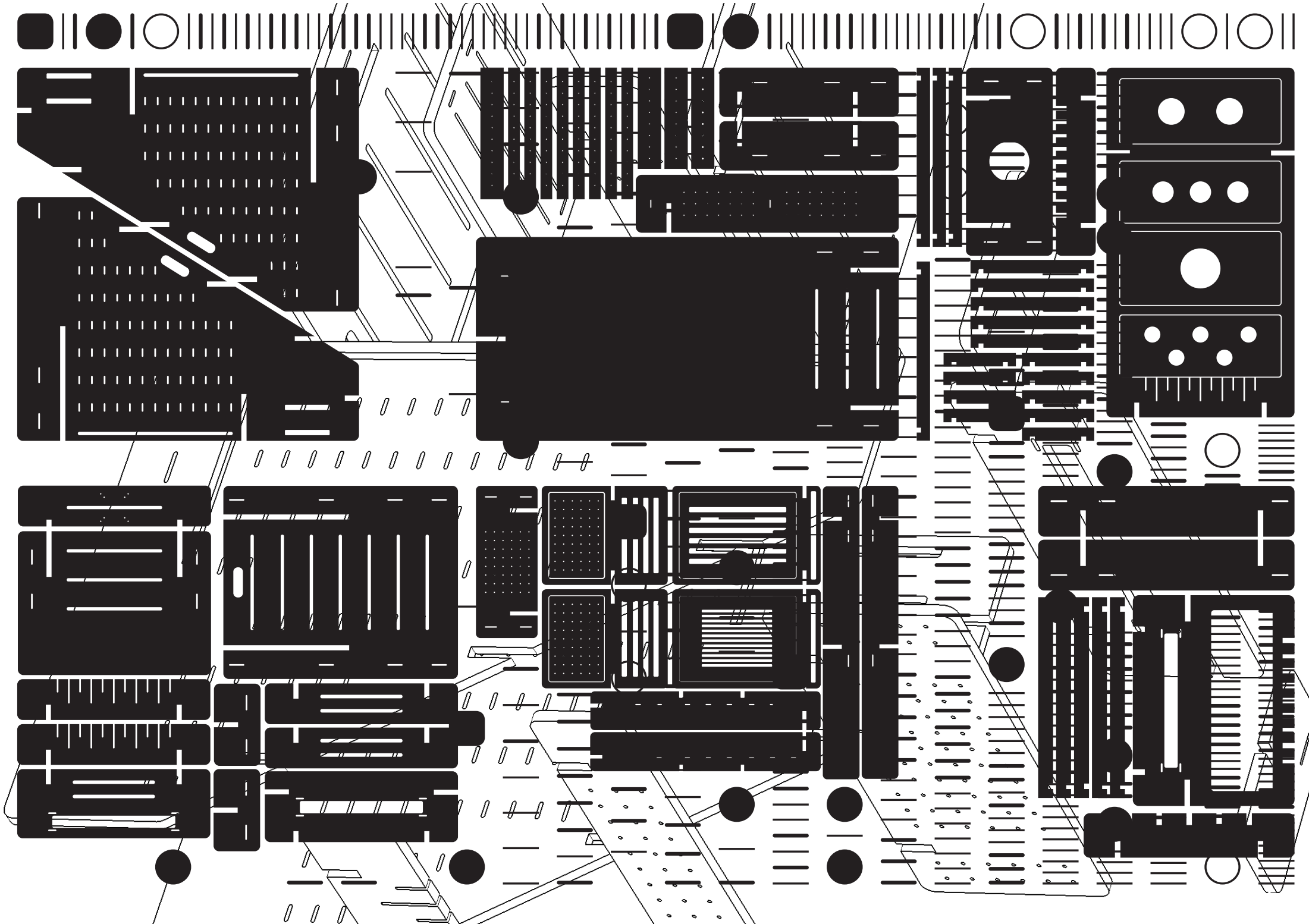


0157 Cabinets
0158 Cabinets
0160 Cabinets
0161 Cabinets
0038 City
0039 City
0040 City
0048 City
0062 City
0058 Climate
0093 Climate
0101 Climate
0124 Cloud
0125 Cloud
0131 Cloud
0133 Cloud
0142 Cloud
0143 Cloud
0145 Cloud
0147 Cloud
0148 Cloud
0153 Cloud
0155 Cloud
0158 Cloud
0159 Cloud
0160 Cloud
0161 Cloud
0017 Clouds
0018 Clouds
0031 Clouds
0039 Clouds
0046 Clouds
0049 Clouds
0050 Clouds
0052 Clouds
0056 Clouds
0057 Clouds
0058 Clouds
0062 Clouds
0063 Clouds
0068 Clouds
0075 Clouds
0080 Clouds
0083 Clouds
0084 Clouds
0096 Clouds
0097 Clouds
0099 Clouds
0108 Clouds
0110 Clouds
0111 Clouds
0112 Clouds
0113 Clouds
0114 Clouds
0115 Clouds
0117 Clouds
0118 Clouds
0121 Clouds
0122 Clouds
0123 Clouds
0126 Clouds
0128 Clouds
0130 Clouds
0132 Clouds
0134 Clouds
0135 Clouds
0136 Clouds
0138 Clouds
0139 Clouds
0140 Clouds
0141 Clouds
0146 Clouds
0147 Clouds
0149 Clouds
0160 Clouds
0004 Code
0036 Code
0072 Code
0095 Code
0096 Code
0105 Code
0108 Code

0112 Code
0140 Code
0141 Code
0145 Code
0147 Code
0155 Code
0015 Computing
0018 Computing
0046 Computing
0070 Computing
0081 Computing
0085 Computing
0086 Computing
0099 Computing
0102 Computing
0104 Computing
0105 Computing
0114 Computing
0119 Computing
0153 Computing
0156 Computing
0157 Computing
0158 Computing
0051 Conditioning
0089 Conditioning
0101 Conditioning
0083 Conferences
0108 Conferences
0109 Conferences
0127 Conferences
0128 Conferences
0140 Conferences
0151 Control
0020 Corporate
0023 Corporate
0024 Corporate
0033 Corporate
0066 Corporate
0011 Craft
0090 Creolized
0119 Critical
0004 Curators
0010 Curators
0119 Curators
0011 Customization
0012 Data
0013 Data
0016 Data
0027 Data
0030 Data
0047 Data
0051 Data
0056 Data
0057 Data
0060 Data
0064 Data
0067 Data
0068 Data
0070 Data
0074 Data
0076 Data
0079 Data
0080 Data
0081 Data
0084 Data
0085 Data
0088 Data
0091 Data
0092 Data
0093 Data
0095 Data
0098 Data
0105 Data
0106 Data
0108 Data
0110 Data
0111 Data
0116 Data
0117 Data
0118 Data
0121 Data
0122 Data

0129 Data
0131 Data
0132 Data
0133 Data
0134 Data
0135 Data
0136 Data
0137 Data
0138 Data
0139 Data
0140 Data
0142 Data
0143 Data
0144 Data
0145 Data
0146 Data
0147 Data
0151 Data
0155 Data
0158 Data
0012 Datacenter
0013 Datacenter
0014 Datacenter
0015 Datacenter
0016 Datacenter
0019 Datacenter
0020 Datacenter
0021 Datacenter
0022 Datacenter
0023 Datacenter
0024 Datacenter
0027 Datacenter
0029 Datacenter
0030 Datacenter
0033 Datacenter
0039 Datacenter
0040 Datacenter
0041 Datacenter
0051 Datacenter
0054 Datacenter
0056 Datacenter
0057 Datacenter
0058 Datacenter
0063 Datacenter
0069 Datacenter
0079 Datacenter
0080 Datacenter
0084 Datacenter
0085 Datacenter
0087 Datacenter
0089 Datacenter
0090 Datacenter
0091 Datacenter
0092 Datacenter
0093 Datacenter
0098 Datacenter
0101 Datacenter
0104 Datacenter
0110 Datacenter
0115 Datacenter
0132 Datacenter
0134 Datacenter
0135 Datacenter
0136 Datacenter
0137 Datacenter
0138 Datacenter
0139 Datacenter
0140 Datacenter
0144 Datacenter
0145 Datacenter
0146 Datacenter
0147 Datacenter
0148 Datacenter
0149 Datacenter
0158 Datacenter
0160 Datacenter
0161 Datacenter
0004 Designers
0005 Designers
0008 Designers
0010 Designers
0030 Designers

0035 Designers
0051 Designers
0060 Designers
0128 Designers
0146 Designers
0147 Designers
0160 Designers
0007 Designers ⟨interaction⟩
0008 Designers ⟨interaction⟩
0010 Designers ⟨interaction⟩
0060 Designers ⟨interaction⟩
0062 Designers ⟨interaction⟩
0063 Designers ⟨interaction⟩
0073 Designers ⟨interaction⟩
0083 Designers ⟨interaction⟩
0097 Designers ⟨interaction⟩
0106 Designers ⟨interaction⟩
0107 Designers ⟨interaction⟩
0121 Designers ⟨interaction⟩
0123 Designers ⟨interaction⟩
0124 Designers ⟨interaction⟩
0146 Designers ⟨interaction⟩
0160 Designers ⟨interaction⟩
0146 Designers ⟨product⟩
0004 Developers
0147 Developers
0102 Devices
0121 Devices
0134 Devices
0037 Digital
0001 Documentation
0002 Documentation
0003 Documentation
0042 Documentation
0043 Documentation
0060 Documentation
0061 Documentation
0062 Documentation
0063 Documentation
0065 Documentation
0070 Documentation
0072 Documentation
0073 Documentation
0074 Documentation
0079 Documentation
0092 Documentation
0093 Documentation
0094 Documentation
0123 Documentation
0124 Documentation
0125 Documentation
0133 Documentation
0148 Documentation
0149 Documentation
0014 Domestic
0015 Domestic
0016 Domestic
0058 Domestic
0064 Domestic
0074 Domestic
0079 Domestic
0080 Domestic
0134 Domestic
0135 Domestic
0136 Domestic
0138 Domestic
0139 Domestic
0143 Domestic
0144 Domestic
0145 Domestic
0148 Domestic
0156 Domestic
0157 Domestic
0160 Domestic
0008 ECAL
0070 ECAL
0071 ECAL
0072 ECAL
0073 ECAL
0074 ECAL
0076 ECAL
0107 ECAL

0117 ECAL
0120 ECAL
0129 ECAL
0132 ECAL
0134 ECAL
0135 ECAL
0136 ECAL
0138 ECAL
0139 ECAL
0142 ECAL
0143 ECAL
0144 ECAL
0145 ECAL
0147 ECAL
0148 ECAL
0160 ECAL
0006 EPFL
0092 EPFL
0093 EPFL
0094 EPFL
0005 EPFL_ECAL_Lab
0092 EPFL_ECAL_Lab
0093 EPFL_ECAL_Lab
0094 EPFL_ECAL_Lab
0107 EPFL_ECAL_Lab
0132 EPFL_ECAL_Lab
0005 Electronics
0036 Electronics
0073 Electronics
0030 Energy
0036 Energy
0089 Energy
0101 Energy
0102 Energy
0115 Energy
0020 Engineering
0024 Engineering
0028 Engineering
0039 Engineering
0040 Engineering
0041 Engineering
0046 Engineering
0069 Engineering
0081 Engineering
0095 Engineering
0096 Engineering
0141 Engineering
0007 Ethnographers
0083 Ethnographers
0106 Ethnographers
0107 Ethnographers
0159 Ethnographers
0034 Ethnography
0043 Ethnography
0044 Ethnography
0045 Ethnography
0123 Ethnography
0124 Ethnography
0125 Ethnography
0133 Ethnography
0097 Exhibitions
0106 Exhibitions
0107 Exhibitions
0132 Experience
0135 Experience
0136 Experience
0138 Experience
0139 Experience
0142 Experience
0143 Experience
0145 Experience
0012 Fabric|ch
0035 Fabric|ch
0095 Fabric|ch
0096 Fabric|ch
0107 Fabric|ch
0141 Fabric|ch
0145 Fabric|ch
0016 Farming
0014 Furnitures
0035 Furnitures
0078 Furnitures

0137 Furnitures
0144 Furnitures
0148 Furnitures
0156 Furnitures
0157 Furnitures
0161 Furnitures
0037 Geography
0047 Geography
0049 Geography
0069 Geography
0087 Geography
0123 Gestures
0151 Gestures
0158 Gestures
0037 Globalization
0007 HEAD
0042 HEAD
0043 HEAD
0044 HEAD
0060 HEAD
0061 HEAD
0062 HEAD
0063 HEAD
0065 HEAD
0107 HEAD
0123 HEAD
0124 HEAD
0125 HEAD
0132 HEAD
0133 HEAD
0159 HEAD
0016 Hack
0038 Hack
0074 Hack
0093 Hack
0129 Hack
0015 Hardware
0020 Hardware
0024 Hardware
0025 Hardware
0026 Hardware
0027 Hardware
0028 Hardware
0029 Hardware
0031 Hardware
0033 Hardware
0039 Hardware
0052 Hardware
0053 Hardware
0055 Hardware
0058 Hardware
0071 Hardware
0077 Hardware
0078 Hardware
0079 Hardware
0080 Hardware
0082 Hardware
0086 Hardware
0098 Hardware
0105 Hardware
0120 Hardware
0146 Hardware
0148 Hardware
0018 History
0038 History
0086 History
0114 History
0115 History
0121 History
0130 History
0014 Housing
0015 Housing
0064 Housing
0085 Housing
0092 Housing
0093 Housing
0094 Housing
0102 Housing
0156 Housing
0157 Housing
0009 Ideas
0024 Ideas

0028 Ideas
0049 Ideas
0050 Ideas
0055 Ideas
0060 Ideas
0063 Ideas
0077 Ideas
0135 Ideas
0136 Ideas
0138 Ideas
0118 Information
0122 Information
0013 Infrastructure
0014 Infrastructure
0015 Infrastructure
0016 Infrastructure
0017 Infrastructure
0018 Infrastructure
0019 Infrastructure
0020 Infrastructure
0021 Infrastructure
0022 Infrastructure
0023 Infrastructure
0024 Infrastructure
0028 Infrastructure
0029 Infrastructure
0033 Infrastructure
0035 Infrastructure
0038 Infrastructure
0039 Infrastructure
0040 Infrastructure
0041 Infrastructure
0047 Infrastructure
0048 Infrastructure
0049 Infrastructure
0051 Infrastructure
0054 Infrastructure
0056 Infrastructure
0057 Infrastructure
0058 Infrastructure
0069 Infrastructure
0075 Infrastructure
0077 Infrastructure
0078 Infrastructure
0080 Infrastructure
0081 Infrastructure
0082 Infrastructure
0085 Infrastructure
0087 Infrastructure
0089 Infrastructure
0090 Infrastructure
0091 Infrastructure
0093 Infrastructure
0094 Infrastructure
0098 Infrastructure
0099 Infrastructure
0114 Infrastructure
0115 Infrastructure
0130 Infrastructure
0131 Infrastructure
0134 Infrastructure
0135 Infrastructure
0137 Infrastructure
0138 Infrastructure
0139 Infrastructure
0144 Infrastructure
0148 Infrastructure
0156 Infrastructure
0157 Infrastructure
0158 Infrastructure
0122 Installation
0132 Installation
0070 Intelligent
0009 Intentions
0065 Interaction
0116 Interaction
0125 Interaction
0126 Interaction
0142 Interaction
0143 Interaction
0151 Interaction
0065 Interface

0070 Interface
0074 Interface
0117 Interface
0118 Interface
0122 Interface
0126 Interface
0129 Interface
0132 Interface
0135 Interface
0136 Interface
0138 Interface
0139 Interface
0142 Interface
0143 Interface
0145 Interface
0151 Interface
0158 Interface
0035 Interferences
0085 Interferences
0090 Interferences
0092 Interferences
0118 Interferences
0031 Internet
0051 Internet
0060 Internet
0075 Internet
0076 Internet
0088 Internet
0130 Internet
0131 Internet
0006 Landscape
0085 Landscape
0059 Library
0095 Library
0096 Library
0139 Library
0141 Library
0155 Library
0158 Library
0161 Library
0001 Links
0002 Links
0012 Links
0013 Links
0015 Links
0017 Links
0018 Links
0019 Links
0020 Links
0023 Links
0025 Links
0026 Links
0028 Links
0031 Links
0036 Links
0038 Links
0050 Links
0071 Links
0078 Links
0102 Links
0103 Links
0104 Links
0105 Links
0112 Links
0113 Links
0119 Links
0126 Links
0146 Links
0014 Makers
0015 Makers
0016 Makers
0019 Makers
0032 Makers
0036 Makers
0048 Makers
0073 Makers
0095 Makers
0100 Makers
0104 Makers
0105 Makers
0121 Makers
0147 Makers

0146 Thinkers
0011 Tools
0016 Tools
0056 Tools
0057 Tools
0058 Tools
0059 Tools
0067 Tools
0068 Tools
0071 Tools
0072 Tools
0074 Tools
0079 Tools
0080 Tools
0095 Tools
0096 Tools
0100 Tools
0103 Tools
0104 Tools
0105 Tools
0111 Tools
0112 Tools
0113 Tools
0120 Tools
0134 Tools
0135 Tools
0136 Tools
0138 Tools
0139 Tools
0141 Tools
0144 Tools
0145 Tools
0147 Tools
0148 Tools
0158 Tools
0160 Tools
0161 Tools
0121 Traces
0006 Urbanism
0092 Urbanism
0093 Urbanism
0007 Users
0034 Users
0037 Users
0042 Users
0043 Users
0044 Users
0045 Users
0047 Users
0062 Users
0097 Users
0100 Users
0123 Users
0124 Users
0125 Users
0126 Users
0132 Users
0159 Users
0082 Variable
0118 Visualization
0155 Visualization
0101 Weather
0068 Web
0111 Web
0126 Web

Tags used in the research blog documenting Inhabiting and Interfacing the Cloud(s), http://www.iiclouds.org/blog-resources

Cloud of Cards

A joint design and ethnographic research investigating personal clouds and data centers

Edited by Patrick Keller
ECAL/University of Art and Design Lausanne

The joint design and ethnographic research project was led at ECAL/University of Art and Design Lausanne, by Prof. Patrick Keller, in collaboration with Prof. Nicolas Nova from HEAD – Genève, with the support of Prof. Christophe Guignard (ECAL).

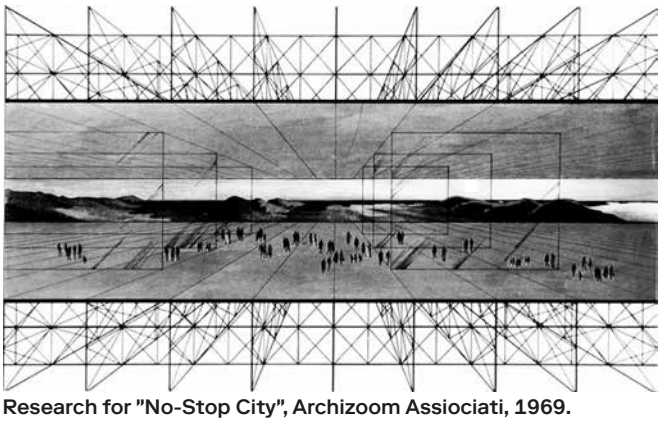
This research counted on the creative involvement of research assistants Lucien Langton and Léa Pereyre (ECAL), Anaïs Bloch and Charles Chalas (HEAD), students from the Media & Interaction Design unit (ECAL), directed by Cyril Diagne, from Media Design (HEAD) and (students) from the Architecture Department (EPFL).

It has also benefited from the engagement of a network of peer partners. Among them the EPFL+ECAL Lab, which made its facilities available to us, Matthew Plummer-Fernandez (#algopop), James Auger (Auger-Loizeau), Prof Dieter Dietz (Alice Lab, EPFL), Sascha Pohflepp, Dev Joshi (Random International) and Christian Babski (fabric|ch).

We would like to thank Alexis Georgacopoulos (Director, ECAL) and Jean-Pierre Greff (Director HEAD – Genève) for having facilitated this collaboration, and HES-SO for its financial support.

Since the end of the 20th century, we have been witnessing the rapid emergence of a new constructed entity. It combines information technology; massive, networked storage of individual or collective data; delocalized computational power and services; distributed access interfaces, security; and functionalism. It is the “Data Center,” which, itself, constitutes the infrastructure and main vector of a renewed form of personal relationship to information: “Cloud Computing”, known more familiarly as “The Cloud.”

This technological setup produces a definite evolution from the, now outmoded, model of the personal computer. It supports almost all types of disseminated or versatile services and forms the already vital infrastructure of contemporary nomadic lifestyles and decentralized communities: “Personal Cloud Computing.”



Research for "No-Stop City", Archizoom Assiociati, 1969.

Google Data Center in Lenoir, North Carolina (USA), 2013. Both images served as founding documents and references for the research. Shown side by side, they confront an anticipative speculation to the implemented reality.

As a consequence, we see materialized before our eyes, on a grand scale, the very idea of “dematerialization” and the ubiquity of networks, concepts that generally accompanied “cloud” — based and networked services from their inception. This is a concrete construction, and obviously a paradoxical one, being physical, proprietary, precisely located, and, in point of fact, heavily centralized.

This was accomplished almost by default — a done deed, apparently, with no original statement or preliminary debate concerning the relationship between the distributed digital realm (networks, data, dematerialized services, computation, and so on) and the sensible world, as well as the intense exchanges that now unite them. This materialization can definitely be viewed as one of the

emerging icons of our modernity, but which, nevertheless, distinguishes itself by its near invisibility or stealth.

It was to examine this paradox that the project Inhabiting and Interfacing the Cloud(s) was initiated in 2014. The research combined the approaches of interaction designers, ethnographers, and architects[1]. Its aim was to explore the creation of counter-proposals to the current expression of "Cloud Computing," particularly in forms intended for private individuals and end users ("Personal Cloud"). It sought to make clouds truly "personal", in order to help give access to tools to the design and makers communities[2]. It was designed to offer an alternate appraisal of this "iconic" infrastructure of our modernity and its services because their implementations have followed a logic chiefly born of technical developments and have been mainly governed by the commercial interests of large corporations.[3] Also, as of today, it continues to be seen mostly as a purely functional, centralized setup. However, the "Personal Cloud" holds a potential that is largely untapped in terms of design, novel uses, and territorial strategies.

With regard to current forms and uses of this "Personal Cloud," we observed early in our research the existence of a paradox between a set of extremely "horizontal" practices, on the one hand (the so-called "networked society'), and, on the other, the Cloud's centralized or hierarchical infrastructure gradually being built up[4]. The research team also noticed a giant gap between the onscreen iconography of the service, usually presented as tiny icons in the corner of users' screens, and the technological arrangement's physical plant, which consists of large quantities of distant servers hosted in dedicated air-conditioned buildings, all governed by the laws of "redundancy," maximum security, "uptime" or "Tier"[5] certifications, and other restrictive and quantitative rules. We further noted what is happening as a result of this new operating mode: a misunderstanding concerning the overall operation of the sophisticated technological setup for end users, as well as a relative loss of control over their own outputs, files, and data, in favor of the interest groups administering the majority of these systems.

As of late Spring 2017, nearly at the end of our research, we can look back and assess the collaborative work process we've been through and the mechanisms that we used to address these issues. We can also explain the results that have been reached gradually, which are explained further in the other sections of of the Cloud of Cards documentation book.

For this to be done, we should first take into account the fact that the research team has followed, as its main research process and in parallel to an ethnographic field study of the usages of the cloud[6], a traditional "step-by-step"creative,design-practice-based process.

This reflexive workflow, which is project oriented,[7] creates a situation whereby the results of one step fuel the next. This process, known for ages by design practitioners,[8] has been "put to research work" and combined with complementary academic procedures (“sampling” and “observation” of primary and secondary material, “comparison,” and “qualitative analyses”) to track, objectivize, and validate the creative path. The overall research activity has been sorted (sampled) and carefully documented along the way for further review. In this sense, the workflow was based on, but also improved upon, one experienced during “Variable Environment,”[9] a previous interdisciplinary work that pursued a similar research-creation path between designers and scientists, which was also entirely documented.

The design research Variable Environment, ECAL, 2007.

The creative research process experienced during Inhabiting and Interfacing the Cloud(s), “practiced based” and “project oriented” as it was, produced successive structured steps over time. It framed sequential periods of experimentation, production of material, and progressive refinements, interspersed with moments of observation and critical analyses, all straining towards a final focus point (“the project”) that emerged progressively.

In a design process, these steps are traditionally labeled, in their consecutive way, as "Intentions" (or "Questions"), "Sketches," and "Project," followed naturally by "Final Project," "Prototypes," and, if everything goes as planned, "Realization" or "Implementation."[10] These latter steps are not necessarily meaningful in the context of a research project, as they could consist of final commercial products or realizations, even if this might exclude the reception dimension from the study. Also note that loops are likely to occur between consecutive steps before advancing. We can, therefore, assess Inhabiting and Interfacing the Cloud(s) workflow and its results accordingly.

The research team's "Intentions," or rather its research questions, were largely exposed in the foundation document of Inhabiting and Interfacing the Cloud(s)[11] back in 2014. These remained valuable until the end of the process, even though some quite interesting new technologies[12] emerged or developed along the way that could offer complementary approaches.

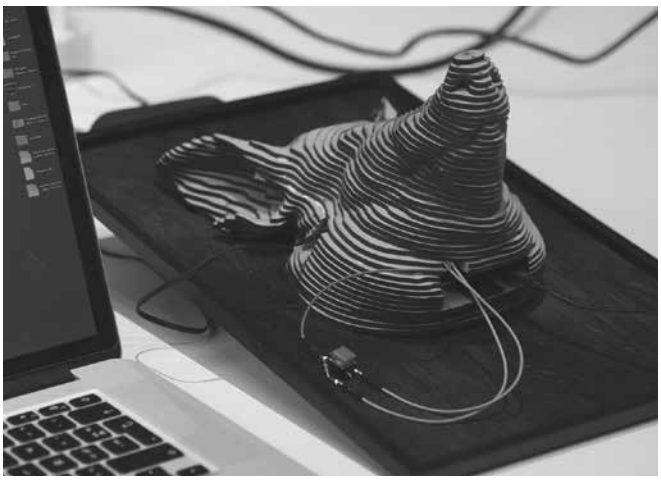
These research questions all addressed the same issue: considering the centralizing nature of the Cloud as it is currently implemented, is there any alternative way to implement the "personal cloud" or even its related "datacenter"? Bearing in mind the results of the parallel ethnographic field study concerning the usages of the cloud[13], do approaches exist that would take into account the potential for new designs, uses and situations, and offer a less centralized architecture? Do research paths that possibly embrace a fully domestic approach exist that are made of small-sized devices that would, therefore, be necessarily distributed physically and spatially, if not digitally? By doing so, would it be possible to develop or adapt tools to make the technology more accessible to "the community,"[14] which would, in its turn, help trigger additional alternatives?

After analyses of complementary works and resources, the establishment of a documentary blog and related collaborative platform, and the start of the ethnographic field study by Nicolas Nova, we entered the "Sketches" step or

the early research-by-design phase. Early in a research process, this sketching phase can benefit from adequate plasticity and easily be opened to various collaborations. It was, therefore, an important leg of the Inhabiting and Interfacing the Cloud⟨s⟩ research, during which we did indeed take advantage of this recognized malleability and practiced intensive design trials with partners and peers within the frames previously identified, while under continuous research directors' monitoring.

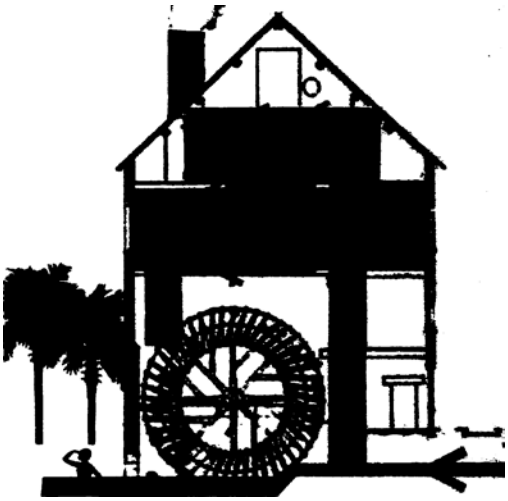
With the objective of reaching a reasonable quantitative result in the creation of samples from the early design proposals to further scrutinize, this phase was opened to a network of national and international peers[15], partners, and interesting contributions from the students of the different schools involved[16]. It was structured in six discontinued weeks of intense, interdisciplinary laboratory design experiments, as well as some underlying, yet continuous, and comparative work about uses, related situations, and platforms of development. At this initial step in the research, this helped us broaden the scope of the early design answers to our "research questions." It facilitated beta-testing various paths. Following the start of the field study of Cloud usage and "life hacks" by Nicolas Nova,[17] and under the guidance of James Auger,[18] the first research workshop had MA students in Media Design from HEAD – Genève work on mapping everyday social scenarios and situations in which cloud technologies and services could interfere with pre-established rules[19].

Later at ECAL, Matthew Plummer-Fernandez[20] was invited to work with BA students in Media and Interaction Design around small, connected, and automated objects ⟨bots⟩ that would collect, treat, and share data on their own,[21] like a combination of tiny situated datacenters and the cloud.



The Beast, a bot inside the head of a 3d printed pig, which continuously asks for money. If unsatisfied, it will "steal" pictures on the hard drive of the user's laptop to which it is connected and automatically publish them online. By Nicolas Nahornyj during the #algopop's workshop at ECAL.

Architects then joined the research project during new design experiments held at the EPFL-ECAL Lab[22]. This was the moment when the team started to question territories, infrastructures, and inhabitable spaces under the prism of information flows and data centers. MA students in architecture from the ALICE laboratory of Prof. Dieter Dietz at the EPFL helped map opportunities for decentralized data infrastructures in the Swiss landscapes[23] under the lead of Thomas Favre-Bulle and Dr. Caroline Dionne[24].



Among different proposals advanced during the laboratory week held with the architects from the EPFL-ALICE laboratory, one demonstrated the value of retrofitting existing homes with small cloud or datacenter "devices." Perhaps even old and sometimes obsolete infrastructures (like watermills, windmills, traditional Swiss chalets, bunkers) could be transformed. Linked to environmental parameters (potential production of energy or heat, access to cooling resources, etc.), these devices would help trigger micro-climatic changes. A sketch by Anne-Charlotte Astrup, Francesco Battaini, Tanguy Dyer, and Delphine Passaquay.

After a brief pause in the project, during which the preliminary results were exhibited at the House of Electronic Arts[25] in Basel, which helped us collect additional feedback from peers, Dev Joshi from Random International[26] took over and investigated new interfaces to address lost or forgotten personal data in the Cloud.[27]
By doing so, he addressed, with the support of the research students involved, a major issue about personal data: the existence of various "online shadows" and "digital ghosts" of ourselves, made of data and hosted in the distant servers of the brands delivering the service.

The following week, Sasha Pohflepp[28] continued the related study of interfacing the cloud and its distant data or services at HEAD – Genève. In an extension of the ethnographic field study, he worked on natural interfaces that would help connect everyday gestures with the main interactions end users have with the flow and storage of their own data[29]. These interactions, which continuously take place through airwaves, network's tubes, and servers' processors, usually remain hidden or invisible, abstract, and hardly understandable to them.

Further experiments were carried out at ECAL around interfaces to tackle lost or forgotten personal data (“data ghosts”) with Random International, alongside a study at HEAD into natural interactions linked to the ethnographic research.

Finally, Christian Babski from fabric|ch[30] collaborated with the research team to develop the “access to tools” approach that we were setting up alongside the sketching process to define our platform of development, and provide tools for the experiments, then further adapt them.[31]

Exhibition of Inhabiting and Interfacing the Cloud(s). Presentation of the sketching phase at HEK in Basel, within an exhibit design by fabric|ch.

Once this extensive phase of “Sketches” was completed, addressing all three joint research project disciplines (interaction design, architecture, ethnography), and samples of design answers had been presented, the research team produced analytical and qualitative “wrap ups” and “learnings.” [32] These would later help us target precisely the steps mentioned previously as the “Project” and the “Final Project.”

Three things emerged clearly from the sketching part of the research, which confirmed, yet helped to nuance our first interrogations: Cloud computing “as a service” is indeed useful and pervasive, but its mode of functioning is almost totally obscure to users, even trained ones in some cases. Its misleading and oversimplified iconography and interaction, coupled with the fragmentation of the overall technological setup (“stacked” and dispersed into different fields of competences[33]) make it extremely hard to address the Cloud as a whole, if only to understand it. Finally, despite the existence of open-source alternatives, the absence of access to creative or popularized development tools for a set of creators outside the technological field itself, locks the technology and its evolution in the hands of too few.

These three wrap-ups informed the frame out of the final design scenario[34] that became the "Final Project." Its purpose was to answer our initial research questions with precision, but also to take into account what was discovered along the step-by-step, "trial and error" process. It would eventually lead us to artifacts and functional prototypes of various natures.

The "Prototype" phase was, therefore, the last leg in our interdisciplinary project and consisted of the development of these artifacts. It was, and still is, composed of open-source, functional, and downloadable "proofs of concepts." We indeed determined that no commercial "Realization" would oversee and close the work at this stage; this resulted in no further testing with panels of users. This could have likely happened in a different research configuration.

These prototypes, numbering four, are extensively presented in the following pages of this book and further examined in the texts written by Natalie Kane, Nicolas Nova, and Christophe Guignard, as well as through an interview with Matthew Plummer-Fernandez.[35] They come as a "kit," Cloud of Cards, a home cloud kit to re-appropriate your data self. The kit, combining digital and physical artifacts, can be accessed and downloaded on a dedicated website,[36] while the overall design research and its evolutionary process have been archived in linear time on a research blog.[37]

Various elements of Cloud of Cards being assembled by Léa Pereyre and Lucien Langton.

The central purpose of the kit and its tools is to give everyone, and the community of designers and makers, in particular, the means by which to set up their own small-sized data-center and cloud, manage their data in a decentralized way, or develop their own alternative projects using this personal, small-scale infrastructure.

Finally, when we looked back to the start of our research and its founding issues, we were

able to confirm that alternatives to the existing cloud can be developed. Of course they can. But we can also state that these alternatives and their associated tools and "recipes" are valuable, necessary and needed diversifications of the model. Decentralized and domestic options to the cloud and its datacenter can undoubtedly be envisaged but remain largely, if not totally, untapped to this day.

Additionally, some thoughts about the conception of this book are warranted[38]. The overall research process has been openly "tagged," sampled in its entirety, and made accessible on a documentary blog, from which representative elements have been extracted.[39] It is the selection of these elements, drawn from the creative process and methodology, that allowed this log book for Inhabiting and Interfacing the Cloud⟨s⟩ to be written.

The selection of posts engendered the structure of the log book and its numbering. It provided meta-data information about tags and categories. The book then became a linear recording highlighting the main elements that led to the research results, which could then be further assessed or even "forked"

The artifacts which form answers to the initial research questions can then be observed as gradually emerging alongside the documented interdisciplinary process. This demonstrates the relevance of a research-creation approach in answering issues previously identified and described in a rigorous, yet unexpected manner and in producing concrete non-exclusive proposals.

Thus, through the experimental research process presented in Cloud of Cards, we gradually moved from ideas to matter; from questions to answers — answers that may indeed give rise to new questions — and from blurry sketches to artefacts that encapsulate and are the sum of our findings.

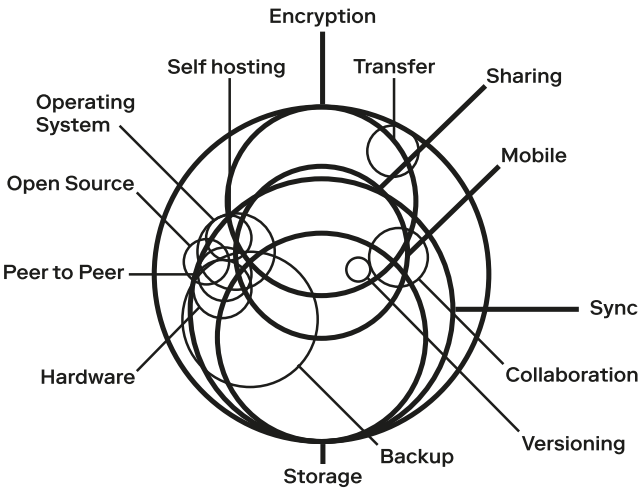
1 The design-research Inhabiting and Interfacing the Cloud(s) was set up by professors Patrick Keller, from ECAL/University of Art and Design, Lausanne (Media & Interaction Design Unit) and Nicolas Nova, from HEAD – Genève (Media Design), with the collaboration of Prof. Christophe Guignard (MID, ECAL), Prof.Dieter Dietz (ENAC, EPFL), and the EPFL+ ECAL Lab.
The complete documentation of the process is accessible on http://www.iiclouds.org
2 The framing of this context excludes existing Networked Attached Storage(NAS) solutions from the field of our research in favor of open-source, semi-professional, and more versatile tools (development opportunities).
3 In his recent book, "La silicolonisation du monde" (éd. L'Échappée, Paris, 2016), the author Eric Sadin critically explains many details of this phenomenon.
4 In the book "Off the Network: Disrupting the Digital World" (ed. University of Minnesota Press, Minnesota, 2013), Ulises Ali Mejias details how our societies have moved from "one to many" monopolistic forms of media and services companies to "many to one" (many offers or participants, one "buyer"). The name of this latter type of corporation is a "monopsony," "nodo-centric" in the terminology of A. Mejias. Youtube, Facebook, Instagram, Twitter, Snapchat, Google, etc., are examples of such structures. "Cloud as a service" functions in the same way.
5 http://www.iiclouds.org/tag/0023/
6 Nova Nicolas. (2018) Cloud of Practices. Raleigh: Lulu.
7 Vial Stéphane. (2015) Le design. Paris: PUF. pp 80–106.
8 This step-by-step creation process is so well known that the Swiss Society of Engineers and Architects (SIA), also known as the main professional association for architects and engineers in Switzerland, has adopted it as part of its official norms (SIA, norm Nº 102) for decades. Nowadays, it helps describe the professional service and billing steps for the work of the architect.
9 http://sketchblog.ecal.ch/variable_environment/(retrieved on March 31, 2018), research led by Patrick Keller.
10 The terminology might change from one domain to another, sub-steps can naturally occur (i.e. "Preliminary Project," "Mockups," "Reception," etc.), but the main and important legs will remain nearly the same.
11 http://www.iiclouds.org/tag/0009/
12 http://www.iiclouds.org/tag/0146/presents a survey of links related to our research. Mostly technologies, projects, and elements that appeared along the process. Notably, we can pinpoint BitTorrent Sync (now Resilio), a peer-to-peer file storage and networked synchronization system, as well as Blockchain architectures (very recently Sia cloud, for example). We should also certainly note the appearance of long-term data storage on DNA.
13 The text by Nicolas Nova, Me, my cloud and I, covers this issue more extensively.
14 As exposed in the foundation document of the research, design and makers communities were envisaged.
15 http://www.iiclouds.org/tag/0004/
16 The text by Christophe Guignard, Cloud, cards and other interactions, covers the issues linked to the process of research in more detail.
17 The text by Nicolas Nova, Me, my cloud and I, covers this issue more extensively.
18 http://www.iiclouds.org/tag/0004/
19 http://www.iiclouds.org/tag/0062/
20 http://www.iiclouds.org/tag/0004/
21 http://www.iiclouds.org/tag/0074/
22 http://www.iiclouds.org/tag/0005/
23 http://www.iiclouds.org/tag/0094/
24 http://www.iiclouds.org/tag/0006/
25 http://www.iiclouds.org/tag/0107/
26 http://www.iiclouds.org/tag/0004/
27 http://www.iiclouds.org/tag/0122/
28 http://www.iiclouds.org/tag/0004/
29 http://www.iiclouds.org/tag/0125/
30 http://www.iiclouds.org/tag/0004/
31 http://www.iiclouds.org/tag/0079/and http://www.iiclouds.org/tag/0096/
32 http://www.iiclouds.org/tag/0133/and http://www.iiclouds.org/tag/0134/
33 Bratton Benjamin. (2016) The Stack: On Software and Sovereignity. Boston: The MIT Press.
34 http://www.iiclouds.org/tag/0138/and http://www.iiclouds.org/tag/0139/
35 Short biographies of the authors are accessible in the last section of this book.
36 The results of the research are accessible and downloadable (code, blueprints, recipes, etc.) on http://www.cloudofcards.org (retrieved on March 31, 2018) under a Creative Commons Attribution — NonCommercial — ShareAlike 4.0 International License.
37 http://www.iiclouds.org/resources/
38 The design has been realized by the collective Eurostandard, with photographs by Daniela & Tonatiuh.
39 http://www.iiclouds.org/category/x-posts/

Note: all links last accessed March 31, 2018.

For a large majority of people, the "cloud" is a weird metaphor. Think about this intriguing study from 2012[1] that showed how 51% of US individuals thought that heavy weather could affect "cloud computing". Although this finding should be taken with a pinch of salt, it nonetheless illustrates the difficulty some users feel when it comes to understand what this technology is about, and how it works. Especially if you think that for most people, the main manifestation of "Cloud Computing" lays in a tiny icon in the corner of one's screen. I'm referring here to how services such as Dropbox or Google Drive operate in the background and sometimes appear to the user when "refreshing" from time to time.

Said differently, there is a gap between the demiurgic existence of "the cloud" and such a confusing user interface. It's this gap between the two that we've been exploring in our design-research project *Inhabiting & Interfacing the Cloud(s)*[2], the misunderstandings, the opportunities, the repurposing of cloud-based technologies and the frustrations that we are investigating. Practically speaking, we conducted a series of interviews and observations with users of the cloud, in order to rely on these practices to design alternative instantiations of cloud computing technologies. The point was not necessarily to do this in a standard user-centered design way of doing things. We were not looking specifically for problems to be solved, we were not asking questions about specific needs. Instead, we were intrigued by how people adapt, modify, adjust, and domesticate these services for their own purposes, in their own contexts. It's the situations that the clouds lead to that attracted our attention. Hence, we didn't focus on standard usage but we looked at peculiar practices, interviewing DJs and VJs, fab lab users, sportevent organizers, biologists or journalists. Such profiles offered curious perspectives because of their nomadism, their need to deal with special types of content (huge files, protected documents, etc.). It's this variation in terms of cloud users that we think could be fruitful to rethink this technology from a design perspective.
What did we found? What did we see when doing this? Well, plenty of things.

For instance, we realized that infrastructure wasn't an issue the users considered; e.g. the actual presence of the data centers, and their corresponding jurisdiction, did not matter, as long as "the services worked smoothly". We also noticed the difficulty for people to formulate what services correspond (or not) to Cloud computing. This difficulty corresponds to the wide diversity of services that matter to the people we spent time with. Beyond the standard use of cloud platforms (storage and sharing), our interviewers highlighted how they used such platforms to host and modify files collaboratively (a musician playing with distant peers), the importance of document versioning to retrieve archives, the possibility to have SaaS-type of applications [3], etc. This diversity also relies on certain needs in our group of non-standard users. For instance, the storage and synchronization of very big files (music, video, large data sets) which other software could access seemed to be important. In addition, security issues appeared relevant too, as attested by people who use encrypted samples and who do want to see their "cloud folders" investigated because they share copyrighted material with their fellow musicians; or users who avoid putting personal documents (ID, banking details) on Dropbox. We indeed saw people with a very conscious perspective on the type of documents they put in the Cloud, and the ones they keep in hard-drive located in their backpacks.



A diagram of the main Cloud features.

Moreover, we also realized how a whole range of new "situations" is made possible with cloud computing: nomadic work ("the office is where I am, my files stay in the Dropbox folder"), the diminishing use of laptops (as opposed to tablets and smartphones) even in work-related activities, or the strategic use of physical hard-drive when needed.

As attested by such examples, the "situations" operate

at different levels, from ways of living to communication practices or what one of our interviewes called “life hacks” (practical trick to be more efficient at doing something). This is the type of material we looked more specifically, especially because it’s this kind of insights that can prove curious to rethink user interfaces and cloud infrastructure. We do believe it’s by taking these into account that we can question the current state of cloud computing and propose relevant or provocating propositions.

1 See http://www.businessinsider.com/people-think-stormy-weather-affects-cloud-computing-2012-8?IR=T

2 See the text *Inhabiting and Interfacing the Cloud(s). An ongoing design research* by Patrick Keller for a general introduction to the project.

3 “Software as a service” (SaaS) is “a software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted.” (Wikipedia)

Note: all links last accessed March 31, 2018.

In discussion with Matthew Plummer Fernandez ⟨#algopop⟩
Patrick Keller

British/Colombian artist and designer, Matthew Plummer Fernandez makes work that critically and playfully examines sociocultural entanglements with technologies[1]. He is currently finishing his practiced-based PHD at Goldsmiths, University of London. Matthew was solicited to be part of our research *Inhabiting and Interfacing the Cloud(s)*[2] for a few weeks ⟨the "Sketches" phase⟩, therefore in the very early time of the project, back in fall 2014.

He played the role of a peer partner for art and design, due to his deep interests and knowledge in algorithms running standalone on servers or "headless computers", which automate sets of procedures: "bots".
The purpose for the research team was at that time to broaden the scope and test different creative approaches to our research.

The discussion took place in November 2017.

PK

Matthew, we invited you to be involved in our design research about the Cloud in a very early stage, mainly because of your interests in algorithms and how they shape products as well as online experiences, but also the fabric of reality we now live in on a daily basis.

And obviously this invisible cloud we were starting to address at that time was, and still is, all made of distant servers, data, networks and algorithms. You kindly got involved. Could you describe how you related your work and research to the ones of our team when you joined the project?

MPF

I think what appealed to me was the fact that cloud computing is not just data storage, like static media and data, it's a place where you run software headless. When you think about software automation, and all these kinds of automated services, you have to understand that the systems that provide these kinds of storage centers rely on servers to run their software, without it having to run off of their personal computers. This is especially the case in the sort of art practices that I am interested in that deal with making bots which automate social media accounts and other platforms.

There's an alternative to that practice in which a few practitioners prefer to run their bots off Raspberry Pis[3], essentially using their own headless server to run their software locally at home. So when you approached me with this project about these kinds of alternatives I made the connection to practice where you have your own bots running from a very small server at home.

PK

We were on our side interested in homemade mining rigs, in people hacking their own swimming pool to cool down their servers[4], for example, or transforming the heating system of their house, and then using Raspberry Pis as a much smaller version of a data center.
How would you compare these two scales, the very big scale of the data centers we are familiar with today and the very small scale with which you started to address the question when you came?

MPF

It's important to understand that the scale is two-fold. There's processing power and scale in data capacity. In one of my most recent projects we were still using a Raspberry Pi to run a bot, which does not have the processing power of a big powerful Amazon server, but then we attached that to an external hard drive that can take terabytes of data so that we could download 3D models from the Internet. I think it's interesting that depending on the project you might require a lot of data or very little, and then in other cases you might require a very fast computer because you're working with very complicated machine-learning algorithms or you're running a very simple server that is just sending and receiving the data that it stores. Like you were saying with the swimming pool, it's interesting that when it's in the home environment you sort of adapt the server to your individual needs.

Whereas, if you compare that to a big Amazon server, they're sort of really high spec so they can do really anything, I forget what they call this type of special data storage where nothing happens for years. It's just like having a backup.

PK

They call it the "Glacier". Which is quite funny, because later in the research and without knowing about this specific Amazon service at that time, we developed an automated storage function labeled "To Freeze". It was a combination between a synchronized distant folder and a networked object, both driven by a strange behavior that was part of the design and was related to this idea of "congelation" of data[5].

MPF

Yes, the "Glacier" is like the cheapest storage without requiring any powerful processing, but you can upgrade to Amazon computers where they have really fast GPUs so you can do all sorts of machine learning, training, stuff like that.

But when you have the home setup and scale, the requirements become so much more tangible, because you can see what you need and decide to buy a more specific GPU for example, or a fan because it's getting too hot, or maybe you

do like the heat and decide to use your server as a radiator. All of these things become involved in your home life, which is kind of funny.

PK

When we are speaking about Amazon, or similar big services, it's almost only a technical or technological discourse —CPUs or processing power, data storage capacity, etc.— and these might be sometimes hard to address. Do you think changing the scale or context makes things more accessible or tangible for the design process?

MPF

Yes, I guess working on a smaller scale makes it more accessible. You're not trying to set up a complicated account, looking at pricing systems, migration updates, and all this stuff, so it's very much like having your own computer. You can plug a screen into it, run a software on it and see what it's doing. Take the screen out and essentially it's a headless computer. On a pragmatic level, it breaks down that entry barrier to understanding what the difference is between your personal computer and the server. When it comes to design, especially with the Raspberry Pi and because it's such a cheap computer essentially, you can have one that is dedicated to a single process and customize that service to accentuate or become an interface to that process. It might have some sort of visual feedback that's not a screen but makes some type of notification that it's running by other means. So there's a lot more personalization that can happen that you don't get if you're using a big cloud-oriented computer, which is designed to suit broad needs.

It's a very generic computer in a server somewhere. I guess what's nice is that with a small scale server you're also exploring areas of tinkering and hacking, and the Internet of Things - it kind of crosses over into those fields as well.

PK

And this clearly relates to your personal practice. Yet it seems that you are using bots and computers to rather generate things than, for example, to work on an 'Internet of Things'. How do you address these questions through your practice?

MPF

In my own practice I still want to explore the physicality of the hardware. I've gotten into bots and have been using them to make these more online interventions where you see their outputs on social media or on a platform. At the same time, I have been thinking more about displaying the bots in a physical location like a gallery.
The few times this has come up it's always been a discussion of whether we should have the server in the gallery space so people can see where the bot's running from.

PK

With this question of the server being visible, was it hesitation on your part or were people visiting the gallery asking about it?

MPF

It's still something I want to explore. You can have different audiences for a project. You can have a physical presence, an installation, but at the same time have a piece that is productive of things happening online. When we spent the week experimenting with student researchers at ECAL in Lausanne, to take part in your research, there was a really good project that was kind of a performance where you would lift up the telephone and go through these speed dial options to automate certain settings on your Facebook account —mass liking or mass retweeting everything, or mass subscribing to every friend possible.

Caroline Buttet (BA M&ID, ECAL) presenting "The Like Hotline" at the end of Matthew Plummer-Fernandez research workshop, in November 2014.

When the student was using the telephone to demonstrate to the rest of the class it was interesting because even though we were enjoying the physical presence of this demonstration she was in fact manipulating a Facebook account at the same time. I think her account got suspended during the performance, which is clearly a stake when it comes to online services that you don't own.

PK

In parallel to your practice, you're in the process of finishing your doctorate at Goldsmiths, which I think you were starting at about the same time we were starting our research. Could we compare the trajectory of the two in some way?

MPF

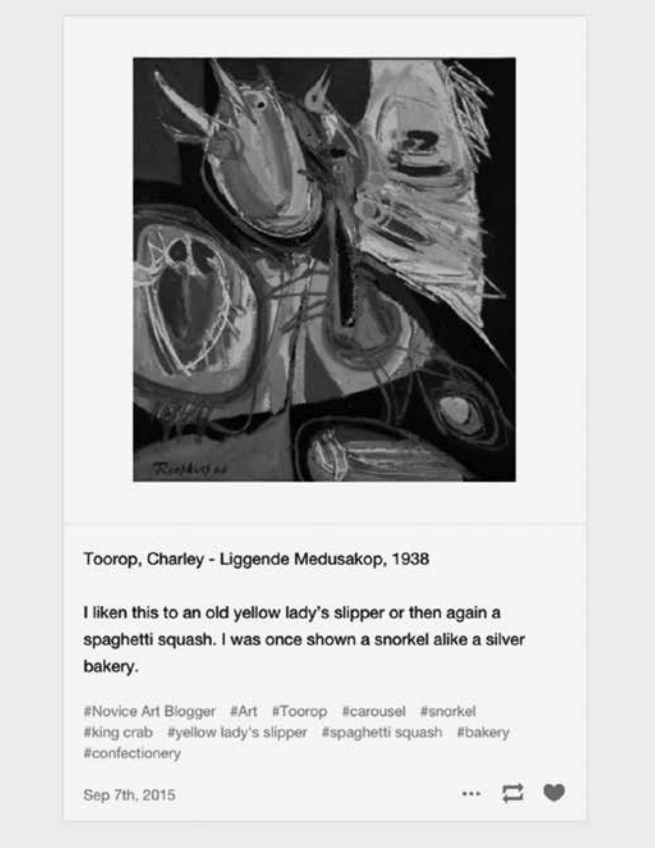
I spent the first couple of years of the PhD being very practice-based and, starting from the workshop, moved into having a Raspberry Pi at home. That was the first stage. Then I started to populate it with bots and created projects like *Every User* (2014–). Then I created a bot that tweets about art and puts the images of artworks through this kind of neuro-network that helps generate image recognition. It was called *Novice Art Blogger* (2014) and was a bot that was like an art critic that sort of rambled on about what it saw in art images.

Ultimately, I did a project with Julien Deswaef called *Shiv Integer* (2016–), which is a bot that exists on the platform Thingiverse, which is like a 3D remix platform where people download their 3D models and then it makes remixes of other people's models by mashing different model sources together and generating the names.

Shiv Integer, Happytippytron. Shiv Integer (2016–ongoing) is a bot making assemblage for 3D printers. Original objects are taken from the Thingiverse online archive.

I think with all of these projects, they're not just prototypes of everyday life, but almost sort of a comment on it, exploring the implications of automated software running on servers. On one hand these are functional prototypes but at the same time it's not about technical achievements. It's more about art after software has become more mainstream and part of everyday life. How does that shape artistic and design practice? We always think of software as a new medium, but really software has become a mass medium. Everyone uses software all day long, on their mobile phones, when they check their email, when they order food, when they go running.

So my PhD is exploring what happens in art and design after software becomes ubiquitous. It's not so much about exploring the cutting edge or showing technical prowess, it's about exploring the intersection of software and everyday life and social activity.



Novice Art Bloger (2015–ongoing), an art critic bot that independently writes posts about art on its Tumblr account.

PK

You also run a blog, Algopop[6]. With all the archiving that you've done there's a sort of process of categorization going on. How do you compare this to your activities as a researcher?

MPF

I'm using *Algopop* as the rough notes for the PhD, the anecdotes that I save for later, then through my writing I can see certain strands, currents, appearing. The entanglement of software and humans is one, for example, and another strand is multiplicity. There's always a sort of overlapping of currents and the PhD helps to structure and provides a framework for being able to understand these topics.

PK

What will be the final outcome of your research?

MPF

I have to submit a written thesis. That's one of the requirements. But it's a lower word count if you're doing a practice-based PhD. Last year I hosted an exhibition called "The Art of Bots" (2016) at Somerset House. It was kind of an outlet of research but also a source of research. I had some of the leading practitioners, artists that work with bots, all in one space. A lot of the works were preexisting ones that were popular on Twitter or other platforms, like YouTube.

The exhibition was also a chance to experiment with the crossovers of physical space. For each project there was a different idea of how that manifests. For instance one artist turned her Twitter bots into these little publications, another made a live projection in real time of computer-generated magical realist stories. A couple of them were hardware-based. We had this Instagram selfie machine, which is an amazing device. It holds an iPhone and actually has these robotic fingers controlling the interface. This machine takes selfies of itself. So the show was a good way to see how some of these bots could become exhibition pieces.

PK

Going back to questions of scale and hacking the domestic environment, as well as the difficulty of setting up technologies of the Cloud, people tend to use a very technical approach when speaking about these things, using terms like efficiency, security, speed, resiliency, etc., there seems to be a big design potential behind the technological setup that is not part of the discussion. We are trying to bring design into the debate with our research. How would you position yourself in terms of this idea that design might be able to help bring a different approach?

MPF

What's different with design, as opposed to a more technically-focused approach, is that the technical approach is naturally determined to always be making things faster and going the next step in a certain direction, whereas design can kind of take a step back. For me it's about widening the adoption of the technology. So it's not about what's happening to the technology when it's in lab phase or startup phase, it's more about the phase when it reaches a wider mass culture and becomes part of everyday life.

I think that negotiation between technology and everyday life is what's really interesting. How do you integrate technology? How do you make it frictionless or provocative? How do you make it desirable? There are so many different approaches you can take but it's ultimately about how it becomes part of everyday life.

Are you integrating it in a way that makes life more convenient or more interesting, more experiential or more comforting? I observe there are lots of different answers and lots of designers have a different ethos' to design. But it's always about that integration into wider society. There's no one solution because there's no one public and it's not always about making the technology better.

PK

In the case of Inhabiting & Interfacing the Cloud(s), which also articulates this question of the adoption of the technology, we have been interested in the question of decentralization because many of the criticisms addressed to the Cloud today are linked somehow to the paradigm of the network. When you speak about the network, or systems that are networked, they seem distributed, a bit everywhere and belonging to everybody, but then when you study the Cloud you realize that it's almost entirely the contrary. It's very centralized, and this brings up the question of to whom your data belongs and what's being done with it.

In our case we tried to address this question and redesign the personal cloud—working at a smaller scale, the domestic one that will by necessity help bring some kind of decentralization for example. We observed in some cases that it might be a good proposal while in some others decentralization will not work. On your side and when trying to bring your projects and data onto small computers that will be by necessity highly distributed, has the question of decentralization been part of your approach?

MPF

It has been about decentralization, but that's really hard to achieve in practice. It's interesting, now that the Internet is run by these giant companies —Facebook, Google, Apple— to sit outside of those platforms and try to resist, but it's very difficult. You can feel like you're keeping your software and systems locally, but as soon as you subscribe to any of those systems you're sharing your data and invariably you're using their servers to store your content. In order for decentralization to work there are multiple elements that need to be technically solved and I

think it's interesting that people are trying to solve that.
When you started your research there weren't really good alternatives, decentralization tools, besides maybe some peer-to-peer options, but since then- we've gone through the invention of cryptocurrencies, blockchains, all of these new forms of resolving decentralization.

PK

It's very interesting that you mention this because it's true that when we started the project, Bitcoin was already existing, but it was also only about digital currency. We maintained a survey along the research though, and we witnessed the Ethereum[7] project emerge that started helping to develop decentralized applications. Very recently, services and technologies like Sia or Storj[8] also appeared, which are truly about decentralized data storage, but in their complete infancy. It's interesting to see that you have now, from a technological point of view, basic bricks, and breaks as a matter of fact, which help directly address this type of question.

MPF

Like I said, when you started your research there weren't really good alternatives, decentralization tools. Maybe there were a few, to appropriate and disseminate the technology mainly, open-source options like the one you chose[9], but you need the decentralized tools to be just as promising and seductive as the centralized tools. Now you see some really good alternatives.
For instance, the practices that I was exploring where artists and designers were making these bots, they were mainly using Twitter as their site of dissemination and Twitter is one of these main centralization nodes of the internet. They can decide to shut down your account, therefore your bot, as I mentioned before regarding the research student's project during my design experiments at ECAL. Now, a few years later, we have Mastodon[10], which is a decentralized social network. A lot of practitioners have actually migrated their work to Mastodon. So they're making decentralized bot networks now and creating their own social networks.

This is amazing because they're saying that not only they want to make their own bots, they want to make their own social network and host their own social network on their own servers, which is quite remarkable. So I think your project is very timely because it has covered a spectrum of time in which we're seeing peak moments of centralization and cloud computing and then the adoption of real alternatives.

PK

Not so long ago, I read a book in which it was explained that Norbert Wiener, while talking about industrialization and the steam machine in his seminal book The Human Use of Human Beings (in the revised version of 1954), detailed how this engine needed a centralized factory, because there was just one big machine to feed energy into all the other ones. With the democratization of electricity, he speculated, this would change because then, there would be a motor in every mechanism and therefore a decentralized factory[11].

He was of course writing a lot about early computing at that time and, in fact, already thought of the automated factory. We're speaking intensively about this topic recently, with "Industry 4.0", third and fourth industrial revolutions, etc. So the question of centralization versus decentralization appears to be an old one in fact. Especially in relation to technology. It seems to be always a question of organizing, structures, and the effect that this has on society, or the way we do things.

MPF

Yes that's really interesting. I never thought about centralization and decentralization as such a wide topic, but, of course different models and different ideologies on how centralized or decentralized you want to be as a government or a nation state exists.

There's always this kind of tension between dependence and independence. For instance with decentralization, when Uber was taken to court by the Black Cab Taxi Association in the UK, all Uber had to say was "Well, we're not operating fare calculations from within the country so we're not under UK law". If you think about it, you can do

calculations on any territory that has the most convenient or most ideal regulations for the purposes that you're trying to establish. So it's difficult.

A country could take a really hard stance against data privacy, for example, but the data centers could say, "Yes, but we're not in your country". So in a way decentralization could work in favor of centralized power as well. We think of decentralization as radical or as taking an opposite stance to big corporations, but big corporations could also use decentralization as a way to establish their power on a global scale.

PK

We should therefore probably better map the different kinds of decentralization at work, also look further into this question of location and data within peer-to-peer network architectures, because ultimately a blockchain plate storage service looks like some kind of peer-to-peer system with a decentralized database distributed everywhere, with every user. So I wonder if it's even possible to say where things are anymore within this emerging cryptographic Internet, a net of nets so to say, where data can be almost atomized into myriad of small parts all over the networks.

Decentralization as a concept, a tool and a technology is undoubtedly very interesting and holds a lot of potential, but its effects—social, energetic, functional, formal, etc., will need to be further explored and nuanced in the near future. By designers-researchers as well, if you ask me.

1 http://www.iiclouds.org/tag/0004/ (retrieved on November 20, 2017—as well as all the links that follow)
2 http://www.iiclouds.org/
3 https://www.raspberrypi.org/
4 http://www.iiclouds.org/tag/0016/
5 The works mentioned here are *5 Folders Cloud* & *5 Connected Objects*: http://www.iiclouds.org/tag/0153/ and http://www.iiclouds.org/tag/0151/
6 http://algopop.tumblr.com/
7 https://www.ethereum.org/
8 https://sia.tech/ & https://storj.io/
9 http://www.iiclouds.org/tag/0056/ and http://www.iiclouds.org/tag/0057/
10 https://joinmastodon.org/
11 Triclot Mathieu. (2008) *Le moment cybernétique. La constitution de la notion d'information*. Ceyzérieu: Champ Vallon.

19” Living Rack ⟨A⟩
Processing Library ⟨B⟩
5 Folders Cloud ⟨C⟩
5 Connected Objects ⟨D⟩

Cloud of Cards kit ⟨A⟩⟨B⟩⟨C⟩⟨D⟩

Cloud of Cards, a home cloud kit to re-appropriate your data self, is the principal outcome of *Inhabiting and Interfacing the Cloud⟨s⟩,* a joint design and ethnographic research project. It is accompanied by two Print-on-Demand books that document its creation.

The main results of the project consist of four digital and physical artefacts ⟨A⟩⟨B⟩⟨C⟩⟨D⟩, forming a set of modular tools ⟨"cards"⟩ that are delivered in the form of an open-source DIY kit, freely accessible at www.cloudofcards.org and on Github. The purpose of these tools is to enable everyone, in particular the community of designers and makers, to set up their own small-scale data center and cloud, manage their data in a decentralized way and develop their own alternative projects using this small-scale personal infrastructure.

Research and Art direction by Patrick Keller ⟨ECAL/University of Art and Design Lausanne⟩.
The kit is based on the open source software ownCloud, which it extends.

Cloud of Cards kit, main recipe:

→Step ❶ Read the statement about the complete *Cloud of Cards kit,* or alternatively download the two accompanying books about the design and ethnographic research (in pdf for free, or in Print-on-Demand) and consult them.

→Step ❷ Download the Cloud of Cards kit assembly manual and recipes from the website (PDF, 10mb).

→Step ❸ Assemble your own *19" Living Rack* using the blueprints and instructions freely accessible on this site.

→Step ❹ Install a Linux server in this rack and add community ownCloud (or Nextcloud) software.

→Step ❺ Continue to follow the instructions and download the *Cloud of Cards Processing Library.* Either install it on your server, or on your personal computer for development purposes.

→Step ❻ Develop your own cloud projects and/or connected objects or anything else cloud related you can think about.

→Step ❼ Simply install ownCloud client, connect it to the *5 Folders Cloud* and discover its automatized functions.

→Step ❽ Assemble the *5 Connected Objects* and associate them with your cloud to add physical interaction.

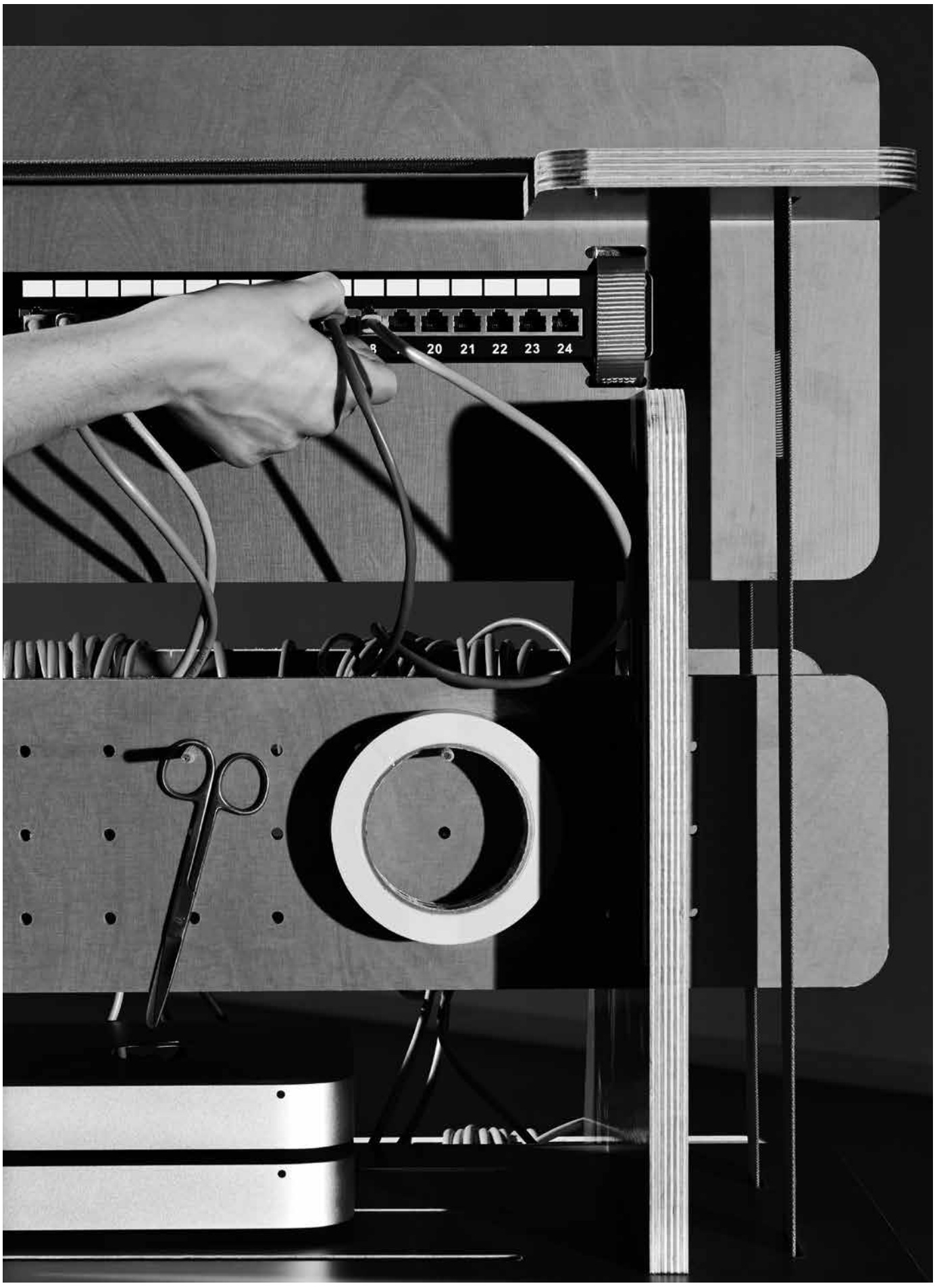
→Step ❾ Play *Cloud of Cards!*

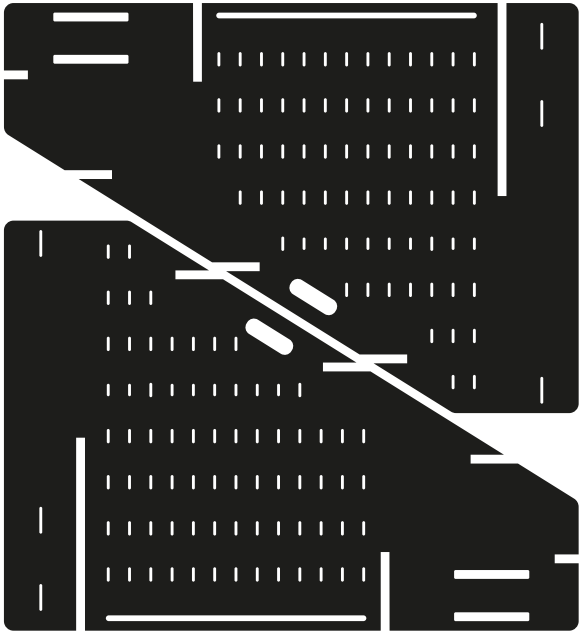
Additional information & downloads about the Cloud of Cards kit are available on the project website. A selection can also be read further in this book.

www.cloudofcards.org

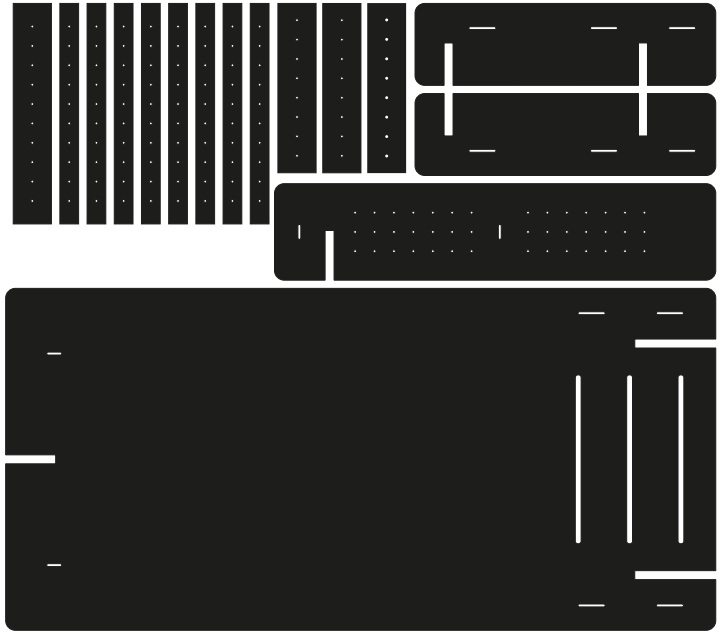
→ Base
→ Home
→ Office
→ Garden

19” Living Rack

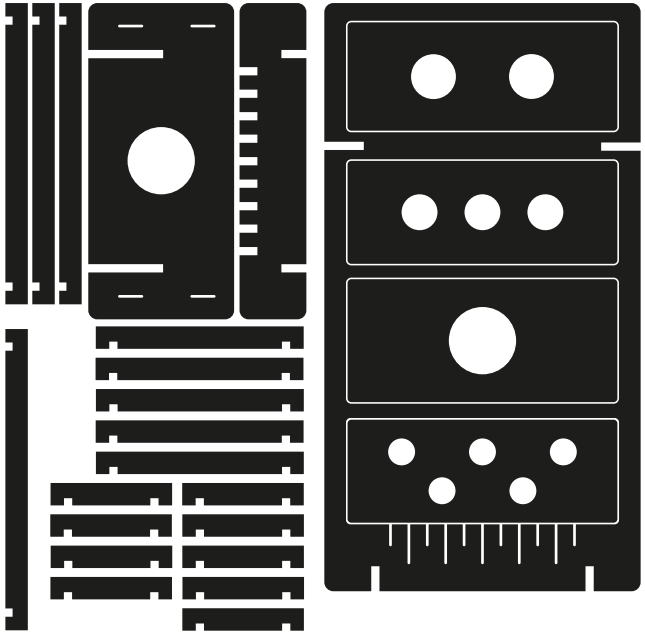




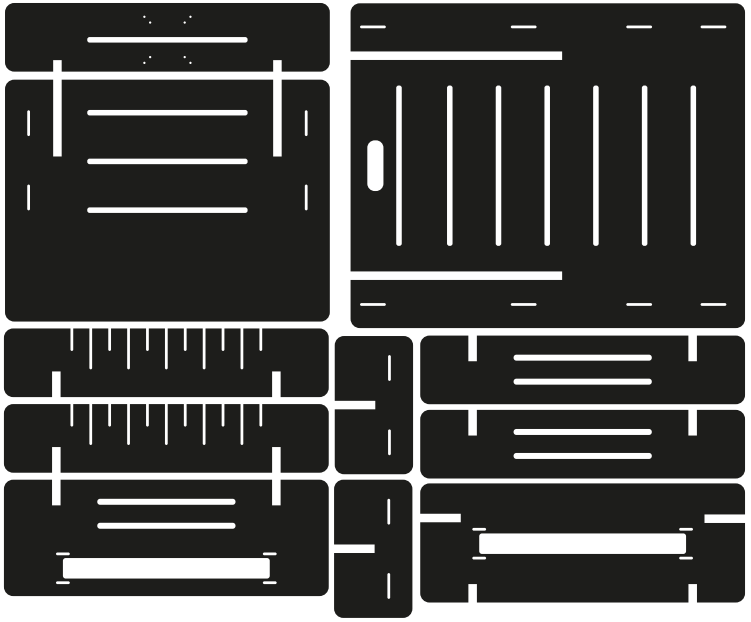
19” Living Rack (A) → Base 1



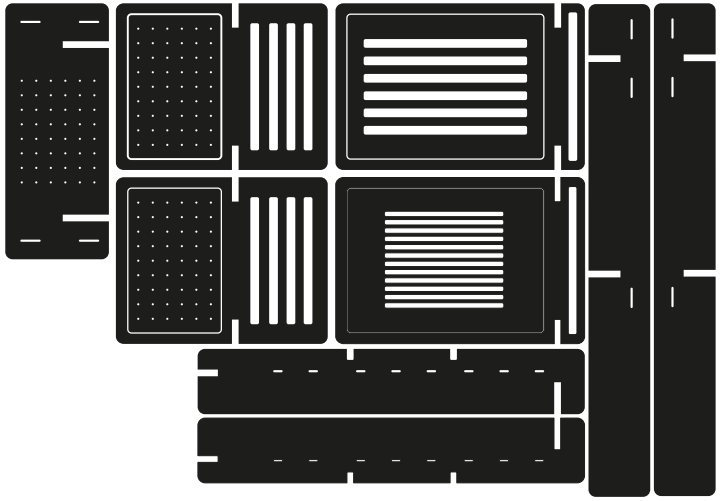
19” Living Rack (A) → Office 1



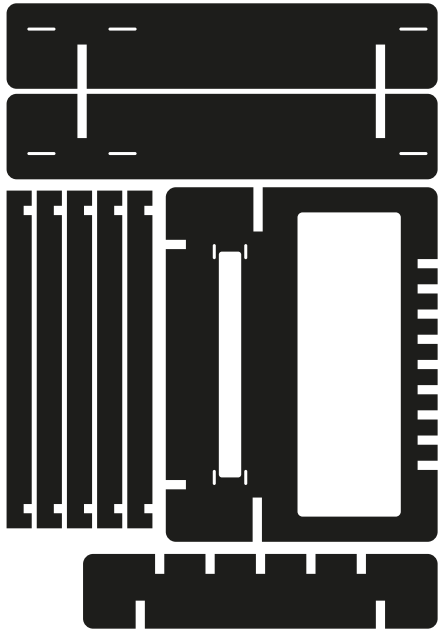
19” Living Rack (A) → Garden 1



19” Living Rack (A) → Base 2



19” Living Rack (A) → Home 1



19” Living Rack (A) → Garden 2

19” Living Rack is an open-source variation of the standardized 19” computer server rack (or cabinet). It is designed to be distributed in domestic environments for personal or small-scale community use, and can be combined with additional functions to address the needs of this new context (small office/home office).

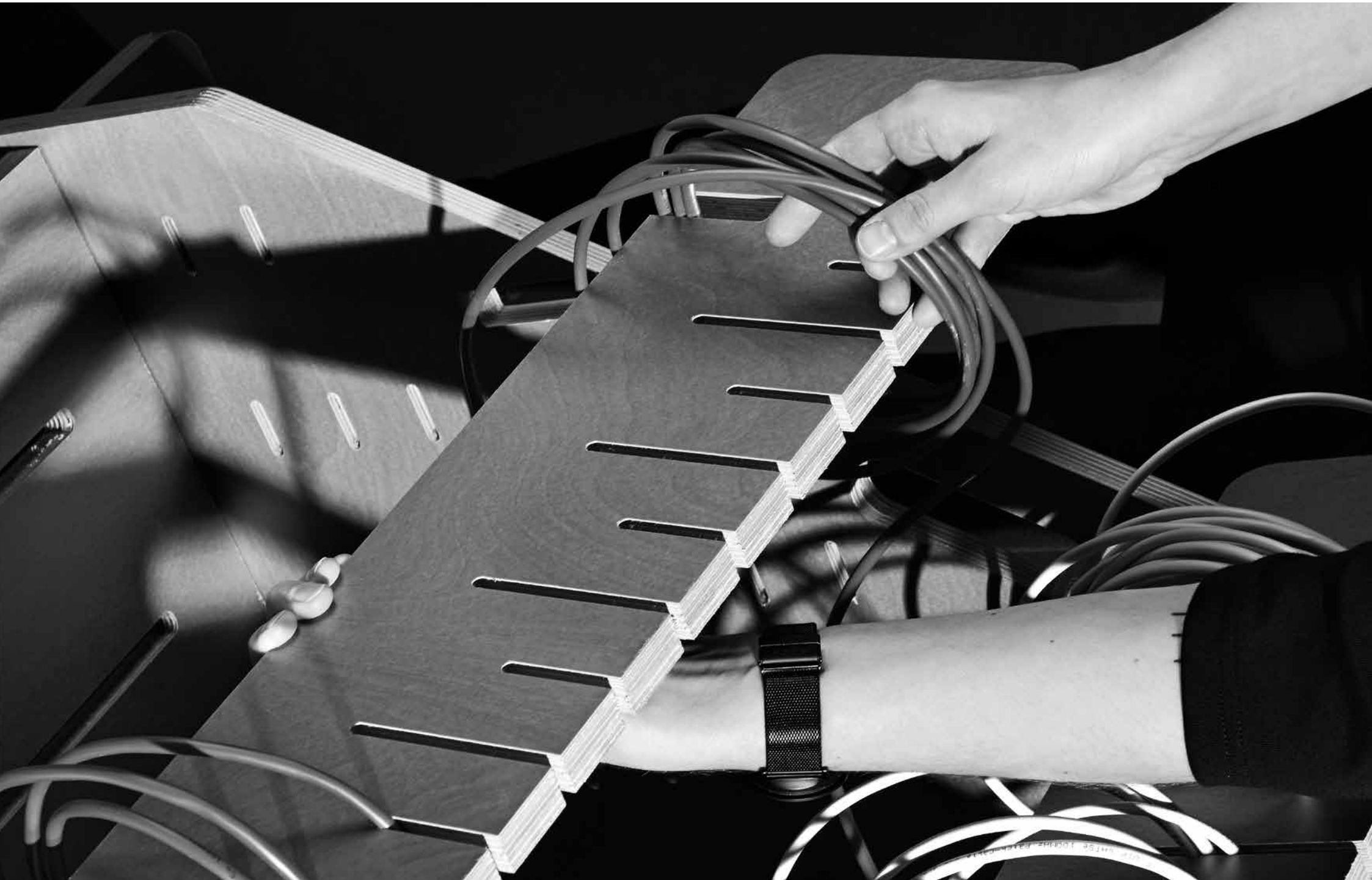
In a clear reference to the famous Ch. and R. Eames toy, their modular and playful House of Cards project, the 19” Living Rack comprises a technical ’Base’ that can then be combined and customized into three different formats: ‘Office’, ‘Home’ and ‘Garden’, to create a personal and somehow undersized data center.

In each configuration, air flows have been taken into consideration both as factors of design and constraints of functionality: The air in the front part of the rack remains fresh before entering the cabinet and cooling the servers, while the back and top air flows are warmed and dried up due to the heat generated by the computers. ‘Office’ functions therefore take place mainly in the front part of the rack, ‘Home’ at the back where elements can be warmed and dehumidified, while ‘Garden’ functions are located at on the top, where there are humid plants which clean, re-humidify, perfume and cool the air.

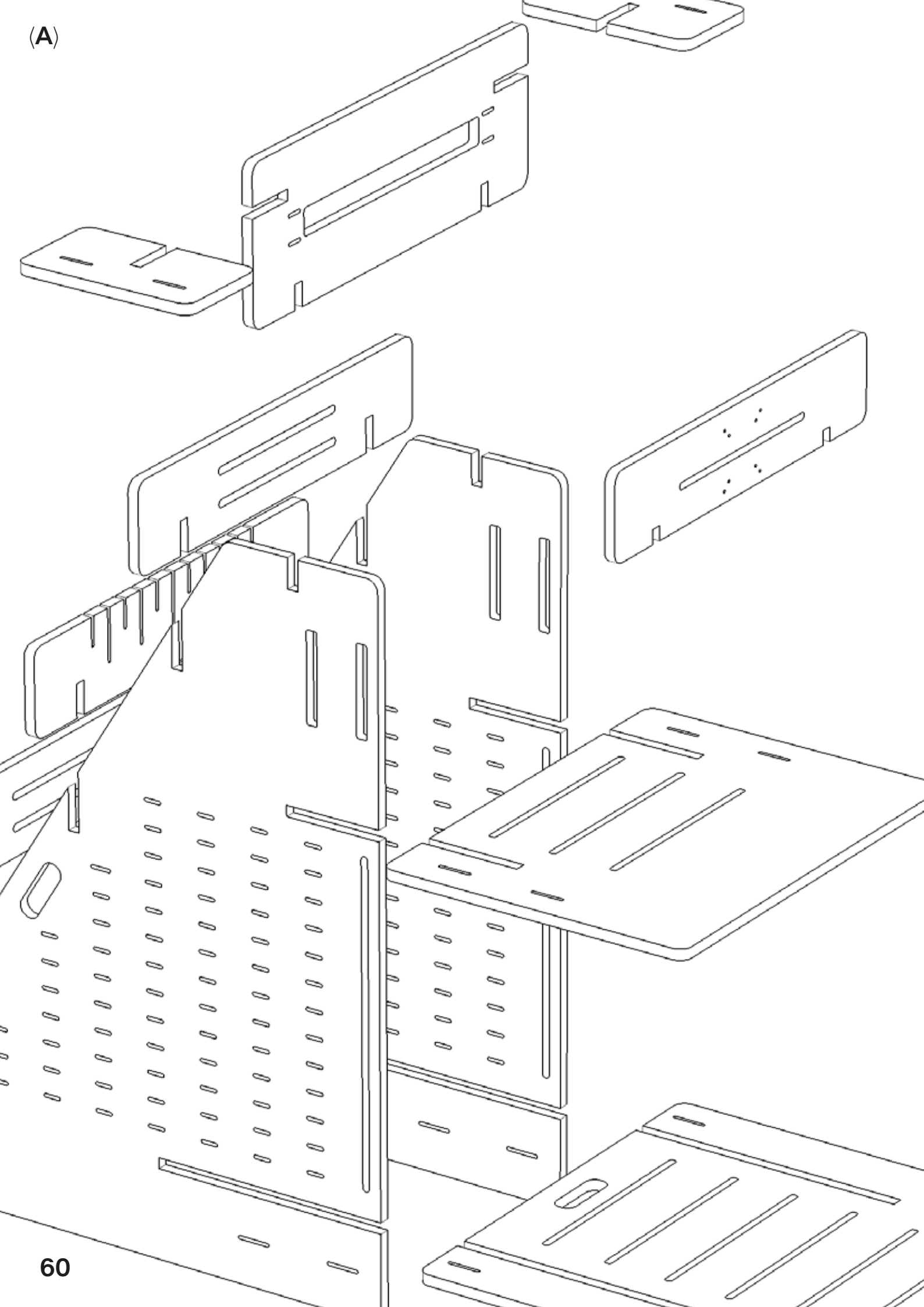
Project developed
by Léa Pereyre

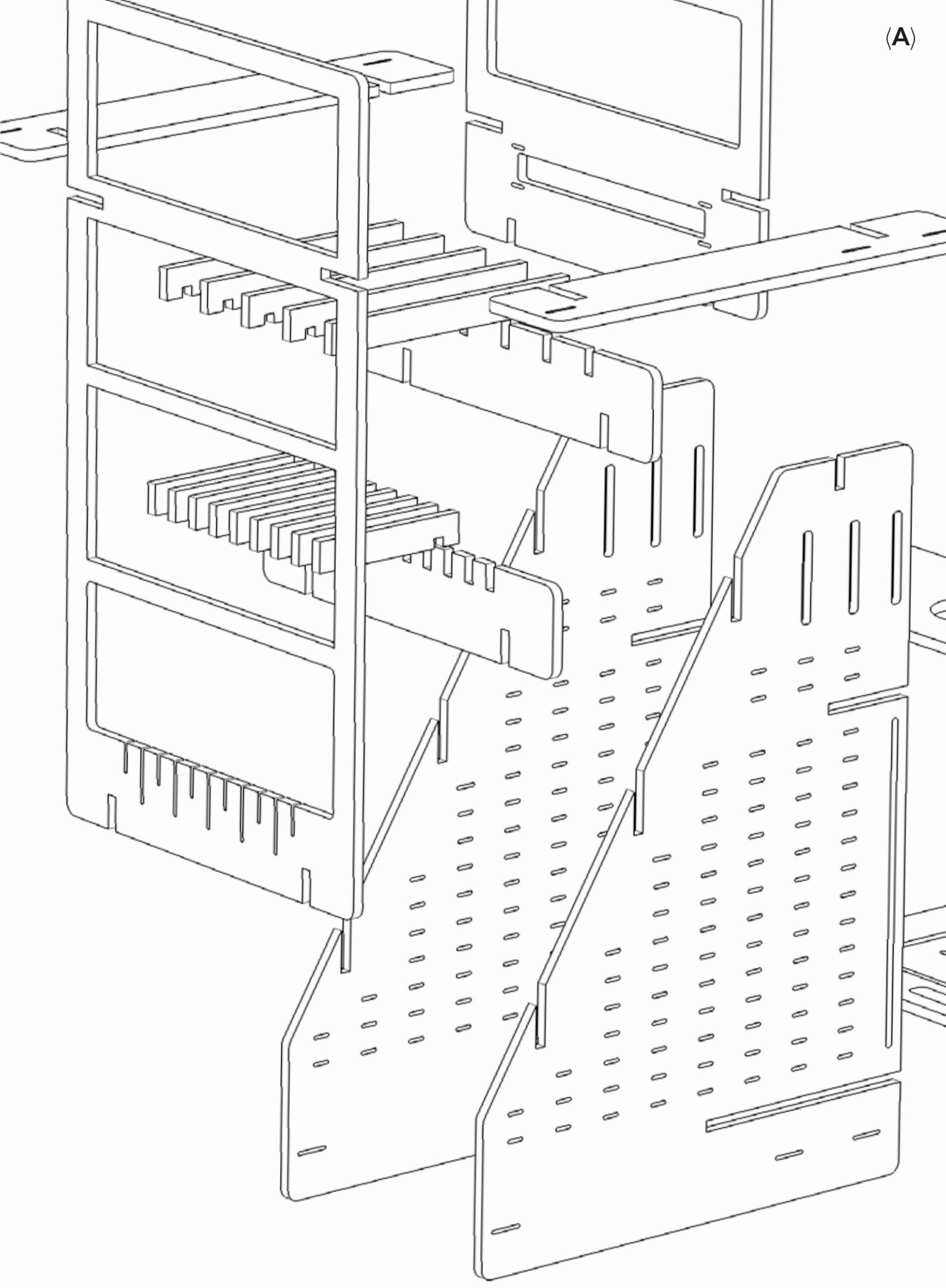
Additional information and downloads about the 19” Living Rack are available on the project website. A selection can also be read further in this book.

www.cloudofcards.org

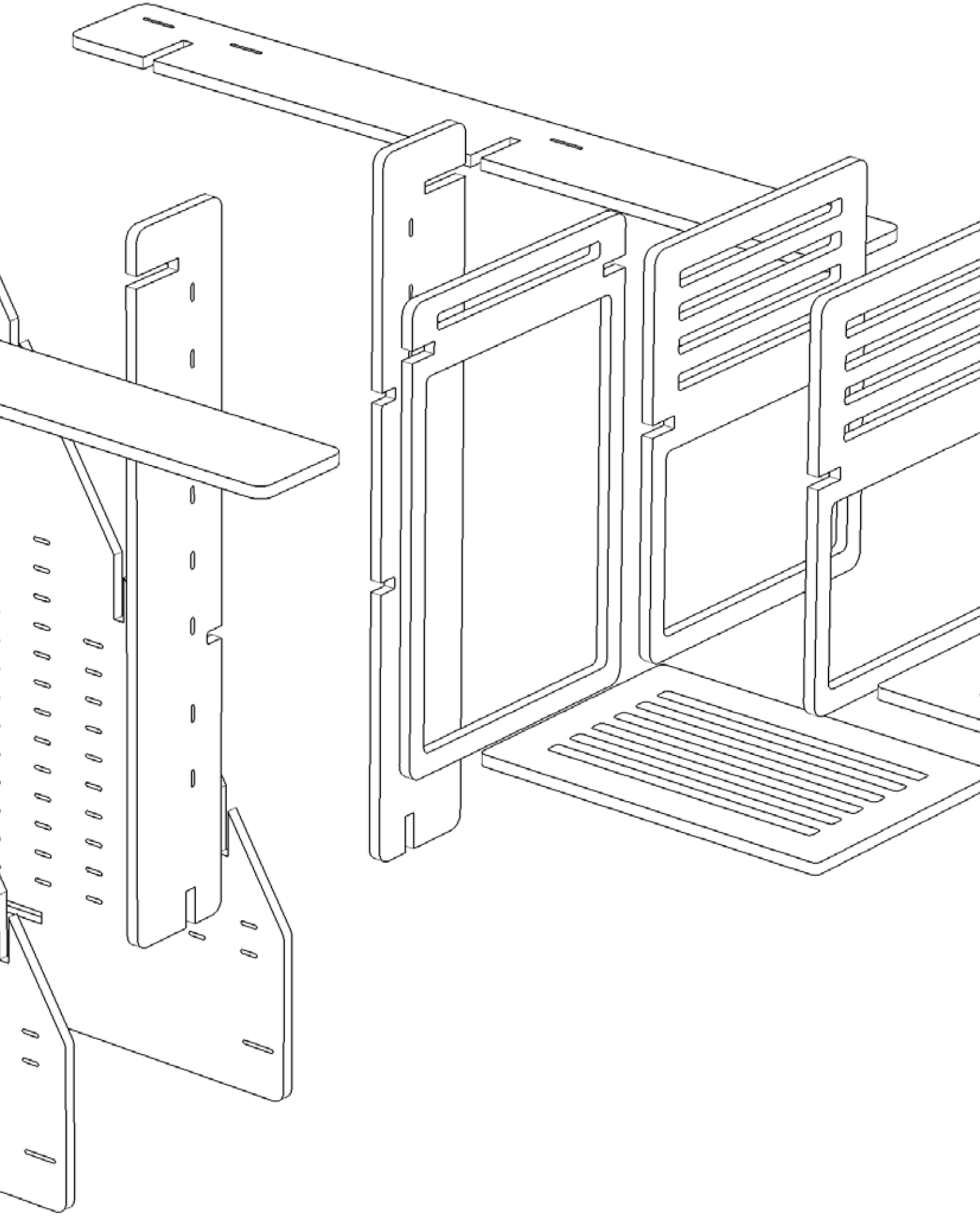


(A)

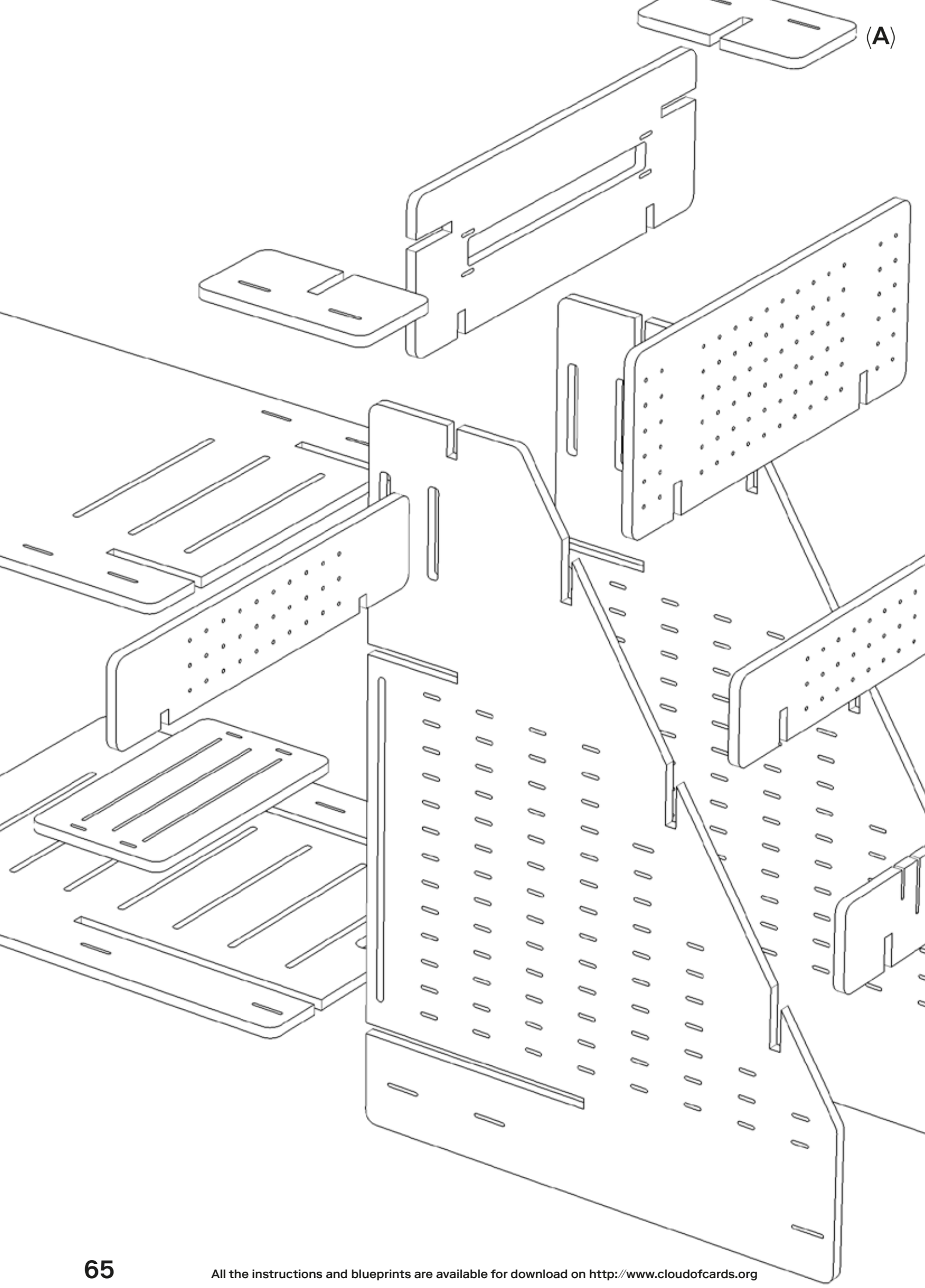


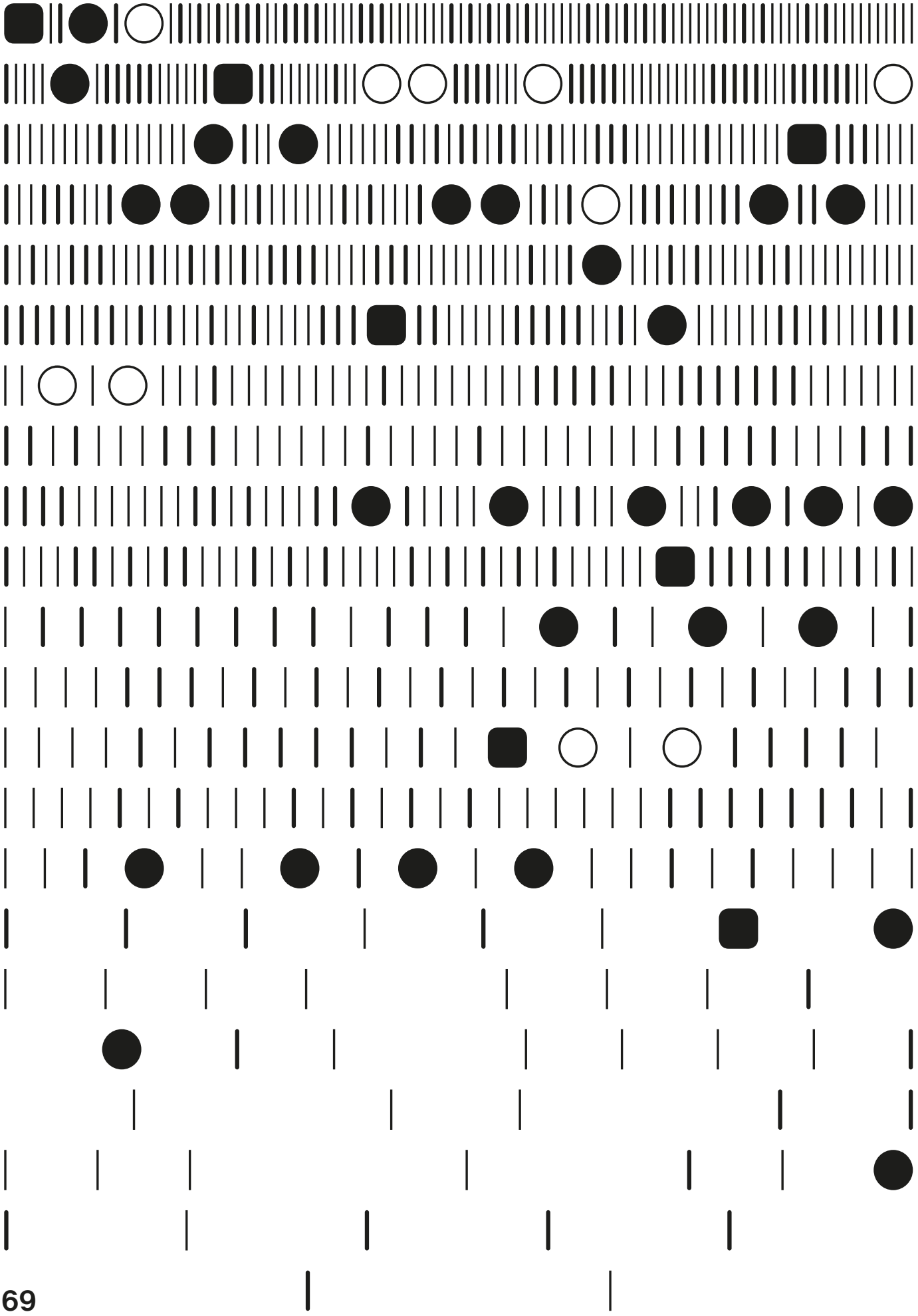


(A)



⟨A⟩





Additional information & downloads about the Cloud of Cards Processing Library are available on the project website.
A selection can also be read further in this book.

0009 → P.110
0057 → P.121
0059 → P.122
0095 → P.140
0096 → P.141
0139 → P.167
0141 → P.169

www.cloudofcards.org

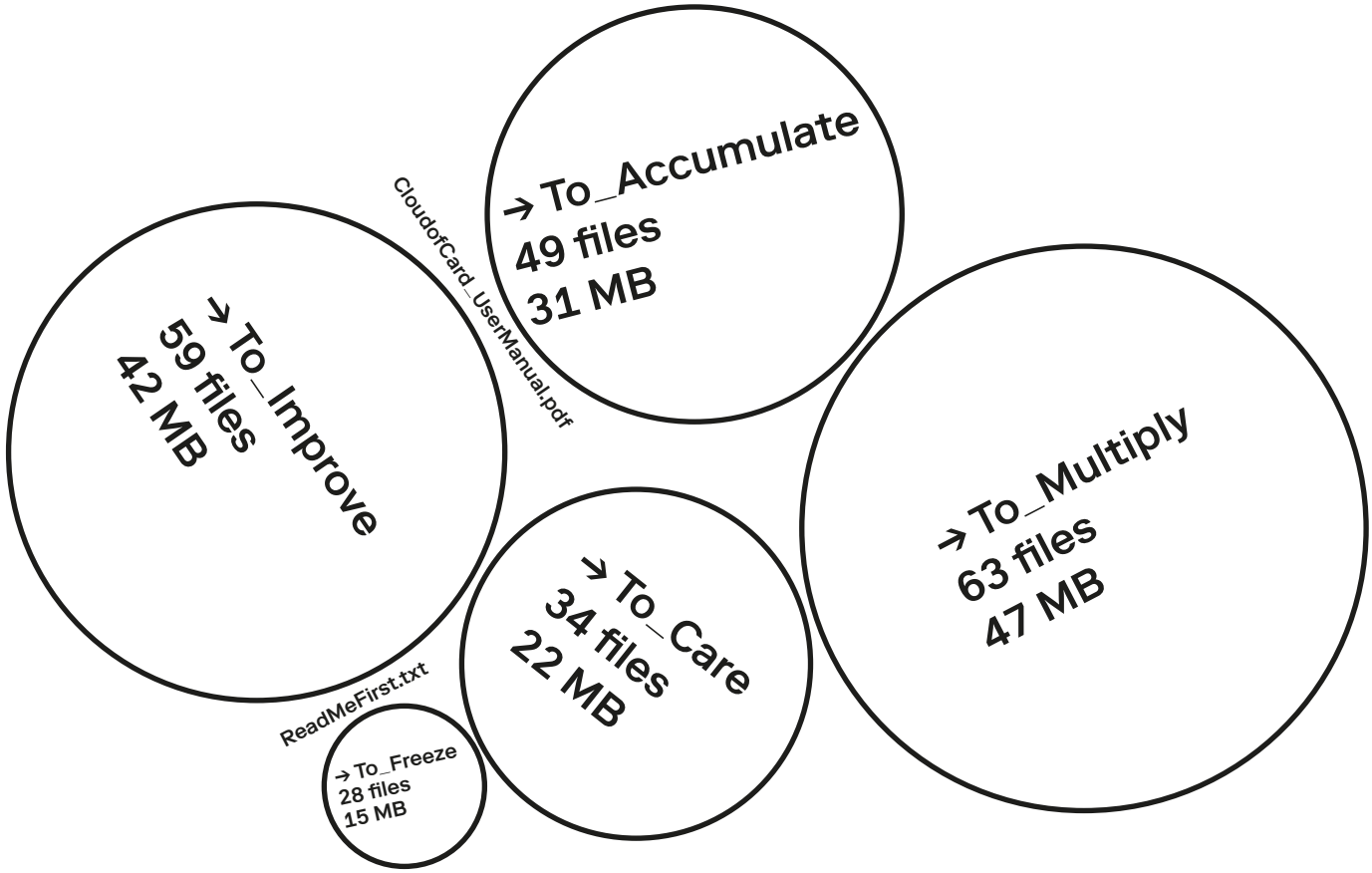
Cloud of Cards Processing Library consists of the unification of three different APIs dedicated to online file and folder manipulation and the development of a fourth additional API specific to the needs of the Cloud of Cards kit and the Inhabiting and Interfacing the Cloud⟨s⟩ research project.

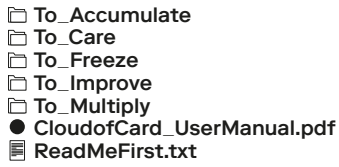
The final overall package has been adapted to the development language Processing and linked to ownCloud open-source cloud software.

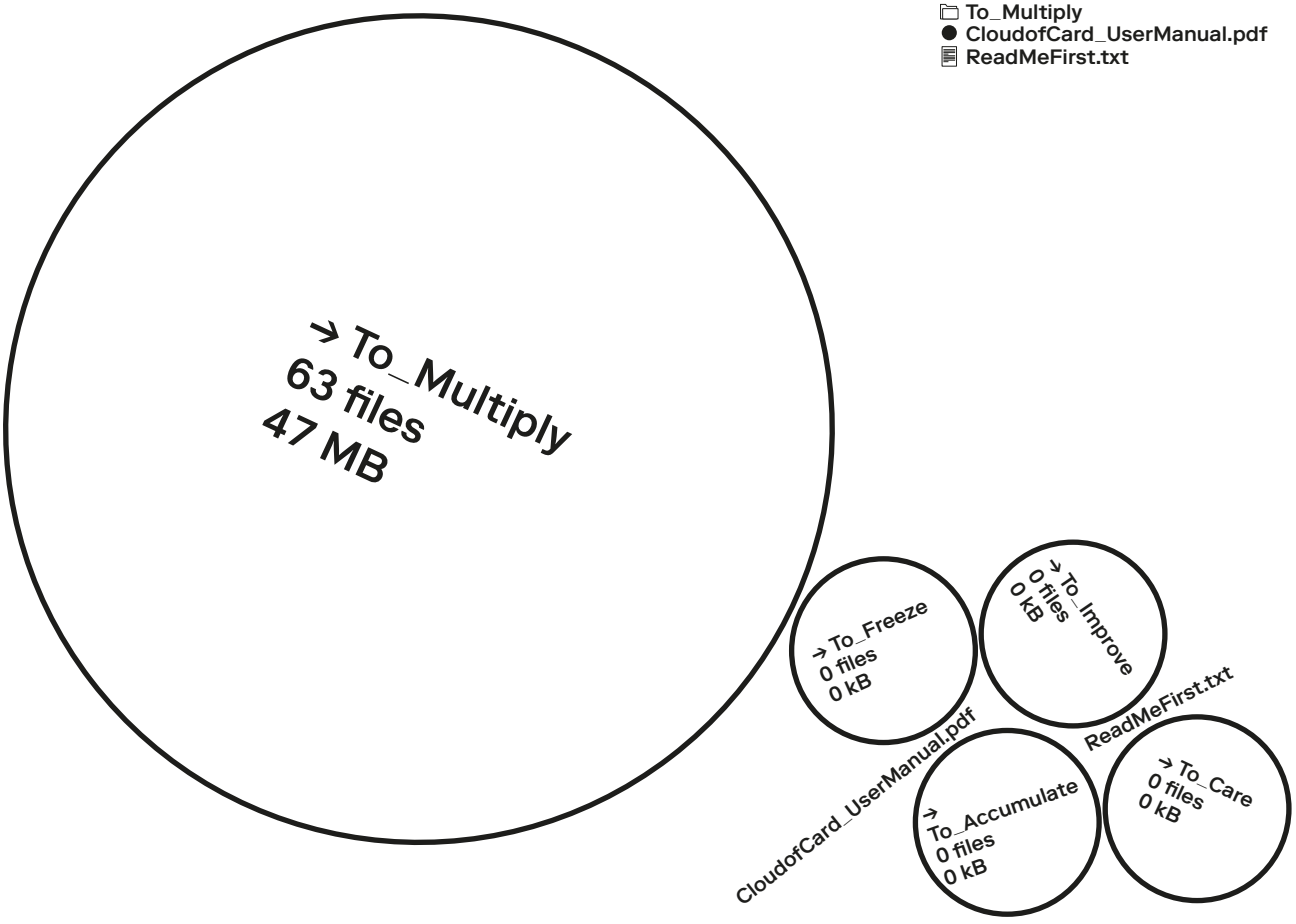
Additional behaviors have been included that can also be used with ownCloud ⟨or Nextcloud⟩, in both its server and clients. These additional functions are the result of implementing the findings of the design research process and of an ethnographic study about the user experience of the cloud.

This new library written in Processing and linked to other open-source tools now makes it easier for a wider public to experiment, sketch and develop alternative interfaces and visual or physical applications for the cloud. It is of particular use to communities of designers and makers acquainted with Processing as a programming language.

Project developed
by Christian Babski ⟨fabric|ch⟩

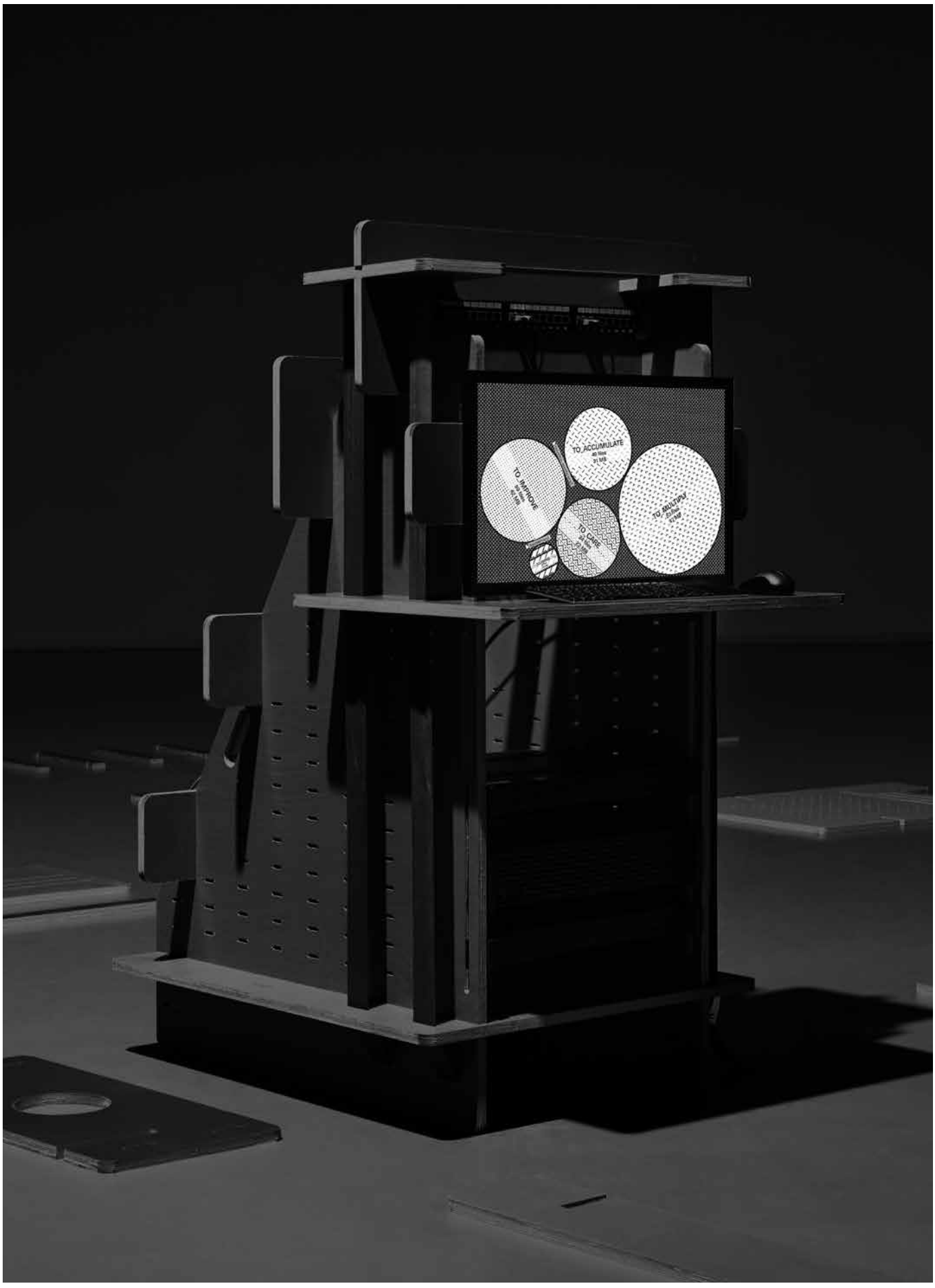

→ To_Accumulate
49 files
31 MB
CloudofCard_UserManual.pdf
→ To_Improve
59 files
42 MB
→ To_Multiply
63 files
47 MB
→ To_Care
34 files
22 MB
ReadMeFirst.txt
→ To_Freeze
28 files
15 MB


To_Accumulate
To_Care
To_Freeze
To_Improve
To_Multiply
CloudofCard_UserManual.pdf
ReadMeFirst.txt


→ To_Multiply
63 files
47 MB
→ To_Freeze
0 files
0 kB
→ To_Improve
0 files
0 kB
CloudofCard_UserManual.pdf
ReadMeFirst.txt
→ To_Accumulate
0 files
0 kB
→ To_Care
0 files
0 kB

5 Folders Cloud

⟨C⟩



Additional information & downloads about the 5 Folders Cloud are available on the project website. A selection can also be read further in this book.

www.cloudofcards.org

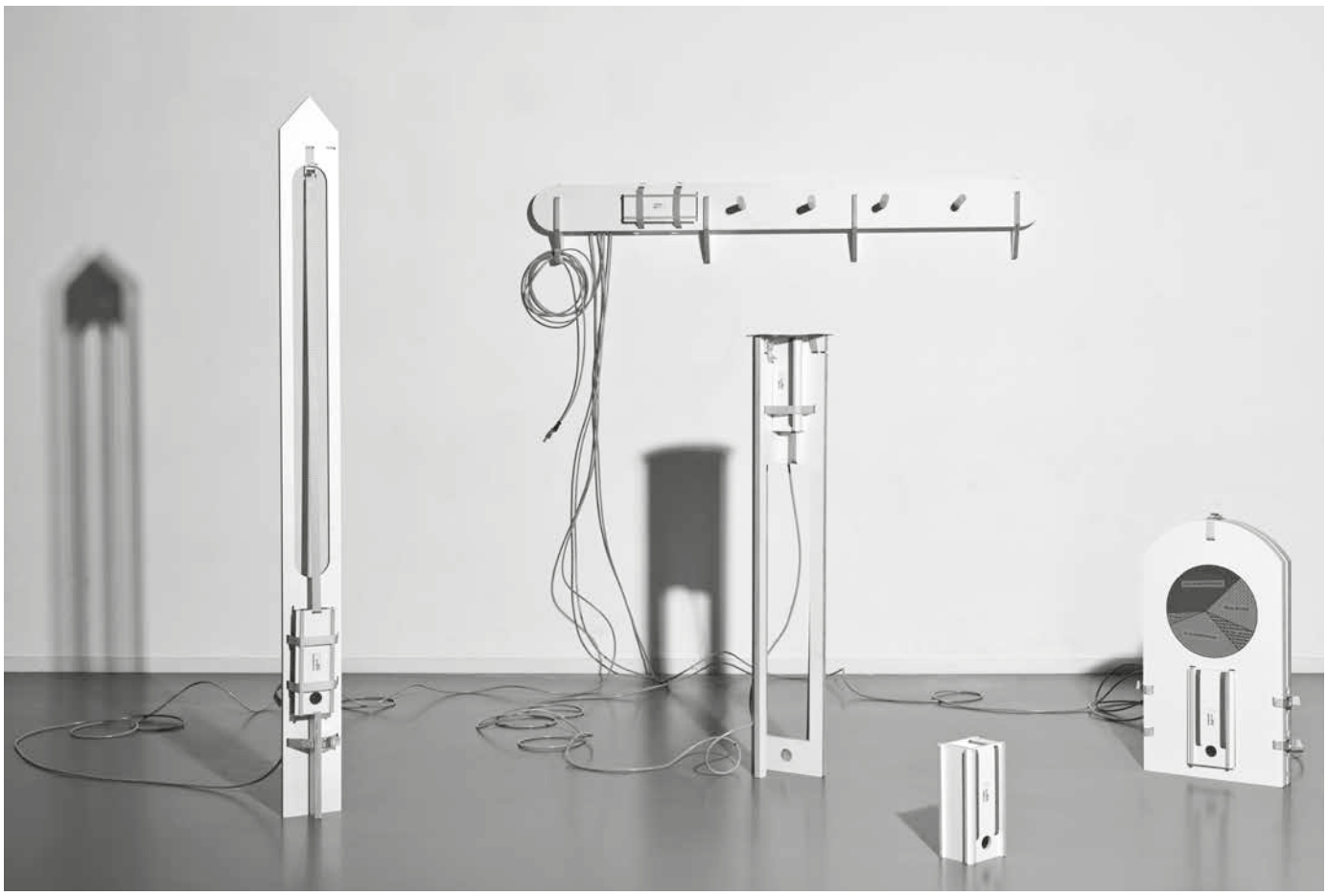
5 Folders Cloud is one of many possible examples of software implementation using the Cloud of Cards Processing Library and exemplifies its use, server and software side. It is a version of ownCloud with automated behaviors and event cascades, in particular when linked to the associated 5 Connected Objects.
In effect, this variation on the cloud combines client-server architecture with a distributed, almost horizontal peer-to-peer approach.

5 Folders Cloud is informed by the results of the research project's ethnographic field study into the uses of the cloud, and uses five action verbs to translate a number of motivations that have been identified as potentially prompting users to drop files and data into this technological setup. These verbs in turn are used to refer to the main functions and names of five synchronized cloud folders that serve the various file interactions. Each folder automates digital procedures related to these motivations.

Project developed
by Christian Babski ⟨fabric|ch⟩

→ To_Accumulate
→ To_Care
→ To_Freeze
→ To_Improve
→ To_Multiply

5 Connected Objects ⟨D⟩



Additional information & downloads about the 5 Connected Objects are available on the project website. A selection can also be read further in this book.

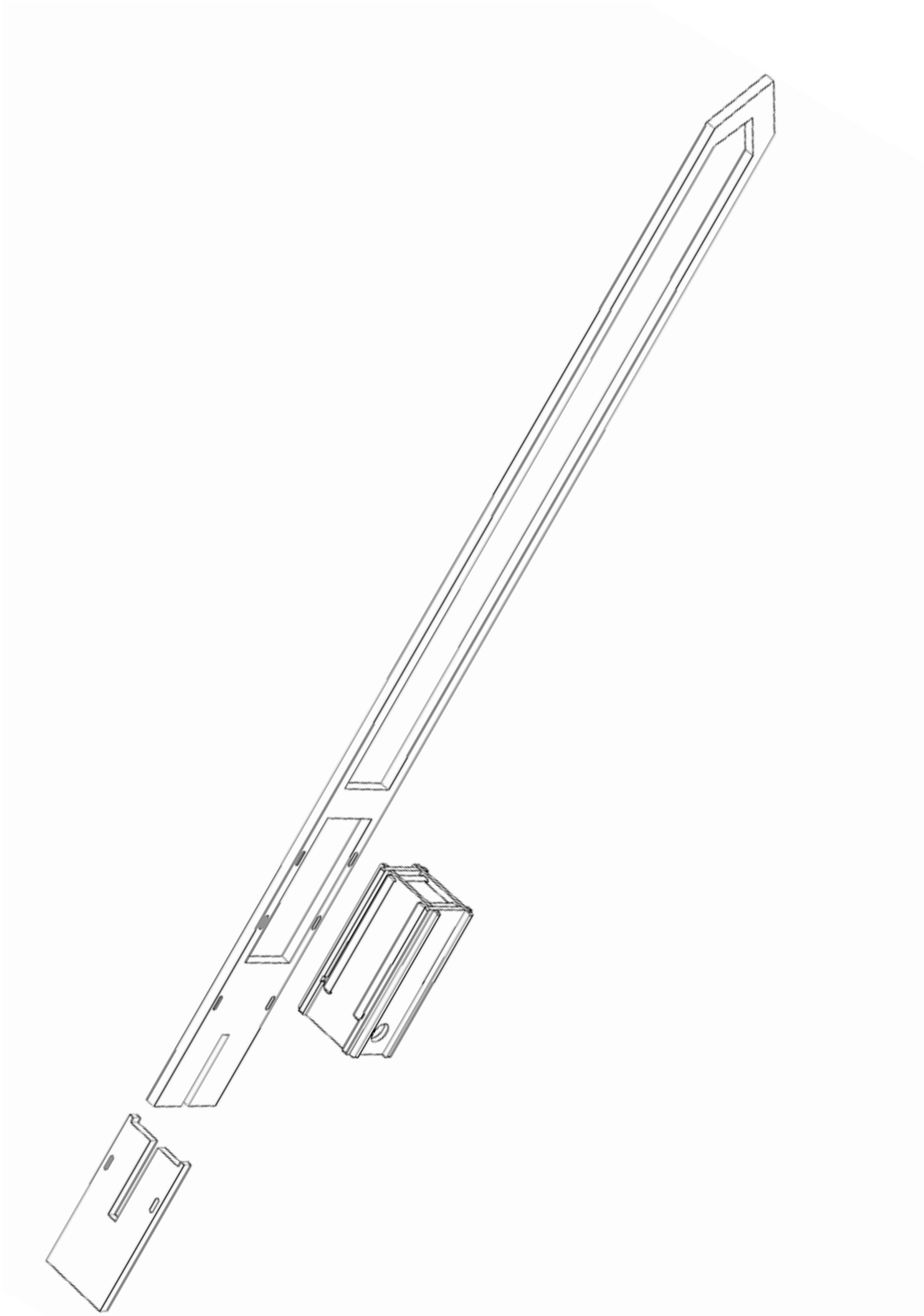
www.cloudofcards.org

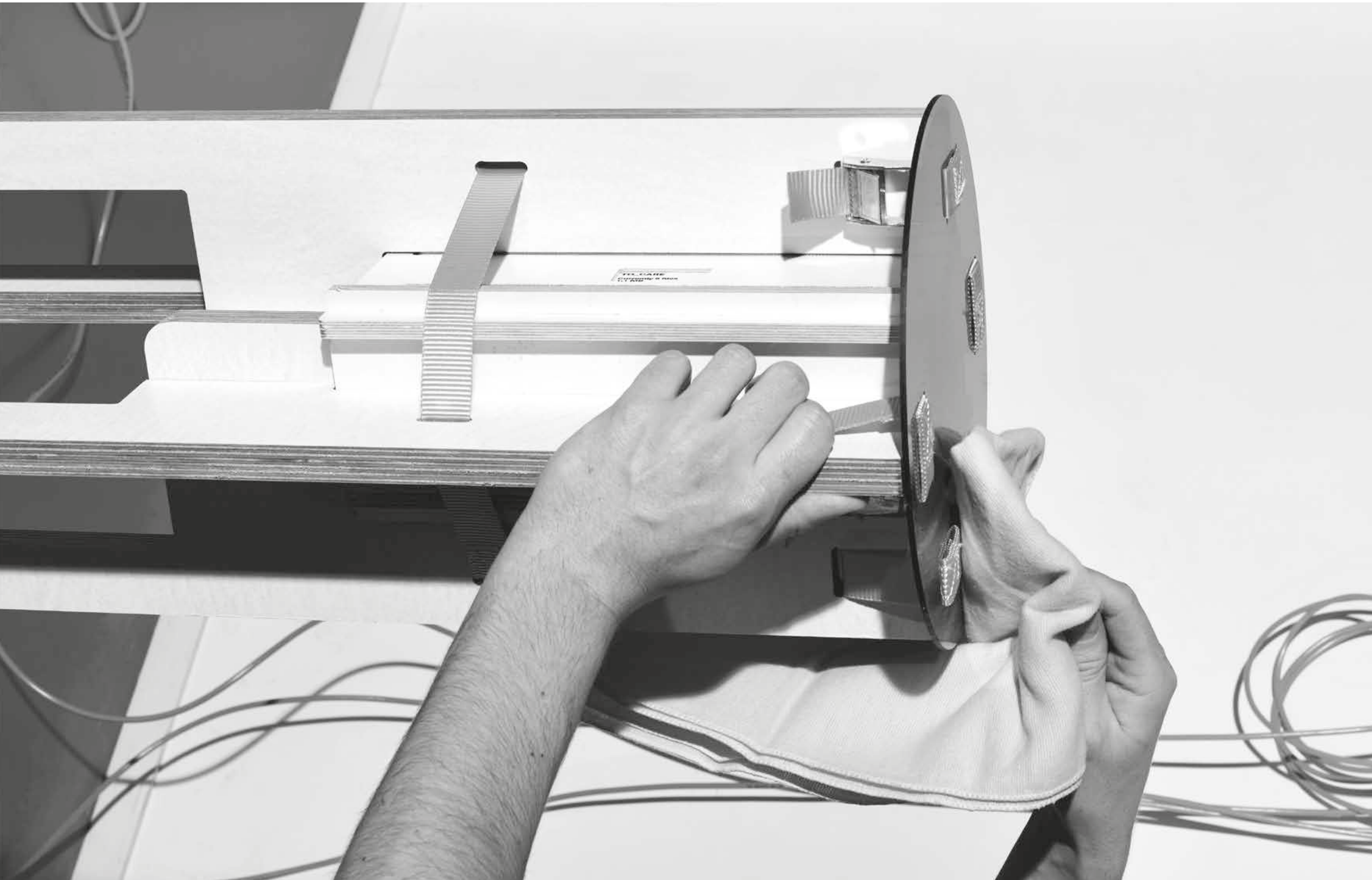
5 Connected Objects is one of many possible physical implementations of the Cloud of Cards Processing Library and exemplifies its use, client side. Linked to the 5 Folders Cloud (both server and software sides), the five physical objects work exclusively as complements to it and have no independent digital functions of their own. They seek to offer a form of interface based on natural gestures ('clients' for the cloud) to enable users to locally access, monitor and manipulate their data or files in the distant cloud, with a Cloud of Cards twist.

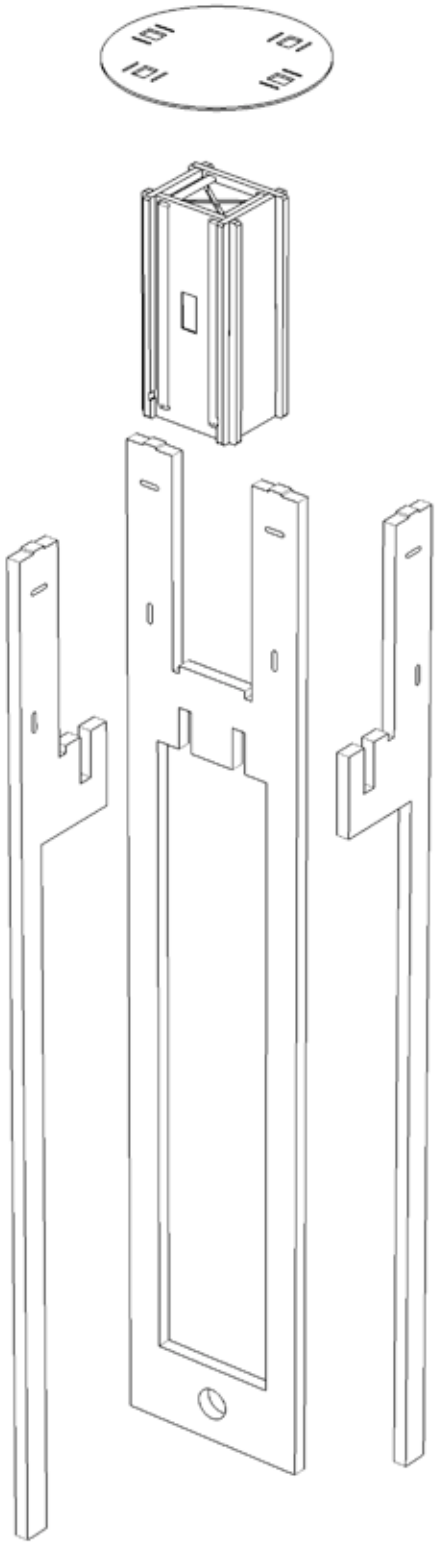
Indeed, the purpose of 5 Connected Objects, which is directly linked to our design research findings and an ethnographic field study into the uses of the cloud, is to materialize the 'ghostly' presence of a user's distant data in everyday environments. It also seeks to embody the 'digital anxiety' caused by mishaps that can happen to personal files and data when dropped into a distant cloud (fear of losing files, anxiety about deleting versions, sharing with the wrong people, misunderstandings over access rights, having private files openly published, undesired updates, hacking, etc.)

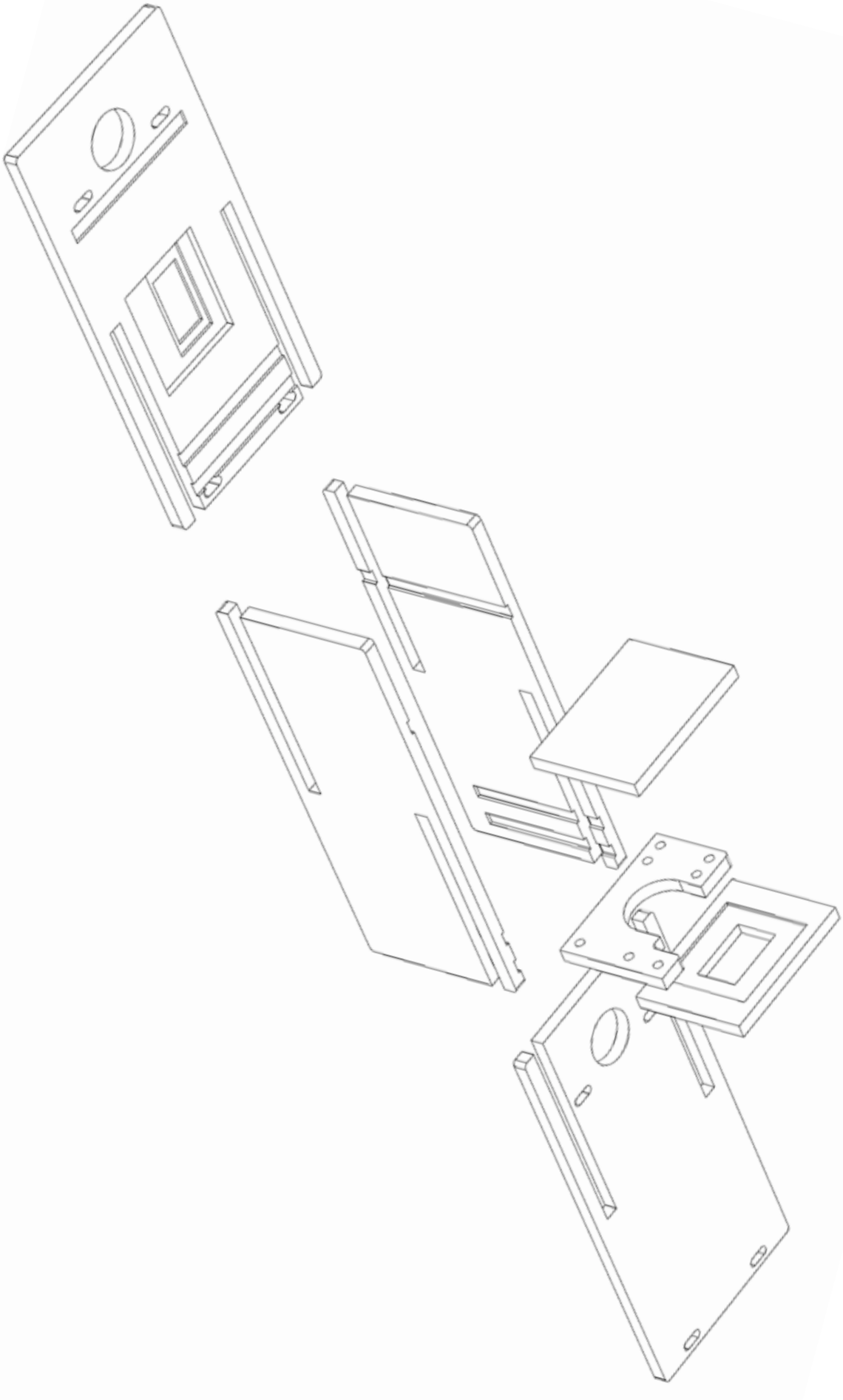
As a consequence, these objects, particularly when they are physically manipulated, can trigger automated procedures related to these potential problems.

Project developed
by Lucien Langton

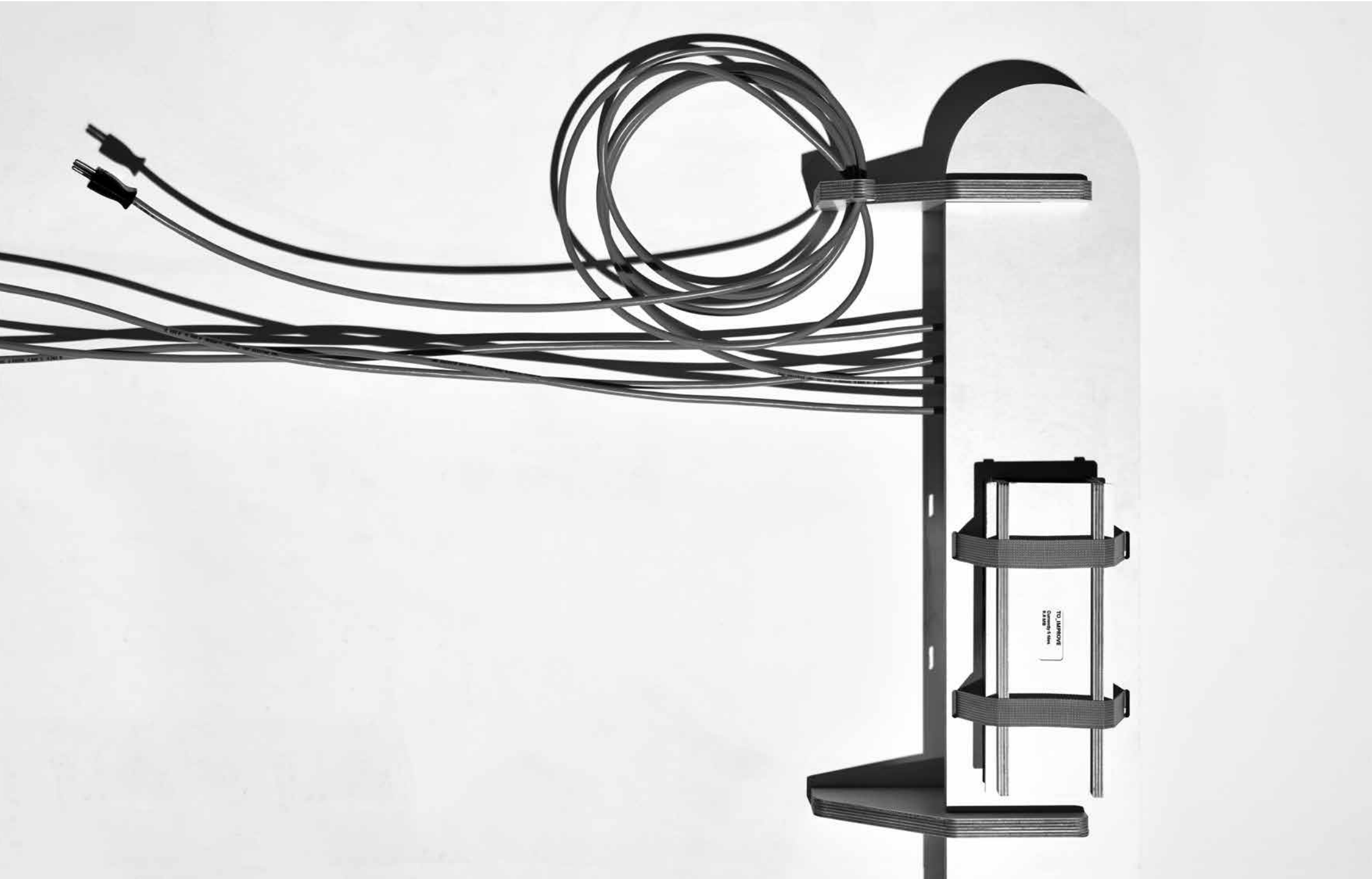


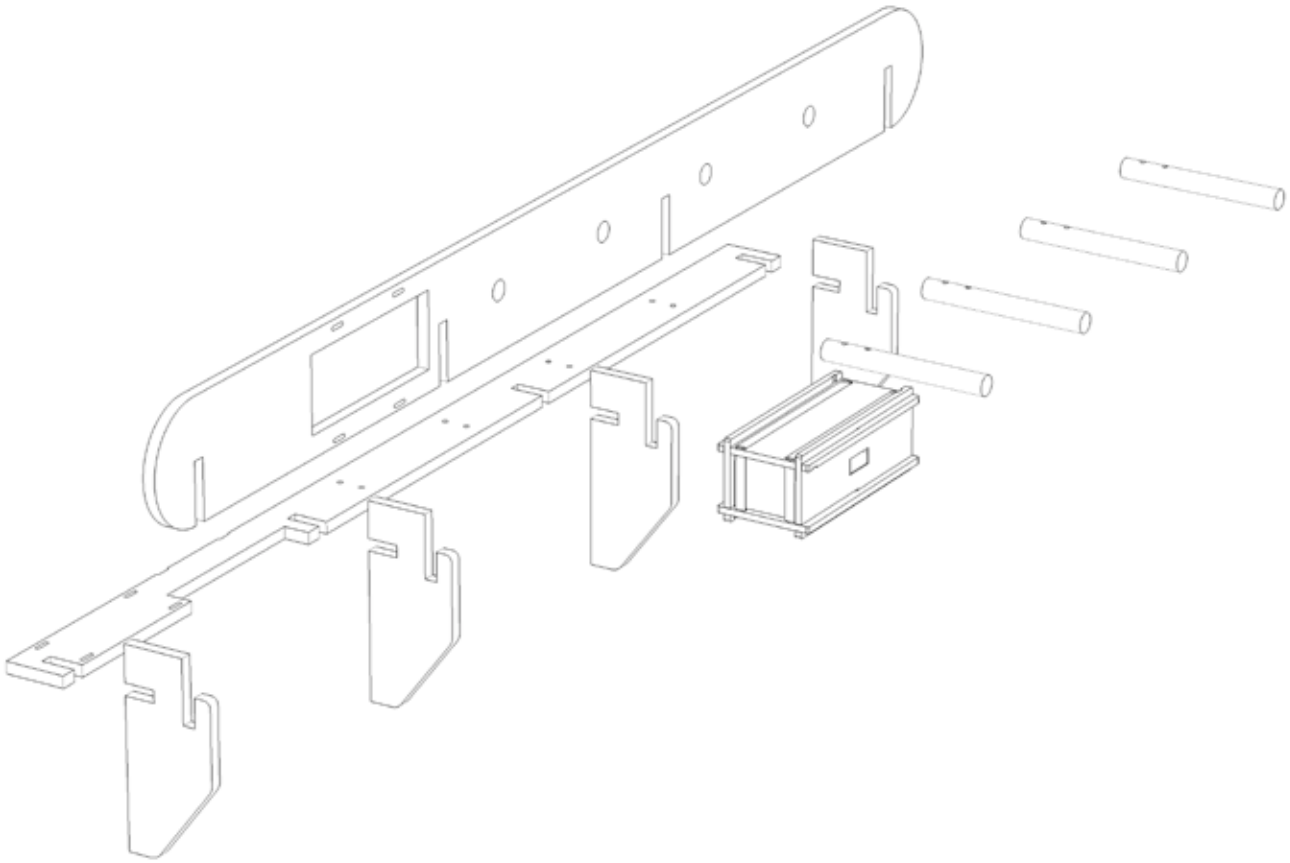

TO_CARE

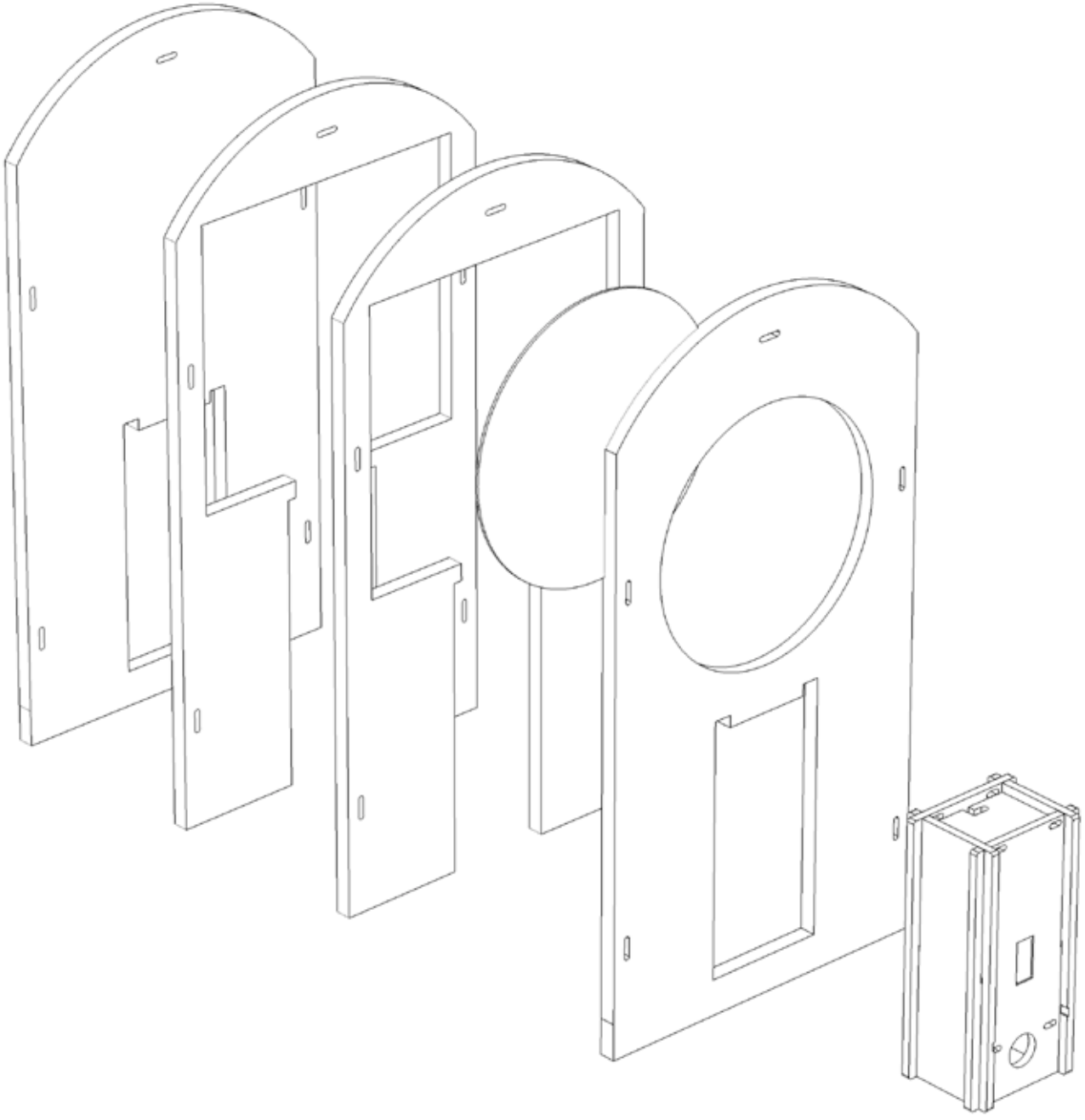





TO_FREEZE
Currently 3 files
15,6 MB


TO_IMPROVE






sound_18_MULTIPLIED.mp3
Movie_05.mp4
file_05.pdf
3d_file_05.max
file_27_MULTIPLIED.pdf
TO_MULTIPLY
Currently 8 files
42.5 MB

In this current time, our bodies persist across networks in ways that we never imagined, and in places we never thought we would go. With the invention of the telephone, the radio, and later, the television and many more devices, our bodies could appear wherever we wanted to. In addition, the fear of death and the hope of an afterlife, a step into the eternal unknown, has translated somewhat into our understanding of the digital world.

In the early days of wireless reception in the 1930s, stories of household that suddenly sprung to life were reported, of a "tin roof, next door, making political speeches." (Sconse, 2000, p. 68) As detailed in Jeffrey Sconce's *Haunted Media*, it was a simple explanation (emphasis mine):

"Other items tell of a house perpetually 'haunted' by radio signals and of a woman who fainted on morning in the bathroom after her mirror greeted her by saying hello *(apparently the lead and glass in the bathroom had served as an antenna for a nearby station.)*" (Sconse, 2000, p. 68-69)

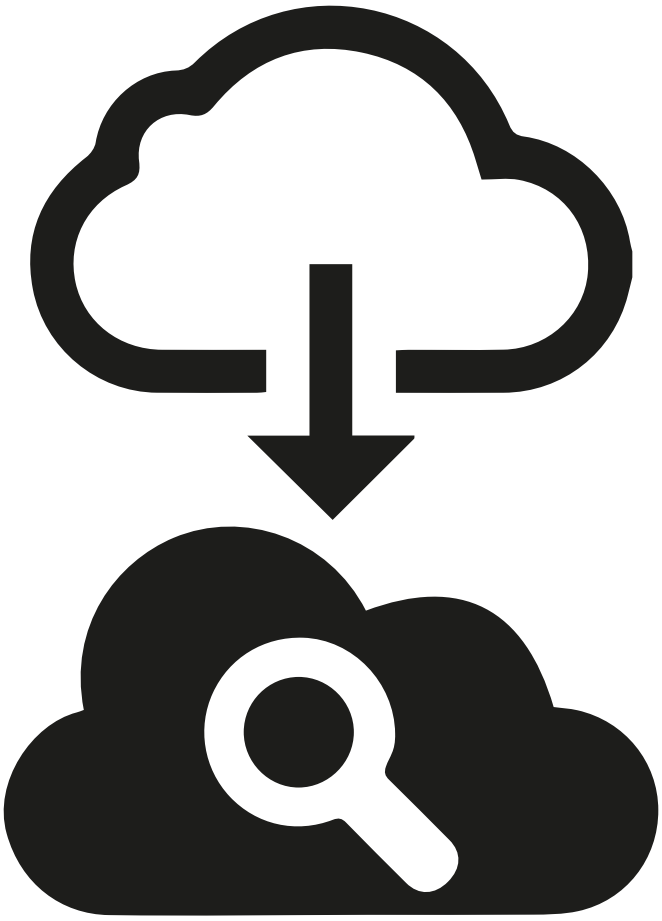
In this case, a mirror did not behave like a mirror should. Of course, due to the seemingly opaque nature of the process at work to make a radio talk at all, the reaction by the woman in question should not be laughed at. The body was not in a place that a body should be. The shock, horror, and fear that arose in the late 1800s as a result of your voice, any voice, being heard in a friend's living room from many hundreds of miles away was understandable. Suddenly, your body was not as immediate as you imagined, not as bound by borders and edges. Time became a looser concept to grasp, as travel and postal time was eliminated through a carefully orchestrated series of buttons, bells, and connections.

With such technology, we had found a way, perhaps, to listen to the recently departed, for if our bodies could transcend time and space when alive, why not in death? Although the belief that the new technologies signaled a leap in spiritual telecommunication diminished significantly (though not dismissed, as evident in the continued work of the Society for Psychical Research) at the end

of the nineteenth century, the “ghosts” they were creating continued to appear, as glitches, abnormalities and phenomena. As computing developed, unanticipated spectres rose to the surface, from malevolent spirits in the form of viruses, to inexplicable, sudden death; the infamous “blue screen” turning your home computer into an incandescent gravestone.

Fitter, Happier, More Productive, Comfortable

With the introduction of cloud-based (internet) computing, atemporality and amorphous presence expands and fractures exponentially. Though the term “cloud” was used to described distributed computing such as ARPANET from as early as 1977, the meaning it holds now wasn’t used until the late 90s, with the term coined (and subsequently verified by Wired in 2011) in 1996 by marketing executive George Favaloro in a Compaq business plan. The term itself has become somewhat ubiquitous, with a variant of icons to match (how many different ways can you draw a cloud?), and suggests a “lighter”, faster, more nimble relationship with your computing. As if sprung from futuristic visions of the 50s and 60s, including Hans Hollein’s mobile office, free from the shackles of infrastructure, the dream promised by cloud computing was the ability to work anywhere, and any time. Any number of product vision videos from Microsoft, Samsung and other big technology companies in the last ten years will show you how effortlessly seamless life can be if you engage with “The Cloud”. No need to carry bulky hardware with you, as long as you have a connection, you have the power.



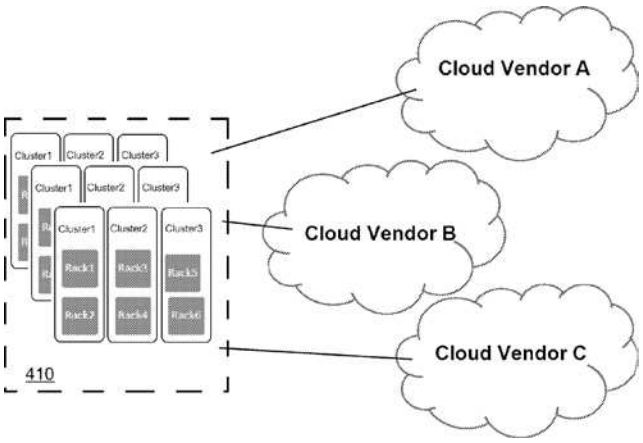
A selection of “Cloud” icons found on Google Images.

As information is not stored with you and the software needed not even necessarily installed (as in the case of Google Drive), it is easier, smarter, more flexible and less dependent on your computer's memory and storage. You are less limited by the machine in front of you, suddenly your laptop or home computer becomes a portal to the aforementioned "no place" that exists virtually, looked after in impressive-sounding data centres, robustly guarded and maintained.

With distribution, comes convenience, but also a lot more things to pay attention to. Rather than one linear connection (human on telephone, switchboard, other human) there are many, and as in the early days of telecommunications, its processes happen behind the scenes, complex workings rendered invisible. If power is what we want, or are given, as is evangelised by companies such as Apple with their 2015 campaign slogans telling you that "you are more powerful than you think", then how do we know what power we have been granted? Is it power at all, or just a clever sleight of hand by the ones that are the true beholders?

As Above So Below/ As Within so Without

Our devices aren't doing what they are supposed to do, or rather what we expect them to do, because of this impermeable, unfathomable relationship to the cloud. Our smart televisions are listening to our conversations, our smartphones are giving away our location without telling us, and the internet of things is opening up wilder possibilities for hackings in our homes. Though we make assumptions on our understanding of presence, of being in-the-world, there is another less recognisable spectre that runs alongside with savage persistence, impacting on our lives economically, socially and politically.



Drawing from US Patent 20100061250A1 (Google)

So, what does this inconsistent, constant presence and persistence do to our understanding, and what does it do to our sense of agency over ourselves? Can we find a way to perceive our bodies, our memories, as they leave us? How does the decentralised, opaque nature of The Cloud create the capacity for ghosts to appear, and what are they telling us? Where bodies are, where we expect them to be, and how to retrieve them once they have left us was once an entirely corporeal concern. Now, we run the risk of losing parts of ourselves entirely, with our "virtual" bodies, so intrinsically tied to our memories, emotions, and everyday machinations, in places we never knew existed in the first place. The Inhabiting & Interfacing the Cloud⟨s⟩ project ⟨I&IC⟩ addressed some of these questions by showing that users are often confused by the inconsistent, amorphous presence of the Cloud[1].

With the cloud, our bodies, both past, present, and future, can exist at once, influencing the way each manifest in the world, a phenomena Amanda Lagerkvist calls the "persistent presence of the infinite, in the age of temporal instantaneity." As I will discuss further in this chapter, in not understanding where our bodies are perceived, persist and are present, we leave ourselves open to possession and subsequent violences.

Ghosts on the network

Evidence of contemporary ghosts, facilitated by opaque network interactions, have already begun to appear over the last few years. In early 2013, 17 year old Retaeh Parsons took her own life after pictures of her being allegedly sexually assaulted were distributed online.[2] Six months later, her image appeared in an advert for singles in Canada on Facebook, sitting alongside the Newsfeed in the column reserved for third party advertisers. Her family, and friends, were rightfully horrified, and sought answers, not knowing quite where to look for them, or who to blame. The website, ionechat.com, was subsequently banned from advertising on Facebook and claimed no ill intention, ceasing to exist ⟨in its current form⟩ entirely. Facebook themselves calling the incident "an unfortunate example of an advertiser

scraping an image from the internet[2]."

Algorithms do not know the context of a photograph. They don't understand, or anticipate the social consequences of their own function. They do not have our faulty methodology, the algorithm is supposedly blameless; it is us as creators who are essentially at fault, it is our faulty application. However, this consistent failure to understand the wider systems at work means that the functions of the algorithm (I am careful not to anthropomorphise, or give an accidental agency here) will continue to act against us unknowingly (as well as with us). It is becoming the benign ghost on the network, walking about without even knowing we are there, or of our fear of it.

Trace Bodies

Who is entitled to share or make sure of your image once it is uploaded to a service provider, and where does the ownership lie? As of January 2017, Facebook's current data sharing policy contains the following:

"We are able to deliver our Services, personalize content, and make suggestions for you by using this information to understand how you use and interact with our Services and the people or things you're connected to and interested in on and off our Services[3]."

As the network becomes far wider and more complex than we can fully understand with the increasing use of cloud computing, signposted by the various terms and conditions that we blithely put our name to as mentioned previously, it becomes harder to see where things go wrong. It becomes hard to know where our information is going, and importantly, where it is held. We are told of the impenetrable fortress of the data centre, but what processes are these "black stacks" a cog in?

Momentarily putting aside their particularly appropriate aesthetic, the data centre is a key example of Bruno Latour's "black box", a key proponent of the scientist's Actor Network Theory (Latour, 1999). We can see what goes in, and what comes out, but not the process that led us to gain the result that we are presented with. We only really see them when they break, when they start to push back against our will and

begin to haunt us. Alongside the very real spectres that are seen from cases such as Retaeh Parsons', the ubiquitous connectivity of services, products and users online hold the power to cause very real, very unexplained violences.

In 2010, a study by the Microsoft Institute and Max Planck Institute in Germany showed evidence of third party advertisers on Facebook accidentally "outing" gay users by showing targeted ads for relevant services, generated through algorithmically derived guesswork. During the research, six fake user profiles were created with different sexualities; two straight men, two straight women, a gay man and a lesbian. Understandably, some targeted ads are trained on specific sexualities, and were visible on the profiles. What was not clear was the adverts for non-sexuality specific subjects, such as those for a nursing school, had potential consequences too.

In the report findings (Guha et al. 2010), researchers discovered that:

"...unlike the gay bar ad where the target demographic is blatantly obvious, is that the user reading the ad text would have no idea that by clicking it he would reveal to the advertiser both his sexual-preference and a unique identifier (cookie, IP address, or email address if he signs up on the advertiser's site)."

As Gawker highlight, who reported on the story following the publishing of the study[4], "The school now knows you're a man who is interested in men, even if you've hidden your sexual preference using Facebook's privacy settings." Therefore your understanding of control over your own data, and curation of where and when it should be seen, falls short. In this specific interaction, it's safe to assume that unless you are particularly technologically literature, you won't know this is happening at all, only feeling the effect at a later stage when it comes back to haunt you. Here, your body becomes subject to the will of others, in this case, your profile and Facebook's privacy policy, which Gawker bluntly suggest, "is fair game.".

Like the infamous concept of the doppelgänger, as your data is released into unknown

fields as a multiplying double, your body "living" across the network without your knowledge or informed consent. As highlighted in Hu's A prehistory of the cloud, MIT's Sun-ha Hong calls these particular entities, enabled by algorithms and ubiquitous connectivity, "trace bodies". In Hong's paper on intimacy and connectivity online in the "new media society", he experiences this feeling of knowing that your "presence" is out there as "a kind of alienation: I am told my personal data is being exploited, but I do not quite 'feel it'". Perhaps the figure of the zombie is more accurate depiction of these separated bodies, removed of the central agent (for arguments sake, you), but still, without consciousness of the action, performs the potentially devastating actions in whatever place (or server rack) that body moves to next.

A representation of a doppelganger / Dante Gabriel Rossetti, How They Met Themselves, watercolor, 1864

Heaven is a place on Earth

If you search for images of "The Cloud" online, you will find thousands of stock images that frame gleaming black stacks with literal clouds, conjuring visions of a heavenly, ethereal "no place", a utopia of information exchange. Aside from the obvious absurdity of this vision, the idea of a data centre as a place of possibility, along with the promises of advanced computing that allows the means to being able to do "more", extends into our dreams of being bigger, more able, than our physical bodies allow. Our bodies, and the bodies of others, are suddenly in many places at one, appearing in sites (in the digital sense) that we never anticipated.

In 2016, a relatively softer episode of Charlie Brooker's regularly traumatic Black Mirror speculated upon the capacity for data centres and cloud computing to digitally enable immortality. San Junipero follows the lives of two women that visit, for a few hours at a time, a technologically assisted "Neverland", where, free from the cage of their corporeal body and "real life", they are able to fall in love.

Upon the approach of actual, corporeal death, a choice given to whether you would "upload" yourself permanently to San Junipero in order to live on in an eternal, atemporal, hinterland. What isn't quite touched upon, but lightly gestured towards, is the negative, visible only through a subtle awareness of those that do not get access to this service or choose not to, and the people left behind. San Junipero taps into our hopes and fears for our bodies, and perhaps, to go down a darker path, or pathological compulsion to prove that our lives meant something, were worth commemorating and preserving. It's hardly surprising that it's the very rich, and the very insecure, that are pioneering the ideas popularised by transhumanist Ray Kurzweil, from radical life extension to the insertion of millions of nanobots that turn our bodies into super efficient, data processing, machines.

But should the dream of immortality not be all it was hyped to be, how do you opt-out of eternal life? Conor Friedersdorf in The Atlantic[5] poses a thought experiment on the potential limits of "radical life extension", in this case, uploading your consciousness onto the cloud, a possibility not entirely out of reach if Kurzweil et all is to be believed. As you are uploaded, and stored, "you" (I daren't enter into a philosophical argument about embodied versus digital consciousness) are subject to those that control the system, the algorithms that determine your life on the server. Time becomes a different consideration altogether, with punishments handed out to those by generations hundreds of years in the future, because if they are not "dead" insofar as we can argue digital immortality a life, they can still betried by the law of that time. Friederdorf's solution is to ensure the possibility of a "suicide switch", that allows the digitally immortal to essentially cancel their subscription and leave the service, as mentioned earlier in the case of San Junipero, performing the final "opt-out".

But in the case of the algorithmically drawn data "doppelganger" and our growing "ombre numérique" as explored in a workshop at I&IC[6], the poltergeist moves your body where you do not want it to, and there is no such thing as a

suicide switch. Even if you withdraw, you still remain, in fragments across the network, subject to the terms and conditions of use by the dozens of services you sign into.
You are involuntarily immortal, even if you do not recognise the spectre to be created in your image. It's important to consider immortality, in whatever form it may take, when considering the lives our data may lead the minute they touch the network and cease to be within reach of our control. We become open to further, wilder interpretation by someone other than you.

Averting Disaster

A tension is born in our relationship to internet-enabled computing and storage, which defines our inability to interpret the myriad structures behind their operation; the loss of control (where our data is going, who has it) versus the loss of memory (what is kept, and how is preservation ensured). This dual phenomenon also emerged in the user research of the I&IC projects, with users actually complaining about such losses.
In A prehistory of the cloud, Tunghui Hu describes the impulse to preserve as a "melancholic attachment to the data" (Hu, 2016, p.108) that is contained within, and perhaps worth "trading off" for the foggy processes that allow this archiving to exist.

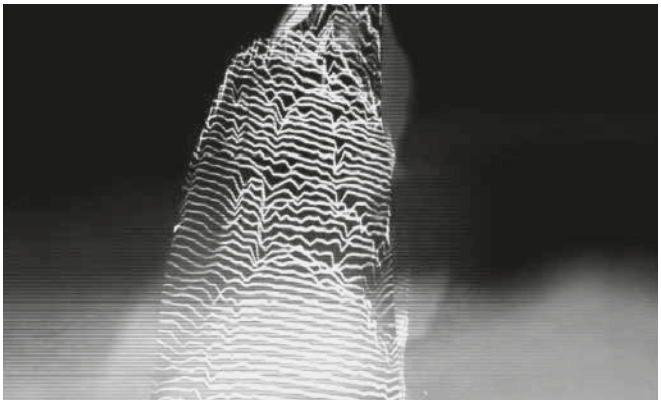
The ability to upload mass amounts of data to the cloud means that our memories — as well as our memory — can live forever. Everything we place online, from Flickr holiday photos to selfies has a purpose, and a meaning, even though at some point in the future they may become illegible and unreadable, a collection of encoded relics from a previous life.
Hu calls this phenomena, this need to store and preserve as melancholia, a phantom that "endures indefinitely, secretly hoping for its resurrection or reincarnation."
(Hu, 2016, p.140).

The cloud, and internet computing as a whole, has supposedly helped to avert the destruction inevitable in our immediate physical devices; the blue screen of death, malfunctioning parts, an accidental baptism. Everything is readily available online with the right username and password, and easy to restore

should your hardware finally give up the ghost. The cloud, and the corresponding data servers, do not have the apparent weakness of physicality, and therefore "allow the death inherent in disaster to be contained by transmuting it into something like limbo: waiting, suspension, a 'living dead.'" (Hu, 2016, p.140)
As humans, we have sought to memorialise our most precious, most important moments, and we can all relate to the horror of losing thousands of photographs or videos of our loved ones that may never be seen again. In 1838, English polymath and inventor Charles Babbage wrote the Nineth Bridgewater Treaty, in which he proposed that we could potentially "rewind" the movement of every molecule of air to recreate the voices of everyone who has ever spoken. Perhaps The Cloud is the nearest we have ever got.

Random Access Monsters

The problem, however, is who else has access to our memories, and what systems they are being placed into that can turn our well-intentioned compulsion to archive into a nightmare. As mentioned in previous examples, our data, once placed onto the network, has a life of its own, redirected and transformed into new forms, subject to unforeseen forces. As mentioned in earlier examples such as the report of Facebook's algorithms "outing" people, perhaps data centres have the capacity to act as a "stone tape", a theory conceived in 1961 by parapsychologist Thomas Charles Lethbridge in which inanimate objects and structures could "record" memories, playing them back once the right emotional trigger occurs. With the right trigger, havoc ensues, with the sufferer never quite knowing why until



it's too late.

Stone Tape, a television play directed by Peter Sasdy (2012).

The threat of disaster Hu mentioned is still there, only this time it has transformed into a wilder, less knowable beast. Instead of stolen hard drives,

which we immediately know what and how our information has been compromised, the effects of stolen data, and what was stolen, may not be known until weeks, or even years later. In 2016, data leaks forced by malicious hackers compromised national security as the details of 20,000 FBI and 9,000 Department of Homeland Security employees were dumped online[7]. In March 2016, the records of 2.2 million patients of 21st Century Oncology, a Florida based cancer-care provider where the names, Social Security numbers, physician names, diagnosis, treatment data and insurance information were accessed, with the company not knowing if anything had been done with them[8]. It's not a coincidence that I bring this particular example into this conversation, with their resemblance to tombs and crypts, data bunkers are still data centres, an atemporal co-presence of the living and the dead, only with a more culturally fitting aesthetic. Although we might not necessarily know all of the infrastructure required to make the cloud work, that it goes somewhere may provide comfort, much like those that believe in the afterlife as a place to tether our worries about our own mortality. It helps us to think that the most emotional, most important, parts of our lives are being revered in this way, protected by the watchful guardians looking for signs of distress in the bleeps and whirrs of a server stack.

As places of importance, data centres have joined other precious sites. In the Eastern Orthodox Church, priests can be requested to protect important personal objects, such as houses, keys, or even weapons, and in recent times, smartphones and data centres. Although primarily asked to protect the security, smooth running and operation of the day centre, it's difficult not to see the power in blessing something that holds so much power. To know a place has "special protection", or to will it to, has an almost power over our judgement, rendering us unable to see the true machinations and obfuscations at play.

Exorcism

While we obviously don't expect The Cloud to act like a cloud, the visual metaphor holds as a reminder of it's power position, above us, another hierarchy

joining the many other actors that interject on our contemporary reality. The ghosts that we have are not just present in the vulnerability presented by hackers, terrorists or various imagined threats, but as gestured to earlier, the results of interactions, restrictions and controls placed by the service providers themselves.

So often we are told to think that it is the hackers that we have to worry about, rather than the companies and organisations who are using algorithms, building backdoors into our technology and enabling biased and prejudiced modes of search in our most personal digital spaces. The NSA and GCHQ position themselves as friendly ghosts, house guardians to watch out for us, but we know that this supposed benevolence, isn't the case. Evident from Edward Snowden's historic leak of classified information in 2013, detailing the existence of numerous global surveillance programmes that intercepted the telecommunications of thousands of individuals with the full knowledge of the service providers. The depths to which this extends are largely unknown, and may never be uncovered, but their effects have been felt indefinitely as we revisit what it means to have a private life at all.

The opacity of these processes do not allow us to see where we can interject and disrupt them, and therefore allowing us to predict the degree of potential disaster. As Stephen Fortune writes in his piece Attuned to Data Doubles[9], "if we have dispersed agency with respect to data systems, is our responsibility similarly dispersed?". It's hard to imagine the future ghosts that may accrue as we interact with others, and in fact ourselves, online, much in the same way that companies using these process might not anticipate the ways in which they could cause harm. However, the act of knowing that they could, forecasting their potential consequences and understanding the nature of uncertainty in a technologically determined landscape, could do something to reduce it. Sadly, capitalism and state actors do not have a particularly good track record in doing this, rather patching together a fix should something break, apologising in the least sincere way possible, and continuing on, until the next colossal failure occurs. I live for the day when my pessimism stops, and

I am allowed to imagine that maybe, one day, companies will choose responsibility and forecasting over profit and ⟨apparent⟩ convenience.

Considering the firehose of information that is already collected, stored and distributed with the help of social networks, can further exorcisms be done to rid yourself of these digitally enabled poltergeists? Removing yourself from a social media site comes at a social cost, suddenly you are absent from the conversations, events and interactions that so many of your peers have grown dependant on. We are but social animals, and this effort to remove yourself may be in vain, unless collective, mass action is performed, in which the abandonment by the many ⟨users, advertisers, developers⟩ cripples the functioning of a system ⟨both operationally and financially⟩.

It is not easy to see yourself in one place anymore, and as Sun-Ha Hong writes in his aforementioned essay on "presence", "how have we come to feel and perceive this world we live in?" Though not ghosts in the paranormal sense, using the framing of their conception, appearance and effect within our contemporary narratives of the digital is useful in understanding where others may arise. Resolutely, this is a conversation of power; who has the ability to enable and control the path of these phantoms, who stops them, who decides what shape they take. Though I do not know the answer to these provocations, perhaps there is something in slowing the speed of innovation down enough for us to see where there are capacities for abuse, by imagining the future ghost stories and terrors, through rehearsal, foresight and analysis which takes that embodiment into consideration. This may happen and may help us to see a little clearer to how we might hope to exorcise them, or at least let our house become less vulnerable to haunting.

1 http://www.iiclouds.org/20160617/iic-ethnographic-research-wrap-up/
2 http://www.independent.co.uk/news/world/americas/facebook-apologises-over-dating-ad-showing-picture-of-rehtaeh-parsons-after-she-killed-herself-8824232.html
3 https://www.facebook.com/full_data_use_policy
4 http://gawker.com/5669316/is-facebook-outing-gay-users-to-advertisers
5 http://www.theatlantic.com/technology/archive/2015/05/immortal-but-damned-to-hell-on-earth/394160/
6 http://www.iiclouds.org/20151111/iic-workshop-5-at-ecal-comments-about-the-brief/
7 http://motherboard.vice.com/read/hacker-plans-to-dump-alleged-details-of-20000-fbi-9000-dhs-employees
8 https://www.databreaches.net/21st-century-oncology-notifies-patients-of-data-security-incident/
9 http://www.stephenfortune.net/blog/attuning-to-data-doubles/

Bibliography

- Latour, Bruno (1999). Pandora's hope: essays on the reality of science studies. Cambridge, Massachusetts: Harvard University Press.
- Sconse, Jeffrey (2000). Haunted Media. Durham, North Carolina: Duke University Press.
- Hong, Sun-ha (2015). Presence, or the sense of being-there and being-with in the new media society. Chicago, Illinois: First Monday. Online at: http://journals.uic.edu/ojs/index.php/fm/article/view/5932
- Guha,Saikat,Cheng,Bin,Francis,Paul(2010).Challengesinmeasuring online advertising systems. Melbourne, Australia: IMC'10. Online at: http://saikat.guha.cc/pub/imc10-ads.pdf
- Hu, Tung-Hui (2016). A Prehistory of the Cloud, Cambridge: The MIT Press.

Note: all links last accessed March 31, 2018.

Inhabiting and Interfacing the Cloud⟨s⟩

Selected extracts from the documentary blog — www.iiclouds.org

The following chapter consists of a selection of articles taken out from the complete documentation of the research process, thus extracted “as is” from the online blog. The collaborative work has been indeed incrementally documented in order to produce a primary material concerning the research-creation approach itself. This material is not analyzed in the context of this book, but could possibly serve for further enquiries into creative and practice based methodologies.

The full documentation of the main process is composed of 161 samples, out of which 88 have been selected. Assembled together, they seem to present a linear evolution of the research, from start to finish. This is actually not the case, if a closer look is taken to the full content of the blog itself. Many of the unused tracks or resources, diverging from our main research questions, could yet possibly function as starting points for new works.

The sampling of the research process has served as well for the main structure of this book. The numbering of articles being directly associated to the ones from the online documentation.

Each post in the following selection turns out to have been influential on the final outcome of the design research. The reasons why they were selected as influential can be summarized by reading the posts 0009, 0133, 0134, and 0138. Therefore their classification follows the labelling of the four resulting artifacts ⟨A⟩, ⟨B⟩, ⟨C⟩, ⟨D⟩, as well as the overall Cloud of Cards kit ⟨ABCD⟩.

(A) 19" Living Rack

0009 I&IC – Preliminary intentions
0014 Reblog → The Home Data Center: Man Cave for the Internet Age
0015 The Home Data Center
0016 The Home & Personal Data(-Mining) Center
0020 Meanwhile... The "classical" extra large data center, in 2014
0056 Setting up our own (small size) personal cloud infrastructure. Part #3, reverse engineer the "black box"
0057 Comments on: Setting up our own (small size) personal cloud infrastructure. Part #1, components
0085 Reblog → Deterritorialized House – Inhabiting the data center, sketches...
0089 Reblog → Power, Pollution and the Internet
0090 Donaghy, R. (2011). Co-opting the Cloud: An Architectural Hack of Data Infrastructure. Graduate thesis work.
0092 I&IC Workshop #4 with ALICE at EPFL-ECAL Lab, brief: "Inhabiting the Cloud(s)"
0094 I&IC Workshop #4 with ALICE at EPFL-ECAL Lab: output → Distributed Data Territories
0098 World Brain: a journey through data centers
0101 About hot and cold air flows (in data centers)
0102 Heating homes with Clouds – links
0104 Raspberry Pis tiny data center(s)?
0139 "A Personal Cloud": a home cloud kit for personal data (centers)/"reappropriate your dataself"!
0144 A Personal Data Center (evolution, models)

(B) Cloud of Cards Processing Library

0009 I&IC – Preliminary intentions
0057 Comments on: Setting up our own (small size) personal cloud infrastructure. Part #1, components
0059 Toward OwnCloud Core Processing Library
0095 Cookbook → How to set up Processing to use the OwnCloud Core Processing Library
0096 (The reasons why an I&IC's) OwnCloud Core Processing Library
0139 "A Personal Cloud": a home cloud kit for personal data (centers)/"reappropriate your dataself"!
0141 I&IC's OwnCloud Core Processing Library, evolution

(C) 5 Folders Cloud

0009 I&IC – Preliminary intentions
0042 I&IC Workshop #1 at HEAD: "Soilless", an ethnographic research
0043 I&IC Workshop #1 at HEAD: output → Diagrams of uses
0056 Setting up our own (small size) personal cloud infrastructure. Part #1, components
0057 Comments on: Setting up our own (small size) personal cloud infrastructure. Part #1, components
0058 Setting up our own (small size) personal cloud infrastructure. Part #2, components
0080 Cookbook → Setting up your personal Linux & OwnCloud server
0081 Towards a new paradigm: Fog Computing
0084 Reblog → Decentralizing the Cloud: How Can Small Data Centers Cooperate?
0099 OpenCloud (Academic Research) Mesh
0100 Personal Cloud?
0133 I&IC ethnographic research wrap-up
0139 "A Personal Cloud": a home cloud kit for personal data (centers)/"reappropriate your dataself"!
0142 A Personal Cloud (evolution)

(D) 5 Connected Objects

0009 I&IC – Preliminary intentions
0064 SQM: The Quantified Home, (2014). Edited by Space Caviar
0070 I&IC Workshop #3 with Algopop at ECAL, brief: "Botcaves"
0074 I&IC Workshop #3 with Algopop at ECAL: output → "Botcaves"/Networked Data Objects
0111 Datadroppers, a communal tool to drop off and/or pick up data (and then develop projects)
0116 Dead Drops and Keepalive by A. Bartholl
0117 I&IC Workshop #5 with Random International at ECAL, brief: "The Everlasting Shadow"
0118 I&IC workshop #5 at ECAL: (esoteric) comments about the cloud (about the brief)
0119 Haunted Machines
0122 I&IC workshop #5 with Random International at ECAL: output → "The Everlasting Shadows"/Ghost Data Interfaces
0123 I&IC Workshop #6 with Sascha Pohflepp at HEAD: brief, "Cloud Gestures"
0125 I&IC Workshop #6 with Sascha Pohflepp at HEAD: output → Cloud Gestures
0126 Old web today, by Rhizome
0139 "A Personal Cloud": a home cloud kit for personal data (centers)/"reappropriate your dataself"!
0143 My Data Controllers (evolution, models)

Note: all links retrieved March 31, 2018.

0001 All initial, then edited Tags

2014.08.25/Patrick Keller

Resources

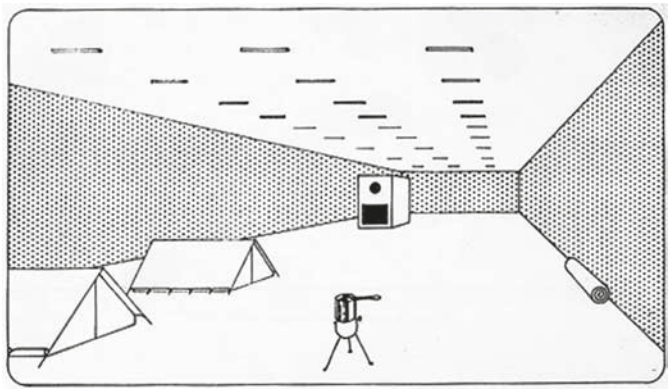
2d/3d/4d/Academic/Activism/Actual/Algorithmic/Application/Architects/Architecture/Art/Art direction/Artificial reality/Artists/Atmosphere/Automation/Behavior/Beliefs/Biology/Body/Books/Cabinets/City/Climate/Clouds/Code/Cognition/Community/Computing/Conceptual/Conditioning/Conferences/Content/Control/Corporate/Craft/Creolized/Critical/Curators/Customization/Data/Datacenter/Designers/Designers⟨interaction⟩/Designers⟨product⟩/Designers⟨visual⟩/Developers/Devices/Digital/Display/Documentation/Domestic/ECAL/Ecology/Economy/Editions/Electronics/Energy/Engineering/EPFL/EPFL+ECAL Lab/Ethnographers/Exhibitions/fabric | ch/Farming/Fiction/Food/Form/Function/Furnitures/Future/Gadget/Game/Geography/Globalization/Hack/Hardware/HEAD/Health/History/Housing/Ideas/Information/Infrastructure/Installation/Intelligent/Intentions/Interface/Interferences/Internet/Kinetic/Knowledge/Landscape/Library/Links/Localized/Mesh/Methodology/Neurosciences/Nomads/Object/Open source/Operating system/Participants/Participative/Personal/Philosophy/Photography/Physical/Physics/Physiological/Poetry/Politics/Pollution/Presence/Print/Privacy/Product/Profiling/Programming/Public/Reactive/Research/Responsive/Robotics/Scenarios/Scenography/Scientists/Screen/Security/Sharing/Situated/Sketches/Smart/Social/Sociology/Software/Sound/Space/Speculation/Standards/Statement/Storage/Surveillance/Sustainability/Tactile/Teaching/Territory/Things/Thinkers/Time/Tools/Topology/Tourism/Traces/Ubiquitous/Urbanism/Users/Variable/Vernacular/Video/Virtual/Visualization/Weather/Web

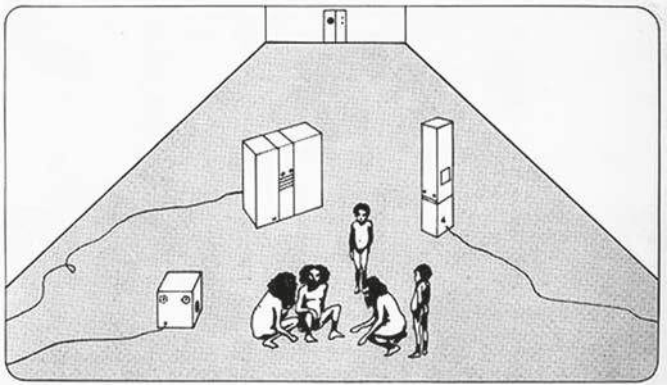
0001 Documentation, Links, http://www.iiclouds.org/tag

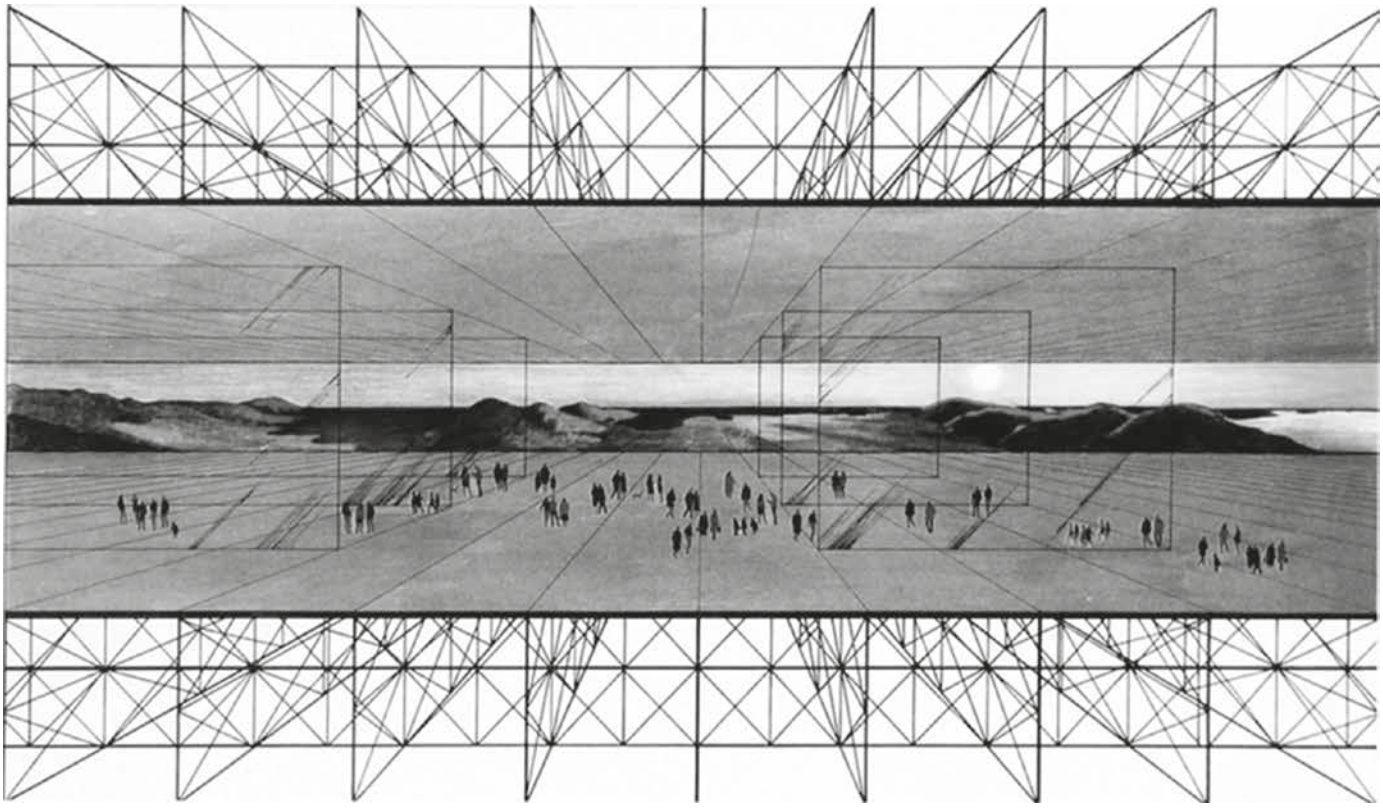
0009 ⟨ABCD⟩ I&IC–Preliminary intentions

2014.09.05/Patrick Keller

Architecture, Design, Ethnography, Interaction Design, Projects, Sciences & Technology, Thinking







Archizoom Associati, 1969, Research for “No-Stop City”.

The following text was written as a description of our goals later in 2013, prior to the start of the project. The structure of the text follows the given guidelines. So to say, to get financing. It is nonetheless a blueprint of what we intend to do and is published on I&IC blog as a matter of documentation.

Inhabiting and Interfacing the Cloud(s) An interdisciplinary design research project under the co-direction of Prof. Patrick Keller (ECAL) and Nicolas Nova (HEAD). With the support of HES-SO and the collaboration of ECAL, HEAD, EPFL (Prof. Dieter Dietz) and EPFL+ECAL Lab (Dir. Nicolas Henchoz). *This design research project explores the creation of counter-proposals to the current expression of "Cloud Computing", particularly in its forms intended for private individuals and end users ("Personal Cloud"). It is to offer a critical appraisal of this "iconic" infrastructure of our modernity and its user interfaces, because to date their implementation has followed a logic chiefly of technical development, governed by the commercial interests of large corporations, and continues to be seen partly as a purely functional, centralized setup. However, the Personal Cloud holds a potential that is largely untapped in terms of design, novel uses and territorial strategies. Through its cross-disciplinary approach, our project aims at producing alternative models resulting from a more contemporary approach, notably factoring in the idea of creolization (Glissant, 1990). From a practical standpoint, the project is intended to produce speculative versions of the "Personal Cloud" in the form of prototypes (whether functional or otherwise) of new interfaces, data processing, reactive environments and communicating objects. To do this, the project will be built around three dimensions forming the relevant pillars of a cross-disciplinary approach: interaction design, the architectural and territorial dimension, and the ethnographic dimension.*

What does it involve?

Background: Since the end of the 20th century, we have been seeing the rapid emergence of a new *constructed entity*. This entity combines extensively information technologies, massive storage of individual or collective data, delocalized computational power, distributed access interfaces, security and functionalism: the "Data Center", which itself constitutes the infrastructure and main vector of a renewed form of personal relationship to information, "Cloud Computing", known familiarly as the "Cloud". The term Cloud Computing thus refers to the modes of computer data processing where delocalized exploitation is performed via communication networks and interfaces, in the form of services provided by a service provider from remote "Data centers" and whose location and operation are not divulged to customers. The *technological setup* thus created produces a definite evolution in comparison with the now outmoded model of the personal computer, and forms the already vital infrastructure of contemporary nomadic lifestyles and decentralized communities. Thus we see materialized before our eyes, on a grand scale, the very idea of "dematerialization" and ubiquity (Weiser, 1991) of networks, or of "spectrality", concepts that generally accompany "cloud" or networked services from their inception. This is a concrete construction of course, but obviously a paradoxical one, being physical, proprietary and in point of fact heavily centralized. Hence it is the accomplishment almost by default — a done deed apparently, with no definite intention — of the relationship between the distributed digital world (networks, data, paperless services etc.) and the world of the senses, and of the intense exchanges that now unite them. This materialization we can definitely view as one of the emerging icons of our modernity, but one that is conspicuous by its near invisibility or stealth. From the organizational standpoint, above and beyond the technical aspects, a set of dimensions define the Cloud, the components of which then constitute its vocabulary: — Digital dimension: characterized by a design with a "universal" calling, leading nonetheless to individual uses producing a feeling of electronic deterritorialization, "dematerialization" (data, services, Media, a), and even ubiquity, as well as remoteness in both the geographical and the technical sense. A digital setup composed of multimodal, reactive user interfaces, modular composition grids, automated algorithmic processes, aggregation and massive centralization of data, delocalized storage and computation, data mining, virtualization, permanent accessibility and various timeframes, etc. — Physical dimension: characterized by a desire for stealth, functional efficiency and neutrality in which one might detect a certain "modern spectrality", the physical dimension refers back to issues relating to structure (security dimension, costs) and energy (production and loss of heat), but basically it leads to the restoration of the centralized pyramid model, in contrast with the network model, which is intrinsically horizontal. A physical and spatial setup composed of organization grids, modularity, normative approach, neutral, functional architectural typology, air conditioning, high tech, technology obsolescence issues etc. — Geographical dimensions: characterized by a territorial basis close to an abundant free supply of specific natural resources (fresh air, waterway, proximity to the cooling circuits), substantial surface area with access to cheap energy resources, accessibility to network nodes (backbone) for high-speed and efficient connections. Geographical and energy setup, thereby emphasizing unusual locations around the globe. These three dimensions highlight the importance of dealing with the Cloud as a many-sided phenomenon with a multi-disciplinary approach corresponding to these various different directions[1]: interaction design (creation of original, innovative interfaces for managing and accessing data and services), the architectural dimension (creation of spatialities, infrastructures and taking the Cloud's territorial dimension into account), and ethnography (study of usage, data exchanges and contemporary lifestyles). These three directions provide the framework for our project since each of these disciplines is represented in our research team. Thus if the imagination and Cloud access interfaces do indeed speak of networks and horizontality in the sharing of digital content, purely electronic data and social communities/networks, the physical reality of its infrastructure, the "Data Center", tells a different story. It is one of centralization, ownership and pyramid systems, of a heavy energy bill and of profiling. It is also one of design and functionalist organization mainly dedicated to machines, since this modular architectural typology, operating continuously, does not cater from the outset for any human presence within it[2].

Problem and issues

With regard to current forms and uses of this "Personal Cloud", we note the existence of a paradox between a set of extremely "horizontal" practices on the one hand (social networking), and on the other, the Cloud's hierarchical infrastructure (centralization) gradually being built up. We further note what is happening as a result of this new operating mode: a relative loss of control for end users over their own output or data in favor of the corporations administering these "technological setups". Moreover, the term "Cloud Computing" is a wide-ranging notion that refers to a variety of technical realities and usages. Here we need to distinguish between the "Corporate Cloud" (data computation, storage and organization resources for large private companies) and the "Personal Cloud", a service available to private individuals, often free of charge. The latter today includes proprietary solutions such as Dropbox, Cloudapp, Google Drive or iCloud (Apple), as well as those of most community sites, which, in their "dimensions" (cf. Background, above) remain relatively similar to services of the Corporate type, plus additional "issues" of privacy and data mining. On top of these, you also have "Personal Cloud" type services provided by longstanding external hard disk manufacturers like LaCie, Iomega (Lenovo EMC) etc., or again professional NAS (Network Attached Storage) solutions[3]. In this project, we wish to work on this second personal version and not on the corporate version, at adjusted scales. We plan, in a spirit of criticism, to offer alternatives that restore a certain form of horizontality within this *technological setup*, and diversity (or "diversalism"), in contradistinction to de rigueur "universalism") in interface experiments and design. We also want to develop the tools (contribution to open source solutions) and recommendations (documented collection of exemplary practices drawn from our research), which will enable the design community to take over the concepts as their own. In concrete terms, on the basis of our reading of the situation[4] and having clearly identified the issue that we wish to address within the *technological setup* that makes up the Cloud, we plan to work on the scale of global networks and data, on the physical level of the data center, but which we shall be viewing here as a "habitable" structure, one that we shall bring down to the smaller dimensions of the "shelter" or the "data processing cabinet". This is for obvious reasons of feasibility, but not only that: envisioning "inhabiting" the Cloud is our *initial gesture of questioning* within the *setup* and incites us to discover in it innovative, symbiotic operating modes (for both people and machines), by including the cultural and design dimension (for a new *technological and cultural setup* therefore). This leads us to imagine alternative, certainly more urban and lasting, locations for the Data Centers, as well as new interfaces. Envisioning the smaller dimension of the shelter or cabinet is our *second gesture*, a fragmentary one that may enable us to picture a potentially non-proprietary, networked distributed structure calling into question the currently centralizing approach of the Corporate Cloud.

Topics

Raising the question of "living" in the Cloud and on a fragmentary physical scale, involves firmly distancing ourselves from the current offering, by studying usages, possibly by taking inspiration from peer-to-peer type technological approaches or by relying on the achievements of open source and by getting the various professionals who are necessarily involved to work together. Which is why we want to operate at the intersection of ethnographic issues (the study of user behaviors), interaction design, architecture and science on the basis of the following set of questions, which extends our first two *questioning gestures*

(cf. above) and will enable us to deploy the problematic within the different work packages (workshops): — How to combine the material part with the immaterial, Media, atized part? What functions are given concrete form through physical means and what others through digital means? Does physical concretization involve nearness to the Data Center? Can we imagine the geographical fragmentation of these setups? (Interaction design, architecture). — Might new interfaces with access to ubiquitous data be envisioned that take nomadic lifestyles into account and let us offer alternatives to approaches based on a "universal" design?[5] Might these interfaces also partake of some kind of repossession of the data by the end users? (Interaction design, ethnography). — What symbioses can be found by occupying the ground and the space between men and machines? Where and how is this ground, are these "expanses", to be occupied? Are they to be camped in, to maintain mobility? Settled on a long-term basis? How do we factor in obsolescence factors? What setups and new combinations of functions need devising for a partly deterritorialized, nomadic lifestyle? Can the Cloud/Data Center itself be mobile[6] (Architecture, interaction design, ethnography). — Might symbioses also be developed at the energy and climate levels (e.g. using the need to cool the machines, which themselves produce heat, in order to develop living strategies there)? If so, with what users (humans, animals, plants)? (Architecture, ethnography).

How is it clearly shown?

The obvious lack of alternative propositions to what we already have in terms of infrastructure and interfacing in the Personal Cloud evidences the need to explore fruitful new paths in this area. The current offerings are largely the work of large technology groups, proposing a mostly functionalist view. Despite a few original attempts (distributed storage among machines from Wuala), all in all, there is little to choose between the interaction models on offer, and their interfaces. Moreover, these arrangements barely touch on the possibility of using ecosystems of everyday objects or micro-spatialities to offer innovative uses of the Cloud, be it from the data processing or the energy standpoint. The few existing examples involve turning power sockets into remote access mini-servers. Our project aims at taking such ideas further by addressing the wide range of household objects and factoring in their ecosystemic dimension. Think for instance of the way servers or computer cabinets might be diverted from their purely technical function by being connected to other items or spatialities requiring extra heat, an air or water flow (cooling circuits), air charged with positive ions, network access, etc.[7] Accordingly, to show the value of alternative proposals, the aim will be to produce a set of prototypes (whether functional or fictional) fueled by the convergence of cross-disciplinary approaches (design, architecture/territory and ethnography)[8], working with the current technical basis. This is why the making of these models will come from a series of workshops, underpinned by input from these various different disciplines: a review of the literature on design issues, theoretical bases, ethnographic study of usages, comparison with artistic projects in related fields etc.

Why must your project receive backing?

Cloud Computing as an infrastructure and interface for accessing our digital content is one of the everyday items that are employed massively and in a broadening range of uses. Moreover, relatively little thought has been given until now as to how the Cloud is organized in actual design terms, and to date, the logic behind it is mostly from a technical and economic standpoint (CLOG, 2012). It is precisely this blinkered view of the situation that calls for a forward-looking, critical and creative contribution when suggesting alternatives in terms both of infrastructure and interaction and their ramifications: customized interfaces, environments or communicating objects, reactive architectures. By switching to a broader perspective, in a combination of applied art, architecture, engineering and social science, we see design as a way of achieving a unique creative convergence and thereby producing an original Cloud Computing mockup that makes more allowance for user-friendliness, the symbioses of various Cloud functions and approaches requiring its re-localization, fragmentary scale, a much-needed questioning of the centralizing method. This approach, combined with our intention to contribute to open source-type community-oriented efforts, places our project perfectly in line with a recent movement in design aimed at reappropriating engineering issues and putting forward relevant thoughts or solutions arising from designers' own personal interests and practices. This is the background to the emergence of electronic platforms and interfaces like Arduino[ix] or Processing[10]. Above and beyond the project's specific aims, the issue for our field (interaction design) is to strengthen the skills that will enable us to be influential players in this sector with new partners, and later hand down these skills to peers and to students. In a general way, and in view of the almost geopolitical stakes of data management today, the design-oriented proposals will serve as exemplary indicators for the various private or government decision-makers, and as an example of what centralizing or proprietary methods are currently not providing. Indirectly, our project serves the interests of the general public and open-source approaches in the coming major "battle" over data ownership. More specifically, the communities of researchers, designers in general and interaction designers in particular will have the benefit of our research results with a view to "gaining a foothold" in designing projects using Cloud resources.

What are its foundations?

While Cloud Computing, its infrastructure and interfaces are something that to date has been little explored from a design perspective, the same cannot be said for its architecture. A number of researchers in this field have in fact produced a relevant body of work, largely theoretical (most notably Varnelis, 2007; Varnelis, 2009; Shepard, 2011; CLOG, 2012; Donaghy, 2011), which can serve as our basis. Here we have a typology of these places coupled with a critical view of the energy, economic and esthetic issues they entail. For all that, very often these architects' theoretical works remain focused on the issue of the Data Center as an architectural object and its insertion within a space, in connection with scales in the order of the building or the neighborhood. The issue of the design of the interface and interaction with the Cloud is thus deliberately overlooked. Moreover, this research does not address the question of usages, and approaches Cloud Computing as a generic object without taking the practices of users and other parties involved into account, whereas our project involves shifting the focus to a less massive dimension in order to tackle the issue of the different Cloud access interfaces, and their multiple, individual usages. Then, in the field of digital design and creation, even though Cloud Computing is not a subject explicitly addressed, we can list the just a very few pieces of research on similar lines that have helped us. Thus "Dead Drops" by the German artist Aram Bartholl (USB smart drives inserted in walls or posts in the public space) may be considered as an occasional expedient for sharing data, with the street as an exchange venue. More adventurously, the "Sewer Cloud" critical design project by the designer Philipp Ronnenberg seeks to use the DNA of bacteria in sewers as storage space. It explores the symbiosis between various biological and computer infrastructures, while remaining largely impracticable as it stands. As regards the scientific method, we may also mention open source Cloud Computing approaches on which we could rely; these include OpenStack, OpenNebula, Reservoir and Ubuntu Cloud. These few projects only serve to emphasize the need for a broader, more varied range of technically feasible projects that address Cloud issues in a holistic way, and do so while rooted in current usage and practice. Lastly, from the standpoint of the theoretical basis, our main anchor point is the notion of creolization (Glissant, 1990). This term designates the unforeseeable outcome of placing in contact several distinct cultures in a part of the world that nonetheless remains conscious of belonging to the "Whole World". It is used in areas as varied as artistic criticism, to refer to the birth of original movements not reducible to the sum of the elements under consideration (Bourriaud, 2009), and social science research in connection with the dissemination of information technologies (Bar et al., 2007). What makes this notion so rich with possibilities for our project is the fact that it offers a way of thinking adapted to current networking practices on the Internet and on the Web, on a global scale, in stark contrast with the centralized, hierarchical Cloud model. Both the circulation of cultural content (e.g. pieces of music, video clips, visual designs) and data produced by users and reassembled to create innovative digital interactions (e.g. displaying urban activity) are instances of such creolized hybridizations. The idea then is to take this reasoning further and use this concept and this "poetics of miscellany" as a guiding principle for outside-the-box Personal Cloud interfaces and spatialities.

What is the most appropriate approach?

In this project, which will look at the centralization at work in the production of these technological setups, we plan to study and reassess deterritorialized, nomadic lifestyles, with a view to devising alternatives to Personal Cloud "universal" interfaces and their underlying infrastructures. To do this, our methodology comprises the following two lines of thought: An ethnographic approach rooted in an investigation into usage and practices. In concrete terms, in the manner of the current immersions within non-places (Augé, 1992), such as recent projects in connection with airports (Ulrberger, 2013), we propose literally to immerse ourselves in the Cloud, both in the physical sense (its infrastructure, the Data Center) and in a media-based manner (interfaces, networks, data). The project's ethnographic dimension aims at gaining a more precise understanding of the place that these technologies occupy in individual people's lives. By highlighting the diversity and complexity of usage, we shall be seeking to get away from the simplistic view currently encapsulated in existing infrastructures and interfaces. A research-

design approach (Léchot-Hirt, 2010) carried out on cross-disciplinary lines, associating the ideas and output of interaction designers (ECAL, EPFL+ECAL Lab, Head), architects (EPFL), scientists (EPFL+ECAL Lab) and classicists (Head, EPFL), thereby pursuing the collaborative method initiated in 2005 for the cross-disciplinary research project Variable Environment[xi], conducted jointly by ECAL and EPFL. So it is planned to have a series of workshops covering specific topics (see next section) and allowing alternation between moments for specialization and moments for cross-disciplinary work. In addition to these two lines of thought, parallel to the project are two steps of lesser importance but which complement our approach: a) a read-only public blog documenting the progress of the projects and its outputs[12] throughout the process (see below); b) an international advisory panel of peers from science and the arts[13] will be called upon from time to time to give us a critical appraisal of our own outputs. These peers are also free to respond to our blog by posting their comments, references and thoughts. From the methodological standpoint, the first line of action will involve a field study aimed at highlighting cloud and deterritorialized mode usages. This study, and likewise, a review of the literature in the field, will provide the initial material to work with for the second line. The idea is then to create the below artefacts, giving concrete form to the different leads we are following from a creative design perspective: — The design of an inhabitable shelter/data center, developing potential for mobility (extensive camping) and combinable with other shelters, thereby pursuing this idea of territorial fragmentation. (Architecture, science)
— The design of new interfaces and peripherals that develop the idea of travel and temporary roots "radicants", that reassess (or exorcise) the idea of "universalism" (as opposed to "diversalism", creolization?). (Interaction design, science) — The selection of a set of exemplary combinations of these various propositions. (Interaction design, architecture, science, ethnography) These artefacts will be produced in a succession of workshops both within our research team and students studying for a bachelor's degree in "Media and Interaction Design" (ECAL) or a master's in "Media Design" (HEAD). They will consist of various prototypes, fictions, demos and proofs of concept. The project documentation to be produced on a blog page will be used both to overview the stages, summarize our process, put aside the main references and present the major outputs. The public, interactive nature of the blog will also help boost our productions while disseminating the work. This will be the first value enhancement of the project. In a second stage, the production of a print-on-demand book will provide a digest or overview of this documentation. This will then lead to the work appearing in a variety of publications (journal articles, conference papers, etc.)

What are the milestone stages?

Preamble, theoretical models, technical bases, orientations: "Data centers, data, cloud computing, nomadism, deterritorialization, creolization" Target: Adjustment of the theoretical tools, standards, various references and state-of-the-art update at project launch. Setting up of refined bases for further research. Setting up of a communication and watch tool (blog). During this phase, various design strategies will also be examined. In particular, the hypothesis of the Cloud as a way of assembling miscellaneous content (aggregation at multiple scales and on multiple timescales of services and/or spatialities, infrastructures and/or technologies) and its adequacy to creolizing thinking. Output: Online blog, overview of the literature relating to Cloud usages and the alternative theoretical and engineering models left unexplored. Disciplines: Ethnography, theory, design, science. Duration: 6 months.

Participants:
N. Nova (HEAD),
P. Keller (ECAL),
C. Guignard (ECAL),
C. Babski (developer, fabric | ch),
C. Carion (sysadmin, fabric | ch),
Assistants (ECAL, HEAD)

Ethnographic study and Workshop #1

"Deterritorialized" Target: Immersion, placement in a radical situation in a deterritorialized context. Observation. For 5 days, surrounded by cloud services and immersed in deterritorialized artificial weather — Deterritorialized Living, I-Weather[14] —, a small group of participants live and document their fully deterritorialized lifestyle as evidence of utilization of the cloud and its infrastructures.) This team is the subject of an ethnographic study combining observation and interviews, with the aim of proposing a summary of usage issues, problems encountered and novel practices and social situations. Output: Summary report on Cloud usage and living-related issues, while specifying promising design leads and problems. Disciplines: Interaction design, architecture, ethnography. Duration: 1 to 5 weeks.

Participants:
fabric | ch (peer, "guinea-pig"),
P. Keller (ECAL),
N. Nova (HEAD).

Workshop #2

"Radicant interfaces, functional and dysfunctional situations — (at HEAD-Geneva)" Target: On the basis of the material gathered during Workshop 1, and that developed in the Preamble and the precise description of a context, the students develop individual screen and physical interfaces for the Personal Cloud.

Participants:
James Auger (peer),
N. Nova (intro, HEAD),
P. Keller (intro, ECAL),
C. Guignard (intro, ECAL),
Ma Media Design students (HEAD).

Output: Series of usage scenarios and prototypes. Disciplines: Interaction design, science. Duration: 1 week.

Workshop #3

"Radicant interfaces, functional and dysfunctional situations — (at ECAL)" Target: On the basis of the material gathered during Workshop 1, Workshop 2, and that developed in the Preamble and the description of a context, the students develop individual screen and physical interfaces for the Personal Cloud. Output: Series of usage scenarios and prototypes. Disciplines: Interaction design. Duration: 1 week.

Participants:
Matthew Plummer-Fernandez (peer),
P. Keller (intro, ECAL),
N. Nova (intro, HEAD),
C. Guignard (intro, ECAL),
Assistants (ECAL, HEAD),
N. Henchoz (EPFL+ECAL Lab),
Assistants (EPFL+ECAL Lab),
Ba M&ID students (ECAL).
Workshop #4

"Living in the Cloud(s) — (at EPFL)" Target: Focus on the reassessment of the data-center and its mockup, work on the scale of the "shelter" or "(computer) cabinet", taking territorial issues into account, according to the principles under study, creation of a "cloud" data infrastructure that is habitable both physically and media-wise. Output: Series of usage scenarios and prototypes. Disciplines: Interaction design, architecture, science

Participants:
P. Keller (ECAL),
N. Nova (intro, HEAD),
D. Dietz (ENAC-EPFL, ALICE Lab),
C. Guignard (intro, ECAL),
N. Henchoz (EPFL+ECAL Lab),
Assistants (ECAL),
Assistants (EPFL+ECAL Lab),
Ba M&ID students (ECAL),
Ma Architecture students (EPFL).

Workshop #5
"New setups" Target: a week in which the outputs of the first four workshops are reviewed, assembled, disassembled, discussed.

Output: Series of usage scenarios and prototypes. Disciplines: Interaction design, architecture, science Duration: 2 months.

Participants:
P. Keller (ECAL),
N. Nova (HEAD),
C. Guignard (ECAL),
D. Dietz (ENAC-EPFL, ALICE Lab),
N. Henchoz (EPFL+ECAL Lab),
Assistants (ECAL),
Assistants (EPFL+ECAL Lab),
Ba M&ID students (ECAL),
Ma Media Design students (HEAD),
Ma Architecture students (EPFL).

Prototyping:
"Prototypes, development, demos, proofs of concept" Target: Further elaboration of 3–4 prototypes up to the working level. Output: Series of usage scenarios and prototypes. Duration: 6 months.

Participants:
P. Keller (ECAL),
N. Nova (HEAD),
C. Babski (fabric | ch),
Assistants (ECAL).

Valorization #1
"Publications, conferences, exhibitions" Targets: Documentation, internal symposium, scientific publications, publications, lectures, exhibitions. Duration: 1 year. What are the outputs you hope to achieve? The aim is to produce a selective body of proposals for alternative infrastructures, spatialities and interfaces for Personal Cloud Computing (PCC). It will be made up of usage scenarios with various different levels of expression (films, storyboards, small-scale model). Despite the speculative nature of these outputs, the most significant proposals will be taken to the stage of functioning prototypes, demos or scale-models that will be expressed in interfaces (tangible), micro-architectures, communicating objects, or even offerings on the territorial scale. (...)

Notes

1 Above and beyond the engineering dimension that will provide the basis for our project.
2 During our conversations with Prof. B. Falsafi (EcoCloud, EPFL), we were struck on noticing to what extent certain current Data Center models closely replicated those of factories during the industrial era. For example, Google's setting up of a data center in a largely uninhabited part of Oregon (at The Dalles) amplified the growth of a small town which became heavily dependent upon this employer (following an "updated" model of the workers' development).
3 We may further note how the Cloud can exist at all kinds of physical levels: from the shared hard disk drive placed on a table or in a cell phone, to the industrial market refurbished to host virtualized servers, and taking in mobile structures mounted on vehicles or in containers — but which nonetheless all maintain their global outreach through the communications networks.
4 It should be stressed that the project's two main applicants can boast hands-on experience in this type of approach in the course of their private practice. Patrick Keller is a member of the fabric|ch group, whose work looks at the shared connections and issues of the digital and physical worlds. In particular, we may note here the current research in progress with Tsinghua University (Peking/Beijing) to be presented at the Lisbon Architecture Triennal (curator Beatrice Galilee): Deterritorialized Living (http://bit.ly/12mi1vC) and Inhabiting the Computer Cabinet (http://bit.ly/15wVRXR). Nicolas Nova for his part is an active member of the Near Future Laboratory group and is a recognized specialist in the study of new technology-related usages and behaviors.
5 So by relying here on the notion of Creolization (Glissant, 1990).
6 In the radical way of the mobile towns of Archigram, or in more concrete terms by taking inspiration from the infrastructures developed by Amazon (Amazon Perdix Container) for their own data centers or SGI's (Ice Cube, Ice Cube Air, MobiRack).
7 A French startup, Qarnot Computing, for instance is thinking of soon marketing a data center distributed in the form of radiators installed in private homes, the Q.rad — http://www.qarnot-computing.com
8 Notice also how for the development of this research we are taking on a network (advisory panel) of peers. Thus Prof. EPFL Babak Falsafi, an eco-manager and specialist in Cloud matters, with whom we have already conducted preliminary discussions, will be validating our scientific hypotheses. Several scientists (EPFL+ECAL Lab) will also be involved during the research process.
9 Printed circuit in free material used to make free-standing interactive objects (rapid prototyping), or perhaps maybe connected to a computer to communicate with its software. Arduino was designed collaboratively by a group of designers, artists and applied arts school contributors.
10 Simplified programming language based on the Java language and enabling designers to take over the encoding tool.
11 The blog that documented the Variable Environment project (cf. note 12) was then used to produce the "print on demand" selected edition, which enhanced the project at little expense, and a pdf version of which is still accessible online: http://sketchblog.ECAL.ch/variable_environment/variable_env_screen_s.pdf
13 See Point 9. What is your team and what skills will its members be bringing to the project.
14 See http://www.i-weather.org and http://www.deterritorialized.org (online 06.09.2013)

0009 Ideas, Intentions, Methodology, Sketch

0010 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ I&IC – Preliminary and then edited bibliography, webography

2014.09.05/Patrick Keller

Resources, Thinking

Note: this is the bibliography that helped us set up the research project, taken out from the I&IC-Preliminary Intentions document. We'll certainly complete it along the way so as possibly document in more details some of the most important resources later (i.e. Clog, 2012). This means that this list might change along the way for our own cross posts references.

Bibliography, Webography

— Augé, M. (1992). Non-lieux, introduction à une anthropologie de la surmodernité, Le Seuil.
— Bar, F. Pisani, F., & Weber, M. (2007). Mobile technology appropriation in a distant mirror: baroque infiltration, creolization and cannibalism. Prepared for discussion at Seminario sobre Desarrollo Económico, Desarrollo Social y Comunicaciones Móviles en América Latina. Convened by Fundación Telefónica in Buenos Aires, April 20–21, 2007.
— Banham, R. (1984). The architecture of the Well-Tempered Environment, The University of Chicago Press.
— Bathia, N. & al. (2013). Bracket [goes soft], Actar.
— Blum, A. (2012). Tubes: A Journey to the Center of the Internet.
— Bourriaud, N. (2009). Radicant, pour une esthétique de la globalisation, Denoël.
— Branzi, A (2006). No-Stop City: Archizoom Association, HYX.
— Bratton, H.B. (2016). The Stack, On Software and Sovereignty, MIT Press.
— CLOG, (2012). Data Space, Clog online.
— Divers (2002). Living in Motion, Design und Architektur für flexibles Wohnen, Vitra Design Museum.
— Donaghy, R. (2011). Co-opting the Cloud: An Architectural Hack of Data Infrastructure. Graduate thesis work.
— Glissant, E. (1990). Poétique de la relation. (Poétique III), Paris: Gallimard.
— Himmelsbach, S. & Mareis, C. (2015). Poetics and Politics of Data. The Ambivalence of Life in a Data-Driven Society. Christoph Merian Verlag.
— Hu, T.-H. (2015). A Prehistory of The Cloud, MIT Press.
— Léchot-Hirt, L. (2010). Recherche-création en design. Modèles pour une pratique expérimentale. Genève: Métis Presses.
— Mejias, U. A. (2013). Off the Network, Disrupting the Digital World. University of Minnesota Press.
— Open Compute Project
— Facebook. (2012). Deploying OCP Hardware in a Collocated Facility.
— Rifkin, J. (2012). La troisième révolution industrielle. Comment le pouvoir latéral va transformer l'énergie, l'économie et le monde, Les liens qui libèrent.
— Serres, M. (2011). Habiter, Le Pommier.
— Shepard, M. (2011). Sentient City: Ubiquitous Computing, Architecture, and the Future of Urban Space, MIT Press.
— Ulrberger, A. (2013). Habiter les aéroports, Paradoxe d'une nouvelle urbanité. Métis Presses.
— Varnelis, K. (2009). The Infrastructural City: Networked Ecologies in Los Angeles. Actar.
— Varnelis, K. (2007). ETHER : One Wilshire, In Sumrell, R. & Varnelis, K., Blue Monday: Stories of Absurd Realities and Natural Philosophies, Actar, pp.48–89.
— Weiser, M. (1991). The Computer for the 21st Century. Scientific American, vol. 265, Nº. 3, pp. 66–75.

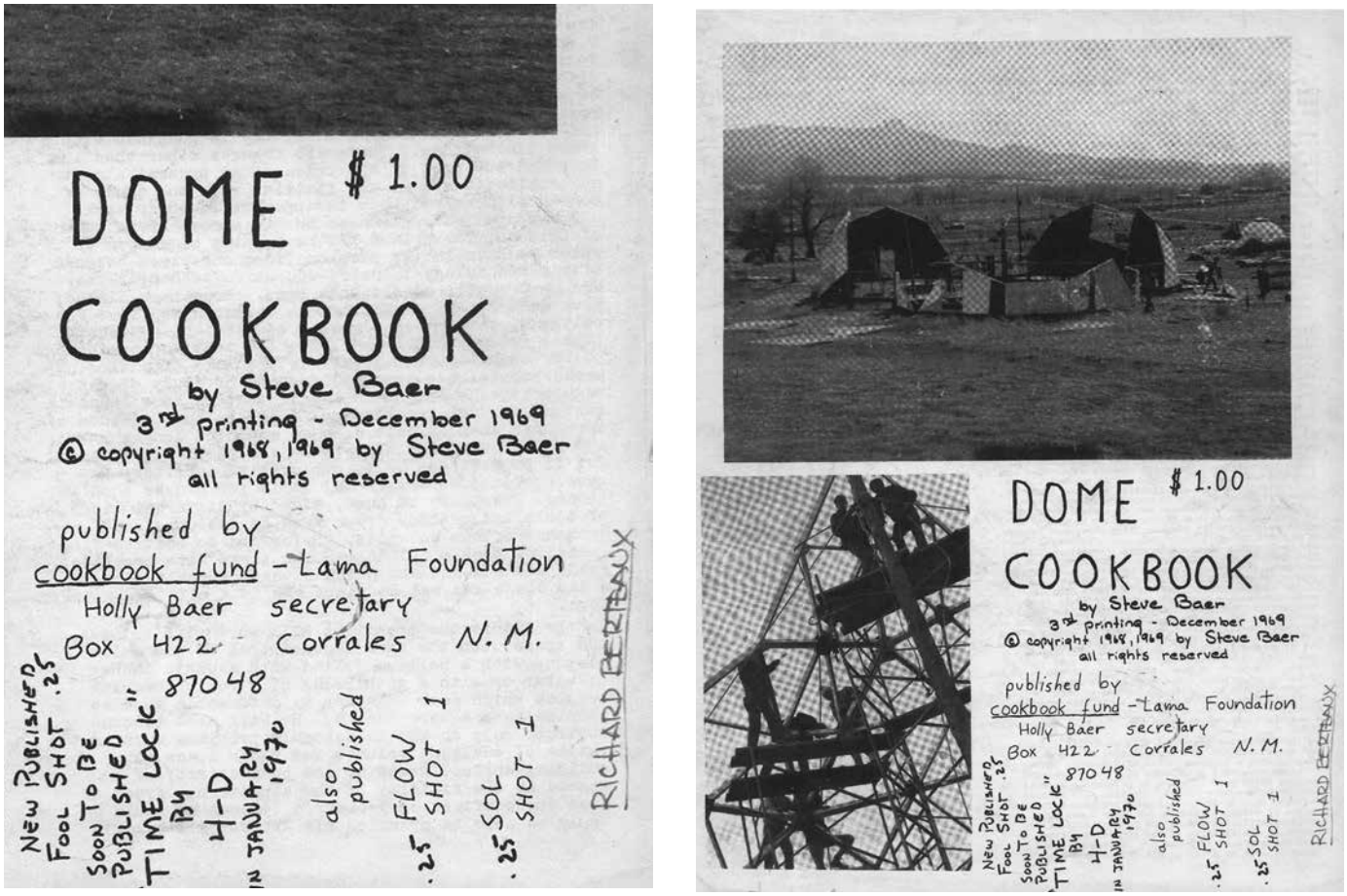
0010 Architects, Books, Curators, Designers, Designers (interaction), Methodology, Scientists, Thinkers

0011 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Note about “Cookbooks”

2014.09.08/Patrick Keller

Cookbooks, Design, Sciences & Technology

“Cookbooks” will mostly consist of ⟨technical⟩ tips and advises in the form of “recipes” dedicated to designers, student-researchers and/or makers. The main purpose of these guidelines will be to help the design community gain access to open cloud technologies and grasp the tools, so to develop their own projects. We’ll select a few of these technologies during our project and try to share what we’ll learn. “Recipes” will also consist in descriptions about the ways to use libraries, APIs and/or other artifacts that will be developed or used in the context of this research project. So to say, we simply envision the I&IC “Cookbooks” as an “Access to tools“ and as an obvious tribute to these historical references, so as the ones who followed. It could lead to some kind of manual of best “open procedures” at the end of the research, or to some kind of kit.



Any desire to build your own dome in the manner of Buckminster Fuller and start your commune? A “Dome Cookbook” in DIY mode by Steve Baer, directly coming out from the Drop City experience, Trinidad USA, 1969.

0011 Books, Craft, Customization, Tools

0014 ⟨A⟩ Reblog → The Home Data Center: Man Cave for the Internet Age

2014.09.08/Patrick Keller

By Rich Miller
Resources, Sciences & Technology

In the ultimate manifestation of the “server hugger” who wants to be close to their equipment, a number of hobbyists and IT professionals have set up data centers in their home, creating server rooms in garages, basements and home offices. The home data center is a novel extension of the central role that data centers now play in modern life. These enthusiasts are driven by a passion for IT, and use their gear for test-driving new equipment, lightweight web hosting or just as the ultimate technology mancave. Whatever the motivation, this level of connected house requires some adaptations, including upgrading power and network connections and running cable throughout a residential home. Here’s a look at a few examples of these projects:

The enterprise is in the house

Canadian IT professional Alain Boudreault has enterprise class equipment from Dell, HP, Sun, Juniper and IBM in his home data center in the basement of his house, including a high-density IBM BladeCenter. His web site provides a detailed overview of his setup, including a diagram of all the components. It includes an Open Stack MAAS ⟨Metal as a Service⟩ cloud and multiple storage systems ⟨iSCSI and Fiber Channel⟩. “My first step was to install an electrical box to provide a power of 240 volts at 40 amp, which will provide a maximum of 9.6 kW/hour when needed, writes Boudreault, who teaches application development and uses the facility for testing. “The servers are rarely open all at once, so average consumption is 1–2 kW/hour.” Electricity is about 7 cents per kW/hour in Quebec, he says. Nonetheless, Boudreault writes that this type of home data center is “not for the faint of heart.”

The data center as YouTube star

Some home data center builders post videos to YouTube. The most popular of these is the Home Data Center Project, another project in Canada that began in 2005 as two computers in a closet and had grown to more than 60 servers as of 2013. The project has been documented in a series of videos that have racked up more than 500,000 views on YouTube. The videos and web site

document the extensive cabling, cooling and network infrastructure upgrades.

"This project was not designed to make a profit," writes developer Etienne Vailleux of Hyperweb Technologies. "This setup was simply there as a hobby. But after some time, it quickly became a passion." In 2013, the project migrated from one house to another and downscaled a bit. "A part of the basement was specially designed to house servers and air conditioners," Vailleux shared in an update. "The project is currently hosting 15 servers. The capacity of the connection is 60 Mbit/s."

About that bandwidth usage...

Running racks of IT gear in your home sometimes gets noticed. In 2012 an IT professional known online as Houkouonchi posted a video of his home rack that has been viewed more than 220,000 times on YouTube. The setup is "not really a data center, but not many homes have a full sized rack with more than 150TB of space in it," he wrote. "The rack is bolted through the wood floor into the cement foundation the home sits on." The fully-packed rack uses only about 1 kW of power, but bandwidth is another matter. In 2013 Houkouonchi told Ars Technica that he had been contacted by Verizon, which was surprised to see a residential account using more than 50 terabytes of traffic per month. It turned out that hosting a high-volume media server violated the terms of service for a residential FiOS line, and he had to upgrade to a business plan.

Here's the tour of Houkouonchi's rack:
The IKEA rack

Why use standard data center racks in your home, when you can house gear in a stylish side table from IKEA? In one of the more playful home data center implementations, hobbyists have adapted the Swedish furniture chain's LACK side table to house servers and switches, creating a LACKRack. It turns out that the space between the table's legs is 19 inches, the same width as a standard slot in a data center server rack. The server space is created by using wood screws to affix rack mounts to the legs of the table. The tables are stackable and modular, so can be assembled in a variety of configurations.

Since its first appearance in 2010, the Lack Rack has spurred design innovations. Frank Dennemen, the technology evangelist for PernixData, adapted the initial Lack Rack spec to create a portable 19-inch rack. "My home office is designed to be an office and not a datacenter," writes Denneman. "So where do you place 19" rack servers without ruining the esthetics of your minimalistic designed home office? Well you create a 19" rack on wheels so you can role it out of sight and place it wherever you want it."

Check out the end result:

Do you know of any other crazy home data center setups? Perhaps at your house? If so, please share your links and experiences in the comments!

0014 Cabinets, Datacenter, Domestic, Furnitures, Housing, Infrastructure, Makers

0015 ⟨A⟩ The Home Data Center

2014.09.08/Patrick Keller

Resources, Sciences & Technology

https://ve2cuy.wordpress.com/my-home-data-center

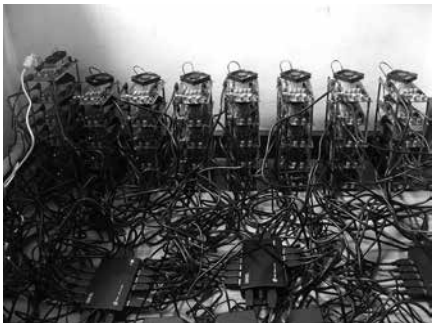
For a fully configured and directly buyable personal cluster ⟨21'000.– $, still⟩,
see also for example the Personal Cluster Model 1600 by Nor-Tech.

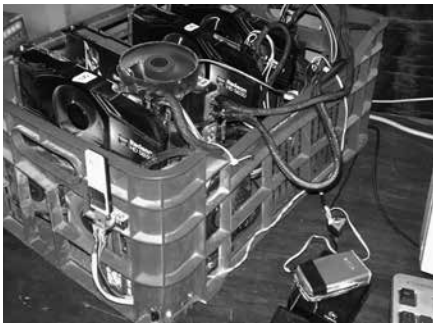
0015 Computing, Datacenter, Domestic, Hardware, Housing, Infrastructure, Links, Makers

0016 ⟨A⟩ The Home & Personal Data⟨-Mining⟩ Center

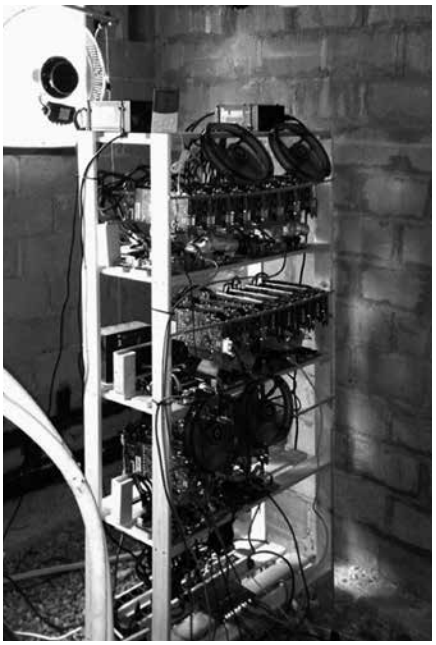
2014.09.08/Patrick Keller

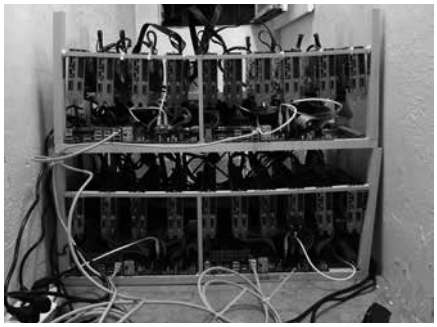
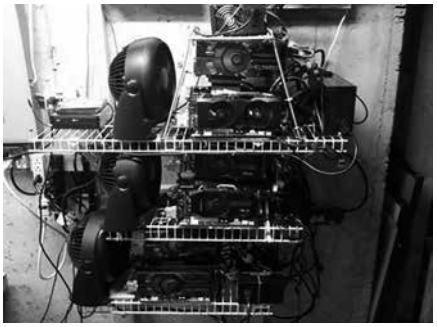
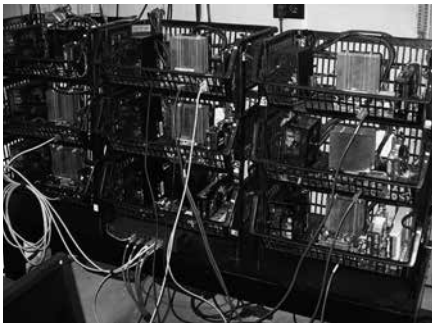
Architecture, Resources, Sciences & Technology









Interestingly, when it comes to experimentation with hardware and The Cloud ⟨or more generally with servers⟩, the most interesting and almost crazy examples are made by the hobbyists and makers who are building and customizing their own data ⟨Bitcoin⟩ mining farms. It happens in their houses, caves, bathrooms, bedrooms, closets, etc., it seems there are no limits to experimentation. A "house miner" even hacked his own swimming pool to cool down his servers ⟨Portrait of a Bitcoin Miner, link below⟩. It is almost a subculture of home-brewed personal data-centers, built at home ⟨or at the small office⟩. A few notable examples in pictures above ⟨where we can verify that the questions of cooling and cables organization are for real⟩. More insane rigs: https://99bitcoins.com/20-insane-bitcoin-mining-rigs/ and http://www.thinkcomputers.org/insane-crypto-currency-mining-rigs/

A portrait of "Eric", a Bitcoin miner: "Eric built a custom cooling system using water from his swimming pool." http://www.pcworld.com/article/2043985/portrait-of-a-bitcoin-miner-how-one-man-made-192k-in-virtual-currency.html And more "mining rigs" of all sorts on Google Image...

0016 Data, Datacenter, Domestic, Farming, Hack, Infrastructure, Makers, Mining, Research, Tools

0018 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ A brief history of cloud computing

2014.09.08/Patrick Keller

Resources, Sciences & Technology

http://www.thoughtsoncloud.com/2014/03/a-brief-history-of-cloud-computing/

0018 Clouds, Computing, History, Infrastructure, Links

0020 ⟨A⟩ Meanwhile... The “classical” extra-large data center, in 2014

2014.09.08/Patrick Keller

Resources, Sciences & Technology

http://www.google.com/about/datacenters/

The “classical” approach to the conception of large contemporary data centers could be exemplified by Google: it usually consist of a “shoe box” (large facility with no particular architectural expression, windowless facades), surmounted by big cooling devices. That’s mainly it for the architectural side.

0020 Corporate, Datacenter, Engineering, Hardware, Infrastructure, Links

0033 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Open Compute Project

2014.09.23/Patrick Keller

Resources, Sciences & Technology

The Open Compute Project was initiated by Facebook. They decided to fully open the specifications of their data center in Prineville, all specs (from hardware to software, through cabinet and building design, etc.) In this way, Facebook pioneered the open source approach that many major players are now adopting. This resource will undoubtedly serve our project when it will come to think about the infrastructure. http://www.opencompute.org

0033 Corporate, Datacenter, Hardware, Infrastructure, Open source, Software

0040 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ “Cloud infrastructures and the public’s right to understand it.”

2014.10.03/Nicolas Nova

Resources

The Creative Time Report has a piece on cloud infrastructures and the public’s right to understand it. The author interestingly describe her discoveries: “In trying to see where data lives, I hoped to better understand how we live with data and, by extension, with the myriad forms of surveillance that it enables. We live with data by pretending that we don’t. The opacity of internet infrastructure and policy — and the insistence that ideally users shouldn’t need to see or understand either — occludes data, the institutions that hold it and the power they exercise with it. Ultimately, in a geography of power, the cloud is not the territory.”

0040 City, Datacenter, Engineering, Infrastructure

0042 ⟨C⟩ I&IC Workshop #1 at HEAD: “Soilless”, an ethnographic research

2014.10.05/Nicolas Nova

Ethnography, Society, Workshops

The first workshop in the project corresponds to a preliminary field research phase devoted to understanding people’s relationship with the Cloud. Given our ambition to revisit and explore alternative personal cloud systems, we find it important to investigate actual usage, problems, limits, experiences and situations related to the pervasive use of cloud computing.

04’22”
Soilless – Research introduction and field study from iiclouds.org design research on Vimeo.

Based on a series of user interviews and observations, we will address various issues related to this theme. Our aim is to have a sample of participants which practices have a certain diversity: nomadic workers, third-space users, musicians, VJs, journalists, etc. These interviews will be complemented by an analysis of on-line forums and groups focused on the discussion of cloud-related issues (Dropbox forums, blogs and social media messages discussing the limits and problems of these platforms, etc.).

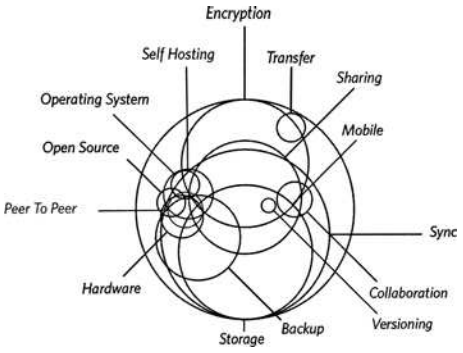
0042 Ideas, Intentions, Methodology, Sketches

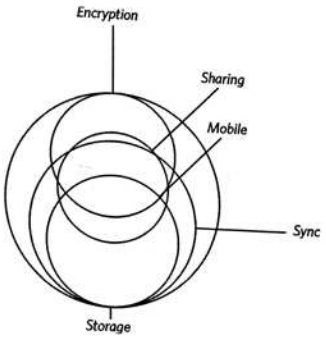
0043 ⟨C⟩ I&IC workshop #1 at HEAD: output → Diagrams of uses

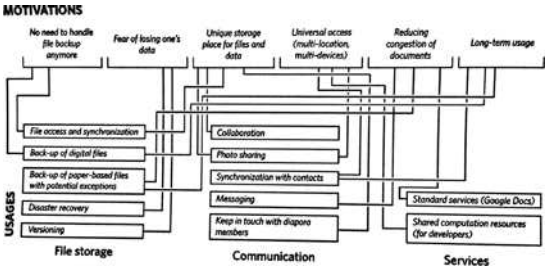
2014.10.06/Nicolas Nova

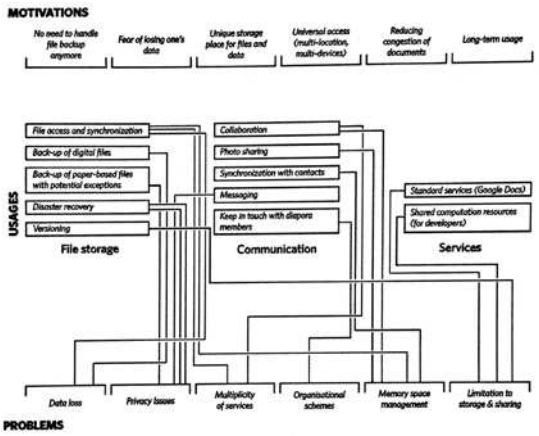
Ethnography, Workshops

Note: the post "Soilless", an ethnographic research presents the objectives for this workshop. A first step in our field research approach consisted in investigating various on-line forums in which people comment/complain/discuss cloud computing services ⟨Dropbox, Google Drive, etc.⟩. These boards are fascinating places to observe users' practices, and the range of topics discussed is quite broad. We quickly discovered that it could enable us to build two typologies about the main usage of cloud computing services, and the motivation of users. We basically built a corpus of messages that we categorized and represented visually with the following diagrams. They shed some light on cloud computing main use cases, namely the practices the cloud help people undertake. We intend to use them in the upcoming workshops as a stimulus/framing/inspiration for designers. The list of platforms and forums we investigated are the following: cloud drive ⟨Dropbox, Google Drive, Insync, Copy, Spideroak, Wuala, Skydrive, SugarSync, LogMeIn Cubby, iCloud, Skydrive, Mozy Stash, Box, Syncplicity, Liner notes⟩, file-sharing systems⟨MediaFire, WeTransfer, YouSendIt⟩, personal cloud services ⟨OVH⟩.









0043 Ideas, Intentions, Methodology, Sketches

0049 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Reblog → The Cloud, the State, and the Stack: Metahaven in Conversation with Benjamin Bratton

2014.10.17/Lucien Langton

via Metahaven
Thinking

"components of a larger, comprehensive, meta-technology. The Stack is planetary-scale computation understood as a megastructure. The term "stack" is borrowed from the TCP/IP or OSI layered model of distributed network architecture. At the scale of planetary computation, The Stack is comprised of 7 interdependent layers: Earth, Cloud, City, Network, Address, Interface, User. In this, it is an attempt to conceive of the technical and geopolitical structures of planetary computation as a "totality." "

An interesting discussion on the speculative futures of clouds, borders and identities. Below are a few excerpts that could perhaps be relevant as breadcrumbs in our research. To read the full interview, click here.

[...] *If you presume that the division is what provides the space, and therefore the spatial identity, then its virtualization into mobile networks could be seen as the removal of one identity and the provision of another.* [...] *I will rely on the characterization of The Stack as a design brief. You are correct that no private Cloud platform existing today has the full power of a State, and perhaps they never will.But Cloud platforms will gain in influence and ubiquity and so may result in modes of sovereignty that are very different but equally impactful as those of States. Perhaps your Google ID will mean more in terms of your effective ability to migrate and trade and communicate than your passport or State ID. Furthermore, and equally important States will themselves increasingly become Cloud-like in various ways. The conversion works both directions.*

0049 Clouds, Geography, Ideas, Infrastructure, Sociology

0050 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ “the cloud is a lie”

2014.10.23/Nicolas Nova

James Bridle
Design

A t-shirt by James Bridle: *Everybody’s talking about “the cloud”, as if it’s some magical faraway place, instead of a bloody great shed on an industrial estate. You should set them straight.*

0050 Clouds, Ideas, Links

0056 ⟨A⟩⟨C⟩ Setting up our own ⟨small size⟩ personal cloud infrastructure. Part #1, components

2014.11.02/Patrick Keller

Projects, Resources, Sciences & Technology

On the way to the development of different artifacts for the design research ⟨Inhabiting & Interfacing the Cloud⟨s⟩⟩, we’ll need to work with our own “personal cloud”. The first obvious reason is that we’ll need a common personal platform to exchange research documents, thoughts and work together between the different ⟨physicallydistributed⟩ partners involved in the project. We are thus our own first case study. The second one is to exemplify the key components about how a small data center/cloud infrastructure might be assembled today and learn from it. But then, more importantly, this will become necessary for two other main objectives: first one is that we would like to give access to “cloud” tools to the design, architecture and makers communities, so that they can start play and transform a dedicated infrastructure ⟨and this won’t of course be possible with all type of systems⟩; second one will possibly be for the “hands on” and “prototyping” parts of our research, for which we’ll need an accessible cloud based architecture to modify or customize ⟨this includes both the software and hardware⟩, around which some open developments, networked objects, new interfaces, apps, etc. could be developed. We are therefore looking for a ⟨personal⟩ cloud technology upon which we could keep ⟨personal⟩ control and this has revealed not so easy to find. Cloud computing is usually sold as a service that “users” are just supposed to... use, rather than a tool to customize or with which to play. We would like of course to decide what to do with the data we’ll provide and produce, we’ll need also to keep access to the code so to develop the functionalities that will certainly be desired later. Additionally, we would like to provide some sort of API/libraries dedicated to specific users ⟨designers, makers, researchers, scientists, etc.⟩ and finally, it would be nice too if the selected system could provide computing functionalities, as we don’t want to focus only on data storage and sharing functions.

Our “shopping list” for technology could therefore look like this:

- On the software side, we’ll obviously need an open source “cloud” system, that runs on an open OS as well, to which we’ll be able to contribute and upon which we’ll develop our own extensions and projects.
- If a “hobbyists/makers/designers/...” community already exists around this technology, this would be a great plus.
- We’ll need a small and scalable system architecture. Almost “Torrent” like, which would allow us to keep a very decentralized architecture.
- Even if small, our hardware and infrastructure must be exemplary of what a “data center” is, today, so to help understand it. It happens that the same concepts are present at different scales and that, simply said, large data centers just look like scaled, more complex/technical and improved small ones... Our data center should use therefore existing norms ⟨physical: the “U“, rack and servers’ cabinet units⟩, air ⟨or water⟩ circulation to cool the servers, temperature monitoring, hardware redundancy ⟨raid disks, internet access, energy plugs⟩.

We are scouting on these questions of software and hardware for some time now and at the time I’m writing this post, our I&IC blog is hosted on our own system in our own little “data center” at the EPFL+ECAL Lab...

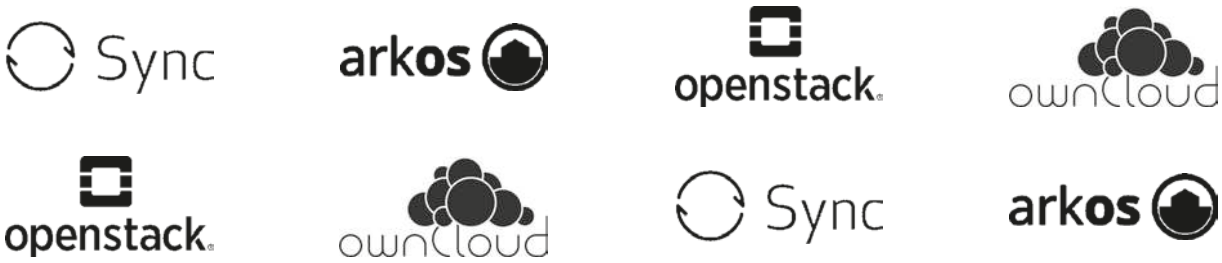
We’ve been through different technologies that were interesting, yet for different reasons, we didn’t really find the ideal system though. I can mention here a few of the systems we’ve checked more deeply ⟨Christian Babski will certainly comment this post in more details later so to help better understand our choice as he, the scientist, finally made it after several discussions⟩:

We've seen some technologies that are based on a Torrent (or similar) architecture, like BitTorrent Sync (that kill the need for data centers) or a crowdfunded one like Space Monkeys. Both answer to our interest in highly decentralized system architectures and infrastructure. Yet they don't offer development capabilities. For the same reason, we're not taking into account open NAS ones like FreeNAS because they don't offer processing functions and focus on passive data storage.

We should also mention one more time arkOS, that is both a very light and interesting alternative hardware/software solution, but that happens to be probably too light for our goals (too low computing and storage capacities on Raspberry Pis).

We've then continued with the evaluation of software that were used by corporations or large cloud solutions and that became open recently, for some parts and for some of them. Openstack seems to be the name that pops up more often. It offers many of the functionalities we were looking for, but yet doesn't have an API and is certainly too low level for the design community, heavy to manage either. Same observation for Riak CS (scalability, but only file storage) that is linked with Amazon S3. Of course, we shouldn't forget to mention here that even big proprietary solutions (like Dropbox, Google Drive, Amazon S3 or EC2, etc. or even Facebook, Twitter and the likes that are typical cloud based services) offer APIs for developers. But this is under the same "user agreement" that is used for their other "free" services (subject to change, but where the "problem" is mentioned in the agreement: you're a user and will remain a user). These options are not relevant in our context.

We've finally almost found what we were looking for with OwnCloud, which is an open source cloud software that can run on a Linux OS, not too low level, with a community of developers and hobbyists, APIs, the standard cloud functionalities already well developed with desktop, iOS and Android clients, some apps. They recently added a server scalability that opens toward highly decentralized and scalable system architecture, which makes it compatible with our *Preliminary intentions*. The only minus points would be that unlike "torrent like" architectures, it maintains a centralized management of data and doesn't offer distributed computing. This means that once you've set up your own personal cloud, you'll become the person who will manage the "agreements" with the "users". This later point could possibly be addressed differently though, now that scalability and decentralization has been added. Regarding computing, as the system is installed on a computer server, with an OS, we maintain server side computing capacities, if necessary. This will become the technical base of some of our future developments.



Please see also the following related posts:
Setting up our own (small size) personal cloud infrastructure. Part #2, components
Setting up our own (small size) personal cloud infrastructure. Part #3, components

0056 Clouds, Data, Datacenter, Infrastructure, Software, Tools

0057 (B)(C) Comments on: Setting up our own (small size) personal cloud infrastructure. Part #1, components

2014.11.03/Christian Babski

Projects, Resources, Sciences & Technology

Following Patrick's post about our different options for choosing a "Cloud" software and the one that we finally made by choosing ownCloud. Here are a few related comments that develop our point of view and technical choices. ArkOs, Openstack and RiakCS all take the hand over an entire server/system/computer, offering a kind of embedded linux system within a human-friendly interface, the kind of mechanism one can find on ready-to-use NAS (Network Attached Storage) hardware. Basically, it transforms any regular computer into a NAS device. One of the key points about the structure we are trying to setup is to be able to host anything we would like/need or may appear interesting to probe. That includes our own website(s), web services in order to feed projects with data and any kind of applications that may be useful to try and develop within the frame of this research. We do need therefore to keep the research server as generic as possible by using a normal linux distribution, which we can then enhance by any set of additional services. While ArkOS, Openstack and RiakCS are of course interesting projects, at some point, it may become already too specific for our goals.

Owncloud appears to be a simple web site structure dedicated to file sharing. As mentioned in my previous post, Owncloud proposes a set of APIs that allow the access to Owncloud features while being able to develop our own applications. Thus, these applications can rely on Owncloud while being hosted on a heterogeneous set of devices, network connected.

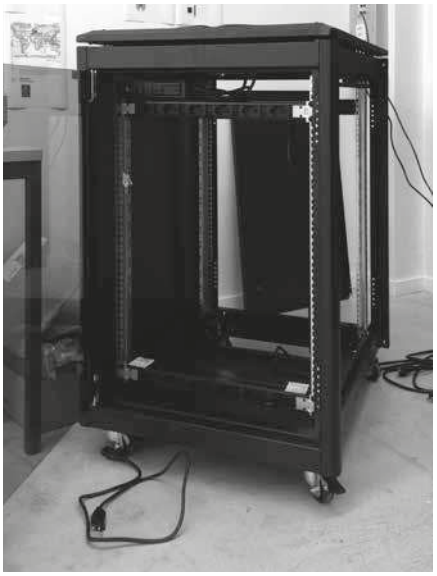
0057 Clouds, Data, Datacenter, Infrastructure, Sharing, Software, Tools

0058 ⟨A⟩⟨C⟩ Setting up our own ⟨small size⟩ personal cloud infrastructure. Part #2, components

2014.11.03/Patrick Keller

Projects, Resources, Sciences & Technology

While setting up our own small size data center and cloud infrastructure, we've tried to exemplify the key constitutive ingredients of this type of computing infrastructure, as of November 2014. But we've also tried to maintain them as much open as we could, for further questioning, developments and transformations. The first key ingredients are software parts and we've described them in the previous post about the same topic. The other key ingredients that we've used to set up our "data center" are the normative approach of the U and the mobile 19" rack cabinet. The idea of redundancy of both hardware ⟨RAID disks⟩ and data is fundamental too, which is extended further with the doubling of electric and internet access plugs ⟨in a big size data center, these redundant plugs are connected to redundant sources, in case of failure in the energy or network access supply chain. And if both energy sources fall down, two local powerful oil engines are ready to take over⟩. We also maintained the need to monitor temperature and air flow in an autonomous manner.



At a small scale, our "data center" has a false floor and ceiling, it maintain enough free space for cables and plugs around the computing unit itself. Fresh air comes from the ground, while hot air charged in positive ions goes out of the cabinet from the top.

Please see also the following related posts:
Setting up our own ⟨small size⟩ personal cloud infrastructure. Part #1, components
Setting up our own ⟨small size⟩ personal cloud infrastructure. Part #3, components

0058 Cabinets, Climate, Clouds, Datacenter, Domestic, Hardware, Infrastructure, Monitoring, Standards, Tools

0059 ⟨B⟩ Toward OwnCloud Core Processing Library

2014.11.03/Christian Babski

Cookbooks, Projects, Sciences & Technology

The purpose of the *OwnCloud Core Processing Library* is to give the possibility to program "cloud functionalities" within a well known and simplified designer oriented programming language ⟨and community⟩: Processing. Therefore, the *OwnCloud Core Processing Library* linked with our personal cloud merges the Open Collaboration Service ⟨OCS⟩ Share API with higher level functions in order to implement seamlessly "search&share files" applications written in the well known designers oriented Processing programming language. This will soon become available to everyone on the I&IC website. The workshops we are currently running/will run during the coming weeks are helping/will help us fine tune its functionalities. The *OwnCloud Core Processing Library* allows the automation of the action of sharing files and the action of file tagging within an open source OwnCloud environment. Search&Sharing tasks can be threaded and/or interdependent, everything depending on the kind of results expected from one application to another. Thus, these actions can be driven by unmanned processes, decision-making ⟨copy, delete, share one or several files⟩ based on related metadata ⟨i.e. metadata relation/link⟩ or based on external data, dug from the Internet or networked/connected items/things. Basically, the core library needs to identify an OwnCloud server, with a set of valid credentials. The application using the *OwnCloud Core Processing Library* is then able to manipulate files, download, upload, duplicate or move them server-side ⟨without downloading the files on a local computer⟩. It is as well possible to share files with another user or group of users on the same OwnCloud server. Depending on the application, several connections to several distinct OwnCloud servers can be managed, making possible to transfer files from one OwnCloud server to another ⟨network of servers⟩. Metadata associated to files work on a key → value pair basis ⟨i.e. 'date → 10/12/1815', 'city → London', etc...⟩. Any number of metadata can be defined for every single file. While duplicating a file, one can decide if attached metadata should be replicated as well or not ⟨i.e. the duplicated file can already be associated with the same metadata set as the original one ⟨inherited metadata or not⟩. The core library allows to retrieve all metadata for a given file or to perform a search through metadata in order to obtain a list of files having the allowed metadata set with the desired value⟨s⟩. This particular set of functions is part of the higher level functions proposed by the *OwnCloud Core Processing Library*, above the OCS Share API. The core library is JAVA based ⟨using WebDav JAVA implementation library Sardine⟩. A connection to the Processing framework has been implemented, making the *OwnCloud Core Processing Library* available within Processing.

0059 Library, Programming, Software, Tools

0064 ⟨D⟩ SQM: The Quantified Home, ⟨2014⟩. Edited by Space Caviar

2014.11.12/Patrick Keller

via Space Caviar
Architecture, Resources, Thinking

Note: an interesting project/book by Space Caviar about the "house" under the pressure of "multiple forces — financial, environmental, technological, geopolitical —", to read in the frame of I&IC. Through its title, the book obviously address the question of domesticity immersed into technologies and the monitoring of its data. While our project is gravitating around "networked objects/spaces", the question of their monitoring, so as the production or use of data ("pushed" into to the cloud?) immediately comes into question, of course. In this context, we must also point out Google and Apple efforts to tap into the "quantified house" with Nest and Homekit.

The way we live is rapidly changing under pressure from multiple forces — financial, environmental, technological, geopolitical. What we used to call home may not even exist anymore, having transmuted into a financial commodity measured in square meters, or sqm. Yet, domesticity ceased long ago to be central in the architectural agenda; this project aims to launch a new discussion on the present and the future of the home. *SQM: The Quantified Home*, produced for the 2014 Biennale Interieur, charts the scale of this change using data, fiction, and a critical selection of homes and their interiors — from Osama bin Laden's compound to apartment living in the age of Airbnb. With original texts by: Rahel Aima, Aristide Antonas, Gabrielle Brainard and Jacob Reidel, Keller Easterling, Ignacio González Galán, Joseph Grima, Hilde Heynen, Dan Hill, Sam Jacob, Alexandra Lange, Justin McGuirk, Joanne McNeil, Alessandro Mendini, Jonathan Olivares, Marina Otero Verzier, Beatriz Preciado, Anna Puigjaner, Catharine Rossi, Andreas Ruby, Malkit Shoshan, and Bruce Sterling. The book is published by Lars Müller, and will be available for sale worldwide from November 2014. The dust jacket is screen-printed on wallpaper in 22 different patterns, randomly mixed.

Download the table of contents.

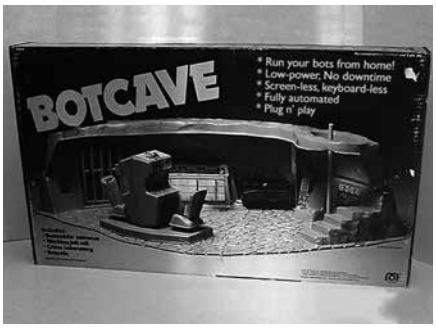
0064 Books, Data, Domestic, Housing, Monitoring

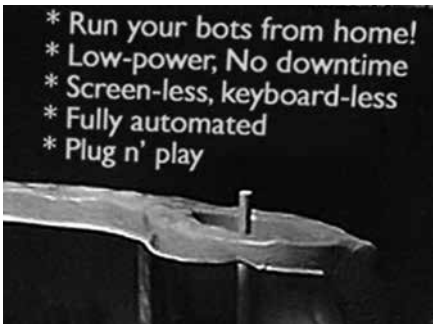
0070 ⟨D⟩ I&IC Workshop #3 with Algopop at ECAL, brief: "Botcaves"

2014.11.14/Patrick Keller

Interaction Design, Schools, Workshops

Note: I publish here the brief that Matthew Plummer-Fernandez ⟨a.k.a. Algopop⟩ sent me before the workshop he'll lead next week ⟨17–21.11⟩ with Media & Interaction Design students from 2nd and 3rd year Ba at the ECAL. This workshop will take place in the frame of the I&IC research project, for which we had the occasion to exchange together prior to the workshop. It will investigate the idea of very low power computing, situated processing, data sensing/storage and automatized data treatment ("bots") that could be highly distributed into everyday life objects or situations. While doing so, the project will undoubtedly address the idea of "networked objects", which due to the low capacities of their computing parts will become major consumers of cloud based services ⟨computing power, storage⟩. Yet, following the hypothesis of the research, what kind of non-standard networked objects/situations based on what king of decentralized, personal cloud architecture? The subject of this workshop explains some recent posts that could serve as resources or tools for this workshop, as the students will work around personal "bots" that will gather, process, host and expose data. Stay tuned for more!





Botcaves

Algorithmic and autonomous software agents known as bots are increasingly participating in everyday life. Bots can potentially gather data from both physical and digital activity, store and share data in the 'cloud', and develop ways to communicate and learn from their databases. In essence bots can animate data, making it useful, interactive, visual or legible. Bots although software-based require hardware from which to run from, and it is this underexplored crossover between the physical and digital presence of bots that this workshop investigates. You will be asked to design a physical 'housing' or 'interface', either bespoke or hacked from existing objects, for

your personal bots to run from. These botcaves would be present in the home, workspace or other, permitting novel interactions between the digital and physical environments that these bots inhabit. Raspberry Pis, template bot code, APIs, cloud storage, existing services (Twitter, IFTTT, etc) and physical elements (sensors, lights, cameras, etc) may be used in the workshop.

British/Colombian Artist and Designer Matthew Plummer-Fernandez makes work that critically and playfully examines socio-cultural entanglements with technologies. His current interests span algorithms, bots, automation, copyright, 3D files and file-sharing. He was awarded a Prix Ars Electronica Award of Distinction for the project Disarming Corruptor; an app for disguising 3D Print files as glitched artefacts. He is also known for his computational approach to aesthetics translated into physical sculpture. For research purposes he runs Algopop, a popular tumblr that documents the emergence of algorithms in everyday life as well as the artists that respond to this context in the work. This has become the starting point to a practice based PhD funded by the AHRC at Goldsmiths, University of London, where he is also a research associate at the Interaction Research Studio and a visiting tutor. He holds a BEng in Computer Aided Mechanical Engineering from Kings College London and an MA in Design Products from the Royal College of Art.

http://www.plummerfernandez.com
http://algopop.tumblr.com

0070 Artificial reality, Computing, Data, Documentation, ECAL, Intelligent, Interface, Object, Robotics, Teaching

0074 (D) I&IC Workshop #3 with Algopop at ECAL: output → "Botcaves"/Networked Data Objects

2014.11.25/Patrick Keller

Interaction Design, Schools, Workshops

Note: the post I&IC Workshop #3 with Algopop at ECAL, brief: "Botcaves" presents the objectives and brief for this workshop. The third workshop we ran in the frame of I&IC with our guest researcher Matthew Plummer-Fernandez (Goldsmiths University) and the 2nd & 3rd year students (Ba) in Media & Interaction Design (ECAL) ended last Friday with interesting results. The workshop focused on small situated computing technologies that could collect, aggregate and/or "manipulate" data in automated ways (bots) and which would certainly need to heavily rely on cloud technologies due to their low storage and computing capacities. So to say "networked data objects" that will soon become very common, thanks to cheap new small computing devices (i.e. Raspberry Pis for diy applications) or sensors (i.e. Arduino, etc.) The title of the workshop was "Botcave", which objective was explained by Matthew in a previous post.

5'00"
Botcaves — Workshop with Matthew Plummer-Fernandez at ECAL on Vimeo.

The choice of this context of work was defined accordingly to our overall research objective, even though we knew that it wouldn't address directly the "cloud computing" apparatus — something we learned to be a difficult approach during the second workshop —, but that it would nonetheless question its interfaces and the way we experience the whole service. Especially the evolution of this apparatus through new types of everyday interactions and data generation.

Matthew Plummer-Fernandez (#Algopop) during the final presentation at the end of the research workshop.

Through this workshop, Matthew and the students definitely raised the following points and questions (details about the projects are below):

1) Small situated technologies that will soon spread everywhere will become heavy users of cloud based computing and data storage, as they have low storage and computing capacities. While they might just use and manipulate existing data (like some of the workshop projects — i.e. *#Good vs. #Evil* or *Moody Printer*) they will altogether and mainly also contribute to produce extra large additional quantities of them (i.e. *Robinson Miner*). Yet, the amount of meaningful data to be "pushed" and "treated" in the cloud remains a big question mark, as there will be (too) huge amounts of such data – Lucien will probably post something later about this subject: "fog computing"–, this might end up with the need for interdisciplinary teams to rethink cloud architectures.

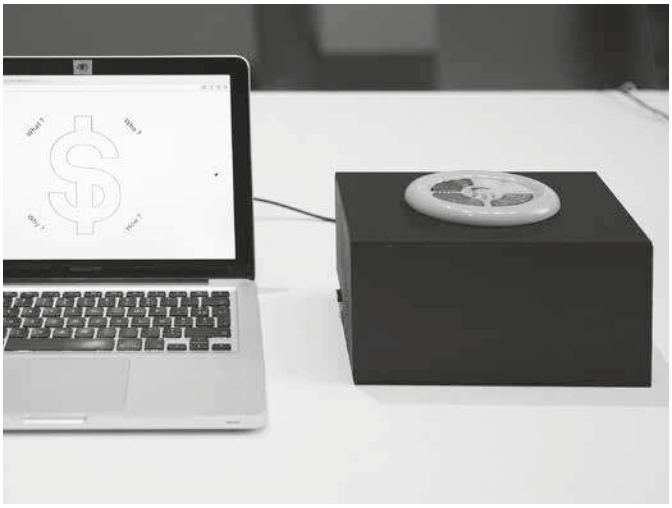
2) Stored data are becoming "alive" or significant only when "manipulated". It can be done by "analog users" of course, but in general it is now rather operated by rules and algorithms of different sorts (in the frame of this workshop: automated bots). Are these rules "situated" as well and possibly context aware (context intelligent) –i.e. *Robinson Miner*? Or are they somehow more abstract and located anywhere in the cloud? Both?

3) These "Networked Data Objects" (and soon "Network Data Everything") will contribute to "babelize" users interactions and interfaces in all directions, paving the way for new types of combinations and experiences (creolization processes) — i.e. *The Beast*, *The Like Hotline*, *Simon Coins*, *The Wifi Cracker* could be considered as starting phases of such processes–. Cloud interfaces and computing will then become everyday "things" and when at "house", new Domestic, objects with which we'll have totally different interactions (this last point must still be discussed though as domesticity might not exist anymore according to Space Caviar).

Moody Printer

(Alexia Léchot, Benjamin Botros) *Moody Printer* remains a basic conceptual proposal at this stage, where a hacked printer, connected to a Raspberry Pi that stays hidden (it would be located inside the printer), has access to weather information. Similarly to human beings, its "mood" can be affected by such inputs following some basic rules (good — bad, hot — cold, sunny — cloudy -rainy, etc.) The automated process then search for Google images according to its defined "mood" (direct link between "mood", weather conditions and exhaustive list of words) and then autonomously start to print them. A different kind of printer combined with weather monitoring.

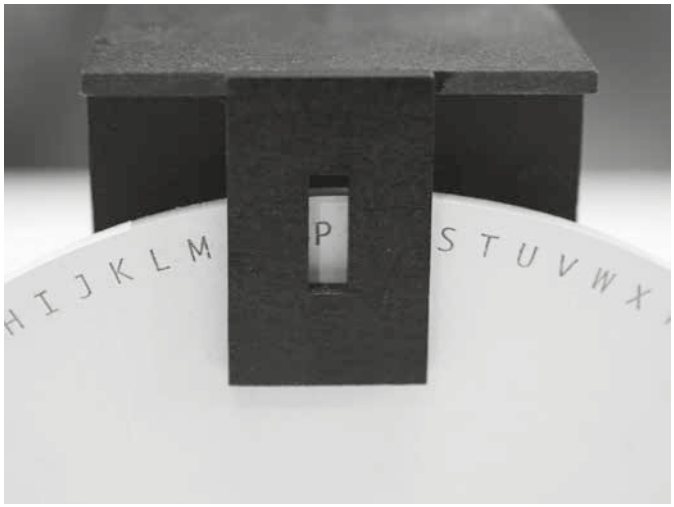
Simoncoin



IMG.1 Romain Cazier introducing its "coin" project.
IMG.2 the device combines an old "Simon" memory game with the production of digital coins.

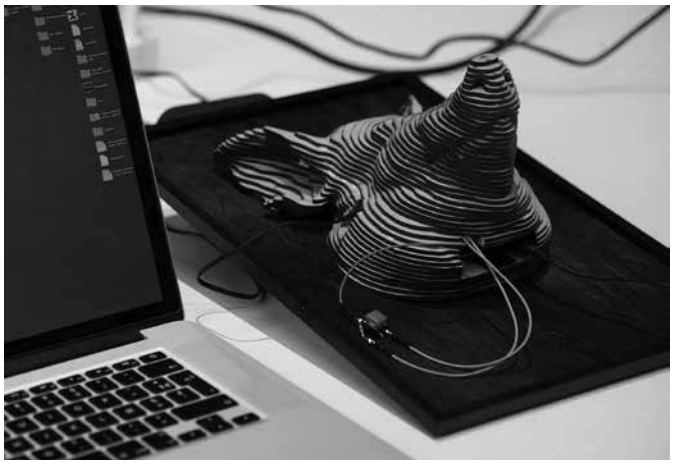
(Romain Cazier) *Simoncoin* was unfortunately not functional at the end of the week of workshop but was thought out in force details that would be too long to explain in this short presentation. Yet the main idea was to use the game logic of the famous *Simon says* to generate coins. In a parallel approach to the one of the Bitcoins that are harder and harder to mill, Simoncoins are also more and more difficult to generate due to the inner game logic: each time a level is achieved by a user on the physical installation, a coin is generated and made available to him in the cloud (so as a tweet that says a coin has been generated). The main difference being that it is not the power of the machine that matters, but its user's ability. Another different kind of money combined with a game.

The Wifi Oracle



(Bastien Girshig, Martin Hertig) *The Wifi Oracle* is an object that you can independently leave in a space. It furtively looks a little bit like a clock, but it won't display time. Instead, it will look for available wifi networks in the area and start try to crack their protected password (Bastien and Martin found online a ready made process for that). Installed on the Raspberry Pi inside the *Oracle*, the bot will test all possible combinations and it will take the necessary time do do so. Once the device will have found the working password, it will use its round display to display it within the space it has been left in. Letter by letter and in a slow manner as well. A different kind of cookoo clock combined with a password cracker.

The Beast



IMG.1 Nicolas Nahornyj is presenting his project to the assembly. IMG.2 the laptop and "the beast".

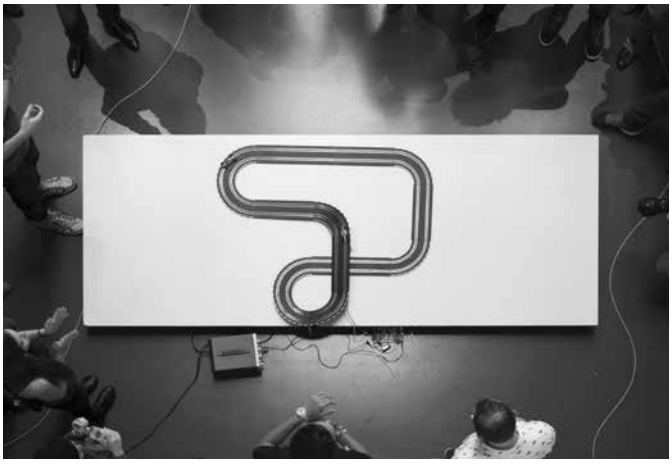
(Nicolas Nahornyj) *The Beast* is a device that asks to be fed with money at random times... It is your new laptop companion. To calm it down for a while, you must insert a coin in the slot provided for that purpose. If you don't comply, not only will it continue to ask for money in a more frequent basis, but it will also randomly pick up an image that lie around on your hard drive, post it on a popular social network (i.e. Facebook, Pinterest, etc.) and then erase this image on your local disk. Slowly, *The Beast* will remove all images from your hard drive and post them online... A different kind of slot machine combined with private files stealing.

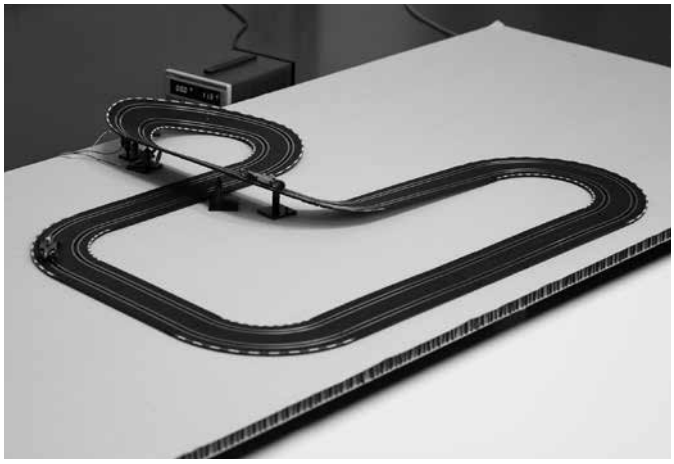
The "Like" Hotline

IMG.1 Caroline Buttet and Mylène Dreyer are explaining their project. The screen of the laptop, which is a Facebook account is beamed on the left outer part of the image. IMG.2 Caroline Buttet is using a hacked phone to "like" pages.

(Mylène Dreyer, Caroline Buttet, Guillaume Cerdeira) *The "Like" Hotline* is proposing to hack a regular phone and install a hotline bot on it. Connected to its online Facebook account that follows a few personalities and the posts they are making, the bot ask questions to the interlocutor which can then be answered by using the keypad on the phone. After navigating through a few choices, the bot hotline help you like a post on the social network. A different kind of hotline combined with a social network.

#Good vs. #Evil

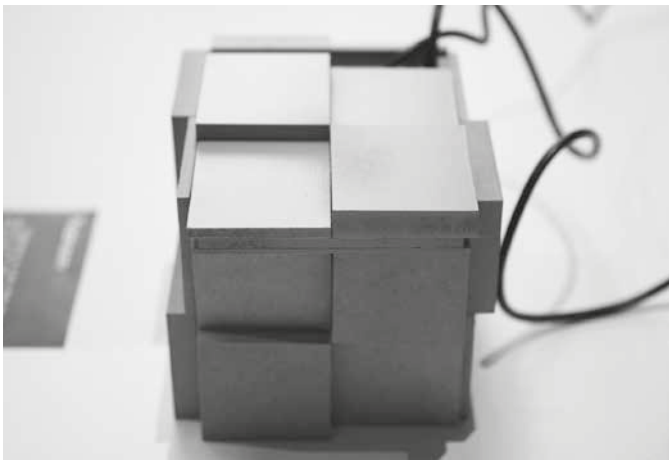




IMG.1 a transformed car racing game. IMG.2 a race is going on between two Twitter hashtags, materialized by two cars.

⟨Maxime Castelli⟩ *#Good vs. #Evil* is a quite straightforward project. It is also a hack of an existing two racing cars game. Yet in this case, the bot is counting iterations of two hashtags on Twitter: #Good and #Evil. At each new iteration of one or the other word, the device gives an electric input to its associated car. The result is a slow and perpetual race car between "good" and "evil" through their online hashtags iterations. A different kind of data visualization combined with racing cars.

Robinson



IMG.1 Pierre-Xavier Puissant is looking at the autonomous "minecrafting" of his bot. IMG.2 the proposed bot container that take on the idea of cubic construction. It could be placed in your garden, in one of your room, then in your fridge, etc.

⟨Anne-Sophie Bazard, Jonas Lacôte, Pierre-Xavier Puissant⟩ *Robinson* automates the procedural construction of MineCraft environments. To do so, the bot uses local weather information that is monitored by a weather sensor located inside the cubic box, attached to a Raspberry Pi located within the box as well. This sensor is looking for changes in temperature, humidity, etc. that then serve to change the building blocks and rules of constructions inside MineCraft ⟨put your cube inside your fridge and it will start to build icy blocks, put it in a wet environment and it will construct with grass, etc.⟩ A different kind of thermometer combined with a construction game.

Note: Matthew Plummer-Fernandez also produced two ⟨auto⟩MineCraft bots during the week of workshop. The first one is building environment according to fluctuations in the course of different market indexes while the second one is trying to build "shapes" to escape this first environment. These two bots are downloadable from the Github repository that was realized during the workshop.

Acknowledgments
Lots of thanks to Matthew Plummer-Fernandez for its involvement and great workshop direction; Lucien Langton for its involvment, technical digging into Raspberry Pis, pictures and documentation; Nicolas Nova and Charles Chalas ⟨from HEAD⟩ so as Christophe Guignard, Christian Babski and Alain Bellet for taking part or helping during the final presentation. A special thanks to the students from ECAL involved in the project and the energy they've put into it: Anne-Sophie Bazard, Benjamin Botros, Maxime Castelli, Romain Cazier, Guillaume Cerdeira, Mylène Dreyer, Bastien Girshig, Martin Hertig, Jonas Lacôte, Alexia Léchot, Nicolas Nahornyj, Pierre-Xavier Puissant.

0074 Behavior, Data, Documentation, Domestic, ECAL, Hack, Interface, Networks, Object, Robotics, Things, Tools

0079 ⟨A⟩ Setting up our own ⟨small size⟩ personal cloud infrastructure. Part #3, reverse engineer the "black box"

2014.12.02/Patrick Keller

Projects, Resources, Sciences & Technology

At a very small scale and all things considered, a computer "cabinet" that hosts cloud servers and services is a very small data center and is in fact quite similar to large ones for its key components... ⟨to anticipate the comments: we understand that these large ones are of course much more complex, more edgy and hard to "control", more technical, etc., but again, not so fundamentally different from a conceptual point of view⟩.

Documenting the black box... ⟨or unblackboxing it?⟩

You can definitely find similar concepts that are "scalable" between the very small — personal — and the extra large. The aim of this post therefore, following two previous ones about software ⟨part #1⟩ — with a technical comment here — and hardware ⟨part #2⟩, is to continue document and "reverse engineer" the set up of our own ⟨small size⟩ cloud computing infrastructure and of what we consider as basic key "conceptual" elements of this infrastructure. The ones that we'll possibly want to reassess and reassemble in a different way or question later during the I&IC research. However, note that a meaningful difference between the big and the small data center would be that a small one could sit in your own house or small office, or physically find its place within an everyday situation ⟨becoming some piece of mobile furniture? else?⟩ and be administrated by yourself ⟨becoming personal⟩. Besides the fact that our infrastructure offers server-side computing capacities ⟨therefore different than a Networked Attached Storage⟩, this is also a reason why we've picked up this type of infrastructure and configuration to work with, instead of a third party API ⟨i.e. Dropbox, Google Drive, etc.⟩ with which we wouldn't have access to the hardware parts. This system architecture could then possibly be "indefinitely" scaled up by getting connected to similar distant personal clouds in a highly decentralized architecture — like i.e. ownCloud seems now to allow, with its "server to server" sharing capabilities — . See also the two mentioned related posts: Setting up our own ⟨small size⟩ personal cloud infrastructure. Part #1, components — Setting up our own ⟨small size⟩ personal cloud infrastructure. Part #2, components. For our own knowledge and desire to better understand, document and share the tools with the community, but also to be able to run this research in a highly decentralized way, so as to keep our research data under our control, we've set up our own small "personal cloud" infrastructure. It uses a Linux server and an ownCloud ("data, under your

control") open source software installed on RAID computing and data storage units, within a 19" computer cabinet. This set up will help us exemplify in this post the basic physical architecture of the system and learn from it. Note that the "Cook Book" for the software set up of a personal cloud similar with ours is accessible *here*. Before opening the black box though, which as you can witness has nothing to do with a clear blue sky (see here too), let's mention one more time this resource that fully documents the creation of open sourced data centers: Open Compute Project (surprisingly initiated by Facebook to celebrate their "hacking background" — as they stated it — and continuously evolving). So, let's first access the "secured room" where our server is located, then remove the side doors of the box and open it...

Standardized

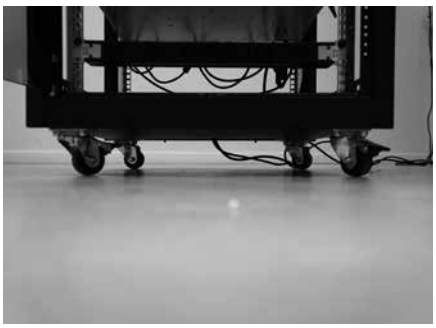
This is the server and setup that currently hosts this website/blog and different cloud services that will be used during this research. Its main elements are quite standarized (according to the former EIA standards –now ECIA–, especially norm EIA/ECA 310E). It is a 19 inches standardized Computer Cabinet, 600 × 800 mm (finished horizontal outside dimensions). Another typical size for a computer cabinet is 23 inches. These dimensions reflect the width of the inner equipment including the holding frame. The heights of our cabinet is middle size and composed of 16 Rack Units (16 U). Very typical size for a computer cabinet is 42U. A rack unit (U) is 1.75 inches (or 4,445 cm). The Rack Unit module defines in return the sizes of the physical material and hardware that can be assembled into the railings. Servers, routers, fans, plugs, etc. and computing parts need therefore to fit into this predefined module and are sized according to "U"s (1U, 2U, 4U, 12U, etc.) in vertical.

Networked (energy and communication)

Even if not following the security standards at all in our case... our hardware is nonetheless connected to the energy and communication networks through four plugs (four redundant electric and rj45 plugs).

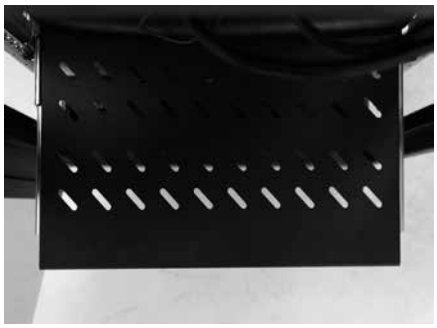
Mobile

Heavy in general (made out of steel... for no precise reasons) the cabinet is usually and nonetheless mobile. It has now become a common product that enters the global chains of goods, so that before you can eventually open it like we just did, it already came into place through container boats, trains, trucks, fork trucks, palets, hands, etc. But not only... once in place, it will still need to be moved, opened, refurbished, displaced, closed, replaced, etc. If you've tried to move it by hands once, you won't like to do it for a second time because of its weight... Once placed in a secured data center (in fact its bigger size casing), metal sides and doors might be removed due to the fact that the building could serve as its new and stronger "sides" (and protect the hardware from heat, dust, electrostatics, physical depredation, etc.)

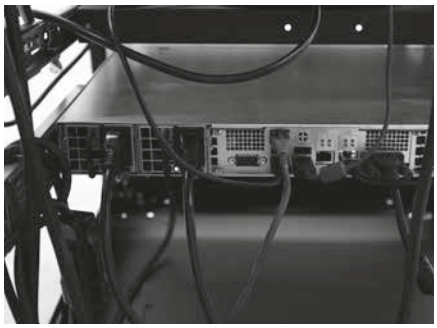


"False"

The computer cabinet (or the data center) usually needs some sort of "false floor" or a "trap" that can be opened and closed regularly for the many cables that need to enter the Cabinet. It needs a "false ceiling" too to handle warmed and dried air –so as additional cabling and pipes– before ejecting it outside. "False floor" and "false ceiling" are usually also used for air flow and cooling needs. "Porous" and climatically monitored, for facilitated air flow (or any other cooling technology, water through pipes would be better)



Temperature and atmosphere monitoring, air flows, the avoidance of electrostatics are of high importance. Hardware doesn't support high temperature and either gets down or used more quickly. Air flow must be controlled and facilitated: it gets hot and dry while cooling the machines, it might get charged in positive ions which in turn will attract dust and increase electrostatics. The progressive heating of air triggers its vertical movement: "fresh" and cool(ed) air enters from the bottom ("false floor"), is directed towards the computer units to cool them down (if the incoming air is not fresh enough, it will need artificial cooling — 27°C seems to be the very upper limit before cooling but most operators use the 24–25°C limit or less) and then gets heated by the process of cooling the servers. Therefore lighter for the same volume, air moves upward and needs to be extracted, usually by mechanical means (fans, in the "false ceiling"). In bigger data centers, cool and hot "corridors" might be used instead of floors and ceilings, which define in return whole hot and cold sqm areas. To help air flow through in a better way, cabling, furniture and architecture must facilitate its movement and not become obstacles by any means.



Wired (redundant)

Following the need for "Redundancy" (= which should guarantee to avoid downtimes as much as possible), the hardware parts need two different energy sources (plugs in the image), so as two different network accesses (rj45 plugs). In the case of big size data centers with TIER certification, these two different energy sources (literally two different providers) need to be backed up by two additional autonomous (oil) engines.

Wired (handling)

The more the hardware, the more the need to handle the cables. 19" cabinets usually have enough free space on their sides and back, between the computing units and the metallic sides of the cabinet, so as enough handling parts to allow for massive cabling.

Redundant (RAID hardware)

One of the key concept of any data center/cloud computing architecture is an almost paranoid concern about redundancy (to at least double any piece of hardware, software system and stored data) so to avoid any losses or downtimes of the service. One question that could be asked here: do we really need to keep all these (useless) data? This concern about redundancy is especially expressed with hardware in the contemporary form of RAID architecture that assure the copy of any content on two hard disks that will work in parallel. If one gets down, the service is maintained and still accessible thanks to the second one. In the case of the I&IC cloud server, we have 1 × 2Tb disk for the system only (Linux and ownCloud) — that isn't mounted in RAID architecture, but should be to guarantee maximum "Uptime" —, 2 × 4Tb RAID disks for data, and 1 × 4Tb for local backup — that should be duplicated in a distant second location for security reasons — Note that our server has a size of 1U. Note that the more the computing units will be running, the more the hardware will get hot and therefore the more the need for cooling. Therefore...

Redundant bis ("2" is a magic number)

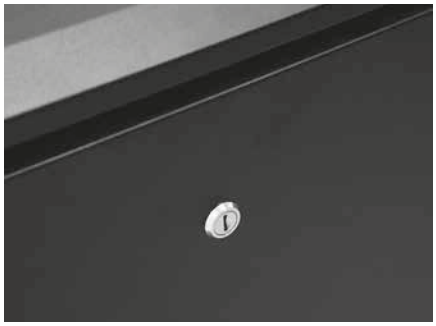
All parts and elements generally come by two (redundancy): two different electric providers, two electric plugs, two Internet providers, two rjs 45 plugs, two backup oil motors, RAID (parallel) hard drives, two data backups, etc. Even two parallel data centers? Virtualized (data) architecture.

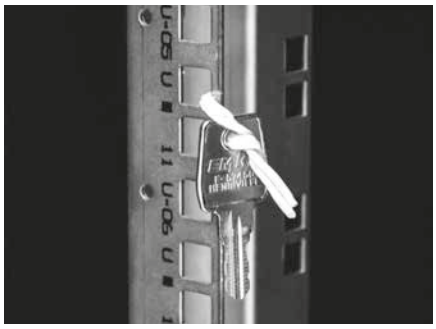
Servers don't need to be physical anymore: virtualize them, manage them and install many of these digital machines on physical ones.

Interfaced

Any data center will need to be interfaced to manage its operation (both from an "end user" perspective, which will remain as "user friendly" as possible and from its "control room"). Our system remains basic and it just needs a login/passwd, a screen, a keyboard and mouse to operate, but it can become quite complicated... (googled here).

We've almost finished our tour and can now close back the box... Yet let's consider a few additional elements...





Controlled physical access

The physical accesses to the hardware, software, inner space and "control room" (interface) of the "data center" are not public and are therefore restricted. For this function too, a backup solution (a basic key in our case) must be managed. Note that while we're closing back the cabinet, we can underline one last time what looks to be obvious: the architecture or the casing is indeed used to secure the physical parts of the infrastructure, but its purpose is also to help filter the people who could access it. The "casing" is so to say both a physical protection and a filter.

Hidden or "Furtive"?

The technological arrangement is undoubtedly wishing to remain furtive, or at least to stay unnoticed. Especially when it comes to security issues.

Unexpressive, minimal

The "inexpressiveness" of the casing seems to serve two purposes. The first one is to remain discreet, functional, energy efficient, inexpensive, normed and mainly

unnoticed. This is especially true for the architecture of large data centers that could be almost considered as the direct scaling of the “black box” (or the shoe box) exemplified in this post. It could explain its usually very poor architecture. The second one is a bit more speculative at this stage, but the “inexpressiveness” of the “black box” and the mystery that surrounds it remains the perfect support for technological phantasms and projections.

0079 Cabinets, Data, Datacenter, Documentation, Domestic, Hardware, Personal, Software, Standards, Tools

0080 ⟨C⟩ Cookbook → Setting up your personal Linux & OwnCloud server

2014.12.10/Christian Babski

Cookbooks, Resources, Sciences & Technology

Note: would you like to install your personal open source cloud infrastructure, maintain it, manage your data by yourself and possibly develop artifacts upon it, like we needed to do in the frame of this project? If yes, then here comes below the step by step recipe on how to do it. The proposed software for Cloud-like operations, ownCloud, has been chosen among different ones. We explained our (interdisciplinary) choice in this post, commented here. It is an open source system with a wide community of developers (but no designers yet).

We plan to publish later some additional Processing libraries — in connection with this open source software — that will follow one of our research project’s objectives to help gain access to (cloud based) tools.

Would you then also like to “hide” your server in a traditional 19” Cabinet (in your everyday physical or networked vicinity)? Here is a post that details this operation and what to possibly “learn” from it “lessons” that will become useful when it will come to possible cabinet alternatives.

A) Linux Server

1 server:
- CPU 64bits
- 8 to 16 Gb of memory
- 1 to 4Tb of disk (can be duplicated in order to setup a RAID mechanism and obtaining a built-in physical redundancy backup)
- 1 × screen
- 1 × USB keyboard
- 1 × USB mouse
- (optional) — dual electric inputs for backup purpose
- (optional) — dual network interfaces for backup purpose or network speed optimization

1 operating system:
(prefer Linux if you want to stick to open source projects). CentOS is a good Linux distribution to consider, very well documented. You can usually download the installer from the Internet and burn it on a CD, DVD or even on a USB Key as an installation support.

How To

1) Plug all the wires in your brand new (or old) server, insert the Linux installer’s CD or DVD and switch the computer on.

2) After showing some hardware check information, it should boot up on the CD/DVD. CentOS installer will appear, few basic questions will be asked (language, time zone, network etc...). CentOS installer is well documented and propose a set of default choices for each decision. CentOS will propose a set of predefined configurations, starting from a very basic installation to a fully loaded server (which includes the setup of a Web server, domain name server etc...).

3) CentOS will propose a set of predefined configurations. Choose the configuration that fits your needs. Keep in mind that you can always add and remove features afterwards, at anytime, so the basic desktop is always a good choice. Prefer to add features step by step, when you are sure that you do need it. Installing useless services can easily drives you to security issue by making your server proposing unsecured features. You should always be able to know the exact list of services proposed by your server.

4) Once the configuration you have chosen is completely installed, the server will reboot and a bunch of seconds later you will front the CentOS GUI, being able to log in by using the credentials you have mentioned during the installation process. Welcome to your first server.

B) ownCloud

Prior to be able to install ownCloud on your server, you will need to setup several services usually resumed in the acronym LAMP. Each letter is associated with one piece of software. We will go through some explanations as it is always better to understand as precisely as possible what we are doing while setting up a LAMP bundle.

1 × Linux
L stands for Linux, and we already got one by installing the CentOS operating system. This prerequisite was already explained and addressed in the previous part of this post.

1 × Apache
A stands for Apache. Apache is one of the most used web server. Like Linux, it is open and free to use. A web server is basically what will distribute web content to you. As soon as you want to access a web link/URL beginning with http or https, your request is intercepted and treated by a web server. You ask something, the web server make it available on your preferred Internet device just a few seconds later. While ensuring a kind of very basic task, a web server can be tricky to configure. There is many parameters and some of them are linked to security issue. As a web server, somehow, distributes to the whole world the content hosted on your server, it is very important to be sure to give access only to specific parts of your server and not to the entire content of your hard drive (unless you would like to fully open it).

1 × MySQL
M stands for MySQL. MySQL is a database server. It is like a web server but dedicated to databases. Databases are usually organized as a set of tables, each table composed of a set of data fields. A data field can be a text, a number, a date, a unique reference number etc... a database being a collection of records. For example, this web site is a database filled with a collection of posts. One post being basically defined by its author, date and time, categories and its content. MySQL is quite straight forward to install, with a few steps to secure it.

1 × PHP
P stands for PHP. PHP is a programming language, also called server-side scripting language. A basic web page can be composed of static HTML tags that need to be delivered to a web browser and interpreted by it so to visually display these tags as a "page". This delivered static web page can then be stored on the web server with the exact same content. It means that delivering this content can be summarized as the simple act of sending the html page from the web server to the user's web browser. Yet nowadays, the content of a web page can be made out of dynamic or live data extracted from a database, or it can be the result of some computation processes performed server-side (performed on the web server). That's where a server-side scripting language like *PHP* is needed. Within a dynamic web page that still needs to be delivered, one can then have *PHP* instructions that will probe a database to extract some data, add these data to the distributed web page and send the final formatted web page. The execution of the *PHP* instructions is initiated by the *Apache* web server and *PHP* instructions may probe the *MySQL* database when needed. Thus you now have an overall picture of the role of each *LAMP* modules. ownCloud (as a web site) will use *Apache* to show user's content, distribute/share files, user's data, user's files and file's meta information being stored in the ownCloud's *MySQL* database, using *PHP* to filter distributed information, checking login credentials, etc...

How To

1) Install Apache. You will have to open a terminal. If you choose the Minimal Desktop, you can go to Applications/System Tools/Terminal. That's basically a command shell where you can invoke Linux commands. For example typing `'ls'+ENTER` will show current directory content, `'pwd'+ENTER` will show the current directory etc... (all Linux commands here). Let's install Apache web server components by typing `'sudo yum install httpd'+ENTER`. It will display packages to be downloaded and installed, just answer 'yes' when prompted and Apache will be downloaded and installed. Once finished, type `'sudo service httpd start'+ENTER`, this will start Apache web server, Then open Firefox on your server and try to access http://127.0.0.1 and you should see the default Apache welcome page. In order to make Apache web server starting automatically after having (re)booted your server, type `'sudo chkconfig httpd on'+ENTER`.

2) Install MySQL. Still within a terminal window, type `'sudo yum install mysql-server'+ENTER`. As previously with Apache, needed MySQL components will be listed, just answer 'yes' when prompted to start downloading and installing MySQL. Once finished, type `'sudo service mysqld start'+ENTER` in order to initiate the MySQL server. You need then to secure MySQL by typing `'sudo mysql_secure_installation'+ENTER`. When prompted for the current root password, leave it blank and press ENTER. You will be asked to define the new root password, so take carefully note of the one you will choose. It will be your key access to your MySQL server. Then answer systematically `'y'` to the 4 or 5 following questions, and you will be done with your MySQL server. In order to make MySQL server starting automatically after having (re)booted your server, type `'sudo chkconfig mysqld on'+ENTER`.

3) Install PHP. Still within a terminal window, type `'sudo yum install php php-mysql'+ENTER`. As previously with MySQL, needed PHP components will be listed, just answer 'yes' when prompted to start downloading and installing PHP. You are done with PHP. As PHP is just a program and not a server there is no need to make it start at reboot etc... Keep in mind that PHP is made of several modules that can be installed or removed. By typing `'yum search php-'+ENTER` you will see already installed modules. When specific modules are needed you can always install them via the command `'sudo yum install PHPModuleName'+ENTER`. You are done with *LAMP*. The path to your web sites should be /var/www/html. In order to test PHP, create a php file from a terminal window again by typing `'sudo nano/var/www/html/info.php'+ENTER`. It will open a text editor, type `'<?php phpinfo();?>'` and save the file. Thus, from a local web browser you should be able to access http://127.0.0.1/info.php. It will display a overall set of PHP information. Apache and PHP are operational.

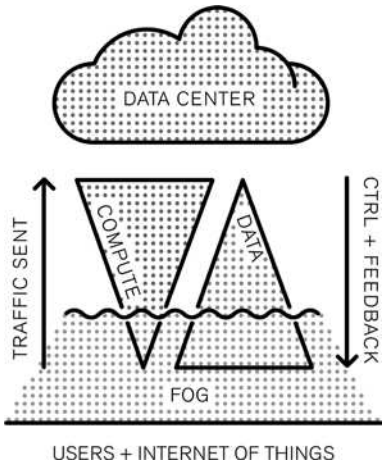
4) InstallownCloud. Download ownCloud archive and extract it to your/var/www/html directory. Once you'll have a directory like/var/www/html/owncloud, you will be able to follow the owncloud's installation wizard via the web address http://127.0.0.1/owncloud. You can refer to the online documentation for setting steps. When the database choice is prompted, choose of course the *MySQL* option. Then, at some point, if you want your ownCloud publicly available, you will have to subscribe for a domain name (like mydomainname.org) and then configure accordingly your *Apache* web server in order to make it respond to http://www.mydomainname.org. You can then choose to make this web address point directly to your ownCloud server, or keep this web address for another web site and make ownCloud available via an address like http://www.mydomainname.org/owncloud/. But these choices depend on what you want to achieve.

Congratulations, you are now ready to play with your own personal cloud service! As already stated, more *Cook Books* should come in the near future under http://www.iiclouds.org/category/cook_books/ Their purposes will be to help you work with this infrastructure and handle your data, so as to set up your own design projects that will tap into this infrastructure and transform it. Don't forget also that an API already exists to help you develop your applications for ownCloud.

0081 (C) Towards a new paradigm: Fog Computing

2015.01.15/Lucien Langton

Sciences & Technology, Thinking

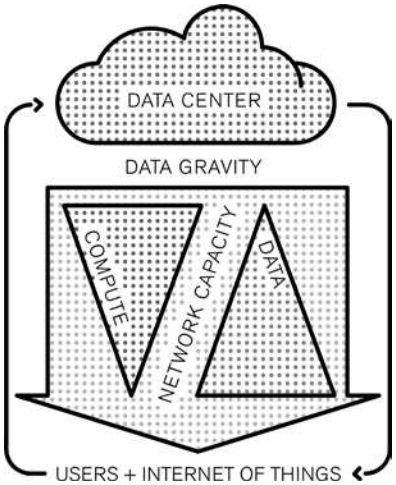


The Internet of Things is emerging as a model, and the network routing all the IoT data to the cloud is at risk of getting clogged up. "Fog is about distributing enough intelligence out at the edge to calm the torrent of data, and change it from raw data over to real information that has value and gets forwarded up to the cloud." Todd Baker, HEAD of Cisco's IOx framework says. Fog Computing, which is somehow different from Edge Computing (we didn't quite get how) is definitely a new business opportunity for the company who's challenge is to package converged infrastructure services as products.

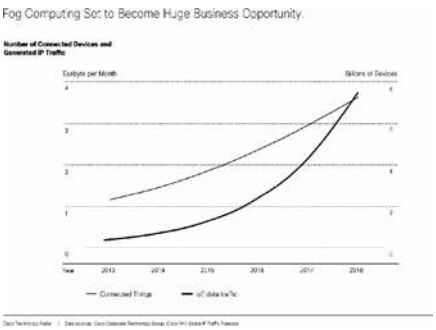
However, one interesting aspect of this new buzzword is that it adds up something new to the existing model: after all, cloud computing is based on the old client-server model, except the cloud is distributed by its nature (ahem, even though data is centralized). That's the big difference. There's a basic rule that resumes the IT's industry race towards new solutions: Moore's law. The industry's three building blocks are: storage, computing and network. As computing power doubles every 18 months, storage follows closely (its exponential curve is almost similar). However, if we graph network growth it appears to follow a straight line.

Network capacity is a scarce resource, and it's not going to change any time soon: it's the backbone of the infrastructure, built piece by piece with colossal amounts of cables, routers and fiber optics. This problematic forces the industry to find disruptive solutions, and the paradigm arising from the clash between these growth rates now

has a name: Data gravity. Data gravity is obviously what comes next after 20 years of anarchic internet content moderation. Have you ever heard of big data? Besides being the IT's industry favorite buzzword alongside "cloud computing", there's a reason we don't call it "infinite data": the data is sorted byte after byte. The problem is, right now everything is sorted in the cloud, which means you have to push all this data up, just to get the distilled big data feedback down. If you think about your cell phone and the massive amounts of data it generates, sends out around the planet and receives in return, there's something not quite energetically efficient about it. For every search query, shopping cart filled, image liked and post reblog, our data travels thousands of kilometers to end up with a simple feedback sent to our device in return. In the long run, the network simply won't be able to cope with these massive amounts of data transit. Data Gravity is the following concept: the closer the data is to the emission source, the heavier it is. If we take the analogy of the cloud, we could see data as a liquid which needs to be "evaporated" in order to be pushed to the cloud, where it can be compared and assimilated to big data, the correct answer being then pushed back to the device in return.



If fog computing is necessary, it is precisely because a solution is needed to distill the huge amounts of data generated "closer to the ground". But under what physical form will it come to exist? Interestingly, it was difficult to find anybody in the field interested in this question. If the idea of creating data treatment facilities closer to users is popular, nobody seems to care about the fact that this "public infrastructure" is invisible. Indeed, the final aim, it seems, is to add a layer to the back-end of user technology, not to bring it closer to the user in terms of visibility. Rather the opposite: it seems we're still all believing in security from opacity, even when the industry's giants are going open-source. The amounts of money engaged in this new paradigm are colossal, Cisco's Technology Radar assures (rather opaquely by the way).



We will keep a close eye on the trends related to Fog and Cloud. However it is essential to stress that fog computing will not elude cloud computing. It is a new model indeed, but it is aimed to extend the cloud and decentralize it's extremities rather than change the architecture of the whole infrastructure. While our main object of study remains the cloud, which is the final abstraction of computing in terms of distance to users (both physical and in terms of cognitive familiarity), it is also important for us to map out what comes in between both. As designers and architects, our work is to build intuitive ways of interacting with reality's abstractions through objects. But @mccrory, who came up with the concept of data gravity also set up a definition of it as a "formula", perhaps it helps.

F is Force (in Megabytes per second squared)
m_d is Data Mass (in Megabytes)
m_a is Application Mass (in Megabytes)
n is Number Requests per second
l is Latency between m and m (in seconds)
r is Average Request Size (in Megabytes)
b is Bandwidth (in Megabytes per second)

$$F = \frac{(m_d \times m_a) \times n}{(l + (r / b))^2}$$

0081 Ideas, Intentions, Methodology, Sketches

0084 ⟨A⟩⟨C⟩ Reblog → Decentralizing the Cloud: How Can Small Data Centers Cooperate?

2015.01.22/Patrick Keller

Schools, Sciences & Technology, Thinking

Note: while reading last Autumn newsletter from our scientific committee partner Ecocloud (EPFL), among the many interesting papers the center is publishing, I stumbled upon this one written by researchers Hao Zhuang, Rameez Rahman, and Prof. Karl Aberer. It surprised me how their technological goals linked to decentralization seem to question similar issues as our design ones (decentralization, small and networked data centers, privacy, peer to peer models, etc.)! Yet not in such a small size as ours, which rather look toward the "personal/small" and "maker community" size. They are rather investigating "regional" data centers, which is considered small when you start talking about data centers. This, combined with the recent developments mentioned by Lucien Langton in his post about *Fog Computing* let us think that our goals match well with some envisioned technological evolutions of the global "cloud infrastructure". They seem to be rooted in similar questions. Via p2p-conference.org via Ecocloud newsletter Abstract *Cloud computing has become pervasive due to attractive features such as on-demand resource provisioning and elasticity. Most cloud providers are centralized entities that employ massive data centers. However, in recent times, due to increasing concerns about privacy and data control, many small data centers (SDCs) established by different providers are emerging in an attempt to meet demand locally. However, SDCs can suffer from resource in-elasticity due to their relatively scarce resources, resulting in a loss of performance and revenue. In this paper we propose a decentralized cloud model in which a group of SDCs can cooperate with each other to improve performance. Moreover, we design a general strategy function for the SDCs to evaluate the performance of cooperation based on different dimensions of resource sharing. Through extensive simulations using a realistic data center model, we show that the strategies based on reciprocity are more effective than other involved strategies, e.g., those using prediction on historical data. Our results show that the reciprocity-based strategy can thrive in a heterogeneous environment with competing strategies.* More about the paper HERE.

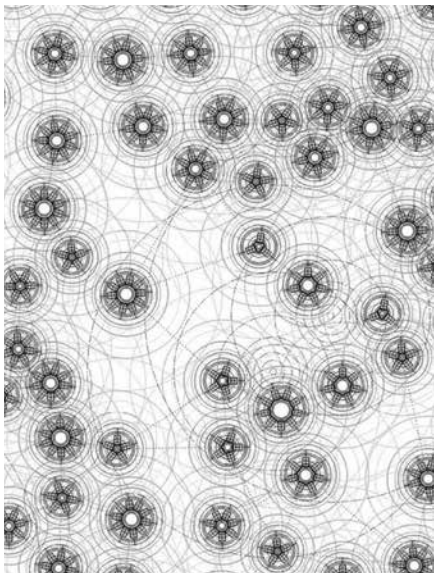
0084 Clouds, Data, Datacenter, Research

Reblog → Deterritorialized House —Inhabiting the data center, sketches...

2015.01.23/Patrick Keller

by fabric|ch
Architecture, Resources

Along different projects we are undertaking at fabric|ch, we continue to work on self initiated researches and experiments ⟨slowly, way too slowly... Time is of course missing⟩. *Deterritorialized House* is one of them, introduced below.



Some of these experimental works concern the mutating "home" program ⟨considered as "inhabited housing"⟩, that is obviously an historical one for architecture but that is also rapidly changing *"⟨...⟩ under pressure of multiple forces — financial, environmental, technological, geopolitical. What we used to call home may not even exist anymore, having transmuted into a financial commodity measured in sqm ⟨square meters⟩"*, following Joseph Grima's statement in sqm. the quantified home, *"Home is the answer, but what is the question?"*

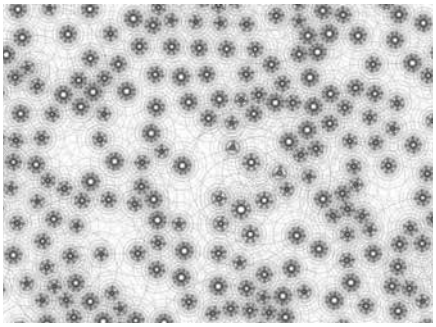
In a different line of works, we are looking to build physical materializations in the form of small pavilions for projects like i.e. Satellite Daylight, 46°28'N, while other researches are about functions: based on live data feeds, how would you inhabit a transformed — almost geo-engineered atmospheric/environmental condition? Like the one of Deterritorialized Living ⟨night doesn't exist in this fictional climate that consists of only one day, no years, no months, no seasons⟩, the physiological environment of I-Weather, or the one of Perpetual Tropical Sunshine, etc.?

We are therefore very interested to explore further into the ways you would inhabit such singular and "creolized" environments composed of combined dimensions, like some of the ones we've designed for installations. Yet considering these environments as proto-architecture ⟨architectured/mediated atmospheres⟩ and as conditions to inhabit, looking for their own logic. We are looking forward to publish the results of these different projects along the year. Some as early sketches, some as results, or both. I publish below early sketches of such an experiment, *Deterritorialized House*, linked to the "home/house" line of research. It is about symbiotically inhabiting the data center...

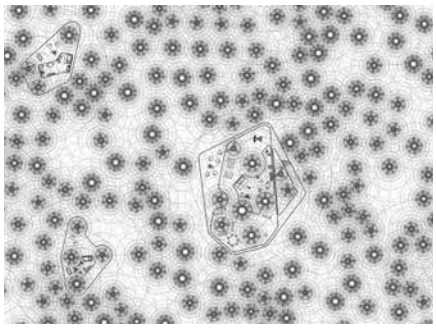
Would you like it or not, we surely de-facto inhabit it, as it is a globally spread program and infrastructure that surrounds us, but we are thinking here in physically inhabiting it, possibly making it a "home", sharing it with the machines...

What is happening when you combine a fully deterritorialized program ⟨super or hyper-modern, "non lieu", ...⟩ with the one of the home? What might it say or comment about contemporary living? Could the symbiotic relation take advantage of the heat the machine are generating — directly connected to the amount of processing power used —, the quality of the air, the fact that the center must be up and running, possibly lit 24/7, etc.

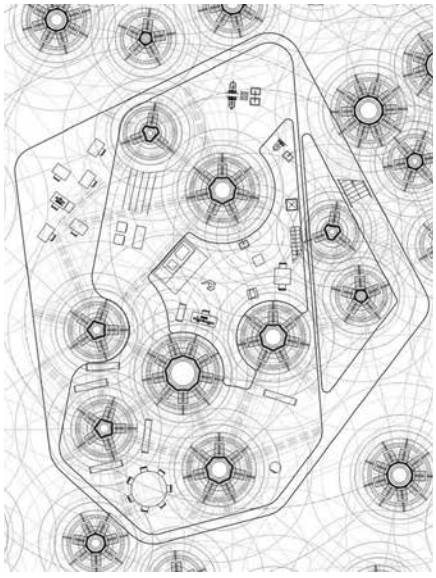
As we'll run a workshop next week in the context of another research project ⟨Inhabiting and Interfacing the Cloud⟨s⟩, an academic program between ECAL, HEAD, EPFL+ECAL Lab and EPFL in this case⟩ linked to this idea of questioning the data center — its paradoxically centralized program, its location, its size, its functionalism, etc. —, it might be useful to publish these drawings, even so in their early phase ⟨theys are dating back from early 2014, the project went back and forth from this point and we are still working on it.⟩



1) The data center level ⟨level -1 or level +1⟩ serves as a speculative territory and environment to inhabit ⟨each circle in this drawing is a fresh air pipe sourrounded by a certain number of computers cabinets — between 3 and 9⟩. A potential and idealistic new "infinite monument" ⟨global⟩? It still needs to be decided if it should be underground, cut from natural lighting or if it should be fragmented into many pieces and located in altitude ⟨— likely, according to our other scenarios that are looking for decentralization and collaboration⟩, etc. Both? Fresh air is coming from the outside through the pipes surrounded by the servers and their cabinets ⟨the incoming air could be an underground cooled one, or the one that can be found in altitude, in the Swiss Alps — triggering scenarios like cities in the moutains? moutain data farming? Likely too, as we are looking to bring data centers back into small or big urban environments⟩. The computing and data storage units are organized like a "landscape", trying to trigger different atmospheric qualities ⟨some areas are hotter than others with the amount of hot air coming out of the data servers' cabinets, some areas are charged in positive ions, air connectivity is obviously everywhere, etc.⟩ Artificial lighting follows a similar organization as the servers' cabinets need to be well lit. Therefore a light pattern emerges as well in the data center level. Running 24/7, with the need to be always lit, the data center uses a very specific programmed lighting system: Deterritorialized Daylight linked to global online data flows.

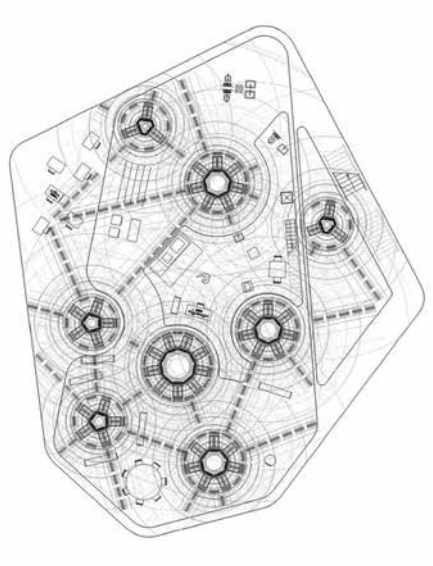


2) Linked to the special atmospheric conditions found in this "geo-data engineered atmosphere" ⟨the one of the data center itself, level -1 or 1⟩, freely organized functions can be located according to their best matching location. There are no thick walls as the "cabinets islands" acts as semi-open partitions. A program starts to appear that combines the needs of a data center and the one of a small housing program which is immersed into this "climate" ⟨dense connectivity, always artificially lit, 24°C permanent heat⟩. "Houses" start to appear as "plugs" into a larger data center.

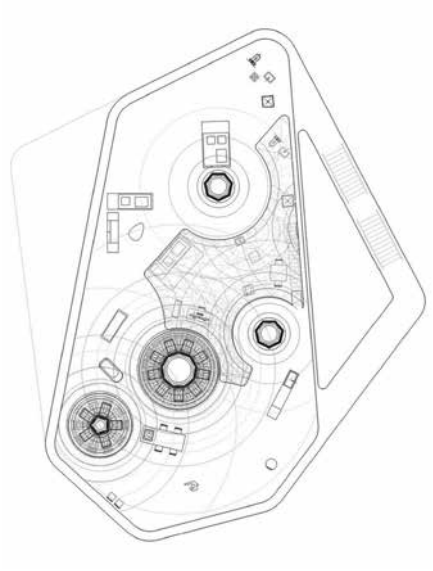


3) A detailed view ⟨data center, level -1 or +1⟩ on the "housing plug" that combine programs. At this level, the combination between an office-administration unit for a small size data center start to emerge, combined with a kind of "small office — home office" that is immersed into this perpetually lit data space. This specific small housing space ⟨a studio, or a "small office —

home office") becomes a "deterritorialized" room within a larger housing program that we'll find on the upper level(s), likely ground floor or level +2 of the overall compound.



4) Using the patterns emerging from different spatial components (heat, light, air quality — dried, charged in positive ions —, wifi connectivity), a map is traced and "moirés" patterns of spatial configurations ("moirés spaces") start to happen. These define spatial qualities. Functions are "structurelessly" placed accordingly, on a "best matching location" basis (needs in heat, humidity, light, connectivity which connect this approach to the one of Philippe Rahm, initiated in a former research project, Form & Function Follow Climate (2006). Or also i.e. the one of Walter Henn, Burolandschaft (1963), if not the one of Junya Ishigami's Kanagawa Institute). Note also that this is a line of work that we are following in another experimental project at fabric | ch, about which we also hope to publish along the year, *Algorithmic Atomized Functioning* — a glimpse of which can be seen in Desierto Issue #3, 28° Celsius.



5) On ground level or on level +2, the rest of the larger house program and few parts of the data center that emerges. There are no other heating or artificial lighting devices besides the ones provided by the data center program itself. The energy spent by the data center must serve and somehow be spared by the house. Fresh and hot zones, artificial light and connectivity, etc. are provided by the data center emergences in the house, so has from the opened "small office — home office" that is located one floor below. Again, a map is traced based and moirés patterns of specific locations and spatial configurations emerge. Functions are also placed accordingly (hot, cold, lit, connected zones). Starts or tries to appear a "creolized" housing object, somewhere in between a symbiotic fragmented data center and a house, possibly sustaining or triggering new inhabiting patterns...

0085 Cabinets, Computing, Data, Datacenter, Housing, Infrastructure, Interferences, Landscape, Moire_pattern, Research

0088 (A)(B)(C)(D) Mejias, U. A. (2013). Off the Network, The University of Minnesota Press.

2015.01.23/Patrick Keller

Resources, Sciences & Technology, Society, Thinking

Note: Off the Netwok, a book by Ulises Ali Mejias that is interesting to read when it comes to objectify and question the network paradigm. Beyond the praise about participation and inclusiveness that was widely used by network advocates and now also by marketing companies, Off the Network brings a critical voice and addresses the centralization, or in some other cases the "nodocentrism" that is at work through many global online services, so as the commodification of many aspects of our lives that comes with them. While we are looking for alternative "architectures" for cloud infrastructure, nodes and services, this is a "dissonant" point of view to take into account and a book that we are integrating into the I&IC bibliography.

From the books' blurb: "*Off the Network* shows us that centralization of online services is not accidental. Take a look behind the social media noise and read how algorithms condition us. Ulises Ali Mejias carves out a postaffirmative theory of networks. No more debates about whether you are a dog or not; identity is over. Power returns to the center of Internet debates. Off the Network disrupts the illusion of seamless participation — it slides with the resisters and rejecters and teaches us to unthink the network logic. Its message: don't take the network paradigm for granted."

0088 Books, Data, Internet, Networks, Research, Thinkers

0089 ⟨A⟩ Reblog → Power, Pollution and the Internet

2015.01.23/Patrick Keller

via Ethan Pines for the New York Times. via Computed·By
Resources, Sciences & Technology, Society

SANTA CLARA, Calif. — Jeff Rothschild's machines at Facebook had a problem he knew he had to solve immediately. They were about to melt.

The company had been packing a 40-by-60-foot rental space here with racks of computer servers that were needed to store and process information from members' accounts. The electricity pouring into the computers was overheating Ethernet sockets and other crucial components. Thinking fast, Mr. Rothschild, the company's engineering chief, took some employees on an expedition to buy every fan they could find — "We cleaned out all of the Walgreens in the area," he said — to blast cool air at the equipment and prevent the Web site from going down. That was in early 2006, when Facebook had a quaint 10 million or so users and the one main server site. Today, the information generated by nearly one billion people requires outsize versions of these facilities, called data centers, with rows and rows of servers spread over hundreds of thousands of square feet, and all with industrial cooling systems.

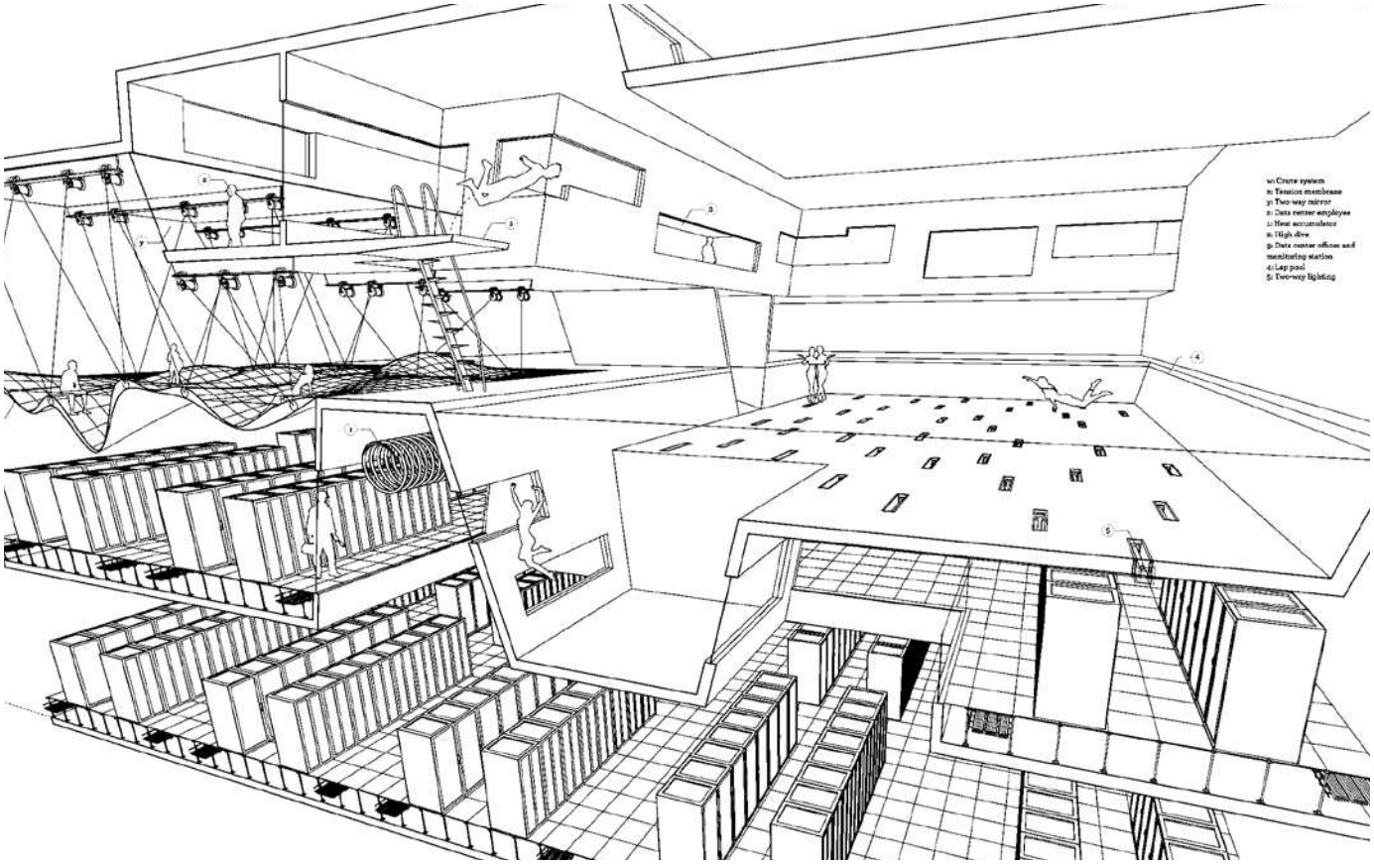
Continue Reading...

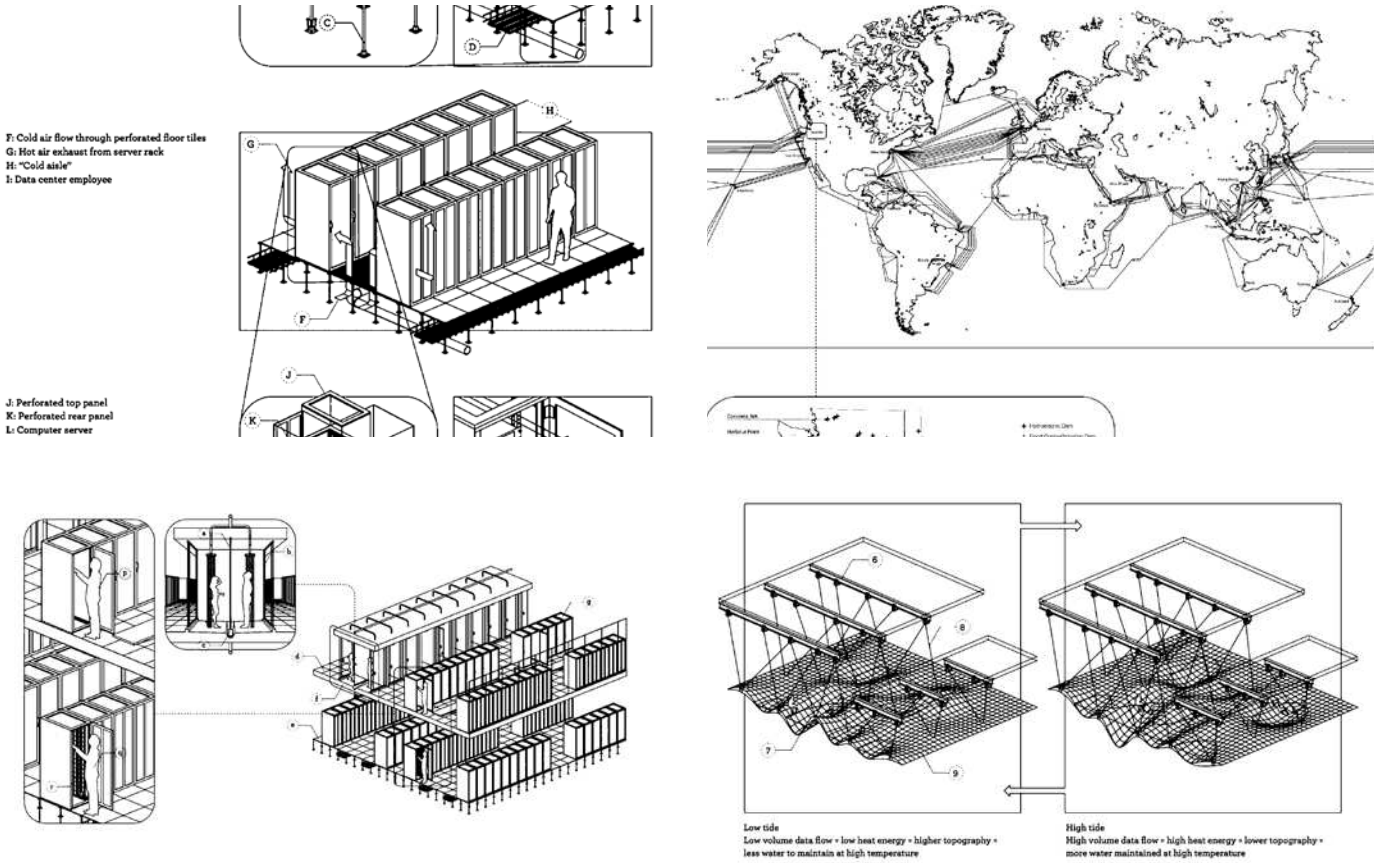
0089 Conditioning, Datacenter, Energy, Infrastructure

0090 ⟨A⟩ Donaghy, R. ⟨2011⟩. Co-opting the Cloud: An Architectural Hack of Data Infrastructure. Graduate thesis work.

2015.01.23/Patrick Keller

by Ryan Donaghy
Architecture, Resources





Part of our bibliography (among different works by architects –K. Varnelis– or about the Internet infrastructure –T. Arnall, A. Blum–) and published in Clog (2012), this thesis work by Ryan Donaghy presents an interesting hack of the data center infrastructure (centered on the hardware and mostly on the object "data center" in this case). The work is published online on ISUU and can be accessed on https://issuu.com/taubmancollege/docs/dimensions25 (p. 148–163).

0090 Cabinets, Creolized, Datacenter, Infrastructure, Interferences, Research, Territory

0091 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Clog ⟨2012⟩. Data Space

2015.01.23/Patrick Keller

Architecture, Interaction Design, Resources, Thinking

Note: we mentioned this "bookazine", Clog, in our bibliography (Clog, (2012). Data Space, Clog online), at the very early stages of our design-research project. It is undoubtedly one of the key references for this project, mostly related to thinking, territory, space and therefore rather oriented toward the architecture field. It will certainly serve in the context of our workshop with the architects (in collaboration with ALICE) next week, but not only, as it states some important stakes related to data in general. This very good and inspiring magazine is driven by a pool of editors that are Kyle May (editor in chief, we invited him as a jury member when we — fabric|ch with Tsinghua University — organized a call during 2013 Lisbon Architecture Triennal, curated by Beatrice Galilee), Julia van den Hout, Jacob Reidel, Archie Lee Coates, Jeff Franklin. The edition is unfortunately sold out. Reason why I assembled several images from the bookazine (for the research sake) in a pdf that can be downloaded here (60mb).

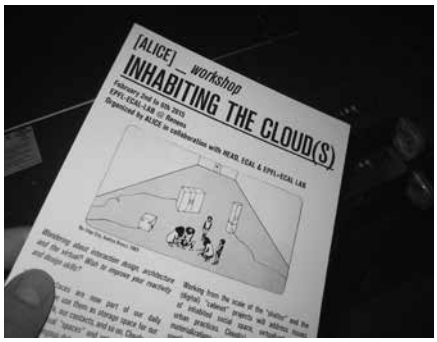
From the editorial (May 2012): "Over two billion people across the world use the Internet regularly. Every second, 2.8 million emails are sent, 30'000 phrases are Googled, and 600 updates are tweeted. While being absorbed into this virtual world, we most rarely consider the physical ramifications of this data. All over the world, data centers are becoming integral components of our twenty-first century infrastructure. These facilities can range from small portable modules to massive warehouses full of servers — from sleek new constructions to reuse of existing infrastructures. What is the significance of this bridge between the virtual and the physical? How does this new typology affect the discourse of architecture and the shaping of our built environment? As cloud storage and global Internet usage increase, it's time to talk about the physical space of data."

0091 Books, Data, Datacenter, Infrastructure, Territory, Thinkers

0092 ⟨A⟩ I&IC Workshop #4 with ALICE at EPFL+ ECAL Lab, brief: “Inhabiting the Cloud⟨s⟩”

2015.01.24/Patrick Keller

by Dieter Dietz
Architecture, Schools, Workshops



Wondering about interaction design, architecture and the virtual? Wish to improve your reactivity and design skills?
Note: we will start a new I&IC workshop in two weeks ⟨02–06.02⟩ that will be led by the architects of ALICE laboratory ⟨EPFL⟩, under the direction of Prof. Dieter Dietz, doctoral assistant Thomas Favre-Bulle, architect scientist-lecturer Caroline Dionne and architect studio director Rudi Nieveen. During this workshop, we will mainly investigate the territorial dimension⟨s⟩ of the cloud, so as distributed “domestic” scenarios that will develop symbiosis between small decentralized personal data centers and the act of inhabiting. We will also look toward a possible urban dimension for these data centers. The workshop is open to master and bachelor students of architecture ⟨EPFL⟩, on a voluntary basis ⟨it is not part of the cursus⟩.

A second workshop will also be organized by ALICE during the same week on a related topic ⟨see the downloadable pdf below⟩. Both workshops will take place at the EPFL+ECAL Lab. I introduce below the brief that has been distributed to the students by ALICE.

Inhabiting the Cloud⟨s⟩

Cloud interfaces are now part of our daily experience: we use them as storage space for our music, our work, our contacts, and so on. Clouds are intangible, virtual “spaces” and yet, their efficacy relies on humongous data-centres located in remote areas and subjected to strict spatial configurations, climate conditions and access control. Inhabiting the cloud⟨s⟩ is a five days exploratory workshop on the theme of cloud interfacing, data-centres and their architectural, urban and territorial manifestations.

Working from the scale of the “shelter” and the ⟨digital⟩ “cabinet”, projects will address issues of inhabited social space, virtualization and urban practices. Cloud⟨s⟩ and their potential materialization⟨s⟩ will be explored through “on the spot” models, drawings and 3D printing. The aim is to produce a series of prototypes and user-centered scenarios. Participation is free and open to all SAR students.

ATTENTION:
Places are limited to 10, register now!
Info and registration: www.iiclouds.org
caroline.dionne@EPFL.ch
& thomas.favre-bulle@EPFL.ch

Download the two briefs
⟨Inhabiting the Cloud⟨s⟩
& Montreux Jazz Pavilion⟩

Laboratory profile The key hypothesis of ALICE’s research and teaching activities places space within the focus of human and technological processes. Can the complex ties between human societies, technology and the environment become tangible once translated into spatial parameters? How can these be reflected in a synthetic design process? ALICE strives for collective, open processes and non-deterministic design methodologies, driven by the will to integrate analytical, data based approaches and design thinking into actual project proposals and holistic scenarios.

http://alice.EPFL.ch/

0092 Architects, Data, Datacenter, Documentation, EPFL, EPFL_ECAL_Lab, Housing, Interferences, Networks, Print, Teaching, Territory, Urbanism

0094 ⟨A⟩ I&IC Workshop #4 with ALICE at EPFL+ECAL Lab: output → Distributed Data Territories

2015.02.09/Lucien Langton

Architecture, Schools, Workshops

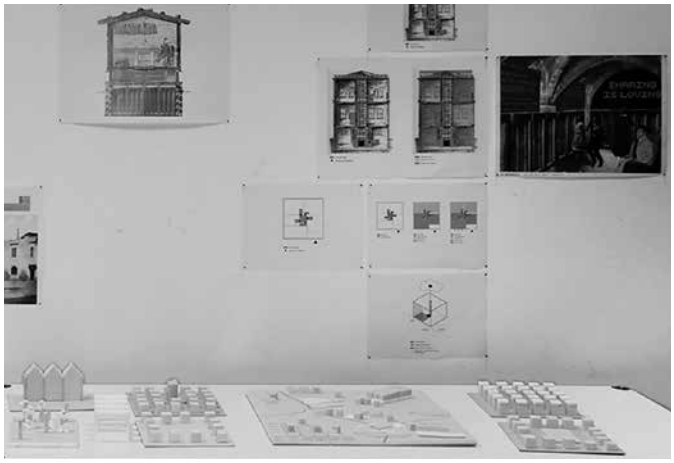
Note: the post I&IC Workshop #4 with ALICE at EPFL+ECAL Lab, brief: “Inhabiting the Cloud⟨s⟩” presents the objectives and brief for this workshop.

The week of workshop with ALICE finished with very interesting results and we took the opportunity to “beam” the students presentation to LIFT15, where Patrick Keller and Nicolas Nova were presenting the research project at the same time. The EPFL architecture laboratory already published a post about the workshop on their blog. The final proposals of the intense week of work were centered around the question of territoriality, and how to spread and distribute cloud/fog infrastructures. You can check out the original brief here and a previous post documenting the work in progress there.

5’41”
Data territories — Workshop with ALICE at EPFL+ECAL Lab from iiclouds.org on Vimeo.

The students Anne-Charlotte Astrup, Francesco Battaini, Tanguy Dyer and Delphine Passaquay presenting their final proposal on friday (06.02) in the workshop room of the EPFL+ECAL Lab.

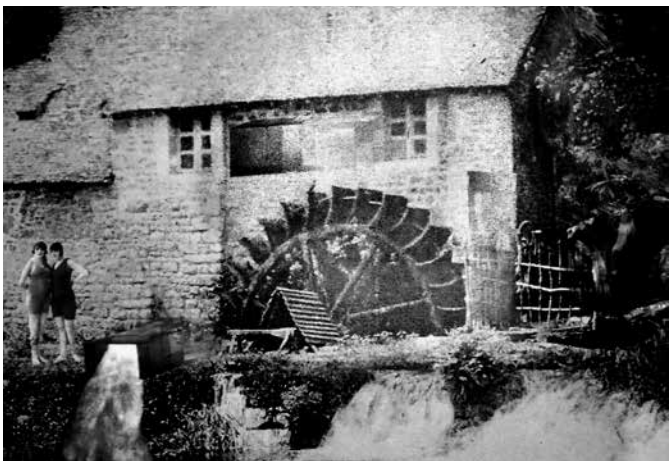
Visibility?

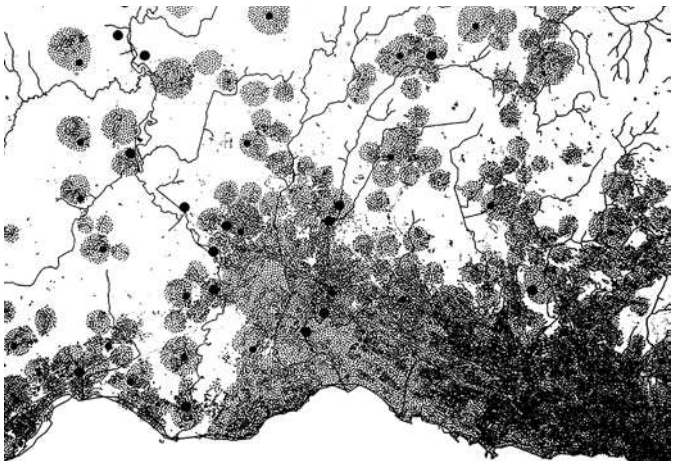


The overall Inhabiting the Cloud(s) research sketches on the wall.

Proposing to make these infrastructures visible raised a flood of questions concerning their social and architectural status. Similarly, it questions several fields about the presence of private data in the public space. How do we represent the data center as a public utility? What types of narratives/usage scenarios emerge from such a proposition? By focusing on different but correlated territorial scales, participants were able to produce scenarios for each case. Swiss territoriality and scale(s)? The three distinct territorial scales chosen were the following: the national/regional scale, the village/town or city, and the personal/common habitat scale. The proposals were established on the basis of an analysis of the locality where the workshop was held: the small city of Renens and its proximities. The research process focused on preexisting infrastructures which responded to several criteria necessary to implement server rack structures: access to regular and alternative power sources, access to cooling sources (water and air), preexisting cabled networks and/or main and stable access routes (in the mindset that the telegraph/telephone lines were setup along the train lines), and finally seismic stability as well as a certain security from other natural disasters. Doing so, it also speculates about the fact that data centers could (should?) partly become public utilities.

Water, water mills?

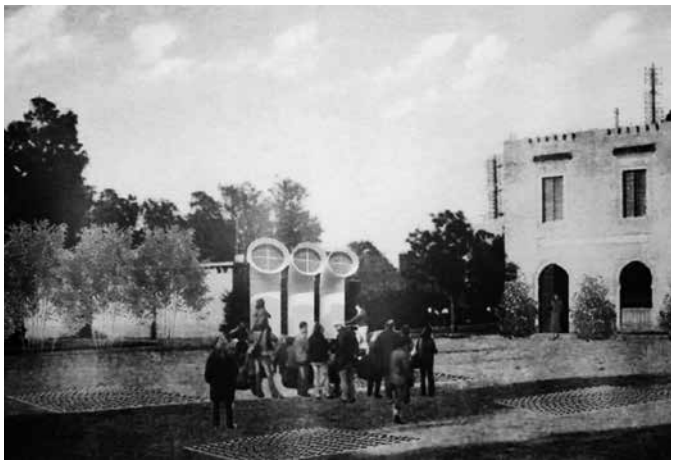


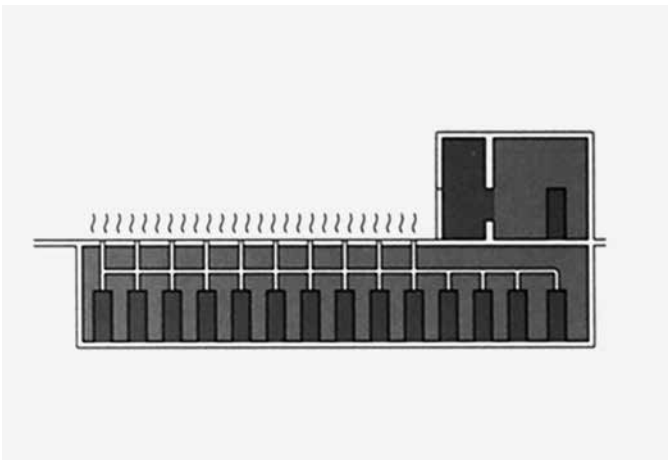


Water Mills, water cooling scenarios and their local position on the map (around the city of Renens).

The first proposition was to rehabilitate old water mills along existing rivers on the countryside leading to cities and villages in the role of “data sorting centers” or “data stream buffers” facilities. As there is no cabling this proposition may seem odd, however especially concerning Switzerland’s topography, the idea is interesting as it investigates several culturally rich aspects, not to mention the abundance of water. The analogy between water streams and network flows seems obvious, but water is also a necessary cooling source for data infrastructures. It could also be considered as a potential energy source. One could even go further and speculate on the potential interactions between the building and wildlife, as in the image used to cover this article published by Icon magazine just a few days ago.

Disused post offices?

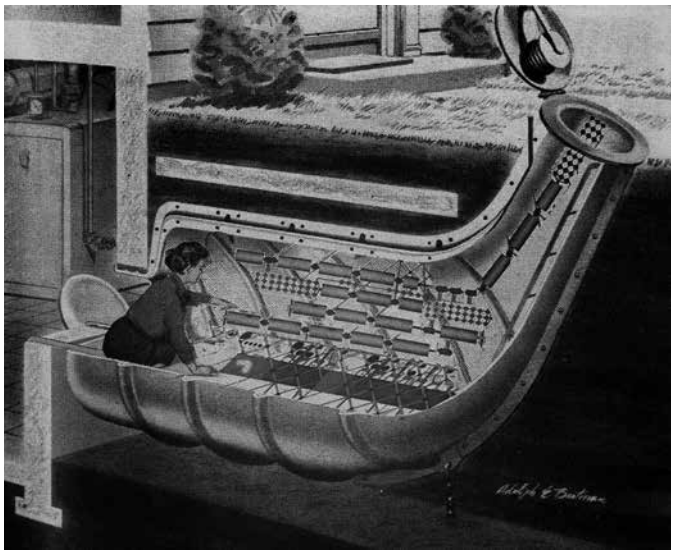


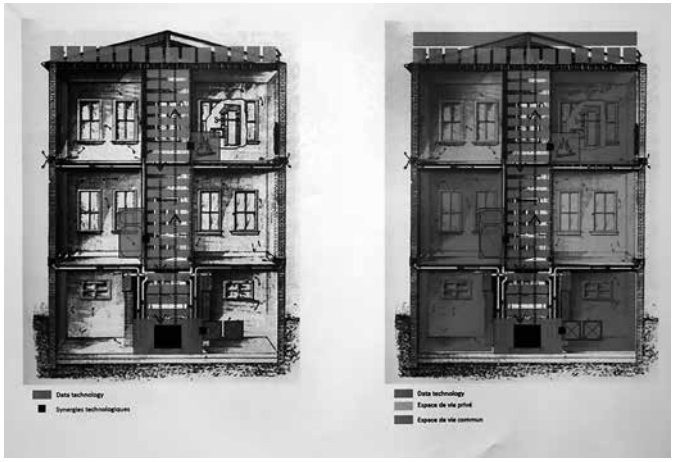


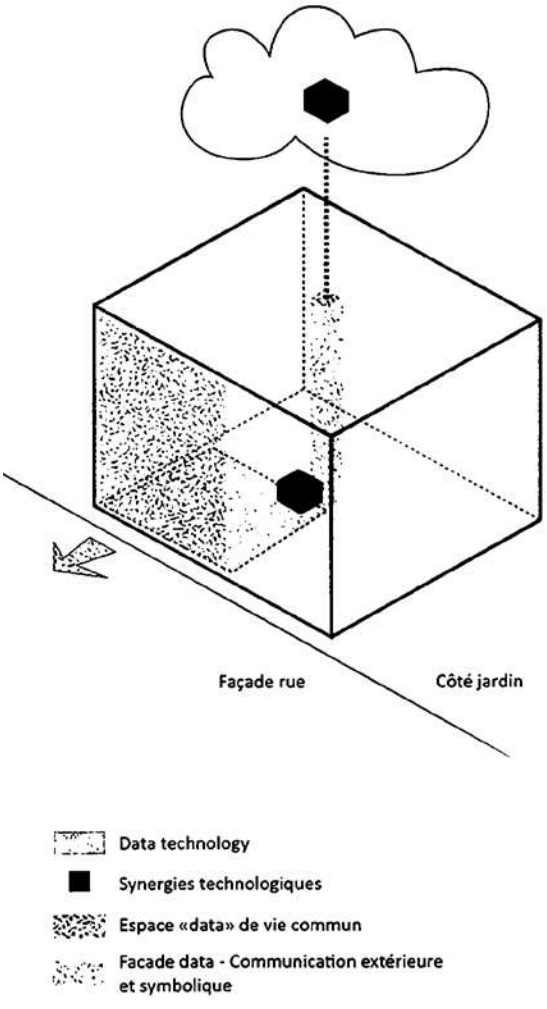
The “front” and “back ends” of most villages’ disused post offices offer quite interesting and appropriate spatial organization, if not metaphors.

On the scale of the city, the preexisting infrastructure chosen was the Post Office. Postal services are still functioning, but the buildings are deserted of much of their social interaction with the public since the coming of age of internet access. The buildings are also identically structured on a national scale, which could facilitate implementation. They are strategically positioned and already well equipped with network standards. Moreover, it could revive the social role of the village square, or redefine the city as a radial organization around data (versus spirituality). Amongst the implementations discussed were the ability to use the excess heat to create a micro-climate over the square and the possibility of redefining the public space inside the post office as a Hackerspace and Makers Lab, a bit in the same way libraries function.

Neighborhoods’ nuclear shelters
(from the cold war period)?







The building would therefore embed the capacity to develop it’s own thermal ecosystem alongside the usage of private, communal and public dataspaces.

On the scale of the office or housing building, the nuclear shelter was immediately proposed. In Switzerland, every home is to have a nuclear bomb shelter. This situation is unique in the world, and most obviously, better serves local metal groups and wine cellar enthusiasts then security. Nevertheless, however awkward this may seem, these shelters are almost a blueprint for a personal data center. Every one of them is equipped with high-end air filtering systems, generators for use in case of power outings, and solidity and stability standards set to resist a nuclear attack. This couldn’t become a model for the other countries though...

This last proposition is finally interesting as it would redefine the organization of the habitat as a radial one, a bit like the students-researchers suggested earlier above for the city. The building could therefore become a transition space in itself between public space, community space and private space. Different directions were also explored with a particular interest on the vernacular "chalet" as a possible candidate for an alpine "meshed data harvesting facilities" scenario. For now, we'll stick to the dream that one day, every family in Switzerland will be able to send their kids play in the data center downstairs. But remember: No Ovomaltine on the ethernet hub!

Acknowledgments

Many thanks to the ALICE team in general and to Prof. Dieter Dietz in particular, Thomas Favre-Bulle for leading the workshop, Caroline Dionne and Rudi Nieveen for organizing it. Thanks to Nicolas Henchoz for hosting us in the EPFL+ECAL Lab, Patrick Keller and Nicolas Nova for their introduction to the stakes of the overall project, Lucien Langton for its hard work, good advices and documentation along the week and last but not least to the students, Anne-Charlotte Astrup, Francesco Battaini, Tanguy Dyer and Delphine Passaquay for their great work and deep thinking proposals.

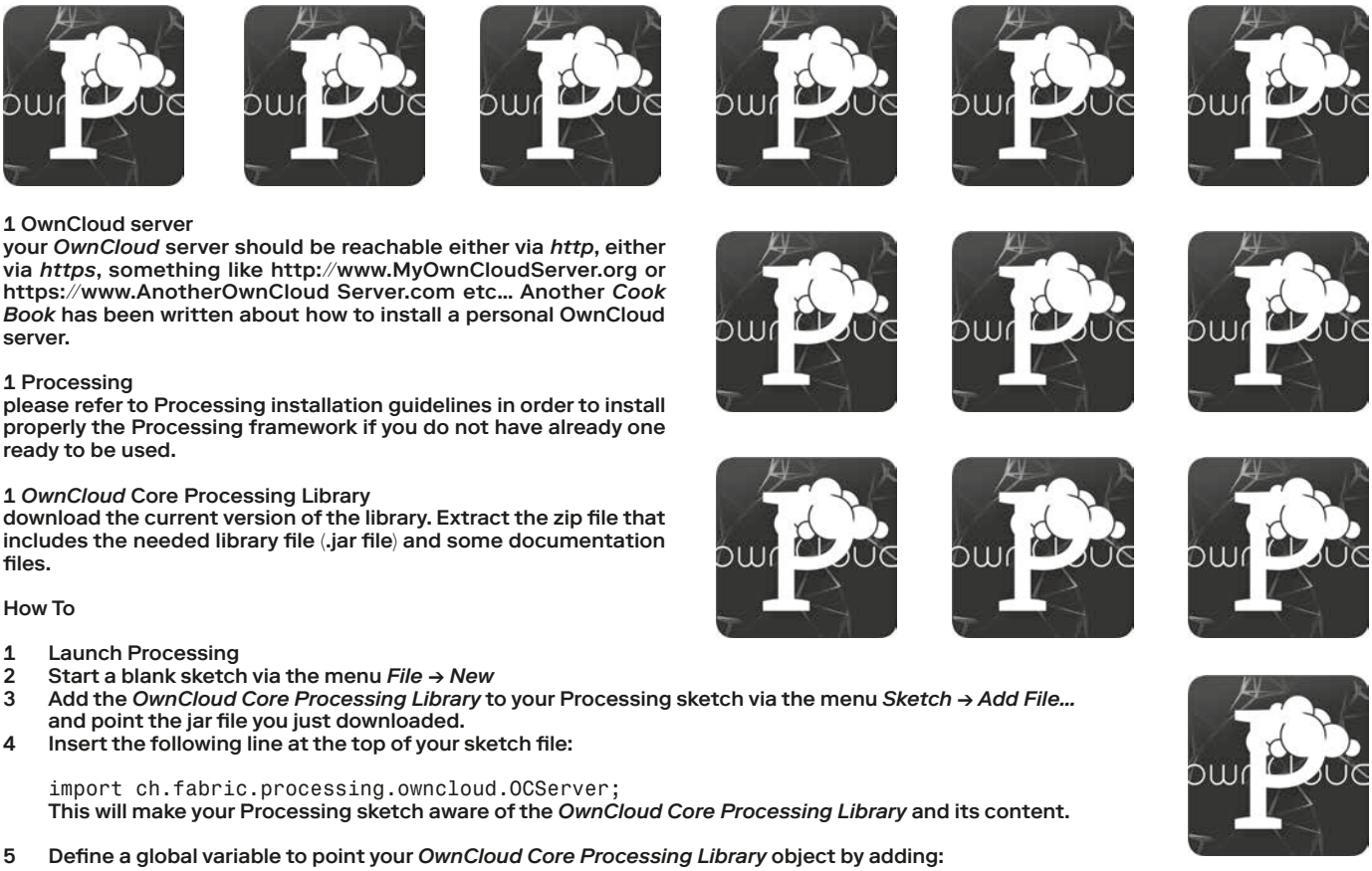
0094 Architecture, Documentation, EPFL, EPFL_ECAL_Lab, Housing, Infrastructure, Territory

0095 ⟨B⟩ Cookbook → How to set up Processing to use the OwnCloud Core Processing Library

2015.02.12/Christian Babski

Cookbooks, Interaction Design, Sciences & Technology

We will describe how to use the *OwnCloud Core Processing Library* within the Processing framework, starting from a blank sketch. Library's functions will be refined and new ones may be developped, some additional libraries will be added as well in order to propose high level functions deeper linked to the IICloud(s) project.



1 OwnCloud server
your *OwnCloud* server should be reachable either via *http*, either via *https*, something like http://www.MyOwnCloudServer.org or https://www.AnotherOwnCloud Server.com etc... Another *Cook Book* has been written about how to install a personal OwnCloud server.

1 Processing
please refer to Processing installation guidelines in order to install properly the Processing framework if you do not have already one ready to be used.

1 *OwnCloud* Core Processing Library
download the current version of the library. Extract the zip file that includes the needed library file (.jar file) and some documentation files.

How To

1 Launch Processing
2 Start a blank sketch via the menu *File → New*
3 Add the *OwnCloud Core Processing Library* to your Processing sketch via the menu *Sketch → Add File...* and point the jar file you just downloaded.
4 Insert the following line at the top of your sketch file:

```
import ch.fabric.processing.owncloud.OCServer;
```

This will make your Processing sketch aware of the *OwnCloud Core Processing Library* and its content.

5 Define a global variable to point your *OwnCloud Core Processing Library* object by adding:

```
//My main access to the Owncloud server
OCServer _myOCServer;
```

6 In the Processing sketch's *setup* function, add the followings:

```
//-- Create a new access to an OwnCloud server
_myOCServer = new OCServer();
//-- Define the targeted OwnCloud server
boolean resB = _myOCServer.SetServer("data.iiclouds.org");
```

The first line define a new *OwnCloud* object. This object will be used to access *OwnCloud* functions (copy, search and share files etc...).
The second line establishes a connection to your *OwnCloud* server by giving your *OwnCloud* server domain name or IP address.
The returned value, a *boolean* (true/false) will indicate if the connection to your *OwnCloud* was established correctly (true) or not (false).

7 In the Processing sketch's *setup* function, add the followings:

```
if (resB) {
//-- Define my Owncloud server login/password
_myOCServer.SetAccess("MyLoginHere", "MyPasswordHere");
//-- Any additional actions here…
}
```

8 You are done! You are now able to copy, transfer, search and share files from you *OwnCloud* server within the *Processing framework*. You can download files, copy them, move them etc... Add any actions you would like to perform, here are few examples:

```
//-- Get the content of my Owncloud's account root directory...
println("--------");
println("[Processing - draw()]-Listing root directory content…");
String [] myContent = _myOCServer.getContentList();
//-- …and loop on the result to display the root directory's content
for(int i=0;i<myContent.length;i++) {
println("[Processing - draw()]-"+(i+1)+"-"+myContent[i]);
}
println("--------");//-- Test if a directory exists in my Owncloud account with error returned value testing
println("--------");
println("[Processing - draw()]-Directory manipulation…");
resI = _myOCServer.fileExists("/music/");
if (resI == OCServer.FILE_EXISTS)
println("[Processing - draw()]-Directory/music/is existing.");
else if (resI == OCServer.FILE_DOES_NOT_EXIST)
println("[Processing - draw()]-Directory/music/is NOT existing.");
else if (resI == OCServer.NETWORK_ERROR)
println("[Processing - draw()]-Network problem while accessing OwnCloud.");
```

Check the *OwnCloud Core Processing Library* documentation (included in the zip file you just downloaded) for an exhaustive list of possible actions/functions, their parameters and the returned values. Have fun!

0095 Code, Data, Engineering, fabric|ch, Library, Makers, Open source, Programming, Tools

0096 (B) (The reasons why an I&IC's) OwnCloud Core Processing Library

2015.02.12/Christian Babski

Cookbooks, Interaction Design, Projects, Sciences & Technology

Beside the reflection produced by the overall *Inhabiting & Interfacing the Cloud(s)* project and the related necessity to provide "access to tools" to a larger community (largely described in the founding document of the project and in a former post about the setting up of this library), new paradigms may arise in the global organization of servers farms. These new paradigms may in return generate new ways to organize files on cloud servers (by a different control of the redundancy principle for example, or a different use of file's duplication, etc.), allowing for new projects. In order to answer the stakes of the *I&IC* design research and to prepare such output/proposals, we have developed the *OwnCloud Core Processing Library* that will allow to setup a software layer on top of the hardware layer. To download and learn how to use the *OwnCloud Core Processing Library*, we've prepared a post in the *Cook Books* section of this site.

In comparison with current use of file sharing systems, associated web interfaces or applications basically allow to synchronize files blindly, without any control nor optimization of what is transferred, when and why. That's where the *OwnCloud Core Processing Library* proposes some tools to manage files stored in cloud infrastructure in a different ways or even to manage the dispatching of files within a brand new cloud organization that this project may propose. With the overall set of bricks and elements we've already set up in the context of the *I&IC* research (*OwnCloud* server set up, *OwnCloud Core Processing Library*), we are now ready to assemble these bricks in many different ways, proposing alternatives to the now classic server farm architecture. Automated processes based on the *OwnCloud Core Processing Library* can tag *OwnCloud* contents, making possible to seal the decision to synchronize/to duplicate/to share a file according to any kind of data else than just the modified time stamp. Files transmission, to/from the cloud, may be decided by autonomous processes based on user's point of interests, user's current device, user's location etc... all this in conjunction with solutions proposed by *IICloud(s)*.

0096 Clouds, Code, Engineering, fabric|ch, Library, Open source, Programming, Tools

0098 ⟨A⟩ World Brain: a journey through data centers

2015.02.18/Nicolas Nova

by Genola Wagon et Stéphane Degoutin
Art, Resources

"World Brain" by Stéphane Degoutin and Gwenola Wagon ⟨2015⟩

World Brain proposes a stroll through motley folkloric tales : data centers, animal magnetism, the Internet as a myth, the inner lives of rats, how to gather a network of researchers in the forest, how to survive in the wild using Wikipedia, how to connect cats and stones... The world we live in often resembles a Borgesian story. Indeed, if one wanted to write a sequel to Borges' Fictions, he could do it simply by putting together press articles. The World Brain is made out mostly of found materials : videos downloaded on Youtube, images, scientific or pseudo scientific reports, news feeds... [...] World Brain takes the viewer through a journey inside the physical places by which the Internet transits: submarine cables, data centers, satellites. The film adopts the point of view of the data. The audience view the world as if they were information, crossing the planet in an instant, copied in an infinite number of instances or, at the contrary, stored in secret places. More projects by S. Degoutin and G. Wagon on their Nogovoyage website.

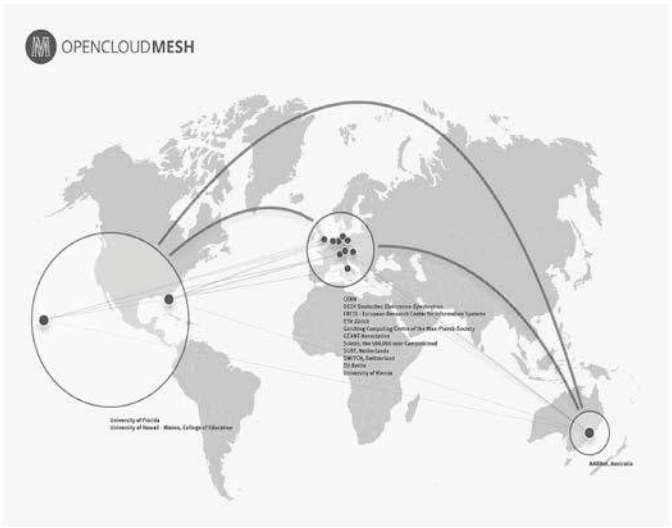
0098 Data, Datacenter, Hardware, Infrastructure

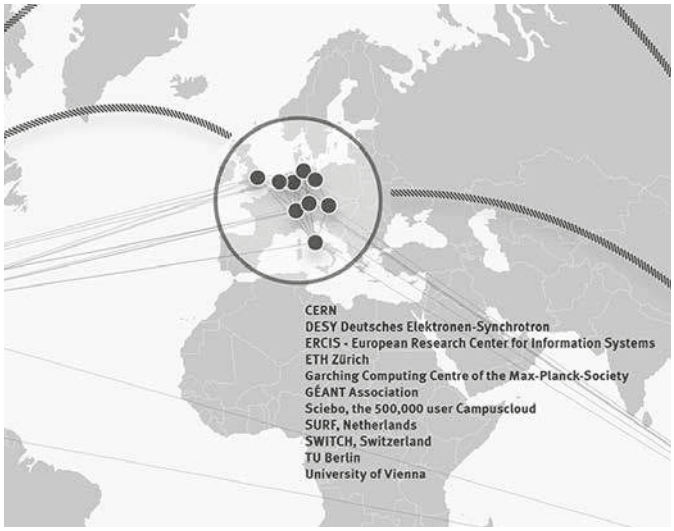
0099 ⟨C⟩ OpenCloud ⟨Academic Research⟩ Mesh

2015.03.04/Patrick Keller

by ownCloud
Resources, Schools, Sciences & Technology

Note: When we had to pick an open source cloud computing platform at the start of our research, we dug for some time to pick the one that would better match with our planned activities. We chose ownCloud and explained our choice in a previous post, so as some identified limitations linked to it. Early this year came this announcement by ownCloud that it will initiate "Global Interconnected Private Clouds for Universities and Researchers" ⟨with early participants such has the CERN, ETHZ, SWITCH, TU-Berlin, University of Florida, University of Vienna, etc.⟩ So it looks like we've picked the right open platform! Especially also because they are announcing a mesh layer on top of different clouds to provide common access across globally interconnected organizations. This comforts us in our initial choice and the need to bridge it with the design community, especially as this new "mesh layer" is added to ownCloud, which was something missing when we started this project ⟨from ownCloud version 7.0, this scalability became available though⟩. It now certainly allows what we were looking for: a network of small and personal data centers. Now the question comes back to design: if personal data centers are not big undisclosed or distant facilities anymore, how could they look like? For what type of uses? If the personal applications are not "file sharing only" oriented, what could they become? For what kind of scenarios?





ownCloud Initiates Global Interconnected Private Clouds for Universities and Researchers. Leading research organizations in the Americas, Europe and Asia/Pacific join to create world's largest public private cloud mesh.

Lexington, MA — January 29, 2015 — ownCloud, Inc., the company behind the world's most popular open source file sync and share software, today announced an ambitious project that for the first time ties together researchers and universities in the Americas, Europe and Asia via a series of interconnected, secure private clouds.OpenCloudMesh, a joint international initiative under the umbrella of the GÉANT Association, is built on ownCloud's open Federated Cloud sharing application programming interface ⟨API⟩ taking Universal File Access beyond the borders of individual Clouds and into a globally interconnected mesh of research clouds — without sacrificing any of the advantages in privacy, control and security an on-premises cloud provides. OpenCloudMesh provides a common file access layer across an organization and across globally

interconnected organizations, whether the data resides on internal servers, on object storage, in applications like SharePoint or Jive, other ownClouds, or even external cloud systems such as Dropbox and Google (syncing them to desktops or mobile apps, making them available offline). "Research labs and universities are by nature social institutions — collaborating, communicating and testing — but at the same time these same institutions must be very protective of their students, researchers and research. This often puts them at the cutting edge of technology," said Frank Karlitschek, CTO, and co-founder, ownCloud. "OpenCloudMesh gives each organization private cloud file sync and share, while Federated Cloud sharing, also known as server-to-server sharing, enables safe sharing between those clouds. The possibilities are unlimited not just for researchers and universities, but for enterprises large and small as well." — "We are at a critical juncture in cloud computing," said Peter Szegedi Project Development Officer, Management Team, GÉANT Association. "There is no longer a need to choose between privacy and security and collaboration and ease of use. We believe OpenCloudMesh will redefine the way people use the cloud to share their important files." This open API ensures secure yet transparent connections between remote on-premises cloud installations. A first draft of this OpenCloudMesh API specification will be published early this year and participation in developing and refining the API is open to all.

To-date, 14 organizations have signed up to participate, including:

— CERN
— Sciebo , the 500k user Campuscloud
— University of Florida
— SWITCH
— SURF
— University of Hawaii – Manoa, College of Education
— University of Vienna
— AARNet
— Garching Computing Centre of the Max-Planck-Society
— GÉANT Association
— DESY Deutsches Elektronen-Synchrotron
— ETH Zürich
— ERCIS – European Research Center for Information Systems
— TU Berlin

Get Involved

For more information, or for researchers and universities interested in getting involved please visit https://owncloud.com/opencloudmesh/. ownCloud protects sensitive corporate files, while providing end users with flexible and easy access to files, from any device, anywhere. Federated Cloud sharing enables users on one ownCloud installation to seamlessly share files with users on a different ownCloud installation without using shared links. Both users retain the privacy and control of a private ownCloud, and gain the flexibility and ease-of-use of a public cloud.

About GÉANT Association

GÉANT is the pan-European research and education network that interconnects Europe's National Research and Education Networks (NRENs). Together we connect over 50 million users at 10,000 institutions across Europe, supporting research in areas such as energy, the environment, space and medicine.

About ownCloud, Inc.

Based on the popular ownCloud open source file sync and share community project, ownCloud Inc. was founded in 2011 to give corporate IT greater control of their data and files — providing a common file access layer across an organization, enabling file access from any device, anytime, from anywhere, all completely managed and controlled by IT. Company headquarters are in Lexington, MA, with European headquarters in Nuremberg, Germany. For more information, visit:

http://www.owncloud.com.

0100 Academic, Clouds, Computing, Infrastructure, Mesh, Networks, Open source, Research, Software

0100 (C) Personal Cloud?

2015.03.13/Patrick Keller

by Ted Nelson
Sciences & Technology, Society, Thinking

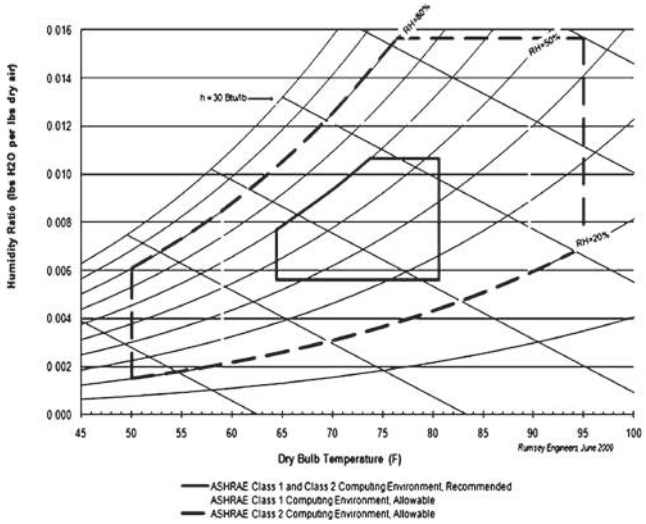
"Computing has always been personal. By this I mean that if you weren't intensely involved in it, sometimes with every fiber in your body, you weren't doing computers, you were just a user."

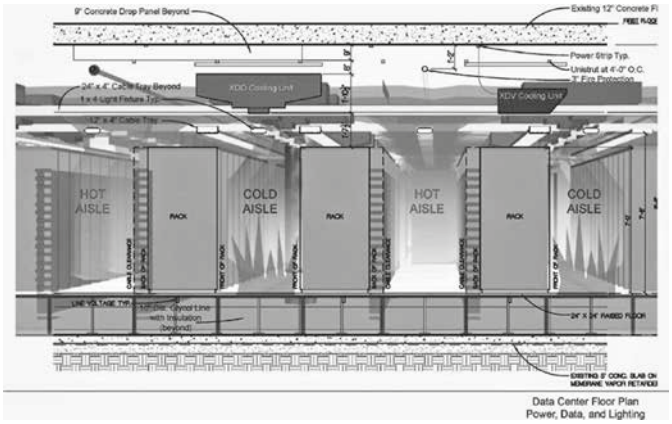
0100 Makers, Participants, Personal, Tools, Users

0101 (A) About hot and cold air flows (in data centers)

2015.03.30/Patrick Keller

Architecture, Resources, Sciences & Technology





Both images taken from the website Green Data Center Design and Management/"Data Center Design Consideration: Cooling" (03.2015). Source: http://macc.umich.edu. ASHRAE is a "global society advancing human well-being through sustainable technology for the built environment".

A typical question that arise with data centers is the need to cool down the overheating servers they contain. The more they will compute, the more they'll heat, consume energy, but also will therefore be in need to be cooled down, so to stay in operation (wide range of operation would be between 10–30°C). While the optimal server room temperature seem to be around 20–21°C, ~27°C for recent and professional machines (Google recommends 26.7°C). The exact temperature of function is subject to discussion and depends on the hardware. Yet, in every data center comes the question of air conditioning and air flow. In this case, it always revolves around the upper drawing (variations around this organization): 1° cold air aisles, floors or areas need to be created or maintained, where the servers will take their refreshing fluid and 2° hot air aisles, ceilings or areas need to be managed where the heated air will need to be released and extracted. Second drawing shows that humidity is important as well depending on heat. As hot air, inflated and lighter, naturally moves up while cold air goes down, many interesting and possibly natural air streams could be imagined around this air configuration ...

0101 Atmosphere, Cabinets, Climate, Conditioning, Datacenter, Energy, Weather

0102 ⟨A⟩ Heating homes with Clouds–links

2015.04.01/Lucien Langton

Resources, Sciences & Technology

Using excess heat generated by data centers to warm homes isn't a new idea. Earlier in our research we stumbled upon Qarnot, a french company proposing to decentralize the data center into meshed radiators to distribute computing resources across people's homes (we're guessing they took their name from Carnot's Limit ;). They announced a partnership with the city of Paris to heat 350 low-income housings in 2013. However, they are not the only rats in the race... Stimergy: Apparently another French start-up proposing to install a centralized heating system for buildings under the form of a small data center distributing heat to the floors. Project Exergy: are in proposing to match grid computing and energy relocation. They are currently fundraising on IndieGogo and have built a functional prototype (perhaps they were also inspired by thermodynamics for the name ;). MtpvCorp: Is claiming to be in possession of a technology able to transform heat to energy. This could very well mean it could directly be applied to the data center instead of decentralizing it. While the concepts seem applicable to our current infrastructure we however wonder if they are durable. Computer components are very likely to evolve in the direction of heat reduction.

0102 Computing, Devices, Energy, Housing, Links

0103 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Decentralization tools–links

2015.04.02/Lucien Langton

Resources, Society

A brief post on additional open-source services, software, hardware, community and art projects we stumbled upon during our ongoing research:

- Commodify.us (service) enables users to retrieve their Facebook data, anonymize it and sell it back for market value. We're not sure it's legit (there's a security warning while loading the site). It however seems to be the same people behind another service of the sort: GiveMeMyData.com
- Freifunk.net (community) is a community-powered free wireless network originating from Germany.
- Guifi.net (community) is an open, free and neutral telecommunication network built piece by piece (by literally deploying cables and antennas) by the community. The project originates from Spain.
- Superglue.it (service, community) is a free tool to build and host your website at home. The project seems ambitious as it combines self-hosting hardware standards with a custom-made WYSIWYG webpage builder and a template repository fed by users (all webpages built become open-source templates).
- FluidNexus.net (software) is a mobile messaging app for Windows and Android. It uses Bluetooth and the movement of crowds to spread data and suppresses the need for operators, a bit like the Firechat app. It however seems that the project has been abandoned in 2009.
- Uncloud (software) is an application that enables anyone with a laptop to create an open wireless network and share information. Users can connect wirelessly while remaining disconnected from the internet.
- GoTenna (hardware) is a product enabling users to text and share their location even when there is no telecom tower or satellite coverage.
- AirChat (software, hardware) is a free, secure and open-source telecommunication network built by LulzLabs working a laptop and a hacked radio.
- Alternet.cc (speculative design) is a free and secure communications network hypothetically built and maintained by the community.
- Project Maelstrom Last but not least, Project Maelstrom is BitTorrent latest proposition to decentralize web hosting through the BitTorrent protocol — We cannot help to ask ourselves: Is it still decentralization if it's owned by a company?
- Project Fi, while we're in the corporate sphere: Google is apparently aiming to take over the front-end customer away from telecom companies. Perhaps decentralization is becoming the new marketing argument for companies which desire in fact to centralize your data.

We will continue to add links as our research goes forward. In the meanwhile, you can find all the links mentioned in the research project on Delicious under the tag "i&ic_designresearch" (*note: also mentioned in this previous post, "*Public Survey on Delicious*", within the* Resources *category on this blog*).

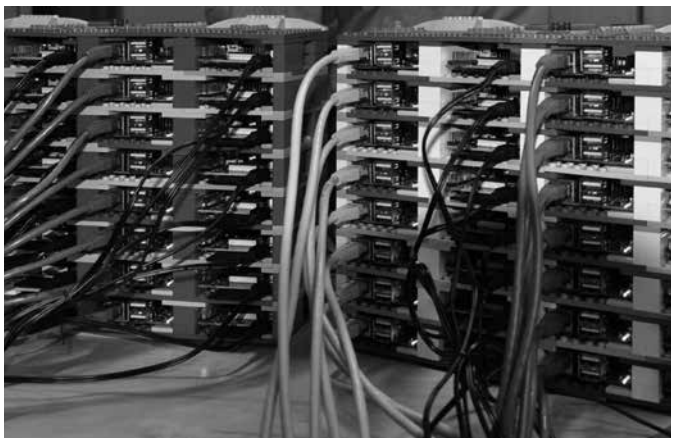
For additional and updated resources, a Github is maintained that lists tools:
https://github.com/redecentralize/alternative-internet
http://redecentralize.org/

0103 Links, Tools

0104 ⟨A⟩ Raspberry Pis tiny data center⟨s⟩?

2015.04.28/Patrick Keller

Resources, Sciences & Technology



Or should we start thinking about tiny clusters of Raspberry Pis?
It seems that they've already done some debugging and Lego constructions at the Southampton University! ⟨for a "supercomputer" though⟩.

0104 Computing, Datacenter, Links, Makers, Open source, Tools

0106 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Poetics and Politics of Data, exhibition at H3K

2015.05.27/Patrick Keller

Publications

Note: after some time of relative silence on the blog, we're happy to say that the design-research project Inhabiting & Interfacing the Cloud⟨s⟩ will be part of the next exhibition at the Haus der elektronischen Künste in Basel ⟨CH⟩, in the form of a counterpoint or "behind the scenes" to the media art exhibition per se. This explains partly that, then... We had to work hard for the exhibition, especially because I was also in charge of the scenography ⟨a work by fabric|ch in this case though⟩, while Lucien Langton produced almost all the video documentation content. At the invitation of H3K curator, Sabine Himmelsbach, we'll therefore present the work that has been realized so far, half-way through our research process. This will consist for large parts in video documentation and few artifacts, including some new ones ⟨"Tools" oriented⟩. We will use this material later on the I&IC website to fully document the current state of our work. The opening of the exhibition Poetics & Politics of Data will be tomorrow at 7pm, at H3K ⟨Dreispitz neighborhood in Basel⟩, the show will then last until end of August.

Poetics and Politics of Data
Duration: 29.05.2015–30.08.2015
Opening: 28.05.2015, 7pm
H3K, Freilager-Platz 9,
4142 Münchenstein/Basel, CH

The exhibition "Poetics and Politics of Data" addresses the paradigm of a data-driven society and reflects life in an increasingly datafied world. In visionary future scenarios, scientists enthuse over a world in which algorithms take over managing processes, envisioning a highly sensory and datafied space for us to live in, a world in which our desires and activities are anticipated, long before we carry them out. „Big Data" is the keyword to this new era in which the power of data induces a radical transformation of a society whose actions and production of knowledge rely increasingly on the accumulation and evaluation of data. "Poetics and Politics of Data" shows artistic works that approach the phenomena of Big Data and data mining, visualizing the continuous bitstream in various ways while referring to the political and social implications that come with a world that is controlled by data — from the processes of self-optimization to economical aspects and questions concerning the use and evaluation of this data. Who has access to our data? In what ways is it possible to extract useful information and find "valuable" and applicable correlations from the immense pool of data? The exhibition introduces critically subversive approaches and interventions in networked spaces that make use of the potential of a virtual community and reflect personal performance in social networks. It focuses on aspects of surveillance strategies, data mining, privacy, post-privacy and digital autobiography acted out in social networks. Amid the constantly growing, infinite ocean of data, artists question the meaning and position of the individual in a technologically networked society and — thanks to their resistance and sense of independence — offer various alternatives to a normative world of data. From computer-mediated installations to data visualizations, they address these questions through different media in order to not only generate a new approach to complex data structure, but to create a poetic immersive space of data. "Poetics and Politics of Data" is an interdisciplinary project between HeK ⟨House of Electronic Arts Basel⟩, the Institute of Experimental Design and Media Cultures of the University of Applied Sciences and Arts Northwestern Switzerland FHNW, the Centre for Technology Assessment TA-SWISS and Opendata.ch, the Swiss chapter of the Open Knowledge Foundation, presenting an exhibition about artistic approaches to big amounts of data. Artistic strategies and concepts of data usage, -interpretation and -criticism will be on display, discussing the potential and dangers of Big Data and data mining.

Scenography

As part of the scenography of the exhibition, the design research group "Inhabiting & Interfacing the Cloud⟨s⟩" has been asked to create an infrastructure that will also present works by ECAL ⟨Media & Interaction Design⟩, HEAD – Genève ⟨Media Design⟩, EPFL Lausanne ⟨ALICE⟩ and fabric|ch.

Group exhibition with works by

Christopher Baker ⟨USA⟩, Aram Bartholl ⟨D⟩, Paolo Cirio ⟨IT⟩, R. Luke DuBois ⟨USA⟩, Ellie Harrison ⟨GB⟩, Marc Lee ⟨CH⟩, Rafael Lozano-Hemmer ⟨MEX/CAN⟩, Bernd Hopfengärtner ⟨D⟩ & Ludwig Zeller ⟨D/CH⟩, Kristin Lucas ⟨USA⟩, Moniker ⟨NL⟩, Jennifer Lyn Morone ⟨USA⟩, RYBN ⟨FR⟩, Erica Scourti ⟨GR/GB⟩

Christopher Baker, *Hello World! or: How I Learned to Stop Listening and Love the Noise,* 2008

0106 Architects, Art, Data, Designers ⟨interaction⟩, Ethnographers, Exhibitions, Media, Students

0107 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ I&IC within Poetics and Politics of Data, exhibition at H3K. Pictures

2015.06.23/Patrick Keller

Publications

Note: a few pictures from the exhibition “Poetics and Politics of Data” that is currently taking place at the Haus der elektronischen Künste in Basel. With works by artists such as Rafael Lozano-Hemmer, Moniker, Aram Bartholl, Ludwig Zeller, Jennifer Lyn Morone, etc., the exhibition gives a sharp view on the production of artists ⟨some of which were presented on this blog⟩ around the contemporary theme of “data”.

We had the pleasure to present the temporary results of our design research as the main part of a scenography created by fabric|ch and accompanied by texts from Nicolas Nova and myself. Note also that Nicolas Nova will be a speaker during the conference Data Traces: Big Data in the Context of Culture & Society that will take place at the H3K between the 3rd and 4th of July and when a publication will be released: Poetics & Politics of Data, Sabine Himmelsbach & Claudia Mareis, ed. Christoph Merian Verlag, Basel, 2015.

Intro text to the exhibition and credits:

Inhabiting & Interfacing the Cloud⟨s⟩ is an ongoing design research about Cloud Computing. It explores the creation of counter-proposals to the current expression of this technological arrangement, particularly in its forms intended for private individuals and end users ⟨Personal Cloud⟩. Through its fully documented cross-disciplinary approach that connects the works of interaction designers, architects and ethnographers, this research project aims at producing alternative yet concrete models resulting from a more decentralized and citizen-oriented approach. Halfway through the exploration process, the current status of the work is presented in the form of a ⟨computer⟩ cabinet ⟨of curiosities⟩.

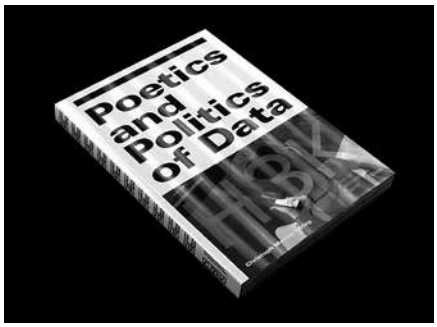
http://www.iiclouds.org

0107 Architects, Art, Designers ⟨interaction⟩, ECAL, EPFL_ECAL_Lab, Ethnographers, Exhibitions, fabric|ch, HEAD, Media, Mediated, Scenography, Students

0108 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Poetics and Politics of Data, the publication

2015.09.28/Patrick Keller

Publications, Thinking



272 p, ills color, 17×24 cm, pb, English Poetics and Politics of Data, ed. Christoph Merian Verlag, Basel, 2015 ⟨29.– CHF⟩

Note: we're pleased to see that the publication related to the exhibition and symposium Poetics & Politics of Data, curated by Sabine Himmelsbach at the H3K in Basel, has been released later this summer. The publication, with the same title as the exhibition, was first distributed in the context of the conference Data Traces. Big Data in the Context of Culture and Society that also took place at H3K on the 3rd and 4th of July. The book contains texts by Nicolas Nova ⟨Me, My cloud and I⟩ and myself ⟨Inhabiting and Interfacing the Cloud⟨s⟩. An ongoing Design Research⟩, but also and mainly contributions by speakers of the conference ⟨which include the American Theorist Lev Manovitch, curator Sabine Himmelsbach and Prof. researcher from HGK Basel Claudia Mareis⟩ , as well as exhibiting artists ⟨Moniker, Aram Bartholl, Rafael Lozano-Hemmer, Jennifer Lyn Morone, etc.⟩ The book serves both as the catalogue of the exhibition and the conference proceedings. Due to its close relation to our subject of research ⟨the book speaks about data, we're interested in the infrastructure –both physical and digital– that host them⟩, we're integrating the book to our list of relevant books. The article by Orit Halpern ⟨A short history of Clouds⟩ is obviously of direct significance to our work.

"Whether using Internet-based installations or graphic data visualizations, these artists question the relevance and place of the individual in a technologically wired society in which each of us generates a nearly incomprehensible amount of data on a daily basis. The digital traces we leave behind reflect a world increasingly controlled by data, and the artistic positions presented in this book seek to make those continuous streams of information visible. Through the phenomena of "big data" and "data mining", critical questions are posed about our ambivalence towards living in such a world. With essays by Orit Halpern, Claudia Mareis, Ramón Reichert, and others."

0108 Books, Clouds, Code, Conferences, Data, Thinkers

0110 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Inhabiting and Interfacingthe Cloud⟨s⟩, a design research teaser about misunderstandings and paradoxes ...

2015.10.05/Patrick Keller

Architecture, Design, Ethnography, Interaction Design, Publications, Sciences & Technology, Thinking

At the occasion of the first peer reviewed conference we'll take part with the I&IC project ⟨Renewable Futures in Riga⟩ and following the exhibition at H3K last 2015 Summer ⟨Poetics and Politics of Data⟩, Lucien Langton edited and produced a short teaser about our design research that dive into misunderstandings and paradoxes that concern the "Cloud⟨s⟩"!

02'31"
Inhabiting & Interfacing the Cloud⟨s⟩, "can weather affect cloud computing?", from iiclouds.org on Vimeo.

0110 Clouds, Data, Datacenter, Research

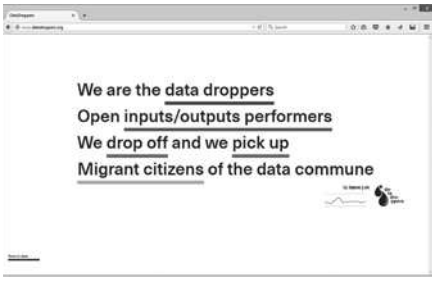
0111 ⟨D⟩ Datadroppers, a communal tool to drop off and/or pick up data ⟨and then develop projects⟩

2015.10.08/Patrick Keller

by datadroppers.org
Projects, Resources, Sciences & Technology

Note: fabric|ch, one of our partner on this project, has developed an open source data sharing tool that tries to simplify the procedures of declaring/logging and sharing data ⟨from "connected sensor things", mainly⟩. This is Datadroppers. The service is somehow similar, yet slightly more versatile than the now vanished Pachube, or the contemporary, but proprietary, Dweet.io ⟨that we've already mentioned in the resources section of this blog⟩. One of the interesting points in this case is that the new

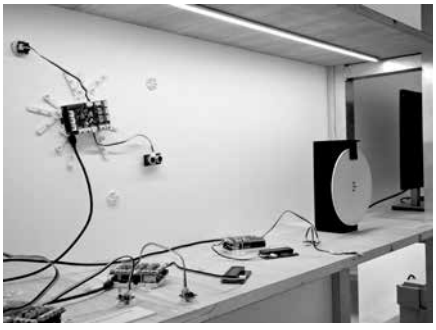
web service has been created by designers/coders that are themselves in need of such data service for their own work, promising in some ways that it won't be commodified. The other interesting point is the fact that they are formally involved in this design research project as well (through Christian Babski, developer), which should help us match the functions of Datadroppers with OwnCloud: through the use of the documented OwnCloud Core Processing Library and the one of Datadroppers, new paradigms and artifacts in file/data sharing and cloud operations could be envisioned, implemented and tested. But moreover and mainly, projects made by the design community could be developed that will take advantages of the open resources of Processing (later on, Javascipt as well), OwnCloud and these libraries. Designing tools remains one of the goals of this design research project. Designing artifacts that will use these (improved) tools will be the work of the coming year in our design research...



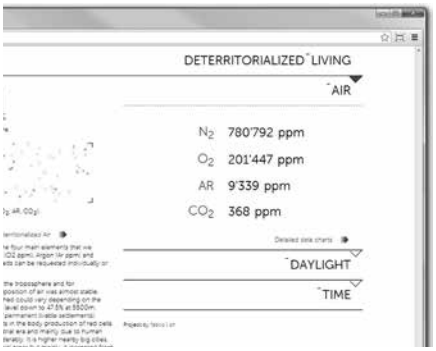
The "communal service" is in fact a statement, the statement becomes the navigation interface. The two main sections of the website are composed by the parts in which you can play with or search for data. We drop off and we pick up is the area where one can see what can be achieved with data. Obviously, it is either possible to declare (drop off) data and tag them, or retrieve them (pick up) — image above —. You can also Search data following different criteria-below —.

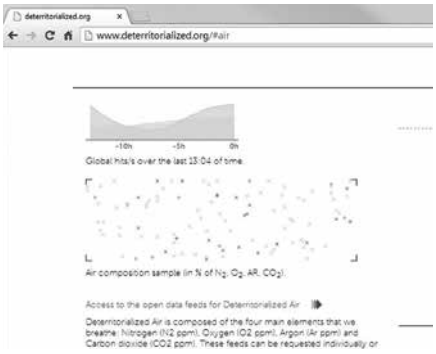
Usual data will certainly be live feeds from sensors, like the one in the top image (i.e. value: lumen). But you could go for more interesting or unexpected things, either when you'll create data or when you'll use them. The two images above are about "curiosity" data. They were captured within an exhibition (see below) and are already partially interpreted data (i.e. you can leave a connected button with no explanation in the exhibition space, if people press it, well... they are curious). As another example, we also recorded data about "transgression" in the same exhibition: a small digital screen says "don't touch" and blinks in red, while an attached sensor obviously connected to the screen can indeed be touched. Childish transgression and slightly meaningless I must admit... It was just a test. But you could also declare other type of data, any type, while using complementary tools. You could for example declare each new image or file within an open cloud service and start cascading things. Or you could start thinking about data as "built" artifacts... like we did in a recent project (see below, Deterritorialized Living) that is delivered in the form of data. Or you could also and of course *drop off* static data that you would like to store and make accessible for a larger community. Possibilities seems in fact to be quite large.

Datadroppers as a commune could even be considered as a micro-society or nation. It comes with a dowloadable "flag", if you desire to manifest your attachment to its philosophy or plant it in your datacenter!



Some views of Datadroppers in first use during Poetics and Politics of Data exhibition at the Haus der elektronische Künste in Basel (Switzerland), as part of the scenography designed by fabric|ch. Many Raspberry Pis were installed inside the space that captured exhibition's data and feed the service. They can now be retrieved from http://www.datadroppers.org/index.html#search as the exhibition will end this week-end → search with string "H3K" or "Museum".





Finally, I must mention the project that initiated Datadroppers, both because we developed the rules of the data sharing service during this latter project (Link → follow "Access to open data feeds"), but also because it is probably one of the most interesting use of Datadroppers so far...

Deterritorialized Living is an artificial, yet livable troposphere that is delivered in the form of data. Just like if we indeed install atmospheric sensors in a real environment, unless the environment doesn't exist in this case (yet), it is the project. The process is therefore reversed within this almost geo-engineered climate that follows different rules than our earth/cosmos driven everyday atmosphere. We have the open data feed to later set it up. fabric|ch or another designer as the feed is open. We plan to use this feed and materialized it through different installations, like we already started to do.

So, for now, this fictive data flow of a designed atmosphere is also delivered as a feed (again: Search data → Deterritorialized), among other ones (some "real", some not), within the webservice offered by Datadroppers .

0111 Clouds, Data, Open source, Service, Sharing, Tools, Web

0116 ⟨D⟩ Dead Drops and Keepalive by A. Bartholl

2015.10.28/Patrick Keller

by Aram Bartholl
Art, Resources

Note: we mentioned the project Dead Drops (2010), by artist Aram Bartholl, in the foundation document of our design research Inhabiting & Interfacing the Cloud(s). The project was about passive memory sticks (usb keys) that were inserted into public streets walls, for anybody to drop or pick files. A. Bartholl recently published a new project, Keepalive, which also presents a public, situated (rural or into the wild) and almost ritual interaction with files. Both projects are presented below in more details, but what interests us in these two cases is this different interaction with files that is proposed. Both physical and that brings a different meaning to the interaction itself: a special type of (situated) interaction to access specific files. Something quite different therefore than a general purpose type of interaction ("clic" with a mouse or "tap" with a finger) to access any type of files (current situation with cloud storage). In the continuity of the workshop we held about physical bot objects that manipulate data, "Botcaves" — Networked Data Objects, this is certainly a track we'll like to pursue and digg into during the next steps of this project.

The Dead Drops Manifesto

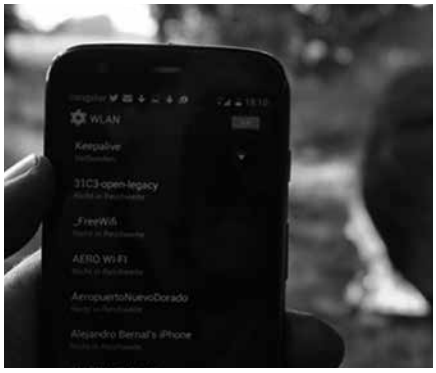
Dead Drops is an anonymous, offline, peer to peer file-sharing network in public space. Anyone can access a Dead Drop and everyone may install a Dead Drop in their neighborhood/city. A Dead Drop must be public accessible. A Dead Drop inside closed buildings or private places with limited or temporary access is not a Dead Drop. A real Dead Drop mounts as read and writeable mass storage drive without any custom software. Dead Drops don't need to be synced or connected to each other. Each Dead Drop is singular in its existence. A very beautiful Dead Drop shows only the metal sheath enclosed type-A USB plug and is cemented into walls.You would hardly notice it. Dead Drops don't need any cables or wireless technology. Your knees on the ground or a dirty jacket on the wall is what it takes share files offline. A Dead Drop is a naked piece of passively powered Universal Serial Bus technology embedded into the city, the only true public space. In an era of growing clouds and fancy new devices without access to local files we need to rethink the freedom and distribution of data. The *Dead Drops* movement is on its way for change! Free your data to the public domain in cement! Make your own Dead Drop now! Un-cloud your files today!!!

Aram Bartholl 2010

Keepalive

Sculpture, permanent outdoor installation
Aram Bartholl 2015

The boulder from the region Neuenkirchen, Niedersachsen contains a thermoelectric generator which converts heat directly into electricity. Visitors are invited to make a fire next to the boulder to power up the wifi router in the stone which then reveals a large collection of PDF survival guides. The piratebox.cc inspired router which is NOT connected to the Internet offers the users to download the guides and upload any content they like to the stone database. As long as the fire produces enough heat the router will stay switched on. The title Keepalive refers to a technical network condition where two network endpoints send each other 'empty' keepalive messages to maintain the connection.https://en.wikipedia.org/wiki/Keepalive To visit the piece please arrange an appointment with Springhornhof.de. The project 'Keepalive' by Aram Bartholl was realised in the context of the research project 'Art and Civic Media', as part of the Innovation Incubator Lüneburg, a large EU project funded by the European Fund for Regional Development and the Germna State of Lower Saxony.




```
  320.264 Boy Basics 101 A Survival Guide for Paren
  696.405 Breathing Retraining Manual (Instructiona
8.459.781 Build a Gel Electrophoresis Chamber .pdf
2.401.003 buyers' handbook to all things fabulous f
  399.139 christian-songwriter-survival-guide.pdf
10.121.028 Cisco Tech Data Survival Guide.pdf
   87.237 Competition Survival Guide High Desert Da
2.608.781 Complete Guide to Twitter Analytics.pdf
6.265.580 CompleteGuidetoInstagramMeasurementSimply
  468.816 Configuration instructions for PPPoE conn
        0 contents.txt
  228.394 CREATING DIGITAL ARTWORK.pdf
5.280.421 creator-playbook-for-brands.pdf
  124.094 digital signature instructions.pdf
  518.114 DIY SYNTH Guide.pdf
1.549.730 DIY_carpet_stain_removal_guide_Infographi
1.971.667 Do It Yourself DIVORCE GUIDE.pdf
  161.294 Don't Panic. The Engineering Physics Surv
2.656.593 Drone Survival Guide.pdf
1.566.031 End of life- a guide.pdf
1.637.413 extreme_gui_makeover.pdf
  264.406 FINE ART GUIDELINES - Art Management Handb
1.478.601 fundraising-kit-and-survival-pack.pdf
1.494.891 GALLERY-SURVIVAL-GUIDE-TATE.pdf
2.138.816 Gentlemans-Guide-to-Rough-Sex.pdf
```

0116 Data, Interaction, Object, Situated, Storage

0117 ⟨D⟩ I&IC Workshop #5 with Random International at ECAL, brief: "The Everlasting Shadow"

2015.11.10/Patrick Keller

by Dev Joshi
Interaction Design, Schools, Workshops

Note: As I mentioned in a previous post, the I&IC design research project enters further developments in the context of new experimental workshops. Being still part of the first phase of our work, these researches are led in collaboration with design partners (peers) and the participation of Interaction Design students (Ba & Ma). They follow the purpose of creating a thematic corpus of design "counter-proposals" to the existing apparatus of the "cloud" (as described in the foundation document about this research). I therefore publish the brief that Dev Joshi (from the London based collective Random International) recently sent me, in preparation of the coming workshop that will take place at ECAL next week (16–20.11.2015). This workshop will interrogate what the "self" might become in an era of permanent personal data traces left on countless online/cloud based services. These traces, now commonly known as "digital footprints", or "data shadows" ("ombres numériques" in French) and even sometimes "data ghosts" open interesting questions when it comes to communicate/interface with these "ghosts", objectify or make them visible.

The Everlasting Shadow
Workshop brief, November 2015.
Random International/Dev Joshi
(Head of Creative Technology)

Introduction

A unique construct, the cloud is always growing but will never fill up and it always looks the same, regardless of the angle from which it is viewed. People often think of the cloud as something which is lightweight, easy to use, not imposing and perhaps even mercurial in nature. Content streams are always changing, documents viewable at their most current version — everything is fast and new. Looking below the surface, it is clear that this perception isn't true. The cloud is heavy — it has a huge physical and environmental impact and the permanence of the data is worrying. Where does all that stuff go, who is there to look after it? When all of your life's information exists on someone else's computer, even if you delete, how can you be sure that it is gone? Years of our lives left to rot in forgotten Dropbox accounts; previous versions of ourselves trapped on abandoned MySpace pages with only Tom for company. The dualism of the ghosts we leave behind in the cloud, these indelible snapshots of ourselves, raise interesting questions about where the self exists in the modern age and of ownership. If ownership over something is the right to destroy it, have we surrendered ourselves to a broken immortality which we cannot control. Have we lost the right to forget and be forgotten?

Questions and staring points

The cloud is always something that belongs to someone else, operating in borrowed time and space. Devise a way of informing others about the physical and digital shadow they leave behind when they use the cloud. Written records have existed for millennia but great effort is still expended in deciphering ancient texts written in forgotten languages. If everything in the cloud really is forever, how can we ensure it retains its value when the world has forgotten how we communicate? How many different versions of you are there in the cloud? If they could speak, what would they say? Your digital ghosts are trapped on islands around the cloud — is there a way to rescue them? Maybe they just need a shelter to live in now that you have moved on?

Output and medium
Could be, but not limited to:

— Making use of existing, static, cloud data (Things in your drop box, old social media accounts)
— Small (desktop) artifacts
— Projection and frames in space
— things which hang from the ceiling or are fixed to the wall
— Screen based

Timeline

— Monday: Introduction and discussion (am briefing)
— Tuesday: Bandwidth and bare minimums (am briefing)
— Wednesday: The trees that grow on technology island (am briefing)
— Thursday: Work day
— Friday: Presentation prep and delivery

Further reading
Marcelo Coelho, Karsten Schmidt, Allison E. Wood

Reference pieces

http://random-international.com/work/temporary-printing-machine/
http://random-international.com/work/aspect-white/
http://random-international.com/work/future-self/
http://random-international.com/work/tower/

0117 Artificial reality, Body, Clouds, Data, ECAL, Interface, Presence, Privacy

0118 (D) I&IC workshop #5 at ECAL: (esoteric) comments about the cloud (about the brief)

2015.11.11/Patrick Keller

Interaction Design, Schools, Uncategorized, Workshops

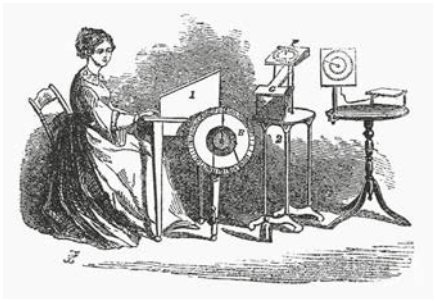
Following the publication of Dev Joshi's brief on I&IC documentary blog yesterday, I took today the opportunity to briefly introduce it to the interaction design students that will be involved in the workshop next week. Especially, I focused on some points of the brief that were important but possibly quite new concepts for them. I also extended some implicit ideas with images that could obviously bring ideas about *devices* to build to access some past data, or "shadows" as Dev's names them. What comes out in a very interesting way for our research in Dev's brief is the idea that the *data footprints* each of us leaves online on a daily basis (while using all type of digital services) could be considered as past *entities* of ourselves, or trapped, forgotten, hidden, ... (online) fragments of our personalities... waiting to be contacted again. How many different versions of you are there in the cloud? If they could speak, what would they say? Yet, interestingly, if the term "digital footprint" is generally used in English to depict this situation (the data traces each of us leaves behind), we rather use in French the term "ombre numérique" (literally "digital shadow"). That's why we've decided with Dev that it was preferable to use this term as the title for the workshop (The Everlasting Shadows): it is somehow a more vivid expression that could bring quite direct ideas when it comes to think about designing "devices" to "contact" these "digital entities" or make them visible again in some ways.

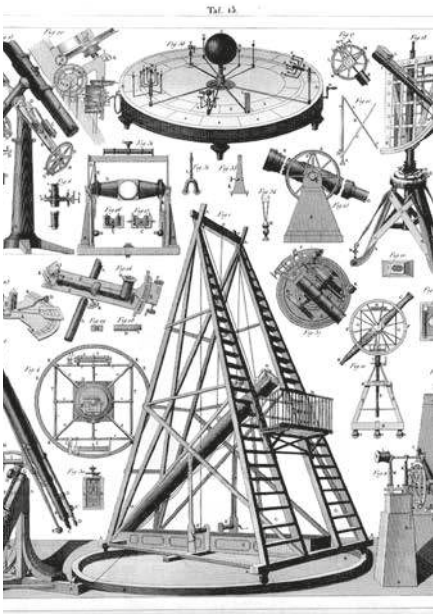
Philippe Ramette, "L'ombre de celui que j'étais/Shadow of my former self ", 2007. Light installation, mixed media.

By extension, we could also start to speak about "digital ghosts" as this expression is also commonly used (not to mention the "corps sans organes" of G. Deleuze/F. Gattari and previously A. Artaud). Many "ghosts"/facets of ourselves? All trapped online in the form of zombie data? "Your digital ghosts are trapped on islands around the cloud — is there a way to rescue them? Maybe they just need a shelter to live in now that you have moved on?" ... or a haunted house? And this again is a revealing parallel, because it opens the whole conceptual idea to *beliefs*... (about ghosts? about personal traces and shadows? about clouds? and finally, about technology? ...) What about then to work with inspirations that would come from the spiritualism domain, its rich iconography and produce "devices" to communicate with your *dead past data entities*? Or even start to think about some kind of "wearables", and then become a new type of fraud *technological data psychic*?

(↑) Fritz Lang. "Dr. Mabuse, the Gambler", movie, 1922. (↓) Fraud medium Colin Evans in levitation, 13 June 1938 (Wikipedia).

We could even digg deeper into these "beliefs" and start looking at old illustrations and engravings that depicts relations to "things that we don't understand", that are "beyond our understanding"... and that possibly show "tools" or strange machinery to observe or communicate with these "unknown things" (while trying to understand them)?





(↑) Spiritualism in 1855, author unknown. (↓) J.G. Heck. A plate from "The Iconographic Encyclopedia of Science, Literature and Art" published in 1851. Astronomy tools.

This last illustration could also drive us, by extension and a very straight shortcut , to the idea of the *Sublime* (in art, but also in philosophy), especially the romantic works of the painters from that period (late 18th and early 19th centuries, among them W. Turner, C. S. Friedrich, E. Delacroix, T. Cole, etc.) Submerged by the presentiment of a nature that was in all dimensions dominating humans, that remained at that time mostly unexplained and mysterious, if not dangerous and feared, some painters took on this feeling, named "sublime" after Edmund Burke's *Philosophical Enquiry* (1757), and start painting dramatic scenes of humans facing the forces of nature.

Thomas Cole, "The Voyage of Life: Old Age", 1842. National Gallery of Art, Washington DC.

It is not by chance of course that I'll end my "esoteric comments about the brief" post with this idea of the Sublime. This is because recently, the concept found a new life in regard to technology and its central yet "unexplained, mysterious, if not dangerous and feared" role in our contemporary society. The term got completed at this occasion to become the "Technological Sublime", thus implicitly comparing the once dominant and "beyond our understanding" Nature to our contemporary technology.

"American Technological Sublime" by D. E. Nye, published in 1994 (MIT Press) was certainly one of the first book to join the two terms. It continues the exploration of the social construction of technology initiated in his previous book, "Electrifying America" (MIT Press, 1990). More recently in 2011, the idea popup again on the blog of Next Nature in an article simply entitled The Technological Sublime.

So, to complete my post with a last question, is the Cloud, that everybody uses but nobody seems to understand, a technologically sublime artifact? Wouldn' it be ironic that an infrastructure, which aim is to be absolutely rational and functional, ultimately contributes to creates a completely opposite feeling?

Quotes are from Dev Joshi's brief "The Everlasting Shadow".

0118 Beliefs, Clouds, Data, Information, Interface, Interferences, Visualization

0119 (D) Haunted Machines

2015.11.12/Patrick Keller

Art, Resources, Thinking

http://hauntedmachines.com

Following yesterday's post related to esoterism and the Cloud, here is an interesting project and resource by Nathalie D Kane (Future Everything) and Tobias Revell (artist) concerning Haunted Machines!

0119 Artists, Computing, Critical, Curators, Links, Speculation, Thinkers

0122 ⟨D⟩ I&IC workshop #5 with Random International at ECAL: output → "The Everlasting Shadows"/ Ghost Data Interfaces

2015.11.23/Patrick Keller

Interaction Design, Schools, Workshops

Note: the post I&IC Workshop #5 with Random International at ECAL, brief: "The Everlasting Shadow" presents the objectives and brief for this workshop. The fifth workshop we ran in the frame of the design research I&IC ended up on November the 20th. It lasted for a week ⟨16–20 November 2015⟩ under the creative direction of our guest researcher and interaction designer Dev Joshi ⟨rAndom International's creative technologist⟩, with the help of research assistants in interaction design Lucien Langton and Laura Perrenoud. It involved 3rd year Ba students in Interaction Design from ECAL, so as one 1st year student in Mas Design Research from EPFL+ECAL Lab.

4'41"
The Everlasting Shadows
Workshop with rAndom International at ECAL
from iiclouds.org on Vimeo.

The title and subject of the workshop was "The Everlasting Shadows", as explained by Dev Joshi in a previous post, and commented by myself later on to the students that would be involved, before the week of work started. The aim of the workshop was to address the ⟨now common⟩ situation of the data we leave or disperse behind us in clouds and online services of all sorts. Data that will then remain, sometimes dormant or even forgotten for a long period of time and to consider these traces as literally ⟨forgotten⟩ parts of ourselves — fragments? shadows? or even ghosts? — The purpose was to select a set of exemplary shadow data and then experiment how one could develop "interfaces" to connect ⟨again⟩ with these "shadows", make them "speak" ⟨"*what would they say if they could speak ?*"⟩, visible or "alive" again. These interfaces could likely be spatial, immersive or "sheltering" in some ways. We chose to realize the workshop in the big cinema studio of the school for that reason.

Dev Joshi presenting rAndom International's work at ECAL during his research workshop week and talking to the students at the beginning of final presentations .

The ongoing work has been shortly documented along the process by Lucien Langton, but we can now take more time to come back to the proposals made by the students and document them. All in all, most of the projects didn't really develop experimental interfaces per se or tried to reformulate the cloud paradigm as it was envisioned, at the exception maybe of *Bits and Tweets of Former Self*, but focused on comments or narratives about the described situation. The overall week of research triggered engaged discussions among the students and seemed to focus — one more time — on the need to "make visible and graspable" in some ways the" invisible" cloud based processes and data. The fact that the students experienced difficulties to develop concrete proposals, which is a situation observed since the beginning of the research project and in particular its workshop period, underlines and confirms our initial hypotheses ⟨centralization, "putting things at a distance" that need to be further questioned⟩. As the "cloud" technological construct and metaphor is dedicated to become the main paradigm and future of ⟨online⟩ computing, at least for the coming decade⟨s⟩ if we consider the amount of money investments made in this sector by big companies, it stresses the needs for simpler, graspable infrastructures and tools.

Anamorphic Memory — ⟨Edina Desboeufs, Pierre Georges⟩

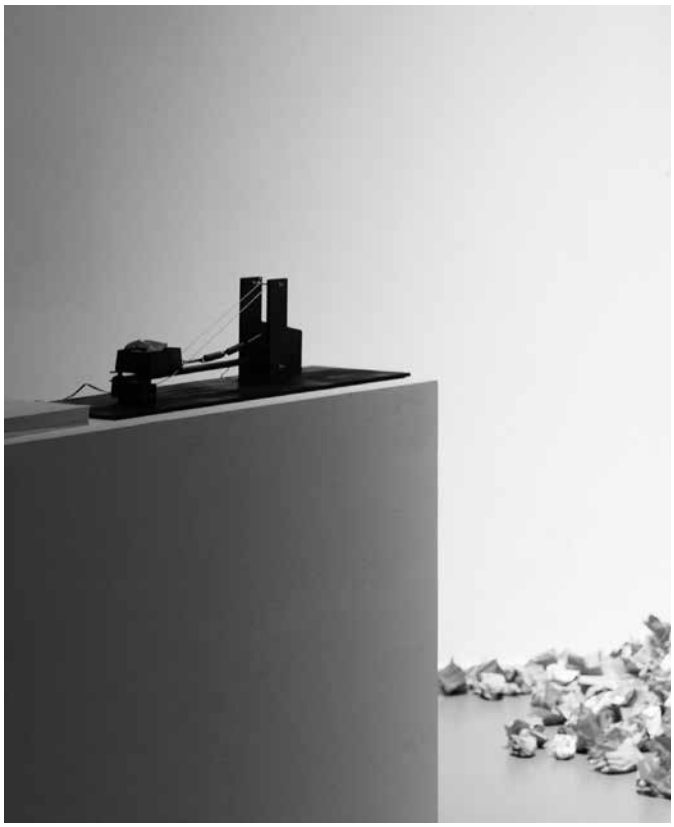
Anamorphic Memory, the proposition made by the two students was more of a personal interpretation and metaphor than it was a concrete interface proposal about "ghost data" kept online in "cloudified" services. Regarding the theme of "shadows" and past identities that would be left online in the form of data, Edina and Pierre decided to record moments of life taken in the cafeteria of the design school ⟨ECAL⟩. These recordings were made with a video camera without sound, shot under a unique point of view while sitting on a chair. Their project then developed a way to navigate these visual memories while overlapping their projection to the current state of the same location. The project ended up in a form of anamorphic projection installation, in which the video shot in the cafeteria were beamed on a screen to be seen from the exact same position and visual deformation as from where they were taken at a different period in time. The seemingly overlapping of past and present times was the purpose of the work.

Pyro42 — ⟨Benjamin Botros⟩

⟨←⟩ *Pyro42* intro screen. ⟨→⟩ Benjamin Botros introducing his "data narration" during final presentation of the workshop.

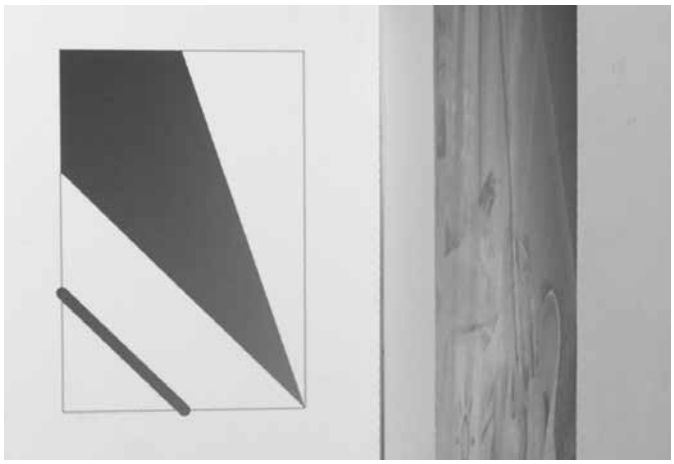
Based on the public data and statistics about a particular gamer who played during 3854 hours since 2005, data mined from the platform STEAM and its online gaming community, Benjamin Botros decided to built up one gamer's digital life narrative. If *Pyro42* didn't really suggest any interface or ways to interact with such data, it nevertheless proposed a story in the form of a quite "surrealistic" and imaginative gaming life about this particular gamer "who collected a fair number of achievements" before "peacefully retiring" after having built "4 bio farms and 4 organic ranches"! All of a sudden, data about wins and losses, flags stolen, cities and countries "built", etc. take a different flavor full of heroic but also depressing moments...

Abandoned Lil_sug4r_92 — ⟨Julie-Lou Bellenot, Lara Défayes, Pablo Perez, Karen Pisoni⟩



The pile of colorful waste ⟨top⟩ reminding us of F. Gonzalez-Torres' pile of candies. Catapult on the left that throw paper on the pile ⟨bottom⟩. A forsaken email account that had not been opened for years but continued to receive emails ⟨mostly spams and publicity⟩ — and therefore be filled, served as the base for this project. The email account was in function years ago when it was used by one of the four students involved in this proposal. A teenager at this time then. *Abandoned Lil_sug4r_92*, only partly realized in the short time at disposal, proposed a kind of automated machine linked to that account and that would fold a piece of colored paper ⟨spam = red, promo = yellow, newsletter = "blue", etc.⟩ for each email received, then throw it away on a nearby pile. It was a way for Julie-Lou, Lara, Karen and Pablo to show the waste associated with such accounts, rather than any meaningful identity or construct. The pile of colored paper eventually acted as an information design, showing by the colors in the pile which was the dominant type of useless emails/data kept online.

Embodied Archive — ⟨Alexia Léchot⟩



"Tempo_B" is a temporary folder in the school ⟨ECAL⟩ where all students from different faculties can leave temporary files during their day of work, until they are erased at the end of the day. Alexia Léchot proposed to keep and curate some of these files so to give view and memory to what happens in the school during a week of workshop. The installation she proposed took the form of a corner projection, immersive and diptych projection of these files which happened to look a bit like a big open book. A tracking camera was observing the x-y movements of any spectator on the floor within this corner and use them to navigate the archived content ⟨old-recent⟩.

Bits and Tweets of Former Self — ⟨Mylène Dreyer, Jasmine Florentile — from EPFL+ECAL Lab–, Lina Vozniuk-Berzhaner⟩

Lina Vozniuk-Berzhaner and Mylène Dreyer playing with their interface, the semi-transparent screen and tweets superimposing to their faces in front of the mirror ⟨top, middle, bottom⟩. Probably the most developed proposal at the end of the workshop and the closest to the brief, *Bits and Tweets of Former Self* was a program that dug into the past content of a ⟨potentially any⟩ Twitter account ⟨you would have to grant access and then login⟩. With the help of a mirror, selected past messages and sentences were beamed into air at the height of the face of the user of the device, reversed and scrolling. You couldn't really see these messages until this person, facing another mirror placed on the wall "catched" these "flying messages" with a sort of "mesh-screen" ⟨semi-transparent⟩ with which she was equipped and that she could move. While displacing this "mesh-screen" in front of her face, the messages started to appear... ephemerally. Further more, they became readable and superimposed to the user with their reflection on the facing horizontal mirror on the wall.

Acknowledgments: Many thanks to Dev Joshi for his involvement with the students, his personal interpretation of the Cloud theme and for the interesting exchanges we had about the subject of the research in general; Laura Perrenoud for helping the students, Lucien Langton for its involvement, pictures and documentation. A special thanks to the students from ECAL and EPFL+ECAL Lab involved in the project and the energy they've put into it: Julie-Lou Bellenot, Benjamin Botros, Lara Défayes, Edina Desboeuf, Mylène Dreyer, Jasmine Florentile ⟨EPFL_ECAL Lab⟩, Pierre Georges, Alexia Léchot, Pablo Perez, Karen Pisoni, Lina Vozniuk-Berzhaner.

0123 ⟨D⟩ I&IC Workshop #6 with Sascha Pohflepp at HEAD: brief, “Cloud Gestures”

2015.11.23/Nicolas Nova

by Sascha Pohflepp
Ethnography, Schools, Workshops

Note: as mentioned by Patrick last week, the I&IC project moved further and we’re now doing additional workshops. Here is the brief of the one proposed by Sascha Pohflepp to Media Design students at HEAD – Genève this week.

Cloud Gestures Workshop brief, November 2015. Sascha Pohflepp ⟨plugimi⟩ Brief We are being ever more permeated by clouds. This migration of aspects of our life into the digital is only going to speed up as more and more aspects of it is being captured as data and mediated by services. But what is the cloud? Does it have a physical presence? What is its language? Can we resist it? Do certain people use it in certain ways? Are users always human? Does it ever rain? What are gestures of the cloud today ? In this project we are asking you to assume both the role of a cloud ethnographer and speculative documentarian. In the first step you will do field work to find out how exactly our lives that are evaporating into the cloud. Formulate a research question, position or hypothesis and observe people, focussing on gestures and metaphors. Ask them to describe how they imagine the cloud, how they conceive of the objects they are creating and the machinery that is running it. How they feel it is affecting their life and where it may be going. Importantly, do not just consider what is in front of you, also think about the vast cascade of actions that a simple touch on a display might initiate. Some gestures may be invisible, some may take the shape of cities. Collect as much as data as you can, this is important. Give thought to your method before you go into the field. Consider some of the examples you’ve seen during the introduction and adapt their techniques to your needs and interests. For the second step we ask you to turn your data into a document of what you observed and its cloudiness. You are fairly free in terms of medium and what aspects you focus on. There will be something in your data that will serve as a focal point. Present your research in an unconventional way.

Suggestions

Elaborate on a small gesture and expand it or focus on the whole and distill it into one gesture. Be a true documentarian or reflect on our world by situating your insights in a speculation. Re-enact ⟨and document⟩ behaviors; make the invisible visible or embody it; describe what you see in language or pretend you are observing a new language; pretend everything is the other way around; consider the largest gesture involved in what you have observed, consider the smallest; consider who is gesturing and towards whom; are users human?; create maps or destroy them; re-/assign gestures; reflect the all-too human; draw. Related work & reading Slides of Sascha’s presentation ⟨PDF⟩ Versuch_einer_Phaenomenologie by Vilem Flusser Drawing a Hypothesis ⟨video⟩ by Nikolaus Gansterer A Simple Introduction to the Practice of Ethnography and Guide to Ethnographic Fieldnotes by Brian Hoey

Photo by Hanna Elisabeth. All that is solid melts into Airbnb — title of an event at the Swiss Institute, September 2014

0123 Behavior, Clouds, Designers ⟨interaction⟩, Documentation, Ethnography, Gestures, HEAD, Scenarios, Teaching, Users

0125 ⟨D⟩ I&IC Workshop #6 with Sascha Pohflepp at HEAD: output → Cloud Gestures

2016.01.15/Nicolas Nova

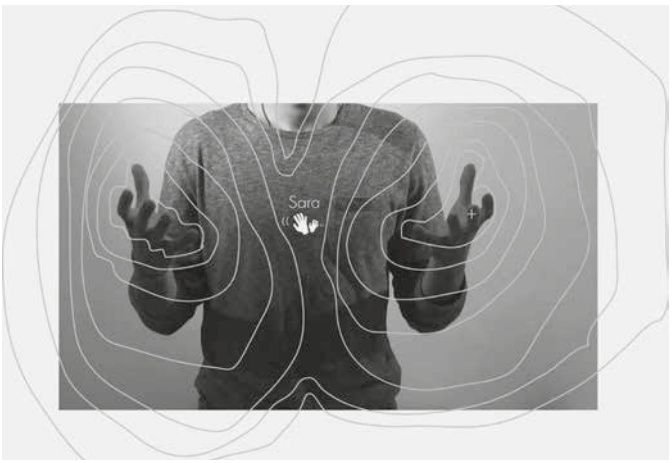
Ethnography, Schools, Workshops

Note: the post I&IC Workshop #6 with Sascha Pohflepp at HEAD: brief, “Cloud Gestures” presents the objectives and brief for this workshop. The 6th workshop of our I&IC project lasted four days at the end of November and it was led by Sascha Pohflepp, with students from the Media Design program at the Geneva School of Art and Design ⟨HEAD – Genève⟩.

3’39”
Cloud Gestures — Workshop with Sacha Pohflepp at HEAD – Genève from iiclouds.org on Vimeo.

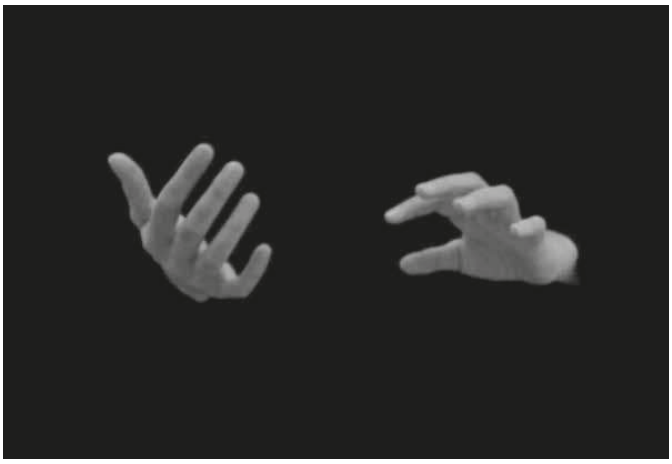
Entitled “Cloud gestures”, the workshop addressed the representations people built when using cloud-based technologies, and, more specifically, the types of gestures they deploy when interacting with them. The group adopted a design ethnography approach to these issues, documenting everyday practices and designing artefacts that materialize the use of cloud computing services. This research direction aimed at generating insights, ideas and opportunities that will later be relevant for designing alternatives to existing systems. The three projects that emerge out of this workshop all address cloud gestures in their own way. The short amount of time devoted to field research/data analysis only led to hypotheses. Nevertheless, they can be seen as relevant directions to be explored in further investigations.

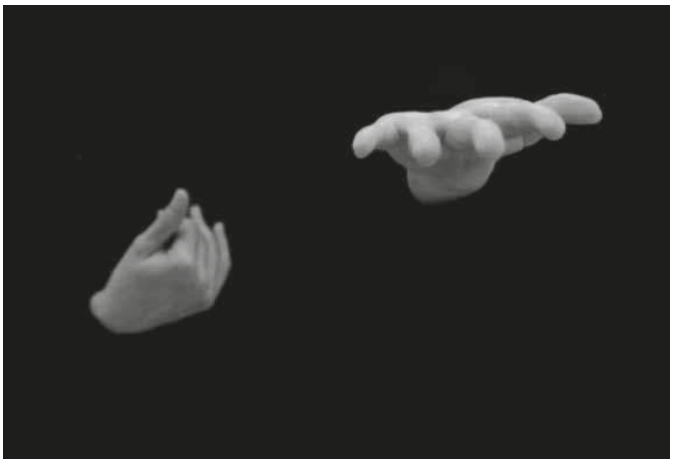
"SARA" — (Vanesa Toquero)

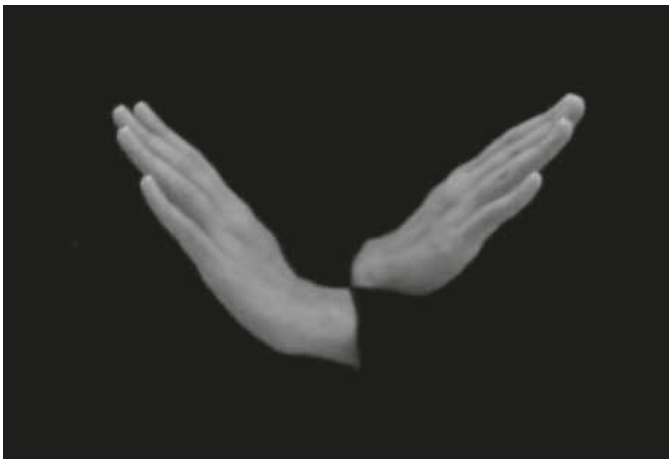


The project explored the notion of predictions, and how data collected by sensors (and located "in the cloud") could be used for anticipating future situations and behaviors. The student selected a group of users and asked them what gestures they did when they wanted to anticipate something, to make a decision, what happens if rain was coming, what happened if they were to receive tons of tons of data. She videotaped this material, following their hand movement (people protecting their HEAD, slapping their fingers, etc.). To some extent, this can be seen as a poetic depiction of anticipatory gestures, as such motion may be remotely connected to cloud technologies. The hypothesis the student wanted to explore consisted in investigating how predictions that could come from the cloud may materialize, or may be triggered by users. The output of the project is a series of little films of people talking about the future, video of human users as seen from "a machine eye" that tracks the movement of one's hands, and detecting their intentions. Such films show how our body language, the non-verbal communication we put in place, could be a relevant way to interact with machines and cloud technologies.

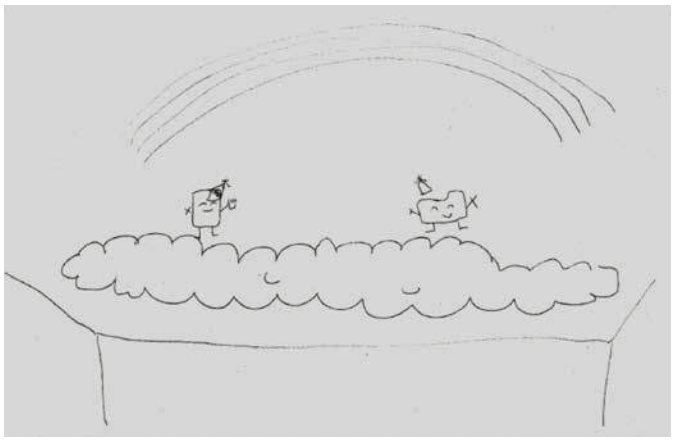
Cumul0mainbus — (Sara Bourquin, Hind Chammas)

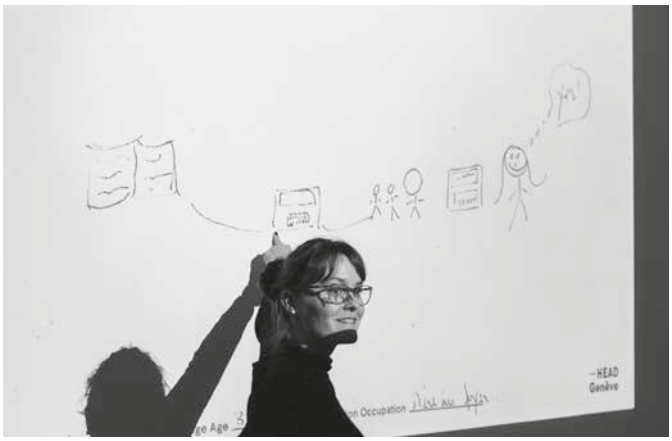






The group approached a group of teenage students and interviewed them about their knowledge about the Cloud, social media and networked technologies. They ask them which action they do repeatedly when they use such platform... which led to a series of "verbs" described by the users: typing, commenting, sharing, liking, stalking, uploading, communicating, etc. They then asked the teenagers to recreate them through gestures, which they videotaped in order to document these so-called "cloud gestures". Interestingly, the group noticed how these users "use their own selves/their body as a reference" and that the gestures proposed were homogeneous between the people interviewed. The next step consisted in selecting the most salient gestures (classifying, sharing, organizing, blocking, stalking) that the group then recreated by filming them in two colors in order to create flip-books. These flip books could be seen as a documentation of cloud gestures, a material depiction of everyday interaction with cloud technologies. The other end of the data center so to say. The project's name — Cumul0mainbus — is a pun, a portmanteau word based on the name of a cloud type, and "main", the French word for "hand", revealing the intersection of gestural interaction and cloud tech.





The group selected a diverse set of individuals and ask them to elicit their representation of the cloud on paper. In order to do that, they asked these people to "draw a life-cycle of your shared files". As the question may be a tad too technical, they told them to represent what happens to their files as they use them. Their intention was to find out how people think about such issues, as well as discuss the temporality of digital content. One of the reason that motivated such approach was that "people did not understand what we meant by cloud", as expressed by one of the group member. The drawings produced were quite abstract. One of the user represented the Cloud as Egypt's pyramid because "whatever I share, it's shared with my family in Egypt". Another described a series of steps that show what happen to one's file from a computer to a server ⟨the latter being represented as humans⟩. This made the students realize no one really knew how the cloud work. An additional remark is that no one raised issues about surveillance. The students then chose the three most interesting drawings and created textual interpretations of this material. Using this, they then created a series of User Interfaces that describe the cloud interface/functionality as envisioned by the person interviewed. Each highlight potential needs and interests regarding cloud functionalities: — Heaven/hell interface: you can decide whether your file would stay or vanish after a certain point in time — The cloud party: files are "drunk"/partying, there's some partying time for the file and you need to be sober so that you can download them "Space wars": when you upload/download files, they would duplicated themselves/leave traces in other places, so there are multiple instances of files ⟨duplicates⟩

0125 Behavior, Cloud, Documentation, Ethnography, HEAD, Interaction, Teaching, Users

0126 ⟨D⟩ Old web today, by Rhizome

2016.01.18/Patrick Keller

by Rhizome.org
Interaction Design, Resources, Sciences & Technology, Thinking

http://rhizome.org/editorial/2015/nov/30/oldweb-today/

"⟨...⟩ Today's web browsers want to be invisible, merging with the visual environment of the desktop in an effort to convince users to treat "the cloud" as just an extension of their hard drive. In the 1990s, browser design took nearly the opposite approach, using iconography associated with travel to convey the feeling of going on a journey. Netscape Navigator, which used a ship's helm as its logo, made a very direct link with the nautical origins of the prefix cyber-, while Internet Explorer's logo promised to take the user around the whole globe. ⟨...⟩"

0126 Clouds, Interaction, Interface, Links, Networks, Users, Web

0130 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Hu T.-H. ⟨2015⟩. A Prehistory of the Cloud

2016.05.12/Patrick Keller

Resources, Thinking, Uncategorized

"We may imagine the digital cloud as placeless, mute, ethereal, and unmediated. Yet the reality of the cloud is embodied in thousands of data centers, any one of which can use as much electricity as a midsized town. Even all these data centers are only one small part of the cloud. Behind that cloud-shaped icon on our screens is a whole universe of technologies and cultural norms, all working to keep us from noticing their existence. In this book, Tung-Hui Hu examines the gap between the real and the virtual ⟨sic⟩ in our understanding of the cloud. ⟨...⟩"

Note: while we do not necessarily follow Mr. Hu in all is assertions, we found it very interesting to dig into the potential past of

this physical and digital construct (the cloud), even so it obviously mingles its own past with the one of the Internet, and previously with telegraph/telephone lines and railways that served as the initial paths for these "lines". Very interesting is also the part that presents the invention of the "user", coming from an initial idea of sharing a common resource. It indeed seems that the "user" emerged from the ideas and technologies of "time-sharing", then "multiprocessing", when a single mainframe computer could remain stuck by a single user's computations for hours or even days, sometimes for no results (error in the code).

0130 Books, Clouds, History, Infrastructure, Internet, Networks, Thinkers

0131 (A)(B)(C)(D) Bratton H. B. (2016). The Stack, On Software and Sovereignty

2016.05.27/Patrick Keller

Design, Resources, Sciences & Technology, Thinking

"(...). In an account that is both theoretical and technical, drawing on political philosophy, architectural theory, and software studies, Bratton explores six layers of The Stack: Earth, Cloud, City, Address, Interface, User. Each is mapped on its own terms and understood as a component within the larger whole built from hard and soft systems intermingling — not only computational forms but also social, human and physical forces. This model, informed by the logic of the multilayered structure of protocol "stacks", in which network technologies operate within a modular and vertical order, offers a comprehensive image of our emerging infrastructure and a platform for its ongoing reinvention. (...)."

Note: recently published by the MIT Press — as well as quoted as a work in progress by Lucien Langton in a post back in 2015 — comes this book by Prof. Benjamin H. Bratton. It consists in a comprehensive analysis, both technical and philosophical of what we could call "The Cloud", yet what Bratton describes as a world scale "stack" consisting in 6 layers: Earth, Cloud, City, Address, Interface, User (and which interestingly is not so distant to our own approach considering the user, the interface, the infrastructure and the territory).

0131 Books, Cloud, Data, Infrastructure, Internet, Networks, Research, Thinkers

0132 (A)(B)(C)(D) Inhabiting & Interfacing the Cloud(s): all research workshops results at once (recap about usages, interaction, territory)

2016.06.13/Patrick Keller

Architecture, Ethnography, Interaction Design, Schools, Workshops

Note: the 6 research workshops we organized in the frame of Inhabiting and Interfacing the Cloud(s) took place during the "preliminary sketches" phase. A known and common phase that takes place in the course of each design process, during which we could naturally involve peers partners and students so to increase our "trials and errors". The outcomes of these experimental workshops were further analyzed in two posts by N. Nova and P. Keller (ethnographic "Lessons" and design "Learnings"), to further develop design proposals as the main results of this research, along with two publications to come.

Introduction to I&IC & field study (10.2014) — no sound :

04'22"
Soilless – Research introduction and field study from iiclouds.org design research on Vimeo.

Situations, usages and alternative clouds (01.2016 & 11.2014), at HEAD – Genève:

3'39"
Cloud Gestures — Workshop with Sacha Pohflepp at HEAD – Genève from iiclouds.org on Vimeo.

2'29"
Cloudified Scenarios — Workshop with James Auger on Vimeo.

Interaction and data interfaces ⟨11.2014 & 11.2015⟩, at ECAL:

5'00"
Botcaves — Workshop with Matthew Plummer-Fernandez at ECAL on Vimeo.

4'41"
The Everlasting Shadows Workshop with rAndom International at ECAL from iiclouds.org on Vimeo.

Networked and decentralized cloud infrastructures ⟨02.2015⟩, at EPFL-ECAL Lab:

5'41"
Data territories — Workshop with ALICE at EPFL+ECAL Lab from iiclouds.org on Vimeo.

0132 Clouds, Data, Datacenter, ECAL, EPFL_ECAL_Lab, Experience, HEAD, Installation, Interface, Methodology, Users

0133 ⟨C⟩ I&IC ethnographic research wrap-up

2016.06.17/Nicolas Nova

Ethnography

It is time to wrap things up with the field research we conducted with a series of workshops. Practically, the material we produced in the first year of the project is based on two main sources. On the one hand, we spent a year and a half collecting messages, discussions, exchanges and arguments online — mostly on forums/on-line platforms related to cloud computing. On the other hand, using this interview guide, we conducted a series of discussions with various profiles of nomadic workers ⟨musicians, VJs, journalists, consultants, third space/fab lab users⟩ to understand how they used cloud computing systems.

Sasha Pohflepp with Nicolas Nova, Patrick Keller and media design students at the end of his workshop at HEAD – Genève. Image pulled from the post "I&IC workshop #6 with Sasha Pohflepp at HEAD" ⟨15.01.2016⟩.This material was complemented by a workshop with Media Design students, under the supervision of Sascha Pohflepp, focused on the gestures people adopt with such platforms. The analysis of this material enabled us to highlight a set of lessons to feed the design of alternative perspectives related to platforms and objects to support the "personal cloud". These design alternatives are further developed in Patrick Keller's post about the design research wrap-up.

Lesson 1: "Cloud!?"

1995, more "Pictures of Clouds" start to appear "denoting anything too complicated for non-technical people to understand." Image from "A Brief History of Cloud" on *Thoughts On Cloud*. Website linked from the post "Pictures of Clouds, 1995" ⟨21.10.2015⟩. If the term "Cloud" is commonly used by our informants, we noticed that it was a surprisingly unclear notion for most of them. As a category, "cloud computing" was hard to grasp and they provided us with several definition of what it actually refers to. Although it is a fundamental infrastructure for everyday life with digital technologies, it seems that it is not as meaningful as we expected. From the users' perspective, the cloud is thus an intriguing research category.

Lesson 2: cloud providers, cloud users

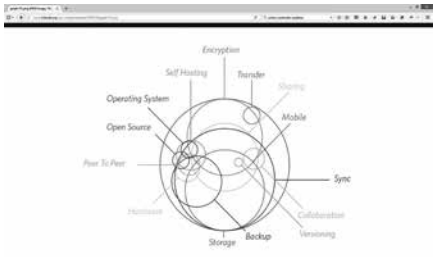


Diagram of motivations, usages and problems in cloud applications by Nicolas Nova and Charles Chalas. Retrieved from the post "I&IC workshop #1 at HEAD" ⟨06.10.2014⟩. As usual with technology, there are two

kinds of discourses: the promises from those who provide the services, and their actual appropriation by the users, which often lead to a mix pleasant surprises, frustrations, interrogations and satisfaction. However, there is a gap between these two. For the majority of people we interviewed, the cloud corresponds to a tiny icon on the OS GUI (Dropbox or Google Drive). Unlike the service providers' discourse and representation (data centers, evanescent clouds of data), the cloud corresponds to a set of (small) user interfaces features, seamlessly integrated into the OS. This means that it is hard for them to separate the cloud and their operating system. As our informants reported, they "feel" the cloud when "it refreshes" or when it doesn't work (or when there's no network access). In addition, our first workshop showed that what people report as "cloud computing" is quite diverse. As represented on the following diagram, it encompasses quite a large set of services. Our interviews, mixed with the analysis of forum content, also enabled us to map the this variety of uses to different motivations, highlighted in the following diagram :

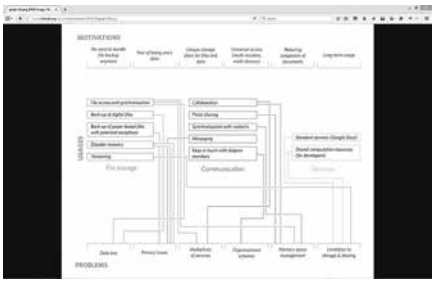


Diagram of motivations, usages and problems in cloud applications by Nicolas Nova and Charles Chalas. Retrieved from the post "I&IC workshop #1 at HEAD" (06.10.2014).

Lesson 3: is the cloud a set of folders?

The gap between the grandiose description of The Cloud by the service providers and what the users actually as a consequence : for the users we spent time with, it corresponds to a set of folders... which actually behave differently than what they are used to. In other words, the representation of distant files/folders is perceived a misleading. The way file storage is represented gives them the impression that they would work as the local folders. But it is not the case and it leads to surprises and frustrations: disappearance of documents when someone accidentally removes a file he though was "only on his laptop", confusion between "shared folder" and "invitation in a folder", etc.

Lesson 4: an opaque process

Image pulled from the post "I&IC Workshop #6 with Sascha Pohflepp at HEAD: output → Cloud Gestures".

A possible reason for this confusion is the difficulty to understand a process that is quite opaque for the users. Because, overall, cloud computing is all about "syncing" as we noticed, except that the syncing behavior of the services is difficult to understand: even when Dropbox tell users when it starts/when it's finished, there are always exceptions. Plus cloud computing relies on constant connectivity... which is not always the case.

Lesson 5: surveillance? mmhmm ...

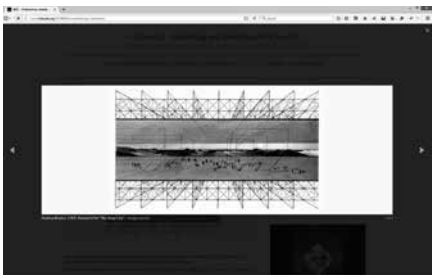
This one was the biggest surprise for us. Although most of our informants were aware of the surveillance risks, robocopyright (automatic verification of IP-protected content), and how personal data can be used for unknown purposes... no one was ready to stop using Cloud platforms. They are concerned by these issues of course but they saw them as drawbacks, the ugly side of the facility of use/access. What's next? We are currently in the process of designing a booklet that expand on these 5 lessons with the material we produced in the field research workshop. In order to do this, we chose the format of the "almanac", which we found quite apropos for this type of content. The book will feature the results of our work in a fragmentary way with a certain diversity of elements : diagrams, quotes, definitions of terms used by service provides and users, photographs, drawings, etc. Mock-up of the booklet summing up the material produced in our field research.

0134 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ I&IC design research wrap-up of sketches, towards artifacts

2016.06.20/Patrick Keller

Architecture, Design, Interaction Design, Projects

Following Nicolas Nova's wrap-up regarding the ethnographic research about Cloud Computing which came to an end last April (publication to come) in the frame of *Inhabiting and Interfacing the Cloud(s) (I&IC)* and learning from it, it is also time for me to write a midterm status report about the design aspects of this ongoing work. It is the occasion to resume what we've been through along the process and highlight the most important elements.



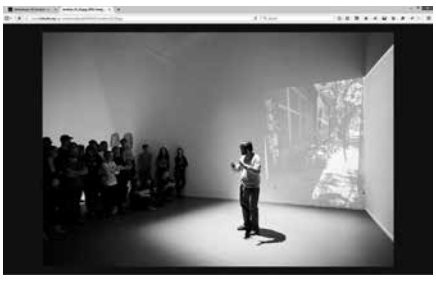
"No-Stop City" (Archizoom Association, 1969) used as an illustration in the founding document of the I&IC design research. Image retrieved from the post "I&IC Preliminary Intentions" (05.09.2014).

We are therefore trying to put in evidence in this article what we've learned so far during the process and where this might lead us as design strategies during the last year of this design study. This while knowing that our plans are to produce design artifacts and functional prototypes as results of this research process — among other ones (books, tools, etc.)

As a reminder about the premises of this interdisciplinary design research, a paper was written and uploaded on this documentation blog at the start of the project back in September 2014. It pointed out big "gaps" between the experience as well as the communication of the cloud service from an end-user perspective on the one side and the centralizing nature of its stacked infrastructure on the other one.

This document resumed and framed at the time the questions we addressed to the technological setup commonly known as "The Cloud", what we planned to realize through our design-research: coming up with design "counter-proposals" to what was questioned as a very functional, engineered and centralized apparatus (points that are explained with more details in the founding document).

As a matter of fact, we insisted in this paper about the interdisciplinary aspects of our research, considering that "The Cloud" couldn't be addressed without taking into account several disciplines: 1° an ethnographic dimension (usages study), 2° an interaction design one (interfaces, interaction) and 3° an architectural one as well (infrastructures, territorial presence). Yet, we deliberately chose to give less importance to the engineering thinking during our process, precisely to be able to come up with "alternatives" articulated around design approaches. This in the context of a research debate on the field largely dominated by scientific discourses.



Dev Joshi from Random International talking to the students about "Ghost Data Interfaces" at the end of a week of workshop with them. Image pulled from the post "I&IC workshop #5 with random International" (23.11.2015)

The foundation document for I&IC described precisely several thematic workshops we planned to organize with the participation of peers. The purpose of these workshops was to act as an equivalent to the "sketch phase" during a design process, a part of the work that could naturally involve peer partners. This phase could also implicate design students — under the research leaders' supervision –, so

to enable us an increase of "quantity" in our design "trials and errors" (sketch phase, iterative). The sorting process of this phase's results and this "quantity" remaining logically the responsibility of the narrowed research team, following criteria that responds to our research questions and the preliminary findings of the ethnographic field study.

Along the way, to bring technical support during the workshops process and to set up our own distributed platform to work collaboratively, we've identified cloud platforms (hardware, software) and chose the one that fitted the most, OwnCloud, to work with or to extend (development of libraries dedicated mainly to designers). Doing so, we've already outlined some of our final deliverables: tools, methods and artifacts for designers and makers to help democratize the technology and develop projects. We've thus became at the same time our very first "users" to observe.

Following this line of thinking, we've also noted that there was a big potential to transform and improve the design of the standard 19" computer cabinet based on the "U" rack unit, so to address a broader base of uses that would match some of our objectives: this would help move the very formal 19" computers cabinet out of his "closet"... (out of a "technical only" use, make it somehow more "domestic" and therefore necessarily more physically distributed). It is therefore about the results of these workshops that we've sorted out and highlighted the following set of "Learnings". They will guide us during the next and final phase of the joint design research *Inhabiting & Interfacing the Cloud(s)*.

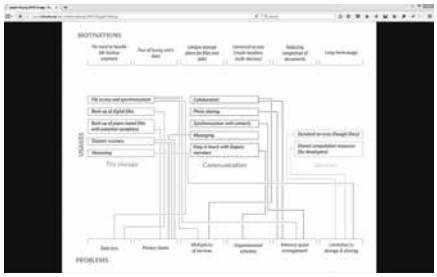


Diagram of motivations, usages and problems in cloud applications by Nicolas Nova and Charles Chalas. Retrieved from the post "I&IC workshop #1 at HEAD" (06.10.2014).

Preliminary learning: "motivations" vs. "problems" in the uses

We've been following the ethnographic field research in parallel to our interaction design sketches (workshops). Especially its recent outcomes. Some of the findings are quite important for the next phase in the design process, in particular the way in which the "cloud experience" was identified, organized and described (diagram above): users usually choose to drop files in the cloud because a set of different "motivations" (i.e. it's convenient, they are mobile persons and want to access their files anywhere, they are afraid of loosing their files or want to hide or encrypt them, they desire an universal access on all their devices, etc.)

It works quite well in general but sometimes "problems" occur (files are not synchronized, erased or lost, some are publicly published that shouldn't, versions are overwritten, copies are in conflict, the person who shares your files decides to move them, etc.) These "problems" always appear to be an "immanent menace" to the fulfillment of the service and to the data it hosts, "dangers" that most users keep in mind almost unconsciously, when they are not directly confronted to them...

The difference between "motivations" and "problems" also points out to some "misunderstandings" about the way the service and technology supporting it are working, which can also be linked to the "invisibility" of the whole experience or its "camouflaged" nature, as observations pointed out.

We've noted though that these "misunderstandings" could be of great interests during the further and final design process, as they point out to an unaddressed "grey zone" that probably need treatment. We've also noticed the possibilities of using natural gestures to "incarnate" cloud functions (image below, Learning 4) during our workshops with the design students, or to develop services that wouldn't be as generic as the default cloud.

Learning 1 — The cloud is indeed a hard to grasp and difficult design question.

This point didn't really come as a surprise as we pointed out the necessity to develop tools and democratize the service and its understanding in the foundation document of this design research. The different experiences we led confirmed this hypothesis (both with end-users and with designers trying to develop personal works for the service).

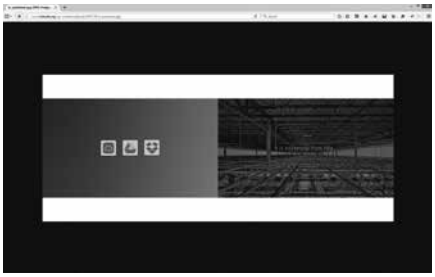
In the continuity of workshop #2 (image above), Nicolas Nova and Charles Chalas even tried to further develop alternative cloud applications and design implications, just to confirm that this wouldn't be a fruitful path for our research: it would mainly consist in creating different applications, drowned in an ocean of cloud applications and interfaces that wouldn't address the technological apparatus in itself.

Yet, it seems almost impossible to address the cloud as a whole because it consists in a stack of services, sometimes distributed, even so often proprietary (and therefore paradoxically centralized as we pointed out, mainly for security and commercial reasons). It needs different skills to address this stack. It is therefore hard to understand it as an entity and address it in that manner. We observed an obvious lack of accessible tools and procedures for designers and makers at large that should be addressed.

This learning stresses the necessity to take on "The Cloud" from different perspectives (same question, different angles) in an interdisciplinary manner, which we did. Lacking to do so prohibit the possibility to propose strong alternatives (i.e. doing a different interface wouldn't change the infrastructure).

James Auger tries to map the presence and "location" of the cloud within a service during a workshop. Image pulled from the post "I&IC workshop #2 with James Auger at HEAD" (04.11.2014).

Learning 2 — Invisibility of the service, the data and the infrastructure or misleading iconography (a camouflage).

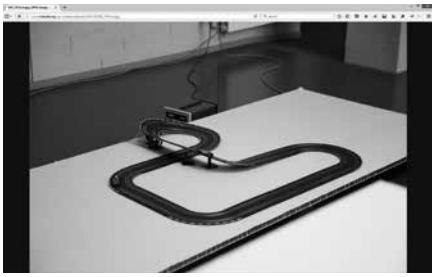


Two images side by side on a screenshot extracted from a video by Lucien Langton and the associated post "Inhabiting and Interfacing the Cloud(s), a design research teaser about misunderstandings and paradoxes..." (05.10.2015).

The chosen and planned invisibility of the cloud service and infrastructure, so as the data it holds reinforced the difficulty to grasp it. The reasons for this invisibility must be sought in the areas of security, of the real secrecy (industrial) or the apparent one (data) and the need for the versatility of the experience.

It has been revealed several times during our research: the absolute misleading iconography acts as a camouflage on the exact nature of the service and creates a huge gap between its representation and physical reality — the service is often represented as a single icon drowned into one's Operating System (above image) —. This fact tends to keep "users" at a distance and contributes largely to the misunderstanding of the technology.

Interestingly, but predictably when confronted to the service, most design sketches that came out through the different workshops made use of data visualization of some sorts to represent either a process, a flow or some data content (by tangible — objects — or intangibles means — screens rather more likely than sounds —). It almost naturally appeared to be a necessity.



Data visualizations about the flow of data in cloud services that materialized as two cars racing against each other on the track of a child toy (top) and a bot that plays video game Minecraft according to data flows (bottom). Both from #Algopop workshop.Pulled from the post "I&IC workshop #3 with Algopop at ECAL" (24.11.2014).

Learning 3 — technological beliefs, (data) phantoms, irrationality.

An illustration published prior to Random International workshop about "The Everlasting Shadow" and "Data Ghosts". The picture is taken from the movie "Dr. Mabuse, the Gambler" by Fritz Lang, 1922, during a session to get in touch with the dead. Retrieved from the post "I&IC workshop #5 at ECAL: esoteric comments about the cloud" (11.11.2015).

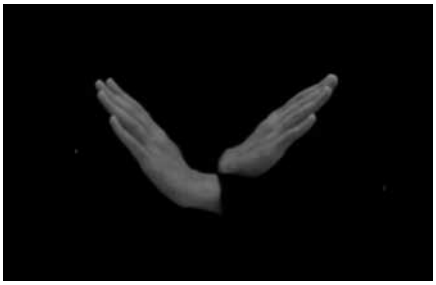
Misunderstandings, invisibility and secrecy often lead to beliefs. It appears it doesn't go differently with technology and especially that of the cloud, as this was regularly observed throughout the workshops we led and observations we made: a tendency for the whole experience to remain almost subliminal (some end users, half-joking, even spoke about their files going to be "stored in some sort of pyramids in Egypt"...) This theme became the subject of a workshop where the design students taking part in the sketching process started to look for strange references when it came to design for such an engineered service and to access the data it holds: spiritism, (forgotten data) ghosts and other kind of irrational devices...

Learning 4 — Physical objects, (bots) and natural gestures as interfaces.

A "networked data object" (wooden pig face that contains a Raspberry Pi) during Matthew Plummer-Fernandez workshop, or the "Internet of Things/Everything" as objectified interfaces for your cloud services. Image retrieved from the post "I&IC workshop with Algopop at ECAL" (25.11.2014).

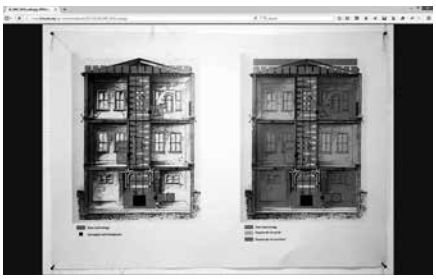
It could be almost perceived as a too direct answer about the "invisibility" and "immateriality" nature of the whole cloud experience: one of the key learning that came out from the design sketches about different ways to interact with "The Cloud" was to focus our efforts on networked objects rather than screens, to think of objects as interfaces to access files/data/processes/... A very specific Internet of Things therefore, accompanied with natural gestures or voice controls that could help "objectify" the hidden processes and actions. This learning came out for different reasons, the most important one being obviously to give visibility and a possible understanding to the largely unseen, within this specific context. Yet another important reason for this research that came out from the design workshops and discussions we led was that it became pretty clear that connected objects (IoT, IoE) would address fundamental questions to the future evolution of cloud infrastructures. There will simply be too many automated data creation once all these objects will be connected, to put it simply. A need will increasingly develop to treat and sort data locally, before "pushing" and "multiplying" the important ones into the large cloud.

The interesting fact is that this point was treated during Matthew Plummer-Fernandez workshop while experimenting at the same time around new types of object-interfaces integrating bots intelligence and automated local data treatment. Following the same line of thinking, gestural interfaces inspired by observation and combined with physical objects could be more intuitive and help understand how things are working.



Taken out from the video realized at the end of Sascha Pohflepp's workshop, this image illustrates potential natural gestures that could incarnate cloud functions in a physical manner (i.e. block access to data in this example). Image retrieved from the article "I&IC workshop #6 with Sascha Pohflepp at HEAD" (15.01.2016).

Learning 5 — Retrofitted domesticity instead of territory.



An illustration (top) as a wink from the workshop led by ALICE laboratory (EPFL) shows a kind of useless house appendix (part of a family nuclear bunker of the 50ies), retrofitted into a house Domestic, data center. Retrofitted apartments with cloud "devices" (bottom). Illustration retrieved from the article "I&IC workshop #4 with ALICE at EPFL+ECAL Lab" (09.02.2015).
The landscape approach revealed to be necessary and revealing, but pretty difficult to address in a concrete manner (because of a too large scale for interventions). But while the architect students looked to decentralize the infrastructure of the cloud and its data center, they also quickly focus their interests on small scale architectures and the possibility to retrofit obsolete, yet existing and already decentralized constructions.

They looked therefore at windmills, family bunkers (we have a lot of these in Switzerland), mountain chalets, etc. They looked as well at how they could possibly combine a fully distributed cloud infrastructure with elements of existing houses and flats (basements, air or water conducts, heaters, thick walls, etc.) that started to get quite closed to furnishing elements (air heaters, air dryers, bookcases,) or even small "living structures/shelters" within interior or enclosed spaces (houses, flats, offices, etc.)

Based on these "Learnings", we can underline four + one strong guidelines for future design developments:

— Our research team needs to continue thinking about simple tools, improved recommendations and possibly methodologies that will help gain access to resources about cloud technologies for a larger community, in particular designers and makers. For this we should pursue what has already been initiated at the beginning of our work when we set up our own platform.
— We shall create with these tools a "version" of the cloud (one or several "I&IC versions") that would exemplify a less neutral interaction, yet in more comprehensive approaches that would "show" and objectify what is happening in the hidden pipes.
— To pursue the general goal of objectification widely requested through the conducted experiences and interviews, to design it and be consistent with our "Learnings", we should mainly associate the visual developments of the project with data visualization (objectification of data, processes, fluxes, etc.) In parallel, a set of physical objects could durably incarnate in each user's proximity the existence of its own or shared cloud files. These responsive physical objects could be associated or combined with natural gestures (objects to manipulate) to perform distant actions on these files and folders.
— To distribute an open, programmable and accessible cloud infrastructure, both soft and hard, we'll need to retrofit or redesign the 19" computer cabinet based on the "U" standard metric, so to host these elements. This could help move the "computer cabinet" out of the data center by transforming its language. If we think about distributed "home data centers", "shelters" or "living structures" that would contribute to the objectives of physical, but also digital decentralization, then the 19" computer cabinet must become a more Domestic, artifact.

+ one:

— All these "findings", tools, methodologies, plans of artifacts, models, etc. should be clearly highlighted and freely accessible on one online platform.

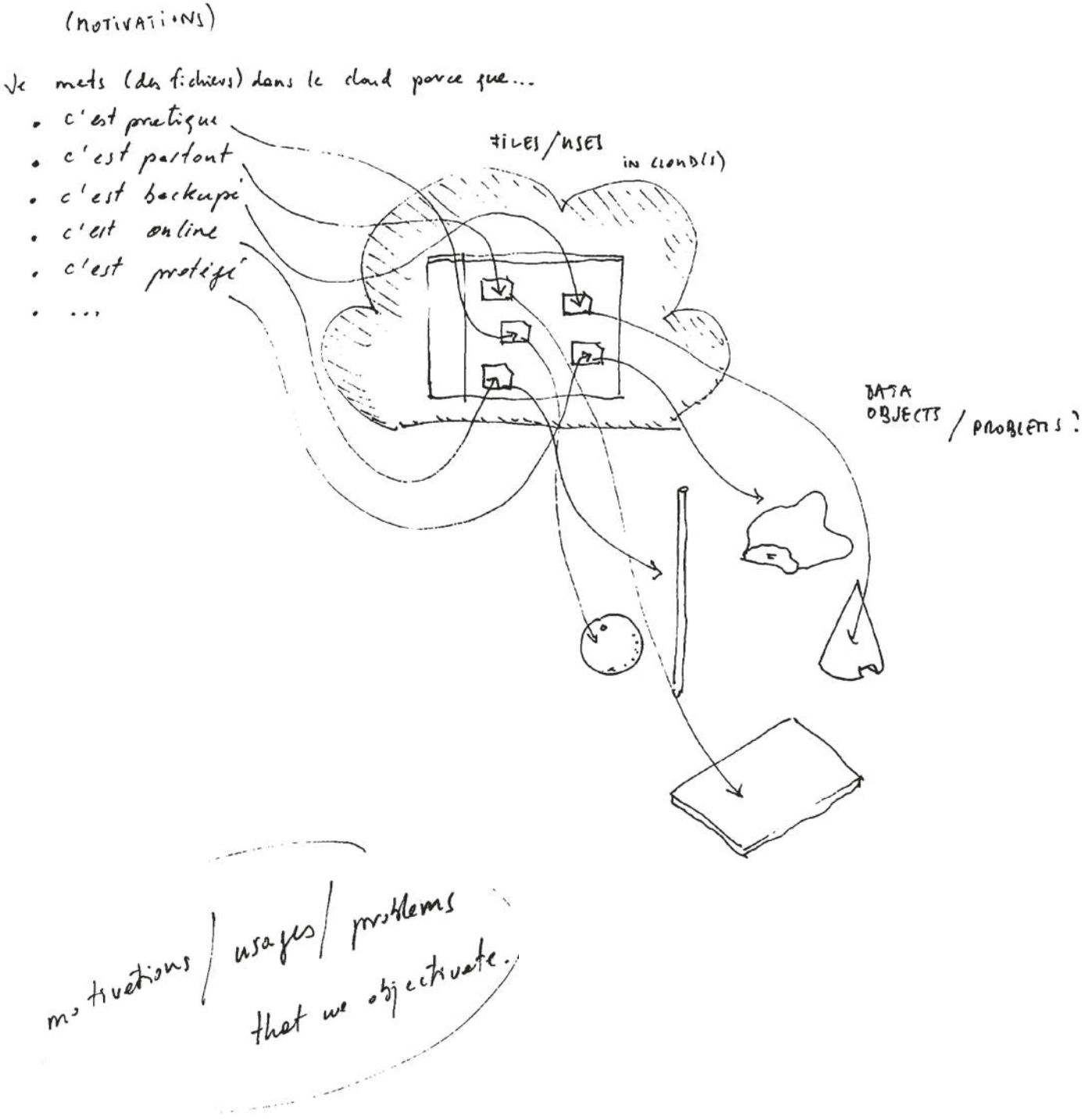
0134 Art direction, Cabinets, Clouds, Data, Datacenter, Devices, Domestic, ECAL, Infrastructure, Object, Open source, Personal, Tools, Wrap-up

0136 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Three summary drawings

2016.09.01/Patrick Keller

Design, Interaction Design, Projects

Three drawings from the previous series of scenario that resume quite well what we intend to do: An objectified cloud (a combination of open source software, automated behaviors and physical data controllers),



... that would find its physical location in a kind of retrofitted and open source 10" cabinet, ... to let anyone create and manage its own "tiny" and personal/home data center, based on existing or newly created open source technology.

0136 Art direction, Clouds, Data, Datacenter, Domestic, ECAL, Experience, Ideas, Interface, Open source, Personal, Tools

0138 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ From design research wrap-up to final artifacts, updated design scenario ⟨in scribble mode, #2⟩

2016.09.02/Patrick Keller

Design, Interaction Design, Projects

This post consists in an important update to the previous note "From design research wrap-up to final artifacts, a design scenario ⟨in scribble mode, #1⟩"

It's main purpose is to narrow down the previously sketched scenario and become more precise about the possible artifacts we will develop. In doing so, the present description shows a likely path and tries to keep some coherence within the overall design that is segmented in four different areas, often combined ⟨software, hardware furniture, responsive objects, visualization⟩. Yet and even so several objects and functions are described and named in this post, it will continue to serve only as a general blueprint for the last phase of our I&IC joint design research, while the final outputs could still largely evolve, based on the same ideas and plan.

These ideas keep their importance though:

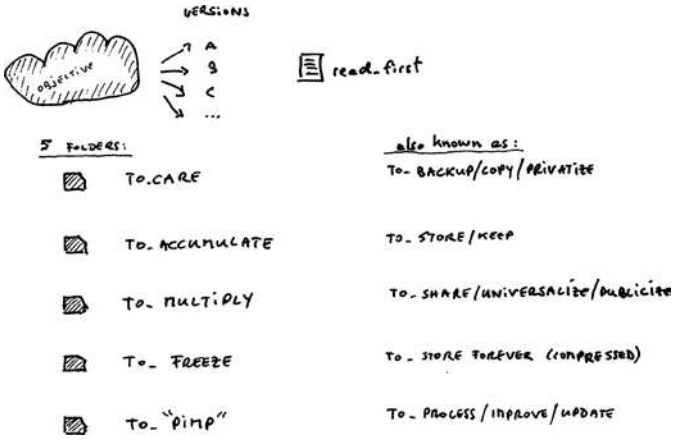
Based on the graphic "Motivations ←→ Usages ←→ Problems" and its description of procedures, based on our "Design Learnings" too, we've tried to translate and objectify these into "natural language" of actions ⟨and problems⟩. At this stage, this is still a trial, but we've listed five pairs of words that work in opposition ⟨verbs vs. past participles⟩ and that cover the spectrum of functions and procedures:

— To Care ⟨vs. Neglected!⟩,
— To Accumulate ⟨vs. Vanished!⟩,
— To Multiply ⟨vs. Shrinked!⟩,
— To Freeze ⟨vs. "Melted!"⟩,
— To "Pimp" ⟨vs. "Jumbled!"⟩

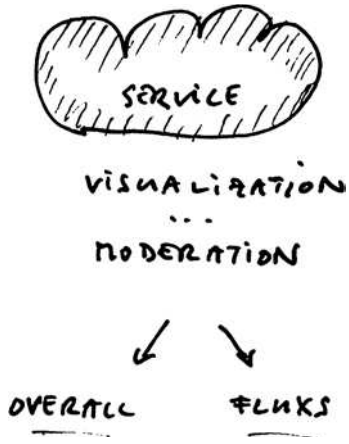
All these corresponding to a set of cloud actions and explained with more details below, after the break — These 5 pairs of terms will drive the development of an alternative, Domestic, and hopefully objective Cloud ("Our Cloud"), built upon the open source software OwnCloud with the help of our own I&IC OwnCloud Core Processing Library ⟨which will be further edited and editable therefore⟩. This personal Cloud will have the opportunity to be hosted into a new type of DIY ⟨and Domestic, as well⟩ 19" Cabinet. The 5 pairs of terms will further drive the implementation of 5 Controllers or Network Data/Bot Objects ⟨*"Smart Objects"*⟩. The aim of these "controllers" will be to give an everyday physical *presence* to each user's personal Cloud, to its 5 main folders, contained files or data and the processes they undergo. The manipulation of some of these objects will include the idea of "natural interface" or "gestures". In addition to these 5 physical controllers, 1 or 2 "root objects" could help monitor and possibly moderate the overall behavior of "Our Cloud".

For the development of these "smart objects", we've decide to take into account the kind of objects or infrastructure that are already present in a Domestic, environment, things like single functional objects ⟨i.e. lamps, electric plugs, consoles, mirrors, clocks, etc.⟩ and revisit them with a slight sculptural approach. We've also decided to consider a "language" that takes into account "invisibility" or "immateriality" ⟨i.e. electricity, electrostatics, magnets, light, reflections, air currents or temperature, dust⟩.

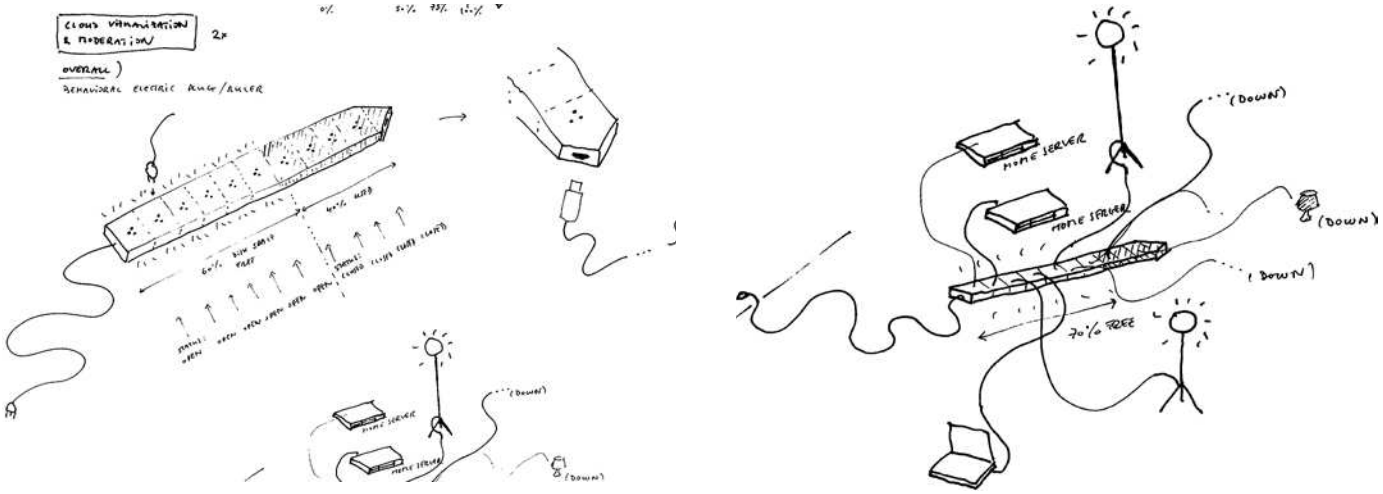
...Finally, all of the above should be distributed as open source.



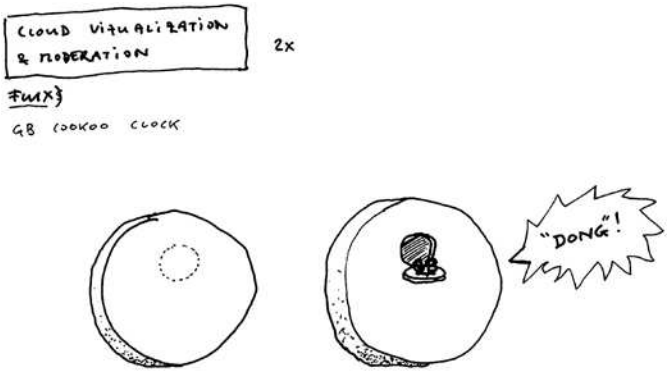
a⟩ "Motivations ↖↘ Usages ↖↘ Problems" graphic from the ethnographic field study is replaced by 5 "natural" terms ⟨verbs of actions⟩ that cover and segment a technical terminology of files manipulation and processing: To_Care = to backup, to copy, to privatize/To_Accumulate = to store, to keep/To_Multiply = to share, to universalize, to publicize/To_Freeze = to store compressed "forever", to hide/To_"Pimp" = to process, to update, to improve. As already stated, these five terms ⟨verbs⟩ will be subject to further modifications depending on the exact final direction the project will take.



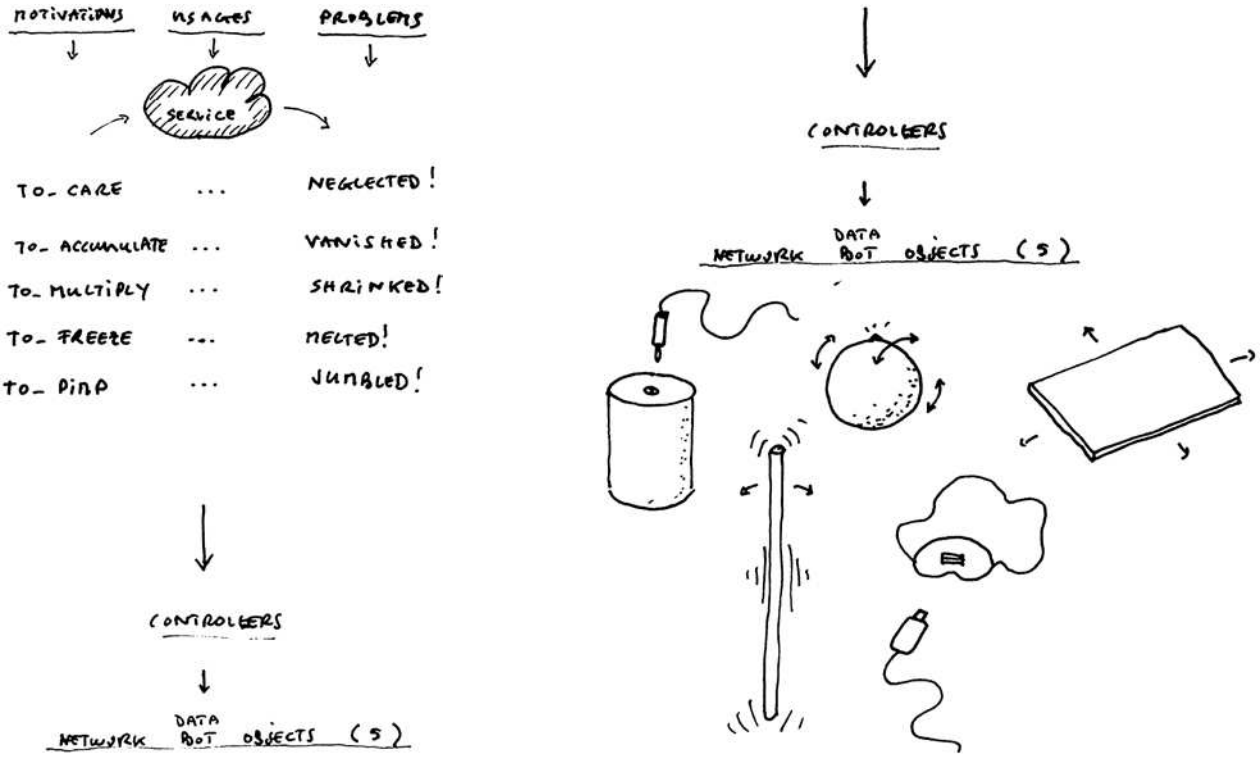
b) The overall Cloud service and its real time behavior can be visualized and somehow moderated. An Overall View would give information about the filling percentage of the hard drives –by doing so, it could help moderate its use– while a Flux View would only give information about the quantity of data stored or erased.



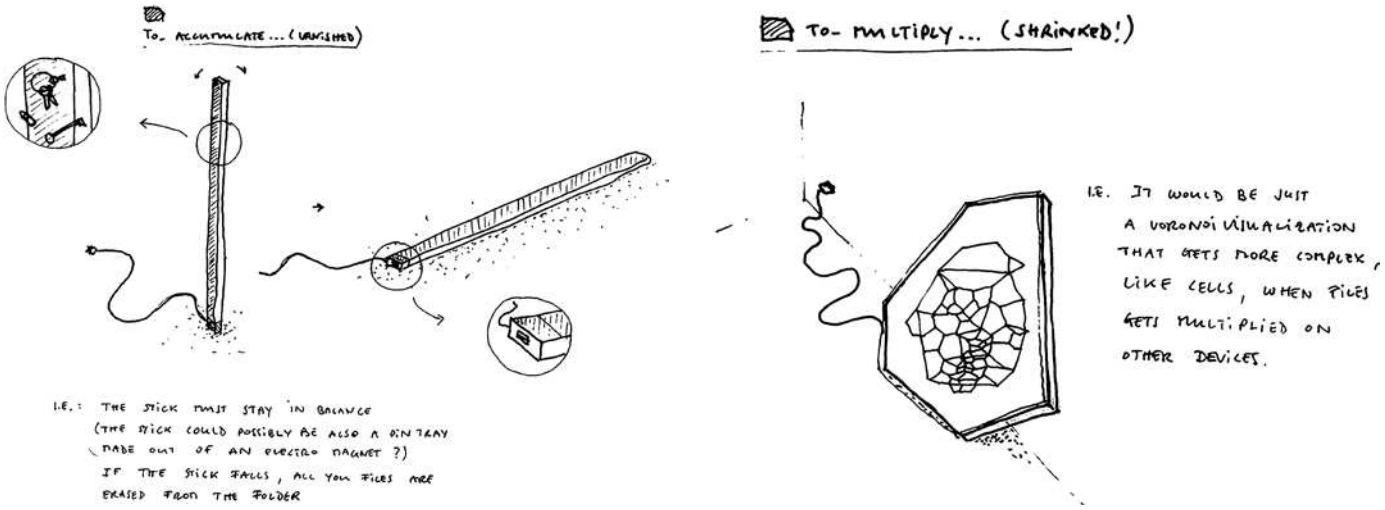
c) Cloud visualization and moderation #1, Overall view: the idea would be to redesign the long power strip and give it a behavior twist. This behavior would be directly linked to the filling percentage (%) of each user's Our Cloud: The more the cloud is full, the less plugs are active and opened (give electricity). Connected to standard home's devices like lights or other electric furniture would turn the overall setup into visualization device (of the filling of the hard drives). By extension, we could even plug the Cloud itself into this plug and turn it into an autonomous, yet risky self moderator.



d) Cloud visualization and moderation #2, Flux view: a Gigabyte's cuckoo clock! It would act like a mural clock, unless for gigabytes in your personal cloud. Every 10 GB it rings, makes a special sound for 100 GB and a concert every 1T.

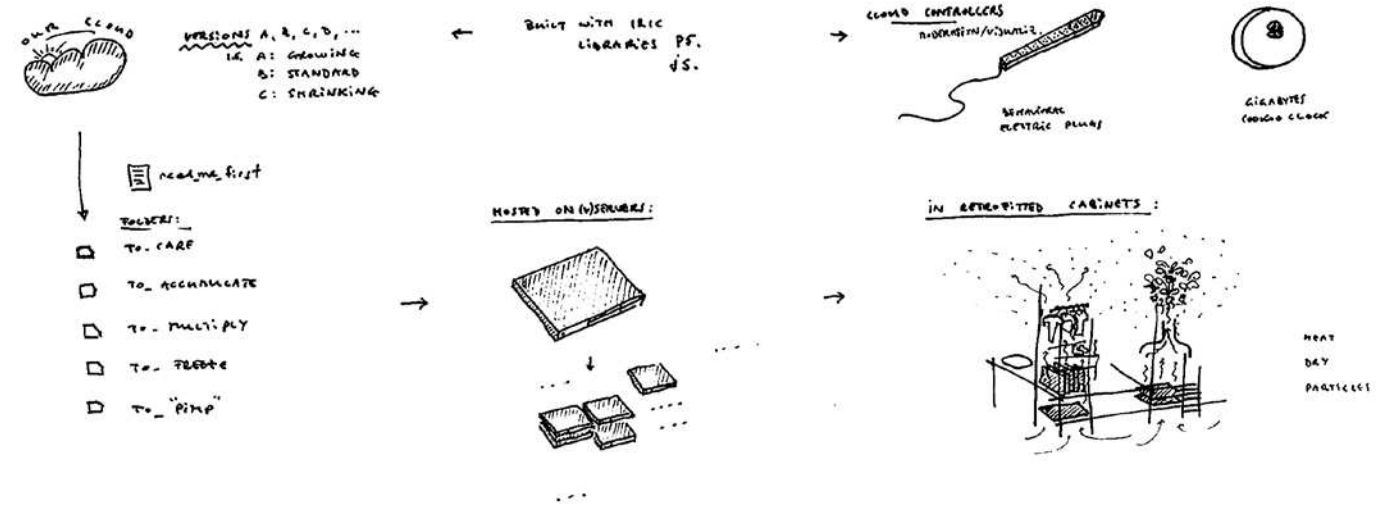


e) To_Care (vs. Neglected!), To_Accumulate (vs. Vanished!), To_Multiply (vs. shrunk!), To_Freeze (vs. "Melted!"), To_"Pimp" (vs. "Jumbled!"): 5 root folders in Our Cloud. The combination of 5 pairs of verbs (actions) vs. past participles would drive the design of 5 controllers (smart objects or networked data/bot objects, similar to the ones designed during Botcave workshop). The 5 controllers drawn here evoke roughly the ideas of vibrating objects, unstable sticks, of file retrieval, of natural manipulation and feedback. What they can concretely become is sketched with more details below.



f) 5 controllers, 5 responsive objects. These controllers could also possibly be plugged in the Overall View device (power strip), therefore working or not depending on the cloud's filling. To_Care (vs. Neglected!) could be an electrostatic shiny large plate that attracts dust. Doing so, it would help clean the air for the servers possibly located in the same room. It would ask to be cleaned regularly otherwise files contained in the To_Care folder would become "Neglected!" (backups erased and files publicized!) To_Accumulate (vs. Vanished!) could be a long stick in precarious balance. It could also possibly be an electro-magnet acting like a pin tray plugged into the power strip. If the stick falls, all your accumulated files would be erased, "Vanished!", except one that could be retrieved from the bottom usb port. To_Multiply (vs. shrunk!) could be linked to a folder in Our Cloud from which all the contained files would be multiplied on all your devices and on fellow cloud users disk (same folder) and their devices. When an other user on a different cloud would add or remove files, it would also act in your own To_Multiply folder, by adding or removing files. Therefore, the files would be "multiplied" or the folder "shrunk" depending on common actions. The device would only visualize the process of multiplication or shrinking behind a two-way mirror through the visualization of a dynamic Voronoi diagram. To_Freeze (vs. "Melted!") could be a device that helps you keep your files "stored forever compressed and private". You would need to put this device in your fridge and keep it at low temperature. When 4°C would be reached, the files in the To_Freeze folder would be compressed and privatized. If the temperature rises, the files would first be uncompressed, then made accessible and finally be publicized (Melted!). A few files could be retrieved from the box itself by turning it upside down. To_"Pimp" (vs. "Jumbled!") could be a mural console with a glowing UV light. The more processes on the files the more it would glow and transform the appearance of the images exposed.

Complete "Our (House) Cloud" Scenario, resume:



1) Based on the open source software OwnCloud and with the help of I&IC OwnCloud Core Processing Libraries, an alternative version of the cloud ("Our (House) Cloud") would be built.

2) "Our (House) Cloud" would always contain the 5 same root folders (To_Care/To_Accumulate/To_Multiply/To_Freeze/To_'Pimp'). Some of these folders and their content would be shared between all "Our (House) Cloud" users. It would be hosted on conventional servers within a retrofitted 19" Cabinet ("Our 19" Cabinet"), a mix between a living structure, a house data center and a 19" computer cabinet. 2 responsive objects would help monitor the overall cloud.

3) 5 controllers (responsive objects) would help give a Domestic, and continuous *presence* to your files and folders.

4) 5 responsive objects as controllers: A low table (To_Care), a long vertical stick (To_Accumulate), a voronoi-like screen and dynamic visualization (To_Multiply), a box in the fridge (To_Freeze), a mural console (To_"Pimp").

0138 Art direction, Cabinets, Clouds, Data, Datacenter, Domestic, ECAL, Experience, Ideas, Infrastructure, Interface, Open source, Personal, Tools, Wrap-up

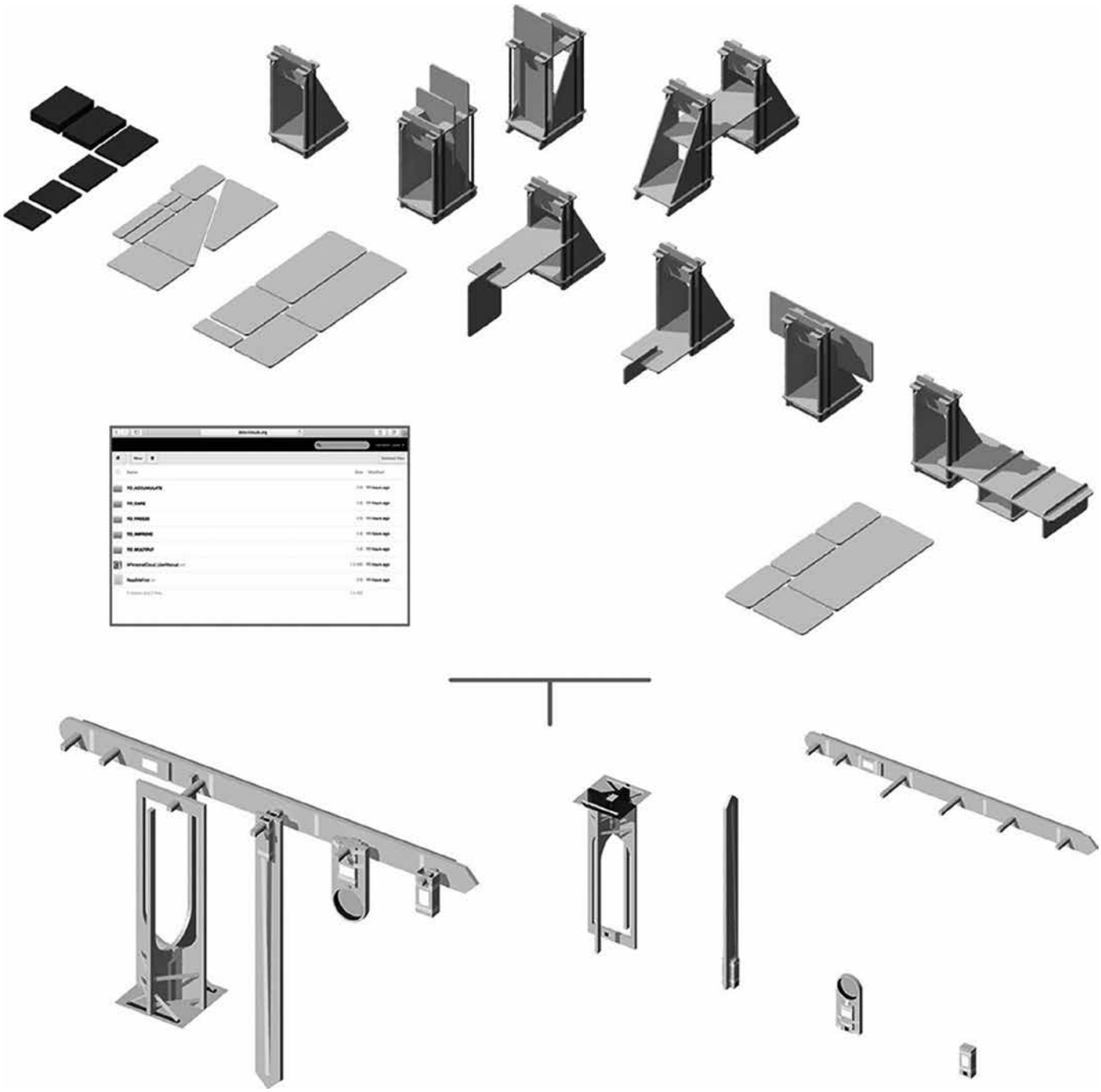
0139 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ “A Personal Cloud”: a home cloud kit for personal data ⟨centers⟩/ “reappropriate your dataself”!

2016.11.24

Patrick Keller & Lucien Langton, Léa Pereyre, Christian Babski
Design, Interaction Design, Projects

We’re entering the final straight of the research project Inhabiting and Interfacing the Cloud⟨s⟩ and we can give at this point a first glimpse of the four design artifacts we are working on at the moment. They will constitute the main outcomes of our joint experimental effort ⟨ECAL, HEAD, EPFL +ECAL Lab⟩ and a kind of “personal cloud kit” ⟨explained below⟩. These creations will be accompanied by two books: one will present the results of the ethnographic research about “the cloud”, the other will present the design research process and its results — both in pod/pdf. We already pointed out in the recentpost “Updated Design Scenario” where we were going. Since then, the different projects were better identified and started to get shaped. Some got eliminated. Prototyping and further technical tests are running in parallel at the moment.

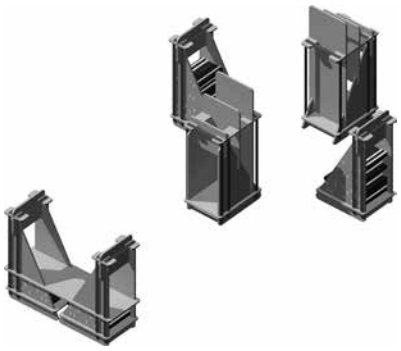
From the original “final scenario” sketch ⟨P.163⟩ to a “Personal Cloud Kit”, composed of various physical and digital modular artifacts.



What emerged reinforced from the main design scenario is that we seek to deliver four artifacts (some physical, some digital, some combined) which themselves will constitute the building blocksof what we'll call "A Personal Cloud Kit". All four parts of this kit will be openly accessible on a dedicated website (e.g. in a similar way to what OpenDesk is doing). The purpose of this "home kit" is toempower designers, makers and citizensat large who would be interested to start develop their own cloud projects, manage or interact with their data or even to set up small scale personal data centers at their places (homes, offices, garages ...) Based on the existing open source cloud software OwnCloud and our I&IC's OwnCloud Core Processing Library, the four elements of the kit will be:

(A)

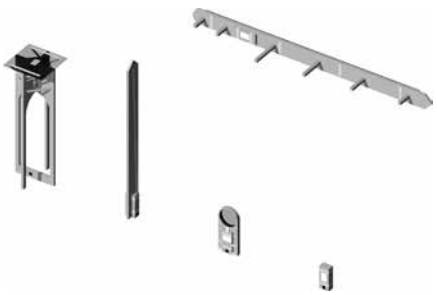
A setof infrastructure furniture ("A Personal Data Center"), to assemble your own small scale and home based (or office based) data center! Pieces should be CNC cut from plywood by following the blueprints and instructions that we'll be published online, then assembled to set up 19" computer cabinet(s), or even small scale data centers with additional "domestic" functions. These later should take benefit of the heated and dried air coming out from the home computers/servers. With Léa Pereyre



A modular/DIY furniture set (to be built and assembled in a "modest" way: cnc cut-outs, plywood, colored straps — no screws, no glue —). It is a 19" computer cabinet for IT servers (one of the main formal building blocks of data centers, which is usually quite expensive, made out of metal and very heavy > in this case it will cost and weight far less). It is extended to new Domestic, functions that should benefit from the heat and dry air released by the computer servers. Cold air is entering from the front and bottom , then heated air is released from the back and top. The air flow is created by natural convection. Assembled and adequately apertured (note: various apertures not drawn in the above illustrations), these 19"cabinets can trigger hot and cold aisles or areas in a large room.

(B)

A set of five cloud data controllers ("My Data Controllers"), directly linked to the five folders and their data in "A Personal Cloud" (below), will help control them (or not) ... To be CNC cut from plywood as well and then put together, along with pieces of electronics (Raspberry Pis and sensors), for which the code will be distributed as well. The controllers will be "dormant" when hanged on the wall and become active once placed in the space. With Lucien Langton



The data controllers embody and allow a simplified, natural interaction with one's data, hosted in one's cloud (version "A Personal Cloud" below, whose servers are placed in "A Personal Data Center" for a full use of the kit). A direct link exists between each physical object and its alter ego as a folder with its contained files and data in the cloud. For example in the above illustrations, would the vertical bar fall (second object from left), then all the files contained in the related or linked folder would be deleted. These objects are therefore "controllers" of personal data and will constitute new functions in the Domestic, environment.

(C)

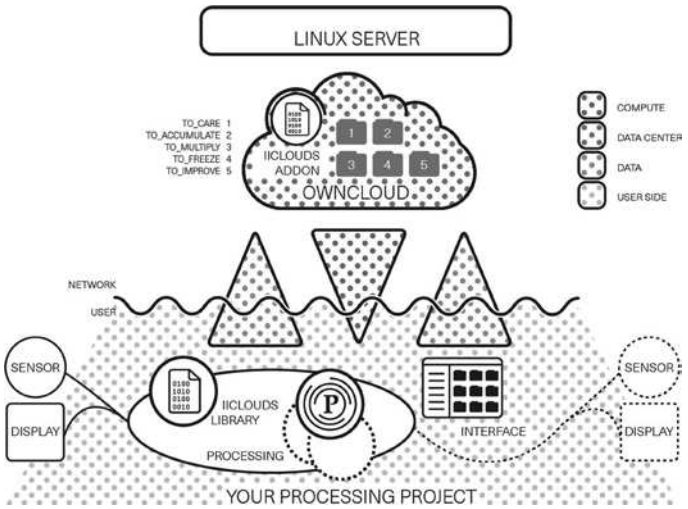
Developed on the basis of open-source software OwnCloud, this element of the kit is an alternative version of the cloud ("A Personal Cloud") with automated behaviors, chains of events. Five folders bring together the main motivations that generally push us to place our files and data in the cloud (e.g. because it's convenient, to make backup, to shares one's files, to preserve data, to multiply files or share them, etc.) These motivations have been identified in our ethnographic field research about the cloud. This alternative version of OwnCloud, developed thanks to I&IC's OwnCloud Core Processing Library, will be openly accessible as well. With Christian Babski (fabric|ch)

There will be direct links between these five folders in "A Personal Cloud" and the five controllers above (e.g. if the plate of the table is not taken care of and its dust cleaned, all the files in the corresponding folder will be first unzipped, then moved in a publicly shared folder!) "A Personal Cloud" as well as "My Data Controllers" are direct implementations of the development library below. Its is an illustration of an alternative to the existing: a different cloud, based on the tools that have been developed or expanded in the frame of this design-research.

(D)

The least visible but probably the most useful part of the project: it is a development library in Processing language (now widely used in the design and makers communities), for the open source cloud software OwnCloud. It is adapted and then extended with new functions according to our needs (it concatenates two libraries and add our own), directly from their own. This will allow everyone with Processing skills to develop their own projects (client side). A tool that was missing so far. The kit that has been developed is made possible mainly by the use of this development library. With Christian Babski (fabric|ch) The new library will be made accessible on Github for further forks and iterations. (A) (B) (C) & (D) will become the four elements that will constitute "A Personal Cloud Kit", to be openly accessed/downloaded on a dedicated website.

0139 Art direction, Cabinets, Clouds, Data, Datacenter, Domestic, ECAL, Experience, Infrastructure, Interface, Library, Open source, Personal, Tools, Wrap-up



One processing project with one cloud, while the server ⟨OwnCloud⟩ can still be accessed by a regular interface ⟨OwnCloud client⟩. The upper part ⟨white⟩ is the "network/server side" of the project ⟨OwnCloud⟩, hosted on a Linux server, while the bottom ⟨grey dots⟩ is user or "client side". It can consists in connected objects or environments, interfaces, visualizations of different sorts. The I&IC's Owncloud Core Processing Library is now composed of a "client side" component and "server side" component ⟨IICloud's Addon⟩. The "client side" part of the library ⟨"user side" vs. "network/server side" in the illustrations above and below⟩ can be used from Processing, in order to get access to OwnCloud server⟨s⟩ and manipulate files. The benefit of the core library resides in the fact that it mashups all together a set of heterogeneous functionalities in one single library ⟨it has been therefore renamed I&IC OwnCloud Core Processing Library as it is more closely related to our research⟩.

Files manipulation

You can copy, move, delete, upload, download any file from your OwnCloud server from within Processing. These basic actions can then be triggered by any external sensors or other monitorable activities, as soon as you have integrated I&IC's OwnCloud Core Processing Library in your Processing project.

Files sharing

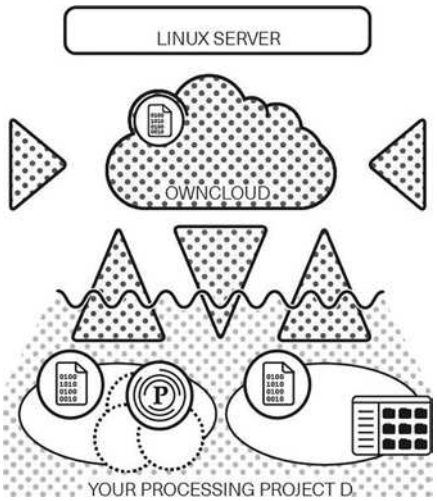
Share your files with other people or/and be part of the IIClouds OwnCloud ecosystem ⟨see below⟩.

Files tagging

Managing files metadata. Every single file can be enhanced/informed with particular tags, a tag being defined by a pair ⟨tag name, tag value⟩. A trivial example may be to define a author tag or a version tag attached to an article ⟨pdf, word document etc.⟩ Then, by using the I&IC's OwnCloud Core Processing Library, you can search your files for a given author or a given document version, etc.

OwnCloud server and account activity

This is a brand new part of the library that extends the initial set of functionalities. One can get usage statistics from the OwnCloud server you are connected to ⟨CPU usage, memory usage, disk usage ⟨global or per account⟩⟩. In order to have access to this extended functionalities from "Your Processing Project" ⟨illustrations above and below⟩, you will have to install the new "IIClouds Addon" on the side of your OwnCloud installation or connect your project to a OwnCloud server that did so. You can monitor your OwnCloud server and user's accounts more precisely and use these statistics directly in "Your Processing Project".



Specific IIClouds behaviourscontrol

This is a brand new part of the library that extends the initial set of functionalities. As mentioned in "From design research wrap-up to final artifacts", the "IIClouds Addon" will enhance the OwnCloud experience with a specific structure of directories. Each directory will have a specific built-in behavior ensured by the "IIClouds Addon". These behaviors can be managed/controlled via the "IIClouds Library".

Taking the example of the TO_FREEZE directory, by the use a the "IIClouds Library" you can decide to freeze content ⟨zip every single file dropped in the TO_FREEZE directory⟩ or let "melt" the content ⟨unzip all archive files⟩.

Several processing projects, several interfaces, etc. with several OwnCloud Servers ⟨including addons⟩ constitute an IIClouds ecosystem. A project ⟨client⟩ can exchange information with one or several servers.

OwnCloud federation to the IIClouds ecosystem : Once your OwnCloud server is installed or from any eligible OwnCloud installation ⟨version → 9.0.0⟩, one can request that a OwnCloud user account may be part of the IIClouds ecosystem/network. By doing so, the concerned OwnCloud account will see a TO_MULTIPLY directory appear ⟨so as To_Accumulate, To_Care, To_Freeze, To_improve. Below, in the conventional interface⟩. By deleting or adding a file in that particular directory, your change will be spread over the entire IIClouds ecosystem

Federation works like a subscription. By subscribing to the IIClouds ecosystem, you will receive all files that any participant to the ecosystem will drop in the TO_MULTIPLY directory, and reversely, any file deletion will be spread over the entire IIClouds ecosystem, meaning that, by deleting a file, it will completely disappear from the IIClouds ecosystem. All described operations/functions can be triggered manually just by manipulating files from your favorite OwnCloud application as well as being controlled/triggered from a Processing application based on any kind of inputs you may want to use. Functionalities and available control will be refined and completed and a full documentation and a complete set of how-to posts will be produced as soon as the version 1.0 of the I&IC's OwnCloud Core Processing library will be released. The entire code source will be made available to the community.

0142 ⟨C⟩ A Personal Cloud ⟨evolution⟩

2017.02.03/Patrick Keller

Design, Interaction Design, Projects, Sciences & Technology

Note: “A Personal Cloud” ⟨working title⟩ is part of a home cloud kit, which was described in a previous post and that will be composed by four various artifacts, both physical and digital. The kit will be distributed freely at the end of the project.

The “alternative version” of the cloud ⟨client, interface⟩ and the way we interact with it is still under development. Strongly connected to the ethnographic field research that was achieved earlier during the research process regarding cloud usages, the purpose of this project is to exemplify a different way of handling or even playing with one’s data and files in the cloud, as well as to demonstrate an implementation of “I&IC’s OwnCLoud Core Processing Library” that will also be part of the final delivery “cloud kit”. “A Personal Cloud” is also in tight connection with the objects controllers project, “My Data Controllers” ⟨working title as well⟩, because these networked objects will directly interact with the files and data contained in it.

A version of OwnCloud developed with the help of “I&IC’s OwnCloud Core Processing Library” and containing five root folders, each with a singular automated behavior.

As already stated in previous drawings, cloud usages scheme and overall scenario sketches, each of the five folders contained in “A Personal Cloud” will encapsulate and automate specific behaviors related to “cloud computing” ⟨third party computation, distant data handling and file storage or management⟩. Some cascade of events and file transfers might even happen. As we can see, the focus as been set on the interaction rather than the visual interface. Especially as our research drove us in the direction of physical interaction, a line of work which became the project “My Data Controllers”. The five folders cloud and its behavior:

TO_ACCUMULATE

Corresponds to the regular storage function of the cloud, like to keep or to store files ⟨“motivations”⟩. Unless this folder is connected with its counterpart physical object from “My Data Controllers“, nothing particular happens to the contained files and the usual function of the cloud is not modified or improved. If it is indeed connected, then all files could be suddenly deleted if a special action is taken, files and data could literally be “vanished!” ⟨“problems”⟩.

TO_CARE

Matches user’s desire to protect its files in an automated way ⟨“motivations”⟩. Therefore to backup or to privatize: each file placed in this folder is automatically backuped and privatized. If the folder is connected with its physical counterpart, its files could be un-backuped, “neglected!” and them moved into the TO_MULTIPLY folder ⟨“problems”⟩.

TO_FREEZE

When a user wishes to keep a file or some data “forever”, he places it in this folder ⟨“motivations”⟩. It can be understood as to compress, to “zip” or to store files endlessly. When linked to its physical interface and not paid attention to, files can be uncompressed, “melted!” and then move into the “TO_ACCUMULATE” folder, where they might then end deleted ⟨“problems”⟩.

TO_IMPROVE

It is a more random and possibly surprising process. Files being placed in this folder will be almost arbitrarily transformed by algorithms according to their types ⟨text, image, sound files⟩.

TO_MULTIPLY

Corresponds to the user’s desire to make copies of its own files on many other devices ⟨to universalize⟩ or to share them with others persons ⟨“motivations”⟩. Only in this case the process is pushed to its limit: all the files in this folder are being automatically shared with other users that are also federated to “A Personal Cloud”. Files deleted by a user somewhere will be deleted everywhere in the cloud and for all users ⟨“problems”⟩. Next steps in development will be to further test the interaction and fine tune it without adding too much complexity to the system. We’re trying not to add another layer ⟨like for example another client-server that would keep track of the status of this and that in the cloud⟩, which might force us to drop some options.

0142 Ideas, Intentions, Methodology, Sketches

0143 ⟨D⟩ My Data Controllers ⟨evolution, models⟩

2017.02.03/Lucien Langton

Design, Interaction Design, Projects

Note: “My Data Controllers” ⟨working title⟩ is part of a home cloud kit, which was described in a previous post and that will be composed by four various artifacts, both physical and digital. The kit will be distributed freely at the end of the project.

Continuing our design process, we milled the first prototypes of the five connected objects, which consist in tangible versions of the five main folders present in our alternative version of Owncloud ⟨“A Personal Cloud”, working title as well⟩. As explained in this post, each object is based on the same elementary brick which brings and manages a natural interaction between the connected object, the personal cloud and its contained data, files and folders — therefore becoming a controller —. This elementary brick holds the Raspberry Pi, sensors and hardware necessary to physically interact with Owncloud. This interaction will be slow and discrete. Furthermore than the identified objectives through the ethnographic field study and design sketches we’ve lead along the research, our approach to these networked objects was fueled by complementary meaningful references. The first one ⟨image below⟩ consisting in a different approach to the behavior users adopt in their interaction with the “technological home”, Shaker furniture:

Shaker furniture as well as their household objects were designed to be suspended to pegs in the living room, in order to make space for spiritual ceremonies. Interestingly, this design also suggests an active state for objects ⟨i.e. when the chairs are oriented “naturally”⟩, and a passive one when hooked, where their main function is somehow “paused”. This status resonates with connected objects and somehow questions their presence in the private sphere, where they’re usually always on, always gathering information, and always connected. We also noticed that this could help connect cloud interactions to natural gestures connected to objects that can happen in a Domestic, environment, on a regular basis. Like opening or closing a door, switching a button, having an object that fall, roll or that you need to clean, maybe store in a special place like those chairs, etc. Connecting simple physical interaction with abstract digital behaviors could be both helpful and meaningful to help understand what is going on. A second important reference is perhaps quite more practical, in the sense it concerns the objects assembly. As explained in the post about our Do-It-Yourself server cabinet, an important concern in our process is to define a simple and accessible assembly process for future users.

This bench by FOBricated needs no glue or screws, it is solely held by a ratchet strap.

The assembled five prototypes still need corrections and improvements, however they were extremely useful to reconsider each object's assembly process which strongly influences their weight. Below in the same alphabetic order as their related and connected folders appear in the standard interface of OwnCloud, pictures from the five data controllers (TO_ACCUMULATE, TO_CARE, TO_FREEZE, TO_IMPROVE and TO_MULTIPLY). These five folders will be automatically created in the "alternative version" of the cloud we are currently working on ("A Personal Cloud"), they carry specific interactive behaviors. The reasons and relations between these five objects and their counterparts as folders and contained files in the cloud have been detailed in the previous post "A Personal Cloud: a home cloud kit for personal data (centers)/reappropriate your data self".

Five cloud folders (above) embodied within the five following networked objects, acting as physical counterparts:

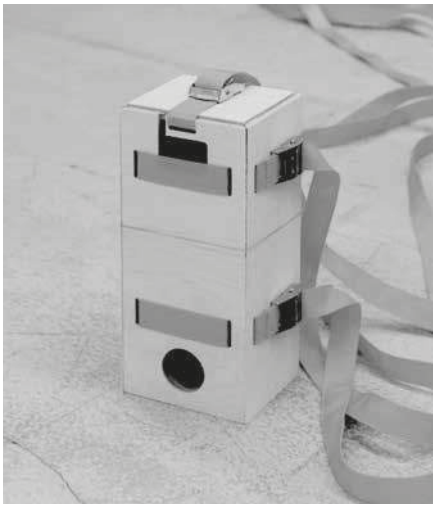
TO_ACCUMULATE

Interaction behavior: if or when the object falls, all the files that have been accumulated in the "TO_ACCUMULATE" folder over time will be deleted, literally "vanished"! Rem.: the object still seems too massive here, perhaps the impression of its instability will be enhanced by making it a bit taller and thinner, like a stick.

TO_CARE

Interaction behavior: the top (missing in the above image) made of acrylic glass will attract dust with the help of a ionizer. It will need to be cleaned and taken care of regularly. This action will help take care of the files contained in the TO_CARE folder by creating backup of them. Yet without this natural interaction, the backups will be deleted and in the end, the last ones automatically moved into the TO_MULTIPLY folder, ready to become "neglected"! Rem.: (here also without the top) the networked object still needs to be reconsidered to be easily suspended to TO_IMPROVE (below), while avoiding the present asymmetry in the assembly between the two main parts.

TO_FREEZE



Interaction behavior: the networked object that consist in the simple original "brick" needs to be maintained at low temperature and in the dark. It should be located in the fridge (!) and kept at low temperature. If this is achieved, the files and data contained in the TO_FREEZE folder will be automatically kept compressed (zipped). From time to time, the brick's battery will need to be recharged and moved out of the fridge... If it is left too long out of freezing temperatures, then its files will be unzipped, "melted"! And then moved into the "TO_ACCUMULATE" folder, ready to be deleted ... Rem.: the object consists only in the main elements that brings interaction to objects, the original "brick". We'll be rethinking the box's assembly to orient it towards the same type of assembly described for our server cabinet.

TO_IMPROVE

Interaction behavior: the object physically holds the four other networked objects and serves as a hook rail. When these are deployed in the home space, the cloud is enhanced by additional functionalities provided by these objects and therefore "improved". The files contained in the TO_IMPROVE folder are themselves subjects to unpredictable "improvements" and updates, only when these other four objects are deployed and according to their file types (images, sounds, texts files, etc.) Rem.: the object, still lacking the pegs here, will be totally redesigned to be much lighter, as well as to set up a standard way of fixing it to a wall.

TO_MULTIPLY

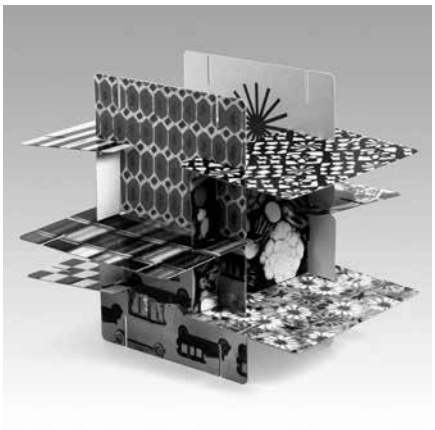
Interaction behavior: no physical interaction in the case of this networked object but only visualization. All the files located in the TO_MULTIPLY folder will be automatically duplicated and spread over the entire network of Personal Clouds! The files deleted will be deleted everywhere in the same way, the volume of the containing folder "shrinked"! Rem.: the object still too small here will become bigger, in order to accommodate a decent sized screen for visualizations as well as to differentiate it from other objects. All the prototypes above are still at a quite early stage, however it seems we can easily start to conceive them as a family, with for each one of them either a suggested interaction or role in the Domestic, environment.

2017.02.03/Lea Pereyre

Architecture, Design, Interaction Design, Projects

Note: "A Personal Data Center" ⟨working title⟩ is part of a home cloud kit, which was described in a previous post and that will be composed by four various artifacts, both physical and digital. The kit will be distributed freely at the end of the project.

After a few design iterations through sketches and a bit of 3D modelling, we recently produced a set of first prototypes of what our Domestic, 19" server rack could look like and how it could handle Domestic, functions as well. As a matter of facts, we can consider this work an alternative approach to what was set up and analyzed at the beginning of our research, when we assembled our own "⟨small size⟩ personal cloud infrastructure". Our approach was fueled by several references, the first one being House of Cards, by Ray and Charles Eames :



The modular, simple and intuitive assembly process guided us for its adequacy within a Do-It-Yourself user context. This part is critical and brings us to the second main reference which is an hybrid of contemporary startup culture ⟨with a sustainable twist⟩ and DIY local manufacturing processes. In this particular case, Opendesk appeared as an relevant example of this smart balance between design and accessibility ⟨although you still need access to a industrial-scale CNC milling machine to "Do-It-Yourself"!

However it isn't OpenDesk's business model which got our attention as much as their aesthetics, with apparent hints of the fabrication process used and assumed in the object's visual identity. On this base we prototyped our first Domestic, 19" rack and kept along the way a few core features. We also kept in mind the different contexts and functional modularity ⟨technical base, office, home⟩ we desired to address. We also took into account some "climatic" parameters that needed to be moderated or exploited within a Domestic, context ⟨production of hot and dried air by the computer servers, mainly⟩.

A 3d view and design iteration of the technical base for our server rack, as modeled following the constraints of CNC fabrication ⟨image above⟩. We chose to assemble elements following the simple "House of Cards" principle ⟨below⟩.

The assembly is solely based on a perpendicular "card" system, which is in turn held together by straps maintaining a regular tension between elements. In order to avoid any metal parts, screws and folding ⟨which usually make regular server racks heavy and expensive⟩ we chose plywood, which also makes things easier to directly produce with a CNC mill, based on drawings. We also chose to go for straps to maintain the server cases in between the two main vertical sides of the rack, as this solution offers extreme modularity and reliable resistance ⟨below⟩.

This approach offers a totally modular approach as the racks's sides are milled every "U" unit in height, enabling users to slide in any height of servers. Due to the shape of the rack, long and heavy servers will sit at the bottom of the rack while shorter ones will stand at its top. Note that the servers cannot be secured ⟨the server is open⟩ as we supposed it is installed at home or inside a small office, mainly accessible by family members and friends.

Over the main "body" of the cabinet, a 1U slot has been designed to fit in a router or perhaps a firewall.

The back of the rack lets an easy access to cables as well as space for the heat to flow up. Overall this whole 19" cabinet could be a simple structure enabling users to hack it to their convenience, perhaps adapting it to the different rooms they choose to set in in. Indeed, setting the server rack as a standardized piece of networking hardware in the living space opens up to several possibilities of "co-existence" between the rack itself and it's situation in the Domestic, space. ... We'll continue to work on the final models from now on, focusing on solving adaptability to different user contexts ⟨basic technical needs combined with home and office situations. Exploitation of heat as well as air humidification and "cleaning"⟩. We will also optimize the models for a minimum material loss during the milling process.

0145 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ A “Home Cloud Kit” ⟨evolution⟩

2017.02.08/Patrick Keller

Architecture, Design, Interaction Design, Projects, Schools

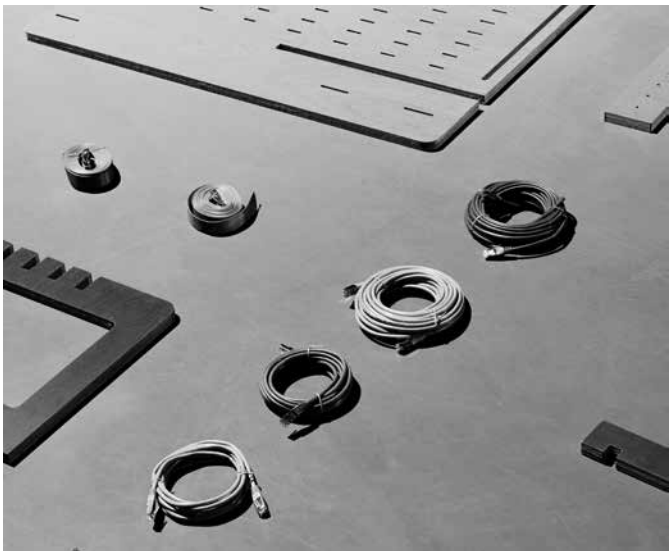
Note: the purpose of a “Home Cloud Kit” ⟨working title⟩ has been described in a previous post. It will be composed by four artifacts which will become the main outcomes of the design research Inhabiting and Interfacing the Cloud⟨s⟩, along with one book about the ethnographic field study and another one about the design research process. Below are four links leading to four posts describing and analyzing the current state of evolution for each part of this kit. We expect the research and the “kit” to be finished by the end of March 17. The “kit” will be distributed freely at the end of the project. The final phase of our research consists in the prototyping of artifacts which relevance have been identified along the process. Tools, infrastructures and services are therefore addressed and will constitute a “Home Cloud Kit”. This final phase is organized into the four following lines of work: ⟨A⟩ A Personal Data Center ⟨evolution, models⟩ ⟨B⟩ I&IC’s OwnCloud Core Processing Library ⟨evolution⟩ ⟨C⟩ A Personal Cloud ⟨evolution⟩ ⟨D⟩ My Data Controllers ⟨evolution, models⟩.

0145 Cabinets, Cloud, Code, Data, Datacenter, Domestic, ECAL, Experience, fabric|ch, Interface, Open source, Things, Tools

0147 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Naming the outputs of our design research: Cloud of Cards, a home cloud kit

2017.03.22/Patrick Keller

Design, Interaction Design, Projects, Schools



Cloud of Cards, a personal cloud kit. Scattered 19” hybrid server racks, elements and kit to assemble and play with. ⟨Photo: Daniela & Tonatiuh⟩

Therefore… Cloud of Cards, is a home cloud kit to help re-appropriate your data self. Obviously a distant tribute to House of Cards, the toy project by the Eames (“Toys and games are preludes to serious ideas”), the kit will consist of four artifacts: *19” Living Rack* is an open source server rack with a few functional hybridizations, declined in four versions. *Cloud of Cards Processing Library* consists in a programming tool to help develop cloud applications with the Processing development language. *5 Folders Cloud* is a version of the Cloud ⟨OwnCloud⟩ with automated behaviors and cascades of events. It is an implementation of the processing library directly linked to the outputs and learnings of the ethnographic research about uses of the cloud. Finally, *5 Connected Objects* physically interface the five automated folders in our version the cloud ⟨5 Folders Cloud⟩ with five “smart” objects and try to embody distant data in some kind of everyday Domestic, presence.

0147 Automation, Behavior, Cloud, Clouds, Code, Data, Datacenter, Designers, Developers, ECAL, Makers, Networks, Object, Open source, Smart, Things, Tools

0158 ⟨A⟩⟨B⟩⟨C⟩⟨D⟩ Cloud of Cards ⟨ABCD⟩, a home cloud kit

2017.06.12/Patrick Keller

Cookbooks, Projects, Resources, Schools

Cloud of Cards, a home cloud kit to re-appropriate your data self, is the principal outcome of the joint design and ethnographic research *Inhabiting and Interfacing the Cloud⟨s⟩,* accompanied by two books in print-on-demand that document it.

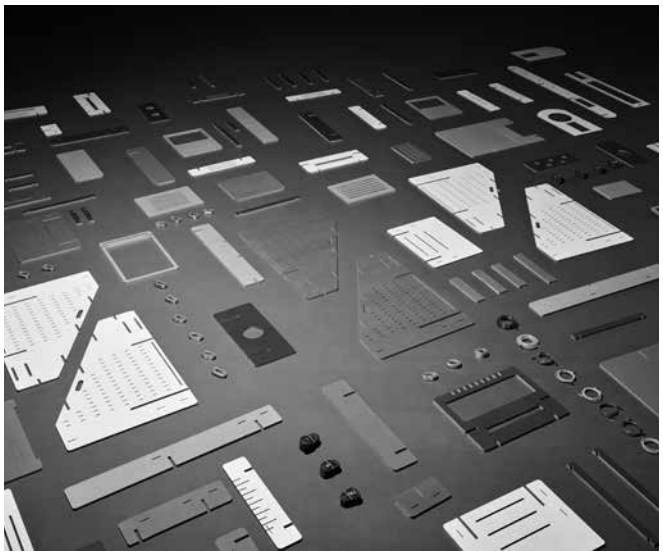
The main results of the project are four artifacts [⟨A⟩–⟨B⟩–⟨C⟩–⟨D⟩], both digital and physical that constitute a set of modular tools (“cards”) that are delivered in the form of an open-source diy kit, freely accessible on www.cloudofcards.org as well as on Github. The purpose of these tools is to give everyone, the community of designers and makers in particular, the possibility to set up their own small size data-center and cloud, manage their data in a decentralized way or develop their own alternative projects upon this personal small scale infrastructure.

Continue Reading…

0158 Clouds, Data, Datacenter, ECAL, Infrastructure, Makers, Object, Storage, Tools

Guided tour

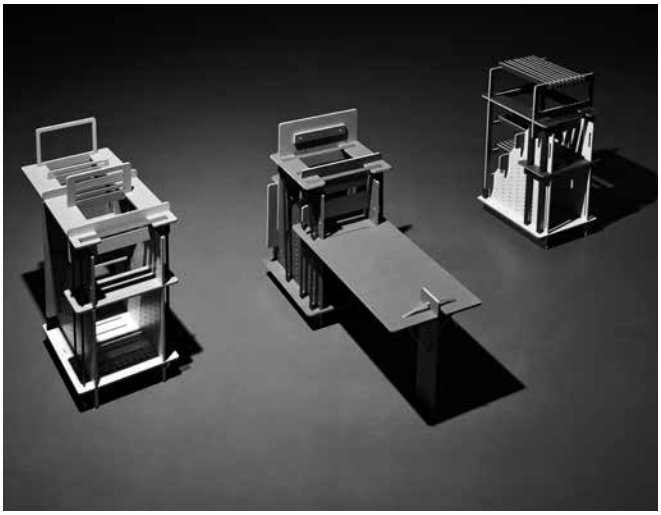
In a graphic designer's studio, a videographer's apartment, a product designer's "home office," or a "maker's" [1] garage, a set of plywood panels and coloured straps shelter server blades that hum slowly in the space. Books, plants, drawing materials, and other various objects coexist with the machines in a kind of ecosystem which varies according to its owner's activities.



19" Living Rack[2] comes in four versions:

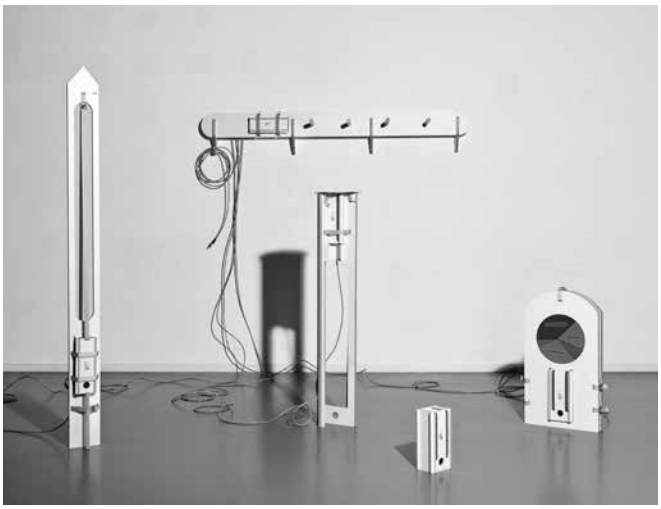
Base: a single cabinet that can accommodate from one to X server units, distributed according to their dimensions, weight, and heat.

Home: a *Base* cabinet enhanced with domestic facilities such as storage, heating, and drying.



Office: a cabinet equipped with a desk and filing spaces.

Garden: a cabinet with a vertical extension ready to accommodate tropical plants in this microclimate, which are particularly efficient in the purification and humidification of the air.



On the wall, a hanger with four suspended objects waiting to be manipulated in order to interact with the digital environment with which they are associated. This set is called the *Five Connected Objects*. Equipped with various sensors, they have

the potential to trigger pre-programmed actions in a cloud server[3] (see the *Five Folders Cloud* below), according to parameters recorded in their physical environment. Sort of "intelligent" controllers, they mimic the "natural" interactions[4] that one can have in a domestic environment: to store, to suspend, to conserve, and so on.

To_Accumulate, To_Care, To_Freeze, To_Improve, To_Multiply:
these are the names of the *Five Connected Objects* imagined by the research team[5]. Nouns of functions, declinable at will, names of actions, between a substantive and a verb, the object and its potential, the real and the virtual, in the etymological sense of the word. This in-between speaks of materiality and immateriality, visibility and imperceptibility, of all the electromagnetic fields that surround us, with which we interact or not, but also of light, heat, dust, and airstreams.

Through these five objects, another understanding of our surrounding objects emerges, offering a physical presence to the intangible services of Cloud Computing at the habitat level. Their intentionally incongruous use may question: for example, *To_Care* must be dusted regularly to make a safe copy of the files contained in the corresponding folder. In the event of a failure, the backup is deleted, then the "neglected" files are transferred to the folder entitled *To_Multiply* before a wide distribution on the network is made. On its side, *To_Freeze* allows archiving of the content of its folder if it is placed in a cold zone, in the refrigerator, for example. The *Five Connected Objects* are, thus, a playful and ironic prefiguration of the Internet of Things, and help make tangible a set of functions hitherto invisible and automated.

On the assembled desk of the *Office* version of the *19" Living Rack*, an open laptop gives access to the digital workspace of the designer, the DJ, the videographer, or the photographer, all large consumers of stored "Gigabytes" or online computing services. On the screen saver, a small program provides continuously information about the status of the user's personal cloud and its activities. The accessed environment starts with a folder called "CLOUD_OF_CARDS," which opens on five specific Folders, hosted in the server blades, synchronized with their "duplicates" (or "triplicates," or "quadruplicates," etc.) by an automated process, which is constantly running in the background. Cloud architecture, fuzzy infrastructure, but, now, inescapable in current practices.

This *Five Folders Cloud*, whose scale and structure echo the results of the ethnographic survey[6] of users' motivations conducted during the first phase of the research, proposes a set of actions associated with the *Five Connected Objects*:

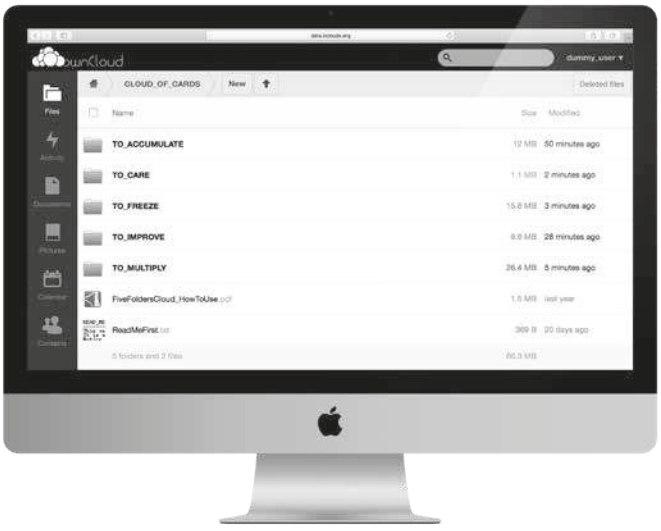
To_Accumulate
→ to record, to store, to keep

To_Care
→ to backup, to copy, to privatize

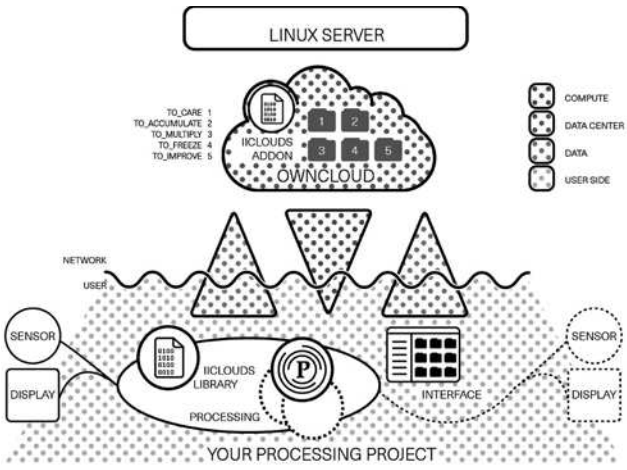
To_Freeze
→ to archive, to hide

To_Improve
→ to share, to expand, to publish

To_Multiply
→ to process, to update, to develop



This interoperability between physical and digital workspaces, as well as the automated functions associated with them, is made possible by the *Cloud of Cards Library*. This library is an improved version of the ownCloud open-source library, which aims to enable designers, artists, architects, and any interested user to easily set up a personal and customizable Cloud Computing system, while remaining on the "Clearnet." [7] Better: to extend its standards[8] by developing alternative, original versions. Without going into the technical details, this new library developed within the framework of the project gathers four existing services[9] in order to simplify the implementation and management of a personal cloud. It brings together the different basic functions of such a system (to create, to move, to copy, to delete files as well as to apply tags), while offering new original services such as "to take care," "to improve," "to multiply," and so on. It also makes it possible to compute and visualize the data and activities of the system. This part of the *Cloud of Cards Library* was designed to be adapted and personalized,[10] since it was developed in Processing,[11] a simple programming language for designers and others without prerequisite technical knowledge.



Once again, the proposed interface is one example among a multitude of possibilities. All are free to create new features or interfaces.

Ultimately, this library offers the possibility of configuring its own cloud architecture, physical and digital, to associate the desired services with different connected objects, in a word, to create a personal version of *Cloud Computing*, for one's own purposes, on a restricted scale.[12]

Here, in the form of an "open source" or even "open design" kit, is the first set of results of the research-creation project *Inhabiting and Interfacing the Cloud(s)*, made available to the community via the platform cloudofcards.org.

Method and results

What can be said about our work process, namely research by project? The design has its own methods of work and thought.[13] Research in design, by design, has its qualities. We shall not ask again here whether the design process can become a research process: others have done this before us[14], more rigorously. Period.

The research team working on *Inhabiting and Interfacing the Cloud(s)* have used this know-how, this multi-centennial practice[15] of sketches, prototypes, projects, objects, analyses, sketches, prototypes, and so on. In a non-linear process, but one which was exhaustively documented,[16] they have tended towards a systematicity and a transparency, often absent from the design process, where subjectivity, or "mystery," can be important. Here, a desire for rigor and documentation has accompanied the whole process so that other designers, other researchers, can follow the process to reproduce it, make it evolve, or, even, bifurcate from it. But also to demonstrate its relevance.

On the research process blog, all articles and sketches published along as the work progressed were tagged with different keywords (such as samples of ideas and/or artefacts), and classified in different categories. At the end of project development, the five keywords or tags that appear to have been most used are, in alphabetical order: "Clouds," "Data," "Datacentre," "Infrastructure," and "Tools." Others have also emerged, such as "Cabinets," "Domestic," "Interface," "Makers," "Networks," "Open source," and "Users." For some of these words, this is logical and merely points out that the team has remained close to its research objectives, while adopting a highly exploratory and non-linear research-creation process. "Clouds" points to the software dimension of the technology, while "Datacentre" refers to the hardware. "Data" refers to the main contents of this "software — hardware" set, while "Infrastructure," an unplanned theme which emerged from the process itself, combines the whole around territorial issues.

The other keywords give direction to the whole: the need to work on "Tools" and references in "Open source" that can be

used by “Makers” or people, designers, and artists wishing to create their own iteration of the cloud. They also bring about a change of scale by imagining investing in the “Domestic” dimension of the “Networks,” or even the scale of the “Cabinet” (of curiosities?). All this, while exploring the “Interface” issue for the final “Users” of a personal cloud.

The results of the workshops[17] that punctuated the progress of the research project are also covered. Critical reviews[18] wrapped up these intense moments of creation, which made the research project also evolve by design, according to cyclical processes rather than linear development, which is common in creation by design. Thus, we observe a reciprocal influence between initial hypotheses, ethnographic studies, exploratory proposals resulting from workshops, and the final design project.

All of this helped to form *Cloud of Cards*, a final deliverable that includes design objects, implementation instructions (the “*cookbooks*”), and new tools to encourage further research.

Means of transmission

The publication of the research project results takes different forms. Cutting plans and mounting instructions for the *19” Living Racks* are available for download, ready to be transmitted to a CNC machine, or modified to create other arrangements. The *Cloud of Cards Library* and other pieces of code are shared on GitHub,[19] a decentralized platform of versions management. *Cookbooks* and their *recipes*, which combine the good practices elaborated during the research process, are available on the project website. These inform the community on how to implement systems that allow users to re-appropriate their tools.

“Why” is also at the heart of the process; it is the engine of the evolution of the research project. At first, one of the objectives of the project was to get rid of existing “solutions” in order to offer to more designers/makers the opportunity to create projects with these tools. During the research, thanks, in particular, to the ethnographic studies carried out by Nicolas Nova and his team, the impact of Cloud Computing on our

ways of doing things and even thinking took on an unexpected dimension. It is perhaps not yet clear how much it contributes to contemporary practices and uses, both professional and private. And, as such, how the resulting uses can influence our relationship to our environment and the world.

By studying its components, by implementing them through design, and by creating new ways of doing things, the research team's intentions have been to question the prevailing situation, think about ways of decentralizing Cloud Computing on a local scale, and develop new tools. Like *House of Cards,*[20] the visual and spatial composition game created by Charles and Ray Eames, *Cloud of Cards* proposes to deploy into space different configurations specific to the desires or needs of the user. While the 1952 card game aimed to educate people about patterns, colours, and architecture, *Cloud of Cards* aims to enable people to re-appropriate their data space. Not only in terms of distribution or backup, which are standard Cloud Computing functions,but also other unforeseen uses, in the manner of the hijacks and hacks that are the work of designers/architects/artists/ethnographers whose behaviours have been studied within the framework of this research project. Here, too, the creation of combinations, associated with a certain "fragility" of the assemblage, invite users to the game and personal experimentation.

Openings

In this article, starting with the design objects and arriving at the process of the research project, I tried to trace a thread from the results to the intentions. There is obviously more than one thread to follow in this ball. This complexity could be the object of criticism in a research project. I see, rather, a plurality of entrance doors to a multitude of questions of design, but also of society.

Rather than leading to a standardization of our work and communication tools, to the globalization of their uses, this research shows that diversity is omnipresent in the practice of cloud computing and that it should be considered a source of wealth. Implementing networked microstructures and creating distributed digital environments, instead of

centralized and universal systems and infrastructures, is reminiscent of the creolization practices and processes described in other contexts by the poet and philosopher Edouard Glissant.[21]

In this way, the design objects produced in the course of the research process are not THE answer to the questions that underpinned the project, but rather an example of design uses, which shows the potential of the *Cloud of Cards* kit. They offer food for reflection, through their uses, forms, and modes of interaction between the physical and digital environments. They also allow the diffusion of the project and the questions it raises from the academic circles of design research to designers[22].

The exhibition of the intermediate project results at HEK[23] in Basel, at the very heart of an art and design exhibition entitled *Poetics and Politics of Data,*[24] showed us this potential and importance. Similarly, the *Bot Like Me*[25] conference organized at the Centre Culturel Suisse in Paris on the occasion of the !*MedienGruppe Bitnik* exhibition made it possible to widen the typical audience for this type of meeting. The question remains as to how to expand further to reach society as a whole. Maybe by using the Cloud?

1 At the beginning of the research process, and in order to document the state of the art, the research team studied the place of the Cloud in various "amateur" or activist practices. See, for example, the case of a man cave for the Internet age: http://www.iiclouds.org/tag/0014/ or that of Bitcoins server farms tinkered with at home: http://www.iiclouds.org/tag/0016/ (accessed March 10, 2017).

2 *19" Living Rack* is the title of one of the design projects resulting from the research process, which evokes both storage furniture and the computer cabinet.

3 To propose responsive, but also sensitive, objects in place of the usual digital interfaces is one of the results of *Bot Caves*, workshop #3, conducted by Matthew Plummer-Fernandez with ECAL students.

4 The intention to associate domestic uses and digital services was developed during *Cloud Gestures*, workshop #6, directed by Sascha Pohflepp at HEAD.

5 The research team is composed of professors Patrick Keller (ECAL/University of Art and Design Lausanne) and Nicolas Nova (HEAD – Geneva), who are the project directors, and assistants Lucien Langton and Léa Pereyre (ECAL), as well as Charles Chalas and Anaïs Bloch (HEAD).

6 http://www.iiclouds.org/tag/0043/(accessed March 12, 2017).

7 The word must be understood to be in opposition to the "darknet." This assumed choice of the research team aims to answer the lack of alternatives to existing Cloud Computing for individuals not wishing to use the current alternative services or lacking the necessary technical skills.

8 A blink at the Dunne & Raby project, *Existing normal*, https://bit.ly/2OK5TPv (accessed March 12, 2017).

9 ownCloud, Sardine (WebDAV library), OCS Share (file management), and OCS User Provisioning API (user management).

10 All code is available on the GitHub platform. (accessed October 18, 2017). https://github.com/cloudofcards

11 Processing: "a language for learning how to code within the context of the visual arts," https://processing.org/ (accessed March 12, 2017).

12 Here we are dealing with the notions of *Fog Computing,* which proposes network architectures similar to *Cloud Computing,* but which is able to perform actions locally; in particular, the development of Internet of Things (goals: better management of resources, energy savings and Infrastructure, data privacy, etc.). The architecture of the system combines a relatively conventional client-server approach with a more distributed one, which approaches the concept of a "peer-to-peer" network.

13 Nigel Cross, Designerly Ways of Knowing, Basel [etc.]: Birkhäuser, 2007.

14 See, in particular, Recherche-création en design, under the direction of Lysianne Léchot-Hirt, Genève: MetisPresses, 2010 and Alain Findeli, « La recherche-projet en design et la question de la question de recherche: essai de clarification conceptuelle », Sciences du Design, 2015/1 (N°1), p. 45–57.

15 ... ←→ Intentions/questions ←→ sketches ←→ preliminary design ←→ project ←→ prototype(s) ←→ realization(s) ←→ ...
Some designers have pushed to "standardize" these work processes, which are closer to circular or spiral schemes than linear. This can be found, for example, in the standards set by the SIA, the Swiss Society of Architects and Engineers.

16 See the blog of the project: (accessed March 13, 2017). https://bit.ly/2KWMx7H

17 http://www.iiclouds.org/category/workshops/ (accessed March 13, 2017).

18 https://bit.ly/2BlZwAp (accessed March 13, 2017).

19 https://bit.ly/2MiniCh (accessed October 18, 2017).

20 https://bit.ly/2ySGXAU (accessed March 13, 2017).

21 In addition to his literary work, Edouard Glissant wrote several theoretical essays which present this idea of creolization at work in the contemporary world, in particular Poétique de la Relation (Gallimard, 1990) and Introduction à une poétique du Divers (Gallimard, 1996).

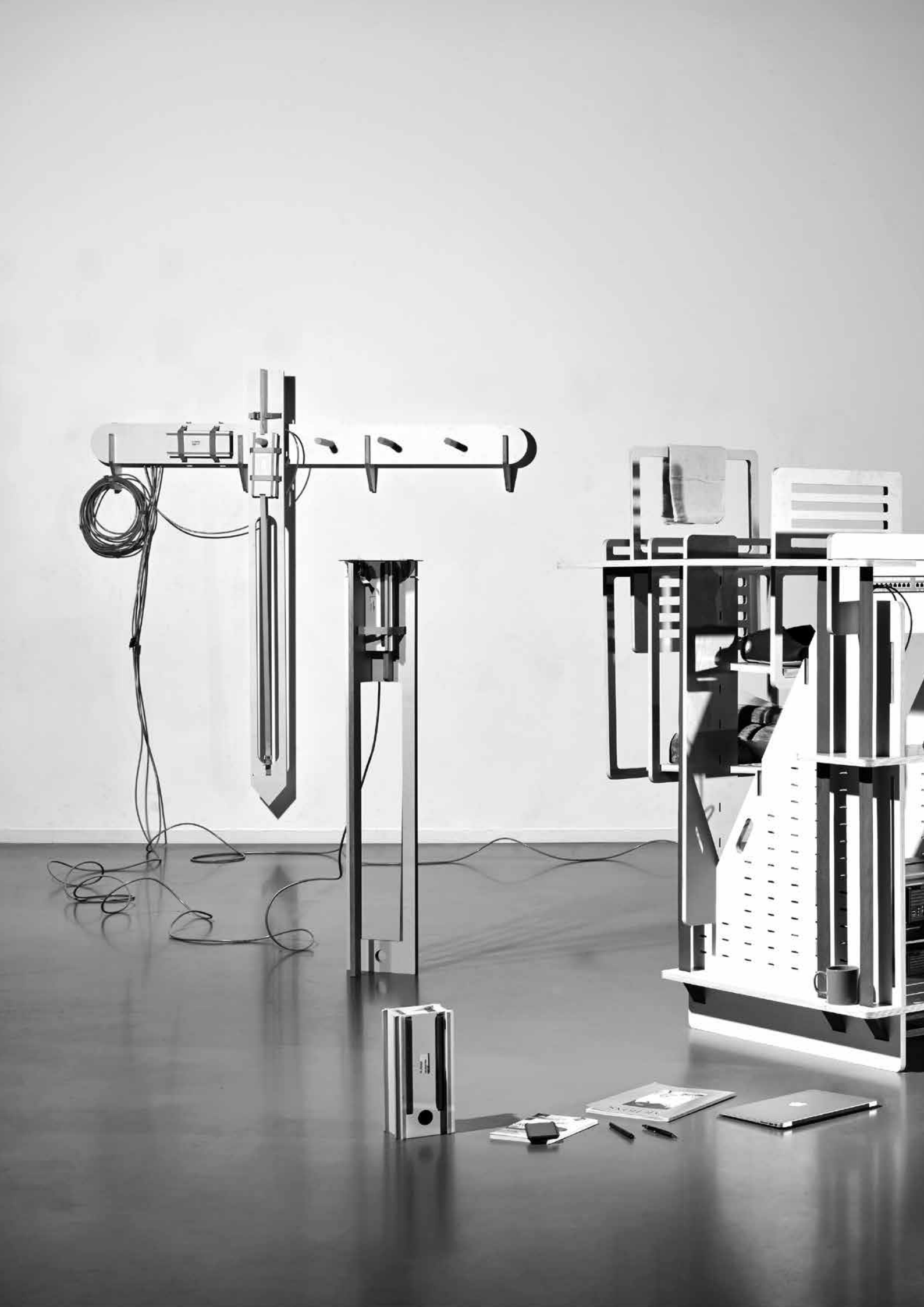
22 The design field has pre-existing distribution channels to design research, namely exhibitions, magazines, books, and other digital means of communication. The idea of integrating design research into existing structures in order to open it up to designers and the design community should be encouraged. A wider study could be carried out from similar experiments, as can be found in certain exhibitions or festivals, such as Transmediale in Berlin.

23 This experience was one of the highlights of this research project, garnering a multitude of positive, and even enthusiastic feedback, from other designers and artists, as well as researchers and the public.

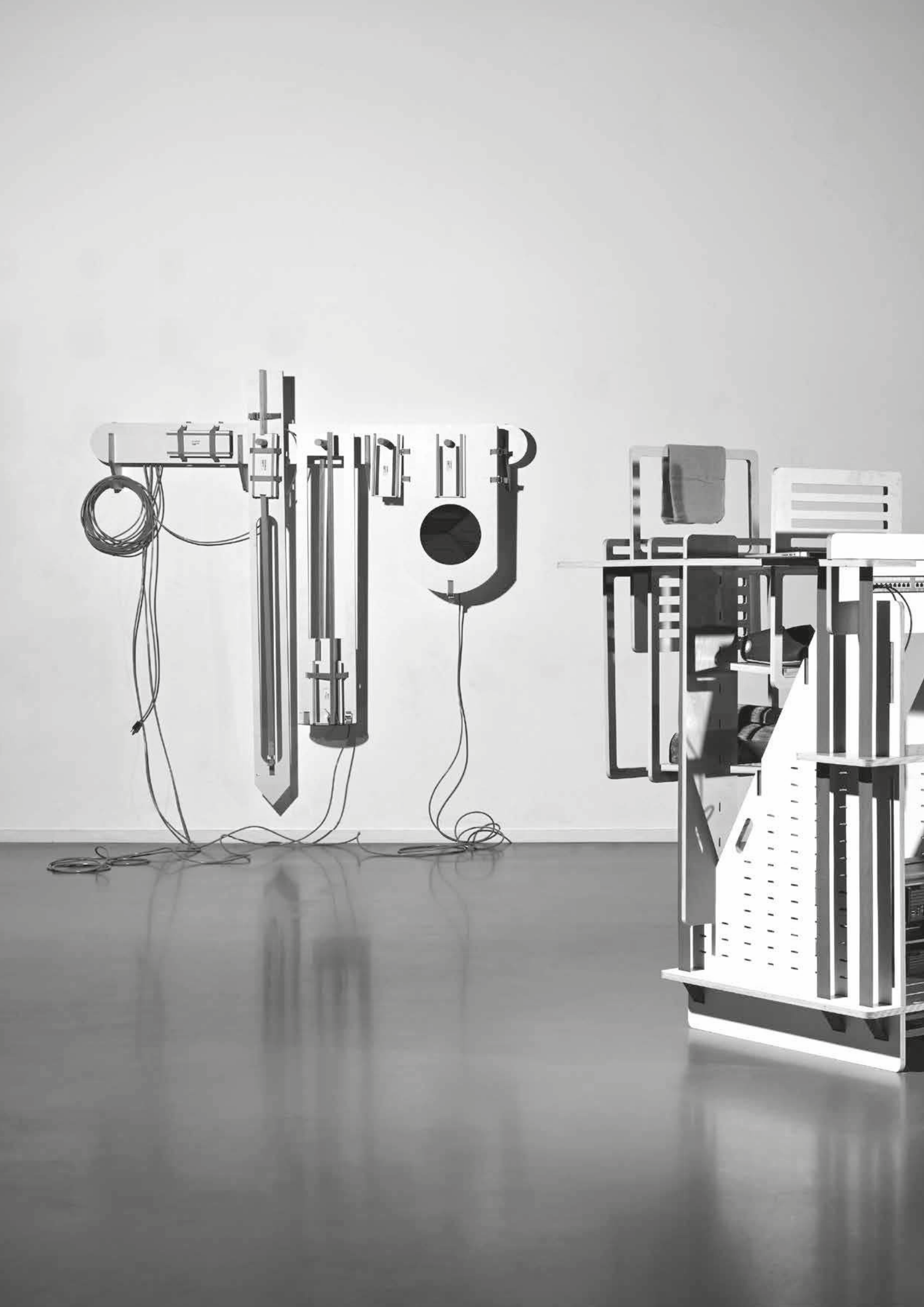
24 *Poetics and Politics of Data*, Haus der elektronische Künste, Basel, 29.05–30.08.2015,http://www.iiclouds.org/tag/0107/ or https://bit.ly/2zTahcD (accessed March 15, 2017).

25 Bot Like Me, Centre Culturel Suisse, Paris, 2–3.12.2016, https://bit.ly/2g0zypp (accessed March 15, 2017).

Note: all links last accessed March 31, 2018.




FON
TS
SA
VE



Partners

ECAL/Media & Interaction Design

Patrick Keller
Co-head of the joint design
& ethnographic research

Patrick Keller is Associate Professor at ECAL/University of Art and Design Lausanne, where he teaches design in the Media & Interaction Design unit. He settled and was in charge of this unit between 2001 and 2004. Between 2005 and 2007, he led the design research Variable_Environment that first combined the skills of designers from ECAL and scientists from EPFL (design & sciences research) that later helped set up further collaborations between the two schools.

Patrick is a founding member of fabric|ch, a studio for architecture, interaction and research. As part of his activity as creative director for the studio, he formulates new space proposals that combines digital, physical and environmental dimensions. Oscillating between devices, installations, experiments and productions, the work of the collective has been exhibited and published internationally, and has been presented in numerous talks.

Patrick Keller studied architecture at the Swiss Federal Institute of Technology, Lausanne (EPFL) where he graduated in 1993 (M.Sc) and in Berlin. He then continued his education in the research labs of the EPFL with a postgraduate in Computer Graphics (Mas).
→ patrick.keller@ecal.ch

Christophe Guignard

Christophe Guignard is Professor at ECAL/University of Art and Design Lausanne, where he teaches design and theory in the Media & Interaction Design unit.

Christophe is a founding member of fabric|ch , a studio for architecture, interaction and research which formulates new space proposals that combines digital, physical and environmental dimensions. Oscillating between devices, installations, experiments and productions, the work of the collective has been exhibited and published internationally, and has been presented in numerous talks.

Christophe studied architecture at the Swiss Federal Institute of Technology, Lausanne (EPFL), at the McGill University in Montreal and in New-York City. He graduated in architecture (M.Sc) before completing his formation with a series of seminars in philosophy at the University of Lausanne (UNIL), then in re-search labs at the EPFL with a postgraduate degree in Computer Graphics (Mas).

Lucien Langton
(research assistant, 2014–17)

Lucien Langton graduated in 2012 from ECAL in Media & Interaction Design (BA). In 2013, he obtained a CAS from HEIG-VD as a part of the Rapid Application Development MAS program. Since his diploma, Lucien worked as a freelance interaction and user experience designer for communication agencies and private clients. He recently co-founded his own company, Octree.

His works have been exhibited at Milan's international design fair, Berlin's Design Days and have been showcased on platforms such as Creative Applications, Gizmodo, Animal New York and The Discovery Channel among others.

His personal work focuses on interfaces, tangible design and ethics in the field of digital media. A selection of his personal projects can be seen on cyberschnaps.com

Léa Pereyre
(research assistant, 2016–17)

Léa Pereyre graduated in 2015 from ECAL in Industrial Design (BA). During her studies, she had the opportunity to exhibit her work at the Milan Design Week (in 2014 & 2015), and develop collaborations with companies such as Axor.

She worked in robotic research at EPFL and more recently with the startup Verity Studios at ETH, in Zürich. Next to this, she also works on personal projects.

HEAD/Media Design

Prof. Nicolas Nova
Co-head of the joint design
& ethnographic research

Nicolas Nova is Associate Professor at the Geneva University of Arts and Design (HEAD – Geneva) and founder of the Near Future Laboratory, a design studio based in Europe and California. His work is about identifying weak signals as well as exploring people's needs, motivations and contexts to map new design opportunities and chart potential futures.

Nicolas has given talks and exhibited his work on the intersections of design, technology and the near-future possibilities for new social-technical interaction rituals in venues such SXSW, AAS, O'Reilly Emerging Technology Conference and the design week in Milano, the Institute for the Future, the MIT Medialab.

He holds a Phd in Human-Computer Interaction from the Swiss Institute of Technology (EPFL, Switzerland) and was previously a visiting researcher at the Art Center College of Design (Pasadena, CA). He was also curator for Lift Conference, a series of international events about digital culture and innovation.
→ nicolas.nova@hesge.ch

Anaïs Bloch
(research assistant, 2016–17)

Anaïs Bloch is a Swiss designer and researcher. She holds an Undergraduate degree in Product Design (ECAL/University of Art and Design Lausanne) and a Master's degree in Cultural Anthropology (University College London). Her main research investigates how people interact and engage with built forms and the digital world. It also examines how culture, goods and design affect people and practices.

She is a founding member of Cleaning up after Gropius — a collective exploring the blurred boundaries between anthropological research methods, art and design. She is also part of The studio of material life — a space for collaborative work in anthropology.

Charles Chalas
(research assistant, 2014–15)

Coming from a graphic design background, Charles has attended the Gobelins school in Paris and obtained an Undergraduate degree in multimedia conception focusing on user centered services and interaction design.

He graduated with a Master's degree in Media Design from the Geneva University of Arts and Design.

His personal work focuses on the interactions between humans and the internet as a complex digital, physical and informational system.

EPFL/ALICE Laboratory
(Atelier de la conception de l'espace)

Dieter Dietz

Educated at the Swiss Federal Institute of Technology, Zurich (Arch. Degree 1991), Dieter Dietz also studied at the Cooper Union in New York with Diller/Scofidio. Since 2006, he is Associate Professor for Architectural Design at EPFL, director of the ALICE laboratory in the ENAC faculty. He collaborates with the ALICE team on research projects at diverse scales with labs inside and outside EPFL.

Caroline Dionne
(Architect scientist & lecturer)

Caroline Dionne is interested in questions of language and architecture — her work generally dwells in between words and buildings. She holds a doctorate in the History & Theory of Architecture Program, McGill University, Montréal (PhD. Arch 2006). Her thesis examines issues of spatial perception and language in the writings and scientific works of 19th century author Lewis Carroll. Since 2016, Caroline is Assistant Professor in Art & Design History & Theory at Parsons New School of Design (NYC).

Thomas Favre-Bulle
(Doctoral assistant & lecturer)

Graduated in architecture (M.Sc) from the Swiss Federal Institute of Technology in Lausanne (EPFL) and bachelored in law (B.Law) from the University of Paris 1 Panthéon-Sorbonne, Thomas Favre-Bulle started under the supervision of Pr. Dieter Dietz a doctoral thesis on the spatial dimensions of law. He was in charge with Shin Koseki of the Teaching Unit Spatial Strategies.

EPFL+ECAL Lab

Nicolas Henchoz

Based in Lausanne, the EPFL+ECAL Lab was founded by Nicolas Henchoz in 2007 to explore the potential of emerging technologies. Its mission is to foster innovation at the point where technology, design and architecture overlap.

Under Nicholas's direction The Lab's activities are focused on three main concerns. First, to develop practical, real-world applications for technologies developed in the scientific labs. Secondly, to drive innovation by widening the scope of designers' work. Thirdly, to form new links and develop synergy between

researchers and wider society seeking technological and other innovative solutions.

Nicholas Henchoz's teaching and research concerns include augmented reality, innovation management and material science. He has been named among Bilan's "300 Most Influential People in Switzerland". The EPFL+ECAL Lab is a unit of the Ecole polytechnique fédérale de Lausanne — Europe's leading research & development university — in co-operation with the Ecole Cantonale d'Art de Lausanne.

Peers & guest researchers

Matthew Plummer-Fernandez
(Algopop), London

British/Colombian Artist and Designer Matthew Plummer-Fernandez makes work that critically and playfully examines sociocultural entanglements with technologies. His current interests span algorithms, bots, automation, copyright, 3D files and file-sharing. He was awarded a Prix Ars Electronica Award of Distinction for the project Disarming Corruptor; an app for disguising 3D Print files as "glitched" artefacts. He is also known for his computational approach to aesthetics translated into physical sculpture.

For research purposes he runs Algopop, a popular Tumblr that documents the emergence of algorithms in everyday life as well as the artists that respond to this context in their work. This has become the starting point to a practice-based PhD funded by the AHRC at Goldsmiths, University of London, where he is also a research associate at the Interaction Research Studio and a visiting tutor. He holds a BEng in Computer Aided Mechanical Engineering from Kings College London and an MA in Design Products from the Royal College of Art.

Dev Joshi
(Random International), London

Dev Joshi is Head of Technology at contemporary art studio Random International. Having trained in product design engineering he has spent the last five years at Random finding ways to bend technologies and systems for use outside their usual arenas.

In addition to his work in the arts, Dev has recently launched Headless Ghost, a Kickstarter funded display emulator and is CTO at Product Laboratories Limited — developers of Rain Cloud, a connected weather device. Focusing on hardware and humans, Dev enjoys exploring the interface between people, objects and the behaviors of both as well as how technology can be used to convey information across the fields of art and science for both practical and emotional expression.

Dr. Christian Babski
(fabric|ch), Lausanne

Christian Babski is lead programmer and co-founder at fabric |ch, a studio for architecture, interaction and research based in Lausanne, Switzerland.

As scientist, Christian Babski takes part in the technical and software development of research projects within the group. Through experimental projects, he developed detailed skills in interfacing heterogeneous systems/mechanism/hardware by achieving specific software libraries in numerous distinct programming languages. Therefore, he is used to managing computer hardware, sensors, mobile devices as well as network and online technologies or services.

Christian Babski holds a Phd in Computer Graphics from the Swiss Federal Institute of Technology (Lausanne), where he was involved into several European research projects. He previously graduated in Computer Science (Ma) in Dijon (France), prior to finalizing a Master of Science (M.Sc) in Lyon (France)/Geneva (Switzerland).

Impressum

Cloud of Cards
Edited by Patrick Keller

Research direction
Patrick Keller, Nicolas Nova

Researchers & guest researchers
Christophe Guignard, Christian Babski ⟨fabric|ch ⟩, James Auger ⟨Auger-Loizeau⟩, Matthew Plummer-Fernandez ⟨Algopop⟩, Dieter Dietz ⟨ALICE, EPFL⟩, Caroline Dionne ⟨Parsons⟩, Thomas Favre-Bulle ⟨EPFL⟩, Dev Joshi ⟨Random International⟩, Sascha Pohflepp

Research assistants at ECAL
Lucien Langton, Léa Pereyre

Texts
Patrick Keller, Nicolas Nova, Nathalie Kane, Christophe Guignard

Interview
Matthew Plummer-Fernandez

Transcription and proof-reading
Ming Lin

Project photography
Daniela et Tonatiuh

Graphic & website design, web development
Eurostandard ⟨Ali-Eddine Abdelkhalek, Pierrick Brégeon, Clément Rouzaud⟩

Typeface
LL Riforma Medium, lineto.com

Printing
Lulu Press, Inc.

www.cloudofcards.org
www.iiclouds.org

Director of ECAL
Alexis Georgacopoulos

Head of Ra&D
Davide Fornari

Head of Media & Interaction Design
Pauline Saglio

Head of EPFL+ECAL Lab
Nicolas Henchoz

Acknowledgements
Alexis Georgacopoulos, Jean-Pierre Greff, Luc Bergeron, Charles Chalas, Anaïs Bloch, Stéphane Carion, Daniela Droz, Tonatiuh Ambrosetti, Laura Perrenoud, Babak Falsafi, Zhang Ga

With the generous support of
HES-SO, University of Applied Sciences and Arts Western Switzerland

ECAL/University of Art and Design Lausanne
Avenue du Temple 5
CH–1020 Renens
Switzerland

www.ecal.ch

0002 Architecture
0009 Architecture
0016 Architecture
0035 Architecture
0064 Architecture
0085 Architecture
0087 Architecture
0090 Architecture
0091 Architecture
0092 Architecture
0093 Architecture
0094 Architecture
0101 Architecture
0110 Architecture
0132 Architecture
0134 Architecture
0140 Architecture
0144 Architecture
0145 Architecture
0156 Architecture
0157 Architecture
0002 Art
0098 Art
0116 Art
0119 Art
0011 Cookbooks
0059 Cookbooks
0071 Cookbooks
0072 Cookbooks
0080 Cookbooks
0095 Cookbooks
0096 Cookbooks
0120 Cookbooks
0151 Cookbooks
0153 Cookbooks
0154 Cookbooks
0156 Cookbooks
0158 Cookbooks
0161 Cookbooks
0002 Design
0009 Design
0011 Design
0012 Design
0013 Design
0019 Design
0030 Design
0050 Design
0052 Design
0066 Design
0109 Design
0110 Design
0131 Design
0134 Design
0135 Design
0136 Design
0137 Design
0138 Design
0139 Design
0140 Design
0142 Design
0143 Design
0144 Design
0145 Design
0147 Design
0148 Design
0149 Design
0156 Design
0157 Design
0160 Design
0161 Design
0002 Ethnography
0009 Ethnography
0034 Ethnography
0042 Ethnography
0043 Ethnography
0044 Ethnography
0045 Ethnography
0060 Ethnography
0062 Ethnography
0110 Ethnography
0123 Ethnography
0124 Ethnography

0125 Ethnography
0132 Ethnography
0133 Ethnography
0140 Ethnography
0159 Ethnography
0161 Ethnography
0002 Interaction Design
0009 Interaction Design
0035 Interaction Design
0046 Interaction Design
0051 Interaction Design
0060 Interaction Design
0061 Interaction Design
0062 Interaction Design
0063 Interaction Design
0065 Interaction Design
0070 Interaction Design
0071 Interaction Design
0072 Interaction Design
0073 Interaction Design
0074 Interaction Design
0076 Interaction Design
0091 Interaction Design
0095 Interaction Design
0096 Interaction Design
0097 Interaction Design
0110 Interaction Design
0117 Interaction Design
0118 Interaction Design
0121 Interaction Design
0122 Interaction Design
0126 Interaction Design
0127 Interaction Design
0129 Interaction Design
0132 Interaction Design
0134 Interaction Design
0135 Interaction Design
0136 Interaction Design
0137 Interaction Design
0138 Interaction Design
0139 Interaction Design
0141 Interaction Design
0142 Interaction Design
0143 Interaction Design
0144 Interaction Design
0145 Interaction Design
0147 Interaction Design
0148 Interaction Design
0151 Interaction Design
0153 Interaction Design
0154 Interaction Design
0155 Interaction Design
0160 Interaction Design
0161 Interaction Design
0004 People
0005 People
0006 People
0007 People
0008 People
0009 Projects
0035 Projects
0052 Projects
0056 Projects
0057 Projects
0058 Projects
0059 Projects
0079 Projects
0096 Projects
0111 Projects
0134 Projects
0135 Projects
0136 Projects
0137 Projects
0138 Projects
0139 Projects
0141 Projects
0142 Projects
0143 Projects
0144 Projects
0145 Projects
0147 Projects
0148 Projects

0151 Projects
0153 Projects
0155 Projects
0156 Projects
0157 Projects
0158 Projects
0076 Publications
0083 Publications
0106 Publications
0107 Publications
0108 Publications
0109 Publications
0110 Publications
0127 Publications
0128 Publications
0129 Publications
0140 Publications
0148 Publications
0149 Publications
0159 Publications
0160 Publications
0161 Publications
0001 Resources
0002 Resources
0003 Resources
0010 Resources
0012 Resources
0013 Resources
0014 Resources
0015 Resources
0016 Resources
0017 Resources
0018 Resources
0019 Resources
0020 Resources
0022 Resources
0022 Resources
0023 Resources
0024 Resources
0025 Resources
0026 Resources
0027 Resources
0028 Resources
0029 Resources
0030 Resources
0031 Resources
0032 Resources
0033 Resources
0036 Resources
0037 Resources
0039 Resources
0040 Resources
0051 Resources
0052 Resources
0055 Resources
0056 Resources
0057 Resources
0058 Resources
0064 Resources
0066 Resources
0067 Resources
0068 Resources
0077 Resources
0078 Resources
0079 Resources
0080 Resources
0082 Resources
0085 Resources
0086 Resources
0087 Resources
0088 Resources
0089 Resources
0090 Resources
0091 Resources
0097 Resources
0098 Resources
0099 Resources
0101 Resources
0102 Resources
0103 Resources
0104 Resources
0105 Resources

0111 Resources
0112 Resources
0113 Resources
0114 Resources
0115 Resources
0116 Resources
0119 Resources
0126 Resources
0130 Resources
0131 Resources
0146 Resources
0158 Resources
0161 Resources
0005 Schools
0006 Schools
0007 Schools
0008 Schools
0060 Schools
0061 Schools
0062 Schools
0070 Schools
0071 Schools
0072 Schools
0073 Schools
0074 Schools
0084 Schools
0092 Schools
0093 Schools
0094 Schools
0099 Schools
0117 Schools
0118 Schools
0120 Schools
0121 Schools
0122 Schools
0123 Schools
0124 Schools
0125 Schools
0129 Schools
0132 Schools
0145 Schools
0147 Schools
0148 Schools
0151 Schools
0153 Schools
0159 Schools
0160 Schools
0009 Sciences & Technology
0011 Sciences & Technology
0012 Sciences & Technology
0013 Sciences & Technology
0014 Sciences & Technology
0015 Sciences & Technology
0016 Sciences & Technology
0017 Sciences & Technology
0018 Sciences & Technology
0019 Sciences & Technology
0020 Sciences & Technology
0022 Sciences & Technology
0022 Sciences & Technology
0023 Sciences & Technology
0024 Sciences & Technology
0025 Sciences & Technology
0026 Sciences & Technology
0027 Sciences & Technology
0028 Sciences & Technology
0029 Sciences & Technology
0032 Sciences & Technology
0033 Sciences & Technology
0036 Sciences & Technology
0041 Sciences & Technology
0047 Sciences & Technology
0051 Sciences & Technology
0053 Sciences & Technology
0055 Sciences & Technology
0056 Sciences & Technology
0057 Sciences & Technology
0058 Sciences & Technology
0059 Sciences & Technology
0067 Sciences & Technology
0068 Sciences & Technology
0069 Sciences & Technology

0077 Sciences & Technology
0078 Sciences & Technology
0079 Sciences & Technology
0080 Sciences & Technology
0081 Sciences & Technology
0084 Sciences & Technology
0086 Sciences & Technology
0087 Sciences & Technology
0088 Sciences & Technology
0089 Sciences & Technology
0095 Sciences & Technology
0096 Sciences & Technology
0099 Sciences & Technology
0100 Sciences & Technology
0101 Sciences & Technology
0102 Sciences & Technology
0104 Sciences & Technology
0105 Sciences & Technology
0110 Sciences & Technology
0111 Sciences & Technology
0112 Sciences & Technology
0113 Sciences & Technology
0114 Sciences & Technology
0126 Sciences & Technology
0131 Sciences & Technology
0141 Sciences & Technology
0142 Sciences & Technology
0154 Sciences & Technology
0155 Sciences & Technology
0028 Society
0031 Society
0037 Society
0038 Society
0042 Society
0048 Society
0054 Society
0075 Society
0086 Society
0088 Society
0089 Society
0100 Society
0103 Society
0109 Society
0140 Society
0159 Society
0009 Thinking
0010 Thinking
0049 Thinking
0064 Thinking
0081 Thinking
0084 Thinking
0088 Thinking
0091 Thinking
0100 Thinking
0108 Thinking
0109 Thinking
0110 Thinking
0115 Thinking
0119 Thinking
0126 Thinking
0127 Thinking
0128 Thinking
0130 Thinking
0131 Thinking
0140 Thinking
0146 Thinking
0149 Thinking
0159 Thinking
0160 Thinking
0002 Uncategorized
0003 Uncategorized
0118 Uncategorized
0130 Uncategorized
0150 Uncategorized
0152 Uncategorized
0042 Workshops
0043 Workshops
0060 Workshops
0061 Workshops
0062 Workshops
0063 Workshops
0065 Workshops

0070 Workshops
0071 Workshops
0072 Workshops
0073 Workshops
0074 Workshops
0076 Workshops
0092 Workshops
0093 Workshops
0094 Workshops
0117 Workshops
0118 Workshops
0120 Workshops
0121 Workshops
0122 Workshops
0123 Workshops
0124 Workshops
0125 Workshops
0129 Workshops
0132 Workshops

Cloud of Cards, “a home cloud kit to re-appropriate your data self”, is the final outcome of Inhabiting and Interfacing the Cloud(s), a joint design and ethnographic research project investigating personal clouds and data centers.

The main results of this design research project have been informed by the preliminary findings of an ethnographic research into the cloud ⟨Cloud of Practices⟩ and a design sketches phase conducted in parallel. They comprise four digital and physical artefacts, forming a set of modular tools ⟨“cards”⟩, which are delivered in the form of an open-source DIY kit, freely accessible at www.cloudofcards.org and on Github.

The purpose of these tools is to enable everyone, in particular the community of designers and makers, to set up their own small-scale data center and cloud, manage their data in a decentralized way and develop their own alternative projects using this small-scale personal infrastructure.

With texts by Christophe Guignard, Nathalie Kane, Patrick Keller and Nicolas Nova, interventions by Random International, students from ECAL/MID ⟨Media & Interaction Design⟩ and Alice Lab ⟨EPFL⟩, fabric|ch, and several others, as well as an interview with Matthew Plummer-Fernandez ⟨#algopop⟩.

www.cloudofcards.org
www.iiclouds.org

écal Hes·so University of Applied Sciences and Arts Western Switzerland

ISBN 978-2-8399-2426-9