Secure ANalysis Environment (SANE)

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Sharing research data

- Increasing desire to use data not made for research purposes

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"I'm willing to share my data, but I can't" 🤷 → SANE

- McKinsey: ~1% of the world's data used for analytics purposes

Sharing research data

- Increasing desire to use data not made for research purposes

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"I'm willing to share my data, but I can't” 🤷 ⟶ SANE

- McKinsey: ~1% of the world’s data used for analytics purposes

2 Mentimeter

3 Use cases

Data provider perspective: KvK

- Pseudonymised data
- Complete control over the data
- Data cannot leave environment
- Trust the research software
- Research purpose
- Approve data upload

- Tinker SANE

Data provider perspective: KB

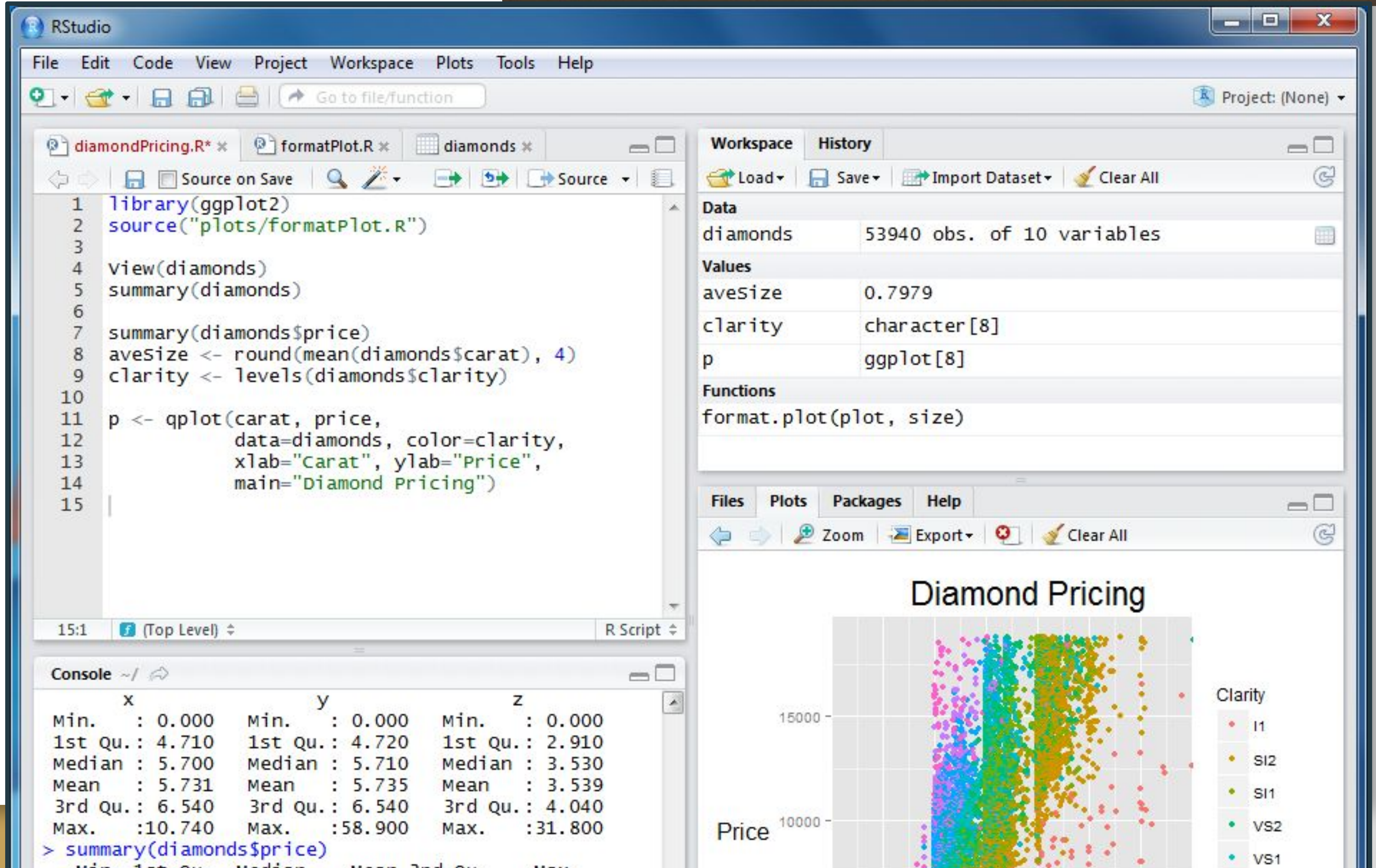
- Collections as data
- In copyright
- Non-consumptive use
- Research purpose
- Data upload allowed
- Software upload allowed
- Review any output

- Blind SANE

Researcher perspective: KvK

“To what extent does the proportion of part-time employees affect firm closure?”

- Combine it with my own data
- Play (Tinker with the data)
- Specific characteristics of the combined data determine consequent analytical steps.
- Use R, Python



RStudio
File Edit Code View Project Workspace Plots Tools Help
Go to file/function
Project: (None)
diamondPricing.R* formatPlot.R diamonds
Source on Save
Source
15:1 (Top Level) R Script
Workspace History
Load Save Import Dataset Clear All
Files Plots Packages Help
Zoom Export Clear All
Console ~/
Diamond Pricing
Price
15000
10000
Clarity
I1
SI2
SI1
VS2
VS1

```
library(ggplot2)
source("plots/formatPlot.R")

View(diamonds)
summary(diamonds)

summary(diamonds$price)
aveSize <- round(mean(diamonds$carat), 4)
clarity <- levels(diamonds$clarity)

p <- qplot(carat, price,
           data=diamonds, color=clarity,
           xlab="Carat", ylab="Price",
           main="Diamond Pricing")
```

```
Data
diamonds        53940 obs. of 10 variables
Values
aveSize         0.7979
clarity         character[8]
p               ggplot[8]
Functions
format.plot(plot, size)
```

```
       x                y                z
Min.   : 0.000   Min.   : 0.000   Min.   : 0.000
1st Qu.: 4.710   1st Qu.: 4.720   1st Qu.: 2.910
Median : 5.700   Median : 5.710   Median : 3.530
Mean   : 5.731   Mean   : 5.735   Mean   : 3.539
3rd Qu.: 6.540   3rd Qu.: 6.540   3rd Qu.: 4.040
Max.   :10.740   Max.   :58.900   Max.   :31.800
> summary(diamonds$price)
```

Researcher perspective: KB

- Mine the KB collections
- Use existing software and algorithms, e.g. NLP pipelines
- Use my own software or algorithm
- Upload a container
- Extract and download non-copyrighted data

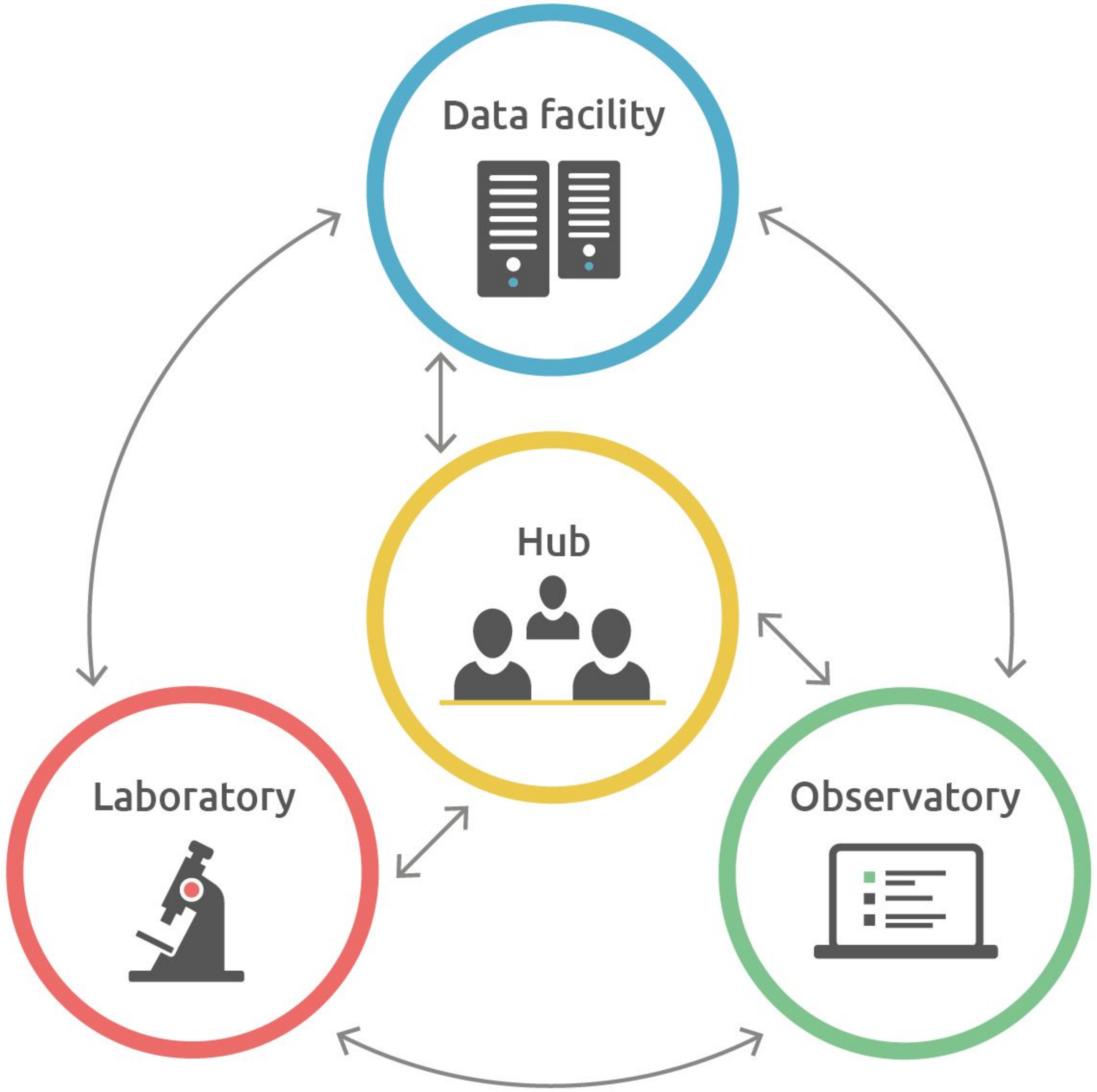
DNB
nscr
SURF
netherlands eScience center
IISG
Data Archiving and Networked Services
DANS
nidi
rijksuniversiteit groningen
UNIVERSITEIT TWENTE.
nivel
TUDelft
Erasmus
CENTERDATA research institute
Tilburg University
Maastricht University

ODISSEI

A national infrastructure for Social Science

ODISSEI creates a federated data infrastructure for the social and economic sciences in the Netherlands, on behalf of more than 40 member organisations.

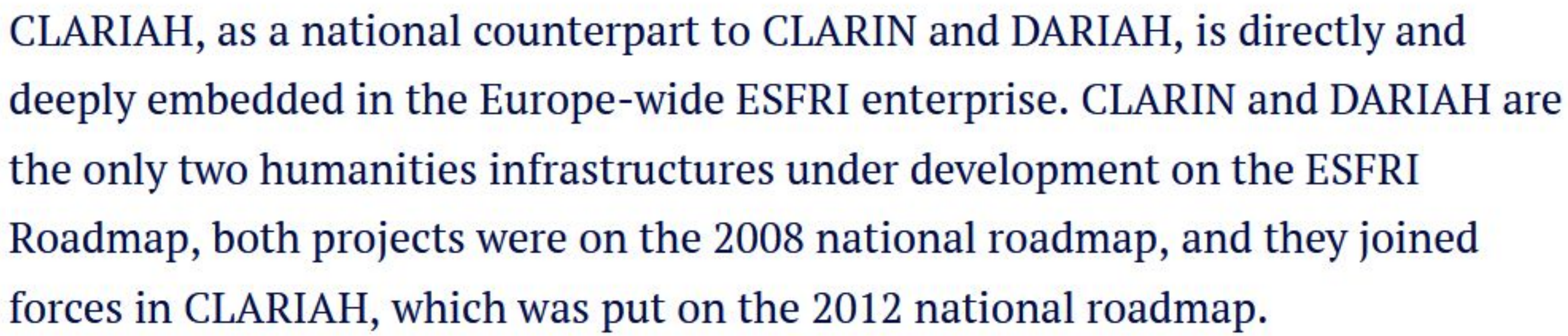
The ODISSEI research infrastructure



CLARIAH

Clariah

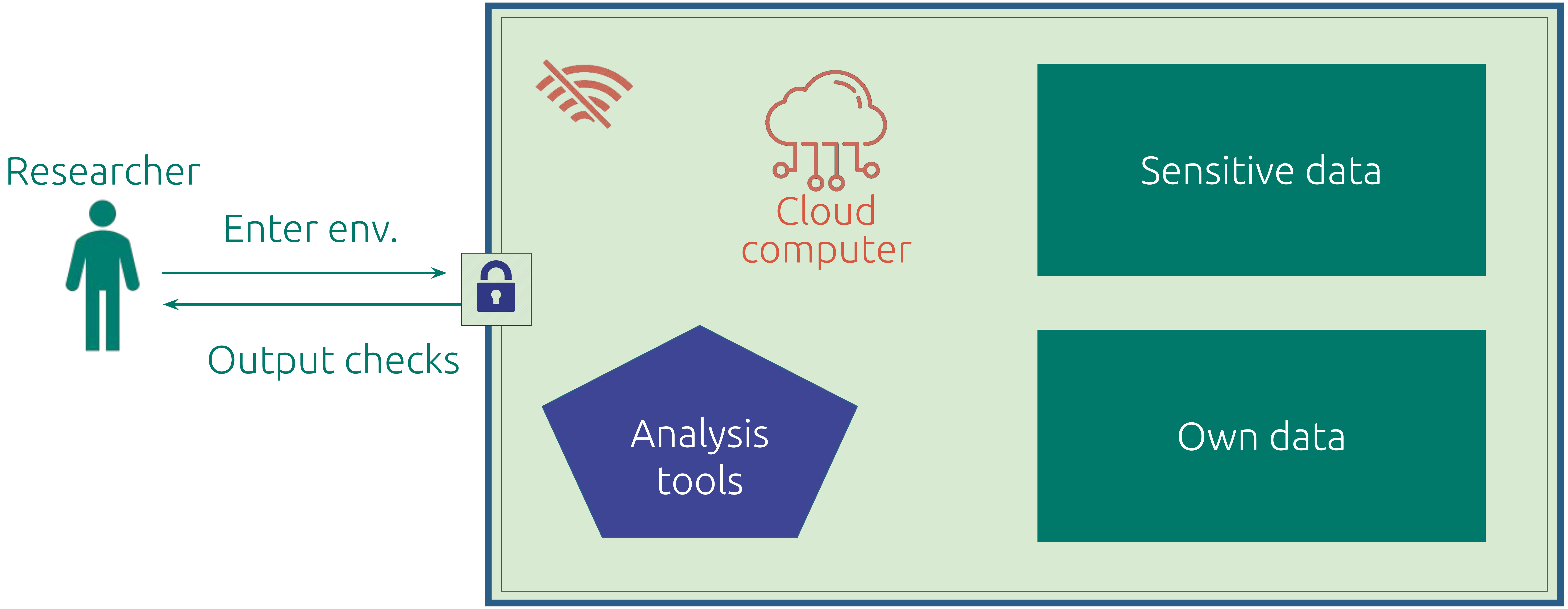
A distributed research infrastructure, part of the National Roadmap for Large-Scale Research Facilities (NWO)



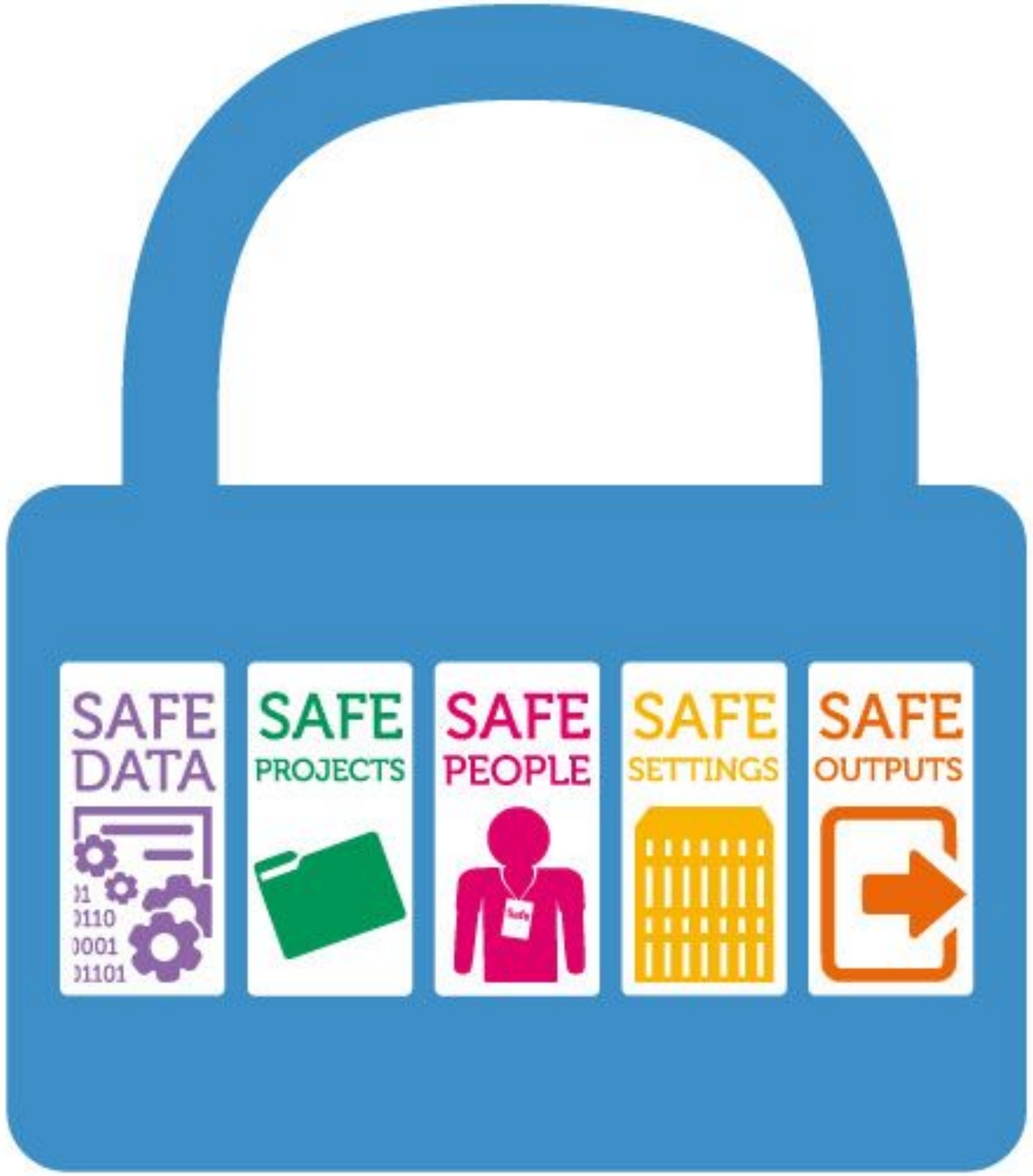
CLARIAH, as a national counterpart to CLARIN and DARIAH, is directly and deeply embedded in the Europe-wide ESFRI enterprise. CLARIN and DARIAH are the only two humanities infrastructures under development on the ESFRI Roadmap, both projects were on the 2008 national roadmap, and they joined forces in CLARIAH, which was put on the 2012 national roadmap.

4 SANE

Secure ANalysis Environment (SANE)



Five Safes

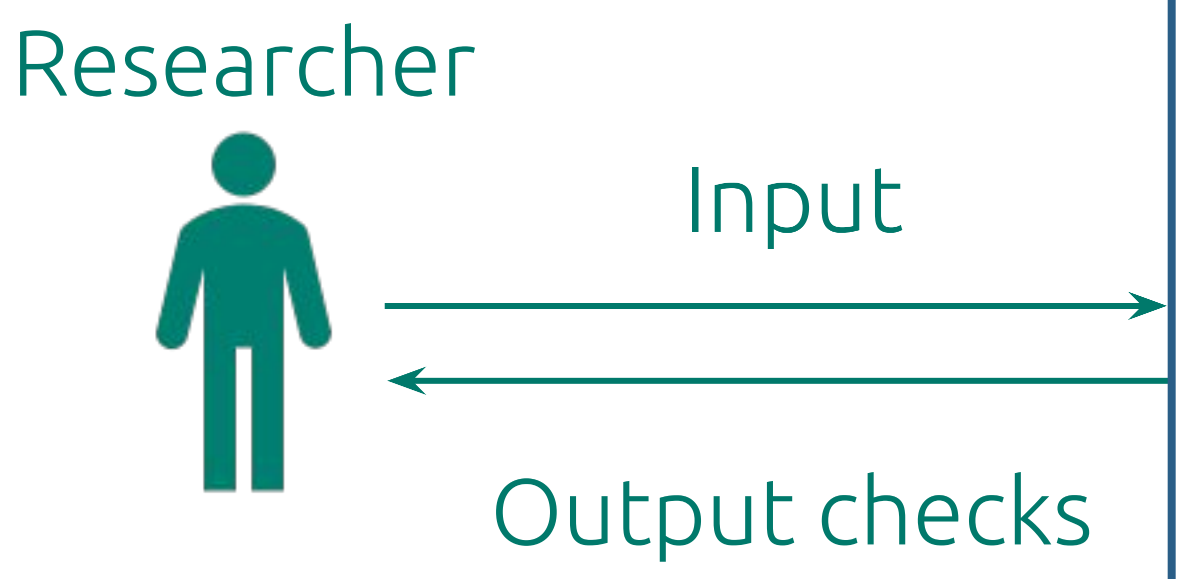

SAFE DATA
SAFE PROJECTS
SAFE PEOPLE
SAFE SETTINGS
SAFE OUTPUTS

Customisations

- Blind
- API connection to Data owner
- Temporary environment
- …

5 Similar initiatives

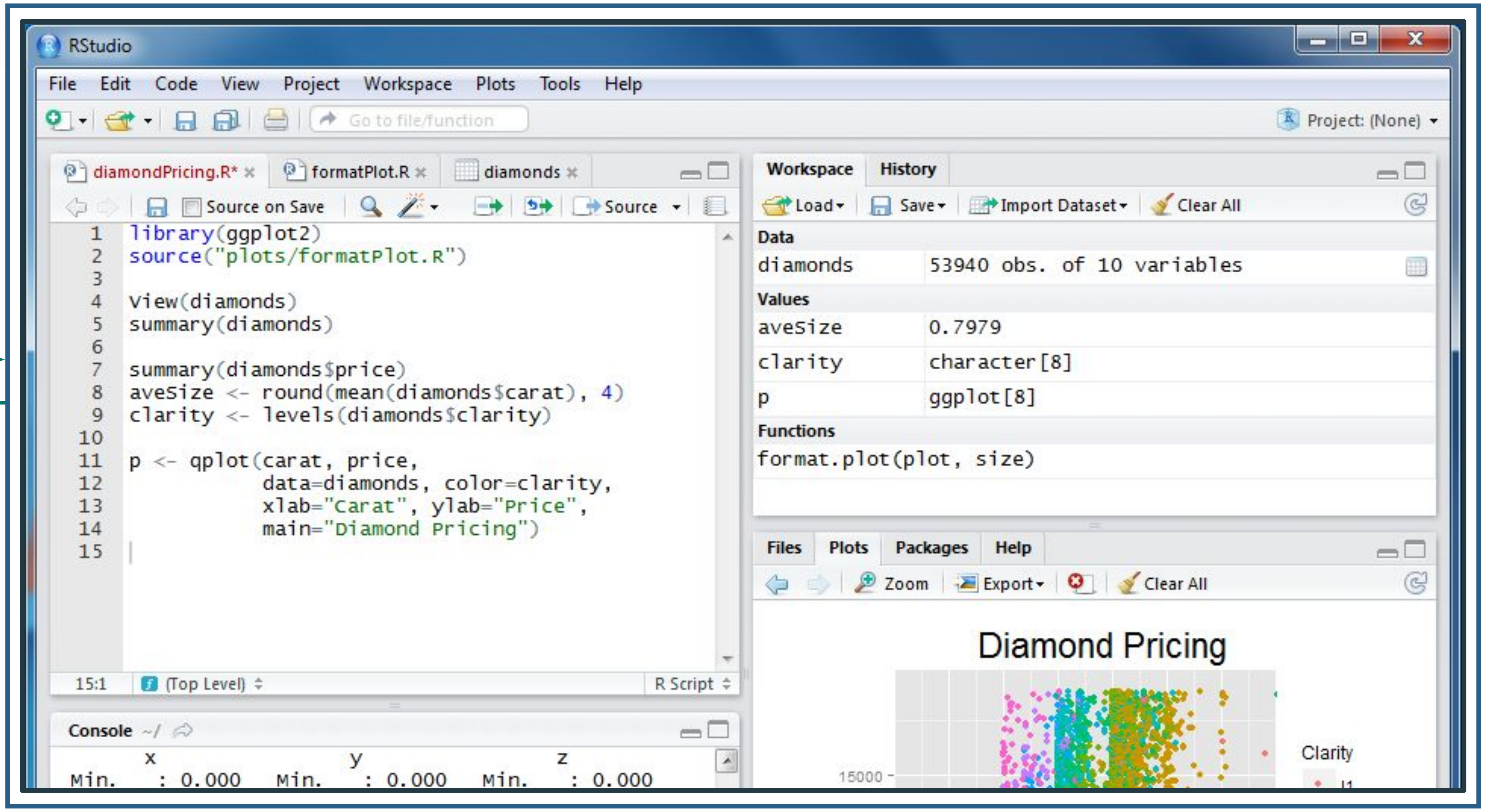
CBS Remote Access Environment



Researcher

Input

Output checks



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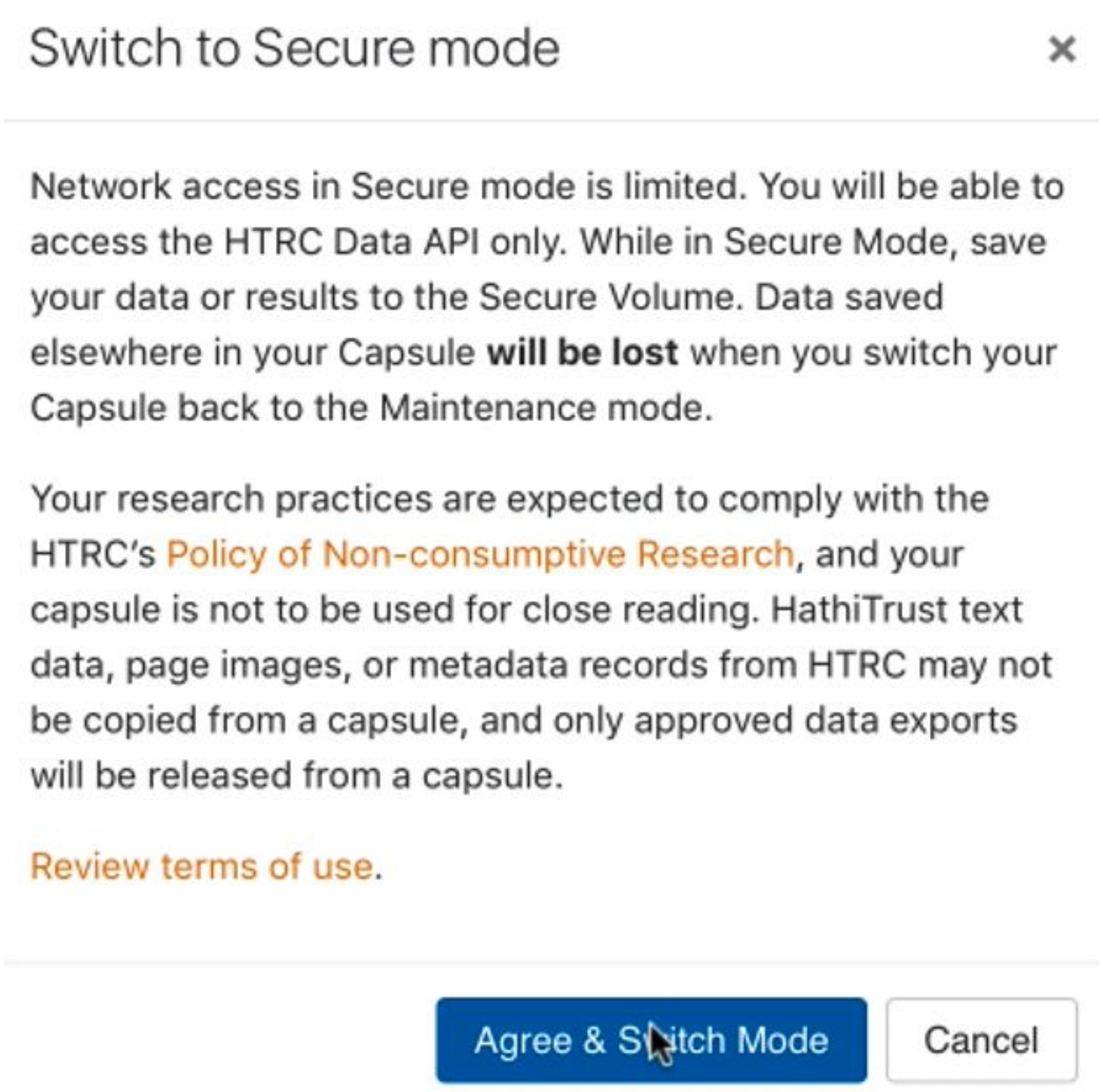
```
      x              y              z
Min.   : 0.000   Min.   : 0.000   Min.   : 0.000
```

Haithi Trust

Data Capsules

Secure virtual environments for non-consumptive text analysis, where researchers can implement their own data analysis and visualization tools.



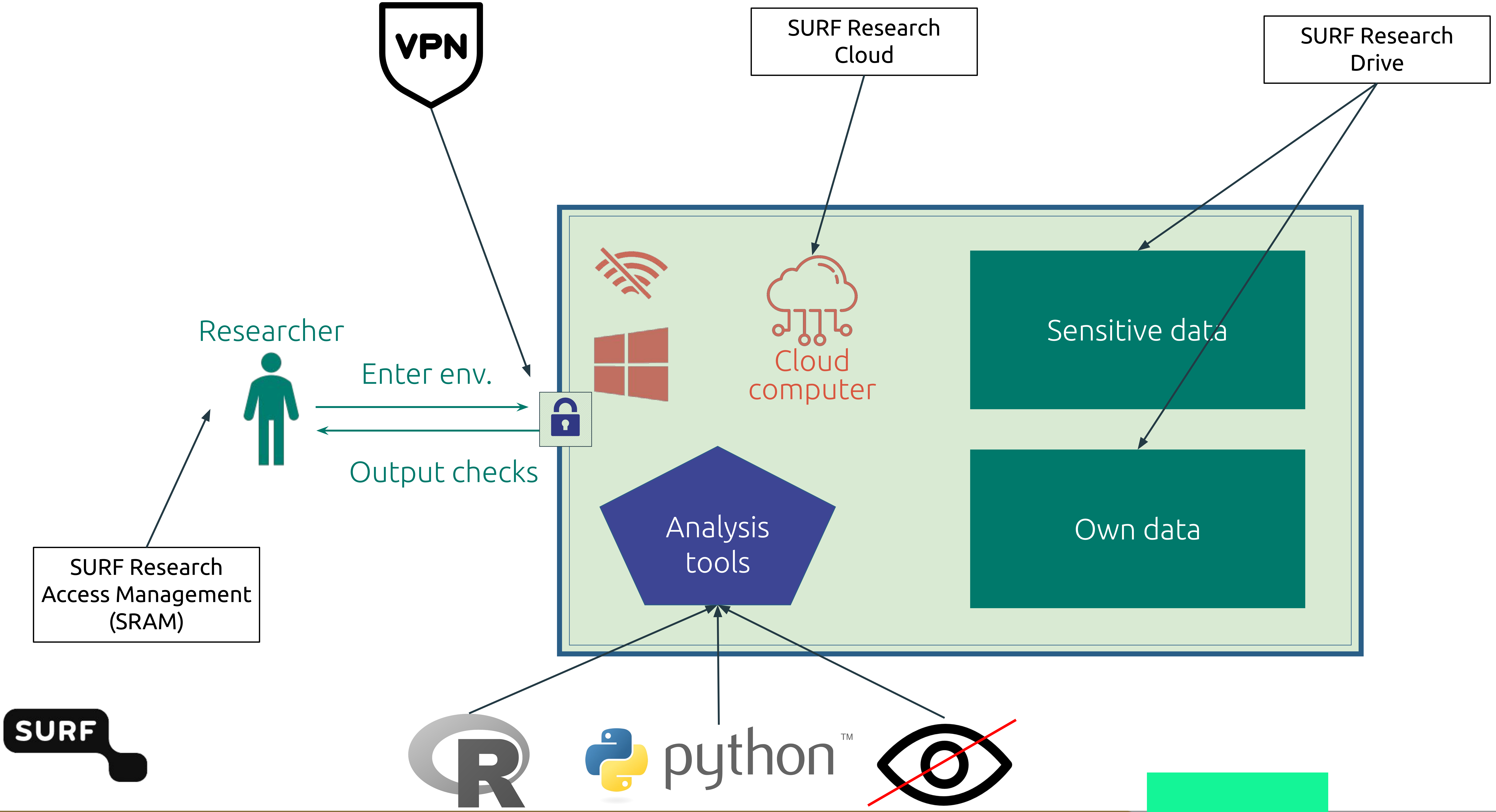
Switch to Secure mode

Network access in Secure mode is limited. You will be able to access the HTRC Data API only. While in Secure Mode, save your data or results to the Secure Volume. Data saved elsewhere in your Capsule **will be lost** when you switch your Capsule back to the Maintenance mode.

Your research practices are expected to comply with the HTRC's Policy of Non-consumptive Research, and your capsule is not to be used for close reading. HathiTrust text data, page images, or metadata records from HTRC may not be copied from a capsule, and only approved data exports will be released from a capsule.

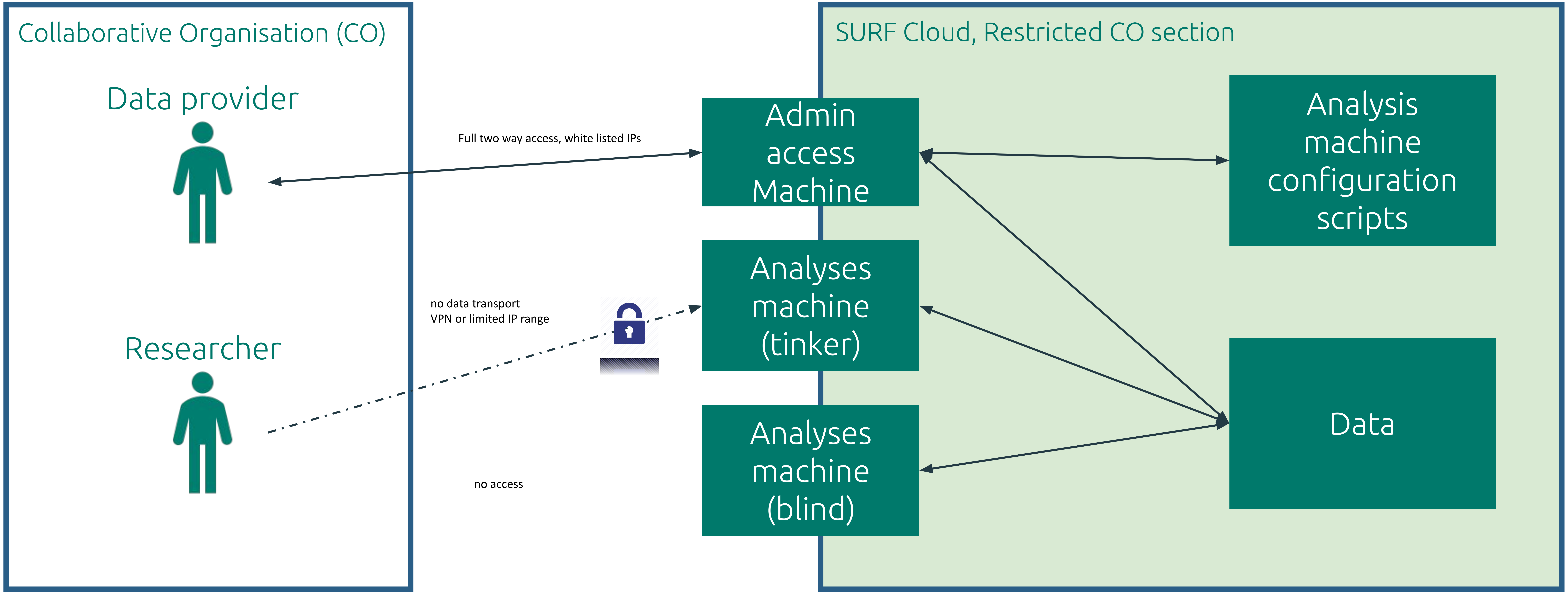
Review terms of use.

6 Available building blocks


VPN
SURF Research Cloud
SURF Research Drive
Researcher
Enter env.
Output checks
Cloud computer
Sensitive data
Own data
Analysis tools
SURF Research Access Management (SRAM)
R
python™

7 Technical blueprint

Blueprint using SURF Research Cloud (SRC) platform


Collaborative Organisation (CO)
Data provider
Researcher
Full two way access, white listed IPs
no data transport
VPN or limited IP range
no access
SURF Cloud, Restricted CO section
Admin access Machine
Analyses machine (tinker)
Analyses machine (blind)
Analysis machine configuration scripts
Data

Researcher flow for starting an analysis environment

1. Researcher is invited into the CO of the project based on Federated Identity
2. Researcher enters SRC portal, selects catalog item, and starts it with his budget
3. SRC platform starts VM and applies configuration based on script
4. After applying configuration SRC closes environment from internet
5. SRC platform links to CO managed data in cloud
6. Analysis phase
    a. (tinker) Researcher gets access over secure connection that prevent data transport
    b. (blind) Algorithm of researcher is started on the data
7. Results are saved to CO managed storage, either by user or by algorithm
8. Researcher requests Data provider to give him the results

Analysis machine features

- Network access control on cloud level
  - Security groups setting port and IP restrictions
  - Provisioned by SRC platform
  - Based on configuration scripts managed by Data provider
- Researcher has control for starting, stopping
- Researcher can request extra packages from Data provider
  - These packages are added to the configuration scripts by Data provider
  - Machine doesn’t need access to internet after configuration phase