THOR Communications Plan

Document Information

Authors: Josh Brown (ORCID)
Tom Demeranville (ORCID)

Reviewers: Sunje Dallmeier-Tiessen (CERN)
Laure Haak (ORCID)
Laura Rueda (DataCite)

Abstract: This document defines the THOR project communications plan and strategy including stakeholder analysis, objectives, methods, and a timeline for delivering these. Externally, we will direct capacity-building resources to sections of the community, and bring feedback to bear on improving and refining those resources. Internally, information will flow between project partners, with the findings and lessons from each task being used to shape and populate our external communications and with feedback flowing in each direction. Our strategy will evolve over the lifetime of the project to meet newly discovered needs gained through this feedback. Through nuanced, targeted communication we will not only promote PID adoption, but will also gain insight into the requirements of our stakeholders and build the infrastructure they really need.

Visit http://project-thor.eu for more information.

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1 Introduction

The THOR project vision is to harmonise existing systems and build a research information infrastructure that enables the creation, connection and analysis of Persistent Identifiers (PIDs) for researchers and research artefacts. It aims to put in place an environment in which using trusted, interoperable PIDs to connect all research actors and outputs is 'business as usual', rather than limited to specific disciplinary or technical silos.

Effective communication and training is fundamental to achieving this vision. Not only do the THOR project team need to communicate what we're working on and what we've achieved, we need to listen to our diverse group of stakeholders and feed their requirements into our development plan. We need to engage institutions, publishers, developers, researchers, funders, librarians and more. We need to produce training materials so they can easily utilise our outputs, and we need to target them by audience. Moreover we need to get the various stakeholders and project partners *communicating amongst themselves*, so that the infrastructure lasts beyond the lifetime of the project.

THOR has four concrete objectives; establishing interoperability, integrating services, achieving sustainability and building capacity. The four objectives are tied together via capacity building, which we describe in this Communication Plan. It is a strategic target of the THOR project to develop and execute this plan.

1.1 Communication Details at a Glance

Website	http://project-thor.eu
Twitter account	@project_thor_eu
Hashtag	#THORlinks
Project reference	654039
Funded under	H2020-EU.1.4.1.3.

2 Strategy

Our communication strategy will be considered from two distinct but connected angles: the human and the technical. On the human side we have a networking and outreach strategy, building an 'ambassador' programme, drawing on existing and new partnerships, and key stakeholder fora; on the technical, we have developer- and provider-focused use-cases to examine, and outputs and services to provide.

We are extending and enhancing the technical infrastructure component of the project vision, but it is the 'human infrastructure' – the social, cultural, and communications aspects of the project – that will ultimately deliver sustainable services with a wide user base.

Communications is therefore central to the project as a whole. Externally, we will direct capacity-building resources to sections of the community, and bring feedback to bear on improving and refining those resources. Internally, information will flow between the different teams responsible for delivering the project, with the findings and lessons from each task being used to shape and populate our external communications, with feedback flowing in each direction. Our strategy will constantly evolve over the lifetime of the project to meet newly discovered needs gained through this iterative feedback. Our aim is that through nuanced, targeted communication we will not only promote PID adoption, but will also gain insight into the requirements of our stakeholders and build the infrastructure they really need. The communication strategy is two-way at each interaction, as shown in Figure 1.

Figure 1: The flow of communication across the THOR work packages

The main tool for dissemination is the project website at http://project-thor.eu. It is intended that this will be an active site, with regular updates on our activities and achievements. The site is being promoted through social media, THOR promotional materials and professional relationships; setting up a knowledge hub within the project website to reference and describe our other outputs is currently a high priority. Of course all materials will be linked using the very PID infrastructure we are putting in place, to encourage discovery via those connections and to give a visible demonstration of the value of PIDs.

Our communications objectives are:

- Share practical information to help improve interoperability between systems
- Promote enhancements to PID systems to encourage the use of new and existing PID functionality
- Ensure that knowledge and practical understanding is made available to the community to enable them to use, implement and promote PID infrastructures
- Generate an engaged 'core community' of users who will lead by example, and amplify our messages

These objectives will be delivered in an open, iterative culture. By sharing our evolving practice with the community, and visibly incorporating their feedback into our guidance and products, we will encourage a sense of ownership among our stakeholders. This will generate an active engagement with the project and its achievements, which is essential if we are to succeed.

We have undertaken an analysis of our stakeholder groups (see Table 1, in the section 'Stakeholders' below) and will relate our activities with each group to the communications goals. For example, in reaching out to research-producing organisations and support staff, we will promote improvements to the PID services that they already use, and provide how-to guides, case-studies and evidence of the benefits of PID adoption. By doing this, we encourage them to make better use of their existing capacity, we will normalise PID use in these institutions, and we will embed the use of PIDs in the environments in which research is generated.

Where there are active interest groups (such as the linked open data community), we will engage them in an active discussion of our aims and our developments. Their expertise can help to make sure that our work is aligned with the evolving technological landscape, and the partnership will ensure that implementers and developers with an interest in emerging technologies are engaged with THOR, and regard PIDs as a core component of their information architecture.

This document sets out our stakeholders, the means by which we will engage and share with them, and then steps through the different media and means that we will employ to deliver specific types of information or message. We have deliberately chosen to treat each of these as a 'starting point'. We will be monitoring engagement and the success of every component in the communications strategy, in partnership with the THOR evaluation and sustainability team, and we will re-prioritise and adapt our practices over the life of the project.

As a first step, the project will produce and distribute communication outputs across a broad range of media and channels; written, verbal, interactive, social and academic. As well as raising awareness of the project and its objectives we will create stakeholder targeted materials with specific aims in mind. The outputs will take the form of formal documentation alongside lighter-weight pieces to cater for our varied audience. Alongside this dissemination activity, we will work to build stakeholder communities through personal outreach, conference attendance and ambassador networks. The communities will be provided with training and promotional materials appropriate to their use-cases, and supported in their work of encouraging adoption and supporting their peers. In this way, the capacity and capabilities of

the entire community will be fostered and enhanced by the ability to use, implement, exploit and benefit from a federated, state-of-the-art PID infrastructure network.

One of the aims of this communication strategy is to ensure that THOR has genuine 'mindshare' across the community, which is to say that our community will be aware of THOR, will be discussing it amongst themselves and will be anticipating its outputs. We are already benefitting from a solid foundation for this aim. We are seeing considerable interest in joining the THOR ambassador network before it has officially launched, and we have been invited to speak at multiple events and workshops about THOR (see Figure 2).

Figure 2: Tom Demeranville delivering a presentation on THOR to the Knowledge Exchange[1] Research Identifier workshop, London, June 22 2015.

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3 Stakeholders

The THOR project activities will cut across a broad swathe of the research community. We will need to foster adoption at the levels of both policy and practice, nurture new communities of practice, support existing expert communities in both using and shaping our products, and undertake a comprehensive awareness-raising programme.

The community in Europe and beyond is necessarily heterogeneous, and each group or individual within our stakeholder groups will occupy various positions on a range of spectra (technological, cultural, disciplinary, geographical, engagement, resource wealth, language). THOR will need to embrace a range of communications strategies and approaches to ensure that we reach each of these groups, and that our messages are heard and understood throughout this complex community. As a first step towards designing and building this communications system, the team undertook a preliminary analysis of the key stakeholder groups and their composition (see Table 1).

Table 1: THOR stakeholders by community grouping

Stakeholder Group	Group Members
Service providers	Data centres Community repositories (figshare, Zenodo) PID service providers: CrossRef/FundRef, ISNI, ORCID, DataCite, Ringgold Github
Research-producing organisations and support staff	Librarians/libraries Research administrators IP and Tech Transfer departments Universities Institutional repositories
Scholarly comms infrastructure	OpenAIRE Disciplinary repositories
Researcher communities	Researchers (privately funded) Scholarly societies Researchers across career stages Researchers (broken down to the four discipline groups listed in the proposal) Research support staff (for example, data collectors, statisticians, lab techs) – those who may desire attribution and credit

Research data community	Data/dataset provider
	Data curator
	RDA/FORCE11/Fairport
	Data centre staff
Policy/governmental/national bodies	EU commission
	Research University Groupings
	Governments
	Standards bodies
	Science programmes (for example, FutureEarth)
Interest groups	Linked open data community
	Horizon 2020 projects
IT infrastructure providers	System vendors
	Open source projects
	Identity federations
	Reference manager developers
	Application developers/integrators
Region	European regions (Scandinavia and Baltic, Western Mediterranean, Central and eastern Europe etc.)
	Major international regions: Asia-Pacific; Europe; Middle East and Africa; North and South America.

This analysis provides a framework for targeting our messages. We will provide the widest possible range of ways of interacting with and learning about the project. The assessment of our lines of communication will be an ongoing process throughout the project. Our outreach and impact metrics will inform our evolving practice, as will qualitative feedback from events and community connections. This will ensure that we are making the best use of limited time and resources and delivering the greatest possible impact for each of our activities.

3.1   Lines of Communication

As part of our initial project-wide stakeholder analysis, we undertook a survey of the lines of communication that we already have at our disposal for reaching each of the stakeholder groups. It has revealed a broad range of lines of communication, which we have used to populate an initial catalogue of routes to deliver information to given stakeholder groups.

Outreach Case Study 1

Publishers, and the service providers and system vendors who serve the publishing industry, come to the CrossRef Annual Meeting[2].

In this context, they are already aware of the value of PIDs, and will be open to hearing more about how they could further leverage their existing use of ORCID iDs and DOIs for journal articles to improve the connections between them. By adding DataCite DOIs to article metadata, they can expose the underlying data that led to the findings that they are publishing, and encourage the re-use and citation of that data.

THOR can deliver this message to this audience because we have close ties to CrossRef, and can directly update the CrossRef team.

This initial catalogue, matching stakeholder groups to lines of communication, makes it clear that we can reach a majority of stakeholders via umbrella organisations and groups, such as the International Association of Scientific, Technical and Medical Publishers (STM) or the Association of Learned and Professional Society Publishers (ALPSP) for publishers. This may be achieved via targeted conference presentations and existing connections to projects with a related goal and overlapping community of practice, such as OpenAIRE – a project that aims to support the implementation of Open Science in Europe. At the same time, we will build up our own communities of practice and peer networks via the proposed ambassador programme (see section 4.10), which will embed experts in our target communities and encourage an organic, natural flow of information and awareness-raising by using each community's preferred channel of current awareness.

Each project partner has a distinct voice and we intend to leverage these to further bolster our stakeholder engagement. For example, ORCID has strategic partnerships with standards bodies, such as the European Current Research Information Systems (EuroCRIS) and Consortia Advancing Standards in Research Administration Information (CASRAI). The British Library has a significant presence in international professional networks for librarians, such as the Conference of European National Libraries. CERN is the nexus of a huge global network of practitioners, working at the cutting edge of research data management. By tapping into each of these connections, THOR partners will be able to extend the reach of our messaging.

Table 2 shows our top-level stakeholder groups and overarching categories of communication activity, prioritised by their potential contribution to the delivery of the THOR communication goals. What this analysis shows is that some activities (meetings and conferences, or formal publications) have the potential to deliver the THOR message to the widest possible range of communities. Some, such as social media, are higher impact for a given subset of our community. Some community groups, such as policy/governmental/national bodies, or IT infrastructure providers are less likely to be influenced by social media on its own. We will need to target these groups via more direct engagement.

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[2] http://www.crossref.org/annualmeeting.html

Table 2: List of stakeholders, prioritised by likely impact of project communications activities

Stakeholder group	Activity							
	Training materials	Training events	Social media	Webinars	Formal reports and publications	Ambassadors	Meetings and conferences	Workshops
Service providers	HIGH	HIGH	LOW	MEDIUM	HIGH	MEDIUM	HIGH	HIGH
Research producing organisations and support staff	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	LOW
Scholarly comms infrastructure	MEDIUM	HIGH	HIGH	MEDIUM	HIGH	MEDIUM	HIGH	HIGH
Researcher communities	MEDIUM	LOW	HIGH	MEDIUM	MEDIUM	HIGH	HIGH	MEDIUM
Research data community	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
Policy/ governmental/ national bodies	MEDIUM	LOW	LOW	MEDIUM	HIGH	HIGH	HIGH	HIGH
Interest groups	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
IT infrastructure providers	HIGH	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH	HIGH

We will also prioritise two-way communication. Many of the target recipients of information about the project are themselves actively shaping the landscape, and it is vital that we maintain a project-wide current awareness. Fortunately we have a diverse team that is already subscribed to a wide range of lists and engaged with various media which overlap with many of our stakeholder groups. The team have been asked to monitor their professional mailing lists and other sources of information both for THOR related posts and to promote THOR outputs, activities and insights when appropriate.

'Current awareness' sources being monitored include mailing lists and Twitter. For example, a quick survey of four project team members showed that they are following:

- Research and Education FEDerations group (REFEDS)
- Future of Research Communications and e-Scholarship (Force11) Data Citation Mailing List
- Force11 Software Citation Mailing List
- National Information Standards Organization (NISO) Altmetrics Working Group B: Output Types and Identifiers
- Biomedical and healthCAre Data Discovery Index Ecosystem (BioCaddie)
- Registry of Research Data Repositories (re3data)
- Jisc research data and repository mailing lists
- Digital Curation Centre (DCC) events, webpages and newsletters

Several members of the team are also active on social media with high profile Twitter accounts. These will be monitored by their owners and information gathered fed back into the communications work package. Notable Twitter accounts within the team include Patricia Herterich (@PHerterich), Paul Groth (@pgroth) and Martin Fenner (@mfenner).

3.2 Tracking Stakeholder Communication Activities

While we will be able to collect some data and information relatively straightforwardly (ambassadors can be asked for regular updates, for example), we will need to ensure that we are monitoring the impact and uptake of our outputs using a range of quantitative and qualitative means. For internal purposes, a simple web form for reporting activities will be used, harvesting such information as when and where a presentation was given, and to how many people from which stakeholder group(s). It will also capture any documents and presentations using persistent identifiers. These persistent identifiers will enable authors to link their works, and all project outputs will be linked to the author's ORCID record.

We will also undertake focus groups periodically, as part of the project evaluation. To achieve this, we will work with the THOR sustainability team to gather detailed qualitative feedback from training events and workshops.

Periodic analysis of social media activities, attendee lists from project events, audiences at conference presentations, examinations of queries and contact via the website or sent to project members directly, will be tracked against our stakeholder matrix, to ensure that any gaps or under-served audiences are picked up and rectified as early as possible.

4 Communication Outputs

A necessary consequence of the diversity of our audience is that our outputs and communication tools must also be diverse, accessible in multiple formats and means, and be engaging and tailored to a wide range of audiences and levels of expertise.

Outreach Case Study 2

A repository manager hears, via Twitter, about a THOR training bootcamp. At the bootcamp, sessions were delivered that covered newly developed tools for tracking data citations, and linking them to individual researchers.

The manager recognises that this tool is a good way for her institution to track the impact of its research data, and to deliver evidence for the effectiveness of its research data management plan. It would also be a good service for researchers, adding value to their engagement with the repository.

She is able to point her technical staff to detailed documentation on the THOR knowledge base, and also finds a case study which clearly enumerates the benefits of implementing these kinds of tools, which enable her to get senior buy-in at her institution for this project.

4.1   Goals

The following goals have been identified based on the above analysis. A matrix for recording our progress towards these goals and the associated project deliverables can be found in Appendix A. The matrix will be updated and will accompany internal and external reporting on our communications activities. This list of concrete communications goals is annotated with the section headings of the plan, linking the goals to pertinent project outputs:

- Raise awareness and promote outputs (4.2, 4.6)
- Evangelise use through case studies (4.3)
- Produce technical and non-technical training materials (4.4)
- Organise and execute workshops, book-sprints, and bootcamps (4.5, 4.4, 4.8)
- Engage the community through social activities (4.6)
- Report activities (4.7)
- Participate and present at meetings and conferences (4.8)
- Deploy a knowledge hub (4.9, 4.4)
- Create an ambassador network (4.10)
- Measure progress (5)

4.2   Branding

We have developed a lightweight approach to branding promotional materials to provide project partners with some leeway in how they develop these outputs. As a minimum, all outputs will contain the project logo (see Figure 3 below), including presentations, training materials and social channels such as the Twitter account. This lightweight approach enables partners to co-brand easily and grants the logo more exposure.

Figure 3: The THOR logo

Versions of the logo will be produced for the project team and ambassador use, including white text versions, versions including the project website URL and versions with the expanded project name. These will also be made available as templated slide decks. We will work with partners and ambassadors to ensure that other needs for branded materials can be met as and when they arise.

4.3   Success Stories and Case Studies

Community feedback already gathered at meetings and informal discussions indicates that 'Success Stories' will be invaluable tools for persuading institutions to adopt the PID infrastructure. They serve the dual functions of highlighting tangible benefits, whilst providing new implementers with the comfort of knowing that it has been done before – successfully. The project will produce a mix of outputs along these lines.

Success stories will be constructed around focused narratives, and will be designed to illustrate the practicality and feasibility of a given approach or to place a set of defined benefits that have accrued from PID use in a relatable context. These stories are primarily intended as motivators: persuasive narratives that community members, policy makers and media sources can use to provide concrete, accessible introductions to the rationale for PID adoption.

Case studies will provide more detailed conceptual or technical insight into a specific implementation, integration or workflow. We will highlight the lessons to be learned or solutions to be recommended from these. They will also serve as a useful research resource for the project team, with obvious applicability across all areas of the THOR project.

4.4   Training Materials

A central component in building capacity is to provide potential users of PIDs with the confidence to implement, use or promote PIDs in their daily work, to integrate them in the services they provide, or to support their peers in so doing. This means that a considerable portion of the activities we undertake that fall under the aegis of this communications plan will involve a substantial training component - face to face and virtually/interactive.

4.4.1   Written Tutorials and Guides

Our outreach publications target end users (human) as well as those developing and implementing PID services (technical), in accordance with our communication strategy. On the human side, we will produce how-to guides and suggested workflows for integration; and on the technical, we will produce detailed instructions on how to integrate and link various elements of PID infrastructure.

The use of dedicated online documentation platforms such as readme[3] or readthedocs[4] will be considered for both technical and non-technical materials. The OpenAIRE project has successfully demonstrated their use for project generated documentation[5], as shown in Figure 4.
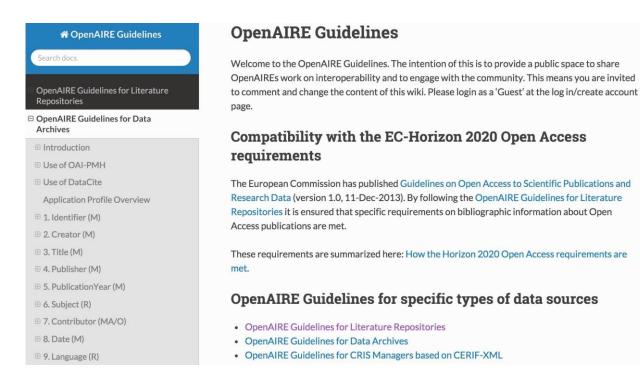

Figure 4: OpenAIRE guidelines on readthedocs.org

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[3] http://readme.io/

[4] https://readthedocs.org/

[5] http://guidelines.readthedocs.org/en/latest/

This platform will enable us to deliver stakeholder targeted guides to persistent identifiers and identifier workflows, for example, 'Introduction to PIDs for administrators' and 'Integration Guidelines for Data Repositories'.

Improved documentation for the application programme interface (API) – enhanced with a 'try it and see' element – will be produced for the relevant THOR partners. This will take the form of Swagger[6] API specifications, which can either be rendered as interactive documentation (see Figure 5), or as static objects for hard copy or the web. Conformance with the widely adopted Swagger 2.0 Specification[7] will also contribute to THOR's development of PID services by facilitating interoperability and enabling us to auto-generate client libraries in multiple languages. This includes Python client software development kits (SDK) that will be used in interactive tutorials (see section 4.4.2). The Swagger work will also form a topic for dedicated codefest activities, which will drive up the level of documentation as well as improving its consistency.
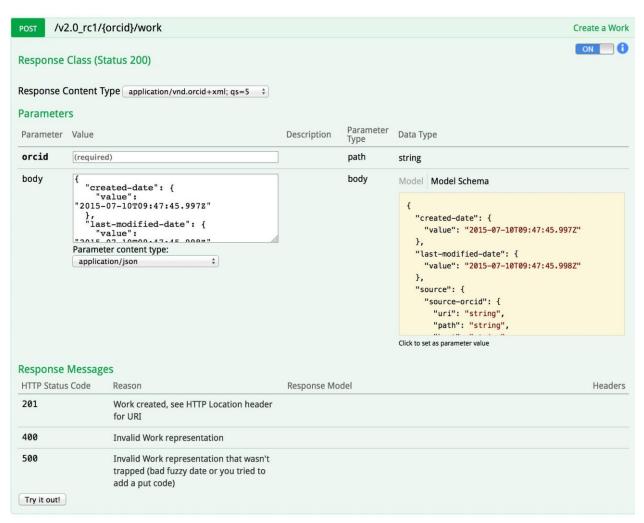

Figure 5: Example of interactive Swagger documentation

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[6] http://swagger.io/

[7] https://github.com/swagger-api/swagger-spec

4.4.2 Interactive Tutorials

Interactive development tutorials will be produced using, for example, Jupyter/IPython notebooks[8]. This format intermixes prose with live code that can be modified and executed, enabling developers to experiment with APIs in an intuitive and immediate manner. The Jupyter framework will enable the project to produce tutorials in multiple languages for different communities. Another advantage of this approach is that Jupyter notebooks can be easily transformed into printed static materials for traditional documentation purposes. This is a proven approach to teaching API use, as demonstrated in *Mining the Social Web* (Russell, 2013) (see Figure 6), which has been used as the basis for API workshops with IPython[9] worldwide.

These interactive tutorials will be available on the knowledge hub, and used to facilitate workshops and codefests. Feedback from previous workshops where we have already used this approach has been overwhelmingly positive. IPython has its roots in academia and is widely used by data professionals, so will be familiar to some of our target audience. Transitioning to IPython will enable us to streamline the process and present it in a format that is familiar to many researchers. Jupyter has recently received a $6 million grant[10] to expand and enhance its capabilities in the scientific computing and data science area.

There are numerous examples of notebooks available, which provide valuable demonstrations of IPython in action.[11]

4.4.3 Visual Tutorials

We will record selected workshop and conference presentations, which will then be posted on the project THOR website. (At the time of writing, a presentation by Andrew Treloar (ANDS)[12] is available.) Future webinars will be recorded and also made available (see section 4.8.1).

In addition, we will use Graphgist[13] to conceptualise, explore and model relationships between the different PID systems and actors. Graphgist is an interactive document format similar to IPython that is used to create, manipulate and visualise property based graphs and is backed by the popular Github gist framework. With this technology we will be able to demonstrate how the various components of the infrastructure interact, and allow users to experiment with and expand the model.

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[8] http://ipython.org/notebook.html

[9] An example of this approach can be found at: https://www.youtube.com/watch?v=jpCG792tVt0.

[10] https://www.moore.org/newsroom/press-releases/2015/07/07/$6m-for-uc-berkeley-and-cal-poly-to-expand-and-enhance-open-source-software-for-scientific-computing-and-data-science

[11] https://github.com/ipython/ipython/wiki/A-gallery-of-interesting-IPython-Notebooks#introductory-tutorials

[12] http://project-thor.eu/2015/07/06/identifiers-and-linked-data-in-the-research-space-seminar/
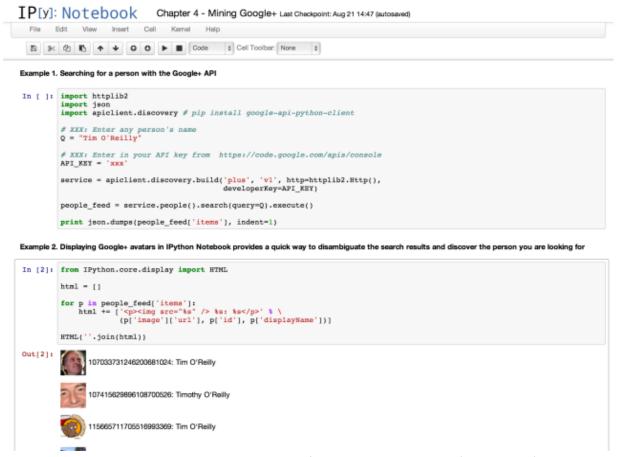
[13] http://gist.neo4j.org/

Figure 6: Example IPython notebook taken from *Mining the social web* (Russell, 2013)

4.5   Bootcamps

The 'bootcamp' concept is based around an immersive activity sprint, targeted at developers, integrators and other technical staff seeking to increase their skills and understanding of PID use and implementation. They will be used primarily for training purposes, or to gather groups of experts to generate a defined, reusable output, such as a book of documentation[14] or similar product, in a focused effort over a few days. This approach is not only applicable to detailed training or the creation of a useful output, but is a valuable community-building technique.

The bootcamp approach can be adapted to communities or regions that have varying levels of familiarity or expertise in a given domain. It could be used to generate syllabi or documentation in an 'expertise rich' context, or to increase technical skills and capacity in areas where uptake has been historically slower for the technologies and tools that THOR is building on. In these areas, the community-building aspect of this work is also vital, and we will seek to nurture these emergent communities of practice after the bootcamp event with virtual follow-up activities.

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[14] This is an approach used by the Book Sprints team: http://www.booksprints.net/. The THOR project team has some connections with this initiative, and will seek their insight.

The bootcamps, in combination with the improved documentation and the interactive tutorials, will complement our more traditional training materials, and produce a rich, accessible pedagogical resource, which can be accessed asynchronously (in the case of the online resources and documentation), and enable those who cannot attend one of our events to work through materials at their own pace, in any location.

The collective result of this resource will be upskilled individuals and teams, who are empowered to implement existing tools, to develop new apps and tools using our APIs and guidance, as well as expert communities of practice dispersed amongst our stakeholder groupings, who will be able to extend the reach of THOR training by passing know-how on to their peers – a process of 'cascading' that we will seek to encourage via our events and our ambassador network. Detailed planning for these events will begin in September 2015.

4.6   Engagement Materials

All of our communication activities will be amplified, promoted and reinforced with a suite of broadly accessible outputs, designed to encourage community awareness of and engagement with our work. These engagement materials not only promote the kinds of activities listed already, they serve to provide conduits for feedback and interaction between our users and the project team (via blog comments, tweets, direct responses, and so on). As such, they provide informal, accessible and non-stop opportunities for the team and the community to connect and communicate.

4.6.1   Blog Posts

The project blog forms a core part of our communication strategy and all THOR partners are expected to contribute to keeping it 'live'. We have an established process to orchestrate the publication and review of blog posts within the wider team, with a minimum of biweekly updates. This will enable us to disseminate our outputs and also facilitate our ambition to build communities: posts will frequently link to potential or existing partners and highlight their contributions to the project.

Posts will include informal project updates, announcements, reports on events, news about the PID landscape, and formal and informal partnerships, in addition to any other information that project members wish to disseminate.

4.6.2   Social Media

The project Twitter account (@project_thor_eu) will be used to alert the community to news, blog posts and upcoming events, reinforced by an active group of 'twitterati' within the project team (see section 3.1). Our feed is intended to provide a feedback channel and a 'human face' for the project as a whole via the following channels:

- Automatic alerts of activities and upcoming events will be pushed to the Twitter feed via WordPress.
- Senior THOR contributors have been supplied with the Twitter credentials to use as they see fit.
- A member of our networking team will actively interact with followers, monitoring and responding to queries and retweeting THOR-related tweets (see Figure 7).
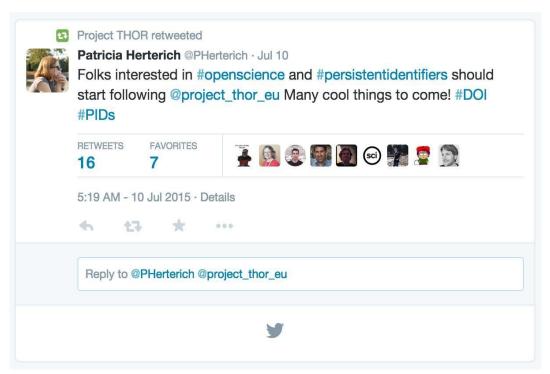
Figure 7: Tweet promoting the project launch

The use of a common hashtag will also be encouraged so we can group together THOR related content. This hashtag will be **#THORlinks.**

4.6.3   Surveys

The project will utilise surveys to solicit feedback from the community. There a number of possible solutions we can use to gather this information, for example Google Forms or wufoo. Wufoo (https://www.wufoo.com) forms can be embedded within the blog for general use such as calls for input or hosted at wufoo itself for more specialist purposes, such as event feedback or stakeholder questionnaires (see Figure 8). Wufoo is a featureful and easy to use form creator that will enable project members to quickly create surveys and collate results. Survey activities will be carefully coordinated with THOR's sustainability team, with whom the results and analyses will be shared to ensure that the data provided by our surveying can be re-used and can help drive project evaluation.

4.6.4   Other Promotional Materials

The ODIN project produced a valuable set of guidance documents, which were heavily used.[15] THOR will adopt a similar approach, but will go beyond the range and scope of materials generated by its predecessor project.

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[15] http://odin-project.eu/project-outputs/material/by-type/

Meeting Feedback

Please share your feedback regarding the recent meeting in this very brief survey. We appreciate your candid responses.

Overall, please tell us how productive the meeting was using a 1 to 5 scale where 1 means not at all productive and 5 means extremely productive.

	Not at all productive	A little productive	Neutral	Mostly productive	Extremely productive
How productive was the meeting?	○ 1	○ 2	○ 3	○ 4	○ 5

Please tell us why you feel that way about how productive the meeting was.

Now we have a few questions about the meeting content and its organization. Please tell us your level of agreement with the following statements about the meeting using a 1 to 5 scale, where 1 means you strongly disagree and 5 means you strongly agree. If a statement does not apply to the meeting you attended, please select "NA."

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A
The meeting objectives were clearly communicated in advance of the meeting	○ 1	○ 2	○ 3	○ 4	○ 5	○ –

Figure 8: Example feedback form.

Webinar recordings, slidedecks, interactive tutorials, short video introductions, event reports, checklists, implementers guides, infographics, 'cheat sheets', large scale training and documentation resources ('books'), syllabi for training events and seminars will all be gathered together in the THOR knowledge hub, and made openly accessible to the community.

Resources will emerge from THOR research findings. We will also generate documentation as part of our service development as well as refined guides and synthetic resources. Each of the activities described in this communications plan has the capacity to generate content for these materials. The communications team will work to package this content in a variety of ways, such as print collateral (flyers, bookmarks, posters), or online resources (infographics, PDF guides, or web pages).

4.7   Publications and Deliverables

Informal reports will be made via the blog as blog posts, and promoted via social media and professional relationships. These will cover event attendance, software releases, meeting summaries, metrics, achievements and survey results.

Formal publications such as journal articles and internal project reports on the subject of PID infrastructure will also be promoted as THOR outputs via the blog. A list of detailed citations will be maintained in the same manner as the ODIN project[16].The target is for the project consortium to publish between six and eight formal publications (including both peer-reviewed journal articles and special interest publications, such as D-Lib) during and shortly after the project lifespan.

Formal project deliverables will be hosted by Zenodo. By using Zenodo we will be 'eating our own dog food' by showcasing another use of the PID infrastructure we are creating. Team authors will link their outputs with their ORCiD iD using the DataCite import tool. This means that all outputs will be assigned PIDs, will be preserved using a European-funded infrastructure component, hosted at a project partner (CERN), and will form part of our drive to ensure that the project acts as an exemplar for the tools and systems we are encouraging others to use.

4.8   Events

Our event strategy is to provide a widely-accessible and varied programme of activities, both virtual and physical, combining broad-based community events with narrowly focused topic- or group-specific events. The range of events will include webinars, workshops, conference presentations and side meetings, and will be amplified wherever possible using our social media presence and the ambassador network. Our plan to devise, promote and execute events launches as this communication plan is being formalised, but we are already able to set out the outlines of our approach, and to give some details about the types of events that we will organise.

The project goals can only be met if the events that we organise are geographically distributed across Europe (and potentially elsewhere in the world for specific, high-value conferences), and their content and activities tailored for varying audiences and community segments. We will encourage members of the ambassador network to organise and host events as well as to promote and participate in them. Core project activities and attendance or participation in external events will be listed and promoted on the project blog and on the events listings on the project website.

4.8.1   Webinars

THOR will take the experience gained from the ODIN project and produce webinars to explain our mission and gather feedback on our activities to shape future work. Webinars are especially suited to our distributed team with participants able to contribute without travel. ODIN proved the popularity of webinars in this context[17], with 120 attendees at the first project webinar, for example. Webinars will

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[16] http://odin-project.eu/project-outputs/publications/

[17] http://odin-project.eu/2014/06/04/first-odin-webinar/

be recorded and made available for later viewing, helping to enrich the range of visual resources available via the project site.

4.8.2 Meetings

The project consortium members are all extremely active across their respective communities, and will be able to introduce THOR as a discussion topic and as a source of presentations in a wide range of fora. This will form an ongoing strand of activity throughout the project, and will be tracked and monitored on an ongoing basis. To give some illustrative examples of the kinds of activities that are already underway, members of the THOR project group will be presenting about THOR and its aims at various interest group[18] sessions affiliated with the Research Data Alliance (RDA). These include the Publishing Data Services Working Group, the Federated identity Interest Group and the PID Interest Group.

In addition, the consortium will be represented in coming months on the CASRAI Dataset Level Metrics Subject Group[19], the Force11 Software Citation Working Group[20] and the NISO non-traditional research outputs group[21].

4.8.3 Conferences

Presentations, papers and posters at conferences are a particularly effective form of focused outreach. Conferences attract an audience of informed and interested individuals, and provide a chance for THOR to deliver specific messages of particular relevance to a given community. The social aspect of conferences and large-scale meetings is also vital, as in many cases the follow-up questions from the audience and subsequent one-to-one conversations prove extremely fruitful. Starting in early 2016, we will target the most prominent conferences for stakeholder groups, submitting proposals for papers and posters or contacting the programme committee directly as appropriate.

For examples of the conferences that we will target, we will submit to the International Federation of Library Associations and Institutions (IFLA)[22], the Ligue des Bibliothèques Européennes de Recherche (Association of European Research Libraries, LIBER)[23] or UKSG[24] to reach the general library community. We will submit to the Advancing Research Communication and Scholarship (ARCSCON) conference[25], FORCE2016[26], the CERN Workshop on Innovations in Scholarly Communication (OAI10)[27] and OpenCon[28]

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[18] https://rd-alliance.org/groups

[19] http://casrai.org/standards/subject-groups/dataset-level-metrics

[20] https://www.force11.org/group/software-citation-working-group

[21] http://www.niso.org/topics/tl/altmetrics_initiative/

[22] http://conference.ifla.org/

[23] http://libereurope.eu/annual-conference/

[24] http://www.uksg.org/events/annualconference

[25] http://arcscon.tumblr.com/

[26] https://www.force11.org/meetings/force2016

[27] https://indico.cern.ch/event/405949/

[28] http://www.opencon2015.org/

to reach the scholarly communications community. We will also target specific community events, such as the International Symposium on Electronic Theses and Dissertations (ETD) or Open Repositories to reach those practitioners.

4.8.4 Workshops

Workshops form an important strand in a number of THOR activities. We will be seeking to align and 'cross-pollinate' ideas and opportunities wherever possible, both for the efficiency gains of using a single workshop or series to provide feedback and information for several project components, and to encourage a constant and consistent 'join up' via collaboration on these events.

Workshops should be regarded as distinct from other THOR events and boot camps, in that they will be more discursive, rely on existing participant expertise, with less emphasis on training, and will be used for a broader range of project needs. These might involve prototyping, user testing, focus groups, messaging, evaluation, or community engagement.

We have already scheduled several workshops in the coming months to test and establish this approach. Co-located with the 6th RDA plenary in Paris, we are running two focus groups to assess and inform the proposed THOR metrics dashboard and evaluation planning. Our research and service delivery partners are collaborating on two workshops at the Mozilla Festival[29] in November 2015: the first on technical leveraging of ORCID and DataCite APIs, and encouraging participants to integrate one or both of these data sources in their work; the second on community building and awareness raising for the aims and vision of the project.

4.9 Knowledge Hub

One of our first actions will be to set up a Knowledge Hub. This hub will catalogue and organise project outputs described in this document, and also curate appropriate external resources. These external resources will include documentation, software, case studies, blog posts and more. The knowledge hub will be promoted on all our literature and at all our events.

Documents will be hosted on Zenodo (a public facing data-centre that allocates DataCite DOIs to all the documents it hosts). We will create a THOR community page directly on the Zenodo site, which will gather all our public outputs. These outputs will then be indexed and linked on the project site, where they will be nested in a richly informative, descriptive context, outlining how the resources relate to one another and giving an indication of the type and level of content being linked to. This is the backbone of our hub.

As with other written guides and technical documentation, familiar, production-ready tools would be much preferred to a home-grown solution. The use of dedicated online documentation platforms such as readme.io or readthedocs will be considered for hosting the knowledge hub as a whole.

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[29] https://2015.mozillafestival.org/

4.10 Ambassadors

Establishing effective communities will enable cooperation on human and technical issues. Ambassadors will provide support and provide 'rallying points' around which communities can be built. The idea of the THOR ambassador network is inspired by the successful, pre-existing ORCID ambassador network.[30] This has gathered 90 members, from every region of the world, and every section of the research community. This has been an incredibly valuable way to scale outreach activities, and to generate informed community voices amplifying messages and encouraging new interactions with the organisation. Given the ambitious outreach goals that we have set for THOR, creating a dedicated THOR ambassador network will be a crucial early target for the project team, and will serve to increase the reach of all our communication activities. Other networks such as those run by altmetrics[31] and Mozilla[32] will serve as further inspiration.

Ambassadors have a variety of motivations. Some see their role as helping the community by supporting improved infrastructures and practices, some are more focused on benefits to themselves from more widespread adoption of PIDs and some just want everything to 'work better'.

At the time of writing, we have received three requests to join the ambassador network via the contacts page on the project website, having undertaken no promotion of the ambassador network concept. This indicates a nascent appetite in the community to engage with the THOR initiative and we have no reason to believe the trend won't continue. We are developing a simple web form for those interested in becoming ambassadors to express interest, and will follow this up with direct contact from a member of the communications team to evaluate their level of expertise and existing community activities.

We will create a series of resources for the ambassadors. These will include posters, guidance and policy documents, advice on crafting messages (with examples of 'elevator pitches' and longer presentations), print and electronic collateral, and tutorials, both for ambassadors themselves and for them to deliver to their peers. We will establish a mailing list for the ambassadors, and will hold regular webinars to get their feedback, and to encourage the exchange of experiences and ideas from members of the network. This fertile exchange of ideas will not only help to build connections across the community, it will help to motivate the ambassadors with a continual flow of new ideas to test out, and will provide the project team with a valuable resource for improved communications targeting.

The connections with the project's evaluation activities are also vital to the success of this activity, as it will provide an additional source of qualitative feedback: both a willing pool of participants for our evaluation and outreach activities, and a testing ground for new ideas.

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[30] http://orcid.org/content/orcid-ambassadors

[31] https://www.altmetric.com/ambassadors.php

[32] https://www.mozilla.org/en-US/contribute/studentambassadors/

5 Metrics

We will monitor a wide range of usage statistics over time, appropriate to each output type. Attendance at events, downloads for online documents, number of views for webinars and videos, as examples, will all form part of our ongoing assessment of the impact of our communications outputs. Engagement with THOR's outreach efforts will be measured as part of an overall metrics dashboard, which is aimed at tracking and publicly disseminating quantitative metrics on project outputs; this will also be used for formal evaluation. These impact metrics will be automated as much as possible (site analytics, Twitter metrics, etc.), and will be tied into other measurements of project activities, such as ORCID integration uptake (Dasler, 2016). Metrics pertinent to the THOR communications plan are shown in Table 3.

Table 3: Example THOR metrics

Goal	Measure of Progress	Source of Measure
Ensure evenly distributed targeting of stakeholder groups	Numbers of event attendees from each stakeholder group	Internal web form for reporting outreach activities, including stakeholder group
Expand the THOR ambassador network	Growth of ambassadors over time	Number of ambassadors
		Uptake rate of ambassadors over time
Demonstrate the wide reach of communications and outreach efforts	Attendance at events	Registration numbers from EventBrite, Wufoo and webinars
	Engagement via social media	Twitter mentions and followers for @project_thor_eu
	Blog reach	WordPress statistics
	Interaction with materials and publications	Altmetric statistics [used by Zenodo] for citation information

6   Conclusion

THOR depends on effective, timely, broad communication for its success. Finding innovative solutions for existing and emerging challenges, and developing enhanced and scalable infrastructures are what drive the project forward. But each of these can ultimately only succeed if there is a community ready to engage, provide input, adopt new practices and use those services. It is this that will provide a sustainable base for the future of the project outputs.

In light of this, we have chosen to adopt a varied, adaptable and extremely ambitious communications strategy, designed to reach across the communities that make up the research enterprise in Europe and beyond. We know that there will be challenges in maintaining momentum and engagement through the life of the project, and for this reason we have chosen to evaluate constantly as we work. Only by doing this can we respond to community needs effectively. Only by assessing the impact of all of our communications work can we ensure that we are not leaving a section of the community behind, or pouring effort and resource into a less-than-effective activity.

The fundamental aim of this plan, as a whole, is to provide the very best framework for the wider world to find out about, help shape, and ultimately benefit from the hard work and creative insight of the THOR partners.

7   Reference List

Dasler, Robin (2016). THOR: Metrics and Tools. *Zenodo*. doi:10.5281/zenodo.46761

Russell, Matthew A. (2013). *Mining the Social Web: Data Mining Facebook, Twitter, LinkedIn, Google+, GitHub, and More*, 2nd Edition [O'Reilly Digital Edition Version. http://shop.oreilly.com/product/0636920030195.do

Appendix A: Progress chart

Goal	Start Date	Finish Date	Status	Task
Raise awareness and promote outputs	June 2015	Nov 2017	In progress	Communications Plan
Evangelise use through case studies	Sep 2015	Nov 2017	Scheduled	Communications Plan
Produce technical and non-technical training materials	Aug 2015	May 2017	In progress	Training Design
Organise and execute workshops	Aug 2015	Nov 2017	In progress	Events
Organise and execute book-sprints and bootcamps	Sep 2015	May 2017	Scheduled	Bootcamps
Engage the community through social activities	July 2015	Nov 2017	In progress	Communications Plan
Report activities	Sep 2015	Nov 2017	Scheduled	Communications Plan
Participate and present at meetings and conferences	Aug 2015	Nov 2017	In progress	Events
Deploy a knowledge hub	Sep 2015	Sep 2016	Scheduled	Knowledge Hub
Create an ambassador network	Sep 2015	Nov 2017	Initiated	Ambassador Programme
Measure progress	Sep 2016	Nov 2017	Initiated	Metrics Dashboard

Appendix B: Project Summary

The **THOR** project will establish seamless integration between articles, data, and researchers across the research lifecycle. This will create a wealth of open resources and foster a sustainable international e-infrastructure. The result will be reduced duplication, economies of scale, richer research services, and opportunities for innovation.

The project has four concrete aims:

1. Establishing interoperability
2. Integrating services
3. Building capacity
4. Achieving sustainability

The project will meet these aims by defining relations between contributors, research artefacts (including data), and organisations. We will incorporate these relationships into the ORCID and DataCite systems. We will also expand existing linkages between different types of identifiers and versions of artefacts to improve interoperability across platforms and integrate ORCID iDs into production systems for article and data submission services in pilot communities and beyond.

The consortium will develop systems to embed new PID resolution techniques into existing services to support seamless direct access to artefacts, and in particular data. We will create services to allow associations between datasets, articles, contributors and organisations at the time of submission. Building on these, we will deliver the means to integrate trans-disciplinary PID services in community-specific platforms, focussing on cross-linking, claiming mechanisms and data citation (guided by the FORCE 11 data citation principles).

For more information, visit http://project-thor.eu or contact mailto:info@project-thor.eu.

Appendix C: Terminology

Additional terms are defined below:

Term	Definition
ANDS	Australian National Data Service
API	Application Program Interface
BioCaddie	Biomedical and healthCAre Data Discovery Index Ecosystem
CASRAI	Consortia Advancing Standards in Research Administration Information
CERN	European Organisation for Nuclear Research: research organisation that operates the largest particle physics laboratory in the world. See http://home.cern/
CRIS	Current Research Information Systems
CrossRef	An official Digital Object Identifier Registration Agency of the International DOI Foundation, working to make content easy to find, link, cite and assess in scholarly publishing. See http://www.crossref.org/
DataCite	An organisation that develops and supports methods to locate, identify and cite data and other research objects. Specifically, DataCite develops and supports the standards behind persistent identifiers for data, and the members assign them. See https://www.datacite.org
DCC	Digital Curation Centre
DOI	Digital Object Identifier
EC	European Commission
ETD	Electronic Theses and Dissertations
EU	European Union
EuroCRIS	European Current Research Information Systems
FORCE11	Future of Research Communications and e-Scholarship: community of scholars, librarians, archivists, publishers and research funders that has arisen organically to help facilitate the change toward improved knowledge creation and sharing. See https://www.force11.org/
ID	Identifier
IFLA	International Federation of Library Associations and Institutions
ISNI	International Standard Name Identifier
JISC	UK higher education, further education and skills sectors' not-for-profit organisation for digital services and solutions. See https://www.jisc.ac.uk/
Jupyter	Web application that enables the creation and sharing of documents that contain live code, equations, visualisations and explanatory text
KPI	Key Performance Indicator
LIBER	Ligue des Bibliothèques Européennes de Recherche (Association of European Research Libraries)
NISO	National Information Standards Organisation

OAI10	CERN Workshop on Innovations in Scholarly Communication
ODIN	ORCID and DataCite Interoperability Network
OpenAIRE	Project that aims to support the implementation of Open Science in Europe. See https://www.openaire.eu/
OpenCon	Student and early career academic professional conference on Open Access, Open Education, and Open Data.
ORCID	An organisation that creates and maintains a registry of unique researcher identifiers and a transparent method of linking research activities and outputs to these identifiers. See http://orcid.org
ORCID iD	Persistent digital identifier that distinguishes individual researchers and, through integration in key research workflows such as manuscript and grant submission, supports automated linkages between individuals and professional activities.
PID	Persistent Identifier
Re3data	Registry of Research Data Repositories
RDA	Research Data Alliance
REFEDS	Research and Education FEDerations Group
Ringgold	Organisation that provides unique identifiers for organisations in the publishing industry supply chain. See http://www.ringgold.com/
SDK	Software Development Kit
THOR	Technical and Human Infrastructure for Open Research
UKSG	Organisation that aims to connect the knowledge community and encourage the exchange of ideas on scholarly communication, spanning librarians, publishers, intermediaries and technology vendors.