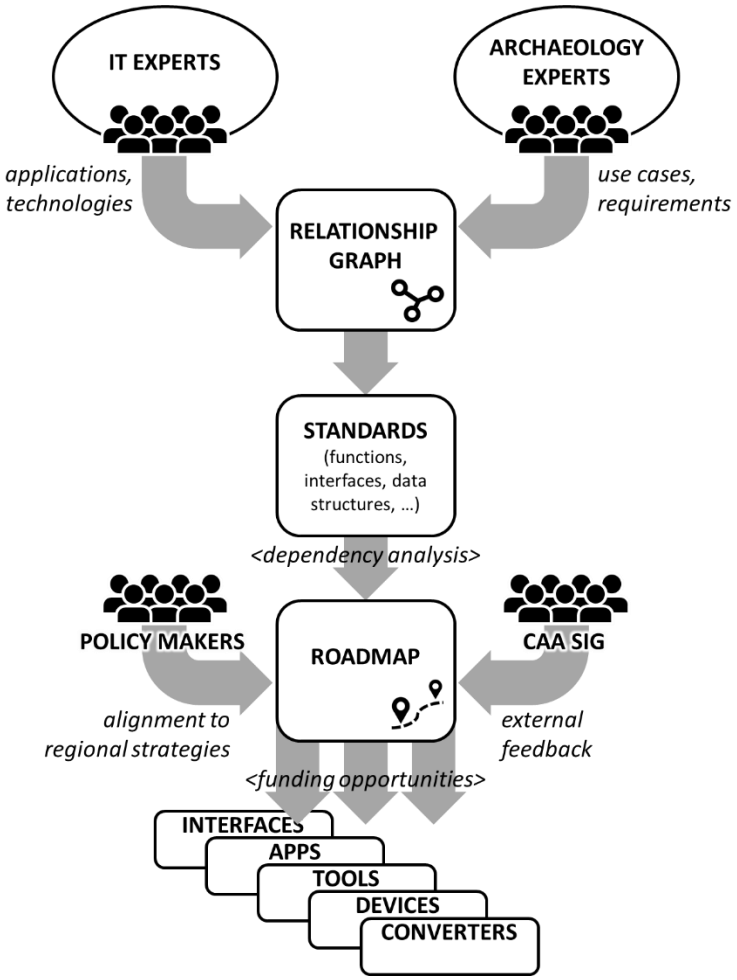
Digital Archaeology Standards Network

Short Description. The Digital Archaeology Standards Network focuses on supporting tool development by bringing archaeologists and IT developers together to foster the development of tools and applications that directly aid archaeological needs. It will develop recommendations for clear standards and interfaces. This differs from related organisations, such as the CAA in that it focuses primarily on helping scientific advances in archaeology by ensuring that tools are available to support archaeologists that are useful, usable and sustainable.



schematic depiction of the network's tasks and relationships

Background

There is an increasing array of digital tools available to support archaeologists but uptake among archaeologists is limited and there are few incentives for professional developers to become involved. As a result, many tools are heavily skewed towards specific research objectives or niche requirements and their authors are often unable to keep their software up to date with the frequent changes in technology emanating from the computing industry.

The main goal of the network is to support the development of new tools and frameworks that will be widely accepted by archaeologists and lead to improvements in the quality and efficiency of research, better integration and wider availability of results.

It will also connect developers with potential end users and funding bodies.

It will do this in two main ways;

- Acting as a support network and information hub for developers interested in producing tools
- Providing a conduit for archaeologists to access information about tools and to interact with developers

The primary method of the network will thereby consist in an open discussion forum to which developers and archaeologists from all areas can equally participate in

1. identifying needs and requirements
2. analysing existing or new tools for their strengths and weaknesses (gap analysis)
3. suggesting and discussing concrete functionalities, tools, data structures etc.
4. identifying commonalities to generate and promote recommended standards (interfaces, data structures etc.)
5. analysing usage potential and scope
6. developing a roadmap consisting of core functionalities and how they relate to other application fields
7. exchanging experience
8. connect developers with potential end users and funding bodies
9. developing funding strategies, including research proposals or crowdfunding development.
10. promoting new tools, their adaptation and adoption.

Principles and Organisation

The network centres on the means and environment(s) to foster discussion and bring experts from different fields together that otherwise wouldn't know of each other. It will therefore generate a

- a set of forums and shared working spaces
- database of experts, including a description of their expertise and enthusiasm and interests
- graph of topical relationship that identifies which people and topics relate to each other
- road map of existing and potential tools and apps (standard recommendations)
- funding network

forums

These will enable exchange between any participating member on specific discussion topics. The primary / initial topics we thereby foresee consist in (a) requirements, (b) functionalities, (c) use cases. This list will be extended as additional topics arise and may be addressed as sub-topics or horizontal, umbrella topics.

Initially, all discussion topics will be moderated and steered by the three main chairs, Keith Jeffery, Gill Hunt and Lutz Schubert. Sub-topics and sub-working groups will be steered by the respective initiators with support by the three main chairs. Voluntary and dedicated individuals can join the group of main chairs. All contributions must be tagged and cross-referenced on basis of a preliminary assessment by the contributor, but further tags and references can be added by the forum members. The tags and references will be analysed to generate the topical relationship graph, respectively to populate the individual topical nodes, and thus to identify key functionalities, requirements etc.

expert database

This is essentially a user profile database with key information about the background of the participants, their projects, their contribution etc. The main goal of this database is to be able to connect individuals on basis of their requirements, future goals, identified issues etc., thus principally spinning off side-discussions, -topics or -developments. The database will be searchable, allowing start-ups, companies, project initiators etc. to identify and address the key people.

relationship graph

This will identify the key topics, functionalities, requirements, contributors covered by the network etc. and where possible connect them on basis of their contributions, identified relationships etc. An initial relationship graph can be found in the appendix. For example, the excavation report includes profile maps which can be generated using enhanced image analysis and 3d scanning techniques to which in particular people with mapping expertise (graphic design etc.) and image analysis can contribute.

roadmap

This will identify the core functionalities and requirements that are of interest to archaeologists and will identify both existing tools and Apps and the potential for new tools to be developed. The network will not try to define requirements for specific tools but will aim to connect archaeological users with developers so that the development of requirements is informed by professional practice at all stages. The roadmap will also include details of appropriate standards, ontologies that are relevant to each functional area and developers will be encouraged to use these when developing tools, respectively identify and recommend new ones, or adaptation to existing ones where a mismatch is identified.

funding network

Important for the development and maintenance of these capabilities is thereby not only their full specification and ensuring uptake / testing, but more crucially, coverage of potential expenses. The chairs specifically therefore have the additional task to identify and promote funding routes. This can take different forms and will range from open source community support via crowd-funding to full-fledged company business plans or spin-offs. The chairs therefore also have the responsibility to connect to policy makers and funding bodies to generate interest in the work, to which end promoting bodies (see roles) and routes will have to be employed. The network will offer the necessary support to develop

funding ideas and research proposals through templates, guidelines, direct feedback, connecting of relevant participants etc.

The Consortium / Roles

Participation and contribution to the network is voluntary, meaning that there will be no membership fee and network members will not be reimbursed for any activity undertaken for the network. No member is obliged to contribute (see below) or partake in the discussion, though this is strongly encouraged. This does not apply to chairs and organisers, who take over responsibility for the smooth operation of the network.

We distinguish the following roles and tasks in the network – note that any member can at any time take on multiple roles:

The network is organised and supervised by the **organisers or chairs**: whereas chairs have responsibility over sub-topics, the organisers are responsible for the whole network as such. Their primary task consists in maintaining membership, ensuring alignment of the discussions and generating the roadmap. They are also the key representatives of the network and thus the interface to policy makers. This does not mean that no other member has the right to connect to policy makers, but that the organisers have responsibility for the network with regards to interaction with policy makers or funding bodies.

The primary participants are the **topical experts** that bring in specific knowledge in the core fields of the network – these are specifically: archaeologists and related fields, as well as IT specialists. Though initially kept generic, the topic differentiation will clearly lead to distinction between different specialised domains, such as geology, climatology, geophysics, bioarchaeology etc. Similarly, we may distinguish between software developers, simulation experts, hardware designers etc. The role of the topical experts consists primarily in contributing to all discussions with their respective expertise, but equally to suggest new discussion topics. Contributions consist e.g. in commenting on approaches, suggesting alternative approaches, identifying requirements, analysing use cases etc.

Further to this, all topical experts are encouraged to use the discussion to develop and promote / integrate their own results. This includes publication of results through dedicated papers and participation in the Special Interest Group's workshops (see below). Product and result owners are expected to open the interfaces and methods to the network, though not necessarily the code or design itself; owners are also expected to adapt the design and interfaces to the requirements and recommendations of the network so as to maintain adherence to the roadmap, or to suggest sensible alternative routes that maintain compatibility and have minimal impact on the roadmap.

Further to this, representatives of **policy makers, public bodies and funding organisations** are strongly encouraged to participate in the network. Whereas the organisers take responsibility of the network against said representatives, anyone can invite or interact with them, unless otherwise specified. The key role of the network is to ensure that its objectives are aligned to the relevant policy makers', public bodies' and funding organisations' research and development strategies. To this end, it will initiate discussion, present the roadmap, request feedback and try to adapt the roadmap to the according strategies – this may result in multiple views on the same roadmap according to the respective body's requirement.

The chairs will promote these bodies' strategical agendas, present them to the network and encourage participation and contribution to calls for proposals, development of project ideas etc. The network and chairs will offer help in development of such proposals (see funding routes, above).

End users are primarily (archaeological and related) researchers and scientists that employ the developed tools in their work – be that on site, during data analysis or under other circumstances – and provide feedback to the network. End-users are obliged to make use of the developed tools and products as much as possible and sensible, in return to which they will receive the tools at no cost and with full support of the network, respectively product owner to usage of the tool and adaptation to the use case. The product owner has the full right to request for reimbursement for product usage, in which case however, usage, uptake and support are no longer obligatory to any member of the network. Also, tool complexity and compatibility with existing methods at the end user's site will be taken fully into consideration.

End users furthermore are encouraged to provide requirements in alignment to their respective use cases, constraints arising from background software and data structures etc.

Promoters are encouraged to publish and promote the results of the network, the usage of tools etc. through available publication channels. This includes equally research paper publication, as news on websites, blog entries etc. As the network cannot rely on funding to reimburse said activity (with exception of sponsored events and similar opportunities), it will mostly rely on the enthusiasm of the participants, but prepare dedicated news entries and promotional material.

Finally, the roles are complemented by **regular members**, which have no specific tasks or obligations, but are welcome to follow the discussions and contribute wherever they seem fit.

Value Proposition

Archaeology is fundamentally a cross-disciplinary subject and many of the most interesting and impactful research has resulted from work done in multiple fields. For example, the relationship between pollen analysis and climatic models, the potential impact of human movement patterns on climate in this context, the analysis of transitions between time periods and their relationship to ceramic typology, architectural changes etc.

Without well thought out tools with common core functionalities and data standards archaeologists are forced to laboriously rebuild and rework data rather than simply building data up from existing research and carrying it over into new results and new ideas.

Archaeologists know that their data needs to be shared and that tools are available to do this, but there is a gap between the theory and practice that if filled would be of general interest and benefit for the research community. Data and functionality would become available and reusable – even within the own research work, but more importantly across projects and research, thus realising the open access and open data concept to its maximum. As the main problem in this realisation lies in the complexity and availability of the right people and enthusiasts, the DArS network provides a realistic approach to supporting developments that will move archaeology closer to this goal.

The DArS network offers further benefits to its members: not only does it ready future research by usage of the tools, it specifically also identifies open problems which form research challenges in themselves, thus opening up the opportunity for further development, and business opportunities. It

enables the identification of relevant people to form consortia, exchange notes or potential uptakers etc.

Relationship to the CAA

The overall goal and objectives are strongly related to the ones of the CAA (Computer Applications & Quantitative Methods in Archaeology) organisation and collaboration should be initiated at least over an SIG (see there). However, the focus of the DArS network is on supporting the development of low-level toolkits, APIs and apps, as well as suggesting a concrete roadmap for existing tools and the development and maintenance of such tools. It will promote specific steps, standards and structures, rather than exploring new algorithms, simulations etc. or to present results. The network is therefore in no competition with the CAA, but rather wants to complement its endeavours by suggesting and building up a development plan and promoting existing results to on-going and upcoming research endeavours, thus to strengthen the coherence between the domains even more. It therefore also builds up much more on the knowledge of IT developers than researchers using IT (such as simulation or modelling experts).

The network would benefit very much from a strong integration with the CAA, as it can use the presentations and publications of the CAA as input for further identification of use cases, requirements, concrete applications etc. It therefore established a SIG under the CAA with the goal of strengthening this relationship and to act as an interface between the two endeavours (CAA and network). The roadmap and concrete recommendations will be presented and discussed in the context of the SIG workshops, thus offering experts from the CAA to voice their opinion and shape the roadmap.

Appendix

Topical Relationship Graph Sketch