

Lightning Talk:

The Science Gateways Community Institute – Supporting Communities to Achieve Sustainability for Their Science Gateways

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Abstract— Cyberinfrastructure including distributed and parallel computing infrastructures, Internet of Things (IoT) and instruments play a critical role in enabling research in many disciplines and often pushes the boundaries. Science gateways - also known as virtual research environments or virtual laboratories - allow researchers to focus on their respective domain challenges without getting distracted with information technology nuances. The newly funded NSF Science Gateways Community Institute (SGCI) aims at supporting creators and users of science gateways and at tackling the challenges of achieving sustainability for science gateways. To reach this goal, the first steps include reaching out to a wide community, gathering its requirements, connecting creators and users to diverse experts, and offering consultancy as well as providing a software collaborative, which contains ready-to-use science gateway frameworks and science gateway components.

Index Terms—science gateways, science gateways community institute, sustainability, developer support, software consultation

I. THE CONCEPT OF THE SCIENCE GATEWAYS COMMUNITY INSTITUTE

In general, science gateways can be defined as software end-to-end solutions tailored to the requirements of a specific community while hiding complex underlying infrastructures. In the last 10 years quite a few web development frameworks, containerizations, science gateway frameworks and APIs with different foci and strengths have evolved to support the developers of science gateways in implementing an intuitive solution for a target research domain [1, 2]. The selection of a suitable technology for a specific use case is essential and helps with reducing the effort in implementing a science gateway by re-

using existing software or frameworks. Thus, a solution for a user community can be provided more efficiently and sustainably. Additionally, novel developments in web-based technologies and agile web frameworks allow for supporting developers in creating web-based science gateways faster. For the first time in the history of such solutions, providers of HPC, grid and cloud infrastructures reported in 2014 that more of their resources have been accessed via science gateways than via command line [3].

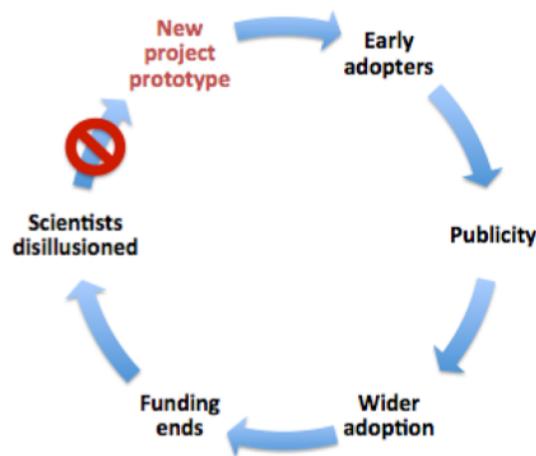


Figure 1: A Typical Life Cycle of a Science Gateway

However, science gateways are realizing only a fraction of their potential. A typical life cycle of a science gateway is presented in Fig. 1. Often scientists get disillusioned after they

have started using a science gateway since it is not maintained or improved after a point in the lifecycle. There are mainly two reasons for this situation: Funding for the project ends or PhD students, who have created and maintained a solution leave the project because they finished their PhDs. The SGCI consists of five areas to support creators and users of science gateways to help with measures for sustainability and to prevent this disillusionment (see Fig. 2).

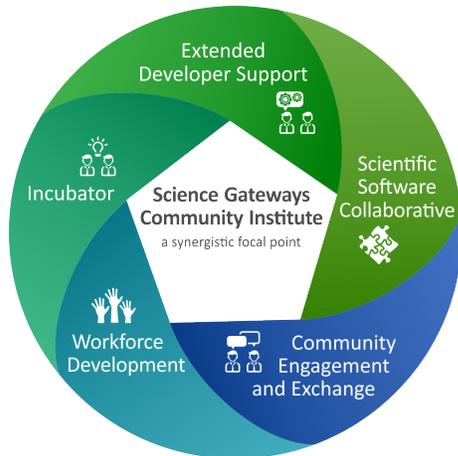


Figure 2: The Five Areas of the SGCI

1. Incubator provides shared expertise in business and sustainability planning, cybersecurity, user interface design, and software engineering practices.
2. Extended Developer Support provides expert developers for up to one year to projects that request assistance and demonstrate the potential to achieve the most significant impacts on their research communities.
3. Scientific Software Collaborative offers a component-based, open-source, extensible framework for gateway design, integration, and services, including gateway hosting and capabilities for external developers to integrate their software into Institute offerings. Such software includes science gateway frameworks, APIs and libraries for developing science gateways and complete solutions already tailored for a specific community.
4. Community Engagement and Exchange provides a forum for communication and shared experiences among gateway developers, user communities,

within NSF, across federal agencies, and internationally.

5. Workforce Development increases the pipeline of gateway developers with training programs, including special emphasis on recruiting underrepresented minorities, and by helping universities form gateway support groups.

The five areas are closely collaborating. The feedback of science gateway users and creators is crucial to further develop the services of the institute, to spread knowledge in the community about existing solutions and to provide consultancy to create their own science gateways – whether they are based on existing frameworks or they are developed from scratch if this is required because of specific demands of the community. The scientific software collaborative can be used to host extensions and further developments. Thus, the goal of the SGCI is to serve as central contact, support and information point and for national as well as international collaborations on science gateways.

Even though SGCI has just started in August 2016, we envision that the efforts will substantially contribute to the sustainability of science gateways and scientific software in general.

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