

Towards an integrated portal for the federation: an open platform approach

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Abstract. Testbed federation as we know it today still lacks one key component to appear as a global experimental facility. We propose an open framework allowing to leverage available components and integrate them into a consistent interface being the entry point for users, and supporting them throughout their experimental lifecycle. We present a working prototype integrating authentication, SFA resources and measurements which is made possible through the combination of existing and proved software bricks.

1 An experimenter’s perspective

An increasing number of testbeds are today joining the global federation which takes its ground on the Slice-Based Federation Architecture (SFA)¹. This effort has fostered the emergence of an ecosystem of tools and services, covering a wide range of applications not included in the SFA thin waist: enriched user interfaces, measurement and monitoring platforms, user registration and authentication services, and experimental management software, to cite a few.

A typical user willing to run an experiment is then required to switch between many heterogeneous and overlapping tools. He needs to discover them, learn their processes and semantics, and often authenticate several times and make the bridge manually between them. As a response to this diversity and complexity, the notion of an experimenter’s portal is often advanced. It is fair to say though that no satisfactory solution has been proposed, beyond sparse integration efforts.

We propose to fill this gap through an open platform, consisting on a thin layer making the glu between existing components. It has the notable characteristic of being itself built from the combination of existing and proved software bricks. We refer to it as MySlice. A prototype is running today², offering a single and consistent interface for authentication, resource browsing/selection and measurements.

To the best of our knowledge, the only related project is the soon-to-be-released GENI portal which offers an integrated portal for user registration and

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¹ <http://groups.geni.net/geni/wiki/SliceFedArch>

² <https://demo.myslice.info>

authentication, and allows the user to manage its experiments before handing the control to external tools for further steps. We expect our solution to reach more integration and more easily welcome external contributions thanks to its extension mechanism.

2 A portal for the federation

MySlice sits at the edge of the federation, and aims at being a trusted entity facing a community of experimenters. This privileged situation makes it possible to simplify and enhance user's experience, for instance by handling complex procedure on his behalf, or preprocessing and caching data. It acts as an intelligent mediator that makes the bridge between the user, and the set of available components, generally distributed. In short, it realizes a semantic integration of interconnected components, and relieves the users from knowing to which source or set of sources to dispatch its requests.

It is a design choice to restrict the core components to the minimal amount of functionalities to ensure a global interoperability, and propose a system of extensions on which to plug new functionalities and make the platform evolve. We believe this is necessary to make the portal sustainable both technically and economically. Testbeds, services and tools will come and go following the evolutions of technology and user needs. The platform should not be impacted by such changes, and accommodate those newcomers in a simple and cost-effective way. As for users, The programming interfaces abstract as much as possible developers from the details of any other extension that can be installed.

We have chosen an open community model, where developers are invited to contribute and share missing extensions. All the software is released under a free and opensource license, and uses commonly used languages to facilitate its adoption. For the same reason, it will adopt as soon as possible open standards, which is currently done with SFA and the increasing use of recognized ontologies for measurements.

Finally, MySlice comes with a wide range of interfaces: (1) a python library – which can be embedded into third party application – (2) a XMLRPC API – exposing its functionalities remotely and allowing a programmatic access –, and finally (3) a web-based GUI enhancing users' experience through a set of widgets, and more convenient for simpler tasks and novice users.

3 Platform building blocks

We made the central brick of TopHat [1] – an interface allowing the integration of various measurement systems and data sources to support testbed experiments – evolve into a more general interconnection framework, at the core of the MySlice platform. New APIs can be connected through a system of gateways. Users can then submit queries that get dispatched optimally and transparently to the different services to form the answer. The current prototype features both the SFA and TopHat API which are combined to augment the value for users.

The framework also allows several same components to coexist and will then realize an union. It would be possible for example to plug an API piloting a remote OMF[2] experiment controller on behalf of the user; this would extend the reach of available functionalities beyond the control plane only. Among other extensions of interest: an interface to a database of in-slice measurements (OML³ or to a stitching service.

The web interface is what was originally known as MySlice. Its features a modular interface that allow new plugins to be developed to enrich its functionalities. This system allows to balance generic displays (result tables) with specific ones exposing the richness of interconnected components (3D layout of nodes, resource scheduler, ...). The plugin system offers an efficient interface benefiting in particular from the interconnection framework, and that isolates one from another, that should make it attractive to contribute. A featured extension is the rich resource selection and reservation interface which allows users to annotate resources with measurements, and uses various filtering mechanisms and visualization to help a user make sense of the range of available data and best choose resources that fits his/her needs. Finally, MySlice is integrated into the Joomla⁴ content management system which allows the integration of data and content, making it possible to easily add content⁵ embedding testbed data to the portal.

4 Conclusion

Building a portal for testbed federation has long been a desired but challenging feature. We propose an open and running platform based on the combination of existing and proved components. It makes for the necessary glu between the various components of interest to ensure their interoperability and propose a consistent interface supporting experiments' lifecycle. Its community oriented development empowers developers to add the missing pieces to enrich its set of functionalities. We already have a growing community of contributors, which will hope will reach a virtuous circle attracting both new users and partners.

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References

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2. Rakotoarivelo, T., Ott, M., Seskar, I., Jourjon, G.: OMF: a Control and Management Framework for Networking Testbeds. SOSP Workshop on Real Overlays and Distributed Systems (ROADS '09), Big Sky, Montana (Oct 2009)

³ <http://mytestbed.net/projects/oml>

⁴ <http://www.joomla.org>

⁵ similar to what the OneLab website provides: <http://www.onelab.eu>