Towards an integrated portal for networking testbed federation: an open platform approach

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FIRE Engineering workshop, Nov 6-7, 2012, Ghent, Belgium
Overview of MySlice

- A user-centric tool to support users’ interaction with the federation of testbeds
- tailored to support the full experiment lifecycle
- based on an open and extensible framework

- MySlice was presented to the GENI community at last GEC in the “Portal and Clearinghouse” session
- a good candidate for a FIRE portal
Hiding the complexity of the experimental lifecycle

- account mgt. & authentication
- browse & reserve resources
- experiment setup & control
- release resources
Hiding the complexity of the experimental lifecycle

- Measurements
- Account management & authentication
- Browse & reserve resources
- Experiment setup & control
- Release resources
Hiding the complexity of the experimental lifecycle

- measurements
- account mgt. & authentication
- browse & reserve resources
- experiment setup & control
- release resources
- stitching
- policies
- etc.
Hiding the complexity of the experimental lifecycle

Towards an integrated portal for networking testbed federation: an open platform approach
Hiding the complexity of the experimental lifecycle
Overview of MySlice

Key aspects

- fully compatible with SFA & GENI software architectures
- extensive support for slice management based on SFA
- rely on existing components and open standards
- integration of measurements and monitoring

Challenges

- leverage a large ecosystem of available complementary and overlapping services and tools (far beyond testbed borders)
- from our experience the UI is essential to users: need provide a transparent and consistent access
- Exploit commonalities in platforms and processes
Design

- A common abstraction to help the user browse through and interact with a large amount of data and sources
- Grounded on related work on data integration and large dataset navigation.
  - formulate semantic queries, requesting filtering and annotations
  - propose enhanced visualizations on received results
  - allow to balance homogeneity and heterogeneity in the GUI
MySlice architecture

Modular web framework

API

Core library

A wide-range of user access interfaces to accommodate the diversity of users' needs
MySlice architecture

- **Plugins**
  - Modular web framework
    - API
      - Core library
        - Gateways
          - GUI enhancements through plugins
          - Interconnection with other existing APIs through gateways
MySlice architecture

Plugins

Modular web framework

API

Core library

Gateways

Standard & cross-platform technologies

- PHP
- JavaScript
- Joomla!
- XML RPC
- XMPP (in progress)
- Python
MySlice architecture

- Plugins
- Modular web framework
- API
- Core library
- Gateways

Higher layers or the user formulate **queries** and receive **results**.

Gateways handle transport, data format & semantics, and provide **metadata**.

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MySlice architecture

Plugins

Modular web framework

API

Core library

Gateways

plugins are isolated from the gateways diversity thanks to the query abstraction
MySlice architecture

MySlice architecture provides a convenient **aggregation** and **interoperability** layer between the various services and the UI.
MySlice architecture

Resource table, map, lease scheduler

Modular web framework

API

Core library

SFA  SFA  TopHat

PlanetLab Europe AM

NITOS (OMF) AM

misc. measurement & monitoring sources

The demo you will see!
Demo

Dashboard & slice management
Interconnection framework

1. Interfaces and metadata

MySlice

SFA::slice (hrn, lease[], resource[])
SFA::resource (hrn, hostname, ...)
SFA::lease (...)

Metadata

Platform A
Platform B
Platform C
Platform D

TopHat::hostname (hostname, city, reliability, ...)

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UPMC
Interconnection framework

2. Query language

Get(
  'slice',
  [['hrn', '=', 'ple.upmc.myslicedeo'],
   {}
   ['hrn', 'resource.hostname', 'resource.city',
    'resource.reliability', 'lease']
  )

Platform A
Platform B
Platform C
Platform D
Interconnection framework
Interconnection framework

3. Query dispatch and aggregation

User

MySlice

Platform A
Platform B
Platform C
Platform D
MySlice extensions: experiment control

Candidates:

- NEPI http://nepihome.org/
- OMF http://mytestbed.net/

- Add a gateway to a service API running an experiment controller:
  - Define the script as a new slice property
  - + support of upload and execution
  - Results can be retrieved through XMPP

- Develop/integrate appropriate visualization plugins
# Community development: contributors

<table>
<thead>
<tr>
<th>Partner/Testbed</th>
<th>Contribution</th>
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<tr>
<td>Princeton University</td>
<td>Architecture (GENI Understanding Federation)</td>
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<td>Tokyo University</td>
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<tr>
<td>INRIA Sophia (FR)</td>
<td>Architecture, scheduler</td>
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<tr>
<td>INRIA Grenoble (FR)</td>
<td>3D map, scheduler</td>
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<tr>
<td>UTH (GR)</td>
<td>Scheduler (in progress)</td>
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<td>IBBT (BE)</td>
<td>Measurement visualization (in discussion)</td>
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<table>
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<tr>
<th>project</th>
<th>testbeds</th>
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<td>PLANETLAB</td>
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<td>NOTOS</td>
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<tr>
<td>FITeagle</td>
<td>(in progress)</td>
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| FIT | EQUIPEX |
| Senslab | |
| FED4FIRE | |
| fibre | |

| (just adopted) | |
| (in discussion) | |
Pointers

For users

- Project website: http://www.myslice.info
- Demo website: https://demo.myslice.info
  - documentation and tutorials

For testbed owners and developers

- Debian packages
- GIT repository: http://git.myslice.info
- TRAC: https://trac.myslice.info (new)
- mailing lists, IRC channel, etc.
Conclusion

• An open solution for users to access the global federation of testbeds
• Support for the complete experimental lifecycle
• Available for download, deployment in progress

Not presented: comprehensive support for authentication

Join the growing community!

References

• Jordan Augé, Loïc Barton, Timur Friedman, Serge Fdida – Supporting the experiment lifecycle with MySlice – Invited talk @ GENI Engineering Conference, GEC15 – Oct. 23-25, 2012 – Houston, TX
Towards an integrated portal for networking testbed federation: an open platform approach
Authentication to MySlice

Through a local account or a trusted third party:

- OneLab or PLC token (login/password (weak), session, GPG, etc.)
- a SFA GID signed by a trusted peer
- (cf Shibboleth for GENI portal)
Authentication to third party platforms

- multiple users, platforms, and authentication schemes
- extensive support for SFA authentication
  - either user upload delegated credentials
  - or MySlice can handle SFA complexity on behalf of the user