



FUTURE INTERNET TESTBEDS
EXPERIMENTATION BETWEEN
BRAZIL AND EUROPE

FIBRE-BR Instrumentation and Monitoring (I&M) Tools

UFPE and UNIFACS Monitoring Team

WP2 Meeting

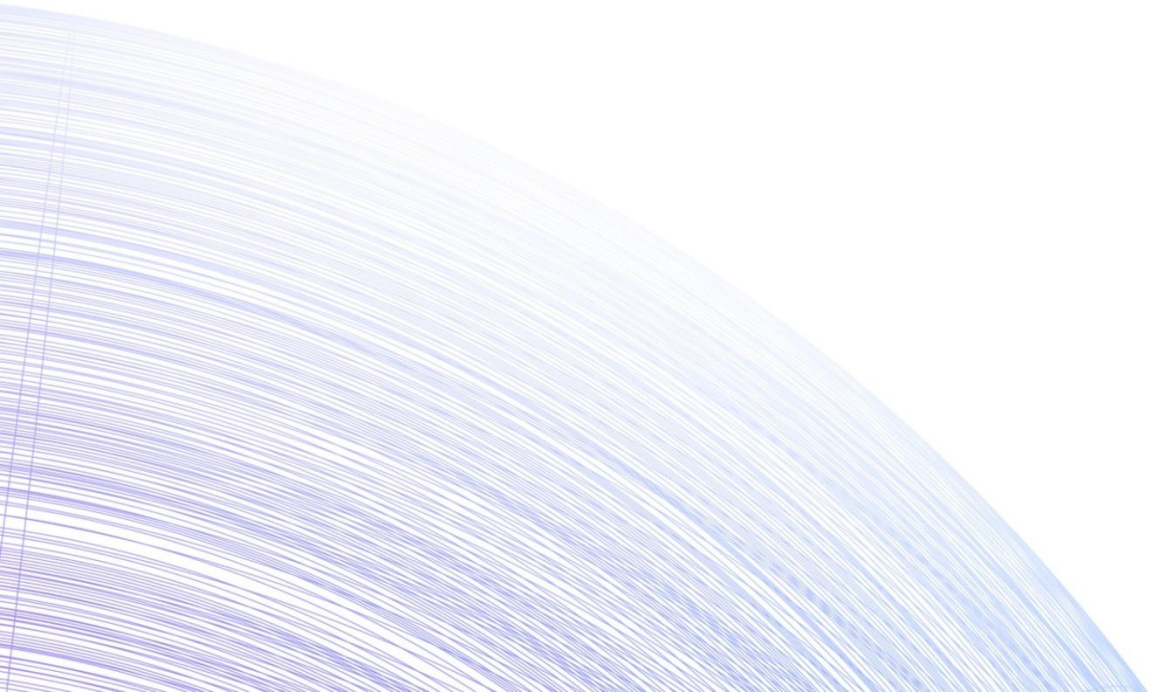
São Paulo – August 16, 2012



European Commission

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- FIBRE-BR I&M Overview
 - Goals for First Version of I&M Services
 - Proposal for organization of I&M VMs
 - Monitoring mini-tasks
 - Other issues
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FIBRE-BR I&M

Overview

Monitoring User Cases

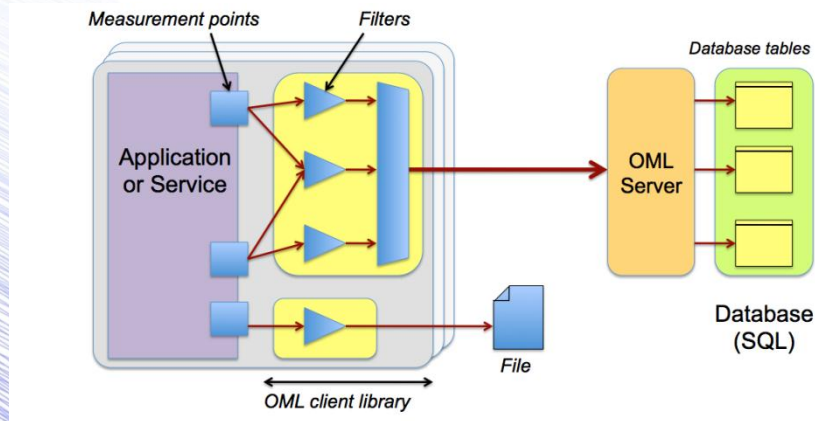
- **Infrastructure Monitoring**
 - For operators to make sure everything is working
 - For experimenters to check about network conditions
 - Which can be used for resources/islands selection
 - For experiment application
- **Experiment/Slice Monitoring**
 - Instrument slices and/or applications to collect performance and, eventually, also user-defined monitoring data, as transparent to the user as possible
 - This would be used by experimenters and other authorized researchers to evaluate a given experiment either on-line or off-line
 - Experiment Application
 - The slice may involve heterogeneous CMFs

Measurement Tools Available at ProtoGENI Island

- Two main measurement tools:
 - INSTOOLS = INStrumentation Tools
 - LAMP (*Leveraging and Abstracting Measurements with PerfSONAR*)
 - perfSONAR = performance Service Oriented Network monitoring ARchitecture
 - Ganglia (servers monitoring)
 - Currently they are being combined in the GEMINI project

Measurement Tools Available at OMF Islands

- OML is originally the OMF Measurement Library
- Today is a stand-alone project (can be used by other CMFs)
- Shortly, it is a framework (set of libraries and services) to collect and store measurements
- In NITOS testbed it is used to collect environmental data. Can be used also for measuring the spectrum, interference, etc.
- In the GENI context, through the GIMI project it is planned an integration with GEMINI, using perfSONAR services.

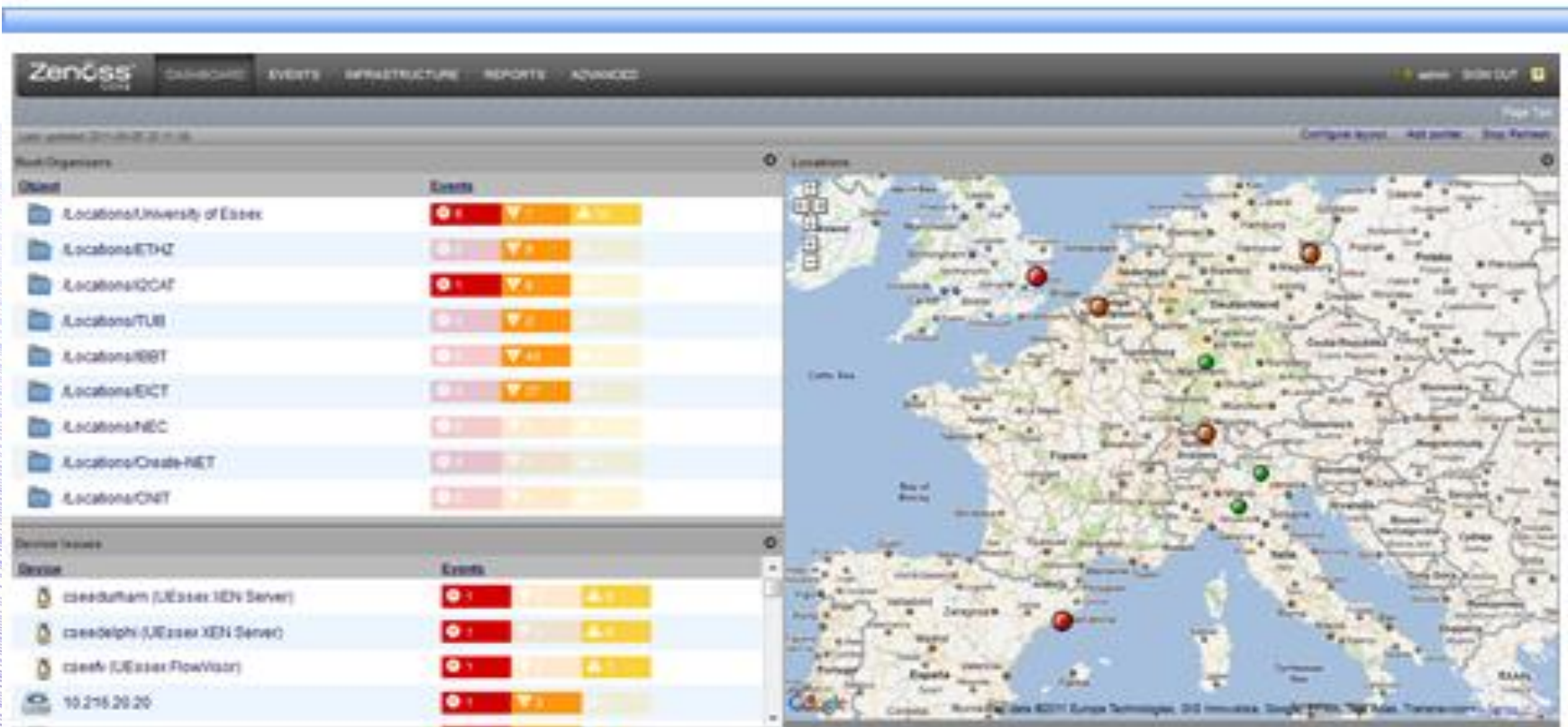


Measurement Tools Available at Ofelia Islands

- Infrastructure monitoring via centralized ZenOSS tool
- VT & Opt-in manager provide experiment monitoring
 - User experiment monitoring difficult due to virtualized resources



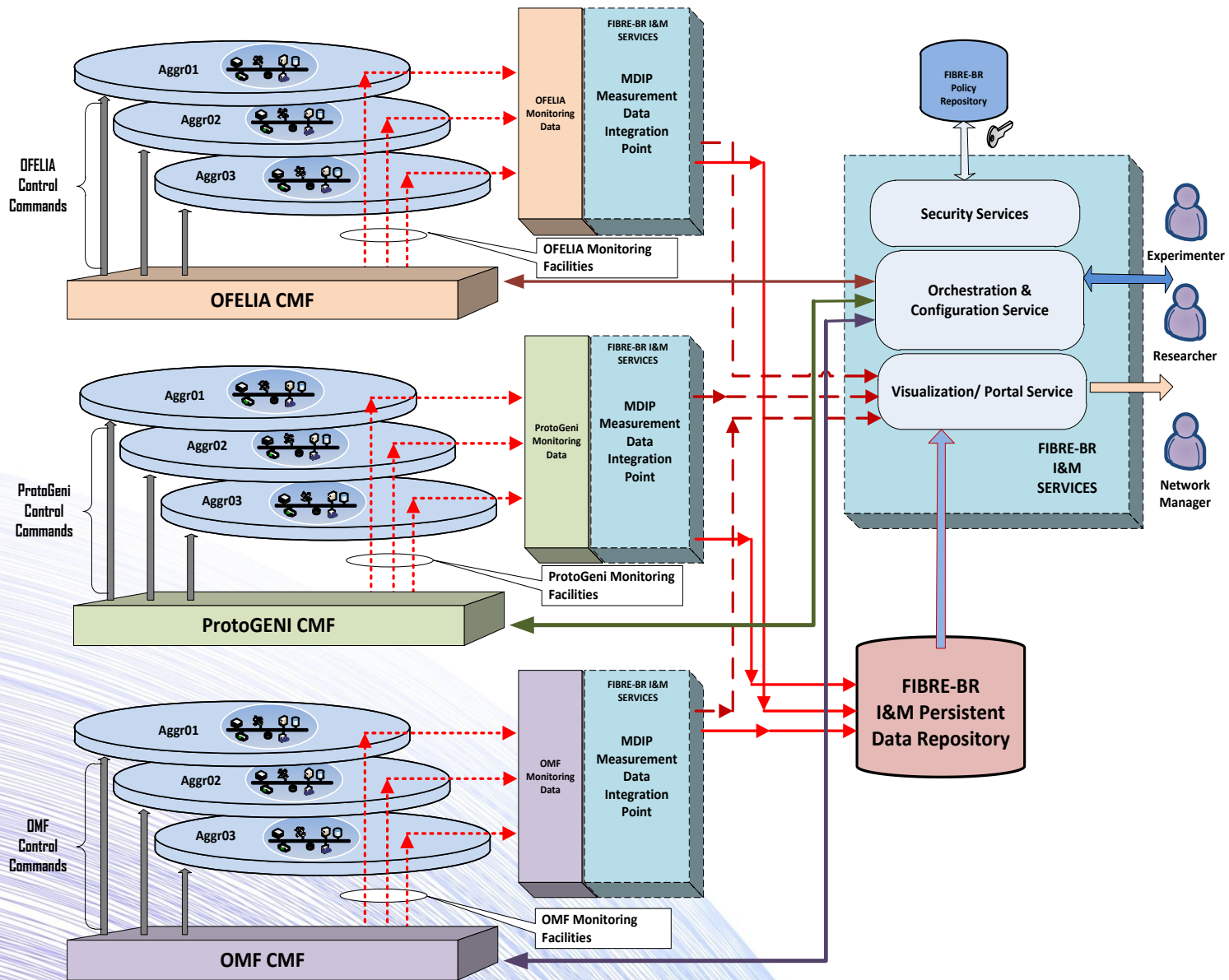
ZENOSS Monitoring (2/2)



FIBRE-BR Proposed Approach

- **An Instrumentation and Measurement Architecture Supporting Multiple Control Monitoring Frameworks**
- Our target is:
 - to provide, possibly, with a maximum reuse of the available CMFs I&M services over a new integrated and federated network structure;
 - To provide instrumentation and monitoring considering different I&M Services through FIBRE-BR (Monitoring Orchestration);
 - Multiple CMFs I&M data integration.

FIBRE-BR I&M Proposed Architecture

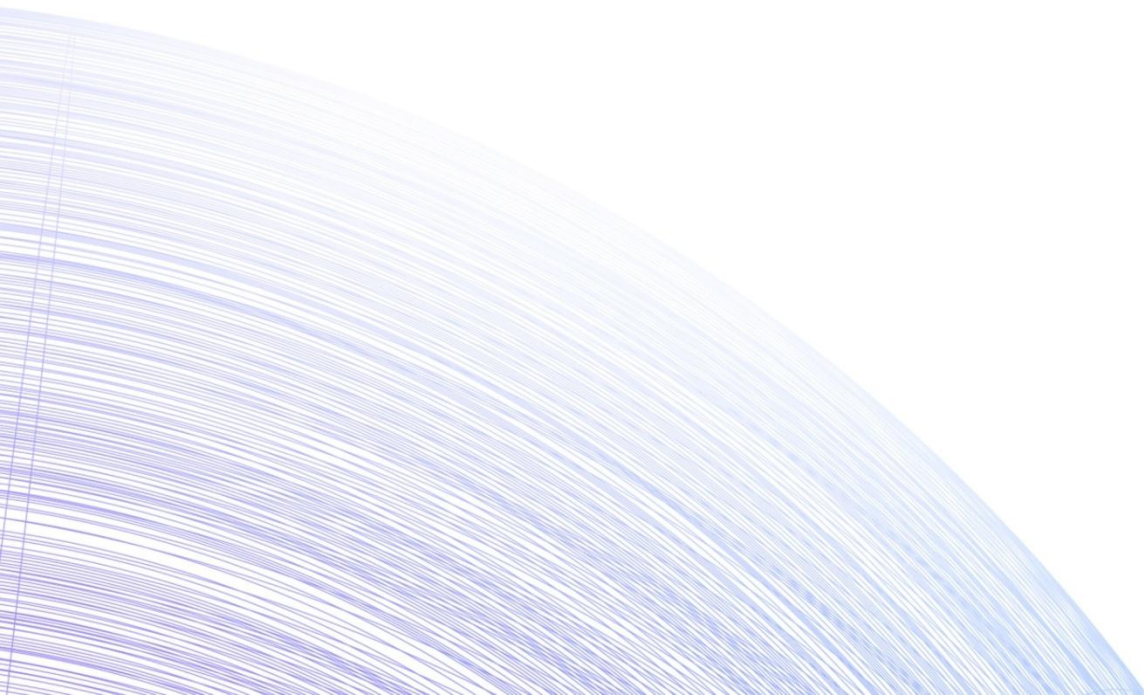


FIBRE-BR Implementation Alternatives

- Original approach (pS based):
 - Create pS MA services to expose CMF Measurement archives
 - Using NM and NML WGs schemas
 - Data transfer using pS protocols
- New approach (iRODS based) – under investigation:
 - Integrate CMF Measurement archives into iRODS shared data collection
 - Using NM and NML WGs schemas
 - Data transfer using iRODS API/client

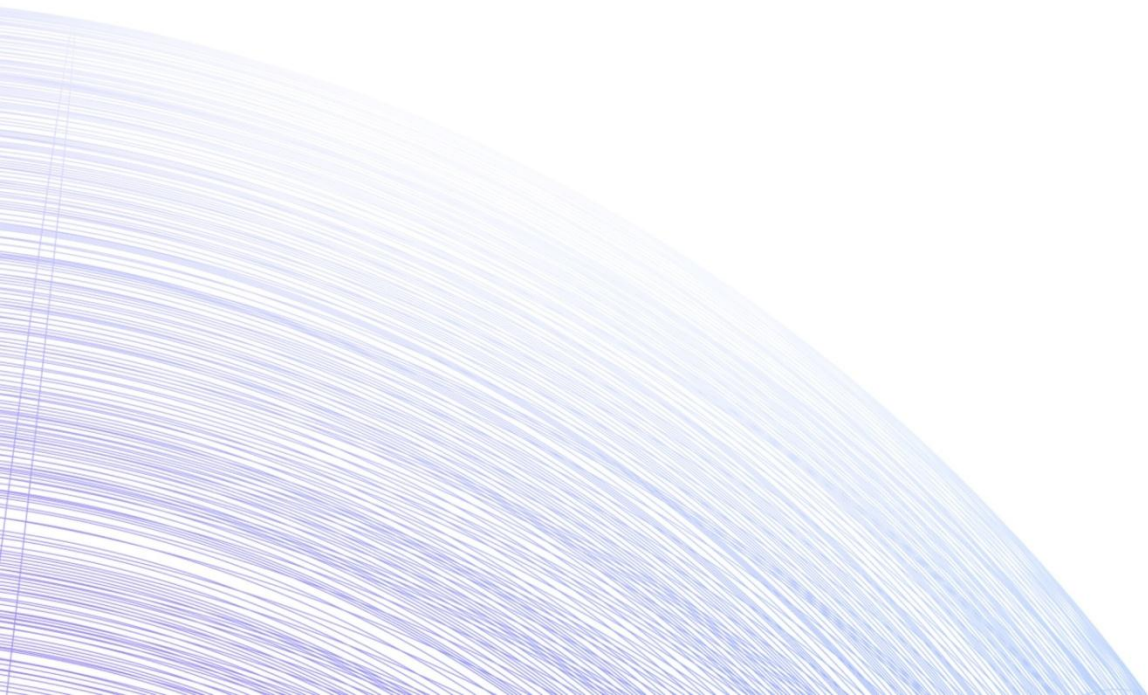
Measurements and Tools

- Experiment Related Measurements
- Slice Measurements
- Infrastructure Measurements



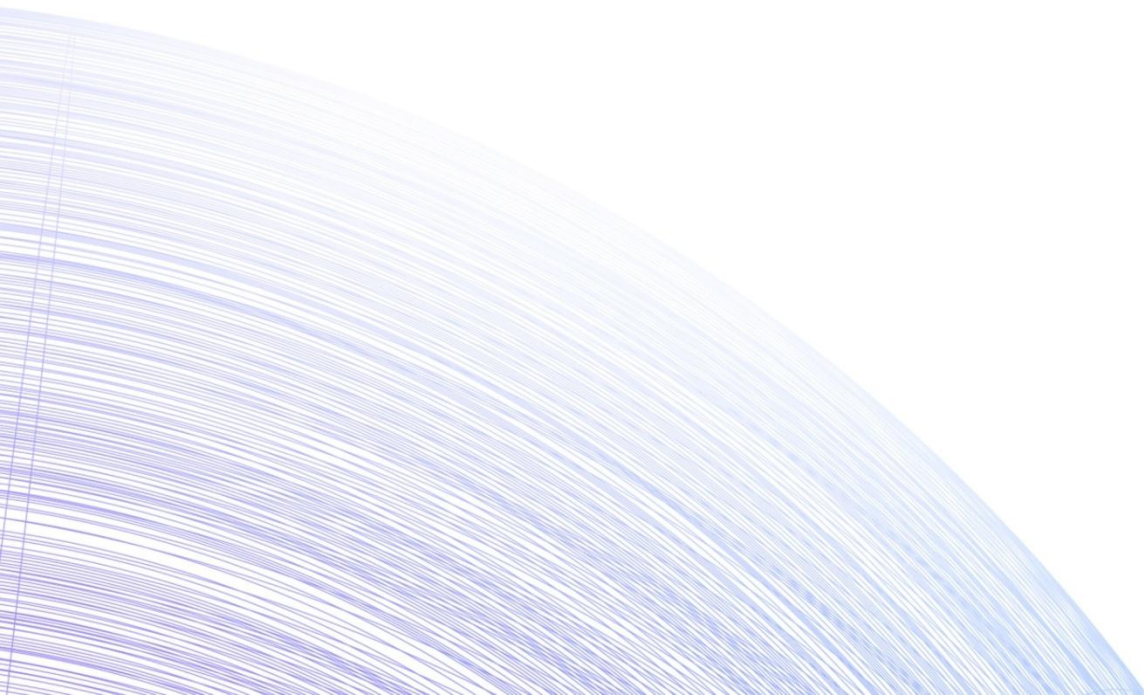
Experiment Related Measurements

- OML (2nd phase because of Experimenter flexibility on defining his/her own data)



Slice Measurements

- Check Pilot Project Measurement Requirements (WP5)
- OML (predefined set of measurements options with a known schema and semantics)
- OF Measurements (Uessex/OFELIA partner)



Infrastructure Measurements

- perfSONAR Services per Island:
 - 1 server with BWCTL MP and MA,
 - 1 server with OWAMP MP and MA, SNMP MA, Status MA
- perfSONAR service at intermediate nodes (circuit intermediate endpoints)
 - It would be useful to have a Status MA at each of the intermediate connection points
- ZenOSS (servers and switches measurement data):
 - Explore complementarity/integration with perfSONAR
 - centralized (per continent?) x distributed (per island, per continent) infrastructure
 - hierarchy: BR or EU islands, BR – EU

Goals for First Version of I&M Services

FIBRE-BR I&M Roadmap Overview

- **Target:**
 - I&M V1.0
 - FIBRE Workshop on 26th – 27th November 2012
- **CMF on islands** (considering CMF roadmap as defined till now):
 - OFELIA and OMF operational on most islands (how many and which ones?)
 - ProtoGeni on USP
- **I&M on islands – V1.0 - Target:**
 - Minimum infrastructure monitoring on all BR islands
 - I&M integration (CMFs and Islands) on next phase (to be refined in terms of the roadmap):
 - V1.1 – I&M Islands integration
 - V1.2 – I&M CMFs integration
 - V1.3 – I&M Federation BR (CMFs and islands integration)
 - V1.4 – I&M Federation BR EU (eventually can be done within V1.3)

I&M V1.0 rationale (in discussion)

- Strong dependencies at this project phase:
 - Islands interconnection (WP 2.2 deliverable)
 - I&M tools installation (prototyping) and dissemination among partners (BR)
 - Has to be experimented/ prototyped on Unifacs/ UFPE and some island(s) (UFSCar and USP possibly)

- Infrastructure measurements:
 - Operational and available on all islands (minimum)
- CMFs Monitoring:
 - OMF, OFELIA and ProtoGeni:
 - Minimum functionality implemented per island (not in all islands)
 - Based on CMF's current available tools (no integration in terms of the island or FIBRE BR architecture)
 - I&M storage:
 - Minimum functionality implemented (all islands)

I&M V1.0 - Goals


- ZenOSS and pS available for infrastructure measurements per island
- OML operational with predefined schemas and/or metrics names both on OMF and OCF
- OF related measurements available on OFELIA CMF
 - Stats collected by GMOC, other
- LAMP/INSTOOLS or GEMINI services on USP's ProtoGENI
- iRODS architecture defined and installed per island
 - Data sharing on measurement plane
- Monitoring VPN (management plane) setup defined and operational per island
- OML MDIP first version available
- OFELIA MDIP first version available
- ProteGENI MDIP first version available
- I&M Portal V1.0:
 - Minimum functionalities available
 - Mostly reuse of current available portals and monitoring data access available on current CMFs (OMF, OFELIA and ProtoGeni)

Proposal for organization of I&M VMs

- OML Server (one per island)
- iRODS iCAT Server (at least two for the entire FIBRE-BR, for redundancy)
- iRODS Rule Engine Server (one per data server, such as OML Server)
- Large persistent “iRODS” based Repository DB server (at least two for the entire FIBRE-BR or shared with other project such as CineGrid)
- UNIS server
- MDIP server
- I&M Portal Server (global or per island depending on similar choice for control Interface).
- 2 extra machines per island (**preferably non virtual ones**) to install infrastructure perfSONAR services: OWAMP and BWCTL MPs.



Other Issues

- FIBRE-BR Authentication/Authorization and use of CAFE Federation
 - Large persistent storage
 - GENI's intended use of iRODS
 - Central x distributed configuration and I&M tools/portals
 - Local x shared aggregate resources (capability of an aggregate to share only a fraction of its resources)
 - Federation
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Thank you / Obrigado

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