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The perfSONAR Project and TTM Enhancement Requests

Loukik Kudarimoti, Dante

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Overview

- Introductions
  - GÉANT2 , GÉANT2 JRA1 (perfSONAR)
- Brief discussion on perfSONAR work
- perfSONAR Roadmap
- Use of RIPE TTMs – current status
- Request For Enhancements
- Thoughts on integrating RIPE TTM with perfSONAR
- Conclusion & References

GÉANT2 – An Introduction

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- GÉANT2 – 7th generation of multi-gigabit pan-European network for Research and Education
- Project partners include 30 of Europe's national research and education networks (NRENs), DANTE and TERENA
- GÉANT2 programme includes
  - 5 Joint Research Activities (JRA)
  - 4 Service Activities (SA)
  - 7 Networking Activities (NA)

GÉANT2

DANTE

GÉANT2 JRA1
An Introduction

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- Goal is to provide performance measurement data from different networks to users (of different types)
  - Locating problems on an end-to-end path
  - Aids in understanding network characteristics
- Also want
  - To increase the types of metrics being measured and presented to the user
  - new tools which can collect and process network measurement data from different networks
- Developing a framework (perfSONAR) to facilitate exchange of measurement data

GÉANT2

DANTE

GÉANT2 JRA1 & perfSONAR Partners

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- Arnes
- Belnet
- Carnet
- Cesnet
- DANTE
- DFN
- FCCN
- GRNet
- ISTF
- PSNC
- NORDUnet (Uninett)
- Renater
- RedIRIS
- Surfnet
- SWITCH
- HEAnet
- GARR

Other partners involved only with perfSONAR

- ESnet
- Internet2
- University of Delaware

GÉANT2

DANTE

perfSONAR and **S**ervice **O**riented **A**rchitecture (SOA)

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- SOA is a collection of one or more services
  - A Service is a well defined, independent entity, which has a well defined interface and can be accessed directly
- Services in SOA can be used either singularly or in conjunction, to accomplish a particular task
- SOA is at the heart of perfSONAR
  - 5 base services and 3 additional services identified

perfSONAR Architecture 1

- Postulate: All measurement systems contain a combination of
  - Measurement tools
  - Data Storage
  - Security and Policy implementation
  - Topology information
  - Visualization
- Services have been identified
  - Based on the above ‘ingredients’
  - Based on requirement for other functionalities such as
    - Service Discovery, Resource protection, Data formatting

perfSONAR Architecture 2

Services identified by perfSONAR

- Base Services
  - Measurement Archive Service
  - Measurement Point service
  - Authentication Service
  - Lookup Service
- Additional Services
  - Resource Protection Service
  - Topology Service
  - Transformation Service

perfSONAR Architecture 3

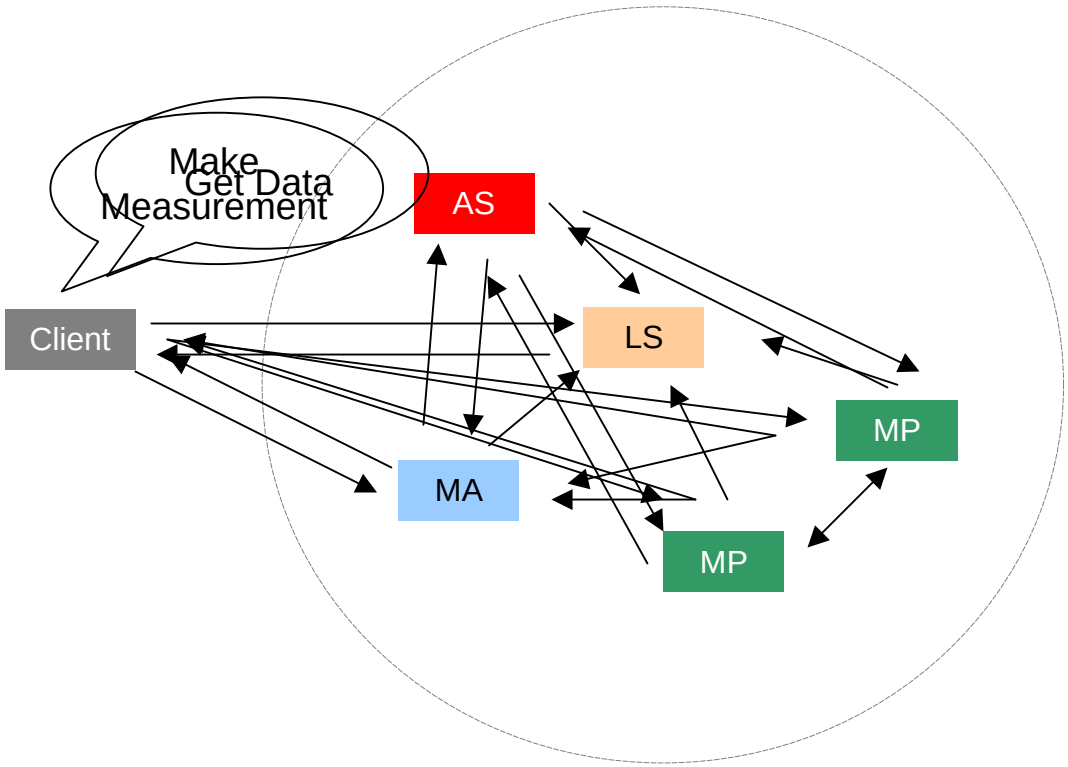
Measurement Tools	=	Measurement Point Service
Data Storage	=	Measurement Archive Service
Security and Policy	=	Authentication Service

- But how do we locate all these services and their capabilities?
  - Lookup Service
- How do we protect resources?
  - Resource Protection Service
- Topology information is required for all services and users
  - Topology Service

perfSONAR Architecture 4

- Common rules for all services
  - Advertise capabilities and existence to a Lookup Service
  - Each Service has local policies for Authorization and Resource protection
    - Delegating decisions to Authentication Service and Resource Protector Service respectively is also supported
- Usage of services in a multi-domain scenario
  - Multiple Lookup Services (ideally one per domain)
    - Lookup Services peer with one another
  - One Authentication Service per realm/domain
    - (example: GÉANT Authentication Service)

perfSONAR Architecture 5



MP — Measurement Point Service

LS — Lookup Service

MA — Measurement Archive Service

AS — Authentication Service

* This slide has animations

perfSONAR - Current Status

- Measurement Archive for Round Robin Database (RRD) available
  - Deployments by GÉANT, Internet2 and ESnet
  - IP Layer Utilization and Capacity data
  - Clients: EGEE, DFN CNM
- Lookup Service - available
  - XML Database
  - Static data content
- Technology used
  - Web Services (SOAP/XML), Java, Axis, RRDTool, eXist database

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perfSONAR - Roadmap

- End of 2005
  - Measurement Point Services for
    - SNMP, DFN IPPM, BWCTL
  - Measurement Archive Service
    - DFN IPPM
  - Visualizations
    - CNM (from DFN), Path based Visualization
  - Refinements to existing services
- 2006 and Beyond - Highlights
  - Authentication Service & Topology Service
  - Passive Monitoring Integration
  - Network Equipment Information and Looking glass
  - NEMO
  - And more!

Using RIPE TTM boxes

We want to **access most recent measurements** made by the TTM Boxes

- RIPE TTM Box provides two options
  - Telnet to the machine and listen on a port
  - Copy files using SSH

- Telnet :
  - Need to keep one session per TTM box open at all times
  - session time-out issues encountered
    - Measurements are missed
- SSH (SCP)
  - Files are big and copy times are too long for regular copies
  - TTM WG has indicated administrative difficulties

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RIPE TTM – Request for Enhancements

- Requests supported by many NRENs who have TTM Boxes
  - GÉANT, SWITCH, HEAnet, NORDUnet, GRNET, CESNET, CERN, HUNGARNET, DFN
- Priority 1
  - Data Access
    - Efficient
    - Most recent measurements
    - Raw data
- Priority 2
  - On-Demand measurements using OWAMP Protocol implementation
    - OWAMP Control and Test protocols on RIPE TTMs

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Integrating RIPE TTM with perfSONAR – some thoughts

- Measurement Archive Service on TTM boxes
  - Measurement Data retrieval
  - Use existing files as repository
- Measurement Point Service on TTM boxes
  - One per box or one for all boxes
  - Supports on-demand measurements
  - Resource management at the box level and also at a central location
- Measurement Archive Service for RIPE TTM central database

Conclusions

- RIPE TTM measurements are very useful and access to raw data access will be very beneficial
  - Can increase the usage of One Way Delay data in Network Analysis
  - Projects like EGEE can have access to a greater variety of data
- Interoperability can make OWD measurements ubiquitous
  - more data = more usage of data
- Integration with perfSONAR can be beneficial to all parties

References

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  - http://www.geant2.net/
- GÉANT2 JRA1 on web
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- perfSONAR – Ongoing work
  - http://monstera.man.poznan.pl/wiki/index.php/Main_Page