



# Monitoring CHEPREO Networks and NSF STI REU program

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# CHEPREO Network Monitoring

- Motivation
  - Understand operational characteristics of CHEPREO-related network activities.
  - Improve the decision making as to how to plan and build up the underlying networking and computational capabilities.
- Challenges
  - A complex system involving computer clusters, routers, switches, optical fibers.
  - How to process and analyze the collected data.



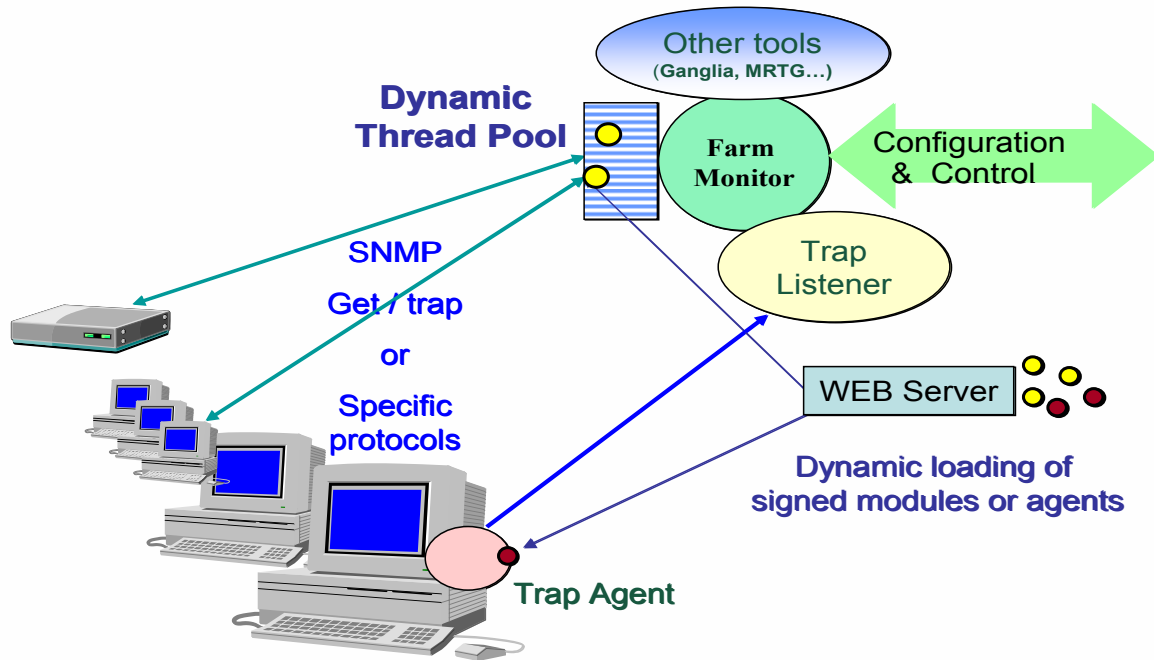
# MonALISA monitoring framework

- ***MON***itoring ***A***gents using a ***L***arge ***I***ntegrated ***S***ervices ***A***rchitecture.
- A distributed monitoring service system based on JAVA/JINI and WSDL/SOAP.
- Dynamically configurable service systems.
- Services can be discovered and used by client and other services.
- Currently interfacing with Ganglia, SNMP etc.





# A schematic view of MonALISA data collection mechanism



- Each monitoring module, either built-in or dynamically loaded, is run on a separate thread.
- Collected data is injected into the service core, where it is stored into a database and forwarded to the registered clients.



# Augmenting MonALISA

- Currently having SNMP-based monitoring information, e.g., traffic volume in/out of a router interface. Coarse-grained aggregate information.
- Flexible design allows for smooth modular augmentation.
- Need to access finer-grained network information
  - Per-flow traffic volume.
  - Application-specific throughput.
  - Traffic trace collection and analysis.
- **Goal:** A comprehensive multi-view network monitoring framework with on-demand traffic analysis capability.





# CHEPREO and Cisco NetFlow/flowtools

- Cisco NetFlow mechanism exports IP flow information to network administrator.
- Data can be used for network planning, traffic accounting and billing, data warehousing and data mining.
- Integrating NetFlow in CHEPREO can help us understanding CHEPREO-related network activity and their relationship with other traffic sharing network resource.
- Flowtools is an open source software to collect and analyze NetFlow data.
- Develop the interface between flowtools and MonALISA.





# CHERREO and NLANR PMA

- NLANR Passive Measurement and Analysis (PMA)
  - Traffic trace collection at OC-48 AMPATH link.
  - Various trace analysis tools can be applied to collected trace data.
  - Understand traffic properties such as packet loss rate, packet reordering probability etc.
- MonALISA as a controlling entity to invoke PMA on the fly, and serve to visualize analysis results.





# NSF STI REU program

- Build on successful summer 2003 REU project on AMPATH traffic analysis.
- Two FIU undergraduates.
- Technical assistance from Caltech MonALISA development team.
- Currently on track for building interfaces and collecting traffic data.
- Expect to result in CHEPREO network traffic reports and reusable software modules for GRID and networking community.







# STI REU 04 Current Status

- Four weeks.
- We have installed MonALISA services software and Enabled NetFlow.
- Coordinate with MonALISA team to define the development steps with help from Iosif Legrand.
- We are adapting ApMon to our purpose to provide interface between flowtools and MonALISA.
- We have started collecting new and using existing NetFlow data from AMPATH's GSR 12012 router, and running analysis using flowtools to obtain significant statistics information.
- We worked on hardware issues with NLANR PMA box at NAP. We are in contact with Jim Hale of UCSD to troubleshooting the problem and will soon be able to collect CHEPREO-related traces and apply analysis scripts on these traces.

