perfSONAR on the Cisco AXP
Cisco AXP

• Embedded Linux system for the Cisco integrated services router
  – Direct connection to the Cisco router via an internal 1Gbps Ethernet connection
  – Includes an SDK for interacting directly with the router

• System Specs*
  – 1.4GHz Pentium M processor
  – 2G of RAM

* For our AXP version donated by Cisco
Cisco AXP - Benefits

• Server consolidation
  – Power/Space/Cooling savings
  – Maintenance ease
  – Share AXP across multiple applications

• Direct access to the Cisco IOS instance
  – Packet Monitoring APIs
  – IOS Configuration/Information APIs
  – Event APIs
AXP Development

• AXP Software Environment
  – Each software package is given its own pseudo-virtual machine
    • Single kernel, but separate “jailed” instances of Linux for each package
  – The machines are running a version of Linux compatible with RHEL4
  – Libraries are available for interfacing with the IOS instance on the router
  – Tools are available for building packages for the AXP
    • Including a tool for converting RPMs
The perfSONAR-PS tools are written in Perl

- There is a Perl bundle available for the AXP which includes most standard modules
- perfSONAR-PS makes use of a number of non-standard modules which may not be included in the Perl bundle
- Used the Perl Archive Toolkit to build versions of the tools that include all the libraries that they use
  - This isn’t usually an option for package distribution, but the standardized software base for the AXP allows the creation of Perl packages that are guaranteed to work on the host.
Counters Measurement Archive

- Counters Measurement Archive
  - Collects statistics about each interface, and stores them in RRD files
  - Provides functionality similar to a combination of Cacti/Cricket/MRTG with the perfSONAR SNMP MA
  - Advertises the data contained using the perfSONAR lookup infrastructure
  - Clients can retrieve both current and historical statistics
    - Currently, saves a day’s worth of statistics, but based on the amount of storage space available, can increase the amount of data stored
Existing perfSONAR GUIs can display the measurement data
Router Measurement Point

- Router Measurement Point
  - Allows clients to run a limited subset of commands on the router
    - E.g. “show environment”, “show interfaces”, etc.
  - Provides functionality of the perfSONAR SSH Telnet MP
  - Registers available commands into the perfSONAR lookup service infrastructure, so clients can locate the Measurement Point, and find out which commands are available.
  - Can be configured to limit the available commands
Using existing perfSONAR GUIs to retrieve the list of commands
Router Measurement Point

Using existing perfSONAR GUIs to run the command
Future Work

- perfSONAR-PS tools
  - Enable access to more data collected from the router
  - Ease configuration
- BWCTL/OWAMP
  - Produce bwctl and owamp packages
  - See what opportunities the tighter integration with the router affords for the active tools
- Raw Traffic Monitoring
  - The router can be configured to mirror all traffic to the AXP allowing applications to directly monitor the traffic flowing over the router.
perfSONAR on the Cisco AXP
2010-04-26, Performance Working Group
Aaron Brown

For more information, visit www.internet2.edu