NTP ARCHITECTURE and IMPLEMENTATION

Nalini Elkins  -  Inside Products
Michael Ackermann  -  BCBS of Michigan
WHY TIME SYNCH?

- Increasingly important for various network management functions
- Performance
- Diagnostics
- Security
- Metrics
- Reporting

- PDM
We propose:

**Requirement**
- In basic IPv6 transport
- Unmolested by middle systems

**Solution (IPv6)**
- Implementation of existing extension header: Destination Options Header (DOH)
- Performance and Diagnostic Metrics (PDM) DOH
  - PDM 1: Requires time synchronization
  - PDM 2: No time synchronization
- IPR declared
Response Time Measurement

Step 1

- Packet 1 sent from source host A
- Time-stamped leaving Host A
- Timestamp is in PDM extension header
Response Time Measurement
Step 2

- Packet 2 sent from Host B (response to Packet 1)
- Time-stamped leaving Host B
- Processing Time = Packet 2 sent (B) - Packet 1 rec’d (B)
When Did it Get to Host A?

- When did Packet 2 arrive at Host A?
- Return route may not be the same, may be congestion, packet might never arrive.
WHAT BCBS DID

- GOAL: Synchronize time across devices attached to BCBS Nationwide Network
- Developed NTP Recommendation.
- Determine precise timing requirements
- Recommend architecture
- Produce installation parameters, examples, documentation.
- Perform Pilot testing.
- Utilize all above to create “Cookbook”
PROPOSED ARCHITECTURE

- Intended to achieve all specifications of NTP Recommendation.
- Single ended Arrows represent client/Server Connections
- Double ended Arrows represent Symmetric Peers.
- DNS should be used at all levels.
  - Round Robin to achieve load balancing and redundancy.
- Redundancy should be required at all levels
  - Except perhaps workstations.

- IBM Mainframes.
  - NTP implementation is Server only.
PROPOSED BACKBONE NTP ARCHITECTURE

November 5, 2013
PROPOSED EDGE NTP ARCHITECTURE

Stratum 1 Internet Time Sources
nist1.datum.com clock.isc.org nist1-ny glassey.com ntp-cup.external.hp.com time.nist.gov tock.cerias.purdue.edu

BluesNet Stratum-1?

November 5, 2013
QUESTIONS.....

Thanks for your attention!

February 7, 2005