DEVELOPMENT OF perfSONAR-MEASUREMENT Archive (MA) capability based on PRESTA 10G

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TARGET

- perfSONAR as a sharing infrastructure of our **precise** and **high-resolution** measurement data taken from PRESTA 10G.
- Currently, **PRESTA 10G** provides following measurement capability.
  I. **One-way delay**: micro-second accuracy.
  - Using probe packets or application’s packets.
  II. **Jitter**: micro-second accuracy.
  III. **Inter-packet gap**: 100-nano-second resolution.
  IV. **Available bandwidth estimation**: by using packet train generation well-controlled by a hardware-assisted function.
  V. **Flow records**: using NetFlow/PSAMP protocols
  VI. **Traffic bit-rate**: 100-micro second resolution.

.... etc.
FIRST STEP: IMPLEMENTATION OF MA

- perfSONAR-MA on PRESTA 10G to show every-micro-second traffic bit-rate.

  cf.) Existing perfSONAR-SNMP MA, ABW based on RRD archives provides every-second/minute bit-rate

We need higher-resolution (up-to micro-second) measurement extensions to existing perfSONAR.
To take advantage of PRESTA 10G, we need to modify perfSONAR-PS to support
1. high-resolution timestamps (100-nanosecond resolution.)
2. Accelerating to calculate a large amount of data from 10-Gbps high-speed networks.

- HRA (High resolution archive) file formats
  - Meta-data to accelerate the calculation of bit-rate.
  - Fixed-length index.

- Timestamps formats
  - sub-second expression: ISO-8601, UNIX timestamps.

- Resolution definition in XML messages.
  - Unit of millisecond (“m”) and microsecond (“u”)

- Compatibility with SNMP MA
  - RRDtools and backend HRA processor.
  - The requests switches based on the resolution.
OVERVIEWS

- High-resolution archive (HRA) patches
  - A daemon captures and stores in the HRA formats by using PRESTA 10G.
  - A processor reads the stored data and calculate traffic bit-rate in requested resolution.
  - perfSONAR requests are switches based on the resolution.

What we made.

Existing codes.

PRESTA 10G provides:
- 10-Gbps wire-rate capturing.
- Accurate and high-resolution timestamps.
Virtual Machine (CentOS 5.4 x86_64)

HRA-enabled perfSONAR MA

local IF (lo)

HRA archives (captured with PRESTA 10G)

Apache TCPmon (*)

Host-only virtual network

HRA viewer

(*) http://ws.apache.org/commons/tcpmon/
CONCLUSION

- We showed our motivation and implementation of perfSONAR measurement archive (MA) capability of PRESTA 10G.
- Our perfSONAR-PS HRAMA takes advantage of our PRESTA 10G's high-resolution accurate timestamps and 10-Gbps wire-rate traffic capturing capability.
- We need comments on
  - Any pointers to high-resolution perfSONAR (ABW)?
  - GUI? (Should I merge to other UI?)
  - Next steps (perfSONAR-PS BUOY?), we are planning to share the results of hardware-assisted available bandwidth estimation.

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Intentionally blank
in SetupDataRequest.

sub-second timestamp expression.

microsecond unit ("u")
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- Accurate and high-resolution timestamps.