Next generation network management
23.04.07
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End to end QoS measurements

- Goal: Knowing the QoS by measurements
- Traditional SNMP/netflow measure volumes not quality
- Both customer oriented and engineering statistics
- User deserve end-to-end inter domain view
- Passive probes see the flows quality
Geant2 - NRNs

- 40 Gbps European backbone
  - Services: circuits, performance team (PERT)
- Development projects - 3/4 years
  - perfSonar - e2e traffic measurement protocols
  - security – attack detection – tools
  - Edugain – authentication
  - Autobahn – User controlled lightpath
perfSonar

- Service Oriented Network monitoring Architecture – with Internet2
- Inter domain authentication
- XML/SOAP interfaces
- Lookup Service, Measurement Points, Measurement Archives, Topology Service
- European-wide measurement system infrastructure
- Edugain authentication architecture
LOBSTER

- 2 year Specific Support Action project supported by the EU project - October 2004-2007.
- Main goal: deploy a passive measurement infrastructure based on SCAMPI throughout Europe.
- SCAMPI – Tools and API(MAPI) for passive measurements (preceeding project)
- Partners:

  FORTH
  Vrije University
  TNO Telecom

  CESNET
  UNINETT
  FORTHNET
  TERENA

  ALCATEL
  ENDACE
  Symantec
Software developed

- Common programming environment
  - Distributed Monitoring Application Programming Interface (DiMAPI)
- Sharing - Anonymization
- Applications
  - Extended flow analysis – Stager
  - Subsecond bandwidth measurement (SSB)
  - Service detection - appmon
  - Polymorphic attack detector
Flow characterization

- MAPI with passive monitoring cards
  - Investigate flows in subsecond intervals
- Extended IPFIX flow records with statistics for intensity, intervals, sizes
  - Will allow us to assess quality by service and location (AS or IP prefix).
  - Research actual quality of services
Framework

- Flow collector based on NERD
- Stager backend
- Passive monitoring card
- MAPI

Stager user interface

http://www.ist-lobster.org
Destination IP report

![Destination IP report screen](image)

**Destination IP**

**Monday 18. September 2006, 15:00**

**??? (in, 1/1)**

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Stager, 2004-2006 © UNINETT AS

Processing the report took 1311.8ms
SSB
(Sub-Second Bandwidth)
Measurement beacons

- Målepåle – Measurement Beacons in UNINETT at customers
- Passive measurement on access with GPS time
- Measurements:
  - Internet 2 NDT/Surfnet detective
  - Multicast beacon, mping, ssmping
  - Attack analysis (Lobster)
  - Q2S research – NTNU – university of Trondheim.
Scaling MAPI

- MAPI works on 2.5Gbps
- 10Gbps demands
  - parallellism - splitting captured data on more cpus for processing
  - offloading processing to hardware
  - flow generation is too complex for hardware?
Future

• Continue to cooperate with research
• Work on international arena to facilitate true end to end statistics
  • Traffic research – Q2S
  • End-to-end - perfSonar – Geant2 /Internet2
• More and better Measurement Beacons
• Scampi-tools
  • Attack detection
  • Flows – Stager
  • MAPI for 10Gbps
• Open software
References

- Our research: http://www.uninett.no/nettforskning/index.en.html
- Our software: http://software.uninett.no
- Statistics: http://drift.uninett.no
- Q2s: http://www.q2s.ntnu.no
- Geant2: http://www.geant2.net
- Lobster: http://www.ist-lobster.org