Realtime Application QOS Monitoring (RAQMON)

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RAQMON Context Setting

Applications
- RTP / FTP / HTTP
- TCP / UDP
- MAC IEEE 802.3
- PHYSICAL

IP End Points
- Router
  - IP
  - MAC 802.3
  - PHYSICAL

Signaling control plane (e.g. RSVP, NSIS)

Streaming Media, Transaction, Bulk data transfer etc

Various packet level priority (TOS, DiffServ etc.)

Domain 1

Domain 2

Domain N

IP Network

Domain N+1

Multiple Equipment vendors, Multiple geographic locations, Multiple xSPs
Control multiple Administrative and Provisioning domain
Functional RAQMON Architecture

2. Transport Network Condition Specific Metrics → Jitter
3. Network Policy Specific → RSVP Failed, Diffsrv = EF
4. Communication Session Related QoS → Session Setup Delay/Duration
5. Device State Specific Metrics → CPU Usage

Variable Metrics list Updated using RAQMON PDU

Transport Protocol Agnostic

Network Alarm Manager

Management Application
RAQMON Framework Definition

Scope of the Framework

- RAQMON PDU is Out of Communication Data Forwarding Path

Communication Data Forwarding Path

1. Communication Data Forwarding Path (e.g. RTP, RTCP, HTTP, FTP, TLS, SIP, H.323)

2. RDS/RRC RAQMON PDU Path
RAQMON Architecture Overview

• A set of RAQMON Application level PDUs to have “common formats” for reporting statistics
  – Between a RAQMON Data Source (RDS) and a RAQMON Report Collector (RRC)
  – Session specific metrics
  – Device status

• RAQMON PDUs will be transported over existing protocols
  – TCP
  – SNMP Notifications

• RDS and RRC as Peer-to-Peer entities
  – RDS reports what “IT” feels to be appropriate for the “application context”
  – RRC consumes what “IT” feels to be appropriate for the “application context”

• RDS ↔ RRC communication is stateless
  – No setup transaction to tell the collector which metrics the data source will be sending later on.
  – RTCP BYE and TIME OUTS are used to terminate reporting between RDS and RRC
Parameters “pushed” by the RDS to RRC

- Data Source Address (DA)
- Receiver Address (RA)
- Data Source Name (DN)
- Receiver Name (RN)
- Data Source Device Port used
- Receiver Device Port used
- Session Setup Date/Time
- Session Setup Delay
- Session duration
- Session Setup Status
- Round Trip End-to-End Net. Delay
- One-way End-to-End Net. Delay
- Inter Arrival Jitter
- IP Packet Delay Variation
- Total number of App. Packets Received
- Total number of App. Packets Sent
- Total number of App. Octets Received
- Total number of App. Octets Sent
- Cumulative App. Packet Loss
- Packet Loss in Fraction (in %)
- Cumulative App. Discards
- Packet Discards in Fraction (in %)
- Source Payload Type
- Receiver Payload Type
- Source Layer 2 Priority
- Source Layer 3 Priority
- Destination Layer 2 Priority
- Destination Layer 3 Priority
- CPU utilization in Fraction (in %)
- Memory utilization in Fraction (in %)
- Application Name/version
RAQMON PDU Overview

Static parameters – static notifications
- once per session, and
- when sub-sessions start or end
Dynamic parameters – dynamic notifications
RAQMON Extensibility

• RAQMON PDUs is extensible for future

a. SMI Enterprise Code (16 bit)
   – 0 Reserved for RMON WG
   – Vendor IDs are allowed for extension
     » http://www.iana.org/assignments/enterprise-numbers

b. Report Type (8 bit)
   – Allows Additional Parameters/Profiles to be added
   – WG can add new Report Type for SMI Enterprise ID = 0
   – Other Standards Development Organizations or Vendors can add Any Report Type for Vendor Specific SMI Enterprise ID
RAQMON MIB

raqmonMIB

raqmonSession
raqmonException
raqmonConfig

raqmonParticipant Table
raqmonQoSTable
raqmonParticipant AddressTable
RAQMON at a Glance

• Part of the RMON family of protocols
• Application view
  – Support for multiple concurrent applications
• Not related to a specific application transport
• Scalable
• Extensible
• Endpoint oriented
  – Works well with encrypted payload and signaling
Internet-Drafts

• Framework

• RAQMON PDU

• RAQMON MIB