RPR MAC objectives based on carrier requirements

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Constantinos Bassias (cbassias@lanterncom.com)
Kanaiya Vasani (kanaiya@lanterncom.com)
Brian Holden (brian_holden@pmc-sierra.com)

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Agenda

- Services
- Ring parameters
- Payload handling
- Quality of Service
- Performance
- Management

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Optimization for Ethernet Services

- Optimized for the delivery of Ethernet services
  - ✓ SBC: “Ethernet-like RPR transport protocols are being developed with the promise of supporting better optimization for packet services”
  - ✓ Global Crossing (GC): “Optimize delivery of Metro Ethernet Services”
  - ✓ Bell Canada (BC): “Ability to provide Gigabit Ethernet in the access”
- Point to point (multipoint) services
  - ✓ GC, BC
- Support for multicast
  - ✓ Excite@home (@ Home): “Desired RPR features – Multicast”
  - ✓ GC: “Service Objectives – Multicast and Broadcast”

Support for Circuit Emulation

- Offers the ability to carry TDM traffic
  - SBC: “Develop RPR objectives … while not precluding TDM circuit transport emulation”
  - Evolution: “T1, T3, OC-3 circuit emulation …”

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Ring Parameters

- Ring Circumference
  - ➢MAN < 200 km
    - ✓BellSouth: “Access rings: 30 miles; inter-office rings: 30 miles”
    - ✓GC: “Support for 150+ km rings”
  - ➢RAN < 1000 km
    - ✓@ Home : “Up to 1000 km ring circumference”

Customer Traffic Separation/Segregation

- Logical separation and identification of each customer's traffic as it flows through the network.
  - MCI Worldcom (MCI): "RPR must encapsulate data to ensure security; Private Line and Virtual Private Line require a search warrant before you can look at the data."
  - GC: "Traffic and service separation – service flows are logically isolated from one another"
  - BC: "Security/Customer Separation"

Payload Preservation

- Customer frames are not modified as they traverse the ring
  - GC: “Transparent LAN service; Maintain customer’s VLAN”

Quality of Service

- Ability to provide SLAs to customers with delay, jitter, availability, and packet loss guarantees
  - Support for a set of service categories
    - ✓ Bell South (Bell) : “RPR should support –Multiple QoS types”
    - ✓ GC: “ 3 Service Categories”
    - ✓ BC: UBR/VBR
  - QoS per subscriber
    - ✓ GC: “Guaranteed service contracts per customer” (delay and jitter < 10ms)
  - Fair allocation of available BW (Weighted or not)
    - ✓ GC: “Bandwidth sharing through weighted fair allocation across burstable services”
    - ✓ Sprint : “Like the fact that there is a fairness algorithm on the ring ”

Efficiency

- Keep ring utilization as high as possible
  - SBC: “Ethernet-like RPR transport protocols are being developed with the promise of supporting shared media access for efficient bandwidth utilization …”
  - Bell South: “Q: Is the link utilization efficiency important? A: Likely.”
  - GC: “Deploy MAN Infrastructure that maximizes fiber utilization; > 90% bandwidth efficiency”

Availability

- SONET-like Protection
  - SBC: “Ethernet-like RPR transport protocols are being developed with the promise of supporting robust protection mechanisms equivalent to SONET…”
  - @ Home: “Path protection with “fast” recovery (sub second)”
  - GC: “50 msec protection performance”

Availability

- Variable Protection
  - ➢Configurable per customer
  - ➢Protection bandwidth equals a percentage of the working bandwidth
    - ✓Bell South: “RPR should support packet level protection options – (e.g. protected, partially protected, unprotected etc.)”
    - ✓Global Crossing: “Configurable service protection per customer; percentage based”

Packet loss

- No packet loss on the ring during normal operation
  - MCI: “Therefore we need networks that are essentially loss-less to have more value add services”
  - BC: “Loss-less once traffic gets on the ring (unless there is a fiber cut)

Performance Monitoring (FCAPS)

- GC: “Frame level (L2) statistics; Ring Segment statistics; SNMP and standardized MIB”
- Bell South: “RPR must provide SONET like OAM&P diagnostics and OS”
- @home: “SNMP Management”
- BC: “Statistics on a per customer (VPN) granularity required for troubleshooting and reporting perspective”

Summary: RPR MAC Objectives

- Optimization for Ethernet Services
- Support for Circuit Emulation
- Ring size (MAN < 200 km, RAN < 1000 km)
- Payload preservation
- No packet loss on the ring under normal operating conditions

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Summary: RPR MAC Objectives

- Customer traffic separation
- Quality of Service (Service categories, Customer SLAs)
- Efficiency (Maximize link utilization)
- Availability (sub 50 msec. restoration, Configurable protection)
- FCAPS (Performance monitoring – Statistics, SLAs)

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References

- MCI Worldcom: March 2001 meeting minutes
- Global Crossing: March 2001 meeting minutes; March 2001 presentation pages 3, 4, 5, 6, 7, 8, 9; May 2001 presentation page 7
- Bell South: March 2001 meeting minutes; March 2001 presentation page 4, 5
- SBC: March 2001 presentation pages 2, 7
- Sprint: March 2001 meeting minutes
- Excite@home: March 2001 presentation pages 4, 13
- Bell Canada: May 2001 presentation page 4, 12