RPR BW Management

Harry Peng hpeng@nortelnetworks.com

RPR Attributes

- Shard Medium
- Contention domain
- Source packet is temporal and spatial unaware of contention
- Parking lot problem
- Downstream disadvantage
- Not a token scheme

Need Dynamic BW management

RPR BW management

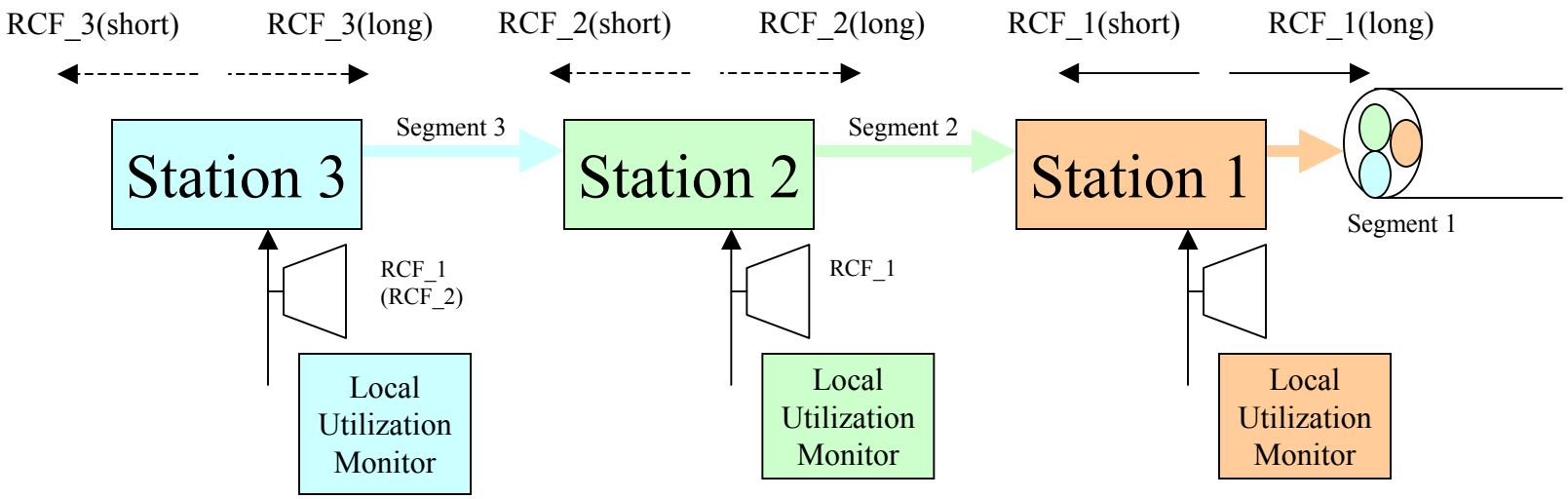
- Congestion avoidance
- Active BW management
  - Fair access as traffic pattern changes
- Dynamic
  - Reallocate resource, high through put as traffic profile changes
- Limit HoL blocking
  - Support for VoQ to maximize throughput on all links
- Support for N+1 format
- Support for weight fairness

BW Management protocol

- Monitor output link BW usage
  = (Transit + transmit)
  - Monitor number of active sources
- Calculate advertised rate: Rate Control Factor (RCF)
- Advertise RCF to upstream stations using Rate Control Messages (RCM)
- Upstream station polices based on received RCF

Active dynamic BW manager reallocate resources

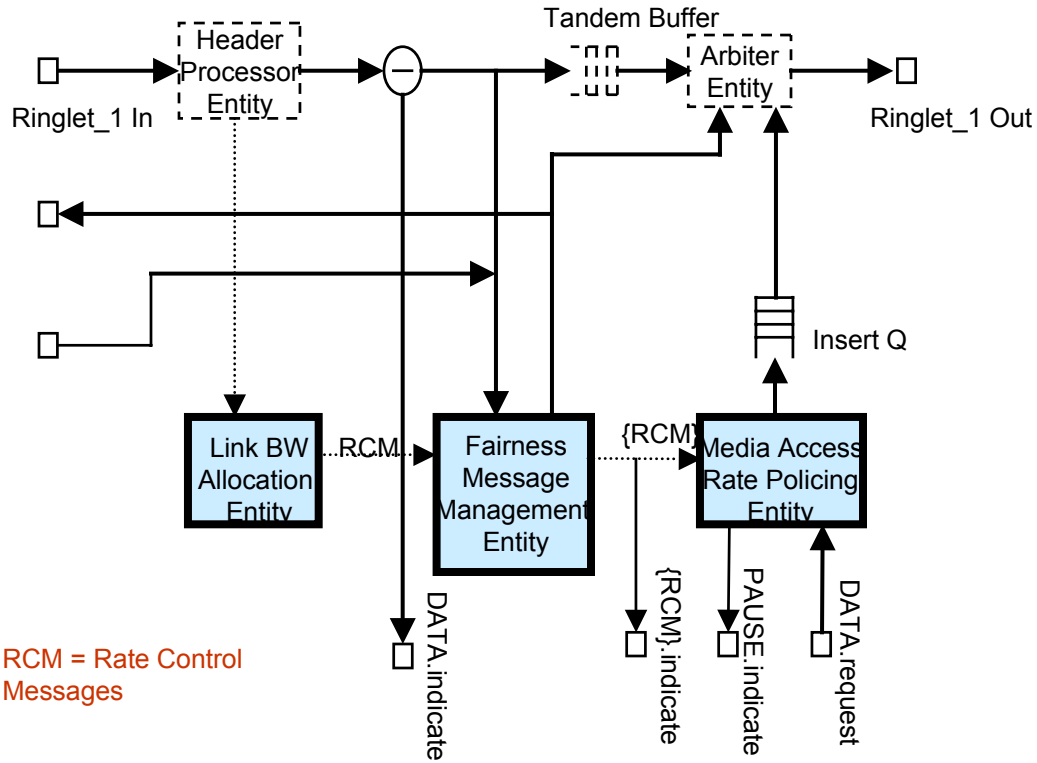
Basic Concept



- RCF indicates BW each station is allowed to send through its segment

Ingress Policer

MAC entities Blocks



- Link BW Allocation
  - Monitors active sources and its usage
- Fairness Message Management
  - Processes RCF
    - Receive and validate message
    - Calculates local RCF
  - Generates advertised RCF
    - Periodic transmit RCF
- Media Access Rate Policing
  - Applies to RCF
  - Generates PAUSE.indicate when over transmit

Rate Control Message Format

RPR Header	
Length	2 bytes
Station ID	6 bytes
Sequence Number	4 bytes
control	4 bytes
RCF Ring 1	4 bytes
RCF Ring 2	4 bytes
RCF ….	
RCF Ring N	4 bytes
CRC-32	4 bytes

- Length: length of RCM packe
- Station ID: packet source station address
- Sequence no: message synchronization
- Local aging timer
- Control: specific control bits
  -version etc.
- RCF: rate control factors. One for each ringlet
- CRC-32: error detection for RCM

Conclusions

- Complete functional BW management protocol that is simple and flexible and logical
  - Interworks with higher layer protocols
  - No inherent problems (HoL, performance)
- Large number of simulation data
  - Simulation Model available