Performance Adhoc Group
IEEE 802.17
Summary of Progress

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IEEE 802.17
Plenary Meeting

March 2001

Formation of the Perf Adhoc Group

Formed in Jan 2001 as a separate Adhoc committee within 802.17 WG to look into performance issues

Perf Adhoc Objectives

Objectives:

- **Set parameters, metrics, scenarios to help provide a consistent way of comparing architectural ideas**
- **Analyze simulations results presented in the 802.17 WG meetings**
- **Not chartered to run simulations for the working group**

Perf Adhoc Objectives ...

- **Agree on common/consistent perf simulation scenarios and metrics:**
  - **Traffic Models**
  - **Performance Metrics**
  - **Test Scenarios**
  - **Presentation format/style**
  - **Other?**

Perf Adhoc Objectives ...

- **These would be used to:**
  - **Compare the performance characteristics of various proposals**
  - **Compare performance characteristics of RPR solutions vs. competing technologies**

Mailing List

- **Currently using the 802.17 reflector**
  - **Put ‘RPR Perf:’ in subject field**
- **May decide to have a separate mailing list for perf discussions in the future (?)**

Participation in Perf Adhoc Group

- **Anyone welcome to participate**
- **People who can contribute to the perf analysis and perf modeling efforts**
- **People just interested in these topics**
- **People concerned about performance related issues and comparison process**
- **And then … anyone is welcome!**

Goals for this week

- **Address unresolved and open issues to facilitate running simulations adhering to the methodology developed by the perf adhoc committee**
- **Finalize plans for Phase I of simulations and have participants start simulations**

Progress and Status Report

- **Presentations and discussions held Monday morning, Monday evening and Wed evening**
- **Closed on many of the general performance metrics and scenarios**
- **Arrived to agreement on details of initial simulation scenarios (Phase I)**

Decisions made on Monday

- **Document describing methodology and framework (David James + volunteers)**
- **Phase I of simulations**
  - **Starts now**
  - **Results in May and July**
  - **No CoS**
  - **No TCP**

Decisions made on Monday ...

- **Phase II of simulations**
  - **Start discussions of Phase II details in May 2001**
  - **Start simulations in July 2001**
  - **Results in Sept and Nov**
  - **Add CoS**
  - **Add TCP**

Resolved Issues

- **Use of different modeling tools**
  - **Not considered to be a big problem**
  - **May even be an advantage (?)**

Resolved Issues

- **Define the RPR MAC/PHY interface model**
- **Architectural/behavioral abstractions needed for each RPR proposal**
- **Understand the effect of various architectural aspects instead of various vendor implementations**
- **Develop a reference model - Harry Peng**

Resolved Issues for Phase I

- **Ring overload: continuous supply of packets**
  - **Hubbing:**
    - **All nodes send and receive to/from a common node on the ring**
  - **Random:**
    - **Source/dest pairs: uniformly distributed**
- **No need to run the ring underloaded (?)**

Open Issues

- **Availability of models from various vendors**
- **ETE delay: From where to where?**

Suggestions Made

- **Comparison of RPR with SONET**
- **Should we model/check the ordering of packets?**
  - **In normal mode**
  - **In protection mode**
- **Ingress/Egress buffer size: 100 ms**
  - **Should we make it 2*RTT?**

Phase I Simulation Scenarios

- **No upper layer protocol**
- **No staggering of inputs**
- **Test Basic Ring Parameters:**
  - **Ring Performance**
  - **Congestion Control**
  - **Fairness**

Ring Performance

- **Metrics:**
  - **Link utilization under heavy loads**
    - **Flow control overhead**
  - **Global throughput**

Congestion Control

- **Metrics:**
  - **Throughput in the presence of congestion**
    - **Per class**
    - **Per node**
    - **Per conversation (or flow)**

Fairness

- **Metrics:**
  - **Throughput and end-to-end packet delay and jitter:**
    - **Per class**
    - **Per node**
    - **Per conversation (or flow)**
- **Need scenarios that demonstrate fairness in overload conditions**

Suggested Starting Configuration

- **Dual Ring**
- **16 nodes**
- **Ring running under capacity and well as over capacity (overload)**
- **Ring circumference (100Km, 1000Km)?**
- **Ring rate: 10G**

Suggested Starting Applications

- **Hub application**
  - **50% of the traffic is generated by all nodes and flows to the hub node (let's say node #15)**
  - **50% of the traffic is generated by the hub node and flows to all the other nodes**

Suggested Starting Applications ...

- **Random source/destination pairs**
  - **Would demonstrate spatial reuse effect better than hub application**

Suggested Traffic Characteristics

- **Packet size distributions (probabilistic):**
  - **Trimodal**
    - **(60% 64B, 20% 512B, 20% 1518B)**
  - **Quadmodal (?)**
    - **(50% 64B, 15% 512B, 15% 1518B, 20% 9K)**
- **Committed rate per node**
  - **30% of ring capacity / # nodes**
  - **60% of ring capacity / # nodes**

Suggested Simulation output results

- **Throughput**
- **ETE delay**
- **Jitter (99.9th percentile of delays)**
  - **Should we use CDF's?**
- **For all output results:**
  - **Show curves and numbers**
  - **Per node, per class, per conversation**

Next steps and Discussions