Performance Adhoc Committee
IEEE 802.17

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IEEE 802.17
Plenary Meeting

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Agenda

- **Objectives**
- **Simulation setup and parameters**
- **Results and analysis of various scenarios**
- **Next steps**

These are preliminary incomplete results of work still in progress

Objectives

- **Investigate the performance characteristics of a ring of Ethernet Switches:**

  - **Enable comparing the results with the performance characteristics of 802.17 RPR solutions**

  - **Quantify areas of strength for 802.17 solutions as compared to Ethernet switches**

Objectives …

- **Focus on fairness in:**
  - **Bandwidth utilization including locality fairness**
  - **ETE delay**

Methodology

- **Follow the methodology that the performance adhoc committee is in the process of defining**

- **Eliminate parameters of specific switches whenever possible:**
  - **Infinite buffers**
  - **Huge switching capacity rate**

Simulation setup

- **Node count: Ring of 8 nodes**

- **Ring circumference: 100Km**

- **Ring Rate: 10 Gbps**

- **Packet size: 1250 Bytes**

- **Configurations:**
  - **Hubbing**
  - **Next hop**

Simulation setup ...

- **Low traffic at the beginning to force Spanning Tree Protocol to break the ring at a predictable point**
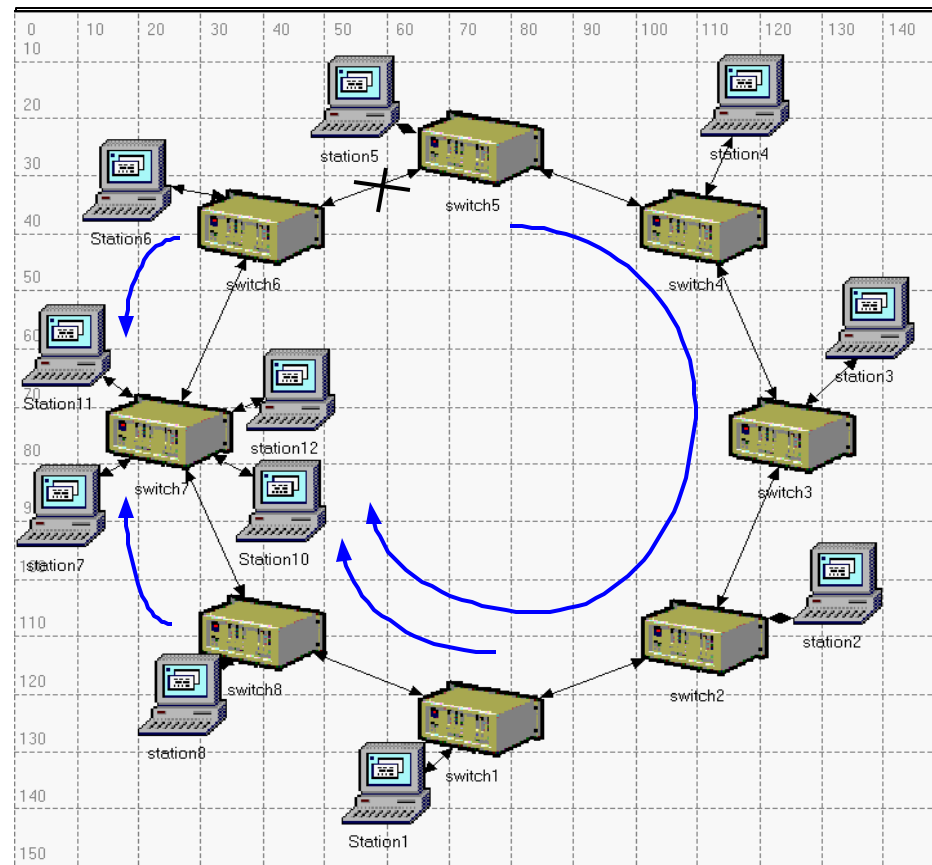
Switch Parameters

- **Generic switch**
  - **10 Gbps ports**
  - **Try to eliminate parameters of specific switches**
- **Store-and-forward**
- **Switch service rate: 10M packets/second**

Metrics

- **Throughput**
  - **In overload conditions**
  - **Per node (for now)**
- **ETE delay**
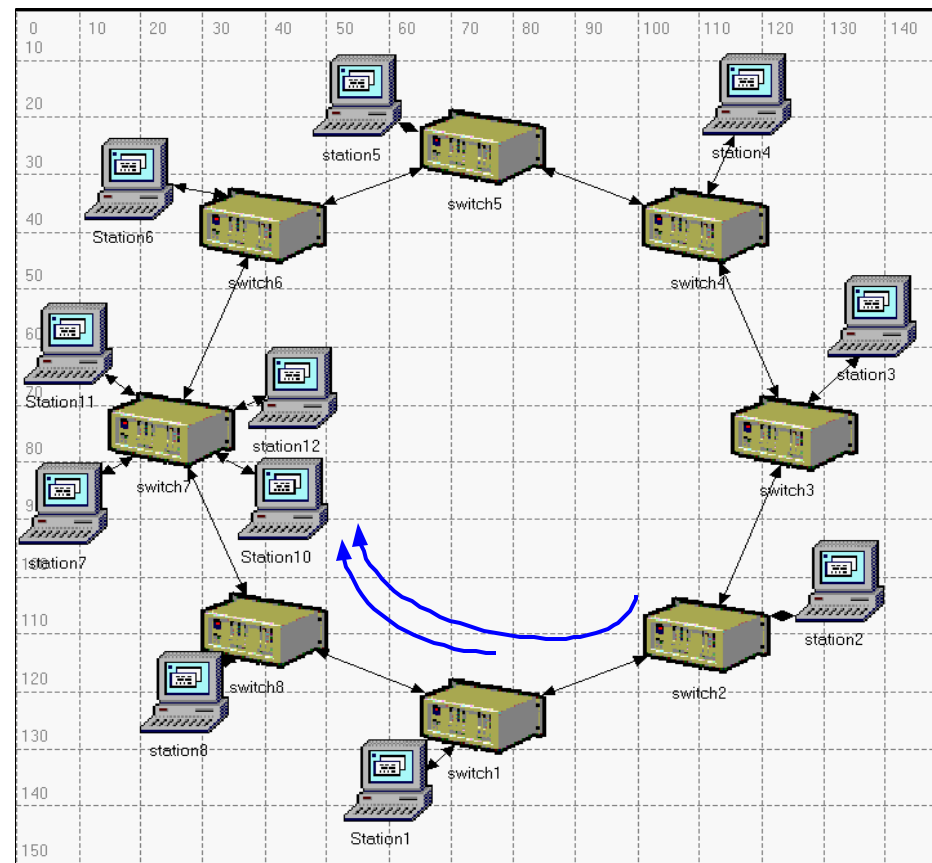
Hubbing Topology Scenario I

Results: Hubbing Topology Scenario I

Hubbing Topology Scenario II

Results: Hubbing Topology Scenario II

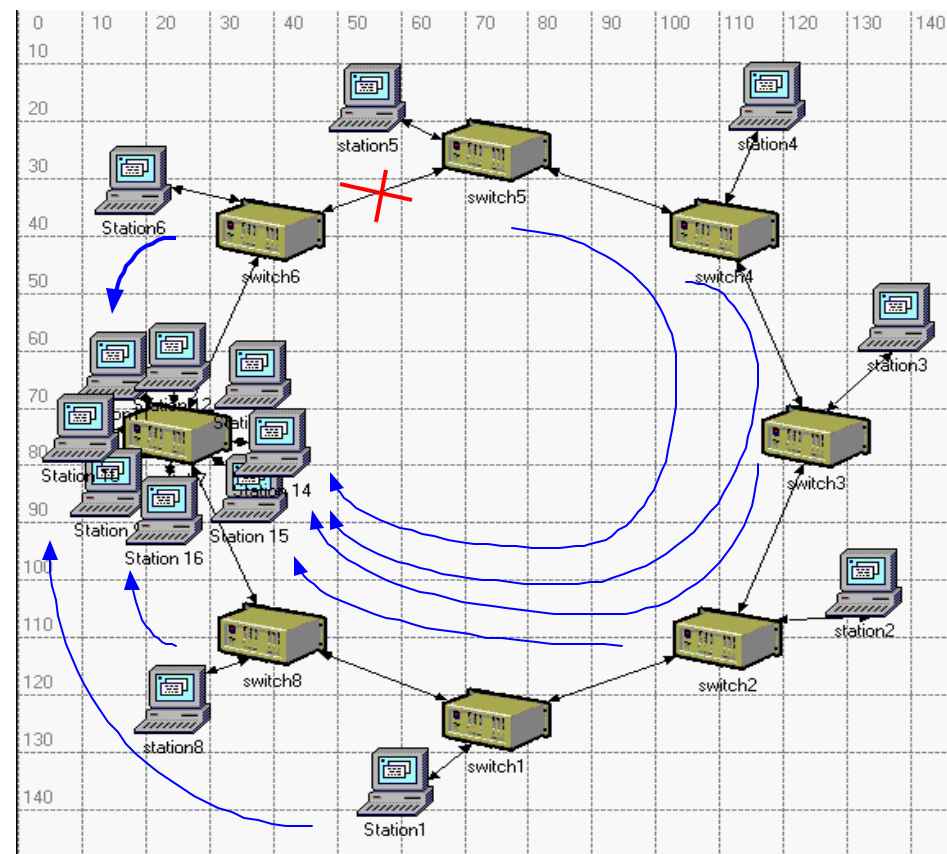# *Hubbing Topology Scenario III*

- Similar to Scenario II except:
  - Station 2 is sending traffic twice what Station 1 is sending.
    - Station 2 is sending 10 Gbps
    - Station 1 is sending 5 Gbps.

Results: Hubbing Topology Scenario III
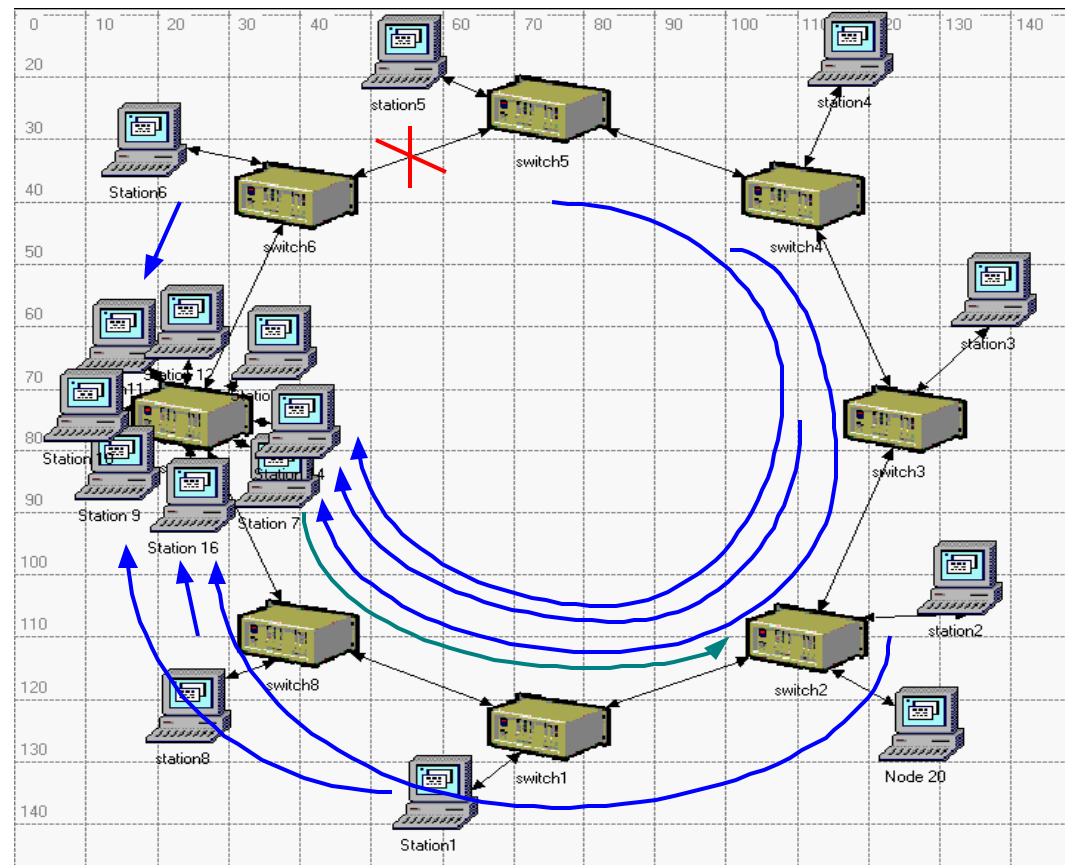
Hubbing Topology Scenario IV

Results: Hubbing Topology Scenario IV

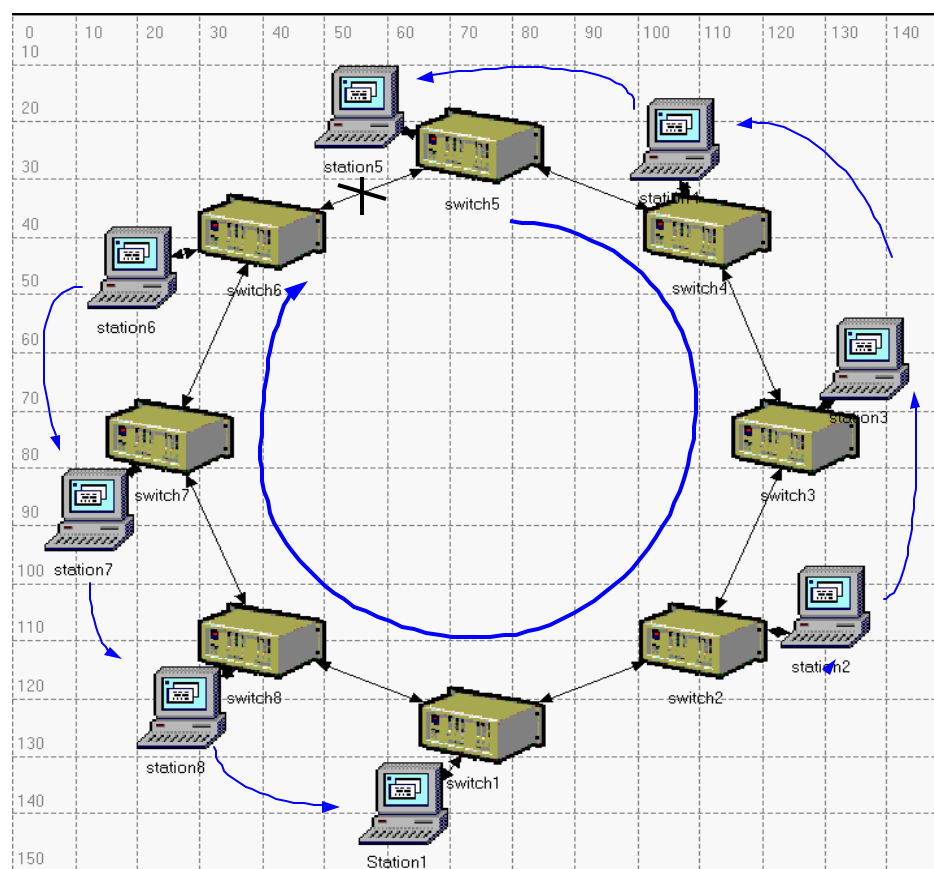# *Hubbing Topology Scenario V*

Results: Hubbing Topology Scenario V

Next Hop Topology Scenario I

Results: Next Hop Topology Scenario I
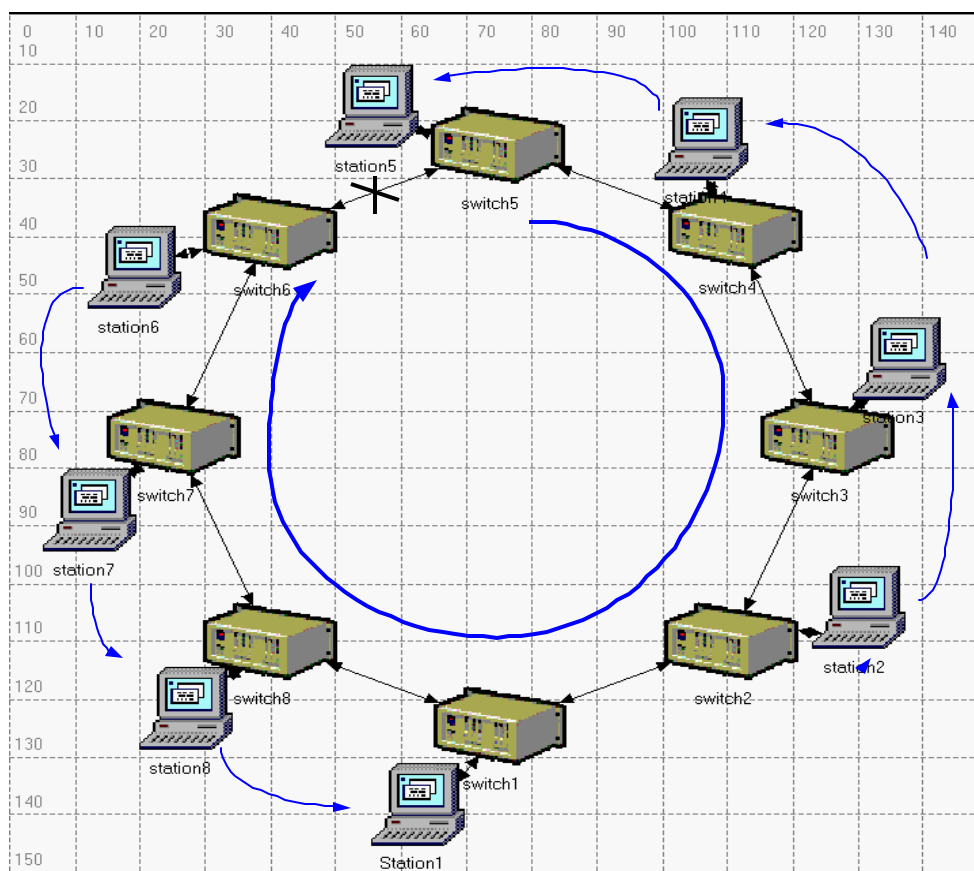
Next Hop Topology Scenario II

- Similar to scenario I except

  – Each station generates Poisson traffic at a 1 Gbps rate.

  – This was done to insure that none of the links will be overloaded to allow evaluation of end-to-end delay

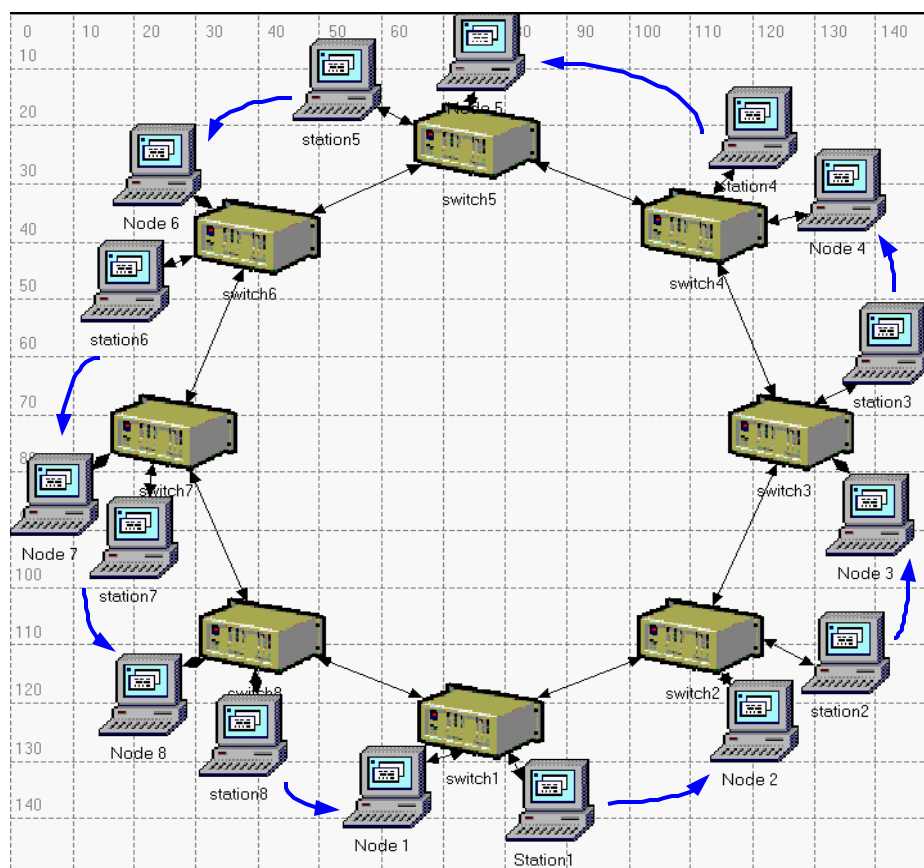# *Results: Next Hop Topology Scenario II*

Next Hop Topology Scenario III

Results: Next Hop Topology Scenario III

Next Hop Topology Scenario IV

Results: Next Hop Topology Scenario IV

Conclusions

What's Next

- **Throughput per flow and per class**

- **More scenarios for next hop and hubbing (?)**

- **Simulations for the random configuration**

- **Packet size distributions (if needed)**

- **More scenarios with various traffic generation distributions:**

  – **Traffic generating nodes move around**

What's Next ...

- **Bursty traffic**
- **TCP and UDP apps (and combinations)**
  - **ftp, http, video-conferencing, voice, video streaming**
- **Multiple rings?**
- **Mesh of rings?**
- **RPR Ring vs. Mesh of switches**
- **Performance behavior when Link fails**

What's Next ...

- **Other metrics:**
  - **ETE packet delay dist and fairness**
  - **Same analysis for jitter**
  - **Packet loss (?)**
  - **Congestion control**
  - **Fault recovery**

Discussions