CMPT 885-3: Special Topics: High-Performance Networks

Final Project Presentations – Spring 2002

Smart Queuing: An Adaptive Approach

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Overview

- Motivation
- Queuing Schemes
- Smart Queuing
- Implementation
- Summary

Motivation

- Explosive growth of Internet
- Need to utilize network efficiently
- Control congestion & provide QoS
- Use queuing schemes
- Dynamic/chaotic Internet
- Answer: Smart Queuing

Queuing Schemes (1)

- FIFO
  - ✓ Simple and predictable
  - × Cannot provide differentiated service
- Priority Queuing
  - ✓ Provide differentiated service
  - × Starving of low priority traffic

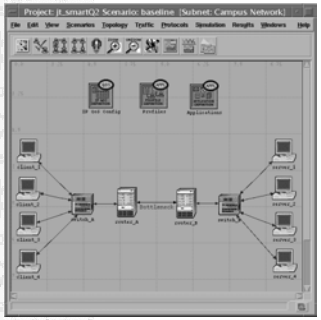
Queuing Schemes (2)

- WFQ
  - ✓Fair
  - × Complex and low-speed
- Custom Queuing (CBQ)
  - ✓Guaranteed output bandwidth for each class
  - × Problem with misbehaving user in same class

Smart Queuing

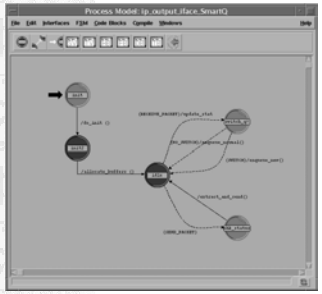
- Maintain a set of parameter
  - Number of flows
  - Quality of Service
  - Rates, packet size
- Decide which queuing is the best
  - Fairness, loss, delay
- Dynamically switch to it

Implementation (1)



- Simple IP network
- UDP traffic with QoS
- Different characteristics
  - C1: 10 pkt/s (Hi Pr.)
  - C2: 20 pkt/s (Hi Pr.) [misbehaving]
  - C3: 5 pkt/s (Low Pr.)
  - C4: 5 pkt/s (Low Pr.)

Implementation (2)



- Modify “ip_output_iface” process model
- Create multiple queuing structure (qm_info)
- Examine current traffic
- Is current method ideal?
  - No: enqueue to new method
- Synchronization issues

Summary

- Is “Smart Queuing” better?
  - Need verification
- Complex algorithm – separate control from hardware
- Issues:
  - How to use parameters to decide? (tables, rules, intelligent-simulation)
  - TCP traffic, active queue management (RED)
  - Incorporate other queuing schemes (i.e. DWRR, VClock)

References

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