S-38.3180: Quality of Service in Internet

Exercise 1: Rate Control and Queue Management

Exercise material

- Source files for the exercises can be downloaded from the web-server
  - *www.netlab.hut.fi/opetus/s-38.3180/2007/harjoitukset*
- ns2 taken into use by command
  - *source /p/edu/s-38.180/use.[sh, csh]*
- Run the simulation program with command
  - *ns diffnet.tcl*
- ***It is a good practise to execute simulations on scratch filesystem***
  - use scratch *-commad creates a symbolic link into scratch filesystem ot your home directory*

diffnet.tcl

- Main program file containing
  - policy definitions
    - *confDSEdges voip1 voip5 <rate> <bucket size> 29_app AF*
  - simulation
    - time controls
    - seeds

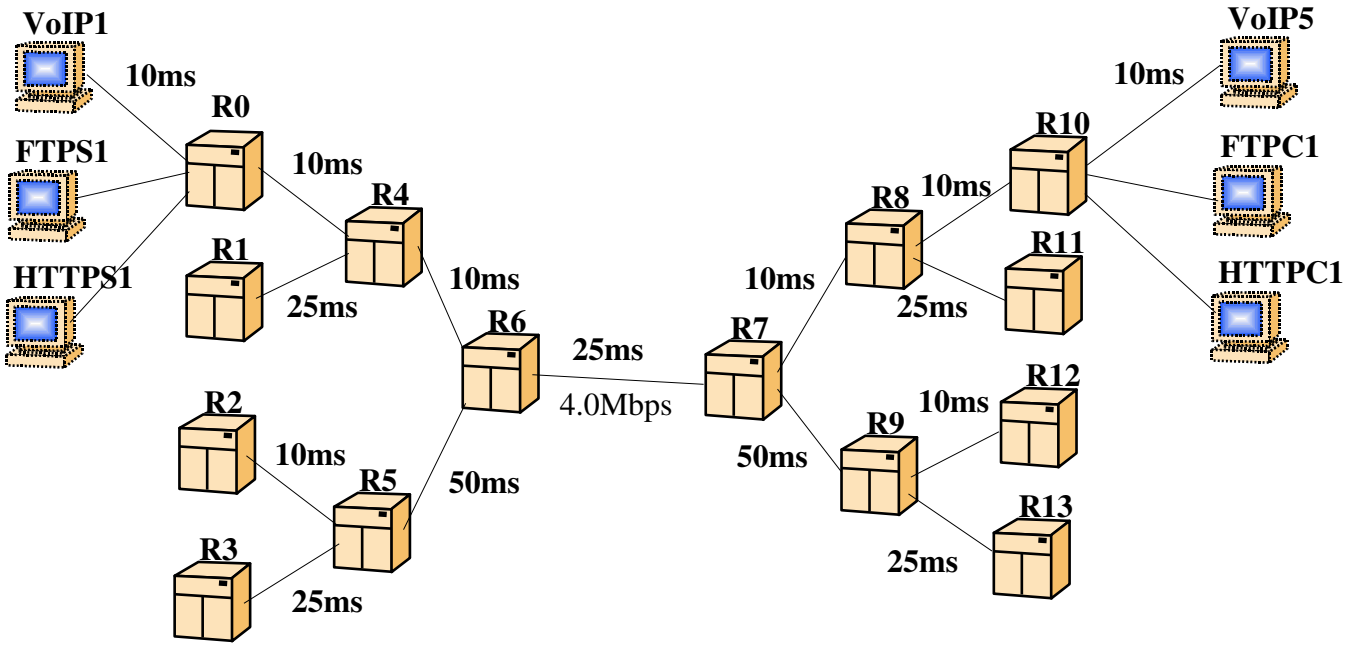
2q2p.tcl

- Configuration file containing necessary functions to setup appropriate queueing actions for each and every router.
- In the beginning of file there is a definitions for Random Early Detection parameters.
  - *set AF(in_min) 30*
  - *set AF(in_max) 60*
  - *set AF(in_prob) 0.05*
  - *set AF(out_min) 30*
  - *set AF(out_max) 60*
  - *set AF(out_prob) 0.05*
  - *set AF(qlimit) 100*

Files

- topology.tcl
  - contains the definitions for the network topology
- peer_setup.tcl
  - contains the definitions for setting the traffic sources up and running
- monitoring.tcl
  - contains funtions needed to set up flow monitoring for each eand every transfer within the network
- awk scripts to parse monitoring files
- shell scripts (*scr) to presentation of results

Topology


VoIP1
10ms
R0
FTPS1
10ms
R4
R1
HTTPS1
25ms
10ms
R6
25ms
4.0Mbps
R2
10ms
R5
50ms
R3
25ms
10ms
R7
R8
10ms
R10
25ms
R11
50ms
R9
10ms
R12
R13
25ms
10ms
VoIP5
FTPC1
HTTPC1

Running simulations

- In principle exercise requires that you
  - Make changes to the files
    - diffnet.tcl – rate control exercise
    - 2q2p.tcl - queue management exercise
  - run the simulation program with command
    - *ns diffnet.tcl*
  - run the shell script with command
    - *source stats.scr*

Task (1/3)

- What is the effect of rate control mechanisms to different traffic types.
  - Set policies to form
    - *confDSEdges voip1 voip5 <rate> <bucket size> <application> EF*
      - To have drop policy for excess rate packets
  - How sensitive is the selection of token bucket parameters
    - How does TCP connections behave when different parameters are used
      - FTP which are long connections (low aggregation)
      - HTTP which are short connections (high aggregation)

Task (2/3)

- How conventional RED operates
  - Set policies to form
    - *confDSEdges voip1 voip5 <rate> <bucket size> <application> BE*
      - Rate and bucket size have no meaning
  - Control of RED parameters is in 2q2p.tcl file BE section
    - See how throughputs change if set RED to be
      - Aggressive (low minimum and maximum threshold and large probability)
      - Conservative (large minimum and maximum threshold with low probability)

Task (3/3)

- How conventional RIO operates
  - Set policies to form
    - *confDSEdges voip1 voip5 <rate> <bucket size> <application> AF*
      - Rate and bucket sizes should follow following principle
        - » Voip rate 100000 size 1500
        - » Http rate 150000 size 60000
        - » Ftp rate 500000 size 80000
  - Control of RIO parameters is in 2q2p.tcl file AF section
    - Configure RIO parameters so that you attain best throughput with uniform service among similar clients

Documentation

- Write a report which answers the questions in previous slides.
- Also write your personal feeling of these mechanisms ability to control the part of quality they should.
- **Your report should not exceed 2 pages**
- Return it before 20.11.2007 / 1600
  - Course locker in G2-wing