

# CS290i - Lecture 10

## Server Monitoring

Scalable Internet Services and Systems, Spring 2001

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## SNMP

- † UDP request/response
  - ‡ Management console sends request packet
  - ‡ Network device sends response packet
- † Packets
  - ‡ Version, Community
  - ‡ Message type
    - † GET-REQUEST, GET-NEXT-REQUEST, SET, GET\_RESPONSE, TRAP
  - ‡ Request-Id, Error status & index
  - ‡ Data
    - † Pairs of Object IDs and Values
- † Variables to GET/SET
  - ‡ Strings and integers
  - ‡ MIB - Management information base
    - † Hierarchy of names
- † Example:
  - ‡ snmpwalk switch1.corp.expertcity.com public .1.3.6.1.2.1

2

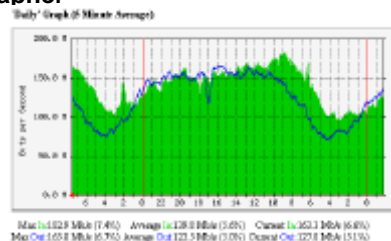
## MRTG

### † Multi Router Traffic Grapher

- ‡ Monitor network links

### † Operation

- ‡ Runs every few minutes
  - ‡ (5 typ.)
- ‡ Fetches link stats
  - ‡ Typ via SNMP
- ‡ Round-robin database
  - ‡ Last day, every 5 minutes
  - ‡ Last week, every 30 minutes
  - ‡ Last month, every 2 hours
  - ‡ Last year, every day
- ‡ Generates GIFs/PNGs for each router, each period
  - ‡ Plus web page to tie images together



3

## RRDtool

### † Round-Robin-Database

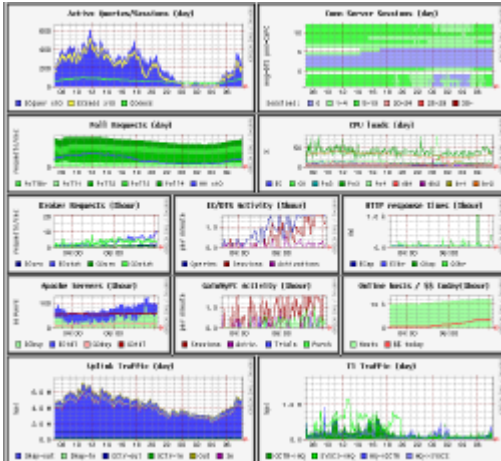
- ‡ Round-robin database
  - ‡ Last day, every 5 minutes
  - ‡ Last week, every 30 minutes
  - ‡ Last month, every 2 hours
  - ‡ Last year, every day
- ‡ Consolidate
  - ‡ Average, min, max

### † URLs

- ‡ MRTG: <http://ee-staff.ethz.ch/~oetiker/webtools/mrtg/>
- ‡ RRDTool: <http://ee-staff.ethz.ch/~oetiker/webtools/rrdtool/>
- ‡ Cricket: <http://cricket.sourceforge.net/>

4

## RRDtool example



5

## Traceroute

- † **Goal**
  - † Determine route from “here” to “there”
- † **Trick**
  - † Send packets with limited TTL
  - † Either ICMP or UDP
  - † Wait for ICMP time exceeded or no such port response
- † **Caveats**
  - † Non-symmetric routes
  - † Slow router CPUs
- † **Traceroute.org**

6

## Commercial products

- † **Some names:**
  - † HP OpenView
  - † CA Unicenter
  - † IBM Tivoli
- † **Features**
  - † Discovery of nodes
  - † GUI display of network, nodes, etc...
  - † MIB browsers
  - † Data gathering, alerts, stats, planning, etc...
  - † Email alerts, trouble tickets, run programs
  - † ...

7

## Project

- † **Schedule**
  - † Week 5: #2 due Friday 5pm in homework box
  - † Week 6: work on #3
  - † Week 7: #3 due Thursday 5pm in homework box
  - † Week 8: work on #4
  - † Week 9: #4 ready Thursday 5pm for benchmark round #1
    - † Site operational on 3 machines
    - † Get to see the benchmarks
  - † Week 10: #4 ready Thursday 5pm for benchmark round #2
    - † Serious attempt at performance & reliability
  - † Week 11: Tuesday 5pm last changes for benchmark round #3
    - † Chance to fix problems uncovered in round #2

8

# Project

## † Embedded GIFs/PNGs

### † GIF servlet

- † URL: /servlets/AbsChart?ticker=AAPL&start=2000-01-01&range=1yr&xsize=600&ysize=400
- † Content-type: image/gif

### † Web page:

- † URL: /servlets/CompanyPage?ticker=AAPL
- † <HTML>...<BODY>...<IMG SRC="AbsChart?ticker=AAPL&range=1yr&start=2000-01-01&xsize=600&ysize=400">...Change range:<a href="CompanyPage?ticker=AAPL&range=3mo">3mo</a>...

## † Stock splits

- † It is ok to pre-compute split ratio for each date
- † Not necessary to scan all dates back from today