AFS-OSD performance tests

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Development Fund of the CESNET Association

CESNET was held in 1996 by all universities of the Czech Republic and the Czech Academy of Sciences

Development Fund was held in 2000 from sells comercial part of CESNET network

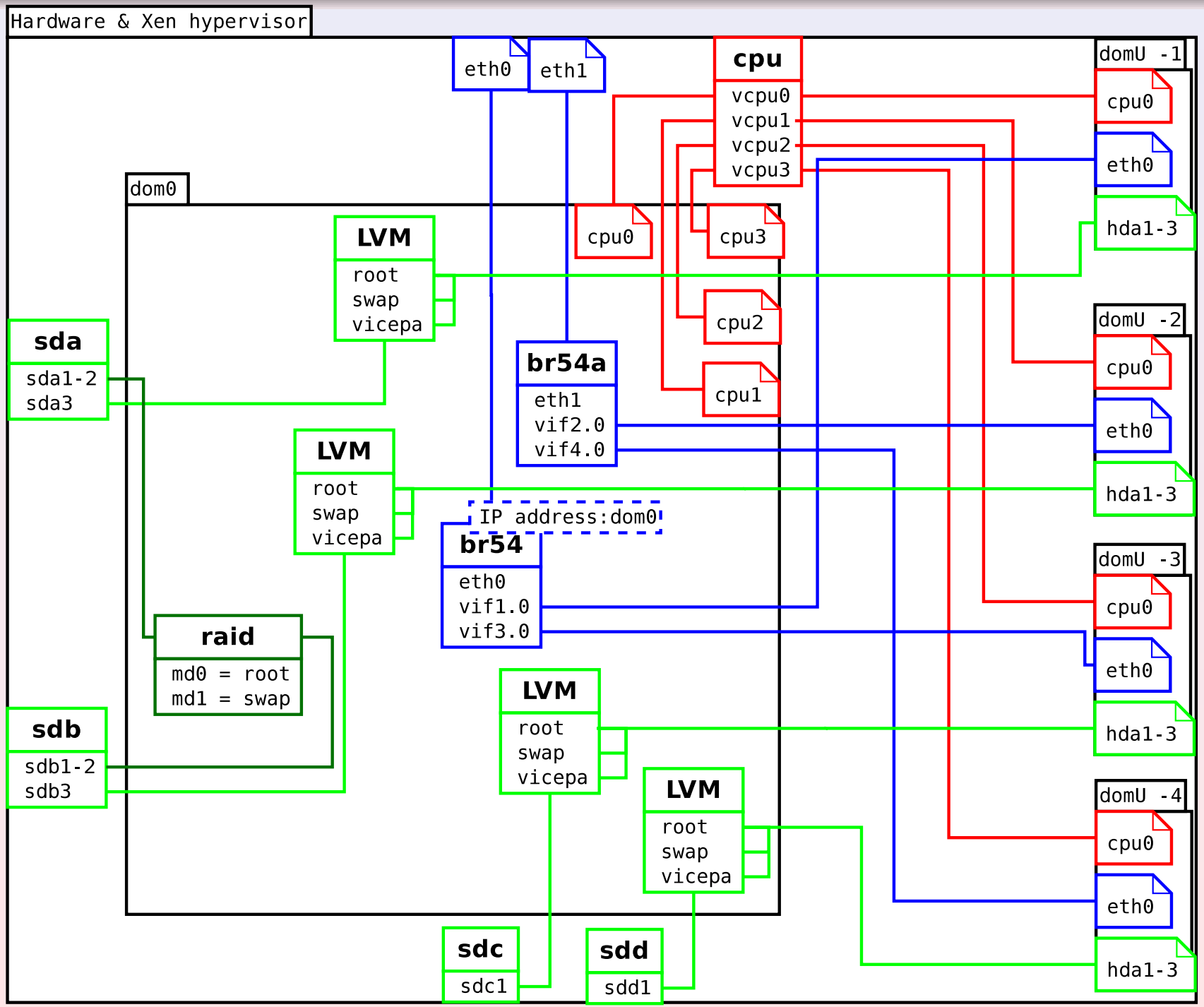
Project about OSD is aimed to getting knowledges and testing its desirability for us

Servers configuration

- 2x Dell R410
  - 8GB RAM
  - 4x HDD 15KRPM 300GB
  - 2x 1Gb network card
  - 1x 2GHz CPU Intel E5504
- Debian GNU/Linux Lenny on kernel 2.6.31.8 x86_64 (amd64)
- Xen virtualization version 3.4
- Domain-0 (chryso1, chryso2) used for:
  - management hosted virtual machines
  - bridging network
  - LVM2 disk management
- Hosts used for:
  - OpenAFS-OSD infrastructure for CIV.ZCU.CZ cell
  - chryso1-1 are AFS-DB and Kerberos servers extra
  - tools for measurement of system (dstat, atop, ...)

AFS virtual servers chryso1-[1-4] and chryso2-[1-4]

- 1GB RAM
- 50GB disk space in /vicepa on own HDD
- 1Gb network card shared with another host
- one CPU core shared with Domain-0
- kernel compilation 2.6.31.8-amd64 x86_64
- OpenAFS version 1.4.12-osd


Hardware & Xen hypervisor
eth0
eth1
cpu
vcpu0
vcpu1
vcpu2
vcpu3
domU -1
cpu0
eth0
hda1-3
dom0
LVM
root
swap
vicepa
cpu0
cpu3
cpu2
cpu1
domU -2
cpu0
eth0
hda1-3
sda
sda1-2
sda3
br54a
eth1
vif2.0
vif4.0
LVM
root
swap
vicepa
IP address:dom0
br54
eth0
vif1.0
vif3.0
domU -3
cpu0
eth0
hda1-3
raid
md0 = root
md1 = swap
LVM
root
swap
vicepa
sdb
sdb1-2
sdb3
LVM
root
swap
vicepa
domU -4
cpu0
eth0
hda1-3
sdc
sdc1
sdd
sdd1

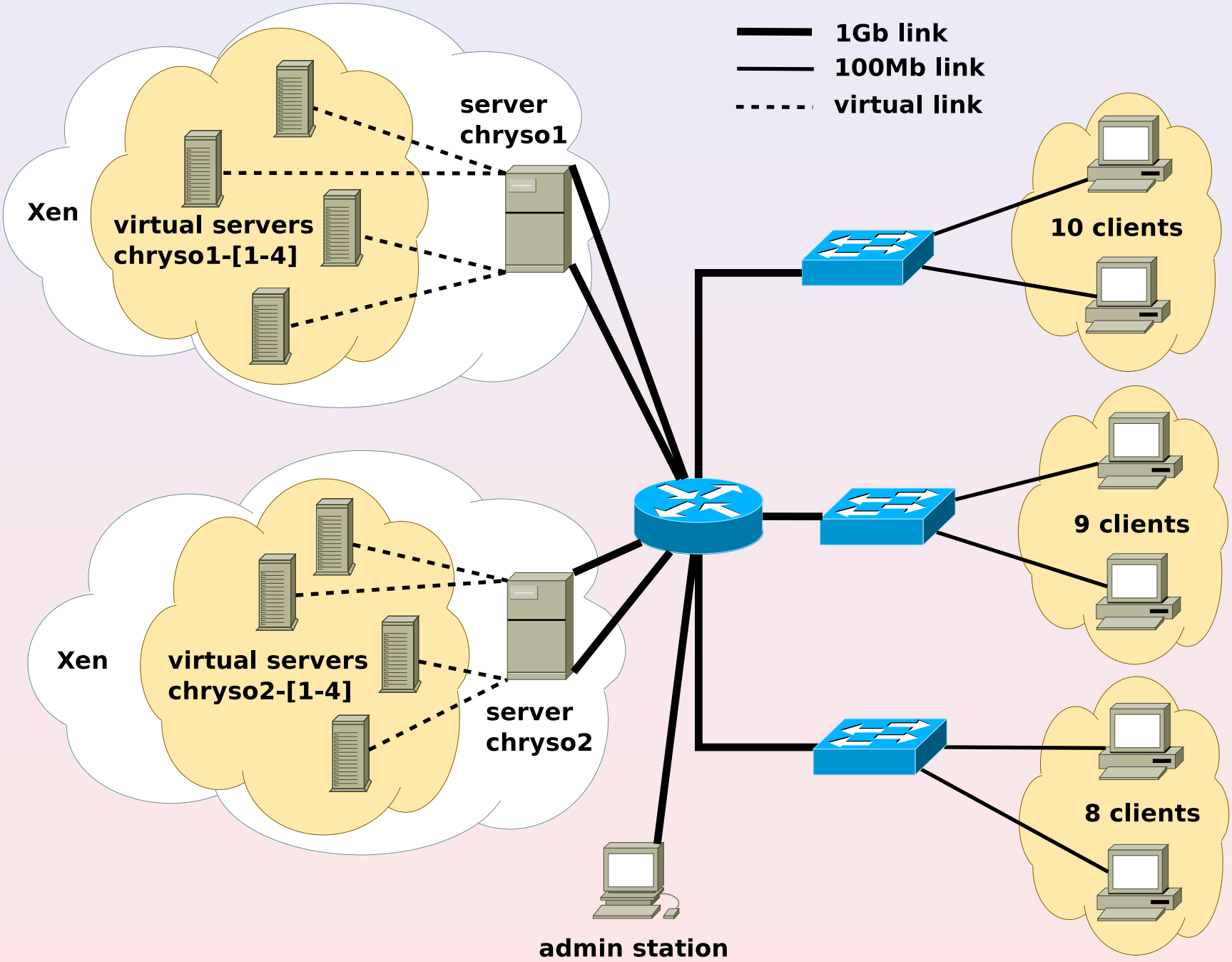
Clients

Hardware: total 27 clients in different configuration:

Number of clients	9	8	10
Memory [MB]	1024	2048	768
CPU type	Intel P4	AMD Athlon 64 X2 4200+	Intel P4
CPU freq. [GHz]	3.4	2.2	2.6
CPU cores	1	2	1
Network [Mb/s]	100	100	100
architecture	i386	amd64	i386

Software:

- Debian GNU/Linux Lenny
- kernel 2.6.30
- OpenAFS 1.4.11-osd
- iozone 3.287


1Gb link
100Mb link
virtual link
server
chryso1
Xen
virtual servers
chryso1-[1-4]
10 clients
9 clients
Xen
virtual servers
chryso2-[1-4]
server
chryso2
8 clients
admin station

Tools for testing

`dstat -n -N total,eth0,eth1 -d -D total,sda,sdb,sdc,sdd`

- running on Domain-0
- getting network and disk statistics

`iozone -s 1G -r 128k -c -t 1 -F fileI3ITvM -i 0 -i 1 -i 2`

- running on AFS clients
- makes 1GB file in specified directory (volume)
- tests: write/rewrite, read/re-read and random-read/write

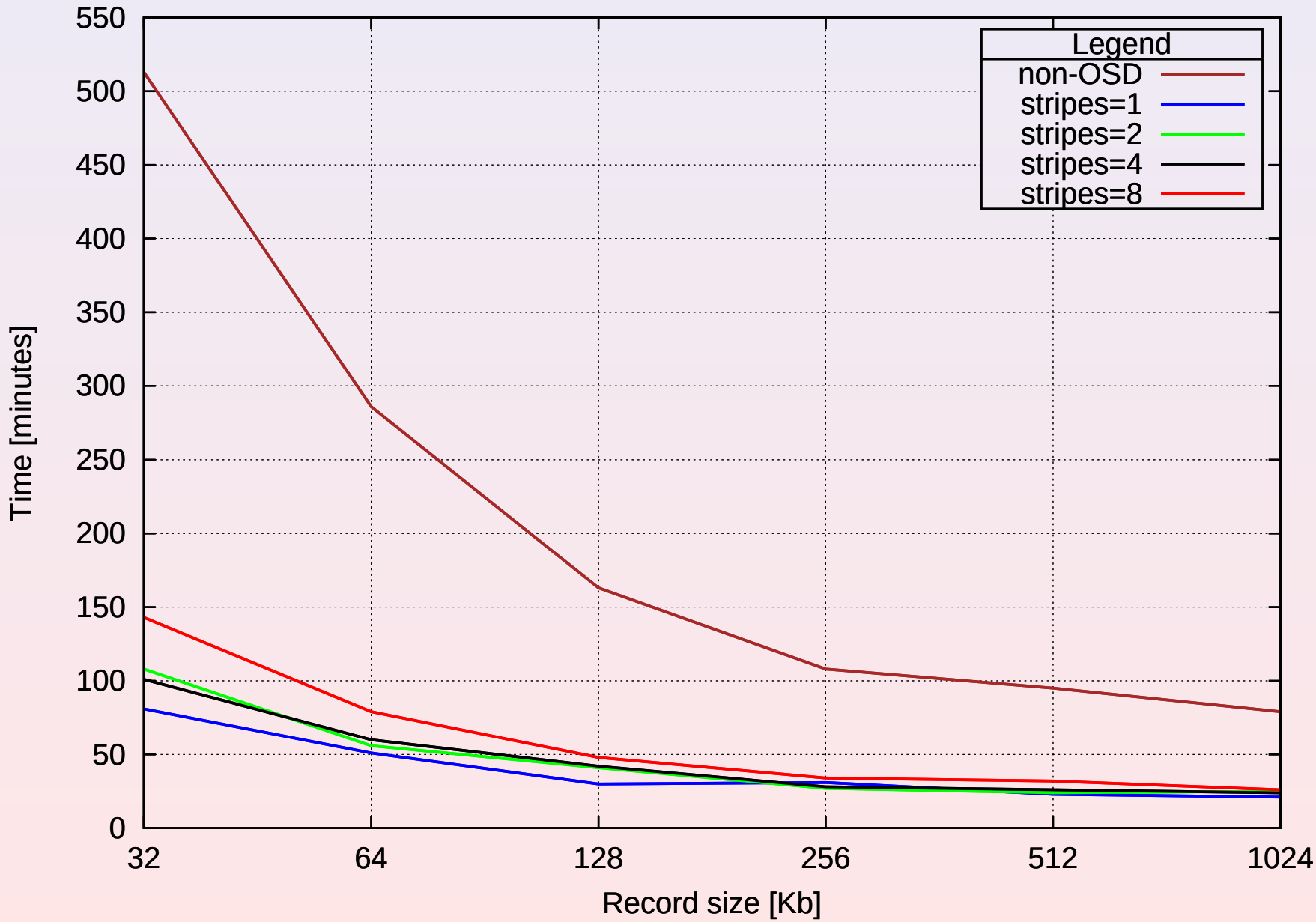
`parallel-ssh -h clients.txt -p 100 -t 86400 '<iozone command>'`

- distribute iozone command to AFS clients
- getting time of single test on every client

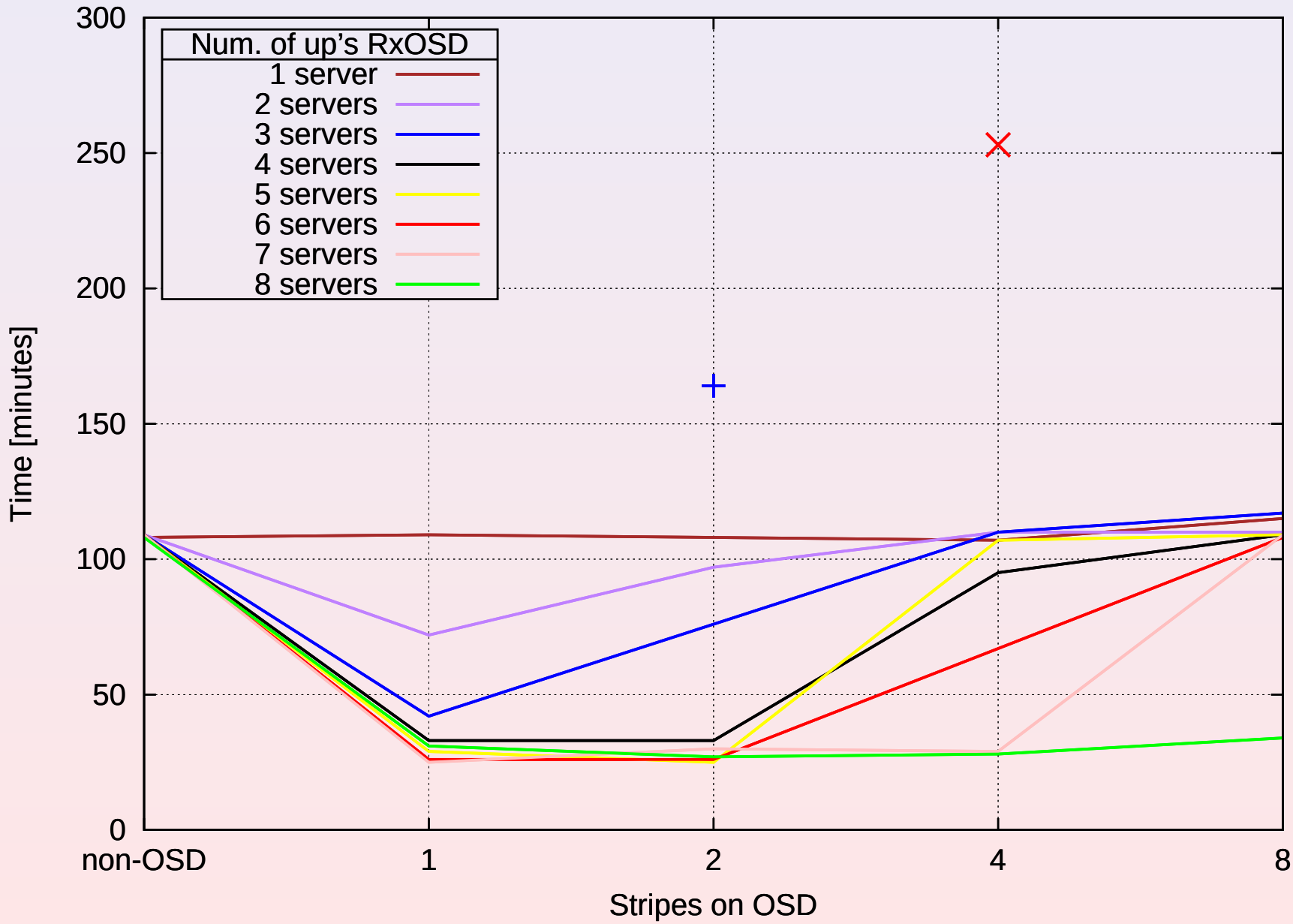
`time <parallel-ssh command>`

- get time of all tests from all clients together

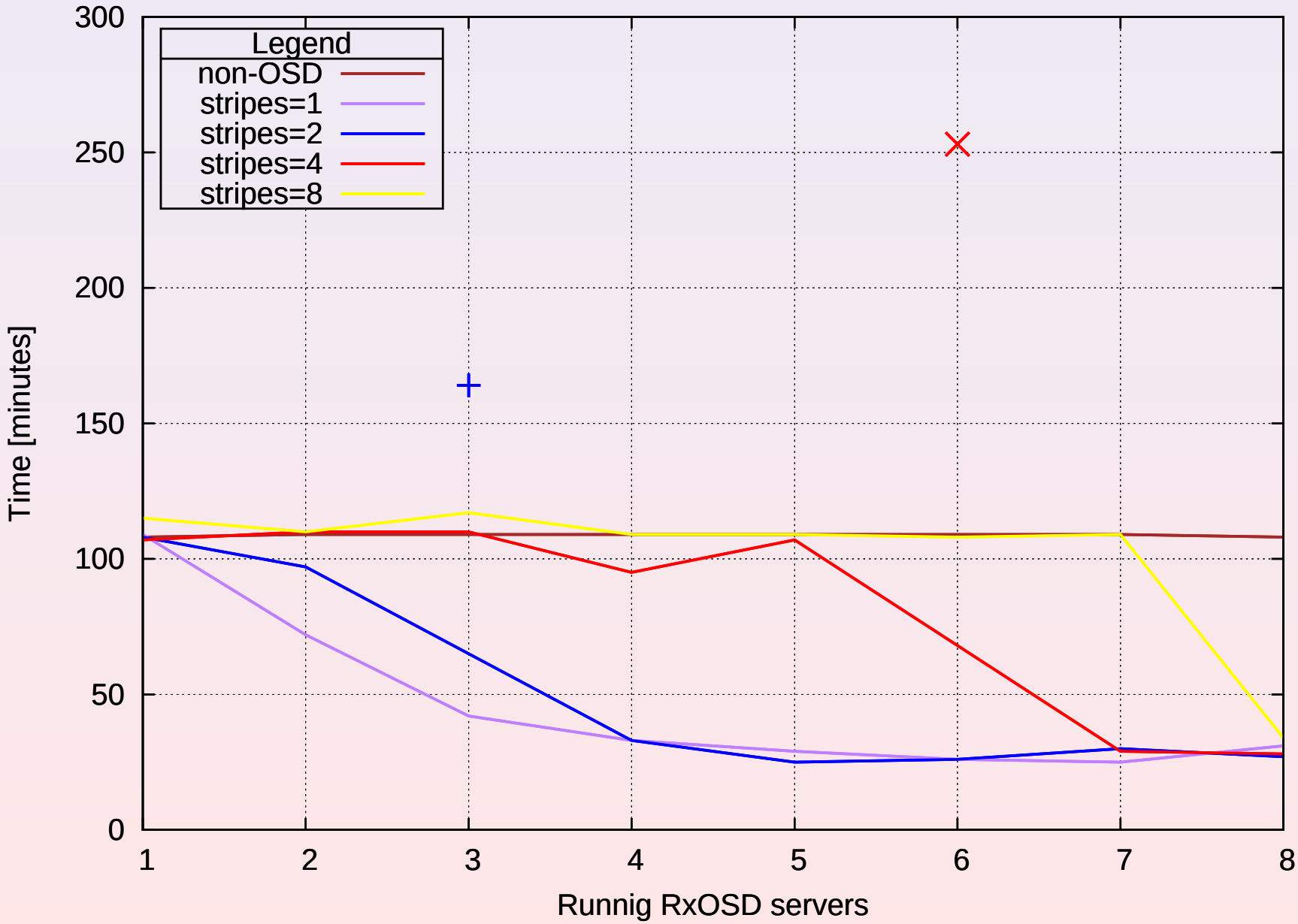
Elapsed time over record size



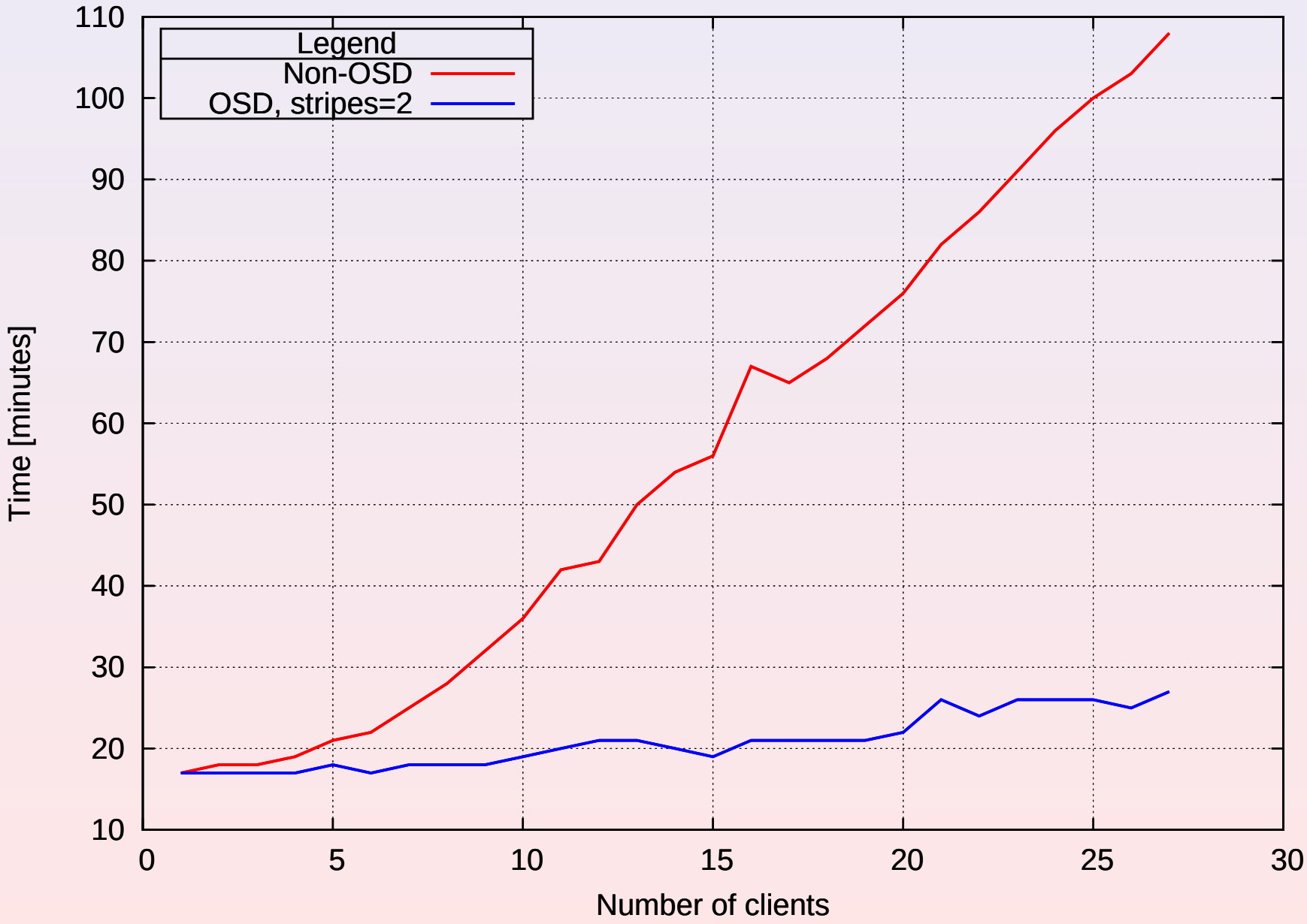
Elapsed time over number of stripes



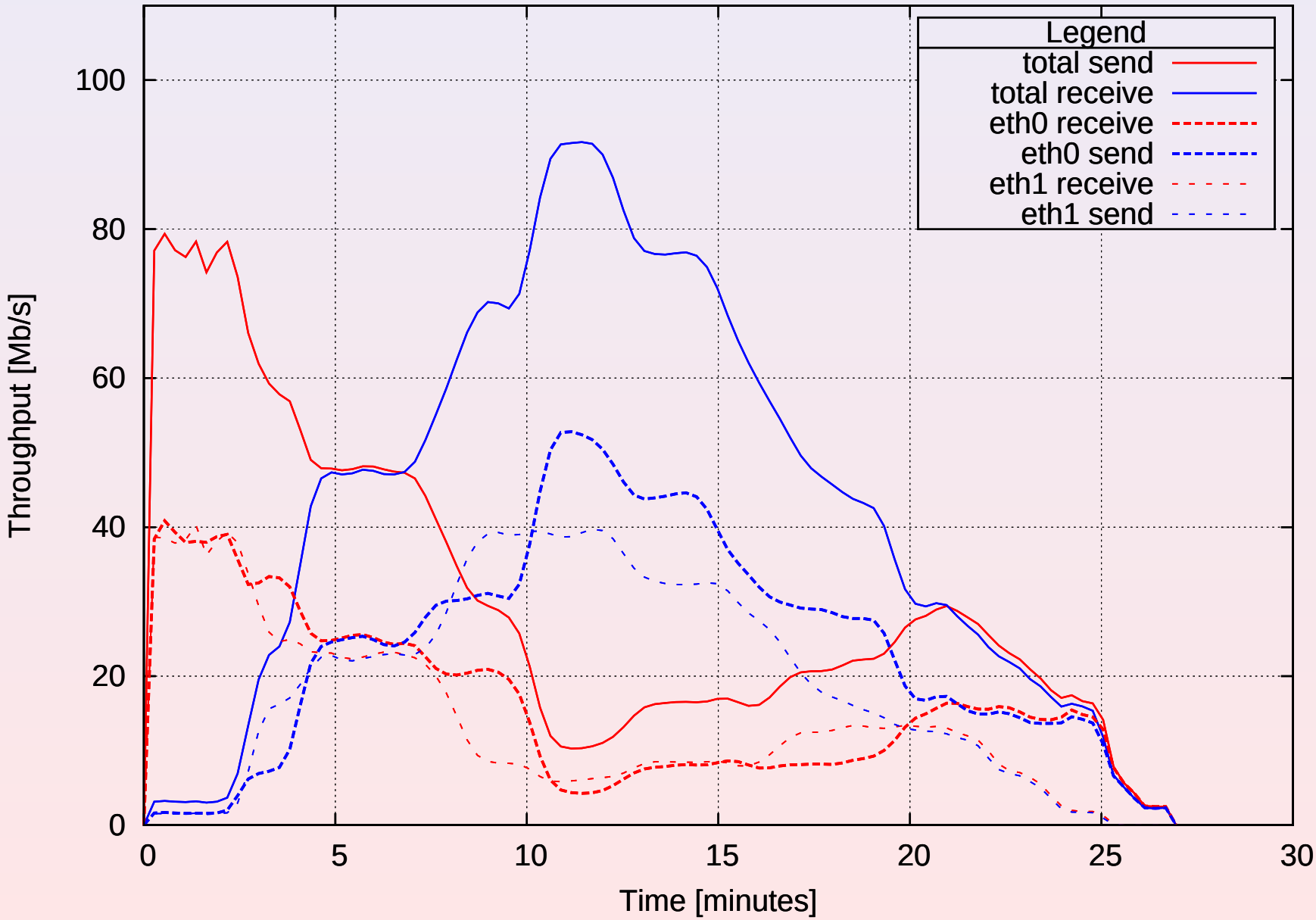
Elapsed time over number of OSDs



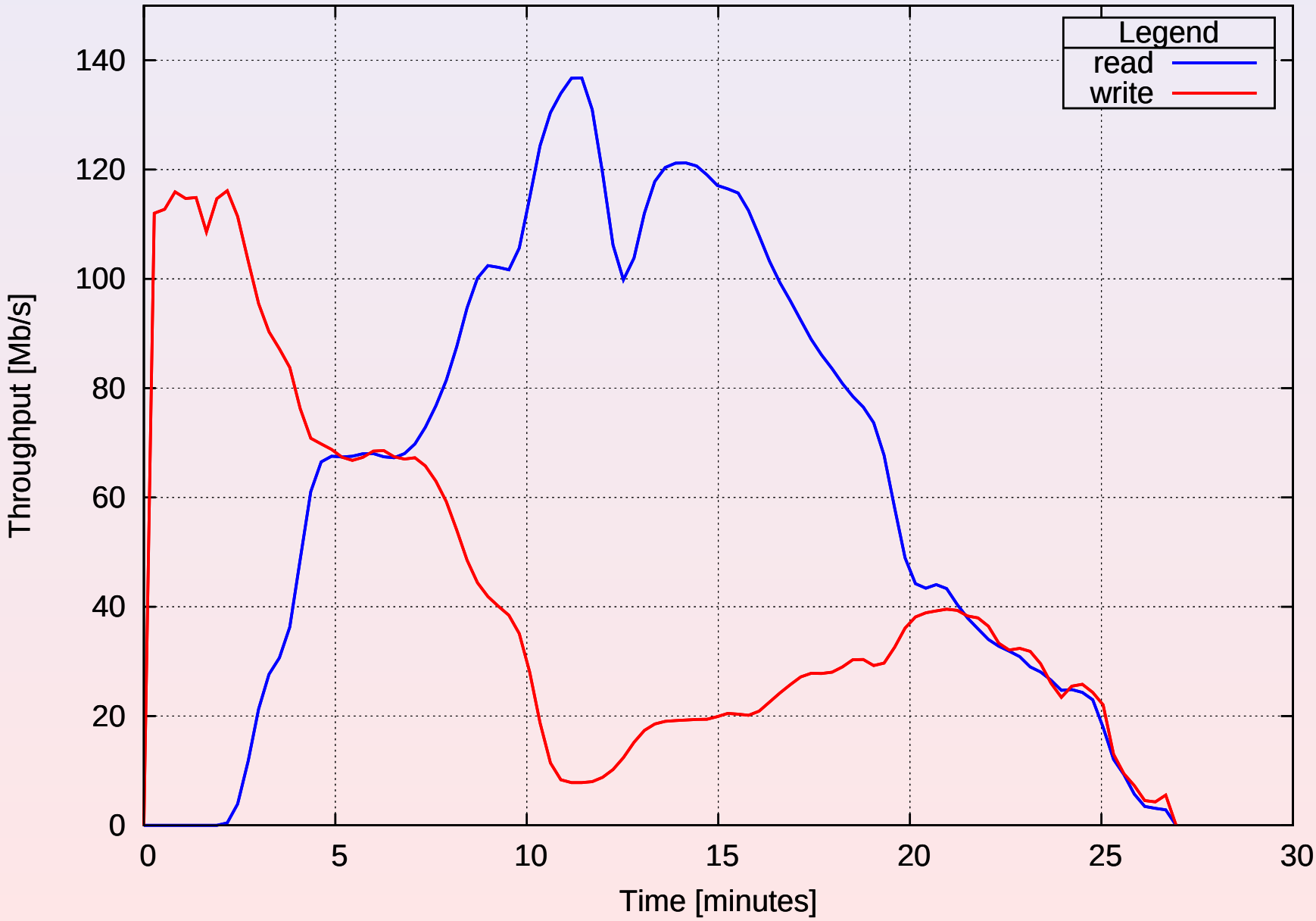
Elapsed time over number of clients



Network throughput on chryso-1



Disks throughput on chryso-1



Notes about testing

- tests running during May and June 2010
- count of tests: 124
- longest test: 513min (8.5 hours)
- shortest test: 17min
- average lenght: 63min
- total time of all tests: 131 hours (5.5 days)

- only if weather temperature is under 30^{o}C
- testing at night or weekend
- OSD is stable solution, RxOSD servers never down
- swaps (2GB) on RxOSD servers are never used

Thanks to Hartmut Reuter for consultation about results and to Christof Hanke for helping with installation of our cell.