

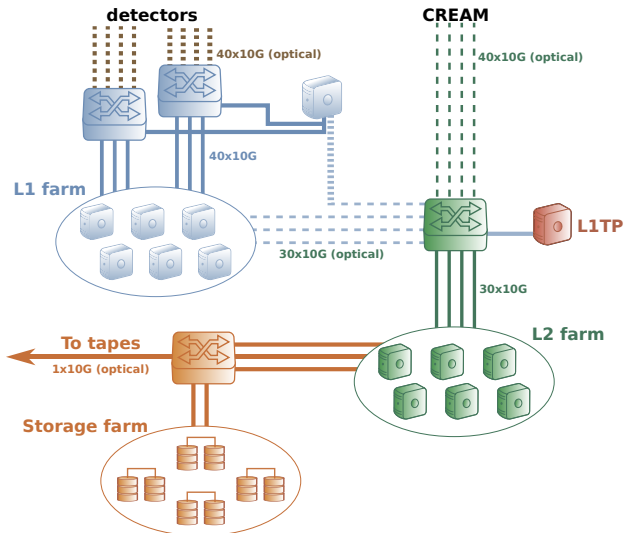
Bonding vs. 10G links

Jonas Kunze

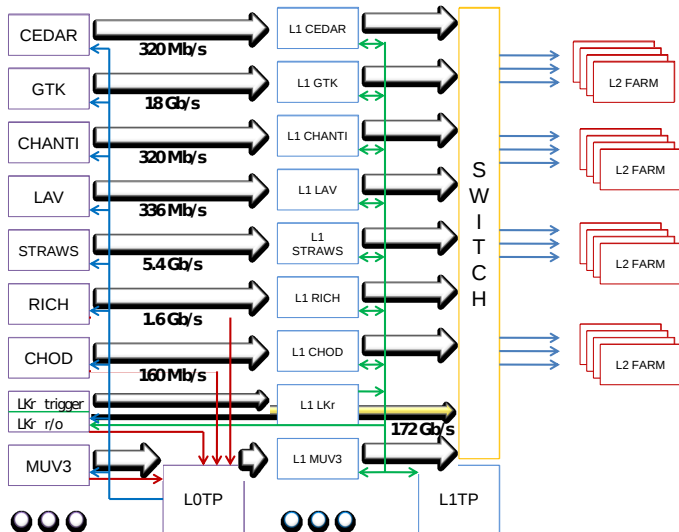
Universität Mainz

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The online farms



Data rates



Network cards

What you would pay today:

Intel NetEffect E10G81GP

- low profile SFP+ PCIe x8
- $\approx 600\text{€}$

Intel PRO/1000 PT 1-4 Port

- low profile RJ45 PCIe x4
- $\approx 500\text{€}$ (quad port)
- $\approx 150\text{€}$ (dual port)
- $\approx 70\text{€}$ (single port)



HP ProCurve-Switch 2910al-24

24 port 1G switch



- Switch $\approx 1000\text{€}$
- SFP+ Module with two ports(2 transceivers included):
 $\approx 1000\text{€}$

HP ProCurve-Switch 2910al-48

48 port 1G switch



- Switch $\approx 1700\text{€}$
- SFP+ Module with two ports(transceiver included): $\approx 1000\text{€}$

HP ProCurve-Switch 6600-24XG

24 port 10G SFP+ switch



- Switch: $\approx 10000\text{€}$
- SFP+ 300m transceiver: $\approx 180\text{€}$
- SFP+ 5m direct attach cables: $\approx 150\text{€}$

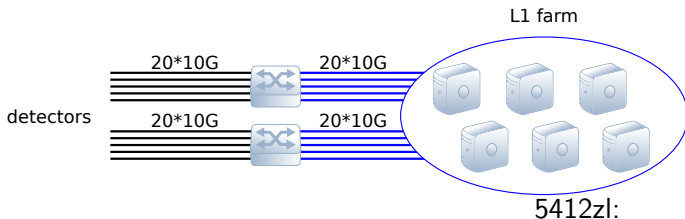
HP ProCurve-Switch 5412zl

Modular Switch with 12 slots



- Switch: $\approx 2000\text{€}$
- 4 port SFP+ module: $\approx 1800\text{€}$
- 24 port 1G module: $\approx 1500\text{€}$
- SFP+ 300m transceiver: $\approx 180\text{€}$
- SFP+ 5m direct attach cables: $\approx 150\text{€}$

Only 10G



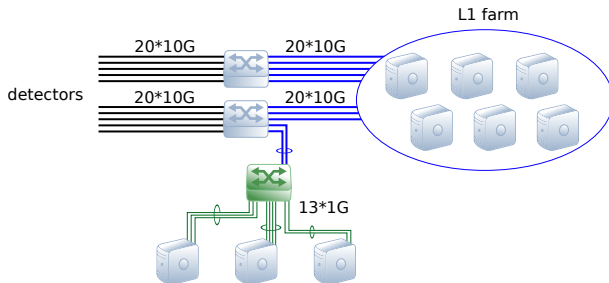
6600-24XG:

Switches : $4 * 10k€$
Opto transceiver : $40 * 180€$
Direct attach : $40 * 150€$
10G cards : $40 * 600€$

Switches : $2 * 2k€$
SFP+ Modules : $20 * 1.8K€$
Opto transceiver : $40 * 180€$
Direct attach : $40 * 150€$
10G cards : $40 * 600€$

Same price for both solutions: 77,200€

1G trunks from seperated switch

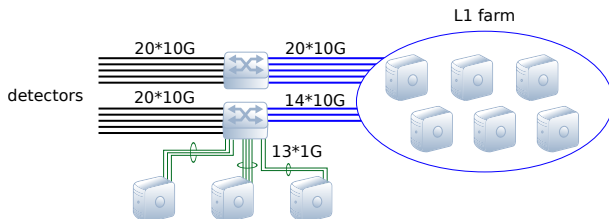


6600-24XG : 4 * 10k€
Opto transceiver : 40 * 180€
Direct attach : 36 * 150€
10G cards : 34 * 600€

2910al-24 : 1k€
SFP+ dual module : 1k€
1G cards : 13 * 70€

Same price for both solutions: 75,910€

1G trunks from modular switch



5412zl : $2 * 2k\text{€}$

SFP+ Modules : $19 * 1.8K\text{€}$

Opto transceiver : $40 * 180\text{€}$

Direct attach : $34 * 150\text{€}$

10G cards : $34 * 600\text{€}$

24 port 1G module : $1.5k\text{€}$

1G cards : $13 * 70\text{€}$

Same price for both solutions: 71,610€

Decline in prices of 10G cards

Super Micro already produces on board 10G cards

≈ 300€ extra for mainboards with on board 10G card

600 € per 10G card:

10G only : 77.2k€

1G trunks with 6600 : 75.9k€

1G trunks with 5412zl : 71.6k€

300 € per 10G card:

10G only : 64.0k€

1G trunks with 6600 : 65.7k€

1G trunks with 5412zl : 61.4k€

The used hardware

The network interface cards

- Four cards with Intel 82541PI controller (PCI on PCI-X)
- Two dualport cards Broadcom BCM5751 (PCIe 4x)
- Two dualport cards Intel 82546GB (PCI-X)

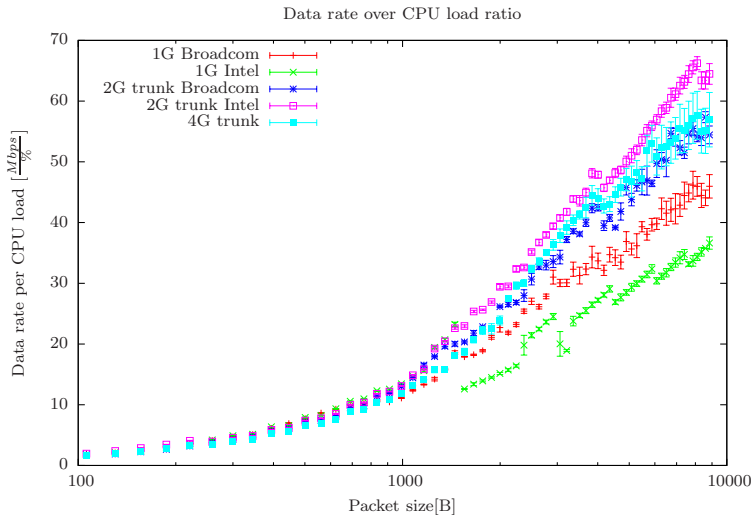
The machines

- Quadcore Intel® Xeon® processor 5100 @ **1,6GHz**



Two machines with four direct attached links on each (no switch!)

1G vs 2G vs 4G



4G with different Coalescence settings

