

Electricity consumption of electronic network components

A report of the Competence Centre Energy and Information Technology

elaborated by:

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1 Situation and Scope of the Project

The Swiss Federal Institute of Technology Zurich intends to substantially expand its communication network. 25'000 computers will be interconnected with this communication network.

The backbone will be realised on ATM technology with a capacity of up to 2.4 Gbits/sec. The ATM backbone will be partly extended up to the floor or at least to each of the different buildings of the institute. After that, Ethernet will interconnect the different computers within the building.

The clear scope is that each of the users will get a bandwidth of 100 Mbits/sec.

2 Strategy

To ensure that the available communication resources are efficient and optimal used new intelligent switches and routers will be purchased. Those routers will optimise the interconnection between the different end users and the servers. This means that the logical connection does not correspond with the physical connection (virtual LAN). With this concept an increasing of the work for the network management is expected.

3 Energy Consumption of the New Components

The following list shows the power of different network components which have been measured:

Device	Power supply and connected ports	measured active power	measured apparent power	Specification
Cisco Catalyst 5505 Ethernet Switch	72 ports	275 W	280 VA	376 W
Cisco 8510 MSR ATM Switch	1 power supply	243 W	250 VA	
	2 power supply	285 W	294 VA	
Cisco 4000 Ethernet Switch	34 ports (max. 96 ports) 1 power supply	100 W	111 VA	400 W
	2 power supply	116 W	140 VA	
Cisco 2916M XL 10/100 Autosensing Fast Ethernet Switch	16 ports	53 W	90 VA	60 W
	24 ports	89 W	144 VA	150 W
Cisco 7206 Router	3 of 6 slots 1 power supply	151 W	161 VA	370 W
	3 of 6 slots 2 power supply	175 W	210 VA	370 W

4 Experiences for the Energy Management

- The devices of the upper class have energy supply systems which have a power factor correction PFC.
- Only the devices of the backbone are connected to an UPS (uninterruptable power supply). The components and devices within the different buildings are not connected to UPS.
- Most of the technical rooms in which the network components are installed are not air-conditioned. The target value of the room temperature of these rooms is 26°. If the temperature of the ventilation systems of the different network components increases to

40° C an internal device-alarm occurs. If the temperature increases further to 50 °C the device will be switched off.

- Per network port an average power value can be defined:
 - Ethernet switch: ca 3 – 4 W per port
 - ATM backbone: ca 2 W per port
 - Total: ca 5 – 6 W per port

5 Further Information

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