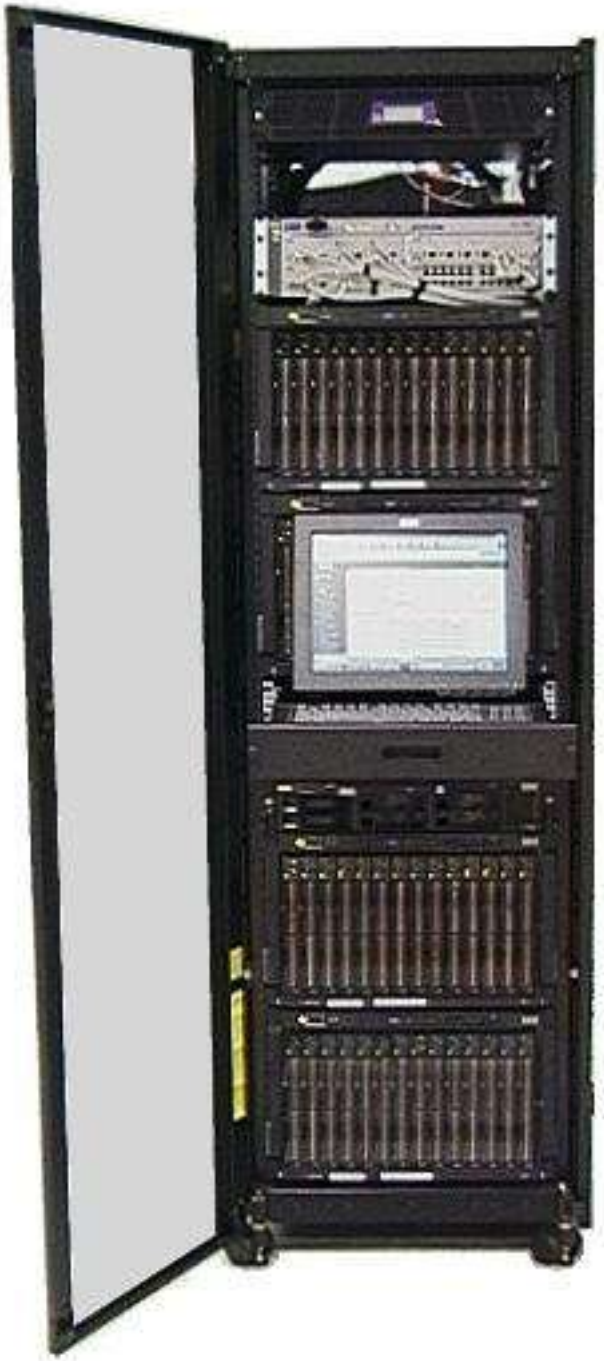


# Computing in Physics

Stefan Kluth

MPI Project Review

19.12.2005

# Overview

- Desktop computing
  - basic services (e-mail, web, etc.)
  - also data analysis, code development
- Local distributed computing
  - Condor batch queue system uses desktop CPU
  - large data sets on nfs mounted servers
- Computing at RZG
  - CPU- and dataintensive applications
  - connected to Grid (LCG)

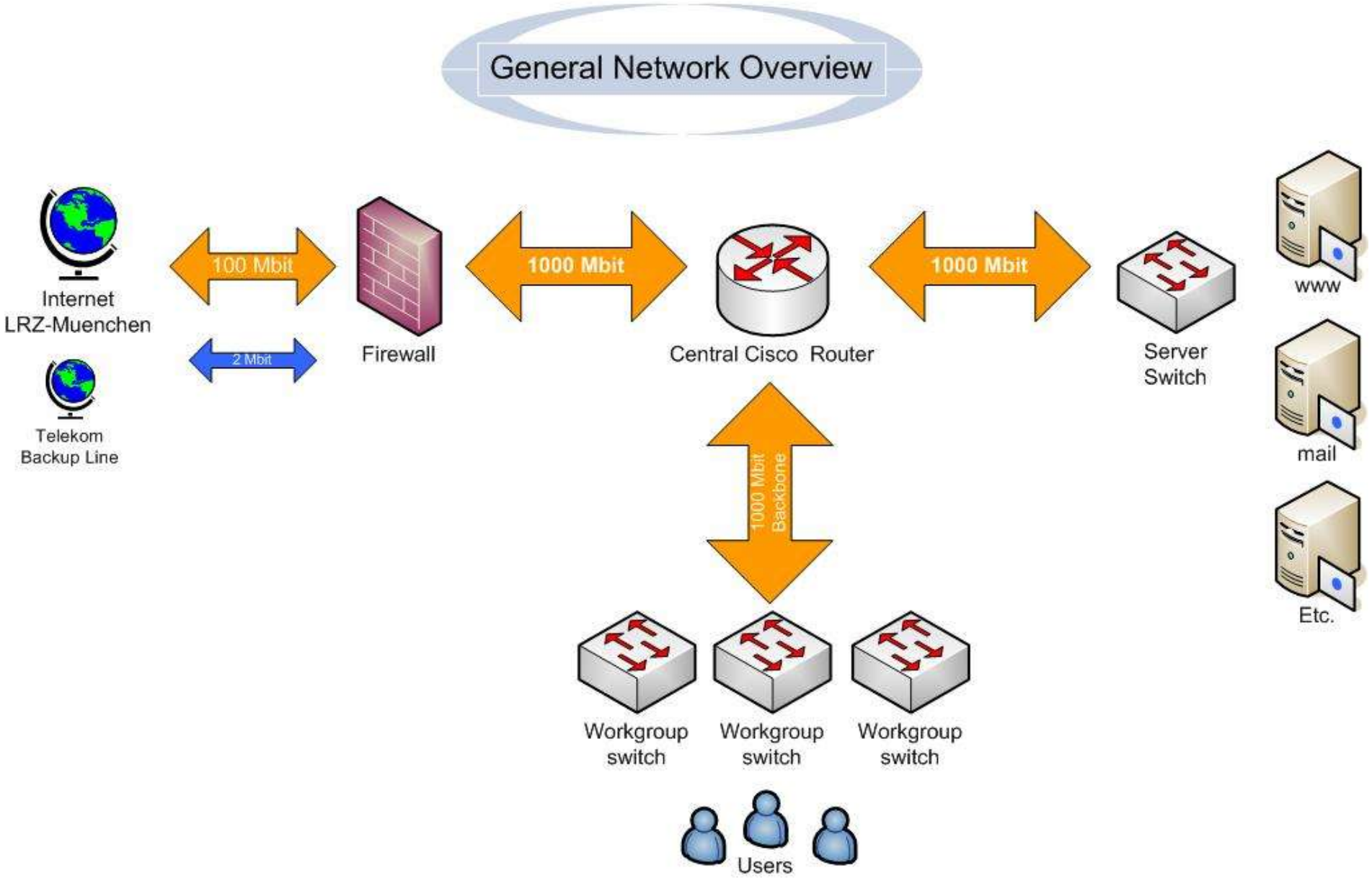
# Physics Desktop Computing

- Standard PCs with Linux OS
- ATLAS, MAGIC, ILC, OPAL/JADE, H1/ZEUS, GERDA (> 100 nodes)
  - managed by C/N (U. Leopold et al.)
  - “MPI-Linux” (Redhat derivative)
- Theory (ca. 70 nodes)
  - “PEB-Linux”, Suse for Laptops (T. Hahn, P. Breitenlohner)
  - Mathematica, Maple, special compilers

# Physics Desktop Computing

- PCs with MS Windows
  - administrative tasks (many Laptops)
  - laboratory applications
- MacOS and VMS
  - tolerated but not directly supported by C/N
- Hardware
  - mostly Roemer, few Dell, Transtec, FSC etc.
  - please coordinate IT purchases with C/N (U. Leupold)

# LAN


General Network Overview
Internet
LRZ-Muenchen
Telekom
Backup Line
100 Mbit
2 Mbit
Firewall
1000 Mbit
Central Cisco Router
1000 Mbit
Server
Switch
www
mail
Etc.
1000 Mbit
Backbone
Workgroup
switch
Workgroup
switch
Workgroup
switch
Users

# CPU- and dataintensive Computing

- Cluster of Linux CPU servers with large fileservers at RZG since 2005
- tape storage available (with robot)
- connected to Grid via LCG
- need to register at RZG to use
- major users ATLAS and MAGIC
- open to all MPI groups

RZG
Rechenzentrum - Garching

# RZG Cluster

IBM BladeCenter Chassis (5 pcs)

infrastructure for 14 single board computers (“blades”)

common power, cooling, LAN, KVM

HS20 blade (70 pcs):

dual Intel Xeon 3 GHz, 2(4) GB RAM, local disk, 64bit extensions
ca. 2 kSi2k per node

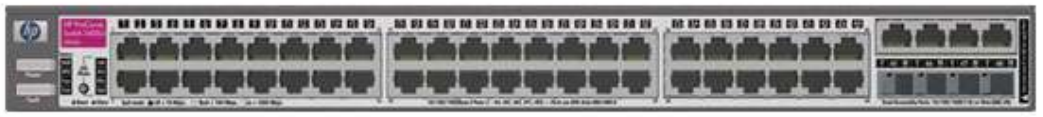
RH Linux + SGE + MR-AFS client

# RZG Fileserver

"Integrated" Filservers:

12 port 3ware SATA – PCI RAID card
12 x 250 GB Maxtor SATA disks
Intel P4, 2 GB RAM, Gb/s LAN
RH Linux + MR-AFS server

HP ProCurve 3400cl



48port 1 Gb/s switch
10 Gb/s uplink possible

# RZG Environment

- RH Linux OS (via RZG)
  - experiment or user software via afs
  - data via afs from/to servers
- SGE batch queue system 

  - managed by RZG
  - flexible management of CPU resources
- Grid middleware (LCG)
  - project between RZG, FZK, MPI
  - serves MAGIC and ATLAS

# RZG Experience

- Fileservers had bad disks
  - > 25% broken (Maxtor Maxline II 250 GB)
  - complete disk replacement 1/2006
- CPUs stable
- OS etc
  - OS stable, MR-AFS needed client and server upgrades
  - SGE mostly stable (one upgrade)
- Power cuts

# ATLAS Munich Tier2/3

- ATLAS Munich Tier-2
  - O(10) larger than current (2008)
  - 810 kSi2k CPU, 345 TB disk (2008)
  - MPI/RZG/LMU/LRZ collaboration
  - our share (1/2) located at RZG
- Integrate Grid connection (LCG)
  - started certification process

# Plans for 2006

- Local
  - OS migration MPI-Linux → Debian
  - ongoing server replacements (mail, print, etc.)
  - commission 1 Gb/s WAN
- RZG
  - new fileservers (MAGIC 50-100 TB/a)
  - new CPU (ATLAS)
  - OS migration (RH → Suse)
  - improved power/cooling capacity

# Summary

- Physics computing
  - small scale on local PCs
  - medium scale in-house via condor
  - large scale at RZG
- Large Linux cluster at RZG
  - mostly ATLAS and MAGIC, but open for all
- Expect large growth of MPI computing at RZG