IT-perspectives

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Outline

- Introduction
- services and technology directions
- new „old challenges“
- conclusion
Tasks:

- Be application driven
- Deliver high quality professional service
- fit the users needs

excellent operation

Before the Grid: the Web

HEP: Invented the "use cases" and the WWW in 1989
- developed the idea of html, first browser
- in the late 1980's Internet technology largely existed:
  + TCP/IP, ftp, telnet, smtp, Usenet
  + Early adopters at CERN, SLAC, DESY
    - test beds, showcase applications
  + First industrial strength browser: Mosaic \rightarrow Netscape
    - "New economy" was just a matter of a couple of years...

DESY IT stood a bit aside in this development:
- IT support was IBM/newlib, VMS, DECnet (early 80's)
- Experiments started own web servers and support until mid-90's
- Web-based collaborative infrastructure (still) is experiment specific
  - Publication/document databases, web calendars, ...

Science Web services are (mostly) in the purview of experiments
Funnel is a Computational Grid

Developed on the LAN, but was quickly moved to the WAN (high CPU, low bandwidth)

- Remote Job Execution
- Job Execution Environment
- Resource Management and Resource Discovery
- Robust File Replication and Movement
- File Replica Catalogs and Meta Data Catalogs
- Web-based User Interfaces - "Funnel Portal"

Large organizational impact

- Helped to organize the infrastructure around MC production
- E.g. funnel data base, catalogs for MC productions
- Infrastructure of organized manpower of several FTE, mostly at Universities

DESY-IT was never involved in Funnel

- not even in maintenance & operations

Grid is Useful Technology for HERA Experiments

Tasks:

- explore new technology
- cooperate with users and companies
- develop new solutions with the users

Innovation
Services
and
directions

Networking

10 Gbs
IPv6
InfiniBand
(iSCSI)
wireless Lan
Network security (ipsec, dnssec)
Mail (spam, virus, ...)

Jun/1st/02
VOG
Networking

VPN
IP-Telephone
Video

WAN, see: www.dante.net/geant
- 2 * 2,5 Gbps GEANT-Abilene
- 2 * 2,5 Gbps in addition by UCAID
- Idea of a global Terabit Research Network (GTRN)
Silk-Project

- Propose a system with 25-50 Mbps for 8 countries in Caucasus and Central Asia
- Investment $2.5M from NATO, but $875K additional from others
- System could grow with additional investment from others
- In preparation
Systems

Focus on Linux (DESY Linux) and Solaris (some IRIX)
Cluster/Farm tools

Windows  --> see W2K project

Future of AFS? ------ > NFS4?

Datamanagement

Oracle
• growing interest
• new license contract

dCache
The users logical view

/users

Data System
(/data/exp1,...)

(users)

(whatever the details are)
Disks vs. tapes

~ 100 $ per 200GB cartridge (5000 cart./silo)
~ 100 k$ per silo
~ 30 k$ per drive (10 is a good number)
900,000 $ or 180$/cartridge or 0.9$/GB

Delphi 2:
~ 8k$/TB or 8$/GB
Disks vs. tapes

Compare apples and pears

1 PB tape space with 1000 delphi

Power 500 kVA; ~ 500 k Euro/year

High bandwith
Random access
Easy to follow the technology (capacity increase forever?)
(joint task of experiments and IT)

Proposal for Q1/03

26 * 9940 Drives
(3 * 100 TB)
(20 for “HEP”,
6 for Backup/Archive)

10 * 9940B Drives
(> 1000 TB)

DESY LAN
Computing
High performance computing
Arpe is Zeuthen specific
PC-clusters are coming and more general
tools to administrate farms and clusters
scientific software support

Scientific Software support
get people together to support
GEANT, ROOT, ...

and to be active in TESLA development ...
in tight cooperation with users and developers
Software technology

Modular design
Coupler?
Non-commercial software
Frameworks (e.g. for machine control etc.)
Software management tools
C++, OO, xml, SOAP, JAVA, ...
MPI-2

Other services

user consultancy
education
telecommunication
SAP-support
hosting systems
printer support
visualization
Other services

- administrative and management tools
- registry
- AMS
- EDMS
- Facility management
- collaborative tools

Projects

- dCache
- Windows
- Registry
- ID-cards
- Web-Office
- SILK
- Help desk
- mail
- Grid
Grid

- Deal with resources and services
- Provide access to distributed resources
- shared distributed "everything"
- Remote maintenance concepts
- Much more than datagrid (LHC)!
- appropriate SW-technology

Grid

- the big thing worldwide
- Central piece in FP6 of the EU
- Funded with >200 m Euro
- New NSF initiatives in the US
- Central piece to enable e-science
- Like the web in '92
Grid

Projects
- Globus
- PPDG
- GriPhyn
- Datagrid
- Eurogrid
- Teragrid
- ...

The Grid:

... good for DESY?
- users in collaborations need remote access
- They will be used to use Grid-SW
- Prerequisite for e-science
- tool for other projects (GAN)
Collaborative tools

- Data access
- Web based foren
- Software frameworks
  (e.g. control)
- Virtual meeting rooms

Collaboration

Video
- via ISDN
- via DFN-Verein and GWiN
- virtual conference room (CERN)
  - http://vrvs.cern.ch
**New challenges**

Groups have to be far more open and borders between groups are disappearing

IT group moves towards experiments and operational groups

Can't be done alone → strategic partnerships with other HEP and computer science centres

New collaboration framework

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**Conclusion**

- IT group as partner of competence
- IT-world changes rapidly and is broadening
- Use as much central resources as possible
- Getting in some areas closer to the users
- DESY should be involved in GRID asap
- This is not all done tomorrow
- All this is not for free