

# **File server infrastructure @NIKHEF**

**CT system support**

## **Outline**

- **Protocols**
- **Naming scheme (Unix, Windows)**
- **Backup and archiving**
- **Server systems**
- **Disk quota policy**
- **AFS**

# Protocols

- **NFS**
  - Unix platform
- **SMB**
  - Windows (native)
  - Unix Open Source implementation (samba)
- **AFS**
  - Unix server/client
  - Windows client

# Network availability

- **hefnet, ikonet**
  - NFS, SMB, AFS
- **pcnet**
  - SMB, AFS
- **guestnet**
  - SMB, AFS
- **internet (world)**
  - AFS

## NOTE:

- Dial-in: access to guestnet.
- Access via cable/ADSL: client limited to AFS

# Unix file service (1)

- **Automount**
  - Automatic mount in case of user access
  - Automatic unmount after time out (10 min.)
  - Automount maps distributed by NIS

# Unix file service (2)

- **Automount naming scheme:**
  - Entry in automount map corresponds with top-level directory
  - **Top-level directories:**
    - /user user home directories
    - /project common directories for projects and groups (also accessible as /group and /global)
    - /public central available software (/usr/public, /usr/local) and /www
    - /data bulk data storage per project/experiment
    - /data/week scratch data directory (100 GB)
  - **Desktop**
    - /stage/hostname shared data disk
    - /localstore non-shared data disk

# Windows file service

- **Global name space:**

- `\\paling\fred$` convention: map windows user home directory on H: drive
- `\\paling\projects\mdt` common directories for projects/groups
- `\\ajax\project\dzero` idem on Unix file server
- `\\gandalf\data\dzero` bulk data storage per project or experiment

**Note:** Windows clients can access Windows and Unix file servers  
Unix clients can only access Unix file servers

# Backup and archive policy

- **TSM service at SARA**
  - Tape robot (15 TB available for NWO institutes; currently 2.5 TB in use by NIKHEF).
  - Daily incremental backup (starts at 10:00 PM)
    - Home, project and /www directories
    - Deleted files are kept 100 days on tape
    - Restore on request via helpdesk
  - Archiving user files on request via helpdesk
- **Archiving 'do-it-yourself':**
  - CD/DVD burner
  - DLT tape unit 'bombur' in H137a

## Home and project directory servers

- **Ajax**
  - Sun Enterprise Server 3500
  - Solaris 2.8
  - 3 x RAID unit, 1.2 TB bruto
- **Paling**
  - Dell PowerEdge 4400
  - Windows NT4
  - RAID unit 170 GB bruto

## Data directory servers

- **Gandalf**
  - Elonex PC Dual CPU
  - Linux Red Hat 7.3
  - RAID unit; max. 20 IDE disken (16 present)
  - Capacity 1.92 TB bruto (1.65 netto)

## Data directory servers trends

- **Sharing local data disks discouraged**
  - Reliability, redundancy, performance
  - Less complex dependencies between systems
- **TBytes of storage requested by running experiments** (D0, ANTARES and ZEUS)

## Coming soon ....

- **4 x Linux servers with 2.4 TByte bruto storage capacity each:**
  - Extending the home and project directories
  - Fulfilling the requests for more central data storage
  - Adding storage capacity to grid infrastructure
- **Hardware:**
  - Supermicro SuperServer, dual-Xeon 2.8 GHz
  - Infortrend RAID unit, 12x200 GB IDE disks
  - Interface: dual port 160 MB/sec UltraSCSI

## Disk quota policy

- **Default quota on home directory:**
  - 400 MB per user on Unix
  - 100 MB per user on Windows
  - 15 MB profile space on Windows
- **Group quota on data directory:**
  - Starting at 50 GB per group/project
- **Project directories currently limited by file system size**

## AFS

- **AFS is a distributed file service protocol**
- **Aimed for wide-area network**
- **Available as open source**
- **Software for Unix and Windows (client only)**
- **Popular amongst HEP sites (CERN, DESY, etc)**
- **Naming schema: /afs/cellname/...**
  - /afs/cern.ch/users/f/fred/...
  - /afs/nikhef.nl/user/fred/...

## AFS compared to NFS

- **Advantages:**
  - Central authentication and authorization (Kerberos)
  - Local caching of files (in case of low network bandwidth)
  - Advanced file access attributes (like ACL's in Windows, dir.level)
- **Disadvantages:**
  - Local caching of files (in case of high network bandwidth)
  - Cannot handle large files (max 2 GB file, max 8 GB volume)
  - Complex system administration

## AFS cell at NIKHEF

- Started March 2002
- Limited user group (ZEUS, LHCb)
- Currently 20 user accounts
- Not integrated into existing user admin

# Questions?