WindowsNT at DESY

Building a Modern Infrastructure for Heterogenuous Computing Demands

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The DESY WindowsNT Project Group is creating an infrastructure to meet both the legitimate heterogenuous demands of the user communities and the pressure to reduce the administration and maintainance overhead. For this purpose it uses state-of-the-art off-the-shelf commercial software products to avoid the innovation drag imposed by homegrown maintainance software systems.
The DESYNT maintainance and software distribution mechanism will be based on commercially available management software, such as the MS Backoffice products including SMS, Trusted Enterprise Manager, WinInstall, Polycenter Assetworks and the MS Resource Kit.

Key words: Commodity Computing; Configuration Management; Off-the-shelf Products; PC Operating Systems;

1 Technological Situation

The furious increase of computing demands for future experiments can only be reasonably met by using commodity computing hardware and software on a large scale. At the same time the individual computing and support demands of the users grow more and more diverse. While the cost of hardware has gone down dramatically, the costs of ownership for PCs are increasing drastically due to multiplication of maintainance work, support structures and "hidden" maintainance staff.

WindowsNT as a mass market product adresses some of these problems by offering the technology that allows to manage large groups of PCs and their user/owners centrally, albeit with the help of local points of competence.

2 DESY Commodity Computing Background

The user community at DESY is very heterogenuous. Traditionally, the accelerator groups and the engineering groups have been the most heavy users of PCs and still comprise the largest user community. PCs are used for mechanical and electronic design and they control and monitor the DESY-accelerators. The latter task is mission critical and the owners of those machines require complete control over the installed hard- and software and its configuration and will resent any preceived attempt at reducing that control. The user community is highly skilled, highly motivated and have in general a large knowledge of PC hard- and software. They generally require state of the art software for their tasks, and the requisite hardware to run it comfortably on.

PCs are also used in the administrative and secretarial sector. Here the computer literacy and the desire to tangle with the intricacies of hard- and software is rather low. The users require a standard set of applications in a stable environment but are in general not dependend of a fast technological turnover.

The running DESY-Experiments and physics groups are as of now mainly using UNIX-Workstations and Workgroup servers and are not likely to change their running computing infrastructure. Recently, however, these groups are starting to utilise PCs as compute engines in farms, as slow control systems , and as replacements for obsolete X-terminal hardware.

There are about 2000 PCs of all makes on DESY-site, ranging from ancient 286-machines to the newest Pentium Pro. Roughly 400 PCs are replaced with newer models each year. Efforts are underway to streamline the procurment of PCs at DESY. Within the last year, socalled DESY-standard PCs have been defined as the common hardware denominator for the supported PC operating systems. DESY is now purchasing larger batches of PCs to insure largely identical hardware within a given batch. To this end, the installation of **WindowsNT** has been recently outsourced to the vendor to enforce a measure of quality control on the delivered hardware before it reaches DESY .

To this date, two PC operating system environments are supported at DESY, **WindowsNT** and the CERN NICE-system.

3 Status of WindowsNT-Support at DESY

One of the basic goals of the DESY-**WindowsNT**-Projectgroup was to have only one domain, if possible, on the enterprise network. The reason for this was to minimise the support infrastructure that has to be set up and operated, another to make it easier to integrate into the central DESY-user acounting. This domain extends to both DESY-sites in Hamburg (HH) and Zeuthen. The domain networking runs via `TCP/IP` over a 2 MBit leased line. A user group structure has been designed to subdivide management responsibilites, which allows the painless split-off of resource domains, if an urgent need arises. User groups may have their own file servers in the central domain, which are completely under their control.

The framework that was established in cooperation with the user community has a small set of fixed rules, which the users/installers of **WindowsNT**-machines must abide by to insure proper use of the network and the resources. The **WindowsNT**-NETBIOS networking is performed exclusively over the TCP/IP transport, and a WINS-Server [1] must be referenced by the individual installations. Within this framework, the DESY-**WindowsNT**-Projectgroup provides central file and print services, provides backup, maintains the account database and provides a limited application support for the user community. The group also coordinates the DESY-wide infrastructure, serves as a point of competence, provides consulting and support, advises on new installations of hard- and software and provides interfacing to the other central computing services at DESY.

The basic mainstay of the DESY-infrastructure is the group administrator. He serves as the local point of competence, through which user problems and requests are filtered, and is empowered to manage all the machines and domain users in his group. Group administrators can also manage local infrastructure and local shared applications. This framework is conducive to utilising local competence, e.g. about a specialised application, enterprise-wide. A project to have CAE/CAD software mananged decentrally by group managers of engineering groups for the whole of DESY is under way.

As of this date (15 May 1997) the central domain, `DESYNT`, contains $\sim$ 180 computers, of which $\sim$ 170 are workstations, mostly on **WindowsNT** V4.0, with $\sim$ 340 registered **WindowsNT**-users. These numbers are increasing rapidly. The resources installed in the domain are available only to domain users. The machines are served by a central infrastructure of 7 servers, 4 of which run at DESY-HH. These have following functionalities:

- one `DEC-alpha` PDC [2], which also serves as central file, product and print server. The file server holds a 16 GByte host-based RAID 5 set as home directory space and 8 GByte product space.
- one *intel* BDC [3] which also doubles as WINS server. The backup for the

[1] Windows Internet Name Service

[2] Primary Domain Controller

[3] Backup Domain Controller

DESY-HH WINS server is in Zeuthen and vice versa.
– one *intel* SQL-Server
– one *intel* Systems Management Server (SMS).

The following servers exist at Zeuthen:

– one *intel* BDC
– one *intel* WINS server
– one `DEC VMS` Fileserver under `DEC Pathworks`

There is no native e-mail service on **WindowsNT** at DESY until now. Users are explicitly instructed not to use MS Mail and Exchange clients due to their incompatibility with existing e-mail standards. Users are advised to use `pine` (with IMAP 4) or `Netscape` (with POP3) to connect to the central DESYe-mail servers.

Applications are as of now in general offered on a self-install basis. If possible, server installations of the offered products are created on the file server, which allows limited preconfiguration of the applications.

4 Expected Developments

The number of computers with **WindowsNT** is growing rapidly. It is expected that the infrastructure will have to serve between 300-400 installations by the end of the year. To retain the high level of performance, two more servers have been purchased to provide for a cleaner separation of service functionalities.

Since the DESY-**WindowsNT**-infrastructure has by now become a production environment and mission critical machines have been brought into the central domain, there is a mounting pressure by the user community to have central high availablility and reliability service. The DESY-**WindowsNT**-Projectgroup is thus investigating the available clustering solutions.

At DESY SMS is already used to take a hardware inventory of machines in the domain and to provide a limited helpsdesk functionality. The use of SMS and other management products will be expanded to inventorying the installed software, as well as deploying products.

The DESY-**WindowsNT**-Projectgroup will investigate available `AFS` and `DCE` products in order to integrate **WindowsNT**-services more closely into the general DESY-computing environment. Specifically the access to experimental data on `AFS` is a critical criterion for the physicists.