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- Hughes Network Systems (HNS)
- Environment
- Development Platforms
- Development Methodology
- System Administration
- LAN/WAN Management
- Training
- Conclusion

- **HNS designs, manufactures, installs and maintains advanced networking solutions for telecommunications in areas including satellite, cellular and enterprise network switching.**
- **Employs nearly 3000 people**
- **$800 million sales**
- **Sales and Support offices in 15 countries worldwide.**
- **Development facilities in Germantown, MD; San Diego, CA and a subsidiary in New Delhi, India. We also have sub-contractors in several locations.**

- **Distributed development over multiple sites: Germantown, MD; San Jose, CA; New Delhi, India.**
- **Major development platform: UNIX**

- **Additional platforms include:**

- **200 ClearCase and 50 MultiSite licenses.**

- VOBs

- Views

- ClearCase regions are implemented like UNIX groups. That is, we have different regions for different projects.
- Approx. 250 - 300 engineers use ClearCase.

- **We have MultiSite implemented between**

  San Diego, CA and Tel Aviv, Israel

- **ClearCase is used at HNS in a variety of different configurations:**

- **Setting up directory structures**
- **Creating Makefiles**
- **Triggers are used to implement project policies.**
- **Activity concepts**

- **For instance, si_cdpd_cu_402 is an activity for system integration for project cdpd, component cu. The new baseline will be labeled 402.**

HNS has developed scripts that aid in implementing the methodology:

- Create activity
- Set activity
- Checkin files

- **Create release**

- **Remove activity**

Issue (I): Machine containing the object that clearmake wants to wink-in is inaccessible. However, for every object it needs from that machine, clearmake times out and then rebuilds.

Desired Atria Fix (DAF): The first time clearmake times out on a machine, flag it. If other wink-ins resolve to that machine ignore it and rebuild.

I: To use ClearCase from DOS (using PC-NFS) is inconvenient.

DAF: Provide a "lite" version for DOS users. This version should have as much of the functionality of the UNIX version as possible but should run natively on DOS.

Tasks:

- **Installing and Maintaining ClearCase**
- **Adding/Moving VOBs**
- **Exporting/Moving Views**
- **Backup/Restore ClearCase data**
- **Kernel Configuration**

I: VOB contains references to non-existent views. This causes problems when trying to wink-in derived objects. This is caused by:

- **Users who use “rm” to remove the view storage area.**
- **Administrators who move views storage areas, but fail to update the registry server.**

HNS Fix (HF): Script that cleans up the references to non-existent views.

I: View references in the VOBs do not get updated when views get moved.

HF: Users must perform a write operation in each VOB that holds a reference.

DAF: Provide a way to automatically update these references

I: Root access is required to export views for DOS users.

DAF: Add a "cleartool export" command similar to "cleartool mount".

I: Machine names are hard-coded in view paths. When views are moved the registry needs to be updated.

DAF: Allow automount paths for views. This way when views are moved only the automount entry has to be updated.

I: There is no easy way to collect statistics for routine operations.

- **How long would it take to reformat a VOB?**
- **How long would it take to create a replica?**
- **How do I find out how much the VOB has grown?**

DAF: Provide scripts that can analyze VOBs and views to give this information.

- **l: Ensuring that the daemons are running all the machines.**
  - **the albd server dies**
  - **the view server process gets corrupted.**
- **l: Ensuring that the proper patches are installed on all workstations in which ClearCase is installed.**

Tasks:

- **Network**

- **Subnet configuration**

- **VOB, License and Registry server availability**

I: The registry information is kept in one machine. This is a single point of failure and also causes network congestion as all machines have to go to one server for path resolution.

DAF: Allow replication of the registry information so it can be put on multiple servers.

I: If licenses have to be pooled they have to be put on one license server. This is a single point of failure.

DAF: Use a scheme like flexlm so that licenses can be placed on multiple servers.

I: VOB server available on one subnet needs to be accessed from multiple subnets (20 subnets and 6 sites). This causes congestion.

HF: Added multiple Network Interface Cards (NICs) to some VOB servers. We are also investigating Sun sparc 1000 and NAC FAServer as possible VOB servers.

I: HPs implementation of NFS causes problems. When a machine goes down all other machines that have it mounted start timing out.

HF: We no longer mount all public VOBs on every machine. Each machine contains a VOB list. We have modified "rc.atria" script to just mount the VOBs contained in that list.

I: VOBs were initially mounted using generic /net mount point. Accessing a machine with this mount point causes all the disks in that machine to be mounted.

HF: We changed this to a dedicated VOB automount point.

I: There is no easy way to find out the resource utilization (CPU, NFS, memory, network bandwidth) when using ClearCase. As the operations are spread over multiple machines and subnets, traditional tools like iostat, top, netstat and even sniffers are not useful.

DAF: Provide a way to collect and analyze this information. This will help tune ClearCase environments better.

I: When using ClearCase there is no easy way to trace which machine or which part of the network has a problem. Due to large number of views and machines we have a increased chance of time-outs and connectivity problems.

HF: We use sniffers, Open view and a number of scripts to look at the machines and the network.

DAF: Atria should provide a way to trace the access. A graphical picture of which machines are being accessed would help.

Issues:

- **Unfamiliarity with UNIX:**

- **Unfamiliarity with ClearCase:**

- **Solution:**

- ClearCase is now our engineering CM standard.
- ClearCase and MultiSite have proved invaluable in our environment.
- Atria support has been very helpful.
- We hope to work with Atria in addressing some of the problems we have had in supporting a large scale distributed development environment.