EIAL-NJ (FPK)
ClearCase Administration:
Tasks for Bringing a New ClearCase Server Online

Preface

Purpose: To summarize the tasks needed in EIAL-NJ Florham Park (henceforth referred to as "FPK") to bring an HP server into service as a new ClearCase server, usually a VOB or view server, but sometimes a MultiSite hub machine, or a build or tools view server.

Audience: FPK ES system administrators;
FPK SCM ClearCase/MultiSite administrator, and his backup.

Terminology:

ES	→ The systems administrators in FPK (Engineering Services)
UXSCM	→ The overall HP-UX ClearCase program, and related processes.
(FPK) SCM	→ FPK ClearCase administrators and processes
MS Toolkit	→ The MultiSite Admin Toolkit, a set of UXSCM Tools provided by Doug Robinson (UXSCM Architect) and essential to UXSCM operations.

Related documents:

- `<anymachine>:/MultiSite/admin/doc/MultiSite-Jazz-Admin.txt`, which is Doug Robinson's interim (until [if] he writes a real document) notes on administering a ClearCase/***jazz*** system.
- *Business Partner Access to UXSCM System: NJL Rollout, 4Q97*, Tim Gill

Issues: I noticed in doing a version in 1999 that I had been entering notes here as though I were only concerned about adding a new machine to an existing region. If we ever add another region (e.g., for Veritas or for the "2nd HP region"), I would need to expand this more, since there are many additional steps that must be taken when creating the 1st VOB and 1st view server for a region.

Status: This document has evolved since 1997 and is still a living document. Be sure you have the latest version!

1. Introduction

When we setup 5 new K-class HP servers on as ClearCase machines for the business partner effort with NEC and Hitachi, in the Nov '97 – Mar '98 time period, we only had a basic list of tasks that needed doing, in the planning document mentioned in the *Preface* above. We found that this was insufficient and had not been updated to accurately reflect all that was needed. We used that list to setup the "new" `njlsrc1` in late 1998 and things went well with that. They also went well with `view4` in early 1999, which we did in about 4 days, from hardware setup to giving Louie free rein on it as a build machine. We have continued to use this document since then for other machines, and we update it each time we use it to refine our process.

Thus this document is meant to be a living document that contains updated material as we learn the best way to configure and administer the FPK ClearCase systems.

2. ES: Preliminary Tasks

This section contains the tasks that the ES group must first do to bring up a new ClearCase server machine. Until the items in both of these sections are done, the ClearCase administrator cannot do *any work* to setup the machine for ClearCase.

2.1. Initial Setup of the Machine

This section lists tasks that ES must do during the basic setup of the machine. *This list only reflects those tasks of particular interest to the SCM team, and must be complemented by the list of tasks that ES itself normally does (and which it maintains on the FPK ES Web site).*

A. Ensure the machine is setup, hardware and networking, in the proper region (firewall) in the production lab. There are 3 regions for ClearCase in FPK:
   - FPK-HP for HP machines on `net15`
   - FPK-NEC for NEC firewalled machines
   - FPK-Hitachi for Hitachi firewalled machines

   We're running 100BaseT networking in (all? the HP?) regions.

B. Get the machine running HP-UX:
   - view servers: HP-UX 10.20
   - VOB servers: HP-UX 11.0
   - others: depends…ask ClearCase administrator… hopefully. HP-UX 11.0

C. As of June, 2000, we are installing VxFS 3.3 on our HP-UX 11.0 machines, because of a defragmenting bug that corrupted some Cupertino VOBs this month. Chris has done this once now, on the first 11.0 machine (`njlsrc2`) and found it on the Web.

D. Ensure the OS installation includes the following:
   1. The SD-UX product *The Advanced VxFS File System*, `AdvJournalFS`.
   2. *HP C/ANSI C Compiler* (SD-UX product `C-ANSI-C`).
   3. *HP GlancePlus/UX* (SD-UX product `Glance`).
   4. *HP-UX CDE User Interface* (SD-UX product `CDE`).
   5. The `sar` software in the SD-UX product *OS-Core.SYS.ADMIN* must be properly configured.

E. Install the latest UXSCM HP-UX patches from the local FPK swinstall depot of those patches. Chris Hodson maintains a weekly mirror of the official UXSCM Tier1 patch set in a standard location; check it out with the command:

HP-UX 10.20	`swlist -s njldepot:/mirror/nebraska.cup.hp.com/var/spool/sw`
HP-UX 11.0	***TBD…***

   Tier1 means that Cupertino has verified this set of HP-UX patches on their machines and is satisfied that they are stable for user machines (i.e., view servers).

F. As of early 1999, all new ClearCase machines were being ordered and setup with a Model 12H AutoRAID unit. This allows for robust growth in view and VOB space on any machine. In September, 1999, Cupertino had a disaster with an AutoRAID unit caused by bad firmware. As a result of that, until further notice, all new AutoRAIDs **must not have firmware level 54** but must be upgraded to firmware level 56.

G. As of June, 2000, we learned how to use mirroring on the internal drives, making them truly usable for something (like the OS). In addition, we started getting machines with 9-GB, 18-GB, and 36-GB internal drives (usually 2), so with mirroring, the internal drives are now truly usable for the OS and for ClearCase.

H. Configure disk Volume Groups as follows:

- `vg00` on the AutoRAID unit, for the OS and applications; usually about 8 GB; the applications include ClearCase as of June 2000, when we decided they could share `vg00` on internal disks, now that we can mirror the internal disks for redundancy protection
- `vg01` on the AutoRAID unit, for VOBs, views, and where needed, home directories

The use of `vg00` was agreed on between Chris and Tim in June, 2000, so that ClearCase could be installed in a volume group separate from views and VOBs, allowing for easier moving of `vg01` from other machines (using `LVM` etc) when upgrading machines. It specifically allows for ClearCase to be installed ahead of time on a new machine, and then have the VOBs imported from another AutoRAID. We had considered using a `vgcc` VG for awhile, but decided it was unnecessary, and was a problem when we wanted both the OS and ClearCase on the internal drives, and they could only be in a single VG.

I. Setup the following file system sizes in `vg00`:

- 1,000 MB for `/var`, to allow for the space needed by lots of patching of HP-UX
- 1,000 MB for `/var/tmp`
- 1,000 MB for `/tmp`

G. Ensure that `xntpd`, the Internet Time Protocol Daemon, is running and properly synchronized with the proper master machine in its region in FPK. This was not properly configured on most machines until September, 1999, and so it is important to follow the setup done at that time by Susan Albers.

H. Ensure that, if the machine is in the NEC or Hitachi subnet, that TIS has configured the firewall router to allow the necessary TCP/UDP traffic through:

- `swinstall` from `nebraska.cup.hp.com`
- `ninstall` from `nebraska.cup.hp.com`
- `xntpd`
- MultiSite TCP packets for port 371 and the port range 7512-7640. If we are still running ClearCase 3.2.1 and not 4.0, then the UDP port 371 must be allowed as well.

2.2. Getting the Machine Usable by ClearCase Administrator

ES must also do the following steps before the ClearCase administrator can effectively do any of his configuration work. These tasks do not affect the basic setup of the machine, but must be done before ClearCase is installed.

A. ClearCase needs world-read access to `/dev/lan*` (on HP-UX 10.20) or `/dev/gelan*` or `/dev/ether*` (on HP-UX 11.0), so these should be available and have permissions `crw-r--r--` before ClearCase is installed. (This is required because, in order to be able to create UUID's, ClearCase needs a MAC address (part of what guarantees that no two UUIDs *in the world* are ever the same). ClearCase will whine when it starts up if it can't read the MAC address from some suitable network device.

   (At one time, we were confused because we did not know that the device name changed in 11.0. Also, the security issue is known, and is considered a cost of doing business with ClearCase).

B. Install the `ninstall` binary into `/usr/sbin` and configure it in `/etc/services` (which is normally maintained in NIS). Make sure you have the latest Y2K-compliant one from this source:
   `ninstall -vvvhnexus.hpl.hp.com ninstall`

C. The use of `cron` must be enabled for `root`, `vobadm`, and `gill` on all machines, and for all users on a view machine.

D. The standard ES `crontab` entry for `root` for FPK must be setup as the `root` cron job.

E. Ensure that NIS is configured to use the NIS server in the particular region, as appropriate.

F. The `remsh` command must work between all machines within a (firewalled) region.

G. The `ssh` command must be installed, as many EIAL-NJ ClearCase admin scripts depend on it.

H. Ensure that DNS "name server caching" is configured on all ClearCase servers that are MultiSite machines (i.e., VOB servers and MultiSite Hub workstations). This is usually done in `/opt/domain/named.boot`.

I. For machines in the HP region (not partner regions), ensure that the file `/etc/resolv.conf` follows 2 UXSCM conventions:

   - the first line must contain the `domain` line:
     ```
     domain fpk.hp.com              # for HP region
     domain fpk.external.hp.com     # for partner regions
     ```
   - the 2nd line must be:
     ```
     search fpk.hp.com  fpk.external.hp.com  cup.hp.com  hp.com
     ```
     so that domain name searches reflect the most-used domains for our ClearCase servers.

J. Ensure that the `sudo` package is installed and working for the users:

   - `gill`
   - `fjb`
   - `vobadm`

K. These users should also be allowed to login, even if this is a VOB server, and should have their home directories properly mounted from the machine in the region that hosts home directories.

L. Ensure that `sendmail` is configured to allow mail to be sent.

M. Ensure that users other than those in the `scmadm` group cannot `login`, `telnet`, or `remsh` to a VOB server or MultiSite hub machine.

N. Allow the console to be accessed via a console server.

O. Ensure that the machine is added to the appropriate `netgroup` group for production ClearCase machines, such as `phtccc`, so that a single netgroup can be specified by the ClearCase admins in the `/etc/exports` file.

P. Configure `lp` to work to the local FPK printers.

3. ES: Other Tasks

This section contains other tasks that the ES team must accomplish on all new ClearCase servers before they can enter production use. These tasks can be accomplished in the same time frame as the SCM team is configuring ClearCase and ***jazz*** on the machine.

3.1 UXSCM-Mandated Configuration Changes

1. The file `/etc/logingroup` must be a symlink to the file `/etc/group`. This enables the "BSD groupset accounting" semantics for group processing, which ***jazz*** relies on.

2. If a VOB server, the login `vobadm` and the group `uxdev` must exist in the *local*, non-NIS version of the `/etc/passwd` file and `/etc/group` files, respectively, in addition to being in the relevant NIS maps for those files. This prevents the following scenario from occurring: 1) the NIS server fails while a MultiSite import of packets is occurring or about to start; 2) since the user id for `vobadm` is not available, packets are imported with the wrong owner/permissions and the database gets corrupted. This has happened to Doug Robinson before, and takes a lot of effort to recover from, so preventing it is now standard UXSCM practice.

3. Create a symlink from `/nfs` to `/net` (this gets around an assumption in the **jazz** code that we do not use here in FPK).

4. Create a symlink from `/static/`*`newname`* to `/` so that the ClearCase global path names for VOBs and views resolve correctly.

5. NFS configuration changes (where are these done?):
   - for view servers:
     ```
     NUM_NFSD=128
     NUM_NFSIOD=128
     ```
   - for VOB servers:
     ```
     NUM_NFSD=128
     NUM_NFSIOD=32
     ```

ALERT: 1-May-2001, Doug noticed that we had 128 `nfsd` processes on a VOB server(what the `NUM_NFSD` parameter starts) and said we should only have 32 or so. So I looked in the `MultiSite-Admin.txt` file he maintains and it talks about 64 for view servers in Cupertino. I suspect he changed that doc and I didn't notice the change, and so our settings here need to be updated, and they need to be updated on all machines.

3.2 UXSCM-Mandated Kernel Configuration Changes

The aspect of ClearCase administration around UXSCM-specific kernel configuration tuning has not been well-documented by the UXSCM architect, and has been a pain to do in FPK. To some extent, it is still a practice of old-style Unix magic in Cupertino. Doug claims (Oct 99) that this is going to get addressed soon for all UXSCM partner sites, but we shall see.

We typically have just copied the kernel configuration from the most recently installed server of the same ClearCase type (VOB or view server). But I spoke to Doug again on this issue at some length in October 1999, and April 2000, and his basic suggestion is that we copy the settings in the `/stand/system` file from a comparable (VOB or view server) machine in Cupertino (taking into account variations in the amount of RAM), as well as ensure that the following changes are addressed. He mentioned in particular a few parameters, which I will summarize below.

A. On view and VOB server machines that have at least 2GB of RAM, the `maxusers` parameter should be set to `8192` on HP-UX 10.20 machines and `4096` on HP-UX 11.0 machines. This large value affects many other kernel tables and makes them large enough to handle the typical UXSCM server requirements.

B. There are several paragraphs of information about disk buffer caching parameters `dbc_max_pct` and `dbc_min_pct` in Doug's text document mentioned in the Preface. I quote:

> *2. Buffer cache size (actually Quadrant 2 Kernel Memory Sizing) must *NOT* be set "too large" or performance will suffer:*
>
> *HP/UX breaks system memory into 4 Quadrants. On a 32-bit PA processor (or a 64-bit PA processor running in 32-bit mode) each quadrant has a 1Gb maximum. The buffer cache is allocated out of quadrant 2 as are certain other things (the set of tables, etc. that are allocated out of quadrant 2 is currently being researched: I'll update this with more information when I have it). While the kernel has special code in it to allow more buffer cache than can fit in a single quadrant, the ensuing thrashing of memory means that it costs more to have such a large buffer cache than to simply re-fetch the disk block, especially from some of our faster cached RAID boxes.*
>
> *Therefore, in order to obtain maximum performance from your 32-bit PA (or 64-bit PA running a 32-bit HP/UX), you should set your configurable parameter "dbc_max_pct" so that the maximum amount of physical RAM that the buffer cache will consume does not exceed 900Mb (or so). This will leave 100Mb for the other, as yet undetermined, stuff co-located in quadrant 2 with the buffer cache.*
>
> *UPDATE: We've been informed by one of the kernel team that there is nothing else in that quadrant with the buffer cache. Therefore I'm recommending the full 1Gb for the limit on 32-bit HP/UX OSs {10.*, 11.0-32}. If anyone determines this to be incorrect please contact me immediately.*
>
> *As noted above, I will update this section as soon as the more information is known.*

Although he does not say so, I believe this applies to VOB servers in particular. From this and from various e-mail on the subject I have collected over the past 2-3 years, I summarize the needs on this as follows:

Set `max_dbc_pct` to the percentage value computed from the formula 1000 / *RAM-in-MB*. Thus, for a typical NJ VOB server which has 2 GB or 2048 MB of RAM, the formula yields 0.5 and so you would set `dbc_max_pct=50`. For the `dbc_min_pct` parameter Doug recommends setting it 10% less than the value of `dbc_max_pct`, or 40% in the case.

C. DO NOT set the `large_ncargs_enabled` parameter to 1, which has recently been done in NJ. It should not be set. The reason for this is as follows:

> *This is a UXSCM-wide standard (set off, or `0`), and is done to prevent problems with source code and partners. The problem is this: if we set it here in NJ—because some developers have "too much stuff" in their environment and so are running up against the limit of number of characters in their environment/argument lists (20K)—then a makefile in their source could rely on this being set and work here in FPK but not in Cup during integration or at a source code customer site. Any such developer should learn to reduce the number of things in their environment and not rely on our changing the kernel parameter (which has the effect of raising that 20K limit). We need our products to work for other partners and customers who may not enable this (and may not want to).*

In summary, use the following table to set kernel parameters for NJ ClearCase servers. For the parameters not yet mentioned above, in this section, the ones in this table are the ones Doug told me we should set and copy the Cupertino values:

Parameter	NJ setting for 10.20 VOB servers	NJ setting for 10.20 view servers	value set in Cupertino *(based on my limited access to 2 view servers and 6 VOB servers)*	Comments on Apr 13, 2000 FPK status
maxusers	if RAM >= 2GB, then 8192 for 10.20 systems 4096 for 11.0 systems	*same as for VOB servers*	yes, like this	*OK*
dbc_max_pct	100*(1000/RAM-size-in-MB), probably about 50	*depends on RAM and view usage, but default might be OK*	*mostly defaulted (50)*	*mostly defaulted (50)*
dbc_min_pct	dbc_max_pct - *10* (probably about 40)	default is OK, I think	*mostly defaulted (5)*	*mostly defaulted (5)*
large_ncargs_enabled	0	0	defaults to 0	*How did this get set to 1?*
create_fast_links	1	1	1	*not set now*
eqmemsize	2000	do not set	set on most VOB servers to 2000, though RAM varies from 2-6 GB	*not set…concerned about Doug's recommendation, given Cup settings*
kern_vm_pct	do not set	do not set	not set, and sysdef does not show any value for it	*How did this get set to 10?*
kern_vm_scan_rate	do not set	do not set	not set, and sysdef does not show any value for it	*How did this get set to 10?*
maxdsiz	0X18000000	0X18000000	mostly 0X18000000	*mostly set to 0X10000000*
maxfiles	512	512	512	*OK*
maxfiles_lim	2048	2048	2048	*OK*
maxssiz	0X04000000	0X04000000	mostly 0X04000000	*mostly OK*
maxtsiz	0X10000000	0X10000000	mostly 0X10000000	*mostly OK*
maxuprc	1024	1024	1024	*mostly 975 now*
semmni	126	126	mostly 126 or 128	*mostly 1024 now*
semmns	256	256	256	*mostly 2048 now*
swapmem_on (for pseudo swap)	1	1	defaults to on	*Why is this set to 0 in FPK?*
timeslice	10	10	defaults to 10 on 10.20 machines	*somehow set to 1 now—must be changed!*

2.3. Changes Needed for Partner View Machines

EIAL in FPK started working with NEC and Hitachi in 1997, collaborating on HP-UX development. In about 1997, they became more officially development partners, and the "Business Partner Access" program was started to allow them official, HP-sanctioned and HP-monitored network access, via a firewall, to our ClearCase servers. This project used the BPA acronym for awhile, but is mostly now just referred to as "partner access".

If the new machine is a view server in a partner (NEC or Hitachi) region, then these additional changes need to be made:

1) POP access for e-mail is required.
2) `mailx` and `elm` must both be supported.
3) Mount, from the proper server for these file systems in the region, these shared resources:
   - `/fs/add-on`
   - `/fs/public`
   - `/fs/support`
4) The `q4` product must be installed.
5) Access to appropriate lab machines must be possible.
6) Console server access must be provided to ES and SCM team members.

4. SCM: Standard FPK ClearCase Server System Setup

This section describes the work that the FPK ClearCase administrator must do to set up ClearCase, MultiSite, and perhaps ***jazz*** on a new server within an existing region (to create a new region, more steps are required and have not yet been incorporated into this document). These tasks can only be done after ES has done the tasks in sections 1. and 2. The quick checks to see if this has been done are as follows:

1. Try to do an `rlogin` to the new machine, and see if I get my home directory and TCE.
2. Try `/opt/sudo/sudo id` and see if it works.
3. Try `vgdisplay` and see if `/dev/vg01` is ready for my use.
4. Try `swlist -l product` and see if the `AdvJournalFS` product is installed.
5. Verify that `/usr/sbin/ninstall` or `/usr/sbin/ninstall` is there and that `ypcat services` shows it configured with a port.

These quick checks are not sufficient to put views and VOBs on the machine, but do let me get started doing my work. If they are not done, I cannot really make any progress.

This section is based on both local FPK standards, and the overall UXSCM Program standards. The local FPK standards concern how consistent file systems, directories, and symbolic links are used to improve overall SCM administrative efficiency, and how `cron` jobs are handled.

4.1 Standard FPK ClearCase File System Setup

After a few years of ClearCase work with Cupertino, and going from 2 or 3 servers to a lot more (now 15), it became essential to have a standard machine setup to streamline ClearCase and UXSCM administration in FPK. The essentials of this setup have evolved to be as follows:

- There is a region for each firewalled partner (now 3: HP itself, NEC, and Hitachi). This region corresponds to a ClearCase and jazz *region* (which are different from each other), and they are commonly referred to as "the HP region," "the NEC region," and "the Hitachi region." All 3 are "`/ux` regions" to ClearCase.
- Each jazz region needs a *control node*, which is where a jazz meta-data directory resides and from which it is NFS-shared to other ClearCase machines in the region. Since there is also a need for a ClearCase *license server* and a ClearCase *registry server*, as well as a machine in each region that functions as a ClearCase *release server*, we have made the control node handle all 4 of these roles. Around FPK and with the ES staff, we call this the *primary VOB server*.
- The FPK ClearCase administrator needs a shared tools directory, and so this naturally gets located on the *primary VOB server* as well. This is `/ClearCase/njl/adm/bin`, naturally enough.
- In order to have a handle on the SCM disk space requirements across all our servers, the goal is to have each VOB and view in its own file system, and to have the `/ClearCase` file system on each machine contain all ClearCase and jazz files that are not VOBs or views. Thus, the main directories for ClearCase (`/var/adm/atria`, `/usr/atria`, and ?) are ideally symlinks to the `/ClearCase` directory, and the main directory for jazz (`/usr/local/scm`) is also a symlink to the `/ClearCase` directory (in practice, I have not been able to get the (`/var/adm/atria` directory to be a symlink—ClearCase refuses to install). This isolates the SCM-specific applications and data from the OS part of the system. We put the ClearCase and **jazz** applications in a logical volume in the volume group `vg00`; this makes machine upgrades easier using low-level Logical Volume Manager (LVM) commands and mirroring to move ClearCase view and VOB files from one machine to another, independent of the OS setup or the installation of ClearCase or **jazz** themselves.
- Critical file systems shared across servers with NFS, except for view file systems, are mounted at `/static/`<*host*>.

The script FPK-standard-new-ClearCase-server-setup implement the details of this setup. Use it as part of the overall initial setup of the file systems on the machine; follow these steps (use /opt/sudo/bin to be root in these initial steps):

A. Mount /ClearCase from control node for the region, to /tmp, so that FPK administrative SCM scripts are available. Put /tmp/ClearCase/jazz/global/.NJL-local/adm/bin in your PATH. Do not mount it to /ClearCase since that is created as a file system in the next step.

B. Run the FPK script FPK-standard-new-ClearCase-machine-setup to create new ClearCase file systems (including the local /ClearCase file system, and /MultiSite if this is a VOB server) and basic symbolic links. This adds proper links of standard directories like /usr/atria and /usr/local/scm to the file system structure used in FPK.

The UXSCM Program recommends a 2 GB /MultiSite file system. Although it rarely uses this much on a day-to-day basis, when new VOBs are re-created VOBs are replicated, this much can be required.

C. Unmount the temporary mount of /tmp/ClearCase.

D. Create the directory /static/<*controlnode*>/ClearCase and an /etc/fstab entry for <*controlnode*>:/ClearCase for mounting at /static/<*controlnode*>/ClearCase, and mount it there.

E. **Can't script do this????** → Create a symlink from /ClearCase/njl to /static/<*controlnode*>/ClearCase/jazz/global/.NJL-local to allow usual FPK SCM admin access to the FPK SCM admin tool directory.

F. Add the new machine name to the .rhosts file in /root_home on all ClearCase machines in the region, and copy such an .rhosts file to the same directory on the new machine. This allows the root user to do remsh commands, a capability which is needed by some local FPK SCM scripts.

G. All administrators should add the new machine name to their own .rhosts file and make sure the updated .rhosts file is copied (no links) to their home directory in all regions.

H. The home directory for the vobadm user is mounted from the /ClearCase directory on the primary control node. So, for each server, the directory /home/vobadm should be setup as a symlink to the /static/*controlnode*/ClearCase/users/vobadm directory on the control node. (Sometimes this has been done by ES as part of the process of setting up /home in general.)

I. *Tim only:* for the customized work environment he uses, he should also:

- on sneezy add machine to his _1A functions in the file TCE/.kshrc-ClearCase
- on sneezy update the .netrc file to allow ftp1 to work
- on sneezy run the command ssh <*newmachine*> and respond yes to the prompt, to get the new machine added to the file sneezy:~/.ssh/known_hosts. This will enter a remote shell on the new machine, but just exit out of it.

H. Ensure that the /etc/PATH file on the server contains these directories, if they are on the machine (it depends on whether it is a VOB or view server, or MultiSite hub workstation):

- /usr/atria/bin
- /usr/local/scm/bin
- /ClearCase/njl/usr/bin

J. July 2001: we need to make c the same across the region… what are the requirements on this file system? Without it being there, the vobadm cron job will generate an error every 20 minutes.

4.2 FPK SCM Standard ClearCase `crontab` Setup

The FPK standard SCM `cron` setup accomplishes several purposes:

- prevents the `root` user from getting any ClearCase `cron` job mail—this is quite important, since the ES administrators get plenty of `root` mail as it is and DO NOT WANT ClearCase `root` mail
- allows consistency in format of entries, which makes comparing crontabs easier (this has to be done fairly often to spot problems)

To setup this `cron` standard, do:

H. Copy the standard FPK cron-enabling script `run_cron_job` to `/usr/sbin`. This script causes cron jobs which have to be run as `root` to send mail only to `vobadm`, since our ES admins do not want ClearCase e-mail. By putting it in `/usr/sbin`, it is in the path of all cron jobs that execute.

I. Setup the `crontab` entry for `vobadm`. Do this either using the `crontab` file stored in SCCS in `/ClearCase/njl/adm/cron/bin/SCCS/s.crontab` or copying a similar one from another machine (the former should be the best way, as I try to keep that file consistent). The crontab for user `vobadm` does not vary much from machine to machine, if at all, since it runs only the administrative monitoring scripts.

J. Setup the `crontab` entry for `root` by using and modifying as needed the ClearCase-related entries in an existing machine's `crontab` entry for `root`. Respect VOB/view machine differences in the entries and adapt an appropriate one. Note the timing differences among MultiSite scripts across the various VOB servers within a region; maintain this so that the load on each regions MultiSite Hub machines is not excessive.

4.3 UXSCM Standard ClearCase and *jazz* Installation and Configuration

The tasks for setting up a new VOB or view server are covered in Doug Robinson's currently minimalist ASCII document, `/MultiSite/admin/doc/MultiSite-Jazz-Admin.txt`. This document will soon **[I HOPE!]** reflects everything in that text file, for the version dated Aug 4, 1999

```
(-r--r--r-- vobadm sys  32786 Aug  4 14:49 /MultiSite/admin/doc/MultiSite-Jazz-Admin.txt).
```

Make sure that there are no new tasks in this file—Doug does not always tell us when he updates it.

Note that some of the tasks needed for making our servers have standard UXSCM configurations are fairly simply (e.g., an `ninstall` from `nebraska` in Cupertino). I have still made a local FPK administrative script to do these, for 2 reasons: it is easier to get consistent file naming out of my `run` script (which records all administrative scripts run in the `/ClearCase/njl/adm/run-logs` directory in each region), and sometimes there are additional steps that experience has told me are easier to roll up into a short script.

K. Install ClearCase from the *release host* for this region. If this is a VOB server, install MultiSite as well as ClearCase when the ClearCase install process gives you a chance to do so. The release host for each of our 3 regions is the ***jazz** control node*, the VOB server whose name ends with a "`1`" (i.e., `njlsrc1`, `necvob1`, `htcvob1`). Each of these has various release areas (perhaps several for different releases of ClearCase) in `/ClearCase/rls`<*number*>.

   The FPK setup has `/usr/atria` as a symlink to `/ClearCase/atria`, and so when the ClearCase install script asks where to put the install, the reply is `/ClearCase/atria`. If this is not a symlink at that point, the install will end up in the `/usr` file system.

   I typically use the local SCM admin script `install_ClearCase_`<*number*> to install the current version.

   NOTE: If the ClearCase installation fails in the final step and then complains that "all files are up-to-date" then just rename `/var/adm/atria` and try again. That seems to be the key directory it checks for when deciding whether to update itself (if `/var/adm/atria` contains past logs, be sure to rename it back or copy them back).

   If this is a MultiSite Hub machine, then you do a "shipping-server-only installation."

L. If this is a view server or the *control node*, install ***jazz*** from `nebraska.cup.hp.com` using `ninstall` (***jazz*** gets installed on all view servers and on the VOB server that functions as the control node for a region. It does not get installed on the other VOB servers, or on the MultiSite Hub machines).

   The instructions from Cupertino for jazz installation almost always say to also run the script `z_setup_scmnode`. However, I sometimes have problems with it, and it has never been clear to me that this is really needed for most installations (i.e., dot releases and patches); I concede it might be needed for major releases. The main problem I have had with it is that it assumes some Cupertino practices that we do not do here, and so it generates a few confusing error messages; it also has in the past updated `cron` jobs in a way that has wiped out local FPK customizations, though I think that was fixed in A.07.06 P9.

   I usually use the local FPK SCM admin script `install_jazz` to do this. Check to see if the current version of this script invokes the dreaded `z_setup_scmnode` script, and decide if you want to do so.

M. Until 1999 sometime, we created a symlink from `/usr/local/scm` to `/ClearCase/usr/local/scm`; now, more simply, the symlink is from `/usr/local/scm`

to /ClearCase/jazz, and this results in a local copy of the **jazz** commands being installed on each **jazz** machine, but a single shared directory for the **jazz** metadata (the global directory) available through several symlinks, from /usr/local/scm/global eventually to the mount point, /static/njlsrc1/ClearCase/jazz/global.

N. If this is not the ***jazz*** control node, replace the symlink that the ***jazz*** installation process does from /usr/local/scm/global to /nfs/*controlnode*/usr/local/scm/global with one instead to /static/*controlnode*/ClearCase/jazz/global.

O. Check /usr/local/scm/global/sys/regiondef file to ensure proper configuration for region and site differences.

P. Install the standard "UXSCM standard perl" package from nebraska in Cupertino (package name is Perl5). This should be done on both VOB and view servers (new requirement agreed to with Doug on June 19, 1998). And as of Aug 1999, there is no longer a "MultiSite Perl" package required for using ***jazz***—all of ***jazz*** makes use of this Perl5 perl package (installed in /opt/perl5).

Q. Disable (by renaming) the rgy_backup.sh and vob_snapshot.sh scripts, per Doug's document. These are both in /usr/atria/config/cron.

R. Create the 2 files file /var/adm/scm/log/SCMlog and /var/adm/scm/log/SCMmakeLog, and make their permissions –rw-rw-rw- (anyone can modify). Otherwise, some user commands will not work.

4.4 VOB Server Preparation

If this machine is going to be a VOB server, then the following VOB server-specific tasks are required:

1. Update the 2 critical VOB server ClearCase parameters:
   - the `lockmgr` parameters in `/usr/atria/etc/atria_start` file
   - the `vobrpc_server` parameter in the file `/usr/atria/config/services/albd.conf`

   For details, see Doug's document.

2. Install the UXSCM MultiSite Toolkit, which enables standard UXSCM MultiSite processing across all 5 (or more) primary HP-UX UXSCM labs around the world. This is done with `ninstall -vvhnebraska.cup.hp.com SCMWG-MultiSite-Toolset`, or with the FPK script `install_MultiSite_admin_tools`.

3. Edit `/var/adm/atria/config/shipping.conf` as follows:
   a. change the `ADMINISTRATOR` field to direct e-mail to `vobadm`
   b. change the shipping bay information to:
   ```
   STORAGE-BAY  -default  /MultiSite/shipping/ms_ship
   RETURN-BAY   -default  /MultiSite/shipping/ms_rtn
   ```
   c. set the `EXPIRATION` field to `0`:
   ```
   EXPIRATION -default 0
   ```
   d. set the `ROUTE` information *[find out what FPK should use here…it is different!]*
   something like: `ROUTE mshub.cup.hp.com -default`
   e. add the following to the end of the file:
   ```
   # RECEIPT-HANDLER storage-class script-pathname
   # RECEIPT-HANDLER -default /usr/adm/atria/config/logit.sh
   # You can specify a script for the shipping_server to run for each packet
   # that it receives into a shipping bay. You specify the script in the
   # shipping.conf file.
   RECEIPT-HANDLER -default /MultiSite/admin/bin/logit.sh
   ```

4. Create `/ux/` mount points for all VOBs in the region, with owner `vobadm` and group `vobadm`.

5. If this is the control node, then edit `/etc/fstab` to include all NFS mounts of VOBs from the other VOB servers in the region to `/static/<remote-VOB-server>/fs/vob/<vobname>` on this machine.

6. Copy the file `zchochg_trigger` from `/MultiSite/admin/bin` to the shared jazz directory `/usr/local/scm/global/tbin`. *Note that this latter directory would not normally be mounted on non-jazz VOB servers, but is needed to be for this reason alone; this is awkward, but what the heck.* Since **jazz** is installed locally on each **jazz** machine, but the `/usr/local/scm/global` directory for it is shared from the control node for each region, the symlink on non-**jazz** systems pointing to `/usr/local/scm` will be different than on the control node.

7. Run the **jazz** script `zsetup_scm_node` (this is apparently more important the first time one sets up a system than on various **jazz** updates over time, since the first time it creates the view `scmDefault_view` for you).

4.5 View Server Preparation

*[Jul 2001:] Need to revise this section to reflect "region" differences in **jazz** & ClearCase, and the fact that we will now have an `/ha` region of the ServiceGuard VOB's.*

If this machine is going to be a view server, then the following view server-specific tasks are required.

1. Assuming you just installed ClearCase and the machine has rebooted, stop ClearCase (try using the FPK script `STOP` for this).
2. As `root`, create an NFS mount point for each VOB in the region on this view server, in `/static/`*`<remote-VOB-server>`*`/fs/vob`. [tool hint: `host=`*`xxx`* `step=1 ccdo vob`]
3. Copy the set of `/etc/fstab` entries for all UXSCM VOBs (not other FPK but non-`/ux/` VOBs unless requested) from some other existing view server to the `/etc/fstab` file on this machine.
4. Run `mountall` as `root` to mount all the remote VOB file systems over NFS.
5. Start ClearCase (try using the FPK script `START` to do this). This should do a "ClearCase mount" of all of the VOBs in the region on the machine.
6. As `root`, create the ClearCase mount point for VOBs via MVFS: the directory `/ux`.
7. Create the file *hostname*`.start` file in the directory `/usr/local/scm/global/sys` probably using a symlink like the other files there. This lets **jazz** control the starting of ClearCase and mounting of VOBs.
8. Copy the `zprevent_info_dest` script from `/MultiSite/admin/bin` to `/usr/local/scm/bin`. The file should be owned by `root` and the permissions should be 555.
9. Tune the MVFS cache parameters. This is something that should be checked every time ClearCase is installed, not just when a machine is setup.

   The original text document authored by Doug and referenced above suggests setting the `mvfs_largeinit?` parameter to 14. But in early 1999, I tried to do machine-specific tunings in FPK for each machine, and succeeded fairly well until setting one or two of them too high resulted in a `malloc` core dump and crash of the machine. I have not re-visited this issue since then, but should.
10. For 10.20 systems, tune the network by running
    ```
    /usr/contrib/bin/nettune -s -w ip_intrqmax 1000 # use ccdo nett
    ```
11. Tune the ClearCase view cache: in the UXSCM Program, we set the site default view cache size to 4MB. This is done by executing the following command:
    ```
    cleartool setcache -view -site -cachesize 4m
    ```
    If you have already done this once for the region, you should not have to do so again for a new machine in the region; if you have not, you will need to know your site's ClearCase `rgy` password in order to complete this command. The cache size for a view is highly work dependent so there's no general statement that can be made. Finding the right number is done by using the view in normal development and then periodically checking on the cache's state by using `cleartool getcache -view` *<view_tag>*. The site default should be set to the empirically determined best value for the majority of the developers. Exceptions can be handled either by host or by view. For more information, please see the ClearCase manual pages for the cleartool `setcache` and `getcache` sub-commands.
12. Provide the standard FPK SCM tools: cscope, prefix, etc. Frank does this normally.

13. Run the **jazz** script `zsetup_scm_node` (this is apparently more important the first time one sets up a system than on various **jazz** updates over time, since the first time it creates the view `scmvobDefault_view` for you).

4.6 MultiSite Hub Workstation Preparation

If a machine is going to be a MultiSite hub workstation (which is a "`shipping_server`-only" MultiSite installation), then the following specific tasks are required. Note that these machines sole purpose is to route MultiSite packets across a firewall, either between HP and NEC regions or between HP and Hitachi regions. Initially we had just old 715-class HP-UX workstations, but in February 2000 we ordered new machines to replace those—A-class rack-mounted servers (and just in time).

The firewall between the partner regions and HP region is mostly controlled by a non-FPK and non-EIAL organization, E-BIS; they have the overall HP authority to control security, and make things hard. They actually own the routers and stuff that we use and we (Mike Pereira currently) cannot always get things done easily. The main hole through which packets go are a set of TCP ports, numbers 7512-7640. These numbers have to be known to the ClearCase processes that try to send packets, and so the configuration below is partly to do that.

The steps to configure these after the base installation covered above are as follows:

A) Ensure that various aspects of general ClearCase machine installation were done correctly for a MultiSite Hub machine:

- Mount <*controlnode-VOB*>:`/ClearCase` to `/static/`<*controlnode-VOB*>`/ClearCase` on the Hub machine, with a symlink from `/ClearCase/njl` to `/static/`<*controlnode-VOB*>`/ClearCase/njl`, to allow FPK SCM standards to work. (You cannot mount it directly to `/ClearCase` since that is where the installation of ClearCase has to go, and it cannot install into an NFS-mounted file system).
- The `ninstall` binary is installed and configured on port 2150 for both TCP and UDP.
- The only ClearCase installation done is for a "shipping server only" install.
- The standard UXSCM perl package, `Perl5`, is installed, followed by the UXSCM tool set package `SCMWG-MultiSite-Toolset`, both from `nebraska.cup.hp.com`.

B) Change the following parameters in the `/var/adm/atria/config/shipping.conf` file:

```
ADMINISTRATOR      vobadm
STORAGE-BAY        -default /MultiSite/shipping/ms_ship
RETURN-BAY         -default /MultiSite/shipping/ms_rtn
EXPIRATION         -default 0
ROUTE              necmshub.fpk.external.hp.com necvob1 necvob2 \
                   necvob1.fpk.external.hp.com necvob2.fpk.external.hp.com
ROUTE              htcmshub.fpk.external.hp.com htcvob1 htcvob1.fpk.external.hp.com
RECEIPT-HANDLER    -default /MultiSite/admin/bin/frh.sh
```

The `ROUTE` parameters are a little tricky and I need to get an accurate sentence or two in here; for now, the best thing is to copy an existing one from another machine.

C) Edit the `/usr/atria/etc/atria_start` startup file to contain the following variable definitions, at about line 115; this ensures this TCP port range in known to the `shipping_server` process if it is spawned from the `albd` process (this occurs for most packets as a result of the configuration setting of `RECEIPT-HANDLER`:

```
export CLEARCASE_MIN_PORT=7512
export CLEARCASE_MAX_PORT=7640
```

It is critical that ClearCase be re-started after this change so that these variables are set in the `albd` process that is running when packets start arriving (otherwise, they will not find the right TCP ports).

D) Create a config file for UXSCM MultiSite, in the file `/MultiSite/admin/config/MS_init.ksh`, that contains the same shell variable definitions:

```
export CLEARCASE_MIN_PORT=7512
export CLEARCASE_MAX_PORT=7640
```

This file is read by the UXSCM MultiSite script `MultiSite_poll.sh`, which is run by an hourly

cron job to clean up (i.e., forward) any un-forwarded packets on the Hub machines (most packets are shipped when they arrive, because of the `RECEIPT-HANDLER` configuration setting).

E) [Apparently] any new machine that replaces an existing MultiSite hub machine has to reuse the same name **and IP address**, given the setup that allows packets through a hole in the firewall.

5. ES: Final Steps Needed Before Permitting Users On

A. Ensure backups of view storage and home directories are being done daily.