

Introduction to ClearCase Administration

v 1.0

Vít Hrachový
Prague, 03. March 2008

Course coverage

- MultiSite capabilities
- Licensing
- MultiSite administration overview
- Single site administration overview
- Solution deployment
 - Single site installation
 - MultiSite installation & configuration
 - Transfer of VOBs
- Site administration
 - Triggers setup
 - User support
 - Cooperation points for project management
- Maintenance
 - VOB troubleshooting
 - View troubleshooting
- Caveats
- 2003.06.00 vs 2002.05.00 diffs highlights

MultiSite capabilities

- MultiSite allows global distributed ClearCase usage over WAN
- Reduces bandwidth usage – ships only packets with deltas
- Sharing the data at the VOB level within VOB family members – replicas
- Automatic replication and synchronization
- Scalable, disaster recovery, robust
- No function penalty – MVFS comfort remains the same

peer-to-peer pattern



Licensing

- FlexLM is used to manage the licenses
- MultiSite licenses are managed separately from usual licenses
- License requirements shall be planned well ahead and with some reserve for project growth
- MultiSite licenses are used on multisite-enabled VOBs
- Licenses are leased by users per VOB access for configurable time frame
- VOB administrator can manually release used licenses
 - `clearlicense`

MultiSite administration overview

- One time job
 - Enable ClearCase Multisite at the installation/upgrade time
 - Upgrades are recommended to be performed simultaneously
 - Set up licensing
 - Define shared VOB triggers
 - Define synchronization master servers and synchronization routes
 - Synchronize the vobs (ensure all sites use the same CCase version)
 - Set up packet shipping cron tables
- Routine administration
 - Check Rational/IBM patches
 - Monthly-quarterly check&clean the incoming packet bay to prevent fillup
 - Nagios or similar monitoring SW is helpful here
 - Define branch masterships per project/vob or project/AdminVob

Single site administration overview

- High level overview
 - User support
 - VCS introduction trainings
 - Close cooperation with project management at the project set up time
 - Branching and labeling strategy guides both global and per team/project
 - AdminVOB usage
 - Importing source code to version control system
- Basic admin training should cover
 - Importing source code to version control system
 - Finding differences between releases in VCS
 - Creating custom branches, working on branches, merging branches
 - Labeling file versions
 - Merging directories

Solution Deployment

- Consider platform – Windows, Linux, commercial Unixes
 - Windows is worse to debug
- Consider site/MultiSite licenses number in advance
- Prepare vobstore, viewstore, license and registry servers
 - Define server backup policy and ensure the process runs and is usable
- When you have working license server
 - You can have as much ClearCase servers as you need (not for CC LT)
 - You can implement load balancing / self healing pool with MultiSite
- Consider AdminVOB usage

Single site installation

- Download the ClearCase installation from IBM Rational support servers
- <ftp://ftp.software.ibm.com/software/rational/clearcase/2003.06.00/clearcase>
- Extract the installation, goto `2003.06.00/{platform}/clearcase/install`
- Run `./site_prep`
 - Enter license host, registry host, registry region and other options
- Run `./install_release`
 - Confirm options given by `site_prep`
 - Select local install, full copy, and component `ClearCase Full Function Installation`, then `f` to finish selection and install
- Upgrades/patches are installed the same way
- Note that for Linux ClearCase supports RedHat kernels only.
- It's possible to use RedHat kernel within Debian system.
- Create registry region using `cleartool mkregion` to be able to create vobs

Multisite installation & configuration

- MultiSite licenses are different than single site!
- Same as single site install, except You have to select 2 components:
 - ClearCase Full Function Installation
 - ClearCase MultiSite Full Function Installation
- Set up AdminVOBs
- Use `/opt/rational/clearcase/bin/multitool` to set up replicated VOBs
 - `mkreplica` to create replicated VOB, to create first packet for other sites
 - `syncreplica` for exporting/importing update packets (should be used in regularly to bring VOBs up to date)
 - `chmaster` to change object masterhips
 - `restorerreplica` for healing the VOB restored from backup with the data from other replicas

Transfer of VOBs

- Ensure the same user and group names and ids exist in both environments.
- Use tar/cpio or some tool that preserves permissions, setuid/GID bits.
- Source
 - lock the VOB
 - tar/pack the VOB directory
- Target
- Unpack the VOB directory to the new vobstore place
 - recursive fix permissions, GID/setuid bits
 - check owner, groups file within VOB store dir
 - create and register new VOB tag with the new storage path info
 - unlock the VOB, clean/setup VOB triggers (triggers are not transferred)
 - test functionality, then mount it on all clients

Site administration

- Set up AdminVOBs
 - AdminVOB has to have at least one global type defined (label, branch...)
 - All VOBs using this VOB must make a special hyperlink to it
 - `cleartool mkhlink -c "link devel to AdminVOB" AdminVOB ^ \vob:/vobs/devel vob:/vobs/AdminVOB`
 - Verify the hyperlink is O.K.: `cleartool describe vob:/vobs/devel`
 - There can be only one AdminVOB hyperlinked within one VOB
- Check unfinished checkouts, remove checkouts older than 6 months
- Monthly check orphaned, duplicate views, remove them to save running view server processes & resources
- Run `vob_scrubber` regularly to minimize unnecessary VOB growth
- Study `cleartool schedule` manpage regarding usual jobs and tasks

Triggers setup

- 10 best ClearCase trigger examples

- <http://www.ibm.com/developerworks/rational/library/4311.html>

- `cleartool mktrtype -c "Trigger to avoid rmelem command" -element -all -preop rmelem -exec "ccperl -e \"exit 1\"" NO_RMELEM`

- `cleartool man mktrtype` is your friend

- Triggers are any executable, preferably Perl / shell scripts

- Trigger's exit status counts for ClearCase – 0 is OK, other means error

- Triggers are launched on client computer, using user's identity and ENV

- Trigger scripts shall be saved on central shared directory (VOB storage)

- Triggers can use special environment variables for their action

- When multiple triggers are fired at once, their order is not deterministic

- Rather use one master trigger with all actions in defined order inside

- Thought-out additional element attributes could boost trigger capabilities

User support

- Educate users to reduce the need for support calls
 - Introduction trainings take only ½ day, saves lot of headaches later
 - Provide access to ClearCase WEB and PDF documentation
 - Create short 1 page reference card with most common actions
- Provide kind config spec advices so users are not scared of it
- Restrict destructive user actions as remelem via triggers and attributes
 - Destructive actions are to be avoided at all as they modify history
 - The only allowed case shall be fresh developer typo
- Optionally restrict usage of branches and labels by users – via AdminVOB facility
- Develop and provide high-level tools for
 - Eclipsing
 - Importing many files (i.e. whole SW source code) incrementally using ClearCase version control features
 - Config spec includes flattening tools ...

Cooperation points for Project Management

- Define branching and labeling strategy according the project needs
 - branch and label naming convention
 - when and why branch
 - development vs stable branches, task branches
- Define release strategy
 - product naming and versioning convention
 - major, minor, service pack #, hotfix, build number
 - maintenance releases, hot fix 'urgent' releases
- Define build and release process, release area for testers/production
 - Build environment, Development environment, Production environment
- Define Configuration management role, tasks and processes
- Cooperate with Quality Architects, ISO/TickIt
- ClearCase role within Configuration Management tracked items

Maintenance – VOB troubleshooting

- `cleartool lock vob:/vobs/myvob`
 - flushes all changes and protects vobs from making any additional changes
 - effectively makes vob RO
- `cleartool unlock vob:/vobs/myvob`
- `/var/adm/rational/clearcase/log/vob*log`
- Restoring VOB from backup for testing purposes
 - unmount VOB from all clients accessing it, lock the VOB
 - restart VOB server on VOB server host
 - unregister old VOB tag
 - register new VOB tag
 - create a new tag to replace old VOB tag with updated storage path info
 - unlock the VOB and mount it on all clients

Maintenance – VOB troubleshooting II

- `cleartool reformatvob /vobstorage/myvob`
 - changes the format of a VOB database
 - used to
 - upgrade DB schema
 - when moving VOB to different binary architecture
- `cleartool mount`
- `cleartool lsvob -long`

Maintenance – VIEW troubleshooting

- `cleartool lsview -long -age`
- `/var/adm/rational/clearcase/log/view_log`
- Only views created with `-ncaexported` flag can be exported over NFS (Unix only)
- Generally the only troubles seen with views originated from NFS timeouts/errors. Files were seen unchanged.
 - These can be pretty tough to debug.
 - In most cases the problem will disappear in 5-10 minutes.
 - 'Hard' resolution would be to restart the view server process

Caveats

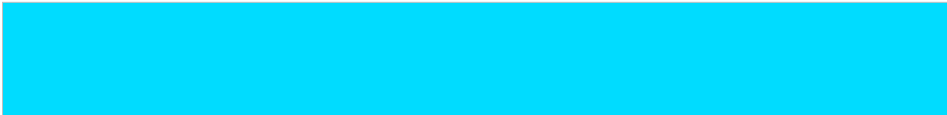
- NFS usage caveats
 - Strive for homogeneous development environment due to different NFS implementations
 - Network structure and switching may become problem due to heavy NFS usage via MVFS and DynamicViews
- 100Mbit net is optimum for LAN with DynamicViews
- Define ClearCase release server, registry server, license server(s)
 - MultiSite licenses have to be on the same server as ClearCase licenses
 - Buy less MultiSite licenses than ClearCase licenses only if you plan usage of non-replicated VOBs (local work only)
 - All three servers can be installed on single machine

2003.06.00 vs 2002.05.00 diffs highlights

- MultiSite VOBs now preserve permissions across replicas
 - increases feature level of replicated VOBs – VOB reformat recommended
 - see 'cleartool checkvob' output
- Web access to VOBs
- GUI find
- ClearCase tutorial is now non-interactive HTML only
- Changed default install directory from /usr/atria to /opt/rational/clearcase
- Env variable ATRIAHOME renamed to CLEARCASEHOME
- Startup/shutdown scripts renamed to rc.clearcase, clearcase in /opt/rational/clearcase/etc
- 2003.06.00 Release notes
- http://www.agsrhichome.bnl.gov/Controls/doc/ClearCaseEnv/2003.06/clearcase/doc/unix/cpf_relnotes.ux.htm#relnotes_ccnew_section_11373139

Useful links

- <http://wood.sandbox.cz/clearcase> - these presentations
- <http://www.cmcrossroads.com>
- <http://clearcase.weintraubworld.net/cc.setup.html>



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- `/var/adm/rational/clearcase/log/vob*log`
- Restoring VOB from backup for testing purposes
 - umount VOB from all clients accessing it, lock the VOB
 - restart VOB server on VOB server host
 - unregister old VOB tag
 - register new VOB tag
 - create a new tag to replace old VOB tag with updated storage path info
 - unlock the VOB and mount it on all clients

```
vobclients$ cleartool umount /vobs/myvob
vobhost$ cleartool space /vobstore/myvob.vbs
vobhost$ ccase-home-dir/etc/atria_start stop
vobhost$ ccase-home-dir/etc/atria_start start
vobhost$ cleartool unregister -vob /vobstore/myvob.vbs
vobhost$ cleartool register -vob /vobst_aux/myvob.vbs
vobhost$ cleartool mktag -vob -replace \
-tag /vobs/myvob /vobst_aux/myvob.vbs
vobhost$ cleartool unlock vob:/vobs/myvob
vobclients$ cleartool mount all
```

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