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ClearCase hosts

Rational software

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This presentation explains the hosts used by IBM Rational ClearCase.

Course objectives

- These topics are covered in this module:
  - ▶ ClearCase hosts
  - ▶ Types of hosts
  - ▶ How hosts work in the ClearCase environment
  - ▶ Examples of host configuration

ClearCase hosts

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In this module, you will be introduced to ClearCase server and client hosts. You will learn about the roles for each and see some basic examples of how a ClearCase environment is configured.
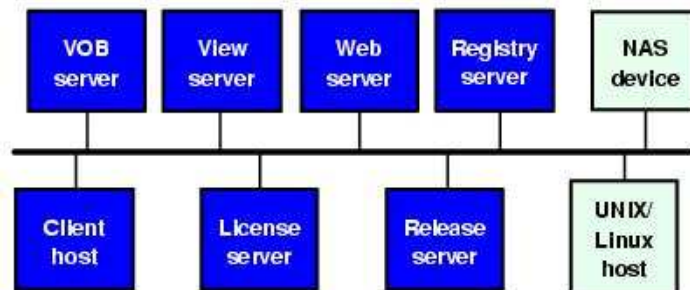
ClearCase hosts

- Client host
- Server host
- Registry server host
- License server host
- IBM Rational Web platform server host
- Network release host
- Network attached storage
- Non-ClearCase hosts

ClearCase hosts

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A Rational ClearCase environment makes use of host machines. ClearCase can run on multiple operating systems, so each machine may vary as far as what OS is running on that machine. Host machines include clients and servers. Clients have specific tasks, while ClearCase server configurations may vary from an all-in-one format to a specific task for each machine. Some types of hosts are shown here.

Overview of hosts

- ClearCase environment contains only two types of hosts:
  - Client host
  - Server host

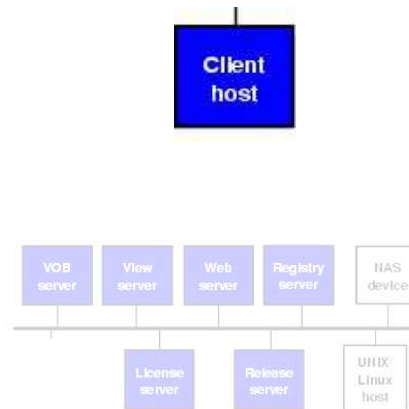ClearCase hosts

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A Rational ClearCase environment contains two types of hosts: the Server host and the Client host. The Client host is pretty self explanatory -- each client host allows the end user to work with ClearCase and integrated products. The end user has the ability to run ClearCase commands and Graphical User Interfaces (GUIs) on the client host. Client host installs may also contain other rational products such as ClearQuest or the Rational Suite. In addition, client hosts have the ability to host their own views, whether they be snapshot or dynamic views.

Server hosts come in a few varieties. ClearCase server hosts are used to host one or more client machines. Servers also may host the ClearCase registry, licenses, and data repositories.

Client host

- Each user works on client host running ClearCase commands

- ClearCase can be integrated with other Rational products and the integration used at the client host

- A client can include Rational ClearCase's Multiversion File System which extends the host's native operating system providing support for ClearCase dynamic views
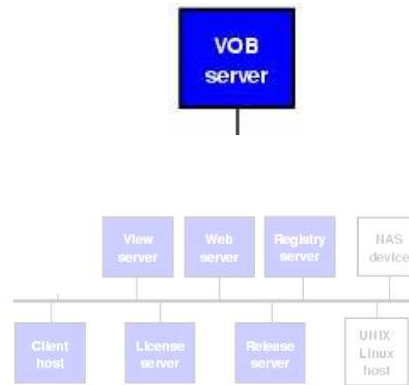
Client host

VOB server   View server   Web server   Registry server   NAS device

License server   Release server   UNIX/Linux host

ClearCase hosts

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A ClearCase client host should be thought of as the ClearCase end-user's workstation. The workstation is a "client" of its parent server or servers and will continuously make calls to the server or servers for information, whether the information be for licensing purposes (running commands), or, for repository information. Client hosts will frequently host their own view storage areas as well. This approach is often taken as an alternative to a View Server host in order to reduce the number of network calls that stretch across the environment. Due to this fact, a client host may also (but not necessarily) include Rational ClearCase's Multiversion File System (MVFS). The MVFS system allows the client host to provide its own support for ClearCase dynamic views.

VOB server host

- Hold repositories of data – Versioned Object Bases (VOBs) for ClearCase client access.

- More than one VOB server may be found in an environment

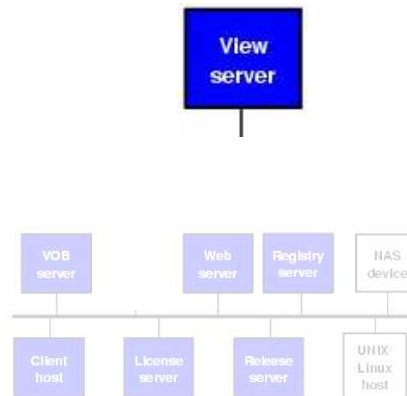- VOB servers may also act as client servers or be dedicated VOB servers with no client software

VOB server

View server   Web server   Registry server   NAS device

Client host   License server   Release server   UNIX/Linux host

ClearCase hosts

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VOB server hosts are hosts for the data repositories that hold the versioned code under development. These are known as VOBs (versioned object bases). The ClearCase VOB server will be a machine that is robust with as much memory and hard drive space as the organization can support; this is due to the fact that VOBs will eventually grow quite large, and there are normally a multitude of VOBs on a VOB server host machine. Calls from client hosts are continuously being made to the VOB server, so the rule of "the more the memory and space, the better" holds true for the ClearCase VOB server.

The ClearCase environment can also support more than one VOB server in order to stretch the workload across multiple machines. In addition, client hosts can also host their own VOBs, though this practice is not widely used as it creates additional administrative overhead of the VOBs.

Since the ClearCase VOB is the backbone of ClearCase's version control, and all of the data is stored within the VOB, often times the ClearCase VOB server data will be backed up to a secondary storage area or network attached storage (NAS) to ensure maximum data protection should the VOB server's drives fail or become corrupt.
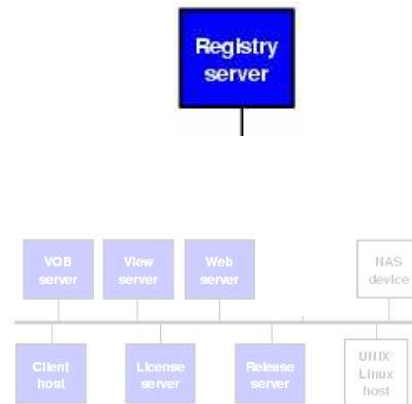
View servers

- Can be a dedicated server on which to store an environment's dynamic views

- Can be combined with VOB server or other ClearCase servers

- More than one view server may exist in a ClearCase Environment

- Each ClearCase client may also host their own dynamic views

View server

| VOB server | | Web server | Registry server | | NAS device |

| Client host | License server | Release server | | UNIX Linux host |

ClearCase hosts

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The ClearCase view server's role is to host all or the majority of the dynamic views in a ClearCase environment. Often times the client hosts will host their own dynamic views (along with any snapshot views) in an environment in order to cut back on administrative overhead. This is due to the fact that a ClearCase view server can often become bogged down over time as a multitude of network calls will be made to the server as developers attempt to checkout/checkin code with their views. Another alternative – as with VOB servers – is to "share the load", that is, create more than one view server within an environment and assign users or groups of users to those particular view servers.
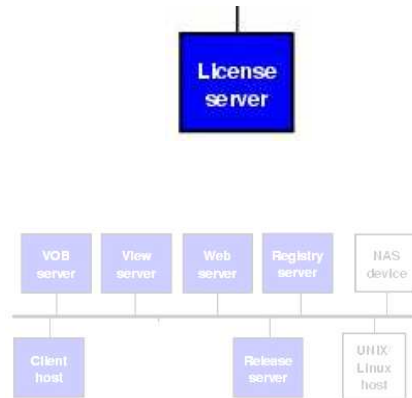
Registry servers

- Every ClearCase environment must have a registry server host

- Only one registry server can exist within any given ClearCase environment

- The registry server host will be designated upon the setup of the ClearCase environment

- The registry server may reside on the same host as the other ClearCase servers

- Each client server is associated with the registry server

Registry server

VOB server   View server   Web server   NAS device

Client host   License server   Release server   UNIX/Linux host

ClearCase hosts

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The ClearCase Registry server is the frame of the ClearCase environment. There can only be one registry server within each ClearCase environment and that server is always designated during the initial environment setup. Like the other servers, the ClearCase registry server can reside on the same host as the VOB, View and licensing server, or it may be stand-alone. Every client server in the environment is associated with the registry server.
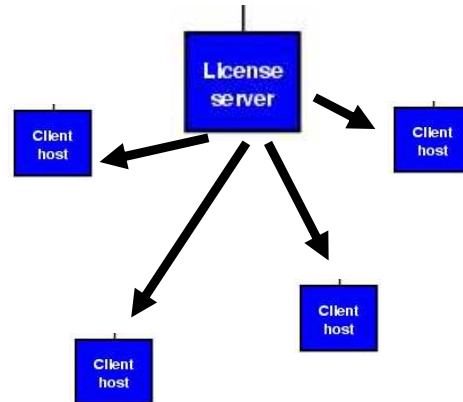
License server

- Each ClearCase environment will have a dedicated license server

- The license server is normally chosen during initial installation, but can be changed at any time

- The license server holds the licenses for the ClearCase environment and manages those licenses for the environment to allow ClearCase to run

License server

VOB server | View server | Web server | Registry server | NAS device

Client host | Release server | UNIX Linux host

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A ClearCase environment will also contain a dedicated licensing server normally assigned during initial setup. The licensing server may also reside on the same hosts as other ClearCase servers. Its sole purpose is to hold and manage licenses for the ClearCase environment. When a ClearCase client host runs a cleartool command or initiates a GUI action, a call is made to the license server and a license is assigned to that user for a specific amount of time. Once the timeout period of the license is reached, that license is released back to the license server for future use.

How licenses work

- The license server maintains an active-user floating license scheme

- ClearCase client software looks to the license server to obtain a license for any ClearCase command run, and a license verification check is made.

- If no license is available, the license server returns an error message stating as such, and the command will not run.

License server

Client host

Client host

Client host

Client host

ClearCase hosts

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The ClearCase License server maintains the floating license scheme for the environment. This license scheme is user based. When a ClearCase user runs a *cleartool* command, a call is made to the license server and the client host obtains the license for that particular user. If no license is available for that user, the user will receive a message stating that a license is not available, and the command the user attempted to use will not run. If the license *is* available, the command will run and that user will obtain that license for a specific amount of time. When the timeout period for that license is reached, the license will be returned to the license server and become available for future use.

More on license servers

- More than one License server may be added to a ClearCase environment.
- Clients can switch between license servers
- New licenses can be added as needed
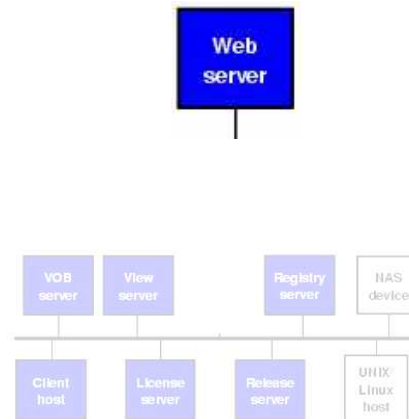- The licenses can be moved to another license server host.
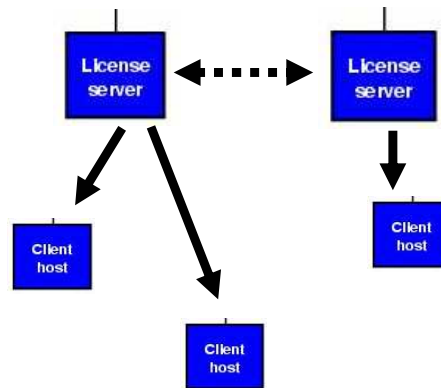
While a license server is dedicated during the initial setup of the environment, more than one license server may exist within that environment. During the course of normal use, a client can switch to an alternate license server. In addition, licenses can also be transferred from one license server to another, and new licenses may be added to an existing server to support a growing environment.

IBM Rational Web Platform Servers

- IBM Rational Web Platform Server
  - ▶ At least one of the servers in the ClearCase environment acts as the Rational Web Platform (RWP) Server
  - ▶ The RWP server provides application support for ClearCase Web clients such as the ClearCase Remote Client or CCRC
  - ▶ CCRC users connect and authenticate through the RWP server and can work outside of the ClearCase local area network.

Web server

VOB server | View server | Registry server | NAS device

Client host | License server | Release server | UNIX Linux host

ClearCase hosts

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The Rational Web Platform server is normally installed along with the registry server on a host, though it can also be a stand-alone system. Its purpose is to provide wide area network connectivity to a ClearCase environment through the Internet. Traditionally, ClearCase does not run properly over a WAN, thus the development of the RWP server. Clients over the WAN can access the server normally on HTTP port 80 (though this can be altered) through a service called CCWeb. WAN clients run CCWeb on their local system and authenticate through the RWP server into the network. The end-user application that uses CCWeb as its backbone is called the ClearCase Remote Client or CCRC. CCRC users have the ability to create snapshot views, checkin, checkout and perform other ClearCase functions from remote locations. CCRC is often used as the solution for offsite developers who could not otherwise access the ClearCase network.

Network release host

- Can be a dedicated host on the network or integrated with another host

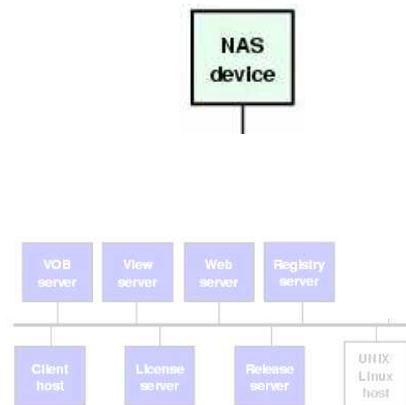- Stores the ClearCase release area used for installing/upgrading the ClearCase Environment

Release server

VOB server | View server | Web server | Registry server | NAS device

Client host | License server | UNIX/ Linux host

ClearCase hosts

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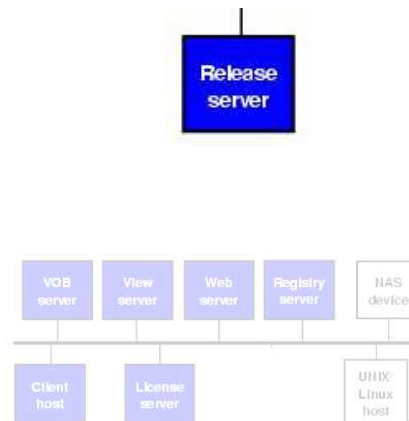
In both ClearCase and ClearCase LT, one computer in the network acts as the network-wide release host. A directory on this host, known as a network-wide release area, stores an entire product release which has been extracted from distribution media or downloaded from Rational. When necessary, patches and service releases can be applied to update a release area with the latest enhancements and defect fixes.

ClearCase can then be reinstalled from the release area to deploy these updates to individual hosts. Certain installation options allow ClearCase hosts running UNIX to access many ClearCase executables and libraries through symbolic links to the release area instead of installing them locally. ClearCase hosts running Windows do not access the network-wide release host after installation is complete. The network-wide release host does not have to run ClearCase.

Network attached Storage (NAS)

- Certain NAS devices are certified to work with ClearCase

- NAS devices can store ClearCase data or applications

- NAS devices themselves do not actually run Rational ClearCase

NAS device

VOB server

View server

Web server

Registry server

Client host

License server

Release server

UNIX/ Linux host

ClearCase hosts

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Network attached storage, or NAS devices are often used in the ClearCase Environment as extra storage for ClearCase VOBs and views. The devices themselves do not run any ClearCase services, though they are typically attached to a ClearCase VOB or view server or both. Rational has certified particular NAS devices for use with ClearCase. More information regarding which NAS devices will work properly with ClearCase can be found in the Rational ClearCase Administrator's Guide.

Non-ClearCase servers

- Some Unix/Linux hosts cannot run Rational ClearCase

- These systems can be configured to read ClearCase VOB information, but will not have the ability to write.

- The ability to read VOB data allows a non-ClearCase system to run builds.

UNIX/ Linux host

VOB server | View server | Web server | Registry server | NAS device

Client host | License server | Release server

ClearCase hosts

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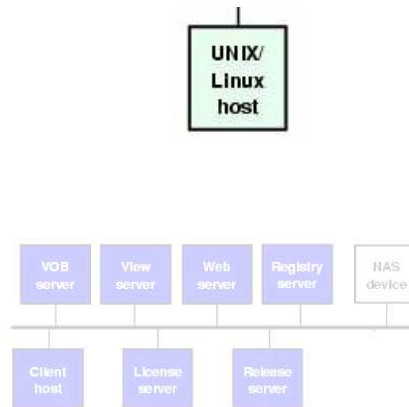
Some varieties of Unix and certain versions of Linux will not properly run ClearCase. However, there may be occasions in which these systems need access to ClearCase VOB information. A good example of this type of situation is a system that is configured to run software builds. If ClearCase cannot be installed on an environment's build server, that server can be configured to read ClearCase VOB data, though no write ability will be available.

Section

Server configuration examples

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The next few slides demonstrate some examples of ClearCase environment configurations. While there are numerous ways to configure an environment's hosts, these are some of the more basic examples.

All-in-one

- Smaller environments
- All servers installed on one host
  - ▸ Registry
  - ▸ License
  - ▸ VOB
  - ▸ View servers

- Pro: Provides simplicity for a smaller environment
- Con: if the host machine fails, the environment is unavailable

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ClearCase hosts

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The all-in-one approach is one taken normally by smaller environments. The Registry, License, VOB and View servers are encompassed within one host. This has it's pros and cons. The main benefit is: less administrative overhead as everything is contained in one package. The disadvantage, however, is if the host fails or one of its drives becomes corrupt, the entire environment will suffer or become unavailable until the problem is remedied.

All client hosts will point to this server for their ClearCase administrative needs. This configuration example is similar to what you will find within a ClearCase LT Environment.

Individual

- All servers - registry, license, VOB and view servers installed on different hosts
  - ▶ Registry – Environment
  - ▶ License – Administer licenses
  - ▶ VOB – Multiple drives for storage and access
  - ▶ View server – Dynamic view storage

- Pro: Performance enhancements
- Con: Setup, administration, overhead increases

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This example shows all servers installed on different hosts. The Registry server host controls the environment. The license server host is solely in charge of administering the licenses to the client hosts. The VOB host contains multiple drives solely for VOB storage and access. The view server host does the same for the environment's dynamic view storage.

The benefits to this type of configuration include performance. With both the VOB and the view servers installed on their own separate hosts, the number of simultaneous calls to any one machine is reduced. In this type of scenario, the VOB server will also frequently have it's own backup configuration to assure the VOB databases have redundancy in the event of disk corruption. The disadvantage to this setup over with respect to the all-in-one solution is that system administration overhead is increased.

Vob/View server

- VOB and View servers exist on same host

- License and registry servers exist on their own

- Pro: Easier system administration

- Con: Locating the VOB and View server on the same host can increase the possibility of latency to/from that server. When calls are being made to numerous VOB/View processes on that host, the host can become taxed for resources.

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In this configuration, the License and Registry servers exist on their own hosts, while the VOB and View servers are located within the same host PC. This allows for easier system administration as all VOBs and views are stored on one physical system. It can have negative implications for performance over the log run when 10's or 100's of calls are being made to one Server for VOBs and Views. That being said, a server host in this type of configuration should be robust.

ClearCase LT

- Out of the box

- "All-In-One" server solution for smaller environments

- VOB, view, registry, and license servers are on one physical host

- Pro: Simplicity

- Con: Restrictions include snapshot-view only configurations and a limitation to **one** server for the entire environment

ClearCase hosts

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ClearCase LT is a one-server approach that is ideal for smaller environments. The VOB, view, registry and license servers are all contained within one physical host. All client hosts make calls to the server for licensing, information, and access to VOBs. With the simplicity comes restrictions. ClearCase LT is limited to snapshot views only, no MVFS file system is installed anywhere within the ClearCase LT environment. Also, one and only one ClearCase server is allowed within the LT environment.

Module summary

- In this module, you have learned about:
  - ▸ ClearCase client hosts
  - ▸ ClearCase server hosts and roles
  - ▸ Licensing
  - ▸ Environment configurations

Contributors: Marcus Matic, Alex Grillakis, and Will Frontiero

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ClearCase hosts

In this module, you have learned about ClearCase client and server hosting roles and about sample configurations of a ClearCase environment. At this stage, you will be able to identify each server and be able to begin planning the initial stages of your environment's configuration.

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