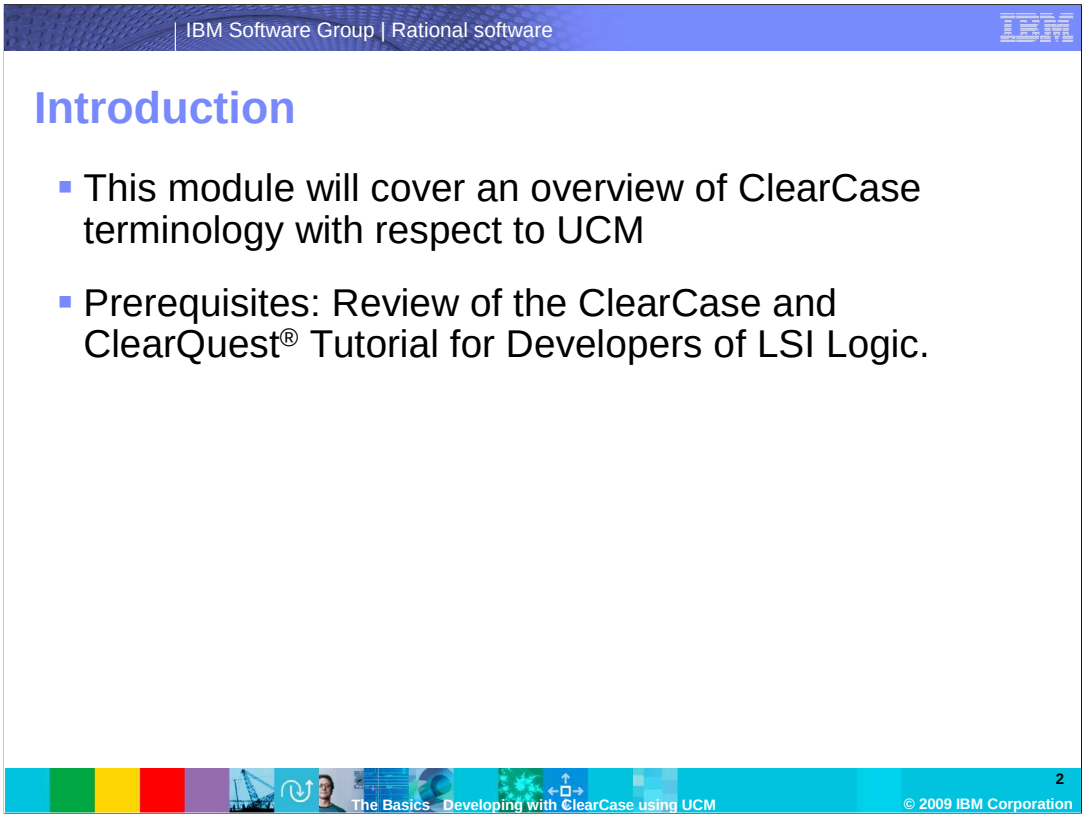
This module will cover an overview of ClearCase® terminology with respect to UCM.



This module is associated with the ClearCase and ClearQuest Tutorial for Developers for LSI Corp. and is intended to help aid in the definition and description of various new terminology associated with ClearCase and ClearQuest.

Module objectives

- The following topics are covered in this module:
  - What are VOBs and views?
  - What are elements, branches, versions, and version trees?
  - What is UCM?
  - What are components, projects, streams, baselines, and activities?
  - What are the deliver and rebase mechanisms?
- When you complete this module, you will be able to:
  - Successfully identify the terms that comprise of ClearCase with UCM development and their purpose.

This module covers basic and advanced ClearCase topics. It will cover base ClearCase concepts; vobs and views and what an element is. You will look at the structure of an element within the vob. You will also be introduced to the advanced concept of Unified Change Management or UCM for short. You will look at the various parts of UCM and how they are used. By the end of this module, you will be familiar with both base and UCM ClearCase concepts in addition to the terminology.

What are VOBs and views?

- **VOBs**
  - A Version Object Base that is used to store source controlled data within ClearCase.
- **Views**
  - A mechanism that allows users to access and filter through the data within a VOB.

Here are the definitions of a VOB and view. They are very fundamental concepts in ClearCase. Understanding vobs and views will help you progress in using ClearCase.

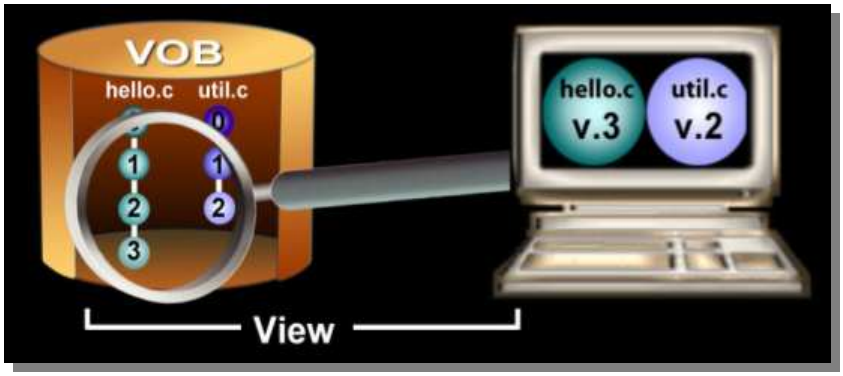
VOB

- A permanent, read-only data repository that:
  - Stores files, directories, and metadata
  - Stores version-controlled data
  - Displays its contents as files in a file system
  - Stores anything that can be represented as a file or directory
  - Can be replicated in two or more sites

A ***VOB*** or Versioned Object Base is a permanent, read-only repository that stores: versions of file elements, directory elements, derived objects (or, executables), version-controlled data, meta data associated with these objects, and virtually anything that can be represented as a file or directory.

View

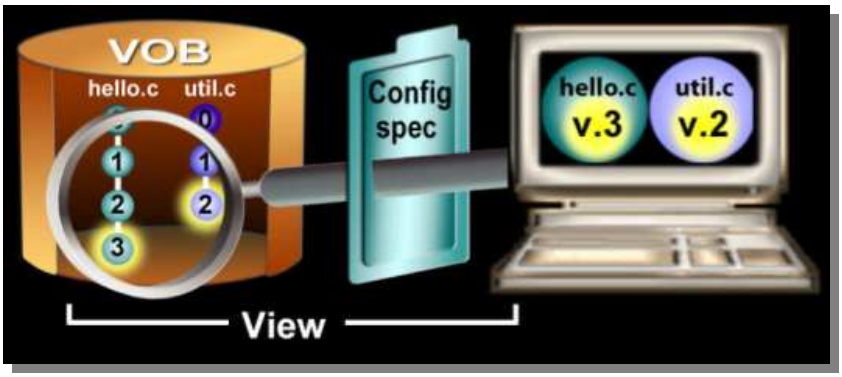
- A ClearCase mechanism that allows users access to versions of elements in VOBs
- An isolated workspace for a user or a group
- Enables users to work in parallel



A ***view*** is a ClearCase object that provides a work area for one or more users to edit and create versions, compile them into object modules, format them into documents, and so on. Users in different views can work on the same files without interfering with each other. To access elements in a VOB you have to use a view.

View and configuration specification

- For each view, a configuration specification is a set of ordered rules used to select [at most] one version of each element
- A configuration specification determines which versions of an element are visible in the view



A set of rules called a ***configuration specification(or config spec for short)***, determines which files are visible in a view. A view's configuration specification selects one version from the element's version tree and displays it in the view. You can determine what elements are visible to the view by adjusting the configuration specification in ClearCase. In this example, only the versions highlighted above are visible in the view.

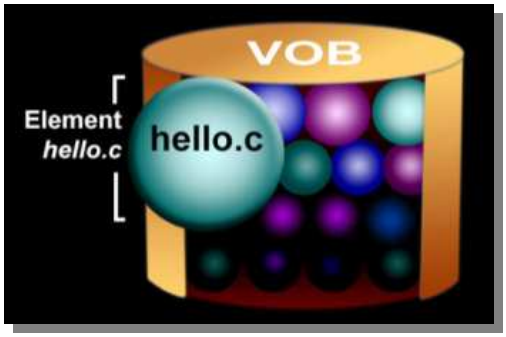
Section

What are elements, branches, versions, and version trees?

This next section covers the concepts and terms elements, branches, versions and version trees. You will also see their structure within the vob.

Elements

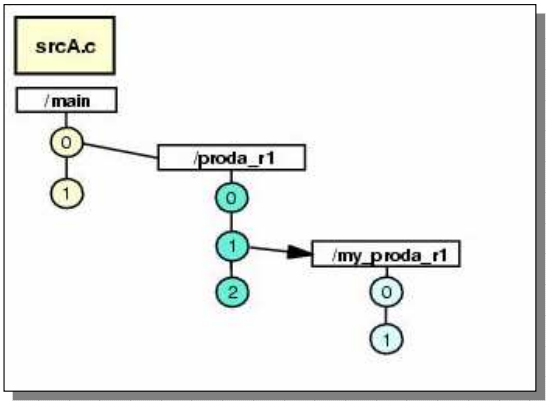
- A file or a directory, under source control, stored in a ClearCase VOB
- Can be any object that can be stored in a native file system, including:
  - Source files
  - Directories
  - Binary files
  - Object libraries
  - Documents



Elements can be either files or directories, under source control that are stored in a ClearCase VOB. A file element can be any object that can be stored in a native file system as shown here.

Branches

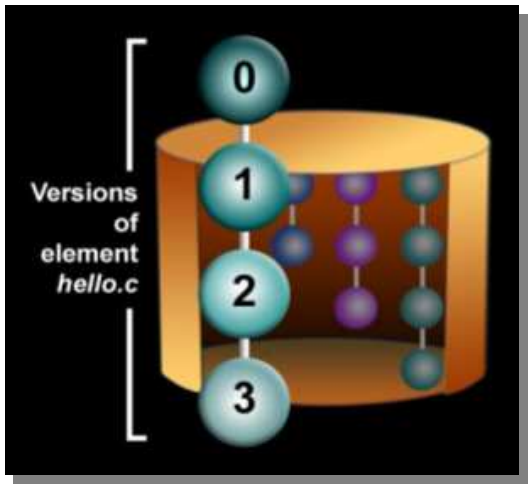
- A ***branch*** is an object that specifies a sequence of versions of an element
- Each element has a main branch
- Branching is done in order to provide work areas for developers



The concept of ***branches*** and branching is an important topic in ClearCase. A branch is an object that specifies a sequence of versions of an element. Branching is done in order to provide work areas for development. It is not uncommon to have dozens of branches in an elements version tree. Note that the ClearCase naming convention for branches is to use lower case alphabetic names. Because branching is done on a very low level, it also becomes very important to find a branching strategy that works from all levels of perspectives and abstractions. Some general rules that apply for branching to help with maintenance. First, the main branch should not be used for development work, but should be reserved for major milestones or released versions. Second, all major development is done on branches.

Versions

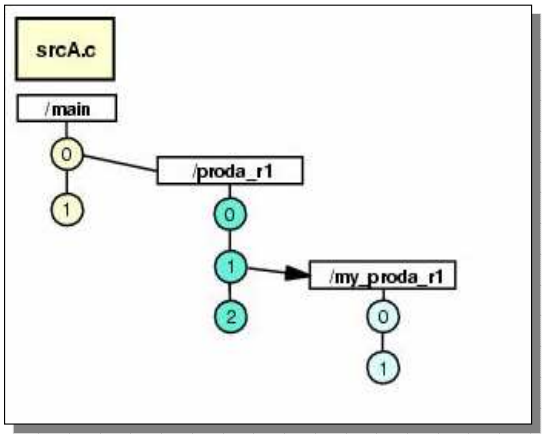
- An element consists of a set of versions, organized into a version tree
- Each version represents one revision of a file under source control
- Versions are displayed in a workspace or view



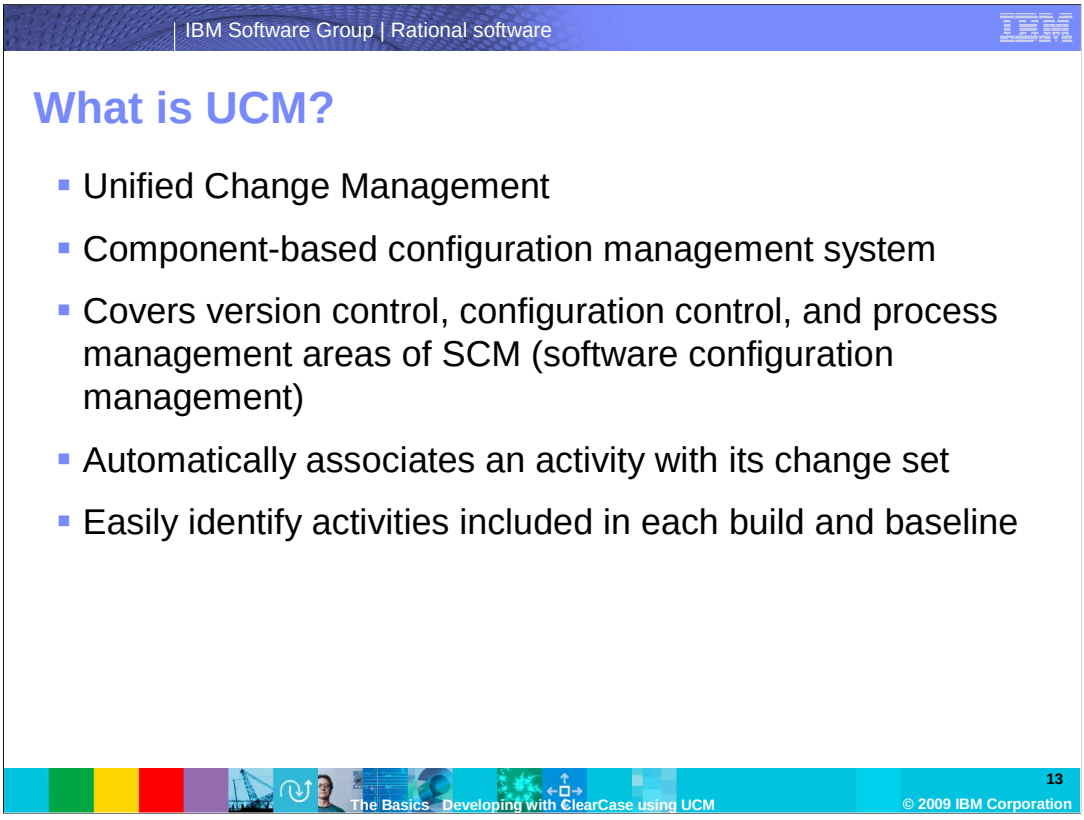
A ***version*** denotes a particular revision of an element. An element consists of a set of versions, organized into a version tree. Each time you revise and check in a file or directory, ClearCase creates a new version of it. The versions of an element are organized into a version tree structure as shown above – with numbered versions 0 through 3 of the element called “hello.c”.

Version tree

- A graphical layout of the versions, branches, and attributes within an element.



The ClearCase version tree displays a graphical view of the version history for a ClearCase element. The different versions of an element in a VOB can be organized into a version tree. A version tree has branches, and each branch represents an independent line of development. Changes on one branch do not affect other branches until you merge. The initial version on the main branch always contains no data and is empty. Version 0 on any sub-branch always contains the same data as the version from which the sub-branch stems from.



On this slide the IBM Rational® ClearCase Unified Change Management is introduced. UCM is a component-based configuration management system. When you specify the component architecture for a UCM project, it is useful to have a sense of how the number of components in the project affects the performance of the commands typically used by developers, project managers, and release engineers. ClearCase UCM covers the *version control, configuration control,* and *process management* areas of the SCM domain. UCM raises the level of abstraction to manage changes in terms of activities, rather than manually tracking individual files. UCM automatically associates an activity with its change set, which encapsulates all project artifact versions used to implement the activity. This enables you to easily identify activities included in each build and baseline.

Section

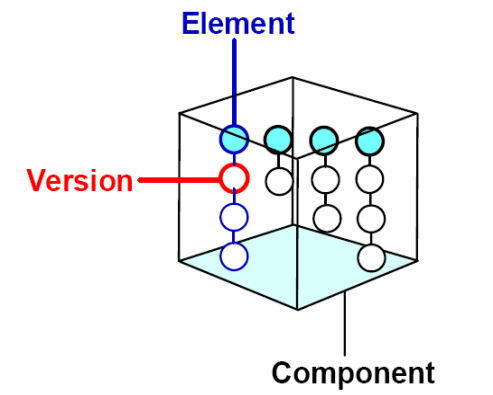
What are components, projects, streams, baselines, activities, deliver and rebase?

This section covers what components, projects, streams, baselines, activities, deliver and rebase are.

UCM terms and concepts

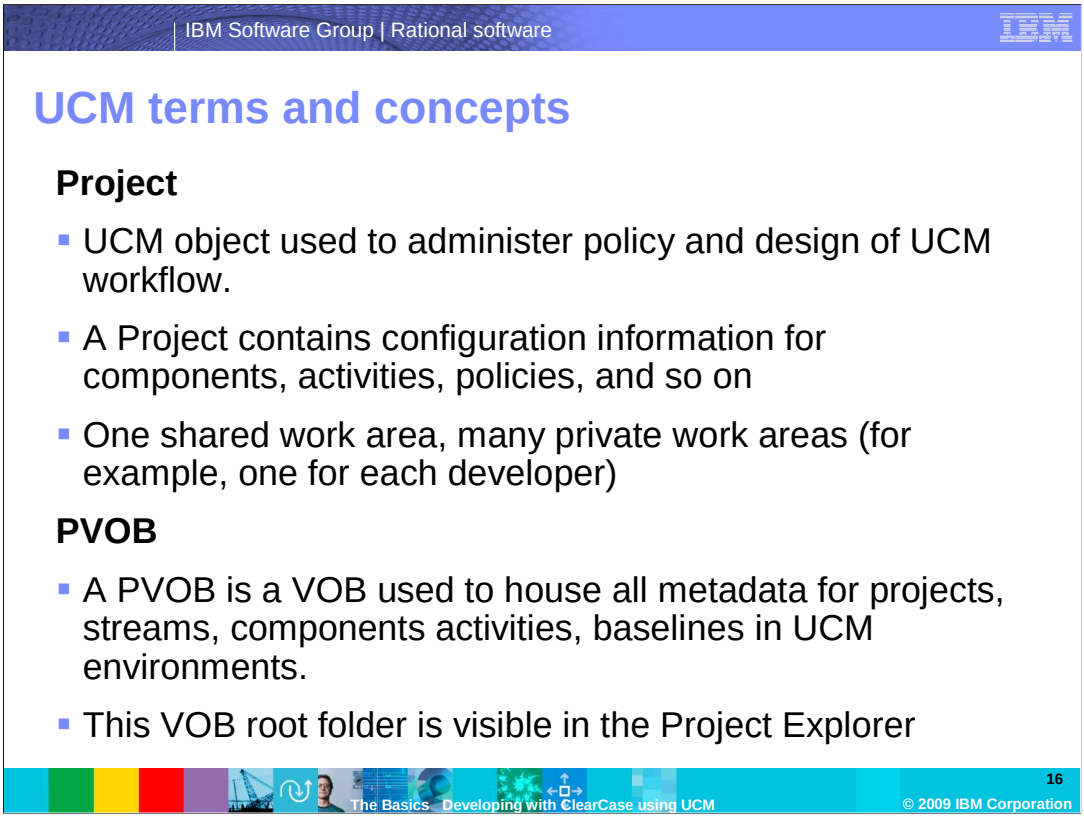
Component

- A group of file and directory elements
- Constitutes parts of a project
- Organizes elements into well-defined entities
- Two types of components used for UCM development:
  - Rooted component
  - Rootless component



A ***component*** is a group of files and directory elements (this might be a library, DLL, JAR, an executable, or other assets) that are released as a unit and are related by being located in a specific directory tree. Components provide separation of concern and organize elements into well-defined entities. A VOB can host one or more components, but a component without any elements does not have to be in a VOB. Similarly, components constitute parts of a project, and projects often share components.

There are two types of components in UCM: a rooted component and a rootless component. A rooted component is a UCM object linked to a VOB root or directory within a VOB. A rootless component is a UCM object containing no root directory (This type of component is used for composite baselines).



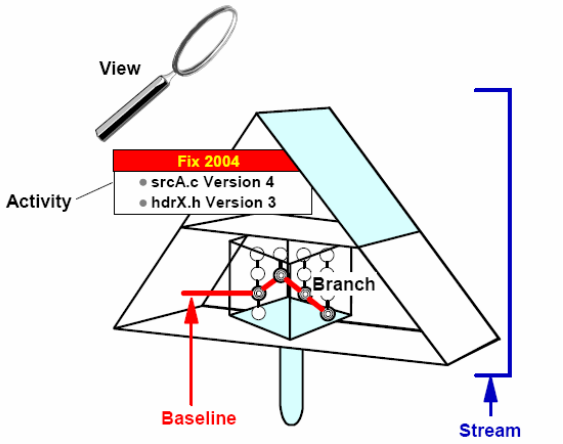
For the first-time user of ClearCase UCM, the terminology can sometimes be a bit overwhelming but do not be intimidated by it. For every tool there is a learning curve, some steeper than others. The first step is to start with terminology and jargon used with UCM.

A UCM *project* is a logical unit that is mapped to the development structure of an application or system. A project contains the configuration information (for example, components, activities, policies) needed to manage and track the work on a specific product of a development effort. This can be an auction Web site or an order fulfillment process for an e-business. A basic UCM project in ClearCase consists of one shared work area and many private work areas. A Project VOB, or *PVOB,* is a VOB used to house all metadata for projects, streams, components activities, baselines in UCM environments. This VOB root folder is visible in the project explorer.

UCM terms and concepts

Stream

- UCM object that links to a Base ClearCase Branch Type.
- Maintains a list of activities and baselines
- This object lives in the PVOB and is hyperlinked to branch types existing in component VOBs.
- In UCM, streams are layered over branches.

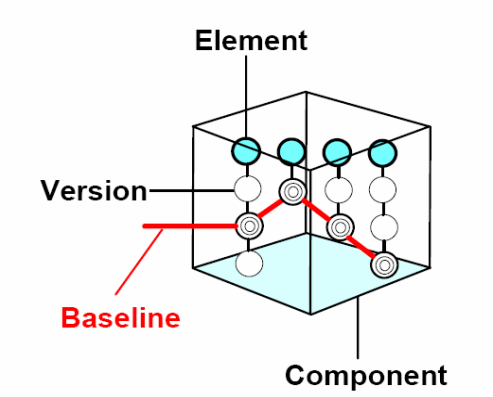


A ***stream*** is a ClearCase object that that links base ClearCase branch types. Streams maintain a list of activities and baselines and determines which versions of elements appear in your view. This object lives in the PVOB and is hyperlinked to branch types existing in Component VOBs. In UCM, streams are layered over branches, so that you do not have to manipulate the branches directly. Note: This figure shows the ClearCase convention of representing streams.

UCM terms and concepts

Baseline

- Identifies one version of each element in a component that represents the integrated or merged work of team members
- Represents a version of a component at a particular stage in project development
- Baselines essentially allow projects to view and develop different versions of components.
- Baselines are component-specific



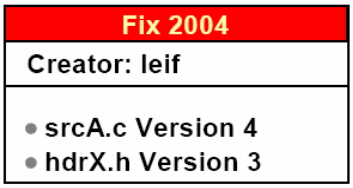
A ***baseline*** identifies one version of each element in a component that represents the integrated or merged work of team members. It represents a version of a component at a particular stage in project development, such as the first design, a beta release, or a final product release. Throughout the project cycle, the project manager creates and recommends baselines and changes their attributes to reflect project milestones. A baseline is the means of communication between team members, allowing them to share new changes developed in the development streams. For example, A UCM object linked to a ClearCase label tracks the development of a component.

When developers join the project, they populate their work areas with the versions of directory and file elements represented by the project's recommended baselines. Alternatively, developers can join the project at a feature-specific development stream level, in which case they populate their work areas with the development stream's recommended baselines. This practice ensures that all members of the project team start with the same set of files.

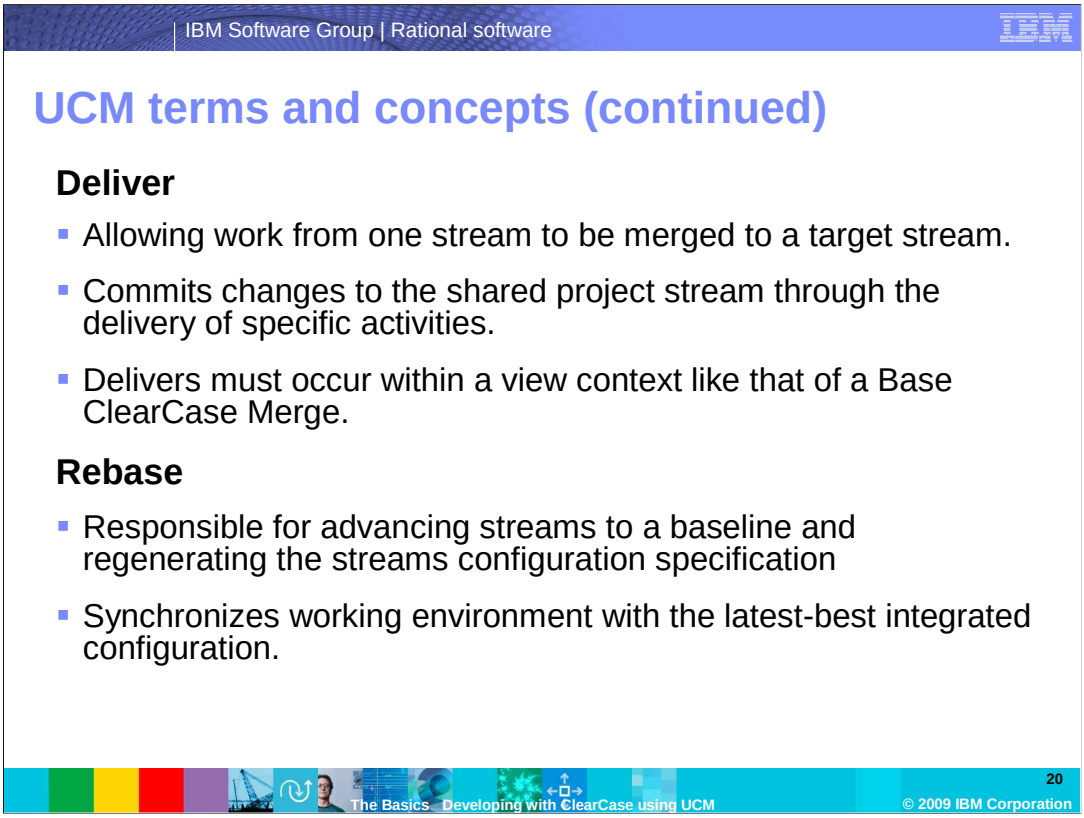
UCM terms and concepts

Activities

- A UCM object allowing users to record and track development on specific streams.
- UCM requires the use of this object when checking out or checking in on any stream.
- Activities are stream-specific; a view must be set to an activity before making modifications in a UCM environment.



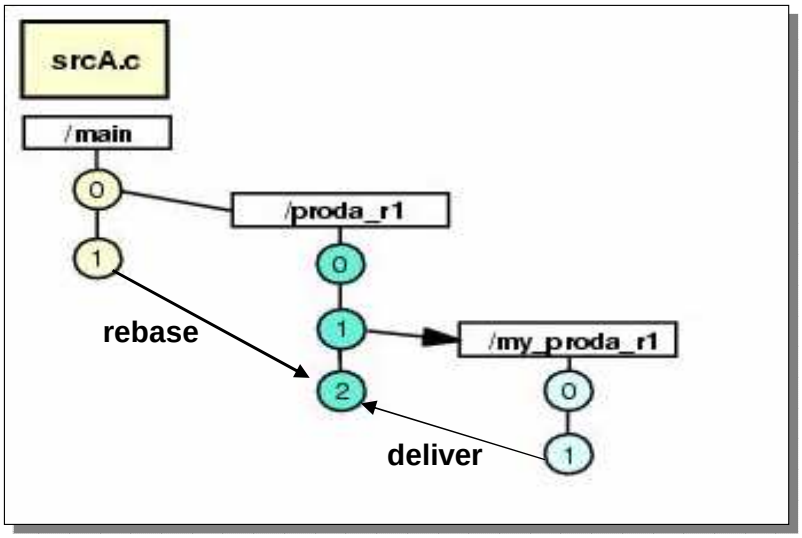
An ***activity*** is an object that records the set of files (*change set*) that a developer creates or modifies to complete and deliver a development task, such as a bug fix as shown here. UCM requires the use of this object when checking out or in on any stream. Keep in mind that activities are stream-specific; that is, a view must be set to an activity before making modifications in a UCM environment. Examples of other activities include: an update to a help file or the addition of a menu item to a GUI component. Note the activity title typically indicates the cause of the change (or is a link to ClearQuest).



A ***deliver*** function is a UCM function allowing work from one stream to be merged to another or to a default target stream. Deliver commits changes to the shared project stream through the delivery of specific activities. Note that delivers must occur within a view context like that of a Base ClearCase Merge. A ***rebase*** function is a UCM function responsible for advancing streams to a baseline and regenerating the streams configuration specification. Rebase synchronizes working environment with the latest-best integrated configuration. Note that rebase, at times, require merging which must be done in a view context.

By performing a rebase before delivery, you reduce surprises at delivery time, which improves the stability of the integration environment.

UCM terms and concepts (continued)



In simplest terms, a deliver is the mechanism for a developer to push their changes to the parent or integration stream from their own private or shared development stream. A rebase is essentially the opposite of a deliver and is the mechanism for a developer to pull changes from the parent or integration stream into their own private or shared development stream.

Additional resources and references

- **Additional resources on ibm.com**
  - Software Information Center

https://publib.boulder.ibm.com/infocenter/cchelp/v7r1m0/index.jsp

  - IBM Education Assistant Modules

http://publib.boulder.ibm.com/infocenter/ieduasst/rtnv1r0/index.jsp?topic=/com.ibm.iea.rcc/rcc/RCCv70_Topic.html

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