PERFORCE

ClearCase-to-Perforce

MIGRATION PLAYBOOK

Congratulations on taking the first step to moving from ClearCase to Helix Enterprise. This playbook contains information on some of the considerations necessary to make your migration timely and successful from the beginning.

ClearCase-to-Helix Enterprise migration projects vary greatly in scale and complexity. Small, simple environments with basic migration requirements are typically migrated in less than two weeks, including setting up Helix Enterprise, migrating, and training users and administrators. Large, complex ClearCase environments might perform a series of migrations over several months or more because individual teams migrate at different times.

"From a developer productivity perspective, there is absolutely no comparison—**merge or integration tasks that would take days to complete in ClearCase, and often involve multiple people, are now done in hours.**"

– Bruce Painter, software engineering manager, *Amdocs Entertainment*

amdocs

GET READY

There are several steps to consider before you begin your ClearCase-to-Helix Enterprise migration. Here are some factors that will help define your migration.

1 Review your existing branching strategy

Determine whether the branching strategy that you used in ClearCase is appropriate to use with Helix Enterprise. If not, decide on the strategy you intend to use with Helix Enterprise.

2 Plan your directory structure

A well-defined directory structure helps convey branch structure and software lifecycle information, making it intuitive to use. After you identify a branching strategy, you can map it to a high-level directory structure to be used in Helix Enterprise. We recommend the Perforce Directory Standard (PDS) structure based on years of successful use with customers.

info.perforce.com/PDS

3 Define release processes and directory structure standards

Think of the directory structure in Helix Enterprise as having low and high levels. Low levels contain your software products. High levels define branching structure, project management, and software lifecycle information. A well-designed high-level directory structure is intuitive for developers and lends itself well to project management metrics, policy enforcement by branch type, and automation.

Migrating to Helix Enterprise typically involves defining a PDS for each product imported into Helix Enterprise and, in some cases, for your entire organization. The high-level structure encourages consistency in release processes for various software products, but it can allow different software products to have different release processes. To minimize the difficulty and impact of migration, the low levels of the directory structure (for example, build scripts and release processes and tools) are untouched.

4 Consider Streams

At this point you should be prepared to make sure everything migrated completely and the source code is verified in your Perforce system. This is also the time to do any necessary retooling on your build systems, such as custom automation that needs to be changed to talk to Perforce instead of ClearCase. Then verify the build results—make sure you can do a build, complete a build, and run it through your test suites.

5 Address intellectual property concerns

Knowing where your source code came from and knowing what legal rights you have to it should be a priority when migrating to a new software version management system. Your migration processes must provide a clear audit trail so all imported files can be traced back to the original ClearCase repository.

Software version management systems store valuable intellectual property. Migrations offer an opportunity to review your access control policies. If sensitive information is being migrated, both the migration process and the resulting Helix Enterprise environment must ensure that access is controlled as well as it was in ClearCase.

6 Schedule training

To ensure a smooth migration and to help your users get the most from Helix Enterprise after a migration, training for your Helix Enterprise users and administrators is essential. It is most effective to train most of your users a few days or weeks before the cut-over to Helix Enterprise.

7 Create a transition team

Establish a transition team—a core group that includes application administrators, system administrators, and other influential users—to define how Helix Enterprise will be used in your organization, how it will tie in to your various processes and workflows, and how to integrate it with other systems. Perforce Consulting can be a valuable part of your transition team.

8 Select your first project

Picking the right pilot or project to migrate first is critical. Choose a project that has a good chance of success, but not one that is so simple or trivial that it does not represent remaining migration projects.

THE IMPORTANCE OF THE IMPORT

Now that you are ready to plan the migration details, consider your import strategy. It requires careful consideration, and you may have different approaches for different products, depending on where they are in their lifecycle and importance to your organization. Also consider that most customers never use the history they've imported, so take a good look at what you'll really need and why before you take the time and effort required for imports.

Starting Over (Tips)

This approach involves getting the latest file versions, or "tips," from ClearCase and adding them to Helix Enterprise. No history is preserved. This approach is sometimes appropriate for documentation versioned object bases (VOBs) or for VOBs for shelved (but not terminated) projects. It is rarely ideal for source code, except for prototype and demo code.

Pros starting over

- Easy: You only need to define target directories in Helix Enterprise and then add the files.
- Fast
- There is no undesirable metadata in Helix Enterprise.

Cons of starting over

- No historical information is available in Helix Enterprise.

Detailed History Import (DHI)

This approach, the most complete case of conversion, captures as much detailed branch/merge information as possible so that comprehensive historical research can occur in the new system without requiring the old one. Detailed history migrations from ClearCase can be selective[1]; a subset of VOBs can be imported, and within each imported VOB, a subset of all available branches and labels can be targeted for import.

Preparing for a ClearCase detailed history import

If you engage Perforce Consulting to help you plan a detailed history migration from ClearCase, here are a few things to be aware of early in your preparations:

- A replica of your ClearCase environment, including all VOBs targeted for import, should be provisioned on hardware separate from your production environment. This allows dry runs and other data analysis that can be unduly taxing on a production server.
- A powerful, dedicated migration server machine must be available. This could be the new Helix Enterprise server machine, and it must be a Linux server, even if the production and replica servers are Windows. A fast network connection between the ClearCase replica machine and the migration server (which can be the Helix Enterprise server) is essential.
- Migration is a very resource-intensive process and can be very demanding in terms of disk space and RAM resources. It is more demanding than actual Helix Enterprise server operation because years of work in ClearCase are being compressed into hours or days.

1. The Total Economic Impact™ Of Perforce, Forrester Research, Inc., May 2014, p.6

- 100G of VOB data converts in about 18 hours, which is the maximum amount of time you would want a migration to take. Dealing with larger repositories is possible, but requires more sophisticated migration strategies and more hardware to enable parallel operation of multiple VOBs.

Extracting and importing

Detailed history migrations can be front- or back-door implementations with respect to both extraction from ClearCase and importing into Helix Enterprise. Depending on your environment and migration plans, awareness of the capabilities and limitations of each style is important when planning migrations, especially for multi-phased migrations involving multiple teams migrating over time.

Perforce Software's migration tool for ClearCase migrations is "front door" for extraction from ClearCase, and "back door" for importing into Helix Enterprise. Being front door on the ClearCase side enables the tool to work across many ClearCase versions, while being back door on the Helix Enterprise side allows it to generate the most accurate representations of ClearCase history in terms of Helix Enterprise journal records.

Full vs. sparse context strategies

A full context strategy is one in which the goal is to recreate history in Helix Enterprise as it would be if Helix Enterprise had been used all along. In ClearCase, however, figuring out what a branch looked like at its start point can be a real challenge for anyone unfamiliar with the branching strategy used when any given branch was created. The alternative to a full context import is a sparse import strategy. This strategy ignores the guesswork and lends itself well to automated discovery and import of all file-level history from ClearCase on all branches.

Pros of a full context import

- It lends itself well to doing easy verification.
- Full context history makes can be used to run builds.
- It offers a richer understanding of your file history.
- File-level merge forensics for any given file is

Cons of a full context import

- The manual effort necessary to do a full-context conversion effectively limits the number of branches that can be imported.
- In large environments, full-context imports force a trade-off of limited scope because only a relatively small number of the most important branches are imported.

Pros of a sparse context import

- File-level merge forensics is possible for any given file, with history showing only branches that it was modified on.
- It is more practical to attempt full-scope (all or many branch) imports, even on large datasets.
- Much less tool configuration is required because the "config spec" gathering/generating process is unnecessary.

Drawback of a sparse context import

- Branch-level history is unavailable. (In Helix Enterprise, you see the set of files modified on any given branch and follow their history, but you cannot see them in the context of the entire branch, including files never modified on the branch.)

Hardware capacity planning

Hardware capacity planning may be impacted significantly with DHI migrations. A software version management system with, for example, 12 years of history would require more hardware (more disk space, more RAM, and faster CPUs and I/O subsystems, for example) than one with no history. If you import 12 years of detailed history, your new Helix Enterprise system will initially require as much hardware as if it had been in operation for 12 years.

Pros of a detailed history import

- Detailed history imports can transfer the most historical detail, including branching history, from ClearCase to Helix Enterprise.
- After the migration, comprehensive historical research and "merge forensics" can be done in Helix Enterprise without the need for going back to ClearCase. (We recommend keeping one user license in ClearCase as a backup.)
- The ability to view file history with Helix Enterprise's powerful visualization tools like Time-Lapse View can shed new light on the evolution of source code and help increase understanding of the changes over time.
- There is an increased benefit for systems integrated with version control. For example, the meaning of the linkage between a set of files originally modified in ClearCase and an issue from your issue tracking system can be maintained.
- Once historical data is in Helix Enterprise, it will gain the benefit of checksum verification of contents of all revisions, which improves IP provenance.

Cons of a detailed history import

- Detailed import tools have a variety of limitations and technical caveats. Some limitations are due to differences in the way ClearCase and Helix Enterprise work, and some are due to the potential complexity of ClearCase environments, including unusual patterns (or even corruption) in the data. So-called Evil Twin elements and certain circular branching patterns created by misconfigured config specs can be difficult to follow.
- Existing detailed history import tools may require development to work on your data. The likelihood of this depends on your data and is typically necessary for a full-context migration.
- Complexity translates into potential schedule and budget risks for the migration project.

Baseline and Branch Import (BBI)

The BBI approach provides a lightweight migration alternative that is more sophisticated than the tips approach and avoids the technical complexity and schedule and budget risks of detailed history imports. With the BBI approach, the "interesting history" to be imported is specified using a branch diagram that shows the baselines (snapshots of a directory structure at a specified time) and major branching operations. A BBI includes branching operations at a high level, capturing the sum of merge operations.

The intent of this approach is to bring over just enough branching history to answer key questions such as what did Release X.0 look like, where was this file branched from, and what files do I need in my workspace to start maintenance work on Release X.3? The BBI approach preserves file contents at key points and retains enough branching history so that the switch to Helix Enterprise can happen at any point in the release cycle, rather than just at "convenient points" in the schedule (which tend to be hard to find).

Accurate diagrams are essential for planning a BBI migration. Ideally, your release engineers can quickly draw an accurate branch history for each software product to be imported. If they cannot, such information can be extracted by exploring ClearCase manually. If detailed historical research is needed often, keep ClearCase online (perhaps with a single license) for a year or two after a BBI migration.

Pros of a BBI strategy

- You have the flexibility to do a multisystem migration of different teams on their own schedules without impacting others. Each team can migrate to Helix Enterprise without impacting those already on Helix Enterprise.
- "Interesting history" is available in Helix Enterprise. After migrating, you can use Helix Enterprise's powerful tools to see your old files in a new light. Detailed history has been omitted, but you can tell how the software product evolved.
- A BBI is fairly straightforward and has little risk of technical problems.
- You can load all of the historical information into Helix Enterprise before migrating. Then, on the day of the migration, only the baselines representing the latest active development branches need to be brought into Helix Enterprise because all historical information has already been imported.
- A BBI runs very quickly, so you can perform dry runs to test any source code changes required as part of the migration, such as updates to build scripts or makefiles.
- The amount of metadata resulting from a BBI is negligible and does not affect server performance or require increased hardware.
- You can normalize history by creating branches in a consistent manner. You can restructure the depot to show how "software product X went to production" in the same way for each of the imported software products.

Cons of a BBI strategy

- If files were renamed or directory structures were reorganized between releases, the historical connection between old and new file names is lost. ClearCase and Perforce track renames differently, so that information is lost by BBI migrations.
- ClearCase supports versioning of some uncommon, low-level file types that are not supported in Perforce, such as block special devices and character special devices. Such files cannot be imported, regardless of migration strategy. Symbolic links can be imported.

THE GREAT MIGRATION

The decision to migrate to Helix Enterprise is the right one. Helix Enterprise provides the benefits you need from a state-of-the-art software change management system, including:

- Fast, powerful, and flexible branching and powerful merge
- Distributed and centralized workflows with full Git support
- Ability to store files of any size or type
- Permanent history combined with universal security policies
- Built-in replication and caching technology for global development sites, at no additional cost
- Scalability to petabytes and millions of concurrent transactions
- "Greater developer and team productivity," according to Forrester Research[2]

Helix Enterprise also outperforms ClearCase in important areas:

- Lower licensing costs than ClearCase
- Fewer admins needed per user than ClearCase
- Proven installations with over 10,000 users accessing a single repository - many Helix Enterprise repositories hold millions of files and many terabytes of data, in some cases up to petabytes.
- 5 to 10 times faster than ClearCase when operating on a project with ~20,000 source code files
- 5 to 20 times faster than ClearCase when operating on a project with ~3.3 GB binary data

Don't put off your migration from ClearCase any longer. You need to position your software development efforts for success. Helix Enterprise is the fast, modern, scalable platform that allows you to version everything. Get started now on your migration to Helix Enterprise.

For more detailed information about planning your migration from ClearCase to Helix Enterprise, download the Migration Planning Guide: IBM Rational ClearCase to Helix Enterprise at this link:

info.perforce.com/rs/perforce/images/MigrationPlanningGuide_ClearCasetoPerforce-web.pdf

2. The Total Economic Impact™ Of Perforce, Forrester Research, Inc., May 2014, p.6

Get Expert Assistance

Not sure where to start with your migration? Contact Consulting Services.
info.perforce.com/ondemand-webinar-legacy-scm-migration.html

See How It's Done

Thousands have migrated from a legacy SCM to Perforce.
Learn how you can too. Get a Migration Kit.
info.perforce.com/migration-kit-overview.html

Customized ROI Analysis

Gauge the increased productivity and bottom line benefits of moving off your legacy SCM system. Get Custom Report.
info.perforce.com/customized-ROI-analysis.html

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