

HP Quality Center

Optimized Repository Preparation Guide

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1 Why optimized repository structure

Introduction

Each Quality Center project holds information in two locations; the project database schema and the project's file system repository. While the database schema holds most of the information of the project, the repository holds different types of files such as attachments, automated test results, workflow scripts etc.

The project's file system repository is affected by many actions done by the end user such as:

- Adding, removing or modifying attachments
- Creation or modification and run of automated tests
- Check-out and Check-in of entities that use repository assets such as attachments and automated scripts and results
- Pasting entities using repository assets such as attachments, automated scripts and results
- Creation of baseline
- Editing of workflow scripts
- Creation of analysis items

Until Quality Center 11, the Quality Center project file system structure had some issues which the new storage solution aims to solve:

- Some operating systems have a limitation on the number of files and folders that can be stored under the same folder
- Some operating systems have a limitation on the possible path length of a file
- File duplication, resulting from running automated tests or attaching identical files, caused issues with backup and restore, that required large storage space and extensive time, due to the size and amount of files.
- Quality Center versioning and baseline features, copy assets 'as is', including their repository assets, causing duplications, which makes the repository hard to maintain and backup, due to its increased size.

Performance issues in repository-related actions, such as pasting assets, opening attachments etc. might be caused by the size of the repository.

Audience

This guide is intended for administrators who are responsible for upgrading their existing Quality Center environment to newer version.

2 Optimized repository solution

How does it work?

The new Optimized Repository is based on an abstraction between the logical file system structure – which is the file system structure that was used until version 10 – and the physical file system structure which is the actual structure of the files on the disk. This separation is achieved by the introduction of two new tables in the DB. One represents the logical FS and the other the actual FS on the disk. This enables us to create a balanced tree structure in the disk as well as save only a single copy of each file – meaning that every file that has duplicates in the disk, from now on, will only be saved once on the disk but have multiple references from the logical table.

In order to identify such duplications, we use a digest algorithm (SHA256) on the files, which is considered very reliable. This, of course, implies that direct access to the file system is strictly forbidden from now on, and isn't possible due to the new cryptic structure of the repository.

All access to the FS must be done through OTA API, namely the ExtendedStorage interface.

Deletions of files only affect the logical table. A scheduled job runs periodically (customizable) and its task is to delete physical files that are no longer used by any logical file.

Migration process

The migration is done in two phases. The first is relatively short and is actually part of the upgrade mechanism. Its task is to map the entire FS into the logical table. Once this process is done, the project can be used normally.

The second phase is usually longer but runs in the background. At this stage, the files are scanned, digested and moved to their new location if needed, or deleted if a copy already exists. At this stage it is obviously not possible to copy and export projects, to ensure a full and successful migration process.

The run time of both phases depends on the number of iNodes on the disk (files and folders), not on the size of the repository.

During the second phase, each QC server node will allow concurrent migration of multiple projects. The user can set the priority that this task will have, and determine the amount of resources it uses:

- Use a lot of resources but finish quicker – good for those who have a scheduled downtime for the entire weekend and want to get things done.
- Use fewer resources and thereby have a low impact on QC users, but cause the entire process to take longer.

The new QC 11 Site administration page will include a new window which will help QC admins to monitor and track the progress of the migration. This is also the place to be notified on problems during this process. In case of such notifications, you will be able to fix the problem and resume the migration.

3 Preparing for enhanced repository migration

Before the new version implementation

Remove partitioning

This is the feature that enabled the user to set a different location for the tests folder, resources, and more. This feature is no longer supported and the user must realign the folders before the process begins. Upgrade to QC 11 will not be possible as long as partitioning is used. To do this, simply update the relevant records in the DATA_CONST table, and move the files back to their original location. Then restart QC. In other words, reverse the steps you took when you started using the partitioning feature.

Locate and modify tools that access the repository directly

Since direct file access is no longer supported, you must either disable any tools that access the repository directly, or modify them to work over the API.

Make sure the locales of the DB server, QC server and FS server are aligned

Failing to do so may result in missing files. This prerequisite is needed, since Java code running on the QC server scans the FS and must be able to read the file names. The files are then cataloged in the DB. Therefore, the DB must be able to represent the file names, so that they can be located afterwards.

Grant permissions to repository directory

The migration process requires full permissions on the project repository directory for the user running the QC service on the QC server machine. Make sure full permissions are assigned before installing the new version.

Review the project repository folders

Check the repository root folders for folders that are not related to Quality Center.

The migration process migrates all files and folders under the project root folders. The migration will take longer if the root folder includes redundant files that are not related to Quality Center. Also, any unrelated files will be inaccessible after the migration in the new file structure.

The migration process changes the structure and location of the scripts folder. Therefore it is recommended to save a copy of the scripts folder before migration.

New implementation requirements

Repository storage requirements:

The FS is expected to shrink, both in number of iNodes as well as in volume on the disk. The reduction ratio may vary dramatically, and best results are expected on projects with large number of iNodes (in the millions).

The DB, on the other hand, is expected to grow due to the listing of each logical file and its physical entry in the DB.

Bandwidth considerations:

Both phases of the migration involve scanning the entire FS and reflecting it in the DB. It is, therefore, IO intensive. If all elements (DB, QC and FS) are on the same machine, the network element is optimized, but at the cost of dedicating all IO on the same machine\disk. This is another reason we recommend using different machines for the DB, QC and FS.

Note that network quality may affect the process. Best results can be achieved by using different machines on the same network, with wide bandwidth and low latency.

Backup of project DB and repository

As the new upgrade mechanism and migration now involve, not only the project database schema, but also the project file system repository, it is highly recommended that you backup your project DB schema along with the file system repository directory.

For further information about backing up HP Quality Center schemas, see knowledge base articles KM205839 and KM169526.