

Collaborative ALM Interoperability

*Options for integrating Rational ClearQuest with
Rational Team Concert and Rational Quality Manager*

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Introduction

This whitepaper provides guidance to enterprise teams adopting new Jazz based tools to improve their team performance. Such teams are often expected to stay integrated with existing project or corporate change management workflows and require tool interoperability that integrates the new and existing change management tool solutions.

Deploying and integrating new Jazz based tools with existing change management workflows can be generalized into two situations, each driving specific requirements on choosing the right interoperability strategy for the new deployed and integrated solution.

In the first situation, teams adopting Jazz based tools like Rational Team Concert and Rational Quality Manager may be expected to fully participate in a formal change management practice implemented as a corporate-wide change management deployment on Rational ClearQuest. In such a situation, integration through synchronization will be a recommended approach. In the other situation, teams adopting a Collaborative ALM approach with team change management practice may choose an integration strategy based on establishing traceability through linking to enterprise change management assets. In both situations, implementing an interoperability solution also brings tighter collaborative capabilities to existing users of Rational ClearQuest.

This whitepaper describes the adoption situations more in detail and how to best choose and deploy an interoperability strategy for each integration scenario.

Overview

1 Approaches to Change Management

Below we will give you more information on each of the factors involved to help you decide which interoperability method is recommended for your tool and practice adoption.

1.1 A Traditional Formal Change Management Approach

Formal Change Management is a well established practice adopted by most software delivery organizations. The formal change management approach institutes an end to end workflow that ensures the control of change requests through their defined lifecycle. This lifecycle starts with the submission of a change request, flows through the implementation and validation of the resulting changes, and the final resolution of the request. See Figure 1.

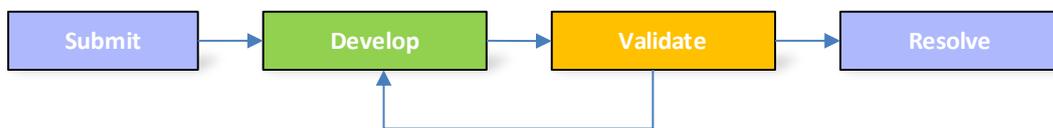


Figure 1. Formal Change Management workflow steps.

Such a formal change management process often flows through multiple teams and roles. For example, a stakeholder submits the change request, a project lead triages the request, a developer implements the request, a tester validates the implementation, and a product owner may resolve the change request and approve its inclusion in a product or application delivery.

A common implementation approach to a formal change management process is to use a Rational ClearQuest record, of a customized change request record type, that passes in sequence through the states of the request. Ownership of the record is passed from team member to team member to orchestrate the sequence of work. The Rational ClearQuest record specifies the property values of the request, and references other supporting records. Figure 2 shows a general state flow for a Change Request record.

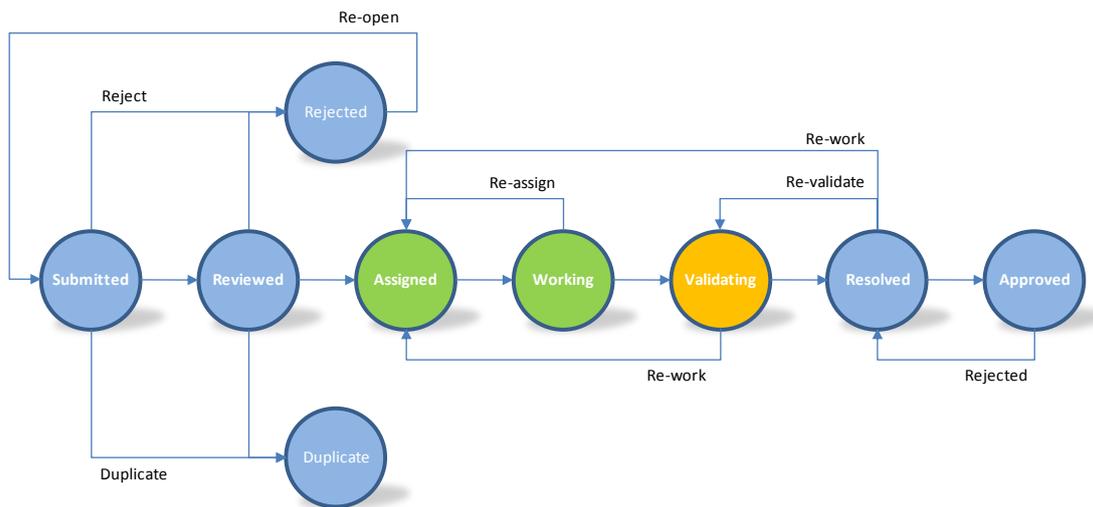


Figure 2. Formal Change Management workflow implemented in ClearQuest.

When providing an interoperability strategy for traditional change management approaches it is key to support and integrate with the controlling workflow implemented in Rational ClearQuest. Over the lifecycle of a single change request the ownership may be passed to a role that will interact with the request from one of the Jazz tools. As an example, a developer may be assigned a defect on a software component that is developed on Rational Team Concert. Also, a team adopting Rational Quality Manager may need requests made available for validation on that platform.

Configuring interoperability for a traditional change management approach requires the change request to be synchronized across the repositories, along with its key properties and request state. Interoperability may be optimized to only synchronize records where ownership is transferred to team members on the Jazz tool.

1.2 A Collaborative Application Lifecycle Management Approach

Collaborative Application Lifecycle Management introduces an alternate approach to implementing Formal Change Management. In this approach the workflow is no longer implemented as a single orchestrated workflow by a single record. Rather, a collection of artifacts are integrated to participate and orchestrate the workflow through collaboration. The states of the related artifacts and their dependencies shape the lifecycle.

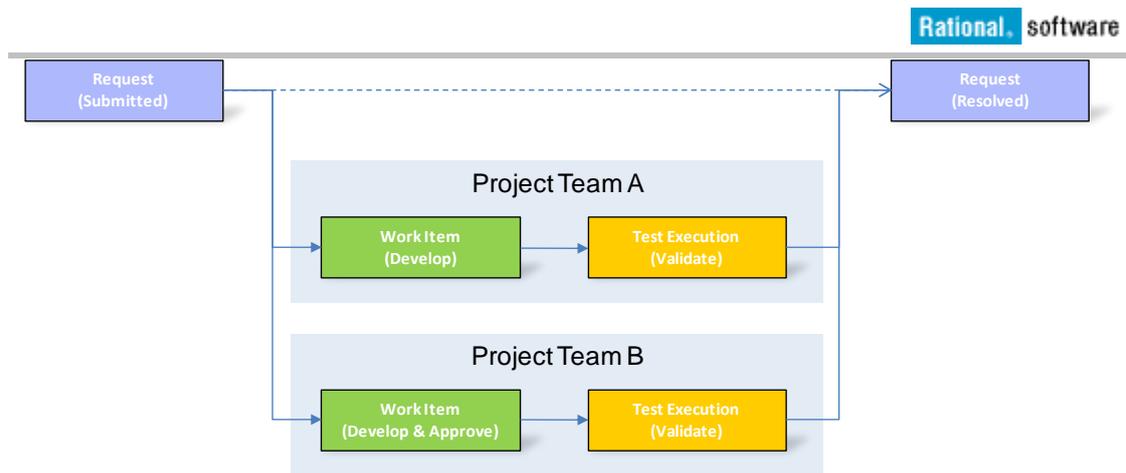


Figure 3. Collaborative Application Lifecycle Management workflow.

As an example, in Figure 3, a single Enhancement change request may be identified as two Work Items, each owned and tracked by a component team. The team will individually plan the work related to developing and validating the request. It is also feasible that each team may have adopted a slightly different development process where one team, for example, requires a code review prior to delivering changes to integration.

This approach to Collaborative Application Lifecycle Management is available in Rational ClearQuest using the ALM schema, and is the foundational principle for Collaborative ALM integrations using the Jazz Integration Architecture.

When using the Rational ClearQuest ALM schema becomes a practice that the flow of work is divided between multiple Rational ClearQuest records (ALMRequests, ALMTasks, ALMActivities) to capture the complete lifecycle. Ownership of records is distributed by function or role.

When using the Collaborative Application Lifecycle Management with the Jazz tools the flow of work is orchestrated by the linking and completion of related Work Items, for example Tasks and Defects in Rational Team Concert. Validation artifacts are managed by Rational Quality Manager as for example Test Cases and Test Execution Records. Defects are submitted from Rational Quality Manager as Defect records in Rational ClearQuest or Rational Team Concert depending on the tool used. A principal view of the Collaborative Application Lifecycle Management assets is shown in Figure 4.

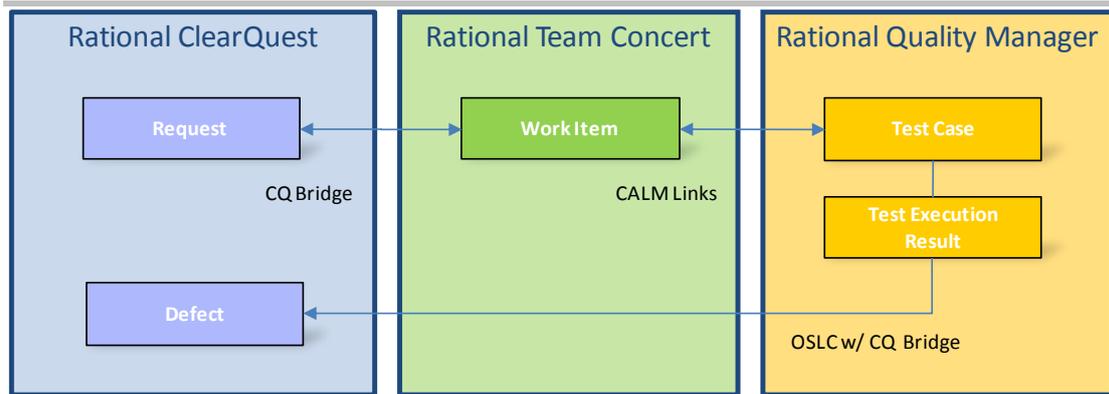


Figure 4. Linked Collaborative Application Lifecycle Management assets.

Teams adopting a Collaborative Application Lifecycle Management approach will benefit from choosing an interoperability solution that enables the linking of artifacts between Rational ClearQuest and the Jazz tools.

2 Choosing an Interoperability Strategy

Rational ClearQuest provide two types of interoperability technologies with the and Jazz tools; A linking solution with ClearQuest Bridge and the Open Services for Lifecycle Integrations (OSLC) for Change Management. A synchronization solution with the ClearQuest Synchronizer Connector. These methods of interoperability allow teams the flexibility to choose whether data is transferred between records and work items or if there will only be a linking of records and work items.

The OSLC and ClearQuest Bridge integrations will enable a linking of Rational ClearQuest records and Rational Team Concert/Rational Quality Manager work items and best fits the Collaborative ALM approach. The ClearQuest Synchronizer will enable a transfer of data between Rational ClearQuest records and Rational Team Concert/Rational Quality Manager work items and best fits the traditional change management approach.

A balance between the way that Rational ClearQuest is utilized and how much data transfer between Rational ClearQuest and Rational Team Concert/Rational Quality Manager is desired will help determine which interoperability strategy is recommended.

2.1 ClearQuest Bridge

The ClearQuest Bridge enables a loose coupling and provides a link between Rational ClearQuest records and Rational Team Concert work items. No record data is transferred between the records. The ClearQuest Bridge is provided as a service in the Jazz Server and configured using the Admin console. There is no additional installation required. Also, the ClearQuest Bridge only stores information in the Jazz Work Items and no changes are required to the Rational ClearQuest schema configured for change management. This simplifies team adoption of the ClearQuest Bridge solution as the record linking can be used without any changes to the Rational ClearQuest schema deployed to production

cross the enterprise. The ClearQuest Bridge can also be used to link any record type, or any number of record types, and hence offer great flexibility in its use.

To configure the ClearQuest Bridge solution the following steps have to be performed:

- Enter the host name (recommended) or IP address to the Rational ClearQuest CM-Server in the Advanced Server Settings for the Rational Team Concert or Rational Quality Manager server.
- Optionally, enter the default Rational ClearQuest schema connection to be used.
- Optionally, select the setting to enable the Rational ClearQuest Records tab in Rational Team Concert Web.

After configuring the Jazz server, Rational ClearQuest records and Jazz (Rational Team Concert/Rational Quality Manager) work items can be linked. When a Rational ClearQuest record, or a Jazz work item, is updated the linked work item or record is not updated as no data is synchronized between the records. The link remains intact throughout the lifecycle of the request, but the user must follow the link to see state and value changes in the linked record.

Additional information on configuring the ClearQuest Synchronizer can be found in the [Rational Team Concert Information Center](#) and section [Configuring and using the Rational ClearQuest bridge](#).

2.2 OSLC for Change Management

Rational ClearQuest and the ClearQuest Bridge can also be configured to become a Change Management service provider for integrations with Rational Team Concert, Rational Quality Manager and other tools consuming OSLC Change Management services. This integration will enable defects to be created in Rational ClearQuest from Test Execution Results in Rational Quality Manager. The OSLC for Change Management is a standards approach and the integration can also be configured for other Change Management service providers like Rational Team Concert or Rational Change.

To configure the Change Management service provider in Rational Quality Manager the following steps have to be performed:

- Establish a Cross-Server Communication relationship between the Rational Quality Manager server and the Rational ClearQuest server in the Jazz Server Administration settings using a Root Services URI.
- Establish a link between the Rational ClearQuest repository and the Rational Quality Manager project area.
- When submitting a new defect from Rational Quality Manager, select Rational ClearQuest as your change management provider.

Additional information on configuring the ClearQuest Synchronizer can be found in the [Rational Quality Manager Information Center](#) and the section [Setting up integration using the Rational ClearQuest Bridge](#).

2.3 ClearQuest Synchronizer

The ClearQuest Synchronizer enables a tight coupling and transfer of data between Rational ClearQuest and Rational Team Concert / Rational Quality Manager. The ClearQuest Synchronizer is a separate install component and requires additional configuration in both Rational ClearQuest and Rational Team Concert / Rational Quality Manager. The ClearQuest Synchronizer allows a higher amount of control, but requires more complex configuration when developed, and more maintenance when taken into production.

To configure the ClearQuest Synchronizer solution the following steps have to be performed:

- The Rational ClearQuest schema implementing the Formal Change Management workflows has to be adapted to the ClearQuest Synchronizer. This involves applying the JazzInterop package.
- A ClearQuest Connector server has to be deployed. This server will perform the synchronization between Rational ClearQuest and Jazz tool records.
- Synchronization rules must be created with mappings of record types to work item types and record properties to work item properties. When a Rational ClearQuest record or Jazz (Rational Team Concert / Rational Quality Manager) work item is created or updated the corresponding work item or record is updated.
- The Change Request records in Rational ClearQuest and Jazz tools may need to be re-factored. This step ensures that any additional attributes are added in Rational ClearQuest, Rational Team Concert or Rational Quality Manager required by the change management workflow. It is also required to clean up existing data values variances to configure the synchronization rules. For example, validate enumerations values like "High" vs. "high".
- Deploying the ClearQuest Synchronizer solution to a sandbox for development and testing.

Additional information on configuring the ClearQuest Synchronizer can be found in the [Rational Team Concert Information Center](#) and the section [Configuring and using the Rational ClearQuest Connector](#).

Additional Configuration Factors To Consider

The following section covers information useful to help determine and balance the complexity vs. capability of an interoperability strategy while taking into consideration the desired amount of data transfer.

2.4 Using ClearQuest Connector for Traditional Change Management

The following should be considered

- A mapping of the Rational ClearQuest change request record type to Jazz work items must be modeled and implemented.
- The Rational ClearQuest change request state model must be unified with the Jazz work item state model. Make sure that the Rational ClearQuest record states used for transitioning a request to an owner on the Jazz tool is modeled. Also, make sure the state is transferred back to Rational ClearQuest when exiting the ownership.
- Map the key attributes in the Rational ClearQuest change request with the Jazz work item. Note that enumeration values can be translated in a sync rule between Rational ClearQuest and Jazz enumeration values. Using enumerations reduces the risk of synchronization errors and lowers solution maintenance.
- Model and map additional Rational ClearQuest record types referenced by the change request record type. Each record type will require its individual synchronization rules.
- Seek one-to-one mapping of a record to a work item and field and value mappings to ease configuration.

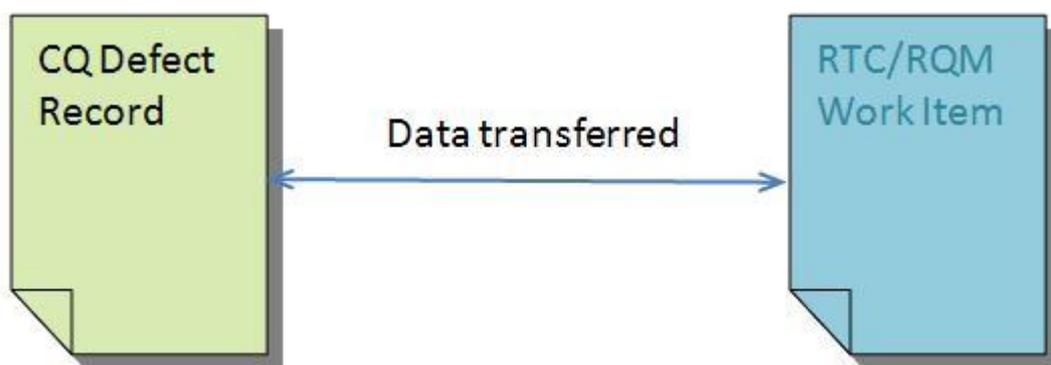


Figure 5. Traditional Change Management with ClearQuest connected with RTC/RQM via ClearQuest Connector.

When modeling the workflow, take into consideration that

- When the Rational ClearQuest record is changed the Rational Team Concert work item is automatically updated using the ClearQuest Connector.
- When the Rational Team Concert work item is changed the Rational ClearQuest record is automatically updated using the ClearQuest Connector.
- Creating a new record may create ripple effects. A new Rational ClearQuest defect record may be created by a tester which causes a single Rational Team Concert work item for the development team to be created using the ClearQuest Connector.

When deploying the ClearQuest Connector solution, take into consideration that

- When using Rational ClearQuest Multisite, there is a restriction that records updated by the connector have to be mastered at the server running the ClearQuest Connector integration. This puts special considerations into schema design, and limits MultiSite support. A centralized Rational ClearQuest installation will resolve such limitations.
- Accept the need to modify the established formal change management workflow to limit synchronization errors. Make sure to refactor Rational ClearQuest record text fields to enumeration values to limit synchronization errors.
- Apply change and configuration management practices to Rational ClearQuest schema development to allow schema and synchronization rules to be co-developed and co-deployed.
- Develop the ClearQuest Connector solution in a sandbox. Always test changes to synchronization rules prior to deployment in production.
- Always perform root cause analysis on synchronization errors to improve synchronization rules and resolve data value inconsistency.

2.5 Using ClearQuest Bridge for Traditional Change Management

The following should be considered when enabling projects using Traditional Change Management with Rational ClearQuest to integrate with delivery teams using Rational Team Concert and/or Rational Quality Manager using the ClearQuest Bridge.

- The ClearQuest Bridge can be used by testers, on Rational Quality Manager, to create Change Requests like Defects in Rational ClearQuest.
- The Rational ClearQuest record and Jazz work item links are only available in the Jazz Web UI (Work Items tab and Rational ClearQuest Records tab)

and in the Rational Team Concert Eclipse Client. Links are not available in the Rational ClearQuest Web or Rational ClearQuest Eclipse clients.

- A link between a Rational ClearQuest record and a Jazz work item is only stored in the work item.
- A Rational ClearQuest request record can be mapped to many Jazz work items in many repositories.
- A Jazz work item can link to one or many Rational ClearQuest records. This eliminates the need to design mappings between record types and work items types.

For example:

- A single Rational ClearQuest defect record is created by a tester.
- A developer creates a Rational Team Concert work item to track the work to be done to fix the defect in the Rational ClearQuest record. The developer links the work item to the Rational ClearQuest record using the ClearQuest Bridge.
- When the Rational ClearQuest record is changed, the Rational Team Concert work item is not updated
- When the Rational Team Concert work item is changed the Rational ClearQuest record is not updated
- No mappings need to be created for record fields and values

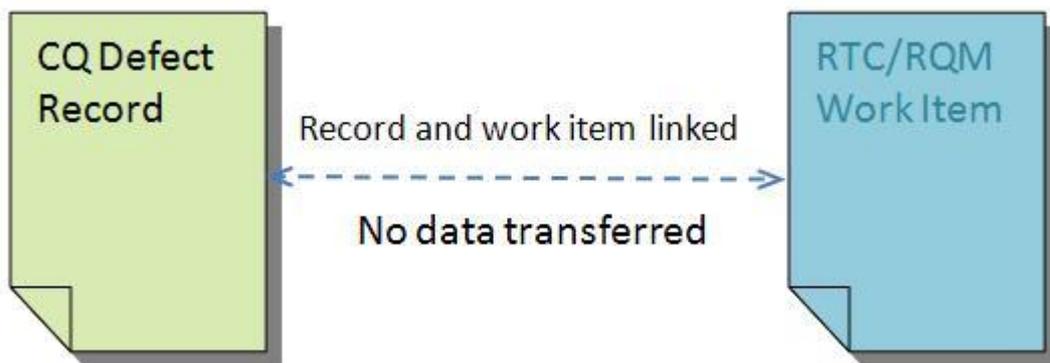


Figure 6. Traditional Change Management with Rational ClearQuest connected with Rational Team Concert/ Rational Quality Manager using ClearQuest Bridge.

2.6 Using Rational ClearQuest ALM schema for Application Lifecycle Management

The following should be considered when enabling projects using the CQALM schema to integrate with delivery teams using Rational Team Concert and Rational Quality Manager with the ClearQuest Connector.

- Each record type participating in synchronization but have individually configured synchronization roles. Each record type must be mapped to a unique work item type. Hence, as the ALM schema splits a work item into a Request, a Task and an Activity record there has to be mappings to each of the types to unique Work Items types.
- Each field of each Rational ClearQuest record type that will need to be updated using the ClearQuest Connector needs to be mapped to a field in Rational Team Concert/Rational Quality Manager.
- Each reference field used by one of the CQALM record types has to be implemented as an individual synchronization rule that will be invoked by the parent sync rule. The ALM schema frequently uses reference types and then further increases the complexity of a mapping.
- Many fields in the ALM schema are mandatory when submitting a new record. This adds complexity to the creation of new ALM Tasks and Activities from Work Items not yet synchronized with a Rational ClearQuest record.
- The planning capabilities in CQALM and Rational Team Concert use different approaches to model the project, teams, phases, and iterations. Mapping two different models cannot effectively be implemented with the ClearQuest Connector that is designed to solve 1:1 field and value mappings. This results in the need to implement custom mapping logic in the Rational ClearQuest schema.

Examples of such cases are:

- A Rational ClearQuest ALMRequest record is created by a tester.
- One or more ALMTasks are created using CQALM.
- One or more ALMActivities are created using CQALM.
- Rational Team Concert work items are created for each of the ALMTasks and ALMActivities.
- When a Rational ClearQuest record is changed the corresponding work item is updated using the ClearQuest Connector.
- When a Rational Team Concert work item is changed the corresponding Rational ClearQuest record is updated using the ClearQuest Connector.

2.7 Using ClearQuest MultiSite and the ClearQuest Connector

The following should be considered when using The Rational ClearQuest MultiSite with the ClearQuest Connector

- Rational ClearQuest records updated by the ClearQuest Connector have to be mastered at the server running the ClearQuest Connector.
- Configure the ClearQuest Connector selection queries to validate MultiSite mastership to avoid synchronization errors.
- Attempt to automate mastership settings based on the record ownership and user mastership settings.
- Consider the benefits of a centralized Rational ClearQuest installation for resolving mastership limitations for the ClearQuest Connector.

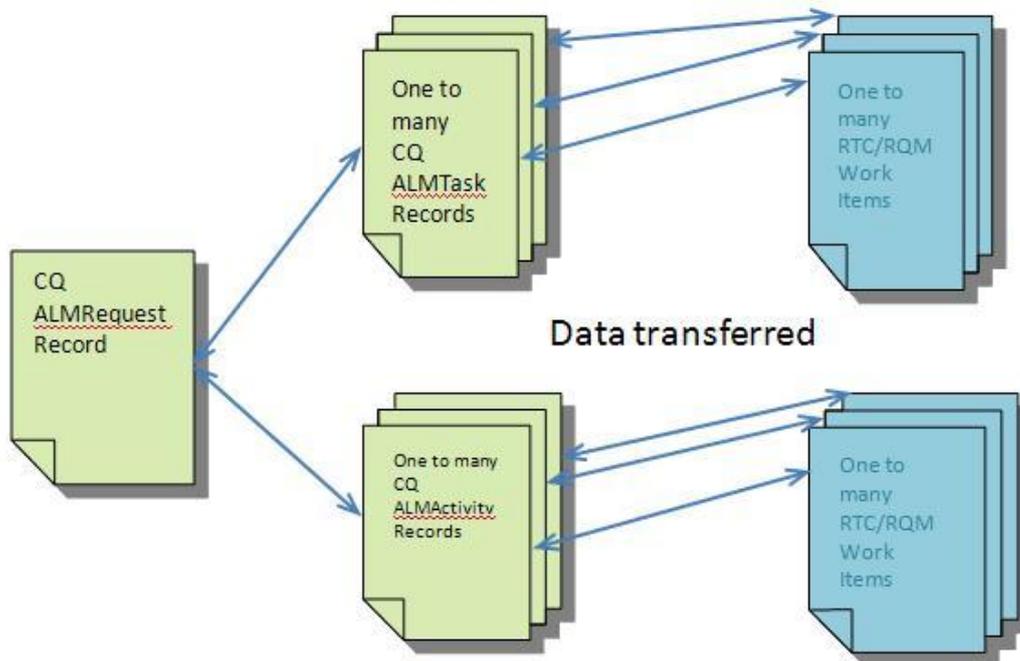


Figure 7. CQALM connected with Rational Team Concert/Rational Quality Manager using ClearQuest Connector.

2.8 Using Rational ClearQuest ALM schema and the ClearQuest Bridge for Application Lifecycle Management

The following should be considered when using the Rational ClearQuest ALM schema with the ClearQuest Bridge

- A Jazz work item can link to one or many Rational ClearQuest records. This eliminates the need to design mappings between record types and work items types.
- Work Items can be linked to ALM Requests, Tasks, or Activities as needed by the adopted change management workflow.
- Work Items can be linked to other types of records, for example BTBuild records to track build failures and build resolutions.
- Work Items can be linked to records that are not change management related, and be used for work assignment and tracking. For example, link to Enhancements to assign and track work to elaborate requirements.
- When configuring the OSLC CM provider in Rational Quality Manager note that the default record type in Rational ClearQuest will be chosen as the default defect type. Update the default record type in Rational ClearQuest to map to the record type used for Defects in your specific schema configuration.

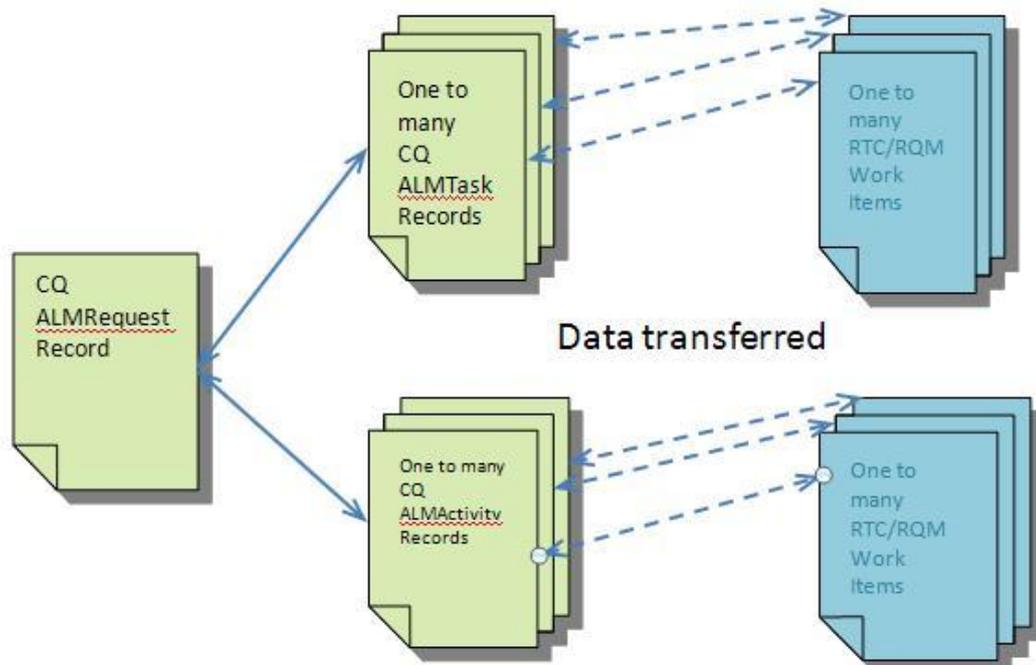


Figure 8. CQALM connected with Rational Team Concert/Rational Quality Manager using ClearQuest Bridge.

Conclusions

The following recommendations are made for the method of interoperability for a deployment based upon the way Rational ClearQuest is implemented and the need for a transfer of data between products.

The ClearQuest Bridge is recommended for:

- The ClearQuest Bridge and OSLC is the recommended solution for any new integration between Rational ClearQuest and the Jazz tools.
- Integration based on OSLC Change Management is a standards approach that delivers openness and flexibility across Rational and other change management vendor solutions.
- Collaborative Application Lifecycle Management with a linking of records across repositories. The ALM and change management lifecycle is implemented using multiple dependent assets across multiple platforms, including Rational ClearQuest.
- Traditional change management in Rational ClearQuest with a linking of records when there is only a need to link between data in Rational ClearQuest and Rational Team Concert/Rational Quality Manager and no need to synchronize state or transfer attribute data.

The ClearQuest Connector is recommended for:

- A traditional change management workflow using a single change request record where Rational ClearQuest records and Jazz Work Items are synchronized and sharing states and attributes.
- The ownership of the change request record is passed across team members across multiple platforms

The ClearQuest Connector is not recommended for:

- Rational ClearQuest Application Lifecycle Management due to the complexity of configuration and maintenance necessary to map the fields and values of ALMRequests, ALMTasks and ALMActivities with Work Items.
- This solution is only recommended when the need for data to be transferred between Rational ClearQuest and Rational Team Concert/Rational Quality Manager is such that the work to implement and maintain the complex configuration is acceptable

References

The following were used in references or as other sources of information:

Collaborative Application Lifecycle Management with IBM Rational Products – IBM Redbook <http://www.redbooks.ibm.com/abstracts/sq247622.html>

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