HP Defects and Requirements Exchange with HP Service Manager/ServiceCenter and HP Quality Center/Application Lifecycle Management

For the Windows® operating systems

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Installation and Administration Guide

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Contents

Chapter 1: Introduction

This chapter describes:

- "Document Purpose" below
- "Synchronization Concepts" below
- "References" on page 12

Document Purpose

This document describes how to configure and deploy the integration components

- HP Service Manager / HP ServiceCenter (SM)
- HP Quality Center (QC)
- HP Quality Center Synchronizer (QCS)

> **Note:** As of version 11.00, HP Quality Center is known as HP Application Lifecycle Management (ALM); as of version 1.40, HP Quality Center Synchronizer (QCS) is known as HP ALM Synchronizer.

This document also describes how to configure and test synchronization links between QC/ALM and SM.

> **Note:** This document contains numerous examples that use the SM and QC/ALM default installation configuration and databases. Your particular configuration may differ significantly. The example synchronization configuration may also differ significantly from your requirements.

The target readers include HP Consultants and/or Application Administrators who must set up and maintain QC/ALM Synchronizer, ensuring that the synchronizer meets all user organization procedural requirements. This document assumes that the reader is an experienced user of either Service Manager or QC/ALM (but not necessarily of both), and therefore describes only the basics of both SM and QC/ALM.

Synchronization Concepts

This section provides a detailed introduction to the following basic synchronization concepts.

- **SM Change -> QC/ALM Defect**

  When a business owner enters a change request in SM and marks the change “Forward as defect”, a defect is created in QC/ALM. This informs the QA personnel that they should begin the QA process.

  During the QA process, key information is synchronized from QC/ALM to SM. The integration administrator has the responsibility of determining the key information and specifying the information in the field mapping (using the provided integration tool) in order for the business owner to view updated (scheduled) information in SM. The information includes the status of all changes in the testing cycle.

- **SM Change -> QC/ALM Requirement**

  The requirement synchronization feature of this integration allows requirements found during the change management process to be systematically tracked by SM and QC.

  When a business owner enters a change request in SM and marks it as “Forward as requirement”, a requirement is created in QC/ALM. This informs the QA personnel that they should begin the QA process.

  During the QA process, key information is synchronized from QC to SM. The integration administrator has the responsibility of determining the key information and specifying the information in the field mapping (using the provided integration tool). This allows the business owner to view updated (scheduled) information in SM.

- **SM Problem -> QC/ALM Defect**

  After a problem is created, if the CPE engineer determines that there is bug with the problem after analyzing it, and the bug fixing work needs to be tracked, the CPE engineer triggers/initiates the creation of the QC CR ticket. When this problem is marked as “Synchronize with QC Defect”, a defect is created in QC/ALM.

- **QC/ALM Defect -> SM Problem**

  The business process for defect management in QC/ALM supports creation of known errors in SM based on information in QC/ALM. However, in the current solution, the integration can only create a problem in SM from a defect in QC/ALM. A user must create the known error in SM manually from the problem in SM. Known errors are a source of information for informal knowledge articles in the Knowledge Base.

- **SM Problem <-> QC/ALM Defect**

  This user story is a combination of SM Problem -> QC/ALM Defect and QC/ALM Defect -> SM Problem.

References

- *HP Quality Center Synchronizer User’s Guide / HP ALM Synchronizer User’s Guide*
- *HP Quality Center Administrator's Guide / HP ALM Administrator's Guide*
- *HP Service Manager Installation Guide*
- *HP Service Manager Online Help*
- *Best Practices for Publishing and Consuming Web Services with ServiceCenter*

Chapter 2: Planning the Deployment

This chapter describes the following deployment plannings:

- "Supported Products and Platforms" below
- "Deployment Scenarios" on the next page
- "Data Types" on the next page
- "Deployment Tasks" on the next page
- "Release Package" on the next page

Supported Products and Platforms

Supported products are shown in the following table.

Supported Product	Version
HP Quality Center Synchronizer / HP ALM Synchronizer	1.2, 1.3, and 1.4
HP Quality Center / HP Application Lifecycle Management	9.2 patch 4 and above, 10, and 11
HP Service Manager	7.01, 7.02, 7.10, 9.20 patch 1 and 9.3x
HP ServiceCenter	6.2.2 and above

- In this integration solution, supported platforms for Quality Center Synchronizer or ALM Synchronizer include:
- Microsoft Windows 2000 with Service Pack 4 (32bit)
- Microsoft Windows XP with Service Pack 2 (32bit)
- Microsoft Windows 2003 Server with Service Pack 2 (32bit)

Note: When used with ALM 11.00, ALM Synchronizer only supports Microsoft Windows XP with Service Pack 2 (32bit).

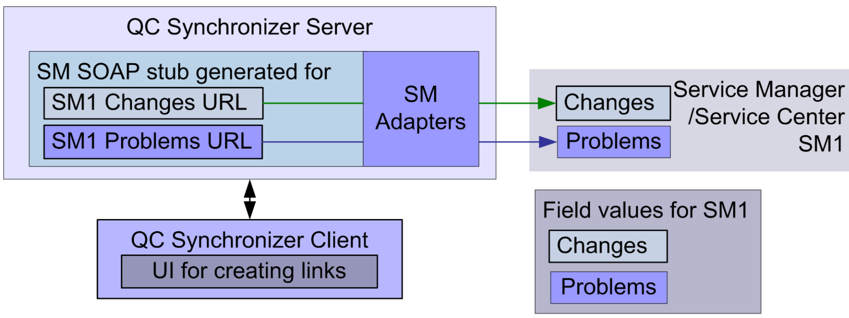
For information about supported platforms of Service Manager, and Quality Center/ALM, refer to their product support matrix.

Deployment Scenarios

The deployment scenarios include:

- A single SM server has a dedicated synchronizer.
- A single SM server can connect to multiple QC/ALM systems.

The scenarios are shown in the following figure:



Data Types

"Matching Types" on page 33 describes the data type requirements between QC, QCS, and SM.

Deployment Tasks

Deployment tasks include:

- Customizing Service Manager/Service Center
- Customizing Quality Center/ALM
- Installing/Configuring QC/ALM Synchronizer
- Configuring Links in QC/ALM Synchronizer

Release Package

The release package is delivered as an executable self-extracting installer. Run the installer by double clicking it. The major contents are shown in the following table.

Directory	Contents
sm-adapter\adapter	Adapter and dependencies (except stub)

Directory	Contents
sm-adapter\ant	Build lib
sm-adapter\bin	Script to generate the stub
sm-adapter\doc	Release documents (including this document)
sm-adapter\jdk5	Sun JDK 1.5
sm-adapter\lib	Binary libraries required to generate the stub
sm-adapter\sample	Examples of WSDL and adapter configuration
sm-adapter\out-of-box	Out-of-box demo package

Caution: The out-of-box demo package does not support Service Manager 9.20 or later, ALM 11, or ALM Synchronizer 1.4.

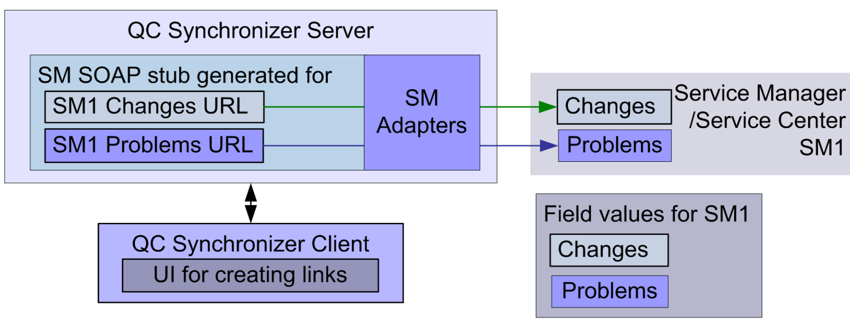
Chapter 3: Installing and Configuring QC/ALM Synchronizer

The QC Synchronizer (QCS)/ALM Synchronizer allows centralized management of a set of tightly coupled one-to-one data synchronization links and provides an open and extensible platform for the development of new data synchronization adapters to entity repositories.

To install and configure the synchronizer, follow these steps:

1. "Installing QC/ALM Synchronizer" below
2. "Deploying the Adapters" on the next page
3. "Generating/Deploying the Stub" on the next page
4. "Copying SM Adapter Configuration Files" on page 19
5. "Editing the Configuration Files" on page 20

The following diagram provides an overview of the installation process.



Installing QC/ALM Synchronizer

Download QC Synchronizer from:

http://updates.merc-int.com/qualitycenter/qc90/sync/qcsynchronizer/index.html

Download ALM Synchronizer 1.4 from:

http://update.external.hp.com/qualitycenter/qc110/sync/almsynchronizer/index.html

Caution: When installing the ALM Synchronizer, select the ALM 11 mode so that it supports synchronization with ALM 11.

Installation Requirements

The following requirements apply for all supported versions of Service Manager / ServiceCenter, QC / ALM, and QCS / ALM Synchronizer:

- The QC/ALM client is installed when you are logging into QC/ALM. The correct QC/ALM client should be installed on the QC/ALM Synchronizer server.

- The QC/ALM Synchronizer machine should have the same time zone with the QC/ALM machine. For more information, see the integration solution release notes.
  For installation instructions, see the *QC/ALM Synchronizer user guide*. You can get the user guide from the installation package or from http://h20230.www2.hp.com/selfsolve/manuals.

- Make sure that the time difference in UTC between SM and QC/ALM Synchronizer is within 5 minutes, otherwise the data might be lost during synchronization. For example, the SM server time is `2008-1-1 21:00:00` in UTC, then the QCS server time must be between `2008-1-1 20:55:00` and `2008-1-1 21:05:00`.

Deploying the Adapters

Copy all files under the `<release-package>\adapter` directory to the `<QCS_Install_Dir>\adapters\lib` directory. Adapters include:

`sm-adapter-XX.XX.XXX.jar` (`XX.XX.XXX` is the version number for the current release)

`sm-adapter-axis-1.4.jar`

`sm-adapter-commons-discovery-0.2.jar`

`sm-adapter-commons-lang-2.3.jar`

`sm-adapter-jaxrpc-1.1.jar`

`sm-adapter-jdom-1.1.jar`

`sm-adapter-saaj-1.2.jar`

`sm-adapter-wsdl4j-1.5.1.jar`

`sm-adapter-commons-codec-1.3.jar`

`sm-adapter-commons-httpclient-3.1.jar`

Generating/Deploying the Stub

To generate and deploy the stub:

1. Start the SM service (stub generation requires access to SM).

2. Edit the following lines in `<release-package>\bin\build.properties` as required for access to SM:

```
#Set up WSDL URL, please change the URL to your actual SM server, eg,
http://<your-server>:<port>/.../<service-name>.wsdl

#Comment this line by this sign "#" if you do not generate stub jar for
change management module
sm.change.wsdl=http://localhost:13080/sc62server/PWS/
QCIntChangeService.wsdl

#Comment this line by this sign "#" if you do not generate stub jar for
problem management module
sm.problem.wsdl=http://localhost:13080/sc62server/PWS/
QCIntProblemService.wsdl
```

3. Run the script `build.bat` from the operating system's command prompt (check the console output for errors). The stub `<Release_Package>\build\sm-adapter-ws-client.jar` is generated.

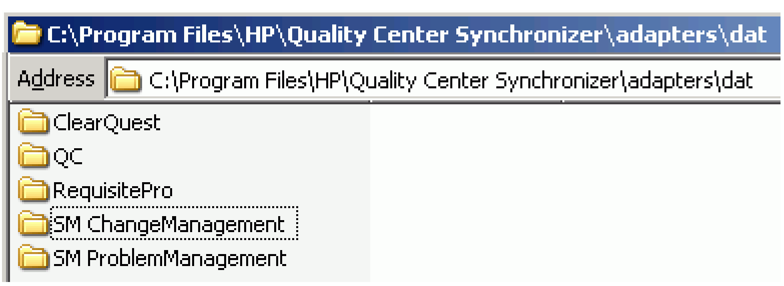
4. Copy the stub to the `<QCS_Install_Dir>\adapters\lib` directory.

Copying SM Adapter Configuration Files

To copy SM adapter configuration files:

1. Start/restart QCS.

   Click **Start** > **All Programs** > **HP Quality Center Synchronizer** > **Start/Stop Synchronizer**. The directories `<QCS_Install_Dir>\adapters\dat\SM ChangeManagement` and `SM ProblemManagement` appear after the synchronizer service is started (this can take up to one minute).



2. Copy the file `<Release_Package>\sample\configuration_file_default.xml` to the following folders:

- `SM ChangeManagement`
- `SM ProblemManagement`

Editing the Configuration Files

Edit the files as described below. The files will be specified later when you create links.

Module Types

There are two module types for this configuration file: `change` or `problem`.

A module named `change` or `problem` means that this module is for Change Management or Problem Management, respectively.

For example:

```
<itg:module name="change">
```

You can define one module or two in this file, but duplicate definitions are not permitted.

Field Types

Field XML Element Specification

Parameter	Description
name	Field name. This name should be the same as **Caption** enabled in the SM/SC WSDL. This field is required.
type	Field type. Its value can be `String`/`Number`/`Date`/`Single_Value_List`/`Multi_Value_List`. This field is required.
readonly	Indicates whether the field is read-only. Its value can be `true` or `false`. This field is optional. Default is `false`.
required	Indicates whether the field is `mandatory`, `recommended` or `optional`. This field is optional. Default value for the field is `optional`.
length	The length of the field in the SM endpoint. This field is optional. The length is unlimited if not specified.

The configuration file is an XML file that provides Change/Problem field values to the SM adapter. These values include:

- Field name (the caption of a field in the SM WSDL configuration form, such as **Status**, **Priority**)
- Field types
  - String
  - Number
  - Date
  - Single_Value_List
  - Multi_Value_List
- List types
  - Array (multi-value list)
  - Single-value list
- For a value list, the mapping of the value in the database and the exposed caption (for a type other than a value list type, the adapter automatically determines the desired data type).

Requirements

- Default field configuration is readable and writable with unlimited length.
- Default field configuration for a Single_Value_List or a Multi_Value_List must be explicitly specified.
- Read-only fields must be explicitly specified.
- You must specify the type and read/write explicitly only for a Single_Value_List/Multi_Value_List.
- If a field is not configured, the field is read/write with unlimited length.
- A list or multi-list field may contain item elements. For each item specify the value and display text in the form `<itg:item value="$value">$display text</itg:item>`.
- If the field in WSDL is an Array, it must be mapped to Multi_Value_List.
- If the QC field is User_List, you can only specify String or Single_Value_List for the corresponding SM field.
- If the field is read-only you must set the attribute `readonly` as `true`.
- If the field attribute `required` is `mandatory`, the field is mandatory for creation of a new entity.
- If the field has a length limitation (attribute `length`), values from other endpoints could be truncated to match this limitation.

SM Field Type and Definition Rule

There are restrictions on data type and field type combination. Define field type in the configuration file according to such rules.

SM Field Type and Definition Rules

SM 7.0x/7.10 DB data type	SC 6.2 DB data type	Field type on Form	WSDL data type	Field Definition Rule
Date/time	Date/time	Date	DateTimeType	Optional. Permitted type is "Date".
Number	Decimal	Decimal Text	<*Empty*> DecimalType IntType	Optional. Permitted type is "Number".
Logical	Boolean	Check Box Radio Button	<*Empty*> BooleanType	Optional. Permitted type is "String".
Character	Text	Text TextArea Combo Box Comfill	<*Empty*> StringType	Optional. Permitted types include "String" and "Single_Value_List".
Array	Array	Text Area	<*Empty*>	Optional. Permitted types include "String" and "Single_Value_List".
Array	Array	Combo Box Comfill Text	<*Empty*>	Required. Permitted type is "Multi_Value_List".

SM Change Management Example

The following is typical for SM change management.

```
<?xml version="1.0" encoding="UTF-8"?>

<itg:mapping xmlns:itg="http://www.hp.com/smci/SMQCIntegration/config">

<itg:module name="change">

  <itg:field name="Urgency" type="Single_Value_List" readonly="false" required="
mandatory" length="50">

    <itg:items>

      <itg:item value="1">1 - Critical</itg:item>

      <itg:item value="2">2 - High</itg:item>
```

```
        <itg:item value="3">3 - Average</itg:item>
      </itg:items>
    </itg:field>
  </itg:module>
  </itg:mapping>
```

SM Problem Management Example

The following is the included `configuration_file_default.xml` for SM problem management.

```
<?xml version="1.0" encoding="UTF-8"?>
<itg:mapping xmlns:itg="http://www.hp.com/smci/SMQCIntegration/config">

<itg:module name="problem">
    <itg:field name="Status" type="Single_Value_List" required="mandatory">
   <itg:items>
       <itg:item value="Open">Open</itg:item>
       <itg:item value="Accepted">Accepted</itg:item>
       <itg:item value="Work In Progress">Work In Progress</itg:item>
       <itg:item value="Pending Vendor">Pending Vendor</itg:item>
       <itg:item value="Pending User">Pending User</itg:item>
       <itg:item value="Rejected">Rejected</itg:item>
       <itg:item value="Deferred">Deferred</itg:item>
   </itg:items>
</itg:field>
<itg:field name="AssignmentGroup" type="Single_Value_List" required="mandatory">
   <itg:items>
       <itg:item value="Application">Application</itg:item>
       <itg:item value="Network">Network</itg:item>
   </itg:items>
</itg:field>
<itg:field name="Service" type="Single_Value_List" required="mandatory">
   <itg:items>
       <itg:item value="Applications">Applications</itg:item>
```

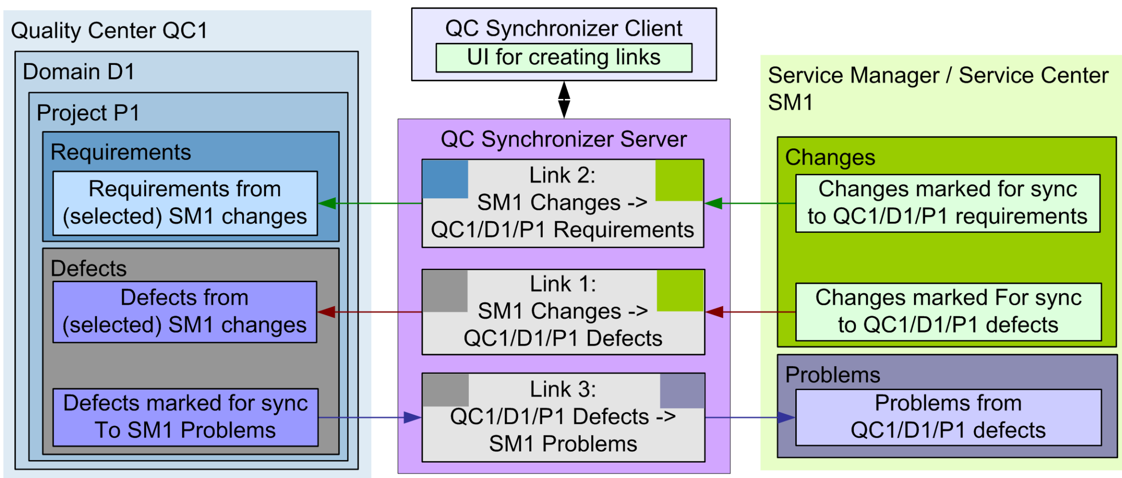
```
        <itg:item value="Service Management">Service Management</itg:item>
    </itg:items>
 </itg:field>
 <itg:field name="Title" type="String" required="mandatory" length="50"/>
     <itg:field name="Description" type="String" required="mandatory"/>
 <itg:field name="Area" type="Single_Value_List" required="mandatory">
    <itg:items>
       <itg:item value="data">data</itg:item>
    </itg:items>
 </itg:field>
 <itg:field name="Subarea" type="Single_Value_List" required="mandatory">
    <itg:items>
       <itg:item value="data or file corrupted">data or file
corrupted</itg:item>
    </itg:items>
 </itg:field>
     <itg:field name="Impact" type="Single_Value_List" readonly="false"
                  required="mandatory">
   <itg:items>
     <itg:item value="1">1 - Enterprise</itg:item>
     <itg:item value="2">2 - Site/Dept</itg:item>
     <itg:item value="3">3 - Multiple Users</itg:item>
     <itg:item value="4">4 - User</itg:item>
   </itg:items>
 </itg:field>
 <itg:field name="Urgency" type="Single_Value_List" readonly="false"
                  required="mandatory">
   <itg:items>
     <itg:item value="1">1 - Critical</itg:item>
     <itg:item value="2">2 - High</itg:item>
     <itg:item value="3">3 - Average</itg:item>
     <itg:item value="4">4 - Low</itg:item>
```

```
    </itg:items>
  </itg:field>
  </itg:module>
  </itg:mapping>
```

Chapter 4: Configuring Links in QC/ALM Synchronizer

This chapter describes how to configure and test links. Although instructions in this chapter are provided as examples using QC Synchronizer and Quality Center, they still apply for ALM Synchronizer and ALM.

The following diagram summarizes link configuration:



You need to create synchronization links in QC/ALM Synchronizer between two endpoints. Each endpoint is an application or system containing data that is synchronized by the synchronizer. A link defines which entities are included in the synchronization, and how the synchronization is performed.

This chapter describes aspects of link creation that are common to all three types of links.

- "Create a Link" below
- "QC/ALM Field <-> SM Field Mappings" on page 31
- "List Value Mappings" on page 36
- "Constant -> SM Field Mappings" on page 36

Filters are only required for QC/ALM Defect -> SM Problem (see "Define Filters" on page 144). The events settings determine what the synchronizer does in response to specified events. Events must be specified for all three link types.

Create a Link

The following table summarizes the properties required in the wizard. Have this data available before starting the wizard.

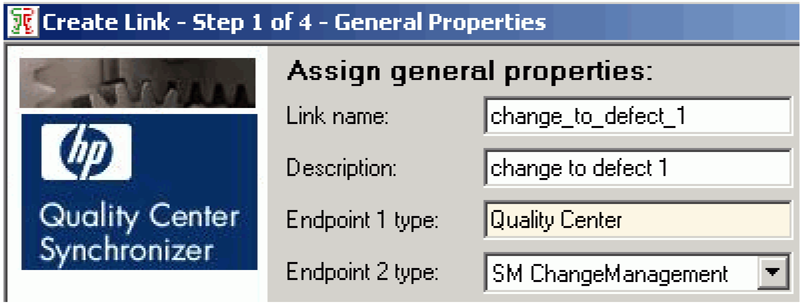
Note: A link cannot be duplicated. For example, if a link already exists for `SMServer1/Changes -> QCServer1/Domain1/Project1/Defects`, a second link between these two entities cannot be created.

End Point	Parameter	Requirements
QC	Username	
QC	Password	
QC	Server URL	
QC	Domain	
QC	Project	
SM	User name	
SM	Password	
SM	Service URL	`http://`*`<service_manager_host>`*`:` `<` *`port`* `>/sc62server/PWS/QCIntChangeService.wsdl` or `http://`*`<service_manager_host>`*`:` *`<port`* `>/sc62server/PWS/QCIntProblemService.wsdl`
SM	Adapter Configuration (SM field values) filename	Empty or the adapter data folder file (see "Copying SM Adapter Configuration Files" on page 19).
SM	QCProject	Required (because of an adapter limitation). The format is `<qc_host>/<qc_domain>/<qc_project>`

To create a link:

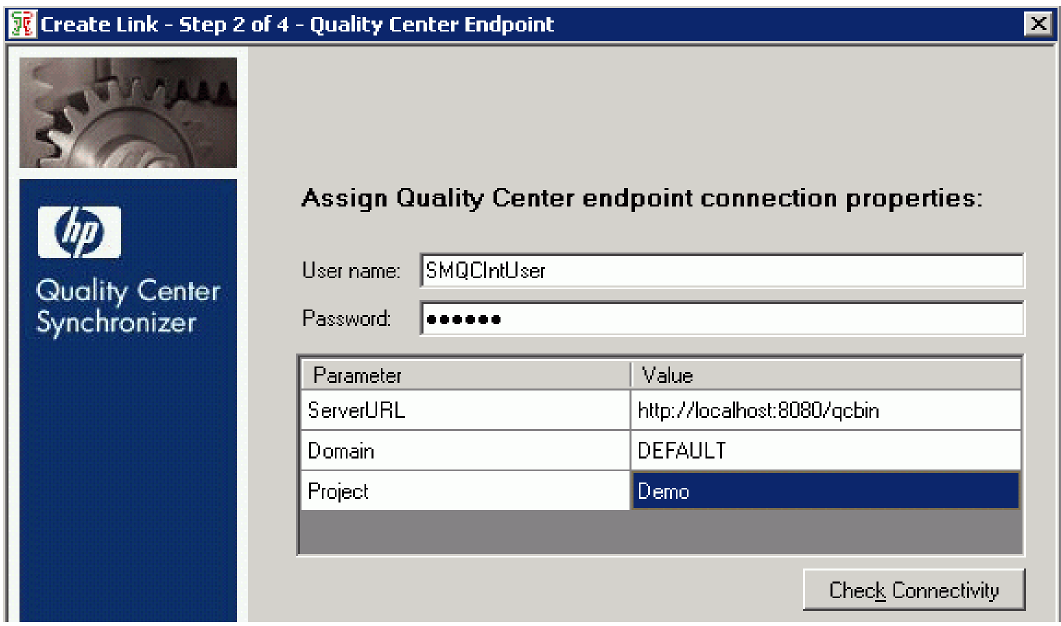
1. Click **Link/Create**. The “Step 1: Assign general properties” dialog appears.

2. Enter the required information (the following example is for SM Change -> QC Defect).



3. Click **Next**. The “Step 2: Assign QC endpoint connection properties” dialog appears.

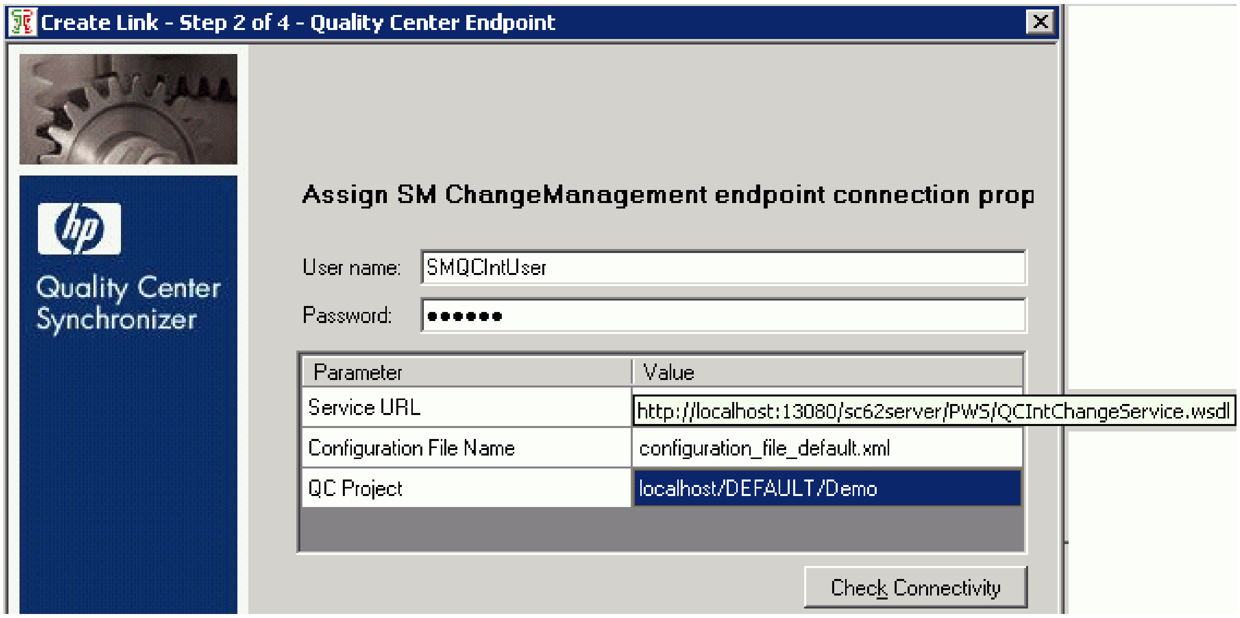
4. Enter the required information.



5. Click **Next**. One of the following appears:

   - “Step 3: Assign SM ChangeManagement endpoint connection properties”
   - “Step 3: Assign SM ProblemManagement endpoint connection properties”

6. Enter the required information (the following example is for SM Change -> QC Defect).

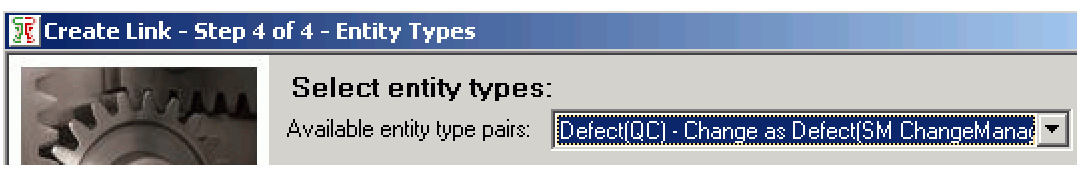


Note: QC Project has the same value as specified on SM customization.

7. Click **Next**. If this is a change management link, “Step 4: Select entity types” dialog appears.

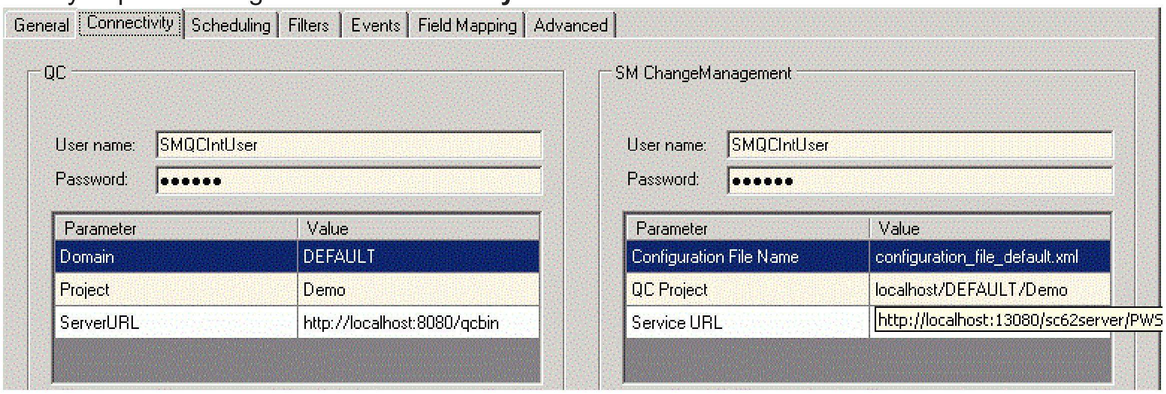
8. Select one of the following:

   - Change as Defect
   - Change as Requirement



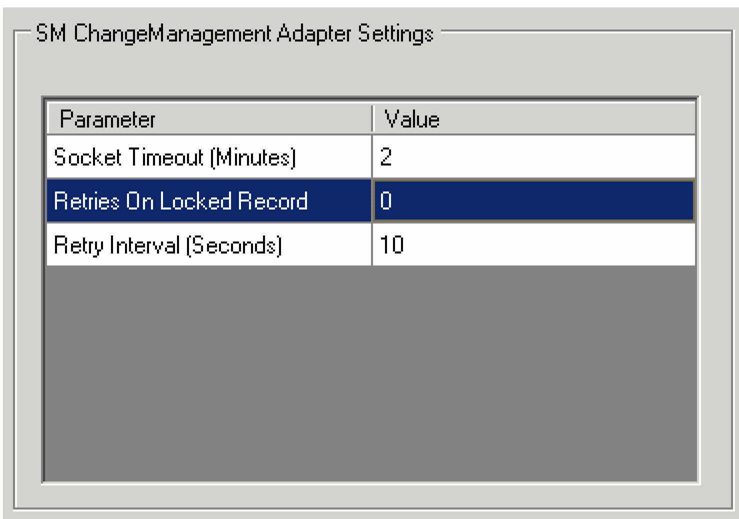
9. Click **Save**. The link is created.

10. Modify required settings on the **Connectivity** tab.



Advanced Parameters

Advanced parameters are shown on the Advanced tab.



- `Retries On Locked Record`
  When a record in the SM endpoint is locked, it will cause synchronization failure. The integration will retry the synchronization according to the value of this parameter. `0` means the retry feature is disabled. For details, see *HP Defects and Requirements Exchange with HP Service Manager and HP Quality Center Release Notes*.

- `Retry Interval (Seconds)`
  When the retry feature is enabled, this parameter defines the retry interval. The retry interval must be an integer between `1` and `10`. For details, see *HP Defects and Requirements Exchange with HP Service Manager and HP Quality Center Release Notes*.

- `Socket Timeout (Minutes)`
  Socket connection will be established during synchronization. If there are many records matching the filter in the SM endpoint, retrieving list operation will cost some time, which might

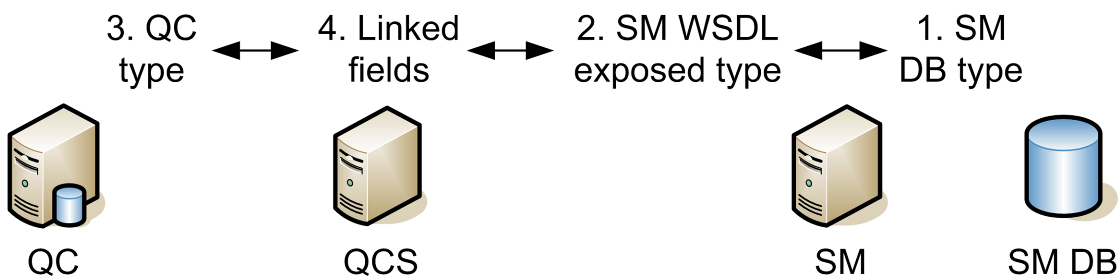
cause timeout of socket connection. This parameter is used to define the socket timeout. Its range is: `0-120`.

QC/ALM Field <-> SM Field Mappings

This section describes how to map QC/ALM fields and SM fields.

- "Creating Mappings" below
- "General Mapping Requirements" on the next page
- "Matching Types" on page 33

The following diagram shows the field mapping chain.



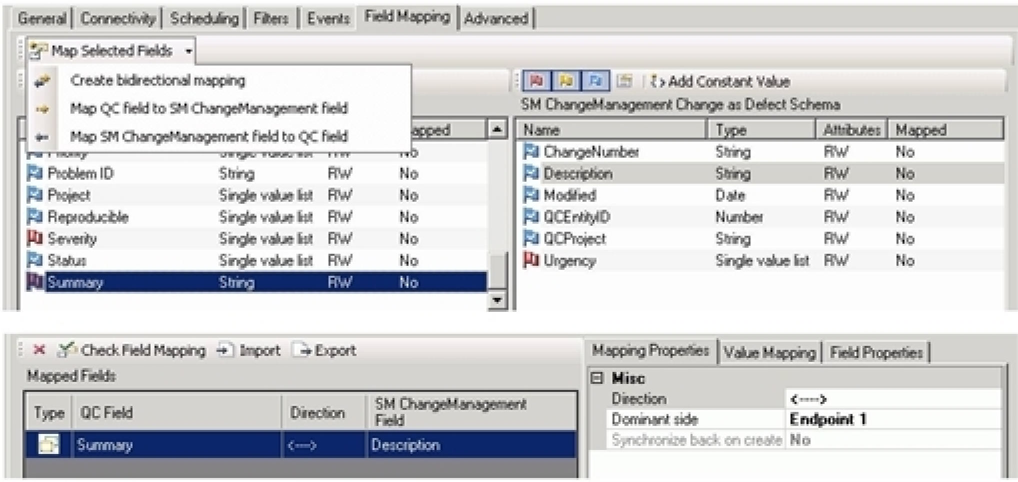
For examples of field mappings, see:

- SM Change to QC/ALM Defect, " QC/ALM Field <-> SM Field" on page 75.
- SM Change to QC/ALM Requirement, "QC/ALM Field <-> SM Field" on page 90.
- QC/ALM Defect to SM Problem, "QC/ALM Field <-> SM Field" on page 147.

Creating Mappings

To map fields:

1. Select a field on each side.
2. Select a direction in the Map Selected Fields tab.



General Mapping Requirements

When creating field links, keep the following limitations in mind:

- If you change the mappings you must do a full synchronization to ensure synchronization of historical data. Otherwise, your historical data cannot be synchronized correctly and you may get errors in the next incremental synchronization.
- A field in one endpoint can be mapped to only one field in the other endpoint.
- Mandatory fields must be mapped. If a null value is written to a mandatory field, an error will occur at runtime.
- If you map string fields with different maximum lengths, during synchronization a string value in the source endpoint will be truncated as necessary if it exceeds the maximum length of the other field.

Matching Types

The following table lists allowed data type combinations. Highlighted entries are demonstrated in examples in this document.

Data Type Combinations

QC Data type	QCS QC Type	Dir	QCS SM type	WSDL data type	Field type on form in SM/SC	SM DB data type for SM	SM DB data type for SC
Number	Number	<->	Number	DecimalType or IntType[1]	Decimal or Text	Number	Decimal
String	String	<->	String	BooleanType	Check Box or Radio Button	Logical	Boolean
Date[2]	Date	<->	Date	DateTimeType (required)	Date	Date/time	Date/time
String	String	<->	String[3]	StringType	Text, TextArea, Combo Box or Comfill	Character	Text
Memo	Memo/ String	<->	String[4]	StringType	Text, TextArea, Combo Box or Comfill	Character	Text
User List[5]	User List	->	String[6]	StringType	Text, TextArea, Combo Box or Comfill	Character	Text
Lookup List	Single-value list	<->	Single-value list/ String[7]	StringType	Text, TextArea, Combo Box or Comfill	Character	Text

Data Type Combinations, continued

QC Data type	QCS QC Type	Dir	QCS SM type	WSDL data type	Field type on form in SM/SC	SM DB data type for SM	SM DB data type for SC
String	String	<->	String	StringType	TextArea	Array[8]	Array[9]
Memo	Memo String	<->	String	StringType	TextArea	Array[10]	Array[11]
Lookup List	Single-value List	<->	String	StringType	TextArea	Array[12]	Array[13]
User List[14]	User List	<->	String	StringType	TextArea	Array[15]	Array[16]
Lookup List	Multi-value List	<->	Multi-value List	StringType	Text, Comfill or Combo Box	Array[17]	Array[18]
Attachment[19]	Attachment	<->	Attachment	Attachment	Attachment	Image	Image

Note: There is no need to explicitly specify WSDL data type on WSDL configuration for all types except for the Date type. For details, see *Best Practices for Publishing and Consuming Web Services with ServiceCenter*.

[1]IntType supports a data range from -2,147,483,648 to 2,147,483,647.

[2]QC data only supports Yr/Mo/Dt.

[3]It is recommended to leave this field blank. Otherwise "`Invalid byte 2 of 3-byte UTF-8 sequence`" might occur if certain I18N characters are synchronized.

[4]See footnote 3.

[5]Write to the QC field `User_List` only if SM has exactly the same users (including logins, names, etc.) as QC. An incorrect entry can cause serious problems in QC. You can read from QC `User_List` field and write to SM `String` type field only if the field in SM is NOT a field with SM logins.

[6]See footnote 3.

[7]See footnote 3.

[8]Only an array of characters is supported.

[9]See footnote 8.

[10]See footnote 8.

[11]See footnote 8.

[12]See footnote 8.

[13]See footnote 8.

[14]See footnote 5.

[15]See footnote 8.

[16]See footnote 8.

[17]See footnote 8.

[18]See footnote 8.

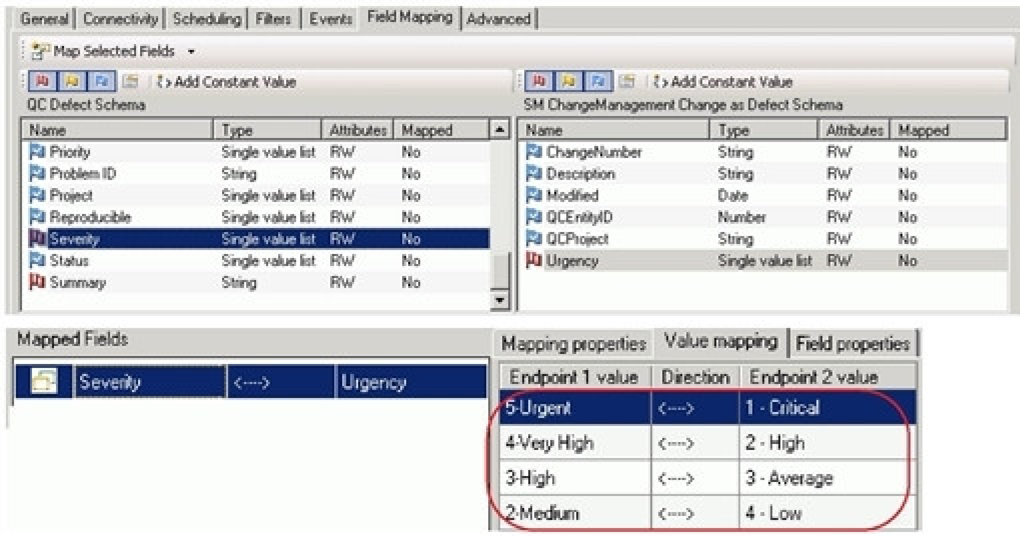
[19] The SM-QC/ALM integration does not support synchronization of an attachment with 0KB size. Consider the following guidelines when mapping attachment fields:

- You can create only one mapping between attachment fields per link.
- Synchronizer identifies attachments by their file name, and not by their content. Therefore:
  - If you change the file name of an attachment, even if you do not change its content, Synchronizer determines that the original attachment has been deleted and a new attachment added, and synchronizes the attachment fields accordingly.
  - If you have different attachments in each of the endpoints, but they have the same file name, Synchronizer is not able to distinguish between them and considers them as the same attachment.
- For a bidirectional attachment field mapping, if an attachment was updated in both endpoints since the last synchronization, Synchronizer copies the attachment in the non-dominant endpoint to the `conflict_backup` directory, located under the main HP ALM Synchronizer directory. It then overwrites the attachment in the non-dominant endpoint with the attachment in the dominant endpoint.

List Value Mappings

This section describes how to map values for multi-valued lists. QCS does not have access to the values of SM multi-values lists, and therefore the values must be specified in an XML file.

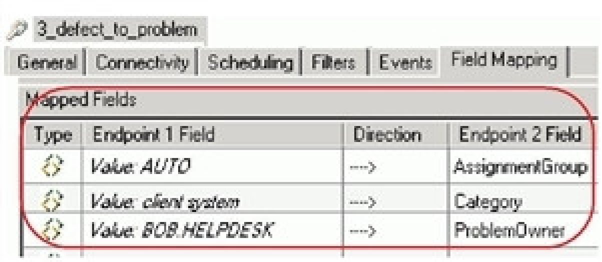
Some list fields also require mapping of available values (as shown in the following figure).



Constant -> SM Field Mappings

For examples of constant -> SM field mappings, see "Constants -> SM Fields" on page 147.

The following figure shows an example of constant -> SM field mapping.



Chapter 5: Integration Account

This chapter includes:

- "Creating an SM Integration Account" below
- "Creating a QC/ALM Integration Account" on page 43

Creating an SM Integration Account

The integration account is equivalent to an operator in Service Manager for exclusive use with this solution.

This section includes:

- "Create a Contact Record" below
- "Create a Profile Record" below
- "Create an Operator Record" on page 40

Create a Contact Record

Create a contact for the integration administrator by clicking **System Administration**> **Base System Configuration** > **Contacts** in Service Manager; or clicking **Support** > **Contacts** in ServiceCenter.

Page	Field	Value
Contact Information	Contact Name	<Administrator’s name>
Contact Information	Full Name	<Administrator’s full name>

Create a Profile Record

To create a profile record for the integration account:

- **Create profile for Change Management** to synchronize SM Changes with QC/ALM Requirements and Defects ("Change -> Requirement" and "Change -> Defect").

  Profile records grant specific rights and privileges to the integration account to enable Change Management.

  On Service Manager:

Click **System Administration** > **Ongoing Maintenance** > **Profiles**and create a Change management profile record by with the parameters shown in the following table.

No	Tab Page	Field	Value	Comment
1		Profile Name	CMProfile_QCInt	
2		Profile Area	Changes	
3	Security/Rights	Update	Always	
4	Security/Rights	View	Yes	Check Box
5	Security/Rights	Reopen	Yes	Check Box
6	Query	Query Options	Yes	Check Box

On ServiceCenter:

Click **Services** > **Change Management** > **Maintenance** > **Profiles** and create a change management profile record with the parameters shown in the following table.

No	Tab Page	Field	Value	Comment
1		Profile Name	CMProfile_QCInt	
2		Profile Area	Changes	
3	Basic/Basic Options	Open	Yes	Check Box
4	Basic/Basic Options	Reopen	Yes	Check Box
5	Basic/Basic Options	Save	Yes	Check Box
6	Query/Query Options	All	Yes	Check Box

- **Create profile for Problem Management** to synchronize SM Problem with ALM/QC Defect ("Problem <-> Defect", "Problem -> Defect" and "Problem <- Defect").

  Profile records grant specific rights and privileges to the integration account to enable Problem Management.

  On Service Manager:

  Click **System Administration** > **Ongoing Maintenance** > **Profiles**and create a change management profile record with the parameters shown in the following table.

No	Tab Page	Field	Value	Memo	Remarks
1		Profile Name	PMProfile_QCInt		
2	Problems/Security/Rights	New	Yes	Check Box	This parameter is not required when synchronizing SM Problems with QC/ALM Defects ("Problem -> Defect").
3	Problems/Security/Rights	Close	Yes	Check Box	
4	Problems/Security/Rights	Update	Always		
5	Problems/Security/Rights	Reopen	Yes	Check Box	

On ServiceCenter:

Click **Services** > **Problem Management** > **Administration** > **User Profiles**and create a problem management profile record with the parameters shown in the following table.

No	Tab Page	Field	Value	Memo	Remarks
1		Profile Name	PMProfile_QCInt		
2	Problem Details	Browse	Yes	Check Box	
3	Problem Details	Open	Yes	Check Box	This parameter is not required when synchronizing SM Problems with QC/ALM Defects ("Problem -> Defect").
4	Problem Details	Update	Yes	Check Box	
5	Problem Details	Reopen	Yes	Check Box	

Create a SecRole Record

Note: Steps in this topic are applicable for the Service Manager Process Designer (PD) Content Pack 9.30.x only. Skip this topic if the PD Content Pack is not installed.

You can create a SecRole Record for Change Management to synchronize SM Changes with QC/ALM Requirements and Defects ("Change -> Requirement" and "Change -> Defect"). The SecRole records grant specific rights and privileges to the integration account to enable Change Management.

To create a SecRole record for the integration account:

1. Click **System Administration** > **Security** > **Roles**.
2. Create a role named `SMQCIntSecRole` with the parameters shown in the following table. Remove all rights from all areas with the exception of the Change area and the Problem area.

No	Tab Page	Field	Value	Comment
1		Security Role Name	SMQCIntSecRole	
2		Security Area	Change	
3	Rights	View	Yes	Check Box
4		Update	Always	
		Security Area	Problem	
5	Rights	View	Yes	Check Box
6		New	Yes	Check Box
7		Update	Always	

Create an Operator Record

The operator record identifies the logon name, password, and other settings for each SM operator. Create the required operator records by clicking **System Administration** > **Ongoing Maintenance** > **Operators** on Service Manager; or clicking **Utilities** > **Administration** > **Security** > **User Administration** > **Search for Operators** on ServiceCenter with the parameters shown in the following table.

Operator Record Parameters

No	Page	Field	Value	Remarks
1	General	Logon Name	SMQCIntUser	
2	General	Full Name	QC Integration Default Account	
3	General	Contact ID	<Integration administrator's account in SM>	The contact created in the previous section.

Operator Record Parameters, continued

No	Page	Field	Value	Remarks
4	Security	Unlimited Sessions	Yes	Check Box
5	Security	Password	<Your password>	
6	Startup	Execute Capabilities	SOAP API	
7	Login Profile	Time Zone	Greenwich/Universal (or create a time zone with no time difference or DST switch in Database Manager)	
8	Login Profile	Date Format	yy/mm/dd	The date format cannot be changed (changing it will cause loss of all data during synchronization).
9	Startup	Execute Capabilities	ChMAdmin	Set the two parameters to synchronize SM Changes with QC/ALM Requirements and Defects ("Change -> Requirement" and "Change -> Defect").
10	General/Application Profiles	Change Profiles	CMProfile_QCInt	
11	Startup	Execute Capabilities	ProbAdmin	Set the two parameters to synchronize SM Problem with ALM/QC Defect ("Problem <-> Defect", "Problem -> Defect" and "Problem <- Defect").
12	General/Application Profiles	Problem Profile	PMProfile_QCInt	

Note: If the Service Manager Process Designer (PD) Content Pack 9.30.x is installed, refer to the parameters shown in the following table for the General/Application Profiles configuration.

Operator Record Parameters

No	Page	Field	Value	Remarks
10	General/Application Profiles	Security Role	SMQCIntSecRole	Set the this parameter to synchronize SM Changes with ALM/QC Requirements and Defects ("Change -> Defect" and "Change -> Requirement").

Operator Record Parameters, continued

No	Page	Field	Value	Remarks
12	General/Application Profiles	Security Role	SMQCIntSecRole	Set this parameter to synchronize SM Problems with ALM/QC Defects ("Problem <-> Defect", "Problem -> Defect"and "Defect -> Problem").

Creating a QC/ALM Integration Account

To create an integration account:

1. **Create a User.**

   Perform the following steps:

   a. Log in to the “Quality Center - Site Administration” or “Application Lifecycle Management - Site Administration” using the QC/ALM site administrator account.

   b. On the Site Users tab, create and configure integration account `SMQCIntUser` (including the User Name and password).

   c. In the Site Projects tab, choose the project from the list.

   d. Click the Project Users tab in the right panel, and click **Add From The Users List**.

   e. Add the configured user `SMQCIntUser` to the project.

   f. Log off.

2. **Create a Group.**

   Perform the following steps:

   On Quality Center 10 and Earlier:

   a. Log on to the QC project using a project administrator account.

   b. Click **TOOLS** > **Customize...**.

   c. Select **Groups**.

d. Click **New**.

e. Enter name `SMIntegration`.

f. For Create As: select **Viewer**.

g. Click **OK**.

h. Select **Yes** to create the user group.

On ALM 11:

a. Log on to the ALM project using a project administrator account.

b. Click **TOOLS** > **Customize...**.

c. Select **Groups and Permissions**.

d. Click **New Group**.

e. Click **Yes** to create the new group.

f. Enter name **SMIntegration**.

g. For Set As: select **Viewer**.

h. Click **OK**.

3. **Assign Permissions.**

Perform the following steps:

a. Click the **`SMIntegration`** group, go to the Permissions tab, and assign permissions for the user group on the Requirements, Defects, and Administration subtabs as shown in the following tables.

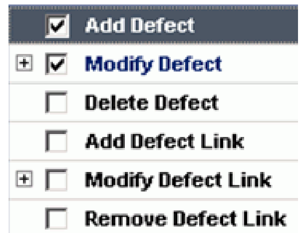
- Change -> Requirement

Subtab	Permission	QC Setting	ALM Setting
	Add Requirement Modify Requirement		Select the following options: ◦ Coverage Level ◦ Create ◦ Update ◦ Requirement ◦ Create ◦ Update ◦ Risk-Based Quality Management ◦ Assess Business Criticality ◦ Assess Failure Probability ◦ Assess Functional Complexity

- Change -> Defect

Subtab	Permission	QC Setting	ALM Setting
Defects	Add Defects/ Modify Defects		Select the following options: ◦ Defect ◦ Create ◦ Update

- Problem -> Defect

Subtab	Permission	QC Setting	ALM Setting
Defects	Add Defects/ Modify Defects		Select the following options: ◦ Defect ◦ Create ◦ Update

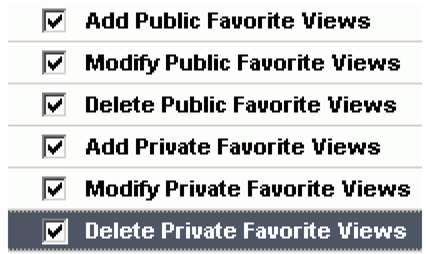
- Problem <- Defect

Subtab	Permission	QC Setting	ALM Setting
Defects	Add Defects/ Modify Defects		Select the following options: ◦ Defect ◦ Create ◦ Update

Administration	Add Public Favorite Views Modify Public Favorite Views Delete Public Favorite Views Add Private Favorite Views Modify Private Favorite Views Delete Private Favorite Views	☑ Add Public Favorite Views ☑ Modify Public Favorite Views ☑ Delete Public Favorite Views ☑ Add Private Favorite Views ☑ Modify Private Favorite Views ☑ Delete Private Favorite Views	Select the following options: ◦ Add Public Favorite View Folders ◦ Add Public Favorite Views ◦ Delete Public Favorite View Folders ◦ Delete Public Favorite Views ◦ Manage Private Favorite Views ◦ Manage Project Planning and Tracking ◦ Modify Public Favorite View Folders ◦ Modify Public Favorite Views

- Problem <- Defect

		QC setting	ALM setting
Defects	Add Defects/ Modify Defects	☑ Add Defect ☑ Modify Defect ☐ Delete Defect ☐ Add Defect Link ☐ Modify Defect Link ☐ Remove Defect Link	Select the following options: ◦ Defect ◦ Create ◦ Update

Administration	Add Public Favorite View Modify Public Favorite Views Delete Public Favorite Views Add Private Favorite Views Modify Private Favorite Views Delete Private Favorite Views		Select the following options: ◦ Add Public Favorite View Folders ◦ Add Public Favorite Views ◦ Delete Public Favorite View Folders ◦ Delete Public Favorite Views ◦ Manage Private Favorite Views ◦ Manage Project Planning and Tracking ◦ Modify Public Favorite View Folders ◦ Modify Public Favorite Views

b. Add the integration user `SMQCIntUser` to group **`SMIntegration`**.

c. Save and close. The integration account is created.

Chapter 6: SM Change -> QC/ALM Defect

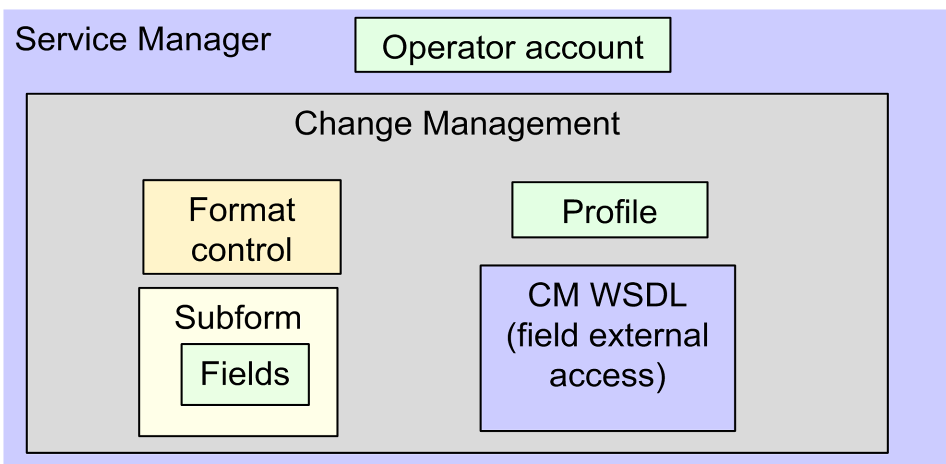
This chapter describes how to synchronize SM Changes with QC/ALM Defects ("Change -> Defect").

This chapter includes:

- "Customizing Service Manager/ServiceCenter for Change Management" below
- "Customizing the QC/ALM Defects Module" on page 65
- "Configuring Links in QC/ALM Synchronizer" on page 73

Customizing Service Manager/ServiceCenter for Change Management

The following diagram summarizes the components which require tailoring in Service Manager/ServiceCenter.



To customize Service Manager/ServiceCenter for Change Management, perform the following tasks:

1. "Add Fields" on the next page
2. "Specify the External Access Definition on Service Manager" on the next page or "Specify the External Access Definition on ServiceCenter" on page 52
3. "Create a Subform" on page 53
4. "Add the Subform to a Form" on page 55
5. "Add Format Control Calculations/Validations" on page 57

Add Fields

To add the required fields:

1. Click **System Definition** > **Tables** > **cm3r**.
2. Add the following required fields to the `cm3r` table. Do not change them.

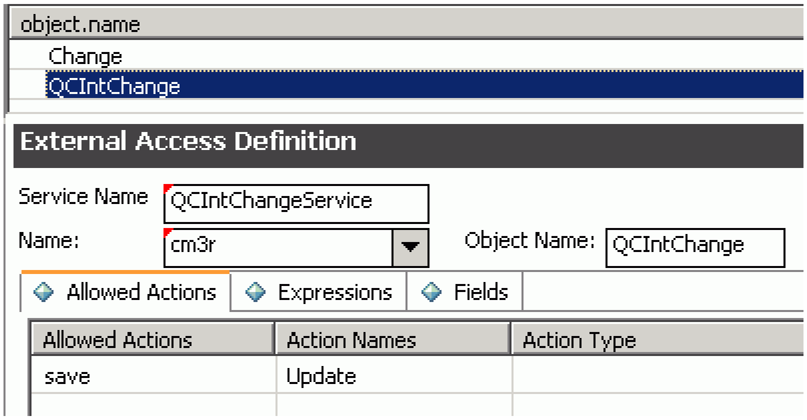
Field	Type	
	Service Manager	ServiceCenter
qcintegration.type	Character	Text
qcintegration.id	Number	Decimal
qcintegration.project	Character	Text

Note: The data type requirements for SM fields are described in "Matching Types" on page 33.

Specify the External Access Definition on Service Manager

To specify the External Access Definition on Service Manager:

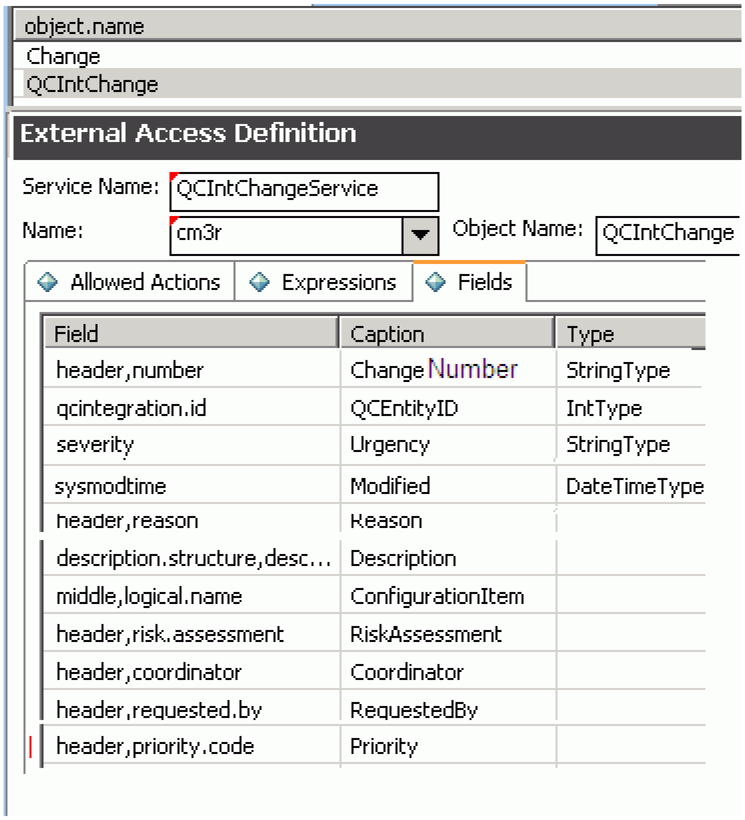
1. Create a custom External Access Definition `QCIntChangeService` by clicking **Tailoring** > **WSDL configuration** on Service Manager 7.0x; or clicking **Tailoring** > **Web Services** > **WSDL Configuration** on Service Manager 7.1x or later with the following values:
   - Service Name: QCIntChangeService
   - Name: cm3r
   - Object Name: QCIntChange
   - Allowed Actions: save / Action Names: Update



Note: The above values are required (Do NOT change them).

2. Enable required fields in the web service.

Field	Caption	Type
header,number	ChangeNumber	StringType
qcintegration.id	QCEntityID	IntType
sysmodtime	Modified	DateTimeType



> **Note:** The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption` and so on). The above values are required (Do NOT change them).

Specify the External Access Definition on ServiceCenter

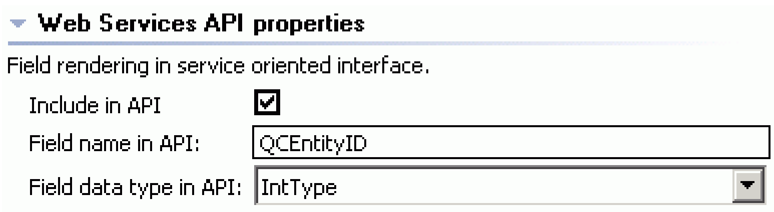
All fields of the ServiceCenter Change entity or Problem entity can be exposed in Web services by modifying their WSDL configuration. In ServiceCenter, you can modify the WSDL configuration by changing the Web Services API properties of the fields in table definition.

> **Note:** Restart the ServiceCenter server whenever you make changes to a WSDL configuration.

To specify the External Access Definition on ServiceCenter:

1. Click **System Definition** > **Tables** > **cm3r** > **Fields and keys definitions for cm3r table** and modify the settings of the following fields:

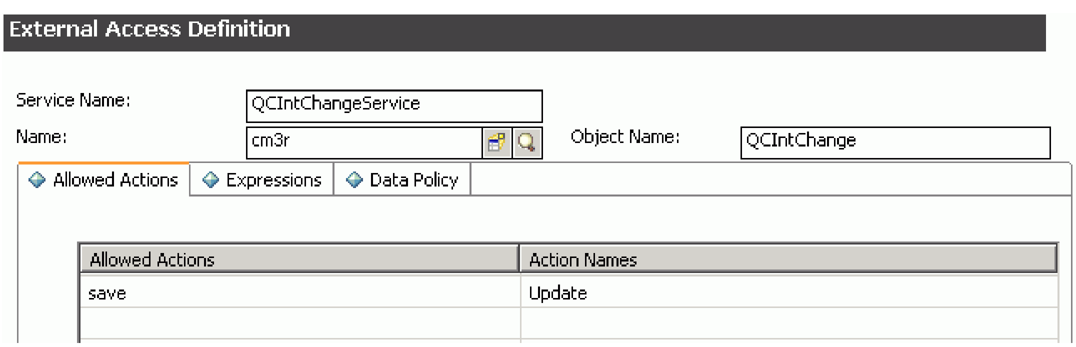
No.	Field	Include in API	Field name in API	Field data type in API
1	header,number	Y	ChangeNumber	StringType
2	qcintegration.id	Y	QCEntityID	IntType
3	sysmodtime	Y	Modified	DateTimeType



Note: The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on).

2. Click **Toolkit** > **WSDL Configuration** and search for the `cm3r` table. Update the External Access Definition as follows based on the `cm3r` table.

No.	Field	Value
1	Service Name	QCIntChangeService
2	Object Name	QCIntChange
3	Allowed Actions	save
4	Action Names	Update



Create a Subform

To create a subform:

1. Create a global list by clicking **Tailoring** > **Tailoring Tools** > **Global Lists** on Service Manager; or clicking **Utilities** > **Tools** > **Global Lists** on ServiceCenter) with the following parameters:

No.	Parameter	Value	Remarks
1	List Name	SMQC Integration CM Project List	
2	Regen Every	1 00:00:00	
3	Build List on Startup?	Yes	Check box
4	List Variable	$G.qcintegration.change.project	
5	User Defined List?	Yes	Check box
6	Value List	{"server1/domain1/project1", "server2/domain2/project2"}	Change to the values for your system. **Note:** No spaces between slashes.

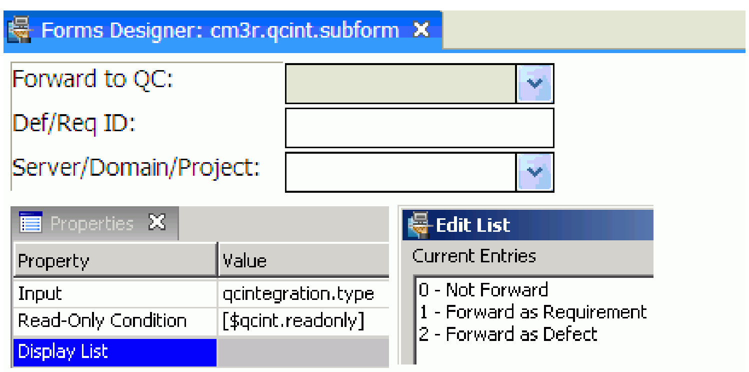
Save this global list and click **Rebuild Global List** in the Options menu.

2. Click **Tailoring** > **Forms Designer** on Service Manager; or click **Toolkit** > **Forms Designer**on ServiceCenter to create the `cm3r.qcint.subform` subform with the following components:

Note: Click **No** when the system message “`Do you want to use Form Wizard?`” appears.

Component	Properties
Label	**Caption**: Forward to QC:

Component	Properties
Combo Box	■ **Input**: qcintegration.type ■ **Value List**: 0;1;2 ■ **Display List**: 0 - Not Forward;1 - Forward as Requirement;2 - Forward as Defect ■ **Select Only**: Yes ■ **Read-Only Condition**: [$qcint.type.readonly]
Label	**Caption**: Def/Req ID:
Text	■ **Input**: qcintegration.id ■ **Read-Only**: Yes
Label	**Caption**: Server/Domain/Project:
Combo Box	■ **Input**: qcintegration.project ■ **Value List**: $G.qcintegration.change.project ■ **Read-Only Condition**: [$qcint.project.readonly] ■ **Mandatory Condition**: [qcintegration.type]>0



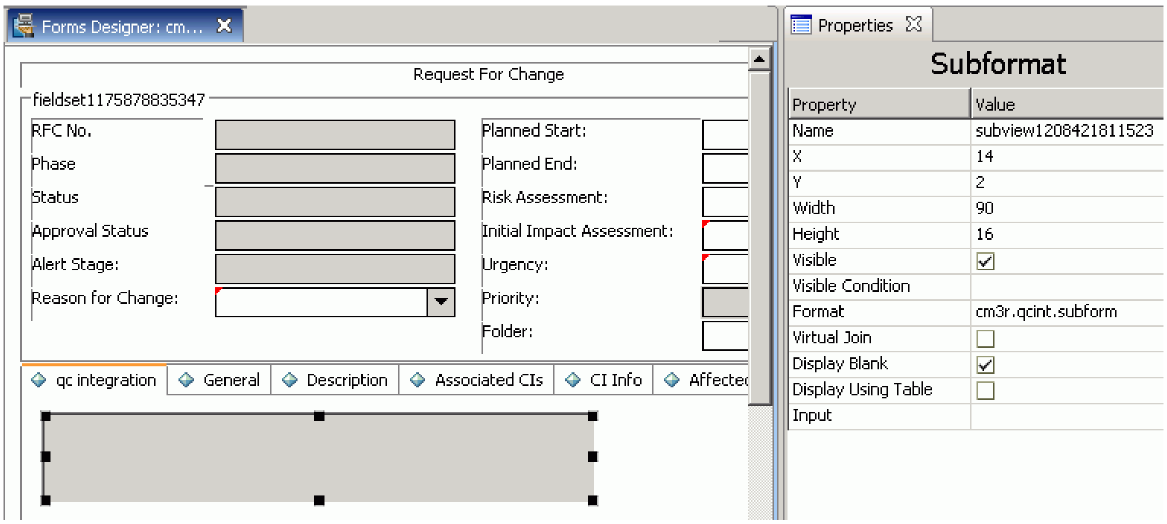
Add the Subform to a Form

If the Service Manager Process Designer (PD) Content Pack 9.30.2 or 9.30.3 is not installed, follow the steps below to add the subform you created to a form:

> **Note:** In Service Manager 9.20 or later, a form may contain only collapsible sections (groups) instead of notebook tabs. If this is the case, replace the terms “notebook tab” and “tab” with

"section" in the following steps.

1. Open the form of a phase of a category by using the Forms Designer (`cm3r.rfc.build.g` is used as an example).
2. Add a notebook tab with the QC Integration caption.
3. Add a subform to the new tab with format `cm3r.qcint.subform`, which is displayed in the following screenshot:

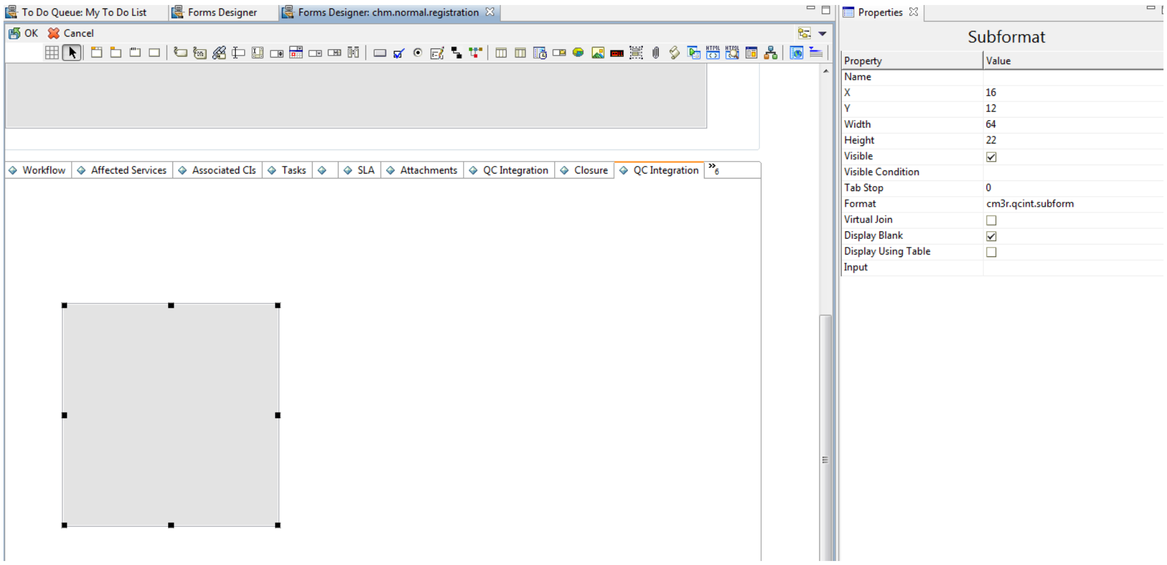


4. Save the changes.

> **Note:** If the error message "`Format 'cm3r.qcint.subform' not found (display, show.rio)`" appears, log out and then log in again to enable the subform.

If the Service Manager Process Designer (PD) Content Pack 9.30.2 or 9.30.3 is installed, follow the steps below to add a subform:

1. Open the form of a phase of a category by using the Forms Designer (`chm.normal.registration` is used as an example).
2. Add a notebook tab with the QC Integration caption.
3. Add a subform to the new tab with format `cm3r.qcint.subform`, which is displayed in the following screenshot:



3. Save the changes.

> **Note:** If the error message "`Format 'cm3r.qcint.subform' not found (display, show.rio)`" appears, log out and then log in again to enable the subform.

Add Format Control Calculations/Validations

> **Note:** Steps in this topic are applicable if the Service Manager Process Designer (PD) Content Pack is not installed. Otherwise, skip this topic and refer to "Add Rule Set Calculations/Validations" on page 59 for configurations in the PD environment.

To add format control calculations and validations, follow the steps below:

1. Open the format control record of the previous change form by clicking **Tools** > **Format Control** on ServiceCenter 6.2, or clicking **Tailoring** > **Format Control** on Service Manager (`cm3r.rfc.build` is used as an example in Service Manager 7.0x)

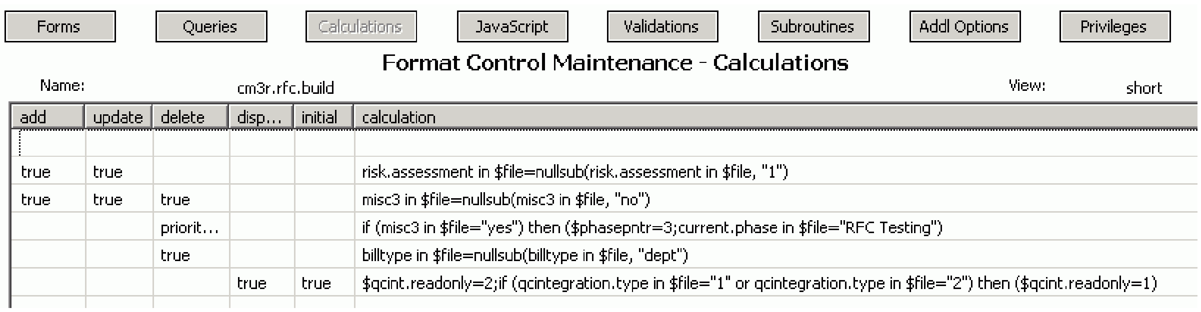
2. Click **Calculations**.

3. Add two rows with the following values.

display	initial	calculation
true	true	$qcint.type.readonly=2;if (qcintegration.type in $file~=0) then ($qcint.type.readonly=1)
true	true	$qcint.project.readonly=2;if (qcintegration.type in $file~=0 and not null (qcintegration.project in $file)) then ($qcint.project.readonly=1)

> **Note:** When you copy the calculations into the rows, make sure that each calculation is in one line; also note that there is a space between lines in the table above. For example, the calculation in the first row is:
> $qcint.type.readonly=2;if (qcintegration.type in $file~=0) then ($qcint.type.readonly=1)

The Change calculations are shown in the following figure:

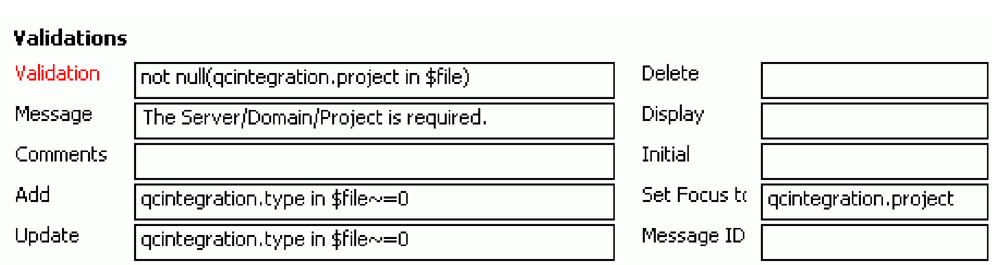


4. Click **Validations**.

5. Add a row with the following values.

No	Parameter	Value
1	Validation	not null(qcintegration.project in $file)
2	Message	The Server/Domain/Project is required.
3	Add	qcintegration.type in $file~=0
4	Update	qcintegration.type in $file~=0
5	Set Focus to	qcintegration.project

The Change validation values are shown in the following figure:



6. Save the changes.

Add Rule Set Calculations/Validations

Note: Steps in this topic are applicable for the Service Manager Process Designer (PD) Content Pack 9.30.2 or 9.30.3 only. Otherwise, refer to "Add Format Control Calculations/Validations" for configurations in non-PD environment.

To add rule set calculations and validations, follow the steps below:

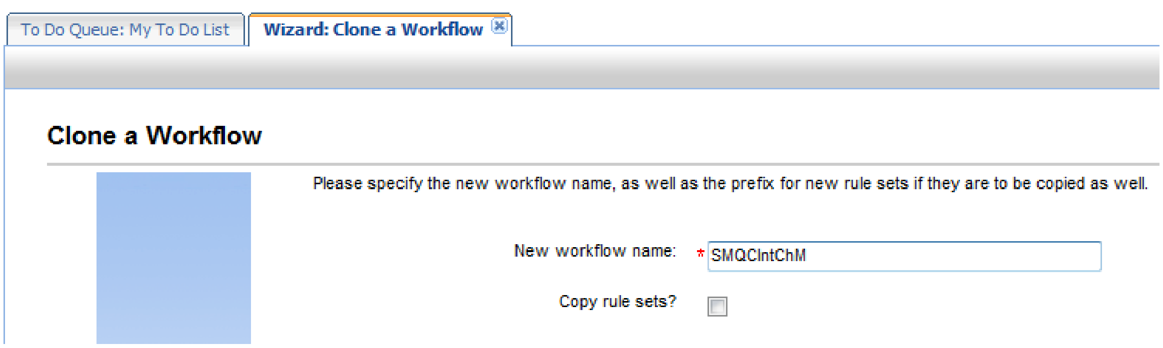
1. "Copy an Existing Workflow" below
2. "Associate an Existing Change Category with the New Workflow" on the next page
3. "Create New Rule Set for Initialization and Validation" on the next page
4. "Associate the New Workflow with the New Rule Set" on page 63

Copy an Existing Workflow

You can use copies of the existing workflows in another business process, or make changes to the HP proprietary workflow copies.

To copy an existing workflow, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Copy Existing Workflow**.
2. On the Clone a Workflow page, select the workflow you want to copy. For example, Normal.
3. Type `SMQCIntChM` in the New workflow name field.



4. Select the Copy rule sets check box if you want to copy rule sets, and then type a rule set prefix.
5. Click **OK**.

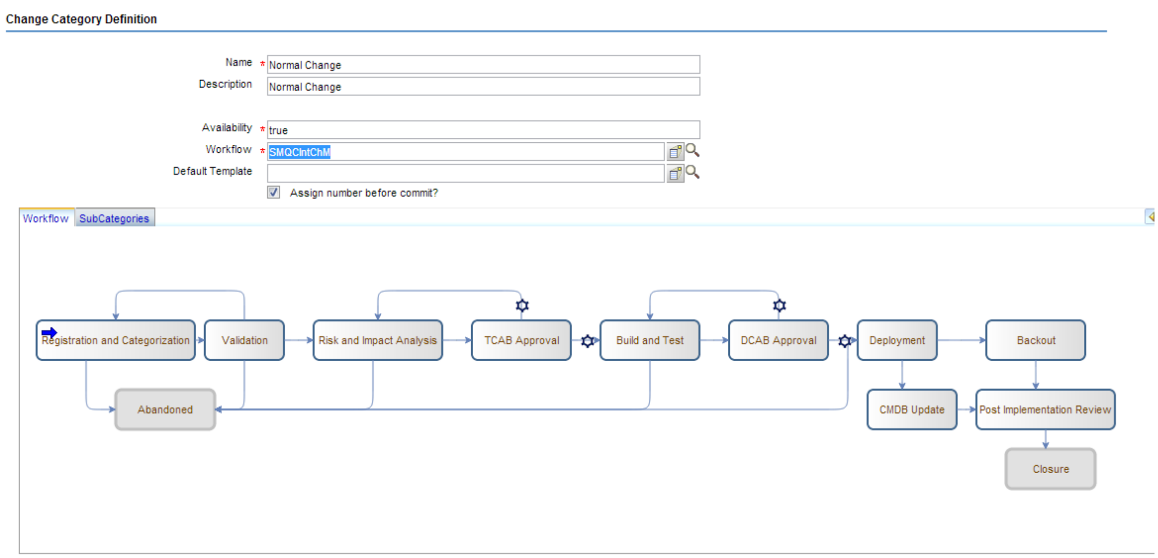
The newly copied workflow appears in the list on the Clone a Workflow page.

Associate an Existing Change Category with the New Workflow

You can update existing change categories, subcategories and areas and associate the updated categories with the new workflow so that they can be used in another business process. For more information, refer to *HP Service Manager – Process Designer Content Pack Administrator's Guide*.

To associate an existing change category with the new workflow, follow the steps below:

1. From the System Navigator, click **Change Management** > **Configuration** > **Change Categories**.
2. Click **Search**.
3. Select the change category for which you want to add a workflow. For example, Normal Change.
4. In the Change Category Definition page, remove the currently assigned workflow from the Workflow field.
5. Type `SMQCIntChM` in the workflow field.
6. Click **Save** to associate the change category with the workflow.



Create New Rule Set for Initialization and Validation

To create a new rule set for initialization, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Rule Sets**.
2. Type the values as follow:

Field	Value
ID	chm.alm.int.init
Available as action	
Name	Initialize for ALM integration in the Change Record
Table name	cm3r
HP Proprietary	

3. Click **New** and **Save**.
4. Click **Add Rule**.
5. In the Select Rule Type page, click Run JavaScript.
6. In the Run JavaScript page, type the values as follow:

Field	Value
Rule Description	Run Javascript for initializing Integration type and project in the Change Record
Statement	vars['$qcint.type.readonly'] = 2; vars['$qcint.project.readonly'] = 2; var _null=system.functions._null; var file = vars.$L_file; if(file["qcintegration.type"] !=0 && !_null(file["qcintegration.type"])) { vars['$qcint.type.readonly'] = 1 } if(file["qcintegration.type"] !=0 && !_null(file["qcintegration.project"])) { vars['$qcint.project.readonly'] = 1 }

7. Click **OK**.

8. Click **Save** and **Exit**.

To create a new rule set for validation, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Rule Sets**.

2. Type the values as follow:

Field	Value
ID	chm.alm.int.validation
Available as action	
Name	Validation for ALM integration in the Change Record
Table name	cm3r
HP Proprietary	

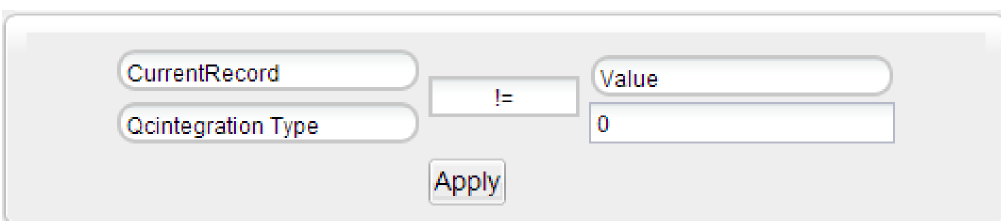
3. Click **New** and **Save**.

4. Click **Add Rule**.

5. In the Select Rule Type page, click **Set Mandatory Fields**.

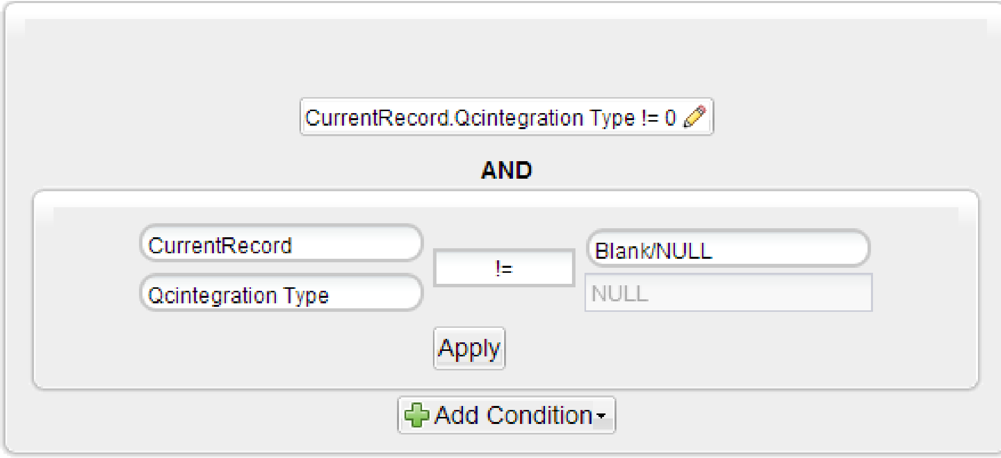
6. Click **Edit**. The Condition Editor opens.

7. Add an expression as illustrated in the following screenshot:

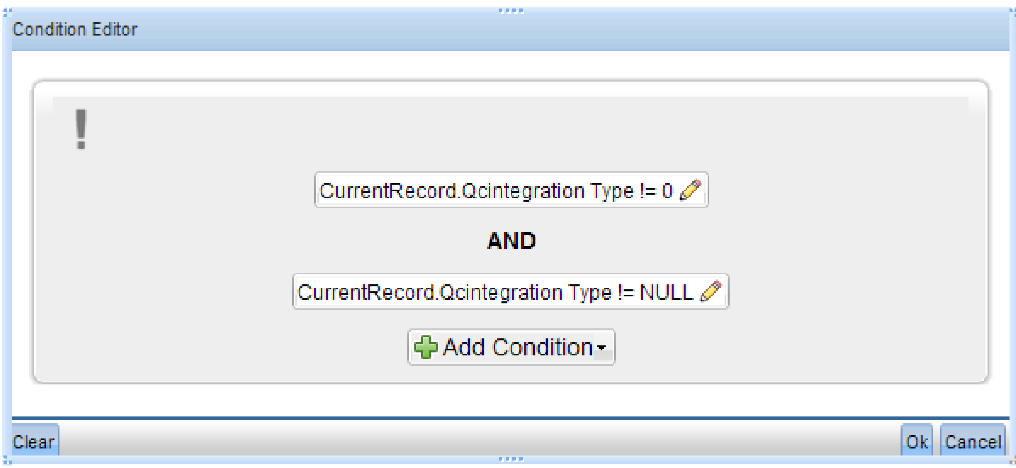


8. Click **Apply**.

9. Add condition, Select the AND operator, and then add another expression as illustrated in the following screenshot:



10. Click **Apply**.



11. Click **OK** to exit the Condition Editor.

12. Click **OK** to exit the Set Mandatory Fields page.

13. Click **Save** and **Exit**.

Associate the New Workflow with the New Rule Set

To associate the new workflow with the new rule set, follow the steps below:

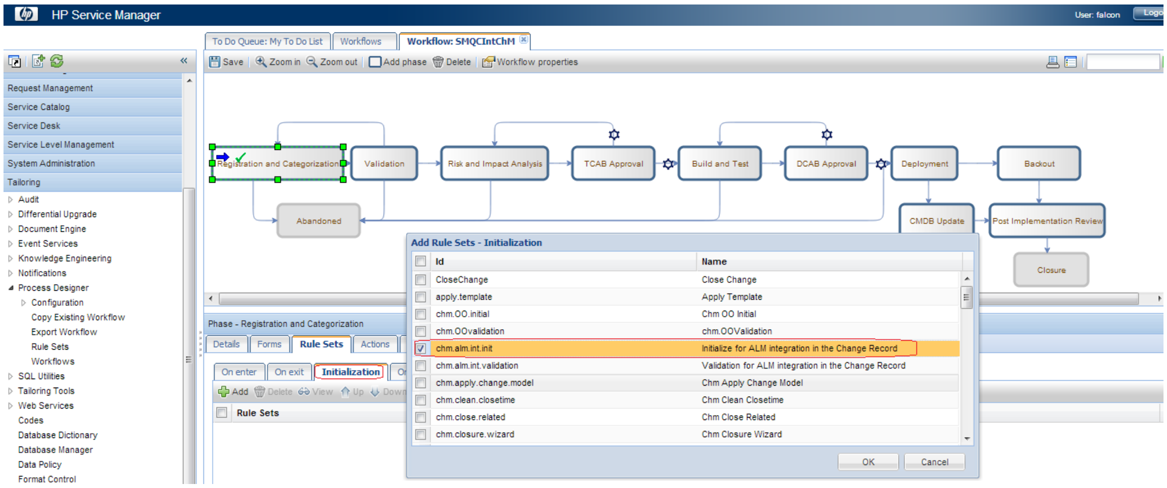
1. From the System Navigator, click **Change Management** > **Configuration** > **Change Workflows**.

2. Select SMQCIntChM in the workflows list.

3. Select the first phase in the workflow graph.

4. Click **Rule Sets** tab > **Initialization** tab.

5. Click **Add** and select the chm.alm.int.init rule set you just created.



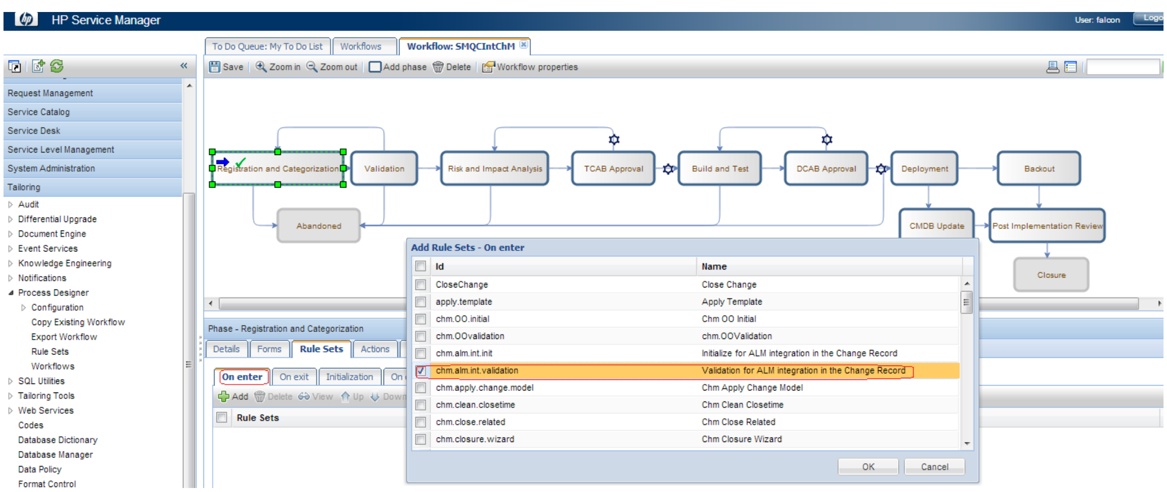
6. Click **OK**.

7. Click **Rule Sets** tab > **On display** tab.

8. Repeat step 5 and 6.

9. Click **Rule Sets** tab > **On update** tab.

10. Click **Add** and select the chm.alm.int.validation rule set you just created.



11. Click **OK**.

12. Click **Rule Sets** tab > **On enter** tab.

13. Repeat step 10 and 11.

14. Click **Save**.

Customizing the QC/ALM Defects Module

The steps for customizing the Defects module vary with different QC versions.

- "On QC 10 or Earlier" below
- "On ALM 11" on page 70

On QC 10 or Earlier

To customize the Defects module on Quality Center 10 or earlier, perform the following tasks:

1. "Add Fields" below
2. "Add Tabs" on the next page
3. "Add Fields to Tabs" on page 68
4. " Verify" on page 69

Add Fields

To add the required fields for Defect module customization:

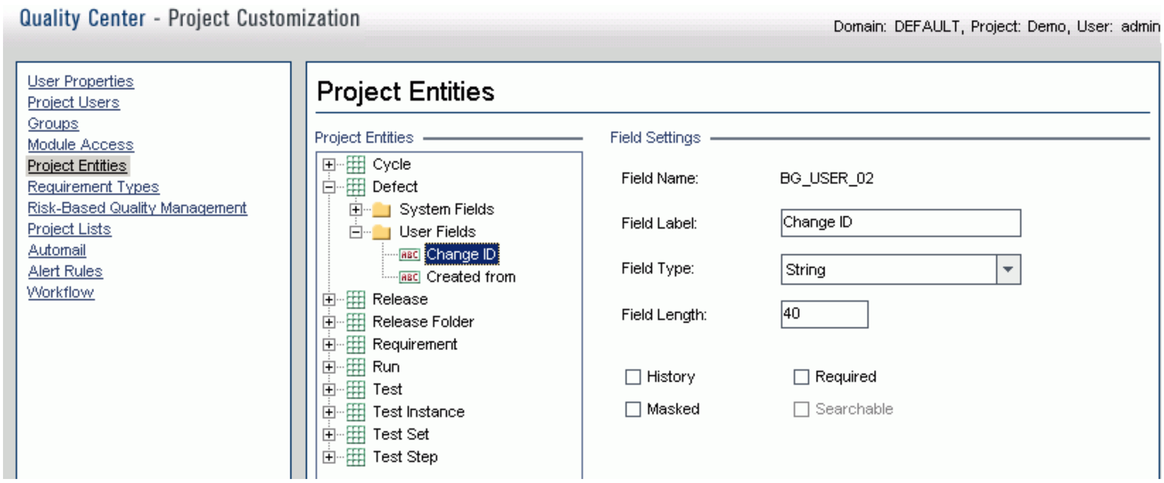
1. Log on to QC as a project administrator.

2. Click **Tools / Customize**. The "QC - Project Customization" module opens.

3. Add the following fields for the defect entity in Project Entities (*XX* and *XY* are sequential numbers auto-generated by QC).

Field Name	Field Label	Field Type
BG_USER_*XX*	Change ID	String
BG_USER_*XY*	Created from	String

The following figure shows an example project entity.

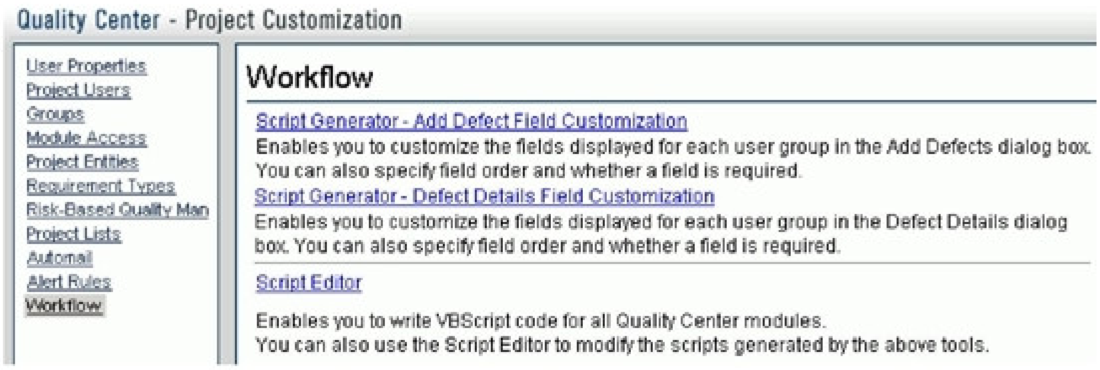


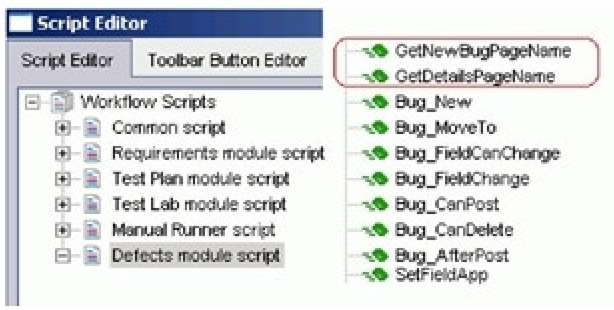
Note: The data type requirements for QC fields are described in "Matching Types" on page 33.

Add Tabs

To add tabs to the Defect form and show fields on these tabs:

1. In "QC - Project Customization", click **Workflow** > **Script Editor**.
2. Select **Defects module script**.





3. Add the following code to the **GetNewBugPageName** event procedure (which is triggered before QC opens the Add Defect dialog box).

```
select case PageNum

  case "2"

    GetNewBugPageName = "SM Integration (New)"

end select
```

> **Note:** The parameter 2 specifies tab 2 (the second tab). For a new bug, the tab name is SM Integration (New).

4. Add the following code to the **GetDetailsPagename** event procedure (which is triggered before QC displays the Defect Details dialog box).

```
select case PageNum

  case "2"

    GetDetailsPageName = "SM Integration (Details)"

end select
```

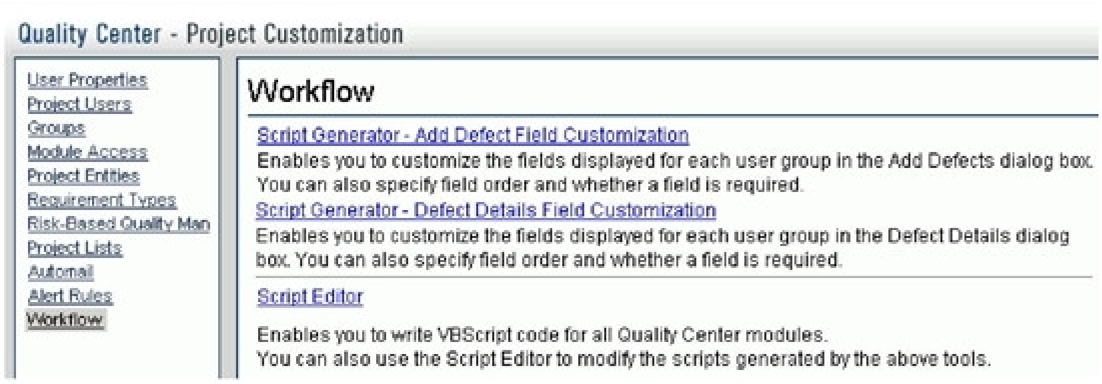
> **Note:** The parameter 2 specifies tab 2 (the second tab). For an existing defect, the tab name is SM Integration (Details).

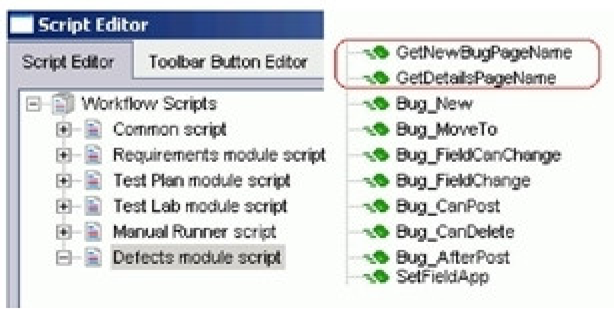
Add Fields to Tabs

To add fields to tabs:

1. In "QC - Project Customization", click **Workflow** > **Script Editor**.

2. Select **Defects module script**.

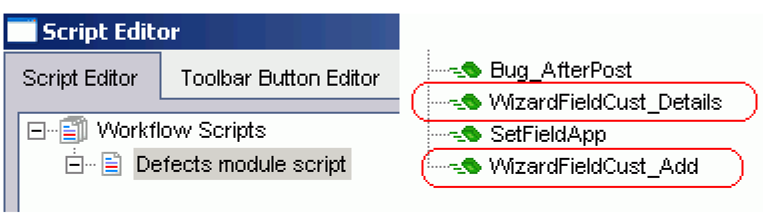




3. If **WizardFieldCust_Details** and **WizardFieldCust_Add** are not found in the list, do the following to generate these two methods.

   a. **Script Generator - Add Defect Field Customization**

   b. **Script Generator - Defect Details Field Customization**



4. Add the following code to the **WizardFieldCust_Details** event procedure.

   ```
   SetFieldApp "BG_USER_XX", True, False, 1, 0

   SetFieldApp "BG_USER_XY", True, False, 1, 1
   ```

   The parameter values are:

   - Field name (`BG_USER_`*XX*, where *XX* consists of two digits)
   - Visible (True)
   - Required (False)
   - Page number (start from `0`)
   - View order (start from `0`)

5. Add the following code to the **WizardFieldCust_Add** event procedure.

   ```
   SetFieldApp "BG_USER_XX", True, False, 1, 0

   SetFieldApp "BG_USER_XY", True, False, 1, 1
   ```

6. Set the **Readonly** fields by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines:

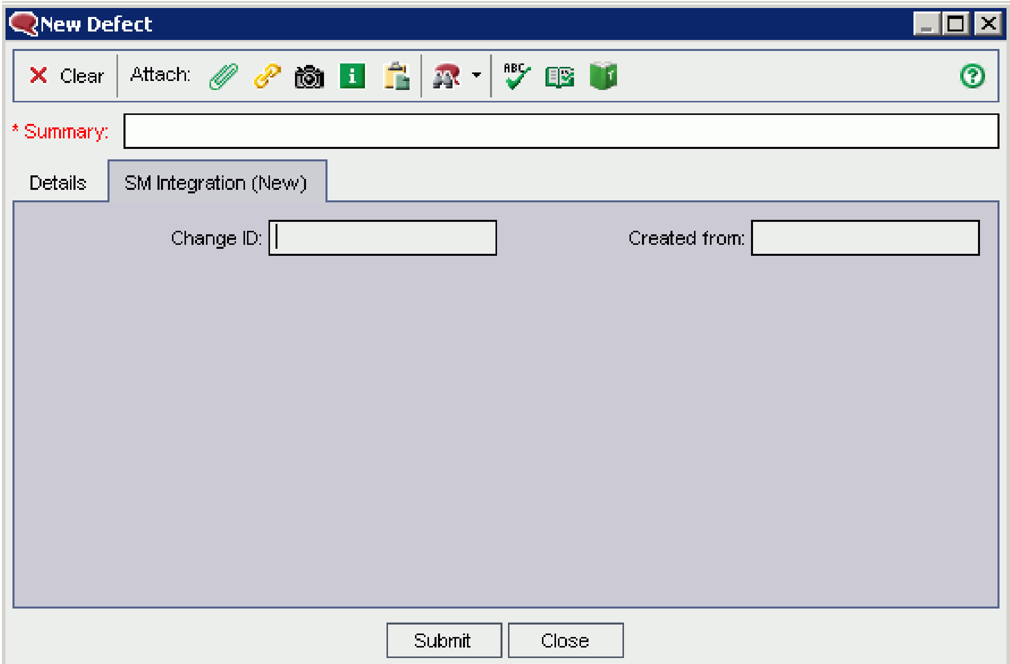
   ```
   Bug_Fields.Field("BG_USER_XX").IsReadOnly=True

   Bug_Fields.Field("BG_USER_XY").IsReadOnly=True
   ```

7. Save your changes.

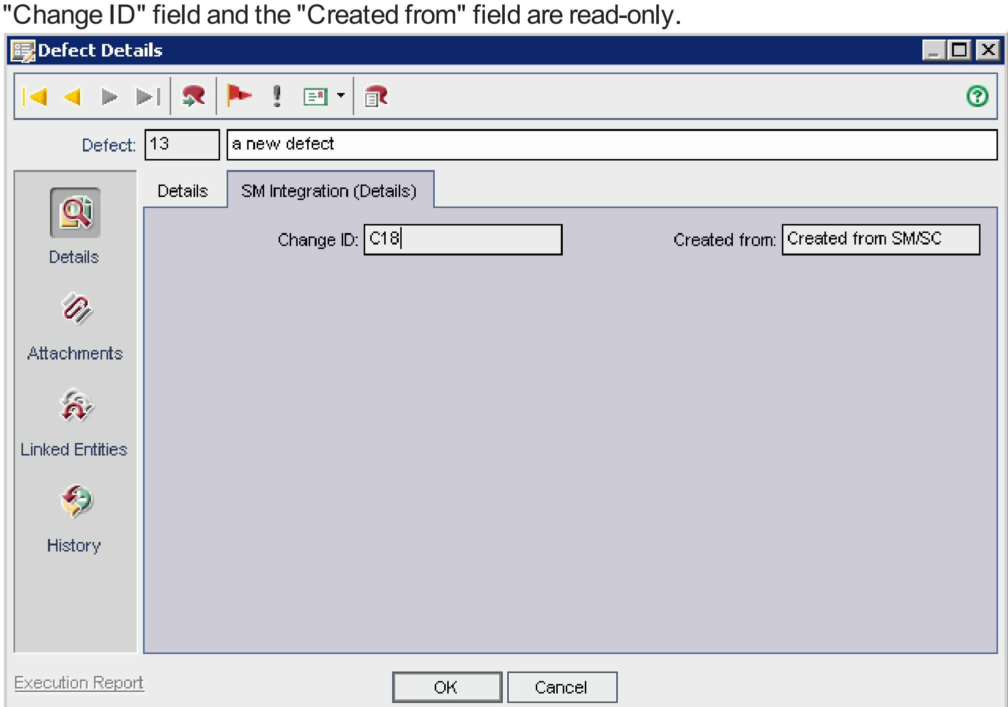
Verify

To verify whether the Defects module on Quality Center 10 or earlier is customized successfully:

1. Create a new defect. The dialog box has a new tab titled "SM Integration (New)" with two fields.



2. Open an existing defect. The second tab is titled "SM Integration (Details)", and both the "Change ID" field and the "Created from" field are read-only.



On ALM 11

On ALM 11, you only need to add new fields directly to the Details tab of the `Defect` form.

To customize the ALM Defects module, perform the following tasks:

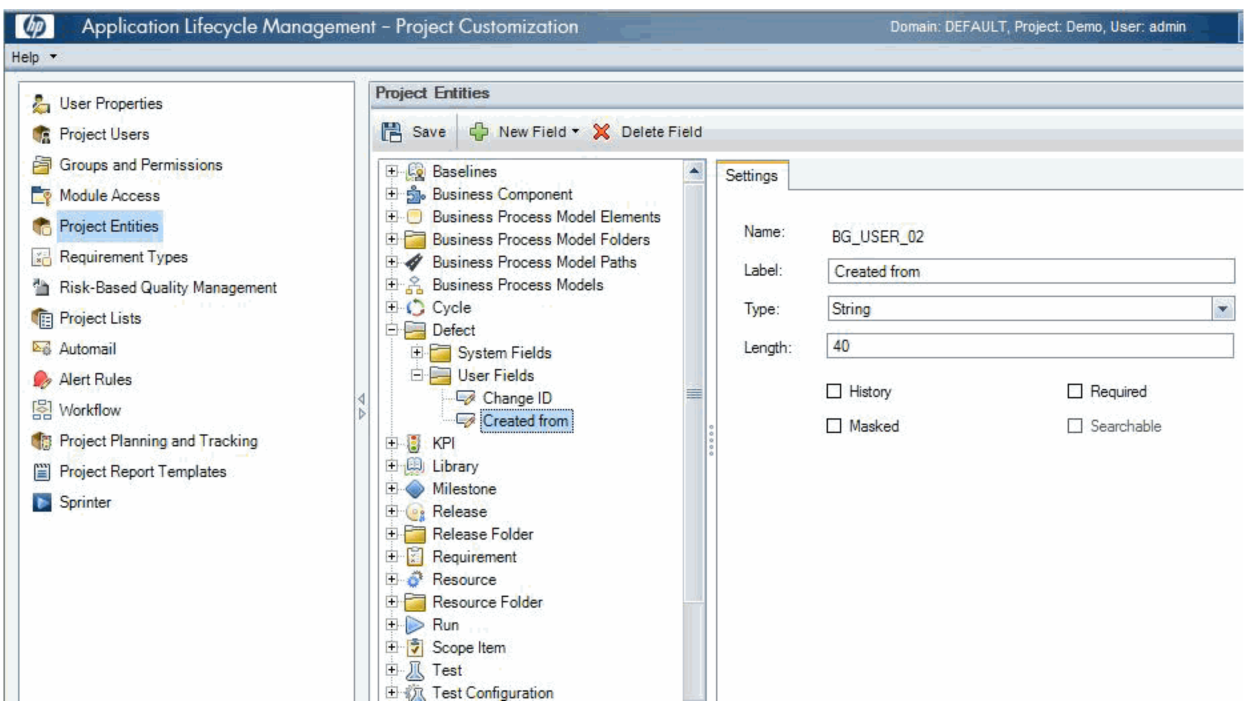
1. "Add fields" below
2. "Verify" on the next page

Add fields

To add the required fields for Defect module customization:

1. Log on to ALM as a project administrator.
2. Click **Tools / Customize**. The "Application Lifecycle Management - Project Customization" module opens.
3. Add the following fields for the defect entity in project entities (*XX* and *XY* are sequential numbers auto-generated by ALM).

Field Name	Field Label	Field Type
BG_USER_*XX*	Change ID	String
BG_USER_*XY*	Created from	String



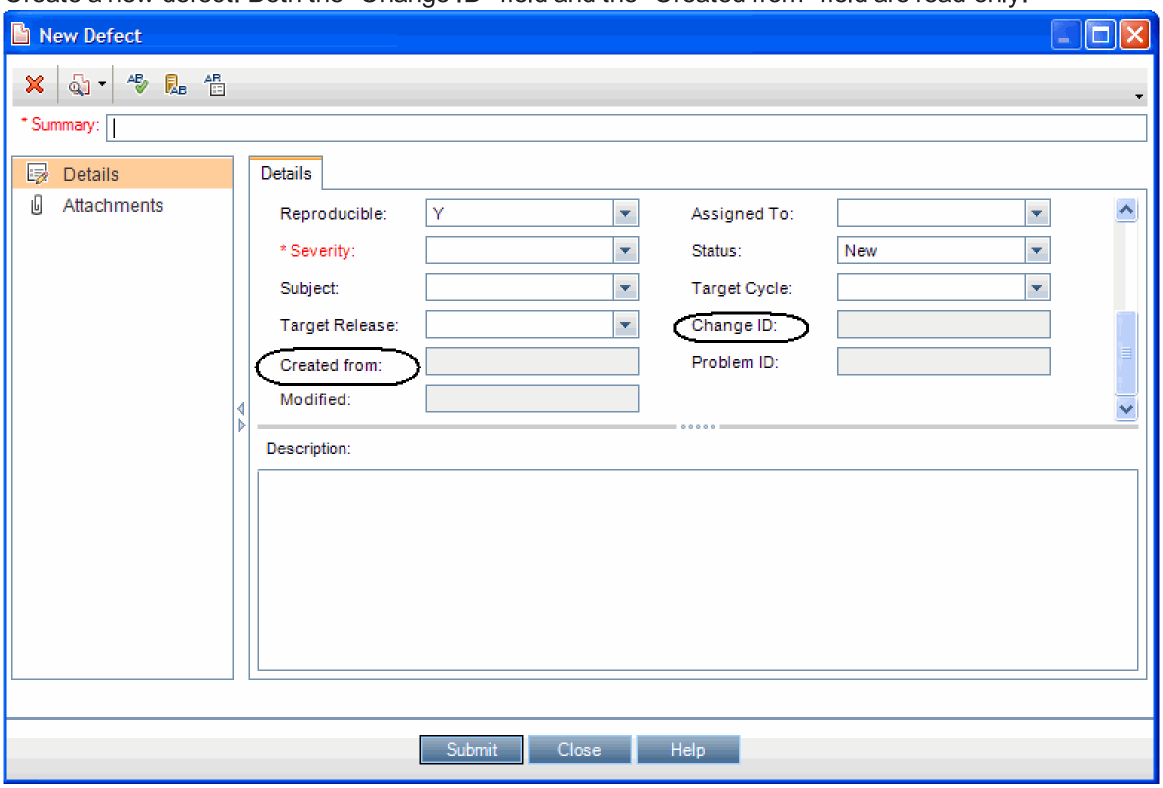
4. Click **Workflow** > **Script Editor**.
5. Select **Defects module script**.

6. Set the **Readonly** fields by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines:
```
Bug_Fields.Field("BG_USER_XX").IsReadOnly=True

Bug_Fields.Field("BG_USER_XY").IsReadOnly=True
```
7. Save your changes.

Verify

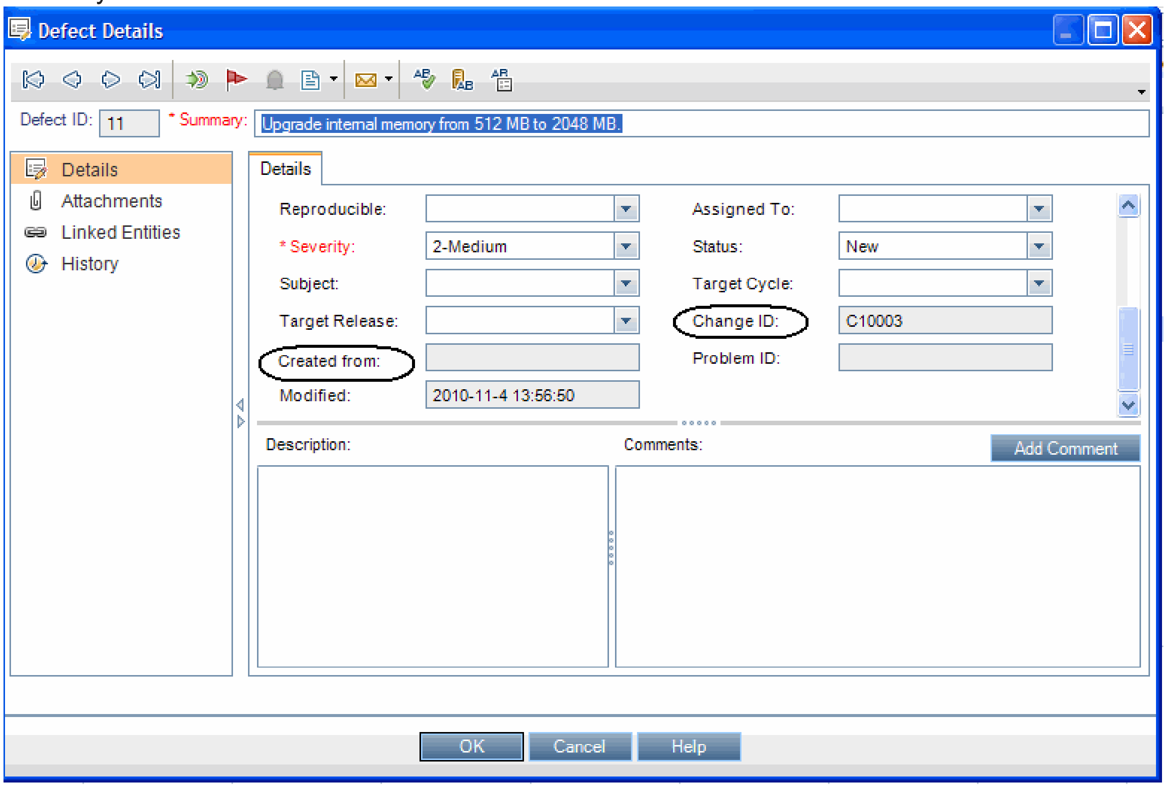
To verify the Defects module on ALM 11 is customized successfully:

1. Create a new defect. Both the "Change ID" field and the "Created from" field are read-only.



2. Open an existing defect. Both the "Change ID" field and the "Created from" field are always

read-only.



Configuring Links in QC/ALM Synchronizer

To configure and test a link in the QC/ALM synchronizer, perform the following tasks:

1. "Specify Endpoints / Type of Link" below
2. "Define Field Mappings" on the next page
3. "Define Events" on page 78
4. "Test the Link" on page 78

Specify Endpoints / Type of Link

Caution: If you are using ALM Synchronizer 1.4 with ALM 11.0, install the HP Quality Center Connectivity Add-in on the ALM server before you proceed; otherwise ALM Synchronizer will not be able to connect to ALM. To install this add-in, click the **Add-Ins Page** link on your ALM options window: http://<*ALM Platform server name*><*:port number*>/qcbin.

Specify the connection properties as described in "Create a Link" with the following settings specific for this type of link:

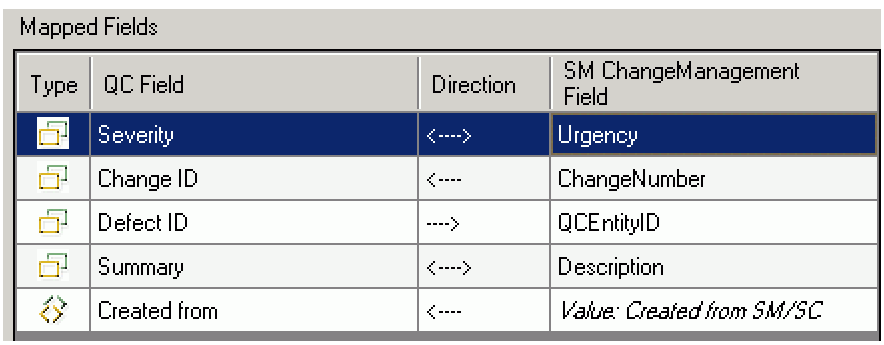
1. Step 1: “Endpoint 2 type” = **SM ChangeManagement**.
2. Step 2: “Service URL” = **http://<*service_manager_host*>:<*port*>/sc62server/PWS/QCIntChangeService.wsdl**
3. Step 3: “Select entity types” = **Change as Defect**.

Define Field Mappings

Basic field mappings are summarized below:

QC	Direction	SM	Constant value	Remarks
Change ID	<-	ChangeNumber		
Defect ID	->	QCEntityID		Synchronize back on create: Yes
Created from			Created from SM/SC	

Example field mappings are shown in the following screenshot:


Mapped Fields

Type	QC Field	Direction	SM ChangeManagement Field
	Severity	<---->	Urgency
	Change ID	<----	ChangeNumber
	Defect ID	---->	QCEntityID
	Summary	<---->	Description
	Created from	<----	*Value: Created from SM/SC*

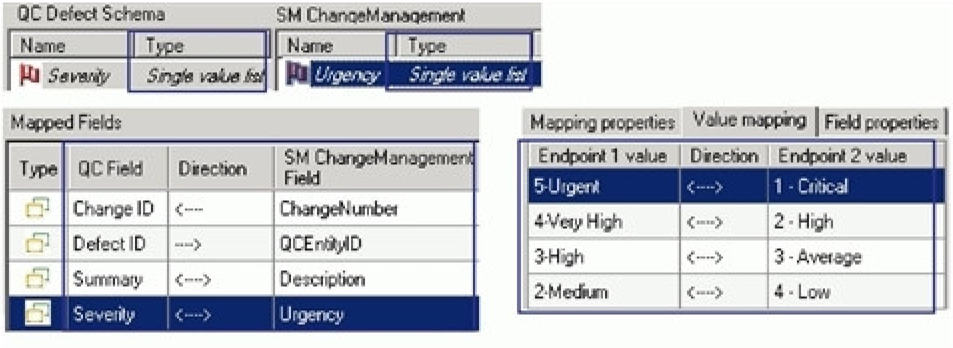
QC/ALM Field <-> SM Field

The following table summarizes the field mappings between QC/ALM and SM. The first two rows are required mappings.

SM Change -> QC/ALM Defect Mappings

QC Len	QC DB Name	QC Type	QC/ QCS Label	QC/ QCS Type	Dir	QCS SM Type	QCS Name/ SM WSDL Caption	SM WSDL Type	SM DB Name/ SM WSDL field	SM7 DB type	SC6 DB type	SM Len[1]
40	BG_USER _02[2]	String	Change ID	String	<-	String	ChangeNumber	StringType	header,number	Char	Text	100
10	BG_BUG _ID	Number	Defect ID[3]	Number	->	Number	QCEntityID[4]	IntType	qcintegration.id	Num	Decimal	xx
255	BG_ SUMMARY	String	Summary	String	<->	String	Description	StringType	description.structure, description	Char	Text	xx
70	BG_ SEVERITY	Lookup List	Severity	Single value list	<->	Single value list	Urgency	Character	severity	Char	Text	40

If you specify a value mapping, for example, Severity <-> Urgency, you can specify as follows:



The following tables summarize the mappings you just created between the single value lists (which have their own directions).

SM Change -> QC Defect List Value Mappings

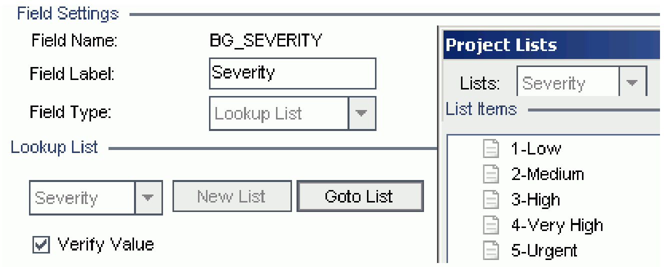
QC Len	QC DB Name	QC Type/ Lookup list Values	QC/QCS Label	QC/QCS Type	Dir	QCS SM Type	QCS Name/ SM WSDL Caption	SM WSDL Type	SM DB Name/ SM WSDL Field	SM DB Type	SM Len
70	BG_ SEVERITY	Lookup List	Severity	Single value list	<->	Single value list	Urgency	String Type	severity	Char (SM7) or Text (SC6)	40

Detailed value mappings between the QC/QCS Severity field and the QCS/SM WSDL Urgency field are listed in the table below:

QC Value (from Lookup List)[1]	Value Map Dir	SM Field Value (from SM Adapter Config File for Change Management)[2]
5-Urgent	<->	1-Critical
4-Very High	<->	2-High
3-High	<->	3-Average
2-Medium	<->	4-Low

1

Lookup list is created in QC.



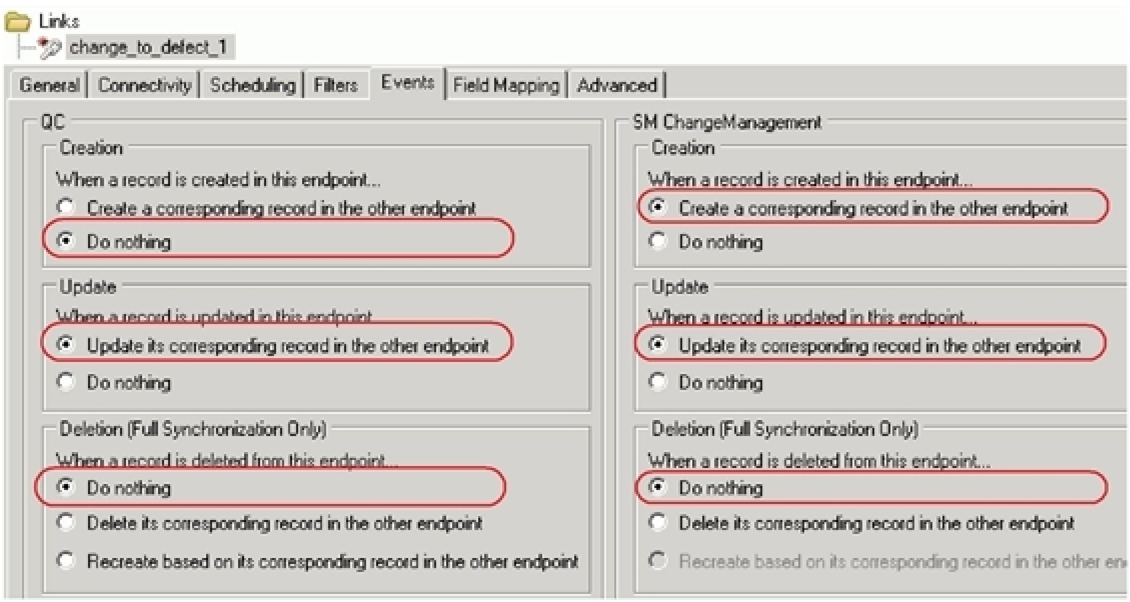
2 The XML file is in `<QCS_Install_Dir>\adapters\dat\SM ChangeManagement\configuration_file_default.xml` (see "SM Change Management Example" on page 22).

Define Events

The following table lists the event settings for the two endpoints.

Operation	QC Action (Event)	SM Action (Event)
Creation	Do nothing.	Create a corresponding record in the other endpoint.
Update	Update its corresponding record in the other endpoint.	Update its corresponding record in the other endpoint.
Deletion	Do nothing.	Do nothing.

The following screenshot shows the settings:



Test the Link

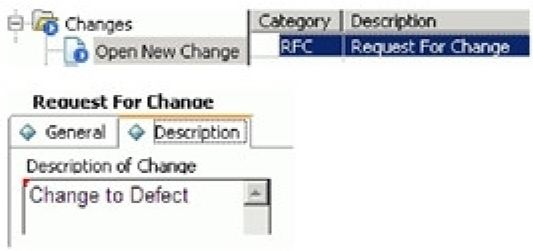
To test the link:

> **Note:** The following sample steps are for your reference only. The exact steps required on your system may differ significantly. The phase in which the QC Integration tab appears may be different on your system.

1. Save the configuration (an integrity check is automatically run).

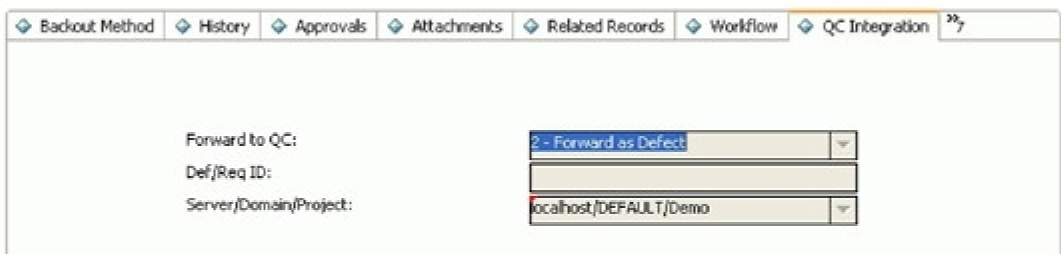
2. Click **Enable Link**.

3. Create a Service Manager Change (the category of the Change depends on each Service Manager customization; RFC is used in ServiceCenter 6.2/Service Manager 7.0x as an example).

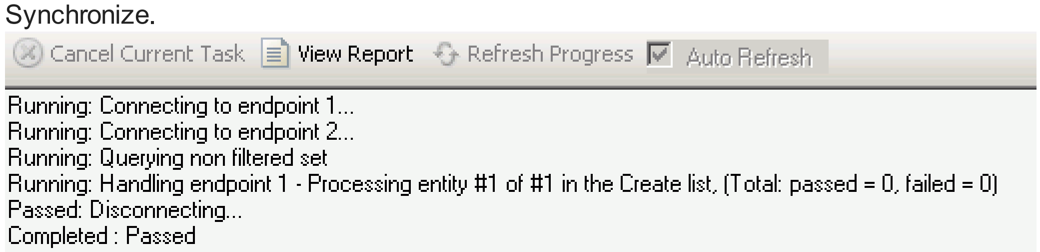


4. Change the phase to **Building**. The QC Integration tab appears.

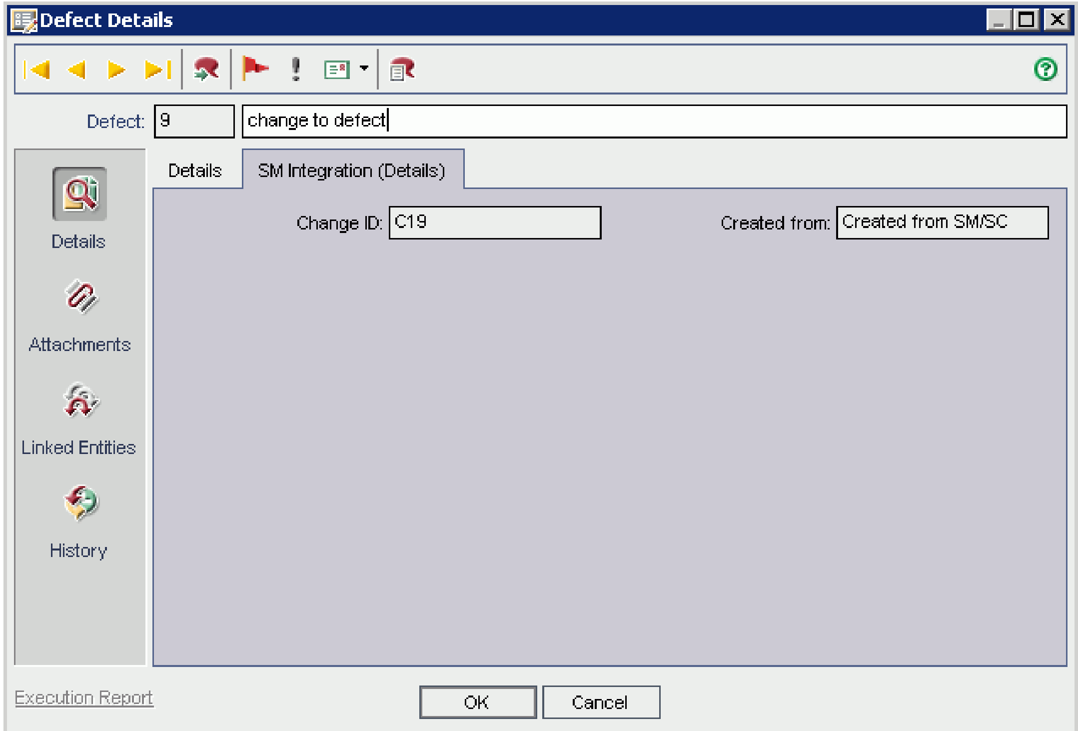
5. Select a value in the Server/Domain/Project field and select **Forward as Defect** in the Forward to QC field.



6. Synchronize.



7. View the Defect in QC.



Note: In ALM 11, the Change ID and Created from fields reside on the Details tab of the Defect form.

Chapter 7: SM Change -> QC/ALM Requirement

This chapter describes how to synchronize SM Changes with QC/ALM Requirements ("Change -> Requirement").

This chapter includes:

Customizing Service Manager/ServiceCenter for Change Management

For details, see the "Customizing Service Manager/ServiceCenter for Change Management" section in "SM Change -> QC/ALM Defect".

Customizing the QC/ALM Requirements Module

The steps for customizing the Requirements module vary with different Quality Center/ALM versions.

- "On QC 10 or Earlier" below
- "On ALM 11" on page 85

On QC 10 or Earlier

To customize the Requirements module on Quality Center 10 or earlier, perform the following tasks:

1. "Add Fields" below
2. "Add Tabs" on page 83
3. "Add Fields to Tabs" on page 84
4. "Create the SM Incoming Changes Folder" on page 87

Add Fields

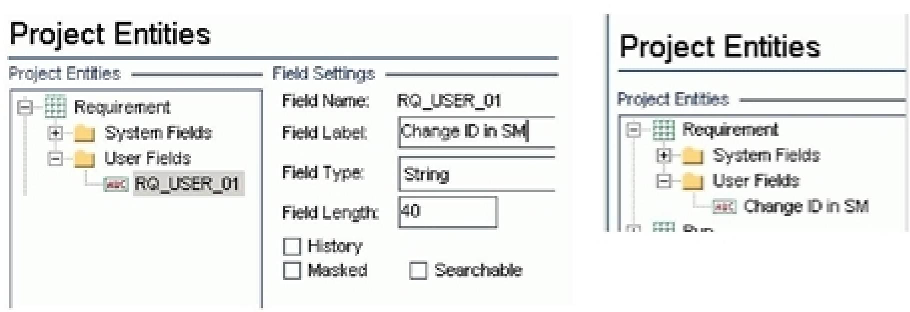
To add required fields for requirement customization, follow these steps.

1. Log on to QC as a project administrator.
2. Click **Tools / Customize**. The "QC - Project Customization" module displays.
3. Add the following fields for the requirement entity in project entities (*XX* and *XY* are sequential numbers auto-generated by QC).

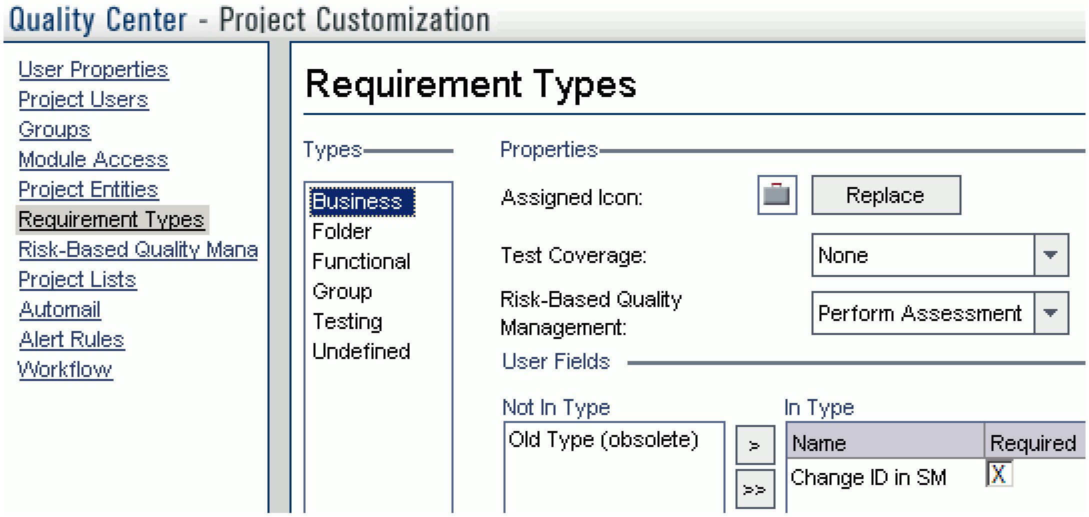
Field Name	Field Label	Field Type
RQ_USER_*XX*	Change ID	String
RQ_USER_*XY*	Created from	String

Note: The data type requirements for QC fields are described in Matching Types.

This is shown in the following figure.



4. In Requirement Types add fields "Change ID"/"Created from" to the Business type requirement.
   `Business` type is the default requirement type for incoming requirements (other types can be used).



Add Tabs

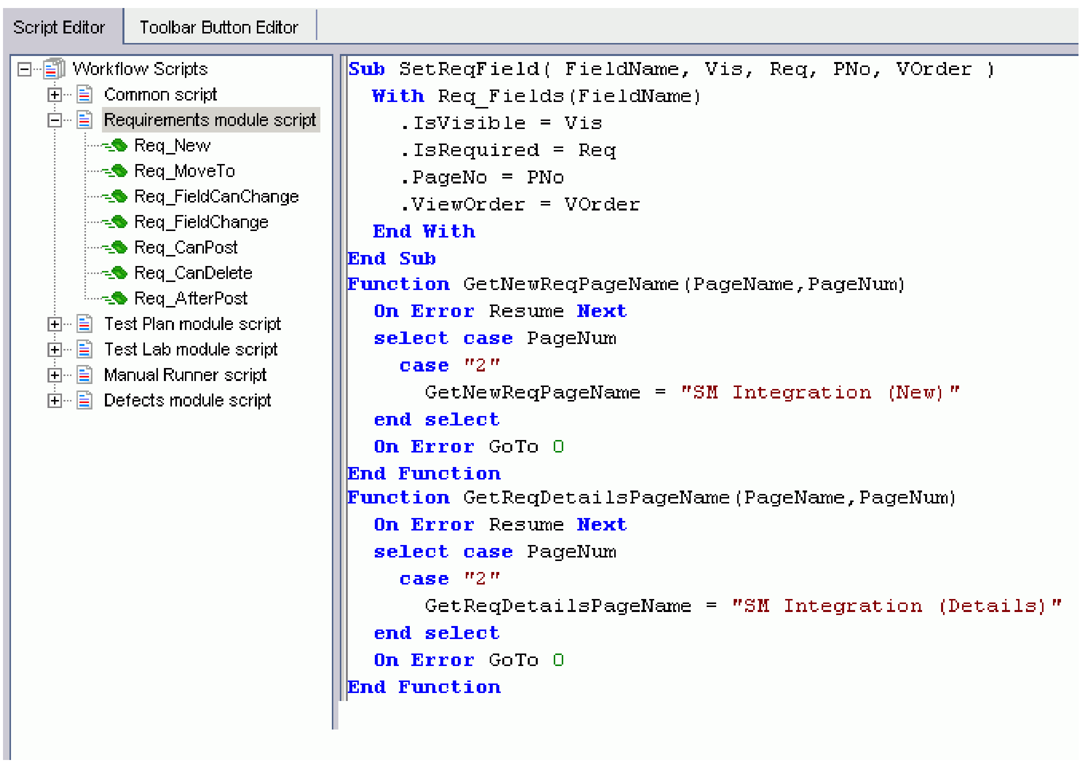
To add tabs to the Requirement form and display the fields on these tabs, click **Workflow** > **Script Editor**. Add the following code to the requirement module.

Note: For a new Requirement, the tab label is "SM Integration (New)". For an existing Requirement, the tab label is "SM Integration (Details)". The parameter `2` specifies tab 2 (the second tab). If N tabs exist, then the number of a new tab should be `N+1`. This function is called when an existing requirement is shown in the dialog.

```
Sub SetReqField( FieldName, Vis, Req, PNo, VOrder )
  With Req_Fields(FieldName)
    .IsVisible = Vis
    .IsRequired = Req
    .PageNo = PNo
    .ViewOrder = VOrder
  End With
End Sub
Function GetNewReqPageName(PageName,PageNum)
  On Error Resume Next
  select case PageNum
    case "2"
      GetNewReqPageName = "SM Integration (New)"
```

```
    end select
    On Error GoTo 0
  End Function
  Function GetReqDetailsPageName(PageName,PageNum)
    On Error Resume Next
    select case PageNum
      case "2"
        GetReqDetailsPageName = "SM Integration (Details)"
    end select
    On Error GoTo 0
  End Function
```

The resulting script is shown in the following screenshot:

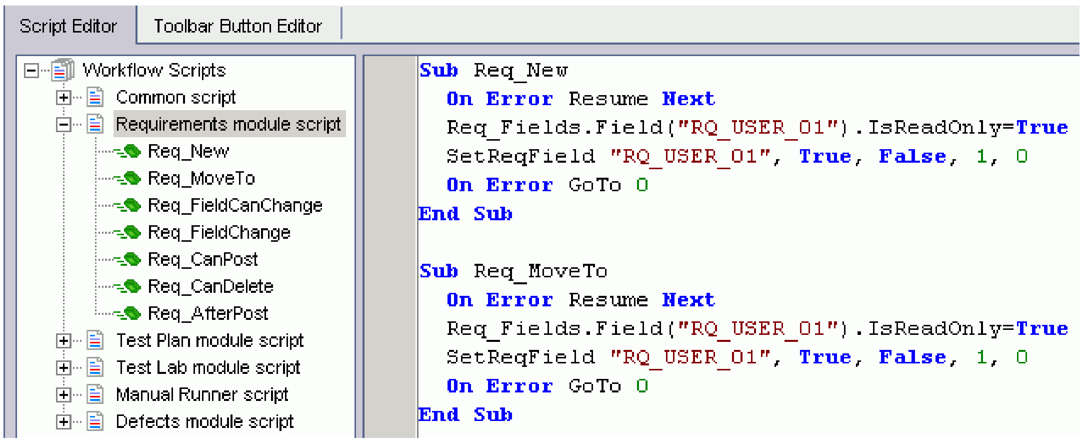


Add Fields to Tabs

To set the fields as read-only and place the fields on the tabs, in the Script Editor for the Requirements module script, add the following code to **Req_New** and **Req_Moveto** (**Req_New** is called when a new Requirement is created; **Req_Moveto** is called when an existing Requirement is opened).

```
Req_Fields.Field("RQ_USER_XX").IsReadOnly=True

Req_Fields.Field("RQ_USER_XY").IsReadOnly=True

SetReqField "RQ_USER_XX", True, False, 1, 0

SetReqField "RQ_USER_XY", True, False, 1, 1
```

The resulting script is shown in the following screenshot:

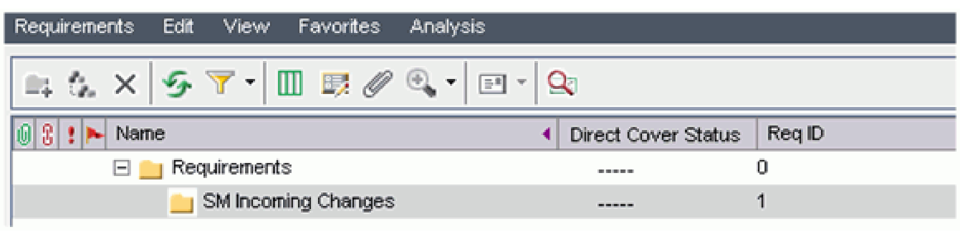


Create the SM Incoming Changes Folder

To create the folder for Requirements originated from SM changes:

1. From the menu, select **Requirements / New Folder**.

2. Set the folder name to `SM Incoming Changes`.



On ALM 11

In ALM 11, you only need to add new fields directly to the Details tab of the `Requirement` form.

To customize the ALM Requirements module, perform the following tasks:

1. "Add Fields" on the next page

2. "Create the SM Incoming Changes Folder" on page 87

Add Fields

To add required fields for requirement customization, follow these steps.

1. Log on to ALM as a project administrator.

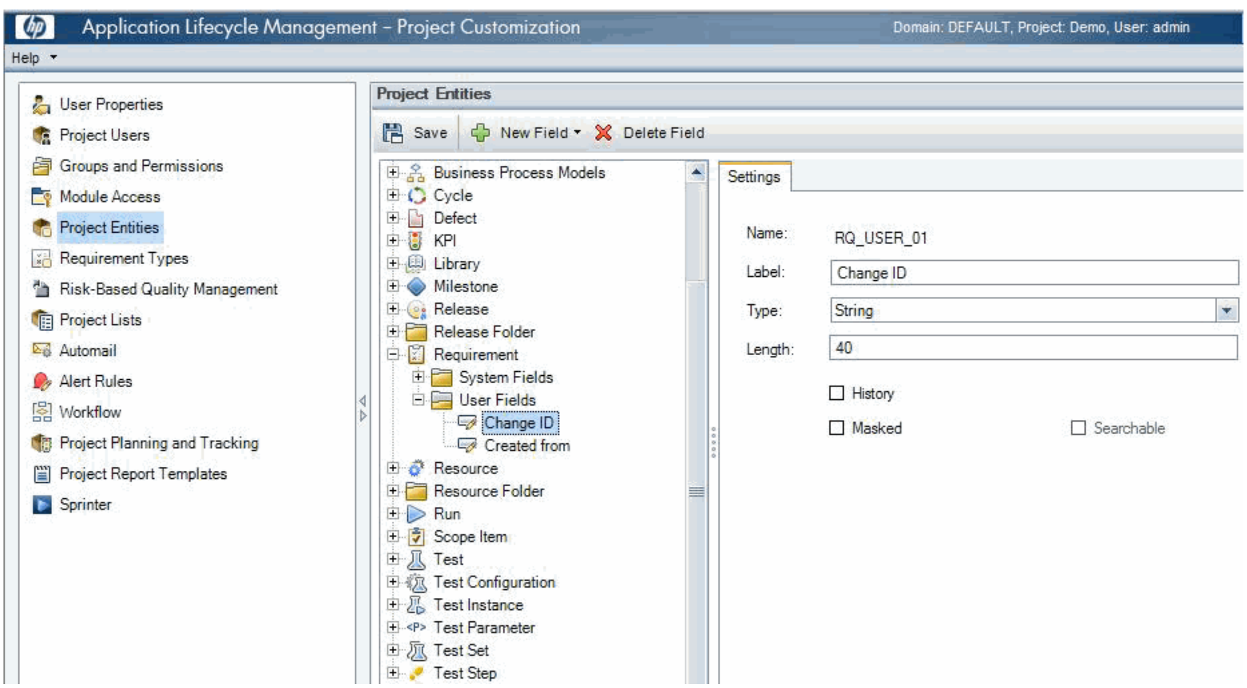
2. Click **Tools / Customize**. The "Application Lifecycle Management - Project Customization" module opens.

3. Add the following fields for the requirement entity in project entities (*XX* and *XY* are sequential numbers auto-generated by ALM).

Field Name	Field Label	Field Type
RQ_USER_*XX*	Change ID	String
RQ_USER_*XY*	Created from	String

Note: The data type requirements for QC fields are described in "Matching Types" on page 33.

This is shown in the following figure.



4. In Requirement Types add fields "Change ID"/"Created from" to the Business type requirement.
   `Business` type is the default requirement type for incoming requirements (other types can be used).

5. Click **Workflow** > **Script Editor**.

6. Select **Requirements module script**.

7. Add the following code to `Req_New` and `Req_Moveto` (`Req_New` is called when a new Requirement is created; `Req_Moveto` is called when an existing Requirement is opened.)

   ```
   Req_Fields.Field("RQ_USER_XX").IsReadOnly=True
   ```

   ```
   Req_Fields.Field("RQ_USER_XY").IsReadOnly=True
   ```

8. Save your changes.

Create the SM Incoming Changes Folder

To create the folder for Requirements originated from SM changes:

1. From the menu, select **Requirements / New Folder**.

2. Set the folder name to `SM Incoming Changes`.

Configuring Links in QC/ALM Synchronizer

To configure and test a link in QC/ALM synchronizer, perform the following tasks:

- "Specify Endpoints / Type of Link" below
- "Define Field Mappings" on page 89
- "Define Events" on page 91
- "Test the Link" on page 91

Specify Endpoints / Type of Link

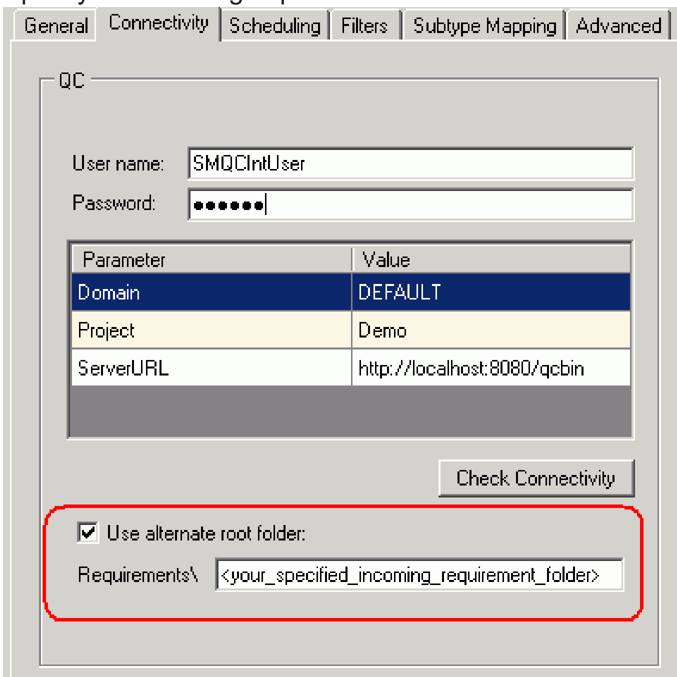
Specify the connection properties as described in "Create a Link" with the following settings specific for this type of link:

1. Step 1: “Endpoint 2 type” = **SM ChangeManagement**.

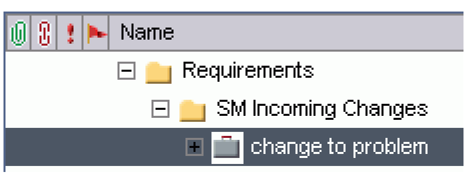
2. Step 2: “Service URL” = **http://<*service_manager_host*>:<*port*>/sc62server/PWS/QCIntChangeService.wsdl**

3. Step 3: “Select entity types” = **Change as Requirement**.

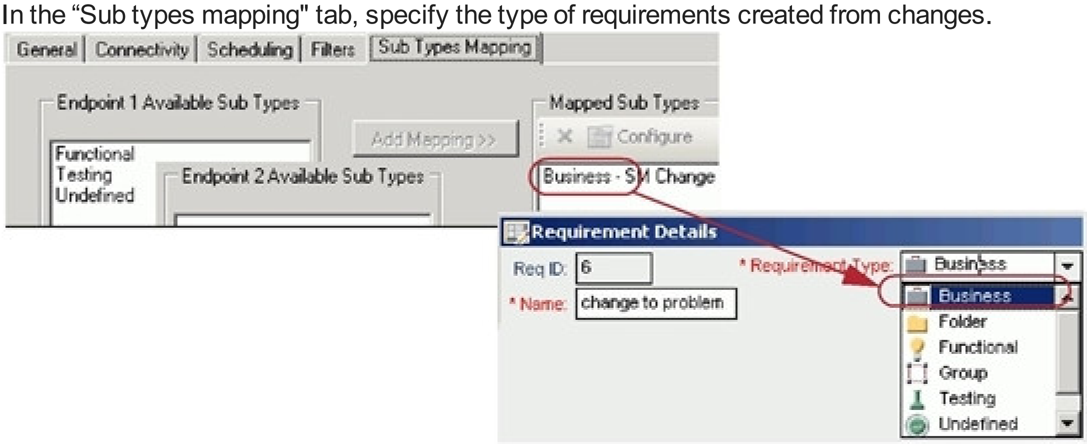
4. Specify the incoming requirement folder as shown in the following screenshot:



Requirements will be created in the specified folder in QC.



5. In the “Sub types mapping" tab, specify the type of requirements created from changes.

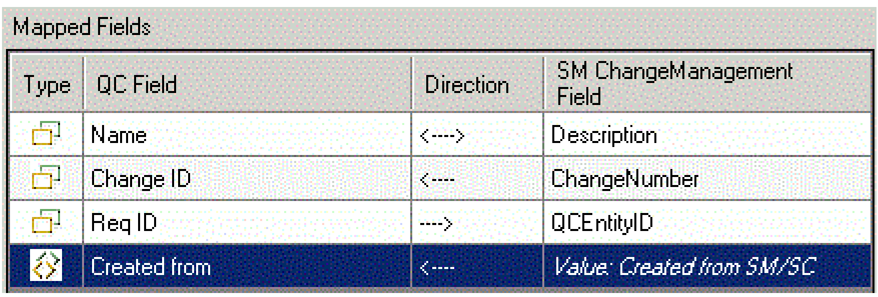


Define Field Mappings

Basic field mappings are summarized below:

QC	Direction	SM	Constant value	Remarks
Change ID	<-	ChangeNumber		
Req ID	->	QCEntityID		Synchronize back on create: Yes
Created from			Created from SM/SC	

Example field mappings are shown in the following screenshot:



QC/ALM Field <-> SM Field

The following table summarizes the field mappings between QC/ALM and SM. The first two rows are required mappings.

SM Change -> QC/ALM Requirement Mappings

QC Len	QC DB Name	QC Type	QC/QCS Label	QC/ QCS Type	Dir	QCS SM Type	QCS Name/ SM WSDL Caption	SM WSDL Type	SM DB Name	SM7 DB type	SC6 DB type	SM Len
40	RQ_USER_01	String	Change ID	String	<-	String	ChangeNumber	StringType	header,number	Char	Text	100
10	RQ_REQ_ID	Number	ReqID	Number	->	Number	QCEntityID	IntType	qcintegration.id	Num	Decimal	xx
255	RQ_REQ_ COMMENT	Memo	Description	String	<->	String	Description	--	description.structure, description	Char	Text	xx

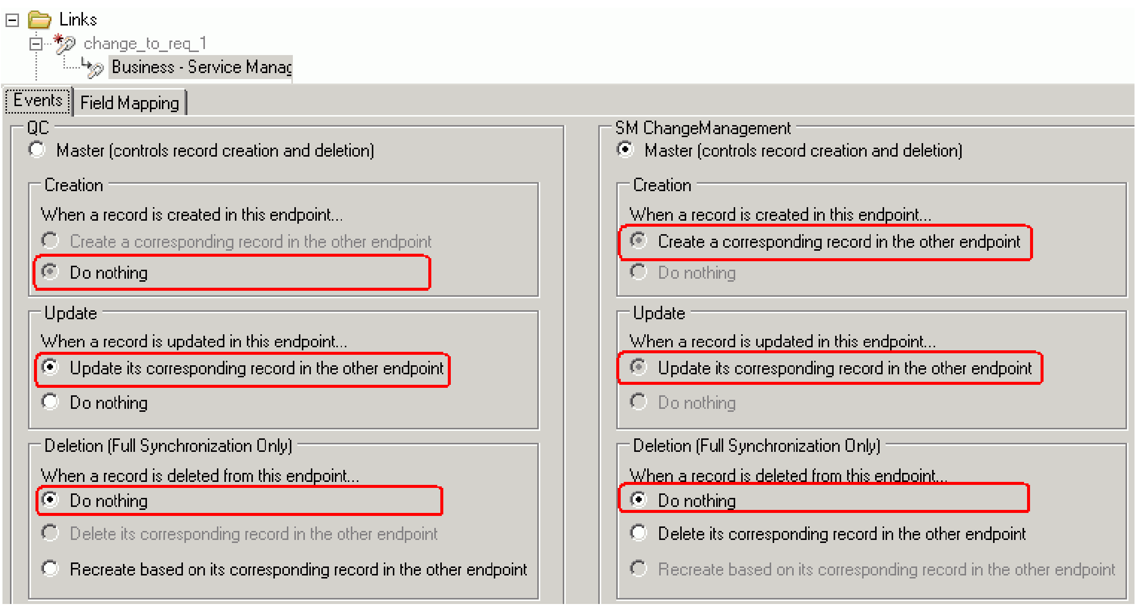
Note: Check for QCEntityID mapping property **Synchronize back on create**.

Define Events

The following table lists the event settings for the two endpoints.

Events Tab Settings	QC Action (Event)	SM Action (Event)
Creation	Do nothing.	Create a corresponding record in the other endpoint.
Update	Update its corresponding record in the other endpoint.	Update its corresponding record in the other endpoint.
Deletion	Do nothing.	Do nothing.

The following screenshot shows the settings:



Test the Link

To test the link:

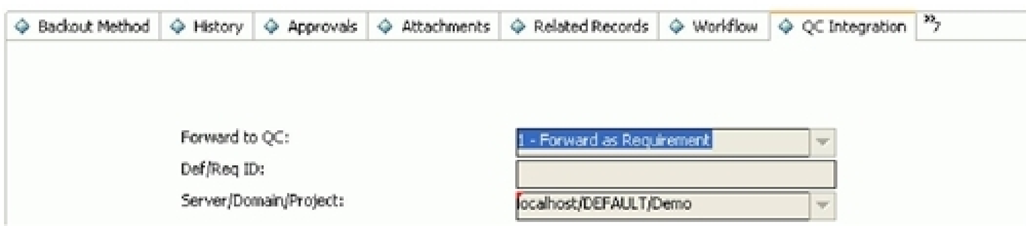
Note: The following is only an example. The exact steps required on your system may differ significantly. The phase in which the tab for QC Integration appears may be different on your system.

1. Save the configuration (an integrity check is automatically run).
2. Click **Enable Link**.

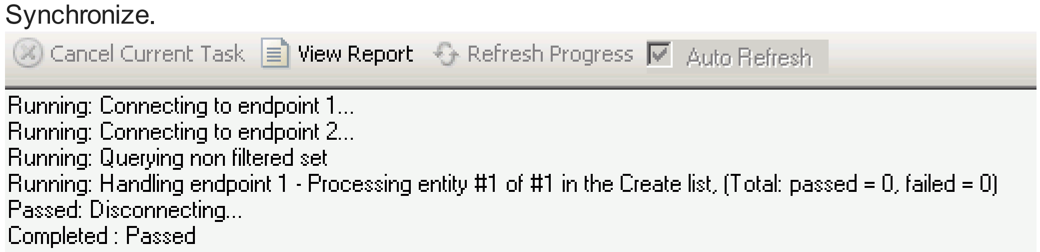
3. Create a Service Manager change (the category of the change depends on each Service Manager customization; RFC is used in this example).

4. Change the phase to **Building**. The “QC Integration” tab appears.

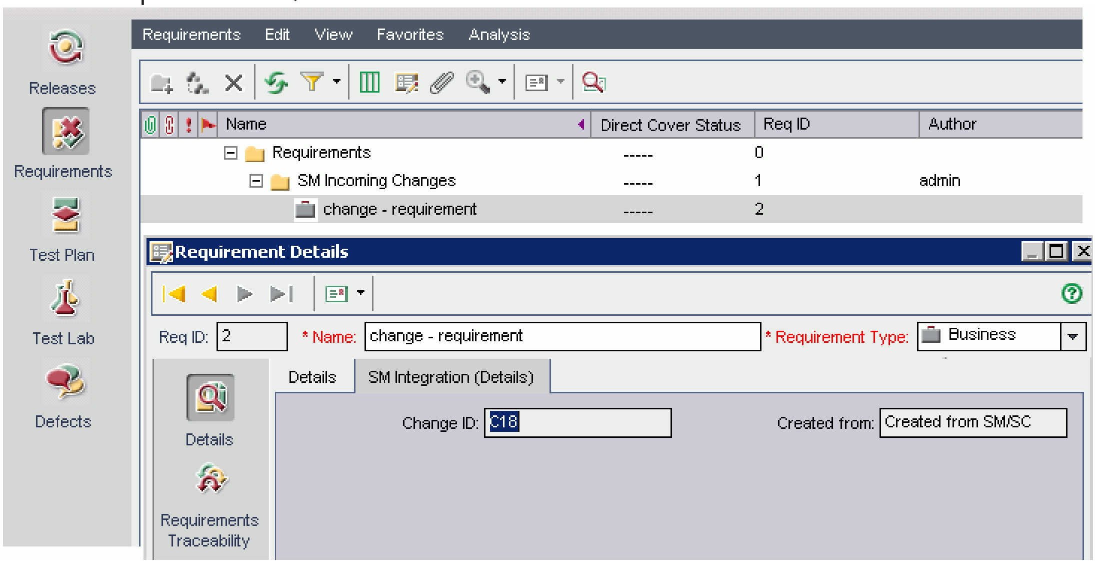
5. Select **Forward as Requirement**.



6. Synchronize.



7. View the requirement in QC.



Note: In ALM 11, the **Change ID** and **Created from** fields reside on the Details tab of the requirement form.

Chapter 8: SM Problem -> QC/ALM Defect

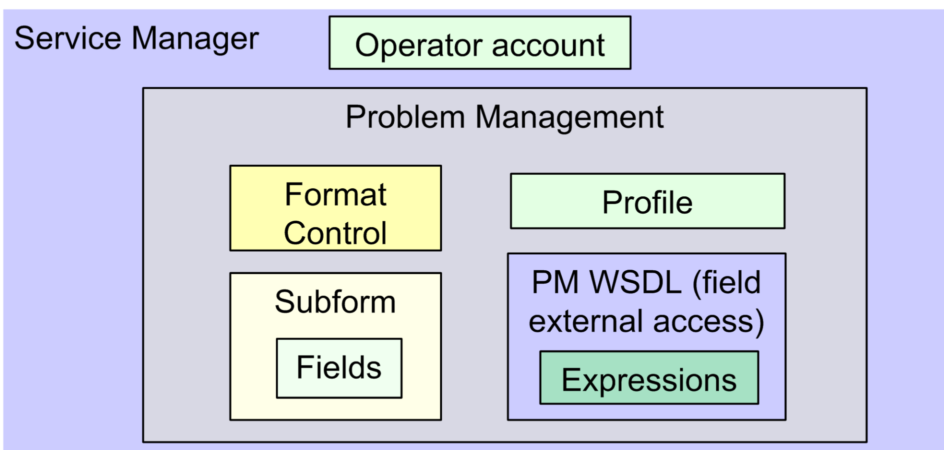
This chapter describes how to synchronize SM Problems with QC/ALM Defects ("Problem -> Defect").

This chapter includes:

- "Customizing Service Manager/ServiceCenter for Problem Management" below
- "Customizing the QC/ALM Defects Module" on page 112
- "Configuring Links in QC/ALM Synchronizer" on page 118

Customizing Service Manager/ServiceCenter for Problem Management

The following diagram summarizes the components which require tailoring in Service Manager/ServiceCenter.



To customize Service Manager/ServiceCenter for Problem Management, perform the following tasks:

1. "Add Fields" on the next page
2. "Specify the External Access Definition on Service Manager" on the next page or "Specify the External Access Definition on ServiceCenter" on page 100
3. "Create a Subform" on page 102
4. "Add the Subform to a Form" on page 104
5. "Add Format Control Calculations/Validations" on page 106

Add Fields

Add the following required fields to the `rootcause` table. Do not change them.

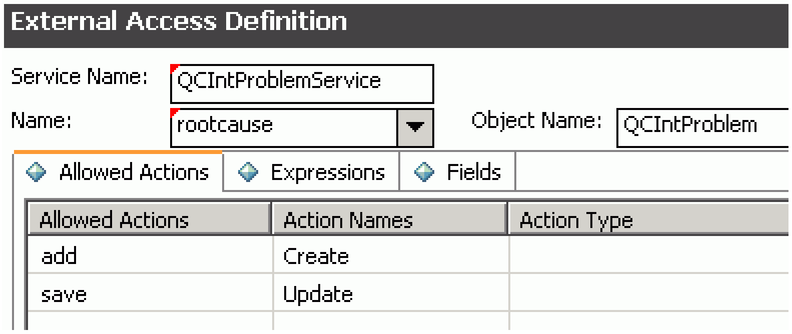
Field	Type	
	Service Manager	**ServiceCenter**
qcintegration.type	Character	Text
qcintegration.id	Number	Decimal
qcintegration.project	Character	Text

Note: The data type requirements for SM fields are described in "Matching Types" on page 33.

Specify the External Access Definition on Service Manager

If the Service Manager Process Designer (PD) Content Pack is not installed, or you have PD Content Pack 9.30.2 installed, follow the steps below to specify the External Access Definition on Service Manager:

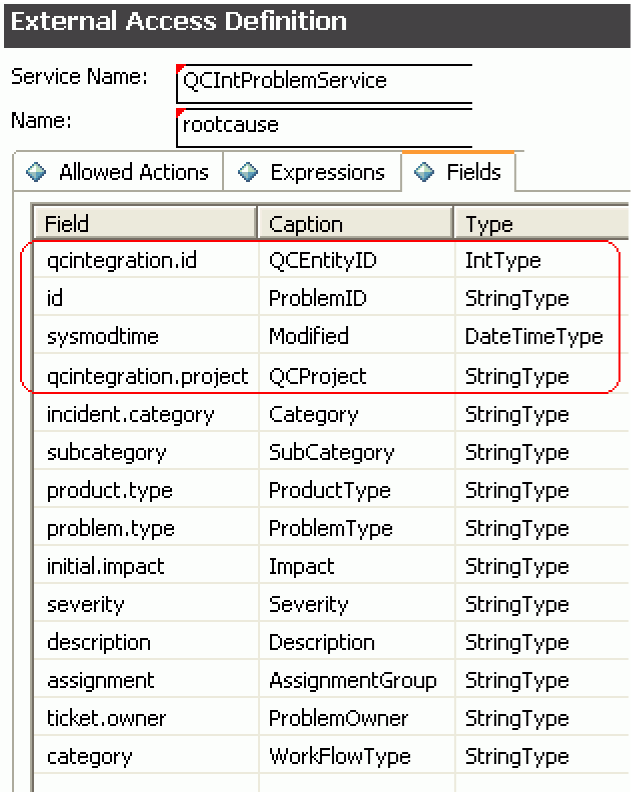
1. Create a custom External Access Definition `QCIntProblemService` by clicking **Tailoring** > **WSDL configuration** on Service Manager 7.0x; or clicking **Tailoring** > **Web Services** > **WSDL configuration** on Service Manager 7.1x or later with the following values:
   - Service Name: QCIntProblemService
   - Name: rootcause
   - Object Name: QCIntProblem
   - Allowed Actions / Action Names:
     - add / Create
     - save / Update



Note: The above values are required (Do NOT change them).

2. Enable the required fields in the web service.

Field	Caption	Type
id	ProblemID	StringType
sysmodtime	Modified	DateTimeType
qcintegration.id	QCEntityID	IntType
qcintegration.project	QCProject	StringType
qcintegration.type	QCIntegrationType	StringType
qcintegration.created.from	CreatedFrom	StringType
current.phase	CurrentPhase	StringType
category	WorkFlowType	StringType



Note: The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on). The above values are required (Do NOT change them).

3. Define expressions for the web service.

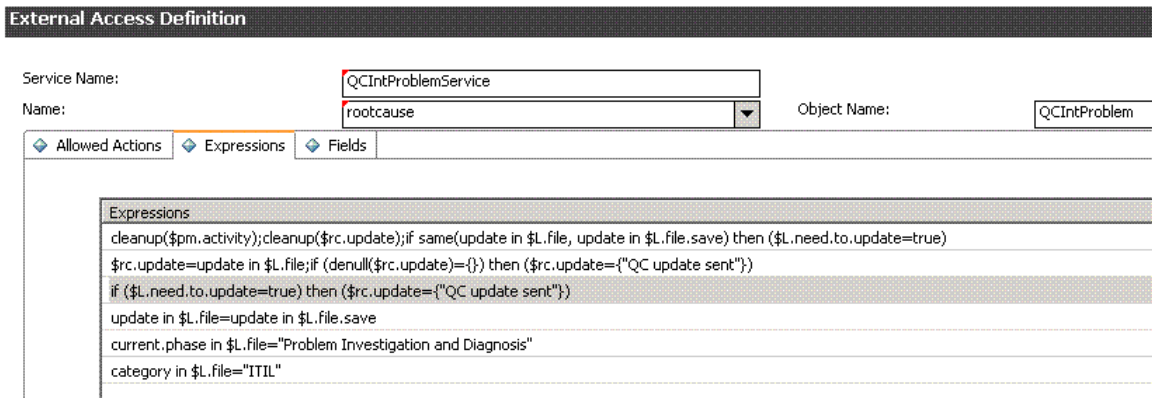
Note:

a. Problem Management requires an activity update provided with each save and for better flow, and this activity update will be hard-coded with the following expressions.

b. Expressions 1 to 4 are for fixing an update issue with the Problem Management web service. For more information, see *SCR 41399*.

No.	Expression
1	cleanup($pm.activity);cleanup($rc.update);if same(update in $L.file, update in $L.file.save) then ($L.need.to.update=true)

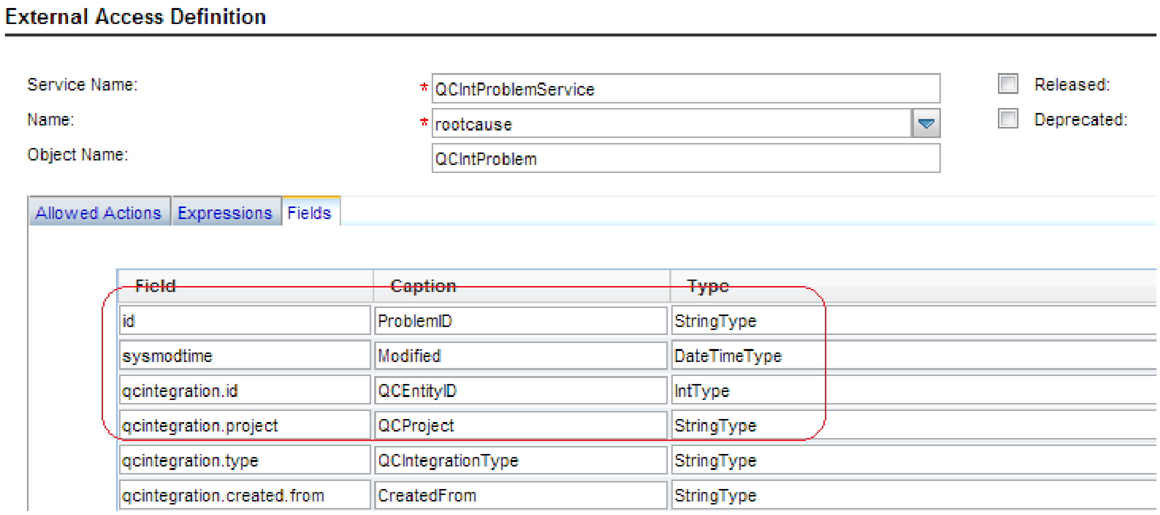
No.	Expression
2	$rc.update=update in $L.file;if (denull($rc.update)={}) then ($rc.update={"QC update sent"})
3	if ($L.need.to.update=true) then ($rc.update={"QC update sent"})
4	update in $L.file=update in $L.file.save



If the Service Manager Process Designer (PD) Content Pack 9.30.3 is installed, follow the steps below to specify the External Access Definition on Service Manager:

1. Refer to step 1.
2. Enable the required fields in the web service.

Field	Caption	Type
id	ProblemID	StringType
sysmodtime	Modified	DateTimeType
qcintegration.id	QCEntityID	IntType

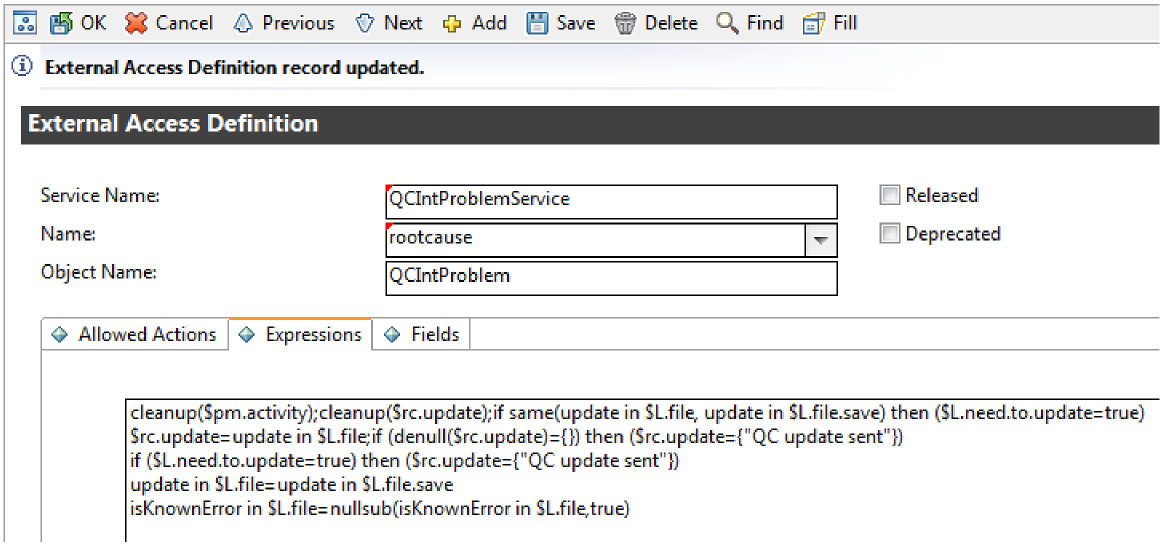


Note: The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on). The above values are required (Do NOT change them).

3. Define expressions for the web service.

Note: Problem Management requires an activity update provided with each save and for better flow, and this activity update will be hard-coded with the following expressions.

No.	Expression
1	cleanup($pm.activity);cleanup($rc.update);if same(update in $L.file, update in $L.file.save) then ($L.need.to.update=true)
2	$rc.update=update in $L.file;if (denull($rc.update)={}) then ($rc.update={"QC update sent"})
3	if ($L.need.to.update=true) then ($rc.update={"QC update sent"})
4	update in $L.file=update in $L.file.save
5	isKnownError in $L.file=nullsub(isKnownError in $L.file,true)



Specify the External Access Definition on ServiceCenter

To specify the External Access Definition on ServiceCenter:

1. Click **System Defintion** > **Tables** > **rootcause** > **Fields and keys definitions for the rootcause table** and change the settings of these fields.

No.	Field	Include in API	Field name in API	Field data type in API
1	id	Y	ProblemID	StringType
2	sysmodtime	Y	Modified	DateTimeType
3	qcintegration.id	Y	QCEntityID	IntType

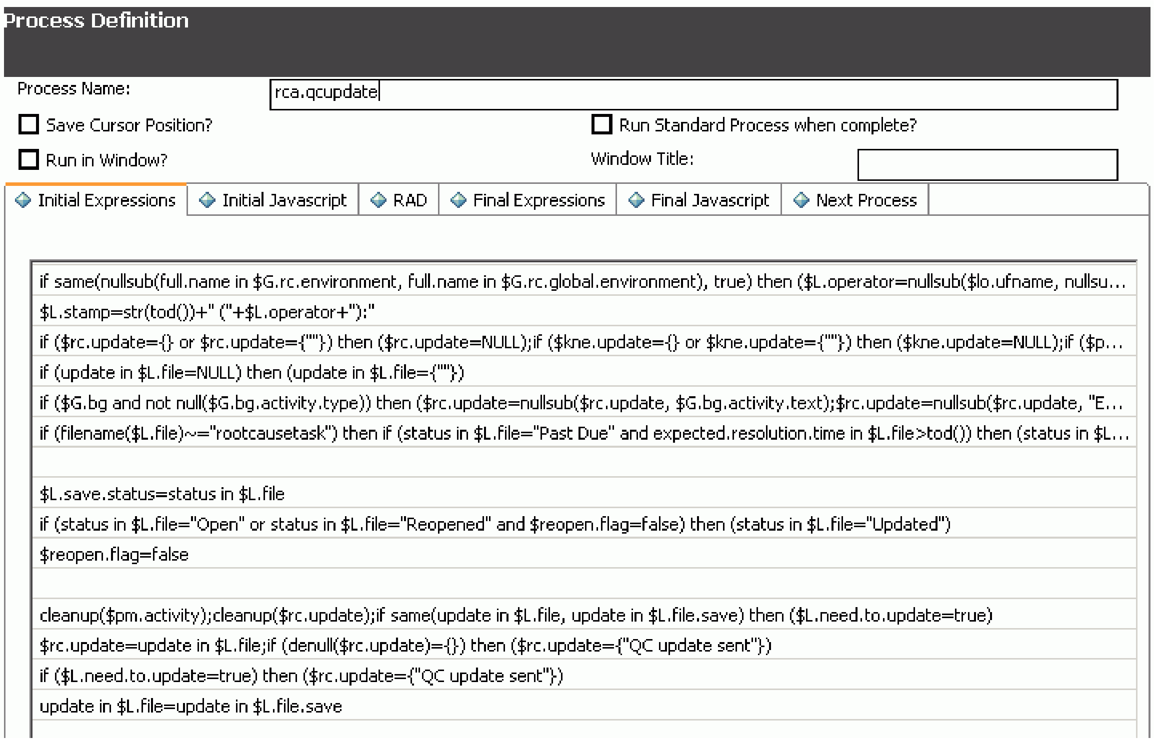
> **Note:** The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on).

2. Click **Menu navigation** > **Utilities** > **Tools** > **Document Engine** > **Process**. Type `rca.save` in the Process Name field, and then click **Search**.

3. Change the name to `rca.qcupdate` and click **Add**.

4. Append the following lines to the Initial Expressions tab.

No.	Expression
1	cleanup($pm.activity);cleanup($rc.update);if same(update in $L.file, update in $L.file.save) then ($L.need.to.update=true)
2	$rc.update=update in $L.file;if (denull($rc.update)={}) then ($rc.update={"QC update sent"})
3	if ($L.need.to.update=true) then ($rc.update={"QC update sent"})
4	update in $L.file=update in $L.file.save



5. Click **Save**.

6. Update the `rca.view` state record .
   a. Click **Utilities** > **Tools** > **Document Engine** > **States**. Type the state name `rca.view` and click **Search**.

   b. Add the following row to the `Non-base methods` table, and then click **Save**.

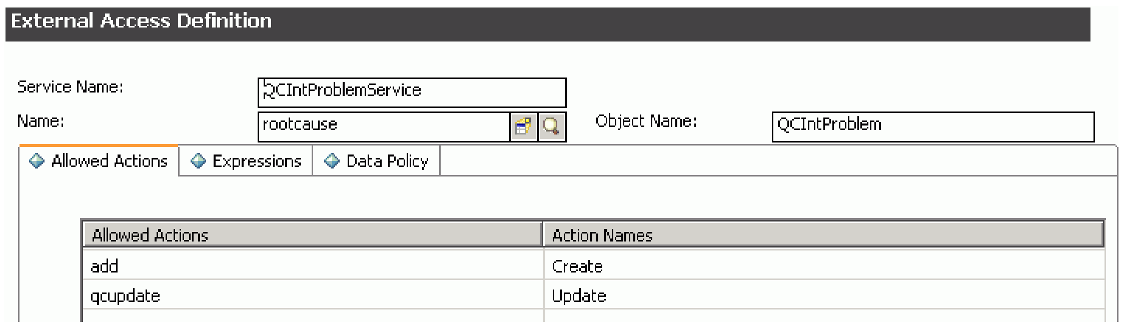
Display Action	Process Name	Condition	Save First
qcupdate	rca.qcupdate	$L.mode~="close" and $L.mode~#"add"	false

7. Update the Problem Management integration web service.

   a. Click **Toolkit** > **WSDL Configuration**. In the Name field type `rootcause`, and then click **Search**.

   b. Update the External Access Definition as follows based on table `rootcause`.

No.	Field	Value
1	Service Name	QCIntProblemService
2	Object Name	QCIntProblem
3	Allowed Actions/Action Names	add/Create
4	Allowed Actions/Action Names	qcupdate/Update



Note: Delete all Allowed Actions without an Action Name.

Create a Subform

To create a subform:

1. Create a global list.

   a. Create a global list by clicking **Tailoring** > **Tailoring Tools** > **Global Lists** on Service Manager 7.0x or later; or clicking **Utilities** > **Tools** > **Global Lists** on ServiceCenter with the following parameters:

No.	Parameter	Value	Remarks
1	List Name	SMQC Integration PM Project List	
2	Regen Every	1 00:00:00	

No.	Parameter	Value	Remarks
3	Build List on Startup?	Yes	Check box
4	List Variable	$G.qcintegration.problem.project	
5	User Defined List?	Yes	Check box
6	Value List	{"server1/domain1/project1", "server2/domain2/project2"}	Change to the values for your system **Note:** No spaces between slashes.

b. Save this global list and click **Rebuild Global List** in the options menu.

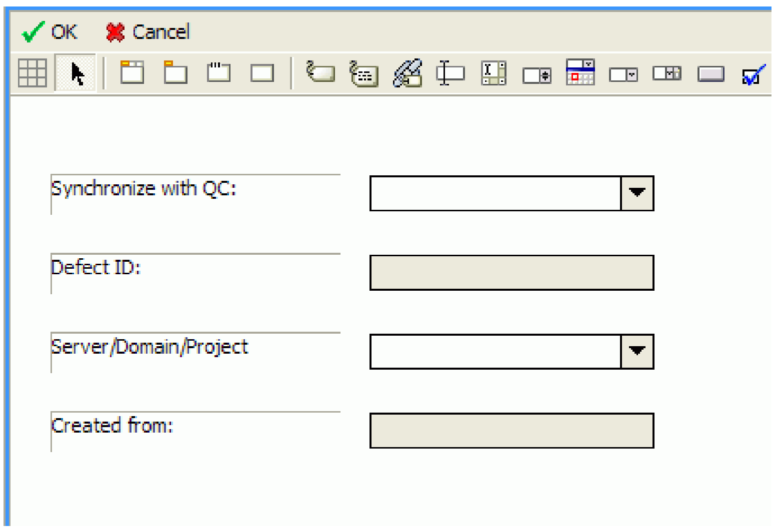
2. Create a subform.

   Click **Tailoring** > **Forms Designer** on Service Manager; or click **Toolkit** > **Forms Designer**on ServiceCenter to create the `pm.qcint.subform` subform with the following components:

   > **Note:** Click **No** when the system message "`Do you want to use Form Wizard?`" appears.

No.	Component	Properties
1	Label	**Caption**: Synchronize with QC:
2	Combo Box	▪ **Input**: qcintegration.type ▪ **Value List**: 0;1; ▪ **Display List**: 0 - Not Synchronize;1 - Synchronize with QC Defect ▪ **Select Only**: Yes ▪ **Read-Only Condition**: [$qcint.type.readonly]
3	Label	**Caption**: Defect ID:

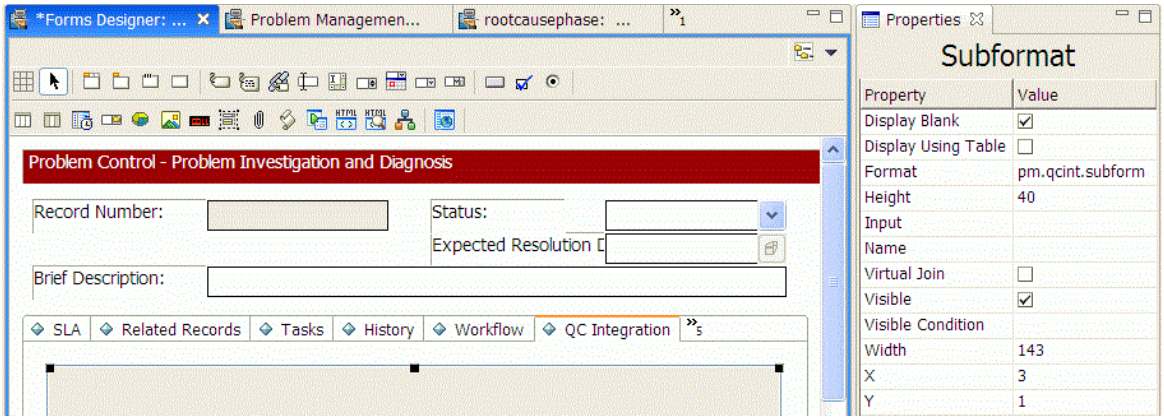
No.	Component	Properties
4	Text	▪ **Input**: qcintegration.id ▪ **Read-Only**: Yes
5	Label	**Caption**: Server/Domain/Project:
6	Combo Box	▪ **Input**: qcintegration.project ▪ **Value List**: $G.qcintegration.problem.project ▪ **Read-Only Condition**: [$qcint.project.readonly] ▪ **Mandatory Condition**: [qcintegration.type]>0



Add the Subform to a Form

If the Service Manager Process Designer (PD) Content Pack is not installed, or you have installed PD Content Pack 9.30.2, follow the steps below to add the subform you created to a form:

1. From Forms Designer, open the default form of a Problem Management phase (`PM.pc.ident.and.class` is used as an example on ServiceCenter 6.2/Service Manager 7.0x).
2. Add a notebook Tab with the QC Integration caption.
3. Add a subform to the new tab with format `pm.qcint.subform`, which is displayed in the following screenshot:



4. Save the changes.

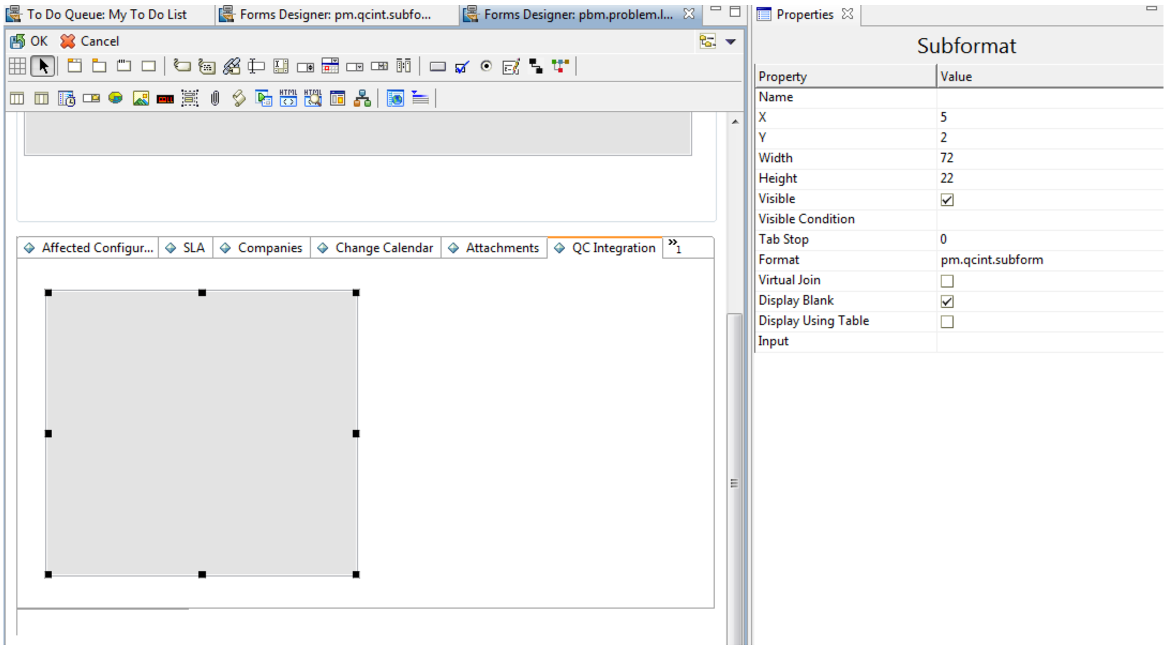
> **Note:** If the error message "`Format 'pm.qcint.subform' not found (display, show.rio)`" appears, restart the SM server to enable the subform.

If the Service Manager Process Designer (PD) Content Pack 9.30.3 is installed, follow the steps below to add the subform you created to a form:

1. From Forms Designer, open the default form of a Problem Management phase (`pbm.problem.logging` is used as an example on Service Manager 9.3x).

2. Add a notebook Tab with the QC Integration caption.

3. Add a subform to the new tab with format `pbm.problem.logging`, which is displayed in the following screenshot:



4. Save the changes.

Add Format Control Calculations/Validations

Note: Steps in this topic are applicable if the Service Manager Process Designer (PD) Content Pack is not installed, or you have PD Content Pack 9.30.2 installed. Otherwise, skip this topic and refer to "Add Rule Set Calculations/Validations" on the next page for configurations in the PD Content Pack 9.30.3 environment.

To add format control calculations and validations, follow the steps below:

1. Open the format control record of the previous Problem Management form `PM.pc.ident.and.class`.
2. Click **Calculations**.
3. Add two rows with the following values:

Record	Parameter	Value
1	display	true
	initial	true
	calculation	$qcint.type.readonly=2;if (qcintegration.type in $file~=0) then ($qcint.type.readonly=1)
2	display	true
	initial	true
	calculation	$qcint.project.readonly=2;if (qcintegration.type in $file~=0 and not null(qcintegration.project in $file)) then ($qcint.project.readonly=1)

4. Click **Validations**.

5. Add one row with the following values:

No.	Parameter	Value
1	Validation	not null(qcintegration.project in $file)
2	Message	The Server/Domain/Project is required.
3	Add	qcintegration.type in $file~=0
4	Update	qcintegration.type in $file~=0
5	Set Focus to	qcintegration.project

6. Save your changes.

Add Rule Set Calculations/Validations

> **Note:** Steps in this topic are applicable for the Service Manager Process Designer (PD) Content Pack 9.30.3 only. Otherwise, refer to "Add Format Control Calculations/Validations" on the previous page for configurations in non-PD or PD 9.30.2 environment.

To add rule set calculations and validations, follow the steps below:

1. "Copy an Existing Workflow" on the next page

2. "Associate an Existing Problem Category with the New Workflow" on the next page

3. "Create New Rule Set for Initialization and Validation" on the next page

4. "Associate the New Workflow with the New Rule Set" on page 111

Copy an Existing Workflow

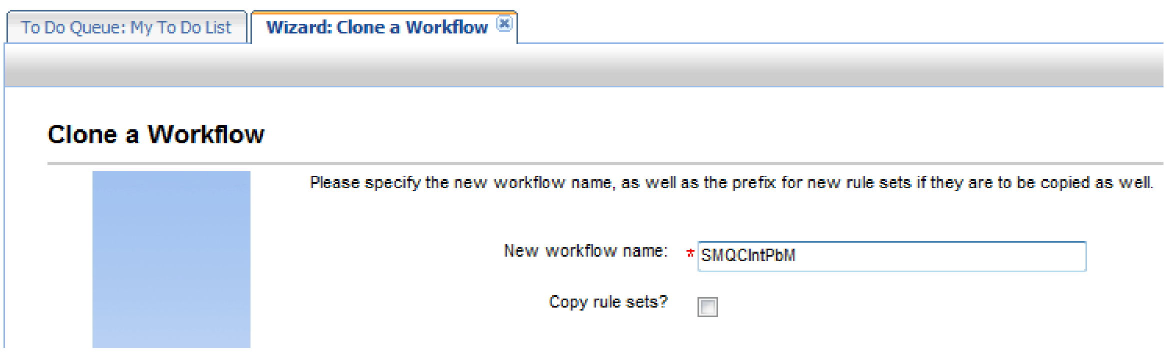
You can use copies of the existing workflows in another business process, or make changes to the HP proprietary workflow copies.

To copy an existing workflow, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Copy Existing Workflow**.

2. On the Clone a Workflow page, select the workflow you want to copy. For example, Problem.

3. Type `SMQCIntPbM` in the New workflow name field.



4. Select the Copy rule sets check box if you want to copy rule sets, and then type a rule set prefix.

5. Click **OK**.

The newly copied workflow appears in the list on the Clone a Workflow page.

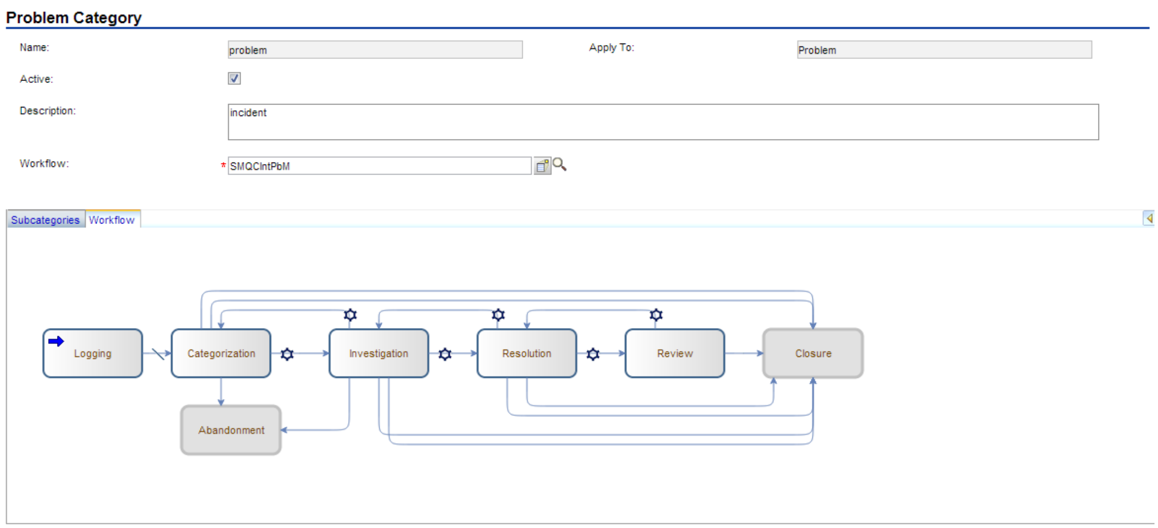
Associate an Existing Problem Category with the New Workflow

You can update existing problem categories, subcategories and areas and associate the updated categories with the new workflow so that they can be used in another business process. For more information, refer to *HP Service Manager – Process Designer Content Pack Administrator's Guide*.

To associate an existing change category with the new workflow, follow the steps below:

1. From the System Navigator, click **Problem Management** > **Configuration** > **Problem Categories**.

2. Click **Search**.
3. Select the problem category for which you want to add a workflow. For example, problem.
4. In the Problem Category page, remove the currently assigned workflow from the Workflow field.
5. Type `SMQCIntPbM` in the workflow field.
6. Click **Save** to associate the problem category with the workflow.



Create New Rule Set for Initialization and Validation

To create a new rule set for initialization, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Rule Sets**.
2. Type the values as follow:

Field	Value
ID	pbm.alm.int.init
Available as action	False
Name	Initialize for ALM integration in the Problem Record
Table name	rootcause
HP Proprietary	

3. Click **New** and **Save**.

4. Click **Add Rule**.

5. In the Select Rule Type page, click Run JavaScript.

6. In the Run JavaScript page, type the values as follow:

Field	Value
Rule Description	Run Javascript for initializing Integration type and project in the Problem Record
Statement	vars['$qcint.type.readonly'] = 2; vars['$qcint.project.readonly'] = 2; var _null=system.functions._null; var file = vars.$L_file; if(file["qcintegration.type"] !=0 && !_null(file["qcintegration.type"])) { vars['$qcint.type.readonly'] = 1 } if(file["qcintegration.type"] !=0 && !_null(file["qcintegration.project"])) { vars['$qcint.project.readonly'] = 1 }

7. Click **OK**.

8. Click **Save** and **Exit**.

To create a new rule set for validation, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Rule Sets**.

2. Type the values as follow:

Field	Value
ID	pbm.alm.int.validation

Field	Value
Available as action	False
Name	Validation for ALM integration in the Problem Record
Table name	rootcause
HP Proprietary	

3. Click **New** and **Save**.

4. Click **Add Rule**.

5. In the Select Rule Type page, click **Set Mandatory Fields**.

6. Refer to step 6 to step 13 as described in "Create New Rule Set for Initialization and Validation" on page 60.

Associate the New Workflow with the New Rule Set

To associate the new workflow with the new rule set, follow the steps below:

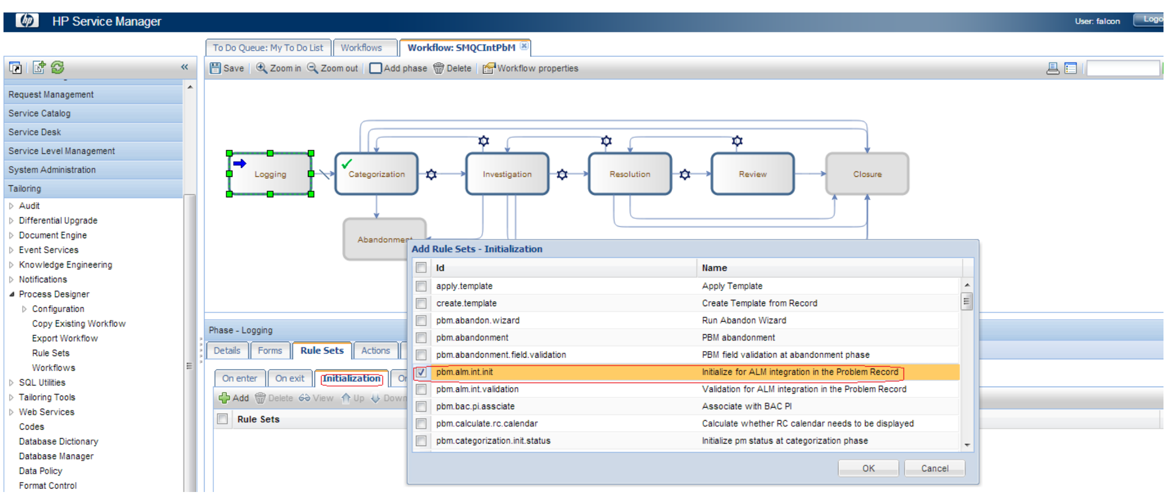
1. From the System Navigator, click **Problem Management** > **Configuration** > **Workflows**.

2. Select SMQCIntPbM in the workflows list.

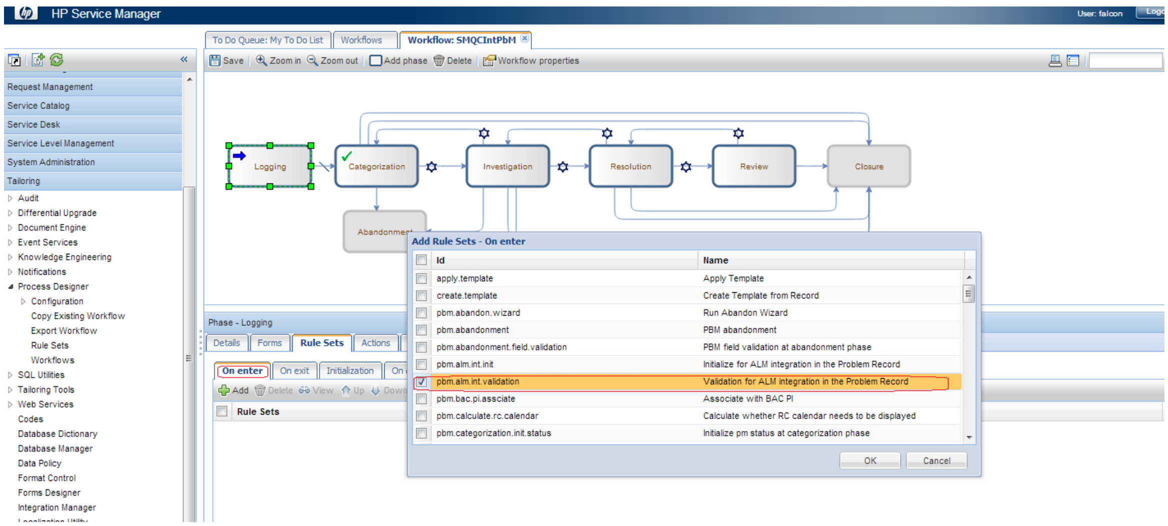
3. Select the first phase in the workflow graph.

4. Click **Rule Sets** tab > **Initialization** tab.

5. Click **Add** and select the pbm.alm.int.init rule set you just created.



6. Click **OK**.
7. Click **Rule Sets** tab > **On display** tab.
8. Repeat step 5 and 6.
9. Click **Rule Sets** tab > **On enter** tab.
10. Click **Add** and select the pbm.alm.int.validation rule set you just created.



11. Click **OK**.
12. Click **Save**.

Customizing the QC/ALM Defects Module

The steps for customizing the Defects module vary with different QC versions.

- "On QC 10 and Earlier" below
- "On ALM 11" on page 116

On QC 10 and Earlier

To customize the Defects module on Quality Center 10 or earlier, perform the following tasks:

1. "Add Fields" on the next page
2. "Add Tabs" on the next page
3. "Add Fields to Tabs" on page 115

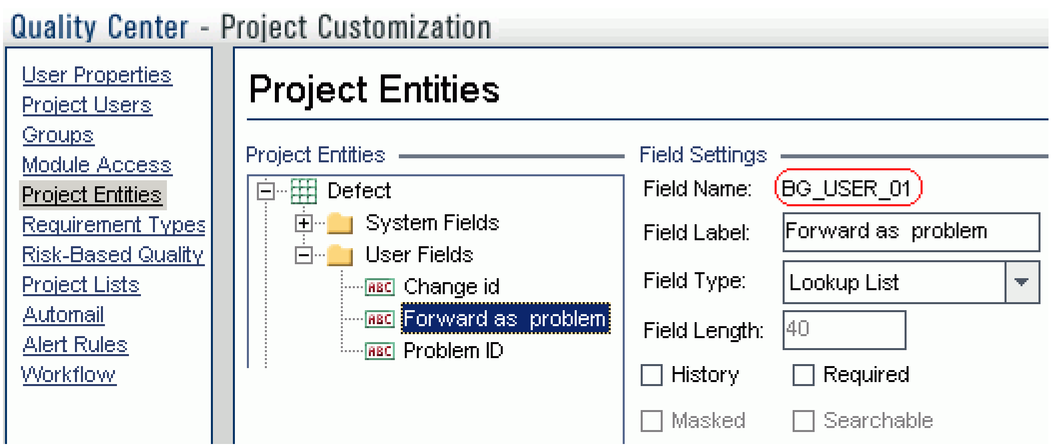
Add Fields

To add the required fields for Defect module customization:

1. Log on to QC as a project administrator.
2. Click **Tools / Customize**. The "QC - Project Customization" module opens.
3. Add the following fields for the defect entity in Project Entities (*XX* and *XY* are sequential numbers auto-generated by QC).

Field Name	Field Label	Field Type	Remarks
BG_USER_*XX*	Problem ID	String	
BG_USER_*XY*	Created from	String	

The following figure shows an example project entity.



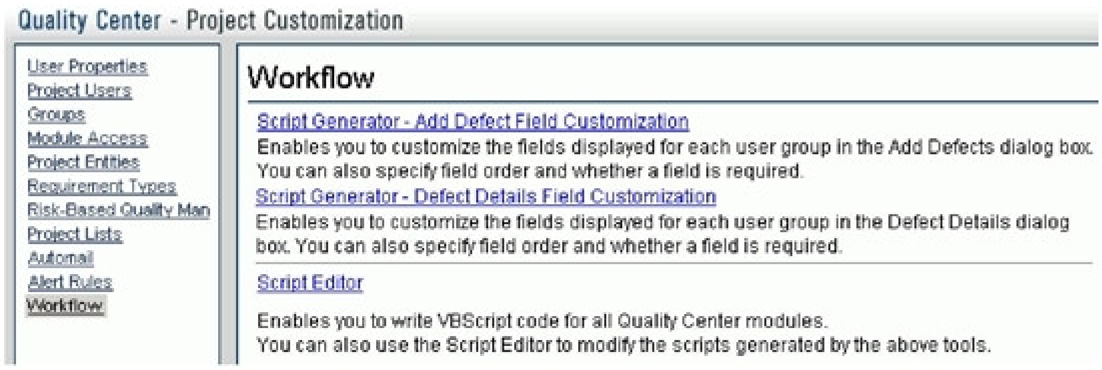
Note: The data type requirements for QC fields are described in "Matching Types" on page 33.

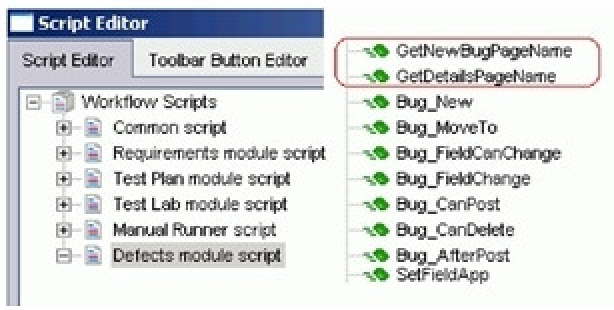
Add Tabs

To add tabs to the Defect form and show fields on these tabs:

1. In "QC - Project Customization", click **Workflow** > **Script Editor**.

2. Select **Defects module script**.





3. Add the following code to the **GetNewBugPageName** event procedure (which is triggered before QC opens the Add Defect dialog box).

```
select case PageNum

  case "2"

    GetNewBugPageName = "SM Integration (New)"

end select
```

> **Note:** The parameter 2 specifies tab 2 (the second tab). For a new bug, the tab name is SM Integration (New).

4. Add the following code to the **GetDetailsPagename** event procedure (which is triggered before QC displays the Defect Details dialog box).

```
select case PageNum

  case "2"

    GetDetailsPageName = "SM Integration (Details)"

end select
```

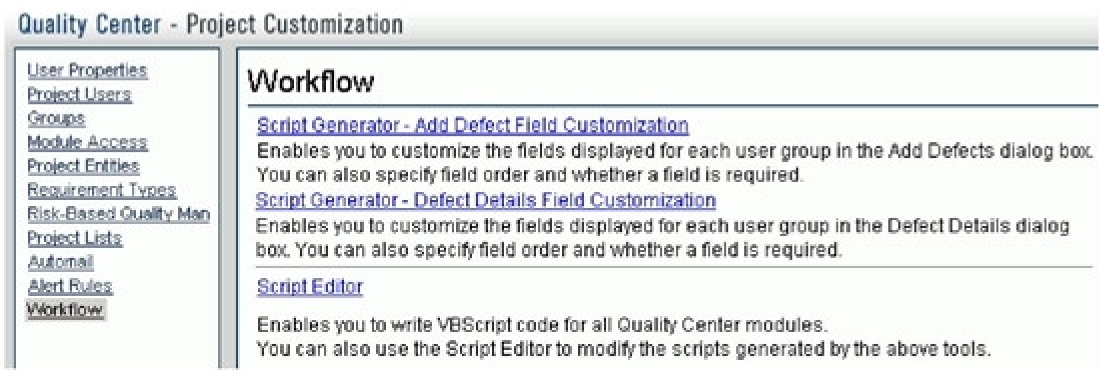
Note: The parameter 2 specifies tab 2 (the second tab). For an existing defect, the tab name is SM Integration (Details).

Add Fields to Tabs

To add fields to tabs:

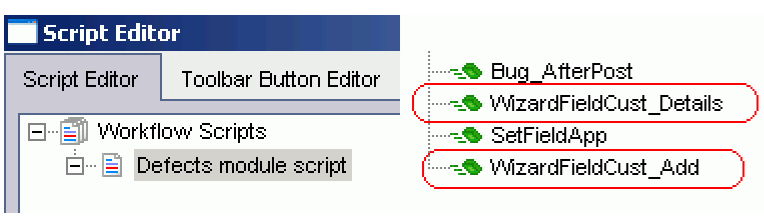
1. In "QC - Project Customization", click **Workflow** > **Script Editor**.

2. Select **Defects module script**.



3. If **WizardFieldCust_Details** and **WizardFieldCust_Add** are not found in the list, do the following to generate these two methods.
   a. **Script Generator - Add Defect Field Customization**

   b. **Script Generator - Defect Details Field Customization**



4. Add the following code to the WizardFieldCust_Details event procedure.
```
SetFieldApp "BG_USER_XX", True, False, 1, 0

SetFieldApp "BG_USER_XY", True, False, 1, 1
```
   The parameter values are:

   - Field name (`BG_USER_`*XX*, where *XX* consists of two digits)
   - Visible (True)
   - Required (False)
   - Page number (start from `0`)
   - View order (start from `0`)

5. Add the following code to the WizardFieldCust_Add event procedure.
```
SetFieldApp "BG_USER_XX", True, False, 1, 0

SetFieldApp "BG_USER_XY", True, False, 1, 1
```
6. Set the **Readonly** fields by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines:
```
Bug_Fields.Field("BG_USER_XX").IsReadOnly=True

Bug_Fields.Field("BG_USER_XY").IsReadOnly=True
```
7. Save your changes.

On ALM 11

On ALM 11, you only need to add new fields directly to the Details tab of the `Defect` form.

To customize the ALM Defects module, perform the following task:

- "Add Fields" below

Add Fields

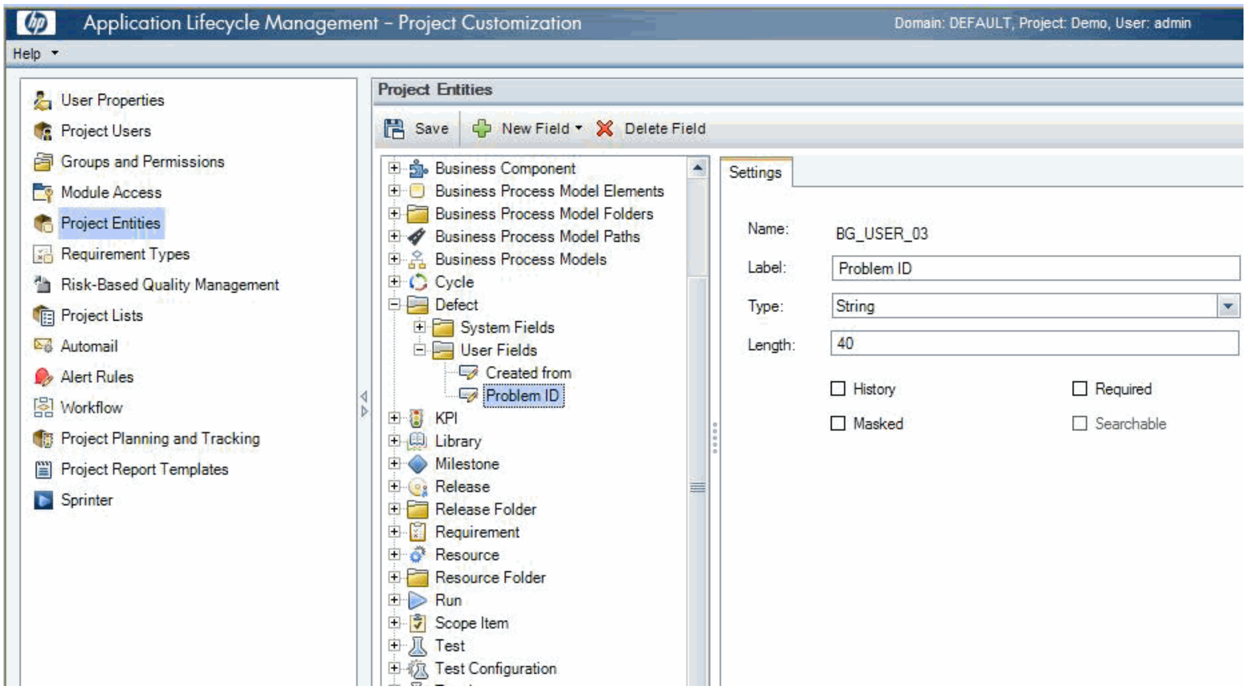
To add the required fields for Defect module customization:

1. Log on to ALM as a project administrator.

2. Click **Tools / Customize**. The "Application Lifecycle Management - Project Customization" module opens.

3. Add the following fields for the defect entity in Project Entities (*XX* and *XY* are sequential numbers auto-generated by ALM).

Field Name	Field Label	Field Type
BG_USER_*XX*	Problem ID	String
BG_USER_*XY*	Created from	String



> **Note:** The data type requirements for QC/ALM fields are described in "Matching Types" on page 33.

4. Click **Workflow** > **Script Editor**.

5. Select **Defects module script**.

6. Set the **Readonly** fields by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines:

```
Bug_Fields.Field("BG_USER_XY").IsReadOnly=True

Bug_Fields.Field("BG_USER_XZ").IsReadOnly=True
```

7. Save your changes.

Configuring Links in QC/ALM Synchronizer

To configure and test a link in the QC/ALM synchronizer, perform the following tasks:

1. "Specify Endpoints / Type of Link" below
2. "Define Field Mappings" below
3. "Define Events" on the next page
4. "Test the Link" on page 120

Specify Endpoints / Type of Link

Specify the connection properties as described in "Create a Link" with the following settings specific for this type of link:

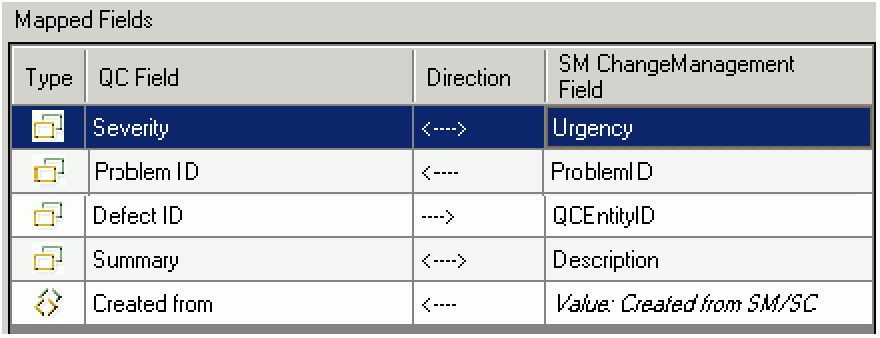
1. Step 1: “Endpoint 2 type” = **SM ProblemManagement**.
2. Step 3: “Service URL” = **http://<*service_manager_host*>:<*port*>/sc62server/PWS/QCIntProblemService.wsdl**
3. Step 4: “Select entity types” = **Problem by Defect** (this is the only available selection).

Define Field Mappings

If the Service Manager Process Designer (PD) Content Pack is not installed, see the following summary for basic field mappings:

QC	Direction	SM	Constant value	Remarks
Problem ID	<-	ProblemNumber		
Defect ID	->	QCEntityID		Synchronize back on create: Yes
Created from			Created from SM/SC	

Example field mappings are shown in the following screenshot:



Mapped Fields

Type	QC Field	Direction	SM ChangeManagement Field
	Severity	<---->	Urgency
	Problem ID	<----	ProblemID
	Defect ID	---->	QCEntityID
	Summary	<---->	Description
	Created from	<----	*Value: Created from SM/SC*

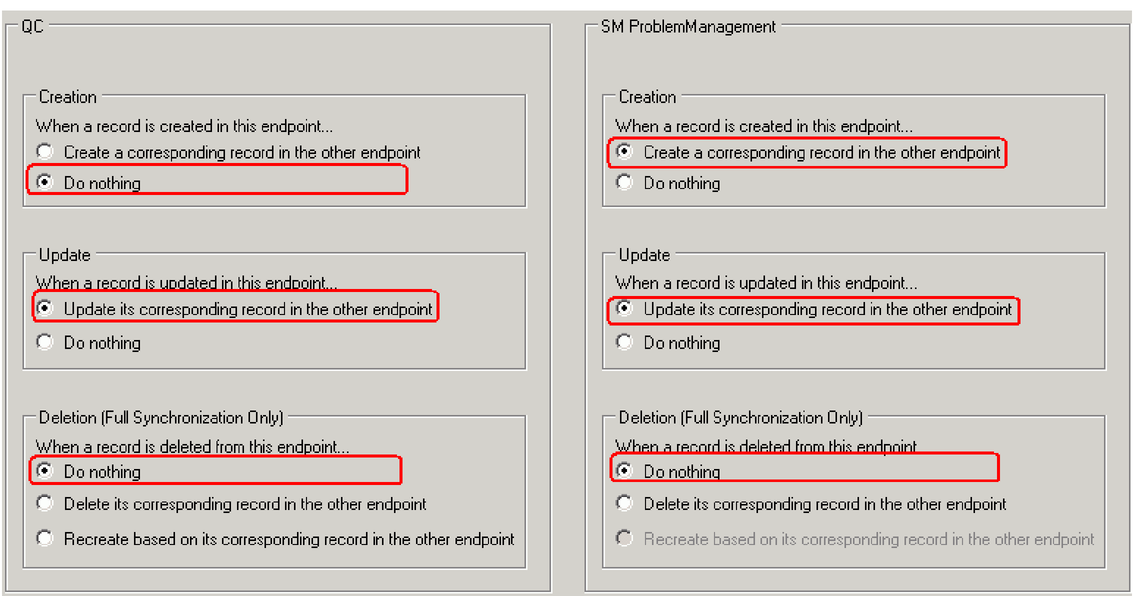
If the Service Manager Process Designer (PD) Content Pack is installed, status drive the business process of Help Desk in Process Designer Content Pack 9.30.3. You need to pay attention to the value mapping about the **Status** field between Service Manager and ALM.

Define Events

The following table lists the event settings for the two endpoints:

Events Tab Settings	QC Action (Event)	SM Action (Event)
Creation	Do nothing.	Create a corresponding record in the other endpoint.
Update	Update its corresponding record in the other endpoint.	Update its corresponding record in the other endpoint.
Deletion	Do nothing.	Do nothing.

The following screenshot displays the settings:



Test the Link

To test the link:

Note:

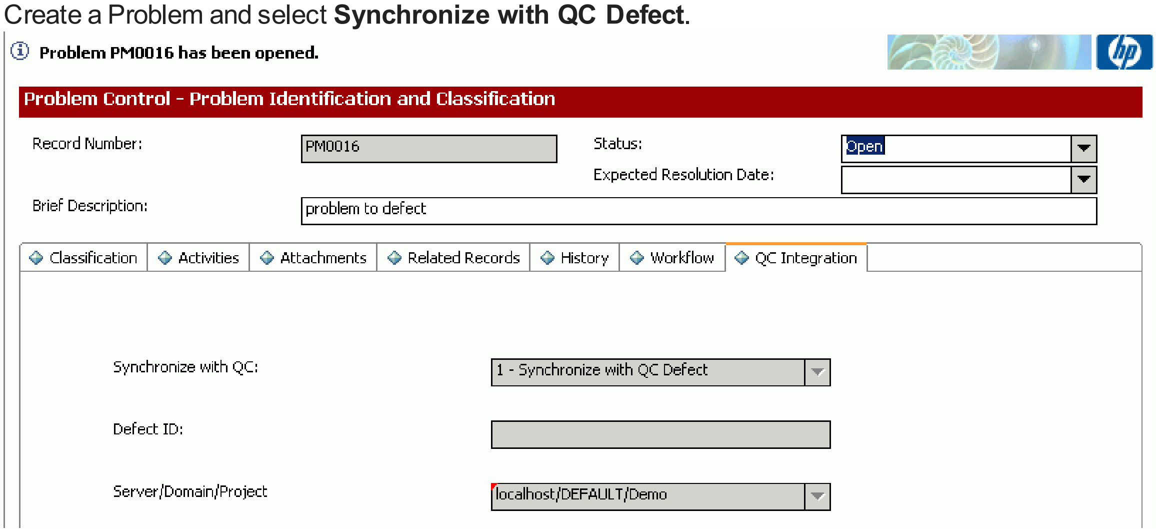
1. A mandatory field (in either SM and QC) does not accept a null value. Synchronization may fail if a mandatory field is mapped to a field that can be null.

2. The following sample steps are for your reference only. The exact steps required on your system may differ significantly. The phase in which the QC Integration tab appears may be different on your system.

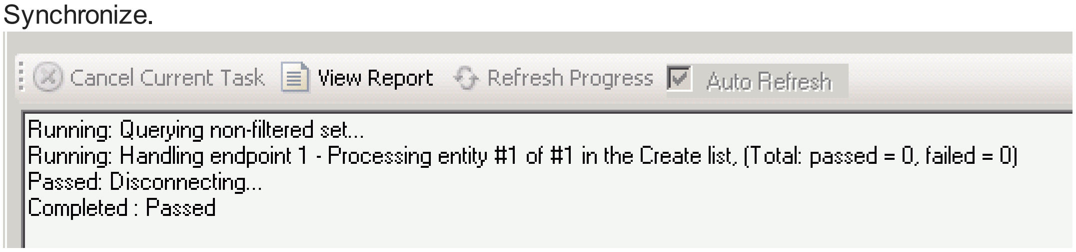
1. Save the configuration (an integrity check is automatically run).

2. Click **Enable Link**.

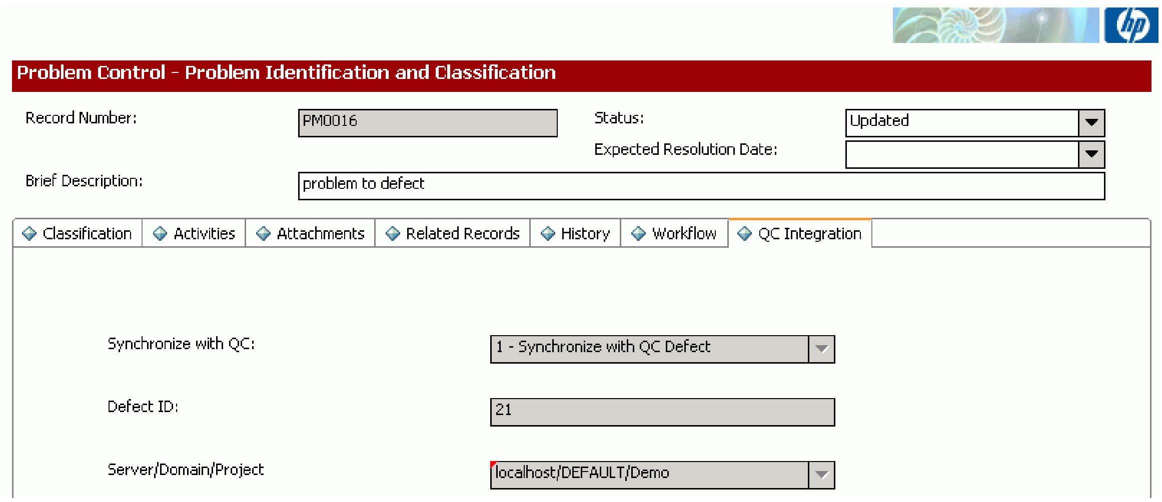
3. Create a Problem and select **Synchronize with QC Defect**.



4. Synchronize.



5. View the Problem in SM.



6. View the defect in QC.

Note: In ALM 11, the Problem ID field and the Created from field reside on the Details tab of the Defect form.

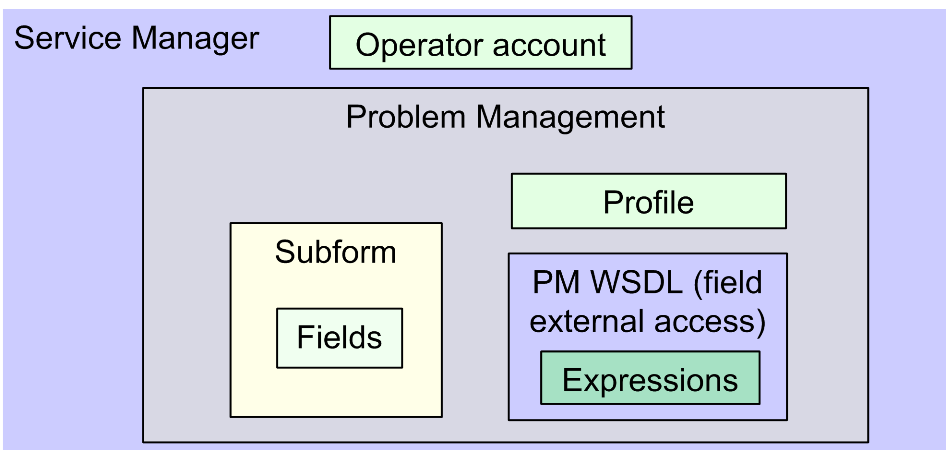
Chapter 9: QC/ALM Defect -> SM Problem

This chapter describes how to synchronize QC/ALM Defects with SM Problems ("Defect -> Problem ").

This chapter includes:

Customizing Service Manager/ServiceCenter for Problem Management

The following diagram summarizes the components which require tailoring in Service Manager/ServiceCenter.



To customize Service Manager/ServiceCenter for Problem Management, perform the following tasks:

1. "Add Fields" on the next page
2. "Specify the External Access Definition on Service Manager" on the next page or "Specify the External Access Definition on ServiceCenter" on page 127
3. "Create a Subform" on page 132
4. "Add the Subform to a Form" on page 132

Add Fields

Add the following required fields to the `rootcause` table. Do not change them.

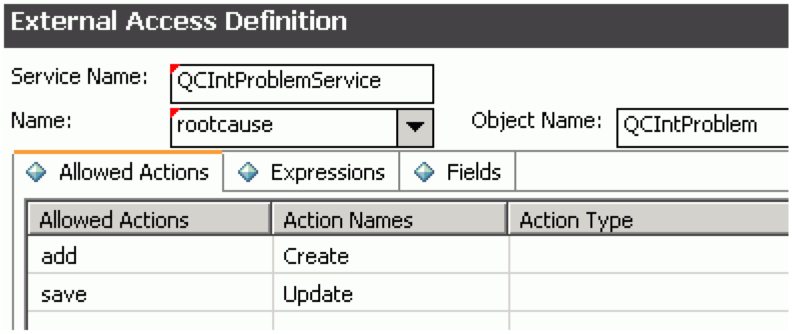
Field	Type	
	Service Manager 7.0x or later	ServiceCenter
qcintegration.type	Character	Text
qcintegration.id	Number	Decimal
qcintegration.project	Character	Text
qcintegration.created.from	Character	Text

Note: The data type requirements for SM fields are described in "Matching Types" on page 33.

Specify the External Access Definition on Service Manager

To specify the External Access Definition on Service Manager:

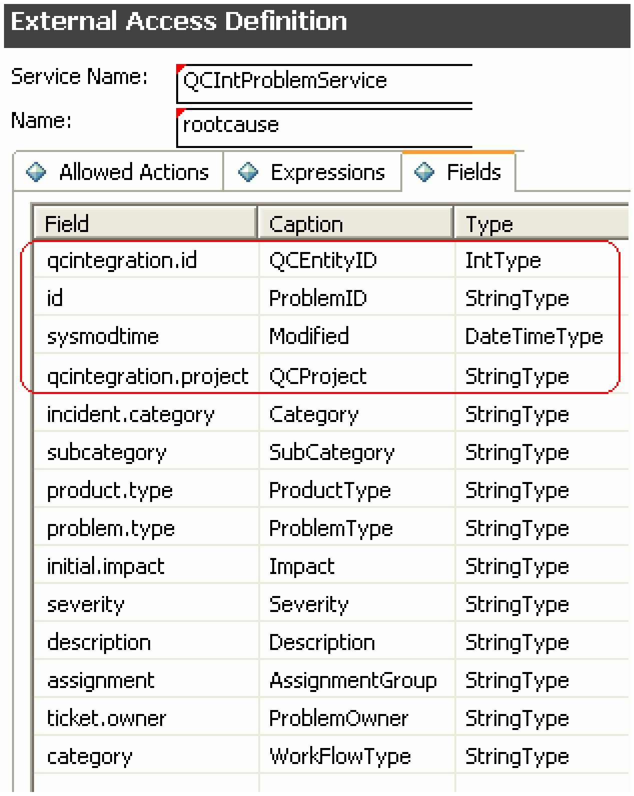
1. Create a custom External Access Definition `QCIntProblemService` by clicking **Tailoring** > **WSDL configuration** on Service Manager 7.0x; or clicking **Tailoring** > **Web Services** > **WSDL configuration** on Service Manager 7.1x or later with the following values:
   - Service Name: QCIntProblemService
   - Name: rootcause
   - Object Name: QCIntProblem
   - Allowed Actions / Action Names:
     - add / Create
     - save / Update



Note: The above values are required (Do NOT change them).

2. Enable the required fields in the web service.

Field	Caption	Type
id	ProblemID	StringType
sysmodtime	Modified	DateTimeType
qcintegration.id	QCEntityID	IntType
qcintegration.project	QCProject	StringType
qcintegration.type	QCIntegrationType	StringType
qcintegration.created.from	CreatedFrom	StringType
current.phase	CurrentPhase	StringType
category	WorkFlowType	StringType



Field	Caption	Type
qcintegration.id	QCEntityID	IntType
id	ProblemID	StringType
sysmodtime	Modified	DateTimeType
qcintegration.project	QCProject	StringType
incident.category	Category	StringType
subcategory	SubCategory	StringType
product.type	ProductType	StringType
problem.type	ProblemType	StringType
initial.impact	Impact	StringType
severity	Severity	StringType
description	Description	StringType
assignment	AssignmentGroup	StringType
ticket.owner	ProblemOwner	StringType
category	WorkFlowType	StringType

Note: The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on). The above values are required (Do NOT change them).

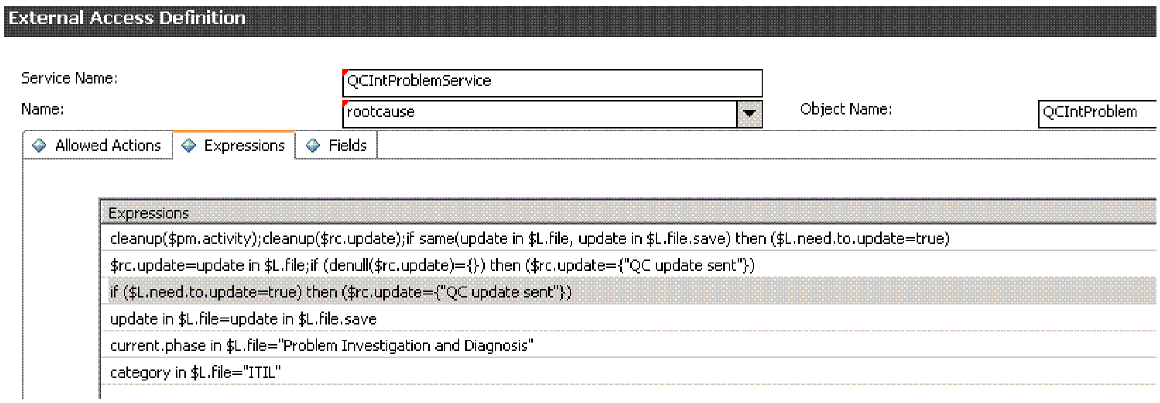
3. Define expressions for the web service .

Note:
a. Problem Management requires an activity update provided with each save and for better flow, and this activity update will be hard-coded with the following expressions.

b. Expressions 1 to 4 are for fixing an update issue with the Problem Management web service. For more information, see *SCR 41399*.

No	Expression
1	cleanup($pm.activity);cleanup($rc.update);if same(update in $L.file, update in $L.file.save) then ($L.need.to.update=true)

No	Expression
2	$rc.update=update in $L.file;if (denull($rc.update)={}) then ($rc.update={"QC update sent"})
3	if ($L.need.to.update=true) then ($rc.update={"QC update sent"})
4	update in $L.file=update in $L.file.save



Specify the External Access Definition on ServiceCenter

To specify the External Access Definition on ServiceCenter:

1. Click **System Defintion** > **Tables** > **rootcause** > **Fields and keys definitions for the rootcause table** and change the settings of these fields.

No.	Field	Include in API	Field name in API	Field data type in API	Remarks
1	id	Y	ProblemID	StringType	
2	sysmodtime	Y	Modified	DateTimeType	
3	qcintegration.id	Y	QCEntityID	IntType	
4	qcintegration.project	Y	QCProject	StringType	
5	qcintegration.type	Y	QCIntegrationType	StringType	
6	qcintegration.created.from	Y	CreatedFrom	StringType	
7	current.phase	Y	CurrentPhase	StringType	
8	category	Y	WorkflowType	StringType	

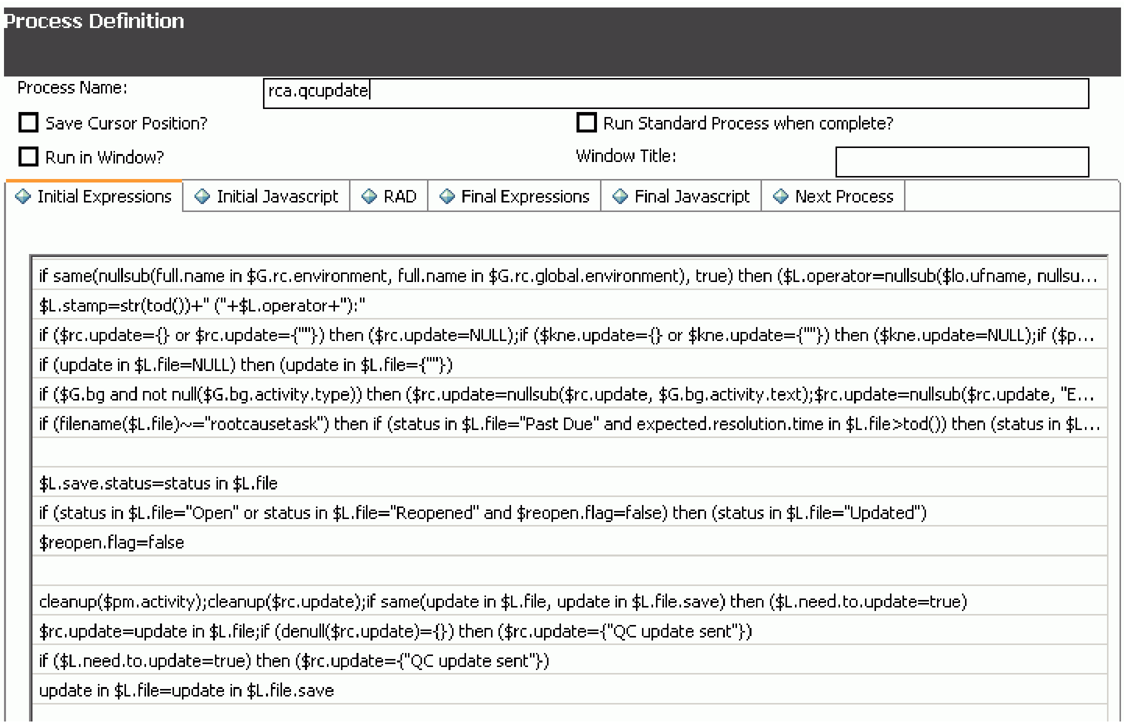
Note: The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on).

2. Create a new Process record named `rca.qcupdate`.
   a. Click **Utilities** > **Tools** > **Document Engine** > **Process**. Type Process Name `rca.save` and then click **Search**.

   b. Change the name to `rca.qcupdate` and click **Add**.

c. Append the following lines to the Initial Expressions tab, and click **Save**.

No.	Expression
1	cleanup($pm.activity);cleanup($rc.update);if same(update in $L.file, update in $L.file.save) then ($L.need.to.update=true)
2	$rc.update=update in $L.file;if (denull($rc.update)={}) then ($rc.update={"QC update sent"})
3	if ($L.need.to.update=true) then ($rc.update={"QC update sent"})
4	update in $L.file=update in $L.file.save



3. Update the `rca.view` state record.

   a. Add the following row to the `Non-base methods` table, and then click **Save**.

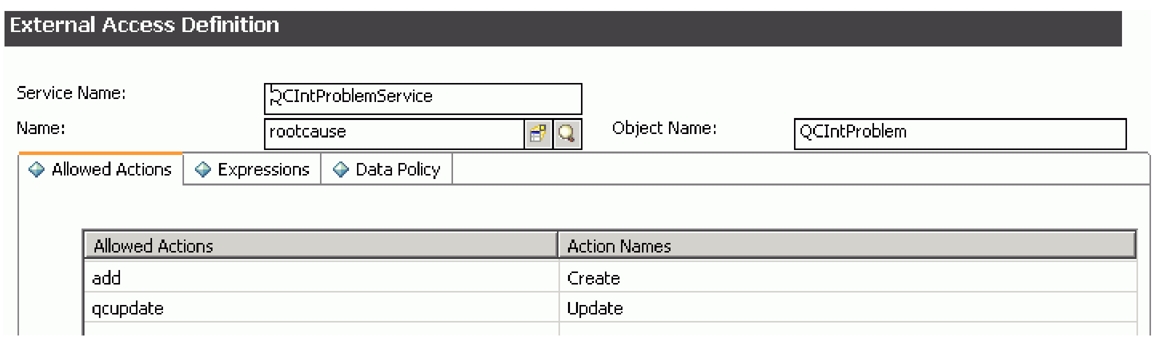
Display Action	Process Name	Condition	Save First
qcupdate	rca.qcupdate	$L.mode~="close" and $L.mode~#"add"	false

4. Update the Problem Management integration web service.

   a. Click **Toolkit** > **WSDL Configuration**. In the Name field type `rootcause`, and then click **Search**.

   b. Update the External Access Definition as follows based on table `rootcause`.

No.	Field	Value
1	Service Name	QCIntProblemService
2	Object Name	QCIntProblem
3	Allowed Actions/ Action Names	add/Create qcupdate/Update



Note: Delete all Allowed Actions without an Action Name.

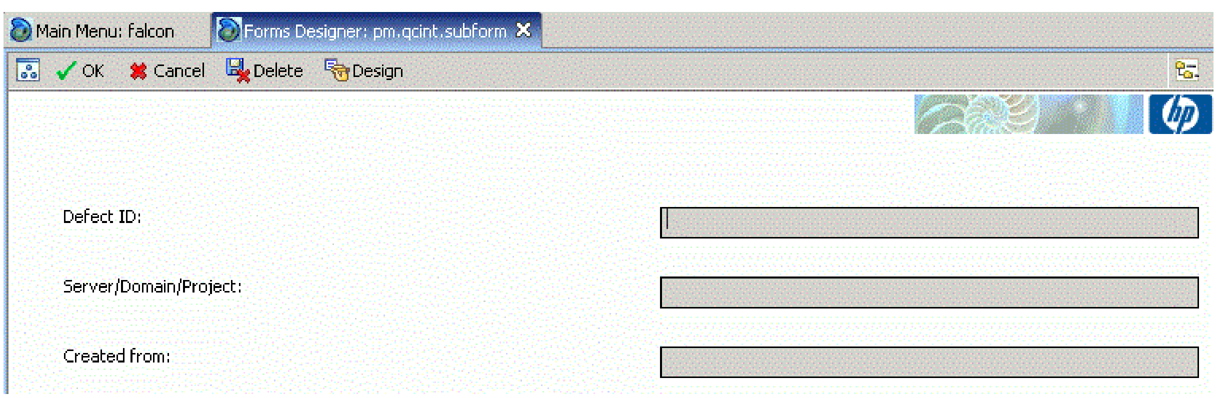
Create a Subform

To create a subform:

Click **Tailoring** > **Forms Designer** on Service Manager7.0x or later; or click **Toolkit** > **Forms Designer**on ServiceCenter to create the `pm.qcint.subform` subform with the following components:

> **Note:** Click **No** when the system message “`Do you want to use Form Wizard?`” appears.

No.	Component	Properties
1	Label	**Caption**: Defect ID:
2	Text	• **Input**: qcintegration.id • **Read-Only**: Yes
3	Label	**Caption**: Server/Domain/Project:
4	Text	• **Input**: qcintegration.project • **Read-Only**: Yes
5	Label	**Caption**: Created from:
6	Text	• **Input**: qcintegration.created.from • **Read-Only**: Yes



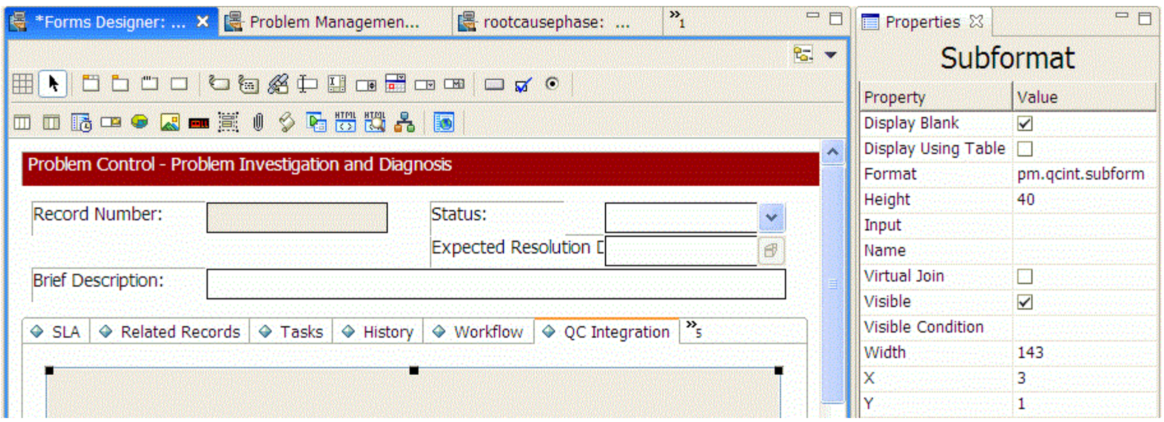
Add the Subform to a Form

If the Service Manager Process Designer (PD) Content Pack is not installed, or you have PD Content Pack 9.30.2 installed, follow the steps below to add the subform you created to a form:

1. From Forms Designer, open the default form of a Problem Management phase (`PM.pc.ident.and.class` is used as an example in ServiceCenter 6.2/Service Manager 7.0x).

2. Add a notebook tab with the QC Integration caption.

3. Add a subform to the new tab with format `pm.qcint.subform`, which is displayed in the following screenshot:



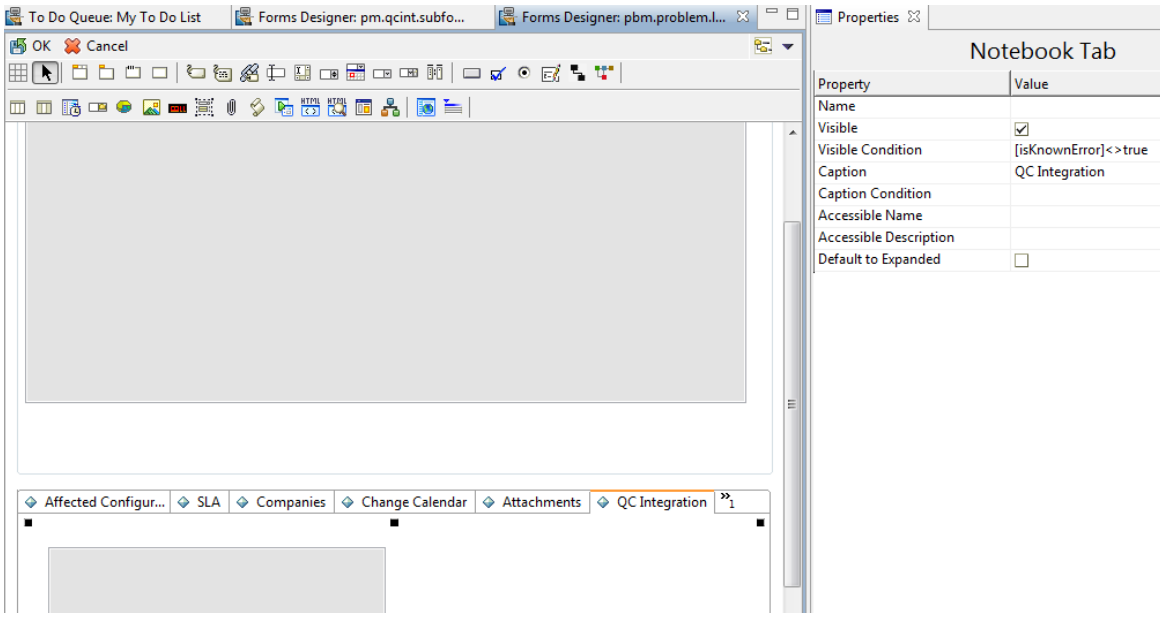
4. Save the changes.

> **Note:** If the error message "`Format 'pm.qcint.subform' not found (display, show.rio)`" appears, restart the SM server to enable the subform.

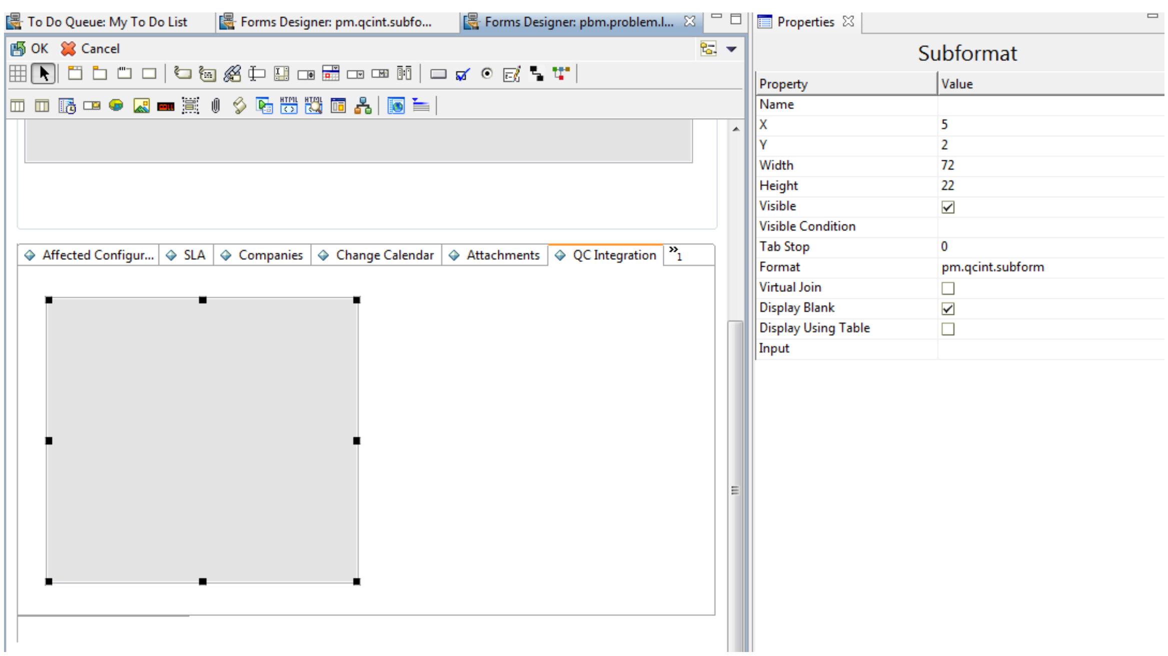
If the Service Manager Process Designer (PD) Content Pack 9.30.3 is installed, follow the steps below to add the subform you created to a form:

1. From Forms Designer, open the default form of a Problem Management phase (`pbm.problem.logging` is used as an example on Service Manager 9.3x).

2. Add a Notebook tab with the QC Integration caption and then set the value of Visible Condition to `[isKnownError]<>true`.



3. Add a subform to the new tab with format `pbm.problem.logging`, which is displayed in the following screenshot:



4. Save the changes.

Customizing the QC/ALM Defects Module

The steps for customizing the Defects module vary with different QC versions.

- "On QC 10 and Earlier" below
- "On ALM 11" on page 140

On QC 10 and Earlier

To customize the Defects module on Quality Center 10 or earlier, perform the following tasks:

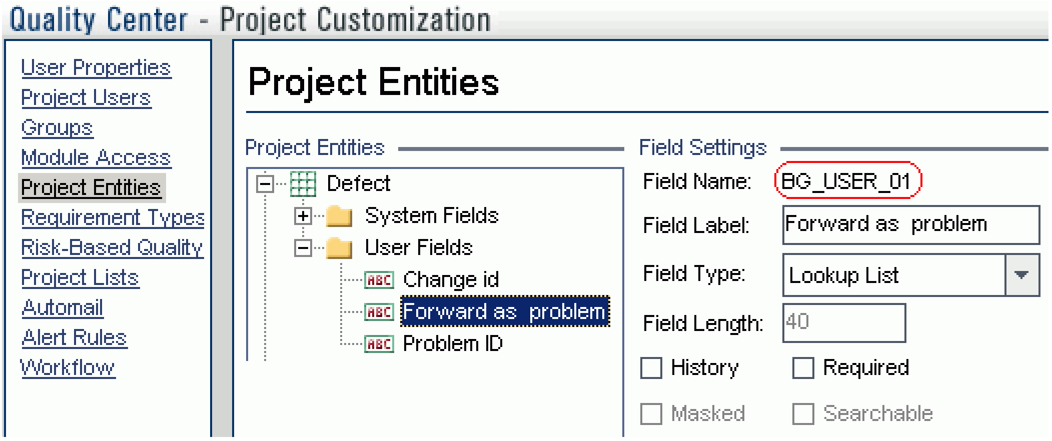
1. "Add Fields" below
2. "Add Tabs" on the next page
3. "Add Fields to Tabs" on page 137
4. "Create a View" on page 139
5. "Verify" on page 140

Add Fields

To add the required fields for Defect module customization:

1. Log on to QC as a project administrator.
2. Click **Tools / Customize**. The “QC - Project Customization” module opens.
3. Add the following fields for the defect entity in Project Entities (*XX* and *XY* are sequential numbers auto-generated by QC).

Field Name	Field Label	Field Type	Remarks
BG_USER_*XX*	Synchronize with SM Problem	Lookup List/YesNo	Select the “Verify Value” check box
BG_USER_*XY*	Problem ID	String	

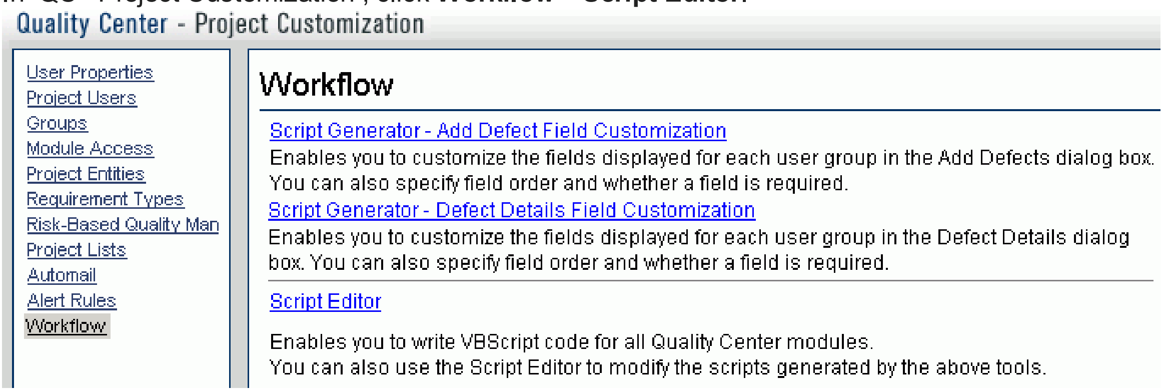


Note: The data type requirements for QC fields are described in "Matching Types" on page 33.

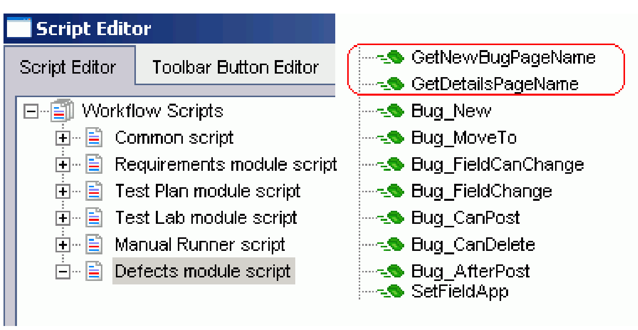
Add Tabs

To add tabs to the Defect form and show fields on these tabs:

1. In “QC - Project Customization”, click **Workflow** > **Script Editor**.



2. Select **Defects module script**.



3. Add the following code to the **GetNewBugPageName** event procedure (which is triggered before QC opens the Add Defect dialog box).

```
select case PageNum

  case "2"

    GetNewBugPageName = "SM Integration (New)"

end select
```

> **Note:** The parameter `2` specifies tab 2 (the second tab). For a new bug, the tab name is SM Integration (New).

4. Add the following code to the **GetDetailsPagename** event procedure (which is triggered before QC displays the Defect Details dialog box).

```
select case PageNum

  case "2"

    GetDetailsPageName = "SM Integration (Details)"

end select
```

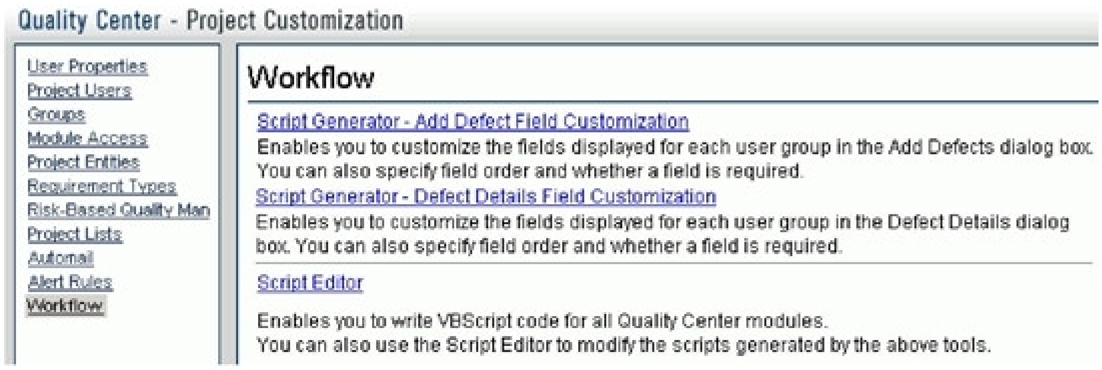
> **Note:** The parameter `2` specifies tab 2 (the second tab). For an existing defect, the tab name is SM Integration (Details).

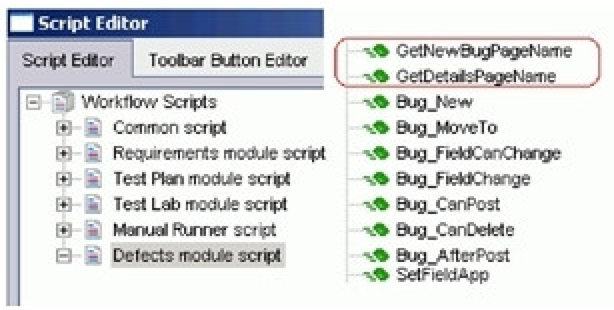
Add Fields to Tabs

To add fields to tabs:

1. In "QC - Project Customization", click **Workflow** > **Script Editor**.

2. Select **Defects module script**.

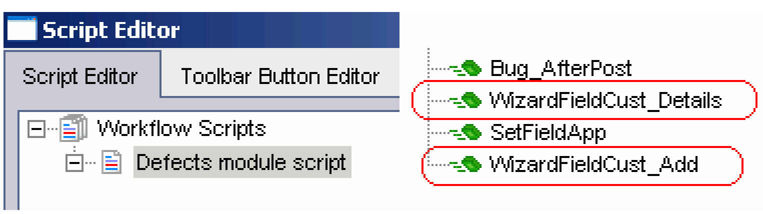




3. If **WizardFieldCust_Details** and **WizardFieldCust_Add** are not found in the list, do the following to generate these two methods.

   a. **Script Generator - Add Defect Field Customization**

   b. **Script Generator - Defect Details FieldCustomization**



4. Add the following code to the **WizardFieldCust_Details** event procedure.

```
SetFieldApp "BG_USER_XX", True, False, 1, 0

SetFieldApp "BG_USER_XY", True, False, 1, 1
```

   The parameters are:

- Field name (BG_USER_*XX*, where *XX* consists of two digits)
- Visible (True)
- Required (False)
- Page number (start from `0`)
- View order (start from `0`)

5. Add the following code to the **WizardFieldCust_Add** event procedure.

```
SetFieldApp "BG_USER_XX", True, False, 1, 0

SetFieldApp "BG_USER_XY", True, False, 1, 1
```

6. Set the **Readonly** fields by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines:

```
if (Bug_Fields("BG_USER_XX").Value="Y") then

  Bug_Fields("BG_USER_XX").IsReadOnly=True

end if

Bug_Fields.Field("BG_USER_XY").IsReadOnly=True
```

   The `if` loop above marks the field “Synchronize with SM Problem” as read-only after selected and saved.

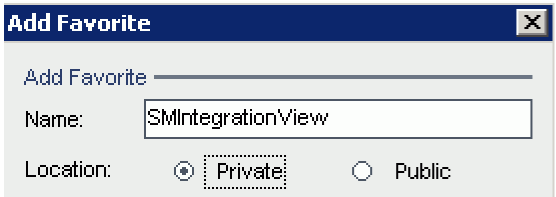
7. Save your changes.

Create a View

To create a view:

1. Log on to QC with the integration account `SMQCIntUser`.
2. In the Defects module, click **View / Filter/Sort / Set Filters/Sort**. The purpose of this view is to make the QC Synchronizer correctly filter those defects to be synchronized to SM as Problems.
3. Set **Synchronize with SM Problem** to **Y**.
4. Add a view to Favorites:
   - **Name**: SMIntegrationView

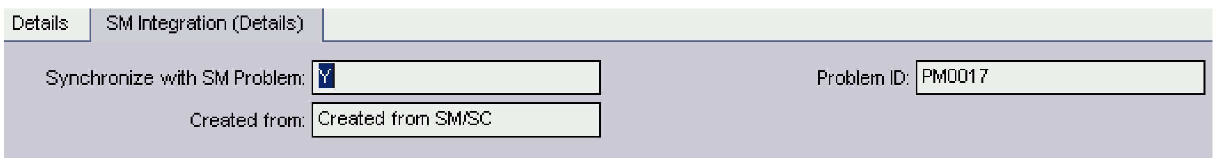
- **Location**: Private



In QC Synchronizer this view will be selected as the QC data filter. Without this filter, QC defects cannot be forwarded to SM as Problems.

Verify

Refer to the following screenshot to verify whether the Defects module on Quality Center 10 or earlier is customized successfully:



On ALM 11

On ALM 11, you only need to add new fields directly to the Details tab of the `Defect` form.

To customize the ALM Defects module, perform the following task:

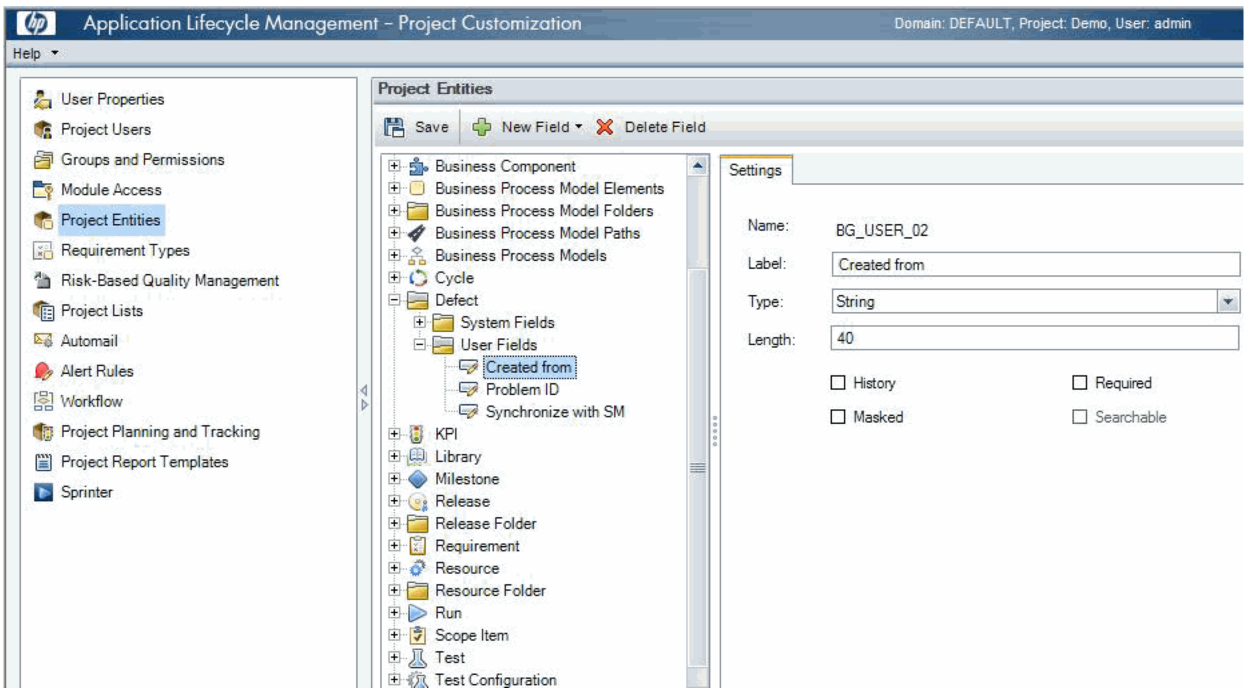
1. "Add Fields" below
2. "Create a View" on page 142
3. "Verify" above

Add Fields

To add the required fields for Defect customization:

1. Log on to ALM as a project administrator.
2. Click **Tools / Customize**. The “Application Lifecycle Management - Project Customization" module opens.
3. Add the following fields for the defect entity in Project Entities (*XX* and *XY* are sequential numbers auto-generated by ALM).

Field Name	Field Label	Field Type	Remarks
BG_USER_ *XX*	Synchronize with SM Problem	Lookup List/YesNo	Select the “Verify Value” check box
BG_USER_ *XY*	Problem ID	String	



Note: The data type requirements for QC/ALM fields are described in "Matching Types" on page 33.

4. Click **Workflow** > **Script Editor**.

5. Choose **Defects module script**.

6. Set the **Readonly** fields by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines:

```
if (Bug_Fields("BG_USER_XX").Value="Y") then
  Bug_Fields("BG_USER_XX").IsReadOnly=True
end if
Bug_Fields.Field("BG_USER_XY").IsReadOnly=True
```

The `if` loop above marks the field "Synchronize with SM Problem" as read-only after selected and saved.

7. Save your changes.

Create a View

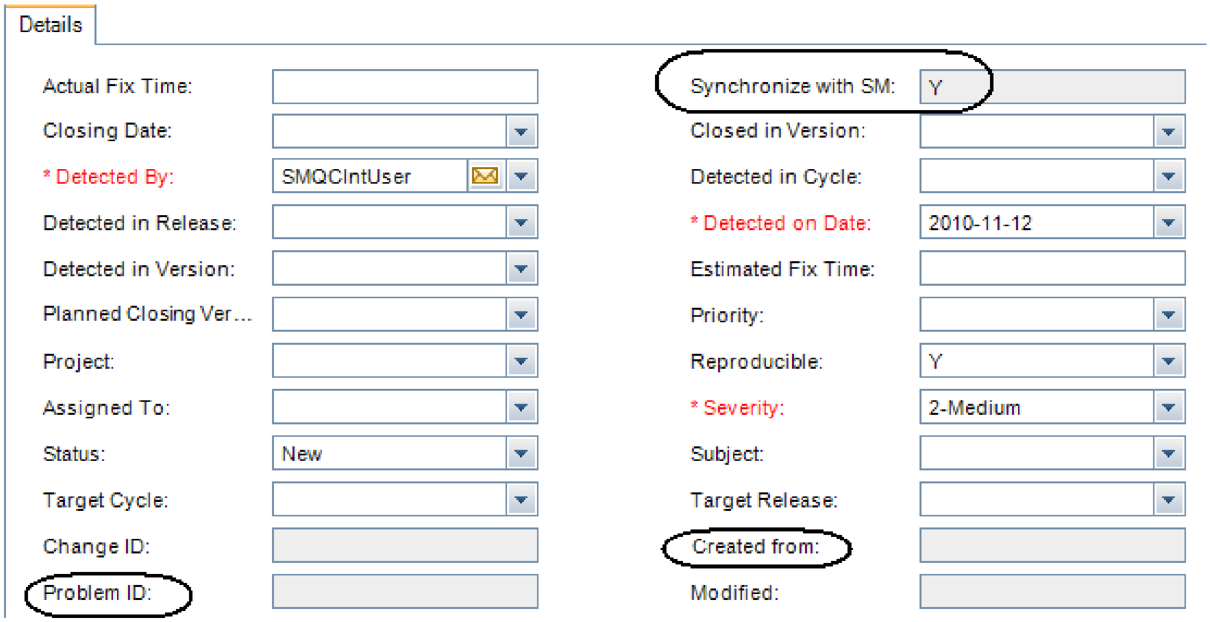
To create a view:

1. Log on to ALM with the integration account `SMQCIntUser`.
2. In the Defects module, click **View / Filter/Sort / Set Filters/Sort**. The purpose of this view is to make ALM Synchronizer correctly filter those defects to be synchronized to SM as problems.
3. Set **Synchronize with SM Problem** to **Y**.
4. Add a view to Favorites:
   - **Name**: SMIntegrationView
   - **Location**: Private

In ALM Synchronizer this view will be selected as the ALM data filter. Without this filter, ALM defects cannot be forwarded to SM as Problems.

Verify

Open a new defect in ALM, select **Y** in the **Synchronize with SM** field, and click **Save**. If the Defects module on ALM 11 is customized successfully, the Defect form is displayed as follow:



Configuring Links in QC/ALM Synchronizer

To configure and test a link in the QC/ALM synchronizer, perform the following tasks:

- "Specify Endpoints / Type of Link" below
- "Define Filters" on the next page
- "Define Field Mappings" on the next page
- "Define Events" on page 150
- "Test the Link" on page 150

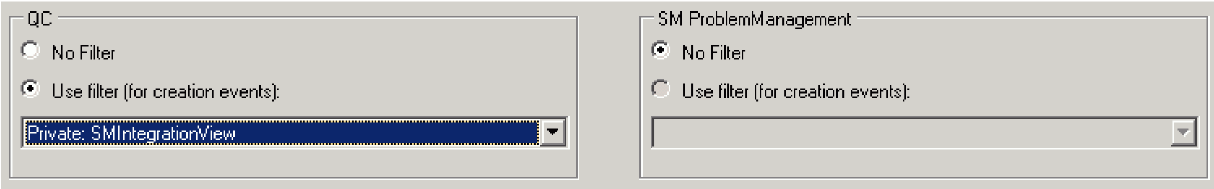
Specify Endpoints / Type of Link

Specify the connection properties as described in "Create a Link" with the following settings specific for this type of link:

1. Step 1: “Endpoint 2 type” = **SM ProblemManagement**.
2. Step 2 “Configuration File Name” = **configuration_file_default.xml**
3. Step 3: “Service URL” = **http://<*service_manager_ host*>:<*port*>/sc62server/PWS/QCIntProblemService.wsdl**
4. Step 4: “Select entity types” = **Problem by Defect** (this is the only available selection).

Define Filters

On the Filters tab, select filter **SMIntegrationView** for the QC endpoint. If the filter is not available, see "Create a View" on page 139.



Define Field Mappings

Basic field mappings are summarized below:

QC	Direction	SM	Constant Value	Remarks
Problem ID	<-	ProblemID		
Defect ID	->	QCEntityID		**Synchronize back on create**: Yes
		QCIntegrationType	1	
		CreatedFrom	Created from QC	
QCProject	<-		(your setup)	This constant value should be the same as that for the "QC Project" parameter in the Connectivity tab.
	->	CurrentPhase	XXX	Replace *XXX* with a valid phase name, such as "Problem Investigation and Diagnosis". This field mapping is optional for Service Manager 7.10.
	->	WorkFlowType	YYY	Replace *YYY* with a valid category name, such as *ITIL* for demo data of SM 7.0x/SC 6.2; *BPPM* is for demo data of Service Manager 7.10. This field mapping is optional for Service Manager 7.10.

Sample field mappings between Service Manager 7.10 and QC 10 are shown in the following screenshot:

Mapped Fields

Type	QC Field	Direction	SM ProblemManagement Field
	Summary	<---->	Description
	Defect ID	---->	QCEntityID
	Severity	<---->	Severity
	Problem ID	<----	ProblemID
	Value: Created from Quality C...	---->	CreatedFrom
	Value: 1	---->	QCIntegrationType
	Value: AUTO	---->	AssignmentGroup
	Value: BOB.HELPDESK	---->	ProblemOwner
	Value: client system	---->	Category
	Value: software	---->	SubCategory
	Value: email client	---->	ProductType
	Value: outlook	---->	ProblemType
	Value: 4 - User	---->	Impact
	Value: Problem Identification ...	---->	CurrentPhase
	Value: localhost/DEFAULT/...	---->	QCProject
	Value: ITIL	---->	WorkFlowType

Sample field mappings between Service Manager 9.20 or later and ALM 11 are shown in the following screenshot:

Mapped Fields

Type	HP-ALM Field	Direction	SM-ProblemManagement Field
	ProblemID	<----	ProblemID
	Summary	<---->	Description
	Severity	<---->	Severity
	Defect ID	---->	QCEntityID
	CreatedFrom	<----	*Value: SM*
	Detected on Date	<----	*Value: 11/2/2010*
	Value: QC	---->	CreatedFrom
	Value: 1	---->	QCIntegrationType
	Value: 4 - User	---->	Impact
	Value: DummyQCServer/DEF...	---->	QCProject
	Value: Application	---->	AssignmentGroup
	Value: Software	---->	AffectedItem
	Value: Problem Detection, Lo...	---->	CurrentPhase
	Value: problem	---->	Category
	Value: hardware	---->	SubCategory
	Value: hardware failure	---->	ProductType

QC/ALM Field <-> SM Field

If the Service Manager Process Designer (PD) Content Pack is not installed, see the following summary for basic field mappings between QC/ALM and SM. The first two rows are required mappings.

QC Defect -> SM Problem Mappings

QC Len	QC DB Name	QC Type	QC/ QCS Label	QC/ QCS Type	Dir	QCS SM Type	QCS Name/ SM WSDL Caption	SM WSDL Type	SM DB Name/ SM WSDL field	SM7 DB type	SC6 DB type	SM Len
40	BG_USER _03	String	Problem ID	String	<-	String	Problem ID	StringType	id	Char	Text	100
10	BG_BUG _ID	Number	Defect ID	Number	->	Number	QCEntityID	IntType	qcintegration.id	Num	Decimal	xx
255	BG_ SUMMARY	String	Summary	String	<->	String	Description	StringType	description	Char	Text	xx
70	BG_ SEVERITY	Lookup List	Severity	Single value list	<->	Single value list	Severity	--	severity	Char	Text	40

If the Service Manager Process Designer (PD) Content Pack is installed, status drive the business process of Help Desk in Process Designer Content Pack 9.30.3. You need to pay attention to the value mapping about the **Status** field between Service Manager and ALM.

Constants -> SM Fields

In order to create a Problem in SM, you need to specify constant values in field mapping. The constant values vary with different SM versions and SM customizations.

If the Service Manager Process Designer (PD) Content Pack is not installed, or you have installed PD Content Pack 9.30.2, see the following summary for sample constant field mappings:

Constant -> SM Problem Mappings

QCS SM constant value	Dir	QCS Name/SM WSDL Caption	SM WSDL Type	SM7 DB Type	SC6 DB Type	SM DB Name / SM WSDL Field	SM Len
1	->	QCIntegrationType	StringType	Char	Text	qcintegration.type	60
Created from Quality Center	->	CreatedFrom	StringType	Char	Text	qcintegration.created.from	60
(your setup)	->	QCProject	StringType	Char	Text	qcintegration.project	60
	->	AssignmentGroup	StringType	Date/time	Date/time	assignment	50
AUTO	->	AssignmentGroup	StringType	Char	Text	assignment	50
client system	->	Category (1)	StringType	Char	Text	incident.category	40
BOB.HELPDESK	->	ProblemOwner	StringType	Char	Text	ticket.owner	40
exchange	->	ProblemType (1)	StringType	Char	Text	problem.type	40
email client	->	ProductType (1)	StringType	Char	Text	product.type	40
4 - User	->	Impact	StringType	Char	Text	initial.impact	50
software	->	SubCategory (1)	StringType	Char	Text	subcategory	40
ITIL	->	WorkFlowType	StringType	Char	Text	category	40
Problem Identification and Classification	->	CurrentPhase	StringType	Char	Text	current.phase	40

If the Service Manager Process Designer (PD) Content Pack 9.30.3 is installed, see the table above plus the following row for sample constant field mappings:

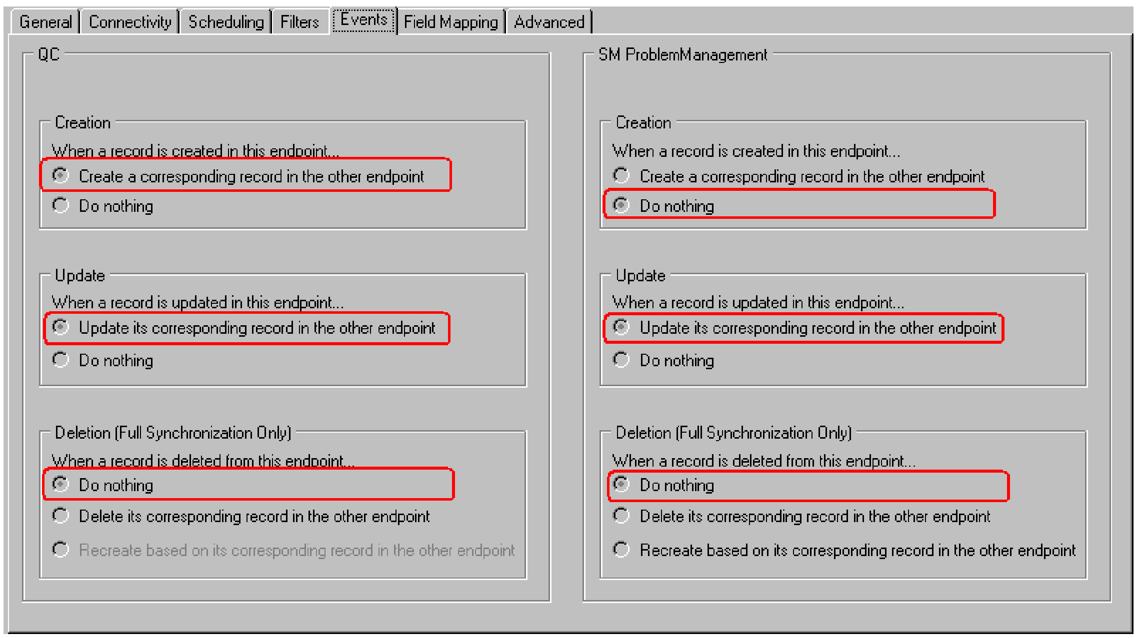
QCS SM constant value	Dir	QCS Name/SM WSDL Caption	SM WSDL Type	SM 9.30 DB type	SM DB Name / SM WSDL Field	SM Len
true	->	IsKnownError	BooleanType	char	isKnownError	1

Define Events

The following table lists the event settings for the two endpoints:

Events Tab Settings	QC Action (Event)	SM Action (Event)
Creation	Create a corresponding record in the other endpoint.	Do nothing.
Update	Update its corresponding record in the other endpoint.	Update its corresponding record in the other endpoint.
Deletion	Do nothing.	Do nothing.

The following screenshot displays the settings:



Test the Link

To test the link:

Note:

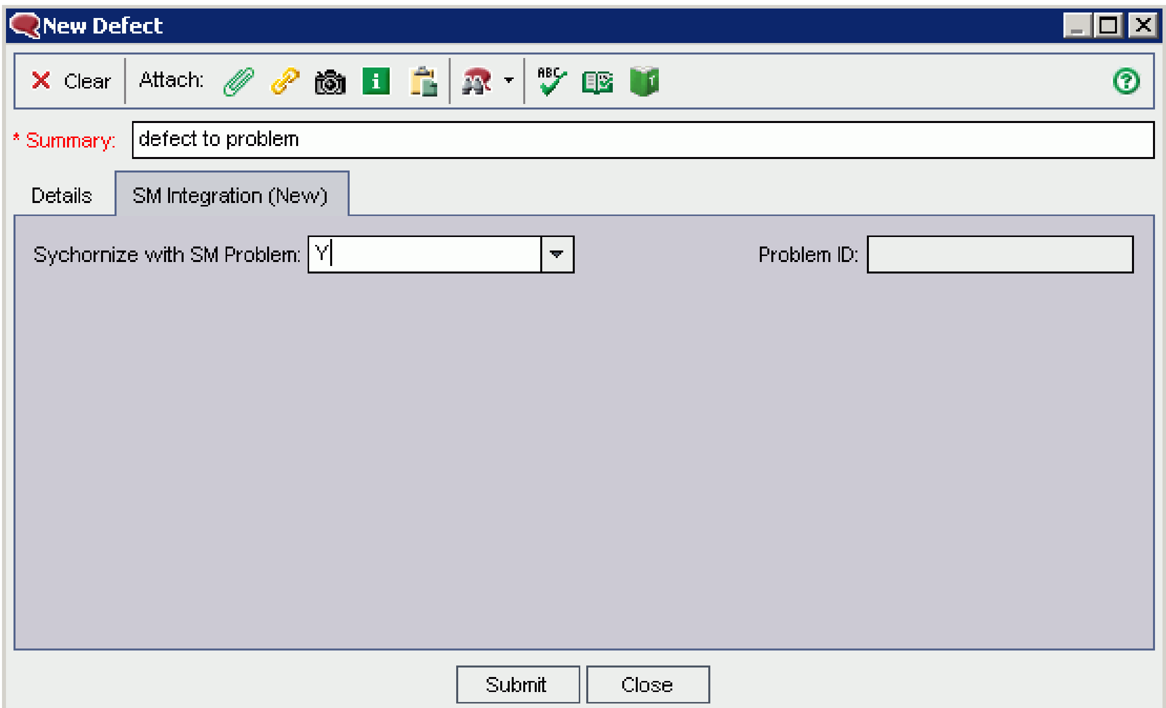
1. A mandatory field (in either SM and QC) does not accept a null value. Synchronization may fail if a mandatory field is mapped to a field that can be null.

2. The following sample steps are for your reference only. The exact steps required on your system may differ significantly. The phase in which the QC Integration tab appears may be different on your system.

1. Save the configuration (an integrity check is automatically run).

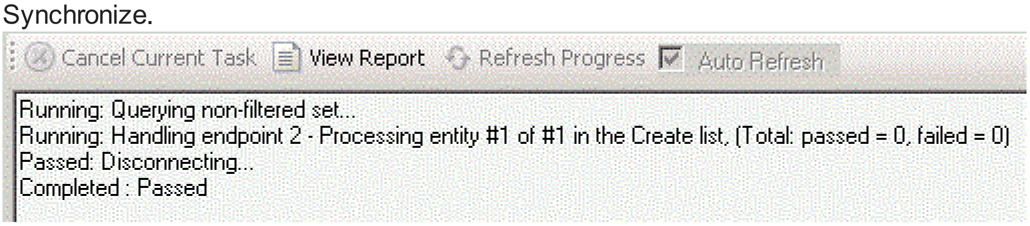
2. Click **Enable Link**.

3. Create a defect and set Synchronize with SM Problem to **Y**.

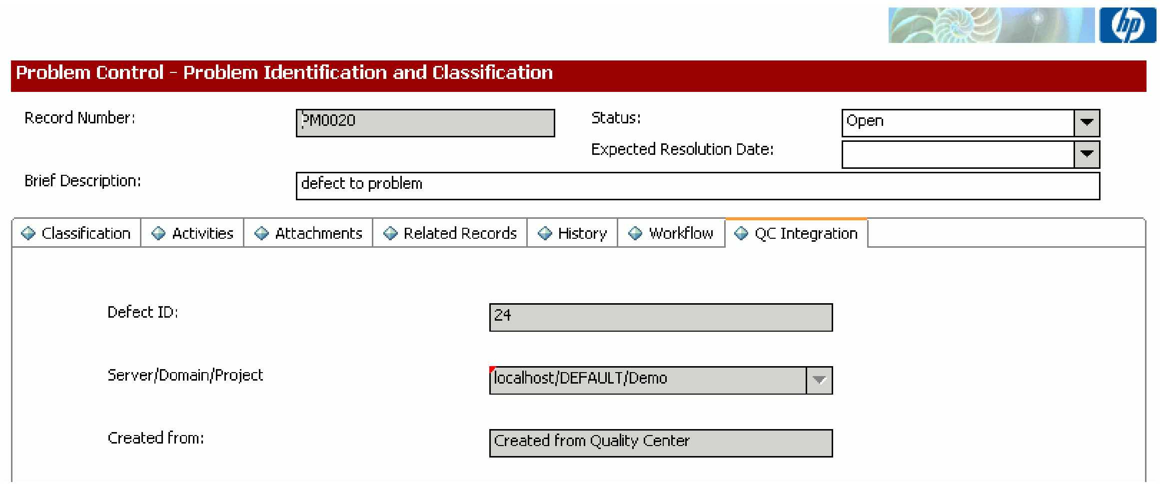


Note: In ALM 11, the **Synchronize with SM Problem** field and the **Problem ID** field reside on the Details tab of the Defect form.

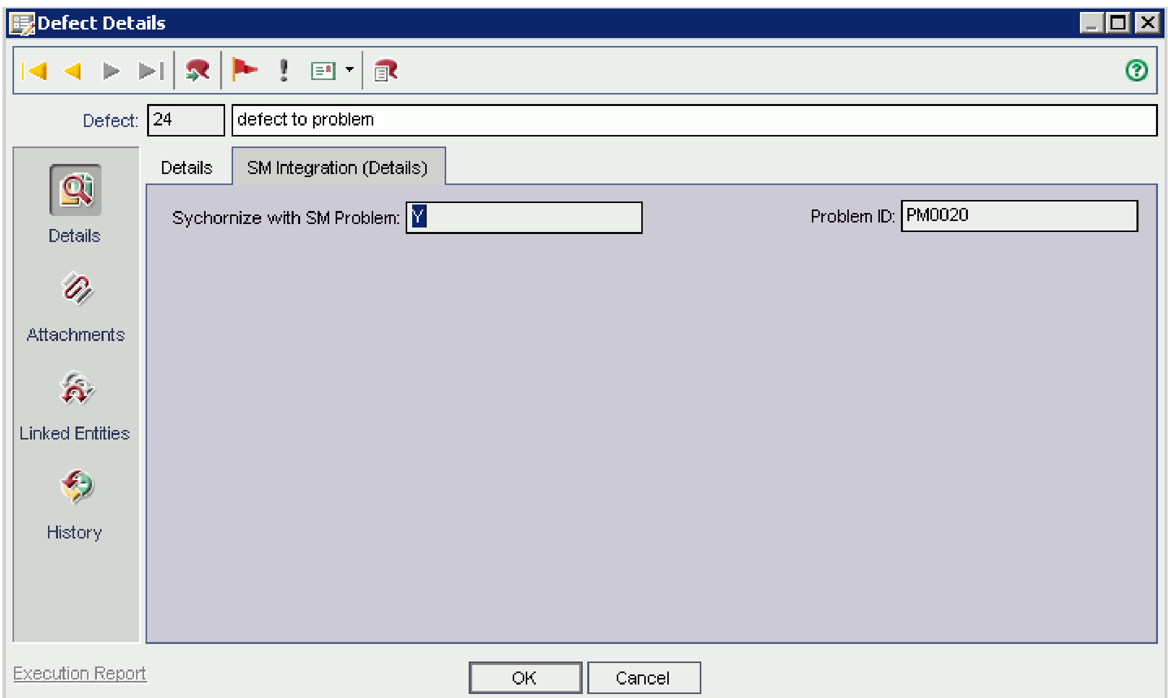
4. Synchronize.



5. View the Problem in SM.



6. View the Defect in QC.



Note: In ALM 11, the **Synchronize with SM Problem** field and the **Problem ID** field reside on the Details tab of the Defect form.

Chapter 10: SM Problem <-> QC/ALM Defect

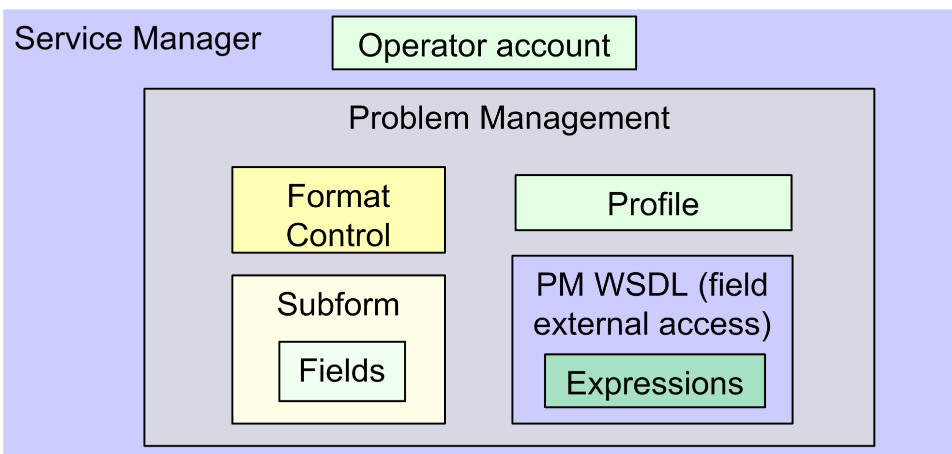
This chapter describes how to synchronize SM Problems with QC/ALM Defects ("Problem <-> Defect").

This chapter includes:

- "Customizing Service Manager/ServiceCenter for Problem Management " below
- "Customizing the QC/ALM Defects Module" on page 172
- "Configuring Links in QC/ALM Synchronizer" on page 180

Customizing Service Manager/ServiceCenter for Problem Management

The following diagram summarizes the components which require tailoring in Service Manager/ServiceCenter.



To customize Service Manager/ServiceCenter for Problem Management, perform the following tasks:

1. "Add Fields" on the next page
2. "Specify the External Access Definition on Service Manager" on the next page or "Specify the External Access Definition on ServiceCenter" on page 159
3. "Create a Subform" on page 161
4. "Add the Subform to a Form" on page 164
5. "Add Format Control Calculations/Validations" on page 165

Add Fields

Add the following required fields to the `rootcause` table. Do not change them.

Field	Type	
	Service Manager 7.0x or later	**ServiceCenter**
qcintegration.type	Character	Text
qcintegration.id	Number	Decimal
qcintegration.project	Character	Text
qcintegration.created.from	Character	Text

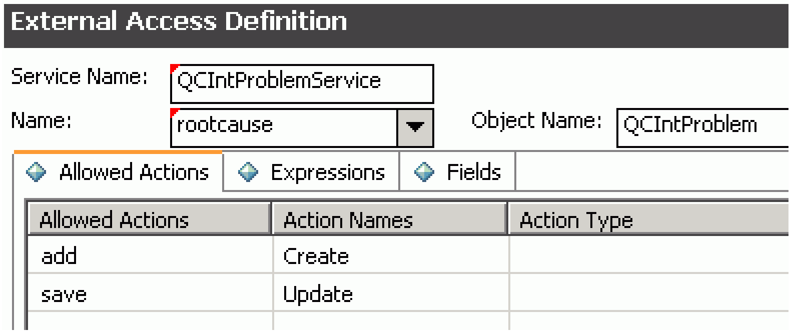
Note: The data type requirements for SM fields are described in "Matching Types" on page 33.

Specify the External Access Definition on Service Manager

If the Service Manager Process Designer (PD) Content Pack is not installed, or you have PD Content Pack 9.30.2 installed, follow the steps below to specify the External Access Definition on Service Manager:

1. Create a custom External Access Definition `QCIntProblemService` by clicking **Tailoring** > **WSDL configuration** on Service Manager 7.0x; or clicking **Tailoring** > **Web Services** > **WSDL configuration** on Service Manager 7.1x or later with the following values:

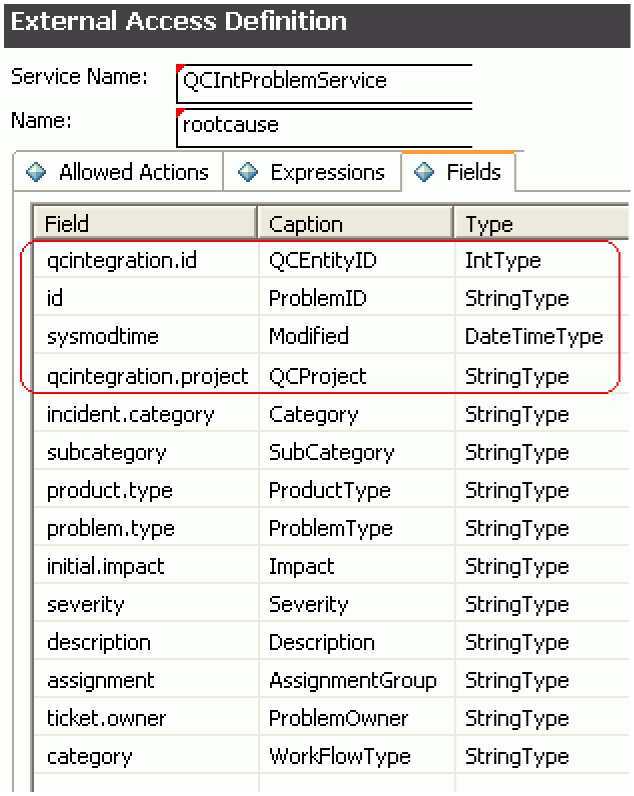
   - Service Name: QCIntProblemService
   - Name: rootcause
   - Object Name: QCIntProblem
   - Allowed Actions / Action Names:
     - add / Create
     - save / Update



Note: The above values are required (Do NOT change them).

2. Enable the required fields in the web service.

Field	Caption	Type
id	ProblemID	StringType
sysmodtime	Modified	DateTimeType
qcintegration.id	QCEntityID	IntType
qcintegration.project	QCProject	StringType
qcintegration.type	QCIntegrationType	StringType
qcintegration.created.from	CreatedFrom	StringType
current.phase	CurrentPhase	StringType
category	WorkFlowType	StringType



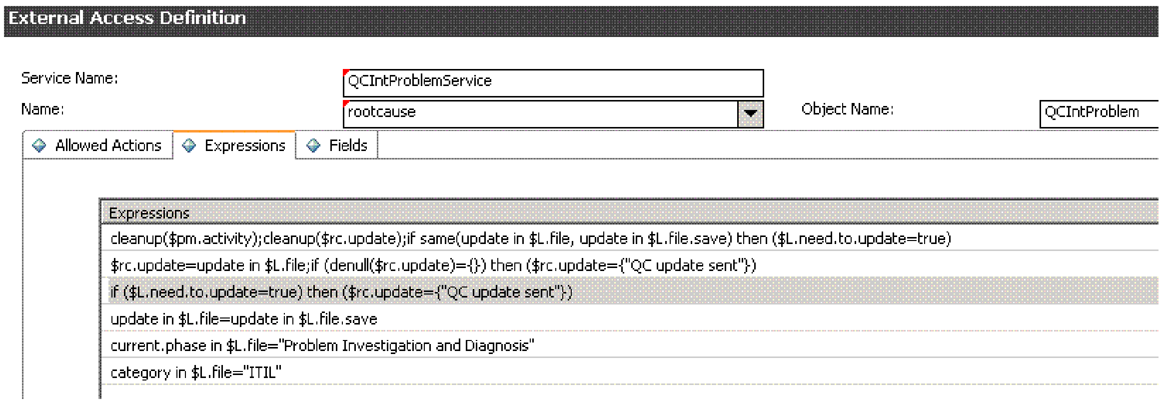
> **Note:** The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on). The above values are required (Do NOT change them).

3. Define expressions for the web service .

> **Note:**
> a. Problem Management requires an activity update provided with each save and for better flow, and this activity update will be hard-coded with the following expressions.
>
> b. Expressions 1 to 4 are for fixing an update issue with the Problem Management web service. For more information, see *SCR 41399*.

No	Expression
1	cleanup($pm.activity);cleanup($rc.update);if same(update in $L.file, update in $L.file.save) then ($L.need.to.update=true)

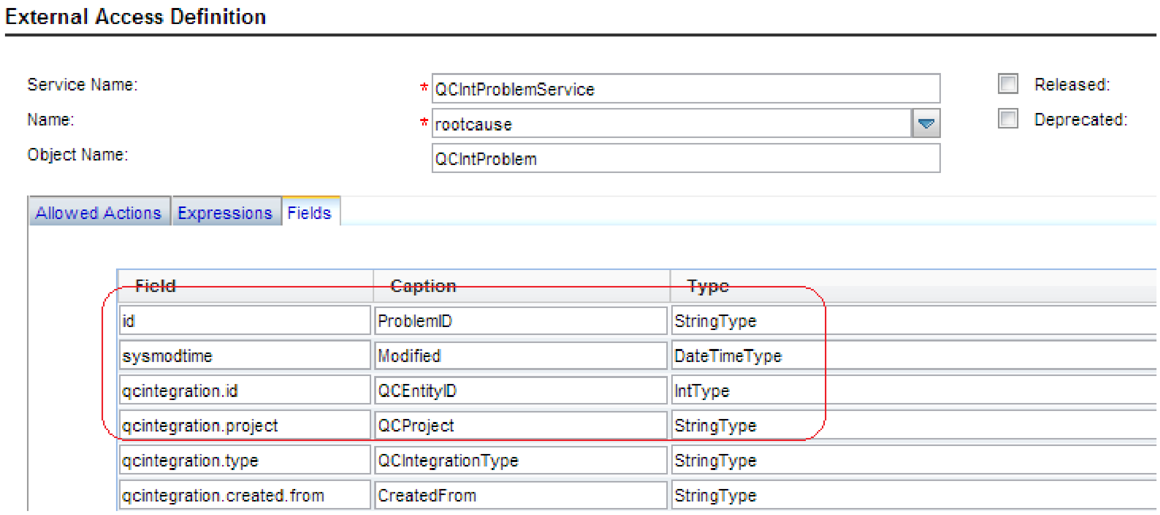
No	Expression
2	$rc.update=update in $L.file;if (denull($rc.update)={}) then ($rc.update={"QC update sent"})
3	if ($L.need.to.update=true) then ($rc.update={"QC update sent"})
4	update in $L.file=update in $L.file.save



If the Service Manager Process Designer (PD) Content Pack 9.30.3 is installed, follow the steps below to specify the External Access Definition on Service Manager:

1. Refer to step 1.
2. Enable the required fields in the web service.

Field	Caption	Type
id	ProblemID	StringType
sysmodtime	Modified	DateTimeType
qcintegration.id	QCEntityID	IntType

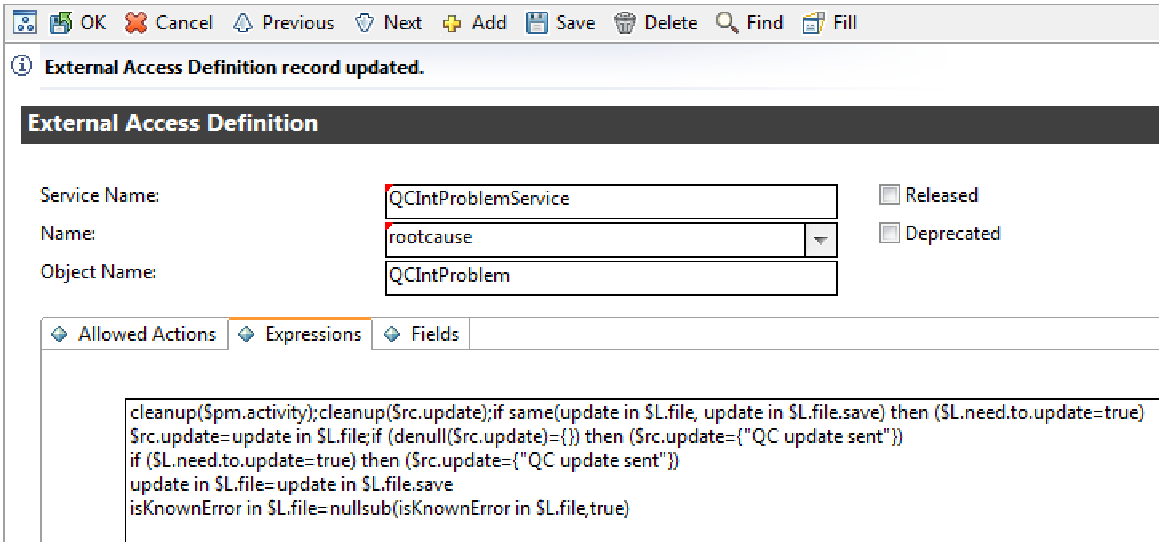


Note: The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on). The above values are required (Do NOT change them).

3. Define expressions for the web service.

Note: Problem Management requires an activity update provided with each save and for better flow, and this activity update will be hard-coded with the following expressions.

No.	Expression
1	cleanup($pm.activity);cleanup($rc.update);if same(update in $L.file, update in $L.file.save) then ($L.need.to.update=true)
2	$rc.update=update in $L.file;if (denull($rc.update)={}) then ($rc.update={"QC update sent"})
3	if ($L.need.to.update=true) then ($rc.update={"QC update sent"})
4	update in $L.file=update in $L.file.save
5	isKnownError in $L.file=nullsub(isKnownError in $L.file,true)



Specify the External Access Definition on ServiceCenter

To specify the External Access Definition on ServiceCenter:

1. Click **System Defintion** > **Tables** > **rootcause** > **Fields and keys definitions for the rootcause table** and change the settings of these fields.

No.	Field	Include in API	Field name in API	Field data type in API	Remarks
1	id	Y	ProblemID	StringType	
2	sysmodtime	Y	Modified	DateTimeType	
3	qcintegration.id	Y	QCEntityID	IntType	
4	qcintegration.project	Y	QCProject	StringType	
5	qcintegration.type	Y	QCIntegrationType	StringType	
6	qcintegration.created.from	Y	CreatedFrom	StringType	
7	current.phase	Y	CurrentPhase	StringType	
8	category	Y	WorkflowType	StringType	

> **Note:** The caption value must be unique and alphanumerics (no spaces) with the first letter capitalized (`AValidCaption123`, `AnotherValidCaption`, and so on).

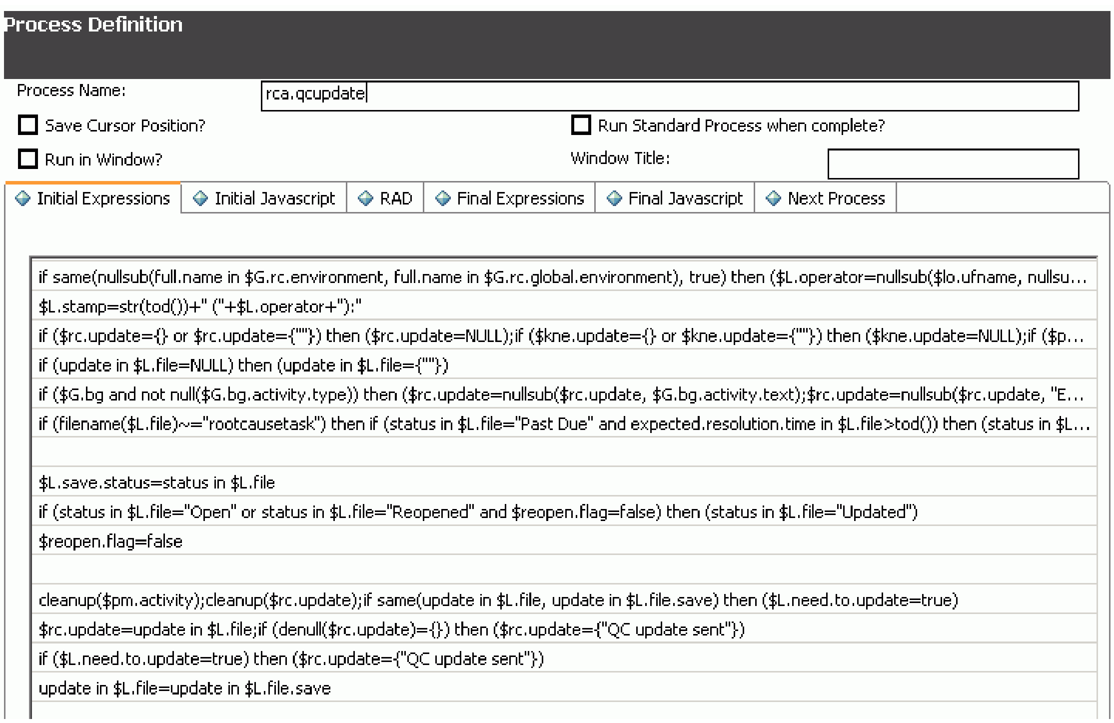
2. Create a new Process record named `rca.qcupdate`.

   a. Click **Utilities** > **Tools** > **Document Engine** > **Process**. Type Process Name `rca.save` and then click **Search**.

   b. Change the name to `rca.qcupdate` and click **Add**.

   c. Append the following lines to the Initial Expressions tab, and click **Save**.

No.	Expression
1	cleanup($pm.activity);cleanup($rc.update);if same(update in $L.file, update in $L.file.save) then ($L.need.to.update=true)
2	$rc.update=update in $L.file;if (denull($rc.update)={}) then ($rc.update={"QC update sent"})
3	if ($L.need.to.update=true) then ($rc.update={"QC update sent"})
4	update in $L.file=update in $L.file.save



3. Update the `rca.view` state record.

a. Click **Utilities** > **Tools** > **Document Engine** > **States**. Type the state name `rca.view` and click **Search**.

b. Add the following row to the `Non-base methods` table, and then click **Save**.

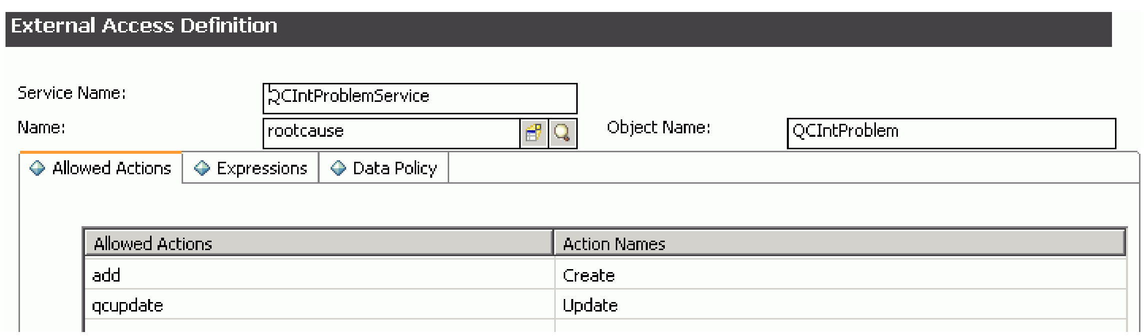
Display Action	Process Name	Condition	Save First
qcupdate	rca.qcupdate	$L.mode~="close" and $L.mode~#"add"	false

4. Update the Problem Management integration web service.

a. Click **Toolkit** > **WSDL Configuration**. In the Name field type `rootcause`, and then click **Search**.

b. Update the External Access Definition as follows based on table `rootcause`.

No.	Field	Value
1	Service Name	QCIntProblemService
2	Object Name	QCIntProblem
3	Allowed Actions/ Action Names	add/Create qcupdate/Update



Note: Delete all Allowed Actions without an Action Name.

Create a Subform

To create a subform:

1. Create a global list.

   a. Click **Tailoring** > **Tailoring Tools** on Service Manager7.0x or later; or click **Utilities** > **Tools** > **Global Lists** on ServiceCenter to creaa a global list with the following parameters:

No.	Parameter	Value	Remarks
1	List Name	SMQC Integration PM Project List	
2	Regen Every	1 00:00:00	
3	Build List on Startup?	Yes	Check box
4	List Variable	$G.qcintegration.problem.project	
5	User Defined List?	Yes	Check box
6	Value List	{"server1/domain1/project1", "server2/domain2/project2"}	Change to the values for your system **Note:** Do not include any spaces between slashes.

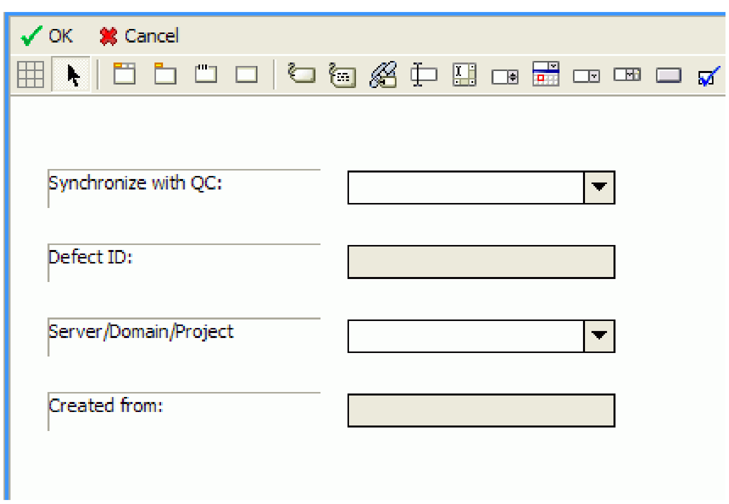
   b. Save this global list and click **Rebuild Global List** from the Options menu.

2. Click **Tailoring** > **Forms Designer** on Service Manager 7.0x or later; or click **Toolkit** > **Forms Designer**on ServiceCenter to create the `pm.qcint.subform` subform with the following components:

   Note: Click **No** when the system message “`Do you want to use Form Wizard?`” appears.

No.	Component	Properties
1	Label	**Caption**: Synchronize with QC

No.	Component	Properties
2	Combo Box	■ **Input**: qcintegration.type ■ **Value List**: 0;1; ■ **Display List**: 0 - Not Synchronize;1 - Synchronize with QC Defect ■ **Select Only**: Yes ■ **Read-Only Condition**: [$qcint.type.readonly]
3	Label	**Caption**: Defect ID:
4	Text	■ **Input**: qcintegration.id ■ **Read-Only**: Yes
5	Label	**Caption**: Server/Domain/Project:
6	Combo Box	■ **Input**: qcintegration.project ■ **Value List**: $G.qcintegration.problem.project ■ **Read-Only Condition**: [$qcint.project.readonly] ■ **Mandatory Condition**: [qcintegration.type]>0
7	Label	**Caption**: Created from:
8	Text	**Input**: qcintegration.project **Read-Only**: Yes



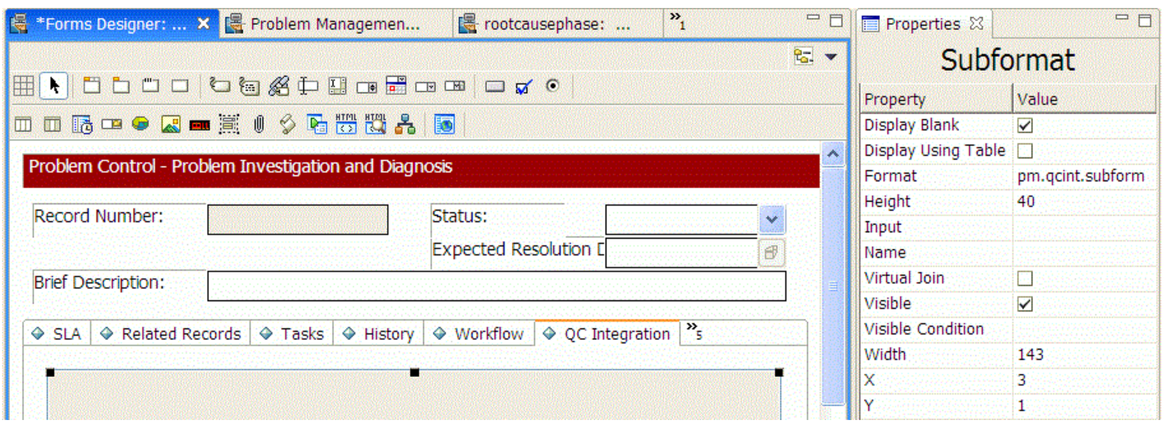
Add the Subform to a Form

If the Service Manager Process Designer (PD) Content Pack is not installed, or you have PD Content Pack 9.30.2 installed, follow the steps below to add the subform you created to a form:

1. From Forms Designer, open the default form of a Problem Management phase (`PM.pc.ident.and.class` is used as an example in ServiceCenter 6.2/Service Manager 7.0x).

2. Add a notebook Tab with the QC Integration caption.

3. Add a subform to the new tab with format `pm.qcint.subform`, which is displayed in the following screenshot:



4. Save the changes.

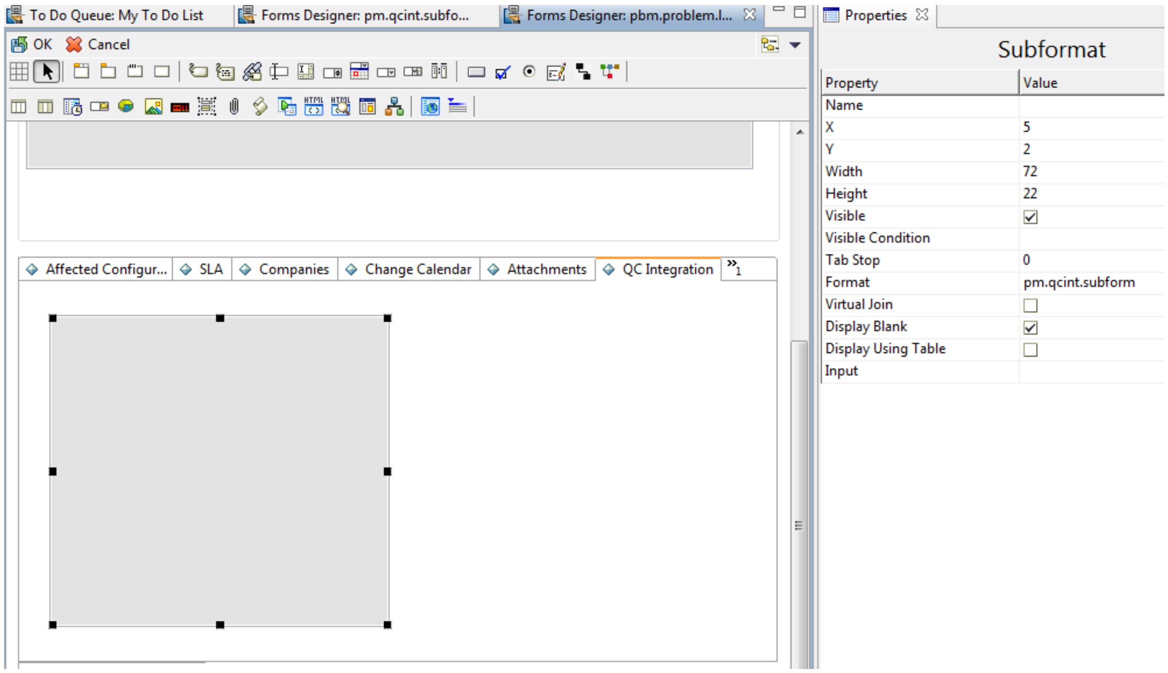
> **Note:** If the error message "`Format 'pm.qcint.subform' not found (display, show.rio)`" appears, restart the SM server to enable the subform.

If the Service Manager Process Designer (PD) Content Pack 9.30.3 is installed, follow the steps below to add the subform you created to a form:

1. From Forms Designer, open the default form of a Problem Management phase (`pbm.problem.logging` is used as an example on Service Manager 9.3x).

2. Add a notebook Tab with the QC Integration caption.

3. Add a subform to the new tab with format `pbm.problem.logging`, which is displayed in the following screenshot:



4. Save the changes.

Add Format Control Calculations/Validations

> **Note:** Steps in this topic are applicable if the Service Manager Process Designer (PD) Content Pack 9.30.x is not installed. Otherwise, skip this topic and refer to "Add Rule Set Calculations/Validations" on page 167 for configurations in the PD environment.

To add format control calculations and validations:

1. Open the format control record of the previous Problem Management form `PM.pc.ident.and.class`.

2. Click **Calculations**.

3. Add two rows with the following values:

Row	Parameter	Value
1	display	true
	initial	true
	calculation	$qcint.type.readonly=2;if (qcintegration.type in $file~=0) then ($qcint.type.readonly=1)
2	display	true
	initial	true
	calculation	$qcint.project.readonly=2;if (qcintegration.type in $file~=0 and not null (qcintegration.project in $file)) then ($qcint.project.readonly=1)

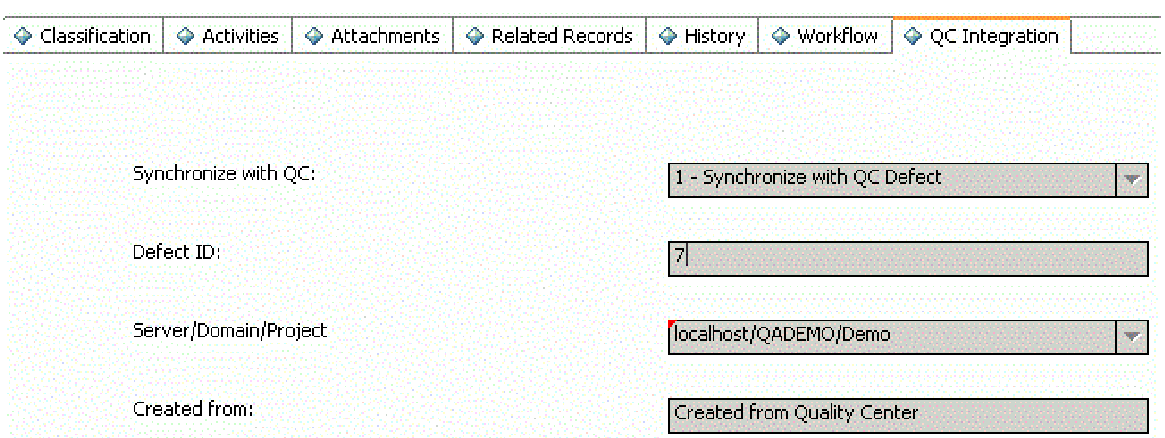
4. Click **Validations**.

5. Add one validation with the following values:

No.	Parameter	Value
1	Validation	not null(qcintegration.project in $file)
2	Message	The Server/Domain/Project is required.
3	Add	qcintegration.type in $file~=0
4	Update	qcintegration.type in $file~=0
5	Set Focus to	qcintegration.project

6. Save your changes.

7. Verify.



Add Rule Set Calculations/Validations

> **Note:** Steps in this topic are applicable for the Service Manager Process Designer (PD) Content Pack 9.30.3 only. Otherwise, refer to "Add Format Control Calculations/Validations" on page 165 for configurations in non-PD or PD Content Pack 9.30.2 environment.

To add rule set calculations and validations, follow the steps below:

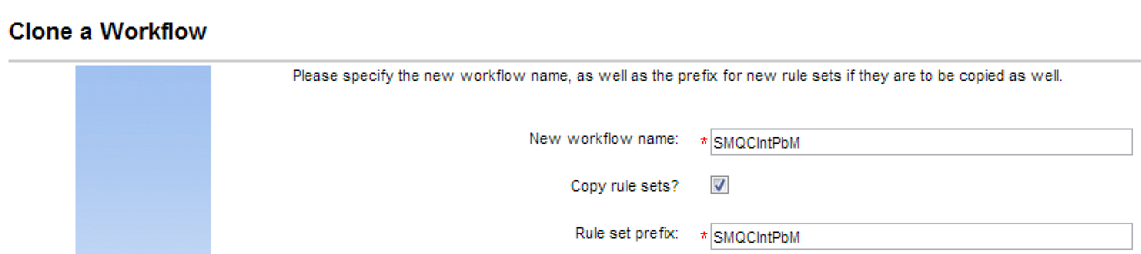
1. "Copy an Existing Workflow" below
2. "Associate an Existing Problem Category with the New Workflow" on the next page
3. "Create New Rule Set for Initialization and Validation" on the next page
4. "Associate the New Workflow with the New Rule Set" on page 170

Copy an Existing Workflow

You can use copies of the existing workflows in another business process, or make changes to the HP proprietary workflow copies.

To copy an existing workflow, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Copy Existing Workflow**.
2. On the Clone a Workflow page, select the workflow you want to copy. For example, Problem.
3. Type `SMQCIntPbM` in the New workflow name field.



4. Select the Copy rule sets check box if you want to copy rule sets, and then type a rule set prefix.
5. Click **OK**.

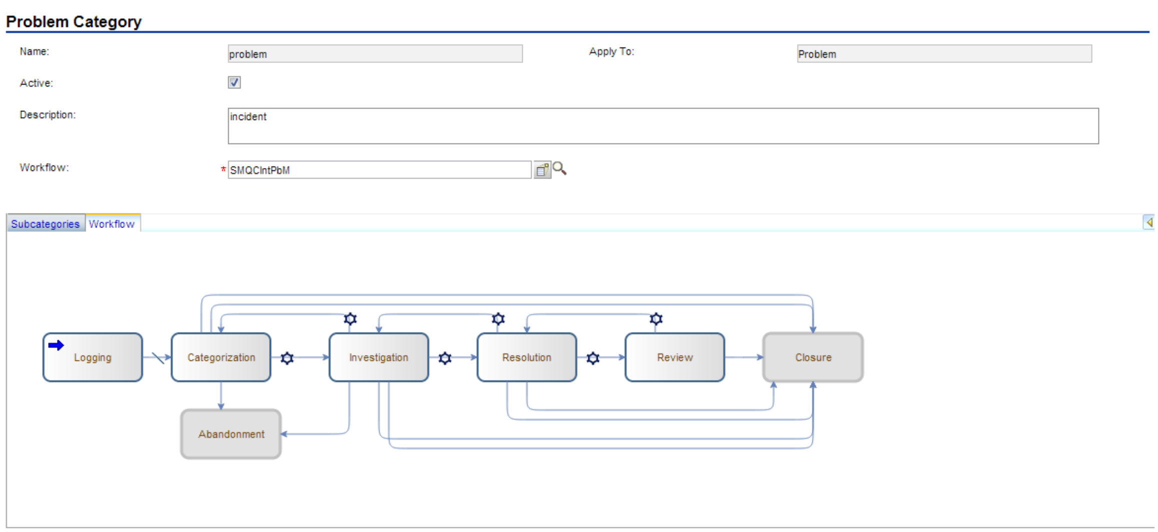
The newly copied workflow appears in the list on the Clone a Workflow page.

Associate an Existing Problem Category with the New Workflow

You can update existing problem categories, subcategories and areas and associate the updated categories with the new workflow so that they can be used in another business process. For more information, refer to *HP Service Manager – Process Designer Content Pack Administrator's Guide*.

To associate an existing change category with the new workflow, follow the steps below:

1. From the System Navigator, click **Problem Management** > **Configuration** > **Problem Categories**.
2. Click **Search**.
3. Select the problem category for which you want to add a workflow. For example, problem.
4. In the Problem Category page, remove the currently assigned workflow from the Workflow field.
5. Type `SMQCIntPbM` in the workflow field.
6. Click **Save** to associate the problem category with the workflow.



Create New Rule Set for Initialization and Validation

To create a new rule set for initialization, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Rule Sets**.
2. Type the values as follow:

Field	Value
ID	pbm.alm.int.init
Available as action	False
Name	Initialize for ALM integration in the Problem Record
Table name	rootcause
HP Proprietary	

3. Click **New** and **Save**.
4. Click **Add Rule**.
5. In the Select Rule Type page, click Run JavaScript.
6. In the Run JavaScript page, type the values as follow:

Field	Value
Rule Description	Run Javascript for initializing Integration type and project in the Problem Record
Statement	vars['$qcint.type.readonly'] = 2; vars['$qcint.project.readonly'] = 2; var _null=system.functions._null; var file = vars.$L_file; if(file["qcintegration.type"] !=0 && !_null(file["qcintegration.type"])) { vars['$qcint.type.readonly'] = 1 } if(file["qcintegration.type"] !=0 && !_null(file["qcintegration.project"])) { vars['$qcint.project.readonly'] = 1 }

7. Click **OK**.

8. Click **Save** and **Exit**.

To create a new rule set for validation, follow the steps below:

1. From the System Navigator, click **Tailoring** > **Process Designer** > **Rule Sets**.
2. Type the values as follow:

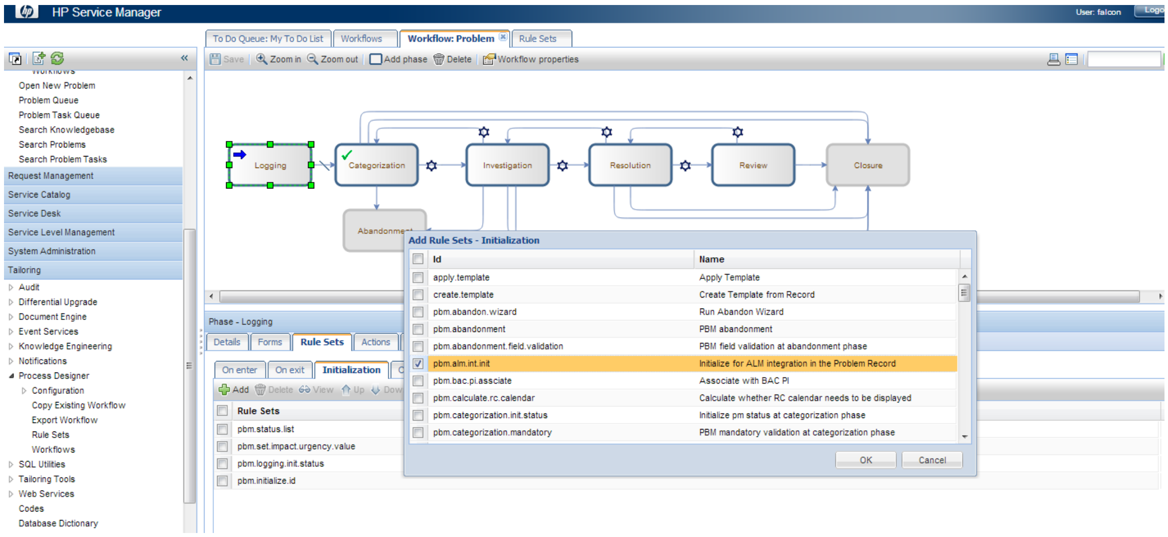
Field	Value
ID	pbm.alm.int.validation
Available as action	False
Name	Validation for ALM integration in the Problem Record
Table name	rootcause
HP Proprietary	

3. Click **New** and **Save**.
4. Click **Add Rule**.
5. In the Select Rule Type page, click **Set Mandatory Fields**.
6. Refer to step 6 to step 13 as described in "Create New Rule Set for Initialization and Validation" on page 60.

Associate the New Workflow with the New Rule Set

To associate the new workflow with the new initialization rule set, follow the steps below:

1. From the System Navigator, click **Problem Management** > **Configuration** > **Workflows**.
2. Select Problem in the workflows list.
3. Select the first phase in the workflow graph.
4. Click **Rule Sets** tab > **Initialization** tab.
5. Click **Add** and select the pbm.alm.int.init rule set you just created.



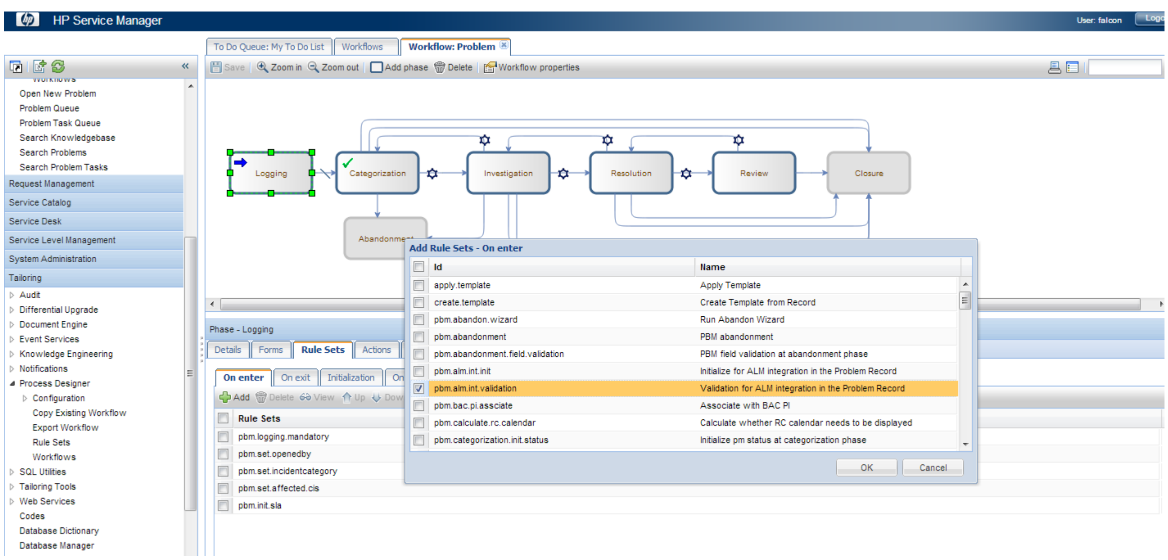
6. Click **OK**.

7. Click **Rule Sets** tab > **On display** tab.

8. Repeat step 5 and 6.

9. Click **Rule Sets** tab > **On enter** tab.

10. Click **Add** and select the pbm.alm.int.validation rule set you just created.



11. Click **OK**.

12. Click **Save**.

Customizing the QC/ALM Defects Module

The steps for customizing the Defects module are different for different versions of Quality Center/ALM.

On QC 10 and Earlier

To customize the Defects module on Quality Center 10 or earlier, perform the following tasks:

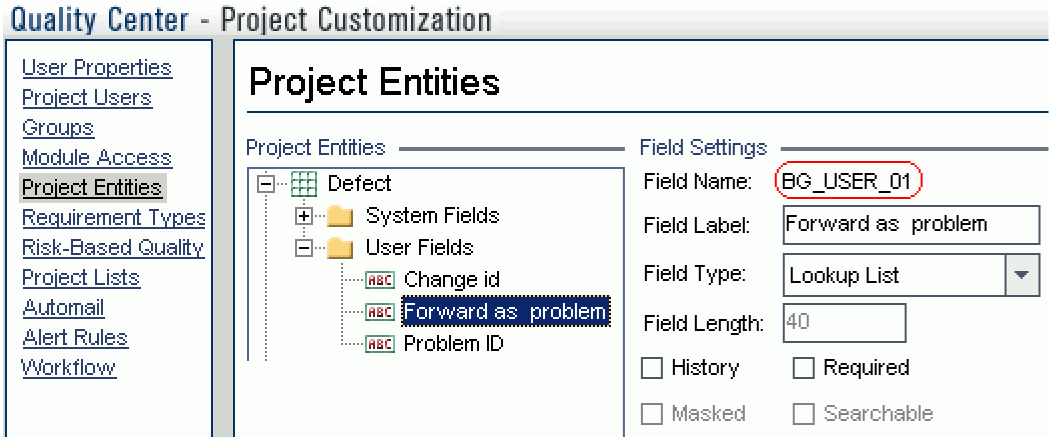
1. "Add Fields" below
2. "Add Tabs" on the next page
3. "Add Fields to Tabs" on page 175
4. "Create a View" on page 176
5. "Verify" on page 177

Add Fields

To add the required fields for Defect module customization:

1. Log on to QC as a project administrator.
2. Click **Tools / Customize**. The “QC - Project Customization” module opens.
3. Add the following fields for the defect entity in Project Entities (*XX*, *XY* and *XZ*are sequential numbers auto-generated by QC).

Field Name	Field Label	Field Type	Remarks
BG_USER_*XX*	Synchronize with SM Problem	Lookup List/YesNo	Select “Verify Value” check box
BG_USER_*XY*	Problem ID	String	
BG_USER_*XZ*	Created from	String	

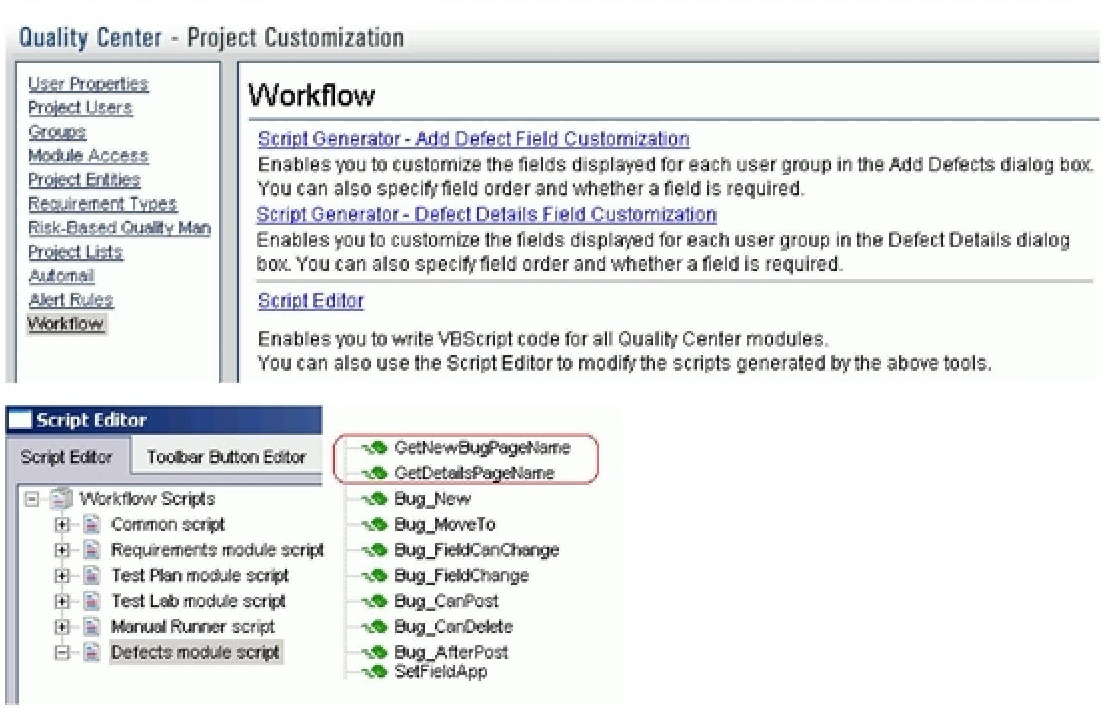


Note: The data type requirements for QC fields is described in "Matching Types" on page 33.

Add Tabs

To add tabs to the Defect form and show fields on these tabs:

1. In “QC - Project Customization”, click **Workflow** > **Script Editor**.
2. Select **Defects module script**.



3. Add the following code to the **GetNewBugPageName** event procedure (which is triggered before QC opens the Add Defect dialog box).

```
select case PageNum

  case "2"

    GetNewBugPageName = "SM Integration (New)"

end select
```

> **Note:** The parameter 2 specifies tab 2 (the second tab). For a new bug, the tab name is SM Integration (New).

4. Add the following code to the **GetDetailsPagename** event procedure (which is triggered before QC displays the Defect Details dialog box).

```
select case PageNum

  case "2"

    GetDetailsPageName = "SM Integration (Details)"

end select
```

> **Note:** The parameter 2 specifies tab 2 (the second tab). For an existing defect, the tab

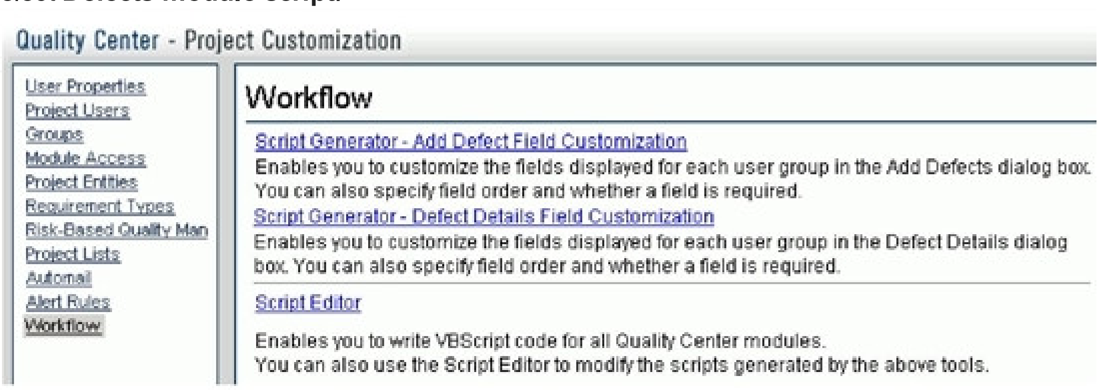
name is SM Integration (Details).

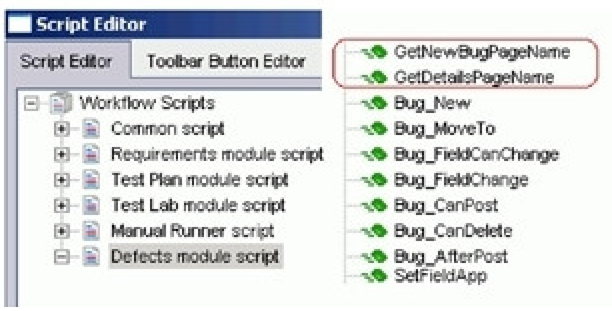
Add Fields to Tabs

To add fields to tabs:

1. In "QC - Project Customization", click **Workflow** > **Script Editor**.

2. Select **Defects module script**.

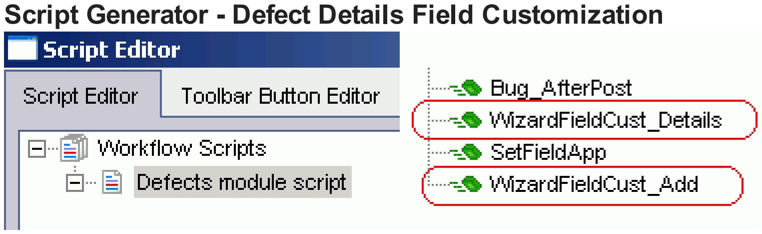




3. If **WizardFieldCust_Details** and **WizardFieldCust_Add** are not found in the list, do the following to generate these two methods.

   a. **Script Generator - Add Defect Field Customization**

   b. **Script Generator - Defect Details Field Customization**



4. Add the following code to the **WizardFieldCust_Details** event procedure.

```
SetFieldApp "BG_USER_XX", True, False, 1, 0
SetFieldApp "BG_USER_XY", True, False, 1, 1
SetFieldApp "BG_USER_XZ", True, False, 1, 2
```

The parameters are:

- **Field name** (BG_USER_*XX*, where *XX* consists of two digits)
- **Visible** (True)
- **Required** (False)
- **Page number** (start from `0`)
- **View order** (start from `0`)

5. Add the following code to the **WizardFieldCust_Add** event procedure.

```
SetFieldApp "BG_USER_XX", True, False, 1, 0
SetFieldApp "BG_USER_XY", True, False, 1, 1
SetFieldApp "BG_USER_XZ", True, False, 1, 2
```

6. Set the **Readonly** fields by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines:

```
if (Bug_Fields("BG_USER_XX").Value="Y") then
  Bug_Fields("BG_USER_XX").IsReadOnly=True
end if
Bug_Fields.Field("BG_USER_XY").IsReadOnly=True
```

The `if` loop above marks the field “Synchronize with SM Problem” as read-only after selected and saved.

7. Save your changes.

Create a View

To create a view:

1. Log on to ALM with the integration account `SMQCIntUser`.
2. In the Defects module, click **View / Filter/Sort / Set Filters/Sort**. The purpose of this view is to make the QC Synchronizer correctly filter those defects to be synchronized to SM as problems.
3. Set **Synchronize with SM Problem** to **Y**.

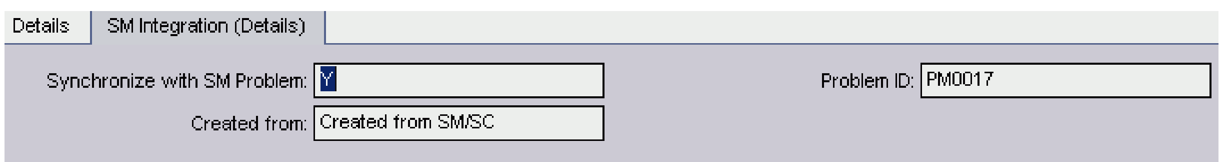
4. Add a view to Favorites:

   - **Name**: SMIntegrationView
   - **Location**: Private

In QC Synchronizer this view will be selected as the QC data filter. Without this filter, QC defects cannot be forwarded to SM as Problems.

Verify

Refer to the following screenshot to verify whether the Defects module on Quality Center 10 or earlier is customized successfully:



On ALM 11

On ALM 11, you only need to add new fields directly to the Details tab of the `Defect` form.

To customize the ALM Defects module, perform the following task:

1. "Add Fields" below
2. "Create a View" on page 179
3. "Verify" on page 179

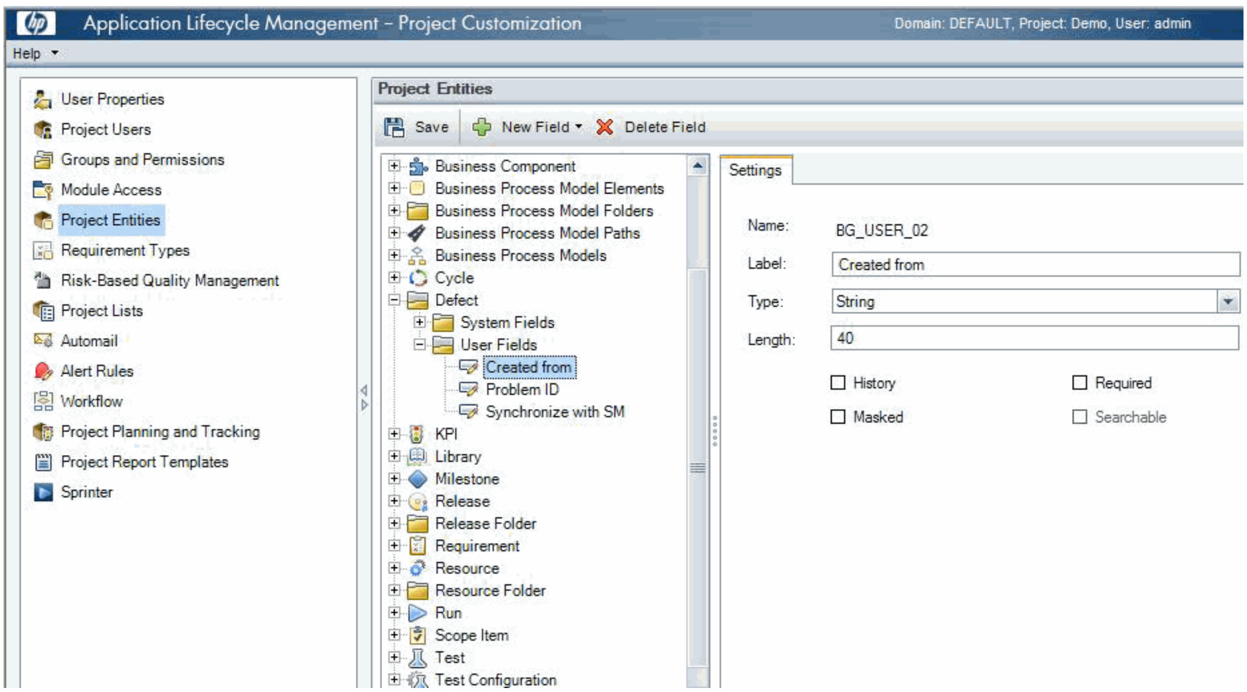
Add Fields

To add the required fields for Defect customization:

1. Log on to ALM as a project administrator.
2. Click **Tools / Customize**. The “Application Lifecycle Management - Project Customization" module opens.

3. Add the following fields for the defect entity in Project Entities (*XX* and *XY* are sequential numbers auto-generated by ALM).

Field Name	Field Label	Field Type	Remarks
BG_USER_*XX*	Synchronize with SM Problem	Lookup List/YesNo	Select the “Verify Value” check box
BG_USER_*XY*	Problem ID	String	



Note: The data type requirements for QC/ALM fields are described in "Matching Types" on page 33.

4. Click **Workflow** > **Script Editor**.

5. Select **Defects module script**.

6. Set the **Readonly** fields by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines:

```
if (Bug_Fields("BG_USER_XX").Value="Y") then

  Bug_Fields("BG_USER_XX").IsReadOnly=True
```

```
end if
```

```
Bug_Fields.Field("BG_USER_XY").IsReadOnly=True
```

The `if` loop above marks the field “Synchronize with SM Problem” as read-only after selected and saved.

7. Save your changes.

Create a View

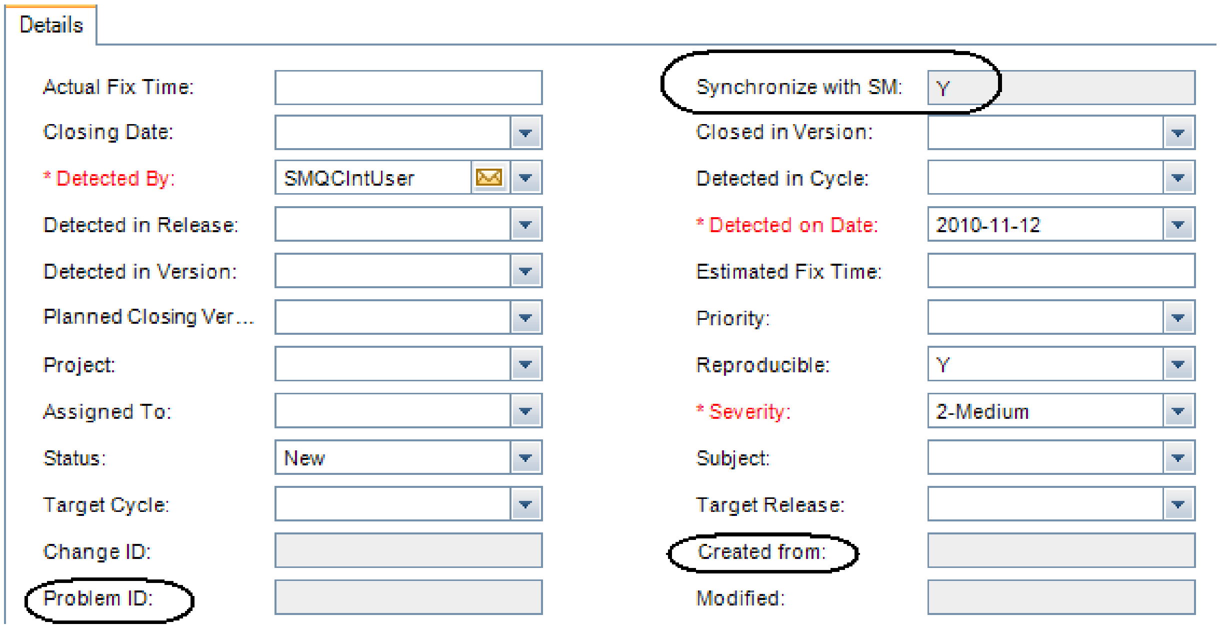
To create a view:

1. Log on to ALM with the integration account `SMQCIntUser`.
2. In the Defects module, click **View / Filter/Sort / Set Filters/Sort**. The purpose of this view is to make the ALM Synchronizer correctly filter those defects to be synchronized to SM as problems.
3. Set **Synchronize with SM Problem** to **Y**.
4. Add a view to Favorites:
   - **Name**: SMIntegrationView
   - **Location**: Private

In ALM Synchronizer this view will be selected as the ALM data filter. Without this filter, ALM defects cannot be forwarded to SM as Problems.

Verify

Open a new defect in ALM, select **Y** in the **Synchronize with SM** field, and click **Save**. If the Defects module on ALM 11 is customized successfully, the Defect form is displayed as follow:



Configuring Links in QC/ALM Synchronizer

To configure and test a link in the QC/ALM synchronizer, perform the following tasks:

- "Specify Endpoints / Type of Link" below
- "Define Filters" on the next page
- "Define Field Mappings" on the next page
- "Define Events" on page 183
- "Test the Link" on page 184

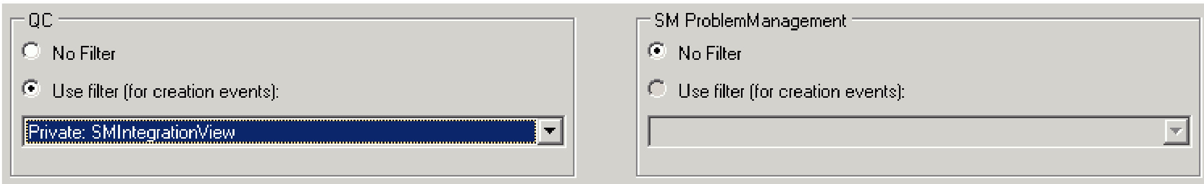
Specify Endpoints / Type of Link

Specify the connection properties as described in "Create a Link" with the following settings specific for this type of link:

1. Step 1: “Endpoint 2 type” = **SM ProblemManagement.**
2. Step 3: “Service URL" = **http://<*service_manager_host*>:<*port*>/sc62server/PWS/QCIntProblemService.wsdl**
3. Step 4: “Select entity types” = **Problem by Defect** (this is the only available selection)

Define Filters

On the Filters tab, select filter **SMIntegrationView** for the QC endpoint. If the filter is not available, see "Create a View" on page 139.



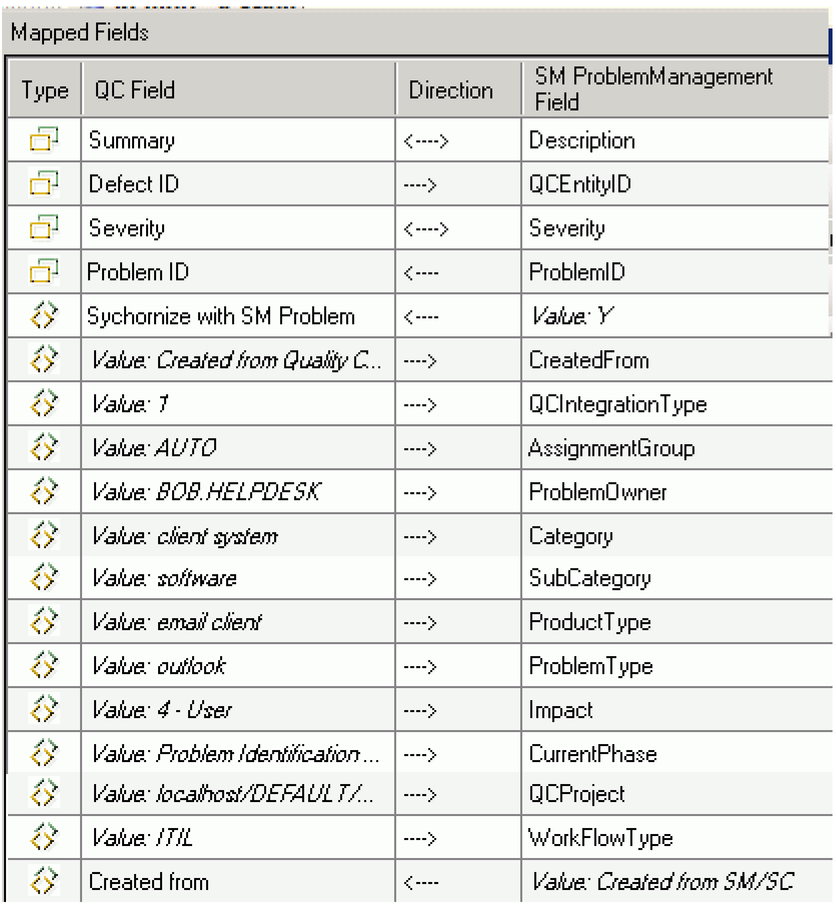
Define Field Mappings

If the Service Manager Process Designer (PD) Content Pack is not installed, or you have installed PD Content Pack 9.30.2, see the following summary for basic field mappings:

QC	Directions	SM	Constant Value	Remarks
Problem ID	<-	ProblemID		Synchronize back on create: Yes
Defect ID	->	QCEntityID		Synchronize back on create: Yes
Synchronize with SM Problem			Y	
		QCIntegrationType	1	
Created from			Created from SM/SC	
		CreatedFrom	Created from QC	
	->	CurrentPhase	*XXX*	Replace *XXX* with a valid phase name, such as “Problem Investigation and Diagnosis”. This field mapping is optional for demo data of Service Manager 7.10.
	->	QCProject	(your setup)	This value should be same with the “QC Project” parameter in the Connectivity tab.

QC	Directions	SM	Constant Value	Remarks
	->	WorkFlowType	*YYY*	Replace *YYY* with a valid category name, such as *ITIL* for demo data of SM 7.0x/SC 6.2; *BPPM* is for demo data of Service Manager 7.10. This field mapping is optional for demo data of Service Manager 7.10.

Sample field mappings are shown in the following screenshot:



Mapped Fields

Type	QC Field	Direction	SM ProblemManagement Field
	Summary	<---->	Description
	Defect ID	---->	QCEntityID
	Severity	<---->	Severity
	Problem ID	<----	ProblemID
	Sychornize with SM Problem	<----	*Value: Y*
	Value: Created from Quality C...	---->	CreatedFrom
	Value: 1	---->	QCIntegrationType
	Value: AUTO	---->	AssignmentGroup
	Value: BOB.HELPDESK	---->	ProblemOwner
	Value: client system	---->	Category
	Value: software	---->	SubCategory
	Value: email client	---->	ProductType
	Value: outlook	---->	ProblemType
	Value: 4 - User	---->	Impact
	Value: Problem Identification ...	---->	CurrentPhase
	Value: localhost/DEFAULT/...	---->	QCProject
	Value: ITIL	---->	WorkFlowType
	Created from	<----	*Value: Created from SM/SC*

If the Service Manager Process Designer (PD) Content Pack 9.30.3 is installed, see the above table plus the following row for basic field mappings:

QC	Directions	SM	Constant Value	Remarks
	->	IsKnownError	true	This field mapping is added in the PD Content Pack 9.30.3. This field mapping marks the current record as KnownError.

Sample field mappings are shown in the following screenshot:

Mapped Fields

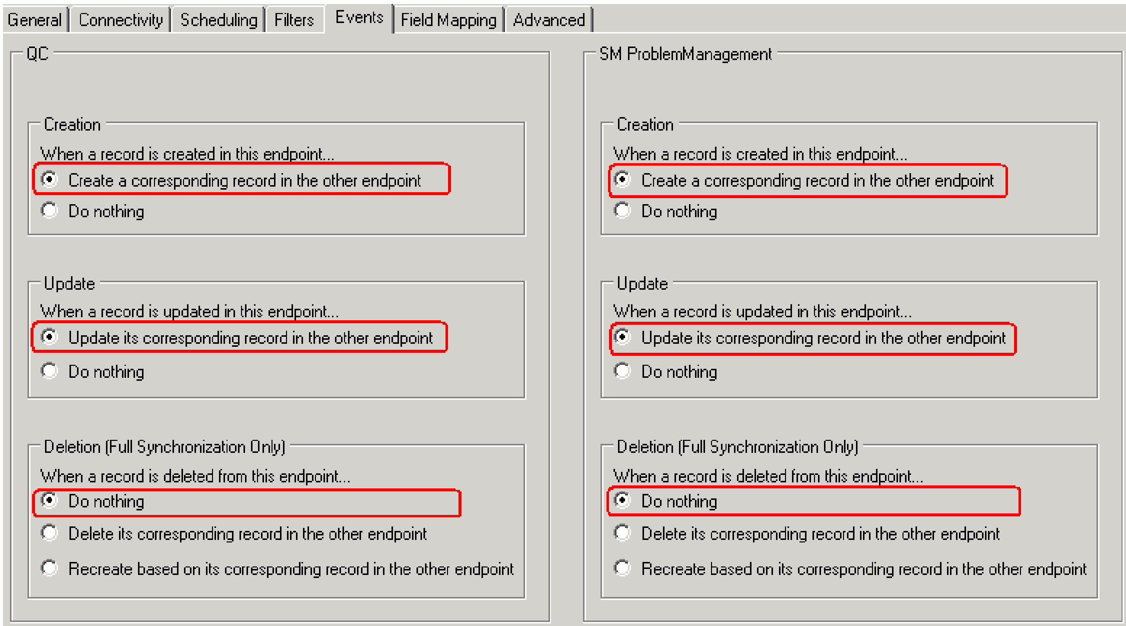
Type	QC Field	Direction	SM ProblemManagement Field
	Summary	<--->	Description
	Defect ID	--->	QCEntityID
	Severity	<--->	Severity
	Problem ID	<---	ProblemID
	Sychornize with SM Problem	<---	*Value: Y*
	Value: Created from Quality C...	--->	CreatedFrom
	Value: 1	--->	QCIntegrationType
	Value: AUTO	--->	AssignmentGroup
	Value: BOB.HELPDESK	--->	ProblemOwner
	Value: client system	--->	Category
	Value: software	--->	SubCategory
	Value: email client	--->	ProductType
	Value: outlook	--->	ProblemType
	Value: 4 - User	--->	Impact
	Value: Problem Identification...	--->	CurrentPhase
	Value: localhost/DEFAULT/...	--->	QCProject
	Value: ITIL	--->	WorkFlowType
	Created from	<---	*Value: Created from SM/SC*
	Value: true	--->	IsKnownError

Define Events

The following table lists the event settings for the two endpoints.

Events Tab Settings	QC Action (Event)	SM Action (Event)
Creation	Create a corresponding record in the other endpoint.	Create a corresponding record in the other endpoint.
Update	Update its corresponding record in the other endpoint.	Update its corresponding record in the other endpoint.
Deletion	Do nothing.	Do nothing.

The following screenshot displays the settings:

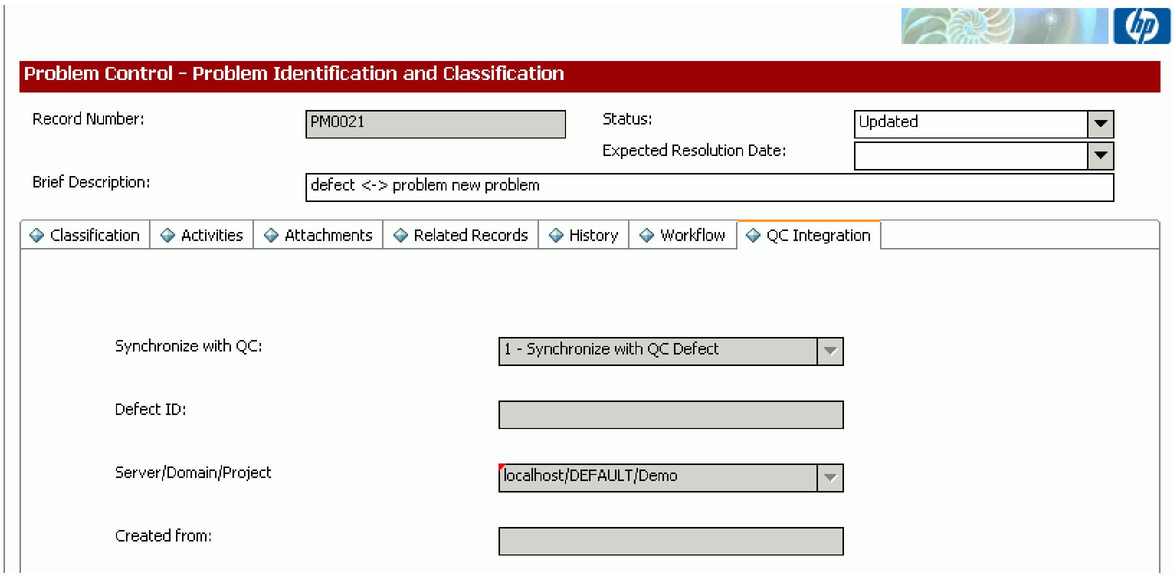


Test the Link

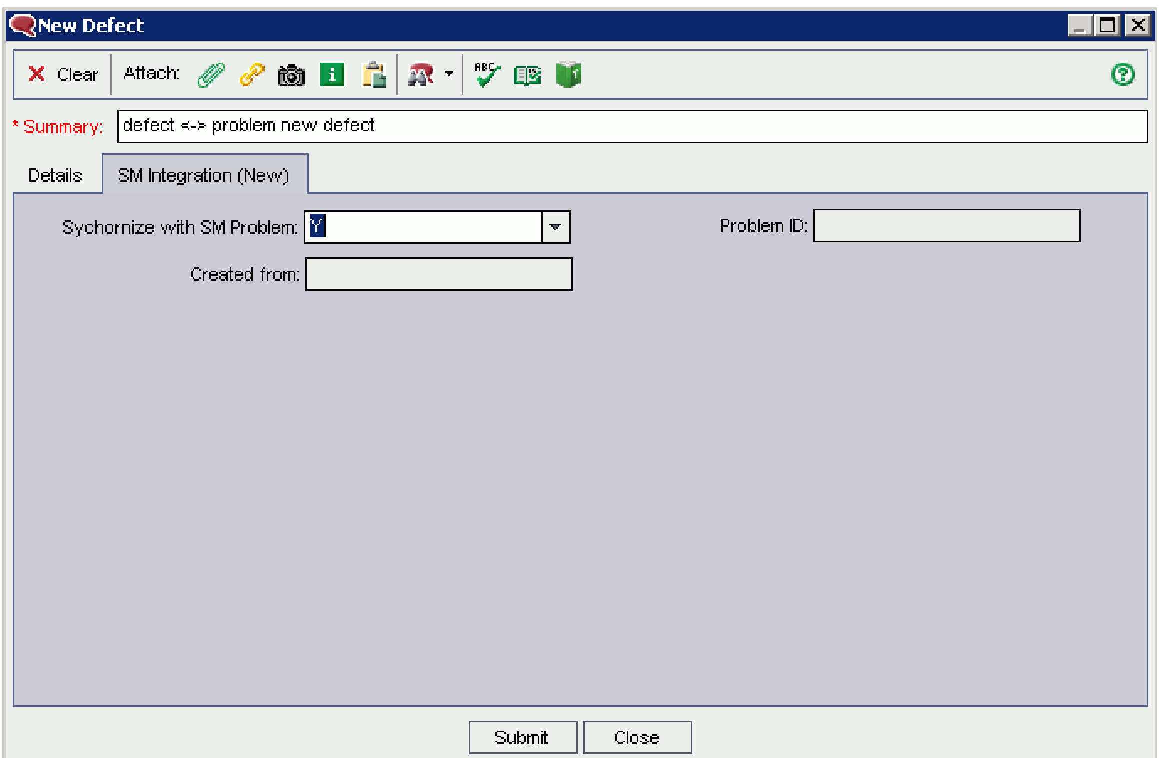
To test the link:

> **Note:**
> 1. A mandatory field (in either SM and QC) does not accept a null value. Synchronization may fail if a mandatory field is mapped to a field that can be null.
>
> 2. The following sample steps are for your reference only. The exact steps required on your system may differ significantly. The phase in which the QC Integration tab appears may be different on your system.

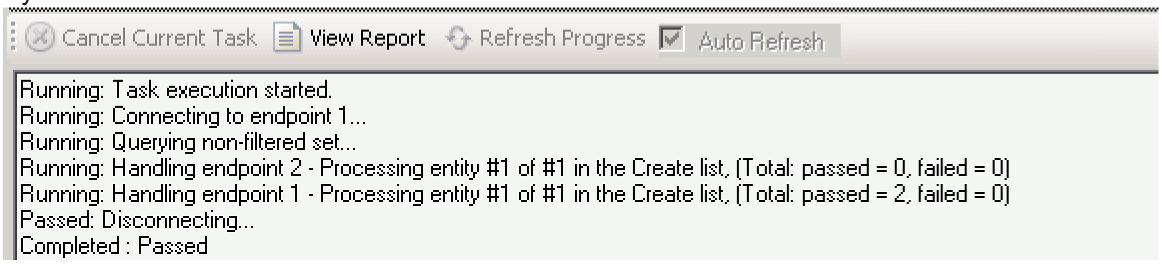
1. Save the configuration (an integrity check is automatically run).
2. Click **Enable Link**.
3. Create a problem in SM and select “1-Synchronize with QC Defect”.



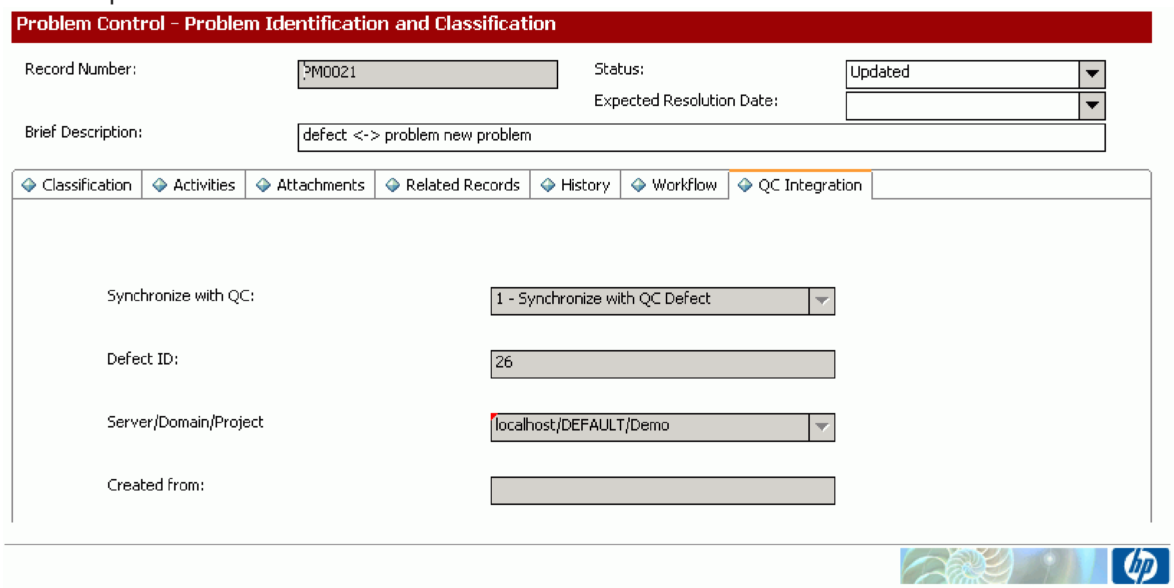
4. Create a defect in QC and set Synchronize with SM Problem to **Y**.

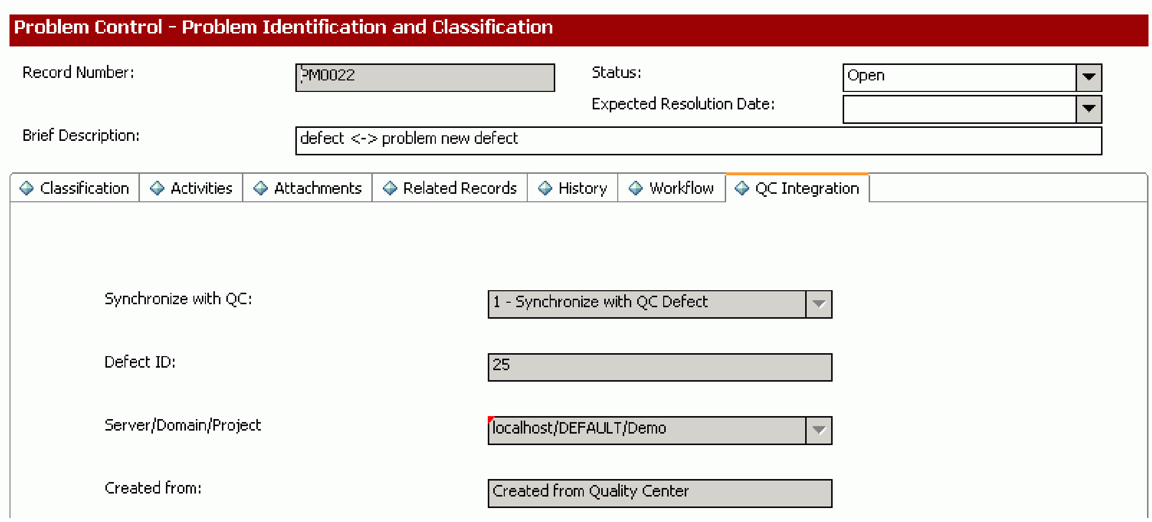


5. Synchronize.

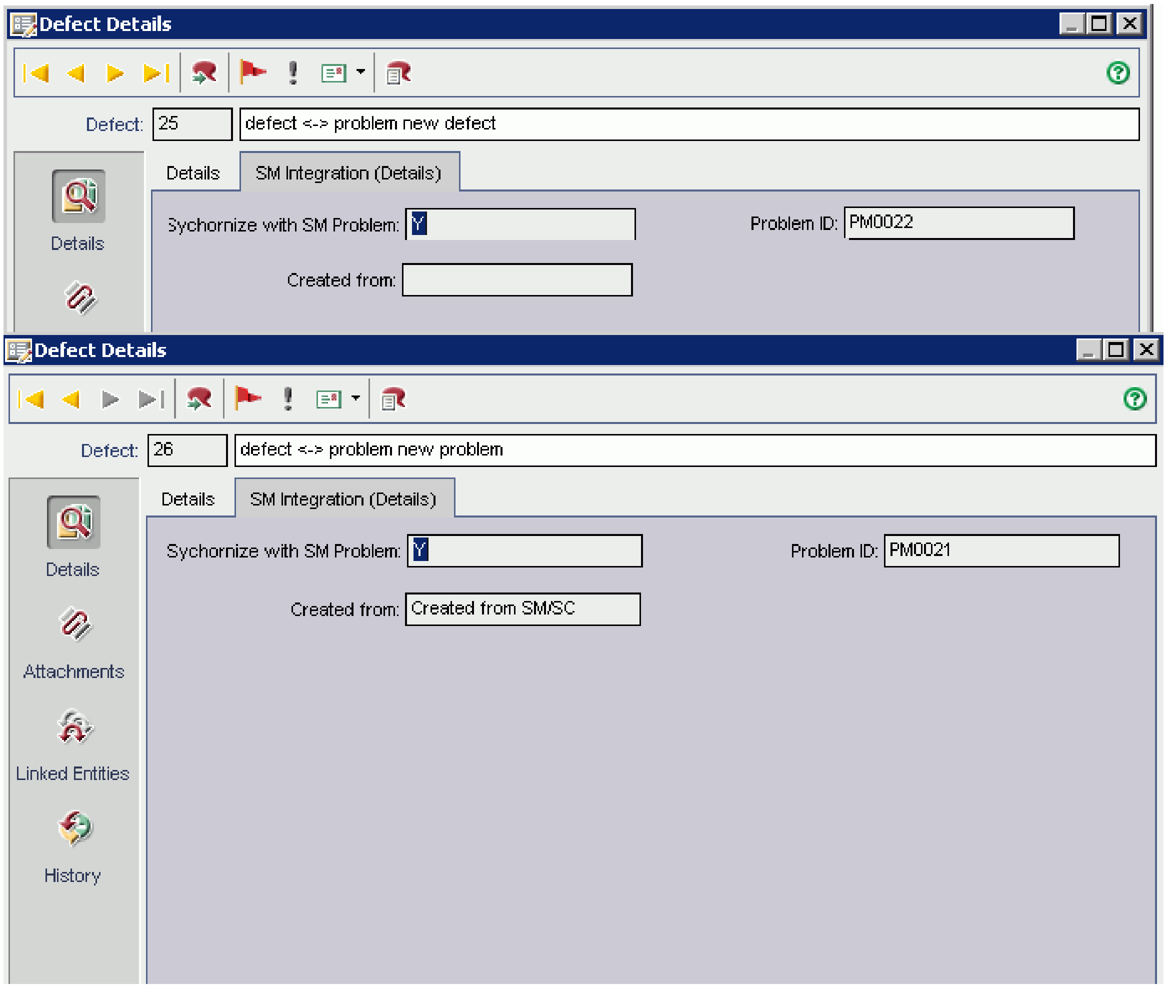


6. View the problem in SM.





7. View the defect in QC.



Note: In ALM 11, the **Synchronize with SM Problem** field and the **Problem ID** field reside on the Details tab of the Defect form.

Chapter 11: Upgrading the Integration

This chapter describes how to upgrade the integration. If the integration components such as Service Manager/ServiceCenter, QC/ALM, and QC/ALM Synchronizer need to be upgraded, refer to the Upgrade Guides of these products.

This chapter includes:

- "Upgrading to the Latest Release" below
- "Post-Upgrade Tasks" on page 197

Upgrading to the Latest Release

To upgrade the integration to the latest release, perform the following tasks:

1. "Back up Jar Files and Links" below
2. "Deploy the Latest Adapters" below
3. "Upgrade for Various Synchronization Scenarios" on the next page

Back up Jar Files and Links

To back up jar files and links:

1. Back up all `sm-*.jar` files (including stub jar) in the `<QCS_Install_Dir>\adapters\lib` directory.
2. Back up the configurations of all links in the QCS client by clicking **Link** > **Export** > **Link Configuration Into XML File...**.
3. Back up the data of all links in the QCS client by clicking **Link** > **Export** > **Link Data Into Backup File...**.

Deploy the Latest Adapters

To deploy the latest adapters:

1. Stop the HP Synchronizer server by clicking **All Programs** > **HP Quality Center Synchronizer** > **Stop Synchronizer**.
2. Remove all `sm-*.jar` files from the `<QCS_Install_Dir>\adapters\lib` directory.

3. Install the SMQC Patch 2 package.
   Download the installer for Patch 2 from the HP Quality Center Add-ins website (http://updates.merc-int.com/qualitycenter/qc90/sync/sm/index.html) and run it.

4. Deploy all jars in the `<release-package>\adapter` folder and the stub jar to the `<QCS_Install_Dir>\adapters\lib` directory. See "Deploying the Adapters" on page 18 for more details.

5. Start the HP Synchronizer server by clicking **All Programs** > **HP Quality Center Synchronizer** > **Start Synchronizer**.

Upgrade for Various Synchronization Scenarios

This section describes how to upgrade various synchronization scenarios to the latest release.

This section includes:

Upgrade in Non-PD Environment

This section describes how to upgrade various synchronization scenarios to the latest release in non-PD environment.

This section includes:

SM Change -> QC/ALM Defect

To upgrade the synchronization scenario of "SM Changes to QC/ALM Defects" ("Change -> Defect"), perform the following tasks:

1. **Upgrade SM/SC Customization**

   No upgrade required.

2. **Upgrade QCALM Customization**

   Perform the following steps to add a new field "Created from" in the defect entity:

   a. Log on to QC as a project administrator.

   b. Click **Tools / Customize**. The "QC - Project Customization" module opens.

   c. Add the following field for the defect entity in Project Entities (*XY* is a sequential number auto-generated by QC).

Field Name	Field Label	Field Type	Remarks
BG_USER_*XY*	Created from	String	

   d. In the "QC - Project Customization" module, click **Workflow**.

      i. Add the following code to the **WizardFieldCust_Details** and **WizardFieldCust_Add** event procedures

      ```
      SetFieldApp "BG_USER_XY", True, False, 1, 1
      ```

      ii. Set the field to Read-only by adding the following lines to the **Bug_New** and **Bug_Moveto** subroutines.

      ```
      Bug_Fields.Field("BG_USER_XY").IsReadOnly=True
      ```

   e. Save your changes and log out.

3. **Upgrade QC/ALM Synchronizer Customization**

   Perform the following steps:

   a. In the Quality Center Synchronizer client, edit the link and refresh Schemas.

   b. Add the following constant mapping to the link for this synchronization scenario.

QC	Direction	SM	Constant Value
Created from	<-		Created from SM/SC

   c. Save the link.

SM Change -> QC/ALM Requirement

To upgrade the synchronization scenario of "SM Changes to QC/ALM Requirements" ("Change -> Requirement"), perform the following tasks:

1. **Upgrade SM/SC Customization**

   No upgrade required.

2. **Upgrade QC/ALM Customization**

   Perform the following steps to add a new field “Created from” in the requirement entity:

   a. Log on to QC as a project administrator.

   b. Click **Tools / Customize**. The “QC - Project Customization” module opens.

   c. Add the following fields for the requirement entity in Project Entities (*XY* are sequential numbers auto-generated by QC).

Field Name	Field Label	Field Type
RQ_USER_*XY*	Created from	String

   d. In Requirement Types add the “Created from” field to the Business type requirement. The Business type is the default requirement type for incoming requirements (other types can be used).

   e. In the “QC - Project Customization” module, click **Workflow**.

   In the Script Editor for the Requirements module script, add the following code to **Req_New** and **Req_Moveto** to set fields as read-only and place the fields on the tabs (**Req_New** is called when a new Requirement is created; **Req_Moveto** is called when an existing Requirement is opened):

   ```
   Req_Fields.Field("RQ_USER_XY").IsReadOnly=True

   SetReqField "RQ_USER_XY", True, False, 1, 1
   ```

   f. Save your changes and log out.

3. **Upgrade QC/ALM Synchronizer Customization**

   Perform the following steps:

   a. In the Quality Center Synchronizer client, edit the link and refresh Schemas.

b. Add the following constant mapping to the link for this synchronization scenario.

QC	Direction	SM	Constant Value
Created from	<-		Created from SM/SC

c. Save the link.

SM Problem -> QC/ALM Defect

No upgrade required.

QC/ALM Defect -> SM Problem

To upgrade the synchronization scenario of "QC/ALM Defects to SM Problems" ("Defect -> Problem"), perform the following tasks:

1. **Upgrade SM/SC Customization**

   Perform the following steps:

   a. Log on to SM/SC as a system administrator.

   b. Click **System Definition** > **Tables** > **rootcause** > **Fields**.

   c. Add two new fields as follow:

Field	Type	
	Service Manager 7.0x or later	**ServiceCenter 6.2**
qcintegration.type	Character	Text
qcintegration.created.from	Character	Text

   d. Customize forms.
   Add a field “Created From” to subform “pm.qcint.subform”. See "Add Fields" on page 123.

   e. Configure WSDL.
   Open the "QCIntProblemService" service in WSDL Configuration, and enable the following two fields:

Field	Caption	Type
qcintegration.type	QCIntegrationType	StringType
qcintegration.created.from	CreatedFrom	StringType

See "Specify the External Access Definition on Service Manager" on page 123 and "Specify the External Access Definition on ServiceCenter" on page 127 for more information.

f. Restart the server if you are using ServiceCenter 6.2.

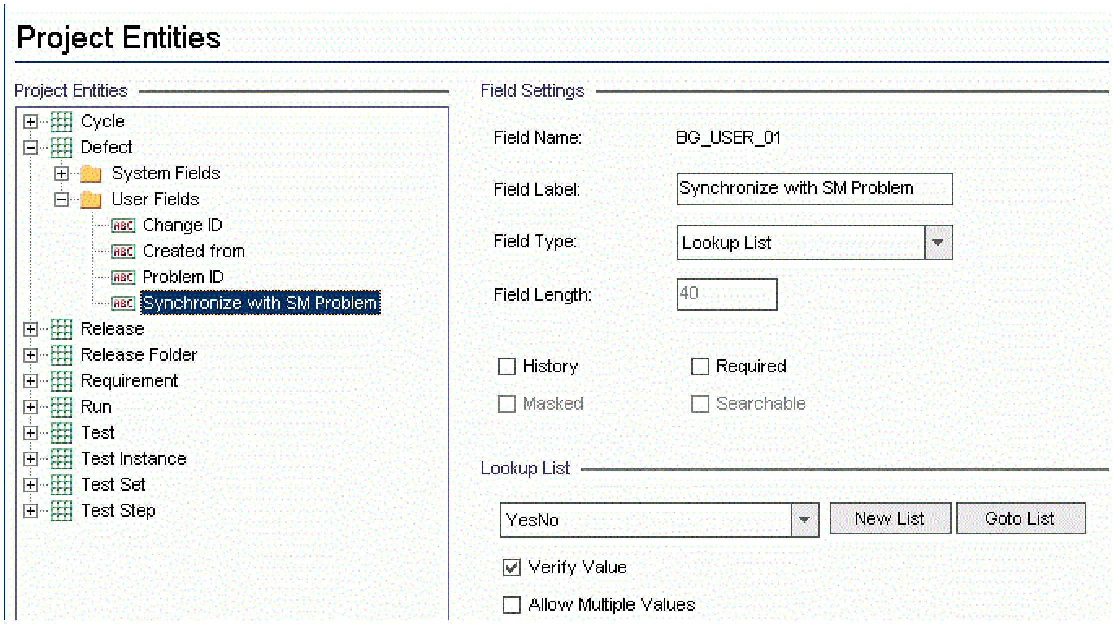
2. **Upgrade QC/ALM Customization**

   Perform the following steps to add a new field “Created from” in the defect entity:

   a. Log on to QC as a project administrator.

   b. Click **Tools / Customize**. The Module “QC - Project Customization” module opens.

   c. Rename “Forward as Problem” to “Synchronize with SM Problem”



   d. Log off and log on again with the integration account.

   e. Update filter “SMIntegrationView” to “Synchronize with SM Problem = Y”.

   f. Log off.

3. **Upgrade QC/ALM Synchronizer Customization**

   Perform the following steps:

a. Deploy the stub jar again. See "Generating/Deploying the Stub" on page 18.

b. In the QC/ALM Synchronizer client, edit the link and refresh Schemas.

c. Add the following two constant mappings to the link for this synchronization scenario.

QC	Direction	SM	Constant Value
	->	QCIntegrationType	1
	->	CreatedFrom	Created from Quality Center

d. Save the link.

SM Problem <-> QC/ALM Defect

No upgrade required.

Upgrade from Non-PD Environment to PD Content Pack 9.30.2

This section describes how to upgrade various synchronization scenarios from non-PD environment to PD Content Pack 9.30.2.

This section includes:

- SM Change -> QC/ALM Defect

  To upgrade the synchronization scenario of "SM Changes to QC/ALM Defects" ("Change -> Defect"), refer to "Add the Subform to a Form" and "Add Rule Set Calculations/Validations" in the SM Change -> QC/ALM Defect chapter.

- SM Change -> QC/ALM Requirement

  To upgrade the synchronization scenario of "SM Changes to QC/ALM Requirements" ("Change -> Requirement"), refer to Add the Subform to a Form and Add Rule Set Calculations/Validation in the SM Change -> QC/ALM Requirement chapter.

Upgrade from Non-PD Environment to PD Content Pack 9.30.3

This section describes how to upgrade various synchronization scenarios from non-PD environment to PD Content Pack 9.30.3.

This section includes:

- SM Change -> QC/ALM Defect

  To upgrade the synchronization scenario of "SM Changes to QC/ALM Defects" ("Change -> Defect"), refer to "Add the Subform to a Form" and "Add Rule Set Calculations/Validations" in the SM Change -> QC/ALM Defect chapter.

- SM Change -> QC/ALM Requirement

  To upgrade the synchronization scenario of "SM Changes to QC/ALM Requirements" ("Change -> Requirement"), refer to Add the Subform to a Form and Add Rule Set Calculations/Validation in the SM Change -> QC/ALM Requirement chapter.

- SM Problem -> QC/ALM Defect

  To upgrade the synchronization scenario of "SM Problems to QC/ALM Defects" ("Problem -> Defect"), perform the following tasks:

  a. Upgrade SM Customization

     Refer to "Specify the External Access Definition on Service Manager", "Add the Subform to a Form" and "Add Rule Set Calculations/Validations" in the SM Problem -> QC/ALM Defect chapter.

  b. Upgrade QC/ALM Synchronizer Customization

     Refer to "Define Field Mappings" in the SM Problem -> QC/ALM Defect chapter.

- QC/ALM Defect -> SM Problem

  To upgrade the synchronization scenario of "QC/ALM Defects to SM Problems" ("Defect -> Problem"), perform the following tasks:

  a. Upgrade SM Customization

     Refer to "Add the Subform to a Form" in the QC/ALM Defect -> SM Problem chapter.

  b. Upgrade QC/ALM Synchronizer Customization

     Refer to "Define Field Mappings" in the QC/ALM Defect -> SM Problem chapter.

- SM Problem <-> QC/ALM Defect

  To upgrade the synchronization scenario between QC/ALM Defects and SM Problems ("Defect <-> Problem"), perform the following tasks:

  a. Upgrade SM Customization

     Refer to "Specify the External Access Definition on Service Manager", "Add the Subform to a Form" and "Add Rule Set Calculations/Validations" in the SM Problem -> QC/ALM Defect chapter.

b. Upgrade QC/ALM Synchronizer Customization

   Refer to "Define Field Mappings" in the SM Problem -> QC/ALM Defect chapter.

Upgrade from PD Content Pack 9.30.2 to 9.30.3

This section describes how to upgrade various synchronization scenarios from PD Content Pack 9.30.2 to 9.30.3.

This section includes:

- SM Problem -> QC/ALM Defect

  To upgrade the synchronization scenario of "SM Problems to QC/ALM Defects" ("Problem -> Defect"), perform the following tasks:

  a. Upgrade SM Customization

     Refer to "Specify the External Access Definition on Service Manager", "Add the Subform to a Form" and "Add Rule Set Calculations/Validations" in the SM Problem -> QC/ALM Defect chapter.

  b. Upgrade QC/ALM Synchronizer Customization

     Refer to "Define Field Mappings" in the SM Problem -> QC/ALM Defect chapter.

- QC/ALM Defect -> SM Problem

  To upgrade the synchronization scenario of "QC/ALM Defects to SM Problems" ("Defect -> Problem"), perform the following tasks:

  a. Upgrade SM Customization

     Refer to "Add the Subform to a Form" in the QC/ALM Defect -> SM Problem chapter.

  b. Upgrade QC/ALM Synchronizer Customization

     Refer to "Define Field Mappings" in the QC/ALM Defect -> SM Problem chapter.

- SM Problem <-> QC/ALM Defect

  To upgrade the synchronization scenario between QC/ALM Defects and SM Problems ("Defect <-> Problem"), perform the following tasks:

  a. Upgrade SM Customization

     Refer to "Specify the External Access Definition on Service Manager", "Add the Subform to a Form" and "Add Rule Set Calculations/Validations" in the SM Problem -> QC/ALM Defect chapter.

b. Upgrade QC/ALM Synchronizer Customization

Refer to "Define Field Mappings" in the SM Problem -> QC/ALM Defect chapter.

Post-Upgrade Tasks

If you are using the integration solution release 1.00:

A new parameter **Socket timeout (Minutes)** has been introduced since Patch 1. To leverage this parameter, you need to export/import links to make this new parameter available on the Quality Center Synchronizer client.

Perform the following steps:

1. Export all links as XML files in the Quality Center Synchronizer client by clicking **Link** > **Export** > **Link Configuration into XML File...**.
2. Delete each link in the HP Quality Center Synchronizer client by clicking **Link** > **Delete**.
3. Restore all links by importing the XML files into the HP Quality Center Synchronizer client by clicking **Link** > **Create From** > **Link configuration XML File...**.

Appendix A: Error Messages

This appendix describes the following categories of error messages:

- "Required Fields" on the next page
- "Installation" on page 200
- "Configuration" on page 200
- "Runtime" on page 203
- "XML Validation" on page 207

Required Fields

The following field names are hard-coded.

Field Name	Module	Action	Error Message/Symptom
qcintegration.type	SM Database	Synchronization	No errors in the log and the records failed to be synchronized.
qcintegration.project	SM Database	Synchronization	No errors in the log and the records failed to be synchronized.
QCIntChangeService	SM WSDL Configuration	Generate/Deploy Stub	The stub for Service Manager Change generation failed.
QCIntChange	SM WSDL Configuration	Create a link	System.Web.Services.Protocols.SoapException:java.lang.reflect. InvocationTargetException
ChangeNumber	SM WSDL Configuration	Synchronization	Query: SM ChangeManagement: Can not getRecordIDs. Synchronize: Processing synchronization events failed. Error : java.lang.NoSuchMethodError
Modified	SM WSDL Configuration	Synchronization	Query: SM ChangeManagement: Can not getRecordIDs. Synchronize: Processing synchronization events failed. Error : java.lang.NoSuchMethodError / Query: SM ProblemManagement: Can not getRecordIDs. Synchronize: Processing synchronization events failed. Error : java.lang.NoSuchMethodError
QCIntProblemService	SM WSDL Configuration	Generate/Deploy Stub	Stub for Service Manager Problem generation failed.

Field Name	Module	Action	Error Message/Symptom
QCIntProblem	SM WSDL Configuration	Create a link	System.Web.Services.Protocols.SoapException:java.lang.reflect. InvocationTargetException.
ProblemID	SM WSDL Configuration	Synchronization	Query: SM ProblemManagement: Can not getRecordIDs. Synchronize: Processing synchronization events failed. Error: java.lang.NoSuchMethodError.

Installation

MSG_ ID	Message	Cause	Solution
INS_1	The stub for Service Manager Change generation failed.	The Change WSDL URL is not valid.	Provide the valid Change WSDL URL. (For example, `http://` *`localhost`*`:13080/sc62server/PWS/QCIntChangeService.wsdl`).
INS_2	The stub for Service Manager Problem generated failed.	The Problem WSDL URL is not valid.	Provide the valid Problem WSDL URL. (For example, `http://` *`localhost`*`:13080/sc62server/PWS/QCIntChangeService.wsdl`).

Configuration

MSG_ ID	Message	Cause	Solution
CFG_ 1	Can not select “Change Management” and “Problem Management” from the endpoint 2 type.	SM adapter cannot be loaded successfully.	Ensure the stub, adapter and dependency jars are in `<QCS_Install_Dir>\adapters\lib`.

MSG_ ID	Message	Cause	Solution
CFG_ 2	No create/delete event on change entity is allowed.	For “Change->Defect” and “Change- >Requirement” in the Events tab, 'Create a / Delete its corresponding record in the other endpoint' for QC Endpoint Events is selected.	Select **Do nothing** in the radio-box.
CFG_ 3	No delete event on the problem entity.	In the Events tab, 'Delete its corresponding record in the other endpoint' is selected.	Select **Do nothing** for all Deletion (Full Synchronization Only) in the Events tab.
CFG_ 4	Missing connection parameter: UserName.	'User name' is empty.	Enter a user name in the Connectivity tab.
CFG_ 5	Missing connection parameter: Service URL.	'Service URL' is empty.	Enter a Service URL in the Connectivity tab.
CFG_ 6	Missing connection parameter: QC Project.	'QC Project’ is empty.	Enter a QC Project name in the Connectivity tab.
CFG_ 7	Missing connection parameter: Service URL.	'Service URL’ is empty.	Enter a Service URL in the Connectivity tab.
CFG_ 8	Connection parameter: Configuration File Path is not valid.	File path is invalid and the specified file does not exist.	Enter a valid configuration file path name in the Connectivity tab (or leave it empty).

MSG_ ID	Message	Cause	Solution
CFG_ 9	To connect to endpoint of type SM ChangeManagement. Error: com.hp.qc.synchronizer.adapters.exceptions. AdapterException: Fail to connect to SM: Connection refused: connect. ERROR #2- Fail to connect to SM: Connection refused: connect.	SM Server is shutdown or not available.	Start the SM Server or make it available.
CFG_ 10	ERROR #1- adapter.CONNECTION_ FAILURE : Failed to connect to endpoint of type SM ChangeManagement. Error: com.hp.qc.synchronizer.adapters.exceptions. AdapterException: Fail to connect to SM: The web service of SM is not reachable! ERROR #2- Fail to connect to SM: The web service of SM is not reachable!	Web service is not available (for example, is not configured).	Make the Web service available.
CFG_ 11	ERROR #1- adapter.CONNECTION_ FAILURE : Failed to connect to endpoint of type SM ChangeManagement. Error: com.hp.qc.synchronizer.adapters.exceptions. AdapterException: The URL of SM web service is not valid! ERROR #2- The URL of SM web service is not valid!	URL format is wrong.	Correct the URL. The format is: `http://<sm server>:<port>/sc62server/PWS/[QCIntChangeService|QCIntProblemService].wsdl`

MSG_ ID	Message	Cause	Solution
CFG_ 12	Retry times must be an integer between 0 and 3. (0 means disabled).	The value for the parameter **Retries on Locked Record** in the Advanced tab is out of range (0~3).	Enter an integer (0 ~ 3) for **Retries on Locked Record** in the Advanced tab.
CFG_ 13	Retry interval must be an integer between 1 and 10.	The value for parameter **Retry Interval (Seconds)** in the Advanced tab is out of range (1 to 10).	Enter an integer (1 to 10) for **Retry Interval(Seconds)** in the Advanced tab.
CFG_ 14	Socket timeout must be an integer between 0 and 120. (0 means default timeout).	The value for parameter: **Socket Timeout (Minutes)** in the Advanced tab is out of range (0 to 120).	Enter an integer (0 to 120) for **Socket Timeout (Minutes)** in the Advanced tab.

Runtime

MSG_ ID	Message	Cause	Solution
RUN_ 1	Required field <Field Name> can not be empty or SPACE filled.	Synchronized null /space value to a required field from sponsor to receiver.	Ensure that required field values are not null or filled with spaces.
RUN_ 2	error when reading web service response from SM: Resource Unavailable	Synchronize updates from QC side to locked change/problem records.	Close the locked records in SM side.

MSG_ ID	Message	Cause	Solution
RUN_ 2	Error when reading web service response from SM: Not authorized	There are two possible causes: • Insufficient rights for the SM Integration user when creating/updating defect/requirement in QC or running synchronization to create/update the corresponding change/problem. • Maximum active logins for integration account is exceeded.	1. Check the rights of integration account. 2. Check and make sure that **Unlimited session** in the **Security** tab is selected.
RUN_ 3	Error 23scxmlapi(23) - XML DOM exception caught - code 5 msg An invalid or illegal XML character is specified	Synchronization is performed with an illegal WSDL caption.	Correct the WSDL configuration.
RUN_ 4	Update failed 1/2/3, retry in 10 seconds, error message=…	Record is locked in SM.	Close the locked record.
RUN_ 5	Update failed for 3 times, skip, error message=...	Record is locked in SM.	Synchronize the record manually or run a full synchronization to run all missing updates.
RUN_ 6	Cannot get field for <Field Name>.	SM adapter cannot get a field.	Ensure that the stub jar has been generated correctly.
RUN_ 7	Value cannot be reached for <Field Name>.	SM adapter cannot find this field from the stub class.	Ensure that the stub jar has been generated correctly.

MSG_ ID	Message	Cause	Solution
RUN_ 8	Mapping error, no such property <property name> defined in type <type name>.	SM adapter cannot find this property.	Ensure that the stub jar has been generated correctly.
RUN_ 9	Error during setting value for key <key name> with value <value>.	Dynamic model cannot find this key.	Ensure that the stub jar has been generated correctly.
RUN_ 10	Mapping file <file path> cannot be found!	The configuration file isn't found.	Please check the configuration file.
RUN_ 10	<Module builder class name> cannot be created because of <message>.	SM adapter cannot load a specified class.	Ensure that the stub jar has been generated correctly.
RUN_ 11	Can not convert to <target class name> from value <value>.	Value cannot be converted to target type.	Ensure that the WSDL does not expose non-supported data types.
RUN_ 12	Exception when getting SM response, return code: <return code>.	Problem with SM communication.	Refer to references for error messages.
RUN_ 13	Error when reading web service response from SM, record is locked [changeID=<recordID>], message=<Message>.	Record is locked.	Close the locked record.

MSG_ ID	Message	Cause	Solution
RUN_ 14	The data in the '<field name>' field of record <record id> - of file <file name> contains data that does not conform to the SOA data type in datadict.	The SOAP field data type in the WSDL is not correct. If the field is of the Number type, the value in the database is out of the range of the specified SOAP type. For example, when choosing IntType (data range: (-2,147,483,648 to 2,147,483,647) for a Number field, if this field has a value of 2,147,483,648 (2^31), it will cause this error when reading the record through the web service interface.	If this field has a Number type, choose **DecimalType** in the WSDL. Otherwise select the correct SOAP type.
RUN_ 15	Unable to create envelope from given source: ...	The name of a structure field in Service Manager may have non-English characters.	Use English characters in the name of a structure field.
RUN_ 16	QC: findRequirementById: Failed getting requirement with id: <id> Failed to update, record was not found or deleted on target null	Deleting or removing a record may result in this problem, because incremental synchronization will fail to find the record.	Restore this record or just run a "Full Synchronization" to remove this mapping relationship established for the record before.
RUN_ 17	Invalid byte 2 of 3-byte UTF-8 sequence.	There are some special non-English characters in the values of fields.	Update the WSDL definition for this field in Service Manager by leaving the "Type" field bank instead of specifying "StringType" for this field.

XML Validation

MSG_ ID	Error Message	Cause	Solution
XML_ 1	Failed to validate the configuration file: cvc-elt.1: Cannot find the declaration of element 'test'.	Root element is not **mapping**.	Add a root element **mapping**.
XML_ 2	Failed to validate the configuration file: cvc-complex-type.2.4.b: The content of element 'mapping' is not complete. One of '{module}' is expected. cvc-complex-type.2.4.b: The content of element 'mapping' is not complete. One of '{module}' is expected.	No **module** element in the **mapping** element.	Add a **module** element in the **mapping** root element.
XML_ 3	Failed to validate the configuration file: cvc-complex-type.2.4.d: Invalid content was found starting with element '{module}'. No child element is expected at this point.	More than two **module** elements in the mapping file.	Make sure the **mapping** element has only one or two **module** elements.
XML_ 4	Failed to validate the configuration file: cvc-enumeration-valid: Value 'others' is not facet-valid with respect to enumeration '[change, problem]'. It must be a value from the enumeration. cvc-attribute.3: The value 'others' of attribute 'name' on element 'module' is not valid with respect to its type, 'ModuleName'.	Name of a module is not **problem** or **change**.	The **name** attribute of a **module** element should be **change** or **problem**.
XML_ 5	Failed to validate the configuration file: cvc-complex-type.2.4.b: The content of element 'module' is not complete. One of '{field}' is expected.	No **field** element in the **module** element.	Define **field** elements in each **module** element.

MSG_ ID	Error Message	Cause	Solution
XML_ 6	Failed to validate the configuration file: cvc-enumeration-valid: Value 'Unknown' is not facet-valid with respect to enumeration '[String, Number, Date, Attachment, Single_Value_List, Multi_Value_List]'. It must be a value from the enumeration. cvc-attribute.3: The value 'Unknown' of attribute 'type' on element 'field' is not valid with respect to its type, 'FieldType'.	The **field** element has a wrong type attribute.	The **type** attribute of a **field** element must be enumeration '[String, Number, Date, Attachment, Single_Value_List, Multi_ Value_List]'
XML_ 7	Failed to validate the configuration file: cvc-datatype-valid.1.2.1: 'wrong' is not a valid value for 'boolean'. cvc-attribute.3: The value 'wrong' of attribute 'readonly' on element 'field' is not valid with respect to its type, 'boolean'.	The **field** element has a wrong **readonly** attribute.	The **readonly** attribute of a **field** element should be **true** or **false**.
XML_ 8	Failed to validate the configuration file: cvc-enumeration-valid: Value 'wrong' is not facet-valid with respect to enumeration '[mandatory, optional, recommended]'. It must be a value from the enumeration. cvc-attribute.3: The value 'wrong' of attribute 'required' on element 'field' is not valid with respect to its type, 'FieldRequired'.	The **field** element has a wrong **required** attribute.	The **required** attribute of a **field** element should be **mandatory**, **optional** or **recommended**.
XML_ 9	Failed to validate the configuration file: cvc-complex-type.4: Attribute 'type' must appear on element 'field'.	The **field** element has no **type** attribute.	The **type** attribute must be defined in each **field** element.
XML_ 10	Failed to validate the configuration file: cvc-complex-type.4: Attribute 'name' must appear on element 'field'.	The **field** element has no **name** attribute.	Define a **name** attribute in the **field** element.

MSG_ ID	Error Message	Cause	Solution
XML_ 11	Failed to validate the configuration file: cvc-complex-type.2.4.d: Invalid content was found starting with element 'items'. No child element is expected at this point.	The **field** element has more than one child element **items**.	Define only one **items** element in each **field** element.
XML_ 12	Failed to validate the configuration file: cvc-complex-type.2.4.b: The content of element 'items' is not complete. One of '{item}' is expected.	The **items** element has no child element **item**.	Add **item** elements in each **items** element.
XML_ 13	Failed to validate the configuration file: cvc-complex-type.4: Attribute 'value' must appear on element 'item'.	The **item** element has no **value** attribute.	Define a **value** attribute for each **item** element.
XML_ 14	Failed to validate the configuration file: cvc-minLength-valid: Value '' with length = '0' is not facet-valid with respect to minLength '1' for type 'Item'. cvc-complex-type.2.2: Element 'item' must have no element [children], and the value must be valid.	The **item** element has no **text** value.	Define a **text** value for each **item** element.
XML_ 15	cvc-minLength-valid: Value '' with length = '0' is not facet-valid with respect to minLength '1' for type 'NonEmptyString'. cvc-attribute.3: The value '' of attribute 'value' on element 'item' is not valid with respect to its type, 'NonEmptyString'.	The **value** attribute has an empty value.	Define a value for the **value** attribute in each **item** element.
XML_ 16	cvc-minLength-valid: Value '' with length = '0' is not facet-valid with respect to minLength '1' for type 'NonEmptyString'. cvc-attribute.3: The value '' of attribute 'name' on element 'field' is not valid with respect to its type, 'NonEmptyString'.	The **name** attribute has an empty value.	Define a value for the **name** attribute of each **item** element.

MSG_ ID	Error Message	Cause	Solution
XML_ 17	cvc-enumeration-valid: Value 'Attachment' is not facet-valid with respect to enumeration '[String, Number, Date, Single_Value_List, Multi_Value_List]'. It must be a value from the enumeration. cvc-attribute.3: The value 'Attachment' of attribute 'type' on element 'field' is not valid with respect to its type, 'FieldType'.	The **field** element has a type of **Attachment**.	Remove the **Attachment** type element.
XML_ 18	Fail to validate the configuration file: cvc-datatype-valid.1.2.1: 'xxx' is not a valid value for 'integer'. cvc-attribute.3: The value 'xxx' of attribute 'length' on element 'field' is not valid with respect to its type, 'positiveInteger'.	The **field** element has an incorrect length attribute value.	Correct the value of the **field** element.

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