
Perforce 2014.1 Defect Tracking Gateway Guide

November 2014

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About This Manual

This is the *Perforce 2014.1 Defect Tracking Gateway Guide*. This guide tells you how to install and configure the gateway to replicate data between a Perforce server and a defect tracker. For details about this release, refer to the defect tracking gateway release notes.

For More Information about Perforce

All of our documentation is available from our web site at <http://www.perforce.com>.

Please Give Us Feedback

We are interested in receiving opinions on this guide from our users. In particular, we'd like to hear from users who have never used Perforce before. Does this guide teach the topic well? Please let us know what you think; we can be reached at manual@perforce.com.

Installing and Configuring the Defect Tracking Gateway

Overview

Perforce Servers include a basic issue-tracking feature called *jobs*. Jobs can be associated with changelists, so that, for example, when you check in the files that fix a bug or implement a new feature, the associated job is closed.

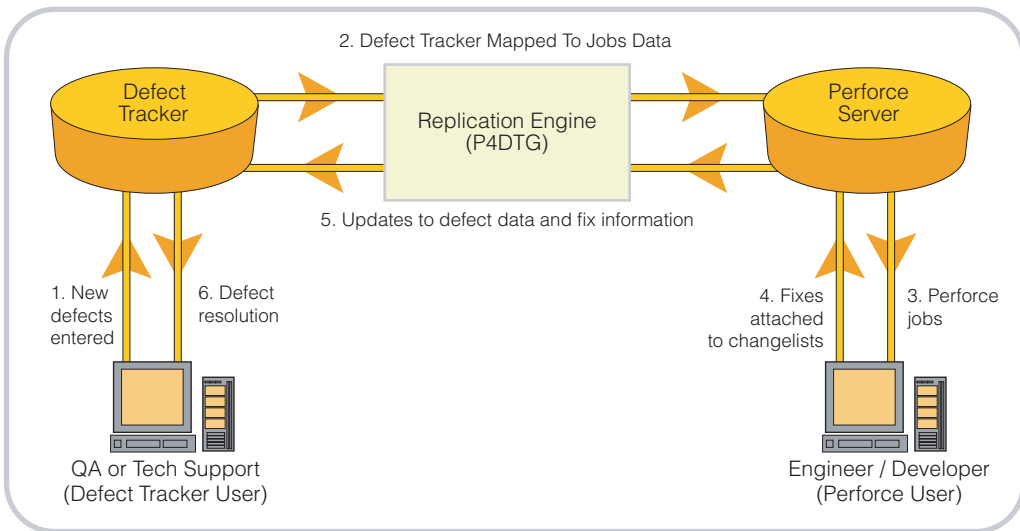
The Perforce Defect Tracking Gateway enables you to integrate Perforce jobs with external defect trackers, so that changes to the status of defect tracker issues are replicated in Perforce jobs and vice versa. For example, when a programmer checks code into Perforce, thereby fixing a job, the fix information can be propagated to your defect tracker, to notify QA engineers that the fix is ready for testing. The gateway enables you to specify how data is propagated between the two systems and provides a program that replicates data according to your specification.

Perforce offers a variety of plug-ins to support various defect trackers, including HP Quality Center, Bugzilla, JIRA, and Redmine. For an up-to-date list of supported defect trackers, consult the Perforce Web site. After you install a plug-in, be sure to read the product-specific documentation that is installed in the `p4dtg/doc/` directory.

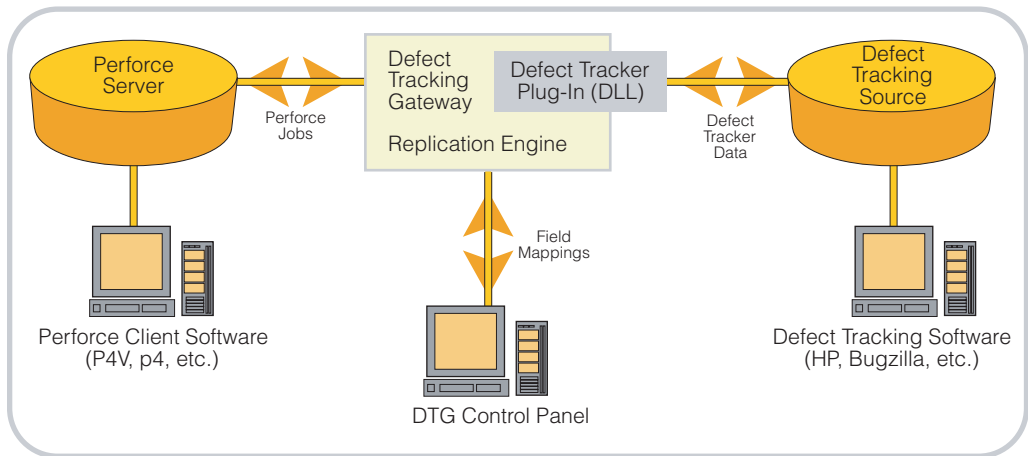
Important: Defect replication is one-to-one, meaning that for each new defect, one Perforce job is created. You cannot configure P4DTG to map multiple jobs to a single defect, or multiple defects to a single job.

The following figure shows the flow of data between the defect tracker and Perforce, which follows this sequence:

1. QA or Support engineer enters a defect into the defect tracker.
2. P4DTG replicates the defect in Perforce as a job.
3. A software engineer reads the Perforce job and fixes the defect.
4. The software engineer attached the job to a changelist containing the fixed files and checks in the changelist, fixing the job in Perforce.
5. P4DTG replicates the fix from Perforce to the defect tracker.
6. The QA or Support engineer sees the fix in the defect tracker.



The following diagram provides an overview of the gateway components and shows how data is transferred.



The data stored for each job is defined by the Perforce job specification, which can be modified by a user with administrative privileges. For details about modifying the job specification, refer to the *Perforce System Administrator's Guide*.

By default, Perforce does not maintain a history of changes to jobs. However, you can create a *spec depot* in which all changes to Perforce specifications are archived. For details about spec depots, refer to the *Perforce System Administrator's Guide*.

For each type of defect tracker (for example, HP Quality Center), a plug-in is required. The plug-in controls which defect tracker data is made available to the gateway. To propagate data between Perforce and defect trackers, you map Perforce job fields to defect tracker fields and specify how they are propagated.

To integrate your defect tracker with Perforce you must:

1. Install the gateway
2. Add required fields to the Perforce job specification
3. Configure the gateway
4. Start the replication engine

The following sections describe these tasks in detail.

Installing the Defect Tracking Gateway

To install the Defect Tracking Gateway on Unix, download the appropriate file for your platform from the Perforce web site. Windows users: run the installer. Unix and Linux users: unpack the archive file.

The following files and folders are installed:

Directory	Contents
p4dtg/	Executables for the replication engine, configuration control panel, test tool, and any required libraries
p4dtg/config	XML files containing field mappings, source definitions and replication settings
p4dtg/help	Online help for configuration control panel
p4dtg/repl	Status and error logs for the replication engine

To replicate with the HP Quality Center defect tracker, you must install the HP Quality Center connectivity add-in, a COM-based DLL that is used by the Quality Center plugin to communicate with the Quality Center server. Note that the Quality Center plugin is available only for Windows.

To install the HP Quality Center connectivity add-in:

1. Launch Internet Explorer.
2. Go to the start page of your HP Quality Center installation.
3. Click **Add-Ins Page**. The Add-Ins page is displayed.
4. Click **HP Quality Center Connectivity**. The **Add-Ins** page is displayed.
5. Click **Download Add-in**, and download and save `TDConnect.exe`.
6. Run `TDConnect.exe`.

Adding Required Fields to the Perforce Job Specification

To edit the Perforce job specification, you must have Perforce admin privilege. To add the required fields:

1. At the command line, issue the `p4 jobspec` command. Perforce launches a text editor displaying the job specification.
2. Add the following fields (*nnn* indicates field numbers, which depend on what's already defined in your job specification. For details, refer to the description of the `p4 jobspec` command in the *Perforce Command Reference*.) Note that the `DTG_MAPID` field is required only if you intend to define segments for filtered replication. For details, see "Filtered Replication" on page 17.

```
nnn DTG_FIXES text 0 optional
nnn DTG_DTISSUE word 32 optional
nnn DTG_ERROR text 0 optional
nnn DTG_MAPID word 32 optional
```

3. If not already defined, add a `date` field that stores the date when the job was last modified and a `word` field that contains the name of the user who last modified the job. In order to guarantee that the data is propagated, the field-type attribute should read `always`. For example:

```
nnn ModDate date 20 always
nnn ModBy word 32 always
```

(The preceding field names are examples. You can assign any valid field name when you edit the job specification.)

4. Define the default value for the preceding fields as follows:

```
ModDate $now
ModBy $user
```

5. Exit the editor, saving your changes.

The attributes you assign to fields in the Perforce job specification determine how the fields can be replicated in the defect tracker, as follows:

Job Specification Attribute	Valid Replication Methods
always	Copy to defect tracker
once	Copy to defect tracker
optional	Copy to defect tracker or Mirror in defect tracker
required	Copy to defect tracker or Mirror in defect tracker

Configuring the Defect Tracking Gateway

To specify how data is replicated between Perforce and the defect tracker, you use the DTG configuration control panel. To launch the configuration control panel, double-click `p4dtg-config.exe`. To configure replication, perform the following steps:

1. Define defect tracking sources (see “Defining Defect Tracker Sources” on page 12)
2. Define Perforce server sources (see “Defining Perforce Server Sources” on page 14)
3. Map job fields to defect fields (“Mapping Data Between Perforce and Defect Trackers” on page 18), optionally including replication of fixes (see “Mapping Fix Data” on page 23)

Note	The data you enter, change, or delete using the DTG configuration control panel is stored (to configuration files on disk) when you click Apply or OK on one of the main tabs. Clicking OK on the data entry dialogs stores your entries temporarily, but they are not stored permanently until you click Apply or OK on one of the main tabs.
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Defining Defect Tracker Sources

For defect trackers, the connection information depends on the requirements of the defect tracker server. For HP Quality Center, the connection information is specified using the syntax `host:port`. In addition to specifying the connection information, some defect trackers (such as HP Quality Center) require you to specify the project to which you are mapping Perforce jobs.

To add a defect tracking source:

1. Click **New**. The **Add Defect Tracking Source** dialog is displayed, as shown in the following figure.

2. Enter the required information as follows:

Field	Description
Name	An alias for the source and its associated information. Specify the defect tracker type by choosing the type from the drop-down list (if you have installed plug-ins for multiple defect trackers).
Server	The information required by the defect tracker for client connections. The format is determined by the defect tracker. For HP Quality Center, specify <i>host:port</i> .
User name	The user name to be used to connect to the defect tracking server.
Password	The password for the specified user, if required.
Reference Fields	The fields that are required to keep Perforce and the defect tracker synchronized.
Modified Date Field	The date that the issue was last changed.
Modified By Field	The user that last changed the issue (if supported by your defect tracker)

The plugin for your defect tracker might enable you to specify other proprietary settings; if so, click **Edit Attributes...** to change these settings. For details, see “Configuring Plug-in Attributes.” on page 14.

If you intend to use filtered replication for this data source, you must define segments. To define segments, click **Edit Segments....** For details, see “Filtered Replication” on page 17.

3. Click **Check connection and retrieve fields**. If you have correctly specified valid values, the dialog displays a success message and the reference fields retrieved from the defect tracker.

If a connection error is displayed, correct your entries and click **Check connection and retrieve fields** again.

4. Choose the defect tracker project from the **Project** drop-down list.
5. Click **OK** to save your entries and dismiss the dialog.

Your newly-defined defect tracking source is now displayed in **Defined Defect Tracking Sources**.

To edit a defect tracking source, click the source in the **Defined Defect Tracking Sources** list, then click **Edit**. To delete a defect tracking source, click the source in the **Defined Defect Tracking Sources** list, then click **Delete**. The source is marked for deletion, as indicated in the **Defined Defect Tracking Sources** list. To finish deletion, click **OK** or **Apply**. To undo deletion, click the source marked for deletion, then click **Undelete**.

Configuring Plug-in Attributes.

Specific defect trackers might require settings outside of those required to configure replication. For example, Bugzilla enables you to specify a MySQL database other than its default database. To configure settings for specific plug-ins, edit its attributes.

To edit attributes, click **Edit Attributes...** . For details about a specific field, click its help button (which is labelled with a question mark). Attributes and valid entries are specific to each plugin, and your defect tracker might not require you to set attributes.

Default attribute settings, which are provided by the plugin, are displayed in light gray. Required attributes are marked with an asterisk (*). Attribute settings are validated by the plugin when you click **OK**.

Defining Perforce Server Sources

To define Perforce Server sources, you specify the information required to connect to the server (the host machine and TCP/IP port) using the syntax *host:port*. The default host is `localhost`, and the default port is 1666.

To add a Perforce Server Source:

1. Click **New**. The **Add Perforce Server Source** dialog is displayed, as shown in the following figure.

2. Enter the server connection details as follows:

Field	Description
Name	An alias for the Perforce server and its associated connection information.
Server	The name of the Perforce server host machine and the port on which it is running. Specify as <i>host:port</i> ; for example p4host 1667. The server host defaults to localhost and the port defaults to 1666.

Field	Description
User name	<p>The Perforce user name used by the replication engine to connect to the Perforce server.</p> <p>Important: To ensure that you can distinguish jobs modified by the gateway, create a dedicated Perforce user to be used only by the gateway. The user name must be used only for defect replication. Do not use this user name for any other purpose.</p> <p>Ensure that the user name is neither a prefix nor a suffix of any other user name. For example, if you have a user named admin-logger, do not use admin or logger as the user name.</p>
Password	<p>The password for the specified user, if required.</p>

If you intend to use filtered replication for Perforce jobs, you must define segments. To define segments, click **Edit Segments....** For details, see “Filtered Replication” on page 17.

3. Click **Check connection and jobspec**. If you have entered valid values, configuration control panel retrieves the job specification for the specified server and displays the names of the reference fields, which are the Perforce job data fields required for replication.

If a connection error is displayed, correct your entries and click **Check connection and jobspec** again.

If the **Server status** field says that the server is not configured, you must add the required fields to the Perforce job specification. For details, see “Adding Required Fields to the Perforce Job Specification” on page 11.

4. Click **OK** to save your entries and dismiss the dialog.

Your newly-defined Perforce server source is now displayed in **Perforce server sources**. Perforce server sources that have been edited and need to be saved are displayed in bold.

To edit a Perforce server source, click the source in the **Perforce server sources** list, then click **Edit**. To delete a Perforce server source, click the source in the **Perforce server sources** list, then click **Delete**. The source is displayed in bold, marked for deletion, but is not deleted until you click **OK** or **Apply**. To undo deletion, click the marked source, then click **Undelete**.

Filtered Replication

To replicate sets of selected defects from a single data source to multiple other defect trackers or version control systems, you define *segments*. For example, if you use Bugzilla to track your database bugs and HP Quality Center to track your Web application bugs, you can create separate segments for each project and replicate them independently. You can create a segment named “Database” that selects all Perforce jobs with the Subsystem field set to “db” and another segment named “Web Application” that selects all Perforce jobs with the Subsystem field set to “webapp.”

To use segments for replication, choose the segment when defining mappings on the Gateway Mappings tab. Note the following requirements:

- If you segment a Perforce source or a Defect Tracking Source, you are required to choose a segment and cannot choose the top-level source.
- A non-segmented data source that is in use (that is, already referenced by a mapping) cannot be segmented.
- After a data source has been segmented and one or more of the segments has been mapped, you cannot remove SELECT values from the segment definition.
- If a data source is already being replicated, you cannot create segments for it.
- Fields only appear in the Perforce Server Source segmentation list if they are defined as SELECT fields in the Perforce job specification.

To create a segment for a Perforce or Defect Tracking Source:

1. On the Perforce Source or Defect Tracking Source tab, click **Edit Segments...** The **Edit Segments** dialog is displayed.
2. Specify the field to be used to filter defects by choosing the field from the **Segment using SELECT field** list. (The fields listed are SELECT fields returned by the data source plugin.)
3. To add a segment, click **New...** In the **New Segment** dialog, specify a name for the segment and click OK.
4. Specify the values that you want to include in the segment by moving them from the **Unassigned options** column to the **Included options** column.
5. To save your segment definition and dismiss the dialog, click **OK**.
6. To save your changes, click OK on the Perforce Source or Defect Tracking Source tab.

Mapping Data Between Perforce and Defect Trackers

After defining Perforce Server sources and defect tracker sources, you must specify how data is replicated between them when a job or issue is changed. In addition, you can configure the data that is transmitted to the defect tracker when a job is fixed in Perforce.

Before entering mappings, define the relationships between the data in Perforce jobs and the data stored by your defect tracker. To display the fields defined for Perforce jobs, issue the `p4 jobspec` command. (For details about modifying the job specification, see the *Perforce System Administrators Guide*.) For details about the data that is stored by your defect tracker, consult the documentation supplied by the defect tracker vendor.

Fields can be replicated in two ways:

- **Copy:** any change in the value is sent from the source system to the target system (one-way replication)
- **Mirror:** any change in the value in either system is replicated in the other system (two-way replication)

Every field has a data type, and mappings between fields must ensure that the data types are compatible, as described in the following table.

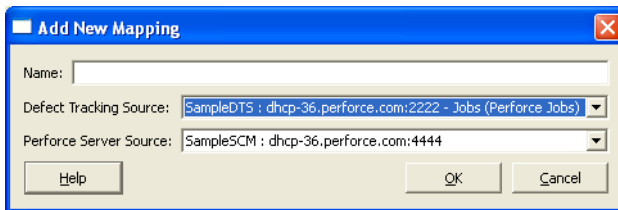
Data Type	Description	Valid Target Data Types	
		Copy	Mirror
word	A one-word entry	word, line or text	word
line	A single line of text	line or text	line
text	Multiple lines of text	For targets of type word, only the first word is copied.	
		text or line	text
		For targets of type line, only the first line is copied.	
		For targets of type word, only the first word is copied.	

Data Type	Description	Valid Target Data Types	
		Copy	Mirror
date	A date and time	date	date
select	A field that is assigned one of a specified set of values. The number of possible values must be identical for Perforce and the defect tracker.	select, word, line, text For select fields, all possible values must be mapped.	select All possible values must be mapped.

Warning! Perforce enables you to add fields to the basic job specification. Your defect tracker might also enable you to define the data that is tracked for defects. To avoid problems with replication, do not modify these definitions after you add mappings and start the replication engine.

To add a set of mappings:

1. On the **Mappings** tab, click **New**. The **Add New Mapping** dialog is displayed.



2. Enter a name for the mapping, and choose the Perforce Server source and the defect tracking source that you want to map. Click **OK**. The **Edit Perforce-Defect Tracker Mapping** dialog is displayed as shown in the following figure.

These two fields
are used for
replicating
Perforce fix
information

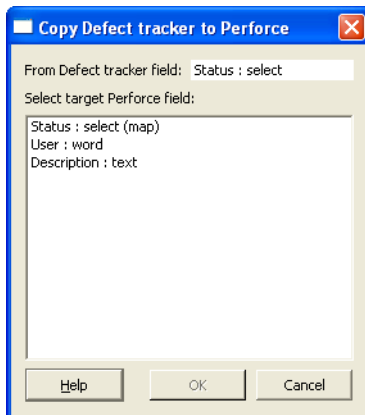
The **Edit Mapping** dialog contains the following fields:

- **Defect tracker fields** lists fields defined in the defect tracker that you can choose to replicate in Perforce jobs. Unmapped fields are displayed in bold.
- **Perforce fields** lists fields from the Perforce job specification that you can choose to replicate in the defect tracker. Unmapped fields are displayed in bold.
- **Field mappings** lists the mappings you have defined, categorized by the method and direction of replication. The mappings are displayed using a tree format, grouped by type.

Read-only fields are indicated by an asterisk.

3. For each field you want to replicate, select the field and choose the method of replication, as follows:
 - To replicate Perforce fields in the defect tracker, select the source field in the **Perforce fields** pane and click the **Copy to Defect tracker** or **Mirror with Defect tracker** button.
 - To replicate defect tracker fields in Perforce, select the source field in the **Defect tracker fields** pane and click the **Copy to Perforce** or **Mirror with Perforce** button.

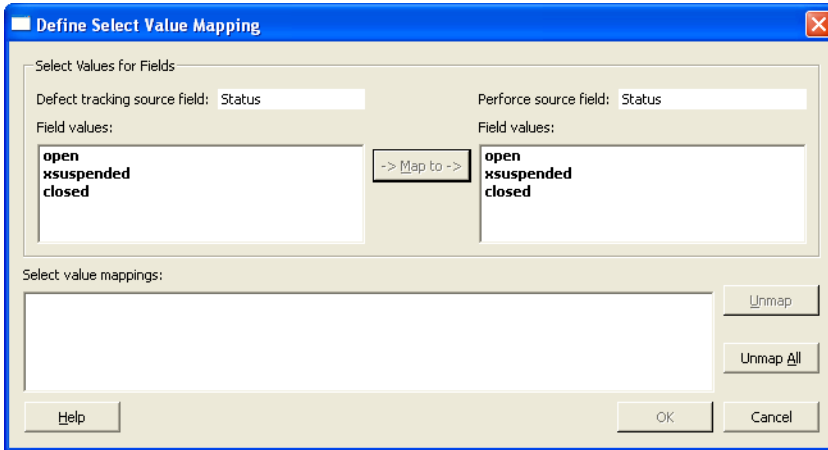
When you click a **Copy** or **Mirror** button, a list of available target fields is displayed, as shown in the following diagram.



If no valid target fields exist, the list is empty.

4. Choose the target field to which you want to map the selected source field and click **OK**.

5. If the target field is a **select** field (meaning a field that can contain one of a defined set of values), the **Define Select Value Mapping** dialog is displayed, as shown in the following figure.



Bold type indicates unmapped fields.

6. Specify the correspondence between values in Perforce and those in the defect tracking system by selecting the Perforce value and its corresponding defect tracker value and clicking **Map to**. Your mappings are listed in the **Current Select Value Mappings** field.

All the values of the left-hand list must be mapped. You can save incomplete mappings and exit, but the replication engine cannot run until you have mapped all values. If you save incomplete mappings, the unmapped values are displayed with “(unmap)” in the **Field Mappings** pane, to indicate that you need to map them.

7. Click **OK** to save your entries and dismiss the dialog.
8. On the **Gateway Mappings** tab, click **Apply** to save your changes.

After you map select fields, the field pair is listed in the **Field Mappings** pane, indicated by “(map)”. To view the value mappings, place the cursor over the field pair—the mappings are displayed in a tooltip. To change the values mapped for a field, click the field in the **Field Mappings** pane and click **Edit Value Mappings**. To remove a mapping, click the mapping in the **Field Mappings** pane, then click **Unmap**.

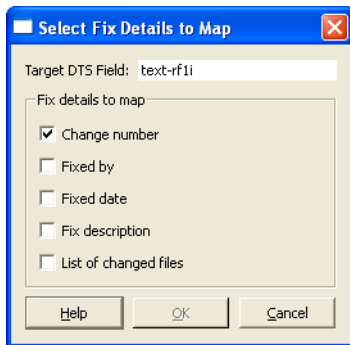
Mapping Fix Data

In Perforce, you can associate a job with a changelist. When the changelist is submitted, the job status is changed, usually to a “closed” status, to indicate that the changes being submitted fix the problem reported in the associated job.

The Defect Tracking gateway enables you to configure how data from fixes submitted in Perforce are transmitted to the defect tracker. To add fix mappings, click **Fix Details** in the **Perforce Fields** list.

To select the Perforce data that is to be transmitted to the defect tracker when a job is fixed:

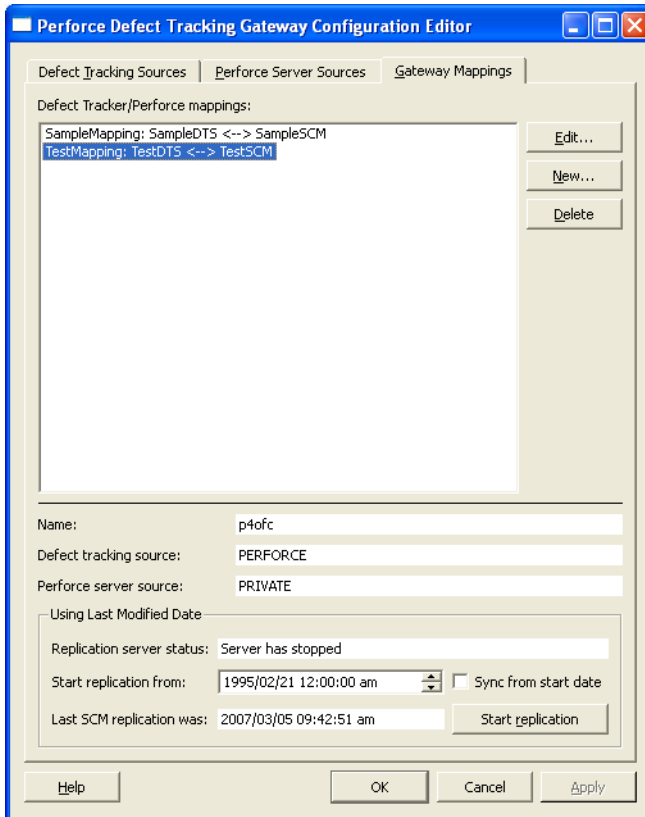
1. On the **Mappings** tab, scroll to the bottom of the **Field Mappings** list and select the desired mapping under **PERFORCE FIX DETAILS -> COPIED -> DEFECT TRACKER**. The **Select Fix Details to Map** dialog is displayed, as shown in the following figure.



2. Check the fields that you want transmitted to the defect tracker, then click **OK** to save your changes and dismiss the dialog.

Configuring and Starting the Replication Engine

To configure and start the replication engine, display the **Gateway Mappings** tab, shown in the following figure.



For each mapping (Perforce/defect tracker pair), you must run an instance of the replication engine, the program that propagates data between Perforce and the defect tracker. Before you start the replication engine, you specify the starting date and time. The replication engine propagates new jobs and issues, and changes that possess a modification date equal to or greater than the specified time. The starting date and time defaults to the current system time. If you want to replicate older issues, set the starting date to the desired previous date and time.

When starting the replication for the first time, check **Sync from start date**.

To start the replication engine:

1. Specify the start date and time.
2. If you have stopped the replication engine and changed mappings, check **Sync from start date** to ensure that previously replicated jobs and issues are replicated again using your new mappings.
3. Click **Start replication**.

Checking for Replication Errors

The replication engine logs errors and warnings in the `p4dtg/repl` folder. For each instance of the replication engine, one log file is created. The log file is named `log-mapfile.log`, where *mapfile* is the name of the corresponding mapping.

After you stop an instance of the replication engine, be sure to examine the log file. If you are experiencing problems, check the log file. If you delete the log file, it is recreated the next time the replication engine is started.

If an error occurs during job-defect replication, the replication engine writes an error message to the `DTG_ERROR` field in the Perforce job involved. Jobs containing entries in the `DTG_ERROR` field are not replicated. To reenble replication, you must clear the `DTG_ERROR` field.

To list all jobs that have entries in the `DTG_ERROR` field, issue the following command:

```
p4 jobs -e "DTG_ERROR=*"
```

To detect replication problems on an ongoing basis, you can create a script that periodically issues the preceding command and reports any problems it detects.

If the replication engine encounters a problem that prevents it from successfully replicating data, it logs error information to a file named `err-mapfile` in the `repl` folder. The replication then exits and cannot be restarted until you resolve the problem and delete the error file.

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