

Oracle Tuxedo Application Rehosting Test Manager

User Guide

12c Release 2 (12.2.2)

March 2017

ORACLE®

Copyright © 2017 Oracle and/or its affiliates. All rights reserved.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

This software or hardware and documentation may provide access to or information on content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services.

Content

Introduction 1

Overview 1

ART Test Manager Outline 2

Online Testing Using ART Test Manager 2

Batch Testing Using ART Test Manager 3

Architecture 3

Terms 4

UI Framework 4

Environment and Configuration 1

Prerequisites 1

System Running ART Test Manager 1

Test Machine 1

Configuring and Starting ART Test Manager 2

Apache Tomcat SSL Configuration 2

Apache Tomcat Port Configuration 3

Derby Port Configuration 4

User Management 1

Built-in Administrator 1

Local User Management 2

Administrator 2

Regular User 2

Using LDAP 2

Operations Framework 1

Project Operations 1

Creating a New Project 3

Open Existing Project 5

Close and Delete Project 5

Inventory Synchronization 6

Group Operations 7

Default Group 10

Create/Delete Group 10

Run Group 12

Start Execution Environment 12

Shutdown Execution Environment 14

Monitor Execution Environment 15

Cleanup Execution Environment 16

Add/Remove Cases to/from Group 16

Add/Remove Test Plans to/from Group 17

Test Plan Operations 18

Create/Delete Test Plan 19

Add/Remove Cases to/from Test Plan 19

Run Test Plan 19

Test CICS Application 1

Overview 1

CICS Execution Environment 2

Start/Shutdown Tuxedo Domain with CICS Region 3

Monitor Tuxedo Domain with CICS Region 3

Cleanup Tuxedo Domain with CICS Region	3
Upload Customized Scripts for CICS Test Group	4
CICS 3270 Test Case (Online Screens)	4
Description	4
Configuration	5
Using tn3270 Recorder and Uploading Captured Baseline	7
Setting up field filtering	9
Execute Test Case and Check the Results	11
Data Stream Compare	11
Side-by-Side Screen Compare	13
Examining Server Logs and Traces	13
CICS DPL Test Case (Message-driven Transactions)	15
Description	15
Configuration	16
Creating DPL Client Using Tuxedo ud32 Script	16
Description	16
Example	16
Uploading DPL Client	17
Execute Test Case and Check Results	17
Examining Server Logs and Traces	18

Test Batch Application 1

Batch Execution Environment	2
Start/Shutdown Batch Domain	2
Monitor Batch Domain	3
Cleanup Tuxedo Domain with Batch System and Purge Jobs	3
Upload Customized Scripts	4
Configure Batch Test Case	4

- Configure Mainframe Connection 5
- Execute Test Case and Check Results 7
 - Return Code Checking 7
 - File Comparison 7
 - DB Update Comparison 8
 - Examining Logs and Traces 9

Test IMS Application 1

- IMS Execution Environment 2
 - Start/Shutdown Tuxedo Domain with IMS Region 2
 - Monitor Tuxedo Domain with IMS Region 3
 - Cleanup Tuxedo Domain with IMS Region 3
- Upload Customized Scripts 4
- IMS MPP Test Case (Online Transactions) 4
 - Description 4
 - Configuration 5
 - Using tn3270 Recorder and Uploading Captured Baseline 7
 - Setting Up Field Filtering 7
 - Execute Test Case and Check the Results 9
 - Datastream Compare 9
 - Side-by-Side Screen Compare 11
 - Examining Server Logs and Traces 11
- IMS BMP Test Case (Batch Programs) 13
 - Description 13
 - Configuration 13
 - Execute Test Case and Check the Results 14
 - Examining Server Logs and Traces 15

Provisioning the Software 1

Install Tuxedo and ART (GA) 2

Apply Tuxedo and ART Rolling Patches (RPs) 4

Install ART Test Manager Agents 6

System Monitoring 1

Dashboard 1

Audit 1

Admin-Level Audit 1

Regular User-Level Audit 3

Appendix I - tn3270 Recorder 1

Architecture 1

Configuration 2

Running the Recorder to Capture 3270 Interactions 3

Appendix II - Sample: TMDEMO 1

Application Description 1

Databases and Files 2

Application Components 2

CICS Components 2

IMS Components 2

Batch Components 3

Migrating and Deploying TMDEMO Using ART Workbench 3

Setting Up ART Test Manager Project 16

Configuring Test Environment 18

Testing CICS 3270 Screens 18

Capturing and Uploading Baseline	18
Executing Test Cases and Comparing Results	18
Testing IMS 3270 Screens	20
Capturing and Uploading Baseline	21
Executing Test Cases and Comparing Results	23
Testing Batch Jobs	24
Executing Test Cases and Comparing Results	25
Return Code Comparison	25
Setting Up and Using File Compare	25
Setting Up and Using DB Compare	27
Using Dashboard	28
Using Audit Trail	29

Introduction

Overview

Oracle Tuxedo Application Rehosting Test Manager (ART Test Manager) is a part of Tuxedo product family designed to automate and speed up testing in mainframe re-hosting projects. Complementing Tuxedo ART Workbench, which provides tools for automating and speeding up the migration process, the Test Manager focuses on the remaining part of the re-hosting project – testing the results. It's role is to enable customers to complete the application functional or regression testing more efficiently, faster, and with fewer resources, thus reducing overall project cost and speeding up time to value – when the target environment can be switched into production and expected savings from elimination or reduction of mainframe MIPS begin to accrue.

Identifying the scope of testing and defining a test plan, determining how to test the application and executing test scenarios presents a significant challenge in many rehost projects. To help customers address these challenges, the testing can be driven by captured information – partly from the source analysis and generated migration artifact and partly from capturing baseline test sequences and results from the mainframe execution. The application execution on the mainframe, in test or production environment, becomes the “source of truth” for expected behaviors and outcomes in the re-hosted application.

A key benefit from capturing test scenarios on the mainframe is ability to replay them on the target environment, and then use captured results to compare with those generated on the target. Such automated comparison can help to speed up the evaluation of the test results and identification of potential issues. This moves the test effort from a manual, human-intensive task to an automated, industrialized process. The test plans and automated test cases can also become a part of the ongoing regression test capability as migrated applications continue to change

through ongoing maintenance and business evolution. In the next version, ART TM will also provide load testing capabilities to create user-configurable stress tests based on the functional test cases that have passed successfully.

ART Test Manager Outline

ART Test Manager provides customers with end-to-end capabilities from creating test plans to executing the test cases, capturing and comparing results, and providing a tracking dashboard. It provides a modern Web UI for user interaction, with authentication, access control, and auditing built in. Users interact with the Test Manager to perform the following tasks:

- **Configure** access to one or more test environments that have been deployed with Tuxedo, relevant CICS, IMS, and Batch runtimes, migrated application components, and any dependencies (e.g., data files, DB clients, MQ client, etc.)
- **Discover** online and batch test case units for CICS or IMS transactions and batch jobs, and select relevant subsets to create test plans. Specify the execution order, upload baseline artifacts, configuration dependencies, and custom pre- and post-processing scripts. Test plans can also be filtered to focus on specific tests and extended to add additional custom test scenarios by users.
- **Execute** test plans on one or more configured test environments and capture results for automated comparison with the mainframe baseline. Built-in result comparison methods include 3270 screen and data stream compares for online CICS and IMS transactions and return code, file, and database compares for batch jobs. These can also be extended with custom results verification scripts. Review collected logs and traces to diagnose anomalies.
- **Track, Audit, and Report.** Track status of test cases and test plans, and generate reports and dashboards. Review audit reports to see all user activity by project.

Online Testing Using ART Test Manager

Online CICS and IMS transactions are defined through CICS CSD configuration file or IMS system configuration macros. These z/OS artifacts are converted into ART CICS or ART IMS resource configuration files by ART Workbench. ART TM uses these resource files to identify relevant transactions and put them in appropriate groups (CICS 3270, CICS DPL, IMS MPP, IMS BMP), where they can be selected and arranged in a specific sequence to form test plans. Online CICS and IMS transactions can be interactive (i.e., using tn3270 terminal emulators driven by users or through macros/screen scraping) or message-driven (i.e., from JEE application servers, MQ, Web Services, etc.) and this guides the approach to capturing baseline test sequence and executing it against ART CICS or IMS.

For interactive tn3270-based transactions, ART TM provides a 3270 socket gateway that is deployed on the socket between tn3270 and target mainframe system. Users can then run test sequences against a mainframe test CICS or IMS region, while the 3270 gateway captures the data stream to and from the mainframe. Once the sequence of transactions and user inputs has been captured as a baseline data stream, ART TM will be able to re-play the inputs against Tuxedo ART CICS or IMS region, while comparing the outputs from ART CICS or IMS servers with those it captured from the mainframe CICS or IMS regions.

Any response discrepancies in the 3270 data stream are flagged for user to analyze and determine if these are acceptable (e.g., based on time difference between mainframe test and Tuxedo ART test) or not in determining the overall success or failure of the test execution.

For non-interactive CICS or IMS transactions, ART TM supports DPL clients for CICS DPL programs and built-in IMS BMP driver for IMS batch programs.

Extensible results verification framework also allows users to add custom comparison tasks to the verification of these tests.

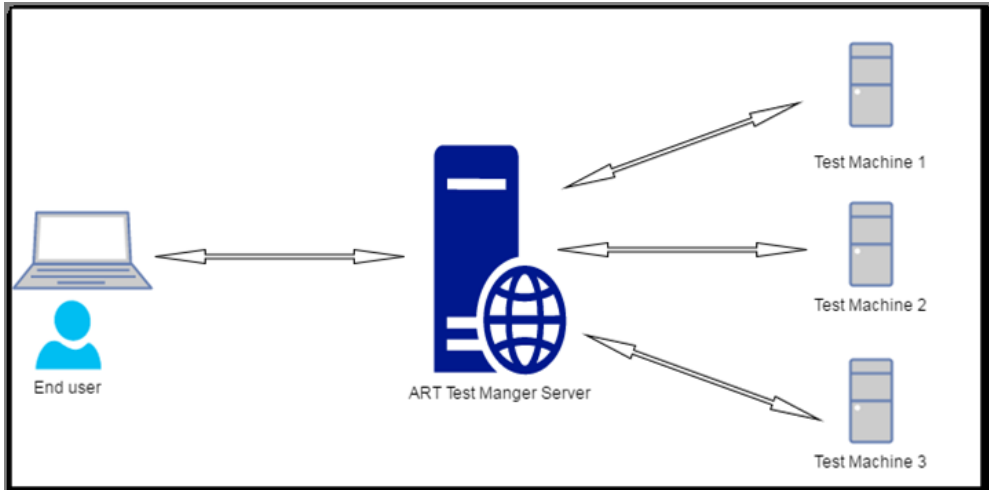
Batch Testing Using ART Test Manager

Batch jobs in most customer environments are executed primarily through schedulers, which determine the sequence of jobs in each scenario based on results from previous jobs and other events. Tuxedo batch runtime provides a command-line tool to submit, control, and query the jobs in ART Batch, and this tool is typically used to integrate with batch schedulers, often through local agents. A version of the same tool in ART TM is used to record the sequence of jobs as submitted from the scheduler and create test plans based on these sequences. Similarly to online test plans, these can be annotated for data and other dependencies, custom verification and before/after scripts, and extended with additional test cases for ad-hoc jobs.

Once test plan is created and ready to be executed, ART TM can run a job in ART batch runtime and then submit it on the mainframe (through an FTP connection to a z/OS test environment). When the jobs complete, results comparison can include the return codes, file and DB comparison, and can be optionally extended to include custom user scripts.

Architecture

The high-level architecture of ART Test Manger is illustrated in the following diagram.



ART Test Manager runs in a web server and is accessed by the end user through a web browser. ART Test Manger can run testing on multiple test machines.

Terms

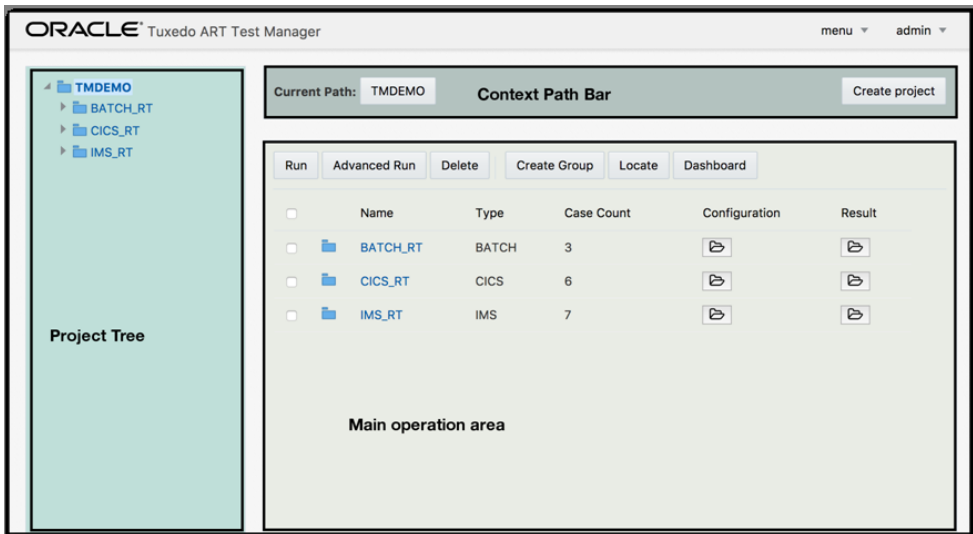
Table 1-1 Terms

Test Project	Execution environments with all converted source code, configuration files, resource files, data files, etc., deployed by ART Workbench Plug-in.
Test Group	An individual test environment, containing settings of one Tuxedo domain, and test plans and test cases. Currently, there are three types of test group; CICS, BATCH, and IMS). All test cases and test plans within one test group share the same execution environment.
Test Plan	Optional logical container for multiple test cases, which can be used to organize testing based on subsystems or other logical parts of the application.
Test Case	Smallest testing unit. For example, a CICS program, an IMS MPP transaction, an IMS BMP program, or a batch JCL job.

UI Framework

The user interface (UI) of ART Test Manger contains three major panels:

- **Project Tree:** Navigation bar that shows project list owned by current user, and the members of a selected project
- **Context Path Bar:** Contains “Create project” button, which can be clicked to create a new project, and current context path if a project is opened. The path may contain 4 levels at most: Project -> Group -> [Plan] -> Case
- **Main operation panel:** The content of currently open object (project, group, plan, or case) is shown here, and a group of buttons that are appropriate in current context are provided.



The drop down menus in the top right corner provide access to additional user management (drop-down menu under userid) and other general-purpose functions (drop down menu under “menu”: Software Provisioning, System Monitoring, Dashboard, and Auditing).

Introduction

Environment and Configuration

This topic contains the following sections:

- [Prerequisites](#)
- [Configuring and Starting ART Test Manager](#)

Prerequisites

The ART Test Manager system and the Test Machines under test have specific software dependencies as described in the sections below.

System Running ART Test Manager

Test Manager currently runs on Linux, OEL or RHEL 6.x or greater. It requires Tomcat 7.x or later with Derby (Apache DB), which are included in the Test Manager installer, and JDK 8, which must be available on the system prior to starting Test Manager.

Test Machine

Test Manager connects remotely to test machines to run test cases. Currently, the test machines must run Linux, OEL or RHEL 6.x or greater and JDK 8. To run the tests, the following version of Tuxedo and ART runtimes must be installed on the test machines with the patch levels at least as indicated below:

- Oracle Tuxedo12.2.2 GA or latest RP

- ART CICS Runtime 12.2.2 RP005
- ART Batch Runtime 12.2.2 RP010
- ART IMS Runtime 12.2.2 RP003

Test Manager enables provisioning of the runtime software and updating the test machines to the latest RP levels.

The **rsync** and **expect** tools must be installed in the test machine.

The default python in the test machine must be python 2.x (rather than python 3.x).

In addition, the Test Manager operates on the deployed directory containing application components and relevant configuration artifacts, which must be present on each test machine. The structure and content of the deployed APPDIR must be generated by Deploy function of ART Workbench 12.2.2 with RP014. Ensure that Eclipse plug-in from this RP is installed under `./eclipse/plugins` directory and is used to generate ART Workbench project. In the ART Workbench Configure wizard, checkbox that this configuration will be used with ART Test Manager and provide required configuration information. After Deploy wizard has been used to deploy the ART Workbench project to a test machine, Test Manager can discover the deployed directory as it creates its own project and automatically import all discovered test units.

Configuring and Starting ART Test Manager

After installing ART Test Manager, follow the steps in the Oracle Tuxedo Application Rehosting Test Manager Installation Guide configuration settings for Apache Tomcat SSL and port, Derby port, and Apache Tomcat must be provided before starting ART Test Manager (TM) web application.

Apache Tomcat SSL Configuration

TM runs in Apache Tomcat as a web application. To avoid exposing sensitive information, SSL configuration is mandatory for Tomcat. The following steps show how to enable SSL in Tomcat.

Use the following command to prepare the certificate keystore.

```
$JAVA_HOME/bin/keytool -genkey -alias tomcat -keyalg RSA -keystore  
/path/to/my/keystore
```

Input the required information and a keystore file will be generated.

A screen shot is shown below. Please note that when answering “What is your first and last name?”, input the domain name of the server.

```

-bash-4.1$ $JAVA_HOME/bin/keytool -genkey -alias tomcat -keyalg RSA -keystore /tmp/ke
Enter keystore password:
Re-enter new password:
What is your first and last name?
  [Unknown]: bej301712.cn.oracle.com
What is the name of your organizational unit?
  [Unknown]: Oracle
What is the name of your organization?
  [Unknown]: Oracle
What is the name of your City or Locality?
  [Unknown]: Beijing
What is the name of your State or Province?
  [Unknown]: Beijing
What is the two-letter country code for this unit?
  [Unknown]: CN
Is CN=bej301712.cn.oracle.com, OU=Oracle, O=Oracle, L=Beijing, ST=Beijing, C=CN corre
[no]: yes

Enter key password for <tomcat>
      (RETURN if same as keystore password):
-bash-4.1$ █

```

Edit the Tomcat configuration file, which is located at `$TOMCAT_DIR/config/server.xml`

Add the following connector to service node in `server.xml`.

```

<Connector port="8443" protocol="HTTP/1.1" SSLEnabled="true"
maxThreads="150" scheme="https" secure="true"          clientAuth="false"
sslProtocol="TLS" keystoreFile="/path/to/my/keystore "
keystorePass="changeit" />

```

`keystorePass` is the password input when generating key.

Startup tomcat by running `./bin/startup.sh` script. Tomcat will start with HTTPS service. If desired, consult your system administrator on how to integrate the startup script into the system startup sequence so that Tomcat is started automatically every time the system is rebooted.

To connect to the TM web application, use “`https://<domain name:port>/arttm`” in a browser. Security issue prompts in the browser can be ignored.

Refer to Apache Tomcat official document for details about SSL configuration.

Apache Tomcat Port Configuration

The user can specify the port for the web server by editing the tomcat configuration file, which is located at `$TOMCAT_DIR/config/server.xml`

The following connector is specified in service node in `server.xml`.

```

<Connector port="8443" protocol="HTTP/1.1" SSLEnabled="true"

```

Environment and Configuration

```
maxThreads="150" scheme="https" secure="true" clientAuth="false"  
sslProtocol="TLS"  
  
keystoreFile="/path/to/my/keystore " keystorePass="changeit" />
```

Change the value given to port, then restart tomcat. The new port will be effective. Check the tomcat log to determine if the port is used by others. The tomcat log is in \$TOMCAT_DIR/logs/catalina.\$DATE.log. If there is port conflict, the tomcat log will show “Address already in use”.

```
r-2017 19:10:20.572 INFO [main] org.apache.coyote.AbstractProtocol.init Initializing ProtocolHa  
http-nio-8080"]  
r-2017 19:10:20.605 SEVERE [main] org.apache.coyote.AbstractProtocol.init Failed to initialize  
t associated with ProtocolHandler ["http-nio-8080"]  
.net.BindException: Address already in use
```

In this case, change the port and restart tomcat.

Derby Port Configuration

Derby database is used to store the user information, and support audit function. It has a default port assigned. If the default port is in use, the port can be changed by the script named config.sh located in \$ORACLE_HOME/art_tm12.2.2.0.0. Get into the directory, and run config.sh without any parameters, for example:

```
-bash-4.1$ ./config.sh  
ART Test Manager workspace is /home/yundeng/OraHome_2/art_tm_workspace  
Do you want to change ART Test Manager workspace [Y/N]:n  
ART Test Manager workspace(/home/yundeng/OraHome_2/art_tm_workspace) is not  
Do you want to keep the old data in it [Y/N]:y  
ART Test Manager derby port is 1529  
Do you want to change ART Test Manager derby port [Y/N]:y  
Please input another port as ART Test Manager derby port : █
```

Input the port number, and press Enter. The port will get changed.

User Management

User management is a basic function of the system. This function can be accessed from the pull-down menu on the upper right corner in main screen after logging in.

This topic contains the following sections:

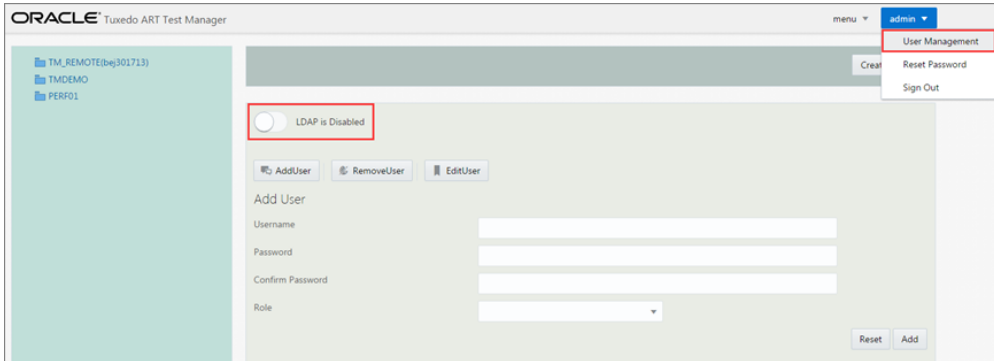
- [Built-in Administrator](#)
- [Local User Management](#)
- [Using LDAP](#)

Built-in Administrator

Account admin is a built-in administrator; the password must be set when installing the product. The admin account can be used when first logging into the system.

The administrator can set the system to use LDAP based user management or local user management. This can be done by clicking **Admin -> User Management**, then select to enable or disable LDAP. By default, local user management is used.

User Management



If administrator chooses to enable LDAP, i.e. use LDAP based user management, see [Using LDAP](#) for details; otherwise see [Local User Management](#) for details.

Local User Management

Administrator

After administrator logs into system, administrator can reset their password, create regular user accounts and set password for the newly created accounts, and delete accounts. The entry menu for user administration functions is a drop down under admin in the upper right corner in main screen.

Regular User

Local user can reset their own password after logging in; the entry menu to access this function is a drop down under the user's ID in the upper right corner in main screen.

Using LDAP

Once administrator selects LDAP, all user authentications would be done through the configured LDAP server. Administrator needs to specify the LDAP server and test the connection.

Following configurations items need be provided:

Table 3-1 Configuration Parameters

Configuration Parameter	Description
Hostname	The host name or IP address of the LDAP server.
Port	The port number on which the LDAP server is listening.
Principal	The Distinguished Name (DN) of the LDAP user that is used to connect to the LDAP server. For example: <code>cn=Manager,dc=my-domain,dc=com</code>
Credential	The credential (generally a password) used to authenticate the LDAP user that is defined in the Principal field.
User Base DN	The base distinguished name (DN) of the tree in the LDAP directory that contains users. For example: <code>ou=users,dc=my-domain,dc=com</code>

After admin inputs the above information, admin may click “**Test Connection**” button to test the connection between ART Test Manger and LDAP server.

The screenshot shows a configuration panel for LDAP. At the top, there is a toggle switch labeled "LDAP is Enabled" which is turned on. Below this, there are four input fields:

- Hostname:** bej301712.cn.oracle.com
- Port:** 3890
- Principal:** cn=Manager,dc=my-domain,dc=com
- Credential:** A masked field with six dots. To its right is a red-bordered button labeled "Test Connection".
- User Base DN:** ou=users,dc=my-domain,dc=com

If the LDAP connection tests successfully, click “**Save**” button to apply the changes. After this is done, any user logon would be authenticated through the LDAP server

When LDAP is enabled, the functions of “Add/Remove/Edit” user are not supported, “reset password” for the current user is not supported either. All user management activities need to be done on the LDAP server side through its interface.

User Management

Operations Framework

ART Test Manager uses a concept of a project to help users manage the tasks of defining and running testing activities. A project is a top level container on which operations can be performed. Additionally, sub-containers created within a project are test groups which contain test cases.

This topic contains the following sections:

- [Project Operations](#)
- [Group Operations](#)
- [Test Plan Operations](#)

Project Operations

Project operations include:

- Create new project
- Open existing project
- Close opened project
- Delete project
- Inventory synchronization

Enter project context by clicking a project in the left tree pane. The project details will be displayed in the main operations panel, including the top action bar and project detail table.



Operations on top bar related to the project are:

- **Locate:** shows the locations of the deployment and project, as well as the subdirectories under project path.



- **Dashboard:** show test case execution statistics of the Project. Details are in Chapter 10.

See [Group Operations](#) for other operations.

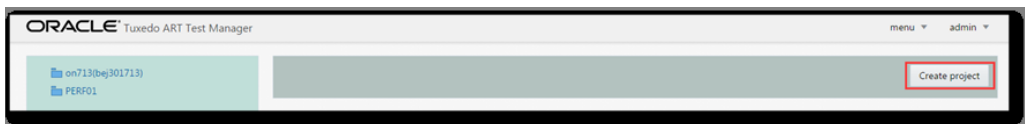
Detail table lists project members, which are test groups. The initial groups are created automatically by analyzing the ART runtimes used in the deployed APPDIR the project has been associated with. Additional groups can be added manually. The table of test groups includes the following columns:

- **Name:** group name

- Type: group type
- Case Count: number of test cases in the group
- Configuration: icon to click in order to view configuration information for the group, such as ubbconfig, etc. or upload pre-/post-processing scripts for the group. “Configuration” in group table is similar.
- Result: icon to click in order to view execution result and logs. “Result” in group table is similar.

Creating a New Project

Before creating a TM project, the application must be migrated using Tuxedo ART Workbench, packed and deployed to a location on a Linux server using the Deploy wizard in the Workbench lifecycle plug-in, and the data reloading process completed by using the same life-cycle plug-in. Refer to the [ART Workbench User Guide](#) for plug-in details. Once the deployment is done, the ART Test Manager project can be created by clicking the “Create project” button in the Context Path Bar.



The create project dialog requires three parameters as show in the figure below

- Project Name
- Deploy Path: The path of the migrated applications, which is created by life-cycle plug-in when migrating the application. This is referred to as APPDIR in the ART Workbench and Runtimes environment.
- Project Path: The path of the ART Test Manager project. This project is populated by copying relevant content from the Deploy Path. Some metadata created by ART Test Manger is stored in this path as well.

Input all required information and click “Create” to create this project and display in left tree.

Create a Test Project

* Project Name Remote Project

* Deploy Path

* Project Path

If the “Deploy Path” is not on the same host where ART Test Manger is installed and running, choose “Remote Project” using the check-box shown above, and provide host and connection information. The connection uses SSH and Test SSH Connection button is provided to verify the connectivity and user credentials. If the test fails, the reason for failure must be analyzed and resolved before proceeding.

Note: Creating a remote project may take some time. If default Java version is 1.8 or higher, “Java Home” can be blank.

Create a Test Project

* Project Name Remote Project

* Host Name and Port :

* User Name

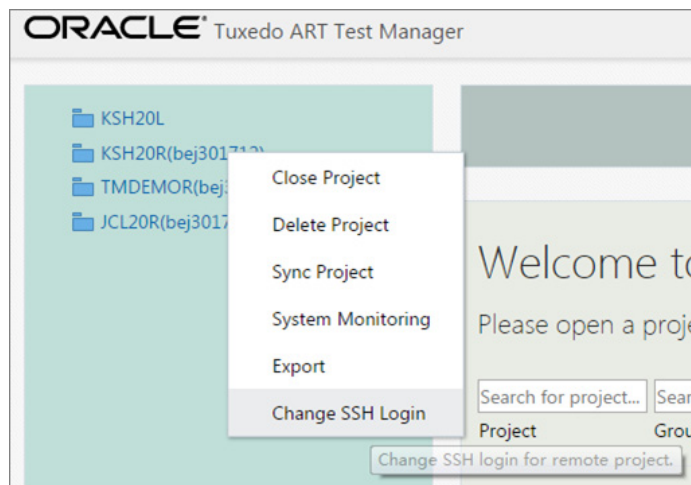
* Password

Java Home

* Deploy Path

* Project Path

The SSH login password can be changed for remote project. Right click on the project in the project tree, and choose "Change SSH Login".



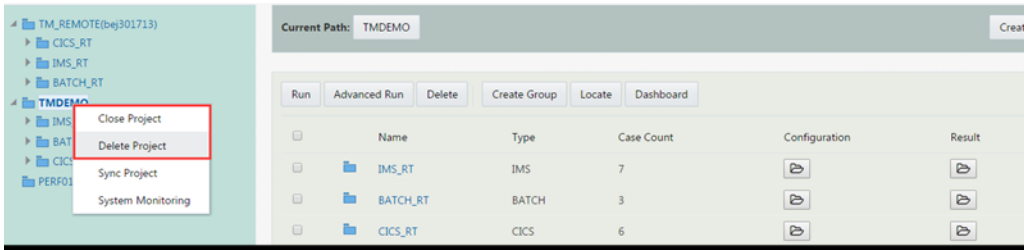
Open Existing Project

By clicking the folded project in left tree, the existing project can be opened. The project context will be displayed in the main operations panel.

Close and Delete Project

When right clicking the project name in left tree, the context menu will show:

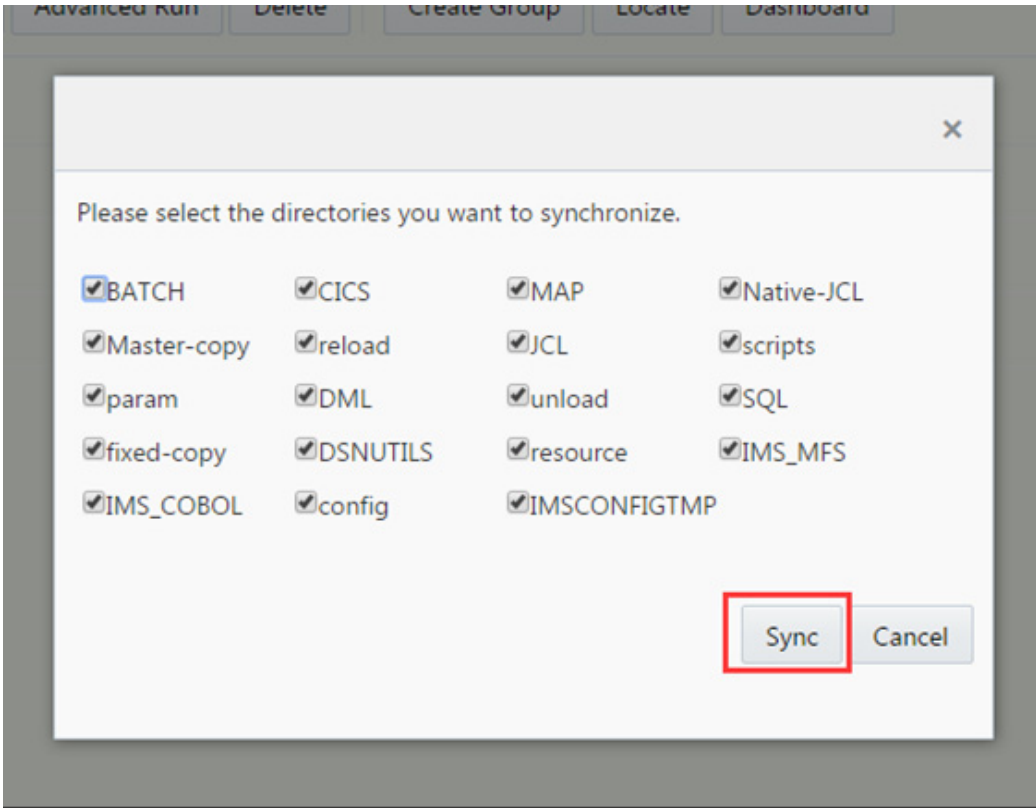
- Close Project: project in left tree will fold and its context in right panels will disappear.
- Delete Project: removes the project from current user’s workspace, but the original deployment still exists and can be used again for creating another project by another user or the current user.



Inventory Synchronization

Migration and testing is an iterative process. To resolve some test issues changes in the migration project in ART Workbench may be required. When these changes are implemented and the project is re-deployed, the Test Manager project must be updated as well. This function provides synchronization between the deployed APPDIR and the Test Manager project and should be used whenever Deploy operation has been performed in ART Workbench lifecycle plug-in

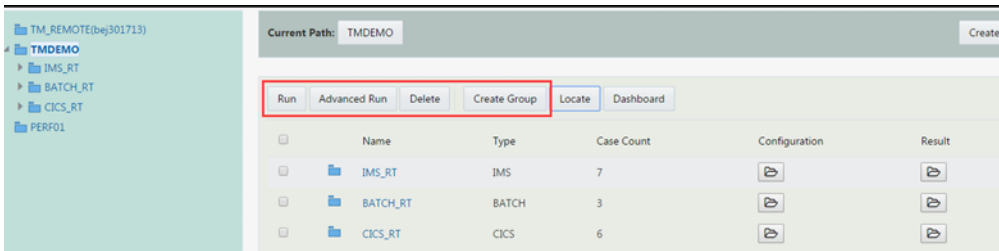
Clicking “Sync Project” in project context menu displays the synchronize dialog. By default, all directories which relate to the user programs are selected. Clicking “Sync”, synchronizes all selected directories.



Group Operations

Test groups are containers of test cases. Each group can contain test cases that correspond to one of the three runtimes: CICS, IMS, and Batch. When the project is initially created, one to three test groups are created based on runtimes defined in APPDIR. Test units are automatically discovered for each runtime from its configuration information and are populated as test cases in each respective group. To view the groups, enter project context by clicking the project in left tree.

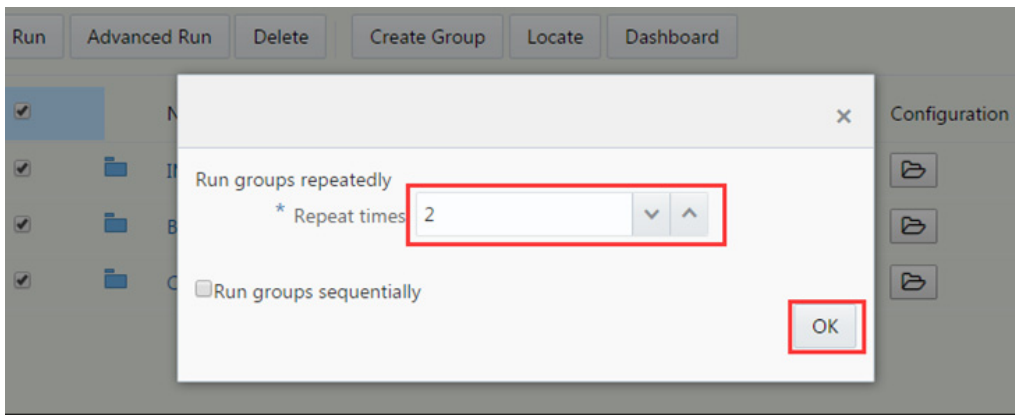
Operations Framework



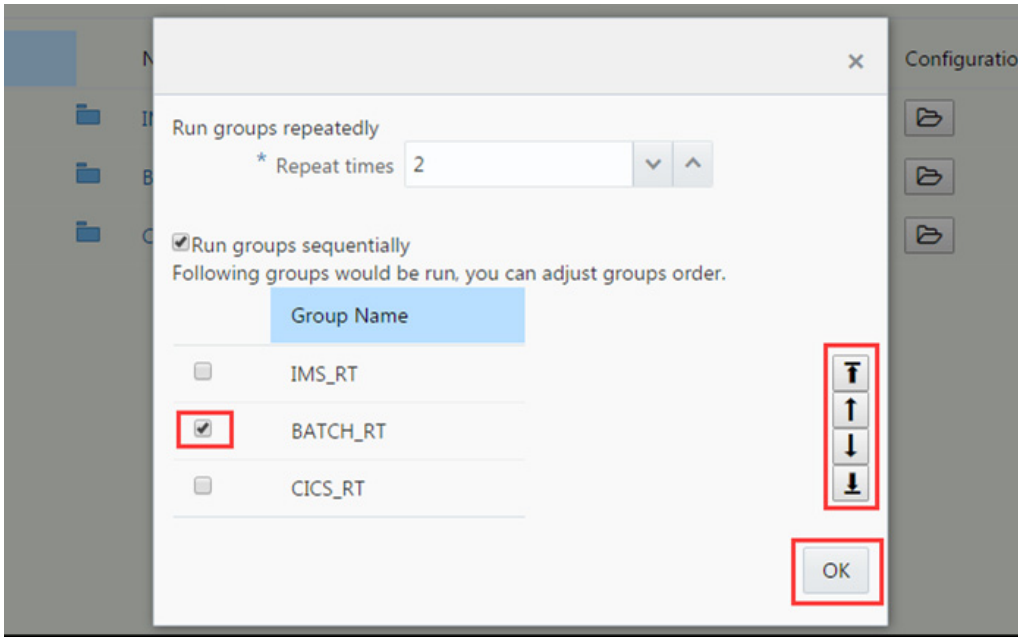
Operations in the project top bar related to the group are:

- Run: run test cases in the selected groups in parallel
- Advanced Run: run selected groups repeatedly; run groups sequentially
- Delete: delete selected groups
- Create Group: create a new group

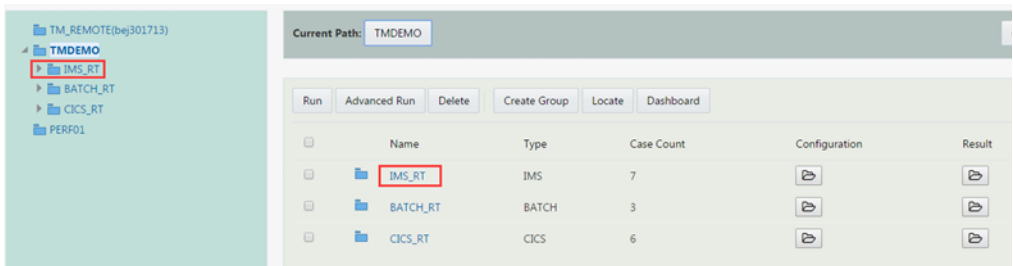
For “Advanced Run”, specify the number of run times, then click “OK” to run.



Checking “Run groups sequentially”, keeps groups from running in parallel. When checked, the run order of groups can be specified by using arrow buttons on the right side of the screen, and clicking “OK” to run as shown in the following figure.



To enter group context click group in left navigation tree or click group name in the detail table.

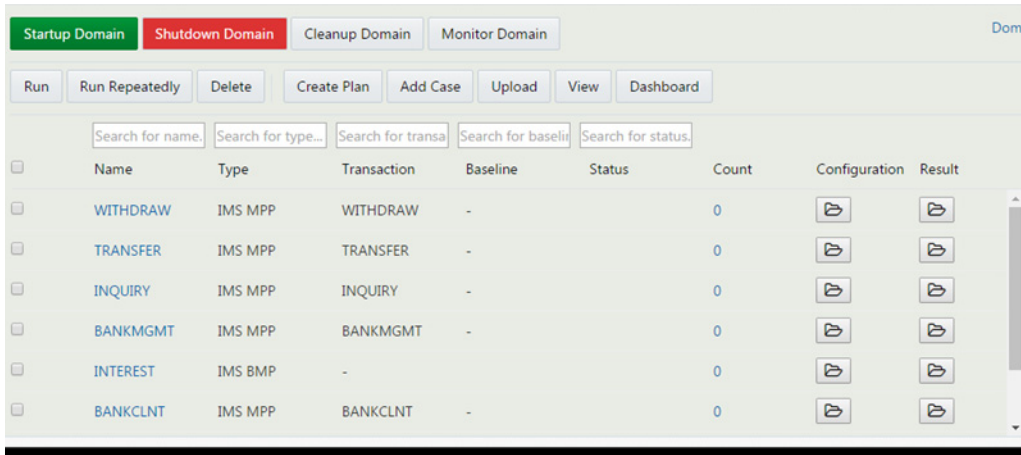


The top bar contains operations for Tuxedo domain associated with this group. See [Run Group](#) for additional details.

The Action below top bar provides the following buttons:

- Run, Run Repeatedly, Delete, Create Plan, Add Case will show in following sections.
- Upload: upload user scripts of this group. Plan is similar with group
- View: show configuration of this group

- Dashboard: show case execution report of this group



Default Group

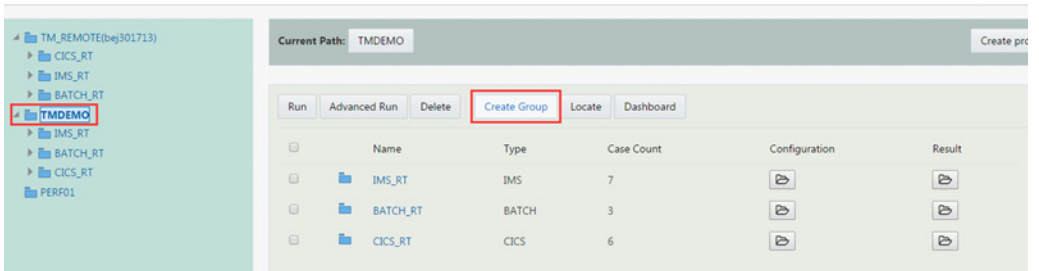
When creating a project ART Test Manger will automatically explore the deployment path and create default groups including all the discovered test cases. Default groups are always named as “BATCH_RT” for BATCH cases, “CICS_RT” for CICS cases and “IMS_RT” for IMS cases.

- For “Batch_RT”, the default job list is generated by checking the file list under JCL directories listed for the `JOBREPOSITORY` in the `jesconfig` file.
- For “CICS_RT”, the default 3270 case list is generated by analyzing the `transactions.desc` configuration file, the default DPL case list is generated by analyzing the `programs.desc` configuration file.
- For “IMS_RT”, the default case list includes both MPP and BMP types, generated by analyzing the `imstran.desc` and `imsapp.desc` configuration files.

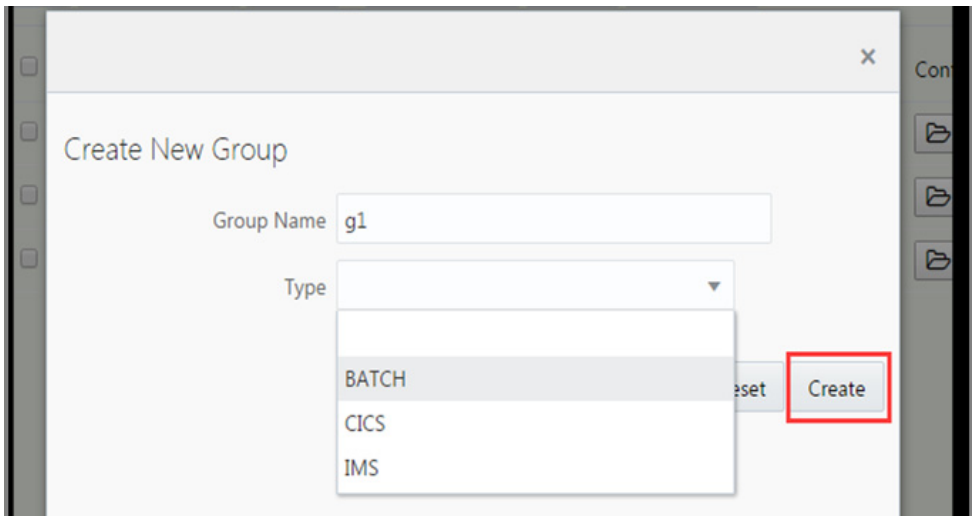
Default groups contain all available test cases.

Create/Delete Group

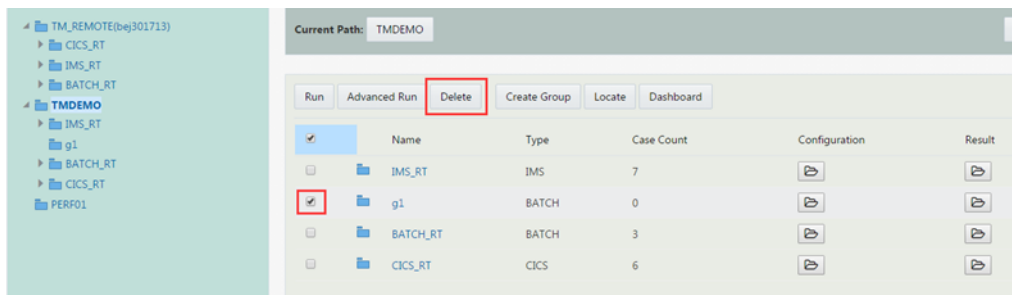
Enter project context by clicking project in left tree. In the project panel, click “Create Group”.



Input Group Name and select group type from the drop down list then click “Create”. The new group “g1” will be created as shown in the figure below.



In project panel, select group(s) to delete, then click “Delete”. The selected groups will be deleted.



Run Group

In group context, the top tool bar provides control of domain operations.

“Run” and “Run repeatedly” launches selected test cases. The arrow buttons on the right provide for ordering the test cases in a specific order they should be run. The detail view can be sorted by clicking on any column header. Clicking R button in the ordering toolbar on the right will re-order the test cases in the last specified execution or run order.

The screenshot shows the top toolbar with buttons for 'Startup Domain', 'Shutdown Domain', 'Cleanup Domain', and 'Monitor Domain'. Below this is a secondary toolbar with 'Run', 'Run Repeatedly', 'Delete', 'Create Plan', 'Add Case', 'Upload', 'View', and 'Dashboard'. A search bar with five input fields is located below the toolbars. The main area contains a table with the following data:

<input type="checkbox"/>	Name	Type	Transaction	Baseline	Status	Count	Configuration	Result
<input type="checkbox"/>	WITHDRAW	IMS MPP	WITHDRAW	-		0		
<input type="checkbox"/>	TRANSFER	IMS MPP	TRANSFER	-		0		
<input type="checkbox"/>	INQUIRY	IMS MPP	INQUIRY	-		0		
<input type="checkbox"/>	BANKMGMT	IMS MPP	BANKMGMT	-		0		
<input type="checkbox"/>	INTEREST	IMS BMP	-			0		
<input type="checkbox"/>	BANKCLNT	IMS MPP	BANKCLNT	-		0		

Start Execution Environment

Start the execution environment by clicking “Startup Domain”, the result can be viewed on right of the top bar, and the console window will show the log messages from domain startup.

Note: If the domain is down, you can click "Run" or "Run repeatedly" to start the domain automatically.

The screenshot displays the Oracle Tuxedo Application Rehosting Test Manager interface. At the top, there are four tabs: "Startup Domain" (green), "Shutdown Domain" (red), "Cleanup Domain", and "Monitor Domain". A "Domain up" button is highlighted with a red box in the top right corner. Below the tabs is a row of action buttons: "Run", "Run Repeatedly", "Delete", "Create Plan", "Add Case", "Upload", "View", and "Dashboard".

Below the buttons are five search input fields: "Search for name.", "Search for type...", "Search for transa", "Search for baseli", and "Search for status.". The main area contains a table with the following columns: Name, Type, Transaction, Baseline, Status, Count, Configuration, and Result. The table lists six server entries, each with a checkbox on the left and a vertical toolbar on the right containing buttons for "R", "↑", "↓", and "↓".

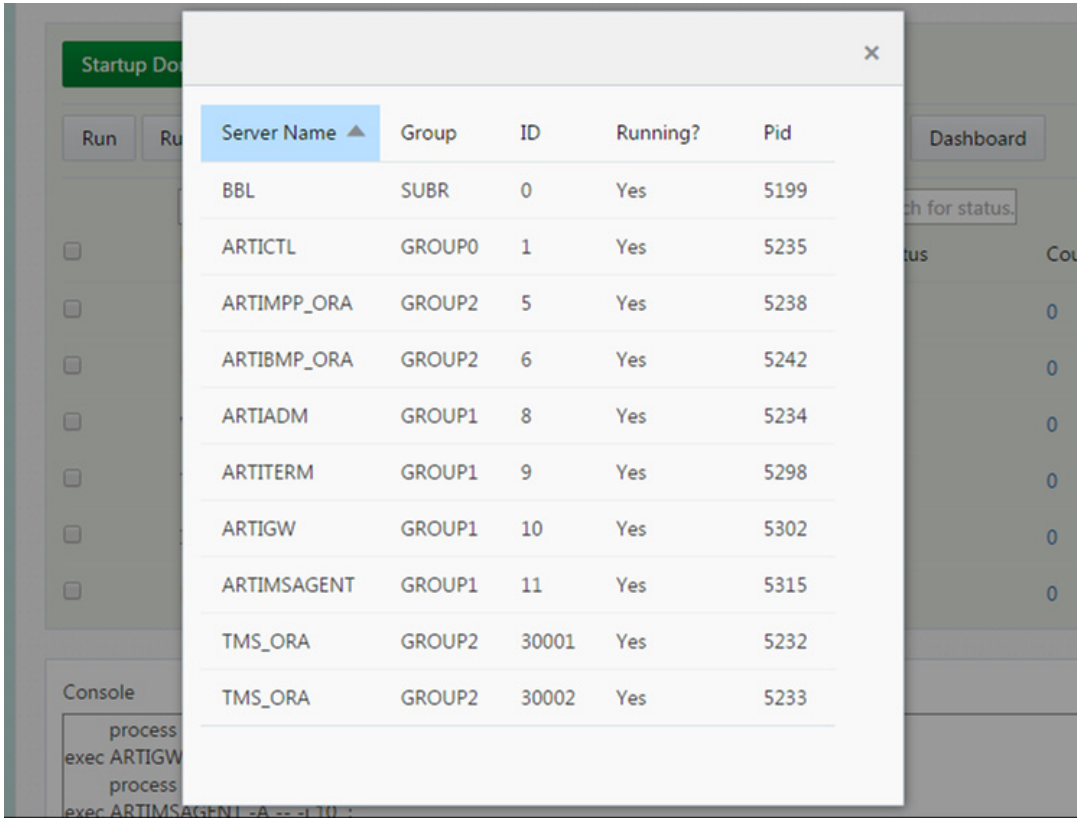
Name	Type	Transaction	Baseline	Status	Count	Configuration	Result
<input type="checkbox"/> BANKCLNT	IMS MPP	BANKCLNT	-		0		
<input type="checkbox"/> DEPOSIT	IMS MPP	DEPOSIT	-		0		
<input type="checkbox"/> WITHDRAW	IMS MPP	WITHDRAW	-		0		
<input type="checkbox"/> TRANSFER	IMS MPP	TRANSFER	-		0		
<input type="checkbox"/> INQUIRY	IMS MPP	INQUIRY	-		0		
<input type="checkbox"/> BANKMGMT	IMS MPP	BANKMGMT	-		0		

At the bottom, there is a "Console" window with a "Clear" button. The console output shows the following text:

```

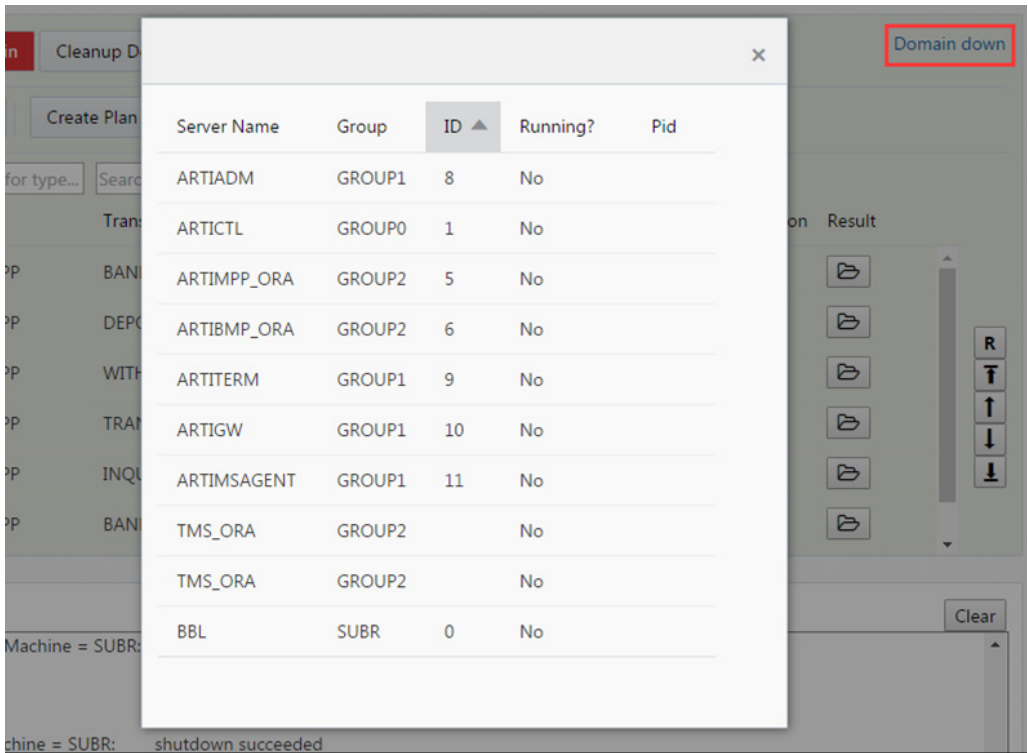
process id=5298 ... Started.
exec ARTIGW :
  process id=5302 ... Started.
exec ARTIMSAGENT -A -- -i 10 :
  process id=5315 ... Started.
10 processes started.
20170324 06:11:54 [INFO] -----RUNNING END-----
  
```

Clicking “Domain up”, will show the server details.



Shutdown Execution Environment

Shutdown the execution environment by clicking “Shutdown Domain”. Clicking “Domain up” or “Domain down”, will show the server details.



Monitor Execution Environment

To monitor the execution environment, first install Test Manager agents on the test machines using Provision function from the drop down menu in the upper right corner. Refer to [Install ART Test Manager Agents](#) for details.

Click “Monitor Domain” to open the Domain Monitoring screen and view execution details information with periodic updates based on the polling interval.

- CICS Domain: list all running tasks/transactions in current CICS region
- Batch Domain: list batch Initiators and job metrics by JES class
- IMS Domain: list transaction/program execution information from IMS MPP and BMP regions.

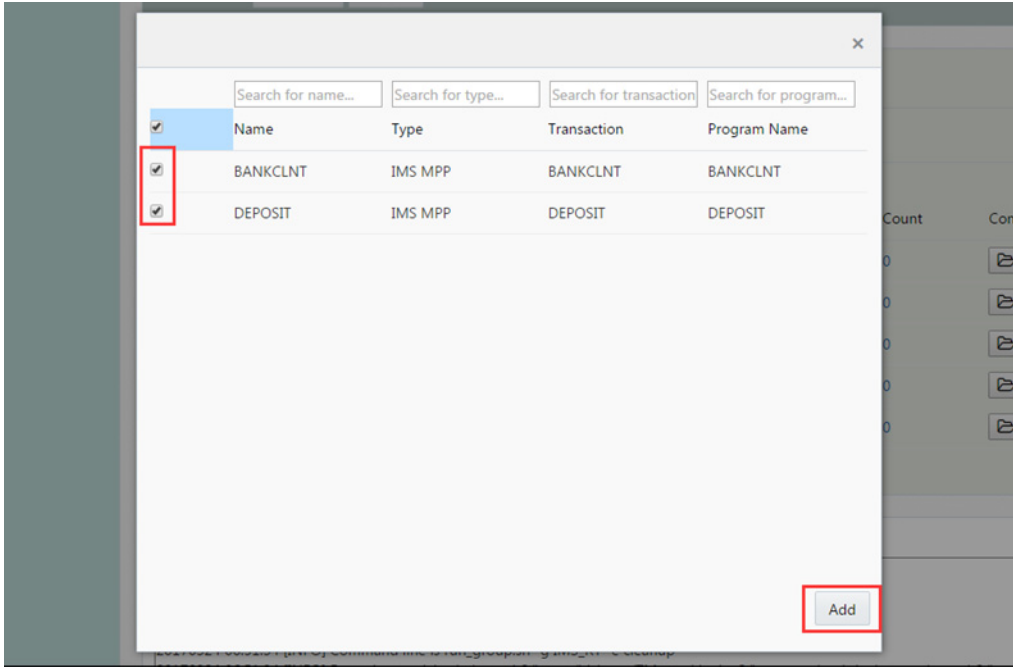
For more information about each of the three domain types, refer to [Monitor Tuxedo Domain with CICS Region](#), [Monitor Batch Domain](#), and [Monitor Tuxedo Domain with IMS Region](#).

Cleanup Execution Environment

Click “Cleanup Domain” to do all necessary cleanup work for the current domain, in case of configuration changes, such as ubbconfig or setenv. Make sure the current domain is down before clicking Cleanup Domain.

Add/Remove Cases to/from Group

Click “Add Case” and select cases to be added from the available list, then click “Add”. Test cases can be filtered by entering search criteria in each of the four columns: Name, Type, Transaction, Program Name.



Select cases to delete then click “Delete”.

Startup Domain Shutdown Domain Cleanup Domain Monitor Domain

Run Run Repeatedly Delete Create Plan Add Case Upload View Dashboard

Search for name. Search for type... Search for transa Search for baseli Search for status.

<input checked="" type="checkbox"/>	Name	Type	Transaction	Baseline	Status	Count	Configuration	Result
<input checked="" type="checkbox"/>	BANKCLNT	IMS MPP	BANKCLNT	-		0		
<input checked="" type="checkbox"/>	DEPOSIT	IMS MPP	DEPOSIT	-		0		
<input type="checkbox"/>	WITHDRAW	IMS MPP	WITHDRAW	-		0		
<input type="checkbox"/>	TRANSFER	IMS MPP	TRANSFER	-		0		
<input type="checkbox"/>	INQUIRY	IMS MPP	INQUIRY	-		0		
<input type="checkbox"/>	BANKMGMT	IMS MPP	BANKMGMT	-		0		

Add/Remove Test Plans to/from Group

Click “Create Plan” from the Group screen and input a test plan name to create a new plan.

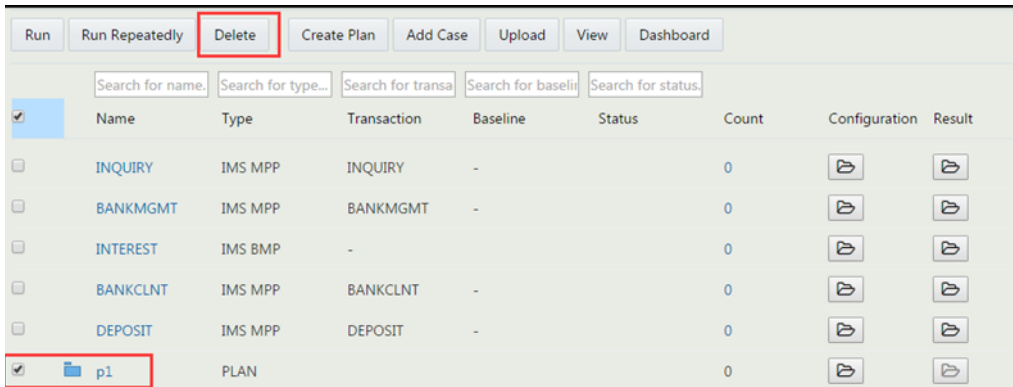
Run Run Repeatedly Delete Create Plan Add Case Upload View Dashboard

Create New Plan

Plan Name p1

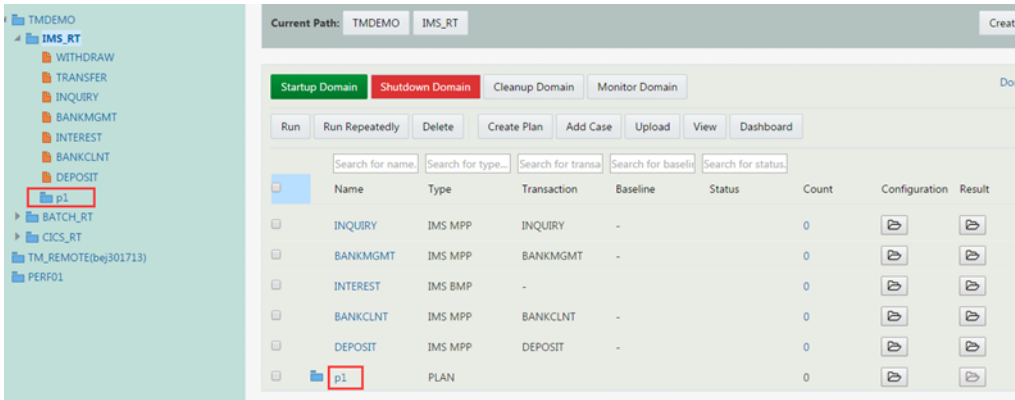
Reset Create

Select test plans to delete and Click “Delete”.

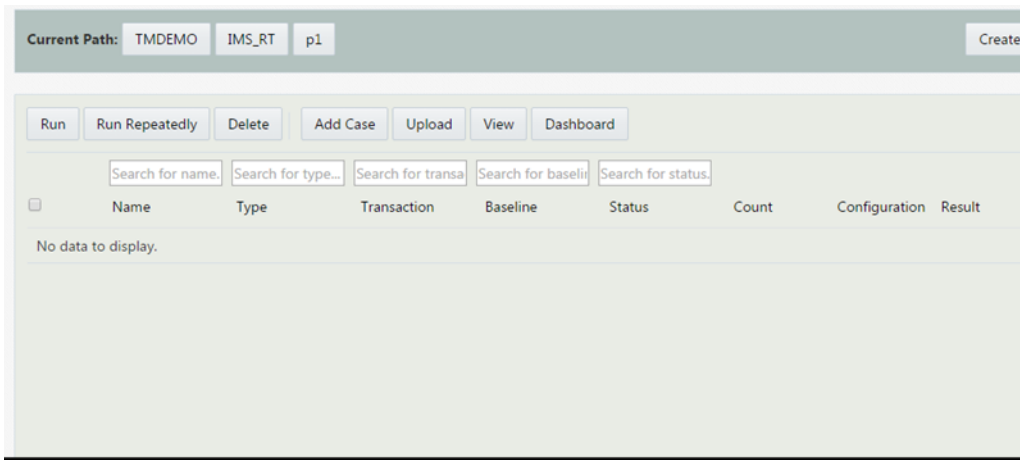


Test Plan Operations

Enter test plan context by clicking the plan name in left tree or clicking in the plan entry in the detail table.



The Test Plan panel is shown below.



Create/Delete Test Plan

Refer to [Add/Remove Test Plans to/from Group](#).

Add/Remove Cases to/from Test Plan

Similarly to group, click “Add Case” to add selected cases to a test plan, and click “Delete” to remove selected cases from a test plan.

Run Test Plan

In group context, select a plan and click “Run”. It is same as selecting all cases in plan context then clicking “Run”.

Operations Framework

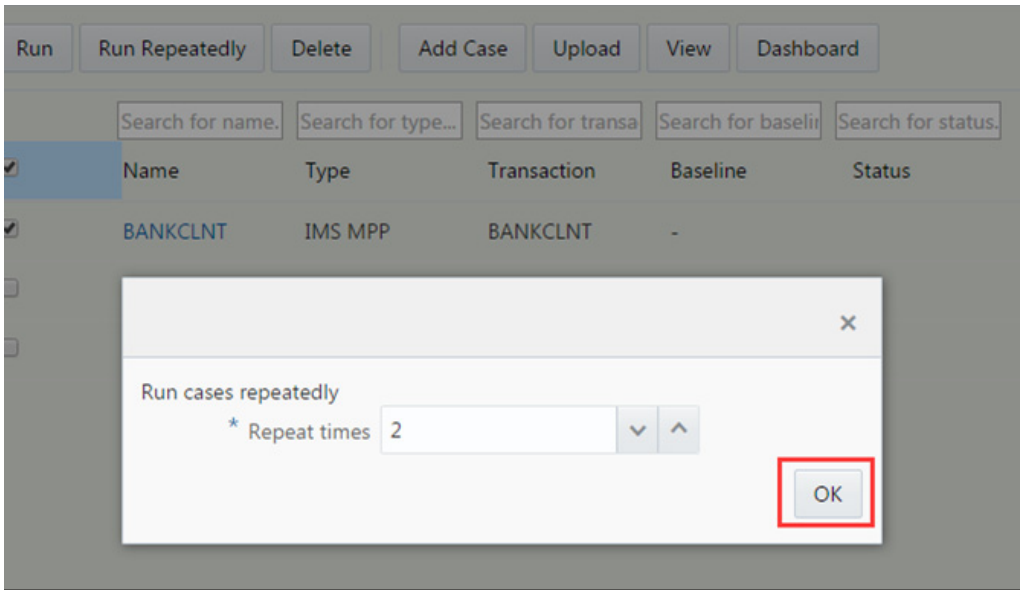
The top screenshot shows the 'Current Path' as TMDEMO and IMS_RT. The 'Run Repeatedly' button is highlighted. The table below shows the following data:

<input type="checkbox"/>	Name	Type	Transaction	Baseline	Status	Count	Configuration	Result
<input type="checkbox"/>	INQUIRY	IMS MPP	INQUIRY	-		0		
<input type="checkbox"/>	BANKMGMT	IMS MPP	BANKMGMT	-		0		
<input type="checkbox"/>	INTEREST	IMS BMP	-			0		
<input type="checkbox"/>	BANKCLNT	IMS MPP	BANKCLNT	-		0		
<input type="checkbox"/>	DEPOSIT	IMS MPP	DEPOSIT	-		0		
<input checked="" type="checkbox"/>	p1	PLAN				3		

The bottom screenshot shows the 'Current Path' as TMDEMO, IMS_RT, and p1. The 'Run Repeatedly' button is highlighted. The table below shows the following data:

<input type="checkbox"/>	Name	Type	Transaction	Baseline	Status	Count	Configuration	Result
<input checked="" type="checkbox"/>	BANKCLNT	IMS MPP	BANKCLNT	-		0		
<input checked="" type="checkbox"/>	DEPOSIT	IMS MPP	DEPOSIT	-		0		
<input checked="" type="checkbox"/>	WITHDRAW	IMS MPP	WITHDRAW	-		0		

The number of time to run selected cases /plans can be specified by clicking “Run Repeatedly” and entering the number of times. Click “OK” to run.



Operations Framework

Test CICS Application

This topic contains the following sections:

- [Overview](#)
- [CICS Execution Environment](#)
- [Upload Customized Scripts for CICS Test Group](#)
- [CICS 3270 Test Case \(Online Screens\)](#)
- [CICS DPL Test Case \(Message-driven Transactions\)](#)

Overview

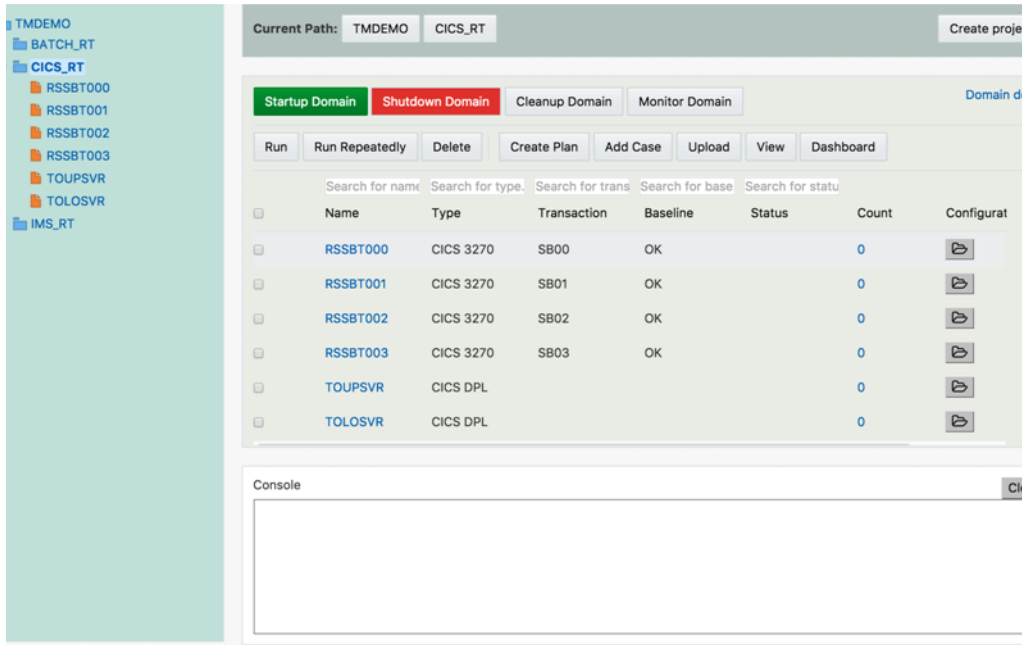
Test Manger can be used to test rehosted CICS applications running on Tuxedo ART for CICS. It helps users to test two kinds of CICS programs:

- Programs associated with 3270 screen transactions, which are identified as CICS 3270 test cases
- Asynchronous programs triggered internally using EXEC CICS LINK or from external environments (e.g., CICS CTG, Web Services, DPL calls from mainframe CICS regions,) which are identified as CICS DPL test cases.

Before doing any testing, a project needs to be created as described in the previous chapters. After the project is created and associated with a deployed APPDIR location on a test machine, all available CICS test units are identified by scanning transactions.desc and programs.desc configuration files in the specified APPDIR for transaction and program definitions. These two

Test CICS Application

files are generated by the ART Workbench from the CICS system definition (CSD) in CICS region configuration on z/OS. Once the project has been created and associated with an APPDIR on a test machine, the scan is performed automatically and all identified test cases are added into a default test group named as CICS_RT. A CICS test case can be executed in this default group or a new group with a custom name created manually, or in a test plan, which is created in a group. The user interface of a CICS group is shown below.



Clicking on the navigator on the left side will expand the tree menu and show the project, group, test plan and test case names. Detailed information and operation buttons are available on the top and right side of the main panel.

CICS Execution Environment

CICS cases are executed in a CICS region in a Tuxedo domain. Each CICS group has an independent CICS region in a Tuxedo domain. Before executing a case, the CICS domain should be booted up. Once started, the region remains running and available for all CICS test cases until it is shutdown.

Start/Shutdown Tuxedo Domain with CICS Region

To start/shutdown CICS region in a Tuxedo domain, enter a test group of CICS type, and then click “Startup Domain” or “Shutdown Domain”. “Domain up”, “Domain up (partial)” or “Domain down” status is indicated on the right side of the panel. The detailed startup or shutdown process and related messages can be viewed in the Console area at the bottom of the main operations panel.

If the status indicates the domain is up only partially, examine the messages in the Console area to determine which servers failed to start and whether they will impact your test cases. If they do, examine Tuxedo ULOG messages (click Result button for the group in the Project view) and related logs to determine the cause. Once the underlying issue has been resolved, shutdown the domain, run Cleanup Domain if any configuration changes have been made, and start it up again.

Monitor Tuxedo Domain with CICS Region

Click “Monitor Domain” to open the CICS Domain Monitoring screen and view information on transactions by polling interval. The view is updated dynamically based on a polling interval that can be changed at the top of the screen by changing the number and clicking Apply button. If there is no data, it means there are no transactions currently running.

Domain Monitoring of Group CICS_RT								
Agent Interval	15	▼	▲	Apply				
LMID	GRPID	SRVID	PROCESS_ID	SYSID	APPLID	TASK_ID	Transaction_ID	Program Name
KIXR	12	20	14281	KIXR	DBDCCICS	0020001C	S800	RSSBT000

This provides basic monitoring of CICS execution within the Test Manager. For more advanced monitoring capabilities Tuxedo System and Application Monitor Plus (TSAM Plus) provides additional capabilities, including real-time and historical performance monitoring, execution detailed tracing, SLA alerting, and much more.

Cleanup Tuxedo Domain with CICS Region

To apply domain configuration changes, such as the ubbconfig or setenv changes, a cleanup operation is needed before re-starting the domain, e.g., deleting tuxconfig and TLOG generated in the setup phase. Click on the “Cleanup Domain” button to have Test Manager perform the

cleanup tasks. If the domain is up, first shut it down before clicking “Cleanup Domain” since these operations aren’t allowed while the domain is up.

Upload Customized Scripts for CICS Test Group

Test Manager provides built-in extension framework that can run user-provided pre- and post-execution scripts or executables as well as a result checking script. These custom scripts are supported for CICS group/plan/case.

- Pre-execution file and post-execution files are executed before and after running a group/test plan/case. They can be either scripts or executable binary files.
- Result check script can be used to extend the built-in results checking with additional steps to help determine whether a case failed or succeeded after it’s been executed.

Clicking the “Upload” button on group/test plan/case panel will open the upload dialog. These custom scripts are optional and are not required to run the test cases.

CICS 3270 Test Case (Online Screens)

When the project is created, the CICS 3270 test cases are automatically detected by analyzing the configuration file `transactions.desc` produced by ART Workbench from the CICS system definition (CSD) extract on z/OS.

Description

Tuxedo ART for CICS provides 3270 support that enables online transactions to interact with tn3270 emulators based on screen definitions in CICS BMS maps. That interaction, in the form of 3270 data stream, is identical to the interaction with online CICS transactions running on z/OS. In order to automate the testing, the Test Manager enables capturing the baseline during mainframe interaction, and then replaying it against rehosted transactions in Tuxedo ART for CICS environment and comparing the corresponding 3270 data streams and screens.

Testing a CICS 3270 case involves the following:

1. Running CICS 3270 transaction (or sequence of screen interactions) on the mainframe to capture the baseline 3270 data stream using the Test Manager provided TN3270 Recorder tool. A complete guide for it can be found in Appendix I. Baseline captured by TN3270 Recorder contains three components packaged as a compressed tar file with “.tgz” extension:
 - Blueprint file (input part): the data stream sent from tn3270 to CICS on z/OS;

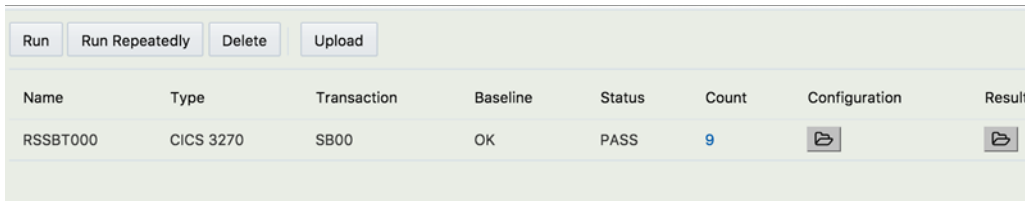
- Benchmark file (output part): data stream sent from CICS on z/OS to tn3270;
 - Screen view rendered in HTML file (output part): the HTML view of the 3270 screenshot.
2. Uploading the baseline to the test case configuration in ART Test Manger using the Upload dialog.
 3. Execute the same 3270 transaction sequence in the ART CICS environment using the blueprint (input part of the baseline), capturing the result. This is simply a matter of running the test case individually or as part of a test plan, the uploaded blueprint is then used to replay the interactions as they were captured.
 4. Compare the captured ART CICS output data stream against the benchmark captured from z/OS interaction and show any differences. The comparison is performed automatically after running the test case and the results can be viewed after clicking the Result icon for the test case. Console tab shows any execution messages or errors, and Screen Diff tab shows screen differences either as a list of fields or actual side-by-side view of the baseline (z/OS) and actual (ART CICS) screens.

Note that there may naturally be some differences if the CICS screens include date/time fields, or fields sensitive to the execution environment, for example host name, IP address, name of the batch job that started the CICS region, userid, or other external attributes. To help overcome these expected differences the Test Manager supports field filtering for 3270 fields. The filter simply enables users to remove certain fields from comparison. Filters can be set up at a test case level, and defined pro-actively when configuring a test case, or post-execution when comparing the results. In the latter case, the test case will initially show Failed status, which user can change to Passed after verifying all the other fields and selecting fields to filter out. Subsequent execution of the test case will automatically apply the filter, and barring any other differences, will mark the case as Passed.

Configuration

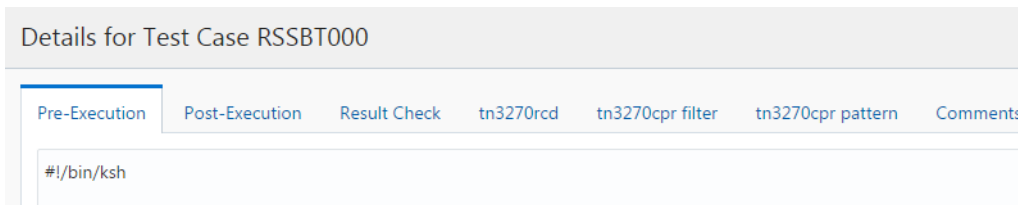
For CICS 3270 case there's one mandatory configuration item, tn3270 recorder's baseline, and 5 optional: pre- and post-execution scripts, 3270 field filter, field filter pattern, and comments. Click the icon in the Configuration column to open the detail configuration dialog for the CICS 3270 case.

Test CICS Application



Name	Type	Transaction	Baseline	Status	Count	Configuration	Result
RSSBT000	CICS 3270	SB00	OK	PASS	9		

The configuration dialog provides six tabs that can be used to enable checking the Pre/Post-Execution scripts already uploaded, to generate the baseline using tn3270 recorder, to check or edit the 3270 field filter list, to add or edit the 3270 field filtering pattern, and to add or edit text comments for this test case.



These tabs are:

Table 5-1 Details for Test Case Tabs

Tab	Description
Pre-Execution	Showing the Pre-Execution script uploaded by user
Post-Execution	Showing the Post-Execution script uploaded by user
tn3270rcd	tn3270 recorder's baseline is loaded here. Further information can be found in section 7.3.2.1
tn3270cpr filter	3270 fields filter configuration consisting of the page number and field position settings for fields to ignore during the comparison
tn3270cpr pattern	3270 field filter pattern Differences, which match the pre-defined pattern, would be marked
Comments	Showing comments added by the user

Using tn3270 Recorder and Uploading Captured Baseline

Before running a CICS 3270 test case, the transaction must be run on z/OS, capturing the 3270 data stream as a baseline in “.tgz” file. The tn3270 recorder tool is used to accomplish this. For the detailed usage of the tn3270 recorder in a standalone mode, refer to [Appendix I - tn3270 Recorder](#).

In the case detail view, click Upload button to open the upload wizard where the baseline “.tgz” file can be uploaded along with optional pre- and post-execution scripts and result checking script for additional custom verification steps (e.g., MQ message has been sent or retrieved from a queue, file or DB have been updated, TSQ item has been posted, batch job submitted through TDQ, etc.).

Upload for Test Case RSSBT000

Upload file from: This machine Other machine

Pre Execution	<input type="button" value="Choose File"/>	No file chosen	
Post Execution	<input type="button" value="Choose File"/>	No file chosen	
Result Check Script	<input type="button" value="Choose File"/>	No file chosen	
TN3270 recorder output file (.tgz)	<input type="button" value="Choose File"/>	No file chosen	Uploaded <input type="button" value="Remove"/>

Alternatively, there is another (more user-friendly) way to generate the baseline file of 3270 case and upload it using the following steps:

1. Open “Configuration” of related case by clicking on the icon in the Configuration column. This will show the Details for the Test Case view with 6 tabs.
2. Click the “tn3270rcd” tab to open a dialog.

Test CICS Application

Details for Test Case RSSBT000

Pre-Execution Post-Execution Result Check **tn3270rcd** tn3270cpr filter tn3270cpr pattern Comments

Mainframe Host Name
Mainframe Host Port

tn3270rcd is started, you can connect bej301713.cn.oracle.com:48933

3. Input the mainframe host name and port for tn3270 connections.
4. Click “Start tn3270rcd”. A message indicating tn3270rcd gateway port is shown to the right of the buttons if tn3270 recorder was started
5. Open the tn3270 (for example: IBM PCOM) and establish a connection to the tn3270rcd gateway. In the screen shot above it is “bej301713.cn.oracle.com:48933”. If using IE browser, Test Manger can help to launch 3270 client (only w3270 client is supported), and connect to the tn3700rcd gateway automatically. Enter the path to the w3270 client and click “Start 3270 client” button.

Details for Test Case RSSBT000

Pre-Execution Post-Execution Result Check **tn3270rcd** tn3270cpr filter tn3270cpr pattern

Mainframe Host Name
Mainframe Host Port

tn3270rcd is started, you can connect bej301713.cn.or

3270 client(wc3270) Path

Note: This function is only supported IE browser, and ActiveX must enabled in IE. For other browsers and tn3270 clients, start the client manually and enter the connection information for the gateway. Once the connection is established:

- In the 3270 terminal, navigate to the CICS application and, when positioned on the screen where you want to start baseline capture, press “PA1” to start recording.
- Execute the application test sequence entering input values, tabs, and using PF keys as normal.
- Press “PA1” again to end recording of the baseline.

- 5) Return to Test Manager screen and click “Kill tn3270rcd” to stop the tn3270 recorder demon.
- 6) Click “Collect baseline” to automatically upload the generated baseline. No manual upload is required.

Setting up field filtering

Assuming the application is executing correctly, most screen fields will match the mainframe baseline. However, some explainable differences may exist, precluding 100% match during the compare. For example, if the screen includes a date or timestamp, this value may differ between the captured z/OS baseline and the date or time of execution on ART for CICS. The difference will cause the Test Manager to fail this test case, even if all other fields match. However, if differences in some 3270 fields are not important, they can be added to the filter specification to be ignored when comparing the captured z/OS output with ART CICS. For example, in following screen, the field in line 1, column 70 is the current date (08-03-17). The test case will fail if the date in the baseline is not same as the date when the test case was executed in ART for CICS.

```

R55BT000          Simple sample application          08-03-17
SB00

-----

Customer's identifier: █

PF04 - Customer's list
PF05 - Add a new customer
PF06 - Modify an existing customer
PF07 - Delete an existing customer
PF08 - Customer's inquiry

PF03 - Quit application

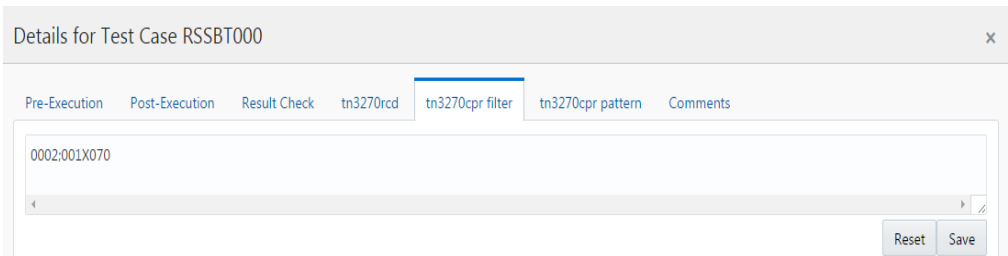
-----

Info: type a customer number, select an action and press Enter.

```

There are two ways to define the fields to be filtered out of comparison: pre-execution and post-execution. To add fields to the filter before running the test case, open “Configuration” of the related case and click the “tn3270cpr filter” tab.

Test CICS Application



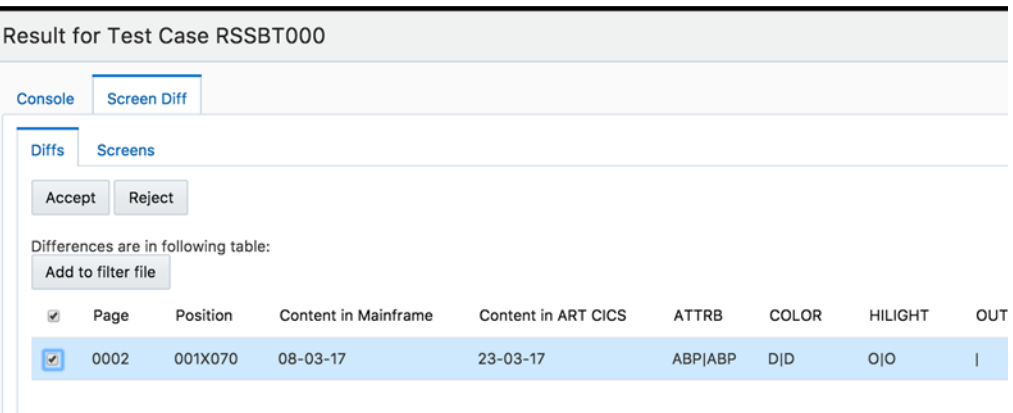
Each line defines the position of a field to be ignored.

The filter format is:

Page number ; rowXcolumn

For example, to ignore the field in line 1 column 70 in the second screen, enter 0002;001X070

Alternatively, there is another (more user-friendly) way to add a filter for a test case post-execution. After running the test case, the differences are shown in the case's Result view under the "Screen Diff" tab in the table form (under Diffs tab) and in side-by-side screen view (under Screens tab). Choose one or more fields from the list under the Diffs tab and click the "Add to filter file" button. The corresponding fields will be added to the filter and ignored the next time the case is executed and the captured results compared. Click "Add to group filter file" to add the corresponding fields to the filter file of this group. The group filter is applied to each case in this group if no filter is specified for the case.



After adding fields successfully, the list of the filtered fields (pagenum:position) can be checked under "tn3270cpr filter" tab in the case configurations view.

If the fields are added to the group filter file, the list of the filtered fields can be checked in the "tn3270cpr filter" tab of group view panel.

Execute Test Case and Check the Results

After generating the baseline, the CICS 3270 case can be executed individually or as part of a test group or test plan by clicking the “Run” button. The 3270 replayer will run the case using the captured blueprint (input) and capture a new benchmark (output), which will then be compared to the baseline benchmark. The log will be displayed in the Console view as shown in the figure below.

```

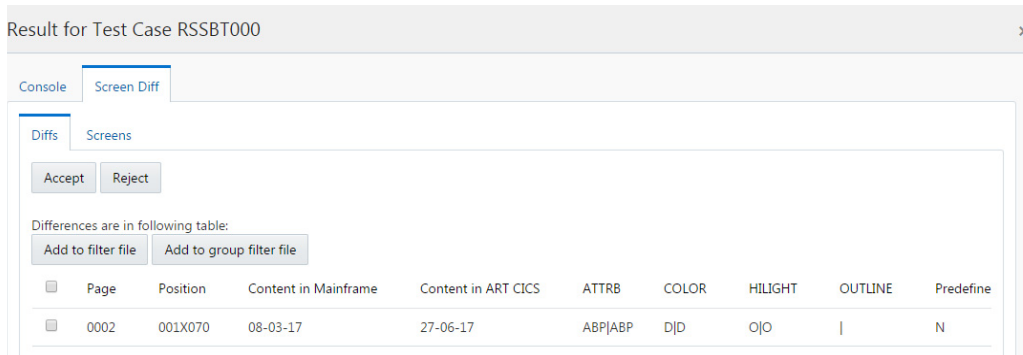
Console
20170324 06:11:26 [INFO] Begin prepare environment for group CICS_RT
20170324 06:11:26 [INFO] Domain has already booted.
20170324 06:11:26 [INFO] Prepare case execution environment for group CICS_RT successful.
20170324 06:11:26 [INFO] Executing CICS 3270 case CICS_3270_RSSBT000.
20170324 06:11:26 [INFO] Begin run case CICS_3270_RSSBT000.
20170324 06:11:26 [INFO] Begin replay CICS 3270 blueprint file for case CICS_3270_RSSBT000.
TN3270 replayer: connect to ARTTCP successfully thru telnet.
start replay....
Replayer process: 1/2
Replayer process: 2/2
end replay....
20170324 06:11:26 [INFO] Begin check result for case CICS_3270_RSSBT000
20170324 06:11:26 [INFO] Begin compare 3270 datastream files.
[170323.231126.578-00031940] INFONo TN3270 field
[170323.231126.579-00031940] INFONo TN3270 field
20170324 06:11:27 [ERROR] Check result for case CICS_3270_RSSBT000 (in group CICS_RT) failed.
20170324 06:11:27 [INFO] -----RUNNING END-----

```

Data Stream Compare

After the test case finishes, the detailed result can be viewed in the “result” dialog. Click the icon in the “Result” column in the row corresponding to the case to open the result dialog. In this dialog, the comparison result is displayed under the “Screen Diff” tab in two ways: data stream difference and side-by-side screen capture rendered in HTML.

The data stream diff result can be found under “Diffs” tab. After examining differences, the results can be accepted by clicking the “Accept” button, which will change the status of the case to “PASS”. To reject the results, click the **Reject** button which will change the status of this case to “FAIL”.



The differences are listed in the table as follows:

Table 5-2 Screen Diff Result

Column	Description
Page	The page number of screen.
Position	The field position in screen, format is: rowXcolumn
Content in Mainframe	Value in Mainframe
Content in ART CICS	Value in ART for CICS
ATTRB	Format: value in Mainframe value in ART CICS. A: ASKIP, B: BRT, D: DET, R: DRK, F: FSET, I: IC, O: NORM, N: NUM, P: PORT, U: UNPROT.
COLOR	Format: value in Mainframe value in ART CICS. D: DEFAULT, B: BLUE, R: RED, P: PINK, G: GREEN, T: TURQUOISE, Y: YELLOW, N: NEUTRAL.
HILIGHT	Format: value in Mainframe value in ART CICS. O: OFF, B: BLINK, R: REVERSE, U: UNDERLINE.
OUTLINE	Format: value in Mainframe value in ART CICS. B: BOX, L: LEFT, R: RIGHT, O: OVER, U: UNDER.
Predefined?	Y: The field could match the predefined pattern, N: The field is different, and no predefined pattern could be matched.

For more information about 3270 data stream field attributes, please refer to [DFHMDF](#) in IBM Knowledge Center.

Side-by-Side Screen Compare

The screens comparison result in HTML format is displayed by clicking the “Screens” tab. The mainframe screen is shown on the left, with the corresponding ART screen on the right. This view is intended as a visual aid to field list under Diffs tab and can also be snipped for inclusion in any test report or for further analysis.

result for Test Case RSSBT000

Console Screen Diff

Diff Screens

Open in new window

```

>>> TN3270 Recorder: Get message from host <bej301713:10146> @ 2017/03/08 00:00:56.163
RSSBT000      Simple sample application      08-03-17
SB00
-----
Customer's identifier: █

PF04 - Customer's list
PF05 - Add a new customer
PF06 - Modify an existing customer
PF07 - Delete an existing customer
PF08 - Customer's inquiry

PF03 - Quit application

```

```

>>> TN3270 Replayer: Get message from host <bej301713.cn.oracle.com:13821> @ 2017/03/08 00:00:56.163
RSSBT000      Simple sample application
SB00
-----
Customer's identifier: █

PF04 - Customer's list
PF05 - Add a new customer
PF06 - Modify an existing customer
PF07 - Delete an existing customer
PF08 - Customer's inquiry

PF03 - Quit application

```

Examining Server Logs and Traces

The ULOG and server traces in CICS group can be checked by viewing the result dialog for the test group. The logs accessible through this dialog include:

Table 5-3 Accessible Logs

Log Type	Description
ULOG	Tuxedo ULOG with messages pertaining to Tuxedo domain and key messages from all the servers
Server Log	ART CICS server logs for all CICS application server types: synchronous screen transactions (ARTSTRN/ARTSTR1), async transactions (ARTATRN/ARTATR1), DPL programs (ARTDPL), and logs from CICS system servers providing supporting functions under Others (e.g., ARTTSQ, ARTCKTI, etc.). For CICS 3270 testing the servers executing online transactions are ARTSTRN/ARTSTR1 and their logs are named in the following format: <code>std{out err}_str[n 1]</code> .
stdout	stdout file display normal program output information.
stderr	stderr file display program error information.
Program Trace	ART CICS trace file showing EXEC CICS level traces for all CICS verbs and program trace output. Level of trace is defined in ART CICS runtime configuration via <code>KIX_TRACE_LEVEL</code> environment variable.

Under each tab, multiple logs can be listed based on what’s available in the runtime. Click on the one that corresponds to the time of the test and it will be displayed with search and pagination capabilities as shown in the figure below.

Details for Test Group CICS_RT

ULOG
Server Log
stdout
stderr
Program Trace

ARTSTRN/ARTSTR1
ARTATRN/ARTATR1
ARTDPL
OTHERS

```

stdout_strn  Fri Mar 24 2017 14:11:26 GMT+0800 (CST)
stderr_strn  Fri Mar 24 2017 14:11:26 GMT+0800 (CST)
stdout_str1  Thu Mar 23 2017 19:12:11 GMT+0800 (CST)
stderr_str1  Thu Mar 23 2017 19:12:11 GMT+0800 (CST)

```

/scratch2/home/lipeng/TMDEMO.APP.NewTEST/CICS_RT/LOGS/sysout//stderr_dpl_60

Input Search Page Size

Goto Page

```

Can't open VSAMFILE
VSAMFILE loaded record: 000

```

SERVICE	PID	SDATE	STIME	EDATE	ETIME
@CICC_TOUPSVR	20403	1490267559	794066227	1490267559	794066232
@CICC_TOLOSVR	20516	1490267559	794066299	1490267559	794066300
@CICC_TOUPSVR	21332	1490267571	794067521	1490267571	794067521
@CICC_TOLOSVR	21450	1490267572	794067591	1490267572	794067592

CICS DPL Test Case (Message-driven Transactions)

When the project is created, the CICS DPL test cases are automatically detected by analyzing the configuration file `programs.desc` produced by ART Workbench from the CICS system definition (CSD) extract on z/OS and all programs with a non-null value in `REMOTESYS` field are considered to be DPL programs and are imported as CICS DPL cases.

Description

Tuxedo ART for CICS provides many ways for online transactions to be triggered without user interaction. Internally to a CICS program, `EXEC CICS LINK` can trigger another program, referred to as DPL (Dynamic Program Link). DPL programs are also used for external interactions from CICS CTG, inbound Web Services requests, mainframe `EXEC CICS LINK`

calls connected to ART CICS over the Tuxedo Mainframe Adapter, and other cases. All of these interactions are supported by DPL programs running in ARTDPL servers. In order to automate their testing, the Test Manager enables users to upload a client that can simulate the DPL request using Tuxedo ud32 driver tool.

To test a DPL program, first prepare a DPL client (currently, only ud32 scripts are supported) and then upload it. When running the test case, ART Test Manger executes this DPL client. However, since no mainframe baseline is available, the test case results cannot be automatically compared. Custom Result Check script can be provided and executed to verify the content of returned messages or for other evidence of successful execution (e.g., file or DB updates).

Configuration

For CICS DPL case there's one mandatory configuration item, DPL client, and 4 optional: pre- and post-execution scripts, result check script, and comments. Clicking the Configuration column will open the detail configuration dialog for CICS DPL case.

Creating DPL Client Using Tuxedo ud32 Script

Description

A client program is needed to launch DPL program. Currently, only ud32 scripts are supported as DPL clients.

For the usage of ud32, refer to [ud,ud32](#), [wud,wud32\(1\)](#).

To create a working ud32 script the correct service name in a supported format and correct message fields must be defined in the ud32 script based on the actual client messages being passed on the DPL call. For details of the DPL interface in ART CICS refer to [Oracle Tuxedo External DPL Communication Interfaces](#).

Example

Here is an example of ud32 DPL client in a text file:

Listing 5-1 Example - ud32 DPL Client

```
SRVCNM CICC_TOLOSVR  
CX_USERIDMAU
```

CXMW_MESSAGEHello_DPL

Note the following ud32 syntax requirements:

- the field name and field value are separated by **one tab**.
- the last line must be an empty line.

Uploading DPL Client

Once the ud32 script is prepared, it can be uploaded through the upload dialog of the test case.

Upload for Test Case TOUPSVR

Upload file from: This machine Other machine

Pre Execution	<input type="button" value="Choose File"/>	No file chosen	
Post Execution	<input type="button" value="Choose File"/>	No file chosen	
Result Check Script	<input type="button" value="Choose File"/>	No file chosen	
DPL client(ud32 script)	<input type="button" value="Choose File"/>	No file chosen	Uploaded <input type="button" value="Remove"/>

Generating Ud32 Script

The screenshot shows a web application window titled "Details for Test Case TOUPSVR". The window has a tabbed interface with the following tabs: "Pre-Execution", "Post-Execution", "Result Check", "tn3270rcd", "tn3270cpr filter", "tn3270cpr pattern", "ud32 script" (which is the active tab), and "Comments". The "ud32 script" tab contains the following form elements:

- Program Name:** A text input field with the placeholder text "Program Name".
- User ID:** A text input field with the placeholder text "User ID".
- COMMAREA Data:** A section with two radio buttons: "String" (selected) and "File". Below this is a text input field with the placeholder text "COMMAREA Data" and a "Choose File" button.
- Other Parameters:** A text area with the instruction "Input other parameters as the following format:" and two example lines: "key1=value1" and "key2=value2".
- Buttons:** "Reset" and "Save" buttons are located at the bottom right of the form.

You can find an easy way to generate ud32 script and upload it for the DPL case. Open the case configuration view and click the "ud32 script" tab. Enter the program name, user ID, and COMMAREA Data in corresponding fields. For COMMAREA data, you can select the input content type string or file. If file is selected, the following page is displayed.

The screenshot shows a "Choose File" dialog box. At the top, there is a close button (X). Below that, the text "Upload file from:" is followed by two radio buttons: "This machine" (selected) and "Other machine". A horizontal line separates this from the file selection area, which is highlighted in yellow. In this area, there is a "Choose File" button, a "Choose file" button, and the text "No file chosen". At the bottom right, there are "Reset" and "Finish" buttons.

Then you can choose the file from local machine or other machine. Once clicking "Finish", the file content is linked to the COMMAREA Data field.

You can specify additional parameters in the "Other Parameters" text area in the format shown on the screen.

When finishing configuration, you can click "Save" to generate corresponding ud32 script and upload for DPL case. You can check the ud32 script in the upload dialog, and click "Uploaded" link in the line of "DPL Client(ud32 script)".

Execute Test Case and Check Results

After uploading the DPL client, the CICS DPL case can be executed by clicking the “Run” button. The log will be displayed in the Console view.

```

Console
20170324 10:18:04 [INFO] Command line is run_group.sh -g CICS_RT -c :CICS_DPL_TOUPSVR -u jdbc:derby://10.182.75.76:9871//home/lipeng
20170324 10:18:04 [INFO] Current group name is CICS_RT, group type is CICS.
20170324 10:18:04 [INFO] Begin prepare environment for group CICS_RT
20170324 10:18:05 [INFO] Domain has already booted.
20170324 10:18:05 [INFO] Prepare case execution environment for group CICS_RT successful.
20170324 10:18:05 [INFO] Executing CICS DPL case CICS_DPL_TOUPSVR.
20170324 10:18:05 [INFO] Begin run case CICS_DPL_TOUPSVR.
SENT pkt(1) is :
SRVCNM   CICC_TOUPSVR
CX_USERID MAU
CXMW_MESSAGE Hello_DPL
RTN pkt(1) is :
SRVCNM   CICC_TOUPSVR
CX_USERID MAU
CXMW_MESSAGE HELLO_DPL
20170324 10:18:05 [INFO] Begin check result for case CICS_DPL_TOUPSVR
20170324 10:18:05 [INFO] -----RUNNING END-----

```

Currently, the check result logic is: if the keyword “error” is found in the ud32 output, the DPL case would be marked as “FAIL”, otherwise, it would be marked as “PASS”. Additional verification can be performed through the custom Result Checking script.

Examining Server Logs and Traces

The ULOG and server traces in CICS group can be checked by viewing the result dialog. For more information, see [Examining Server Logs and Traces](#). Under the **Server Log** tab, the relevant server executing DPL programs is ARTDPL and its logs are named using the following format `std[out|err]_dpl_*` as shown in the figure below.

Test CICS Application

Details for Test Group CICS_RT

ULOG **Server Log** stdout stderr Program Trace

ARTSTRN/ARTSTR1 ARTATRN/ARTATR1 **ARTDPL** OTHERS

stdout_dpl_60 Fri Mar 24 2017 18:18:05 GMT+0800 (CST)
stderr_dpl_60 Fri Mar 24 2017 18:18:05 GMT+0800 (CST)

/scratch2/home/lipeng/TMDEMO.APP.NewTEST/CICS_RT/LOGS/sysout//stdout_dpl_60

Input Search Page Size

Goto Page

```
KIXDIR=/home/lipeng/OraHome_101/art12.2.2.0.0/Cics_RT
Using COBOL-IT: COBOLITDIR=/opt/cobol-it-3.9.18
TRACE:1 KIX_TRACE_LEVEL: <9>
TRACE:1 SERVER_PID      : <19059>
TRACE:1 SERVER_EXE_NAME :
TRACE:1
TRACE:1 Groups loaded: <0001>
TRACE:1 |-----|
TRACE:1 | GROUP |
TRACE:1 |-----|
TRACE:1 | ARTTEMP|
```

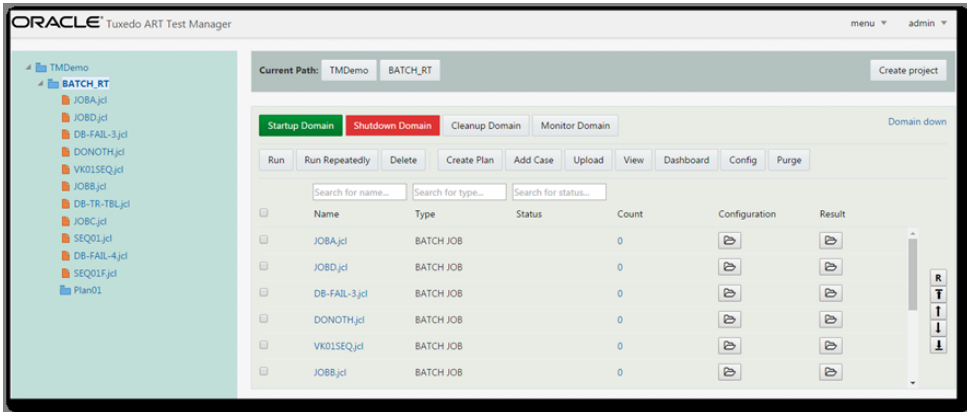
Test Batch Application

This topic contains the following sections:

- [Batch Execution Environment](#)
- [Upload Customized Scripts](#)
- [Configure Batch Test Case](#)
- [Execute Test Case and Check Results](#)

ART Test Manager can be used to test rehosted mainframe batch jobs running on Tuxedo ART for Batch. Each batch job is treated as an independent test case but these can be combined and ordered into a desired sequence in a test plan. Before doing any testing, an ART Test Manager project needs to be created as described in the previous chapters. After the project is created all available batch jobs are identified by scanning the associated APPDIR. Once the project has been created and associated with an APPDIR on a test machine, the scan is performed automatically and all identified batch test cases are added into a default test group named as BATCH_RT. A Batch test case can be executed in this default group or a new group with custom name created manually, or in a test plan, which is created in a group. The user interface of a Batch group is shown below.

Test Batch Application



Clicking on the navigator on the left side will expand the tree menu and show the project, group, test plan and case names. Detailed information and operation buttons are available on the top and right side of the main panel.

Batch Execution Environment

Batch cases are executed in a Batch system (TuxJES) in a Tuxedo domain. Each Batch group has an independent Batch system in a Tuxedo domain. Before executing a case, the Tuxedo domain should be booted up. Once started, the domain is available until it is shutdown.

Start/Shutdown Batch Domain

To start/shutdown Batch system in a Tuxedo domain, enter a test group of Batch type, and then click “Startup Domain” or “Shutdown Domain”. “Domain up”, “Domain up (partial)”, or “Domain down” status will be indicated on the right side of the panel. The detailed startup or shutdown process and related messages can be viewed in the Console area at the bottom of the main operations panel.

If the status indicates the domain is up only partially, examine the messages in the Console area to determine which servers failed to start and whether they will impact your test cases. If they do, examine Tuxedo ULOG messages (click Result button for the group in the Project view) and related logs to determine the cause. Once the underlying issue has been resolved, shutdown the domain and start it up again.

Monitor Batch Domain

Click “Monitor Domain” to open the Batch Domain Monitoring screen and view the detailed information on the running Initiators and Job Metric information by JES classes.

LMID	GRPNAME	GRPID	SRVID	PROCESS_ID	STATUS	CLASS	MAX_CONCURRE
SITE1	ARTGRP	1	30	16851	RUNNING	ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789	20

The “Job Metrics” tab shows number of jobs in various JES phases by JES class as shown in the figure below.

CLASS	INPUT	HOLD	WAITING	EXECUTING	FINISHED
2	0	0	0	0	4

This provides basic monitoring of batch system and jobs within the ART Test Manager. For more advanced monitoring Tuxedo System and Application Monitor Plus (TSAM Plus) provides additional capabilities, including real-time and historical performance monitoring, execution detailed tracing, SLA alerting, and much more. Additionally, ART batch provides batch monitoring in ISPF through ARTISPF extensions to uni-SPF.

Cleanup Tuxedo Domain with Batch System and Purge Jobs

To apply domain configuration changes, such as the ubbconfig change, a cleanup operation is needed before re-starting the domain, e.g., deleting tuxconfig and TLOG generated in the setup phase. Click the “Cleanup Domain” button to have ART Test Manager perform the cleanup tasks. If the domain is up, first shut it down before clicking “Cleanup Domain” since these operations aren’t allowed while the domain is up.

Click the “Purge” button of a Batch group to have all the test cases submitted to this domain purged after a confirmation. This action will remove all the case execution records, such as logs, job information in the TuxJES control tables, etc. Use this function with caution as once removed, this information is not recoverable.

Upload Customized Scripts

ART Test Manager provides built-in extension framework that can run user-provided pre- and post-execution scripts or executables as well results checking script. These optional custom scripts are supported for Batch group/plan/case.

- Pre-execution file and post-execution files are executed before and after running a group/test plan/case. They can be either scripts or executable binary files provided at a group/test plan and test case level.
- Result check script can be used to extend the built-in results checking with additional steps to help determine whether a case failed or succeeded after it’s been executed.

Additionally, batch jobs may refer to environment variables as part of their execution. Env file can be provided for each test case which sets environment variables with values relevant to each case.

Note: batch jobs that run IMS BMP programs using DFSRRC00 utility require that the env file contains TUXCONFIG variable set to the full path of the tuxconfig file of the Tuxedo domain for IMS, and that the domain configuration includes ARTIBMP servers.

Clicking the “Upload” button on group/test plan/case panel will open the upload dialog where you can specify and upload these custom scripts/files. All of these customized scripts are optional, not mandatory.

Configure Batch Test Case

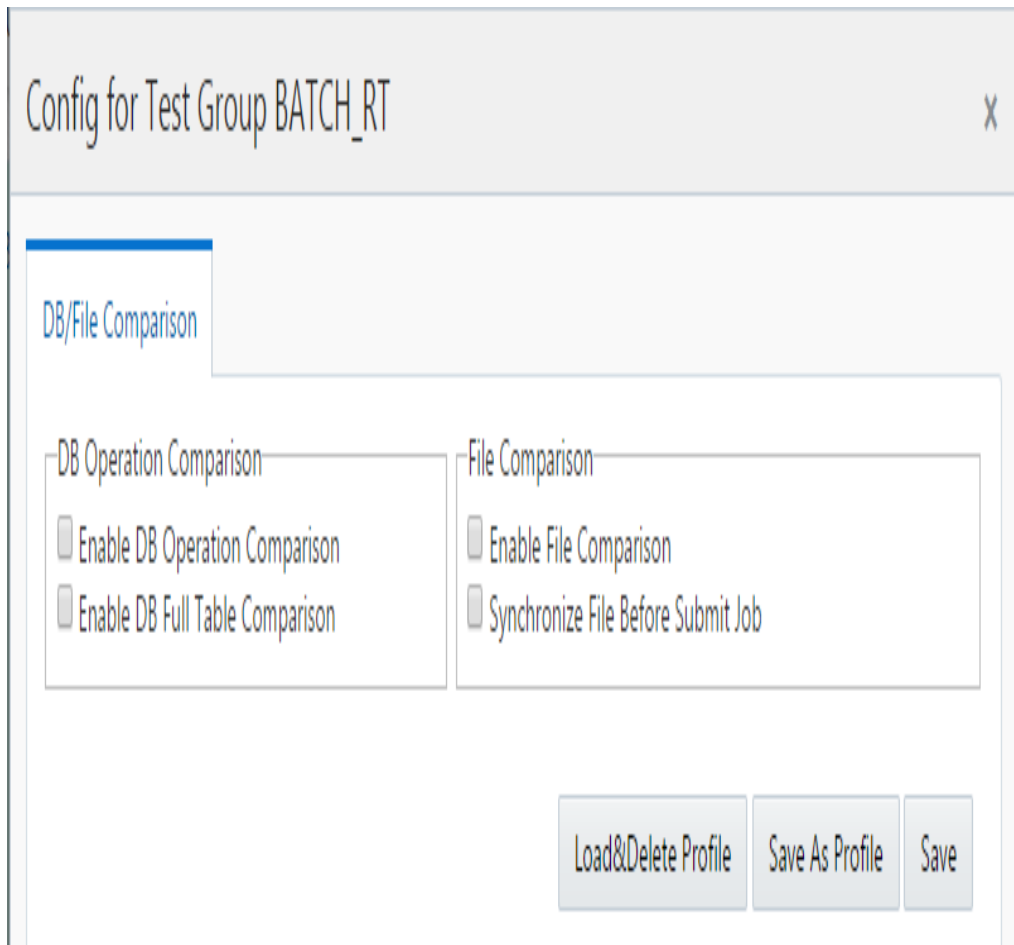
ART Test Manager provides the optional capability to compare batch job execution in ART environment with a baseline execution on the mainframe. This is accomplished by submitting the job on the mainframe after it completes execution on ART using FTP, and downloading results for comparison. To use this functionality, additional configurations are required. When using this feature, ensure that FTP access to the mainframe is available, identify the mainframe user credentials authorized to connect and submit jobs via FTP, and ensure the execution environment on the mainframe is valid, and that the state of the database and any input files matches that in ART environment.

When file comparison is enabled, ART Test Manager will attempt to download and transcode the data files identified in the job's JCL by DD statements so they can be compared with the files generated by the job running in ART for Batch. To ensure the download and transcoding work, the following conditions must be met:

- Ensure there's adequate disk space available to download and transcode files. Since two copies will exist, calculate the space requirements as double the original file sizes.
- Supported file organizations/types for comparison are Sequential (including GDGs) and VSAM KSDS (Indexed). The latter files can be migrated to an indexed file or database table. The comparison is only available when the file is migrated to an indexed file.
- Transcoding (EBCDIC to ASCII conversion for text field, leaving binary/packed decimal fields unchanged) is performed using the transcoding routines generated by ART Workbench as part of the migration project. Further information about generating these routines and their location in APPDIR can be found in the [ART Workbench User Guide](#).

Configure Mainframe Connection

Click the "Config" button on the group panel to enter the mainframe configuration information. The configuration dialog shown below will be displayed.



If any of the comparison is enabled, the required configuration is displayed as below.

Config for Test Group BATCH_RT

DB/File Comparison

DB Operation Comparison

Enable DB Operation Comparison

Enable DB Full Table Comparison

File Comparison

Enable File Comparison

Synchronize File Before Submit Job

Mainframe

Mainframe Host Name: Mainframe host name

Mainframe FTP port: 21

User Name: User name

Password: Password

DB2

DB2 Home: Path to DB2 home

DB2 Database Name: Database name

DB2 Database Connect Port: Port

DB2 User: User name

DB2 Password: Password

Enter mainframe FTP information and user credentials to enable submitting the job on the mainframe and downloading the results, including logs and data files. Click “Test FTP Connection” to ensure ART Test Manager can connect using the information provided. If this fails, please resolve the reason for failure as this function cannot work until FTP connectivity is available.

Select the “Enable DB Operation Comparison” to compare DB changes on the mainframe and in ART environment after both jobs have completed. After entering the required DB2 information for the database used by the mainframe job, click “Test DB2 Connection” button to have ART Test Manager attempt to connect. If the connection test fails, review the reason for failure and

correct it. Ensure that the DB2 user entered has appropriate DB2 permission grants to access the database objects used by the job.

Select "Enable DB Full Table Comparison" to compare all related tables on the mainframe and ART environment after both jobs completed.

Select "Enable File Comparison" to have ART Test Manager download, transcode, and compare files from the mainframe with the ones produced by the Batch job in ART.

These configurations can be saved to profile with given names by clicking the button "Save As Profile". The saved profiles can be deleted or loaded as current configuration by clicking "Load&Delete Profile".

In the "Step RC Comparison" tab, Step RC Comparison can be enabled or disabled.

After making all the required selections, entering the relevant information, and getting successful results from Test FTP Connection and Test DB2 Connection, click on the "Save" button in the lower right corner to save the mainframe configuration. This configuration is only effective for the current group.

Execute Test Case and Check Results

Before executing a test case, ensure the domain is up for the test group. Choose groups/plans/cases by clicking the associated checkboxes, and click the "Run" button. Execution output will be displayed in the console on the bottom half of the screen. After case execution, ART Test Manager provides built-in result checking in three aspects, which are described below.

Return Code Checking

Return code checking is the default result checking for batch test cases in ART Test Manager. For Native-JCL cases, return code 0 makes the case pass, or the case fails. For KSH cases, return code C000 makes the case pass. If the mainframe FTP connection is not defined and file comparison and/or DB operation comparison are not selected, this is the only built-in checking that's available in ART Test Manager, except for the custom Result Checking script that can be provided by the user.

Step RC Checking

Step RC Checking is performed when it is enabled (refer to Configure Mainframe Connection). Step RCs is compared with those on the mainframe. If Step RC Checking is enabled, Return Code Checking will not be performed.

The result is shown in the test case result dialog, which can be opened by clicking the icon in the Result column for the relevant case. Click the "Step RC Compare" tab to show the following information.

Step	RC	Zos Step	Zos RC
STEP00	0	STEP00	00
STEP01.PSTP00	0	STEP01.PSTP00	00
STEP02	8	STEP02	08
STEP03.P2STP.PSTP00	0	P2STP.PSTP00	00
STEP03.P2STP1	0	STEP03.P2STP1	16
STEP04	0	STEP04	00
STEP05	1	STEP05	01
STEP06	2	STEP06	02
STEP07	3	STEP07	03

File Comparison

File comparison will be performed if it is enabled (refer to [Configure Mainframe Connection](#)).

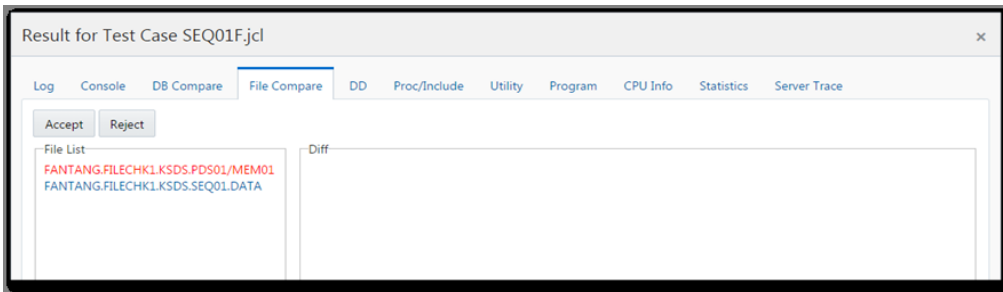
You can make some customized configurations for each case in the configuration panel shown as below. When file comparison for this group is enabled, the **File Comparison** Configuration is available.

File Name	File Type	Download Enable	Compare Enable
FANTANG.FILECHK1.KSDS.PDS01(MEM01)	SQ	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FANTANG.FILECHK1.KSDS.SEQ01.DATA	SQ	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

If **Run on mainframe** is not checked, the job is not submitted on the mainframe.

If **Edit file list** is checked, the job referenced files are listed in the table. The **Download Enable**, **Compare Enable**, and **Text File** options can be configured for each file. If **Download** is not enabled, the file comparison uses the files downloaded from the mainframe last time.

The result is shown in the test case result dialog, which can be opened by clicking the icon in the Result column for the relevant case. Clicking the “File Compare” tab will show the following information in two panes. Left pane lists the files referenced by the batch job. Click a file in the list, and details of any differences will be shown on the right. For files with text-only content the differences will be displayed directly. For binary files or files with mixed text and binary content, the location of the differences will be indicated. If there are no differences or differences are acceptable, click the “Accept” button in this page, which will mark the case as Passed.



DB Update Comparison

DB update comparison is processed if it is enabled (refer to [Configure Mainframe Connection](#)). The result is shown in the case result dialog, which can be opened by clicking the icon in the Result column for the relevant case. Click the “DB Operation Compare” tab to open a two pane view. The left pane shows all the DB tables and operations performed in the job. Click the DB operation on the left and relevant details will be shown in the right pane if there’s any difference. If the difference is acceptable, click the “Accept” button in this screen to mark the test case as “Passed”. Check **Only show difference** checkbox to filter out consistent operations.

Result for Test Case DB-FAIL-3.jcl

Log Console **DB Operation Compare** DB Table Compare File Compare DD Proc/Include Utility Program CPU Info Statistics Serv

Accept Reject Only show difference

	ORA		DB2		ORACLE			DB2			
	TABLE	OP	TABLE	OP		BEFORE	AFTER		BEFORE	AFTER	
					COLBIGINT	214	414		COLBIGINT	214	414
					COLBLOB				COLBLOB		
					COLBLOB1K				COLBLOB1K		
					COLCHAR	B	D		COLCHAR	B	D
1	scott.DBCHECK	INS	FANTANG.DBCHEC	INS	COLCHAR1	BBCD1234	DBC1234		COLCHAR1	BBCD1234	DBC1234
2	scott.DBCHECK	INS	FANTANG.DBCHEC	INS	COLCHAR6	BBCDEF	DBCDEF		COLCHAR6	BBCDEF	DBCDEF
3	scott.DBCHECK	INS	FANTANG.DBCHEC	INS	COLCLOB				COLCLOB		
4	scott.DBCHECK	UPI	FANTANG.DBCHEC	UPI	COLCLOB1K				COLCLOB1K		
5	scott.DBCHECK	UPI	FANTANG.DBCHEC	UPI	COLDATE	2012-01-13	2014-01-13		COLDATE	2012-01-13	2014-01-13
6	scott.DBCHECK	UPI	FANTANG.DBCHEC	UPI	COLDECIM#	22	42		COLDECIM#	22	42
7	scott.DBCHECK	UPI	FANTANG.DBCHEC	UPI							
8	scott.DBCHECK	UPI	FANTANG.DBCHEC	UPI							
9	scott.DBCHECK	UPI	FANTANG.DBCHEC	UPI							

DB Full Table Comparison

DB full table comparison will be performed if it is enabled (refer to Configure Mainframe Connection).

You can make some customized configurations for each case in the configuration panel shown as below. When DB full table comparison for this group is enabled, the DB Table Comparison Configuration is available.

Details for Test Case SEQ01F.jcl

Source Code Pre-Execution Post-Execution Result Check DFSRRC00 Comments **File/DB Compare**

Run on mainframe

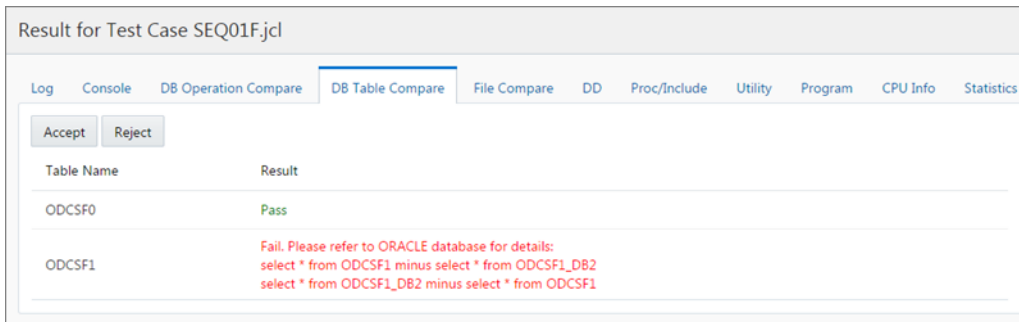
File Comparison **DB table Comparison**

Table Name	Download Enable	Compare Enable
ODCSF0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ODCSF1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DBCHECK	<input type="checkbox"/>	<input type="checkbox"/>

If Run on mainframe is not checked, the job is not submitted on the mainframe. The DB full table comparison is done based on the tables downloaded from the mainframe last time.

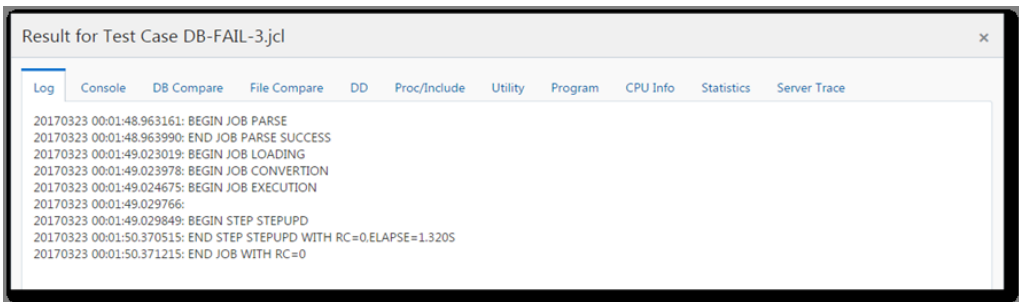
The Download Enable and Compare Enable options can be configured for each table. If Download is not enabled, the table comparison uses the tables downloaded from the mainframe last time.

The result is shown in the test case result dialog, which can be opened by clicking the icon in the Result column for the relevant case. Clicking the "DB Table Compare" tab will show the following information. If there are no differences or differences are acceptable, click the "Accept" button in this page, which will mark the case as Passed.



Examining Logs and Traces

Logs and traces can be examined in the test case result dialog. Switch to the “Log” tab to display the job log. Server trace can also be displayed when clicking the “Server Trace” tab. This shows JESTRACE information as described in the [ART Batch User Guide](#).

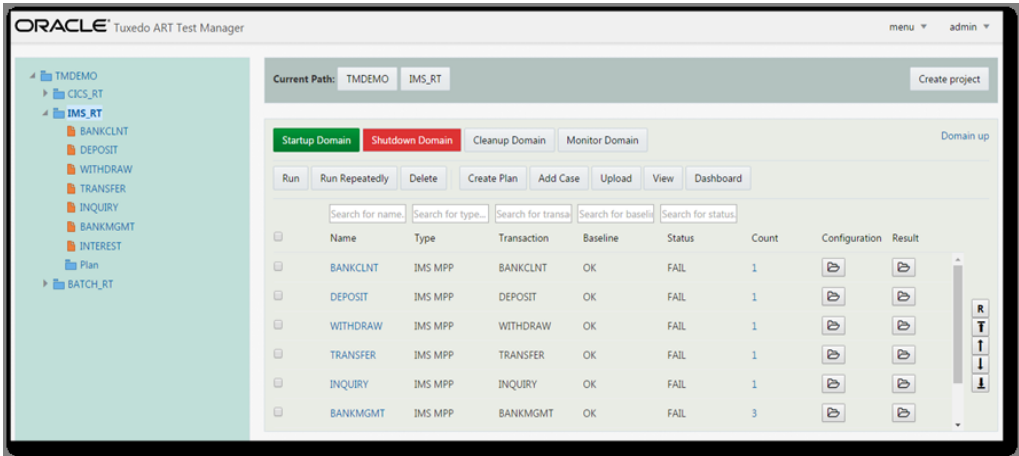


Test IMS Application

This topic contains the following sections:

- [IMS Execution Environment](#)
- [Upload Customized Scripts](#)
- [IMS MPP Test Case \(Online Transactions\)](#)
- [IMS BMP Test Case \(Batch Programs\)](#)

ART Test Manager can be used to test rehosted IMS TM or DC applications running on Tuxedo ART for IMS. Before doing any testing, a project needs to be created as described in the previous chapters. After the project is created and associated with a deployed APPDIR location on a test machine, all available IMS test units are identified by scanning `imstrans.desc` and `imsapps.desc` files in the specified APPDIR for transaction and program definitions. These two files are generated by the ART Workbench from the `TRANSACT` and `APPLCTN` macros defined in IMS system configuration on z/OS. Once the project has been created and associated with an APPDIR on a test machine, the scan is performed automatically and all identified test cases are added into a default test group named as `IMS_RT`. An IMS test case can be executed in this default group or a new group with a customized name created manually, or in a test plan, which is created in a group. The user interface of an IMS group is shown below.



Clicking on the navigator on the left side will expand the tree menu and show the project, group, test plan and test case names. Detailed information and operation buttons are available on the top and the right side of the main panel.

IMS Execution Environment

IMS cases are executed in an IMS region in a Tuxedo domain. Each IMS group has independent IMS MPP (online) and IMS BMP (batch) regions in a Tuxedo domain. Before executing a case, the Tuxedo domain with these regions should be booted up. Once started, IMS regions remain running and available for all IMS test cases until they are shutdown.

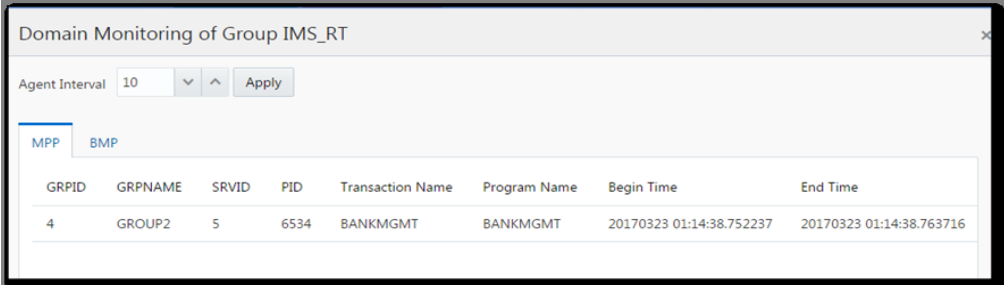
Start/Shutdown Tuxedo Domain with IMS Region

To start/shutdown CICS domain, enter a test group of IMS type, and then click “Startup Domain” or “Shutdown Domain”. “Domain up”, “Domain up (partial)”, or “Domain down” status will be indicated on the right side of the panel. The detailed startup or shutdown process and related messages can be viewed in the Console area at the bottom of the main operations panel.

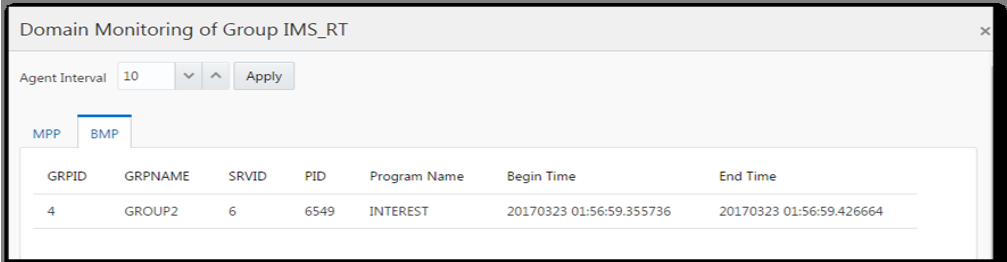
If the status indicates the domain is up only partially, examine the messages in the Console area to determine which servers failed to start and whether they will impact your test cases. If they do, examine Tuxedo ULOG messages (click Result button for the group in the Project view) and related logs to determine the cause. Once the underlying issue has been resolved, shutdown the domain, run Cleanup Domain if any configuration changes have been made, and start it up again.

Monitor Tuxedo Domain with IMS Region

Click “Monitor Domain” to open the IMS Domain Monitoring screen and view information on executing transactions and programs. The view is updated dynamically based on a polling interval that can be changed at the top of the screen by changing the number and clicking Apply button. Two tabs are provided to access information from MPP region for online transactions and BMP region for batch programs as shown in the two figures below. If there is a transaction or program executing, the view will display the current execution information, if there is no task running, the view will display the last execution record.



GRPID	GRPNAME	SRVID	PID	Transaction Name	Program Name	Begin Time	End Time
4	GROUP2	5	6534	BANKMGMT	BANKMGMT	20170323 01:14:38.752237	20170323 01:14:38.763716



GRPID	GRPNAME	SRVID	PID	Program Name	Begin Time	End Time
4	GROUP2	6	6549	INTEREST	20170323 01:56:59.355736	20170323 01:56:59.426664

This provides basic monitoring of IMS execution within the ART Test Manager. For more advanced monitoring capabilities, Tuxedo System and Application Monitor Plus (TSAM Plus) provides additional capabilities, including real-time and historical performance monitoring, execution detailed tracing, SLA alerting, and much more.

Cleanup Tuxedo Domain with IMS Region

To apply domain configuration changes, such as the ubbconfig or setenv changes, a cleanup operation is needed before re-starting the domain, e.g., deleting tuxconfig and TLOG generated in the setup phase. Click on the “Cleanup Domain” button to have ART Test Manager perform

the cleanup tasks. If the domain is up, first shut it down before clicking “Cleanup Domain” since these operations aren’t allowed while the domain is up.

Upload Customized Scripts

ART Test Manager provides built-in extension framework that can run user-provided pre- and post-execution scripts or executables as well as a result checking script. These custom scripts are supported for IMS group/plan/case.

- Pre-execution file and post-execution files are executed before and after running a group/test plan/case. They can be either scripts or executable binary files.
- Result check script can be used to extend the built-in results checking with additional steps to help determine whether a case failed or succeeded after it’s been executed.

Clicking the “Upload” button on group/test plan/case panel will open the upload dialog. These custom scripts are optional and are not required to run the test cases.

IMS MPP Test Case (Online Transactions)

When the project is created, the IMS MPP test cases are automatically detected by analyzing the configuration files `imstrans.desc` and `imsapps.desc` produced by ART Workbench from the IMS system definition macros on z/OS.

Description

Tuxedo ART for IMS provides 3270 support that enables online transactions to interact with tn3270 emulators based on screen definitions in IMS MFS maps. That interaction, in the form of 3270 data stream, is identical to the interaction with online IMS MPP transactions running on z/OS. In order to automate the testing, the ART Test Manager enables capturing the baseline during mainframe interaction, and then replaying it against rehosted transactions in Tuxedo ART for IMS environment and comparing the corresponding 3270 data streams and screens.

Testing an IMS MPP case involves the following:

1. Running an IMS MPP transaction (or sequence of screen interactions) on the mainframe to capture the baseline 3270 data stream using the ART Test Manager provided TN3270 Recorder tool. A complete guide for it can be found in Appendix I. Baseline captured by TN3270 Recorder contains three components packaged as a compressed tar file with “.tgz” extension:
 - Blueprint file (input part): the data stream sent from tn3270 to IMS TM or DC on z/OS;

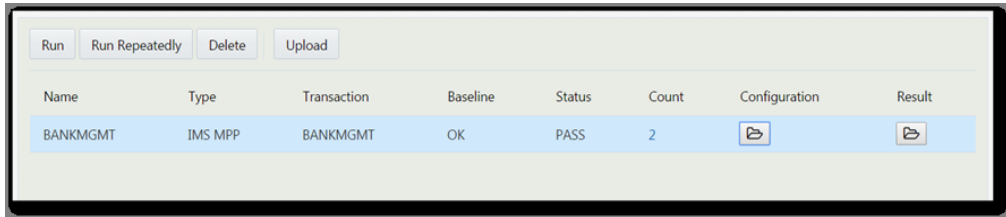
- Benchmark file (output part): data stream sent from IMS TM or DC on z/OS to tn3270;
 - Screen view rendered in HTML file (output part): the HTML view of the 3270 screenshot.
2. Uploading the baseline to the test case configuration in ART Test Manger using the Upload dialog.
 3. Execute the same 3270 transaction sequence in the ART IMS environment using the blueprint (input part of the baseline), capturing the result. This is simply a matter of running the test case individually or as part of a test plan, the uploaded blueprint is then used to replay the interactions as they were captured.
 4. Compare the captured ART IMS output data stream against the benchmark captured from z/OS interaction and show any differences. The comparison is performed automatically after running the test case and the results can be viewed after clicking the Result icon for the test case. Console tab shows any execution messages or errors, and Screen Diff tab shows screen differences either as a list of fields or actual side-by-side view of the baseline (z/OS) and actual (ART IMS) screens.

Note that there may naturally be some differences if the IMS screens include date/time fields, or fields sensitive to the execution environment, for example host name, IP address, name of the batch job that started the IMS region, userid, or other external attributes. To help overcome these expected differences the ART Test Manager supports field filtering for 3270 fields. The filter simply enables users to remove certain fields from comparison. Filters can be set up at a test case level, and defined pro-actively when configuring a test case, or post-execution when comparing the results. In the latter case, the test case will initially show Failed status, which user can change to Passed after verifying all the other fields and selecting fields to filter out of the comparison. Subsequent execution of the test case will automatically apply the filter and, barring any other differences, will mark the case as Passed.

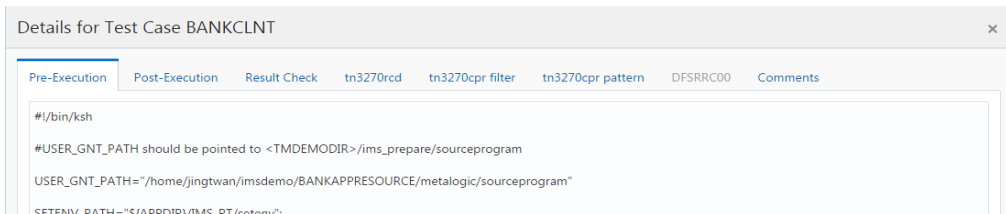
Configuration

For IMS MPP case there's one mandatory configuration item, tn3270 recorder's baseline, and five optional: pre- and post-execution scripts, 3270 field filter, field filter pattern, and comments. Click the icon in the Configuration column to open the detail configuration dialog for the IMS MPP case.

Test IMS Application



The configuration dialog provides six tabs that can be used to enable checking the Pre/Post-Execution scripts already uploaded, to generate the baseline using tn3270 recorder, to check or edit the 3270 field filter list, to add or edit the 3270 field filtering pattern, and to add or edit text comments for this test case.



These tabs are:

Table 7-1 Tabs

Tab	Description
Pre-Execution	Showing the Pre-Execution script uploaded by user
Post-Execution	Showing the Post-Execution script uploaded by user
tn3270rcd	tn3270 recorder's baseline is loaded here. Further information can be found in Using tn3270 Recorder and Uploading Captured Baseline
tn3270cpr filter	3270 fields filter configuration consisting of the page number and field position settings for fields to ignore during the comparison
tn3270cpr pattern	3270 field filter pattern Differences, which match the pre-defined pattern, would be marked
Comments	Showing comments added by the user

Using tn3270 Recorder and Uploading Captured Baseline

Before running an IMS MPP test case, the transaction must be run on z/OS, capturing the 3270 data stream as a baseline in “.tgz” file. The tn3270 recorder tool is used to accomplish this. For the detailed usage of the tn3270 recorder in a standalone mode, refer to [Appendix I - tn3270 Recorder](#).

In the case detail view, click Upload button to open the upload wizard where the baseline “.tgz” file can be uploaded along with optional pre- and post-execution scripts and result checking script for additional custom verification steps (e.g., MQ message has been sent or retrieved from a queue, file or DB have been updated, etc.).

Upload for Test Case BANKMGMT

Upload file from: This machine Other machine

Pre Execution	<input type="button" value="Choose file"/>	No file chosen	
Post Execution	<input type="button" value="Choose file"/>	No file chosen	
Result Check Script	<input type="button" value="Choose file"/>	No file chosen	
TN3270 recorder output file (.tgz)	<input type="button" value="Choose file"/>	No file chosen	Uploaded <input type="button" value="Remove"/>

Alternatively, there is another (more user-friendly) way to generate the IMS MPP case baseline and upload it using the steps described in [Using tn3270 Recorder and Uploading Captured Baseline](#). After the baseline has been uploaded, the MPP case is ready to run.

Setting Up Field Filtering

Assuming the application is executing correctly, most screen fields will match the mainframe baseline. However, some explainable differences may exist, precluding 100% match during the compare. For example, if the screen includes a date or timestamp, this value may differ between the captured z/OS baseline and the date or time of execution on ART for IMS. The difference will cause the ART Test Manager to fail this test case, even if all other fields match. However, if differences in some 3270 fields are not important, they can be added to the filter specification to be ignored when comparing the captured z/OS output with ART IMS.

Test IMS Application

There are two ways to define the fields to be filtered out of comparison: pre-execution and post-execution. To add fields to the filter before running the test case, open “Configuration” of the related case and click the “tn3270cpr filter” tab.

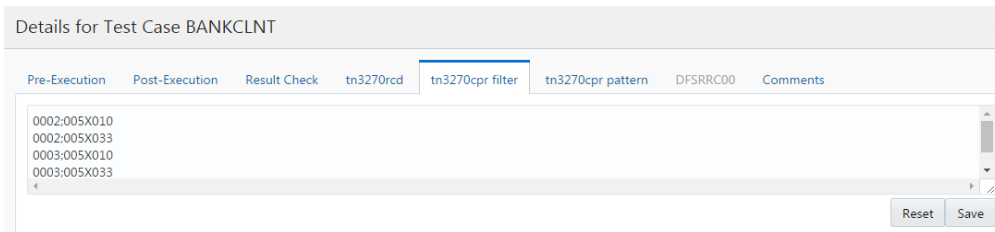
Each line defines the position of a field to be ignored.

The filter format is:

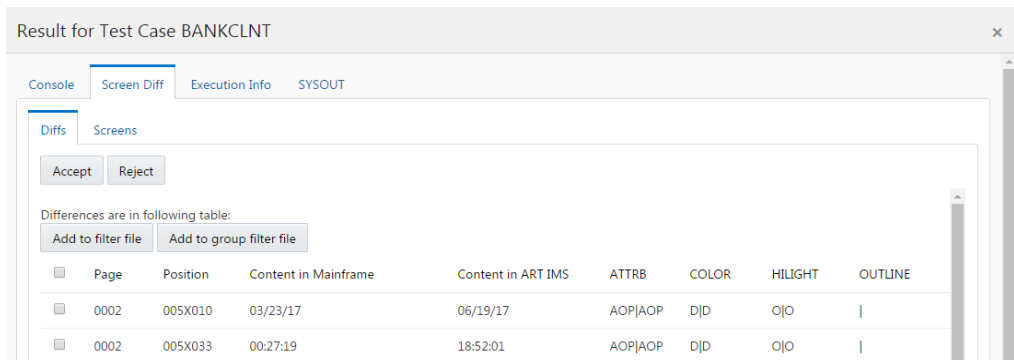
```
Pagenumb;rowXcolumn
```

For example, to ignore the field in line 1 column 70 in the second screen, enter:

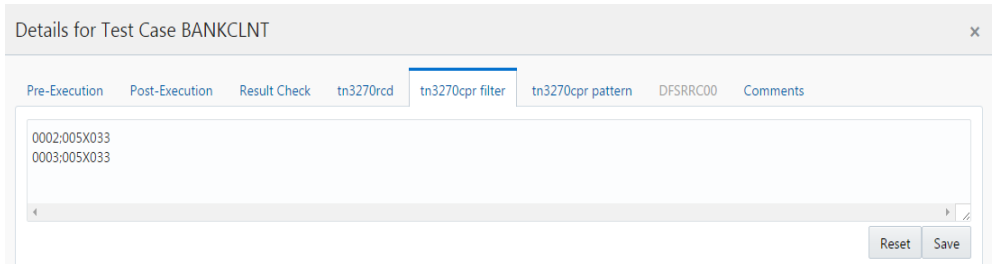
```
0002;001X070
```



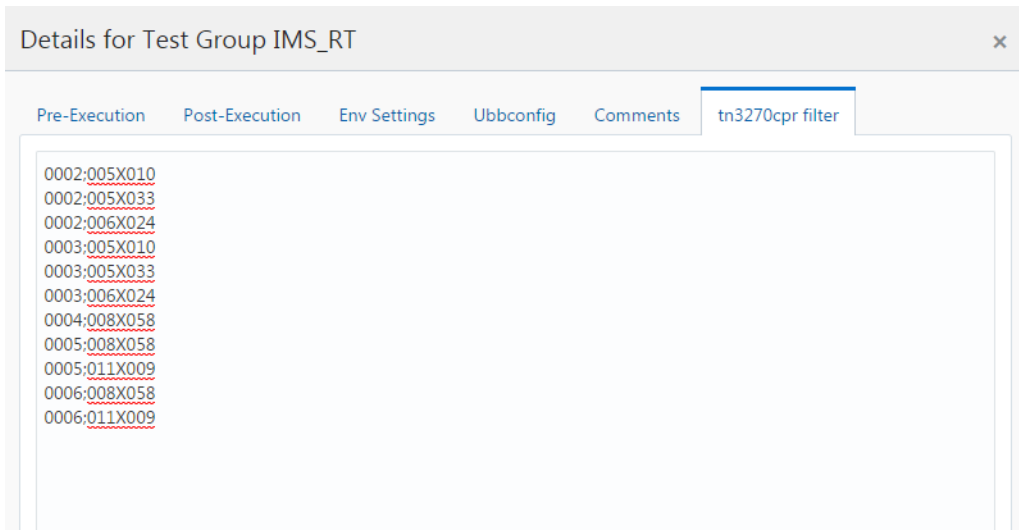
Alternatively, there is another (more user-friendly) way to add a filter for a test case post-execution. After running the test case, the differences are shown in the case’s Result view under the “Screen Diff” tab in table form (under Diffs tab) and in side-by-side screen view (under Screens tab). Choose one or more fields from the list under the Diffs tab and click the “Add to filter file” button. The corresponding fields would be added to the filter and ignored the next time the case is executed and the captured results compared. Click "Add to group filter file" to add corresponding fields to the group filter file. The group filter is applied to each case in the group if no filter is specified for the case.



After adding fields successfully, the list of the filtered fields (pagenum;position) can be checked under “tn3270cpr filter” tab in the case configurations view.



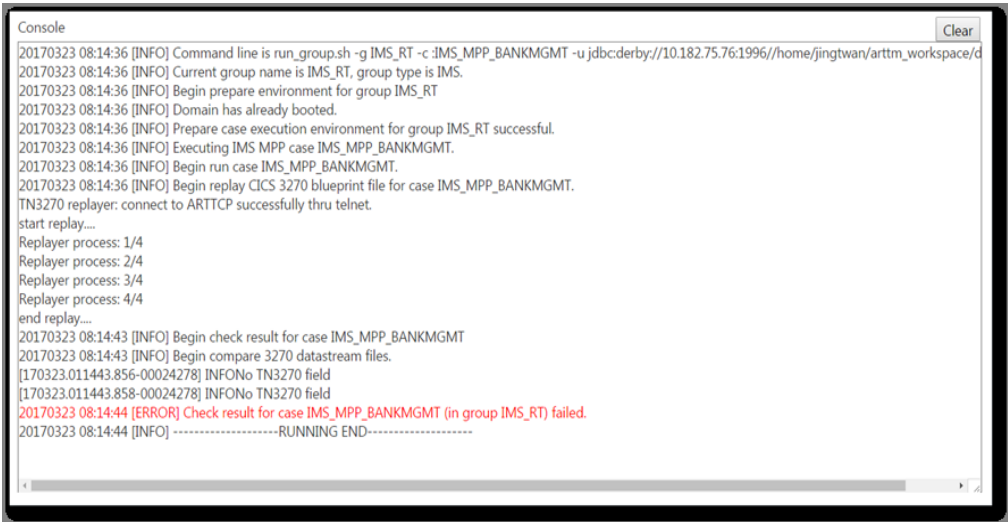
If the fields are added to the group filter file, the filtered fields list can be checked in the "tn3270cpr filter" tab of group view panel.



Execute Test Case and Check the Results

After generating the baseline, the IMS MPP case can be executed individually or as part of a test group or test plan by clicking the “Run” button. The 3270 replayer will run the case using the captured blueprint (input) and capture a new benchmark (output), which will then be compared to the baseline benchmark. The log will be displayed in the Console view as shown in the figure below.

Test IMS Application



```
Console
20170323 08:14:36 [INFO] Command line is run_group.sh -g IMS_RT -c :IMS_MPP_BANKMGMT -u jdbc:derby://10.182.75.76:1996//home/jingtwan/arttm_workspace/d
20170323 08:14:36 [INFO] Current group name is IMS_RT, group type is IMS.
20170323 08:14:36 [INFO] Begin prepare environment for group IMS_RT
20170323 08:14:36 [INFO] Domain has already booted.
20170323 08:14:36 [INFO] Prepare case execution environment for group IMS_RT successful.
20170323 08:14:36 [INFO] Executing IMS MPP case IMS_MPP_BANKMGMT.
20170323 08:14:36 [INFO] Begin run case IMS_MPP_BANKMGMT.
20170323 08:14:36 [INFO] Begin replay CICS 3270 blueprint file for case IMS_MPP_BANKMGMT.
TN3270 replayer: connect to ARTTCP successfully thru telnet.
start replay....
Replayer process: 1/4
Replayer process: 2/4
Replayer process: 3/4
Replayer process: 4/4
end replay...
20170323 08:14:43 [INFO] Begin check result for case IMS_MPP_BANKMGMT
20170323 08:14:43 [INFO] Begin compare 3270 datastream files.
[170323.011443.856-00024278] INFONo TN3270 field
[170323.011443.858-00024278] INFONo TN3270 field
20170323 08:14:44 [ERROR] Check result for case IMS_MPP_BANKMGMT (in group IMS_RT) failed.
20170323 08:14:44 [INFO] -----RUNNING END-----
```

Datastream Compare

After the test case finishes, the detailed result can be viewed in the “result” dialog. Click the icon in the “Result” column on the row corresponding to the case to open the result dialog. In this dialog, the comparison result is displayed under “Screen Diff” tab in two ways: data stream difference and side-by-side screen capture rendered in HTML.

The data stream difference result can be found under “Diffs” tab. After examining differences, the results can be accepted by clicking the “Accept” button, which will change the status of the case to “PASS”. To reject the results, click the “Reject” button, which will change the status of this case to “FAIL”.

Result for Test Case BANKMGMT

Console | **Screen Diff** | Execution Info | SYSOUT

Diff | Screens

Accept | Reject

Differences are in following table:

Add to filter file

<input type="checkbox"/>	Page	Position	Content in Mainframe	Content in ART IMS	ATTRB	COLOR	HILIGHT	OUTLINE
<input type="checkbox"/>	0002	005X033	00:00:29	01:14:36	AOP AOP	DJD	OJO	
<input type="checkbox"/>	0003	005X033	00:00:29	01:14:36	AOP AOP	DJD	OJO	
<input type="checkbox"/>	0005	011X009	ACCOUNT ID:0000000000000028	ACCOUNT ID:0000000000000034	OP OP	DJD	OJO	
<input type="checkbox"/>	0006	011X009	ACCOUNT ID:0000000000000029	ACCOUNT ID:0000000000000035	OP OP	DJD	OJO	

The differences are listed in the table as follows:

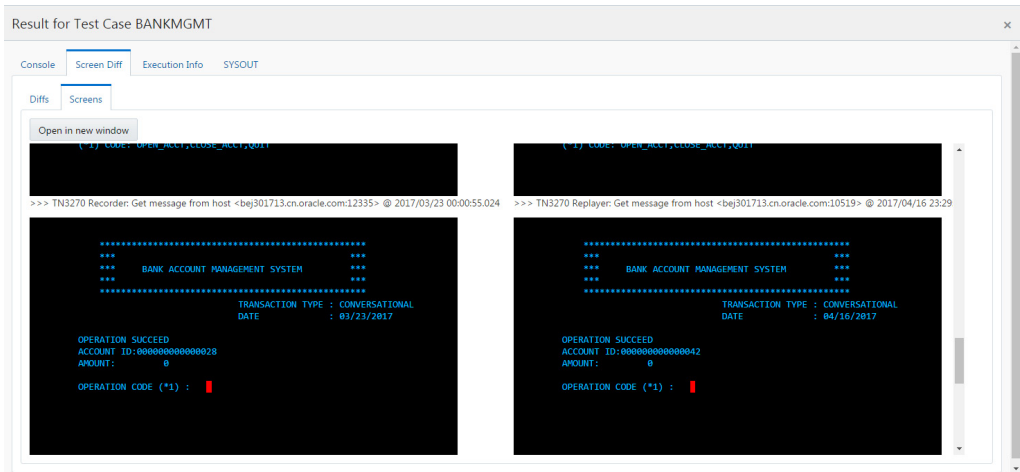
Table 7-2 Data Stream Differences

Column	Description
Page	The page number of screen.
Position	The field position in screen, format it: rowXcolumn
Content in Mainframe	Value in Mainframe
Content in ART IMS	Value in ART for IMS
ATTRB	Format: value in Mainframe value in ART CICS. A: ASKIP, B: BRT, D: DET, R: DRK, F: FSET, I: IC, O: NORM, N: NUM, P: PORT, U: UNPROT.
COLOR	Format: value in Mainframe value in ART CICS. D: DEFAULT, B: BLUE, R: RED, P: PINK, G: GREEN, T: TURQUOISE, Y: YELLOW, N: NEUTRAL.
HILIGHT	Format: value in Mainframe value in ART CICS. O: OFF, B: BLINK, R: REVERSE, U: UNDERLINE.
OUTLINE	Format: value in Mainframe value in ART CICS. B: BOX, L: LEFT, R: RIGHT, O: OVER, U: UNDER.
Predefined?	Y: The field could match the predefined pattern. N: The field is different, and no predefined pattern could be matched.

For more information about 3270 data stream field attributes, please refer to:
http://www.ibm.com/support/knowledgecenter/SSGMCP_4.2.0/com.ibm.cics.ts.applicationprogramming.doc/topics/dfhp473.html.

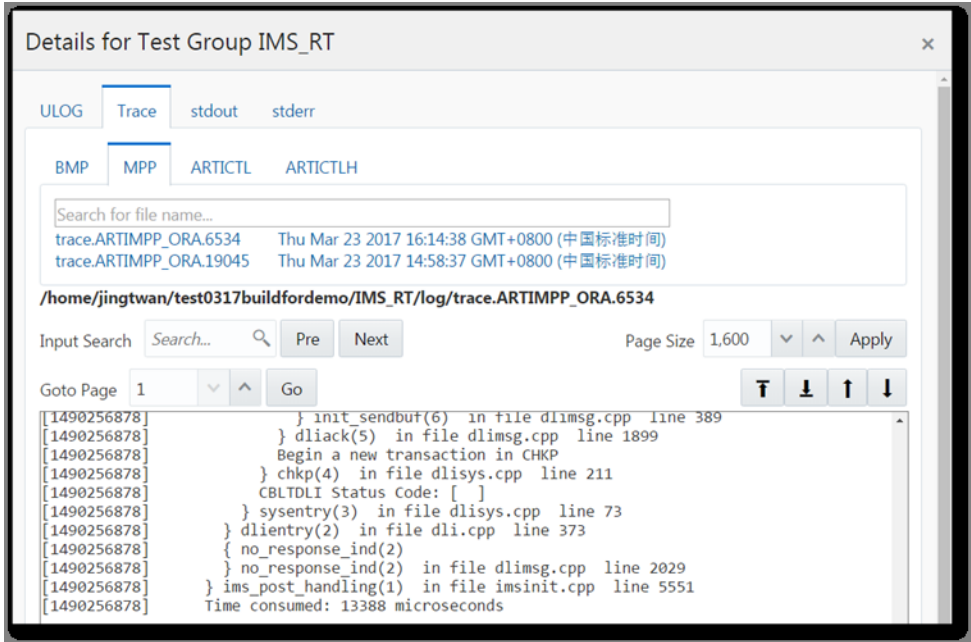
Side-by-Side Screen Compare

The screens comparison result in HTML format is displayed by clicking the “Screens” tab. The mainframe screen is shown on the left, with the corresponding ART screen on the right. This view is intended as a visual aid to field list under Diffs tab and can also be snipped for inclusion in any test report or for further analysis.



Examining Server Logs and Traces

The ULOG and server traces in IMS group can be checked by viewing the result dialog for the test group.



The logs accessible through this dialog are listed under four tabs and described in the table below.

Table 7-3 Log Descriptions

Log type	Explanation
ULOG	Tuxedo ULOG with messages pertaining to Tuxedo domain and key messages from all the servers
Trace	ART IMS server traces for all ART IMS server types: online transactions (MPP), batch programs (BMP), 3270 terminal listener and MFS services (ARTICTL), and terminal control handler (ARTICTLH). For IMS MPP testing the servers executing online transactions are in the MPP region and their logs are named in the following format: trace.ARTIMPP*.
stdout	stdout file displays normal program output information
stderr	stderr file displays program error information

Under each tab, multiple logs can be listed based on what’s available in the runtime. Click on the one that corresponds to the time of the test and it will be displayed with search and pagination capabilities as shown in the figure below.

IMS BMP Test Case (Batch Programs)

When project is created, the IMS BMP test cases are automatically detected by analyzing the configuration files `imstrans.desc` and `imsapps.desc` produced by ART Workbench from the z/OS IMS system definition macros.

Description

Tuxedo ART for IMS provides BMP region support, which can execute batch IMS programs. In real world these are typically launched through the batch jobs using a DFSRRC00 launcher specified on EXEC PGM statement in JCL with the BMP program as a parameter. This mode of executing IMS BMP programs is supported in the Test Manager and described under the chapter Test Batch Application. In addition, IMS BMP programs can be tested directly as IMS BMP test cases in a test group, individually, or as part of a test plan under IMS group. Click “Run” button to execute IMS BMP cases directly.

Name	Type	Transaction	Baseline	Status	Count	Configuration	Result
INTEREST	IMS BMP	-		PASS	1		

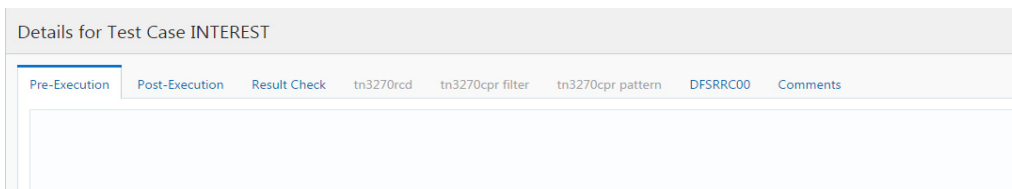
Configuration

For IMS BMP test cases all configuration elements are optional. Click the icon in the Configuration image to open the detail configuration dialog for BMP case.

In the configuration dialog, you can view or edit the Pre/Post-Execution scripts and Result Check script if uploaded, and add or edit comments for this case, besides, you can specify parameters listed in [Table 7-4](#) under the DFSRRC00 sub-tab.

Table 7-4 DFSRRC00 Parameters

Parameter	Description	Default Value
PSB	Specifies PSB Name	Program name
IN	Specifies an input transaction queue	
CKPTID	Specifies checkpoint for program restart	0

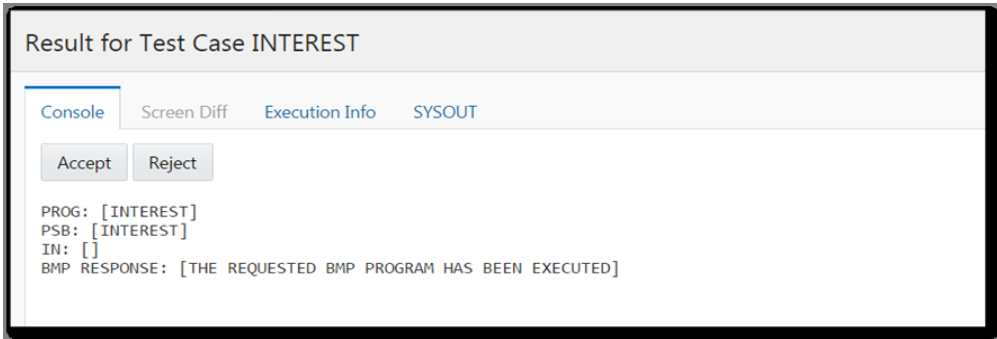


Execute Test Case and Check the Results

The BMP case execution log will be displayed in the Console view.



Click the corresponding icon under Result column to further check the results of the test case.



The results can be accepted by clicking the “Accept” button, which will change the status of the case to “PASS”. To reject the results, click the “Reject” button which will change the status of this case to “FAIL”.

“Execution Info” tab displays the case execution start time, end time, server id and group id of the processed server. For BMP cases, process id also will be displayed. To enable collection of this execution information export `IMS_PRO_LOG=Y` by editing env settings at the group level. “SYSOUT” tab displays the redirected program output.

Examining Server Logs and Traces

The ULOG and server traces in IMS group can be checked by viewing the result dialog as shown in the figure below. For details see [Examining Server Logs and Traces](#). Under Trace tab, the servers executing BMP programs are in BMP region and their logs are under BMP tab named trace.ARTIBMP*. If multiple files are listed, click on the one with the timestamp matching the execution timeframe of the test case. The trace log will be displayed below in a view with search and pagination capabilities.

Details for Test Group IMS_RT

ULOG Trace stdout stderr

BMP MPP ARTICTL ARTICTLH

Search for file name...

trace.ARTIBMP_ORA.6549 Thu Mar 23 2017 14:58:53 GMT+0800 (中国标准时间)
 trace.ARTIBMP_ORA.19054 Thu Mar 23 2017 13:14:27 GMT+0800 (中国标准时间)

/home/jingtwan/test0317buildfordemo/IMS_RT/log/trace.ARTIBMP_ORA.6549

Input Search Search... Pre Next Page Size 1,600 Apply

Goto Page 1 Go

```
[1490252333] WARNING: Resolve
[/home/jingtwan/test0317buildfordemo/IMS_RT/config/ims/desc/imsdebug.desc] failed, error: Open
file failed: [/home/jingtwan/test0317buildfordemo/IMS_RT/config/ims/desc/imsdebug.desc],
reason: [No such file or directory]

[1490252333] WARNING: Resolve
[/home/jingtwan/test0317buildfordemo/IMS_RT/config/ims/desc/imsresource.desc] failed, warning
message: Open file failed:
[/home/jingtwan/test0317buildfordemo/IMS_RT/config/ims/desc/imsresource.desc], reason: [No
such file or directory]

[1490252333] WARNING: init_tranqmap() Failed.
[1490252333] advertising ARTIBMP_SVC successfully
[1490252333] INFO: advertise service [..IMSDM_4_6] successfully
```

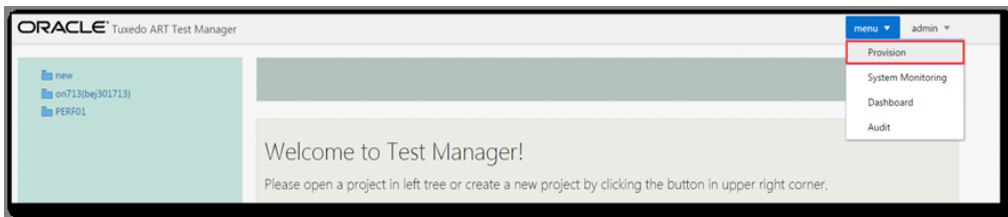
Test IMS Application

Provisioning the Software

This topic contains the following sections:

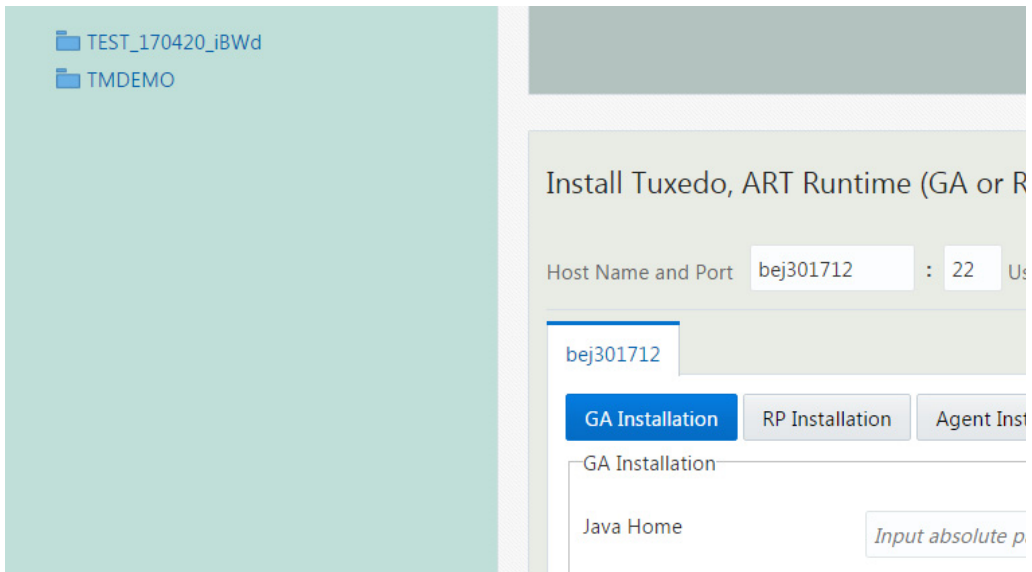
- [Install Tuxedo and ART \(GA\)](#)
- [Apply Tuxedo and ART Rolling Patches \(RPs\)](#)
- [Install ART Test Manager Agents](#)

This function is accessed from the main ART Test Manager menu in the top right corner of the window. It is used to facilitate installing and updating Tuxedo, ART Runtimes and ART Test Manager Agents on one or more test machines concurrently. If the test machines already have Tuxedo and ART for CICS, IMS, or Batch installed, these don't need to be installed again. If the installations don't have current rolling patches (RPs) applied, this function can be used to apply them remotely. However, the only mandatory action is the provisioning of ART Test Manager Agents, which is required once per test environment before any testing can be run through the ART Test Manager.



In the Provisioning dialog, the target machine can be added by specifying its host name and ssh port along with user name and password. Click “Test SSH Connection” button to verify the

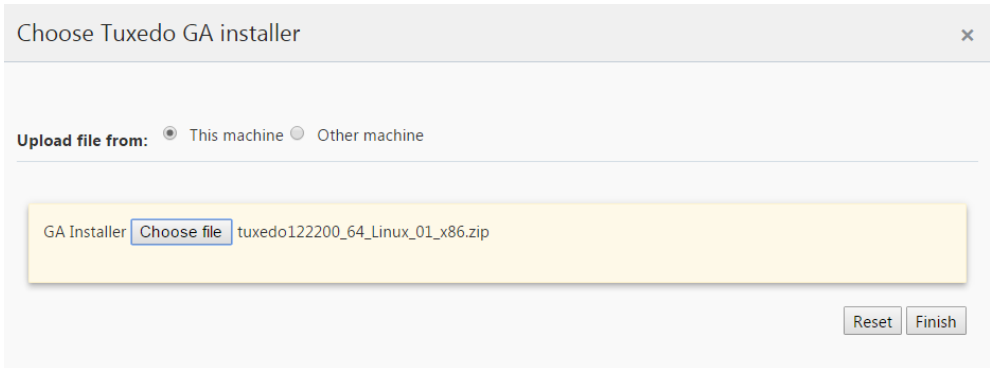
connectivity and the validity of the credentials, then click “Add” button. Once required machines have been added, each will appear under its own tab as shown in the figure below. Under the machine tab, three functional tabs are available: GA Installation for provisioning the required software, RP installation for applying rolling patches, and Agent Installation for the mandatory installation of ART Test Manager agent.



Install Tuxedo and ART (GA)

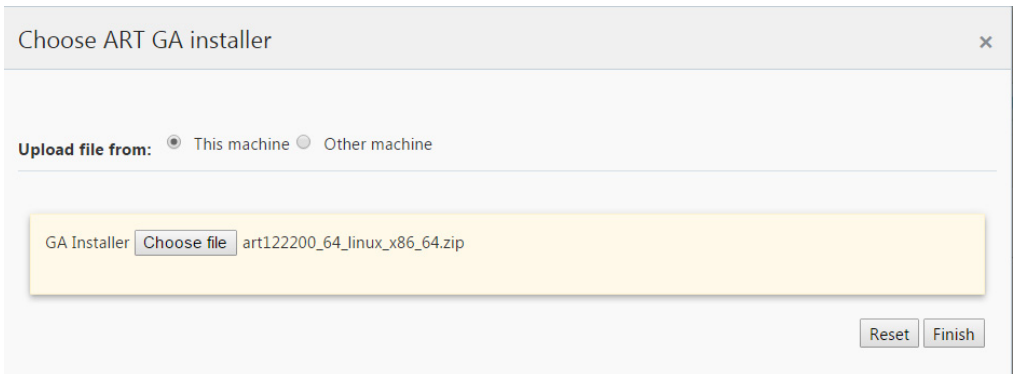
To install Tuxedo and ART, click “GA Installation” tab, then fill in the required information and click “Install GA” button. The input parameters required on the form are:

- Java Home: Absolute path of JDK 1.7 or later
- Oracle Home: Installation path
- Oracle Home Name: An alias of Oracle Home, default value is the directory name of Oracle Home
- COBOL Compiler Type: If choosing “COBOL-IT”, specify the COBOL-IT install path. If choosing “Micro Focus COBOL”, compiler installation path is not required.
- Location of Tuxedo installer package on local machine or remote machine. It will be uploaded to the ART Test Manager and transferred to the target machine.



The screenshot shows a dialog box titled "Choose Tuxedo GA installer" with a close button (X) in the top right corner. Below the title bar, there is a section labeled "Upload file from:" with two radio buttons: "This machine" (which is selected) and "Other machine". Below this is a large yellow text input field containing the text "GA Installer Choose file tuxedo122200_64_Linux_01_x86.zip". At the bottom right of the dialog, there are two buttons: "Reset" and "Finish".

- Location of ART (runtimes for CICS, IMS, and Batch) installer package on local machine or remote machine. It will be uploaded to the ART Test Manager and transferred to the target machine.



The screenshot shows a dialog box titled "Choose ART GA installer" with a close button (X) in the top right corner. Below the title bar, there is a section labeled "Upload file from:" with two radio buttons: "This machine" (which is selected) and "Other machine". Below this is a large yellow text input field containing the text "GA Installer Choose file art122200_64_linux_x86_64.zip". At the bottom right of the dialog, there are two buttons: "Reset" and "Finish".

During the installation, progress indicator will appear. After the installation is finished, the results will appear.

Provisioning the Software

bej301738

Oracle Home: /home/bishang/OraHome_4

Oracle Home Name: OraHome_4

Cobol Compiler Type: COBOL-IT

COBOL-IT Install Dir: /opt/cobol-it-3.7.10-enterprise-64-x86_64-pc-linux-gnu

Tuxedo GA Installer: tuxedo122200_64_Linux_01_x86.zip
Successful! Install Location is: bej301738:/home/bishang/OraHome_4/tuxedo12.2.2.0.0

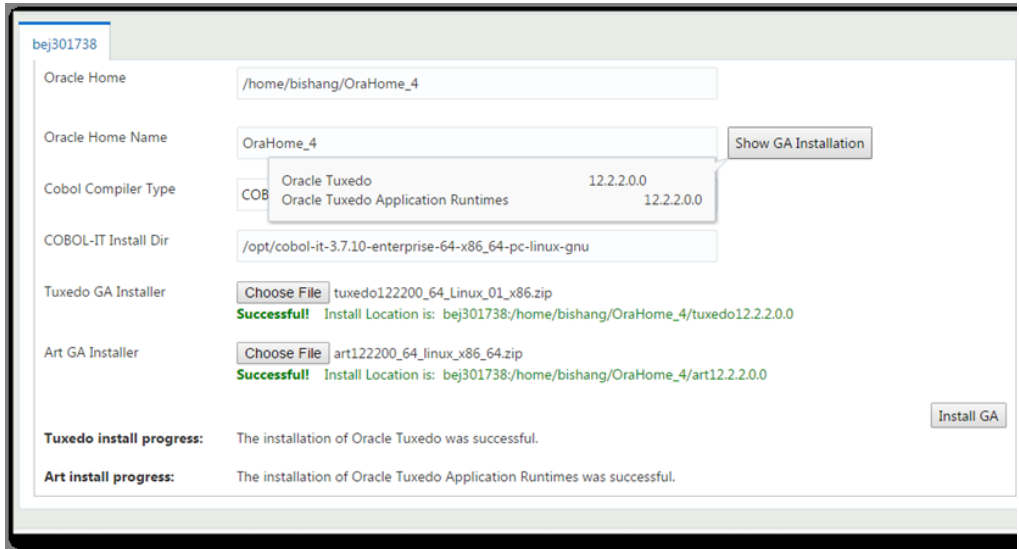
Art GA Installer: art122200_64_linux_x86_64.zip
Successful! Install Location is: bej301738:/home/bishang/OraHome_4/art12.2.2.0.0

Tuxedo install progress: The installation of Oracle Tuxedo was successful.

Art install progress: The installation of Oracle Tuxedo Application Runtimes was successful.

Tip: Do not refresh the browser during the installation. If the connection to the ART Test Manager is over WiFi, the upload and installation process may take longer.

After the installation, click “Show GA Installation” to the right of the Oracle Home Name input field to check if ART Test Manager can find them.

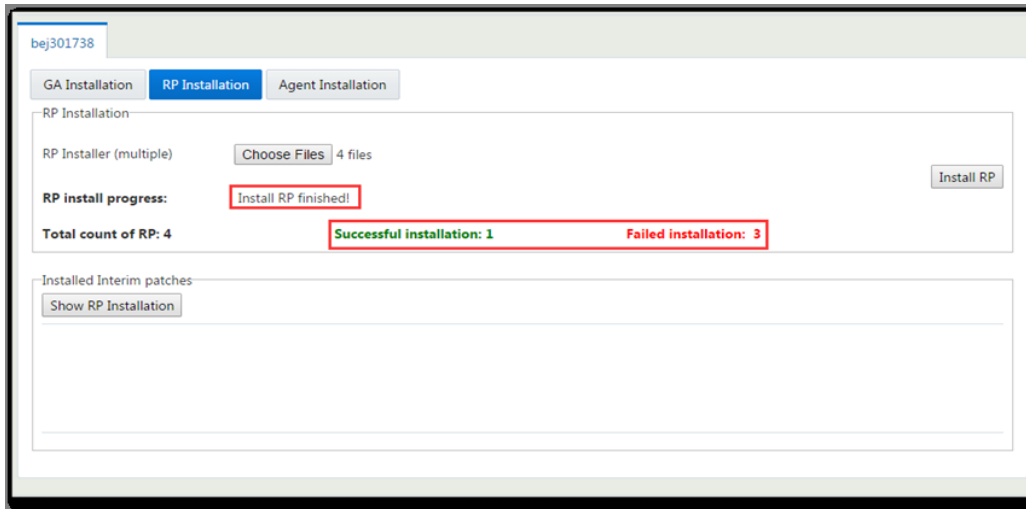


Apply Tuxedo and ART Rolling Patches (RPs)

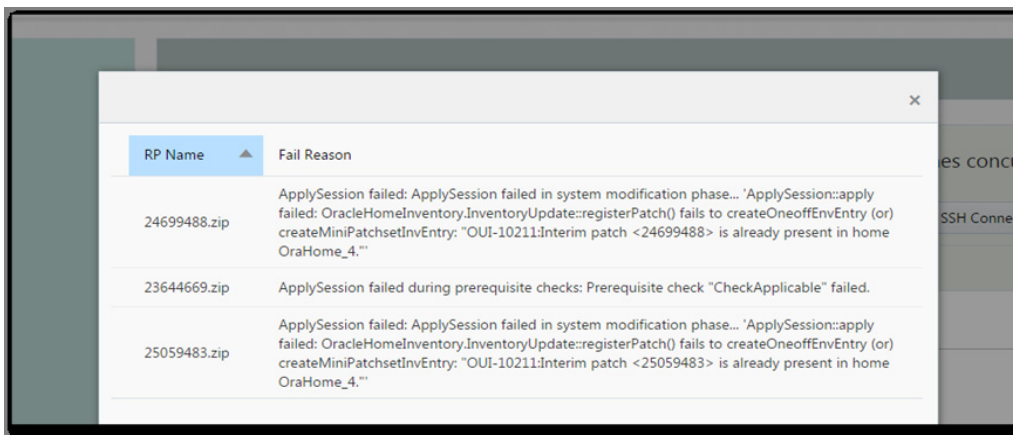
Between releases, Oracle provides patches and minor enhancements in update packages called Rolling Patches (RPs). Click the “RP Installation” tab and select one or more RP installer packages for Tuxedo and/or ART, then click “Install RP”. Based on the Oracle Home location specified in the GA Installation tab, ART Test Manager will locate currently installed versions and run Oracle Opatch tool to apply the RP packages.

During the installation, progress indicator will appear. After the installation is finished, the results will appear.

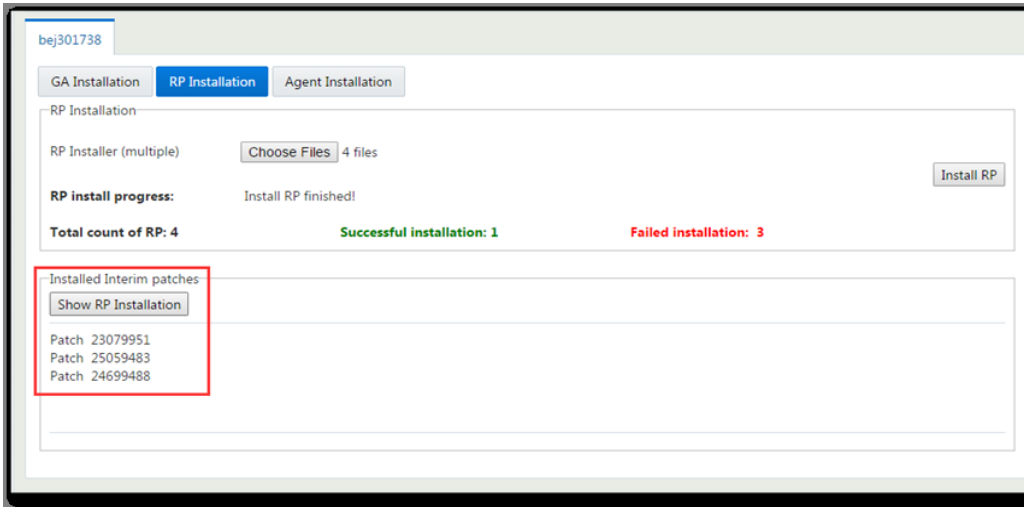
Provisioning the Software



If any RP installation fails, click “Failed Installation” red link to check the details.



Click “Show RP Installation” button to review the RP installation history as shown in the figure below.

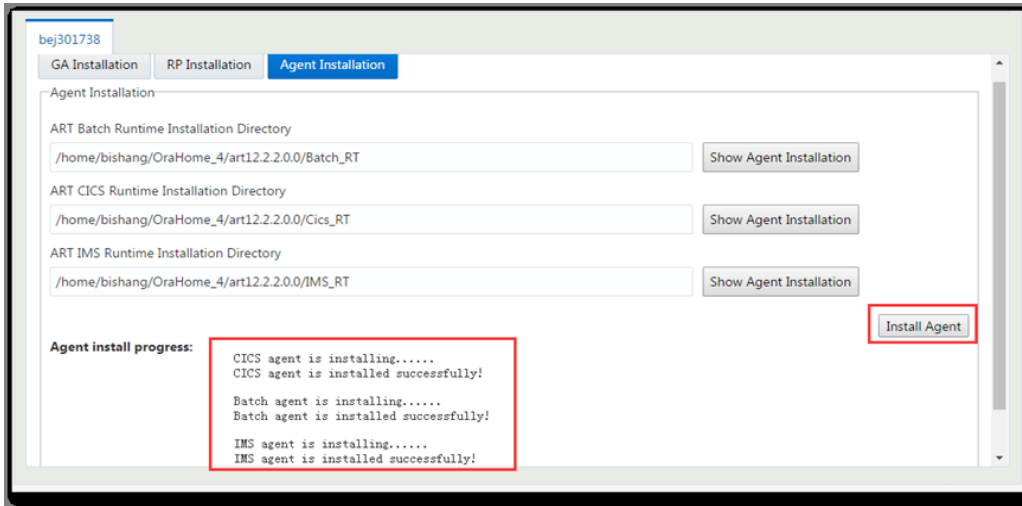


Install ART Test Manager Agents

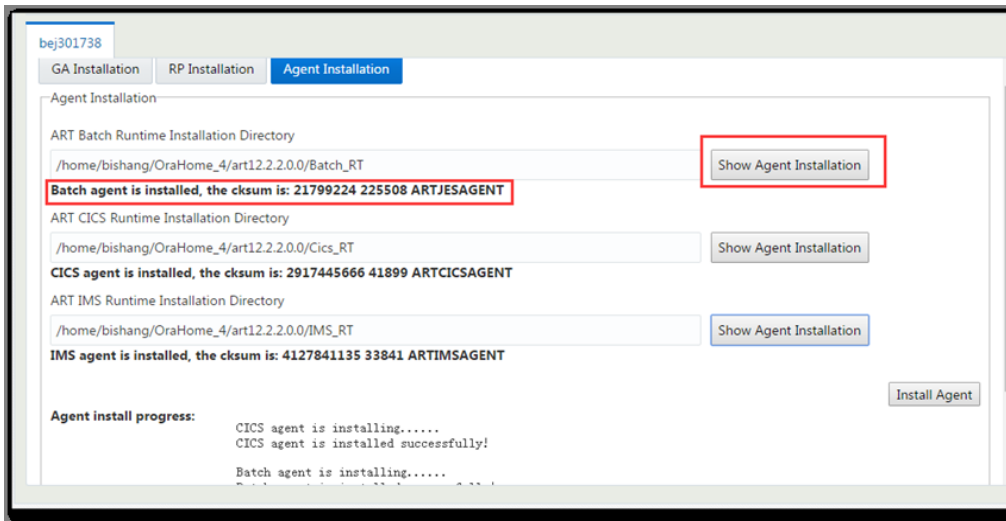
ART Test Manager provides agents for each of the three Tuxedo Application runtimes: CICS, IMS, and Batch. These agents run as Tuxedo servers the corresponding domain and provide information back to the ART Test Manager about the running transactions, programs, and jobs. They need to be installed before you can start Tuxedo domains from the ART Test Manager and run test cases.

To install the agents, in the Provisioning view click “Agent Installation” tab. For each runtime the form provides input field to specify its location, usually in a runtime-specific subdirectory under the common deploy location. To check if the agents are installed, click “Show Agent Installation” button to the right of each input field. If they are not installed, after filling in the locations of the three runtimes, click “Install Agent” button in the lower right corner. The progress window shows agent installation in process for each runtime and final status.

Provisioning the Software



After installation click “Show Agent Installation” button to confirm the installation.



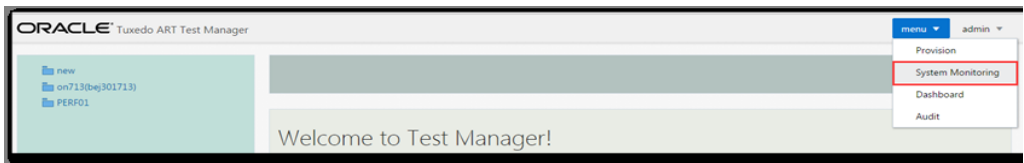
After installing the agents, when starting relevant Tuxedo domains, the console window shows all Tuxedo servers being started. Check to make sure that the servers containing ART Test Manager’s agents start normally. These servers in CICS, IMS, and Batch domains are called ARTCICSAGENT, ARTIMSAGENT, and ARTJESAGENT respectively.

The information provided by these agents is designed to cover the basic view of what's executing in each domain directly within the ART Test Manager user interface. More extensive monitoring options are available in Tuxedo Systems and Application Monitor Plus (TSAM Plus), and in the case of Batch runtime in ARTISPF panels available in Tuxedo ART Batch as extensions to uni-SPF.

Provisioning the Software

System Monitoring

In addition to the transaction, program, or job execution monitoring provided through ART Test Manager agents, ART Test Manager also provides system level monitoring for the remote test machine. System monitoring provides a remote interface for monitoring test machines using system monitoring tools specified by the users. This function can be accessed from the dropdown menu at upper right of the window.



The first step in the System Monitoring view is to add the system to be monitored. To add the host and start monitoring specify host name and ssh port, user name and password, then click “Add” button. Each system added is represented by a tab. A Delete drop down menu is provided to allow deleting systems no longer required.

After clicking on the tab for a specific system, the two pane view is presented. The control pane on the left is where the refresh interval is specified and monitoring commands are entered.

System Monitoring

System monitoring on one or more test machines concurrently.

▲ Add Host

Host Name and Port: :

User Name:

Password:

bej301738

Interval: (s)

Commands:

```
#Command: top -n 1 -c -b | head -n 15
top - 22:06:14 up 69 days, 22:26, 89 users, load average: 6.93, 7.17, 6.94
Tasks: 1294 total, 1 running, 1285 sleeping, 4 stopped, 4 zombie
Cpu(s): 3.2%us, 3.7%sy, 0.0%ni, 76.5%id, 16.5%wa, 0.0%hi, 0.1%si, 0.0%st
Mem: 62284456k total, 61856872k used, 427584k free, 1740768k buffers
Swap: 34930680k total, 8575080k used, 26355600k free, 37882872k cached

<  PID USER   PR  NI  VIRT  RES  SHR  S %CPU  %MEM     TIME+  COMMAND
19239 bishang 20   0 14072 2060 772  R 13.9  0.0   0:00.12 top -n 1 -c -b
29921 gangw   20   0 490m  24m 13m  S 13.9  0.0 136:17.60 ARTJESINITIATOR -C
4027 zhaozhan 20   0 142m  46m 856  S  3.5  0.1  60:00.82 /nfs/users/zhaozhan
29975 gangw   20   0 271m  22m 12m  S  3.5  0.0  52:18.77 ARTJESCONV -C dom
  30 root    20   0 0      0    0    S  1.7  0.0  162:46.65 [events/3]
1272 root    20   0 0      0    0    S  1.7  0.0  361:22.57 [xpcid/0]
2415 gangw   20   0 215m  22m 12m  S  1.7  0.0  18:39.31 ARTJESCONV -C dom
```

For example, in the figure above the Interval is set to 2, and monitoring commands “top” and “vmstat” are specified. After clicking “Apply” button in the lower right corner of the control pane the output pane on the right will show the output of the monitoring commands and is refreshed based on the interval setting. In the figure below, the Interval has been changed to three seconds and “iostat” command added to “top” and “vmstat” from the previous example.

bej301738

Interval: (s)

Commands:

```
#Command: vmstat
procs-----memory-----swap-----io-----system-----cpu-----
 r b swpd free buff cache si so bi bo in cs us sy id wa st
 0  2 8575080 415504 1740792 37912792 0 0 3 63 0 0 3 4 77

#Command: iostat
Linux 2.6.32-100.28.5.el6.x86_64 (bej301738.cn.oracle.com) 03/22/17

< avg-cpu:  %user   %nice %system %iowait  %steal   %idle
           3.22    0.00   3.74  16.51    0.04   76.50

Device:            tps    Blk_read/s    Blk_wrtn/s    Blk_read    Blk_wrtn
xvda                194.05         90.14         1854.62    544682424    11206689684
xvdb                  0.45           12.32           19.25     74419010     116321801
```

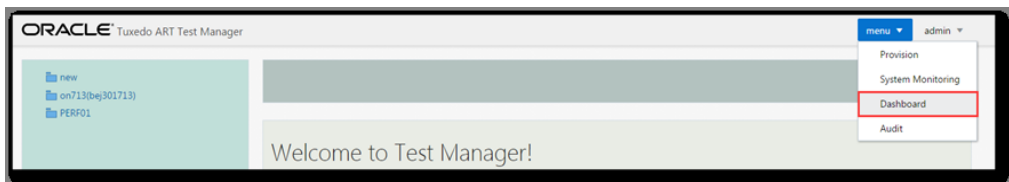
Successful!

Dashboard

ART Test Manager dashboards provide statistical information about test cases and test results. The dashboards provide context-specific information on test execution, including total available number of test cases by type and passed/failed statistics in absolute numbers and by percentages. There are three ways to access the Dashboard functionality in ART Test Manager:

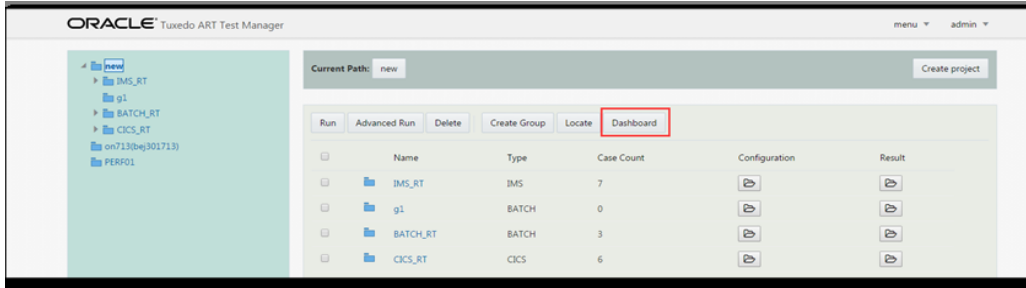
- At login time users are presented with a dashboard for all of their projects
- Dashboard view can be entered using the drop down menu in upper right corner
- Each project/group/test plan provides a Dashboard button
- Dashboard can be exported to csv file

When presented at login time or accessed from the drop down menu by a regular user, dashboard includes all projects created by the user.



When Dashboard button is clicked inside a project/group/plan, the dashboard presents the information within the current scope (i.e., the current project/group/plan.)

Dashboard



Dashboard view presents the following information:

- Project: only shown in user context.
- Group: only shown in user and project context.
- Plan: only shown in user, project and group context. When “Plan” column is blank, the statistics are for cases are part of the test group but don’t belong to any test plan under the group.
- Type: case type, including IMS MPP, IMS BMP, CICS 3270, CICS DPL, BATCH JOB.
- Total: number of available test cases
- Passed/Failed: number of passed/failed cases.
- Passed(%)/Failed(%): percentage of passed/failed cases relative to the total number

Dashboard filtering is available by using the Search field to enter any combination of project name, group, plan, and/or type. You can export dashboard to the csv file by clicking the blue button on the upper right corner.

Dashboard for User admin

Search for project... Search for group... Search for plan... Search for type...

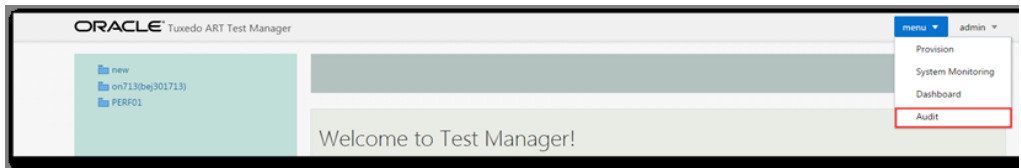
Download

Project	Group	Plan	Type	Total	Passed	Failed	Passed(%)	Failed(%)
TM_REMOTE	CICS_RT		CICS 3270	4	0	0	0.00%	0.00%
TM_REMOTE	CICS_RT		CICS DPL	2	0	0	0.00%	0.00%
TM_REMOTE	IMS_RT		IMS MPP	6	0	0	0.00%	0.00%
TM_REMOTE	IMS_RT		IMS BMP	1	0	0	0.00%	0.00%
TM_REMOTE	BATCH_RT		BATCH JOB	4	0	0	0.00%	0.00%
TMDEMO	IMS_RT	p1	IMS MPP	3	0	1	0.00%	33.33%
TMDEMO	IMS_RT		IMS BMP	1	1	0	100.00%	0.00%
TMDEMO	IMS_RT		IMS MPP	6	2	0	33.33%	0.00%
TMDEMO	BATCH_RT		BATCH JOB	3	0	1	0.00%	33.33%
TMDEMO	CICS_RT		CICS 3270	4	1	1	25.00%	25.00%
TMDEMO	CICS_RT		CICS DPL	2	2	0	100.00%	0.00%
PERF01	IMS_RT	p1	IMS MPP	2	0	0	0.00%	0.00%

Dashboard

Audit

Tracking of test case creation and execution is often an important requirement in testing, particularly in industries with strong regulatory mandates. ART Test Manager maintains an audit log, which tracks all user operations, including login/logout, creating or deleting projects, user management, and many others. To access the audit log click “Audit” button in right upper menu drop-down.



The presentation of the audit log is different between administrator and regular user.

- [Admin-Level Audit](#)
- [Regular User-Level Audit](#)

Admin-Level Audit

Administrator can view audit logs for all ART Test Manager users, and can filter the view by date and time range, user, action, and status of the operation. If no filter is set, full audit log is shown. To view relevant subsets specify values in one or more filter fields and click the magnifying glass icon. Click the reset icon next to it to clear out all filters. Available filters are:

- Start date time and End date time: to specify a date and time range

- Status: the result of operation, Succeed or Fail
- Action: operations, one or more can be selected
- User: userid under which the operation was submitted.

The columns in the audit log are:

- Operation's Start date and time
- Operation's End date and time.
- User who performed the operation.
- Action: user operation, includes the following:
 - Login, Logout
 - Edit password, Create user, Remove user, Change Auth Settings
 - Create project, Delete project, Sync project, Create group, Create plan, Configuration (container)
 - Run, Delete item, Add case, Reorder, Configuration (case)
 - Upload, Remove uploaded file
 - Set case status
 - Startup domain, Shutdown domain
 - Set Comment, Set DFSRRC00, Set Content Size
 - Install GA, Install RP, Install Agent
 - Start Monitor
 - Purge Jobs
 - Update Group
- Object: user, project, group, plan, case on which the action was performed
- Details: detailed information specific to the action.
- Status: Succeed or Fail.
- Reason: Information on why the operation failed.

The screenshot shows the 'Audit Log' window in Tuxedo ART Test Manager. The window title is 'Audit Log' and it has a close button (X). The interface includes filter fields for 'From' (17-03-22 11:06:07), 'To' (17-03-24 11:06:07), 'Status' (All), 'Action' (All), and 'User' (All). There are search and reset icons for the filters. The main area is a table with the following columns: Start Time, End Time, User, Action, Object, Details, Status, and Reason.

Start Time	End Time	User	Action	Object	Details	Status	Reason
2017-03-23 10:23:35.205	2017-03-23 10:23:35.641	admin	Login	User admin	From 10.182.54.149:60778	Succeed	
2017-03-23 10:23:30.545	2017-03-23 10:23:30.545	qq	Logout	User qq	From 10.182.54.149:60785	Succeed	
2017-03-23 10:22:56.152	2017-03-23 10:22:56.599	qq	Login	User qq	From 10.182.54.149:60787	Succeed	
2017-03-23 10:22:54.191	2017-03-23 10:22:54.191	admin	Logout	User admin	From 10.182.54.149:60786	Succeed	
2017-03-23 10:22:52.319	2017-03-23 10:22:52.89	admin	Create User	User qq	Regular User	Succeed	
2017-03-23 10:22:45.831	2017-03-23 10:22:45.869	admin	Remove User	User qq:test		Succeed	
2017-03-23 10:18:58.558	2017-03-23 10:18:58.559	admin	Start Monitor	bej301147	Interval: 2s. Commands: top -n 1 -c -b head -n 15vmstat	Succeed	
2017-03-23 10:17:56.965	2017-03-23 10:17:56.975	admin	Start Monitor	bej301738	Interval: 2s. Commands: top -n 1 -c -b head -n 15vmstat	Succeed	
2017-03-23 10:17:56.896	2017-03-23 10:17:56.903	admin	Start Monitor	bej301147	Interval: 2s. Commands: top -n 1 -c -b head -n 15vmstat	Succeed	
2017-03-23 10:17:56.851	2017-03-23 10:17:56.856	admin	Start Monitor	bej301713	Interval: 2s. Commands: top -n 1 -c -b head -n 15vmstat	Succeed	
2017-03-23 10:17:42.973	2017-03-23 10:17:43.561	admin	Login	User admin	From 10.182.54.149:60776	Succeed	
2017-03-23 10:17:38.924	2017-03-23 10:17:38.924	admin	Logout	User admin	From 10.182.54.149:60778	Succeed	
2017-03-23 10:17:38.924	2017-03-23 10:17:38.924	admin	Login	User admin	From 10.182.54.149:60715	Succeed	

Regular User-Level Audit

Unlike Administrator, regular users only can view and search their own audit log. To view relevant subsets specify values in one or more filter fields and click the magnifying glass icon. Click the reset icon next to it to clear out all filters. Available filters are:

- Start date time and End date time: Specify a date and time range
- Status: the result of operation, Succeed or Fail
- Action: operations, one or more can be specified

The major difference with the audit log view available to a regular user is that there isn't "user" column since only operations performed by this user are available in their audit log.

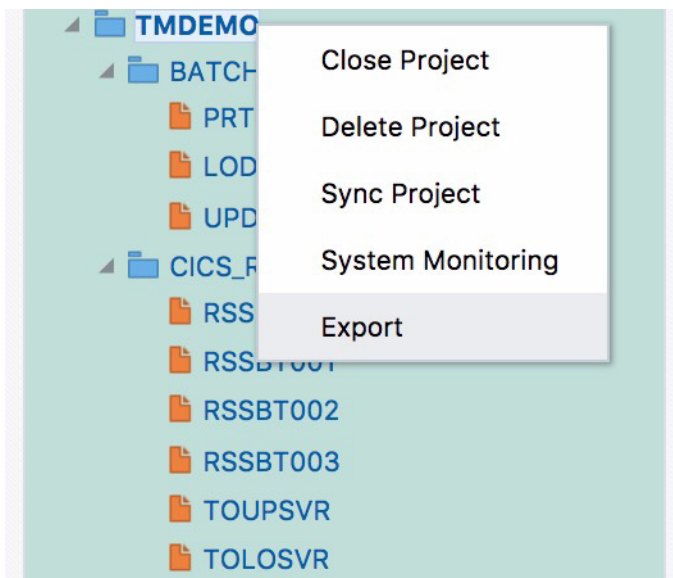
The screenshot shows the 'Audit Log' window in Tuxedo ART Test Manager. The window title is 'Audit Log' and it has a close button (X). The interface includes filter fields for 'From' (17-03-22 11:14:25), 'To' (17-03-24 11:14:25), 'Status' (All), 'Action' (All), and 'User' (All). There are search and reset icons for the filters. The main area is a table with the following columns: Start Time, End Time, Action, Object, Details, Status, and Reason.

Start Time	End Time	Action	Object	Details	Status	Reason
2017-03-23 11:19:30.838	2017-03-23 11:19:31.336	Login	User Li	From 10.182.54.149:61139	Succeed	

Report

ART Test Manager supports exporting the project information into HTML format for printing or sharing.

To generate the report, right-click the project tree and then click **Export**.



If you right click on the "Project" node, the entire selected project can be exported.

If you right click on the "Group" node, the current project, current group, and the plans/cases in selected group can be exported.

If you right click on the "Plan" node, the current project, current group, current plan, and the cases in selected plan can be exported.

The exported report (.html) can be opened using a browser. Following is a sample which shows a small part of the report:

Report for project TMDEMO	
Project Summary Information	
Project name	TMDEMO
Creator name	admin
Create time (UTC)	2017-04-14 03:23:53
Is remotd	Yes
Host name	bej301712.cn.oracle.com
Host OS Type	Linux
Project Path	/scratch2/home/lipeng/TMDEM041401
Executed number of cases	0
Passed number of cases	0
Failed number of cases	0
Total number of cases	18
Number of CICS 3270 cases (cases with baseline)	4 (0)
Number of CICS DPL cases (cases with client)	2 (0)
Number of IMS MPP cases (cases with baseline)	6 (0)
Number of IMS BMP cases	1
Number of Batch Job cases	5

In the report, you can find following information:

- Project Level Information
 - Project name
 - Project creator
 - Project created time (only available for project created after RP001);
 - Is remote project
 - Host name
 - Host OS type
 - Project path
 - Executed number of cases
 - Passed number of cases

- Failed number of cases
- Total number of cases
- Number of CICS 3270 cases (cases with baseline)
- Number of CICS DPL cases (cases with client)
- Number of IMS MPP cases (cases with baseline)
- Number of IMS BMP cases
- Number of Batch Job cases
- Contained groups info
- Group level information
 - Group name
 - Group type
 - APPDIR
 - DB information
 - Key directories and their description
 - User comments
 - Pre execution script
 - Post execution script
 - Output of env command
 - Executed case number (exclude the cases in sub-plan)
 - Passed number (exclude the cases in sub-plan)
 - Failed number (exclude the cases in sub-plan)
 - Contained plans/cases info
 - Special info for Batch group
 - Mainframe settings for DB/File comparison.
- Plan level information
 - Plan name
 - Pre execution script

- Post execution script
- User comments
- Executed case number
- Passed number
- Failed number
- Contained cases info
- Case level information
 - Case name
 - Case type
 - Case status
 - User comments
 - Pre execution script
 - Post execution script
 - Result check script
 - Special info for 3270 case (CICS 3270/IMS MPP)
 - Baseline is ready or not
 - Tn3270cpr filter file/pattern file
 - Special info for dpl case
 - Dpl client (ud32) is ready or not (show content of ud32)
 - Special info for batch job
 - IMS tuxconfig for DFSRRC00
 - Special info for IMS BMP case
 - DFSRRC00 parameters

Appendix I - tn3270 Recorder

This topic contains the following sections:

- [Architecture](#)
- [Configuration](#)
- [Running the Recorder to Capture 3270 Interactions](#)

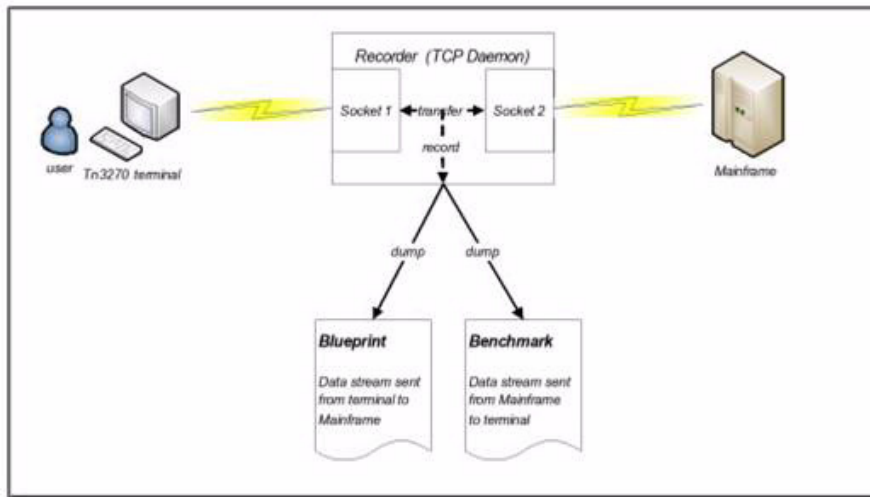
The purpose of the TN3270 Recorder is to capture the baseline of user's online interactions with CICS or IMS applications on z/OS and enable ART Test Manager to replay these interactions automatically against rehosted applications running under ART for CICS or IMS, collecting responses and comparing them with the ones from z/OS. This capability enables ART Test Manager to completely automate the testing of the online screens in rehosted applications.

Before testing CICS 3270 and IMS MPP test cases, users need to run the equivalent tests with the mainframe application and use TN3270 Recorder to capture the baseline information. The recorder is able to collect the 3270 data stream in both directions and the associated screenshots. The ART Test Manager uses the input portion of the datastream (from terminal to the mainframe) to automatically replay the online interactions, and uses the output portion of the datastream (from mainframe to the terminal) to compare results.

The TN3270 Recorder can be launched from a command line or from inside the ART Test Manager.

Architecture

Recorder (tn3270rcd) runs on a Linux system as a TCP daemon or socket gateway between the terminal and the mainframe. It accepts the data stream from both terminal and Mainframe side, then transparently transfers the data stream to the other side, while recording it to the blueprint (input) and benchmark (output) files as shown in the following diagram.



Configuration

To start the recorder manually, enter the following on the command line:

```
tn3270rcd -f <recorder configuration file path>
```

Example of a configuration file:

```
[tn3270rcd]
gwPort=50002
hostAddr=your.mainframe.server
hostPort=43945
printHTML=YES
Caption=YES
```

FnPlay=PA1

Configuration file parameters are described in the table below.

Table 13-1 Configuration File Parameters

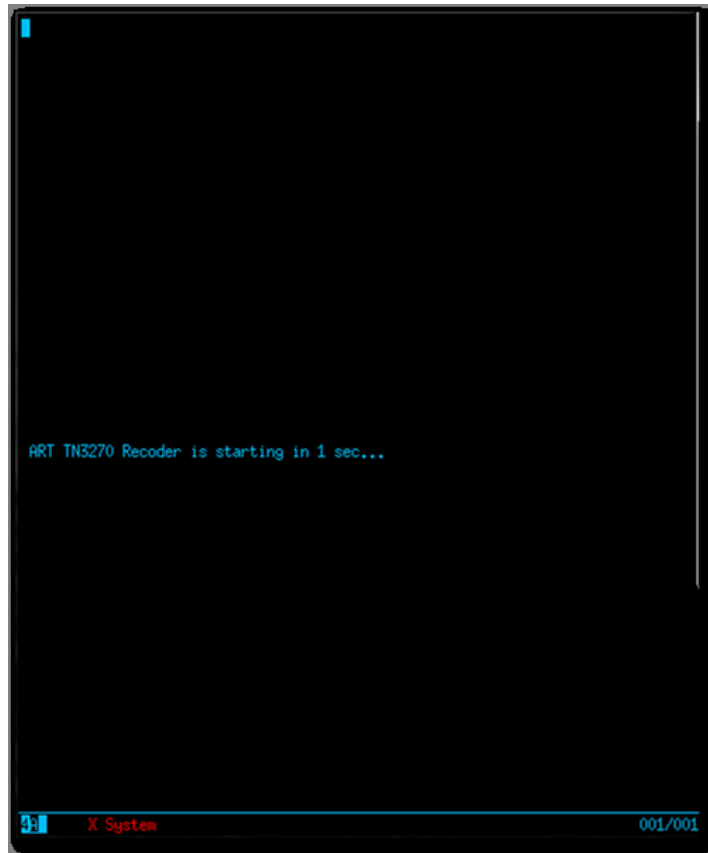
Field Name	Value	Description
gwPort	Mandatory	The port number the Recorder uses for accepting connections from tn3270 emulators.
hostAddr	Mandatory	IP address of the mainframe host
hostport	Mandatory	The port number on the mainframe used for accepting tn3270 connections
printHTML	YES NO	Specifies whether screenshot file in HTML format is generated. The screenshot file in TEXT is generated by default. If YES is specified, the recorder generates an HTML version of the screenshot for side-by-side view in ART Test Manager.
Caption	YES NO	Specifies whether the caption is added before each screenshot in output file.
FnPlay	Mandatory	Specifies function key to start and stop recording. PA1 is a typical choice as it's rarely used by applications and therefore will not interfere with the application processing in most cases. If this key is not available for keyboard entry, tn3270 emulators provide soft keyboards where you can find and click PA1 key.

Running the Recorder to Capture 3270 Interactions

Assuming the configuration file is named tn3270rcd.ini, start the recorder by entering on the command line:

```
$ ./tn3270rcd -f tn3270rcd.ini
```

Then start a tn3270 emulator and connect to gwPort defined in tn3270rcd.ini (for example 50002). The recorder will initiate a connection to the mainframe using the host address and port number specified in the tn3270rcd.ini file and will present the mainframe screen. Login and navigate to the CICS or IMS application, then press PA1 (or another FnPlay key defined in tn3270rcd.ini) to start recorder session.



Once connected and positioned at the right place to run the application, submit transaction in 3270 terminal and interact with the CICS or IMS screens as usual. When the test sequence is completed, press PA1 again to stop the recording. Blueprint, benchmark, and representation of screenshots are generated by tn3270rcd and packaged into a compressed tar file with “.tgz” extension. This package is now ready to be uploaded to the ART Test Manager case. If the TN3270 Recorded was started directly from the ART Test Manager, “Collect Baseline” button can be used to upload the captured baseline package.

Appendix II - Sample: TMDEMO

A sample called TMDEMO is provided with the ART Test Manager. It's a small mainframe application that contains CICS, IMS, and Batch components. The step-by-step tutorial below is intended to help users get familiar with all the key functions of the ART Test Manager based on this sample.

- [Application Description](#)
- [Migrating and Deploying TMDEMO Using ART Workbench](#)
- [Setting Up ART Test Manager Project](#)
- [Configuring Test Environment](#)
- [Testing CICS 3270 Screens](#)
- [Testing IMS 3270 Screens](#)
- [Testing Batch Jobs](#)
- [Using Dashboard](#)
- [Using Audit Trail](#)

Application Description

TMDEMO application is a combination of a simple banking application using IMS online transactions and a batch program coupled with a set of CICS screens for maintaining customer contact information. The online transactions and batch jobs in this sample that map to CICS, IMS,

and Batch test cases. Some test cases load data from file into database; others update or delete data in database. This sample can show you some basic operations about TM.

Databases and Files

The test cases in this sample access some files and Oracle database migrated from IMS DB.

Application Components

CICS Components

There are six CICS programs in this demo.

Table 14-1 CICS Programs

Name	Description
RSSBT000	Customer maintenance entry program.
RSSBT001	Customer data inquiry program.
RSSBT002	Customer data maintenance program (new/update and delete customer).
RSSBT003	Customer list program.
TOLOSVR	DPL program to change input to lowercase.
TOUPSVR	DPL program to change input to uppercase.

IMS Components

There are seven IMS test units in TMDEMO, six IMS MPP online transactions and one cases and one BMP program. Their functions are listed in following table.

Table 14-2 IMS Program Functions

Case Name	Type	Function
BANKCLNT	IMS MPP	It's the entry for other transaction (including DEPOSIT, WITHDRAW, TRANSFER, INQUIRY)
DEPOSIT	IMS MPP	Used to deposit money to an existing account

Table 14-2 IMS Program Functions

WITHDRAW	IMS MPP	Used to withdraw money from an existing account
TRANSFER	IMS MPP	Used to transfer money from one existing account to another
INQUIRY	IMS MPP	Used to inquiry the balance of an existing account
BANKMGMT	IMS MPP	Used to open an account and close an account
INSTERET	IMS BMP	Used to add interest for all the existing account

Batch Components

There are three Batch jobs in the sample. All the batch jobs run COBOL programs to insert or update data in database or to generate a report file from the database.

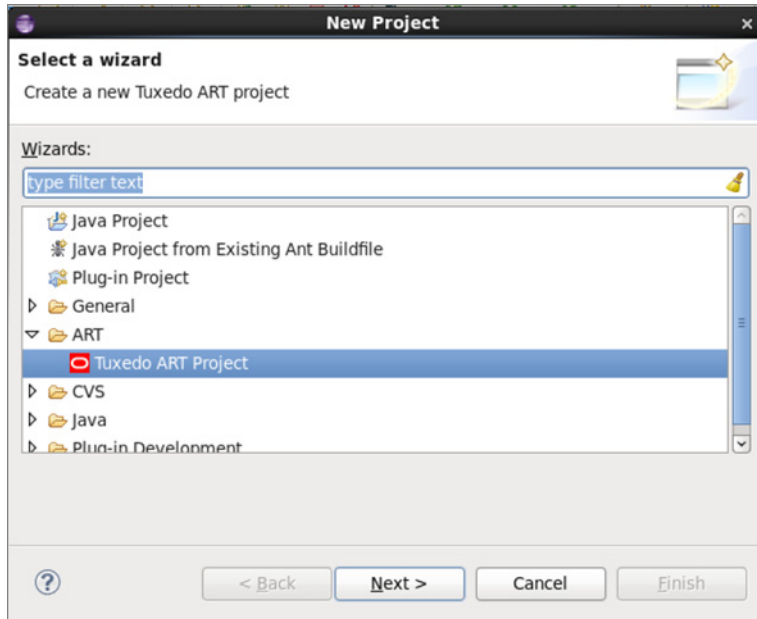
Table 14-3 Batch Jobs

Case Name	Program Called	Description
LODCUST.jcl	RSSBBB00	Insert data read from file into database (Table ODCSF0).
UPDCUST.jcl	RSSBBB02	Update data to database.
PRTCUST.jcl	RSSBBB01	Fetch data in database.

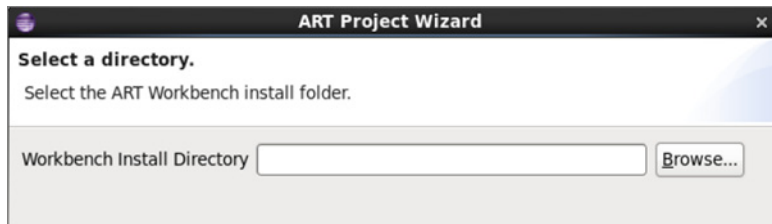
Migrating and Deploying TMDEMO Using ART Workbench

Before the application can be tested with the ART Test Manager, it must be migrated from the mainframe version using Tuxedo ART Workbench so that it can run in Tuxedo ART environment. The following briefly explains how to use the eclipse plug-in to execute the ART Workbench migration life-cycle. For more information refer to [Tuxedo ART Workbench User Guide](#).

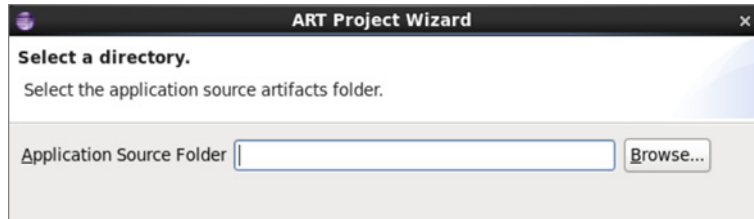
1. Use menu “File->New->Project” in Eclipse to create a new project, select “Tuxedo ART Project” as project type in the list.



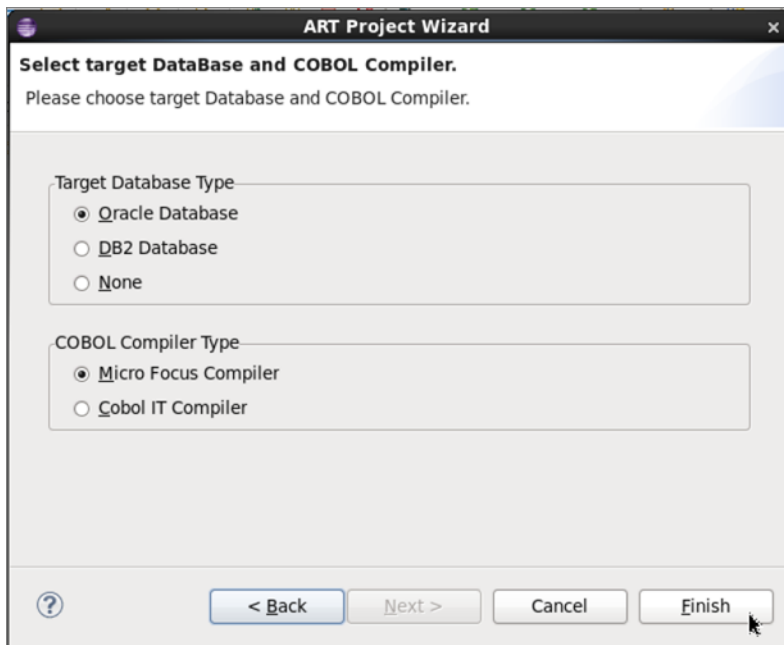
2. Specify the installation path of Workbench.



3. Specify the application source directory in the following page. This is the location `./TMDEMO/source`.



4. After selecting the target database and compiler type, you can click “Finish” button in the right corner, then the project is created.



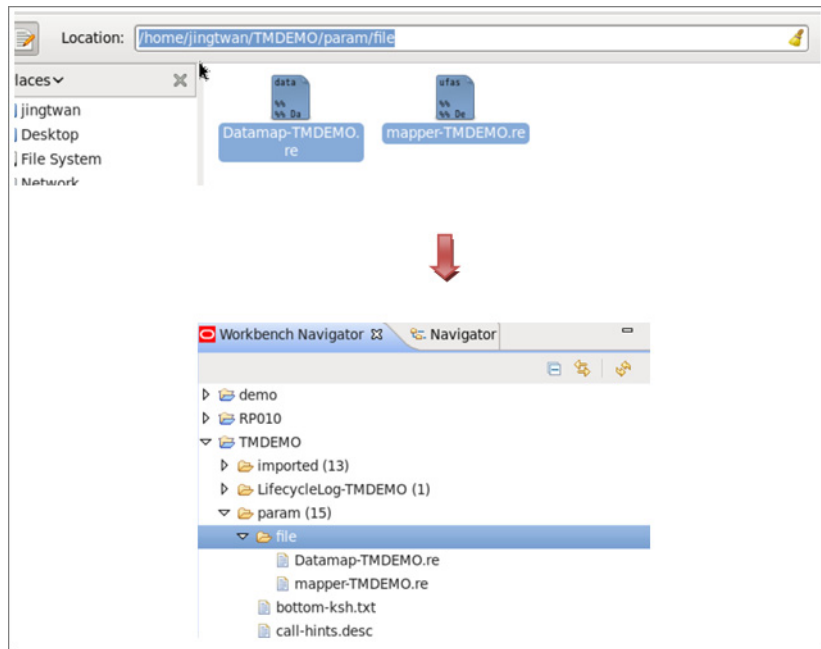
5. Use ART pull down menu on Eclipse tool bar to run Import and Prepare lifecycle steps. Keep all the default options.
6. Use ART pull down menu to bring up Configure Scope dialog: ART->Analyze-> Configure Scope, then select the corresponding Type for each directory as shown below:

Table 14-4 Select Type for Each Directory

Directory Name	Type	Content
IMS_DBD	IMS-DBD	IMS DBDGEN extract
IMS_PSB	IMS-PSB	IMS PSBGEN extract
IMS_APPL	IMS_APPL	IMS APPLCTN macros
IMS_MFS	IMS_MFS	MFS IMS screen maps
JCL	JCL	Batch JCL
CICS	Cobol-TPR	COBOL/CICS programs
COPY	Cobol-Library	Copybooks
MAP	BMS	BMS CICS screen maps
IMS_COPY	Cobol-Library	Copybooks
IMS-COBOL	Cobol-Batch	COBOL/IMS
DDL	SQL-Script	DB2 DDL
BATCH	COBOL-Batch	Batch COBOL programs
RDO	RDO	CICS CSD extract

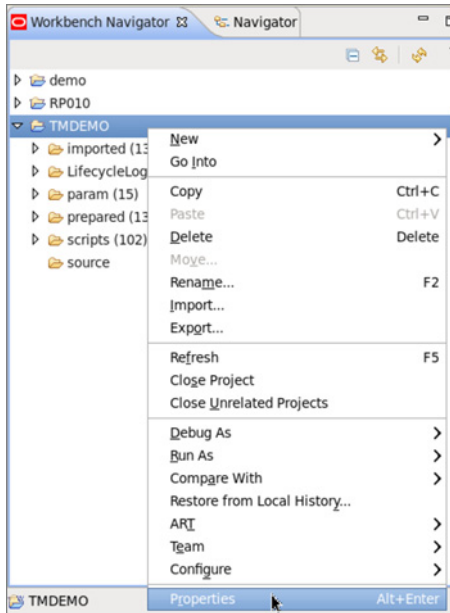
When all Types have been correctly selected click “Select All” button to change “Process” column value of all the directories to “YES”, and then click “Finish”. This will set up the Workbench configuration appropriately for each of the directories.

7. Create or copy two parameter files for File Converter. These can be copied from <TMDEMO sample direcotry>/param/file to the <ART WB TMDEMO Project directory>/param/file in order to generate the file converter artifacts for the sample.

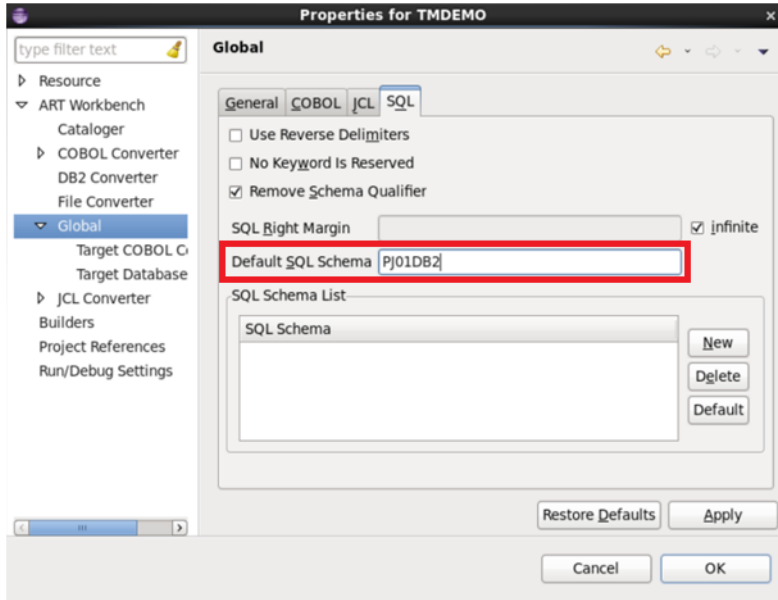


8. Set default Oracle Database schema to use for the Oracle table and other objects as follows. Open project Properties by right clicking TMDEMO project name in Workbench Navigator and selecting “Properties” at the bottom of the menu as following:

Migrating and Deploying TMDEMO Using ART Workbench



Select “ART Workbench -> Global-> SQL” and input “**PJ01DB2**” into “Default SQL Schema” text to specify the schema name, then click “Apply->OK” finish this step.



- Run ART Workbench Cataloger using ART drop down menu on Eclipse toolbar: “ART->Analyze -> Catalog”. To check whether the catalog process finished successfully check whether there are any ERROR-level messages in the Console view or open “Catalog Reports” view and check Anomalies report shown below to ensure there are no “ERROR” or “FATAL” severity messages (WARNING messages are expected) as well as any ERROR messages in any other report tabs.

PATH	SUB PATH	LINE	SUB-LINE	SEVERITY	CATEGORY	TAG	DESCRIPTION
JCL/LODCUST.jcl		0		WARNING	LINKAGE	UNSET-VARIABLE	use of a variable SYSUID in JCL, but not defined
JCL/PRTCUST.jcl		0		WARNING	LINKAGE	UNSET-VARIABLE	use of a variable SYSUID in JCL, but not defined
JCL/UPDCUST.jcl		0		WARNING	LINKAGE	UNSET-VARIABLE	use of a variable SYSUID in JCL, but not defined
RDO/cicsb.rdo		1		WARNING	LINKAGE	FILE-NEVER-USED	File declared and never Used : ODCSF0

- Open ART Workbench Converters Wizard using ART drop down menu on Eclipse toolbar: ART->Convert. Click “Select All” button to check all items, and then click “Finish”. To verify that converter process finished successfully, check for any ERROR level messages in “Console” view or open “Tracking” view and, check the “Converted” column under “Code

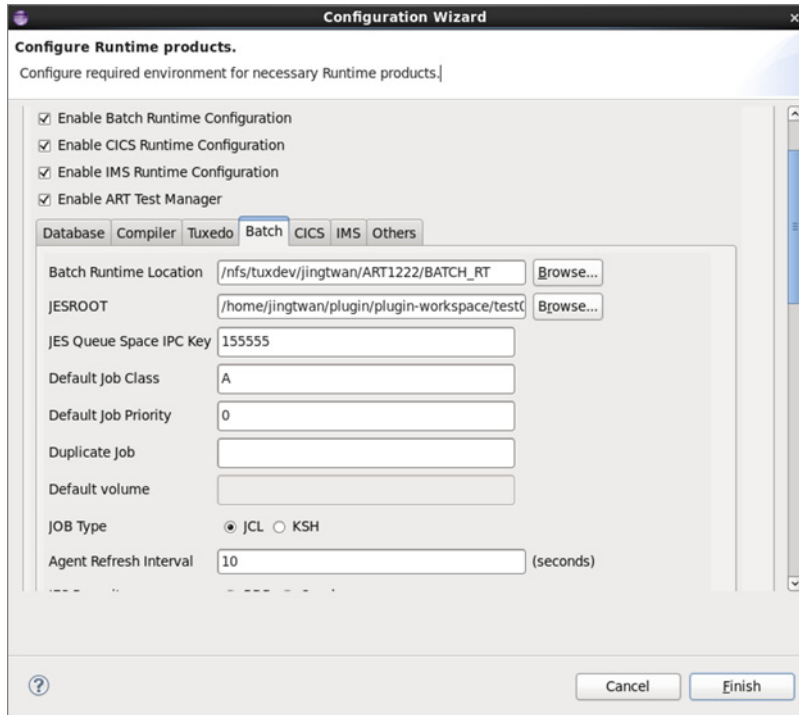
summary” tab to ensure all JCL, CICS, IMS, and Batch components show 100% converted as shown in the figure below.

Path	Type	Original	Cataloged	Converted	Compiled	Deployed	More information
JCL	JCL	3	3(100.0%)	3(100.0%)			Details
CICS	Cobol-TPR	6	6(100.0%)	6(100.0%)			Details
IMS_COBOL	Cobol-Batch	7	7(100.0%)	7(100.0%)			Details
BATCH	Cobol-Batch	3	3(100.0%)	3(100.0%)			Details

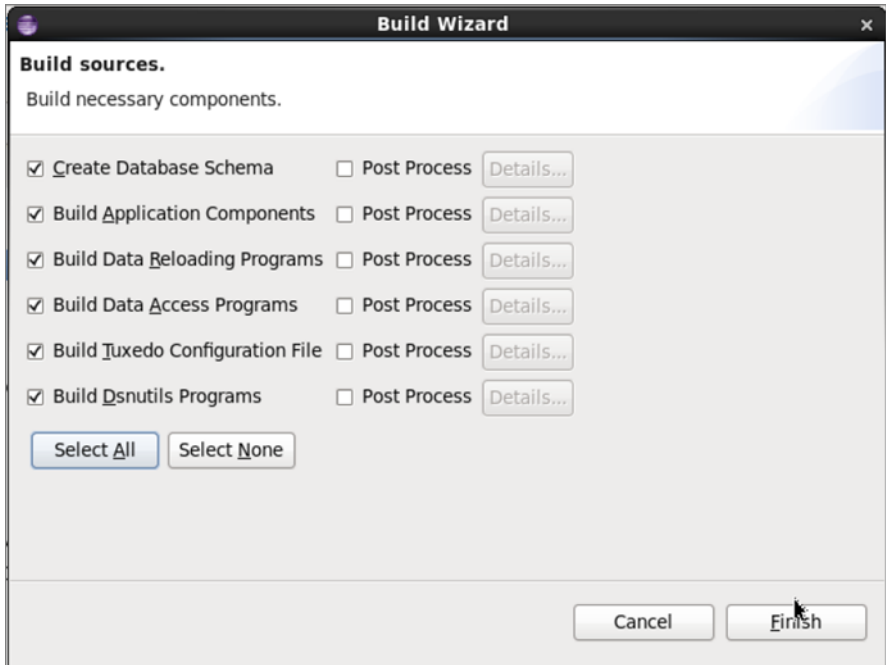
Export

11. Enter Configuration wizard: “ART->Configure”. Use local machine configuration as default or add remote machine configurations.
 - a. Check “Enable Batch Runtime Configuration”, “Enable CICS Runtime Configuration”, “Enable IMS Runtime Configuration”, “Enable ART Test Manager”
 - b. Open each tab and enter the relevant configuration information. Note that under IMS one of the input fields is an IPCKEY for ART Test Manager agent. This IPCKEY must be unique in the system.

After all the parameters are configured, click “Finish”.



12. With configurations defined and makefiles generated build the application executables by using ART Workbench Build wizard: “ART->Build”. Click “Select All” button to check all the items, then click “Finish” to launch the build steps in the sequence shown in the figure below.



To verify that build processes finished successfully, check the “Console” for any ERROR level messages or use “Tracking” view to check the “Compiled” column value under “Code summary” tab. It should show 100% results for CICS, IMS, and Batch programs. Value for JCL will be blank as JCL is not compiled.

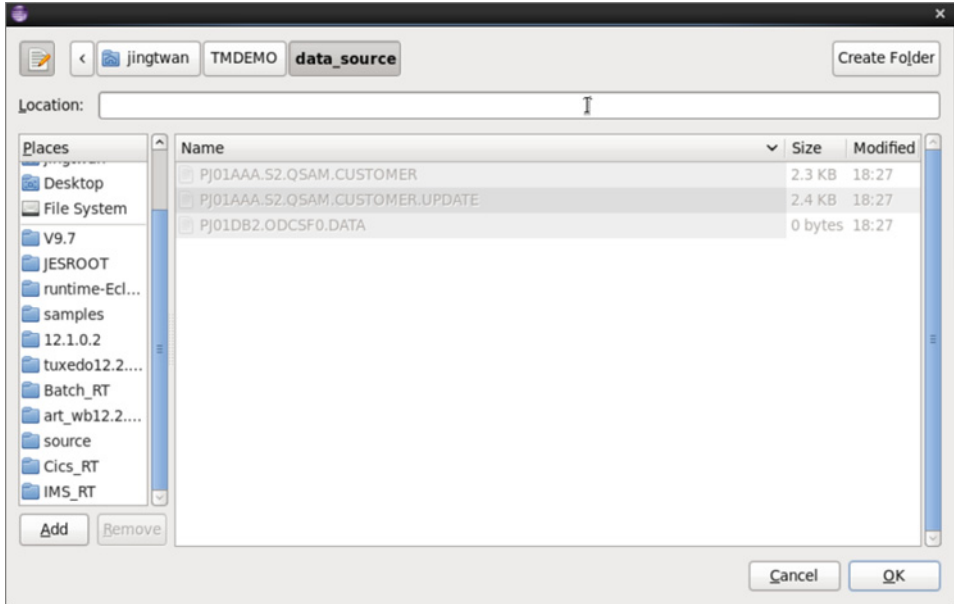
Path	Type	Original	Cataloged	Converted	Compiled	Deployed	More information
JCL	JCL	3	3(100.0%)	3(100.0%)			Details
CICS	Cobol-TPR	6	6(100.0%)	6(100.0%)	6(100.0%)		Details
IMS_COBOL	Cobol-Batch	7	7(100.0%)	7(100.0%)	7(100.0%)		Details
BATCH	Cobol-Batch	3	3(100.0%)	3(100.0%)	3(100.0%)		Details

- To deploy the migrated, configured, and built application select “ART->Deploy” wizard. Enable “Batch”, “CICS” and ”IMS” in target selection area, then click “Pack Target” to package application components and configuration artifacts for each runtime. After pack step

has finished, click “Deploy Application” to deploy the application packages to the target APPDIR directory specified in the Configure wizard. Then click “Finish”. To verify that this step has finished successfully, check the log in “Console” view for any ERROR level messages or open “Tracking” view to check “Deployed” column value under “Code summary” tab. It should show 100% of the components have been deployed as shown in the figure below.

Path	Type	Original	Cataloged	Converted	Compiled	Deployed	More information
JCL	JCL	3	3(100.0%)	3(100.0%)		3(100.0%)	Details
CICS	Cobol-TPR	6	6(100.0%)	6(100.0%)	6(100.0%)	6(100.0%)	Details
IMS_COBOL	Cobol-Batch	7	7(100.0%)	7(100.0%)	7(100.0%)	7(100.0%)	Details
BATCH	Cobol-Batch	3	3(100.0%)	3(100.0%)	3(100.0%)	3(100.0%)	Details

14. Before starting Tuxedo domains for each runtime, Setup Runtimes function must be run to prepare the domain dependencies. This can be done from ART->Deploy->Setup Runtimes wizard; however, if this project will be used by the ART Test Manager, this step is optional as ART Test Manager will automatically perform these functions before starting the domains. To execute this step in the ART Workbench plugin open the wizard: “ART->Deploy->Setup Runtime”, check the three checkboxes: “Setup Batch runtime environment”, “Setup CICS runtime environment”, “Setup IMS runtime environment”, then click “Finish”. To verify the setup status, check the log in “Console” view.
15. To provide the data files required by the application, open the Reload File Data wizard as follows: ART->Deploy->Reload File Data. Specify <TMDEMO directory>/data_source as VSAM/QSAM source location as shown in the figure below.

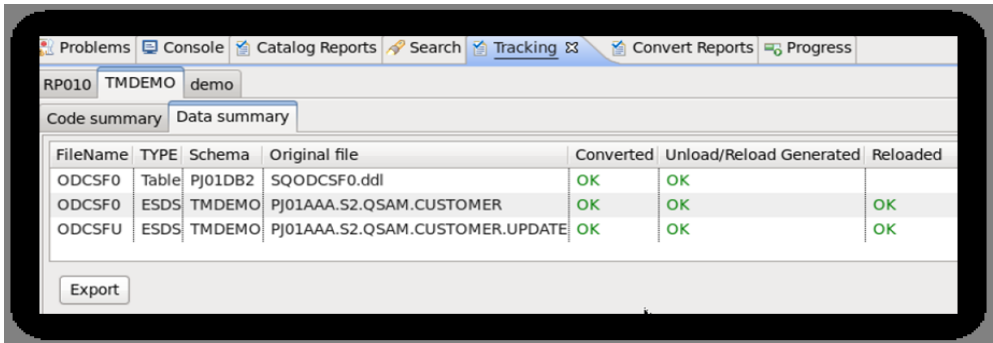


Specify the Data Source Files as shown in the following table:

Table 14-5 Data Source File

File Schema	File Name	Data Source File
TMDEMO	PJ01AAA.S2.QSAM.CUSTOM. UPDATE	PJ01AAA.S2.QSAM.CUSTOM.UPDATE UPDATE
TMDEMO	PJ01AAA.S2.QSAM.CUSTOM	PJ01AAA.S2.QSAM.CUSTOM

Input the deploy target location, and click “Finish”. To verify that file conversion and reload were successful check the log in “Console” view or open “Tracking” view and check status in Reloaded column under “Data summary” tab.

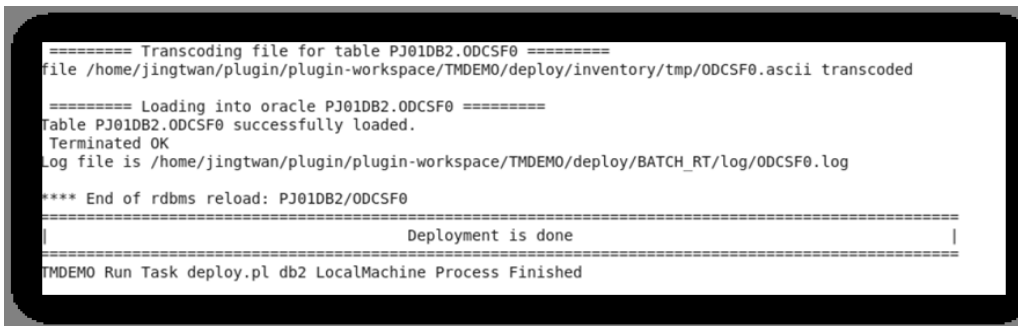


- To reload the database table required by the application, open the Reload DB2 Data Data wizard as follows: ART->Deploy->Reload DB2 Data. Specify <TMDEMO directory>/data_source as data source location and specify “DB2 Data File” as shown in the following table:

Table 14-6 DB2 Data File

DB Schema	Table Name	DB2 Data File
PJ01DB2	ODCSF0	PJ01DB2.ODCSF0.DATA

Click “Finish” to perform data transcoding and reload Oracle table. To verify that database reload finished successfully check the log in “Console” view, which should contain the messages as shown in the figure below.



The TMDEMO application has been migrated, configured, built, and deployed and its data dependencies have been similarly converted and reloaded. It is ready to run and can be tested using ART Test Manager as described in the next section of this tutorial.

Setting Up ART Test Manager Project

Once ART Test Manager has been installed and configured, start Tomcat as described in 2.2.2 Configuring and Starting ART Test Manager. Specify hostname:port/arttm URL in a web browser address bar to get to the login page, enter username “admin” and admin’s password as specified during ART Test Manager installation, and click Login button. Once logged in, proceed with the next steps as admin user or use the pull down menu under admin in the upper right corner to enter User Management and create a new, regular user. Continue the tutorial with the steps below.

To create an ART Test Manager project, click the “Create project” button in Context Path Bar and enter the required information.

The screenshot shows a web form titled "Create a Test Project". It has three main input fields, each with an asterisk indicating it is required:

- Project Name:** A text input field containing "TMDEMO". To its right is a checkbox labeled "Remote Project" which is currently unchecked.
- Deploy Path:** A text input field containing "/home/jingtwan/test0317build".
- Project Path:** A text input field containing "/home/jingtwan/tmdemo".

At the bottom right of the form, there are two buttons: "Reset" and "Create".

- “Project Name”: A name to identify your project.
- “Deploy Path”: The path of your migrated application, it’s the APPDIR where ART Workbench deployed the migrated TMDEMO application.
- “Project Path”: The path where ART Test Manager will maintain the project information. It will contain content from the APPDIR and metadata created by ART Test Manger.

If Workbench APPDIR is not on the same machine where ART Test Manger is installed and running, check “Remote Project” check-box and provide required machine and connection information as shown in the figure below.

Create a Test Project

* Project Name: Remote Project

* Host Name and Port: :

* User Name:

* Password: Successful!

Java Home:

* Deploy Path:

* Project Path:

After you provide necessary information, and click “Create” button, a new project would be created. ART Test Manger will automatically scan the deployment APPDIR and create default test groups including all the discovered test cases. These groups are always named “BATCH_RT” for BATCH cases, “CICS_RT” for CICS cases and “IMS_RT” for IMS cases. For “Batch_RT”, the batch test cases represent the jobs found under JCL directory. For “CICS_RT”, the CICS 3270 test cases represent the transactions listed in the configuration file transactions.desc and the CICS DPL test cases represent the DPL programs listed in the configuration file programs.desc. For “IMS_RT”, the IMS MPP and BMP test cases represent the online and batch programs listed in the configuration files imstran.desc and imsapp.desc.

After creating the TMDEMO project, click on the project in the left navigation tree to open the project context consisting of the three test groups in the main operations pane. Notice the Case Count column shows the number of test cases in each group – these are the cases automatically discovered and imported from the APPDIR when the project was created.

Current Path: TMDEMO

Run Advanced Run Delete Create Group Locate Dashboard

<input type="checkbox"/>	Name	Type	Case Count	Configuration	Result
<input type="checkbox"/>	CICS_RT	CICS	6	<input type="button" value="⌵"/>	<input type="button" value="⌵"/>
<input type="checkbox"/>	IMS_RT	IMS	7	<input type="button" value="⌵"/>	<input type="button" value="⌵"/>
<input type="checkbox"/>	BATCH_RT	BATCH	4	<input type="button" value="⌵"/>	<input type="button" value="⌵"/>

Configuring Test Environment

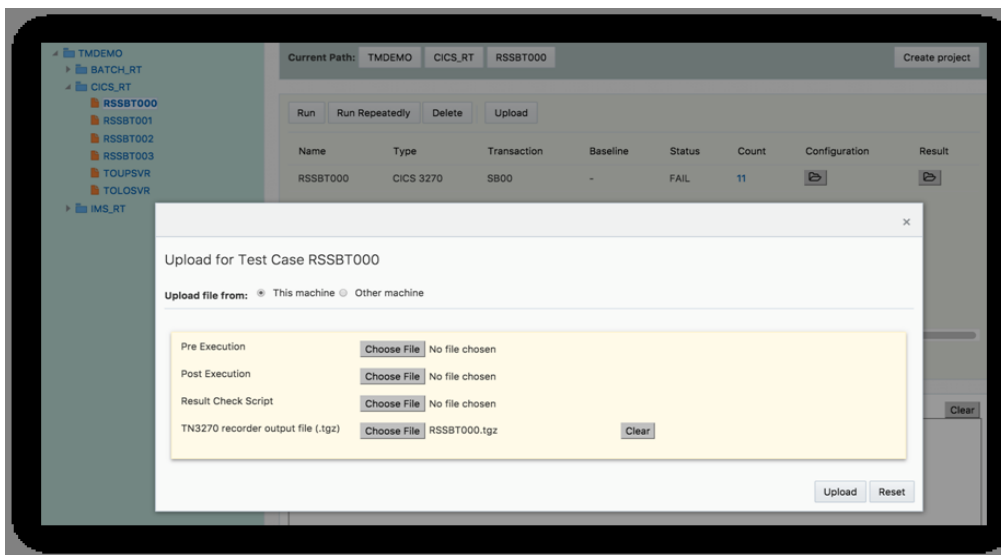
Once the project is created in ART Test Manager, the test environment has been configured.

Testing CICS 3270 Screens

As described in the User Guide, to test CICS 3270 screen, first run the transactions against the mainframe and capture the baseline using tn3270 recorder.

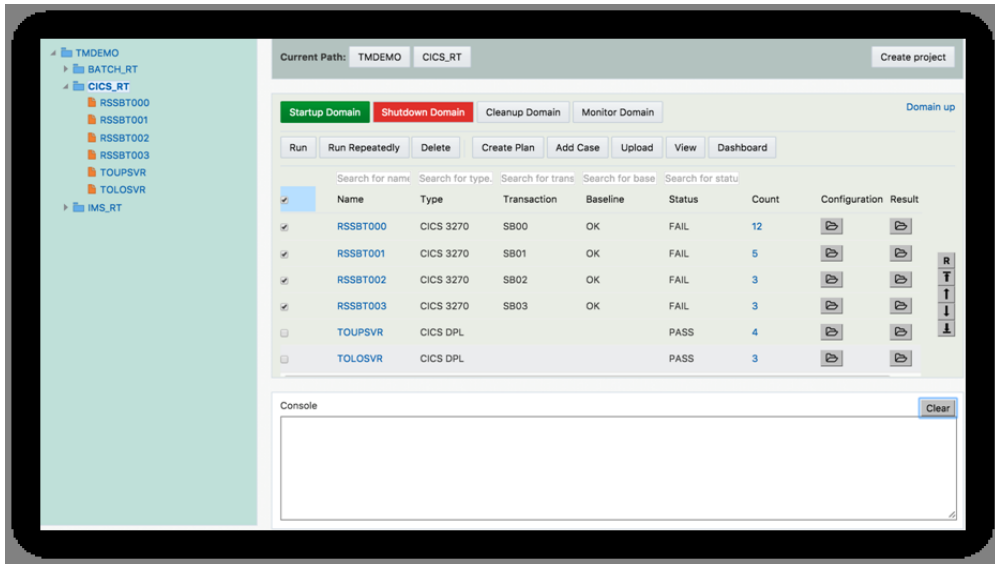
Capturing and Uploading Baseline

Follow the guidelines in Appendix I of this User Guide on how to configure and use the TN3270 Recorder. Afterwards, upload the captured baseline “.tgz” files using the “Upload” dialog of each CICS 3270 test case as shown in the figure below.

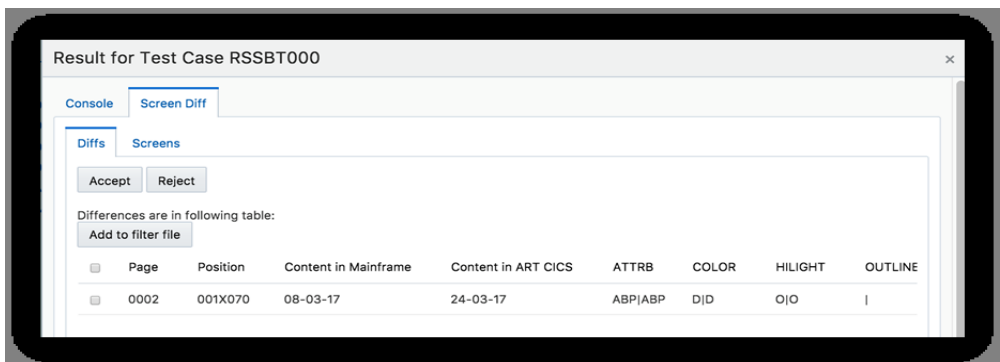


Executing Test Cases and Comparing Results

After uploading the baseline select one or more CICS 3270 test cases and click the “Run” button to execute selected cases.



The “Status” column indicates if the test case has failed or passed. For detailed result click the icon in the “Result” column to see any detailed differences if they exist.



For RSSBT00 case, the difference is on one field located at row 1 column 70 of the second screen. The mainframe value “08-03-17” doesn’t match ART value “24-03-17”. This is in fact a date field that contains the current execution date. It is normal for this field to not match unless the baseline from the mainframe execution was done on the same date and ART execution. Check the check-box to the left of the field and click “Add to filter file” button to filter this field from

the any future comparison. Once this case is re-run, there will be no other differences identified in the datastream and the case will pass.

Testing IMS 3270 Screens

To run IMS cases perform the following steps to finish preparing the IMS environment before starting the Tuxedo domain for IMS MPP and BMP regions.

1. cd to <TMDEMO Directory>/ims_prepare directory, edit the setenv.sh corresponding to the compiler used, to update the values of IMSDIR, COBDIR, ORACE_HOME, ORACLE_USER, and then source this setenv script.
2. Execute script run.sh under <TMDEMO Directory>/ims_prepare to replace libldlib.so, compile DLI-to-Oracle Data Access Layer programs, and reload IMS DB data into Oracle schema. To verify that database reload succeeded, check that the following output is displayed showing contents of two Oracle tables reloaded from IMS DB data.

```

SQL>
A  SEG_LEN  LATEST_ID  A1111111_SEQUENCE
-----
1          0          10                1

A  ACCOUNT_ID      SEG_LEN2      AMOUNT  A222222_SEQUENCE
-----
1  0000000000000002      0           0           1
1  0000000000000003      0           36          2
1  0000000000000005      0      1190068          3
1  0000000000000006      0        1070          4
1  0000000000000008      0        7423          5
1  0000000000000009      0        2121          6

6 rows selected.

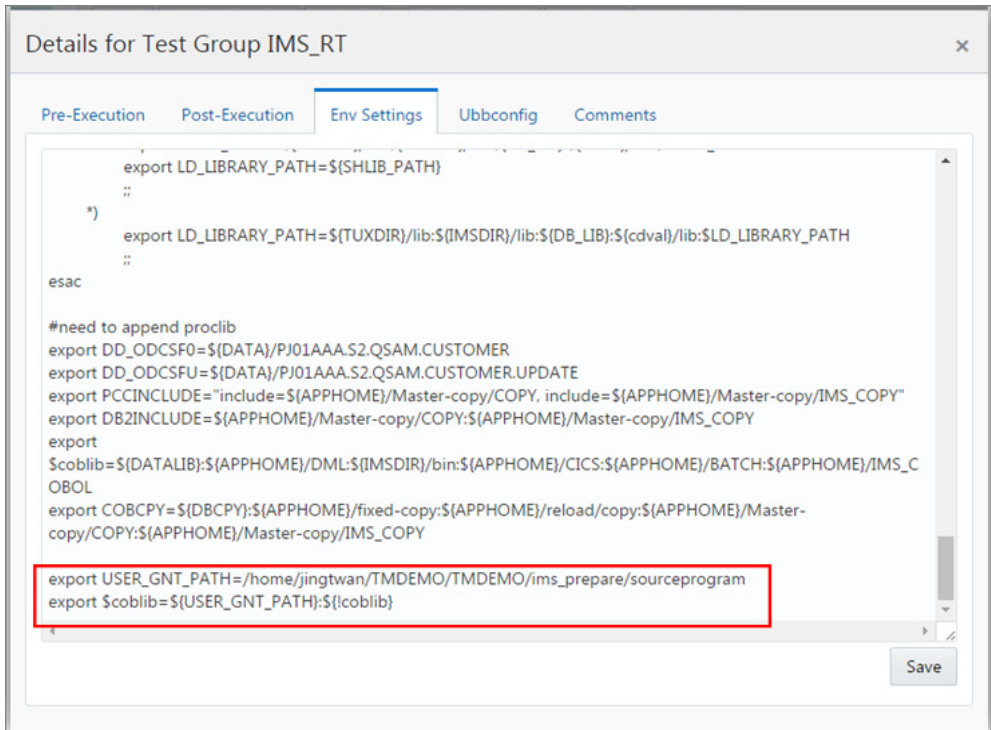
```

3. In ART Test Manager project context open “Configuration” dialog for IMS group by clicking on the icon under Configure column and click “Env Setting” tab. In this tab, append the following env variable settings at the end and click “Save” button in lower right:

```

export USER_GNT_PATH=<TMDEMO Directory>/ims_prepare/sourceprogram
export $coblib=${USER_GNT_PATH}:${!coblib}

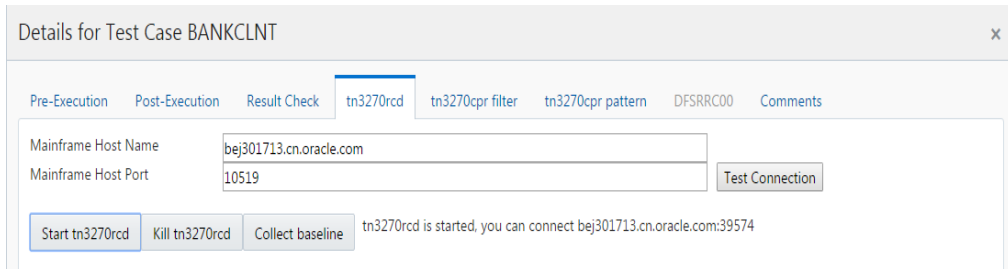
```

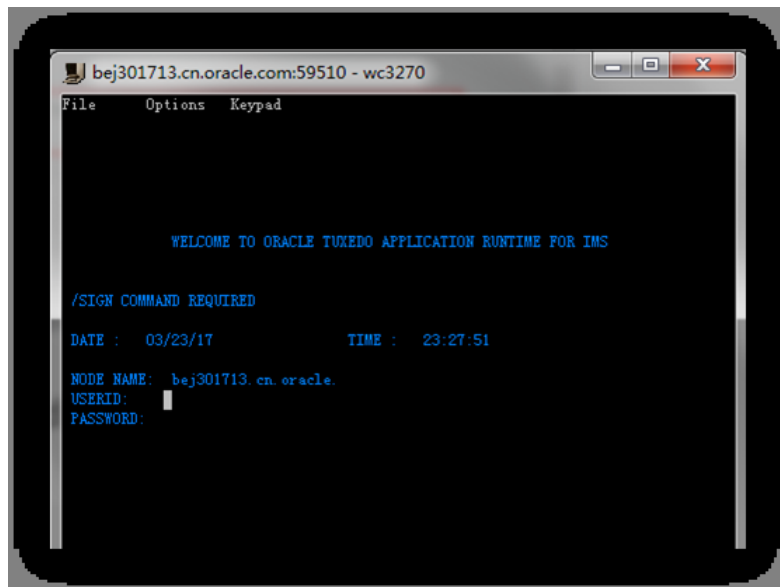
This completes the prerequisites for running TMDEMO IMS test cases.

Capturing and Uploading Baseline

As in CICS 3270 cases, before running IMS MPP cases prepare and upload the baseline from mainframe execution. In IMS group context displaying all IMS test cases, click the “Configuration” column icon for BANKCLNT case. In this Configuration dialog, click “tn3270rcd” tab and specify the required values in the “Mainframe Host Name” and “Mainframe Host Port” fields. Click “Test Connection” button to verify the connection. Once connection has been verified, click “Start tn3270rcd” button to start the recorder and note the hostname:gwPort in tn3270rcd’s message.



Start a tn3270 terminal emulator session and connect to hostname:gwPort specified in tn3270rcd's message. Navigate to the IMS BANKCLNT application, press PA1 to start recorder, and perform normal sequence of interactions with the application. When finished, press PA1 to end the recorder and save the datastream baseline.



Back in ART Test Manager, click “Kill tn3270rcd” and “Collect Baseline” buttons to terminate the recorder and upload the baseline for the BANKCLNT test case.

Executing Test Cases and Comparing Results

To run the IMS MPP case, check BANKCLNT and click the “Run” button. The uploaded baseline will be used to drive the interaction with BANKCLNT transaction in ART IMS environment. Click the Result column icon to check the execution results, starting with the execution log displayed under “Console” tab, which should look similar to the log sample in the figure below.

```

Result for Test Case BANKCLNT

Console  Screen Diff  Execution Info  SYSOUT

20170324 08:59:46 [INFO] Begin run case IMS_MPP_BANKCLNT.
20170324 08:59:46 [INFO] Begin replay CICS 3270 blueprint file for case IMS_MPP_BANKCLNT.
TN3270 replayer: connect to ARTTCP successfully thru telnet.
start replay....
Replayer process: 1/2
Replayer process: 2/2
end replay....
20170324 08:59:47 [INFO] Begin compare 3270 datastream files.
20170324 08:59:47 [ERROR] Compare 3270 datastream failed.
  
```

Click “Screen Diff” tab to check the data stream comparison. Under “Diffs” tab the two fields with differences are indicated as shown in the figure below.

Result for Test Case BANKCLNT

Console **Screen Diff** Execution Info SYSOUT

Diffs Screens

Accept Reject

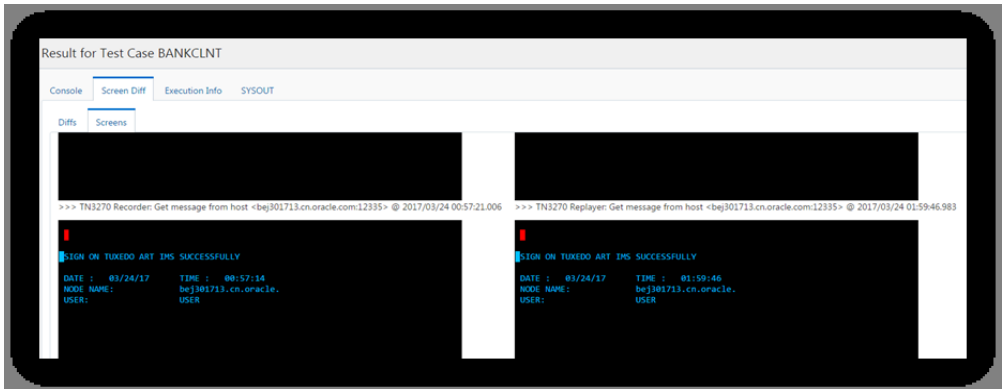
Differences are in following table:

Add to filter file

<input type="checkbox"/>	Page	Position	Content in Mainframe	Content in ART IMS	ATTRB	COLOR	HILIGHT	OUTLINE	Predefined
<input type="checkbox"/>	0002	005X010	03/24/17	04/05/17	AOP AOP	DJD	O O		N
<input type="checkbox"/>	0002	005X033	00:57:14	00:49:35	AOP AOP	DJD	O O		N

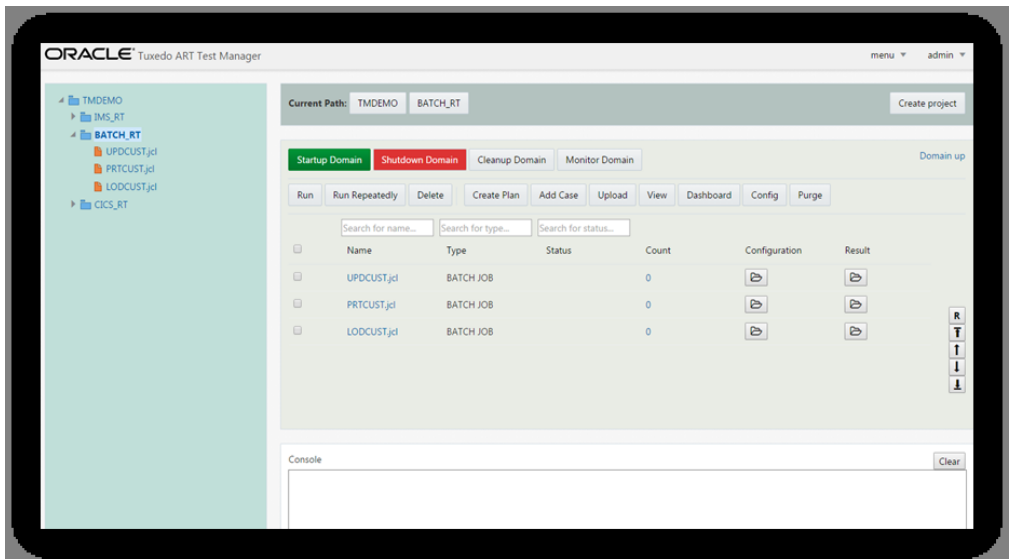
The two fields contain timestamp values, which would most likely be different between the captured mainframe baseline and ART IMS execution. To filter these fields out of any future comparison, select them using checkboxes to the left and click “Add to filter file”.

Click on the “Screens” tab to check the side-by-side screen views.



Testing Batch Jobs

There are three jobs in the sample and they appear as three batch test cases in BATHC_RT group as shown in the figure below.



Executing Test Cases and Comparing Results

To execute a test case, first click “Startup Domain”. Once the domain is up select the jobs to test using checkboxes on the left and click “Run” button to launch them. The output will be displayed in the console view below.

Return Code Comparison

The default result checking for batch test cases is to check the return code of the job. For a native JCL job, the return code 0 is taken as test passed; any other value means it failed. For a KSH job, C000 return code is taken as passed, any other value means it failed.

Setting Up and Using File Compare

File compare option is used to compare files in ART Batch with datasets on mainframe after the job has been executed. When this option is enabled and FTP connection has been set up and verified, ART Test Manager will submit the job on the mainframe and download the referenced data from mainframe to Linux. After transcoding and reloading data, files will be compared.

In order to ensure the job runs successfully on the mainframe verify that all the PROCs and programs referenced by the job can be found on the mainframe, that all required datasets are available, and that the state of the database is as expected by the job.

File compare option is disabled by default. This option can be enabled in the Batch configuration dialog. Click “Config” button on the group panel to access the configuration dialog.

Config for Test Group BATCH_RT

DB/File Comparison

DB Operation Comparison

Enable DB Operation Comparison

File Comparison

Enable File Comparison

Synchronize File Before Submit Job

Mainframe

Mainframe Host Name

Mainframe FTP port

User Name

Password

DB2

DB2 Home

DB2 Database Name

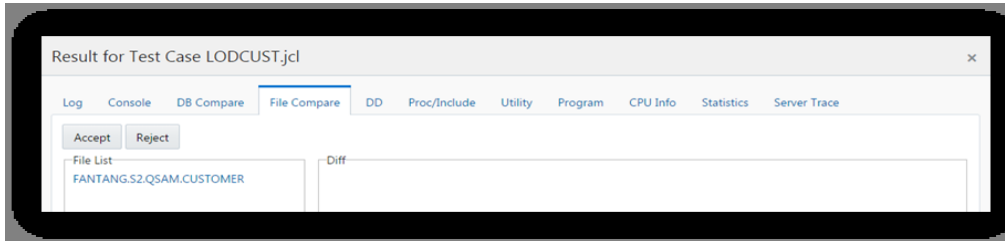
DB2 Database Connect Port

DB2 User

DB2 Password

Choose “Enable File Comparison” and input the mainframe information including host name, ftp port, user name and password. Try ftp connection by clicking “Test FTP Connection” button. Then click “Save” button.

After configuration select and “Run” this test case then click result icon to view results. In the results dialog click “File Compare” tab to check the result of file comparison.



The left pane lists the file referenced by the job. Click the file to see any differences from the comparison.

Setting Up and Using DB Compare

When batch test cases update the database, DB compare option can be used to compare DB operations between mainframe execution of the job updating DB2 and ART execution updating Oracle Database. This also involved submitting the job on the mainframe using FTP connection, so it also requires the mainframe environment to be set up correctly in order to be able to run the job.

DB compare option is disabled by default but it can be enabled by the configuration dialog for Batch group. Click “Config” button on the group panel. (Refer to [Configure Mainframe Connection](#) for the dialog details.) Select “Enable DB Operation Comparison”, and input the mainframe information including host name, ftp port, user name and password, then test ftp connection by clicking “Test FTP Connection” button. Then input DB2 information including DB2 home, DB2 name, DB2 port, DB2 user name and password and test DB2 connection with “Test DB2 Connection” button. When both FTP and DB2 connections are successful, click “Save” button to save the configuration.

After configuration select LODCUST batch case and click “Run” button to execute it. After execution click Result column icon to open the results dialog and click “DB Compare” tab to see the comparison of DB operations between DB2 on the mainframe and Oracle Database.

ORA				ORACLE		DB2	
TABLE	OP	TABLE	OP	BEFORE	AFTER	BEFORE	AFTER
1 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		1275. BOURB		1275. BOURB
2 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		1961-09-07		1961-09-07
3 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		New Orleans		New Orleans
4 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		bob.richardsc		bob.richardsc
5 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		Bobby		Bobby
6 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		1		1
7 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		Richardson		Richardson
8 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		5553557901		5553557901
9 FANTANG.ODCSFC	INS	FANTANG.ODCSFC	INS		LO		LO

As illustrated in the figure above, the INS (ert) operations are shown in the left pane. Clicking on any of them shows the BEFORE and AFTER values in the table for both Oracle and DB2, which in these case match 100%.

Using Dashboard

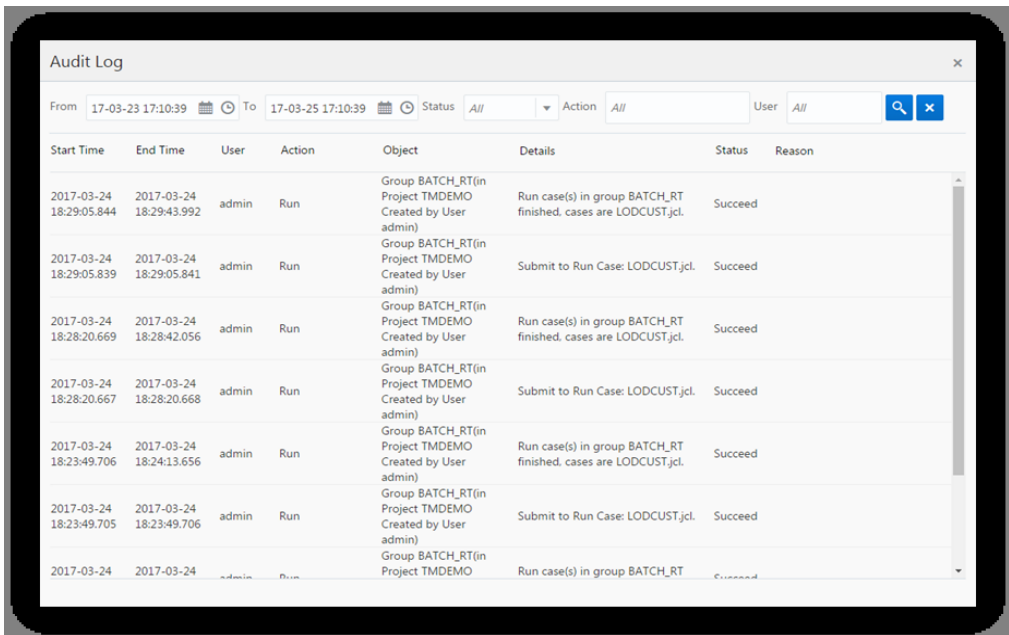
Click “Dashboard” button on the project, group, or test plan panel to see case execution report of the TMDEMO project. Total/passed/failed number and passed/failed percentages will be listed in table format for each case type.

Group	Plan	Type	Total	Passed	Failed	Passed(%)	Failed(%)
IMS_RT		IMS MPP	6	0	0	0.00%	0.00%
IMS_RT		IMS BMP	1	0	0	0.00%	0.00%
BATCH_RT		BATCH JOB	3	2	0	66.67%	0.00%
CICS_RT		CICS 3270	4	0	0	0.00%	0.00%
CICS_RT		CICS DPL	2	0	0	0.00%	0.00%

Use the filter search boxes on the top of the table to filter the dashboard to a required subset based on group name, test plan name, or test case types.

Using Audit Trail

Click “Audit” in the drop down menu in upper right corner to see and audit report of all operations performed on project TMDEMO. Starting and ending timestamp, userid, action, target object, action details, status, and if failed, reason for failure will be shown in the table.



The screenshot shows a window titled "Audit Log" with a search and filter interface at the top. The filters are set to "From 17-03-23 17:10:39" to "To 17-03-25 17:10:39", "Status All", "Action All", and "User All". The table below contains the following data:

Start Time	End Time	User	Action	Object	Details	Status	Reason
2017-03-24 18:29:05.844	2017-03-24 18:29:43.992	admin	Run	Group BATCH_RT(in Project TMDEMO Created by User admin)	Run case(s) in group BATCH_RT finished. cases are LODCUST.jcl.	Succeed	
2017-03-24 18:29:05.839	2017-03-24 18:29:05.841	admin	Run	Group BATCH_RT(in Project TMDEMO Created by User admin)	Submit to Run Case: LODCUST.jcl.	Succeed	
2017-03-24 18:28:20.669	2017-03-24 18:28:42.056	admin	Run	Group BATCH_RT(in Project TMDEMO Created by User admin)	Run case(s) in group BATCH_RT finished. cases are LODCUST.jcl.	Succeed	
2017-03-24 18:28:20.667	2017-03-24 18:28:20.668	admin	Run	Group BATCH_RT(in Project TMDEMO Created by User admin)	Submit to Run Case: LODCUST.jcl.	Succeed	
2017-03-24 18:23:49.706	2017-03-24 18:24:13.656	admin	Run	Group BATCH_RT(in Project TMDEMO Created by User admin)	Run case(s) in group BATCH_RT finished. cases are LODCUST.jcl.	Succeed	
2017-03-24 18:23:49.705	2017-03-24 18:23:49.706	admin	Run	Group BATCH_RT(in Project TMDEMO Created by User admin)	Submit to Run Case: LODCUST.jcl.	Succeed	
2017-03-24	2017-03-24	admin	Run	Group BATCH_RT(in Project TMDEMO)	Run case(s) in group BATCH_RT	Succeed	

Filters above the table can be used to restrict the audit report to specific date/time range, actions, or users.

