Installer Zero Downtime Database Setup and Operational Guide
Oracle Banking ELCM
Release 14.5.5.0.0
[May] [2022]

ORACLE
FINANCIAL SERVICES

Table of Contents

1. INSTALLER ZERO DOWNTIME DATABASE SETUP 1-1

1.1 INTRODUCTION 1-1
1.2 PRE-REQUISITE 1-1
1.3 ZERO DOWNTIME DATABASE SETUP 1-2
1.3.1 Patch set Database Compilation Process Flow 1-3
1.3.2 ZDT Installer Stage Sequence Flow 1-4
1.3.3 Creating Patch set Edition 1-4
1.3.4 Database Setup in Patch set Edition 1-4
1.3.5 Application Deployment in Patchset Edition 1-5
1.3.6 Edition Switch in Patchset Edition 1-5
1.3.7 Application Management in Patchset Edition 1-5
1.3.8 Database Setup in Base Edition 1-5
1.3.9 Application Deployment in Base Edition 1-6
1.3.10 Edition Switch in Base Edition 1-6
1.3.11 Application Management in Base Edition 1-6
1.3.12 Drop Patch Set Edition 1-7
1.4 CONNECTION ROUTING TO DOMAINS USING ORACLE TRAFFIC DIRECTOR 1-7
1.5 ADDITIONAL INTEGRATION SOURCE COMPILATION ..... **ERROR! BOOKMARK NOT DEFINED.**
1.6 OPERATIONAL RECOMMENDATIONS ON OTHER APPLICATION COMPONENTS 1-7
1.7 OPERATIONAL ISSUES AND TROUBLESHOOTING 1-8

1. Installer Zero Downtime Database Setup

1.1 Introduction

Patch set Installation with Zero downtime (ZDT) requires Installer to use Editions in a Database Schema.

Installer is enhanced to use Database Schema Editions and apply the Patch set DB compilation in patch set edition and then Base edition in a staggered manner to achieve Zero Downtime.

Installer support establishing JDBC connections through Application, Gateway, ATM etc. To be pointing to a specific edition.

The approach is discussed in detail under the following heads.

1.2 Pre-Requisite

Below Privilege must be provided to the Database Schema from SYS Database User.

```
1. ALTER  USER <SCHEMA NAME> ENABLE EDITIONS [FORCE];
2. GRANT CREATE ANY EDITION TO <SCHEMA NAME>;
3. GRANT DROP ANY EDITION TO <SCHEMA NAME>;
4. GRANT ALTER SESSION TO <SCHEMA NAME>;
5. GRANT EXECUTE on DBMS_SESSION TO <SCHEMA NAME>;
```

Note: Refer to section 1.6 Operational Issues and Troubleshooting.

Pre-Installation Configuration:

- ZDT_PATCHING is a property in the file **`env.properties`**. Set this property to 'Y' if ZDT patching is required and 'N' if application should be taken offline when patching is done.
- BASE_EDITION is a property in the file **`env.properties`**. This property is used to indicate the Base Edition. For example 'ORA$BASE'.
- PATCHSET_EDITION is a property in the file **`env.properties`**. This property is used to specify the Edition that would be used as the alternate Edition during ZDT Patch-set Installation. For example, 'E1'.
- ZDT_OBJECTS_ACTUALIZATION_REQUIRED is a property in the file **`env.properties`**. This property used to specify whether the actualization of objects from Base edition to Patch-set Edition is required or not. It is recommended to give as Y for a smooth Zero Downtime patch set application process.
- ZDT_OBJECTS_COMPILE_THREAD is a property in the file **`env.properties`**. This property used to specify the number of threads used to compile during actualization of objects from Base Edition to Patch-set Edition. Please give a numeric value greater than zero. For example 5.
- NUMBER_OF_CPU_CORES_FOR_ZDT_RECOMP is a property in the file **`env.properties`**. This property used to specify the number of parallel threads the system

can utilize for recompilation of invalids during the actualization of objects. This value depend on the number of CPU cores. Please give a numeric value. For example 4 or above.

- PATCHSET_INSTALLATION is an existing property in the file **`env.properties`**. It will have value 'Y' for Patch set installation process.

Sample Entries in **`env.properties`** as given below.

```
PATCHSET_INSTALLATION=Y
ZDT_PATCHING=Y
BASE_EDITION=ORA$BASE
PATCHSET_EDITION=E1
ZDT_OBJECTS_COMPILE_THREAD=5
ZDT_OBJECTS_ACTUALIZATION_REQUIRED=Y
NUMBER_OF_CPU_CORES_FOR_ZDT_RECOMP=4
```

Refer "Property File Creation" User Manual section of User manual for detailed procedure to create Property file.

Application Domain - Prerequisite:

- Two application domains – <Domain1>, <Domain2> required. These Domains will be integrated and controlled with Oracle Traffic Director to support Zero downtime Patching.
- By default, <Domain2> will remain inactive (Standby mode) and all JDBC connections to Database (Schema) routed to <Domain1>.

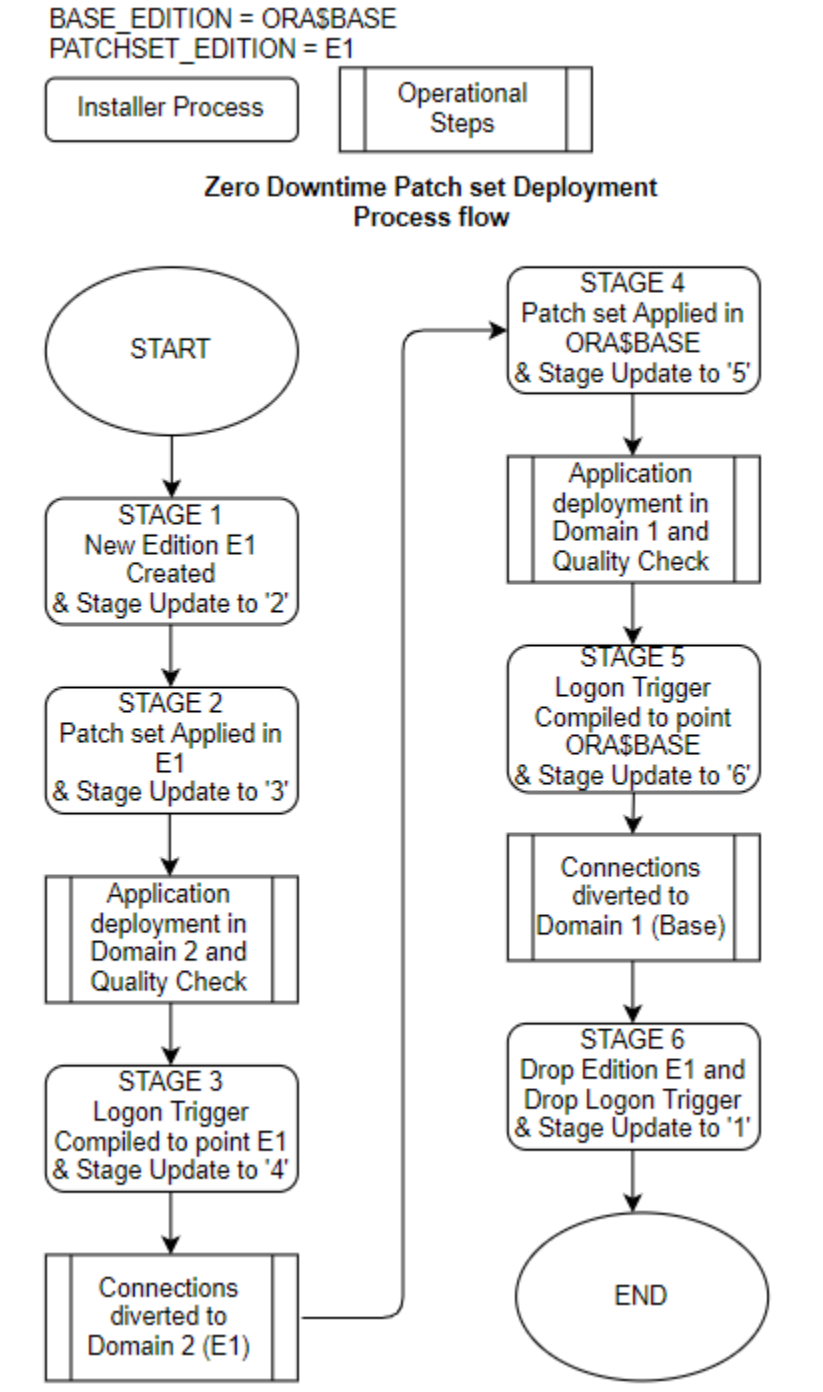
- Any Bulk upload processing, Batch processing (including End of Day operations) to be planned either to complete before the start or after completion of the Patch Set Compilation / Deployment.

1.3 Zero Downtime Database Setup

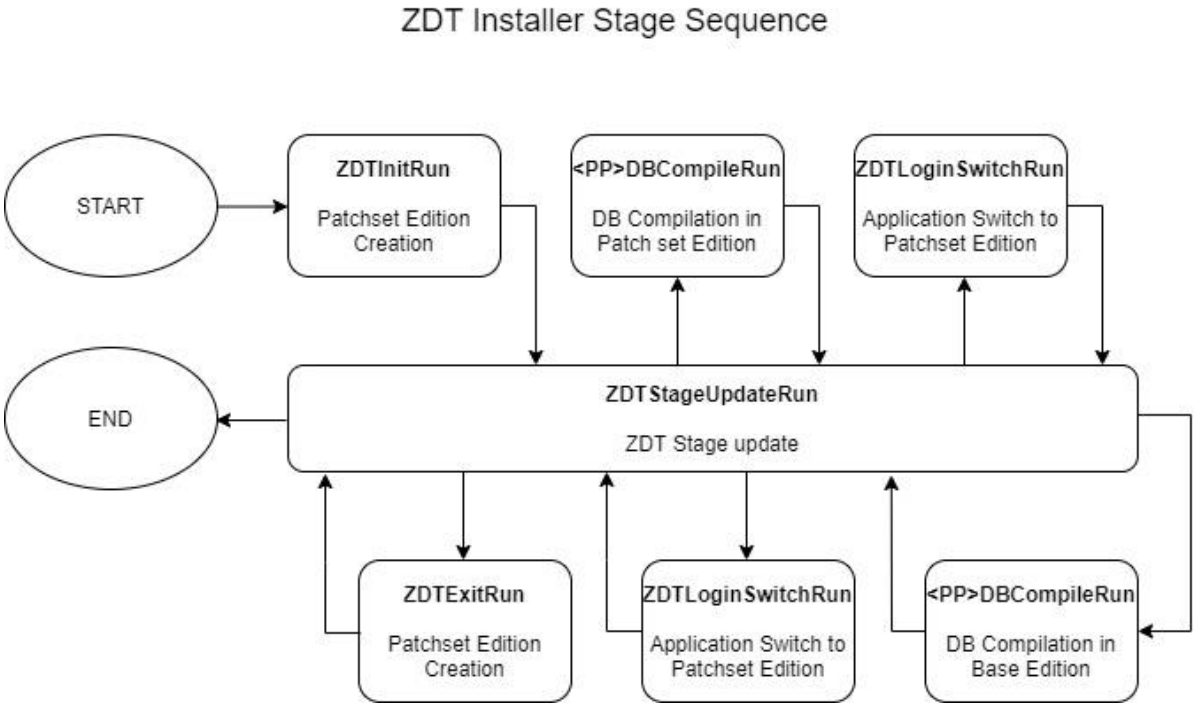
This section details about the Installer commands and Operational steps required to be done in the same order as specified to achieve Zero Downtime Patch Database Compilation and Application management.

ORACLE

1.3.1 Patch set Database Compilation Process Flow



1.3.2 ZDT Installer Stage Sequence Flow



1.3.3 Creating Patch set Edition

Patch set Edition creation done using Silent Installer.

At the start of Zero downtime Database Setup process, Run **`ZDTInitRun.bat`** in Windows (**`ZDTInitRun.sh`** for Linux)

This will ensure that a new Edition is created with the name configured in **`env.properties`** file for the property 'PATCHSET_EDITION'.

Also the Base edition objects were actualized to the new Edition if the property ZDT_OBJECTS_ACTUALIZATION_REQUIRED is Y in the **`env.properties`**.

Run **`ZDTStageUpdateRun.bat`** in Windows (**`ZDTStageUpdateRun.sh`** for Linux) to move to process the next stage operation.

1.3.4 Database Setup in Patch set Edition

Backend Setup done using Silent Installer.

DDL Compilation, Object Compilation and Static Data Loading are part of Backend Setup.

Run the **`SMSDBCompileRun.bat`** in windows (**`SMSDBCompileRun.sh`** in Linux) for SMS schema (DB) compilation.

Run the **`ELCMDBCompileRun.bat`** to complete DDL Compilation, Object Compilation and Static Data load.

For Example: ELCM INSTALLATION-

a. Run **`ELCMDBCompileRun.bat`** in windows (ELCMDBCompileRun.sh in linux)

   Check for the Invalid Count and make sure that the Invalid count is zero.

   This step will ensure the Database Backend Setup done in Patch set Edition of the Schema.

   Run **`ZDTStageUpdateRun.bat`** in Windows (**`ZDTStageUpdateRun.sh`** for Linux) to move to process the next stage operation.

1.3.5 Application Deployment in Patchset Edition

This section briefs on the Application setup in <Domain 2>

- Generate Application / Gateway Ears and deploy in <Domain2> Application.
- <Domain 2> to be in inactive state (Standby mode).

Refer “EAR Building” User Manual section for EAR building steps.

1.3.6 Edition Switch in Patchset Edition

Run **`ZDTLoginSwitchRun.bat`** (**`ZDTLoginSwitchRun.sh`** for Linux Operating System).

This BAT file execution will ensure all new JDBC connections from application points to the new Edition created (as maintained by the property PATCHSET_EDITION).

Run **`ZDTStageUpdateRun.bat`** in Windows (**`ZDTStageUpdateRun.sh`** for Linux) to move to process the next stage operation.

1.3.7 Application Management in Patchset Edition

This section briefs on the <Domain 2> application Sanity and to activate for live transaction traffic.

a. Operational Recommendation briefed in section 1.5 Operational recommendations on Other Application Components to be adhered.
b. Start the <Domain 2> Application.
c. Sanity Check of Patch set in <Domain 2> Application
d. All incoming transactions traffic routed to <Domain 2> using Oracle Traffic Director and,
e. <Domain 1> to be made inactive status (Standby mode), once all the existing transactions in process in <Domain 1> completes its process.

1.3.8 Database Setup in Base Edition

Backend Setup done using Silent Installer.

ORACLE

DDL Compilation, Object Compilation and Static Data Load will be taken care as part of Backend Setup.

Run the **SMSDBCompileRun.bat** in windows (**SMSDBCompileRun.sh** in Linux) for SMS schema (DB) compilation.

Run the **ELCMDBCompileRun.bat** to complete Object Compilation.

For Example: In case of ELCM INSTALLATION

a. Run **ELCMDBCompileRun.bat** in windows (**ELCMDBCompileRun.sh** in Linux)

Check for the Invalid Count and make sure that the Invalid count is zero.

This step will ensure the Database Backend Setup is done in Base Edition of the Schema.

Run **ZDTStageUpdateRun.bat** in Windows (**ZDTStageUpdateRun.sh** for Linux) to move to process the next stage operation.

1.3.9 Application Deployment in Base Edition

This section briefs on the Application setup in <Domain 1>

- Generate Application / Gateway Ears and deploy in Domain1 Application.
- <Domain 1> to be in inactive status (Standby mode).

Refer "EAR Building" User Manual section for EAR building steps.

1.3.10 Edition Switch in Base Edition

Run **ZDTLoginSwitchRun.bat** (**ZDTLoginSwitchRun.sh** for Linux)

This BAT file execution will ensure all new JDBC connections from application points to the Base Edition (as maintained by the property BASE_EDITION)

Run **ZDTStageUpdateRun.bat** in Windows (**ZDTStageUpdateRun.sh** for Linux) to move to process the next stage operation.

1.3.11 Application Management in Base Edition

This section briefs on the <Domain 1> application Sanity and to activate for live transaction traffic.

a. Operational Recommendation briefed in section 1.5 Operational recommendations on Other Application Components to be adhered.

b. Start the <Domain 1> Application.

c. Sanity Check of Patch set in <Domain 1> Application

d. All incoming transactions traffic routed to <Domain 1> using Oracle Traffic Director and,

e. <Domain 2> to be made inactive status (Standby mode), once all the existing transactions in process in <Domain 2> completes its process.

ORACLE

1.3.12 Drop Patch Set Edition

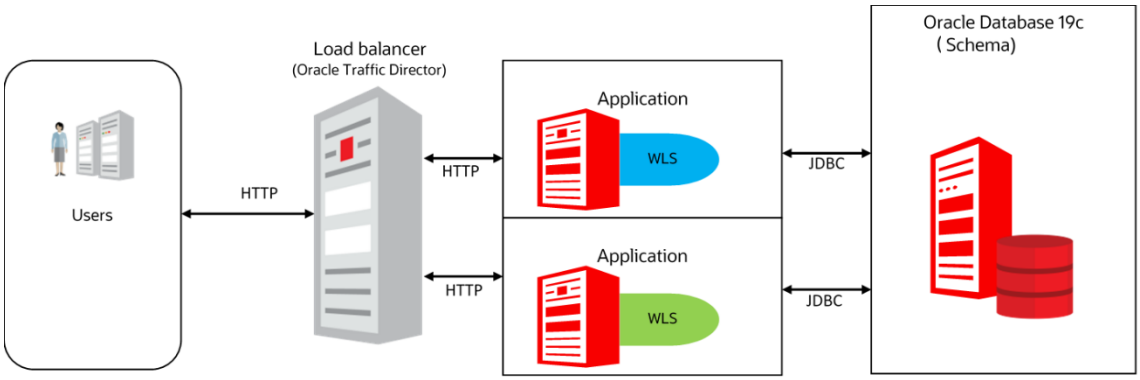
At the end of the Zero downtime Database Setup process, Run **`ZDTExitRun.bat`** in Windows (**`ZDTExitRun.sh`** for Linux).

This will ensure that the Patch Set Edition (as maintained by the property PATCHSET_EDITION) dropped.

Run **`ZDTStageUpdateRun.bat`** in Windows (**`ZDTStageUpdateRun.sh`** for Linux) to move to process the next stage operation.

1.4 Connection routing to Domains using Oracle Traffic Director

In below representation <Domain 1> as denoted as Green and <Domain 2> as Blue.



The Blue-Green deployment process uses two identical environments-Blue and Green. Only one environment is active at a time, serving all the traffic with the load balancer and the other environment is in the standby mode.

Example, let us consider that Blue is in standby and Green is active. When the updates are completed in the Blue environment, you can use the load balancer to switch the traffic to the Blue environment.

Once the Traffic is diverted and directed to the Blue environment using the Load balancer. Health checks are performed for all the components of the currently active Blue environment with traffic.

1.5 Operational recommendations on Other Application Components

This section briefs the recommendations on other application components.

- For Zero Downtime patch set Deployment following operational steps / setup recommended,
  - Standalone Scheduler Application is recommended.
  - As part of Application Management sections 1.3.7 Application Management and 1.3.11 Application Management,

- Scheduler jobs to be paused or stopped as a pre requisite before diverting the transactions traffic from one Domain to another using Oracle Traffic Director.
- Scheduler jobs has to be started back once the transaction traffic diverted to the specific domain.

1.6 Operational Issues and Troubleshooting

This section briefs on the common issues and its troubleshooting methods.

1. If there are objects with version number other than 1 and While enabling editions for the User <Schema name> in section 1.2 Pre-Requisite will result with the below error
   "ERROR at line 1:
   ORA-38820: user has evolved object type "

   Solution:
   Below query will list the objects with version number other than one.

   Select type_name,owner, version# from dba_type_versions where owner='&SCHEMA_NAME' and VERSION# !='1';

   Below query's result to be executed in SQL command prompt to reset the version to one.

   Select 'ALTER TYPE ' ||TYPE_NAME|| ' RESET;' FROM dba_type_versions where owner='&SCHEMA_NAME' AND VERSION# !='1';

2. Patch set edition will not be dropped in section 1.3.12 Drop Patch Set Edition, if there are active connections to the schema pointing to Patch set Edition.

   "Exception in dropping edition java.sql.SQLException: ORA-38805: edition is in use"

   Clear such sessions and section 1.3.12 Drop Patch Set Edition to process again to get the Patch set Edition dropped

   Below query would help to list all editions in the Schema. At the end of process 1.3.12 Drop Patch Set Edition, only Base Edition should present.

   *Select * FROM all_editions*

Installer Zero Downtime Database Setup and Operational Guide

[May] [2022]

Version 14.6.0.0.0

Oracle Financial Services Software Limited

Oracle Park

Off Western Express Highway

Goregaon (East)

Mumbai, Maharashtra 400 063

India

Worldwide Inquiries:

Phone: +91 22 6718 3000

Fax: +91 22 6718 3001

www.oracle.com/financialservices/

Copyright © [2021] [2022] Oracle and/or its affiliates. All rights reserved.

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

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 failsafe, 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.

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 de-compilation 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.

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.