

# Transitioning from Oracle Directory Server Enterprise Edition to Oracle Unified Directory

## Co-existence through Replication Gateway

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## 1. Executive Summary

Transitioning to Oracle Unified Directory (OUD) replaces your existing Oracle Directory Server Enterprise Edition (ODSEE) installation with OUD's all-in-one storage, proxy, sync, and virtual capabilities. Choose from several tested and supported ODSEE to OUD transition paths, such as DIP Synchronization, Replication Gateway, and Export/Import, based on your deployment and data needs. This document outlines the transition paths, including an option for ODSEE and OUD coexistence in a replicated environment.

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*“Oracle Unified Directory scales from Enterprise use to the largest Carrier-Grade Deployments.”*

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## 2. Transition Strategies

There are three high-level strategies to transition from Oracle Directory Server Enterprise Edition (ODSEE) topology to Oracle Unified Directory (OUD). The transition strategy depends upon the size of the deployment, criticality of the dependent client applications, data consistency, data adaptation, structural change in data, high availability, and so on. The three transition strategies are as follows:

- » **Direct Transition Strategy** – Ideal for small deployments and if clients/applications are ready to take outages/interruptions for a while.  
This strategy uses export and import methods. The user data and configuration are exported from ODSEE, adapted (if required), and imported into OUD respectively.
- » **Coexistence Using Oracle Directory Integration Platform (DIP)** – Ideal for medium and large deployments and if clients/applications are expecting a completely new data structure compared to the existing one.  
This strategy synchronizes ODSEE and OUD topologies using the changelogs configured on ODSEE and OUD to detect changes and then replay them back and forth.
- » **Coexistence Via Replication Gateway** – Ideal for most deployments. If high data consistency, high performance and high availability is required, then Oracle highly recommends this transition strategy. This strategy keeps ODSEE and OUD replicated using Replication Gateway between them without interrupting the service. By default, the Replication Gateway provides bi-directional replication capabilities with ODSEE, so that transition to OUD can happen smoothly, over time. However, Replication Gateway can also run in one-way mode, which allows changes from ODSEE to replicate to OUD only, so that the dependent applications are tested with OUD without affecting the ODSEE topology.

**This white paper describes how to migrate from an existing ODSEE deployment to OUD using “Coexistence via Replication Gateway” strategy.**

### 3. Flowchart

The following diagram illustrates the process for transitioning to OUD.

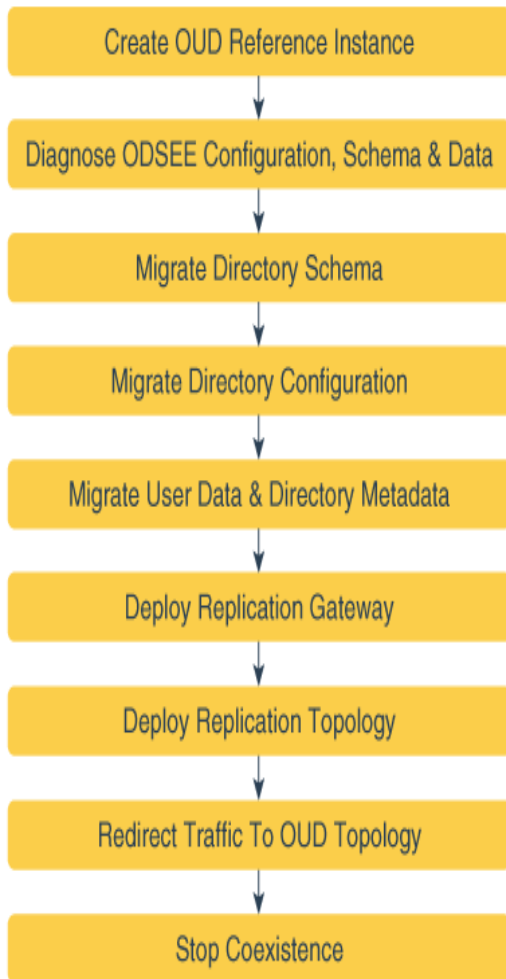


Figure 1. ODSEE to OUD Transition Using Coexistence via Replication Gateway Flowchart

### 4. Infrastructure and Data

Cohabitation of OUD with ODSEE requires in-depth analysis of the existing ODSEE infrastructure, replication agreements, and the underlying data. It helps in deciding the future OUD topology and its infrastructure.

#### 4.1 ODSEE Infrastructure

Figure 2 illustrates the existing ODSEE topology and it includes: sixteen master ODSEE instances and sixteen slave/consumer instances distributed equally across four data centers. Four master instances

(one from each data center) are logically grouped to form a set. Hence, four sets in total. Each master instance is connected to a slave/consumer instance, which is read-only in nature.

All the instances of a set have the same suffix, base-DN. For this scenario, consider the following:

- First set namespace is `dc=example,dc=com`.
- Second set namespace is `ou=Products,dc=example,dc=com`.
- Third set namespace is `ou=Applications,dc=example,dc=com`.
- Fourth set namespace is two suffixes `c=us` and `o=configuration`.

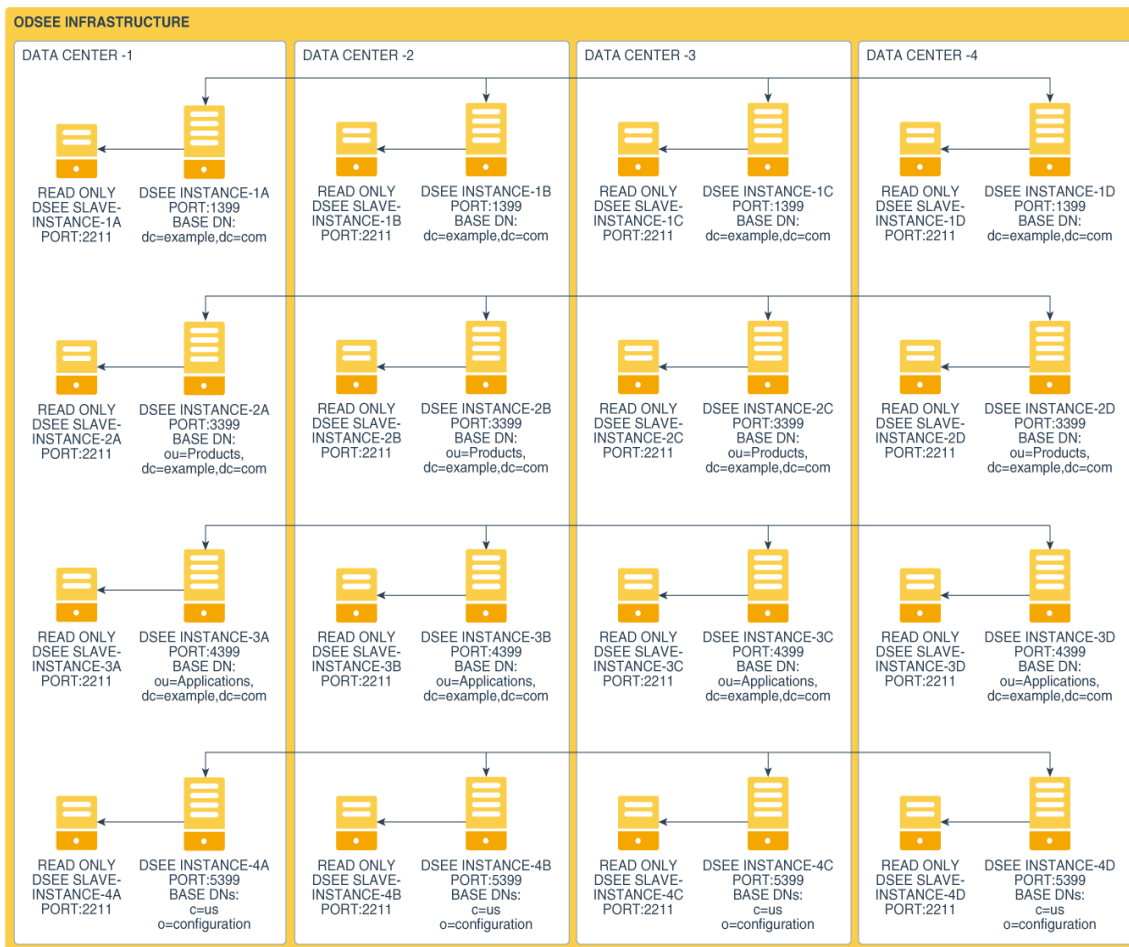


Figure 2. ODSEE Infrastructure Topology

In each set, master instance is enabled with four outgoing (three master instances and one slave/consumer instance) and three incoming (three master instances) replication agreements, in turn forming a multi-master replication topology.

For the first three sets, different suffixes for each set are configured for replication for each instance of the set but for the last set two suffixes are configured for replication for each instance.

Figure 3 illustrates the replication agreement for a set of four instances of master and slave/consumer ODSEE deployed across data centers in a multi-master replication topology. All the master instances have the same suffix and each master has four outgoing and three incoming replication agreements.

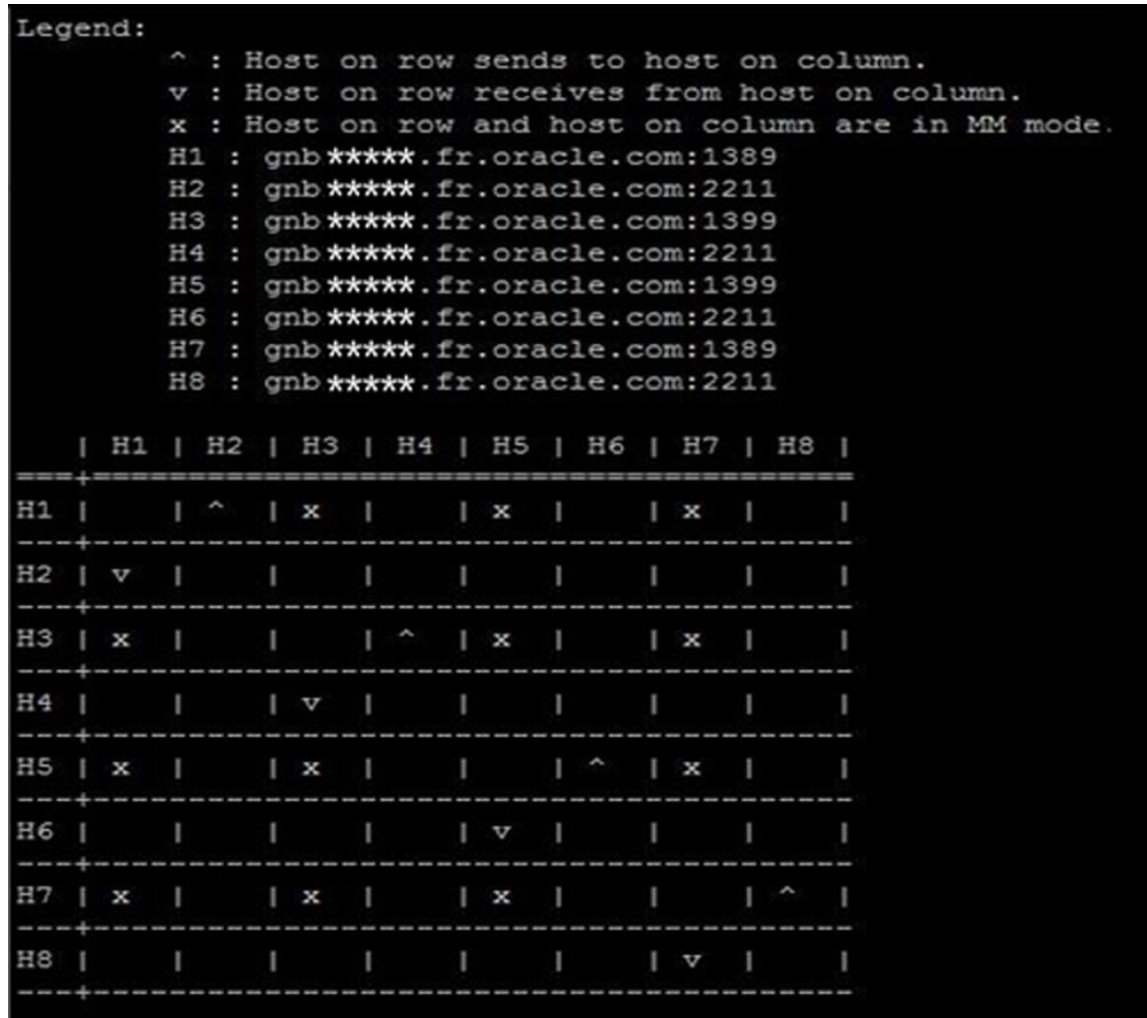


Figure 3. ODSEE Replication Agreement for a Set

**Note:** In a typical ODSEE master/slave topology a master is connected to one or more masters and multiple slaves. You can perform read and write operations on the masters and the changes in the masters are replicated to the slaves. You can perform read operation on the slave as well. Figure 4 shows a sample master/slave topology.



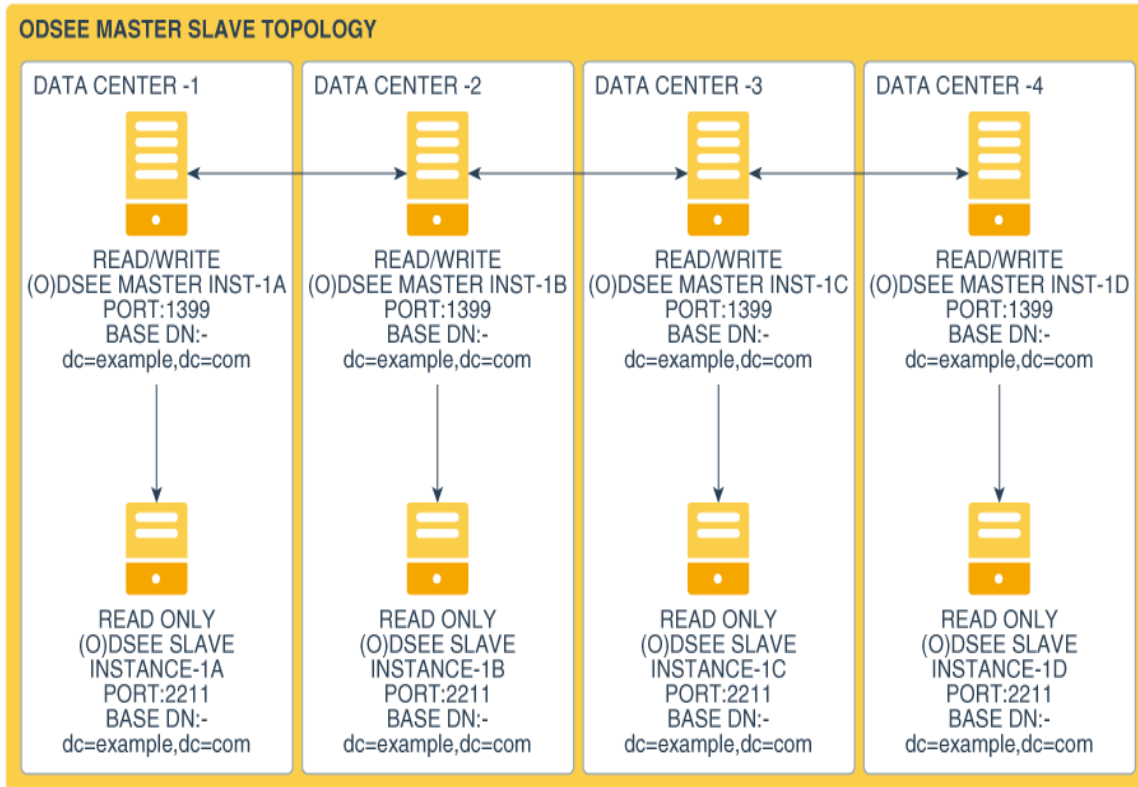


Figure 4. (O)DSEE Master/Slave Topology

## 5. Migration to OUD

For each set of ODSEE, OUD instance, and replication gateway, perform the standard steps described here for migration. Once all the applications are redirected to OUD and validated, the replication gateway(s) and ODSEE instances are de-provisioned.

### 5.1 Understanding Infrastructure for Coexistence

For each master ODSEE instance, you must create an empty (without suffix) OUD instance that is connected via replication gateway as illustrated in Figure 5. Each set now has four master ODSEE instances, four OUD instances, and four replication gateways. Replication is enabled amongst OUD instances of a set as well.

### 5.2 Diagnose ODSEE Configuration and Schema Using ds2oud Utility

OUD ships with the `ds2oud` utility that allows you to diagnose ODSEE configuration, schema, and existing user data. Several inconsistencies diagnosed by `ds2oud` are migrated automatically. However, rest require manual interventions.

Run the following command for diagnosis:

```
$ORACLE_HOME/asinst_1/OUd/bin/ds2oud --diagnose -h localhost -p 4399 -D
"cn=Directory Manager" -j /scratch/password.txt
```

In this scenario, custom schema and attributes are used for the first set of ODSEE instances; therefore `ds2oud` diagnosis prompts you to take an action as depicted in Figure 5 before migration.

```
Do you want to check if the default schema has been extended (yes / no) [yes]: yes
** Schema

The schema was extended regarding the original delivery. The following schema
should be added to the new OUD server
attributeTypes : ( 2.25.128424792425578037463837247958458780603.6 NAME
'customEmployeeName' EQUALITY caseIgnoreMatch SUBSTR
caseIgnoreSubstringsMatch SYNTAX 1.3.6.1.4.1.1466.115.121.1.15 X-ORIGIN 'user
defined' )
```

Figure 5. Custom Schema Diagnosis by `ds2oud`

### 5.3 Diagnose ODSEE data

The `ds2oud` utility also checks the data for compliance. In the present scenario, ODSEE data is compliant with OUD schema, therefore the data is validated successfully.

### 5.4 Migrate ODSEE Schema

The `ds2oud` tool adds ODSEE schema extensions automatically to the OUD reference instance schema.

Run the following command to migrate the schema:

```
$ORACLE_HOME/asinst_1/OUd/bin/ds2oud --migrateUserSchema -h <hostname> -
p 1399 -D "cn=Directory Manager" -j /scratch/password.txt
```

The preceding command adds custom schema details in `$OUD_INSTANCE_HOME/OUd/config/schema/99-users.ldif` as depicted in Figure 6.

```

dn: cn=schema
objectClass: top
objectClass: ldapSubentry
objectClass: subschema
cn: schema

attributeTypes: ( 2.25.128424792425578037463837247958458780603.7 NAME
'customEmployeeCityName' EQUALITY caseIgnoreMatch SUBSTR
caseIgnoreSubstringMatch SYNTAX 1.3.6.1.4.1.1466.115.121.1.15(1024) X-ORIGIN
' user defined' )

attributeTypes: ( 2.25.128424792425578037463837247958458780603.6 NAME
'customEmployeeName' EQUALITY caseIgnoreMatch SUBSTR
caseIgnoreSubstringMatch SYNTAX 1.3.6.1.4.1.1466.115.121.1.15 X-ORIGIN 'user
defined' )

attributeTypes: ( 2.25.128424792425578037463837247958458780603.8 NAME
'customEmployeeObjectClass' DESC 'customEmployeeObjectClass' SUP TOP
STRUCTURAL MAY ( customEmployeeName $ customEmployeeCityName ) X-
ORIGIN 'user defined' )

modifierName: cn=directory manager
modifyTimestamp: 20171122093905Z
ds-sync-generation-id: 8408

```

Figure 6. User-defined Schema (99-users.ldif)

## 5.5 Migrate ODSEE Configuration

The `ds2oud` tool allows you to migrate the server configuration as well. When used in conjunction with the `-batchFile` option it generates a batch file that contains a list of configuration changes to apply to the OUD directory server. You can use this batch file to set up other OUD servers.

Run the following command to migrate the ODSEE configuration:

```

$OUD_INSTANCE_HOME/OUd/bin/ds2oud --migrateConfiguration --odseeBindDN
"cn=Directory Manager" --odseePort 4399 --odseeBindPasswordFile
/scratch/password.txt --oudBindDN "cn=Directory Manager" -
oudBindPasswordFile /scratch/password.txt --oudPort 14399 --oudAdminPort
14444 --no-prompt --batchFile /scratch/config_batch

```

Figure 7 shows a generated batch file content:

```
create-workflow-element --set base-dn:dc=example, dc=com --set enabled:true --type db-local-backend --element-name userRoot -n create-workflow --set base-dn:dc=example,dc=com --set enabled:true --set workflow-element:userRoot --workflow-name examplecom_workflow -n set-network-group-prop --group-name network-group --add workflow:example_workflow -n set-global-configuration-prop --set disabled-privilege:proxied-auth -n set-password-policy-prop --policy-name 'Default Password policy' --set password-attribute:userPassword --set default-password-storage-scheme: 'Salted SHA-1' --set allow-user-password-changes:true --set password-change-requires-current-password:false --set skip-validation-for-administrators:false --set password-history-count:0 --set min-password-age:0s --set force-change-on-reset:false --set max-password-age:0s - --set grace-login-count:0 --set lockout-failure-count:3 --set lockout-failure-expiration-interval:600s -n
```

Figure 7. Configuration Batch File

Apply the generated configuration batch file to OUD instance as follows:

```
$OUD_INSTANCE_HOME /OUD/bin/dsconfig -h localhost -p 14444 -D
cn="Directory Manager" -j /scratch/password.txt -F /scratch/config_batch
-X -n
```

Follow the [Understanding \(O\)DSEE Directory Server, Configuration, Schema and Data using ds2ud](#) for more information.

## 5.6 Upgrade ODSEE Password Policy

In a replicated topology with global password policy and account lockout across the entire topology, the ODSEE servers that communicate directly with the replication gateway must run with the password policy in DS6-mode and the user entries must not contain data related to previous password policy mode.

**Note:** This is not mandatory if you do not need global password policy and when OUD and ODSEE have their own password policy management.

It is essential to switch to DS6-mode before exporting data from ODSEE. To switch to DS6-mode, you must first switch to the intermediate DS6-migration mode.

Run the following commands for password policy upgrade:

```
dsconf pwd-compat -p <port> to-DS6-migration-mode
dsconf pwd-compat -p <port> to-DS6-mode.
```

## 5.7 Migrate User Data

You must export the user data to an LDIF file import it into OUD. For this transition strategy, you need the replication metadata that is adapted to OUD.

Some ODSEE entries may contain the resource limit attributes, for instance nsSizeLimit, nsTimeLimit, nsLookThroughLimit, and nsIdleTimeout. The corresponding attributes on OUD are ds-rlim-size-limit, ds-rlim-time-limit, ds-rlim-lookthrough-limit, and ds-rlim-idle-time-limit. Account

based resource limits are not taken into account by `ds2oud` and you must migrate these manually. See [Custom Resource Limits](#) for more information.

Run the following command to export user data:

```
$ODSEE_HOME/dsee7/bin/dsconf export -f opens-export --decrypt-attr -h localhost -p 4399 dc=example,dc=com /scratch/transition_data/dsee3_data/user_data.ldif
```

The option `-f opens-export` was introduced in 11gR1 release and can only be used with this or later release. The `opens-export` option adapts the replicated metadata to OUD format.

## 5.8 Initialize Replication Between ODSEE and OUD

Each OUD instance in a replication gateway topology is configured between ODSEE and OUD instance as illustrated in Figure 5. The data exported in Step 7 is imported into OUD.

Run the following commands to import data into OUD:

```
$OUD_INSTANCE_HOME/OUD/bin/dsreplication pre-external-initialization --hostname localhost --port 14444 --adminUID admin --adminPasswordFile /scratch/password.txt --baseDN dc=example,dc=com --trustAll --no-prompt -noPropertiesFile
```

```
$OUD_INSTANCE_HOME /OUD/bin/import-ldif --hostname localhost --port 14444 --bindDN cn=Directory\ Manager --bindPasswordFile /scratch/password.txt --includeBranch dc=example,dc=com -ldifFile /scratch/transition_data/dsee3_data/user_decrypted.ldif --clearBackend -trustAll -noPropertiesFile
```

```
$OUD_INSTANCE_HOME /OUD/bin/dsreplication post-external-initialization -hostname localhost --port 14444 --adminUID admin --adminPasswordFile /scratch/password.txt --baseDN dc=example,dc=com --trustAll --no-prompt -noPropertiesFile
```

You must note the following:

- `pre-external-initialization` option prepares the replication topology for initialization.
- `import-ldif` option imports the ODSEE data into OUD.
- `post-external-initialization` option enables replication.

## 5.9 Enable Replication Amongst OUD Instances

Run the following command to enable replication amongst all the OUD instances in a set:

```
$OUD_INSTANCE_HOME/OUD/bin/dsreplication enable --host1 localhost --port1 14444 --bindDN1 "cn=Directory Manager" --bindPasswordFile1 /scratch/password.txt --replicationPort1 38989 --host2 gnb10017.fr.oracle.com --port2 14444 --bindDN2 "cn=Directory Manager" --bindPasswordFile2 /scratch/password.txt --replicationPort2 38989 --
```

```
adminUID admin --adminPasswordFile /scratch/password.txt --baseDN
"dc=example,dc=com" -X -n
```

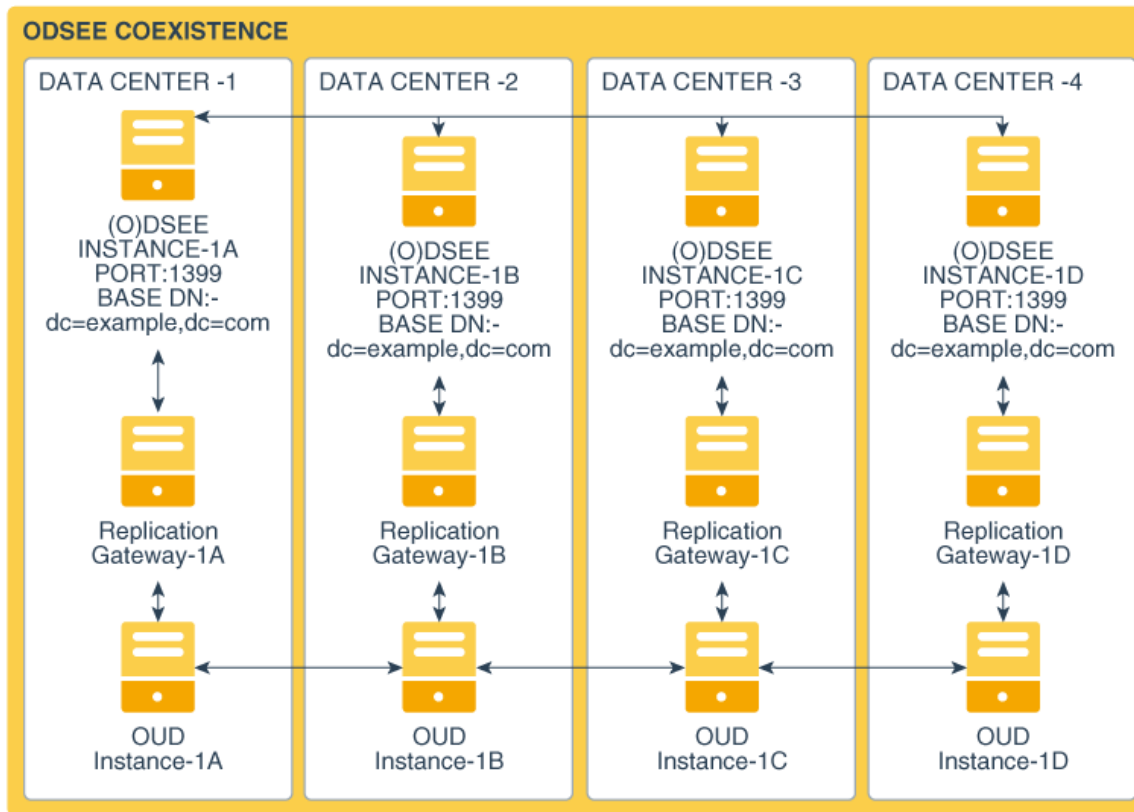


Figure 8. Coexistence Infrastructure and Topology for a Set

Figure 9 depicts the replication status after the OUD set up and replication gateway infrastructure for a set of ODSEE instances. It distinctly portrays that data is synced to OUD instances and no data is pending for replication.

```

dc=example,dc=com - Replication Enabled
=====
Server      : Entries : M.C. [1] : A.O.M.C. [2] : Port [3] : Status [4] : Conflicts [5]
-----
gnb****:14444 : 2518    : 0        : 0        : 38989    : Normal    : 0
gnb****:14444 : 2518    : 0        : 0        : 38989    : Normal    : 0
gnb****:14444 : 2518    : 0        : 0        : 38989    : Normal    : 0
gnb****:14444 : 2518    : 0        : 0        : 38989    : Normal    : 0

Replication Gateway : DSEE Server      : M.C. [1] : A.O.M.C. [2] : Status [4]
-----
gnb****:14555      : gnb****:4399    : 0        : 0        : Normal
gnb****:14555      : gnb****:4399    : 0        : 0        : Normal
gnb****:14555      : gnb****:4399    : 0        : 0        : Normal
gnb****:14555      : gnb****:4399    : 0        : 0        : Normal

[1] The number of changes that are still missing on this element (and that have been applied to at least one other server).
[2] Age of oldest missing change: the age (in seconds) of the oldest change that has not yet arrived on this element.
[3] The replication port used to communicate between the servers whose contents are being replicated.
[4] The status of the replication on this element.
[5] The number of currently unresolved replication conflicts.

```

Figure 9. Replication Status for a Set

**Note:** By default, the replication gateway provides bi-directional replication capabilities with ODSEE. However, it is possible to configure it in one direction only, such that the changes from ODSEE are replicated to OUD only. This can be achieved by using – **doNotSendUpdatesToLegacyServer** flag while setting up the replication gateway. If this option is used, the changes made directly in OUD server are not synced with ODSEE server’s replication topology.

In a typical coexistence topology, one replication gateway per suffix is sufficient. However, to provide high availability and to avoid failures in replication gateway you can use two replication gateways per suffix.

## 6. Redirect Traffic to OUD

Applications dependent on ODSEE topology are redirected towards OUD topology in a progressive manner.

## 7. Stop Coexistence

When all the applications dependent on ODSEE topology are redirected to OUD topology and tested successfully, then the replication gateways and ODSEE instances are stopped and deprovisioned.

Run the following command to stop ODSEE instance:

```
$ODSEE_HOME/dsee7/bin/dsadm stop /scratch/dsee-instances/dsee
```

Run the following command to stop replication gateway:

```
$ORACLE_HOME/asinst_replgw_1/OUD/bin/stop-ds
```



Figure 10 depicts the topology after stopping coexistence.

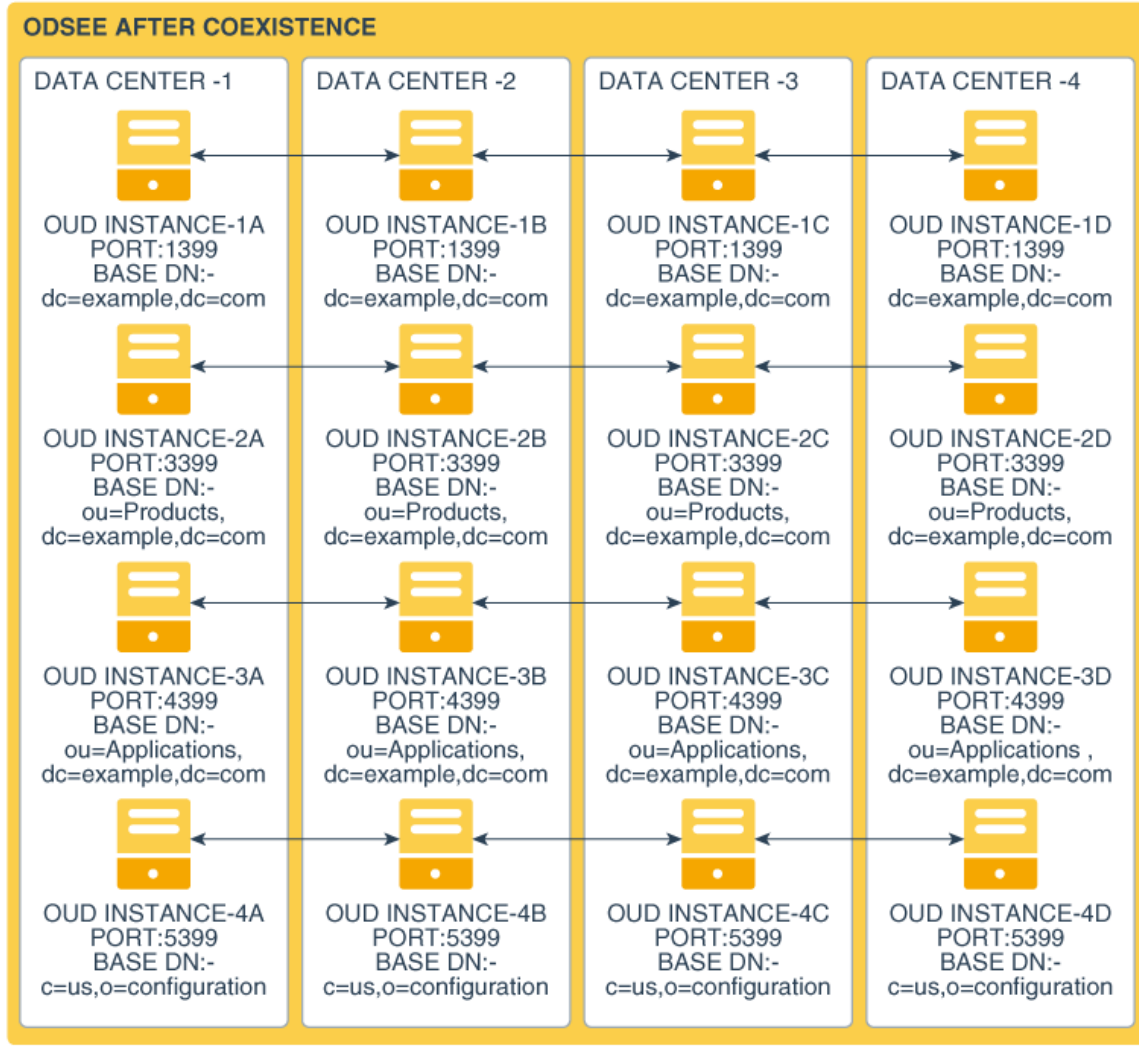


Figure 10. Topology after Stopping Coexistence

## 8. Conclusion

Coexistence of ODSEE and OUD using replication gateway allows real-time migration without any interruption in the service. It also allows transition to OUD over time while validating the transition strategy in parallel.

The migration tools shipped with OUD solve and automate the majority of transition issues, requiring minimal manual intervention in most transitions. To continue the transition, access the [OUD Transition Guide](#) for complete information and support.





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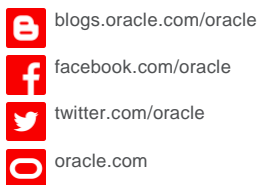
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