Oracle Unified Directory. Lessons learnt.

Is it worth moving from OID?

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About me

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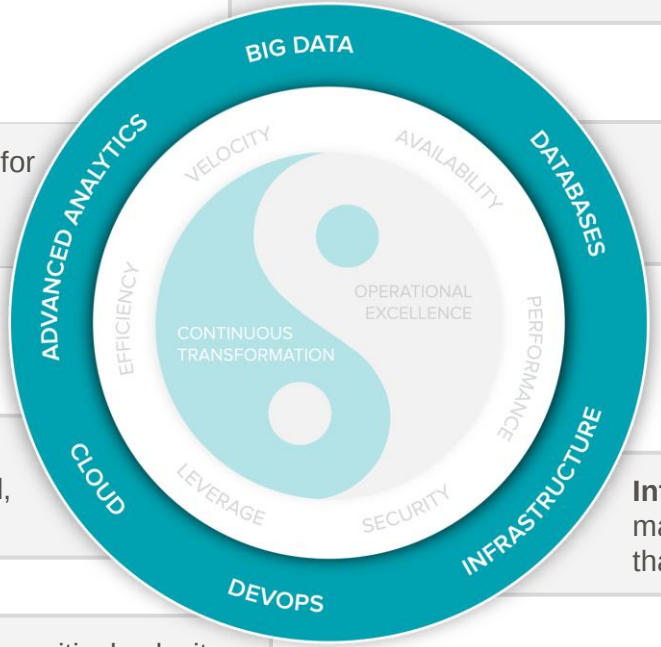

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Agenda

- What is Oracle Unified Directory?
- Quick overview of integration process with Oracle E-Business Suite R12.2.5.
- Issues faced while implementing OUD.
- Features that deserve a note.
- Performance tuning considerations.

What is Oracle Unified Directory?

What is Oracle Unified Directory?

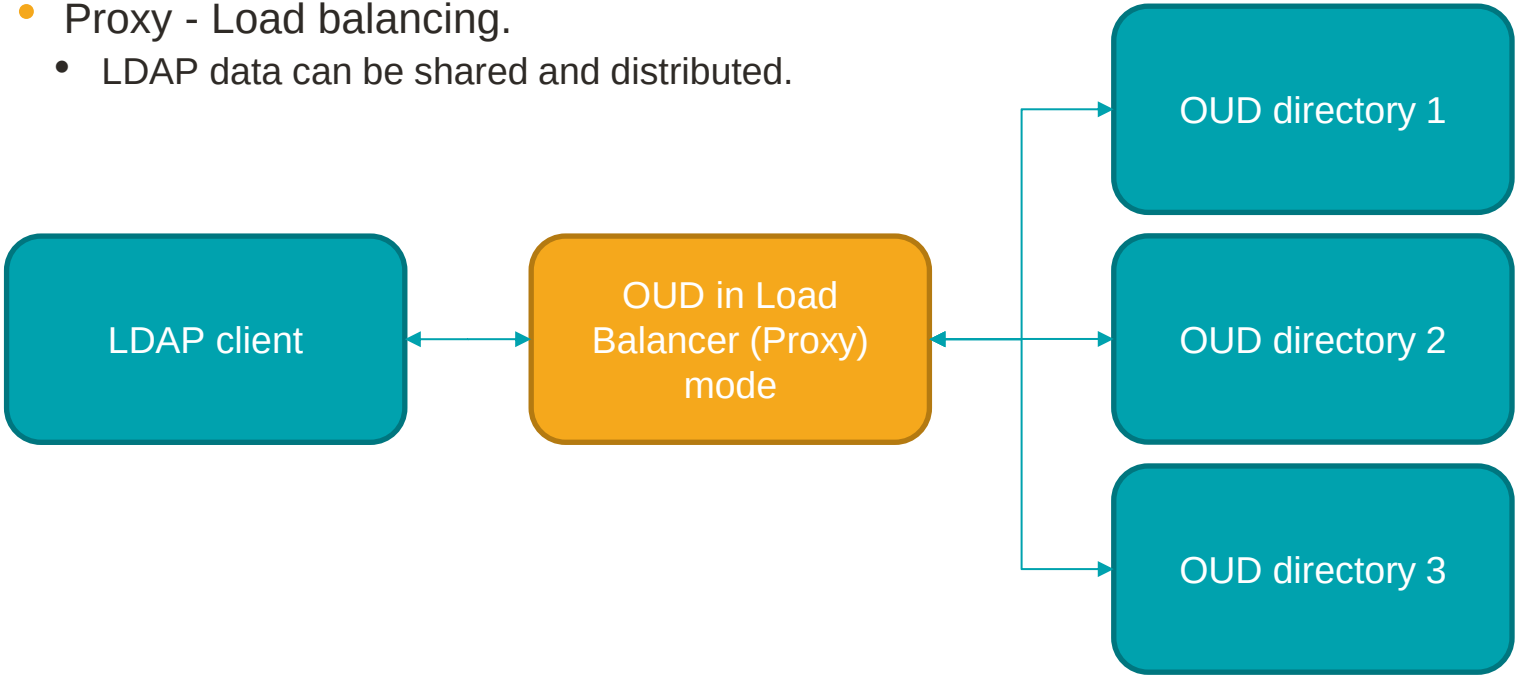
- LDAP v3 compliant directory. Ex Sun iPlanet Directory.
- Completely runs on Java.
- New generation of Oracle Directory Services since 11gR2.
- Announced product replacement of Oracle Internet Directory.

- Features:
  - Storage
  - Proxy and Load Balancing
  - Virtualization
  - Synchronization and Replication

- Data is stored in JavaDB (Oracle Berkeley DB Java Edition).
- Licensed under Oracle Directory Services Plus license.
- Supports known features like Enterprise User Security and TNS store.

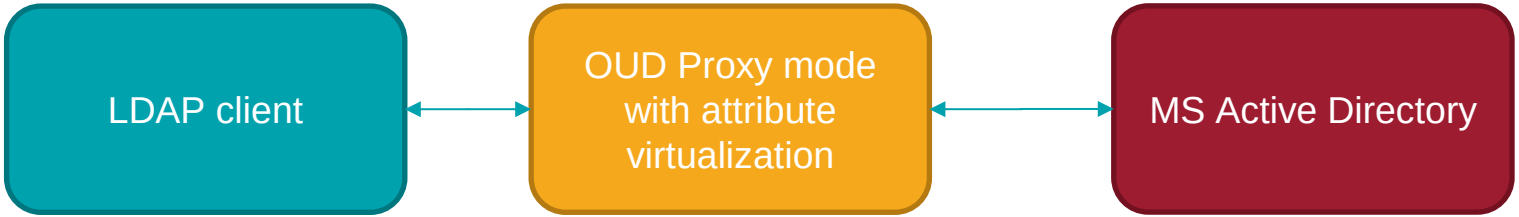
What is Oracle Unified Directory?

- Proxy - Load balancing.
  - LDAP data can be shared and distributed.



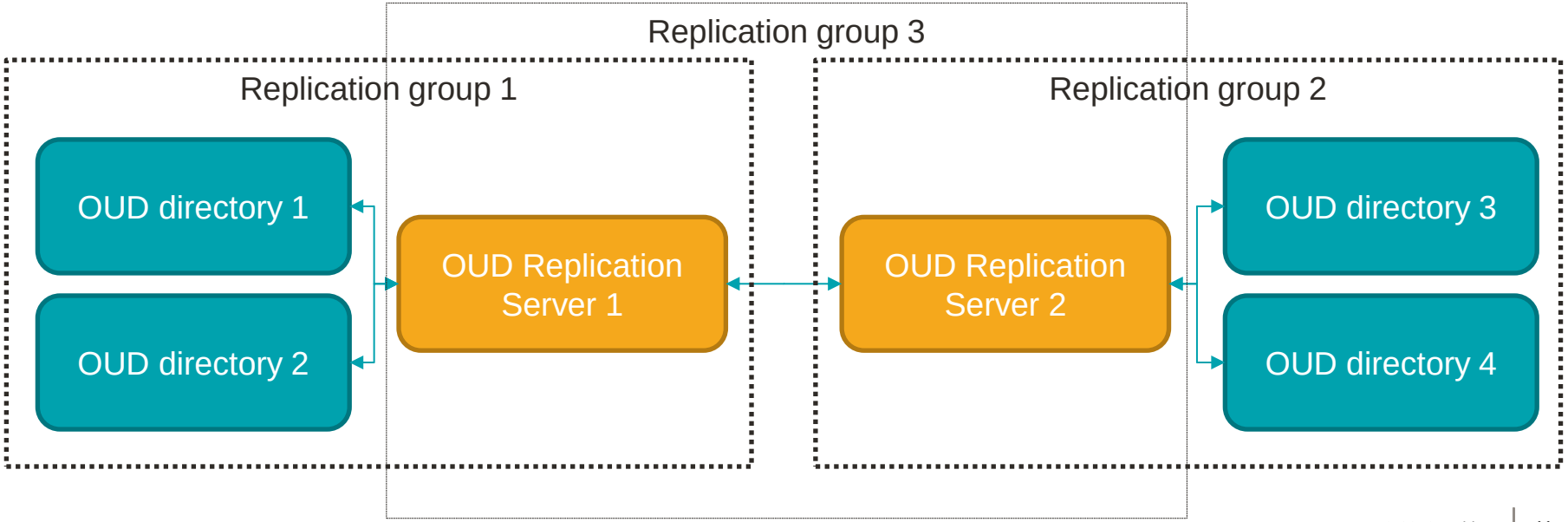
What is Oracle Unified Directory?

- Proxy – mapping of external directories, like Active Directory.



What is Oracle Unified Directory?

- Replication and High Availability.
  - Same instance can share multiple roles like Storage and be a replication server.



Oracle Internet Directory comparison

- **Oracle Unified Directory**
  - Runtime
    - Java
  - Storage
    - JavaDB, local disk storage
  - Clustering concept
    - Multiple instances within replication group
  - Proxy / Virtualization
    - Native support
  - Tools
    - No ldapadd anymore, instead there is "ldapmodify --defaultAdd"
  - Backups
    - No PITR, full or incremental snapshots initiated by the backup utility.

- **Oracle Internet Directory**
  - Runtime
    - C
  - Storage
    - Oracle Database as metadata repository
  - Clustering concept
    - Multiple instances connected to one common Oracle database
  - Proxy / Virtualization
    - Not supported
    - Requires Oracle Virtual Directory
  - Tools
    - Standard set of tools (ldapadd, ldapmodify, ldapdelete, etc)
  - Backups
    - Full PITR supported by Oracle Database.

Oracle E-Business Suite integration overview

Software requirements

- E-Business Suite R12.2.5+
  - FMW 11.1.1.9
  - R12.AD.C.7+
  - Patches 22098300, 21229697, and 24008856
- Oracle Unified Directory 11.1.2.3
  - Being deployed into a separate Fusion Middleware Home.
  - Oracle Directory Services Manager (ODSM) 11.1.2.3
    - Weblogic Server 10.3.6
    - Oracle ADF 11.1.1.9
- Repository Creation Utility 11.1.1.9
- Oracle Directory Integration Platform 11.1.1.9
- Oracle Access Manager 11.1.2.3

Documentation reference

- Integrating Oracle E-Business Suite Release 12.2 with Oracle Unified Directory 11gR2 (Doc ID 2003483.1)
- Integrating Oracle E-Business Suite Release 12.2 with Oracle Access Manager 11gR2 (11.1.2) using Oracle E-Business Suite AccessGate (Doc ID 1576425.1)
- Installation Guide for Oracle Identity Management
  - https://docs.oracle.com/middleware/11119/core/INOIM/under_install.htm#INOIM1024

Configure OUD

- Create the OUD instance.

```
$ echo "welcome1" > /tmp/oud_pwd
$ ./oud-setup --cli \
--hostName myoud.domain.com --ldapPort 1389 --ldapsPort 1636 \
--adminConnectorPort 4461 \
--rootUserDN "cn=directory manager" --rootUserPasswordFile /tmp/oud_pwd \
--generateSelfSignedCertificate --enableStartTLS \
--baseDN dc=example,dc=com \
--integration generic \
--serverTuning 512m --offlineToolsTuning 512m \
--no-prompt
```

  - “generic” integration option creates the necessary naming context, required for EBS integration.

Configure Naming Context

- Modify the realm default user and group base DN references.
  - Very important as this will bring issues at later stages, if not executed.
  - Reference:
    - https://docs.oracle.com/cd/E52734_01/oud/OUDAG/eus.htm#BABGJFEE

  - Locate the LDIF template and edit the naming context you configured.
  - Execute it after correction.

```
$ ldapmodify -h localhost -p 1389 -D "cn=directory manager" -j pwd-file -f
$ORACLE_INSTANCE/config/EUS/modifyRealm.ldif
```

Configure DIP with OUD

- Enable the External Change Log

```
$ dsreplication enable-changelog -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -r 8989 -b
dc=example,dc=com --trustAll --no-prompt
$ dsreplication enable-changelog -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -r 8989 -b
cn=oraclecontext --trustAll --no-prompt
```

- Enforce Unique UID Attribute

```
$ dsconfig -p 4461 -h localhost -D "cn=directory manager" -j /tmp/oud_pwd -n --trustAll set-plugin-prop --
plugin-name "UID Unique Attribute" --set enabled:true
$ dsconfig -p 4461 -h localhost -D "cn=directory manager" -j /tmp/oud_pwd -n --trustAll set-plugin-prop --
plugin-name "UID Unique Attribute" --set base-dn:ou=people,dc=example,dc=com
```

- Configure DIP for OUD

```
$ $ORACLE_HOME/bin/dipConfigurator setup -wlshost localhost -wlsport 7001 -wlsuser weblogic -ldaphost
localhost -ldapport 1389 -ldapuser "cn=directory manager" -isldapssl false -ldapadminport 4461
```

Registration with Oracle EBS

- Start EBS Online Patching Cycle (adop phase=prepare)
- Run all the actions against patch filesystem
  - Register OUD:

```
$FND_TOP/bin/txkrun.pl -script=SetSSOReg -registerldap=yes -ldapadminuser="cn=directory manager"
```

  - Update EBS Profile Options
  - Autoconfig
- Cutover

- Side note:
  - You can do all this in hot mode directly on run file system.
  - Multi-node: This isn't required to be executed on all nodes as stated in the documentation.

Registration with Oracle EBS

- Start EBS Online Patching Cycle (adop phase=prepare)
- Run all the actions against patch filesystem
  - Install WebGate
    - Recommendation: Apply WebGate latest BP patch
  - Deploy AccessGate

```
perl $AD_TOP/patch/115/bin/adProvisionEBS.pl ebs-create-oaea_resources -deployApps=accessgate
```

  - Register OAM

```
$FND_TOP/bin/txkrun.pl -script=SetOAMReg -registeroam=yes -ldapProvider=OUD
```

  - Autoconfig
- Cutover

Registration with Oracle EBS

- Side note:
  - You can do all this in hot mode directly on run file system.
  - But beware of Bug 19817016 **!!!**
    - oaea_server1 (AccessGate) port conflict between run and patch during the fs_clone.

  - Solution:
    - Stop oaea_server1.
    - Run fs_clone.
    - Restart oaea_server1.
    - Next fs_clone executions will not have this conflict anymore.

Issues faced while implementing OUD

Issue #1: Configure Naming Context

- $ORACLE_INSTANCE/config/EUS/modifyRealm.ldif

```
$ ls -l $ORACLE_INSTANCE/config/EUS/modifyRealm.ldif
ls: cannot access /u01/app/oracle/product/fmw11g_oud/instances/OUD_instance/config/EUS/modifyRealm.ldif: No
such file or directory
$ ls -l $ORACLE_HOME/config/EUS/modifyRealm.ldif
-rw-r-----. 1 oracle oinstall 1608 Nov 15  2013
/u01/app/oracle/product/fmw11g_oud/Oracle_OUD1/config/EUS/modifyRealm.ldif
$
```

- Documentation bug.
  - Is deployed only with “--integration EUS”, but still available under Oracle Home

Issue #1: Configure Naming Context

- What does it fix?

```
# cn=Common,cn=Products,cn=OracleContext
orclSubscriberSearchBase: dc=com
orclSubscriberNickNameAttribute: dc
orclDefaultSubscriber: dc=example,dc=com

# cn=Common,cn=Products,cn=OracleContext,dc=example,dc=com
orclCommonUserSearchBase: ou=people,dc=example,dc=com
orclCommonGroupSearchBase: ou=groups,dc=example,dc=com
```

- Side note: Handled automatically since 11.1.2.3.161018 BP

Issue #2: No Subscriber found

- Let’s query the naming context we created.

```
$ ldapsearch -h localhost -p 1389 -D "cn=directory manager" -j /tmp/oud_pwd -b "dc=example,dc=com" -s one
"(objectclass=*)" "dn"
dn: cn=OracleContext,dc=example,dc=com

$
```

- Where is my naming context base entry?

```
$ ldapsearch -h localhost -p 1389 -D "cn=directory manager" -j /tmp/oud_pwd -b "dc=example,dc=com" -s base
"(objectclass=*)" "dn"
SEARCH operation failed
Result Code:  32 (No Such Entry)
Additional Information:  The entry dc=example,dc=com specified as the search base does not exist in the
Directory Server
$
```

Issue #2: No Subscriber found

- Fix: Manually create the Naming Context base DN as subscriber.

```
$ ldapmodify -h localhost -p 1389 -D "cn=directory manager" -j /tmp/oud_pwd –defaultAdd

dn: dc=example,dc=com
objectClass: top
objectClass: domain
objectclass: orclSubscriber
dc: example
orclversion: 90600
orclsubscriberfullname: example
aci: (targetattr != "userpassword || authpassword || aci") (version 3.0; acl "Anonymous read access to
dc=example, dc=com"; allow (read,search,compare) userdn = "ldap:///anyone";)
```

- Optional: Add read-only ACI permission for non-super-user access (except password attributes).

Issue #3: User and Group Base DNs

- Let’s query the naming context again.

```
$ ldapsearch -h localhost -p 1389 -D "cn=directory manager" -j /tmp/oud_pwd -b "dc=example,dc=com" -s one
"(objectclass=*)" "dn"
dn: cn=OracleContext,dc=example,dc=com

$
```

- Where are my user and group base DNs?

Issue #3: User and Group Base DNs

- Fix: Manually create the base DN entries.

```
$ ldapmodify -h localhost -p 1389 -D "cn=directory manager" -j /tmp/oud_pwd –defaultAdd

dn: ou=people,dc=example,dc=com
ou: people
objectClass: top
objectClass: organizationalUnit

dn: ou=groups,dc=example,dc=com
ou: groups
objectClass: top
objectClass: organizationalUnit
```

Issue #4: Write permissions for DIP profiles

- Documentation states that we need to apply these ACIs:

```
dn: dc=example,dc=com
changetype: modify
add: aci
aci: (target=" ldap:///dc=example,dc=com" )(version 3.0; acl "Entry-level DIP permissions"; allow
(all,proxy) groupdn=" ldap:///cn=odisgroup,cn=DIPadmins,cn=Directory Integration
platform,cn=Products,cn=oraclecontext"; allow (all,proxy) groupdn="
ldap:///cn=dipadmingrp,cn=DIPadmins,cn=Directory Integration Platform,cn=Products,cn=oraclecontext";)
-
add: aci
aci: (targetattr="*")(version 3.0; acl "Attribute-level DIP permissions"; allow (all,proxy) groupdn="
ldap:///cn=odisgroup,cn=DIPadmins,cn=Directory Integration Platform,cn=Products,cn=oraclecontext"; allow
(all,proxy) groupdn=" ldap:///cn=dipadmingrp,cn=DIPadmins,cn=Directory Integration
Platform,cn=Products,cn=oraclecontext";)
```

- But DIP runtime still fails on writes.

Issue #4: Write permissions for DIP profiles

- Fix: Add few more ACI permissions.
- DIP profiles are actually running with “odipgroup” App DN members.

```
dn: dc=example,dc=com
changetype: modify
add: aci
aci: (target="ldap:///dc=example,dc=com" )(version 3.0; acl "Entry-level DIP permissions"; allow (all,proxy)
groupdn=" ldap:///cn=odipgroup,cn=DIPadmins,cn=Directory Integration
platform,cn=Products,cn=oraclecontext";)
-
add: aci
aci: (targetattr="*")(version 3.0; acl "Attribute-level DIP permissions"; allow (all,proxy) groupdn="
ldap:///cn=odipgroup,cn=DIPadmins,cn=Directory Integration Platform,cn=Products,cn=oraclecontext";)
```

Issue #5: OUD restrictions on unindexed search

- There are limits when OUD allows non-super-user to do unindexed searches.
- None of OID specific attributes are indexed by default.

- Example: search per “orcguid” attribute filter.

```
[27/Apr/2016:01:25:45 -0700] SEARCH RES conn=381168 op=514 msgID=515 result=50 message="You do not have
sufficient privileges to perform an unindexed search  Operation 'SEARCH' failed in participant 'user' for
entry 'ou=people,dc=example,dc=com'  Operation 'SEARCH' failed in participant 'user' for entry
'ou=people,dc=example,dc=com'" nentries=0 authzDN="orclodipagentname=AD_DIP_PROFILE,cn=subscriber
profile,cn=changelog subscriber,cn=directory integration platform,cn=products,cn=OracleContext" etime=0
```

Issue #5: OUD restrictions on unindexed search

- Fix: Give a permission to your required non-super-user.
- For DIP – required for each subscriber app DN.
- Example:

```
$ ldapmodify -h localhost -p 1389 -D "cn=directory manager" -j /tmp/oud_pwd

dn: orclodipagentname=AD_DIP_PROFILE,cn=subscriber profile,cn=changelog subscriber,cn=directory integration
platform,cn=products,cn=OracleContext
changetype: modify
add: ds-privilege-name
ds-privilege-name: unindexed-search
-
add: ds-privilege-name
ds-privilege-name: proxied-auth
```

Issue #6: cn=changelog data timeout

- By default, purge delay for replication in OUD is set to 1 day.
- Set it to 1 week, at least.

```
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -w password -n get-replication-server-prop \
--provider-name "Multimaster Synchronization" --advanced --property replication-purge-delay
Property                : Value(s)
------------------------:---------
replication-purge-delay : 1 d
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -w password -n set-replication-server-prop \
--provider-name "Multimaster Synchronization" --set replication-purge-delay:1w
```

- Historical replication data retention also can be tuned.

```
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -w password -X -n \
set-replication-domain-prop --provider-name "Multimaster Synchronization" \
--domain-name dc=example,dc=com --set conflicts-historical-purge-delay:7200m
```

Issues faced while implementing OAM with OUD

Issue #1: EBS registration

- Test connection to identity server is failing.
- But network is fine, LDAP connection is working.

```
$ txkrun.pl -script=SetOAMReg -registeroam=yes -ldapProvider=OUD

...

Failed while doing policy configurations

In the log file this will be the only actual information.

<class>oracle.apps.fnd.txk.oam.UserIdentityStoreConf</class>
<message>Test connection to identity server is failed. Please verify the settings and try again.</message>

<class>oracle.apps.fnd.txk.oam.RegisterOAM</class>
<message>Failed while updating the configurations in OAM console</message>
```

Issue #1: EBS registration

- Only LDAP trace helped.

```
[25/Nov/2016:13:50:35 +0200] CONNECT conn=1939 from=10.10.10.187:13771 to=10.10.10.160:1389 protocol=LDAP...
[25/Nov/2016:13:50:35 +0200] UNBIND REQ conn=1939 op=1 msgID=2...
[25/Nov/2016:13:50:36 +0200] CONNECT conn=1940 from=10.10.10.160:63638 to=10.10.10.160:1389 protocol=LDAP...
[25/Nov/2016:13:50:36 +0200] SEARCH REQ conn=1940 op=1 msgID=2 base="ou=people,dc=example,dc=com" scope=sub
filter="(uid=*)" attrs="ALL"
[25/Nov/2016:13:50:36 +0200] SEARCH RES conn=1940 op=1 msgID=2 result=0 nentries=0 etime=1
[25/Nov/2016:13:50:36 +0200] SEARCH REQ conn=1940 op=2 msgID=3 base="ou=groups,dc=example,dc=com" scope=sub
filter="(cn=*)" attrs="cn"
[25/Nov/2016:13:50:36 +0200] SEARCH RES conn=1940 op=2 msgID=3 result=0 nentries=0 etime=0
```

Issue #1: EBS registration

- Fix: User Base DN and Group Base DN should have at least 1 user and 1 group created.
- In OID cn=orcladmin and cn=public are being seeded by default.

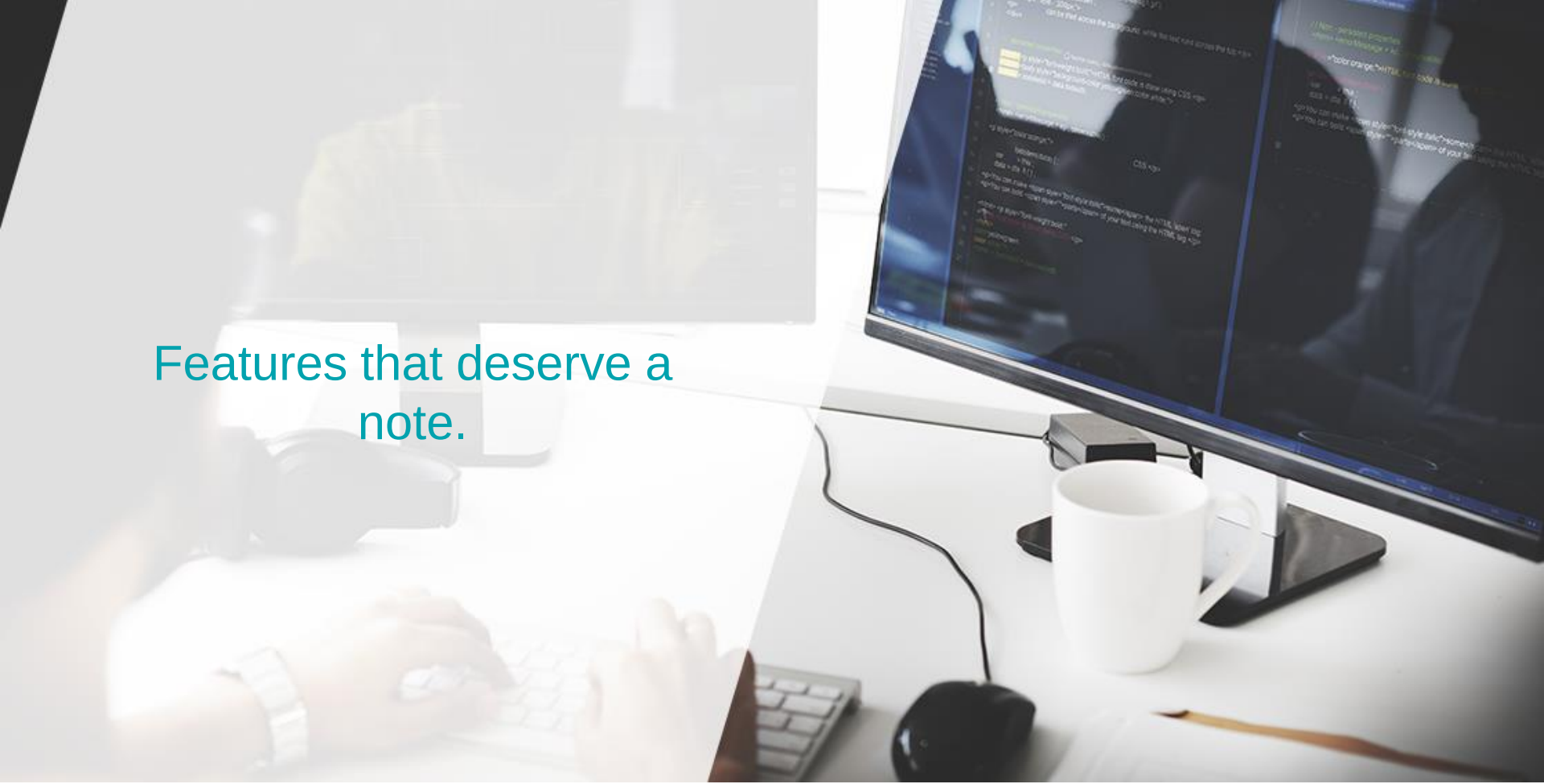
```
dn: cn=testuser1,ou=people,dc=example,dc=com
objectClass: person
objectClass: inetOrgPerson
objectClass: organizationalPerson
objectClass: top
givenName: John
sn: Testercn: testuser1
uid: testuser1
userpassword: welcome1
mail: test@test.com

dn: cn=admins,ou=groups,dc=example,dc=com
objectClass: groupOfNames
objectClass: top
cn: testgroup
```

Issue #2: Configuration of the User Identity Store

- Not an issue, actually. More a recommendation.

- These parameters are not set by default.
  - User Filter Object Classes: person
  - Group Name Attribute: cn
  - Group Filter Classes: groupofnames
  - Inactivity Timeout (in seconds): 60



Features that deserve a note.

SSL

- RIP SSL no-auth mode

- Only SSL server or client-server authentication.
- JSSE - Java Secure Socket Extension.

- And this is good !

- Default keystore: $ORACLE_INSTANCE/OUD/config/keystore

SSL - small comment about DIP

- By default, DIP is configured with non-SSL.

- SSL only mode is required if passwords are provisioned from external directories.
- Requires a JKS keystore configuration with OUD server certificate imported.

```
$ keytool -importcert -trustcacerts -alias OUD -file /tmp/oud_server_certificate_b64.txt -keystore
$ORACLE_INSTANCE/config/DIP_JKS/dip.jks

$ wlst.sh
> connect('t3://localhost:7001')
> createCred(map="dip", key="jksKey", user="jksuser", password="changeit")

$ $ORACLE_HOME/bin/manageDIPServerConfig set -h localhost -p 7005 -D weblogic -attribute keystorelocation -
val /u01/app/oracle/product/fmw11g/dip_inst1/config/DIP_JKS/dip.jks
$ $ORACLE_HOME/bin/manageDIPServerConfig set -attribute sslmode -val 2 -h localhost -p 7005 -D weblogic
$ $ORACLE_HOME/bin/manageDIPServerConfig set -attribute backendhostport -val localhost:1636 -h localhost -p
7005 -D weblogic
```

External password plugins in OUD

- Use case: Active Directory – passwords are not directly synced by DIP.
- OID has a cool feature – external password plugin.
  - Java based module which forwards the BIND requests to external LDAP directories for authentication.
- OUD does not have these kind of modules, however there are alternatives.
  - Pass Through Authentication (OUD 11.1.2.2+)
  - On-Demand Password and Password Translate (OUD 11.1.2.3+)
  - OUD / DIP Synchronization with Active Directory (Doc ID 1534241.1)

Pass Through Authentication

- How it works: Proxy mode workflow.
- You have your Local Naming Context “dc=example,dc=com” with synced user entries by DIP (no userpassword / orclpassword attributes).
- New Proxy Workflow is configured to mount external LDAP Base DN.
- A Workflow Element will merge both sources and use local context as user provider and external proxy context as authentication provider.

Pass Through Authentication

- Configure OUD LDAP extension.

```
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -X -n create-extension \
--type ldap-server \
--extension-name proxy_extension_pta_ext_ldap \
--set remote-ldap-server-read-only:true \
--set remote-ldap-server-address:myad.example.com \
--set remote-ldap-server-port:389  \
--set remote-ldap-server-ssl-port:636 \
--set remote-ldap-server-ssl-policy:always \
--set ssl-trust-all:true \
--set ssl-trust-manager-provider:JKS \
--set enabled:true
```

Pass Through Authentication

- Configure OUD Proxy Workflow elements.

```
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -X -n create-workflow-element \
--set client-cred-mode:use-specific-identity \
--set enabled:true --set ldap-server-extension:proxy_extension_pta_ext_ldap \
--set remote-ldap-server-bind-dn:cn=system_user,ou=ad_system_accounts,dc=example,dc=com \
--set remote-ldap-server-bind-password:password \
--set remote-root-dn:cn=system_user,ou=system_accounts,dc=ad,dc=example,dc=com \
--set remote-root-password:password \
--type proxy-ldap \
--element-name wf_element_auth_pta_ext_ldap

$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -X -n create-workflow-element \
--set auth-provider-workflow-element:wf_element_auth_pta_ext_ldap \
--set enabled:true --set user-provider-workflow-element:userRoot \ # our default naming context created
--set pta-suffix:ou=people,dc=example,dc=com \
--set pta-auth-suffix:ou=people,dc=example,dc=com \
--set pta-user-suffix:ou=people,dc=example,dc=com \
--type pass-through-authentication \
--element-name wf_element_pta_ext_ldap
```

Pass Through Authentication

- Configure OUD Proxy Workflow.

```
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -X -n create-workflow \
--workflow-name pta_ext_ldap_wf \
--set base-dn:ou=people,dc=example,dc=com \
--set enabled:true \
--set workflow-element:wf_element_pta_ext_ldap
```

- Enable the new configuration.

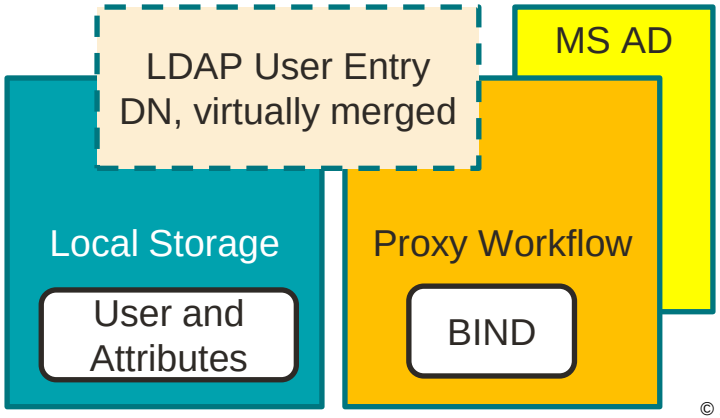
```
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -X  -n set-network-group-prop \
--group-name network-group \
--set enabled:true \
--add workflow:pta_google_openldap_wf
```

Pass Through Authentication

- It works.

```
$ ldapsearch -h localhost -p 1389 -D "cn=user1,ou=people,dc=example,dc=com" -b
"cn=user1,ou=people,dc=example,dc=com" -s base "(objectclass=*)" "orclSourceObjectDN"
Password for user 'cn=user1,ou=people,dc=example,dc=com':
dn: cn=user1,ou=people,dc=example,dc=com
orclSourceObjectDN: cn=user1,ou=People,dc=example,dc=com
$
```

- Some illustration.



OUD Access Log

- OUD has access log tracing similar to Apache.
- It tracks everything and YOU SHOULD LOVE IT!

- $ORACLE_INSTANCE/OUD/logs/access

```
[25/Nov/2016:13:50:35 +0200] CONNECT conn=1939 from=10.10.10.187:13771 to=10.10.10.160:1389 protocol=LDAP
[25/Nov/2016:13:50:35 +0200] BIND REQ conn=1939 op=0 msgID=1 type=SIMPLE dn="cn=directory manager" version=3
[25/Nov/2016:13:50:35 +0200] BIND RES conn=1939 op=0 msgID=1 result=0 authDN="cn=Directory Manager,cn=Root
DNs,cn=config" etime=1
[25/Nov/2016:13:50:35 +0200] UNBIND REQ conn=1939 op=1 msgID=2
[25/Nov/2016:13:50:35 +0200] DISCONNECT conn=1939 reason="Client Disconnect”
[25/Nov/2016:13:50:36 +0200] CONNECT conn=1940 from=10.10.10.160:63638 to=10.10.10.160:1389 protocol=LDAP
[25/Nov/2016:13:50:36 +0200] BIND REQ conn=1940 op=0 msgID=1 type=SIMPLE dn="cn=directory manager" version=3
[25/Nov/2016:13:50:36 +0200] BIND RES conn=1940 op=0 msgID=1 result=0 authDN="cn=Directory Manager,cn=Root
DNs,cn=config" etime=0
[25/Nov/2016:13:50:36 +0200] SEARCH REQ conn=1940 op=1 msgID=2 base="ou=people,dc=domain,dc=com" scope=sub
filter="(uid=*)" attrs="ALL”
[25/Nov/2016:13:50:36 +0200] SEARCH RES conn=1940 op=1 msgID=2 result=0 nentries=0 etime=1
[25/Nov/2016:13:50:36 +0200] SEARCH REQ conn=1940 op=2 msgID=3 base="ou=groups,dc=domain,dc=com" scope=sub
filter="(cn=*)" attrs="cn”
[25/Nov/2016:13:50:36 +0200] SEARCH RES conn=1940 op=2 msgID=3 result=0 nentries=0 etime=0
```

Virtual Attributes

- An attribute which is more like a function.
- The best example: isMemberOf
  - Is true if a user is a member of a defined group
  - The most useful place to use: LDAP filters

- Example: OAM User Identity Store filter to allow only specific group to access your application.
  - KEY_LDAP_FILTER: (&(uid={KEY_USERNAME})(isMemberOf=cn=ebs_sso_allowed_users,ou=groups,dc=example,dc=com))

Performance tuning considerations

Overview

- Performance is a feature. ☺
- Overall the OUD performance is good.

- The more memory you configure – the more you get into the cache.

- Always try to apply the latest PSU BP. Many performance related bugs are resolved per the change log in every bundle.

- Some real problems to look at may start only when your data size exceeds hundreds of thousands, like 400 000 user accounts.

Indexes

- OUD is not indexing by default most of the common OID attributes.
- Example: DIP ApplicationToOID profile is doing Root DN sub-search looking for entries with required orclGUID, to confirm it exists.
  - With large directories it can spin the CPU a lot. Can be indexed.

```
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -X -n create-local-db-index --
element-name userRoot --index-name orclguid --set index-type:equality
$ rebuild-index -h localhost -p 4461 -D "cn=directory manager" -j /tmp/oud_pwd -X -b "dc=example,dc=com" -
i orclguid
```

- If DIP bootstrap has synchronized a huge amount of new user accounts (ex from external directory) – full index rebuild is highly recommended.

```
$ rebuild-index -b "dc=example,dc=com" --rebuildAll
```

Root DN based search

- Same use case: DIP ApplicationToOID

```
$ ldapsearch -h localhost -p 1389 -D "cn=directory manager" -j /tmp/oud_pwd -b ""
"(orclguid=XXXXXXXXXXXXXXXXXXXXX)" "*"
```

- OUD will also look into “cn=changelog” as it interprets it as non-hidden naming context.
- This is how OUD works.
- Recommendation: evaluate the data size, and put the memory enough to cache as maximum as possible.
  - https://blogs.oracle.com/sduloutr/entry/oud_external_change_log_and
  - OUD - Bad Performance of a Subtree Search on the Root DSE if the External Changelog is Enabled. (Doc ID 1676998.1)
- With PTA add here your external Proxy Workflow Element as well.

Data cache tuning

- If your LDAP data is 1 GB in size, you can configure your OUD instance to 2 GB memory and set data cache to utilize 50 %.

```
$ dsconfig -h localhost -p 4461 -D "cn=directory manager" -w password set-workflow-element-prop --element-name userRoot --set db-cache-percent:50
```

- Cache as much as possible **!!!**

Summary

- OUD is an interesting lightweight product.
- Hard to say if it’s better or worse than OID. Both OUD and OID have their own pros and cons.
- OUD – is a replacement product. OID is going away soon (Dec 2018 / Dec 2021).
- Comparing to 11gR1, where OUD was not usable at all for all main integration use cases, it is now more less ready. Of course, with some nuances mentioned.
- Simplified setup and configuration.
- It takes time to tune everything. Let us be patient. There is a potential.

THANK YOU

Q & A