

SOLUTION TO CENTRALIZE AND SIMPLIFY TNS MANAGEMENT

OID / PROXY AND EXTERNAL LISTENER



ABOUT ME



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- DBA since 2008
- Senior Database Architect
 - MAA Infrastructure (RAC / Dataguard)
 - Exadata / Exadata Cloud at Customer, ZDLRA and Big Data Appliance.
 - Performance Tuning
 - Oracle Security (OKV/Audit/Database Hardening)

PROGRAM AGENDA



- 1 ➤ Listener explanation
- 2 ➤ Oracle Internet Directory
- 3 ➤ Oracle Proxy Listener
- 4 ➤ Oracle Network Listener / External Scan Listener
- 5 ➤ Conclusion & QA

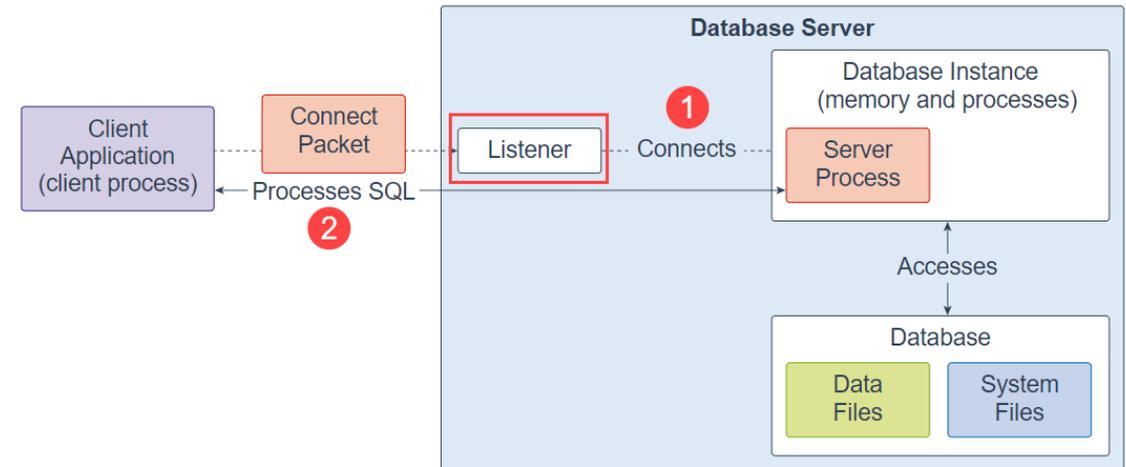
PROGRAM AGENDA WITH HIGHLIGHT



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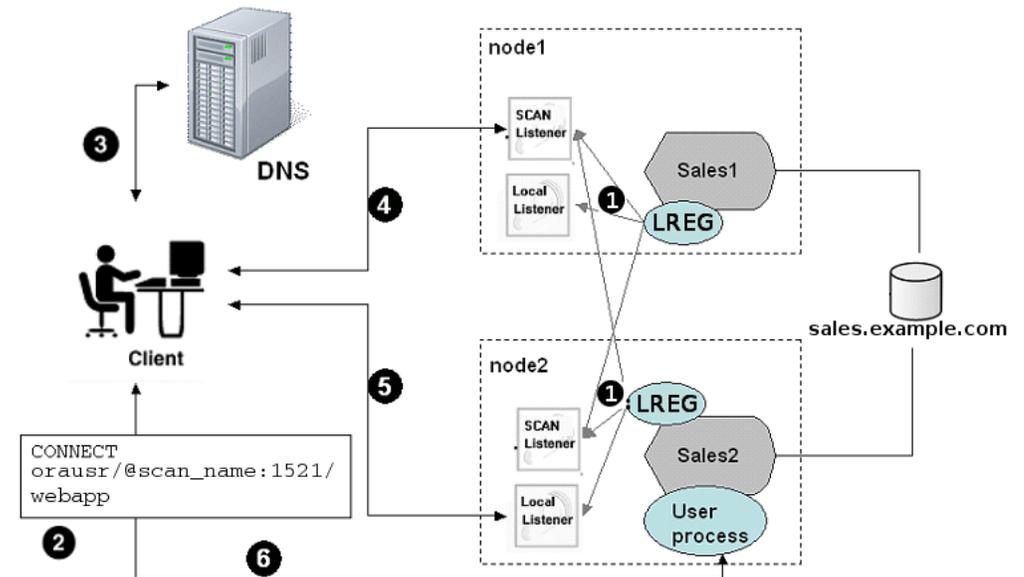
LISTENER EXPLANATION – HOW IT’S WORKING

- Listener (Process listen on tcp port (Default 1521))
 - Configuration was control by listener.ora file where you can configure listen address, tcp port, size of buffer, encryption and firewall configuration.
 - To stop/start process you can used lsnrctl command or srvctl command if you are using grid infrastructure.
 - You have two type of listener registration (Static “inside listener.ora file” or dynamic when database running).
- When you start database:
 - Background “LREG” process was startup by database and lookup “local_listener”, listener_networks or remote listener (RAC) parameter to register service inside listener (Dynamic registration)
 - By default “LREG” process sent service declaration to listener every 60s.
 - Force register can be made by command “alter system register;”
 - You can check registration path with view “V\$LISTENER_NETWORK”
 - When you restart listener, all dynamic registration can be lost during 60s.



SCAN LISTENER EXPLANATION – HOW IT'S WORKING

- Scan Listener (Process listen on tcp port (Default 1521))
 - Configuration was control by listener.ora but everything was control by grid infrastructure command when you create scan listener.
 - To stop/start process you can used lsrnctl or srvctl command.
 - If you have two cluster node you must have at least 3 scan listener running.
 - DNS scan_name resolved 3 ips of scan in round robin if you have real application cluster configuration with two nodes.
 - Oracle client automatically detect that dns return 3 ips and try all ips if some part was offline before return an error to client.
- When you start database:
 - Background “LREG” was startup by database and lookup “local_listener” and remote listener (RAC) parameter to register service inside listener (Dynamic registration)
- When application initialized session :
 - Client start to create session with “scan_name” address.
 - If service exist, scan listener check workload of both nodes if service listen on both nodes and redirect session to the server with less workload. Session will communicate directly with local listener of server listener with “vip” address.
 - Client can communicate with “ONS” (Oracle Notification Service) process to managed lost of session with “FAN” message (Fast Application Notification) to restart transaction lost.
 - ONS process listen on TCP/6200.



WHY IMPLEMENT CENTRALIZATION OF TNS MANAGEMENT?



- If you have a complex environment with lot of databases / pluggable databases with services associated.
- You are using Oracle database appliance and you don't want every 4 years modify all tns in all application each time you migrate database to new physical server.
- When you want relocate pluggable database without impact client configuration each time you move databases.
- Make dba life easier!

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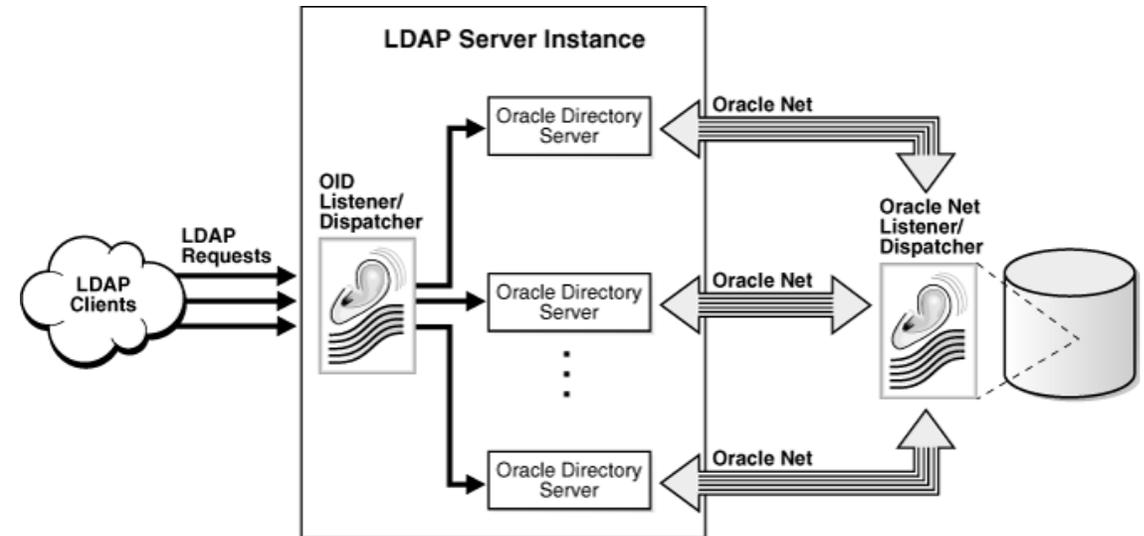


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ORACLE INTERNET DIRECTORY

- Oracle Internet Directory (OID) is an LDAP server which uses an Oracle database as a datastore and Oracle middleware to expose ldap service.
- Oracle client must use ldap request to resolve tns of database.
 - Instead of tnsnames.ora you must create file ldap.ora point to OID servers.
(`$ORACLE_HOME/network/admin` or `TNS_ADMIN`)

```
DEFAULT_ADMIN_CONTEXT = ""
DIRECTORY_SERVERS = (ldap-server:389:636)
DIRECTORY_SERVER_TYPE = OID
```
 - You must update your sqlnet.ora file to point to "ldap".
(`NAMES.DIRECTORY_PATH = (LDAP)`)
- Oracle client must use ldap jdbc url like below with jdbc format.
 - `jdbc:oracle:thin:@ldap://oid:5000/mydb1,cn=OracleContext,dc=myco,dc=com`
- This solution centralized all database resolution in one point without maintain tnsnames.ora file but must be updated manually / or with `ldif` command each time you create new database or service name. When you migrate database to new server you must also update ldap entry to point to new server.



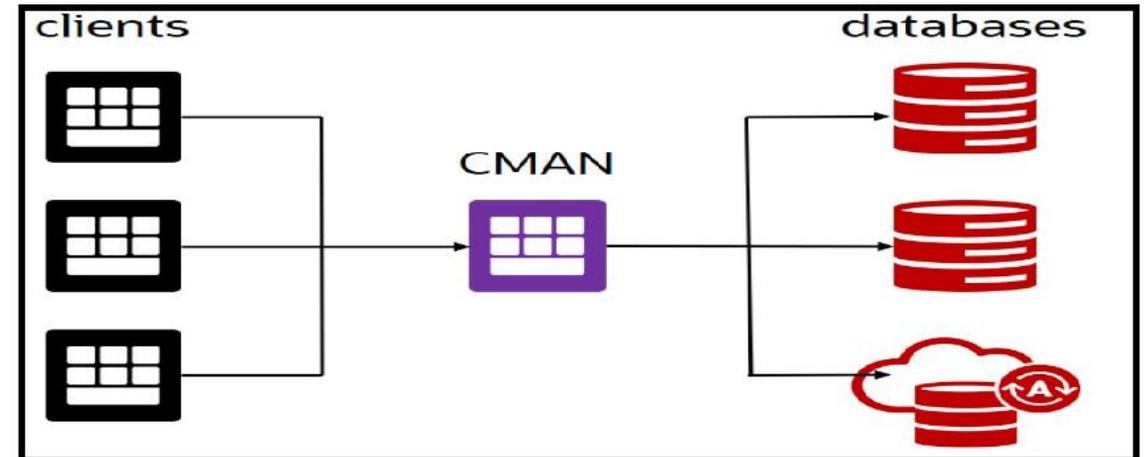
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ORACLE PROXY LISTENER

- Connection Manager (CMAN) is an Oracle utility that acts as a proxy server to forward connection requests from clients to databases. It operates on the session level.
- Include in Oracle client. (Not instant client)
- Configuration was control by cman.ora instead of listener.ora.
- Process cman was control by command “cmctl”.
- Work as proxy, so if process failed you lost all client session connected to databases.
- You are able to used cman to define complex rules on different clients to accept or reject some session for specific Oracle services. Compare to listener.ora was not limited to accept or reject client ips.
- If you have consolidated Oracle databases server you can control external access and filter access.
 - Cloud Access (AWS/Azure..) to expose some on premise databases in Cloud.
- You are able to enable “compression” on the communication to reduce by example traffic over Azure Express route.
 - `SQLNET.COMPRESSION=on`
 - `SQLNET.COMPRESSION_THRESHOLD=1024`
 - `SQLNET.COMPRESSION_LEVELS=(high)`



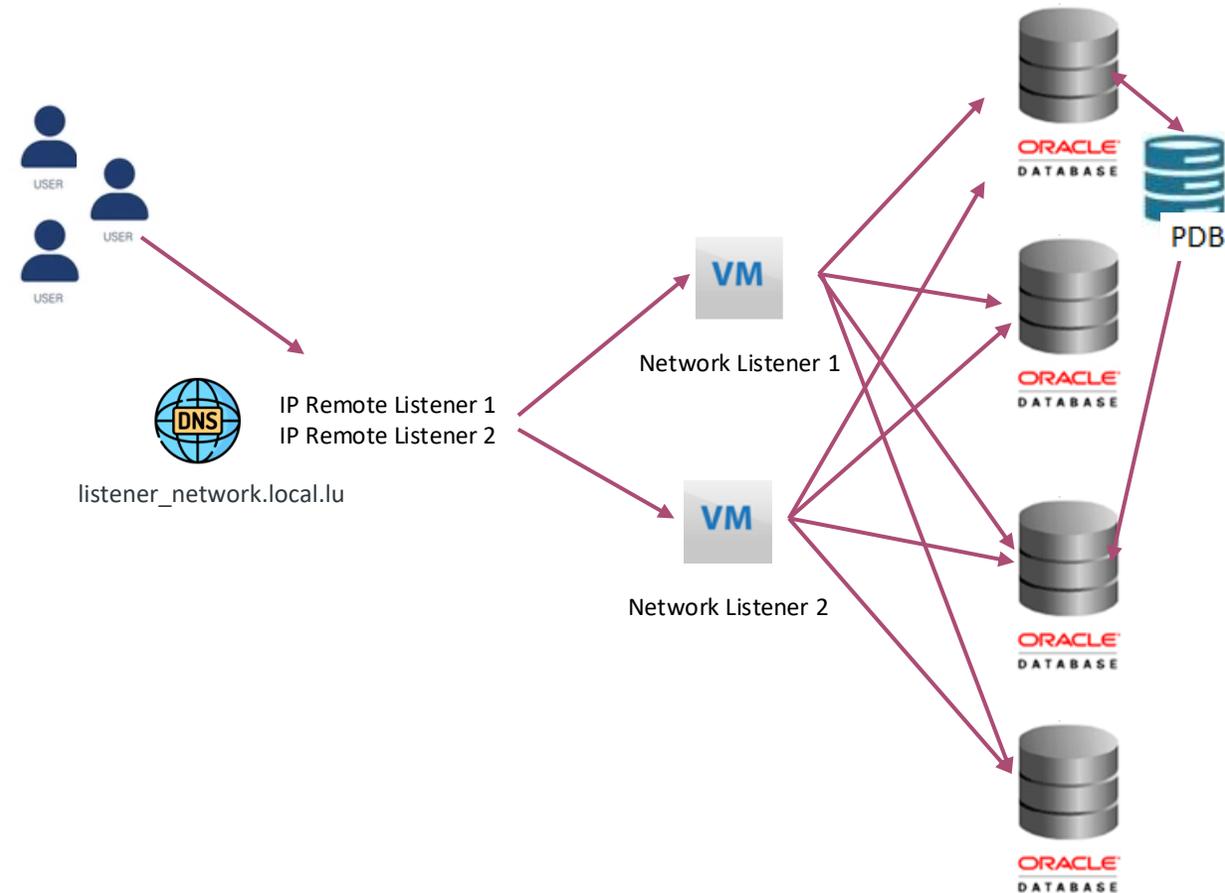
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ORACLE NETWORK LISTENER / EXTERNAL SCAN LISTENER

- Network/Remote listener was a standard listener that you install outside database server.
- When database startup “LREG” process will register all services owned by Oracle database to this remote listener.
- Not needed to maintain service registration up to date because database declare only service know.
- Register can be issue with two Oracle database parameters, listener_networks and remote_listener.
- With listener_networks parameter, you can control “route” path to contact database and force client to contact scan listener before contact local_listener. So load balancing still working.
- With this architecture we mutualized scan capability but outside Oracle database server. So you are able to migrate database without any change from client side or ldap side. Everything was automatic for the entire life of service / pluggable database!



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CONCLUSION FOR EACH ARCHITECTURE

OID

- Not needed to maintain tnsnames.ora on each client / Desktop.
- If you lost OID infrastructure, all sessions connected remain connected over databases.
- Need to rebuild some application to used ldap.
- You must maintain manually service registration.
- OID architecture must be maintain and patch. (*Middleware*)
- You can implement load balancer frontend of this architecture for high availability or round robin

¹⁵dns.

PROXY Listener

- Better Isolation and reduce firewall rules to control which client can connect to mutualized database server.
- You are able to control compression depending of the source of clients.
- You must maintain tnsnames.ora manually each time when you create new database or service.
- If you lost proxy, you lost all clients connexion.

Remote/Network Listener

- Not needed to maintain the list of databases and services compare to OID.
- You still must maintain tnsnames.ora.
- All applications can connect to Oracle can used this kind of architecture. (*host:tcp/service*)
- Old application can't manage complex tns are able to works with network listener and support dataguard switchover/failover.
- If you lost network listener, all sessions connected on databases remain connected.

FORWARD_LISTENER?

THANK YOU!