**》Oracle Net 结构**

Client 
Server 
TCP/IP 
ROBMS 
Oracle 

客户端：本地网络服务命名

网络：TCP/IP

服务端：listener

相关的配置文件

$ORACLE\_HOME/network/admin/tnsnames.ora    --client

$ORACLE\_HOME/network/admin/listener.ora    --server

$ORACLE\_HOME/network/admin/sqlent.ora    --both

$ ps -ef |grep tns

root        13     2  0 16:16 ?        00:00:00 [netns]

grid      1924     1  0 16:43 ?        00:00:00 /u01/app/11.2.0/grid/bin/tnslsnr LISTENER -inherit

grid      1934  1904  0 16:43 pts/1    00:00:00 grep tns

listener有两种监听：本地、远程

本地监听：可以和rdbms在同一个服务器，基本不受网络影响，监听和rdbms通信快

本地监听通常配置local\_listener

远程监听：监听单独安装在一台服务器，可能会受网络影响，监听和rdbms通信慢，则连接就会慢

远程监听需要配置remote\_listener

alter system set remote\_listener='(ADDRESS=(PROTOCOL=TCP)(HOST=192.168.6.13)(PORT=1521))';

reference：mos

**Oracle Net 12c: Remote Instance Registration Failing with TNS-01182 after a New Oracle 12c Installation (Doc ID 1592571.1)**

**》连接方式**

Dedicated Server Architecture

Client 
Client 
Client 
Dedicated 
Server 
P rocess 
Dedicated 
Server 
Process 
Dedicated 
Server 
P rocess 
Database 

专有服务器模式：每一个服务器进程对应一个用户进程，效率高

Shared Server Architecture

Client 
Web 
Browser 
Client 
Client 
Web 
Dispatcher 
Shared 
Server 
Process 
Shared 
Server 
Process 
Database 

共享服务器模式：初始化一批服务器进程（3个server process），如果有5个用户进程（user process）通过调度程序轮寻服务于所有的用户进程，效率低，节省内存资源

SQL> show parameter share

NAME                     TYPE     VALUE

------------------------------------ ----------- ------------------------------

hi\_shared\_memory\_address         integer     0

max\_shared\_servers             integer

shared\_memory\_address             integer     0

shared\_pool\_reserved\_size         big integer 5033164

shared\_pool\_size             big integer 0

shared\_server\_sessions             integer

shared\_servers                 integer     1

**》客户端发起连接**

о 
снет 
о 
Database lnstance 
Server 
Process 
0ataDase 

1. The listener receives a client connection request.
2. The listener starts a dedicated server process.
3. The listener provides the location of the dedicated server process to the client in a redirect message.
4. The client connects directly to the dedicated server.

客户端发出请求需要知道4个要素，哪4个要素？

监听中注册的IP

监听使用的端口号

监听中注册的服务名

连接数据库使用的用户名/口令

注意：监听中的服务名，而不是service\_name

连接方式

Easy Connect Naming Method（EZCONNECT）

CONNECT username@[//]host[:port][/[service\_name][:server]][/instance\_name]]

conn [sys/oracle@192.168.6.31:1521/+ASM](mailto:sys/oracle@192.168.6.31:1521/+ASM) as sysdba

conn [sys/oracle@192.168.6.31:1521/orcl](mailto:sys/oracle@192.168.6.31:1521/orcl) as sysdba

conn [hr/hr@192.168.6.31:1521/orcl](mailto:hr/hr@192.168.6.31:1521/orcl)

Local Naming Method（TNSNAMES）

CONNECT username/PASSWORD@TNSNAMES

conn hr/hr@conn

其他

WALLET

**》服务端管理监听**

NETCA

lsnrctl status

lsnrctl start

lsnrctl stop

实用性配置

1 设置日志文件目录及路径

设置日志文件目录的两种方法

    1. lsnrctl SET LOG\_DIRECTORY directory

    2. LSNRCTL> SET LOG\_DIRECTORY /usr/oracle/admin/log

设置日志文件的两种方法

    1. lsnrctl SET LOG\_FILE file\_name

    2. LSNRCTL> SET LOG\_FILE file\_name

2 设置日志的状态

    1. lsnrctl SET LOG\_STATUS {on | off}

    3. LSNRCTL> SET LOG\_STATUS {on | off}

注：可用来清理监听日志

3 设置密码

As the "oracle" user, set and encrypt the listener password:

1) LSNRCTL> set current\_listener <listener\_name>

2) LSNRCTL> change\_password

    Old password: <enter>

    New password: 10glistener  (text is not echoed)

    Reenter new password: 10glistener    (text is not echoed)

3) LSNRCTL> save\_config

4) LSNRCTL> status

STATUS output will now show:

Security                  ON: Password or Local OS Authentication

服务状态

LSNRCTL> status

Connecting to (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=192.168.6.13)(PORT=1522)))

STATUS of the LISTENER

------------------------

Alias                     listener2

Version                   TNSLSNR for Linux: Version 11.2.0.4.0 - Production

Start Date                16-AUG-2018 11:16:07

Uptime                    0 days 0 hr. 42 min. 56 sec

Trace Level               off

Security                  ON: Password or Local OS Authentication

SNMP                      OFF

Listener Parameter File   /u01/app/oracle/product/11.2.0/db\_home/network/admin/listener.ora

Listener Log File         /u01/app/oracle/diag/tnslsnr/wl/listener2/alert/log.xml

Listening Endpoints Summary...

  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=192.168.6.13)(PORT=1522)))

  (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1522)))

Services Summary...

Service "ora" has 1 instance(s).

  Instance "orcl", status READY, has 1 handler(s) for this service...

Service "orcl" has 1 instance(s).

  Instance "orcl", status READY, has 1 handler(s) for this service...

Service "orclXDB" has 1 instance(s).

  Instance "orcl", status READY, has 1 handler(s) for this service...

The command completed successfully

Instance

The name of the instance associated with the service along with its status and number of service handlers associated with the service

Status can be one of the following:

A READY status means that the instance can accept connections.

A BLOCKED status means that the instance cannot accept connections.

A READY/SECONDARY status means that this is a secondary instance in an Oracle Real Application Clusters primary/secondary configuration and is ready to accept connections.

An UNKNOWN status means that the instance is registered statically in the listener.ora file rather than dynamically with service registration. Therefore, the status is not known.

可以使用命令lsnrctl status来查看某服务是静态注册还是动态注册。

实例状态为UNKNOWN值时表明此服务是静态注册的设置。这时监听器用来表明它不知道关于该实例的任何信息，只有当客户发出连接请求时，它才检查该实例是否存在。

动态注册的数据库通过状态信息中的状态READY或状态BLOCKED（对于一个备用数据库）来指明。不管关闭何时数据库，动态注册的数据库都会动态地从 监听器注销，而与之相关的信息将从状态列表中消失。这样，不管数据库是在运行还是已经关闭，监听器总是知道它的状态。该信息将被用于连接请求的回退（fallback）和负载平衡。

**》监听工作机制**

service names 
db_unique_name 
db domain 
instance name 
Pmon 
listener.ora 
local listener 

服务注册

服务注册分为动态注册和静态注册，需要以下的元素

PMON

service\_name

db\_domain

db\_unique\_name

local\_listener

remote\_listener

......

oracle监听器运行后，oracle实例在open时，PMON会每60s动态向监听程序注册其服务名（service\_names）和实例（instance\_name）

只有将服务注册到监听中，才可以连接数据库

数据库参数

服务名（service\_names）默认是：service\_name.db\_domain; db\_unique\_name.db\_domain

实例（instance\_name）默认是：instance\_name

db\_unique\_name默认是：db\_name

注意：参数没有设置并不等于参数值为空（db\_unique\_name=''），没有配置也是有值的，db\_unique\_name不能为空

客户端tnsname中配置的参数

SERVICE\_NAME=GLOBAL\_DBNAME就是动态服务名（SERVICE\_NAME）

SID\_NAME就是动态实例（INSTANCE\_NAME）

参数解释

LOCAL\_LISTENER specifies a network name that resolves to an address or address list of Oracle Net local listeners (that is, listeners that are running on the same machine as this instance). The address or address list is specified in the TNSNAMES.ORA file or other address repository as configured for your system.

REMOTE\_LISTENER specifies a network name that resolves to an address or address list of Oracle Net remote listeners (that is, listeners that are not running on the same machine as this instance). The address or address list is specified in the TNSNAMES.ORA file or other address repository as configured for your system.

alter system set service\_names='orcl,ora';

alter system set db\_domain='www' scope=spfile;

alter system set db\_unique\_name='ORCL' scope=spfile;

1 动态注册

SQL> show parameter local\_

NAME                                 TYPE        VALUE

------------------------------------ ----------- ------------------------------

local\_listener                       string

log\_archive\_local\_first              boolean     TRUE

SQL> alter system set local\_listener=listener;    --动态注册

SQL> alter system register;   --可手工发起立即注册

或者：

SQL> alter system set LOCAL\_LISTENER='(ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.6.13)(PORT = 1522))';

SQL> alter system register;

什么是默认动态监听？

什么是非默认动态监听？

默认动态监听

默认名字（listener）默认端口（1521）的监听可以没有listener.ora，所以动态注册的情况可以配置listener.ora也可以不配

LISTENER =

  (DESCRIPTION\_LIST =

    (DESCRIPTION =

      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))

      (ADDRESS = (PROTOCOL = TCP)(HOST = db)(PORT = 1521))

    )

  )

非默认动态监听

LISTENER2 =

  (DESCRIPTION\_LIST =

    (DESCRIPTION =

      (ADDRESS = (PROTOCOL = TCP)(HOST = db)(PORT = 1522))

    )

  )

同时动态注册两个本地监听

alter system set LOCAL\_LISTENER='

(ADDRESS\_LIST=

(ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.6.11)(PORT = 1521))

(ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.6.11)(PORT = 1522))

)';

独立于数据库服务器的监听配置（远程监听）

数据库服务器：192.168.6.11

监听服机器：192.168.6.13

客户端：192.168.6.1

1 192.168.6.11 --将服务注册到远端监听

remote =

  (DESCRIPTION =

    (ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.6.13)(PORT = 1521))

    (CONNECT\_DATA =

      (SERVER = DEDICATED)

      (SERVICE\_NAME = orcl)

    )

  )

alter system set remote\_listener=remote;

2 192.168.6.13    --查看监听的服务

lsnrctl services

Services Summary...

Service "orcl" has 1 instance(s).

  Instance "orcl", status READY, has 2 handler(s) for this service...

    Handler(s):

      "DEDICATED" established:0 refused:0 state:blocked

         REMOTE SERVER

         (ADDRESS=(PROTOCOL=TCP)(HOST=192.168.6.11)(PORT=1522))

      "DEDICATED" established:1 refused:0 state:ready

         REMOTE SERVER

         (ADDRESS=(PROTOCOL=TCP)(HOST=192.168.6.11)(PORT=1521))

注意：如果HOST使用的主机名，则需要将host解析加入到hosts

3 客户端测试

SQL> conn [system/oracle@192.168.6.13:1521/orcl](mailto:system/oracle@192.168.6.13:1521/orcl)

2 静态注册

status    UNKNOWN

当instance关闭后，或instance状态为blocked，无法远程连接，此时需要静态注册（远程连接未打开的数据库）

远程使用sys用户操作数据（startup，shutdown）

服务器端配置配置两个监听LISTENER、LISTENER1，其中LISTENER1配置了静态注册

LISTENER =

  (DESCRIPTION\_LIST =

    (DESCRIPTION =

      (ADDRESS = (PROTOCOL = TCP)(HOST = db)(PORT = 1521))

      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))

    )

  )

ADR\_BASE\_LISTENER = /u01/app/grid

ENABLE\_GLOBAL\_DYNAMIC\_ENDPOINT\_LISTENER = ON

LIS =

  (DESCRIPTION\_LIST =

    (DESCRIPTION =

      (ADDRESS = (PROTOCOL = TCP)(HOST = db)(PORT = 1522))

    )

  )

SID\_LIST\_LIS=

  (SID\_LIST=

  (SID\_DESC =

      (GLOBAL\_DBNAME =orcl)

      (SID\_NAME = orcl)

      (ORACLE\_HOME =/u01/app/11.2.0/grid)

     )

   )

注意：SID\_LIST\_LISTENER，LISTENER要与监听名一致

SQL> conn [sys/"oracle"@192.168.6.11:1521/orcl](mailto:sys/) as sysdba

ERROR:

ORA-12514: TNS: 监听程序当前无法识别连接描述符中请求的服务

SQL> conn [sys/"oracle"@192.168.6.11:1522/orcl](mailto:sys/) as sysdba

》tnsping工具

1 服务器关闭数据库

2 客户端tnsping，tnsping依然显示正常

PS C:\WINDOWS\system32> tnsping 192.168.6.11:1521/orcl

TNS Ping Utility for 64-bit Windows: Version 12.1.0.2.0 - Production on 16-8月 -2018 15:44:54

Copyright (c) 1997, 2014, Oracle.  All rights reserved.

已使用的参数文件:

C:\app\oracle\product\12.1.0\dbhome\_1\network\admin\sqlnet.ora

已使用 HOSTNAME 适配器来解析别名

尝试连接 (DESCRIPTION=(CONNECT\_DATA=(SERVICE\_NAME=orcl))(ADDRESS=(PROTOCOL=TCP)(HOST=192.168.6.11)(PORT=1521)))

OK (0 毫秒)

PS C:\WINDOWS\system32>

以上测试说明了，不论数据库是否运行，只要监听存在并在运行，tnsping 都可以成功解析！

**tnsping 是用于诊断各种客户端连接的一个非常好的工具。**

**但是我们要清楚的知道，这个工具能做什么（检查客户端TNS配置），什么不能做（检查数据库实例是否启动，监听端口是否在1521上）！**

**从以上试验我们看到，tnsping的解析成功仅仅意味着本地的tnsnames.ora ，IP地址，TNS\_ADMIN 变量等配置成功。**

**但是，完全跟目标数据库实例连接没有任何关系！**

》sqlnet.ora文件

The database server can be configured with access control parameters in the sqlnet.ora file.

These parameters specify whether clients are allowed or denied access based on the protocol.

有关访问数据库安全控制的一个概要文件

认证方式

SQLNET.AUTHENTICATION\_SERVICES=(all)

SQLNET.AUTHENTICATION\_SERVICES=(NONE)     --禁用操作系统验证

none for no authentication methods, including Microsoft Windows native operating system authentication.

When SQLNET.AUTHENTICATION\_SERVICES is set to none, a valid user name and password can be used to access the database.

all for all authentication methods.

连接方式

NAMES.DIRECTORY\_PATH=(tnsnames, ldap, ezconnect)

限制IP

TCP.EXCLUDED\_NODES=(192.168.217)

TCP.INVITED\_NODES=(192.168.217.0/24)

TCP.VALIDNODE\_CHECKING=yes

禁用ezconnect方式！！！！！！！

》典型案例-PL/SQL连接缓慢

用PL/SQL登录数据库，等待大约20多秒后才连上数据库。。

原因：

vi /etc/resolv.conf

nameserver 192.168.217.100

添加了DNS服务，且此DNS不可用

解决：在resolv.conf中配置正确的DNS IP.如果数据库服务器不接外网，就去掉DNS配置

nameserver 192.168.217.131这行。

课下自己做一下试验。

最后！

回顾Oracle的体系结构

Instance 
System Global Area (SGA) 
Shared Pool 
Large Pool 
Library Cache 
Shared SQL Area 
SELECT • FROM 
emp I e s 
Database 
Butter Cache 
SQL Area 
(Shared 
Server Onl 
Redo 
Log 
B utter 
Fixed 
SGA 
Server 
Streams 
pool 
CKPT 
LGWR 
Free Memory 
I/O Buffer Area 
UGA 
"MON 
SMON 
MMON 
MMNL 
Others 
Background 
P rocesses 
ARCn RVWR 
PGA 
SQL Work Areas 
Session Memory private SOL Area 
Client 
: Database 
Data 
Files 
10101 
DBWn 
Files 

》Memory Architecture    --ok

》Process Architecture    --ok

》Physical Storage Structures    --

》Logical Storage Structures    --

》Application Architecture    --ok

》Oracle Networking Architecture    --ok

<https://docs.oracle.com/cd/E11882_01/network.112/e10835/sqlnet.htm#NETRF184>

reference：

Home / Database / Oracle Database Online Documentation 11g Release 2 (11.2) / Database Administration

6 Local Naming Parameters (tnsnames.ora)

Connect-Time Failover and Client Load Balancing with Oracle Connection Managers

<https://docs.oracle.com/cd/E11882_01/network.112/e41945/toc.htm>