
How to create your own Instant Client Bundle

By Richard Ji

Introduction

- How many people have used instant client?



Introduction

- Oracle instant client provides an easy and quick way of deploying your OCI, OCCI, JDBC OCI based applications.



Introduction

- By adding more tools such as the following, instant client can become a much more powerful tool.
 - tnsping
 - sqlldr
 - tkprof
 - exp/imp
 - OCM
 - Your own tools
-

Introduction

- The key advantages of doing it are:
 - Installation is a breeze, just unzip and you are done.
 - Size is small, 100MB to 150MB uncompressed or 50MB compressed. It can fit on a USB stick.
 - No SA involvement.

As compares to a full blown Oracle installation that requires lots of space. SA's involvement.

Requirements

- A Unix/Linux account with 150MB+ disk space.
 - Read access to an Oracle 10gR2 installation of the same platform.
-

Installation

- Download from otn.oracle.com
 - instantclient-basic-linux32-10.2.0.3-20061115.zip
 - instantclient-jdbc-linux32-10.2.0.3-20061115.zip
 - instantclient-sdk-linux32-10.2.0.3-20061115.zip
 - instantclient-sqlplus-linux32-10.2.0.3-20061115.zip
-

Installation

- Copy all four or at least the basic and sqlplus to the home directory of your account.
 - Unzip and you are done.
-

Post Installation

- Setup the following environment variables in your shell's profile.

```
ORACLE_IC_HOME=$HOME/instantclient_10_2
```

```
ORACLE_HOME=$ORACLE_IC_HOME
```

```
TNS_ADMIN=$ORACLE_IC_HOME
```

```
PATH=$PATH:$ORACLE_IC_HOME
```

```
LD_LIBRARY_PATH=$ORACLE_IC_HOME
```

```
CLASSPATH=$ORACLE_IC_HOME/ojdbc14.jar:./
```

```
export ORACLE_IC_HOME ORACLE_HOME TNS_ADMIN PATH  
LD_LIBRARY_PATH CLASSPATH
```

Post Installation

- Create a tnsnames.ora file under your \$ORACLE_IC_HOME

```
$ more tnsnames.ora
```

```
mt1 =
```

```
  (DESCRIPTION =
```

```
    (ADDRESS_LIST =
```

```
      (ADDRESS = (PROTOCOL = TCP)(HOST =  
saturn)(PORT = 1521))
```

```
    )
```

```
  (CONNECT_DATA =
```

```
    (SERVER = DEDICATED)
```

```
    (SERVICE_NAME = mt1)
```

```
  )
```

```
)
```

Post Installation

■ Do a test with SQL*Plus

```
$ sqlplus rich/rich@mt1
```

```
SQL*Plus: Release 10.2.0.3.0 - Production on Tue Mar 6 17:53:46  
2007
```

```
Copyright (c) 1982, 2006, Oracle. All Rights Reserved.
```

```
Connected to:
```

```
Oracle8i Enterprise Edition Release 8.1.7.4.0 - 64bit Production
```

```
With the Partitioning option
```

```
JServer Release 8.1.7.4.0 - 64bit Production
```

```
SQL>
```

Post Installation

- Now we have a base for building our own instant client bundle.



Inside of Instant Client

- Here are the core files of Instant Client
 - libclntsh.so.10.1 : Client Code Library
 - libociei.so : OCI Instant Client Data Shared Library
 - libnnz10.so : Security Library
 - libocci.so.10.1 : Oracle C++ Call Interface Library
 - libocijdbc10.so : JDBC OCI Library
 - ojdbc14.tar : JDBC driver (OCI and Thin)
 - orai18n.jar : Character conversion and locale support
-

Add More Stuff

- Let's start with adding tnsping.
 - Copy the binary from the Oracle installation to the directory for instant client (\$ORACLE_IC_HOME).

- Now let's try to run it:

```
$ tnsping mt1
```

```
TNS Ping Utility for Linux: Version 10.2.0.1.0 - Production  
on 06-MAR-2007 17:59:33
```

```
Copyright (c) 1997, 2005, Oracle. All rights reserved.
```

```
Message 3511 not found; No message file for  
product=network, facility=TNSMessage 3512 not found; No  
message file for product=network, facility=TNSAttempting  
to contact (DESCRIPTION = (ADDRESS_LIST = (ADDRESS =  
(PROTOCOL = TCP)(HOST = saturn)(PORT = 1521)))  
(CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME =  
mt1)))
```

```
Message 3509 not found; No message file for  
product=network, facility=TNS
```

Add More Stuff

- So it complains about some file is missing or more specifically a message file is missing.
 - Now let's copy that file from the Oracle installation.
-

Add More Stuff

```
$ cd instantclient_10_2/  
$ mkdir -p network/mesg  
$ cd network/mesg/
```

Now copy the `tnsus.msb` file to this directory.

```
$ scp  
  oracle@neptune:/d00/app/oracle/product/10.2.0/network/me  
  sg/tnsus.msb ./  
tnsus.msb                100%   46KB   45.5KB/s   00:00
```



Add More Stuff

- Let's give it a try again.

```
[oracle@ny11x04 instantclient_10_2]$ tnsping mt1
TNS Ping Utility for Linux: Version 10.2.0.1.0 - Production on
 06-MAR-2007 18:39:45
Copyright (c) 1997, 2005, Oracle. All rights reserved.
Used parameter files:
Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS_LIST = (ADDRESS =
  (PROTOCOL = TCP)(HOST = saturn)(PORT = 1521))) (CONNECT_DATA =
  (SERVER = DEDICATED) (SERVICE_NAME = mt1)))
OK (0 msec)
```

- It worked!

Add More Stuff

- Let's add another tool, sqlldr
- First we copy the binary from the Oracle installation to the instant client directory.

```
[oracle@ny11x04 instantclient_10_2]$ scp  
  oracle@neptune:/d00/app/oracle/product/10.2.0/bin/sqlldr  
  ./  
sqlldr          100%  713KB  712.9KB/s   00:00
```

Add More Stuff

- Try to run it.

```
[oracle@ny11x04 instantclient_10_2]$ sqlldr
Message 2100 not found; No message file for
product=RDBMS, facility=ULMessage 2100 not
found; No message file for product=RDBMS,
facility=UL
```

Add More Stuff

- First we need to create rdbms/mesg directories under our ~/instantclient_10_2 directory.

```
[oracle@ny11x04 instantclient_10_2]$ mkdir -p rdbms/mesg
[oracle@ny11x04 instantclient_10_2]$ cd rdbms/mesg/
[oracle@ny11x04 mesg]$ scp
  oracle@neptune:/d00/app/oracle/product/10.2.0/rdbms/mesg/ulus.m
  sb ./
ulus.msb          100%   37KB   37.0KB/s   00:00
```

Add More Stuff

- Now let's try to run it again

```
[oracle@ny11x04 instantclient_10_2]$ sqlldr
SQL*Loader: Release 10.2.0.3.0 - Production on Tue Mar 6 19:53:40
 2007
Copyright (c) 1982, 2005, Oracle. All rights reserved.
Usage: SQLLDR keyword=value [,keyword=value,...]
Valid Keywords:
    userid -- ORACLE username/password

... output truncated
```



Add More Stuff

- Now we are on a roll. Let's add my favor tool, tkprof.

```
[oracle@ny11x04 instantclient_10_2]$ scp
  oracle@neptune:/d00/app/oracle/product/10.2.0/bin/tkprof ./
tkprof                               100% 136KB 135.8KB/s   00:00
[oracle@ny11x04 instantclient_10_2]$ mkdir -p oracore/mesg/
[oracle@ny11x04 instantclient_10_2]$ cd oracore/mesg/
[oracle@ny11x04 mesg]$ scp
  oracle@neptune:/d00/app/oracle/product/10.2.0/oracore/mesg/lrmu
  s.msb ./
lrmus.msb                             100% 4608      4.5KB/s   00:00
[oracle@ny11x04 instantclient_10_2]$ tkprof test.trc test.out
TKPROF: Release 10.2.0.3.0 - Production on Tue Mar 6 20:06:07
      2007
Copyright (c) 1982, 2005, Oracle.  All rights reserved.
```

Add More Stuff

- Now for the final piece, let's add a more complex tool like OCM (Oracle Connection Manager).

```
[oracle@ny11x04 instantclient_10_2]$ scp  
  oracle@neptune:/d00/app/oracle/product/10.2.0/bin/cmctl ./  
cmctl                                100% 195KB 195.0KB/s   00:00
```



Add More Stuff

- Copy `cmadmin` and `tnslsnr` from Oracle installation to the instant client bin directory.
 - Copy `network/msg/nlus.msb` from Oracle installation to the instant client `/network/msg` directory.
 - Copy `lib/libons.so` from Oracle installation to the instant client directory.
 - Copy `cman.ora` or create a `cman.ora` from Oracle installation to the instant client directory.
 - Create `network/log` under the instant client directory.
-

Add More Stuff

```
[oracle@ny11x04 instantclient_10_2]$ cmctl
CMCTL for Linux: Version 10.2.0.1.0 - Production on 14-MAR-2007 16:19:40
Copyright (c) 1996, 2005, Oracle. All rights reserved.
Welcome to CMCTL, type "help" for information.
CMCTL> administer
Current instance CMAN_ny11x04 is not yet started
Connections refer to (address=(protocol=tcp)(host=ny11x04)(port=1621)).
The command completed successfully.
CMCTL:CMAN_ny11x04> start
Starting Oracle Connection Manager instance CMAN_ny11x04. Please wait...
TNS-04077: WARNING: No password set for the Oracle Connection Manager
instance.
CMAN for Linux: Version 10.2.0.1.0 - Production
Status of the Instance
-----
Instance name          CMAN_ny11x04
Version                CMAN for Linux: Version 10.2.0.1.0 - Production
Start date             14-MAR-2007 16:19:43
Uptime                 0 days 0 hr. 0 min. 9 sec
Instance Config file   /app/oracle/instantclient_10_2/cman.ora
Instance Log directory /app/oracle/instantclient_10_2/network/log
Instance Trace directory /app/oracle/instantclient_10_2/network/log
The command completed successfully.
```

Howto

- So how do I know that we need to get `tnsus.msb` and put it under `$ORACLE_IC_HOME/network/mesg` for `tnsping`?
 - And how do I figure out all the other missing files that the program depends on and missing libraries in the case of OCM.
-

Howto

- The two tools that I used here is the strace and ldd program for Linux. On Solaris truss is the equivalent as strace.
 - strace or truss are the system call tracer.
 - ldd displays shared libraries dependency.
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Howto

- Here is the ldd output for cadmin.
- Notice it says “not found” for libons.so, a search on the Oracle installation it’s under \$ORACLE_HOME/lib directory.

```
[oracle@ny11x04 instantclient_10_2]$ ldd cadmin
    libnnz10.so => /app/oracle/instantclient_10_2/libnnz10.so
(0x0000002a9566c000)
    libons.so => not found
    libclntsh.so.10.1 =>
/app/oracle/instantclient_10_2/libclntsh.so.10.1 (0x0000002a95b1c000)
    libdl.so.2 => /lib64/libdl.so.2 (0x0000002a96eb9000)
    libm.so.6 => /lib64/tls/libm.so.6 (0x0000002a96fbd000)
    libpthread.so.0 => /lib64/tls/libpthread.so.0 (0x0000002a97143000)
    libnsl.so.1 => /lib64/libnsl.so.1 (0x0000002a97258000)
    libc.so.6 => /lib64/tls/libc.so.6 (0x0000002a97370000)
    /lib64/ld-linux-x86-64.so.2 (0x0000002a95556000)
```

Howto

- **Using strace to start the tnsping.**
- **You can also use strace to attach to an already running process.**

\$ strace tnsping mt1

```
open("/app/oracle/instantclient_10_2/network/mesg/tnsus.msb",  
O_RDONLY) = -1 ENOENT (No such file or directory)
```

```
write(1, "Message 3511 not found; No messa"..., 317Message 3511  
not found; No message file for product=network,  
facility=TNSTMessage 3512 not found; No message file for  
product=network, facility=TNSTAttempting to contact  
(DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL =  
TCP)(HOST = saturn)(PORT = 1521))) (CONNECT_DATA =  
(SERVER = DEDICATED) (SERVICE_NAME = mt1)))  
) = 317
```

Howto

- In Oracle Connection Manager's case, there are also two binaries `cmadmin` and `tnslsnr` that `cmctl` uses. Without it, `cmctl` keeps giving me TNS-4012 when I execute the start command. Through examining `strace` output closely it reveals that it's looking for `cmadmin` and `tnslsnr` under the `bin` directory.
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Final Step

- Now that we got everything working. Simply zip the instantclient_10_2 directory and you got yourself a very own instant client bundle.
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Final Words

- As you can see, package instant client with tnsping, sqlldr, exp/imp, tkprof, connection manager makes the instant client much more powerful.
 - There is a jump server between you and the DB box that you can't use one of your favor tool to connect to it? No problem, run instant client with Connection Manager to route your SQL*Net traffic.
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Final Words

- I hope that with the understanding of instant client you gained in this presentation, it opens up many possibilities for you. Whether it's for your own personal toolbox, or deploying something that was difficult to do previously. And I'd love to hear what you have done with your instant client after this session.
 - Let me know your story, send me e-mail at **richard.c.ji@gmail.com**.
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