How to create your own Instant Client Bundle

By Richard Ji
Introduction

- How many people have used instant client?
Oracle instant client provides an easy and quick way of deploying your OCI, OCCI, JDBC OCI based applications.
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
  mtl =
    (DESCRIPTION =
      (ADDRESS_LIST =
        (ADDRESS = (PROTOCOL = TCP)(HOST = saturn)(PORT = 1521))
      )
    )
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = mtl)
    )
  )
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)
  - orail8n.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:

```bash
$ 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=TNS
Message 3512 not found; No message file for product=network, facility=TNS
Attempting 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.
$ 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/mesg/tnsus.msb ./

tnsus.msb                          100%   46KB   45.5KB/s  00:00
Let’s give it a try again.

[oracle@ny1lx04 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@nyllx04 instantclient_10_2]$ scp
  oracle@neptune:/d00/app/oracle/product/10.2.0/bin/sqlldr
  ./
sqlldr
  100%  713KB  712.9KB/s   00:00
```
Try to run it.

[oracle@nyllx04 instantclient_10_2]$ sqlldr
Message 2100 not found; No message file for product=RDBMS, facility=UL
Message 2100 not found; No message file for product=RDBMS, facility=UL
First we need to create rdbms/mesg directories under our ~/instantclient_10_2 directory.

```
[oracle@ny1lx04 instantclient_10_2]$ mkdir -p rdbms/mesg
[oracle@ny1lx04 instantclient_10_2]$ cd rdbms/mesg/
[oracle@ny1lx04 mesg]$ scp
  oracle@neptune:/d00/app/oracle/product/10.2.0/rdbms/mesg/ulus.msb ./
ulus.msb                           100%  37KB  37.0KB/s   00:00
```
Add More Stuff

- Now let’s try to run it again

[oracle@ny1lx04 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
Now we are on a roll. Let’s add my favor tool, tkprof.

```
[oracle@ny1lx04 instantclient_10_2]$ scp
    oracle@neptune:/d00/app/oracle/product/10.2.0/bin/tkprof ./
tkprof 100%  136KB 135.8KB/s  00:00
[oracle@ny1lx04 instantclient_10_2]$ mkdir -p oracore/mesg/
[oracle@ny1lx04 instantclient_10_2]$ cd oracore/mesg/
[oracle@ny1lx04 mesg]$ scp
    oracle@neptune:/d00/app/oracle/product/10.2.0/oracore/mesg/lrmus.msb ./
lrmus.msb 100% 4608     4.5KB/s   00:00
[oracle@ny1lx04 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@ny1lx04 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/mesg/nlus.msb` from Oracle installation to the instant client `/network/mesg` 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@ny1lx04 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_ny1lx04 is not yet started
Connections refer to (address=(protocol=tcp)(host=ny1lx04)(port=1621)).
The command completed successfully.
CMCTL:CMAN_ny1lx04> start
Starting Oracle Connection Manager instance CMAN_ny1lx04. 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_ny1lx04
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.
Here is the ldd output for cmadmin.
Notice it says “not found” for libons.so, a search on the Oracle installation it’s under $ORACLE_HOME/lib directory.

[oracle@ny1lx04 instantclient_10_2]$ ldd cmadmin
    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)
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=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)))
) = 317
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.
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.
As you can see, package instant client with tnsping, sqllldr, 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.
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.