



Quick Guide – Time Machine UNIX for Oracle 12c

The following is a quick guide to evaluating Solution-Soft’s Time Machine with Oracle 12c on UNIX operating systems. This paper will show how simple it is to integrate Time Machine to perform date & time (temporal) testing with Oracle 12c.

Note: This paper is specific to Time Machine for use with UNIX. For those running on other platforms please refer to the Time Machine manual or contact Solution-Soft support at support@solution-soft.com

Time Machine is supported on Windows, AIX, HP-UX, Linux, and Solaris.

System Configuration used in creating this paper:

OS: CentOS 64-bit

Time Machine: Version 10.1R1 for Linux Kernel 2.6.18

Oracle: Oracle 12c, Release 1

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Configuration (SQL*Plus)

Before starting up SQL*Plus to access your database, you need to set up oracle shell environmental variables.

1. Execute the following commands depending on your shell. These values are derived from the Oracle installation process. (Note: The values below serve as an example, your environment may have a different SID or Path.)

a. For csh

```
setenv ORACLE_SID "orcle"  
setenv ORACLE_BASE "/u01/app/oracle1"  
setenv ORACLE_HOME "/u01/app/oracle1/product/12.1.0/dbhome_1"
```

b. For bash

```
set ORACLE_SID=orcle  
set ORACLE_BASE=/u01/app/oracle1  
set ORACLE_HOME=/u01/app/oracle1/product/12.1.0/dbhome_1
```

c. Type "**env | grep ora**" to check if the environment variables were loaded.

Setting Up a Second Instance

With one instance of Oracle; all users connect to that instance will see the same virtual clock. It is sometimes useful to have multiple Oracle instances; so that different users can test concurrently with different virtual clocks. Or one group of users can see one virtual clock and other group can see the system clock.

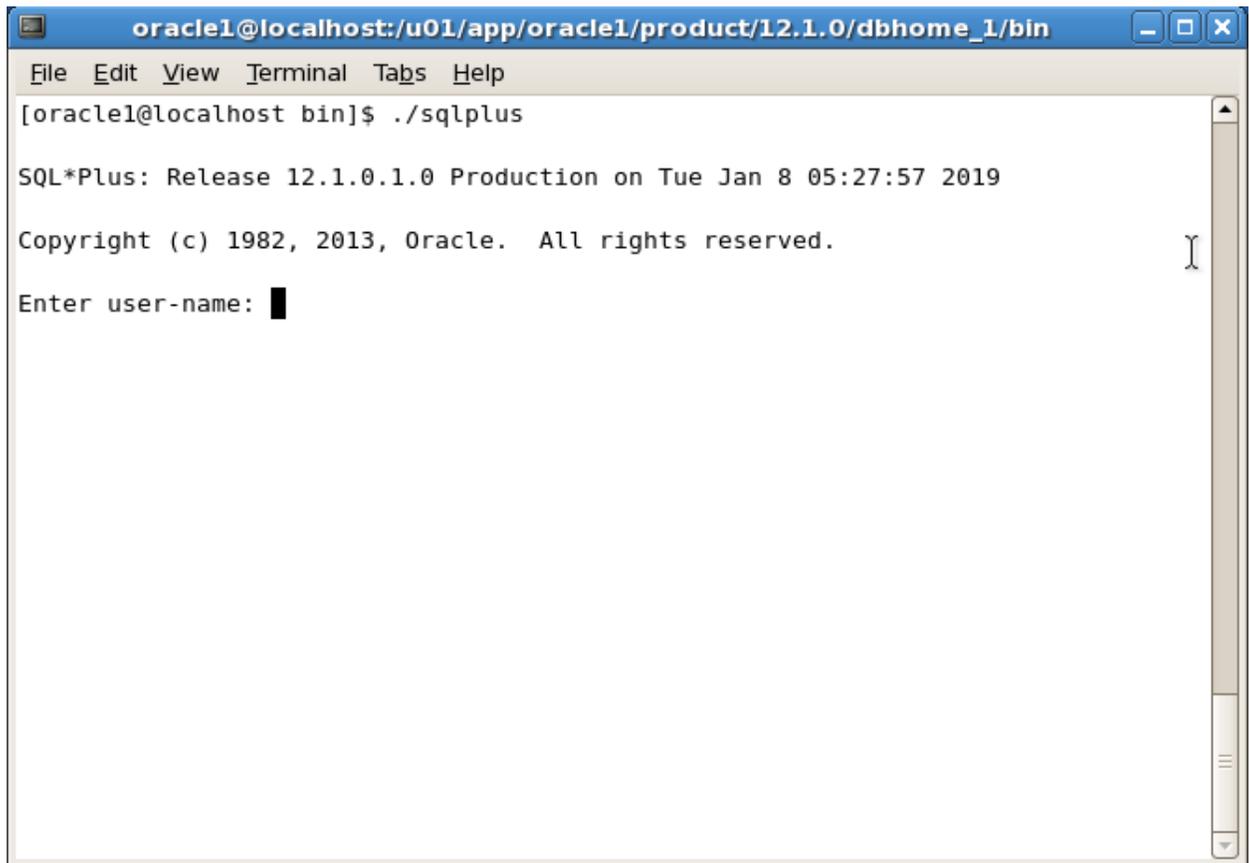
To set up a second instance for concurrent time testing, install Oracle under a different user with a different SID.

Then different virtual clocks can be set against different SID to enable concurrent testing of different virtual clocks.

Time Machine Configuration

Before running Time Machine to create a virtual clock and access it from your SQL*Plus database, you need to configure the environmental variables from the Configuration (SQL*Plus) section above.

1. Go into the Time Machine directory (**/etc/ssstm**) and execute the below command as **root**
 - a. `tmuser -a -u oracle -y 5`
 - i. Please refer to Time Machine manual for more information on the acceptable commands.
 - ii. Any user can be given a virtual clock, the key is to assign a virtual clock to the user who will be running the SQL database, otherwise the database will not receive the virtual time.
2. Go into `/u01/app/oracle/product/12.1.0/dbhome_1/bin` and execute **“./sqlplus”**.
3. Log in and you will see your virtual date in the SQL welcome header.
 - a. Below you can see our virtual date that we set for 5 years in the future, year 2019.



```
oracle1@localhost:/u01/app/oracle1/product/12.1.0/dbhome_1/bin
File Edit View Terminal Tabs Help
[oracle1@localhost bin]$ ./sqlplus

SQL*Plus: Release 12.1.0.1.0 Production on Tue Jan 8 05:27:57 2019

Copyright (c) 1982, 2013, Oracle. All rights reserved.

Enter user-name: █
```

Client/Listener Configuration (External Client Accessing DB)

Before running the client you need to start the Listener service. Before running the Listener service you need to make sure that you've started up the Oracle Database ("**startup**" in sqlplus).

1. Go to the "**u01/app/oracle1/product/12.1.0/dbhome_1/bin**" and execute "**./lsnrctl**".
 - a. If you receive the below error, you must go into the "**listener.ora**" file located in the directory **u01/app/oracle1/product/12.1.0/dbhome_1/network/admin** and comment out with the '#' character the line '(ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))'

```
TNSLSNR for Linux: Version 12.1.0.1.0 - Production
System parameter file is
/u01/app/oracle1/product/12.1.0/dbhome_1/network/admin/listener.ora
Log messages written to
/u01/app/oracle1/diag/tnslsnr/ORL5/listener/alert/log.xml
Error listening on:
(DESCRIPTION=(ADDRESS=(PROTOCOL=IPC)(KEY=EXTPROC1521)))
TNS-12555: TNS:permission denied
TNS-12560: TNS:protocol adapter error
TNS-00525: Insufficient privilege for operation
Linux Error: 1: Operation not permitted
```

Fixed listener.ora file

```
# listener.ora Network Configuration File:
# Generated by Oracle configuration tools.
LISTENER =
(DESCRIPTION_LIST =
(DESCRIPTION =
# (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))
(ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
)
)
ADR_BASE_LISTENER = /u01/app/oracle1
```

2. Enter "**start**"
3. Now the listener service is started and you can make outside client queries to the database.
 - a. The Listener Configuration uses 3 files "**listener.ora**" "**tnsnames.ora**" "**sqlnet.ora**" located in "**u01/app/oracle1/product/12.1.0/dbhome_1/network/admin**" that can be configured as you wish. However the default configuration is fine and how we left it in this guide. For more details please refer to

http://docs.oracle.com/cd/E16655_01/network.121/e17610/listenercfg.htm

The next steps show how to install the Oracle client on a remote machine. This guide installs a 64-bit Windows client and connects to the Oracle 12c database. The below link has instructions for configuring the client for Unix/Linux/Windows.

http://docs.oracle.com/cd/E16655_01/server.121/e18404/apd.htm

4. Download the “**Oracle Instant Client**” for your correct platform with the below link

<http://www.oracle.com/technetwork/database/features/instant-client/index-097480.html>

a. Download the “**Instant Client - Basic**” and “**Instant Client Package - SQL*Plus**”

5. Unzip both packages into the top directory, e.g. **C:\instantclient_12_1**

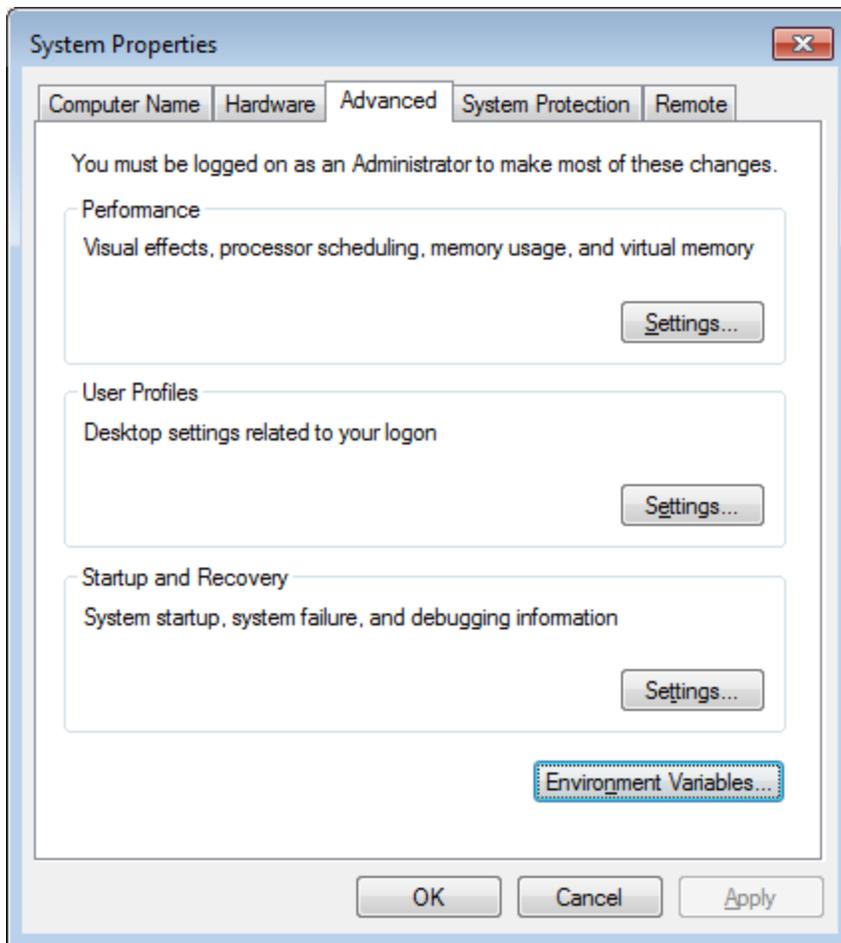
6. Make a copy of the “**tnsnames.ora**” file from the server directory “**u01/app/oracle1/product/12.1.0/dbhome_1/network/admin**” to the client directory **C:\instantclient_12_1**

a. If any problems occur connecting the client, make sure the HOST value inside the “**tnsnames.ora**” is the explicit IP address of the server 192.xxx.xx.xxx

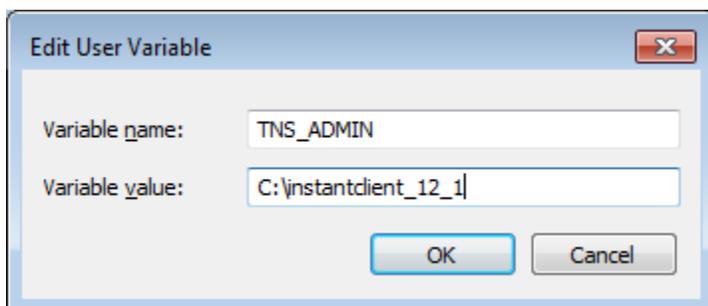
b. You may also need to explicitly enter the address 192.xxx.xx.xxx in replace of “localhost” in the listener.ora and tnsnames.ora files in the server directory.

Before running the **sqlplus.exe** inside **C:\instantclient_12_1**, environment variables need to be set.

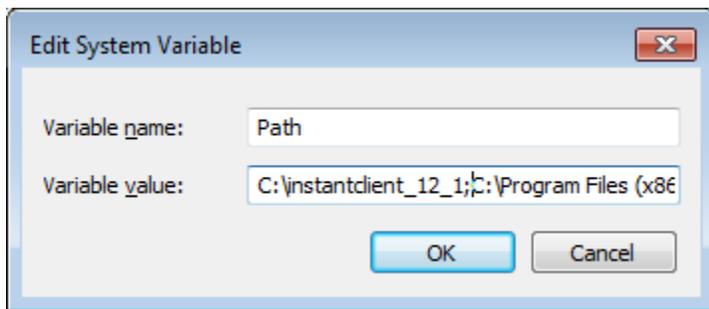
7. Right click **My Computer** and click Properties. Click **Advanced system settings** and click **Environmental Variables...**



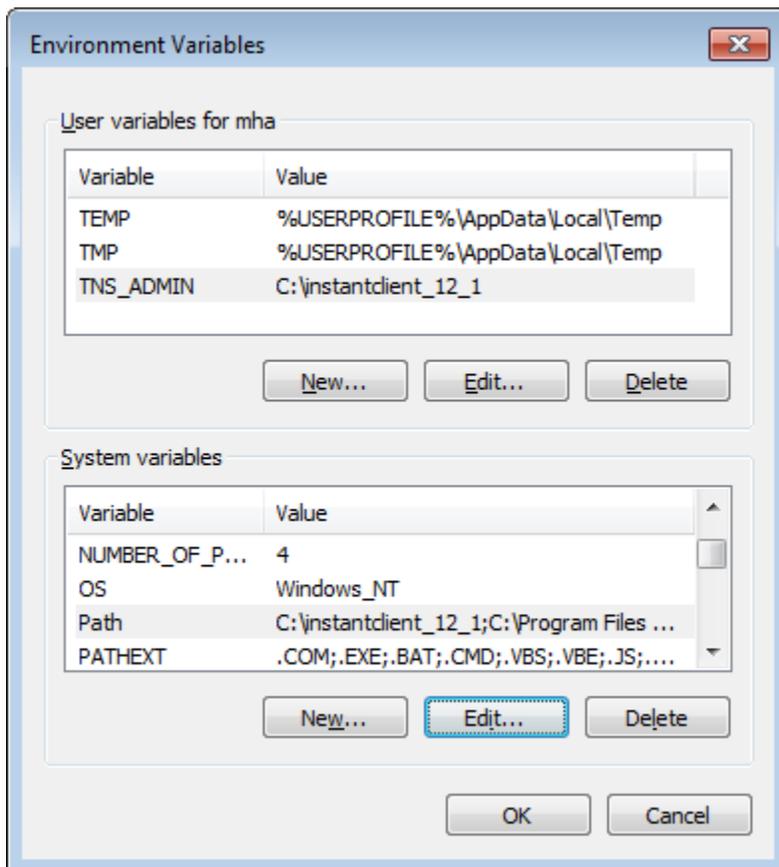
8. Create a new “User Variables” called **TNS_ADMIN** with the installed client folder **C:\instantclient_12_1** as the Variable value.



9. Scroll down in “System variables” and edit the “**Path**” variable. Paste the location **C:\instantclient_12_1** in the Variable value in front of all the present values. Make sure to include a ‘;’ to separate it from the current values. (Shown below)



10. Press **OK**. Your final window should look similar to below



11. Open the **C:\instantclient_12_1** folder and execute the **sqlplus.exe**

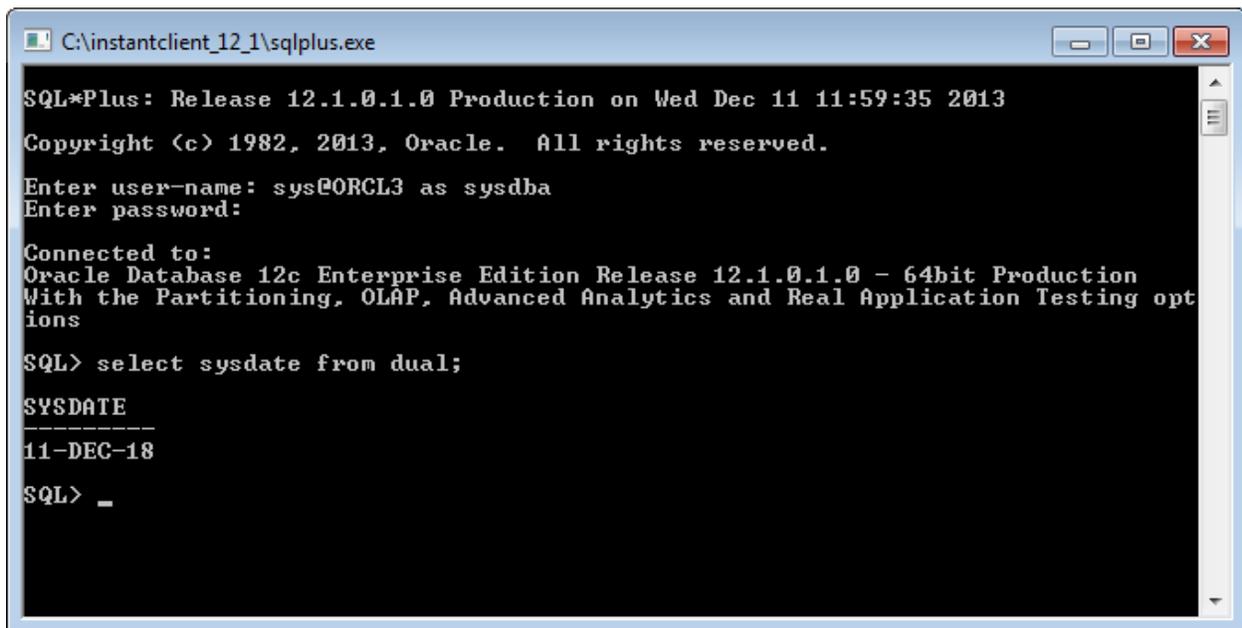
12. For the sake of testing, use the username **sys** and the password we created before to log in. The format is **username@identifier**. Then your password.

- a. **ORACLE** is the identifier from our **tnsnames.ora** file. It's a representation of hostname/sid.
- b. If you get the error "*ORA-12543: TNS: destination host unreachable*" and your configuration is completely correct, then **turn off** the **firewall** on the server/database system and you will be able to connect with the client.

For more details refer to the below link

http://docs.oracle.com/cd/E16655_01/server.121/e18404/apd.htm

13. You've successfully installed an Oracle client and remotely logged into your database server. Below is the final screenshot of accessing the virtual date from the client.



```
C:\instantclient_12_1\sqlplus.exe
SQL*Plus: Release 12.1.0.1.0 Production on Wed Dec 11 11:59:35 2013
Copyright (c) 1982, 2013, Oracle. All rights reserved.
Enter user-name: sys@ORCL3 as sysdba
Enter password:
Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
SQL> select sysdate from dual;
SYSDATE
-----
11-DEC-18
SQL> _
```

As you can see, the SQL call retrieves the virtual date we created (5 years in the future to 2018), differing from the SQL header system date.

- a. If you do not get the virtual date, you have to restart the LISTENER service.
 - i. Close and reopen the client without logging in.
 - ii. Go to the "**u01/app/oracle1/product/12.1.0/dbhome_1/bin**" and execute "**./lsnrctl**"
 - iii. Enter "**stop**" then "**start**"
 - iv. Log into the client and check the date. You will now see the virtual date.