

## **Quick Start Guide – Time Machine Linux for Oracle11g**

The following is a quick guide to evaluating Solution-Soft's Time Machine with Oracle11g on Linux installed on an Intel machine. This paper will show how simple it is to integrate Time Machine to perform date & time (temporal) testing with two instances of Oracle11g running under separate user accounts with different virtual dates.

NOTE: This paper is specific to Time Machine for use with Linux. For those running on other platforms please refer to the Time Machine manual or contact Solution-Soft support at <a href="support@solution-soft.com">support@solution-soft.com</a>

Time Machine for Oracle11g is supported on Windows, AIX, HP-UX, Linux, and Solaris

System Configuration used in creating this paper: OS: Oracle Enterprise Linux, 1 CPU, 2.4 Gb Ram

Time Machine:Version 6.1 R6 for Linux Kernel 2.6Oracle:Oracle 11g, Release 2

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### **Oracle11g Installation**

- Create 2 user accounts that will be using the Oracle db. We used "oracle1" and "oracle2".
   i. Create 2 folders for each user, "u01" and "u02", outside of the user's home directories.
- 2. Download the 2 CDs for Oracle11g on Linux
  - i. Files we used were linux.x64\_11gR2\_database\_1of2.zip, linux.x64\_11gR2\_database\_2of2.zip
- 3. Unzip both files inside the same directory, (for **oracle1** unzip in **u01**, for **oracle2** unzip in **u02**). Do not unzip each CD in different directories otherwise you will receive the error below

Invalid source path '../stage/Components/oracle.jdk/1.5.0.17.0/1/DataFiles' specified for unzip. Unzip command failed. Please check oraparam.ini and specify a valid source path. : No such file or directory

- i. **Warning**: Each user installing Oracle needs to have full ownership of their installation files. So in the "oracle1" folder the 2 zip files should be under the ownership of user "oracle1" before unzipping. Same goes for oracle2. Otherwise you need to manually change the ownership of the entire unzipped directory with chown or chmod.
- 4. Log in as the first user, "**oracle1**" and go into the "**u01/database/**" folder and execute "**./runInstaller**". Then follow the installation GUI.



5. For Configure Security Updates, Enter your email address you registered with Oracle and press **Next** i. The checkbox is optional: for this install we unchecked it

X Oracle Database 11g Release 2 I	nstaller - Installing database - Step	1 of 9	
Configure Security Update	s		DATABASE 118
Configure Security Updates	Provide your email address to be and initiate configuration manag	e informed of security issues, install the p jer. <u>View details</u>	roduct
Installation Option Grid Options Install Type Typical Installation Prerequisite Checks Summary Install Product Einish	Email:	Easier for you if you use your My Oracle address/username. ates via My Oracle Support.	] : Support email
Help		< <u>B</u> ack	Next > Einish Cancel

- 6. For Installation Options choose the appropriate option and click Next

   We selected "Create and configure database". This option creates a standard database along with installing Oracle11g.

X Oracle Database 11g Release 2 Ir	staller - Installing database - Step 2 of 9	Name and Add.	
Select Installation Option	مر. مر		LE <b>11</b> g
Configure Security Updates Installation Option Crid Options Crid Optio	Select any of the following install options.		
Help		< <u>B</u> ack <u>N</u> ext >	Einish Cancel

### 7. For System Class choose your option and click Next i. We selected "Desktop Class"

X Oracle Database 11g Release 2 I	nstaller - Installing database - Step 3 of 8
System Class	
Configure Security Updates Installation Option System Class Typical Installation Prerequisite Checks Summary Install Product Finish	<ul> <li>● Desktop Class</li> <li>Choose this option if you are installing on a laptop or desktop class system. This option includes a starter database and allows minimal configuration.</li> <li>● Server Class</li> <li>Choose this option if you are installing on a server class system, such as what you would use when deploying Oracle in a production data center. This option allows for more advanced configuration options.</li> </ul>
Help	- < <u>₿</u> ack <u>N</u> ext > <u>Einish</u> Cancel

- 8. For *Typical Installation*, the fields will be populated. We kept the default locations and added a password
  - i. Passwords must be 8 characters minimum containing at least one upper case letter, one lower case letter, and one number

🗙 Oracle Database 11g Release 2 Ir	nstaller - Installing database - 1	Step 4 of 8		×
Typical Install Configurati	on		DATABASE 118	ġ.
Configure Security Updates Installation Option System Class Typical Installation Prerequisite Checks Summary Install Product Finish	Perform full Database insta Oracle ba <u>s</u> e: Software <u>location</u> : <u>D</u> atabase file location: Database <u>e</u> dition: Character Se <u>t</u> : OSDB <u>A</u> Group: <u>G</u> lobal database name: <u>G</u> lobal database name: <u>G</u> onfirm Password:	allation with basic configuration. /u01/app/oracle1 /u01/app/oracle1/product/11.2.0/dbhor /u01/app/oracle1/product/11.2.0/dbhor /u01/app/oracle1/oradata Enterprise Edition (4.29GB) Default (WE8MSWIN1252) Oracle1 oracle1 orcle.solution-soft.com ********	ne_1  Brows Brows Brows	se se
Help		< <u>B</u> ack	Next > Einish Cance	el

#### ii. If you receive the below error, change the "Global database name"

										-
		(INS-35	074] The	specified	SID is alrea	ady in use.				
								Dataile		OK
								Decuns		<u></u> 6
Suce - Th	. <i>c</i> no	cified S	Dues al	readu reali	torad in th	o oratab fi		c (oratak	Nont	
<b>ause</b> - Th erver. The	e spe orat	cified S ab file is	D was ali used by	ready regis Oracle pro	tered in th oducts to	ne oratab fi detect exis	ile (/et ting d	ic/oratab atabase i	) on t instan	the ices.
<b>ause -</b> Th erver. The <b>action -</b> Sp	e spe orat iecify	cified S ab file is a uniqu	D was alı s used by ie Oracle	ready regis Oracle pro system ido	tered in th aducts to entifier (Sl	ne oratab fi detect exis D):	ile (/et ting d	tc/oratab atabase i	o) on t instan	the ices.
Cause - Th erver. The Action - Sp	e spe orat ecify	cified S ab file is a uniqu	D was ali used by ie Oracle	ready regis Oracle pro system ido	tered in th oducts to entifier (SI	ne oratab fi detect exis D):	ile (/et ting d	ic/oratab atabase i	) on t instan	the ices.
Cause - Th server, The Action - Sp	e spe orat ecify	cified S ab file is a uniqu	D was alı used by Ie Oracle	ready regis Oracle pri system idi	tered in th oducts to entifier (Sl	ne oratab fi detect exis D):	ile (/et ting d	atabase i	) on t instan	ihe ices.

9. For Prerequisite Checks, the course of action will depend on your errors given.

X Oracle Database 11g Release 2 In:	staller - Installing database - Step 5 of 8		
Perform Prerequisite Check		ACLE A B A S E	11 <sup>g</sup>
Configure Security Updates Installation Option System Class	Some of the minimum requirements for installation are not completed. Review and the following table, and recheck the system.	d fix the issue:	: listed in ] <u>Ig</u> nore All
Typical Installation	Checks	Status	Fixable
Description of the	🙆 Checks	20	11
Prerequisite Checks	😼 Swap Size	Failed	
y Summary	💮 😳 Group Membership: oinstall	Failed	Yes
O Install Product	🔤 🧠 Hard Limit: maximum open file descriptors	Failed	Yes
	This is a prerequisite condition to test whether sufficient total swap space is avail system. <u>(more details)</u> Expected Value : 2.34GB (2457600.0KB) Actual Value : 2.01GB (2104504.0KB)	able on the	
Help	<pre></pre>	] [Einish]	Cancel

### i. Click Fix & Check Again

i. Follow the instructions on the bottom of the pop up window to execute the script

xecute	d as the "root" user on the given nodes".
cript:	/tmp/CVU_11.2.0.1.0_oracle1/runfixup.sh
lodes:	ORL5
o exec	ute the fixup scripts:
2. Log	in as "root"
3. Rui 4. Ret	the scripts up to this window and click "OK" to continue
4. REI	and to this window and there or to continue

- ii. If presented with a Swap Size error, the script will be unable to fix the issue and you will have to manually assign more space.
  - i. However, if your usage permits it, you can click the top right "**Ignore All**" and click **Next**. Being as this guide is a Proof-of-Concept, we chose **Ignore All**

erform Prerequisite Check				<b>1</b> g
Configure Security Updates Installation Option System Class	Some of the minimum requirement the following table, and recheck the Check Again Eix & Check Again	nts for installation are not complete ne system. ain Show Failed 🗨	d. Review and fix the issues I	isted in <u>Ig</u> nore A
Typical Installation		Checks	Status	Fixable
Prerequisite Checks	Checks		an a	1
Commentation (	South Size		Fanca	
summary				
Install Product				
Finish				
	This is a prerequisite condition to	test whether sufficient total swap s	space is available on the	
	This is a prerequisite condition to system. (more details) Expected Value 12 34GB (24576)	test whether sufficient total swap s	space is available on the	
	This is a prerequisite condition to system. (more details) Expected Value : 2.34GB (245760 Actual Value : 2.01GB (210450	test whether sufficient total swap s 00.0KB) 04.0KB)	space is available on the	

10. Click Finish and wait for Installation to complete



11. If the below error occurs during the install, Click **OK** to close the window and **Retry** at the main install window. For us, the **Retry** fixed the error



12. During the *Database Configuration Assistant*, if a Warning pops up, take down the info as a precaution and click **OK** to resume install.

X X Database Configuration Assistant : Warning Enterprise manager configuration failed due to the following error -I Listener is not up or database service is not registered with it. Start the Listener and register database service and run EM Configuration Assistant again . Refer to the log file at /u01/app/oracle1/cfgtoollogs/dbca/oracle1/emConfig.log for more details. You can retry configuring this database with Enterprise Manager later by manually running /u01/app/oracle1/product/11.2.0 /dbhome\_1/bin/emca script. ОK 00 × Database Configuration Assistant Copying database files **Ideal Platform for** Creating and starting Oracle instance **Grid Computing** Completing Database Creation Low cost servers and storage **Highest availability** Clone database creation in progress **Best scalability** 2% Log files for the current operation are located at: /u01/app/oracle1/cfgtoollogs/dbca/oracle1 Stop

13. On the completed Database Configuration Assistant, click Password Management.

X Database Configuration Assista	nt
Database creation complete. Fo /u01/app/oracle1/cfgtoollogs	or details check the logfiles at: /dbca/oracle1.
Database Information: Global Database Name: System Identifier(SID): Server Parameter File name:	oracle1.solution-soft.com oracle1 /u01/app/oracle1/product/11.2.0/dbhome_1/dbs/spfileoracle1.ora
Note: All database accounts ex Password Management button accounts (except DBSNMP and accounts you will use. Oracle Co immediately after unlocking the	cept SYS, SYSTEM, DBSNMP, and SYSMAN are locked. Select the to view a complete list of locked accounts or to manage the database SYSMAN). From the Password Management window, unlock only the orporation strongly recommends changing the default passwords e account.
	(Password Management)
i. For this install we	assigned a default password for the accounts SYS and SYS

For this install we assigned a default password for the accounts SYS and SYSTEM. Click **OK** when finished.

User Name	Lock Account?	New Password	Confirm Password	1
ราร				
SYSTEM				
OUTLN	×			
FLOWS_FILES	×			3
MDSYS	× .			
ORDSYS	×			_
EXFSYS	×			
WMSYS	~			
APPQOSSYS	× 1			
APEX_030200	×			
OWBSYS_AUDIT	×			
ORDDATA	×			
CTXSYS				
	-			1

ii. The password must be minimum 8 characters long and contain at least one upper case character, one lower case character and one digit.

14. Afterwards, follow the instructions to execute the **root.sh** script. When asked to "**Enter the full pathname of the local bin directory**:" we entered the default "**/usr/local/bin**" and selected the recommended answers to the remaining questions. See the terminal picture below

X Execute Configuration scripts	
The following configuration scripts need to be executed	I as the "root" user.
∑cripts to be executed:	
Number Script Location	
1 /u01/app/oracle1/product/11.2.0/dbhome	e_1/root.sh
To execute the configuration scripts: 1. Open a terminal window	
2. Log in as "root"	
3. Run the scripts	
4. Return to this window and click "OK" to continue	
Help	ОК
root@ORL5:/u01/app/oracle1/product/11.2.0/dbhome 1	
unning Oracle 11g root sh script	
The following environment variables are set as	:
ORACLE_OWNER= oracle1 ORACLE HOME= /u01/app/oracle1/product/11.	2.0/dbhome 1
nter the full pathname of the local bin direc	tory: [/usr/local/bin]: /usr/local
pin "he file "dbhome" already exists in /usr/local	/bin. Overwrite it? (v/n)
n]: y	areas as rearrant rat 14614
Copying dbhome to /usr/local/bin	
The file "oraenv" already exists in /usr/local,	/bin. Overwrite it? (y/n)
Copying oraenv to /usr/local/bin	
The file "coraenv" already exists in /usr/loca	l/bin. Overwrite it? (y/n)
n]: y	
Copying coraeny to /usr/local/bin	
Intries will be added to the /etc/oratab file .	as needed by
Database Configuration Assistant when a databa	se is created
finished running generic part of root.sh scrip	Ê.
그렇게 잘 잘 못 못 못 잘 못 했는 것 것 같은 것	
Now product-specific root actions will be perfo	ormed.

### 15. Click Next and Close

nstall Product		TABASE 118
Configure Security Updates Installation Option System Class Typical Installation Prerequisite Checks Summary Install Product Finish	Progress         100%         Status         Oracle Database installation         Prepare         Copy files         Link binaries         Setup files         Oracle Database configuration         Oracle Database configuration Assistant         Oracle Database Configuration Assistant         Oracle Configuration Manager Configuration (Optional)         Execute Root Scripts for Oracle Database installation	Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded
	Data Warehousing	Details Retry Skip Extreme Performance Integrated Analytics Enterprise-Ready

X Oracle Database 11g Release 2 Ir	staller - Installing database - Step 8 of 8
Finish	
Configure Security Updates Installation Option System Class Typical Installation Prerequisite Checks Summary Install Product Finish	The installation of Oracle Database was successful.
Help	< <u>Back</u> <u>Next</u> > <u>Einish</u> <u>Close</u>

16. Now user "**oracle1**" is fully installed. For "**oracle2**" follow same steps; log in as oracle2, run the installer and use the same name convention but with a '2'.

\*\* If installing 2 oracle11g instances, you may get the below error. If so, go to the **/etc/oralnst.loc** file and modify the file to say u02 instead of u01



### Post-Install Configuration (SQLPLUS)

Before starting up SQLPLUS 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 step 8 of the "Oracle11g Install".
  - a. For csh setenv ORACLE\_SID "orcle" setenv ORACLE\_BASE "/u01/app/oracle1" setenv ORACLE\_HOME "/u01/app/oracle1/product/11.2.0/dbhome\_1"
  - b. For bash export ORACLE\_SID=orcle export ORACLE\_BASE=/u01/app/oracle1 export ORACLE\_HOME=/u01/app/oracle1/product/11.2.0/dbhome\_1
  - c. Type "env | grep ora" to check if the environment variables were loaded.
- 2. Now go into your "/u01/app/oracle1/product/11.2.0/dbhome\_1/bin" folder and execute "./sqlplus".
- 3. Log in to **sqlplus** 
  - a. For our guide we used "**sys as sysdba**" with the password for **SYS** we created in the "Oracle11g Install" Step 13
- 4. Once logged in, type "startup" to officially start the Oracle database for use.
  - a. If you get the error "ORA-00845: MEMORY\_TARGET not supported on this system", you can follow guides online to umount/remount "tmpfs" and allocating more memory. However simply rebooting the machine solved the issue on our install.
- 5. Now you're done, enter "exit".

### Time Machine Configuration

Before running Time Machine to create a virtual clock and access it from your SQLPLUS database, you need to configure the environmental variables from the Post-Install Configuration (SQLPLUS) section up above.

- 1. Go into the Time Machine directory (*letc/ssstm*) and execute the below command as **root** a. tmuser –a –u oracle1 –x (enter your own virtual date)
  - i. -x or -h or -y are acceptable ending parameters to create your own time. For this guide we used -y and created a virtual date 5 years in the future.
- 2. Go back to "/u01/app/oracle1/product/11.2.0/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 2016.



### **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/11.2.0/dbhome\_1/bin" and execute "./Isnrctl".
  - a. If you receive the below error, you must go into the "listener.ora" file located in the directory u01/app/oracle1/product/11.2.0/dbhome\_1/network/admin and comment out with the '#' character the line ' (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))'

```
TNSLSNR for Linux: Version 11.2.0.1.0 - Production
        System parameter file is /u01/app/oracle1/product/11.2.0/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/11.2.0/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 <a href="http://download.oracle.com/docs/cd/E11882\_01/network.112/e10836/listenercfg.htm">http://download.oracle.com/docs/cd/E11882\_01/network.112/e10836/listenercfg.htm</a>

The next steps show how to install the Oracle client. This guide installs a 32bit Windows client and connects to the Oracle11g database. The below link has instructions for configuring the client for Unix/Linux/Windows.

http://download.oracle.com/docs/cd/E11882\_01/server.112/e16604/apd.htm#SQPUG157

- 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 "Client Basic" and "Client Package SQL \*Plus" We used the packages below.

Version 11.2.0.1.0

Instant Client Package - Basic: All files required to run OCI, OCCI, and JDBC-OCI applications <u>■ instantclient-basic-win32-11.2.0.1.0.zip</u> (51,458,190 bytes) \*Instant Client Package - SQL\*Plus: Additional libraries and executable for running SQL\*Plus with Instant Client

- 5. Unzip both packages into the top directory, e.g. C:\instantclient\_11\_2
- Make a copy of the "tnsnames.ora" file from the server directory "u01/app/oracle1/product/11.2.0/dbhome\_1/network/admin" to the client directory C:\instantclient\_11\_2
  - 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.xxx
  - b. You may also need to explicitly enter the address 192.xxx.xx.xxx in replace of "localhost" in the listener.ora and thshames.ora files in the server directory

Before running the **sqlplus.exe** inside **C:\instantclient\_11\_2**, environment variables need to be set.

7. Right click My Computer and click the Advanced Tab and click Environmental Variables

Systemine	store	Automa	tic Updates	Remote
General	Compute	er Name	Hardware	Advanced
ou must be l Performance Visual effect	ogged on as a s, processor s	an Administra cheduling, m	tor to make most of emory usage, and v	these changes. virtual memory
Iser Profiles			(	<u>S</u> ettings
Desktop sett	ings related to	o vour logon		
			(	S <u>e</u> ttings
Startup and I	Recovery			
System starti	up, system fail	ure, and deb	ugging information	Settings

Env	Environment Variables 🔹 💽 🔀	
ſĽ	ser variables for ad	lesiniotis
	Variable	Value
	TEMP TMP	C:\Documents and Settings\ C:\Documents and Settings\
	TNS_ADMIN	C:\instantclient_11_2
		New Edit Delete
	ystem variables	Value
-		
	OS	Windows_NT
	Path	C:\instantclient_11_2;C:\WINDOWS\sy
	PATHEXT PROCESSOR_A	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS; x86
		New Edit Delete
		OK Cancel

8. Create a new "User Variables" called **TNS\_ADMIN** with the installed client folder **C:\instantclient\_11\_2** as the Variable Value

Edit User Variable	e ? 🔀
Variable <u>n</u> ame:	TNS_ADMIN
Variable <u>v</u> alue:	C:\instantclient_11_2
	OK Cancel

Scroll down the "System variables" and edit the "Path" variable. Paste the location
 C:\instantclient\_11\_2 in the Variable value in front of all the present values. Make sure to include a ';' to separate it from the current values, as below.

Edit System Variable	
Variable <u>n</u> ame:	Path
Variable <u>v</u> alue:	C:\instantclient_11_2;%SystemRoot%\sys
	OK Cancel

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

Environment Variables		
٦	⊔ser variables for ad	lesiniotis
	Variable	Value
	TEMP TMP TNS_ADMIN	C:\Documents and Settings\ C:\Documents and Settings\ C:\instantclient_11_2
	System variables	<u>N</u> ew <u>E</u> dit <u>D</u> elete
	Variable	Value
	NUMBER_OF_P OS Path PATHEXT PROCESSOR_A	1 Windows_NT C:\instantclient_11_2;C:\WINDOWS\sy .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS; x86
		Ne <u>w</u> Edit Delete
		OK Cancel

- 11. Open the C:\instantclient\_11\_2 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. **ORCLE** 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://download.oracle.com/docs/cd/E11882\_01/server.112/e16604/apd.htm#SQPUG157

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, created earlier in the guide, from the client.



As you can see, the SQL call retrieves the virtual date we created (5 years in the future to 2016), 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/11.2.0/dbhome\_1/bin**" and execute "**./IsnrctI**".
  - iii. Enter "stop" then "start"
  - iv. Log into the client and check the date. You will now see the virtual date.