DbClone

Smart Database Cloning

DbClone Version 2.4 S

**Installation Guide
&
User Manual for DbClone**

Release Notes: July 05, 2003

**A Product of
Reston Technology Group Inc,**
13000 Bankfoot court
Herndon, VA 20171 USA
www.rtg-usa.com

703.810.8800

703.810.8802
Toll Free Support calls: 1-888-830-5663

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Welcome to DbClone

Thank you for using the DbClone. If your software license is a 30-day evaluation or trial version of DbClone it license can be converted to full user license. For additional information and advantages of DbClone, and how to buy the DbClone please visit our website at http://www.dbclone.com. Unless license is purchased this trial version will automatically expire after thirty days of installation.

Please Check the DbCLone CD or Downloaded Version to make sure that it matches with your UNIX Platform and Oracle Version.

Minimum Hardware and Software requirements:

Please read the following and make sure the Minimum Hardware and Software Resources are available, before starting the DbClone installation.

Dbclone doesn't need a stand-alone dedicated UNIX Server; it can share an existing UNIX Server, preinstalled with Oracle Enterprise Ver. (8.1.7, 9.2.0 or higher).

Server:
SUN, HP-UX, INTEL RED HAT LINUX, or IBM-AIX platform running Oracle Enterprise Edition Version 8i (8.1.7) or 9i (9.2.0) JDK 1.3.1 or later version

Browser:
DbClone is web-based and needs Microsoft I E 5.5 or later Version with JVM 1.4.1 Plug-in Netscape Navigator 7.0

CDROM:
The server on which the DbClone is to be installed should have the CDROM availability so that the DbClone application files can be copied on to the hard disk and installed.

Disk Space:
Minimum of **350 MB** disk space is required for installing DbClone. The free disk space information on the server can be found out by giving the command **df –k** on the console of any Unix Server. This command displays the available mount points on the server and also the free and used disk space.

Oracle version:
Preinstalled Oracle Enterprise Edition 8i(8.1.7) or 9i (9.2.0) is required for successful installation of DbClone.

I. DBCLONE INSTALLATION

1.1   Setting up environment for DbClone installation
Please take a minute to review the Hardware/Software requirements and the contents of the DbClone installation CD or the downloaded software and make sure that it contains the following files:

i. Install.sh
ii. DbClone.config
iii. DbClone.tar.Z
iv. User Manual.doc

Select a UNIX HOST Server:
Select a UNIX server (SUN, HP, INTEL, LINUX, IBM) with Oracle Enterprise Edition of 8.1.7. or 9.2.0 pre-installed and tested.

UNIX user Account for DbClone:
It is recommended to use the Oracle Unix account, or create a new account as *dbclone,* a Unix user account and password belonging to dba group

The user installing the DbClone must have all the privileges of Oracle User and must belong to the dba group.

Logon:

For example:
Logon to Unix, using the user account on the selected server by starting a "telnet" session and typing in at login prompt

Login: Oracle (or dbclone)
Password: *******

Banner >>> Sun 5.8.........
$

After successful login, please do a quick check and verify the Unix account and user environment as shown by following commands.

Check the proper creation of account by "id" command

$ id
uid=1003(oracle) gid=101(dba)
At first, a new DBCLONE_INSTALL installation directory should be created. Use the "make directory" Unix command:

$> mkdir DBCLONE_INSTALL

Check the proper creation of DBCLONE_INSTALL directory and check its permission. We recommend making this as a subdirectory within the user home directory.

Installing from DbClone CDROM:

Please identify the Operating Systems Platform and version of DbClone CDROM Purchased /Received from DbClone and make sure that it is correct and compatible with your Unix and Oracle Version.

Use the following command to verify

```
$ uname -a
SunOS sun31 5.8 Generic_108528-12 sun4u sparc SUNW, Ultra-4

$ echo $ORACLE_HOME
>/u02/app/oracle/product/9.2.0
```

Mounting DbClone CDROM on server:
Take your Unix system administrator's help in mounting the DbClone CDROM Purchased/Received from DbClone. You must have Unix super user (root) account privileges to mount a cdrom.

Place the DbClone CD in your Unix server CDROM.

Unix command for mounting cdrom for example: is:

```
$ mount /dev/dsk/c0t3d0s0 /cdrom
```
(this */dev/dsk/c0t3d0s0* may be different for your specific server)

Check the proper mounting of DbClone CDROM by using following Unix command

```
$ ls –la /cdrom

Install.sh
DbClone.config
DbClone.tar.Z
User Manual.doc
Readme.txt
```

If the CDROM is correctly mounted, you will see DbClone, in the above mentioned Documentation & Binaries Files,

Use the cp command to copy above files to a directory on the server where the application has to be installed. The DbClone application contains the DbClone.tar file for all supported versions of Oracle Database and also for 64 and 32 bit Oracle Database word sizes.
The Oracle Versions needed for DbClone application are Oracle 8.1.7 and Oracle 9.2.0 in 32-bit and 64-bit Oracle word sizes.

The user picks the appropriate DbClone.tar.Z file to copy on to the server, depending on the Oracle Version and also the Database Word Size.

For example, if the user has 64 bit Oracle 8.1.7 then the user picks **DbClone-8.1.7-64.tar.Z** file to his server along with install.sh, DbClone.config and User Manual.doc files.

For 32 bit Oracle 8.1.7, to copy on the Unix Server, the user picks **DbClone-8.1.7-32-tar.Z** file. Similarly for Oracle 9.2.0 32-bit, the file to copy is **DbClone-9.2.0-32-tar.Z** and for Oracle 9.2.0 64-bit, the file to copy is **DbClone-9.2.0-64-tar.Z**.
```
$ cp /cdrom/*  $ORACLE_HOME/DBCLONE_INSTALL.
```

1.1.1 Setting up and Verifying DbClone environment:

Please make sure that the server on which the DbClone has to be installed should either have Oracle 8i (version 8.1.7) or Oracle 9i (Version 9.2.0) installed and the user should belong to a dba group. Oracle provided Apache server that comes pre-installed at the $ORACLE_HOME/Apache/Apache directory.

After coping the files to DBCLONE_INSTALL directory the user should verify other inputs required to continue with the DbClone installation, like the hostname and local IP Address of the server on which DbClone is to be installed.

The input can be obtained from the Unix System Administrators or by using following commands on Unix user account, For example:

```
$ uname -a
> SunOS sun31 5.8 Generic_108528-12 sun4u sparc SUNW, Ultra-4

$ echo $ORACLE_HOME
> /u02/app/oracle/product/9.2.0

$ hostname
 > sun31

$ ifconfig –a
 > 10.2.2.43

$ df -k
```

Filesystem	Kbytes	Used	Avail	Capacity	Mounted on
/dev/dsk/c0t0d0s0	963869	50338	855699	6%	/
/dev/dsk/c0t0d0s5	2057501	754086	1241690	38%	/usr
/proc	0	0	0	0%	/proc
fd	0	0	0	0%	/dev/fd
mnttab	0	0	0	0%	/etc/mnttab
/dev/dsk/c0t0d0s3	482824	80806	353736	19%	/var
swap	699632	24	699608	1%	/var/run
/dev/dsk/c0t2d0s0	6193583	886295	5245353	15%	/u04
/dev/dsk/c2t0d0s0	5041987	3611186	1380382	73%	/u02
/dev/dsk/c2t0d0s1	3650488	6044	3607940	1%	/u03
/dev/dsk/c0t2d0s3	6193583	1018743	5112905	17%	/u05
/dev/dsk/c0t0d0s4	482824	5114	429428	2%	/opt
/dev/dsk/c0t0d0s7	2569479	692905	1825185	28%	/u01
/dev/dsk/c0t2d0s4	6193583	1576791	4554857	26%	/u06
/dev/dsk/c0t2d0s5	6193583	2749079	3382569	45%	/u07
/dev/dsk/c0t2d0s6	5161437	1696030	3413793	34%	/u08
/dev/dsk/c0t2d0s7	4851576	1220421	3582640	26%	/u09
/dev/dsk/c0t0d0s6	1490275	618689	811975	44%	/export/home

1.1.1.1 Editing and Verifying DbClone environment configuration file:

Next step to install DbClone after verifying the required inputs is the DbClone environment variables in DbClone.Config, by using vi editor.

Please verify the value of the following before editing the DbClone.Config file
1. Oracle Version
2. Oracle_Home
3. Apache_Home
4. Apache_Port # for Oracle_Home where DbClone will be installed (5555 or 7777)
5. Database Listener Port # (1521)
6. Oracle_Admin directory where the bdump, cdump & udump directories will be created
7. Oradata_Dir directory where the DbClone database files will be created
8. Control_Dir directories where the DbClone database control files will be created which are required for the DbClone database startup
9. Tar_Location directory where the DbClone installation and configuration files are kept and this is also the directory where the installation log file will be written
10. Ip_Address of the Host machine on which DbClone will be installed

It is recommended to make a backup of the original DbClone.config as DbClone.config_original before editing & save it for later use.

For example: to create a backup copy of the file, you may use following Unix command
$ cp DbClone.config DbClone.config_original

Use vi editor to edit and enter the values of the following 11 variables in the given DbClone.config file provided to set the environment for the DbClone installation.

# Location where Oracle Home of 8.1.7 is installed
Oracle_Home=/data01/ORA817/app/product/oracle/8.1.7

# Location where Apache 1.3.9 or later is installed
Apache_Home=/data01/ORA817/app/product/oracle/8.1.7/Apache/Apache

# Apache port number to be configured for DbClone
Apache_Port=5555

# Location where DbClone data files will be deployed
Oradata_Dir=/data01/817CLONE/ORADATA

# Location where the bdump, cdump & udump directories will be created
Oracle_Admin=/data01/ORA817/app/product/oracle/8.1.7/admin

# Location where 1st control file is created
Control_Dir1=/data01/817CLONE/ORADATA

# Location where 2nd control file is created
Control_Dir2=/data01/817CLONE/ORADATA

# Location where 3rd controlfile is created
Control_Dir3=/data01/817CLONE/ORADATA

# Database Listener Port
Listener_Port=3333

```
# Location where DbClone.tar.Z is put in
Tar_Location=/data01/INSTALL

# IP Address of the host system (local IP Address)
Ip_Address=10.2.2.21
```

After editing the above variable values in the DbClone.config file, please remove the DbClone.Config file that contains "NOT_CONFIGURED". The installer checks for this line and starts installing DbClone only is this line is removed.

1.1.1.2 Review the DbClone.config file:
Review the DbClone.config file, check and verify that all directories and file paths given in the DbClone.config file are correct and are pre-created.

1.1.1.3 Check availability of disk space:
Check and verify the availability of disk space in all the directory and file paths given in the DbClone.config file. DbClone, needs a minimum of 350MB of the disk storage space.

1.2 Installing DbClone Version 2.4 S
Installation of DbClone Starts with Executing install.sh script for Installing DbClone Version 2.4 S. This interactive shell script will help build and install the DbClone package for your server and would prompt you for the following inputs based on your environment, Unix Server and Oracle platform. Please read the prompted request and enter the desired inputs from your keyboard.

1.2.1 Running the install.sh

Change directory to DBCLONE_INSTALL and execute the install.sh script provided in the DBCLONE_INSTALL directory, by using the following Unix Command.

$ . ./install.sh

The installer script asks for a few inputs, please enter the appropriate response through the keyboard.

The Installer will uncompress and extract the files and directories and put them at the specified locations by using uncompress and tar –xvf commands.

DbClone installation may run for about 10 to 15 minutes and provide messages on the progress of the installation. An installation log is written into the file install.log, where the DbClone.tar.Z is located. This log file is created during the installation process for checking, whether the installation is a success or failure.

Check the log for any error messages given by this step and make the corrections and restart the execution of the install.sh. If installation fails, make the correction in Config.log file and restart.

On successful completion of installation, a DbClone application database is created and all the required directories are created in appropriate locations.

Check to see if the database instance is up, listener is up and http (Apache) is up by giving ps –ef | grep command.

DbClone is now ready to run and can be used through the Internet Explorer Browser by specifying the URL, IP address/hostname and apache port number given in the DbClone.config file. DbClone is installed according to the parameters, which were set in the DbClone.config file.

Help & Technical Support for Installation:
If any error or problem that occur during the Installation, please check the installation log file written in the $Tar_Installation directory. If any system errors occur due to setup parameters, please check the errors and fix them by changing the parameters required for installing DbClone or granting the required privileges for the user and start the installation process a fresh.

If the problem still persists please go to the DbClone website www.dbclone.com and fill in and post the support page for technical installation help. Technical Support representative will respond within few hours or next business day if the request is received after 1700 hrs.

For immediate assistance or support, please call the toll free number: 1-888-830-5663 during office hours. . Technical Installation support personnel are available from 09:00 to 18:00 EDT, Monday - Friday.

1.3   Getting started on DbClone

Starting DbClone first time may take several minutes

1.3.1   Starting DbClone First Time after Installation:
After installing the DbClone application database, the Database Listener and the Apache Listener are started immediately so that the DbClone application can be accessed immediately.

1.3.1a Starting DbClone any time after Installation:
DbClone need following three components be started; **DbClone Database**, **Database Listener** and the **Oracle Apache Server** that comes bundled with the Oracle.
TO start these components, begin by setting the UNIX environment for DbClone first. The DbClone installer automatically creates the required environment files **DbClone817.env** or **DbClone920.env** depending on the Oracle Version of the DbClone database. This environment file is found in the home directory of the DbClone user\dba.

Log on to UNIX and execute the **DbClone**xxx**.env** file by **. ./DbClone920.env** to set the environment for starting the DbClone.

After successfully running the **DbClone920.env,** start DbClone by typing **dbclonectl start** at the command prompt. The UNIX messages at shell will provide running log of actions confirming the start of database, the database Listener and the Apache server. DbClone can be accessed after the successful start of these three components.

1.3.1b Login To Dbclone:

DbClone uses web based user interface, and supports Microsoft or Netscape Internet browser. DbClone is launched by entering the appropriate URL, like.,

http://your-url:5555/startup.html for example (http://sun-dev4:5555/startup.html)
depending on you're the hostname or its IP address and the port number selected
during installation of DbClone.

It will bring up the start page with DbClone Logo. Dbclone's user interface is Java
Applet based therefore the M S Ineternet Explorer needs to have a Java applets
plug-in Version 1.4.1 to start the loading of the Applet.

If Java applets plug-in Version 1.4.1 is not pre-installed in your browsers, The
DbClone automatically initiates for direct downloading of the Java-plug-in from
internet FTP site of Sun Microsystems. This plug-in will be installed only the first
time you start to use DbClone from a Internet Browser.

The Downloading and installation of Java-plug-in for Applet is fully automatic and
may take several minutes to download, depending on your Internet connection
speed. Please follow the prompts wait until download is complete and it prompts
the user to install the Java-Plug-in. Please follow the instructions and complete the
installation.

DbClone will start the console, on successful completion of Java-plug-in
installation; it may take a few more minutes.

This brings up a login screen where the user has to enter the Username and
Password, which are initially set to **dbclone/dbclone**. DBClone will force you to
change the password at **the first login** after installation.

The password can also be changed any time using the "DbClone Manage Dbclone"
menu on the DbClone Console.

Before using DbClone for any operation like cloning, migrations refreshing a
database , the DBA or the DbClone super user must perform the following steps
- Register the Oracle Home
- Register the Oracle Databases
- Register the DbClone Users
- Register the storage Mount Points
- Grant user Privileges

**DbClone Console provides Inverted Tree structure and menu items to pick and
run the desired function.**

1.3.2   Registering the Oracle Home:

The DBA or the super user (dbclone) should register/add the different oracle
homes that are present in the network and the ones the DBA wish to administer
using DbClone. To do this, the user has to open the Manage DbClone node of the
tree displayed on the Graphical User Interface. By right clicking the Register/Edit
Oracle Home node the user is presented with three options of Adding a oracle
home, modifying an already registered oracle home or deleting a registered oracle
home. The user has to click on the Add option to add/register an Oracle Home. All
the entries have to be added in the form for registering the Oracle Home along
with the OS password. All the entries are checked and if correct then the Oracle
Home is registered with the DbClone application.

1.3.3 Registering the Oracle Databases:

Once the registration of the oracle home is complete then the databases present under that oracle home can be added/registered with the DbClone application in order to perform any operations involving them. The user needs to open the <u>Manage DbClone</u> node and then right click on the <u>Register/Add Database</u> node, which presents with three options of Adding, Modifying or Deleting the existing Database from the application. Once the Add option is selected then a frame is displayed wherein all the database details have to be entered. All the entries are checked and if correct then that particular database is added to the DbClone application.

1.3.4 Registering the DbClone Users:

With the Oracle Home and the Database being registered with the DbClone application the super user (dbclone) can start performing the normal operations of the DbClone application. In order to allow other users in an organization to access DbClone, the super user has to register/add that particular user to the DbClone application. This can be done using the <u>Manage DbClone</u> node of the tree structure. Right click on the <u>Register/Edit DbClone User</u> node and choose Add option to add/register a user. Along with the user password and other details the expiry date for the user to access DbClone has to be entered. Then the user is added to DbClone's user list and can access the DbClone from a local client machine till the expiration date.

1.3.5 Registering the storage Mount Points:

The dbclone super user can start using the DbClone functionalities like cloning, refreshing, migrating and others. Before proceeding further, the dbclone super user has to register the Storage Mount Points with the DbClone application. For operations like Cloning, Refreshing, Migrating or Creating a standby database the storage space on the target machine has to be registered with the DbClone application which is used for mapping the source files while doing these operations. In order to do this the super user of DbClone has to open <u>Manage DbClone</u> node and has to right click on the <u>Register/Edit Storage Mount Point</u> and choose the Add option to add/register the mount points to the DbClone. Then after selecting the required host whose mount points have to be added, the particular disk mount points have to be selected and then "saved" meaning that these mount points can now be accessed by the DbClone application and can use the space under these mount points for various DbClone operations.

1.3.6 Granting user Privileges:

When a normal user logs on to the DbClone application he would not be able to see any of the DbClone features like Cloning, Refreshing, Migrating or Creating Standby as he has no privileges given by the super user to perform these operations. The DbClone super user has to grant the required privileges to the users to access DbClone and use its features. If the DbClone super user wishes to grant a Clone privilege to any particular user he has to do the following: Open the <u>Clone Oracle Database & Objects</u> node and expand the <u>Host</u> node. Under this host node all the Hosts that are registered with the DbClone are displayed, select the

one on which that particular database is installed and go down the node by selecting the Oracle Home on which that database exists and right click on the desired Database which then presents seven (7) options regarding that database. Then select the Grant Privilege option and click on it. The dbclone user is presented with a interface wherein he can select the user he wish to grant privilege to and also the privileges he wishes to grant or revoke. The privileges the dbclone super user can Grant or Revoke are Clone Oracle Database or Objects, Refresh Oracle Database or Objects, Migrate Oracle Database or Objects and Create Standby Oracle Database. Later on when ever the normal user log's on then he is presented with the nodes that he has privilege on.

1.3.7 Stopping the DbClone Application:

Only the super user of the DbClone or the user with the dba privileges can stop the DbClone application. All the users of the DbClone application need to Log Off from the application before shutting down the DbClone application. Set the DbClone environment by executing the environment file DbClonexxx.env in the home directory of the user. Execute the **dbclonectl stop** command at the UNIX prompt; This will automatically initiate the stopping of the DbClone application database, database listener and the Apache server, earlier started for starting the DbClone application.

1.3.8 Uninstalling DbClone.

If you wish to uninstall the DbClone from your server, please follow step given below. Allow to complete any currently running function on Dbclone. Logout from DbClone Console Execute the **dbclonectl stop** command at the UNIX prompt; this will automatically initiate the stopping of the DbClone application database, database listener and the Apache server, earlier started for starting the DbClone application. Please wait until Database, Database Listener and The Apache http servers are shut down. You may have to wait for a few minutes before these shutdown. If these fail to shutdown even after a few minutes, then check status of these processes by ps –ef | grep dbclone, lsnrctl and httpd process and you may have to kill these by their pid's. After successfully shutting down all these process please run uninstall.sh script provided initially with the Installation CD or Download.

II. DBCLONE CONCEPTS

2.1 What is Database Cloning?

Oracle Cloning is a process of creating a true copy of Oracle Database image, which has exactly similar physical properties and data structure, objects and exactly same overall properties and security. The cloned database can then operate independently with the same set of applications or a new set of applications. The Cloned Database continues to operate and grow independently in a same operating system environment. <u>Cloning delivers Cloned Database, which is physically equitant to the Parent Database</u>

2.2 Cloning Database Across Dissimilar Operating System (OS-Migration).

Oracle Cloning **across Dissimilar Operation System** is a process of creating a true copy of Oracle Database image, which has exactly similar logical properties, data structure, objects and exactly same overall properties and security. The cloned database can then operate independently with the same set of applications or a new set of applications. The Cloned Database continues to operate and grow independently in New Operating system environment. <u>OS-Migration delivers Migrated Database, which is logically equitant to the Parent Database</u>

2.3 Why Use DbClone?

Cloning of Oracle Database is frequently required to create copies of production or any other non-production databases to develop, debug, modify or test applications without using the actual production or critical databases. This ensures that the development, test or reporting teams have the exact data images of the actual parent databases. Cloning is also used to setup and update copies of production databases for the purpose of reporting and data warehouse.

DbClone is an Internet-browser-based tool to automate Cloning, Refresh, and platform migration (OS-Migration) of Oracle Databases on Unix servers. DbClone quickly automates and makes the complex task of Oracle Cloning, Migration, refresh very simple, easy, efficient and secure. DbClone works directly the at Operating System level rather than at SQL, DDL or DML level this make the process fast and easy.

It empowers Oracle DBA with advanced tool to manage the frequent need to Clone, Migrate or Refresh large number of Oracle instances running on multiple Unix platforms. It saves Oracle DBA's time by eliminating the need for designing complex cloning processes, then writing and testing scripts. DbClone is a unique tool to clone, refresh or migrate a database across various Unix servers or between Oracle homes on the same Unix server.

III. DBCLONE FEATURES

3.1   Clone Oracle Database and Objects:

Oracle Cloning is frequently required to create copies of production or any other critical databases to develop, debug, modify or test applications without using the actual production or critical databases. This ensures that the development, test or reporting teams have the exact data images of the source databases. The process of cloning is done at physical level where in the source data files are physically copied to the target machine. DbClone provides automatic cloning of oracle databases without DBA scripts. The portal interface provides graphically laid out Unix host servers and databases for easy selection of source and target databases. Cloning of Databases can be done with in the same host or across the Sever Hosts that have the same operating system and the same Oracle version.

Prerequisites for Cloning a Database:

3.1.1   Make sure that the Source Database is registered with the DbClone Application
3.1.2   The target host machine and the Oracle Homes should be registered with the DbClone application
3.1.3   Target host should have sufficient disk storage space to hold the cloned database.
3.1.4   Disk storage mount points of the target host should be registered with the DbClone
3.1.5   The source and target host operating systems should be of the same version
3.1.6   The Oracle Database versions for the source and target host should also be same
3.1.7   An interconnecting network should be present between the source, target and the application server
3.1.8   The RCP protocol should be enabled on both the source and target host machines
3.1.9   Ping should be enabled on both the source and target host machines
3.1.10   The local IP addresses of all the hosts in the network, especially the source, target and the application server should be in the /etc/hosts file on all the machines
3.1.11   The default Shell environment on all the systems should be set to Korn Shell

The inputs required for the Cloning process are tabulated as below:

CLONING			
DbClone – Database Cloning Required Inputs and Expected Deliverables			
1. Running Oracle Database on any of the SUN Solaris, Red Hat Linux, HP-UX, IBM AIX			
2. Participating Hosts, Oracle Homes, disk mount points must be registered With DbClone			

| INITIAL ONE-TIME-INPUT AT SETUP TIME			
Source Database Input Required		**Target Database Input Required**	
Title	Default	Title	Default
Oracle Home	ORACLE_HOME	Oracle Home	ORACLE_HOME
Oracle Version	8.0.5/8.1.7/9.2.0	Oracle Version	8.0.5/8.1.7/9.2.0
Hostname	sunmis1	Hostname	sunmis2
Host Type	SUN/LINUX/HP/IBM	Host Type	SUN/LINUX/HP/IBM
OS Version	5.8	OS Version	5.8
Oracle OS user name	Oracle	Oracle OS user name	Oracle
Oracle OS user password	********	Oracle OS user password	********
Oracle System password	********	Oracle System password	********
INPUT REQUIRED AT THE TIME OF CLONING			
Oracle System ID	ORACLE_SID	Oracle System ID	ORACLE_SID
		Online or Off line Clone	Online
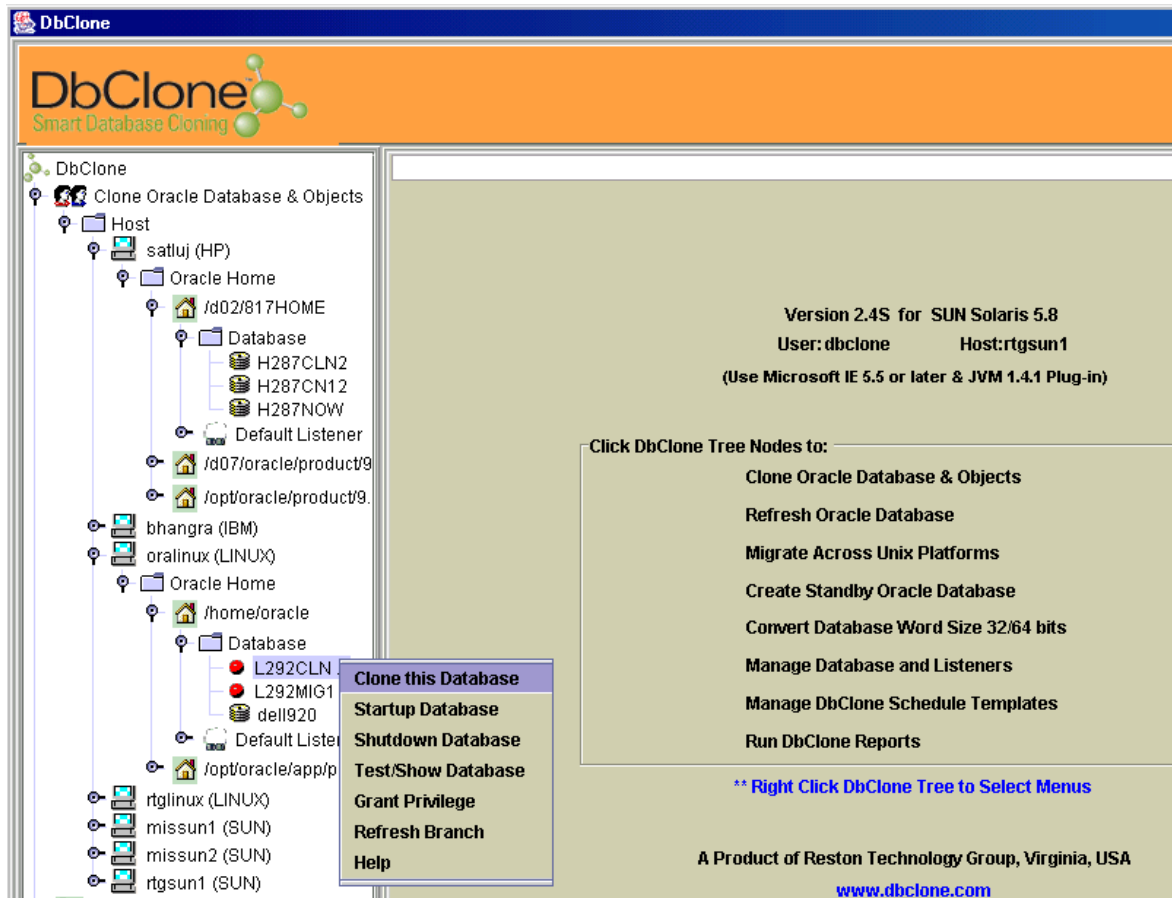
Fig 1: Clone Database

These are steps to be followed for **Cloning process:**

    i. Open the <u>Clone Oracle Database & Objects</u> node and select the desired <u>Host</u> on which the <u>Database</u> is residing that has to be cloned.

    ii. Open the <u>Oracle Home</u> node and choose the correct Oracle home if more that one is present. Right click on the <u>Database</u> that needs to be cloned. The user is presented with options like Clone this Database, Startup Database, Shutdown Database, Test/Show Database, Grant Privilege, Refresh Branch and Help.

        3.1.1.1 Clone this Database: Clones this database to get an exact similar copy of this on the desired target host with the given database name.

        3.1.1.2 Startup Database: This feature starts up the current database if it is not up and gives the status report of the database. This feature is only presented to the DbClone super user and not to others.

        3.1.1.3 Shutdown Database: If the database is running then clicking on this feature will shut down the database immediately. This feature is only presented to the DbClone super user and not to others.

        3.1.1.4 Test/Show Database: This feature will test the database and indicates whether the database is reachable or not, database listener is up or down and database up or not etc.

        3.1.1.5 Grant Privilege: This feature allows the super user to grant or revoke any kind of privilege to the user for doing operations on this particular

database. This feature is only presented to the DbClone super user and not to others.

3.1.1.6   Help: Help is provided in regard to the cloning process.
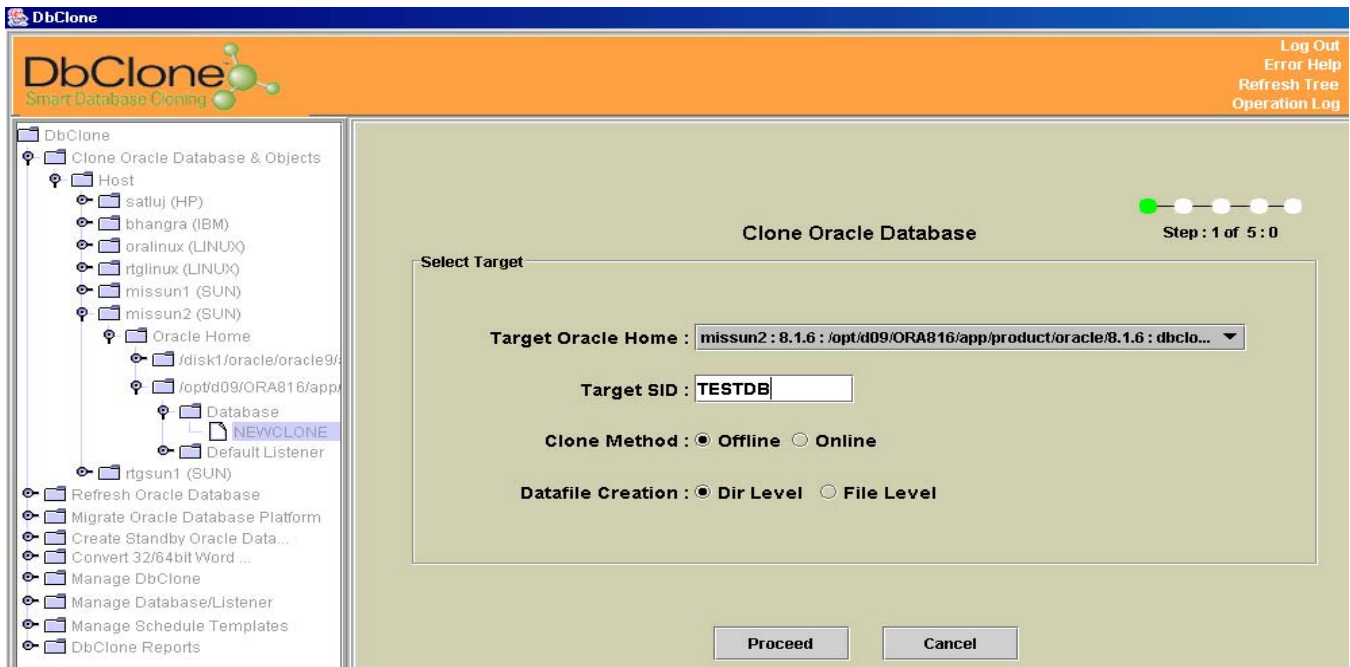
iii.   Now click on the <u>Clone This Database</u> feature and the user is presented with the following screen.

The user has to select desired target Oracle Home from the selection available and enter a name to the target SID. The target SID is the only input required to complete database cloning.

iv.   The user has to select whether the cloning process has to be done Online or Offline. Offline means the source database is shutdown before the cloning process starts and all the users are logged off from the source database. Online means the cloning can be done while the source database is up and running without any interference to the users.

v.   The user then has to select whether the cloning has to be done at the directory level or at the file level and then click the **Proceed** button.

vi.   After the **Proceed** button is clicked a frame containing the source and target information is displayed. To continue further with cloning process the **Proceed** button has to be clicked.

vii.   Then in the next screen the mapping information of the target files is displayed. It also provides the flexibility for DBAs to make any changes to the file layout or any Oracle parameters. The registered mount points along with the available mount points are displayed and also the available free space on them. If the location of the target database files is OK, then click the Approve button. If the location of the data files has to be changed then select the desired mount points from <u>Target Mount Point</u> column of the table and then change the target directory path if needed or just

click on the **Remap** button which will automatically remap all the files to the mount points which have sufficient space. Then Validate button is activated in order to verify the mount points chosen and the target path specified. Click on the **Validate** button. If the changed paths are correct then an **Approve** button is displayed. Click the Approve button it will bring up the next screen.

viii. In the next screen all the init.ora parameters of the target database to be created are displayed. The init.ora parameters can be changed as needed by clicking the **Edit** button and making the changes. If any changes are made they have to be updated first by clicking the **Update** button. Then click the **Proceed** button to proceed further.

ix. Then finally a small message panel is displayed and gives the option of whether to start the clone immediately or to schedule the process for later time. Once the **Clone Now** button is click, the Clone process would start immediately and a progress bar is displayed showing the underlying processes that are taking place.

x. Once the Cloning process is over the final report is displayed which gives the status of the new database that has been created.

Deliverable: A true copy of the source Database up and running with the target Oracle SID. The status of the target database is displayed in the final report.
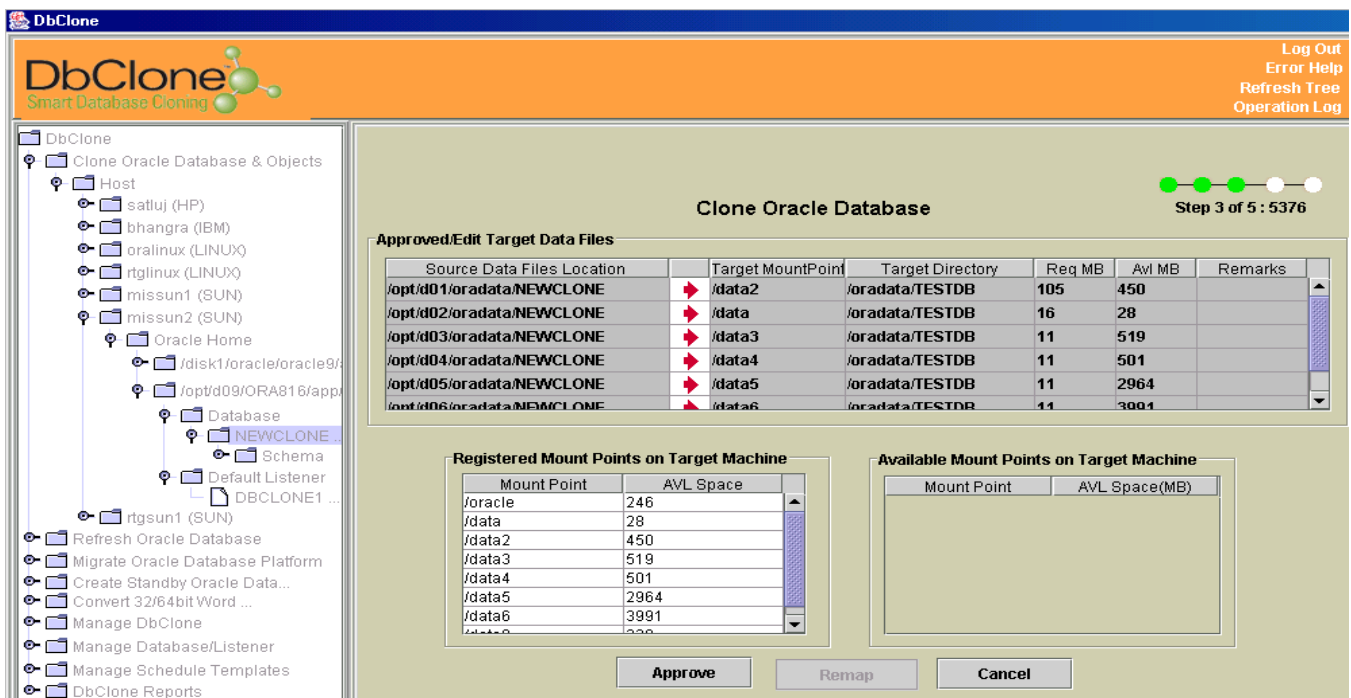
3.2   Refresh Oracle Database:

Refreshing can only be done on the databases, which are already Cloned databases. Refreshing a cloned database is important in order to maintain the synchronization between the source and target databases. Any time the refreshing is done on the cloned

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database all the previously applied updates to the cloned database are lost and replica of the source database is made at the same location. The cloned database is really of some help only when it is in consistent state with the source database. As the cloned database is not a standby database it need not be online or updated every time a change occurs on the source database. The frequency of updating the cloned database is the issue the DBAs have to decide depending on the criticality of the databases in the application.
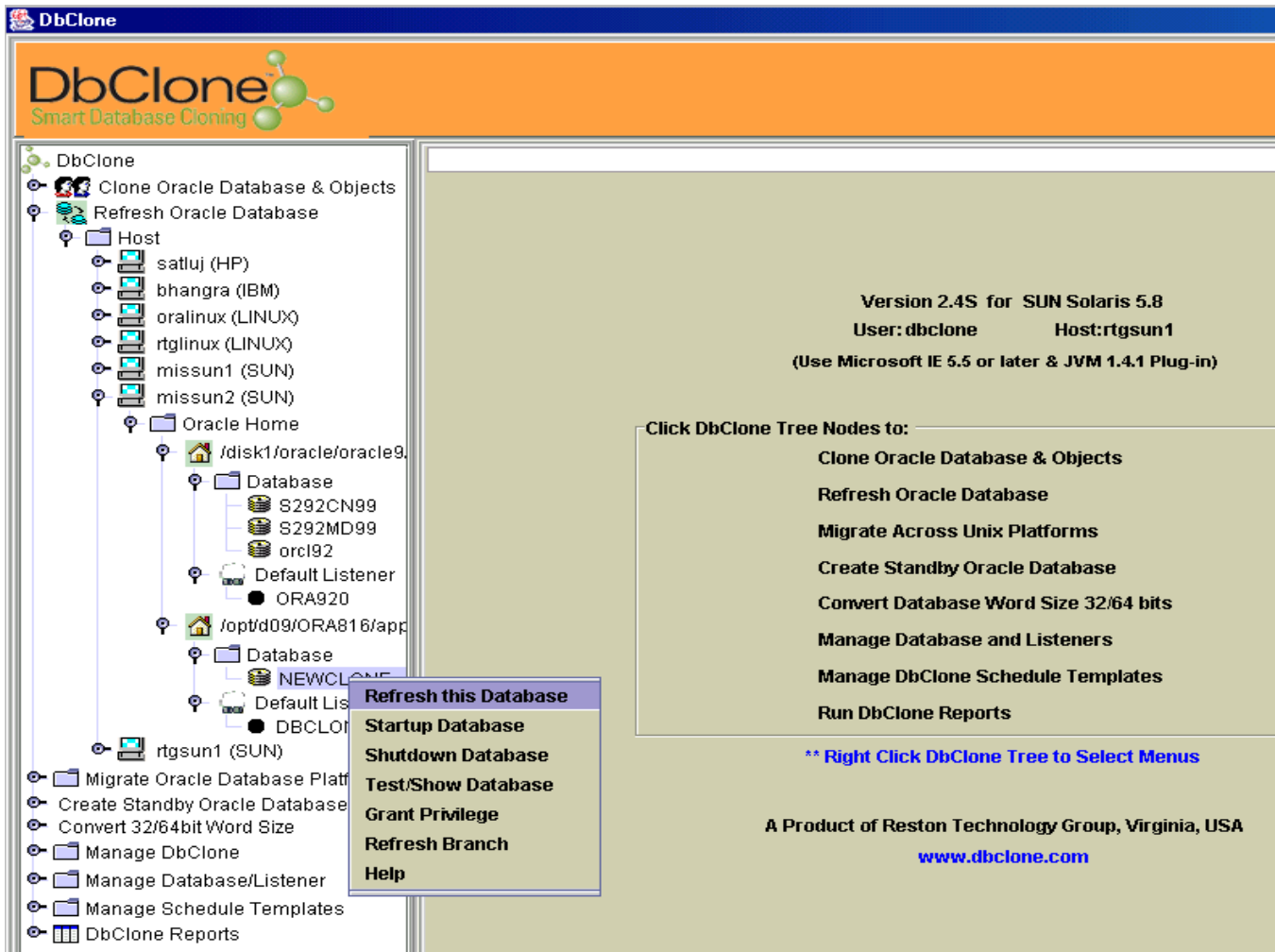

Fig 2: Refresh Database

Prerequisites for Refreshing a Database:

3.2.1   Make sure that the Source Database is registered with the DbClone Application.

3.2.2   The target host machine, the Oracle Homes and the target Database should be registered with the DbClone application.

3.2.3   The target host machine should have the sufficient disk space to hold the source database.

3.2.4 The storage mount points on the target host machine should be registered with the DbClone application.

3.2.5 The source and target host operating systems should be of the same version.

3.2.6 The versions of Oracle Database on both the source and target host machines should also be same.

3.2.7 An interconnecting network should be present between the source, target and the application server.

3.2.8 The RCP protocol should be enabled on both the source and target host machines.

3.2.9 Ping should be enabled on both the source and target host machines.

3.2.10 The local IP Addresses of all the machines in the network especially the source, target and that of the application server should be made in the /etc/hosts file on all the machines.

3.2.11 The default Shell environment on all the systems should be set to Korn Shell.
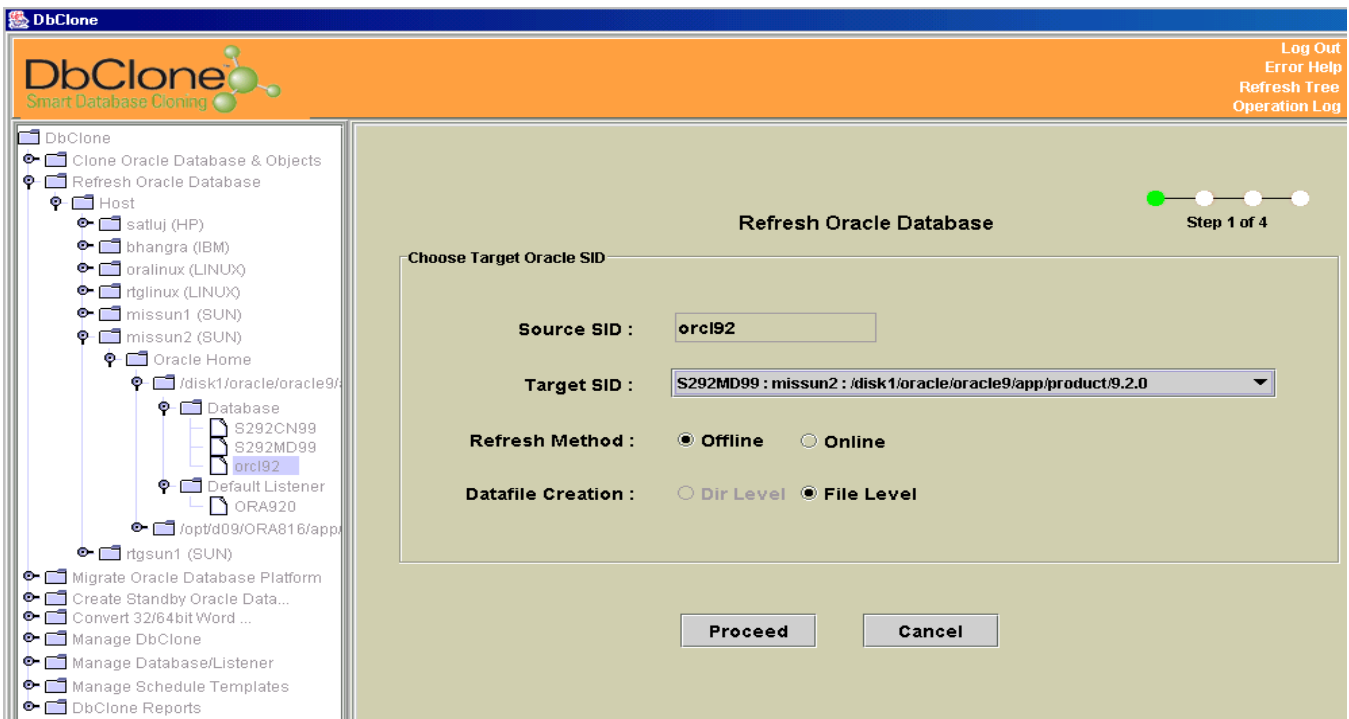
The inputs required for the Refresh Process are as below:

REFRESHING
DbClone – Database Refreshing Required Inputs and Expected Deliverables
1. Running Oracle Database on any of the SUN Solaris, Red Hat Linux, HP-UX, IBM AIX
2. Participating Hosts, Oracle Homes, disk mount points must be registered With DbClone

INITIAL ONE-TIME-INPUT AT SETUP TIME			
Source Database Input Required		**Target Database Input Required**	
Title	Default	Title	Default
Oracle Home	ORACLE_HOME	Oracle Home	ORACLE_HOME
Oracle Version	8.0.5/8.1.7/9.2.0	Oracle Version	8.0.5/8.1.7/9.2.0
Hostname	Sunmis1	Hostname	sunmis2
Host Type	SUN/LINUX/HP/IBM	Host Type	SUN/LINUX/HP/IBM
OS Version	5.8	OS Version	5.8
Oracle OS user name	Oracle	Oracle OS user name	oracle

Oracle OS user password	********	Oracle OS user password	********
Oracle System password	********	Oracle System password	********

INPUT REQUIRED AT THE TIME OF REFRESHING			
Oracle System ID	ORACLE_SID	Oracle System ID	ORACLE_SID
		Online or Off line Clone	Online

These are steps required for doing a Refresh Operation on a database:

i. Open the <u>Refresh Oracle Database</u> node and click on the Host, which has the Database to Refresh with and go down the branch till the Database is seen and then right click on the database, which needs to be the Source database for the refresh operation and select the <u>Refresh This Database</u> option. This database will now be the source database, which will refresh the target database.

ii. The following screen is displayed when the refresh option is selected.

The user has to select the target SID from the list presented and refresh can be done only across the same operating systems and also across the same oracle version.

iii. Then user has to select the option of either doing the Refresh operation Online or Offline and then click the **Proceed** button.

iv. After Proceed button is clicked a frame containing the source and target information is displayed. To continue further with Refreshing process the **Proceed** button has to be clicked.

v. The mapping information of the target files on the target machine is displayed and the user can remap or change the location of the database files. If the user changes the location of the target files on the target host then the user has to validate the newly entered path by clicking the **Validate** button. Once the validation is over the user can proceed further by clicking the **Approve** button.

vi. Then the final screen is displayed and the user has the option to either do the Refresh operation immediately or Schedule it for a later date and time.

vii. If Refresh is done immediately then the progress of the Refresh operation is displayed using the Progress bar and the percentage completed is displayed.

viii. After the refresh operation is completed successfully then a status report of the Target Database is displayed.

Deliverable: An updated copy of the already cloned target instance in up and running condition.

3.3   Migrate Oracle Database:

Migration process is required when cloning of databases is not possible due to dissimilarities of operating systems, Oracle Versions between source and target platforms.

Therefore migration process is required for the databases to be migrated across different platforms and across various versions of Oracle. For Example: An Oracle source Database running on Sun, HP, Linux, and IBM platform can be transparently migrated to any platform of the choice.

The DbClone performs the migration at the logical level in which the target Database is built from scratch whereas, the process of cloning is done at an operating-system-level by coping and physical transfer of files across an identical platforms and versions of Oracle. The migration can be performed on Unix hosts, which are physically away from each other by means of the network. DbClone performs Migration of Oracle Database in two phases. In the first phase it creates a new oracle instance copying only the database structure but no data. This creates an Oracle Database instance with exactly similar properties and behavior that of the source database. Therefore the target database will have the same Table Spaces and sized data files and other Database characteristics and Properties. In the second phase it sucks/imports the actual data from source database.

The DbClone can also create an empty database by creating only the database structure, but not importing the data

Prerequisites for Migrating a Database:

3.3.1   Make sure that the Source Database is registered with the DbClone Application.

3.3.2   The target host machine and the Oracle Homes should be registered with the DbClone application.

3.3.3   The target host machine should have the sufficient disk space to hold the source database.

3.3.4   The storage mount points on the target host machine should be registered with the DbClone application.

3.3.5   The versions of Oracle Database on both the source and target host machines should be same or higher.

3.3.6 An interconnecting network should be present between the source, target and the application server.

3.3.7 The RCP protocol should be enabled on both the source and target host machines.

3.3.8 Ping should be enabled on both the source and target host machines.

3.3.9 The local IP Addresses of all the machines in the network especially the source, target and that of the application server should be made in the /etc/hosts file on all the machines.

3.3.10 The default Shell environment on all the systems should be set to Korn Shell.

The inputs required for the Migration process are as below:

MIGRATION
DbClone – Database Migration Required Inputs and Expected Deliverables
1. Running Oracle Database on any of the SUN Solaris, Red Hat Linux, HP-UX, IBM AIX
2. Participating Hosts, Oracle Homes, disk mount points must be registered With DbClone

ONLY ONE-TIME-INPUT AT SETUP TIME			
Source Database Input Required		**Target Database Input Required**	
Title	Default	Title	Default
Oracle Home	ORACLE_HOME	Oracle Home	ORACLE_HOME
Oracle Version	8.0.5/8.1.7/9.2.0	Oracle Version	8.0.5/8.1.7/9.2.0
Hostname	sunmis1	Hostname	sunmis2
Host Type	SUN/LINUX/HP/IBM	Host Type	SUN/LINUX/HP/IBM
OS Version	5.8	OS Version	5.8
Oracle OS user name	Oracle	Oracle OS user name	Oracle
Oracle OS user password	********	Oracle OS user password	********
Oracle System password	********	Oracle System password	********

INITIAL REQUIRED AT THE TIME OF MIGRATION			
Oracle System ID	ORACLE_SID	Oracle System ID	ORACLE_SID
		Dir Level or File Level	Dir Level

These are the steps required for migrating a Database:

i. Open the Migrate Oracle Database Platform node from the tree and go down the node by selecting the corresponding Host and the Oracle Home till you reach the Database to be migrated.

ii. Right click on the database and select the Migrate This Database option. The following screen is displayed

iii. Select the Target Oracle Home and enter the Target SID in the text field. Select the data file creation level i.e. Directory Level or the File Level and also the Migration type whether Migrating the whole data or just the Blank Instance i.e. creating a blank instance without any data in it. Then click on the Proceed button to start the process.

iv. After Proceed button is clicked a frame containing the source and target information is displayed. To continue further with Migration process the **Proceed** button has to be clicked.

v. The mapping information of the target files on the target machine is displayed and the user can remap or change the location of the database files. If the user changes the location of the target files on the target host then the user has to validate the newly entered path by clicking the **Validate** button. Once the validation is over the user can proceed further by clicking the **Approve** button.

vi. In the next screen all the init.ora parameters of the target database to be created are displayed. The init.ora parameters can be changed as needed by clicking the **Edit** button and making the changes. If any changes are made they have to be updated first by clicking the **Update** button. Then click the **Proceed** button to proceed further.

vii. Then finally a small message panel is displayed and gives the option of whether to start the Migration immediately or to schedule the process for later time. Once the Create Now button is clicked, the Migration process would start immediately and a progress bar is displayed showing the underlying processes that are taking place.

viii. Once the Migration process is over the final report is displayed which gives the status of the new database that has been created.
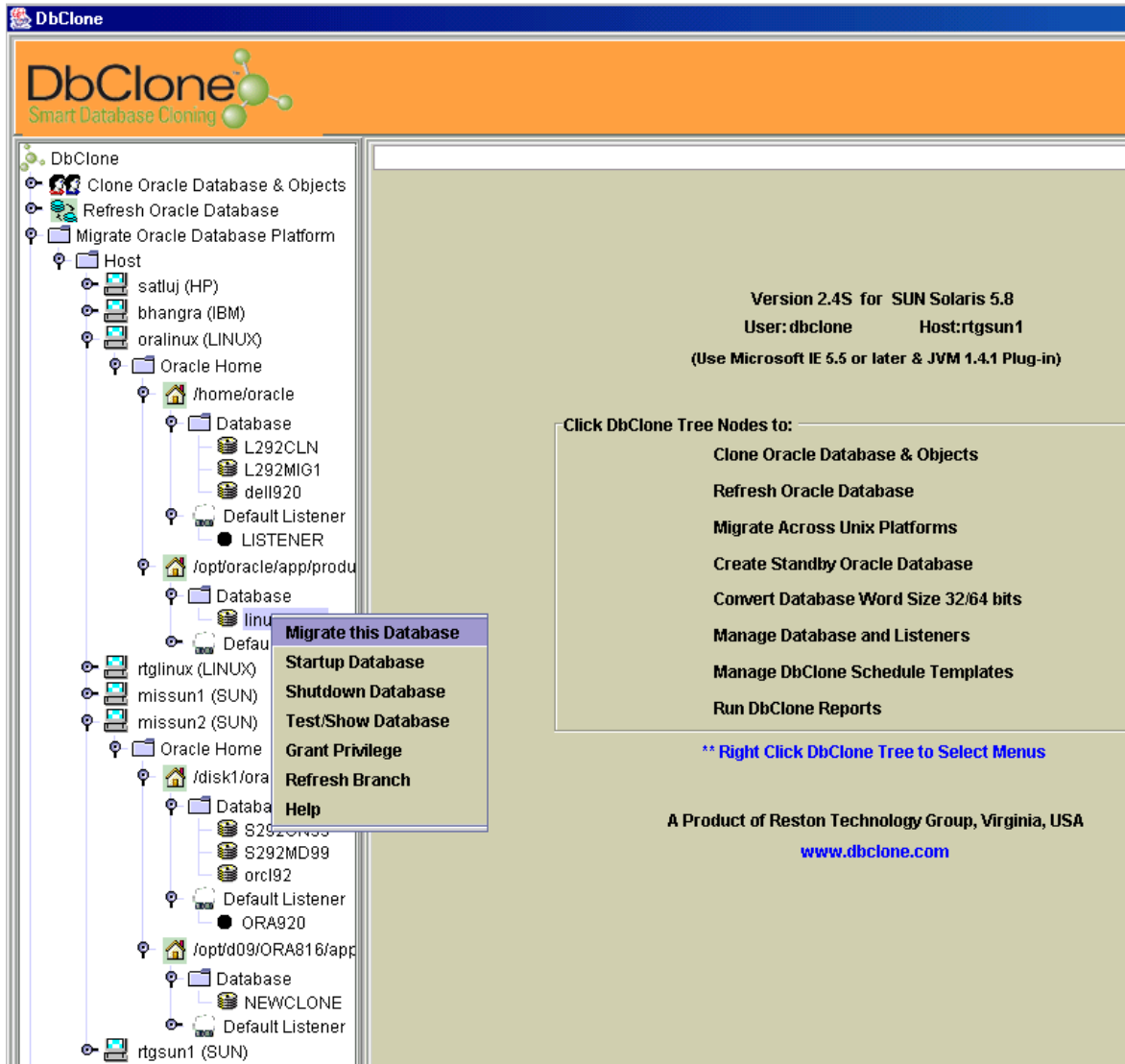
Deliverables:

An exact copy of the source Database or the blank instance with the given Target SID is created on the target host. The database Listener is also configured and the Listener entry is made in the Listener.ora file of the Database and is ready to accept requests for database connections. This database listener entry is also made in the DbClone application tables.

Caution:
If the complete Database has to be migrated then DbClone uses the export and import utilities of Oracle to transfer the data from the source database to the target database once a blank instance is created on the target machine. Export utility of Oracle on the source machine is invoked and a binary file of the whole source database is created at the specified location on the source machine. Using Ftp this binary file is then copied to the target machine and is kept in the /tmp/(cl_id)_target_dir directory. Then the import utility of Oracle is invoked at the target machine,

which reads this binary file and creates the database and tables needed on the target machine. While doing the import operation some of the errors or warnings that occur are neglected as these errors or warnings does not effect the operations of the databases. The errors neglected are of two types. They are Oracle errors and the others are import errors.

The errors are listed below are ignored during the operations:

ORA-00942, ORA-22337, ORA-00001, ORA-06512, ORA-00604, ORA-00990, ORA-04042, ORA-24021, ORA-00904, IMP-00015, IMP-00041, IMP-00061, IMP-00060, IMP-00003, IMP-00092, IMP-00017, IMP-00063, IMP-00058, IMP-00075, IMP-00091.

3.4 Data Masking:

Masking of the data is very crucial as to provide the privacy of the information stored in the database. The data stored in the database need not be shared with each and every one in an organization and needs to be protected from the people who try to access it without required permissions.

In any organization the online production database and the development databases are different and the development database being a replica of the production database. The information in the development database might be crucial and so important that the developer should not be able so see this information. In this case the DBA after creating the replica for the development or the testing purposes should mask the crucial and important information present in these database and this is where the **Data Masking** functionality of the **DbClone** is used.
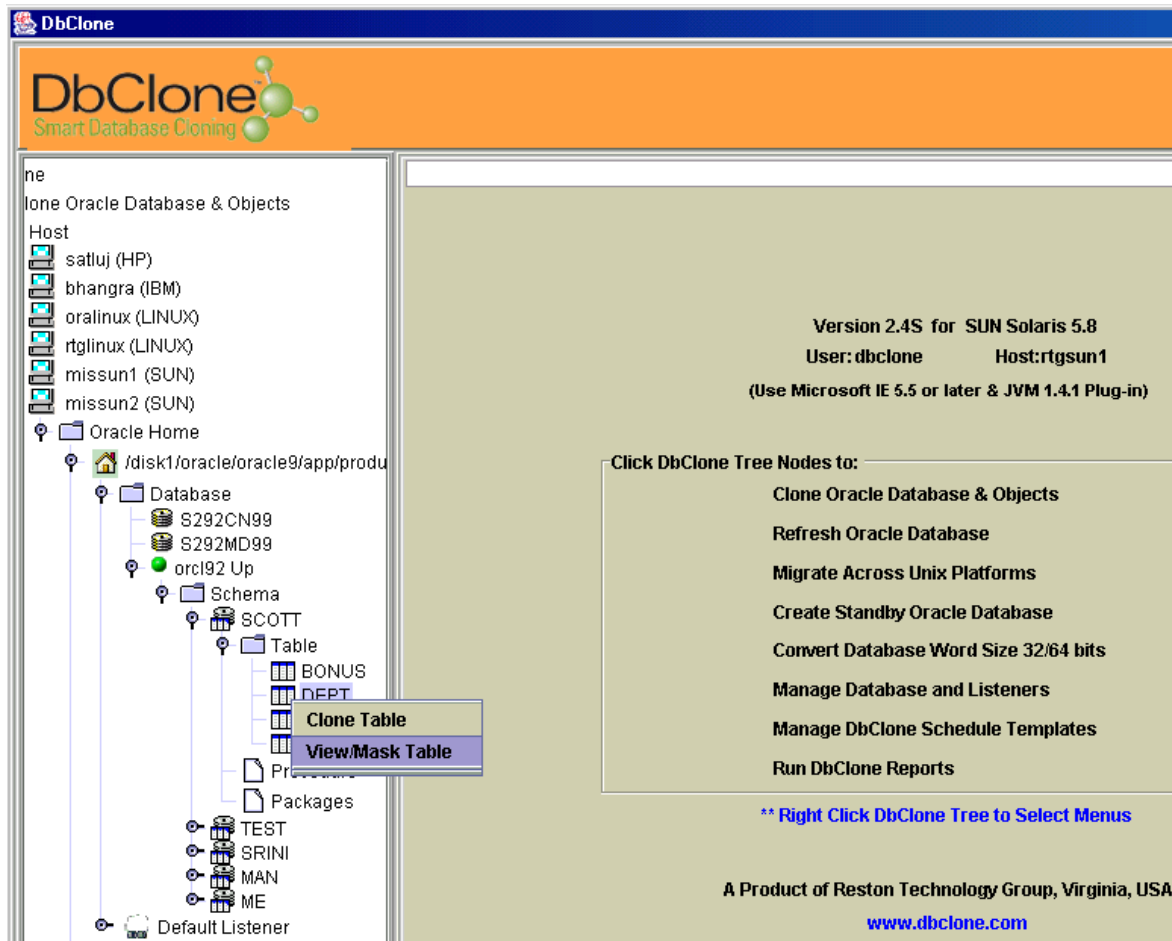
The DBA or the owners of the table can **Mask the Data.** Once the data from any column in the table is masked it cannot be brought back to its original state and the original data is not present anymore. This Mask Data functionality of the DbClone can be accessed as follows:

1. The Database should be in running condition. If it is not in startup mode, then right click on the Database and click the Startup option from the option menu. Once the Database is up and running the schema of the database is also opened.

2. If the database is already in open mode, right click on the database and select the Test/Show database option. This will bring up the schema of the database.

3. Open the schema and down to the table level and right click on the table whose information needs to be masked.

4. Select the **View/Mask Table** option and the whole table data is displayed.

5. Immediately below the Column header there is a button for masking that particular column and it is different for each column. Click on the button whose column data needs to be masked.

6. The DbClone application checks for any constraints existing on that column. The columns, which are defined to be Primary or the unique keys for that table cannot be masked as this violates the constraints, defined on the table.

7. The Non- primary/unique keys can be masked and the user is presented with a small window showing the Data type of the column and a small text field for taking the input.

8. Then the complete column is updated using the entered value and the table is refreshed.
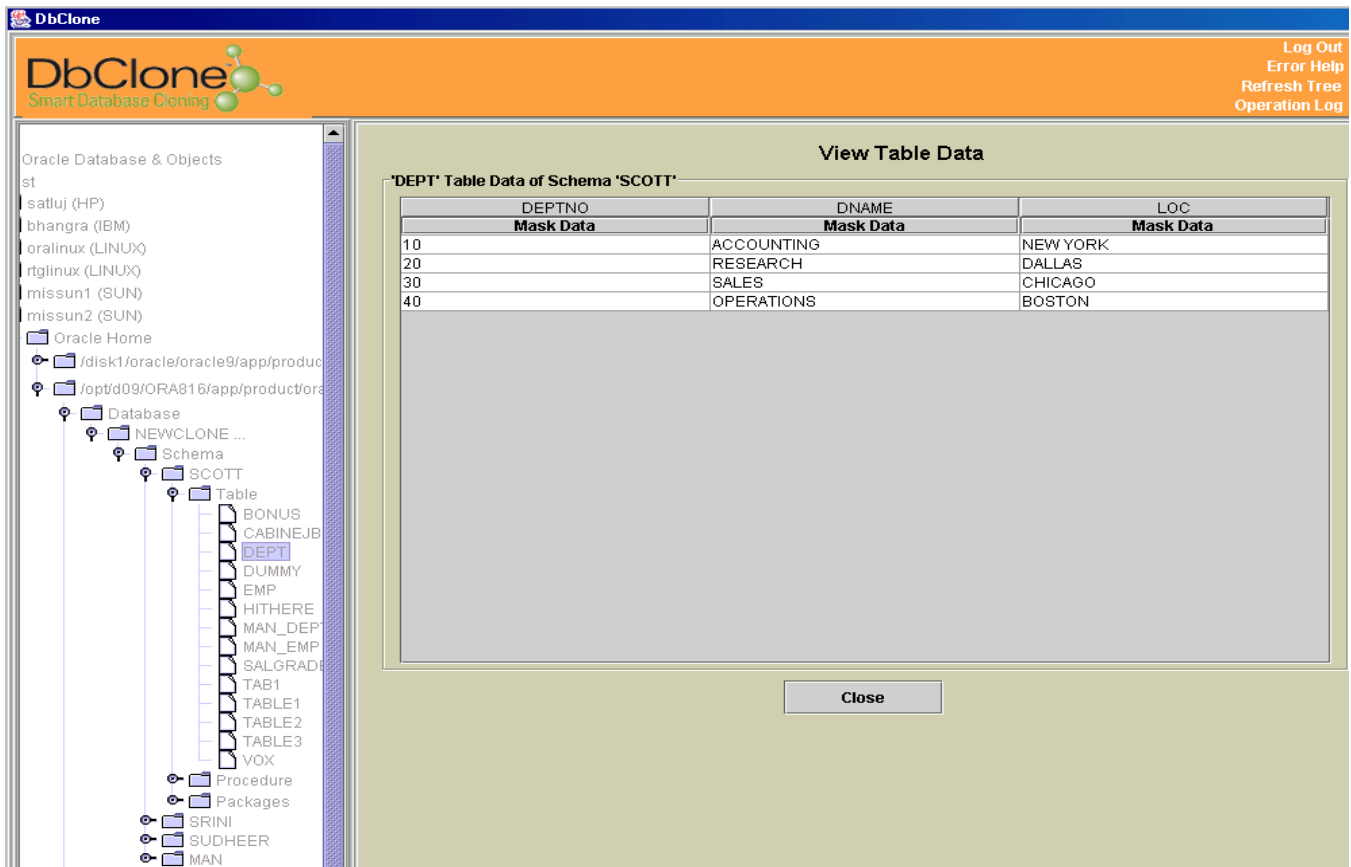
3.5 Create Standby Databases:

Creating a standby Database is the process of creating a duplicate copy of the existing database and keeping it in a totally isolated environment. The high availability of the database for the business purposes makes it necessary to have a standby database for any kind of disaster recovery management. The newly created standby database can function as a primary database at times of disaster.

Prerequisites for Creating Standby Database:

3.4.1 Make sure that the Source Database is registered with the DbClone Application.

3.4.2 The source Database for which a standby has to be created should have the Create Standby Attribute set. This can be done using the Manage DbClone feature of the DbClone and using Modify Database option of the Register/Edit Database

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3.4.3 The target host machine and the Oracle Homes should be registered with the DbClone application.

3.4.4 The target host machine should have the sufficient disk space to hold the source database.

3.4.5 The storage mount points on the target host machine should be registered with the DbClone application.

3.4.6 The source and target host operating systems should be of the same version.

3.4.7 The versions of Oracle Database on both the source and target host machines should be same.

3.4.8 An interconnecting network should be present between the source, target and the application server.

3.4.9 The RCP protocol should be enabled on both the source and target host machines.

3.4.10 Ping should be enabled on both the source and target host machines.

3.4.11 The local IP Addresses of all the machines in the network especially the source, target and that of the application server should be made in the /etc/hosts file on all the machines.

3.4.12 The default Shell environment on all the systems should be set to Korn Shell.

The inputs required for creating a standby database are as shown in the table:

CREATE STANDBY
DbClone – Creating Standby Database Required Inputs and Expected Deliverables
1. Running Oracle Database on any of the SUN Solaris, Red Hat Linux, HP-UX, IBM AIX
2. Participating Hosts, Oracle Homes, disk mount points must be registered With DbClone

INITIAL ONE-TIME-INPUT AT SETUP TIME			
Source Database Input Required		**Target Database Input Required**	
Title	Default	Title	Default
Oracle Home	ORACLE_HOME	Oracle Home	ORACLE_HOME
Oracle Version	8.0.5/8.1.7/9.2.0	Oracle Version	8.0.5/8.1.7/9.2.0
Hostname	sunmis1	Hostname	Sunmis2
Host Type	SUN/LINUX/HP/IBM	Host Type	SUN/LINUX/HP/IBM
OS Version	5.8	OS Version	5.8
Oracle OS user name	Oracle	Oracle OS user name	Oracle
Oracle OS user password	********	Oracle OS user password	********
Oracle System password	********	Oracle System password	********

INPUT REQUIRED AT THE TIME OF CREATING STANDBY DATABASE			
Oracle System ID	ORACLE_SID	Oracle System ID	ORACLE_SID
		Online or Off line Clone	Online

The steps for Creating a standby database are as below:

i. The first thing is that the Database should have the Create Standby attribute set. This can be done using the Manage DbClone feature of DbClone. This feature can be accessed or changed only by the DBA. To set these attributes please refer to the Manage DbClone section of the user manual. Once this attribute is set then the Database is ready for this Create Standby operation and it is added to the Create Standby Oracle Database node of the DbClone.

ii. Open the Create Standby Oracle Database node. Selecting any of the standby set will show the host and selecting the appropriate host will display the Database. Now select the Database for which a standby has to be created.

iii. Right click on the Database and click the Create Standby option and the following screen is displayed.

Fig 4: Create Standby Database inputs

iv. Select the Target Oracle Home and enter the Standby SID in the text field. The SID should not be more than 9 characters and only Digits or letters should be used without any special characters.

v. Select the Standby method whether to do it Online or Offline and also the Data file creation level whether Directory level or the File level. For Oracle 8i or earlier versions the Data file creation level is disabled and the creation level is only Offline, as Oracle 8i does not support this feature. Then click on the **Proceed** button, which takes you to the next screen.

vi. In this screen the source and target database details are shown and to proceed further click **Proceed**.

vii. The mapping information of the target files on the target machine is displayed and the user can remap or change the location of the database files. If the user changes the location of the target files on the target host then the user has to validate the newly entered path by clicking the **Validate** button. Once the validation is over the user can proceed further by clicking the **Approve** button.

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viii. Then a screen showing the Standby Instance details is shown and the Primary and Standby Archive Log Destinations are shown. It also provides the flexibility for DBAs to make any changes to these Oracle parameters.

ix. Then a small window is displayed and gives the option of whether to start the Creating Standby process immediately or to schedule the process for later time. Once the **Create Standby Now** button is click, the Create Standby process would start immediately and a progress bar is displayed showing the underlying processes that are taking place.

x. Once the Create Standby process is over the final report is displayed which gives the status of the new database that has been created.

Deliverable: An exact copy of the source database with the Target SID is obtained on the target host.

3.5 Convert 32/64-bit word size:

Converting a database from 32/64-bit word size to 64/32-bit word size can be done using this feature of DbClone. The existing database word size can be changed to make it suitable for the hosts, which have 32 or 64 bit operating systems.
In order to use this feature the source host should be having two oracle homes of same version installed with different word sizes i.e. one with 32 bit word size and the other with 64 bit word size. Then only the conversion can take place across these. The conversion of the 32/64 bit word size can be done only the single host and not across different hosts.

Caution: In the conversion process the existing database is completely changed to the new database and the old copy of the database is lost and it will be removed from the source host node of the DbClone tree and is added to the target host node. If you would like to keep the old copy of Database then you need to clone it first and then convert the word size of the cloned database.

Prerequisites for Converting 32/64-bit word size:

3.5.1 Make sure that the Source Database is registered with the DbClone Application.

3.5.2 The target host machine and the Oracle Homes should be registered with the DbClone application.

3.5.3 The target host machine should have the sufficient disk space to hold the source database.

3.5.4 The storage mount points on the target host machine should be registered with the DbClone application.

3.5.5 The source and target host operating systems should be of the same version.

3.5.6 The versions of Oracle Database on both the source and target host machines should be same.

3.5.7 An interconnecting network should be present between the source, target and the application server.

3.5.8 The RCP protocol should be enabled on both the source and target host machines.

3.5.9 Ping should be enabled on both the source and target host machines.

3.5.10 The local IP Addresses of all the machines in the network especially the source, target and that of the application server should be made in the /etc/hosts file on all the machines.

3.5.11 The default Shell environment on all the systems should be set to Korn Shell.

These are the inputs required to use this feature of the DbClone:

CONVERT 32/64 BIT WORD SIZE			
DbClone – Convert 32/64 bit word size of Database Required Inputs and Expected Deliverables			
1. Running Oracle Database on any of the SUN Solaris, Red Hat Linux, HP-UX, IBM AIX			
2. Participating Hosts, Oracle Homes, disk mount points must be registered With DbClone			
INITIAL ONE-TIME-INPUT AT SETUP TIME			
Source Database Input Required		**Target Database Input Required**	
Title	Default	Title	Default
Oracle Home	ORACLE_HOME	Oracle Home	ORACLE_HOME
Oracle Version	8.0.5/8.1.7/9.2.0	Oracle Version	8.0.5/8.1.7/9.2.0
Hostname	Sunmis1	Hostname	Sunmis2
Host Type	SUN/LINUX/HP/IBM	Host Type	SUN/LINUX/HP/IBM
OS Version	5.8	OS Version	5.8
Oracle OS user name	Oracle	Oracle OS user name	Oracle
Oracle OS user password	********	Oracle OS user password	********
Oracle System password	********	Oracle System password	********

INPUT REQUIRED AT THE TIME CONVERTING 32/64 BIT WORD SIZE OF THE DATABASE			
Oracle System ID	ORACLE_SID	Oracle System ID	ORACLE_SID

The steps to be followed are:

i. Open the Convert 32/64 bit Word Size node of the tree.

ii. Traverse down the tree till you get the database, which needs to be converted to different word size.

iii. Right click on the Database and select the Convert This Database Word Size. Then the following screen is displayed.

Select Target

Target Oracle Home : Select Target Oracle Home ▼

Host : Oracle Version : Oracle Home

Target SID : S292OFCL

Source Db Word Size :

Target Db Word Size :

Proceed   Cancel

Home   User Input

Fig 5: Convert Database Word Size inputs

iv. Select the Target Oracle Home.

v.   Then the source and target database word sizes are displayed and to proceed further with the process, click on the **Proceed** button

vi. Then the source and target database parameters are displayed. To start the process, click the **Proceed** button.

vii. Then the progress bar is displayed along with the process undergoing and the complete status report is displayed after the converting process is over.

Deliverable: A copy of the source database with the Target SID is obtained on the target host with the changed word size corresponding to the word size of the Target Oracle Home.

3.6   **Manage DbClone:** This module has features that are required for managing the DbClone. The operations that are included are:

3.6.1   **Request for Operation:** Using this functionality the users of DbClone can request the DBA to perform Clone/Refresh/Migrate/Standby operations on their behalf by providing all the source and target host/database information required for these operations. These requests can be scheduled for later dates also. All these requests are kept in the table and the DBA has to perform these operations as per the dates specified.

3.6.2   **Request for Self-Service Privilege:** This module incorporates the functionality that the user of DbClone can request the DBA to grant a privilege to perform operations like Cloning, Refresh, Migration, and Standby or all by feeding in the source host and database information. Once the request for privilege is accepted and granted by the DBA, the user can perform that operation at his will.

3.6.3   **Check Request Status:** The status of the requested operations/privileges by the user can be checked and updated using this functionality. Once the DBA finishes any operation, the DBA can change the status of that particular request to Completed. The user can check the status of his request for operation/privilege

and can also cancel the request for operation/privilege before being executed by the DBA.

3.6.4 Register/Edit Oracle Home: This interface allows the DBA to register the oracle home to the DbClone application before performing any operations involving that oracle home. The already existing oracle home can be modified or deleted (unregistered) using this interface. This is the first operation that the DbClone Super User needs to do in order to start using the application for the first time after logging on.

3.6.5 Register/Edit Database: Using this functionality the DBA can register a database to the DbClone and can change the settings of an already existing (registered) database. The Oracle user password can be changed and also create standby option is provided in this in this functionality. The listener port number can also set as per the requirement. After installing the DbClone application the DbClone super user needs to register the Databases present in the network or the ones to be managed using DbClone application in order to do any operations involving them. He can Register Databases only after registering their respective Oracle Home.

3.6.6 Register/Edit DbClone User*[1]: The DBA can add users to the DbClone application using this interface. The existing users information like Department name, telephone number and Email address can be modified. The DbClone super user can also delete a user.

3.6.7 Register/Edit Storage Mount Points: Before performing any kind of cloning, refresh, migration, or standby the mount points on the target host should be registered with the DbClone so that these mount points can be used while performing these operations. If the mount points are not registered then an error message is displayed and operation halts in the middle. The mount points can also be deleted using this tool. This feature also helps in maintaining/optimizing the disk space usage by adding (registering) empty mount points and deleting (un-registering) the completely filled up mount points.

3.6.8 Edit Passwords: The Super User of the DbClone has the privilege of editing or changing the OS level as well as the DB level passwords as and when necessary taking the security issues in consideration.

3.6.9 Resolve Cloning Deadlocks: Whenever any operation is performed the source object is locked from other users and may not allow the other users to perform any operation on this object unless that particular object is set free by removing the lock. These locks can be released by the DBA using this feature of the DbClone i.e. Resolve Cloning Deadlocks. The locks are generally set on the Oracle homes and on the Databases before the start of the operation involving these objects. Resolve Cloning Deadlocks feature can be used to remove the lock either on the Oracle home or the Database.

3.6.10 Modify DbClone Settings: The settings of the DbClone can be changed whenever required by the DBA using this feature of DbClone. The settings include the Listener and Apache port numbers. Only the DBA can change the DbClone settings. The DbClone settings tell us all about the DbClone application installation

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[1] * Only the Super User of DbClone can view and access these features

directories. The DBA can use this feature of DbClone to create DbClone log files for all the operations that are taking place and these log files can be used for error analysis and for debugging purposes if anything goes wrong. Even after changing the settings of DbClone using this tool the Super User needs to change these parameters physically at the Database in order to take effect.

3.7 Manage Database/Listener:
The management of the Database and the database Listeners can be done using this feature of DbClone. The status of the Database can be found using this. This **Manager Database/Listener** feature of DbClone is only made available to the DbClone **Super User** and not to the normal user.

3.7.1 Steps required for using the Manage Database/Listener features for databases are as follows: Open the <u>Manage Database/Listener</u> node and traverse down the tree by selecting the corresponding <u>Host</u>, <u>Oracle Home</u>, <u>and Database</u>. Right click on the desired Database and the following features are displayed.

The features are as follows:

3.7.1.1 Startup Database: The database can be made to start using this feature. After right clicking on the database select the Startup database option. It starts up the database and displays the status of it. If any error occurs while starting up the Database it will display that error to the user.

3.7.1.2 Shutdown Database: The already running database can be shut down using this feature. The errors that may occur while shutting down are displayed along with the status of the database to the user.

3.7.1.3 Test/Show Database: This feature tests whether the Database is in running condition or not. If the Database is up and running it would show the status of it and also bring up the whole schemas present in this database. The user can then open up the schemas and see the underlying objects of that database that are present. If the database is not running it would display the reason for it. The reasons could be like the Host may not be reachable i.e. the host system is either not connected in the network or it may not be powered up or the Database Listener may not be in running condition. If the database listener is not up, it could be made running by starting the Listener as is described later in this section.

3.7.1.4 Grant privilege: This feature is same as the one discussed earlier in the **Clone Oracle Database & Objects** section of the user manual.

3.7.1.5 Refresh Branch: Please refer to the **Refresh Branch** topic of the **Clone Oracle Database & Objects** section of the User Manual.

3.7.1.6 Steps required for managing Database Listeners using Manage Database/Listener of DbClone:

3.7.1.7 Open the <u>Manage Database/Listener</u> node and traverse down the tree by selecting the corresponding <u>Host</u>, <u>Oracle Home</u>, and <u>Default Listener.</u>

Right click on the Default Listener and the following features are displayed:

3.7.1.7.1 **Start Listener:** In order to start a listener this feature can be used. By selecting this feature the listener is made to start and the errors if any are displayed to the user.

3.7.1.7.2 **Stop Listener:** The already running Listener can be made to stop using this function. By clicking on this option the DbClone application stops this Listener and if the user tries to stop Listener that is not running then an error message is displayed and the operation fails.

3.7.1.7.3 **Test Listener:** This feature tests that particular Database Listener whether the Listener is up or not. If the Listener not running it can be made to run by using the Start Listener feature discussed above and to stop a already running listener the Stop Listener option can be used.

3.8 **Manage Schedule Templates***[1]**:**

This feature of DbClone is used for managing the Schedule Templates of the DbClone. The Schedule Templates are used for scheduling the DbClone operations and when the schedule time comes the DbClone automatically performs that operation internally. The **Manage Schedule Templates** feature of DbClone can be accessed only by the DbClone super user and not by the normal users. Manage Schedule Templates consists of the following features:

3.8.1 **Edit Schedule Templates:** The DBA or the DbClone super user can create, modify or delete the existing Schedule Templates for scheduling the DbClone operation by any user of the DbClone.

3.8.2 **Add Schedule:** The DbClone super user can add a scheduling template to the existing list of scheduling templates to be used by the DbClone user for performing any particular DbClone operation at any convenient time like the off peek hours.

3.8.3 **Modify Schedule:** The DbClone super user can modify the parameters of the already existing Schedule Template like the expiry date of the template or the scheduling nature of the template whether it is One time or a Repetitive task and also the nature of operation that template has to perform and many others.

3.8.4 **Delete Schedule:** The DbClone super user can delete the existing schedule template or the ones that already expired.

3.8.5 **Show Active Schedules:** The DBA can see the Active Schedules that are present in the DbClone. All the operations that have been scheduled by the users are displayed to the DbClone super user.

3.8.6 Steps for using the Manage Schedule Templates feature of DbClone:

i. Open the Manage Schedule Templates node of the DbClone application.

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[1] * Only the Super User of DbClone can view and access these features

ii. The two features of Manage Schedule Templates are displayed i.e. Edit Schedule Templates and Show Active Schedules.

iii. Right click on the Edit Schedule Template feature and three options of Adding, Modifying or deleting a template is displayed.

iv. Select the appropriate option to be performed.

3.8.7 Adding a Schedule Template: The DbClone super user can create a schedule template for any particular operation by specifying the following required inputs:

i. Target operation: The operation that this schedule template performs at the specified time and date.

ii. Date created: This is the date on which this Schedule template is created and is cannot be edited by the user as this presents the current date of the system on which DbClone is installed.

iii. Effective date: This is the date on which the current schedule template becomes effective and can be used by the DbClone user for scheduling purposes.

iii. Expiry date: This is the date on which the current schedule template becomes invalid and cannot be used for scheduling purposes.

v. Schedule Type: The super user can design the template, which can be used for One time purpose or for using it repetitively. Repetitive operations can be performed everyday or weekly or on monthly basis.

vi. Enable/Disable: The schedule template if enabled can be seen and used by the DbClone normal users. A schedule template can be created and put in Disabled mode so that the user cannot access it until the DbClone super user changes it to Enabled mode.

3.8.9 Modifying a Schedule Template: The DbClone super user can modify the existing schedule templates. All the template properties can be modified and even the target operation and the schedule type.

3.8.10 Delete a Schedule Template: The DbClone super user can delete the exiting schedule template. The super user has to select the Schedule ID to be deleted and then click the delete button in order to delete the schedule template.

3.9 DbClone Reports

DbClone gives user the flexibility to select various database reports to show the health of the databases, Listeners and Disk Storage usage, Memory and other parameters. The DbClone provides the extensive report on the portal activity like Cloning History, DbClone users, the privileges granted to them and the current system or user activity in the DbClone. The Reports Interface is part of the Java Console and provided selection of parameters through dropdown lists and other input selections. Three folders are provided to pick the desired reports and run by right click of the Mouse. The reports in general are Tabular and provide Color Alerts and problem area of the Reports are highlighted in Color.

3.9.1 Global Database Reports:

3.9.1.1 Global Database Inventory

This report instantaneously captures and provides the physical status details of all the server hosts and the databases that are registered with the DbClone. It lists in an easy readable format the host status, database statistics, version, and the number of users session connected.

This report would take long time to generate as is has to access all the systems connected and registered with the DbClone and also has to check the status of the Databases of the hosts, which are connected and are in running condition.

3.9.1.2 Performance Reports

3.9.1.2.1 SGA Statistics Info

This report displays the internal memory allocations of the Database System Global Area (SGA). All the memory that is allocated to different buffers, pools and cache is displayed in Bytes along with their internal names. The Subdivision of shared pool into its various components is also displayed in this report.

3.9.1.2.2 Monitor Performance

The different Cache Hit Ratios and various other database performance parameters of any Database are displayed along with the accepted values. If the parameter value is below some optimum value then the remedy for improving the performance is also displayed in this report. This report helps in determining the optimum size of the db_block_buffers for improving the Db Block Buffer Cache Hit Ratio, which in turn helps in reducing the number of memory access, which ultimately improves the DB performance.

3.9.1.2.3 Table Space Info

This report generates a table showing the tablespace information. The memory utilized by each tablespace along with the total memory allocated to that tablespace and the free space left for that tablespace is displayed in Mega Bytes. All the tablespace information displayed is pertaining to the database selected and if the space available falls below a particular value then the DBA can take necessary steps to enhance it in order to improve the DB performance.

3.9.1.2.4 Extent Information

Extent information of database segments is shown in this report. The name, size of the segment and the owner of the segment are displayed here. The user can also see the maximum number of extents allocated, size of the next extent and the total number of extents utilized. If the number of utilized extents exceeds certain threshold a

warning mark is displayed so that the DBA can make the necessary changes.

3.9.1.2.5 Session Information

All the session information of the database is given in this report. The CPU usage, current running operation, the logon time, the memory and the host information of all the users of database are displayed in a tabular form. The DBA can thus check the numbers of users at any particular time and the kind of operation they have been doing to allocate the necessary resources efficiently. This reports also helps the DBA in scheduling the shut downs or updating the standby and other tuning issues.

3.9.1.2.6 Locked Objects

The Oracle locked objects are shown in this report. Some of the objects are locked in order to maintain their consistency. When a user is updating an object the Oracle locks that object and does not give access to other users unless the update /writing process is complete.

3.9.1.2.7 Top SQL Queries

Top SQL Queries mean the ones that have more number of reads per execution. This report displays the top sql queries running on a particular database along with no. of disk reads, buffer fetches, no. of times the query is executed and the first time the query is executed.

3.9.1.3 Security Reports

3.9.1.3.1 User Roles

This report gives the different roles that are granted to the users of the selected database. The administrative role if granted to the user is also displayed in this report. This report helps the DBA to improve if needed the security levels of the database in terms of the access/operations done by the users.

3.9.1.3.2 User Privileges

The privileges granted to the users on a particular database are shown in this report.

3.9.1.4 Capacity Reports :

3.9.1.4.1 Redo Logs

The redo logs that are created during any transaction are displayed in this report. These redo logs used whenever any roll back has to be done due to some failure. All the important redo log parameters are displayed in a tabular

form. The group number, group name and the number of members in that group are displayed. The size of the redo log file, its archive mode and its status whether current/inactive/unused are also shown in this report.

3.9.1.4.2 Init.ora Parameters
In this report the init.ora parameters of the oracle database are tabulated. The parameter types and their values are shown. The DBA can directly use this report to see the values of the init.ora parameters instead of trying to view these parameters from the console, which is very cumbersome. The DBA can thus refine these parameter values for better performance.

3.9.1.4.3 All User Information
All the user information along with their account status can be known from this report. The number of objects created by these users in the database is shown along with the default tablespace.

3.9.2 Object Differences

3.9.2.1 Table Column Differences
This report gives the table column differences between the two selected schemas that are registered with the DbClone. In this report the user of DbClone has to select two schemas he may wish to compare by selecting the hosts and the databases to which these schemas belong. The report performs a difference operation on the schemas and lists the tables with same name and those having different column names, types and even the column size.

3.9.2.2 Index Column Differences
This report generates the index column differences of the two schemas selected from the interface. Similar to the table column differences, this index column differences gives the index names and the properties they differ with from the two selected schemas.

3.9.2.3 Object Differences
This report generates all the object differences between the two selected schemas by doing a difference operation on the two schemas. The following object types are considered while doing difference operation: index, package, package body, procedure, sequence, synonym, trigger, table, and view. This report displays the object name, schema to which this object belongs, object type and also the status of the object whether it is valid or invalid.

3.9.2.4 Trigger Differences
This report generates the difference in Triggers that are defined on the schemas selected. The triggers with different names and also the triggers with similar names and having different properties are listed using this feature of DbClone.

3.9.2.5 Sequence Difference

Sequences are defined on a table for implementing the uniqueness of the rows in the table. The sequence limits can be set when defined on the table like the minimum, maximum, the increment values of the sequence. This report displays all the sequence differences that exist between the selected schemas.

3.9.2.6 View Column Difference

This report gives the view differences between the two selected schemas that are registered with the DbClone. In this report the user of DbClone has to select two schemas he may wish to compare by selecting the hosts and the databases to which these schemas belong. The report performs a difference operation on the schemas and lists the views with same name and those having different column names, types and even the column size.

3.9.2.7 Privilege Difference

This report generates the difference in the privileges that exist on the schemas selected. A comprehensive difference operation is performed on the schemas. The report shows the privileges that are similar but differ at the ownership level as to who granted the privilege on a particular table.

3.9.2.8 Synonym Difference

The Synonyms or aliases are defined on the tables for easy access when they have to be involved in complex queries. This report displays the different synonyms having same names, which differ in respect to the table they are pointing to and the user access granted on them.

3.9.3 DbClone Internal Reports

3.9.3.1 DbClone History

This report generates the history of operations that are performed using DbClone. Displays all operations performed by all users, the time & date of operation, the type of cloning done, the method of cloning, target and source hosts and SID's. The DbClone interface gives the option of selecting any parameter like the username, type of cloning or method of cloning, the target SID's to further refine the report.

3.9.3.2 DbClone User Privileges

The privileges granted by the DbClone administrator to iusers are shown in this report. This report displays privileges granted on various oracle homes /databases to all users, listing username, Object type (Oracle Home /database), Object name, granted privilege on database (Clone /Refresh /Migrate) or Oracle home. Selecting any particular user and viewing all the privileges granted to that user could further refine this report.

3.9.3.3 DbClone Object Privileges

All the privileges granted on any particular object by the DbClone administrator to the users are displayed in this report. Displays information about privileges granted on each object (database/Oracle home), listing host name, object name, object type (Database/Oracle

Home), user ID, granted privilege on database (Clone/Refresh/Migrate) or Oracle home.

3.9.3.4 DbClone Current Activity

DbClone generates this report showing all the online users who are currently performing activities like Cloning, Migration, Refreshing or creating a blank database. This report also lists the source and target databases and the status of the operation the user is performing.

3.9.3.5 DbClone User Activity Log

This report gives the comprehensive list of operations that are performed by the users of DbClone. It also gives the logon and logoff times of the user along with the session ID and the status of the operation. The report can further be refined to any particular user of DbClone.

3.9.3.6 DbClone Configuration Management

Displays the hierarchical structure (parent-child) of all cloned/migrated databases starting with root database.

IV. DbClone Internal Settings and Security

5.1 Clone settings:

The DbClone super user can change the settings of the DbClone application configuration. The settings include the **Database Listener port number, Apache Port number, DbClone Oracle home, TNS file location, Scripts directory, UTL Directory** and many others.

The DbClone super user can also change the settings of the other database or oracle homes that are registered with the DbClone by using the <u>Manage DbClone</u> feature of the DbClone and by selecting the <u>Register/Edit Database</u> or <u>Register/Edit Oracle Home</u> option. These changes cannot be effective unless these parameters are also changed at that database physically by changing the init.ora or the control files of the Database. The changes made using the DbClone are only reflected in the DbClone application database.

The DbClone super User can change the paths of the Oracle Homes, TNS file locations and others but before doing he has to make sure that the modified paths do exist if not has to make sure they are created before modifying the paths using DbClone application.

The DbClone application generates log files and script files during the DbClone operations that are present on the source as well as on the target machines that are involved in the operation performed using DbClone. The files on the source machine are located at /tmp/(clone_id)_source_dir directory where clone_id is the ID that is generated when starting the process and the files on the target machine are present at /tmp/(clone_id)_target_dir directory. These files are deleted as soon as the user who performed these operations logs out and that is the default condition set in the DbClone configuration environment.

The DbClone Super User can change this parameter and set the Create DbClone Log and Create DbClone Scripts parameters to YES in Clone setting Screen provided in the Manage Dbclone feature. Then all the log and script files are not deleted from the source and target machines even when the user logs off the DbClone application. The DbClone super user can use these files for any debugging required if something goes wrong while doing the operations.

The DbClone super user has the privilege to access all the DbClone application database tables and make any changes that may be required for the running of the DbClone application.

V   DbClone Technical Support

5.1   **Help & Technical Support:**

Dbclone Console provides built-in Error reporting and error logging facility.
Help text can be reached by using DbClone help or Oracle help.
For all Oracle related Errors, which start with ORA- IMP- EXP or SQL-, please use Oracle provided (**oerr)** error facility to get Oracle help text. Enter oerr command at UNIX prompt on server where DbClone is installed.

Usage: $ oerr ORA 00941

For all other DBClone errors please note the Error Code and use the **Help Link on top right corner of the DbClone Console.** Enter the DbClone Error Code to obtain detailed help text.

Take the appropriate action, as given out by help text to remedy the error condition and restart the operation.

If any error or problem occur during the user interaction or installation, please check the Dbclone log file in the $Tar_Installation directory.

If any system errors occur due to setup parameters, please check the errors and fix them by changing the parameters required for installing DbClone or granting the required privileges for the user and start the installation process a fresh.

If the problem still persists please go to the DbClone website www.dbclone.com and fill in and post the support page for technical installation help. Technical Support representative will respond within few hours or next business day if the request is received after 1700 hrs.

For immediate assistance or support, please call the toll free number: 1-888-830-5663 during office hours. Technical Installation support personnel are available from 09:00 to 18:00 EDT, Monday - Friday.