Novell ZENworks Linux Management

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ORACLE CONFIGURATION GUIDE

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1 Preamble

This document assumes that you have a working Oracle 9i server running on any of Oracle's supported platforms, running a listener on a tcp port. We also assume you, or your DBA, has some experience with Oracle, and its command line utilities.

At this time, Oracle support is offered only on ZENworks Linux Management servers running on RedHat Enterprise Linux 3.

This guide describes one possible method of setting up a ZENworks Linux Management server with Oracle, but also aims to provide you with the information necessary to produce alternate configurations that fit your existing Oracle setup.

2 Before We Begin

We assume that you have, at the very least, a database and a user set up for your use to begin with. For the purposes of this document, we will assume that you will use a single oracle user for all operations (we'll use 'redcarpet' in our examples). Information about user privilege separation can be found in section 6 of this document.

Tablespaces

A fully deployed ZENworks Linux Management server tends to have a fairly sizable amount of metadata stored in the database. It's recommended that you start with around 2 Gigabytes of tablespace to begin with.

Managing tablespace is something best left to the DBA due to performance considerations and filesystem constraints on large file sizes.

We recommend that you create tablespace(s) for exclusive use by ZENworks Linux Management server.

System Privileges

Your user will require the necessary privileges to connect remotely, create tables, sequences, indexes, and functions, and an appropriate quota on available tablespace(s).

The Oracle Listener Service

In order to contact your database instance remotely via TCP, your DBA will have to set up an entry in the $ORACLE_HOME/network/admin/listener.ora file.

By default, Oracle's listener is set up to listen on port 1521. That is the value we assume for the examples in this document.

Setting up an Oracle 9i Client

Setting up an Oracle client on your ZENworks Linux Management server is non-trivial. Initially, the Oracle Universal Installer won't actually run on RedHat Enterprise Linux 3.

The following should help you to set up an Oracle 9i client on your ZENworks Linux Management server.

Required Packages

Certain packages are required for an Oracle installation to finish successfully:

compat-db

compat-gcc

compat-gcc-c++

compat-libstdc++

compat-libstdc++-devel

openmotif21

setarch

tcl

These can be installed with rug from the distribution channel, or by installing each package manually with rpm.

Relinking GCC

Oracle requires an older version of gcc (2.9.6) in order to link. See Oracle note 252217.1 for more information. To make the installer use the older version, you need to relink gcc in the path to the older version.

To relink gcc:

```
su - root
mv /usr/bin/gcc /usr/bin/gcc323
ln -s /usr/bin/gcc296 /usr/bin/gcc
mv /usr/bin/g++ /usr/bin/g++323
ln -s /usr/bin/g++296 /usr/bin/g++
```

Oracle Installer Patches

Running the installer successfully to install Oracle or Oracle's client libraries on Red Hat Enterprise Linux release 3 requires a patch from Oracle (p3006854_9204_LINUX.zip). Please see Oracle bug 3006854 for more information. You can download this patch from http://metalink.oracle.com (Note: Access to metalink requires a valid Oracle Support Identifier - your DBA will have more information on this).

To patch your system:

```
su - root
```

```
unzip p3006854_9204_LINUX.zip

cd 3006854

sh rhel3_pre_install.sh
```

Environment Variables

Once patched, you need to set some environment variables for your Oracle install user before running the Oracle installer from the Oracle CDs:

```
export LD_ASSUME_KERNEL=2.4.1
```

In addition to the LD_ASSUME_KERNEL environment variable, you should set your Oracle environment variables at this time. Your DBA will have more information on these values.

Note: Environment settings will apply whenever you run Oracle's installer. This includes patching Oracle for updates (to 9.2.0.4, for example).

Installing

You should now be able to run the Oracle Universal Installer. It's recommended that you create a user that will own the Oracle installation, since the Oracle installer won't run as root. Likely choices tend to be 'oracle' or 'oinstall'.

Typically, Oracle software is installed under /opt/oracle. In the case of database software, we install using /opt/oracle/product/9.2.0 as our Oracle Home. This is the case in the examples in this document. This directory is typically referred to as $ORACLE_HOME (export ORACLE_HOME=/opt/oracle/product/9.2.0).

You should only install the Oracle 9i Client on your ZENworks Linux Management server. The "Runtime" installation type is sufficient for both configuring and running the server.

Oracle TNS Names

For our examples we use tnsnames. Onames will work in much the same way, but are something that should be handled by your dba.

For tnsnames, you'll need to edit the $ORACLE_HOME/network/admin/sqlnet.ora file to make sure that TNSNAMES is checked first. This file should contain:

```
NAMES.DIRECTORY_PATH=(TNSNAMES, ONAMES, HOSTNAME)
```

Next, you'll need to edit the $ORACLE_HOME/network/admin/tnsnames.ora file to create a TNS entry for your database instance. This file is equivalent, in oracle, to the /etc/hosts file for hostname resolution in Linux.

You'll want to create a TNS entry similar to the following:

```
MYDB =
 (DESCRIPTION =
  (ADDRESS_LIST =
   (ADDRESS = (PROTOCOL = TCP)(HOST = oracle.mycompany.com)(PORT = 1521))
  )
  (CONNECT_DATA =
   (SID = MYDB)
   (SERVER = DEDICATED)
   (SERVICE_NAME = mydb)
  )
 )
```

Your DBA should be able to provide you with a value to replace "MYDB", a hostname, and a port, which should match settings from your Oracle 9i Server's $ORACLE_HOME/network/admin/listener.ora file.

Finishing up

You'll need to set some environment variables in order to use Oracle utilities. Based on our setup, the following is appropriate:

```
export ORACLE_BASE=/opt/oracle
export ORACLE_HOME=$ORACLE_BASE/product/9.2.0
export NLS_LANG=AMERICAN;
export ORA_NLS33=$ORACLE_HOME/ocommon/nls/admin/data
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib:/usr/local/lib

export PATH=$PATH:$ORACLE_HOME/bin
```

For ease, you may want to add these lines to your shell's rcfile (.bashrc or equivalent).

To test that you can access your Oracle database, you can use the tnsping utility as follows (based on the above tnsnames example):

```
$ tnsping mydb

TNS Ping Utility for Linux: Version 9.2.0.1.0 - Production on 17-NOV-2004 22:55:45

Copyright (c) 1997 Oracle Corporation.  All rights reserved.

Used parameter files:
/opt/oracle/product/9.2.0/network/admin/sqlnet.ora


Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP)(HOST = oracle.mycompany.com)(PORT = 1521))) (CONNECT_DATA = (SID = MYDB) (SERVER = DEDICATED) (SERVICE_NAME = mydb)))
OK (110 msec)
$
```

Alternatively, you can simply attempt to login to your Oracle database using SQL*Plus:

```
$ sqlplus redcarpet/password@mydb

SQL*Plus: Release 9.2.0.1.0 - Production on Wed Nov 17 22:59:18 2004
Copyright (c) 1982, 2002, Oracle Corporation.  All rights reserved.


Connected to:
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production
```

```
SQL> quit
Disconnected from Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production
$
```

--

3 Installing ZENworks Linux Management Server with Oracle Support

At this point, you should have a working Oracle 9i client running on the machine that will host your ZENworks Linux Management server. This section will guide you through the package installation.

The “zlm-server-oracle” Task Package

The zlm-server-oracle package has no payload -- it merely leverages the RPM packaging system's metadata infrastucture to trigger the installation of additional packages, while "providing" Oracle library dependencies which are not otherwise packaged as RPMs, such as libclntsh.so.9.0 and libwtc9.so.

Similar functionality can be achieved with ZENworks Linux Management server with the Package Sets functionality. Please refer to Chapter 4 of the ZENworks Linux Management Administration guide for more information on Package Sets.

Installing from the CD or ISO Image

We'll assume that you've mounted your CD media or ISO image at '/mnt/cdrom' in the following example.

Run through the rce-install script as normal (Please refer to Chapter 3 of the ZENworks Linux Management Administration guide for further details).

The installer exits with a message that reads:

> To initialize your ZLM server, run /usr/sbin/rce-init as root.
>
> You will only need to do this once.

Before we can do this, we need to install a few more packages, and reconfigure the server to point to a remote Oracle database.

As root, mount the directories as channels using rug, and install the zlm-server-oracle task package:

```
$ su -
Password:
# /etc/init.d/rcd stop
# /usr/sbin/rcd --no-services
# cd /mnt/cdrom
# rug mount -a zenworks66 ZENworks66/rhel-3as-i386

Mounted '/iso/zlm66-iso/ZENworks66/rhel-3as-i386' as a channel.

# rug mount -a redcarpet2 redcarpet2/rhel-3as-i386

Mounted '/iso/zlm66-iso/redcarpet2/rhel-3as-i386' as a channel.

# rug mount -a rhel-3as-i386 rhel-3as-i386/rhel-3as-i386

Mounted '/iso/zlm66-iso/rhel-3as-i386/rhel-3as-i386' as a channel.

# rug in -y zlm-server-oracle

...
Transaction finished

#
```

Installing Online

Install online as normal using your activation key (Please refer to Chapter 3 of the ZENworks Linux Management Administration guide for further details).

The package installation using rcd will end:

```
Transaction finished
```

Install the zlm-server-oracle task package:

```
# rug in -y zlm-server-oracle

...
Transaction finished

#
```

4 Importing the ZENworks Linux Management Tables

When using PostgreSQL on the same server as ZENworks Linux Management, the "rce-init" script handles the generation of the database tables that ZENworks Linux Management server will use.

Using Oracle on a remote machine requires us to load the schema by hand using SQL*Plus.

Running rcserver.sql.ora

Prior to actually running the script, it's highly recommended that you and your DBA go through the script to understand exactly what database objects it creates. If you're doing something non-standard like user privilege separation (see section 6 of this document), you may need to make alterations to the script.

The script itself is located at /usr/share/rcserver/rcserver.sql.ora.

This following command merely runs the script. If you require additional help with using SQL*Plus to capture output or otherwise, please consult your DBA.

On your ZENworks Linux Management server:

```
$ sqlplus redcarpet/password@mydb

SQL*Plus: Release 9.2.0.1.0 - Production on Wed Nov 17 23:55:36 2004

Copyright (c) 1982, 2002, Oracle Corporation.  All rights reserved.


Connected to:
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
```

```
JServer Release 9.2.0.4.0 - Production

SQL> @/usr/share/rcserver/rcserver.sql.ora

...

SQL>
```

The rcserver.sql.ora script in its shipped form will generate some errors about granting privileges to a non-existent user, and not finding certain objects to drop. These can be safely ignored.

Checking the Results

From within SQL*Plus, you should be able to check object counts:

```
SQL> select count(*),object_type from user_objects group by object_type;

  COUNT(*) OBJECT_TYPE
---------- ------------------
         2 FUNCTION
       100 INDEX
        15 LOB
        22 SEQUENCE
        75 TABLE

SQL>
```

If your database reflects different numbers of these objects, it is likely that you are lacking requisite system privileges. Speak with your DBA to be granted the necessary privileges.

5 Configuring ZENworks Linux Management for use with Oracle

Since the ZENworks Linux Management server uses services, it requires the Oracle environment to be transposed into those services' runtime environments in order to function correctly with an Oracle 9i database.

Additionally some generic configuration parameters need to be set in order to inform the server of precisely how to contact the database.

rcserver.conf

This file is located at /etc/ximian/rcserver/rcserver.conf. It contains configuration parameters that the server uses, among other things, to determine how to contact the database.

The following is a list of relevant tokens, and their meanings (defaults in parens):

dbname - the service name of your database (rcserver)

dbuser - the database user (redcarpet)

dbpass - the database user's password (no default)

dbhost - the tcp host on which to contact the database (localhost)

dbport - the tcp port on which to contact the database (no default)

dbproto - the protocol by which to contact the database (unix)

dbback - the type of database to expect (pgsql)

ora_sid - the Oracle SID of the database (no default)

ora_tnsname - the Oracle TNS name defined in tnsnames.ora (no default)

Once configured, your rcserver.conf should look something like the following:

[System]

smarty_compile_dir = /var/tmp/smarty-compile

dbname = mydb

dbuser = redcarpet

dbpass = password

dbhost = oracle.mycompany.com

dbport = 1521

dbproto = tcp

dbback = oci8

ora_sid = MYDB

ora_tnsname = mydb

packages_path = /ximian/red-carpet-server

cachedir = /var/tmp/rce-cache/

lang = en_US

magicproxy = /etc/ximian/rcserver/magic-proxy

expire = 7200

secret = ssshhh

Service Environments

The two services that ZENworks Linux Management uses are apache, as the http server, and rcq-runner, an asynchronous processing daemon.

Setting up these environments is relatively simple. They merely need the same environment any other Oracle user would require to be written to /etc/sysconfig/httpd and /etc/sysconfig/rcq-runner respectively:

export ORACLE_BASE=/opt/oracle

export ORACLE_HOME=$ORACLE_BASE/product/9.2.0

export NLS_LANG=AMERICAN_AMERICA.UTF8

export ORA_NLS33=$ORACLE_HOME/ocommon/nls/admin/data

export LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib:/usr/local/lib

/usr/sbin/rce-init

Since the rce-init script makes database calls, it is required that you set up root's environment correctly before running it. You can do so by simply sourcing either /etc/sysconfig/httpd or /etc/sysconfig/rcq-runner prior to running rce-init.

The following is an example from the bash shell (RedHat Enterprise Linux's default root shell):

```
# . /etc/sysconfig/rcq-runner
# /usr/sbin/rce-init
Initializing Red Carpet Enterprise

Your RCE server appears to have a remote database.
If it is not already configured you will need to configure
it now.
Is your remote DB already configured? (yes/no) yes
Reconfiguring Apache httpd
Restarting Apache httpd
Starting rcq-runner
Red Carpet Enterprise Server initialization complete
#
```

Creating the Initial Administrator

Before you can use you ZENworks Linux Management server, you'll need to create an initial administrator. This is done via the web interface by accessing http://servername in a browser.

Further administration can be done via the web interface, or by accessing the rcman command line client. Please see Chapters 5 and 6 respectively of the ZENworks Linux Management Administration guide for further details on using these tools.

6 User Privilege Separation

This section describes the needs of ZENworks Linux Management in order to function correctly with separate users for runtime and administrative use, which is essentially the way the server operates when using a PostgreSQL database.

For the purpose of our examples, we'll be using the same users that we use in PostgreSQL. These names are flexible since the server never references them directly.

rcadmin - the administrative user for doing the majority of table and maintenance operations.

redcarpet - the runtime user that the server uses for doing typical data manipulation operations.

System and Object Privileges

The rcadmin user will own most of the tables and requires system privileges to create tables, indexes, sequences and functions, and an appropriate quota on tablespace.

The redcarpet user will require system privileges to connect remotely, create tables and indexes, and an appropriate quota on tablespace. Additionally, the redcarpet user needs object permissions for select, insert, update and delete on rcadmin's tables and sequences, and execute privileges on rcadmin's functions.

Running the following script as rcadmin will grant the necessary object privileges:

```
begin
  for i in (select table_name from user_tables) loop
    execute immediate 'grant select,insert,update,delete on '||i.table_name||' to redcarpet';
  end loop;
  for i in (select object_name from user_objects where object_type = 'SEQUENCE') loop
    execute immediate 'grant select on '||i.object_name||' to redcarpet';
  end loop;
```

```
  for i in (select object_name from user_objects where object_type = 'FUNCTION') loop
    execute immediate 'grant execute on '||i.object_name||' to redcarpet';
  end loop;
end;
```

Synonyms

The server refers to objects by oracle's OBJECT_NAME rather than OWNER.OBJECT_NAME. It is therefore necessary to create private synonyms for all of rcadmin's referenced objects so that the redcarpet user can refer to them by OBJECT_NAME. Referenced object include tables, sequences and functions.

Running the following script as redcarpet will create the necessary synonyms:

```
begin
  for i in (select object_name from all_objects where owner = 'RCADMIN' and object_type in
('TABLE','SEQUENCE','FUNCTION')) loop
    execute immediate 'create synonym '||i.object_name||' for RCAMIN.'||i.object_name;
  end loop;
end;
```

The tmp_deps table

The tmp_deps table stores no permanent data and requires the use of the truncate operation which doesn't work on synonyms. For that reason it needs to be created and owned by the redcarpet user.

7 Tuning

Confirm that the database has statistics enabled as this improves performance substantially. If not enable statistics in the ZENworks Linux Management server Oracle database as follows, from within SQL*Plus.

```
exec
dbms_stats.gather_schema_stats('redcarpet',NULL,FALSE,NULL,4,'ALL',TRUE,NULL,NULL)
;
```