

README_hpux.txt: HP-UX Addendum to the "Oracle9i Application Server Infrastructure: Improved Availability with Hardware Clusters Updated: July 2003" Oracle White Paper (9ias_cfc.pdf)

This addendum lists the differences and extra steps needed on HP-UX to implement the Cold Failover solution outlined in 9ias_cfc.pdf. 9ias_cfc.pdf should initially be read to get a general understanding of the solution. Once the user has a good understanding of the solution, the steps listed below (in the "Differences from 9ias_cfc.pdf on HP-UX" section) should be taken to implement this solution on HP-UX.

This solution is applicable to the following 9iAS (Oracle9i Application Server) releases on HP-UX (for the Infrastructure part, only):

9.0.2.0.1

9.0.2.2 Core Patchset

9.0.2.3 Core Patchset

Contents of the current directory:

9ias_cfc.pdf: an Oracle White Paper that describes and provides the steps to implement a Cold Failover solution for the 9iAS Infrastructure on a hardware cluster

README_hpux.txt: this file

Contents of the scripts directory (instructions for modifications are within each file; these scripts are the equivalent HP-UX versions of the scripts provided in the Appendixes of 9ias_cfc.pdf):

start: file to execute to startup the 9iAS Infrastructure processes (needs: (1) to be modified for the environment, (2) executed only by root, (3) owned by root with permission 500 (i.e. "-r-x-----"))

start9ias902infra.sh: file that the start script will execute (does not need modification)

stop: file to execute to stop the 9iAS Infrastructure processes (needs: (1) to be modified for the environment, (2) executed only by root, (3) owned by root with permission 500 (i.e. "-r-x-----"))

stop9ias902infra.sh: file that the stop script will execute (may need modification for the last 4 lines)

Contents of the setup directory:

ENV: sample file to execute to set the required environment variables for this solution

Makefile: makefile to create derived objects in this setup directory (just type "make")

hostname.c: C source code to create the hostname32.exe and hostname64.exe executables

hostname32.exe: 32-bit HP-UX executable to simulate a gethostname() call

hostname64.exe: 64-bit HP-UX executable to simulate a gethostname() call

hostname.java: java source code to create hostname.class

hostname.class: java class file to simulate a gethostname() call within java

iASVrtIHst32.c: C source code for the new gethostname() routine

iASVrtIHst32.o: 32-bit object file created from iASVrtIHst32.c

iASVrtIHst64.c: C source code for the new gethostname() routine (same as iASVrtIHst32.c)

iASVrtIHst64.o: 64-bit object file created from iASVrtIHst64.c

libloghost.sl: 32-bit HP-UX shared library to load to get the new gethostname() routine (created from iASVrtIHst32.o)

pa20_64/libloghost.sl: 64-bit HP-UX shared library to load to get the new gethostname() routine (created from iASVrtIHst64.o)

Differences from 9ias_cfc.pdf on HP-UX:

1) libloghost.sl is the only shared library needed on HP-UX, thus \$LD_PRELOAD needs to be set to "libloghost.sl"

2) \$LD_LIBRARY_PATH needs to include "/usr/lib" on HP-UX before the 9iAS 9.0.2.0.1 Infrastructure install (see the ENV file)

3) to install libloghost.sl on HP-UX, execute the following commands from the setup directory as root:

```
# chown root libloghost.sl pa20_64/libloghost.sl
```

```
# chgrp root libloghost.sl pa20_64/libloghost.sl
```

```
# chmod 755 libloghost.sl pa20_64/libloghost.sl
```

```
# cp libloghost.sl /usr/lib
```

```
# cp pa20_64/libloghost.sl /usr/lib/pa20_64
```

4) before the 9iAS 9.0.2.0.1 Infrastructure install on HP-UX, the following has to be performed:

(a) as root, add the following lines to /etc/services:

```
ldap 389/tcp
```

```
ldap 389/udp
```

```
ldaps 636/tcp
```

```
ldaps 636/udp
```

(note: remove these lines AFTER the 9iAS 9.0.2.0.1 Infrastructure has been successfully installed)

(b) as the user that will perform the 9iAS 9.0.2.0.1 Infrastructure install, create a \$ORACLE_HOME/lib32 directory (\$ORACLE_HOME has to be set and should be an empty directory with enough disk space where the 9iAS 9.0.2.0.1 Infrastructure install is to take place) and copy the 32-bit version of libloghost.sl there

(example: export ORACLE_HOME=/oracle/ias902infra; mkdir \$ORACLE_HOME/lib32; chmod 755 \$ORACLE_HOME/lib32; cp libloghost.sl \$ORACLE_HOME/lib32)

(note: the last command has to be performed within the same directory as step #2 was performed and AFTER step #2 has been performed; make sure not to copy the 64-bit version of libloghost.sl (which exists in the pa20_64 directory) to \$ORACLE_HOME/lib32)

5) to account for both 32-bit and 64-bit executables on HP-UX, the hostname.exe mentioned in 9ias_cfc.pdf is provided as hostname32.exe (32-bit version) and hostname64.exe (64-bit version) on HP-UX; thus, before the 9iAS 9.0.2.0.1 Infrastructure install, ensure that executing "hostname32.exe", "hostname64.exe", and "java hostname" return the virtual hostname (as defined in \$LHOSTNAME); the install should not start unless this test passes

6) the following needs to be done right after root.sh is executed and before resumption of the install process

(a) chown the_oracle_owner \$ORACLE_HOME/bin/oidldapd

(b) chmod 710 \$ORACLE_HOME/bin/oidldapd

(c) chattr +s enable \$ORACLE_HOME/opmn/bin/opmn

(note: replace "the_oracle_owner" with the OS user (non-root) that owns the 9iAS 9.0.2.0.1 Infrastructure software files; all three commands should be run as the root user; if the chattr command fails, it is most likely because the opmn executable is running; in this case, perform the opmnctl stopall and startall steps exemplified in step #8, below (do not perform the other steps within step #8 of modifying opmn.xml and executing dcmctl at this point))

7) after the 9iAS 9.0.2.0.1 Infrastructure install, modify the \$ORACLE_HOME/bin/resetiaspasswd.sh script by adding the following lines after the "export LD_LIBRARY_PATH" line:

```
SHLIB_PATH=${ORACLE_HOME}/lib32
```

```
export SHLIB_PATH
```

8) after the 9iAS 9.0.2.0.1 Infrastructure install, execute the following steps:

```
$ $ORACLE_HOME/opmn/bin/opmnctl stopall (this will stop OPMN)
```

```
$ vi $ORACLE_HOME/opmn/conf/opmn.xml
```

==> edit opmn.xml by adding an environment section (or add to an existing environment section) for every OC4J instance (like for "OC4J_DAS", "home", "OC4J_Demos", and "CUSTOM") that would include the following:

```
<environment>
  <prop name="SHLIB_PATH" value="/oracle/ias902infra/lib32"/>
  <prop name="LD_LIBRARY_PATH" value="/oracle/ias902infra/lib"/>
  <prop name="LD_PRELOAD" value="libloghost.sl"/>
  <prop name="LHOSTNAME" value="infracore"/>
</environment>
```

==> "/oracle/ias902infra" should be replaced with the full path of the \$ORACLE_HOME of the 9iAS Infrastructure install and "infracore" should be replaced with the virtual hostname used for this solution; search for "environment" within opmn.xml for existing environment sections and search for "instanceName" to identify the beginning of each OC4J instance section

```
$ $ORACLE_HOME/opmn/bin/opmnctl startall (this will start OPMN)
```

==> this "opmnctl startall" command will startup two additional OPMN managed processes that are not typically started in a default install; you can shutdown these two processes with

```
"$ORACLE_HOME/dcm/bin/dcmctl stop -co OC4J_Demos" and "$ORACLE_HOME/dcm/bin/dcmctl stop -co home")
```

```
$ $ORACLE_HOME/dcm/bin/dcmctl updateConfig -ct opmn
```

9) if the 9iAS 9.0.2.2/3 Core Patchset is applied, re-perform all steps within step #6

10) if the 9iAS 9.0.2.2/3 Core Patchset is applied, opmn.xml needs to be modified (similarly as in step #8) with the following environment section, right after the line that contains "dcm/bin/dcmctl shutdowndaemon" (replace "infracore" with the virtual hostname used for this solution and "/oracle/ias902infra" with the full path of the \$ORACLE_HOME of the 9iAS Infrastructure install):

```
<environment>
  <prop name="SHLIB_PATH" value="/oracle/ias902infra/lib32"/>
  <prop name="LD_LIBRARY_PATH" value="/oracle/ias902infra/lib"/>
  <prop name="LD_PRELOAD" value="libloghost.sl"/>
  <prop name="LHOSTNAME" value="infracore"/>
</environment>
```

same commands as in step #8 to start/stop/updateConfig OPMN and DCM should be executed

11) similar changes to opmn.xml (as in steps #8 and #10) are required after any update to this file (from

an OPMN operation, manual editing, by a new patch/patchset install, etc) for any new OC4J, "CUSTOM", etc. instance; consequently, the same commands as in step #8 to start/stop/updateConfig OPMN and DCM should be executed

Notes to keep in mind:

- 0) the clustering software (like HP MC/ServiceGuard) needs to be shutdown before the 9iAS 9.0.2.0.1 Infrastructure install (as noted in 9ias_cfc.pdf) as well as before any 9iAS patchset install (such as the 9iAS 9.0.2.2/3 Core Patchset); the clustering software can be re-started after the install
- 1) libloghost.sl has to be installed on all nodes of the hardware cluster where this solution is being implemented on
- 2) all other shells that are not involved with the 9iAS Infrastructure install or in it's operations should NOT be setting \$LHOSTNAME nor \$LD_PRELOAD
- 3) \$LHOSTNAME and \$LD_PRELOAD do not need to be set before running root.sh during the 9iAS Infrastructure install process
- 4) the 9iAS Infrastructure install process will create /etc/oratab and /etc/emtab (append to them if they already exist); these files need to be copied to all nodes of the cluster used for this solution after the install (or info that is appended need to be appended to existing /etc/oratab and /etc/emtab files on the other nodes of the hardware cluster used for this solution) (note: 9ias_cfc.pdf refers to these files being in the /var/opt directory but on HP-UX, they are in the /etc directory)
- 5) the appropriate "ifconfig" commands (referred to in Pre-Install step #7 and #8 of 9ias_cfc.pdf) on HP-UX are "/sbin/ifconfig lan0:1 netmask {netmask_value} {logical_ip_address}" and "/sbin/ifconfig lan0:1 down", respectively (note: all ifconfig, mount, umount, etc commands (referenced in 9ias_cfc.pdf) for HP-UX can be found in the start and stop scripts in the setup directory)
- 6) on HP-UX, before any mount or umount commands are executed, "vgchange" need to be performed (as root) to the volume group containing the filesystem where the 9iAS Infrastructure install is to take place; see the start and stop scripts in the setup directory
- 7) on HP-UX, "cmhaltcl -v" and "cmrunccl -v" can be executed (as root) to shutdown and startup, respectively, an HP MC/ServiceGuard cluster (subsequently, "cmviewcl -v" can be executed (as root) to see the status of the cluster)
- 8) although this solution can be enhanced with the clusterware (like writing an HP MC ServiceGuard Package to perform automatic node failure detection and automatic 9iAS Infrastructure startup on remaining nodes) (note: this is referred to as enabling a "data service" in 9ias_cfc.pdf), the Cold Failover solution documented in 9ias_cfc.pdf does not provide this package nor does it technically depend on any clusterware running; the implementation of this solution depends only on two nodes (minimum) with access to a filesystem that can be mounted at the same mount point on these nodes (mounted on one node at one point of time)
- 9) to confirm that the 9iAS Infrastructure install process is correctly picking up the virtual hostname (as set in \$LHOSTNAME), check all *.log files in the oraInventory/logs directory during the install process (do a "grep" of both the virtual and physical hostnames; no physical hostnames should be returned and multiple virtual hostnames should be returned)
- 10) this solution on HP-UX was tested on HP-UX 11.0 with the September/2002 Quality Pack
- 11) if the hostname.exe check of step #5 is not working, check that you have the appropriate HP-UX patches on your system to support LD_PRELOAD functionality; on HP-UX 11i, PHSS_26560 is a confirmed patch to support LD_PRELOAD functionality