

HP Performance Insight

For the HP-UX operating system

Software Version: 5.41

Configuration Guide for MC/Service Guard Cluster

April 2011



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1 Introduction

This guide provides instructions on how to configure HP Performance Insight in a high availability environment using the HP MC/Service Guard (MC/SG) Cluster version A.11.18.00. Configuring PI in high availability environment improves its availability when used as a mission critical application.

▶ This guide does not cover how to set up an MC/SG cluster.

High availability (HA), as used in this guide, implies that single points of failure (SPOFs) are eliminated from the environment. Examples of SPOFs include System Processing Unit (SPU), disks and disk controllers, LAN interface cards and cables, and power connection.

These potential SPOFs are removed by clustering the SPUs, mirroring or using RAID technology, providing redundant LAN interface cards, and attaching UPSs to the system. Clustering also facilitates operating system and application upgrades. HA solutions, however, cannot protect against failures caused by defects in applications and OS panics.

Configuration Considerations

This guide covers the Configuration of a two node cluster using a shared disk connected to each node through SCSI cable (and not through NFS) with PI 5.41 installed in a standalone setup (All PI components installed on a single machine.)

▶ The scripts provided in this guide can also be used in PI setups where the Performance Manager and database server are installed on a system separate from the Web Access Server/Web Application Server.

The database can be either Sybase or Oracle.

2 MC/SG Implementation Pre-requisites

The primary requirement for an MC/SG implementation is that in case of a failover, all the designated processes are initiated seamlessly on the secondary (failover) system and the LAN connection is moved.

To provide access to the application processes regardless of the physical system on which they run, you must assign a logical hostname and associated IP address to the one and only physical system currently running. Though both the primary and secondary systems access the same shared disks, it is never at the same time. Only the system currently running the application must read and write to the shared disks.

There are, therefore, two core considerations when implementing high availability with MC/SG:

- Assigning a logical hostname and associated IP address
- Appropriate handling of files both shared and local



OVPI supports active-passive cluster type. At any point of time only one node is active and the other is a standby. It is a failover cluster support.

Hostname and IP Address

For a simple system failover implementation there must be two or more servers that are each capable of hosting a unique “floating” hostname and associated IP address that are not associated with a physical system (that is a “logical” hostname and IP address).

Only one of the failover systems will host this name and IP address at any given time. During a system failover, the hostname and IP is “transferred” from the failed server to the failover system. The applications, however, will always access the same hostname and IP.

Both Sybase and Oracle create some files that store the information about the hostname and IP address. PI also stores the values of hostname and IP during installation for use at run time. You must, therefore, set the logical name before installing the database or PI.

Shared and Local Files

In the MC/SG high availability setup, the PI installation files are placed under a specified directory on the shared disk. However, some of the files can not be placed on the shared disk and require special handling. These files are grouped under the following categories:

- Static files – These files are placed on the primary system during installation. These files do not change. Do *ONE* of the following:
 - Copy these files to each of the secondary systems.
 - Move these files to the shared disk and create symbolic links, which reference the file locations on the shared disk, on all failover systems.
- Dynamic files – These files are modified by the application during normal use. You can move these files to the shared disk and create symbolic links, which reference the file locations on the shared disk, on all failover systems.
- System files – These files are shared with other HP Software applications. These files are, for example, `/etc/passwd`, `/etc/group`.
You must perform similar actions on these files (for example, add group, add user) on each of the failover systems.
- Files shared with other HP Software applications – Example for such a file is `/opt/OV`. You must handle these files like static files.

MC/SG Services and Package Control Scripts

HP MC/SG uses scripts for starting and stopping the various “resources” that make up a Package. These Packages can be:

- Disk groups
- Volume groups
- IP addresses
- Applications such as PI, Oracle and Sybase

All these resources are started or stopped in the correct order by an MC/SG “Package Control Script”. MC/SG provides a template script for handling package control. Disk groups, volume groups, and IP addresses are handled by the code present in the template script.

The applications, however, are handled by empty “stub” routines within the template script. You must provide the contents to enable MC/SG to start and stop these applications.

MC/SG monitors the health of Disk groups, volume groups, and IP addresses through its daemons and other executables. To monitor the health of the applications, you must provide a “Service” that monitors the health of the applications to MC/SG. This “Service” is usually a script. It is invoked once by MC/SG when the package is started. You must write this script to have an endless loop repeatedly checking the health of the applications. If it never exits, then MC/SG assumes all is well with the applications being monitored.

It should only exit if it detects failure in the monitored applications.

HP provides customizable scripts to handle the starting, stopping and monitoring of both PI and its underlying database – either Sybase or Oracle. You can purchase the ECM Toolkit product that contains template scripts for handling the startup and shutdown of several types of databases, including Sybase and Oracle (see `/opt/cmcluster/toolkit/${DB}/README`). If you are already managing the startup or shutdown of your database using scripts from this toolkit, or scripts from some other source, then you can customize the scripts provided by HP to manage just PI and not the database.

3 Configuring PI on MC/SG

The following variables/names are used in this chapter:

Name	Description
<code>/mnt/HAdisk</code>	The symbolic link on the failover machines that references the mount point on the external shared HA disk. For example: <code>/usr/OVPI</code> links symbolically to <code>/mnt/HAdisk/OVPI</code>
<code>failover1</code>	The primary node of the failover cluster
<code>failover2</code>	The secondary node of the failover cluster to which control transfers in a failover event
<code>logicalhost</code>	The hostname assigned to the node that currently controls of the files and applications; also known as the “floater” or “virtual” hostname
<code>15.15.15.1,</code> <code>15.15.15.2,</code> <code>15.15.15.99</code>	IP addresses for failover1, failover2, and logicalhost
<code>/dev/vgclust</code>	Volume Group for Cluster’s Shared Data on shared external disk

Configuring PI on MC/SG involves the following tasks:

- Task 1: *Setting Failover Machines*
- Task 2: *Verifying System Resources and Machine Patch Levels*
- Task 3: *Synchronizing System Clocks*
- Task 4: *Setting the Logical Hostname*
- Task 5: *Installing a Database*
- Task 6: *Installing PI*
- Task 7: *Installing Report Packs*
- Task 8: *Completing the PI Configuration*
- Task 9: *Propagating Shared and Local Files*

Task 1: Setting Failover Machines

To set failover machines, follow these steps:

- 1 In a two node cluster, set one system to function as the primary node and one system to function as secondary node and install the MCSG cluster software on both.

Ensure that both the primary and secondary nodes have similar system resources.

This is because when you install the database and PI; the database tuning parameters are set based on the system resources available on the machine on which it is installed. In case there is a failover and the secondary system has significantly less resources than the primary system, the parameters used to initialize and tune the database might not only be sub-optimal but could also prevent the database from being started.



If your hardware availability is limited, you might want to install the database and PI on the less powerful machine to avoid incompatible settings in case of a failover. However, it is best practice to use the more powerful machine as the primary system.

- 2 Set up a shared disk.
- 3 Set one floating “virtual” IP address.
This IP address shares the primary Network Interface Card (NIC) with the “real” IP address of each system.
- 4 Obtain a NIC and IP address to mount the PI resource group.

Task 2: Verifying System Resources and Machine Patch Levels

Follow these steps:

- 1 Verify that each failover node has adequate resources (for example, RAM, swap, kernel settings) and patch levels for the operating system and Java before installing the database and PI.
- 2 See the pre-installation checklist provided in the *HP Performance Insight Installation Guide for Unix* before installing PI.
- 3 See the Oracle Installation Guide for your operating system before installing the Oracle database.

Task 3: Synchronizing System Clocks

PI has many time-dependent, time-critical processes. Therefore, it is important that each machine in the cluster uses the same source for time synchronization to keep data collection, aggregation, reporting, and logging correct and consistent.

You can use the Network Time Protocol Daemon (xntpd) to keep the system's time-of-day in agreement with Internet standard time servers.

For example, to set up the xntpd for HP-UX, follow these steps:

- 1 Open the `/etc/rc.config.d/netdaemons` file.
- 2 Make sure the following variables are defined and XNTPD is set to 1:

```
export NTPDATE_SERVER="ntp.mycorp.com"
export XNTPD=1
export XNTPD_ARGS=
```

- 3 Add the following line in the `/etc/ntp.conf` file.

```
server ntp.mycorp.com
```

This identifies the local time server that provides synchronization

- 4 Launch the xntpd daemon. Type:

```
/sbin/init.d/xntpd start.
```

See the xntpd (1M) manpage for details.

Task 4: Setting the Logical Hostname

Before installing the database and PI, set the logical hostname and IP address on the system that will function as the primary node.

If you face problems when configuring the primary node to use the logical hostname and IP address, see [Configuring PI to Function in a Cluster Setup](#).

Before setting the logical hostname:

- 1 Verify that both failover systems are on the same LAN with identical netmasks. For more information, type the following commands:

```
lanscan
```

```
ifconfig <lan number>
```

- 2 Add logicalhost to DNS. To verify that logicalhost is recognized, type:
`nslookup logicalhost`
- 3 Disable the auto-startup under `/etc/rc*.d/` for those applications that you do NOT want to automatically start during restart. This prevents any problems arising due to restarting with a different hostname.

To set the logical hostname, follow these steps:

On HP-UX systems (PARISC and Itanium)

- 1 At the command prompt, type `set_parms hostname`
- 2 Enter the logical hostname when prompted.
- 3 Restart the system.
- 4 Type `hostname`. It should return logicalhost.

Task 5: Installing a Database

You can customize the database installation based on your environment.

You must install the database on the primary node in the MCSG cluster.

Sybase Database

To install Sybase database, follow these steps:

- 1 On the shared disk, create the Sybase target directory:
`mkdir -p /mnt/HAdisk/sybase`
`ln -s /mnt/HAdisk/sybase /usr/Sybase`
- 2 Verify the following:
 - a The primary node is set to return the “logicalhost” name. See the section *Setting the Logical Host Name*.
 - b The shared disk is mounted.
- 3 Mount the PI DVD as per the instructions in the *HP Performance Insight Installation and Upgrade Guide for Sybase – UNIX* and launch the setup.
- 4 Select **Sybase 15.0.2**
- 5 In the Sybase settings window change the default Installation Path to:
`/usr/Sybase`

This path is symbolically linked to the external shared disk.

- 6 Continue the installation per the instructions in the installation guide.



The name of the Sybase server (the DSQUERY value) defaults to <HOSTNAME_SYBASE> (the HOSTNAME being the logical hostname) during the installation.

For details on installing and configuring Sybase database for PI, see the *HP Performance Insight Installation and Upgrade Guide for Sybase – UNIX*.

Oracle Database

To install Oracle database, follow these steps:

- 2 On shared disk, create the Oracle target directory:

```
mkdir -p /mnt/HAdisk/oracle
ln -s /mnt/HAdisk/oracle /home/oracle
```

- 2 Verify the following:

- a The primary node is set to return the “logicalhost” name. See the section *Setting the Logical Host Name*.
- b The shared disk is mounted.

- 3 Create a .profile file. Follow these steps,

```
umask 022

export ORACLE_SID=mcsgora
export ORACLE_HOME=/home/oracle
export ORACLE_BASE=/home/oracle
export ORACLE_OWNER=oracle

export LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH
export CLASSPATH=$ORACLE_BASE/oraInventory:$ORACLE_HOME/
jlib:$CLASSPATH

export
PATH=$PATH:$ORACLE_HOME/bin:$ORACLE_HOME:/mnt/HAdisk/local/bin
```

- 4 Follow the instructions provided in the *HP Performance Insight Installation and Upgrade Guide for Oracle – UNIX* to install Oracle 10.2.0.1 Enterprise Edition with Partitioning.

- 5 When prompted for the Installation Path, change the default value to `/home/Oracle`. Continue the installation as per the Installation Guide.
- 6 Download and install the Oracle 10.2.0.4 patch. See the instructions in `README.html` available with the 10.2.0.4 patch.

Task 6: Installing PI

The following are the prerequisites for installing PI in a cluster environment. You can customize the PI installation based on your environment. For detailed installation steps, see the *HP Performance Insight Installation and Upgrade Guide-UNIX* for the respective database.

You must install PI on the primary node in the MCSG cluster

On Sybase Database

Ensure the following:

- The PI installation folder must use the shared drive. For example, `/usr/OVPI` (symbolic link `→ /mnt/HAdisk/OVPI`)
- The Sybase server name (DSQUERY) must match the one created during the Sybase installation
- The Sybase host name must use the “logicalhost” name not the physical name of the machine
- The Sybase directory must be the location on the shared disk into which Sybase was installed. For example, `/usr/Sybase` (symbolic link `→ /mnt/HAdisk/Sybase`).

On Oracle Database

Ensure the following:

- The PI destination folder must use the shared drive. For example, `/usr/OVPI` (symbolic link `→ /mnt/HAdisk/OVPI`)
- The Oracle database name (SID) must match the name set during the Oracle database creation
- The Oracle Home directory must be the location on the shared disk in which Oracle was installed. For example, `/home/oracle` (symbolic link `→ /mnt/HAdisk/oracle`)

- The location of the Oracle datafiles (in case you select the option to allow the PI installation to create the necessary tablespaces) must be on the shared disk. For example, `/home/oracle/dbs` (symbolic link → `/mnt/HAdisk/oracle/dbs`)
- The location for the collection cache must be on the shared disk. For example, `/usr/OVPI/collect` (symbolic link → `/mnt/HAdisk/OVPI/collect`)
- The location for the PI log files must be on the shared disk. For example, `/usr/OVPI/log` (symbolic link → `/mnt/HAdisk/OVPI/log`)

Task 7: Installing Report Packs

Installing report packs from the primary node, will place the report pack files on the shared disk at `DPIPE_HOME/packages`. `DPIPE_HOME` is the environment variable that identifies the installation directory of PI. In this guide `DPIPE_HOME` is `/usr/OVPI`. The report packs you choose will depend on your needs

See the Report pack documentation for details about extracting and installing report packs from the August 2009 Release Report Pack CD.

Launch the setup from the RNS CD

- 1 Install the report packs only from the August 2009 Release Report Pack CD. To launch the RNS CD, as a **root** user, type:

```
./setup
```

- 2 In Package Manager, set the following values:
 - Destination Folder = `/usr/OVPI/packages` (default)
 - Deploy Reports = [**checked**] (default)
 - Application Server Name: `logicalhost.<FQDN>`

Task 8: Editing `trendtimer.sched`

To collect data using the Report Packs installed on a PI/HA node you must edit the configuration file: `$DPIPE_HOME/lib/trendtimer.sched`. This file contains specifications on how `trendtimer` invokes `mw_collect`.

Follow these steps:

- 1 Open the file `$DPIPE_HOME/lib/trendtimer.sched`.
- 2 Edit the default command-line arguments for all `mw_collect` entries to include the `-H <logical hostname>` option along with the `-n` option. The `-H` option along with the `-n` option gives the flexibility to specify the logical name in case of HA and ensures that only the specified nodes get polled.



Edit any other collector (for example, `pa_collect` and `ee_collect`) that you might be using in a similar manner.

For example,

OLD

```
5 -- {DPIPE_HOME}/bin/mw_collect -n -i 5 -K 1
. . . . .
24:00+1:00 -- {DPIPE_HOME}/bin/mw_collect -n -i 1440 -K 1
```

NEW

```
5 -- {DPIPE_HOME}/bin/mw_collect -n -H <logical hostname>
-i 5 -K 1
. . . . .
24:00+1:00 -- {DPIPE_HOME}/bin/mw_collect -n
-H <logical hostname> -i 1440 -K 1
```

Task 9: Completing the PI Configuration

To complete the basic PI configuration, follow these steps:

- Add nodes (either through a node import via `node_manager` or with the SNMP discovery).
- Complete type discovery.
- Verify that collections have occurred successfully.

After completing the PI Configuration, change the hostname of the primary node back to the physical hostname. **This step is mandatory.**

See [Setting the Logical Hostname](#) for instructions on changing the hostname.

Task 10: Propagating Shared and Local Files

Complete the following tasks to ensure that “local” files are available in case of a failover. Both PI and the database (Oracle or Sybase) are installed on the shared disk. Some of these changes must be replicated to the other failover machines (secondary nodes) or disabled on the local system as follows:

Sybase Shared and Local Files

File	Task	Notes
System Files		
/etc/group	“groupadd sybase” to secondary nodes	Replicates “sybase” group to failover boxes
/etc/passwd	On secondary nodes: useradd sybase	Replicates “sybase” user to failover boxes
Static File		
/sbin/init.d/Sybase	Modify file name to prevent Sybase from restarting at boot time; for example, Sybase_DONTRUN Copy to secondary nodes	MC/SG Package Control Script will handle the Sybase process startup. File is copied to failover machines in case a manual startup is necessary.

Oracle Shared and Local Files

File	Task	Notes
System Files		
<code>/etc/group</code>	“groupadd dba” to secondary nodes	Add group “dba” if that is the group created for the Oracle installation
<code>/etc/passwd</code>	“useradd oracle” to secondary nodes	Add user “oracle” in group “dba” with same home directory and shell
Static Files		
<code>~oracle/.profile</code>	Copy this file to the ORACLE_HOME folder on the shared drive.	Verify that the oracle user’s .profile has the appropriate Oracle environment variables before copying. At a minimum, it should include entries for ORACLE_SID, ORACLE_BASE and ORACLE_HOME.
<code>/etc/oratab</code>	Copy this to all failover machines.	
<code>/var/opt/oracle/oraInst.loc</code>	Copy file to secondary nodes.	
<code>/opt/ORCLfmap</code>	Recursively copy this directory to secondary nodes.	There are 3 subdirectories with a total of 6 files to be copied.

PI Shared and Local Files

File	Task	Notes
System Files		
/etc/group	groupadd trendadm to each secondary node	Add group “trendadm”
/etc/passwd	useradd trendadm to each secondary node	Add user “trendadm”
Static Files		
/etc/trend.conf	Copy file to secondary nodes.	Contains PI home directory
HP-UX <ul style="list-style-type: none"> • /sbin/init.d/OVPI_timer • /sbin/init.d/OVPI_httpd 	Modify file name to prevent Sybase from restarting at boot time; for example, ovpi_<process>_DONTRUN Copy to secondary nodes	MC/SG Package Control Script handles process startup. File is copied to failover machines if a manual startup is necessary.

Dynamic Files

<ul style="list-style-type: none">• <code>/etc/opt/OV/share/conf/snmpmib</code>• <code>/etc/opt/OV/share/conf/snmpmib.bin</code>	<ul style="list-style-type: none">• Copy to shared disk• Create symbolic link on each failover node for <code>/etc/opt/OV/share/conf</code> to new location on shared disk	Stores MIBs loaded via the PI MIB Browser. Must be shared so that updates are available to any failover machine
---	---	---

Shared Files (Static)

<code>/opt/OV/</code>	Recursive copy to shared disk	Create symbolic links on failover nodes.
<code>/var/opt/OV/</code>	Recursive copy to shared disk	Create symbolic links on failover nodes.
<code>/opt/dcelocal</code>	Recursive copy to shared disk	Create symbolic links on failover nodes.

4 Configuring MC/SG Scripts

HP MC/SG uses scripts for starting and stopping the various “resources” that make up a Package. These Packages can be:

- Disk groups
- Volume groups
- IP addresses
- Applications such as PI, Oracle and Sybase

See *MC/SG Services and Package Control Scripts* for details.

Generic Steps for Configuring a Package

To configure a package, follow these steps:

- 1 Create a directory for package specific files. Type:
`mkdir /etc/cmcluster/package_name`
- 2 Make the new directory your working directory. Type:
`cd /etc/cmcluster/package_name`
- 3 Create a package configuration template. Type:
`cmmakepkg -p pkg.conf`
- 4 Open `pkg.conf` and modify the package parameters. Type:
`vi pkg.conf`
- 5 Create a package control script template. Type:
`cmmakepkg -s pkg.cntl`
- 6 Open `pkg.cntl` and modify the script variables. Type:
`vi pkg.cntl`
- 7 Distribute the control script `pkg.cntl` to all nodes in the cluster through FTP.
- 8 Validate the package configuration file. Type:
`cmcheckconf -P /etc/cmcluster/package_name/pkg.conf`

- 9 Compile the package and distribute the configuration file `pkg.conf`.
Type:

```
cmapplyconf -P /etc/cmcluster/package_name/pkg.conf
```

To create the package configuration for PI, follow these steps:

- 1 Create a directory for package specific files. Type:

```
mkdir /etc/cmcluster/OVPIpkg
```

- 2 Go to the parent directory. Type:

```
cd /etc/cmcluster
```

- 3 Change the permission of the OVPIpkg directory to 744. Type:

```
chmod -R 744 OVPIpkg
```

Configuring the MC/SG Cluster Configuration Scripts

After you configure the cluster for both the IP address and shared external disk, the critical values that determine the structure of the cluster are available in the four main cluster configuration files. These files are available in the `/etc/cmcluster/` directory. The main cluster configuration files are:

CLUSTER NODELIST FILE: `/etc/cmcluster/cmclnodelist`

CLUSTER CONFIG FILE: `/etc/cmcluster/cmclconfig.ascii`

PACKAGE CONFIG FILE: `/etc/cmcluster/OVPIpkg/OVPIpkg.ascii`

PACKAGE CONTROL SCRIPT: `/etc/cmcluster/OVPIpkg/control.sh`

To create and configure these files, complete these tasks:



The values given in the following examples are indicative. You must change them depending on your environment.

Task 1 Generate the `cmclconfig.ascii`, `OVPIpkg.ascii`, and `control.sh` scripts:

Run the following commands:

```
— cmquerycl -v -C /etc/cmcluster/cmclconfig.ascii -n failover1 -n failover2 -w full -l net
— cmmakepkg -p /etc/cmcluster/OVPIpkg/OVPIpkg.ascii
— cmmakepkg -s /etc/cmcluster/OVPIpkg/control.sh
```

These files are templates that you must edit and customize to suit your environment.

Task 2 Create the Cluster Nodelist file

To set up trusted hosts within cluster systems, create `~/.rhosts` or `/etc/cmcluster/cmclnodelist` on all nodes.



The `cmclnodelist` takes precedence over `.rhosts`.

Syntax for `cmclnodelist`:

```
node1 root
node2 root
```

Ensure that every node has ALL hostnames.

It is recommended that you use `cmclnodelist` because `rlogin`'s auto-authentication is considered insecure.

```
CLUSTER NODELIST FILE: /etc/cmcluster/cmclnodelist
node1 root
node2 root
CLUSTER CONFIG FILE: /etc/cmcluster/cmclconfig.ascii
CLUSTER_NAME sgovpi
FIRST_CLUSTER_LOCK_VG /dev/vgclust
NODE_NAME failover1
NETWORK_INTERFACE lan0
HEARTBEAT_IP 10.0.0.2
NETWORK_INTERFACE lan1
HEARTBEAT_IP 15.15.15.1
FIRST_CLUSTER_LOCK_PV /dev/dsk/c0t0d0
NODE_NAME failover2
NETWORK_INTERFACE lan0
HEARTBEAT_IP 10.0.0.1
NETWORK_INTERFACE lan1
HEARTBEAT_IP 15.15.15.2
FIRST_CLUSTER_LOCK_PV /dev/dsk/c0t0d0
```

```
MAX_CONFIGURED_PACKAGES 150
VOLUME_GROUP /dev/vgclust
```

Task 3 Edit the Package Configuration file

To start a package in the cluster, modify the Package Configuration File to reflect the configuration of that particular package. Make the following changes:

```
PACKAGE_CONFIG_FILE: /etc/cmcluster/OVPI/OVPIpkg.ascii
PACKAGE_NAME OVPIpkg
NODE_NAME failover1
NODE_NAME failover2
RUN_SCRIPT /etc/cmcluster/OVPIpkg/control.sh
HALT_SCRIPT /etc/cmcluster/OVPIpkg/control.sh
MONITORED_SUBNET 15.15.15.0
SERVICE_NAME OVPI_MONITOR
SERVICE_FAIL_FAST_ENABLED NO
SERVICE_HALT_TIMEOUT 300
```

Task 4 Edit the Package Control scripts

Edit the Package Control scripts to configure and define the “Service.” For example, to edit the `/etc/cmcluster/OVPIpkg/control.sh` script, follow these steps:

- 1 Insert the following paragraph at the top of the `control.sh` script:

```
OVPI_START=/etc/cmcluster/OVPIpkg/Run_OVPI.ksh
OVPI_STOP=/etc/cmcluster/OVPIpkg/Halt_OVPI.ksh
# These 2 scripts symbolic link to
/etc/cmcluster/OVPIpkg/Script.OVPI.MCSG.StartStopMonitor.k
sh
```
- 2 Insert the following paragraph immediately after the “SERVICE NAMES AND COMMANDS” comments:

```
SERVICE_NAME[0]="OVPI_MONITOR"
SERVICE_CMD[0]="/etc/cmcluster/OVPIpkg/Monitor_OVPI.ksh"
SERVICE_RESTART[0]="-r 2" a
```

The description for these paragraphs is provided as comments within the script.

- 3 In the function `customer_defined_run_cmds{}`, replace the “do nothing” contents with `${OVPI_START}`
- 4 In the function `customer_defined_halt_cmds{}`, replace the “do nothing” contents with `${OVPI_STOP}`

```
PACKAGE CONTROL SCRIPT: /etc/cmcluster/OVPIpkg/control.sh
OVPI_START=/etc/cmcluster/OVPIpkg/Run_OVPI.ksh
OVPI_STOP=/etc/cmcluster/OVPIpkg/Halt_OVPI.ksh
VG[0]=/dev/vgclust
LV[0]=/dev/vgclust/lvol1
FS[0]=/mnt/HAdisk
FS_MOUNT_OPT[0]=" "
IP[0]=15.15.15.99
SUBNET[0]=15.15.15.0
(netmask=255.255.248.0)
SERVICE_NAME[0]="OVPI_MONITOR"
SERVICE_CMD[0]="/etc/cmcluster/OVPIpkg/Monitor_OVPI.ksh"
SERVICE_RESTART[0]="-r 2" a
function customer_defined_run_cmds
{
  ${OVPI_START}
}
function customer_defined_halt_cmds
{
  ${OVPI_STOP}
}
```

- 5 Manually copy `/etc/cmcluster/OVPIpkg/control.sh` to other failover nodes maintaining the same directory structure.

Task 5 Regenerate the Cluster Configuration Binary file

Regenerate the file `/etc/cmcluster/cmclconfig` on `node1` and redistribute it. Follow these steps:

- 1 Verify the cluster configuration file. Run:

```
cmcheckconf -C /etc/cmcluster/cmclconfig.ascii -P /etc/cmcluster/OVPIpkg.ascii
```

- 2 Regenerate and distribute the configuration files. Run:

```
cmapplyconf -C /etc/cmcluster/cmclconfig.ascii -P /etc/cmcluster/OVPIpkg.ascii
```

The `cmapplyconf` command regenerates the binary configuration file `/etc/cmcluster/cmclconfig` from the contents of the `cmclconfig.ascii` and the Package Configuration File.

Task 6 Create a folder and place the start, stop, and monitor scripts

The three scripts are:

- `/etc/cmcluster/OVPIpkg/Run_OVPI.ksh`
- `/etc/cmcluster/OVPIpkg/Halt_OVPI.ksh`
- `/etc/cmcluster/OVPIpkg/Monitor_OVPI.ksh`

These scripts are combined into a single script `/etc/cmcluster/OVPIpkg/Script.OVPI.MCSG.StartStopMonitor.ksh` with the above three scripts symbolically linked to it. The script examines the name it was called with to determine which function to implement.

To symbolically link the three files with the `Script.OVPI.MCSG.StartStopMonitor.ksh` file, run:

```
cd /etc/cmclconfig/OVPIpkg/  
  
ln -s Script.OVPI.MCSG.StartStopMonitor.ksh Run_OVPI.ksh  
  
ln -s Script.OVPI.MCSG.StartStopMonitor.ksh Halt_OVPI.ksh  
  
ln -s Script.OVPI.MCSG.StartStopMonitor.ksh Monitor_OVPI.ksh
```

Task 7 Edit the `Script.OVPI.MCSG.StartStopMonitor.ksh` script

The `Script.OVPI.MCSG.StartStopMonitor.ksh` script contains a several configurable parameters before the first function definition (in the beginning of the script). These parameters are accompanied by relevant comments.

- 1 Provide the following information:
 - The floating/logical hostname

- The database type (Oracle or Sybase)
 - The Debug output mode
 - The PI “distribution scenario type” (standalone, database-only or Web Application Server-only)
 - Timeouts
 - Oracle-only parameters
 - Sybase-only parameters
 - “Debug individual pieces within the service” flag
- 2 Manually copy the `Script.OVPI.MCSG.StartStopMonitor.ksh` script to other failover nodes. Run:


```
rcp /etc/cmcluster/OVPIpkg/  
Script.OVPI.MCSG.StartStopMonitor.ksh  
failover2: /etc/cmcluster/OVPIpkg/  
Script.OVPI.MCSG.StartStopMonitor.ksh
```
 - 3 On failover nodes symbolically link the start, stop, and monitor scripts with `Script.OVPI.MCSG.StartStopMonitor.ksh`. Run:


```
cd /etc/cmclconfig/OVPIpkg/  
ln -s Script.OVPI.MCSG.StartStopMonitor.ksh Run_OVPI.ksh  
ln -s Script.OVPI.MCSG.StartStopMonitor.ksh  
Halt_OVPI.ksh  
ln -s Script.OVPI.MCSG.StartStopMonitor.ksh  
Monitor_OVPI.ksh
```

Task 8 Verify that the following Oracle environmental variables exist

As “oracle” OS user, run:

```
su - oracle -c env |grep ORACLE_
```

Verify if the following environment variables are set:

- ORACLE_BASE
- ORACLE_HOME
- ORACLE_SID

These variables are required to run the scripts successfully on Oracle installation.

5 Configuring PI to Function in a Cluster Setup

In a scenario where both the PI and database installations have a physical hostname and IP address instead of a logical hostname and IP address, follow these steps to change to logical hostname and IP address (to make them a part of the MC/SG cluster):

- 1 Install the underlying database for PI. See, the section *Installing a Database*.
- 2 Install PI. See, the section *Installing PI*.

Now, the PI installation is usable with the physical name/IP on the clustered node on which it is installed. However, it is not usable with the logical name/IP.

- 3 Replace all occurrences of the physical name and IP address with the logical name and IP address. See the section “*Changing Hostname on a PI 5.41 Installation*.” Replace the “old hostname” and “new hostname,” with the “physical hostname” and “logical hostname,” respectively.

Similarly, replace “Old IP address” and “new IP address” with appropriate values for “physical IP address” and “logical IP address,” respectively.

Changing Hostname on a PI 5.41 Installation

When you install the complete PI (including report packs) on one of the clustered servers in an HA scenario, the configuration of both PI and the underlying database will be based on the “physical” hostname and the IP address of the clustered server on which PI is installed.

To reconfigure PI and the database to run on the logical/virtual/ floating hostname and IP address, you must follow these instructions:

Make the following replaceable values are used in the code given in the instructions. You must make the necessary substitutions as per your environment.

`<OLD_HOST>` – The “old” hostname. In the HA case, this will be the "physical" hostname obtained when you run `uname -n`.

`<OLD_IPADDR>` – The “old” IP address associated with `<OLD_HOST>`.

`<NEW_HOST>` – The “new” hostname. In the HA case, this will be the logical/virtual/floating hostname.

`<NEW_IPADDR>` – The “new” IP address associated with `<NEW_HOST>`.

Changing Hostnames and IP Addresses in the Configuration Files and PI Tables

Follow these steps:

- 1 Stop PI if it is running.
`/sbin/init.d/ovpi_httpd stop`
`/sbin/init.d/ovpi_timer stop`
- 2 Start the database. For Oracle, the Listener is not required to be running.

Oracle:

- a From the `<ORACLE_HOME>/bin` directory, type `sqlplus`
- b Type the username sys as `sysdba`
- c Type the appropriate password
- d Type `startup`

Sybase:

Type `/sbin/init.d/Sybase start`

- 3 Connect to the database using `sqlplus` or `isql` as appropriate:

Oracle:

Type, `sqlplus dsi_dpipe/<Password>`

Sybase:

Type, `su - trendadm -c "isql -Udsi_dpipe -P <Password>"`

- 4 Update the `DSI_SERVER` table.

Oracle:

```
SELECT NAME, HOST_NAME, HOST_ADDRESS FROM DSI_SERVER;
```

```
UPDATE DSI_SERVER SET NAME = '<NEW_HOST>'
```

```
WHERE NAME = '<OLD_HOST>';
```

```
UPDATE DSI_SERVER SET HOST_NAME = '<NEW_HOST>'
```

```
WHERE HOST_NAME = '<OLD_HOST>';
```

```
UPDATE DSI_SERVER SET HOST_ADDRESS = '<NEW_IPADDR>'
```

```
WHERE HOST_ADDRESS = '<OLD_IPADDR>';
```

```
SELECT NAME, HOST_NAME, HOST_ADDRESS FROM DSI_SERVER;
```

Sybase:

```
SELECT name, host_name, host_address FROM dsi_server  
go
```

```
UPDATE dsi_server SET name = '<NEW_HOST>''
```

```
WHERE name = '<OLD_HOST>'
```

```
go
```

```
UPDATE dsi_server SET host_name = '<NEW_HOST>''
```

```
WHERE host_name = '<OLD_HOST>'
```

```
go
```

```
UPDATE dsi_server SET host_address = '<NEW_IPADDR>'
```

```
WHERE host_address = '<OLD_IPADDR>'
```

```
go
```

```
SELECT name, host_name, host_address FROM dsi_server
```

Go

- 5 Update the DSI_INSTALLED_DATAPIPE table. The NAME and HOST_NAME fields appear both with and without the fully qualified domain name appended. If you are using NAME and HOSTNAME field without the domain name appended (and vice-versa) then use the same form when updating these values.



If more than one row is selected by any of the following sql “updates,” modify the update statement with a more-specific constraint clause to avoid uniqueness constraint violations.

Oracle:

```
SELECT * FROM DSI_INSTALLED_DATAPIPE;  
UPDATE DSI_INSTALLED_DATAPIPE SET NAME = '<NEW_HOST>'  
WHERE NAME = '<OLD_HOST>';  
UPDATE DSI_INSTALLED_DATAPIPE  
SET HOST_NAME = '<NEW_HOST>.<FULL_DOMAIN>'  
WHERE HOST_NAME = '<OLD_HOST>.<FULL_DOMAIN>';  
UPDATE DSI_INSTALLED_DATAPIPE  
SET HOST_ADDRESS = '<NEW_IPADDR>'  
WHERE HOST_ADDRESS = '<OLD_IPADDR>';  
SELECT * FROM DSI_INSTALLED_DATAPIPE;
```

Sybase:

```
SELECT * FROM dsi_installed_datapipe  
go  
UPDATE dsi_installed_datapipe SET name = '<NEW_HOST>'  
WHERE name = '<OLD_HOST>'  
go  
UPDATE dsi_installed_datapipe  
SET host_name = '<NEW_HOST>.<FULL_DOMAIN>'  
WHERE host_name = '<OLD_HOST>.<FULL_DOMAIN>'  
go
```

```

UPDATE dsi_installed_datapipe
SET host_address = '<NEW_IPADDR>}'
WHERE host_address = '<OLD_IPADDR>'
go
SELECT * FROM dsi_installed_datapipe
Go

```

- 6 Stop the database.

Oracle:

- b From the <ORACLE_HOME>/bin directory, type **sqlplus**
- e Type the username sys as **sysdba**
- f Type the appropriate password
- g Type **shutdown**

Sybase:

Type **/sbin/init.d/Sybase stop**

- 7 Make the following changes in the database configuration file:

Oracle:

- a Type, **cd \$ORACLE_HOME/network/admin/**
- b Type, **vi listener.ora tnsnames.ora**
- c Replace the old system name with the new system name in files similar to:
- d **ADDRESS = (PROTOCOL = TCP)(HOST =**
or
snmp.longname.listener = listener_.....
- e Save the file. If intelligent agent is installed edit the **snmp_ro.ora** file too.

Sybase:

- a Type **cd ~sybase**
- b Backup the old file and type:
vi interfaces

- c In the master and query lines replace the physical hostname with the logical hostname.

8 Edit the PI configuration files, type:

```
cd $DPIPE_HOME/data
```

```
— vi systems.xml
```



Backup the `systems.xml` file before making any changes to it. If this file is corrupted PI will not work.

Replace all occurrences of the old hostname and IP address with the new hostname and IP address:

Example: `<Name><OLD_HOST </Name>`

```
<HostName><OLD_HOST>.<FULL_DOMAIN></HostName>
```

```
<IPAddress><OLD_IPADDR></IPAddress>
```

```
<Host><OLD_HOST>.<FULL_DOMAIN></Host>
```

Oracle:

```
<JdbcString>jdbc:oracle:thin:@
```

```
<OLD_HOST>:1521:mcsgora</JdbcString>
```

```
<OdbcString>DSN=PI_ORACLE;SID=mcsgora;PORTNUMBER=1521  
;HOSTNAME=<OLD_HOST></OdbcString>
```

Sybase:

```
<JdbcString>jdbc:sybase:Tds:
```

```
<OLD_HOST>.{FULL_DOMAIN}:2052</JdbcString>
```

```
<OdbcString>DSN=PI_SYBASE;DB=dpipe_db;  
NA=<OLD_HOST>.{FULL_DOMAIN},2052</OdbcString>
```

```
— vi config.prp
```



Backup the `config.prp` file before making any changes to it. If this file is corrupted PI will not work.

Replace all occurrences of the old hostname and IP address with the new hostname and IP address:

Example: `database.host=<OLD_HOST>`

```
appserver.host=<OLD_HOST>
```

```
localhost=<OLD_HOST>
```

```
database_schema.host=<OLD_HOST>
```

```
server.host=<OLD_HOST>
```

Installing a Patch in an MC/SG setup

To apply a patch in an MC/SG setup, follow these steps:

- 1 Shut down the PI resource and the DB resource by stopping the PI package. Type: **cmhaltpkg** *<package_name>*
Do *not* shutdown MC/SG.
- 2 Edit `Script.OVPI.MCSG.StartStopMonitor.ksh` script to set `DEBUG_SERVICES=1` instead of the default 0 and restart the PI package.
Type:
cmrunpkg *<package_name>*.
Setting `DEBUG_SERVICES=1` will not start, stop, or monitor PI and DB instead it will start, stop, or monitor logical IP address and shared disk.
- 3 Start the database manually.
This is mandatory for any PI upgrade or patch installation.
- 4 Back up your system before installing the patch and ensure that you have proper administrative privileges.
- 5 Run the upgrade or patch setup.
- 6 Follow the instructions in the wizard for the upgrade or patch installation.
- 7 Check the log file for any upgrade or patch errors.
- 8 If the upgrade or patch needs a report pack upgrade, upgrade the report pack to the latest version.
- 9 Stop the PI package. Type: **cmhaltpkg** *<package_name>*
- 10 Edit the `Script.OVPI.MCSG.StartStopMonitor.ksh` script to reset `DEBUG_SERVICES` to the default value 0.
- 11 Restart the PI package. Type: **cmrunpkg** *<package_name>*

6 Miscellaneous Tasks and Commands

Start/Stop MC/SG Clusters

- To stop MC/SG, run:
`cmhaltcl # Halt Cluster`
`cmhaltpkg PACKAGE_NAME # Halt Package`
- To start MC/SG, run:
`cmruncl # Start Cluster`
`cmrunpkg PACKAGE_NAME # Start Package`

Listing MC/SG Processes

- To get a list of MC/SG processes, run:
`ps -ef | grep cm | grep -v grep | sort`
- To get a list of all PI processes (except piweb), run:
`ps -fu trendadm,oracle`
If you are using Sybase, substitute “oracle” with “sybase”.
- To view the piweb process, run:
`ps -ef |grep piweb |grep -v grep`

Useful MC/SG commands

- To get information about an MC/SG command, run:
`<cmd> -?`
`man <cmd>`
In this instance, `<cmd>` is the MC/SG command. MC/SG commands start with the characters, “cm”.
- To get status and configuration information, run:
`cmquerycl -v # Query Cluster`
`cmquerycl -v -n $NODE # Query Node config Info`

`cmviewcl # Info about a cluster`

`cmviewcl -v # Verbose Cluster Info`

`cmviewconf # Config info about a cluster`

`cmcheckconf # Verify config files are bugfree.`

See the MC/SG guides and man pages for additional information.

- To Switch-over the entire package from one failover node to the other, run:

`cmhaltpkg OVPIpkg`

`cmrunpkg -n failover2 OVPIpkg`

`cmmodpkg -e OVPIpkg`

7 Troubleshooting MC/SG


Troubleshooting the `cmapplyconf` Command

If you face problems while using the `cmapplyconf` command, follow these steps:

- Verify that the attribute values are correct.
- Check for missing attributes in the package configuration file
- Verify the permissions and location of scripts.
- Check the original cluster and package files (`cmclconfig.ascii`, `pkg.conf`, `pkg.cnt1`) in the `/etc/cmcluster/` folder.
- Run the `cmscancl` command to extract diagnostic information in a file.

MC/SG Log files

To troubleshooting MC/SG cluster problems:

- Check the following log files for errors.
 - `/var/adm/syslog/syslog.log`
 - `/var/adm/syslog/OLDsyslog.log`
-  Log files are created locally, therefore, to diagnose the problem check the log files on all affected nodes.
- Review the package log in the `/etc/cmcluster/<package name>/<package control script>.log`

You can add `set -x` in the package control scripts to get additional information in the log.

Enable Logging

To enable logging for any MC/SG command, append the following lines in the `/etc/cmcluster.conf` file:

```
COMMAND_LOG_LEVEL=5
COMMAND_LOG_FILE=/tmp/<command>.log
```



This will enable logging for all MC/SG commands and the log file may grow to large size soon.

Enable Logging for a Single Command

To enable logging for a single command, run the command with the `-D {1-5}` or `-O {filename}` option. This feature is valid only for MC/SG versions A.11.18 and later.

For example:

```
# cmviewcl -D 5 -O /tmp/cmviewcl.out
```

System Management Homepage

You can use the System Management Homepage (SMH) to manage MC/SG and other system components through a web browser.

Through SMH, you can:

- Determine MC/SG configuration and status.
- Modify the MC/SG cluster, node, and package configuration.

To access SMH, type:

```
http://<full hostname of server>:2301
```

Login using root user credentials.

For example:

```
http://clusternode1.hp.com:2301
```

A References

Software Depots and Versions

PI

The latest version of PI is PI 5.41. You can upgrade to PI 5.41 or install PI 5.41 from the product DVD.

Sybase

Use the Sybase version bundled in the PI 5.41 product DVD. The version is 15.0.2.

To verify the version, log in to `isql` and run:

```
select @@version
```

Oracle

PI 5.41 currently supports only Oracle version 10.2.0.4. To verify the version of Oracle, connect to `sqlplus` and run:

```
select * from v$version
```

Report Packs

Use the August 2009 Release Report Pack CD with PI 5.41.

Location for PI and MC/SG Manuals

MC/SG

You can download the latest versions of all the manuals from the following location:

Managing MC-ServiceGuard Version A.11.18, Sixteenth Edition:

<http://docs.hp.com/en/B3936-90140/B3936-90140.pdf>

Check **<http://www.docs.hp.com>** → **High Availability** → **Service Guard** for latest information about Service Guard.

PI

You can download PI related guides from the following location:

<http://h20230.www2.hp.com/selfsolve/manuals>

Log in to the site using your HP Passport id and select Performance Insight from the product list.

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