

Migrating from WLM to gWLM



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Overview

HP-UX Workload Manager (WLM) and HP Integrity Essentials Global Workload Manager (gWLM) provide similar functionality. They both:

- Move resources between different types of partitions
- Can activate and deactivate utility pricing resources
- Manage workloads based on real-time workload requirements
- Offer goal-based workload management

So, how do they differ? WLM is optimized to work in a single physical server environment. It is configured in each operating system that it manages and provides utilization and charge-back reporting on a workload-by-workload basis. This makes HP-UX WLM an excellent product for consolidating HP-UX 11i workloads onto one server.

HP Integrity Essentials Global Workload Manager is optimized for a centralized IT environment where many servers are being managed. It has a central management server (CMS) that is tightly integrated with HP Systems Insight Manager (SIM), as well as other HP Integrity Essentials products such as HP Integrity Essentials Capacity Advisor and HP Integrity Essentials Virtualization Manager. It offers centralized policy creation, deployment, and management. In addition, while the utilization and charge-back reporting are still available down to the workload level, all of the reporting is available from the CMS. Finally, gWLM supports multiple operating systems: HP-UX 11i on HP 9000 servers and HP Integrity servers; OpenVMS on HP Integrity and Alpha servers. (Functionality varies based on the capabilities supported by the underlying operating system.) It also supports various HP Integrity Virtual Machines guests.

In short, WLM is well-suited to managing a small number of servers, while gWLM can manage a small number of servers as well as multiple servers in a multiple-operating system environment.

Why migrate?

The benefits of migrating to gWLM include:

- Simplified configuration
- Centralized management using HP SIM
- Integration with HP Integrity Essentials products
- Deeper integration with HP Integrity Virtual Machines
- Automatic discovery of systems to manage
- OwnBorrow policies (allow you to specify the amount of resources a workload owns, as well as exactly how much the workload can borrow and lend, in essence combining base and stretch goals into a single policy)

gWLM terms to know

Here are some terms to know when using gWLM:

- **Workload**

The collection of processes that are within a single compartment. gWLM manages a workload by adjusting the system resource allocations for its compartment.
- **Compartment**

An entity with its resource allocation being managed by gWLM. A compartment can be an nPartition, a virtual partition, a virtual machine, a processor set (pset), or a Fair Share Scheduler (fss) group.

Multiple compartments are grouped to form a shared resource domain, or SRD. The compartments all share the resources within the SRD. Each compartment holds a workload and can be in only one deployed SRD. gWLM manages each workload by adjusting the resource allocation for its compartment.
- **Shared Resource Domain (SRD)**

A collection of compartments that share system resources.

gWLM creates SRDs when you use the Manage Systems and Workloads wizard.
- **Policy**

A policy is a collection of settings that instruct gWLM how to manage a compartment's resources—and thus the resources available to the workload within the compartment. For example, a policy can indicate the amount of CPU resources a workload owns (and is allocated when needed), how much of those resources the workload can lend to other workloads, and how much the workload can borrow from other workloads.

A single policy can be associated, or applied, to multiple workloads.
- **Mode**

gWLM offers two modes: advisory and managed. Advisory mode allows you to see what CPU requests gWLM would make for a compartment—without actually affecting resource allocation. You can use this mode when creating and fine-tuning your policies. Once you are comfortable with your policies, use managed mode to have gWLM automatically adjust the resource allocations for your defined compartments. (Advisory mode is not available for SRDs containing virtual machines, psets, or fss groups.)

You can only set the mode on the SRD level: All compartments within an SRD operate in the same mode, either advisory or managed.
- **Deploy**

Enable gWLM control of an SRD.

Deploying an SRD in managed mode enables gWLM control of resource allocation within the SRD. When deploying an SRD in advisory mode, gWLM simply reports what the allocation would be—without actually affecting resource allocations on a system.
- **Undeploy**

Disable gWLM's management of resources in a specified SRD.

If an SRD is in managed mode, undeploying stops the migration of system resources among compartments in the SRD. If the SRD is in advisory mode, gWLM no longer provides information on what requests would have been made.

WLM-to-gWLM terminology comparison

The following table shows WLM terms and their corresponding gWLM terms.

WLM term	gWLM term
Service-level objective	Policy
Partition set	Shared resource domain (SRD)
Passive mode	Advisory mode (not available for HP Integrity Virtual Machines, psets, or fss groups)

Availability of WLM features in gWLM

The table below lists various WLM features and then indicates whether the given feature is supported by gWLM.

Comparisons are based on the functionality available in WLM A.03.02 and gWLM A.03.00.00.xx.

Feature	WLM A.03.02 support	gWLM A.03.00.00.xx support
CPU resource management	Yes	Yes
Memory resource management	Yes	No
Disk bandwidth resource management	Yes	No
Workload types	FSS groups, psets, virtual partitions, nPartitions that use Instant Capacity	FSS groups, psets, virtual partitions, nPartitions that use Instant Capacity, HP Integrity Virtual Machines, simulated psets on OpenVMS, OpenVMS soft partitions, workloads based on the OpenVMS class scheduler
SLO (policy) types	Fixed, utilization-based, metric-based (including shares-per-metric)	Fixed, utilization-based, metric-based (not including shares-per-metric, which is planned for the A.04.00 release), OwnBorrow
Multiple SLOs (policies) per workload (stretch goals)	Yes	No However, OwnBorrow policies simulate a WLM base/stretch goal combination
Nested partitions	Yes	Yes
Time-based SLOs (policies)	Yes (<code>condition</code> keyword)	No (Planned for the A.04.00 release)
Conditional SLOs (policies)	Yes (<code>condition</code> keyword)	Yes (for Serviceguard events)
Process placement based on binary name	Yes	Yes
Process placement based on user name	Yes	Yes
Process placement based on Unix group name	Yes	Yes (with a user-defined process map)
Process placement based on process maps	Yes (<code>procmaps</code> keyword)	Yes
Monitoring process placement by workload with <code>ps</code>	Yes	Yes

Disabling of workloads with no active SLOs	Yes (transient_groups keyword)	No
Smoothing of metric data available	Yes (cntl_smooth keyword)	Yes—if WLM Toolkits are installed (/opt/wlm/toolkits/oracle/bin/smooth)
WLM Toolkits	Yes	Yes—with customizations
Workload monitoring (on the command line and in a GUI)	Yes	Yes
Events/alarms	Event Monitoring Service (EMS)	HP Systems Insight Manager (SIM) Events
Data collector started when a configuration is activated	Yes	No No standard mechanism for starting a data collector; however, you can use gw1msend to supply data
Policy/SLO storage	SLO data is stored in configuration files on each node; identical SLOs are cut-and-paste copies of an original	Policies are stored in a centralized database; the same policy can be applied to multiple workloads without being replicated Can export or import in XML format
Data source integration (DSI) support, providing workload data to OpenView tools including OVPM	Yes	Yes
HP-UX Security Containment integration	Yes	No
Passive mode	Yes	Yes (Advisory mode) Advisory mode is not available for HP Integrity Virtual Machines, psets, or fss groups

Command comparison

The following table lists all the WLM commands and their equivalent gWLM commands.

WLM A.03.02 command	Equivalent gWLM A.03.00.00.xx command
wlmaudit	gwlreport
wlmd	HP SIM interface; gwlm
wlmcw	HP SIM interface
wlmgui	HP SIM interface
wlmpard	HP SIM interface; gwlm
wlmcemd	Not needed
wlminfo	gwlm monitor
wlmcert	HP SIM interface; gwlmsslconfig
wlmsend/wlmcvdc	gwlm send/built-in standard out capture
glance_*	No equivalent
sg_pkg_active (Serviceguard integration)	Conditional policies use a built-in equivalent
prmrn/prmmove	gwlmplace

The manpages for these commands are available from the following websites:

- WLM: <http://www.hp.com/go/wlm>, in the “Information library”
- gWLM: <http://docs.hp.com/en/vse.html>

System requirements for gWLM

gWLM is a component of the Virtual Server Environment Management Software suite. For information on system requirements for this suite, see the VSE Management Software Installation and Update Guide available from

<http://docs.hp.com/en/vse.html>

Common gWLM tasks

For information on how to accomplish common gWLM tasks, see the document *HP Integrity Essentials Global Workload Manager User's Guide* available from:

<http://docs.hp.com/en/vse.html>

Examples of gWLM tasks discussed include:

- Fixing the amount of CPU resources a workload gets
- Resizing a workload's compartment as needed, based on the workload's utilization

Migrating WLM configurations

The gWLM management model has a central management server, or CMS, and the managed systems, or nodes. The CMS must have HP Systems Insight Manager (SIM) and gWLM installed, while managed nodes need only gWLM agent software installed. To manage a system with gWLM, you define a shared resource domain (SRD) to contain workloads on that system. You can use existing workloads or create new ones. Each workload needs a policy to govern its resource allocation. You can choose a policy from the collection of policies that come with gWLM or create new ones. You can apply a single policy to multiple workloads. If you update a policy definition, that update is automatically used to govern resource allocations for all workloads associated with the policy. The gWLM interface in HP SIM provides a wizard to step you through the creation of SRDs, workloads, and policies.

HP recommends using the gWLM interface in HP SIM to configure gWLM. However, you can also configure gWLM using XML-based files. You create these files according to the syntax described in the `gwlmxml(4)` manpage and then import and deploy them using the `/opt/gwlm/bin/gwlm` command, described in the `gwlm(1M)` manpage.

To convert WLM configurations:

1. Determine whether the systems designated to be the CMS and managed nodes can support the system requirements of HP SIM and gWLM (for the CMS) or just gWLM (for the managed nodes). Find alternate systems if needed. Install HP SIM and gWLM.
2. Determine the policies to use in place of the SLOs in your WLM configurations.

Both WLM and gWLM provide:

- Fixed SLOs (policies)
- Utilization SLOs (policies)
- Metric-based SLOs (policies) (In gWLM, metric-based policies are available as custom policies.)

gWLM also provides an OwnBorrow policy type, which is based on utilization, that lets you explicitly indicate how much of a resource a workload should own as well as how much it should be allowed to borrow and lend.

gWLM comes with a library of policies (SLOs) for you to use. Check whether the provided policies meet your needs. If not, create the appropriate policies.

3. Create your SRD using the gWLM Manage Systems and Workloads wizard.

For each system to be managed by gWLM, use the wizard to enter the system name and define the workloads and policies. The wizard produces an SRD and immediately begins managing the workloads for the specified system.

To access the wizard in HP SIM:

- a. Select
Tools -> VSE Management
- b. Click the Shared Resource Domain tab
- c. Select the menu item
Create -> Shared Resource Domain

Once you have an SRD deployed, you can monitor your workloads by selecting items in the Reports menu. You can also monitor workloads on the command line using `gwlm monitor`. (In WLM, when you are working with FSS-based workload groups or PSET-based workload groups, you have a default group, `PRM_SYS`, for system processes. gWLM monitoring tools do not show `PRM_SYS`. However, activity in `PRM_SYS` may still affect the resources available to the workloads you define.)

Migration example: FSS-based workloads with usage goals

WLM and gWLM both provide usage goals. However, in gWLM, the usage goal is known as a utilization policy.

The WLM configuration

The example below splits an 8-CPU server into two FSS-based workload groups, each sized by CPU utilization. Each group gets a minimum of one CPU and maximum of seven CPUs. Application records place a few applications in the workload groups.

```
prm {
    groups = app_dev_grp : 2,
           db_dev_grp   : 3;

    # place a custom binary and perl script into app_dev_grp,
    # shell script and oracle instance into g3
    apps = app_dev_grp : /opt/perl/bin/perl "myperlscript.pl",
           app_dev_grp : /opt/myapp/bin/myapp,
           db_dev_grp  : /bin/sh "myscript.sh",
           db_dev_grp  :
/oracle/u01/app/oracle/product/10.2.0/db_dev_1/bin/oracle "ora*MYINST*";
}

slo slo2 {
    pri = 1;
    goal = usage _CPU;
    mincpu = 100;
    maxcpu = 700;
    entity = PRM group app_dev_grp;
}

slo slo3 {
    pri = 1;
    goal = usage _CPU;
    mincpu = 100;
    maxcpu = 700;
    entity = PRM group db_dev_grp;
}

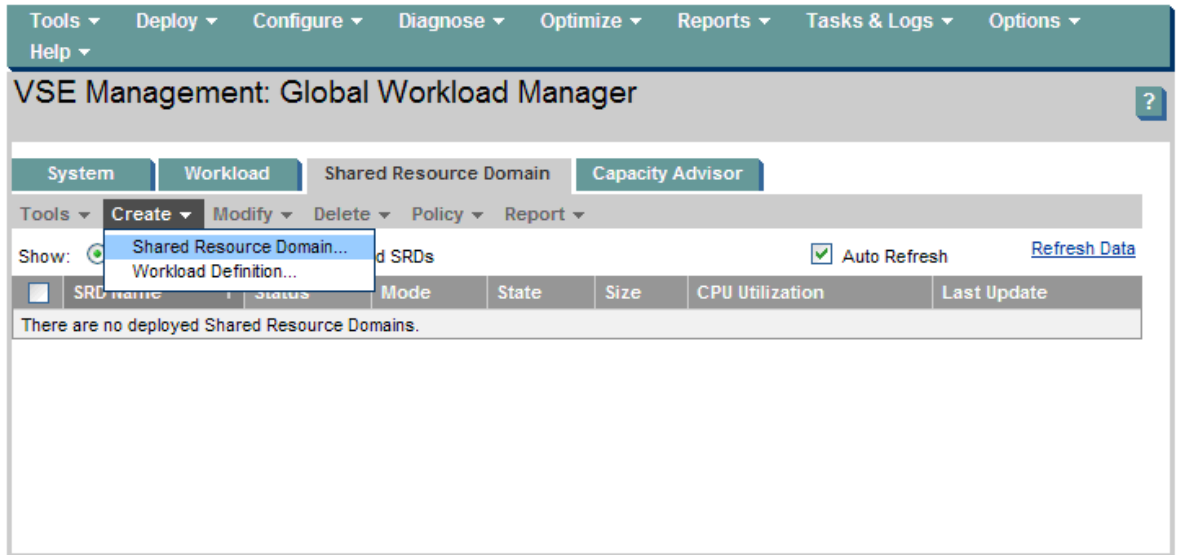
tune {
    absolute_cpu_units=1; # 100 units is 100% of 1 CPU, not the whole server
}
```

Creating an equivalent gWLM configuration

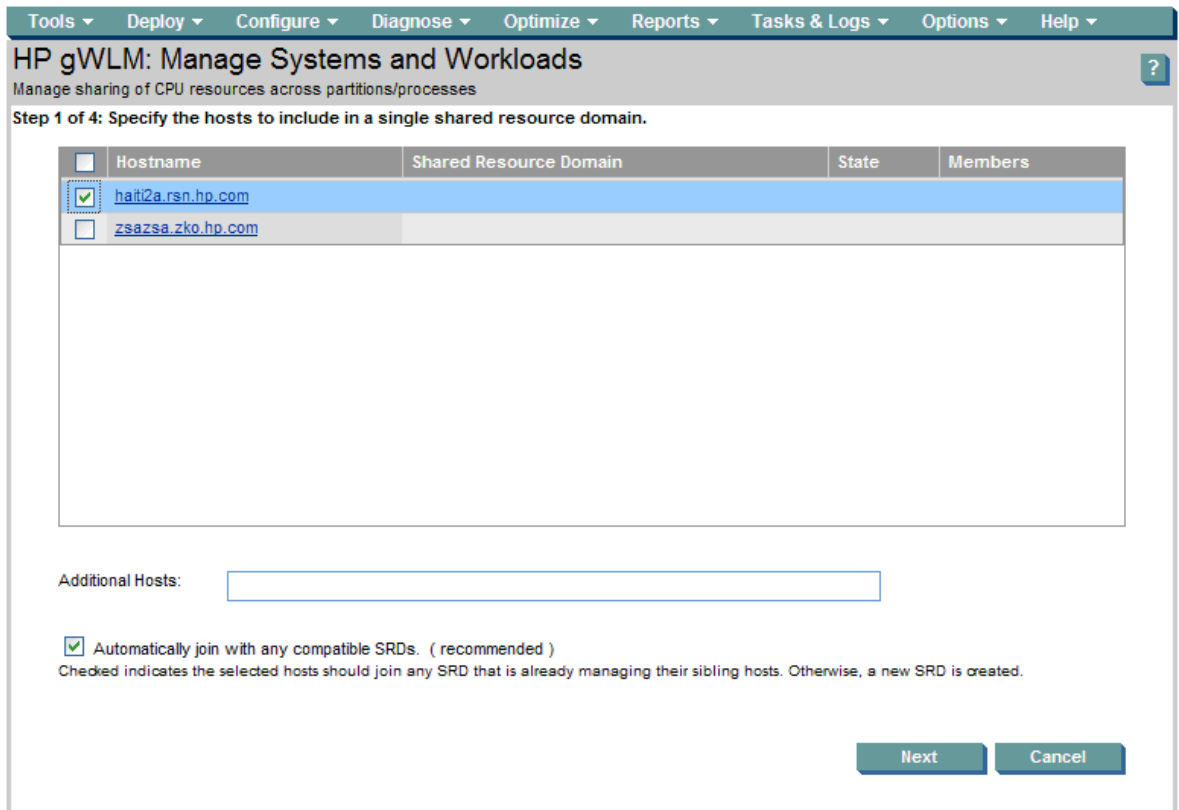
To create an equivalent gWLM configuration, follow the steps below in HP Systems Insight Manager. (For information on installing, configuring, and accessing VSE Management Software, such as gWLM, in HP Systems Insight Manager, see the *VSE Management Software Installation and Update Guide*, available from <http://docs.hp.com/en/vse.html>.)

In a WLM configuration, you can optionally specify the default user workload group OTHERS. In the gWLM configuration though, the workload must be specified. It takes a name of the form hostname.OTHER. The steps below reflect this requirement. Although gWLM provides a number of policies you can use, the procedure below creates a new policy to match the behavior of the SLOs in the WLM configuration. While the WLM configuration explicitly uses absolute CPU units, gWLM uses such units by default.

1. From the Shared Resource Domain tab, select Create followed by Shared Resource Domain to start the Manage Systems and Workloads wizard.



2. Specify, using the table or the Additional Hosts field, the host that will be divided into fss-based workloads. Then select the Next button.



- Set Mode to Managed and select the Next button.

Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 2 of 4: Set properties for the shared resource domain.

Shared Resource Domain Name:
The name used to identify a group of systems sharing resources.

Mode: **Managed** ▾
Advisory mode allows you to see what resource requests would be made--without affecting resource allocation. Managed mode automatically adjusts the resource allocations.

Global use of Temporary Instant Capacity (TiCAP) cores: **Off** ▾
The On option causes TiCAP cores to be activated as necessary to satisfy the resource request for all workloads in this Shared Resource Domain regardless of policy settings. The Off option limits TiCAP activation only to workloads that explicitly enable use of TiCAP in their associated policy settings.

Resource Allocation Interval:
The time period in seconds during which resource utilization is measured and resource allocation decisions are made and carried out. The default value is set based on the compartment selection made for the SRD.

- Select (new...) in the Policy column dropdown to create a new policy.

Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 3 of 4: Specify workload/policy settings.

[Refresh Data](#)

Hostname	Workload	Policy	Compartment Type	Add/Remove Sub-OS Workload	Compartment Min/Size/Max (Cores)
haiti2a.rsn.hp.com	<input type="text" value="haiti2a.rsn.hp.com"/>	Fixed_1 ▾ (select policy) (new...) CPU_Utilization Fixed_1 Fixed_2 Fixed_3	vpar ▾	<input type="button" value="Add"/>	1 / 8 / 8

Total Size=8

- Name the new policy and set its type to Utilization. Here the name chosen is CPUUtil_Min1_Max7. Set the Min Size value to 1.0 to represent one CPU. Set the Max Size value to 7.0 for seven CPUs. Then select the OK button. (Although WLM requires you specify a priority through the `pri` keyword, gWLM assigns a default priority of 100. You can change the priority after selecting the 'Show advanced policy configuration options' checkbox.)

HP gWLM: Create or Edit Policies

New Policy

Policy Name:* CPUUtil_Min1_Max7

Policy Description:

Policy Type: Fixed Utilization OwnBorrow Custom Conditional (Serviceguard)

Policy Settings:

Min Size (cores):* 1.0

Max Size (cores):* 7.0

* required field

Show advanced policy configuration options.

OK Cancel

- Set Compartment Type to fss. The workload field, which used to be haiti2a.rsn.hp.com, is now haiti2a.OTHER.

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 3 of 4: Specify workload/policy settings.

[Refresh Data](#)

Hostname	Workload	Policy	Compartment Type	Add/Remove Sub-OS Workload	Compartment Min/Size/Max (Cores)
haiti2a.rsn.hp.com	haiti2a.OTHER	CPUUtil_Min1_Max7	fss	Add	0.05 / 8 / 8

Total Size=8

Previous Next Cancel

- Change the policy for the workload to the CPU_Utilization policy.

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 3 of 4: Specify workload/policy settings.

[Refresh Data](#)

Hostname	Workload	Policy	Compartment Type	Add/Remove Sub-OS Workload	Compartment Min/Size/Max (Cores)
haiti2a.rsn.hp.com	haiti2a.OTHER	CPU_Utilization	fss	Add	0.05 / 8 / 8

Total Size=8

Previous Next Cancel

- Select the Add button to add a row for another workload. Set the policy for the new workload to the new policy CPUUtil_Min1_Max7. Select (new...) in the Workload column dropdown to create the new workload.

HP gWLM: Manage Systems and Workloads
Manage sharing of CPU resources across partitions/processes

Step 3 of 4: Specify workload/policy settings.

Refresh Data

Hostname	Workload	Policy	Compartment Type	Add/Remove Sub-OS Workload	Compartment Min/Size/Max (Cores)
haiti2a.rsn.hp.com	haiti2a.OTHER	CPU_Utilization	fss	Add	0.05 / 7.95 / 7.95
	(select workload) (select workload) (new...)	CPUUtil_Min1_Max7	fss	Remove	0.05 / 0.05 / 7.95

Total Size=8

Previous Next Cancel

- Specify a name for the new workload, app_dev_wkld. To add application records for the workload, set workload definition criteria to 'by executable' in the dropdown. Then fill in the fields and select [Add to definition]. The graphic below shows one application record, for /opt/perl/bin/perl with an alternate name of myperlscript.pl, has already been added. A second record, /opt/myapp/bin/myapp, is being added. When finished defining the workload, select [OK].

Create gWLM Managed Workload Definition

A gWLM managed workload definition specifies the users and processes whose utilization is being managed.

Workload Name: * app_dev_wkld
Note: The workload name is a short identifier for the workload. It must be unique across the CMS.

Workload Description:
Note: This can be the same as the workload name or it can be any other descriptive text used to provide more information about the workload.

Specify Workload Definition Criteria:

by executable /opt/myapp/bin/myapp Add to definition
Enter the full path to the executable, Enter the alternate name of the executable including wildcards in the filename portion of (optional). [What is this?](#) the path.

Criteria Used To Define Workload:

Type	Value	Alternate Name(s)	Remove from definition
executable	/opt/perl/bin/perl	myperlscript.pl	

Note: A process that meets one or more of the specified criteria will be counted as part of the workload.

* required field

OK Cancel

10. You will see the same screen you saw in step 8. As in step 8, select the Add button to add a row for the workload. Set the policy for the new workload to CPUUtil_Min1_Max7. Select (new...) in the Workload column dropdown to go to the page to create the new workload. Name the workload db_dev_wkld. This workload, shown below, has application records for a shell script and for an Oracle instance. Select OK after defining the workload.

Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

Create gWLM Managed Workload Definition

A gWLM managed workload definition specifies the users and processes whose utilization is being managed.

Workload Name:
Note: The workload name is a short identifier for the workload. It must be unique across the CMS.

Workload Description:
Note: This can be the same as the workload name or it can be any other descriptive text used to provide more information about the workload.

Specify Workload Definition Criteria:

by executable ▾

Enter the full path to the executable, including wildcards in the filename portion of (optional). [What is this?](#) Enter the alternate name of the executable the path.

Criteria Used To Define Workload:

Type	Value	Alternate Name(s)	<input type="button" value="Remove from definition"/>
<input type="radio"/> executable	/bin/sh	myscript.sh	
<input checked="" type="radio"/> executable	/oracle/uo1/app/oracle/product/10.2.0/db_dev_1/bin/oracle	ora*MYINST*	

Note: A process that meets one or more of the specified criteria will be counted as part of the workload.
 * required field

11. Now continue creating the SRD. The workloads and policies are set, so select the Next button.

Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 3 of 4: Specify workload/policy settings.

[Refresh Data](#)

Hostname	Workload	Policy	Compartment Type	Add/Remove Sub-OS Workload	Compartment Min/Size/Max (Cores)
haiti2a.rsn.hp.com	<input type="text" value="haiti2a.OTHER"/>	CPU_Utilization ▾	fss ▾	<input type="button" value="Add"/>	0.05 / 7.9 / 7.9
	<input type="text" value="db_dev_wkld"/>	CPUUtil_Min1_Max7 ▾	fss	<input type="button" value="Remove"/>	0.05 / 0.05 / 7.9
	<input type="text" value="app_dev_wkld"/>	CPUUtil_Min1_Max7 ▾	fss	<input type="button" value="Remove"/>	0.05 / 0.05 / 7.9

Total Size=8

12. The final step of the wizard allows you to review the SRD. Select Finish to begin managing the workloads.

HP gWLM: Manage Systems and Workloads
Manage sharing of CPU resources across partitions/processes

Step 4 of 4: Review and confirm.

Warning: gWLM communications are not secure. For security information see the [gwlmsslconfig\(1\)](#) man page.

Shared Resource Domain Name	haiti2a.srd
Size	8
Mode	Managed
Resource Allocation Interval	15
Global use of Temporary Instant Capacity (TiCAP) cores	Off

Workload	Hostname	Type	Policy	Min/Size/Max
haiti2a.OTHER	haiti2a.rsn.hp.com	fss	CPU_Utilization	0.05 / 7.9 / 7.9
db_dev_wkld	haiti2a.rsn.hp.com	fss	CPUUtil_Min1_Max7	0.05 / 0.05 / 7.9
app_dev_wkld	haiti2a.rsn.hp.com	fss	CPUUtil_Min1_Max7	0.05 / 0.05 / 7.9

Previous Finish Cancel

13. After you select Finish, you are taken to the Shared Resource Domain tab.

VSE Management: Global Workload Manager

System Workload **Shared Resource Domain** Capacity Advisor

Tools Create Modify Delete Policy Report

Show: Deployed SRDs Undeployed SRDs Auto Refresh [Refresh Data](#)

<input type="checkbox"/>	SRD Name	Status	Mode	State	Size	CPU Utilization	Last Update
<input type="checkbox"/>	haiti2a.srd	?	Managed	Deployed	8	0.0%	May 04, 2007 11:17:05

Details for SRD: haiti2a.srd

Shared Resource Domain	haiti2a.srd
Mode	Managed
TiCAP	Off
State	Deployed
CPU Utilization	0.0%

<input type="checkbox"/>	Workload	Type	Policy	Hostname
<input type="checkbox"/>	app_dev_wkld	fss	CPUUtil_Min1_Max7	haiti2a.rsn.hp.com
<input type="checkbox"/>	db_dev_wkld	fss	CPUUtil_Min1_Max7	haiti2a.rsn.hp.com
<input type="checkbox"/>	haiti2a.OTHER	fss	CPU_Utilization	haiti2a.rsn.hp.com

The gWLM configuration file

gWLM can display an XML version of the configuration file using `gwlm export`. (You can also configure gWLM using XML. For more information, see the `gwlmxml(4)` manpage.)

The following command was used to display the XML for this configuration:

```
gwlm export \
  --srd=haiti2a.srd \
  --workload=haiti2a.OTHER \
  --workload=app_dev_wkld \
  --workload=db_dev_wkld \
  --policy=CPUUtil_Min1_Max7 \
  --policy=CPU_Utilization
```

The XML file is:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE dataStore SYSTEM "file:/opt/gwlm/dtd/config.dtd"> <dataStore>
  <policyDefinition name="CPUUtil_Min1_Max7" ticapByPolicy="false"
time="0" type="Utilization">
    <cpu>
      <minimum>1.0</minimum>
      <maximum>7.0</maximum>
      <target>75.0</target>
      <weight>1.0</weight>
      <convergenceRate>1.0</convergenceRate>
    </cpu>
    <priority>100</priority>
  </policyDefinition>
  <policyDefinition name="CPU_Utilization" ticapByPolicy="false"
time="0" type="Utilization">
    <cpu>
      <minimum>0.0</minimum>
      <maximum>2048.0</maximum>
      <target>75.0</target>
      <weight>1.0</weight>
      <convergenceRate>1.0</convergenceRate>
    </cpu>
    <priority>100</priority>
  </policyDefinition>
  <workloadDefinition name="haiti2a.OTHER">
    <policyReference name="CPU_Utilization"/>
  </workloadDefinition>
  <workloadDefinition name="app_dev_wkld">
    <application>
      <path>/opt/perl/bin/perl</path>
      <alternateName>myperlscript.pl</alternateName>
    </application>
    <application>
      <path>/opt/myapp/bin/myapp</path>
    </application>
    <policyReference name="CPUUtil_Min1_Max7"/>
  </workloadDefinition>
  <workloadDefinition name="db_dev_wkld">
    <application>
      <path>/bin/sh</path>
      <alternateName>myscript.sh</alternateName>
    </application>
    <application>
      <path>/oracle/u01/app/oracle/product/10.2.0/db_dev_1/bin/oracle</path>
      <alternateName>ora*MYINST*</alternateName>
    </application>
    <policyReference name="CPUUtil_Min1_Max7"/>
  </workloadDefinition>
  <sharedResourceDomain interval="15" mode="Managed" name="haiti2a.srd"
ticapMode="off" time="1178288612790">
```

```

<compartment id="3" name="" type="fss">
  <cpu>
    <minimum>0.05</minimum>
    <maximum>7.90</maximum>
    <size>0.05</size>
  </cpu>
  <hostName>haiti2a.rsn.hp.com</hostName>
  <nativeId>3</nativeId>
  <parentId>0</parentId>
  <workloadReference name="app_dev_wkld"/>
</compartment>
<compartment id="2" name="" type="fss">
  <cpu>
    <minimum>0.05</minimum>
    <maximum>7.90</maximum>
    <size>0.05</size>
  </cpu>
  <hostName>haiti2a.rsn.hp.com</hostName>
  <nativeId>2</nativeId>
  <parentId>0</parentId>
  <workloadReference name="db_dev_wkld"/>
</compartment>
<compartment id="1" name="default" type="fss">
  <cpu>
    <minimum>0.05</minimum>
    <maximum>7.90</maximum>
    <size>7.90</size>
  </cpu>
  <hostName>haiti2a.rsn.hp.com</hostName>
  <nativeId>1</nativeId>
  <parentId>0</parentId>
  <workloadReference name="haiti2a.OTHER"/>
</compartment>
</sharedResourceDomain>
</dataStore>

```


Migration example: FSS-based workloads with stretch goals

In WLM, you can create a stretch goal for a workload by defining multiple SLOs, at distinct priorities, for the workload.

The WLM configuration

In this example, we have another 8-CPU server split into two FSS-based workload groups sized by CPU utilization. Each group has a CPU allocation at priority 1 and at priority 2. The priority 1 SLOs guarantee the workloads four CPUs each. The priority 2 SLOs (stretch goals) allow a workload to borrow any resources that go unused after the priority 1 SLOs are satisfied. The configuration also sets a minimum allocation of one CPU and a maximum allocation of seven CPUs for both workloads. It also has several application records.

```
prm {
    groups = apps_grp : 2,
           db_grp    : 3;

    # place a custom binary and perl script into apps_grp,
    # shell script and oracle instance into g3
    apps = apps_grp : /opt/perl/bin/perl "myperlscript.pl",
           apps_grp : /opt/myapp/bin/myapp,
           db_grp   : /bin/sh "myscript.sh",
           db_grp   : /oracle/u01/app/oracle/product/10.2.0/db_dev_1/bin/oracle
"ora*MYINST*";
}

slo apps_base_slo {
    pri = 1;
    goal = usage _CPU;
    mincpu = 100;
    maxcpu = 400;
    entity = PRM group apps_grp;
}

slo db_base_slo {
    pri = 1;
    goal = usage _CPU;
    mincpu = 100;
    maxcpu = 400;
    entity = PRM group db_grp;
}

slo apps_stretch_slo {
    pri = 2;
    goal = usage _CPU;
    mincpu = 100;
    maxcpu = 700;
    entity = PRM group apps_grp;
}

slo db_stretch_slo {
    pri = 2;
    goal = usage _CPU;
    mincpu = 100;
    maxcpu = 700;
    entity = PRM group db_grp;
}

tune {
    absolute_cpu_units=1; # 100 units is 100% of 1 CPU, not the whole server
}
```

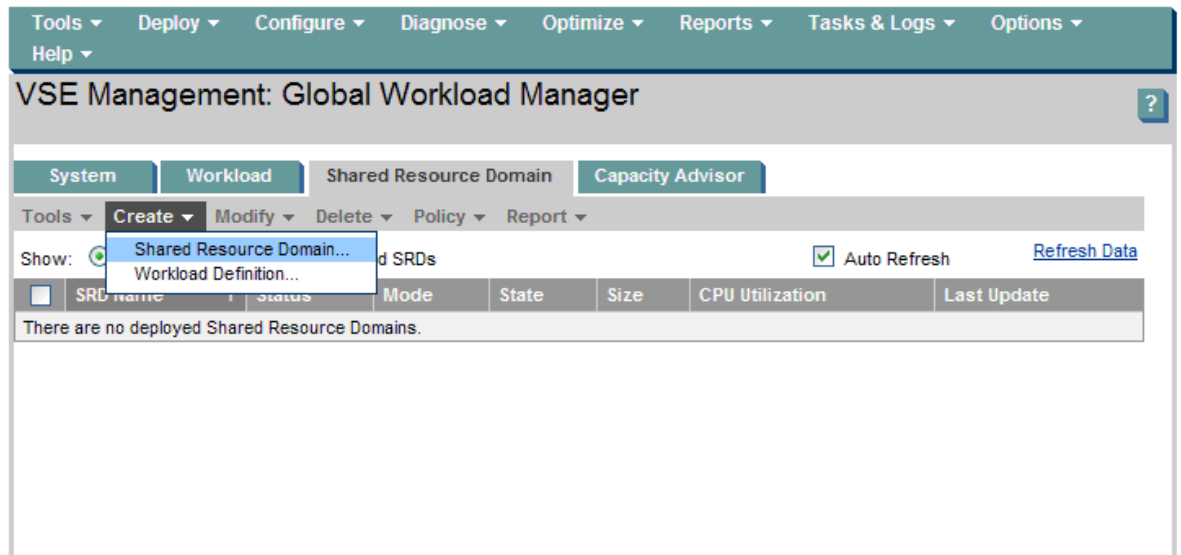
Creating an equivalent gWLM configuration

To create an equivalent gWLM configuration, follow the steps below in HP Systems Insight Manager. (For information on installing, configuring, and accessing VSE Management Software, such as gWLM, in HP Systems Insight Manager, see the *VSE Management Software Installation and Update Guide*, available from <http://docs.hp.com/en/vse.html>.)

In a WLM configuration, you can optionally specify the default user workload group OTHERS. In the gWLM configuration though, the workload must be specified. It takes a name of the form hostname.OTHER.

In this configuration, use an OwnBorrow policy. This type of policy behaves similar to WLM's combination of a base goal and a stretch goal. We will use a gWLM-provided policy for the hostname.OTHER workload and create a policy for the two user-defined workloads. (Although WLM requires you specify a priority through the `pri` keyword, gWLM assigns a default priority of 100. You can change the priority after selecting the 'Show advanced policy configuration options' checkbox when setting up policies. However, HP recommends accepting the default priority.) Also, while the WLM configuration explicitly uses absolute CPU units, gWLM uses such units by default.

1. From the Shared Resource Domain tab, select Create followed by Shared Resource Domain to start the Manage Systems and Workloads wizard.



- Specify, using the table or the Additional Hosts field, the host that will be divided into fss-based workloads. Then select the Next button.

Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 1 of 4: Specify the hosts to include in a single shared resource domain.

<input type="checkbox"/>	Hostname	Shared Resource Domain	State	Members
<input checked="" type="checkbox"/>	haiti2a.rsn.hp.com			
<input type="checkbox"/>	zsazsa.zko.hp.com			

Additional Hosts:

Automatically join with any compatible SRDs. (recommended)
 Checked indicates the selected hosts should join any SRD that is already managing their sibling hosts. Otherwise, a new SRD is created.

Next Cancel

- Set Mode to Managed and select the Next button.

Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 2 of 4: Set properties for the shared resource domain.

Shared Resource Domain Name:
 The name used to identify a group of systems sharing resources.

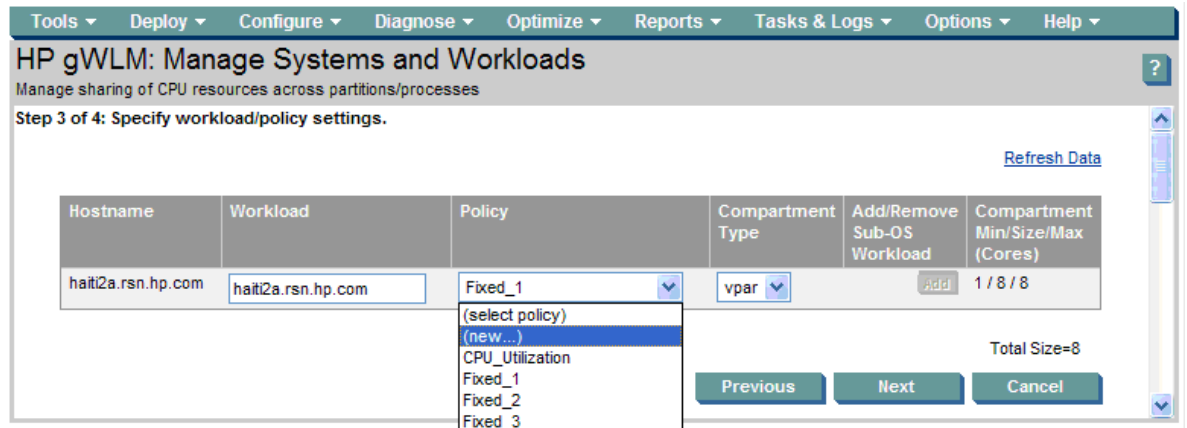
Mode: ▾
 Advisory mode allows you to see what resource requests would be made--without affecting resource allocation. Managed mode automatically adjusts the resource allocations.

Global use of Temporary Instant Capacity (TICAP) cores: ▾
 The On option causes TiCAP cores to be activated as necessary to satisfy the resource request for all workloads in this Shared Resource Domain regardless of policy settings. The Off option limits TiCAP activation only to workloads that explicitly enable use of TiCAP in their associated policy settings.

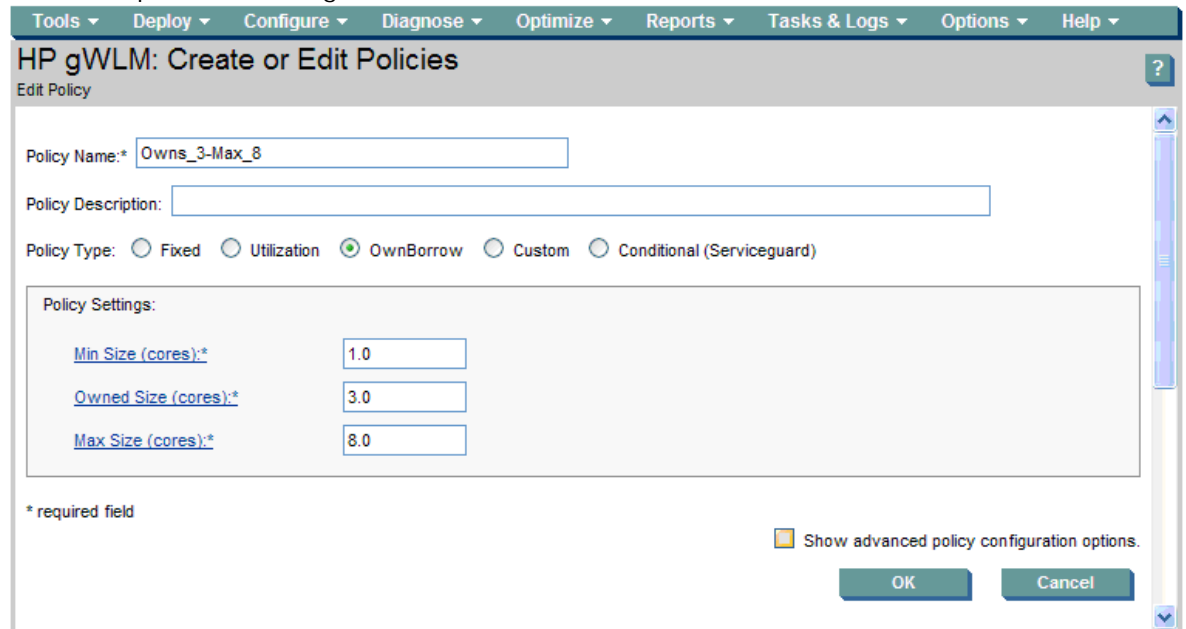
Resource Allocation Interval:
 The time period in seconds during which resource utilization is measured and resource allocation decisions are made and carried out. The default value is set based on the compartment selection made for the SRD.

Previous Next Cancel

- Select (new...) in the policy dropdown to create a new policy.



- Name the new policy and set its type to OwnBorrow. Here the name chosen is Owns_3-Max_8. This policy is for the user-defined workloads. Set the PolicyMin value to 1.0 for one CPU. Any workload with this policy will get at least one CPU. Set the Owned (CPU) value to 3.0 for three CPUs. The associated workload gets these three CPUs whenever needed. Set PolicyMax (CPU) to 8.0. If other workloads are not using their resources, the associated workload can borrow those resources up to a total of eight CPUs. Select OK when done.



- Set Compartment Type to fss. (The name for the workload changes to haiti2a.OTHER.)
- Set the policy for the .OTHER workload to the gWLM-provided policy Owns_2-Max_4.
- Select the Add button to add a row for another workload. Set the policy for second workload to Owns_3-Max_8.

- Select (new...) to define the new workload. Define the workloads in the same manner as in the section "Migration example: FSS-based workloads with usage goals" on page 8. Set the policy for the app_dev_wkld to Owns_3-Max_8 as well, and then select the Next button.

Tools Deploy Configure Diagnose Optimize Reports Tasks & Logs Options Help

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 3 of 4: Specify workload/policy settings. [Refresh Data](#)

Hostname	Workload	Policy	Compartment Type	Add/Remove Sub-OS Workload	Compartment Min/Size/Max (Cores)
haiti2a.rsn.hp.com	haiti2a.OTHER	Owns_2-Max_4	fss	Add	0.05 / 7.9 / 7.9
	db_dev_wkld	Owns_3-Max_8	fss	Remove	0.05 / 0.05 / 7.9
	app_dev_wkld	Owns_3-Max_8	fss	Remove	0.05 / 0.05 / 7.9

Total Size=8

Previous Next Cancel

- The final step of the wizard allows you to review the SRD. Select Finish to begin managing the workloads.

Tools Deploy Configure Diagnose Optimize Reports Tasks & Logs Options Help

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 4 of 4: Review and confirm.

Warning: gWLM communications are not secure. For security information see the [gwlmsslconfig\(1\)](#) man page.

Shared Resource Domain Name	haiti2a.srd
Size	8
Mode	Managed
Resource Allocation Interval	15
Global use of Temporary Instant Capacity (TiCAP) cores	Off

Workload	Hostname	Type	Policy	Min/Size/Max
haiti2a.OTHER	haiti2a.rsn.hp.com	fss	Owns_2-Max_4	0.05 / 7.9 / 7.9
db_dev_wkld	haiti2a.rsn.hp.com	fss	Owns_3-Max_8	0.05 / 0.05 / 7.9
app_dev_wkld	haiti2a.rsn.hp.com	fss	Owns_3-Max_8	0.05 / 0.05 / 7.9

Previous Finish Cancel

11. After you select Finish, you are taken to the Shared Resource Domain tab.

The screenshot shows the VSE Management: Global Workload Manager interface. The 'Shared Resource Domain' tab is active, displaying details for 'haiti2a.srd'. The interface includes a menu bar (Tools, Deploy, Configure, Diagnose, Optimize, Reports, Tasks & Logs, Options, Help) and a sub-menu (Tools, Create, Modify, Delete, Policy, Report). The 'Show:' section is set to 'Deployed SRDs' with 'Auto Refresh' checked. A table lists the SRD 'haiti2a.srd' with a status of 'Managed' and 'Deployed', a size of 8, and 0.2% CPU utilization. Below this, a 'Details for SRD: haiti2a.srd' section shows configuration parameters: Shared Resource Domain (haiti2a.srd), Mode (Managed), TiCAP (Off), State (Deployed), and CPU Utilization (0.2%). A second table lists workloads: 'app_dev_wkld', 'db_dev_wkld', and 'haiti2a.OTHER', each with 0.2% CPU utilization and specific policies. A 'Totals' row at the bottom indicates 'Req = 3', 'Alloc = 8', and 'Size = 8'.

The gWLM configuration file

gWLM can display an XML version of the configuration file using `gwm export`. (You can also configure gWLM using XML. For more information, see the `gwmxml(4)` manpage.)

The following command was used to display the XML for this configuration:

```
gwm export \
  --srd=haiti2a.srd \
  --workload=haiti2a.OTHER \
  --workload=app_dev_wkld \
  --workload=db_dev_wkld \
  --policy=Owms_3-Max_8 \
  --policy=Owms_2-Max_4
```

The XML file is:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE dataStore SYSTEM "file:/opt/gwlm/dtd/config.dtd"> <dataStore>
  <policyDefinition name="Owms_3-Max_8" ticapByPolicy="false" time="0"
type="OwnBorrow">
    <cpu>
      <minimum>1.0</minimum>
      <maximum>8.0</maximum>
      <own>3.0</own>
      <target>75.0</target>
      <weight>3.0</weight>
      <convergenceRate>1.0</convergenceRate>
    </cpu>
    <priority>100</priority>
  </policyDefinition>
  <policyDefinition name="Owms_2-Max_4" ticapByPolicy="false" time="0"
type="OwnBorrow">
```

```

    <cpu>
      <minimum>1.0</minimum>
      <maximum>4.0</maximum>
      <own>2.0</own>
      <target>75.0</target>
      <weight>2.0</weight>
      <convergenceRate>0.0</convergenceRate>
    </cpu>
    <priority>100</priority>
  </policyDefinition>
  <workloadDefinition name="haiti2a.OTHER">
    <policyReference name="Owns_2-Max_4"/>
  </workloadDefinition>
  <workloadDefinition name="app_dev_wkld">
    <application>
      <path>/opt/perl/bin/perl</path>
      <alternateName>myperlscript.pl</alternateName>
    </application>
    <application>
      <path>/opt/myapp/bin/myapp</path>
    </application>
    <policyReference name="Owns_3-Max_8"/>
  </workloadDefinition>
  <workloadDefinition name="db_dev_wkld">
    <application>
      <path>/bin/sh</path>
      <alternateName>myscript.sh</alternateName>
    </application>
    <application>
      <path>/oracle/u01/app/oracle/product/10.2.0/db_dev_1/bin/oracle</path>
      <alternateName>ora*MYINST*</alternateName>
    </application>
    <policyReference name="Owns_3-Max_8"/>
  </workloadDefinition>
  <sharedResourceDomain interval="15" mode="Managed" name="haiti2a.srd"
ticapMode="off" time="1178290010336">
    <compartment id="6" name="" type="fss">
      <cpu>
        <minimum>0.05</minimum>
        <maximum>7.90</maximum>
        <size>0.05</size>
      </cpu>
      <hostName>haiti2a.rsn.hp.com</hostName>
      <nativeId>3</nativeId>
      <parentId>0</parentId>
      <workloadReference name="app_dev_wkld"/>
    </compartment>
    <compartment id="5" name="" type="fss">
      <cpu>
        <minimum>0.05</minimum>
        <maximum>7.90</maximum>
        <size>0.05</size>
      </cpu>
      <hostName>haiti2a.rsn.hp.com</hostName>
      <nativeId>2</nativeId>
      <parentId>0</parentId>
      <workloadReference name="db_dev_wkld"/>
    </compartment>

```

```

    <compartment id="4" name="default" type="fss">
      <cpu>
        <minimum>0.05</minimum>
        <maximum>7.90</maximum>
        <size>7.90</size>
      </cpu>
      <hostName>haiti2a.rsn.hp.com</hostName>
      <nativeId>1</nativeId>
      <parentId>0</parentId>
      <workloadReference name="haiti2a.OTHER"/>
    </compartment>
  </sharedResourceDomain>
</dataStore>

```

Migration example: vPar-based workloads with usage goals

As with WLM, you can manage virtual partitions with gWLM. gWLM greatly simplifies the configuration however.

The WLM configurations

WLM requires two configurations to manage partitions: one for `wlmd` and one for `wlmpard`.

The two configurations below are based on the files `par_usage_goal.wlm` and `par_usage_goal.wlmpar`, both available in `/opt/wlm/examples/wlmconf/` on systems with WLM installed.

First, we have the `wlmd` configuration file. This file is used in every virtual partition.

```

primary_host = myserver;           # Change this value
tune {
    wlm_interval = 5;
}
slo slo_myslo {
    pri = 1;                       # Change this value
    goal = usage _CPU;
}

```

Next, consider the `wlmpard` configuration file.

```

par {
    interval = 10;
}

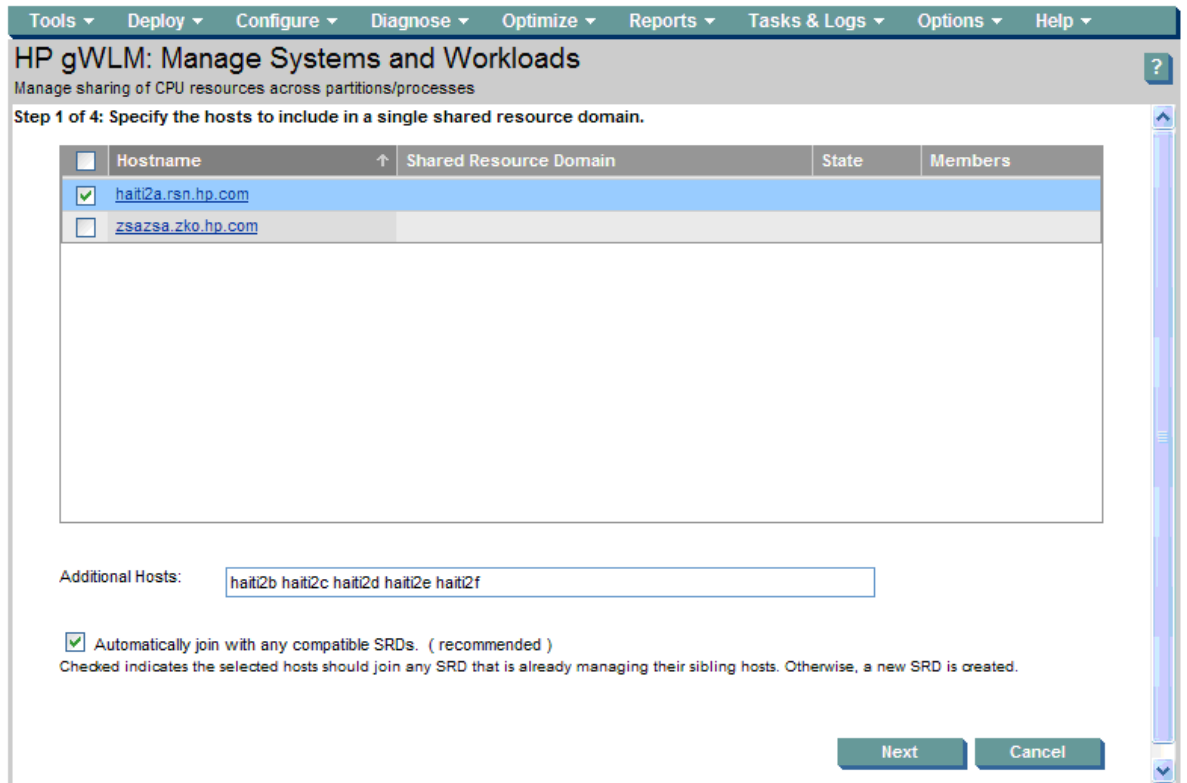
```


Creating an equivalent gWLM configuration

To create an equivalent gWLM configuration, follow the steps below in HP Systems Insight Manager. (For information on installing, configuring, and accessing VSE Management Software, such as gWLM, in HP Systems Insight Manager, see the *VSE Management Software Installation and Update Guide*, available from <http://docs.hp.com/en/vse.html>.)

gWLM does not require the multiple configuration files that WLM does. Also, there is no need to set a priority; you can simply accept the default.

1. Select the host and specify all the remaining virtual partitions in the server or nPartition. Here, there are five other virtual partitions specified. Select the Next button when done.



The screenshot shows the HP gWLM configuration interface. The title bar includes navigation menus: Tools, Deploy, Configure, Diagnose, Optimize, Reports, Tasks & Logs, Options, and Help. The main header reads "HP gWLM: Manage Systems and Workloads" with a subtitle "Manage sharing of CPU resources across partitions/processes". The current step is "Step 1 of 4: Specify the hosts to include in a single shared resource domain." Below this is a table with columns: Hostname, Shared Resource Domain, State, and Members. Two hosts are listed: "hait2a.rsn.hp.com" (checked) and "zsazsa.zko.hp.com" (unchecked). Below the table is an "Additional Hosts:" text box containing "hait2b hait2c hait2d hait2e hait2f". A checkbox labeled "Automatically join with any compatible SRDs. (recommended)" is checked. A note below states: "Checked indicates the selected hosts should join any SRD that is already managing their sibling hosts. Otherwise, a new SRD is created." At the bottom right are "Next" and "Cancel" buttons.

<input type="checkbox"/>	Hostname	Shared Resource Domain	State	Members
<input checked="" type="checkbox"/>	hait2a.rsn.hp.com			
<input type="checkbox"/>	zsazsa.zko.hp.com			

Additional Hosts:

Automatically join with any compatible SRDs. (recommended)
Checked indicates the selected hosts should join any SRD that is already managing their sibling hosts. Otherwise, a new SRD is created.

Next Cancel

- Set the Mode to Managed. (Notice that gWLM automatically changed the Resource Allocation Interval to 85. gWLM changes the interval based on the type of workloads being managed.) Select the Next button.

Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 2 of 4: Set properties for the shared resource domain.

Shared Resource Domain Name:
The name used to identify a group of systems sharing resources.

Mode: ▾
Advisory mode allows you to see what resource requests would be made--without affecting resource allocation. Managed mode automatically adjusts the resource allocations.

Global use of Temporary Instant Capacity (TiCAP) cores: ▾
The On option causes TiCAP cores to be activated as necessary to satisfy the resource request for all workloads in this Shared Resource Domain regardless of policy settings. The Off option limits TiCAP activation only to workloads that explicitly enable use of TiCAP in their associated policy settings.

Resource Allocation Interval:
The time period in seconds during which resource utilization is measured and resource allocation decisions are made and carried out. The default value is set based on the compartment selection made for the SRD.

- Set the policy for each workload to the CPU_Utilization policy provided by gWLM. Select the Next button.

Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 3 of 4: Specify workload/policy settings.

[Refresh Data](#)

Hostname	Workload	Policy	Compartment Type	Add/Remove Sub-OS Workload	Compartment Min/Size/Max (Cores)
haiti2a.rsn.hp.com	<input type="text" value="haiti2a.rsn.hp.com"/>	<input type="button" value="CPU_Utilization"/> ▾	<input type="button" value="vpar"/> ▾	<input type="button" value="Add"/>	1 / 8 / 8
haiti2b.rsn.hp.com	<input type="text" value="haiti2b"/>	<input type="button" value="CPU_Utilization"/> ▾	<input type="button" value="vpar"/> ▾	<input type="button" value="Add"/>	1 / 1 / 8
haiti2c.rsn.hp.com	<input type="text" value="haiti2c"/>	<input type="button" value="CPU_Utilization"/> ▾	<input type="button" value="vpar"/> ▾	<input type="button" value="Add"/>	1 / 1 / 8
haiti2d.rsn.hp.com	<input type="text" value="haiti2d"/>	<input type="button" value="CPU_Utilization"/> ▾	<input type="button" value="vpar"/> ▾	<input type="button" value="Add"/>	1 / 1 / 8
haiti2e.rsn.hp.com	<input type="text" value="haiti2e"/>	<input type="button" value="CPU_Utilization"/> ▾	<input type="button" value="vpar"/> ▾	<input type="button" value="Add"/>	1 / 1 / 8
haiti2f.rsn.hp.com	<input type="text" value="haiti2f"/>	<input type="button" value="CPU_Utilization"/> ▾	<input type="button" value="vpar"/> ▾	<input type="button" value="Add"/>	1 / 1 / 8

Total Size=13

- The final step of the wizard allows you to review the SRD. Select Finish to manage the workloads.

Tools Deploy Configure Diagnose Optimize Reports Tasks & Logs Options Help

HP gWLM: Manage Systems and Workloads

Manage sharing of CPU resources across partitions/processes

Step 4 of 4: Review and confirm.

Warning: gWLM communications are not secure. For security information see the [gwlmsslconfig\(1\) man page](#).

Shared Resource Domain Name	haiti2a.srd
Size	13
Mode	Managed
Resource Allocation Interval	85
Global use of Temporary Instant Capacity (TiCAP) cores	Off

Workload	Hostname	Type	Policy	Min/Size/Max
haiti2a.rsn.hp.com	haiti2a.rsn.hp.com	vpar	CPU_Utilization	1 / 8 / 8
haiti2b	haiti2b.rsn.hp.com	vpar	CPU_Utilization	1 / 1 / 8
haiti2c	haiti2c.rsn.hp.com	vpar	CPU_Utilization	1 / 1 / 8
haiti2d	haiti2d.rsn.hp.com	vpar	CPU_Utilization	1 / 1 / 8
haiti2e	haiti2e.rsn.hp.com	vpar	CPU_Utilization	1 / 1 / 8
haiti2f	haiti2f.rsn.hp.com	vpar	CPU_Utilization	1 / 1 / 8

Previous Finish Cancel

- After you select Finish, you are taken to the Shared Resource Domain tab.

Tools Deploy Configure Diagnose Optimize Reports Tasks & Logs Options Help

VSE Management: Global Workload Manager

System Workload Shared Resource Domain Capacity Advisor

Tools Create Modify Delete Policy Report

Show: Deployed SRDs Undeployed SRDs Auto Refresh [Refresh Data](#)

<input type="checkbox"/>	SRD Name	Status	Mode	State	Size	CPU Utilization	Last Update
<input type="checkbox"/>	haiti2a.srd		Managed	Deployed	13	<input type="text" value="0.0%"/>	May 04, 2007 11:35:55

Details for SRD: haiti2a.srd

Shared Resource Domain	haiti2a.srd
Mode	Managed
TiCAP	Off
State	Deployed
CPU Utilization	<input type="text" value="0.0%"/>

<input type="checkbox"/>	Workload	Type	Policy	Hostname
<input type="checkbox"/>	haiti2a.rsn.hp.com	vpar	CPU_Utilization	haiti2a.rsn.hp.com
<input type="checkbox"/>	haiti2b	vpar	CPU_Utilization	haiti2b.rsn.hp.com
<input type="checkbox"/>	haiti2c	vpar	CPU_Utilization	haiti2c.rsn.hp.com
<input type="checkbox"/>	haiti2d	vpar	CPU_Utilization	haiti2d.rsn.hp.com
<input type="checkbox"/>	haiti2e	vpar	CPU_Utilization	haiti2e.rsn.hp.com
<input type="checkbox"/>	haiti2f	vpar	CPU_Utilization	haiti2f.rsn.hp.com

The gWLM configuration file

gWLM can display an XML version of the configuration file using `gwlmm export`. (You can also configure gWLM using XML. For more information, see the `gwlmmxml(4)` manpage.)

The following command was used to display the XML for this configuration:

```
gwlmm export \  
  --srd=haiti2a.srd \  
  --workload=haiti2a.rsn.hp.com \  
  --workload=haiti2b \  
  --workload=haiti2c \  
  --workload=haiti2d \  
  --workload=haiti2e \  
  --workload=haiti2f \  
  --policy=CPU_Utilization
```

The XML file is:

```
<?xml version="1.0" encoding="UTF-8"?>  
<!DOCTYPE dataStore SYSTEM "file:/opt/gwlm/dtd/config.dtd"> <dataStore>  
  <policyDefinition name="CPU_Utilization" ticapByPolicy="false"  
time="0" type="Utilization">  
    <cpu>  
      <minimum>0.0</minimum>  
      <maximum>2048.0</maximum>  
      <target>75.0</target>  
      <weight>1.0</weight>  
      <convergenceRate>1.0</convergenceRate>  
    </cpu>  
    <priority>100</priority>  
  </policyDefinition>  
  <workloadDefinition name="haiti2a.rsn.hp.com">  
    <policyReference name="CPU_Utilization"/>  
  </workloadDefinition>  
  <workloadDefinition name="haiti2b">  
    <policyReference name="CPU_Utilization"/>  
  </workloadDefinition>  
  <workloadDefinition name="haiti2c">  
    <policyReference name="CPU_Utilization"/>  
  </workloadDefinition>  
  <workloadDefinition name="haiti2d">  
    <policyReference name="CPU_Utilization"/>  
  </workloadDefinition>  
  <workloadDefinition name="haiti2e">  
    <policyReference name="CPU_Utilization"/>  
  </workloadDefinition>  
  <workloadDefinition name="haiti2f">  
    <policyReference name="CPU_Utilization"/>  
  </workloadDefinition>  
  <sharedResourceDomain interval="85" mode="Managed" name="haiti2a.srd"  
ticapMode="off" time="1178291082325">  
    <compartment id="7" name="haiti2a" type="vpar">  
      <cpu>  
        <minimum>1</minimum>  
        <maximum>8</maximum>  
        <size>8</size>  
      </cpu>  
      <hostName>haiti2a.rsn.hp.com</hostName>  
      <nativeId>Z3e11d5b8fdef7289_P2_V00</nativeId>  
      <parentId>Haiti_Complex_USE4514JRL_P2</parentId>  
      <workloadReference name="haiti2a.rsn.hp.com"/>  
    </compartment>
```

```

<compartment id="8" name="haiti2b" type="vpar">
  <cpu>
    <minimum>1</minimum>
    <maximum>8</maximum>
    <size>1</size>
  </cpu>
  <hostName>haiti2b.rsn.hp.com</hostName>
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```

Licensing and availability

WLM and gWLM are both licensed on a per-CPU basis. Both are in the VSE Suite.

WLM is available through the:

- Mission-critical Operating Environment
- Quarterly AR media

gWLM is available through the:

- Foundation Operating Environment (includes the trial agent)
- Quarterly AR media (includes the CMS, as part of the VSE Mgmt bundle, and the trial agent)

When migrating from HP Process Resource Manager (PRM) or from WLM to gWLM, upgrade credits are available.

For information on obtaining gWLM, contact your HP sales representative or your HP authorized partner.

For more information

The following sites provide high-level product information:

<http://www.hp.com/go/wlm>

<http://www.hp.com/go/gwlm>

<http://www.hp.com/go/vse>

The following white paper, HP Global Workload Manager—Improving server CPU utilization technical overview, provides a number of use cases:

<http://h71028.www7.hp.com/ERC/downloads/5983-0505EN.pdf>

The following site provides technical documentation for WLM, gWLM, and VSE Management Software:

<http://docs.hp.com/en/vse.html>