

Improving Performance in Virtualization Manager Version 4.0



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Obstacles to Scalability

Attempting to view large numbers of managed nodes in the Virtualization Manager tool can decrease performance because the following tasks are too time consuming:

- Central management server (CMS) collection of performance data and processing of events for the nodes being viewed
- CMS generation of the HTML that represents the managed nodes
- Transmission of the HTML over the network
- Rendering of a page by the client web browser

A practical limit for a fast CMS and a fast browser system with good network connectivity to the CMS seems to be 500 simultaneously displayed nodes. Fewer nodes further improve performance, while larger numbers degrade performance. As the number of managed nodes in HP Systems Insight Manager (HP SIM) increases, the ability to show all of them in Virtualization Manager decreases.

Virtualization Manager operates on managed nodes in a collection. When a collection is selected (the current collection is shown as the subtitle of the Virtualization Manager window banner), Virtualization Manager takes the managed nodes out of the collection, discovers ancestor nodes, and then discovers all their descendant nodes. The types of ancestors discovered depend on the selected perspective. The **All VSE Resources** collection defaults to the Physical and Virtual perspectives and discovers enclosures from blades, complexes from nPartitions, VM hosts from VM guests, and so on.

As a result, on a CMS with a large number of managed nodes, selecting the **All VSE Resources** collection displays everything that falls within the criteria of the queries inside it. Typically, this means that, by default, entering Virtualization Manager results in the display of every managed node in HP SIM.

The two main entry points into Virtualization Manager are as follows:

- Selecting **Tools → VSE Management...** from the HP SIM menu. This action launches Virtualization Manager with the **All VSE Resources** collection selected.
- Clicking the **All VSE Resources** collection in left pane of the HP SIM window.

To improve scalability in Virtualization Manager, use or create collections that contain subsets of the managed nodes in the **All VSE Resources** collection.

Fan-out and Auto-collapse

Virtualization Manager uses the fan-out and auto-collapse features to display systems of interest to you while maintaining high levels of performance.

For every system in a collection, fan-out identifies all of that system's ancestors and, from those ancestors, all descendant systems. For example, a virtual machine might be contained within a blade that, in turn, is contained within an enclosure that is in both a Virtual Connect (VC) Domain and VC Domain Group. Then, starting from the VC Domain Group, multiple VC Domains, multiple enclosures, multiple blades, may be added in. In this way, Virtualization Manager creates displays that include the entire hierarchy of systems even if only a few of those systems are specified in a collection.

Auto-collapse is a performance feature that limits the amount of information that is initially displayed in any page view. Ideally, Virtualization Manager displays all systems that result from the fan-out of a collection, but this can decrease performance because of the resources required to discover, transmit, and render all the information. As a result, by default, up to the first 60 systems (in alphabetical order by ancestor root nodes) are displayed in an expanded form (that is, their descendants are visible). After this threshold is reached, any additional systems are shown in collapsed form (that is, their descendants are not visible). This feature helps maintain good performance with hierarchies that contain large numbers of systems.

The benefits of auto-collapse vary widely depending both on the depth and breadth of each hierarchy displayed and on the number of hierarchies. For example, rendering a collection of 500 standalone servers results in the display of 500 containers, and auto-collapse is not possible because no ancestor/descendant relationships are present. However, displaying a single VC Domain with an enclosure that contains 16 blades with 20 virtual machines each (a total of 338 entities) results in the collapsed display of at least some of those blades so that their virtual machines are not visible by default.

Because you can expand any collapsed system, you can also negate the benefits of the auto-collapse feature. Therefore, to maintain performance, first collapse the systems that you do not want to display before you expand the systems that you do want to display.

Use of Existing Subcollections

The **All VSE Resources** collection already includes several predefined subcollections and queries. To view these, expand the **All VSE Resources** collection in the left pane of the HP SIM window:

- All VSE Resources
 - Blades
 - + ProLiant Blades
 - + Integrity Blades
 - Logical Servers
 - + Active Logical Servers
 - + Inactive Logical Servers
 - + Shared Resource Domains
 - Standalone Servers
 - + ProLiant Servers
 - + Integrity-9000 Servers
 - + VM Hosts
 - + VMs
 - + Enclosures
 - + Instant Capacity Resources
 - + nPartitions
 - + Virtual Partitions
 - + Resource Partitions
 - + HP Serviceguard Clusters

For example, to view information about only an ESX host or virtual machine, select the **VM Hosts** or **VMs** query to display that subset of the **All VSE Resources** collection.

Keep in mind, however, that fan-out can still occur. Depending on the perspective you select, a virtual machine in one of these queries can result in the discovery of its parent VM Host. Similarly, if that host is a server blade, of the parent enclosure, parent VC Domain, and parent VC Domain Group.

Fortunately, the perspectives associated with the subqueries of **All VSE Resources** are designed to discover only the most useful parent nodes. Thus, selecting the **VMs** query defaults to the Virtual Machines perspective and discovers only the VM Host parents.

Subqueries and collections are intended for the most common categories of managed nodes. Using these as entry points into Virtualization Manager improves performance relative to using the larger **All VSE Resources** collection.

Use of Custom Collections

To further reduce the scope of systems displayed in Virtualization Manager and improve performance, you can create custom collections in HP SIM. For detailed information about how to create a custom collection, see the next section. For best performance improvement, create collections that display fewer than 500 nodes.

Even a small collection can easily fan out to display a very large number of nodes. For example, consider a collection consisting of a single server blade that is also a VM host). If this collection defaults to being viewed in the Blades perspective, the collection can fan out to discover the enclosure, the VC Domain, and the VC Domain Group. If there is a VC Domain Group, all VC Domains in the Group are discovered, along with all enclosures in all VC Domains. Subsequently, all server blades in all enclosures and all virtual machines in all server blades also are discovered.

Because of this fan-out effect, consider the following when you create collections:

- Send the collection to the correct perspective. In the preceding example, if the perspective were set to the Virtual Machines perspective, only the server blade and its virtual machines would have been displayed.
- Consider using the **VSE (collection nodes only)** default view. This selects the Physical and Virtual perspective in Virtualization Manager but shows only the nodes in the collection without any fan-out. From this point, you can navigate to any other perspective and maintain the no-fan-out criteria.

Consider creating a Custom Collections folder under the **All VSE Resources** collection to hold all of the custom collections you create. To do this, and to create collections within this folder, you must be logged in as an administrator.

The following are ways you can create custom collections:

- **A single enclosure:** If you want to view only an enclosure and its contents, the best method is to create a collection by specifying the contents explicitly instead of using attributes (to avoid the problems noted earlier). Then select the **VSE (collection nodes only)** default view so that fan-out does not occur. Alternatively, if no VC Domain or VC Domain Group is associated with the enclosure, you can choose the **VSE (Blades)** default view.
- **A set of systems making up a solution:** If, for example, you want to view a database server, application server, and web host as a set of systems that implement an application, identify the members of the collection individually with the default view set to **VSE (collection nodes only)**.
- **A single ESX host:** Again, to display just one host and its virtual machines, create a collection, specify the ESX host individually, and set the default view to **VSE (Virtual Machines)**.

How to Create a Custom Collection

In the left pane of the HP SIM window, click **Customize....** You can perform this action as either a normal user or as an administrator. If you choose normal user, the resulting collection appears under the **Private** heading and is visible only to that user. If you choose administrator, the resulting collection can be visible to all users. The following example collection is created as an administrator.

First, click **New...** and select one of the options under **New Collection** at the bottom of the screen (The option you choose depends on how you want to set up your collection.) Because this example sets up a collection of ESX VM hosts to be managed as a group the members are chosen individually.

The screenshot shows the HP Systems Insight Manager interface. The left pane displays the 'System and Event Collections' tree, with 'Systems' expanded to show various categories like 'All Systems', 'Private', 'Shared', and 'Systems by Type'. The main pane is titled 'Customize Collections' and contains a table of existing collections. Below the table is the 'New Collection' section with three radio button options.

Item	Visible	Status displayed
<input type="radio"/> Private	Yes	-
<input type="radio"/> Shared	Yes	-
<input checked="" type="radio"/> Systems by Type	Yes	-
<input type="radio"/> All Systems	Yes	No
<input type="radio"/> All Servers	Yes	No
<input type="radio"/> All VSE Resources	Yes	-
<input type="radio"/> HP BladeSystem	Yes	-
<input type="radio"/> Storage Systems	Yes	-
<input type="radio"/> All Racks	Yes	No
<input type="radio"/> All Enclosures	Yes	No
<input type="radio"/> All Clients	Yes	No
<input type="radio"/> All Networking Devices	Yes	No
<input type="radio"/> All Printers	Yes	No
<input type="radio"/> All Management Processors	Yes	No
<input type="radio"/> All Virtual Connect Domains	Yes	No
<input type="radio"/> Virtual Machine Hosts	Yes	-
<input type="radio"/> Virtual Machines	Yes	-
<input type="radio"/> Systems by Status	Yes	-
<input type="radio"/> Systems by Operating System	Yes	-
<input type="radio"/> Clusters by Type	Yes	-
<input type="radio"/> Clusters by Status	Yes	-
<input type="radio"/> System Functions	Yes	-

New Collection

- Choose members individually
- Choose members by attributes
- Choose members from the existing system and event collections

From the **Choose from:** list, select **VM Hosts** or **All ESX Hosts** or some other collection that shows the set of systems. Then select the hosts you want to include in the custom collection, and click the double right-angle bracket (>>) to transfer the hosts to the right-hand list. Then click **Save As Collection...**, give the collection a name, and choose where you want it to appear.

New Collection

- Choose members individually
- Choose members by attributes
- Choose members from the existing system and event collections

Choose from:

Available Items:	Selected Members:
baker miter3 notLicensedIntegrity2 notLicensedIntegrity4 notLicensedIntegrity6 notLicensedIntegrity8 notLicensedProLiantBlade1 notLicensedProLiantBlade2 plaza puny01 rainier saber1 saber3 saber6 sthelans torres	esxhost7 esxhost8 esxhost9.testdom.rdm01.adapps.hp.com

Remove [A] [V]

Administrators can add the collection to any existing collection, but normal users can add a collection only to their own private collections. To give all users access to this collection, move it directly into the **Shared** collection. Alternatively, you can create a new collection called Custom Collections under **All VSE Resources** and place all your custom collections there.

Save As Collection

Required Field *

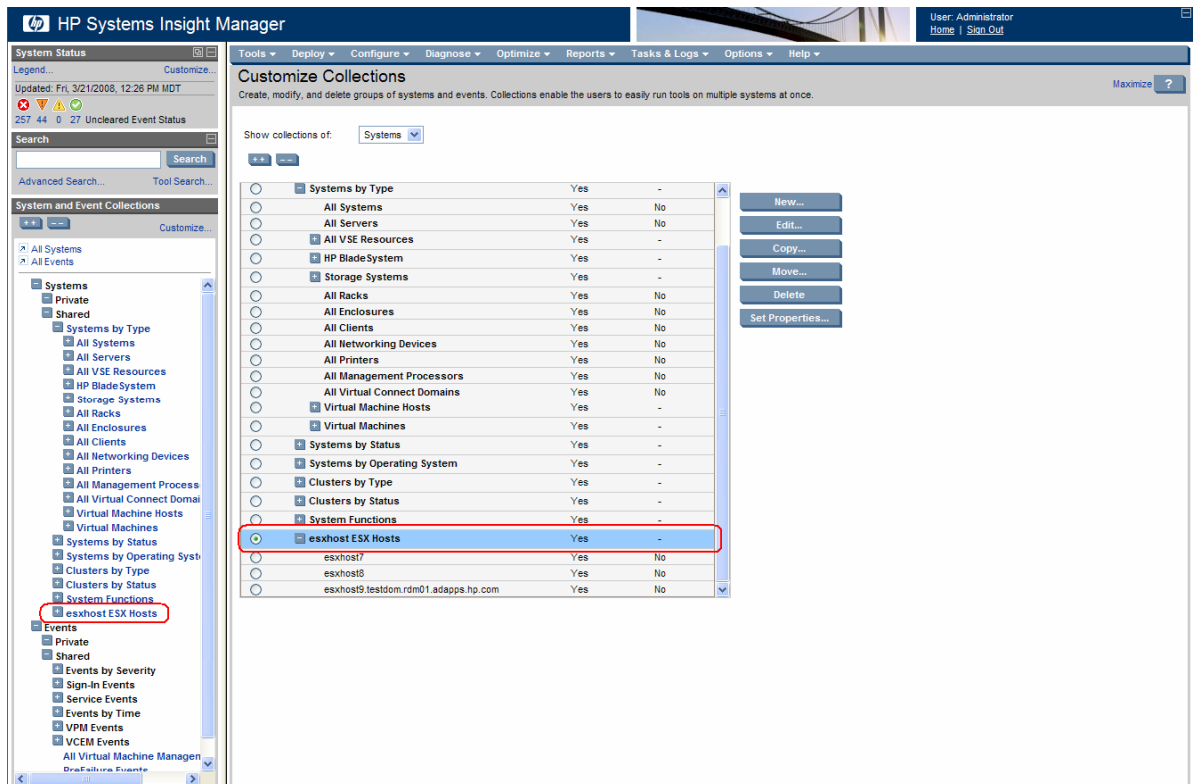
Collection name: *

Place in:

Existing collection:

New collection: within

When you click **OK**, the collection is displayed in the left pane as well as in the table in the right pane, as shown in the following figure. To set the default action to take when clicking the collection, click **Set Properties...**:



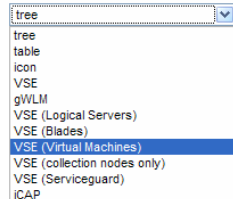
Because this is a collection of VM Hosts, you want to view this collection in Virtualization Manager's VM perspective. To specify this perspective, select **VSE (Virtual Machines)** from the **Default View** list and click **OK**.

Set Properties for: esxhost ESX Hosts

Visible:

- Yes, show collection and its members in the user interface
 No, do not show collection and its members in the user interface

Default View:

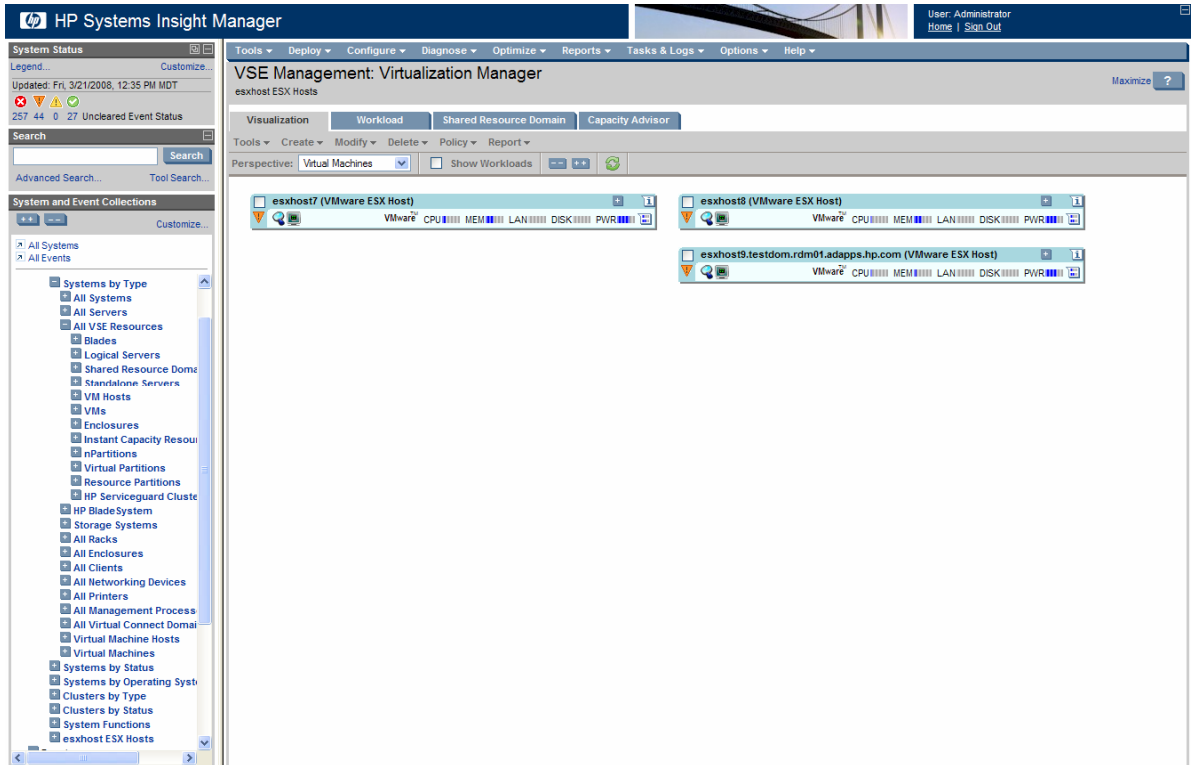


OK Cancel

Select from one of the following Virtualization Manager views available in the **Default View** drop-down list:

- VSE – Displays nodes (with fan-out) in the Physical and Virtual perspectives.
- VSE (collection nodes only) – Displays nodes (without any fan-out) in the Physical and Virtual perspectives.
- VSE (Logical Servers) – Displays logical servers in the Logical Servers perspective.
- VSE (Blades) – Displays blades with fan-out to VM guests, blade enclosures, VC Domains, and VC Domain Groups in the Blades perspective.
- VSE (Virtual Machines) – Displays VM Hosts and guests in the Virtual Machines perspective.
- VSE (Serviceguard) – Displays Serviceguard clusters and nodes in the Serviceguard perspective.

Now, to view the ESX hosts of interest to you, you can simply click the **esxhost ESX Hosts** collection clicking **All VSE Resources** or the **VM Hosts** query:



Creating custom collections improves performance in several ways:

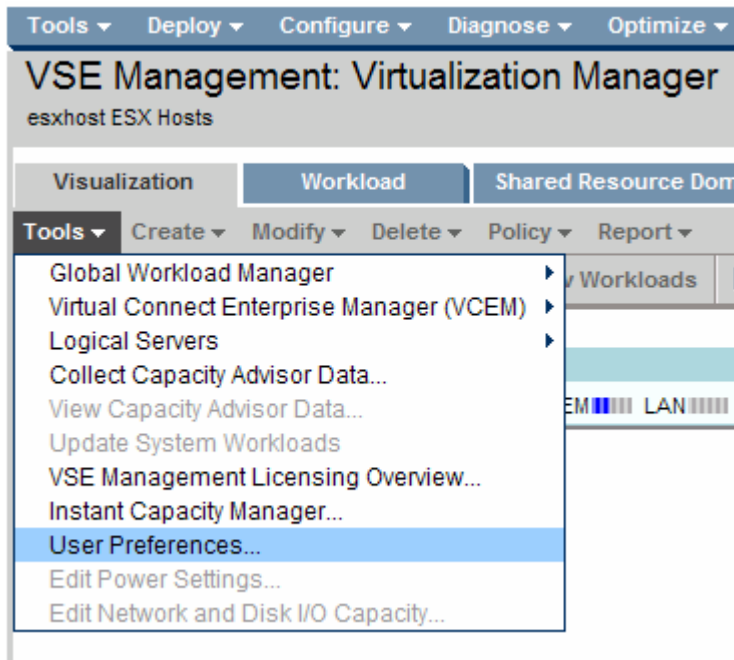
- Virtualization Manager does less processing to create the display of the systems.
- The HTML transmitted across the network is smaller and therefore faster to transmit.
- The browser does less processing to render the page.
- Periodic performance data collection by the CMS is limited to only the visible systems.
- Event handling on the CMS is limited to only the visible systems.

In general, the fastest way to enter Virtualization Manager is to select the correct collection from the HP SIM left pane rather than to select **Tools → VSE Management** or **All VSE Resources**, since these latter actions display too much information. For numbers of nodes approaching or exceeding 500, performance suffers simply because of the amount of information being compiled for display for each node, the network transmission time for the page, and the significant amount of time required to draw the screen.

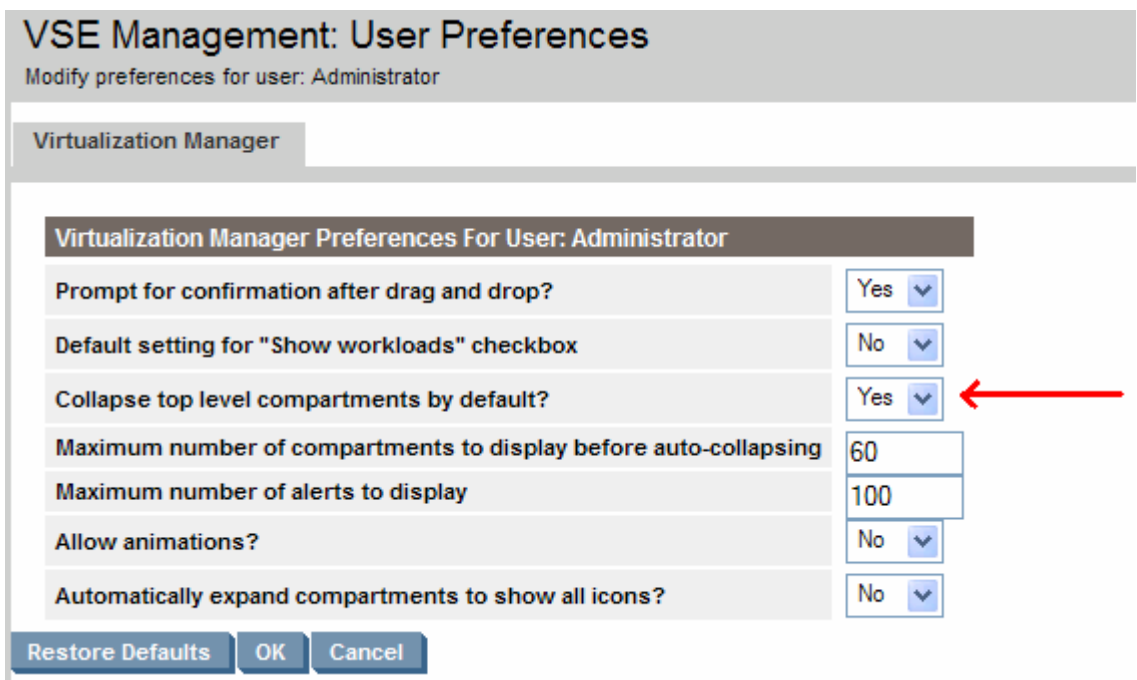
Improving Performance by Adjusting User Preferences


By default, Virtualization Manager expands compartments to show children up to a threshold of 60 visible compartments on a page. After this point, any newly rendered compartments with children are rendered as collapsed. You can achieve better performance by collapsing all compartments by default.

To collapse all compartments by default, adjust user preferences by selecting **Tools → User Preferences** from the Virtualization Manager **Visualization** tab:



Then, to get the best performance, select **Collapse top level compartments by default** and click **OK**:



For the new setting to take effect, re-enter Virtualization Manager via a collection in the HP SIM left pane. (Alternatively, to collapse all containers without re-entering Virtualization Manager, click the  button on the toolbar). Now you can expand only the compartments whose contents you want to view.

Browser Render Time

The amount of time a browser uses to render large numbers of managed nodes depends on the browser itself. A comparison of Microsoft® Internet Explorer 6, Internet Explorer 7, and Mozilla Firefox 2 revealed that render times for displaying large numbers of systems are significantly faster with Firefox than with Internet Explorer.

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