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How to Manage System Center Operations Manager using Groups

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In the early days of Microsoft Operations Manager (MOM) it is said that a council conference was called for those who would toil daily behind glowing displays, tending to the omniscient presence known as MOM. It is also told that where Microsoft was reported to have generously bestowed mini-MOM-radios to all those attending this fabled conference. These mini-radios, tradition has it, had the MOM logo displayed for all to see upon them. Those favored few that received the mini radio were utterly captivated with this prodigious endowment. Those who dreamt up and bestowed this wondrous gift began to praise themselves for their astounding vision. This self adoration came to an abrupt end as a lone call from the multitude cried out "Hey look, you have to tune this just like MOM!"

This story may be IT geek folklore but it provides a solid framework to think about when working with Operations Manager (OpsMgr). Things have evolved significantly since the MOM 2005 days, but tuning is still required to make OpsMgr meet the requirements for your specific environment.

So why do we need to tune OpsMgr? One of the primary goals of System Center Operations Manager 2007 R2 is to provide proactive monitoring. This basically means "Tell me when something is going to break before it breaks." This approach leads to increased availability of key applications and servers (whether physical or virtual) and a better user experience as a result. To provide proactive monitoring Operations Manager (OpsMgr) needs to identify potential errors and to provide administrators with a mechanism to receive a notification when these conditions occur.

A common critique of Operations Manager is that it is too "noisy". When you think about this from high level perspective this is a catch-22 situation for Microsoft. OpsMgr's goal is to notify administrators of issues. Microsoft is doing their job by alerting on issues preferably before they occur. If OpsMgr does not provide alerts of these situations it is not doing its job. If OpsMgr does provide all of these alerts it's being too "noisy".

So what is noise in Operations Manager? Noise is generated when alerts (usually sent via email) are created by Operations Manager for situations which are not actionable, irrelevant, or duplicated. This concept of OpsMgr as noisy is based upon a few key concepts to remember:

1) Not all alerts which are generated by Operations Manager are sent to recipients via email. Alerts can be generated which are only displayed in the Operations Manager console and are not included in subscriptions for Operations Manager. These alerts can be relevant for the Operations Manager administrator but do not necessarily require email notification when they occur. We will discuss proper subscription design approaches in a later white paper in this series.

2) One company's noise may be another company's business critical alerts. The Operations Manager management packs are designed to be used from organizations which range from relatively small to large-scale enterprise environments. As an example, for the Exchange management pack a queue threshold of 10 may be valid for a small organization but not for a large organizations. The loss of a default website may be critical for one organization but irrelevant for another because they do not use the default website. Many of these types of situations are addressed through designing distributed applications which we will discuss in a later white paper in this three part series.

3) Proper tuning of Operations Manager to match the requirements of your organization is a requirement and it takes time. Taming Operations Manager can be done, and using groups is a key component in effectively tuning your environment. One of the focuses of this article is groups and how they can be used in Operations Manager to tune your environment.

Taming vs. Tuning

Before we start delving into how to tune Operations Manager using groups we should start with an explanation of the differences between taming and tuning in Operations Manager. A tamed Operations Manager environment is fully utilized to do what it is designed to do: Provide proactive actionable alerting to users in an environment focused on what they are interested in, and to automatically responding to conditions when appropriate for the environment. A tuned environment provides usable alerts with a minimal amount of noise.

Actionable Alert Notifications: A properly tuned OpsMgr environment means that alerts which are generated are generally considered to be actionable. A well-tuned environment is a solid component of a tamed Operations Manager environment. This topic is discussed in the ["Using groups for Overrides in Operations Manager"](#) section of this white paper.

Customized User Experience: The Operations Manager console needs to be targeted so that when a user accesses the console they only see the information which is relevant to them, including their servers and applications. These same user groups can also be used when generating targeted reports in Operations Manager. This topic is discussed in the ["Grouping and targeting the Operations Manager Console"](#) section of this white paper.

Going Proactive & Automatically Adapting: Dynamic groups can be used to tune the environment as new entities are added or removed. These topics are discussed in the ["Adapting through using groups"](#) section of this white paper.

To summarize taming versus tuning, a properly tuned Operations Manager environment is a critical piece of a tamed Operations Manager environment. Each of these three major areas provides a piece of the equation to tame your Operations Manager environment. Before we delve into how groups can be used in Operations Manager to further tame your environment we need to start with an explanation of what groups are in Operations Manager and how they are created.

What are groups in Operations Manager?

Groups in Operations Manager are similar to groups in Active Directory. OpsMgr groups can contain different types of entities including windows computers. As an example, a group could be created which contains the web servers which are part of a web farm. Groups are stored in management packs and can be added through importing the management pack into Operations Manager.

There are two general ways to classify groups in Operations Manager: Dynamic and Static.

Static groups are created by adding specific entities into the group as an explicit member. Static groups are useful when a group is required to contain the members but there are no criteria available to define the group memberships. Often these types of groups are used when customizing the user experience. Often a team will want to know the health of multiple servers in the environment which do not have criteria available for them. This idea is discussed in the "[Grouping and targeting the Operations Manager console](#)" section of this white paper.

Dynamic groups are created by identifying criteria which define what entities are members of the group. Dynamic groups are often contained in management packs to target monitoring in Operations Manager. As an example, the IIS Management Pack identified servers which have IIS installed and adds them to the "IIS Computer Group". Thus the IIS rules and monitors can be targeted to these servers. Additionally views can be restricted to display only those computers which have IIS installed on them.

The Veeam management pack includes multiple dynamic groups which populate based upon the entities available in the environment. The Veeam management pack includes groups which identify items such as VMware clusters, ESX Host Servers, guests, vCenter servers, and Virtual Applications among others.

Other examples of how dynamic groups can be used in Operations Manager include:

- Creating a group of web servers based upon the name of the server [see [Dynamic groups using regular expressions](#) in the URL reference section]
- Grouping servers based upon their Active Directory site [see [Dynamic groups using AD sites](#) in the URL reference section]
- Grouping servers based upon their Organizational Unit in Active Directory [see [Dynamic groups using OU membership](#) in the URL reference section]
- Grouping virtualized servers [see [Dynamic groups for Hyper-V and VMware](#) in the URL reference section]
- Creating a custom attribute [see [Dynamic groups using custom attributes](#) in the URL reference section]

Groups in Operations Manager are extremely flexible and can provide functionality which is critical to an OpsMgr environment. As we discuss in the Using Groups for Overrides in Operations Manager section of the white paper, groups can even be used to automatically identify entities which we choose to disable specific monitoring on.

Subgroups

One of the commonly overlooked features of Operations Manager is the ability to create subgroups. Subgroups can be used as regular groups in OpsMgr but they are also used to roll up membership to a high level group. For example, in our environment we have a three tier web-site called Web1. Web1 has a front-end web-server farm with five web servers, a mid-tier with two application servers, and a clustered SQL server back-end.

The owners of the Web1 application want to be able to view all of the servers involved in Web1 and have the ability to break them down into each of the different tiers. To meet this requirement we created three subgroups: Web1 Web Farm, Web1 Application, Web1 SQL. Each of these is created as a sub-group under the Web1 group. Each of these groups can now be used to further tune and tame the Operations Manager environment.

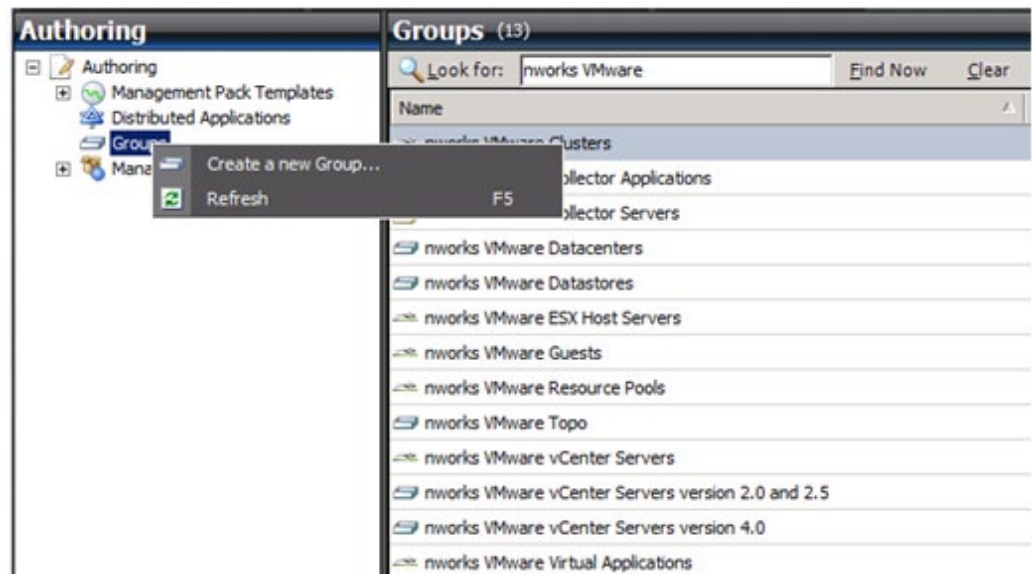
Best practices for group creation

While groups are extremely useful in Operations Manager there are several best practice considerations when using them.

- *Use a naming convention for your groups:* Using a naming convention with descriptive names for your groups makes it easier to find them when you need them. Pre-pending the group name with your company name is a good place to start as you can easily find any groups which you created.
- *Create groups only when there is a business need:* Unless you need the groups to perform a function (like customizing the user experience, tuning alerts, grouping servers for maintenance mode or overriding alerts) do not create the group.
- *Keep the number of groups reasonable:* In most environments, there should be no need to create more than 1,000 groups for the Management Group. Large numbers of groups may result in performance issues in your environment.
- *Keep dynamic membership criteria simple:* Avoid complex group membership situations such as multiple regular expressions based upon the name of the computer. A better approach is to provide a group membership which can be written into a singular expression as shown in this article on groups [see [Simple to Complex groups](#) in the URL reference section].

Creating groups

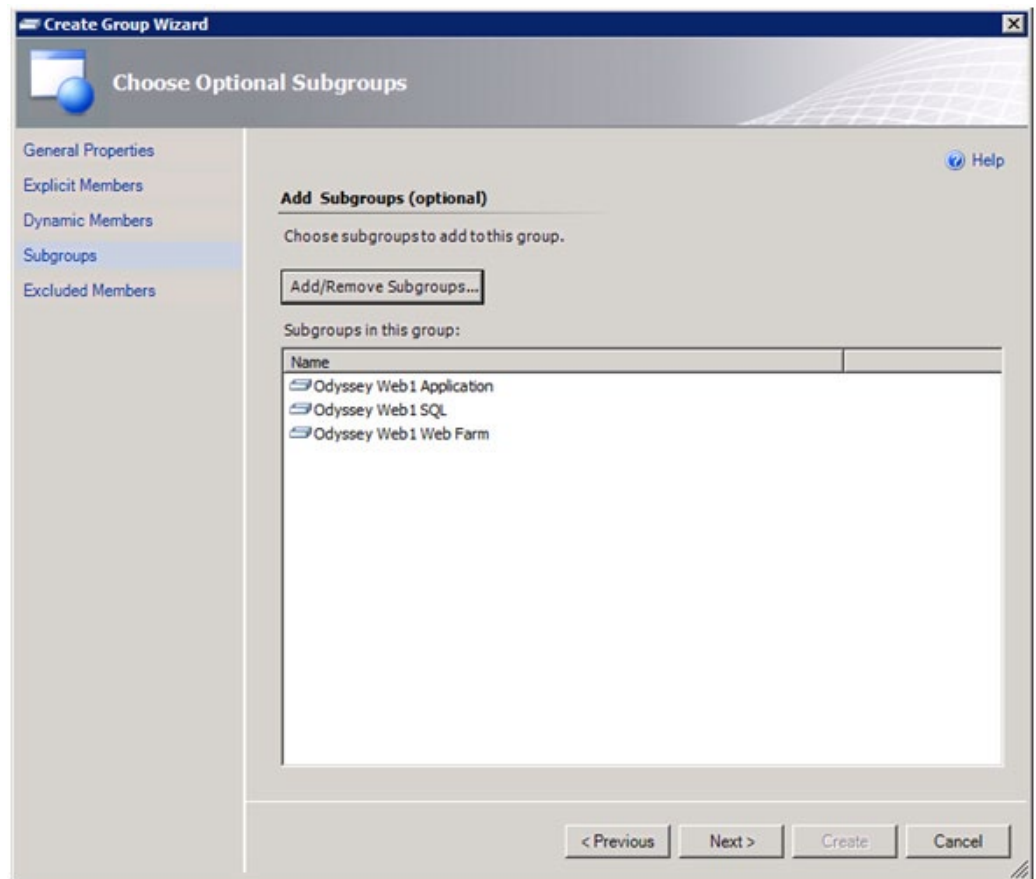
Groups can be created in a variety of different ways including the Operations Manager authoring console, creation of a management pack in XML, or the most common method, which is to use the authoring pane in the Operations Manager console. In the Operations Manager console, groups are created in Authoring / Groups. Right-click on Groups and choose the option to create a new group as shown below:



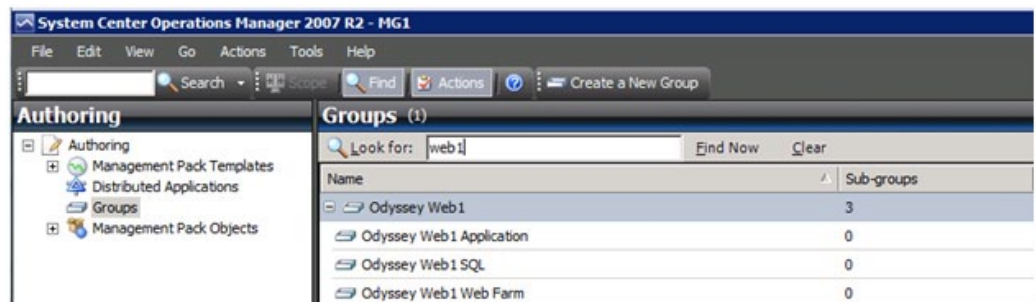
To provide monitoring for our Web1 application, we need to create a total of four groups, as discussed above in "Subgroups" (Web1 Web Farm, Web1 Application, Web1 SQL, Web1). For this example, our company name is Odyssey. To match our naming convention, we will prepend these with the name of our company so these will actually be named Odyssey Web1 Web Farm, Odyssey Web1 Application, Odyssey Web1 SQL, and Odyssey Web1.

When creating these, we create a management pack for our new groups (or use an existing management pack, but do not use the default management pack to store these groups as this is not a best practice approach). In our example we'll create the Web1 management pack. When creating our groups we have the ability to define explicit members (static membership), dynamic members (dynamic rules), subgroups, and members which should be excluded. Once we have established each of our subgroups, we can add our subgroups into the group that we are creating (Odyssey Web1 subgroup members shown below).

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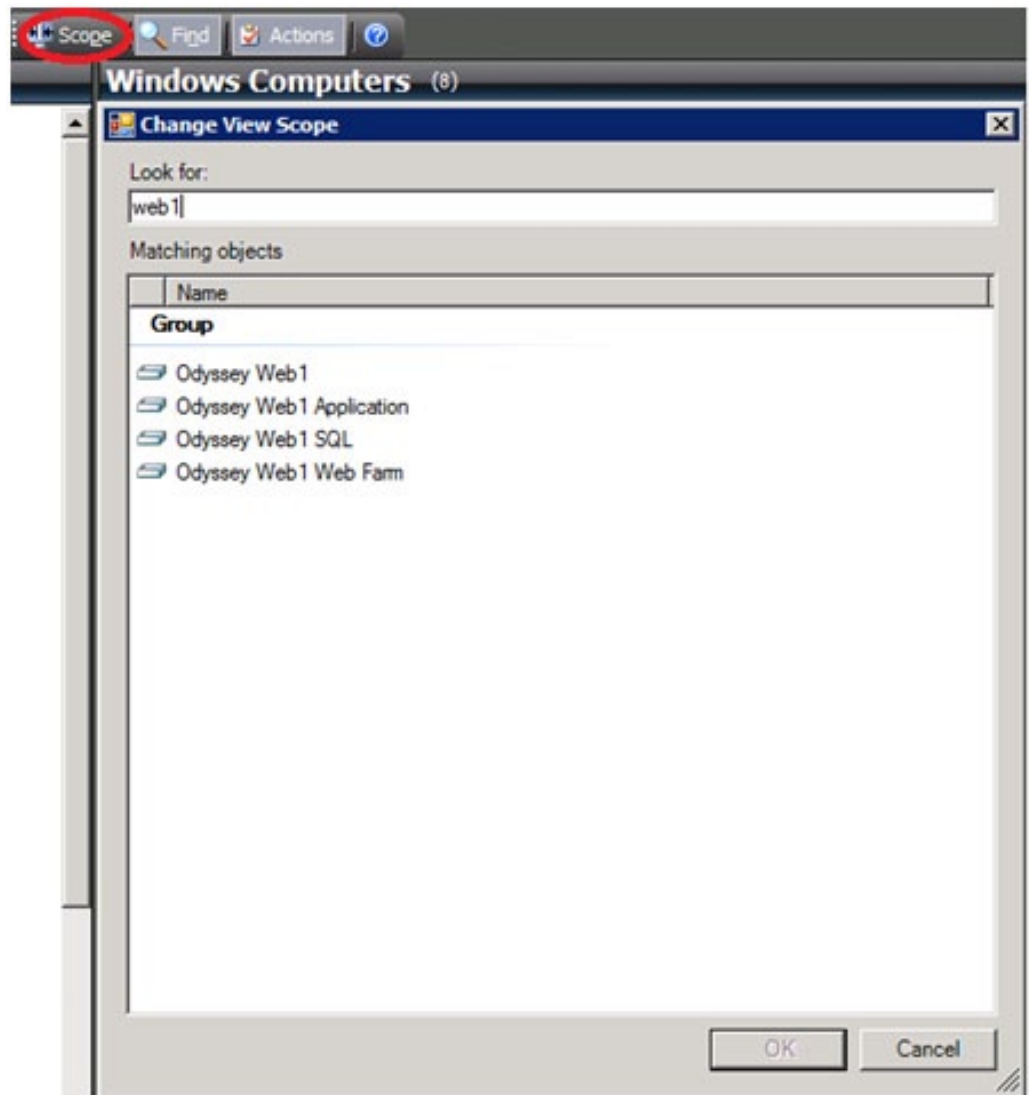
Since we used a consistent naming convention we can either search on our company name (Odyssey), or on the application (Web1) as shown below:



If we right-clicked on the Odyssey Web1 group we would see the group members which are gathered from each of the subgroups which we created. In our example we would see that the Odyssey Web1 group contains the two application servers, two SQL servers, and five web servers discussed earlier in "Subgroups" in this white paper. Now that we have created the groups for our Web1 application we can show how these groups can be used in Operations Manager.

Using groups in Operations Manager

Now that we have created these groups, they are now available when we are using views in the Operations Manager console within the monitoring pane using the Scope button (highlighted in the image below). If we filter based upon the name of our application we see the following options available:



Scoping allows us to easily identify objects which are relevant to users of a specific application (or in this case a piece of an application such as the servers in the web farm).

Using groups for Overrides in Operations Manager

These same groups can also be used to generate more actionable alerting in Operations Manager. For our Web1 application we can change the default behavior of Operations Manager to more closely match the monitoring requirements for our application.

Front-end web servers: By default Operations Manager will provide a critical alert when a website is offline. However since each of the web servers, which are part of this group, are members of a web farm and we may not want to generate a critical alert when a single website is down in the farm. More likely we will want to generate a warning alert (sent to the owners of the web farm) when a single website is down and generate a critical alert when several of members of the web farm are non-functional as part of a distributed application (which we will discuss in another article in this series).

Mid-tier application servers: Application servers often have custom services which need to be monitored by Operations Manager. These services can be monitored through a service monitor that will alert when the service is not started. Service monitors are created in the Authoring / Management Pack Templates / Windows Service and can be targeted to a specific group. This approach lets us monitor each of the servers in the group which have this service. We can also integrate the services into a distributed application and provide critical alerts if multiple services are not functional.

Back-end SQL servers: SQL servers will expand to use nearly all available memory on the system. SQL server polices can be implemented to restrict how much memory SQL can use on the server. Using an existing group created in the SQL management pack (SQL Computers or SQL 2008 Computers) we can tune the memory threshold to 95% - 99%. Exceeding 99% memory utilization represents an issue as the Operating System is most likely being starved for memory. Tuning this configuration minimizes the noise in the environment while providing actionable alerting when a memory issue has occurred.

Proper tuning of our application servers using the groups which we created decreases the noise for these servers and provides more actionable alerting in Operations Manager. Using groups for tuning is not limited to applications. We can generate groups for different types of servers in an environment and then use those groups to either change the threshold or disable the monitoring. In our environment we may want to monitor Development, Test and Production systems but we may want to provide different levels of monitoring. If we create groups for these types of servers (preferably dynamic based upon name or an attribute which we gather which indicates the type of server that they area) we can customize the level of monitoring which Operations Manager provides. For our development servers we may not care about memory or processor utilization but we do want to be notified if a server is offline so we can create overrides using our development group which disable these monitors for the development servers.

TIP: *Do you want to know what groups your server is a member of?*

There is a PowerShell script to display groups to display this information which is available. It is referenced in the URLs at the end of this article.

Tuning can also be done through adding a management pack designed to tune another management pack. Veeam provides an Operational Best Practices Management Pack for Veeam. It is like an Auto Tuning management pack which uses custom groups to provide targeted overrides. Various groups are created as part of the management pack including:

ESX Host Servers: Console CPUs

nworks VMware ESX Host Servers: vmHBAs – Local Storage

nworks VMware ESX Host Servers: vmHBAs – Shared Storage Tier 1

nworks VMware ESX Host Servers: vmHBAs – Shared Storage Tier 2

nworks VMware ESX Host Servers: vmHBAs – Shared Storage Tier 3

nworks VMware ESX Host Servers: NIC – 100Mbps

nworks VMware ESX Host Servers: NIC – 1Gbps

nworks VMware ESX Host Servers: NIC – 10Gbps

These groups are then targeted for overrides which are contained within the management pack. The effect is a more efficient way to tune your Veeam management pack.

How you use groups in Operations Manager will vary depending upon your environment. The goal however is to focus on how to decrease the noise while not sacrificing actionable alerts in Operations Manager.

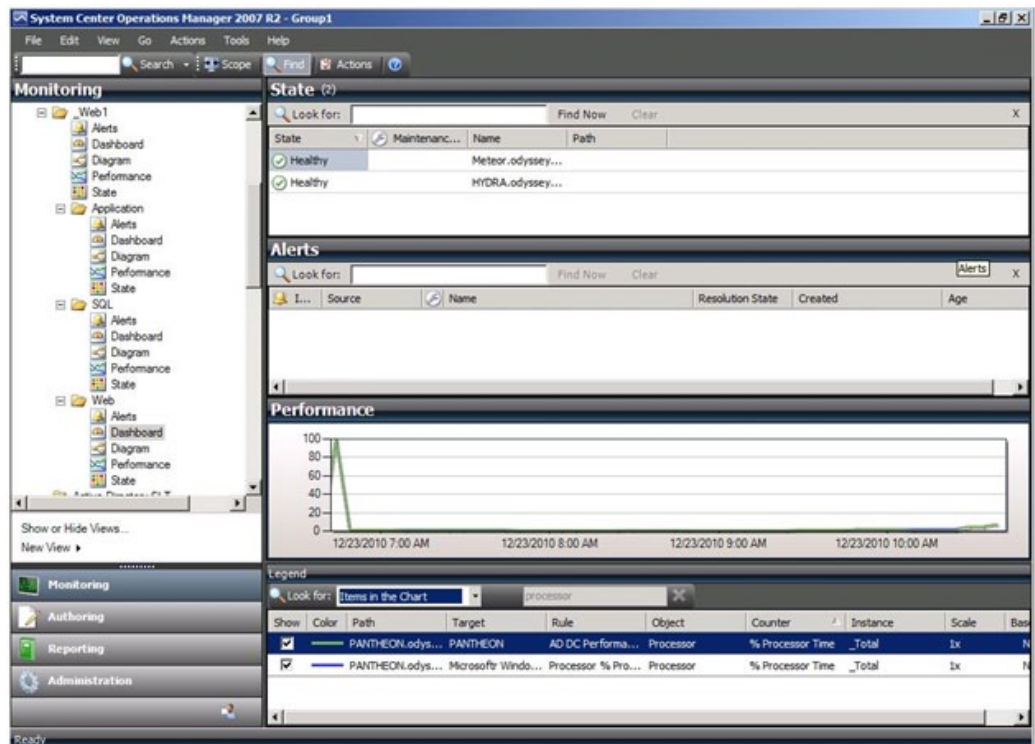
Best practices when tuning in Operations Manager

The following are best practices to consider when tuning Operations Manager:

- *Use classes where possible:* If a class already exists which meets your requirements use the class instead of a custom group (unless you need to create the group for other reasons such as customizing the user experience). A discussion on this is available at on the OpsMgr Unleashed book blog. [[When to use classes or groups for Overrides](#) in the reference URLs]
- *Target overrides to a group versus an entity:* Target overrides to a group when possible. Using groups allows these overrides to be portable so that they can be moved between Operations Manager environments. This approach also minimizes the number of overrides required through gathering similar systems and applying a single override to the group.
- *Use dynamic groups when possible:* Static groups require maintenance to add and remove members of the group as agents are deployed or removed from the environment. Dynamic groups do not require this added maintenance.
- *Microsoft best practices on overrides:* You can view Microsoft's best practices on overrides [here](#).
- *Create groups for entities which are relevant to your environment:* Groups can contain any type of entity – not just servers. Once the IIS Management Pack has been installed Operations Manager automatically provides an alert when the default application pool or default web site is not running. While removal of these websites and application pools are the recommended approach, instead you can generate a group which contains the entities which match the name and then disable the monitor for that group of entities. A discussion of how to tune the IIS management pack to ignore the default items in the reference URL's. [[Tuning the IIS MP to ignore default items](#) in the URL reference section.]

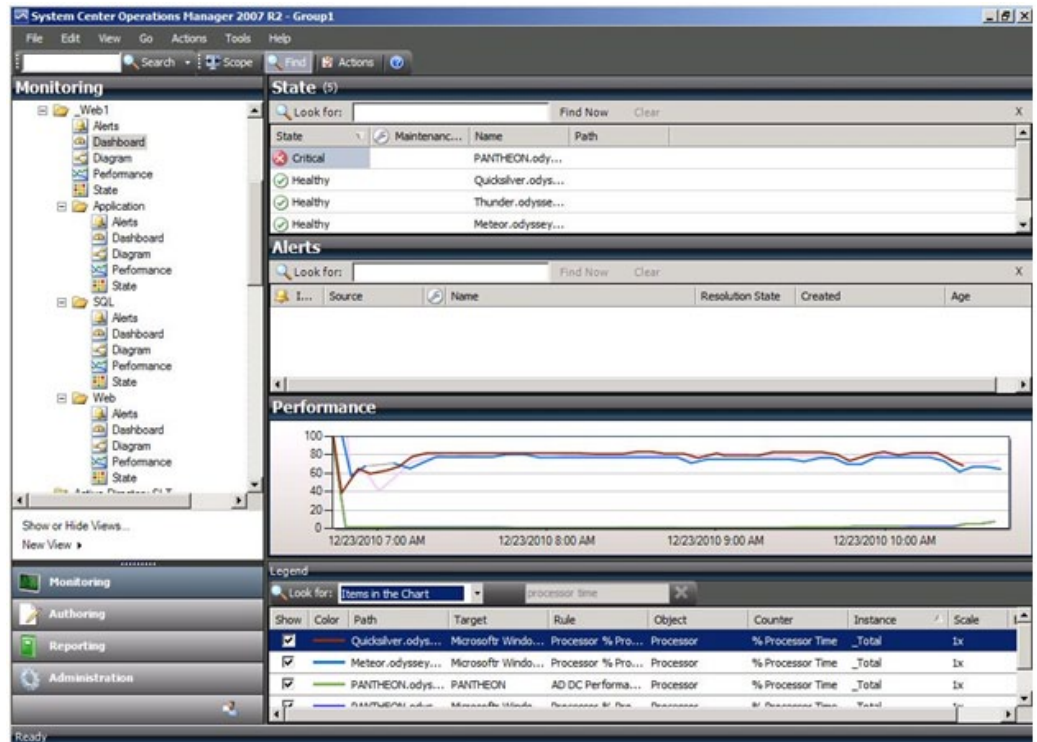
Grouping and targeting the Operations Manager console

Now that we have created the groups for our Web1 application we can now use these to customize the user experience. For our Web1 team we create a top level folder which contains all of the servers, and sub-folders which are restricted into the application, web and SQL pieces of the Web1 application. The screenshot below shows the folder structure where each of the different pieces has views created (Alerts, Dashboard, Diagram, Performance, State) which are restricted to their appropriate group. The following screenshot shows two of the web servers in the farm including their state view, alert view, and performance view (with the % Processor Time counter shown for each server).

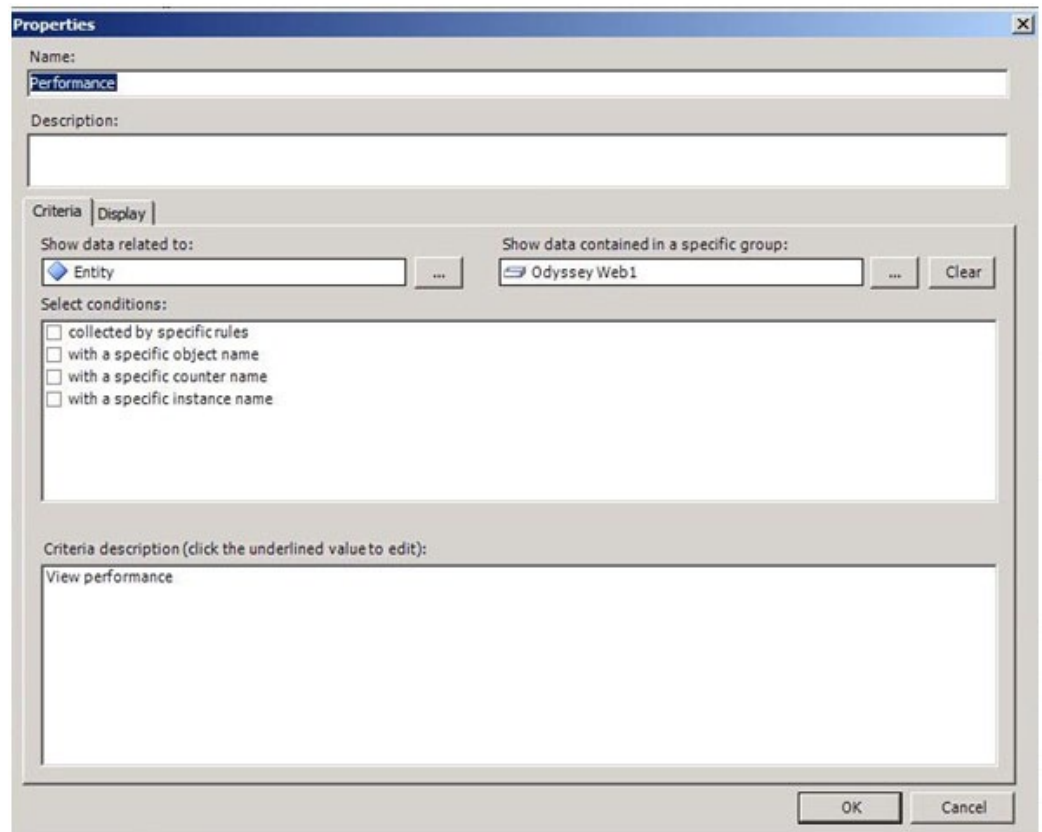


The top level folder also has the same views provided on each of the pieces of the Web1 application but the top level folder views are restricted to the top level group. This results in a view which displays all of the servers that are in the Web1 application as shown below. This approach provides an easy way to identify overall trends (such as processor utilization as shown below in the Dashboard view for all servers in the Web1 application).

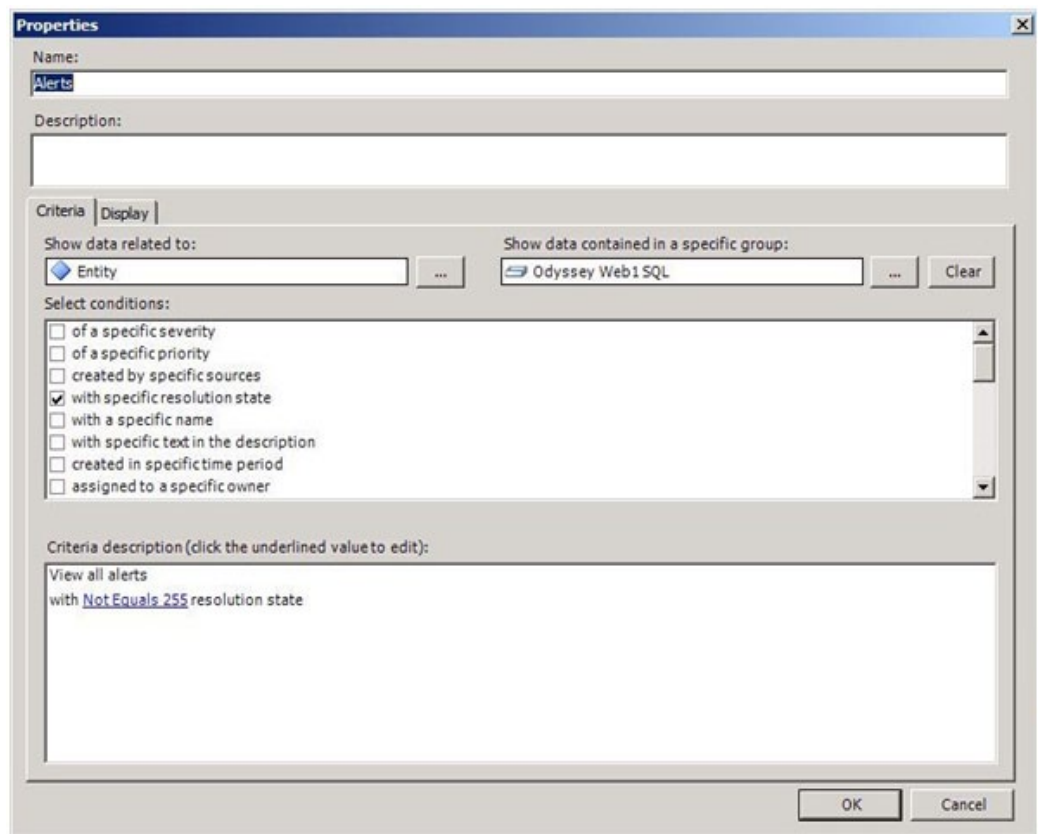
How to Manage System Center Operations Manager 2007 R2 using Groups



The Dashboard shown is built from the State, Alerts and Performance views within the top level folder. These views are restricted to the Odyssey Web1 group when they are created. The configuration to restrict a performance view to a group is shown below.



The Dashboard shown is built from the State, Alerts and Performance views within the top level folder. These views are restricted to the Odyssey Web1 group when they are created. The configuration to restrict a performance view to a group is shown below.



Using groups and subgroups in this way provides us with an intuitive approach which provides a more user-targeted console experience. This approach also increases the capabilities for the teams that monitor applications within Operations Manager. For more details on how to use groups to restrict the views in Operations Manager see the reference URLs section of this document [[Custom Groups in Operations Manager](#)].

Operations Manager can also use groups to simplify the process to generate reports. In the example below, the Configuration Changes Report was configured and run to use the top level group that was created for our Web1 application (Odyssey Web1). This report displays the configuration changes which have occurred for any servers contained within the group specified (such as the DNS Zone change that occurred).

How to Manage System Center Operations Manager using Groups

The screenshot shows the 'Configuration Changes Report' interface. The report is for the group 'Group1' and covers the period from 'Yesterday 10:49 AM' to 'Today 10:49 AM' in '(GMT-08:00) Pacific Time (US & Canada)'. The report details changes for the 'DNS Zone: odyssey.com (PANTHEON.odyssey.com)' and the 'Folder: C:\MyShare'. A table shows a change in the 'Serial Number' property of the DNS zone.

Date Time	Change	Property	Old value	New value
12/23/2010 9:10:26 AM	Change value	Serial Number	866	875

Many different reports can use groups to specify which objects to report on in Operations Manager. The Availability Report (shown below) provides up/down availability monitoring. In the example shown below, the availability report is configured to only show objects which are part of the Odyssey Web1 SQL subgroup.

The screenshot shows the 'Availability Report' interface. The report is for the group 'Group1' and covers the period from 'Yesterday 10:50 AM' to 'Today 10:50 AM' in '(GMT-08:00) Pacific Time (US & Canada)'. The report details availability for 'Odyssey Web1 SQL'. A table shows uptime and downtime percentages and times for various objects.

Object	Uptime (%)	Downtime (%)	Uptime (times)	Downtime (times)
Windows Computer: Quickilver.odyssey.com	7.23 %	92.77 %	1:44:10	22:15:50
Group1	Availability Tracker			
Windows Computer: Thunder.odyssey.com	94.66 %	5.34 %	22:43:07	1:16:53
Group1	Availability Tracker			

Reports such as these can also be configured to deliver (via email or to a file share location) to the owners of these applications. This approach provides the application owners a consistent set of reports which are specific to the servers which are relevant to their application.

Adapting through using groups

As discussed earlier in this white paper, dynamic groups update as new entities are identified which match the criteria for the group. As a result, as new entities are identified the group members change and the overrides which were applied to the group now apply to the new entity which became a member of the group. This is just one aspect of how a group can be used to adapt to changes in an Operations Manager environment. For another example we can look to how disk defragmentation monitoring occurs in Operations Manager.

In Operations Manager the Windows Server monitoring management pack performs an assessment of the fragmentation level of the drives in a server on Saturday at 3:00 am by default. If the drive is found to be fragmented a monitor is set to a warning level indicating that the drive should be defragmented. There is a task in the management pack which can be used to run a defragmentation of the drive but with large numbers of servers and fragmented disks in an environment it would take a lot of time and labor to use this task to perform the defragmentations required. The management pack also includes a recovery that can occur when the monitor changes from healthy (green) to warning (yellow). This recovery can be configured to automatically perform a defragmentation when the monitor changes state. Most organizations are not comfortable with activating this override for all servers but they may be interested in automating this process for development servers in an environment. We can create a dynamic group that matches based either on an attribute which is common for the development servers or based upon matching a naming convention for development servers. Once we have created this group we can create an override that causes this recovery to automatically occur for the group we have created. The result is an automated process which will attempt to defragment drives which are on servers that are part of the development environment. There are several additional steps which would be required to fully automate this process. For more details reference URLs at this end of this document labeled "[Using Green Machine to Reset Logical Disk Fragmentation and Automate Defragmentation of servers in OpsMgr](#)".

The Veeam Management Pack includes PRO Tips (Performance and Resource Optimization). PRO Tips can detect conditions such as high resource usage for an ESX host and perform an automated migration of a virtual machine to a less utilized ESX host. PRO Tip migration for resources is another example of how Operations Manager can adapt to changes which occur within your environment. Operations Manager is extremely powerful especially when combined with dynamic groups and diagnostics and recoveries.

Summary:

Using groups effectively in Operations Manager can customize the OpsMgr console for your users, provide more actionable alerting and can automatically react to changes in your environment. Using groups in these ways will go a long way towards taming an Operations Manager environment. In the second part of this white paper series we will discuss tuning processes and distributed applications in Operations Manager. In the final part of this series we will discuss subscriptions and how they can be used to provide more actionable alerting in Operations Manager.

About the Author



Cameron Fuller is an Operations Manager Most Valuable Professional (MVP) and a Principal consultant for Catapult Systems, an IT consulting company and Microsoft Gold Certified Partner. Cameron is the co-author of *Microsoft Operations Manager 2005 Unleashed*, *System Center Operations Manager 2007 Unleashed*, *System Center Operations Manager 2007 R2 Unleashed* and a contributor to *System Center Configuration Manager 2007 R2 Unleashed*. Cameron presents at the Microsoft Management Summit (MMS) and TechEd, writes for various technical blogs, and has written articles for Windows IT Professional and TechNet magazines.

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