CA Spectrum®

Service Manager User Guide

Release 9.3

CA Technologies Product References

This document references the following CA Technologies products:

- CA Spectrum®
- CA Spectrum® Service Manager (Service Manager)
- CA Spectrum® Report Manager (Report Manager)
- CA Spectrum® Modeling Gateway Toolkit (Modeling Gateway)

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Contents

Chapter 1: Introducing Service Manager

This section contains the following topics:

About Service Manager

CA Spectrum Service Manager is a tool that provides the capability to monitor and manage IT infrastructure based on the business services that it provides. Rather than managing a collection of network devices, servers, and applications; you will be able to organize and manage these elements based on how they provide or support specific services. CA Spectrum service models offer you visibility into how these infrastructure elements affect the availability of the business services upon which you rely! This visibility aids in prioritizing infrastructure faults based on their impact to business services, and highlighting weaknesses in the environment.

The Service Manager application includes a comprehensive set of tools for creating, managing, and monitoring business services, Service Level Agreements (SLAs), and service customer models in CA Spectrum. Leveraging CA Spectrum fault-management capabilities, Service Manager provides real time and historical insight into the status of your service management components. It also provides a suite of reports for all service management components which can be generated with the CA Spectrum Report Manager application.

You can manage and monitor Service Manager components in the following interfaces:

- The OneClick Console provides administrative personnel complete access to Service Manager configuration editors and service management models.
- The Service Dashboard provides service providers and customers access to status views of service management models and service outage management tools.
- The Service Level Manager portlet, which can be incorporated into the Unicenter Management Portal (UMP), provides summary status information on services, SLAs, and customers to Unicenter users with security access to Service Manager models.

Service Manager lets you extend your infrastructure management capabilities beyond the per-device and per-application level. It provides you with the tools to build mechanisms that let IT-service providers and customers validate service availability and performance.

Services

A CA Spectrum service is a model that represents some logical business service. For example, a router model represents the status of physical device similarly, a service model represents status of the business service.

A service model contains a set of resources and a policy indicating the behavior of resources. Service resources are other CA Spectrum models which collectively provide or support the availability of a business service. A service is only available when its resources are available. In turn the service model monitors the availability of its resources to determine its health or availability. By applying the collective resource availability to its service policy, the service model can depict the real-time health of the business service it represents.

A service model differs from other types of models in CA Spectrum. To confirm this information, perform the following actions:

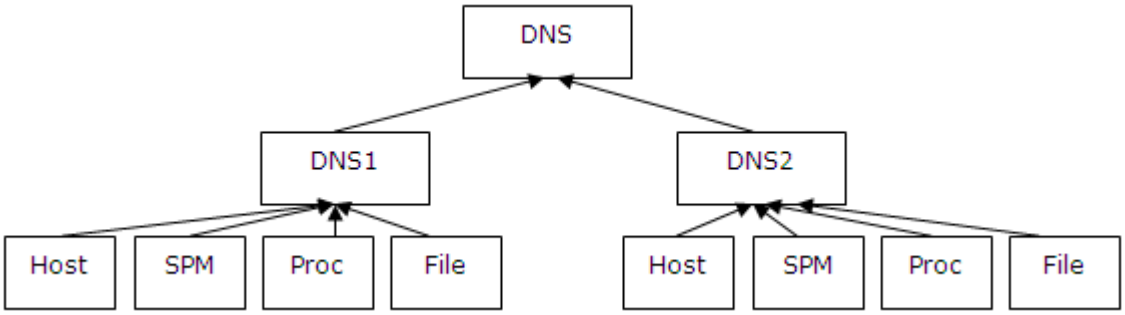
- Consider some of the patterns that are common in IT management. For example, redundant devices, hot swap back ups, load balanced servers, clustered or pooled resources.
- Verify how these patterns are used to support specific business services. One of the oldest and most common business services is DNS. The critical nature of DNS lets you deploy multiple DNS servers. DNS improves performance and also mitigates the risk of DNS failure.
- Represent the real-time status of the DNS service in an environment with two servers that are dedicated to DNS. Monitor the servers themselves as host models in CA Spectrum. The host model lets you understand the situation if contact is lost to the server and provides information about a number of other potential system faults. You can create SPM tests to validate that each server is responsive. You can also monitor critical processes or file systems on the servers.

Availability of DNS

DNS is available when both servers are functioning. If one of the servers is down, DNS is still available. However, DNS is not available when both the servers are down. The host models, SPM tests, monitored processes, and file systems are all individual models, any of which can fail and produce an alarm. You can view alarms to determine the availability of DNS which can become complex and error prone with this small set of models.

You can manage this complexity using CA Spectrum Service Manager. Using service models, you can organize the host models, SPM tests, processes, and file systems to represent the DNS service and express the availability of that service.

The following diagram illustrates the process to implement DNS in CA Spectrum Service Manager.



Service Policy

In addition to the resources that constitute a service, each service specifies a policy that infers a service viability (its service health) based on the collective status of its resources. The role of the service policy is to create an accurate representation of the service health that is based on health of the resources that comprise the service. The objective is to ensure that the health indicated by the service model in CA Spectrum reflects the performance of service. Selecting or creating the appropriate service policy is essential to ensure that service health is accurately represented in CA Spectrum.

A policy specifies a single attribute to monitor for the collective set of service resources. The policy is comprised of two basic components, the Attribute Map and the Rule Set. The Attribute Map associates resource attribute values to service health values. The Rule Set defines what the health of the service will be given a set of resource health values.

A service can also include one or more resource monitors instead of a single policy. Each resource monitor can use its own policy extending the monitoring capability of the service.

A number of policies are shipped with CA Spectrum Service Manager which represent common resource monitoring patterns. If applicable, you can use these policies and also familiarize yourself with the creation of custom policies. The use of custom policies can be necessary to verify the accuracy of health that is represented by the service model.

Customers

A CA Spectrum Customer model or Customer represents any person or an organization that uses services or is a party to a Service Level Agreement (SLA). CA Spectrum Service Manager lets you associate customers with the services and SLAs to monitor the service management components on a per-customer basis.

SLAs

A CA Spectrum SLA model, or *SLA*, comprises one or more service *guarantees* that specify the service obligations stipulated in an SLA contract for a particular time period (for example, week, month). Service Manager lets you specify the following two types of guarantees:

- Availability
- Response time.

Both types of guarantees record service outage time and compare it against a user specified threshold for a period. Availability guarantees also support supplemental thresholds (Mean Time to Repair, Mean Time Between Failure, and Maximum Outage Time).

You can create SLAs from scratch or you can create SLAs from SLA templates and associate multiple SLAs with a single service and multiple customers with an SLA.

Service Health Values

A *service health* value indicates the viability of a service, whether it is operating at an acceptable or less than acceptable level or is essentially inoperable. Service Health also indicates whether a service is in maintenance mode or is in an initial state if the service has no resources.

The following table lists and describes service health values and corresponding CA Spectrum alarm states.

Service Health	Description	Icon Color
Up	The service is operating normally.	Green
Down	The service is unavailable. The service is experiencing a critical outage.	Red
Degraded	The service is available but operating at a limited capacity. The service is experiencing a major outage.	Orange

Service Health	Description	Icon Color
Slightly Degraded	The service is available but operating at a slightly diminished capacity. The service is experiencing a minor outage.	Yellow
Maintenance	The service has been put into maintenance mode and is not actively monitoring resources. The service is experiencing a maintenance outage.	Brown
Loss Of Management	The SpectroSERVER has been shut down. The service is experiencing a loss of management outage.	Gray
Defunct	The service has a configuration error. The service stays in the nonfunctional state until the error has been corrected.	Blue
Initial	The service has no resources associated with it. The service stays in an initial state until resources have been associated with the service.	Blue

Service Management Features

CA Spectrum Service Manager includes the following features:

- Views that let you monitor the health of services in real time and relate the services to customers affected by IT infrastructure faults.
- Service health records that provide the basis for reports that you can generate on a scheduled or on an on-demand basis using Spectrum Report Manager.
- SLA violation alarms that notify you when an agreement has been violated or is in danger of being violated.
- Root cause analysis of any service degradation (in terms of infrastructure alarms).
- The capability to designate maintenance periods for services.
- The capability to exempt any service outage from impacting an SLA.
- Extensions to Modeling Gateway that let you create service management components and schedule service maintenance through an XML feed.
- A web page that is added to UMP for viewing service management-related information.

OneClick Licenses and Service Manager Privileges

To access Service Manager from the OneClick Console, OneClick administrator privileges or operator license is required. To access the Service Dashboard, Service Manager license is required. For more information, see the *Administrator Guide.*

The following table compares license types and the default roles and privileges that are associated with them:

OneClick License	Default Role	Default Privileges
Operator	OperatorRW	Ability to update service descriptions and view service information and the Service Management hierarchy in the OneClick Console.
Administrator	AdministratorRW	Ability to create and edit services, customers, and SLAs with Service Editor, and create and edit policies, attribute maps, and rule sets with Service Policy Editor.
Service Manager	ServiceManagerRW	Access Service Dashboard.

More information:

The Service Dashboard (see page 147)

Service Manager Installation Considerations

Important! Service Manager must be installed on both the SpectroSERVER and OneClick servers.

Review the following Service Manager installation considerations:

- The modeling catalog and all modeling intelligence exist within SpectroSERVER.
- The historical database and event handling code exist on the OneClick web server which is installed with OneClick.
- All the client UI components and dashboard are installed with OneClick.
- If you have a separate OneClick installation for Spectrum Report Manager, install Service Manager on that server to populate the Service and SLA reporting tables.

Plan Service Management Implementation

To benefit fully from Service Manager's capabilities, you should carefully plan your service management implementation. You should contemplate the following questions and considerations:

- What business services do you want to monitor?
- What particular resources — processes, software applications, and IT devices — support those services?
- How can conditions and faults that affect services be detected? Which resource attribute(s) should be monitored to determine the health of a service?
- Who should be notified if a service fails?
- What are the service performance obligations, and how should they be quantified?
- What is the criticality of a given service relative to other services?
- Consider implementing a Service Manager solution as an iterative process. In the initial phase concentrate on obvious resources and obvious faults. Answer the question: the service won't work if _____ is down. This will give you a good foundation for enhancing the service at a later time.
- Identify common sub services or foundation services. When you find that multiple services all rely on a common set of resources group those resources in their own service, and make that service a resource of higher level services that depend on it.
- Create empty services in cases where you know a service exists, but you don't yet understand the resources that comprise it. These services left initial are important because they represent areas of infrastructure that are not well understood, and need to be explicitly monitored.
- Build your services such that they can be easily enhanced. Rather than services which directly monitor resource models such as devices and applications, build services using resource monitors. It's very easy to enhance these services in the future by adding new resource monitors without having to change the overall structure of the service.

Service Manager Utilities

You can work with the following utilities to create and manage the Service Manager components:

Service Editor

Lets you create and manage services, SLAs, SLA guarantees, SLA templates, SLA guarantee templates, customers, and customer groups.

Service Policy Editor

Lets you create and manage service monitoring policies and their constitute components, attribute maps, and rule sets.

Condition Correlation Editor

Lets you build correlation domains to monitor resources for specific resource events or combinations of events. These correlation domains can then be used as service resources, extending the monitoring capability of the service from attribute monitoring to event monitoring.

Open the Service Editor

The Service Editor is the primary administrative tool for configuring service models, SLAs, and Customers. The Service Editor displays service models in a flat list or in a hierarchy view. From the Service Editor, you can create new service models or can edit existing service models.

Follow these steps:

1. Select the OneClick Console or the Service Dashboard.
2. Click Tools, Utilities, Service Editor, from the main menu.

   Note: The Service Editor is not available if you do not have access privileges or the OneClick installation does not include the Service Manager product.

   The Service Editor opens.

Open the Service Policy Editor

The Service Policy Editor lists service monitoring policies and policy specifications and includes commands for creating and managing policies. It lets you create and manage policies and their constituent components, attribute maps, and rule sets.

Follow these steps:

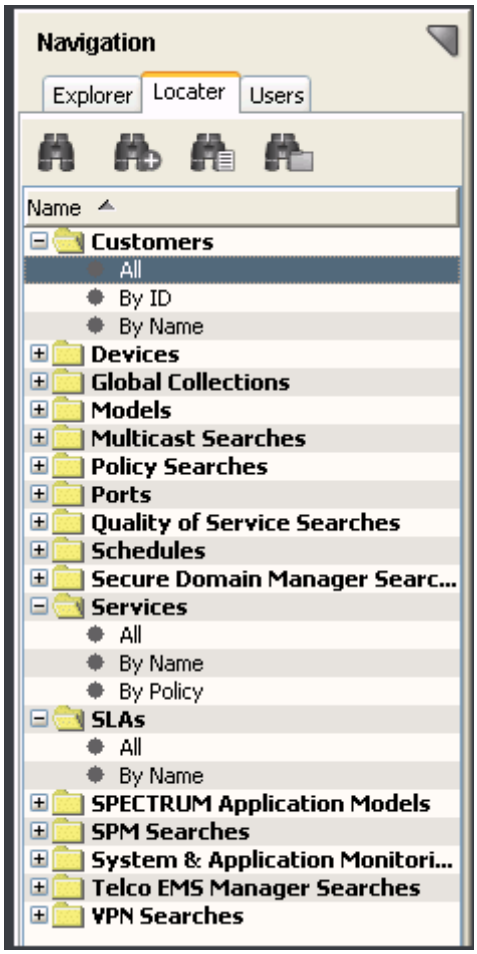
1. Select the OneClick Console or the Service Dashboard.
2. From the main menu, click Tools, Utilities, and Service Policy Editor.

   Note: The Service Policy Editor is not available if you do not have access privileges or the OneClick installation does not include the Service Manager product.

   The Service Policy Editor appears.

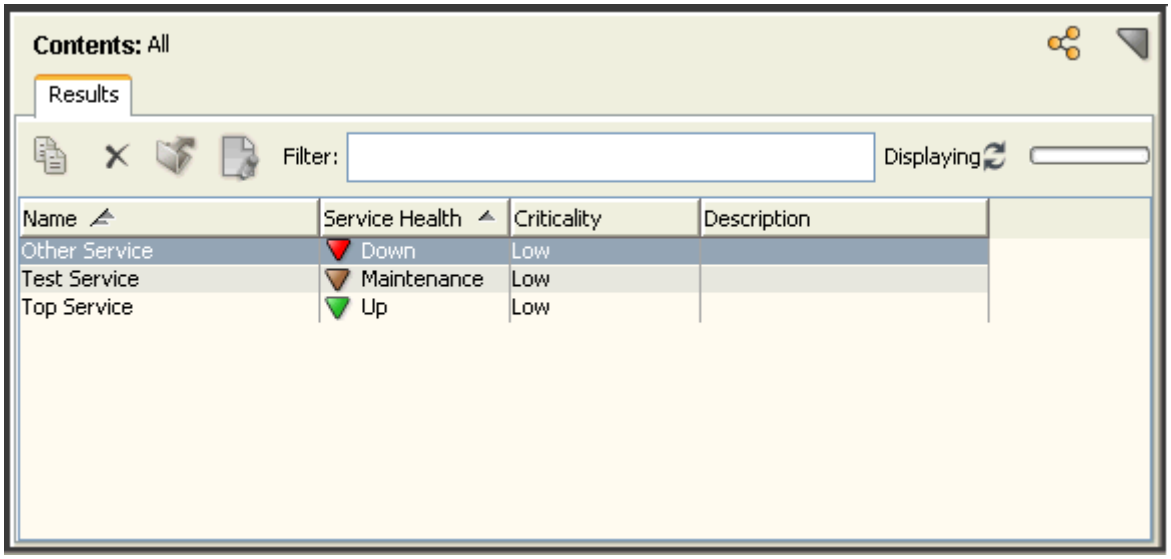
Locating Service Manager Components

You can locate and display services, service customers, and SLAs in the Locater tab of OneClick Console Navigation panel. Search can be initiated from Customers, Services, and SLAs folders, as shown in the following image:

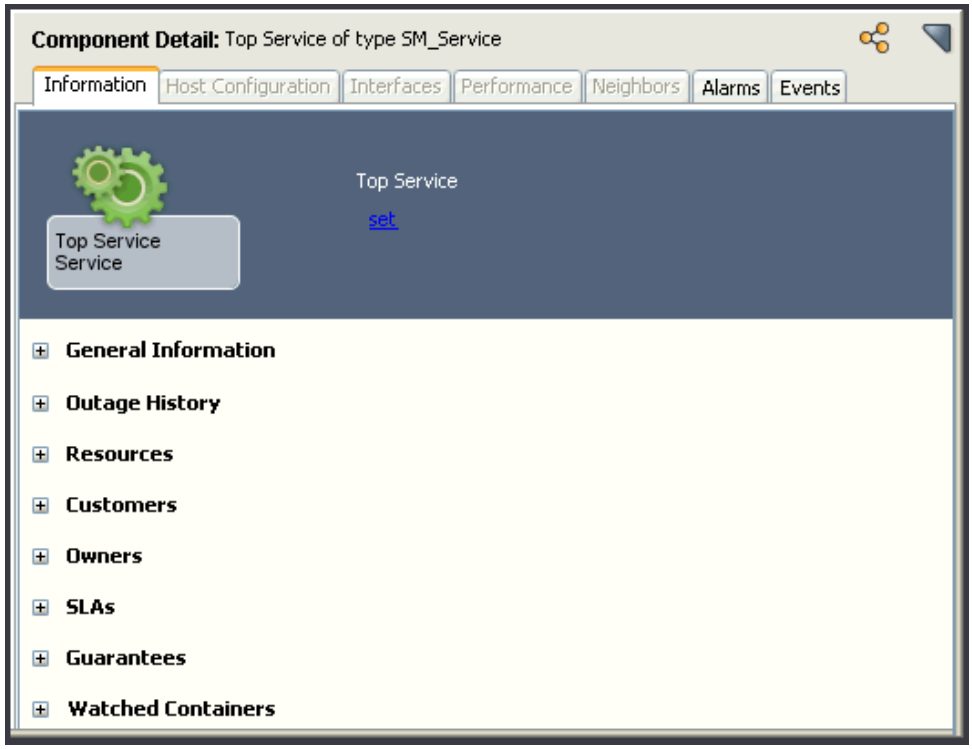


This facilitates tracking of Service Manager components in a distributed SpectroSERVER environment. For more information, see the *Operator Guide*.

Search results appear in the Contents panel of OneClick Console , as shown in the following image:



Details about all aspects of the selected entry are displayed in the Component Details panel, as shown in the following image:



Roll-Up Indications for Service Manager Models

The Service Management tree consists of a set of four models. The root model is the Service Management model, which contains three top level manager models the Service Manager, Customer Manager, and SLA Manager models. These top level managers organize all of the user created service management components. All service models will be organized under the Service Manager model which is displayed in OneClick with the name Services. Likewise all SLA models and customer models will appear under SLAs and Customers.

The Condition of each of these manager models is equivalent to the worst status of all contained models. For example if the worst service within the landscape has a service health of Degraded, the Service Manager model on that landscape will have a Condition of Major. If the worst SLA within the landscape has a SLA Status of violated the SLA Manager will have a Condition of Critical. The Condition of a manager model is seen only by the icon color. There are no alarms associated to the Condition of the manager models.

Within the Service Dashboard all landscapes are merged into a single tree in the Explorer panel. Within the service dashboard a set of folders represent the collective set of manager models from each landscape. Regardless of how many landscapes occur within a DSS the Service Dashboard displays only one folder for each category of manager model. These folders have the same names as the set of models within the SpectroSERVER: Services, Customers SLAs. The icon for each folder will show the status of the worst top level model within the DSS. If the worst Service Manager status within the DSS is Minor, the Service Folder in the Service Dashboard will show a yellow icon. Likewise if a Customer Manager within the DSS has a Condition of critical, the Customers folder in the Service Dashboard will have a red icon.

Service Manager Component Views Outside of the OneClick Console

You can view Service Manager components outside of the OneClick Console from the following interfaces:

Service Dashboard

The Service Dashboard is a service management only view. It provides visibility to the real time status for all Services, Customers and SLAs. The Service Dashboard provides OneClick like console with an Explorer tree, component detail view, and topology view. In addition the Service Dashboard provides some historical service management views including service outage history, and SLA/Guarantee trending. The dashboard is designed for anyone who is interested in monitoring Service Manager components, and enforces CA Spectrum model security.

Unicenter Management Portal

CA Unicenter users can view summary information about Service Manager components by adding content from the Service Manager portlet. The Service Manager portlet displays flat lists of service models, customer models, and SLAs models. The Service Manager portlet also provides context launching to the OneClick Console or Service Dashboard.

Chapter 2: Creating and Managing Services

This section contains the following topics:

Service Management Solution Design Guidelines

The key to a successful service management deployment is accuracy in service modeling. The goal when designing services should always be to create the most accurate representation possible. Given that objective, it is often the case that you will not fully understand how each service functions, and all of the resources upon which that service relies. Undoubtedly one of the most challenging aspects of building a service management environment is collecting all of the information required to model each service. As you approach this task recognize that you will require a significant amount of collaboration to insure that you create accurate services.

It's very rare that a single individual has all the information required to build a large service management environment. In most businesses, different teams specialize in different areas of the business each focused purely on their own domain. Ironically it is this typical business structure that creates the need for a service management solution. In fact the more difficult it is to build the service management environment, the greater the need for doing so.

The following section outlines some guidelines for planning and building a service management solution. You should realize that its takes time to plan and to model a large and complex service management environment. Investing the time to collect information and development a plan for building the service management solution will help to insure your success. Part of your plan should include incremental goals, identifying a timeline and milestones for the project. These might include a representation of services for each organization, perhaps a demonstration of how specific infrastructure faults are now processed and prioritized base on service impact. Establishing these milestones will allow you to realize value throughout the process, and will motivate you to continually expand your solution.

One final note on planning is to recognize that you're building a service management solution that must continue to evolve. You're plan may identify a time and point of completion, but that does not mean you will never again have to create or edit a service model. Business infrastructure is continually changing, and you will undoubtedly find that services change too. Your goal should be to build a service management solution that is flexible and easy to maintain. Doing so will insure that your solution can accommodate the dynamic nature of your business.

Service Model Identification and Creation Guidelines

Perhaps the most daunting task you will face is determining where to start creating your service management environment. There are a number of techniques; top down, bottom up, most critical first, etc. Regardless of which technique you choose there are some guidelines to follow that will help you to be successful.

The first step is to define a phased approach. Before creating any service models you should have developed a multi phase plan. The goal of this plan to two fold. First a plan will help you manage the complexity of creating a large environment. Second a plan will insure that you receive incremental value throughout the deployment process. It is important that you are able to recognize value from each service that you create and consequently from each phase of your deployment.

Each environment is different, but the following three phase deployment plan may work for you, or can be adapted to fit your environment.

Phase I: Build a Service Hierarchy Reflecting Your Business Environment

Phase I focuses on the building all of the major services, and establishing the service hierarchy which reflects your business environment. This phase will produce all of the high level business related services, as well as many of the lower layer services upon which they rely. Phase I implementation will not provide a comprehensive solution that encompasses all possible service faults, but will create a hierarchy which shows the services each organization relies upon and the impact those services have on the overall business.

Keep in mind that throughout this process you are likely to identify services with which you are not familiar and for which you cannot determine resources. This is fine, there is nothing wrong with creating an empty service. In fact defining empty services can shed light on areas of the business or infrastructure which are not well understood. These tend to be the areas in most need of a good service management solution.

Generally you can start identifying high level services by listing different organizations within your business environment. If your business is a service provider this may include different customers, and core service components shared by those customers. If you are working in an enterprise environment often you can simply list the different departments within the business. These departments can frequently be considered high level services. You may even be able to identify dependencies within these high level services.

Once you have determined the high level business specific services, think about what services they rely on. This next tier of services will commonly be associated to specific job functions within an organization. These services may be related to specific applications, specific data, and perhaps specific security access. You will likely identify a variety of specialized services as well as some shared services.

Once you have identified the services upon which various organizations rely, consider the requirements for providing those services. At this level you may start to identify servers for applications or databases. Depending of the nature of these services you might recognize specialized service hierarchies, as well as application interdependencies.

You've now defined a broad set of services which are critical to various job functions. This will allow you to look for shared component services that these job function services require. Regardless of the variety of applications or access areas you will find that there are many common services that provide the foundation for the specialize services. At this level you see common networking or domain management services like DNS and DHCP.

Finally, determine the shared network resources upon which all higher level services rely. You'll locate core areas of networks which managed traffic and control access. These core services ultimately impact virtually all other services which you have identified.

At this point you've probably collected enough information to start creating service models. For this initial phase of service creation focus on the most obvious resources and obvious faults. The goal of this phase is not to create completely comprehensive services, but rather to establish the broad service hierarchy which depicts how the business functions.

It's easy to fall into the trap of trying to define a perfect service that covers all possible resource faults. The problem with doing so is that you quickly get mired by complexity, and will require assistance from domain experts who understand the intricacies of each service. This will consume a lot of time, and can stall the process of building the overall service hierarchy. You will be able to revisit each service in subsequent phases and will have the opportunity to refine the resource monitoring capacity to handle the more complex fault scenarios.

As a guideline for determining resources for the first phase complete the following statement: "The service won't work if _____ is down". The obvious answers to this question will be the resources you should monitor for the first phase. Take care not to dwell on all of the potential resources, just create the service with the obvious resources and move on. The vast majority of your services for phase I will have other services as their resources. Again you may determine that one service relies on another service, but not understand how the other service works. That's fine create the empty service and move on.

Phase I is complete when you have built a service hierarchy which reflects your business environment. This is a good opportunity to consult with others and validate your overall design. The hierarchy you've created will serve as the baseline for subsequent phases.

Phase II: Add Significant Resource Monitoring Capacity

The goal of phase II is to increase the accuracy of your service models. Increasing accuracy means two things:

1. Adding resource monitoring capacity to encompass more potential faults, and eliminating resource monitoring configuration which may produce false service outages.
2. Enhancing your resource monitoring capacity such that you can identify various levels of service degradation instead of simply showing that a service is Up or Down.

Typically in phase II you will revisit the lower layer services which you created in phase I as well as any empty services identified in phase I.

For phase II you will be expanding many of the lower layer services, by adding new resource monitoring capacity. Refine the resource statement to include more subtle faults:

- The service won't work if _____ is not available
- The service won't work if _____ is not responding
- The service won't work if _____ is not running
- The service won't work if _____ is not found

- The service won't work if _____ is slow
- The service won't work if _____ is at maximum capacity

To help identify resource faults which will degrade service health consider statements like this:

- The service will be slow if _____ is down
- The service may not work if _____ is not available
- The service can not perform these functions if _____is not accessible
- The service will not be able to handle all requests if _____ is at maximum capacity

In phase II you will start adding monitoring capability for system resources, performance statistics, and response times. You may refine the existing service resources by identifying more discrete resources, such as the specific interfaces that a service relies instead of simply the devices.

In addition to monitoring the Condition or status of resource models you may add new resource monitors to evaluate the value of other attributes which express the performance of a model.

Throughout phase II you will likely identify many new service models which encompass subtle, but critical pieces of functionality upon which other services rely.

Look for dependencies between services particularly where an application server relies on another application. Look for areas where network configuration is critical to data processing for security access or quality of service.

Once again take care not to go too deeply into the intricacies of each service. Limit your phase II enhancements to the type of refinements common to many services. For example, regardless of the application system resources will affect availability. Additionally, poor response time between various parts of you network will impact many higher level services.

In particular do not yet expand resource monitoring to include application specific detail. This type of monitoring will be addressed in Phase III.

Phase II is complete when you have added significant resource monitoring capacity. With the exception of specific application faults your solution should now be able to correctly process a much wider set of enterprise faults. Likewise your solution should also be able to report various levels of service degradation.

Phase III: Ongoing Refinement

Phase III can be considered the ongoing phase. Regardless of how complete the solution may seem there is most likely some potential to further refine it. During phase III you will extend your resource monitoring capacity to the most complex resource faults. It's difficult to define an end point for phase III, but one guideline is to consider the resolution process. If the resolution process is the same regardless of the fault your monitoring capacity is granular enough. It's tempting to continually add new resource monitors for very specific types of faults, but this is only useful if the course of action will be different for each fault

Depending on your level of expertise this is also the phase where you are most likely to require the collaboration of other domain experts for specific services.

When dealing with application based services collect information about the application specific resources that can be monitored. These may include specific processes, files systems and log files. Add new services and resource monitors for these various aspects of the application. Also add monitoring for specific connection ports, and where possible specific transactions.

Also as part of phase III add monitoring capacity for configuration changes. This might include monitoring of network configuration policies, and server configuration utilities. Look for configuration changes that may degrade or otherwise impact services.

Whenever possible include monitoring of user access and security mechanism for different applications or networks.

Look for scenarios where a service is impacted even if no specific fault occurs on the service resources. Also look for instances where a service is impacted differently depending upon a combination of resource faults.

You can again refine the service resource statements to look for additional types of faults:

- The service won't work if the _____ process is not running.
- The service won't work if _____ is restricting access.
- The service won't work if the _____ queue is full.
- The service wont' work if the _____ is archiving.
- The service won't work if _____ doesn't authenticate the user.

Each time you add new resource monitoring capacity to a service you are expanding the set of resource faults the service covers. This increases the accuracy of the service.

It's difficult to define when phase III is complete. In all likelihood new resource faults will be discovered which were not previously identified. Ideally your design can accommodate these new faults. Each time a new fault is discovered adapt your resource monitoring such that the next time the fault occurs you can correctly understand it's service impact.

Basic Service Definition

Once you have determined what services to model, you must identify several key properties of each service and characterize the behavior of the service under certain circumstances. This process can be broken down into the following steps:

1. Defining the role of the service
2. Identifying service resources
3. Selecting resource models
4. Specifying the service policy
5. Considering resource failure affects on service health

Defining the Role of the Service

First and foremost is identifying the role of the service model. The service role encompasses the capability and purpose of the service.

The capability identifies what the service is monitoring. Each service model should in some way represent a capability that can be monitored. This capability can be a very tangible process such as an "email" service. Alternately the monitored capability may be more abstract or represent for example a "human resources" service. Regardless of the particular service role you should be able state that the service measures the health of some capability.

Once you have identified what capability is being monitored you should then define the purpose for monitoring that capability. The purpose is simply a statement of what value you expect to get from monitoring the capability. For example many services are intended to provide real-time fault analysis. You may want to create a service to tell you at any time what the health of the email system is. Or a service that will show you the impact of resource faults within your infrastructure. Other services are designed to monitor responsibility or compliance. For example you may a service that monitors server availability to insure that it is in compliance with some specified guarantee. Additionally, some service models are used to represent organizational dependencies such as regional offices, depending on resources from a centralized location.

Determining the role of the service will help you select service resources, specify service criticality, as well as defining service relationships with customers and SLAs.

Identifying Service Resources

Once the service role is defined you will identify service resources. Service resources provide the capability the service is monitoring.

As an example, consider a service with the role of monitoring the real-time availability of a web based application. Most likely the application is hosted by one or more servers. These servers can be considered service resources.

It's important to understand that identifying service resources is an iterative process. It's recommended first to identify the most obvious resources that provide the services capability. Given the example above the servers hosting the web application are the most obvious resources.

Later in the process you will determine how to monitor the services resources. In many cases determining how to monitor one resource will reveal other previously unidentified resources. You must manage the service modeling process and implement your solution in phases. The first phase encompasses the most obvious resources, and higher level faults. Subsequent phases will add additional or more discrete monitoring capability.

Selecting Resource Models

Once you have identified a service's most obvious resources, you will need to determine what CA Spectrum models best represent those resources.

Using the example of a service with the role of monitoring the real-time availability of a web based application; you would start with device models that represent the servers. These are likely to be Host models of some sort in CA Spectrum, or may simply be Pingable models.

Specifying the Service Policy

Having located the set of CA Spectrum models which represent the service resources you will next determine how best to monitor those models. This is the process of specifying the service policy that the service will apply to its monitored resources.

The first part of specifying the service policy is identifying which model attribute can be monitored to best determine the status of the resource.

Choosing which attribute to monitor has a lot to do with the type of resource that is being monitored. If the model is simply a Pingable monitoring its Contact Status attribute would be very reliable. If the resource model is a Port model, monitoring its Port Status might be a good choice. Perhaps the resources of the service are other services. In that case it you would monitor the Service Health of the resources models.

Remember for the first phase of service creation stick to the obvious resources and obvious resource faults. You may identify several attributes which could be used to express the status of a resource model. For the first phase choose the attribute which provides the broadest representation. You can refine the service later by adding additional attribute monitoring, or narrowing the specific faults associated to an attribute.

Most models in CA Spectrum have the Condition attribute. This is the attribute commonly associated to alarms on the model. For example if a model has a major or orange alarm, the value of its Condition attribute will be Major. Condition is often the simplest attribute to use for monitoring a resource. If you cannot identify another attribute which expresses a models status Condition is probably a good starting point.

Note: It's often easiest when creating services to start by monitoring the Condition of the service's resource models. Although this may be a good starting point the value of Condition is often influenced by many different types of outages some of which may not be appropriate for the service.

Considering Resource Failure Affects on Service Health

The next part of specifying the service policy is to consider how each individual resource impacts the service. More specifically consider how the failure of each resource affects the health of the service.

The health of a service model can be expressed by these four values: Up, Down, Degraded and Slightly Degraded. Consider each resource that has been identified, and what the health of the service should indicate if that resource fails.

A fault matrix table can be a useful tool to document how various resource failures should impact the health of a service. The fault matrix is a table with columns for each resource, and a column for service health. Here is an example of a simple fault matrix for a pair of servers that support a web based application. The columns Server 1 and Server 2 contain potential status for each server, the Service Health column contains the logical service health given the status of each Server.

Server 1	Server 2	Service Health
Up	Up	Up
Down	Up	Slightly Degraded
Up	Down	Slightly Degraded
Down	Down	Down

In reviewing the table you can describe the behavior of the service with the following statements:

- If either Server 1 or Server 2 are Down the Service Health will be Slightly Degraded
- If both Server 1 and Server 2 are Down the Service Health will be Down

Stated in a resource independent manner, the following two expressions can be identified:

- When any 1 resources is Down the service is Slightly Degraded
- When all resources are Down the service is Down

In terms of a CA Spectrum service policy these two expressions can be considered rules, and collectively they make up a rule set. The combination of an attribute and a rule set is the service policy.

By first identifying which resource model attribute represents its status, and next identifying a set of rules which describe how each resource impacts service health you have now specified the service policy.

CA Spectrum service manager provides a number of policies out-of-the-box, but you should feel free to create your own polices whenever an out-of-the-box policy does not match the resource behavior you have identified.

At this point you have determined the basic structure of the service, and can model it in CA Spectrum. You might consider this model to be a first phase model. Chances are throughout this process you identified some areas where the monitoring capacity of the service is not quite adequate. As mentioned before service modeling is an iterative process, each phase expands or refines the monitoring capacity of the service to make it more accurate.

The next section refining the service definition covers some of the common issues you will find when first defining a service, and provides some techniques for how to improve your service models.

Refining the Service Definition

Regardless of the role defined for a service model, your goal should always be to create a service such that the health of the service model accurately depicts the logical status of the service. You should strive to eliminate scenarios where the service is logically down, but the service model indicates that it is up. Likewise a service model should not indicate that its health is impacted if logically the service is functioning normal. The following section introduces some techniques for refining your service models. These techniques are best applied in phases. Take care not to make too many enhancements at once. Define a strategy to improve your services, and implement that strategy. Break down the service revision process into multiple phases that can be managed and validated.

There are a variety of reasons why a service models monitoring capacity may be inaccurate. This section will cover a few of these, and discuss ways to improve your service models.

The following are potential scenarios that can affect the accuracy of a service model:

- Missing resource models
- Resource models which are not discrete enough
- Resource faults that shouldn't impact the service
- Service impacting events that don't impact the resource
- Patterns of resource faults which impact services

Missing Resource Models

Perhaps the most common issue when building service models is failure to identify all of a service's resources. The principle for reason for this is that most of the time we identify the resources that are providing the service directly to an end user, and not the capabilities that those resources rely upon.

Continuing with the example of a web based application. Often when focusing on user faces applications we will start with the servers which host the application. This is a great starting point, but you may find that you've missed servers that support the application. Consider how the web application might rely on a database to provide content. Here's how our fault matrix might change:

Database	Server 1	Server 2	Service Health
Up	Up	Up	Up

Database	Server 1	Server 2	Service Health
Up	Up	Up	Up
Down	Up	Up	Down
Down	Down	Up	Down
Down	Up	Down	Down
Down	Down	Down	Down
Up	Down	Up	Slightly Degraded
Up	Up	Down	Slightly Degraded
Up	Down	Down	Down

The table is a bit more complicated, but if you look closely you'll see that with the addition of the Database the previously identified rule set will no longer work. What you can see is that regardless of the status of Server 1 and Server 2 if the Database is Down the service is Down.

This type of pattern is very common, and what you've identified is that the service relies on more than just the web servers it requires an additional resource which behaves differently than the web servers. To support this new set of resources use a new model type called a Resource Monitor.

The job of a resource monitor is to manage diverse sets of resources which do not follow a behavior pattern that can easily be captured in a single policy. A resource monitor is very similar to a service in that it applies a policy to a set of resource values to determine its own health. It might be useful to think of resource monitors as a type of sub-service. A resource monitor by itself does not represent a logical service, but rather a critical aspect of that service.

Let's see how resource monitors could be used in this example. To begin we've already captured the following behavior for the web servers and their relationship to the health of the service.

Server 1	Server 2	Service Health
Up	Up	Up
Down	Up	Slightly Degraded
Up	Down	Slightly Degraded
Down	Down	Down

If we specifically consider how the database impacts the service a very simple matrix can be created.

Database	Service Health
Up	Up
Down	Down

Let's capture each of these patterns into its own resource monitor.

The Database RM will monitor the database resource with the following rule:

- When all resources are down the service is down

The Webserver RM will monitor the web servers with this rule set:

- When any 1 resources is Down the service is Slightly Degraded
- When all resources are Down the service is Down

The service will monitor the two resource monitors, and the service's health will reflect the status of the worst resource monitor. Here's how the fault matrix for the service would look now:

Database RM	Webserver RM	Service Health
Up	Up	Up
Down	Up	Down
Down	Slightly Degraded	Down
Down	Down	Down
Up	Down	Down
Up	Slightly Degraded	Slightly Degraded

From this matrix you can see the following rule set for the service:

- When any 1 resource is Down the service is Down
- When any 1 resource is Slightly Degraded the service is Slightly Degraded

By expanding the service from monitoring the Condition of two host models to instead monitoring the health of two resource monitors we have significantly improved the accuracy of the service model. You may have noticed that the database resource was never referred to as a host model or a database server. This is because the database is likely to be a service itself.

This scenario of missing resources is so common that you should consider it when creating service models. Even if the database server was not identified as a service resource in the initial phase the service could still have been created to monitor a single resource monitor for the web servers. In later phases as additional resources are identified it's very easy to simply add new resource monitors to the service itself.

Resource Models Which Are Not Discrete Enough

Missing service resources is certainly one common cause for inaccurate service model. Another cause for inaccuracy in services model is resource models which are not discrete enough. For the most part CA Spectrum monitors devices at a fairly high level, and reports their Condition based on fairly basic criteria. For example a host model which responds to SNMP traffic and has normal CPU and memory utilization will be considered Up or Normal.

Going back to the web application service example, consider if that very simple host monitoring would be adequate to determine if the web application is working properly. Imagine if on Webserver 1 a critical file system had become full, and on webserver to the actual webserver process was not running. If this were the case the web application service would not be available to users, but the given the basic host monitoring the service model would indicate a health of Up.

You've probably realized that in addition to the host being contactable, there are a number of other aspects that must be monitored to determine if the web application is running. A few common components to determine application status might be: monitoring critical processes, monitoring critical file systems, monitoring application connectivity and response time.

If we take a closer look at each web server we might define a fault matrix that looks something like this:

Host	Process	File System	App Connection	Service Health
Up	Up	Up	Up	Up
Down	Down	Down	Down	Down
Up	Down	Up	Down	Down
Up	Up	Down	Up	Down
Up	Up	Up	Down	Down

In the abbreviate matrix above we can see that in order for the web server to be considered up, we must consider more than just the host model. There is a webserver process, a critical file system, and the web application must also be responsive to connections and requests.

You can see that rather than simply a host model each webserver is actually a service in and of itself. With the example shown above you can envision a service with three resource monitors

The Host RM, simply monitors the Condition of the host model. The Proc and FS RM monitors the Condition of a process model, and a file system model. The App Conn RM monitors the status of a series of response time tests which send requests to the server.

At first given that the Host RM and the Proc and FS RM are both monitoring the Condition attribute you might want to combine these into a single resource monitor. It is however a good idea to separate these resource models into two resource monitors as they represent very different classes of models. As you will see in the next section isolating the host model within its own resource monitor will give you the ability to exclude host related alarms that should not impact the service.

The Host RM and Proc and FS RM models have simple fault matrix tables.

For the Host RM model:

Host	Service Health
Up	Up
Down	Down

For the Proc and FS RM Model:

Process	File System	Service Health
Up	Up	Up
Down	Up	Down
Up	Down	Down
Down	Down	Down

The App Conn RM will be based on response time monitoring. It is at your discretion to utilize the multi-level threshold capability of CA Spectrum's service performance manager to create additional health values. For simplicity we'll look at a Timeout, Critical Threshold, and Major Threshold configuration. The matrix would look something like this presuming a condensed set of response time test values:

Response Time	Service Health
Normal	Up

Response Time	Service Health
Timeout	Down
Critical Threshold	Down
Major Threshold	Degraded

Let's take a look at the fault matrix for a single webserver now:

Host RM	Proc and FS RM	App Conn RM	Service Health
Up	Up	Up	Up
Down	Down	Down	Down
Up	Down	Down	Down
Up	Up	Down	Down
Up	Up	Degraded	Degraded

You can quickly determine that all resource monitors must be Up for the web server to be considered Up. Remember this is the fault behavior for a single web server.

In review we earlier expanded the web application service to include two resource monitors: Database RM, and Webserver RM. At the time the Webserver RM was monitoring the Condition of two host models. Given the behavior we identified above rather than two host models, the web servers can be instead be represented as two service models, each with three resource monitors. The previous configuration still applies, but now the Webserver RM will monitor the service health attribute of two services models, instead of the Condition of two hosts. You can see that despite vastly improving the accuracy of the web application service the structure of the service remains intact. The fault matrix determined early is still accurate:

Database RM	Webserver RM	Service Health
Up	Up	Up
Down	Up	Down
Down	Slightly Degraded	Down
Down	Down	Down
Up	Down	Down
Up	Slightly Degraded	Slightly Degraded

What has really been improved is the definition of what Up means for the webserver RM.

Resource Faults that Shouldn't Impact the Service

Missing resources and resources which are not discrete enough can often lead to a service indicating a health of Up when it shouldn't. Sometimes a service model may indicate a health of Down or Degraded when logically it isn't. This can best be described as a non service impacting resource fault.

There are two common situations that produce this type of problem both of which are very different.

The first situation is when a resource models status is influenced by associated child models. This can happen when you choose a model that is logically a service resource, but has a status that can be affected by other models that are not service resources. A common example of this is when you specify a network device as a resource for a particular service, rather than the interfaces that actually support the service. Another example when dealing with host models or servers is to specify that the host itself alarms for a failed process or file system instead of the monitored process or file system model. If the process or file system is not logically a part of the particular service the service may indicate an affected health when it shouldn't. These situations are usually easy to resolve by simply choosing the most appropriate model as the service resource, be it a specific interface, or monitored process for example.

The second situation occurs exclusively when a service monitors the Condition of its resource models. The Condition of a resource model will hold the value of the most severe alarm on the model. CA Spectrum generates thousands of different types of alarms, certainly some of these alarms are indicative of service impacting faults, but many are not. By default CA Spectrum monitors devices for a variety of reasons, but principally to insure that are functioning normally from a network infrastructure perspective. There are a variety of alarms which faults having to do with network management, but these alarms may have no logical impact on capability that is being monitored by the service. Likewise a given model may be a resource of multiple services, such that a particular alarm may be significant for some services and not others. This occurs frequently when the purpose of the service is to monitor compliance based on some specific responsibility.

Service Manager's alarm type exemption functionality is designed to support resource alarms which should not impact service health. When you discover that certain resource faults should not impact a service, you can specific an alarm type exemption configuration. This configuration can be specified for an individual service or resource monitor, or if the behavior is common it can be specified in a service policy.

By applying alarm type exemptions you can again improve the accuracy of your service models, by eliminating false service outages.

Service Impacting Events That Don't Impact Resources

Once in a while you may encounter a situation where a resource model experiences an event that does not produce an alarm on the resource, but logically affects the capability being monitored by the service. When deployed with a primary focus on network infrastructure management there are often many events produced by or passed to CA Spectrum which do not produce alarms. Usually this is because the events are too common or generally insignificant. That said there are circumstances where these events that a usually ignored should be considered for a specific service. In some situations it may be appropriate for you to map the event to a new alarm, which will affect the Condition of a resource model. Since this alarm configuration will take affect for all models of a given type it may not be a good practice if the event is significant only for a small number of models.

When the situation arises that an event is service impacting, but does not produce an alarm you should consider creating a Correlation Domain to represent the service resource. Much like a service determines its own health by monitoring attributes of its resources, a correlation domain can determine its own condition by monitoring events occurring on its resources.

To support non alarm producing events create a Correlation Condition for the event. This is done by simply specifying the event code for the logical set, and then the corresponding event code for the logical clear.

If we revisit the Database service discussed early in this guide, suppose the Database service was comprised of two host models. At some time during the day each database server may initiate an automatic data archival process. Suppose that CA Spectrum was integrated with a database management tool which would produce an event on the CA Spectrum host model when the archival process begins, and another event when the archival process is complete. Since this normal behavior for the server there is no alarm. However, during the archival process the server's may not respond as quickly to requests.

In general the data archival process does not impact the database service as a whole. However if both database servers were archiving data at the same time the service would become Slightly Degraded. If one of the database servers was down, and the other was archiving data the service would become Degraded.

You can create a new Correlation Condition and a pair of Correlation Rules to capture this behavior.

The Correlation Condition would consist of a set event code and clear event code which correspond to the start and completion of the archival process.

Two new Correlation rules can be created which specify an Implied Cause of either Service Impact Slightly Degraded or Service Impact Degraded. Service Manager adds these out-of-the-box Conditions along with a Service Impact Down Condition. The correlation rules would look like this:

- DB Archiving Exists AND Device Contact Lost Exists Implied Cause Service Impact Degraded
- DB Archiving Count = 2 Implied Cause Service Impact Slightly Degraded

Both rules would specify the Correlation Domain as the root cause target. The new rules would be combined into a new Correlation Policy perhaps called Data Archival Policy. You would then create a new Correlation Domain using the Data Archival Policy, and specify both database servers as resources.

Finally to extend the Database service, a new resource monitor called Data Archival RM would be created to monitor the Condition of the correlation domain.

By using this approach you are able to show the service impact of non alarm producing events.

Patterns of Resource Faults Which Impact Services

You may encounter resource monitoring scenarios where the relationship of particular service resources is too complex to capture simply by monitoring the Condition attribute of the models. More specifically the Condition of the model may have a greater or lesser significance depending on some additional resource monitoring criteria.

Consider the following scenario. An account management team working in a remote office uses a local database server to access customer information. In the event that the local system is down the account management team is still able to access the information they need by connecting to a server at the company head quarters. The service representing the customer account system should behave in the following manner:

- If the local server is down, and the head quarters server is up the customer account service should be Slightly Degraded
- If the local server is up and the and the head quarters server is down the customer account service should be Up.
- If the local server is down and the head quarters server is down the customer account service should be Down
- If the local server is down and the head quarters server is in maintenance the customer account service should be Down
- If the local server is in maintenance and the head quarters server is in maintenance the customer account service should be Down

As you can see the service impacting scenarios are fairly complex. Even though there are two servers providing the service, the servers are not treated equally.

For handling a resource monitoring scenario such as this a Correlation Domain can be used that will managed the complexities of monitoring the individual resources.

A service utilizing two resource monitors can be used to implement this example. First you can isolate the local server into its own resource monitor, which uses a very simple fault matrix. The Local Server RM would use a policy to support this pattern

Local Server	Service Health
Up	Up
Down	Slightly Degraded

The second resource monitor which we'll call Local & Remote Domain RM will also have a simple fault matrix:

Local & Remote Domain	Service Health
Up	Up
Down	Down

The Local & Remote Domain RM will monitor a Correlation Domain which contains the host model for the local server and the host model for the head quarters server.

The Condition of the Correlation Domain should behave like this:

Local Server	Remote Server	Domain Condition
Normal	Normal	Normal
Contact Lost	Normal	Normal
Normal	Contact Lost	Normal
Contact Lost	Contact Lost	Critical
Contact Lost	Maintenance	Critical
Maintenance	Maintenance	Critical
Maintenance	Contact Lost	Critical

The domain will utilize a policy with the following rules, all utilizing the domain for the root cause target.

- Device Contact Lost Count = 2 Implied Cause Service Impact Down
- DeviceInMaintenance Count = 2 Implied Cause Service Impact Down
- Device Contact Lost Exists AND DeviceInMaintenance Exists AND Device Contact Lost Model Does Not Equal DeviceInMaintenance Model Implied Cause Service Impact Down

The Customer Account Service would monitor the service health of the two resource monitors in the following way:

Local Server RM	Local and Remote Domain	Server Health
Up	Up	Up
Slightly Degraded	Up	Slightly Degraded
Slightly Degraded	Down	Down
Up	Down	Down

The Customer Account Service will simply base its health on the worst status of the two resource monitors which is the common high sensitivity pattern.

Using this approach you can create accurate resource monitoring capacity for your services even when the scenarios have complex requirements.

Service Attributes and Relationships

When creating a service you will need to specify a number of attributes, as well as associate the service to its resources, and other service management models. This section explains the attributes that you will be asked to configure as well as the potential relationships you can create for each service model.

Name and Description

The service name and description identify the service model. You can define multiple services with the same name, provided they have unique descriptions.

There are no rules for defining service names; however, it is often useful to utilize some naming scheme or convention that will allow you to quickly identify a service model if you encounter it outside of the service management hierarchy. Some naming schemes include multiple parts which allow you to categorize the service in some way, perhaps geographically or organizationally. Other naming schemes associate the service to a particular customer or function.

It is a useful practice to state the service role in the service description. The service role is determined in the planning phase, and states the capability and purpose of the service model.

Criticality

Service criticality is an enumerated value ranging from a Low value of 10 to a High value of 30. All or a portion of a services criticality will be added to the Impact value of any resource alarms effecting the service.

If a service is down, the entire value is factored into the calculation. If a service is degraded as a result of the resource alarm, one half of the service's criticality value is factored into the impact calculation for the alarm. If a service is slightly degraded, one fifth of the value is factored into the calculation.

Criticality values include the following:

- Low (default) = 10
- Medium Low = 15
- Medium = 20
- Medium High = 25
- High = 30

For example, a Degraded High criticality service has an impact of (50%) * 30 = 15, and a Down Low criticality service has an impact of (100%) * 10 = 10. The alarm that caused the Degraded High criticality service has a comparatively greater impact than the alarm the caused the Down Low criticality service. If alarms are sorted and prioritized by impact value this will help insure that the alarms impacting the most critical services are given the highest priority.

Landscape

The landscape field specifies the landscape where the service model will reside. The landscape option appears only when multiple SpectroSERVERs are deployed in a distributed environment.

To optimize performance the service should be created on the landscape where all or the majority of its resource reside. If the service has resources spanning multiple landscapes review the section of this guide entitled Service Models in a DSS environment.

Security String

The security string secures access to the service model in CA Spectrum. See the *Administrator Guide* for more information on securing CA Spectrum models.

Note: Security in the service dashboard differs from the OneClick Console. If a user does not have access to a service model all icons and list entries for that service will be absent from the service dashboard. This differs from the OneClick console where icons will be exposed, but no model data will be available.

Maintenance Mode

Service models support maintenance mode as do many other models in CA Spectrum. When a service is "in maintenance" it is not actively monitoring any of it resources.

You may create a service in maintenance to avoid the generation of any service outages while you are still building your service hierarchy and identifying resources. In this capacity maintenance model is used to show that the service is under construction.

Service models also support scheduled maintenance. Schedule maintenance defines preconfigured periods of time where the service will stop actively monitoring its resources. Commonly service level agreements will specify periods of time which are reserved for service maintenance.

Generate Service Alarms

Each service can be configured to generate alarms which correspond to changes in service health.

Disabling the generation of alarms for the service simply means that an alarm will not be generated, the service health will still changed based on policy evaluation. All icons within the OneClick Console and Service Dashboard will show the appropriate color for service health regardless of whether or not an alarm is generated. Regardless of the generate service alarms setting; all or a portion of the services criticality will be added to any resource alarms impacting the health the service. Also the service will be shown in the service impact table of such resource alarms, even if no alarm is generated for the service model itself. Any guarantee models associated to the service will track outage time regardless of whether or not an alarm is generated for the outage.

There are several reasons to disable the generation of service alarms. First is simply to reduce the number of alarms produced in CA Spectrum. If you are sure that all resource alarms will indicate service impact than the service alarm may be unnecessary.

Another reason to disable service alarms is when the alarm is redundant. Often multiple services are created which monitor many of the same resources, but with a different role. For example you may create a service model which focuses on the real-time status of a service and have it generate alarms. Other services models monitor specific aspects or resources of the service model for SLA purposes may be configured such that they will not produce an alarm.

Containers

The containers setting specifies how a service will monitor its resources if the specified resource is a type of container model. This setting applies only to those resources which are containers and is not used for non container resources.

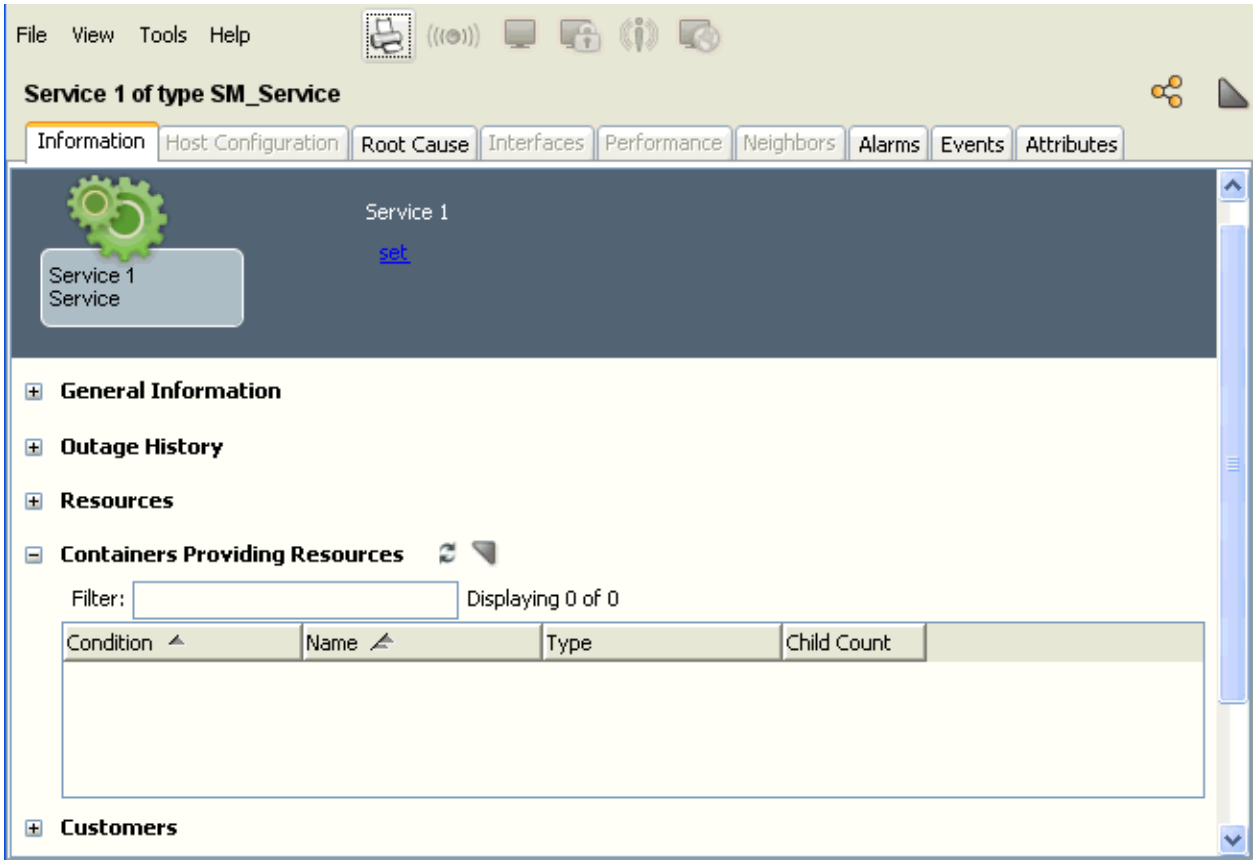
You may add different types of containers to a service. Depending on the type of container you can configure the service to monitor container model itself or the contents of the container. When set to Monitor Contents (default) the service will apply the policy to the models within the container. When using Monitor Container the service will apply the policy to the container itself.

When Monitor Contents is specified the service monitors the containment relations of the container model, and updates its resources as models are added or removed from the container.

Consider, for example, the effect of physically removing a router and replacing it with a new router during a network upgrade. If the original router model was placed in a container model monitored by Service Manager, it will automatically be removed from the service. If you place the new router in the same container, it will automatically be monitored as part of the service.

Many environments tend to be very dynamic, meaning the service resources may periodically change. Consider the addition of new infrastructure components that increase capacity and mitigate the risk of failure. As these resources are added services should take them into account. Well structured containers and services can adapt easily to these types of changes.

You can view a list of containers in a service under Containers Providing Resources in the OneClick Console or Service Dashboard Information view as shown in the following image:


File View Tools Help
Service 1 of type SM_Service
Information
Host Configuration
Root Cause
Interfaces
Performance
Neighbors
Alarms
Events
Attributes
Service 1
Service
Service 1
set
General Information
Outage History
Resources
Containers Providing Resources
Filter:
Displaying 0 of 0
Condition
Name
Type
Child Count
Customers

The Containers Providing Resources subview indicates the container condition, name, type, and child count (the number of resources in the container).

The Containers setting applies to all resources which are derived from the Container model type. If you want different behavior for different containers within the same service, consider the use of multiple resource monitors, which each have their own container monitoring setting.

Service Policy

During the planning phase you identified the resource attribute to monitor and the rule set by which to determine service health. You can select an existing policy that matches this behavior or create a new one.

The policy should reflect the behavior of the resources the service will monitor. You will be choosing the policy first by which resource attribute will be monitored, and next by which policy best reflects the behavior of the resources collectively. For example if the service monitors a pair of redundant servers, a redundancy type policy would be appropriate. If you find the no single policy accurately reflects the behavior of the resource, you may want to create multiple resource monitors to organize resources based on their specific monitoring requirements.

Service Manager provides a set of standard policies that represent common service monitoring requirements. It also lets you create custom policies to meet your particular requirements.

If the service will utilize resource monitors, or have other services as its resources only Service Health based policies can be used.

Create a Service

Before creating a service you should have an understanding of what the service represents, and the resources that provide the service. Consider how the resources should be monitored and the relative impact of resource outages on the availability of the service. Identifying the resources and how they impact the service will make policy and resource selection very easy.

Services you create appear under the Service tab in Service Editor, in Service Dashboard, and in OneClick Console under Service Management in the Navigation panel.

To create a service

1. Open the Service Editor.
2. Click Tools, Utilities, Service Editor from the main menu.

3. Click the Services tab.

   At the bottom of Services table you will see two options/tabs:

   - List - Creates a service as a child of the top level services model
   - Hierarchy - Creates a service as a child of the service which is selected when the Create button is clicked

   If you are going to create a service as a child or resource of another service the parent service must use a Service Health based policy.

4. Click Create.

   The Create Service dialog appears. The Create Service dialog lets you specify service properties, the IT resources that support the service, and the service policy or resource monitors that define which resource attributes are monitored.

5. Specify the following service propertie, some are required for service creation other are optional. Most required fields have default values, but you should always consider if these values are appropriate.

   Name (Required)

   Multiple services can have the same name provided they have unique descriptions. Consider using a naming scheme or convention that allows for quick identification of the service model.

   Description (Optional)

   Describes the service. You can enter unique descriptions for services that have the same name to facilitate finding each service using a list's filtering utility. The service description will appear within Service Availability and Service Health Reports.

   Criticality (Required)

   Specifies the criticality value that is factored into the impact calculation for a service resource model in an alarm state (the root cause alarm).

   Landscape (Required)

   Specifies the landscape where the service model will be created. The landscape field appears only when you are working in the DSS environment.

   Security String (Optional)

   Specifies the security string for the service model.

   In Maintenance (Optional)

   Selecting this option puts the service model into maintenance mode.

   Generate Service Alarms (Required)

   Specifies whether CA Spectrum generates alarms for the service model which correspond to changes in service health.

Containers (Required)

Specify how the service should monitor resources which are containers.

6. Specify the service policy and click the Set button to select or create the service policy.

   For services that will define resource monitors or monitor of have other services as their resource only Service Health based policies can be used.

   Note: When you specify Service Policy, the Service Editor automatically selects the most appropriate table to display the resources of the service.

   Note: The service policy dictates which attribute of the resources will be monitored. Make sure the service resources you specify support the attribute you choose. In the event that a resource is specified which doesn't support the attribute, SPECTRUM generates a yellow (minor) alarm for the service Management model

7. If the service will utilize resource monitors click the gear icon to create each new resource monitor.

   For each resource monitor specify a name and policy. You can also specify the Container behavior, and an alarm type exemption.

8. Configure alarm type exemptions.

   This feature is only available for services which are using a Condition based Policy.

9. Select containers and resources for a service by clicking the binoculars icon to launch the resource locator; search for resources and add them to the service.

   If you have created resource monitors first select the resource monitor, and then launch the resource locator.

   When specifying resources which are container model the Containers configuration specified in step 5 will apply.

   Note: For more information about working with searches, see the *Administrator Guide*.

   If you are creating the service on the main location server, you can select resources from any landscape. If the service is created on a landscape which is not the MLS you will be restricted to selecting resources only from the local landscape, and the MLS. Notify your organization's CA Spectrum administrator if the search does not find the resources you expect to find.

10. Select the resources (models) you want to include from the returned search list and click Add Selected to Monitored Resources. Close the Locate Resources dialog when you have all resource.

11. Click the Create button to create the service model.

    The service will now appear in the table view of the service editor.

More information:

Service Health Policies (see page 189)

Resource Monitors

Resources in Maintenance Mode

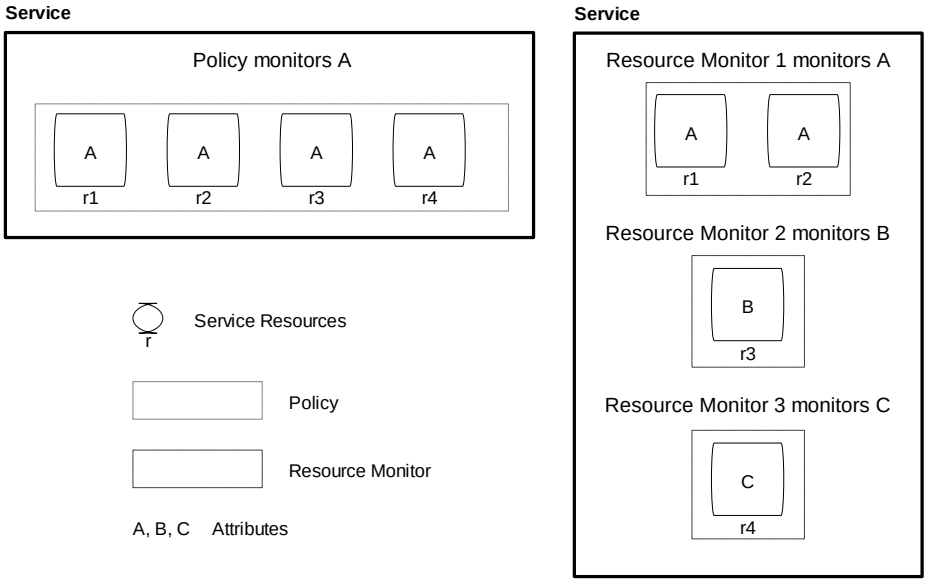
When a service resource is put into maintenance mode, Service Manager stops monitoring the resource for the duration of the maintenance mode period. For certain types of resources (port models, monitored process models, and monitored file system models, for example), Service Manager respects the maintenance status of the parent device model.

When the parent model for the following resource types is put into maintenance mode, the service will stop monitoring the resource:

- interface models
- monitored process models
- monitored disk (file system) models

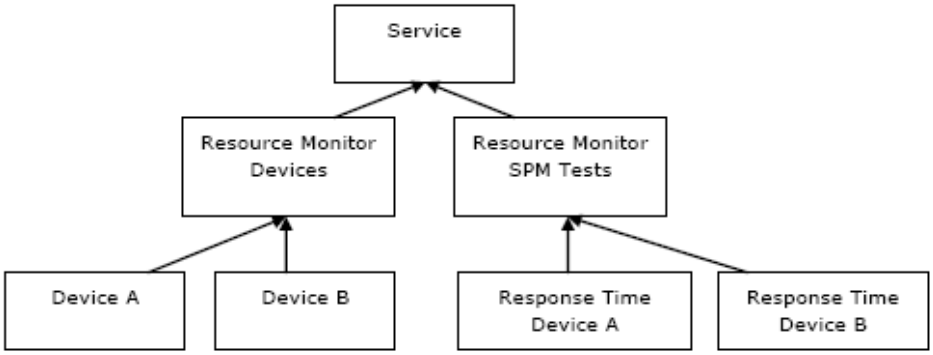
A resource monitor is a CA Spectrum model. Where a policy, which is not a model, specifies a *single* watched attribute common to *all* resources monitored by a service, a resource monitor monitors an *attribute* common to *one or more* service resources to determine its own service health status, the same way a service determines its health status. Using resource monitors lets you implement a finer mode of monitoring service health than is provided by a single policy.

The following diagram illustrates the difference between the two by showing how each could be implemented for the same service:



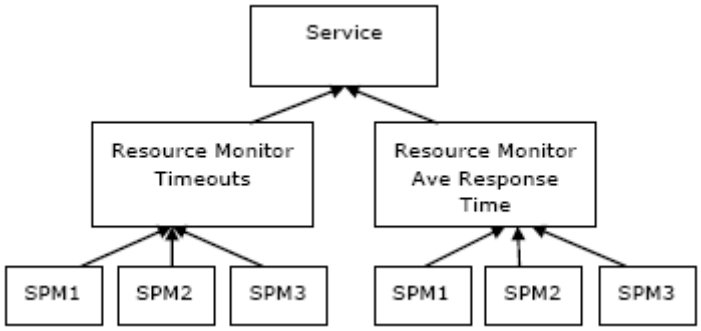
A resource monitor is a resource of a service, and you can apply multiple resource monitors to monitor a service. A service monitors the service health attribute of each resource monitor to determine its own health.

A simple scenario of when resource monitors might be used is when the resources of a service are of mixed types. For example when monitoring a pair of device models, and a pair of response time test models. Because different policies are used to monitor device models, and SPM test models, resource monitors could be created to organize the device models, and the SPM test models in the following way:



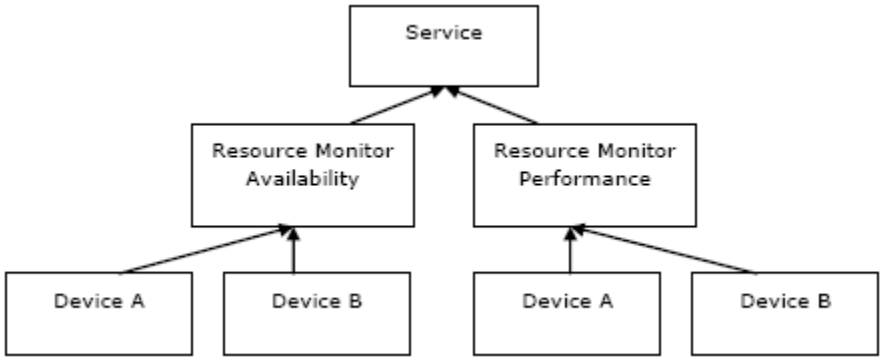
The Service model would use a policy such as Service Health High Sensitivity, the Resource Monitor for Devices might use the policy Condition Redundancy, and the Resource Monitor for Response Time tests might use Response Time Redundancy.

In other cases you might want to monitor multiple attributes of the same resources. In other words apply multiple policies to the same resources. For example you may be interested in monitoring a set of SPM Tests with a response time policy such that the service is impacted when too many response time test are timing out. You might also want to monitor the average response time of the same response time tests such that the service is impacted when the average response time exceeds some specific threshold. Again resource monitors can be used to create this type of service.



In this scenario the service might use the Service Health High Sensitivity policy. The Resource Monitor for timeouts could use a custom policy focusing specifically on the Latest Error Status value of Timeout for the SPM Tests. The Resource Monitor for average response time might use another custom policy which compares the average Latest Result for the SPM tests to a particular set of threshold values.

In yet another scenario multiple resource monitors might monitor the Condition of common resources, but use different policies to organize resource outages by fault type. For example resource monitors could be used to categorize availability impacting faults and performance impacting faults:



In this configuration the Service would again use a service health policy, the availability resource monitor might use a customer policy with an Alarm Type exemption configuration designed to isolate resource faults that are designated as availability impacting. The performance resource monitor would in turn use of custom policy which isolates resource faults that are designated as performance impacting.

Create a Resource Monitor

You can monitor multiple attributes on a single resource with different resource monitors.

To create a resource monitor

1. Open the Service Editor (see page 18).
2. Click the Services tab and click Create.

   The Create Service dialog appears.

3. Click  .

   The Create Resource Monitor dialog appears.

4. Do the following:
   a. Enter a name for the resource monitor and, optionally, a security string.
   b. Choose whether the resource monitor monitors the resources in a container or the container itself.
   c. Select a policy.
   d. (Optional) Specify which alarms you want to affect or not affect the health of the resource monitor (see page 58).
   e. Click OK.

   The resource monitor appears in the Containers in Resources to Monitor list in the Create Service dialog.

5. Add the resources with the attribute you want to monitor (the attribute specified by the resource monitor policy) with the resource monitor:
   a. Select the resource monitor.
   b. Click the Locate resources and containers icon.
   c. Select the containers and resources for the resource monitor.
   d. Click Add Selected to the Monitored Resources.

   The resources appear under the resource monitor icon in the Containers and Resources to Monitor panel.

Specify the Alarm Types That Affect or Do Not a Affect Service Health

You can specify resource alarm types to either affect or not affect service health when you create a service or resource monitor with a policy that specifies the Condition attribute. You can do this by from the Exemptions Panel; by selecting the appropriate alarm impact options.

Note: This functionality replaces the manual setting of the Exempt_Cause_List attribute which was documented for previous releases.

Consider the following before you specify resource alarm types:

- Individual services or resource monitors can specify a list of alarm types to be excluded from or included in the service health calculation.
- Service alarm type exemptions should be used to establish a specific behavior for individual services. For example, only this service will be affected by this alarm type, or this particular service should not be affected by this alarm type.
- Service alarm type exemptions take precedence over any configuration that is defined at the policy.

Note: When you specify alarm type exemptions for a service, Service Manager ignores any exemption specification that is defined for the policy used by the service.

To specify the alarms that affect or do not affect service health

1. Do one of the following:
   - Create a service (see page 51).
   - Create a resource monitor (see page 57).
2. Click the Exemptions tab and select one of the following alarm impact options from the Service Health Impacted Only When Resource Outages * drop-down list:

   Caused By

   Only these selected alarm types will impact the service health.

   Not Caused By

   Exclude these alarms from impacting the service.

   Disabled (default)

   Do not use service level alarm type exemptions. If the policy defines exemptions, those will be used.
3. Move the available alarm types you want to affect or not affect a service to the Selected Alarm Types box, or specify a range of alarm cause codes.

   The alarm types are specified.

More information:

Create a Policy (see page 75)
Example: Define an Alarm Exemption List for a Service or Resource Monitor (see page 131)

Add a Resource to a Service

You can create a service and add resources to the service, or add resources to an existing service or resource monitor using the OneClick Console as an alternative to using the Service Editor.

To add a resource to a service

1. Select the resource (model) you want to add to an existing service or a service you plan to create.
2. Right-click the model and click Add To, Service.

   The Add to Service/Resource Monitor dialog appears. This dialog lists available services.

   Note: To display resource monitors for a service, select the service.
3. Create a service to which you want to add the resource or add the resource to an existing service or resource monitor:

   - To create a service, click Create.

     The Create Service dialog appears. It lists the selected resource as a resource of the service. Specify service properties as described in Create a Service (see page 51).
   - To add the selected resource to an existing service or a resource monitor, select the service or resource monitor to which you want to add the resource and click OK.

   The resource is added to the service or resource monitor.

Delete a Resource from a Service

You can remove a resource from a service using the OneClick Console as an alternative to using the Service Editor.

To remove a resource from a service

1. Select the resource (model) you want to remove from an existing service.
2. Right-click the model and click Remove From, Service.
3. Click OK.

   The resource is removed from the service.

Edit a Service

You can change all service properties anytime after you create a service.

Consider the following before you edit a service:

- If you change a service name, all historical data in reports for the service generated with CA Spectrum Report Manager is listed under the new name.
- If you delete a service that is monitored by an SLA, the SLA guarantee goes to the Initial (Blue) state.
- If a service has a resource monitor monitored by an SLA and you delete the resource monitor, the SLA guarantee watching it goes to the initial (Blue) state.

Important! Editing services should be performed by authorized personnel who are aware of the potential ramifications of these actions, particularly as they relate to services monitored by SLAs.

To edit a service

1. Open the Service Editor (see page 18).
2. Click the Services tab, select the service you want to edit from the list, and then click Edit.

   The Edit Service dialog appears.

   Edit the settings, as described in Create a Service (see page 51) and click OK.

   The service is edited.

Delete a Service

Before you delete a service, make sure that it is not associated with an SLA you intend to implement that is scheduled to be activated.

Important! Deleting services should be performed by authorized personnel who are aware of the potential ramifications of these actions, particularly as they relate to services monitored by SLAs.

To delete a service

1. Open the Service Editor dialog (see page 18).
2. Click the Services tab, select the service you want to remove from CA Spectrum, and then click Delete.
3. Respond to the confirmation message that appears to complete the deletion.

   The service is deleted.

Cut a Service

CA Spectrum Service Manager lets you cut a resource monitor as part of editing a service.

Create a service and add a resource monitor. The policy and resources don't matter. Save the service, then edit it. Note that with the resource monitor selected the cut icon is disabled.

To cut a service

1. Open the Service Editor dialog (see page 18).
2. Click the Services tab, select the service you want to cut from the resource monitor, and then click Cut.

   The service is cut.

Service Maintenance Schedule Management

When you schedule maintenance for a service, CA Spectrum puts the service in maintenance mode (brown state) for the duration specified by the schedule. A service in maintenance mode is a planned outage. If the service is monitored by an SLA, the frequency and duration of the scheduled planned outages are typically defined by the SLA contract between a service provider and a service customer. Planned service outages are not accumulated as down or degraded time by SLA guarantees.

You can manage service maintenance schedules in the following ways:

- Create and save multiple one-time and recurring schedules.
- Add schedules to the list of schedules to be implemented on an as-desired basis.
- Remove schedules from the list of schedules to be implemented.

More information:

Example: Define a Service Maintenance Schedule (see page 131)

Create a Maintenance Schedule

When you create a schedule, Service Manager saves it to CA Spectrum and adds it by default to the list of schedules that will be implemented for the service. If you do not want the schedule implemented, you can remove it from the list and add it to the list at another time. There are two ways to create or specify a maintenance schedule for a service. The use can specify scheduled maintenance from the Component Detail view of a service model much like other CA Spectrum models, or the user can configure schedule maintenance from the service editor. To configure schedule maintenance from the service editor see below.

To create a maintenance schedule

1. Open the Service Editor (see page 18).
2. Click the Services tab, select the service for which you want to manage maintenance schedules, and then click the Scheduled Maintenance tab.
3. Click Create.

   The Create Schedule dialog appears.
4. Configure the new schedule and click OK.

   Service Manager adds the schedule to the Current Schedules list.

More information:

Remove a Maintenance Schedule from the Current Schedules List (see page 63)
Add a Maintenance Schedule to the Current Schedules List (see page 62)

Add a Maintenance Schedule to the Current Schedules List

If you want to implement a maintenance schedule for a service it must be included or you must include it in the Current Schedules list for the service.

To add a maintenance schedule to the Current Schedules list

1. Open the Service Editor (see page 18).
2. Click the Services tab, select the service for which you want to manage maintenance schedules, and then click the Scheduled Maintenance tab.
3. Select the schedule you want to add from the Available Schedules list and move it to the Current Schedules list.

   The maintenance schedule is added to the Current Schedules list.

Remove a Maintenance Schedule from the Current Schedules List

If you do not want to implement a maintenance schedule, you can remove it from the Current Schedules list.

To remove a maintenance schedule from the Current Schedules list

1. Open the Service Editor (see page 18).
2. Click the Services tab, select the service for which you want to manage maintenance schedules, and then click the Scheduled Maintenance tab.
3. Select the schedule you want to remove from the Current Schedules list, and then move it to the Available Schedules list.

   The maintenance schedule is removed from the Current Schedules list.

Associate an Owner with a Service

Service Manager lets you designate one or more users as owners of a service. A service owner serves as the contact person for the service. Service owner information will also be available from Service Availability and Service Health reports.

To associate an owner with a service

1. Open the Service Editor (see page 18).
2. Click the Services tab, select the service you want to associate with an owner, click the Owners tab, and then click Select Service Owners.

   The Select Owners dialog appears.
3. Move the owner you want to associate with the service from the Available Owners list to the Service Owners list and click OK.

   The owner is associated with a service.

Associate a Customer with a Service

Service Manager lets you associate one or more customer models with a service to help you track and manage services and customers. You can generate service reports with CA Spectrum Report Manager based on service customer associations. When a service is associate to one or more customer models the Criticality of each customer will be factored into the alarm impact for any service impacting outage. This insures that resource outages which impact highly critical customers will have a greater impact value.

To associate a customer with a service

1. Open the Service Editor (see page 18).
2. Click the Services tab, select the service you want to associate with a customer, click the Customers tab, and then click Select Service Customers.
3. The Select Customers dialog appears.
4. Move the customer you want to associate with the service from the Available Customers list to the Customers that use this Service list and click OK.

   The customer is associated with a service.

Service Models in a DSS Environment

When creating service models in a distributed SpectroSERVER (DSS) environment there are some important factors to consider. Service models can be associated to resource models from other landscapes. The supported behaviors are as follows:

- A service model created on the MLS can monitor resources from the MLS or any second tier landscape.
- A service model created on a second tier landscape can monitor resources models on its own landscape or the MLS, but not other second tier landscapes.

It is important to note that these behaviors apply to services which use global collections to define their resources:

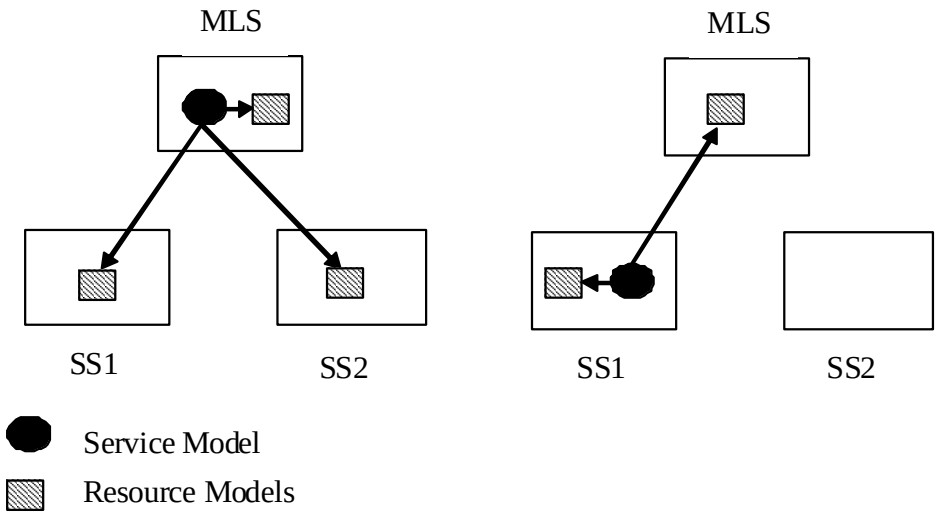
- A service model created on the MLS using a global collection can monitor all resources contained by the global collection.
- A service model created on a second tier landscape using a global collection can monitor only those resources in the collection which reside on its own landscape or the MLS.

In CA Spectrum r9.2, the performance heavy cross landscape watches is replaces with asynchronous action notifications, relieving some of the burden from the SpectroSERVERs. In addition a relay mechanism allowing the MLS to forward second tier notifications from one landscape to another will allows second tier services to monitor resources from other second tier landscapes.

This will allow you to construct services with less concern over performance impact. In addition, it will allow you to create services on landscapes where the service should logically reside without concern over what landscape required remote resources reside upon. This will not eliminate the need for an efficiently designed service hierarchy, but it will provide flexibility which makes it easier to design the service hierarchy. All resources from all landscapes will be visible to you, regardless of where the service mode is being created.

Example: Supported Service to Remote Resource Configurations

The following depicts the supported service to remote resource configurations:



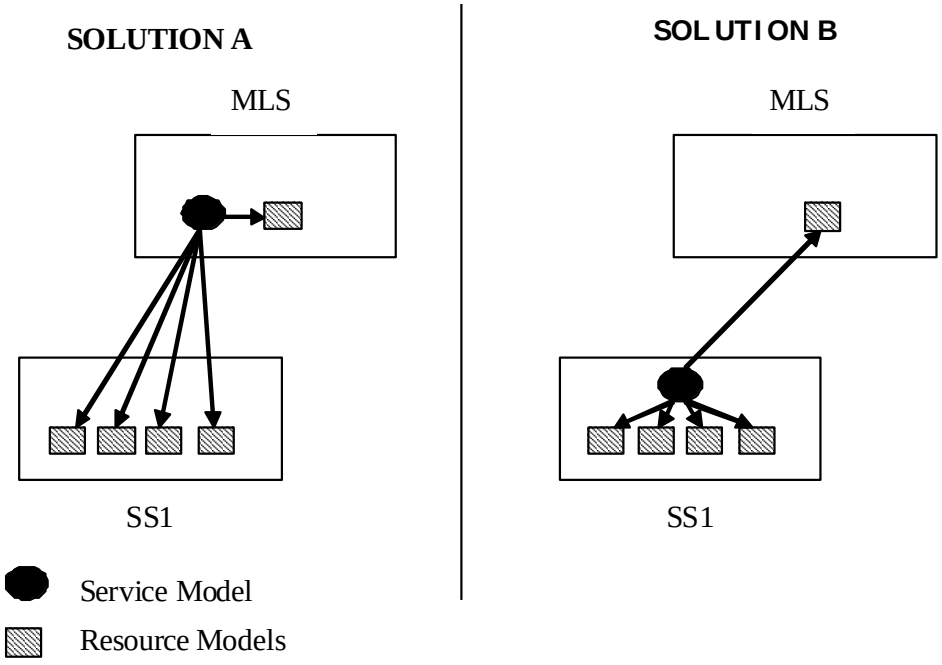
In addition to understanding which configurations are supported it is also important to consider the efficiency of the service model, and resource distribution impact. Monitoring a resource which resides in the same landscape is more efficient than monitoring a resource which resides in another landscape. When creating service models, users should strive to minimize the number of service resources which reside on remote landscapes. Consider the following example. Service XYZ has 5 resources, 1 of these resource models resides on the MLS while the other 4 reside on SpectroSERVER 1 (SS1). The following image depicts two potential designs for service XYZ:

Service Model Example: Resource Distribution Impact

Because of the reduced number of resources residing on a remote landscape, Solution B is a more efficient design. If the service can reside on either landscape, choose the landscape where the majority of resources exist. You can summarize this by stating 'build the service closest to the bulk of its resources'.

There are some circumstances where the service has resources on multiple second tier landscapes and must reside on the MLS. In these scenarios, a more efficient service design can be created by consolidating the remote resources into a sub-service which is monitored by the parent service on the MLS.

The following depicts two solutions which can be created when the service must reside on the MLS.

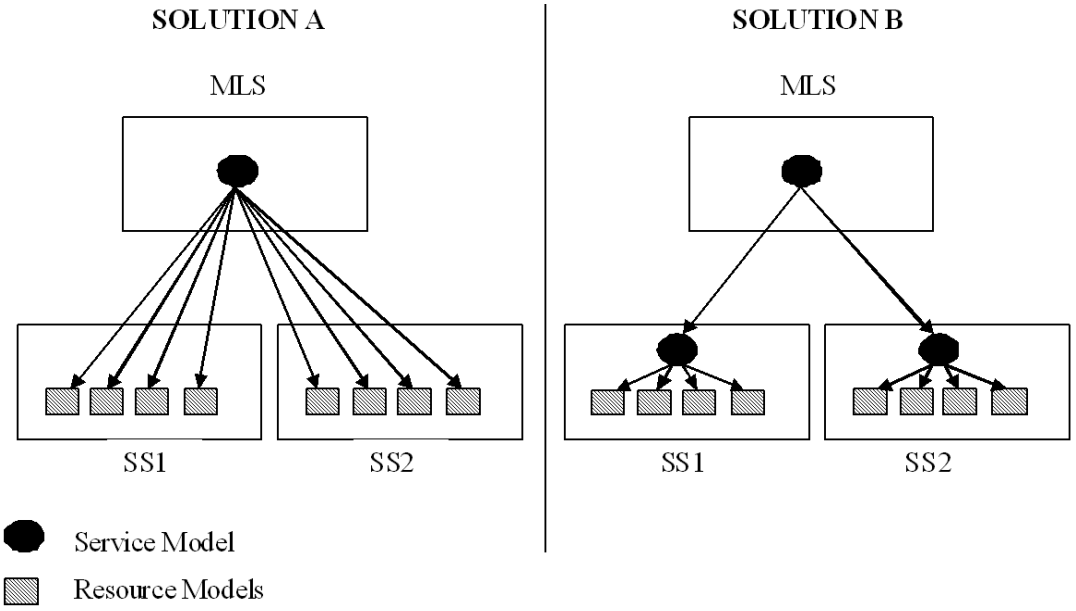


Service Model Example: Service Resides on the MLS

Solution B represents a more efficient design by minimizing the number of resources which are monitored remotely. In Solution B, the service models created on SS1 and SS2 become resources of the service created on the MLS. When creating service hierarchies such as the one depicted in Solution B, it's important to make sure the policies used for each service will correctly reflect the behavior of the resources from each landscape.

When creating services which use global collection consider the number of remote resources that result from the use of the global collection. When any type of container is used to specify service resources by default, the service will monitor the contents of the container. A global collection can contain models from multiple landscapes.

Consider the following, and how the use of a global collection could potentially create an inefficient service design.



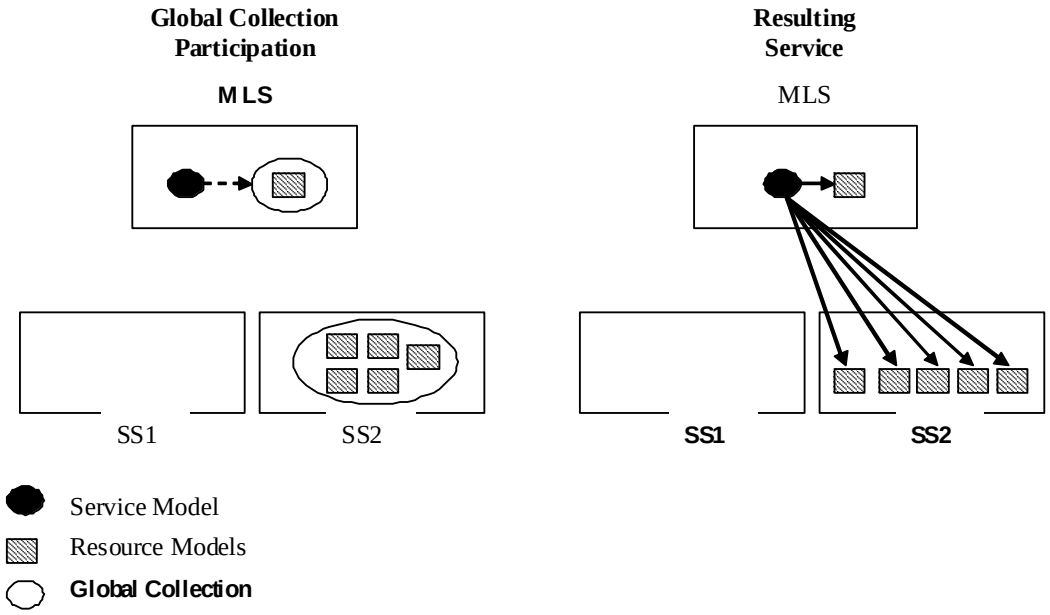
Again Solution B represents a more efficient design by minimizing the number of resources which are monitored remotely. In Solution B the service models created on SS1 and SS2 become resources of the service created on the MLS. When creating service hierarchies such as the one depicted in Solution B, it's important to make sure the policies used for each service will correctly reflect the behavior of the resources from each landscape.

When creating services which use Global Collection consider the number of remote resources that result from the use of the Global Collection. When any type of container is used to specify service resources by default, the service will monitor the contents of the container. A Global Collection can contain models from multiple landscapes. Consider the following images, and how the use of a Global Collection could potentially create an inefficient service design.

Example: Global Collection

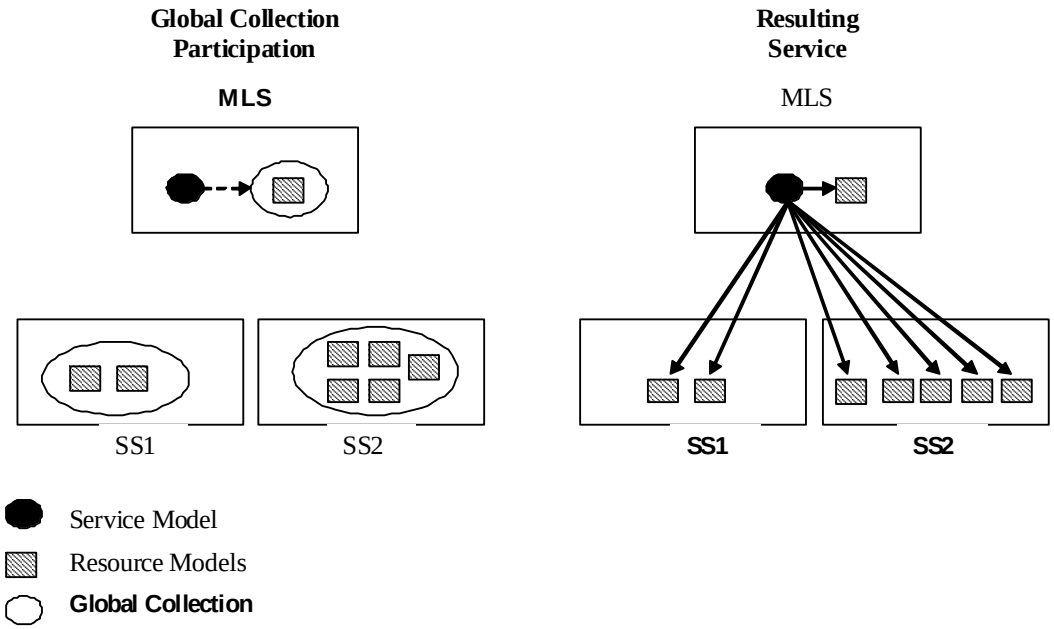
In the following scenario, if the service is created on the MLS it would be monitoring five remote resources. If the service was created on SS2, it only has to maintain one remote resource.

However, improving efficiency on this scenario might not be as simple as moving the service to SS2. The service is using a global collection to specify its resources; presumably this is to support a set of potentially dynamic resources. Consider if two additional models were created on SS1 which participate in the global collection.



Global Collection Example: Add Two Additional Models

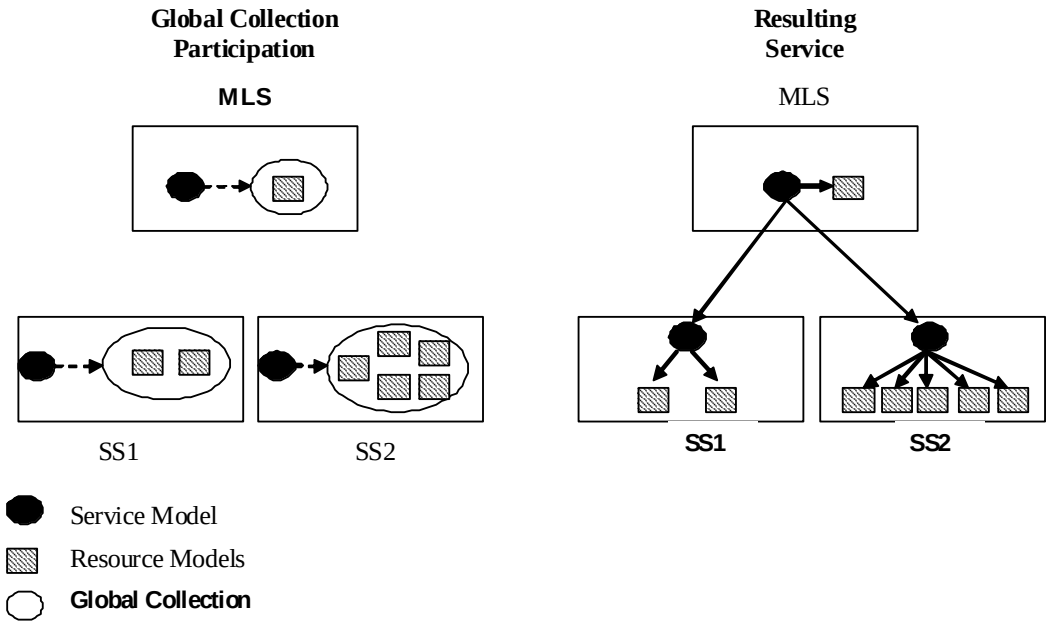
If the global collection contained resources from all landscapes the service would have to reside on the MLS. An alternative to consider is the use of multiple services which monitor the local copy of the global collection, residing on the same landscape. Remember although logically a global collection is a single model, it is actually implemented as a set of duplicate models with a model residing on each landscape for which the global collection is specified.



Example: Multiple Services Monitoring the Local Copy of the Global Collection

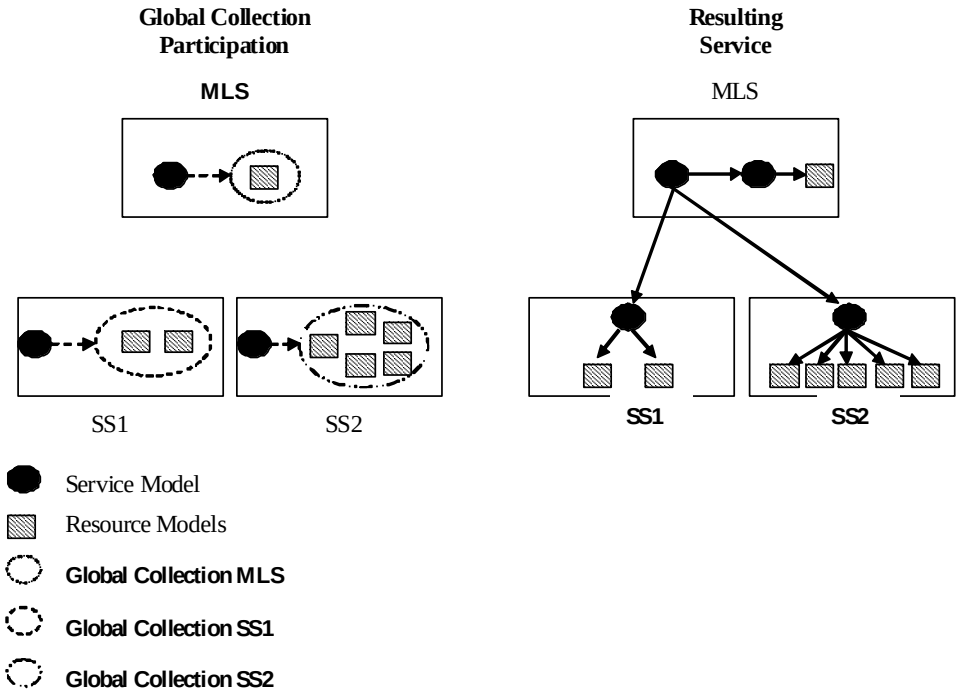
Although this approach does produce a more efficient service, it can be complex to maintain and may require the use of CA Spectrum Command Line Interface (CLI) to implement.

An alternate technique would be to create multiple global collections which are bound to a single landscape. Services can then be created on each landscape, with a parent service to monitor them.



Example: Multiple Global Collections Bound to a Single Landscape

This design allows for the benefits of a dynamic collection, but also provides an efficient service design. It may not be ideal to maintain multiple Global Collections in this way so you must weigh the costs and benefits of this solution.



Chapter 3: Working with Policies and Policy Components

This section contains the following topics:

Policies

A service policy should reflect how the behavior of a set of resources logically impacts a service. The policy specifies which resource attribute will be monitored and how those attributes will be interpreted in order to determine the health of a service. A number of common policies are available out-of-the-box, and users can create their own policies to more accurately monitor service resources.

A policy includes two basic components:

Attribute map

The attribute map serves two purposes. First it specifies which resource attribute will be monitored. Secondly it maps resource attribute values to a set of resource health values. The mapping is done based on the logical severity of the attribute value. For example if the attribute map represents the Port Status attribute a disabled port could be logically considered a down resource. If the attribute map represents the status of a response time test you might logically consider a minor threshold violation could be considered a slightly degraded resource.

This mapping allows policy rule sets to handle a variety of resource types in a common way, by having only to consider the resource health values of down, degraded and slightly degraded.

Rule set

A rule set consists of a number of statements evaluating the cumulative mapped resource health values of a set of service resources against some criteria. Each rule within the set specifies the criteria and the resulting service health value if the criteria are met. For example a rule might look something like this: When all resources are down the service is down. This means that given the mapping of the monitored attribute if all resources have a resource health of down the resulting health of a service using this policy would be down.

As mentioned above the rule set consists of multiple statements or rules. The rules are evaluated from the top down, and the first rule which is satisfied will determine the health of any service using that policy. If none of the rules in the rule set are satisfied the service health will be up.

Important! Editing and deleting policies and attribute maps and rule sets should be performed by authorized personnel who are aware of the potential ramifications of these actions, particularly with respect to policies for services that are being watched by Service Level Agreements (SLAs).

Policy Types

Before you create a custom policy, you should have a clear understanding of what you want to monitor (the watched attribute and its status values) and the method used for the monitoring. There are two distinct types of service monitor policies:

- Status policies use an attribute map to compare the status of monitored attributes indicated by the rule sets. These policies use the *All*, *Any*, or *Percentage* rule sets.
- Statistical policies use Aggregate rules and compare the value of the monitored attribute to the computed value set by each rule. A statistical policy requires an attribute map to specify which attribute will be monitored, but the mapped values are ignored in favor of the attributes pure values. The attributes values can be summarized in several ways such as average, min, max. The summarized values are then compared against numeric thresholds specified in the rule-set.

For example, a status policy might monitor the operational status of an interface, where a statistical policy might monitor the error rate of an interface.

Create a Policy

You can create policies using any combination of standard and user-defined attribute maps and rule sets. When you create a policy, it becomes available to other Service Manager users. You can also create a new policy by saving a uniquely named version of an existing policy.

To create a policy

1. Open the Service Policy Editor (see page 19).
2. Click the Policies tab and click Create.

   The Create Policy dialog appears. Service Manager autofills the Author field with your CA Spectrum user name.
3. Enter a unique name for the policy in the Policy field.
4. Select an attribute map.

   Properties for the map you select appear. If the attribute maps available do not meet your requirements, you can create an attribute map (see page 80) or edit an existing user-created attribute map (see page 82).
5. Select a rule set.

   Rules for the rule set you select appear. The rule set specifies what the status (or health) of a service is based on the mapped health values of the service resources. A rule set consists of conditional statements that assert what the health of the service will be based on the collective set of resource health values.

   If the rule sets available do not meet your requirements, you can create a rule set (see page 85) or edit an existing user (see page 86).
6. (Optional, and only applicable if you chose a Condition attribute map)

   Specify alarm type exemptions for the policy. This will consist of a set of alarm types and how they will be applied either inclusively (caused by) or exclusively (not caused by).

   You would typically specify alarm type exemptions at the policy level if the policy will be used by multiple services. If the alarm type exemption configuration is only relevant for a single service it may be better to define if for the service itself rather than at the policy level.

   Consider the following before you specify allow or disallow alarm type lists in policies:

   - Alarm type exemptions configured at the policy are enforced only for services using the policy which do not define their own alarm type exemptions. If a service using the policy is later edited and has alarm type exemptions configured for it, the policies configuration will be ignore from that point forward.
   - Any changes you make to the alarm type exemption configuration for a policy affect all services that use the policy.

Follow these steps to specify alarm type exceptions for a policy:

a. In the policy create/edit dialog Click Set. (If the set button is disabled it's likely that the specified attribute map is not for the Condition attribute, only Condition based policies can specify alarm type exemptions.)

   The Configure Inclusive or Exclusive Alarm Types dialog appears.

b. Specify Caused By or Not Caused By.

c. Select the appropriate alarm types and click OK.

d. The Create Policy dialog shows the alarm type inclusion or exclusion list you specified.

7. Click Create.

   The policy appears in the Policy list in the Service Policy Editor dialog.

More information:

Add Alarm Types to a Custom Condition Policy (see page 76)

Add Alarm Types to a Custom Condition Policy

You can add resource impacting alarm to the list of alarm types specified in any user created policy which uses a Condition attribute. This option is available from when selecting an Alarm in the Alarm tab of the OneClick Contents Panel.

To add an alarm type to a custom condition policy

1. Select one or more alarm types you want to include in the policies from any OneClick alarm view.
2. Right-click and click Add Alarm Type to Service Policies.

   The Specify Alarm Types for Service Policies dialog appears. This dialog lists selected alarm types and all custom (user-created) Condition policies.

   Note: You can include the Alarm Behavior column by right-clicking any table column heading. This will indicate how the policy interprets the alarm exemption either caused by or not caused by.

3. Select the policies to which you want to add the alarm types and click OK.

   The alarm types are included in the alarm type list for each selected policy. If you selected a policy without an alarm type configuration, Service Manager will default to a setting of Not Caused By for the policy.

Create a Policy from a Copy

You can create a policy by copying an existing policy and saving it with the settings you require under a different name.

To create a policy from a copy

1. Open the Service Policy Editor (see page 19).
2. Click the Policies tab, select the policy from which you want to create a new policy, and click Copy.

   The Create Policy: <*Policy Name*> dialog appears. It includes the settings for the policy you are going to use as the basis for your new policy.
3. Enter a unique name for the new policy in the Policy field.
4. Edit policy properties, as described in Create a Policy (see page 75), and click Create.

   The new policy appears in the Policy list in the Service Policy Editor dialog.

Edit a Policy

You can modify all user-created policies. Service Manager implements modified policy settings immediately after you save them.

To edit a policy

1. Open the Service Editor (see page 18).
2. Click the Policies tab, select the policy you want to edit, and then click Edit.

   The Edit Policy: <*Policy Name*> dialog appears.

   Note: Policy edits will be applied to all services or resource monitors which are currently using the policy. Depending on the nature of the edit this could result in a change to the service health of one or more services.
3. Edit the settings, as described in Create a Policy (see page 75), and click OK.

   The policy is edited.

The following limitations apply to service policy editing:

- You can edit or delete user-created policies, attribute maps, or rule sets. However, Service Manager prevents you from deleting any policy (or any attribute map or rule set that are part of it) that is currently being used by a service or resource monitor.
- You cannot edit or delete CA-authored Service Manager policies.
- You can copy any policy and save it under a unique name and edit it or delete at will.
- You cannot edit or delete CA-authored attribute maps and rule sets.

  You can copy any attribute map or rule set and save it under a unique name.

Delete a Policy

You can delete any user-created policy that is not currently in use. If the policy is being used by a service deletion will fail and an error dialog indicating the failure will be displayed.

Note: When you delete a policy you do not delete its attribute map and rule set.

To delete a policy

1. Open the Service Editor dialog (see page 18).
2. Click the Policies tab and then select the policy you want to delete.
3. Click Delete.

   The policy is removed from the Policy list.

Attribute Maps

Attribute maps associate natural resource attribute values to equivalent resource health values, and allow you to specify a root cause reason string for each mapped value. Any attribute which has whole number values can be mapped. Multiple attribute maps can exist for the same attribute, and can have different value mappings or just different root cause reason strings. Each attribute map will have its own name which should describe its purpose.

The attribute map serves two purposes when added to a service policy. First is specifies which resource attributes will be monitored. Secondly it provides a mapping of how the resource attribute values indicate the health of the resource. When the specified attribute changes for a resource model, the service will evaluate the value to determine its relative resource health then apply that health value along with all of the other resources health values to the rule set.

If the out-of-the-box attribute maps are not sufficient you can create a new custom attribute map. All user-created attribute maps can be edited and deleted by any Service Manager user.

Consider the following about attribute maps:

- An attribute map must have a unique name.
- You cannot edit or delete CA-authored attribute maps.
- Any attribute can have multiple mappings.
- Service resource(s) must support the attribute specified in the attribute map. CA Spectrum generates a minor (yellow) alarm on the Service Management model if a service uses a policy that specifies a watched attribute that is not supported by the service's resources.
- You must know what values an attribute returns and what they indicate about the state of the resource(s) on which they are monitored to map those values to service health values.
- At a minimum, an attribute map must include one mapped value, and define a default root cause reason.
- You can map multiple attribute values to the same service health value. For example, port statue values of disabled, down, and unreachable are all mapped to a resource health of down.
- If the attribute you select returns enumerated values, each value must be mapped to up, down, degraded, or slightly degraded before you can save the new mapping.

- Service Manager attribute maps now support range values in addition to single value mapping.

  For example an attribute map value can appear in this form single value 100, range value 100-200. Logically the user will be able to configure attribute maps like this:

  - 1-99 = Slightly Degraded
  - 100-199 = Degraded
  - 200-300 = Down

  Also supported will the greater than and less than operators so a set of mapped values might look like this:

  - <100 = Down
  - 100-200 = Degraded
  - 300-400 = Degraded
  - >400 = Down

Create an Attribute Map

You can create a custom attribute map.

To create an attribute map

1. Open the Service Policy Editor (see page 19).
2. Click the Attribute Maps tab and click Create.

   The Create Attribute Map appears.
3. Specify the following properties:

   Attribute Map

   Identifies the attribute map. You must provide a unique name.

   Default Root Cause Reason

   Identifies the underlying reason for the service health state. Later, when you map particular attribute values to service health values, you can overwrite the default reason for each mapping.
4. Click Attribute.

   The Attribute Selector dialog appears.

5. Select an attribute of the allowed type (counter, integer, date, time ticks, and gauge), and then click OK.

   The Create Attribute Map dialog appears.

6. Click Add.

   The Add Value to Service Health Mapping dialog appears.

7. Enter the following values:

   Attribute Value

   Specifies the attribute value you want to map to a service health value.

   Service Health

   Specifies the service health value you want to map to the attribute value.

   Root Cause Reason

   Describes the root cause you want to provide for this particular mapping. The root cause reason will be displayed in the root cause tab of the OneClick Component detail panel, as well as the Outage Details in a service's outage history table.

   You may create new attribute maps specifically to provide better root cause reasons. For example the standard Condition attribute map defines very generic root cause reasons.

   It might be useful to create multiple purpose specific attribute maps for the Condition attribute. For example a user might define a Condition attribute map specific for services monitoring cable modems and define root cause reasons like: "Modem disconnect, and Data transfer fault." These more descriptive strings would be used in place of standard Condition strings of "A critical problem was detected on the resource, and A major problem was detected on the resource."

8. Click OK.

   The Mapped Values panel lists the new attribute value and service health mapping.

9. Click Create to save the new attribute map.

   The new attribute map appears in all attribute map lists in Service Manager, and it can be used in all user-created policies.

More information:

Create a Policy (see page 75)

Create an Attribute Map from a Copy

You can create an attribute map by copying an existing map and saving it with the settings you require under a different name.

To copy an attribute map

1. Open the Service Policy Editor (see page 19).
2. Click the Attribute Maps tab, select the map you want to copy, and click Copy.

   The Create Attribute Map dialog appears. It includes the settings for the map you want to copy.
3. Specify a unique name, modify settings as required (using the set command where applicable), and click Create.

   The new attribute map appears in all attribute map lists in Service Manager, and it can be used in all user-created policies.

Edit an Attribute Map

You can edit any user-defined attribute map regardless of whether or not it is included in a policy that is currently in use. When edits to the attribute map are saved all services or resource monitors using related policies will reevaluate their health based on the edit, which could result in a change in service health for those models.

Consider the following before editing an attribute map:

- You can change the attribute map name, the service health designation for an attribute value, the default root cause reason, and the root cause reason for each service health mapping.
- You cannot change the attribute originally specified.

To edit an attribute map

1. Open the Service Policy Editor (see page 19).
2. Click the Attribute Maps tab, select the attribute map you want to edit, and then click Edit.

   The Edit Attribute Map: <*Attribute Map Name*> dialog appears.
3. Modify settings as required (using the set command where applicable), and click OK.

   The attribute map is edited.

More information:

Create a Policy (see page 75)

Delete an Attribute Map

You can delete any user-created attribute map that is not part of a policy currently in use.

To delete an attribute map

1. Open the Service Policy Editor (see page 19).
2. Click the Attribute Maps tab, select the map you want to delete, and click Delete.

   The attribute map is removed from the attribute maps list.

Rule Sets

As its name implies a rule set consists of a set of rules. Each rule is a conditional statement comprised of a comparator and a resulting health value. A rule is considered satisfied if the cumulative resource health matches it's criteria. For example a rule might indicate something like this: When all resources are Down the service is Down. Naturally if all resources within the service have a resource health of down the rule will be satisfied, and the policy will be evaluated to a resulting health of down.

Rule's are evaluated from the top down, meaning the first rule within the rule set which is satisfied will dictate the health of any service or resource monitor using the policy. It's important to consider rule evaluation when creating a rule set, and insure that rules of lesser significance will not hide rules of greater significance. For example consider a rule set with this logic:

Rule 1 = When any 1 resource is Down the service is Degraded

Rule 2 = When all resources are Down the service is Down

A rule set like this would never return anything other than Degraded, because even if all resources were down Rule 1 would still be satisfied as of course 1 resource is down.

Service manager supports four different categories of rules which can be used to form a rule set. All, Any, and Percent Rules use the mapped values provided by the attribute map. Aggregate rules use the resource attributes natural values.

Rules types are defined as follows:

All

When all the monitored service resources or all resources watched by a resource monitor have this service health value (down, degraded, or slightly degraded), the service or resource monitor is (down, degraded, or slightly degraded).

Any

When a particular number of monitored service resources or a particular number of resources watched by a resource monitor have this service health value (down, degraded, or slightly degraded), the service or resource monitor is (down, degraded, or slightly degraded).

Percent

When the percentage of monitored service resources or the percentage of resources watched by a resource monitor have this value (down, degraded, or slightly degraded), the service or resource monitor is (down, degraded, or slightly degraded).

Aggregate

When the (Sum, Minimum, Maximum, and Average) for all monitored service resources or the (Sum, Minimum, Maximum, and Average) of resources watched by a resource monitor is (less than, greater than, or equal to) the Integer or attribute value you designate, the service or resource monitor is (down, degraded, or slightly degraded).

A status policy rule set can consist of any combination of All, Any, and Percentage rules. Because mapped values are ignored, a statistical rule set can use only Aggregate rules.

Consider the following about rule sets:

- You can create any number of uniquely named rule sets.
- Uniquely named rule sets can include identical rules.
- You can create new versions of existing rule sets.
- You cannot edit or delete CA-authored rule sets.
- The order in which you list rules in a rule set is important. The first rule satisfied dictates the service health value returned.

Create a Rule Set

You can create an original custom rule set or another version of an existing rule set in the Service Policy Editor if the CA-authored rule sets do not meet your requirements for a policy. All user-created rule sets can be modified and deleted by any Service Manager user.

To create a rule set

1. Open the Service Policy Editor (see page 19).
2. Click the Rule Sets tab and click Create.

   The Create Rule Set dialog appears.
3. Enter a name for the new rule set in the Rule Set field.

   The Author field autofills with the current Service Manager user name.
4. Click Add to create a rule for the rule set.

   The Create Rule dialog appears.
5. Configure rule parameters, including the type and the conditions for the type, and click OK.

   The rule appears in the Create Rule Set dialog.
6. Rearrange the order of rules as necessary using the Up Arrow and Down Arrow buttons, and click Create.

   The rule set is created.

More information:

Create a Policy (see page 75)

Create a Rule Set from a Copy

You can create a new rule set by copying an existing rule set and saving it with the settings you require under a different name.

To create a rule set from a copy

1. Open the Service Editor (see page 19).
2. Click the Rule Sets tab, select the rule set you want to copy, and click Copy.

   The Create Rule Set dialog appears. This dialog includes the settings for the rule set you are going to use as the basis for your new rule set.
3. Specify a unique name and edit rules and modify rules as required, and then click Create.

   The rule set appears in all rule set lists in Service Manager, and it can be used in all user-created policies.

Edit a Rule Set

You can edit any user-defined rule set regardless of whether or not it is included in a policy that is currently in use. When edits to the rule set are saved all services or resource monitors using related policies will reevaluate their health based on the edit, which could result in a change in service health for those models.

To edit a rule set

1. Open the Service Editor (see page 18).
2. Click the Rule Sets tab, select the rule set you want to edit, and then click Edit.

   The Edit Rule Set: <*Rule Set Name*> dialog appears.
3. Modify the name of the rule set in the Rule Set field.
4. (Optional) Use the arrow keys to rearrange rules.
5. Edit a rule by selecting the rule and clicking Edit.

   The Edit Rule dialog appears.
6. Change rule settings as needed and click OK.

   The Edit Rule dialog appears.
7. Click OK.

   Your edits are saved.

More information:

Create a Policy (see page 75)

Delete a Rule Set

You can delete a rule set which is not part of a policy currently in use by a service or resource monitor.

To delete a rule set

1. Open the Service Editor (see page 18).
2. Click the Rule Sets tab view, select the rule set you want to delete, and click Delete.

   The rule set is removed from the rule sets list.

Chapter 4: Creating and Managing Customers

This section contains the following topics:

Customers and Customer Groups

Customers are CA Spectrum models that represent a person or organization that is associated with services or SLAs. The use of customer models enables you to track and monitor each customer's services and SLAs.

A customer model's status attribute reflects the status of the customers services. The customer status will be equivalent to the worst service health value for all of the customer's services. For example, assume a customer is associated with services A, B and C. If service A is up, service B is degraded, and service C is down, the customer's status attribute will have a value of severe, to reflect that it has a service that is down. If service C is restored to up and B remains degraded the customer's status attribute will indicate significant impact to reflect that it has a service that is degraded. Customer icons within OneClick and the Service Dashboard indicate the value of the customer status attribute. There are no alarms associated to changes in customer status, the only visual indication is icon color.

Each customer model also has a criticality attribute with values ranging from low to high. Much like the criticality of a service model, all or a portion of the customer models criticality is added to the impact of any resource alarms that are affecting the customers services. This insure that alarms impacting highly critical customers will have a high impact value.

Customer models can be added to customer groups. The customer group model provides a way to organize similar customers. The condition of a customer group will be equivalent to the worst status of all customers within the group. There are no alarms associated to condition changes for the customer group model, the only visual indication is icon color.

Customers and customer groups you create appear under the Customers tab in the Service Editor, in Service Dashboard, and in OneClick under Service Management in the Navigation panel.

Create a Customer

A customer identifies a person or an organization that is associated with a service, an SLA, or both. In addition to the Criticality and Security String parameters included for all CA Spectrum models, it includes customer identity and contact information and other fields in which you can enter additional information.

To create a customer

1. Open the Service Editor (see page 18).
2. Click the Customers tab.

   A list of customers created in Service Manager appears.
3. Click Create Customer.

   The Create Customer dialog appears.
4. Complete the required fields (denoted by asterisks).
5. (Optional) Specify the customer group (using the Customer Group tab) to which you want to add the customer and click Create.

   The customer is created.

More information:

Example: Define a Customer and a Customer Group (see page 135)

Customer Criticality and a Service's Outage Alarm Priority

A customer's criticality is factored into the impact calculation of any alarms that cause a service outage for one of the customer's services. Assume, for example, that "Customer A" has a Medium criticality value of 15 and "Customer B" has a Low criticality value of 5 and both Customer A and B are associated to services that have high criticality values and are down.

The root cause alarm for the outage on Customer A's service will have an increased impact of + 30 for the service and + 15 for the customer. The root cause alarm for Customer B's service will have an increased impact of +10 for the service and +5 for the customer.

Consequently, because Customer A has a higher criticality value, the alarms that affect Customer A's service have a higher impact. This means that although both example alarms affect high criticality services, the root-cause alarm that affects Customer A's service will have a higher impact values. If the alarm view in OneClick is ordered by alarm impact, the alarm affecting Customer A would appear higher in the alarm table.

Create a Customer Group

Service Manager lets you organize customers in groups in any way that meets your requirements for tracking and managing customers.

To create a customer group

1. Open the Service Editor (see page 18).
2. Click the Customers tab and click Create Group.

   The Create Customer Group dialog appears.
3. Enter a Customer Group Name, the landscape where you want to create the group, and, optionally, a security string.
4. Under Group Location, select the group in which you want the new customer group saved.

   Note: By default, Service Manager saves all customers and customer groups under the customer manager model on the landscapes where the customer model or customer group model exists.
5. Click Create.

   The customer group is created.

More information:

Example: Define a Customer and a Customer Group (see page 135)

Edit Customer Settings

You can edit customer settings as required.

To edit customer settings

1. Open the Service Editor (see page 18).
2. Click the Customers tab, select the customer you want to edit, and then click Edit.

   The Edit Customer dialog appears.
3. Modify the settings:
   - Under the Contact Information tab, you can edit all contact information except the landscape where the customer was created.
   - Under the Customer Group tab, you can move the customer to a new location.

   Click OK.

   The customer settings are edited.

Edit a Customer Group

You can edit customer group settings as required.

To edit a customer group

1. Open the Service Editor (see page 18).
2. Click the Customers tab, select the customer group you want to edit, and click Edit.

   The Edit Customer Group dialog appears.
3. Modify the settings.

   Note: You can modify the group name and security string. You cannot modify the landscape where the group was created.
4. Click OK.

   The customer group is edited.

Move a Customer or a Customer Group

As your customer list grows, you may want to reorganize your customers and customer groups by moving them from their current locations to new locations. When you move a customer group, you also move its customers along with it.

To move a customer or a customer group

1. Open the Service Editor (see page 18).
2. Click the Customers tab, select the customer or customer group you want to move.
3. Drag and drop the customer or customer group to the new location.

   The customer or customer group is moved.

Delete a Customer or a Customer Group

You can delete customers and customer groups you no longer use. When you delete a customer group, you can choose to delete or retain its customers.

To delete a customer or a customer group

1. Open the Service Editor (see page 18).
2. Click the Customers tab, select the customer or customer group you want to delete, and then click Delete.

   Note: If you are deleting a customer group, you are prompted to retain the group's customers or delete them along with the group.
3. Respond to the confirmation message that appears to complete the deletion.

   The customer or customer group is deleted.

Associate a Service or an SLA with a Customer

Service Manager lets you associate customers with services and SLAs. This is beneficial in the following ways:

- You can track services and SLAs associated with customers in Service Dashboard, Service Editor, and OneClick.
- You can generate service and SLA reports about specific customers with CA Spectrum Report Manager.

To associate a service or an SLA with a customer

1. Open the Service Editor (see page 18).
2. Click the Customers tab, select the customer you want to associate with a service or SLA, click the Services or SLAs tab, and click Select Customer Services or Select Customer SLAs.

   The Select Services or Select SLAs dialog appears.
3. Move the services or SLAs you want to associate with the customer from the Available Services or Available SLAs list to the Customer Services or Customer SLAs list. (Do the opposite to remove services or SLAs.) and click OK.

   The service or SLA is associated with the customer.

Note: Only the real-time health of services will impact the status of associated customers. The customer status attribute indicates the real-time status of a customer in terms of any impacted services. Changes to the SLA status of SLA models associated to a customer will not alter the customer models status as the SLA status does not indicate a real-time value.

Chapter 5: Creating and Managing Service Level Agreements

This section contains the following topics:

About Service Level Agreements

CA Spectrum represents a service level agreement or operational level agreement with an SLA model. A Service Manager SLA model or SLA, incorporates measurable provisions which are defined by the service or operational level agreement. These provisions are implemented as service models within CA Spectrum which are in turn monitored by the SLA model. The SLA monitors the real-time health of each associated service, and records outage time when the service is down. The recorded time is compared against a number of thresholds to determine the status of the SLA for a given period of time. SLA models can be created as individual SLAs or from preconfigured SLA Templates.

Guarantees

Each SLA will specify one of more guarantees. A guarantee is a CA Spectrum model that represents and monitors a provision of a the SLA . Each guarantee is associated to a service or resource monitor. The guarantees record service outage time and compares the amount of recorded time to a threshold specified by the user. A guarantee is considered violated if the amount of accumulated service down time exceeds the threshold specified by the users. If the guarantee has not recorded any outage time, or the recorded outage time is less than the threshold, the guarantee is considered complaint. The status of an SLA will be equal to the status of its worst guarantee. In other words if any one of an SLAs guarantees is violated, the SLA is violated. The status of an SLA is always expressed in terms of a period. Once an SLA is violated it remains violated for the duration of the current period, unless outages contributing to the violation are edited in such a way that recorded outage time is removed from the guarantee.

Many SLAs include some form of an availability guarantee. For example the SLA may stipulate that the service is guaranteed to be available 99.9% of each month. These statements define both the availability threshold and the period of time for which the threshold applies.

SLAs commonly will include performance or response time provisions. For example an SLA might state that service response time will be 100 ms or better 99.9% during the hours of 8 AM to 5 PM each week day.

Service Manager provides both Availability and Response Time guarantees. Functionally availability and response time guarantees are very similar in the way that outage time is recorded. Availability guarantees offer three additional thresholds for mean time to repair, maximum outage time and mean time between failures. The distinction of availability vs. response time is generally used for organizational convenience rather than functional purposes, as an availability guarantee can be configured to perform identically to a response time guarantee.

An SLA can include as many guarantees (either availability or response time) as required, to monitor all measurable provisions in a service level agreement. The SLA is considered complaint when all of it guarantees are compliant, or violated if any of its guarantees are violated. Guarantees and SLAs can also have a status of warned or at risk if a guarantee has record service outage time such that a violation is likely to occur. When the status of the SLA changes to a warned or violated state, an alarm will be generated on the SLA model. This alarm will remain on the model until the SLA period ends, or a user initiated outage edit causes the recorded time to fall below the threshold.

Guarantee thresholds can be configured in one of two ways. First and most common is by percentage of availability. When configuring percentage based thresholds a user will specify was the desired availability for the guaranteed service is. User can also configure guarantee thresholds by the number of seconds of outage time not to be exceeded for the period. Configuring a threshold based on a set number of seconds can eliminate some of the variability found with percentage based thresholds for monthly periods.

Regardless of how the threshold is configured the guarantee determines it's status based on the amount of recorded outage time versus the amount of allowable outage time for the period. Consider an SLA that stipulates that a service must be available 99.5% of the time for the SLA period. The SLA must include a guarantee that specifies the availability threshold (99.5%). Stated another way, the service cannot be down more than 0.5% of the total time for the The SLA period, in this case a calendar month. For a thirty-day month this means that out of 720 available hours, the service cannot be down more than 3.6 hours.

Suppose that additionally the SLA stipulates that no individual service outage will exceed 15 minutes, and that average time to repair an outage should not exceed 10 minutes. These statements indicate that 1 addition to overall threshold of 99.5% the guarantee will also specific threshold for MOT (maximum outage time), and MTTR (mean time to repair). If any of the guarantees thresholds are violated the guarantee, and likewise the SLA will be considered violated for the period.

Period

A *SLA period* is the interval for which the guarantees will compute their status. The most common SLA periods are monthly, this means that the guarantees specified for the SLA will record time and calculate status on a monthly bases, with a specific start and end time. For example if the SLA period is monthly on the first the period will begin at midnight on the first of the month, and end at midnight on the first day of the following month. The next SLA period begins immediately after the current SLA period ends.

In addition to the overall SLA period, some service level agreements may define specific hours that a guarantee is relevant for. For example the SLA may state availability of 99.9% from 8 AM to 5PM Monday through Friday. These time frames within the period are called *business hours*.

Business hours can also be described as the times when the guarantee is active. A guarantee will not record outage time for service outages occurring outside of its business hours. Also percentage based guarantee thresholds are calculated specifically to include only the time for which the guarantee is active. What this means is that a guarantee which defines a percentage based threshold and business hours will have far less allowable outage time, than a guarantee that specifies the same threshold, but no business hours.

SLA Considerations

It's important that SLA status is accurate based on the guarantees stipulations in the SLA. In almost every case you will find that not all service outages should impact the SLA. One of the most common problems that users will encounter when using SLA models is guarantees recording outage time for issues that are not guaranteed by the SLA. The reason for this is that services designed for accurate real-time monitoring generally do not lend themselves well to SLAs.

When designing a service to encompass all possible fault scenarios users will build a vast set of resource monitoring capability. SLAs on the other hand tend to be very focused on specific types of service outages. For example consider a critical application service. For real time monitoring users would want to understand the availability of the physical servers, the critical processes, system resources, network connections, application and network response time etc. For accurate real-time management it's necessary that the service consider a wide range of potential resource faults.

In support of the application service the server team has an SLA that stipulates the physical servers will be available 99.9% of the time during regular business hours. The server team is responsible for the physical servers, but not for the applications running on them, or the network which provides access to them. Consequently the availability guarantee for the server teams SLA should only record time if there is a failure of the server itself, but not if there is a failure of the application, or a network failure that prevents access to the server.

When considering this it's easy to understand that the design of a service designed for real-time monitoring is likely to be very different from a service that is designed to isolated specific resource faults for an SLA. Let's look at a couple aspects of the scenario described above, and consider how service design might be different.

First consider how availability of the physical servers is monitored in CA Spectrum. In the most basic terms if contact is lost to the server then the server can be considered not available. In terms of the SLA; however, it's not enough to say that contact is lost, the SLA must consider the distinction between a server outage and a network outage preventing access to the server. In CA Spectrum this could mean that the availability guarantee should only record outage time if the server is red, and should not record outage time if the server is gray. If the application service was designed for real-time monitoring it's unlikely that its designers included resource monitoring components to distinguish between these two types of outages.

Next consider how server faults must be distinguished from application or process failures. The server team is not responsible for the processing running on the server itself. To begin any monitored processes outages probably should be isolated to the process model and not the server. Other system resource related failures may or may not be the responsibility of the server team, for example high CPU is likely the result of the applications on the machine, failures of local files systems on the other hand could be the responsibility of the server team. Again it's unlikely the original designers of a service for real time monitoring would have considered making these distinctions in their service design.

There are two techniques that can be used to help insure that SLAs accurately monitor the services they guarantee.

The first option is to simply create a parallel set of services which specifically monitor the components guaranteed by the SLA. These services are built in addition to services designed for real time monitoring. They will monitor a smaller set of resources, possibly use different service policies, and likely will not produce alarms. SLA specific services might also define periods of maintenance with makes them inactive outside of the SLA specified business hours. This is probably the easiest technique, but it doesn't always scale well. Consider the example of the server team SLA, imagine that the application team and the network also have SLAs. For one logical application service you could easily produce four service hierarchies to support, one for real-time monitoring, one server specific, one application specific, and one network specific. The implementation and maintenance of these services can be daunting.

The second option, an alternate technique, is to insure that all services are built with a very modular design. It is valuable to remember that the use of resource monitors makes it easier to extend the monitoring capability of a service. This is true not only when adding new resources, but also when adding support for SLAs. Resource monitors can used to isolate very specific faults such that guarantees can be associated to the specific resource monitor. If well designed the same service can be used for multiple SLAs, and still used for real-time monitoring.

Create an SLA

When you create an SLA, you name it, specify the period during which it is in effect, and the guarantee thresholds for the services or resource monitors monitored by the SLA. After you create an SLA, you can associate it with an SLA customer. You can also modify an SLA as necessary when service delivery requirements change.

Consider the following before you create an SLA:

- An SLA can have multiple guarantees.
- You can associate a single service to an SLA, but guarantees can be created for that service, or any of it sub services or resource monitors.
- You may need to create new service components to isolate the specific set of faults for which the guarantee is responsible.
- SLA models will reside on the same landscape as the service the SLA is associated to.

To create an SLA

1. Open the Service Editor (see page 18).
2. Click the SLAs tab and click Create.

   The Create SLA dialog appears.
3. Specify the following SLA properties:

   SLA Name

   Identifies the SLA model. OneClick lists SLA names under the Service Management - SLAs category in the Explorer view for each landscape where you have created SLAs. You can use duplicate names for SLAs. However, to facilitate filtering when searching through a lengthy list of identically named SLAs, provide different descriptions for each SLAs.

Control

Specifies whether the SLA is activated during the current SLA period (Active), the default setting, or the next period (Inactive Until Next Period).

Note: If you activate an SLA during an SLA period, Service Manager does not prorate allowable outage time. The service associated with the SLA is allowed the amount of down or degraded time specified for the entire period. For example, if an SLA allows five hours of outage for a 30-day month and you activate an SLA on the 15th of the month, the service associated with the SLA can be unavailable for up to five hours over the course of remaining 15 days. In terms of an availability obligation, this situation allows for twice as much service outage than a service customer would expect over the remaining 15-day period. In this case, you could modify the availability threshold for the SLA's guarantee(s) to an amount of time for the partial period proportional to the entire period. For example, in the previous example, you could change the availability threshold to two and half hours for the partial 15-day period.

Description

(Optional) Describes the SLA. You can enter unique descriptions for SLA that have the same name to facilitate finding each SLA using a list's filtering capabilities.

Security String (Optional)

Identifies the security string for the SLA model. The security string secures access to the SLA model in CA Spectrum. See the *Administrator Guide* for more information on securing CA Spectrum models.

Notes

(Optional) Includes any information about the SLA you want to enter not covered in the Description field.

Expiration Date

Specifies the date a recurring SLA period expires. Check the box, and enter the date in the field that appears. If the date falls within an SLA period, the SLA stays in effect to the end of the period.

Period

Specifies the interval during which the SLA is in effect. Select the period from the drop-down list, or click Create to create an SLA period (see page 109).

4. Configure one or more guarantees for the SLA.
5. Associate a service to the SLA by moving it from the Available Services list to the SLA Services list.
6. Click Create.

   The SLA is created.

More information:

Create a Guarantee for a Service, Sub-Service, or Resource Monitor (see page 105)
Create a Guarantee for a Top-Level Service (see page 104)
Create an SLA Template (see page 112)
Edit an SLA (see page 110)
Edit an SLA Template (see page 113)
Examples: Create a Guarantee for an SLA (see page 133)

Create an SLA From an SLA Template

An SLA template is an SLA configuration you create and save as a template and from which you can create multiple SLAs. When you create an SLA from an SLA template the SLA inherits the template settings. You can tailor SLA settings inherited from a template except for following:

- Guarantees — The guarantees in an SLA template can only be modified in the SLA template workspace, and any changes to the guarantees extend to only those SLAs created from the template that have been kept in sync with the template.
- Period — The period in an SLA template can only be modified in the SLA template workspace, and any changes to it extend to only to those SLAs created from the template that have been kept in sync with the SLA template.

Consider the following before you create an SLA from an SLA template:

- When you create an SLA from an SLA template, you can choose whether or not to keep the SLA in sync with (or associated with) the SLA template. If you choose to keep the SLA in sync with the template, all changes to the template guarantees and SLA period extend to the SLA. If you choose not to keep the SLA in sync with the template, changes to the template guarantees and the SLA period do not extend to the SLA created from the template.
- The settings for any SLA created from an SLA template that has been deleted convert to local settings.

To create an SLA from an SLA template

1. Open the Service Editor (see page 18).
2. Click the SLAs tab and then click Create From Template.

   The Select SLA Template dialog appears.
3. Select the SLA template you want to use to create the SLA and click OK.

   The Create SLA From Template dialog appears.
4. Configure editable settings as required.
5. Choose whether or to keep the SLA in sync with the template. If you do not want to keep the SLA in sync with the template, deselect the Keep in sync with template option. Otherwise, leave it selected. You can also deselect the option anytime after you have created the SLA from the template.
6. Click Create.

   The SLA is created from an SLA template.

More information:

SLA Templates (see page 112)

Guarantee Types

You can specify one of the following guarantees for a service or a resource monitor:

Availability

You can specify an availability threshold expressed as a percentage of the period for which the service will be available or the amount of time in seconds that the service must not exceed for the period. This guarantee interprets the time a service or a resource monitor's service health value is down as outage time. You can also specify these supplemental thresholds when you specify an availability guarantee:

Mean Time Between Failure (MTBF)

(total time between failures) / (total number of failures – 1)

If the interval between failure falls below this value, the status of the guarantee changes to "At Risk," and CA Spectrum generates a Major (Orange) alarm for the SLA. Any time the interval between failures exceeds this value, CA Spectrum clears the "At Risk" alarm. If the guarantee is "At Risk" at the end of the period, CA Spectrum generates a Critical (Red) alarm for the SLA.

Mean Time to Repair (MTTR)

(total outage time) / (total number of outages)

If the average outage duration exceeds this value, the status of the guarantee changes to “At Risk,” and CA Spectrum generates a Major (Orange) alarm for the SLA. Any time the average duration falls below this value, CA Spectrum clears the “At Risk” alarm. If the guarantee is “At Risk” at the end of the period, CA Spectrum generates a Critical (Red) alarm for the SLA.

Maximum Outage Time (MOT)

If the service or resource monitor has an outage that exceeds this value, The SLA is violated, and CA Spectrum generates a Critical alarm for the SLA.

Response Time

Lets you define a threshold for monitoring a service or resource monitor that determines its service health from the results of response time (or performance) tests. This guarantee interprets the time a service or a resource monitor’s service health value is degraded as outage.

Create a Guarantee for a Top-Level Service

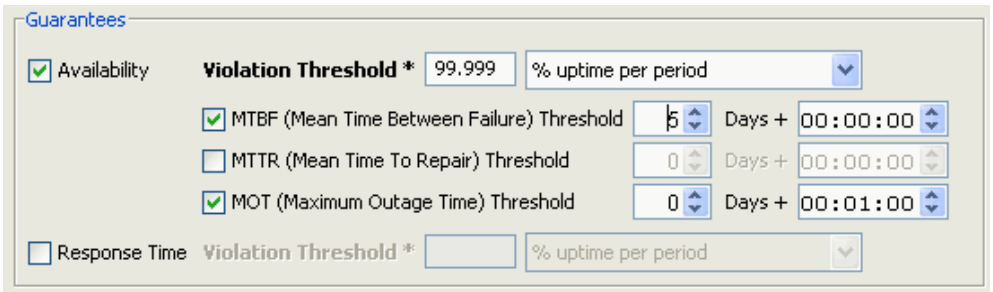
You can create a guarantee for a top-level service, which lets you create a guarantee for an entire service but not to any sub-services and resource monitors it may include.

To create a guarantee for a top-level service

1. Select a threshold type: Availability or Response Time:
   - Specify a Violation Threshold value for % uptime per period or seconds of outage time per period for the threshold(s). The default uptime percentage is 99.9.
   - If you specify an availability threshold, specify values for any or all of the MTBF, MTTR, and MOT thresholds.

   Service Manager provides a name for the guarantee using this format: *Threshold type - SLA name*. For example: Availability - Web Service SLA

The following is an example availability guarantee that includes an uptime threshold and MTBF, MTTR, and MOT supplemental thresholds:



More information:

Create an SLA (see page 100)
Examples: Create a Guarantee for an SLA (see page 133)

Create a Guarantee for a Service, Sub-Service, or Resource Monitor

You can create a guarantee for a service, a sub-service, or a resource monitor.

To create a guarantee for a service, a sub-service, or a resource monitor

1. Open the Service Editor (see page 18).
2. Click the SLAs tab, select the SLA for which you want to create the guarantee, click the Guarantees tab, and then click the Create button.

   The Create Guarantee dialog appears.
3. Specify the following guarantee properties:

   Guarantee Name

   Identifies the guarantee model.

   Control

   Specifies whether the guarantee is Enabled or Disabled during the current SLA period. When you disable a guarantee, it does not accumulate outage time during the SLA period. Generally a guarantee is created in the disabled state if SLA and the services it guarantees are still be defined. However, there may be scenarios where due to alterations of a specific service it makes sense to periodically disable one of more guarantees.

   Guarantee Type

   Specifies the type of guarantee: Availability or Response Time.

   Outage Type

   Specifies whether the guarantee accumulates Down or Degraded time. response time guarantees accumulate only degraded time, while availability guarantees can be configured to accumulate either down time or degraded time.

Accumulation Method

Service Manager provides two accumulation methods: Straight time and Per Resource.

Straight time means that the guarantee will record outage time that corresponds exactly to service outage time. One minute of service outage time produces one minute of outage time for the guarantee. Straight time is almost always the appropriate configuration for a guarantee. Under extremely rare circumstances per resource configurations are used to record time based on the resources contributing to the service outage.

Per resource guarantee are only used for a very specific type of SLA which actually guarantees specific availability of individual service resources as opposed to the service as a whole. The result is the guarantee can record outage time in excess of the actual service outage time. Once again per resource guarantees are very specialized and are very uncommon.

Violation Threshold *n*% uptime per period or seconds of outage time per period

Specifies a service availability threshold that if during the current SLA period results in a critical alarm on the SLA model. The default uptime percentage is 99.9.

(Optional) Generate warning alarm after accumulating *n*% of allowed outage time

The warning percentage is a percentage of the violation threshold in terms of allowable outage time. When a guarantee becomes warned a major alarm is generated on the SLA. This may allow users to take action before the SLA becomes violated.

4. Select the Service or Resource Monitor tab, and then select a service or resource monitor by moving it from the Available Services and Groups box to the Service or Group being Measured box.
5. (Optional) Specify “business hours” intervals (see page 107) during which you want the guarantee in effect.

   Note: By default a guarantee is always active, meaning that it will record outage time 24x7.
6. Click Create.

   The guarantee is created.

More information:

Create an SLA (see page 100)
Edit a Guarantee (see page 108)
Create a Guarantee Template (see page 114)
Edit a Guarantee Template (see page 115)
Examples: Create a Guarantee for an SLA (see page 133)

Specify Business Hours for a Guarantee

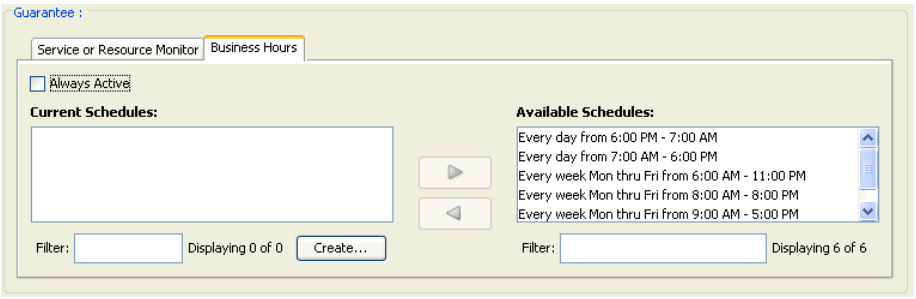
If you are creating a guarantee for an SLA that measures service availability or performance for a particular portion of a day, or "business hours," you can identify those hours in the guarantee. This means that the guarantee accumulates service outage time only during the business hours, and the SLA availability threshold applies only to the business hours.

You can also specify multiple intervals for a guarantee, as long as they do not overlap. For example, if you want a guarantee to watch a service or resource monitor 7 AM to 5 PM on Monday, Wednesday, and Friday, 6 AM to 6 PM Tuesday and Thursday, and continuously throughout the weekend, you could specify these three schedules in the guarantee.

For guarantees which specify a percentage of availability it's important to understand that the availability calculation is made against the time the guarantee is actually active. This means that a guarantee defining business hours may have significantly less available outage time than one with the same availability threshold that does not define business hours.

To specify business hours for a guarantee

1. Open the Service Editor dialog (see page 18).
2. Click the SLAs tab, select the SLA that contains the guarantee you want to modify, and click the Guarantees tab.
3. Select the guarantee you want to specify business hours for and click Edit.
4. Click the Business Hours tab, and deselect Always Active, as shown following:



Note: If you want the guarantee in effect continuously throughout the SLA period, click the Business Hours tab and select Always Active (default).

5. Select and move one or more intervals from the Available Schedules list to the Current Schedules list.
6. (Optional) If you require a custom interval do the following:
   a. Click Create.
   b. Configure the interval and click OK.

      The custom interval is added to the Available Schedules list.
   c. Select and move the custom interval from the Available Schedules list to the Current Schedules list.
7. Click OK.

   Business hours are specified for the guarantee.

More information:

Create a Guarantee for a Service, Sub-Service, or Resource Monitor (see page 105)

Edit a Guarantee

You can edit a guarantee anytime after you create it; however changes to thresholds or business hours are not recommended.

Consider the following before editing a guarantee:

- Modified thresholds take effect during the current period, this may not be desirable.
- A guarantee begins a new down or degraded time tally when you change the service or resource monitor with which it is associated during the current period.
- A guarantee modifies its outage time tally during a period if an outage has occurred and ended during the period and the outage has had its status modified (to exempt for example) during the period.

To edit a guarantee

1. Open the Service Editor (see page 18).
2. Click the SLAs tab, select an SLA from the list of SLAs, click the Guarantees tab (in the lower panel) and click Edit.

   The Edit Guarantee dialog appears.
3. Edit the settings, as described in Create a Guarantee for a Service, Sub-Service, or Resource Monitor (see page 105) and click OK.

   The guarantee is edited.

Delete a Guarantee

You can delete a guarantee for an SLA as your requirements for the SLA change.

Important! Delete with caution. Deleting the only guarantee for an SLA renders it inoperative.

To delete a guarantee

1. Open the Service Editor (see page 18).
2. Click the SLAs tab, and then select the SLA from which you want to delete a guarantee.
3. Click the Guarantees tab, select the guarantee you want to delete, and then click Delete (in the lower panel).
4. Respond to the confirmation message that appears to complete the deletion.

   The guarantee is deleted.

Create an SLA Period

Service Manager provides two default SLA periods that commence at the following times for the time zone where the SpectroSERVER is located:

- On the 1st of every month at 12:00 AM
- On the 15th of every month at 12:00 AM

You can specify one of these periods when you create or edit an SLA, or you can create and specify a custom period that meets your particular service contract requirements. Service Manager saves the periods you create so you can use them for other SLAs.

To create an SLA period

1. Click the Create button next to the Period field in the Create SLA dialog or the Edit SLA dialog.

   The Create Period dialog appears.
2. Specify a period, and optionally a description, and then click OK. Repeat as necessary to create and save additional periods.

   The SLA period is created.

More information:

Create an SLA (see page 100)

Edit an SLA

Periodically it may be necessary to alter the configuration of a SLA model. Service Manager allows certain edits, but you should take care in the types of changes that are made. If the required change involves alteration of guarantee thresholds, business hours or the SLA period it is recommended that you do not make these edits to an active SLA. The period and guarantee thresholds are the essence of the SLA. If the guarantees stipulations are changed it really means there is a new SLA.

Therefore it's important that the real-time status of an SLA, and its historical reported status are based on complete periods with consistent thresholds. Consider how confusing data might look if an SLA recorded that same amount of outage time across two periods, but was compliant for one period and violated for the next due to a threshold change.

Rather than making edits to the standing SLA it is recommended that you set the expiration date of the SLA to correspond with the end of the current period, then create a new SLA with the new threshold settings, and set its control value to Inactive Until Next Period. This will insure that the current SLA will complete the period with its existing configuration and the new SLA will take over seamlessly at the beginning of the next period.

If you change the service associated with the SLA, the following occurs:

- Service Manager resets the start time of the SLA.
- All of the SLA's guarantees go to the Initial (Blue) state, which means you must associate a new service or resource monitor to each guarantee.

To edit an SLA

1. Open the Service Editor (see page 18).
2. Cick the SLA tab, select the SLA you want to edit from the list, and then click Edit.

   The list field, Template Name, indicates whether the SLA was created from an SLA template. If it was, the field lists the source SLA template name.

   The Edit SLA dialog appears. If you select an SLA created from an SLA template, the dialog includes the Keep in sync with template selection box. You can deselect the sync option if you want to disassociate the SLA from its source SLA template and edit all SLA fields. Otherwise, you can edit only those settings that are not managed in the source SLA template.
3. Edit the settings, as described in Create an SLA (see page 100) and click OK.

   The SLA is edited.

Delete an SLA

You can delete an SLA anytime after you create it. However, you would typically not delete an SLA that is actively monitoring a service.

Important! Use caution when deleting SLAs because you may inadvertently delete an SLA that is actively monitoring a service.

To delete an SLA

1. Open the Service Editor (see page 18).
2. Click the SLAs tab, select the SLA you want to remove from CA Spectrum, and then click Delete.
3. Respond to the confirmation message that appears to complete the deletion.

   The SLA is deleted.

Associate a Customer with an SLA

Service Manager lets you associate one or more customers with an SLA to help you track and manage SLAs and customers. The status of the customer model is not impacted by the status of the SLAs associated to it. You can generate SLA reports with CA Spectrum Report Manager based on SLA-customer associations.

To associate a customer with an SLA

1. Open the Service Editor (see page 18).
2. Click the SLAs tab, select the SLA you want to associate with a customer, click the Customers tab, and then click Select SLA Customers.

   The Select Customers dialog appears.
3. Move the customer you want to associate with the SLA from the Available Customers list to the Customers that use this SLA list and click OK.

   The customer is associated with an SLA.

SLA Templates

An SLA template includes configuration settings that are inherited by the SLAs you can create from the template. This lets you create multiple SLAs with similar settings for different customers and services without having to fully configure each SLA individually. The use of SLA templates is common in traditional service provider environment which offer similar SLAs to multiple customers. The SLA template also allows for users to make changes or additions to all associated SLAs by editing the template itself. Although this can be a convenient feature users should be cautious when making edits guarantee thresholds or business hours setting.

The following SLA template settings cannot be edited in an SLA that has been created from a template while the SLA in sync with the template:

- Period
- Guarantees

All other inherited settings can be modified in the SLA. All settings can be modified, however, if an SLA is disassociated (in sync option deselected) from its parent template.

The guarantees you create for SLA templates are referred to as guarantee templates. You create and manage guarantee templates in the SLA Template workspace the same way you do with guarantees in the SLA workspace.

More information:

Create an SLA From an SLA Template (see page 102)

Create an SLA Template

You can create as many SLA templates as you require, but the templates must have unique names.

To create an SLA template

1. Open the Service Editor (see page 18).
2. Click the SLA Templates tab and click Create.

   The Create SLA Template dialog appears.

3. Specify settings for the SLA template (see page 100).

   Note: SLA Templates are often created with a control of Inactive. This allows users to instantiate the actual SLAs in the inactive state, and activate them when appropriate.

4. (Optional) Configure basic guarantee settings for the template. You can specify more detailed guarantee settings or a new guarantee for the template (called a guarantee template) after you create the template.

5. Click Create.

   The SLA template is created.

Edit an SLA Template

You can edit an SLA template anytime before or after it is in effect.

Consider the following before editing an SLA template:

- Changes to the period and guarantees in a template extend to all SLAs created from it that are in sync with the template. This may not be desirable.
- When you delete a template, the associations between the SLAs created from it that are in sync with the template are severed. This means you can edit all period and guarantee settings in the SLAs that were once managed exclusively in the former template.

To edit an SLA template

1. Open the Service Editor (see page 18).
2. Click the SLA Templates tab, select the template you want to edit from the list, and click Edit.

   The Edit SLA Template dialog appears.

3. Edit the settings, as described in Create an SLA (see page 100), and click OK.

   The SLA template is edited.

Delete an SLA Template

You can delete an SLA template anytime after you create it. When you delete an SLA template, all SLAs created from the template that were kept in sync with it become fully editable.

To delete an SLA template

1. Open the Service Editor (see page 18).
2. Click the SLA Templates tab, select the template from the list you want to remove from CA Spectrum, and click Delete.
3. Respond to the confirmation message that appears to complete the deletion.

   The SLA template is deleted.

Guarantee Templates

You can create guarantee templates for SLA templates. You can edit guarantee template settings, and those changes extend to all SLAs created from the SLA template that includes the guarantee template.

You can modify guarantee templates only from the SLA Templates workspace. You cannot access guarantee templates from the Guarantees tab in the SLA workspace.

You cannot specify watched services or Resources Monitors for guarantee templates. You associate the guarantee created from it to services and resource monitors you specify when you create an SLA from an SLA template that includes the guarantee template.

Note: Users should exercise caution when editing guarantee templates for the reasons outlined in the Edit an SLA section.

Create a Guarantee Template

Guarantee templates can be created in the Create SLA Template dialog or in the Create Guarantee Template dialog. This section describes the latter method.

To create a guarantee template

1. Open the Service Editor (see page 18).
2. Click the SLA Templates tab, select the SLA template for which you want to create the guarantee template, click the Guarantee Template tab, and then click Create.

   The Create Guarantee Template dialog appears.
3. Configure settings (see page 105), and then click Create.

   The guarantee template appears under the Guarantee Template tab for the SLA template and is inherited by all SLAs created from the template.

Edit a Guarantee Template

You can edit a guarantee template any time after you create it. Because they are changed within the context of an SLA template, all SLAs created from it that are in sync with the template are changed as well. Users should exercise caution when editing guarantee templates for the reasons outlined in the Edit an SLA section.

To edit a guarantee template

1. Open the Service Editor (see page 18).
2. Click the SLA Templates tab and select the SLA Template that includes the guarantee template you want to edit from the list of templates.
3. Click the Guarantee Templates tab to display guarantee templates for the selected SLA template
4. Select the guarantee template you want to edit from the list, and then click Edit (in the lower panel).

   The Edit Guarantee Template dialog appears.
5. Edit the settings as necessary as described in Edit a Guarantee, and click OK.

   Note: See Create a Guarantee for a Service, Sub-Service, or Resource Monitor (see page 105) for information about guarantee settings.

Delete a Guarantee Template

You can delete a guarantee template as your requirements change.

Important! Delete with caution. Deleting the only guarantee template for an SLA template renders the SLAs created from and in sync with the template inoperative.

To delete a guarantee template for an SLA template

1. Open the Service Editor (see page 18).
2. Click the SLA Templates tab and select the SLA template from the list of templates from which you want to delete a guarantee template.
3. Click the Guarantee Templates tab, select the guarantee template you want to delete, and then click Delete (in the lower panel).
4. Respond to the confirmation message that appears to complete the deletion.

   The guarantee template is deleted.

Chapter 6: Creating Service Management Components with Modeling Gateway

You can create service management component models using the CA Spectrum Modeling Gateway Toolkit to define service component model configurations in XML input files and import the files into CA Spectrum. Defining service management models with the Modeling Gateway Toolkit and importing them into CA Spectrum instead of creating them with Service Editor is advantageous in the following ways:

- Modeling Gateway lets you define new models in bulk. Once you have created a particular service management model, you can use the XML input file for the model as a template for creating other models of that type.
- You can edit service management models imported through Modeling Gateway either by using the Service Editor or by simply editing and re-importing the original XML file.
- There may be an opportunity to automate the creation of service management models by producing an xml file for import based on an external data source.

Note: For information about Modeling Gateway capabilities and Modeling Gateway user prerequisites, see the *Modeling Gateway Toolkit Guide.*

This section contains the following topics:

About the XML Framework

The hierarchy models (SM_Service_Mgt, SM_ServiceMgr, SM_SLA_Mgr, CustomerManager) must be arranged and named in the XML input file according to the following example.

The following example illustrates the basic framework of the XML input file. Each service management component will be added within the appropriate section of the file. Service models can be created within the SM_ServiceMgr block, or within other services. Customer models and Customer Group models are created within the CustomerManager block. Finally SLA models are created within the SLA_Mgr block.

```
<?xml version="1.0" standalone="no"?>
<!DOCTYPE Import SYSTEM ".import.dtd">

<Import>

<SM_Service_Mgt
      name="Service Management"
      containment_relation="SlmHasServiceComponent">

        <SM_ServiceMgr
                name="Services"
                containment_relation="SlmContains">

        </SM_ServiceMgr>

        <SM_SLA_Mgr
                name="SLAs"
                containment_relation="SlmContainsSLAs">

        </SM_SLA_Mgr>

        <CustomerManager
                name="Customers"
                containment_relation="Groups_Customers">

        </CustomerManager>

</SM_Service_Mgt>

</Import>
```

The following shows the hierarchy represented in the OneClick Console.

Important! While the name and containment_relation attribute values in the framework tags must be adhered to in the XML file you import, the individual service, resource monitor, customer, SLA, and guarantee models you import must have unique names. This differs from the OneClick client. Because modeling gateway uses name for uniqueness services with the same name will be interpreted as the same model.

Service Models

Service models must be defined within the SM_ServiceMgr tag in the XML file that you import. For each landscape where Service Manager is installed, there is only one SM_ServiceMgr model with the model name, Services.

Each service model in a given landscape must be either SlmContains by the ServiceManager or SlmMonitors by another service model.

To use Modeling Gateway effectively, you should understand the mapping between policies and policy IDs. For example, if a service monitors other services or resource monitors, it should be configured with a service health policy (IDs 6-9). Also, you can determine a policy ID for a user-created policy by setting up the Policies table in the Service Policy Editor to display IDs.

More information:

Service Manager Policy Descriptions (see page 183)
Customize a Service Policy Editor Information Table (see page 198)
Service Attributes (SM_Service) (see page 139)
Monitor Resource Monitor Attributes (SM_AttrMonitor) (see page 140)
Customer Group Attributes (SM_CustomerGroup) (see page 141)
Customer Attributes (SM_Customer) (see page 141)
SLA Attributes (SM_SLA) (see page 142)
Guarantee Attributes (SM_Guarantee) (see page 143)
Schedule Attributes (Schedule) (see page 145)

Policies and Watched Attributes

When using Modeling Gateway to model services, the value for the MonitorPolicy_ID should be set to the id number associated with the policy the service will use. Service policy ids can be seen in the service policy editor by adding the Service Policy ID column to the service policies table. Out-of-the-box policies start at 1, user created policies start at 1000.

In addition to viewing policy ID in the service policy editor you can see the policy id displayed at the following link.

http://<server>/spectrum/slm/ policyrep.jsp

Keep in mind the when specifying the Monitor Policy_ID you must also insure that the AttrToWatch matches the attribute for the policy you have chosen.

Note: If your XML file creates a mismatch between a monitor policy ID and watched attribute (for example watching Contact Status using policy ID 2), Service Manager puts the service in a defunct condition, which is reported as an outage and can be viewed in Service Dashboard. When a service becomes default an alarm is generated on the Service Management model. This alarm is major for services which are associated to an SLA, and minor for services which are not.

More information:

Policy ID Mappings (see page 183)

Example: Services That Monitor Resources Directly

The following XML document configures a service named “Test Service.” It monitors the contact status of two Cisco routers and generates a critical alarm if contact to either router is lost:

```
<!-- Each SpectroSERVER will have only one -->
<!-- SM_ServiceMgr model, named “Services”. -->

<SM_ServiceMgr
    name="Services"
    containment_relation="SlmContains">

    <SM_Service
        containment_relation="SlmMonitors"
        name="Test Service"
        AttrToWatch="Contact_Status"
        MonitorPolicy_ID="11"
        Criticality="10"
        Generate_Service_Alarms="true">
        <Device ip_dnsname="10.253.9.7" />
        <Device ip_dnsname="10.253.9.8" />
    </SM_Service>

</SM_ServiceMgr>
```

This relation associates a service with resources.

Enter either a SPECTRUM-provided Policy ID (1-21) or ID (1000, 1001, ...) for a policy created in Service Editor.

Enter device (resource) IP address or DNS name.

- The Services model contains (has an SlmContains relationship with) Test Service. This would make the Test service a direct child of the service manager. The Test service would appear under the Services icon in the OneClick navigation panel.
- Test Service monitors (has an SlmMonitors relationship with) the 10.253.9.7 and 10.253.9.8 devices and watches their Contact_Status attributes using the Contact Status High Sensitivity policy.
- The value of Generate_Service_Alarms is true, indicating that when the service's health value is down, degraded, or slightly degraded, CA Spectrum generates an alarm for the service.

More information:

Example: Import XML Input Files (see page 138)

Example: Services That Monitor Resources in Resource Monitors

The following XML document defines a service named "XYZ Service," which monitors two other services (Core Routers and DNS) directly. In addition the XYZ service defines three resource monitors by specifying SM_AttrMonitor elements. The first resource monitor is called XYZ Condition and monitors the contents of the XYZ Network container. The second resource monitor is called XYZ Response Time and monitors an SPM test call XYZ_RTM_1. Finally the service also defines a resource monitor called XYZ Port Status which monitors an interface model.

```
<SM_Service
                containment_relation="SlmMonitors"
                name="XYZ Service"
                Criticality="25"
                AttrToWatch="Service_Health"
                MonitorPolicy_ID="8"
                Generate_Service_Alarms="true">

                <SM_AttrMonitor
                        containment_relation="SlmWatchesContainer"
                        name="XYZ Condition"
                        AttrToWatch="Condition"
                        MonitorPolicy_ID="2">

                        <Topology_Container model_type="Network" name="XYZ
Network Servers" />
                </SM_AttrMonitor>

                <SM_AttrMonitor
                        containment_relation="SlmMonitors"
                        name="XYZ Response Time"
                        AttrToWatch="LatestErrorStatus"
                        MonitorPolicy_ID="18">

                        <RTM_Test name="XYZ_RTM_1" />
                </SM_AttrMonitor>

                <SM_AttrMonitor
                        containment_relation="SlmMonitors"
                        name="XYZ Port Status"
                        AttrToWatch="Port_Status"
                        MonitorPolicy_ID="15">

                        <Port ip_dnsname="10.253.50.5"
                        identifier_name="ifIndex"
                        identifier_value="45" />
                </SM_AttrMonitor>
```

```
        <SM_Service name="Core Routers"/>
        <SM_Service name="DNS"/>

</SM_Service>
```

Example: Using XML to Define a Service Template

If you encounter a scenario where many services will share a common pattern or structure it might be handy to define that structure in xml, and use it as a common template. For example you might find yourself building services to monitor a set of applications which are all different, but have common service modeling components. You can define the structure and import as many service models as you need from it. Some of the data may be added for import, or you might create empty services and resource monitors and add resources to them using the OneClick client.

The following shows an example of the xml for a small service hierarchy that define a set of reusable service and resource definitions. The TMPL text represents wildcard test that can be changed to a more meaningful name for each set of services to be imported.

For this example you'll see a service which includes monitoring capability for some application servers, and associated database servers. As well as some additional some response time and performance monitoring. This is not intended to match any specific requirements, but rather serve as an example of how you could create an xml template for a set of services that have common needs.

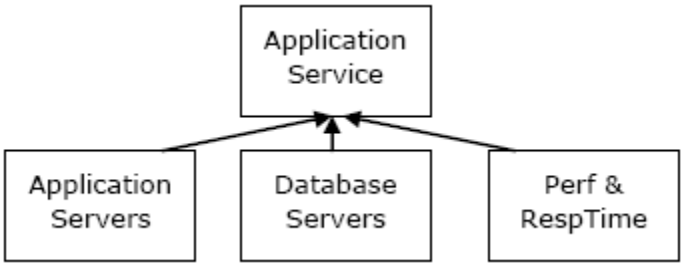
```
<SM_Service
        containment_relation="SlmMonitors"
        name="TMPL Application Service"
        Criticality="10"
        AttrToWatch="Service_Health"
        MonitorPolicy_ID="7"
        Generate_Service_Alarms="true">

        <SM_Service
                containment_relation="SlmMonitors"
                name="TMPL Application Servers"
                Criticality="10"
                AttrToWatch="Service Health"
                MonitorPolicy_ID="9"
                Generate_Service_Alarms="true">

                <SM_Service
                        containment_relation="SlmMonitors"
                        name="TMPL Application Server 1"
                        Criticality="10"
                        AttrToWatch="Service Health"
                        MonitorPolicy_ID="7"
                        Generate_Service_Alarms="true">

                        <SM_AttrMonitor
                                containment_relation="SlmMonitors"
                                name="TMPL App Host 1"
                                AttrToWatch="Condition"
                                MonitorPolicy_ID="3"
                                Cause_List_Control="2"
```

```
                Special_Cause_List="0x1106f-0x11232">

                // Excludes all eHealth alerts

        </SM_AttrMonitor>

        <SM_AttrMonitor
                containment_relation="SlmMonitors"
                name="TMPL App Server 1 Critical Processes"
                AttrToWatch="Condition"
                MonitorPolicy_ID="3">

        </SM_AttrMonitor>

        <SM_AttrMonitor
                containment_relation="SlmMonitors"
                name="TMPL App Server 1 System Resources"
                AttrToWatch="Condition"
                MonitorPolicy_ID="3">

        </SM_AttrMonitor>

        <SM_AttrMonitor
                containment_relation="SlmMonitors"
                name="TMPL App Server 1 Connection"
                AttrToWatch="Response Time"
                MonitorPolicy_ID="19">

        </SM_AttrMonitor>

        <SM_AttrMonitor
                containment_relation="SlmMonitors"
                name="TMPL App Server 1 Performance"
                AttrToWatch="Condition"
                MonitorPolicy_ID="3"
                Cause_List_Control="1"
                Special_Cause_List="0x1120a,0x11219">

                // Includes 2 specific eHealth alerts only
        </SM_AttrMonitor>

    </SM_Service>

</SM_Service>

<SM_Service
        containment_relation="SlmMonitors"
        name="TMPL Database Servers"
        Criticality="10"
```

```
AttrToWatch="Service Health"
MonitorPolicy_ID="6"
Generate_Service_Alarms="true">

<SM_Service
        containment_relation="SlmMonitors"
        name="TMPL Database Server 1"
        Criticality="10"
        AttrToWatch="Service Health"
        MonitorPolicy_ID="7"
        Generate_Service_Alarms="true">

        <SM_AttrMonitor
                containment_relation="SlmMonitors"
                name="TMPL DB Host 1"
                AttrToWatch="Condition"
                MonitorPolicy_ID="3"
                Cause_List_Control="2"
                Special_Cause_List="0x1106f-0x11232">

                // Excludes all eHealth alerts

        </SM_AttrMonitor>

        <SM_AttrMonitor
                containment_relation="SlmMonitors"
                name="TMPL DB Server 1 Critical Processes"
                AttrToWatch="Condition"
                MonitorPolicy_ID="3">

        </SM_AttrMonitor>

        <SM_AttrMonitor
                containment_relation="SlmMonitors"
                name="TMPL DB Server 1 System Resources"
                AttrToWatch="Condition"
                MonitorPolicy_ID="3">

        </SM_AttrMonitor>

        <SM_AttrMonitor
                containment_relation="SlmMonitors"
                name="TMPL DB Server 1 Connection"
                AttrToWatch="Response Time"
                MonitorPolicy_ID="19">

        </SM_AttrMonitor>

</SM_Service>
```

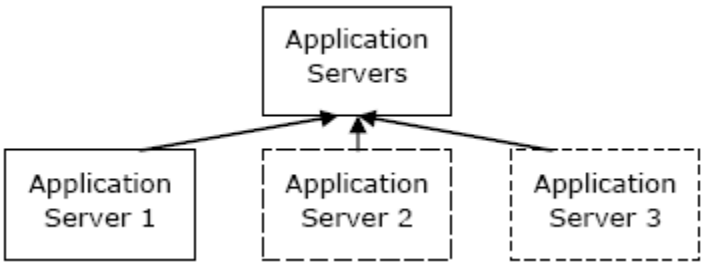
```
        </SM_Service>

        </SM_Service
                containment_relation="SlmMonitors"
                name="TMPL Application Performance & Response Time"
                Criticality="10"
                AttrToWatch="Service Health"
                MonitorPolicy_ID="7"
                Generate_Service_Alarms="true">

                <SM_Service
                        containment_relation="SlmMonitors"
                        name="TMPL Application Response Time"
                        Criticality="10"
                        AttrToWatch="Response Time"
                        MonitorPolicy_ID="20"
                        Generate_Service_Alarms="true">

                <SM_Service>

                <SM_Service
                        containment_relation="SlmMonitors"
                        name="TMPL Application Performance
                        Criticality="10"
                        AttrToWatch="Condition"
                        MonitorPolicy_ID="4"
                        Cause_List_Control="1"
                        Special_Cause_List="0x1106f-0x11232">

                                // Includes eHealth alerts only

                        Generate_Service_Alarms="true">

                <SM_Service>

        </SM_Service>

</SM_Service>
```

Now let's review each component in the xml to understand its purpose and how it fits within the service hierarchy that is defined by the xml. At the top of the hierarchy we have the application Service which has three direct child services:



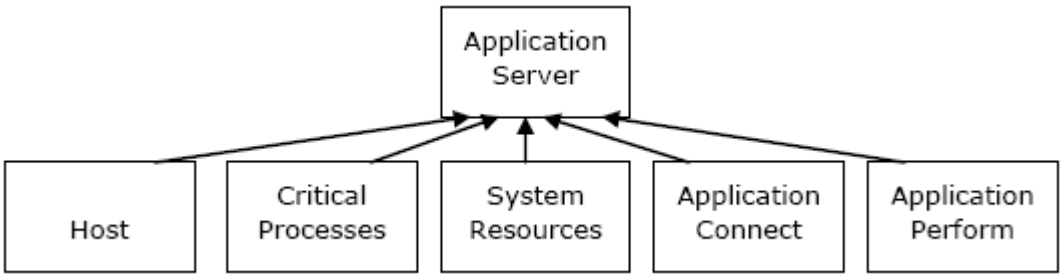
The Application Service monitors each of its child service with a high sensitivity policy, essentially meaning that the Application Service will have a service health equal to that of its worst direct resource.

The Application Servers service is designed to monitor child services which represent individual servers. Each server is represented by a service model with five resource monitors. The xml example contains only Application Server 1, but you could add this section for as many servers as necessary.

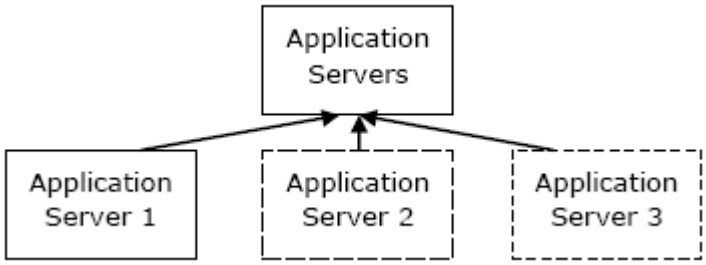


The Application Servers service could monitor the health of individual child services with a redundancy, percentage of low sensitivity policy.

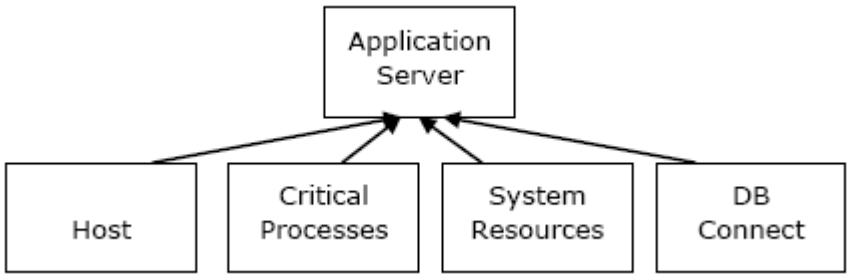
Each Application Server service; however, would monitor its resource monitors with a high sensitivity policy. The resource monitors focus on the host itself, critical processes, system resources, application connection and application performance. You'll note that the Host resource monitor excludes eHealth notifications which are generally performance based. The Application Performance resource monitor is only impacted by eHealth notifications. Both resource monitors would likely have the same host model as a resource, but are affected by different types of resource outages. This allows the user to quickly determine if the service outage is related to availability or performance.



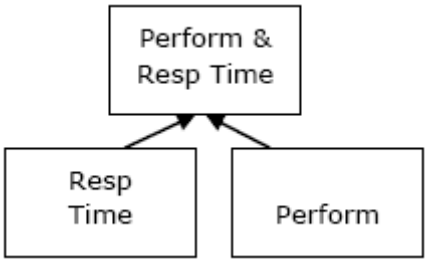
The Database Servers service has a similar structure to Application Servers. Multiple individual servers can be supported.



Each individual server supports four resource monitors. These detect faults on the host model, critical database processes, system resources and database connections. Once again you can see that the Host resource monitor excludes eHealth notifications.



Finally the service also includes a component for monitoring performance and response time. Application Response Time sub service would focus on monitoring SPM tests in CA Spectrum. You might use default response time policies, or perhaps develop a custom policy for average response time. The Performance sub service would detect resource faults specifically based on eHealth performance notifications that are sent to CA Spectrum. The performance service would likely use a set of host models as its resources where eHealth notifications are mapped to resource alarms.



Once again this example is not designed to fit a specific scenario, but provide you with an example of how modeling gateway can be used to model common patterns in your environment.

If you are able to identify all of the resources they can be added to the service and resource monitor elements in the xml file. If you are not sure of all service resources, that's fine. The services and resource monitors can still be imported and empty of resources. The empty services and resource monitors will appear with blue icons in CA Spectrum prompting you to the need to fill in the resources.

Example: Define a Service Maintenance Schedule

In addition to defining the structure of a service and its resources you can also specify a maintenance schedule for service. The following XML segment defines a maintenance schedule for a service named "ABC Service", using an existing schedule model.

```
<SM_Service
     containment_relation="MaintenenceScheduledBy"
     name="ABC Service">

          <Schedule name="Every day from 6 PM - 7 AM"
                    SCHED_Recurrence="2"
                    SCHED_Duration="46800"
                    SCHED_Start_Hour="18"
                    SCHED_Start_DoM="0"
                    SCHED_DayBitMask="0"
                    SCHED_Start_Day="0"
                    SCHED_Description=""
                    SCHED_Start_Year="0"
                    SCHED_Start_DoW="0"
                    SCHED_Start_MoY="0"
                    SCHED_Start_Minute="0"
                    SCHED_Start_Month="0"
                    SCHED_Daily_Repeat_Limit="2"
                    SCHED_Recurrence_Multiplier="1"/>

</SM_Service>
```

More information:

Service Maintenance Schedule Management (see page 61)

Example: Define an Alarm Exemption List for a Service or Resource Monitor

You can specify an alarm type exclusion list for a service using modeling gateway. Keep in mind that this setting applies specifically the service model, and will be used in lieu of any setting made at the policy level. This xml configuration is equivalent to specifying the alarm type exemption in the Exemptions tab of the Service Editor. If the configuration you want to specify for this service is defined within a policy you need only specify the policy ID.

The following XML segment specifies the three alarms (0xabcd0001, 0xabcd0001, 0xabcd0002) that will be the only alarm types to affect (Cause_List_Control="1") the service:

```
<SM_Service
          containment_relation="SlmMonitors"
          name="Access Routers"
          Criticality="30"
          AttrToWatch="Condition"
          Cause_List_Control="1"
          Special_Cause_List="0xabcd0001,0xabcd0001,0xabcd0002"
          MonitorPolicy_ID="2"
          Generate_Service_Alarms="true">

          <Device ip_dnsname="10.253.9.16" />
          <Device ip_dnsname="10.253.9.17" />
          <Device ip_dnsname="192.168.152.5" />
          <Device ip_dnsname="172.19.17.174" />
      </SM_Service>
```

The following XML document specifies a range of alarms (0xeeee0000-0xeeee002b) that will be excluded from impacting the health of the service (Cause_List_Control="2") the resource monitor:

```
      <SM_AttrMonitor
          containment_relation="SlmMonitors"
          name="Access Routers"
          Criticality="30"
          AttrToWatch="Condition"
          Cause_List_Control="2"
          Special_Cause_List="0xeeee0000-0xeeee002b"
          MonitorPolicy_ID="2">

          <Device ip_dnsname="10.253.9.16" />
          <Device ip_dnsname="10.253.9.17" />
          <Device ip_dnsname="192.168.152.5" />
          <Device ip_dnsname="172.19.17.174" />
      </SM_AttrMonitor>
```

More information:

Specify the Alarm Types That Affect or Do Not a Affect Service Health (see page 58)

Example: Associate an SLA to a Service

Service models can be associated to SLA models using modeling gateway. This association does not create any specific guarantee models, or associate the service to any existing guarantee model. Associations for guarantees must be done explicitly and will be covered later in this document.

The following sample XML shows how to associate an SLA to a service:

```
<SM_SLA
        containment_relation="SlmGuarantees"
        name="Acme Service Level Agreement">

        <SM_Service name="Acme"/>
</SM_SLA>
```

Examples: Create a Guarantee for an SLA

Guarantee models are created within an SLA element, and can be associated to a service or resource monitor model. The following XML shows how to create a guarantee for an SLA call Acme Service Level Agreement. The guarantee will be called Engineering Guarantee and will record outage time when the Engineering service is Down.

```
<SM_SLA
     containment_relation="SlmHasGuarantee"
     name="Acme Service Level Agreement">

     <SM_Guarantee
        containment_relation="SlmIsMeasuredBy"
        name="Engineering Guarantee"
        GuaranteeControl="1"
        GuaranteeType="0"
        ServiceHealthType="1"
        WarningThresholdPercent="80.5"
        ViolationThresholdPercent="99.5"
        GuaranteeNotes="Tracks Down Time For Engineering Service"
        GuaranteeDescription="Availability Guarantee for Acme Engineering"
        MOT_Threshold="300"
        MTBF_Threshold="300"
        MTTR_Threshold="300">

        <SM_Service name="Engineering"/>

     </SM_Guarantee>

</SM_SLA>
```

Guarantee business hours can be specified using xml, by defining the schedule. The example below shows how a schedule called Business Hours can be associated to the Engineering Guarantee model.

```
<SM_Guarantee
    containment_relation="SlmSchedulesGuarantee"
    name="Engineering Guarantee"
    GuaranteeType="0">

    <Schedule
        name="Business Hours"
        SCHED_Recurrence="2"
        SCHED_Daily_Repeat_Limit="0"
        SCHED_Duration="25200"
        SCHED_Recurrence_Multiplier="1"
        SCHED_Start_DoM="0"
        SCHED_Start_DoW="0"
        SCHED_Start_Hour="8"
        SCHED_Start_Minute="0"
        SCHED_Start_Month="0"
        SCHED_Start_Day="0"
        SCHED_DayBitMask="0"
        SCHED_Start_Year="0"
        SCHED_Start_MoY="0"
        SCHED_Description="Standard Business Hours 8AM Start"/>
</SM_Guarantee>
```

More information:

Create an SLA (see page 100)
Create a Guarantee for a Service, Sub-Service, or Resource Monitor (see page 105)
Create a Guarantee for a Top-Level Service (see page 104)
SLA Attributes (SM_SLA) (see page 142)
Guarantee Attributes (SM_Guarantee) (see page 143)

Example: Define an SLA

The SLA Manager is the top level model for all SLAs. Each SpectroSERVER has one SLA Manager model.

In addition to creating the SLA and it's guarantees, the SLA period can be defined using modeling gateway. The following XML example shows how to define an SLA period, by specifying the period schedule.

```
<SM_SLA_Mgr
        name="SLAs"
        containment_relation="SlmContainsSLAs"
        >
<SM_SLA
        containment_relation="SlaPeriod"
        name="Acme Service Level Agreement"
        SLA_Control="1"
        SLA_ExpirationDate="1514696400"
        SLA_Notes="Manages SLA for Acme Services"
        SLA_Description="Acme Management Technologies Internal Service Level
Agreement">

         <Schedule
            name="Daily SLA Schedule"
            SCHED_Recurrence="2"
            SCHED_Duration="0"
            SCHED_Start_Hour="0"
            SCHED_Start_DoM="0"
            SCHED_DayBitMask="0"
            SCHED_Start_Day="0"
            SCHED_Description=""
            SCHED_Start_Year="0"
            SCHED_Start_DoW="0"
            SCHED_Start_MoY="0"
            SCHED_Start_Minute="0"
            SCHED_Start_Month="0"
            SCHED_Daily_Repeat_Limit="0"
             SCHED_Recurrence_Mutiplier="1"/>

</SM_SLA>

</SM_SLA_Mgr>
```

More information:

SLA Attributes (SM_SLA) (see page 142)

Example: Define a Customer and a Customer Group

Customer models must be defined within the CustomerManager tag in the XML file. Each SpectroSERVER has one Customer Manager model, and it must be named “Customers.”

The following example XML document defines a customer named “Product Development” within a customer group named “XYZ Group":

```
<CustomerManager
        name="Customers"
        containment_relation="Groups_Customers">

        <SM_CustomerGroup
                name="XYZ Group"          <-- Specify Customer Group name here.
                containment_relation="Groups_Customers">

                <!-- This code defines a Customer and associates -->
                <!-- it with a Service. A Customer contains -->
                <!-- primary and secondary contact information, -->
                <!-- and a criticality that can effect the -->
                <!-- severity of a Service outage for Service -->
                <!-- models used by the Customer. -->

                <SM_Customer
                        containment_relation="SlmUses"
                        name="Product Development"     <-- Specify Customer name here.
                        CustomerField4="Pease International TradePort"
                        CustomerField5="123 Big Dr."
                        CustomerField6="Portsmouth, NH 03801"
                        CustomerField7="USA"
                        CustomerID="11DU-156"
                        Criticality="10"
                        Contact_Name="Fred Flintstone"
                        Contact_Title="Product Development Manager"
                        Email_Address="fred@proddev.com"
                        Phone_Number="123-456-7890"
                        Mobile_Phone_Number="123-456-1111"
                        Secondary_Contact_Name="Barney Rubble"
                        Secondary_Contact_Title="Product Development Manager"
                        Secondary_Phone_Number="123-456-9999"
                        Secondary_Mobile_Phone_Number="123-456-8888"
                        Secondary_Email_Address="barney@proddev.com">

                        <SM_Service name="Development"/>   <-- Specify service name here.

                </SM_Customer>


                <!-- This code associates a Customer with an SLA. -->
                <SM_Customer
                        containment_relation="SlmAgreesTo"
                        name="Product Development">

                        <SM_SLA name="XYZ Service Level Agreement"/>

                </SM_Customer>

        </SM_CustomerGroup>

</CustomerManager>
```

More information:

Create a Customer (see page 90)
Create a Customer Group (see page 91)
Customer Group Attributes (SM_CustomerGroup) (see page 141)
Customer Attributes (SM_Customer) (see page 141)

Example: Import XML Input Files

You can use Modeling Gateway to import your Service Manager configuration files. Use the Modeling Gateway to test the XML document in Example: Services That Monitor Resources Directly (see page 121).

To import xml input files

1. Create a file containing the example XML document (see page 121) and save it to the <*$SPECROOT*>/SS-Tools directory with the file name, slm_test1.xml.
2. Import the file using the following command from the <*$SPECROOT*>/SS-Tools directory:

   ```
   /topimport  -vnm <vnm_name>  -i slm_testl.xml  -debug
   ```

   vnm_name

   Is the name of the system on which the SpectroSERVER is running.

   -debug

   Generates a TIDebug.txt file, which is useful for debugging import errors.
3. If no errors are reported, device and container models are created. Your output should be similar to the following:

   ```
   Import session started Fri, December 29, 2006, at 02:53:32 EST
   Start parsing file slm_test1.xml
   Start importing file slm_test1.xml
   Container models created: 1
   Identifying ports...
   Import session finished Fri, December 29, 2006, at 02:53:38 EST
   ```

Service Attributes (SM_Service)

When creating service management models with Modeling Gateway, the XML code must provide values for the service attributes (sm_service) listed in the following table.

Attribute	Description	Possible Values
containment_relation	The set of supported relations from which associations can be created.	SlmMonitors SlmWatchesContainer MaintenenceScheduledBy
name	The model name of the service.	Text string, up to 256 characters
Criticality	The impact severity of the alarm relative to other current alarms. A higher Criticality value contributes to a higher impact severity value for alarms in OneClick.	10 = Low 15 = Medium Low 20 = Medium 25 = Medium High 30 = High
AttrToWatch	The attribute monitored on the service resource models. The AttrToWatch value should be consistent with the MonitorPolicy_ID. For example, if you specify AttrToWatch="Condition", you should specify a MonitorPolicy_ID for a Condition Policy (1-5).	Condition RM_Condition(service health) Contact_Status Port_Status LatestErrorStatus (Response Time)
MonitorPolicy_ID	The ID of a specific monitor policy as defined on the GlobalConfig model type. The ID should be consistent with the AttrToWatch value.	1 - 21 (CA Spectrum default) 1000 - *n* (User-defined)
Generate_Service_Alarms	Determines whether the SM_Service model generates alarms upon a change in service health.	True or False
Special_Cause_List	The alarm cause codes to include in an alarm type exemption list for a service.	Text string in the form of comma separated alarm causes or ranges separated with a hyphen (–)
Cause_List_Control	The integer that defines which alarm types affect or do not affect a service.	0=Unused (Ignore Cause) 1=Inclusive (Caused By) 2=Exclusive (Not Caused By)

More information:

Policy ID Mappings (see page 183)

Monitor Resource Monitor Attributes (SM_AttrMonitor)

When creating service management models with Modeling Gateway, the XML code must provide values for the monitor resource monitor attributes (SM_AttrMonitor) listed in the following table.

Attribute	Description	Possible Values
containment_relation	The set of supported relations from which associations can be created.	SlmMonitors SlmWatchesContainer
name	The model name of the resource monitor.	Text string, up to 256 characters
AttrToWatch	The attribute monitored by the resource monitor. The AttrToWatch value should be consistent with the MonitorPolicy_ID. For example, if you specify AttrToWatch="Condition", you should specify a MonitorPolicy_ID for a Condition Policy (1-5). **Note:** See Policy ID Mappings (see page 183) for more information.	Condition RM_Condition (service health) Contact_Status Port_Status LatestErrorStatus (Response Time)
MonitorPolicy_ID	The ID of a specific monitor policy as defined on the GlobalConfig model type. It should be consistent with AttrToWatch value. **Note:** See Policy ID Mappings (see page 183) for more information.	1 - 21 (CA Spectrum default) 1000 - *n* (User-defined)
Special_Cause_List	The alarm cause codes to include in an alarm type exemption list for a resource monitor.	Text string in the form of comma separated alarm causes or ranges separated with a hyphen (–)
Cause_List_Control	The integer that defines which alarm types affect or do not affect a resource monitor.	0=Unused (Ignore Cause) 1=Inclusive (Caused By) 2=Exclusive (Not Caused By)

Customer Group Attributes (SM_CustomerGroup)

When creating service management models with Modeling Gateway, the XML code must provide values for the customer group attributes (SM_CustomerGroup) listed in the following table.

Attribute	Description	Possible Values
containment_relation	The set of supported relations from which associations can be created.	Groups_Customers
name	The model name of the customer group.	Text string, up to 256 characters

More information:

Example: Define a Customer and a Customer Group (see page 135)

Customer Attributes (SM_Customer)

When creating service management models with Modeling Gateway, the XML code must provide values for the customer attributes (SM_Customer) listed in the following table.

Attribute	Description	Possible Values
containment_relation	The set of supported relations from which associations can be created.	SlmUses
name	The model name of the customer.	Text string, up to 256 characters
CustomerField4	Address Line 1	Text string, up to 256 characters
CustomerField5	Address Line 2	Text string, up to 256 characters
CustomerField6	City, State, Postal Code	Text string, up to 256 characters
CustomerField7	Country	Text string, up to 256 characters
CustomerID	Any identification number.	Alpha-numeric string

Attribute	Description	Possible Values
Criticality	The impact severity of the alarm relative to other current alarms. A higher Criticality value contributes to a higher impact severity value for alarms in OneClick.	10 = Low 15 = Medium Low 20 = Medium 25 = Medium High 30 = High
Contact_Name	The person associated with the customer model.	Text string, up to 256 characters
Contact_Title	The contact person title.	Text string, up to 256 characters
Email_Address	The contact person email address.	Text string, up to 256 characters
Phone_Number	The contact person phone number.	Text string, up to 256 characters
Mobile_Phone_Number	The contact person mobile phone number.	Text string, up to 256 characters
Secondary_Contact_Name	The alternate contact person name.	Text string, up to 256 characters
Secondary_Contact_Title	The alternate contact person title.	Text string, up to 256 characters
Secondary_Phone_Number	The alternate contact person phone number.	Text string, up to 256 characters
Secondary_Mobile_Phone_Number	The alternate contact person mobile phone number.	Text string, up to 256 characters
Secondary_Email_Address	The alternate contact person email address.	Text string, up to 256 characters

More information:

Example: Define a Customer and a Customer Group (see page 135)

SLA Attributes (SM_SLA)

When creating service management models with Modeling Gateway, the XML code must provide values for the SLA attributes (SM_SLA) listed in the following table.

Attribute	Description	Possible Values
containment_relation	The set of supported relations from which associations can be created.	SlaPeriod SlmHasGuarantee SlmGuarantees

Attribute	Description	Possible Values
name	The model name of the SLA.	Text string, up to 256 characters
SLA_Control	Specifies whether the SLA is active during the current SLA period or becomes active at the onset of the next period.	0 (inactive until next period) or 1 (active)
SLA_ExpirationDate	The UNIX timestamp, measured as the number of seconds from January 1, 1970.	For example, the value 1514696400 – Dec 31, 2017
SLA_Notes	Any text notes about the SLA.	Text string, up to 256 characters
SLA_Description	Any text description of the SLA.	Text string, up to 256 characters

More information:

Example: Define an SLA (see page 134)
Examples: Create a Guarantee for an SLA (see page 133)

Guarantee Attributes (SM_Guarantee)

When creating service management models with Modeling Gateway, the XML code must provide values for the guarantee attributes (SM_Guarantee) listed in the following table.

Attribute	Description	Possible Values
containment_relation	The set of supported relations from which associations can be created.	SlmIsMeasuredBy
name	The model name of the guarantee.	Text string, up to 256 characters
GuaranteeControl	Specifies whether the guarantee is active or inactive during the current period.	0 (inactive) or 1 (active)
GuaranteeType	Specifies whether the guarantee monitors service availability or performance (response time).	0 (availability) or 1 (performance)

Attribute	Description	Possible Values
ServiceHealthType	The type of service health time that is accumulated by the guarantee. An availability guarantee can accumulate both down and degraded time. A performance guarantee accumulates only degraded time.	1 (Down) or 2 (Degraded)
WarningThreshold	The number of seconds of outage time allowed per period before a warning alarm is issued.	0 - *n*
WarningThresholdPercent	The percentage of outage time allowed before a warning alarm is issued.	0 - 100%
ViolationThreshold	The number of seconds of outage time allowed per period before a violation occurs.	0 - *n*
ViolationThresholdPercent	The percentage of uptime per period below which a violation occurs.	0 - 100%
GuaranteeNotes	Any text notes about the guarantee.	Text string, up to 256 characters
GuaranteeDescription	A text description of the guarantee.	Text string, up to 256 characters
MOT_Threshold	Maximum outage time in seconds	0 - *n*
MTBF_Threshold	Mean time between faults in seconds	0 - *n*
MTTR_Threshold	Mean time to repair in seconds	0 - *n*

More information:

Examples: Create a Guarantee for an SLA (see page 133)

Schedule Attributes (Schedule)

When creating service management models with Modeling Gateway, the XML code must provide values for the schedule attributes (Schedule) listed in the following table.

Attribute	Description	Possible Values
name	The model name of the schedule. **Note:** CA Spectrum renames the schedule name you provide.	Text string, up to 256 characters
SCHED_Recurrence	Specifies when the schedule is implemented.	1 = Always (24 x 7) 2 = Daily 3 = Weekly 4 = Monthly 5 = Yearly
SCHED_Start_Hour	The hour the schedule starts.	0 - 23
SCHED_Start_Minute	The minute the schedule starts.	0 - 59
SCHED_Start_DoW	The day of the week the schedule starts	0 - 6
SCHED_Start_DoM	The day of the month the schedule starts.	1 - 31
SCHED_Start_Month	The month of the year the schedule starts.	0 (Jan.) - 11 (Dec.)
SCHED_Start_Year	The year the schedule starts. Entering 0 starts the schedule in the current year.	0
SCHED_Start_MoY	The month of the year the schedule starts. Entering 0 starts the schedule in the current month.	0
SCHED_Description	The description of the schedule.	Text string, up to 256 characters
SCHED_Duration	The duration the schedule is in effect in seconds.	0 - *n*
SCHED_Recurrence_Multiplier	The number of times the schedule is implemented.	1 - *n*
SCHED_Daily_Repeat_Limit	The number of consecutive days to repeat a daily schedule at the start of each recurrence period. Applicable to Weekly, Monthly, or Yearly recurrence only.	0 - *n*

Chapter 7: Monitoring Service Management Components with the Service Dashboard

The Service Dashboard is Service Manager's dedicated operational and administrative console. The Service Dashboard includes many of the same operational features as the OneClick Console, but focuses purely on service management components. The service dashboard offers an at-a-glance view to the real-time status of services, SLAs and customers. Using Service Dashboard, you can also view history outage information, outage trends and summarized service availability.

This section contains the following topics:

The Service Dashboard

The Service Dashboard provides a service centric view of your service management environment. Unlike the OneClick Console, which enforces user security at the data level; the Service Dashboard shows only those service, SLA, and customer models to which a given user has security access. To better explain, if a user does not have access to a specific model, they may still see explorer and topology icons in the OneClick Console. Within the service dashboard if a user does not have access to a model, that model will be absent from all dashboard views. In some circumstances this may allow the CA Spectrum Administrator to provide the service dashboard to specific CA Spectrum users such that those users will see only the appropriate service and SLA components.

Using the Service Dashboard, you will be able to navigate your service management environment through the dashboard explorer and topology panels. Component detail information for services, SLA, and customer models is equivalent to that available in OneClick with the addition of some new panels which display outage history and SLA/Guarantee trend information.

Unique to the Service Dashboard is the service topology view. These semi customizable topology icons indicate service health. These topology icons are expandable and provide navigation to lower layer services. You can edit and annotate the topology view for those service hierarchies you create.

More information:

OneClick Licenses and Service Manager Privileges (see page 16)

Open the Service Dashboard

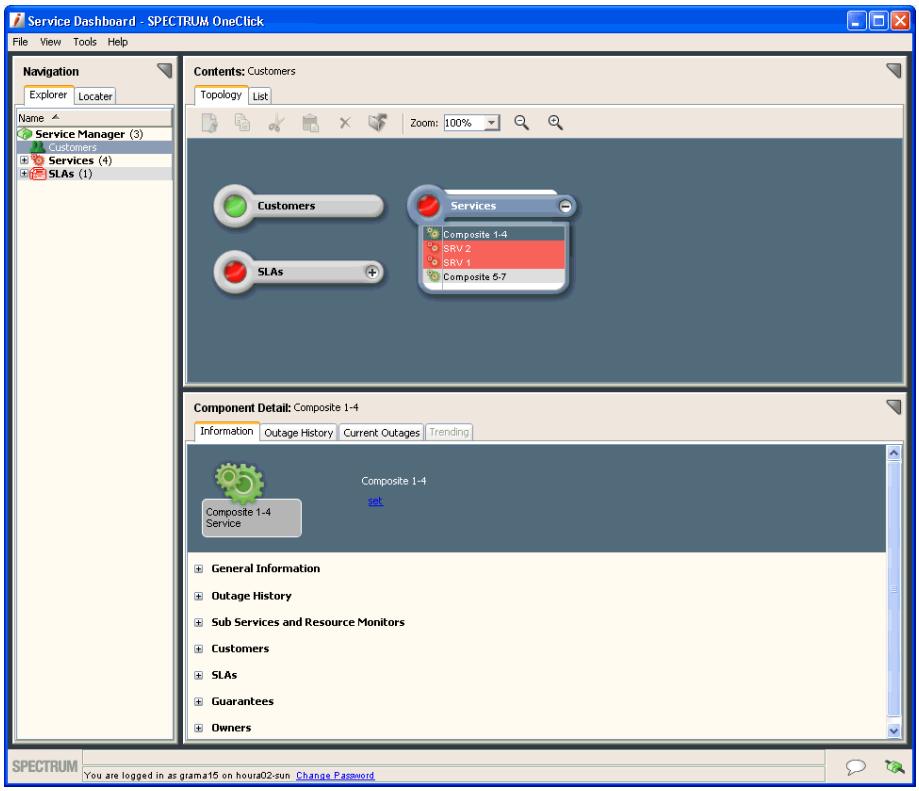
There are several ways to open the Service Dashboard.

Note: You must have Service Manager license privileges to access the Service Dashboard.

To open the Service Dashboard

1. Do *one* of the following:
   - Click the Service Dashboard link on the OneClick home page.
   - Click Tools, Utilities, Service Dashboard, from the main menu.
   - Right-click Service Manager in the Navigation panel and select Utilities, Service Dashboard in the OneClick Console.

   The following shows the areas of the Service Dashboard you work with to monitor service components.



The Service Dashboard interface includes three main information panels that you work with to monitor your organizations services management components:

Navigation Panel

Displays components in a hierarchical folder structure. It provides two options:

Explorer tab

Lets you select the component you want to view in the Contents panel and the Component Details panel. It groups components by services, SLAs, and customers. The explorer tab in the service dashboard condenses all landscapes into a single tree. You'll notice that services which reside on different landscapes are all organized into the same services folder. This allows users to view their service management implementation without consideration of how many SpectroSERVERS are deployed.

Locater tab

Lets you search for the services, SLAs, or customers you want to view in the Contents panel. For example, can specify a particular component name or you can specify all components from a service management component category.

Contents Panel or Topology Panel

Displays summary information about the status of components you specify in the Navigation panel. You can select Topology and List views of service management components selected in the Navigation panel. The panel's topology view provides basic editing tools that you can use to arrange component icons, create basic shapes in the view, and annotate the view.

Note: Only the topology of user created hierarchies can be edited. Specifically the topology of the top tier folder called Services can not be edited. This folder is comprised of multiple landscapes, and is shared among users. Given the variability in user access it would not be practical to allow topology editing to the top tier services topology.

Component Detail Panel

Displays detailed information about components selected in the Navigation or Contents panels. Tables and sub-view available in the Component Detail panel contain service configuration information as well as real-time and historical outage information.

More information:

OneClick Licenses and Service Manager Privileges (see page 16)
View Outage History (see page 161)

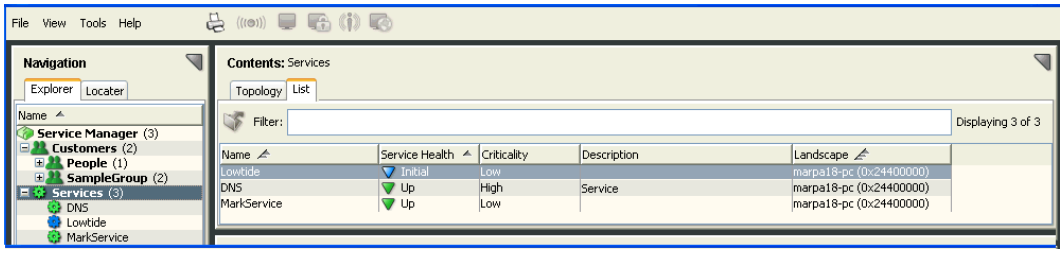
Topology and List Views in the Contents Panel

The Contents Panel contains a Topology and List view. The topology view provides expandable icons which indicate the real-time status of each service management component. The List view provides a table of service component models as well as specific attribute data. When a model is selected in the navigation panel both the List and Topology views will show either the selected models children, or if the selected model has no logical children the list and topology view will show the selected model as contained by its parent.

Note: The List view is the default view for component results found through the Locater tab. You must specify a List view for components selected from the Explorer tab.

The Component Details panel displays comprehensive information about the component selected in the Contents panel.

To display a List view of a service management component group selected in the Explorer tab, click the List tab in the Contents panel, as shown in the following image:



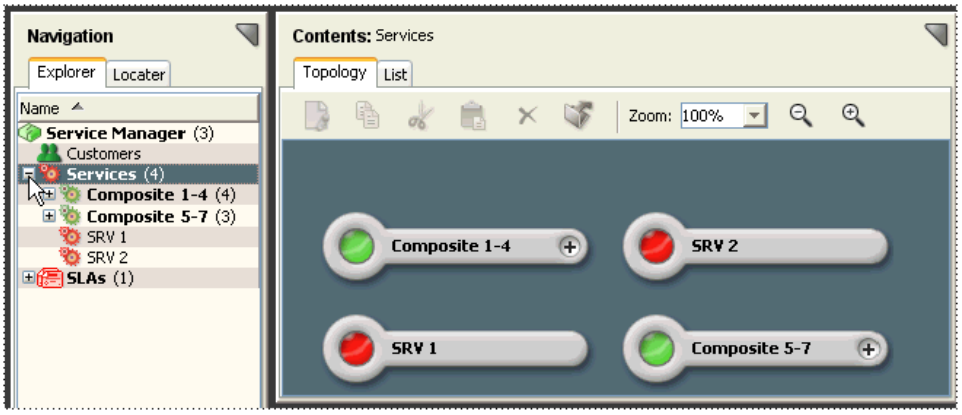
Explorer Folders and Topology Icons

The service dashboard does not display the service hierarchy with respect to the landscapes where the models reside. Within the service hierarchy you will see only the parent/child relationships of their service models. The means that within the OncClick Console a service might appear as a top tier service directly under the service manager model on its landscape. If that service is a child of a service on another landscape it will be seen in the dashboard only as a child, and not as both a child and top tier service. This behavior has changed from earlier releases of Service Manager in which the service would have appeared both directly under the Services folder as well as a child of the other service.

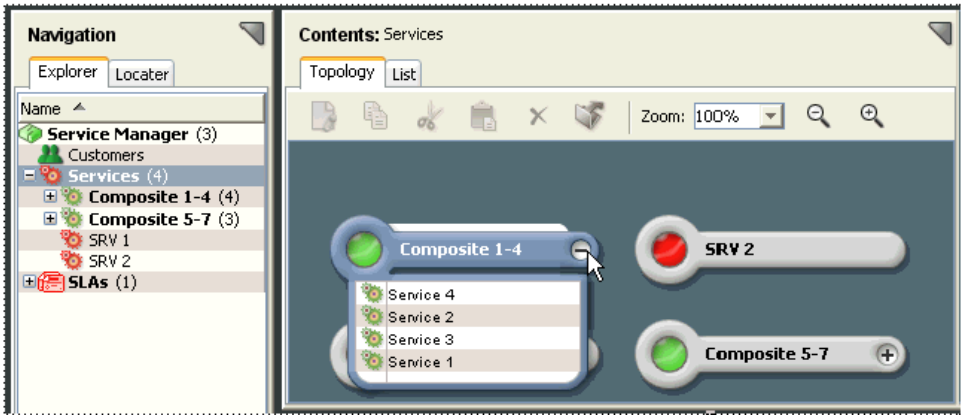
If a service management component displayed in the Explorer tab of the Navigation panel has a (+) next to it, this indicates that the model or folder has one of more children. If you select such a model the List or Topology view displays the child models.

Icons within the topology view may also have (+) displayed in the icon itself. This indicates that the model has children, clicking the + will expand the icon to show a table of the associated child models.

For example click the plus sign (+) next to a folder in the Navigation panel or on an icon in the Contents panel, or double-click a folder or icon:



For example, click the plus sign (+) on an icon in the Contents panel and then click a component from the drop-down list:



Status Indicators

The top-level service management component icons—Services, SLAs, and Customers—indicate the most severely affected corresponding top-level category for each landscape. In other words, if the Services icon is red, that indicates that the service manager model (Services) in at least one landscape has a Condition of critical.

The following table describes service component icon colors, and the associated state attribute values:

Color	Service	SLA	Customer
Green	Normal	Unaffected	Not Impacted

Color	Service	SLA	Customer
Yellow	Slightly Degraded	Compliant	Slightly Impacted
Orange	Degraded	Warned (at risk)	Significantly Impacted
Red	Down	Violated	Severely Impacted

Access Information about a Service Management Component

When you select a service management component from the Navigation panel or the Contents panel, the Service Dashboard's Component Detail panel displays detailed information about it.

To access information about a Service Management component

1. Open the Service Dashboard (see page 149).
2. To access information in the Component Detail Panel, navigate to a model from either the Navigation or Contents views.
3. When the model is selected the Component Detail panel will contain the following tabs:

   Information tab

   Displays detailed information about any service management component (customers, services, SLAs, guarantees). Contains a number of sub-view each with detailed configuration information or historical data.

   Outage History tab

   Displays outage history (see page 161) for the last 31 days for the selected service.

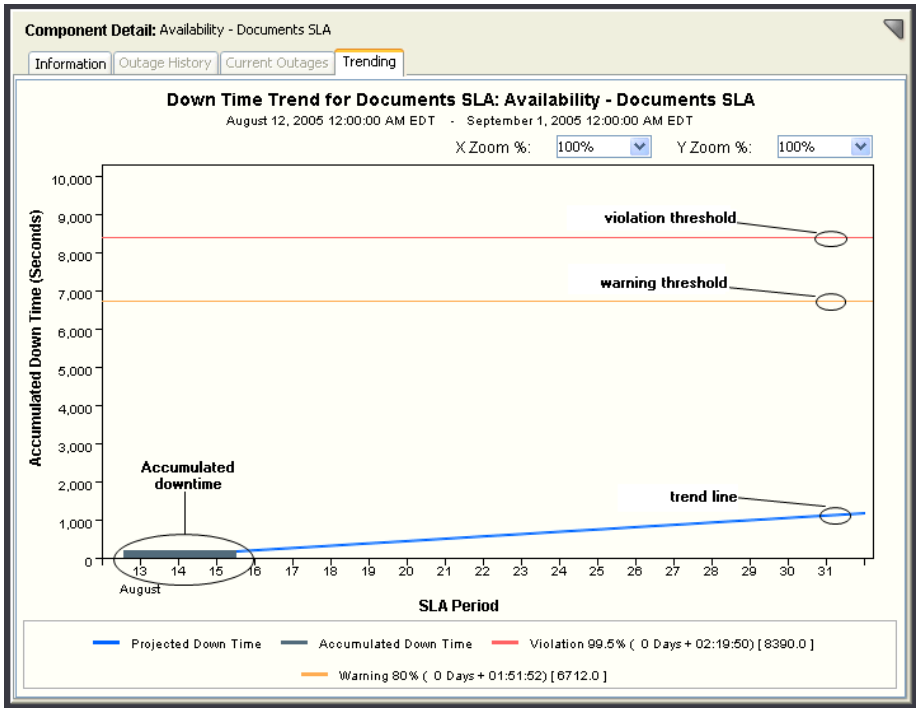
   Current Outages tab (service and customer models only)

   Displays information for any current service outage (see page 160), including the cause of the current outage, assignment, trouble ticket ID, and status note of root cause alarm.

Trending tab (SLAs and guarantee models only)

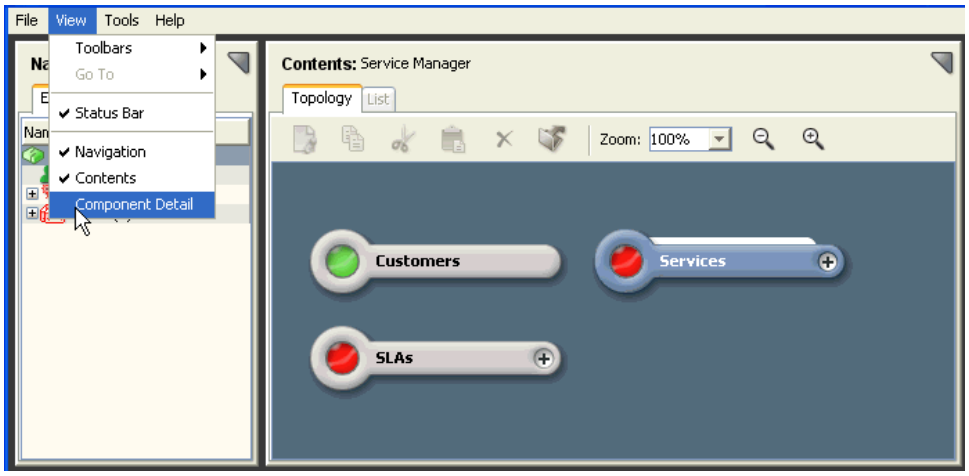
The trending chart displays accumulated outage time for a guarantee and a trend line to indicate the likely hood the guarantee will become warned or violated within the current SLA period.

The following shows an example of a trend chart:



Service Dashboard Interface Management

To show and hide Service Dashboard panels and the Status bar, select the interface component you want to display from the View menu, or deselect the interface component you want to hide. The following image shows that the Component Detail panel has been deselected and is not included in the Dashboard interface:



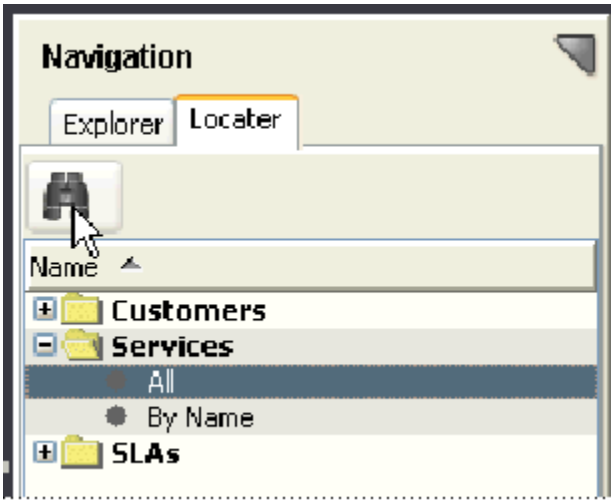
To dock and undock Dashboard panels, which include the Navigation, Content, and Component Detail panels and Component Detail information panels, click the Dock/Undock icon. The following image shows and example of Docking/Undocking icon locations (circled). An undocked panel includes many of the same interface controls and options available from the main Service Dashboard.

Locate Service Management Components

You can use the Dashboard's Locater tab to display those service management components you specify, in the Contents panel and Component Detail panel.

To locate service management components

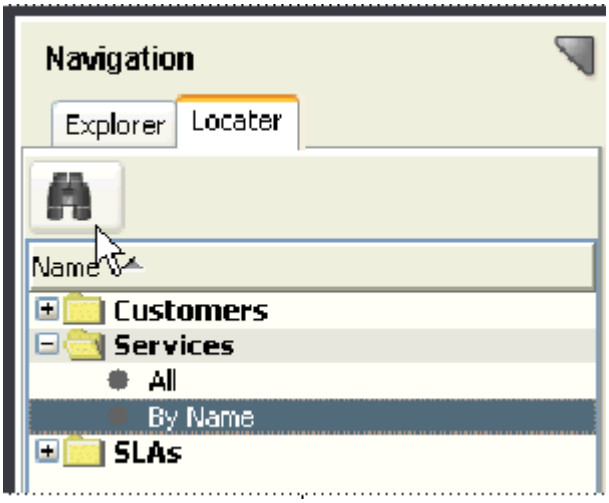
1. Open the Service Dashboard (see page 149).
2. Click the Locater tab in the Navigation panel.
3. Expand the customers, services, or SLAs folder from which you want to locate a component.
4. Specify whether to locate all components or a particular component from the selected component category:
   - Select All and click  to locate all components.



The Select landscape to search dialog appears.

Specify the landscape you want to search and click OK.

- Select By Name and click  to locate a specific component.



The Search dialog appears.

Enter the component name in the Model Name field and click OK.

Note: To specify which landscapes to search, click the Landscapes button to open the Select Landscapes to Search dialog.

Results are displayed in the Contents panel.

Print Dashboard Views

Service Dashboard lets you print content from the Explorer and Locater tabs, and the Topology, List, and Results views in the Contents panel, and the Information view of the Component Details panel.

To print a dashboard view

1. Click File, Print.

   The Print dialog appears.

2. Select the content you want to print, and click OK.

Export Dashboard Views

Service Dashboard lets you save content from the Contents panel in multiple formats, using the export function.

You can export to a PNG (portable network graphics) format from the Explorer tab's Topology view.

You can export to CSV (comma separated values - spreadsheet compatible), text, and HTML formats from the Explorer tab's List view and the Locater tab's Results view.

To export a dashboard view

1. Click  .

   The Save As dialog appears.

2. Select an available format and click Save.

   The dashboard view is exported.

Use the Service Dashboard Editing Tools

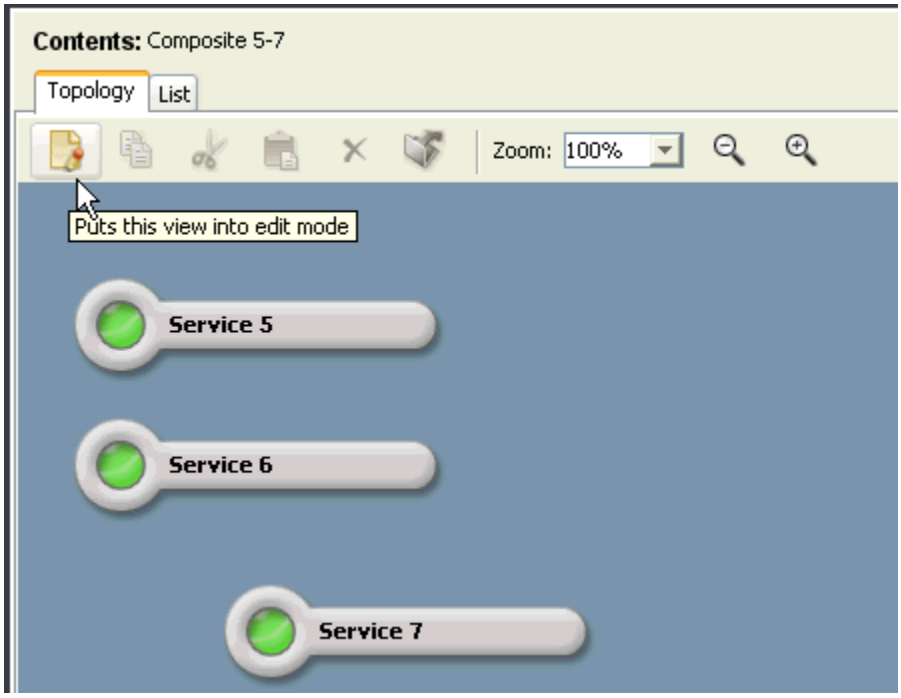
The Service Dashboard editing tools let you customize the topology views for Service, SLAs and Customer Groups. Only the topology views of user created models can be edited. You cannot edit the topology views of the top tier service management folders.

You can do the following:

- Arrange component icons.
- Create basic shapes (rectangles, ovals) and lines.
- Enter annotations.
- Modify annotation text color, font, style, and size.
- Modify the topology view’s background color, grid dimensions (which you can use to precisely align and resize shapes and lines), and size.

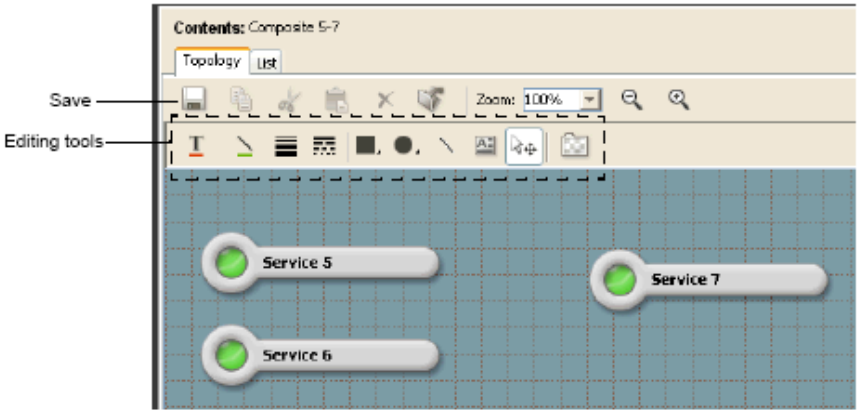
To use the Service Dashboard editing tools

1. Click the Edit Mode icon in the Content's panel Topology view, as shown in the following image:



The Topology view changes to editing mode and the editing toolbar appears. You can invoke a description of an editing tool by holding the cursor over the icon for the tool. The editing tools are a subset of tools available for editing the OneClick topology, and function in the same mapped.

Icon placement can be done either in tiled format or in custom format by selecting and dragging icons.



2. Edit the view as required and click Save.

Service Outage Management

Service dashboard provides a variety of options for viewing current or historical service outages. From the current outage tab you can the view the following outage details:

- The health or severity of the outage
- The start time of the outage
- The resource or resources that are contributing the outage
- Any trouble shooter assignment or notation added to the outage

You can view and edit service outages from the Outage History tab panel or the Outage History sub-view of the Information tab panel.

The following information is available from the outage history table:

- Start time, end time and duration of all outages.

  NOTE: With Service Manager r9.2, the outage limitation of 31 days has been removed. You can now specify the date range of all outages.
- The resource or resources that caused each outage
- The name of the person assigned to troubleshoot the current service outage
- The status of an outage (unplanned, planned or exempt

The Outage History tab panel also offers a pie chart depicting service health or historical availability for the past 31 days.

The service outage editor is available from either the Outage History tab panel of the outage history sub-view. The outage editor allows user to add outage note or change the status of an outage by marking it as exempt or planned.

View Current Outages

Service Dashboard lets you view information about a service that is currently in an outage state.

To view current outages

1. Open the Service Dashboard dialog (see page 149).
2. Select the service with the outage that you want to review.
3. Click the Current Outage tab in the Component Detail panel.

   The Component Detail panel displays information about the current outage, including the resource or resources that are contributing to the outage.

More information:

Access Information about a Service Management Component (see page 153)

View Outage History

Service Dashboard lets you view information about all past and current outages for a service over the last 31 days.

To view outage history

1. Open the Service Dashboard (see page 149).
2. Select a service that you want to review.
3. Click the Outage History tab in the Component Detail panel.

   The Component Detail panel displays information about the service's outage history, including a chart with a summary of outage information and an itemized list of recent outages.

   The panel also displays Outage Details pertaining to the resources which contributed to the outage.

More information:

Access Information about a Service Management Component (see page 153)

Service Outages

A service outage will have one of three potential status values: Unplanned, Planned or Exempt. For the most part the status of a service outage influences only how the historical record for that outage will be interpreted.

Most service outages will have the status of Unplanned unless they are edited by the user. Unplanned outage time counts against the historical availability of a service model, and may be recorded if an SLA has associated one of more guarantees to the service.

You can utilize the service outage editor to change the status of an Unplanned outage to either Planned or Exempt. A status of planned indicates that the outage was expected to happen, and can be considered a maintenance outage. A status of Exempt indicates that the outage was not expected, but the cause or nature of the outage is such that the outage time should not be counted against the historical availability of the service. Outages which have a status of planned or exempt will not contribute time to SLAs.

It's important to understand that editing an outage will not change the real time status of a service. If a service is Down and the user marks the outage as exempt the service will remain down, as that is the true health of the service. Even though the real-time health of the service is unchanged if a guarantee was recording time for the outage, that time will be removed from the guarantee which could change the status of an SLA.

Edit a Past or Ongoing Outage Status

You can edit the status of an ongoing or historical outage.

Consider the following before editing a past or ongoing outage status:

- If an ongoing outage is edited the outage status will persist for the duration of the outage regardless of changes to the resources that contribute to the outage. This means if the outage is marked as exempt it will remain exempt even if the resources contributing to the outage change. The current outage status can be seen in the Information tab for any service model.
- Outage time that is exempted or marked as planned is subtracted from the outage time tallied by a guarantee. This means that the status of an SLA that includes the guarantee changes accordingly as well. For example, an SLA with a current status of violated resulting from a service outage that exceeded an availability guarantee threshold is restored to compliant when the outage is exempted.

To edit a past or ongoing outage status

1. View Outage History (see page 161) tab or open the Outage History sub-view of the Information tab.
2. Expand the Recent Outages subview in the Component Detail panel and select the outage you want to edit from the Recent Outages list.

   Note: Only outages with health values of Down, Degraded or Slightly Degraded can be edited. You will also see periods of Maintenance time, Initial time and Loss of Management time in the outage table.
3. Click Outage Editor.

   The Edit Service Outage dialog appears.
4. Select an outage type for the service outage from the Set Outage Type to drop-down list:

   Unplanned

   Outages count against service availability.

   Planned

   Outages do not count against service availability.

Exempt

Outages are those unplanned outages that you have determined should not count against service availability.

5. (Optional) Enter comments in the Notes/Reason field for the outage you changed. You can also enter comments for any outage regardless of whether you changed its status.
6. Click Save.

   The login name of the user who edited the outage is recorded and is displayed in the outage history table and in reports.

   The outage status is edited.

Note: You can also edit outages with the Affected Services Editor in Report Manager. See the *Report Manager Installation and Administration Guide* for more information.

More information:

View Outage History (see page 161)

Chapter 8: Monitoring Service Management Components with Unicenter Management Portal

This section contains the following topics:

About the Service Level Manager Portlet

The Service Level Manager portlet provides summary status information on services, SLAs, and customers to Unicenter users with security access to Service Manager models. The portlet can be incorporated into the Unicenter Management Portal (UMP).

The portlet displays information about services, SLAs, and customers in a customizable tabular format. The portlet also provides context-sensitive links to the OneClick Console and Service Dashboard where you can view more detailed information about the services, SLAs, and customers.

Publish the Service Level Manager Portlet in UMP

Before you can view and access resources provided by the Service Level Manager portlet, you must first publish the portlet in UMP. See UMP documentation for complete and up-to-date information on publishing a portlet to UMP.

To publish the portlet in UMP

1. Click the Knowledge tab, and then choose Publish File.
2. Enter the URL for Service Level Manager portlet in the Content box.

   For example: http://abcde-sun/spectrum/slm
3. Enter a title for the Service Level Manager portlet and click OK.

   The Library tab displays the portlet title.
4. Click the portlet title to open the portlet.

   You are prompted to log in with a CA Spectrum user name and password. After you log in, the portlet appears.
5. Click the Work Place tab, and choose the workplace where you want to add the portlet.
6. Select Add Content, select the Service Level Manager portlet name, add it to the desired column, and click OK.

   The portlet is published in UMP.

View Service Information

You can use the Service Level Manager portlet to view service information.

To view service information

1. Click the Services tab.

   The table displays status information about service models, as shown in the following image:

2. To view context-sensitive views of a service in OneClick and Service Dashboard, do one of the following:

   - Click a service Name to view a detailed information view of the service in OneClick Console.
   - Click the Service Health indicator for a service to view information about the service in Service Dashboard.

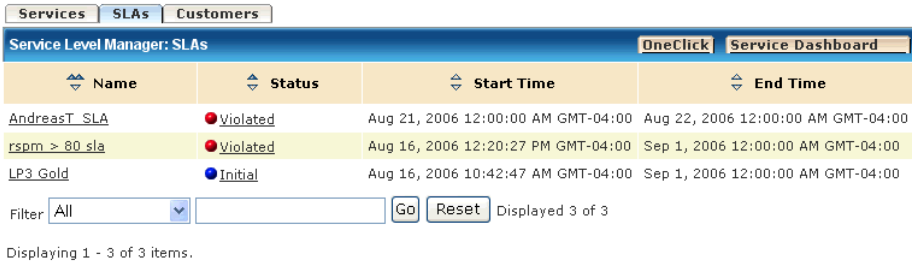
View SLA Information

You can use the Service Level Manager portlet to view SLA information.

To view SLA information

1. Click the SLAs tab.

   The table displays status information about SLA models, as shown in the following image:



2. To view context-sensitive views of an SLA in OneClick Console and Service Dashboard, do one of the following:

   - Click an SLA Name to view a detailed information view of the SLA in OneClick Console.
   - Click the Status indicator for an SLA to view information about the SLA in Service Dashboard.

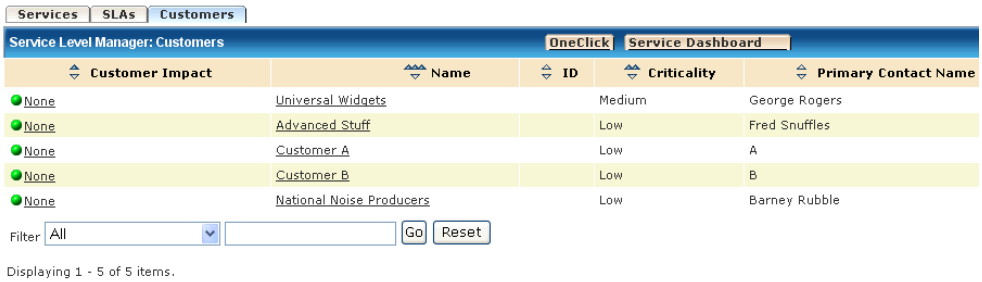
View Customer Information

You can use the Service Level Manager portlet to view customer information.

To view customer information

1. Click the Customers tab.

   The table displays status information about customer models, as shown in the following image:



2. To view context-sensitive views of a customer in OneClick and Service Dashboard, do one of the following:
   - Click a customer Name to view a detailed information view of the customer in OneClick Console.
   - Click the Customer Impact indicator for a customer SLA to view information about the customer in Service Dashboard.

Open the OneClick Console and the Service Dashboard

You can open the OneClick Console and the Service Dashboard from any component view in the Service Level Manager portlet.

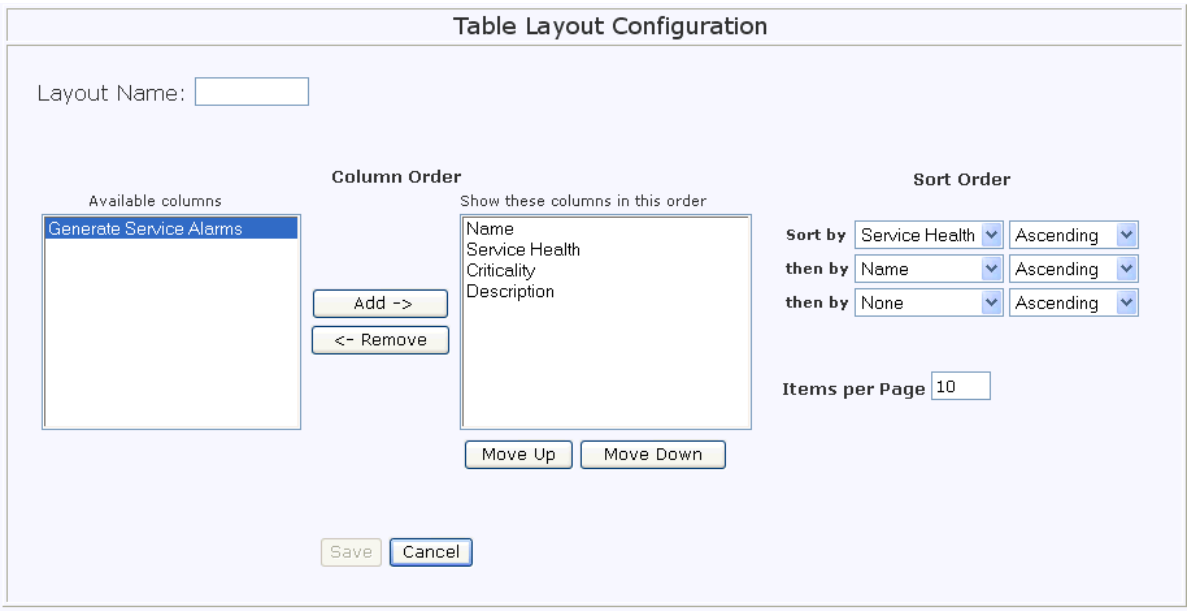
To open the OneClick Console and Service Dashboard, do one of the following:

- Click the OneClick button.
- Click the Service Dashboard button.

Apply and Manage Layouts

The Service Level Manager portlet lets you customize the type of information to include in the services, SLAs, and customers views, and lets you customize how you want to organize this information. You can also save multiple customized layouts for each view, edit all user-created layouts, export and import layout files, and remove layouts from the Service Level Management portlet.

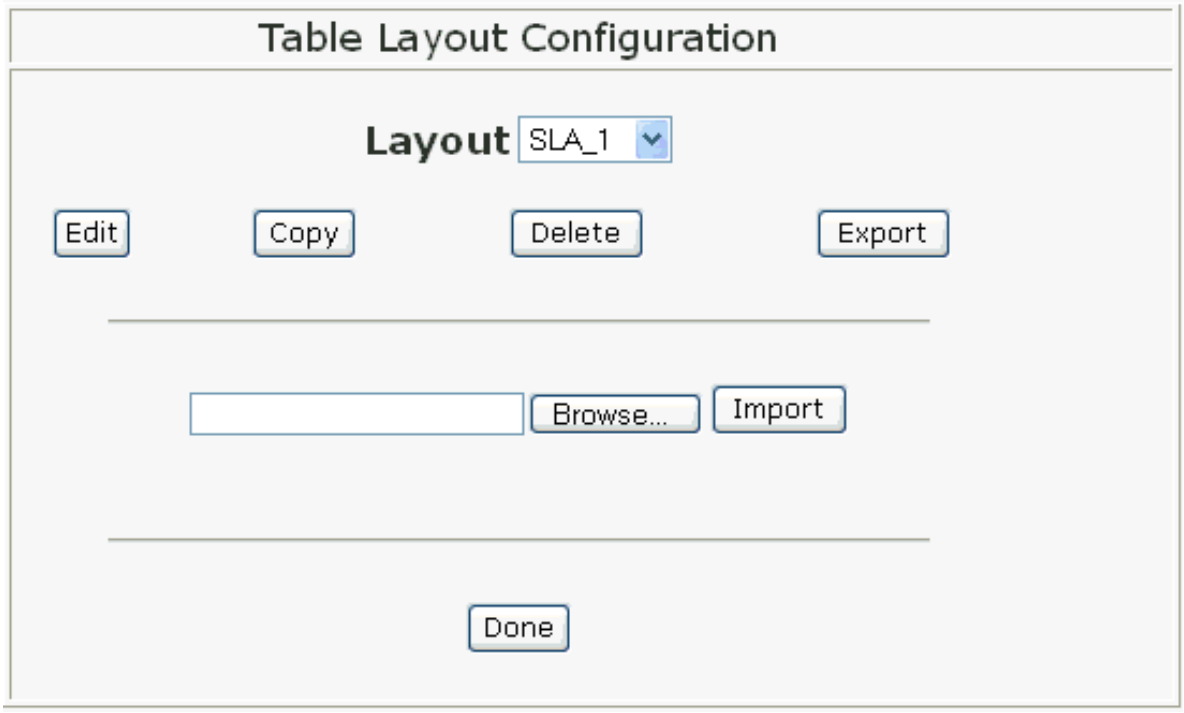
The following image shows an example default layout for a service:



To apply and manage layouts

- To apply a layout to a component view, select it from the Configuration drop-down list. The table displays the columns and sort order specified for the layout.
- To create a layout for a component view, apply the default layout to the view, click Configure to open the Table Layout Configuration window, specify settings, and click Save.
- To manage a layout, apply the layout you want to edit, copy, or delete to the current component view and click Configure.

The Table Layout Configuration windows appears with available layout management options, as shown in the following image:



Select the action you want to perform:

- Click Edit if you want to modify the layout.
- Click Copy if you want to create another version of the layout.
- Click Delete if you want to remove the layout from Service Level Management. You may want to export a layout to your hard drive before you delete it in case you want to re-use the layout in the future by importing it back into Service Level Management.
- Click Export if you want to save a copy of the layout to your hard drive (as a .prx file).
- Click Browse to locate a layout file on your hard drive and then click Import to add a layout to the list of available layouts.

Chapter 9: Generating Service Manager Reports

You can generate a variety of informative reports about services, SLAs, and customers with CA Spectrum Report Manager. This chapter briefly describes the types of service management reports you can generate and how to generate reports. If you are an application administrator responsible for managing access to reports, see the *Report Manager Installation and Administration Guide* for information on managing Report Manager user accounts.

Note: For more information about service management reports, see the *Report Manager User Guide*.

This section contains the following topics:

Service and SLA Reports

Report Folders

A number of sub folders are available within the Service and SLA package. These sub folders are used to organize reports by the type of data the report provides. Many reports contain status and outage information that can be produced for a specified time ranges. Other reports contain configuration information that is based on the current time. The follow sub folders are available for Service and SLA reports.

- Detailed Availability
- Summarized Availability
- Health
- SLA Status
- Inventory
- Customer

Report Categories

Service Manager reports can be loosely categorized into two groups; Customer Facing and Administrative.

Although there is a significant amount of content overlap customer facing reports tend to be simpler than administrative reports. In some cases a report may be designed specifically to be customer facing, in other cases a report may have parameters allowing it to be tailored for a specific customer.

Administrative reports tend to be very detailed and are not specific to any customers services or SLAs. Administrative reports may show health or status values which would not be appropriate to expose to customers. Administrative reports may also show system wide statistics which span the services of different customers.

For example a service administrator may produce two sets of service availability and SLA reports for a given period of time. The Service Availability By Customer, and SLA Detail By Customer will show basic availability and SLA compliance for all of a customer's services and SLAs. These customer facing reports can be distributed to the service customers. The administrator may also produce a Service Health and SLA Detail By Name report for their own use. These reports will show more detail including lesser severity service outages, and SLA status. The administrator will look for services which experienced considerable degraded time, or SLAs which had a warned status. Using these more detailed reports will help the service administrator indentify services or SLA which are at risk or otherwise unstable.

Reporting Data

Reports found in the Service and SLA folder are based upon data from the service manager specific tables in the reporting database. Because service outage information is also displayed in the OneClick client the service manager tables in the reporting database are updated in real time. This allows a user to run a service availability, service health or SLA status report and see the actual real time status of that model.

Report Structure and Exporting Reports

Most service and SLA reports have a similar structure. The main report includes summarized data, and may include various charts or graphs. More detailed data is available by navigating to sub reports. Report Manager supports exporting report data to other common formats, but only the main report's data is exported. Sub-report data is not available through export, if a specific user needs access to detailed sub-report data they should be given privileges to generate reports using CA Spectrum Report Manager.

Report Parameters

Many service manager reports utilized the standard report manager parameter for selecting time and data ranges to report on. Note that for SLA reports the time specified may not completely encompass a single SLA period. Despite this the SLA report will always show the complete period of data.

In addition Service and SLA reports offer additional parameters that allow for the customization of report titles and chart titles. Some reports often parameter options that allow users to specify what data is displayed and how availability is calculated.

By default Service and SLA reports display data only for models which still exist in the CA Spectrum environment. Many reports provide a parameter that allows you to report on models that have been destroyed.

Outage Reports

The following outage reports are useful for the service administrator. These reports provide insight into the worst performing services, the worst overall service outages, and the service resources which contribute the greatest amount of service outage time. All outage reports allow the user to specify how the time range to report for, and the number of models or outages to summarize in the report.

Top N Worst Performing Services

Displays the top N worst services in terms of total down time. User's may select how many services to report on, the default is 10. The report contains a bar chart for up to 10 services. The user can specify the units of the time axis for the bar chart to be in seconds, minutes, hours or days. For each service listed in the main report a service availability sub report can be accessed by clicking on the service name. This version of the service availability sub report shows only down time, and normal time.

Top N Worst Performing Services Including All Outage Types

Displays the top N worst services in terms of total down time, but also displays summarized degraded and slightly degraded time. User's may select how many services to report on, the default is 10. The report contains a bar chart for up to 10 services. The user can specify the units of the time axis for the bare chart to be in seconds, minutes, hours or days. For each service listed in the main report a service availability sub report can be accessed by clicking on the service name. This version of the service availability sub report shows down, degraded and slightly degraded time as well as normal time.

Top N Worst Service Outages

Displays the top N worst service outages, and displays a summarized bar chart for the top 10 plus the rest. This report is useful for identifying specific outages that resulted in long periods of service outage time. If the environment does not experience long periods of service down time this report will not be very revealing. The user can specify the number of outages to display and the units of the outage chart. For each outage users can navigate to a sub report to view the impacted service and any impacted customers.

Top N Worst Service Resources By Total Down Time

Lists the service resources which contributed to the greatest amount of service down time. The calculation for service down time is cumulative, meaning although one resource may have been down for less actual time than another it's cumulative service impact may have been greater. The default number of resources displayed is 50. From each resource a sub report is available showing the specific outage times and impacted services. An outage impacting multiple services will be listed multiple times, and grouped by shading to show that it is really a single resource outage which led to multiple service outages. This report is useful for service administrators who want to understand if there are particular service resources which contribute to high amounts of service outage time. Service administrators may want to replace these resources with more reliable products, or perhaps add redundancy such that the service impact of an individual resource is minimized.

Inventory Reports

Inventory reports provide a snap shot of the current modeling in CA Spectrum. There are now time ranges specified when running the report, it produces data based on the current time and configuration. Inventory reports show only service and SLA structure and not status. SLA Inventory reports display the configuration of specific SLA models and their guarantees. It may be appropriate to provide a customer with an inventory report for their SLAs. This insures the customer understands the configuration of each SLA and the thresholds specified for each guarantee.

Service Inventory

Lists all service models and their resources. This is a complex report and it may be useful to export to a spread sheet. Because many services monitor other services the tabular form of this report can make it difficult to decipher the service hierarchy. This report can be used to capture a snap shot of the overall service hierarchy which can be saved and referenced.

SLA Inventory by SLA Customer

Displays a list of all of a customer's SLA models and the configuration for each guarantee. May be useful to distribute to customers so that they understand the configuration for each SLA. This report is also available in the Customer folder.

SLA Inventory by SLA Name

Lists each user specified SLA model and it's guarantee configurations. This report provides a quick way to review SLA configuration without having to navigate to each SLA through the OneClick interface.

Detailed Availability Reports

Detailed availability reports provide information about the availability and outages of services in CA Spectrum organized by customers or service name. These reports are designed to be customer facing, each report displays a pie chart summarizing service availability, and lists outages which impacted the availability of the service. From each outage a sub report is available showing the resource faults that contributed to the service outage. Note that this resource detail is not available when the report is exported to another format.

Service Availability By Service Customer

Produces a service availability report for all of a customer's service models. This availability report display only down time and normal time. This report is also available in the Customer folder.

Service Availability By Service Name

Produces a service availability report for each specified service. This availability report displays only down time and normal time.

Service Availability Variable Health Level

Produces a service availability report for each specified service. Provides a parameter which specifies which service health types will be displayed and factored into the availability calculation. By default Down, Degraded and Slightly Degraded outage types are show, optionally the report could show Down only or Down and Degraded. It may be useful to produce this report for customers who are interested in seeing a service availability report which includes outages of lesser severity.

Summarized Availability Reports

Summarized availability reports provide summary information about service availability and outages for a specified time range. These reports are designed to be customer facing, and may be useful to distribute to customers. Services are listed in tabular form, but provide a sub report that will display service availability. You should be aware that the sub report will not be available if exporting to another format.

Service Summary By Service Customer

Lists all of a customer's service models with summarized availability statistics. Provides a link to a sub report which displays down and normal time. This report is also available in the Customer folder.

Service Summary By Service Name

Lists all specified service models and summarized availability statistics. Provides a link to a sub report which displays down and normal time.

Service Summary Variable Service Health

Lists all specified service models, and configurable availability statistics. Provides a parameter which specifies which service health types will be displayed and factored into the availability calculation. By default Down, Degraded and Slightly Degraded outage types are shown, optionally the report could show Down only or Down and Degraded. It may be useful to produce this report for customers who are interested in seeing a service availability report which includes outages of lesser severity.

Customer Reports

Customer reports provide information about service customers, and the services and SLAs those customers are associated with.

Customer Detail

Provides contact information and a list of managed services for a specific customer. The listed services include only those service models currently associated to the customer. This report does not include any status information.

Customer SLA Summary

Provides a summary of customer SLAs and status for up to the six most recent SLA periods. This report is useful for the service administrator to quickly review the status of a customer's SLA for some recent periods. This report may be appropriate to distribute to customers, but it does display SLA warning status which is not available in the SLA Detail By Customer report.

Service Availability by Service Customer

Produces a service availability report for all of a customer's service models. This availability report displays only down time and normal time. This report is also available in the Detailed Availability folder.

Service Summary by Service Customer

Lists all of a customer's service models with summarized availability statistics. Provides a link to a sub report which displays down and normal time. This report is also available in the Summarized Availability folder.

SLA Detail by Customer

Displays the status for all of a customer's SLA models for a specified amount of time. The time range may span multiple periods. For each guarantee listed a sub report shows outages impacting the guarantee for the specific SLA period. This report can be distributed to customers allowing them to see the status of their SLA models. You should note the sub report data for guarantee periods details will not be available if this report is exported to another format. This report is also available in the SLA Status folder.

SLA Inventory by SLA Customer

Displays a list of all of a customer's SLA models and the configuration for each guarantee. May be useful to distribute to customers so that they understand the configuration for each SLA. This report is also available in the Inventory folder.

SLA Status Current and Recent by Customer

Displays a table for all of the customer's SLA models with the status for the current period, and any number of past periods specified by the user. For each SLA model listed a set of guarantee detail sub reports is available by clicking on the SLA name and paging through each sub report. The guarantee period detail report displays outages impacting the guarantee for the specific SLA period. This report may be appropriate to distribute to customers however it will display SLA warned status values which are not exposed in the SLA Detail by Customer report. This report is also available in the SLA Status folder.

SLA Summary by Customer

Displays table for all of the customer's SLA models organized by SLA status and arranged by SLA period. For each SLA model listed a set of guarantee detail sub reports is available by clicking on the Period Details link and paging through each sub report. The guarantee period detail report displays outages impacting the guarantee for the specific SLA period. This report may be appropriate to distribute to customers however it will display SLA warned status values which are not exposed in the SLA Detail by Customer report. This report is also available in the SLA Status folder.

SLA Status Reports

A variety of SLA status reports are available in the SLA Status folder. Many of these reports can be distributed to customers, but you should be aware that sub report data is not available in exported reports. It's important to understand that although some reports allow you to specify time ranges an SLA report will always be expressed in terms of one or more complete SLA periods. For example if the SLA period is montly it doesn't make sense to generate a report for the previous day, as daily status has no bearing on a monthly SLA. If you generate a report for any portion of an SLA period, the report will contain data for the complete period. If you generate a report for multiple SLA periods the report will be organized to display each period individually.

SLA Detail By Customer

Displays the status for all of a customer's SLA models for a specified amount of time. The time range may span multiple periods, and the report will organize each guarantee by period. This report displays only the compliant and violated status values. SLA Status values of Unaffected, Compliant(Affected) and Warned are all displayed as Compliant in this report. For each guarantee listed a sub report show outages impacting the guarantee for the specific SLA period. This report can be distributed to customers allowing them to see the status of their SLA models. You should note the sub report data for guarantee periods details will not be available if this report is exported to another format. This report is also available in the Customer folder.

SLA Detail By SLA Name

Displays the status for all specified SLA models for a specified amount of time. The time range may span multiple periods, and the report will organize each guarantee by period. This report shows all SLA Status values including Compliant(Affected) and Warned which may not be appropriate for customers. For each guarantee listed a sub report show outages impacting the guarantee for the specific SLA period. You should note the sub report data for guarantee periods details will not be available if this report is exported to another format.

SLA Detail With Resource Outages

Displays the status of an SLA for a specific period and includes very detailed information on the service resources which led to any SLA impacting outages. This is a very specialized report and may not be appropriate for all users. If the SLA experienced a large number of outages or was impacted by a large number of resources the report will be very large, and will not display well. Because this report transcends the service layer by displaying actual resource with respect to an SLA it is not useful for most enterprise style services. This report may be useful in service provider environments where the service itself is essentially a single customer edge device or set of devices.

SLA Status Current and Recent

Displays a table for all specified SLAs with the status for the current period, and any number of past periods specified by the user. For each SLA model listed a set of guarantee detail sub reports is available by clicking on the SLA name and paging through each sub report. The guarantee period detail report displays outages impacting the guarantee for the specific SLA period.

SLA Status Current and Recent By Customer

Displays a table for all of the customer's SLA models with the status for the current period, and any number of past periods specified by the user. For each SLA model listed a set of guarantee detail sub reports is available by clicking on the SLA name and paging through each sub report. The guarantee period detail report displays outages impacting the guarantee for the specific SLA period. This report may be appropriate to distribute to customers however it will display SLA warned status values which are not exposed in the SLA Detail by Customer report. This report is also available in the Customer folder.

SLA Summary By Customer

of the customer's SLA models organized by SLA status and arranged by SLA period. For each SLA model listed a set of guarantee detail sub reports is available by clicking on the Period Details link and paging through each sub report. The guarantee period detail report displays outages impacting the guarantee for the specific SLA period. This report may be appropriate to distribute to customers however it will display SLA warned status values which are not exposed in the SLA Detail by Customer report. This report is also available in the Customer folder.

SLA Summary By Name

Displays tables organized by status for all specified SLAs. Each status based table is organized by period, and may contain entries for multiple SLA periods. For each SLA model listed a set of guarantee detail sub reports is available by clicking on the Period Details link and paging through each sub report. The guarantee period detail report displays outages impacting the guarantee for the specific SLA period.

SLA Summary By Status

Displays tables organized by status for all SLAs. Each status based table is organized by period, and may contain entries for multiple SLA periods. For each SLA model listed a set of guarantee detail sub reports is available by clicking on the Period Details link and paging through each sub report. The guarantee period detail report displays outages impacting the guarantee for the specific SLA period.

SLA Summary of Warned or Violated SLAs

Displays table of all SLAs that are currently warned or violated. For each SLA model listed a set of guarantee detail sub reports is available by clicking on the Period Details link and paging through each sub report. The guarantee period detail report displays outages impacting the guarantee for the current SLA period. This report is useful for the service administrator to get a quick summary of all SLAs that are currently violated or at risk of becoming violated.

Health Reports

A service health report provides information detailed service health information for service models and resource monitors for a specified period of time. The report differs from the availability report in that it includes all aspects of service health, including up, down, degraded, slightly degraded, and Maintenance time.

Service or Resource Monitor Health by Name

Displays a pie chart summarizing policy violation and incidental outage time. Lists all outages, and provides a sub report for policy violation outage which displays the resources that contribute to the outage. You should be aware that the outage detail will not be available if the report is exported to another format. This is the most comprehensive report available for a service administrator to understand the historical status for any service at any period of time.

Generate Reports

Before you can access Report Manager and generate Service Manager reports, you must have a Report Manager user account and the appropriate permissions (rights) to the Service and SLA report pack. Request both from your OneClick/Report Manager administrator.

Note: By default, Report Manager does not generate reports for services that have been deleted from CA Spectrum. To include deleted service information, you must select Include Destroyed Services when you configure the report.

Note: At this time Report Manager does not enforce CA Spectrum model security for individual service or SLA models. This means that anyone with privileges for the Service and SLA content area may report on any service or SLA model.

To generate reports

1. Access Report Manager from the OneClick Console.
2. Click the On Demand Reports tab.
3. Select the Service and SLA folder.
4. Select the report category from which you want to generate a report. Report Manager displays a list of reports from the category you selected.
5. Select a report from the list.
6. Configure the report, and then click View Report.

   The report is generated.

   After you generate the report, you can choose to save it as a favorite, which you can generate anytime without having to configure it again. You can also choose to schedule the report to run on a one-time or on-going basis.

Appendix A: Service Manager Policy Descriptions

This section contains the following topics:

Policy ID Mappings

The following table lists associations between watched attributes and monitor Policy IDs (1-21) for standard monitoring policies shipped with Service Manager.

Note: User-defined policies begin with ID value 1000 (and are incremented by 1, 1001, 1002, and so on).

To view user-defined Policy IDs, access the following link: http://<server>:CA Portal/spectrum/slm/ policyrep.jsp.

Watched Attribute (AttrToWatch)	Monitor Policy ID (MonitorPolicy_ID)	Policy
Condition_Value	1	Condition Value Sum Greater Than Or Equal (see page 185)
Condition	2	Condition Redundancy (see page 187)
Condition	3	Condition High Sensitivity (Default Policy) (see page 187)
Condition	4	Condition Low Sensitivity (see page 187)
Condition	5	Condition Percentage (see page 187)

Watched Attribute (AttrToWatch)	Monitor Policy ID (MonitorPolicy_ID)	Policy
RM_Condition	6	Service Health Redundancy (see page 189)
RM_Condition	7	Service Health High Sensitivity (see page 189)
RM_Condition	8	Service Health Low Sensitivity (see page 189)
RM_Condition	9	Service Health Percentage (see page 189)
Contact_Status	10	Contact Status Redundancy (see page 190)
Contact_Status	11	Contact Status High Sensitivity (see page 190)
Contact_Status	12	Contact Status Low Sensitivity (see page 190)
Contact_Status	13	Contact Status Percentage (see page 190)
Port_Status	14	Port Status Redundancy (see page 186)
Port_Status	15	Port Status High Sensitivity (see page 186)
Port_Status	16	Port Status Low Sensitivity (see page 186)
Port_Status	17	Port Status Percentage (see page 186)
LatestErrorStatus	18	Response Time Redundancy (see page 188)
LatestErrorStatus	19	Response Time High Sensitivity (see page 188)
LatestErrorStatus	20	Response Time Low Sensitivity (see page 188)
LatestErrorStatus	21	Response Time Percentage (see page 188)

More information:

Policies and Watched Attributes (see page 120)
Service Attributes (SM_Service) (see page 139)
Monitor Resource Monitor Attributes (SM_AttrMonitor) (see page 140)

Condition Value Sum Greater Than Or Equal

Watched attribute: Condition_Value

Default reason: The condition value has violated the allowable threshold

This policy is different from the other standard Service Manager policies. Where other policies include a attribute map, which defines the attributes that are monitored, this policy monitors the aggregate value of the Condition_Value (0x1000b)attribute for all resources associated with a service.

Rule Set

- When the sum of the Condition_Value attribute for all monitored resources is equal to or greater than the value of Red_Threshold (0x10012), the service is down.
- When the sum of the Condition_Value attribute for all monitored resources is equal to or greater than the value of Orange_Threshold (0x10011), the service is degraded.
- When the sum of the Condition_Value attribute for all monitored resources is equal to or greater than the value of Yellow_Threshold (0x10010), the service is slightly degraded.

You can adjust the values for Red_Threshold, Orange_Threshold, and Yellow_Threshold on the service model, or adjust Value_When_Red (0x1000e), Value_When_Orange (0x1000d), or Value_When_Yellow (0x1000c) on the service's component resource models to obtain the desired behavior.

More information:

Policy ID Mappings (see page 183)

Port Status Policies

Watched attribute: Port_Status

Default Reason: Bad Port Status

Value Mapping

- Service Health = Down if the watched attribute value is down, disabled, or unreachable
- Service Health = Up if the watched attribute value is up

Port Status High Sensitivity

- When any 1 resource is Down then the service is Down.

Port Status Low Sensitivity

- When all resources are Down then the service is Down.
- When all resource(s) are Down then the service is Degraded.

Port Status Redundancy

- When all resources are Down then the service is Down.
- When any 1 resource(s) are Down then the service is Slightly Degraded.

Port Status Percentage

- When 75% of the resources are Down then the service is Down.
- When 50% of the resources are Down then the service is Degraded.
- When 25% of the resources are Down then the service is Slightly Degraded.

Port Status - Automatically Configured

PollPortStatus has been automatically configured for interface models which are added or removed from services or resource monitors. This works as follows:

- If an interface model has a PollPortStatus of False (No), when the model is added to a service or resource monitor PollPortStatus will be set to True (Yes). (OneClick View Attributes which imply false are displayed as 'No' and true are displayed as 'Yes'.)
- If an interface model has a PollPortStatus of True, when the model is added to a service or resource monitor, no changes are made. When the model is removed from the service or resource monitor the PollPortSTatus is left as true.
- There is a caveat to the functionality described above. In scenarios where the PollPortStatus is automatically updated from false to true, that information is only preserved for the life cycle of the running SpectroSERVER. This means the PollPortSTatus would not be restored to False when the interface is removed from the service, if the SpectroSERVER was shutdown between the time the interface was added and removed.

More information:

Policy ID Mappings (see page 183)

Condition Policies

Watched attribute: Condition_Value

Default reason: Bad Condition

Value Mapping

- Service Health = Down if the watched attribute value is Critical or Suppressed
- Service Health = Degraded if the watched attribute value is Major
- Service Health = Slightly Degraded if the watched attribute value is Minor
- Service Health = Up if the watched attribute value is Normal

Condition High Sensitivity (Default Policy)

- When any 1 resource(s) are Down then the service is Down.
- When any 1 resource(s) are Degraded then the service is Degraded.
- When any 1 resource(s) are Slightly Degraded then the service is Slightly Degraded.

Condition Low Sensitivity

- When all resources are Down then the service is Down.
- When all resources are Degraded then the service is Degraded.
- When all resources are Slightly Degraded then the service is Slightly Degraded.
- When any 1 resource(s) are Down then the service is Degraded.
- When any 1 resource(s) are Degraded then the service is Slightly Degraded.

Condition Redundancy

- When all resources are Down then the service is Down.
- When all resources are Degraded then the service is Degraded.
- When all resources are Slightly Degraded then the service is Slightly Degraded.
- When any 1 resource(s) are Down then the service is Slightly Degraded.

Condition Percentage

- When 75% of the resources are Down then the service is Down.
- When 50% of the resources are Down then the service is Degraded.
- When 25% of the resources are Down then the service is Slightly Degraded.

More information:

Policy ID Mappings (see page 183)

Response Time Policies

Watched attribute: LatestErrorStatus

Default reason: Bad Response Time

Value Mapping

- Service Health = Down if the watched attribute value is Timeout or Threshold_Critical
- Service Health = Degraded if the watched attribute value is Threshold_Major
- Service Health = Slightly Degraded if the watched attribute value is Threshold_Minor
- Service Health = Up if the watched attribute value is OK

Response Time High Sensitivity

- When any 1 resource(s) are Down then the service is Down.
- When any 1 resource(s) are Degraded then the service is Degraded.

Response Time Low Sensitivity

- When all resources are Down then the service is Down.
- When all resources are Degraded then the service is Degraded.
- When any 1 resource(s) are Down then the service is Degraded.
- When any 1 resource(s) are Degraded then the service is Slightly Degraded.

Response Time Redundancy

- When all resources are Down then the service is Down.
- When all resources are Degraded then the service is Degraded.
- When any 1 resource(s) are Down then the service is Slightly Degraded.

Response Time Percentage

- When 75% of the resources are Down then the service is Down.
- When 50% of the resources are Down then the service is Degraded.
- When 25% of the resources are Down then the service is Slightly Degraded.

More information:

Policy ID Mappings (see page 183)

Service Health Policies

Watched attribute: RM_Condition

Default reason: Bad Service Health

Value Mapping

- Service Health = Down if the watched attribute value is Down
- Service Health = Degraded if the watched attribute value is Degraded
- Service Health = Slightly Degraded if the watched attribute value is Slightly Degraded
- Service Health = Up if the watched attribute value is Up

Service Health High Sensitivity

- When any 1 resource(s) are Down then the service is Down.
- When any 1 resource(s) are Degraded then the service is Degraded.
- When any 1 resource(s) are Slightly Degraded then the service is Slightly Degraded.

  Note: This is the default Policy for a SM_Service model that monitors resource monitor models/monitor groups/SM_AttrMonitor models.

Service Health Low Sensitivity

- When all resources are Down then the service is Down.
- When all resources are Degraded then the service is Degraded.
- When all resources are Slightly Degraded then the service is Slightly Degraded.
- When any 1 resource(s) are Down then the service is Degraded.
- When any 1 resource(s) are Degraded then the service is Slightly Degraded.

Service Health Redundancy

- When all resources are Down then the service is Down.
- When all resources are Degraded then the service is Degraded.
- When all resources are Slightly Degraded then the service is Slightly Degraded.
- When any 1 resource(s) are Down then the service is Slightly Degraded.

Service Health Percentage

- When 75% of the resources are Down then the service is Down.
- When 50% of the resources are Down then the service is Degraded.
- When 25% of the resources are Down then the service is Slightly Degraded.

More information:

Create a Service (see page 51)
Policy ID Mappings (see page 183)

Contact Status Policies

Watched attribute: Contact_Status

Default reason: Bad Contact Status

Value Mapping

- Service Health = Down if the watched attribute value is Lost
- Service Health = Up if the watched attribute value is Established

Contact Status High Sensitivity

- When any 1 resource(s) are Down then the service is Down.

Contact Status Low Sensitivity

- When all resources are Down then the service is Down.
- When any 1 resource(s) are Down then the service is Degraded.

Contact Status Redundancy

- When all resources are Down then the service is Down.
- When any 1 resource(s) are Down then the service is Slightly Degraded.

Contact Status Percentage

- When 75% of the resources are Down then the service is Down.
- When 50% of the resources are Down then the service is Degraded.
- When 25% of the resources are Down then the service is Slightly Degraded.

More information:

Policy ID Mappings (see page 183)

Appendix B: Resource Monitor Implementation

This section contains the following topics:

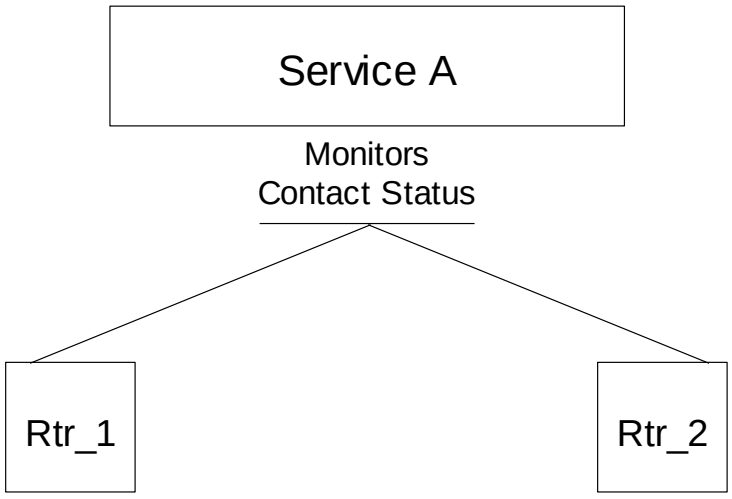
Policy Implementation: Monitor Routers

Service A monitors two routers: Rtr_1 and Rtr_2. Service A functions if either Rtr_1 or Rtr_2 is up, but it cannot function if both routers are down. Service A uses the Contact Status Low Sensitivity policy to monitor the service.

This policy's rule set stipulates the following:

- When all resources are down then the service is down.
- When any 1 resource(s) are down then the service is degraded.

Service with Policy



Service A seems to adequately monitor Rtr_1 and Rtr_2, but, on second glance, perhaps not enough to determine Service A's actual viability. What about the case where Service A is not only dependent on the routers but also on particular router ports? The Contact Status Policy only monitors whether the routers are up or down.

The contact status of the routers could be established while at the same time the ports on which Service A depends could be unavailable. Because of the limited scope of monitoring provided by its policy, Service A appears viable when actually it is not. Service A requires the more precise method of monitoring its resources that resource monitors provide.

Resource Monitor Implementation: Monitor Routers and Their Ports

Scrutiny of the policy implementation reveals that it does not monitor the status of router ports that support Service A. The ports must be monitored along with contact status of the routers. Moreover, ports 4 and 5 on each router must be available for Service A to function optimally and that at least two of the four ports must be available for Service A to function adequately.

Two resource monitors can be created as resources of Service A:

- Router Contact Resource Monitor — Monitors the contact status of Rtr_1 and Rtr_2 (same as the policy implementation).
- Port Status Resource Monitor — Monitors the port status of ports 4 and 5 on each router. Because at least two of four ports must be available, this resource monitor uses a Port Status Percentage Policy that reports down when 75% of the ports are unavailable and degraded when 50% of the ports are unavailable.

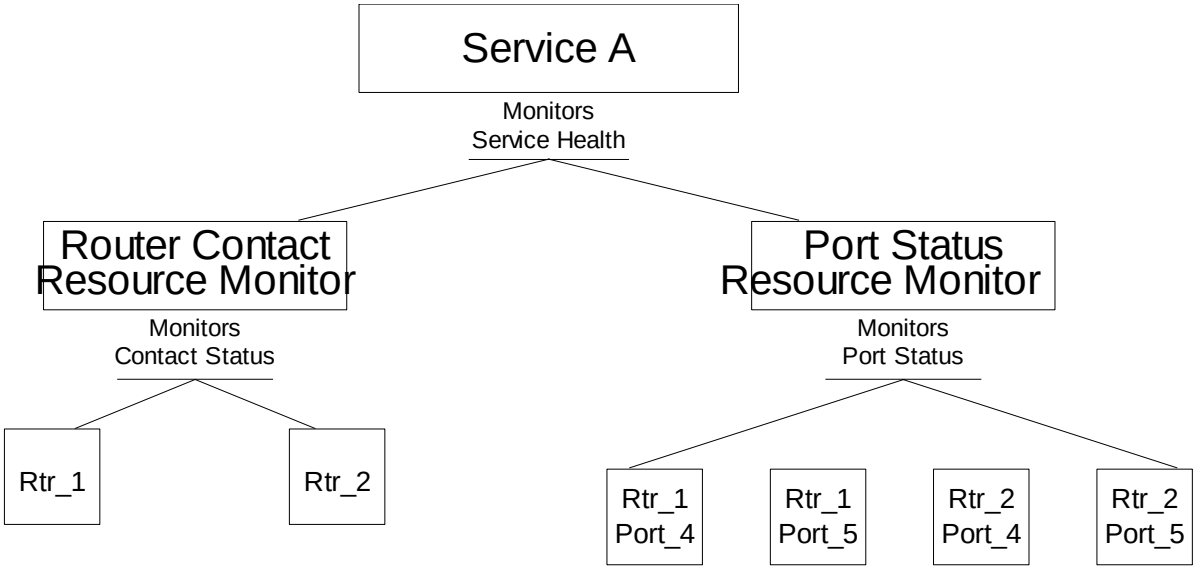
The result is that Router Contact Resource Monitor and Port Status Resource Monitor become resources of Service A. Rtr_1 and Rtr_2 become resources of the Router Contact Resource Monitor, and ports 4 and 5 on each router become resources of the Port Status Resource Monitor.

Service A will monitor the service health attribute of Router Contact Resource Monitor and Port Status Resource Monitor with the Service Health High Sensitivity Policy. This policy's rule set stipulates the following:

- When any 1 resource(s) are Down then the service is Down.
- When any 1 resource(s) are Degraded then the service is Degraded.
- When any 1 resource(s) are Slightly Degraded then the service is Slightly Degraded.

So, if either one of the resource monitors is Down, Service A is down.

Resource Monitors Monitor Routers and Ports



Refined Resource Monitor Implementation: Monitor Routers, Ports, and Response Time Tests

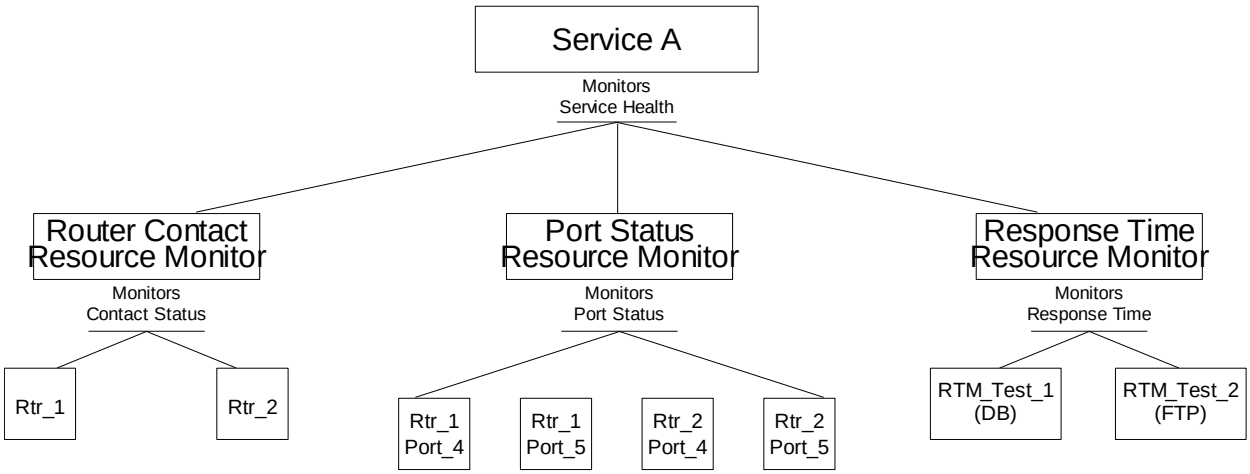
Further scrutiny of service A reveals that database server responsiveness and FTP transfer time are critical to its functionality. Assuming there are two RTM_Test models in CA Spectrum that define critical, major, and minor thresholds for response time to the database server and the FTP server, these tests can be resources of another resource monitor, the Response Time resource monitor, which becomes another resource of Service A.

Response Time Resource Monitor will monitor the response time tests with the Response Time High Sensitivity Policy. This Policy's rule set stipulates the following:

- When any 1 resource(s) are down then the service is down.
- When any 1 resource(s) are degraded then the service is degraded.

So, if this resource monitor reports down (either test indicates unacceptable response time latency) then Service A is down as stipulated by the Service Health High Sensitivity Policy which monitors all Service A Resource Monitors.

Resource Monitors Monitor Routers, Ports, and Response Time



Appendix C: Administration and Maintenance

This section contains the following topics:

Customize a Service Editor Information Table

You can specify the information tables for services, customers, SLAs, and SLA templates in the Service Editor dialog. You can specify the information types (columns) to include, the sort order (by status, by name, or by date for example), and the font and text size. You can revert back to default settings as well.

Note: For more information about customizing interface settings, see the *Operator Guide.*

To customize a Service Editor information table

1. Open the Service Editor (see page 18).
2. Select the tab for which you want to customize an information table and right-click any column heading.

   The Table Preferences dialog appears.
3. Configure the table properties and click OK.

   The information table is customized.

Customize a Service Policy Editor Information Table

You can specify the information tables for policies, attribute maps, and rule sets in the Service Policy Editor dialog. You can specify the information types (columns) to include, the sort order (by status, by name, or by date, for example), and the font and text size. You can also revert back to default settings.

Note: For more information about customizing interface settings, see the *Operator Guide.*

To customize a Service Policy Editor information table

1. Open the Service Editor (see page 18).
2. Select the tab for which you want to customize an information table and right-click any column heading.

   The Table Preferences window appears.
3. Configure the table properties and click OK.

   The information table is customized.

Remove Service Manager Historical Data from All Landscapes

You can remove Service Manager historical data from all landscapes.

Note: Once you remove historical data from the database you can no longer generate reports about them.

To remove Service Manager historical data from all landscapes, run the following script:

- Windows:

  `<$SPECROOT>\bin\SMIntializeDB.bat`
- UNIX/Linux:

  `<$SPECROOT>/bin/SMIntializeDB`

Remove Service Manager Historical Data from a Single Landscape

You can remove Service Manager historical data from a single landscape.

Note: Once you remove historical data from the database you can no longer generate reports about them.

To remove Service Manager historical data from a single landscape, run the following script:

- Windows:

  `<$SPECROOT>\bin\SMInitializeLandscape.bat Live Health`

  lh

  Is the landscape handle

- UNIX/Linux:

  `<$SPECROOT>/bin/SMInitializeLandscape Live Health`

  lh

  Is the landscape handle

Remove Destroyed Service Manager Models from All Landscapes

You can remove destroyed Service Manager models from all landscapes.

Note: Once you remove destroyed Service Manager models from the database you can no longer generate reports about them.

To remove destroyed Service Manager models (services, SLAs, and so on) and historical data for those models from all landscapes, run the following script:

- Windows:

  `<$SPECROOT>\bin\SMRemoveDestroyedModels.bat`

- UNIX/Linux:

  `<$SPECROOT>/bin/SMRemoveDestroyedModels`

Custom Resources Table

When you create a service that uses a policy with a custom attribute map, you may also want to customize the Resources table to display the data you want to view about the monitored attribute specified in the custom attribute map. The Resources table appears in the following locations:

- Resources link under the OneClick Information tab
- List tab in OneClick Contents panel
- Service Dashboard List tab
- Resources tab in Service Editor

Note: For more information about customizing OneClick interface elements, see the *OneClick Customization Guide*.

The following table lists Resources table configuration files for attributes monitored by standard Service Manager attribute maps:

Attribute	Attribute ID	File
Contact Status	0x10004	table-resources-0x10044-config.xml
Condition	0x1000a	table-resources-0x1000a-config.xml
ConditionValue	0x1000b	table-resources-0x1000b-config.xml
Port Status	0x10f1b	table-resources-0x10f1b-config.xml
Service Health	0x12a40	table-resources-0x12a40-config.xml
Response Time	0x456008c	table-resources-0x456008c-config.xml

These default files are located in the following directory:

`<$SPECROOT>/tomcat/webapps/CA Spectrum/WEB-INF/slm/config`

Suppose, for example, you have a service that monitors “load in” data on a set of port resources. In this case you would want to create a custom Resources table to display NRM_PortLoadIn (0x12aad) attribute data for a set of ports monitored by the service instead of the default Condition attribute data. The NRM_PortLoadIn (0x12aad) attribute example is used in the sections that follow that describe how to configure the custom file.

Create the Custom Table File

You can create the custom file from scratch and save it to the custom file directory, or you can save a modified version of the default table-resources-config.xml file from the following directory to the custom file directory:

<*$SPECROOT*>/tomcat/webapps/spectrum/WEB-INF/slm/config

To create the custom table file

1. Create the following custom file directory:

   <*$SPECROOT*>/custom/slm/config

2. Save all custom Resources table configuration files for Service Manager to this directory.

3. Create the custom file using the following naming convention:

   table-resources-<attribute ID>-config.xml

   For the load in attribute example:

   table-resources-0x12aad-config.xml

Example: Resources Table Configuration File

The following shows an abbreviated example of the table-resources-0x12aad-config.xml configuration file. OneClick loads the table specified by this file to display the “load in” data column along with other types of data for the port resources monitored by the service.

Elements pertaining to the “load in” example are highlighted in bold.

```
<?xml version="1.0" encoding="utf-8"?>

<table id="table-resources-0x12aad-config"
       xmlns="http://www.aprisma.com"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.aprisma.com
                           ../../common/schema/table-config.xsd">

  <orientation>horizontal</orientation>

  <swing-table-template>
    <show-vertical-lines>true</show-vertical-lines>
    <show-horizontal-lines>false</show-horizontal-lines>
  </swing-table-template>

  <swing-header-row-template>
    <static-color idref="row-header-color-config"/>
  </swing-header-row-template>

  <swing-row-template>
    <enumerated-color idref="alternatingrow-color-config"/>
  </swing-row-template>

  <column-list>
    <column>
      <name>Load In</name>
      <content>
        <attribute>0x12aad</attribute>
       </content>
      <default-width>125</default-width>
    </column>

    <column idref="column-normalizedstatus-config">
      <default-width>125</default-width>
    </column>

    <column idref="column-modelname-config">
      <default-width>125</default-width>
    </column>
</column-list>

  <default-sort>
    <sort-column-list>
      <sort-column>
        <name>

com.aprisma.spectrum.app.topo.client.interfaces.render.NormalizedStatusColumn
        </name>
```

```
        <direction>ascending</direction>
      </sort-column>
      <sort-column>
        <name>
          com.aprisma.spectrum.app.util.render.ModelNameColumn
        </name>
        <direction>ascending</direction>
      </sort-column>
    </sort-column-list>
  </default-sort>
</table>
```

More information:

Create the Custom Table File (see page 201)

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