4.2.2 Hyperic System Monitoring Tool

4.2.2.1 Hyperic Overview

Hyperic HQ is a computer system and network monitoring application software. The software provides the ability to discover, organize, and monitor resources. The operator has the ability to control software resources remotely and control actions allow operator to execute tasks (e.g., starting and stopping resources. Alerts can be set on metrics and a control action can be configured to execute when an alert fires. HQ can respond to alerts in various ways such as email and sms. HQ's rich web-based interface allows the operator to view, manage, and configure resources.

Figure 4.2.2.1-1 shows the key components of Hyperic HQ and how they fit together. The information presented in this section can be found at http://www.hyperic.com.

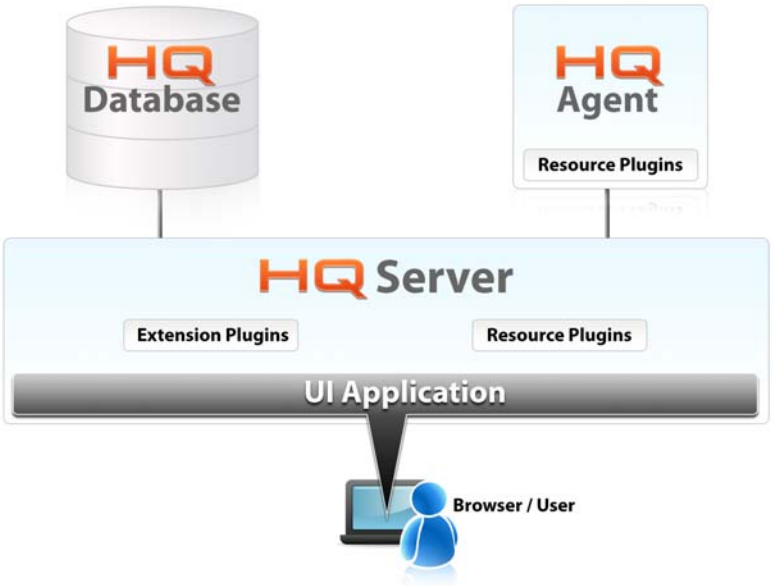


Figure 4.2.2.1-1. Hyperic HQ Architecture

4.2.2.1.1 HQ Agent

Hosts being monitored with Hyperic must have the HQ Agent installed and running. The agent will auto-discover software running on the host on startup and will periodically re-scans for configuration changes. The agent gathers metrics, performs log tracking, and event tracking. The operator the ability to perform control actions to start and stop servers. The HQ agent will send all gathered information to the HQ Server. (Figure 4.2.2.1-1)

4.2.2.1.2 HQ Server and HQ Database

Information gathered by the HQ Agent is sent to the HQ Server and is stored in the HQ Database. The server manages the software inventory and grouping resources in useful ways to ease monitoring and management. The server handles alerts and executes configured notification and escalation processes. It handles actions initiated through the user interface or through the Hyperic Web Service API. (Figure 4.2.2.1-1)

4.2.2.1.3 User Interface

Hyperic provides a rich user interface for browsing inventory, viewing and visualizing metrics, and managing your monitoring and alerting logic. The user interface home page, the Dashboard, provides an overview of the software inventory changes, problem resources, recent alerts, and metric charts.

4.2.2.1.4 Plugins

Hyperic capabilities can be extended with two types of plugins

1. Resource plugin - can be used to discover, monitor, and control software resources. It is mainly used for resources that Hyperic does not support.
2. Extension plugin - can be developed to extend the user interface, develop scripts for automating common processes, and develop web services interface with other management systems.

4.2.2.1.5 HQ API

Hyperic HQ also provides a web services API that enables user/plugins to programmatically access all HQ Server data and functionality.

4.2.2.1.6 HQ Inventory and Access Model

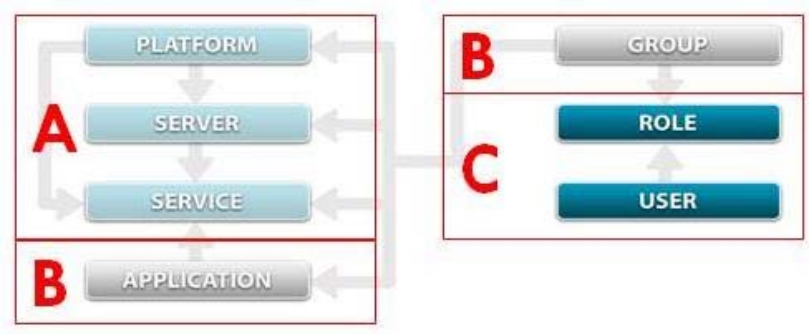


Figure 4.2.2.1-2. Hyperic Inventory and Access Model

Inventory is the sum of all the infrastructure's resources, which includes hosts, operating systems, applications servers and their components, and other software.

Hyperic auto-discovers and classifies different resources into a hierarchy structure: platform, server, and service. (Figure 4.2.2.1-2 section A)

- *Platform* is a hosting system (i.e., xxdpl01)
- *Server* is a software that runs on a platform (i.e. BMGTExportServer_OPS)
- *Service* is a component that runs in a server (i.e. PostgreSQL DBConnection), or is associated with a platform (i.e. SSH, RPC, etc.)

There are two inventory types which can be configured by real users, (Figure 4.2.2.1-2 section B).

- *Application* is a set of services. It reflects the performance and availability at the application level.
- *Group* is a collection of resources. If the resources in a group are of the same type, it is called a compatible group. Otherwise, it is a cluster. A compatible group can be performed a control actions like start, stop, and restart with a single command on all its members.

Group plays a fundamental part in HQ's access model. By grouping resources that should have the same access requirements together and mapping groups and *Users* to *Roles.* Administrator can control a user's access to specific resources in the inventory. These two components are introduced in section 4.2.2.2.2.

4.2.2.2 Hyperic Basic Operations and Capabilities

4.2.2.2.1 Start/Stop HQ Server/Agents

- **Start/Stop HQ Server:** HQ Server is running on host x5iil01v.

```
ssh to host x5iil01v
cd /usr/ecs/OPS/COTS/hyperic/server-5.0.0-EE/bin
./hq-server.sh start|stop
```

Even if Start command is executed successfully from the command line, it will take some time for HQ Server to be completely started.

During this time period, you will see this page first when trying to log in:

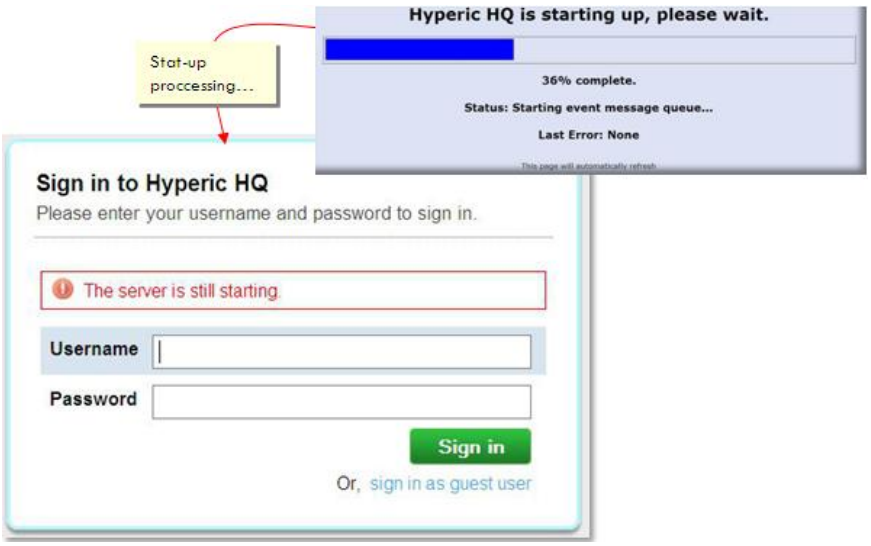


Figure 4.2.2.2.1-1. HQ Server is Starting up

Note: Refresh the page if it freezes (i.e., red warning box). At this point, the HQ Server may not have started completely. After a few minutes, perform a restart:

- **Start/Stop HQ Agent:** HQ Agent is installed and runs on each host that is to be monitored with Hyperic.

```
ssh to host
cd /usr/ecs/OPS/COTS/hyperic/hyperic-hq-agent/bin
./hq-agent.sh start|stop|restart|status|dump|ping|setup
```

4.2.2.2.2 Users and Roles

4.2.2.2.2.1 Users

Hyperic allows customization of user accounts. A user can be assigned a role to manage access to resources. Administrators can configure all user roles (Figure 4.2.2.2-1).

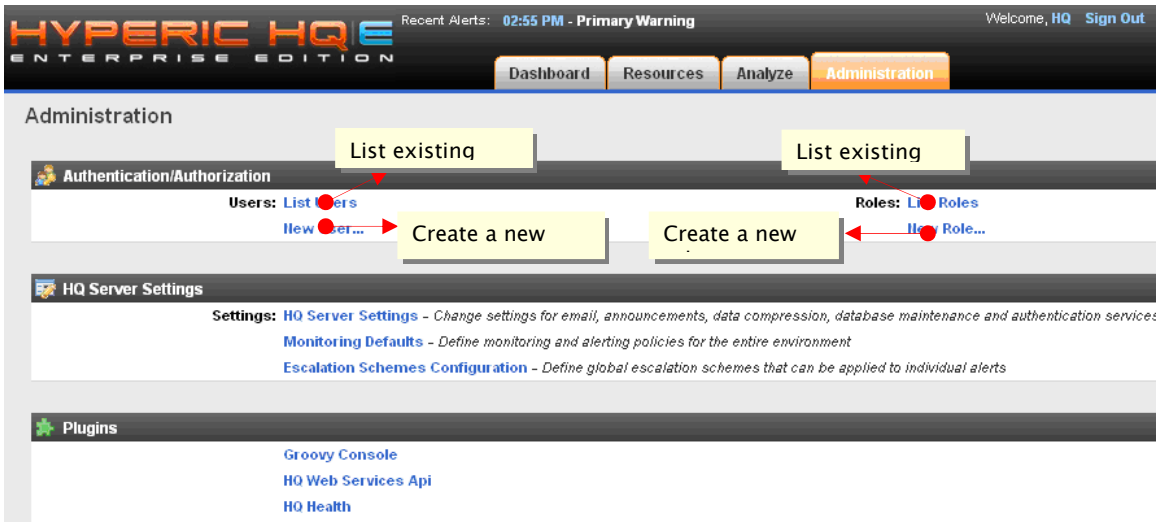


Figure 4.2.2.2.2-1. List/Create Users and Roles

Figure 4.2.2.2.2-2. Add New User Page

To confugure a new or existing user, perform the following:

- **List Users**

Under the Administration tab click on “List Users” (Figure 4.2.2.2.2-1)

- **Create a User**

Step 1: Click “New User” (Figure 4.2.2.2.2-1).

Step 2: Input New User information then select “Ok & Assign User To Roles”.

4.2.2.2.2.2 Roles

A role in HQ is defined as a permission level to a resource as Full, Read-Write, Read or None. The system has been designed in such a way as to shorten the actual process of assigning permissions to roles. Modify individual user's roles to manage the permissions to perform tasks and view resources within Hyperic. An administrator creates roles to limit a user's permission to view, monitor, modify, create, or control of resource within Hyperic.

NOTE: In HQ, the permission assigned to an inventory type creates a distinction between the right to manage and create alert definitions. For example, a 'full' permission role allows user to create, edit, and view, as well as perform operations for alert definitions on platforms.

- **List Roles**

Under the Administration tab click on "List Roles" (Figure 4.2.2.2.2-3)

- **Create a Role**

Step 1: Under the Administration tab click on "New Role…" (Figure 4.2.2.2.2-1)

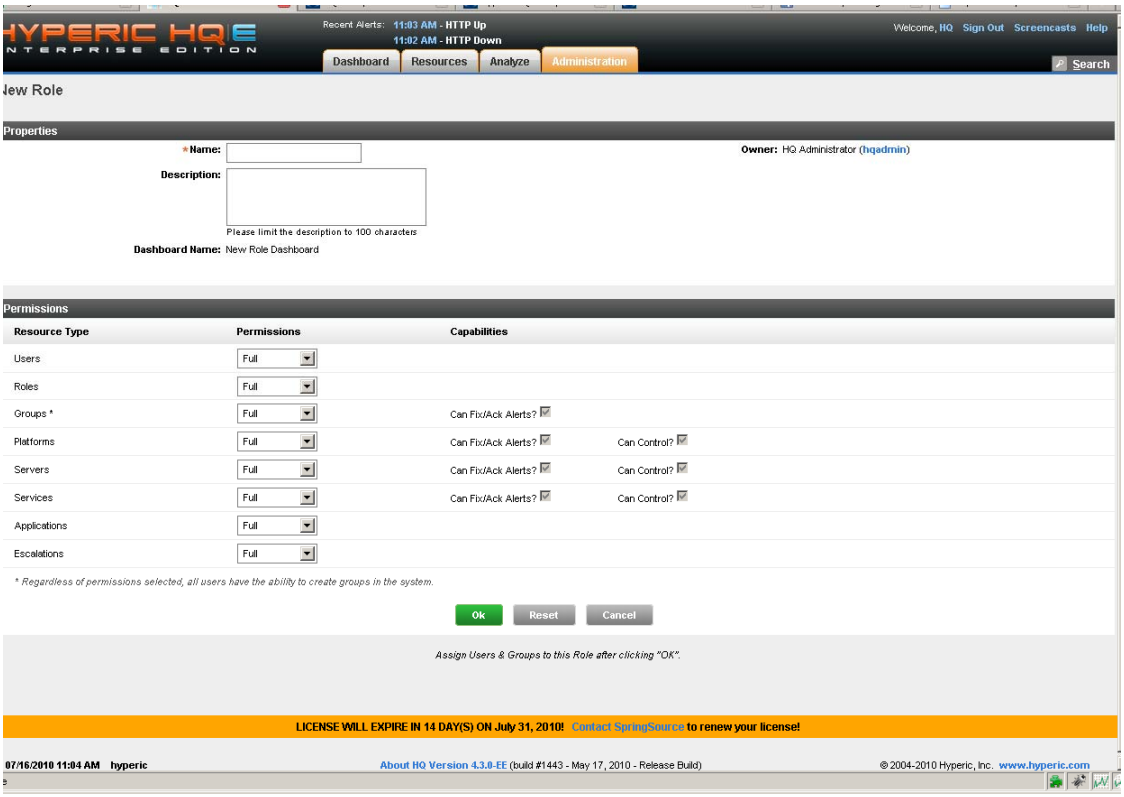


Figure 4.2.2.2.2-3. Add New Role

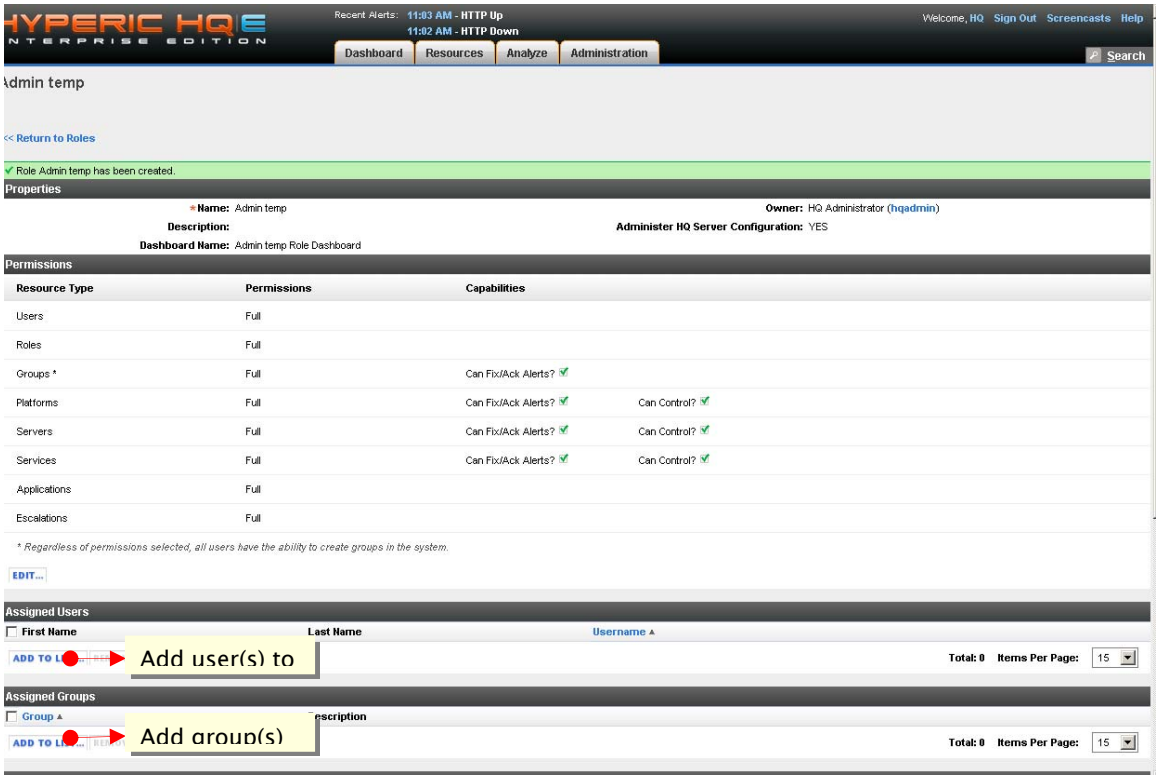


Figure 4.2.2.2.2-4. Role Configuration Page

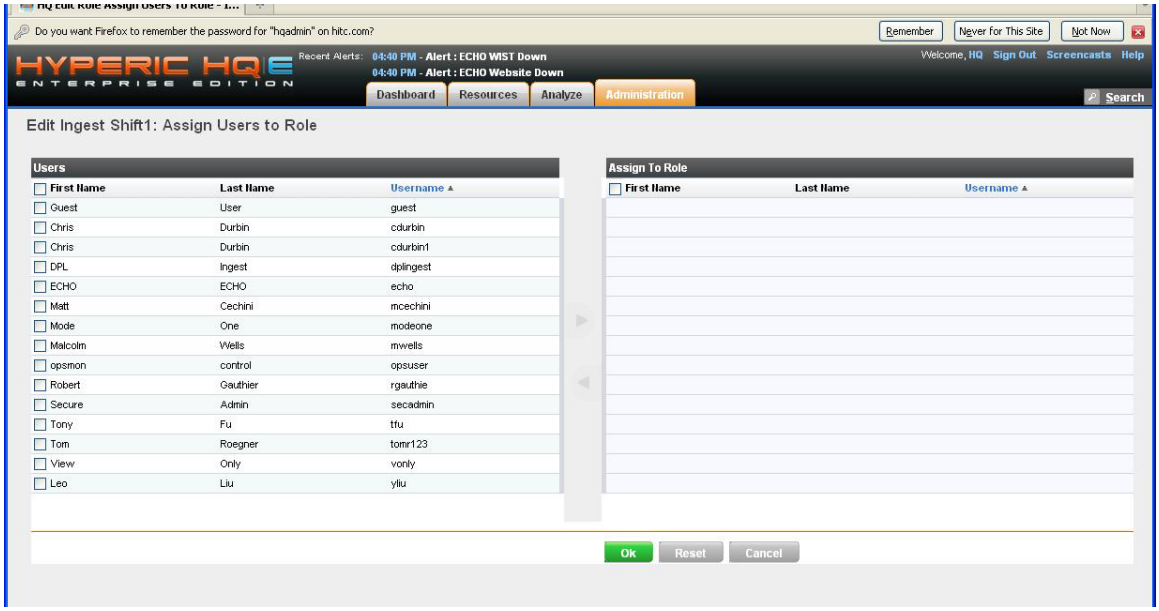


Figure 4.2.2.2.2-5. Add Users to Role

Step 2: Complete the New Role form click “Ok” (Figure 4.2.2.2.2-3)

Step 3: Ensure successful creation of Role, then click button to add users to the Role (Figure 4.2.2.2.2-4)

Step 4: Select the users to add to the Role. Users will appear in the left pane. When all desired users have been added to the Role select “Ok” (Figure 4.2.2.2.2-5)

Step 5: Select the groups to assign to the Role. Only after groups are assigned to a Role, can the permission of that Role be applied properly. (Refer to 4.2.2.2.8 Groups)

4.2.2.2.3 Auto-Discovering Resources

Auto-discovery is a feature where Hyperic collects resource-specific details about an environment. This feature will discover all resources running on a host which includes operating systems (platforms), servers, and services. An auto-discovery list is created and displayed on the user’s dashboard so users can add discovered resources into Hyperic’s inventory. Auto-discovery scans the environment periodically for new resources and can detect key changes to resources that are already in the inventory.

Step 1: View the dashboard and locate the auto-discovery pane (Figure 4.2.2.2.3-1)

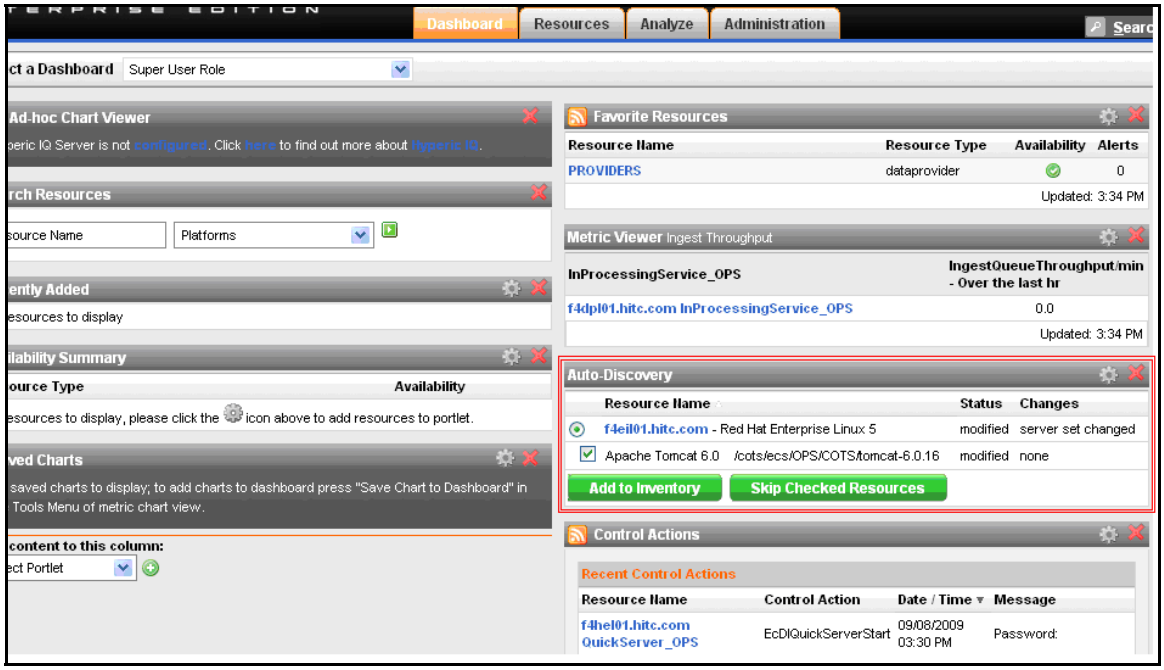


Figure 4.2.2.2.3-1. Dashboard Page

Step 2: Auto-Discovery will display any new resources (Figure 4.2.2.2.3-2).

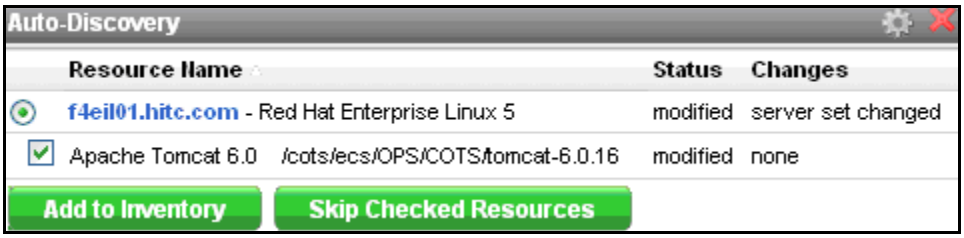


Figure 4.2.2.2.3-2. Auto-Discover List

Step 3: Select the resources to permanently add to the HQ Inventory and click "Add to Inventory" (or "Skip Checked Resources" to bypass the monitor specific resources).

Note: When a new custom plugin is deployed it will be auto-discovered and appear in the auto-discovery pane. Administrators must choose to add the resource to the HQ inventory to begin monitoring the resource.

4.2.2.2.4 Add New Resources

Hyperic provides two ways to add new resources:

1. Hyperic can *auto-discover* standard resources it monitors and allow the users to add the resources into its inventory through the auto-discover list. To add a custom resource, the user first needs to generate the custom plugin xml or jar file and deploy it. See section 1.8, Resource Plugin. Once deployed, Hyperic will auto-discover the resource and put the resource in the auto-discover list.
2. Resources can be *manually* added to a new platform. The user would go to the Browse Resource page, click on "Tool Menu" and select "New Platform". To add a new server or service, the user would first select a platform from the Browse Resource page. In the platform resource page click on "Tool Menu" and select either "New Server" or "New Service".

Note: Before some resources are added to the Hyperic inventory and can be monitored, required configuration must be completed.

4.2.2.2.5 View Resources

4.2.2.2.5.1 Viewing a Resource

Step 1: Select the "Browse" option from the drop-down menu when hovering over the "Resources" tab (Figure 4.2.2.2.5-1)

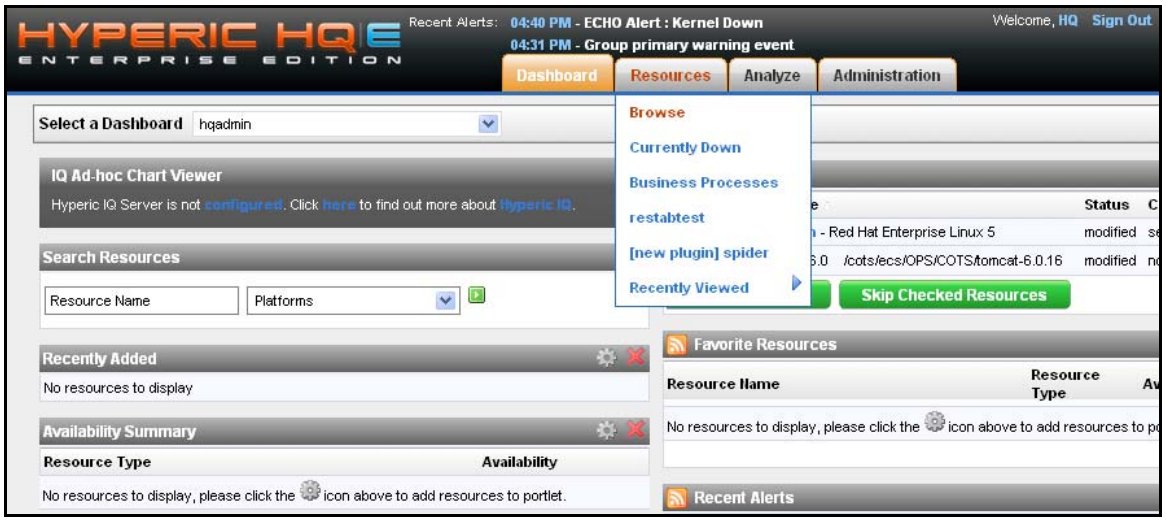


Figure 4.2.2.2.5-1. Resource Browse Link

Step 2: Select the type of resource (Platform, Server, Service, Compatible Group, Mixed Group, and Application) (Figure 4.2.2.2.5-2)

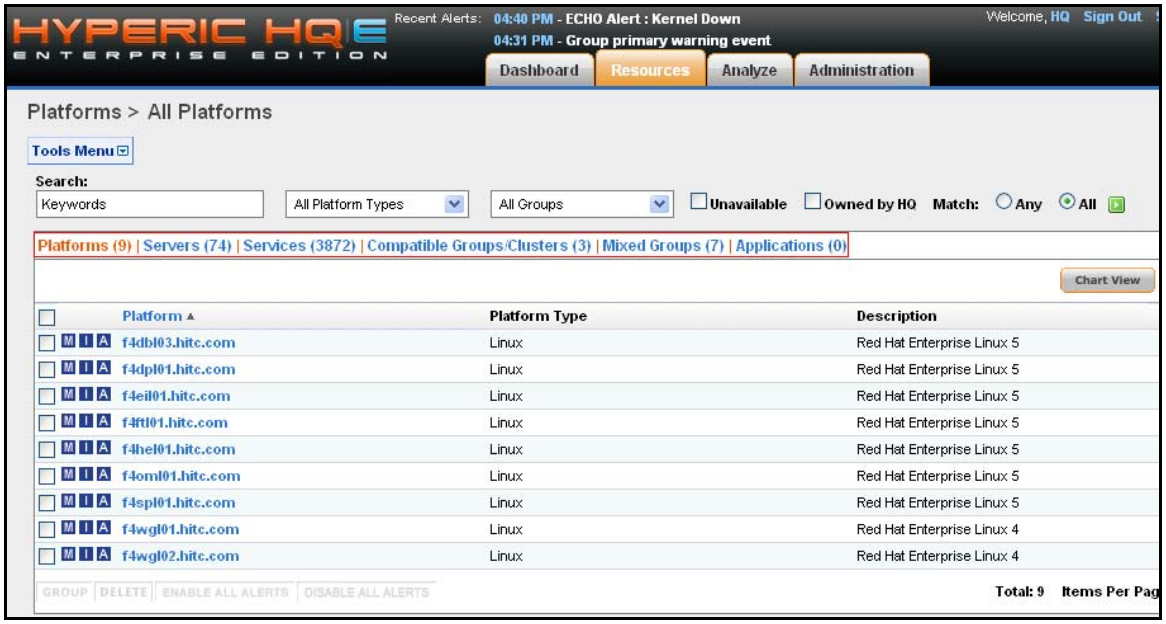


Figure 4.2.2.2.5-2. Choose Resource Type

Step 3: Select the resource you want to view

4.2.2.2.5.2 Resource View

Figure 4.2.2.2.5-3. Resource Tabs

Monitor Tab

The monitor tab is the default resource view. The monitor tab allows users to view the availability and current metrics being collected for a resource. This view will give insight into any problems with the resource. (Figure 4.2.2.2.5-4)

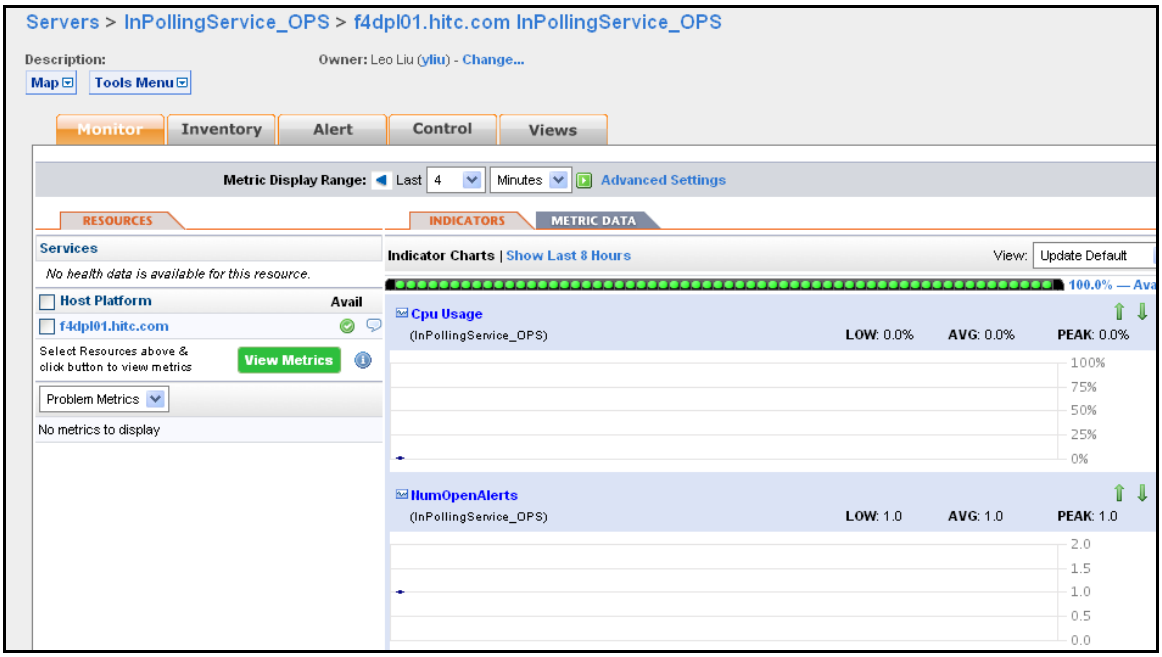


Figure 4.2.2.2.5-4. Resource Monitor Page

Inventory Tab

The inventory tab allows a user to view and edit various properties of a resource. (Figure 4.2.2.2.5-5)

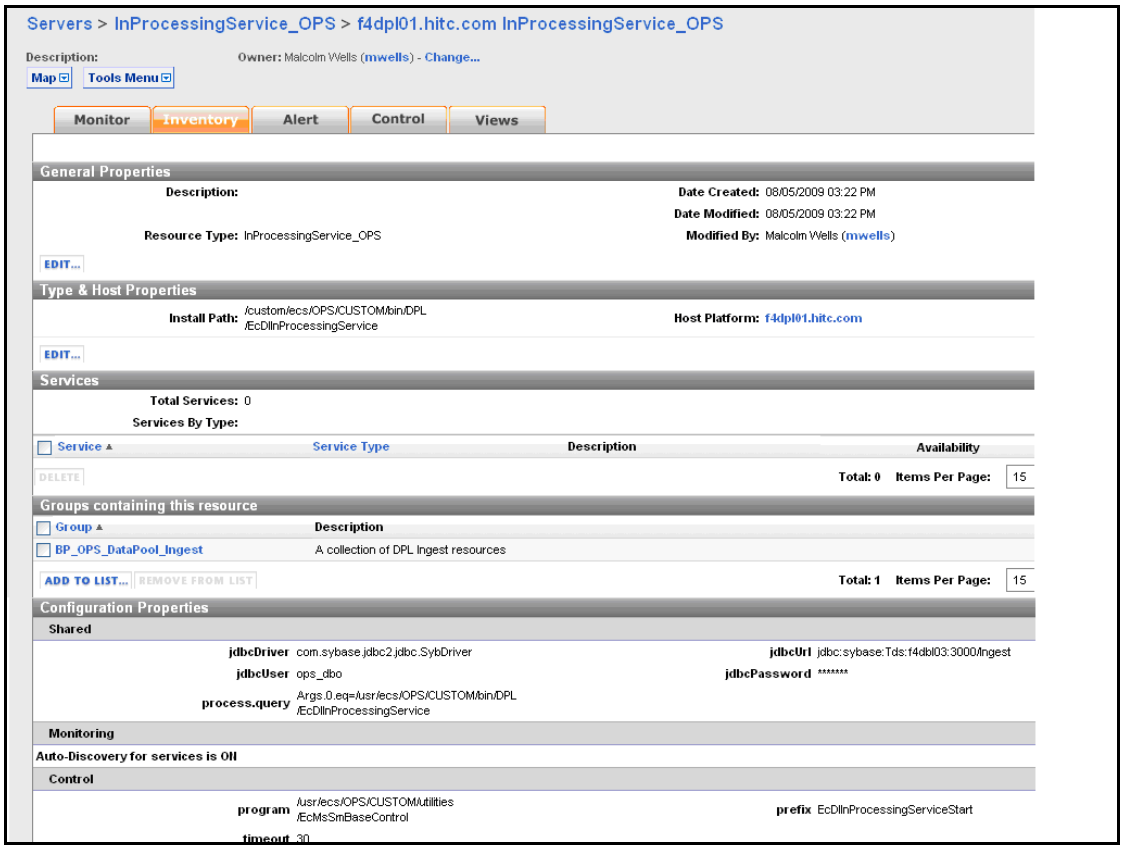


Figure 4.2.2.2.5-5. Resource Inventory Page

Alert Tab

The alert tab displays the alert history for a resource. Under this tab a user is able to define a new alert or edit an existing one. (Figure 4.2.2.2.5-6)

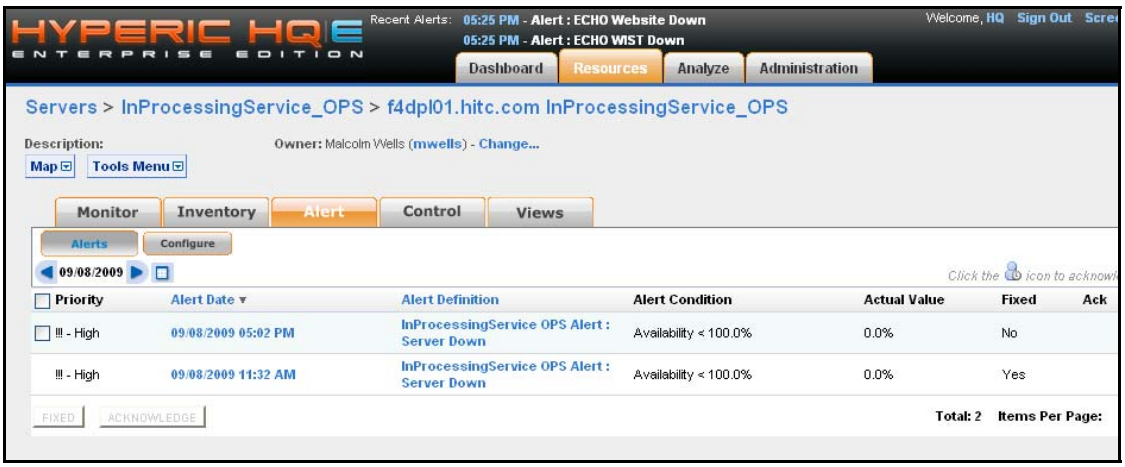


Figure 4.2.2.2.5-6. Resource Alert Page

Control Tab

The control tab displays all of the defined control actions for a resource. A user can manually execute a defined control action or schedule one to be executed from the control tab. Under this tab a user is also able to define a new control action or edit an existing one. (Figure 4.2.2.2.5-7)

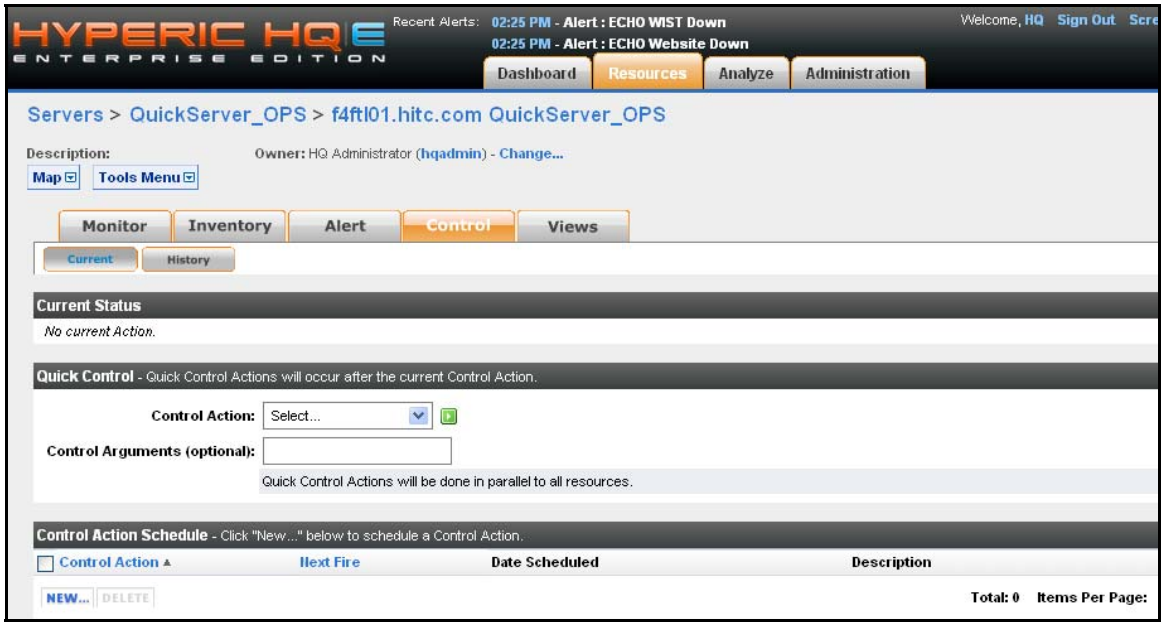


Figure 4.2.2.2.5-7. Resource Control Page

4.2.2.2.6 Alert and Control Actions

4.2.2.2.6.1 Alert

An alert is a set of rules that a user defines that tells Hyperic how to detect a problem with a given resource. The rules that can be defined for an alert can be:

- A metric value or event that triggers the alert
- What to do when the specified measurement or event is reported:
    - Email and SMS notifications
    - Generating OpenNMS traps
    - Escalation schemes
    - Execute a custom script
    - Execute a control action
    - Notify specific Hyperic roles and/or users

Creating an Alert

In order to create an alert for a resource you must create an alert definition that will define the conditions that should trigger an alert to fire.

Step 1: Navigate to the detailed view of a resource (See section 1.4 View Resource) and select the Alert tab. (Figure 4.2.2.2.6-1)

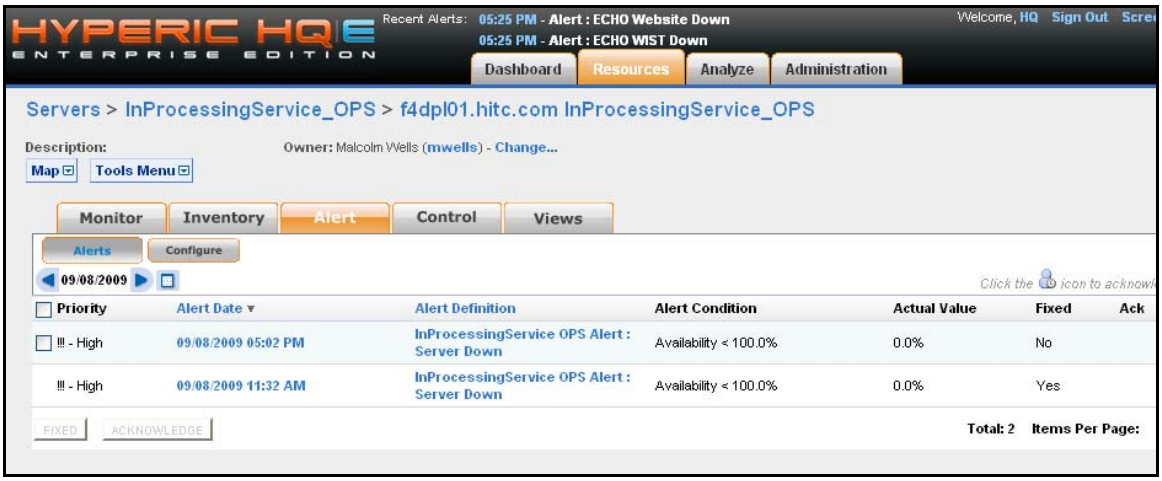


Figure 4.2.2.2.6-1. Resource Alert Page

Step 2: Select the "Configure" button (Figure 4.2.2.2.6-2)

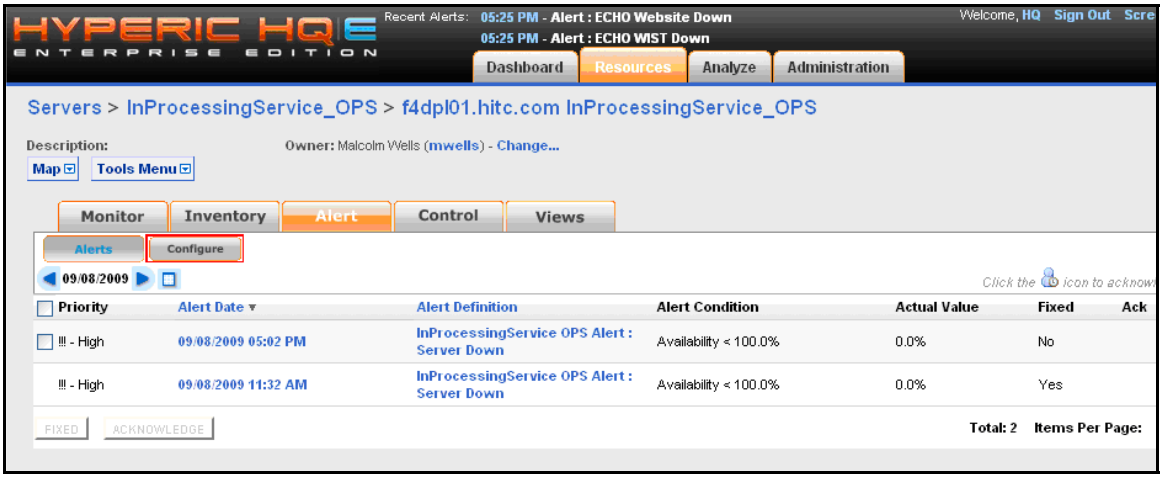


Figure 4.2.2.2.6-2. Resource Alert Configure Page

Step 3: Select the "New…" option (Figure 4.2.2.2.6-3)

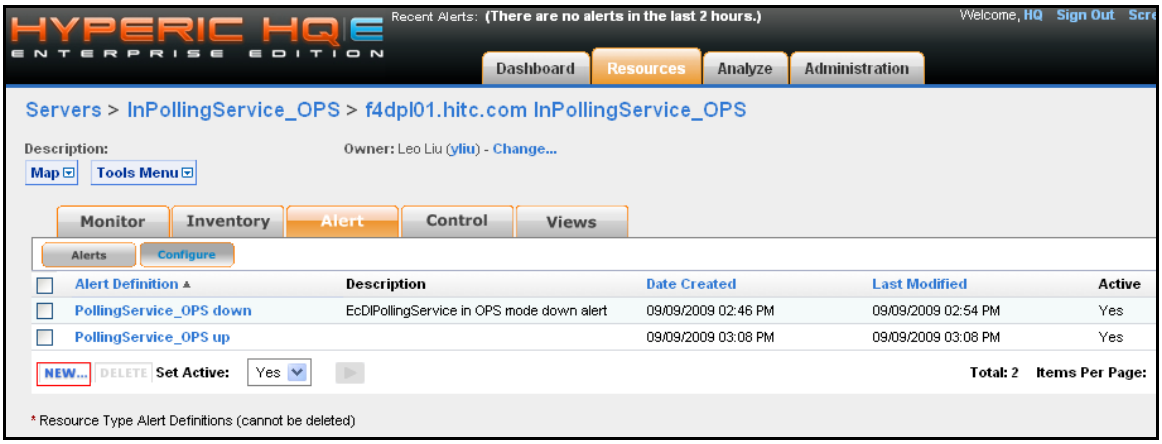


Figure 4.2.2.2.6-3. Add New Alert Definition

Step 4: Complete the Alert Definition Form and Select "Ok" (Figure 4.2.2.2.6-4)

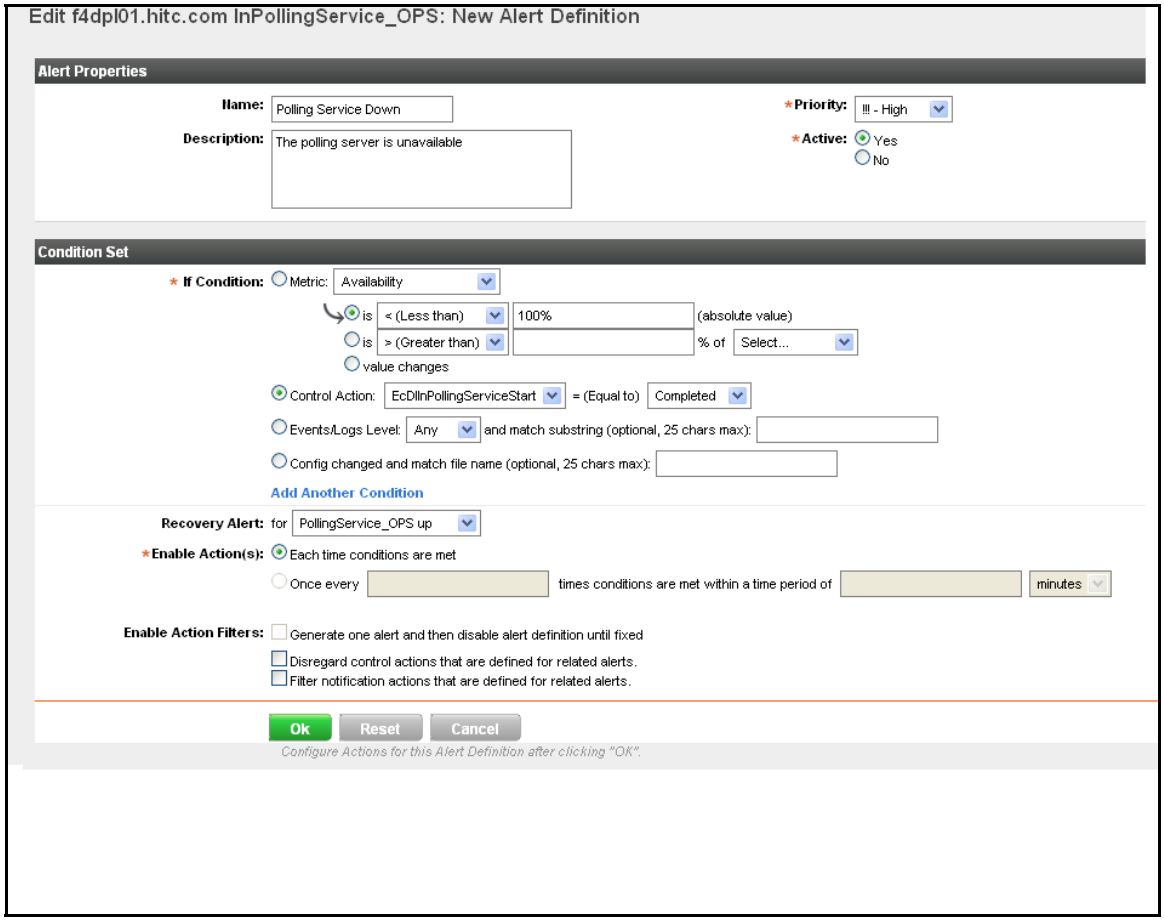


Figure 4.2.2.2.6-4. Configure Alert Definition

4.2.2.2.6.2 Control Actions

Control actions are user defined actions that can control the status or function of a server or service. Actions such as “start”, “stop”, and “restart” are examples of typical control actions. Hyperic allows users to define their own control actions via custom scripts that are not tied to the Hyperic system.

Creating a Control Action

See section 4.2.2.4.2.3, Polling Server.

4.2.2.2.6.3 Recovery Alerts

In order to automatically mark an alert as fixed once the problem is resolved, a recovery alert must be configured. For details on how to configure a recovery alert see section 4.3, Polling Server.

4.2.2.2.6.4 Hierarchical Alerting

Hierarchical Alerting is a function of HQ that would reduce a number of similar alerts from firing from a single root cause from a resource hierarchy. The objective of hierarchical alerting is to guarantee that the operations teams are not overloaded with multiple alerts resulting from the same root cause.

For example, when a server reports that a resource with an active alert definition is down, HQ checks whether its parent (platform is the parent of a server, server is the parent of a service, etc.) in the resource hierarchy is up or down. HQ will then generate an alert in accordance with its definition only in the following situations:

- Whenever the parent is available
- Whenever the parent is unavailable and there is no active single-condition alert definition on its availability

Disabling the ‘Global Alert Properties’ section

Hierarchical alerting is enabled by default. To disable the alerting feature please follow the following steps:

Step 1: Click on the administration tab of the Hyperic HQ home. (Figure 4.2.2.2.6-5)

Figure 4.2.2.2.6-5. Hyperic Main Page

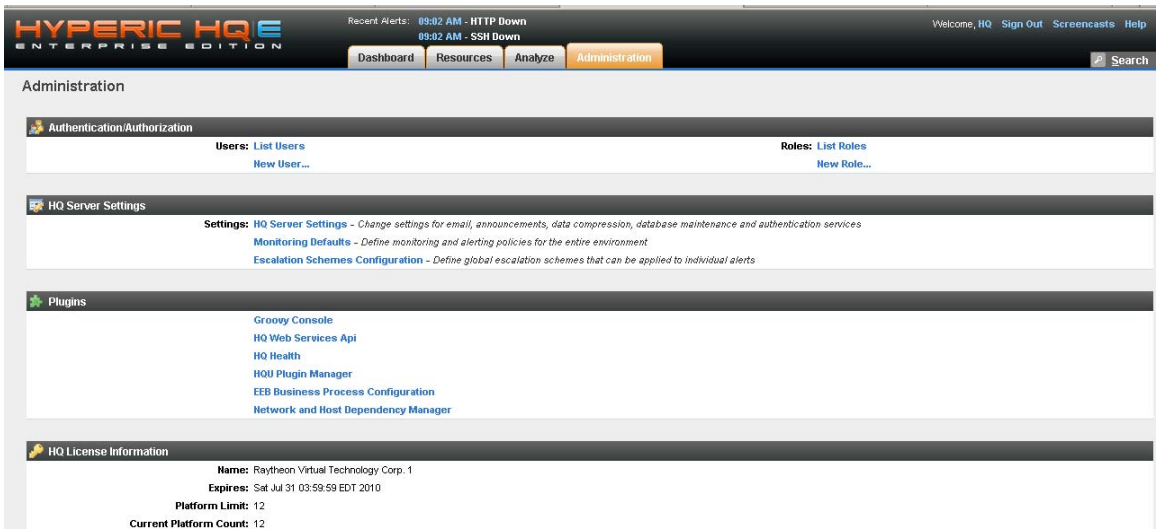


Figure 4.2.2.2.6-6. Hyperic Administration Page

Step 2: Click on the HQ Server Settings under the HQ Server Settings pane. (Figure 4.2.2.2.6-6)

Step 3: Click on the HQ Server Settings under the HQ Server Settings pane. (Figure 4.2.2.2.6-7)

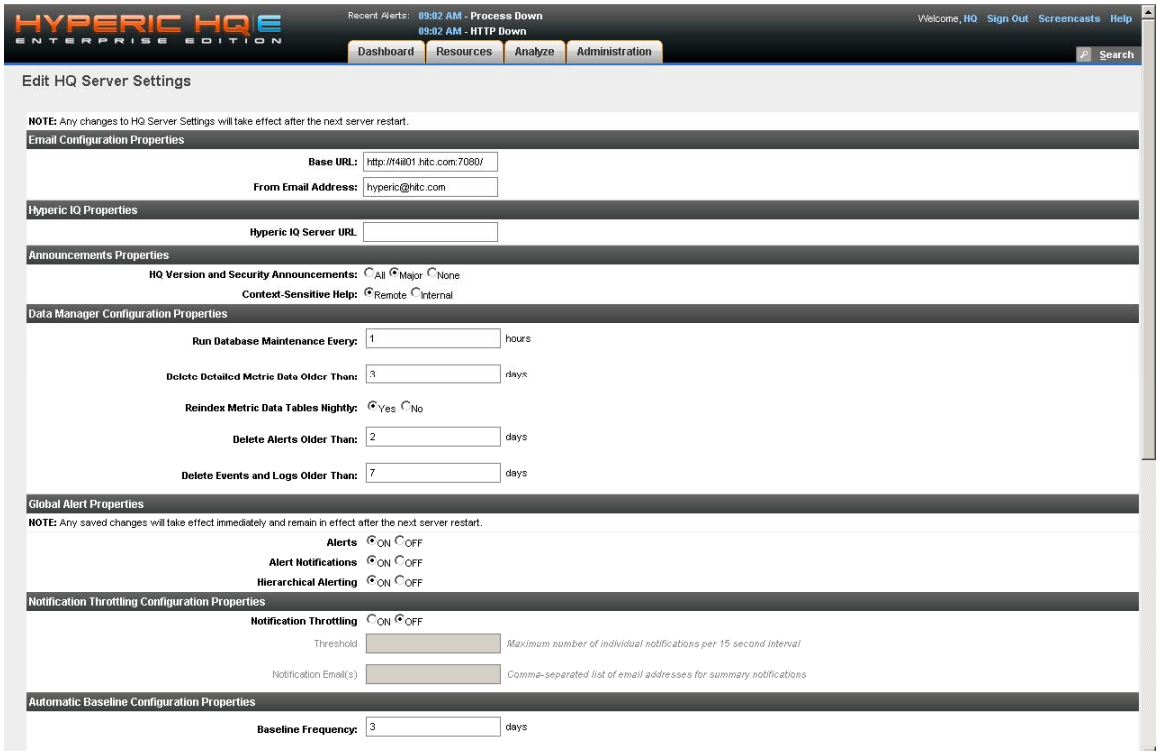


Figure 4.2.2.2.6-7. Editing the HQ Server Settings

Step 4: To disable the Hierarchical Alerting simply select the OFF radio button of the Hierarchical Alerting field and click on OK to save the changes.

The change takes effect immediately without need to restart the HQ Server. The setting will persist through HQ Server restarts.

When hierarchical alerting is enabled, HQ will process alerts as described above, leveraging its built-in knowledge of how each resource fits into HQ's three-level (platform-server-service) inventory model without requiring additional configuration.

4.2.2.2.6.5 Alert Notification Throttling

You can configure the HQ Server to throttle back alert notifications if there are myriad of alerts generated. You can thus configure a maximum number of notifications that HQ will issue within a fifteen second interval. When that threshold is reached, HQ will stop sending individual alert notifications. Instead, HQ will send a rollup notification to designated notification recipients. HQ continues to evaluate alert volume, and continues to throttle notifications until alert volume decreases sufficiently. Rollup notification e-mails are sent every 10 minutes and indicate whether or not throttling will continue.

Enabling Alert Notification Throttling

Step 1: Click on the administration tab of the Hyperic HQ home. (Figure 4.2.2.2.6-8)

Figure 4.2.2.2.6-8. Hyperic Main Page

Step 2: Click on the HQ Server Settings under the HQ Server Settings pane. (Figure 4.2.2.2.6-9)

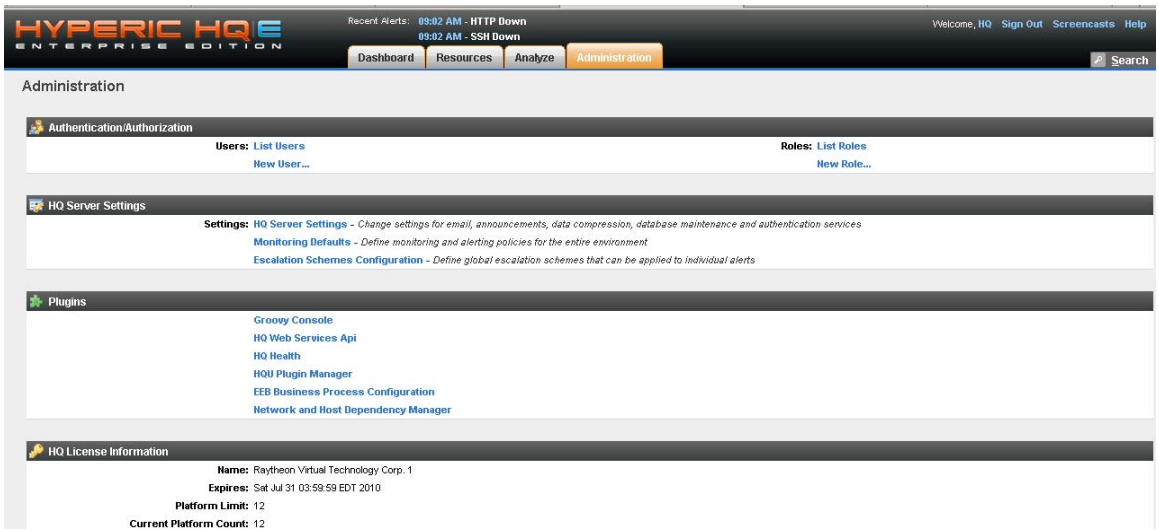


Figure 4.2.2.2.6-9. Hyperic Administration Page

Step 3: Click on the HQ Server Settings under the HQ Server Settings pane. (Figure 4.2.2.2.6-10)

Step 4: To turn on the feature, Under the Notification Throttling Configuration Properties click on the ON radio button under the Notification Throttling. Once that has been selected, one can select the maximum number of individual notifications per 15 second interval, and can also specify email addresses as to where those notifications should be sent.

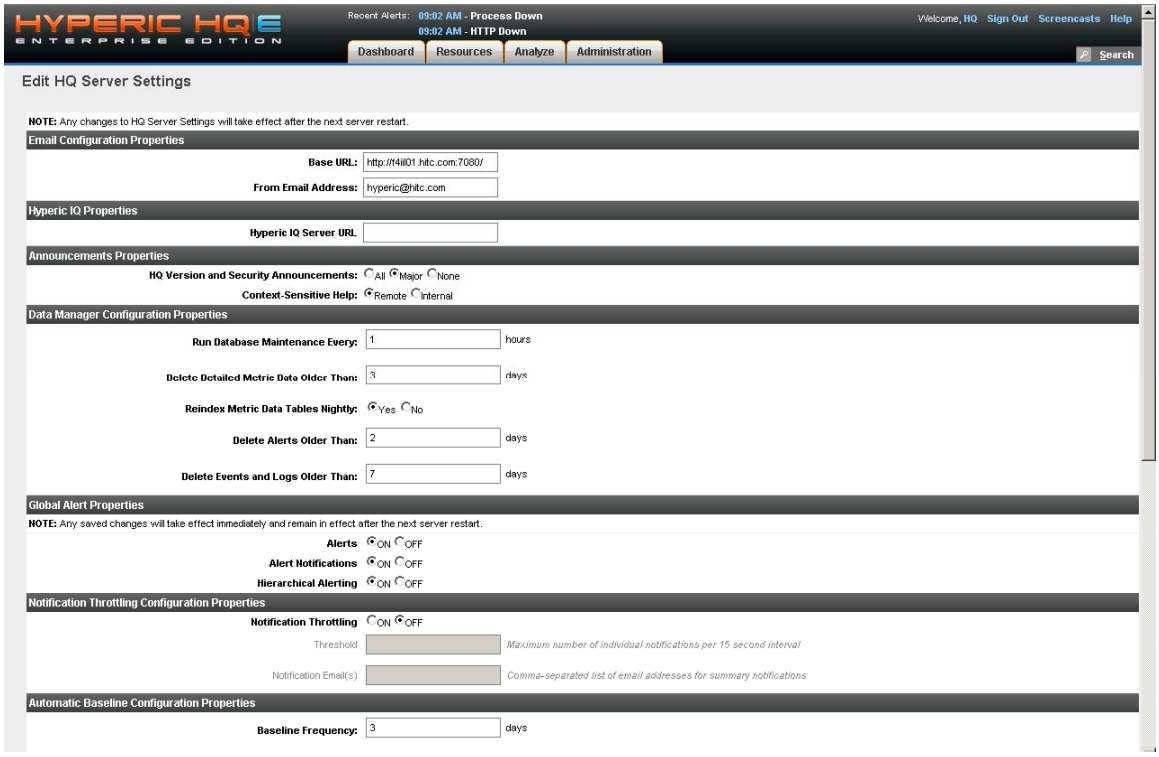


Figure 4.2.2.2.6-10. Editing the HQ Server Settings

4.2.2.2.7 Configuration Tracking

Configuration tracking notifies users of changes of selected files within an environment. This feature continuously compares an original version of a file with the current version to see if any changes have occurred. An alert can be triggered when a file is changed. The files that are tracked by Hyperic must have the appropriate permissions to allow the HQ agents to access them. Also, resources that are capable of configuration tracking are usually limited to platform or server types.

4.2.2.2.7.1 Enable and Configure "Configuration Tracking" for a resource

Step 1: Follow the steps to view a resource and select the "Inventory" tab. (Figure 4.2.2.2.7-1)

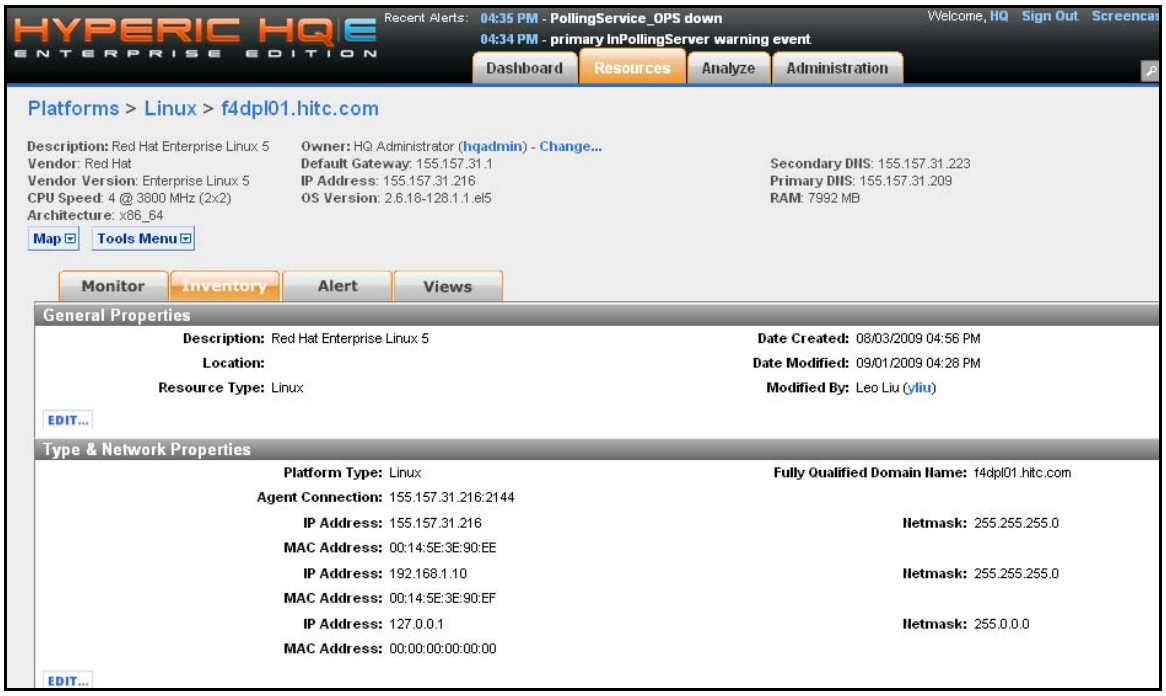


Figure 4.2.2.2.7-1. Configuration Tracking Inventory Tab

Step 2: Scroll down the page to the Configuration Properties section and select "Edit…" (Figure 4.2.2.2.7-2)

Figure 4.2.2.2.7-2. Configuration Properties

Step 3: Follow the instruction on Configuration Tracking page to complete the form. (Figure 4.2.2.2.7-3)

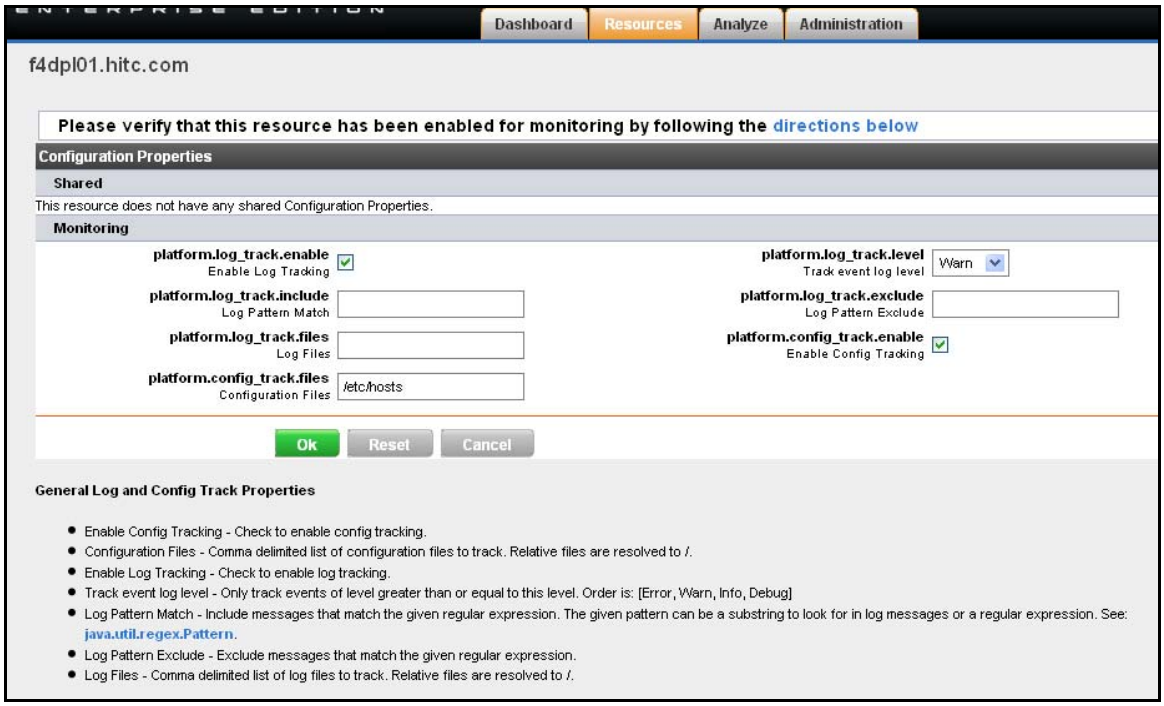


Figure 4.2.2.2.7-3. Configuration Properties Form

NOTE: Although custom plugins have been defined to track configuration files it will not occur automatically when the plugin is deployed. The user must manualyl accept the configuration properties through the hyperic UI to enable configuration tracking.

4.2.2.2.7.2 Configure "Configuration Tracking" Alert

Step 1: Follow the steps to create a new Alert

Step 2: Select the alert condition "Config change and match file name" (Figure 4.2.2.2.7-4)

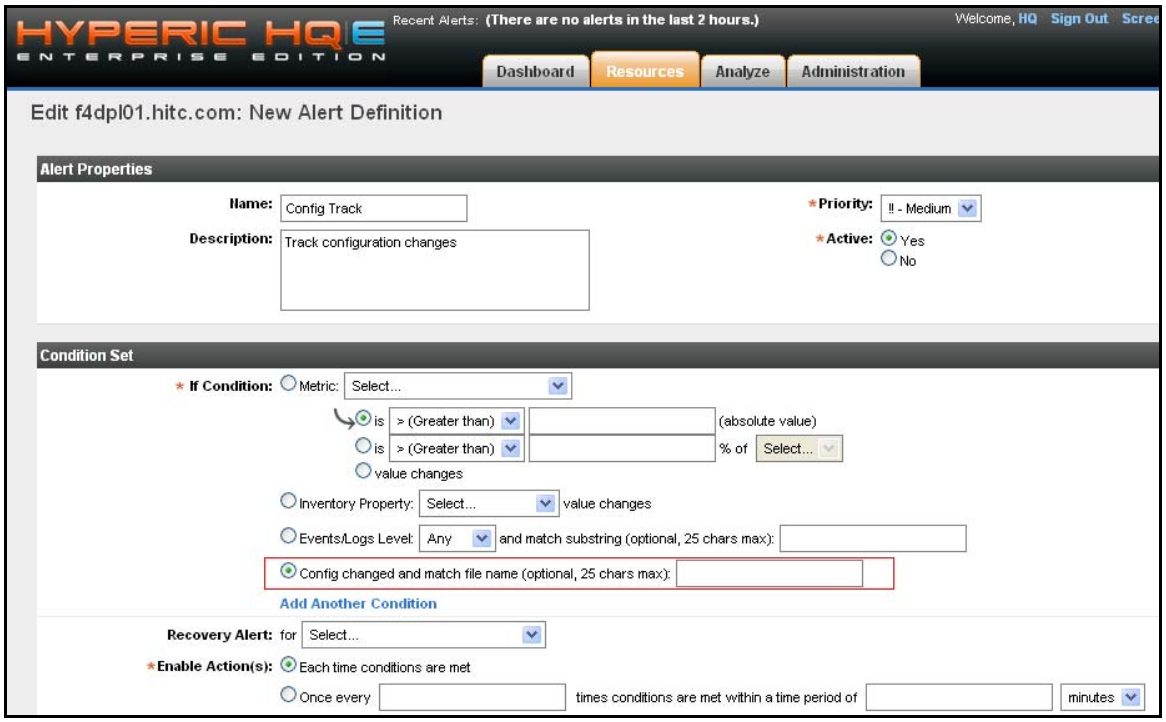


Figure 4.2.2.2.7-4. Configuration Tracking Alert

4.2.2.2.8 Groups

Groups in Hyperic allow users to create collections of resource. This feature is useful when resources have a relationship to each other. Business Processes will be created via the group feature. A business process will be defined by creating a group assigning all resources that are members of the business process to the group. The business process can later be configured at the Business Process Configuration page.

Creating a New Group

Step 1: Under the Resource Tab expand the "Tools Menu" and Select "New Group" (Figure 4.2.2.2.8-1)

Figure 4.2.2.2.8-1. Selecting New Group

Step 2: Complete the New Group form and Select "Ok"(Figure 4.2.2.2.8-2)

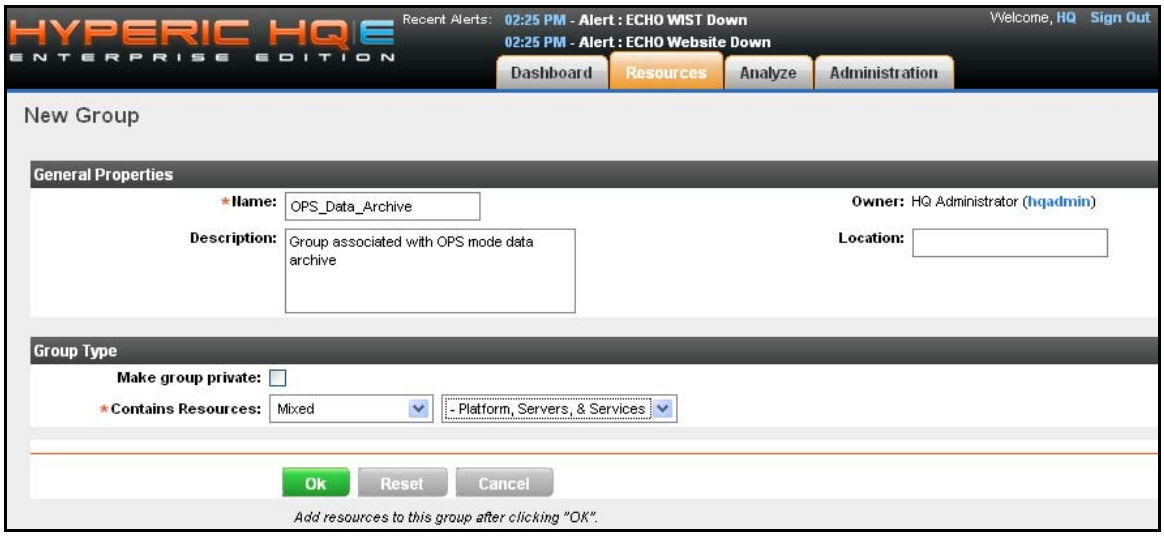


Figure 4.2.2.2.8-2. Configuring New Group

Note: When creating a business process you must prefix the group name with "BP_<Mode>_<Business Process Name>"

Step 3: Ensure successful creation of group and select the button to add resources to the group. (Figure 4.2.2.2.8-3)

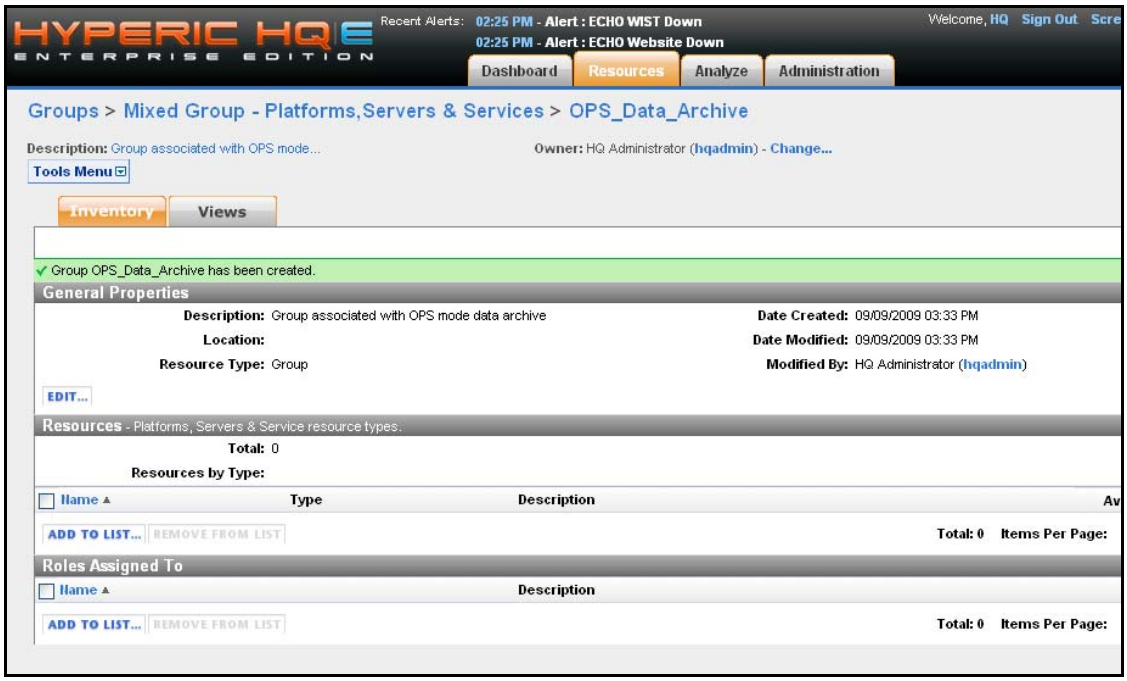


Figure 4.2.2.2.8-3. Group Inventory Page

Step 4: Select the resources you want to include in the group. Add them to the group so that they show up in the right pane. When all desired resources have been added to the group select "Ok" (Figure 4.2.2.2.8-4)

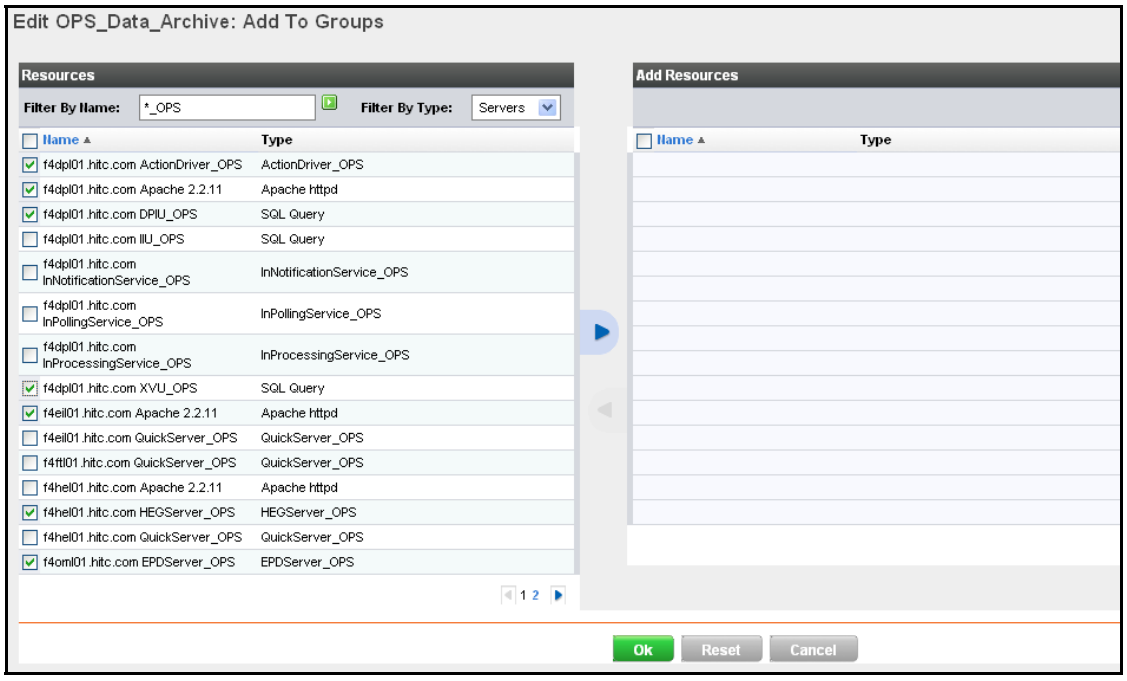


Figure 4.2.2.2.8-4. Add Resource to Group

4.2.2.2.9 Escalation Scheme

An escalation is a type of alert action that contains a notification procedure that is triggered when an alert fires. An escalation scheme can define various steps to execute during the lifetime of an alert. When the alert is marked as "fixed" the escalation scheme will discontinue.

Creating an Escalation Scheme

Step 1: Under the Administration tab select "Escalation Scheme Configuration"

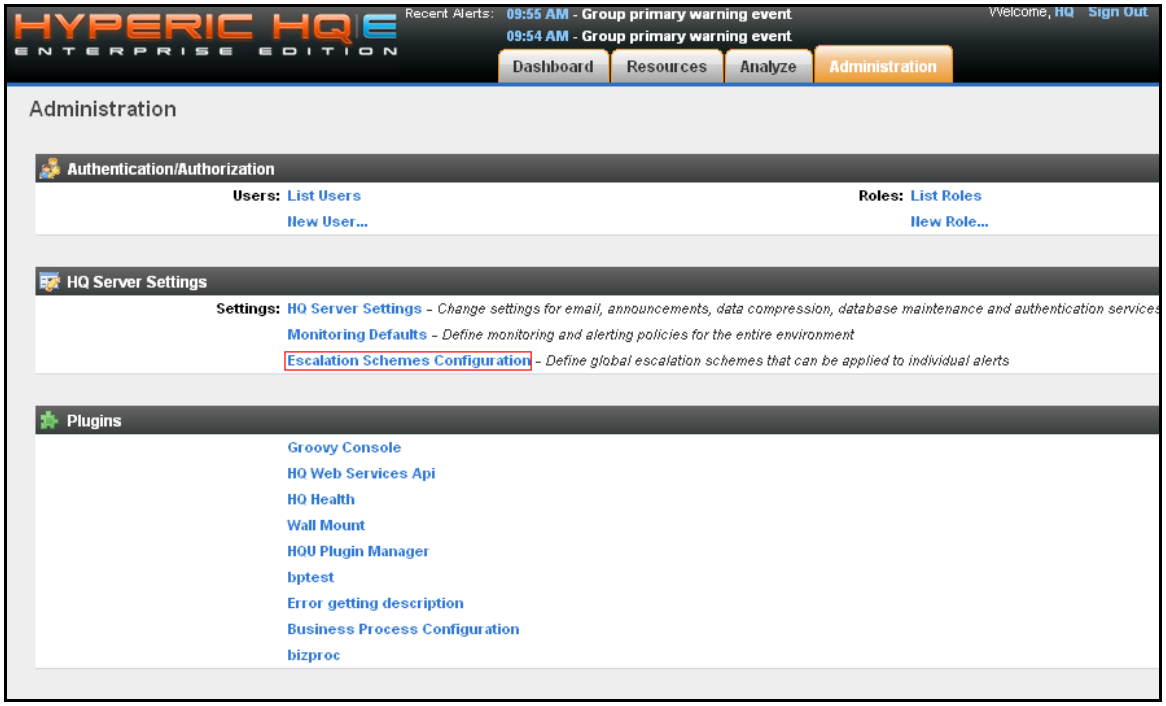


Figure 4.2.2.2.9-1. Escalation Scheme Configuration Link

Step 2: Complete the form to define a new escalation scheme

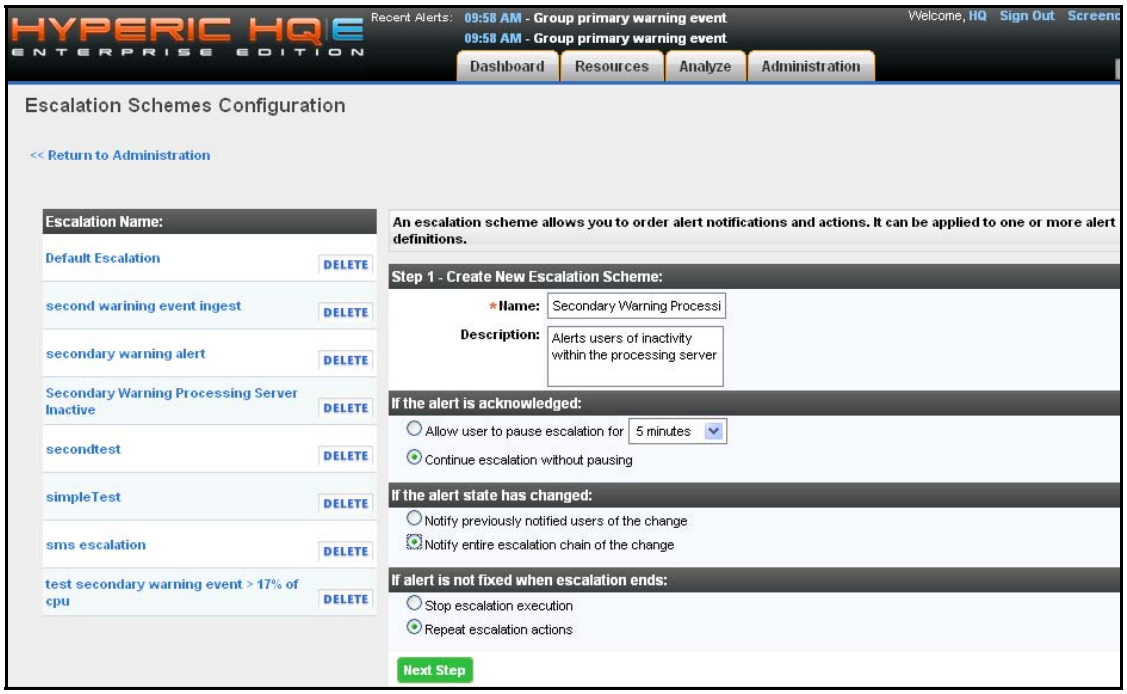


Figure 4.2.2.2.9-2. Escalation Scheme Configuration Page

Step 3: Create escalation scheme action by selecting "Create Action"

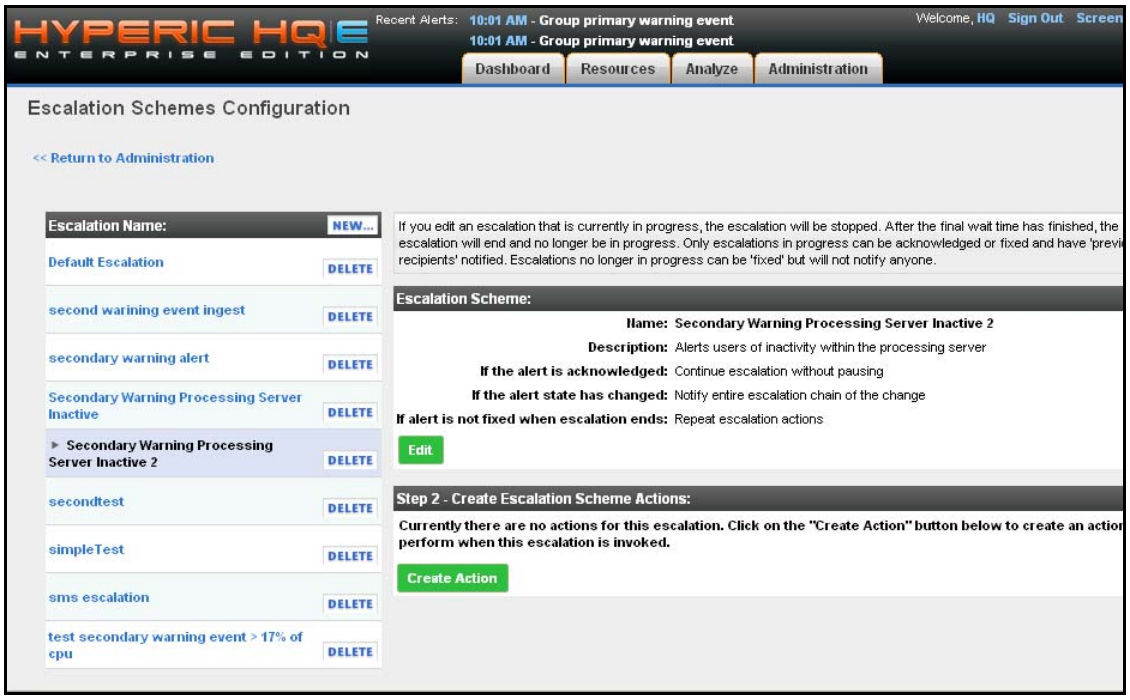


Figure 4.2.2.2.9-3. Escalation Scheme Create Action Link

Step 4: Select the notification method and notification recipients

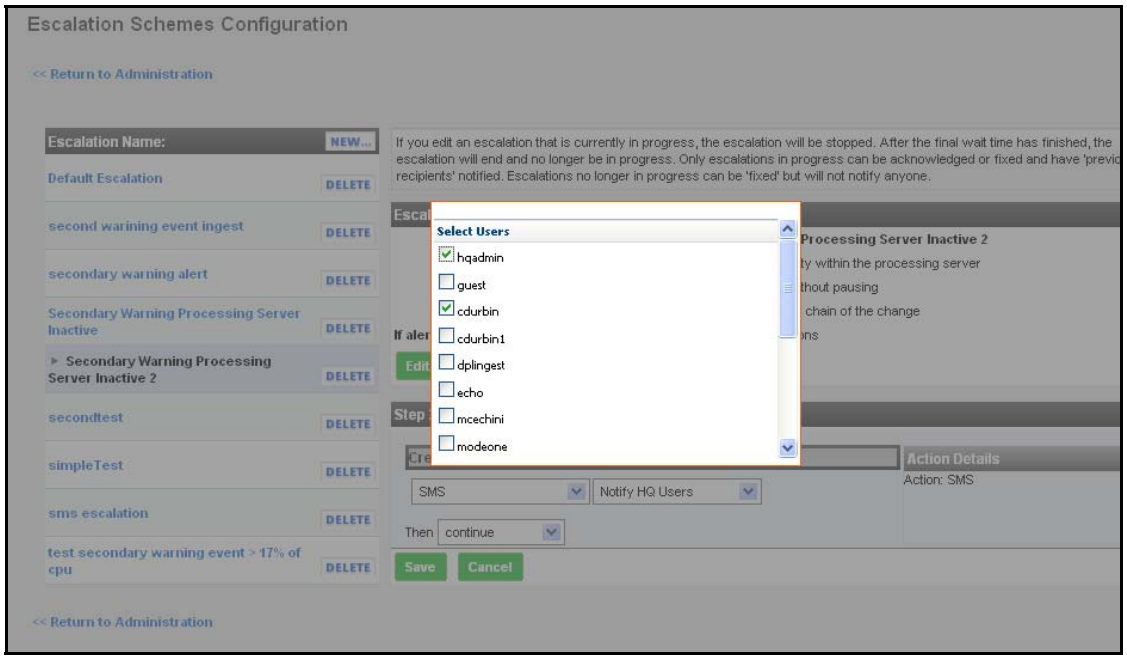


Figure 4.2.2.2.9-4. Escalation Scheme Configure Notification

Step 5: Choose the wait interval and select "Save" at the bottom of the screen

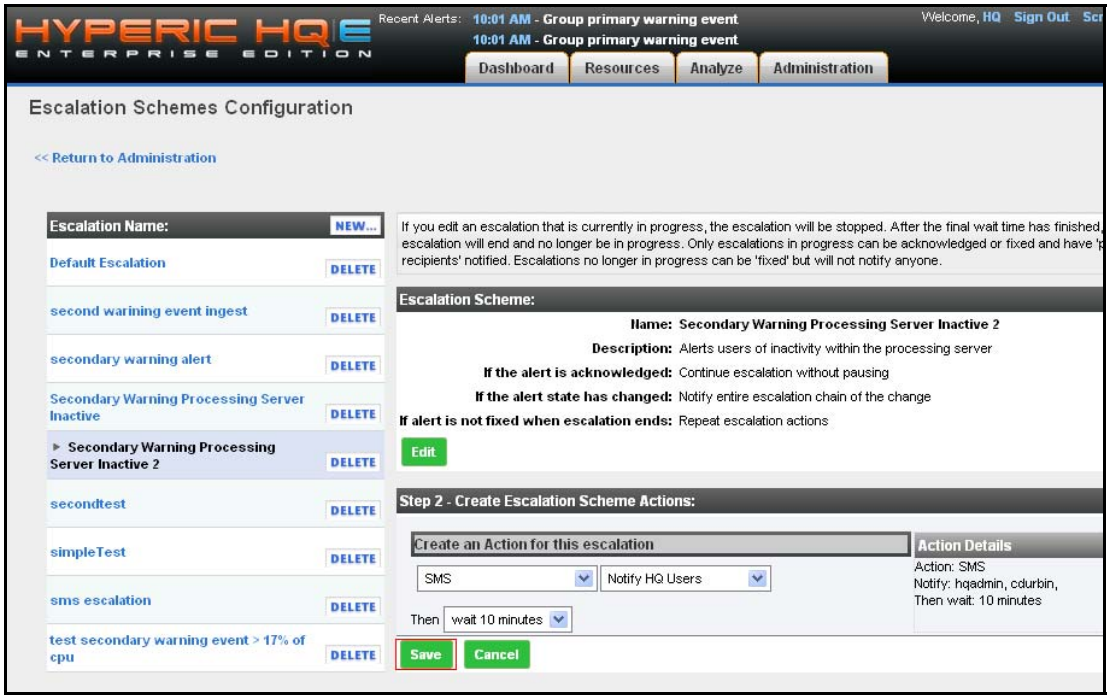


Figure 4.2.2.2.9-5. Escalation Scheme Configure Wait Interval

4.2.2.2.10 Setting Default Metrics Collections

For most resource types the user will want to configure the same metrics collections for all resources of that type. This is accomplished by using the monitoring defaults configuration. Any new resource added of that type will automatically monitor according to the default configuration. The user should be aware that modifying the defaults will overwrite any existing metrics collection configuration for every resource of that type.

Modifying metric templates for a resource type

Step 1: Under the Administration tab select "Monitoring Defaults"

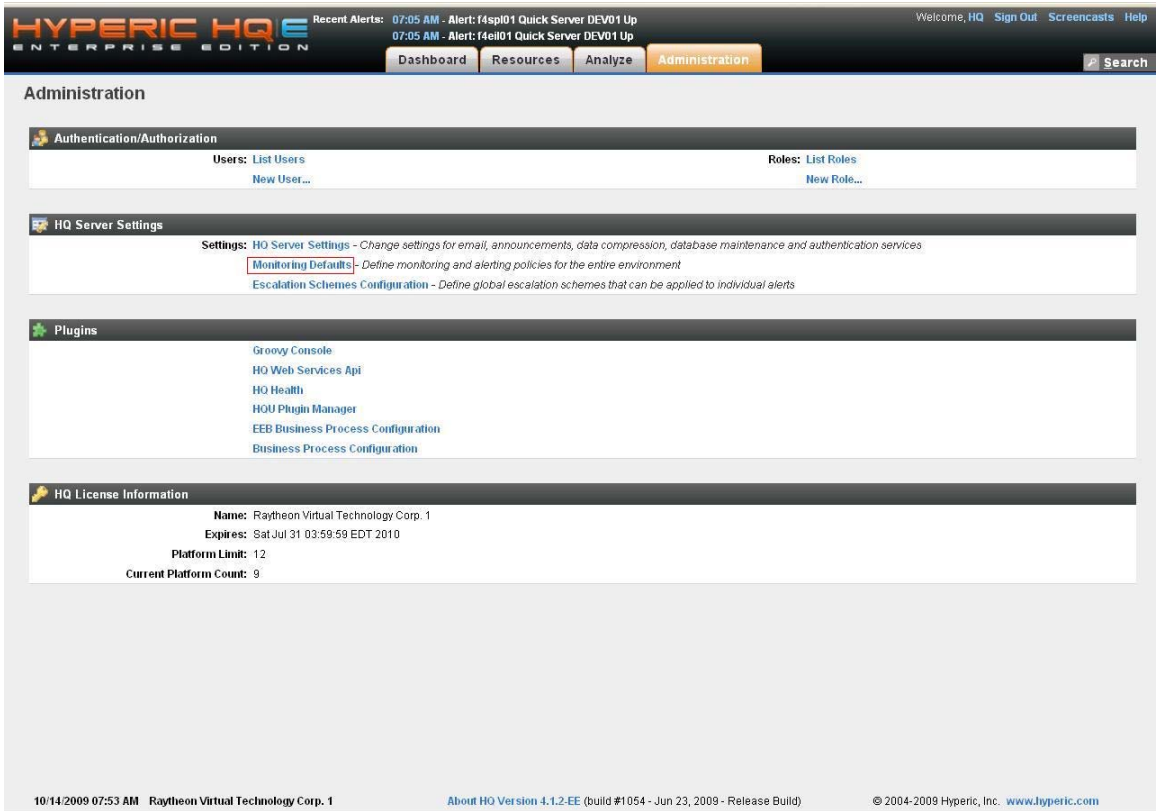


Figure 4.2.2.2.10-1. Monitoring Defaults Link

Step 2: Locate the resource type to configure in the list and select 'Edit Metric Template'

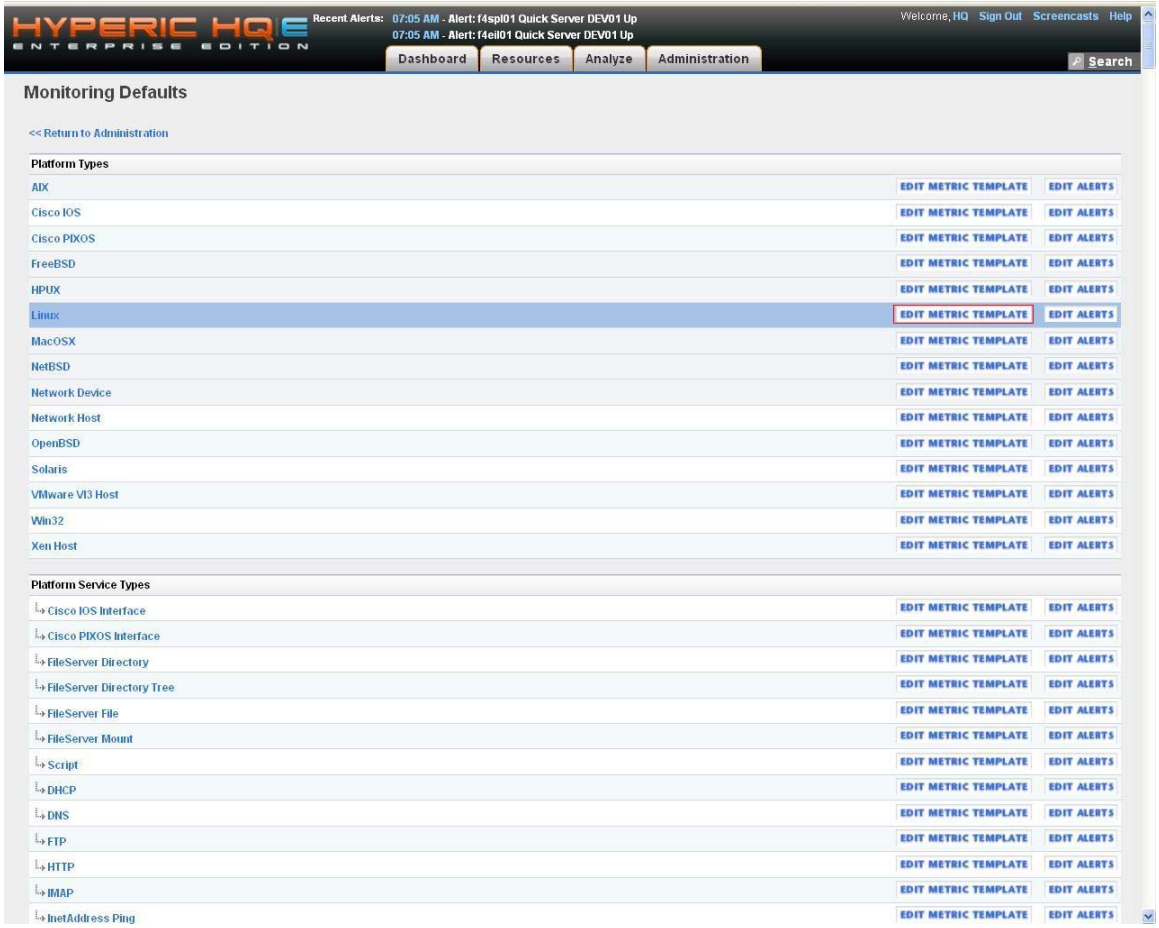


Figure 4.2.2.2.10-2. Monitoring Defaults Configuration Page – Edit Metric Template

Step 3: Select the metrics to be captured for all resources of that type, choose the collection interval for those metrics, and then click the play icon.

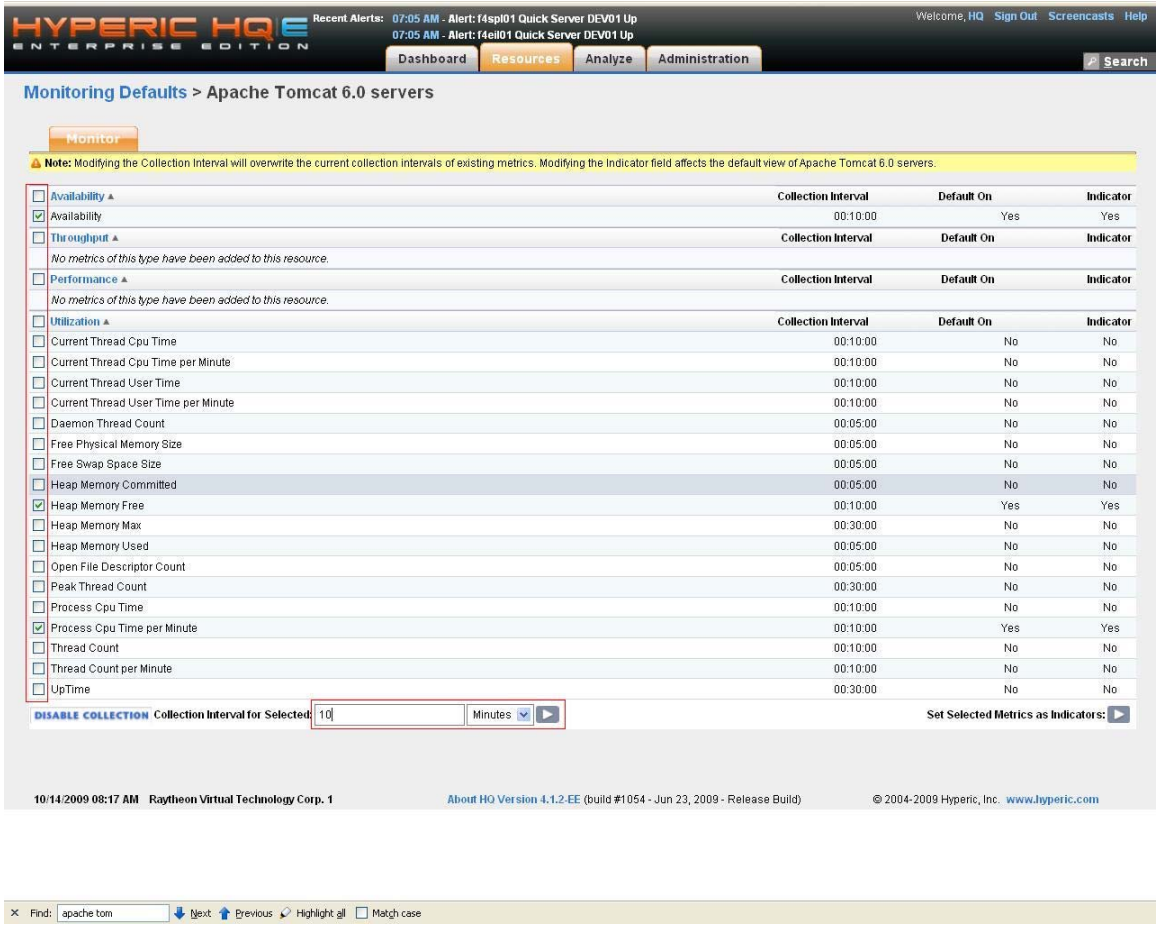


Figure 4.2.2.2.10-3. Default Metrics Collection Configuration

Step 4: Select all of the metrics which are captured to also be indicators (They will be displayed graphically when navigating to any resource of that type).

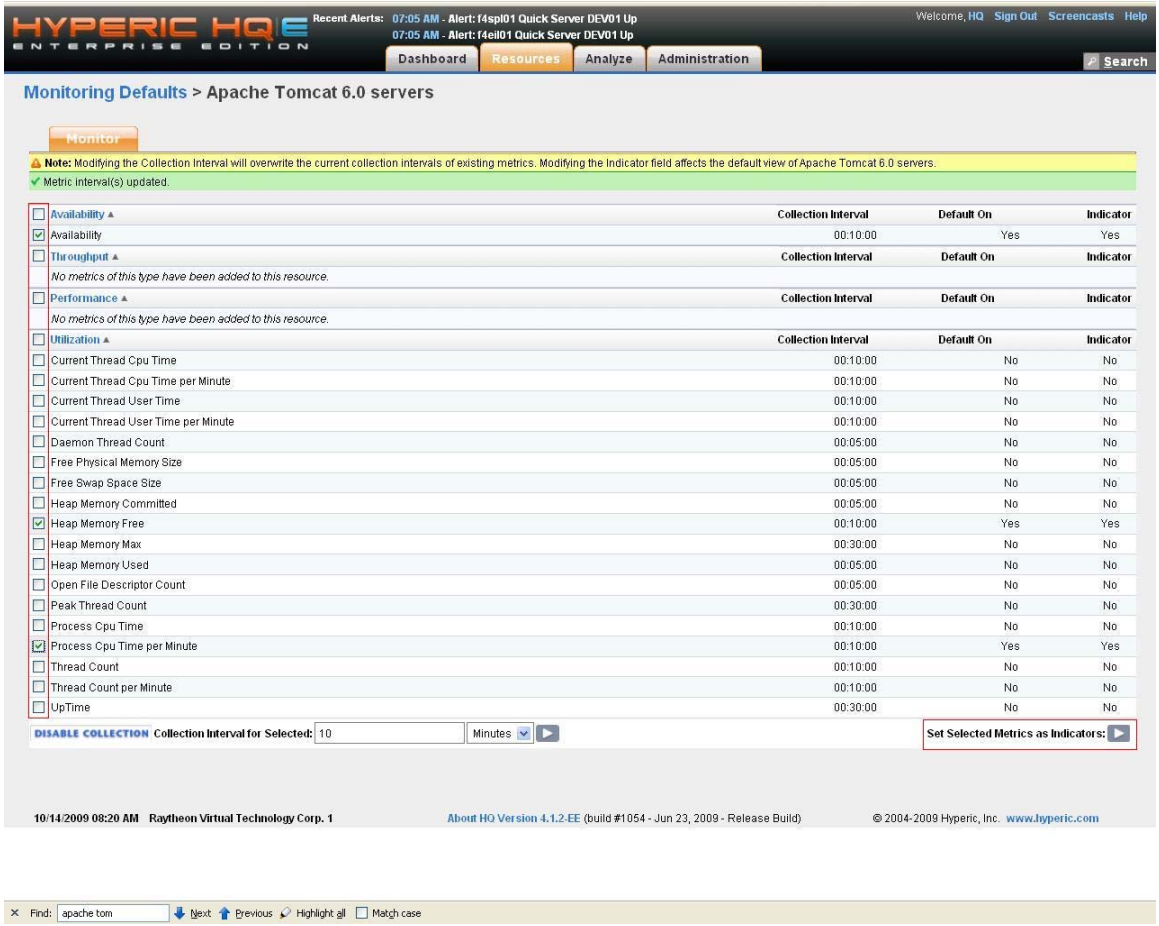


Figure 4.2.2.2.10-4. Default Metrics Collection Configuration – Set Indicators

4.2.2.2.11 Setting Default Alerts

For most resource types the user will want to configure the same alerts for all resources of that type. This is accomplished by using the monitoring defaults configuration. Any new resource added of that type will automatically inherit the default alert configuration. The user should be aware that modifying the defaults will overwrite any existing alerts configuration for every resource of that type.

Modifying the alerts for a resource type

Step 1: Under the Administration tab select “Monitoring Defaults”

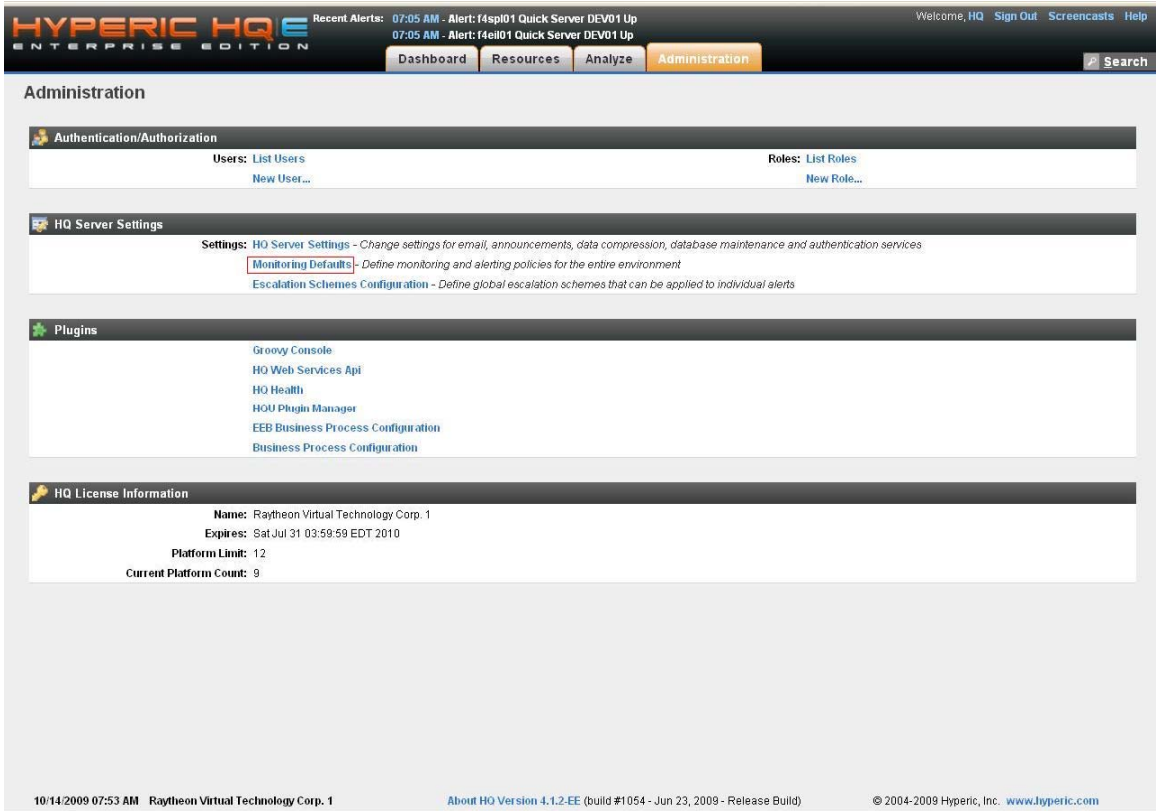


Figure 4.2.2.2.11-1. Monitoring Defaults Link

Step 2: Locate the resource type to configure in the list and select 'Edit Alerts'

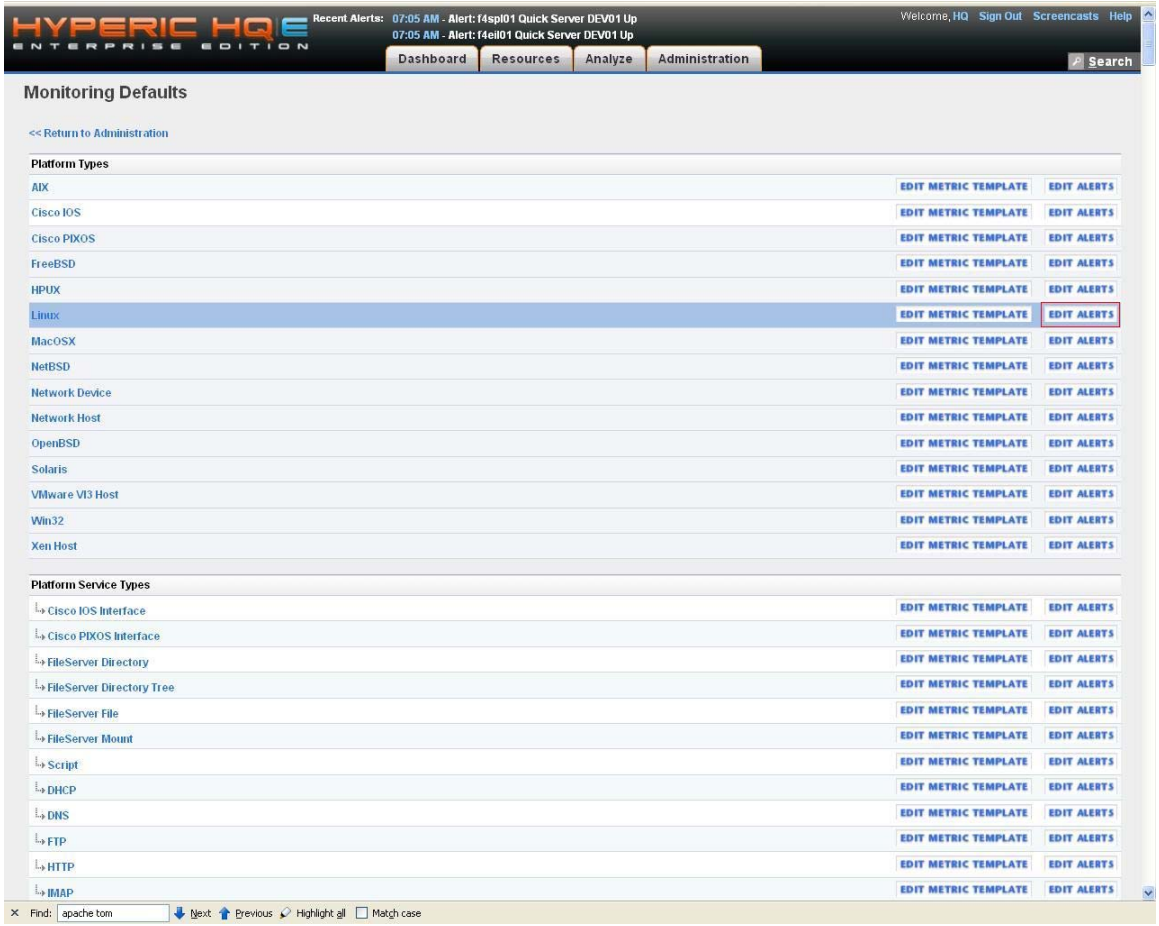


Figure 4.2.2.2.11-2. Monitoring Defaults Configuration Page – Edit Alerts

Step 3: Choose to create a new alert.

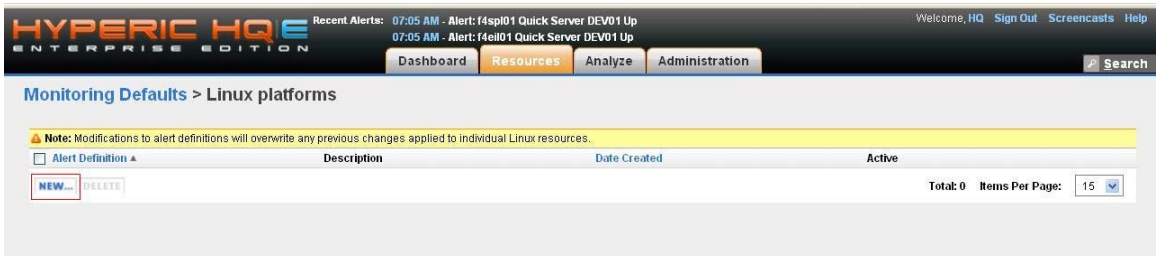


Figure 4.2.2.2.11-3. Create New Alert for Resource Type

Step 4: Create the alert using the instructions provided in section 4.2.2.2.6. Be sure to create a recovery alert for each alert. See the figure below for an example of what the page should look like after configuring the alert and recovery alert.

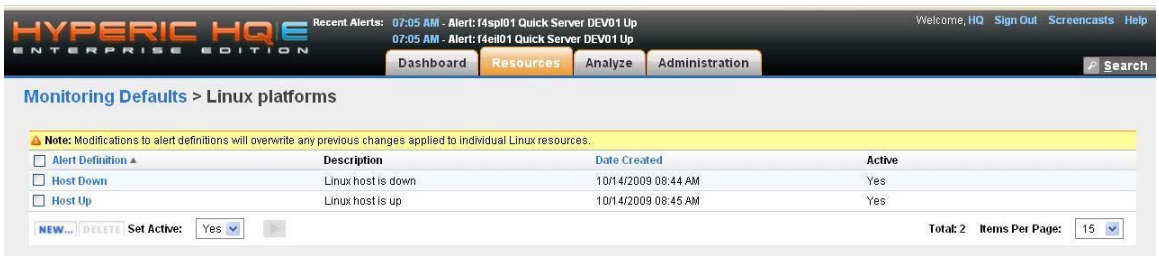


Figure 4.2.2.2.11-4. Linux Platform Alert Definitions Example

4.2.2.2.12 Dashboard

The dashboard serves as a management tool to observe the overall health of a system. Users can organize the screen to correspond to their workflow or infrastructure. By default, the screen displays information about resource health, recent alerts, recently performed auto-discovery scans, and control actions.

The Dashboard is a collection of user-selected portlets. Each portlet contains different types of data. Users can choose which portlet to display, the location of each portlet, and the type of data they display. The data portlets displayed in the Dashboard is determined by the user's role. Administrators are able to configure role-based dashboards.

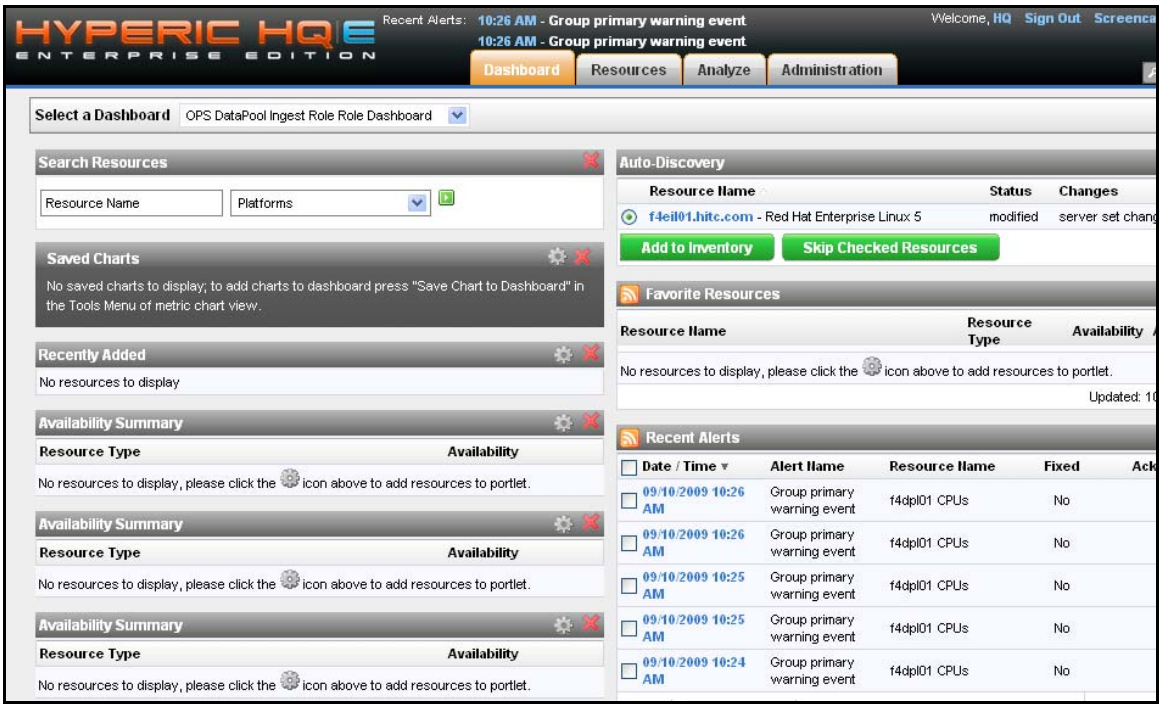


Figure 4.2.2.2.12-1. Dashboard

A new user can have access to multiple dashboards when logging into HQ. One can also select his or her personal dashboard, which is his or her default dashboard until he or she explicitly designates a different dashboard to be the default. A user with access to multiple dashboards may select a different dashboard. When a dashboard other than the user's default is active it can be converted as to make the current dashboard the default.

A user with modify permissions to multiple dashboards can add a resource, or save a chart, multiple dashboards with a single command, as outlined below. A user with modify permissions to more than one Dashboard can select multiple Dashboards and add the resource to each. Such users can also, when viewing a metric chart, select multiple Dashboards and add the chart to each.

Selecting a different dashboard/Changing the default dashboard to default

Step 1: Under the Dashboard tab select the pull down list 'Select a Dashboard', and pick the Dashboard that you want to change the current one with

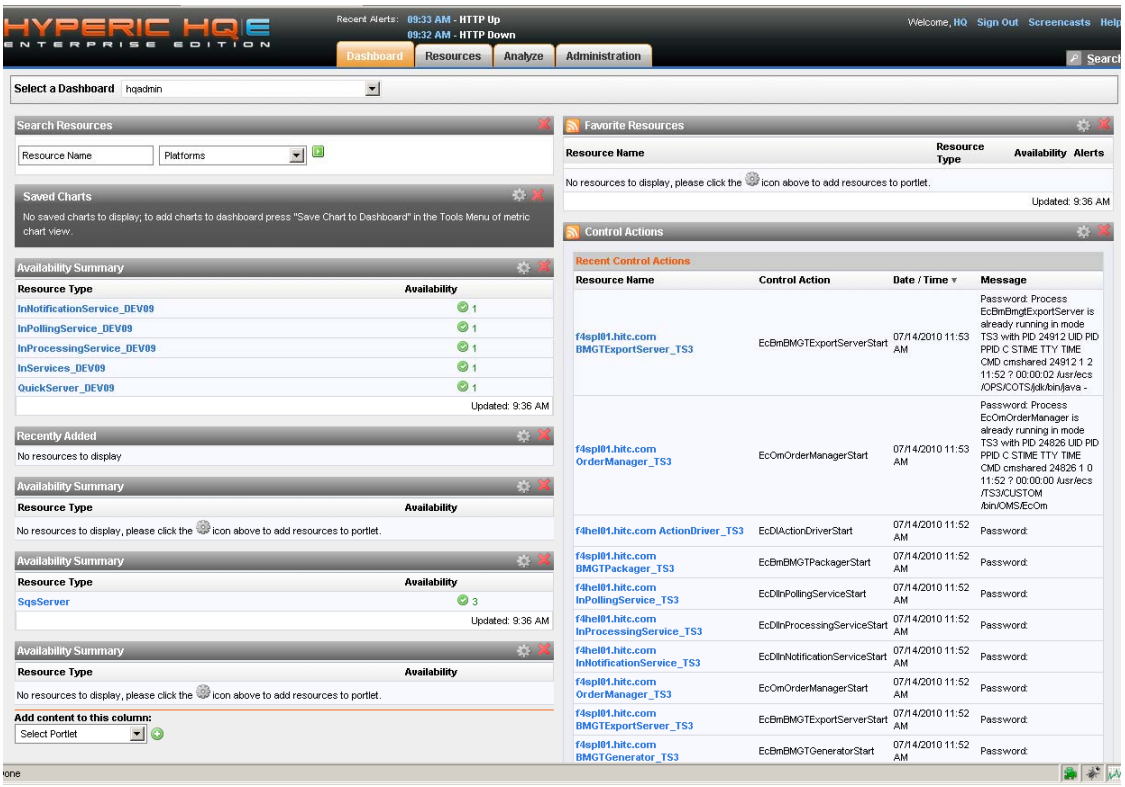


Figure 4.2.2.2.12-2. Selecting a Different Dashboard

Step 2: When a new dashboard has been selected, a green button will appear right next to the dropdown list of dashboards. Clicking on the Make Default button will make the currently selected dashboard default

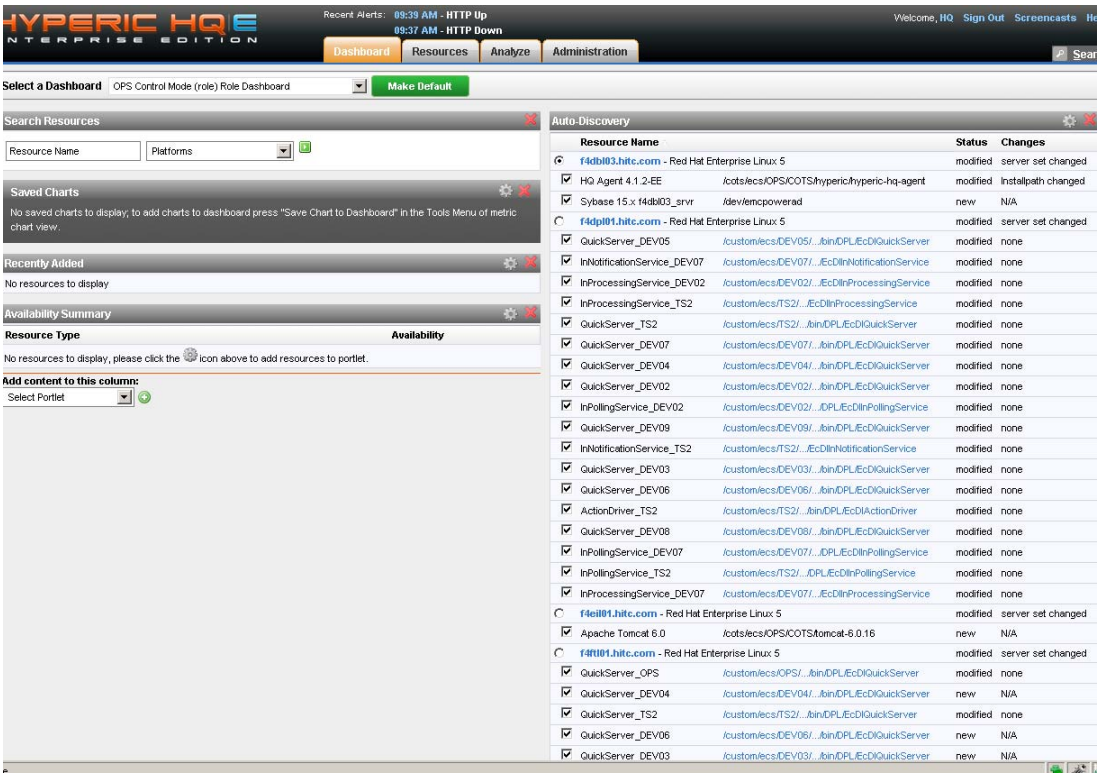


Figure 4.2.2.2.12-3. Changing the Default Dashboard

Adding a resource or a metric chart to a dashboard

Step 1: It is possible to add a resource, or save a chart from a resource or server metric to a dashboard. To achieve that open a desired resource from the Resources tab

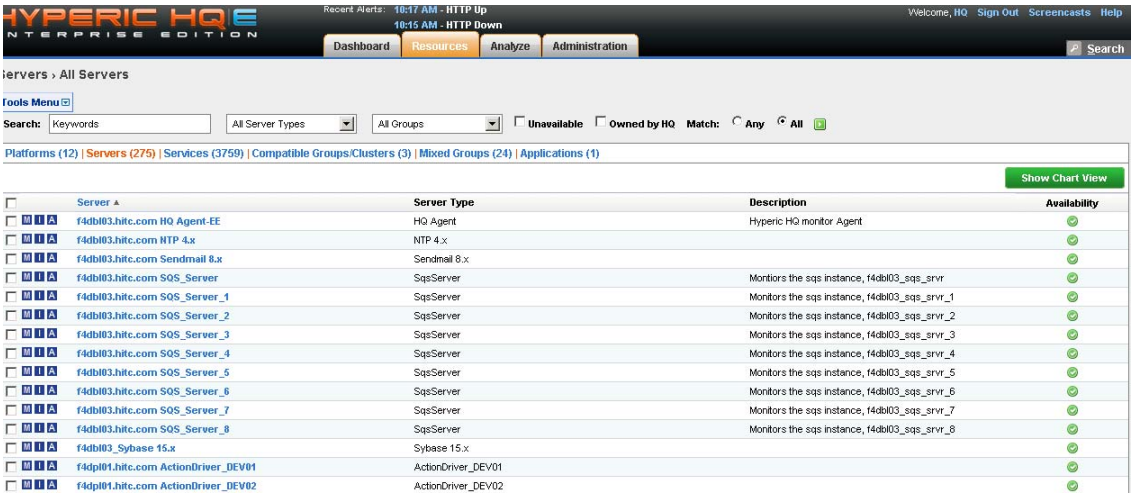


Figure 4.2.2.2.12-4. Selecting a Desired Resource or Server

Step 2: Once a resource or a server has been selected and the desired indicator shown, click on the 'Tools Menu' button and select 'Add to Dashboard favorites'. This option will add that metric to the currently selected dashboard.

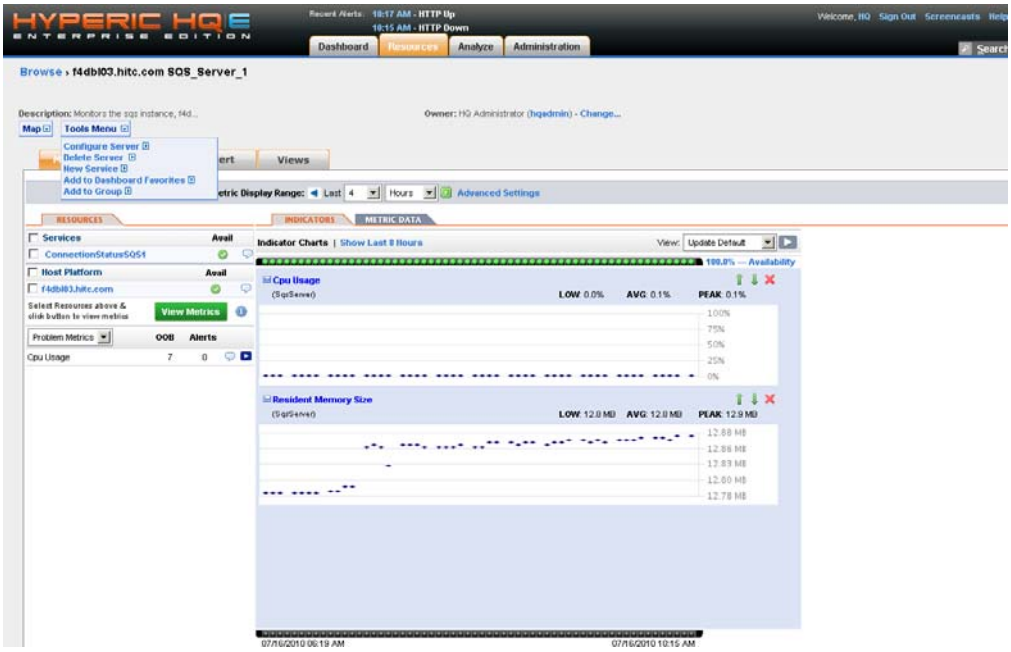


Figure 4.2.2.2.12-5. Selecting the Metric to be seen in the Selected Dashboard

4.2.2.2.13 Resource Plugins

Hyperic, out of the box, detects and monitors a set of standard Linux resources. For resources that are not included in the standard list, resource plugins can be written to discover, monitor, and control these resources. Hyperic provides the ability to create two types of resource plugins, one is a xml plugin and the other is a java plugin. All plugin filename must end with either "-plugin.xml" or "-plugin.jar".

4.2.2.2.13.1 Installing Plugin

Resource plugins need to be installed on the server and agent. The plugin will be placed in a subdirectory called hq-plugin of the server and agent's parent directories. This directory is located at /usr/ecs/OPS/COTS/hyperic/hq-plugin. This directory is considered a hot deploy folder for the server meaning plugins can be added, updated, or removed without restarting the server. Agent does not support hot deployment and must be restarted after a plugin is added, updated, or removed.

4.2.2.2.13.2 Updating Plugin

Updating resource plugins requires dropping the plugin in the server and agent's hq-plugin directories and restarting the agent. When adding new metrics, the operator will need to go to the resource page and configure the collection interval for each metric.

4.2.2.2.13.3 Removing Plugin

Removing custom plugins requires first removing the resource from the Hyperic GUI, second removing the plugin from the hq-plugin directory, and lastly restarting the agent.

4.2.2.2.13.4 Standard Metrics

Every custom resource plugin will be deployed with a set of standard metrics. These metrics will serve to provide general information pertaining to a resource. The general information is useful in measuring the overall health of a resource quickly. The standard metrics consist of Availability, CPU Usage, Memory Size, Resident Memory Size, and Start Time. Detailed information about each metric can found in the table below.

Table 4.2.2.2.13-1. Resource Plugin Standard Metrics

Standard Metrics	
Metric Name	**Description**
Availability	The Availability metric indicates whether a Resource is up or down. A metrics-gathering plugin must determine Availability for *every* server and *every* service it monitors. A single plugin will likely gather Availability for multiple Resources. If Availability is not gathered for a Resource, HQ will consider the Resource to be unavailable, and will not show any metrics for it in the Portal. A plugin sets the value of Availability to 1 if the Resource is up, and 0 if it is down. These values are displayed in the Portal as "available" or "not available". Verifying the existence of a Resource's process is a common technique for determining its Availability. However, the method a plugin uses to determine Availability can vary depending on the Resource Type and the plugin developer's judgment. There might be alternative techniques for determining the Availability of a Resource. For instance, a plugin might determine the Availability of a web server based on whether its process is up, its port is listening, it is responsive to a request, or by some combination of these conditions.
CPU Usage	The percentage of time the specified resource uses in processing instructions.
Memory Size	The amount of memory allocated to the specified resource.
Resident Memory Size	The amount of RAM being consumed by the specified resource.
Start Time	The time the specified resource was instantiated

4.2.2.2.14 User Interface Extension Plugin

Hyperic provides an HQU plugin framework which allows custom user interfaces to be developed and plugged right into the Hyperic GUI. The HQU plugins have the ability to directly access the entire Hyperic backend and utilize Hyperic's API. HQU plugins are developed in Groovy, an Object-Oriented scripting language alternative to Java. Groovy files are compiled into byte code and run in the JVM and can interact with Java classes and libraries.

4.2.2.2.14.1 HQU Plugin Directory Structure

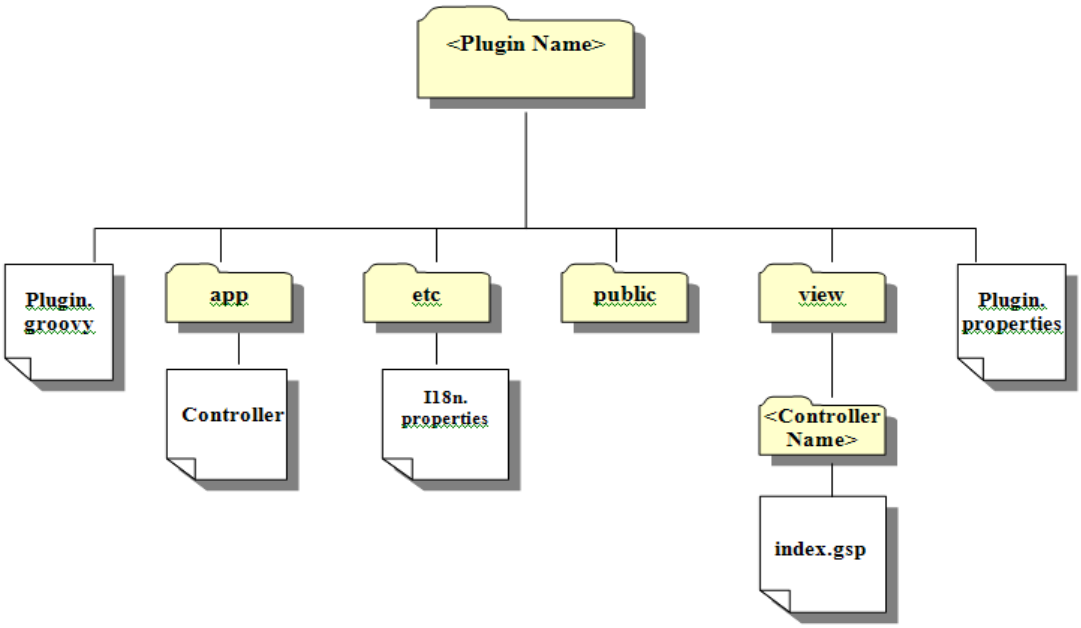


Figure 4.2.2.2.14-1. HQU Plugin Structure Diagram

Table 4.2.2.2.14-1. HQU Plugin Structure Description

Plugin Structure Descriptions	
<Plugin Name>	The name of the plugin
Plugin.groovy	This is the main class that HQ uses to interact with the plugin. It handles deployment messages, declares and attaches views, and provides more advanced HQU features
app	Contains the controllers and Groovy code which respond to web requests
etc	Contains auxiliary files such as localization resources
public	Contains additional HTML, images, and CSS that the plugin depends on
view	Contains the HTML and templates which will be rendered to browsers
Plugin.properties	a general descriptor that HQ uses to identify the plugin
Controller	The interface between the view and Hyperic backend
<plugin_name>_Il8n.properties	Localization files are stored in /etc. If your plugin is named cool, there is a file named /etc/cool_i18n.properties which contains all the localization strings
<Controller Name>	Sub-directory containing the views .gsp files
index.gsp	Default file the controller renders information to as the view

4.2.2.2.14.2 HQU Plugin MVC Framework

HQU plugins utilize a Model View Controller framework to manage the user interface. The model is provided by the Hyperic backend, the view is composed of html with groovy and javascript elements, and the controller handles the communication between the view and model.

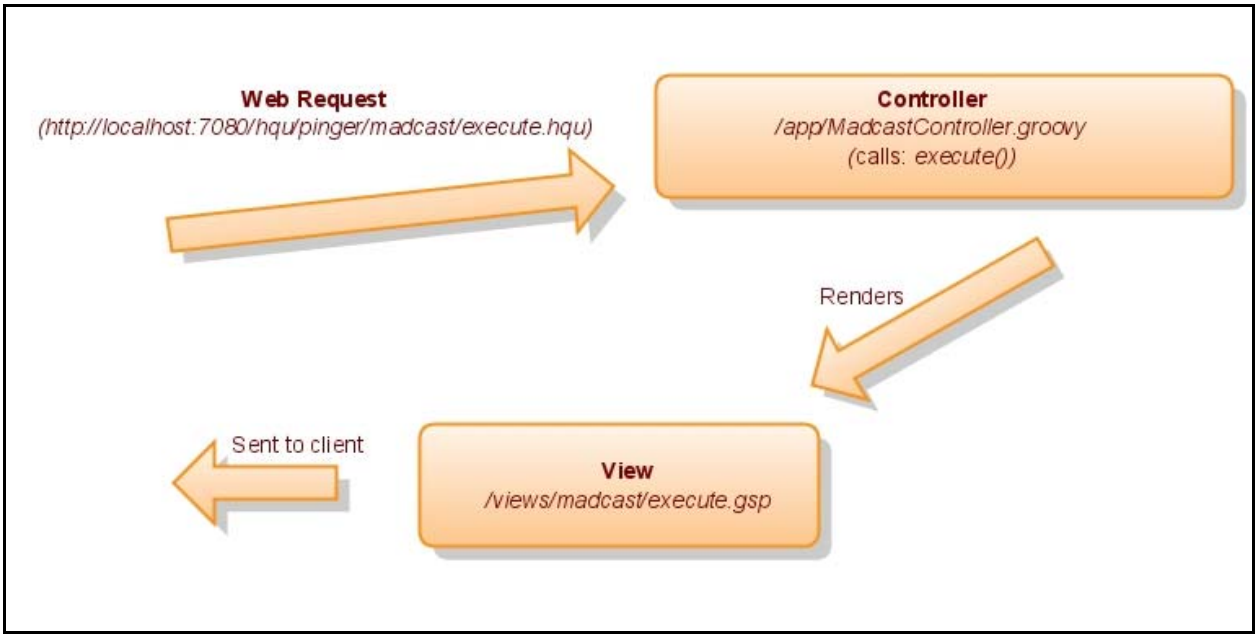


Figure 4.2.2.2.14-2. MVC Framework

Model

The Model represents the business logic and can be accessed through the uses of Hyperic's backend API. The API is written in Java and allows users and developers to create, retrieve, update, and delete information stored in Hyperic.

View

The View, a gsp file, is comprised of HTML, JavaScript, and groovy. It is responsible for rendering the content in the Hyperic GUI. The HTML provides the structure of the file. The JavaScript component provides interaction between the user and user interface. AJAX techniques are used to process requests and distribute data to the screen. The view invokes methods defined in the controller via AJAX requests to obtain information maintained in the Hyperic backend. HQU Plugins use an internet rich application toolkit called Dojo. The Dojo toolkit coordinates the AJAX requests and it helps process responses. Responses to AJAX requests are returned in JSON (JavaScript Object Notation) format. JSON is a light weight data interchange format similar to XML but can be decoded into JavaScript objects easily.

Controller

The controller is written using the groovy scripting language and the file ends with the .groovy extension. The controller is responsible for coordinating the activities between the model and view. The view submits a request to the controller. The controller decodes the request and calls the Hyperic backend API (the model) to perform some task. The result returned from the model is than transferred from the controller to the view to be rendered.

4.2.2.2.14.3 Installing HQU Plugin

Hyperic is bundled with the JBOSS web application server. Installing the HQU plugin retrieves copying the HQU directory into the JBOSS web application deployment directory, /usr/ecs/OPS/COTS/hyperic/server-4.1.2-EE/hq-engine/server/default/deploy/hq.ear/hq.war/hqu. The Hyperic server does not need to be stopped and started. Hyperic support hot HQU plugin deployment.

4.2.2.2.14.4 Updating HQU Plugin

Updating an HQU plugin requires removing the plugin through the HQU Plugin Manager page. The page is located under the administration section of the Hyperic GUI. Once removed, copy the plugin into the JBOSS web application deployment directory and the plugin will be updated automatically.

4.2.2.2.14.5 Removing HQU Plugin

Removing a plugin requires going to the HQU Plugin Manager page and remove the plugin from the list. The plugin will be automatically removed.

4.2.2.2.15 Hyperic ingrained metric data state definitions

Hyperic has ingrained metric data that can be monitored for specific services such as HTTP,FTP,NTP, and more. One can obtain those metrics by going to the individual service, and invoking those states by going to the Metric data tab under the Monitor general tab, and clicking on Show All Metrics button. Some of the most common metrics are displayed below:

HTTP Throughput States

Once a connection has been initialized it goes thru a series of states, which can be seen in the table below:

Table 4.2.2.2.15-1. HQU Plugin Structure Description (1 of 2)

CLOSE	represents no connection state at all
CLOSE_WAIT	represents waiting for a connection termination request from the local user
CLOSING	represents waiting for a connection termination request acknowledgment from the remote TCP

Table 4.2.2.2.15-1. HQU Plugin Structure Description (2 of 2)

ESTABLISHED	represents an open connection, data received can be delivered to the user. The normal state for the data transfer phase of the connection
FIN_WAIT1	represents waiting for a connection termination request from the remote TCP, or an acknowledgment of the connection termination request previously sent
FIN_WAIT2	represents waiting for a connection termination request from the remote TCP
LAST_ACK	represents waiting for an acknowledgment of the connection termination request previously sent to the remote TCP (which includes an acknowledgment of its connection termination request)
SYN_RECV	represents waiting for a confirming connection request acknowledgment after having both received and sent a connection request
SYN_SENT	represents waiting for a matching connection request after having sent a connection request
TIME_WAIT	represents waiting for enough time to pass to be sure the remote TCP received the acknowledgment of its connection termination request
Response Code	A utilization metric representing the number of HTTP Response codes thrown in the current active session

A connection progresses from one state to another in response to a certain event. Those events are usually user calls, incoming segments, and timeouts.

For more detailed picture of the states, please consider the following figure below:

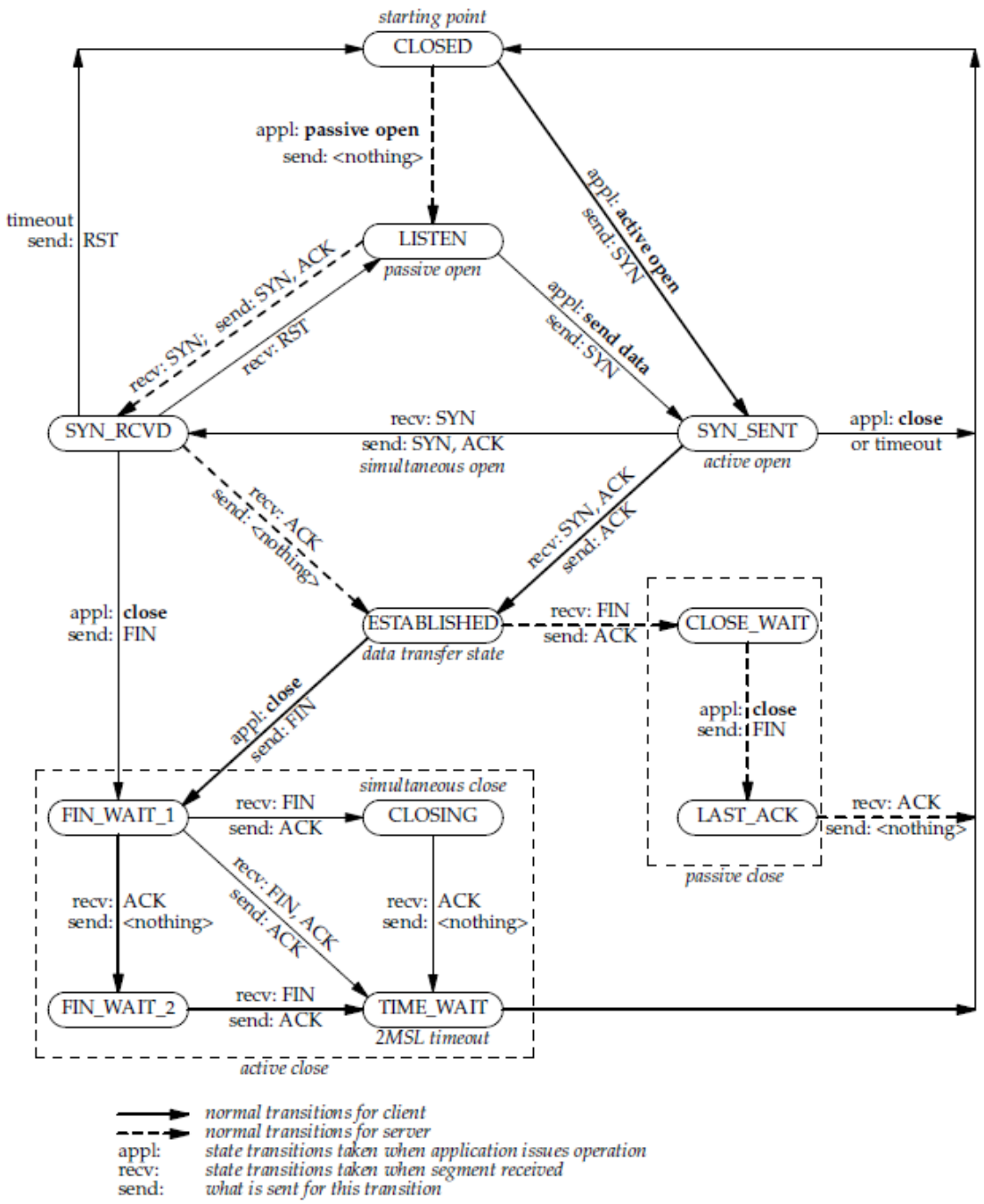


Figure 4.2.2.2.15-1. MVC Framework

Copyright: Internet Engineering Task Force

The starting point of the process is the closed state, from where a process is initialized. Each arrow represents a relationship between the next state and how the transition is made.

Table 4.2.2.2.15-2. HQU Plugin Structure Description

DNS Metrics

Metric	Definition
Answers	The number of records that the server answers to queries
Authority Records	The number of valid domain records that the server answers to queries
Additional Records	The number of other records that hold additional information, that the server answers to queries

Table 4.2.2.2.15-3. HQU Plugin Structure Description

NTP Metrics

Metric	Definition
Local Clock Offset	UTC Time is estimated by all the peer clocks (servers on the UTP network). NTP continually modifies the clock rate on the local system in an attempt to bind the local clock offset from UTC. The offset of the rest of the systems is known as Local Clock Offset
Response Time	The Response Time it takes to reach the UTC server, when there is a query instantiated from a server on the network
Root Delay	Round trip delay between the server and the (root) NTP server
Root Dispersion	Measurement of all the errors associated with the network hops and servers between the server and its clients
Round Trip Delay	The delay of a NTP packet sent from the NTP server to a client

4.2.2.3 Configure Resources

Section 4.2.2.2 described how Hyperic provides the capability of adding resources to its inventory to monitor. This section shows how to add and/or configure some common resources using Hyperic.

4.2.2.3.2 Configuring Tomcat

Hyperic will auto-discover Tomcat instances running on a platform but requires some modifications to Tomcat for monitoring to take place. Hyperic gathers metrics from Tomcat via JMX. Thus Tomcat needs to be configured to gather these metrics and allow these metrics to be retrieved via JMX. The following steps will accomplish this.

1. Log onto Tomcat web server host
2. cd /usr/ecs/OPS/COTS/tomcat/bin
3. Save off a copy of the tomcatENV.sh file
4. Editing the tomcatENV.sh file do the following
   - remove the double quote at the end of -XX:PermSize=512m \”
   - add the following the following bolded lines
   **-Dcom.sun.management.jmxremote **
   **-Dcom.sun.management.jmxremote.port=6969 **
   **-Dcom.sun.management.jmxremote.ssl=false **
   -Dcom.sun.management.jmxremote.authenticate=false"

The file should look like the following:

```
 #!/bin/sh
 #
 #
ECS_HOME=/usr/ecs
JAVA_HOME=/usr/ecs/OPS/COTS/jdk
CATALINA_OPTS="-DECS_HOME=/usr/ecs -DARCH= -ms245m -mx512m -
XX:MaxPermSize=512m -XX:PermSize=512m \
-Dcom.sun.management.jmxremote \
-Dcom.sun.management.jmxremote.port=6969 \
-Dcom.sun.management.jmxremote.ssl=false \
-Dcom.sun.management.jmxremote.authenticate=false"

umask 002

export ECS_HOME JAVA_HOME CATALINA_OPTS
```

5. Stop and restart the tomcat server
6. Using the Hyperic GUI, drill down to the tomcat instance running on a given platform using the Resource->Browse screen. The screen should look like the following

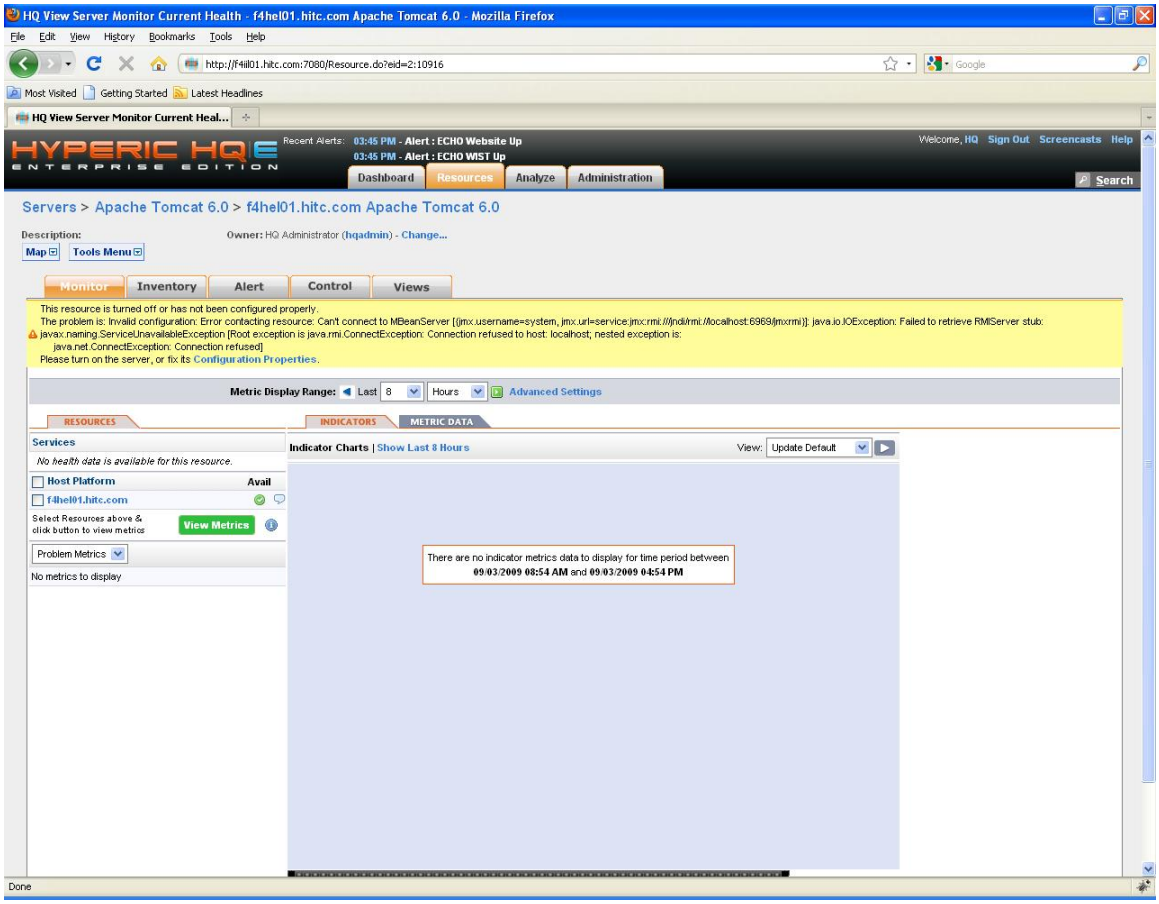


Figure 4.2.2.3.2-1. Tomcat Monitor Page

7. Click the Inventory button. The following screen should look similar to the following screen when the user scrolls to the bottom. Click the EDIT button in the Configuration Properties section.

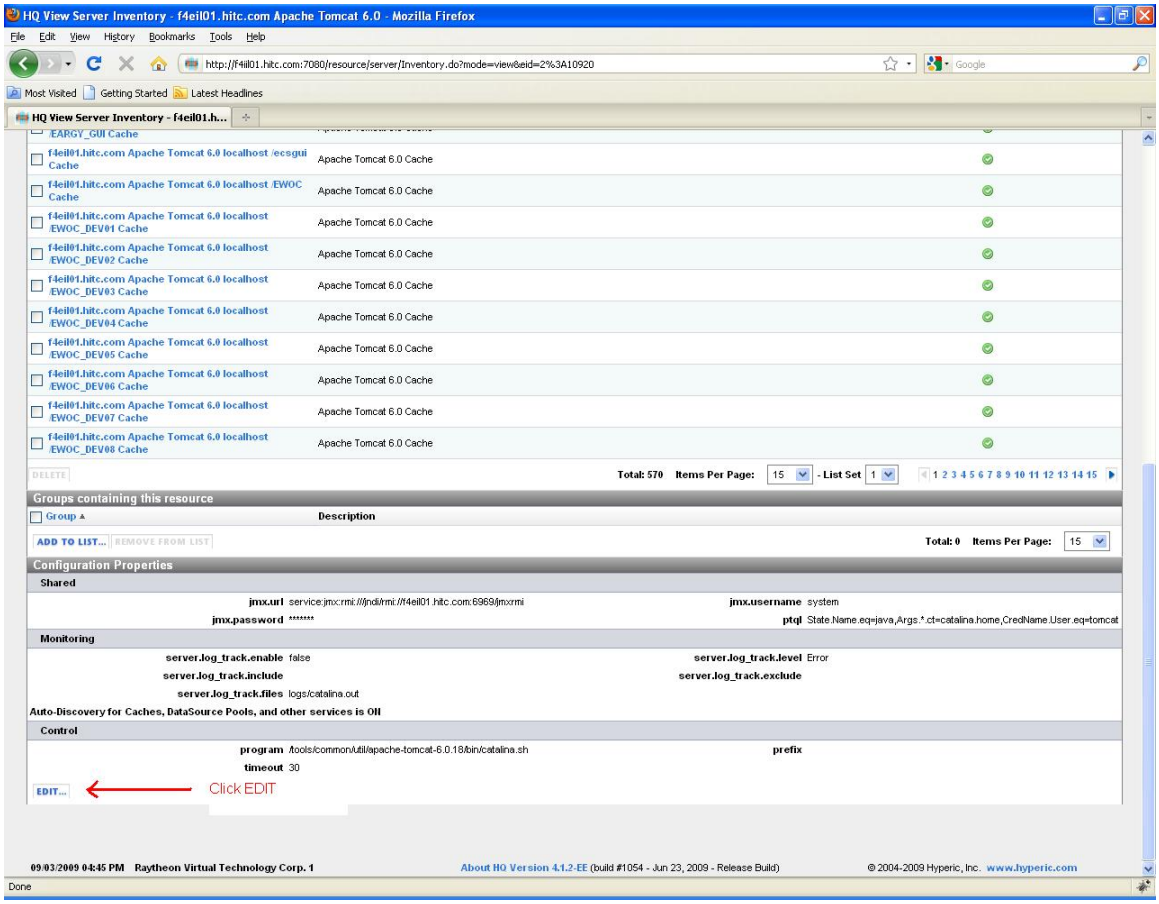


Figure 4.2.2.3.2-2. Tomcat Inventory Page

8. The next screen prompts for information to needed by Hyperic to monitor the Tomcat server. Fill in the following fields

jmx.url: service:jmx:rmi:///jndi/rmi://<hostname>:6969/jmxrmi
jmx.username: system (default)
jmx.password: leave blank
ptql-State.Name.eq=java,Args.*.ct=catalina.home,CredName.User.eq=tomcat

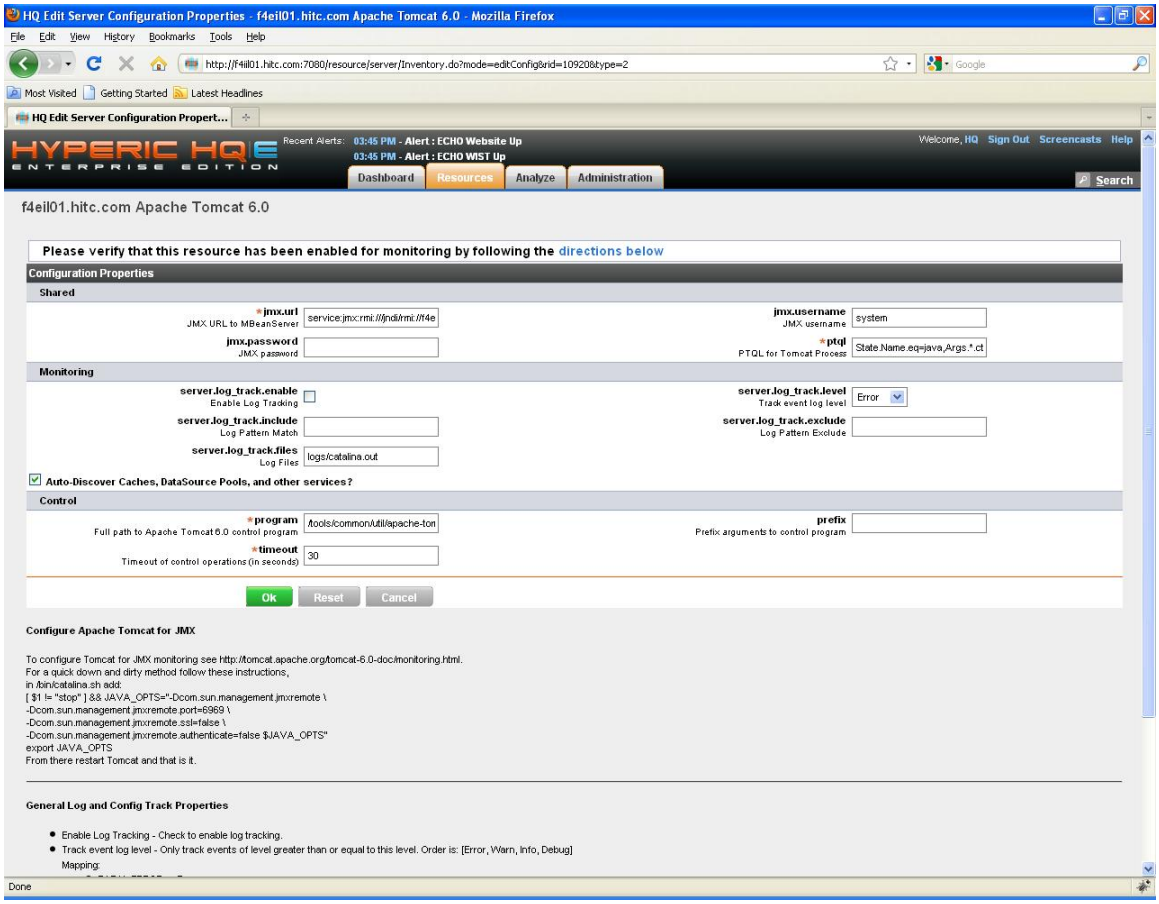


Figure 4.2.2.3.2-3. Tomcat Configuration Page

9. Click “OK” button.
10. After a few minutes, the Tomcat server monitor page should appear similar to the following.

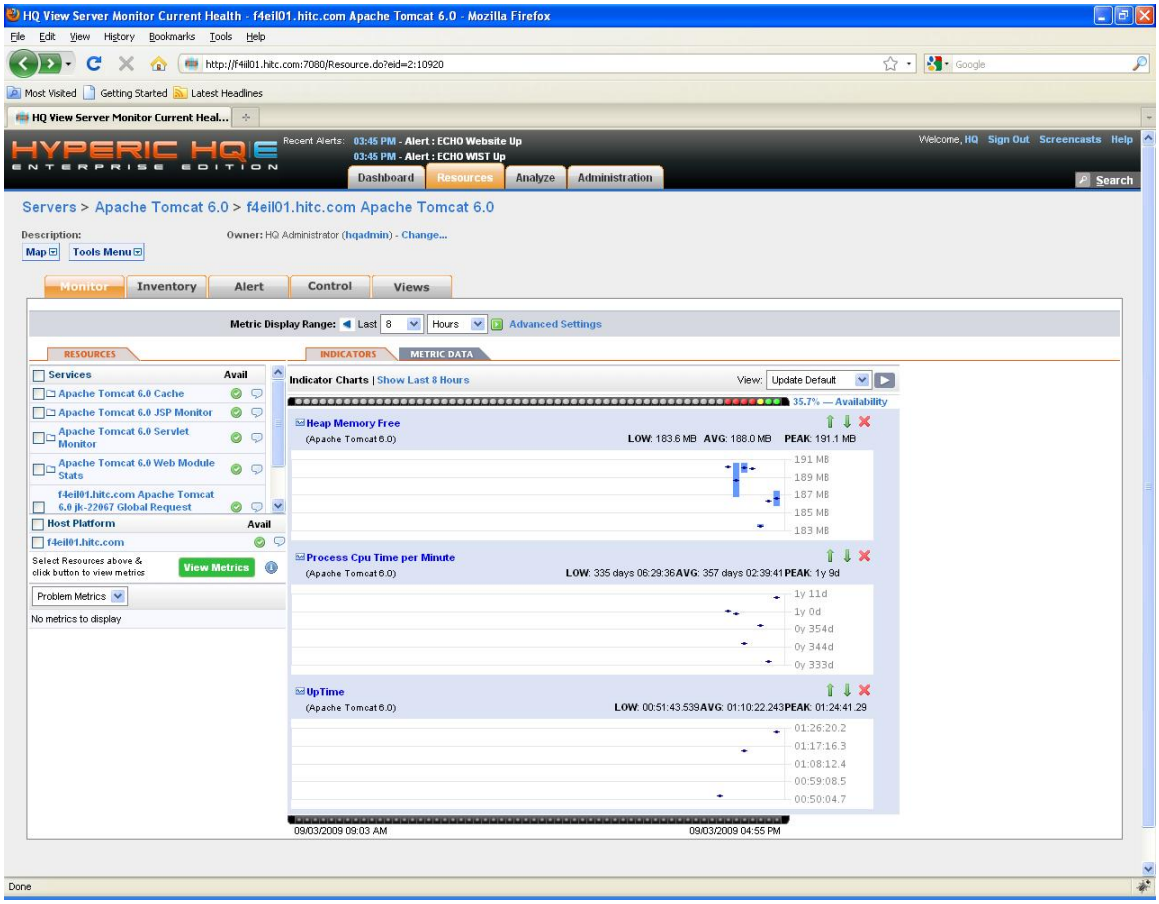


Figure 4.2.2.3.2-4. Tomcat Configured Monitor Page

** If the only metric that is of concern is if the server is up or down, DAACs may consider using the HTTP service to ping a url instead. Details on how to configure an HTTP service are described in the setup of the Sun Web Server 7 configuration.

4.2.2.3.3 Configuring xinetd

Hyperic does not provide a service that explicitly monitors the xinetd service but it does provide the ability to monitor a process. This may be accomplished by following the following steps.

1. Choose the host platform that you want to monitor the xinetd service – xxf4eil01
2. Drill down to the platform using the Resources->Browse on the Hyperic GUI. The screen should look like the following

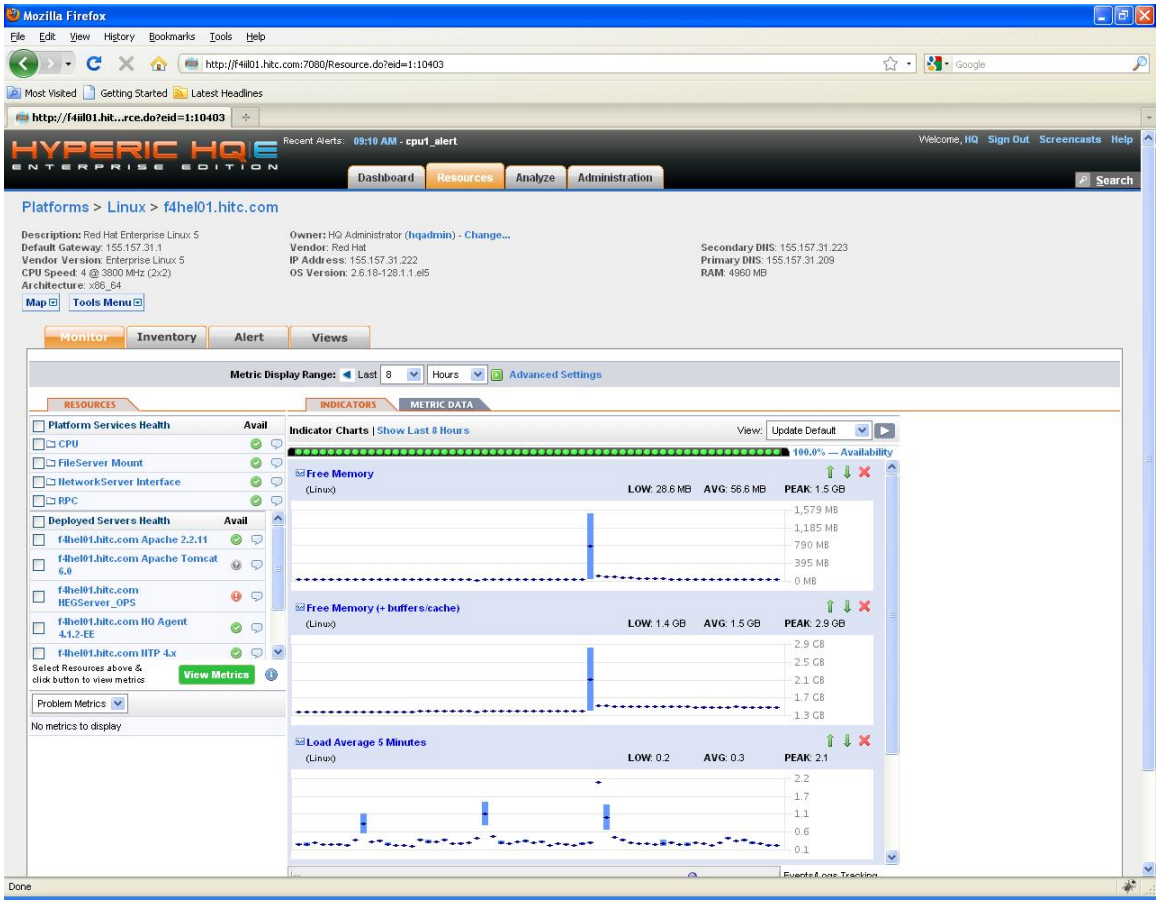


Figure 4.2.2.3.3-1. Host Resource Page

3. From this screen choose from the Tools Menu (upper left) the New Platform Service link.

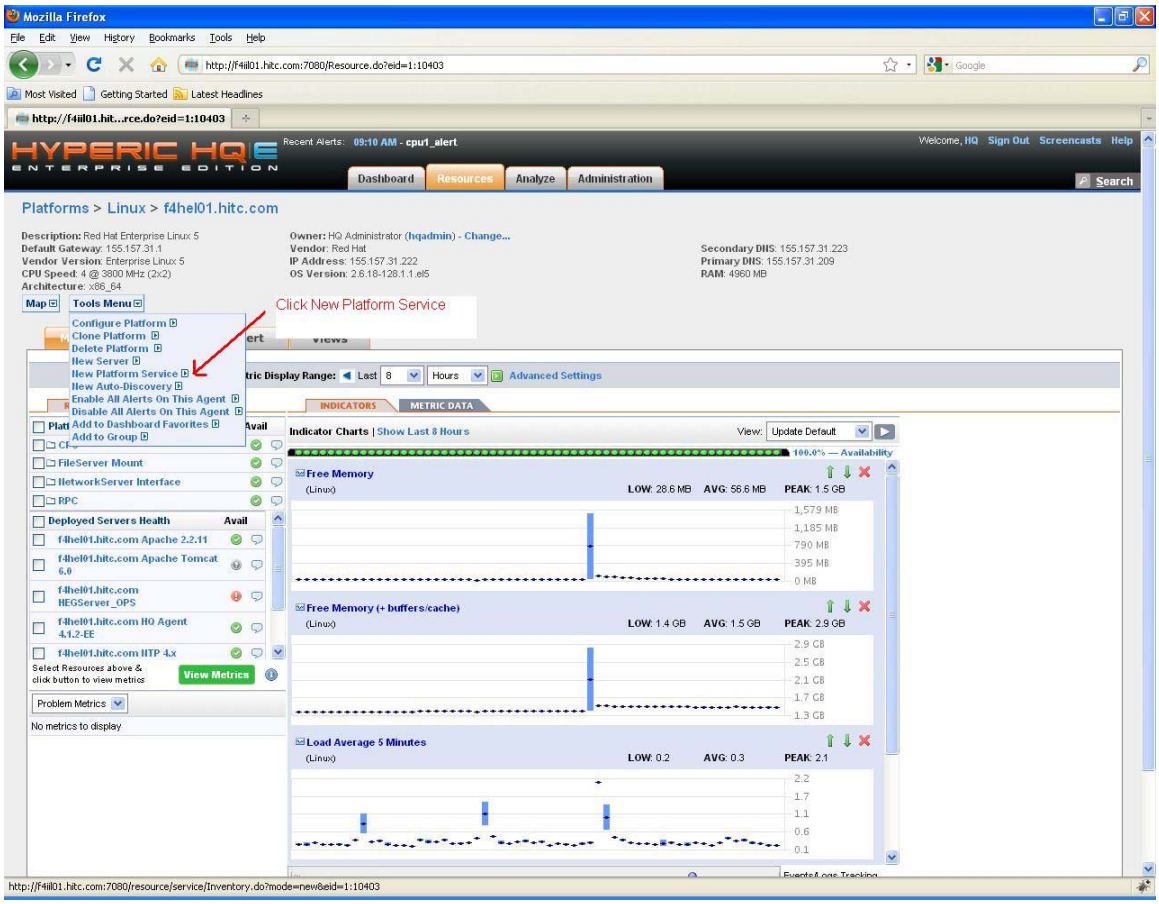


Figure 4.2.2.3.3-2. Add New Platform Service

4. The following screen appears. Fill in the following fields
   name: the name of the service ex “xinetd xxhel01”
   description: the description of the service
   (ex. ”Monitors the xinetd service on xxhel01”)
   service type: choose Process from the drop down menu

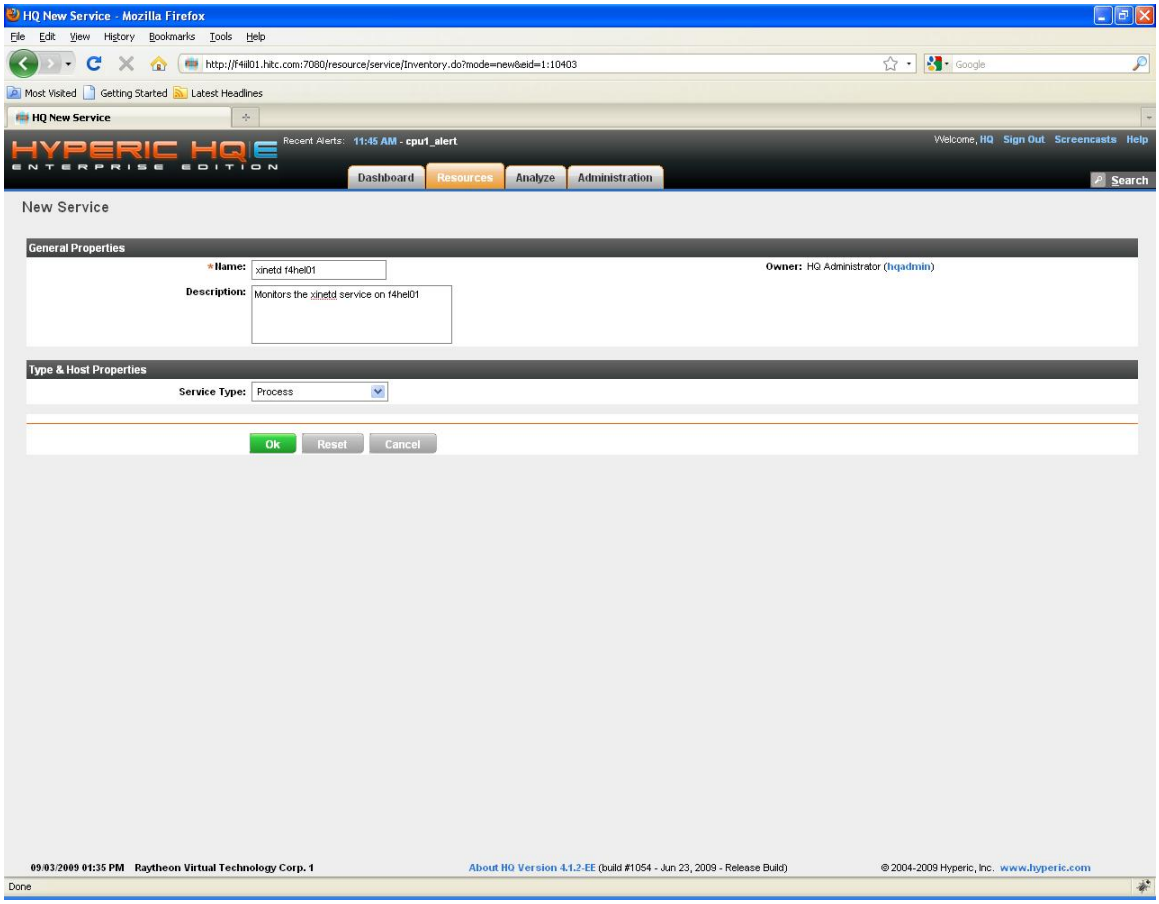


Figure 4.2.2.3.3-3. Configure xinetd

5. Click “OK” button
6. The next screen allows for the configuration of the Process service. In the following screen, hit the EDIT button in the Configuration Parameters panel.

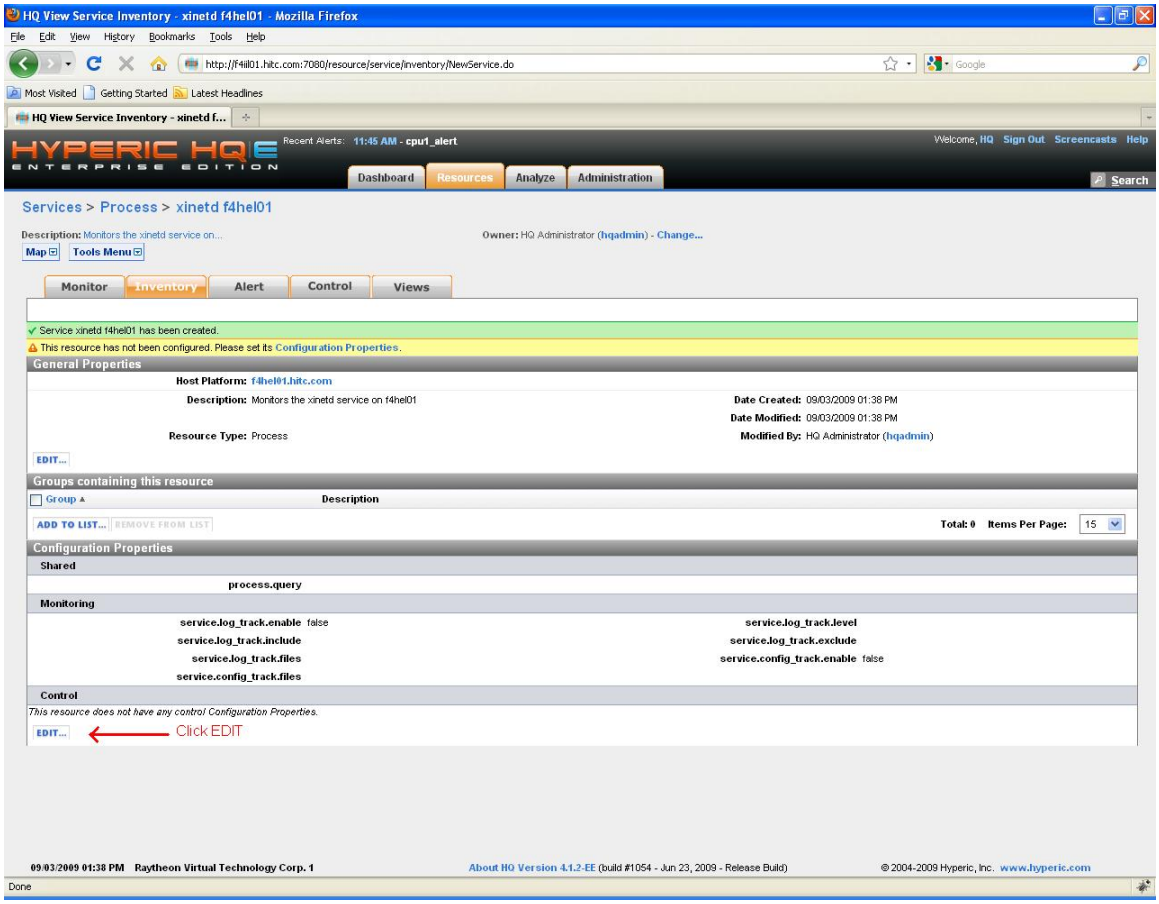


Figure 4.2.2.3.3-4. xinetd Inventory Page

7. The next screen allows the user to define how to "find" the process. Hyperic uses what it refers to as PTQL(Process Table Query Language) to identify a process. To find the xinetd process enter the following:
   process.query: Pid.PidFile.eq=/var/run/xinetd.pid
   The Pid.PidFile.eq=/var/run/xinetd.pid tells Hyperic that it can find the pid associated with the xinetd process within the file /var/run.xinetd.pid
   For detailed information about PTQL visit the Hyperic site http://support.hyperic.com/display/SIGAR/PTQL

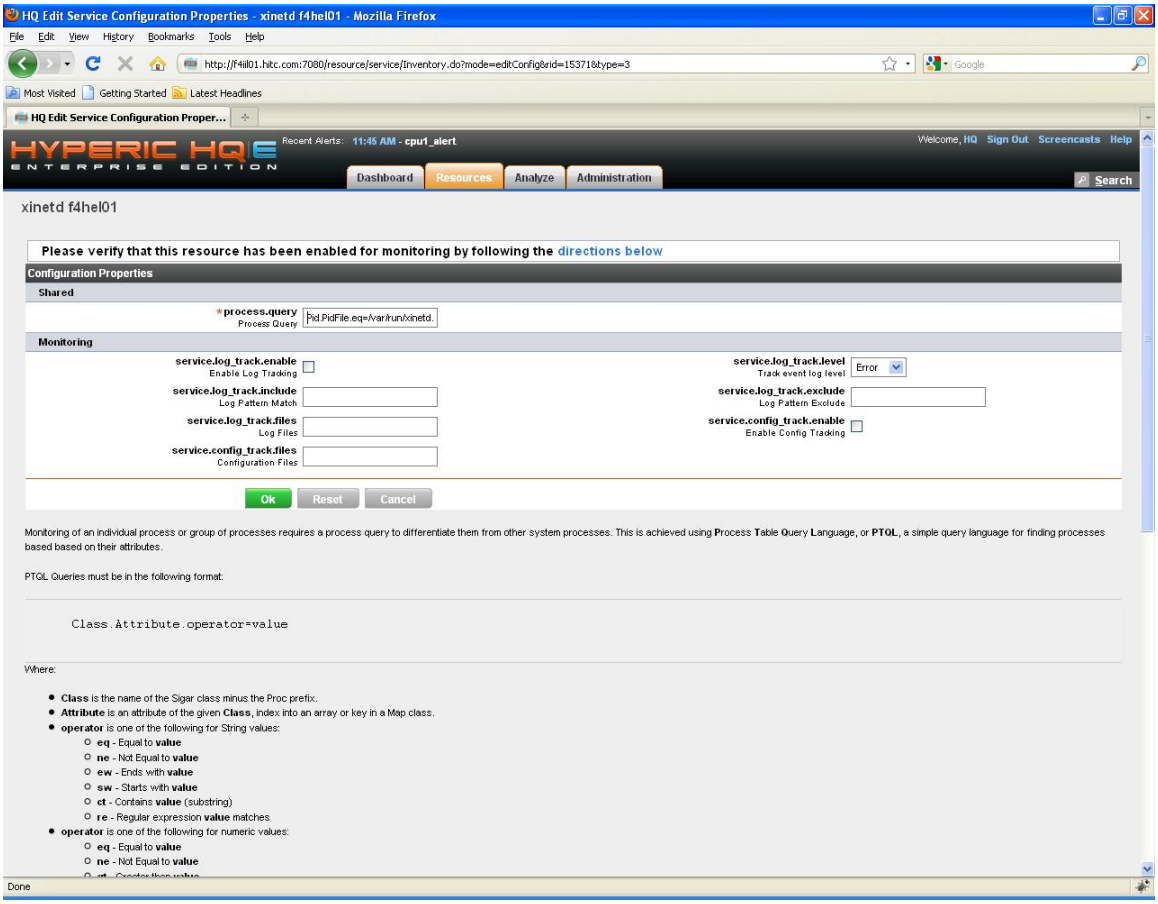


Figure 4.2.2.3.3-5. xinetd Configuration Page

8. Click “OK” button
9. After a few minutes, the xinetd xxhel01 service monitor page should appear similar to the following.

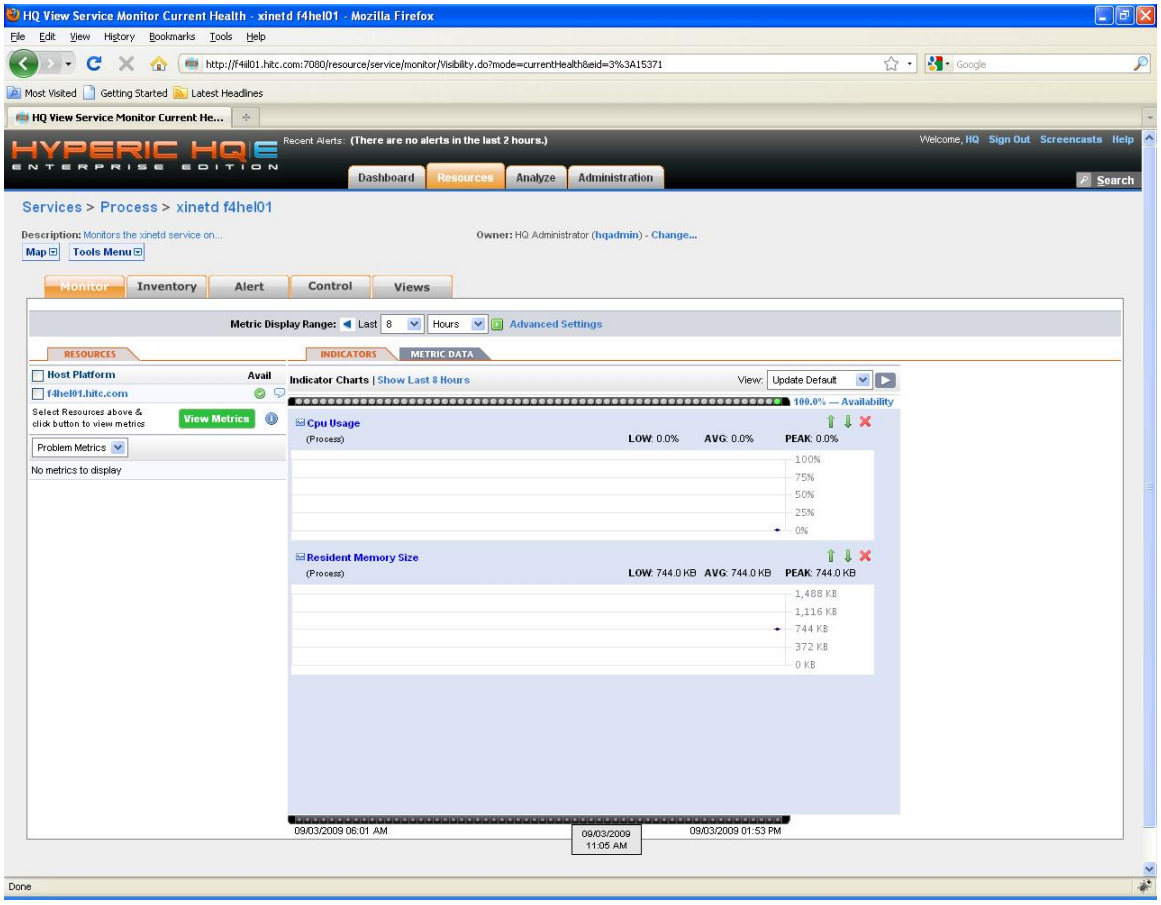


Figure 4.2.2.3.3-6. xinetd Configured Monitor Page

4.2.2.3.4 Configuring DNS

Monitoring a DNS service works by configuring a Hyperic DNS service. This service will perform a DNS lookup to the DNS service and comparing the return with an expected answer. To configure a Hyperic DNS service, perform the following steps.

1. Choose a host platform to create the Hyperic DNS service – xxeil01
2. Drill down to the platform using the Resources->Browse on the Hyperic GUI. The screen should look like the following

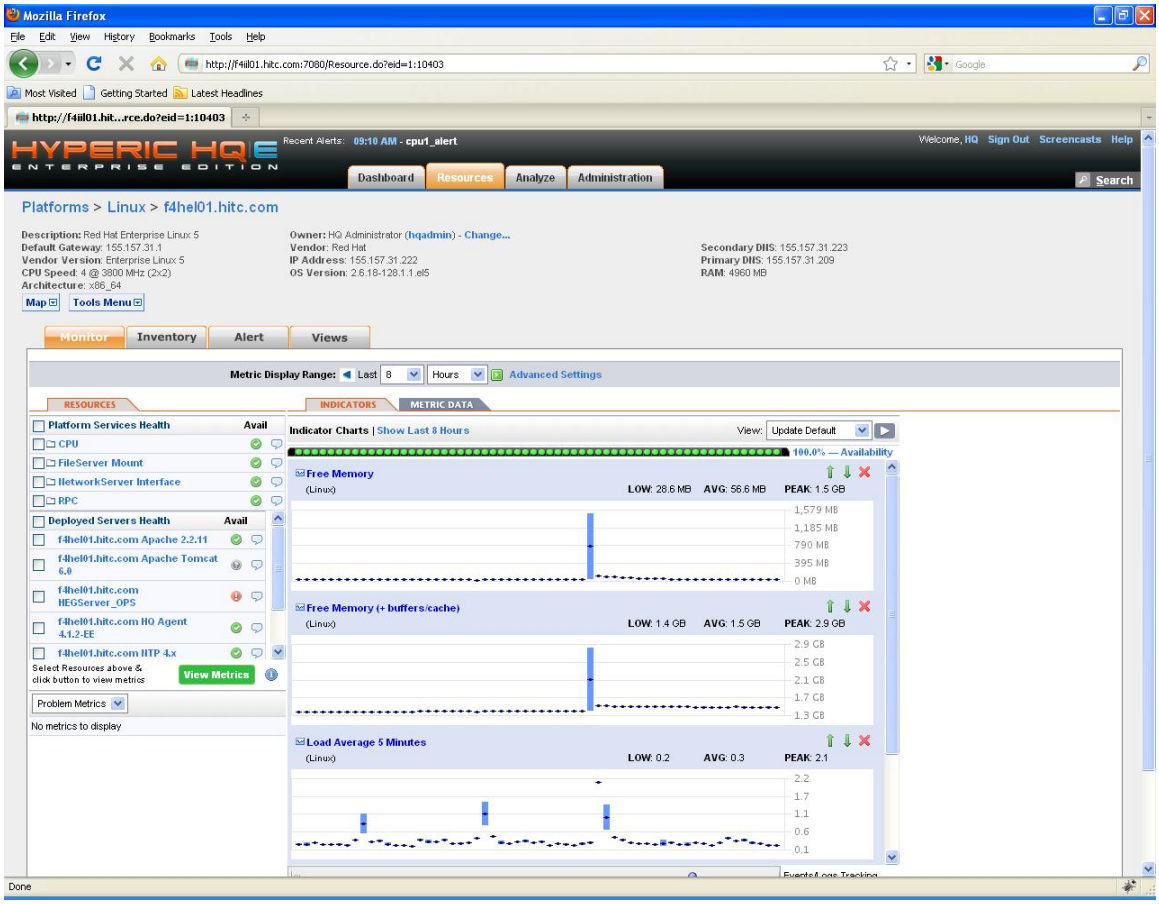


Figure 4.2.2.3.4-1. DNS Monitor Page

3. From this screen choose from the Tools Menu (upper left) the New Platform Service link.

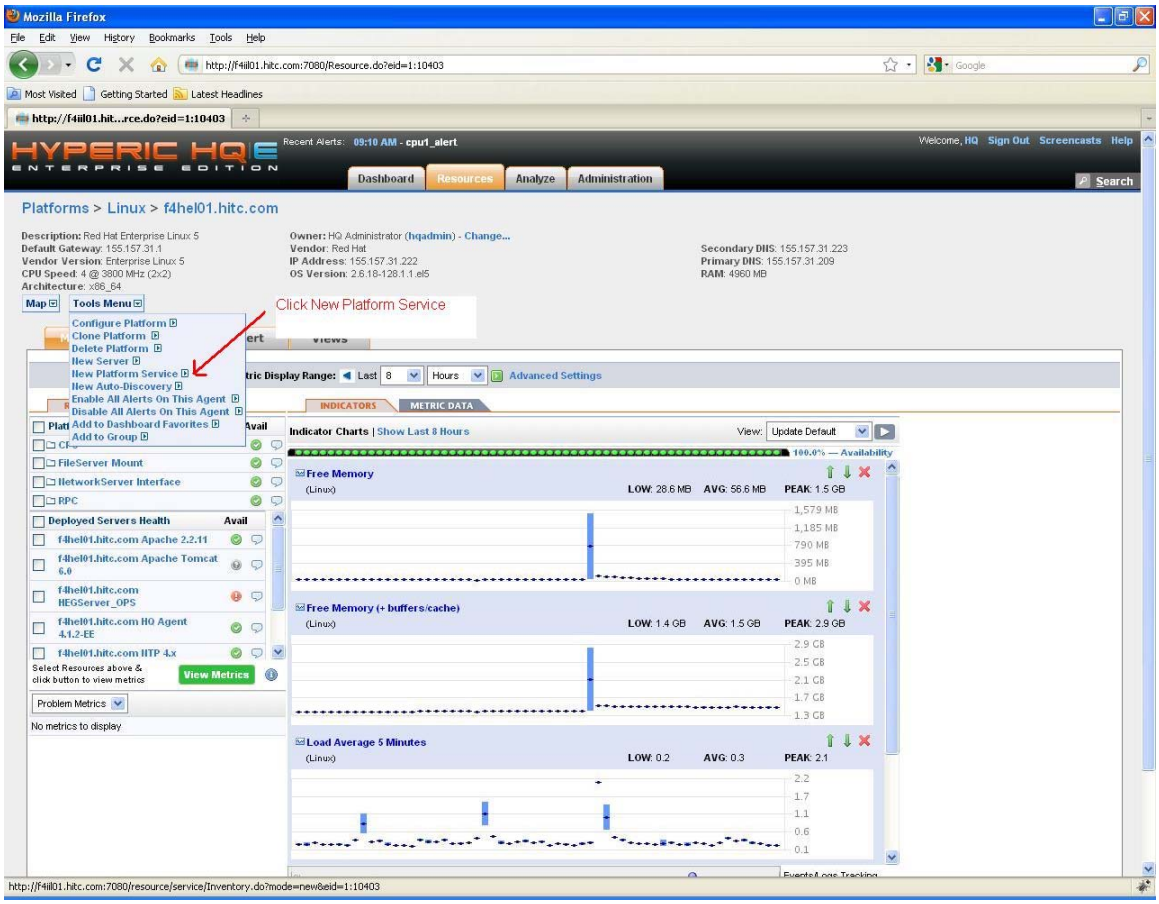


Figure 4.2.2.3.4-2. Add New Platform Service

4. The following screen appears. Fill in the Name, Description, and choose DNS from the Service Type drop down menu.

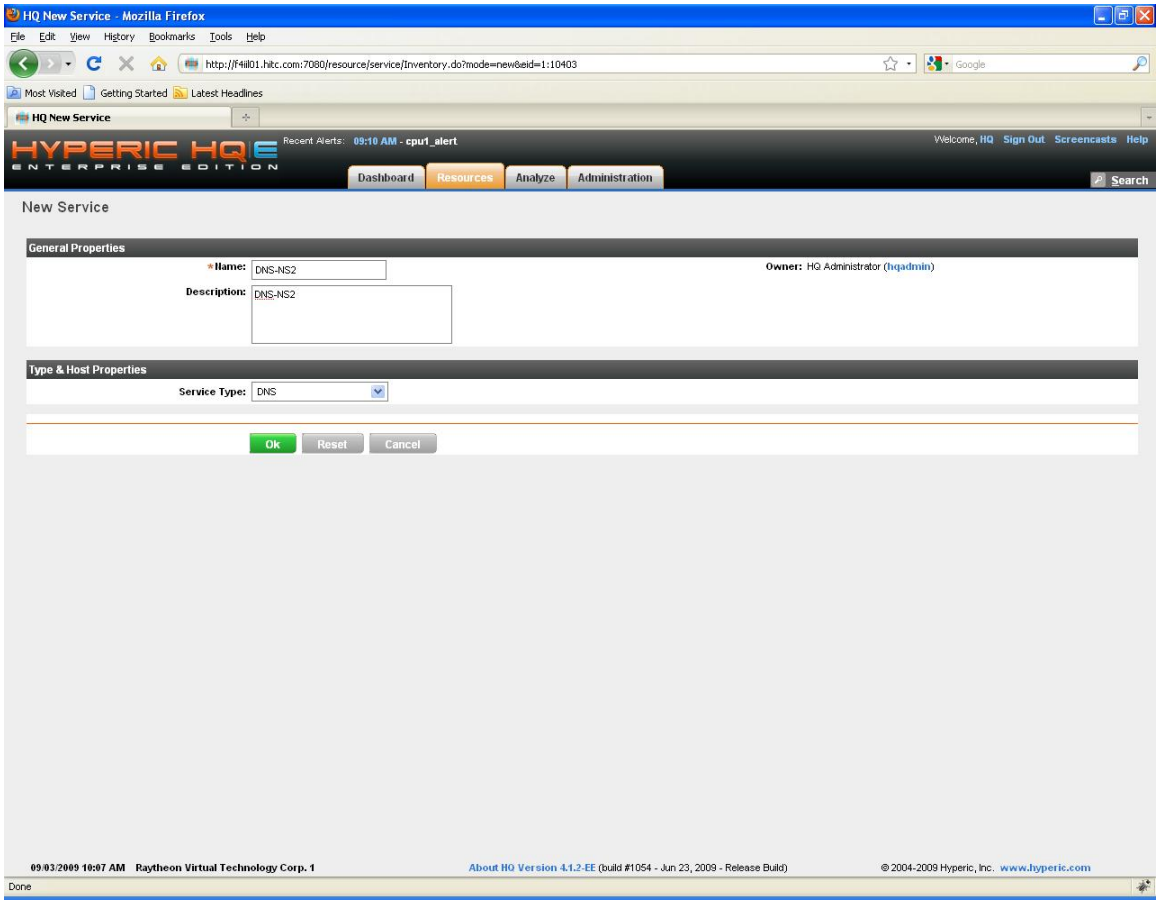


Figure 4.2.2.3.4-3. Configure DNS

5. The next screen allows for the configuration of the DNS service. In the following screen, hit the EDIT button in the Configuration Parameters panel

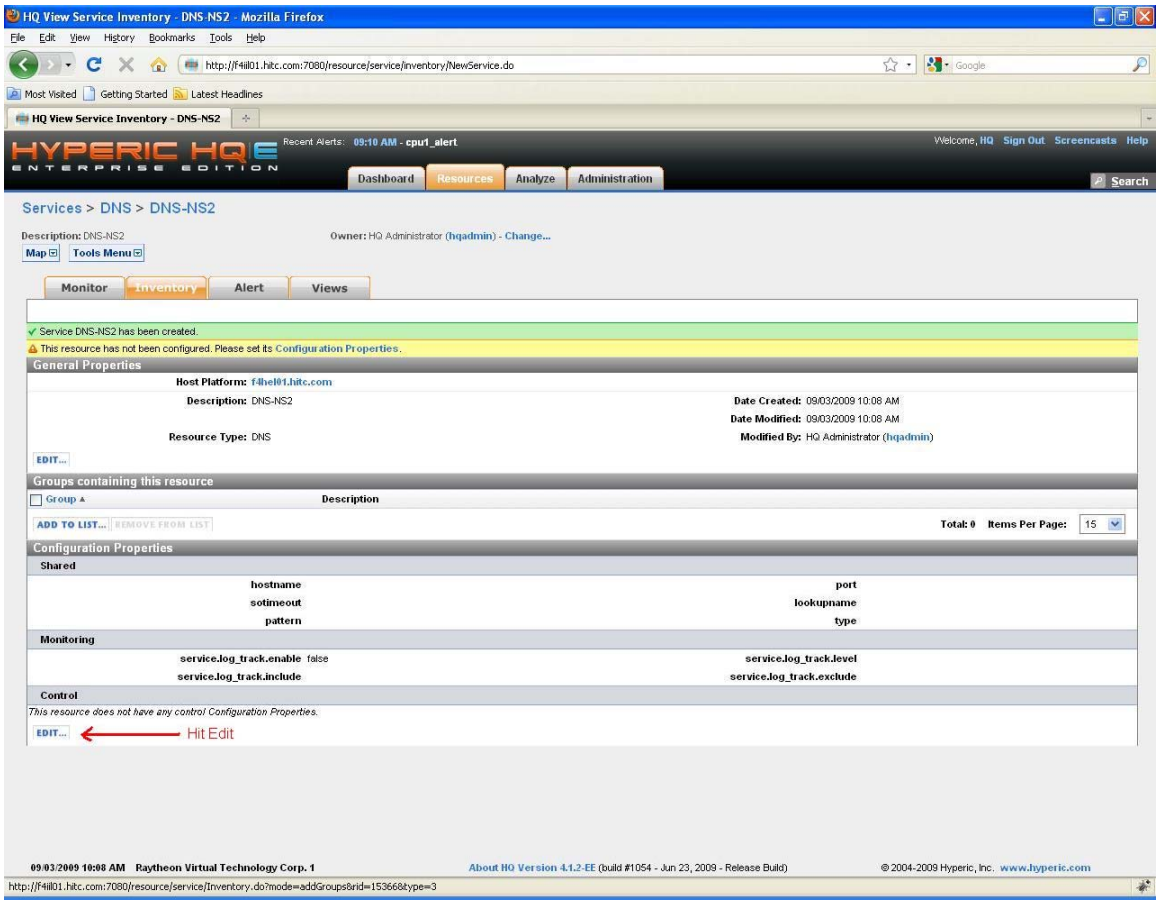


Figure 4.2.2.3.4-4. DNS Inventory Page

6. Configure the service by populating the following
   - **hostname:** host that DNS is running on
   - **port:** the port number DNS is listening on, typically 53
   - **sotimeout:** socket timeout, defaults to 10 seconds
   - **lookupname:** choose a host that your DNS will have an answer for. (ex. xxdpl01.edn.ecs.nasa.gov)
   - **pattern:** perform an nslookup on the host that you chose for lookupname and enter the Address. 155.157.31.204 in the below example.

   Example

   - bash-3.2$ nslookup f4iil01v
     Server: 155.157.31.209
     Address: 155.157.31.209#53

     Name: f5iil01v.edn.ecs.nasa.gov

Address: 155.157.31.204

type: choose A from the drop down menu

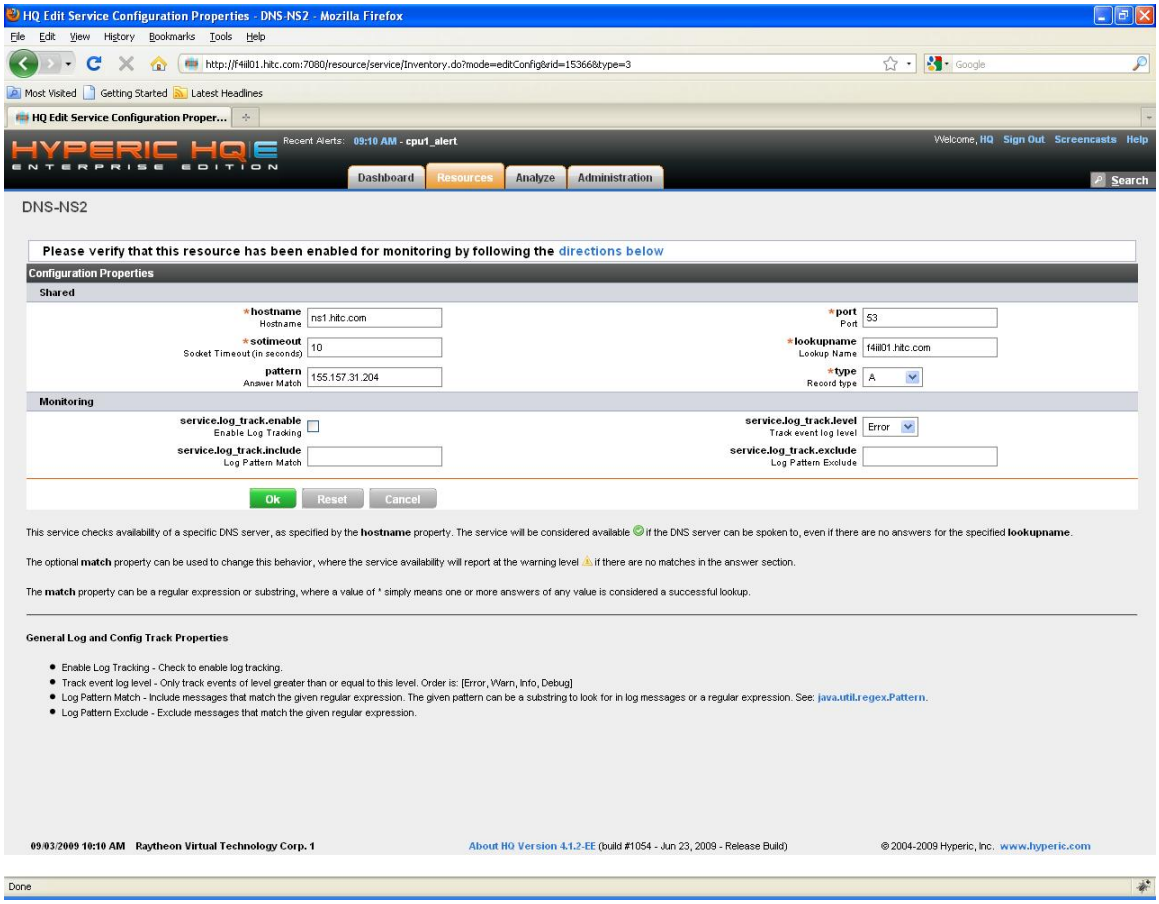


Figure 4.2.2.3.4-5. DNS Configuration Page

7. Click “OK” button
8. After a few minutes, the DNS-NS2 service monitor page should appear similar to the following.

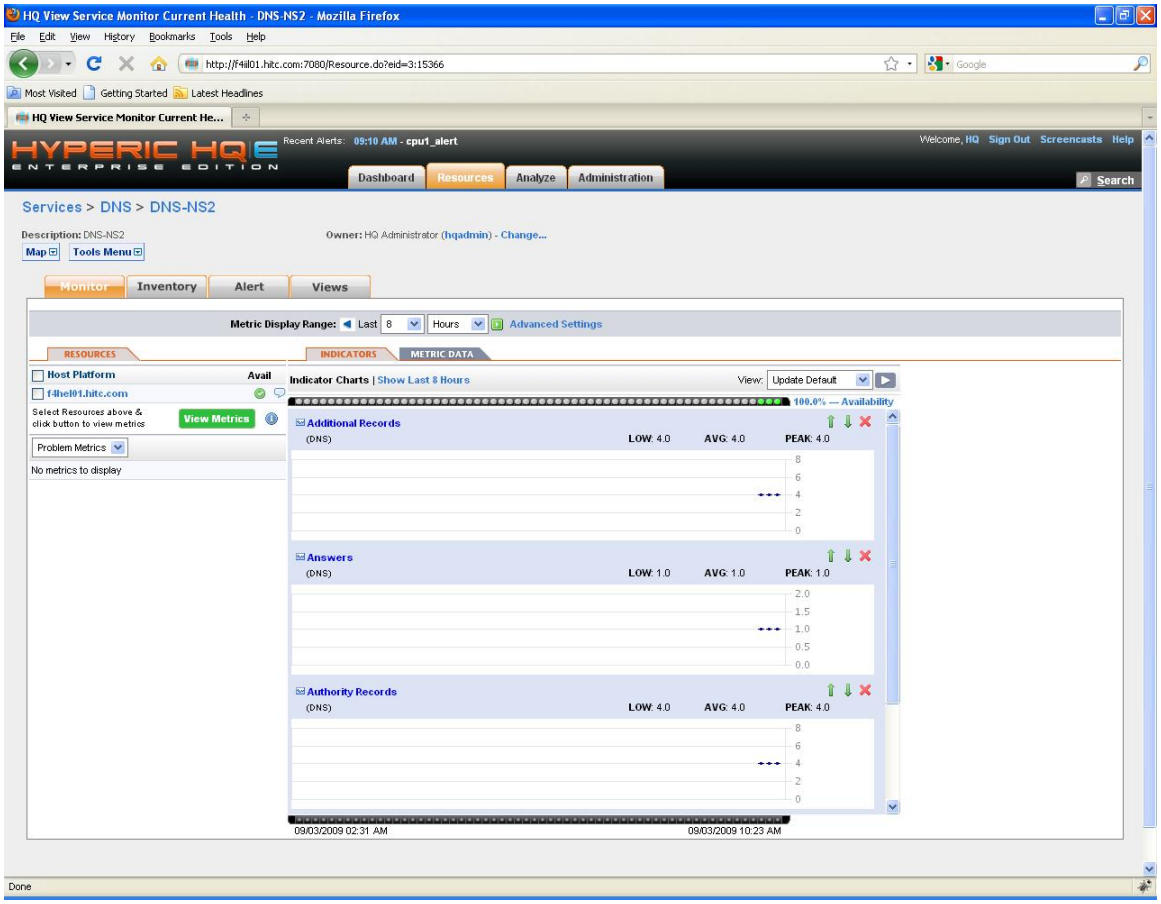


Figure 4.2.2.3.4-6. DNS Configured Monitor Page

4.2.2.3.5 Configuring ssh

Monitoring a host's SSH service works by configuring a Hyperic SSH service. This service will secure shell with a configured username and password. The success of the secure shell along with the response time will be stored as metrics. To configure a Hyperic SSH service perform the following steps.

1. Choose a host platform to create the Hyperic SSH service – xxf4eil01.
2. Drill down to the platform using the Resources->Browse on the Hyperic GUI. The screen should look like the following.

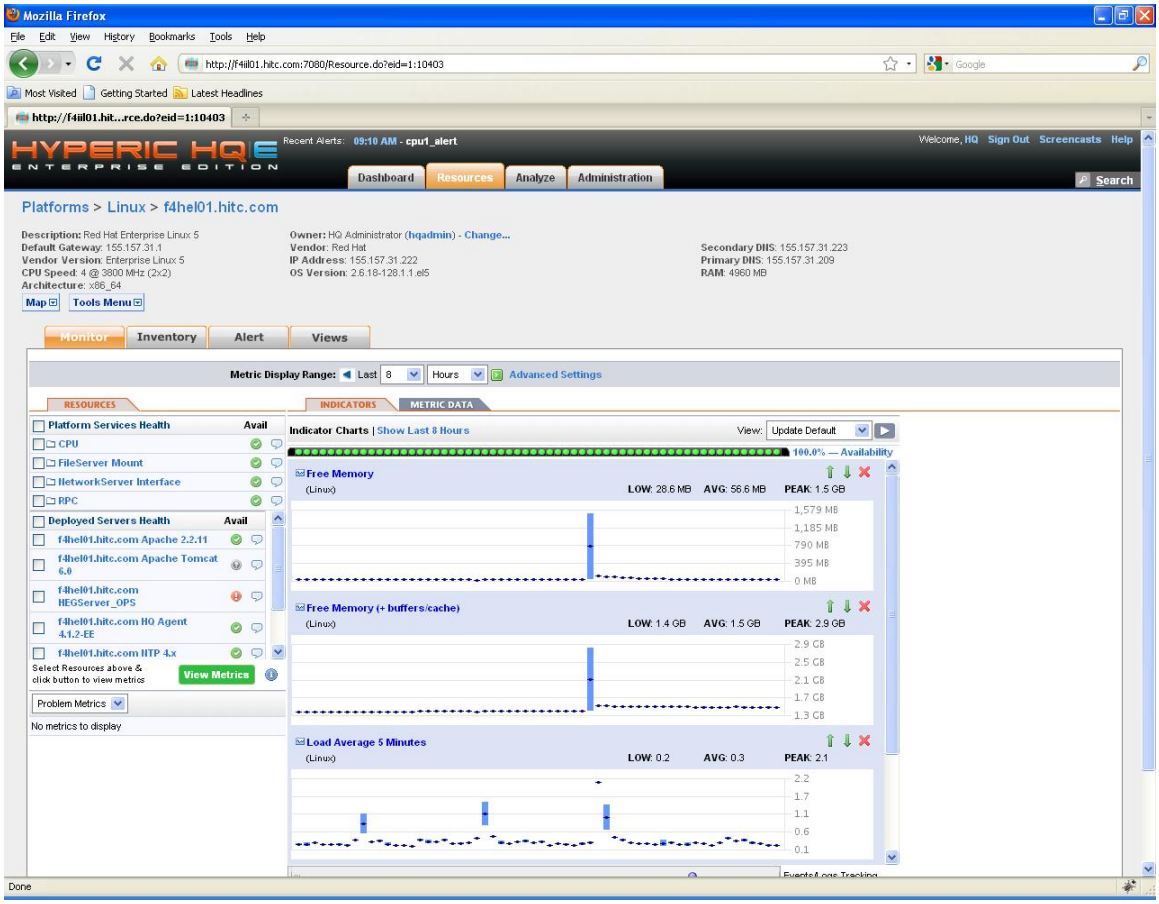


Figure 4.2.2.3.5-1. Host Resource Page

3. From this screen choose from the Tools Menu (upper left) the New Platform Service link.

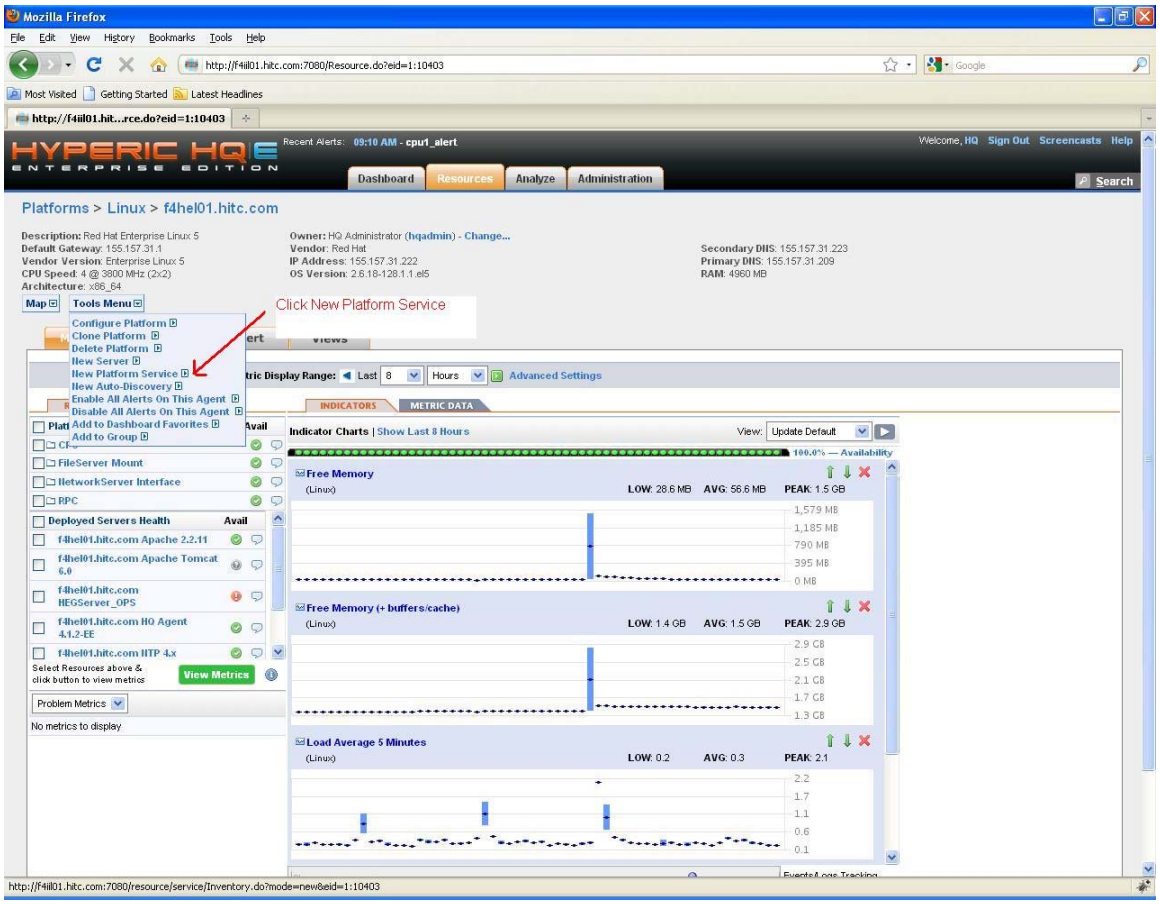


Figure 4.2.2.3.5-2. Add New Platform Service

4. Choose a host platform to create the Hyperic SSH service – xxf4eil01
5. The following screen appears. Fill in the following
   name: Choose a name such as SSH xxdpl01
   description: Choose a description such as "checks ssh on xxdpl01 host"
   service type: From the drop down menu choose SSH

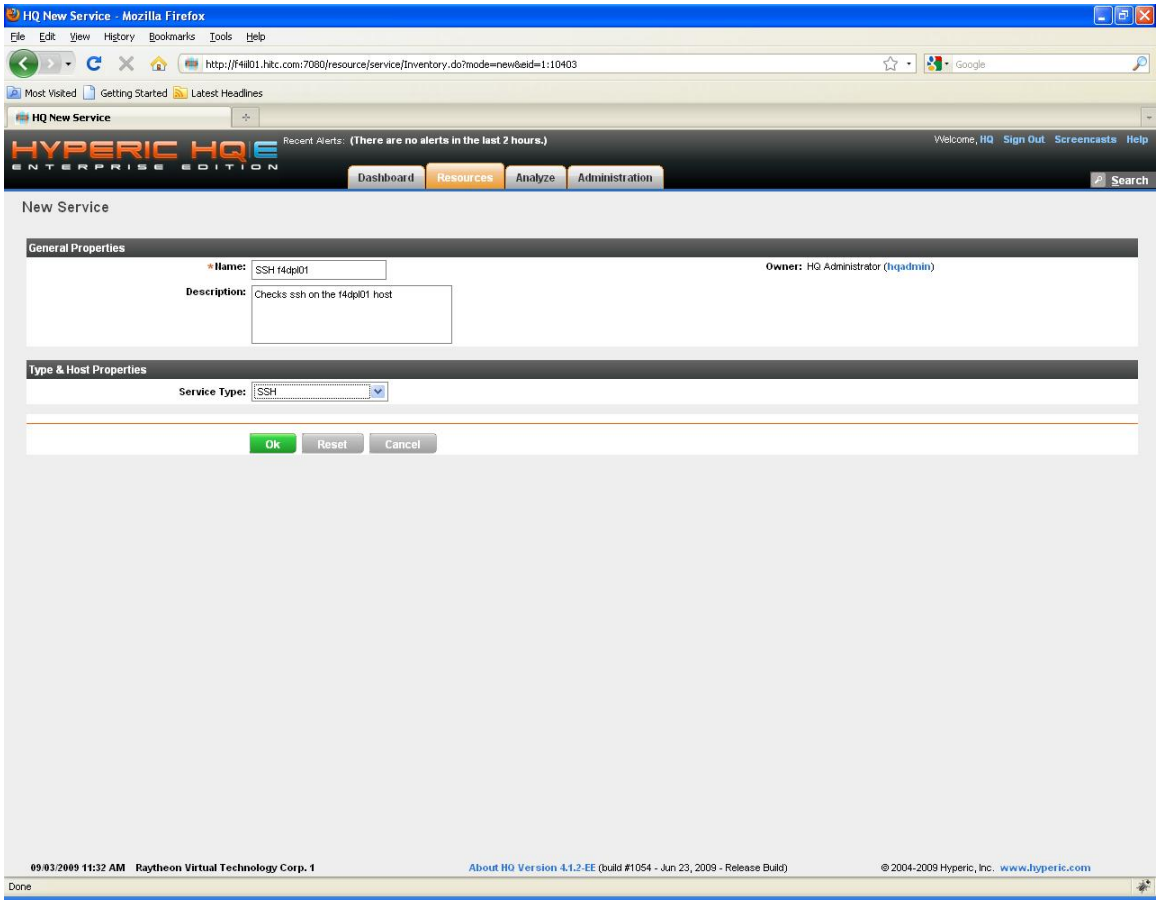


Figure 4.2.2.3.5-3. Configure ssh

6. Click “OK” button.
7. The next screen allows for the configuration of the SSH service. Hit the Edit button in the Configuration Properties section.

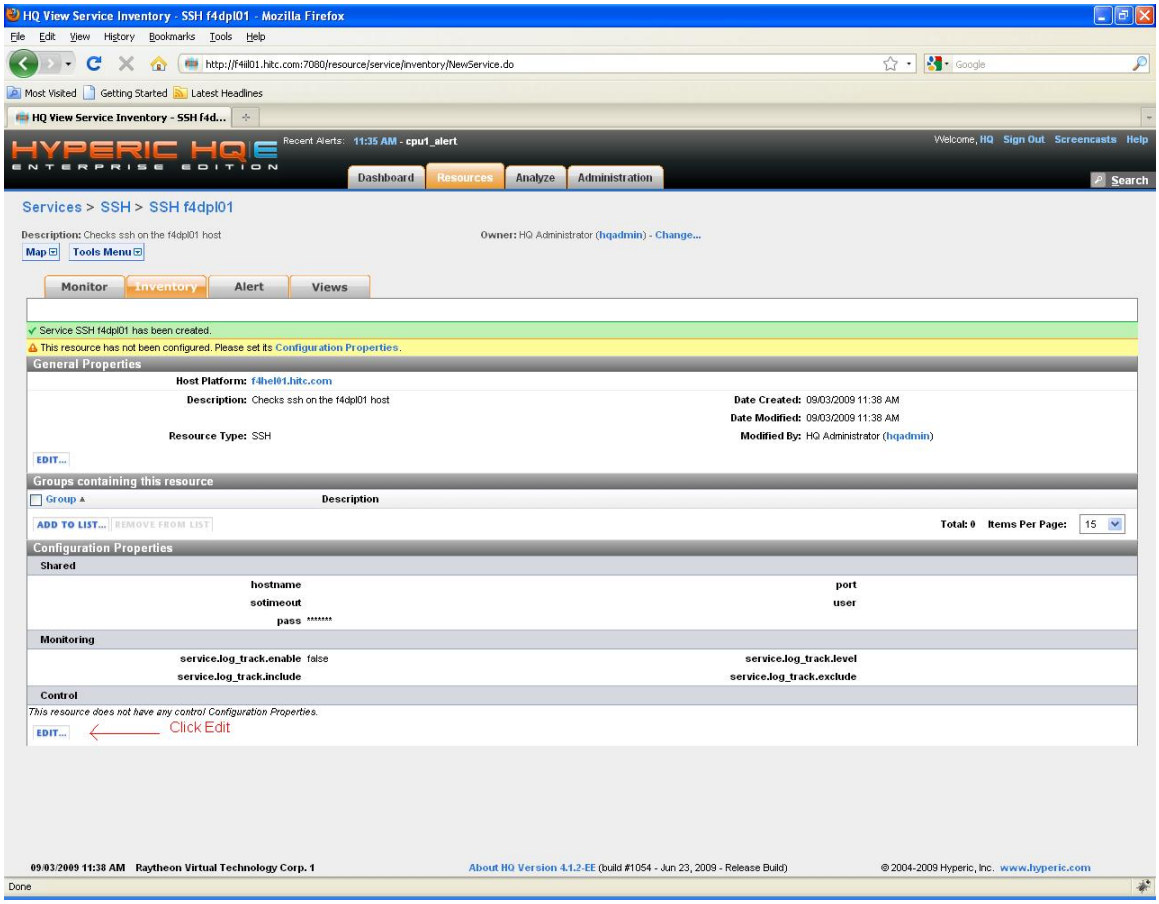


Figure 4.2.2.3.5-4. ssh Inventory Page

8. Fill in the following fields on the next screen
   hostname: The host whose ssh service is being monitored
   port: The ssh port number, typically 22
   sotimeout: The socket timeout, typically 10 seconds
   user: The user name to log into the host via ssh
   pass: The password for the user

   ****NOTE** the pass value will need to be updated every time the password is changed for the user

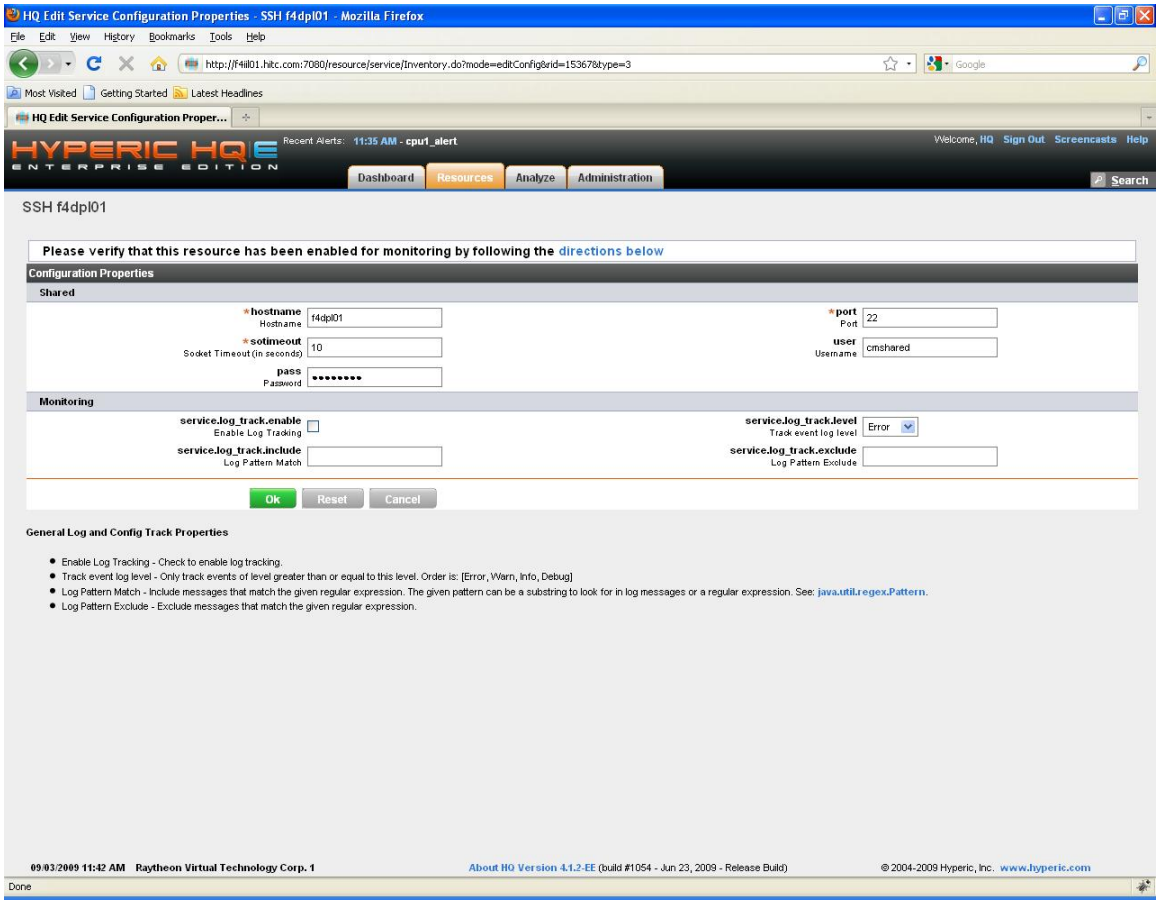


Figure 4.2.2.3.5-5. ssh Configuration Page

9. Click “OK” button.
10. After a few minutes, the SSH-xxdpl01 service monitor page should appear similar to the following page.

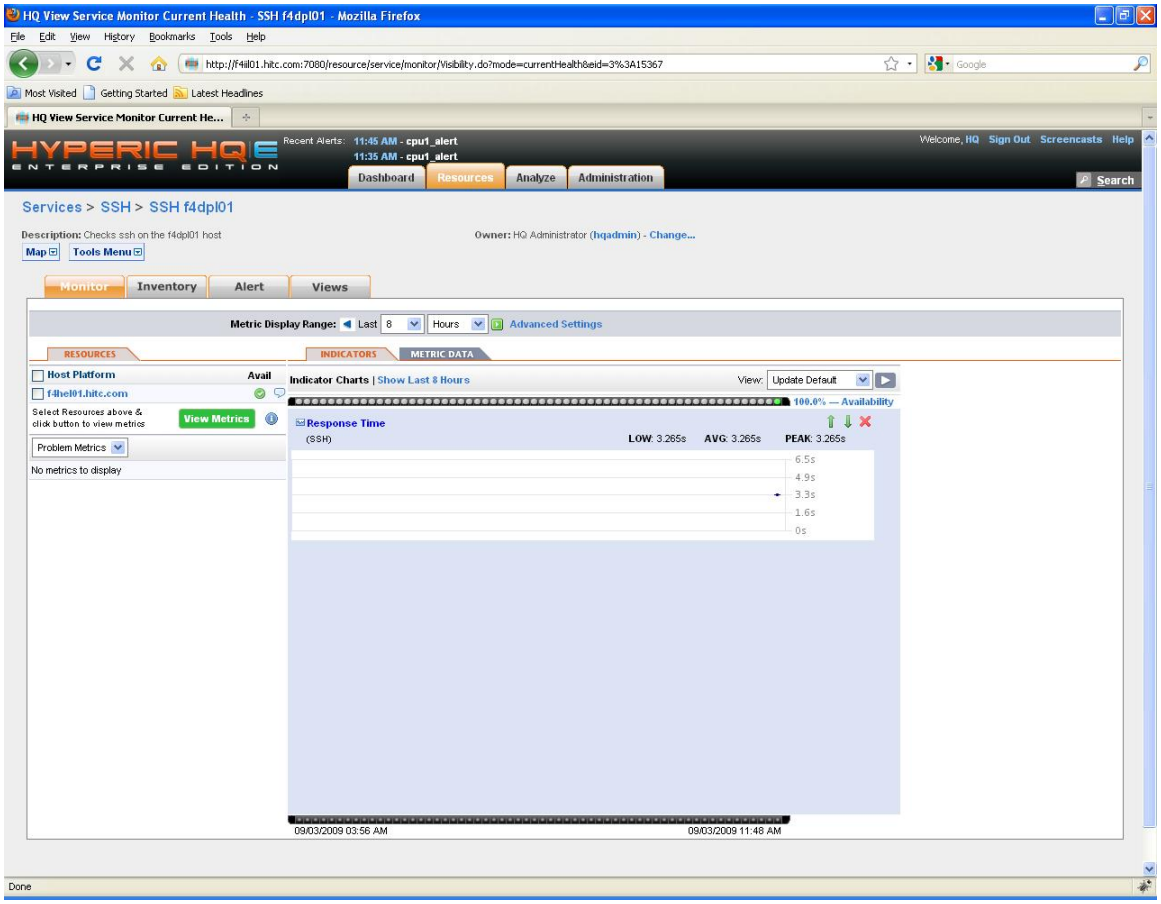


Figure 4.2.2.3.5-6. ssh Configured Monitor Page

4.2.2.3.6 Configuring Sun Java System Web Server

The monitoring of Sun Java System Web Server may be accomplished by creating a service that pings a configured url. To configure a Hyperic http service perform the following steps

1. Choose a host platform that is running the Sun Java System Web Server – xxdpl01
2. Drill down to the platform using the Resources->Browse on the Hyperic GUI. The screen should look like the following

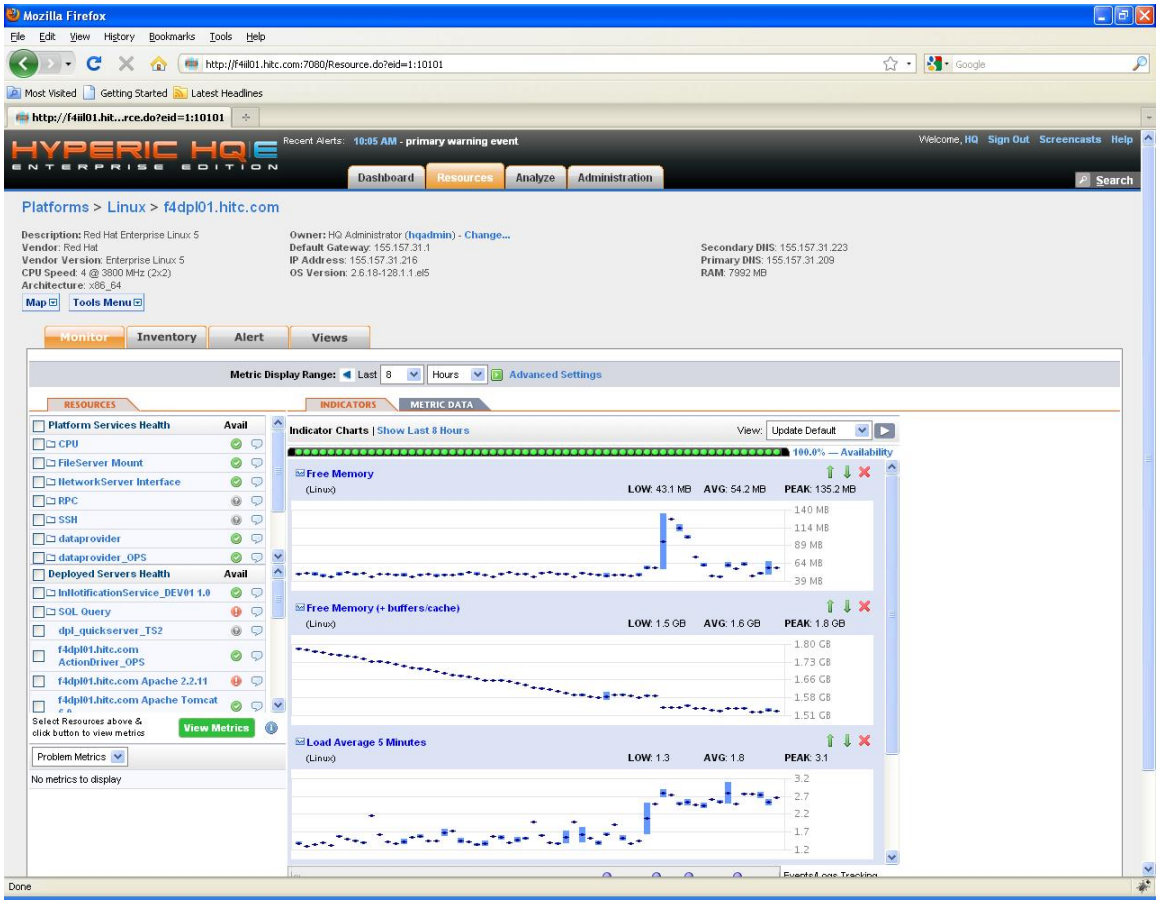


Figure 4.2.2.3.6-1. Host Resource Page

3. From this screen choose from the Tools Menu (upper left) the New Platform Service link.

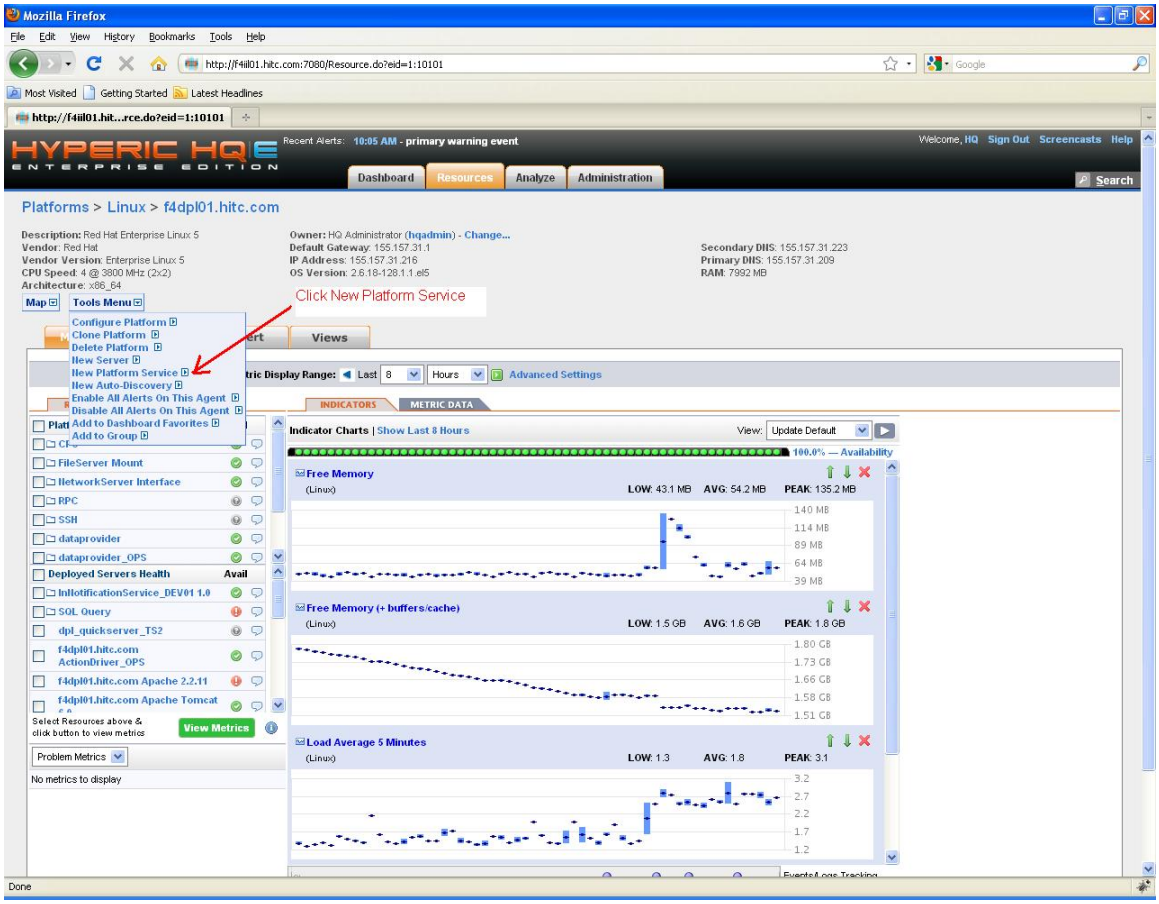


Figure 4.2.2.3.6-2. Add New Platform Service

4. The following screen appears. Fill in the following

   name: choose a name such as Sun Web Server 7 xxdpl01

   description: choose a description such as "Monitors Sun Web Server 7 on xxdpl01 host"

   service type: Choose from the drop down menu - choose HTTP

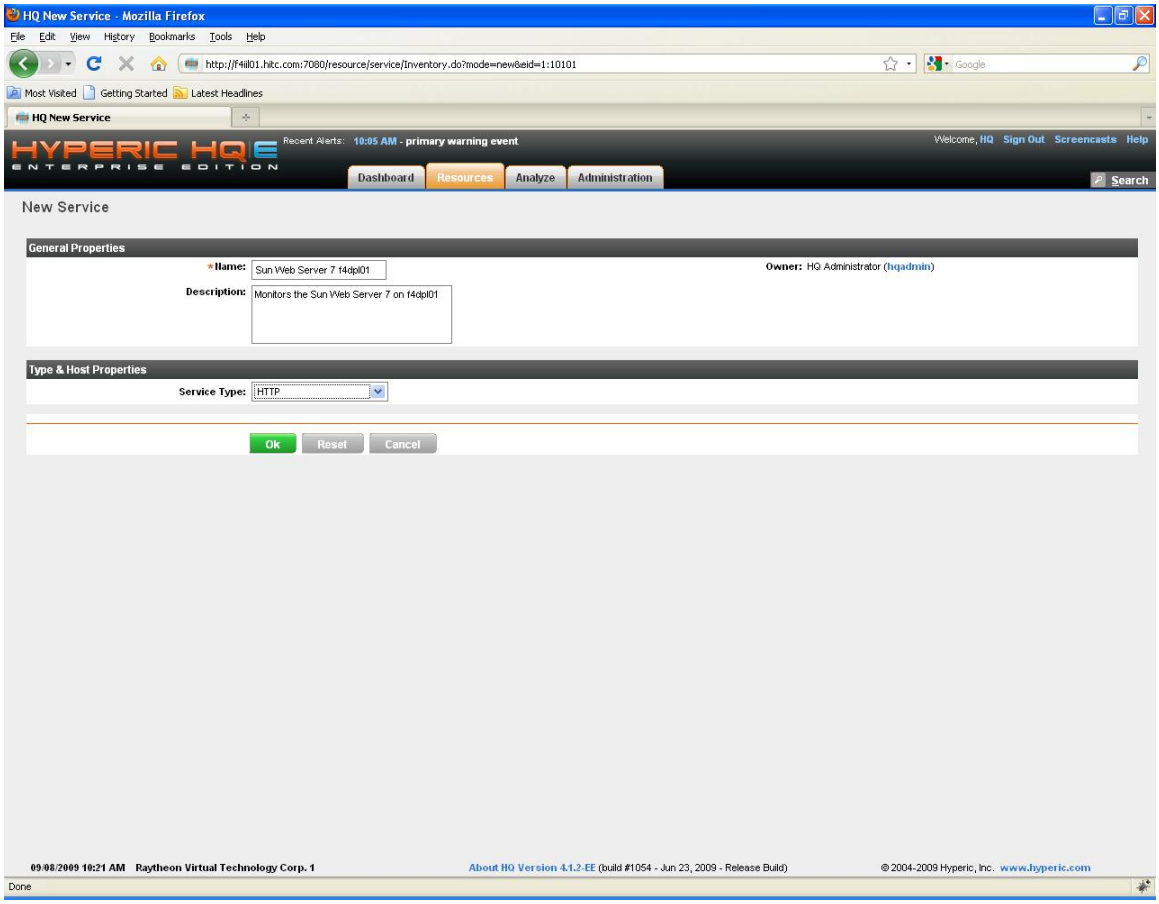


Figure 4.2.2.3.6-3. Configure Sun Java System Web Server

5. Click “OK” button.
6. The next screen allows for the configuration of the HTTP service. Hit the Edit button in the Configuration Properties section.

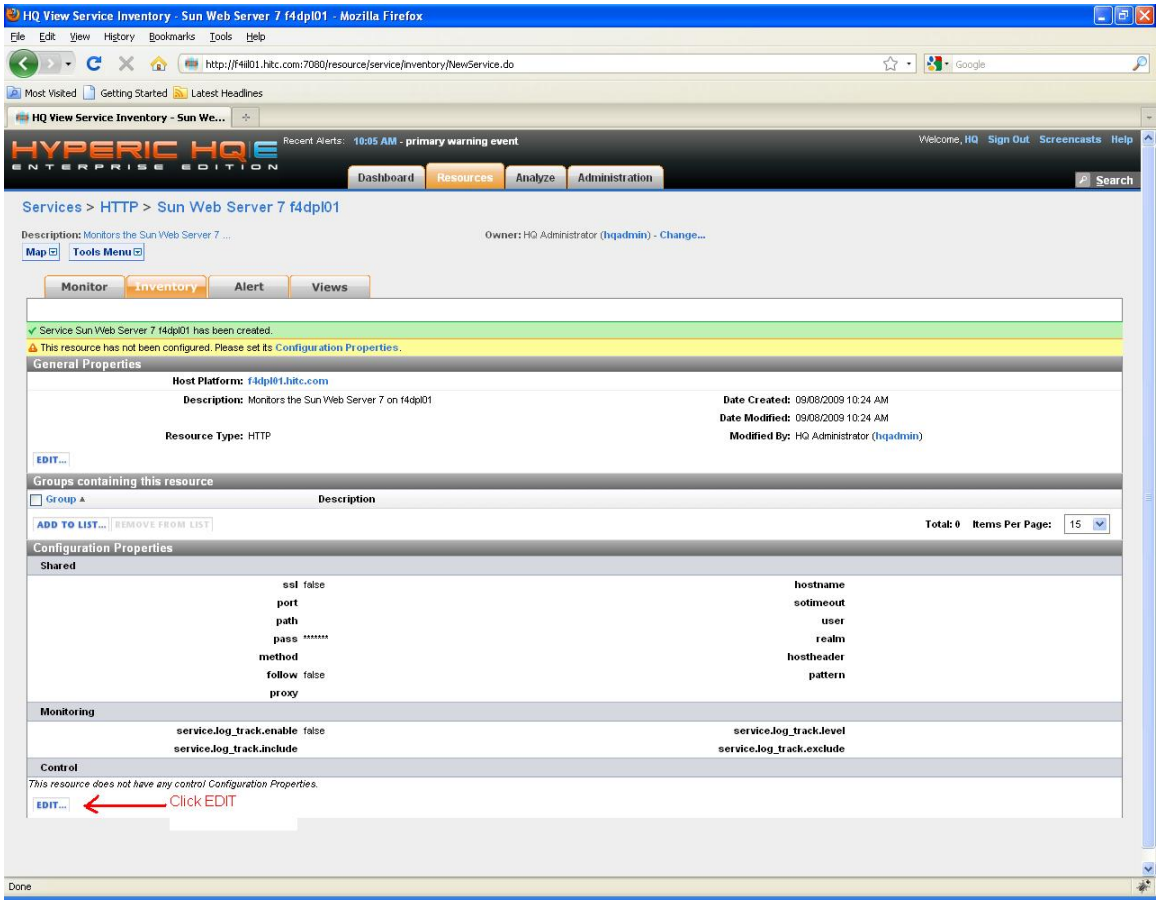


Figure 4.2.2.3.6-4. Sun Java System Web Server Inventory Page

7. Fill in the following fields on the next screen

   hostname: the host of the Sun Web Server 7 being monitored

   port: the port number

   sotimeout: the socket timeout, typically 10 seconds

   path: leave as /

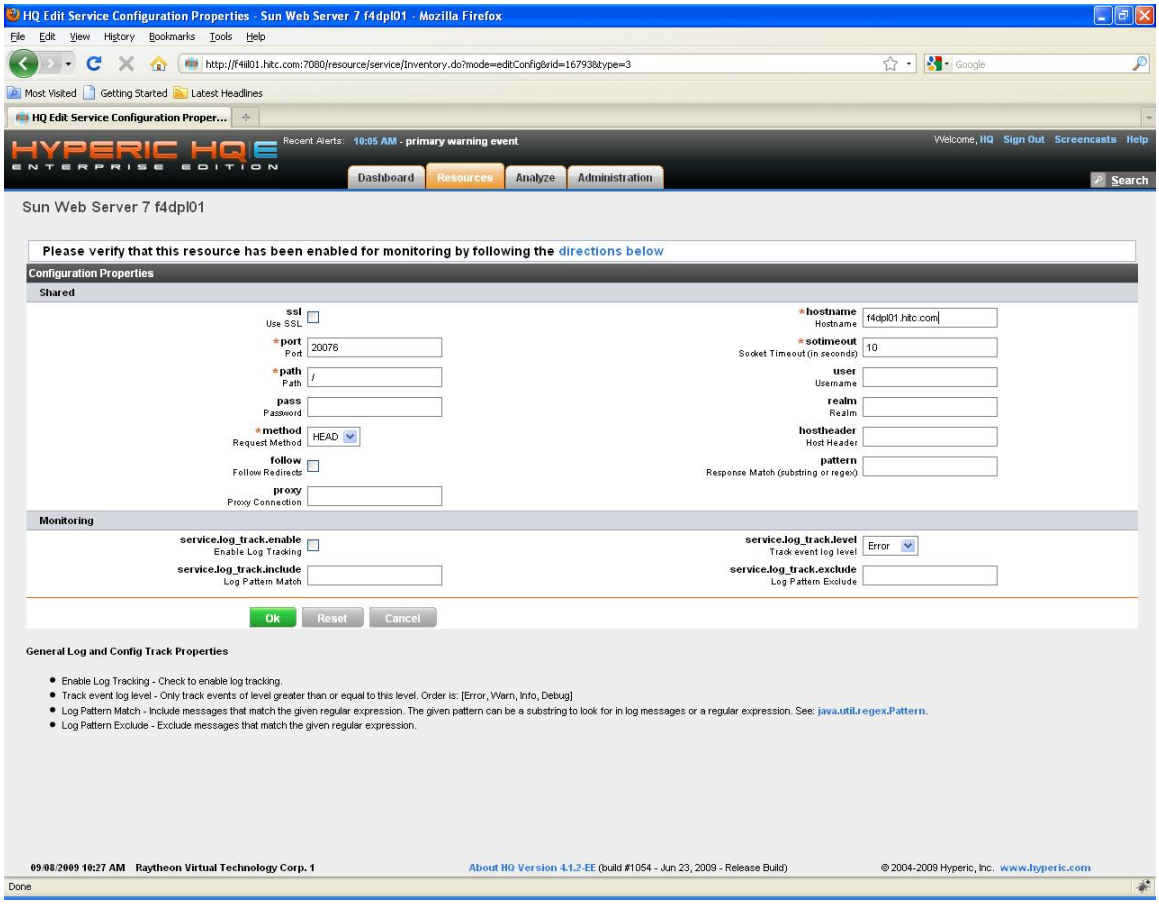


Figure 4.2.2.3.6-5. Sun Java System Web Server Configuration Page

8. Click “OK” button.
9. After a few minutes, the HTTP-xxdpl01 service monitor page should appear similar to the following page.

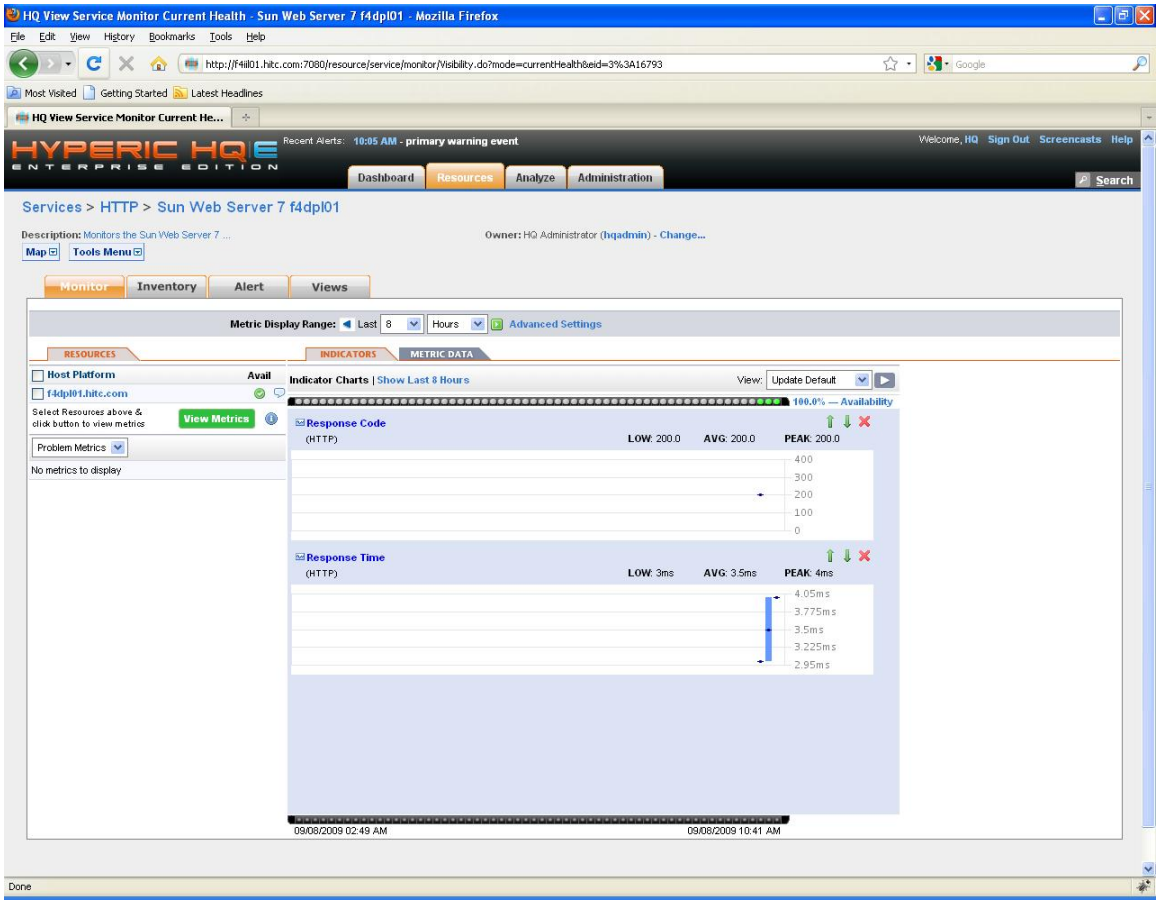


Figure 4.2.2.3.6-6. Sun Java System Web Server Configured Monitor Page

**The Hyperic application is supposed to be able to monitor the Sun Web Server via SNMP which would provide more detail about the status of the server. However, as of the writing of this document, having the Sun Web Server gather metrics and make them available via SNMP has not been successful.

4.2.2.3.7 Configuring SendMail

Hyperic will auto-discover Sendmail instances running on a platform but requires some modifications for the Sendmail monitoring to take place. Hyperic gathers metrics by running a script which will try to cd into the directories /var/spool/mqueue and /var/spool/clientmqueue and list the contents. Hyperic will need permission to cd into these directories and perform an ls. The following steps will accomplish this.

On the mail server host:

```
xxeil01# ls -ld /var/spool/*queue
drwxrwx--- 2 smmsp smmsp  4096 Sep  9 04:05 /var/spool/clientmqueue
drwx------ 2 root  mail  20480 Sep  9 10:21 /var/spool/mqueue

xxeil01# chmod 750 /var/spool/mqueue

xxeil01# ls -ld /var/spool/*queue
drwxrwx--- 2 smmsp smmsp  4096 Sep  9 04:05 /var/spool/clientmqueue
drwxr-x--- 2 root  mail  20480 Sep  9 10:21 /var/spool/mqueue

xxeil01# vi /etc/group  (add hyperic to "mail" and "smmsp" groups)
mail:x:12:mail,hyperic
smmsp:x:51:hyperic
```

After a few minutes, the xxeil01 Sendmail 8.x monitor page should appear similar to the following page.

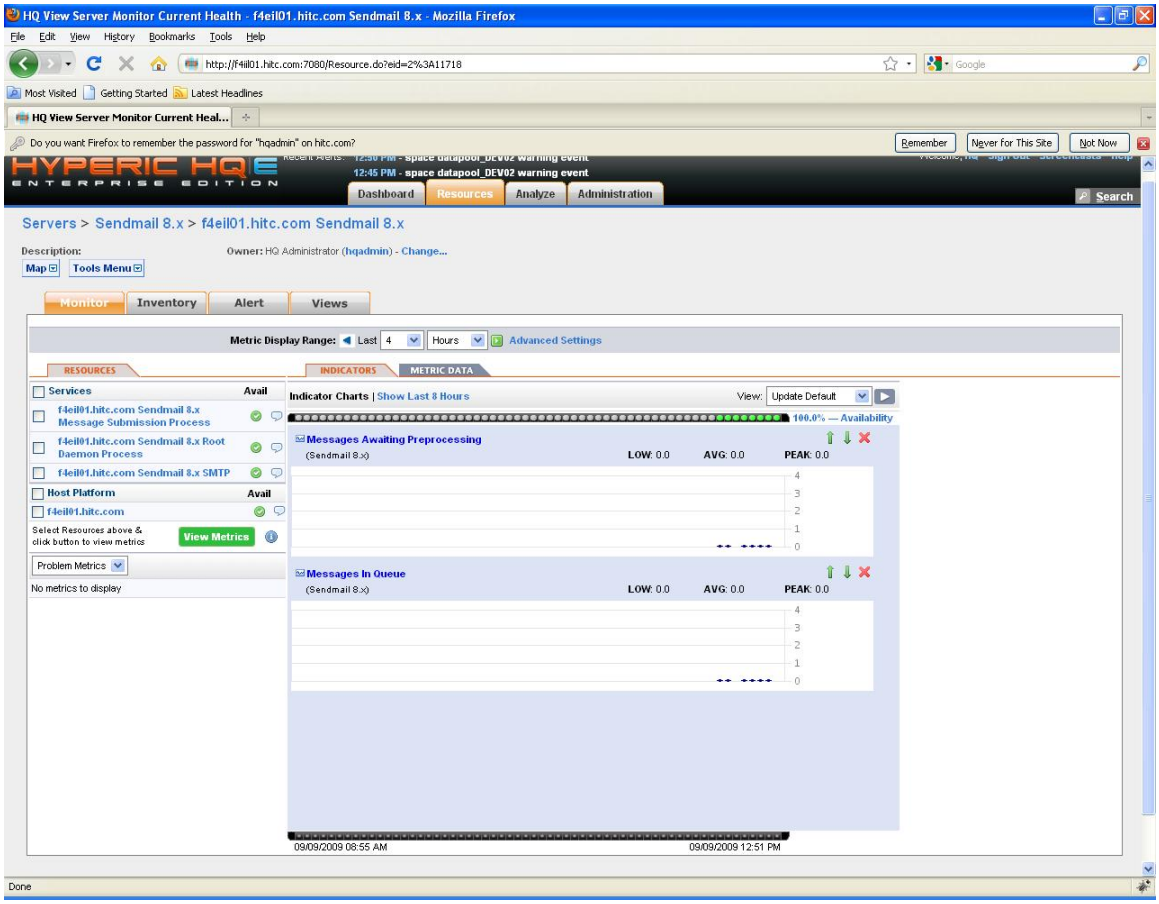


Figure 4.2.2.3.7-1. SendMail Monitor Page

**Detailed instructions will be issued concerning the permission changes.

*** Do not follow the instructions provided by Hyperic for the configuration of Sendmail. Their instruction was to give sudo/NOPASSWD such that the script will execute as root without a password which EEB system administrators strongly discouraged.

***Sendmail should only be auto-discovered on the xxeil01 host.

3.2.2.3.8 Configuring StorNext Host Monitoring

Quantum, the makers of StorNext, recommend against any other software being installed on the metadata host. Thus, an agent will not be installed and the only monitoring will be a ping of the virtual StorNext metadata host. Hyperic provides the ability to ping a host. The following steps will accomplish this.

1. Choose a host platform that can ping the xxsmvaa host.

2. Drill down to the platform using the Resources->Browse on the Hyperic GUI. The screen should look like the following.

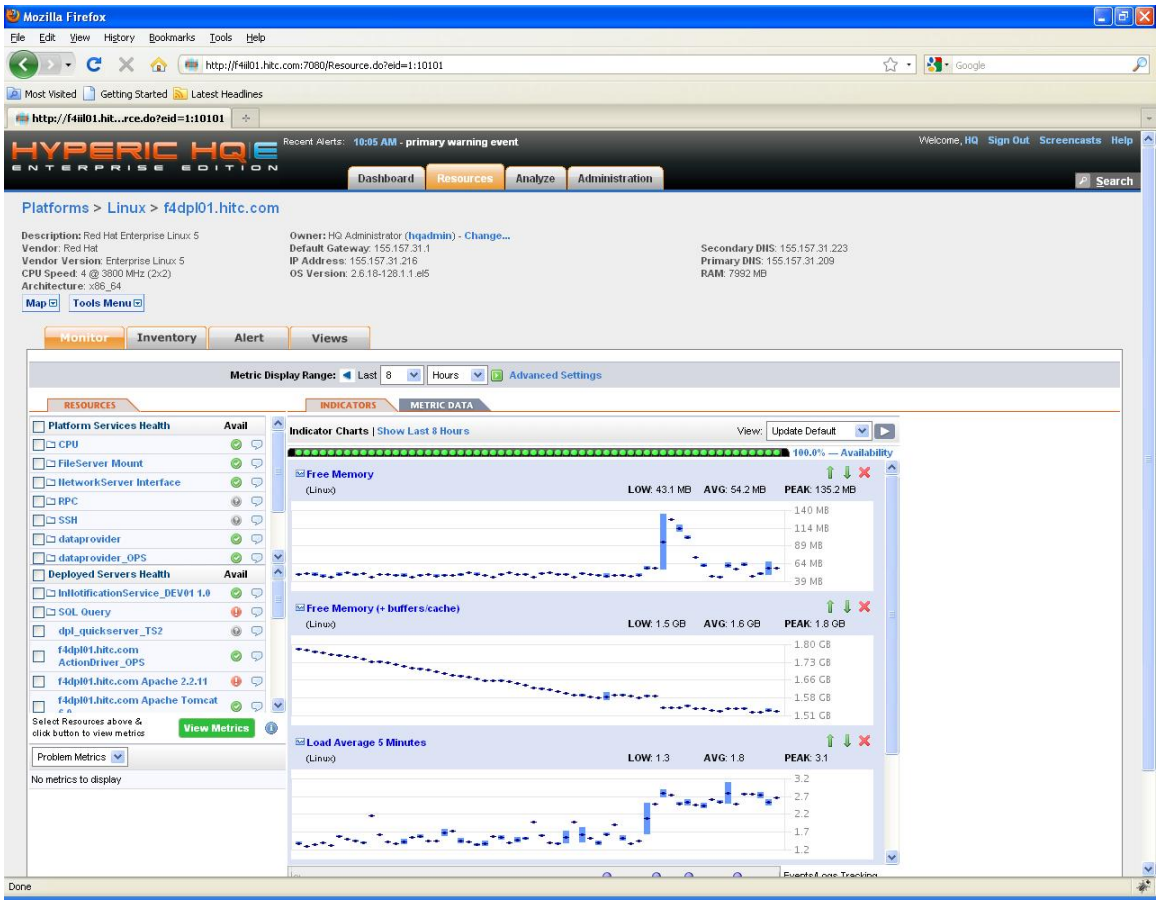


Figure 4.2.2.3.8-1. Host Resource Page

3. From this screen choose from the Tools Menu (upper left) the New Platform Service link.

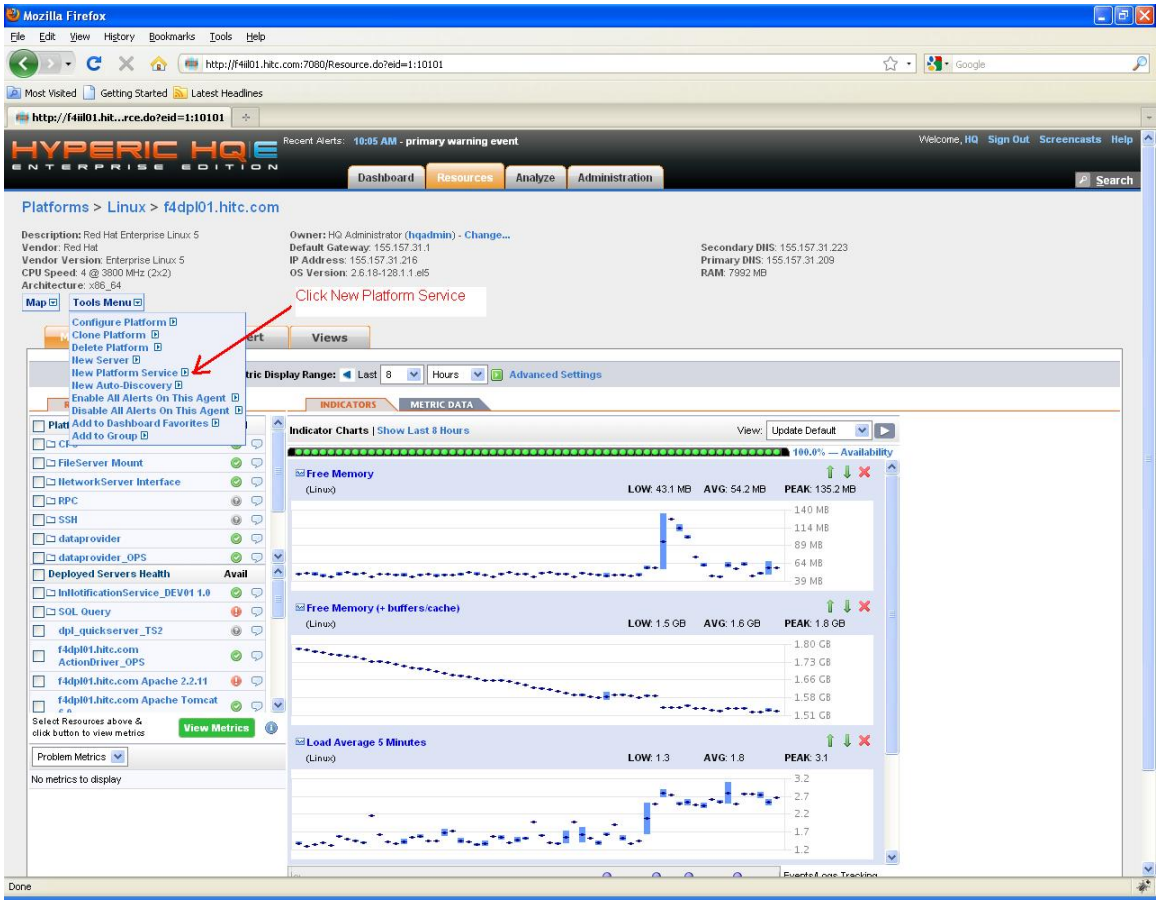


Figure 4.2.2.3.8-2. Add New Platform Service

4. The following screen appears. Fill in the following

   name: choose a name such as StorNext Metadata Host Ping

   description: choose a description such as “This service will ping the metadata host”

   service type: From the drop down menu - choose InetAddress Ping

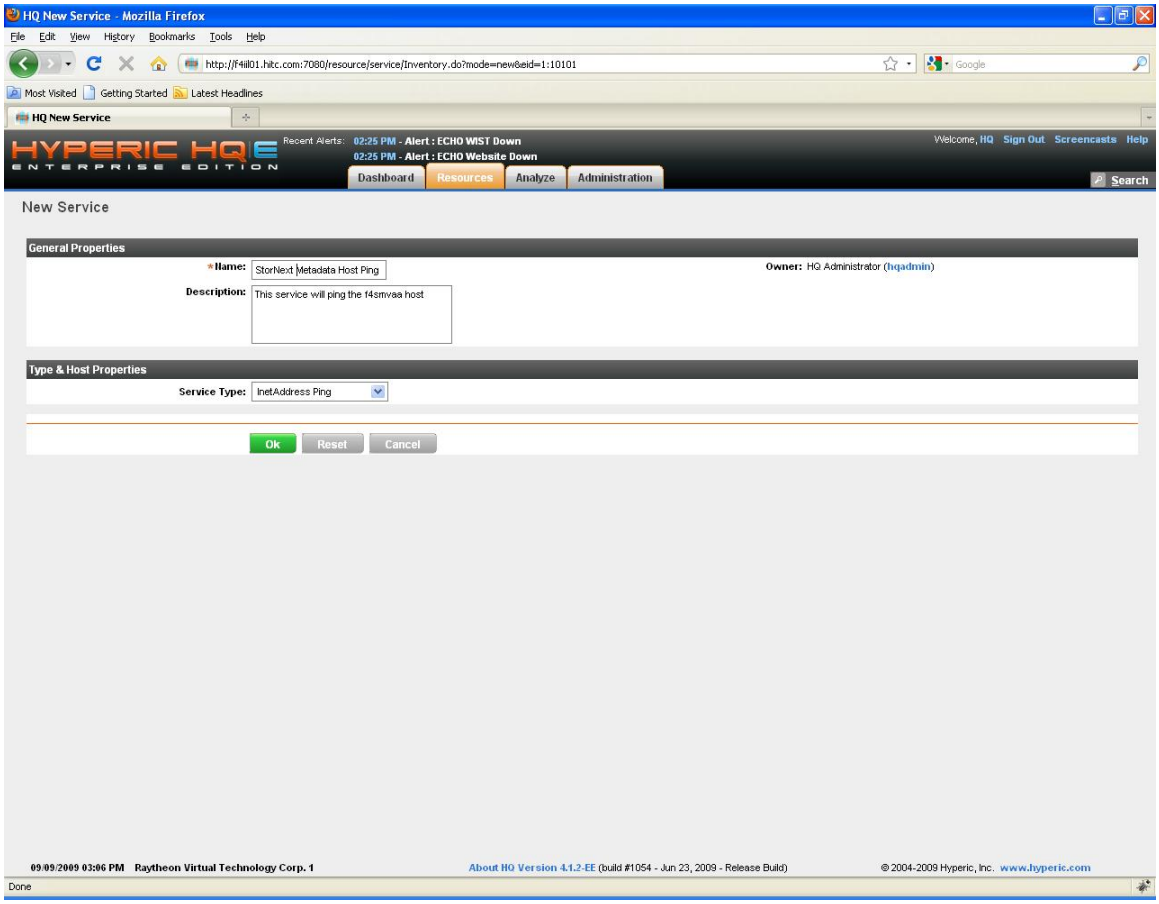


Figure 4.2.2.3.8-3. Configure StorNext Host Monitoring

5. Click “OK” button.
6. The next screen allows for the configuration of the ping service. Hit the Edit button in the Configuration Properties section

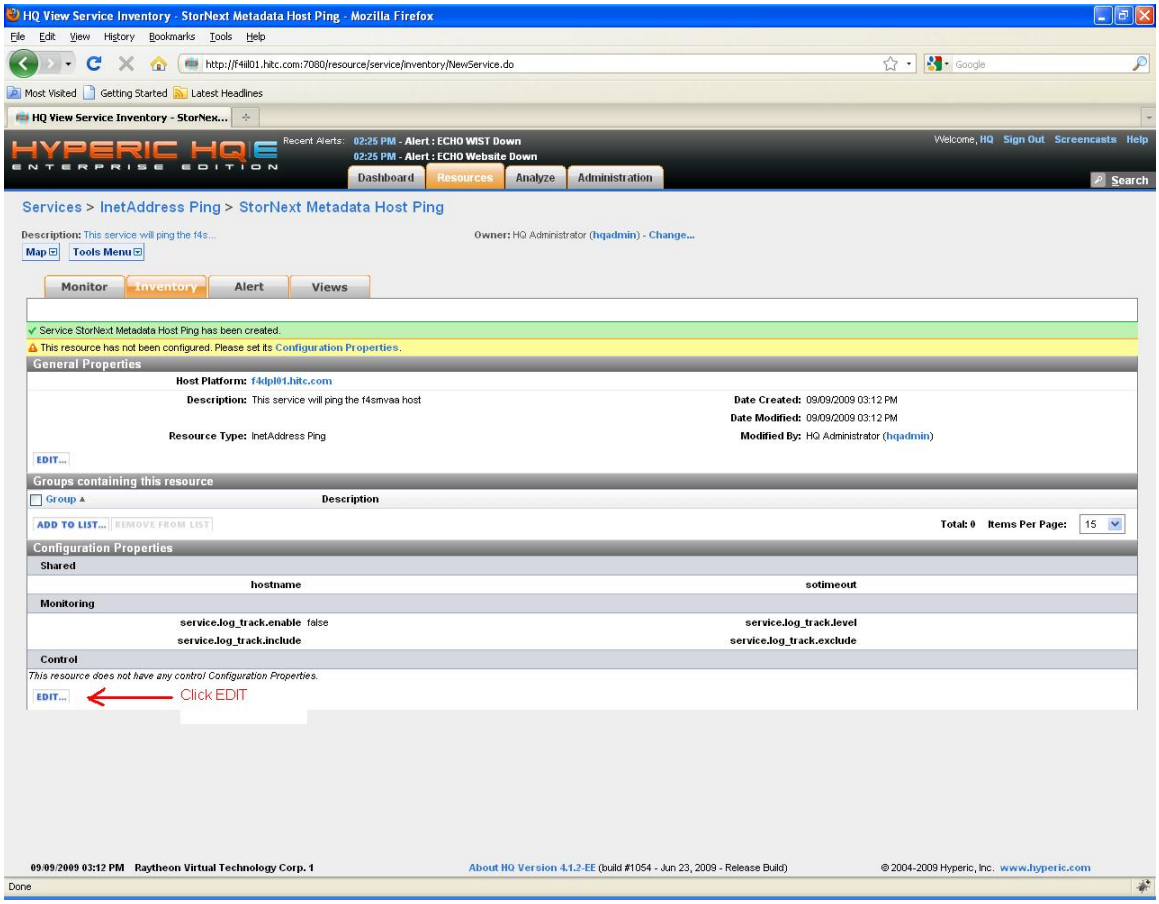


Figure 4.2.2.3.8-4. StorNext Host Monitoring Inventory Page

7. Fill in the following fields on the next screen.

   hostname: the virtual host name (ex. p4smvaa)

   sotimeout: the socket timeout, typically 10 seconds

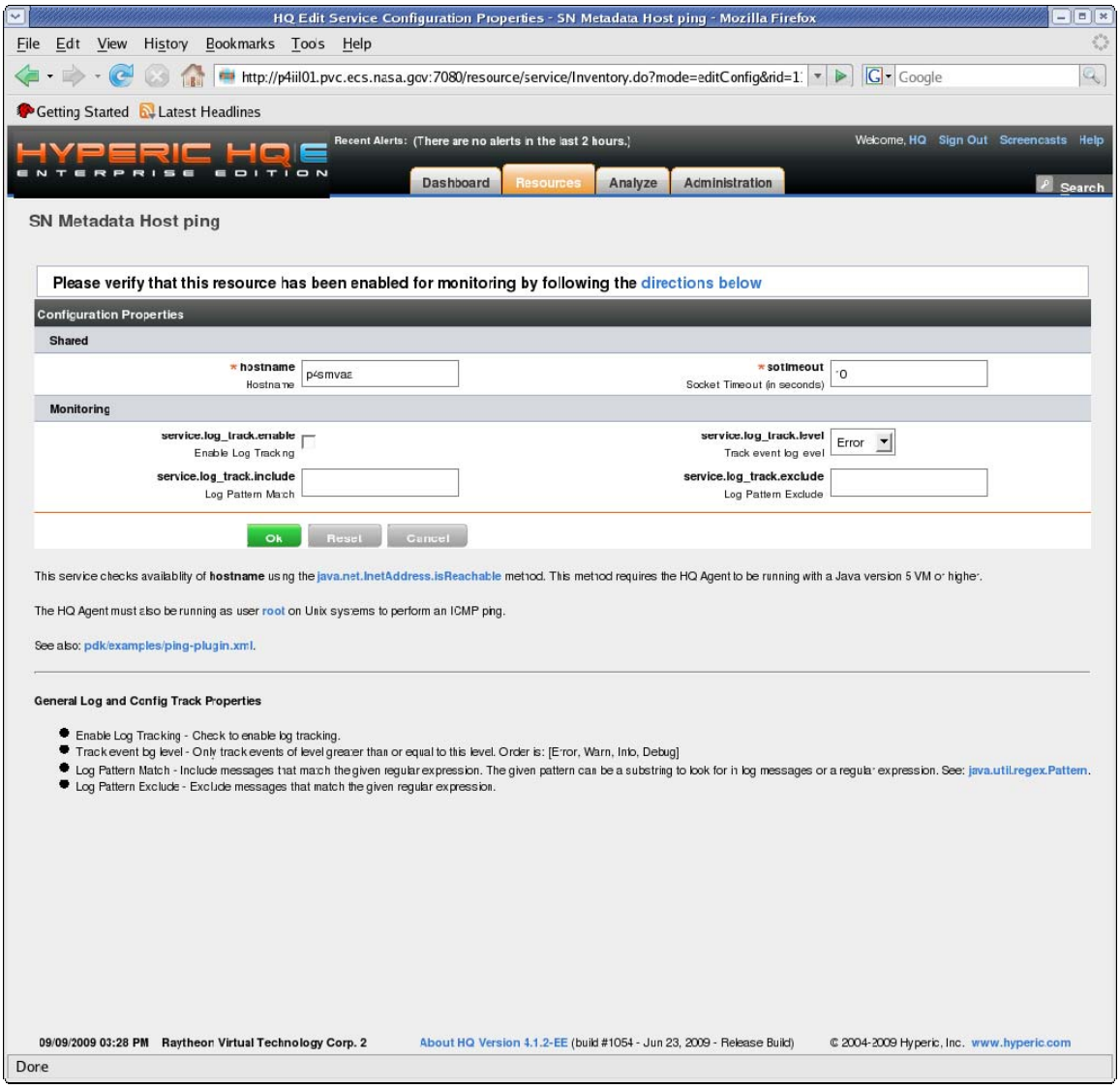


Figure 4.2.2.3.8-5. StorNext Host Monitoring Configuration Page

8. Click “OK” button.
9. After a few minutes, StorNext Metadata host ping service monitor page should appear similar to the following page.

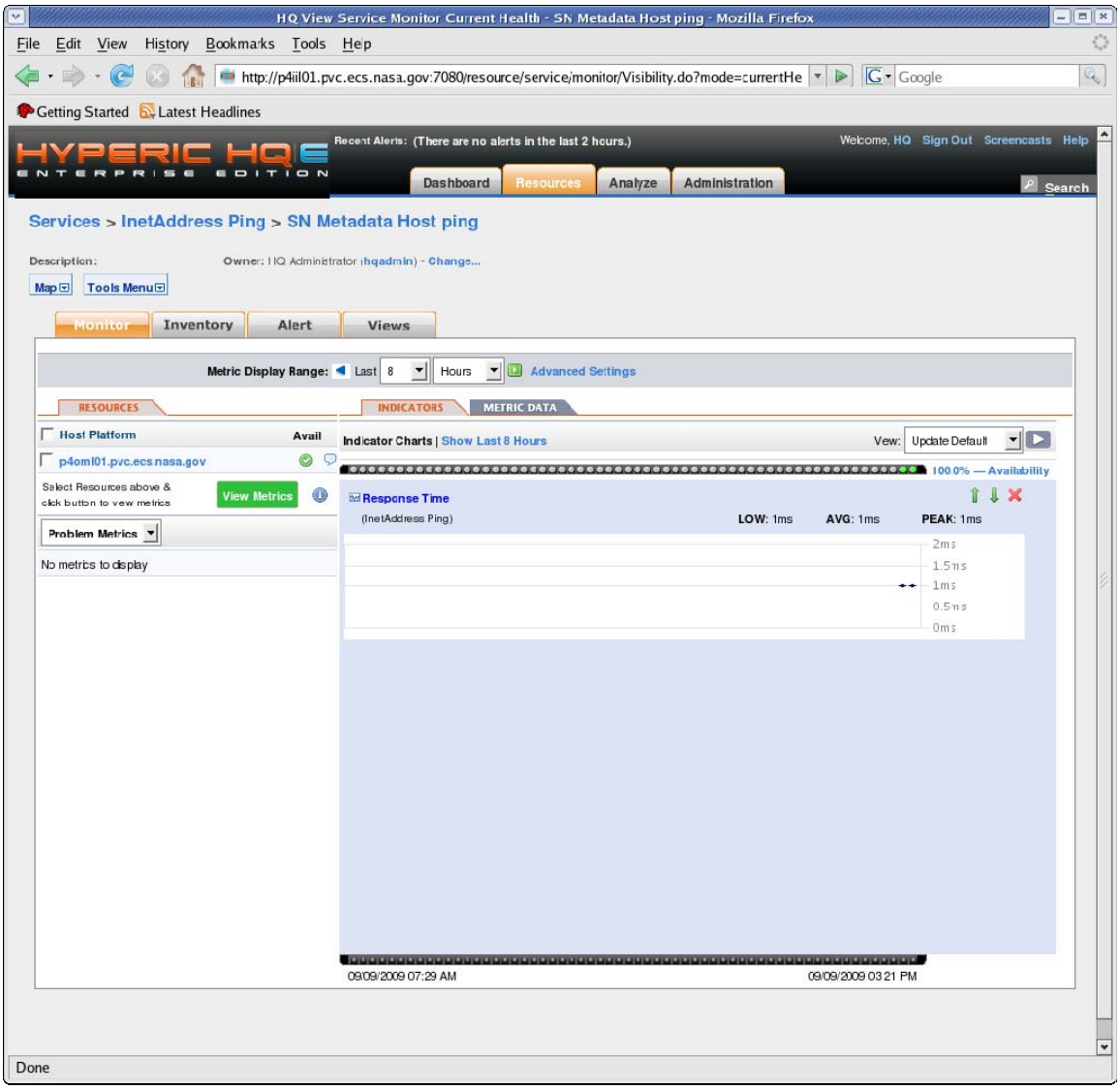


Figure 4.2.2.3.8-6. StorNext Host Monitoring Page

4.2.2.3.9 Configuring NIS

Hyperic does not provide a service that explicitly monitors the Network Interface Service (NIS) but it does provide the ability to monitor a process. We can use the process monitoring capability to monitor NIS clients and server.

The NIS client should be running on every host platform within the EEB system. For each host platform, follow the following steps to configure the NIS client monitoring:

1. Choose the host platforms that you want to monitor the NIS cient, e.g x4hel01.

2. Drill down to the platform using the Resources->Browse on the Hyperic GUI. The screen should look like the following.

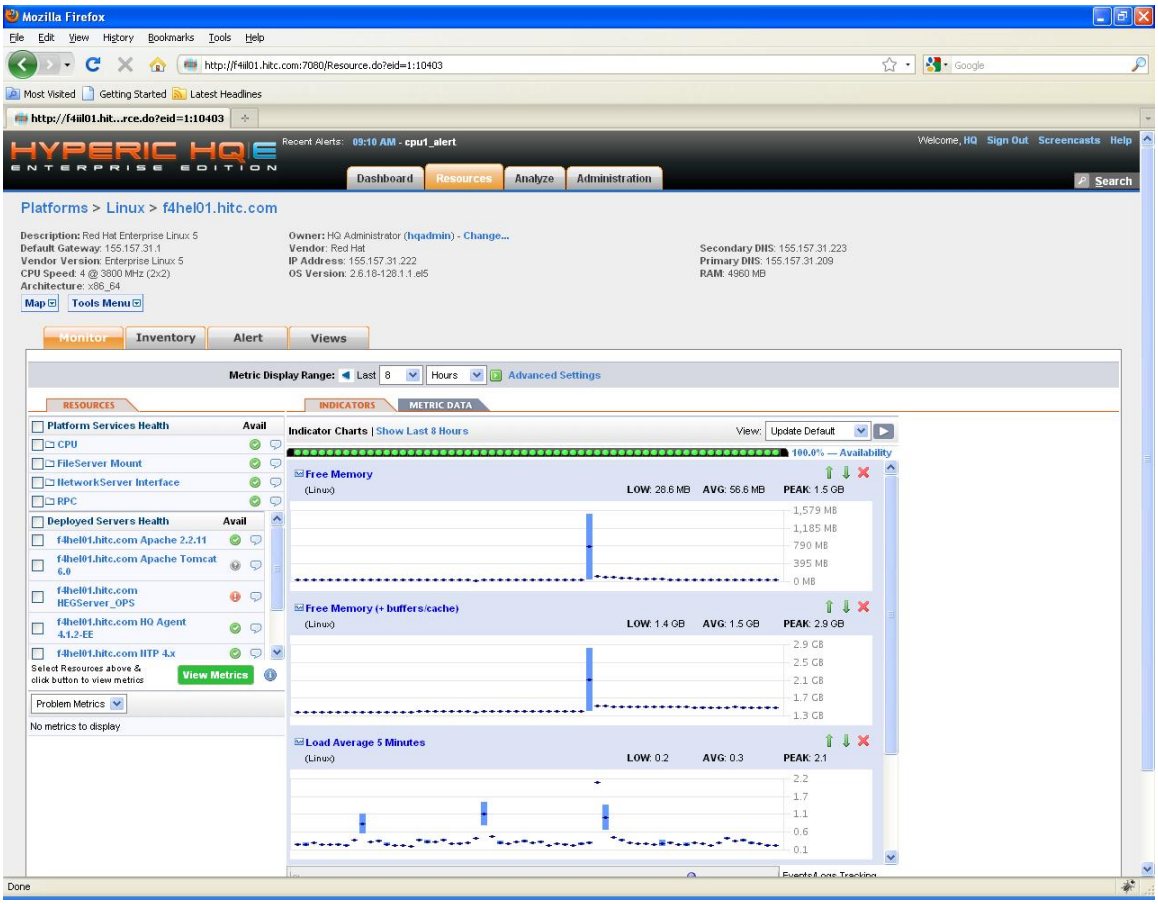


Figure 4.2.2.3.9-1. Host Resource Page

3. From this screen choose from the Tools Menu (upper left) the New Platform Service link.

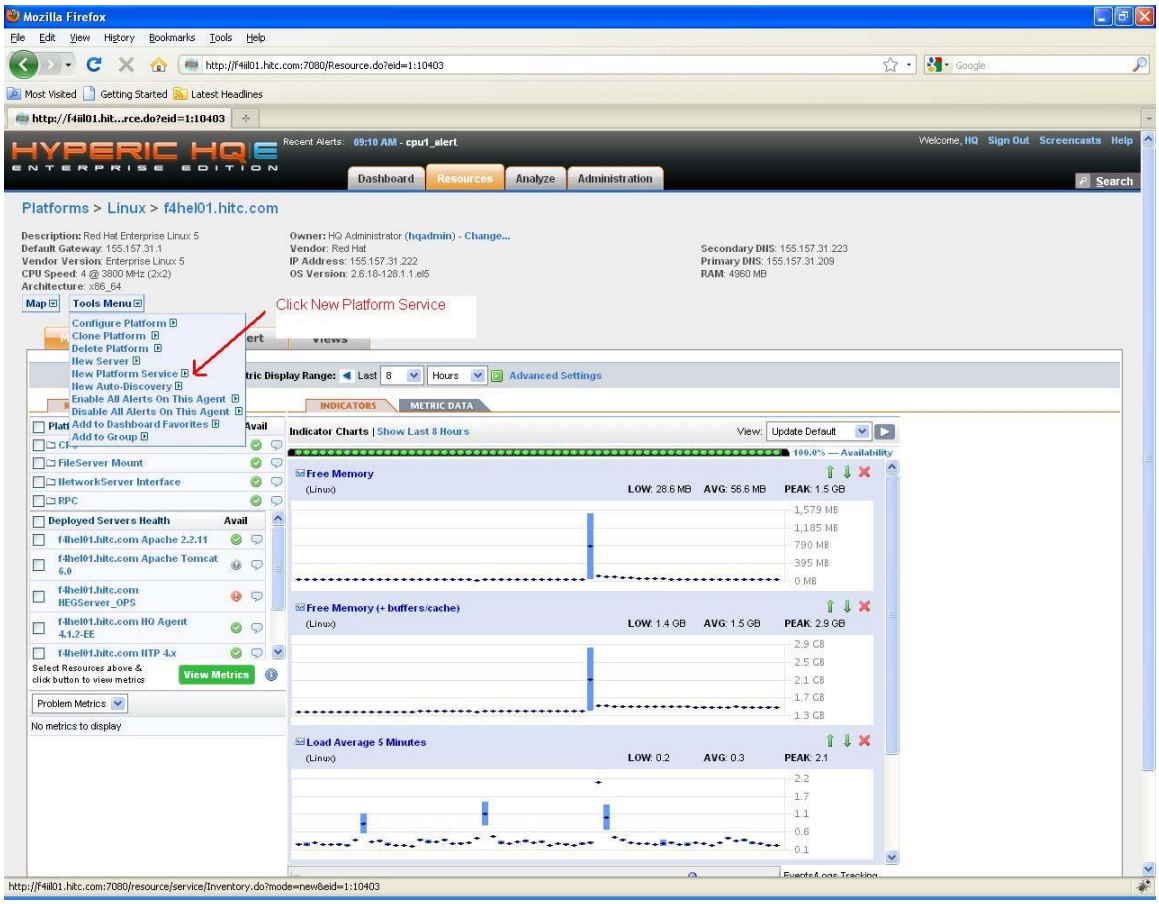


Figure 4.2.2.3.9-2. Add New Platform Service

4. The following screen appears. Fill in the following fields

   name: the name of the service ex "NIS client x4hel01"

   description: the description of the service

   (ex. "Monitor NIS client on x4hel01")

   service type: choose Process from the drop down menu

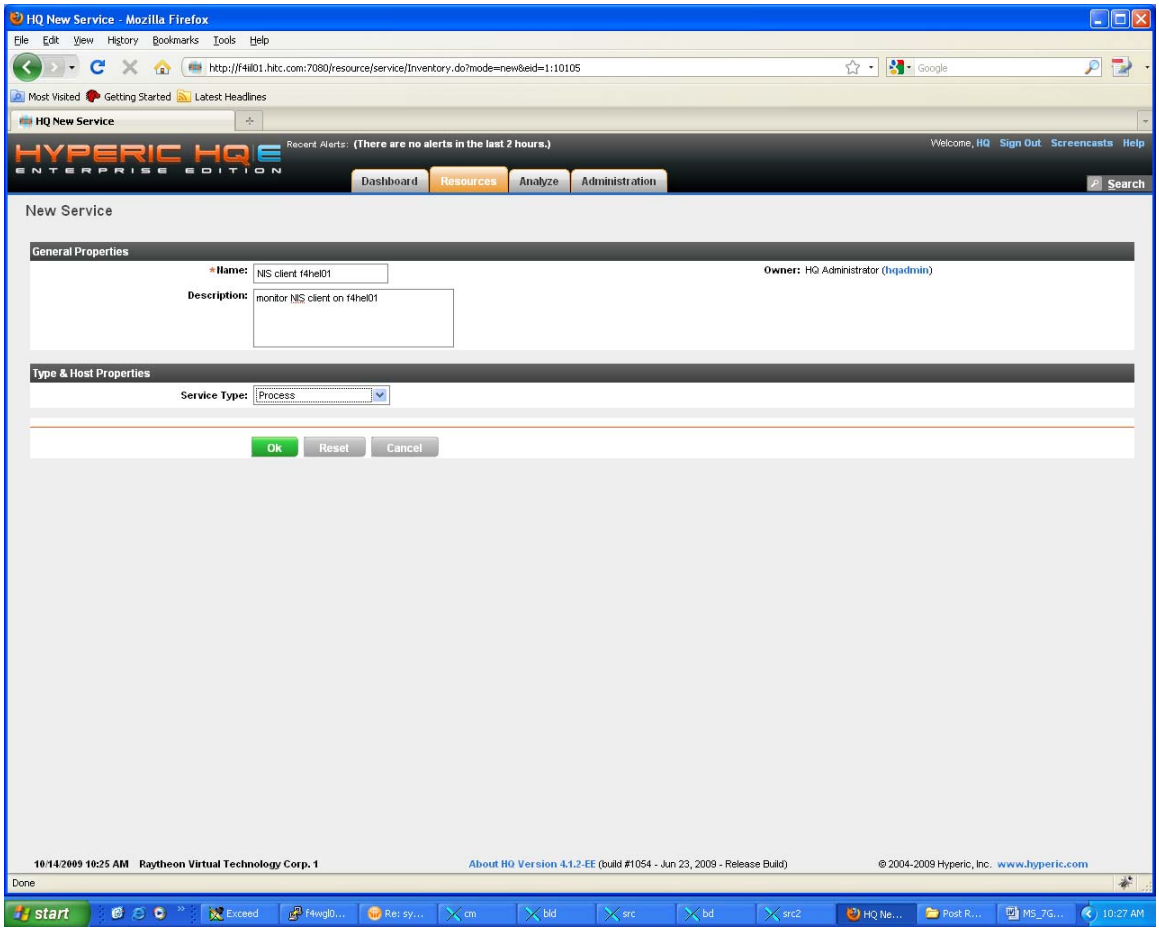


Figure 4.2.2.3.9-3. Configure NIS client

5. Click “OK” button
6. The next screen allows for the configuration of the Process service. In the following screen, hit the EDIT button in the Configuration Parameters panel.

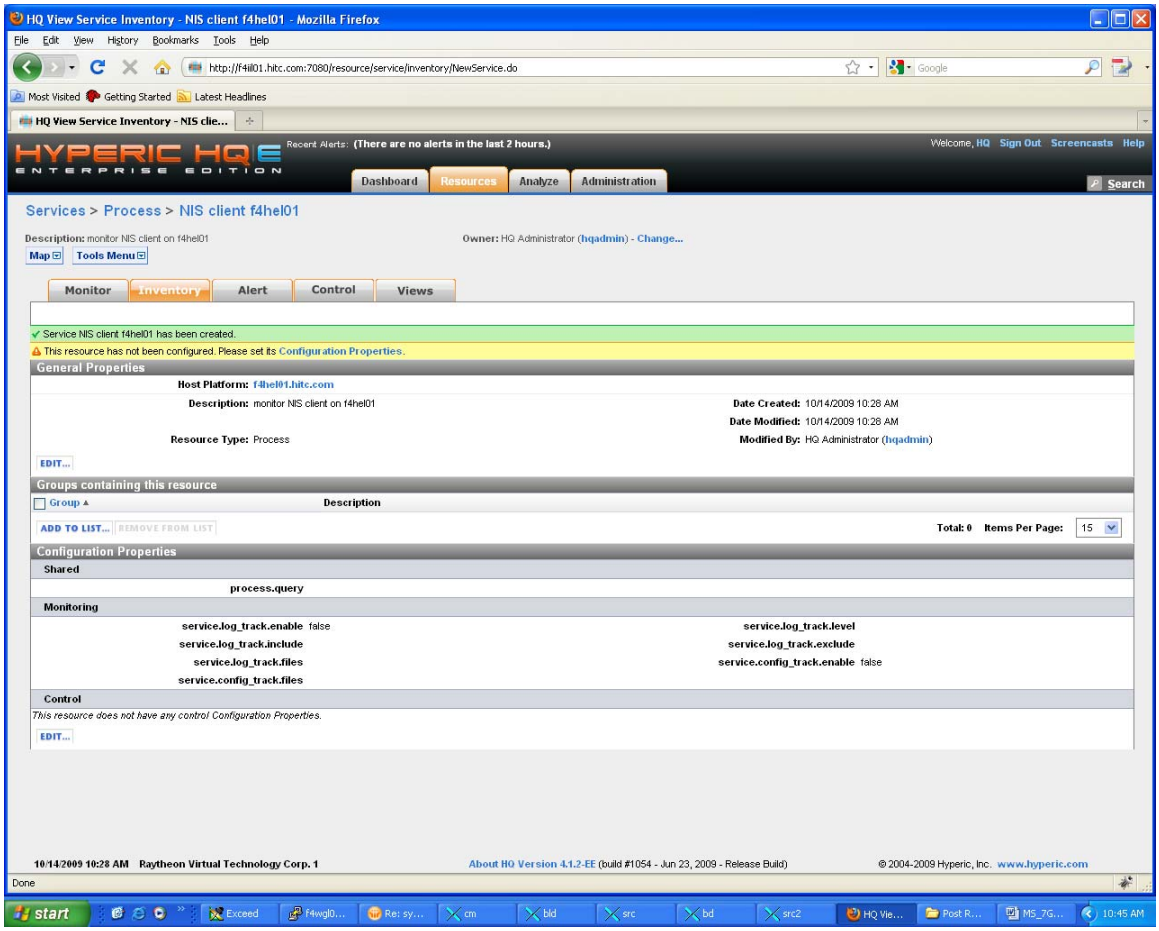


Figure 4.2.2.3.9-4. NIS client Inventory Page

7. The next screen allows the user to define how to "find" the process. Hyperic uses what it refers to as PTQL (Process Table Query Language) to identify a process. To find the NIS client process enter the following:

   process.query: Pid.PidFile.eq=/var/run/ypbind.pid

   The Pid.PidFile.eq=/var/run/ypbind.pid tells Hyperic that it can find the pid associated with the NIS client process within the file /var/run/ypbind.pid

   For detailed information about PTQL visit the Hyperic site http://support.hyperic.com/display/SIGAR/PTQL

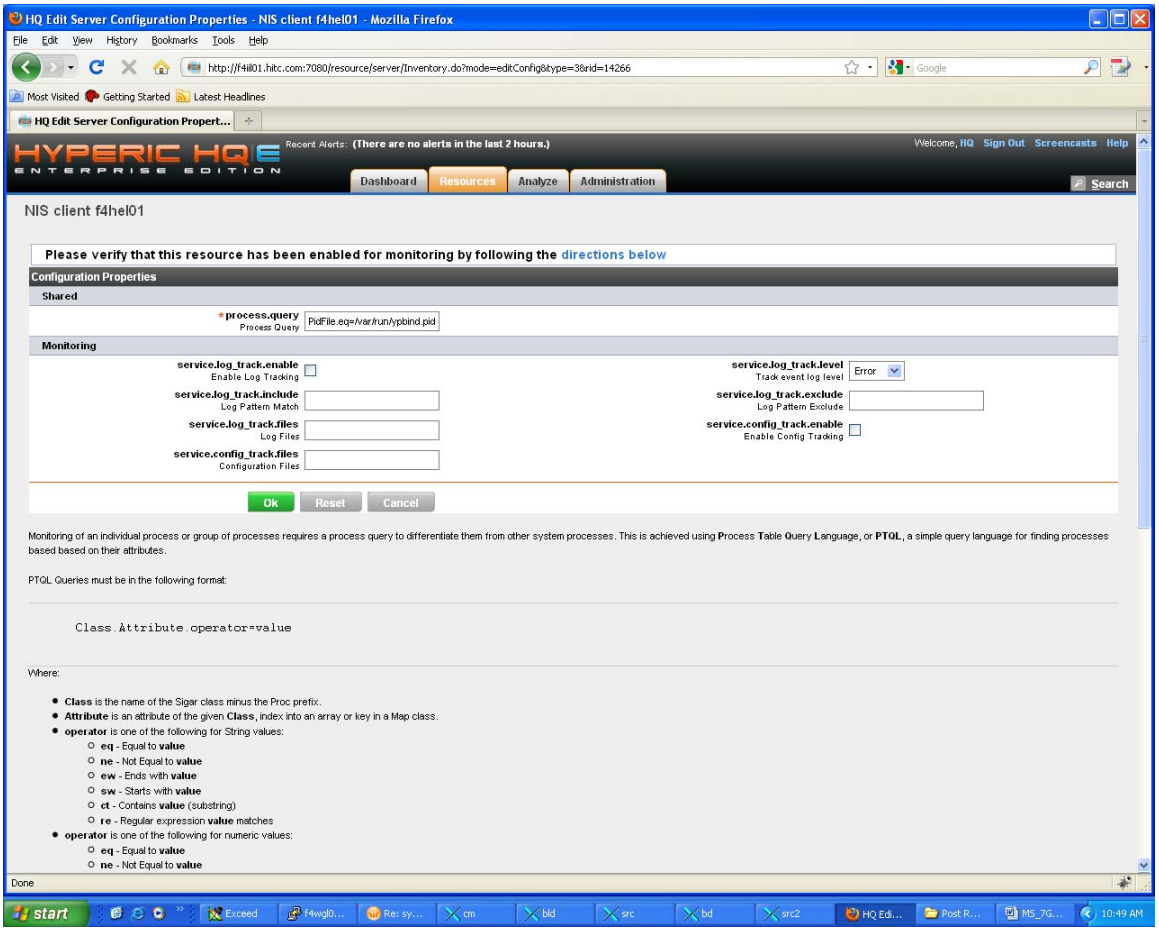


Figure 4.2.2.3.9-5. NIS client Configuration Page

8. Click “OK” button
9. After a few minutes, the NIS client x4hel01 service monitor page should appear similar to the following:

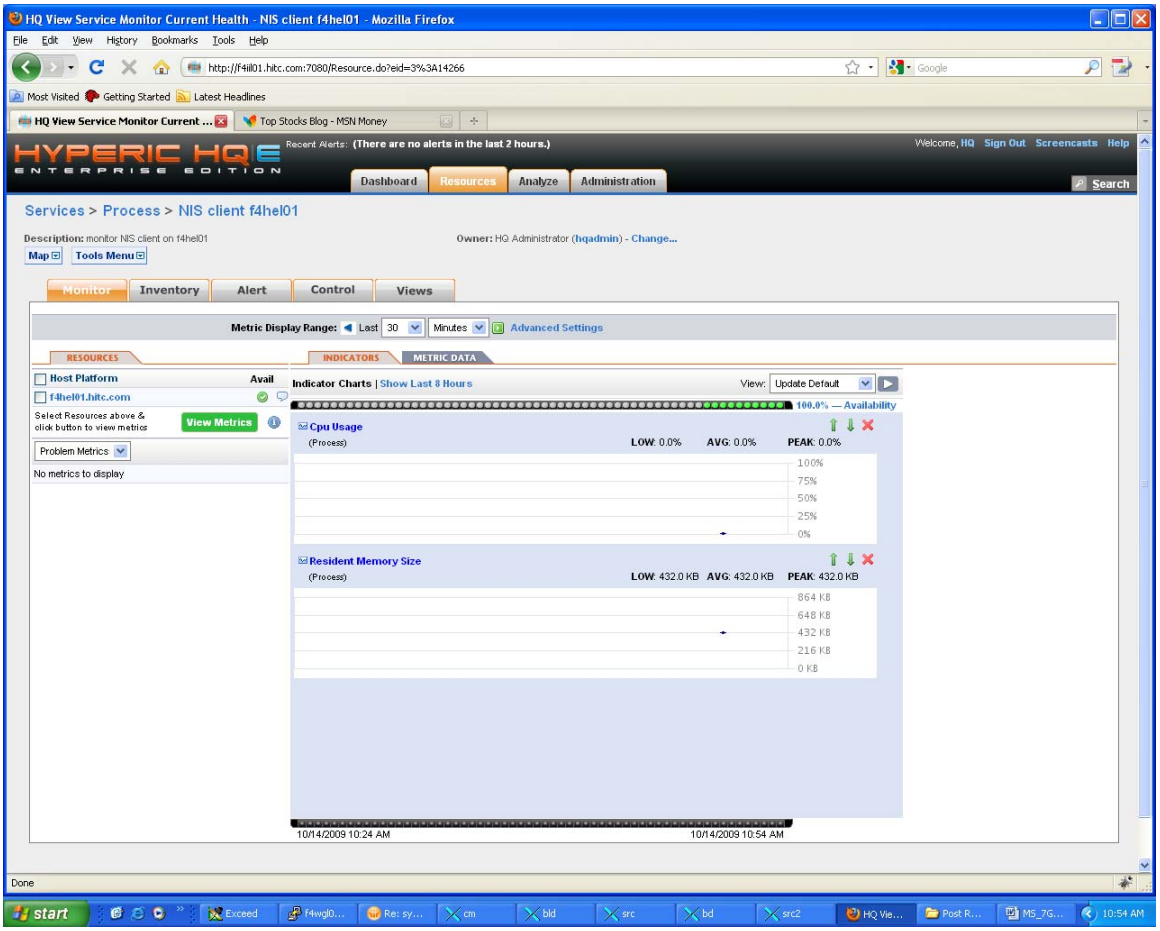


Figure 4.2.2.3.9-6. NIS client Configured Monitor Page

The NIS server can be monitored in a similar fashion:

1. Choose the host platform that NIS server resides on, e.g. X4nsl01
2. Drill down to the platform using the Resources->Browse on the Hyperic GUI. The screen should look like the following.

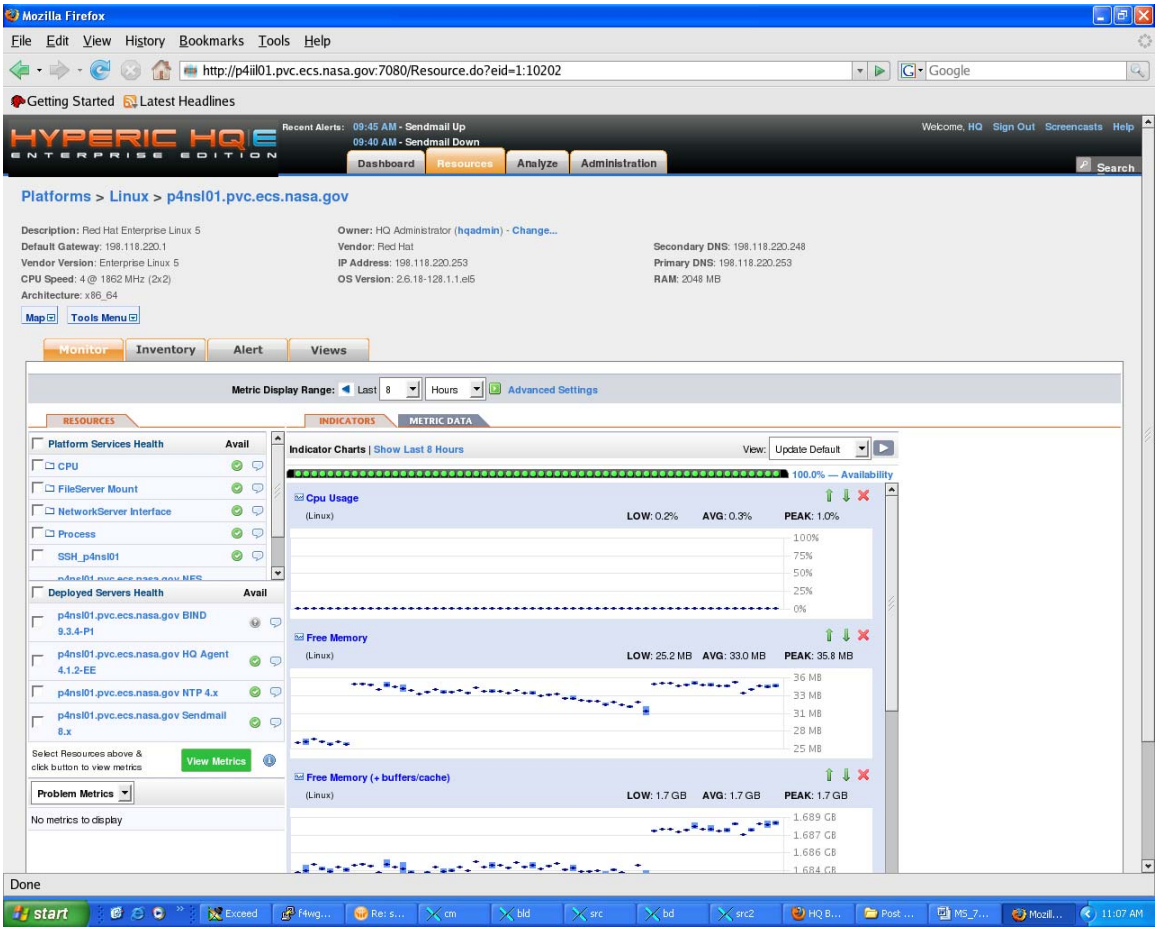


Figure 4.2.2.3.9-7. Host Resource Page

3. From this screen choose from the Tools Menu (upper left) the New Platform Service link.
4. The following screen appears. Fill in the following fields

   name: the name of the service ex "NIS server x4nsl01"

   description: the description of the service

   (ex. "Monitor NIS server on x4nsl01")

   service type: choose Process from the drop down menu

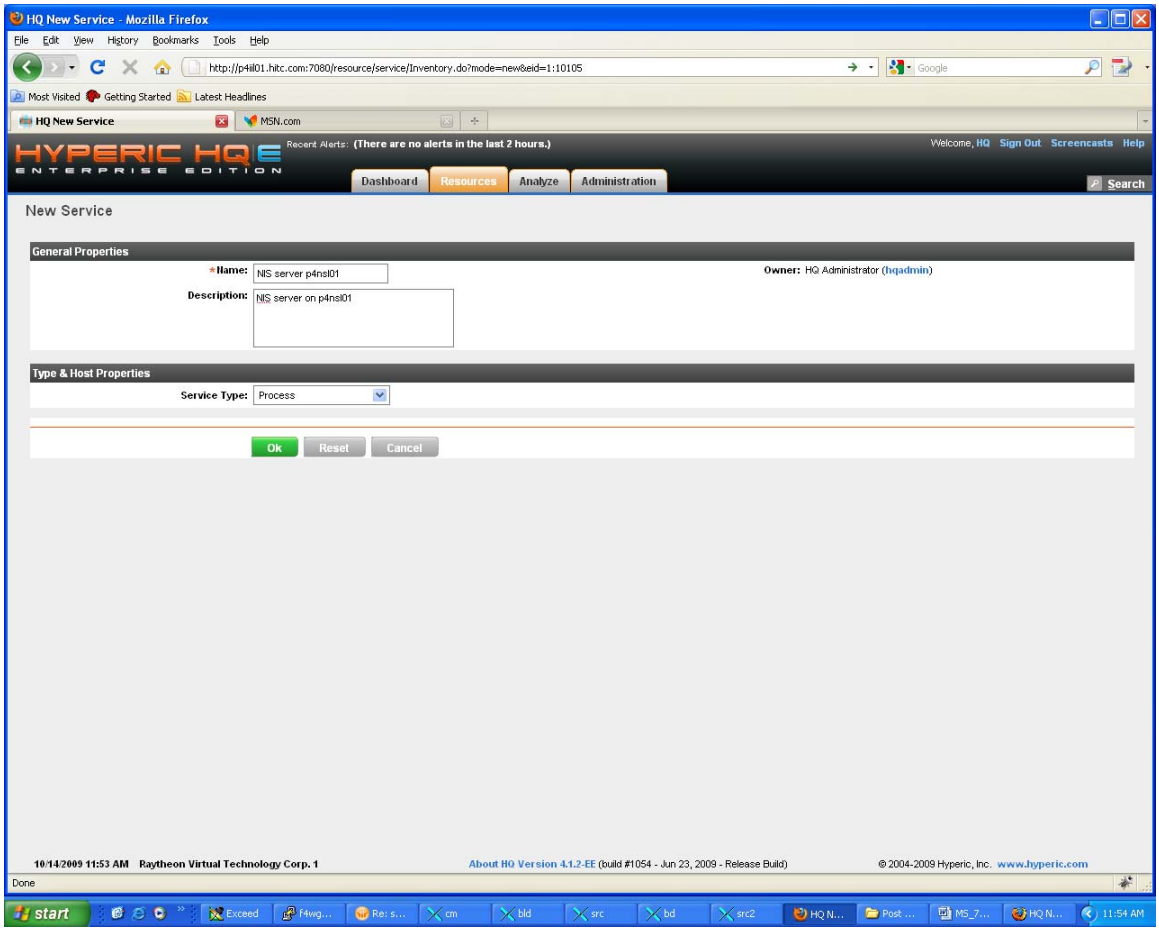


Figure 4.2.2.3.9-8. Configure NIS Server

5. Click “OK” button
6. The next screen allows for the configuration of the Process service. In the following screen, hit the EDIT button in the Configuration Parameters panel.

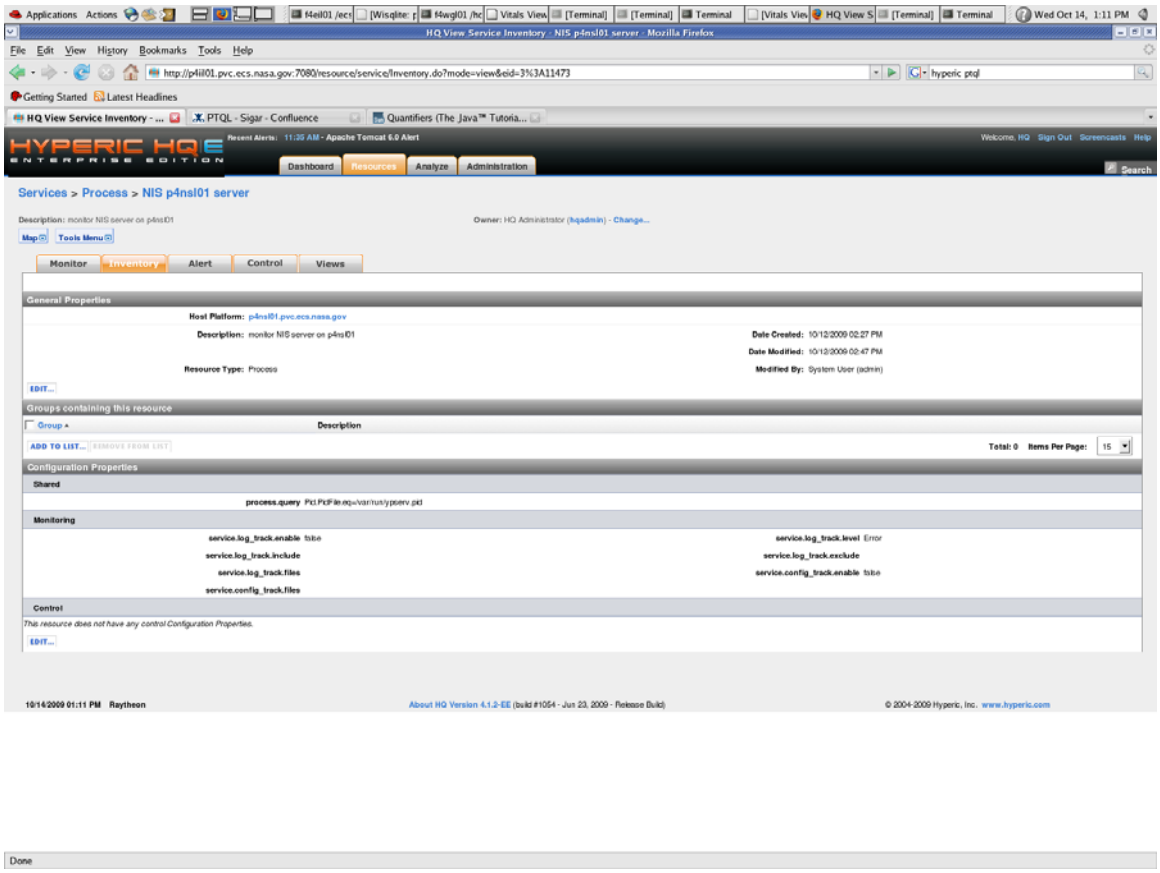


Figure 4.2.2.3.9-9. NIS Server Inventory Page

7. The next screen allows the user to define how to "find" the process. Hyperic uses what it refers to as PTQL(Process Table Query Language) to identify a process. To find the NIS server process enter the following:

   process.query: Pid.PidFile.eq=/var/run/ypserv.pid

   The Pid.PidFile.eq=/var/run/ypserv.pid tells Hyperic that it can find the pid associated with the NIS client process within the file /var/run/ypserv.pid

   For detailed information about PTQL visit the Hyperic site http://support.hyperic.com/display/SIGAR/PTQL

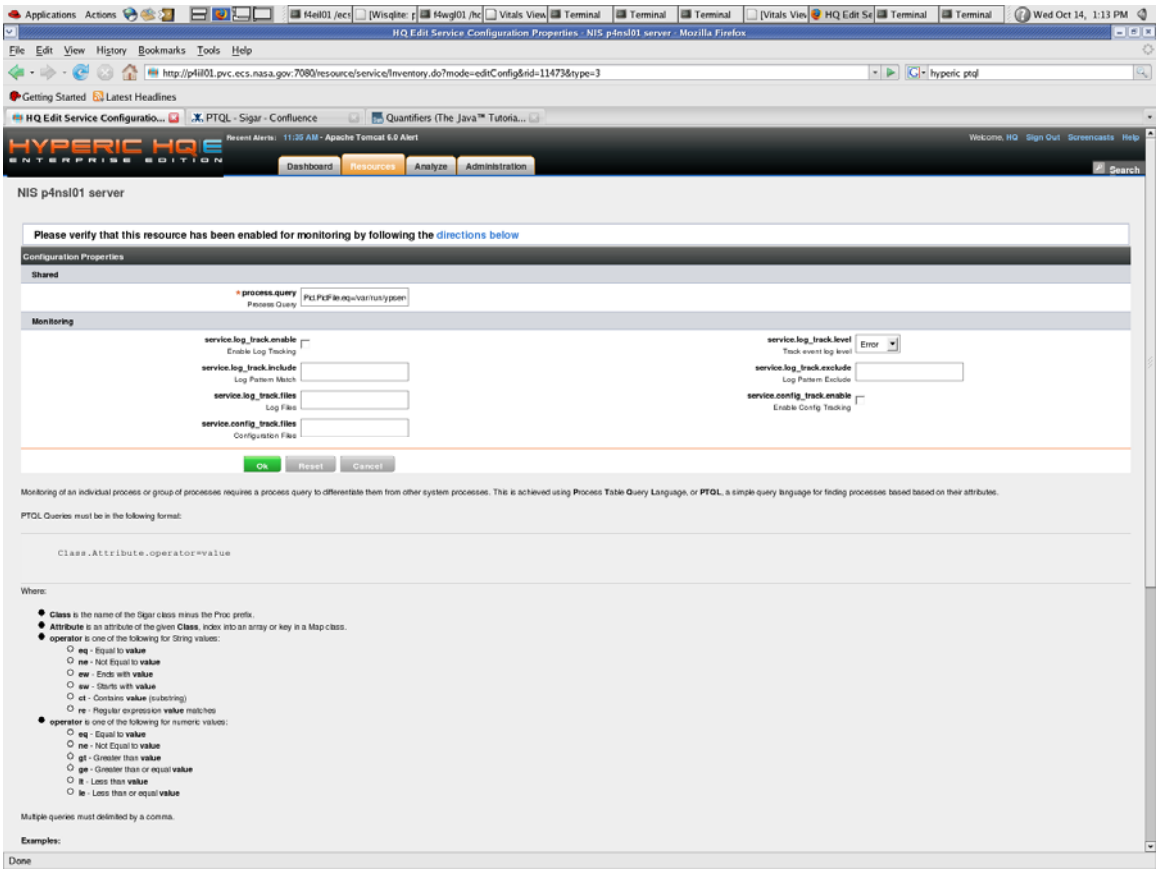


Figure 4.2.2.3.9-10. NIS Server Configuration Page

8. Click “OK” button
9. After a few minutes, the NIS server x4nsl01 service monitor page should appear similar to the following:

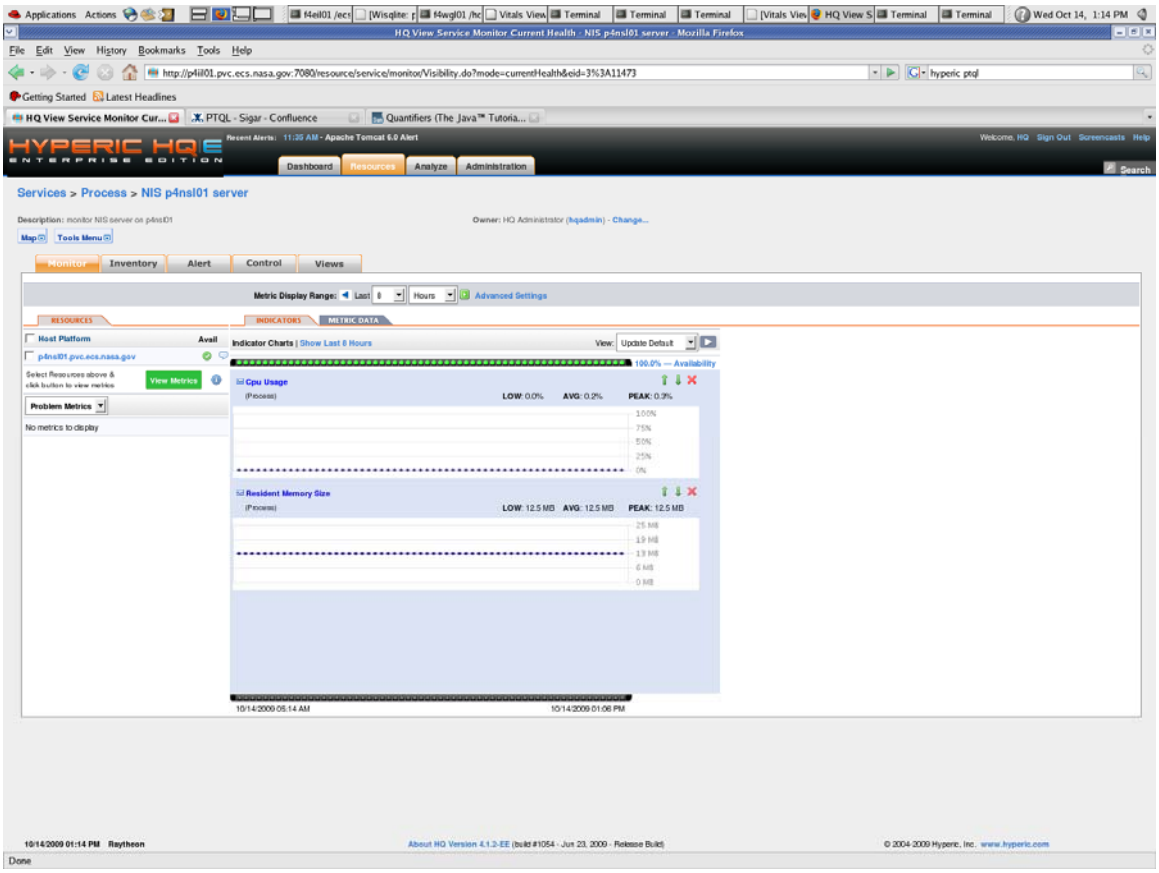


Figure 4.2.2.3.9-11. NIS Server Configured Monitor Page

4.2.2.3.10 Configuring HTTP

Hyperic provides an http service to monitor webpage. The service will submit an http request to the specified site, parse the http response, and update the status of the webpage in Hyperic. Both http and https can be monitored using this service. Follow the following steps to configure Hyperic to monitor a webpage:

1. Select the platform you want to add the http service resource.

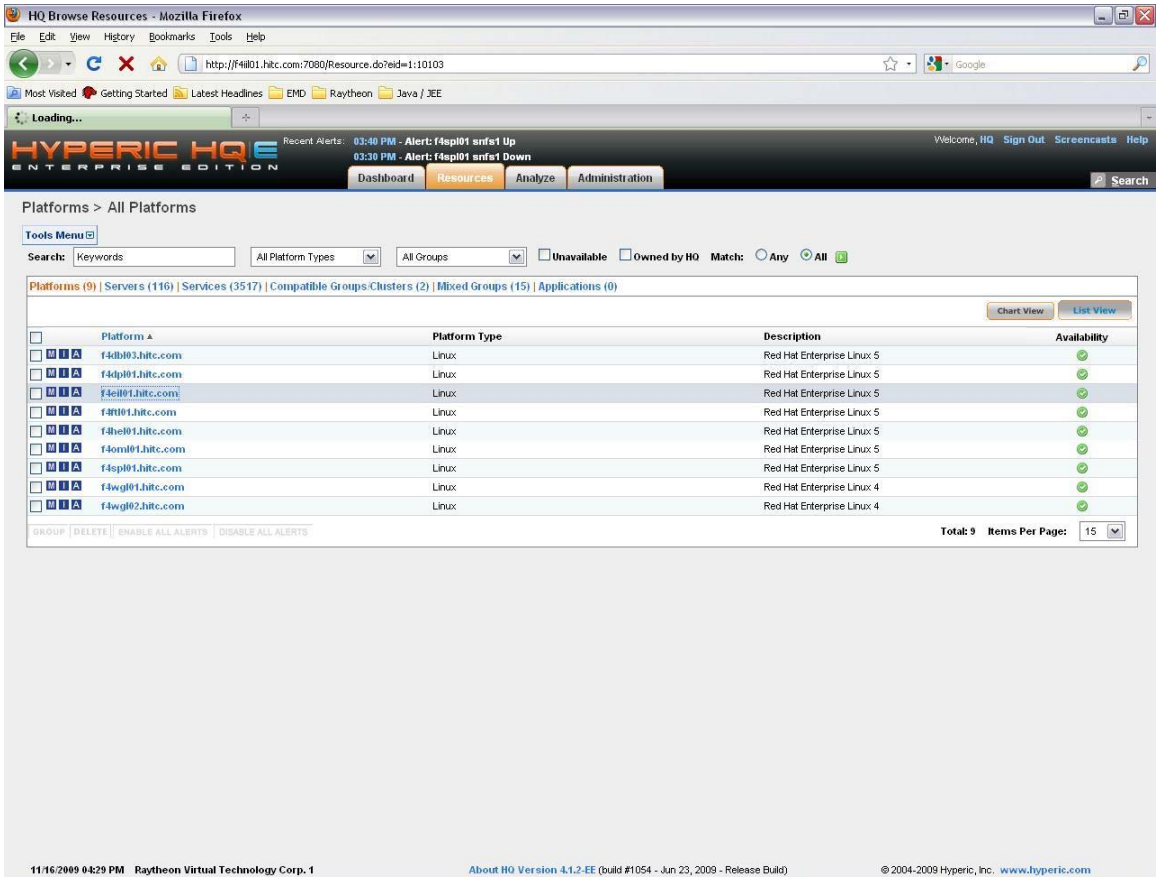


Figure 4.2.2.3.10-1. Configure HTTP Pick Platform

2. Select the “Add New Service” from the drop down list.

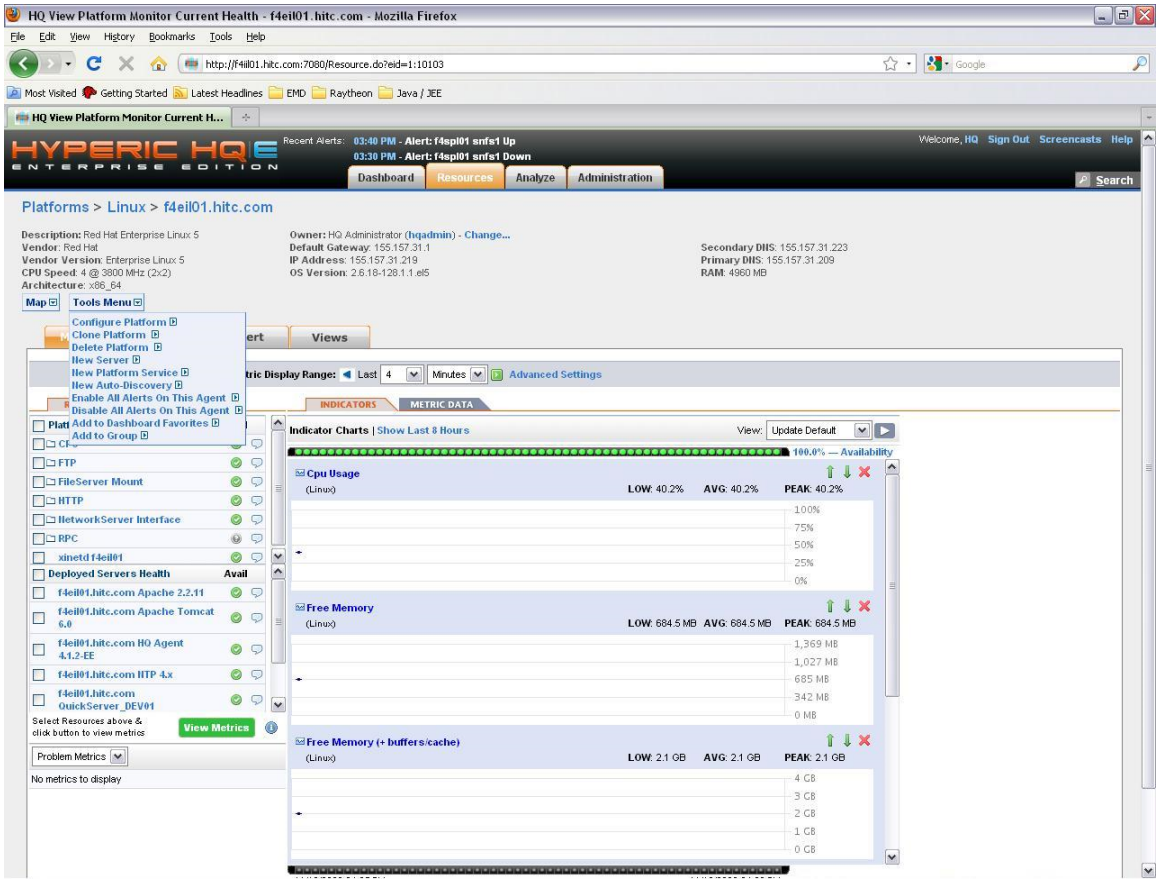


Figure 4.2.2.3.10-2. Configure HTTP Add New Service

3. Fill in the requested properties information.

   Name – The name of the http service.

   Description – A description of the http service.

   Service Type – Select the 'HTTP' from the drop down list.

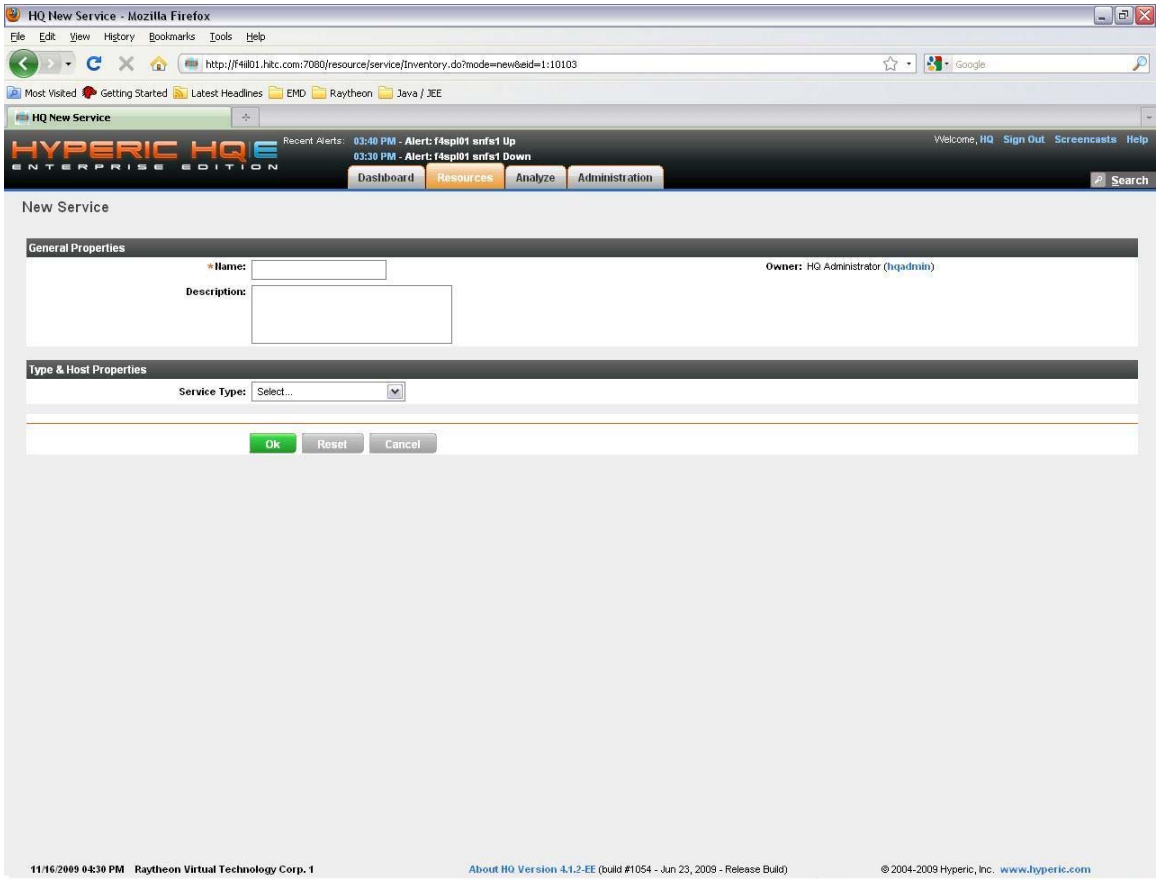


Figure 4.2.2.3.10-3. Configure HTTP General Properties

4. Next, we need to configure the service to monitor a specific webpage. Select the 'Configuration Properties' link.

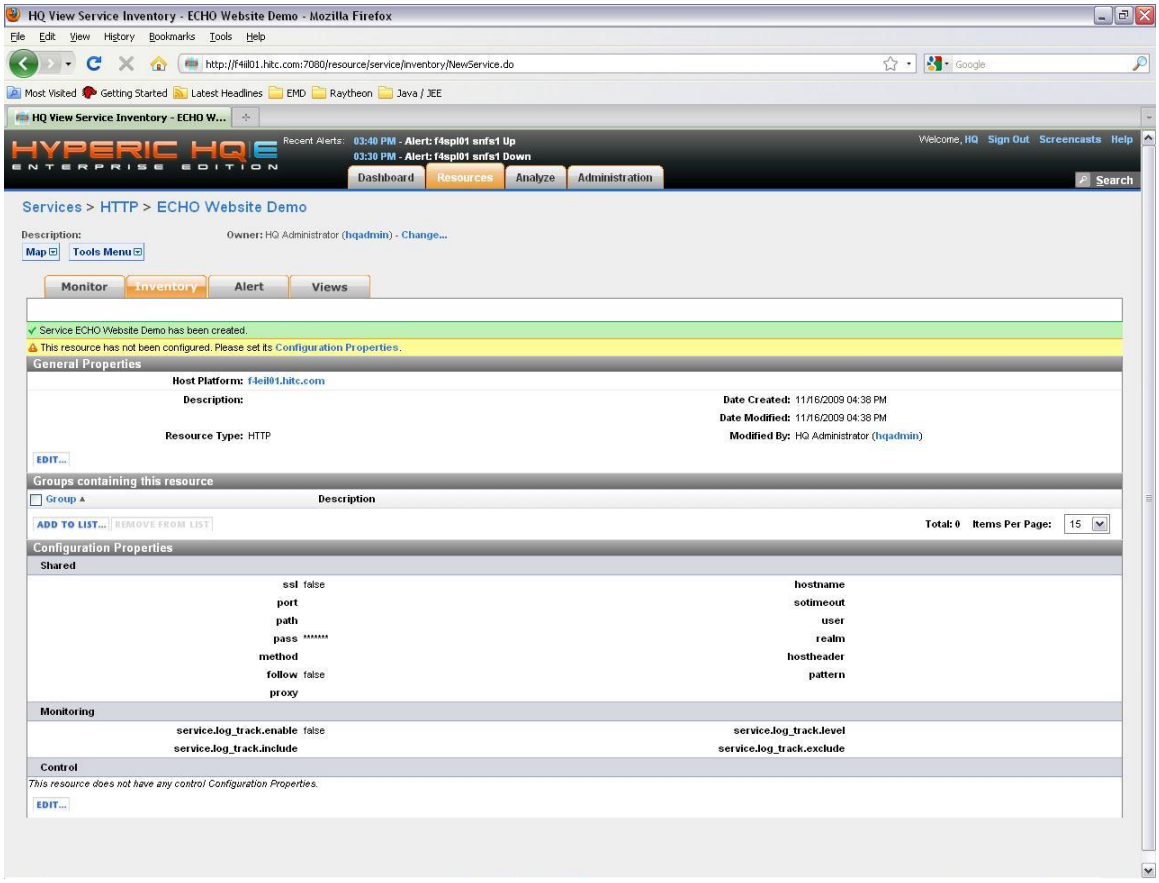


Figure 4.2.2.3.10-4. Configure HTTP Configuration Properties Link

5. Fill in the configuration properties and click the 'OK' button.

   ssl (optional) – Check this box if the site communicates via https.

   hostname (required) – The hostname to the webpage. http://<hostname>:<port>/<path>

   port (required) – The port the http service communicates with. Usually http uses port 80 and https uses 443, but check with the web administrator for the correct port.

   sotimeout (required) – The about of time to wait before timing out the http request.

   path (required) – The path of the webpage. http://<hostname>:<port>/<path>

   user (optional) – Supply the username if one is required.

   pass (optional) – Supply the password if one is required.

   realm (optional) – Supply the realm if one is required.

method (required) – Select an http request type to submit from the drop down list (HEAD, GET, POST, etc.).

hostheader (optional) – Supply the hostheader if one is required.

follow (optional) – Check this box if the hostname and path supplied above will redirect you to another page.

pattern (optional) – A pattern or regex that matches the responses from the webpage.

proxy (optional) – Supply the proxy URL **(with the port number appended to the end of it)** if one is required to access the webpage. See example below.

Example: 192.121.253.1:80

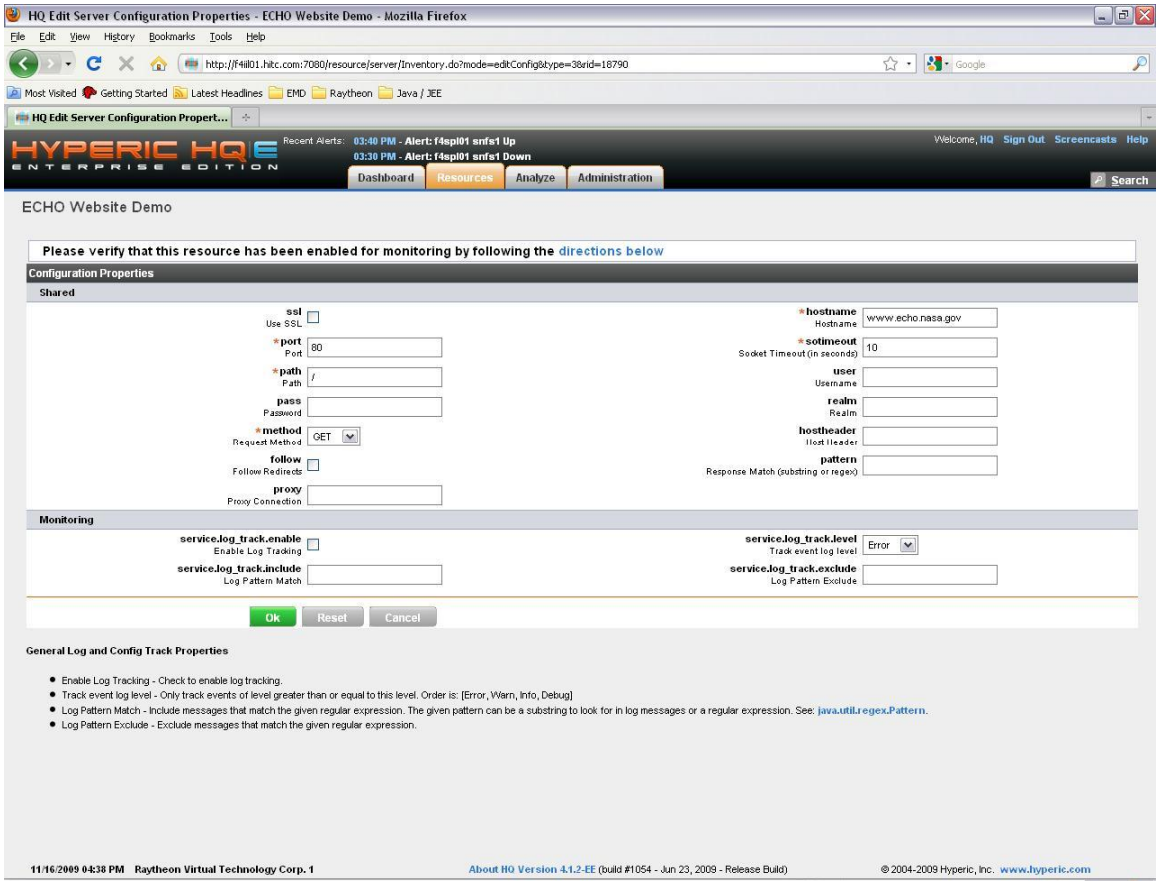


Figure 4.2.2.3.10-5. Configure HTTP Configuration Properties

6. At this point, the http service is configured and the operator can select the 'Inventory' to monitor the webpage. The operator can also go to the 'Inventory' tab, select the 'metrics' tab', and configure the monitoring interval for the metrics gathered by the http service.

4.2.2.3.11 Configuring FTP

Hyperic provides an ftp service to monitor an ftp site. The service will attempt to login into the site. Being able to login, Hyperic will mark the resource (ftp site) as being up. Follow the steps below to configure Hyperic to monitor an ftp site:

1. Select the platform you want to add the ftp service resource.

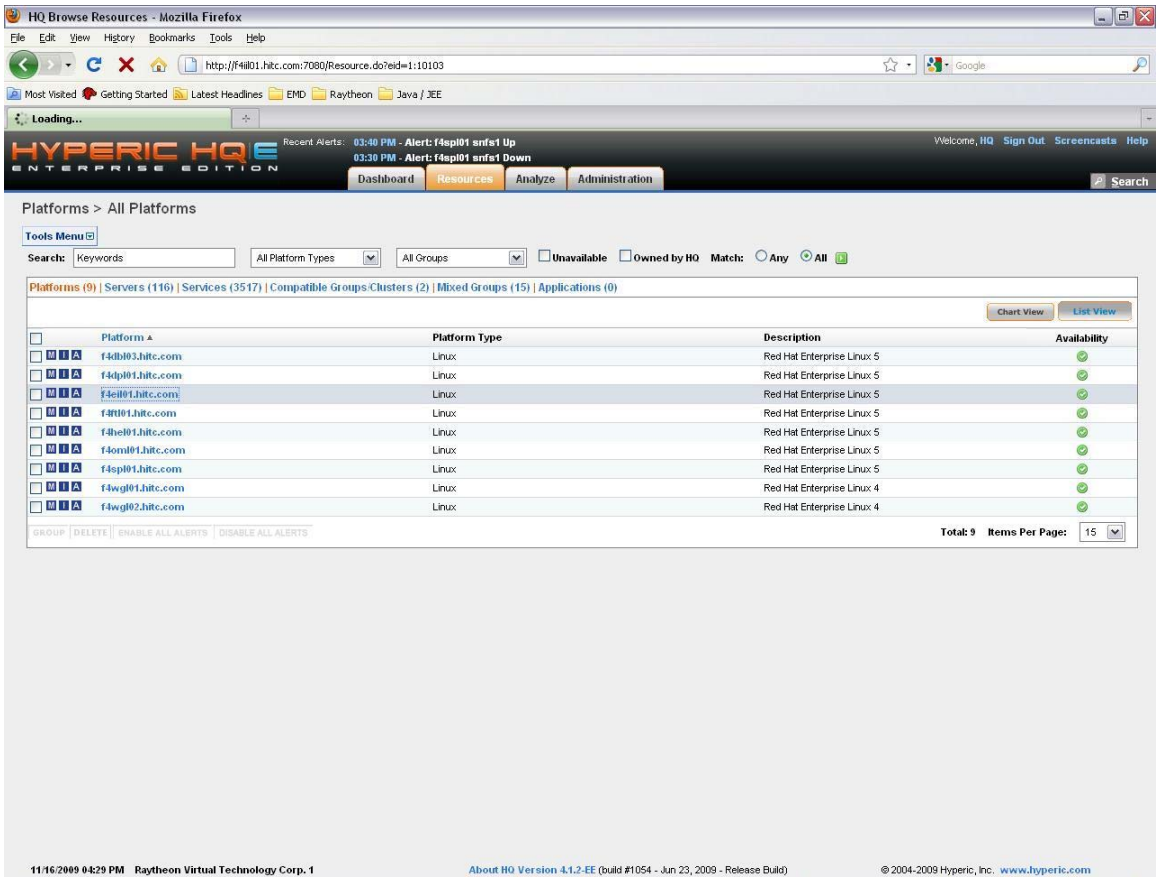


Figure 4.2.2.3.11-1. Configure FTP Pick Platform

2. Select the “Add New Service” from the drop down list.

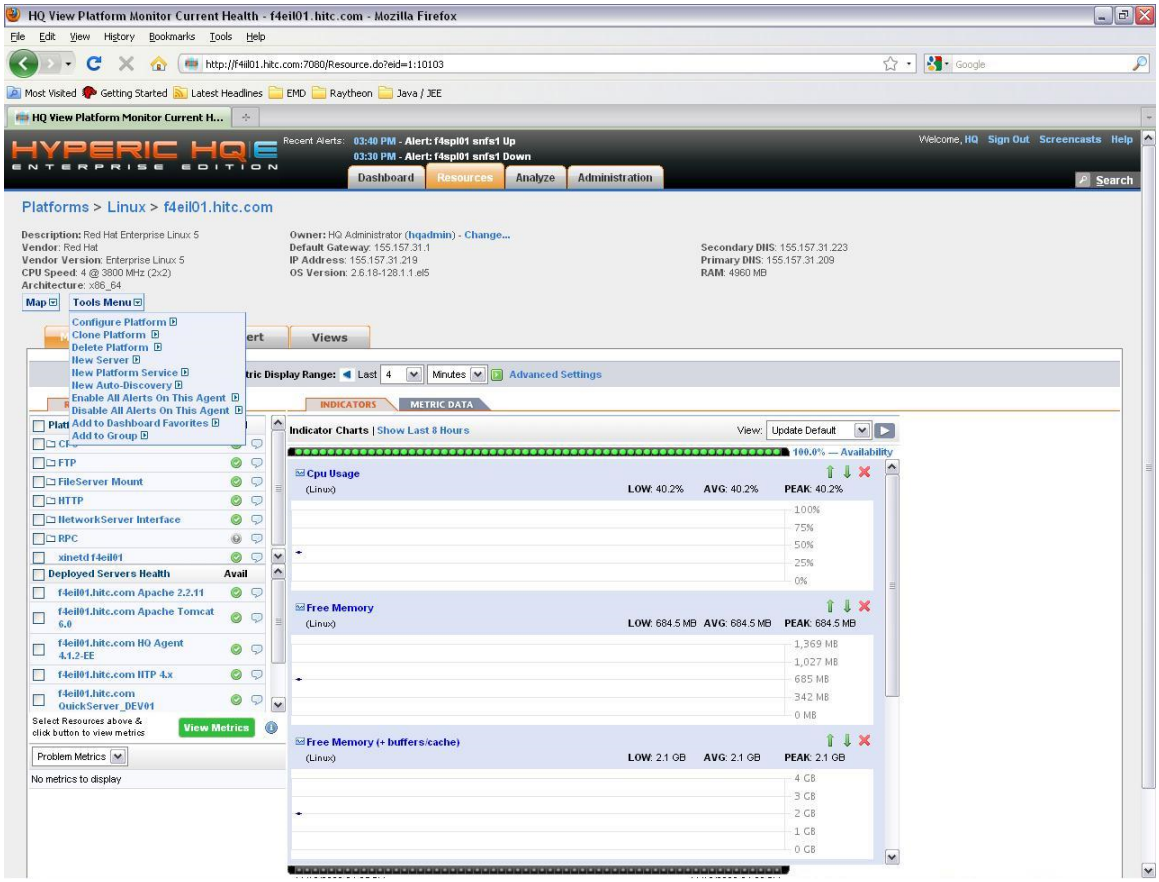


Figure 4.2.2.3.11-2. Configure FTP Add New Service

3. Fill in the requested properties information.

   Name – The name of the ftp service.

   Description – A description of the ftp service.

   Service Type – Select the 'FTP' from the drop down list.

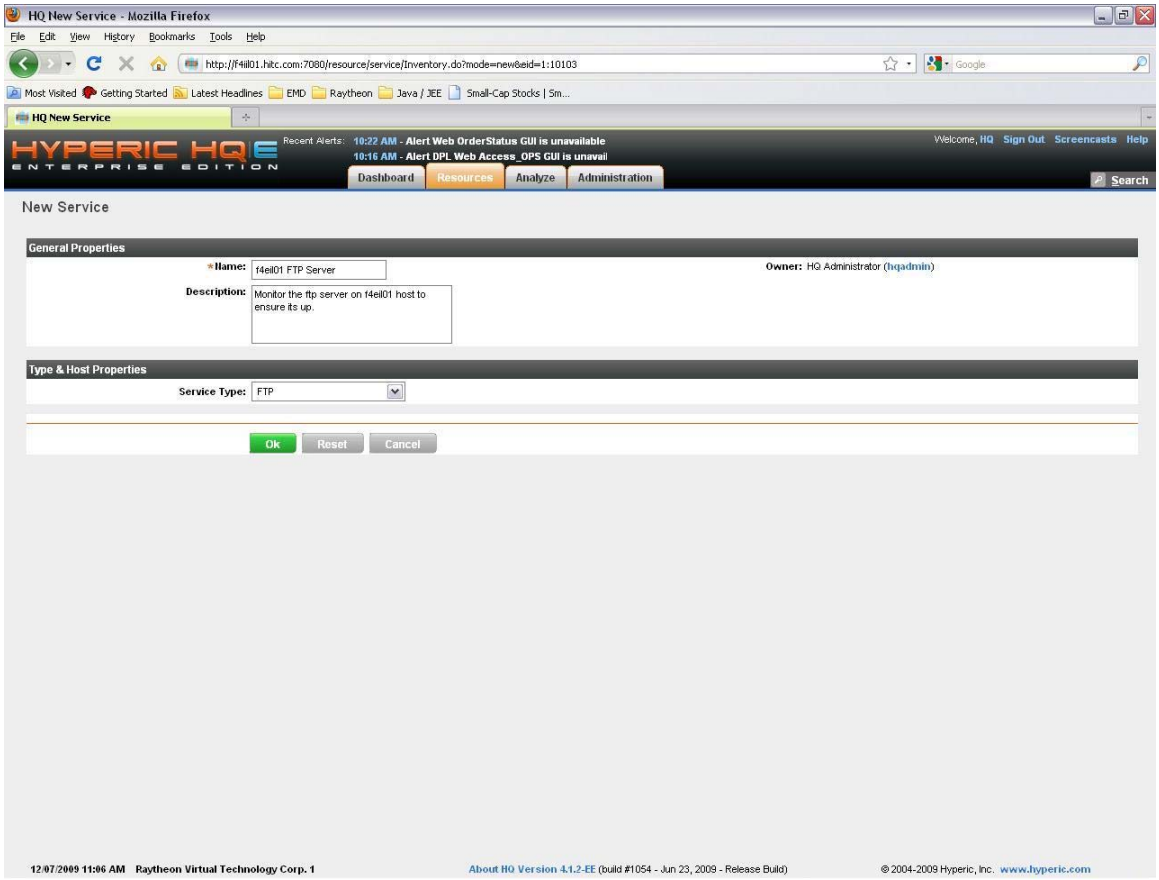


Figure 4.2.2.3.11-3. Configure FTP General Properties

4. Next, we need to configure the service to monitor a specific ftp site. Select the 'Configuration Properties' link.

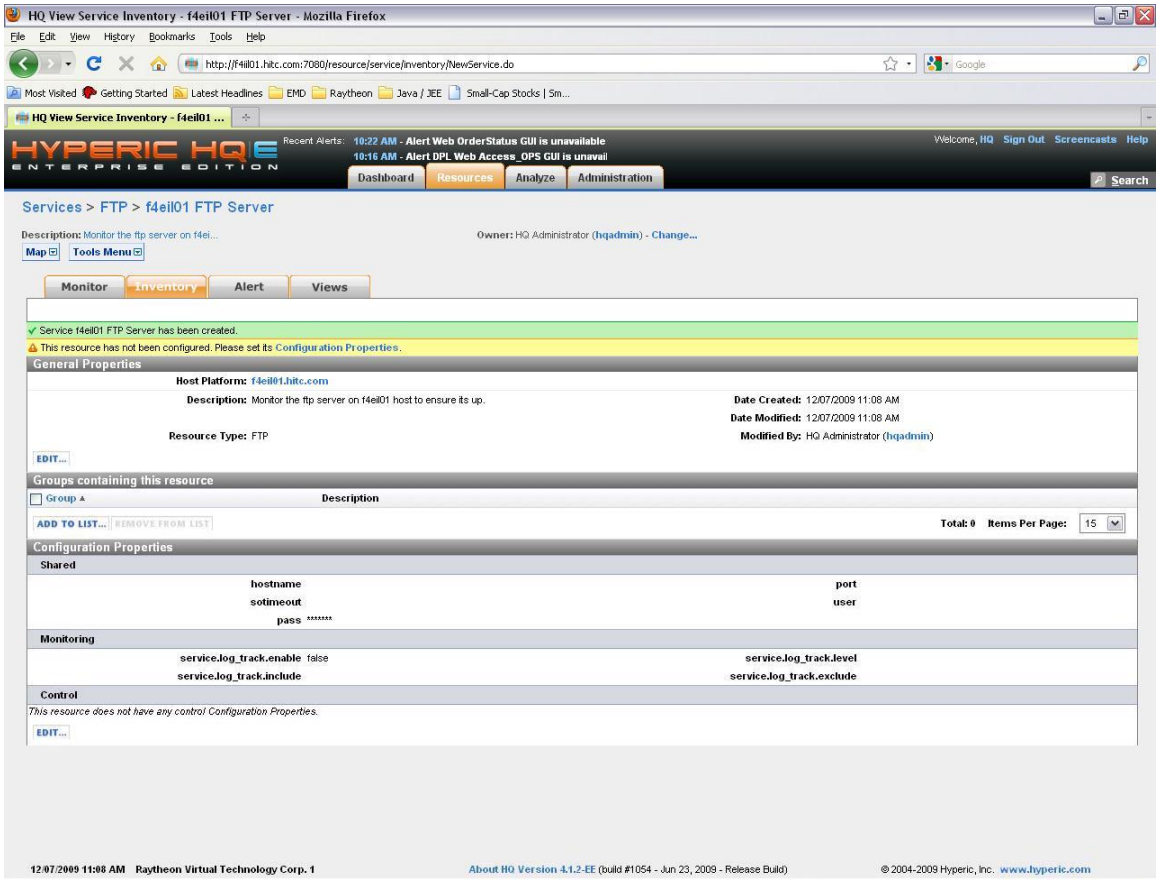


Figure 4.2.2.3.11-4. Configure FTP Configuration Properties Link

5. Fill in the configuration properties and click the 'OK' button.

   hostname (**required**) – The hostname to the ftp site.

   port (**required**) – The port the ftp site listen on. The default port is 21.

   sotimeout (**required**) – The about of time to wait before timing out the ftp login attempt.

   user (**optional**) – Supply the username if one is required.

   pass (**optional**) – Supply the password if one is required.

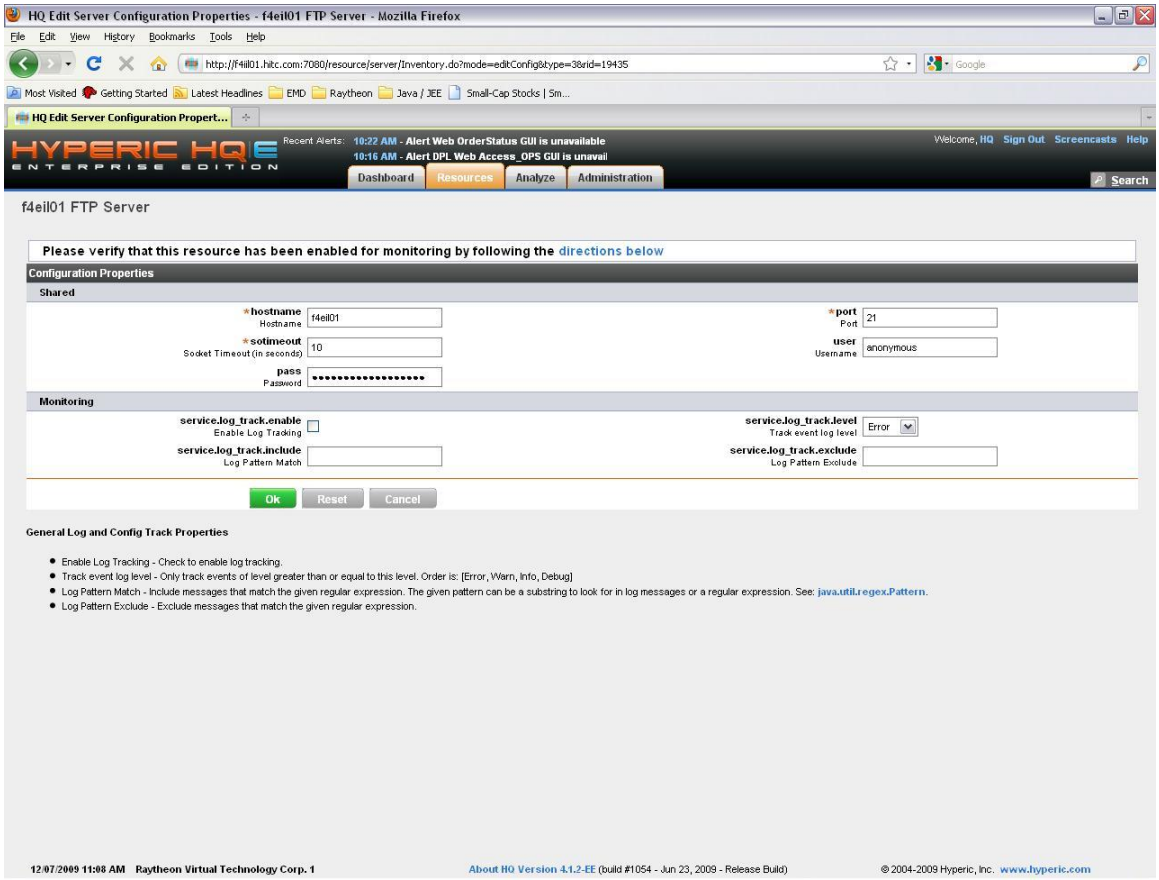


Figure 4.2.2.3.11-5. Configure FTP Configuration Properties

6. At this point, the ftp service is configured and the operator can select the 'Inventory' to monitor the webpage. The operator can also go to the 'Inventory' tab, select the 'metrics' tab', and configure the monitoring interval for the metrics gathered by the ftp service.

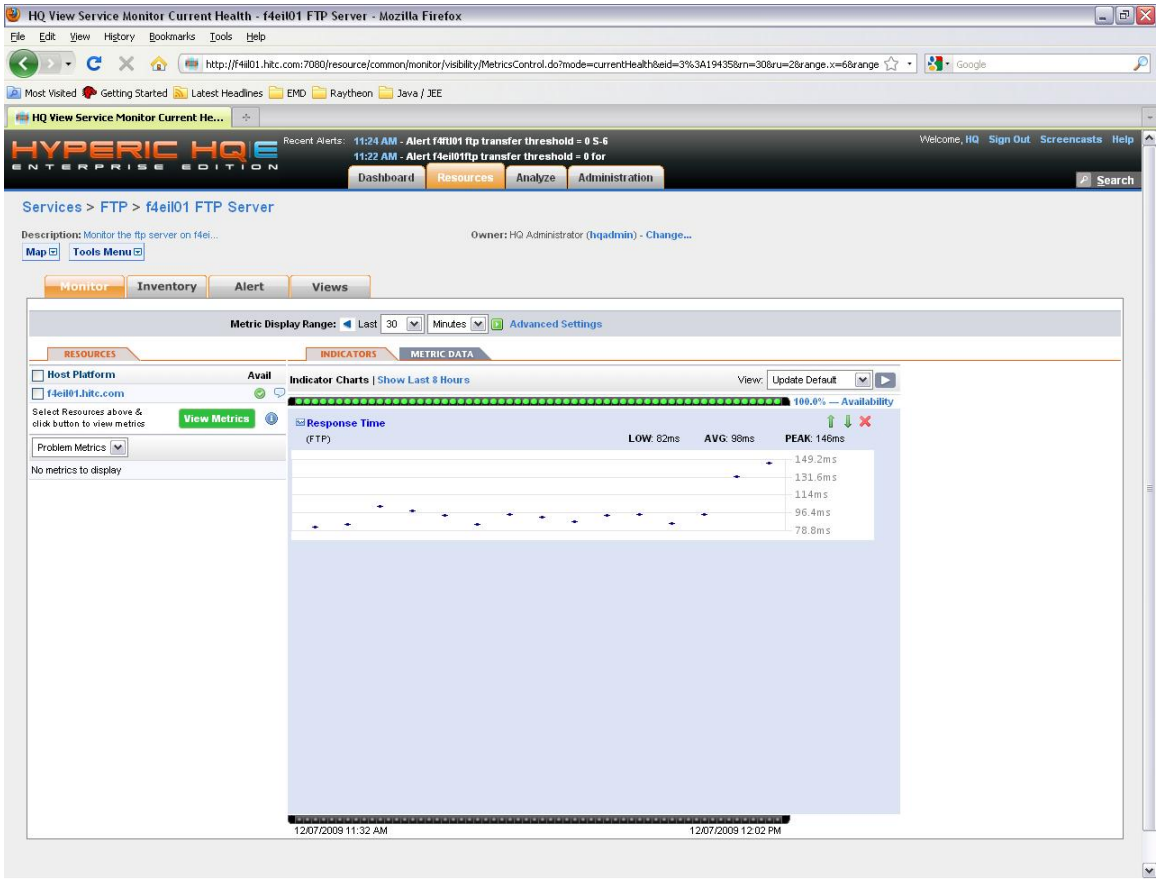


Figure 4.2.2.3.11-6. FTP Monitoring

4.2.2.3.12 Configuring InetAddress Ping

Hyperic provides an InetAddress Ping service to monitor a host to determine if it's up or down. This is useful for situation where an Hyperic agent can not be installed on the host, but knowing if the host is up or down is critical to operations. Follow the steps below to configure Hyperic to monitor a host:

1. Select the platform you want to add the InetAddress Ping service resource. The agent on this platform will initiate the ping to the destination host.

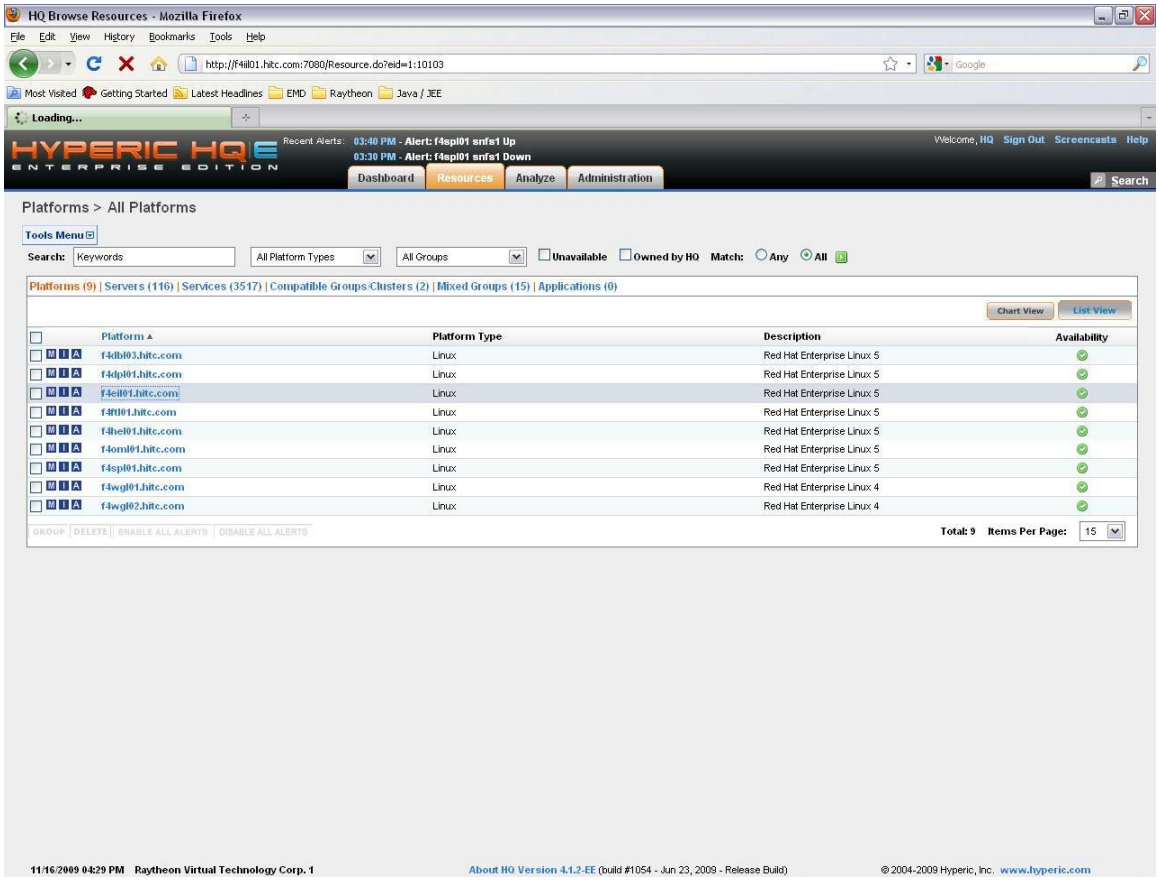


Figure 4.2.2.3.12-1. Configure InetAddress Ping Pick Platform

2. Select the “Add New Service” from the drop down list.

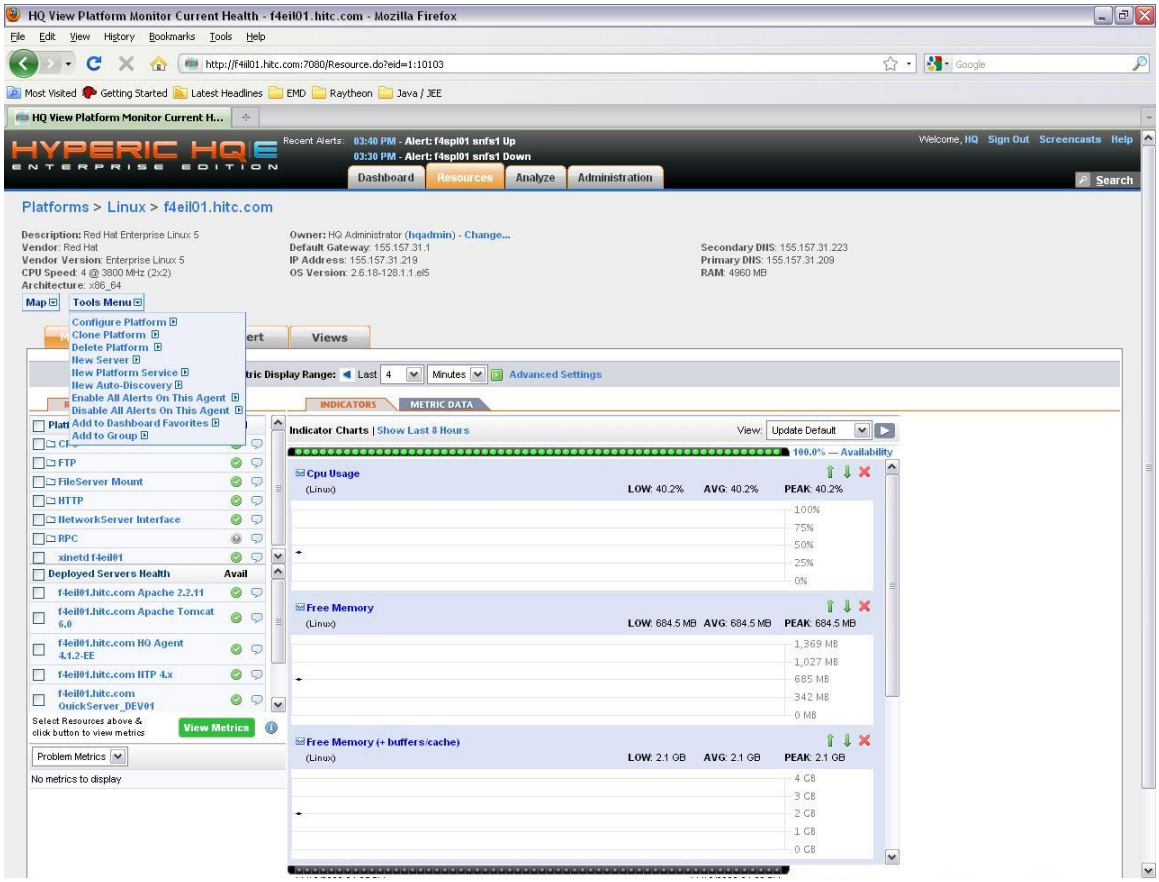


Figure 4.2.2.3.12-2. Configure InetAddress Ping Add New Service

3. Fill in the requested properties information.

   Name – The name of the InetAddress Ping service.

   Description – A description of the InetAddress Ping service.

   Service Type – Select the 'InetAddress Ping' from the drop down list.

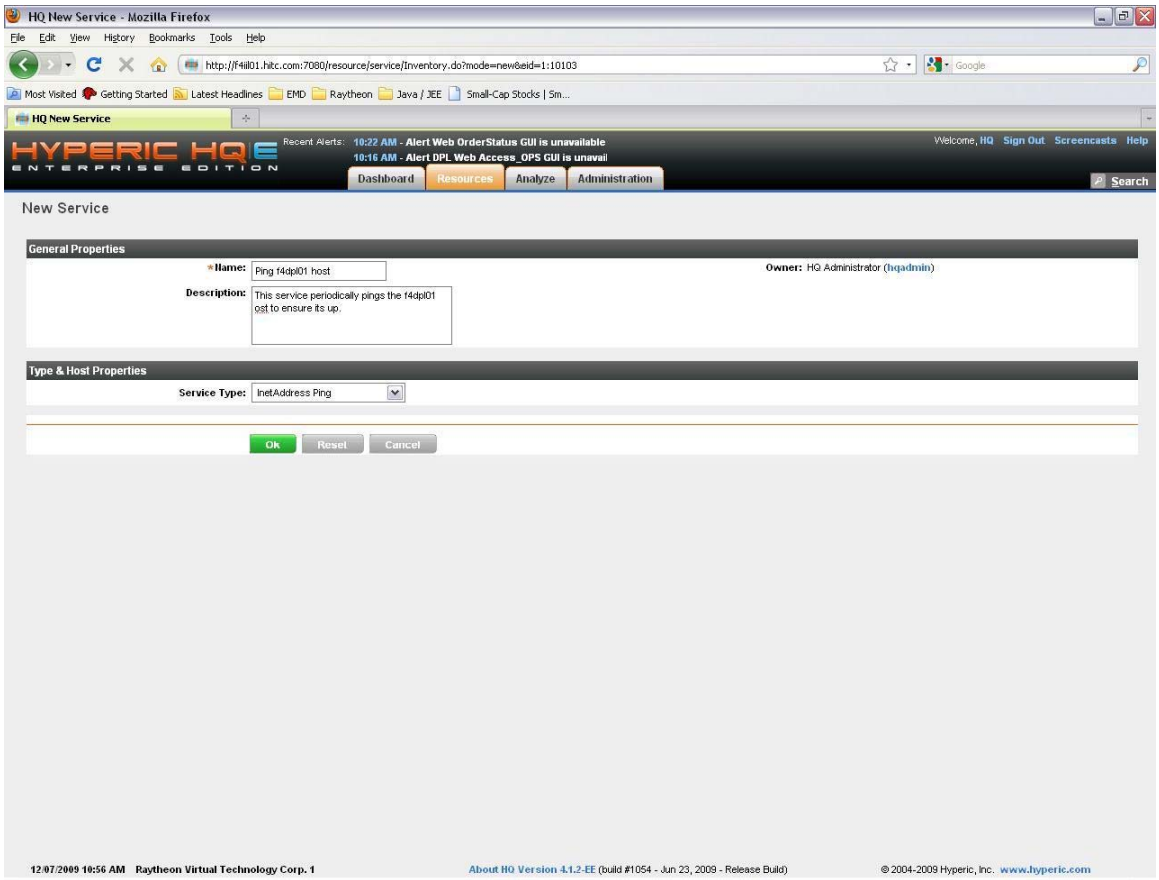


Figure 4.2.2.3.12-3. Configure InetAddress Ping General Properties

4. Next, we need to configure the service to monitor a specific host. Select the 'Configuration Properties' link.

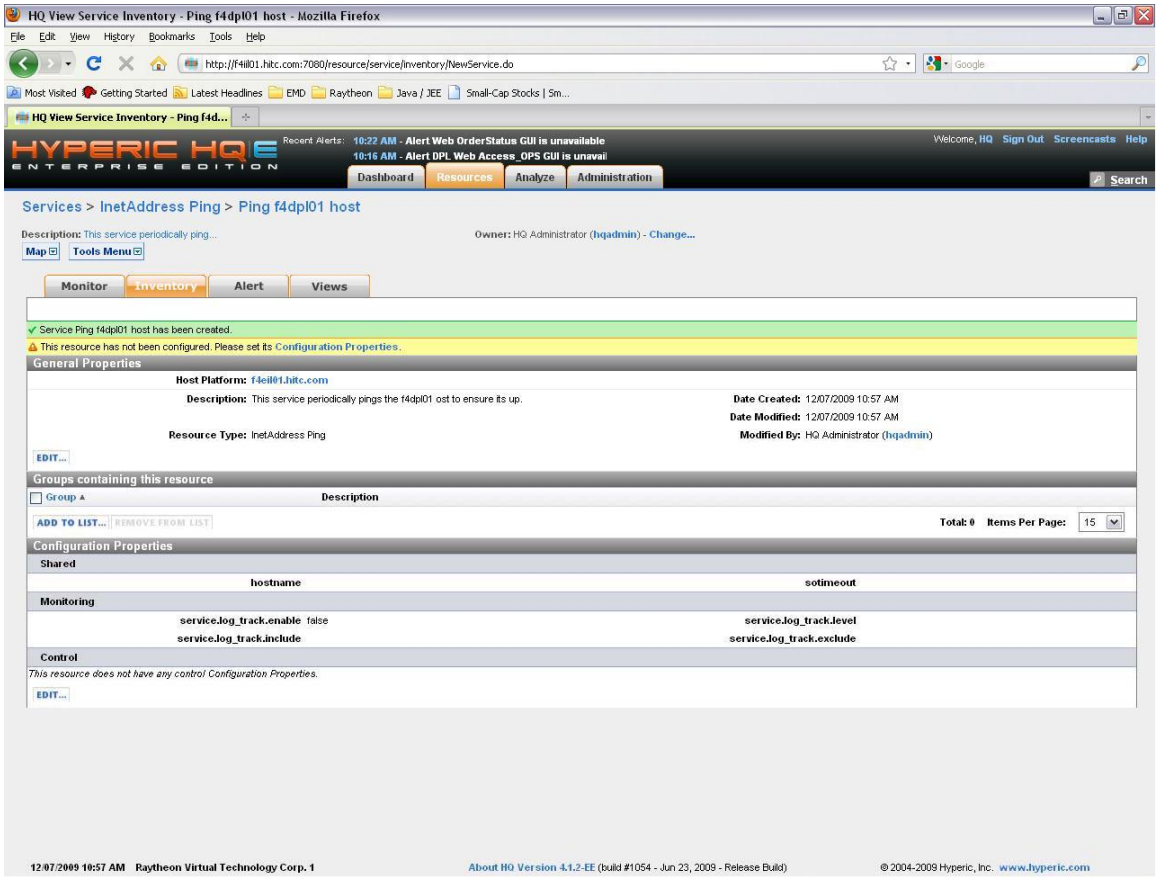


Figure 4.2.2.3.12-4. Configure InetAddress Ping Configuration Properties Link

5. Fill in the configuration properties and click the 'OK' button.

   hostname (**required**) – The hostname to monitor.

   sotimeout (**required**) – The about of time to wait before timing out the ping.

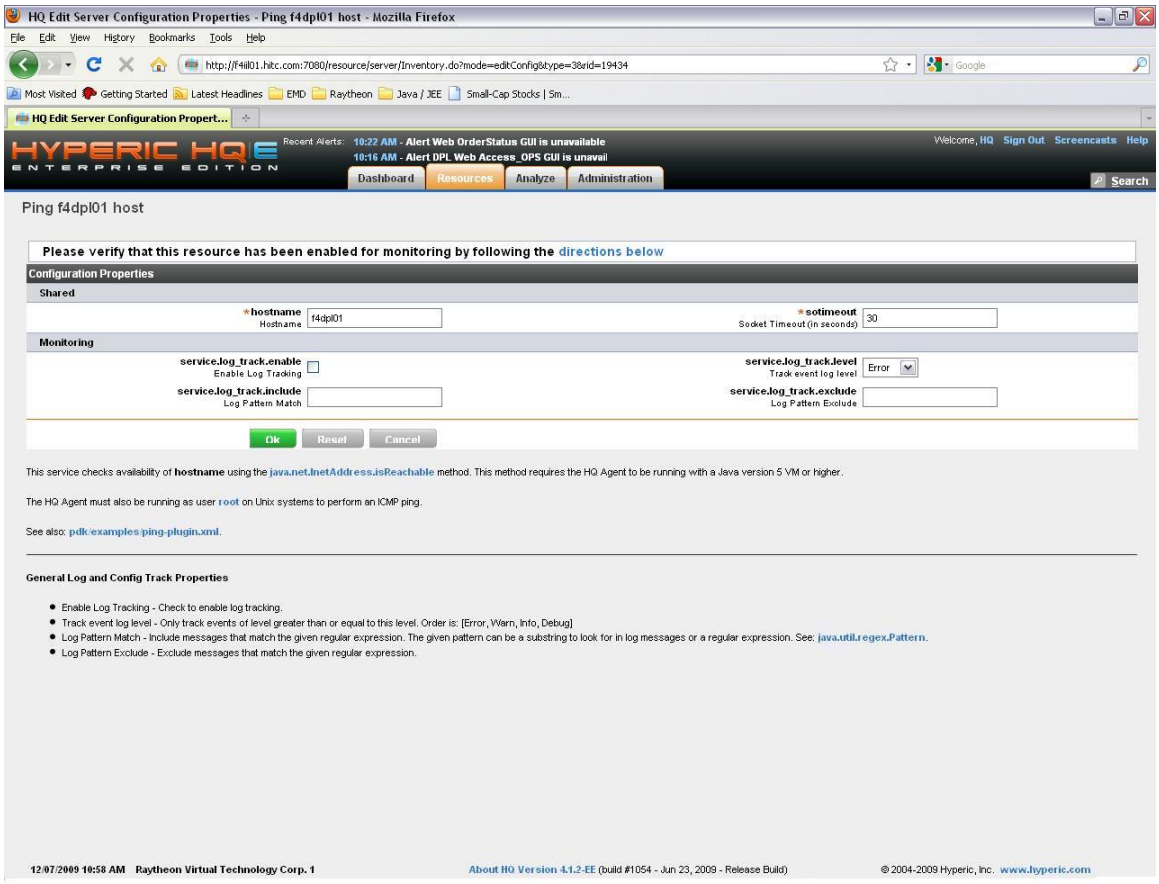


Figure 4.2.2.3.12-5. Configure InetAddress Ping Configuration Properties

6. At this point, the InetAddress Ping service is configured and the operator can select the 'Inventory' to monitor the webpage. The operator can also go to the 'Inventory' tab, select the 'metrics' tab', and configure the monitoring interval for the metrics gathered by the InetAddress Ping service.

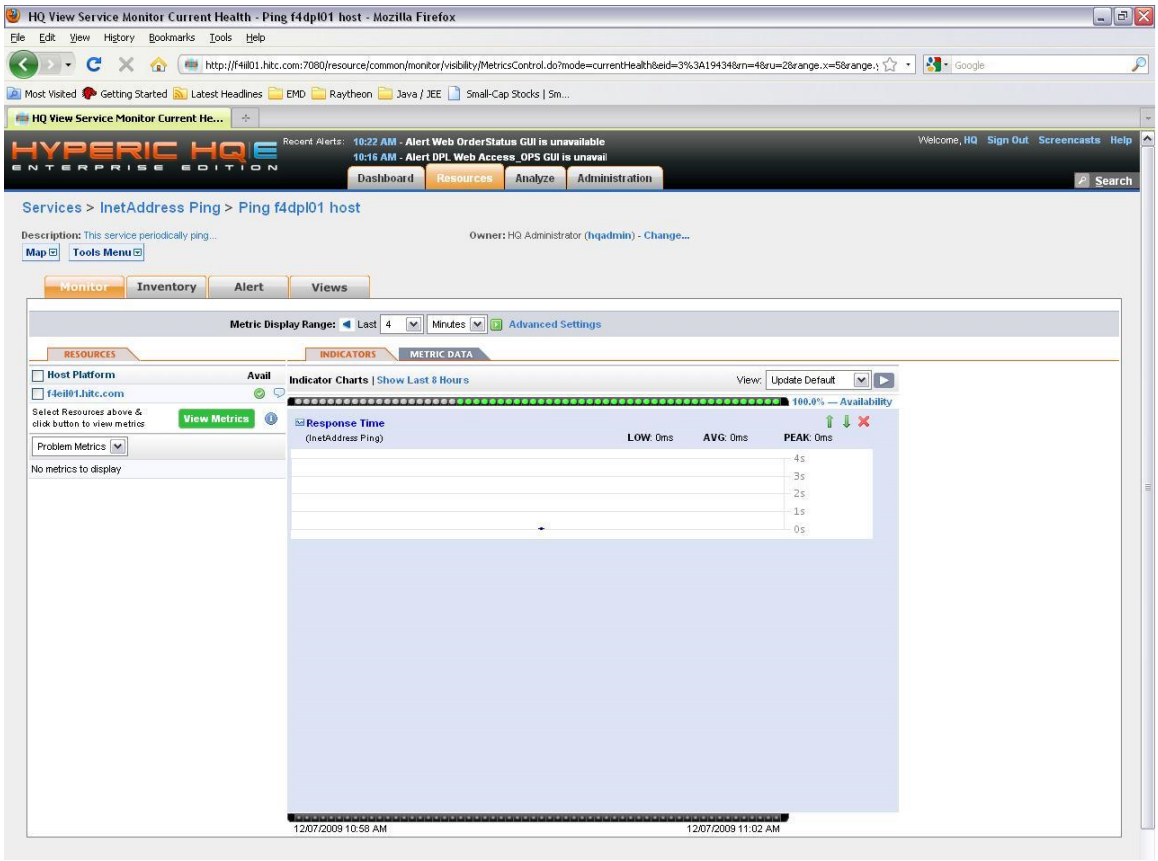


Figure 4.2.2.3.12-6. InetAddress Ping Monitoring

4.2.2.4 Business Processes and Configuration

4.2.2.4.1 Business Processes

4.2.2.4.1.1 Overview

Business Processes are a way of organizing resources to quickly recognize problems and to assess the operational impact of individual component failures. A custom Hyperic HQ User Interface plugin will be developed to extend the standard COTS GUI to provide the operator with a mechanism to configure and view their business processes.

Business processes can have one of four statuses:

- Active – There is work to do and the work is being completed as expected
- Inactive – All of the components appear to be functional, but there is not any work to complete.
- Degraded – The business process is functioning but not at the required capacity

- Down – The business process is unable to complete any work.

Each business process contains a collection of resources and the resources can have one of three statuses:

- Available – The resource is currently up
- Unavailable – The resource is currently down
- Alert Pending – There is at least one alert pending for the resource

4.2.2.4.1.2 Configuring Business Processes

The Hyperic grouping feature will be used to define a business process. All resources related to a business process will be mapped to a group. The business process group name must follow the naming convention BP_<MODE>_<Business Process Name>. This will allow the custom Hyperic HQ User Interface plugin a way to identify a business process group from one that is not.

The information of resource state and metrics are conveyed to the business process through alerts. For example, if we decided that the status of the DPL Ingest business process should be 'Down' if the EcDlProcessingService resource is unavailable, an alert must be configured to occur when the processing service is down. Then the Ingest business process can be configured to be 'Down' based on the alert.

In order to determine which resource alert has an impact on the overall business process status and to what degree, each business process has an alert definition configuration file named <business_process_name>_AlertDefinitionConfig.xml. The files are located under /usr/ecs/OPS/CUSTOM/cfg directory. This xml file holds the configuration information of the business processes within the mode and the mapping of the relevant alert definition to the status (down, inactive, degraded, active) category of the business process. Not all alerts need to be defined in this configuration file, only those that impact the status of the business process. For alerts that are raised within a business process that are not defined in the configuration file, the priority of the alert is examined and the status of the business process will be defaulted to 'Degraded' if the alert has a priority of 'Medium' or 'High'. This gives the operator the capability to handle newly created alert definitions.

See below for the xml schema diagram of the business process alert definition configuration file.

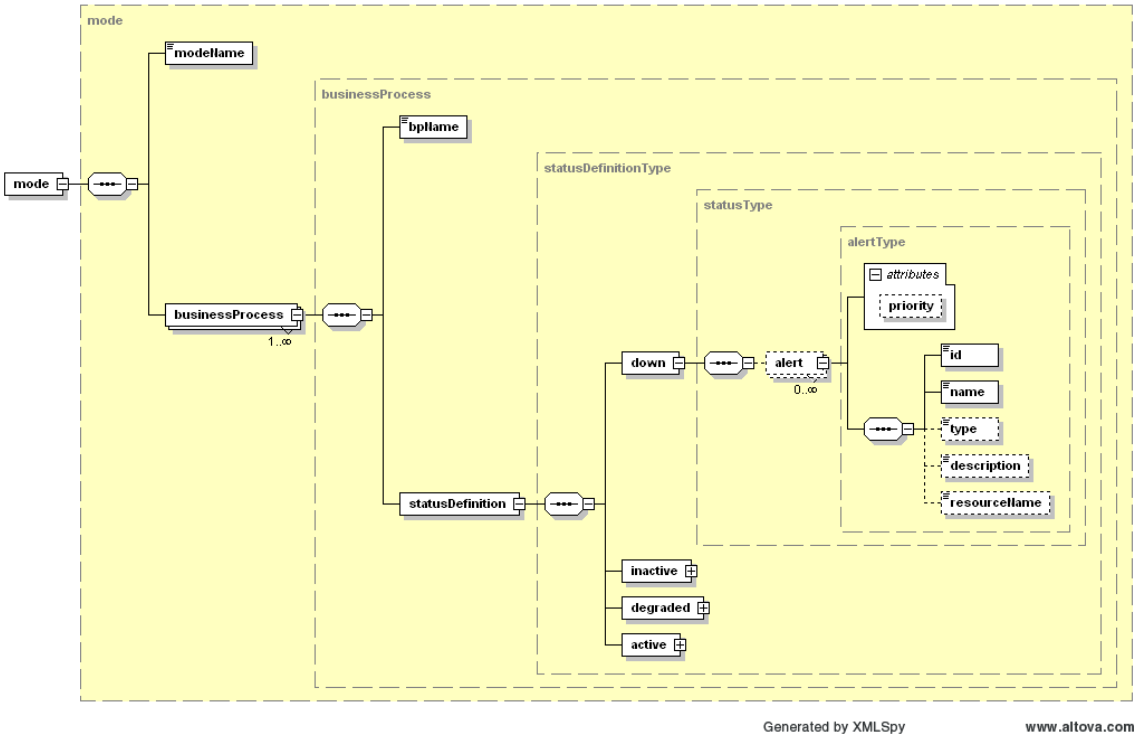


Figure 4.2.2.4.1-1. Alert Definition Schema Diagram

See appendix 2.1 for the schema xml and appendix 2.2 for a sample configuration xml for OPS mode.

Sometime we may want to change the status of a business process when a combination of different alerts on different resources happens at the same time. For example, we may want to mark the Data Access business process as “degraded” when EWOC or DataDataAccess is down; but when both of them are down, we want to mark the Data Access business process as “down”. Since hyperic does not provide the functionality to configure alerts on incompatible groups, we added a custom group alert capability in our Business Process configuration and view pages.

Operator can configure group alert to be any combination of resource alerts and define how the group alert would impact the overall business process status. Each business process could have a group alert definition configuration file. If exists, it is named <business_process_name>_GroupAlertDefinitionConfig.xml. The configuration files are located under /usr/ecs/OPS/CUSTOM/cfg directory. Operator should not manually update the configuration files. All update should be done through the hyperic GUI.

We created a custom HQU Business Process Configuration page to let operators view and configure the existing resource alert and group alert definitions with in the system. See screenshots below:

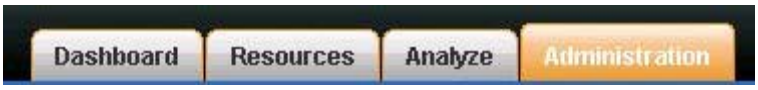


Figure 4.2.2.4.1-2. Hyperic GUI Administration Tab

The Business Process Configuration page will be located under the Administration tab.

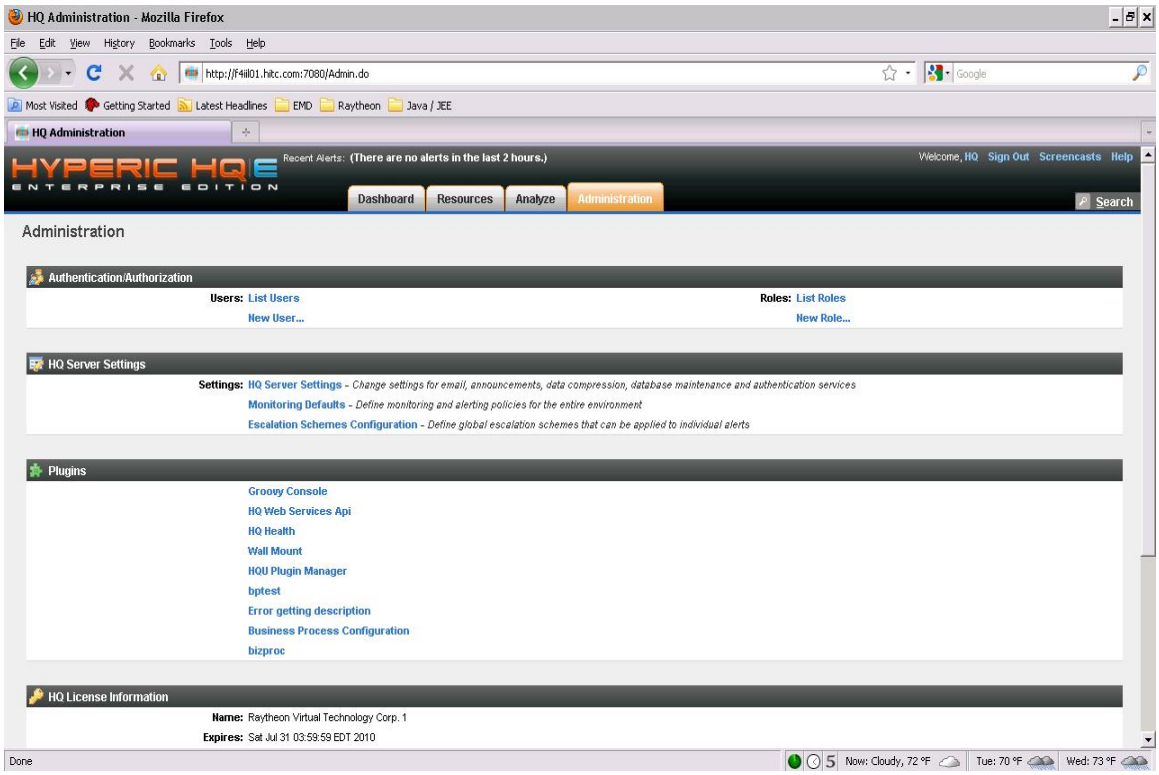


Figure 4.2.2.4.1-3. Hyperic GUI Administration Page

After clicking on the tab, the administration page is loaded. The business process configuration link, “Business Process Configuration” is located under the Plugin section. Click on the link to load the page.

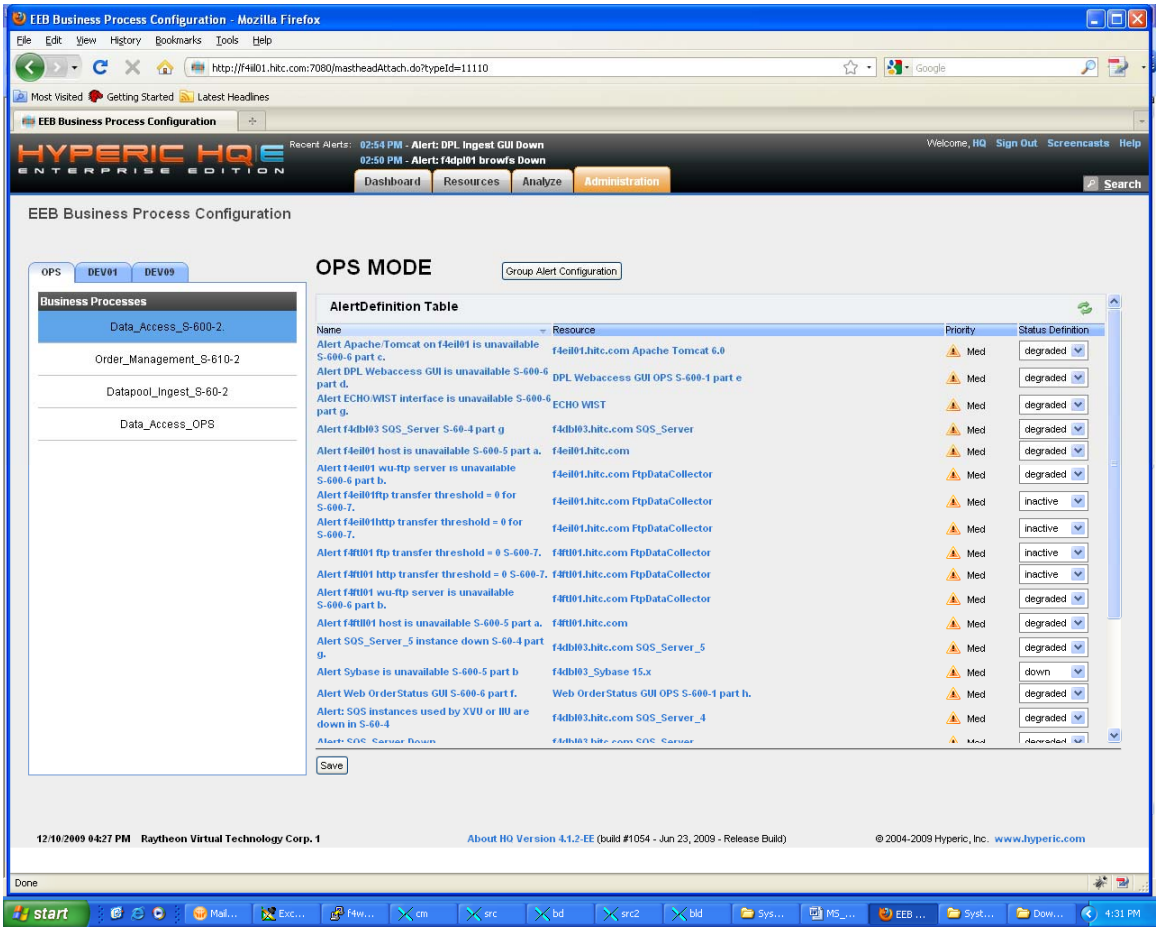


Figure 4.2.2.4.1-4. Business Process Configuration Page

The Business Process Configuration page contains a tab container. Each tab represents an ECS mode. Each mode container is divided into two panes and will display mode specific business process configuration. The left pane contains a list of business processes. The business process highlighted represents the current selection. Selecting a business process in the left pane will update the information on the right pane. The right pane contains a list of alert definitions for the selected business process. For each item in the list, the alert definition name, the resource name, the priority and the status definition is displayed. The alert definition name is a link to the configuration page of the alert definition. The resource name indicates which resource the alert definition is associated with and is a link to the detail page of the resource. The priority column shows the severity of the alert definition. It can have one of three values - low, medium, or high. The status definition shows the mapping of the alert definition to a business process status category. It can have one of four values - “Active”, “Inactive”, “Degraded”, or “Down”.

The alert definition configuration files will be loaded for all modes when the Business Process Configuration page is loaded or refreshed. An operator with admin privileges can configure the

status definition field of each alert to its desired category. Once the operator clicks the “save” button at the bottom of the page, the xml configuration file will be updated with the new configuration values on the page.

Operator can configure group alerts by clicking on the “Group Alert Configuration” button on the top of the right pane. This will bring up the group alert configuration page, see screen shot below:

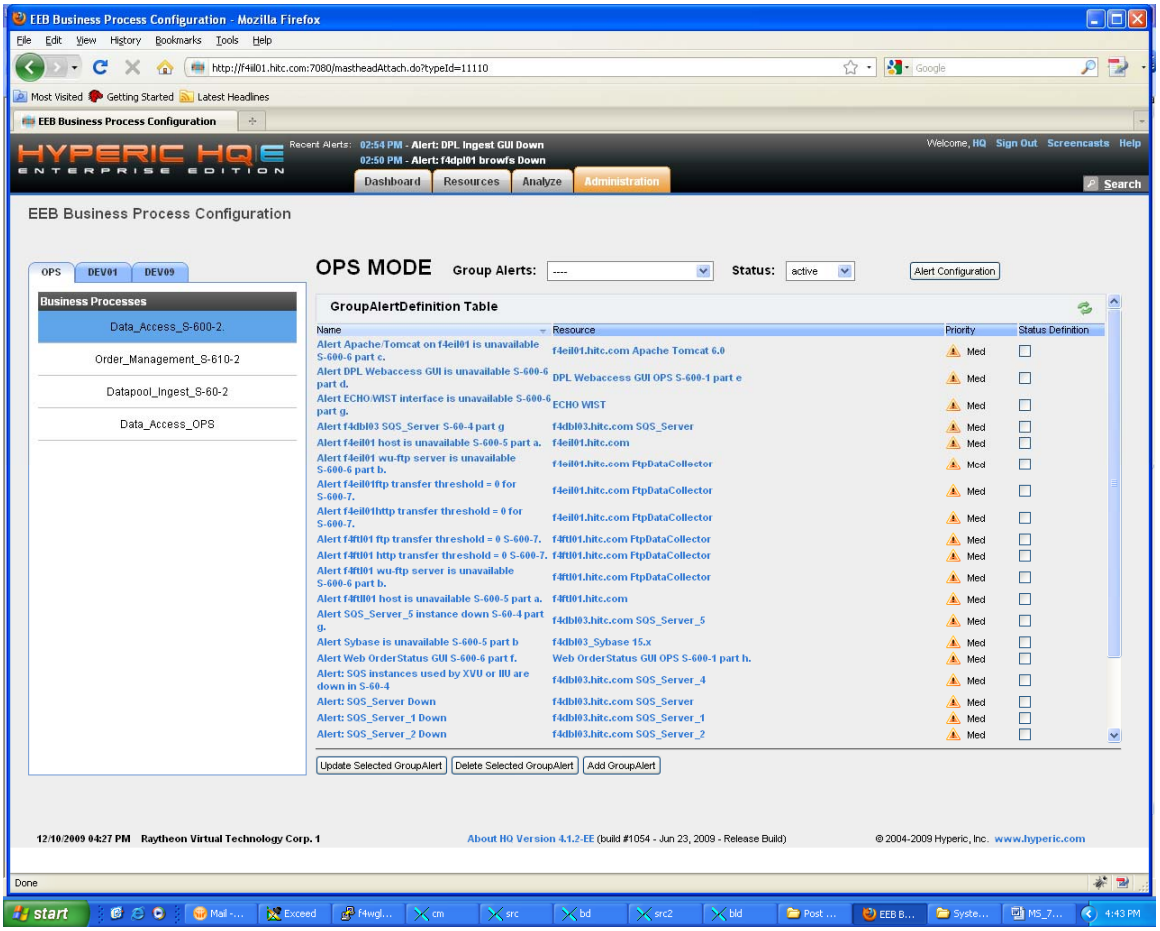


Figure 4.2.2.4.1-5. Business Processes Group Alert Configuration

“Alert Configuration” button will lead operator back to the Alert definition page. Operator can view existing group alerts, updated group alerts, delete group alerts and create new group alerts through the buttons on the page.

To view an existing group alert, operator can click the drop down list on the top of the page next to the MODE. When clicked, the drop down list will list all existing group alerts. Once operator makes a selection, the group alert configuration will be displayed in the GroupAlertDefinition table below. See screen shot below:

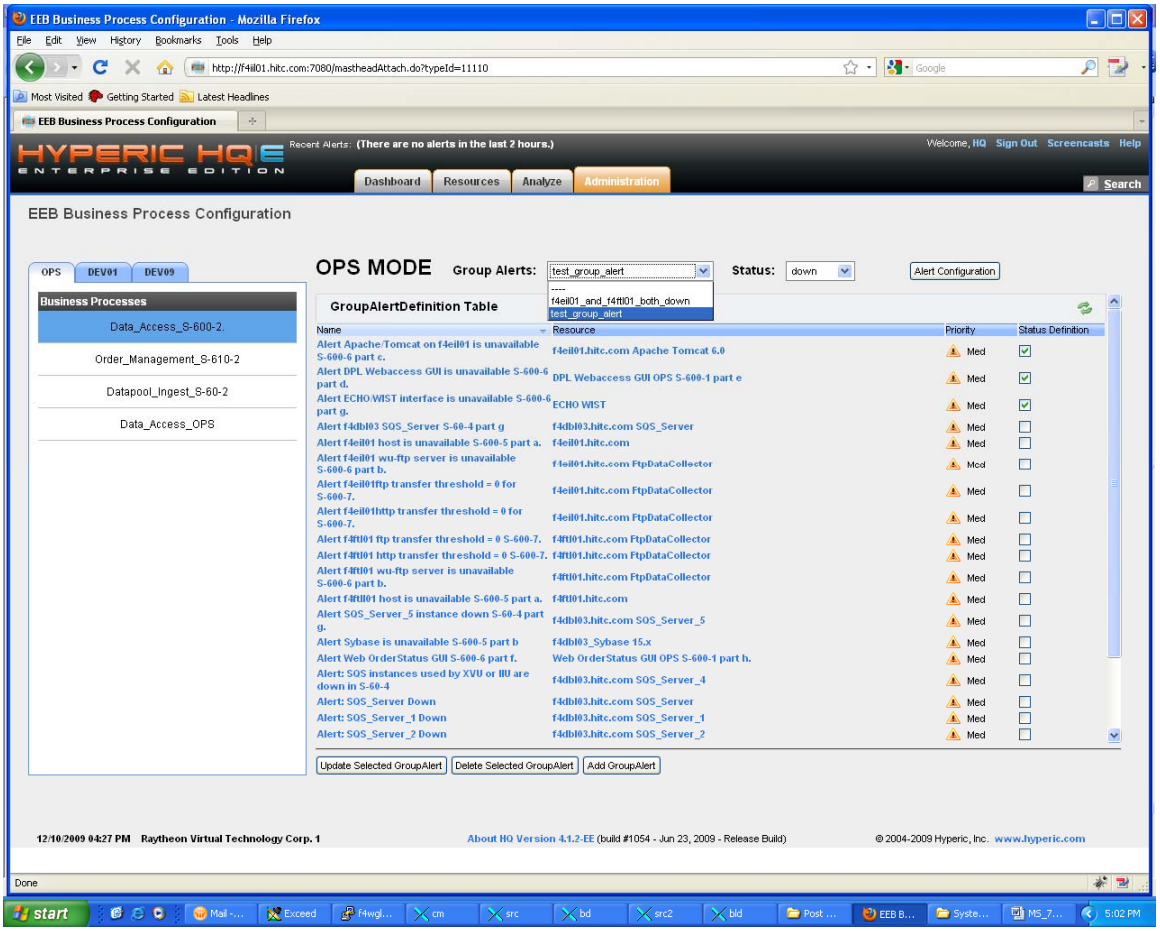


Figure 4.2.2.4.1-6. View Business Process Group Alert

Operator can delete the selected group alert by clicking on the “Delete Selected GroupAlert” button.

Operator can modify the group alert definition by selecting a different status definition of the business process on the status drop down list next to the Group Alert name on the top of the page; or/and check/uncheck the checkboxes in the GroupAlertDefinition table, then click the “Update Selected GroupAlert” button to update the group alert definition. See screen shot below:

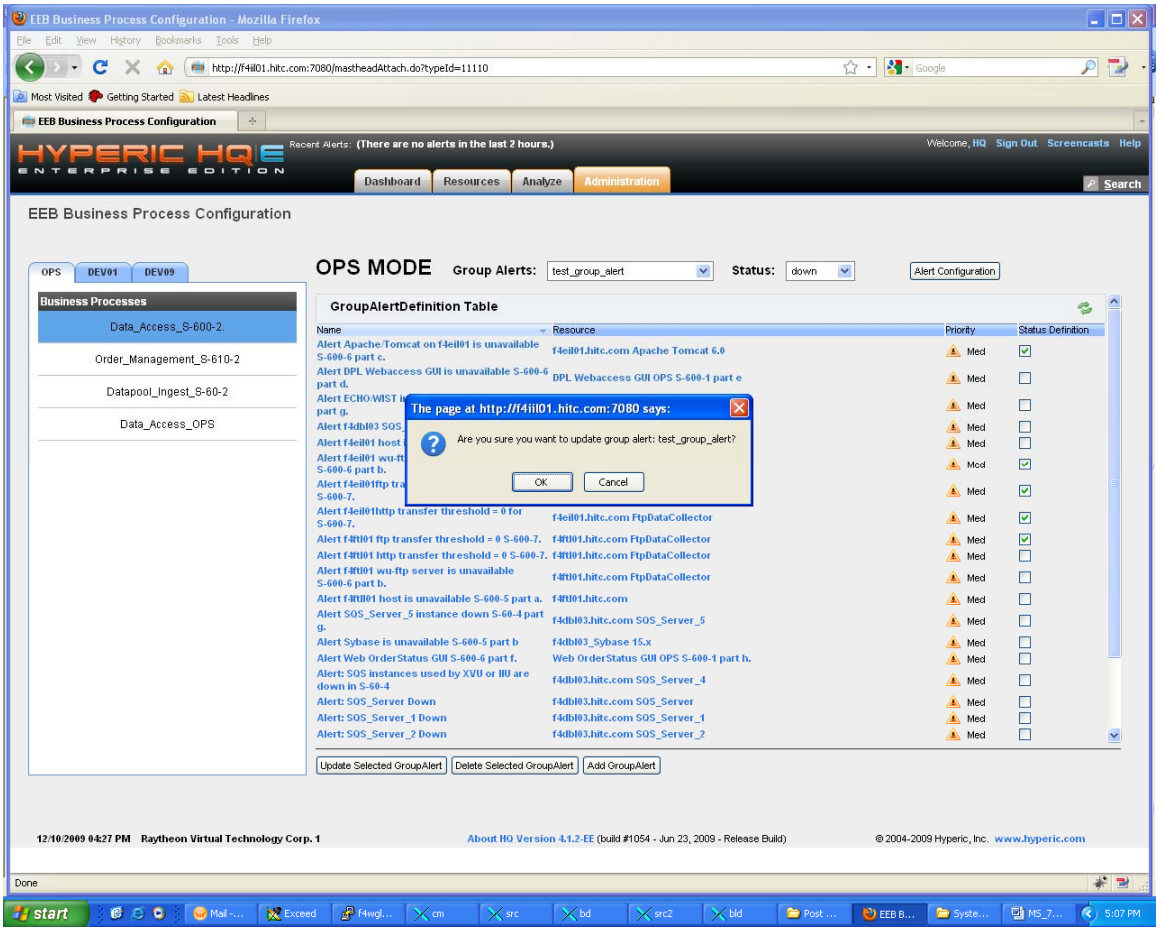


Figure 4.2.2.4.1-7. Update Business Process Group Alert

Operator can add a new group alert by clicking on the “Add GroupAlert” button. See screen shot below:

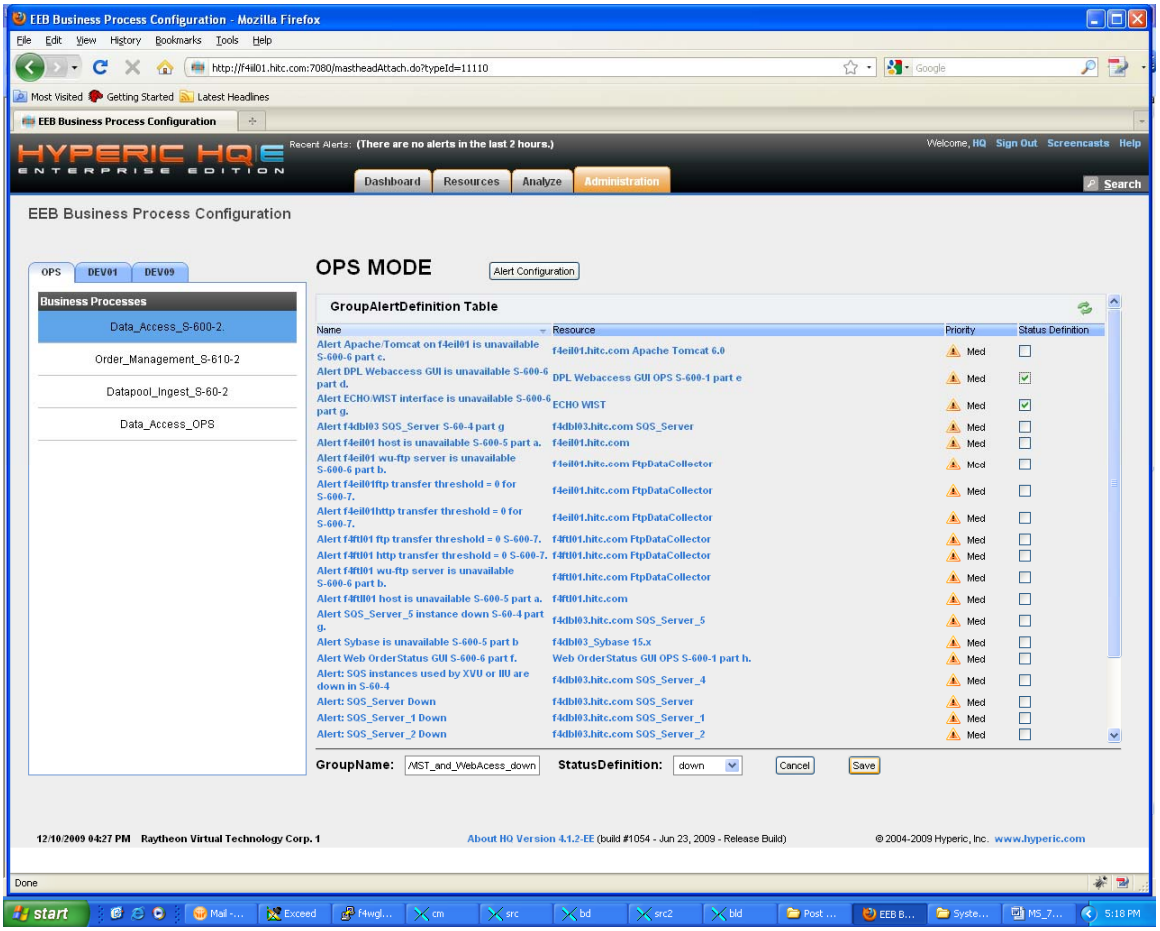


Figure 4.2.2.4.1-8. Add new Business Process Group Alert

Operator can type in the group alert name in the GroupName text box, select the status definition of the group alert via the StatusDefinition drop down list and check/uncheck the checkboxes in the GroupAlertDefinition table to add selected individual resource alerts in the group alert definition. Operator can cancel the add operation by clicking the “Cancel” button. Once operator click the “Save” button and confirm through the confirmation popup window. A new group alert will be added and become visible through the Group Alerts drop down list on the group alert configuration page. See screen shot below:

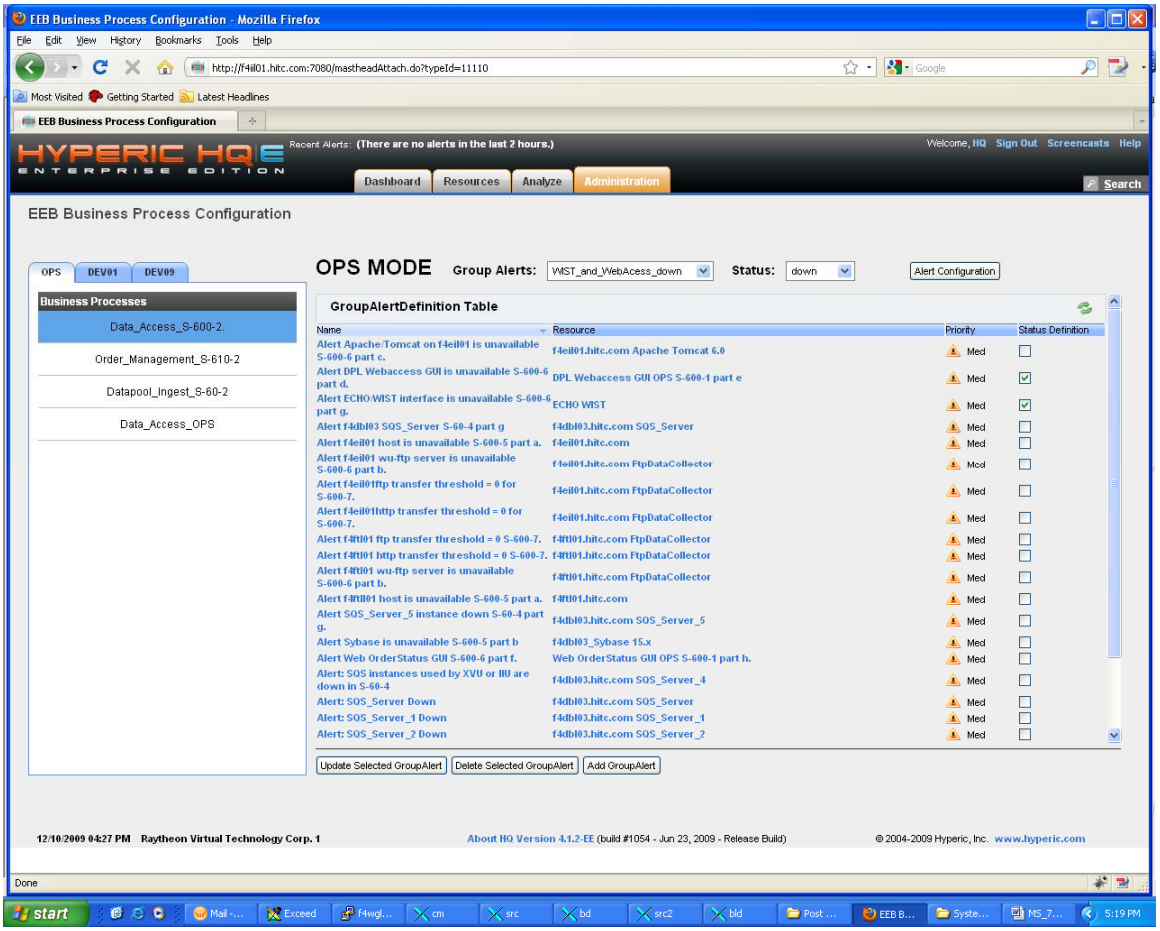


Figure 4.2.2.4.1-9. View added Business Process Group Alert

4.2.2.4.1.3 View Business Process

With the custom HQU plugin, an operator can use the Hyperic HQ GUI to get a quick overview of the status of all business processes. The business process page can be navigated to via the Resource tab and clicking on the 'Business Processes' link.

Figure 4.2.2.4.1-10. Business Processes Link

Business Process Status Page

The Business Process Status page is divided into two panes. The left pane contains a list of business processes. It shows the name and the business process status. The business process that is currently selected is highlighted in blue. The right pane contains a list of resources for the selected business process. It shows the resource name, the status of the resource, and the reason explaining why a resource is not available. Clicking on the resource name will take the operator to a detailed page of the resource. Selecting another business process will update the resource list in the right pane.

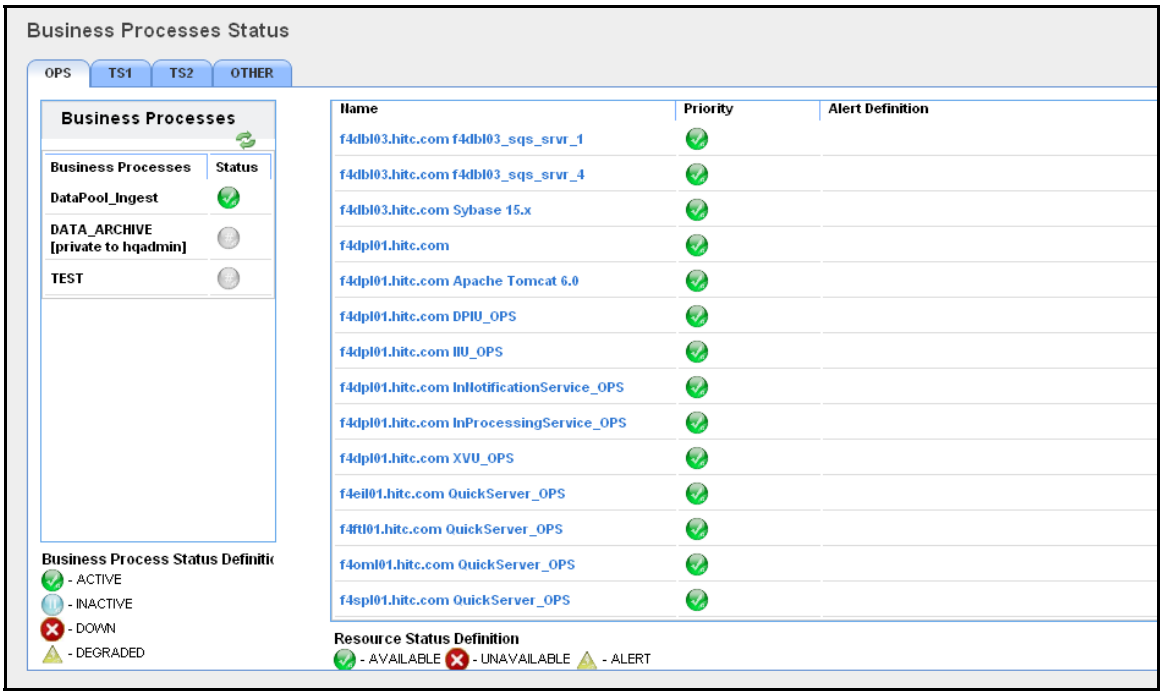


Figure 4.2.2.4.1-11. View Business Process Page – DPL Ingest Active

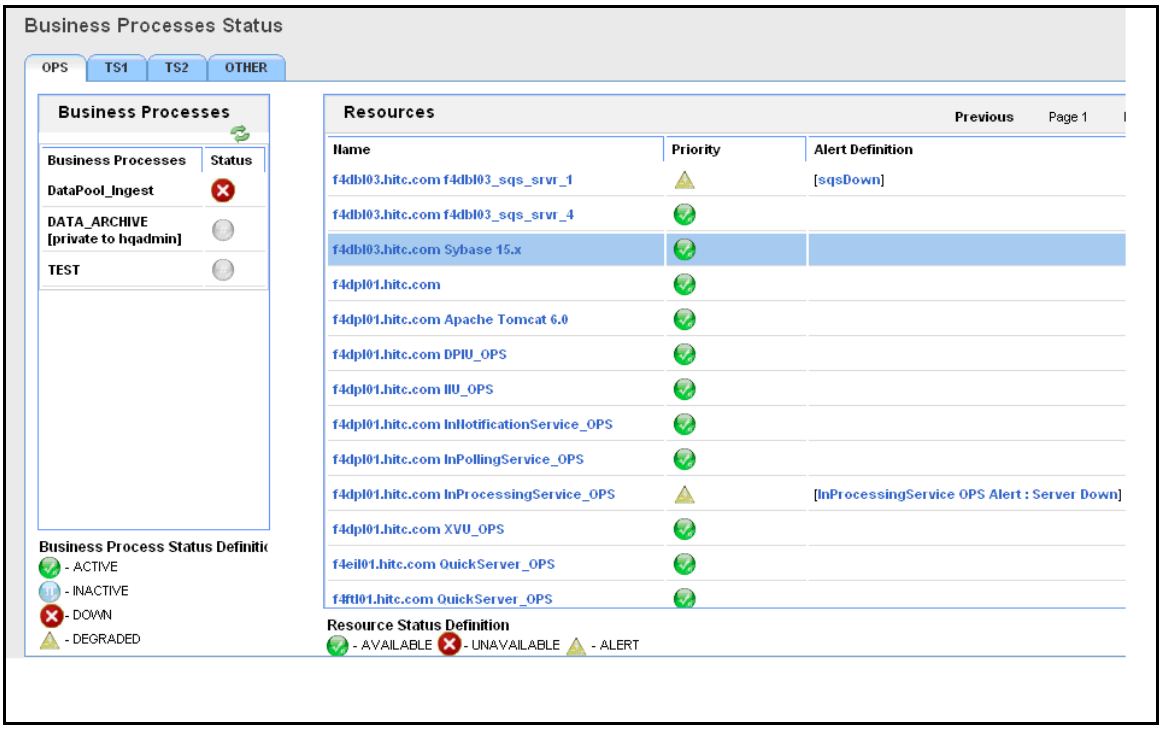


Figure 4.2.2.4.1-12. View Business Process - DPL Ingest Down

Mode Tabs

The Mode Tabs renders a different view of the Business Process filtered by mode. All business processes are defined within a specified mode thus the specified mode tab will display only those business process defined within the current mode

Figure 4.2.2.4.1-13. Business Process Mode Tab

Business Process Status Table

The Business Process Status Table provides a quick view of the overall health of a business process. The “Business Processes” column provides the name of all the business processes within the specified mode. The “Status” column provides the overall status of the business process. The status of the business process is determined by the alerts that correspond to the resources that are members of the business process. An xml configuration file will hold the definitions of the impact an alert has on the overall state of a business process (For more details see section 4.2.2.4.2.2 Configure Business Process). The Business Process Status Table controls the Business Process Resource Table located to the left of it. When the cursor is placed over the

name of a particular business process within the Business Process Status Table it is highlighted and the Business Process Resource Table will refresh to display information on the resources that are members of the selected business process.

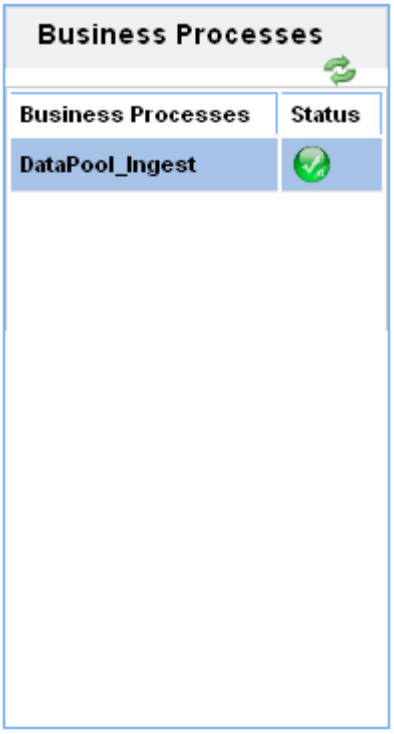
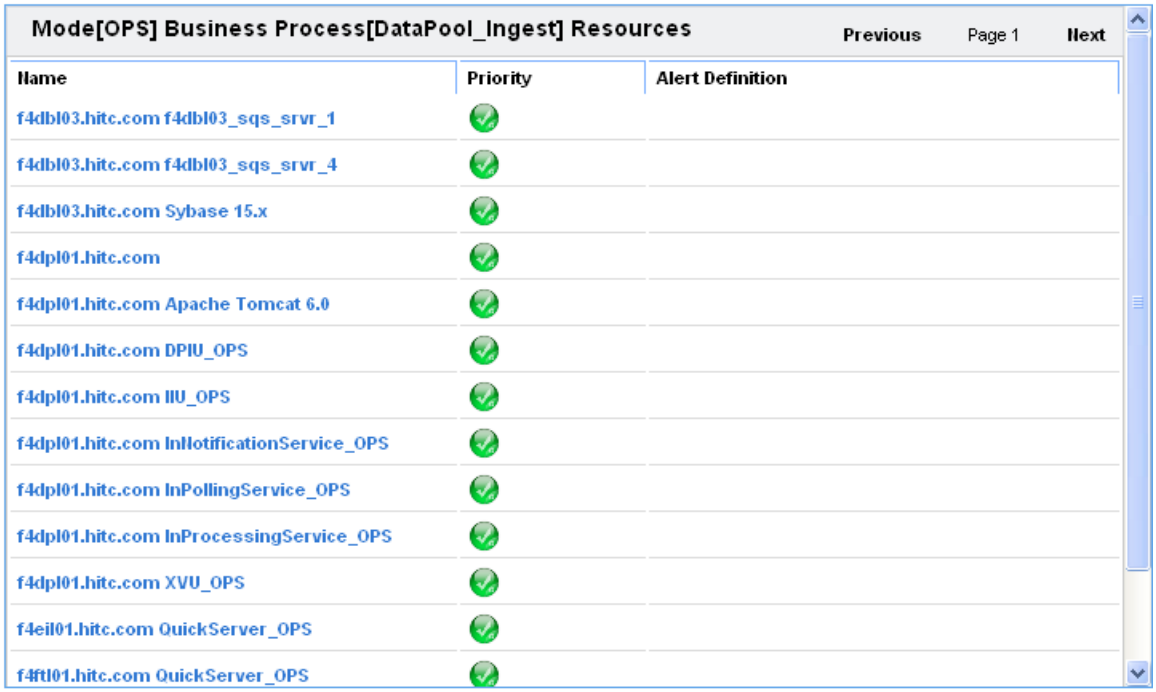


Figure 4.2.2.4.1-14. Business Process Status Table

Business Process Resource Table

The Business Process Resource Table provides a view of the resources that are members of the current business process selected in the Business Process Status Table. Besides the resources defined in the hyperic system, custom group alerts are also displayed as a type of resource. This gives user a better view when the business process status is determined by a custom group alert.

The “Name” column contains the name of a resource. The resource name can be clicked on for a detailed view of the resource. The “Priority” column defines the status of a resource. If any alerts have fired that pertain to a resource, the column will display the status change. The “Alert Definition” column will display the names of any alerts related to the resource that have fired and have not been fixed. The alert name can be clicked on for a detailed view of the alert definition.



Mode[OPS] Business Process[DataPool_Ingest] Resources Previous Page 1 Next

Name	Priority	Alert Definition
f4dbl03.hitc.com f4dbl03_sqs_srvr_1		
f4dbl03.hitc.com f4dbl03_sqs_srvr_4		
f4dbl03.hitc.com Sybase 15.x		
f4dpl01.hitc.com		
f4dpl01.hitc.com Apache Tomcat 6.0		
f4dpl01.hitc.com DPIU_OPS		
f4dpl01.hitc.com IIU_OPS		
f4dpl01.hitc.com InNotificationService_OPS		
f4dpl01.hitc.com InPollingService_OPS		
f4dpl01.hitc.com InProcessingService_OPS		
f4dpl01.hitc.com XVU_OPS		
f4eil01.hitc.com QuickServer_OPS		
f4ftl01.hitc.com QuickServer_OPS		

Figure 4.2.2.4.1-15. Business Process Resource Table

Business Process Status Definition

The Business Process Status Definition legend defines the meaning of each icon displayed in the Business Process Status Table.

- Active – There is work to do and the work is being completed as expected
- Inactive – All of the components appear to be functional, but there is no work to complete
- Degraded – The service is functioning but not at the required capacity
- Down – The service is unable to complete any work

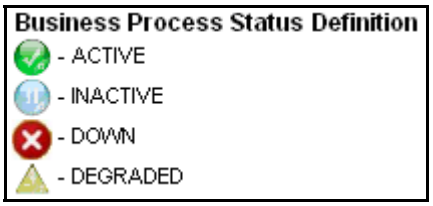


Figure 4.2.2.4.1-16. Business Process Status Definition

Resource Status

The Resource Status legend defines the meaning of each icon displayed in the Business Process Resource Table.

- Available – The resource is currently up
- Unavailable – The resource is currently down
- Alert Pending – There is at least one alert pending for the resource

Figure 4.2.2.4.1-17. Business Process Resource Status

4.2.2.4.2 DPL Ingest Business Process

This section describes the resources that are grouped within the DPL Ingest Business Process.

4.2.2.4.2.1 Ingest Resources

Hosts

- X4dpl01
- ECS Service Hosts

Custom Code Servers

- Polling
- Processing
- Notification
- QuickServer

File Systems

- Data Pool
- Archive

Database

- Sybase
- SQS Server

Apache / Tomcat Web Server

StorNext Primary Metadata Server

4.2.2.4.2.2 DPL Ingest Host

A Hyperic agent will be installed on each host used by DPL Ingest. Each host will be configured to be monitored via Hyperic's auto-discovery service. Once the host is selected to be monitored there are a number of metrics that can be captured including availability, load average, CPU usage, TCP statistics, memory usage, and swap space.

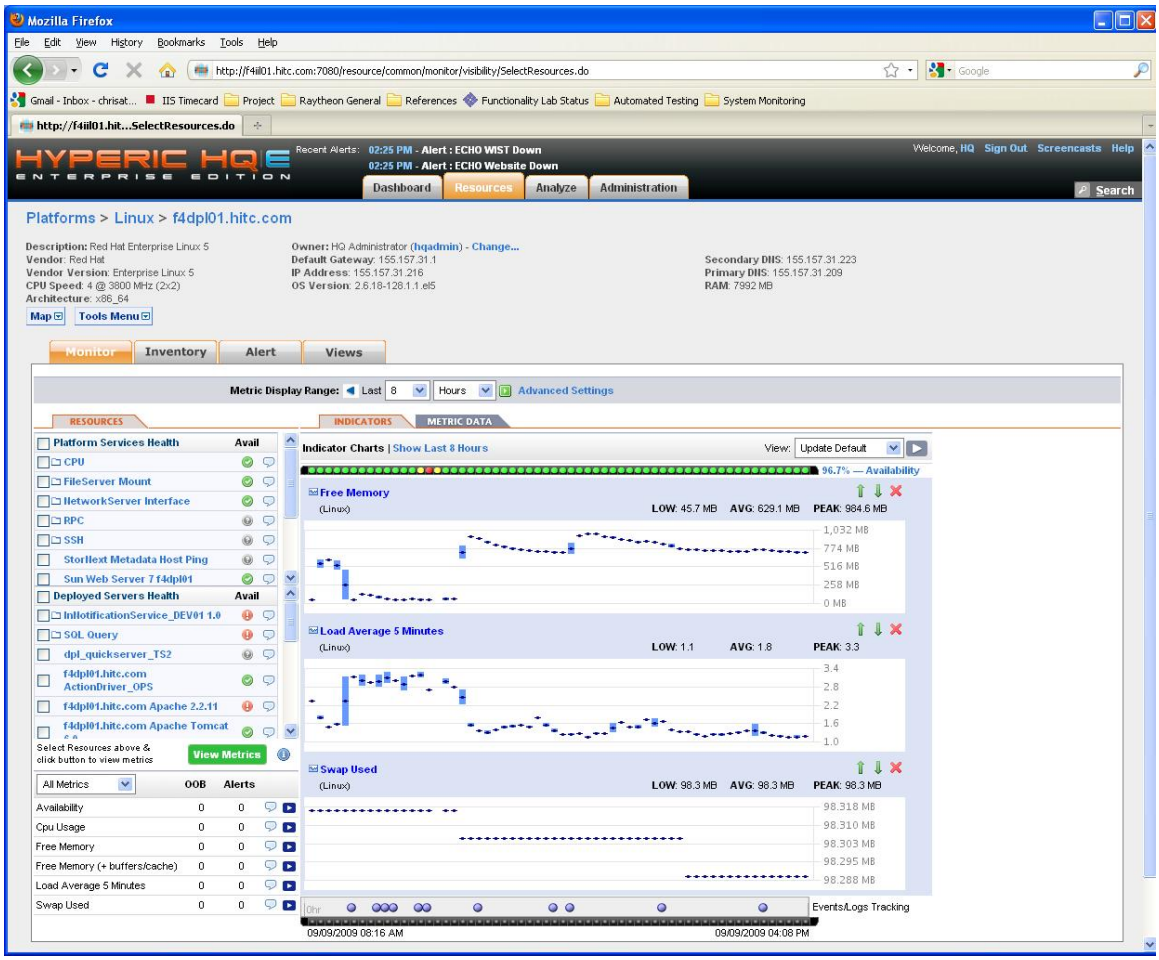


Figure 4.2.2.4.2-1. DPL Ingest Host Monitor Page

4.2.2.4.2.3 Polling Server

The Ingest Polling Server monitoring is done through a custom xml plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-DPL-InPollingService-plugin.xml.

Since almost all the custom xml plug-ins are organized as one per mode, only one template of each plug-in will be saved in the clearcase and delivered. Upon installation in the DAACs, the plugin generator script will read in the plugin template and generate the mode specific plug-ins for the specified mode. This installation detail will be omitted in the subsequent server descriptions. See the attached appendix for the Polling Server xml plug-in file for OPS mode.

The metrics that will be collected for the Ingest Polling Server include the standard Hyperic metrics (see section 4.2.2.2.13: Standard Plugin Metrics) and custom metrics (see below).

Table 4.2.2.4.2-1. Polling Server Metrics

Custom Metrics	
Metric Name	**Description**
NumOpenAlerts	The total number of open alerts in the Polling server.

The Polling server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in and the custom metrics will be collected through the SQL plug-in by querying the Ingest database.

If the Polling Server is up after the custom xml plug-in is deployed in Hyperic, the Polling Server will be auto-discovered by Hyperic and shows up in the Auto-Discovery list. The user can then choose the Polling Server from the Auto-Discovery list to add it to the inventory (refer to the Auto-discovery section of the document for details).

Up/down alerts are set up for the Polling server based on its availability metrics. The down alert is used to notify a user of the problem, update the DPL Ingest business process status, and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Below are some details on the control actions and alerts configurations:

To configure the control action for starting the server, go to the Inventory page of the Polling Server. See screen shot below:

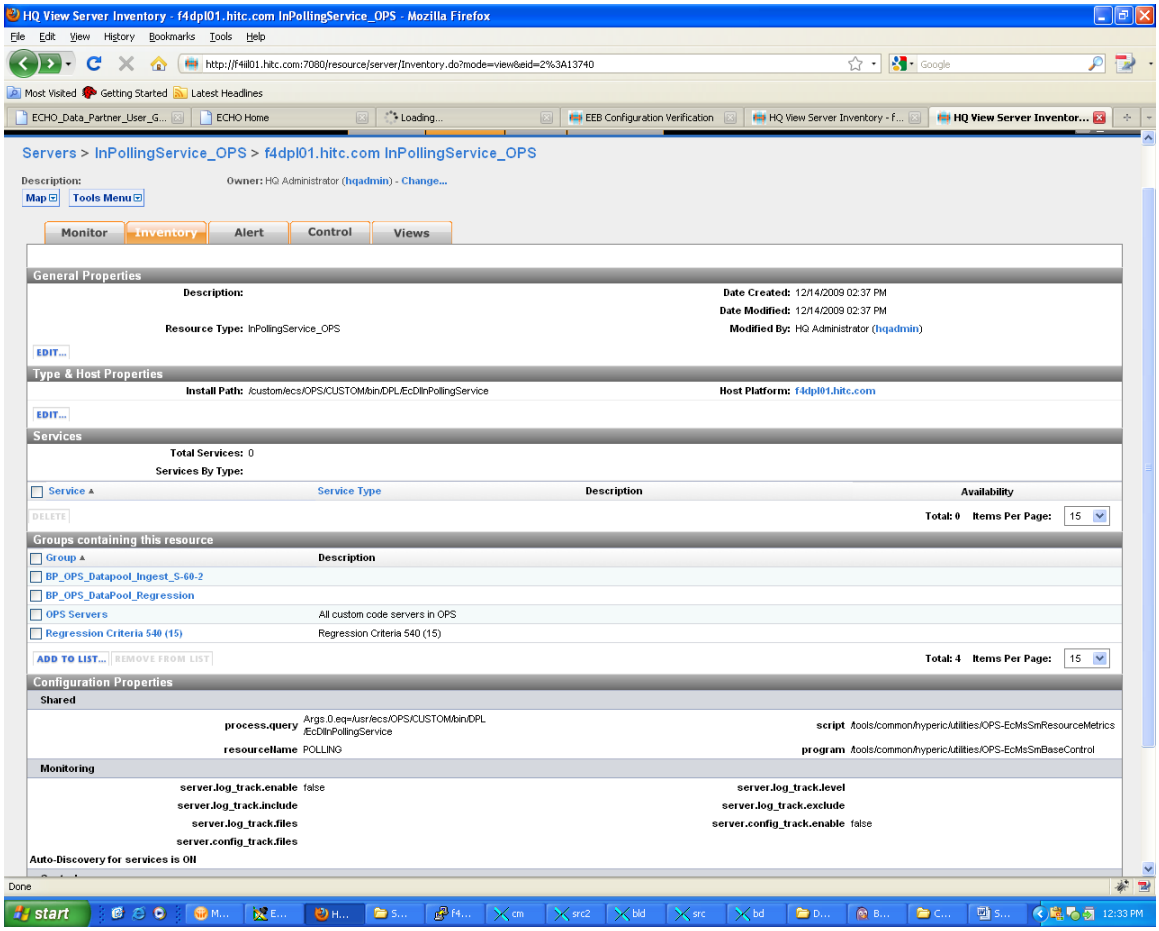


Figure 4.2.2.4.2-2. Polling Server Inventory Page

Note the server.config_track.files configuration is blank and the server.config_track.enable is false on this page even though the configuration file is specified in the server plugin xml and configuration tracking is turned on by default. This is due to a bug (HHQ-3627 DaemonDetector does not set control configuration) in hyperic. It is scheduled to be fixed in HQ 4.3. To work around the bug, operator has to manually accept the Configuration Properties setting again by performing the following two steps:

Click on the “EDIT” button on the Configuration Properties section to bring up the Configuration Properties detail page. On this page, operator can see the configuration file name is already populated and the server.config_track.enable checkbox is checked. Operator can also verify the Program under the Control section is set to the correct value. In this specific example, it is set to: /usr/ecs/OPS/CUSTOM/utilities/EcMsSmBaseControl which is specified in the "DEFAULT_PROGRAM" element in the xml plug-in file. See screen shot below:

NOTE: The EcMsSmBaseControl is a custom script used to execute a Linux command or script as the cmshared user. This script is generally used for starting, stopping, and restarting ECS resources as a control action in an alert but can be used to perform other tasks.

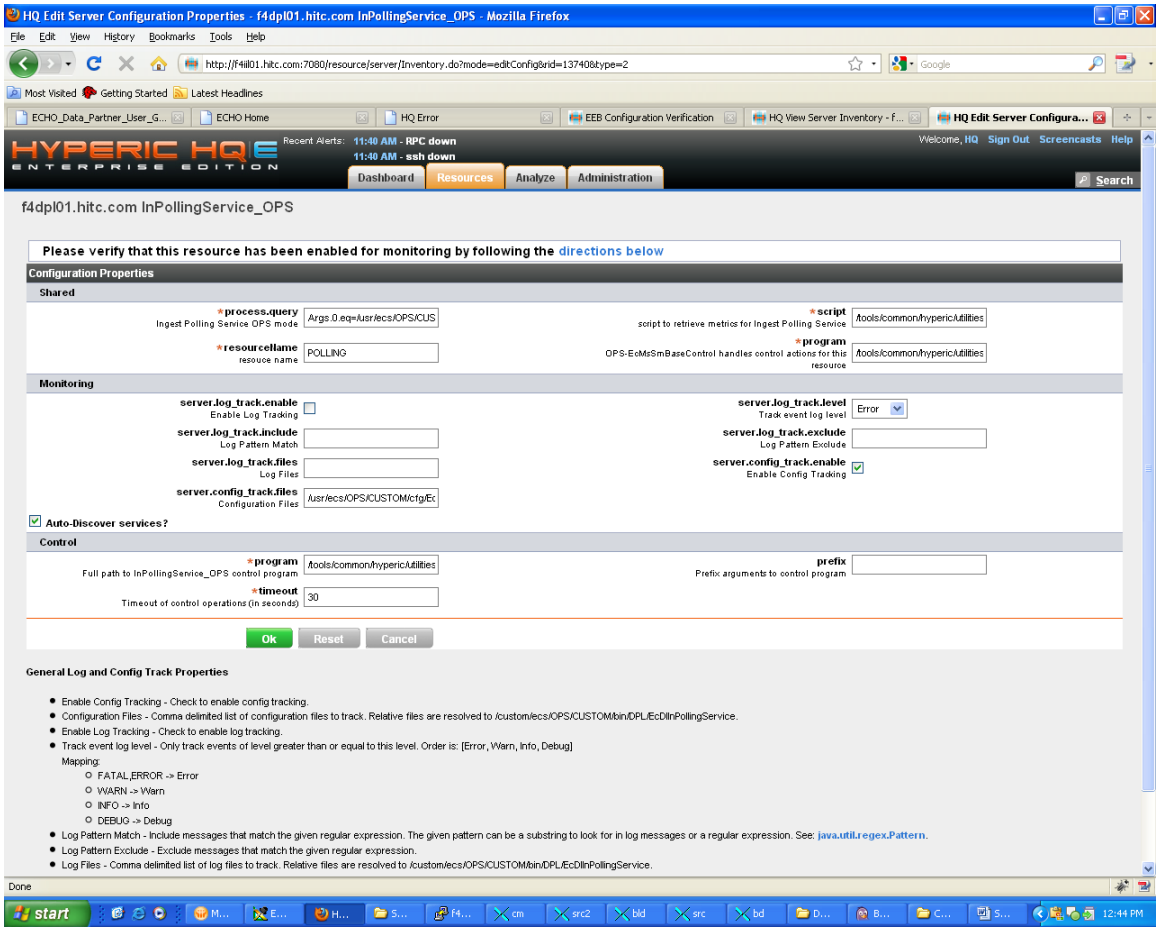


Figure 4.2.2.4.2-3. Polling Server Configuration Properties Page

Click "Ok" button to accept the configuration. This is the manual step to register the configuration with the hyperic server to work around the bug mentioned above. After operator clicked "Ok" to manually accept the configuration, the server.config_track.files and the server.config_track.enable configuration properties are shown with the correct values. See screen shot below:

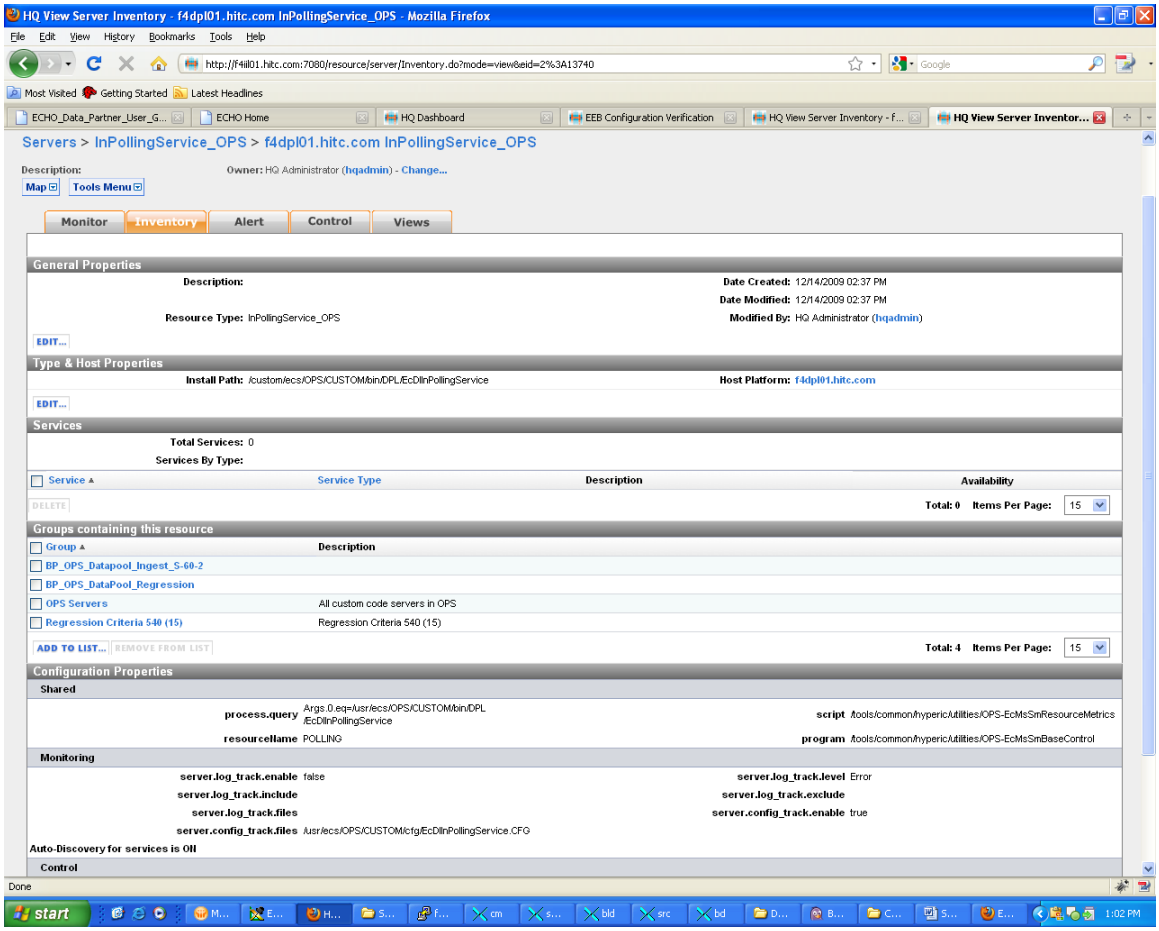


Figure 4.2.2.4.2-4. Polling Server Inventory Page after Manual Update

To configure the server down/up alerts, go to the alert page of the Polling Server. See screen shot below:

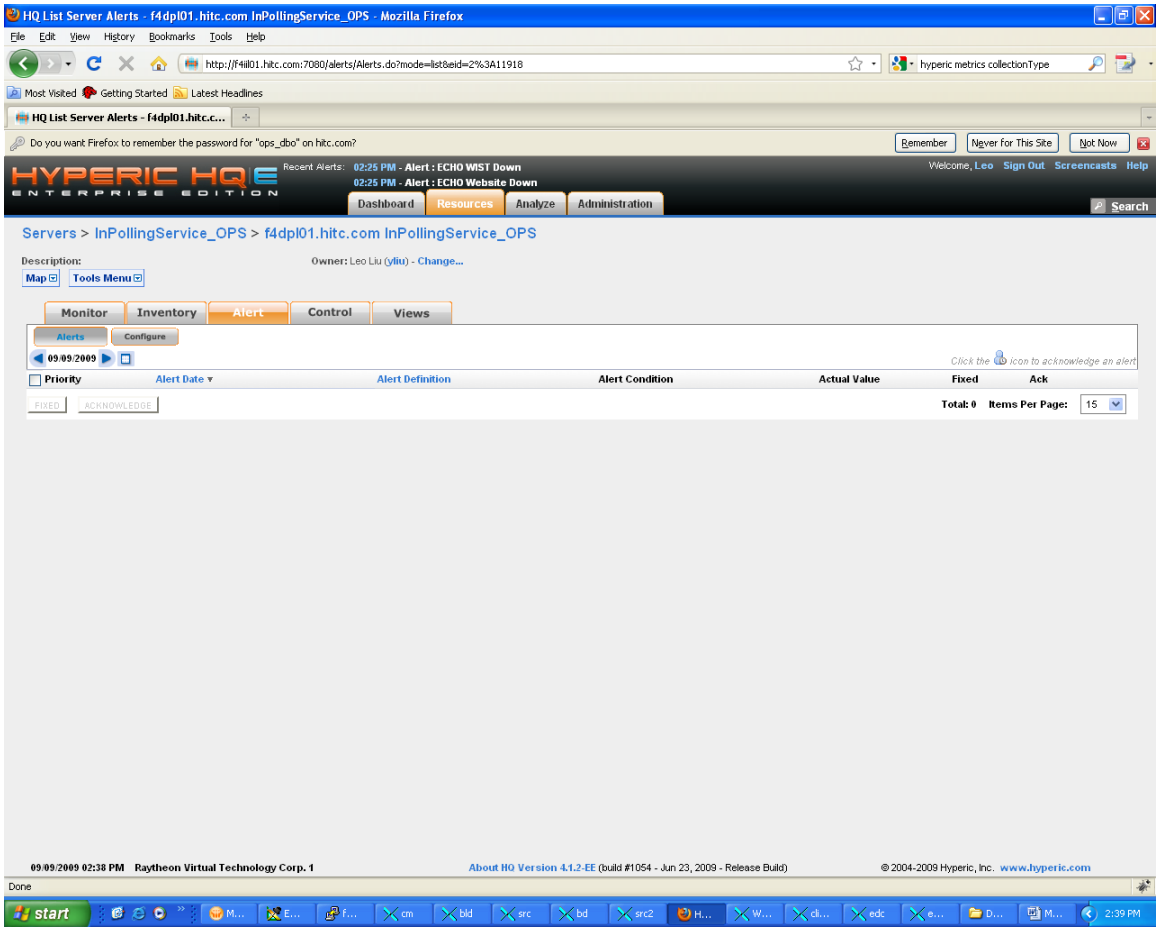


Figure 4.2.2.4.2-5. Polling Server Configure Alert Definition

Click on the "Configure" button on the page to set up the alerts (refer to section 4.2.2.2.6, Alert and Control Action for more details). First we will set up the server down alert. The server down alert is based on the condition of Availability metric. See screen shot below for more details:

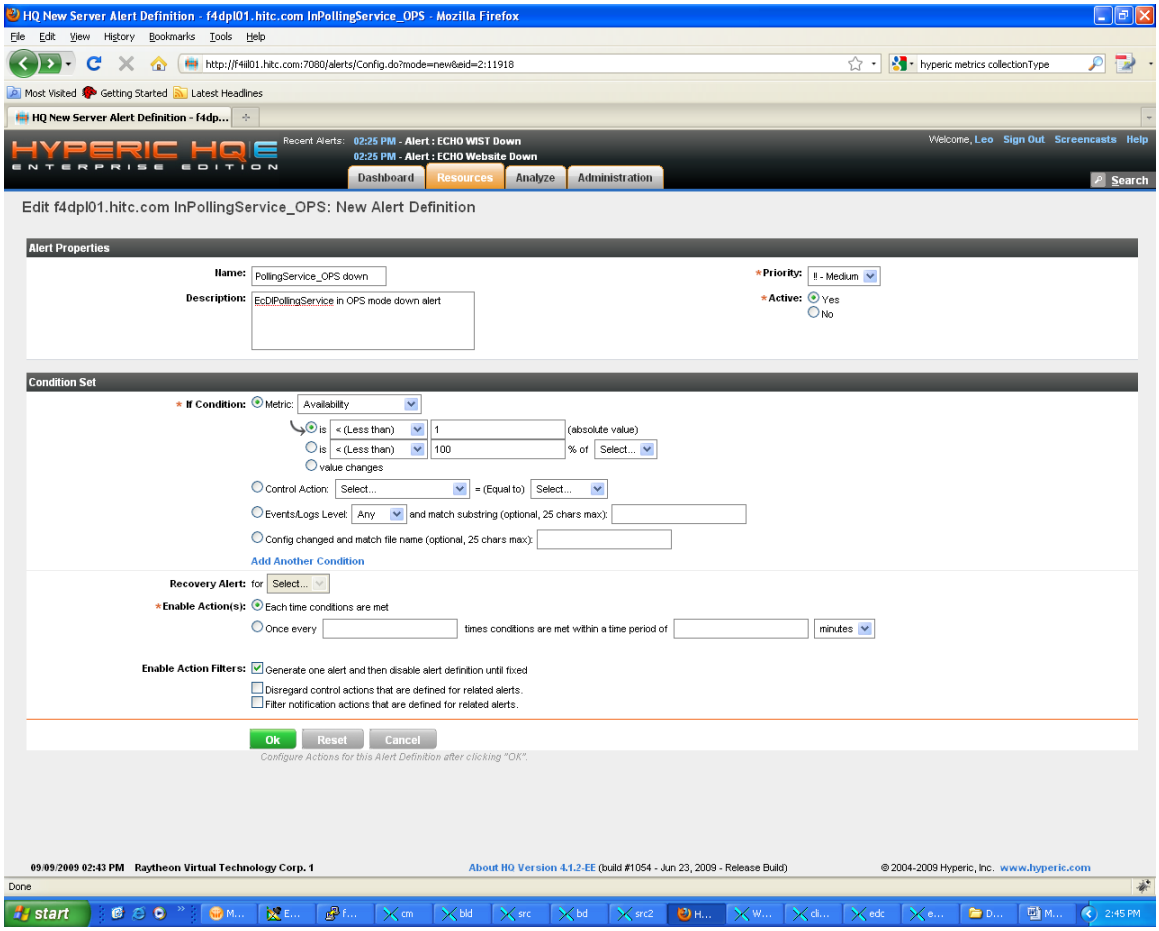


Figure 4.2.2.4.2-6. Polling Server New Alert Definition

Click the “Ok” button will bring us to the alert definition page, see below:

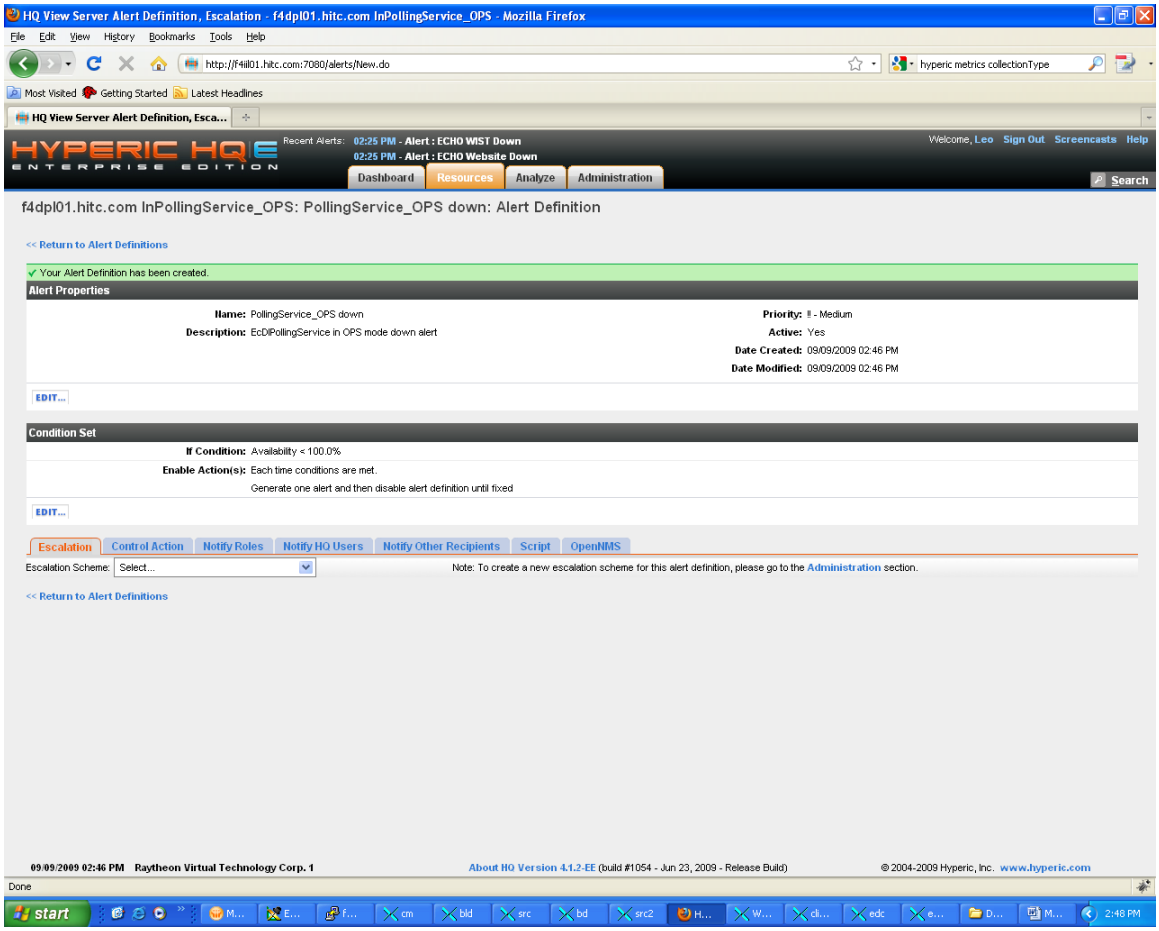


Figure 4.2.2.4.2-7. Polling Server Alert Definition Page

Next, click on the “Control Action” tab and then “Edit” to link the previous configured server start control action to the down alert. See the next two screen shots:

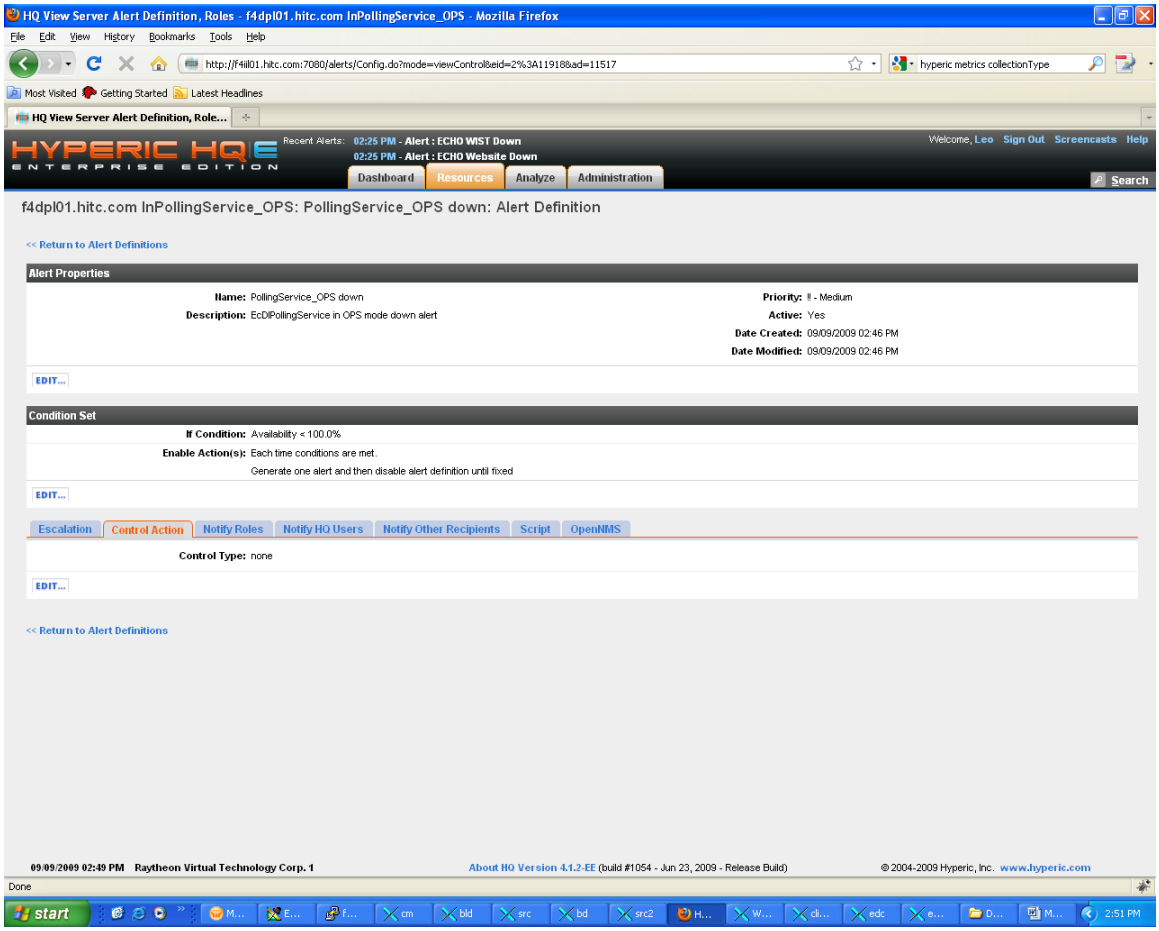


Figure 4.2.2.4.2-8. Polling Server Select Control Action

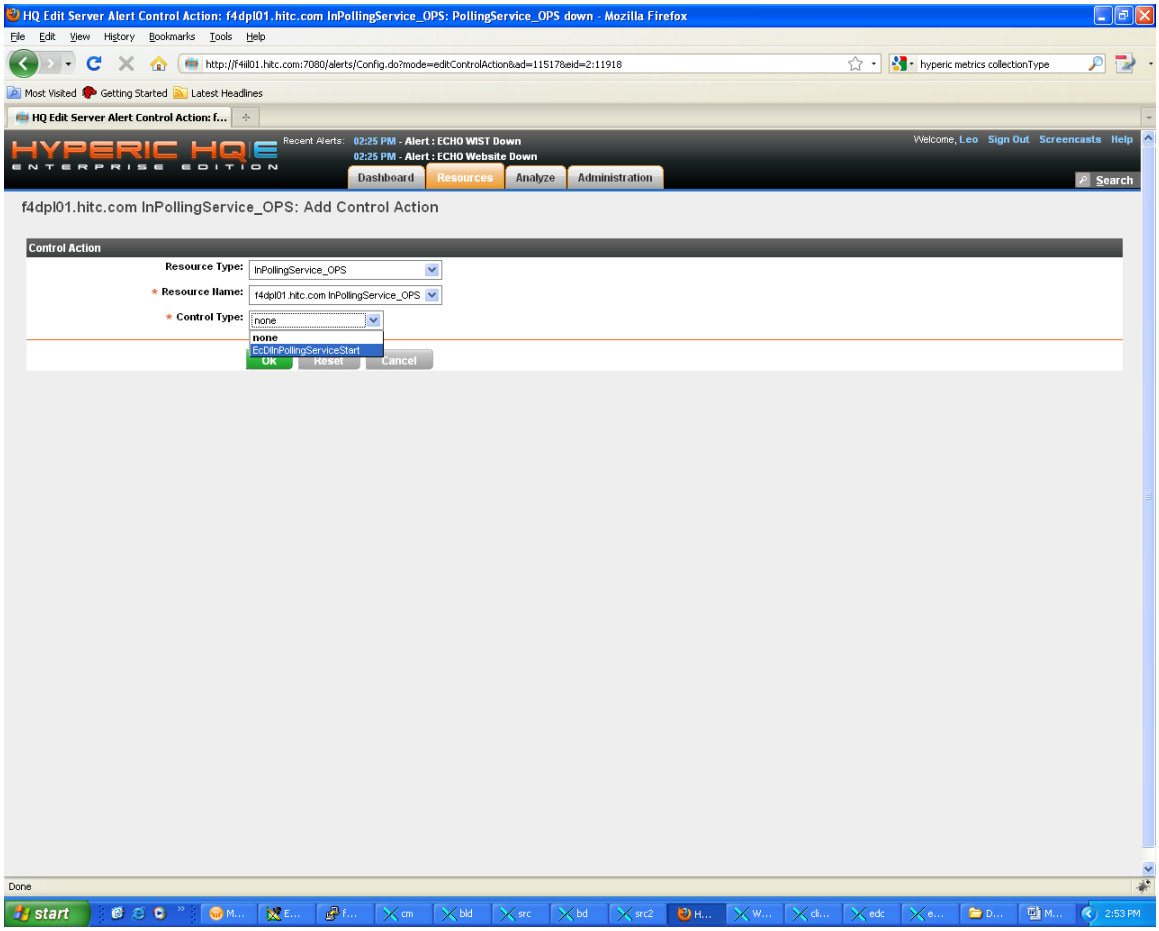


Figure 4.2.2.4.2-9. Polling Server Configure Control Action

Choose the "EcDlInPollingServiceStart" (this is configured through the "actions include" element in the xml plug-in file) as the Control Type and click "OK". Operator can click on the "Notify Roles", "Notify HQ Users" or "Notify Other Recipients" tabs to configure the notification mechanism when the alert fires. This completes the Polling Server down alert configuration.

Go back to the alert page of the Polling Server, click on the "New" button to configure the server up alert. On the Alert Definition page, set the Recovery Alert drop down list to the down alert. This will mark the previous server down alert as "fixed" when the server up alert fires. See screen shot below:

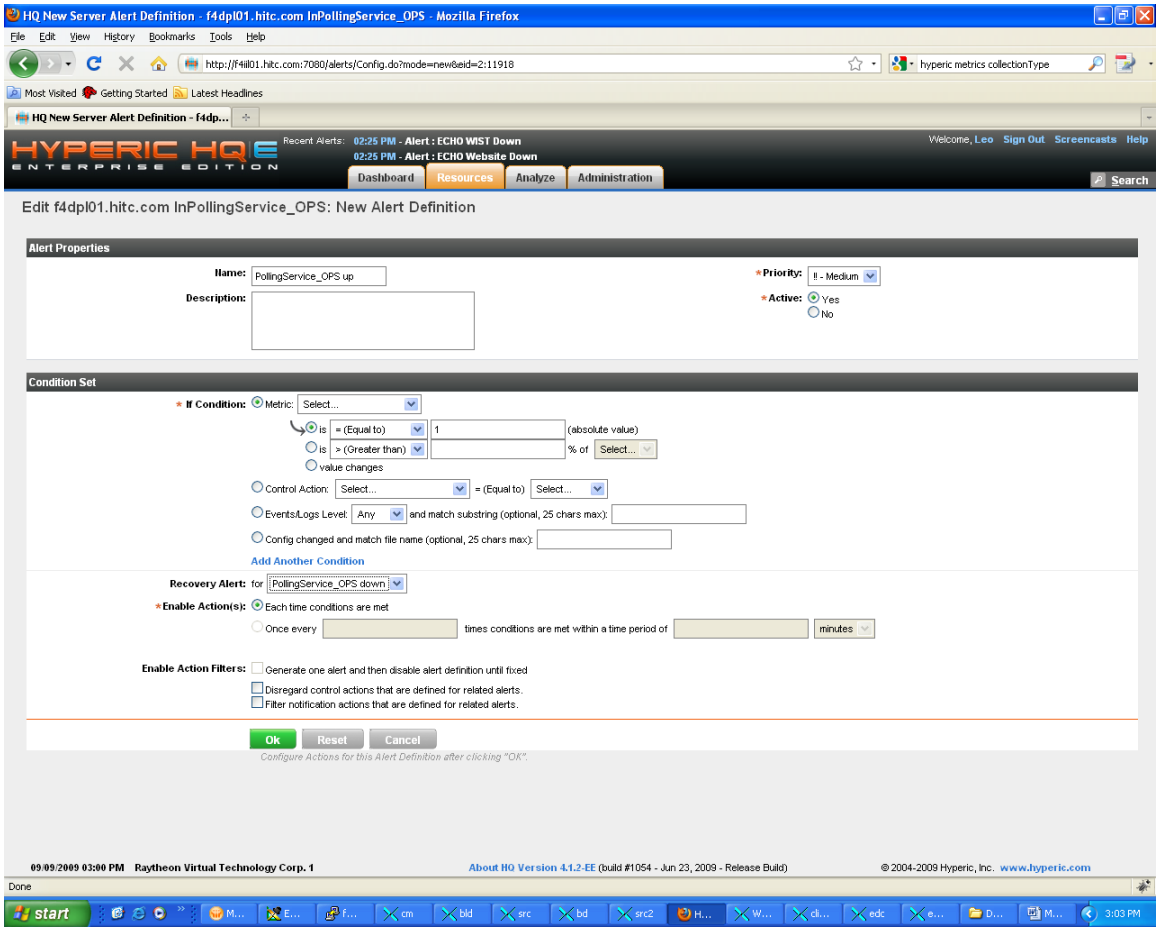


Figure 4.2.2.4.2-10. Polling Server Set Recovery Alert

Click on “Ok” button to accept the change and this completes the server up alert configuration. There is no need to link any control action to the server up alert since it is configured to be a recovery action.

After all the above configurations are complete, the Polling Server will be monitored by Hyperic and when the EcDlInPollingService custom server goes down, a PollingService_OPS down alert will be generated and the configured operators will be notified through their configured notification methods. The control action will be called to automatically start the EcDlInPollingService custom server. Once the server is back up, a server up alert will be generated and it will mark the server down alert as fixed, then the server up alert will be automatically closed.

4.2.2.4.2.4 Processing Server

The Ingest Processing Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-DPL-InProcessingService-plugin.xml. See attached appendix for the Processing Server xml plug-in file of OPS mode.

The metrics that will be collected for the Ingest Processing Server include the standard Hyperic metrics (see section 4.2.2.2.13, Standard Plugin Metrics) and custom metrics (see below).

Table 4.2.2.4.2-2. Processing Server Metrics

Custom Metrics	
Metric Name	**Description**
RequestQueueSize	The total number of requests queued in the system.
GranuleQueueSize	The total number of granules queued in the system.
ScienceGranuleQueueSize	The total number of science granules queued in the system.
NumOpenAlerts	The total number of open alerts in the processing server.
NumOpenInterventions	The total number of open interventions in the processing server.
NumOldRequests	The total number of requests older than a user defined number of hours.
NumOldGranules	The total number of granules older than a user defined number of hours.
Throughput (gran/min)	The average number of granules throughput per minute over the last five minutes.
ScienceGranuleThroughput (gran/min)	The average number of science granules throughput per minute over the last five minutes.
Throughput (MB/min)	The average volume (in MB) throughput per minute over the last five minutes.
CompletionTime (minutes)	The estimated time (in minutes) to complete the work currently queued in the system.

The Processing server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in and the custom metrics will be collected through the SQL plug-in by querying the Ingest database.

Up/down alerts are set up for the Processing server based on its availability metrics. The down alert is used to notify operator of the problem and update the DPL Ingest business process status and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to screen shots in 4.3 Polling Server for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

4.2.2.4.2.5 Notification Server

The Ingest Notification Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-DPL-InNotificationService-plugin.xml. See the attached appendix for the Notification Server xml plug-in file of OPS mode.

The metrics that will be collected for the Ingest Notification Server include the standard Hyperic metrics (see section 4.2.2.2.13, Standard Plugin Metrics) and custom metrics (see below).

Table 4.2.2.4.2-3. Notification Server Metrics

Custom Metrics	
Metric Name	**Description**
NotificationQueueSize	The total number of notifications queued in the system with notification status of "READY".
NumOpenAlerts	The total number of open alerts in the notification server.

The Notification server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in and the custom metrics will be collected through the SQL plug-in by querying the Ingest database.

Up/down alerts are set up for the Notification server based on its availability metrics. The down alert is used to notify operator of the problem and update the DPL Ingest business process status and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to screen shots in 7.3 Polling Server for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

4.2.2.4.2.6 QuickServer

QuickServer monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The file name is <MODE>-DPL-QuickServer-plugin.xml. See the attached appendix for the Quick Server xml plug-in file of OPS mode.

The metrics that will be collected for the Quick Server include the standard Hyperic metrics (see section 4.2.2.2.13, Standard Plugin Metrics).

The QuickServer resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in.

Up/down alerts are set up for the QuickServer based on its availability metrics. The down alert is used to notify operator of the problem and update the DPL Ingest business process status and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to screen shots in 7.3 Polling Server for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

4.2.2.4.2.7 Data Providers

Data provider monitoring is done using the built-in Hyperic group and service metrics monitoring capability through a custom xml plug-in. See the attached appendix for the data provider xml plug-in file of OPS mode.

We collect the following metrics for each data provider:

Table 4.2.2.4.2-4. Data Provider Metrics

Custom Metrics	
Metric Name	**Description**
RequestQueueSize	The total number of requests queued for the provider.
GranuleQueueSize	The total number of granules queued for the provider.
ScienceGranuleQueueSize	The total number of science granules queued for the provider.
NumOpenAlerts	The total number of open alerts for the provider.
NumOpenInterventions	The total number of open interventions for the provider.
Throughput (gran/min)	The average number of granules throughput per minute over the last five minutes for the provider.
ScienceGranuleThroughput (gran/min)	The average number of science granules throughput per minute over the last five minutes for the provider.
Throughput (MB/min)	The average volume (in MB) throughput per minute over the last five minutes for the provider.
CompletionTime (minutes)	The estimated time (in minutes) to complete the work currently queued for the provider.

All data providers in a mode are displayed as a group called “<MODE>_PROVIDERS”. The <MODE>_PROVIDERS group can be added to the “Favorite Resources” portlet on the Dashboard for easy access. See screen shot below:

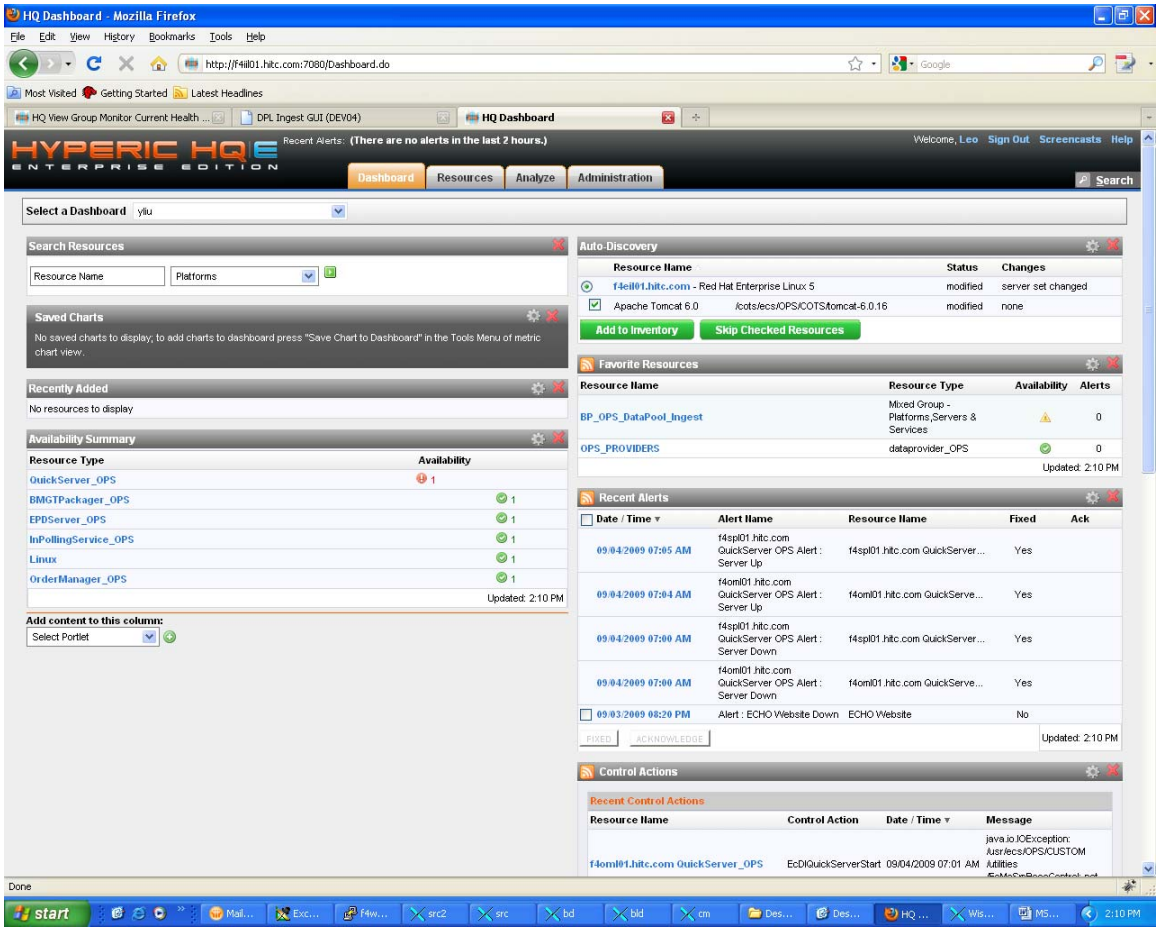


Figure 4.2.2.4.2-11. Data Provider Dashboard

Click on the OPS_PROVIDERS will bring up the providers details page which lists the list of defined data providers in the OPS mode and the combined statistic metrics of all the providers. See screen shot below:

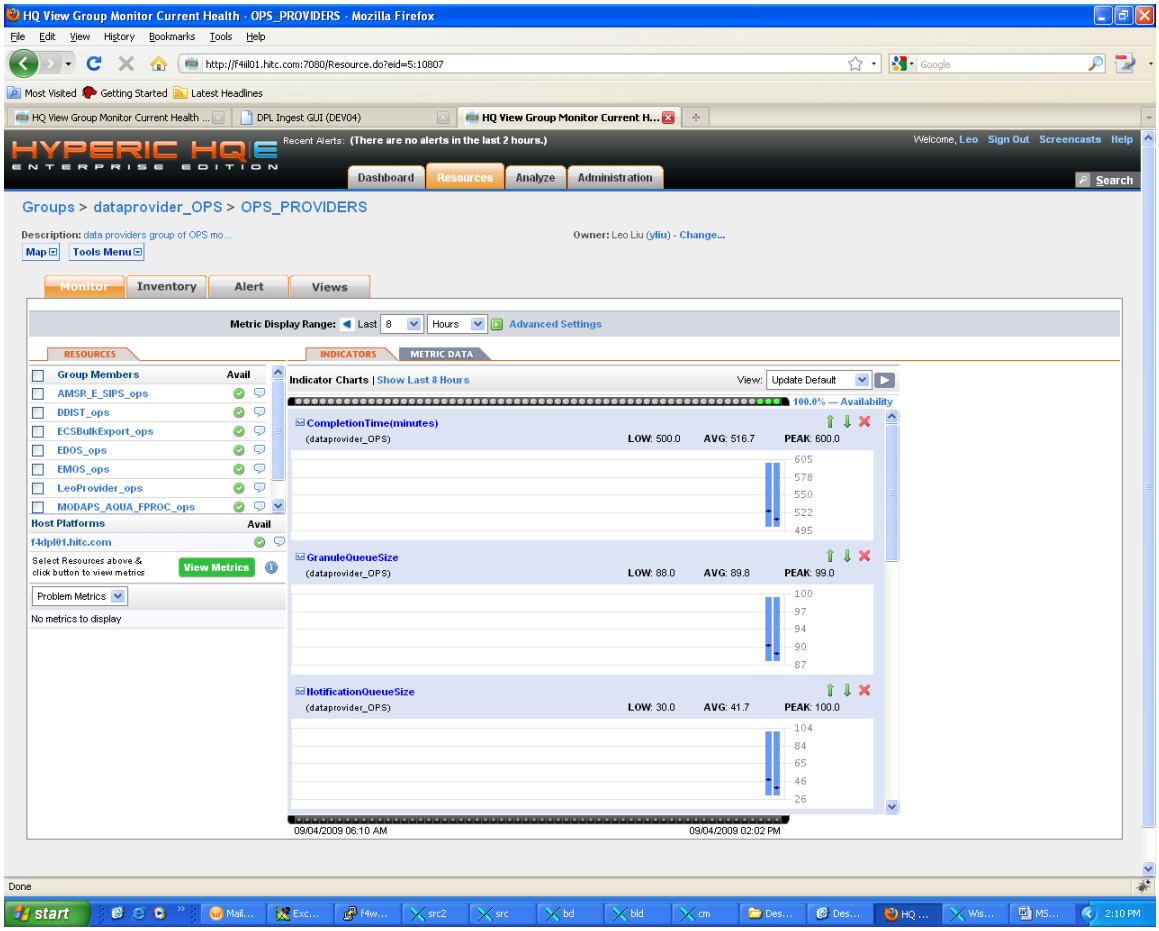


Figure 4.2.2.4.2-12. Data Provider Group Monitor Page

To see the metrics of an individual provider, click on the provider name in the "Resources" window on the left. See below for a screen shot of the provider detail page.

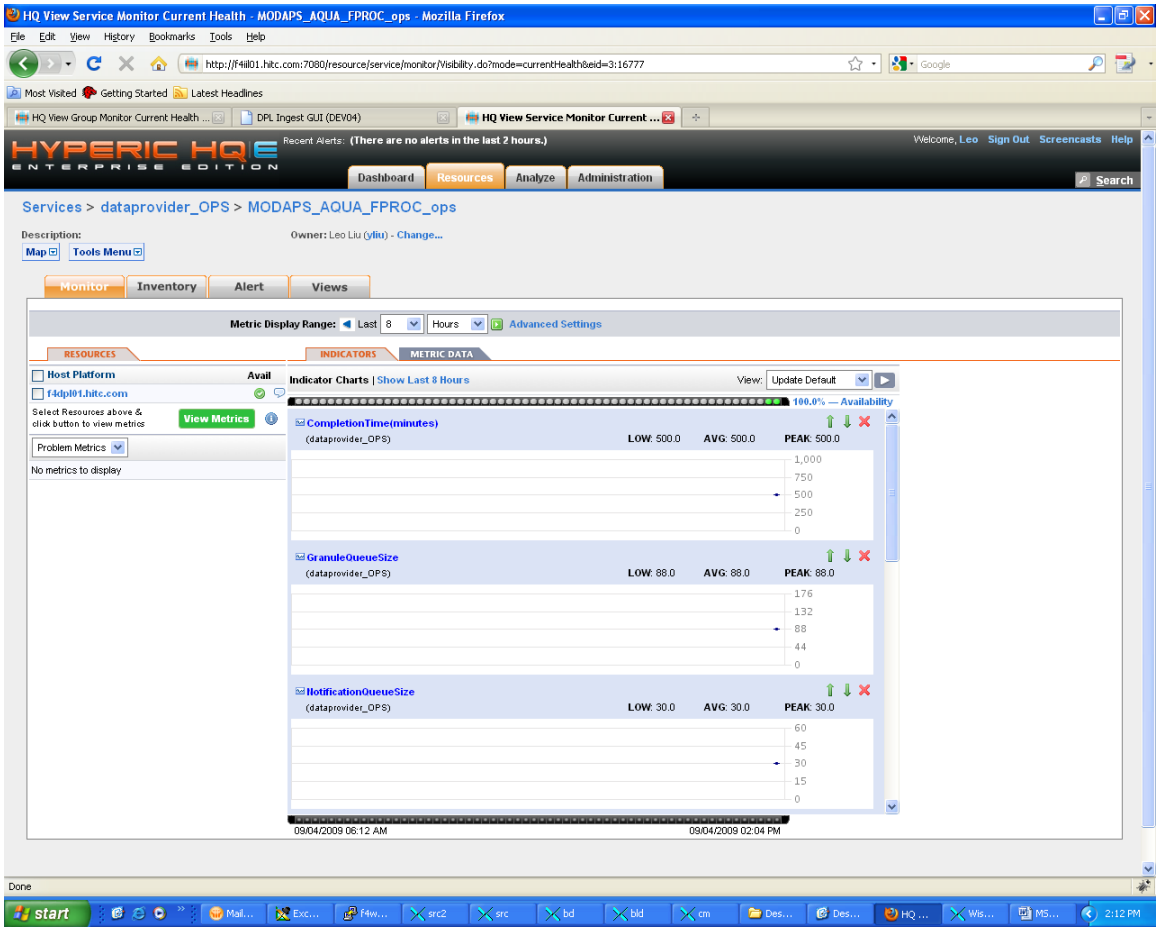


Figure 4.2.2.4.2-13. Individual Data Provider Monitor Page

Below are the four major steps to set up the OPS_PROVIDERS for monitoring:

1. Define the data provider resource through a custom plugin. The data provider resource is defined as a platform service type on the DPL box. The plugin xml is named <MODE>_dataprovider-plugin.xml. It defines the metrics that pertain to the resource type of dataprovider. Please refer to the general instruction on how to deploy a plugin in Hyperic.

2. Define the OPS_PROVIDERS compatible (not mixed) group. The group type should be dataprovider_OPS. Please refer to the general instruction on how to define a compatible group in Hyperic.

3. Configure individual data provider through Hyperic GUI. See section below for details.

Add the configured individual data provider to the OPS_PROVIDERS group. Please refer to the general instruction on how to add a resource to a group.

Below is a detailed description on how to configure an individual data provider using the Hyperic GUI.

Click on the “Resource” tab at the top of the page. Select “Browse” in the drop-down menu. Click on “Platforms” tab to list all the platforms defined in the system. Click on the platform where DPL Ingest servers are installed (i.e. X4dpl01 box) to bring up the platform detail page. See the screen shot below for an example:

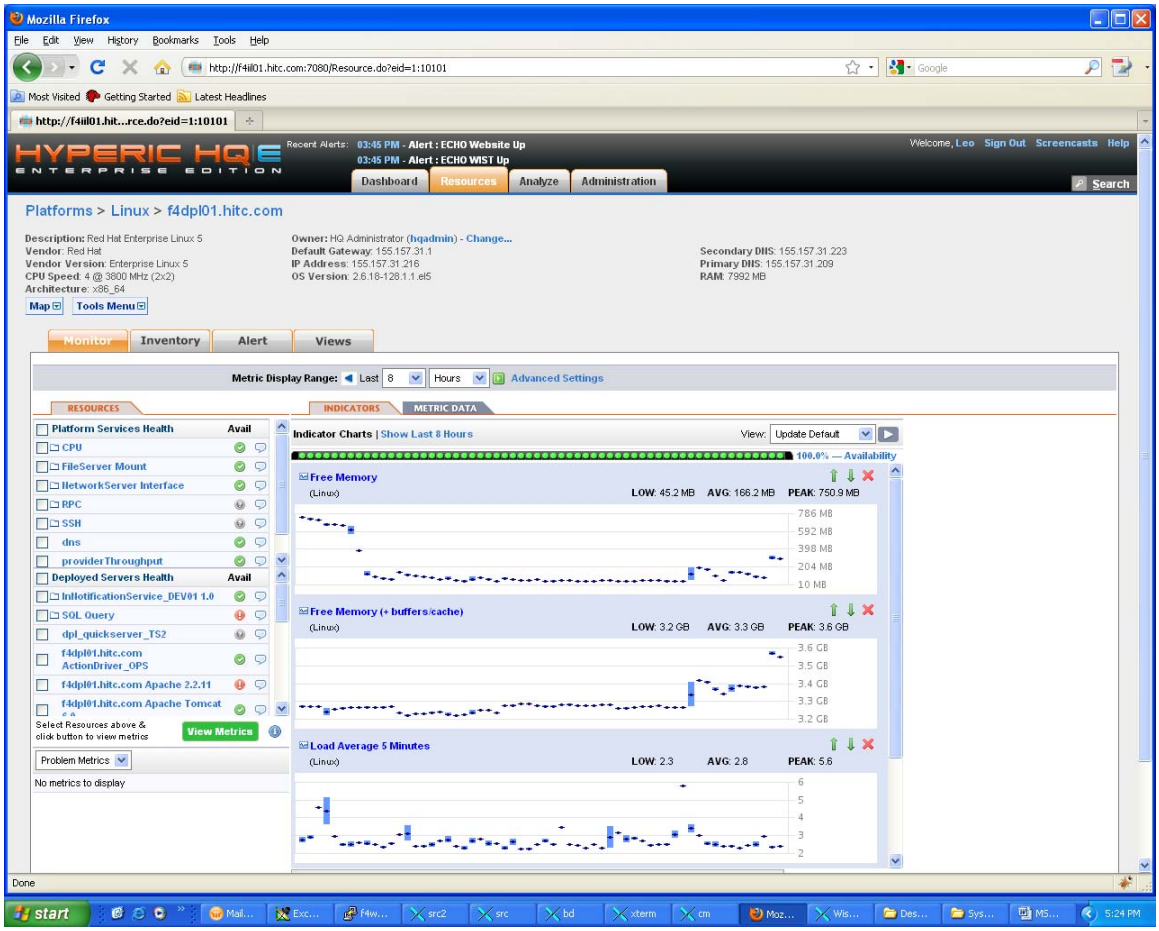


Figure 4.2.2.4.2-14. Host Resource Page

On the platform detail page, click on the “Tools Menu” drop down that is located on the upper left corner of the page, then click on “New Platform Service” in the drop down menu. See Screen shot below:

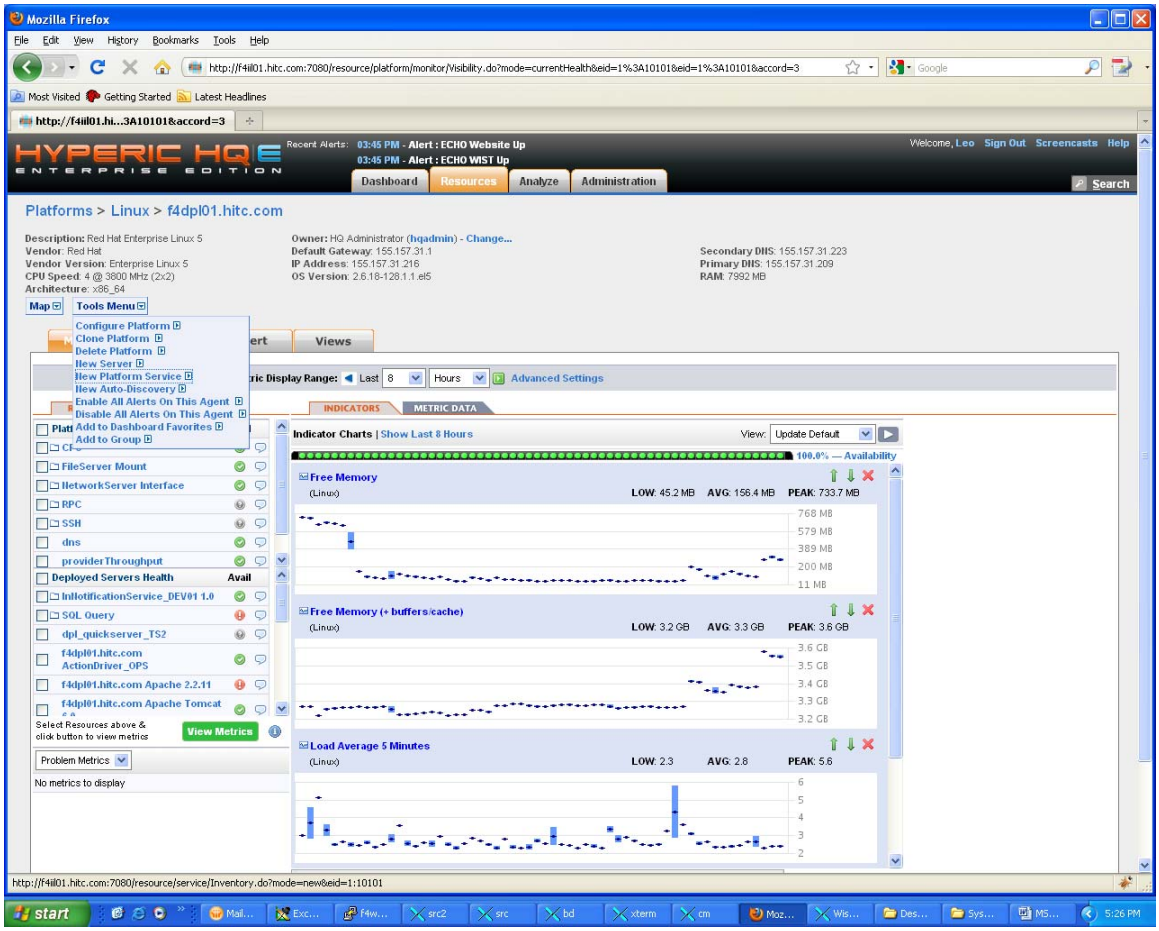


Figure 4.2.2.4.2-15. Add New Platform Service

This brings up the new platform service configuration page. On this page, fill in the name of the data provider and description, on the Service Type drop down menu, select “dataprovider_OPS”. See screen shot below:

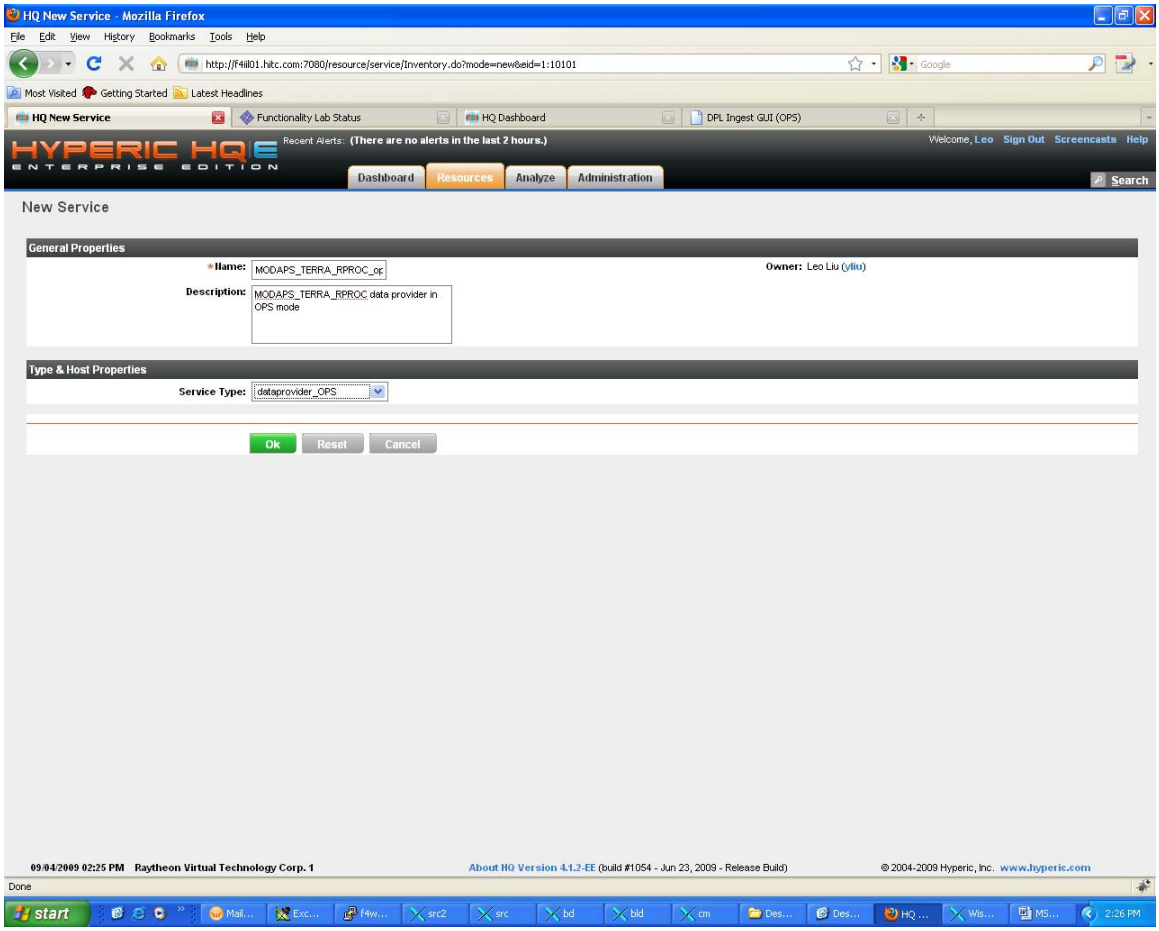


Figure 4.2.2.4.2-16. Configure Individual Data Provider

Then click “OK”. The service detail page will pop up as a result. See below:

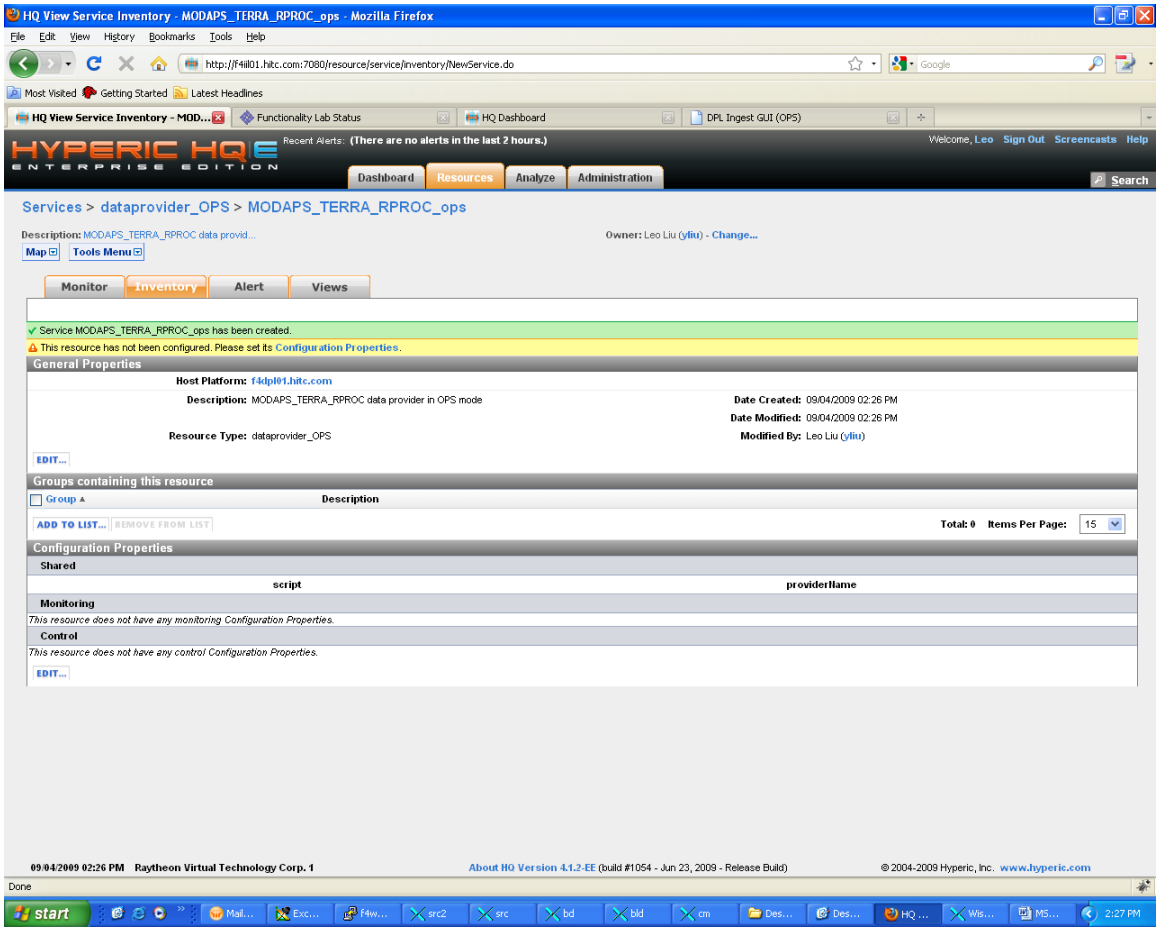


Figure 4.2.2.4.2-17. Individual Data Provider Inventory Page

Click on the link to configure its configuration properties. On the popped up page, the script input text box should be prepopulated and does not need to be modified. In the providerName input text box, type in the name of the data provider.

Note: the provider name typed in has to exactly match the ExternalDataProvider field defined in the InExternalDataProvider table in Ingest database. See the screen shot below:

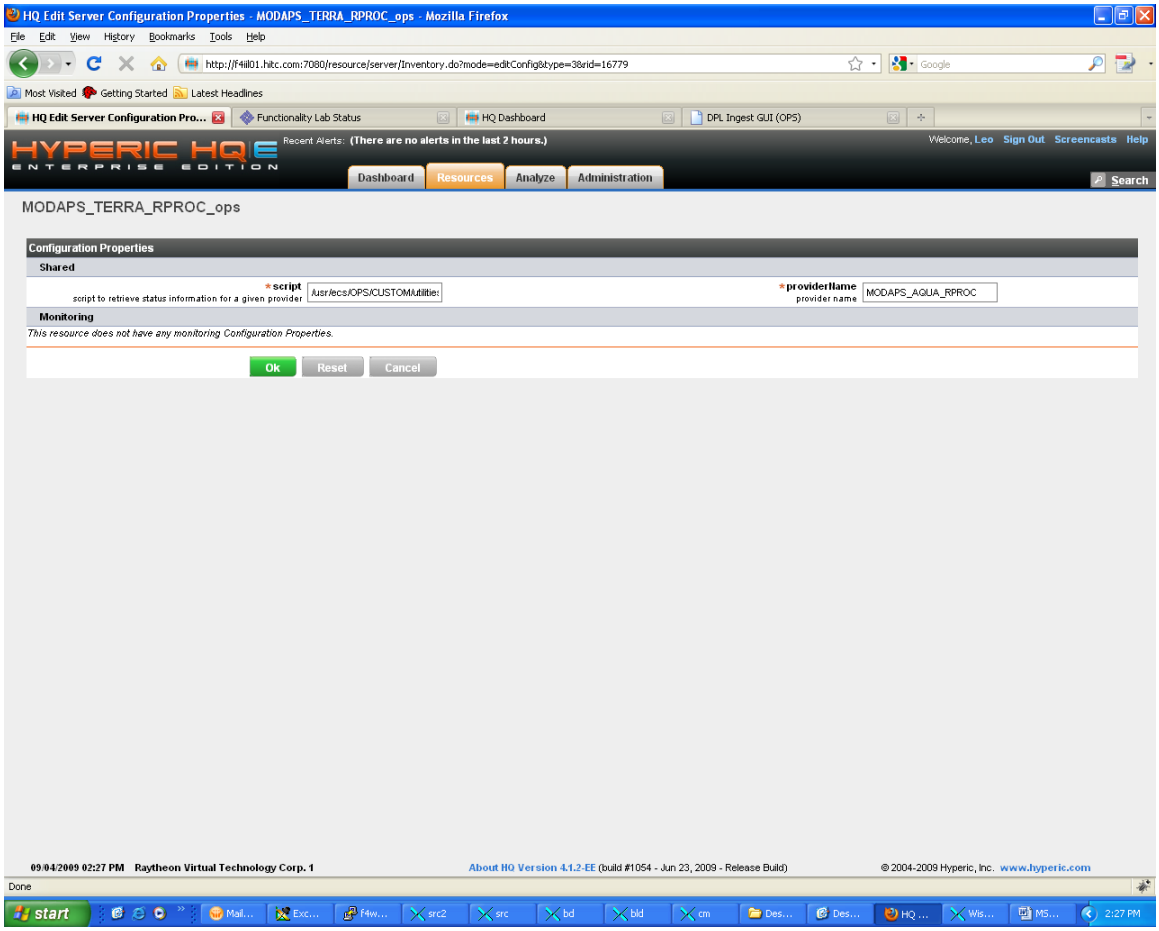


Figure 4.2.2.4.2-18. Individual Data Provider Configuration Page

Click on “OK” to accept the configuration. The screen will go back to the service detail page. That is the end of configuring an individual data provider.

Once the data provider is configured, the Hyperic server will be able to collect the defined metrics by executing the script (defined in the plugin xml file) periodically which invokes a Perl script to retrieve the requested statistic information from the Ingest database. The Perl script invokes a stored proc named SmGetProviderMetrics.sp which takes the data provider name as input and outputs the metrics information for that data provider.

4.2.2.4.2.8 DPL Ingest services

DPL Ingest services monitoring is done using the built-in Hyperic group and service metrics monitoring capability through a custom xml plug-in. See the attached appendix for the DPL Ingest services xml plug-in file of OPS mode.

We collect the following metrics for DPL Ingest services:

- isDpiuActive
- isXvuActive
- isIiuActive
- numTransferServiceAvailable
- numTransferServiceSuspended
- numChecksumServiceAvailable
- numChecksumServiceSuspenced
- numArchiveServiceAvailable
- numArchiveServiceSuspended

The DPL Ingest services plug-in is defined as a service within hyperic. Operator can add it to the x4dpl platform to start collecting the metrics. This is done by clicking the “New Platform Service” menu under the “Tools Menu” of the platform detail page. See screen shot below:

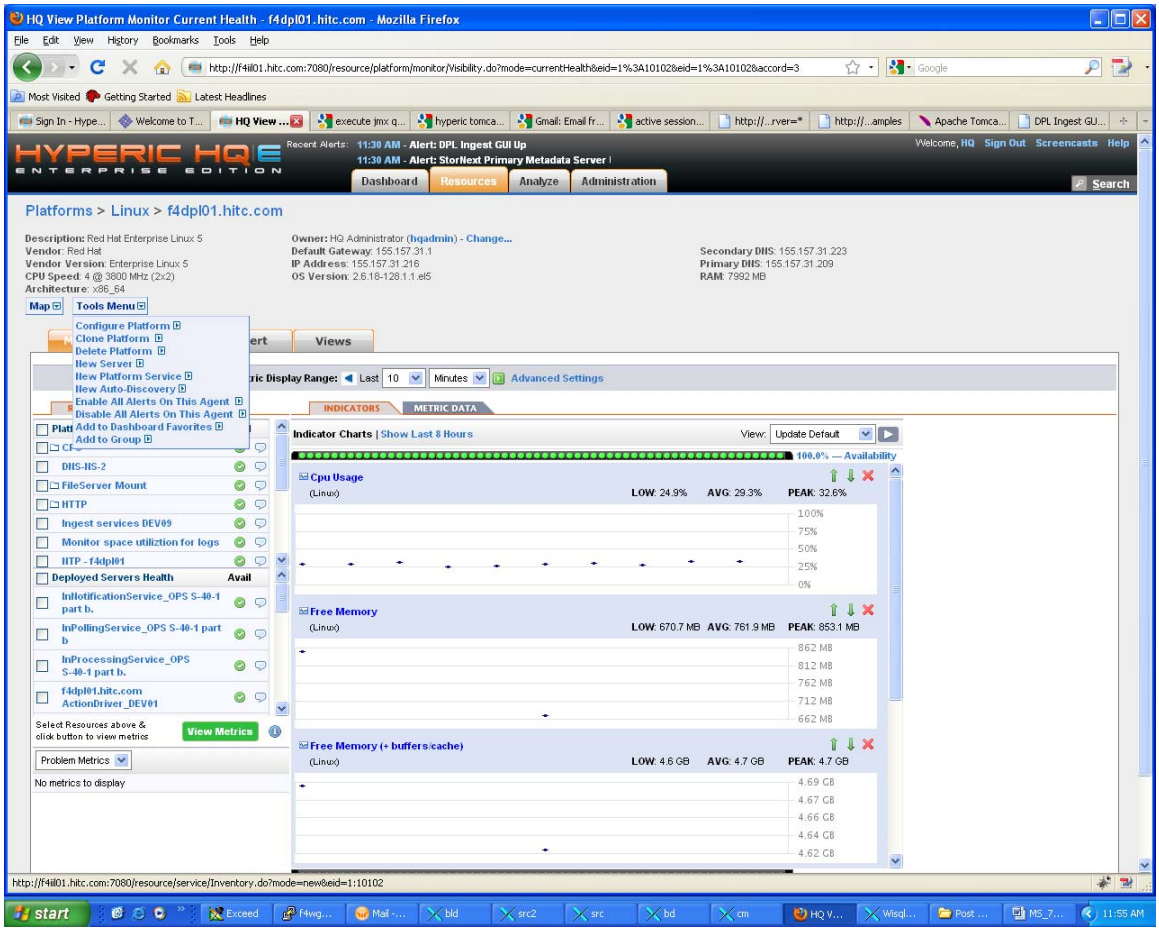


Figure 4.2.2.4.2-19. Add a New Platform Service

On the new platform service configuration page, select the Ingest services for the mode and type in the name and description, then click “OK” to create the platform service. See screen shot below:

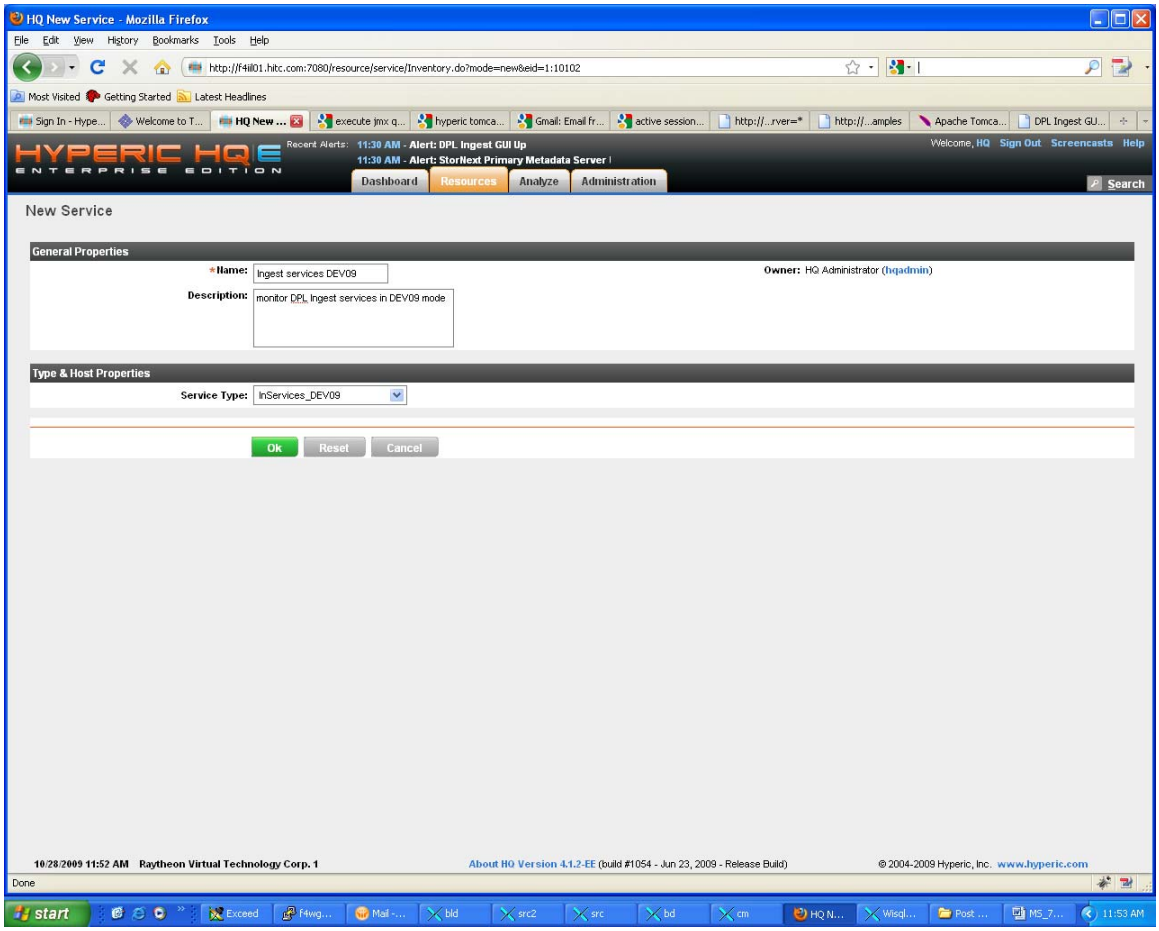


Figure 4.2.2.4.2-20. Create Ingest Services Monitor Service

Wait for a few minutes, the metrics info will show up on the Ingest services monitor page. See screen shot below:

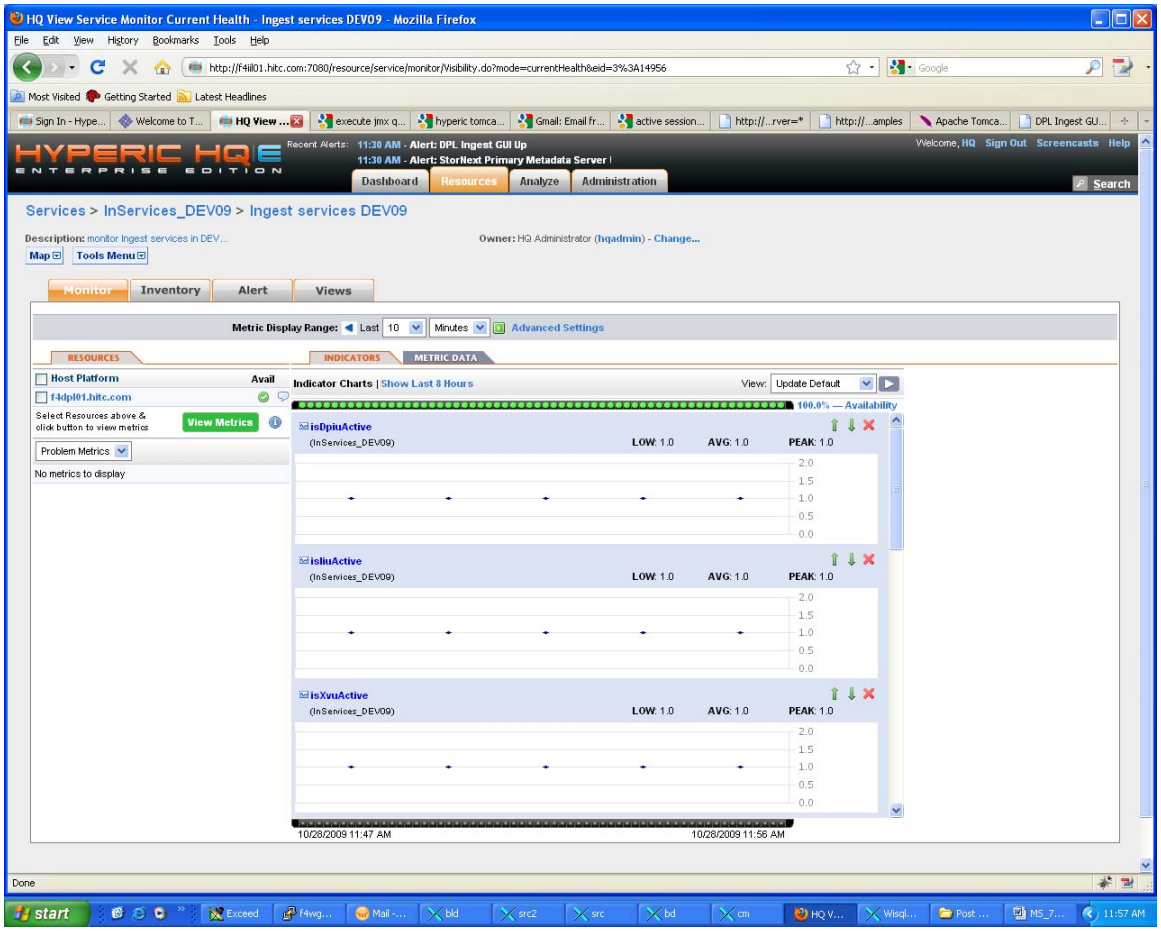


Figure 4.2.2.4.2-21. Ingest Services Metrics

Then click on the Alert tab to configure the alerts and recovery alerts that are necessary for the DPL Ingest business process monitoring. See below for a list of alert definitions that should be configured for the Ingest services monitoring:

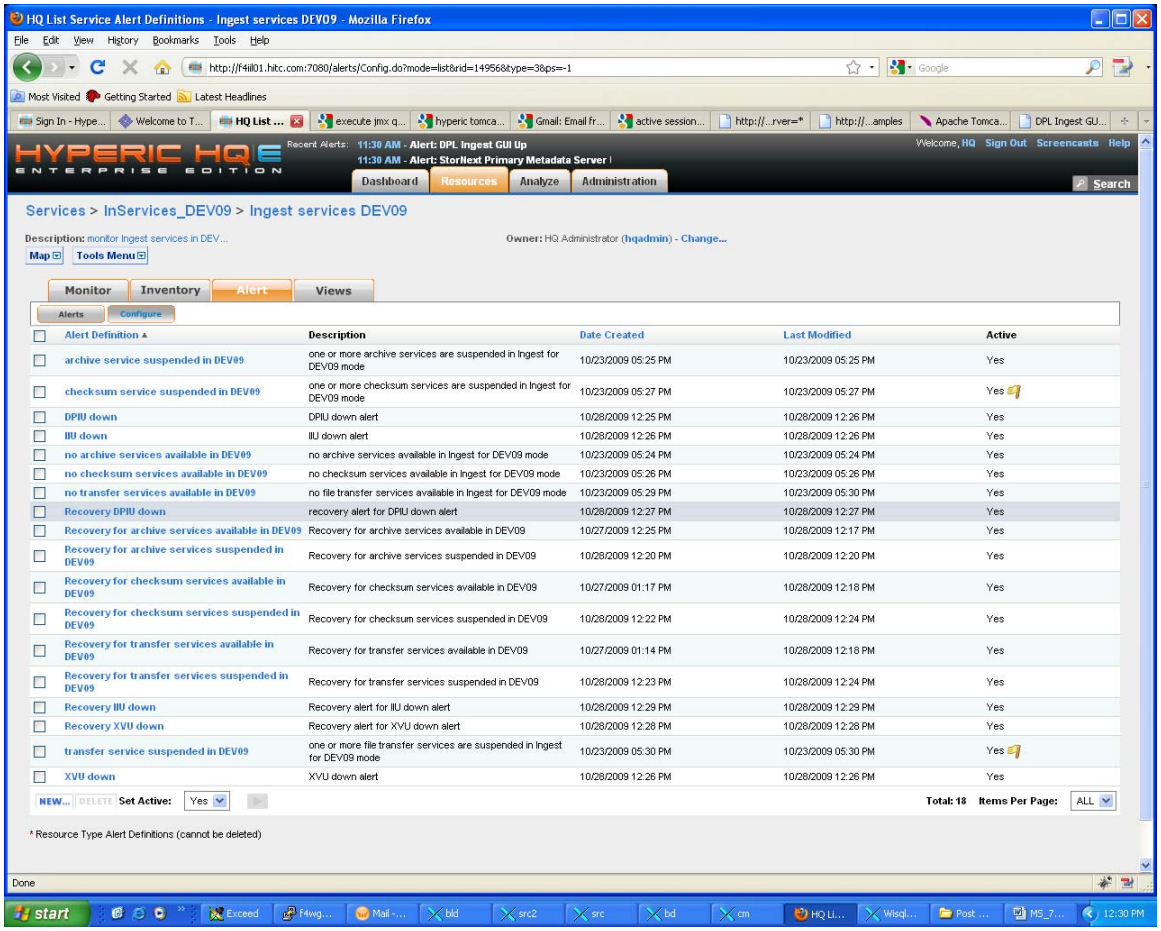


Figure 4.2.2.4.2-22. Ingest Services Alert Definitions

4.2.2.4.2.9 DataPool File System

Data Pool file systems and Archive file systems will be discovered automatically via Hyperic when any host that mounts that file system is configured to be monitored. File systems are displayed as services within the 'FileServer Mount' section for a platform. Metrics that can be captured include availability and free space. I/O statistics can be captured for some file systems; however, currently I/O statistics cannot be captured for StorNext file systems.

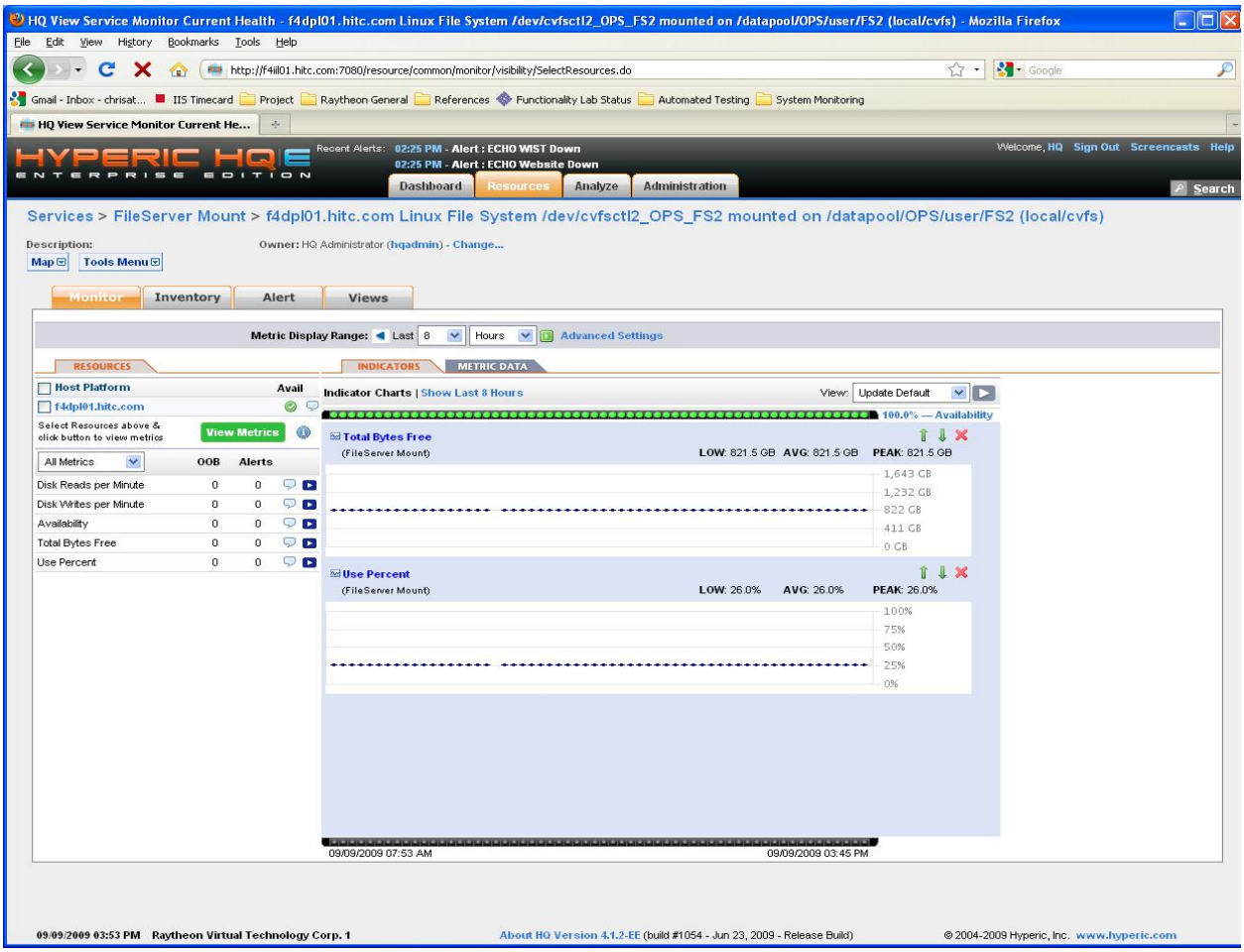


Figure 4.2.2.4.2-23. DataPool File System Monitor Page

4.2.2.4.2.10 Archive File System

See section 4.2.2.4.2.10, Data Pool File System.

4.2.2.4.2.12 pache / Tomcat Web Server

See section 4.2.2.3.2, Configuring Tomcat.

4.2.2.4.2.13 torNext Primary Metadata Server

See section 4.2.2.3.8, Configuring StorNext Host Monitoring.

4.2.2.4.2.14 Monitor number of active sessions of Tomcat Web applications

We modified hyperic tomcat plug-in jar file to provide the functionality to be able to monitor the number of active sessions of a particular Apache Tomcat web application. It is done through a

hyperic service type named “Apache Tomcat 6.0 WebApp Session Count”. One service of “Apache Tomcat 6.0 WebApp Session Count “ service type will be created automatically for each deployed tomcat web service after tomcat is auto-discovered by hyperic server. Operator can list all the WebApp Session Count services by filtering on the service type. See screenshot below:

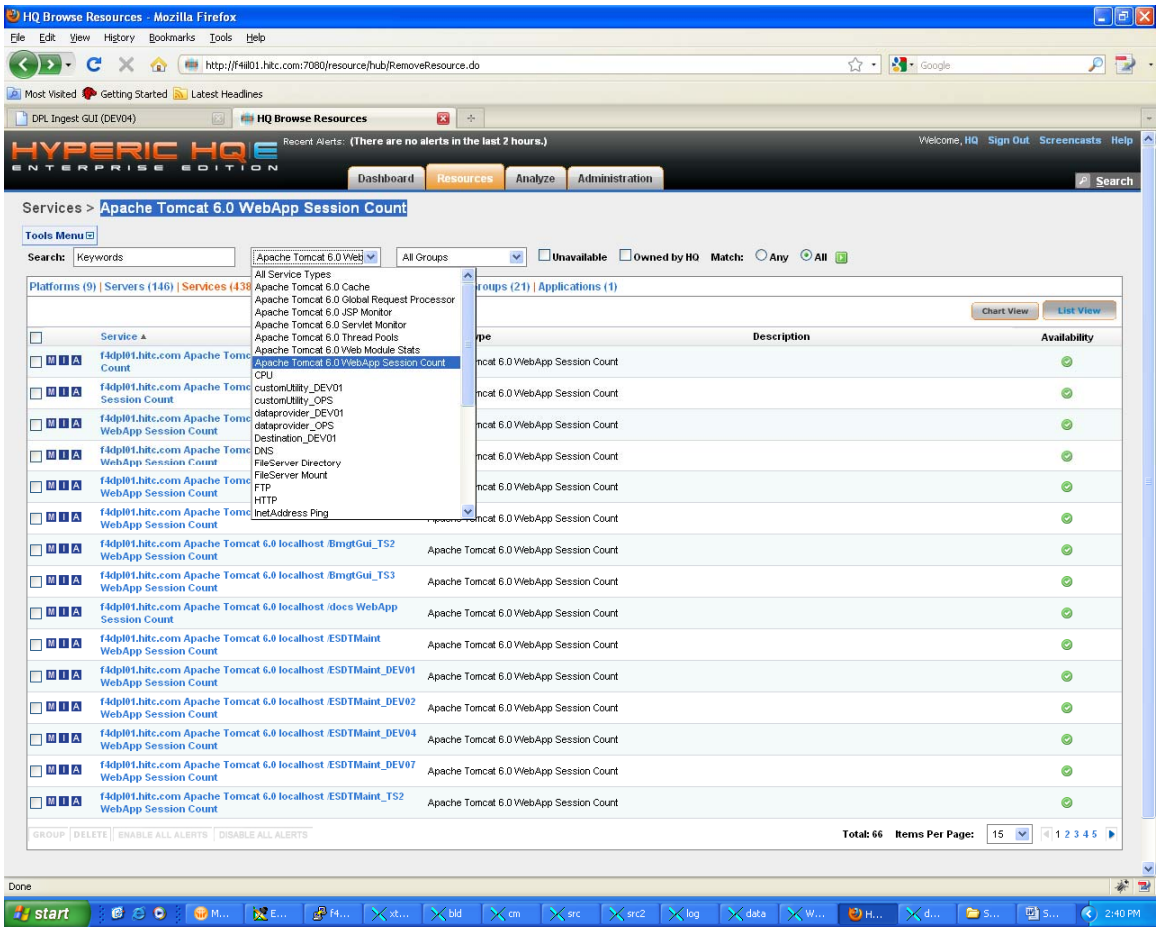


Figure 4.2.2.4.2-31. List of WebApp Session Count Services

The number of active sessions of a web service is monitored through the metric named activeSessions. By default, the collection of the activeSessions is turned off. Operator should turn on the metrics collection of the WebApp Session Count service for the particular web application service he/she wants to monitor. For example, if operator wants to monitor the number of active sessions of DataAccess service in OPS mode, he/she can click on the WebApp Session Count service of the DataAccess service link and turn on the metrics collection of activeSessions. The following is a way of doing this:

To identify the WebApp Session Count service for DataAccess service in OPS mode, operator can filter by the name of DataAccess service on the service listing page. See screen shot below:

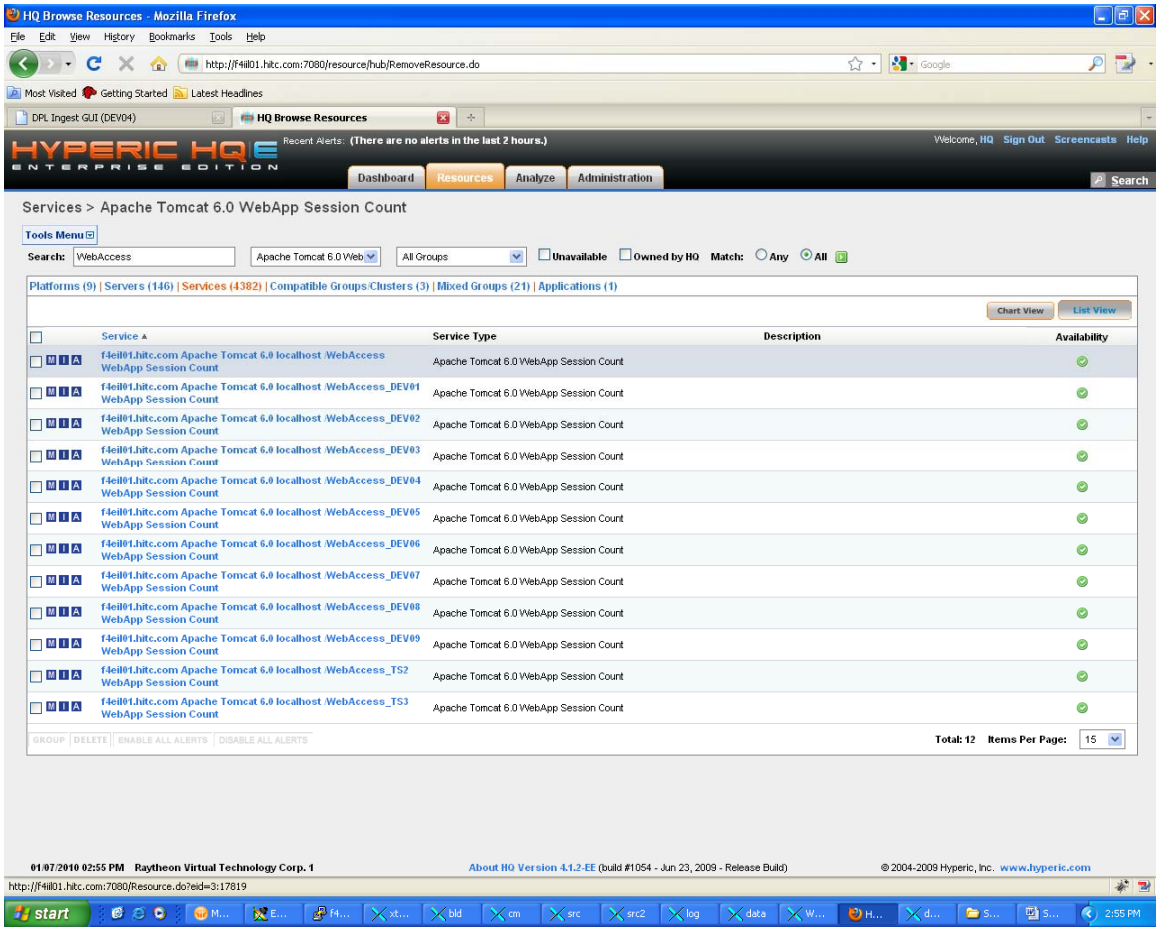


Figure 4.2.2.4.2-32. identify WebApp Session Count Service for OPS DataAccess Service

Click on the link of the DataAccess service to enter the monitor page of the service, see screen shot below:

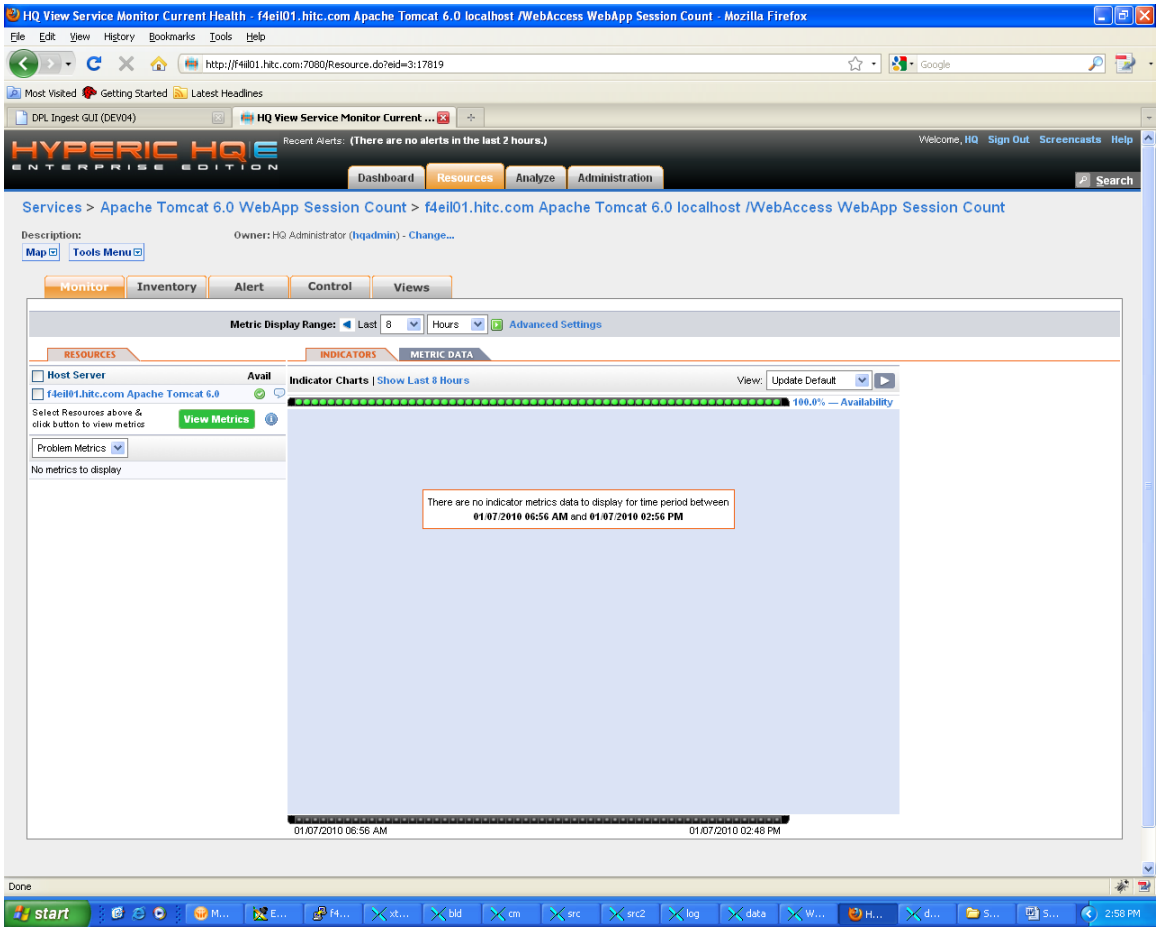


Figure 4.2.2.4.2-33. WebApp Session Count Service of OPS DataAccess

Click on the “METRIC DATA” tab to navigate to the metrics page, then click on the “Show All Metrics” arrow if activeSessions metrics is not listed on the page already. Once the activeSessions metrics is listed on the page, operator can modify the Collection Interval of the activeSessions metrics from NONE to a desired value (e.g. 5 minutes) to start the metrics collection of the activeSessions metrics. See screen shot below:

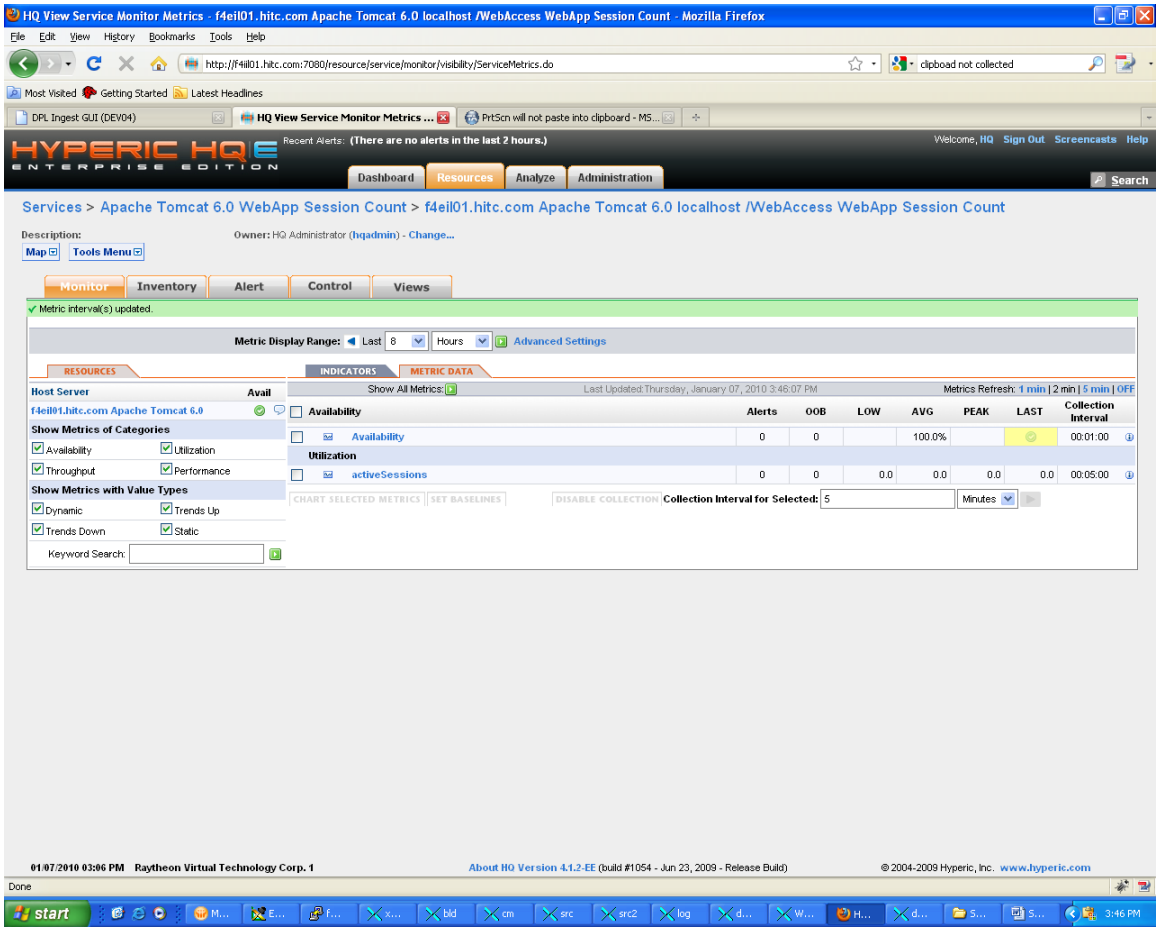


Figure 4.2.2.4.2-34. activeSessions Metrics Collection

4.2.2.4.3 Data Access Business Process

This section describes the resources that are grouped within the DPL Ingest Business Process.

4.2.2.4.3.1 Data Access Resources

Hosts

- x4eil01
- x4ftl01

Custom Code

- Web Order Status GUI

File Systems

- Data Pool

Database

- Sybase
- SQS Server

Apache / Tomcat Web Server

Wu-FTP Server

4.2.2.4.3.2 x4eil01 / x5eil01 Host

A Hyperic agent will be installed on the x4eil01 / x5eil01 host. The host will be configured to be monitored via Hyperic's auto-discovery service. Once the host is selected to be monitored there are a number of metrics that can be captured including availability, load average, CPU usage, TCP statistics, memory usage, and swap space.

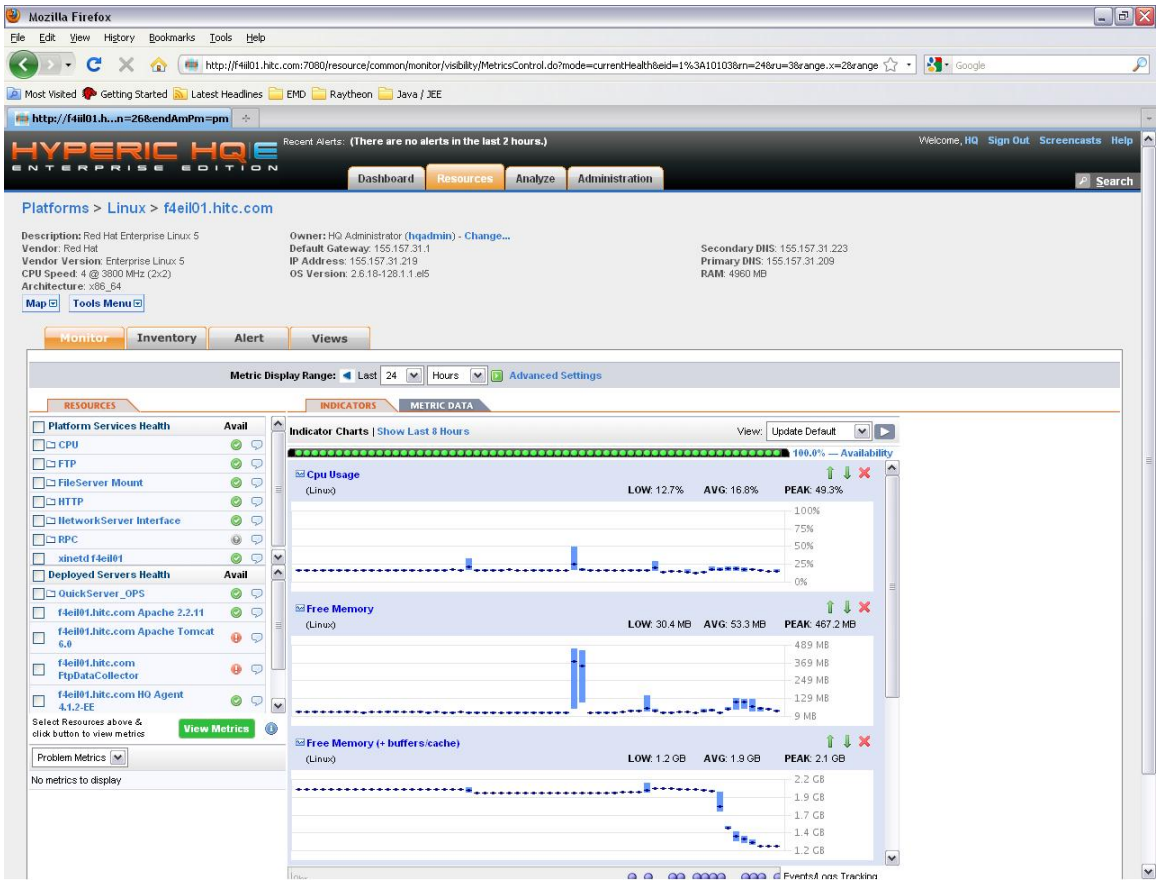


Figure 4.2.2.4.3-2. x4eil01 /x5eil01 Host Monitor Page

4.2.2.4.3.3 x4ftl01 Host

See section 4.2.2.4.3.2, x4eil01 Host.

DataAccessDataAccessDataAccessedn.ecs.nasa.govDataAccessDataAccessDataAccessDataAccessDataAccessDataAccessDataAccessDataAccessDataAccessDataAccessedn.ecs.nasa.govDataAccessDataAccessDataAccessDataAccess4.2.2.4.3.5 Web Order Status GUI

The URL to the Web Order Status GUI is http://<hostname>:<port>/OrderStatus <_MODE>, an example is http://f4eil01.edn.ecs.nasa.gov:22500/OrderStatus. To monitor the website, Hyperic provides a HTTP service that can be configured to periodically submit an http request to a specified URL. Hyperic will read the responses and determine if the website is available or not. Below are the steps to configure Hyperic to monitor the Web Order Status GUI.

1. Select a platform where you want to define your HTTP service. The agent on this platform will be in charge of submitting a http request and reading the responses. Mouse over the 'Resources' tab and select the 'Browse' option. Click on the 'Platforms' link if it isn't highlighted and select a platform.

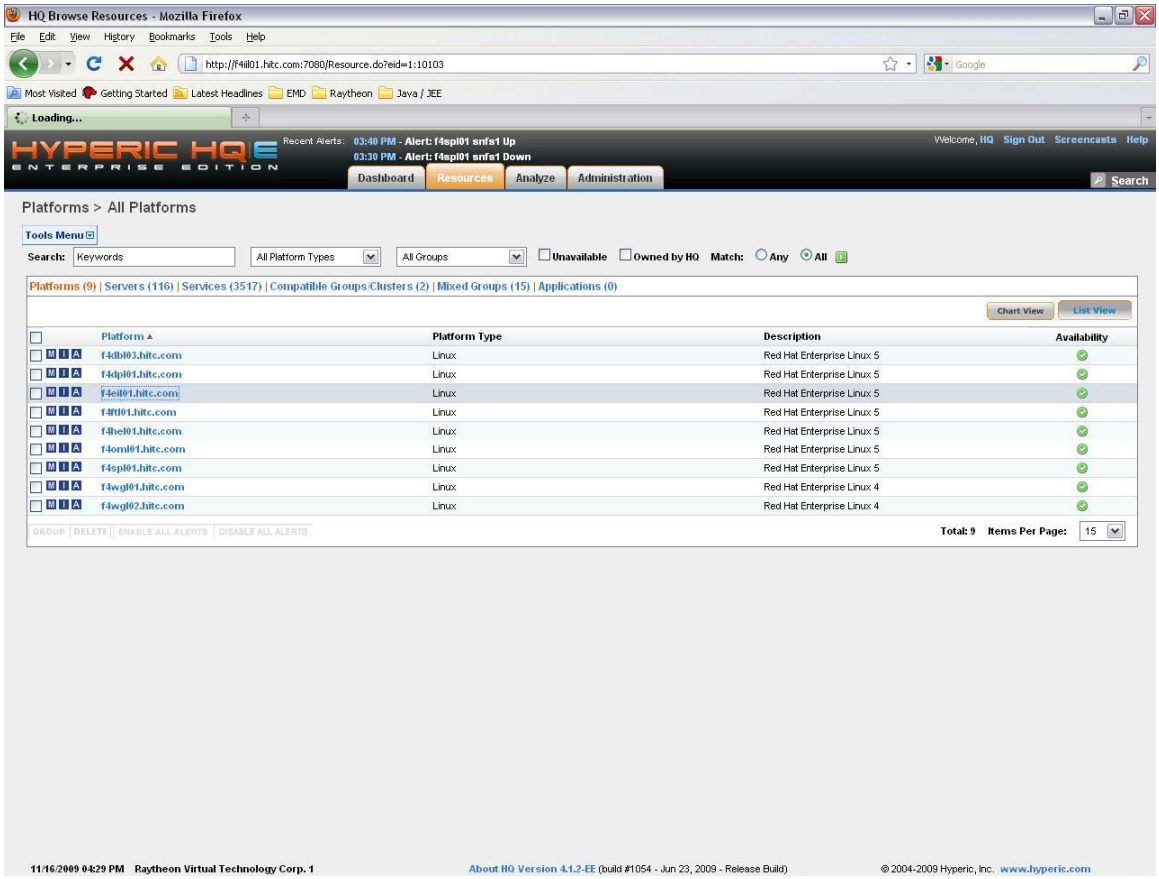


Figure 4.2.2.4.3-9. Select Web Order Status GUI HTTP Service Platform

2. In the platform's detailed page, click on the 'Tools Menu' button and select the 'Add Platform Service' option.

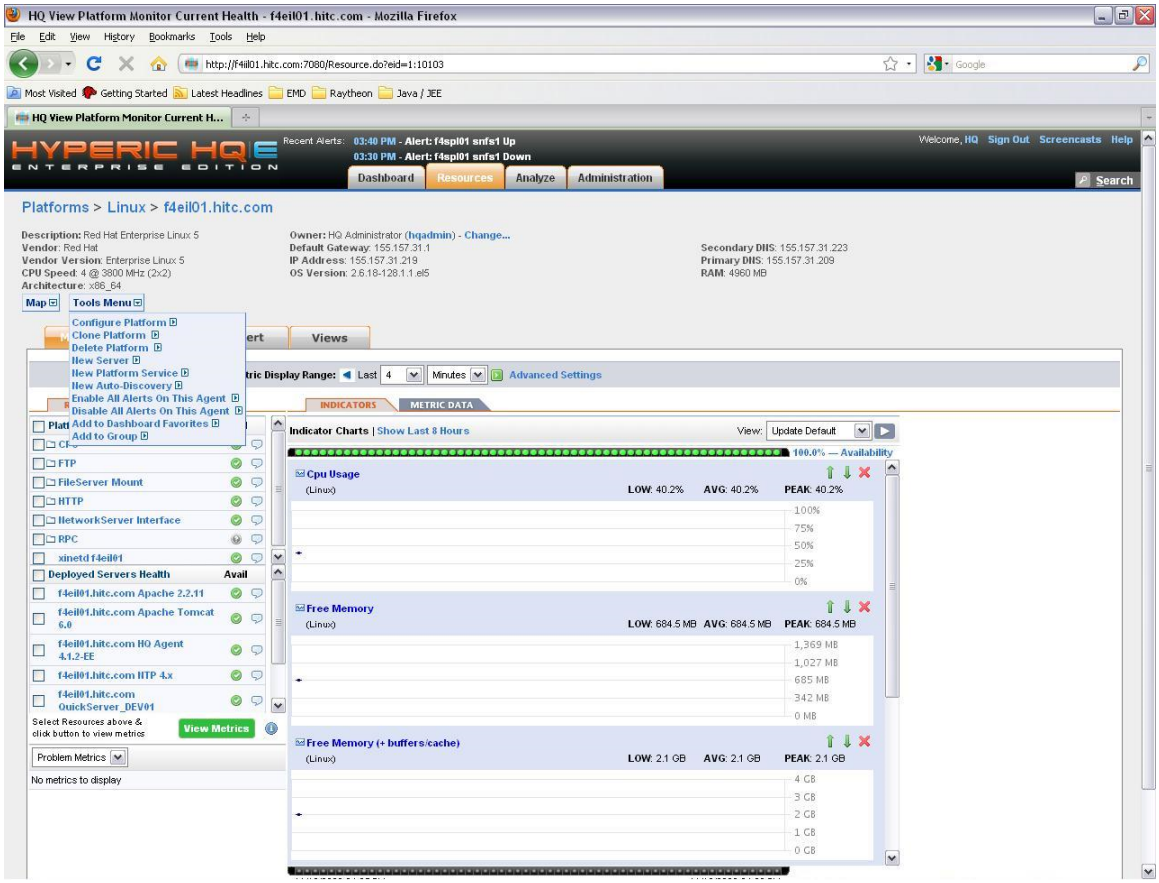


Figure 4.2.2.4.3-10. Web Order Status GUI Add New Service

3. A new service general properties page will be displayed. Fill in the name, description, and service type. Afterward, click the 'OK' button.

   Name: OrderStatus GUI OPS

   Description: This service monitors the OrderStatus GUI in the OPS mode.

   Service Type: HTTP

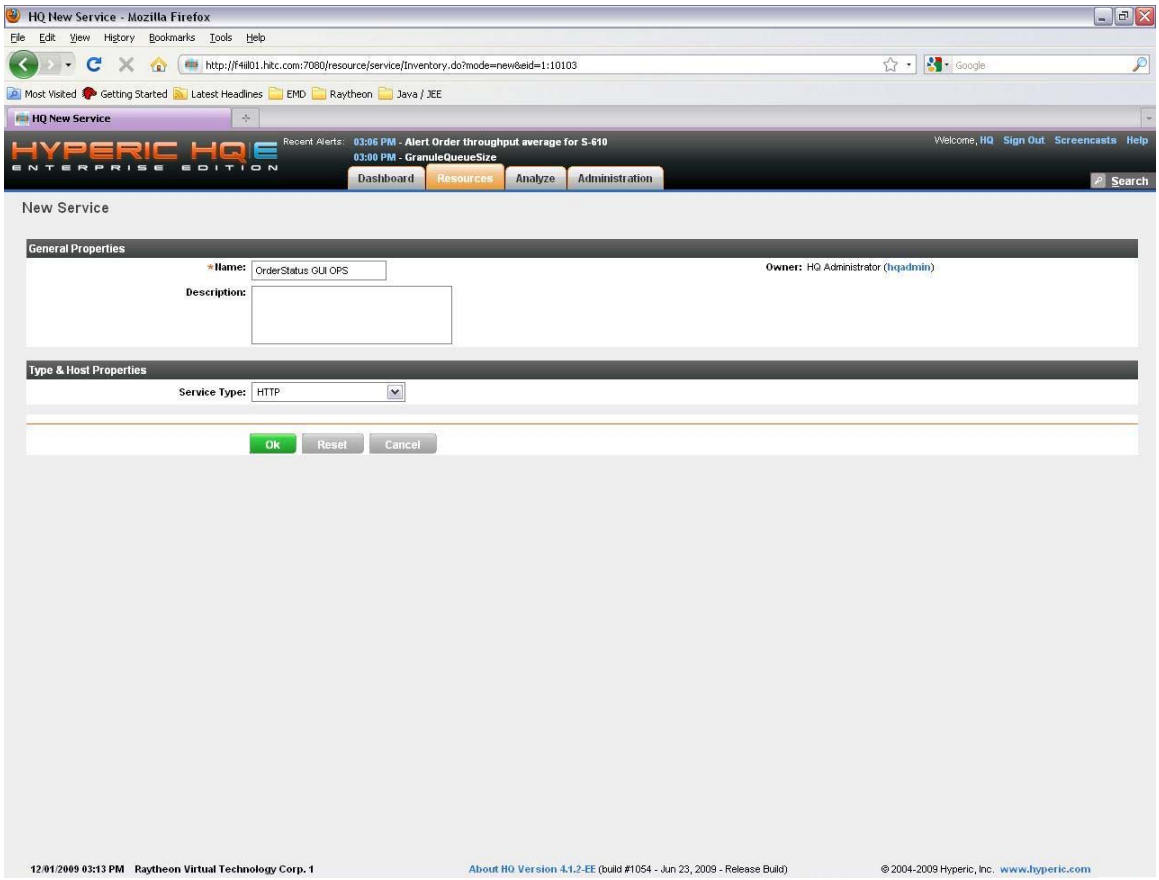


Figure 4.2.2.4.3-11. Web Order Status GUI General Properties

4. You will be taken to the service detail page, but the service has not been configured to monitor the Web Order Status GUI yet. Click on the 'Configuration Properties' link.

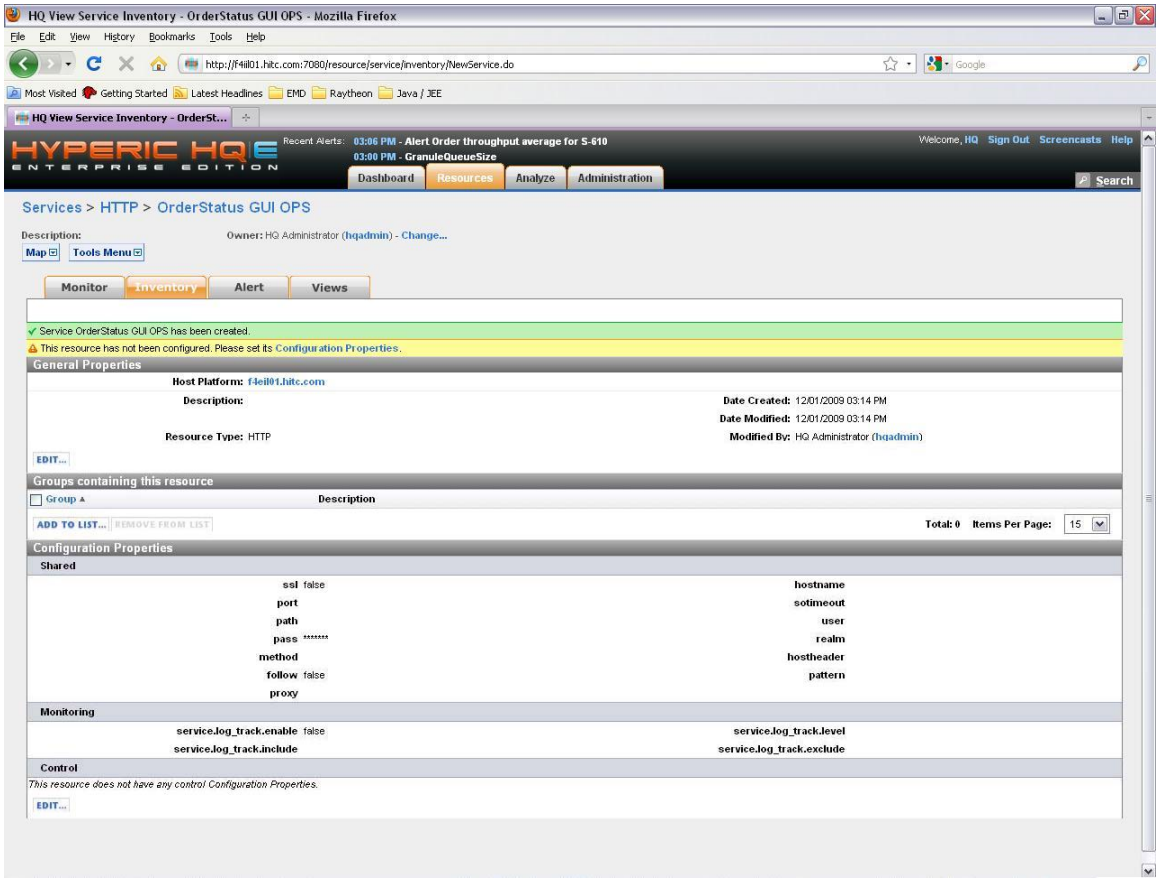


Figure 4.2.2.4.3-12. Web Order Status GUI Configuration Properties Link

5. In the configuration properties page fill in the following fields (below is an example from EDF) and click the 'OK' button.

   hostname: f4eil01.edn.ecs.nasa.gov

   port: 22500

   ***sotimeout**: 60

   path: /OrderStatus

   method: GET

   follow: check the box

   ****proxy**: <hostname>:<port>

   *This is the amount of time in seconds Hyperic will timeout from the http request.

   **If your internal network uses a proxy to get out supply it here.

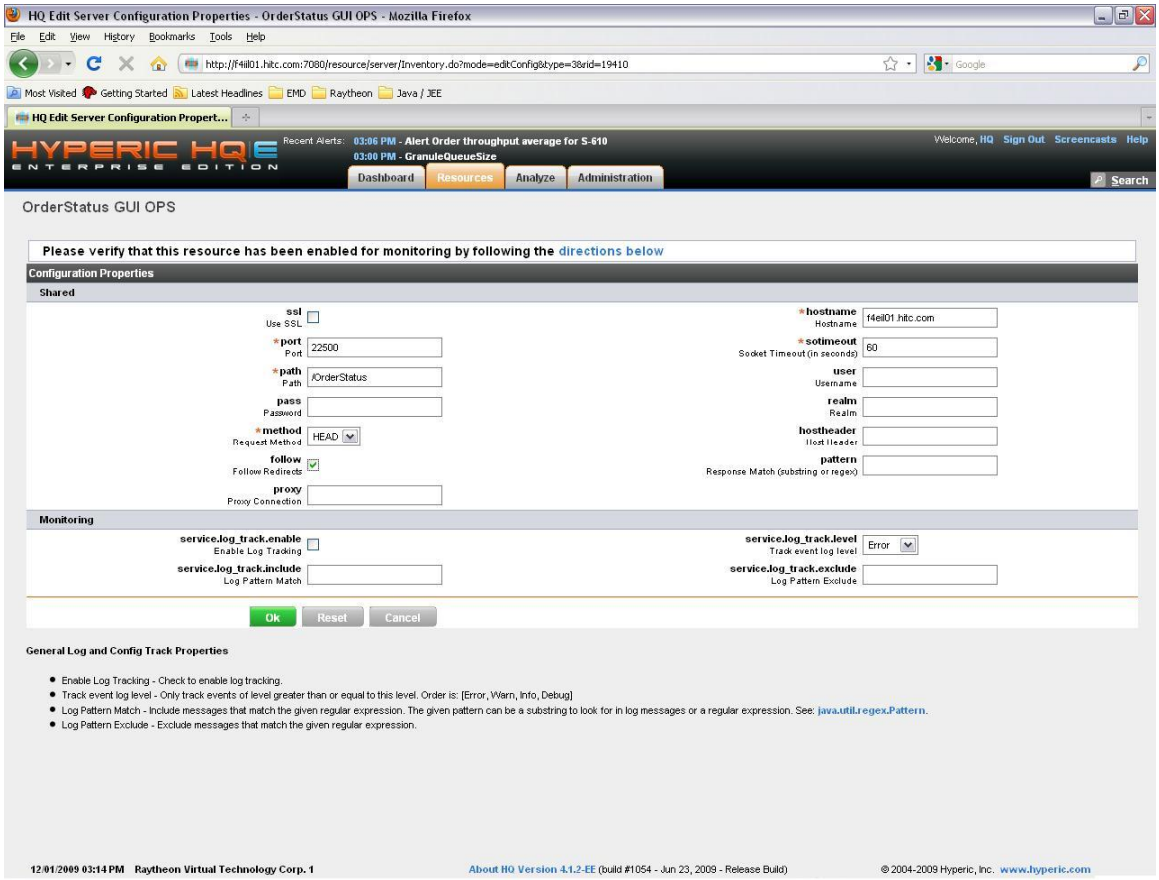


Figure 4.2.2.4.3-13. Web Order Status GUI Configuration Properties Page

6. The Web Order Status GUI HTTP service is now configured and you can go ahead and monitor it, setup alerts, and change the monitoring interval of the metrics it gathers.

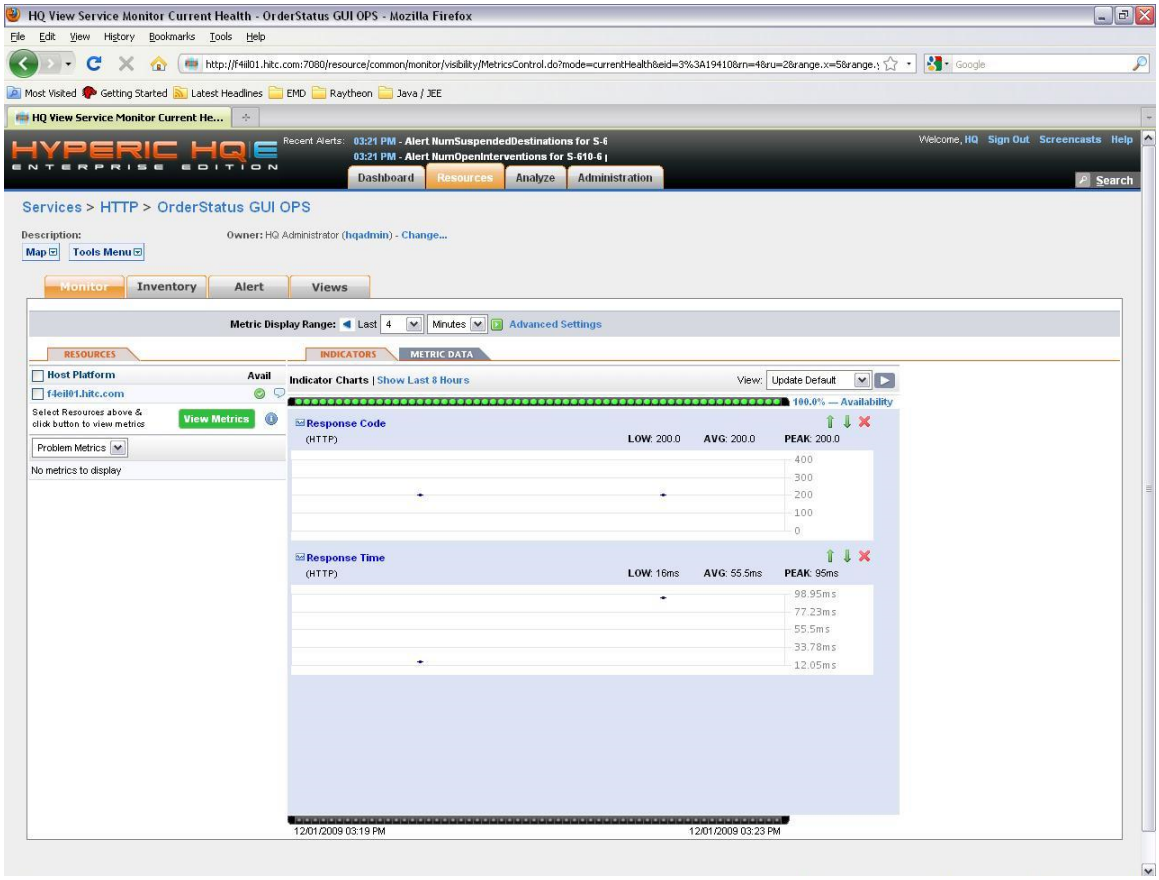


Figure 4.2.2.4.3-14. Web Order Status GUI Monitoring

4.2.2.4.3.6 DataPool File System

See section 4.2.2.4.2.9, DataPool File System.

4.2.2.4.3.7 Sybase

See section 4.2.2.3.1, Configuring Sybase.

4.2.2.4.3.8 SQS Server

See section 4.2.2.4.2.12, it show how to configure Hyperic to monitor each SQS Server.

4.2.2.4.3.9 Apache / Tomcat Web Server

See section 4.2.2.3.2, Configuring Tomcat.

4.2.2.4.3.10 Wu-FTP Server

The Wu-FTP COTS Server runs on the x4eil0x, x4ftl0x and x5eil01 hosts servicing ftp requests. A custom server, FtpDataCollector was developed to poll the Wu-FTP log for completed request and the information captured is stored in the Sybase database. In order to monitor the Wu-FTP Server a FTP service is configured to periodically ping the server to determine if it is availability, its response time, and to gather ftp protocol specific metrics. A custom Hyperic plugin was developed to monitor the FtpDataCollector server and to retrieve the information stored in the Sybase database for display in the Hyperic GUI.

4.2.2.4.3.10.1 Configure FTP Service

Please refer to the "Configure FTP" section. The section provides step-by-step instructions on how to configure an ftp service to monitor a host with an ftp server running.

4.2.2.4.3.10.2 FtpDataCollector Server

The EcMsSmFtpDataCollector Server monitoring is done through an xml custom plug-in. There is one plug-in file per host. The plug-in file name is FtpDataCollector-plugin.xml.

The metrics that will be collected for the FtpDataCollector Server includes the standard Hyperic metrics (see section 4.2.2.2.13, Standard Plugin Metrics) and custom metrics (see below).

Table 4.2.2.4.3-1. FtpDataCollector Metrics

Custom Metrics	
Metric Name	**Description**
Number of Ftp Sessions	The total number of ftp sessions for the host.
Number of Ftp Transfers	The total number of ftp transfers over the last five minutes for the host.
Ftp Transfer Rate	The average ftp volume (in MB) throughput per minute over the last five minutes for the host.
Number of Http Transfers	The total number of http transfers over the last five minutes for the host.
Http Transfer Rate	The average http volume (in MB) throughput per minute over the last five minutes for the host.

The FtpDataCollector Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in and the custom metrics will be collected through the SQL plug-in by querying the Ingest database.

Up/down alerts are set up for the FtpDataCollector Server based on its availability metrics. The down alert is used to notify operator of the problem and update the Data Access business process status and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to screen shots in 7.3 Polling Server for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

4.2.2.4.4 Order Management Business Process

This section describes the resources that are grouped within the DPL Ingest Business Process.

4.2.2.4.4.1 Order Management Resources

Hosts

- x4oml01 / x5oml01

Custom Code

- Order Manager Server
- HEG Server (Release 8.1 only)
- EPD Server
- Copy Server
- EWOC
- WIST

File Systems

- Data Pool

Database

- Sybase

HSA

4.2.2.4.4.2 Order Manager Host

A Hyperic agent will be installed on each host used by Order Manager. Each host will be configured to be monitored via Hyperic's auto-discovery service. Once the host is selected to be monitored there are a number of metrics that can be captured including availability, load average, CPU usage, TCP statistics, memory usage, and swap space.

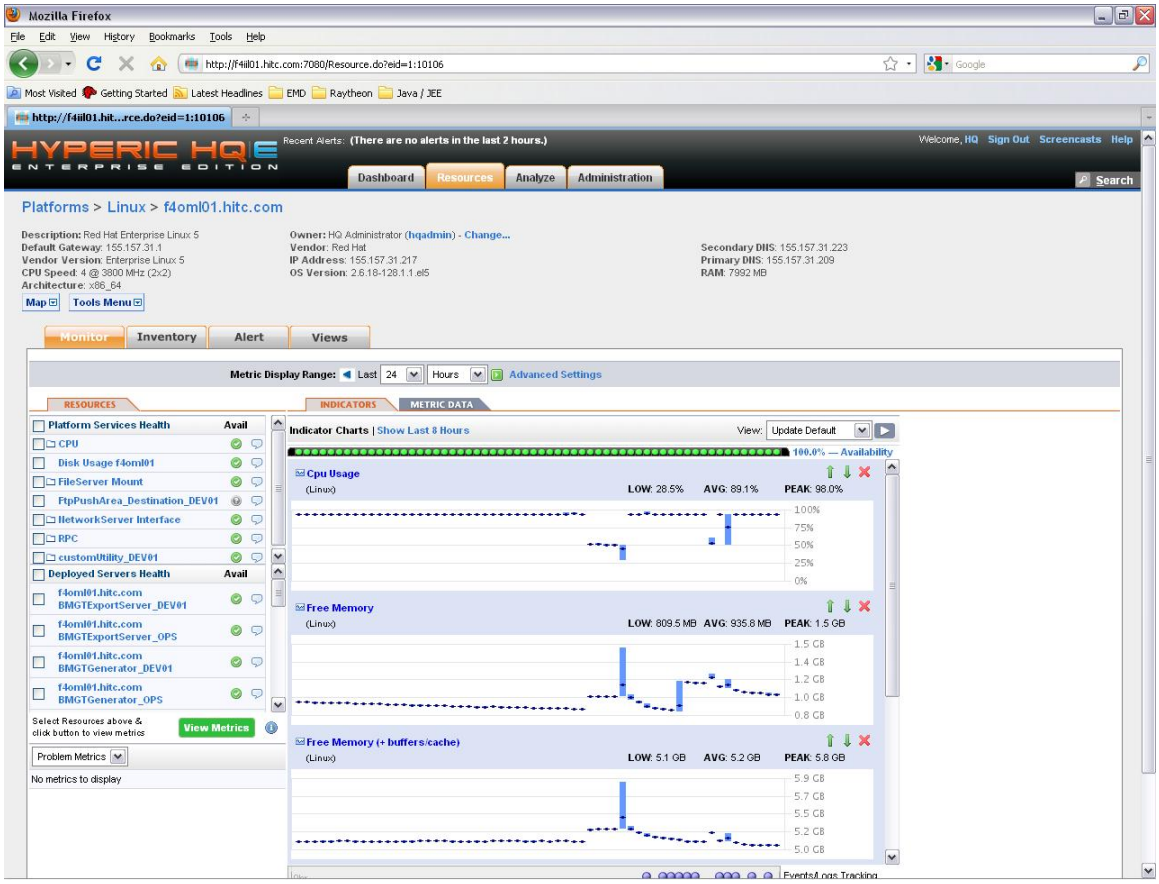


Figure 4.2.2.4.4-1. Order Manager Host Monitor Page

4.2.2.4.4.3 Order Manager Server

The Order Manager Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-OMS-OrderManager-plugin.xml.

The metrics that will be collected for the Order Manager Server include the standard Hyperic metrics (see section 4.2.2.2.13, Standard Plugin Metrics) and custom metrics (see below).

Table 4.2.2.4.4-1. Order Manager Server Metrics (1 of 2)

Custom Metrics	
Metric Name	**Description**
RequestQueueSize	The total number of requests queued in the system.
GranuleQueueSize	The total number of granules queued in the system.

Table 4.2.2.4.4-1. Order Manager Server Metrics (2 of 2)

Custom Metrics	
Metric Name	**Description**
NumOpenAlerts	The total number of open alerts in the server.
NumOpenInterventions	The total number of open interventions in the server.
NumSuspendedDestinations	The total number of suspended destinations in the server
Throughput (gran/min)	The average number of granules throughput per minute over the last five minutes.
Throughput (MB/min)	The average volume (in MB) throughput per minute over the last five minutes.
FtpPushThroughput (gran/min)	The average number of granules throughput per minute over the last five minutes for ftp push orders.
FtpPushThroughput (MB/min)	The average volume (in MB) throughput per minute over the last five minutes for ftp push orders.
FtpPullThroughput (gran/min)	The average number of granules throughput per minute over the last five minutes for ftp pull orders.
FtpPullThroughput (MB/min)	The average volume (in MB) throughput per minute over the last five minutes for ftp pull orders.

The Order Manager server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in and the custom metrics will be collected through the SQL plug-in by querying the OMS database.

Up/down alerts are set up for the Order Manager server based on its availability metrics. The down alert is used to notify operator of the problem and update the Order Manager business process status and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to screen shots in 7.3 Polling Server for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

4.2.2.4.4.4 OM Destination

Om Destination monitoring is done using the built-in Hyperic group and service metrics monitoring capability through a custom xml plug-in.

We collect the following metrics for each destination:

- Throughput (granules/minutes over the previous five minutes)
- Throughput (MB/minutes over the previous five minutes)

All destinations in a mode are displayed as a group called “<MODE>_DESTINATIONS”. The <MODE>_DESTINATIONS group can be added to the “Favorite Resources” portlet on the Dashboard for easy access. See screen shot below:

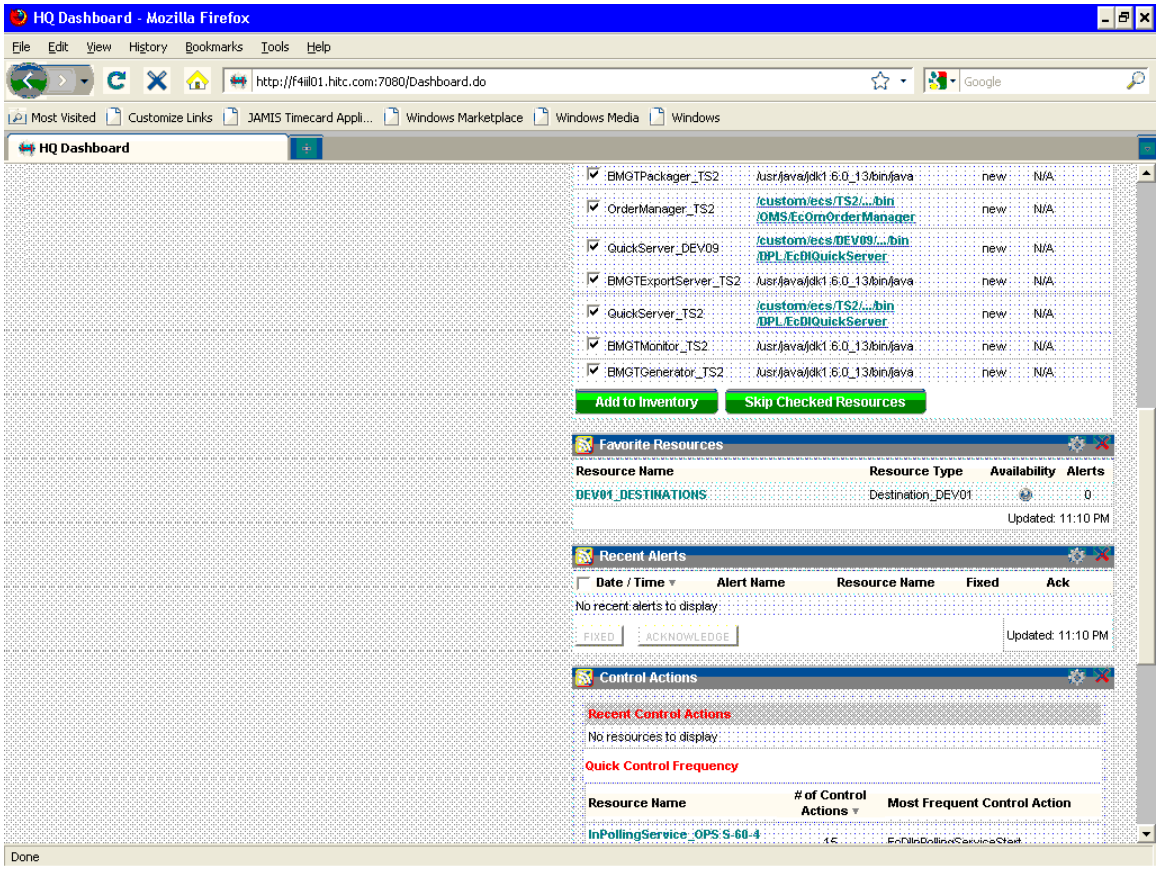


Figure 4.2.2.4.4-2. Destination Dashboard

Click on the OPS_DESTINATIONS will bring up the providers details page which lists the list of defined destinations in the OPS mode and the combined statistic metrics of all the destinations. See screen shot below:

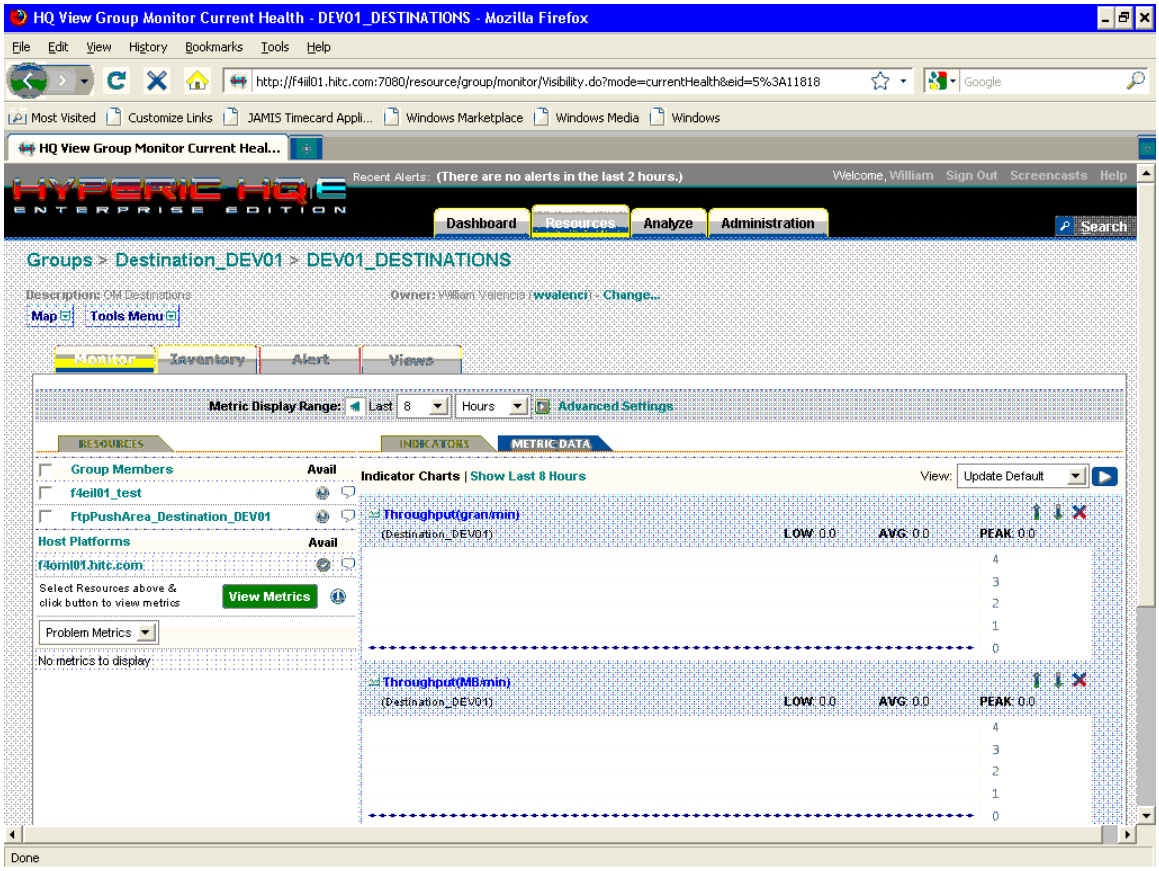


Figure 4.2.2.4.4-3. Data Provider Group Monitor Page

To see the metrics of an individual destination, click on the destination name in the “Resources” window on the left. See below for a screen shot of the destination detail page.

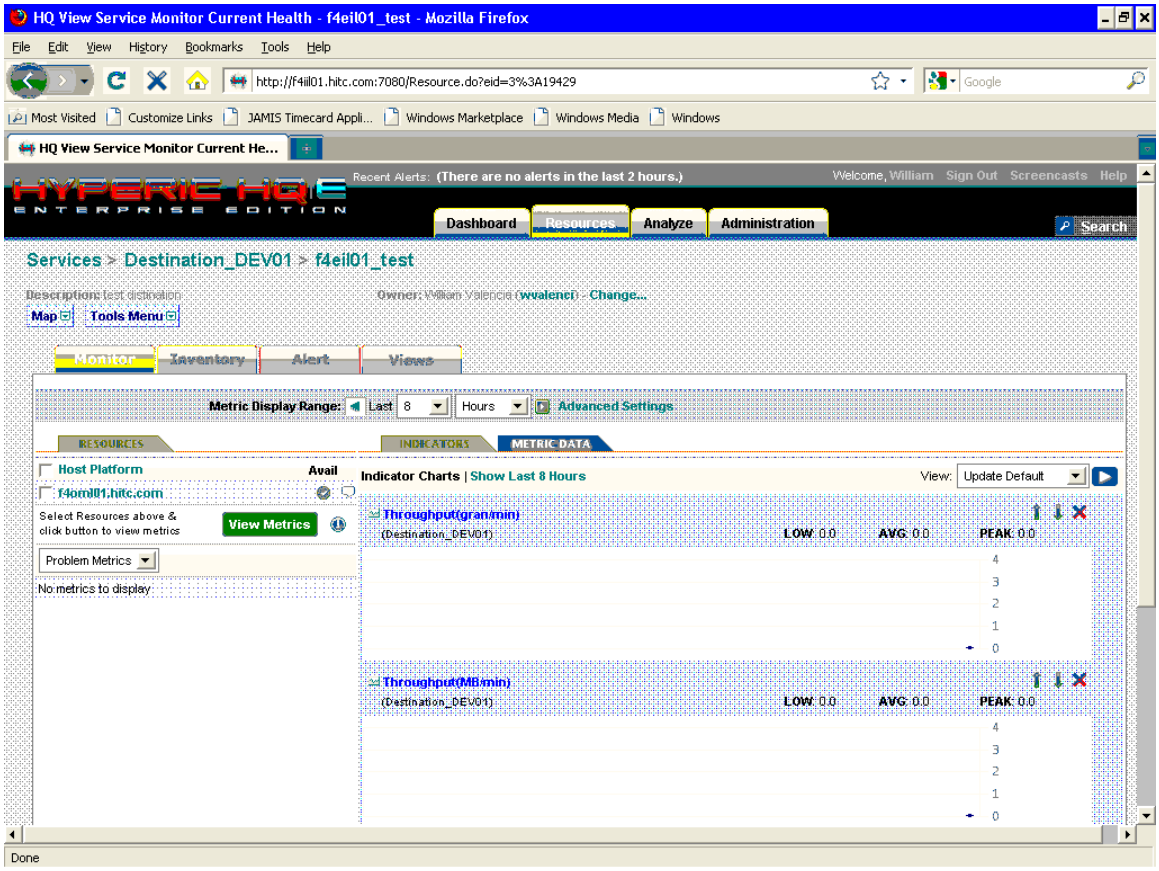


Figure 4.2.2.4.4-4. Individual Destination Monitor Page

Below are the four major steps to set up the OM Destination for monitoring:

1. Define the destination resource through a custom plugin. The destination resource is defined as a platform service type on the OML box. The plugin xml is named <MODE>-OMS-Destination -plugin.xml. It defines the metrics that pertain to the resource type of destination. Please refer to the general instruction on how to deploy a plugin in Hyperic.

2. Define the OPS_DESTINATIONS compatible (not mixed) group. The group type should be destination_OPS. Please refer to the general instruction on how to define a compatible group in Hyperic.

3. Configure individual destinations through Hyperic GUI. See section below for details.

Add the configured individual destination to the OPS_DESTINATIONS group. Please refer to the general instruction on how to add a resource to a group.

Below is a detailed description on how to configure an individual destination using the Hyperic GUI.

Click on the “Resource” tab at the top of the page. Select “Browse” in the drop-down menu. Click on “Platforms” tab to list all the platforms defined in the system. Click on the platform where OMS servers are installed (i.e. X4oml01 box) to bring up the platform detail page. See the screen shot below for an example:

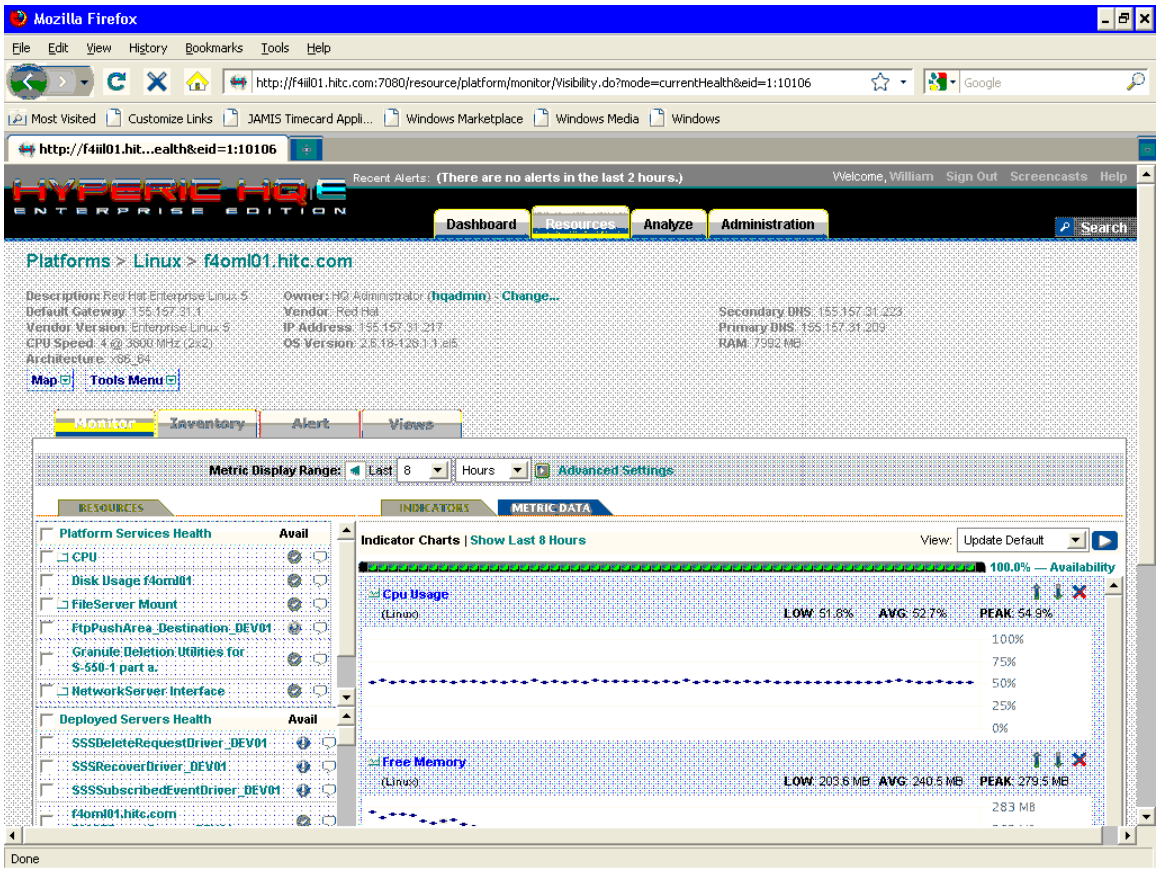


Figure 4.2.2.4.4-5. Host Resource Page

On the platform detail page, click on the “Tools Menu” drop down that is located on the upper left corner of the page, then click on “New Platform Service” in the drop down menu. See Screen shot below:

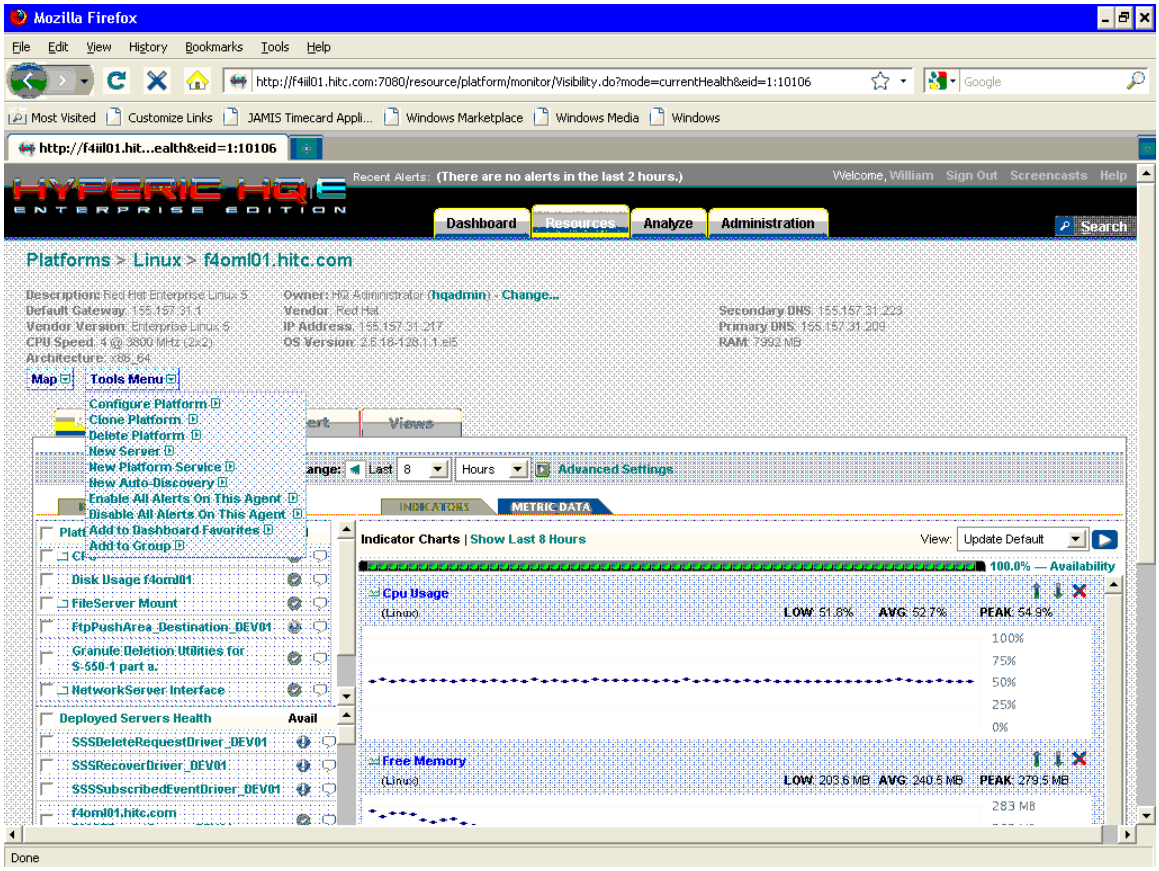


Figure 4.2.2.4.4-6. Add New Platform Service

This brings up the new platform service configuration page. On this page, fill in the name of the destination and description, on the Service Type drop down menu, select “Destination_OPS”. See screen shot below:

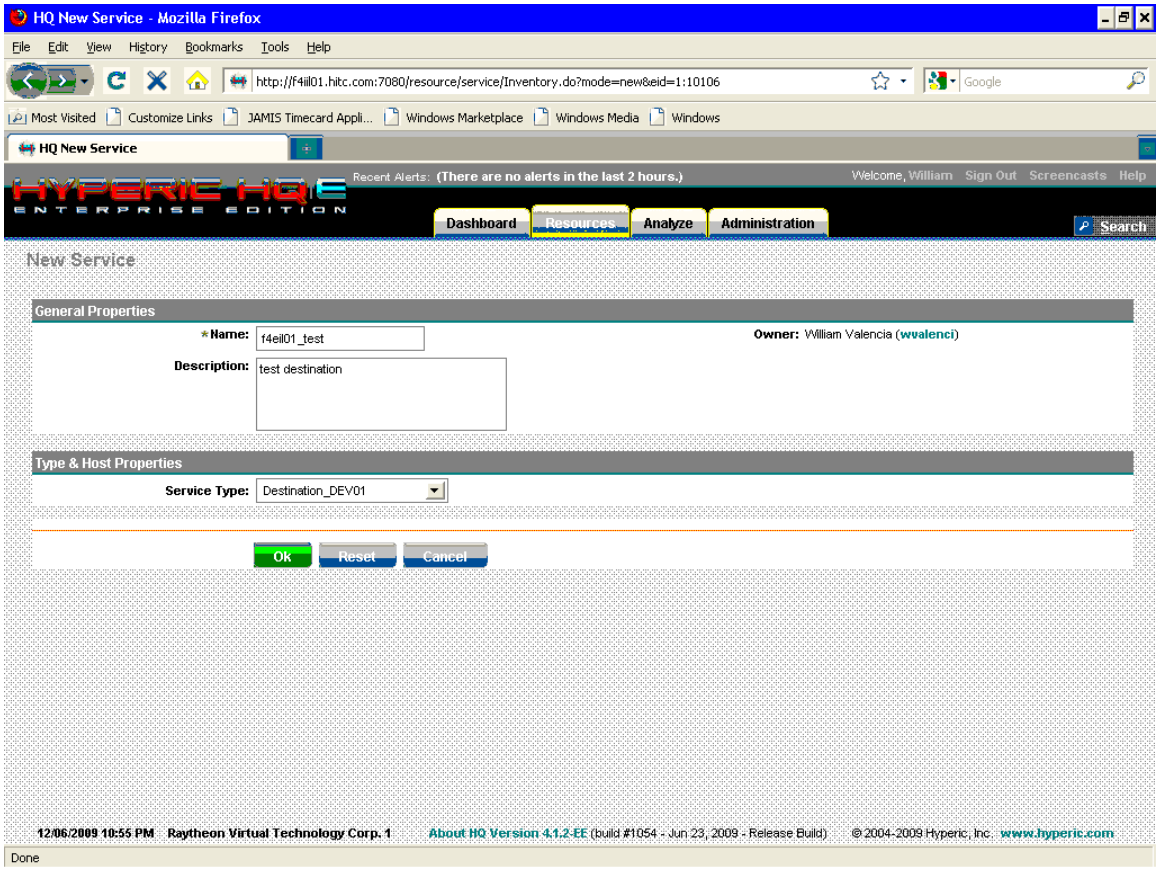


Figure 4.2.2.4.4-7. Configure Individual Destination

Then click “OK”. The service detail page will pop up as a result. See below:

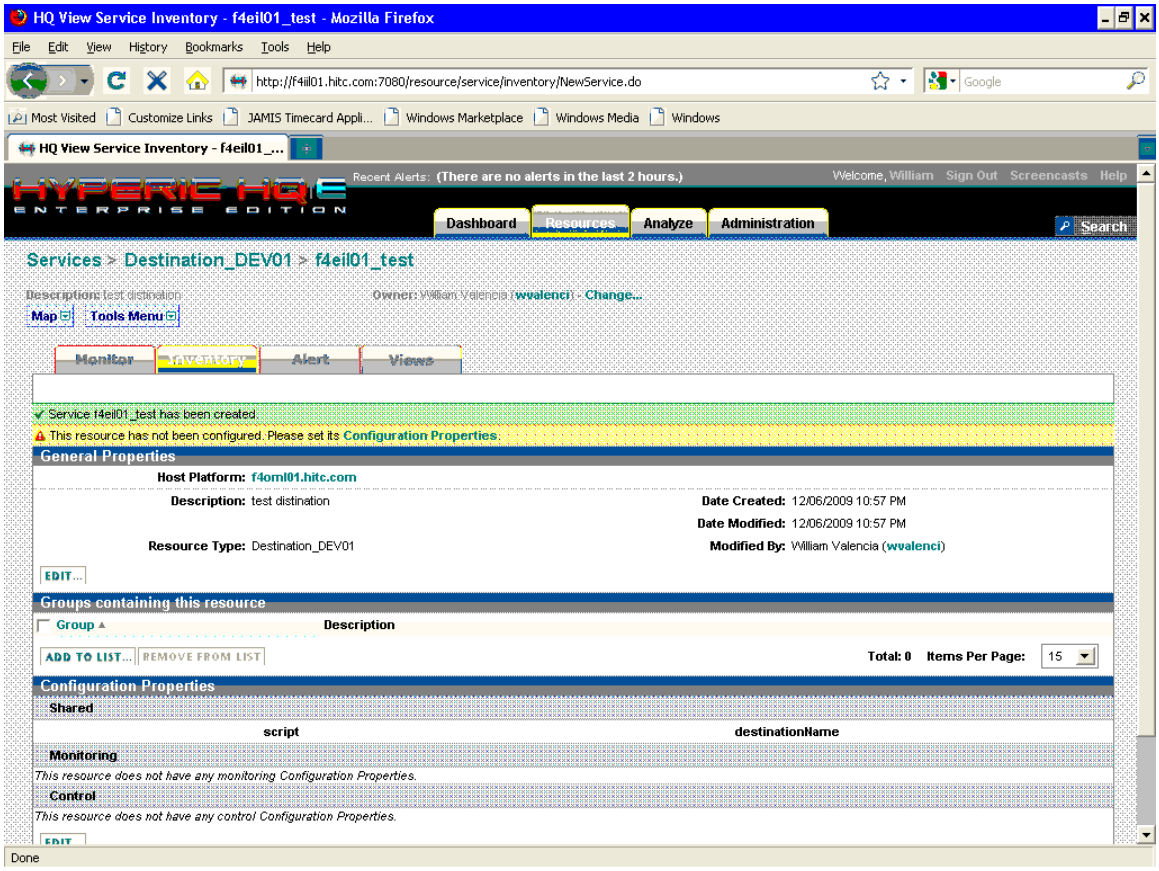


Figure 4.2.2.4.4-8. Individual Destination Inventory Page

Click on the link to configure its configuration properties. On the popped up page, the script input text box should be prepopulated and does not need to be modified. In the destinationName input text box, type in the name of the destination. **Note: the destination name typed in has to exactly match the DestinationName field defined in the OmConfigDestination table in OMS database.** See the screen shot below:

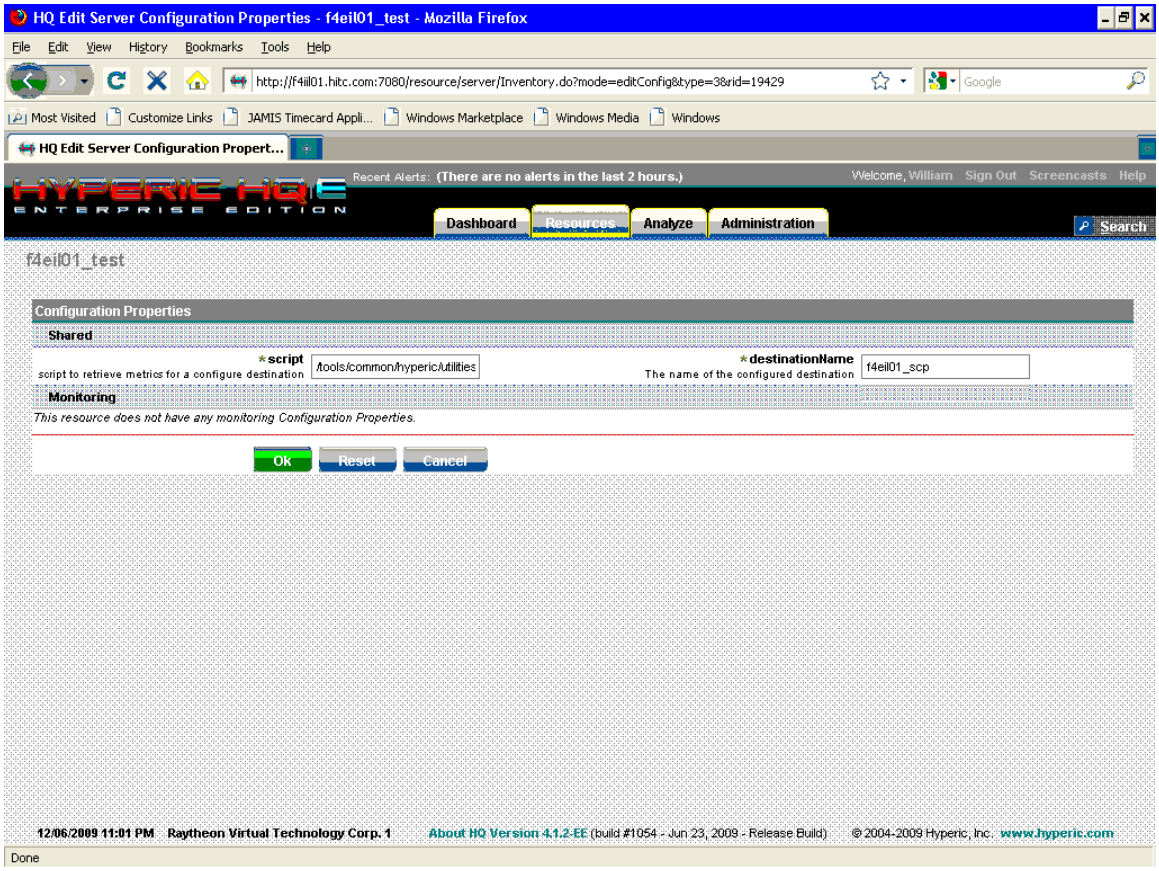


Figure 4.2.2.4.4-9. Individual Destination Configuration Page

Click on “OK” to accept the configuration. The screen will go back to the service detail page. That is the end of configuring an individual destination.

Once the destination is configured, the Hyperic server will be able to collect the defined metrics by executing the script (defined in the plugin xml file) periodically which invokes a Perl script to retrieve the requested statistic information from the Ingest database. The Perl script invokes a stored proc named SmGetDestinationMetrics.sp which takes the destination name as input and outputs the metrics information for that destination.

4.2.2.4.4.5 HEG Server (Release 8.1 only)

The HEG Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-HEG-HEGServer-plugin.xml. The HEG Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in.

Up/down alerts are set up for the HEG Server based on its availability metrics. The down alert is used to notify operator of the problem and update the Order Management business process status

and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3 for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

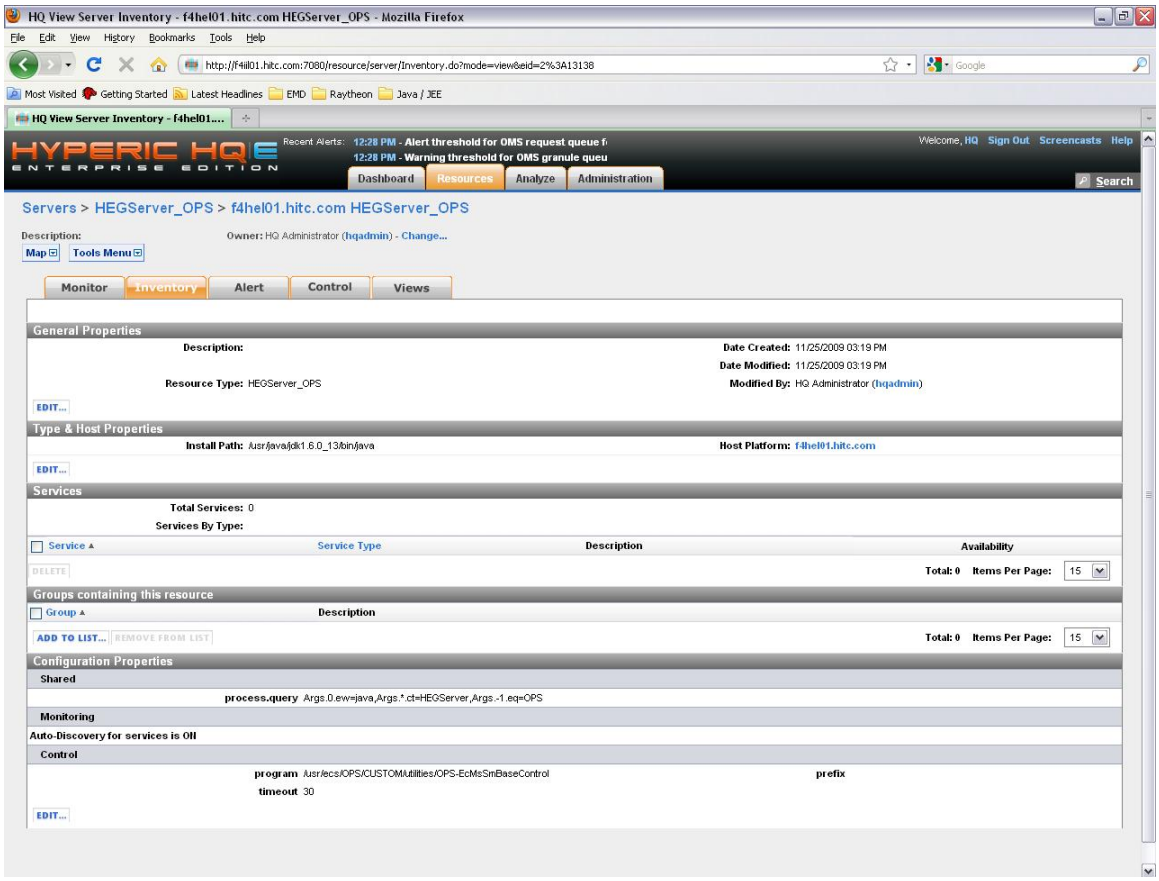


Figure 4.2.2.4.4-10. HEGServer Configuration View

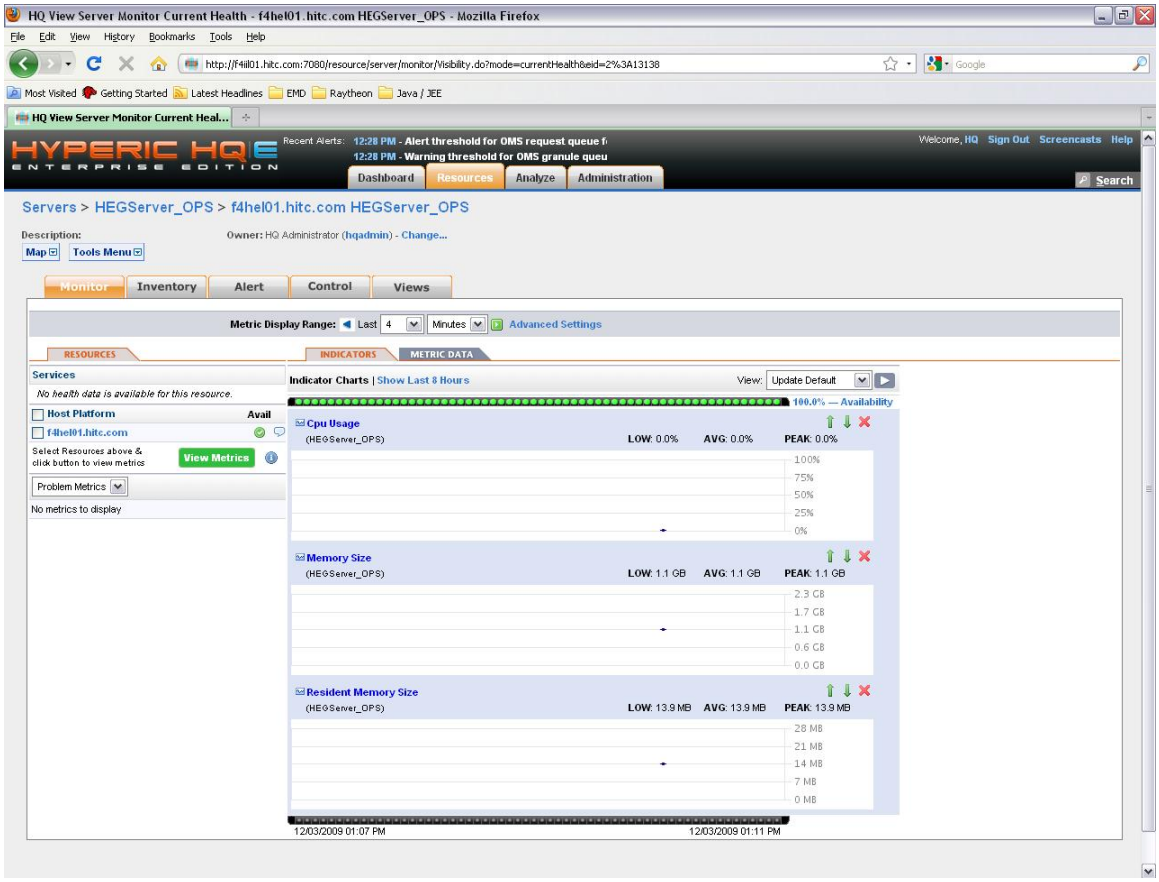


Figure 4.2.2.4.4-11. HEGServer Monitoring

4.2.2.4.4.6 EPD Server

The EPD Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-OMS-EPDServer-plugin.xml. The EPD Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in.

Up/down alerts are set up for the EPD Server based on its availability metrics. The down alert is used to notify operator of the problem and update the Order Management business process status and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

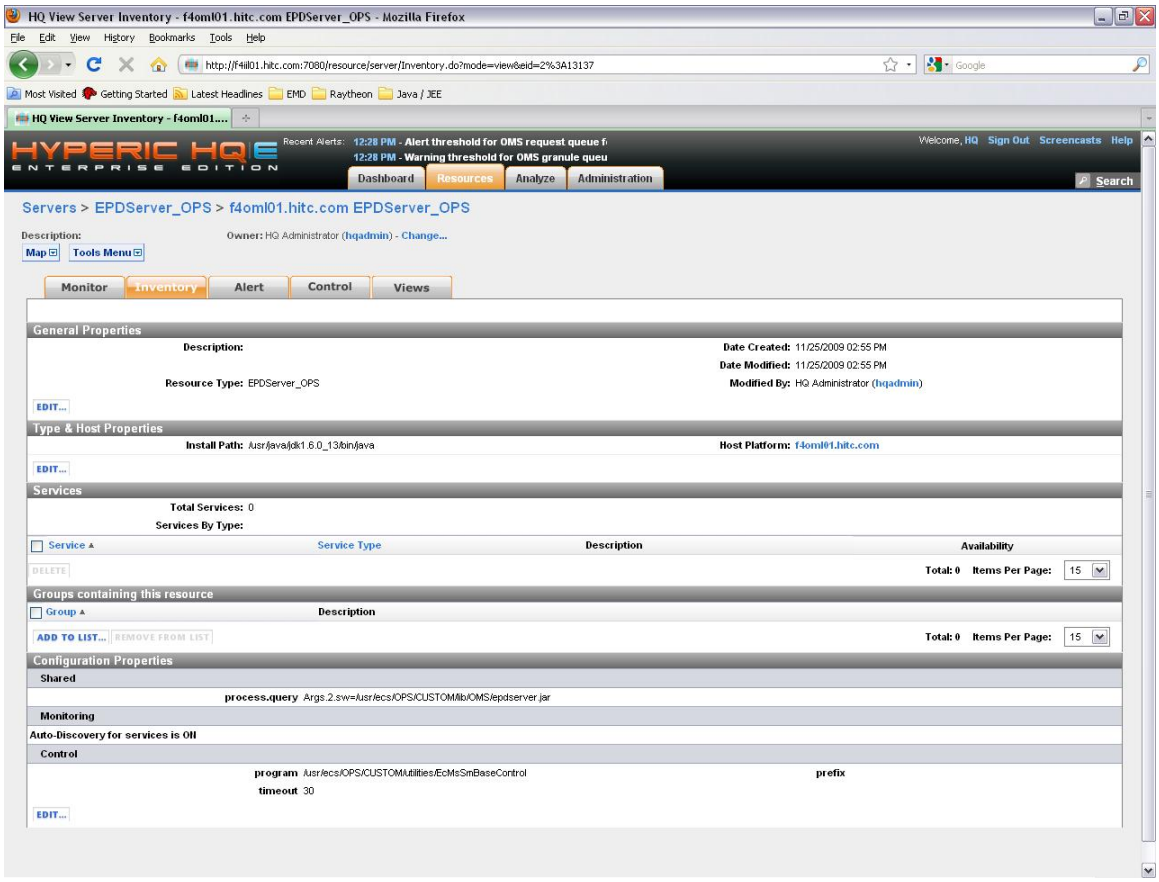


Figure 4.2.2.4.4-12. EPDServer Configuration View

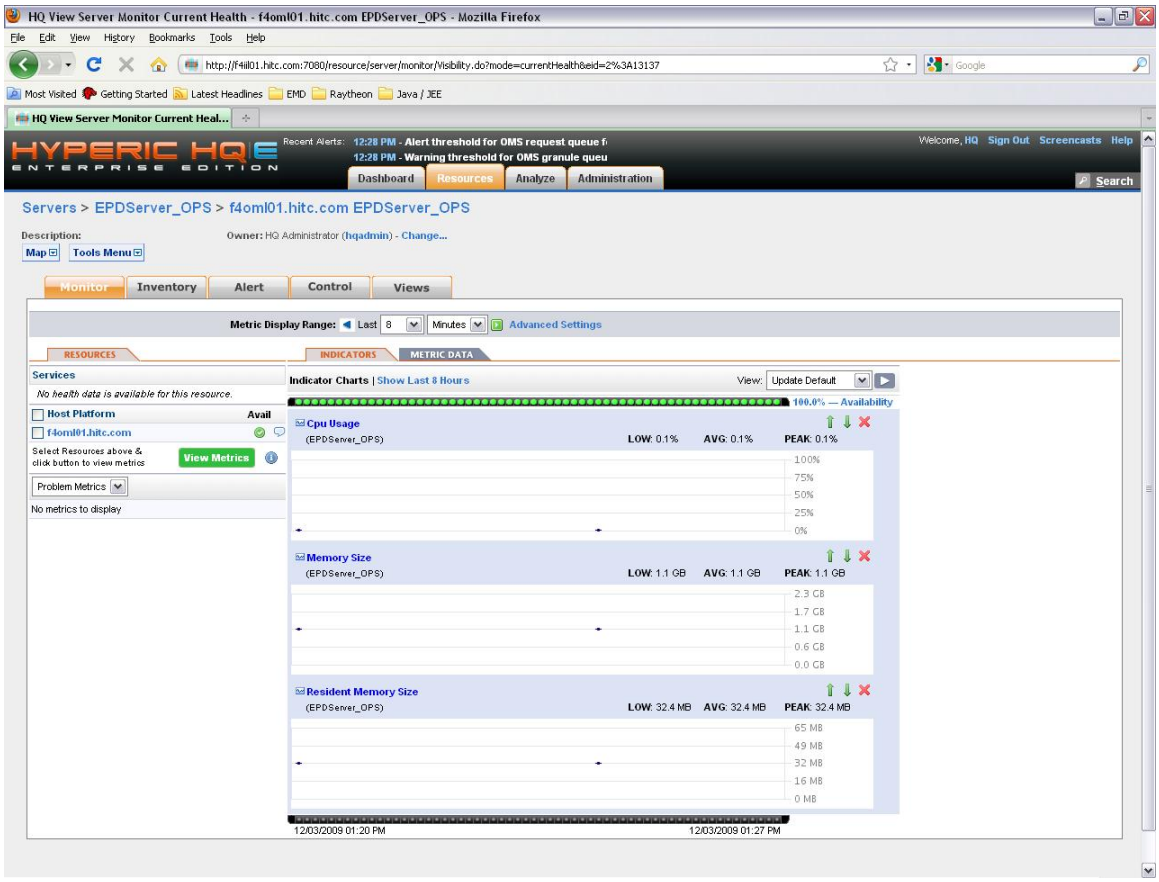


Figure 4.2.2.4.4-13. EPDServer Monitoring

4.2.2.4.4.7 Copy Server

The Order Manager Copy Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-OMS-CopyServer-plugin.xml. The plugin defines the server type and an operator will need to configure Hyperic to monitor the Copy Server. Below are the steps to configure Hyperic to monitor this resource.

1. Select the platform where the Copy Server runs on. The agent on this platform will be in charge of gathering metrics for this resource. Mouse over the 'Resources' tab and select the 'Browse' option. Click on the 'Platforms' link if it isn't highlighted and select a platform.

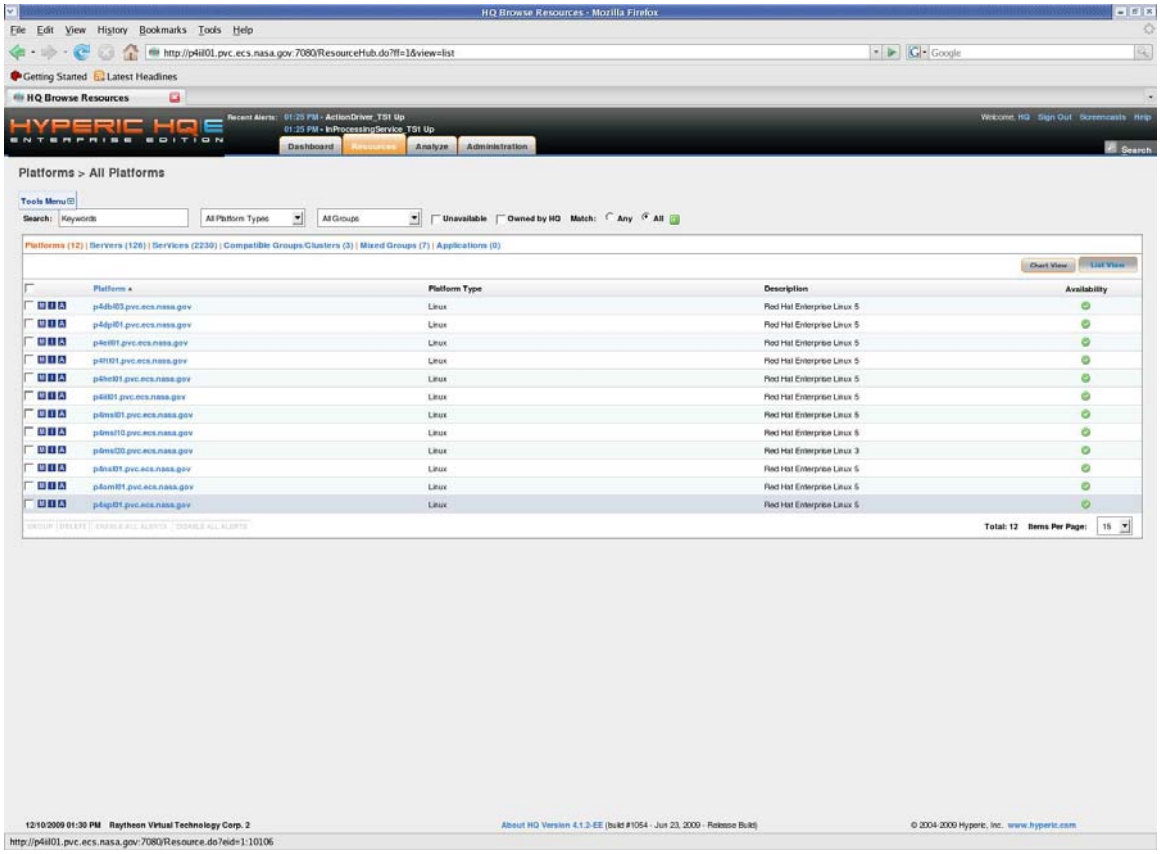


Figure 4.2.2.4.4-14. Copy Server Select Platform

2. In the platform's detailed page, click on the 'Tools Menu' button and select the 'New Server' option.

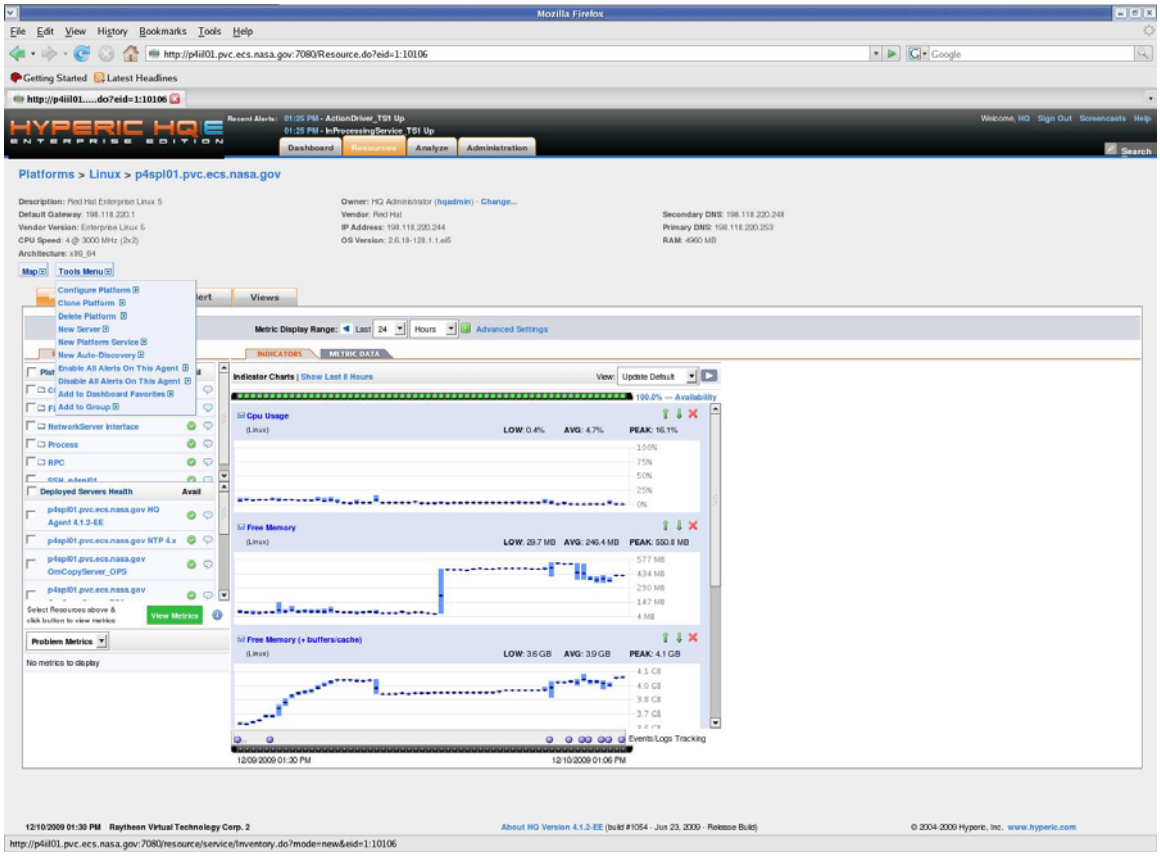


Figure 4.2.2.4.4-15. Copy Server Add New Server

3. A new server general properties page will be displayed. Fill in the name, description, server type, and installpath. Afterward, click the 'OK' button.

   Name: OmCopyServer_OPS

   Description: This service monitors the OmCopyServer in the OPS mode.

   Server Type: OmCopyServer_OPS

   Installpath: /usr/ecs/OPS/CUSTOM/bin/OMS/EcOmSrCopyServer.pl

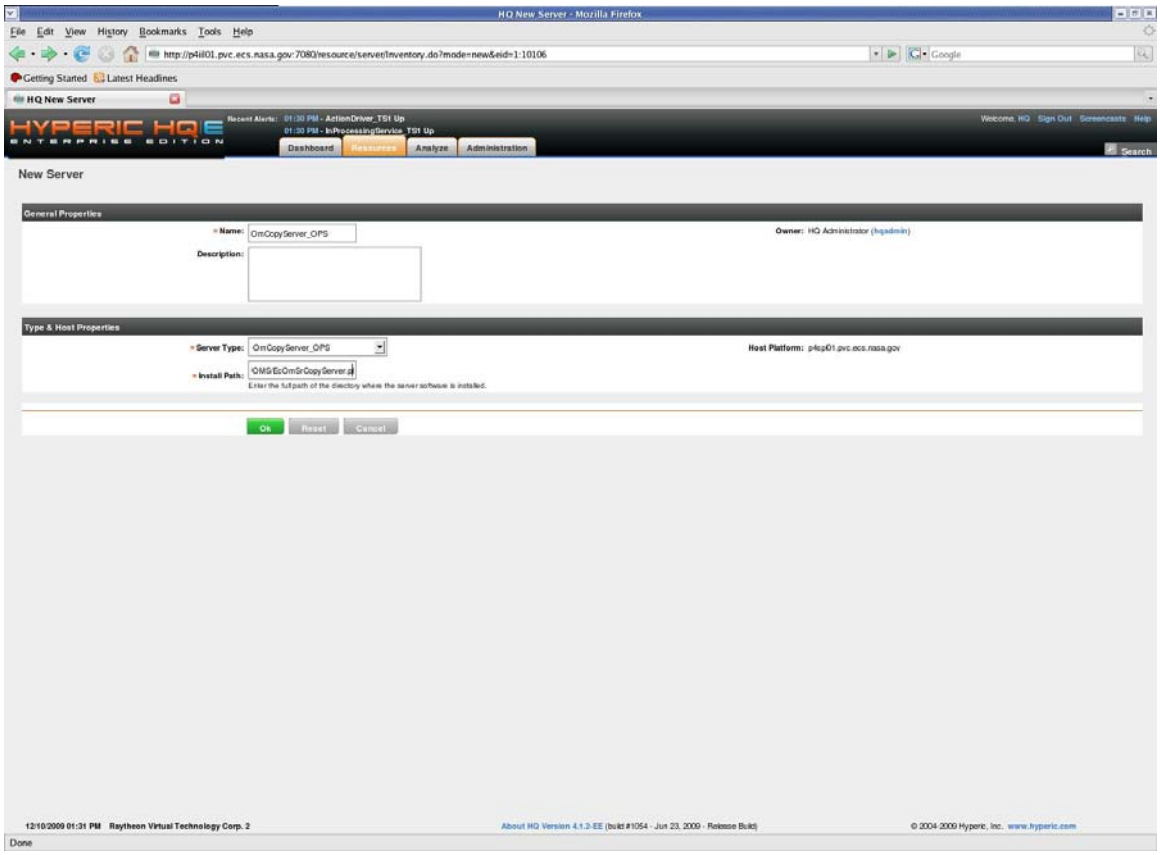


Figure 4.2.2.4.4-16. Copy Server General Properties

4. You will be taken to the server detail page, but the server has not been configured to monitor the Copy Server yet. Click on the 'Configuration Properties' link.

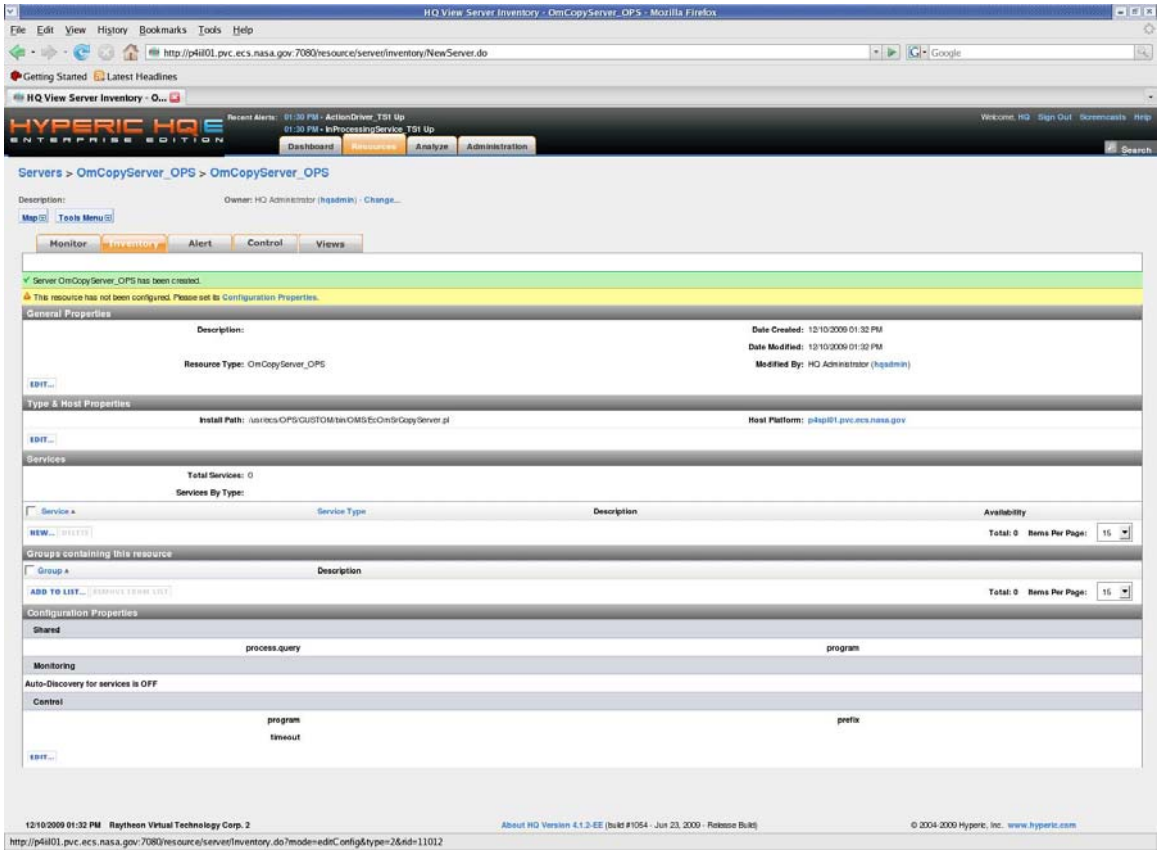


Figure 4.2.2.4.4-17. Copy Server Configuration Properties Link

5. In the configuration properties page, leave all the properties as it is and verify that the control program is pointing to /tools/common/hyperic/utilities/<MODE>-EcMsSmBaseControl (where MODE is fill in) and click the 'OK' button.

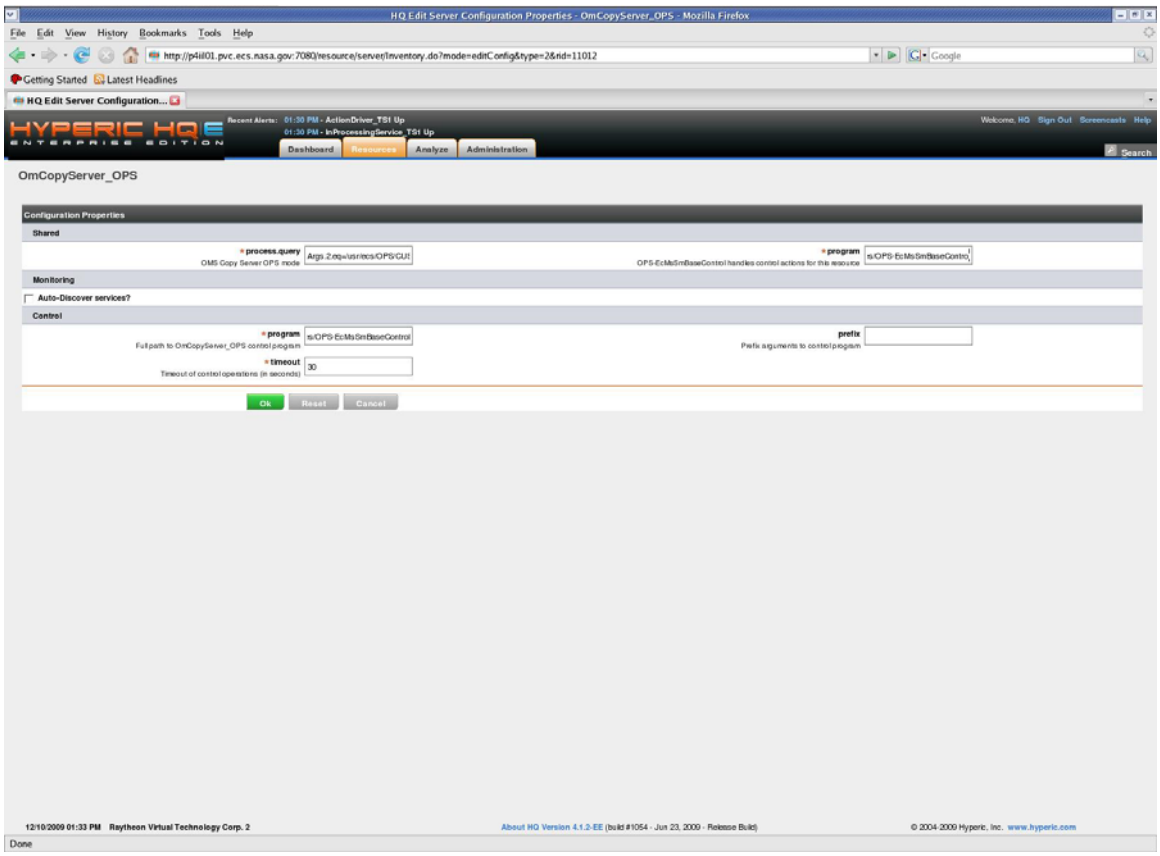


Figure 4.2.2.4.4-18. Copy Server Configuration Properties

6. The Copy Server is now configured and you can go ahead and monitor it, setup alerts, and change the monitoring interval of the metrics it gathers.

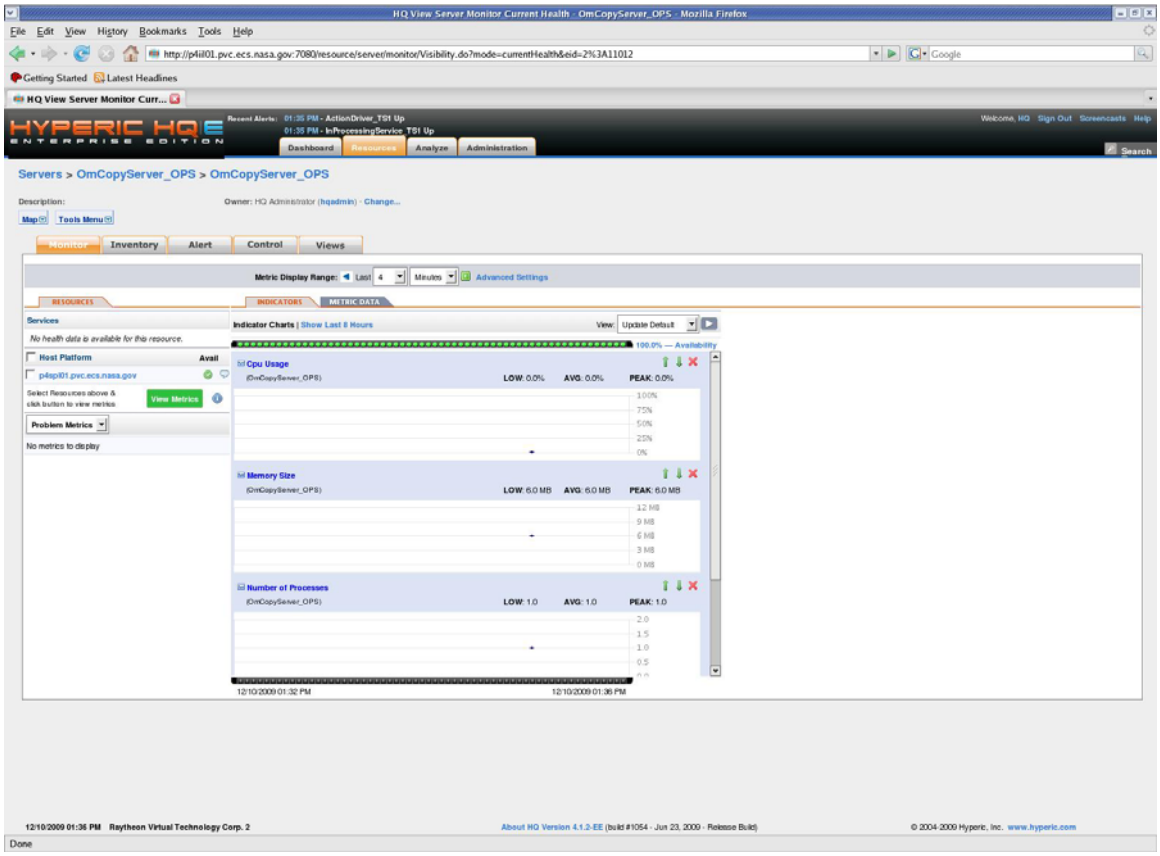


Figure 4.2.2.4.4-19. Copy Server Monitoring

The metrics that will be collected for the Copy Server include the standard Hyperic metrics (see section 4.2.2.2.13: Standard Plugin Metrics) and custom metrics (see below).

Table 4.2.2.4.4-2. Copy Server Metrics

Custom Metrics	
Metric Name	**Description**
Number of Processes	The number of Copy Server instances running.

Up/down alerts are set up for the Copy Server based on its availability metrics. The down alert is used to notify operator of the problem and update the Order Management business process status and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

4.2.2.4.4.8 EWOC

The URL to the EWOC Apache Axis homepage is http://<hostname>:<port number>/EWOC/. EWOC provides two services, OrderStatusUpdate and OrderFullfillment. The example below will show you how to configure HTTP services via Hyperic to monitor the EWOC OrderStatusUpdatePort and OrderFullfillmentPort wsdl.

Note: WSDL is an xml-based language which describes a web service.

1. Select a platform where you want to define your HTTP service. The agent on this platform will be in charge of submitting an http request and reading the responses. Mouse over the 'Resources' tab and select the 'Browse' option. Click on the 'Platforms' link if it isn't highlighted and select a platform.

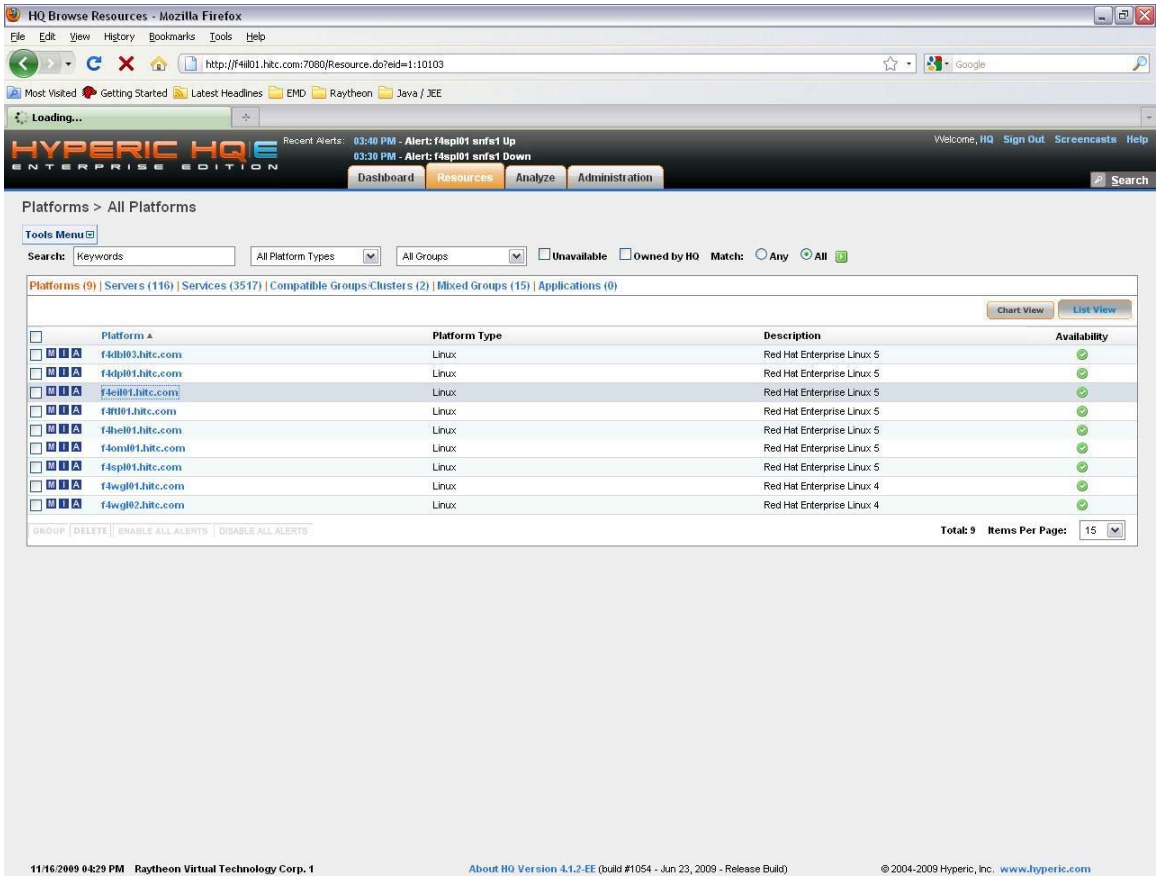


Figure 4.2.2.4.4-21. Select EWOC HTTP Service Platform

2. In the platform's detailed page, click on the 'Tools Menu' button and select the 'Add Platform Service' option.

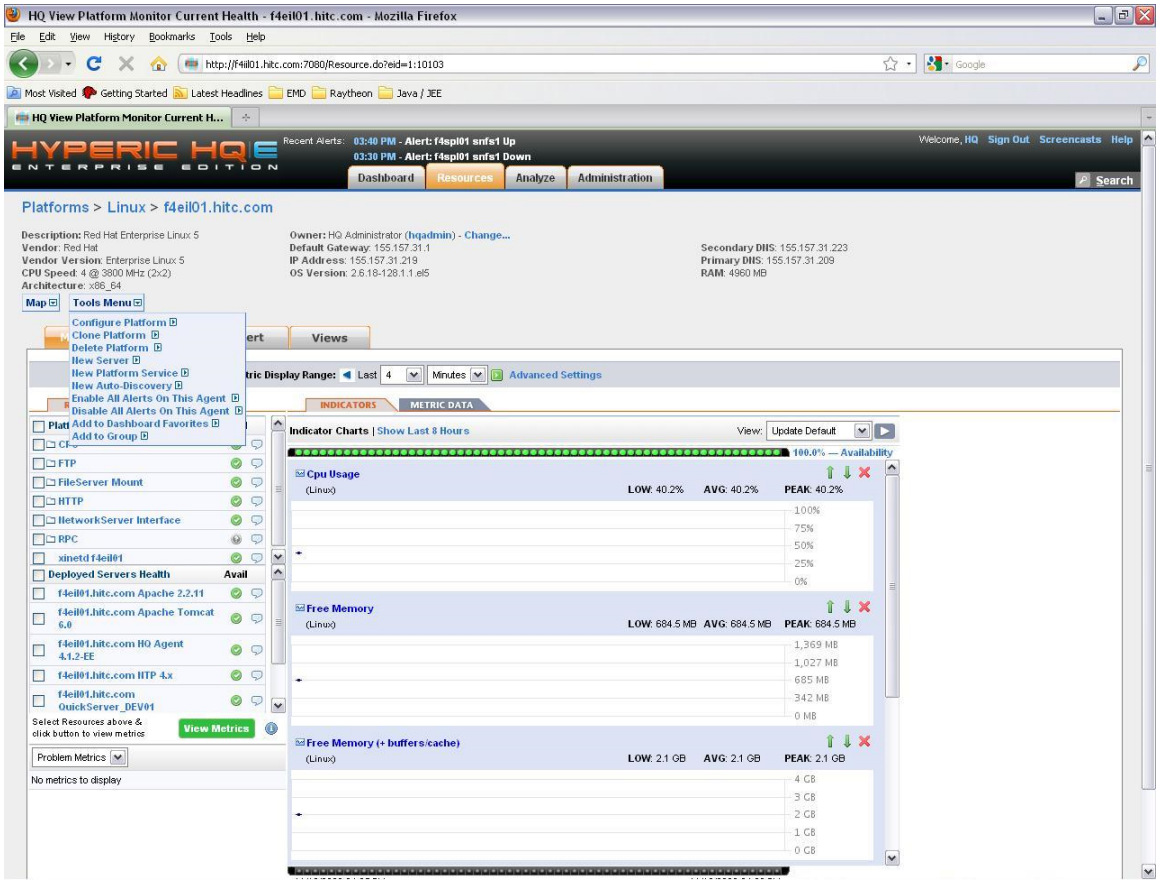


Figure 4.2.2.4.4-22. EWOC Add New Service

3. A new service general properties page will be displayed. Fill in the name, description, and service type. Afterward, click the 'OK' button.

   Name: Monitor EWOC_OrderStatusUpdatePort_OPS

   Description: This service monitors EWOC OrderStatusUpdatePort wsdl.

   Service Type: HTTP

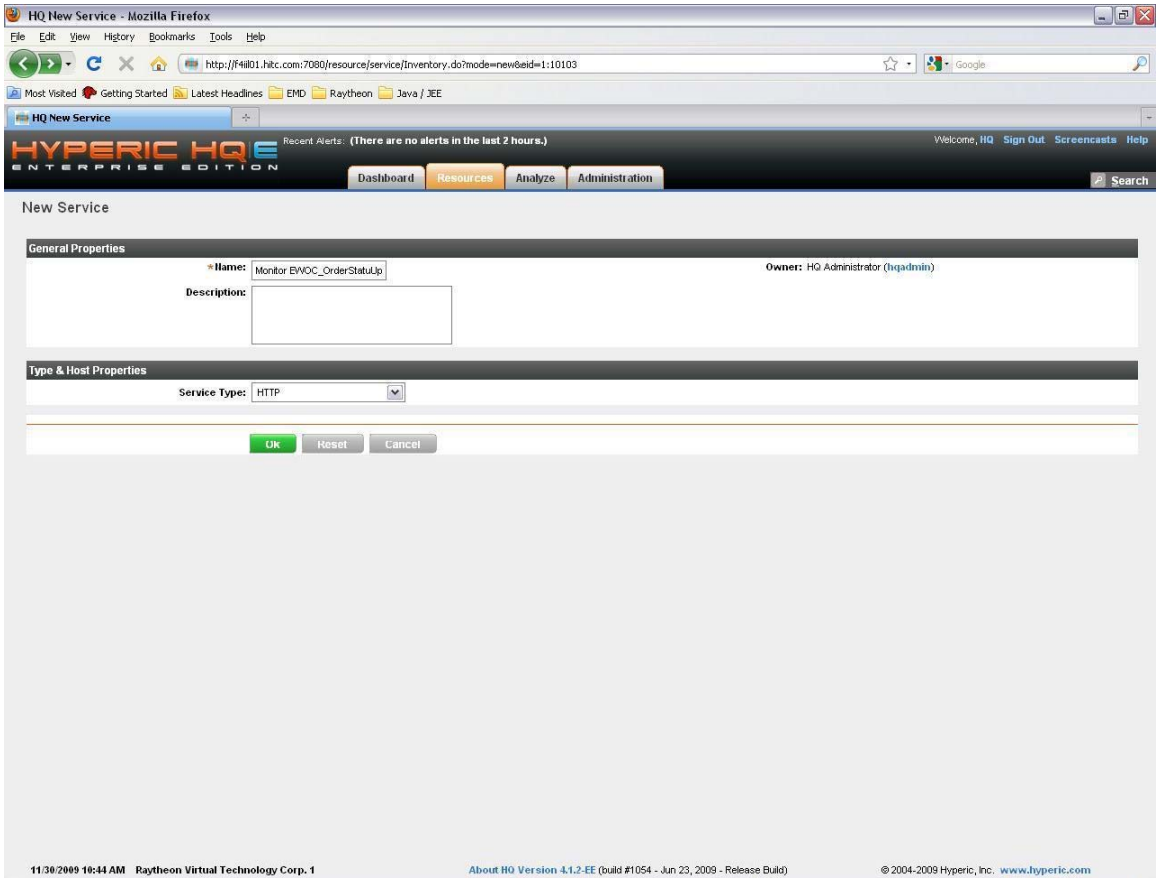


Figure 4.2.2.4.4-23. EWOC OrderStatusUpdatePort General Properties

4. You will be taken to the service detail page, but the service has not been configured to monitor the EWOC OrderStatusUpdatePort wsdl yet. Click on the 'Configuration Properties' link.

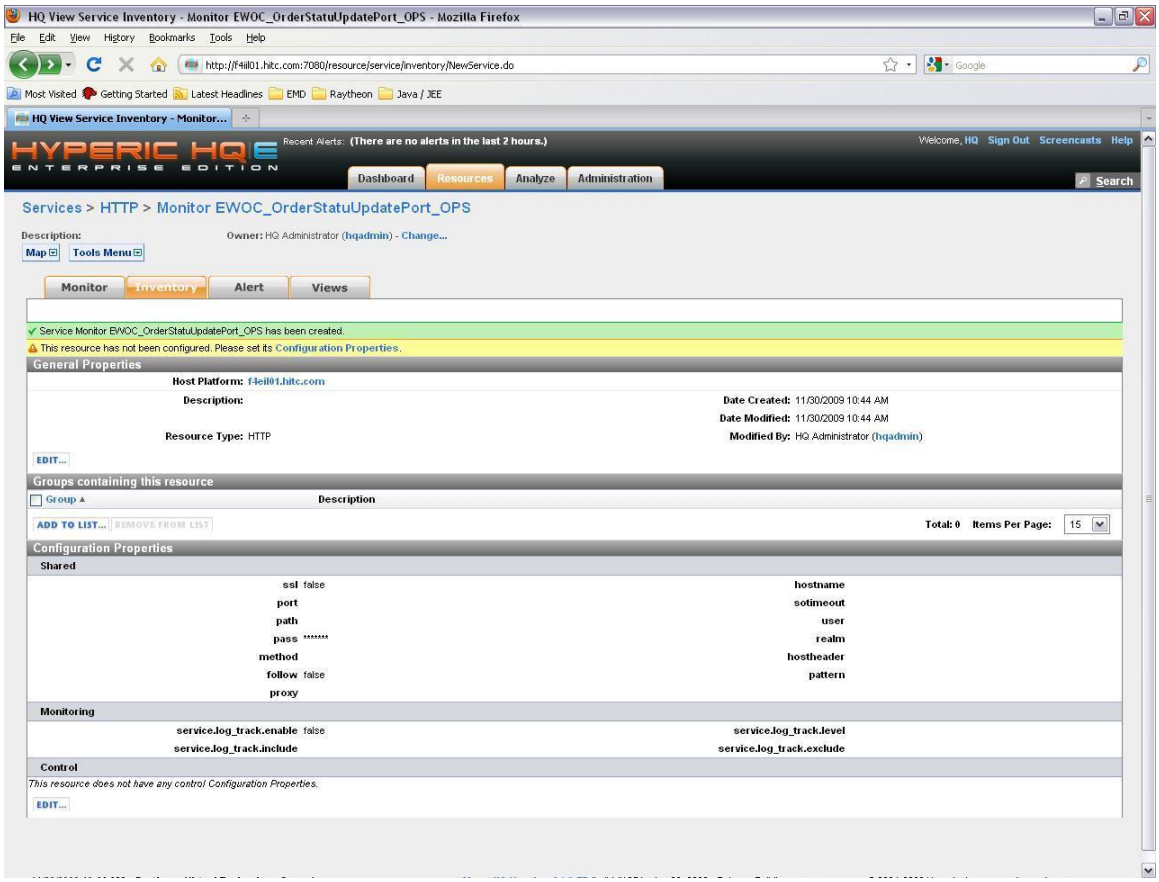


Figure 4.2.2.4.4-24. EWOC OrderStatusUpdatePort Configuration Properties Link

5. In the configuration properties page fill in the hostname, port, path, and method fields. When finish click the 'OK' button. Here's an example configuration of the EWOC OrderStatusUpdatePort wsdl in the EDF.

   hostname: f4eil01.edn.ecs.nasa.gov

   port: 22500

   sotimeout: 10

   path: /EWOC/services/OrderStatusUpdatePort?wsdl

   method: GET

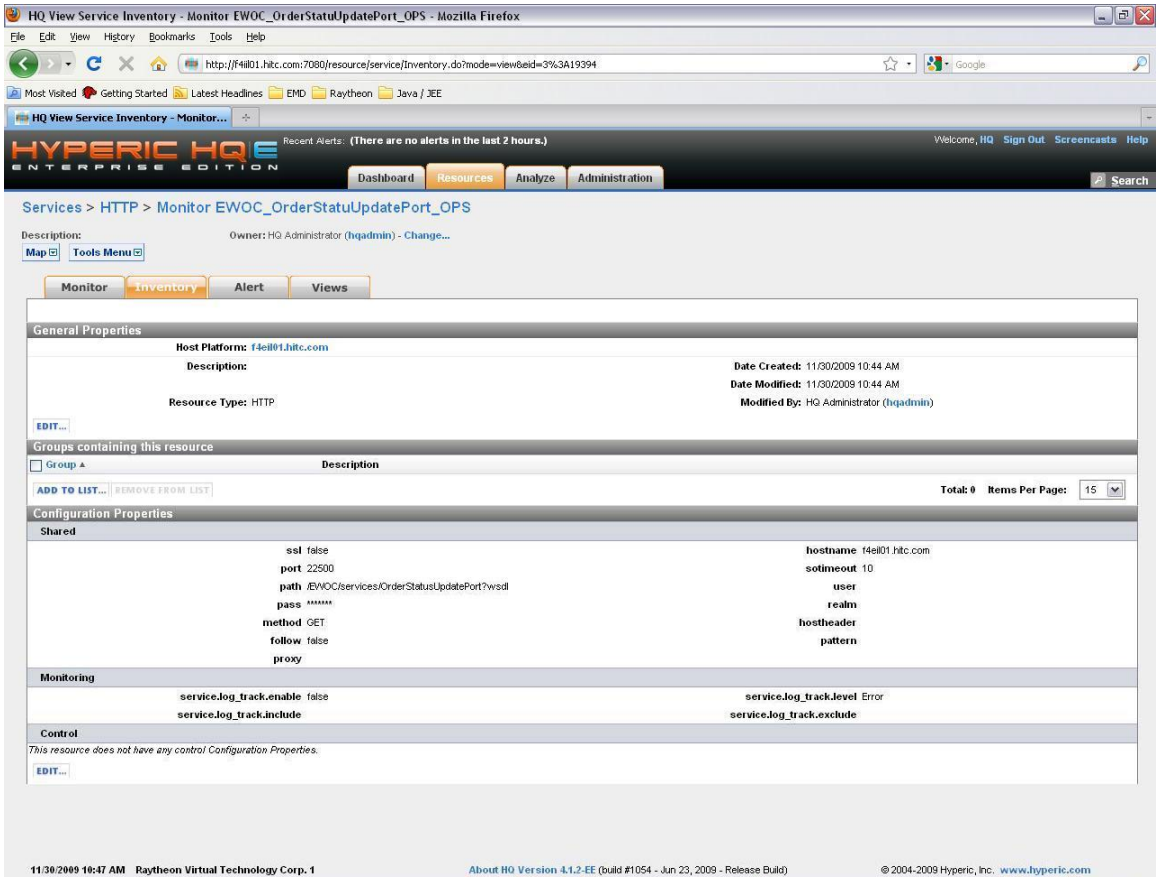


Figure 4.2.2.4.4-25. EWOC OrderStatusUpdatePort Configuration Properties Page

6. The EWOC OrderStatusUpdatePort HTTP service is now configured and you can go ahead and monitor it, setup alerts, and change the monitoring interval of the metrics it gathers.

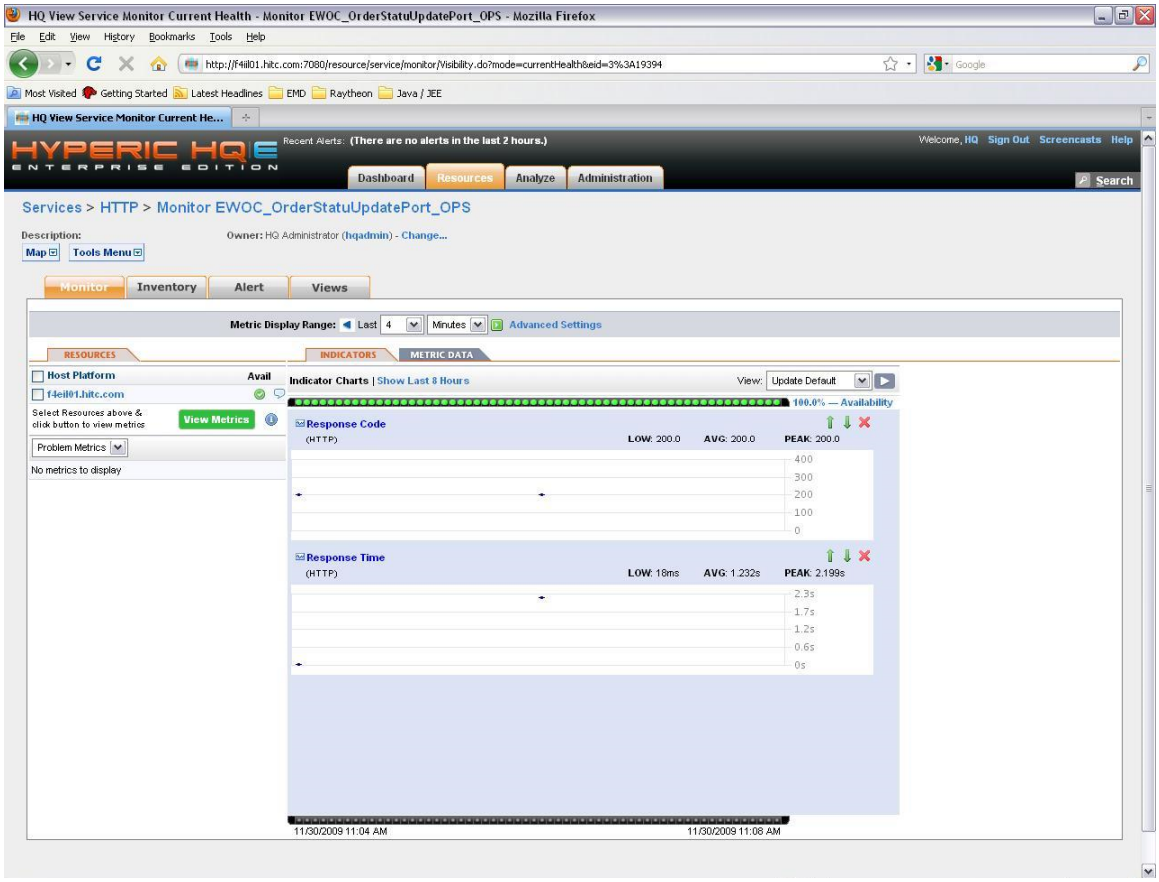


Figure 4.2.2.4.4-26. EWOC OrderStatusUpdatePort Monitoring

7. Perform steps 1 – 6 to configure Hyperic to monitor the OrderFullfillmentPort wsdl. The image below shows an example of the configuration in EDF.

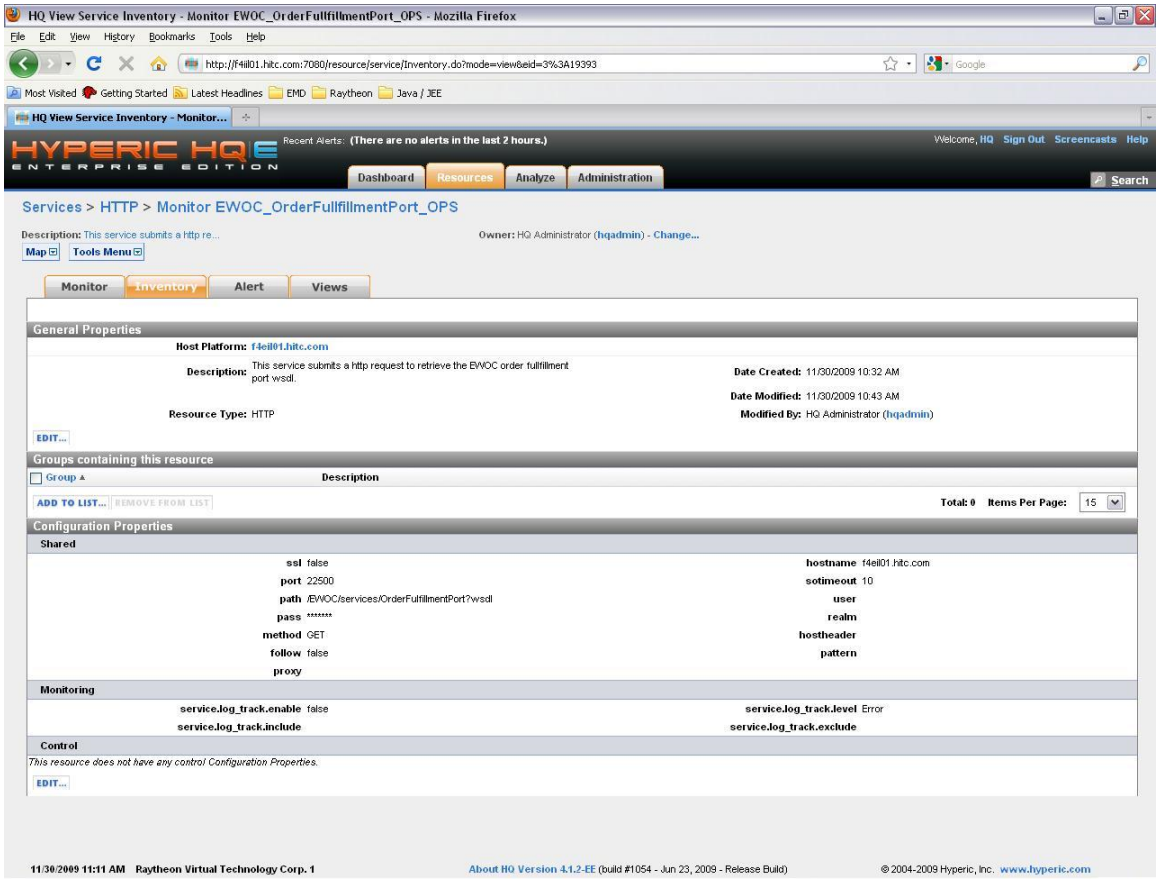


Figure 4.2.2.4.4-27. EWOC OrderFullfillmentPort Configuration Properties Page

4.2.2.4.4.9 WIST

See section 4.2.2.5, ECHO WIST.

4.2.2.4.4.10 DataPool File System

See section 4.2.2.4.2.9, DataPool File System.

4.2.2.4.4.11 Sybase

See section 4.2.2.3.1, Configuring Sybase.

4.2.2.4.4.12 HSA

A Hyperic agent will not be installed on the HSA host, thus it is not possible to directly monitor the HSA service. Instead, Hyperic will be configured to ping the HSA host to ensure it is available. The following steps describe how to configure Hyperic to monitor the HSA host using the InetAddress Ping service.

1. Select a platform where you want to define your InetAddress Ping service. The agent on this platform will ping the HSA host periodically. Mouse over the ‘Resources’ tab and select the ‘Browse’ option. Click on the ‘Platforms’ link if it isn’t highlighted and select a platform.

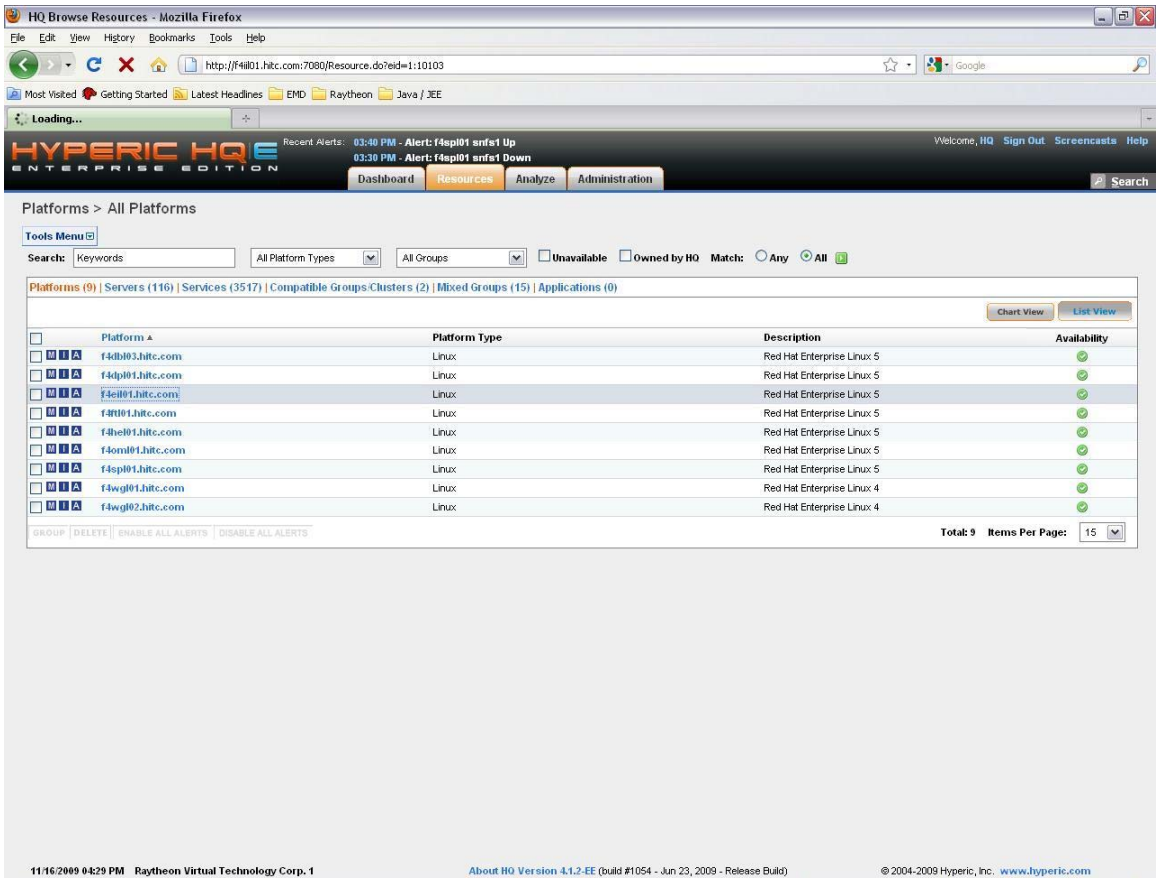


Figure 4.2.2.4.4-28. Select HSA InetAddress Service Platform

2. In the platform’s detailed page, click on the ‘Tools Menu’ button and select the ‘Add Platform Service’ option.

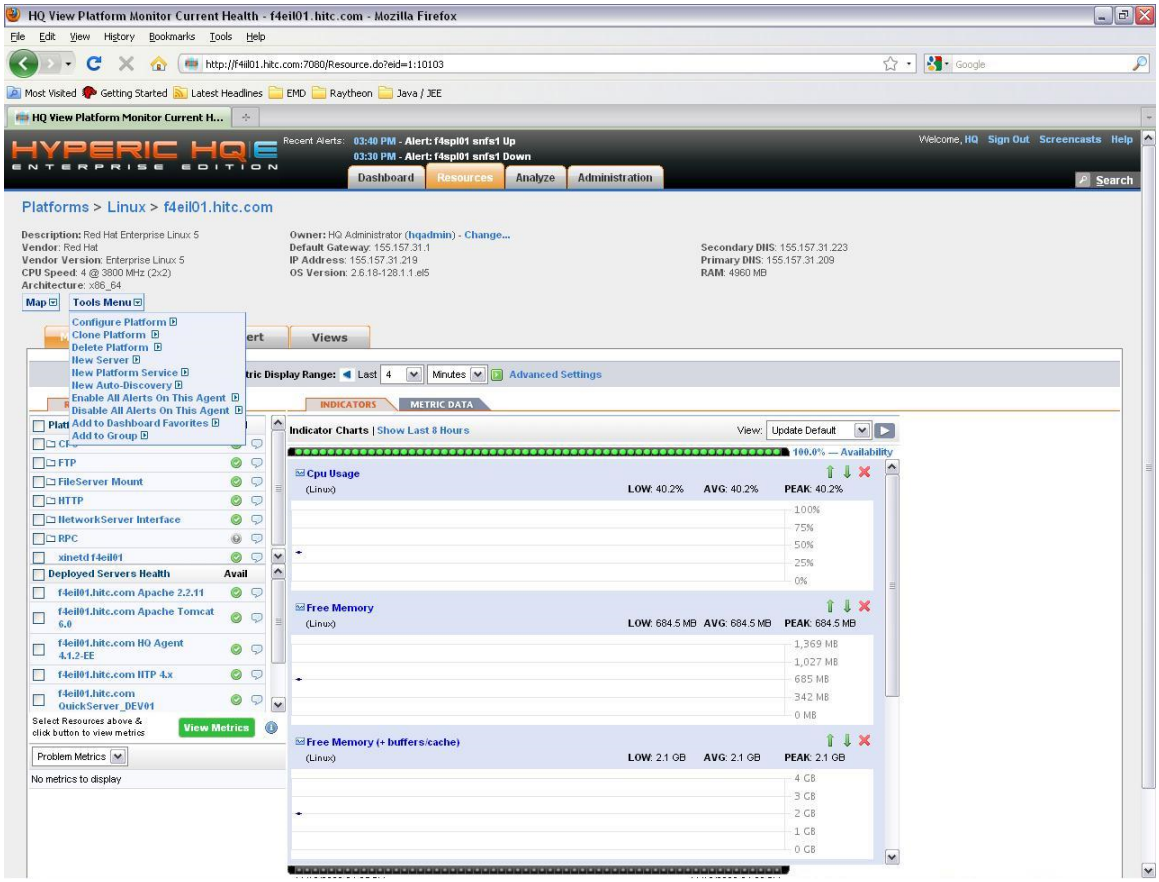


Figure 4.2.2.4.4-29. HSA Add New Service

3. A new service general properties page will be displayed. Fill in the name, description, and service type. Afterward, click the 'OK' button.

   Name: Monitor HSA Host

   Description: This service monitors the HSA host.

   Service Type: InetAddress Ping

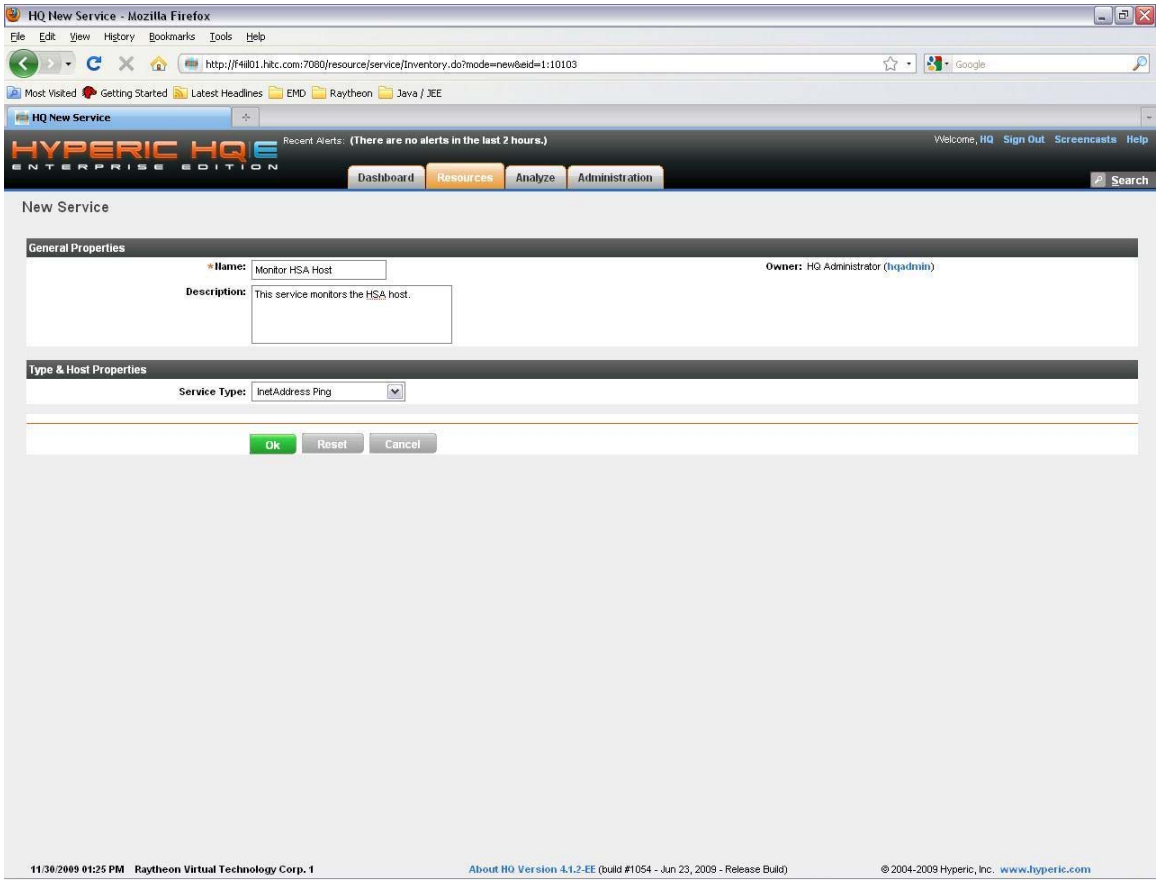


Figure 4.2.2.4.4-30. HSA General Properties

4. You will be taken to the service detail page, but the service has not been configured to ping the HSA host. Click on the 'Configuration Properties' link.

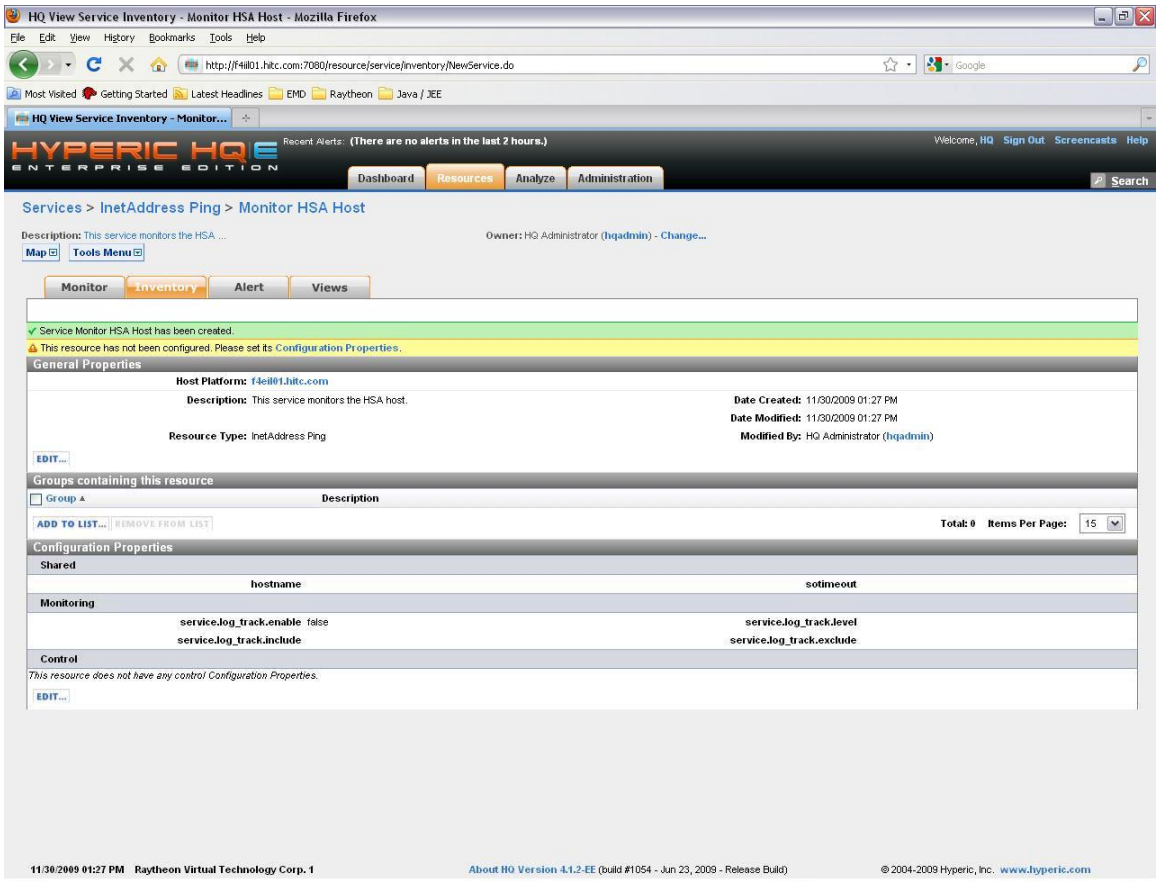


Figure 4.2.2.4.4-31. HSA Configuration Properties Link

5. In the configuration properties page fill in the hostname field. When finish click the ‘OK’ button.

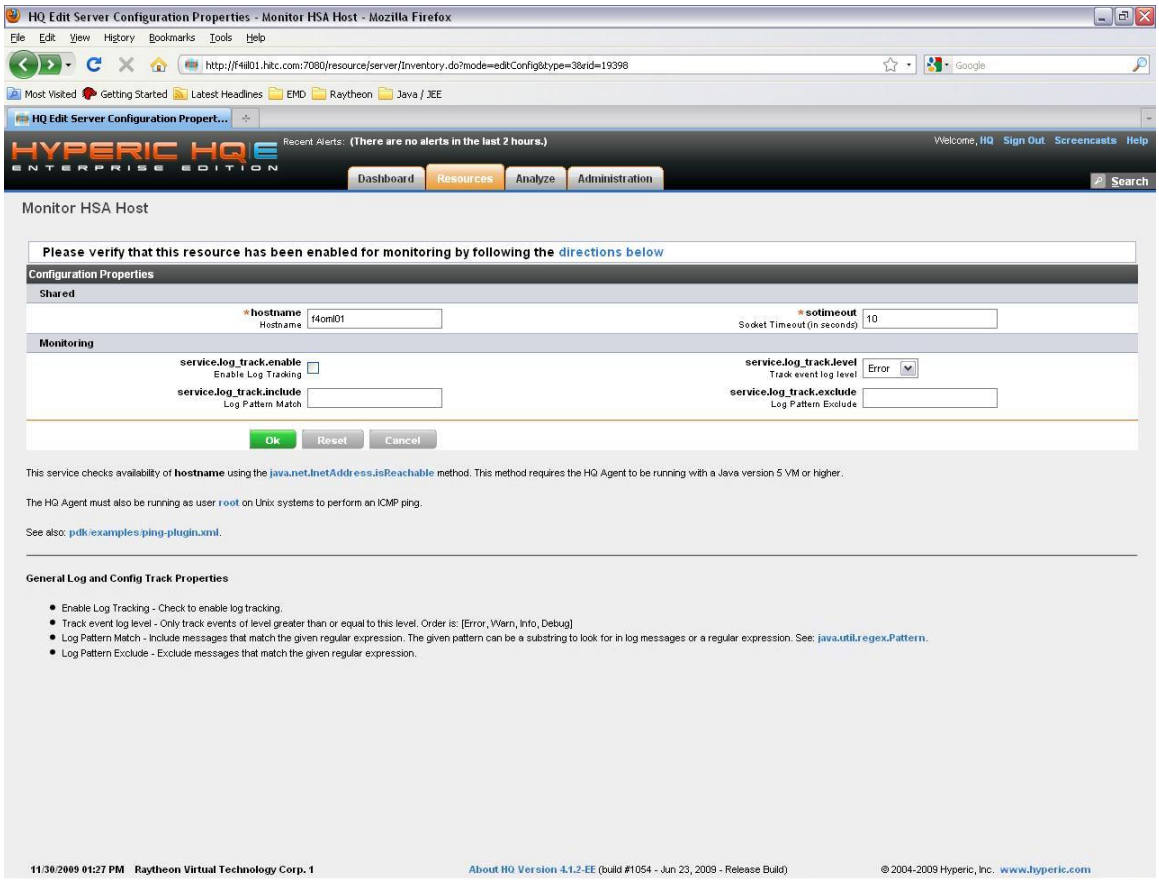


Figure 4.2.2.4.4-32. HSA Configuration Properties Page

The HSA Host InetAddress Ping service is now configured and you can go ahead and monitor it, setup alerts, and change the monitoring interval of the metrics it gathers

4.2.2.5 ECHO Resources

This section describes how to configure Hyperic to monitor the ECHO website, WIST, ECHO API, and the ECHO FTP site.

4.2.2.5.1 ECHO Website

The URL to the ECHO website is http://www.echo.nasa.gov. To monitor a website, Hyperic provides a HTTP service that can be configured to periodically submit an http request to a specified URL. Hyperic will read the responses and determine if the website is available or not. Below are the steps to configure Hyperic to monitor the ECHO website.

1. Select a platform where you want to define your HTTP service. The agent on this platform will be in charge of submitting a http request and reading the responses. Mouse

over the ‘Resources’ tab and select the ‘Browse’ option. Click on the ‘Platforms’ link if it isn’t highlighted and select a platform.

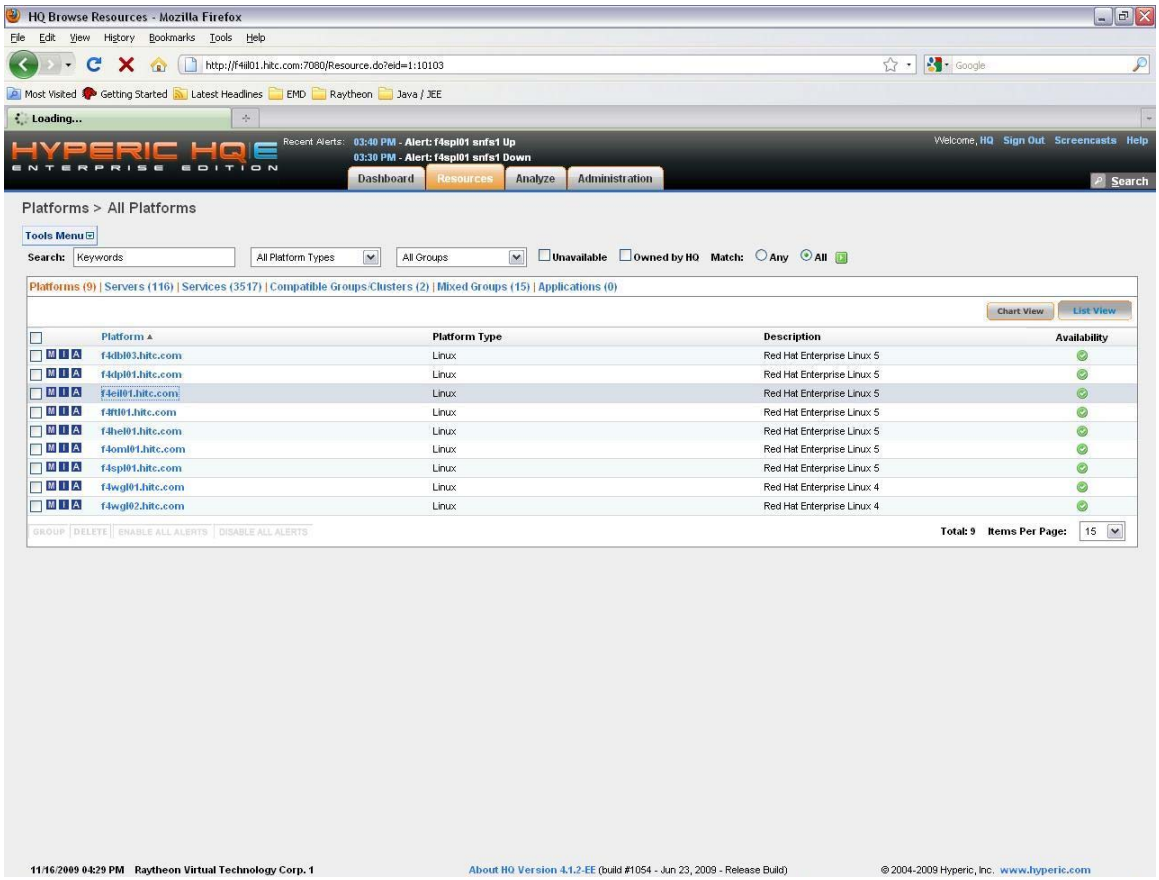


Figure 4.2.2.5.1-1. Select ECHO HTTP Service Platform

2. In the platform’s detailed page, click on the ‘Tools Menu’ button and select the ‘Add Platform Service’ option.

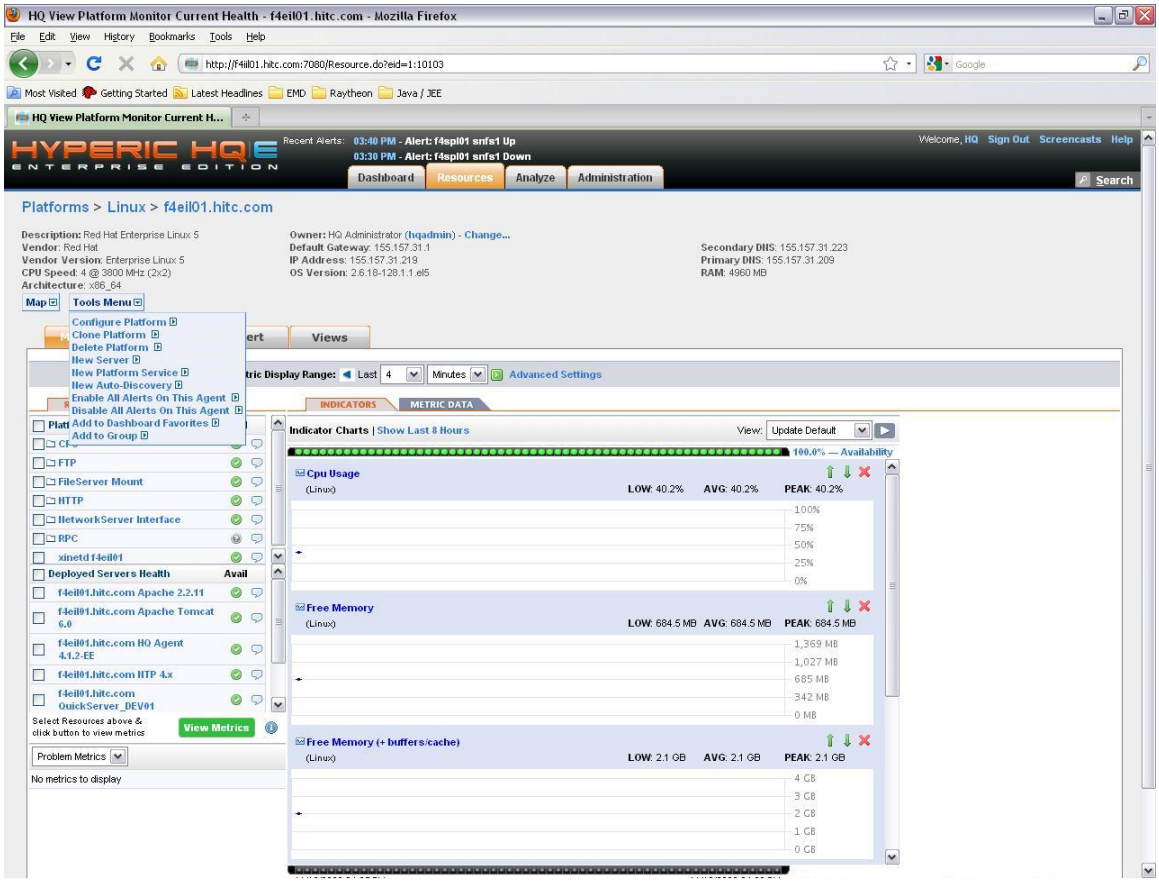


Figure 4.2.2.5.1-2. ECHO Website Add New Service

3. A new service general properties page will be displayed. Fill in the name, description, and service type. Afterward, click the 'OK' button.

   Name: ECHO Website

   Description: This service monitors the ECHO website.

   Service Type: HTTP

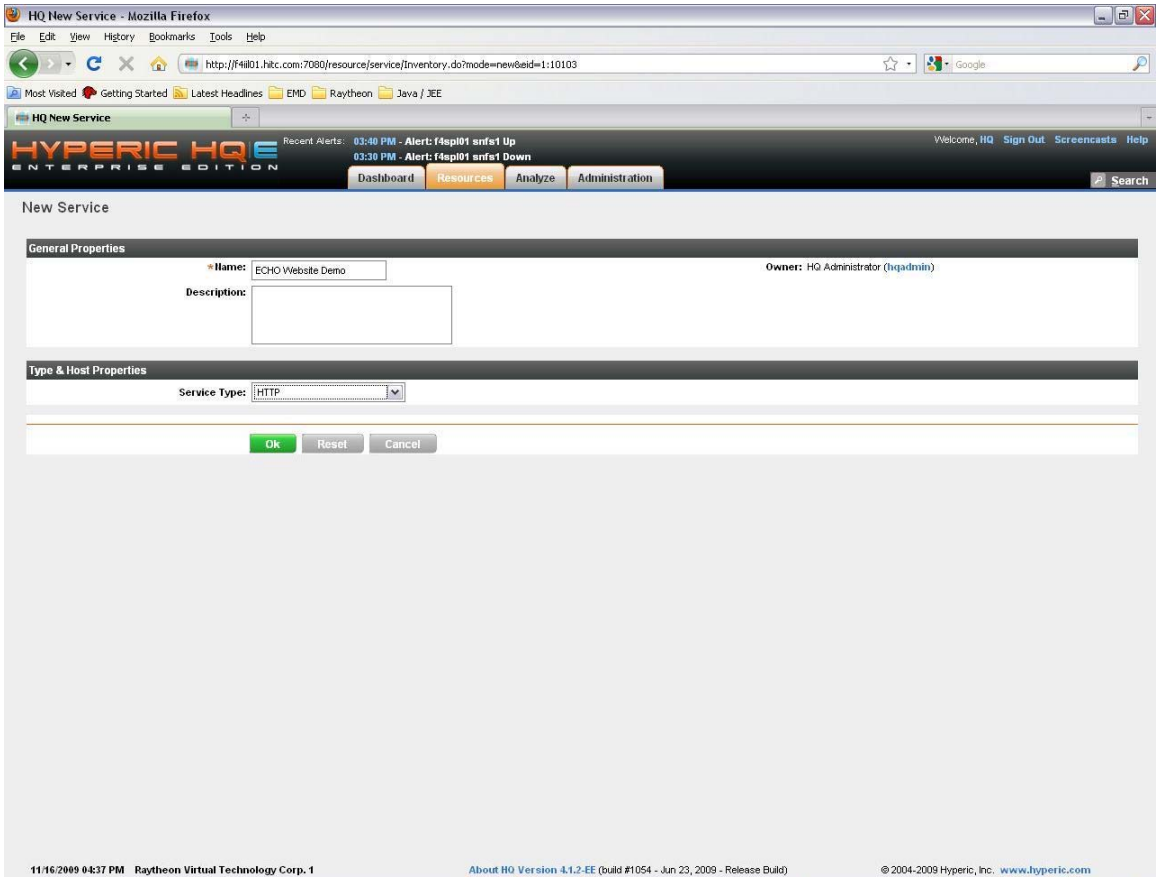


Figure 4.2.2.5.1-3. ECHO Website General Properties

4. You will be taken to the service detail page, but the service has not been configured to monitor the ECHO website yet. Click on the 'Configuration Properties' link.

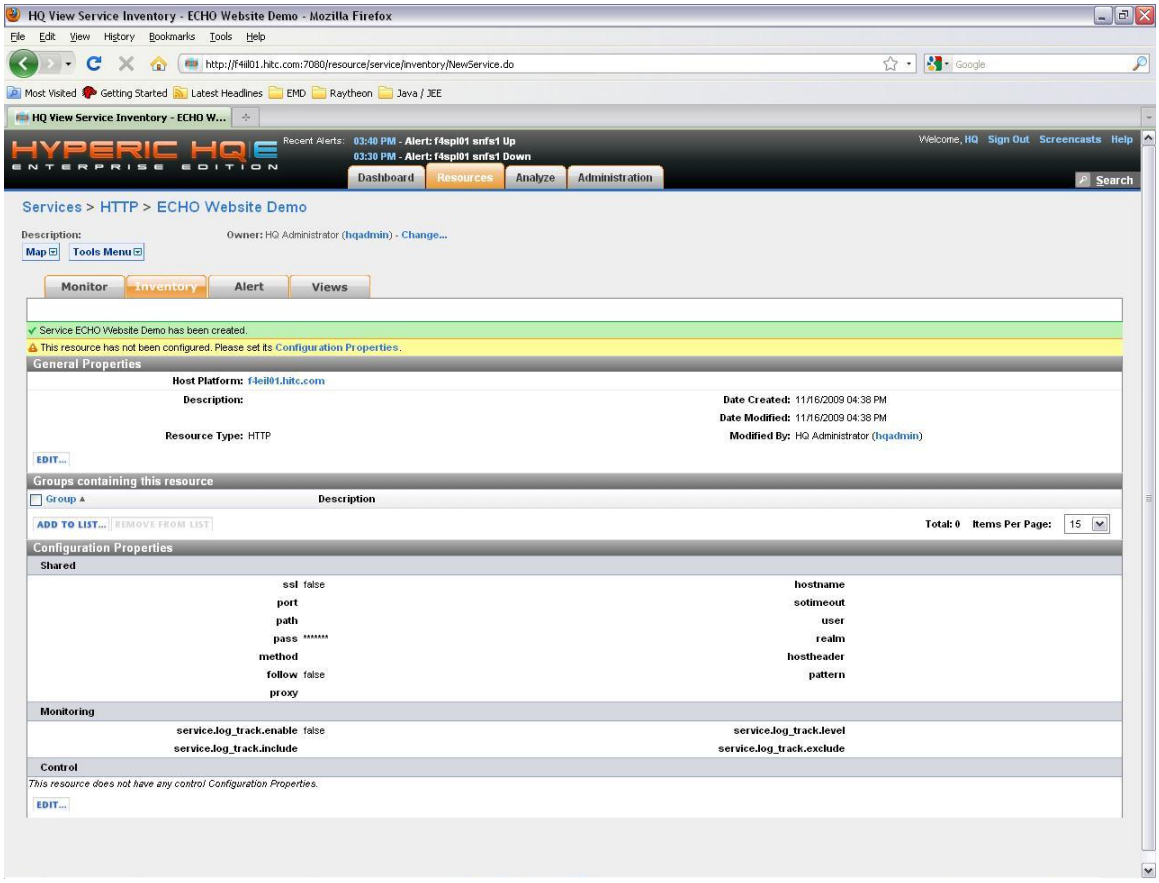


Figure 4.2.2.5.1-4. ECHO Website Configuration Properties Link

5. In the configuration properties page fill in the following and click the 'OK' button.

hostname: www.echo.nasa.gov

port: 80

*sotimeout: 10

path: /

method: GET

**proxy: <hostname>:<port>

*This is the amount of time in seconds Hyperic will timeout from the http request.

**If your internal network uses a proxy to get out supply it here.

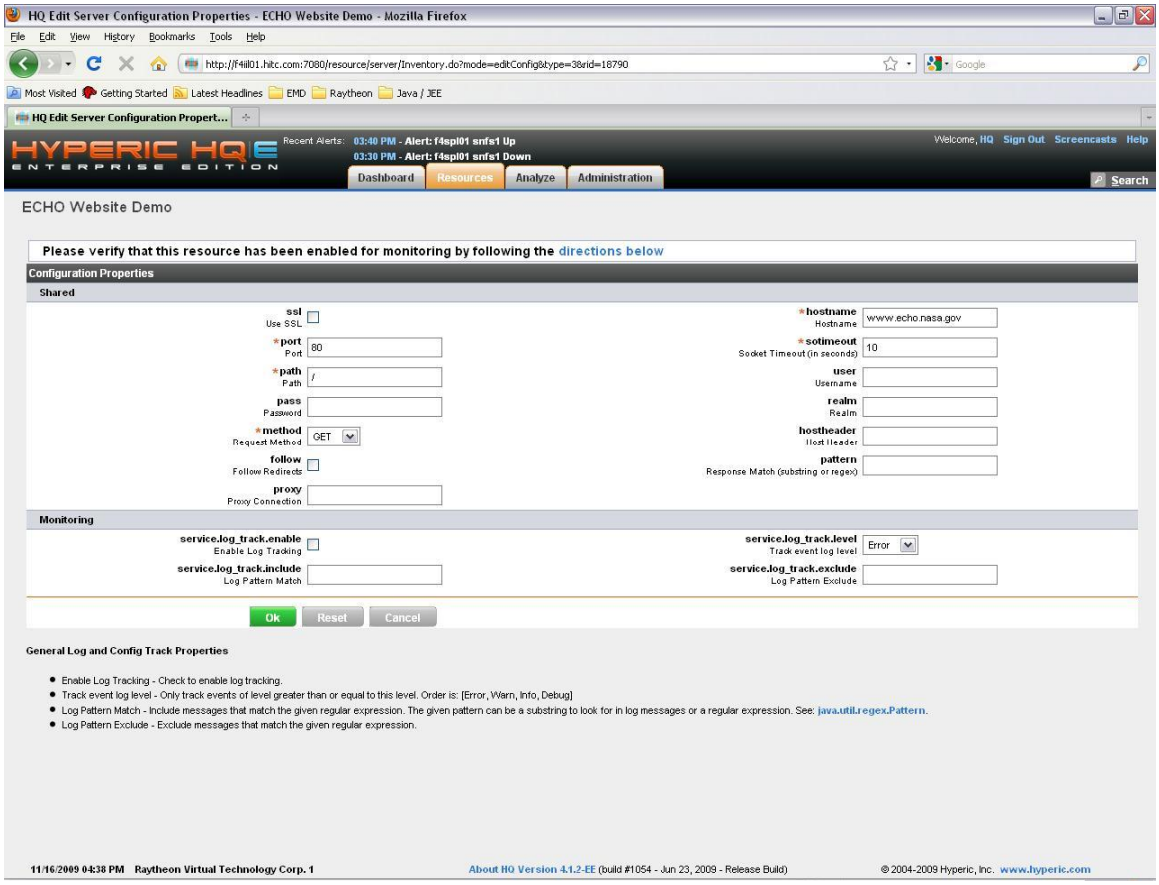


Figure 4.2.2.5.1-5. ECHO Website Configuration Properties Page

6. The ECHO Website HTTP service is now configured and you can go ahead and monitor it, setup alerts, and change the monitoring interval of the metrics it gathers.

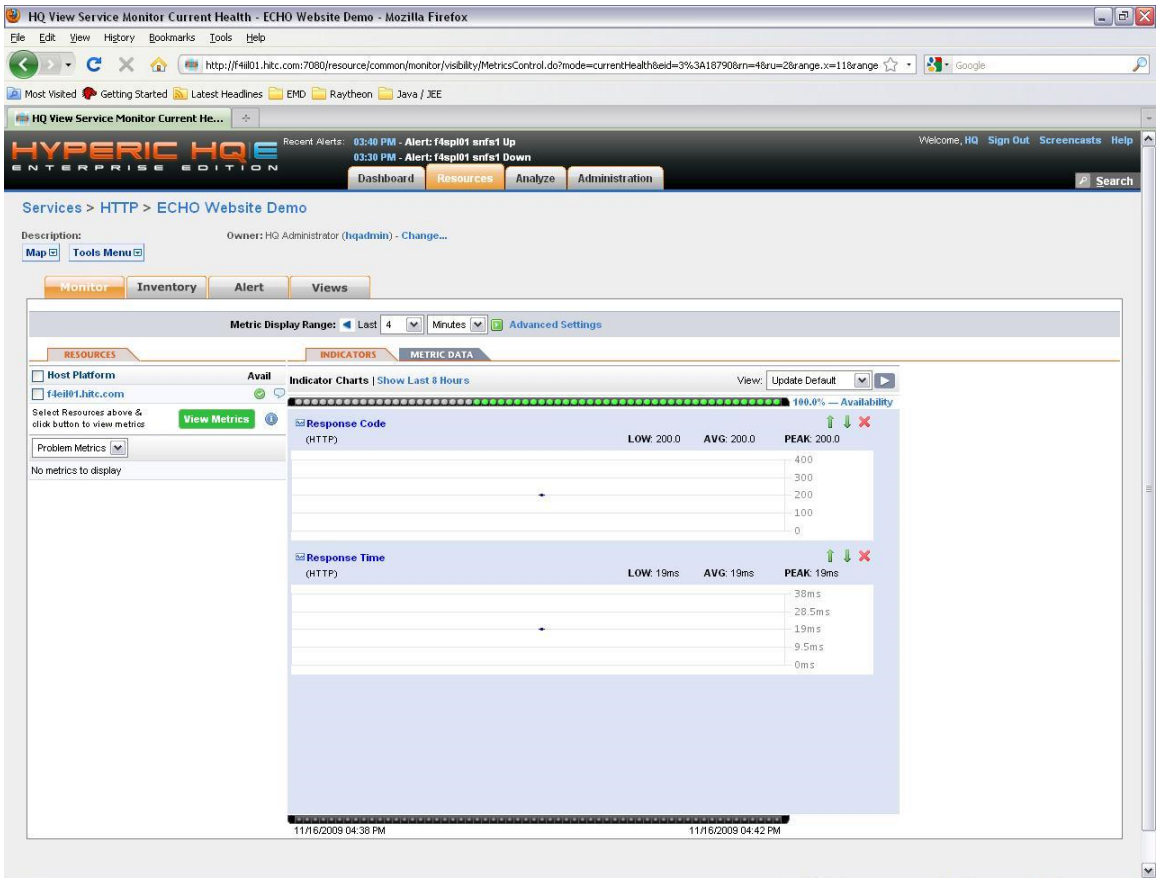


Figure 4.2.2.5.1-6. ECHO Website Monitoring

4.2.2.5.2 ECHO WIST

The URL to the ECHO WIST is https://wist.echo.nasa.gov. To monitor a website, Hyperic provides a HTTP service that can be configured to periodically submit an http request to a specified URL. Hyperic will read the responses and determine if the website is available or not. Below are the steps to configure Hyperic to monitor ECHO WIST.

1. Select a platform where you want to define your HTTP service. The agent on this platform will be in charge of submitting an http request and reading the responses. Mouse over the ‘Resources’ tab and select the ‘Browse’ option. Click on the ‘Platforms’ link if it isn’t highlighted and select a platform.

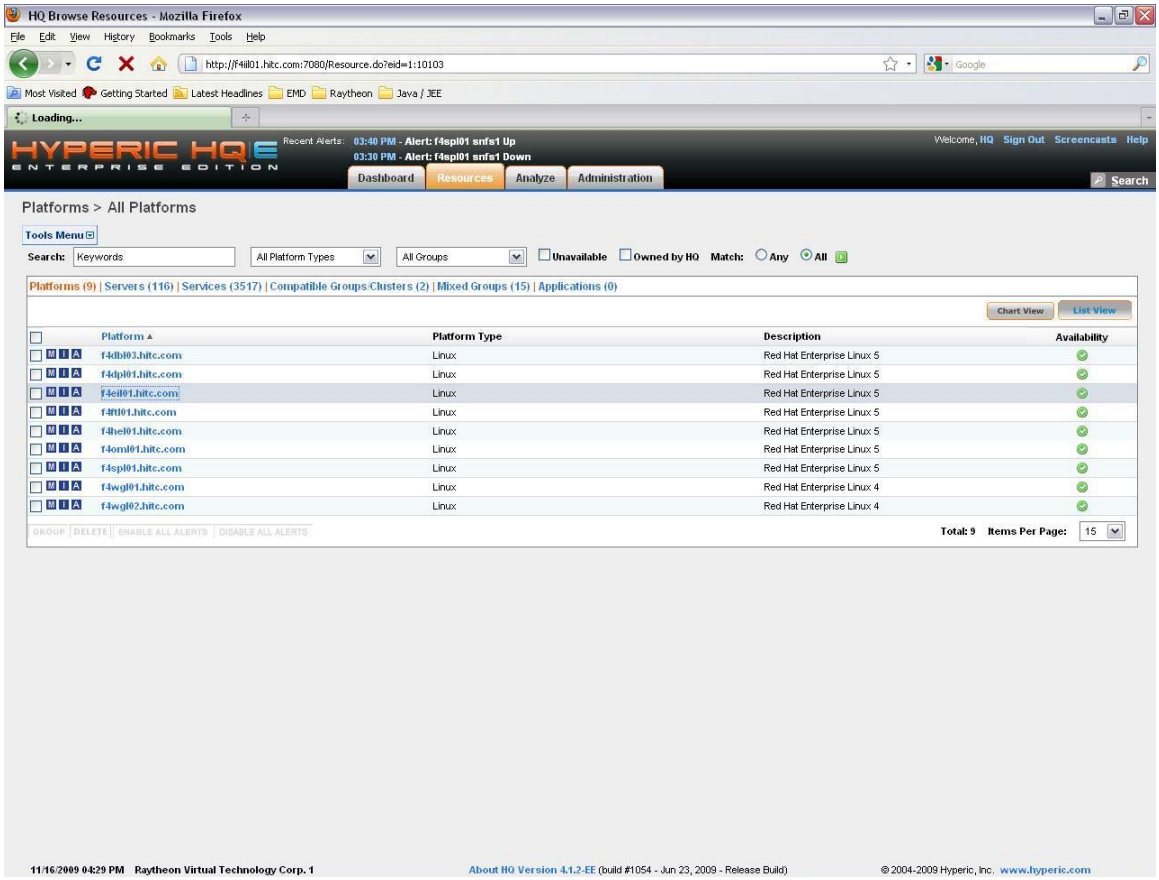


Figure 4.2.2.5.2-1. Select ECHO WIST Service Platform

2. In the platform's detailed page, click on the 'Tools Menu' button and select the 'Add Platform Service' option.

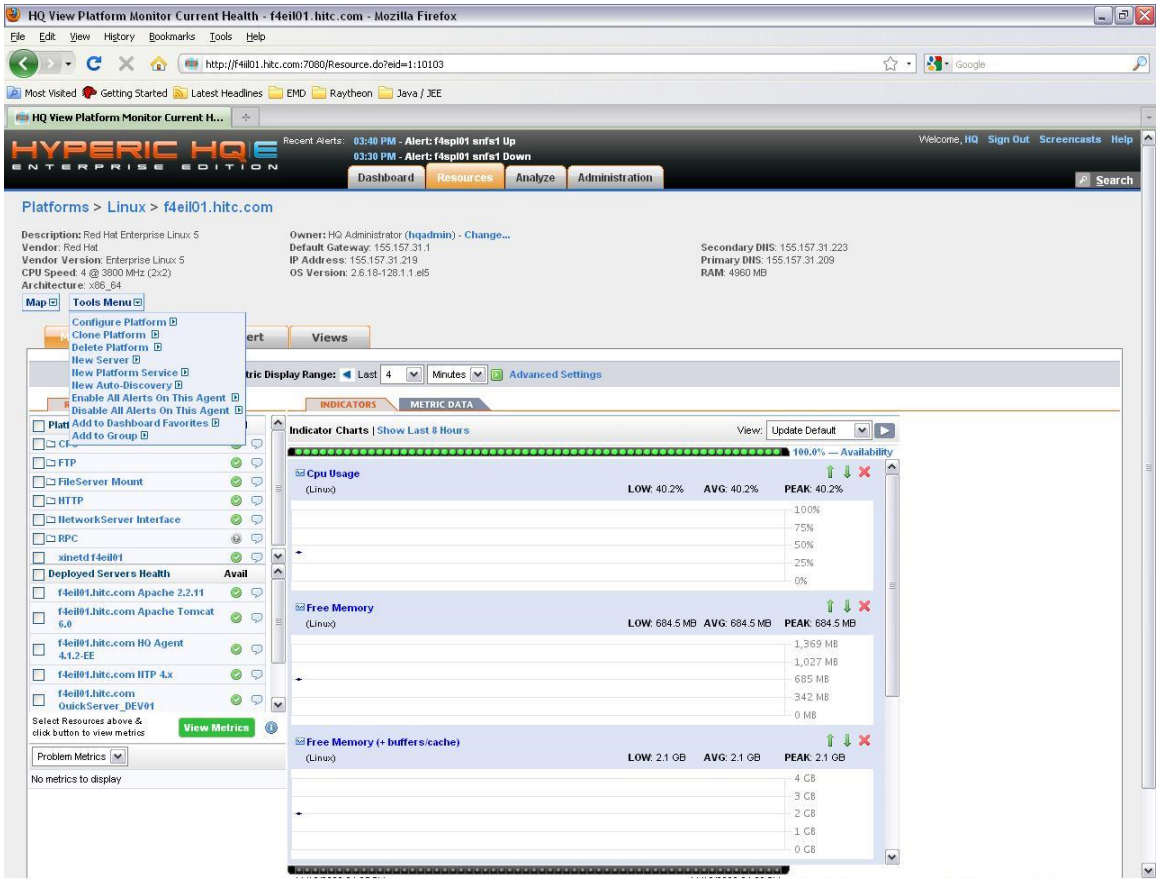


Figure 4.2.2.5.2-2. ECHO WIST Add New Service

3. A new service general properties page will be displayed. Fill in the name, description, and service type. Afterward, click the 'OK' button.

   Name: ECHO WIST

   Description: This service monitors ECHO WIST.

   Service Type: HTTP

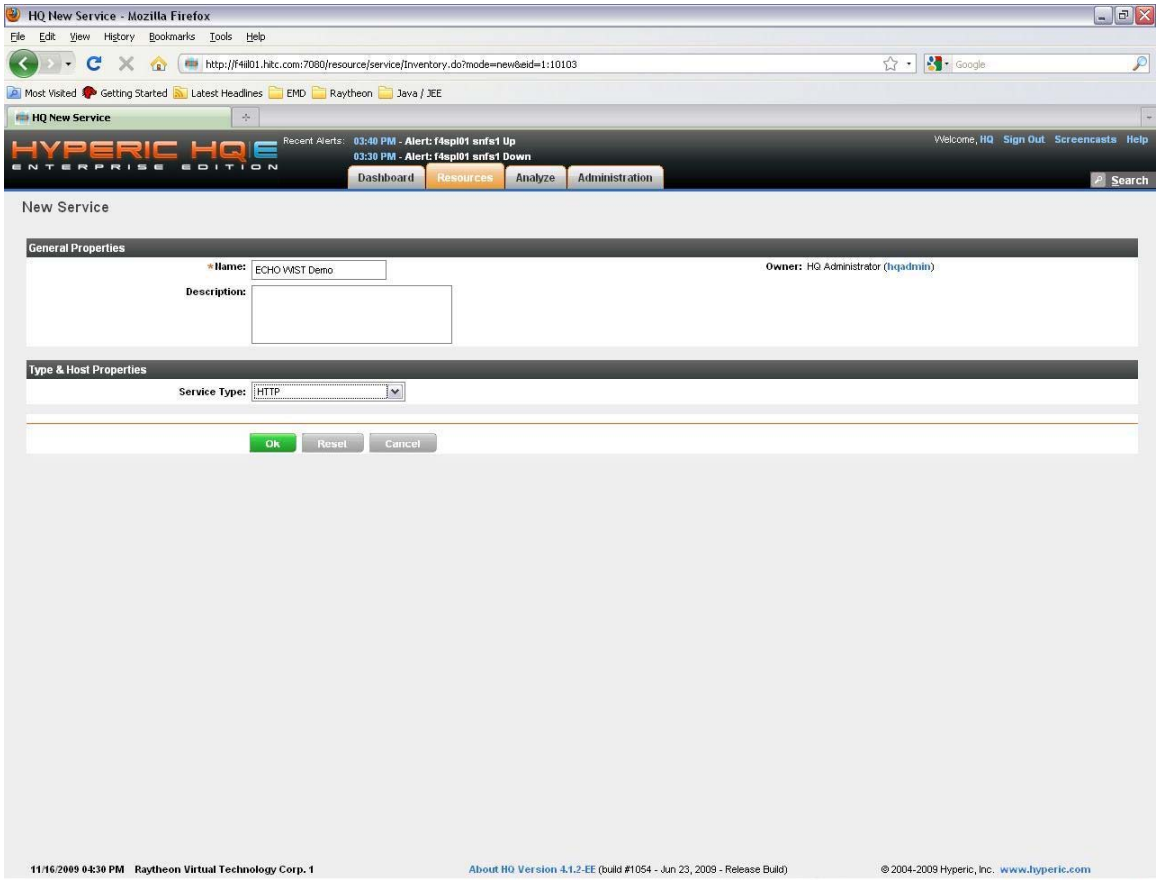


Figure 4.2.2.5.2-3. ECHO WIST General Properties

4. You will be taken to the service detail page, but the service has not been configured to monitor ECHO WIST yet. Click on the ‘Configuration Properties’ link.

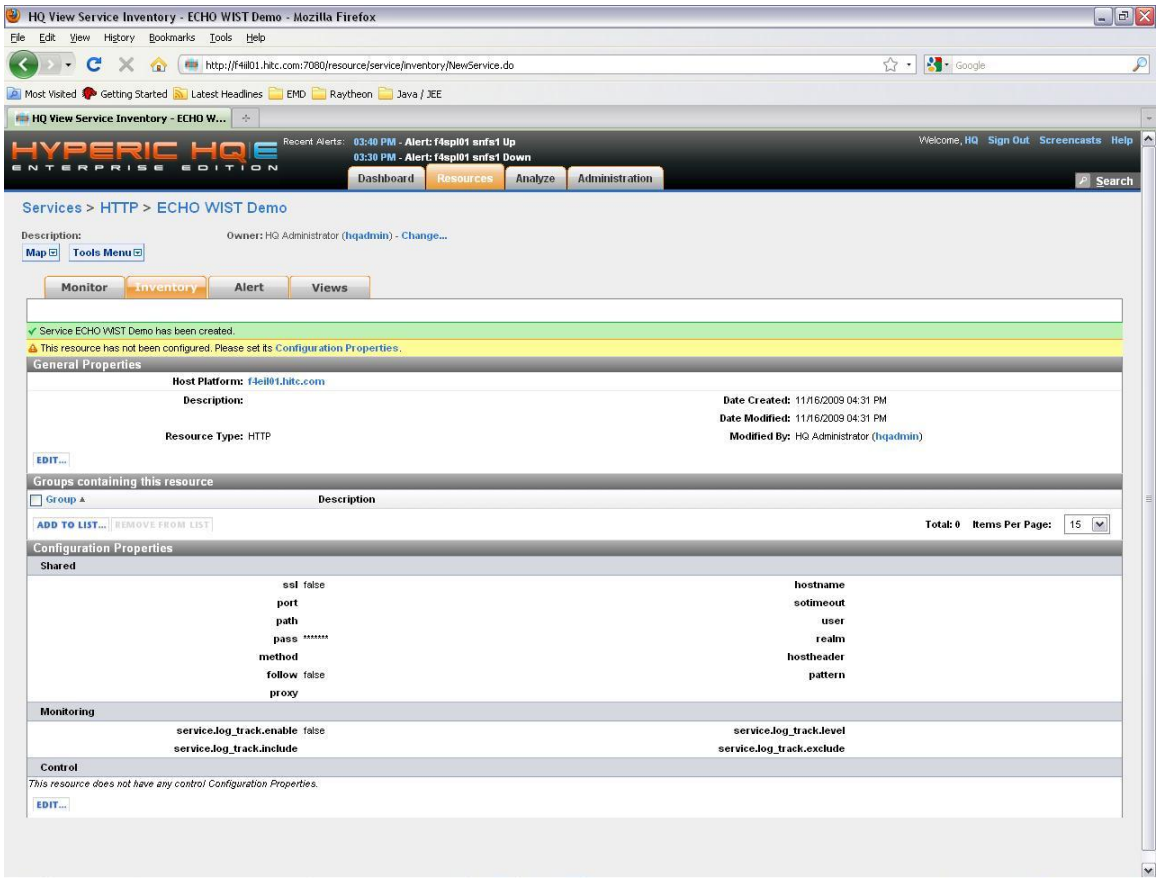


Figure 4.2.2.5.2-4. ECHO WIST Configuration Properties Link

5. In the configuration properties page fill in the following and click the ‘OK’ button.

   ssl: check the checkbox

   hostname: wist.echo.nasa.gov

   port: 443

   *sotimeout: 10

   path: /

   method: GET

   follow: check the checkbox

   **proxy: <hostname>:<port>

   *This is the amount of time in seconds Hyperic will timeout from the http request.

**If your internal network uses a proxy to get out supply it here.

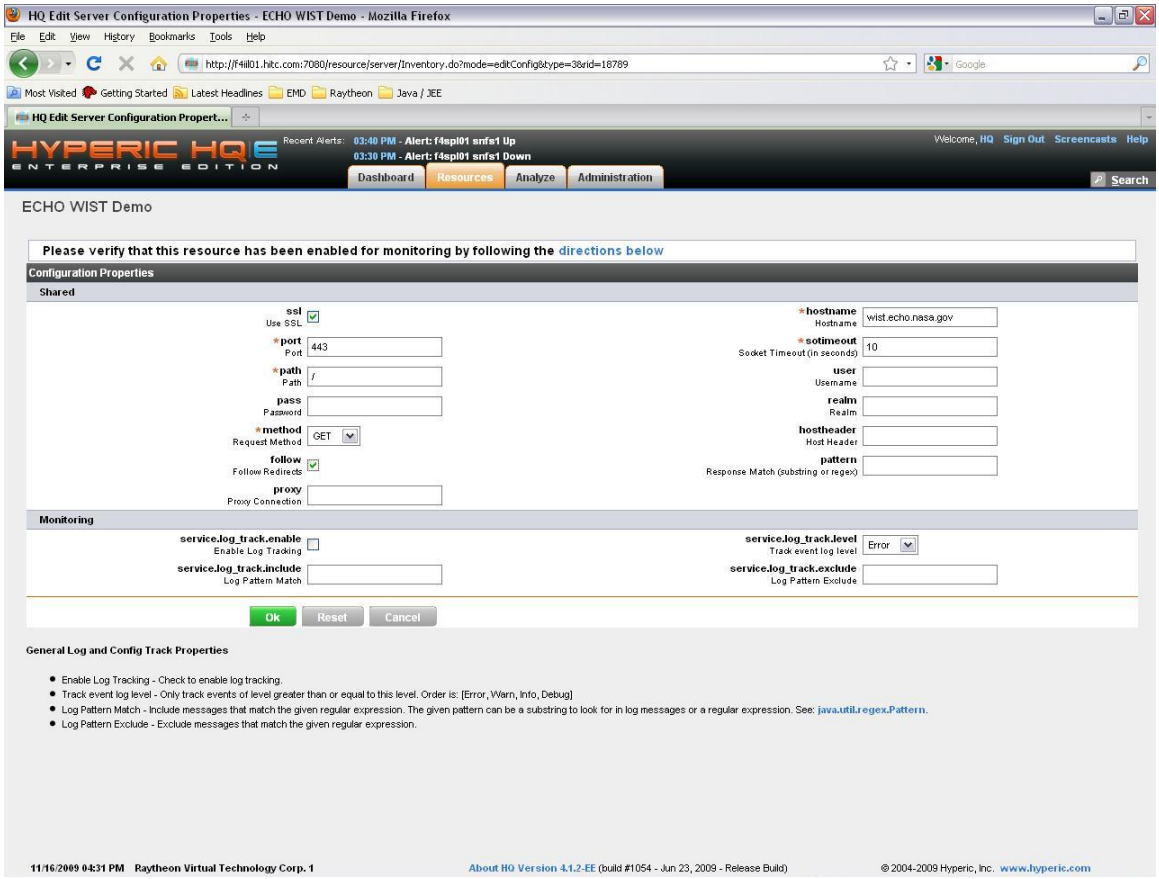


Figure 4.2.2.5.2-5. ECHO WIST Configuration Properties Page

6. The ECHO WIST HTTP service is now configured and you can go ahead and monitor it, setup alerts, and change the monitoring interval of the metrics it gathers.

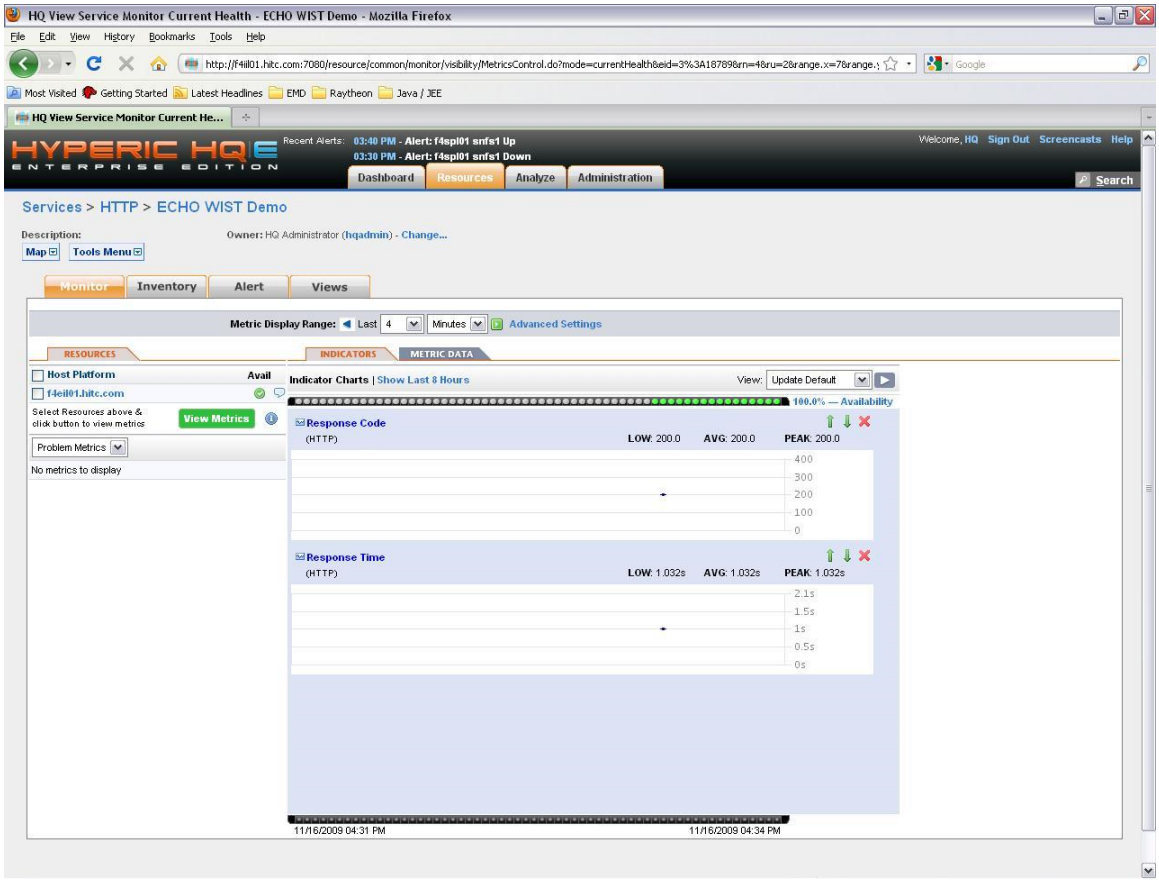


Figure 4.2.2.5.2-6. ECHO WIST Monitoring

4.2.2.5.3 ECHO API

The URL to the ECHO API is http://api.echo.nasa.gov/echo/apis.html. To monitor the API site, Hyperic provides a HTTP service that can be configured to periodically submit an http request to a specified URL. Hyperic will read the responses and determine if the site is available or not. Below are the steps to configure Hyperic to monitor the ECHO API.

1. Select a platform where you want to define your HTTP service. The agent on this platform will be in charge of submitting an http request and reading the responses. Mouse over the ‘Resources’ tab and select the ‘Browse’ option. Click on the ‘Platforms’ link if it isn’t highlighted and select a platform.

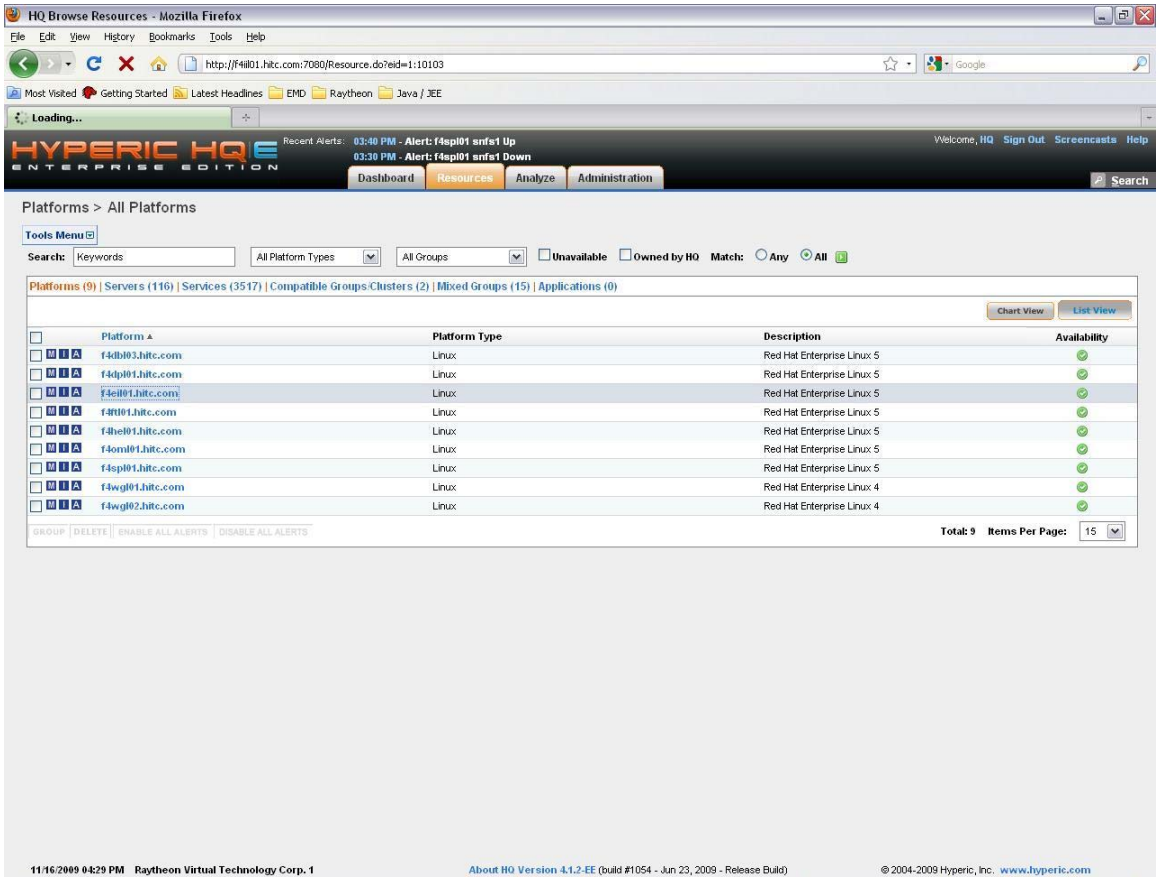


Figure 4.2.2.5.3-1. Select ECHO WIST Service Platform

2. In the platform's detailed page, click on the 'Tools Menu' button and select the 'Add Platform Service' option.

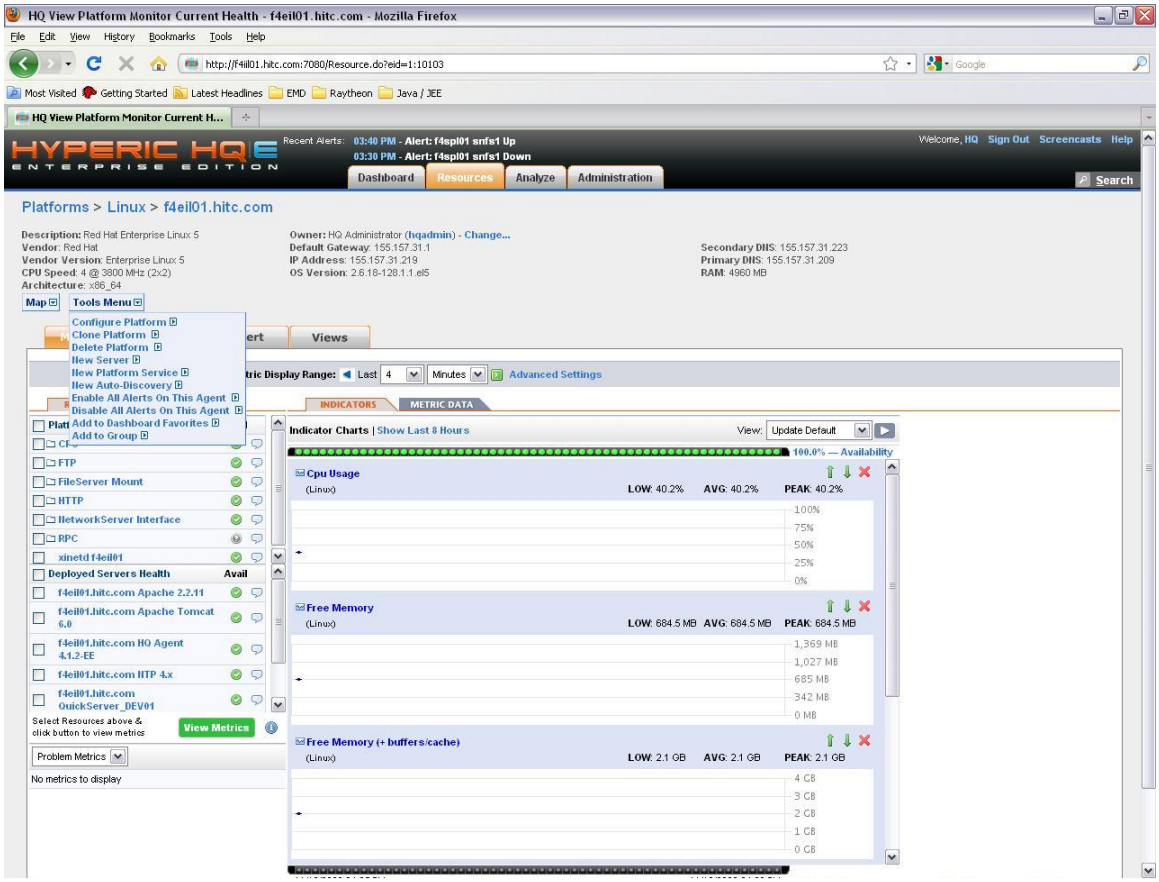


Figure 4.2.2.5.3-2. ECHO WIST Add New Service

3. A new service general properties page will be displayed. Fill in the name, description, and service type. Afterward, click the 'OK' button.

   Name: ECHO API

   Description: This service monitors ECHO API.

   Service Type: HTTP

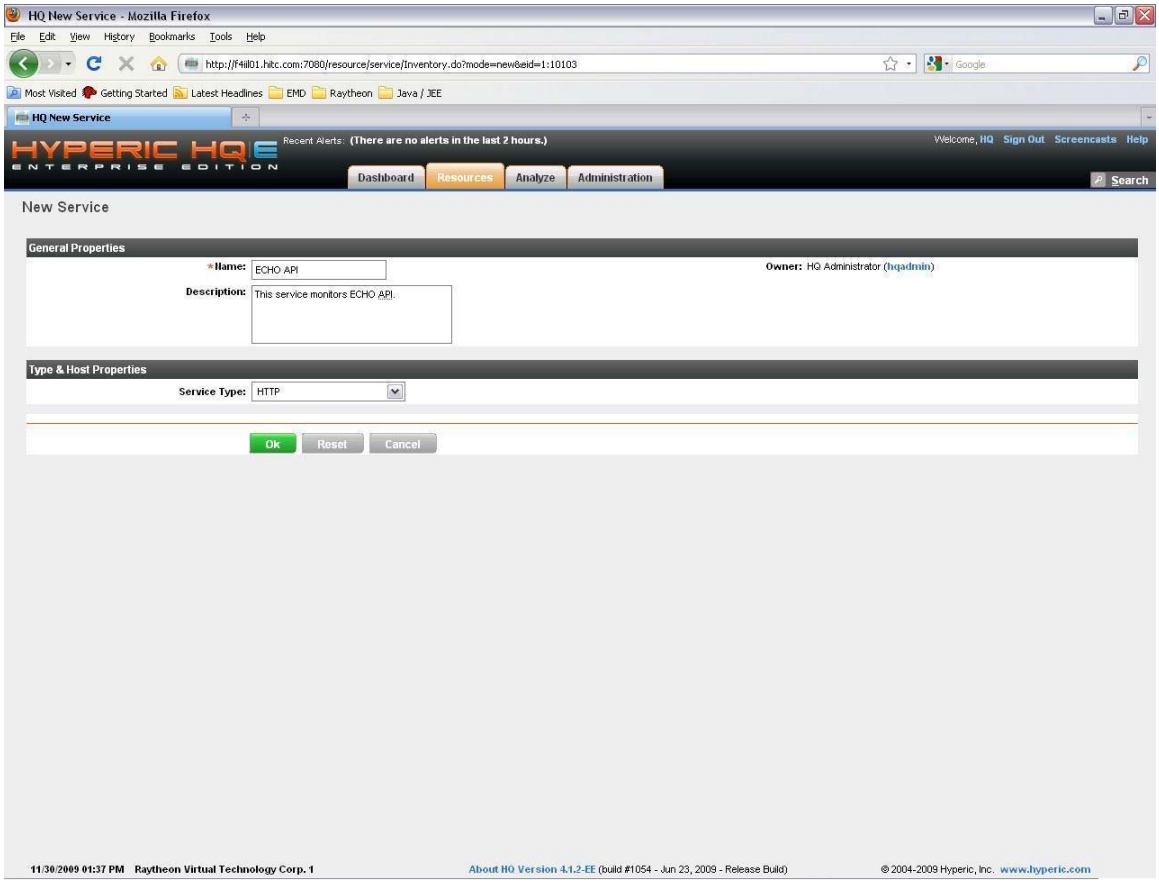


Figure 4.2.2.5.3-3. ECHO API General Properties

4. You will be taken to the service detail page, but the service has not been configured to monitor the ECHO API yet. Click on the 'Configuration Properties' link.

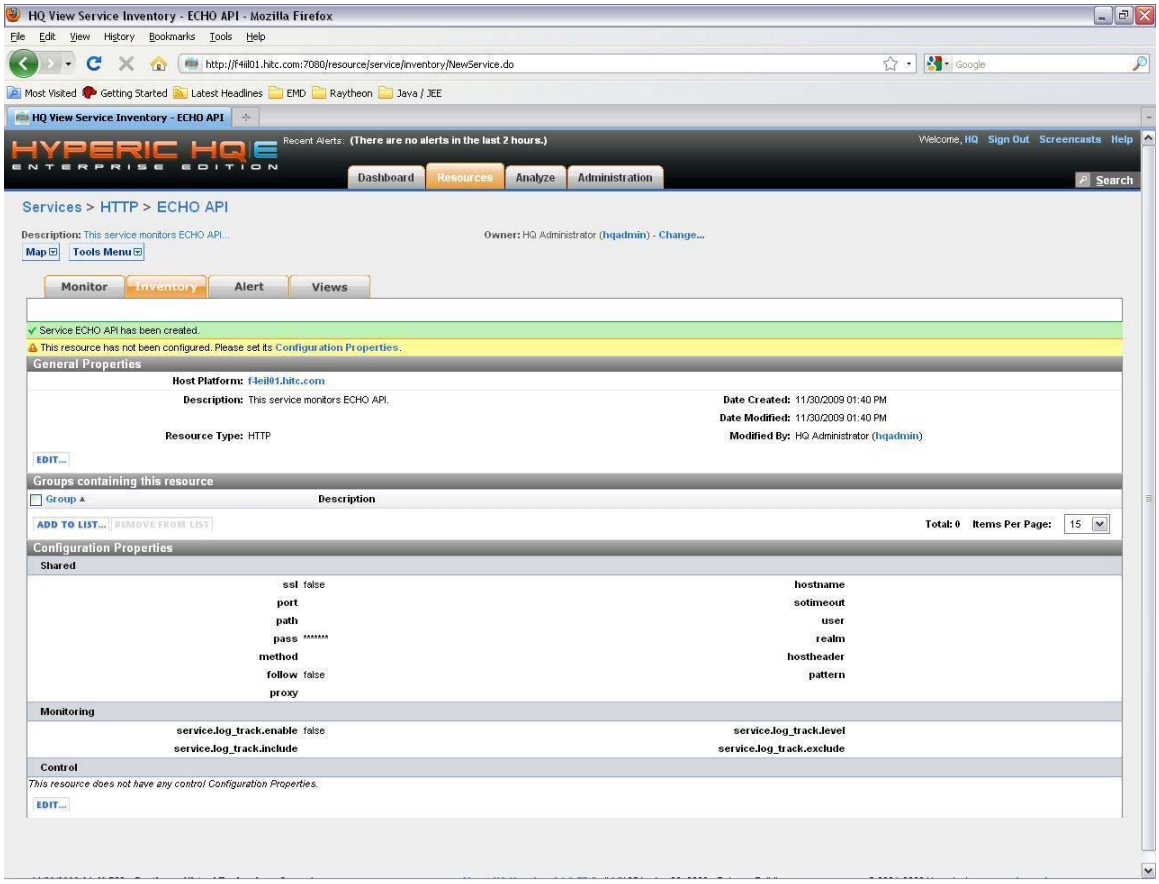


Figure 4.2.2.5.3-4. ECHO API Configuration Properties Link

5. In the configuration properties page fill in the following and click the ‘OK’ button.

   hostname: api.echo.nasa.gov

   port: 80

   *sotimeout: 60

   path: /echo/apis.html

   method: GET

   **proxy: <hostname>:<port>

   *This is the amount of time in seconds Hyperic will timeout from the http request.

   **If your internal network uses a proxy to get out supply it here.

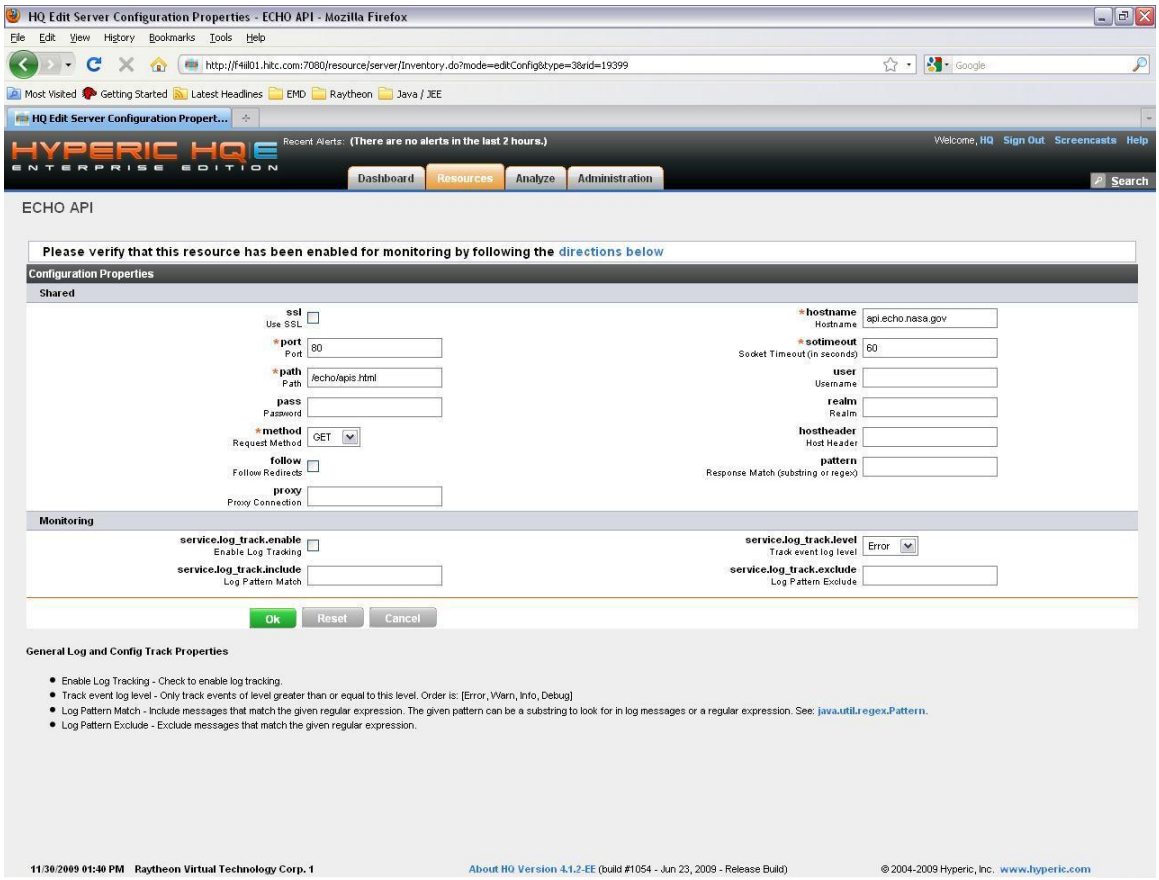


Figure 4.2.2.5.3-5. ECHO API Configuration Properties Page

6. The ECHO API HTTP service is now configured and you can go ahead and monitor it, setup alerts, and change the monitoring interval of the metrics it gathers.

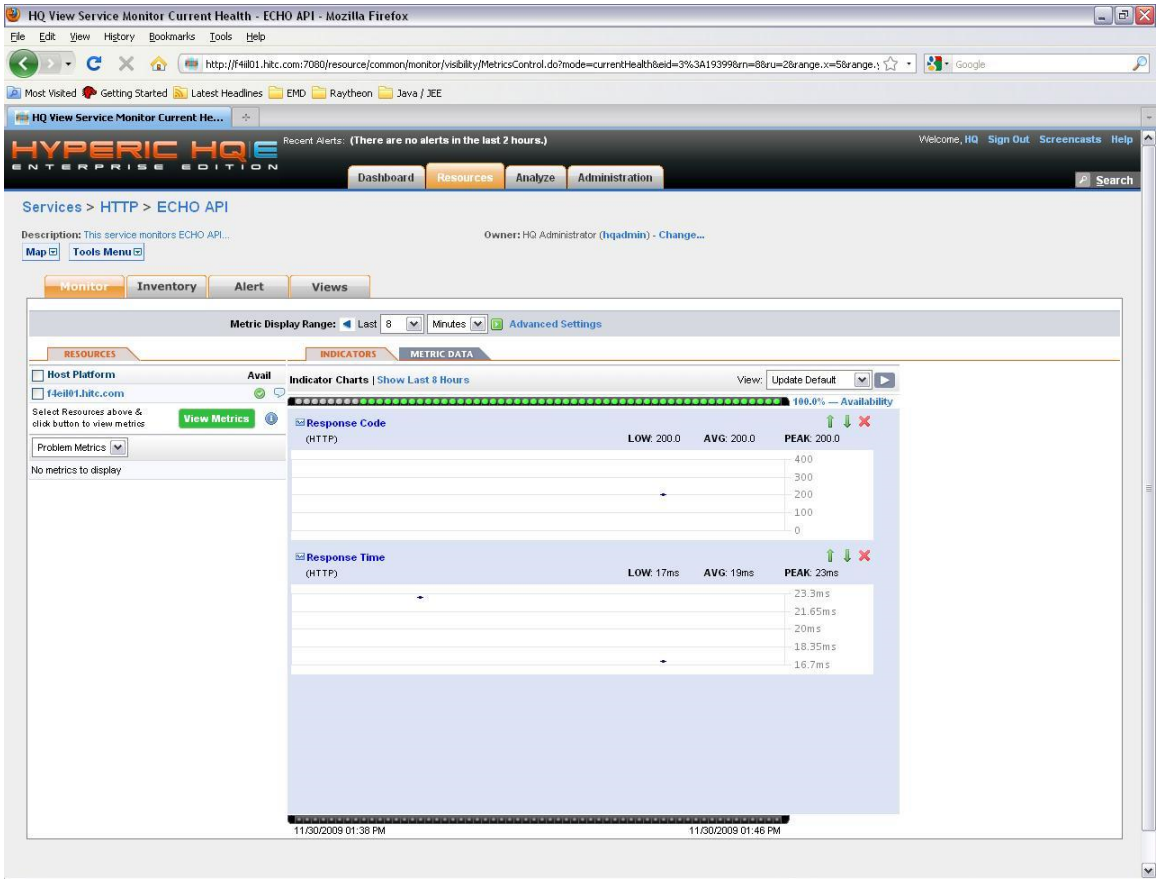


Figure 4.2.2.5.3-6. ECHO API Monitoring

4.2.2.5.4 ECHO FTP

Hyperic provides a FTP service that can be configured to periodically log into an ftp site to see whether it is up or down. This approach will be taken to monitor the ECHO FTP site. Below are the steps to configure Hyperic to perform this task.

1. Select a platform where you want to define your FTP service. The agent on this platform will be in charge of logging into the ftp site. Mouse over the 'Resources' tab and select the 'Browse' option. Click on the 'Platforms' link if it isn't highlighted and select a platform.

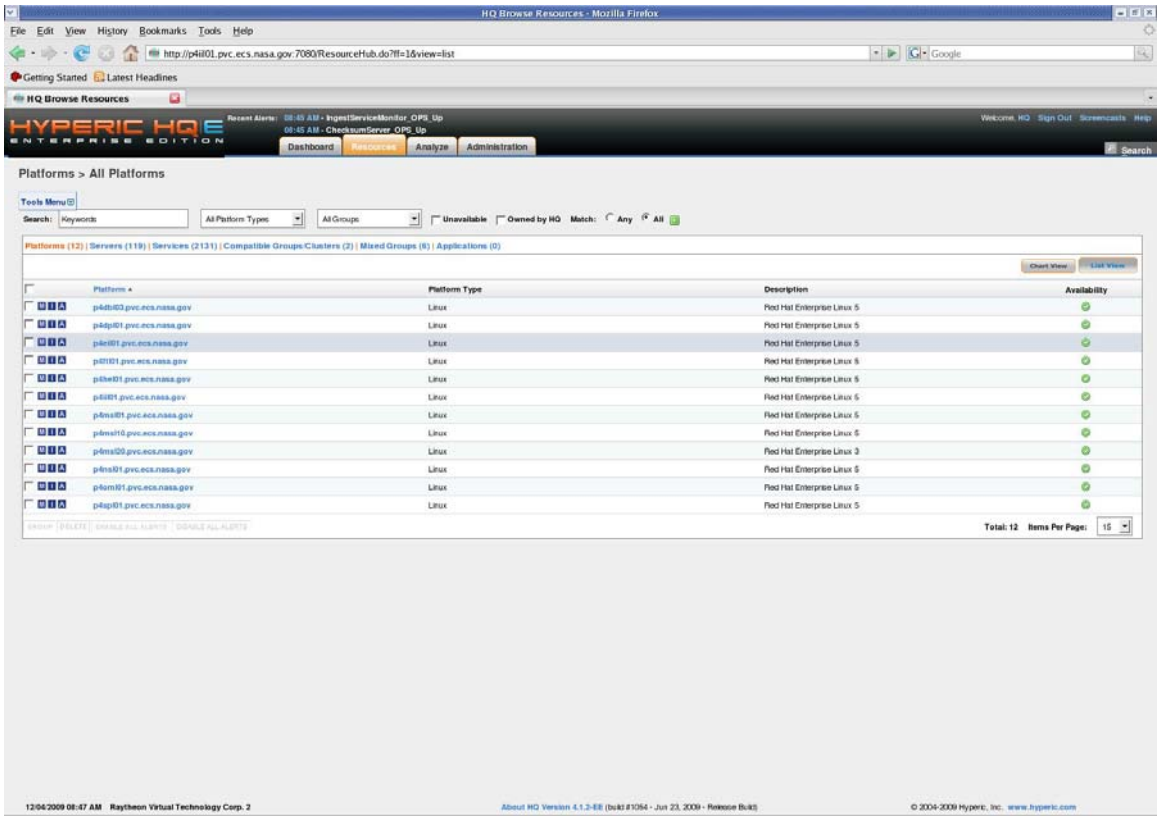


Figure 4.2.2.5.4-1. Select ECHO FTP Service Platform

2. In the platform's detailed page, click on the 'Tools Menu' button and select the 'Add Platform Service' option.

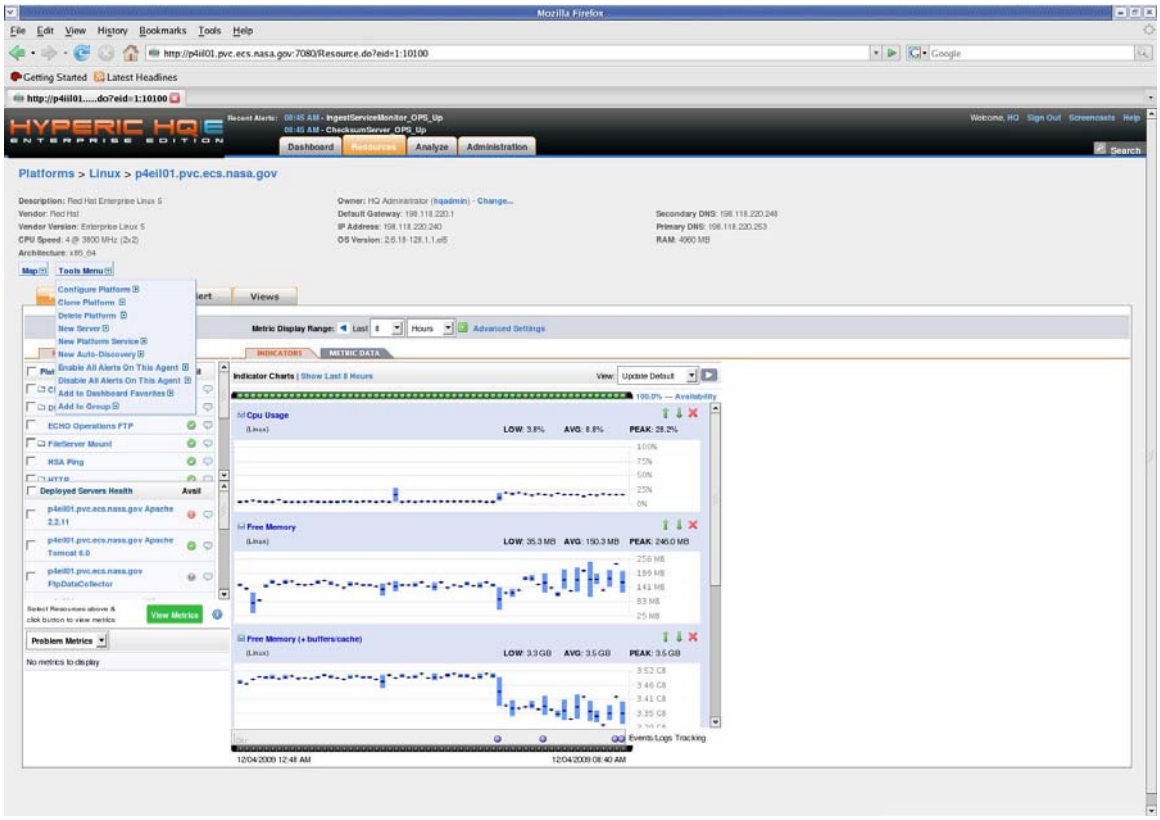


Figure 4.2.2.5.4-2. ECHO FTP Add New Service

3. A new service general properties page will be displayed. Fill in the name, description, and service type. Afterward, click the 'OK' button.

   Name: ECHO FTP Site

   Description: This monitors the ECHO FTP site.

   Service Type: FTP

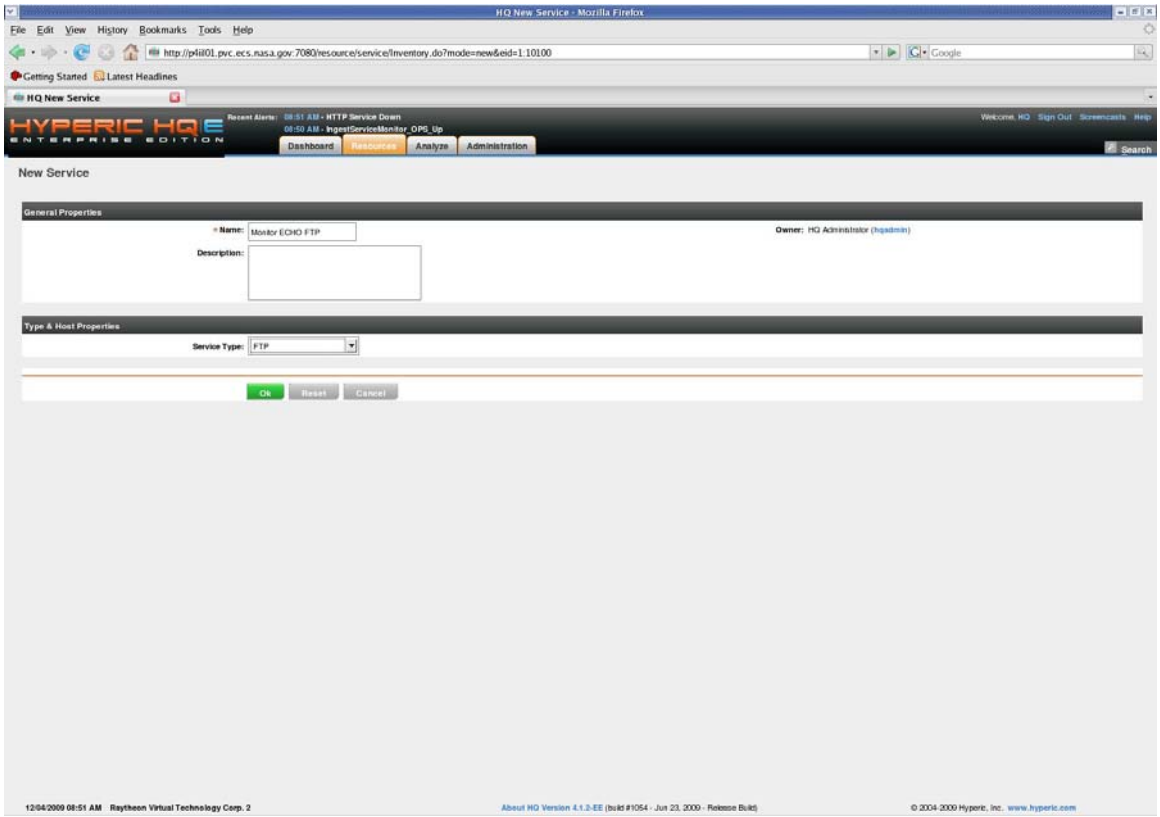


Figure 4.2.2.5.4-3. ECHO FTP General Properties

4. You will be taken to the service detail page, but the service has not been configured to monitor the ECHO FTP yet. Click on the 'Configuration Properties' link.

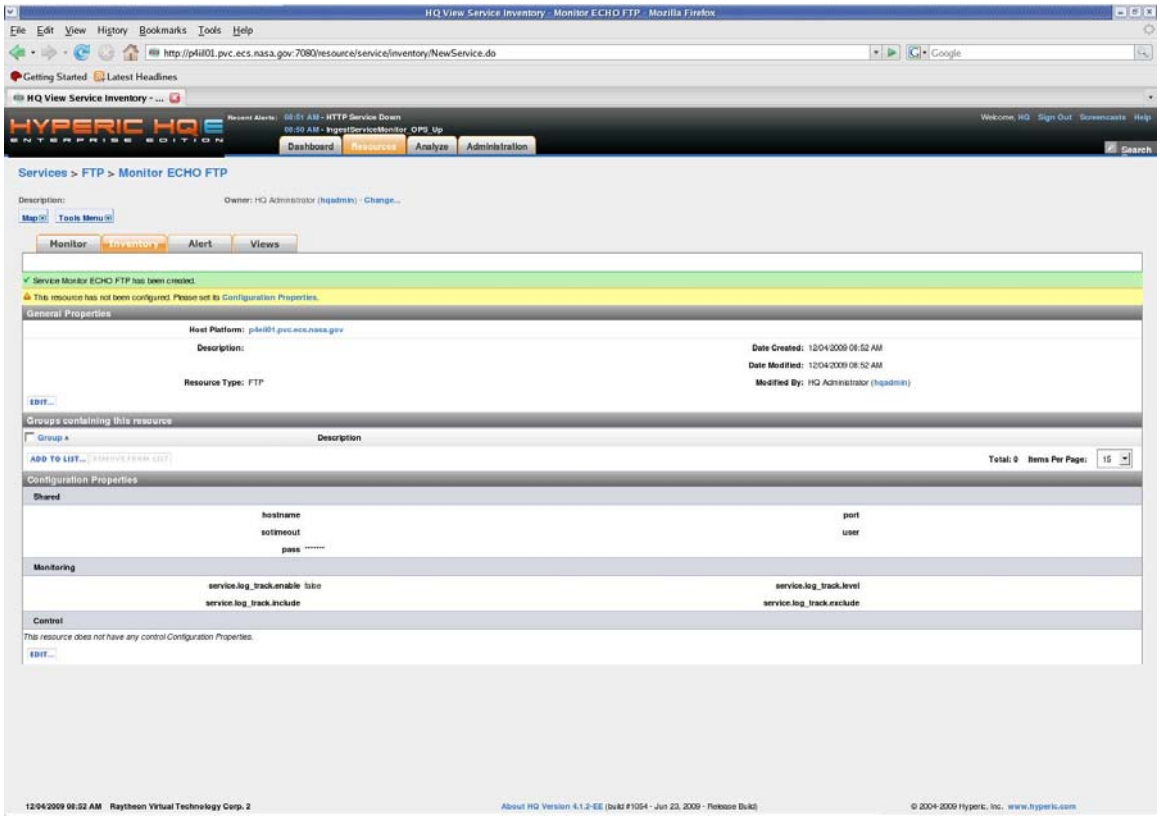


Figure 4.2.2.5.4-4. ECHO FTP Configuration Properties Link

5. In the configuration properties page fill in the following (below is an example configuration from Riverdale PVC) and click the 'OK' button.

   hostname: p0fwi09.pvc.ecs.nasa.gov

   port: 21

   *sotimeout: 20

   user: pvc_ts2@ingest-test.echo.nasa.gov

   pass: <password>

   *This is the amount of time in seconds Hyperic will timeout from the ftp request.

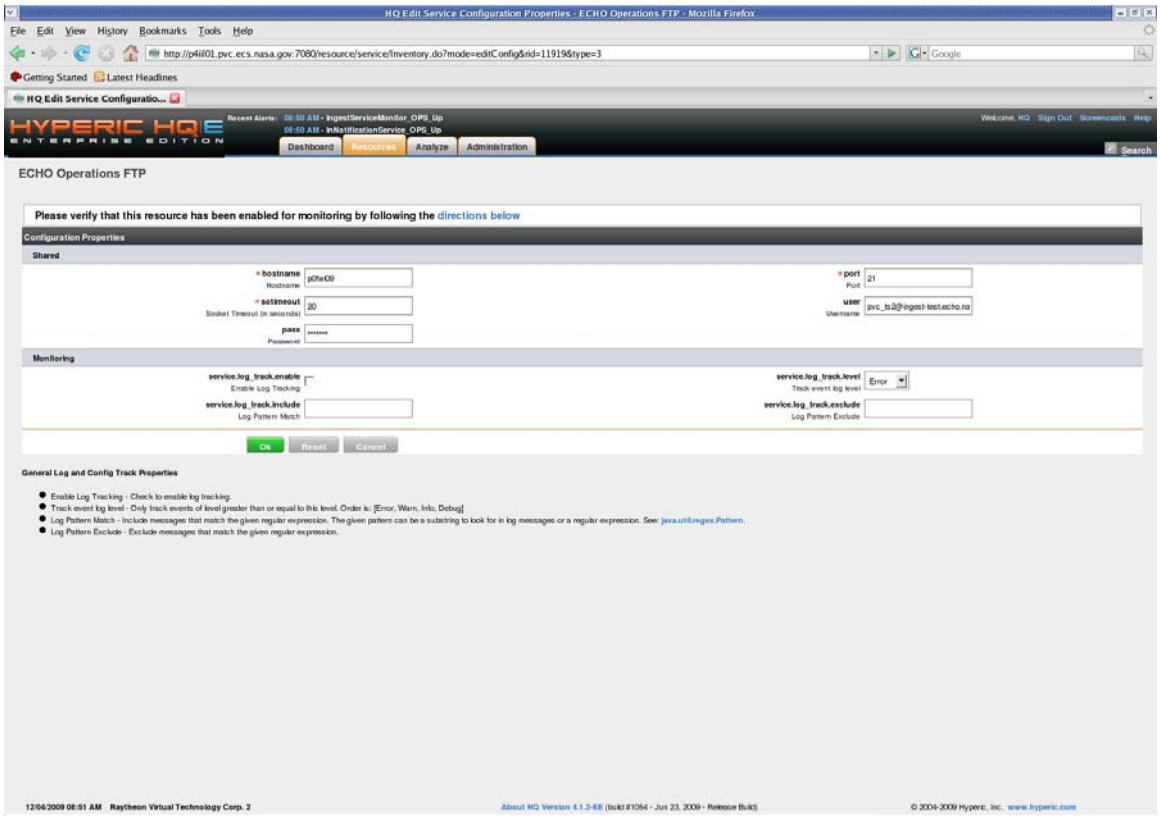


Figure 4.2.2.5.4-5. ECHO FTP Configuration Properties Page

6. The ECHO FTP service is now configured and you can go ahead and monitor it, setup alerts, and change the monitoring interval of the metrics it gathers.

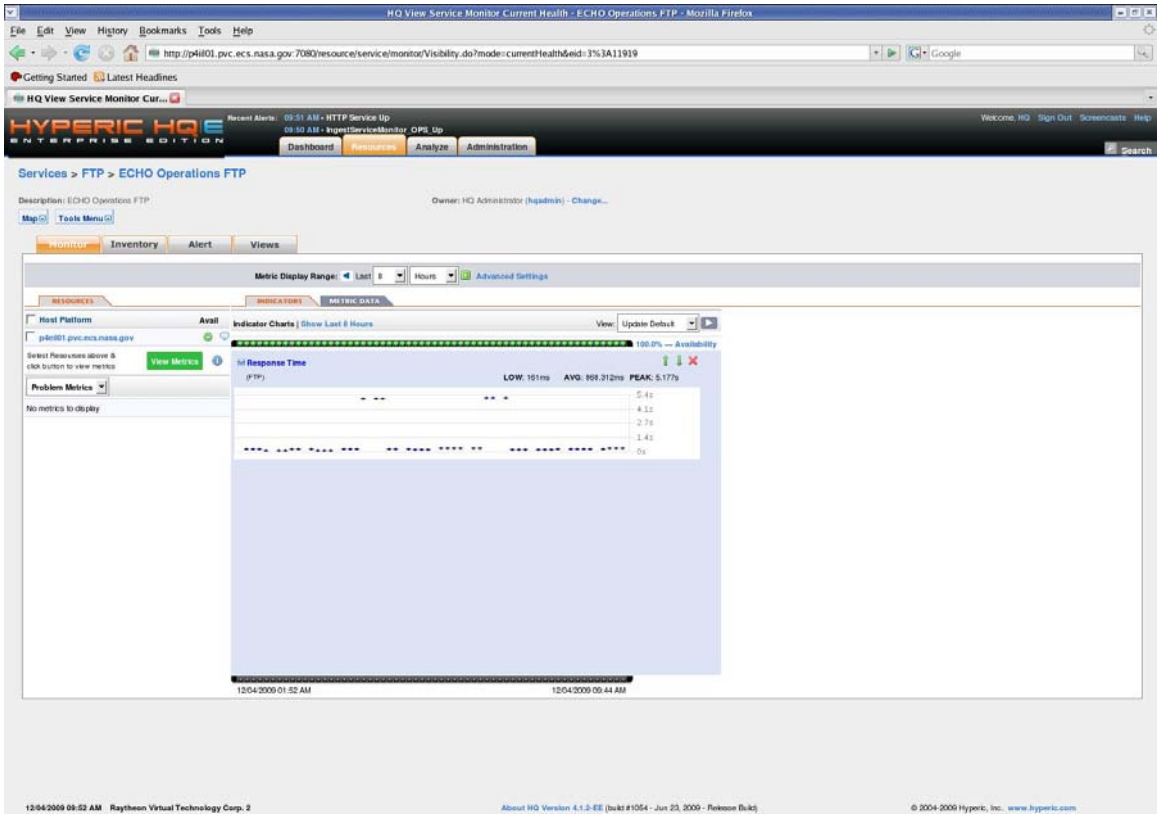


Figure 4.2.2.5.4-6. ECHO FTP Monitoring

4.2.2.6 Other Custom Resources

This section describes configure and/or monitor EEB custom resources via Hyperic that are not covered in the previous section.

4.2.2.6.1 BMGT Monitor Server

The BMGT Monitor Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-BMGT-Monitor-plugin.xml. The BMGT Monitor Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in.

The metrics that will be collected for the BMGT Monitor Server include the standard Hyperic metrics *(see section 4.2.2.2.13, Standard Plugin Metrics)* and custom metrics (see below).

Table 4.2.2.6.1-1. BMGT Custom Metrics

Custom Metrics	
Metric Name	**Description**
PercentIncVerComplete	The percent that Incremental Verification is complete.
NumNewPackages	The total number of new packages.
NumExportedPackages	The total number of exported packages.
NumPkgGenFailed	The total number of packages that failed Package Generation.
NumPrdtGenFailed	The total number of packages that failed Product Generation.
NumRetransmit	The total number of packages that are being retransmitted.

Up/down alerts are set up for the BMGT Monitor Server based on its availability metrics. The down alert is used to notify operator of the problem and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3 for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

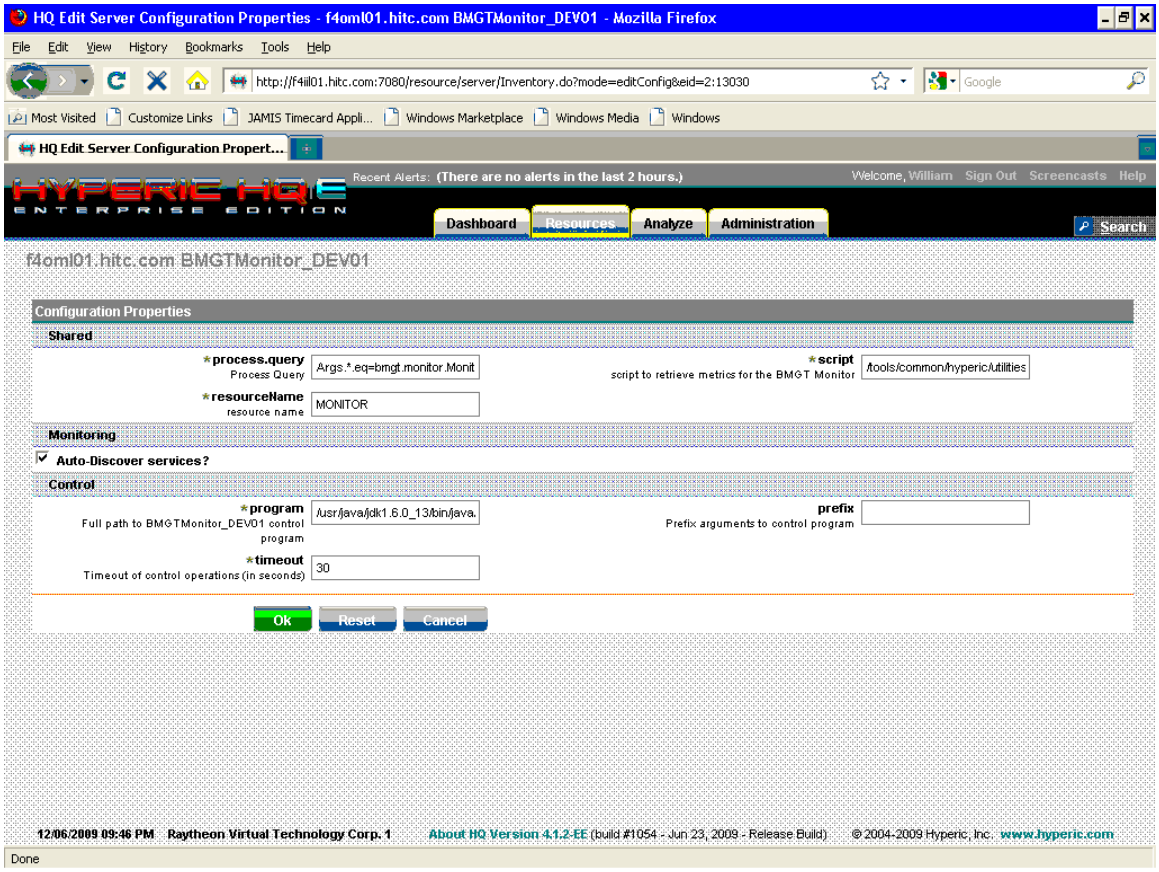


Figure 4.2.2.6.1-1. BMGT Monitor Server Configuration View

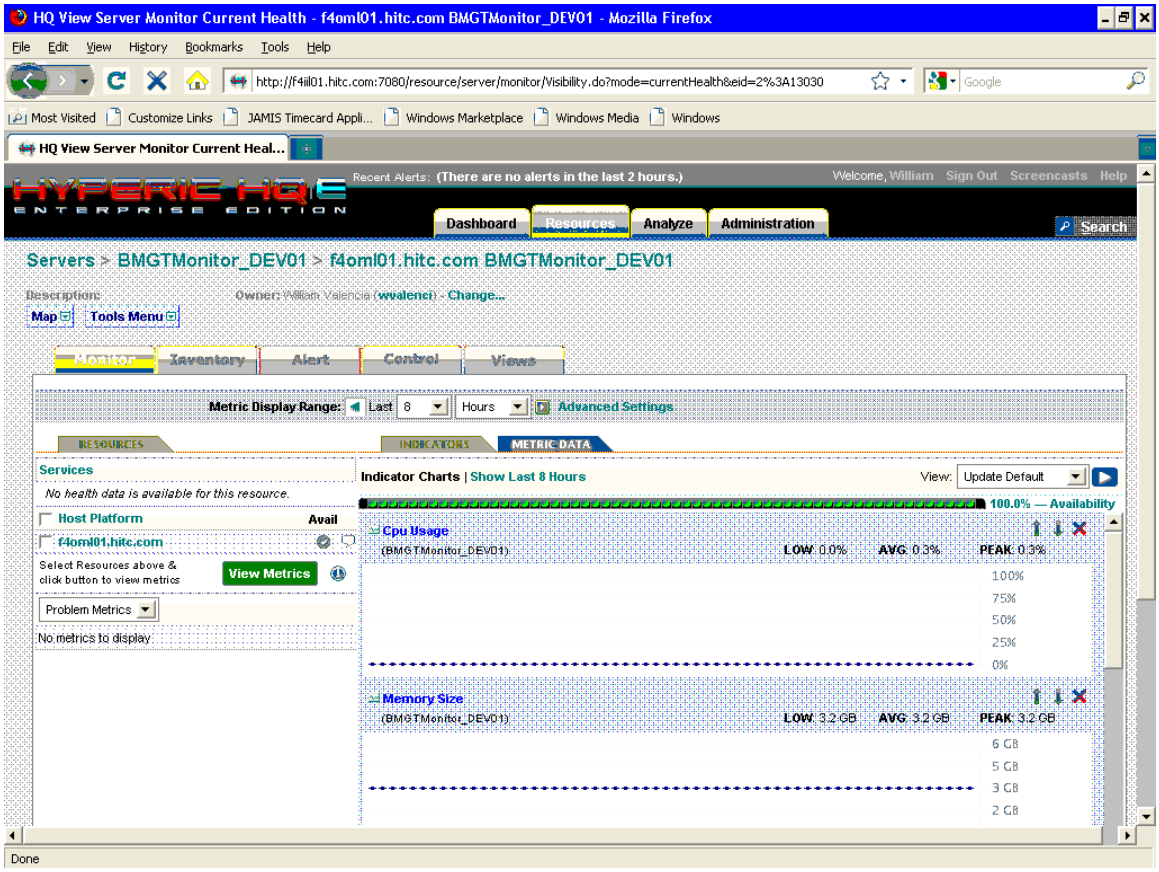


Figure 4.2.2.6.1-2. BMGT Monitor Server Monitoring

4.2.2.6.2 BMGT Generator Server

The BMGT Generator Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-BMGT-Generator-plugin.xml. The BMGT Generator Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in.

Up/down alerts are set up for the BMGT Generator Server based on its availability metrics. The down alert is used to notify operator of the problem and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3 for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

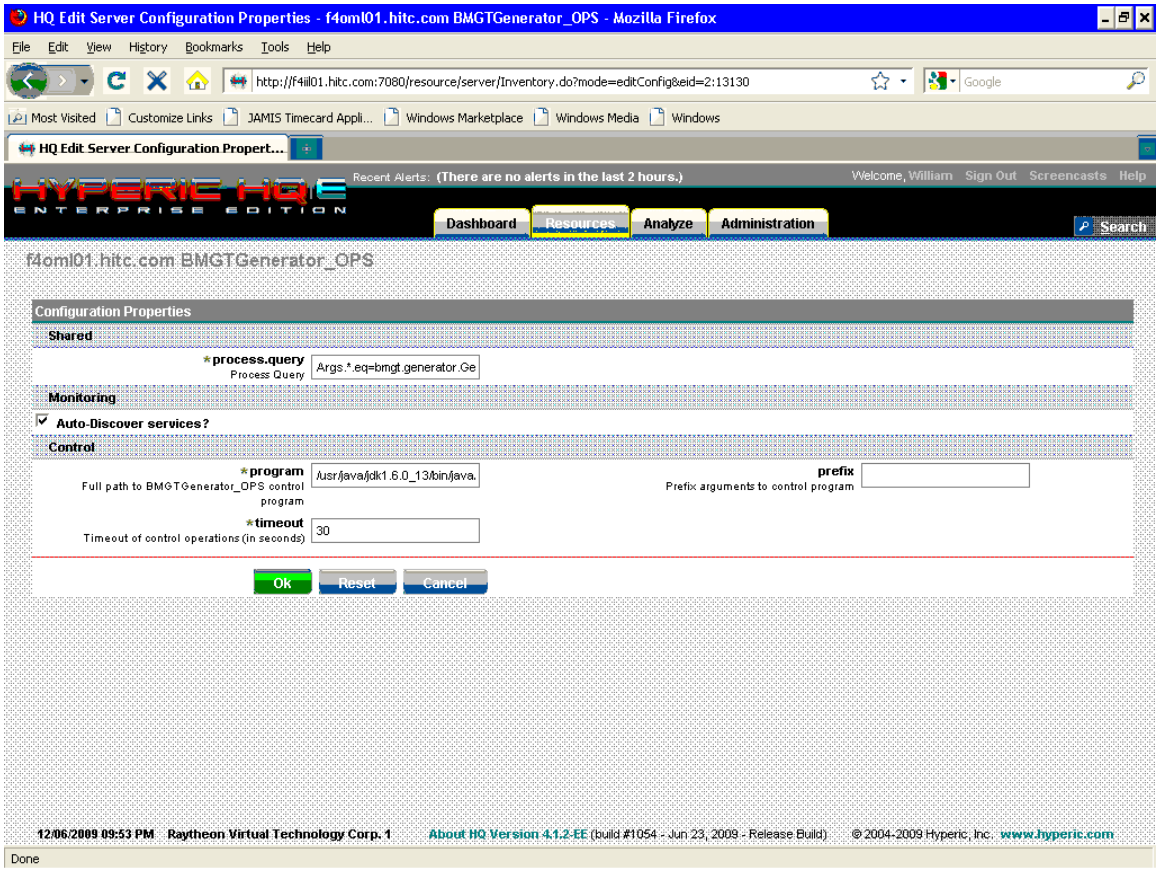


Figure 4.2.2.6.2-1. BMGT Generator Server Configuration View

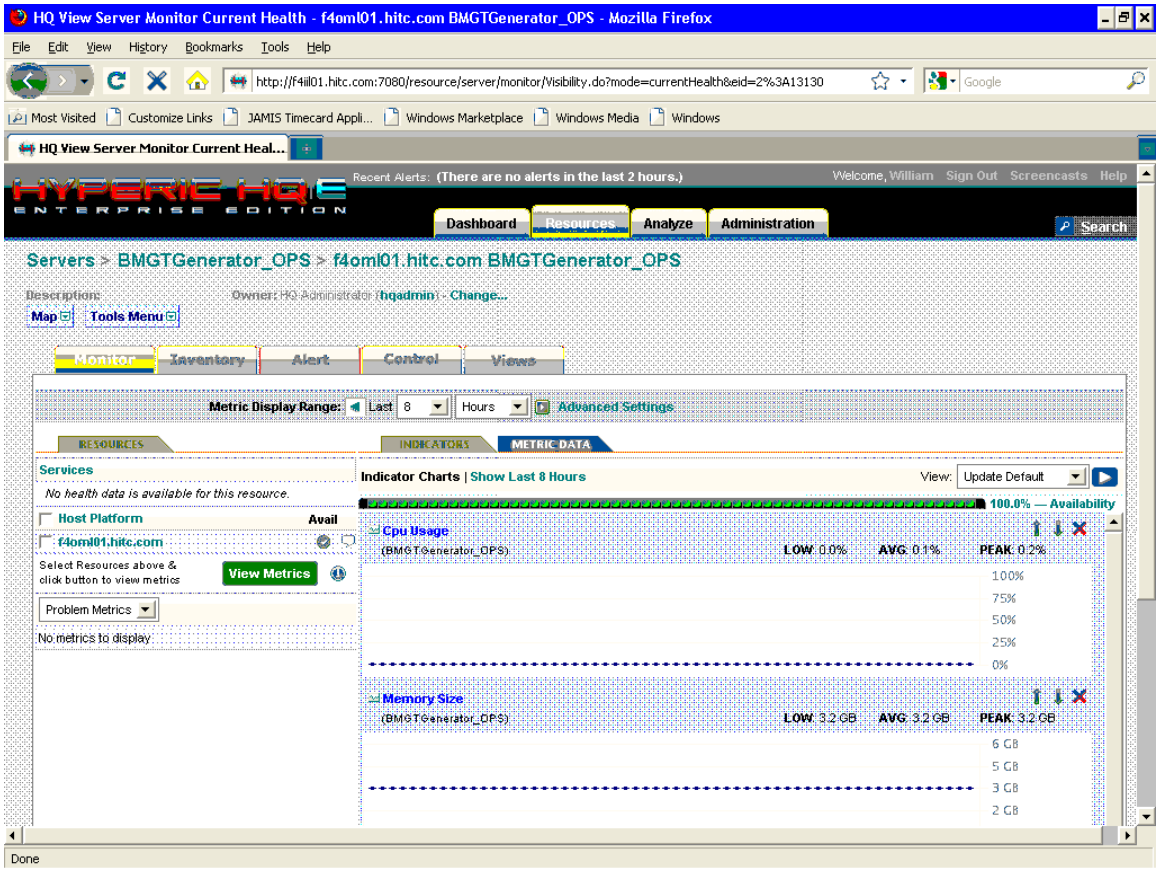


Figure 4.2.2.6.2-2. BMGT Generator Server Monitoring

4.2.2.6.3 BMGT Packager Server

The BMGT Packager Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-BMGT-Packager-plugin.xml. The BMGT Packager Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in.

Up/down alerts are set up for the BMGT Packager Server based on its availability metrics. The down alert is used to notify operator of the problem and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3 for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

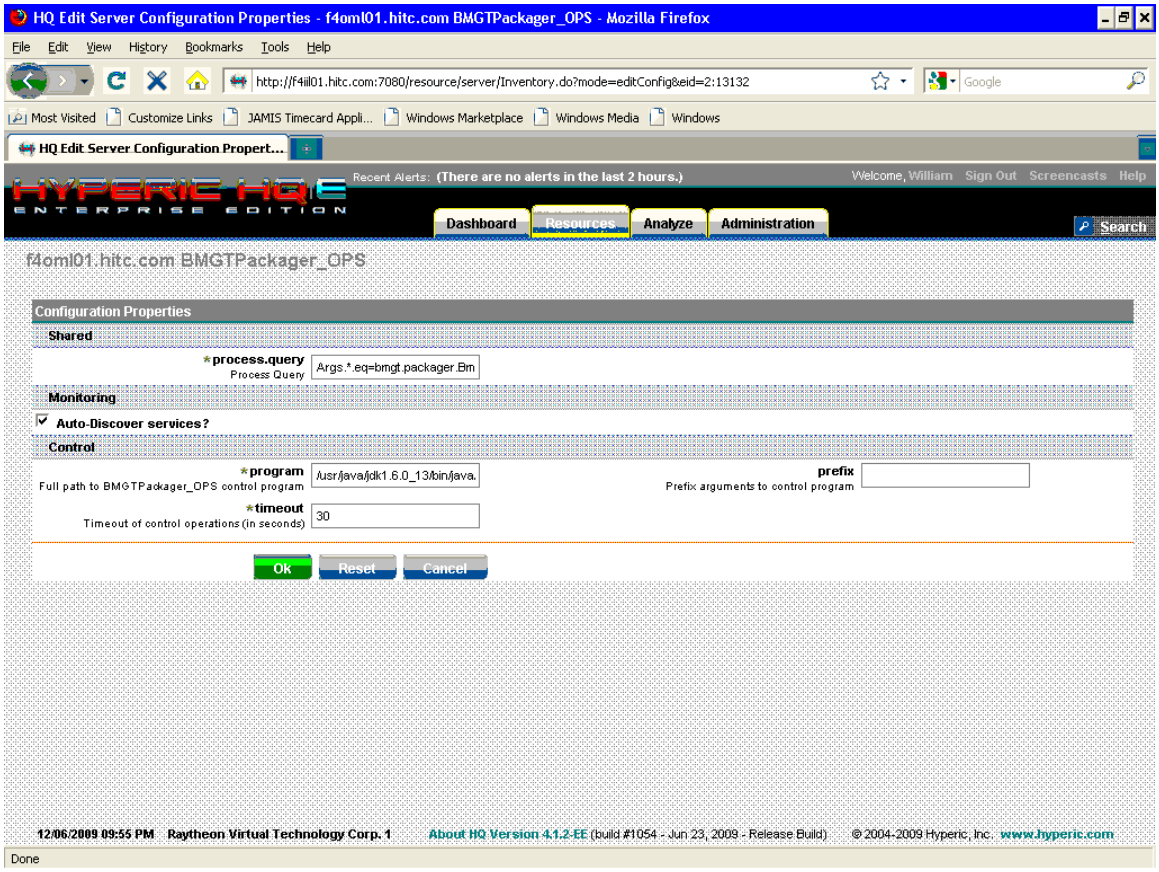


Figure 4.2.2.6.3-1. BMGT Packager Server Configuration View

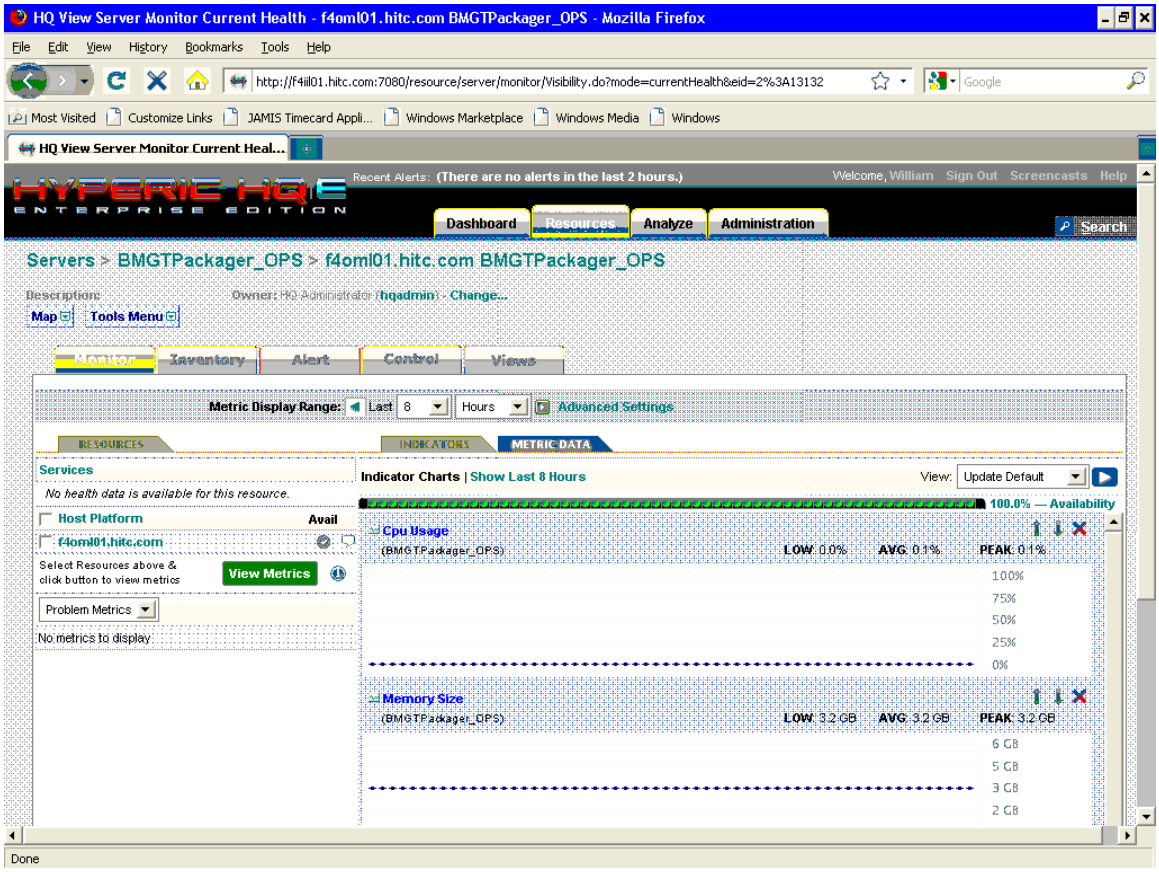


Figure 4.2.2.6.3-2. BMGT Packager Server Monitoring

4.2.2.6.4 BMGT Export Server

The BMGT Export Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-BMGT-ExportServer-plugin.xml. The BMGT Export Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in as well as the custom metric shown below.

Table 4.2.2.6.4-1. BMGT Export Server Metrics

Custom Metrics	
Metric Name	**Description**
ReexportQueueSize	The current size of the Re-export Queue

Up/down alerts are set up for the BMGT Export Server based on its availability metrics. The down alert is used to notify operator of the problem and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3 for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

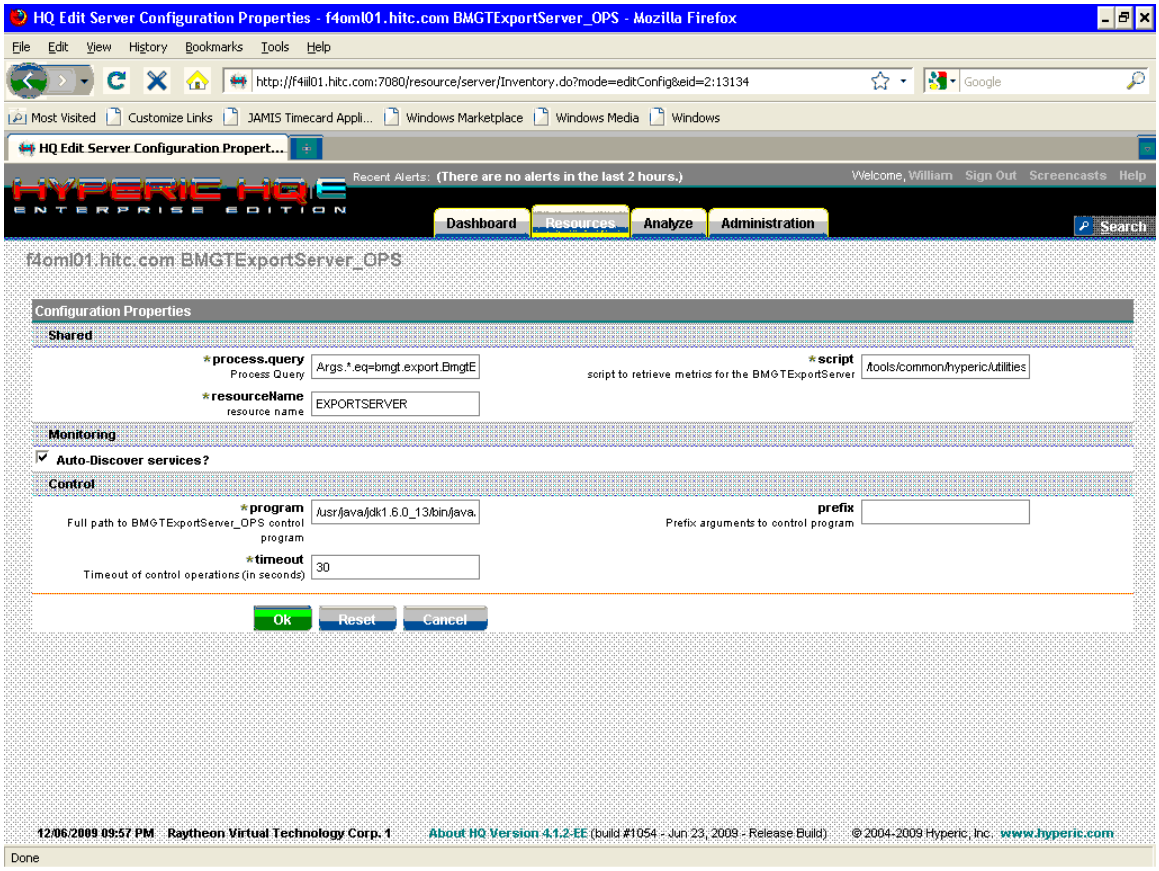


Figure 4.2.2.6.4-1. BMGT Export Server Configuration View

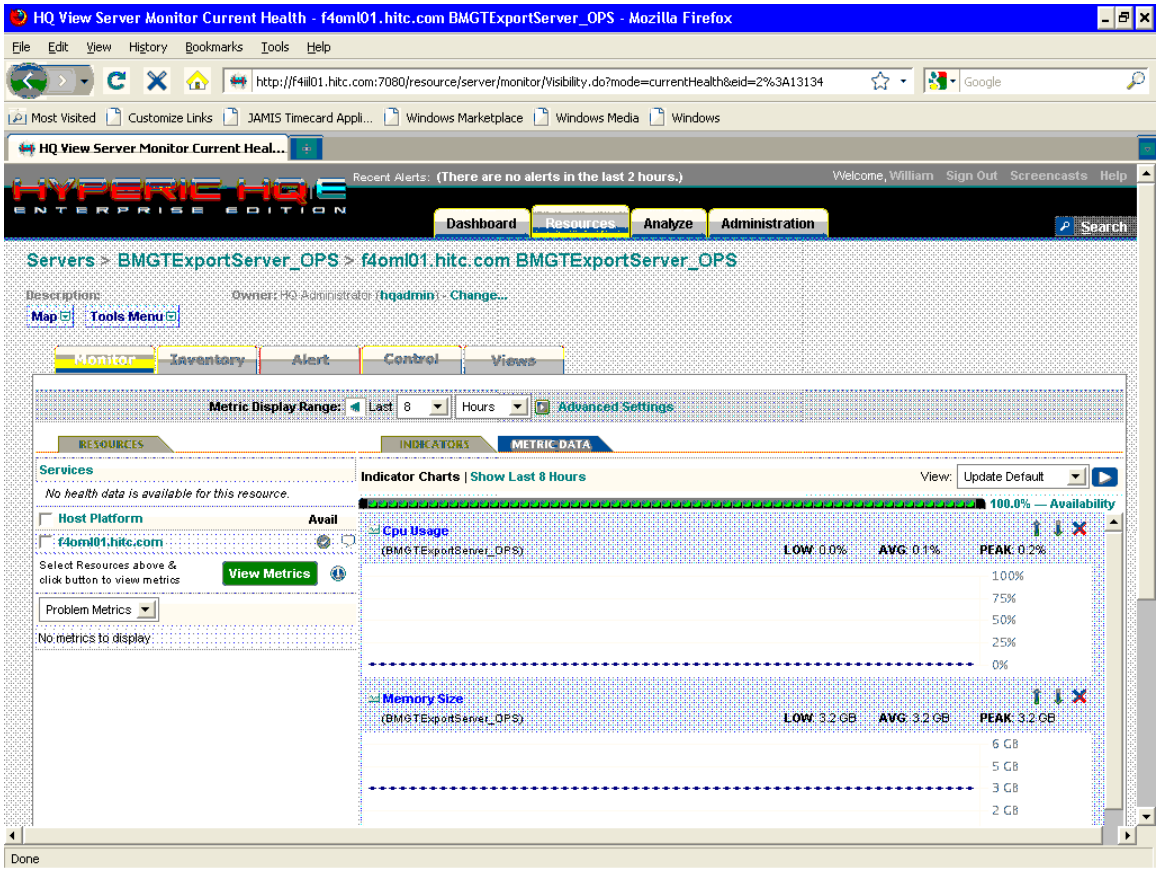


Figure 4.2.2.6.4-2. BMGT Export Server Monitoring

4.2.2.6.5 Custom Code Utilities

Custom utilities are monitored through a custom service xml plug-in. See the attached appendix for the custom utilities xml plug-in file of OPS mode.

We collect the following metrics for each custom utility:

- NumInstances
- Cpu Usage
- Memory Size
- Resident Memory Size
- LongestRunningPid
- LongestRunningTime

The custom utility plug-in is defined as a service within hyperic. Operator should add the custom utility plug-in to the host platform where the utility is installed, i.e. where it would run. This is done by clicking the “New Platform Service” menu under the “Tools Menu” of the platform detail page. See screen shot below:

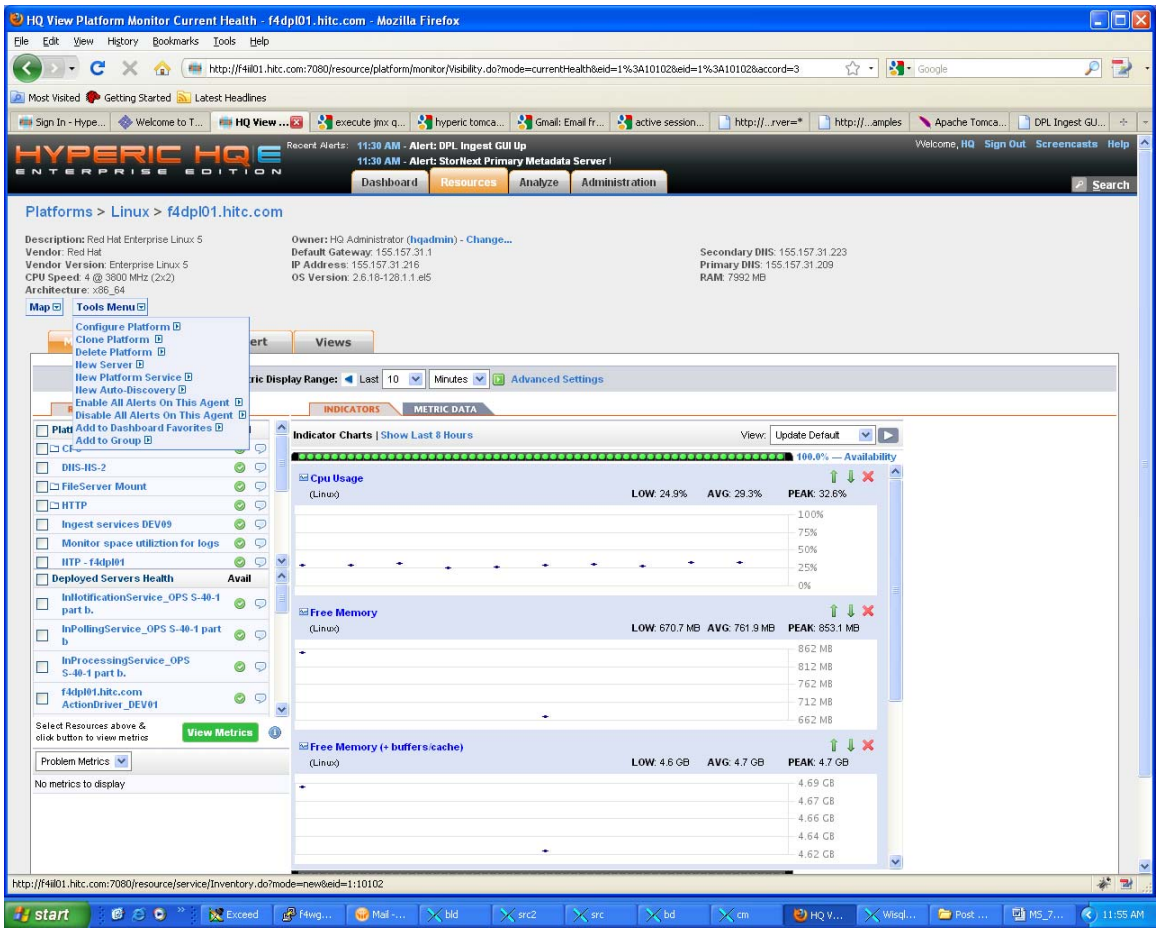


Figure 4.2.2.6.5-1. Add a New Platform Service

On the new platform service configuration page, select the custom utility service for the mode and type in the name and description, then click “OK” to create the platform service. See screen shot below:

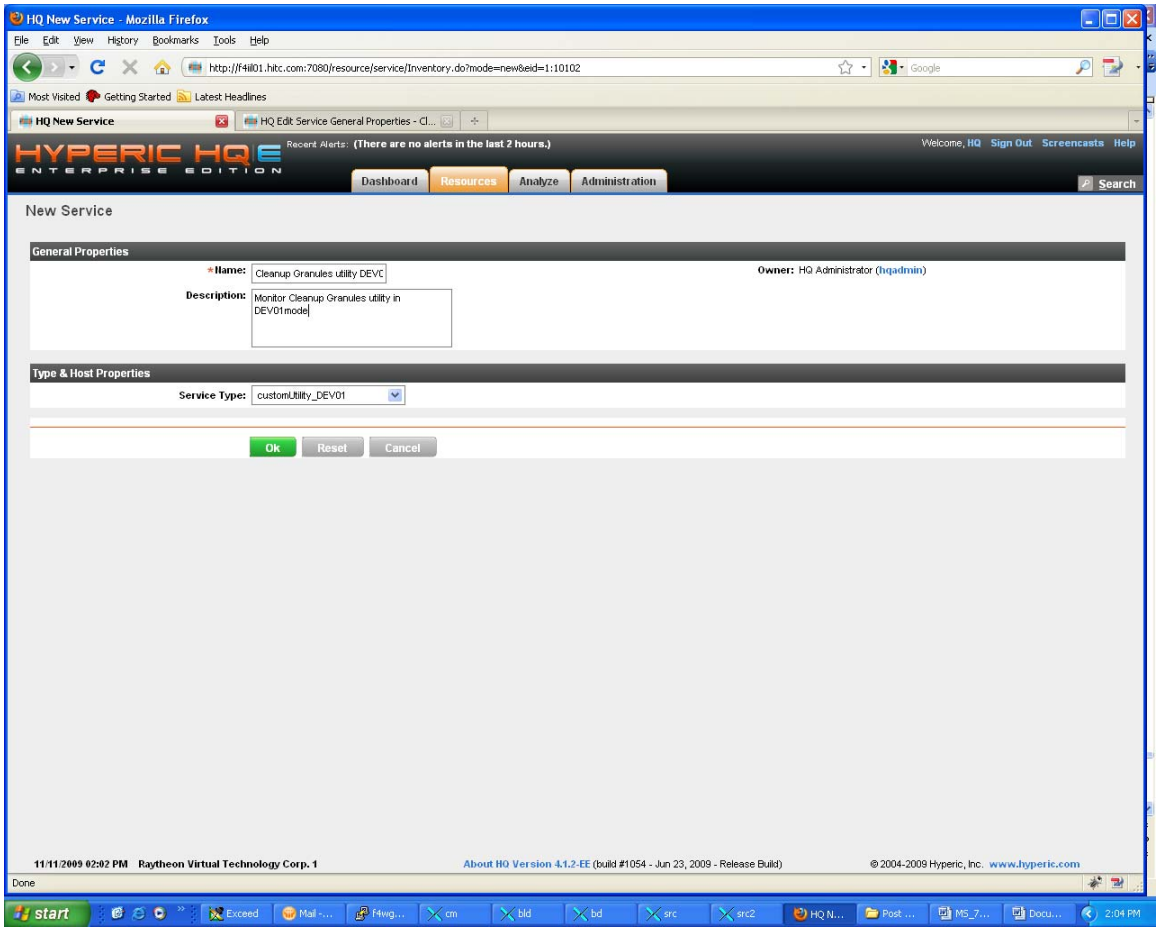


Figure 4.2.2.6.5-2. Create cleanup granules utility monitor service

Click the highlighted "Configuration Properties" link on the ensuing page (See screen shot below) to finish the configuration of the custom utility.

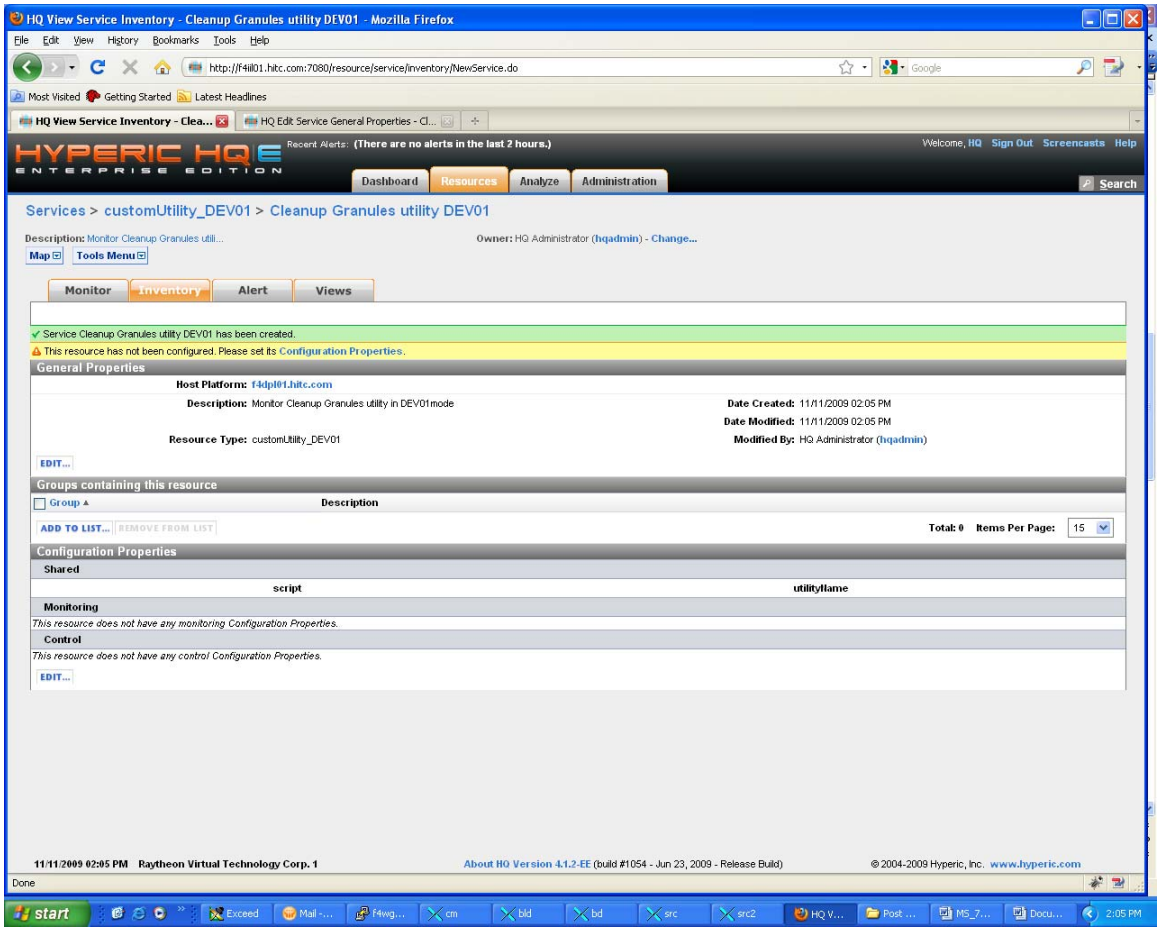


Figure 4.2.2.6.5-3. Link to Configuration Properties

On the Configuration Properties page, type in the defined utility name into the UtilityName input box, e.g. “CLEANUP_GRANULES” for the Cleanup Granules utility. Then click “OK”. See screen shot below:

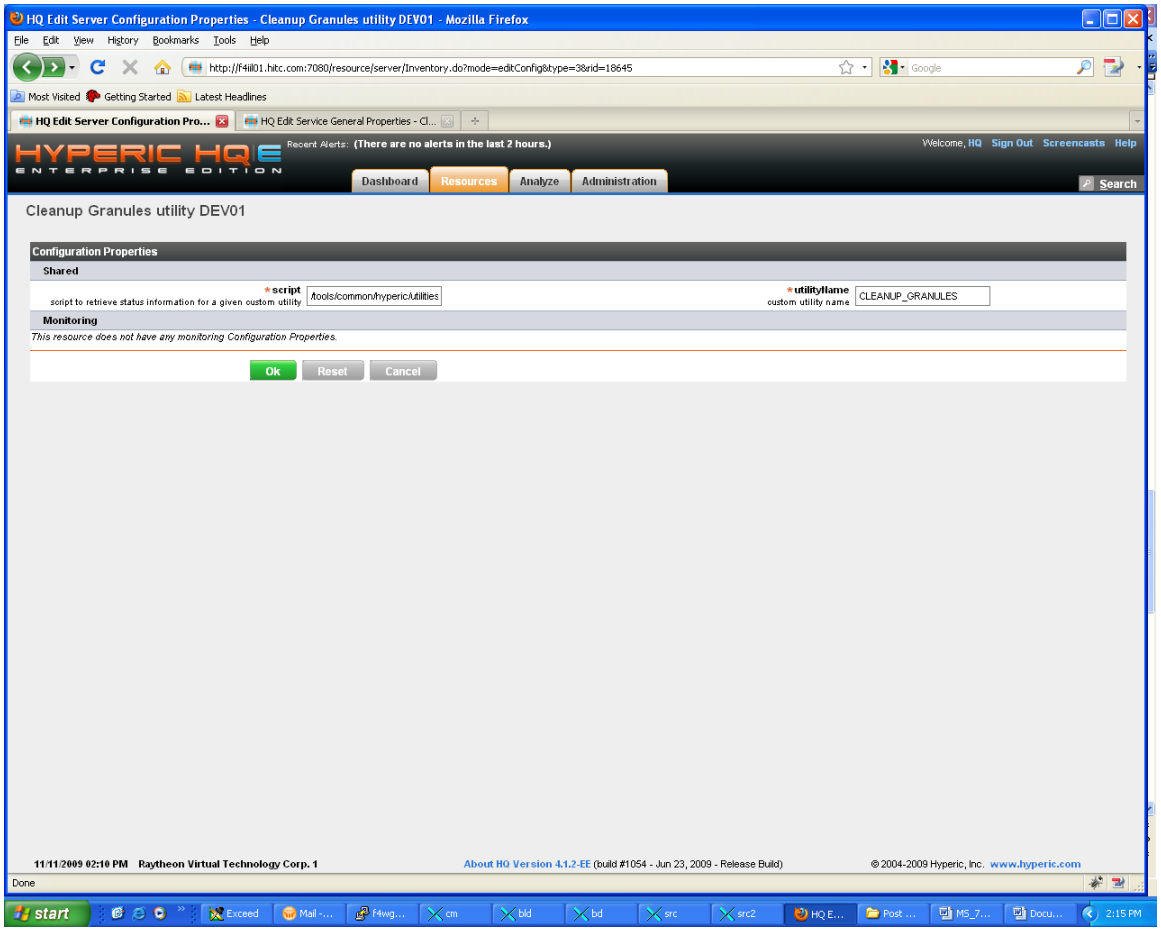


Figure 4.2.2.6.5-4. Configuration Properties Page for Cleanup Granules Utility

Below is the list of defined custom utility names:

"GRANULE_DELETE" Granule delete utility

"QA_UPDATE" QA update utility

"RESTORE_OLA" Restore OnlineArchive from tape utility

"RESTORE_TAPE" Restore tape from OnlineArchive utility

"MOVE_COLLECTION" Move collection utility

"DPCV" DataPool checksum verification utility

"ACVU" Archive checksum verification utility

"CLEANUP_GRANULES" Cleanup granules utility

"CLEANUP_FILES" Cleanup files utility

"INVENTORY_VALIDATION" Inventory validation utility

Wait for a few minutes, the metrics info will show up on the custom utility monitor page. See screen shot below:

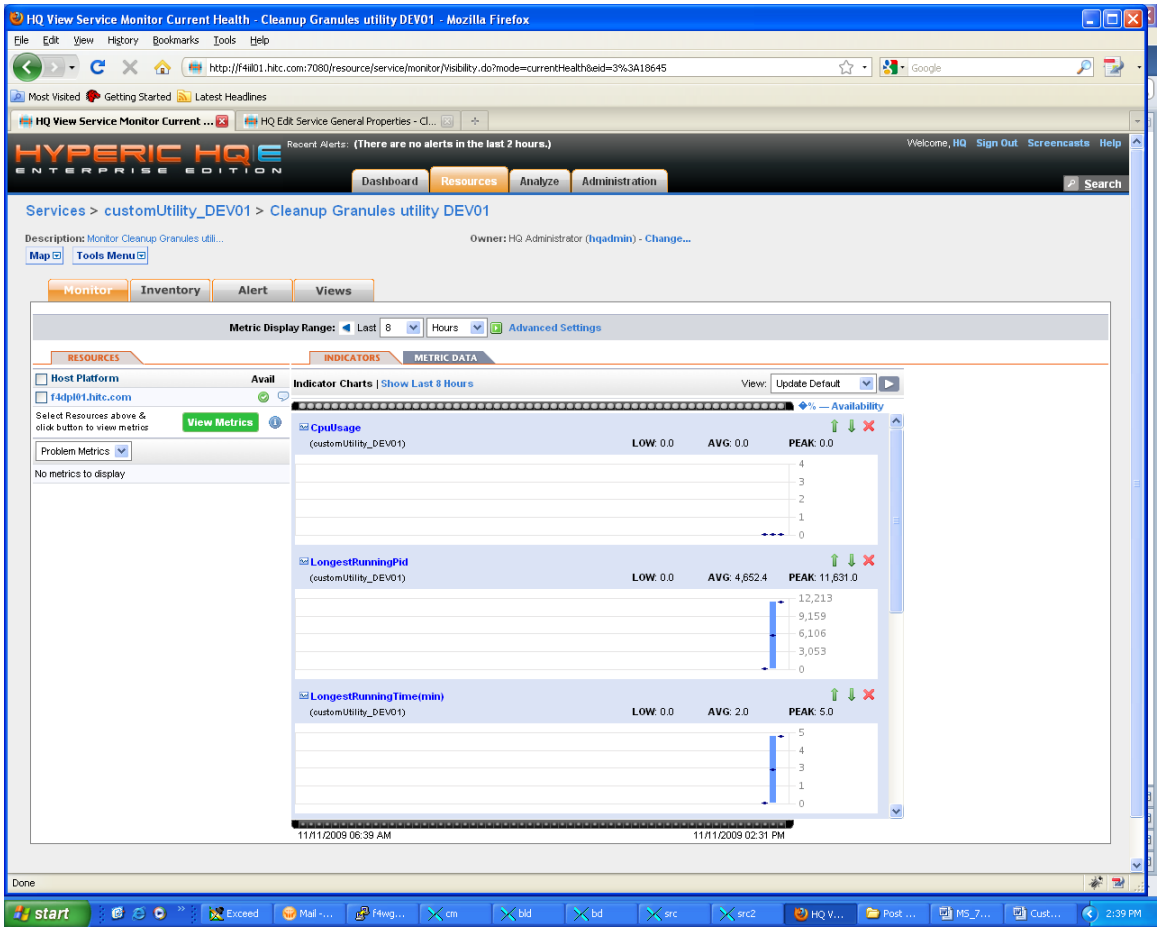


Figure 4.2.2.6.5-5. Cleanup Granules Utility Metrics

The integral part of the LongestRunningPid metric is the PID of the longest running instance of the utility. The maximum value is collected when there are multiple instances of the utility running. When there is no instance running, the metrics are set to 0. In operation environment, there should be at most one instance running for all utilities except DPCV.

4.2.2.6.6 Email GW Server

The Email GW Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-DPL- EcDlInEmailGWServer-plugin.xml. The Email GW Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in.

Up/down alerts are set up for the Email GW Server based on its availability metrics. The down alert is used to notify operator of the problem and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3 for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

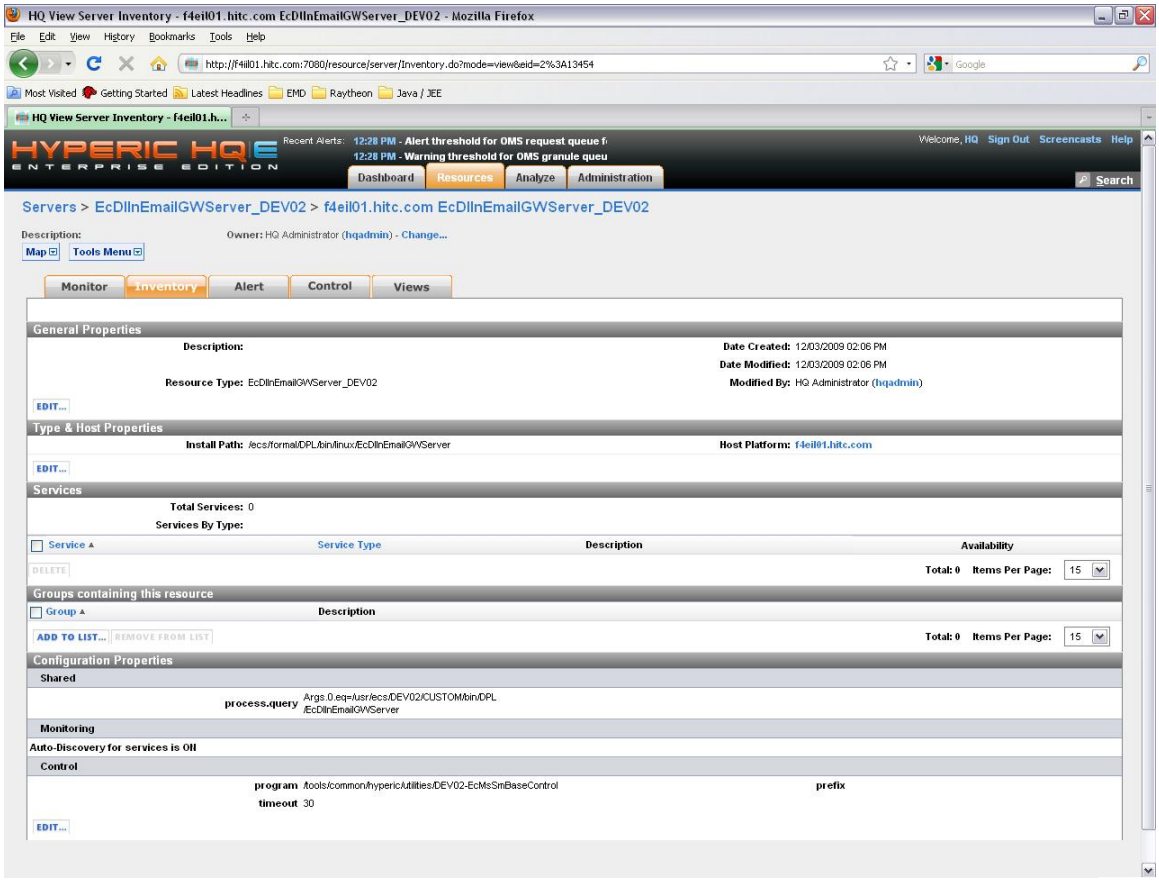


Figure 4.2.2.6.6-1. Email GW Server Configuration View

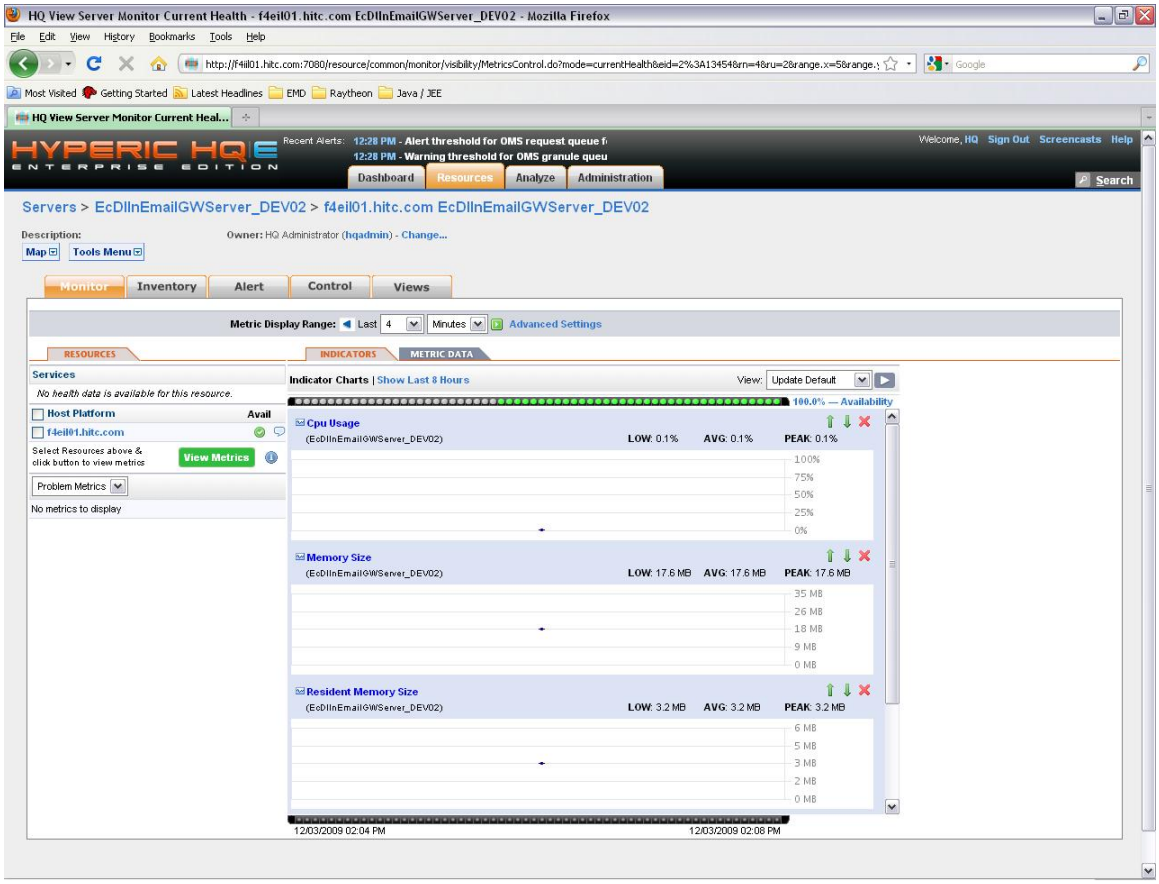


Figure 4.2.2.6.6-2. Email GW Server Monitoring

4.2.2.6.7 Action Driver Server

The Action Driver Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-DPL-ActionDriver-plugin.xml.

The metrics that will be collected for the Action Driver Server includes the standard Hyperic metrics *(see section 4.2.2.2.13, Standard Plugin Metrics)* and custom metrics (see below).

Table 4.2.2.6.7-1. Action Driver Server Metrics (1 of 2)

Custom Metrics	
Metric Name	**Description**
DPL Insert Queue Size	The total number of granules waiting to be inserted.
Number of Granules in 'Pending' State	The total number of granules in the PENDING state.

Table 4.2.2.6.7-1. Action Driver Server Metrics (2 of 2)

Custom Metrics	
Metric Name	**Description**
Number of Granules in 'Validated' State	The total number of granules in the VALIDATED state.
Number of Granules in 'Copied' State	The total number of granules in the COPIED state.
Number of Granules in 'Checksummed' State	The total number of granules in the CHECKSUMMED state.
Number of Granules in 'Extracted' State	The total number of granules in the EXTRACTED state.
Number of Failed Inserts	The total number of failed DPL Inserts.
Number of Recent Failed Inserts	The total number of recently failed DPL inserts. The total is a count of failed inserts from the current time to a calculated end time. This end time is dependent on a configurable interval.
Number of Completed Inserts	The total number of completed DPL inserts.
Number of Recent Completed Inserts	The total number of recently completed DPL inserts. The total is a count of completed inserts from the current time to a calculated end time. This end time is dependent on a configurable interval.
Number of Available DPL File System	The numbers of available DPL file systems.
Number of Unavailable DPL File System	The numbers of unavailable DPL file systems.
Number of Active Checksum Service	The numbers of active checksum service host.
Number of Disabled Checksum Service	The numbers of disabled checksum service host.
Number of Suspended Checksum Service	The numbers of suspended checksum service host.
Number of Active Copy Service	The numbers of active copy service host.
Number of Disabled Copy Service	The numbers of disabled copy service host.
Number of Suspended Copy Service	The numbers of suspended copy service host.

The Action Driver Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in and the custom metrics will be collected through the SQL plug-in by querying the DPL database.

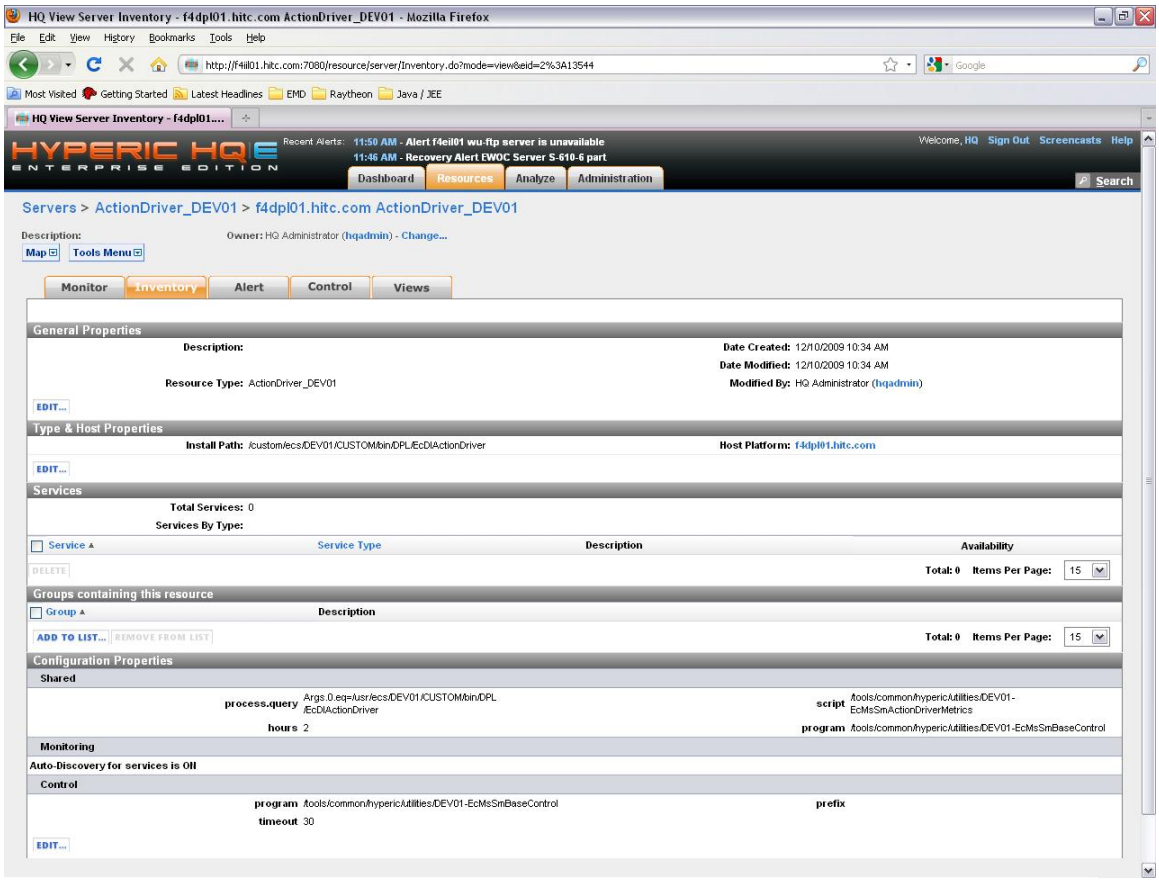


Figure 4.2.2.6.7-1. Action Driver Server Configuration View

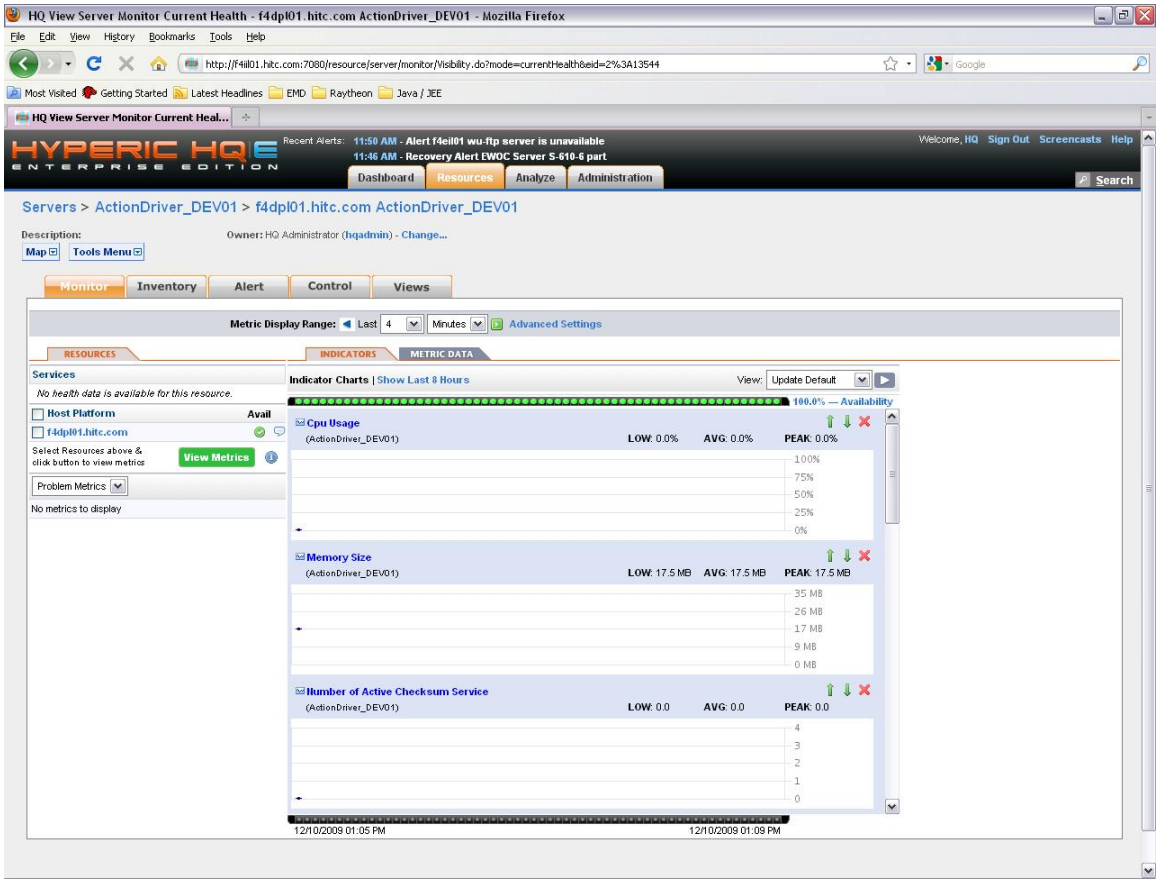


Figure 4.2.2.6.7-2. Action Driver Server Monitoring

The data collected for the 'Number of Recent Failed Inserts' and the 'Number of Recent Completed Inserts' metrics are configurable. To configure this value go to the Action Driver server detail page and click on the 'Inventory' (see Figure 233). In the configuration properties section, click the edit button and modify the hours field. This field is used to calculate the end time (current time minus the configured hours). Using this end time, the agent will get a count of failed and completed inserts from the current time to the end date.

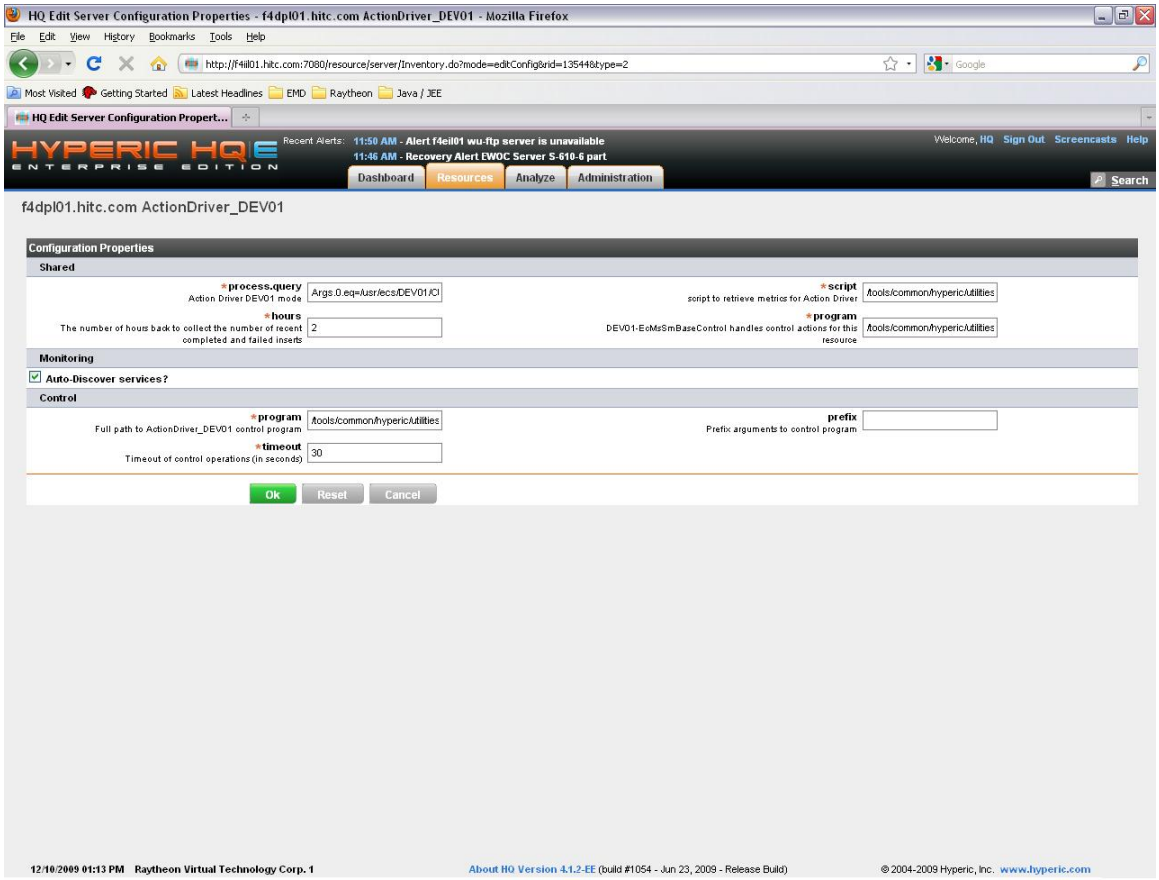


Figure 4.2.2.6.7-3. Action Driver Configure Metric Interval

Up/down alerts are set up for the Action Driver Server based on its availability metrics. The down alert is used to notify operator of the problem and trigger the control action that will automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.2.13 for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

4.2.2.6.8 Checksum Verification Server

The Checksum Verification Server monitoring is done through an xml custom plug-in. There is one plug-in file per mode. The plug-in file name is <MODE>-DPL-ChecksumServer-plugin.xml. The Checksum Verification Server resource will be auto-discovered by Hyperic using the PTQL query defined in the xml plug-in. The standard metrics will be collected by the SIGAR plug-in.

Up/down alerts are set up for the Checksum Verification Server based on its availability metrics. The down alert is used to notify operator of the problem and trigger the control action that will

automatically start the server; the up alert is used as a recovery alert for the down alert to mark the down alert as fixed.

Please refer to the Polling Server, section 4.2.2.4.2.3 for details on the control actions and alerts configurations. The configuration process is basically identical except the resource type, control action, script names and alert names are changed accordingly.

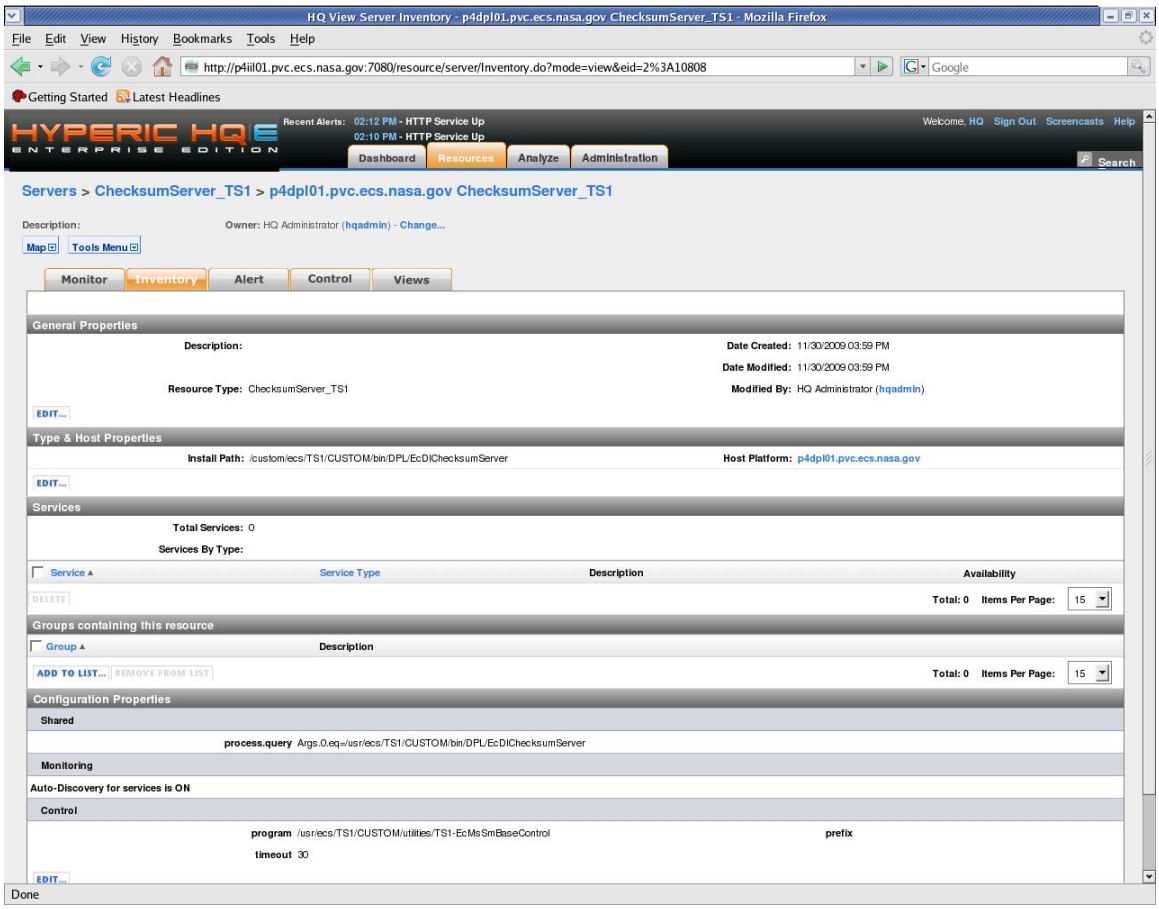


Figure 4.2.2.6.8-1. Checksum Verification Server Configuration View

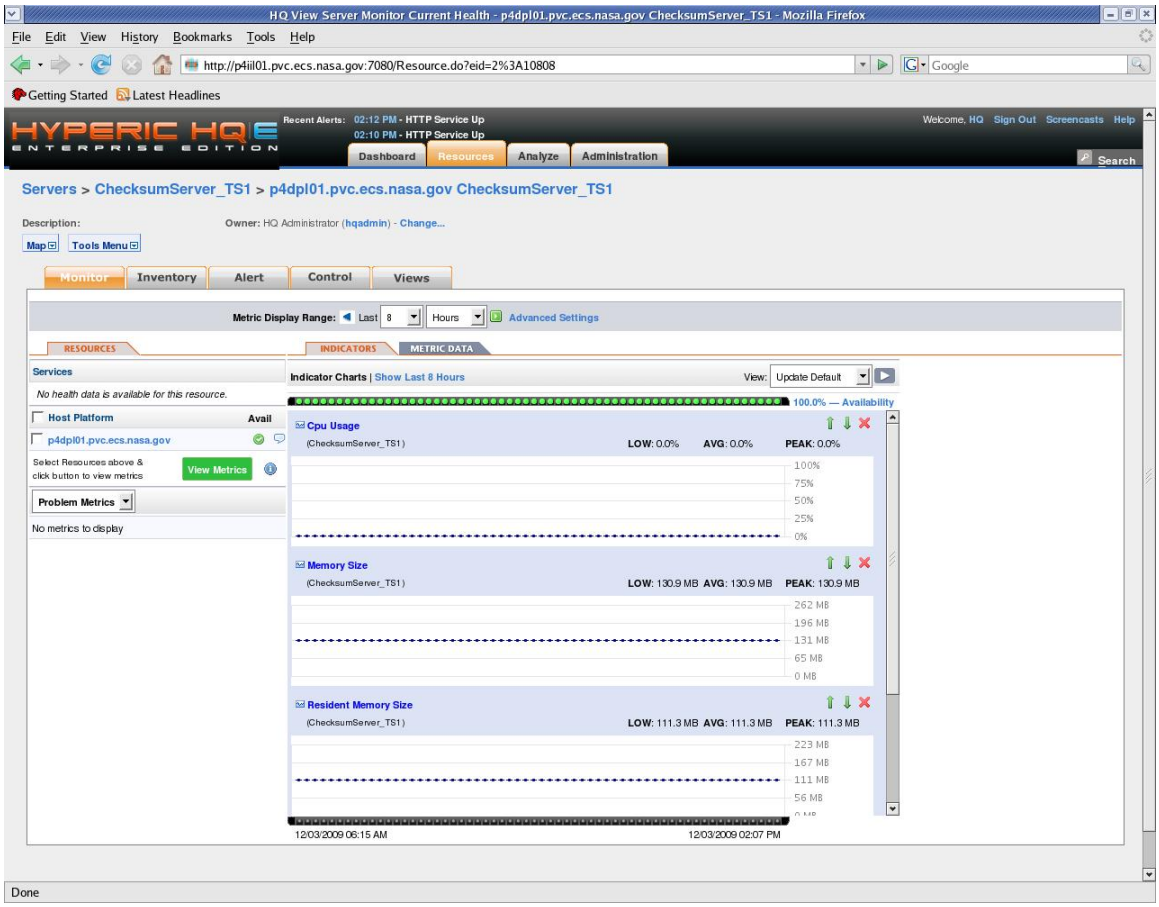


Figure 4.2.2.6.8-2. Checksum Verification Server Monitoring

4.2.2.6.9 Subscription Servers

Monitoring Spatial Subscription Server Drivers work by configuring the designated server on the xxoml01 platform. The 4 different servers are the Action Driver, Event Subscription Driver, Delete Request Driver, and the Recovery Driver. The Action, Subscribed Event, and Delete Request Drivers have their respective metrics monitoring the amount of work each has left to do. All 4 servers have the following metrics: Availability, Cpu Usage, Memory Size, Number of Processes, and Resident Memory Size. To configure an SSS Driver, perform the following steps.

1. Choose the xxoml01 platform to create the SSS Driver.
2. Drill down to the platform using the Resources->Browse on the Hyperic GUI. The screen should look like the following.

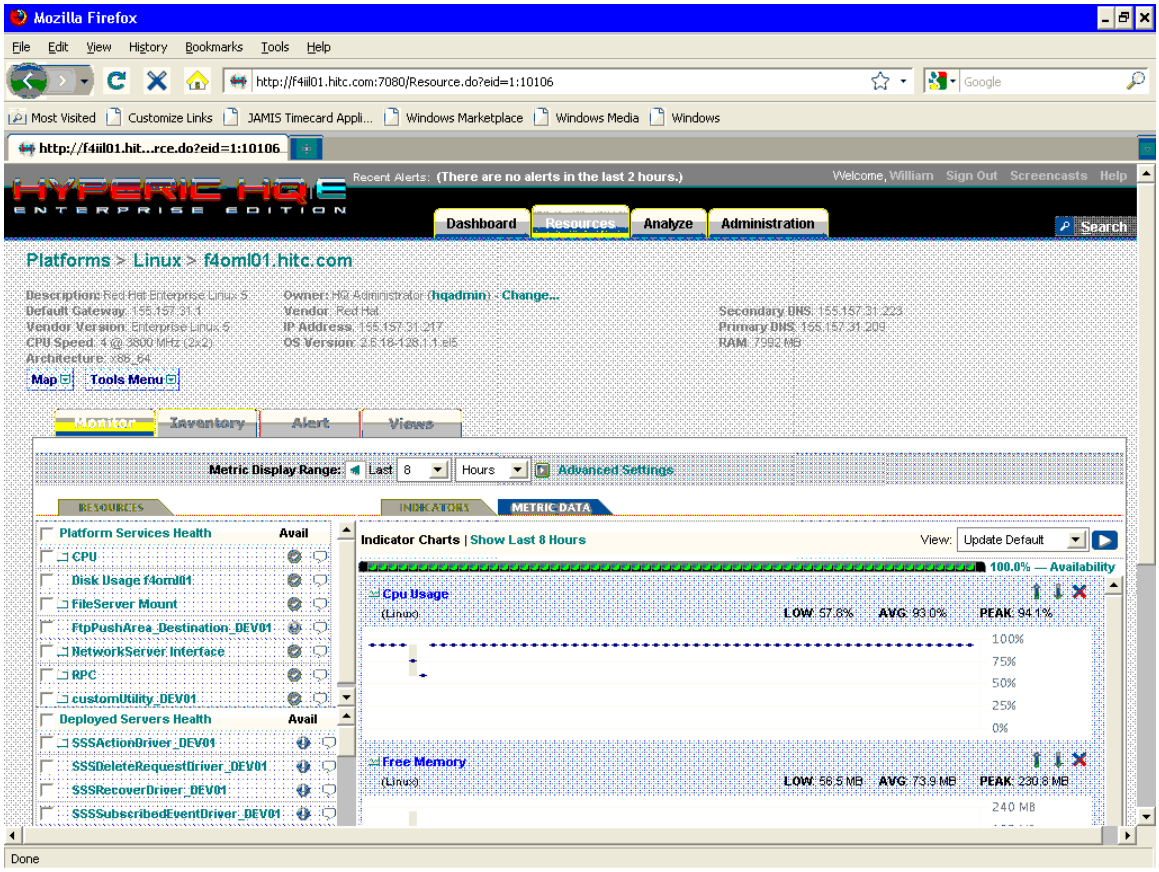


Figure 4.2.2.6.9-1. Host Resource Page

3. From this screen choose from the Tools Menu (upper left) the New Server link.

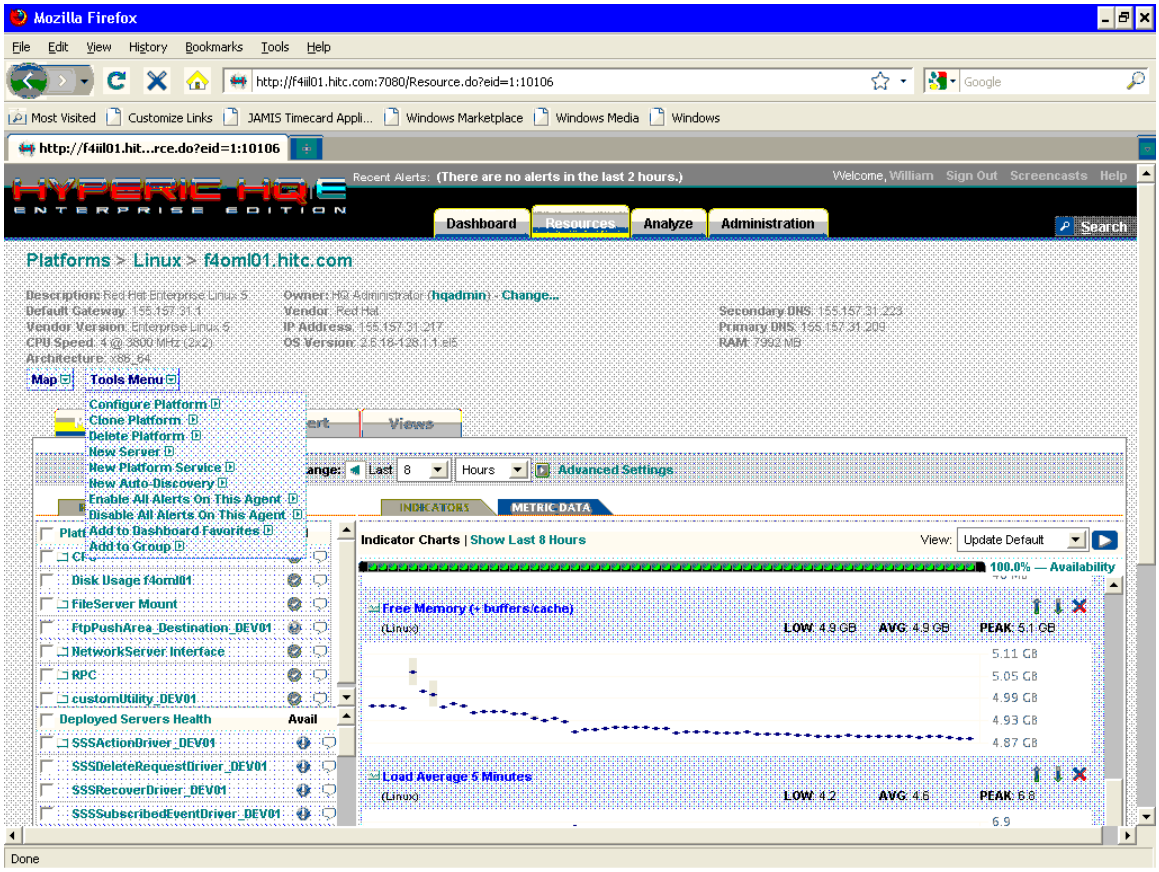


Figure 4.2.2.6.9-2. Add New Platform Server

4. The following screen appears. Fill in the following

   name: Choose a name such as SSS Action Driver DEV01

   description: Choose a description such as "SSS Action Driver for DEV01 mode"

   server type: From the drop down menu choose the SSS Driver for the mode you are working in ie: SSSActionDriver_DEV01

   install path: For the install path just use the base directory "/" without the quotes.

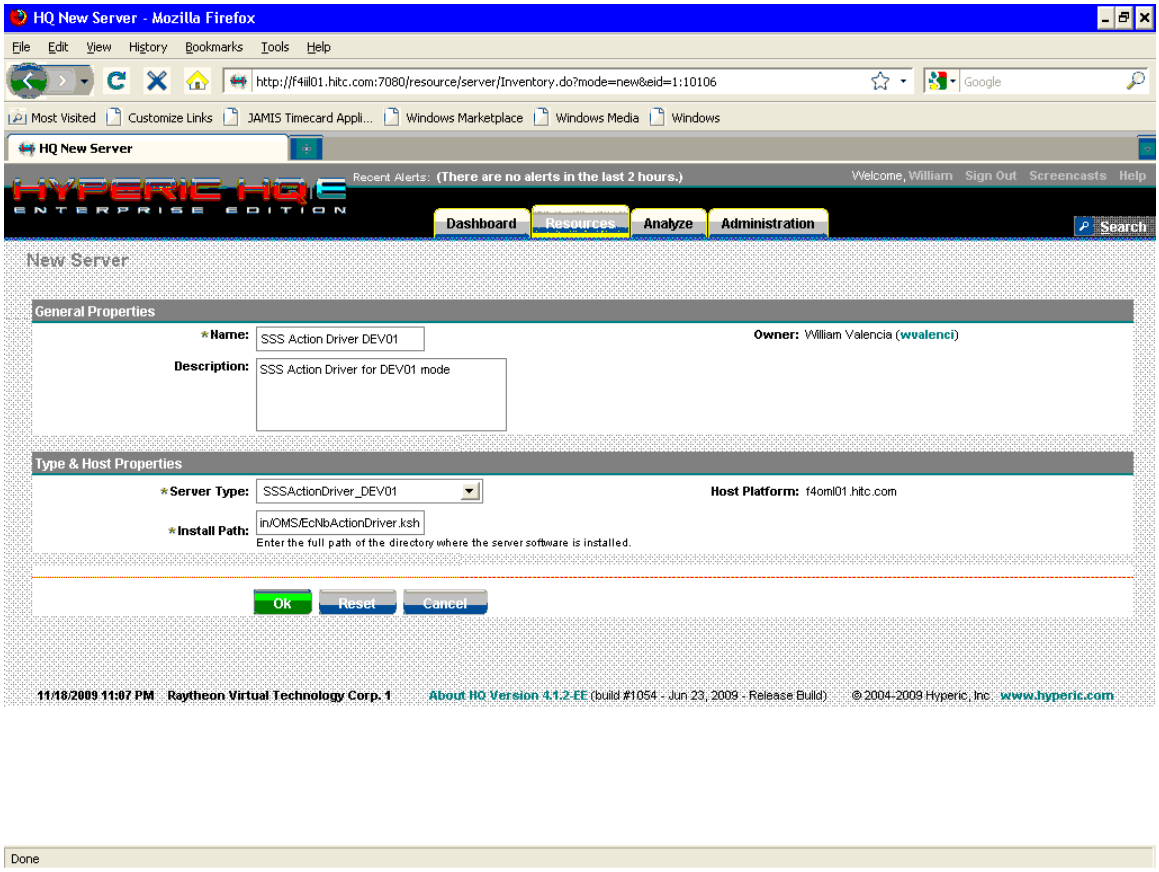


Figure 4.2.2.6.9-3. Configuration Screen

5. Click “OK” button.
6. The next screen allows for the configuration of the SSS Driver. Hit the Edit button in the Configuration Properties section or click on Configuration Properties on the yellow pane

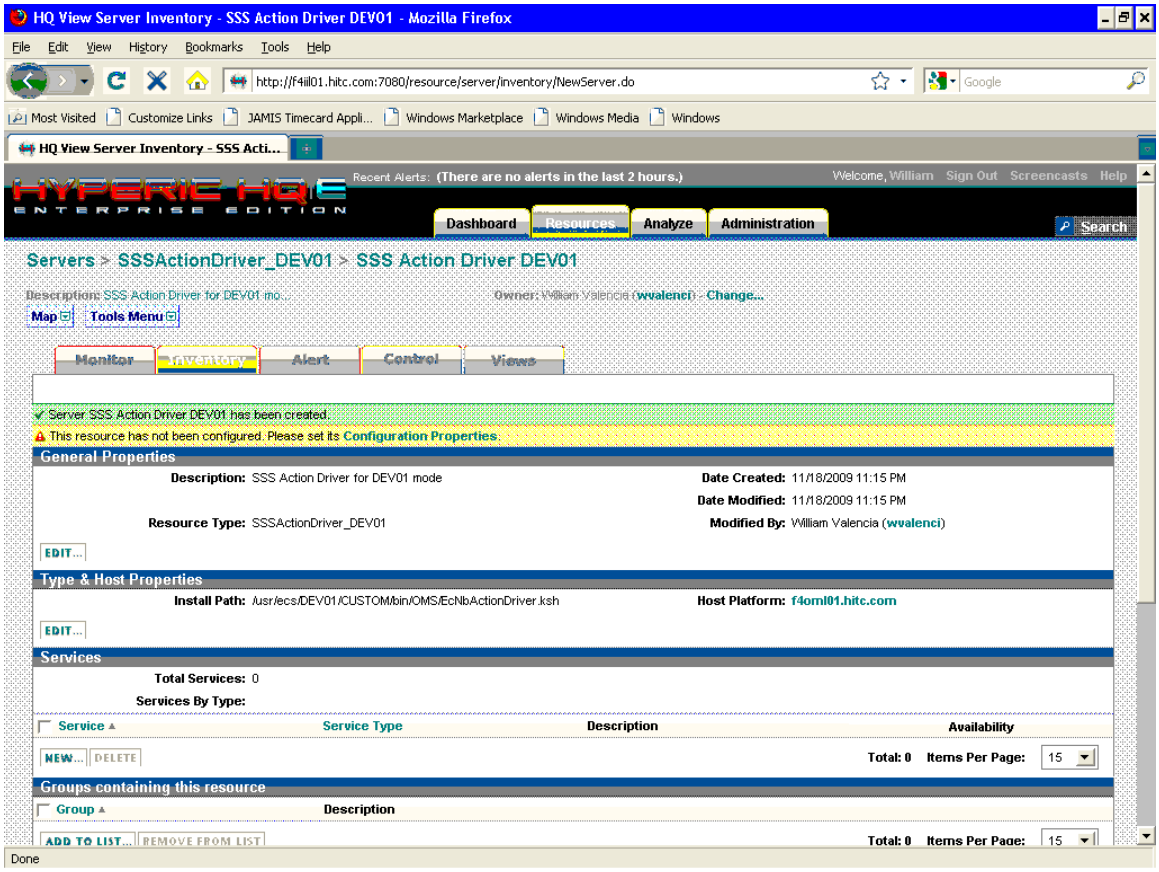


Figure 4.2.2.6.9-4. SSS Action Driver Inventory Page

7. You should not need to fill in anything here.

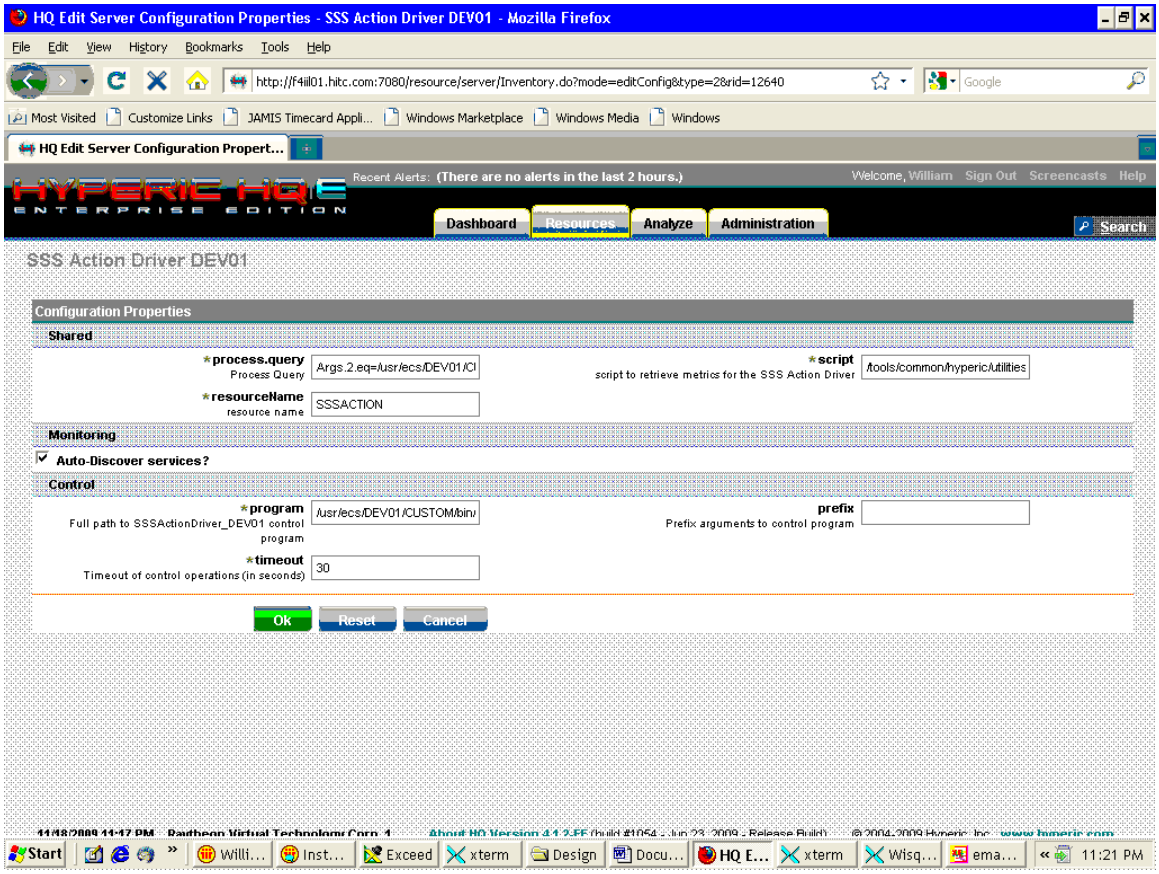


Figure 4.2.2.6.9-5. ssh Configuration Page

8. Click “OK” button.
9. After a few minutes, the SSS Driver Server monitor page should appear similar to the following page.

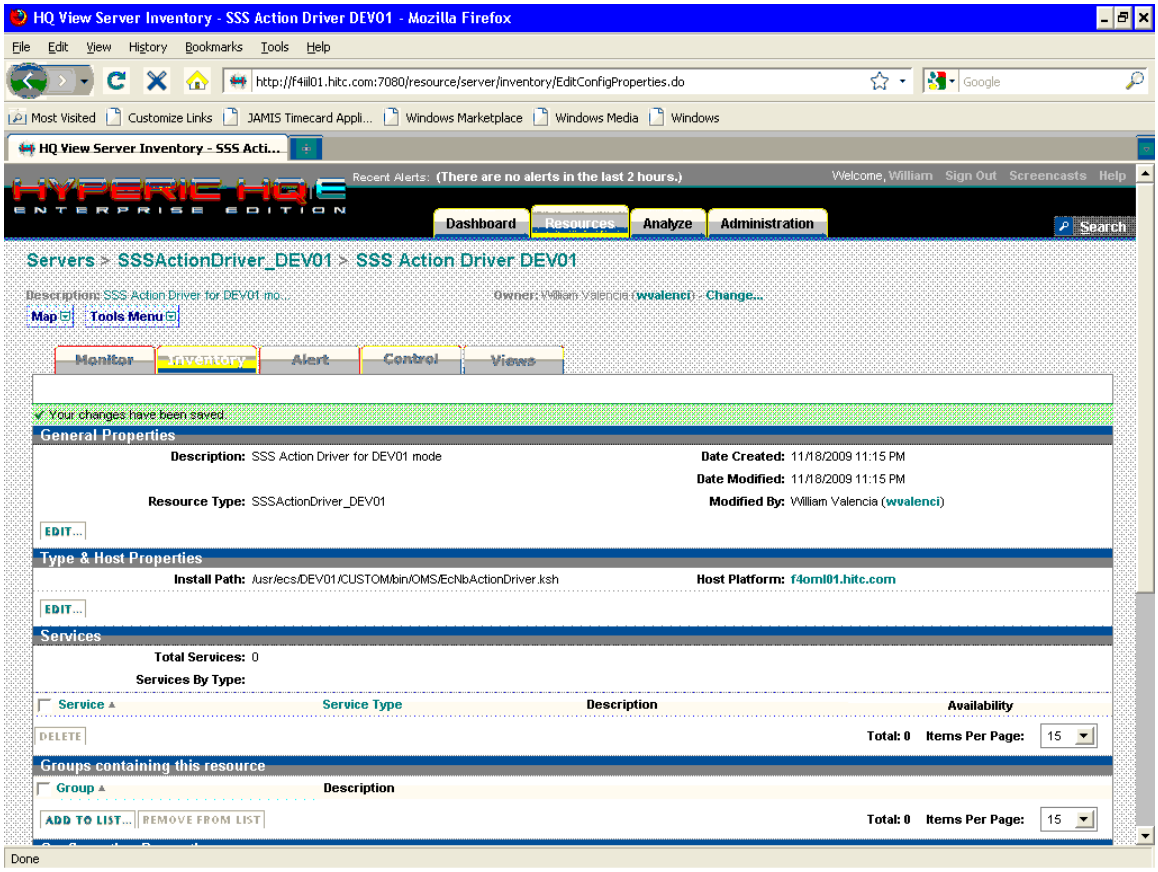


Figure 4.2.2.6.9-6. SSS Driver Configured Monitor Page

10. Repeat steps 1-9 for the rest of the SSS Drivers. You would need to run through this 4 times, Once for each of the following SSS Drivers SSSAction Driver, SSS Subscribed Event Driver, SSS Delete Request Driver, SSS Recover Driver.

11. If you want to configure the default number of drivers that start for the SSS start scripts, you can modify each of the driver's respective .CFG files located under /usr/ecs/<MODE>/CUSTOM/cfg directory on the x4oml01/x5oml01 box. The configuration parameter is called DEFAULT_NUM_DRIVERS.

4.2.2.7 Server Control

4.2.2.7.1 Overview

Server Control is designed for the user to be able to start or stop certain modes, servers, or resources. It can be done in two ways, namely through the GUI or through the command line. The sections below briefly describe how that can be achieved.

4.2.2.7.2 Server Control Command Line Tool

The Server Control Command Line utility will provide the user the ability to start and stop custom code servers via web service calls to custom services running on the Hyperic server. The result of these calls will be to disable or enable the alert definition which is mapped to the availability metric associated with the server being stopped or started. The associated servers start or stop script will then be executed by Hyperic via a Hyperic agent resulting in the server being stopped or started.

The Server Control Command Line utility provides a menu driven ability to start or stop servers by mode, by mode and host, or by individual server. The utility also allows for these options to be passed in via the command line.

4.2.2.7.2.1 Server Control Command Line Tool Usage

Starting a mode via the menu:

./HypericControlCommandLine

Action:

1)Start Mode

2)Stop Mode

3)Start Servers by Mode/Host

4)Stop Servers by Mode/Host

5)Start Server

6)Stop Server

Enter:1

Action:<Start Mode> Mode:

1)OPS

2)TS1

Enter the mode:1

Processed servers running in mode OPS

Starting a mode via command line options:

./HypericControlCommandLine –ACTION [START_MODE,STOP_MODE] –MODE <mode>

Starting of servers on a given host running in a given mode via the menu:

./HypericControlCommandLine

Action:

1)Start Mode

2)Stop Mode

3)Start Servers by Mode/Host

4)Stop Servers by Mode/Host

5)Start Server

6)Stop Server

Enter:3

Action:<Start Servers by Mode/Host> Mode:

1)OPS

2)TS1

Enter the mode:1

Action:<Start Servers by Mode/Host> Mode:<OPS> Host:

1)f4oml01.edn.ecs.nasa.gov

2)f4eil01.edn.ecs.nasa.gov

Enter the Host:1

Processed servers running in mode OPS on host f4oml01.edn.ecs.nasa.gov

Starting of servers on a given host running in a given mode via command line options:

./HypericControlCommandLine –ACTION [START_HOST,STOP_HOST] –MODE <mode> -HOST <host>

Starting of an individual server via the menu:

Action:

1)Start Mode

2)Stop Mode

3)Start Servers by Mode/Host

4)Stop Servers by Mode/Host

5)Start Server

6)Stop Server

Enter:5

Action:<Start Server> Mode:

1)OPS

2)TS1

Enter the mode:1

Action:<Start Server> Mode:<OPS> Host:

1)f4oml01.edn.ecs.nasa.gov

2)f4eil01.edn.ecs.nasa.gov

Enter the Host:2

Action:<Start Server> Mode:<OPS> Host:<f4eil01.edn.ecs.nasa.gov> Server:

1)EcDlPollingServer

2)EcDlQuickServer

Enter the Server:1

Processed server EcDlPollingServer

Starting of a server via command line options:

./HypericControlCommandLine –ACTION [START_SERVER,STOP_SERVER] –MODE <mode> -HOST <host> -SERVER <server>

4.2.2.7.3 Server Control GUI

In addition to the Server Control Command Line utility a user is able to disable and enable custom code servers through the Hyperic GUI on a new page labeled "Server Center". The Server Center link is located under the Analyze tab.

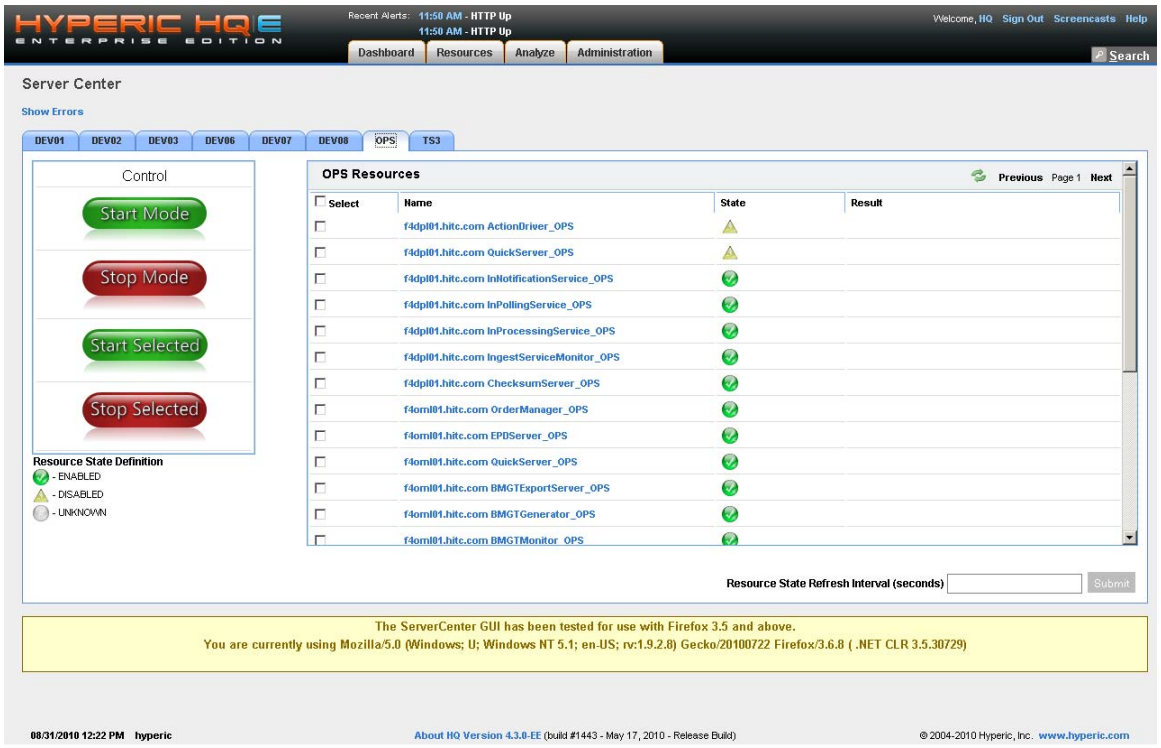


Figure 4.2.2.7.3-1. Server Center Main Screen

The server center page is divided based upon mode tabs. When a particular mode is selected the page will only show custom code servers pertaining to the selected mode. An entire mode can be brought down by simply clicking on the "Stop Mode" button and the mode that you are currently viewing will be stopped intelligently (each server will be stopped in the order specified by a start and stop precedence number). Similarly, a mode can be started by selecting the "Start Mode" button. An individual resource that is part of that mode can be started or stopped – once the selected resources are selected on the right side, one can either start or stop them by using the "Start Selected" or the "Stop Selected" buttons on the left side.

Resource State

The state of a resource is dependent upon the its availability alerts. ***The state of a resource does not denote the resource's availability***. There are three recognized states for a resource – Enabled, Disabled, and Warning.

Table 4.2.2.7.3-1. Server Center State Icon Description

State Icon	State Definition	Description
	Enabled	**At least one of the alerts pertaining to the resource that has a condition for availability is active**
	Disabled	**All of the alerts pertaining to the resource that has condition for availability is inactive**
	Unknown	**There are no alerts for the specified that contain availability as a condition thus the state of the resource cannot be determined**

Start/Stop Resource Status Feedback

When a resource is selected to be started, a control action for the resource is scheduled and deployed to the agent on the host on which the server is running on.

Before the control action is passed to agent, a pop-up dialog is shown to confirm the operation; Server Center lets the user choose whether to proceed the command or not.

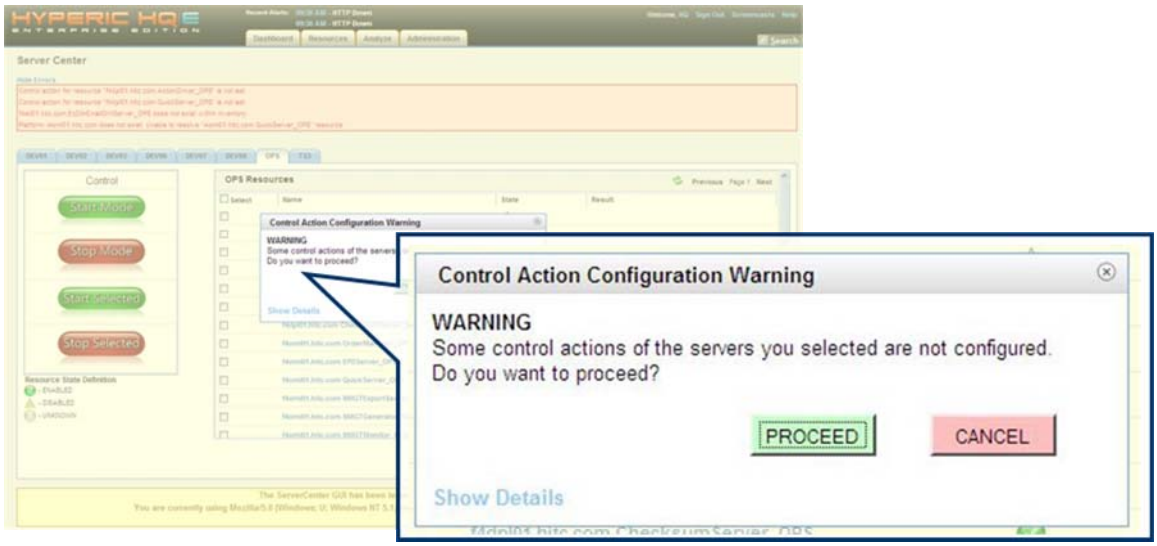


Figure 4.2.2.7.3-1. Pop-up Dialog

By clicking on “Show Details”, more information will be provided:

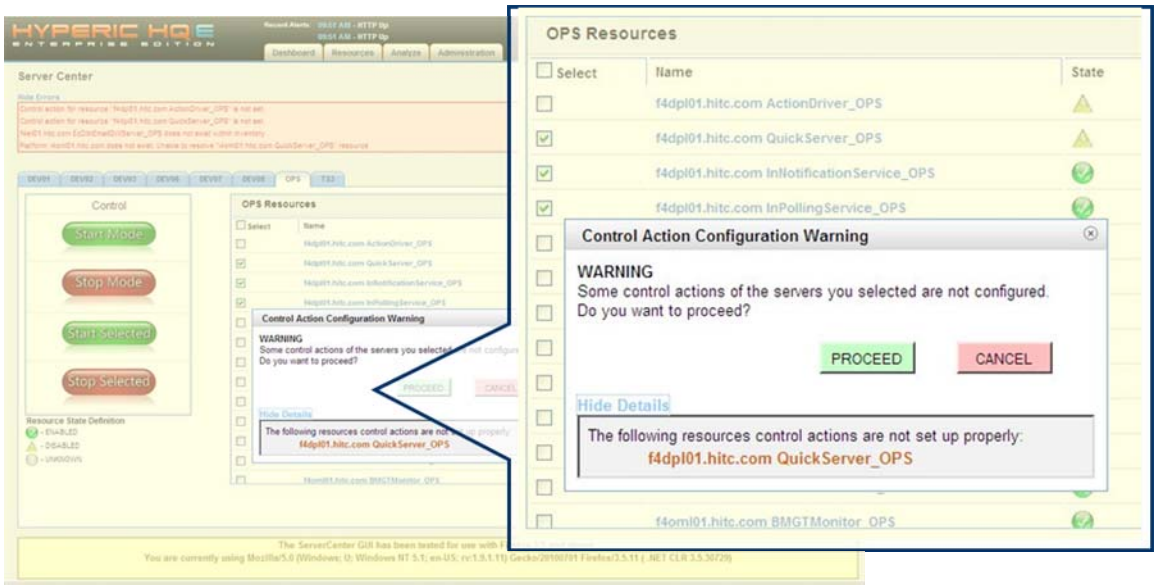


Figure 4.2.2.7.3-2. Show Detail Pane

At the same time, Server Center will again make sure that all the resources Start/Stop control actions have been set up in the configuration file. Also, Server Center checks all the agents availabilities before any control actions are executed by the user.

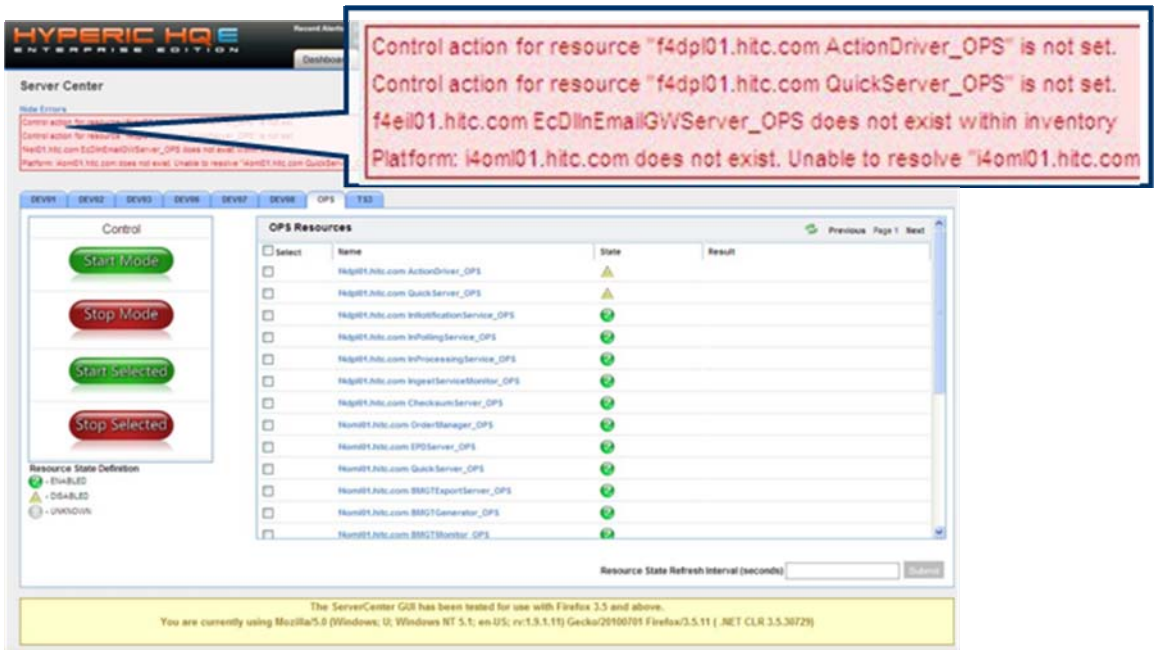


Figure 4.2.2.7.3-3. Red Error Pane

The agent then executes the control action which will invoke a start or stop script. The agent will send the Hyperic server a status report on the issued control action. This status is relayed to the GUI in the “result” column of the resources table. A green loading bar will appear for resources that have been issued a start command and the process has not yet completed. Similarly, a red loading bar will appear for resources that have been issued a stop command the process has not yet completed. Upon completion of any action the status of the control action will be printed in the result column pertaining to the resource.

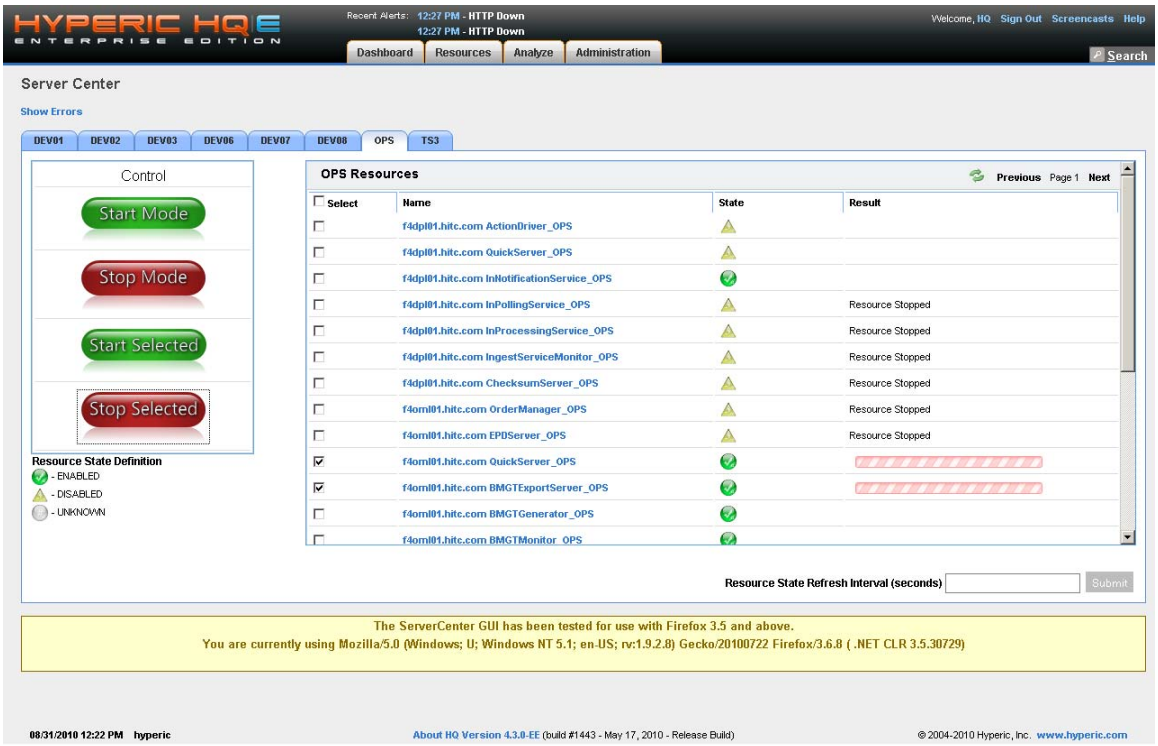


Figure 4.2.2.7.3-4. Server Control Status Feedback Example

4.2.2.7.4 Server Control Configuration

The Server Control Command line utility and GUI will have a configuration file that has the following parameters, HOST, PORT, USER, ENCRYPTED_PWD along with an xml file that contains information about a DAACs holding. The delivered xml file will be preconfigured for each DAAC. DAACs may add to this xml if they want to control their DUE’s.

Example Configuration File:

<?xml version="1.0" encoding="UTF-8"?>

<HypericControl xsi:noNamespaceSchemaLocation="HypericControl2.xsd" xmlns:xsi="h

ttp://www.w3.org/2001/XMLSchema-instance">

```
<DAAC Name="PVC">
    <MODE Enabled="true" Name="OPS">
        <Host Name="f4oml01.edn.ecs.nasa.gov">
            <Server Enabled="true" Name="EcOmOrderManager">
                <StartScript>EcOmOrderManagerStart</StartScript>
                <StartNumber>0</StartNumber>
                <StopScript>EcOmOrderManagerStop</StopScript>
                <StopNumber>0</StopNumber>
            </Server>
            <Server Enabled="true" Name="EcDlQuickServer">
                <StartScript>EcDlQuickServerStart</StartScript>
                <StartNumber>0</StartNumber>
                <StopScript>EcDlQuickServerStop</StopScript>
                <StopNumber>0</StopNumber>
            </Server>
        </Host>
        <Host Name="f4eil01.edn.ecs.nasa.gov">
            <Server Enabled="true" Name="EcDlInPollingService">
                <StartScript>EcDlInPollingServiceStart</StartScript>
                <StartNumber>0</StartNumber>
                <StopScript>EcDlInPollingServiceStop</StopScript>
                <StopNumber>0</StopNumber>
            </Server>
            <Server Enabled="true" Name="EcDlQuickServer">
                <StartScript> EcDlQuickServerStart</StartScript>
                <StartNumber>0</StartNumber>
                <StopScript> EcDlQuickServerStop</StopScript>
                <StopNumber>0</StopNumber>
```

```
            </Server>
        </Host>
    </MODE>
  </DAAC>
</HypericControl>
```

Note: The Enabled attribute is meant to give the ability to disable the controlling of the resource or mode while preserving the information for possible later use. The StartNumber and StopNumber are used to determine the order of starting and stopping of servers. Having StartNumber/StopNumber values being the same will result in those servers being logically started/stopped together.

4.2.2.8 Configuration Verification

4.2.2.8.1 Overview

Configuration verification checks the Hyperic inventory configuration against a baseline and reports any discrepancies. The configuration verification is filtered by mode. The baseline to validate the specified mode configuration is defined through the xml file. DAACs are able to customize the xml file to define requirements for resource monitoring, alerts, and control actions.

XML Filename: <Mode>_<Configuration Category>_Config_Verification.xml

XML File Location (x4iil01v host): /usr/ecs/OPS/COTS/hyperic/cfg

4.2.2.8.2 Configuration Verification Page

The page displays configuration categories (Ex: Monitoring Defaults, COTS, CustomServers, DataProviders, OmDestinations, DUEs) filtered by mode. There is an option to display all configured resources or just those with configuration issues. Configuration verification is conducted against the specified mode baseline (defined in the customizable xml file).

The configuration category status displays the overall health of a configuration category. A green check symbol indicates the category has been fully verified and there are no existing issues. A red “x” symbol indicates that issues exist within the configuration category. A user is able to drill-down on each category to determine the exact issues that may result in a failed verification or to view the members of the category. An example of the drill-down capability is shown in figure 256.

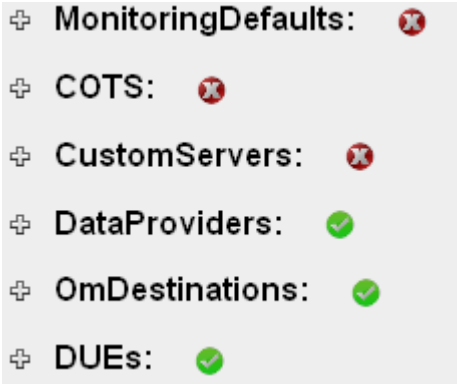


Figure 4.2.2.8.2-1. Configuration Category Status

Figure 4.2.2.8.2-2. Configuration Category Drill Down

Verify Mode Configuration

Step 1: Under the Analyze tab select “EEB Configuration Verification”

Figure 4.2.2.8.2-3. Verify Mode

Step 2: Select the mode to verify and choose the "Verify Configuration" option

4.2.2.8.3 Create Default Availability Alerts Command Line Utility

The Create default availability utility creates default availability alerts. This utility uses the information in the Configuration Verification XML files to create type based avalability alerts for all resources mentioned in those XML files. This should help in configuring hyperic and save some time manually configuring availability alerts for each individual resource. One limitation is that control actions cannot be configured this way so they would need to be entered manually via the GUI.

The usage for this utility is as follows:

EcMsSmCreateDefaultAlerts.pl [-delete] [-skipbackup]

Parameters:

-delete - optional parameter to delete previously created Availability alerts

-skipbackup - optional parameter to skip creating a backfup file

The -delete flag is optional and will delete previously created resource based availability alerts for the resources mentioned in the Configuration Verification XML files. The –skipbackup flag is also optional and will skip creating an XML backup of all previous alerts.

The utility needs a user created configuration file located at and called ~/.hq/client.properties. This file will have the following info

host=localhost

port=7443

secure=true

user=<hyperic GUI admin ie. hqadmin>

password=<password>

This utility is located under “/tools/common/hyperic/hqapi/hqapi1-3.1/bin”. The utility should be run by the “hyperic” user on the x4iil01v box.

4.2.2.3 Outputs

None

4.2.2.4 Event and Error Messages

None

4.2.2.5 Reports

None