
NetXMS User Guide

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Warning: This guide is a work in progress.

INTRODUCTION

1.1 About this document

The User Manual describes the main aspects of NetXMS monitoring system. This manual enables all users to get an overview of the various functionalities of NetXMS. The main aspects outlined in here describe the possibilities and functionalities of the NetXMS interface and elucidate working processes.

1.2 Target audience

This manual is intended for NetXMS operators, and provides all information necessary to successfully operate NetXMS.

1.3 Conventions

The following typographical conventions are used in this manual.

Sample	Description
<i>Button</i>	Any GUI element: Button, Menu item
<i>Another Guide</i>	Reference to external manual or man page
Control-M	Keyboard shortcut
<i>DCI</i>	Term which could be found in glossary
<i>File</i> → <i>Exit</i>	Menu selection path, you must click on <i>File</i> , then <i>Exit</i>

BASIC CONCEPTS

2.1 Object Types

All network infrastructure monitored by NetXMS inside the system is represented as a set of objects. Each object represents one physical or logical entity (like host or network interface), or group of them. Objects are organized into hierarchical structure. See *Administrator Guide* for detailed description.

2.2 Data Collection Items

Every node can have many parameters, such as CPU utilization, amount of free memory or disk space usage. The management server can collect these parameters, check them for threshold violations and store them in the database. In NetXMS, parameters configured for collection are called Data Collection Items or DCI for short. One DCI represents one node's parameter, and unlimited number of DCIs can be configured for any node.

2.2.1 Thresholds

Each threshold is a combination of a condition and event pair. If a condition becomes true, associated "activation" event is generated, and when it becomes false again, "deactivation" event generated. Thresholds let you take a proactive approach to network management. You can define thresholds for any data collection items that you are monitoring. When setting thresholds, first determine what would constitute reasonable thresholds. To decide on a threshold value, you need to know what is normal value and what is out of range. You need to define what is the normal behavior for a device on your network. Generally, it's recommended that you collect information about a device throughout one complete business cycle, before determining the normal high/low range. Consider collecting values such as error rates, retry limits, collisions, throughput, relation rates, and many more. You also have the possibility to define more than one threshold for a single DCI, which allows you to distinguish between different severity conditions.

2.3 Events and Alarms

Many services within NetXMS gather information and generate events that are forwarded to NetXMS Event Queue. Events can also be emitted from agents on managed nodes, or from management applications residing on the management station or on specific network nodes. All events are processed by NetXMS Event Processor one-by-one, according to the processing rules defined in Event Processing Policy. As a result of event processing, some actions can be taken, and event can be shown up as alarm. NetXMS provides one centralized location - the Alarm Browser, where the alarms are visible to your team. You can control which events should be considered important enough to show up as alarms. You and your team can easily monitor the posted alarms and take appropriate actions to preserve the health of your network.

Examples of alarms include:

- A router exceeded its threshold of traffic volume that you configured in Data Collection.

- The shell script that you wrote gathered the specific information you needed and posted it to the NetXMS as an event.
- One of your mission-critical servers switched to UPS battery power.
- An SNMP agent on a managed critical server forwarded a trap to NetXMS because it was overheating and about to fail.

USER INTERFACE

Note: One of the goals of NetXMS Management Console is to provide identical user experience across all supported platforms, including Web Interface. Screenshots in this particular guide are based on Mac OS X version.

3.1 Login

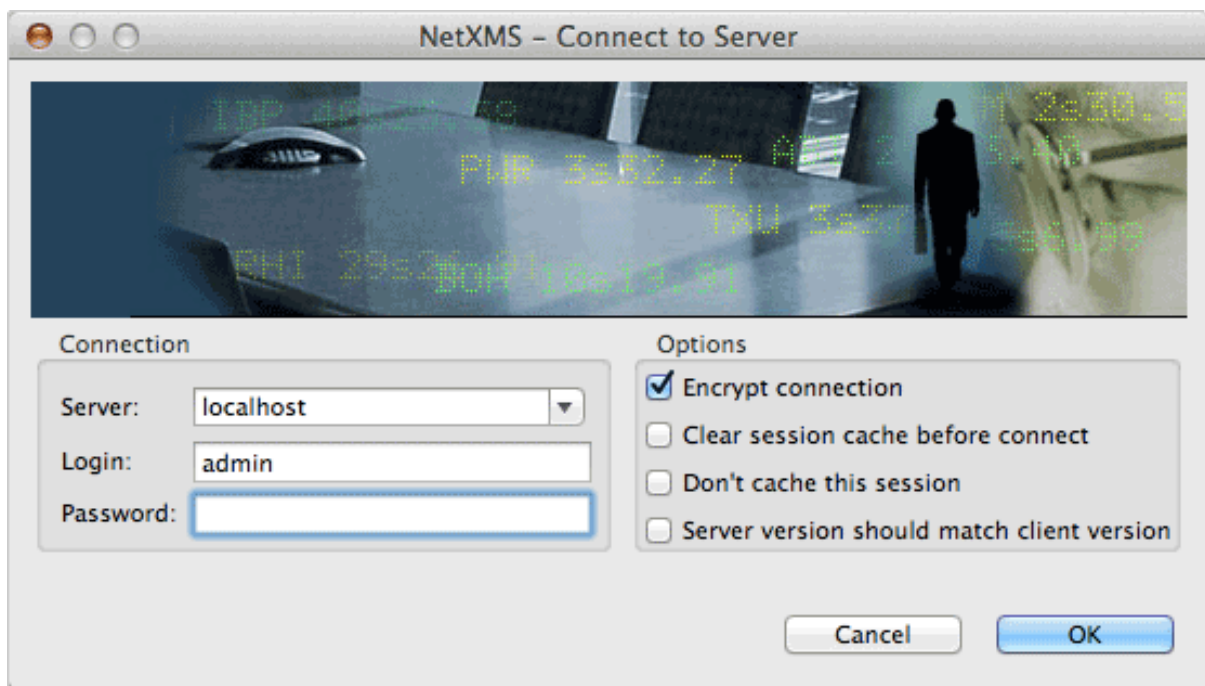


Figure 3.1: Login Dialog

When Management Console is started, user is presented with login dialog. User should enter server host name or IP address, login and password. Optionally, user can disable communication-level encryption by deselecting *Encrypt Connection* checkbox.

Following options are deprecated and will be removed in the future:

- *Clear session cache before connecting*
- *Don't cache this session*
- *Server version should match client version*

3.2 Workbench

When user is authenticated, a single Workbench window is displayed. A Workbench window offers one or more perspectives. A perspective contains views, such as the *Object Browser*. Multiple Workbench windows can be opened simultaneously. Initially, in the first Workbench window that is opened, the *Management* perspective is displayed, with *Object Browser* and *Object Details* views visible. A shortcut bar appears in the top right corner of the window. This allows you to open new perspectives and switch between ones already open. The name of the active perspective is shown in the title of the window and its item in the shortcut bar is highlighted.

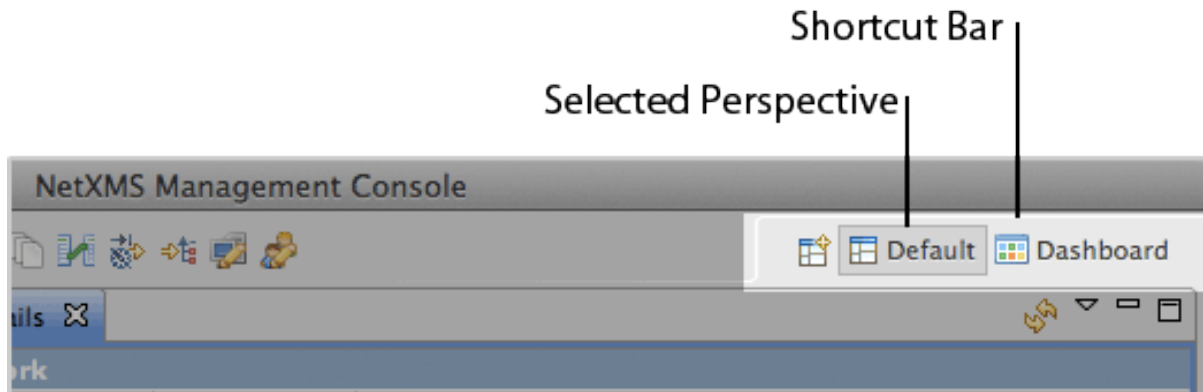



Figure 3.2: Shortcut bar, *Management* perspective is selected

3.3 Views

The primary use of Views is to provide convenient navigation through the information displayed in Workbench. A view might appear by itself or stacked with other views in a tabbed notebook. To activate a view that is part of a tabbed notebook simply click its tab. Views have two menus. The first menu, which is accessed by right-clicking on the view's tab, allows the view to be manipulated in much the same manner as the menu associated with the Workbench window. The second menu, called the “view pull-down menu”, is accessed by clicking the down arrow . The view pull-down menu typically contains operations that apply to the entire contents of the view, but not to a specific item shown in the view.

A view can be displayed by selecting it from the appropriate *View*, *Monitor*, or *Configuration* menu, or via *Window* → *Show View* menu. A perspective determines which views may be required and displays these on the *Show View* sub-menu. Additional views are available by choosing command link *Other* at the bottom of the *Show View* sub-menu. This is just one of the many features that provide for the creation of a custom work environment.

Through the normal course of using the Workbench you will open, move, resize, and close views. If you'd like to restore the perspective back to its original state, you can select the *Window* → *Reset Perspective* menu operation.

3.3.1 Rearranging views







You can change the position of any view in the Workbench by following the steps below:

1. Click in the title bar of the view and drag the view across the Workbench window. Do not release the mouse button yet.
2. While still dragging the view around on top of the Workbench window, note that various drop cursors appear. These *Drop cursors* indicate where the view will dock in relation to the view underneath the cursor when the mouse button is released. Notice also that a rectangular highlight is drawn that provides additional feedback on where the view will dock.

3. Dock the view in any position in the Workbench window, and view the results of this action.

3.3.2 Drop cursors

Drop cursors indicate where it is possible to dock a part in the Workbench window. Several different drop cursors may be displayed when rearranging a part.

	Dock above: If the mouse button is released when this cursor is displayed, the part will appear above the part underneath the cursor.
	Dock below: If the mouse button is released when this cursor is displayed, the part will appear below the part underneath the cursor.
	Dock to the left: If the mouse button is released when this cursor is displayed, the part will appear to the left of the part underneath the cursor.
	Dock to the right: If the mouse button is released when this cursor is displayed, the part will appear to the right of the part underneath the cursor.
	Stack: If the mouse button is released when this cursor is displayed, the part will appear as a tab in the same pane as the part underneath the cursor.
	Restricted: If the mouse button is released when this cursor is displayed, the part will not dock there.

3.3.3 Maximizing and minimizing views

The console presentation provides a rich environment consisting of one or more View Stacks (each containing one or more views). These various parts compete for valuable screen real-estate and correctly managing the amount of screen given to each can greatly enhance your productivity within the console. The two most common mechanisms for managing this issue are “minimize” (i.e. make me use as little space as possible) and “maximize” (i.e. give me as much space as you can). The console presentation provides a variety of ways to access these operations:

- Using the minimize and maximize buttons provided on a stack’s border
- Using the minimize and maximize buttons provided on a stack’s border
- Selecting the *Minimize* or *Maximize* item on the context (right-click) menu for a stack
- Double-clicking on a stack
- Using `Control + M`: this is a key binding for a command that will toggle the currently active part between its “maximized” and its “restored” (i.e. normal) states.

Maximize

It is desirable at times to focus your attention on one particular view to the exclusion of the others. Console implements the maximize behavior by minimizing all stacks except the one being maximized. This allows the maximized stack to completely occupy the main presentation while still allowing to access any open views in your perspective by using the icons in their *Trim Stack* (the area around the edges of the window is called the “trim”).

Minimize

Another way to optimize the use of the screen area is to directly minimize stacks that are of no current interest. Minimizing a stack will cause it to be moved into the trim area at the edges of the workbench window, creating a *Trim Stack*. *View Stack* will get minimized into a trim representation that contains the icons for each view in the stack:

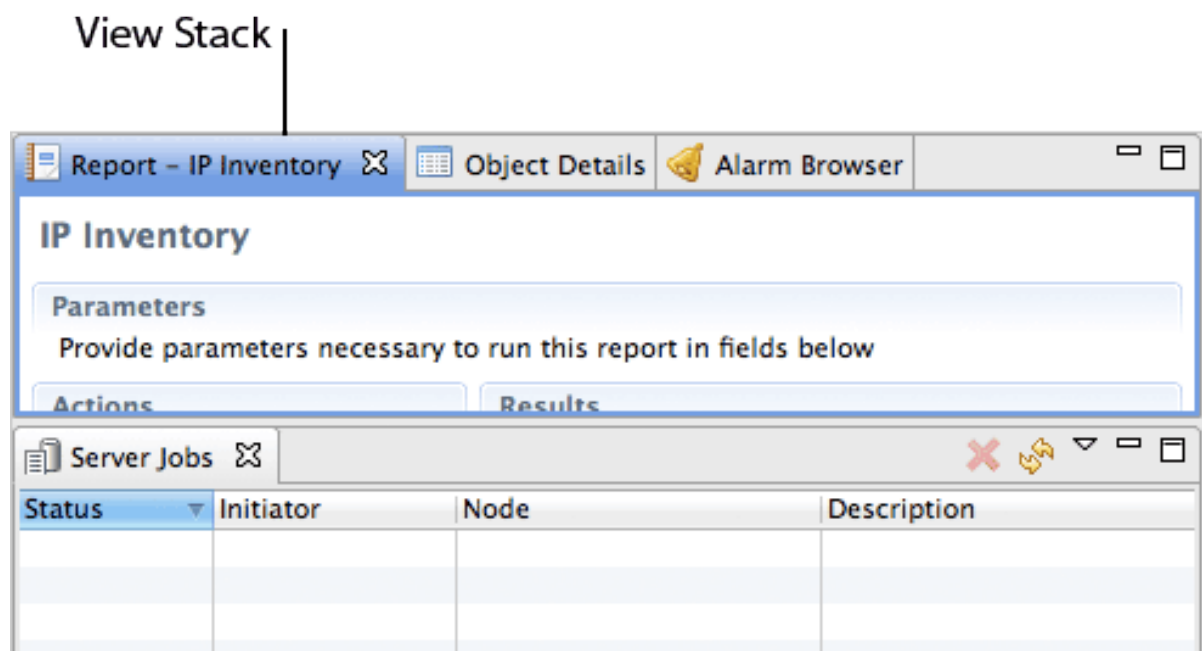
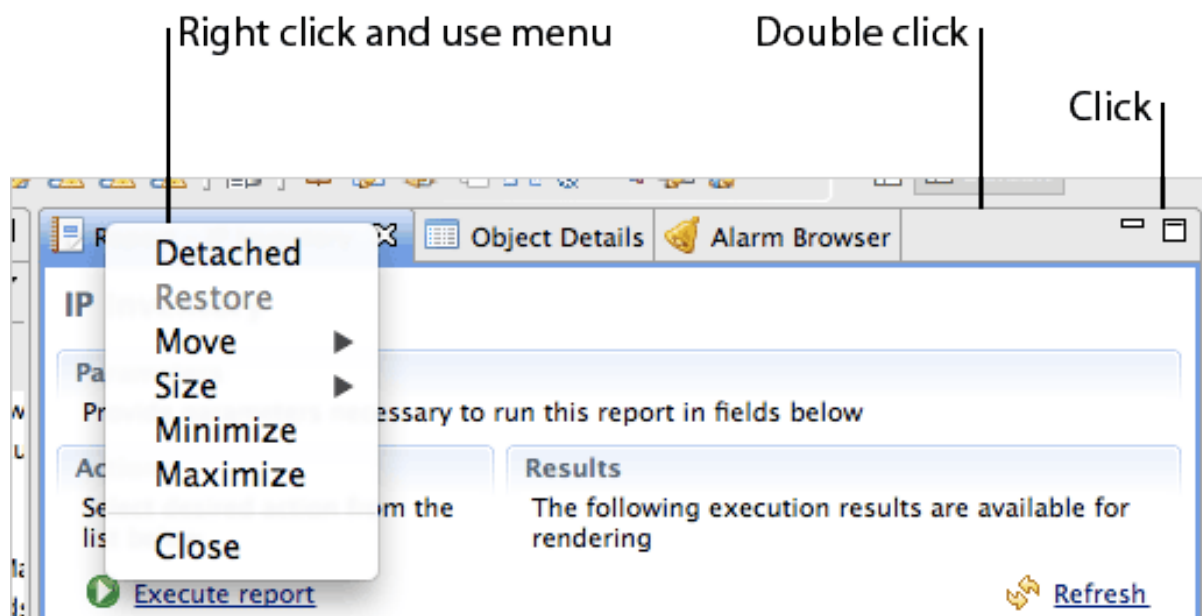


Figure 3.3: Stacked Views

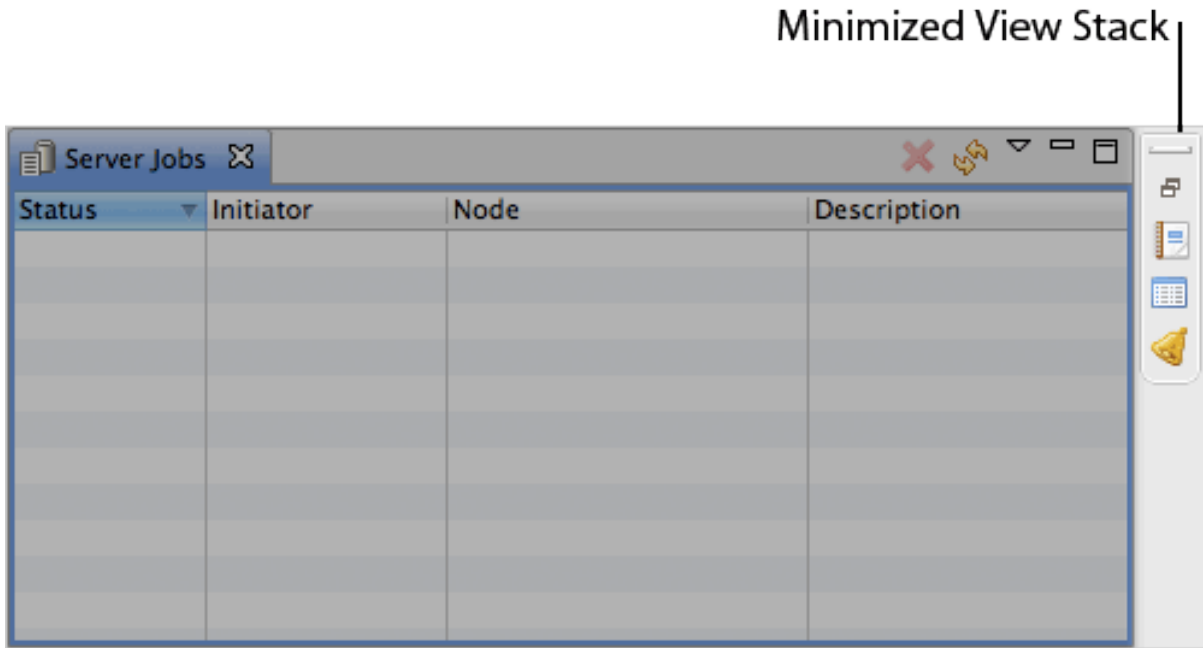


Figure 3.4: Views minimized into Trim Stack

3.4 Perspectives


A perspective defines the initial set and layout of views in the Workbench window. One or more perspectives can exist in a single Workbench window. Perspectives can be opened in one of two ways:

1. In the same (existing) Workbench window.
2. In a new Workbench window.


Perspectives define visible action sets, which can be changed to customize a perspective. A perspective that is built in this manner can be saved, creating a custom perspective that can be opened again later.

3.4.1 New perspectives

There are several ways to open a new perspective within this Workbench window:

- Using the *Open Perspective* button  on the shortcut bar.
- Choosing a perspective from the *Window* → *Open Perspective* menu.

To open one by using the shortcut bar button:

1. Click on the *Open Perspective* button .
2. A menu appears showing the same choices as shown on the *Window* → *Open Perspective* menu. Select perspective from the list or choose *Other* (in that case additional *Select Perspective* dialog will be opened).

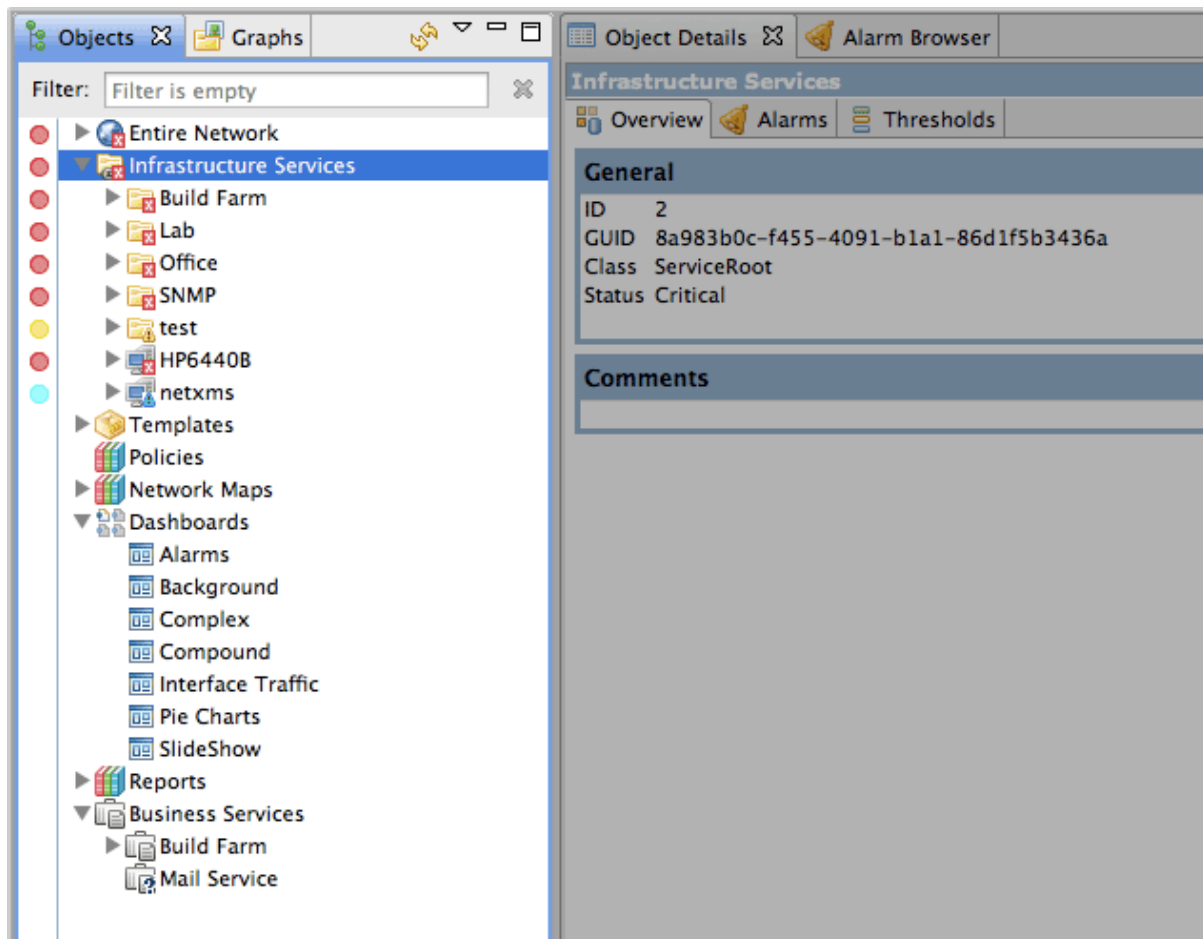
Icons of recently used perspectives will be placed on shortcut bar for quick selection.

3.4.2 Saving perspectives

The Workbench allows any current view layout to be saved for future use. To save current layout as new perspective:

1. Choose *Window* → *Save Perspective As* from main menu.
2. The *Save Perspective As* dialog allows for an existing perspective to be redefined or for a new perspective to be created. Select existing perspective to redefine or type name of new perspective, and click *OK*.
3. Answer *Yes* to the subsequent confirmation dialog. The new perspective layout will be used if the perspective is reset or if a new one is opened.

3.5 Object Browser



Object browser represents all objects in the system as a tree with multiple root objects. Tree is built based on object hierarchy and user permissions. Only objects available to currently logged in user will be shown. User has two options to interact with objects:

- Click Left mouse button to select object and display its details (see *Object Details*)
- Click Right mouse button to open context menu with actions available for this particular object type

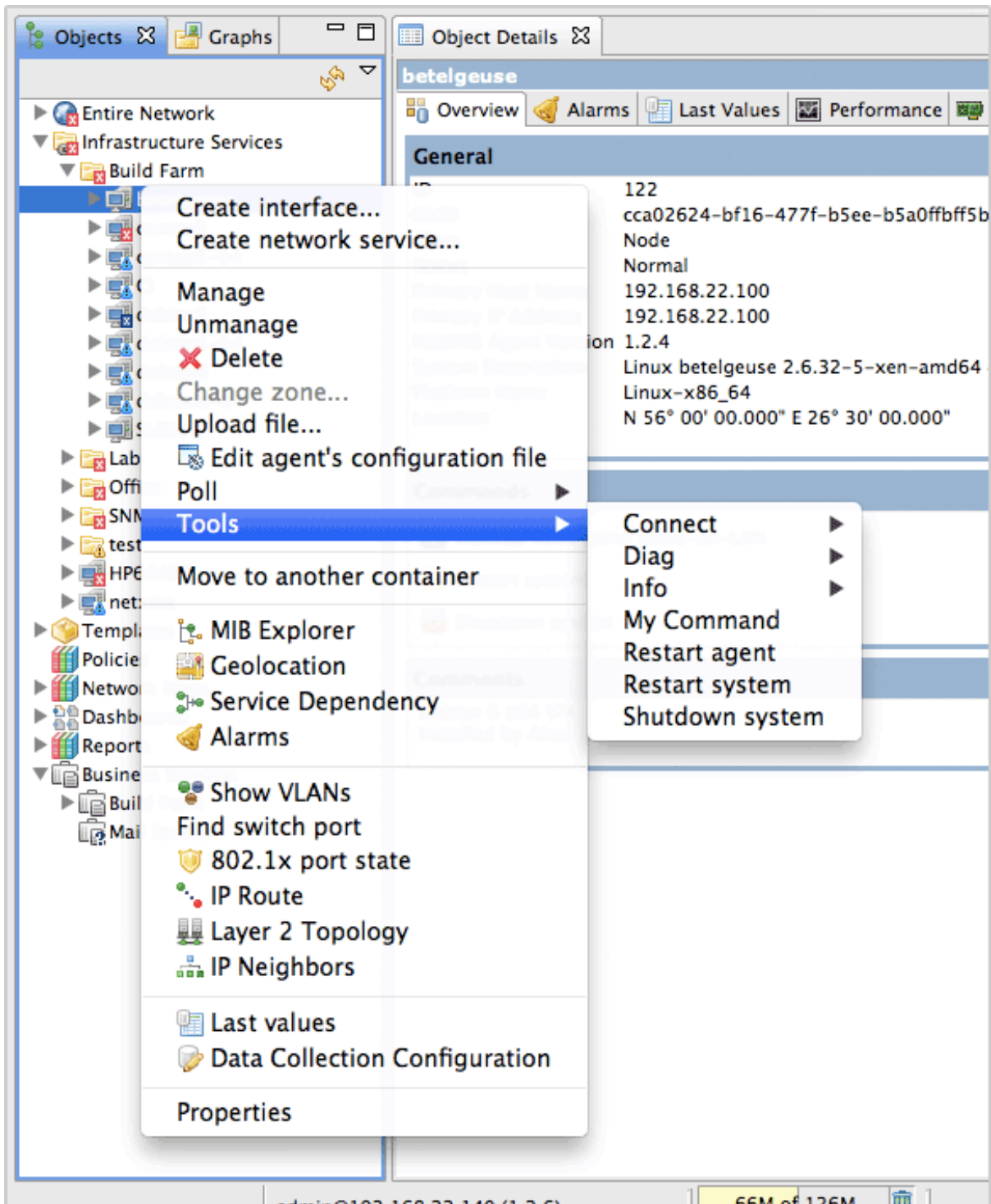


















Figure 3.5: Popup menu for object type *Node*

3.5.1 Object Types

 Entire Network	Root of IP topology tree. All subnet objects located under it. Built automatically by the system and read-only to user.
 Subnet	Object representing IP subnet. Typically objects of this class are created automatically by the system to reflect system's knowledge of IP topology.
 Node	Object representing physical host or network device. These objects can be created either manually by administrator or automatically during network discovery process.
 Infrastructure Services	Root of your infrastructure service tree as defined by administrator.
 Container	Grouping object which can contain nodes, subnets, clusters, conditions, or other containers. With help of container objects administrator can build object's tree which represents logical hierarchy of IT services in organization.
 Templates	Root of templates tree.
 Template	Data collection template. See <i>Data Collection</i> section in <i>Administrator Guide</i> for more information.
 Policies	Root of agent configuration policies tree. See <i>Agent Configuration Policy</i> section in <i>Administrator Guide</i> for more information.
 Network Maps	Root of network maps tree.
 Network Map	Network map (structural or Geo), as defined by administrator.
 Dashboards	Root of dashboards tree.
 Dashboard	Dashboard, as defined by administrator. See <i>Dashboards</i> for more details
 Reports	Root of reports tree.
 Report	Single report, as defined by administrator. See <i>Reports</i> for more details.
 Business Services	Root of business services tree.
 Business Service	Single logical business service as defined by administrator. Provides access to availability data. See <i>Business Services</i> for more details.

3.5.2 Object status

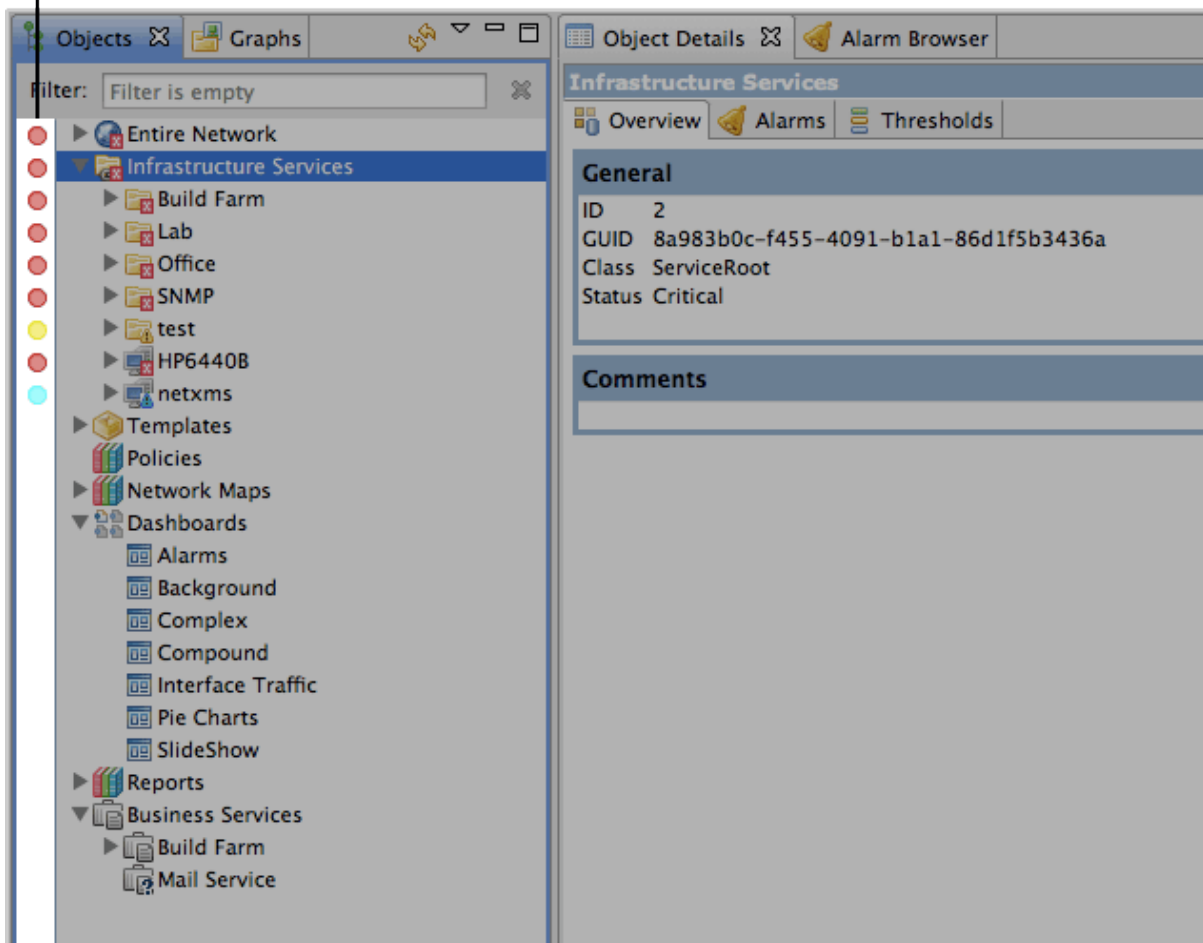
System track status of each object, which can range from *Minor* to *Critical* and show in two places:

- Status indicator on the left
- Icon overlay next to object name

Object status is based on a number of conditions (unless it is changed by administrator, highest priority selected):

- Network communication status (*Node* objects only)
- Pending alarms
- Child objects status

Object Status Indicator



Possible statuses, sorted by priority:

Icon	Status
	Unknown
	Warning
	Minor
	Major
	Critical

3.5.3 Filtering

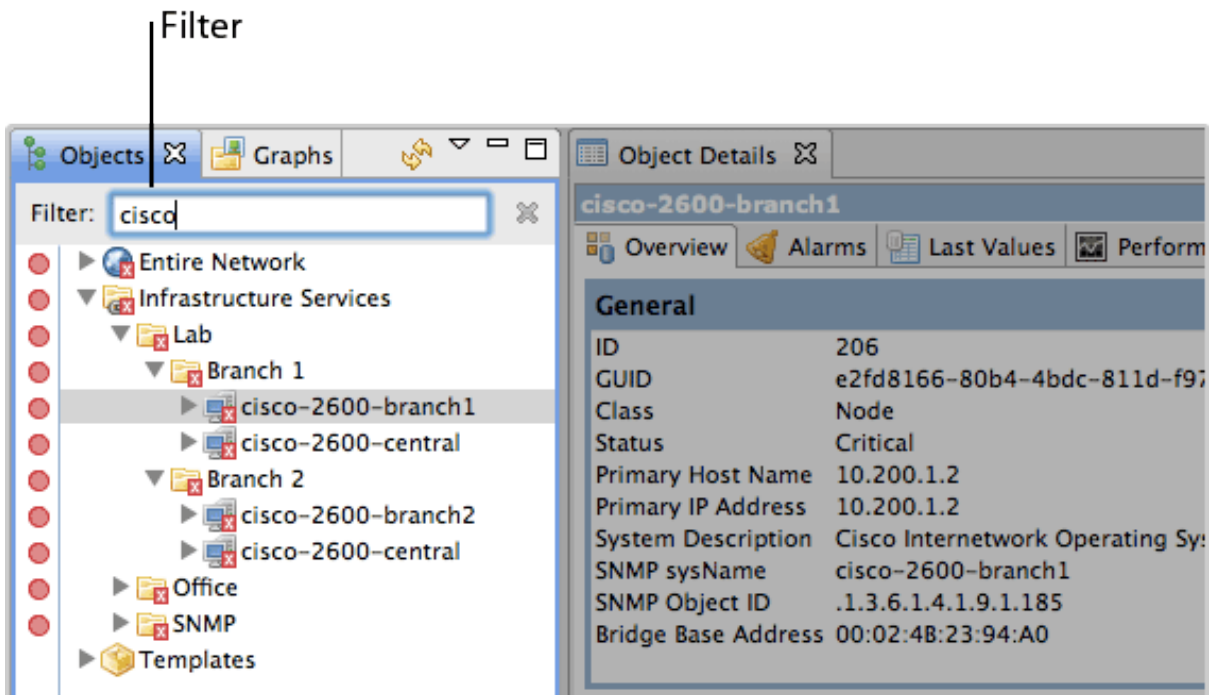


Figure 3.6: As-you-type filter in action

3.6 Object Details

This view provides one or more tabs with detailed information about object currently selected in *Object Browser*. List of available tabs depends on type of the selected object.

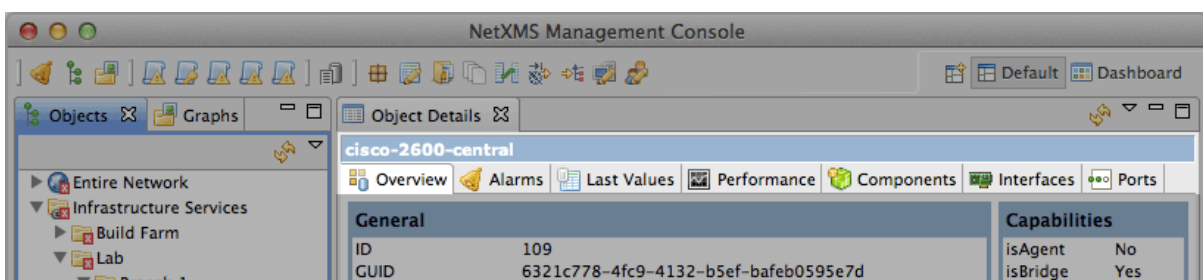


Figure 3.7: Additional row of tabs (SNMP-capable router selected in *Object Browser*)

3.6.1 Overview

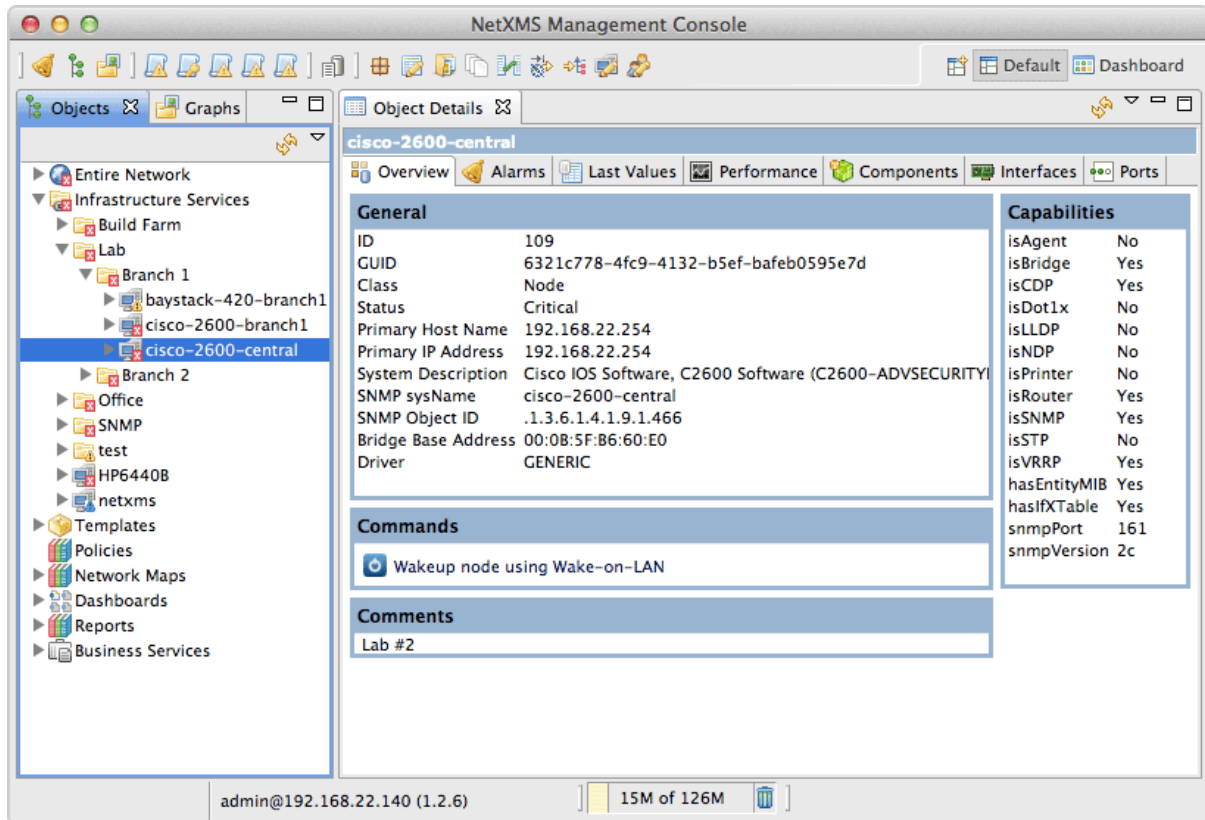


Figure 3.8: Overview tab

This view provides basic information about selected object: Name, Class, Status and comments. For *Node* objects, it also show IP address, Host name, SNMP details as well as Capabilities.

Node capabilities

Capability	Description
isAgent	True if NetXMS Server can communicate with NetXMS agent installed on the node
isRouter	True if selected object can route network traffic
isSNMP	True if selected object is SNMP-capable

3.6.2 Alarms

Alarm view provides user with list of alarms for currently selected element of the tree, including all child objects. To view all alarms in the system, either use system-wide *Alarm Browser* (click *View* → *Alarm Browser* to open) or select *Entire Network* object. Right-click on the alarm will open pop-up menu with available actions

Each alarm can be in one of three different states:

State	Description
Outstanding	Newly created alarm, no actions was taken by user
Acknowledged	User acknowledged raised issue, work in progress
Resolved	Issue resolved, but alarm is kept in the list. This state mostly used when alarm is automatically resolved by the system, to keep users informed about incident
Terminated	Issue resolved and alarm removed from list.

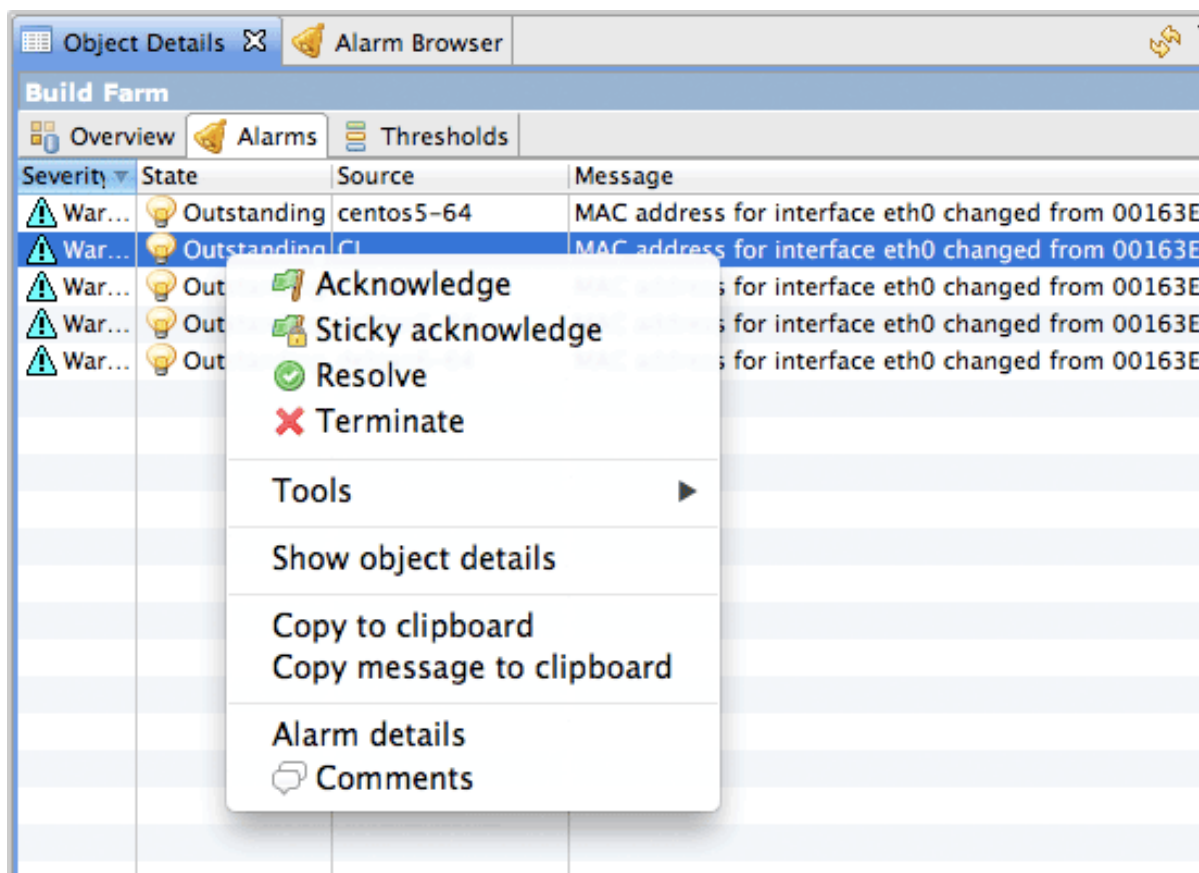
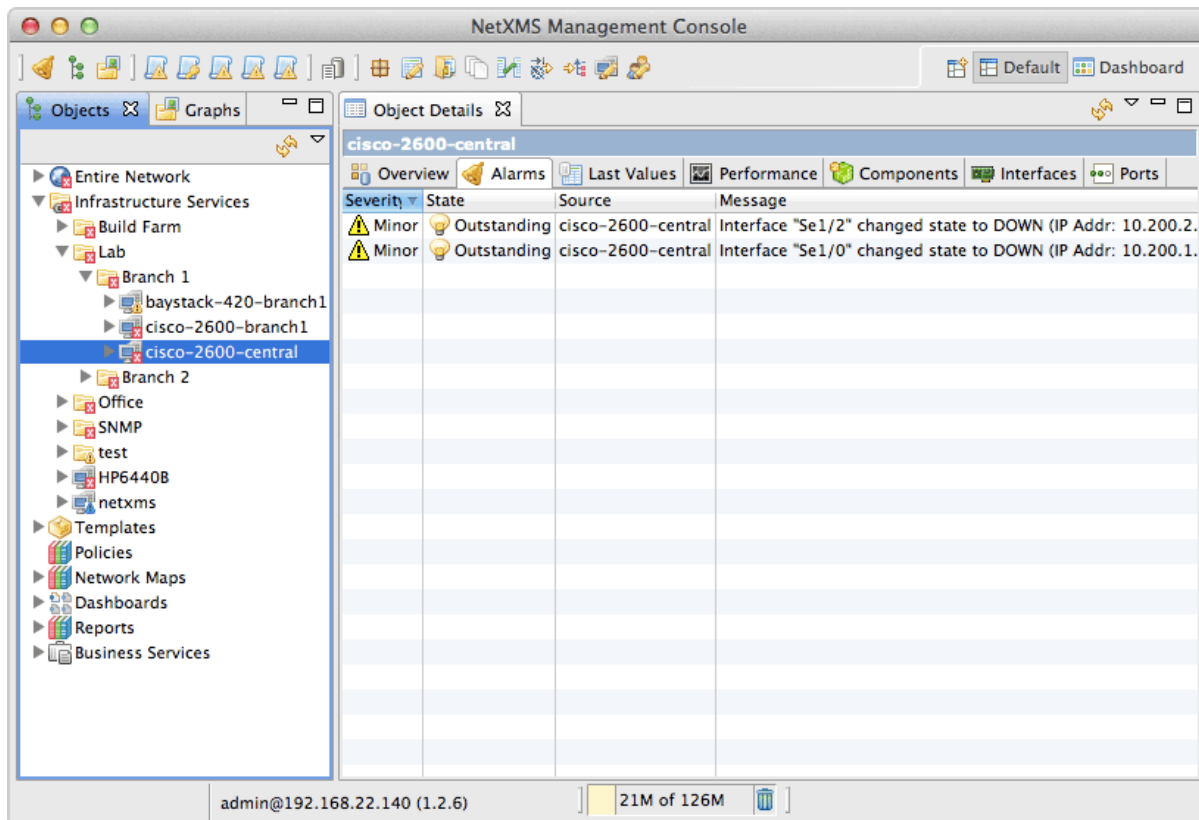


Figure 3.9: Alarm context menu

3.6.3 Last Values

ID	Description	Value	Timestamp	Threshold
25	Status	4	04.03.2013 23:22:41	OK
67	Outbound traffic on Se1/2 (bytes/sec)	0	04.03.2013 23:22:41	OK
65	Outbound traffic on Se1/0 (bytes/sec)	0	04.03.2013 23:22:46	OK
63	Outbound traffic on Fa0/0 (bytes/sec)	366	04.03.2013 23:22:46	OK
72	Next routing hop for IP address 8.8.8.8	192.168.22.1	04.03.2013 23:22:46	OK
66	Inbound traffic on Se1/2 (bytes/sec)	0	04.03.2013 23:22:46	OK
64	Inbound traffic on Se1/0 (bytes/sec)	0	04.03.2013 23:22:46	OK
62	Inbound traffic on Fa0/0 (bytes/sec)	389	04.03.2013 23:22:45	OK
43	CPU utilization	0	04.03.2013 23:22:46	OK

This view provides access to all collected data, both latest and historical. When view is show, it displays latest values, as well as timestamp when each record was collected. Threshold column indicates violations for current *DCI*. User has two options to interact with data:

- Double click on the *DCI* will open line graph view for last hour
- Right-click on the *DCI* will open pop-up menu giving access to all available actions
 - *History* - show historical data
 - *Line Chart, Pie Chart, Bar Chart* - show historical data in graphical form
 - *Clear collected data* - remove all history for selected *DCI*

3.6.4 Performance Tab

Performance tab is a special view that allows to quickly assess health of the selected node using one or more graphs predefined by administrator. Each graph can contain data from multiple sources.

3.7 Network Maps

This view allows user to see network overview in a map form. Map can be build and routed either manually or automatically for selected part of the network. Maps can be automatically generated based on:

- IP topology, both Level 2 and Level 3
- Geographical location of the objects
- Object relations

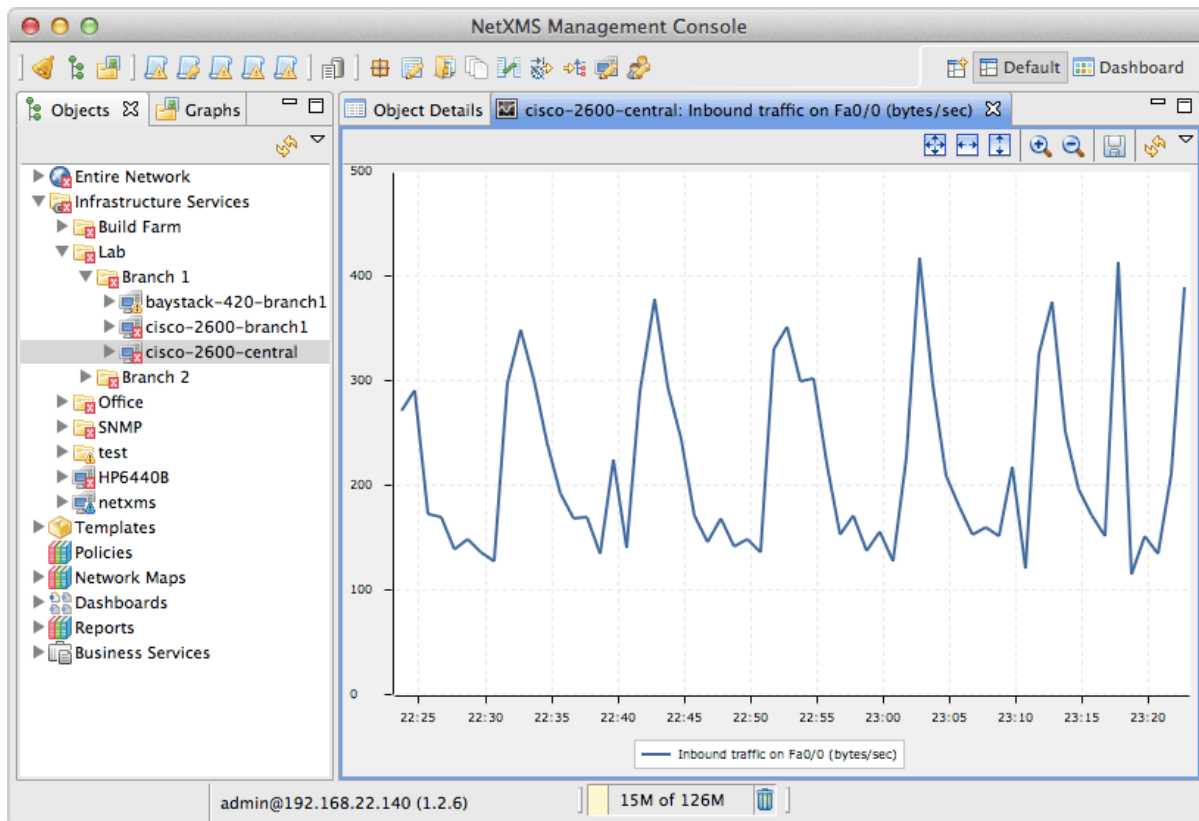


Figure 3.10: Line graph build from collected data

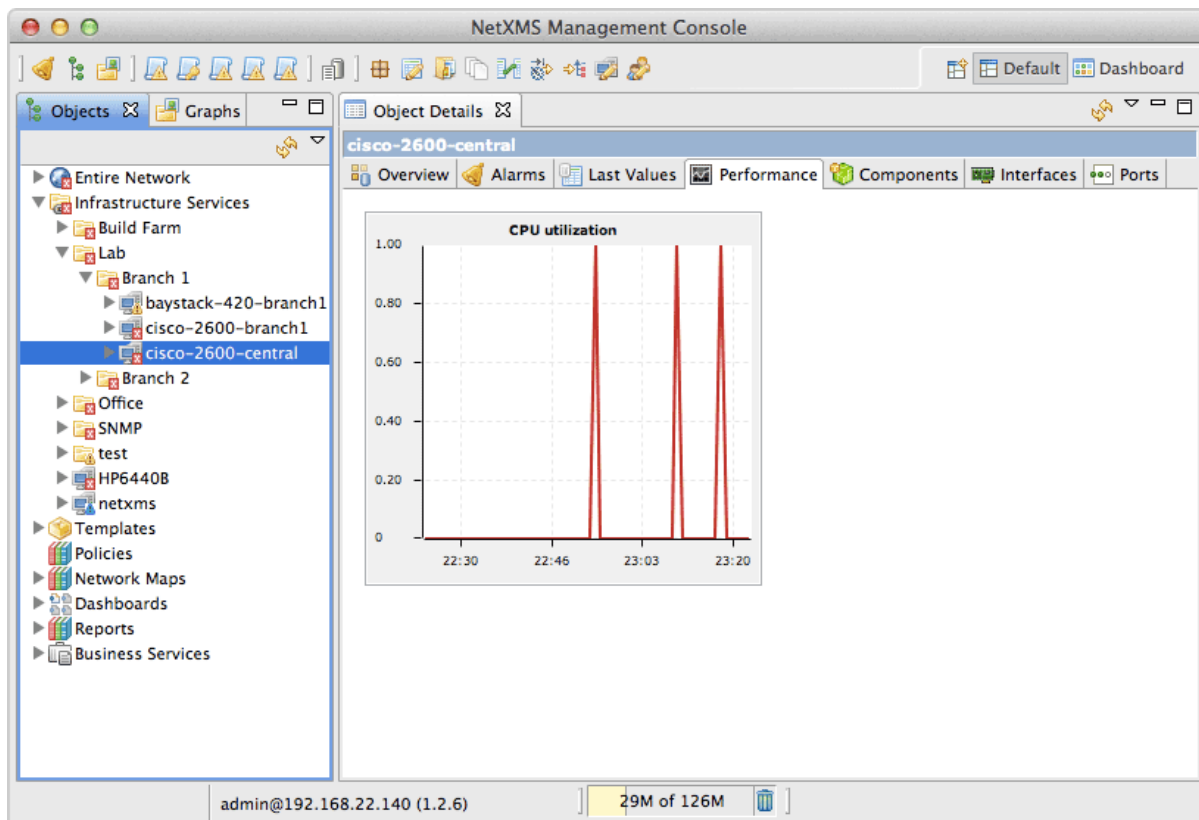


Figure 3.11: Router's CPU usage displayed

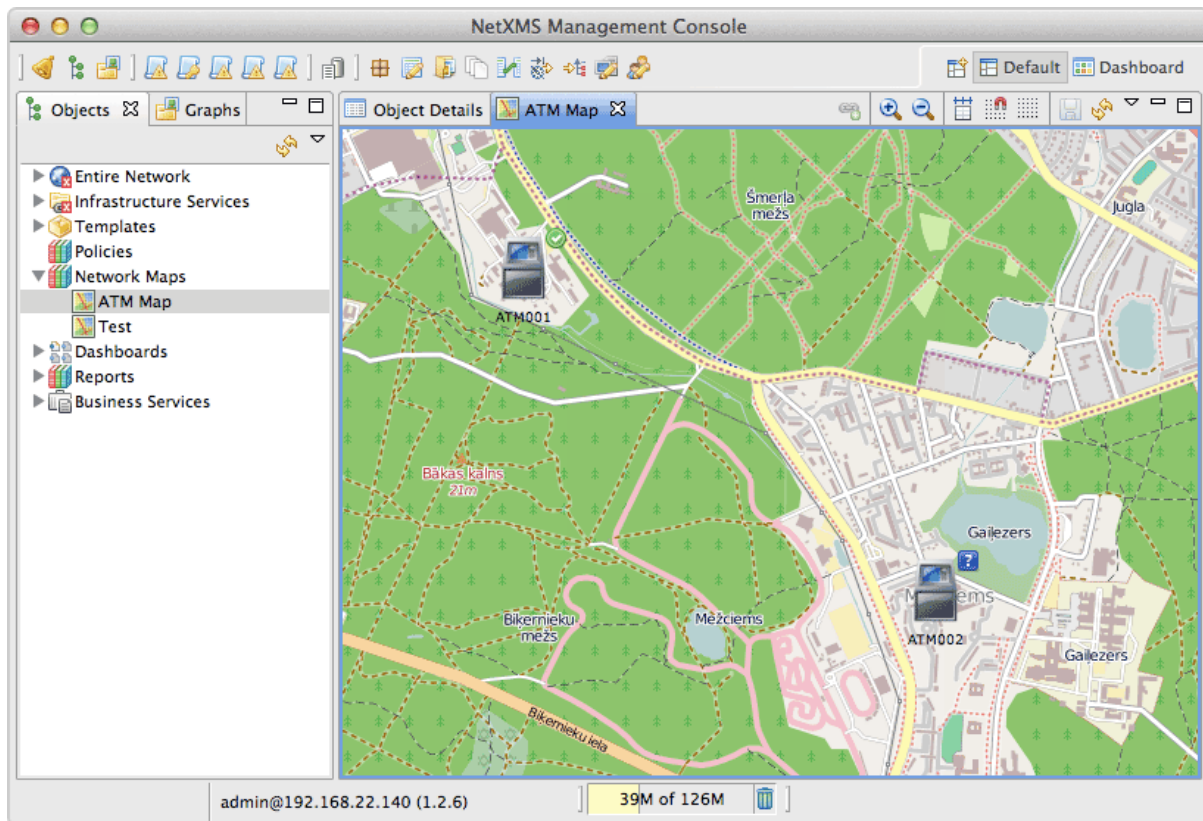


Figure 3.12: Geo map showing part of the ATM network

To open existing map, either double click on the name in *Object Browser* or right-click and select *Open map* in pop-up menu.

3.8 Reports

NetXMS is integrated with *Jasper* reporting engine from *Jaspersoft*. This view allows user to generate report and download result as PDF file. Report generation can take long time, so it's done in background, without user interaction. When report is generated, resulting PDF can be downloaded any time, as well as any result from previous runs.

To generate report:

- Right-click on report name in *Object Browser* and select *Open report* in pop-up menu, report view will open (as show in figure above)
- In report view, fill parameters and click *Generate Report*

You can monitor progress in *Server Jobs* view. To open it, select *Window* → *Show view* → *Other* → *Server Jobs*.

When report is generated, new finished job will appear in *Results* table of the view. Select it and click on *Render to PDF* to download.

When generated report data is not longer needed, it can be deleted from the sever by selecting job in *Results* view, and then clicking *Delete*.

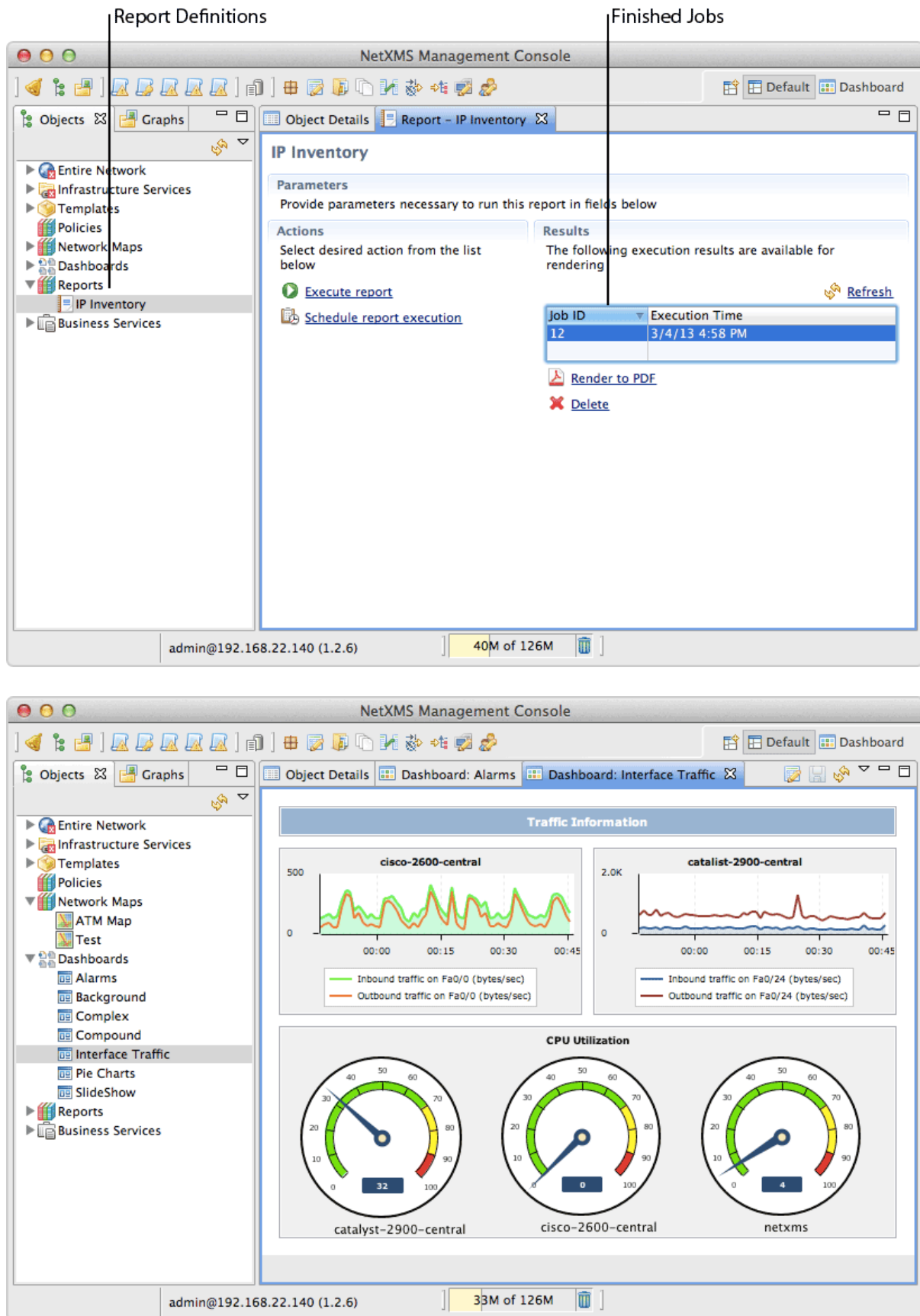


Figure 3.13: Dashboard showing traffic information from core router, as well as CPU usage from vital nodes

3.9 Dashboards

Dashboards are defined by administrator and allow to combine any available visualization components with data from multiple sources in order to create high-level views to see network (or parts of it) health at a glance. There are two ways to access dashboards:

- Open dashboard from *Object Browser*
- Switch to *Dashboard* perspective and select dashboard with left-click

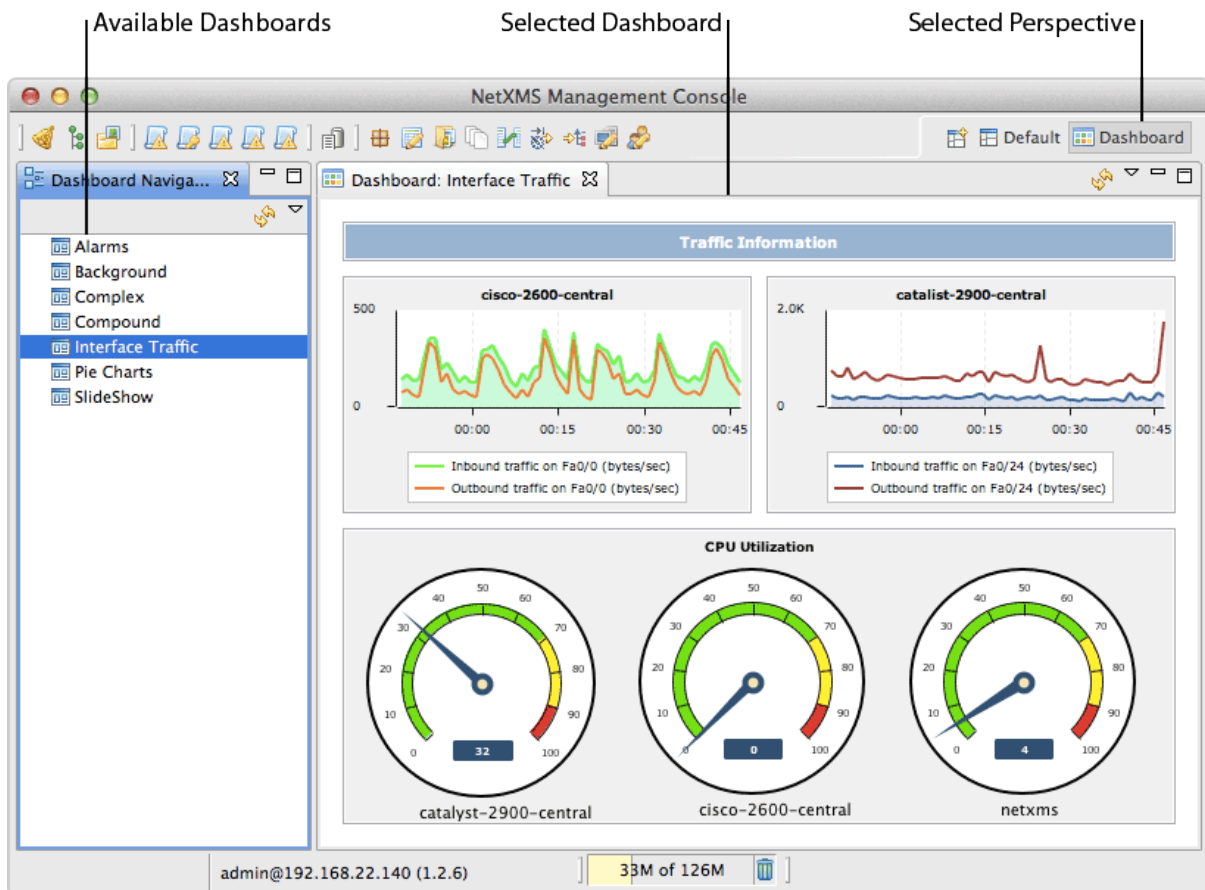


Figure 3.14: Dashboards perspective

3.10 Business Services

Business Services is a hierarchy of logical services as defined by administrator. Each service can represent combined state of multiple elements. For each service in the hierarchy, NetXMS calculates availability percentage and keeps track of all downtime cases. To check availability of any particular level, select it in *Object Browser*.

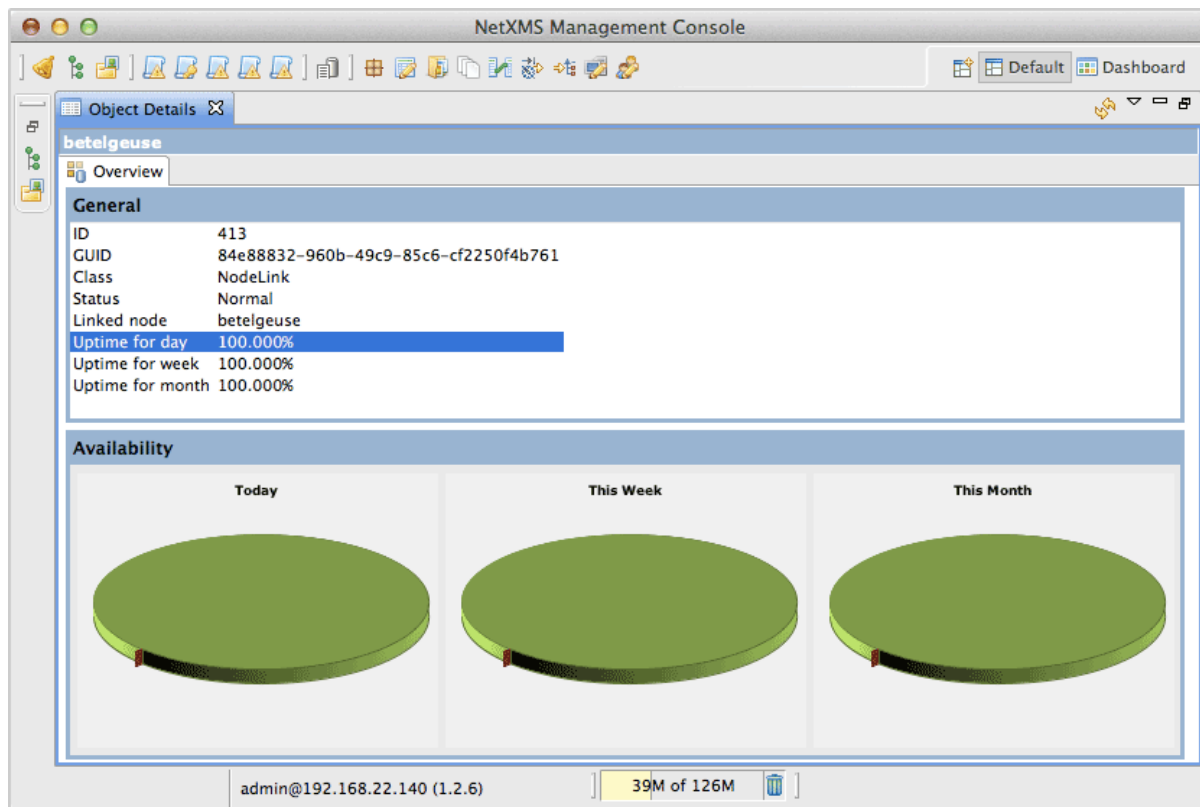


Figure 3.15: Availability chart and uptime percentage for root Business Service

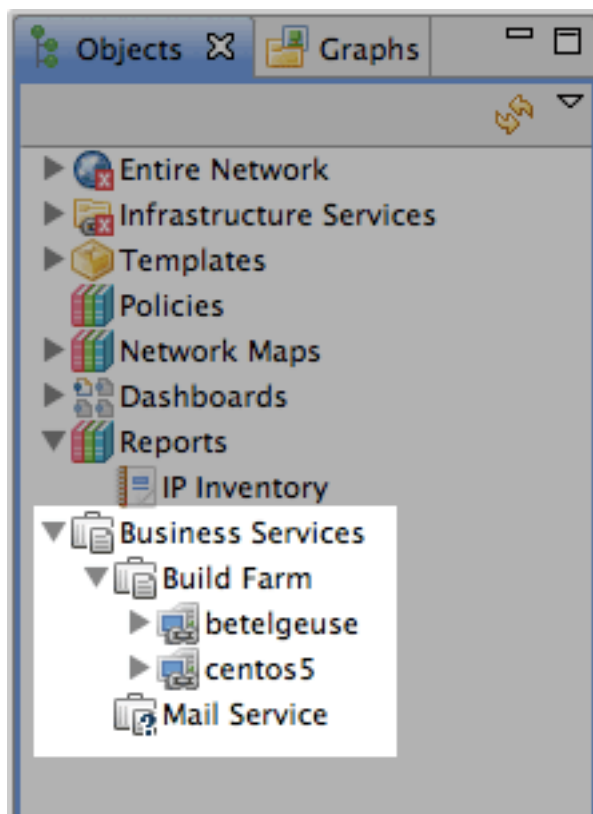


Figure 3.16: Service dependency tree down to specific nodes

GLOSSARY

Alarm Browser View, which shows all active alarms in the system and provides tools to interact with them

DCI Data Collection Item, configuration element, which contains parameter to collect (for example “CPU Usage”), collection schedule and thresholds

Entire Network Automatically generated hierarchy that contains all nodes known to NetXMS

Node Object that represents physical server

Trim Stack *View Stack* in minimized state, represented as a set of buttons, one for each View in the stack

View Stack Multiple views combined into single one, with tab navigation on top of it

A

Alarm Browser, [25](#)

D

DCI, [25](#)

E

Entire Network, [25](#)

N

Node, [25](#)

T

Trim Stack, [25](#)

V

View Stack, [25](#)