



Purpose

This document explains how to use the Capacity Planning feature of Nagios XI to predict what the future trends in your network infrastructure will be. Predicting trends helps in supporting network growth and sustainability, and is a valuable asset for anybody, from a junior network admin, to a C-level wanting a more overall view.

Target Audience

This document is intended for use by Nagios Administrators and Users who wish to learn how capacity planning works in Nagios XI.

Prerequisites

Capacity planning is a feature of the Enterprise Edition license. If you do not have the Enterprise Edition license of Nagios XI, you can enable the free 60 day trial to experience what it has to offer before making a purchase. The trial can be activated via **Admin > System Config > License Information**.

Navigating to Capacity Planning

Capacity Planning is located under the **Reports** menu.

The screenshot shows the Nagios XI web interface. The 'Reports' menu item is circled in the top navigation bar. In the left sidebar, 'Capacity Planning' is also circled under the 'Available Reports' section. The main content area displays a 'Capacity Planning' report for 'rt_a for _HOST_ on APC Smart-UPS 1500'. The report shows a line graph with 'Observed' data (blue bars), 'Predicted' data (black bars), and a 'Fit' line (grey line). The x-axis represents time from 2 Nov to 22 Nov, and the y-axis represents 'rt_a (ms)' from 0 to 30. The legend at the bottom of the graph includes 'Observed', 'Predicted', 'Fit', 'Warning', and 'Critical'. The report also includes navigation controls like 'Page 1 of 5' and '5 Per Page'.

The default view will display the 1 week capacity planning reports for the hosts in alphabetical order. From the screenshot above you can see the first one displayed is the APC Smart-UPS 1500 host with the rta data source from the check_icmp plugin.

Description Of Options

At the top of the page there are a common set of options available. They are described as follows:

Period

 ▾

This is the duration that you would like to see the capacity report predict into the future.

Limit To

 ▾ ▾ ▾

This is the criteria you wish to use for your report. You can choose options such as a specific host, a specific service (available after selecting a host), a hostgroup, or a servicegroup. The Host Selection drop box allows you to pick a host to evaluate and the Service selection drop down (appears after selecting a host) allows you the same.

Extrapolation Method

 ▾

This is referring to the mathematical method that will be used to approximate and forecast that data that it receives. The current methods are Holt-Winters and then three more forms of a polynomial fitting. Holt-Winters has long been regarded as a good forecasting algorithm for hard to predict trends. The polynomial fits would be good to use if you are expecting exponential growth or decay.

Run

A blue rectangular button with the word "Run" in white text.

Click **Run** to generate the capacity planning report.

Search

A search box for easier access to specific services/hosts .

Report Options

A row of four icons: a star, a clock, an envelope, and a dropdown menu labeled "Download".

Options for managing the reports you have ran, you can save, email, schedule and download the report.

This is explained in further detail further on in this document.

Extrapolation Options


Nagios XI chooses the available Periods that you are allowed to choose from based on how long you have been collecting data for. If the Nagios XI instance is relatively new, then you won't have much data to extrapolate off of, and thus selecting a high period would not be advised.

You must have twice as much solid data as the period you wish to use. A caveat of this is that if the data that you are gathering is spotty, capacity planning will not work. Capacity planning also requires that 66% of the period you wish to extrapolate with must have real values. If Nagios goes down, or the plugin that you're using starts malfunctioning and performance data does not get recorded, that starts adding to the 66% of values that are not acceptable values for number crunching.

To cap it off, here are some points to remember:

- The more (complete) data you have, the further into the future you can extrapolate
- The method you choose can have an impact on the actual prediction, so it takes a bit of intuition

Run Report

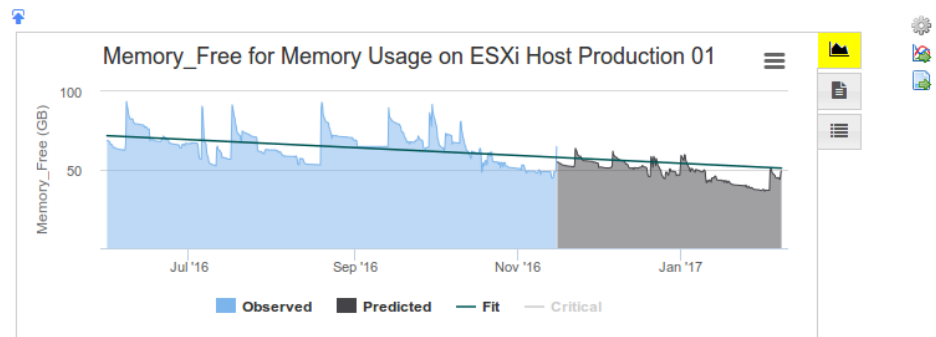
Once you have selected the data set you wish to evaluate, click the blue **Run** button to generate a report dashlet. Once your report dashlet has been generated, your first view should be of a graph containing the collected data as well as a prediction based on your extrapolation method (Holt-Winters by default). You should also see tabs on the right of this dashlet that include an executive summary as well as the data set used for this report. The dashlet can be added to any dashboard by clicking the  icon.

Hosts and services in Nagios XI that generate performance data may have more than one datasource (DS) in the graph data. For example a Ping check returns four DS's **rta**, **pl**, **rtmax** and **rtmin**. The capacity planning reports will generate one report per DS.

The following examples are showing a **3 month** report for the **Memory Free** for an ESXi server using Holt-Winters.

Graph

The graph shows the 66% of the data used to generate the prediction as the left part of the graph. The right hand part of the graph is the predicted data.



Moving your mouse cursor over the graph will display the relative graph values.

There is a **fit** line that spans the length of the graph which can make it easier to understand the prediction.

If the Nagios XI service performance data contained a warning or critical threshold then warning and critical lines are made available but not shown. In the screenshot above you can see the word **Critical** grayed out. If you click the word, the critical threshold line will be shown (as a horizontal line that spans the length of the graph).

Executive Summary

This provides a written summary of the observed data and how it relates to the predicted data.

Executive Summary

The track Memory_Free for service Memory Usage on ESXi Host Production 01 has High data integrity over the previous observed 6 months period. During the observed 6 months the data has ranged to a maximum of 93.62GB, with an average of 64.82GB. For the estimated 3 months period the maximum of 63.66GB, a -29.95GB (-32.00%) change from observed maximum, is predicted to occur at 2016-11-22 11:00. For the estimated 3 months period the estimated average is 48.83GB, which is a -15.99GB (-24.67%) change from observed data.

Summary Data	
Host	ESXi Host Production 01
Service	Memory Usage
Track	Memory_Free

Data

This shows you the raw data used for the prediction. Data that is in blue is observed data, while data that is in black italics is predicted data.

Date	Value	Warning	Critical	Fit
2016-11-14 17:00	48.741		3	57.983
2016-11-14 23:00	48.794		3	57.962
2016-11-15 05:00	49.388		3	57.942
2016-11-15 11:00	64.815		3	57.921
<i>2016-11-15 17:00</i>	<i>54.964</i>		<i>3</i>	<i>57.901</i>
<i>2016-11-15 23:00</i>	<i>54.696</i>		<i>3</i>	<i>57.880</i>
<i>2016-11-16 05:00</i>	<i>54.687</i>		<i>3</i>	<i>57.860</i>
<i>2016-11-16 11:00</i>	<i>54.008</i>		<i>3</i>	<i>57.839</i>

Since the critical threshold is **3**, the projections in the **Value** column indicate that the ESXi server will have enough free memory for the next three months.

Dashlet Icons

There are three icons that are located on the right hand pane of the the dashlet which perform the following:

Edit Dashlet Settings

This allows the time period and extrapolation method to be defined specifically for this dashlet

View All Service Tracks

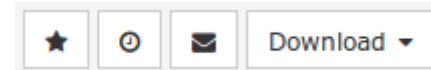
Displays all of the capacity planning services available for the object you are currently viewing

Download as CSV

Provides you with a CSV file of all the data used to generate the prediction

Report Output Options

These options allow you to save, schedule, email and download a report.



Add

Clicking the **Add** button will allow you to save the report under the **My Reports** section. When you click the button you will be presented with the following screen:

Add to My Reports

Use this function to save reports that you frequently access to your 'My Reports' menu.

Report Title:

The name you want to use for this report.

Do not show this report in the my reports menu section.

Populate the fields as required and click **Save Report** when done.

Schedule

Clicking the **Schedule** button will allow you to schedule the report to run at specific times and email selected recipients. When you click the button you will be presented with the following options:

Report Name

A name required for the report

Schedule

Define when you would like this report to run

Attachments

Select the type(s) of attachments you want the report to included in the email as

Recipients

Provide a list (comma-separated) of email addresses this report should be sent to

Subject

The subject of the email being sent

Schedule New Report

Use this form to create a new scheduled report that is sent to one or more recipients you define.

Report Name:

The name you want to use for this report.

Schedule: Frequency: Time: :

Specify the schedule you want this report to be emailed.

Attachments: PDF

Select the types of attachment(s) you want in the report.

Recipients:

Comma-separated list of email addresses this report should be sent to.

Subject:

The subject that should be used for the report email.

Message:

A custom message to be added to the report email.

Do not show this report in the my reports menu section.

Message

The message body of the email being sent

Populate the fields as required and click **Save** when done.



Clicking the **Email** button will allow you to send the report immediately via email to selected recipients.

The options available are identical to the **Schedule** options listed above.



The Download button can be used to save the report as a PDF or JPG.

Finishing Up

This completes the documentation on how to use capacity planning in Nagios XI.

If you have additional questions or other support related questions, please visit us at our Nagios Support Forums:

<https://support.nagios.com/forum>

The Nagios Support Knowledgebase is also a great support resource:

<https://support.nagios.com/kb>