The Industry Standard in IT Infrastructure Monitoring

Purpose

This document explains how to better 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.

Prerequisites

Capacity Planning within Nagios XI requires Nagios XI 2012 Enterprise Edition or greater, any previous version of Nagios XI will not have the Capacity Planning capabilities. You can download a copy of Nagios XI 2012, with trial access to Enterprise features [here].

Navigating to Capacity Planning

Capacity Planning is located under the Reports Tab, refer to the following pictures:

Description Of Options

The Capacity Planning component initially displays the first host by alphanumeric order, and its first service. On the first page you see:

- Host Selection
- Service Selection
- Calculate Button

The Host Selection drop box allows you to pick a host to evaluate, while the Service selection drop down allows you the same. Please note, that the Service Selection box will gray out service names for services that do not have enough information for calculations, a matter we will get into in further depth later.

Illustration 1: An Example of a grayed out service
Beyond these drop downs, there are two other things of note on this page, one is the data, which consists of a graph and possibly an HTML table underneath it. If there is no table underneath the graph, click the calculate button to see the table.

This shows the known data in yellow, and the extrapolated data in blue. We'll get to the extrapolation later. Also, there is a table, that isn't fully populated with data, however, capacity planning does populate this table with values such as dates and expected values on those dates.

On the top of the page, there is a tab menu, which is what will be used for most of the navigation around the capacity planning report.

**Extrapolation Options**

Upon clicking on the 'Extrapolation Options' tab, you are given some new options.

- **Period:** This is the time where you think a pattern will repeat itself. It's a good bet that this period of time is a multiple of one week, which is why Nagios has made them multiples of one week.
- **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, Least Squares, and then two more forms of a polynomial fitting. Holt-Winters has long been regarded as a good forecasting algorithm for hard to predict trends. However, the Least Squares algorithm will give you a single line, which shows whether or not the general trend is going up or down. The polynomial fits would be good to use if you are expecting exponential growth or decay.
- **Extrapolate Out** – This is how far algorithm with extrapolate out, and it will always be a multiple of the Period. So if you choose a Period of 1 week, the most you will ever be able to extrapolate out is 4 weeks. If you choose 4 weeks as your period, you will be able to extrapolate out 16 weeks, etc.

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 Nagios will not allow you to choose a very high period, as it doesn't make much sense to set the period for 8 weeks if you only have 4 weeks of data accrued.

The numbers that Nagios picks for the available periods are also not arbitrary. 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

**Date Values**

This tab allows you to specify dates in which you would like to know the forecasted value of. For instance, if you would like to know what the forecasted value of the service you are working with on some specific date, click on the Data Selection box, select a date, and press done. To do multiple dates, simply click the Add Another Date button and choose as many dates as you need.

**Expected Values**

Clicking on this tab allows you to enter an expected value, which will be taken into account when the forecasting happens, and the capacity planning will print the date that the expected value is forecasted to be reached.

If the service has a defined warning and critical value, these values will automatically be plugged into this table and will be dates for them will be calculated. If the date falls outside the range of the forecast, Nagios will simply say that.

**Use**

Clicking the calculate button on any of the tabs causes Nagios to redraw the graph and calculate the input information. Here is an example graph and table:

As you can see, this is written as of March 2012, and we can see the trend and possible future values going far into the future. The warning value is forecasted to be hit on May 31st 2013.
Conclusion

Predicting the future trends in your network infrastructure via the Capacity Planning in Nagios XI will help you make informed decisions. The web interface is quite intuitive, however if you experience any problems while using the Capacity Planning features, feel free to submit your questions to the Nagios online support forum: http://support.nagios.com/forum.