Purpose

This document describes how to install and configure the Bischeck plugin extension for use with Nagios XI in order to dynamically monitor Linux machines with time-based thresholds. The Bischeck extension is an application that sends passive checks to a Nagios server, specifically relating to dynamic and adaptive thresholds that change over time.

Target Audience

This document is intended for use by Nagios XI Administrators who wish to monitor dynamic behavior of applications and Linux machines over time. It is assumed that the reader has a working Nagios XI installation and is comfortable with the Linux command line.

Bischeck Plugin Extension Overview

Bischeck executes checks on a schedule, using a mixture of Nagios plugins and various other polling methods to gather information. It caches the results and uses this cache to perform calculations on historical data. This allows Bischeck to follow trends and (in future releases) predict future metrics. What this means for a user is that you now have the ability to have one check in Nagios report different data throughout the day depending on previous results, as opposed to current status.

Bischeck is designed to follow trends, not static values, and it compares the current status of a check to the recent historical data from the check. Because of this design, any check which returns a Warning or Critical status may eventually change back to an OK status without any external action. If you do not set up Nagios XI to email when a warning or critical status occurs, you may not benefit from the power of Bischeck.

This documentation will configure Bischeck to monitor the Nagios XI localhost root partition growth over time. Using this example will teach you how you can use Bischeck for your needs.

Editing Files

In many steps of this documentation you will be required to edit files. This documentation will use the vi text editor. When using the vi editor:

- To make changes press `i` on the keyboard first to enter insert mode
- Press `Esc` to exit insert mode
- When you have finished, save the changes in vi by typing `:wq` and press Enter

Prerequisites

Bischeck will run on RHEL/CentOS 6/7. Bischeck requires Java version 6+, NSCA and REDIS to be configured on your Nagios XI server in order to function. Establish a terminal session to your Nagios XI server as the root user and execute the following commands to install the prerequisites:

RHEL | CentOS | Oracle Linux

```
yum install -y java redis
```

Debian | Ubuntu

```
default-jre redis-server
```

You will need to configure NSCA in Nagios XI, this guide will be using the Decryption Method set to **XOR** and the password (this guide is using **`Str0ngP@sswr0d`**). The following documentation explains how to configure NSCA:

How To Use The NSCA Addon

Note: By default the `/etc/xinetd.d/nsca` has the `only_from` line configured with `127.0.0.1`, this is all that is required.

Bischeck Installation

In your terminal session execute the following commands to install Bischeck:

```
mkdir -p /opt/socbox/addons
cd /tmp
wget https://github.com/thenodon/bischeck/releases/download/bischeck_rel-1.1.2/bischeck-1.1.2.tar.gz
tar xzf bischeck-1.1.2.tar.gz
cd bischeck-1.1.2
chmod +x install
./install
```

Note: If any problems occur, you can run the following command to view the command-line options supported by the installer:

```
./install -u
```

It has been identified that on RHEL 6.x/7.x the installer fails as it does not correctly detect the distribution. This can be rectified by adding the word **red** to line 224 of the **install** file:

```
red|rh|rhel|redhatenterpriseserver|centos|debian|ubuntu)
```

This command will make that change for you:

```
sed -i 's/rh|/red|rh|/g' install
```

Create check_root_used Check

In the configuration step below you will define a check to be used for the Bischeck service. This part of the documentation creates that check and tests that it works. In a terminal session execute the following command to open vi to the new file `/usr/local/nagios/libexec/check_root_used`:

```
vi /usr/local/nagios/libexec/check_root_used
```

Paste the following code into the `check_root_used` file:

```
#!/bin/bash
USED=`df -Ph | grep "/$" | awk '{print $5;}' | sed 's/\%//'`
echo "used=$USED"
exit 0
```

Save the file as you do not need to make any additional changes. You will need to set proper permissions on the file in order for it to run, execute the following command:

```
chmod +x /usr/local/nagios/libexec/check_root_used
```

Now run the command to test it works:

```
/usr/local/nagios/libexec/check_root_used
```

Your output will look something like this:

```
used=34
```

This is the percent of your root partition which is used. Bischeck will grab the 34 and use it to determine whether or not the disk is filling up too fast (this is explained later in this document).

Configuring The Bischeck Plugin Extension

Three main files make up the configuration of Bischeck and are located by default in `/opt/socbox/addons/bischeck/etc/`:

- `bischeck.xml`
  - holds scheduling and check command configuration
- `24thresholds.xml`
  - describes time profiles and thresholds used to evaluate measured data
- `servers.xml`
  - parameters for connecting to the Nagios server

You will need to configure Bischeck with the password you entered when setting up NSCA within Nagios XI. Edit the file `/opt/socbox/addons/bischeck/etc/servers.xml` and locate the following lines:

```
<class>NSCAServerNOSEND</class>

<key>password</key>
<value>nscapassword</value>
```

Change `NSCAServerNOSEND` to `NSCAServer` (remove the NOSEND portion). Change `nscapassword` in the value field to the password you entered when setting up NSCA. Here are those changes:

```
<class>NSCAServer</class>

<key>password</key>
<value>Str0ngP@sswr0d</value>
```

Save the file, this completes the changes required.

Define bischeck.xml Configuration File

The next step is to configure the `bischeck.xml` file. The default file provided with the install is going to be purged, you will define the contents of this file using the code on this page. Execute the following commands:

```
cd /opt/socbox/addons/bischeck/etc
echo "" > bischeck.xml
vi bischeck.xml
```

Paste the following code into the `bischeck.xml` file *(lines in bold will be discussed below)*:

```
<?xml version='1.0' encoding='UTF-8'?>
<bischeck>
    <host>
          <name>localhost</name>
          <desc>My localhost</desc>
          <service>
                <name>root</name>
                <desc>Monitor the root space used</desc>
                <schedule>30S</schedule>
                <url>shell://localhost</url>
                <serviceitem>
                      <name>used</name>
                      <desc>Percent of root used</desc>
                      <execstatement>
                            {"check":"/usr/local/nagios/libexec/check_root_used","label":"used"}
                      </execstatement>
                      <thresholdclass>Twenty4HourThreshold</thresholdclass>
                      <serviceitemclass>CheckCommandServiceItem</serviceitemclass>
                </serviceitem>
          </service>
    </host>
</bischeck>
```

The indentation may be lost when you copy and paste, but this is not important. Save the file as you do not need to make any additional changes, the lines in bold are explained as followed.

- **`<name>localhost</name>`**
  - This is the name of the host which must have a matching host entry in Nagios. In our example we are running Bischeck and Nagios XI on the same host, on a default install of Nagios XI `localhost` is an existing host.
  - If you were running this on a remote host named `mailserv1`, you would have to create a host in Nagios XI with the name `mailserv1`.
- **`<name>root</name>`**
  - This the name of the service you are checking with Bischeck. This needs a matching service entry in Nagios XI and that service must be attached to the host above (`localhost`). Creating this service is discussed later in this document.
  - **Note:** Don't confuse this `root` service with the `Root Partition` service that is part of the Nagios XI default installation.
- **`<schedule>30S</schedule>`**
  - This how often the check will be performed. You can enter either a specific interval such as `10M`, or in this case `30S`, or you can use a cron-style expression such as "`0 15 10 ? * MON-FRI`" to run every week day at 10:15AM.
  - **Note:** When using intervals you must use capital letters for the Second, Minute, and Hour specifier.
- **`<name>used</name>`**
  - This line is just a subname of the service you are checking. It is arbitrary and does not need to be configured in Nagios XI however it is mentioned here as it is reference in the next setting.
- **`{"check":"/usr/local/nagios/libexec/check_root_used","label":"used"}`**
  - This is the check that will be run to gather the required metrics. In our case it is running `/usr/local/nagios/libexec/check_root_used`, this is the script you created earlier on.
  - The check is looking for the label used.

Note:

- For the name, the following characters are valid: `a-z`, `A-Z`, `0-9`, dash (`-`), period (`.`), and underscore (`_`)
- The **`service`** and **`serviceitem`** entries have all of the above valid characters, plus the at sign (`@`) and spaces

Define 24thresholds.xml File

The next step is to configure the `24thresholds.xml` file. The default file provided with the install is going to be purged, you will define the contents of this file using the code on this page. Execute the following commands:

```
cd /opt/socbox/addons/bischeck/etc
echo "" > 24thresholds.xml
vi 24thresholds.xml
```

Paste the following code into the `24thresholds.xml` file (lines in bold will be discussed below):

```
<?xml version='1.0' encoding='UTF-8'?>
<twenty4threshold xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <servicedef>
        <hostname>localhost</hostname>
        <servicename>root</servicename>
        <serviceitemname>used</serviceitemname>

        <period>
             <calcmethod>&lt;</calcmethod>
             <warning>0</warning>
             <critical>0</critical>
             <hoursIDREF>1</hoursIDREF>
        </period>
```

```
    </servicedef>

    <hours hoursID="1">
        <hourinterval>
            <from>00:00</from>
            <to>23:00</to>
            <threshold>avg(localhost-root-used[0:3])+5</threshold>
        </hourinterval>
    </hours>
</twenty4threshold>
```

The indentation may be lost when you copy and paste, but this is not important. Save the file as you do not need to make any additional changes, the lines in bold are explained as followed.

- The **<hostname>**, **<servicename>**, and **<serviceitemname>** fields
  - These need to match what was entered in the `bischeck.xml` file's **<host><name>**, **<service><name>**, and **<serviceitem><name>** fields
- **<calcmethod>**
  - This defines how Bischeck will test the measured metrics.
  - You want to verify that the percent of your root partition that is used, is less than a certain threshold.
  - In this case, `<` is being used for the less than character (<) because it will break the XML file.
- **<warning>** and **<critical>**
  - These fields are percentage variances from the threshold, they are not used in this example.
- **<hoursIDREF>**
  - Refers to a time period that the check will be performed, and this refers to the **<hours hoursID="1">** field

- **<hours hoursID="1">**
  - Within this section there is a <from> and a <to> field which are used to define start and end times for running the check, they must be supplied in 24-hour time.
- **<threshold>**
  - In this field a formula is used to average out the last 4 checks (starting at 0 and going to 3) and the it adds 5. This value is what the current value must be less than in order to return OK

How To Start Bischeck

At this point things should be ready to go. Execute the following commands to begin the necessary services:

RHEL 6 | CentOS 6 | Oracle Linux 6

```
service redis start
service bischeckd start
```

RHEL 7 | CentOS 7 | Oracle Linux 7

```
systemctl start redis
systemctl start bischeckd
```

Ubuntu 14

```
service redis-server restart
service bischeckd start
```

Debian | Ubuntu 16/18

```
systemctl start redis-server
systemctl start bischeckd
```

The Bischeck installation should start making checks immediately.

Execute the following command to confirm:

```
tail -f /var/tmp/bischeck.log
```

You should see output similar to the following:

```
2017-02-09 05:05:33.489 ; INFO ; pool-3-thread-1 ;
com.ingby.socbox.bischeck.servers.NSCAWorker ; NSCA-1:localhost:root:OK used =
28 (33 < 33 <  W < 33 <  C < )  |  used=28;33;33;0; threshold=33;0;0;0; avg-
exec-time=5ms
```

This is just some informational output showing what the check is returning and the values being compared. In our example, Bischeck is checking used root partition space every 30 seconds, averaging the last 4 results, and alerting as CRITICAL if the latest used space percentage has risen 5 or more in the last 30 seconds. The values used in this example were chosen somewhat randomly, but a 5% increase in used space over a 30-second period should be an indication of a problem in just about any system.

Don't be concerned with warnings like the following, they exist because the check hasn't executed enough times to gather data to calculate.

```
2017-02-09 05:02:33.729 ; WARN ; DefaultQuartzScheduler_Worker-1 ;
com.ingby.socbox.bischeck.jepext.ExecuteJEP ; Math jep parse error for
expression - avg(null)+5 : Error during evaluation: Invalid parameter type
```

Execute these commands to ensure these services start on boot:

RHEL 6 | CentOS 6 | Oracle Linux 6

```
chkconfig redis on
chkconfig bischeckd on
```

RHEL 7 | CentOS 7 | Oracle Linux 7

```
systemctl enable redis
systemctl enable bischeckd
```

Ubuntu 14

```
update-rc.d redis-server defaults
update-rc.d bischeckd defaults
```

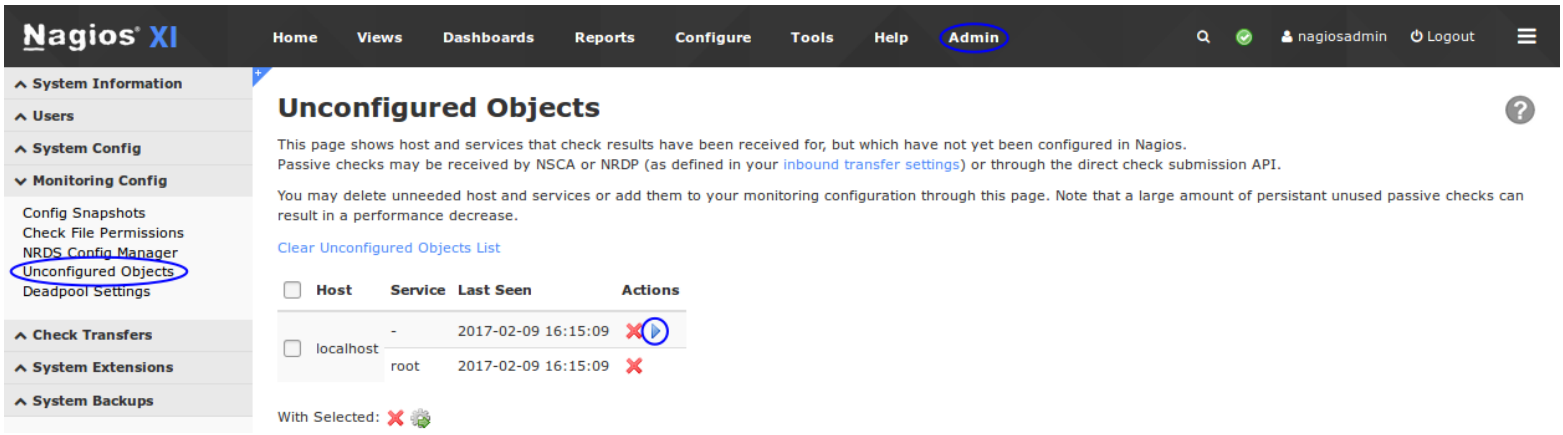
Debian | Ubuntu 16/18

```
systemctl enable redis-server
systemctl enable bischeckd
```

Configuring Bischeck In Nagios XI

Once Bischeck is running, it will start sending passive checks to the Nagios XI server. These will show up as **Unconfigured Objects** in Nagios XI until you set up a service for your local host with the name you specified in `bischeck.xml`.

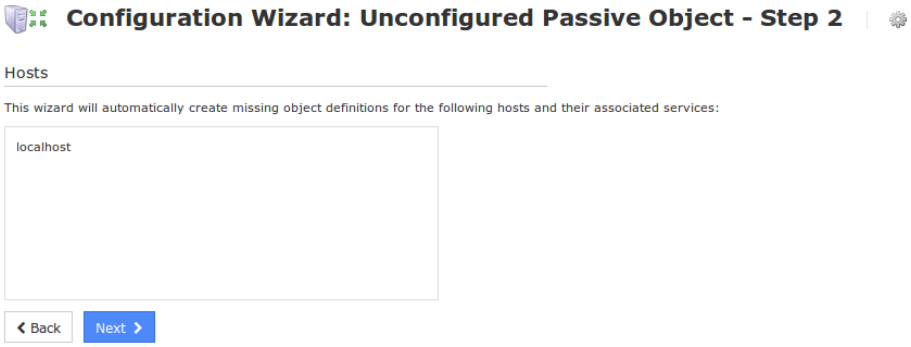
In the Nagios XI web interface, navigate to **Admin** > **Monitoring Config** > **Unconfigured Objects**.



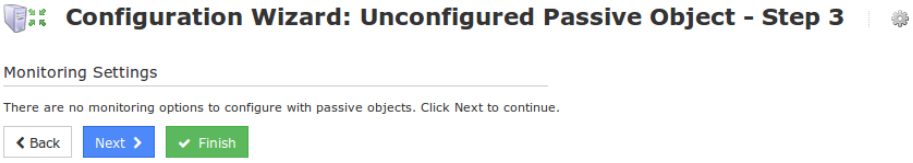
These are results from passive checks that do not have an associated service check in Nagios XI. To turn these check results into a service, click the blue arrow under Actions.

When the Unconfigured Passive Object wizard starts, you will be presented with a screen like the one to the right.

Click Next.



On the next step, there are no monitoring options, just click Next.



Run through the wizard selecting your preferred settings such as notifications, groups, parents. Finish the wizard and you will now have a service set up in Nagios for your Bischeck results. When the configuration is successfully applied, click the **View status details for localhost** link which should look like this screenshot.

Host	Service	Status	Duration	Attempt	Last Check	Status Information
localhost	Current Load	Ok	5h 30m 43s	1/4	2017-02-09 16:24:01	OK - load average: 1.48, 2.82, 2.16
	Current Users	Ok	5h 30m 22s	1/4	2017-02-09 16:24:14	USERS OK - 1 users currently logged in
	HTTP	Ok	5h 30m 0s	1/4	2017-02-09 16:24:40	HTTP OK: HTTP/1.1 200 OK - 3270 bytes in 0.001 second response time
	PING	Ok	5h 29m 39s	1/4	2017-02-09 16:25:04	PING OK - Packet loss = 0%, RTA = 0.03 ms
	root	Ok	6m 53s	1/1	2017-02-09 16:27:08	OK used = 29 (34 < 34 < W < 34 < C <)
	Root Partition	Ok	5h 29m 17s	1/4	2017-02-09 16:25:32	DISK OK - free space: / 7997 MB (71% inode=96%):
	Service Status - crond	Ok	5h 28m 35s	1/4	2017-02-09 16:23:51	crond (pid 3485) is running...
	Service Status - httpd	Ok	5h 23m 10s	1/4	2017-02-09 16:24:21	httpd (pid 3472) is running...
	Service Status - mysqld	Ok	5h 23m 48s	1/4	2017-02-09 16:23:36	mysqld (pid 3399) is running...
	Service Status - ndo2db	Ok	5h 20m 43s	1/4	2017-02-09 16:26:50	ndo2db (pid 3575) is running...
	Service Status - npcd	Ok	5h 20m 21s	1/4	2017-02-09 16:27:10	NPCD running (pid 3529).
	Service Status - ntpd	Ok	5h 20m 0s	1/4	2017-02-09 16:22:31	ntpd (pid 3276) is running...
	SSH	Ok	5h 28m 56s	1/4	2017-02-09 16:25:54	SSH OK - OpenSSH_4.3 (protocol 2.0)
	Swap Usage	Ok	5h 19m 38s	1/4	2017-02-09 16:22:52	SWAP OK - 100% free (4031 MB out of 4031 MB)
	Total Processes	Ok	5h 19m 17s	1/4	2017-02-09 16:23:13	PROCS OK: 42 processes with STATE = RSZDT

That's it, you now have Bischeck up and running.

Additional Information

The Bischeck project site can be found here:

http://www.bischeck.org/

The Bischeck installation and configuration pages can be viewed below:

http://www.bischeck.org/wp-content/uploads/2014/06/Bischeck_installation_and_administration_guide.html

http://www.bischeck.org/wp-content/uploads/2014/06/Bischeck_configuration_guide.html

Finishing Up

This completes the documentation on integrating the Bischeck Plugin Extension with 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