

The Industry Standard in IT Infrastructure Monitoring

Purpose

This document describes how to fully utilize the Nagios Business Process Intelligence (or BPI) component for Nagios XI. This document contains the following instructions:

- BPI Overview
- Installation and Setup for Nagios XI
- The BPI User Interface
- BPI Permissions Summary
- Understanding the BPI Group Logic
- Service Checks for BPI Groups
- Manual configuration, XML Output, and Troubleshooting

Target Audience

This document is intended for use by and Nagios XI Administrators who wish to create “Business Processes” out of hosts and services in their monitoring environments.

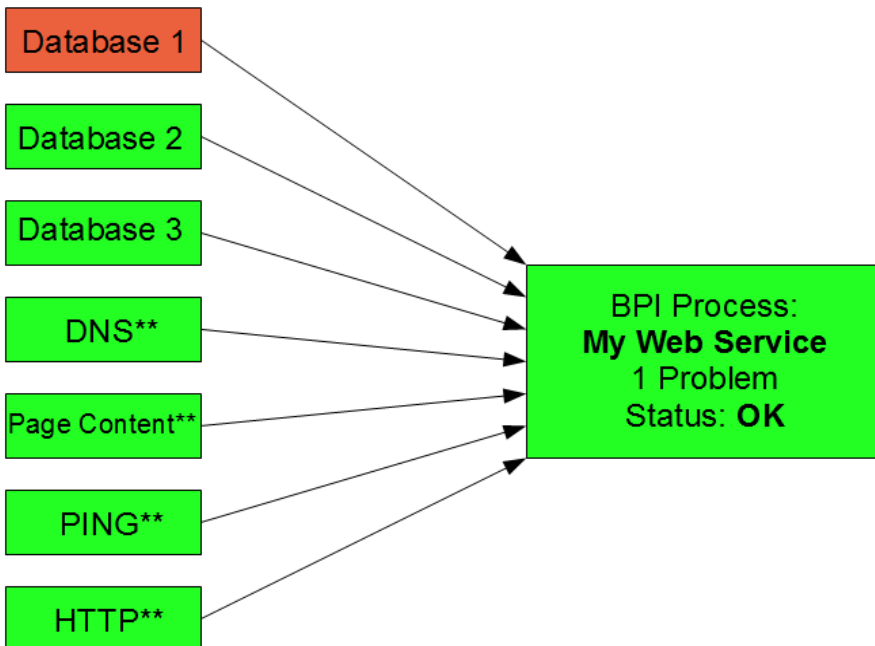
BPI Overview

Nagios BPI was created as a way to visualize business process health by grouping hosts and services together, and creating rules to discern the true health of the network infrastructure as it relates to the business. An admin can define rules for each BPI group, and monitor the health of the group's state based on what has been defined. This concept is illustrated below:

For this particular business process, a redundant database solution is being used for a web service. If the one of the 3 database servers goes down, there are two more servers in place to act as failover solutions. Even though the first server is in a critical state, the actual business process of the web service is still in an OK state because all services required for it to run correctly are still in place.

However, if DNS Resolution, Page Content, PING, or HTTP were to stop working for this process, the end user would not be able to utilize the web service. Therefore we call these services “*Essential Members*” for this business process, and if any of them failed, the business process would be in a critical state. In Nagios BPI, *Essential Members* are denoted with **.

Thresholds can also be set for a group's health percentage. If a “*Warning Threshold*” of 80% was set for this group, a warning alert would be generated if 2 of the databases were down, even though the business process is still working correctly. The rules for the BPI Group state logic are defined below in the section **Understanding the BPI Group Logic**.



Installation and Setup for Nagios XI

The Nagios BPI Component, along with with a tutorial video, can be downloaded from the following location:
<http://exchange.nagios.org/directory/Addons/Components/Nagios-Business-Process-Intelligence-%28BPI%29/details>

IMPORTANT NOTE: If you've used a previous version of Nagios BPI, you will either need to update or recreate your existing BPI groups, as some of the configuration settings have changed in Nagios BPI 2.x.

After downloading the component, Nagios BPI can be installed through Nagios XI's Admin->Manage Components page. Once the component is uploaded successfully, there are a few configuration settings that will be to be put in place. Access the **Nagios BPI** entry in from the list of components, and click the **Edit Setting** icon.

Nagios BPI Advanced grouping and dependency tool for viewing business processes. Can be used for specialized checks. Version: 2.0 EE Author: Mike Guthrie, Nagios Enterprises, LLC	User		
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All of the default settings should be fine for most installations. The one setting to review is the **Logic Handling For Problem States**. If this box is checked, Nagios BPI will ignore any problems states that are either "Acknowledged" or in "Scheduled Downtime."

Once the desired settings are in place, click **Apply Settings**.

The BPI interface can now be accessed from the **Home->Nagios BPI** menu item.

Nagios BPI

Nagios BPI Settings

BPI Group Configuration File:	<input type="text" value="/usr/local/nagiosxi/etc/components/bpi.conf"/> The directory location of your bpi.conf file.
BPI Group Backup Configuration File:	<input type="text" value="/usr/local/nagiosxi/etc/components/bpi.conf.bac"/> The directory location of your bpi.conf.backup file.
BPI Log File:	<input type="text" value="/usr/local/nagiosxi/var/components/bpi.log"/> The directory location of your bpi.log file.
BPI XML Cache:	<input type="text" value="/usr/local/nagiosxi/var/components/bpi.xml"/> The directory location of your bpi.xml file. This file is used to cache check results for BPI service checks and to decrease CPU usage from BPI checks.
XML Cache Threshold:	<input type="text" value="90"/> This is the age limit for cached BPI check result data. If a BPI service check detects this file as being too old, it will recalculate the status of all BPI groups and cache to the XML file.
Logic Handling For Problem States	<input checked="" type="checkbox"/> Ignore host and service problems that are acknowledged or in scheduled downtime. "Handled" problems will not be factored into the group's problem percentage.

The BPI User Interface

The interface of BPI is broken down by group categories. Each BPI group can be assigned a priority, and as of BPI 2.0, BPI groups can automatically be generated from hostgroups or servicegroups. Groups can be expanded to see each of it's members, along with their status. Groups can also be members of other groups, so a business process can consist of many groups and can be many levels deep if necessary.

Nagios Business Process Intelligence

Business Process Categories

High Priority
Medium Priority
Low Priority
Hostgroups
Servicegroups
Create New BPI Group

Last Update: Thu Dec 01 2011 15:12:19 GMT-0600 (Central Standard Time)
 Essential group members are denoted with: **
 Handled problems are denoted with: ✓

Ok	▼ Local Services	URL	Group health is 75.00% with 1 problem(s)	Example BPI Group	Edit	Delete
Ok	localhost	Current Load	OK - load average: 1.19, 1.71, 1.95			
Ok	localhost	Current Users	USERS OK - 1 users currently logged in			
Warning	localhost	HTTP	HTTP WARNING: HTTP/1.1 403 Forbidden			
Ok**	localhost	PING	PING OK - Packet loss = 0%, RTA = 0.03 ms			
Critical	▶ Test Group		Group health is below critical threshold of 80%! Health is 73.91% with 12 problem(s).	asdfsadf	Edit	Delete
Ok	▶ Test Group 2		Group health is 95.45% with 1 problem(s)	Another Test for the demo	Edit	Delete

Group members can also be sorted by their problem "weight" by clicking the sort icon.

Warning			▼ akooankoaanslo			Essential member "192.168.5.42 : Port-3-Gigabit-Ethernet Status" is in a problem state! Group health		
Down	192.168.5.32	check_icmp	Failed to resolve 192.168.5.999					
Down	192.168.5.40	CRITICAL - 192.168.5.40: Host unreachable @ 192.168.5.59. rta nan, lost 100%						
Down**	192.168.5.42	CRITICAL - 192.168.5.42: Host unreachable @ 192.168.5.59. rta nan, lost 100%						
Critical	192.168.5.40	Ping	CRITICAL - 192.168.5.40: Host unreachable @ 192.168.5.59. rta nan, lost 100%					
Critical	192.168.5.42	Ping	CRITICAL - 192.168.5.42: Host unreachable @ 192.168.5.59. rta nan, lost 100%					
Critical	192.168.5.43	Port 3 Status	CRITICAL: Interface Port: 3 Gigabit - Level (index 3) is down.					
Unknown	192.168.5.32	Ping	check_icmp: Failed to resolve 192.168.5.999					
Warning	192.168.5.42	Port-1-Gigabit-Ethernet Status	WARNING: SNMP error: No response from remote host '192.168.5.42'					
Warning	192.168.5.42	Port-2-Gigabit-Ethernet Status	WARNING: SNMP error: No response from remote host '192.168.5.42'					
Warning**	192.168.5.42	Port-3-Gigabit-Ethernet Status	WARNING: SNMP error: No response from remote host '192.168.5.42'					
Warning	192.168.5.42	Port-5-Gigabit-Ethernet Status	WARNING: SNMP error: No response from remote host '192.168.5.42'					
Warning	192.168.5.42	Port-6-Gigabit-Ethernet Status	WARNING: SNMP error: No response from remote host '192.168.5.42'					
Warning	192.168.5.42	Port-7-Gigabit-Ethernet Status	WARNING: SNMP error: No response from remote host '192.168.5.42'					
Up	192.168.5.11	OK	192.168.5.11: rta 0.785ms, lost 0%					

Hostgroups and Servicegroups can be automatically generated or synced by selecting the **Sync Hostgroups** or **Sync Servicegroups** link.

Business Process Categories

[High Priority](#)
[Medium Priority](#)
[Low Priority](#)
[Hostgroups](#)
[Servicegroups](#)
[Create New BPI Group](#)

Last Update: Thu Dec 01 2011 15:27:51 GMT-0600 (Central Standard Time)
 Essential group members are denoted with: **
 Handled problems are denoted with:

Sync Hostgroups

Ok	▶ HG: TestGroup	Group health is 84.62% with 2 problem(s)	Edit Delete
Ok	▶ HG: linux-servers	Group health is 77.78% with 4 problem(s)	Edit Delete
Ok	▶ HG: BPI Demo Hostgroup	Group health is 77.97% with 13 problem(s)	Edit Delete
Ok	▶ HG: newGroup	Group health is 65.00% with 7 problem(s)	Edit Delete

New BPI Groups can be created by selecting the **Create new BPI Group** tab. Each group property on this page can be explained in detail by clicking the help icon next to the form field. These properties are outlined below:

**Required*

***Group ID:** The Group ID is a unique identifier used internally by Nagios BPI and the check plugin. Only alpha-numeric characters are allowed. Spaces are not allowed.

***Display Name:** The group name that will be displayed to the end-user in the BPI Interface.

Group Description: [optional] A text description of the group.

Info URL: [optional] A web url for the group.

Primary Group: Primary Groups are visible on the top level of the tree. Non-primary groups must be added as a child member to a visible group in order to be displayed in the tree.

Warning Threshold: If the health percentage of the group drops below the Warning Threshold, the group state changes to "Warning."

Critical Threshold: If the health percentage of the group drops below the Critical Threshold, the group state changes to "Critical." Must be a lower number than the Warning Threshold.

Authorized Users: A list of non-administrative users who can view this group. Non-administrative users will only see hosts and services within the groups that they are authorized for, and the group state will be calculated based on the "visible" group members. Admin-level users can automatically see and modify all groups.

***Group Members:** Group Members can be hosts, services, or other groups. "Essential" members can decide the entire group's state. If an essential member's state is in a problem state the parent group is listed as "Critical." If all essential members are in a non-problem state, the group's state is then determined by the threshold settings.

BPI Permissions Summary

Versions of Nagios BPI earlier than 2.0 had no distinction of permissions for users. Users could view all groups and all of its members, regardless of whether or not they were a contact for it. As of version 2.0, only Nagios XI admins can add, edit, or remove groups, and each group can have a list of authorized “read-only” users. This was done to allow for multi-tenancy use with Nagios BPI. Now non-admin users will only be able to view groups that they are specifically authorized for in the group definition. If a group has hosts or services in it that a read-only user is not authorized to see, the member will be ignored for that user and will not be calculated for the group's state, nor will it be visible in the user interface.

Important Note: Service checks that for BPI groups calculate the group state based on **all defined members** in the group, as seen by an Admin-level user. It is important in multi-tenancy situations to define BPI groups and service checks in accordance with what the tenant user can actually see. If a user views a BPI group and some of its members are being hidden from view, these members will be noted in the **bpi.log** file that is defined in the Admin->Manage Components->BPI Settings page.

Understanding the BPI Group Logic

The Nagios BPI groups can be a flexible tool for determining a “real” network state for a group of services. Dependencies are highly customizable, and the logic for determining a group state can be defined by the user. The logic for determining group states has changed from BPI 1.x to version 2.x.

Factors that create a 'Warning' or 'Critical' state

- **Any** “Essential members” are in a problem state
- The group's health percentage drops below the **Warning Threshold**
- The group's health percentage drops below the **Critical Threshold**

A Basic BPI Group

This is a basic group with 5 members. The group has a *warning threshold* of 60%, and a *critical threshold* of 70%. Even though the group has one member in a Warning state, the group state is still 'Ok' because the health percentage is at 75%.

Ok	Local Services	URL	Group health is 75.00% with 1 problem(s)	Example BPI Group	Edit	Delete
Ok	localhost	Current Load	OK - load average: 0.88, 2.09, 2.44			
Ok	localhost	Current Users	USERS OK - 0 users currently logged in			
Warning	localhost	HTTP	HTTP WARNING: HTTP/1.1 403 Forbidden			
Ok**	localhost	PING	PING OK - Packet loss = 0%, RTA = 0.03 ms			

A Group Using Essential Members

This group has one *Essential Member* defined, which is denoted with a "***" next to its state. If an essential member has a problem, the entire group will be in a problem state, even though the thresholds have not been exceeded, and there is only one problem.

Ok	More Local Services	URL	Group health is 100.00% with 0 problem(s)	Demo Group 2	Edit	Delete
Ok**	localhost	Root Partition	DISK OK - free space: / 3435 MB (49% inode=94%):			
Ok	localhost	SSH	SSH OK - OpenSSH_4.3 (protocol 2.0)			
Ok	localhost	Swap Usage	SWAP OK - 100% free (511 MB out of 511 MB)			
Ok	localhost	Total Processes	PROCS OK: 62 processes with STATE = RSZDT			
Ok	Local Services	URL	Group health is 75.00% with 1 problem(s)	Example BPI Group	Edit	Delete

Complex BPI Groups

The BPI groups determine state by looking down only one level. The BPI group will essentially look for the worst state trigger in the group, so if the warning threshold is exceeded for a group, but an essential member is “critical”, the group will still be “critical”. There is no limit to the number of sub groups that can be created, you can define as many levels in your dependency tree as you want.

Warning	asdfsadfsadfsadf	URL	Group health is below warning threshold of 90% Health is 80.00% with 1 problems		Edit	Delete
Ok	Local Services	URL	Group health is 75.00% with 1 problem(s)	Example BPI Group	Edit	Delete
Ok	More Local Services	URL	Group health is 100.00% with 0 problem(s)	Demo Group 2	Edit	Delete
Ok**	localhost	Root Partition	DISK OK - free space: / 3434 MB (49% inode=94%):			
Ok	localhost	SSH	SSH OK - OpenSSH_4.3 (protocol 2.0)			
Ok	localhost	Swap Usage	SWAP OK - 100% free (511 MB out of 511 MB)			
Ok	localhost	Total Processes	PROCS OK: 62 processes with STATE = RSZDT			
Ok	Local Services	URL	Group health is 75.00% with 1 problem(s)	Example BPI Group	Edit	Delete
Ok	localhost	Current Load	OK - load average: 0.95, 1.76, 2.22			
Ok	localhost	Current Users	USERS OK - 0 users currently logged in			
Warning	localhost	HTTP	HTTP WARNING: HTTP/1.1 403 Forbidden			
Ok**	localhost	PING	PING OK - Packet loss = 0%, RTA = 0.03 ms			
Ok	HG: TestGroup		Group health is 84.62% with 2 problem(s)		Edit	Delete
Ok	HG: linux-servers		Group health is 77.78% with 4 problem(s)		Edit	Delete
Critical	Test Group		Group health is below critical threshold of 80%! Health is 73.91% with 12 problem(s).	asdfsadf	Edit	Delete

Service Checks for BPI Groups

To create service checks for the Nagios BPI groups, download the [BPI Wizard](#) from Nagios Exchange and install the zip through the Admin->Manage Config Wizards page.

The wizard will automatically populate your list of BPI groups that you can run checks against, and group states will be determined by the same logic and thresholds used in the BPI user interface.

BPI Wizard Monitoring Wizard - Step 3

Group ID	Display Name	Selected
localServices1	Local Services	<input type="checkbox"/>
localServices2	More Local Services	<input checked="" type="checkbox"/>
TestGroup	Test Group	<input checked="" type="checkbox"/>
group2	Test Group 2	<input type="checkbox"/>

Manual Configuration, XML Output, and Troubleshooting

bpi.conf

All BPI group definitions are defined in a single configuration file **bpi.conf**. Nagios BPI does allow for manual configuration of this file, although the config editor through the web interface ensures the proper syntax. In the event of a bad configuration, Nagios BPI will open a text editor in the web interface for Admin users to troubleshoot the error. A custom location for the **bpi.conf** file can be used, but the permissions of both that file and the **bpi.conf.backup** must be:

```
-rwxrwxr-x 1 apache nagios
```

And can be set by running:

```
chmod 775 /path/to/bpi.conf*  
chown apache.nagios /path/to/bpi.conf*
```

bpi.log

For administrative users, Nagios BPI will dump error output to the browser, and will generate links to fix the configuration issues. For read-only user, the errors will be suppressed and sent to the **bpi.log** file. The location of which is specified in the BPI Options in the **Admin->Manage Components** page.

bpi.xml

When service checks are run, the first time a BPI service check is run the BPI Group states are dumped to the **bpi.xml** file. After that the service checks check the file age of the XML file, and if the age threshold is exceeded, a new file will be made. Otherwise, the check plugin will use the cached results in the XML file. This file can also be used as a data API for use with external applications.