Red Hat Insights 2022

Monitoring and Reacting to Configuration Changes Using Policies

How to create policies to detect inventory configuration changes and send email notifications
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Red Hat Customer Content Services
Abstract

This document provides an overview of the Policies service and explains how to create a policy to detect system configuration changes and be notified by email.
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MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see our CTO Chris Wright’s message.
PROVIDING FEEDBACK ON RED HAT HYBRID CLOUD CONSOLE DOCUMENTATION

We appreciate your input on our documentation. Please let us know how we could make it better. To do so, create a Bugzilla ticket:

1. Go to the Bugzilla website.
2. As the Component, use Documentation.
3. Fill in the Description field with your suggestion for improvement. Include a link to the relevant part(s) of documentation.
4. Click Submit Bug.
CHAPTER 1. RECEIVING AUTOMATIC NOTIFICATIONS FROM POLICIES ABOUT CHANGES IN YOUR INSIGHTS FOR RHEL INVENTORY

Policies service users can set notification preferences that notify the user of changes to systems or potential security issues.

1.1. POLICIES DETECTION AND NOTIFICATION OF INVENTORY CONFIGURATION CHANGES

Policies you create are applicable to all systems in your Insights for RHEL inventory. You can create and manage policies using the Insights for RHEL user interface or via API.

Policies can assist you by managing tasks such as:

- Raising an alert when particular conditions occur in your system configuration.
- Emailing a team when security packages are out of date on a system.

Using policies to monitor configuration changes in your inventory and notifying by email requires:

- Setting user email preferences (if not already set).
- Creating a policy to detect configuration changes as a trigger and selecting email as the trigger action.

NOTE

- See User Access Configuration Guide for Role-based Access Control (RBAC) for more information about this feature and example use cases.
CHAPTER 2. USER PREFERENCES

Update your information and set email preferences for Red Hat Hybrid Cloud Console services in your user preferences.

2.1. SETTING USER PREFERENCES

You can set or update your email preferences as follows.

Procedure

1. Click the user menu located on the upper-right side, then go to: User preferences > Notifications > Red Hat Enterprise Linux https://console.redhat.com/user-preferences/email. Check the appropriate boxes to define your policies notification preferences.

2. Depending on your email notification preferences, you can subscribe to Instant notification emails for each system with triggered policies or a Daily digest summarizing triggered application events in a 24-hour time frame.

NOTE

Subscribing to instant notification can result in receiving many emails on large inventories, that is, one email per system checking in.

3. Click Submit.
CHAPTER 3. CREATING POLICIES

The following workflow examples explain how to create several types of policies that detect system configuration changes and send notification of the changes by email.

NOTE
When creating a policy, if you see a warning message that you have not opted in for email alerts, set your preferences to receive email from your policies. See Chapter 2, User preferences, for information.

3.1. CREATING A POLICY TO ENSURE PUBLIC CLOUD PROVIDERS ARE NOT OVER PROVISIONED

Procedure

1. In Red Hat Hybrid Cloud Console, go to Red Hat Enterprise Linux > Policies.

2. Click Create policy.

3. On the Create a policy page, click From scratch or As a copy of existing Policy as required. Note that the As a copy of existing Policy option will prompt you to select a policy from the list of existing policies to use as a starting point.

4. Click Next.

5. Enter Condition. In this case, enter: facts.cloud_provider in ['alibaba', 'aws', 'azure', 'google'] and (facts.number_of_cpus >= 8 or facts.number_of_sockets >=2). This condition will detect if an instance running on the specified public cloud providers are running with CPU hardware higher than the allowed limit.

NOTE
You can expand What condition can I define? and/or Review available system facts to view an explanation of conditions you can use, and see the available system facts, respectively. In this section are examples of syntax you can use.

6. Click Validate condition.

7. Once the condition is validated, click Next.

8. On the Trigger actions page, click Add trigger actions. If notifications is greyed out, select Notification settings in the notifications box. Here you can customize notifications and their behaviors.

9. Click Next.

NOTE
On the Trigger actions page, you can also enable email alerts as well as open email preferences.
10. On the Review and enable page, click the toggle switch to activate the policy and review its details.

11. Click Finish.

Your new policy is created. When the policy is evaluated on a system check-in, if the condition in the policy is met, Policies automatically sends an email to all users on the account with access to Policies, depending on their email preferences.

3.2. CREATING A POLICY TO DETECT IF SYSTEMS ARE RUNNING AN OUTDATED VERSION OF RHEL

You can create a policy that detects if systems are running outdated versions of RHEL and notifies you by email about what it finds.

Procedure

1. In Red Hat Hybrid Cloud Console, go to Red Hat Enterprise Linux > Policies.

2. Click Create policy.

3. On the Create policy page, click From scratch or As a copy of existing Policy as required. Note that the As a copy of existing Policy option prompts you to select a policy from the list of existing policies to use as a starting point.

4. Click Next.

5. Enter a Name and Description for the policy.

6. Click Next.

7. Enter Condition. In this case, enter facts.os_release < 8.1 This condition will detect if systems still run an outdated version of our operating system based on RHEL 8.1.

8. Click Validate condition, then click Next.

9. On the Trigger actions page, click Add trigger actions and select Email.

10. Click Next.

11. On the Review and activate page, click the toggle switch to activate the policy and review its details.

12. Click Finish.

Your new policy is created. When the policy is evaluated on a system check-in, if the condition in the policy is triggered, the policies service automatically sends an email to all users on the account with access to Policies, depending on their email preferences.

3.3. CREATING A POLICY TO DETECT A VULNERABLE PACKAGE VERSION BASED ON RECENT CVE

You can create a policy that detects vulnerable package versions based on recent CVE and notifies you by email about what it finds.
Procedure

1. In Red Hat Hybrid Cloud Console, go to Red Hat Enterprise Linux > Policies.

2. Click Create policy.

3. On the Create Policy page, click From scratch or As a copy of existing Policy as required. Note that the As a copy of existing Policy option will prompt you to select a policy from the list of existing policies to use as a starting point.

4. Click Next.

5. Enter a Name and Description for the policy.

6. Click Next.

7. Enter Condition. In this case, enter facts.installed_packages contains ['openssh-4.5']. This condition will detect if systems still run a vulnerable version of an openssh package based on recent CVE.

8. Click Validate condition, then click Next.

9. On the Trigger actions page, click Add trigger actions and select Email.

10. Click Next.

11. On the Review and activate page, click the toggle switch to activate the policy and review its details.

12. Click Finish.

Your new policy is created. When the policy is evaluated on a system check-in, if the condition in the policy is met, Policies automatically sends an email to all users on the account with access to Policies, depending on their email preferences.
CHAPTER 4. REVIEWING AND MANAGING POLICIES

You can review and manage all created policies (enabled and disabled) by navigating to Red Hat Enterprise Linux > Policies.

You can filter the list of policies by name and by active state. You can click the options menu next to a policy to perform the following operations:

- Enable and disable
- Edit
- Duplicate
- Delete

Additionally, you can perform the following operations in bulk by selecting multiple policies from the list of policies and clicking the options menu located next to the Create policy button at the top:

- Delete policies
- Enable policies
- Disable policies

NOTE

If you see a warning message about email alerts not opted in, set your preferences to receive email from your policies as described in Chapter 2, User preferences.
CHAPTER 5. APPENDIX

This appendix contains the following reference materials:

- System Facts
- Operators

5.1. SYSTEM FACTS

Table 5.1. System Facts and Their Functions

<table>
<thead>
<tr>
<th>Fact Name</th>
<th>Description</th>
<th>Example Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>arch</td>
<td>System architecture</td>
<td>x86_64</td>
</tr>
<tr>
<td>bios_release_date</td>
<td>BIOS release date; typically MM/DD/YYYY</td>
<td>01/01/2011</td>
</tr>
<tr>
<td>bios_vendor</td>
<td>BIOS vendor name</td>
<td>LENOVO</td>
</tr>
<tr>
<td>bios_version</td>
<td>BIOS version</td>
<td>1.17.0</td>
</tr>
<tr>
<td>cloud_provider</td>
<td>Cloud vendor. Values are google, azure, aws, alibaba, or empty</td>
<td>google</td>
</tr>
<tr>
<td>cores_per_socket</td>
<td>Number of CPU cores per socket</td>
<td>2</td>
</tr>
<tr>
<td>cpu_flags</td>
<td>Category with a list of CPU flags. Each name is the CPU flag (ex: vmx), and the value is always enabled.</td>
<td>vmx, with a value of enabled.</td>
</tr>
<tr>
<td>enabled_services</td>
<td>Category with a list of enabled services. Each name in the category is the service name (ex: crond), and the value is always enabled.</td>
<td>crond, with a value of enabled.</td>
</tr>
<tr>
<td>fqdn</td>
<td>System Fully Qualified Domain Name</td>
<td>system1.example.com</td>
</tr>
<tr>
<td>infrastructure_type</td>
<td>System infrastructure; common values are virtual or physical</td>
<td>virtual</td>
</tr>
<tr>
<td>infrastructure_vendor</td>
<td>Infrastructure vendor; common values are kvm, vmware, baremetal, etc.</td>
<td>kvm</td>
</tr>
<tr>
<td>installed_packages</td>
<td>List of installed RPM packages. This is a category.</td>
<td>bash, with a value of 4.2.46-33.el7.x86_64.</td>
</tr>
<tr>
<td>Fact Name</td>
<td>Description</td>
<td>Example Value</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>installed_services</td>
<td>Category with a list of installed services. Each name in the category is the service name (ex: crond), and the value is always installed.</td>
<td>crond, with a value of installed.</td>
</tr>
<tr>
<td>kernel_modules</td>
<td>List of kernel modules. Each name in the category is the kernel module (ex: nfs), and the value is enabled.</td>
<td>nfs, with a value of enabled.</td>
</tr>
<tr>
<td>last_boot_time</td>
<td>The boot time in YYYY-MM-DDTHH:MM:SS format. Informational only; we do not compare boot times across systems.</td>
<td>2019-09-18T16:54:56</td>
</tr>
<tr>
<td>network_interfaces</td>
<td>List of facts related to network interfaces.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There are six facts for each interface: ipv6_addresses, ipv4_addresses, mac_address, mtu, state and type. The two address fields are comma-separated lists of IP addresses. The state field is either UP or DOWN. The type field is the interface type (ex: ether, loopback, bridge, etc.).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each interface (ex: lo, em1, etc) is prefixed to the fact name. For example, em1’s mac address would be the fact named em1.mac_address.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Most network interface facts are compared to ensure they are equal across systems. However, ipv4_addresses, ipv6_addresses, and mac_address are checked to ensure they are different across systems. A subexception for lo should always have the same IP and mac address on all systems.</td>
<td></td>
</tr>
<tr>
<td>number_of_cpus</td>
<td>Total number of CPUs</td>
<td>1</td>
</tr>
<tr>
<td>number_of_sockets</td>
<td>Total number of sockets</td>
<td>1</td>
</tr>
<tr>
<td>os_kernel_version</td>
<td>Kernel version</td>
<td>4.18.0</td>
</tr>
<tr>
<td>os_release</td>
<td>Kernel release</td>
<td>8.1</td>
</tr>
<tr>
<td>running_processes</td>
<td>List of running processes. The fact name is the name of the process, and the value is the instance count.</td>
<td>crond, with a value of 1.</td>
</tr>
<tr>
<td>sap_instance_number</td>
<td>SAP instance number</td>
<td>42</td>
</tr>
</tbody>
</table>
### Fact Name

<table>
<thead>
<tr>
<th>Fact Name</th>
<th>Description</th>
<th>Example Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>sap_sids</td>
<td>SAP system ID (SID)</td>
<td>A42</td>
</tr>
<tr>
<td>sap_system</td>
<td>Boolean field that indicates if SAP is installed on the system</td>
<td>True</td>
</tr>
<tr>
<td>sap_version</td>
<td>SAP version number</td>
<td>2.00.052.00.1599 235305</td>
</tr>
<tr>
<td>satellite_managed</td>
<td>Boolean field that indicates is a system is registered to a Satellite server.</td>
<td>FALSE</td>
</tr>
<tr>
<td>selinux_current_mode</td>
<td>Current SELinux mode</td>
<td>enforcing</td>
</tr>
<tr>
<td>selinux_config_file</td>
<td>SELinux mode set in the config file</td>
<td>enforcing</td>
</tr>
<tr>
<td>system_memory</td>
<td>Total system memory in human-readable form</td>
<td>3.45 GiB</td>
</tr>
<tr>
<td>tuned_profile</td>
<td>Current profile resulting from the command tuned-adm active</td>
<td>desktop</td>
</tr>
<tr>
<td>yum_repos</td>
<td>List of yum repositories. The repository name is added to the beginning of the fact. Each repository has the associated facts base_url, enabled, and gpgcheck.</td>
<td>Red Hat Enterprise Linux 7 Server (RPMs).base_url would have the value <a href="https://cdn.redhat.com/content/dist/rhel/server/7/$releasever/$basearch/os">https://cdn.redhat.com/content/dist/rhel/server/7/$releasever/$basearch/os</a></td>
</tr>
</tbody>
</table>

### 5.2. OPERATORS

Table 5.2. Available Operators in Conditions

<table>
<thead>
<tr>
<th>Operators</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical Operators</td>
<td>AND</td>
</tr>
<tr>
<td></td>
<td>OR</td>
</tr>
<tr>
<td>Boolean Operators</td>
<td>EQUAL</td>
</tr>
<tr>
<td></td>
<td>NOTEQUAL</td>
</tr>
<tr>
<td>Operators</td>
<td>Value</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Numeric Compare Operators</td>
<td>GT</td>
</tr>
<tr>
<td></td>
<td>GTE</td>
</tr>
<tr>
<td></td>
<td>LT</td>
</tr>
<tr>
<td></td>
<td>LTE</td>
</tr>
<tr>
<td>String Compare Operator</td>
<td>CONTAINS</td>
</tr>
<tr>
<td>Array Operators</td>
<td>IN</td>
</tr>
<tr>
<td></td>
<td>CONTAINS</td>
</tr>
<tr>
<td>Parser Operators</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>AND</td>
</tr>
<tr>
<td></td>
<td>NOT</td>
</tr>
<tr>
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<td>EQUAL</td>
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