White Paper

IT Infrastructure Management

Monitoring with SUSE Manager 4

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SUSE Manager 4 is a best-in-class, open source infrastructure management solution that lowers costs, enhances availability and reduces complexity for lifecycle management of Linux systems in large, complex and dynamic IT landscapes.

You can use SUSE Manager to configure, deploy and administer thousands of Linux systems running on hypervisors, as containers, on bare metal systems, IoT devices and third-party cloud platforms. SUSE Manager also enables you to easily monitor your entire deployment of systems, across locations.

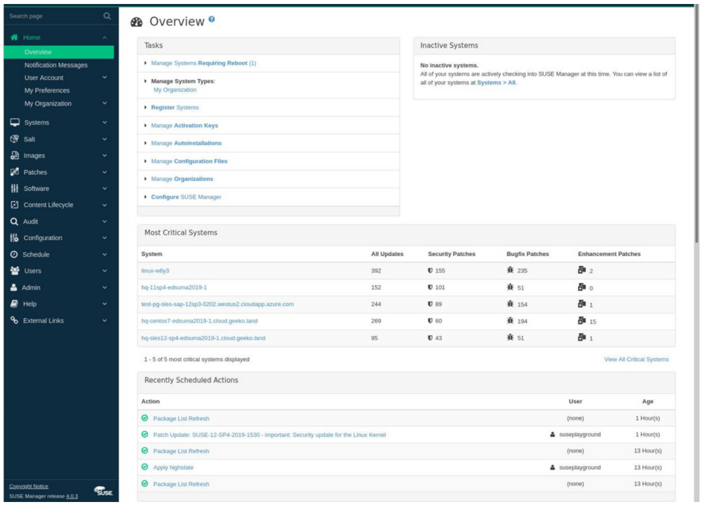
Why Monitor Your Systems?

One of a system administrator's most challenging tasks is keeping tabs on every system in the company. When a company's IT landscape is multi-tenant and multi-region, that task becomes exponentially more difficult. That's where a monitor becomes a must-have tool. With the right monitor, an administrator will always be on top of their systems.

SUSE Manager 4 includes very powerful monitoring options (which can be added for an additional fee), with the option to install two additional very powerful monitoring and visualization tools: **Prometheus** (for monitoring) and **Grafana** (for visualization). These tools add real-time monitoring capability to the SUSE Manager 4 system. In addition, you can monitor a number of other events and system states found within the SUSE Manager 4 framework.

Systems Overview

Some of the most basic monitoring is on the SUSE Manager 4 Overview page (Figure 1). Here you'll find a dashboard that gives you immediate access to information such as Tasks, Most Critical Systems, Recently Scheduled Actions, Relevant Security Patches, System Groups and Recently Registered Systems.



Overview

Tasks

- Manage Systems **Requiring Reboot** (1)
- **Manage System Types**: My Organization
- **Register** Systems
- Manage **Activation Keys**
- Manage **Autoinstallations**
- Manage **Configuration Files**
- Manage **Organizations**
- **Configure** SUSE Manager

Inactive Systems

No inactive systems.
All of your systems are actively checking into SUSE Manager at this time. You can view a list of all of your systems at **Systems > All**.

Most Critical Systems

System	All Updates	Security Patches	Bugfix Patches	Enhancement Patches
linux-w6y3	392	155	235	2
hq-11sp4-edsuma2019-1	152	101	51	0
test-pg-sles-sap-12sp3-0202.westus2.cloudapp.azure.com	244	89	154	1
hq-centos7-edsuma2019-1.cloud.geeko.land	269	60	194	15
hq-sles12-sp4-edsuma2019-1.cloud.geeko.land	95	43	51	1

1 - 5 of 5 most critical systems displayed

View All Critical Systems

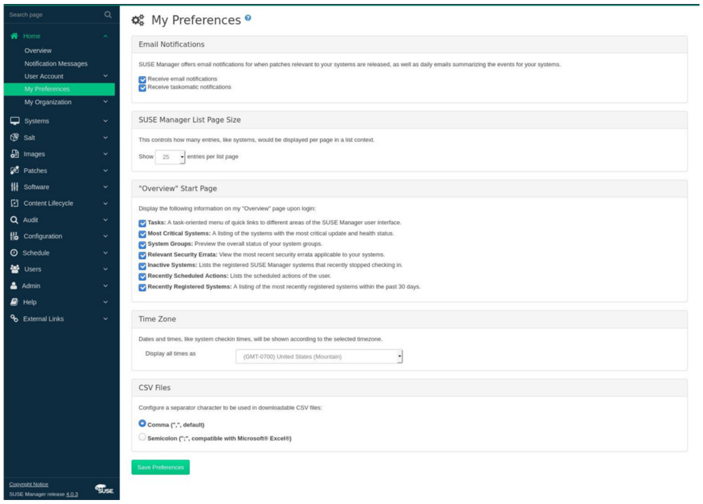
Recently Scheduled Actions

Action	User	Age
Package List Refresh	(none)	1 Hour(s)
Patch Update: SUSE-12-SP4-2019-1530 - important: Security update for the Linux Kernel	suseplayground	1 Hour(s)
Package List Refresh	(none)	13 Hour(s)
Apply highstate	suseplayground	13 Hour(s)
Package List Refresh	(none)	13 Hour(s)

Figure 1. *The SUSE Manager 4 Overview page.*

The Overview (or "Start") page should be one of the first pages that the SUSE Manager 4 administrator looks at. It is also possible to configure what you see on the Overview page. To do this, log into SUSE Manager 4 and go to Home | My Preferences. In this new window (Figure 2), you can enable/disable various options, such as receiving email/taskomatic notifications, Time Zone, CSV file data delineator, and other types of viewable information.

Set the SUSE Manager 4 Overview as your web browser's home page, and you'll always be on top of what's going on with your systems.



My Preferences

Email Notifications

SUSE Manager offers email notifications for when patches relevant to your systems are released, as well as daily emails summarizing the events for your systems.

☑ Receive email notifications
☑ Receive taskomatic notifications

SUSE Manager List Page Size

This controls how many entries, like systems, would be displayed per page in a list context.

Show 25 entries per list page

"Overview" Start Page

Display the following information on my "Overview" page upon login:

☑ **Tasks:** A task-oriented menu of quick links to different areas of the SUSE Manager user interface.
☑ **Most Critical Systems:** A listing of the systems with the most critical update and health status.
☑ **System Groups:** Preview the overall status of your system groups.
☑ **Relevant Security Errata:** View the most recent security errata applicable to your systems.
☑ **Inactive Systems:** Lists the registered SUSE Manager systems that recently stopped checking in.
☑ **Recently Scheduled Actions:** Lists the scheduled actions of the user.
☑ **Recently Registered Systems:** A listing of the most recently registered systems within the past 30 days.

Time Zone

Dates and times, like system checkin times, will be shown according to the selected timezone.

Display all times as (GMT-0700) United States (Mountain)

CSV Files

Configure a separator character to be used in downloadable CSV files:

● **Comma (",", default)**
○ **Semicolon (";", compatible with Microsoft® Excel®)**

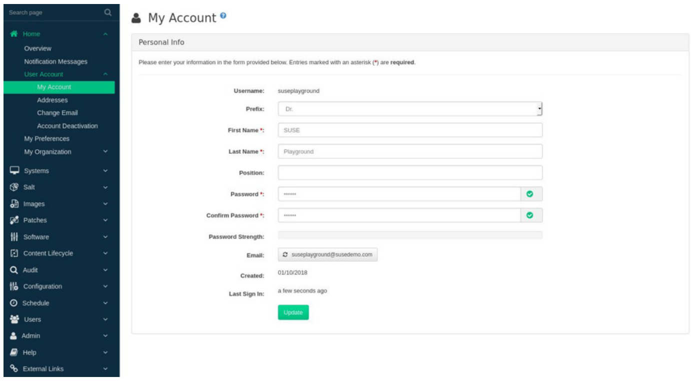
Figure 2. *The Overview configuration options page.*

Patch and Event Alerts

Alerts are one of the first lines of defense with SUSE Manager 4. You can configure alerts to be sent to a specific email address, so you will always be in the know when patches that are relevant to your systems are released. You will also receive daily emails that summarize a number of events that have occurred on your systems.

Knowing when patches are available is crucial to keeping your systems up to date. This is especially true when security patches are ready. When a vulnerability is discovered, you don't want to hold off on patching affected systems; otherwise, they could be compromised.

The first thing you'll want to do is configure an email address to which those alerts are sent. To do this, log into SUSE Manager 4 and go to Home | User Account | My Account. In the resulting window (Figure 3), configure the email address to be used.



My Account

Personal Info

Please enter your information in the form provided below. Entries marked with an asterisk (*) are **required**.

Username: suseplayground
Prefix: Dr.
First Name *: SUSE
Last Name *: Playground
Position:
Password *: ••••••
Confirm Password *: ••••••
Password Strength:
Email: suseplayground@susedemo.com
Created: 01/10/2018
Last Sign In: a few seconds ago

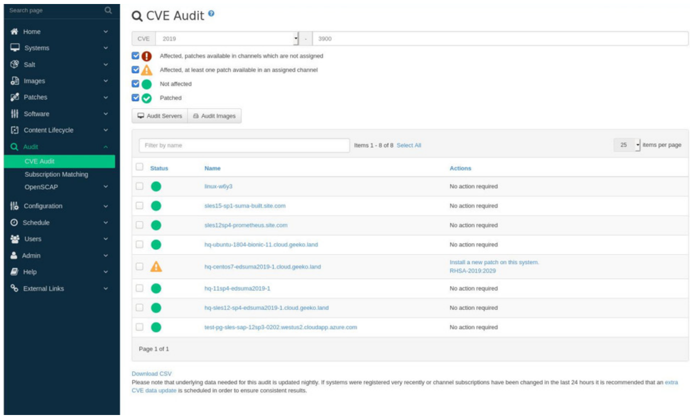
Figure 3. *Configuring the email to be used for alerts.*

Once you have configured this email address, ensure that you have access to incoming email on desktop, laptop and mobile devices. As a busy administrator, you want to have 24/7 access to those alerts, no matter where you are.

CVE Scans

One form of monitoring that should be at the top of your list is running Common Vulnerability and Exposure (CVE) scans. This will scan all of your servers and images for CVE issues and report whether any of them are affected.

In order for this to be effective, make sure that you are up on your CVE vulnerabilities. You can get the latest vulnerabilities from the **Published SUSE Security Advisories** or **Linux Kernel CVEs**. Wherever you get your information about CVEs, you will need to know the CVE number for a particular vulnerability. With that number in hand, log into your SUSE Manager 4 instance and go to Audit | CVE Audit. In the resulting window (Figure 4), select the date of the CVE from the drop-down and then enter the CVE number in the text area to the right. Click the Audit Servers button to scan your systems or click Audit Images to scan the images used to deploy systems.



CVE Audit

CVE 2019 - 3900

☑ Affected, patches available in channels which are not assigned
☑ Affected, at least one patch available in an assigned channel
☑ Not affected
☑ Patched

Filter by name | Items 1 - 8 of 8 | 25 items per page

Status	Name	Actions
●	linux-w6y3	No action required
●	sles15-sp1-suma-built.site.com	No action required
●	sles12sp4-prometheus.site.com	No action required
●	hq-ubuntu-1804-bionic-11.cloud.geeko.land	No action required
⚠	hq-centos7-edsuma2019-1.cloud.geeko.land	Install a new patch on this system. RHSA-2019:2029
●	hq-11sp4-edsuma2019-1	No action required
●	hq-sles12-sp4-edsuma2019-1.cloud.geeko.land	No action required
●	test-pg-sles-sap-12sp3-0202.westus2.cloudapp.azure.com	No action required

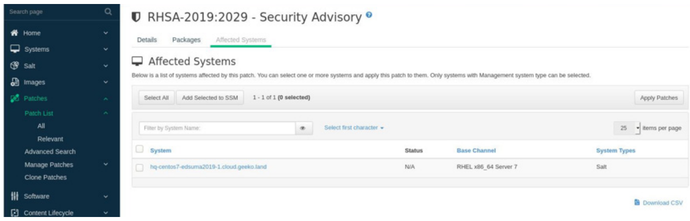
Page 1 of 1

Please note that underlying data needed for this audit is updated nightly. If systems were registered very recently or channel subscriptions have been changed in the last 24 hours it is recommended that an extra CVE data update is scheduled in order to ensure consistent results.

Figure 4. *Scanning for known CVE vulnerabilities.*

If any CVE issues are found in any of your deployed servers, they will be listed in the window's main pane. You'll see either No action required or a warning to install a specific patch on the affected system. Click the patch number listed, select the affected system (Figure 5) and click Apply Patches.

And that's all there is to monitoring for and patching specific CVE vulnerabilities.



RHSA-2019:2029 - Security Advisory

Affected Systems

Below is a list of systems affected by this patch. You can select one or more systems and apply this patch to them. Only systems with Management system type can be selected.

1 - 1 of 1 **(0 selected)**

Filter by System Name: | 25 items per page

System	Status	Base Channel	System Types
hq-centos7-edsuma2019-1.cloud.geeko.land	N/A	RHEL x86_64 Server 7	Salt

Figure 5. *Applying a patch to a specific system.*

Prometheus

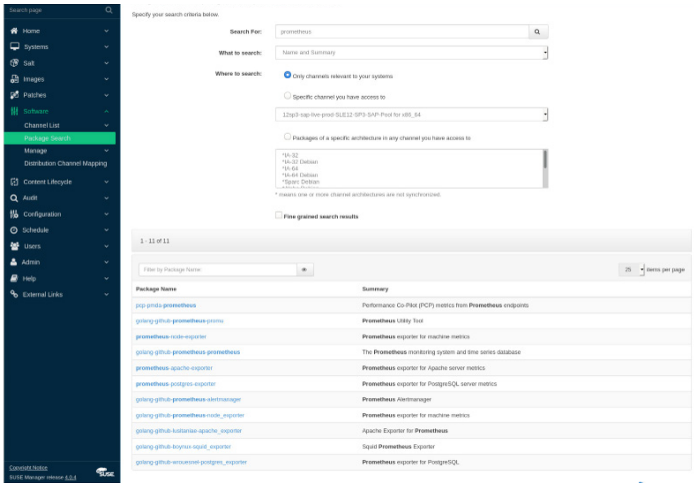
You can monitor your SUSE Manager 4 environment using Prometheus. SUSE Manager Server and Proxy are able to provide self-health metrics. Server and Proxy can also install and manage a number of Prometheus exporters on Salt clients.

Prometheus is an open source monitoring tool used to record real-time metrics in such a way that allows for higher performance and scalability. Prometheus fetches metrics using a pull mechanism, so the server must be able to establish network communications to monitored clients. Clients must have an open port and be reachable on the network.

In order to take advantage of Prometheus, you must first install it. Prometheus can be installed on any SLES instances with the command:

```
zypper in golang-github-prometheus-prometheus
```

Prometheus can also be installed via the SUSE Manager 4 GUI (Figure 6).



Specify your search criteria below.

Search For: prometheus
What to search: Name and Summary
Where to search: ● Only channels relevant to your systems
○ Specific channel you have access to
12sp3-sap-live-prod-SLE12-SP3-SAP-Pool for x86_64
○ Packages of a specific architecture in any channel you have access to
*IA-32
*IA-32 Debian
*IA-64
*IA-64 Debian
*Sparc Debian
* means one or more channel architectures are not synchronized.
□ **Fine grained search results**

1 - 11 of 11

Filter by Package Name | 25 items per page

Package Name	Summary
pcp-pmda-**prometheus**	Performance Co-Pilot (PCP) metrics from **Prometheus** endpoints
golang-github-**prometheus**-promu	**Prometheus** Utility Tool
prometheus-node-exporter	**Prometheus** exporter for machine metrics
golang-github-**prometheus-prometheus**	The **Prometheus** monitoring system and time series database
prometheus-apache-exporter	**Prometheus** exporter for Apache server metrics
prometheus-postgres-exporter	**Prometheus** exporter for PostgreSQL server metrics
golang-github-**prometheus**-alertmanager	**Prometheus** Alertmanager
golang-github-**prometheus**-node_exporter	**Prometheus** exporter for machine metrics
golang-github-lusitaniae-apache_exporter	Apache Exporter for **Prometheus**
golang-github-boynux-squid_exporter	Squid **Prometheus** Exporter
golang-github-wrouesnel-postgres_exporter	**Prometheus** exporter for PostgreSQL

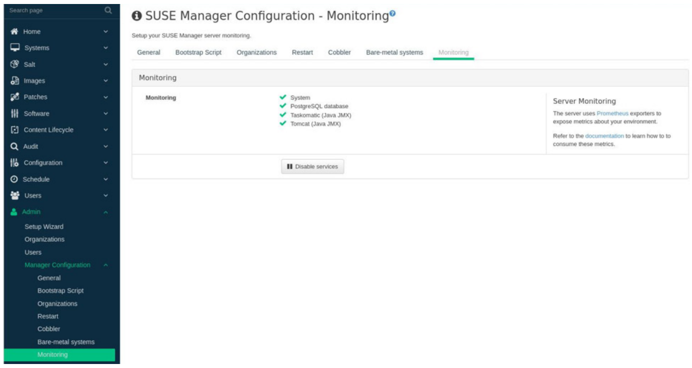
Figure 6. *Installing Prometheus via the SUSE Manager GUI.*

By installing Prometheus via the SUSE Manager GUI, you are able to create a formula to deploy a particular Prometheus package to any system.

Once installed, you must enable the service with the command:

```
systemctl enable --now prometheus
```

Once installed and enabled, you are ready to configure and enable Prometheus-based self-monitoring within SUSE Manager 4. Log into SUSE Manager and go to Admin | Manager Configuration | Monitoring. Click Enable services (Figure 7) and wait for the services to be enabled.



SUSE Manager Configuration - Monitoring

Setup your SUSE Manager server monitoring.

Monitoring

Monitoring
✓ System
✓ PostgreSQL database
✓ Taskomatic (Java JMX)
✓ Tomcat (Java JMX)

Server Monitoring

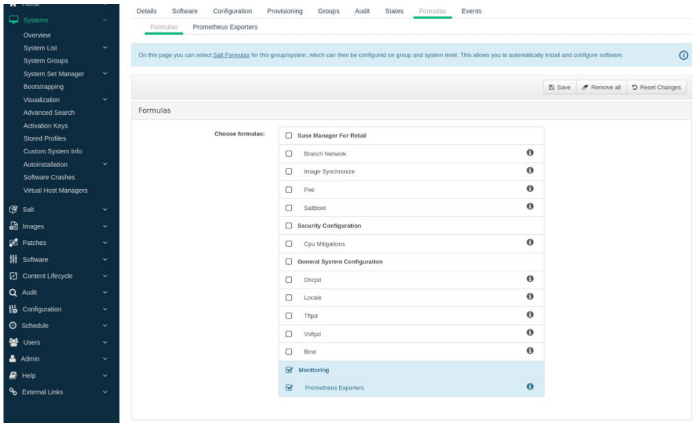
The server uses Prometheus exporters to expose metrics about your environment.

Refer to the documentation to learn how to to consume these metrics.

Figure 7. *Once the services are enabled, the button will be listed as Disable services.*

After you have monitoring enabled, you can then configure monitoring formulas by following these steps:

1. *Log into SUSE Manager 4 Web UI and locate/open the details page of the system to be monitored.*
2. *Navigate to the Formulas tab.*
3. *Select the Monitoring checkbox to enable all monitoring formulas (Figure 8) and activate the Prometheus exporters if this is a client system.*
4. *Continue filling in the formula and then apply the highstate.*



On this page you can select Salt Formulas for this group/system, which can then be configured on group and system level. This allows you to automatically install and configure software.

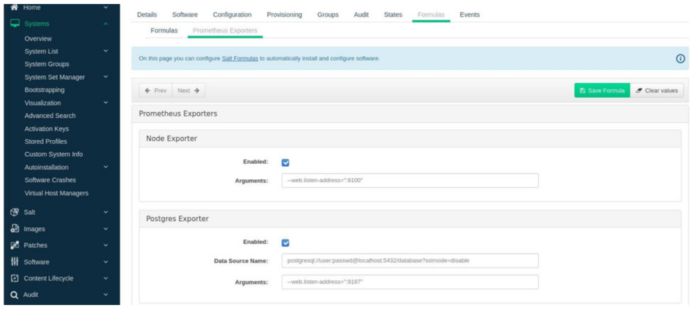
Formulas

Choose formulas:
☐ Suse Manager For Retail
☐ Branch Network
☐ Image Synchronize
☐ Pxe
☐ Saltboot
☐ Security Configuration
☐ Cpu Mitigations
☐ General System Configuration
☐ Dhcpd
☐ Locale
☐ Tftpd
☐ Vsftpd
☐ Bind
☑ Monitoring
☑ Prometheus Exporters

Figure 8. *Configuring monitor formulas for a system.*

Next, you must configure the exporters with the following steps:

1. *In the SUSE Manager Web UI, open the details page of the system to be monitored and navigate to the Formulas | Prometheus Exporters tab.*
2. *Check the Enabled checkbox for both Node and Postgres Exporter (Figure 9). Make sure to only activate the exporters that you need. (For example, if there is no Postgres database, you won't need to activate the Postgres exporter.)*
3. *In the Postgres Exporter section, in the Data Source Name field, enter the path to your data source (for example, postgresql://user:passwd@localhost:5432/database?sslmode=disable).*
4. *Click Save Formula.*
5. *Apply the highstate.*



On this page you can configure Salt Formulas to automatically install and configure software.

Prometheus Exporters

Node Exporter

Enabled: ☑

Arguments: --web.listen-address=":9100"

Postgres Exporter

Enabled: ☑

Data Source Name: postgresql://user:passwd@localhost:5432/database?sslmode=disable

Arguments: --web.listen-address=":9187"

Figure 9. *Configuring the Prometheus exporter.*

Finally, open the Prometheus static configuration file /etc/prometheus/prometheus.yml and add or update the following section.

```
job_name: ‘suma’
Uyuni_sd_configs:
host: “http://SERVER”
username: “APIUSER”
password: “PASSWORD”
```

Where SERVER is the IP address or domain of your SUSE Manager server and APIUSER and PASSWORD match your authentication information. Save and close the file and then restart Prometheus with the command:

```
systemctl restart prometheus
```

Of course, you will also have to do a bit of heavy lifting with the Prometheus configuration. For this, make sure to read the **official Prometheus documentation**.

Prometheus metrics exporters can also be used on Salt clients. The packages are available from the SUSE Manager 4 client tools channels and can be enabled and configured directly in the SUSE Manager 4 Web UI. Currently, two exporters are supported:

- *Node exporter: golang-github-prometheus-node_exporter. See **https://github.com/prometheus/node_exporter***
- *PostgreSQL exporter: golang-github-wrouesnel-postgres_exporter. See **https://github.com/wrouesnel/postgres_exporter***

Installing and configuring exporters is done using a Salt formula. When you have the exporters installed and configured, you can begin using Prometheus to scrape metrics from monitored systems. Service discovery instructs Prometheus to automatically scrape metrics from systems as they are enabled.

Grafana

One thing that hasn’t been mentioned yet is monitoring the SUSE Manager 4 server itself. Fortunately, Grafana has an application for that. Grafana is an open source tool that enables you to visualize data from a number of services (such as Graphite, MySQL, InfluxDB, Prometheus, Elasticsearch and CloudWatch). With this tool, you can customize your dashboard to keep tabs on your SUSE Manager 4 server.

Grafana must first be installed. On smaller setups, Grafana can be installed on the same server as Prometheus. On larger rollouts, it should be deployed to its own server. It is possible to install Grafana with the command:

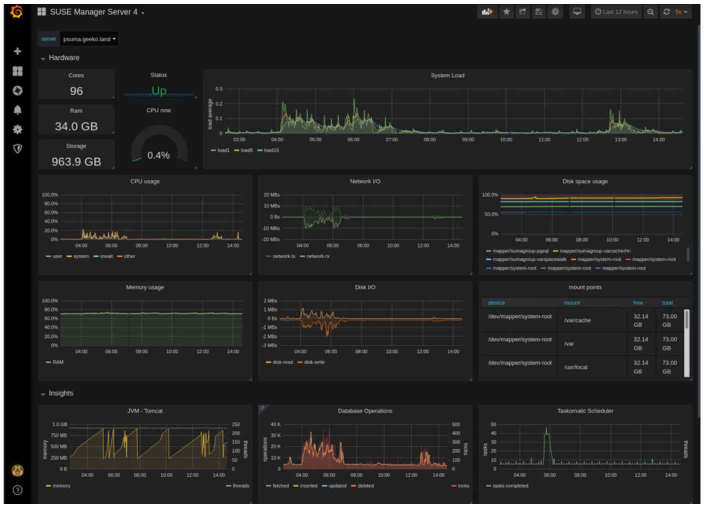
```
zypper in grafana
```

The best practice, however, is to install Grafana via the SUSE Manager GUI.

Once installed, start and enable the service with the command:

```
systemctl enable --now grafana-server
```

You can then reach Grafana at http://SERVER:3000 (where SERVER is either the domain or IP address of the hosting server). During the creation of the Grafana formula, a new data source will be automatically configured (which will point to the Prometheus server at port 9090). With this configuration complete, you should start seeing real-time data for your SUSE Manager 4 server (Figure 10).



mount points

device	mount	free	total
/dev/mapper/system-root	/var/cache	32.14 GB	73.00 GB
/dev/mapper/system-root	/var	32.14 GB	73.00 GB
/dev/mapper/system-root	/usr/local	32.14 GB	73.00 GB

Figure 10. *Grafana monitoring SUSE Manager 4 by way of Prometheus.*

With everything in place, you now have the means to monitor all of the servers and patches deployed by SUSE Manager 4, as well as the SUSE Manager 4 server itself—all from within your web browser. That's power. That's the SUSE way.

Additional contact information and office locations:
www.suse.com

www.suse.com