



# New in Checkmk 2.2

Check Engine and More



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- 01  New and better checks
- 02  Agent improvements
- 03  Making MKPs ready for updates
- 04  Quality of Life improvements



# 150+ new and improved checks



30+

checks for  
new systems

40+

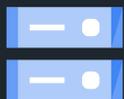
checks supporting  
further systems

80+

checks with additions  
to metrics, rulesets



# Introducing Google Cloud Platform monitoring



Cloud Storage



Cloud Load Balancing



Compute Engine



Status



Cloud SQL



Filestore



Memystore for Redis



Cloud Functions



Cloud Run



Cloud Costs

# Nine new Azure integrations ...



 App Gateway



DB for MySQL



DB for PostgreSQL



App Registration



Traffic Manager



Load Balancer



Resource Health



 Recovery Services Vault



Status

# ... and major redesigns of existing Azure integrations



## Extended

- ◆ New checks for
  - ◇ Virtual Machines (**5!**)
  - ◇ Virtual Network Gateway (**4!**)

## Improved / reworked

- ◆ Option to (de)select services to be monitored
- ◆ Additional host labels *cmk/azure/vm:instance*
- ◆ Simpler VM service state remapping

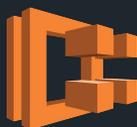
# 7 new AWS integrations and many new regions



## New



Cloud Edition only  
Lambda



Cloud Edition only  
ECS



Cloud Edition only  
CloudFront



Cloud Edition only  
ElastiCache



Cloud Edition only  
SNS



Cloud Edition only  
Route53



Status

## Extended

- Additional regions: GovCloud, Zurich, Spain, Milan, Jakarta, Hyderabad, Hong Kong, Bahrain, UAE, Cape Town
- EBS: Support for gp3 & io2 volumes

## Improved / reworked

- Additional host labels  
`cmk/aws/account:<account>`  
`cmk/aws/ec2:instance`
- EC2: Configurable piggyback names  
(use private IP DNS name)

# Enterprise Edition covers Lift & Shift scenarios



<b>Compute</b>	<ul style="list-style-type: none"><li>● EC2</li></ul>	<ul style="list-style-type: none"><li>● Compute Engine</li></ul>	<ul style="list-style-type: none"><li>● Virtual Machine</li></ul>
<b>Storage &amp; Backup</b>	<ul style="list-style-type: none"><li>● Elastic Block Storage</li><li>● S3</li></ul>	<ul style="list-style-type: none"><li>● Cloud Storage</li><li>● Filestore</li></ul>	<ul style="list-style-type: none"><li>● Azure Blob Storage</li><li>● Azure Storage Accounts</li></ul>
<b>Database</b>	<ul style="list-style-type: none"><li>● RDS</li><li>● DynamoDB</li></ul>	<ul style="list-style-type: none"><li>● Cloud SQL</li></ul>	<ul style="list-style-type: none"><li>● DB for PostgreSQL</li><li>● DB for MySQL</li></ul>
<b>Load Balancer</b>	<ul style="list-style-type: none"><li>● Application ELB</li><li>● Network ELB</li></ul>	<ul style="list-style-type: none"><li>● GCP Load Balancer</li></ul>	<ul style="list-style-type: none"><li>● Azure Load Balancer</li></ul>
<b>Management</b>	<ul style="list-style-type: none"><li>● Cost and Usage</li><li>● Cloud Watch</li></ul>	<ul style="list-style-type: none"><li>● Cost</li><li>● GCP Health</li></ul>	<ul style="list-style-type: none"><li>● Usage Details (cost)</li><li>● Azure Resource Health</li></ul>

# Cloud Edition covers advanced use cases



<b>Functions</b>	<ul style="list-style-type: none"><li>● Lambda</li></ul>	<ul style="list-style-type: none"><li>● Cloud Functions</li></ul>	
<b>Containers &amp; Kubernetes</b>	<ul style="list-style-type: none"><li>● ECS</li><li>● EKS</li></ul>	<ul style="list-style-type: none"><li>● Cloud Run</li><li>● GKE</li></ul>	<ul style="list-style-type: none"><li>● AKS</li></ul>
<b>Storage</b>	<ul style="list-style-type: none"><li>● S3 Glacier</li></ul>		<ul style="list-style-type: none"><li>● Recovery Service Vaults</li></ul>
<b>Networking</b>	<ul style="list-style-type: none"><li>● Route53</li><li>● CloudFront</li><li>● WAF</li></ul>		<ul style="list-style-type: none"><li>● Azure VPN Gateway</li><li>● Azure Traffic Manager</li></ul>
<b>Cache</b>	<ul style="list-style-type: none"><li>● ElastiCache for Redis</li></ul>	<ul style="list-style-type: none"><li>● Memorystore</li></ul>	
<b>App integration</b>			<ul style="list-style-type: none"><li>● App Gateway</li><li>● Azure Web Apps</li></ul>
<b>Notifications</b>	<ul style="list-style-type: none"><li>● AWS SNS</li></ul>		
<b>User Management</b>			<ul style="list-style-type: none"><li>● Azure AD Connect</li></ul>

# New checks and distros for Kubernetes monitoring



## New checks

- ✓ Deployments
- ✓ StatefulSets
- ✓ DaemonSets
- ✓ Namespaces
- ✓ Nodes
- ✓ Pods incl. containers
- ✓ Persistent Volume Claims **NEW**
- ✓ CronJobs **NEW**

## Supported container runtimes

- ✓ Docker
- ✓ containerd
- ✓ CRI-O **NEW**

## Supported distros

- ✓ Vanilla
- ✓ Google Kubernetes Engine
- ✓ Azure Kubernetes Services
- ✓ AWS Elastic Kubernetes Service

# Kubernetes Deployment php-apache

Monitor > Applications > Kubernetes > Cluster staging > Namespace default > Deployment php-apache

Navigate via breadcrumbs now!

Dashboard Add Dashboards Display Help

Deployment

# php-apache

Namespace

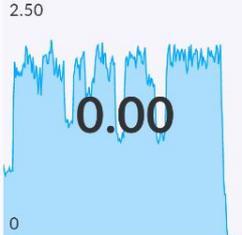
# default

Condition

Summary

PROGRESSING: True, AVAILABLE: False  
(MinimumReplicasUnavailable: Deployment does not have minimum availability.) for 25 minutes 2 seconds

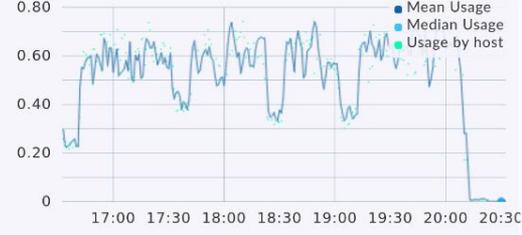
CPU usage



CPU resources: Deployment



CPU usage: Pods



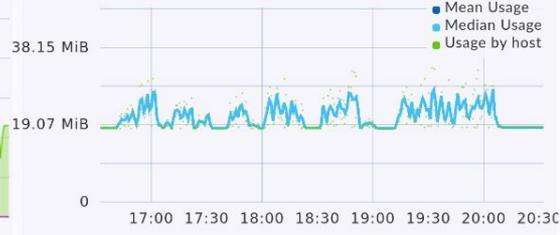
Memory usage



Memory resources: Deployment



Memory usage: Pods



Desired replicas



Up-to-date replicas



Ready replicas



Pod resources: Deployment



Pods



OpenShift monitoring via native monitoring stack: No add. load!



CRIT	Deployment	php-apache	Replicas	Ready: 2/3, Up-to-date: 3/3, Not ready for: 24 minutes 39 seconds (warn/crit at 5 minutes 0 seconds/10 minutes 0 seconds)	CRIT
CRIT	Pod	php-apache-8c488b5f6-rv54f	Status	Pending: since 12 minutes 1 second (warn/crit at 5 minutes 0 seconds/10 minutes 0 seconds)	

# Mobile device monitoring via Ivanti Neurons MDM



Formerly also known as MobileIron Cloud

## Overview

**CRIT**

Mobileiron source host statistics

Non-compliant devices: 90.91% (warn/crit at 10.00%/20.00%) **CRIT**,  
Non-compliant: 20, Total 22

For each  
mobile  
device

### android-gandalf

State	Service	Icons	Summary	Perf-O-Meter
<b>OK</b>	Uptime	☰ 📈	Up since March 21 2023 19:28:38, Uptime 85 days 21 hours	<div style="width: 86%;"><b>86 d</b></div>
<b>CRIT</b>	Mobileiron versions	☰	OS build version is 232 days old. 2022-10-12 <b>CRIT</b> , Security patch level date is 232 days old: 2022-10-12 <b>CRIT</b> , OS version: 10, Client version 83.0.0.15	
<b>CRIT</b>	Mobileiron compliance	☰ 📈	Policy violation count: 2 (warn/crit at 2/3) <b>WARN</b> , Compliance state: False <b>CRIT</b>	
<b>OK</b>	Filesystem/	☰ 📈	27.49% used (17.59 of 64.00 GB, trend 0.00 B / 24 hours	<div style="width: 27.49%;"><b>27.49%</b></div>

# That's not all! Further new integrations



# Extended various integrations



Catalyst 37xx  
Catalyst 9200  
Catalyst 9200L  
Catalyst 9800-L  
Catalyst 9800-CL  
Cisco IP SLA <sup>1)</sup>  
HyperFlex



FortiGate 100F  
FortiGate 501E  
FortiGate Firewalls <sup>1)</sup>  
FortiGate AP <sup>1)</sup>



MX2010



**Hewlett Packard** A10508  
Enterprise



PDU v4



8801



MX521ade  
CX923de  
Optra T612  
CX410de  
Forms Printer 2580  
C4150  
CX725



Unified Access  
Gateway



<sup>1)</sup>



docker  
SDK 6.0+



SQL Server 2022  
RDS licenses for Windows 2022



Enviromux 16D  
Enviromux Micro-T



Lantime NTP <sup>1)</sup>



FlashSystem 900



SANbox 5600 FC



ETERNUS DX600

# 80+ improvements to existing integrations



## Examples

---

More checks

Events & Alerts for Graylog  
Volume Efficiency for NetApp

More info

VM name now included in vSphere snapshot summary  
Used provisioned space added to service details for vSphere

Improved rules

Magic factor added for Sansymphony Pool  
Levels for size of PostgreSQL databases

# Thanks to all pull requests



14 🙌 Yogibaer75

5 🙌 Gurubert

5 🙌 dirkhub

4 🙌 ttrafelet

4 🙌 Sven-ruess

4 🙌 Bastian-Kuhn

3 🙌 NimVek

3 🙌 Ma7h1

3 🙌 jplitza

2 🙌 TomyLobo

2 🙌 tgm4883

2 🙌 pechsteinma

2 🙌 kleinski

2 🙌 Cclauss

2 🙌 Agabellini

1 🙌 Zeha

1 🙌 Y0d0g

1 🙌 Versa12

1 🙌 vafgoettlich

1 🙌 tmanninger

1 🙌 Timdebruijn

1 🙌 thomas1147

1 🙌 sva-mh

1 🙌 simonmeggle

1 🙌 sdx23

1 🙌 ronansalmon

1 🙌 Rendanic

1 🙌 phreaker0

1 🙌 OguzhanCicek

1 🙌 nedjitef

1 🙌 Mweissen13

1 🙌 moschlar

1 🙌 mika

1 🙌 Mayrstefan

1 🙌 Marho96

1 🙌 marcohald

1 🙌 m4c3

1 🙌 M3rlinux

1 🙌 LuNie

1 🙌 koeniglorenz

1 🙌 Jwiederh

1 🙌 Jsjhb

1 🙌 Jay2k1

1 🙌 gratuxri

1 🙌 gradecke

1 🙌 Gpochiscan

1 🙌 Gnitset

1 🙌 Enucatl

1 🙌 Elwood218

1 🙌 earl

1 🙌 Dennis-Q

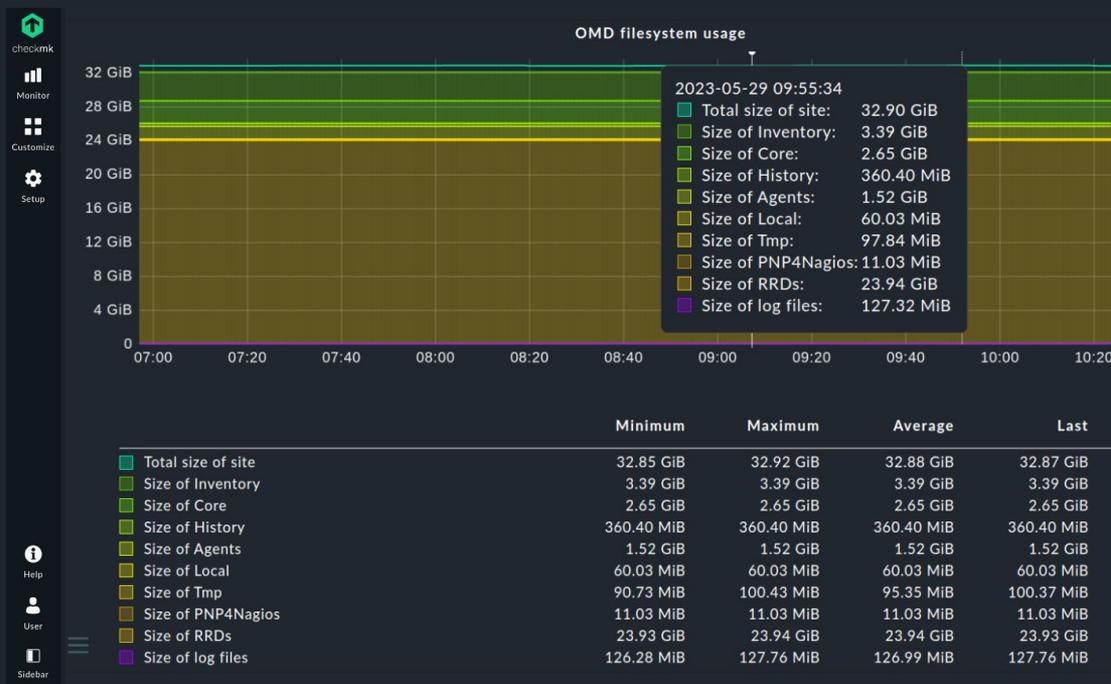
1 🙌 bsramin

1 🙌 Abelcheung

# Checkmk self-monitoring for disk usage



- HW/SW inventory cache
- Monitoring state & history
- Archived events (Event Console)
- Baked agents
- Customizations – local/
- Temporary and runtime files
- Graphing data (PNP4Nagios)
- Graphing data (RRDs)
- Logging files



# Improved Checkmk performance monitoring



**RENAMED**

Active check helper usage:

**RENAMED**

Active check latency:

Checker helper usage:

Checkmk checker latency:

Checkmk fetcher latency:

Fetcher helper usage:

Forks:

Host check rate:

Livestatus connects:

Livestatus overflows:

Livestatus requests:

Livestatus usage:

Log messages:

Monitored hosts:

Monitored services:

**NEW**

Carbon queue usage:

**NEW**

Carbon queue usage rate:

**NEW**

InfluxDB queue usage:

**NEW**

InfluxDB queue usage rate:

**NEW**

RRD queue usage:

**NEW**

RRD queue usage rate:

**NEW**

Rate of bytes sent to the Carbon connection:

**NEW**

Rate of bytes sent to the InfluxDB connection:

**NEW**

Rate of bytes sent to the RRD connection:

**NEW**

Rate of metrics received:

**NEW**

Rate of performance data loss for Carbon:

**NEW**

Rate of performance data loss for InfluxDB:

**NEW**

Rate of performance data loss for RRD:

**NEW**

Rate of performance data received:

Service check rate:

# Extended *Check\_MK* Agent service



Monitors the validity / expiration of the controllers certificate  
(used for TLS)

---



Monitors the validity of the agent updater certificates that the  
monitored host is configured to trust.

---



Monitor if host is specifically excluded from agent updates  
(optional)

# Agent improvements

# Password store available for all special agents



StoreOnce via REST API 4.x

integrations > HPE StoreOnce via REST API 4.x > New rule

play Help

Special agent for HPE StoreOnce Appliances instead of the normal Checkmk agent for REST API v4.x or higher.

REST API 4.x

Username (required)

Password (required)

SSL certificate verification

via REST API 4.x

PE StoreOnce via REST API 4.x > Add rule: HPE StoreOnce

Special agent for HPE StoreOnce Appliances instead of the normal Checkmk agent for REST API v4.x or higher.

REST API 4.x

Username (required)

Password

From password store HPE StoreOnce

SSL certificate verification

# Password store available for all special agents



## Password store added to ...



Aerohive  
HiveManager + NG



Apache ActiveMQ  
queues



EMC VNX



Microsoft Azure



NetApp  
via  
WebAPI



HP MSA via Web  
Interface



AppDynamics via  
REST API



Nutanix Prism



Ruckus Spot



UCS BladeCenter



DDN S2A



HPE StoreOnce



Zerto



IPMI Sensors via Freeipmi or IPMItool



# We continuously strive to unify agent behavior



## Examples

- ◆ **Kill long running async processes:** Beyond Linux, Solaris, now also for AIX
- ◆ **Unified MRPE support** (to execute legacy Nagios remote plugins)
  - ◇ AIX and FreeBSD now support async MRPE
  - ◇ OpenWrt now fully supports MRPE
  - ◇ Windows support caching interval for async MRPE
- ◆ IBM Tivoli Storage Manager (tsm\_scratch): Windows, now also for Linux

# No more stealing from the monitoring!



## Logwatch

**Before:** Sends all messages since last plugin execution.

**Problem:** Execute via HW/SW inventory, service discovery or manually

→ **Lost log messages**

**Now:** Locally stored 'bundles' with configurable retention period. Checkmk can handle previously seen bundles.

**Trade-offs:** Disk space & network traffic

## HW/SW Inventory

**Before:** Plugin execution depends on special flag file.

**Problem:**

- Debugging / simulation requires changes to the flag file. Intervenes with Checkmk operations!
- Manual execution directly after install also intervenes with Checkmk ops!

**Now:**

```
check_mk_agent --force-inventory
```

# Making MKPs ready for updates

# MKP: Extension packages



- ◆ Enables adding new/modified
  - ◇ Checks and agent plug-ins
  - ◇ Extensions for the GUI (views, dashboards, columns, icons, etc.).
  - ◇ Notification and alert handler scripts
- ◆ 500+ on exchange.checkmk.com
- ◆ Sometimes directly interact with

code base ⇒ **Incompatibilities**  
Checkmk Conference

**Search** here for your package

### latest

-  **Redfish Restful API Checks**  
by [Andreas-Doebler](#)  
Generic Redfish REST API Checks  
👁️ 188 📄 140 📅 23 May 2023
-  **Special Agent to read M365 service health from MS Graph API**  
by [gradecke](#)  
M365 Service Health  
👁️ 187 📄 66 📅 23 May 2023
-  **Pure checks**  
by [Bastian-Kuhn](#)  
Pure Devices  
👁️ 1151 📄 348 📅 21 May 2023
-  **Telematikinfrastruktur Konnektor Agent**  
by [Kleinrotti](#)  
Special Agent to monitor a TI Konnektor  
👁️ 306 📄 203 📅 14 May 2023

### most downloaded

-  **RobotMK | Robot Framework End2End Test Integration**  
by [simonmeggle](#)  
Robotmk - Robot Framework E2E test integration  
👁️ 7684 📄 11883 📅 01 Jul 2020
-  **SSL-Certificates**  
by [rsander](#)  
Agent Plugin to check SSL certificates in specified directory. Now with support to check signature algorithm Windows added.  
👁️ 13220 📄 5885 📅 02 Jan 2019
-  **SIGNL4 - Critical Mobile Alerting**  
by [rons4](#)  
SIGNL4 is a mobile alert notification app for powerful alert management and mobile assignment of work items alerting via app push  
👁️ 4710 📄 4924 📅 23 Jan 2020

★ 5.0

OK

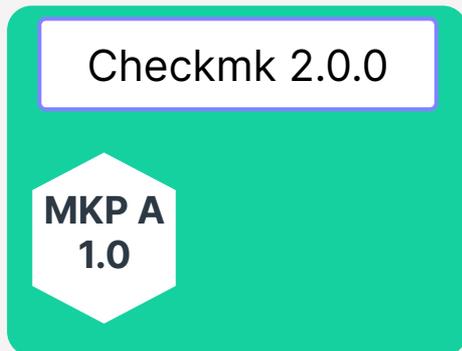
# Before the update (2.0.0)



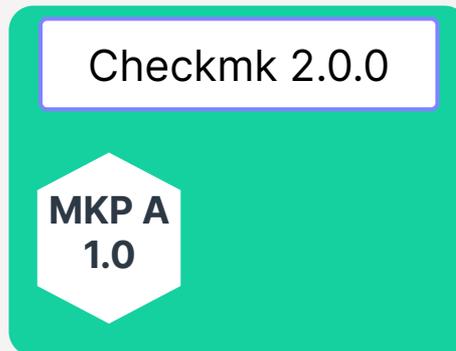
Central site



Remote site A



Remote site B



CRIT

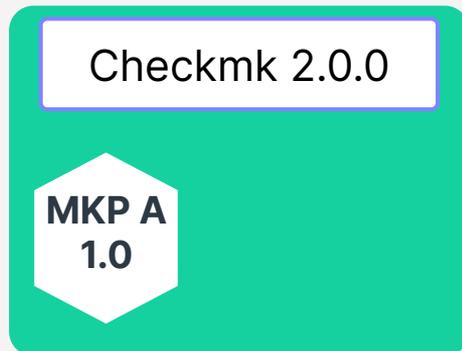
# During the update (2.0.0 → 2.1.0)



Central site



Remote site A



Remote site B



Yes... we should probably fix that.



OK

# Before the update (2.1.0)

Central site

Installed

Available

Checkmk 2.1.0

MKP A  
1.0

MKP A\*  
1.1

Remote site A

Checkmk 2.1.0

MKP A  
1.0

MKP A\*  
1.1

Remote site B

Checkmk 2.1.0

MKP A  
1.0

MKP A\*  
1.1

OK

# During the update (2.1.0 → 2.2.0)

Central site

Installed

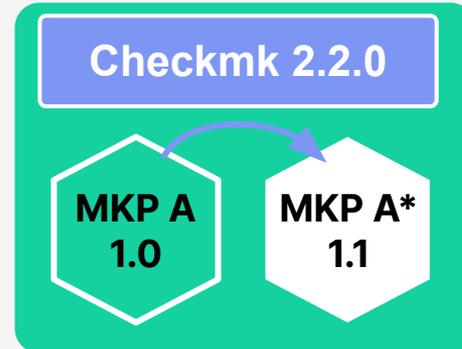
Available



Remote site A



Remote site B



# To make this possible, we need ...



**Multiple MKPs handling the same files** within a site

---



**New MKP states:**

Enabled (active on this site), Enabled (inactive on this site), Disabled

---



**Sortable versions** to know which to use

→ Semantic Versioning (only for syntactic reasons)

---



**Min and max Checkmk version** specified in MKPs



# Extension packages

Setup > Maintenance > Extension packages

No pending changes

Packages

Display

Help

Filter



## Enabled (active on this site)

Actions	Name	Version	Title	Author	Req. Version	Until Version	Contents
 	test-package-only-21	1.0.0	Test package (Checkmk 2.1)	harri-hirsch	2.1.0p1	2.1.0p99	Legacy check plugins: 1

Di



1. Install new version of package on your site





# Extension packages

Setup > Maintenance > Extension packages

4 changes



Packages

Display

Help

Filter



The package is now enabled, but could not be installed on this site: Package requires Checkmk version 2.2.0p1 (this is 2.1.0p18)

## Enabled (active on this site)

Actions	Name	Version	Title	Author	Req. Version	Until Version	Contents
	test-package-only-21	1.0.0	Test package (Checkmk 2.1)	harri-hirsch	2.1.0p1	2.1.0p99	Legacy check plugins: 1

## Enabled (inactive on this site)

Actions	Name	Version	Title	Author	Req. Version	Until Version	Contents
	test-package-only-22	1.1.0	Test package (Checkmk 2.2)	harri-hirsch	2.2.0p1	2.2.0p99	Legacy check plugins: 1

## All packages (enabled or disabled)

Author	Req. Version	Until Version	Contents
harri-hirsch	2.1.0p1	2.1.0p99	Legacy check plugins: 1
harri-hirsch	2.2.0p1	2.2.0p99	Legacy check plugins: 1

2. Enable MKP of next version (file conflicts are now handled)



# Compatible package is installed during update



```
Executing update-pre-hooks script '01_mkp-disable-outdated'...
-| [test-package-only-21 1.0.0]: Uninstalling: Package requires
                                Checkmk version below 2.1.0p99
                                (this is 2.2.0p1)
-|                                Part 'checks':
-|                                just-some-file
```



# Extension packages

Setup > Maintenance > Extension packages

5 changes



Packages Display Help

2.2 MKP now automatically activated

## Enabled (active on this site)

Actions	Name	Version	Title	Author	Req. Version	Until Version	Contents
	test-package-only-22	1.1.0	Test package (Checkmk 2.2)	harri-hirsch	2.1.0p1	2.2.0p99	Legacy check plugins: 1

2.1 MKP deactivated

## Enabled (inactive on this site)

Actions	Name	Version	Title	Author	Req. Version	Until Version	Contents
	test-package-only-21	1.0.0	Test package (Checkmk 2.1)	harri-hirsch	2.1.0p1	2.1.0p99	Legacy check plugins: 1



Post-Update



# Subsequent changes to MKP workflows

## Checkmk 2.1 and before

"Upload and install" and hope for the best

Installed extension packages	
Actions	Name
     	sslcertificates

- Only 'one' state: installed packages

## Checkmk 2.2

Uploading & installing now split into two steps

- 🛡️ **Upload:** always possible, even if not suitable for version or colliding with already installed MKP → **Disabled**
- 🛡️ **Enable / Download / Remove:** Enabling will fail as previously (incompatible, already installed) → **Enabled (inactive)**

# Modernization of MKP CLI



Available commands are:

```
create NAME      ... Collect unpackaged files into new package NAME
pack NAME        ... Create package file from installed package
release NAME     ... Drop installed package NAME, release packaged files
find             ... Find and display unpackaged files
list            ... List all installed packages
list NAME       ... List files of installed package
list PACK.mkp   ... List files of uninstalled package file
show NAME       ... Show information about installed package
show PACK.mkp   ... Show information about uninstalled package file
install PACK.mkp ... Install or update package from file PACK.mkp
remove NAME     ... Uninstall package NAME
disable NAME    ... Disable package NAME
enable NAME     ... Enable previously disabled package NAME
disable-outdated ... Disable outdated packages
```

available commands:

```
{find,inspect,show,show-all,files,list,install,add,release,remove,enable,disable,template,package,disable-outdated,update-active}
find             Show information about local files
inspect          Show manifest of an MKP file
show            Show manifest of a stored package
show-all       Show all manifests
files           Show all files belonging to a package
list            Show a table of all known files, including the deployment state
install         This command is deprecated. Please use the 'add' and 'enable' commands.
add             Add an MKP to the collection of managed MKPs
release         Remove the package and leave its contained files as unpackaged files behind.
remove          Remove a package from the site
enable          Enable a disabled package
disable         Disable an enabled package
template        Create a template of a package manifest
package         Create an .mkp file from the provided manifest. You can use the 'template' command to create a manifest.
disable-outdated Disable MKP packages that are declared to be outdated with the new version. Since MKP packages are installed, this command compares that version with the installed version. If the installed version is disabled.
update-active   Disable MKP packages that are not suitable for this version, and enable others.
```

# MKPs maintainers. It will get better.



In Checkmk 2.0, we introduced a proper development API for checks. This was not covering all the areas though.

---



In 2.2, we changed how Checkmk imports stuff. Causing incompatibilities. Moved validation upfront, from runtime to update. Causing more error messages.

---



In 2.3, the goal is to have development APIs for the entire plug-in development.

- Metrics plugins. API (incl. Performer)
- Rulesets API
- Special Agent parameterization

# Quality of Life

# Pre-flight check for omd update



# Pre-flight check for omd update



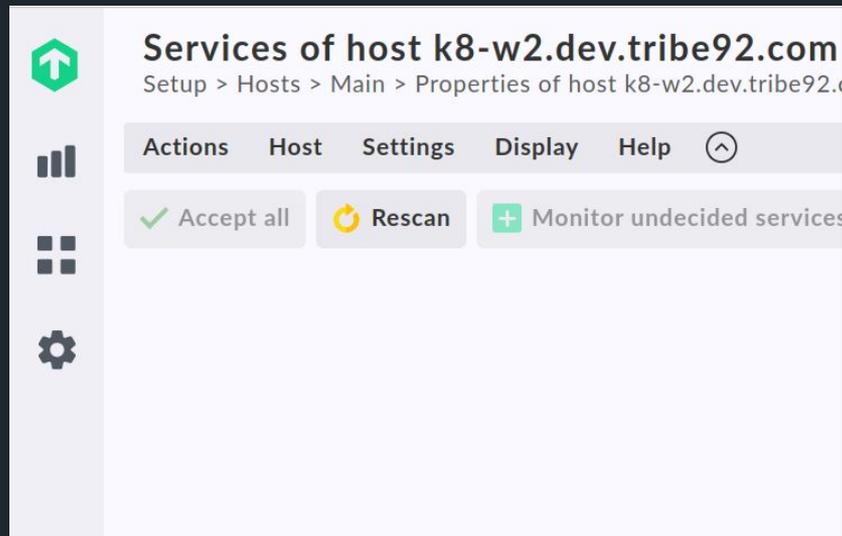
```
Executing update-pre-hooks script "02_cmk-update-config"...
```

# Ever wanted to know if service discovery worked?



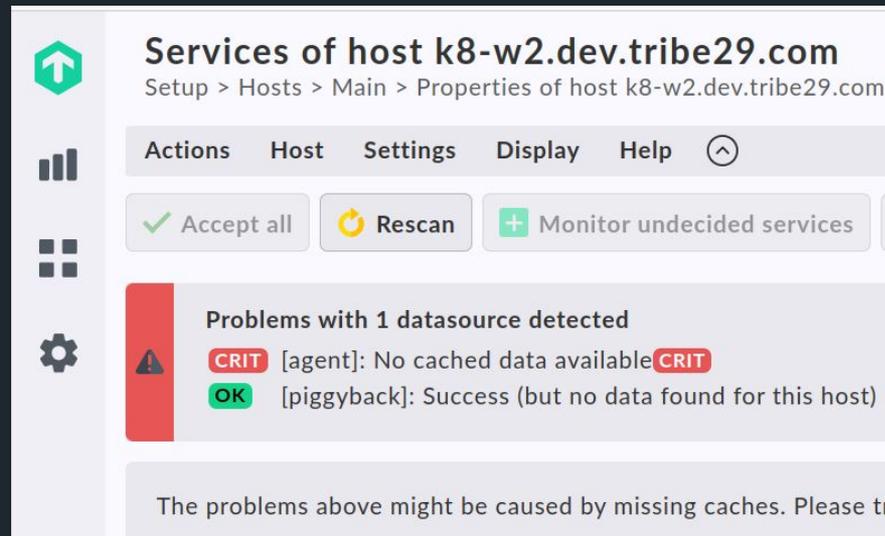
## Checkmk 2.1 and before

No error message for failing service disco.



## Checkmk 2.2

Failing service discovery can now be seen



# Service Discovery with multiple datasources



## Service discovery now shows state of each data source

Use cases:

- Agent + Piggyback (vSphere, Proxmox, AWS, Azure, GCP, ...): Distinguish between services that are actually vanished and services that are missing as a result of a failed datasource
- Bulk discovery: Don't discover zero services if the datasource failed

The screenshot displays the 'Services of host k8-w3.dev.tribe29.com' page. At the top, there are navigation tabs for 'Actions', 'Host', 'Settings', 'Display', and 'Help'. Below these are four buttons: 'Accept all' (green checkmark), 'Rescan' (yellow refresh), 'Monitor undecided services' (green plus), and 'Remove' (red minus). A green status bar indicates 'All datasources are OK' with a checkmark icon. Below this, two status entries are shown: '[agent]: Success' and '[piggyback]: Success (but no data found for this host)'. A summary bar shows 'Undecided services: 49 | Vanished services: 0 | New host labels: 3'. A section titled 'Discovered host labels (3)' contains a table with columns 'Status' and 'Host labels'. The table shows 'New' status with two labels: 'cmk/device\_type:vm' and 'cmk/docker\_object:node'. At the bottom, a section titled 'Undecided services - currently not monitored (49)' is partially visible.

# Thank you!

Vielen Dank!



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