# New in Checkmk 2.2

User Interface

**Lars Michelsen**

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Checkmk GmbH

**01** Share your monitoring customizations

**02** Make the most out of your monitoring data

**03** Integrations: Grafana, InfluxDB & MS Teams

**04** Performance improvements

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Conference

# Share views, dashboards & reports via MKP

- Export views, dashboards and reports as MKP

- Share with other Checkmk users, or sites

- Leverage standard MKP mechanism

## Edit Views
Customize > Views

| Views | Related | Display | Help | Filter |
|---|---|---|---|---|

### Customized

| Actions | ID |
|---|---|
| | it_efficiency_servers_cpumem_linux |

### Extensions

| Actions | State | ID |
|---|---|---|
| | | it_efficiency_servers_cpumem_linux |

### Builtin

# Control visuals access by Checkmk site

Central site

| Managed Services Provider |
| --- |

Site A          Site B          Site C

| Customer A | Customer B | Customer C |
| --- | --- | --- |
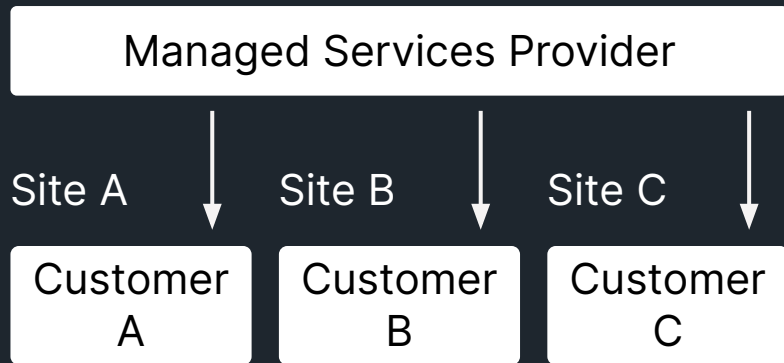
**Certain views should be accessible to all users of a specific customer. At little effort.**

Unique ID (required) ........  cpu_custom_B

Title* (required) .................  CPU utilization - Customer B

Topic in 'Monitor' menu ...  System ▼

Icon ...........................................  🔼 + ☐

Visibility .......................................  ☐ Hide this view in the monitor menu
☐ Hide this view in dropdown menus
☒ Make this view available for other users

Publish to users of sites ▼

Available          >    <          Selected

central - Local site central              customerB - Customer B
customerA - Customer A
customerC - Customer C

# Make the most out of your monitoring data

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# AWS EC2 instances

Dashboard    Add    Dashboards    Display    Help

## EC2 services OK/Total

# 43/43

## EBS health OK/Total

# 14/14

## CPU utilization

## Instances

| EC2 instance | CPU utilization | Disk IO | Network IO |
|---|---|---|---|
| 10.0.1.234-eu-central-1-i-0947b0098dbacc1a2 | 11.96% | | 1.61 Mbit/s / 708 kb |
| 10.0.3.85-eu-central-1-i-0a71087ea7df0b60b | 11.24% | | 203 kbit/s / 431 kbit |
| 10.0.2.149-eu-central-1-i-0061a50ea7494126f | 11.12% | | 1.89 Mbit/s / 2.77 M |
| 10.0.3.151-eu-central-1-i-0f4424a5714fe1a75 | 7.17% | | 431 kbit/s / 698 kbit |
| 10.0.151.54-eu-central-1-i-001435e4905932e79 | 3.52% | 0.00 B/s / 0.00 B/ | 173 kbit/s / 10.8 Mb |
| 10.0.3.166-eu-central-1-i-02090631d76793c04 | 3.45% | | |
| 10.0.1.161-eu-central-1-i-0efd56f0c39f40793 | 3.42% | | 450 kbit/s / 633 kbit |
| 10.0.101.126-eu-central-1-i-05049d82a0742f06b | 0.34% | 0.00 B/s / 0.00 B/ | 1.14 kbit/s / 4.06 kb |
| | | | 1.04 kbit/s / 1.21 kb |
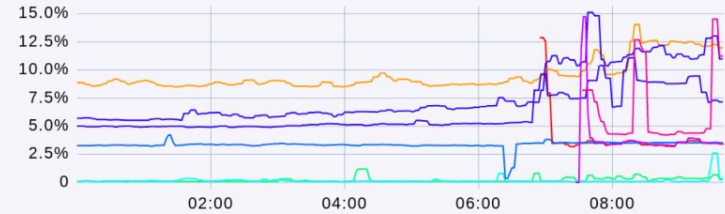
## Network throughput
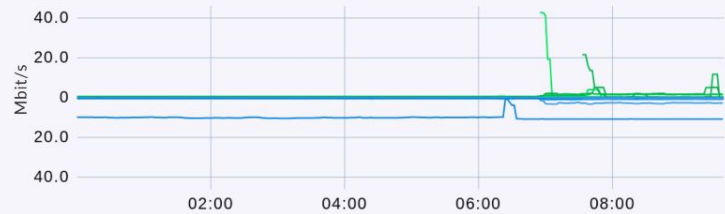
## Disk throughput

## Disk operations

# VM dashboards for
# Azure, AWS, GCP

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checkmk

Monitor

Customize

Setup

Help

Use

Sidebar

Dashboard   Add   Dashboards   Display   Help

**Buckets**

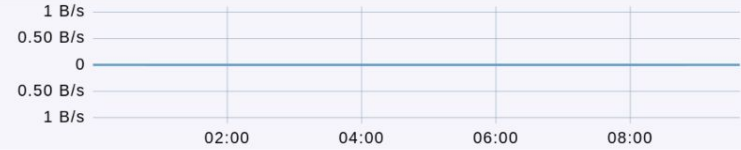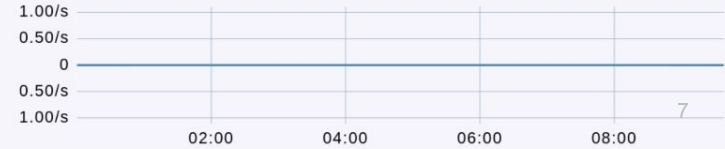| State | Service | Perf-O-Meter |
|---|---|---|
| OK | AWS/S3 Objects tribe29-saas-service-remote-state-bucket | 979.04 MiB |
| OK | AWS/S3 Objects tribe29-backend-remote-state-bucket | 3.55 MiB |
| OK | AWS/S3 Objects tf-saas-dev.tribe29.io | 1.50 MiB |
| OK | AWS/S3 Objects cmk-ctl-plane | 11.80 KiB |
| OK | AWS/S3 Objects aws-accelerator-s3-access-logs-914463316976-eu-central-1 | 0.00 B |
| OK | AWS/S3 Objects aws-accelerator-s3-access-logs-468021654173-eu-central-1 | 0.00 B |
| OK | AWS/S3 Objects aws-accelerator-s3-access-logs-321490468156-eu-central-1 | 0.00 B |
| OK | AWS/S3 Objects aws-accelerator-s3-access-logs-311474614737-eu-central-1 | 0.00 B |
| OK | AWS/S3 Objects aws-accelerator-s3-access-logs-020121057511-eu-central-1 | 0.00 B |
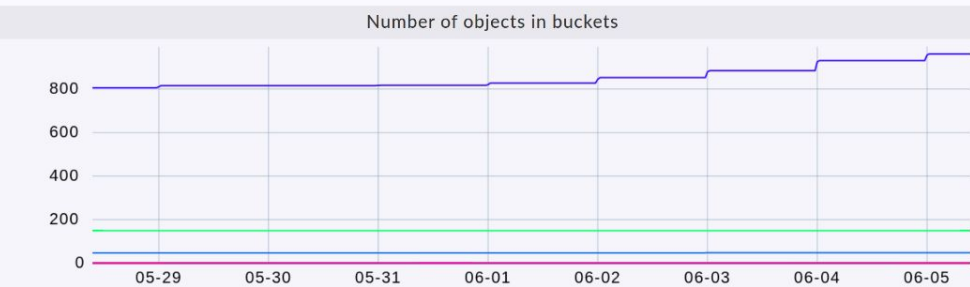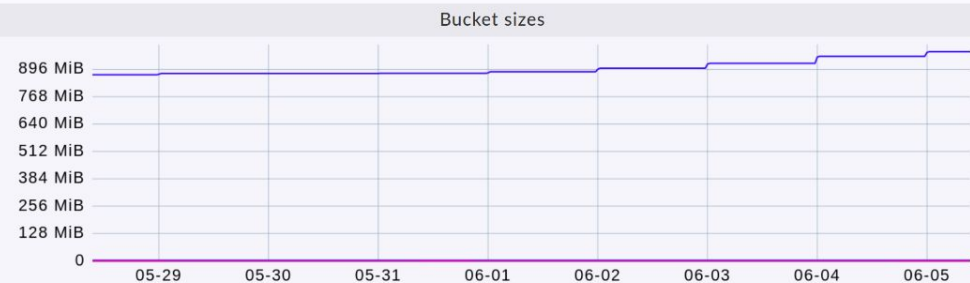
**Limits**

| State | Host | Service | Perf-O-Meter |
|---|---|---|---|
| OK | DEVAWSpiggyback | AWS/S3 Limits Global | 3 |
| OK | STAGINGAWSpiggyback | AWS/S3 Limits Global | 1 |

**Bucket sizes**

896 MiB
768 MiB
640 MiB
512 MiB
384 MiB
256 MiB
128 MiB
0

05-29   05-30   05-31   06-01   06-02   06-03   06-04   06-05

**Number of objects in buckets**

800
600
400
200
0

05-29   05-30   05-31   06-01   06-02   06-03   06-04   06-05

**Total size of buckets**

896 MiB
768 MiB
640 MiB
512 MiB
384 MiB
256 MiB
128 MiB
0

05-30   06-01   06-03

2023-05-31 14:18:00
STAGINGAWSpiggyback:      0.00 B
SANDBOX4AWSpiggyback:   0.00 B
PRODAWSpiggyback:          0.00 B
INFRAAWSpiggyback:        881.11 MiB
DEVAWSpiggyback:           1.51 MiB

**Number of buckets**

05-30   06-01   06-03

Storage dashboards for
Azure, AWS, GCP

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# Combining Checkmk data for views/dashboards ...

## Checkmk
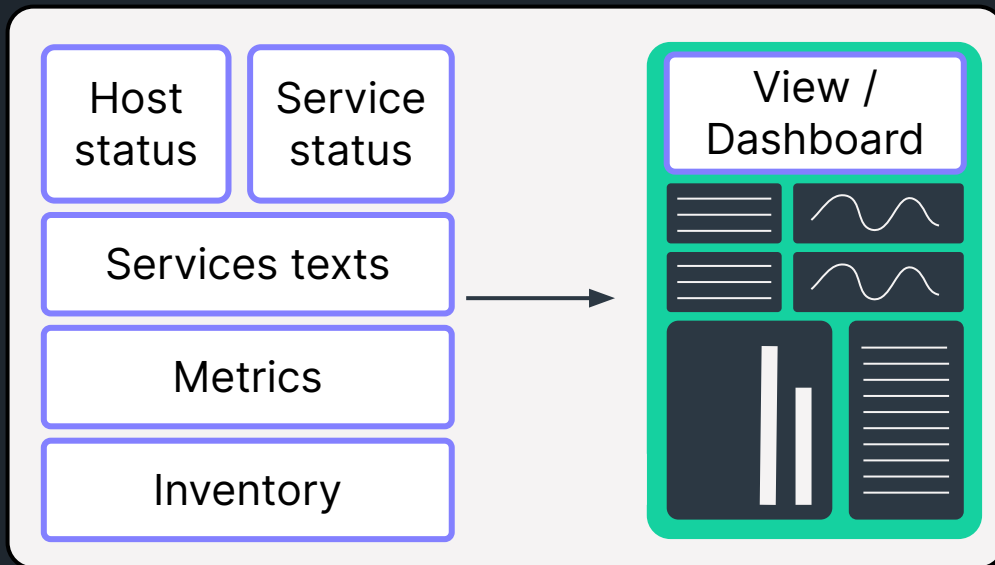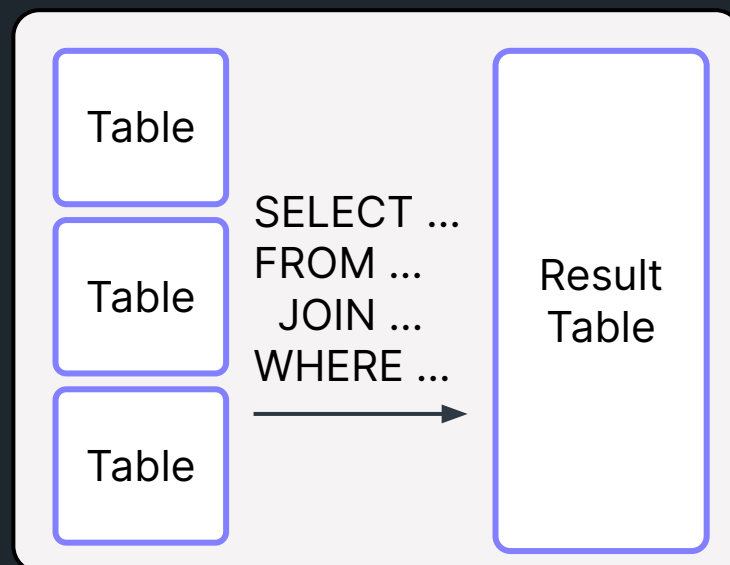
| Host status | Service status |
| Services texts | |
| Metrics | |
| Inventory | |

→ View / Dashboard

## Analogy: SQL DB

Table
Table
Table

SELECT ...
FROM ...
JOIN ...
WHERE ...

→ Result Table

# ... making more powerful dashboards possible
## Application Monitoring │ Oracle



**Oracle Performance Monitoring**
Monitor > Workplace > Oracle Performance Monitoring

State | Inventory | ORA $SID$ Uptime | (?i)Filesystem /(oradata|oracle)/$SID$

| State | Host | SID | Version | Uptime | Filesystem | Processes | Sessions | Recovery |
|-------|------|-----|---------|--------|-----------|-----------|----------|----------|
| UP | | | 18.0.0.0.0 | 4.9 d | 79.94% | 746 | 729 | OK |
| UP | | | 18.0.0.0.0 | 4.5 d | 79.44% | 356 | 355 | OK |
| UP | | | 12.2.0.1.0 | 8 h | 79.14% | 313 | 312 | OK |
| UP | | | 12.2.0.1.0 | 15 h | 79.16% | 312 | 311 | OK |
| UP | | | 18.0.0.0.0 | 4.6 d | 79.4% | 275 | 274 | OK |
| UP | | | 12.2.0.1.0 | 15 d | 79.62% | 221 | 220 | OK |
| UP | | | 11.2.0.4.0 | 31 d | 1.4% | 210 | 226 | OK |
| UP | | | 11.2.0.4.0 | 31 d | 1.4% | 210 | 226 | OK |
| UP | | | 18.0.0.0.0 | 4.5 d | 79.4% | 187 | 186 | OK |
| UP | | | 18.0.0.0.0 | 4.6 d | 79.4% | 183 | 182 | OK |

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# Inventory views. What are inventory views?

## Hardware/Software inventory table



Example for inventory tables

- Network interfaces & tunnels

- Physical components (fans, chassis, ...)

## Inventory view



- Software packages

- Oracle DBs

# The problem when combining inventory & services

> **The services all have different names,**
> **but I want to show them together with the inventory** ?

| | | | | | |
|---|---|---|---|---|---|
| **Local site stable, oracle-instance-2** | | | | | |
| State | Service | | | Icons | Summary |
| OK | ORA | **ABC** | Processes | ≡ 〰 | 120 of 2500 processes are used: 4.80% |
| OK | ORA | **XYZ** | Processes | ≡ 〰 | 312 of 2500 processes are used: 12.48% |

Relevant when service names contain an identifier, for example:

- Oracle instances, tablespaces etc.

- OMD services

- Filesystems

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# More flexibility in building inventory views

| State | Host | SID | Version | Processes | Uptime | Filesystem | Session |
|-------|------|-----|---------|-----------|--------|------------|---------|
| **UP** | server-solaris-oracle-2 | **ABC** | 11.2.0.4.0 | 27 | 15 d | 0.08% | 33 |
| **UP** | server-solaris-oracle-2 | **XYZ** | 11.2.0.4.0 | 33 | 15 d | 0.08% | 45 |

Use value from    SID ▼

✛ ✕

As macro named    $SID$

**Column with variable content:**
→ ORA ABC Processes
→ ORA XYZ Processes

Joined column ▼

Column (required)

Services: Service Perf-O-Meter ▼

of Service

✛ ✕    Explicit match ▼    ORA $SID$ Processes

# More flexibility for building almost all views

- 'Joined columns': for mixing host & service data

- Select now between:

  - Explicit match

  - Regular expression match

- Combinable with macros in inventory-based views

Joined column ▼

Column (required)

Services: Service Perf-O-Meter ▼

of Service

Regular expression mat... ▼  (?i)Filesystem /(oradata|oracle)/$SID$

Title

Filesystem

☐ Link
☐ Tooltip

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# Combining inventory tables: Why?

Oracle DB ▼
Oracle instances ▼

**Table with 'missing' data**

| SID | Process name | Version | Open mode |
|-----|--------------|---------|-----------|
| AALUOG | | 18.0.0.0.0 | OPEN |
| DALUOE | | 12.2.0.1.0 | OPEN |

**Columns I want to merge**

Oracle SGA info ▼

| SID | Fixed size | Redo buffers | Buffer cache size | In-memory area | Shared pool size | Large pool size |
|-----|-----------|--------------|-------------------|----------------|------------------|-----------------|
| AALUOG | 11.74 MiB | 20.26 MiB | 7.56 GiB | 0.00 B | 2.00 GiB | 512.00 MiB |
| DALUOE | 11.70 MiB | 20.30 MiB | 7.56 GiB | 0.00 B | 2.00 GiB | 512.00 MiB |

- ⬣ Combine data from two different tables together.

- ⬣ Only for inventory views

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# Combining inventory tables: How?

Joined inventory colu... ▾

Column

From inventory table | Oracle DB ➤ Oracle SGA info ▾

Display the column

Fixed size ▾

Columns to match (required)

✛ ✕ | The column | Must match
SID ▾ | $SID$

**Add new match criteria**

Title

Fixed size

☐ Link
☐ Tooltip

| SID | Version | Fixed size |
|---|---|---|
| DALUOK | 18.0.0.0.0 | 11.74 MiB |
| DALUOG | 18.0.0.0.0 | 11.74 MiB |
| DALUOS | 12.2.0.1.0 | 11.70 MiB |
| DALUOH | 18.0.0.0.0 | 11.74 MiB |
| TALUOE | 12.2.0.1.0 | 11.70 MiB |
| DALUOJ | 18.0.0.0.0 | 11.74 MiB |
| AALUOG | 18.0.0.0.0 | 11.74 MiB |
| TALUOG | 18.0.0.0.0 | 11.74 MiB |

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# ... making more powerful dashboards possible
## Application Monitoring │ Oracle



Oracle Performance Monitoring
Monitor > Workplace > Oracle Performance Monitoring

Inventory          ORA $SID$ Uptime          (?i)Filesystem /(oradata|oracle)/$SID$

| State | Host | SID | Version | Uptime | Filesystem | Processes | Sessions | Recovery |
|-------|------|-----|---------|--------|-----------|-----------|----------|----------|
| UP | | | 18.0.0.0.0 | 4.9 d | 79.94% | 746 | 729 | OK |
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| UP | | | 11.2.0.4.0 | 31 d | 1.4% | 210 | 226 | OK |
| UP | | | 11.2.0.4.0 | 31 d | 1.4% | 210 | 226 | OK |
| UP | | | 18.0.0.0.0 | 4.5 d | 79.4% | 187 | 186 | OK |
| UP | | | 18.0.0.0.0 | 4.6 d | 79.4% | 183 | 182 | OK |

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# Business Intelligence: Making changes visible



Overall state is OK, if ≥ 3 nodes are OK

OK

CRIT

CRIT

**New**

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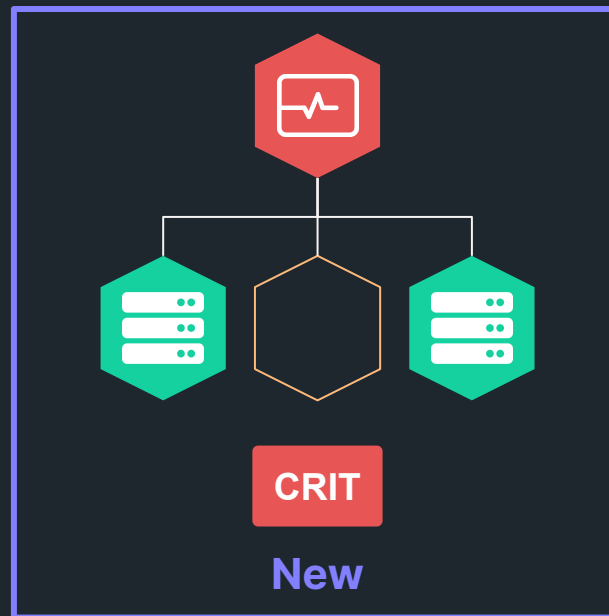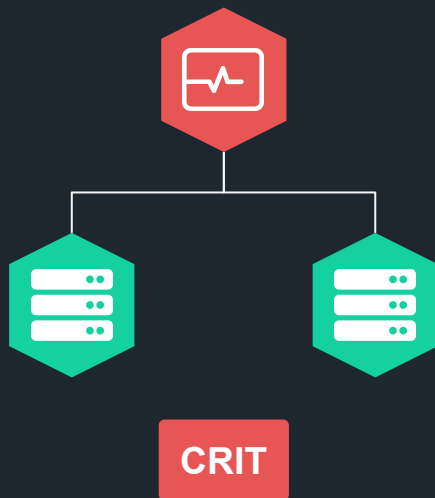
# BI aggregation can be frozen to identify changes

**Frozen aggregation**

**Current state**

**Hosts**

| X | Links | Tree | Difference between frozen and live aggregation |
|---|-------|------|------------------------------------------------|
|   |       | **CR** ▶ Host k8s-staging | Aggregations are equal |

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# Integrations

# Introducing Grafana integration 3.0.0
## For Checkmk >= 2.1.0 and Grafana >= 8.0

## Visible improvements

- Stability & Performance
  - More efficient API calls
- Quality of Life improvements
  - Simplified interface
  - CRE/CEE more similar
  - More explicit errors, if too many results are found
  - Graphs colors same as in CMK

## Internal improvements

- Nearly full rewrote plugin last year
- Higher long-term software quality
  - CI for building releases
  - End-to-End tests for core features
  - More unit tests
  - Typescript type safety
- License changed to Apache-2.0

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# Variable support is finally available with 3.1



43 votes

**Grafana integration: Support dashboard variables**

We want to build 1 dashboard to monitor a class of servers (e.g. MS SQL servers) and select the server we want to see via a dropdown. Unfortunately, the Grafana …

Suggested by: **Thomas Lippert** (26 Apr, '22) • Upvoted: 03 May • Comments: 2

Pin this | Planned | #Grafana

Hello,

what about Hostname Variables? Is this feature now supported?
So far, I always get the following error, wehen using hostname variables:

"Template variables could not be initialized: Template Variable Support not implemented."

**Support for Variables #28**

⊙ Open  ░░░░░░ opened this issue on Dec 3, 2019 · 22 comments

░░░░░░ commented on Dec 3, 2019  · · ·

It would be nice if you can use variables in the provided fields eg. host. So it is possible to create dynamic dashboards with rows.

# New possibilities with variables

**Application / server dashboard**

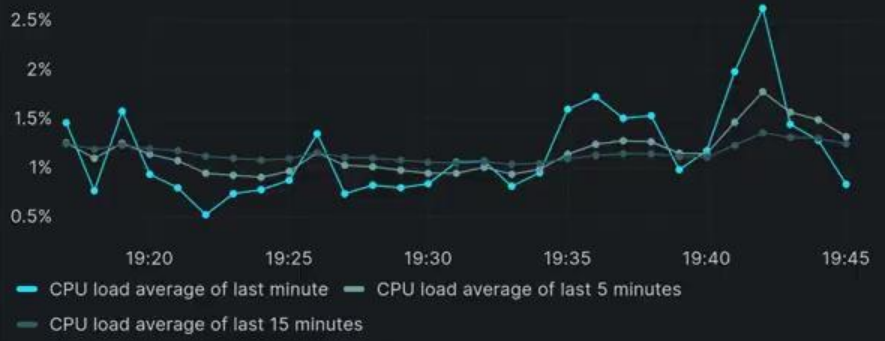Standard set of graphs. Adapt by changing host name.

**Narrowing down**

All (pre-filtered) graphs available for a host are shown.

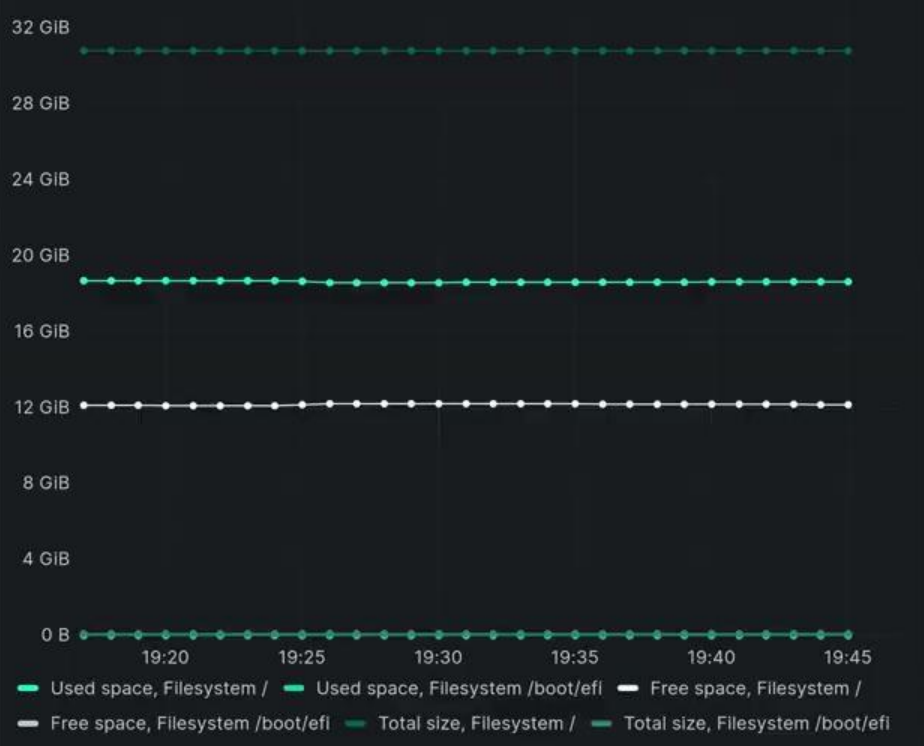Adapt by changing host or filtering further by service

Search or jump to...    ctrl+k

Add

Last 30 minutes

Site    Local site stable ⌄        Host    k8-w1.dev.tribe29.com ⌄

## CPU utilization



2.5%
2%
1.5%
1%
0.5%

19:20        19:25        19:30        19:35        19:40        19:45

● CPU load average of last minute    ● CPU load average of last 5 minutes
● CPU load average of last 15 minutes

## Memory



13.8%
13.75%
13.7%
13.65%

19:20        19:25        19:30        19:35        19:40        19:45

● RAM used %

## Filesystem



32 GiB
28 GiB
24 GiB
20 GiB
16 GiB
12 GiB
8 GiB
4 GiB
0 B

19:20        19:25        19:30        19:35        19:40        19:45

● Used space, Filesystem /    ● Used space, Filesystem /boot/efi    ● Free space, Filesystem /
● Free space, Filesystem /boot/efi    ● Total size, Filesystem /    ● Total size, Filesystem /boot/efi

# How to use variables in Grafana

**Sites / hosts / services** can be used as variables

**Variable dropdowns are dependent on each other**:
show only hosts from already selected site

**Feedback welcome!**
Ask for Benedikt / Teresa / Marcel at the knowledge fair

Checkmk
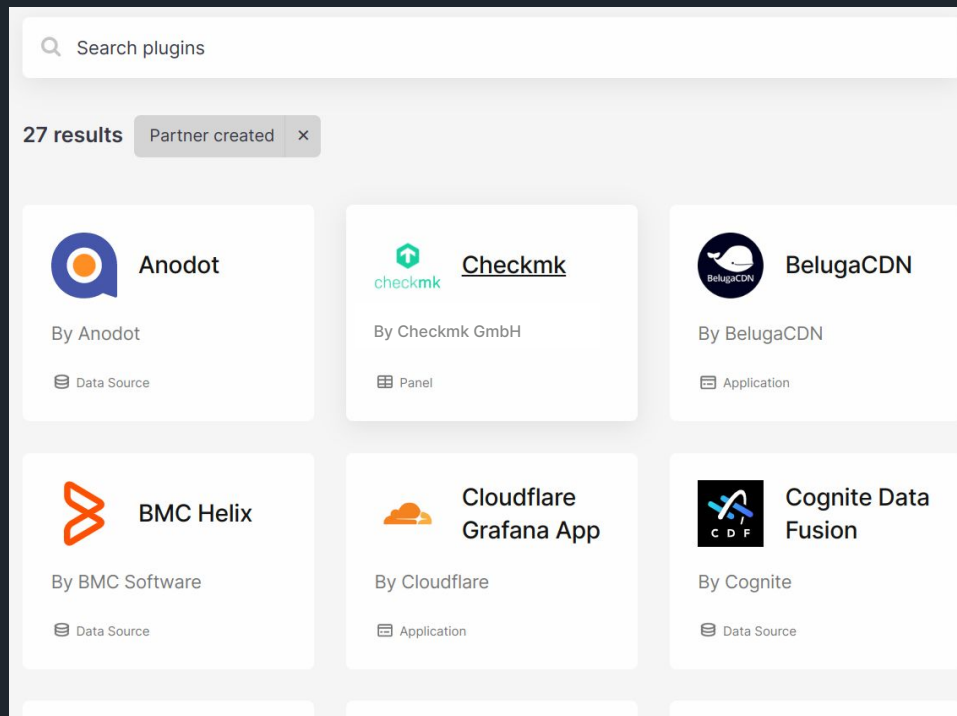Conference

# Integration now an official Grafana data source

## Grafana Cloud

- Grafana Cloud only allows installation of signed plug-ins (from official store)

- Required Checkmk Cloud Edition

## Grafana Self-managed

- Identical plug-in available on Checkmk GitHub, however unsigned

- Works with Checkmk Raw & Enterprise



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# Performance boost for InfluxDB integration

Acquire & analyze data  →  Retain & share data

**Measures to improve performance for export to InfluxDB**

- Increased metric queue sizes

- Send metrics to InfluxDB in batch

- Zip metrics sent to InfluxDB

# New MS Teams integration and mail improvements

## Alert via Microsoft Teams

New integration

- Highly requested via feature portal

- Based on MS Teams exchange plugin from Ricardo Ribeiro

- Integrated into general notification mechanism
  → Selectable as *Notification Method*

## Alert via mail

Quality of Life improvements

- New fields:
  Notification author & comment

- Alias is only shown if set and different to hostname

- Metrics not displayed on default anymore

  - Graphs are still shown on default

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# Quality of Life improvements
Performance

# More speed for Checkmk!

Many 'smaller' improvements in …

**Views**

**Setup**

**Event Console**

**Distributed monitoring**

# Performance improvements (I/II)

## Views / dashboards / graphs

- Many custom visualization elements lead to large configs:

  - Caching + optimized file format ⇒ 10x faster parsing

- Every page uses filters:

  - Optimized loading of filters ⇒ Few hundred ms faster

## Setup

- Service discovery: SNMP now up to 2x faster due to elimination of one out of two scan cycles

- Further areas with improvements: activate changes, rules, searches, notification processing, LDAP integration

# Bake agents faster!

| Configuration | | | Windows | Linux | Linux | Linux | AIX | Solaris | Solaris | Agent type |
|---|---|---|---|---|---|---|---|---|---|---|
| *Default configuration* | | | MSI | RPM | DEB | TGZ | TGZ | PKG | TGZ | Vanilla (factory settings) Folders: / (root folder) Hosts: co2-ampel, ... (6 Hosts) |
| Agent bakery packages: | Select packages: | Linux: DPKG (.deb) | not available | not available | DEB | not available | not available | not available | not available | Hosts: localhost |

- Reduce number of to be baked agents by defining target platform

- Compression of baked agents now turned off by default as often not needed

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# Performance improvements (II/II)

## Event Console

- Delete and archive events

- Filtering event console history

    - In general

    - Especially when using regex

    - For time range filters

- Processing of large logwatch.ec spool files

## Distributed monitoring

**Site status** ⌃

Local site stable                    **online**

**Enable all**    **Disable all**
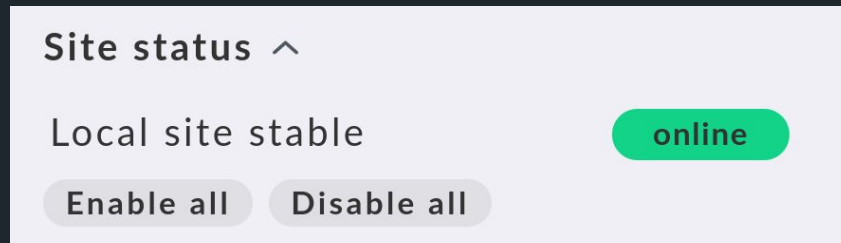
- Activate changes when synchronising users and user settings

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# Checkmk 2.2: UI improvements at a glance

## Extensions

Share your
monitoring
customizations

## Insights

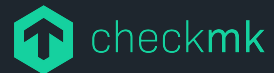Make the most
out of your
monitoring data

## Integrations

Export
Checkmk data

## Performance

Improve
Quality of Life

# Thank you!
Vielen Dank!

checkmk

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