

Newest Developments in Checkmk

CHECKMK CONFERENCE #6 – MUNICH, APRIL 28, 2020



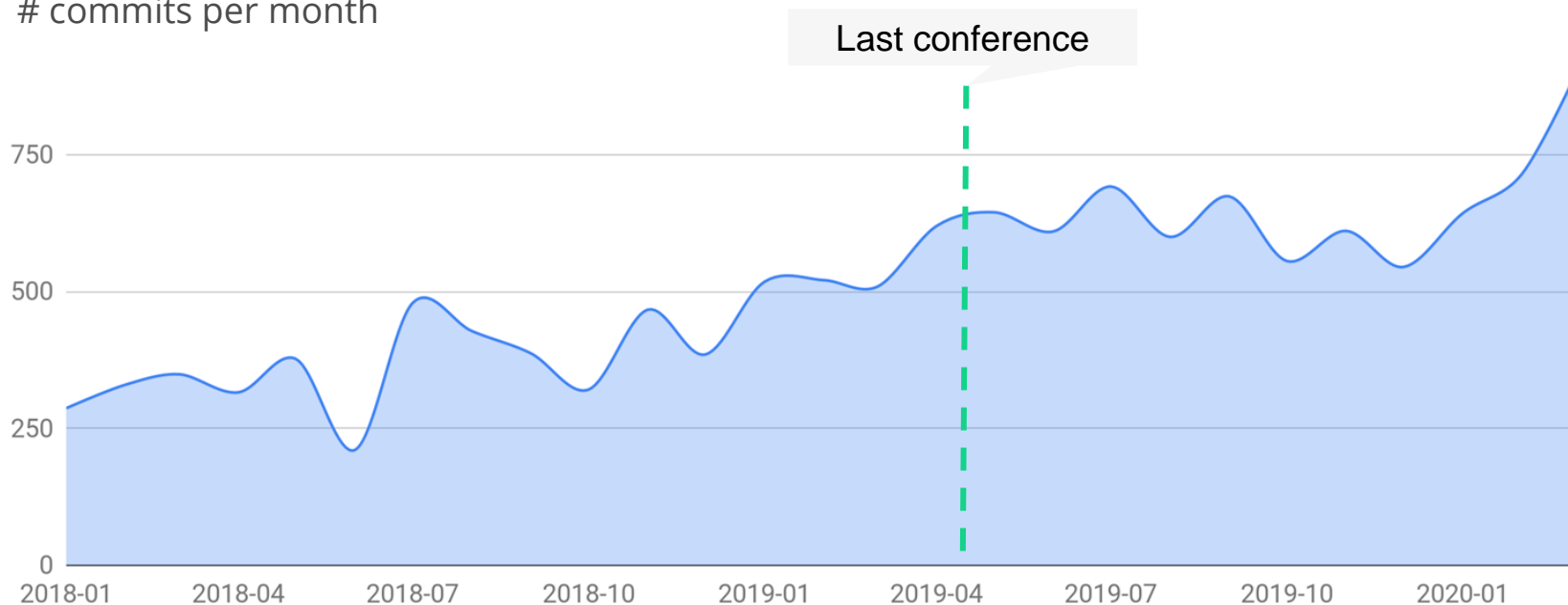
Lars Michelsen

Head of Development

tribe29

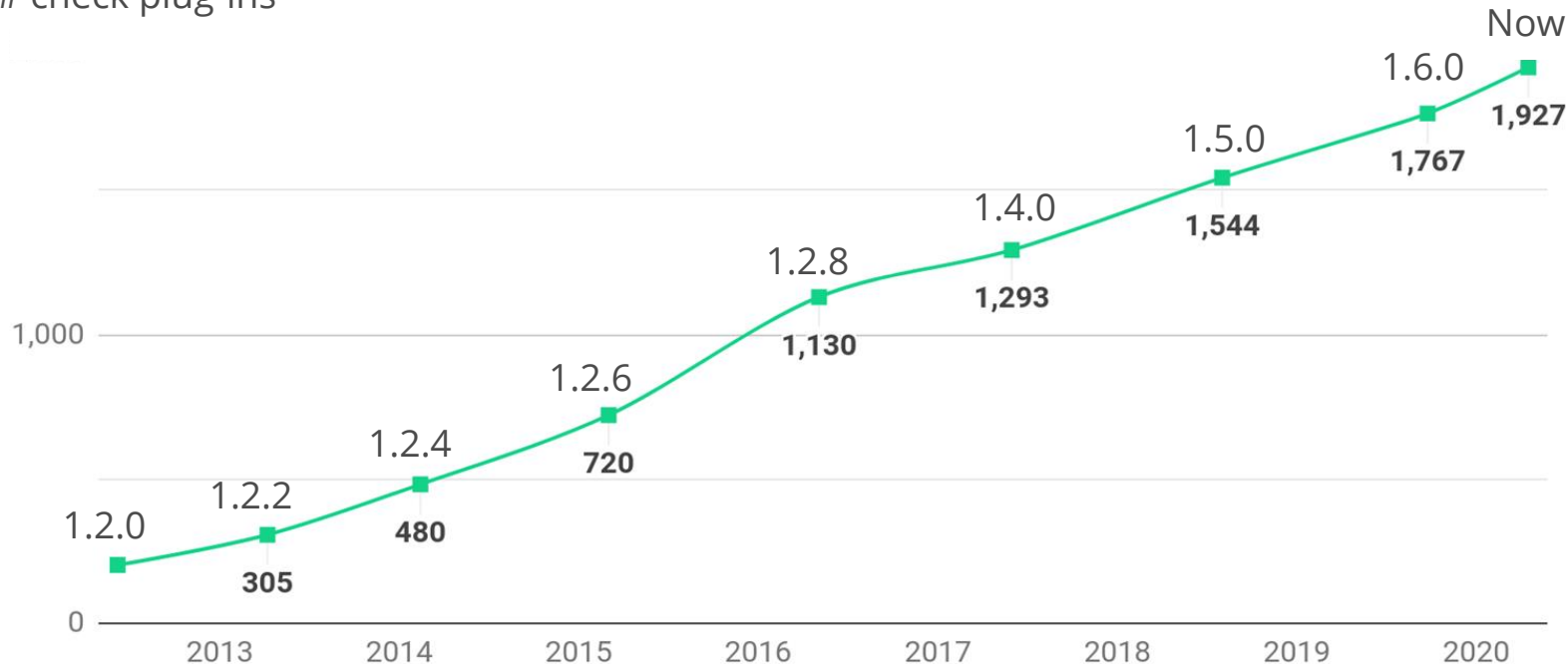
We have been busy in the last year

commits per month



Checkmk comes now with almost 2000 plug-ins

check plug-ins



And in werks...

320+

New features

800+

Bug & Security Fixes

Agenda

1. User Experience

2. Cloud & Containers

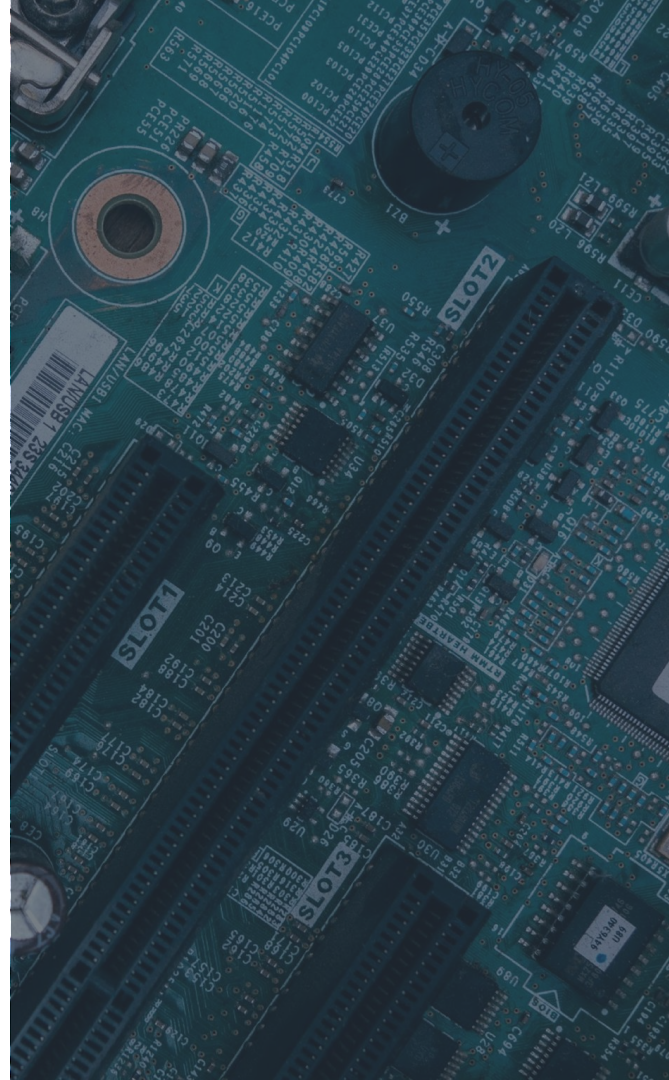
3. Network Monitoring

4. Automation & Extensibility

5. Performance

6. New Checks

7. State of Python 3 Migration





User Experience



Graphing & Metrics



Reporting



Dashboards



Tags & Labels



The New User Experience

Today 4:30pm by Mathias Kettner



User Experience

Graphing & Metrics

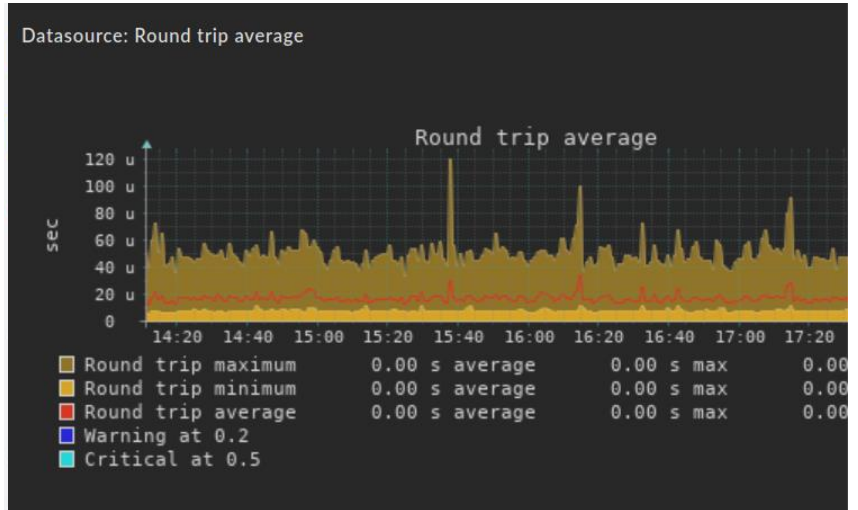
Reporting

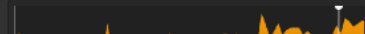
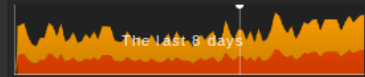
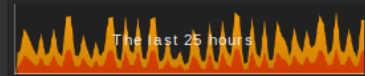
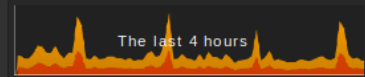
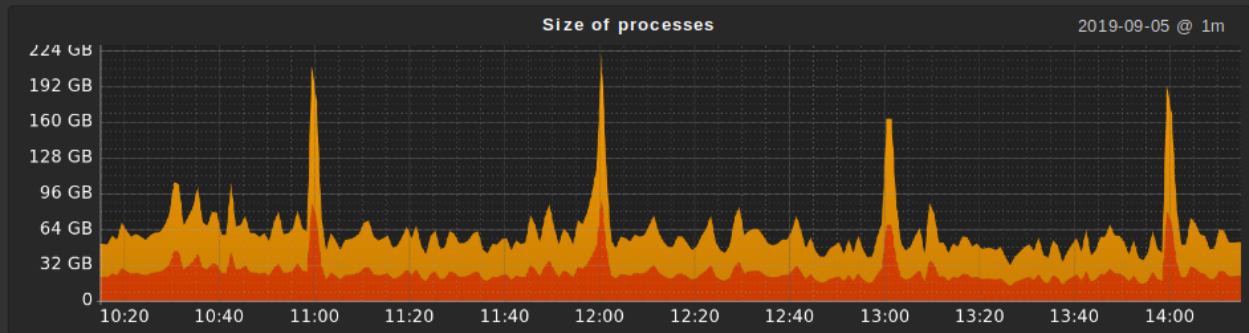
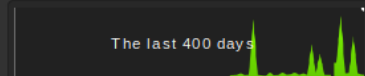
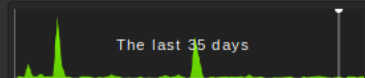
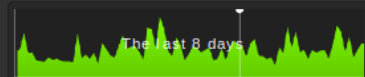
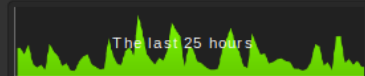
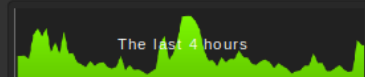
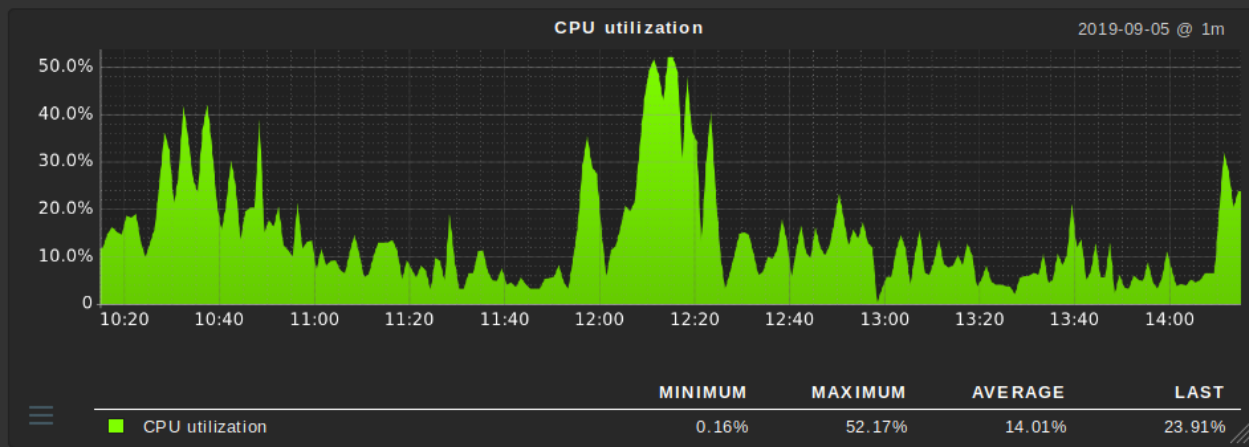
Dashboards

Tags & Labels



Modernized graphing in Raw Edition







User Experience

Graphing & Metrics

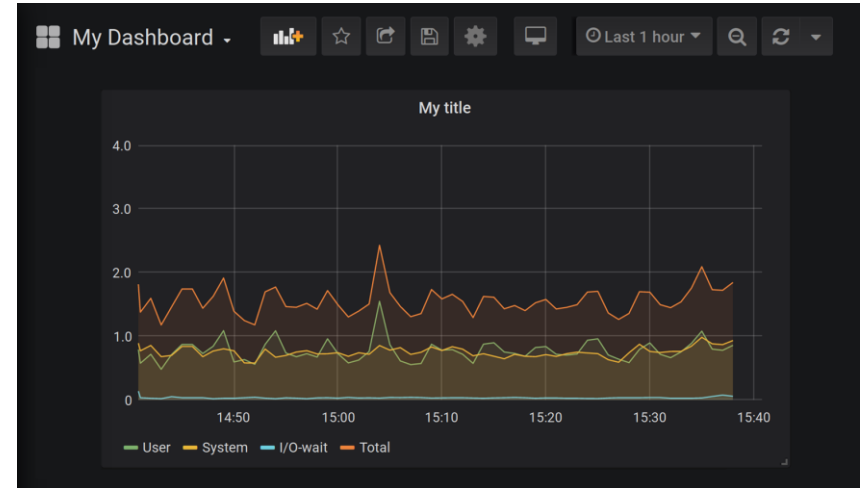
Reporting

Dashboards

Tags & Labels



Grafana integration for Raw Edition





User Experience



Graphing & Metrics



Reporting



Dashboards



Tags & Labels



Historic data analytics

- Years of data in your monitoring
- Understand historic performance



HOST	CPU LAST WEEK	CPU LAST 35 DAYS	RAM LAST WEEK	RAM LAST 35 DAYS
ldaptest.lan.tribe29.com	200%	90.99%	120.72 MB	118.03 MB
ci.lan.tribe29.com	118%	105%	12.73 GB	12.82 GB
review.lan.tribe29.com	42.18%	42.46%	1.76 GB	1.74 GB
mx.tribe29.com	39.24%	37.82%	10.53 GB	10.30 GB
pve-muc-1.lan.tribe29.com	23.49%	24.01%	11.50 GB	11.87 GB
build-dc4-001.tribe29.com	15.08%	9.06%	8.05 GB	6.36 GB
sw-ks-06.lan.tribe29.com	14.83%	14.81%	No data	No data
build-dc14-001.tribe29.com	11.6%	12.43%	16.66 GB	13.37 GB
sw-ms-01.lan.tribe29.com	10.28%	10.28%	No data	No data
monitoring.lan.tribe29.com	9.74%	8.8%	2.29 GB	2.43 GB



User Experience



Graphing & Metrics



Reporting



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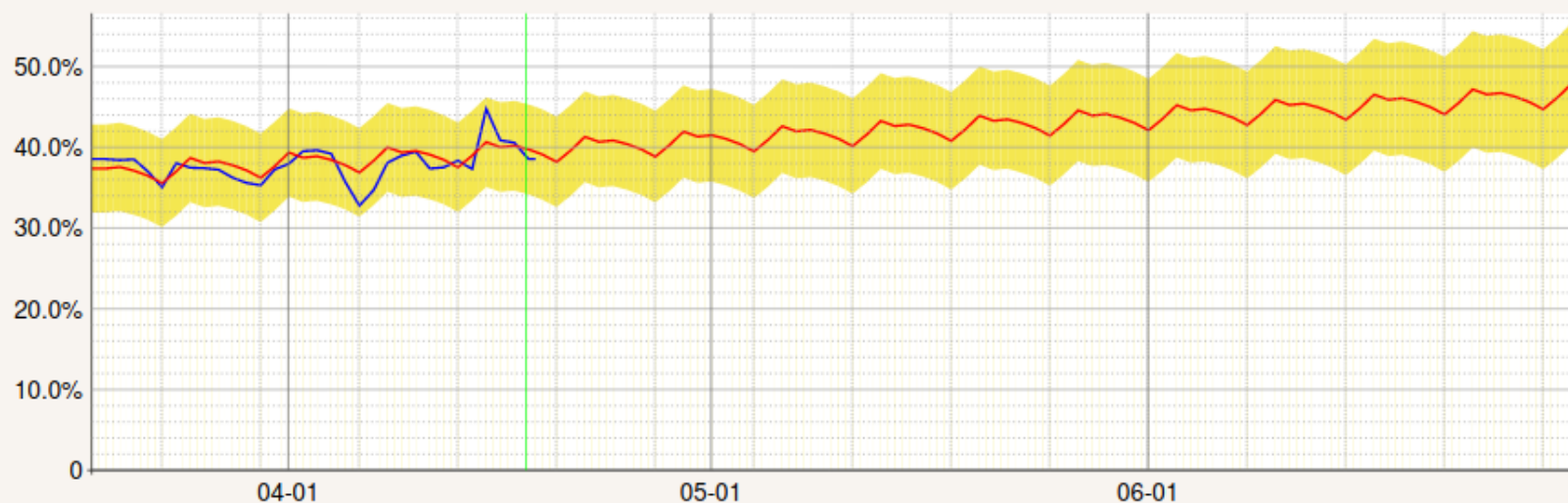
Forecast graphs

- Discover issues early
- Predict capacity requirements



Forecast for mx.tribe29.com - CPU utilization

2020-03-19 — 2020-06-30 @ 1d



	Minimum	Maximum	Average	Last
CPU utilization - upper band	41.03%	55.34%	47.78%	55.34%
CPU utilization - lower band	30.1%	40.33%	35.61%	40.33%
CPU utilization - original	32.79%	44.76%	37.85%	38.54%
CPU utilization - fit & forecast	35.56%	47.83%	41.7%	47.83%

Growth on 3 months

7.02% / month

Growth on 6 months

4.37% / month

▼ MODEL PARAMETERS

Change metric pve-dc4-002.tribe29. CPU utilization ▼ CPU utilization ▼ Maximum ▼ [Change metric](#)

Forecast Model Parametrization

Consider history of

| This year ▼

Forecast into the future

| 6 months ▼

Trend flexibility

| Susceptible ▼

Model seasonality

| Additive: Effects of seasonality are added to the trend. ▼

Confidence interval

| 86% - 1.5 standard deviations ▼

Display historic data since the last

| 100 days

Display Model Parametrization in graph

| ☐

[Apply](#)



User Experience



Graphing & Metrics



Reporting



Dashboards



Tags & Labels



Improved PDF reports

- Table of Contents
- Front matter / cover templates
- Custom time ranges for elements



User Experience



Graphing & Metrics



Reporting



Dashboards



Tags & Labels



Reporting for Managed Services Edition

- Customer specific macros
- Customer individual templates



User Experience



Graphing & Metrics



Reporting



Dashboards



Tags & Labels

- 1 Powerful data visualization
- 2 Easy-to-build dashboards
- 3 Pre-built intelligent dashboards



User Experience

Graphing & Metrics

Reporting

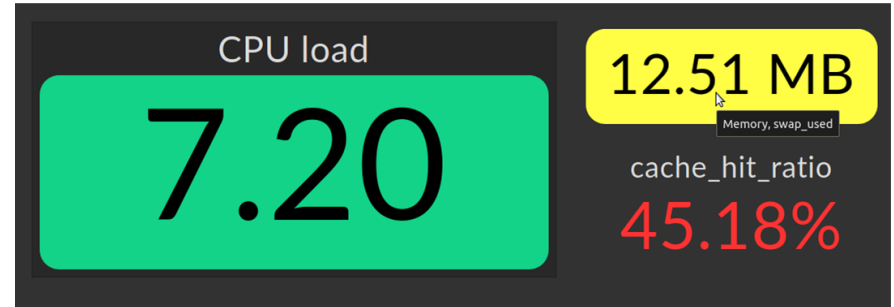
Dashboards

Tags & Labels

1 Powerful data visualization



New dashlets - Single metric





User Experience



Graphing & Metrics



Reporting



Dashboards



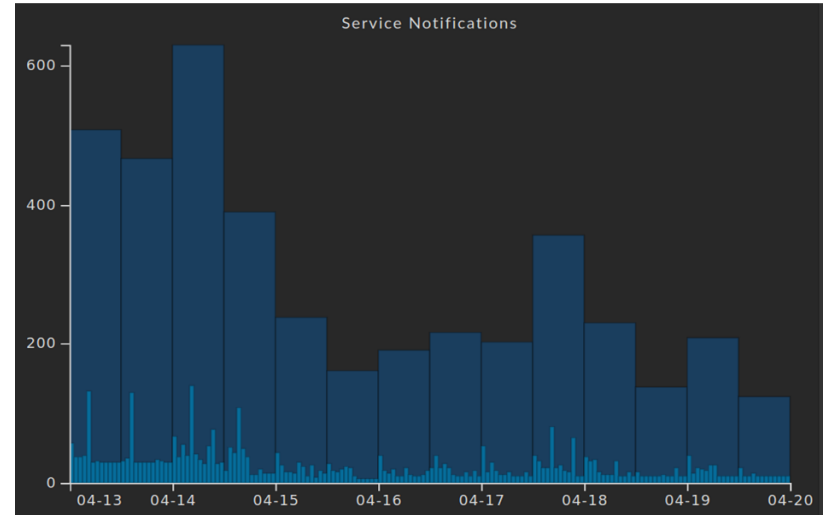
Tags & Labels

1

Powerful data visualization



New dashlets - BarBar charts





User Experience

Graphing & Metrics

Reporting

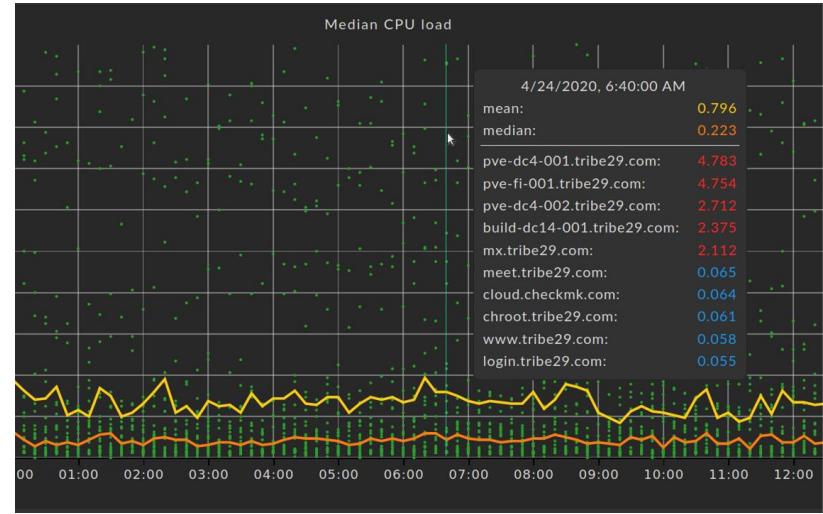
Dashboards

Tags & Labels

1 Powerful data visualization

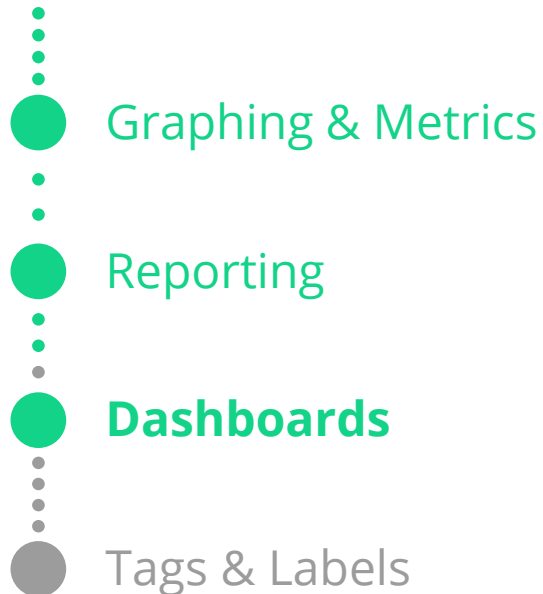


New dashlets - Scatter plots






User Experience



2 Easy-to-build dashboards

- ✓ Seamless deleting of dashlets
-  Editing dialogs in pop-ups
- ✓ Copying of dashlets
- ✓ "Link existing view" dashlet



User Experience

Graphing & Metrics

Reporting

Dashboards

Tags & Labels

3 Pre-built intelligent dashboards



Context-sensitive dashboards

URL: /dashboard.py?name=esx_host&host=esx-6.0-2&service_regex=Filesystem

ESX Host esx-6.0-2

VIEW	
STATE	SERVICE
OK	Filesystem FILER2-BTStaging
OK	Filesystem FILER1-NYVStore2



User Experience



Graphing & Metrics



Reporting



Dashboards



Tags & Labels

3 Pre-built intelligent dashboards



Checkmk Dashboard



vSphere Dashboard



Linux Dashboard



Windows Dashboard

and so on...

Checkmk overview

Tech preview - still to be styled

CHECKMK SERVERS


HOST	OPERATING SYSTEM	CORES	TOTAL USABLE RAM	CPU UTILIZATION	CPU LOAD	MEMORY	DISK IO SUMMARY
cmk_berlin	Ubuntu 18.04.4 LTS	4	15.53 GB	19.9%	1.78	66.85%	212.27 kB/s / 572
cmk_dortmund	Ubuntu 18.04.4 LTS	4	15.53 GB	18.17%	1.96	66.88%	127.36 kB/s / 650
cmk_london	Ubuntu 18.04.4 LTS	4	15.53 GB	17.55%	1.88	67.16%	93.65 kB/s / 904

CHECKMK SITES

HOST	SITE	VERSION	HOSTS	SERVICES	ACT. HELPER	CMK HELPER	LIVE HELPER	CMC	DCD	LIVEPROXYD	MKNOTIFYD	MKEVENT
cmk_berlin	heute	2020.04.21.cee	3	117	3.72%	2.67%	0.94%	running	running	running	running	running
cmk_dortmund	heute	2020.04.21.cee	3	117	1.86%	2.45%	1.78%	running	running	running	running	running
cmk_london	heute	2020.04.21.cee	3	117	1.00%	2.44%	2.53%	running	running	running	running	running

Tech preview - still to be styled

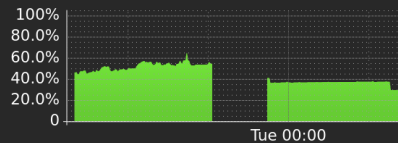
Checkmk server heute

cmkadmin (admin) 08:26 

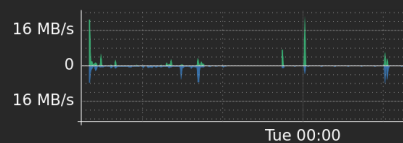
CPU load

4.12

RAM used %



Disk throughput



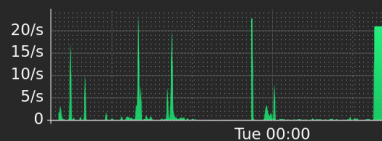
NETWORK

OK	Interface 2	0.00 bit/s	96.1 bit/s
OK	Interface 4	24.2 bit/s	362 bit/s
OK	Interface 6	0.00 bit/s	0.00 bit/s

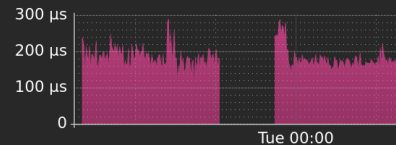
Filesystem /

194.85 GB

Major page faults



Average disk latency



CHECKMK SITES OF HOST HEUTE

HOST	SITE	VERSION	HOSTS	SERVICES	ACT. HELPER	CMK HELPER	LIVE HELPER	CMC	DCD	LIVEPROXYD	MKNOTIFYD	MKEVENTD	APACHE	RRDCACHED	XINETD	CRONTAB
heute	heute		1	58	0.00%	0.35%	0.66%	running	running	running	running	running	running	running	not existent	running
heute	lmtest		0	0	0.00%	0.00%	0.00%	running	running	running	running	running	running	running	not existent	running



User Experience



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Tags & Labels



Tag usage overview



Tags

▶ ACTIONS	TAG GROUP	TAG	EXPLICITLY SET ON FOLDERS	EXPLICITLY SET ON HOSTS	USED IN RULESETS
	Agent type	Check_MK Agent (Server)			
	Agent type	SNMP (Networking device, Appliance)			
	Criticality	Do not monitor this host			• Hosts to be monitored
	Networking Segment	Local network (low latency)			
	Networking Segment	WAN (high latency)			• PING and host check parameters
(builtin)	Data sources / SNMP	No SNMP	<ul style="list-style-type: none"> • Main directory / WebShop / Routers • Main directory / WebShop / Loadbalancers 	<ul style="list-style-type: none"> • larsmichelsen.com, google.com, google.de, mail.web.de 	

Auxiliary tags

▶ ACTIONS	TAG	USED BY TAGS	EXPLICITLY SET ON FOLDERS	EXPLICITLY SET ON HOSTS	USED IN RULESETS
(builtin)	monitor via SNMP	<ul style="list-style-type: none"> • Dual: Check_MK Agent + SNMP, Legacy SNMP device (using V1), SNMP (Networking device, Appliance), SNMP v1, SNMP v2 or v3 			• CPU load (not utilization!)



User Experience

- Graphing & Metrics
- Reporting
- Dashboards
- Tags & Labels**

✓ Host/service label filters

HOST LABELS

cmk/docker_object:node x

cmk/docker_image_version:9.5 x

Add some label

SERVICE LABELS

cmk/jenkins_node_label_cmk_gerrit:yes x

Add some label



User Experience

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Tags & Labels



Labels for vSphere, Kubernetes, Docker



Labels for operating systems

UP	deployment_kubernetes-dashboard	4	0	0	0	addonmanager.kubernetes.io/mode:Reconcile cmk/piggyback_source_minikube-master:yes kubernetes.io/minikube-addons:dashboard version:v1.10.1
UP	e024ecb21536	7	0	0	0	cmk/docker_image:friendlyhello:latest cmk/docker_image_name:friendlyhello cmk/docker_image_version:latest cmk/docker_object:container cmk/piggyback_source_heute:yes
UP	heute	37	2	3	6	cmk/docker_object:node
UP	minikube	10	0	0	0	beta.kubernetes.io/arch:amd64 beta.kubernetes.io/os:linux cmk/piggyback_source_minikube-master:yes kubernetes.io/arch:amd64 kubernetes.io/hostname:minikube



User Experience



Graphing & Metrics



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Dashboards



Tags & Labels

Improved label usability



Labels as notification condition



Improved label discovery

Agenda

1. User Experience

2. Cloud & Containers

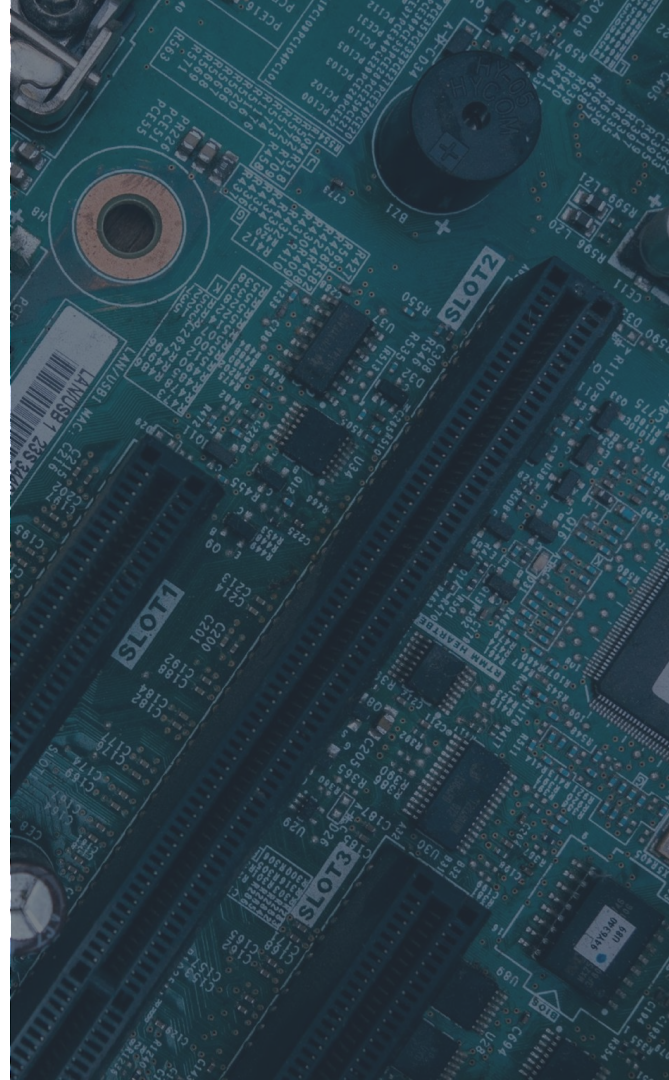
3. Network Monitoring

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5. Performance

6. New Checks

7. State of Python 3 Migration





Cloud & Containers

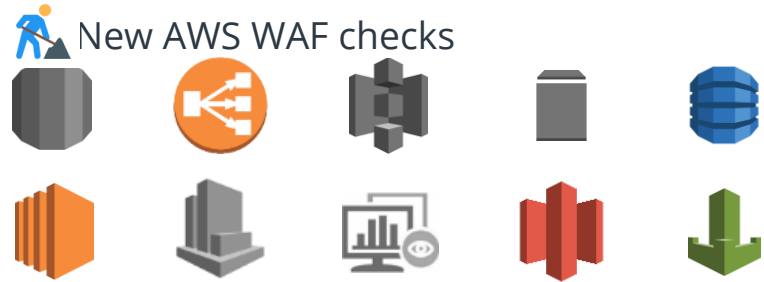
-
- AWS
-
- Azure
-
- Kubernetes
-
- Prometheus
-
- Dynamic Config



Cloud & Containers

- **AWS**
- Azure
- Kubernetes
- Prometheus
- Dynamic Config

- ✓ In-depth monitoring for AWS ELB
- ✓ Updated AWS EC2 monitoring
- ✓ New AWS Glacier checks
- ✓ New AWS DynamoDB checks
- ✓ New AWS WAF checks





Cloud & Containers

•

● AWS

•

● **Azure**

•

● Kubernetes

•

● Prometheus

•

● Dynamic Config

✓ Azure Active Directory Connect Check





Cloud & Containers

•

● AWS

•

● Azure

•

● **Kubernetes**

•

● Prometheus

•

● Dynamic Config

✓ Kubernetes Ingress monitoring

✓ Kubernetes jobs



Cloud & Containers

-
- AWS
-
- Azure
-
- Kubernetes
-
- **Prometheus**
-
- Dynamic Config



**Integrating Prometheus:
Towards a Unified Monitoring**

Tomorrow morning by Wontek Hong



Cloud & Containers

-
- AWS
-
- Azure
-
- Kubernetes
-
- Prometheus
-
- **Dynamic Config**

- ✓ Deletion grace time
- ✓ Piggyback usage improvements
- 👷 DCD-Plugin-API

Agenda

1. User Experience

2. Cloud & Containers

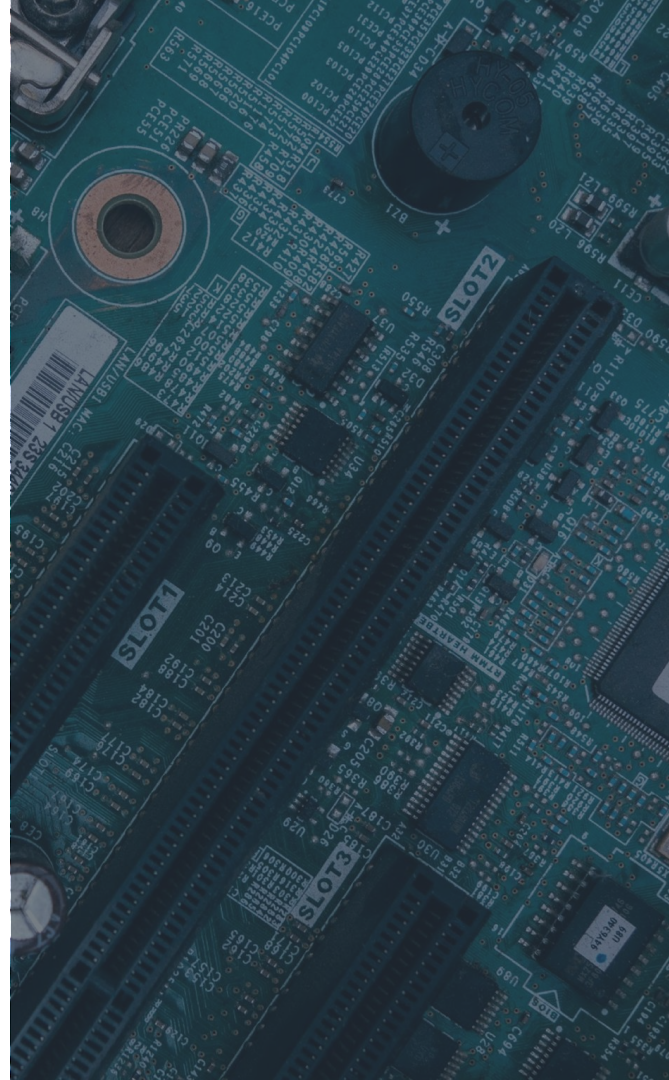
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Network Monitoring



Netflow monitoring



Network check plug-ins



**Network Flow Monitoring:
Integrating ntop & Checkmk**

At 11:30 by Alex Wilms and Simone Mainardi



Network Monitoring



Netflow monitoring



Network check plug-ins



Extended VPN Monitoring

- Pulse Secure Appliances
- Fortigate: VPN tunnels (WATO option)
- Cisco ASA: WebVPN & IPsec sessions

Anything missing? We prioritize any development requests in this category



Network Monitoring

- Netflow monitoring
- Network check plug-ins



And many more check plug-ins around network monitoring

HUAWEI

aruba
a Hewlett Packard
Enterprise company

 **TERACOM**
control solutions

 **Entersekt**

ARISTA

 **tp-link**

 **BeyondTrust**

 **Pulse Secure**

 **IBM DataPower
Gateways**

SOPHOS



CISCO

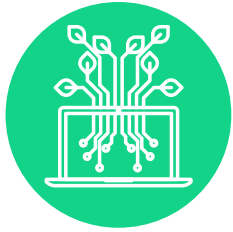
Cisco ASA
Cisco UCS
Cisco ISE

 **SEH**

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Automation & Extensibility



Agency Bakery



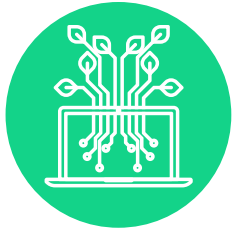
Notifications



REST-API



Internal APIs



Automation & Extensibility



● Agency Bakery



● Notifications



● REST-API

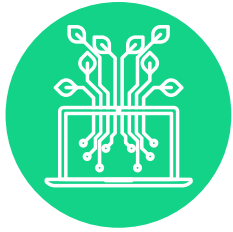


● Internal APIs



Distributed Agent Updates

- Deal with segmented networks
- Save bandwidth



Automation & Extensibility



Agency Bakery



Notifications



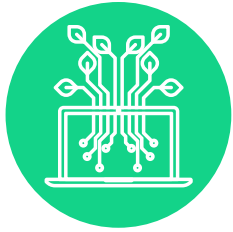
REST-API



Internal APIs



Support of local files



Automation & Extensibility



Agency Bakery



Notifications



REST-API



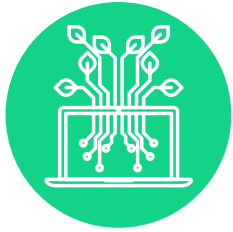
Internal APIs



Integration for Cisco Webex Teams



Integration for Microsoft Teams



Automation & Extensibility



Agency Bakery



Notifications



REST-API



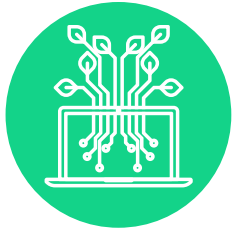
Internal APIs



One API to Rule Them All:

The New REST-API

Tomorrow by Christoph Rauch



Automation & Extensibility



Agency Bakery



Notifications



REST-API

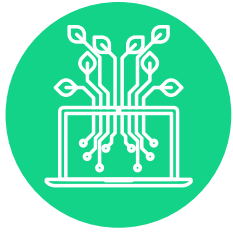


Internal APIs



The New Check-API

Tomorrow by Moritz Kiemer



Automation & Extensibility



Agency Bakery



Notifications



REST-API



Internal APIs



Inventory-API



Bakery-API

Agenda

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Performance

-
- **Helper processes**
-
- **Activate Changes**
-
- **Configuration**



Performance



Helper Processes



Activate Changes



Configuration



Improved scalability of Checkmk Helpers

- Split helpers in two
- Fetcher: Collect raw monitoring data
 - Small memory usage
 - May wait for network IO
 - We can have a lot of them!
- Checker: Produces check results
 - CPU bound
 - Uses as much memory as today
 - Need a lot less of them



Performance



Helper Processes



Activate Changes



Configuration

The issue

- Each activation packs the whole configuration into a config snapshot
- Syncs the whole thing
- Unpacks it on the target sites.

This involves the whole Checkmk configuration and can also include the MKPs (lots of files, potentially larger files)



Performance

-
- Helper Processes
-
- **Activate Changes**
-
- Configuration

The solution



Faster activation of changes via incremental sync of configuration of remote sites



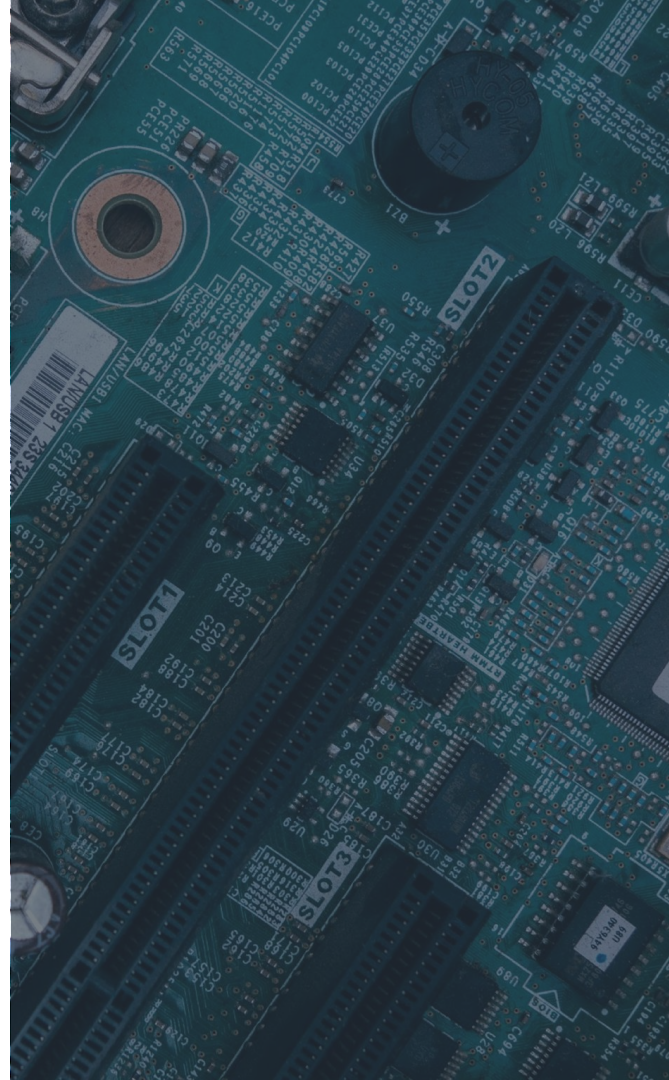
Performance

-
- Helper Processes
-
- Activate Changes
-
- **Configuration**

- ✓ Increased rule evaluation performance
- ✓ Decreased configuration loading time for setups with large amount of folders
- ✓ Faster ruleset searches

Agenda

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New and extended check plug-ins

 checkmk
Application
Monitoring

 graylog
 elasticsearch

 RabbitMQ
 redis
 IBM MQ
 mongoDB
 MySQL
 Couchbase
 ORACLE

 Jira
 Apache
 SAP

 Jenkins
 Zerto



 checkmk
Infrastructure
Monitoring

 HUAWEI
 tp-link
 Pulse Secure
 IBM DataPower Gateways
 ARISTA
 CISCO
 BeyondTrust
 SOPHOS
 SEH
 aruba

 silver peak
 TERACOM
 Entersekt

 DELL EMC ECS
 SCALEIO
 Hewlett Packard Enterprise
 NetApp
 QNAP
 FUJITSU

 Linux
 ORACLE
 SOLARIS
 AIX
 OpenBSD


 DELL
 PowerEdge
 QCT

 ceph
 vmware
 kubernetes
 Microsoft Hyper-V
 Azure
 NUTANIX
 PROXMOX
 aws

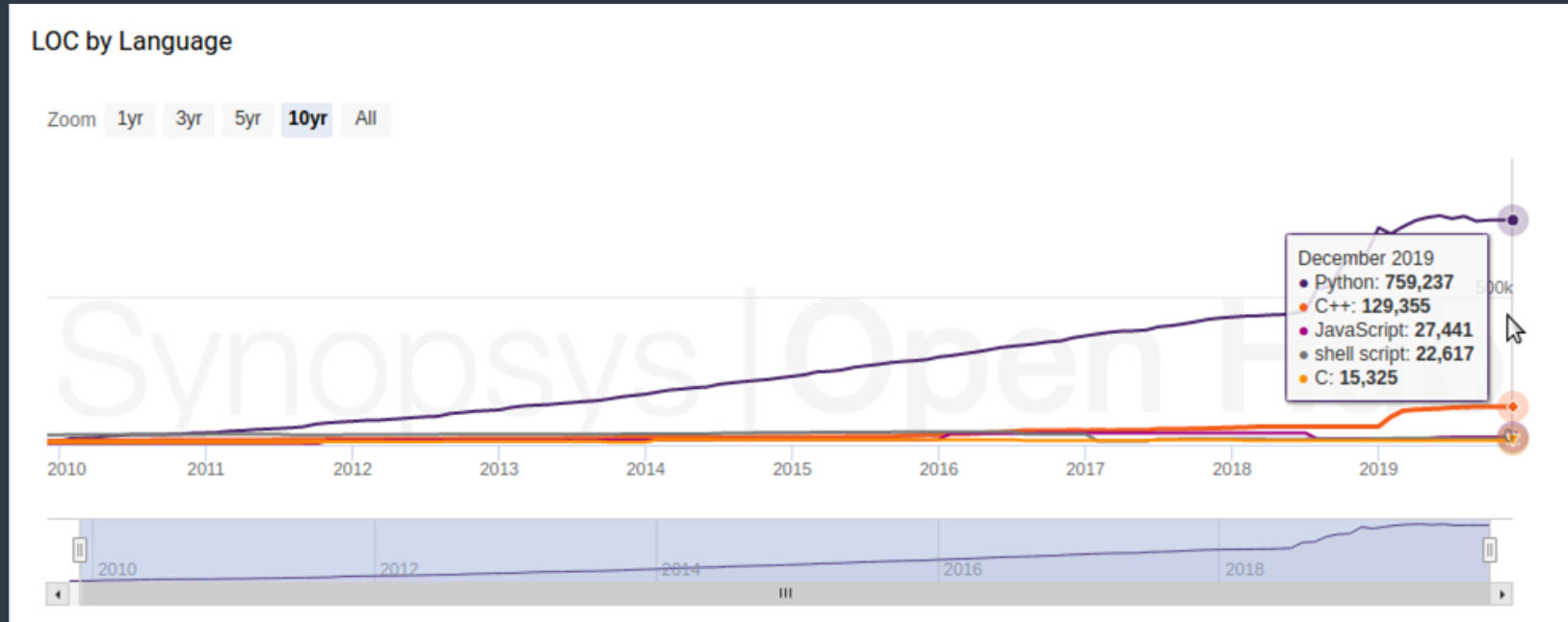
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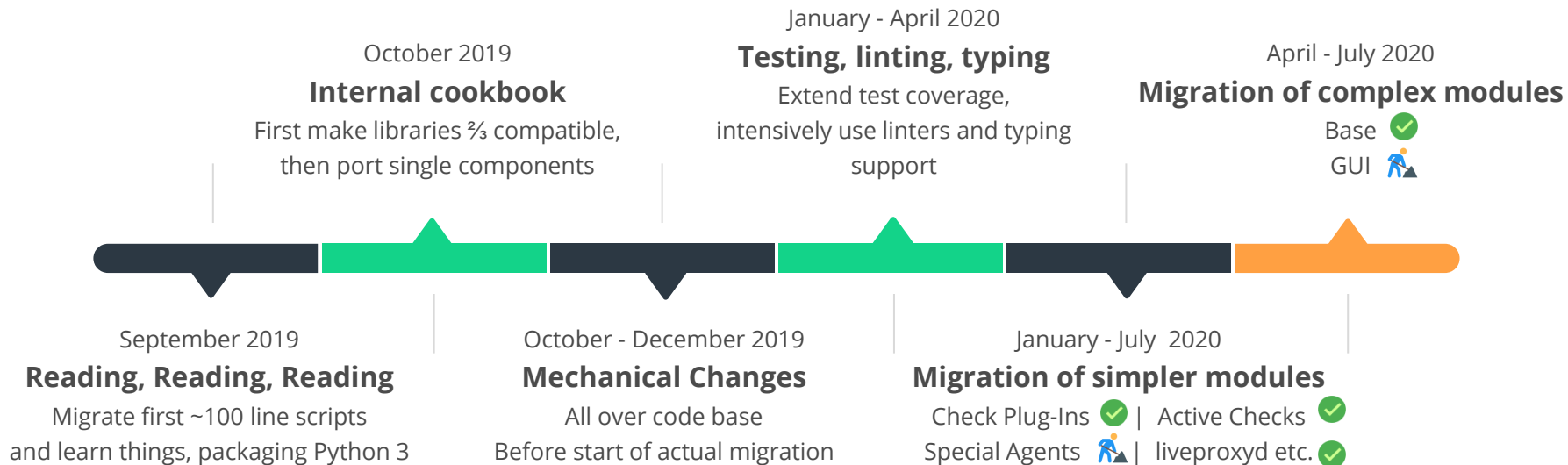
To-Do

Move 760.000 lines of Python 2.7 code to Python 3



Thanks and Have fun...

The road to Python 3 - We are on track for 1.7



Shipping Python 2.7 and 3.8 during the transition phase, 2.7 will be dropped till 1.7

Thank you

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