CERN

Chopin Management System

Improving Windows infrastructure monitoring and management

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Outline

- Windows Server Infrastructure
- Objective
- The Chopin project
- Architecture overview
- Deployment

Collaboration, Devices and Applications

CERN, IT-CDA

The group Collaboration, Devices and Applications (CDA) provides information services such as video conferencing, webcast & recording, indico, the CERN Document Server (CDS), document conversion, printing, e-mail, IP telephony, the Invenio Digital Library Framework, Windows' environment tools, web services, authentication and authorisation services, e-publishing and software development tools on a range of devices, such as desktops, laptops, tablets and smartphones.

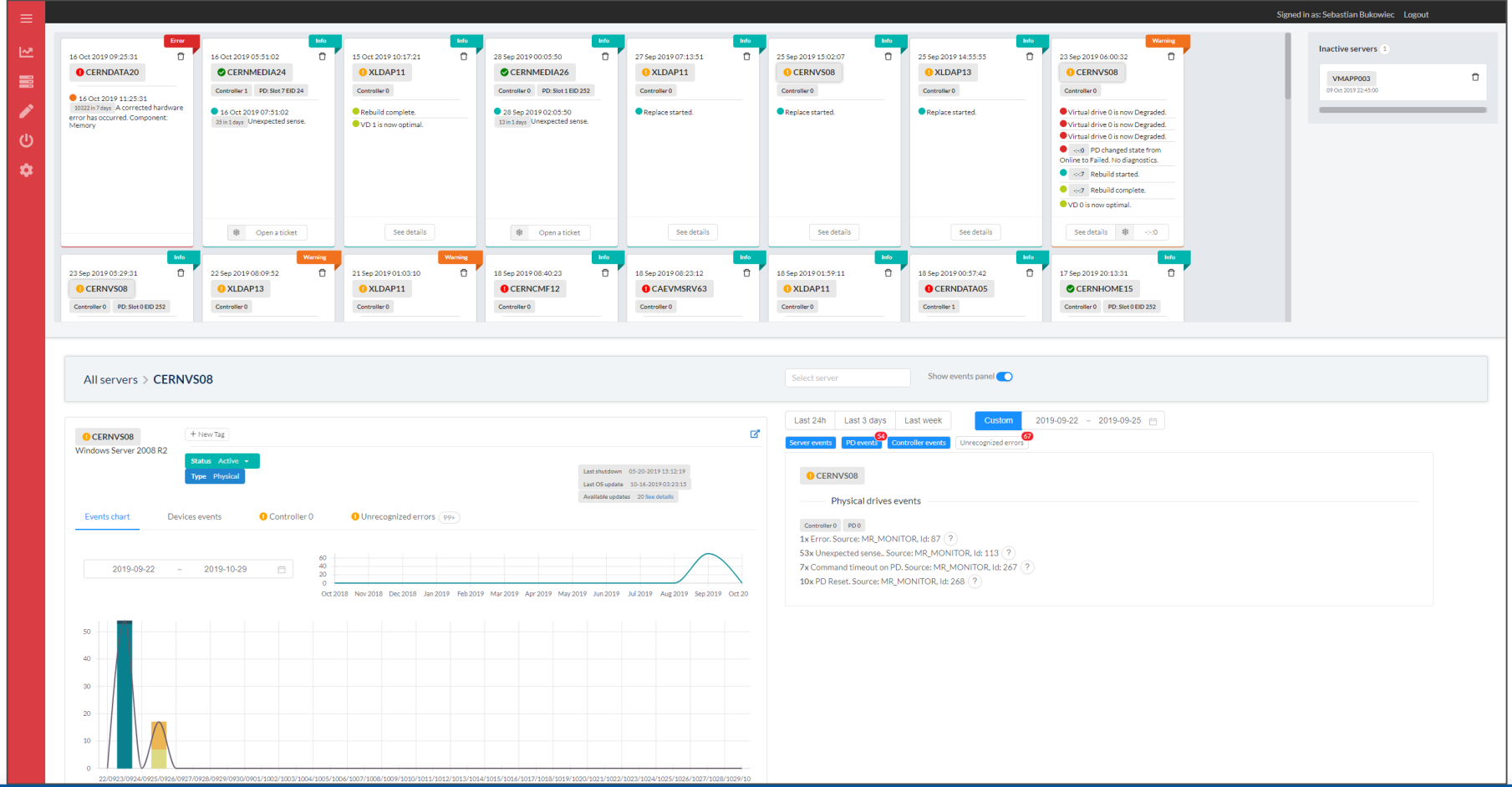
Windows Server Infrastructure

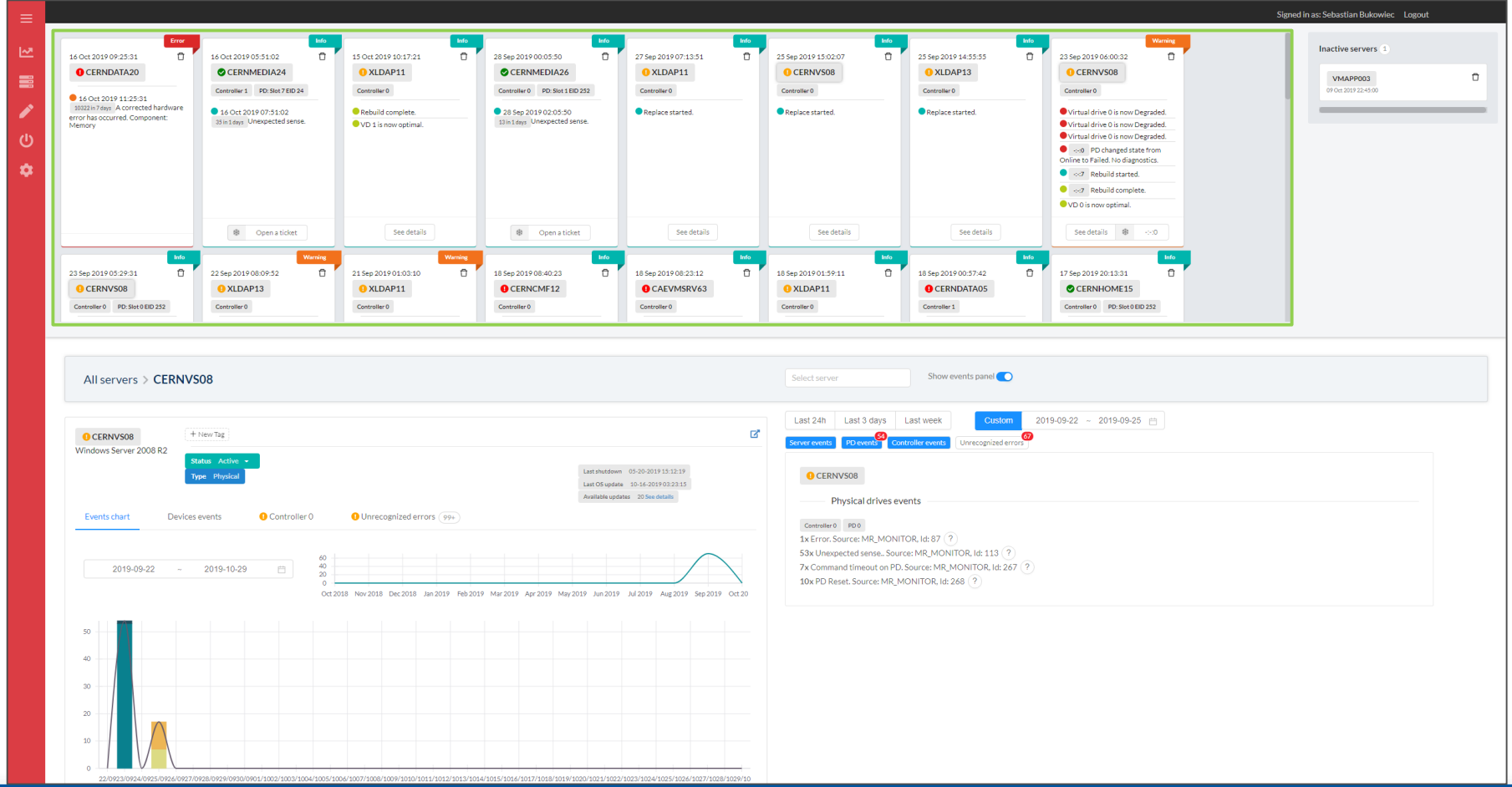
- ~700 machines to manage
- Microsoft System Center Operation Manager (SCOM) used for alarming and availability
- Many automatic operational information coming via e-mails
  - Daily hardware events report

Objective

- Central and readably access to details about all managed machines
- Detection of critical events
- Assistance in the operations
- Possibility to extend
- SCOM replacement

Chopin Management System


Signed in as: Sebastian Bukowiec Logout
Inactive servers
VMAPP003
All servers > CERNVS08
Select server
Show events panel
CERNVS08
Windows Server 2008 R2
Status Active
Type Physical
Events chart
Devices events
Controller 0
Unrecognized errors
Last 24h
Last 3 days
Last week
Custom
2019-09-22 ~ 2019-09-25
Server events
PD events
Controller events
Unrecognized errors
Physical drives events
1x Error. Source: MR_MONITOR, Id: 87
53x Unexpected sense.. Source: MR_MONITOR, Id: 113
7x Command timeout on PD. Source: MR_MONITOR, Id: 267
10x PD Reset. Source: MR_MONITOR, Id: 268


Signed in as: Sebastian Bukowiec Logout
Error
16 Oct 2019 09:25:31
CERNDATA20
16 Oct 2019 11:25:31
10322 in 7 days A corrected hardware error has occurred. Component: Memory
Info
16 Oct 2019 05:51:02
CERNMEDIA24
Controller 1 PD: Slot 7 EID 24
16 Oct 2019 07:51:02
33 in 1 days Unexpected sense.
Open a ticket
15 Oct 2019 10:17:21
XLDAP11
Controller 0
Rebuild complete.
VD 1 is now optimal.
See details
28 Sep 2019 00:05:50
CERNMEDIA26
Controller 0 PD: Slot 1 EID 252
28 Sep 2019 02:05:50
13 in 1 days Unexpected sense.
Open a ticket
27 Sep 2019 07:13:51
XLDAP11
Controller 0
Replace started.
See details
25 Sep 2019 15:02:07
CERNVS08
Controller 0
Replace started.
See details
25 Sep 2019 14:55:55
XLDAP13
Controller 0
Replace started.
See details
Warning
23 Sep 2019 06:00:32
CERNVS08
Controller 0
Virtual drive 0 is now Degraded.
Virtual drive 0 is now Degraded.
Virtual drive 0 is now Degraded.
-:-0 PD changed state from Online to Failed. No diagnostics.
-:-7 Rebuild started.
-:-7 Rebuild complete.
VD 0 is now optimal.
See details
-:-0
Inactive servers 1
VMAPP003
09 Oct 2019 22:45:00
23 Sep 2019 05:29:31
CERNVS08
Controller 0 PD: Slot 0 EID 252
22 Sep 2019 08:09:52
XLDAP13
Controller 0
21 Sep 2019 01:03:10
XLDAP11
Controller 0
18 Sep 2019 08:40:23
CERNCMF12
Controller 0
18 Sep 2019 08:23:12
CAEVMSRV63
Controller 0
18 Sep 2019 01:59:11
XLDAP11
Controller 0
18 Sep 2019 00:57:42
CERNDATA05
Controller 1
17 Sep 2019 20:13:31
CERNHOME15
Controller 0 PD: Slot 0 EID 252
All servers > CERNVS08
Select server
Show events panel
CERNVS08
Windows Server 2008 R2
+ New Tag
Status Active
Type Physical
Last shutdown 05-20-2019 13:12:19
Last OS update 10-16-2019 03:23:15
Available updates 20 See details
Events chart
Devices events
Controller 0
Unrecognized errors 99+
2019-09-22 ~ 2019-10-29
Oct 2018 Nov 2018 Dec 2018 Jan 2019 Feb 2019 Mar 2019 Apr 2019 May 2019 Jun 2019 Jul 2019 Aug 2019 Sep 2019 Oct 20
22/0923/0924/0925/0926/0927/0928/0929/0930/0901/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/10
Last 24h
Last 3 days
Last week
Custom
2019-09-22 ~ 2019-09-25
Server events
PD events 54
Controller events
Unrecognized errors 67
CERNVS08
Physical drives events
Controller 0 PD 0
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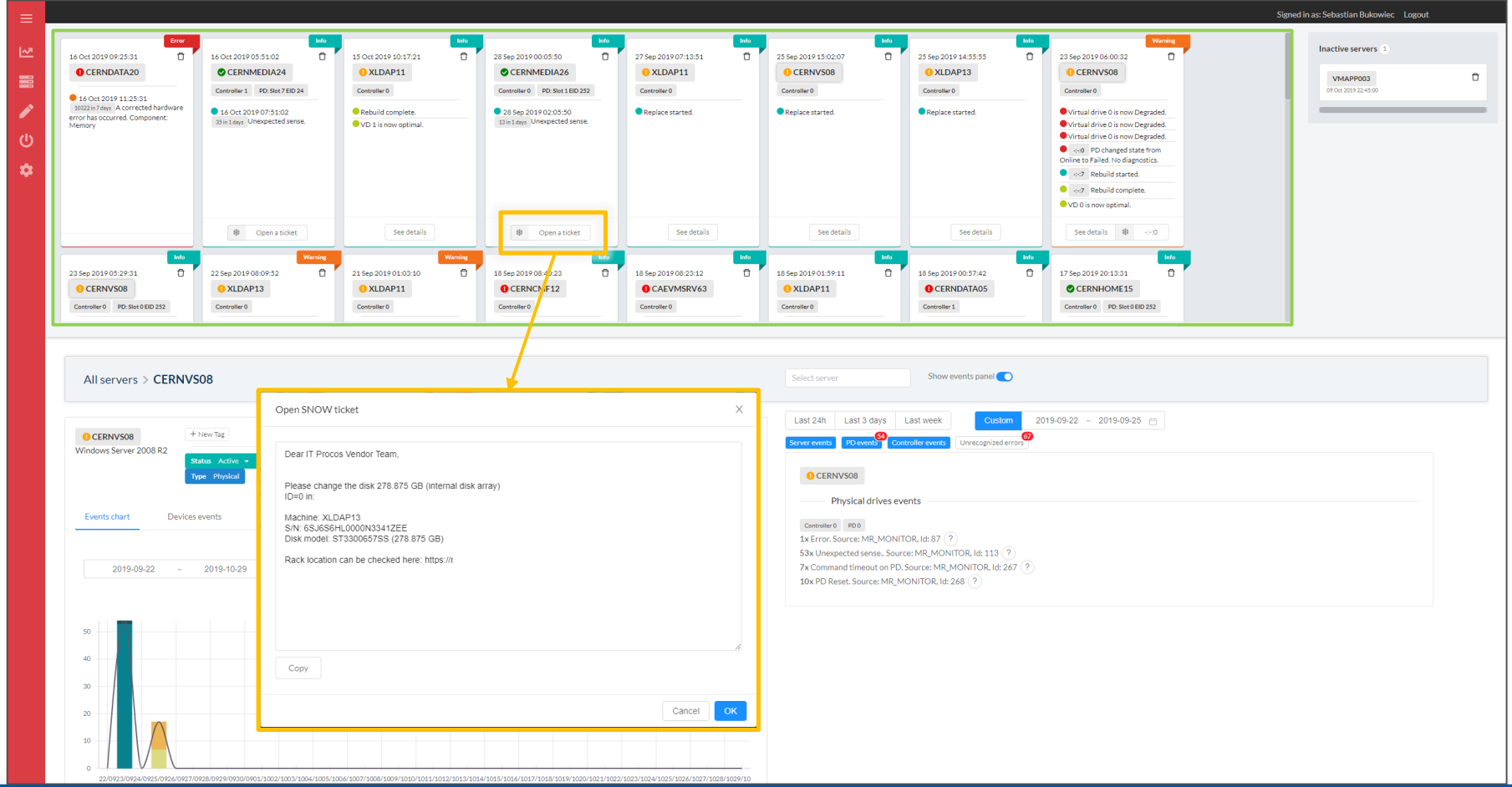
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Inactive servers
VMAPP003
All servers > CERNVS08
Select server
Show events panel
Open SNOW ticket
Dear IT Procos Vendor Team,
Please change the disk 278.875 GB (internal disk array)
ID=0 in:
Machine: XLDAP13
S/N: 6SJ6S6HL0000N3341ZEE
Disk model: ST3300657SS (278.875 GB)
Rack location can be checked here: https://r
Copy
Cancel
OK
CERNVS08
Windows Server 2008 R2
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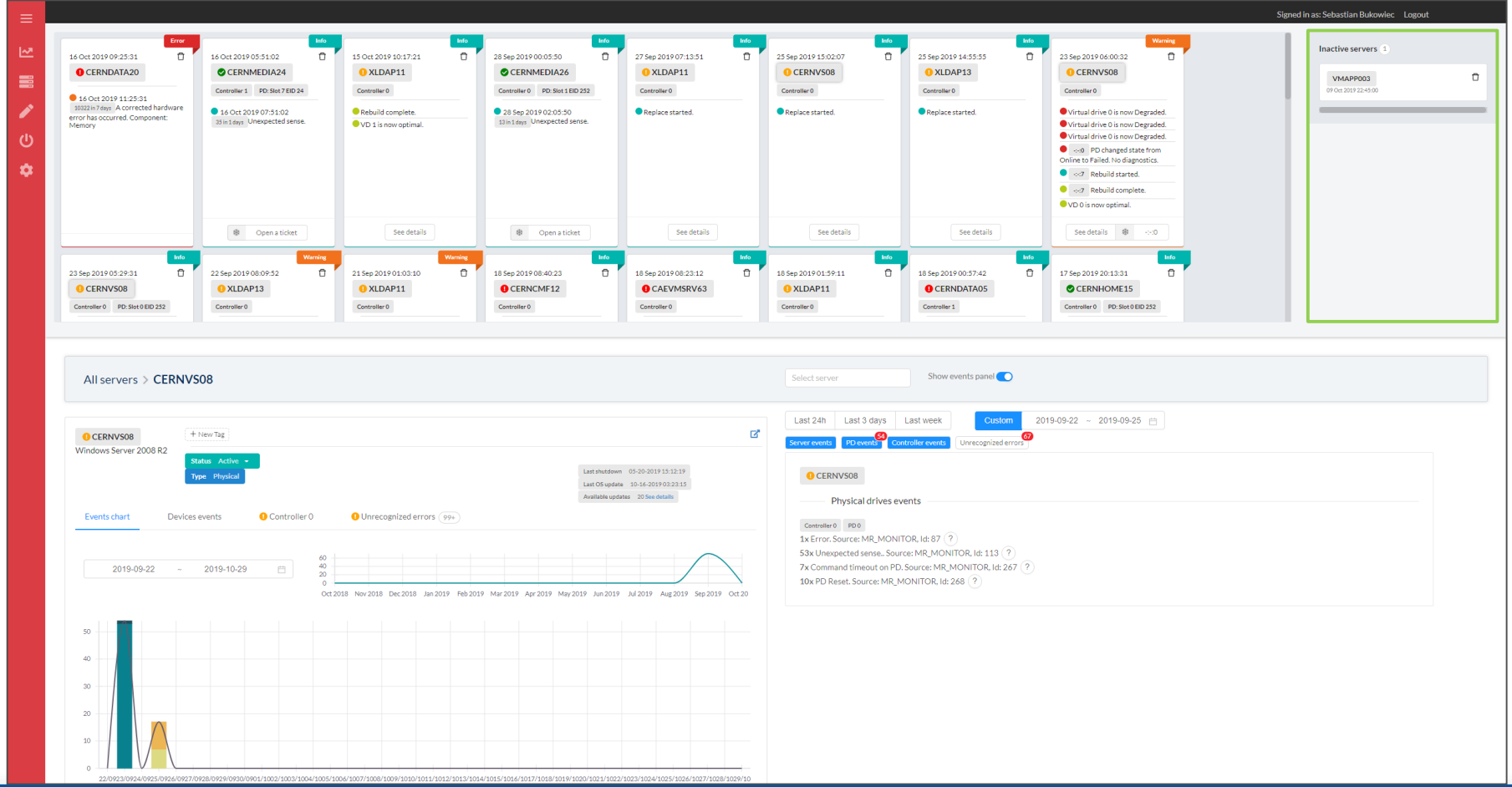
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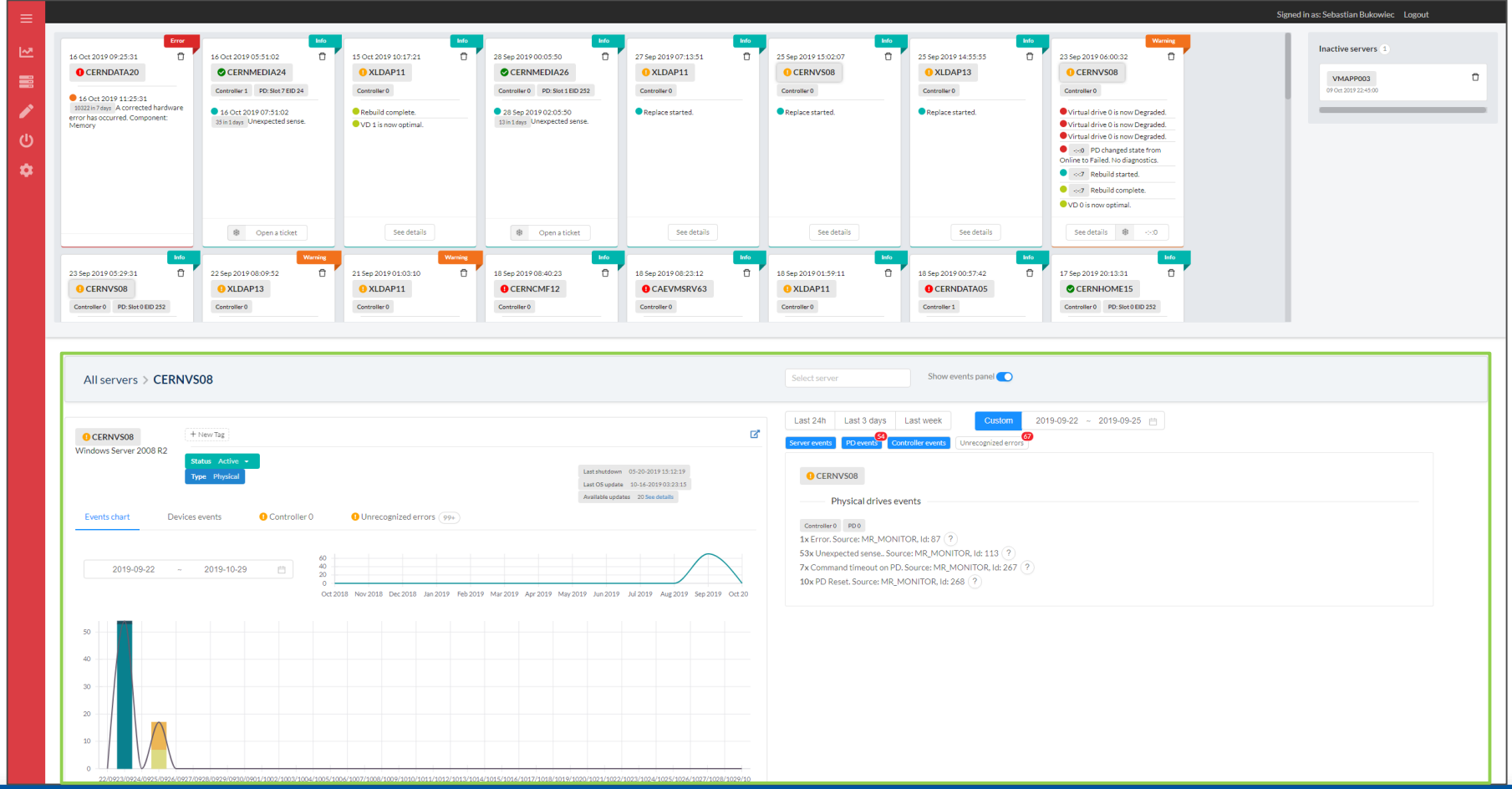
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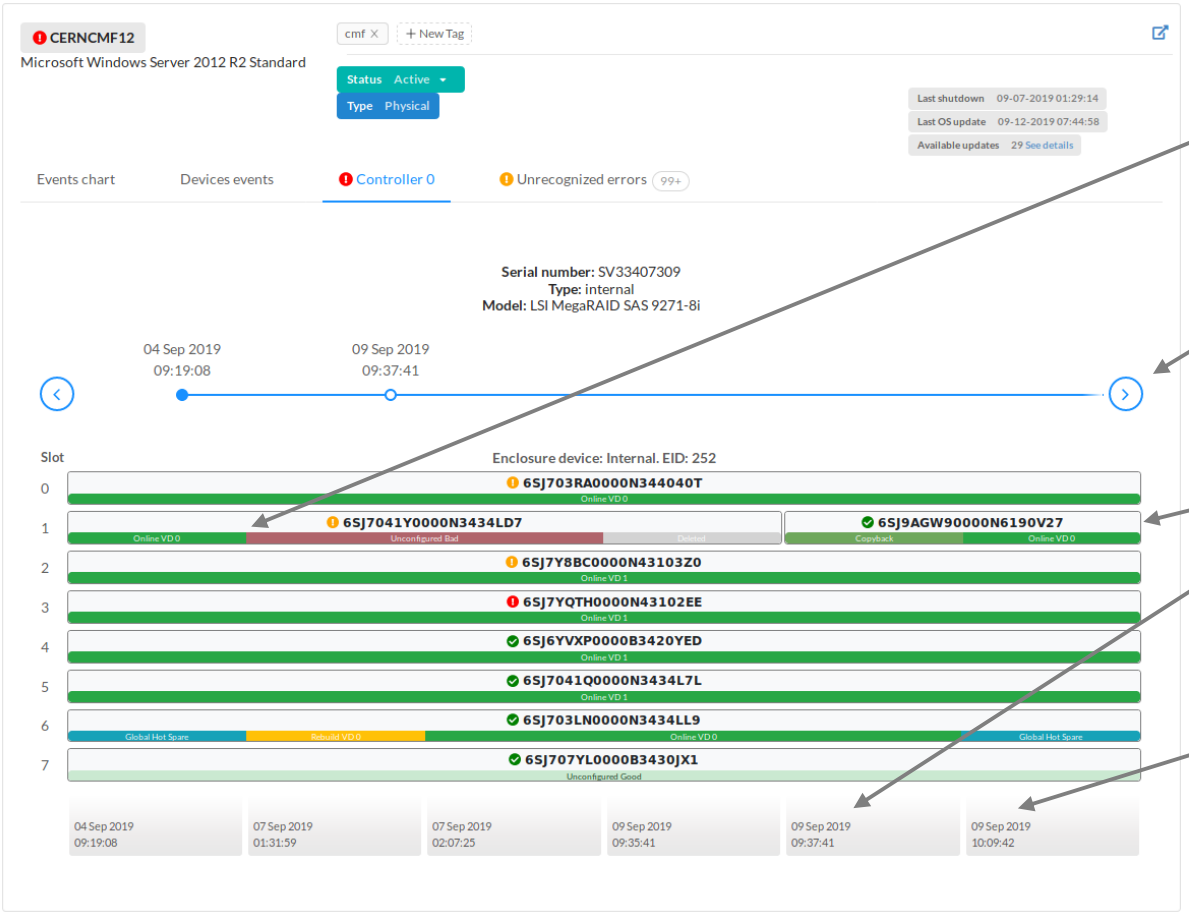


Drive failure.

Physical configuration

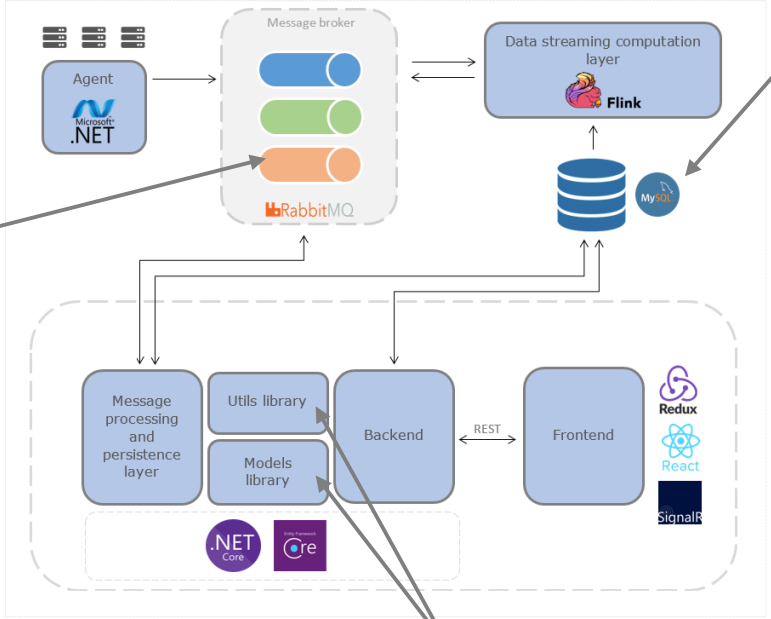
Drive ...LD7 has been replaced on Sep 9 at 9:37 by the physical drive ...V27

Rebuild succeeded. The new logical configuration has been created.

Architecture

MySQL database:
CERN Database on Demand Service

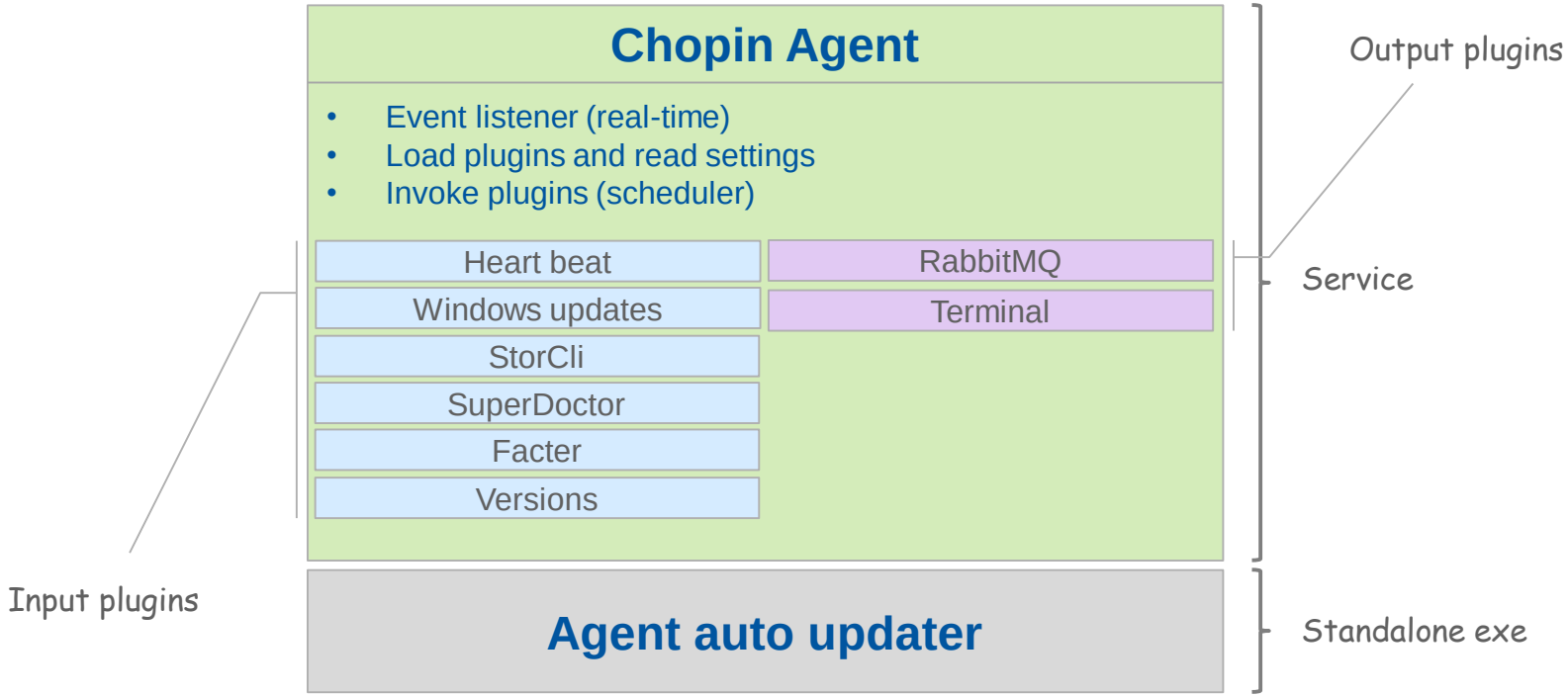
Message broker:
Used for communication and a buffer



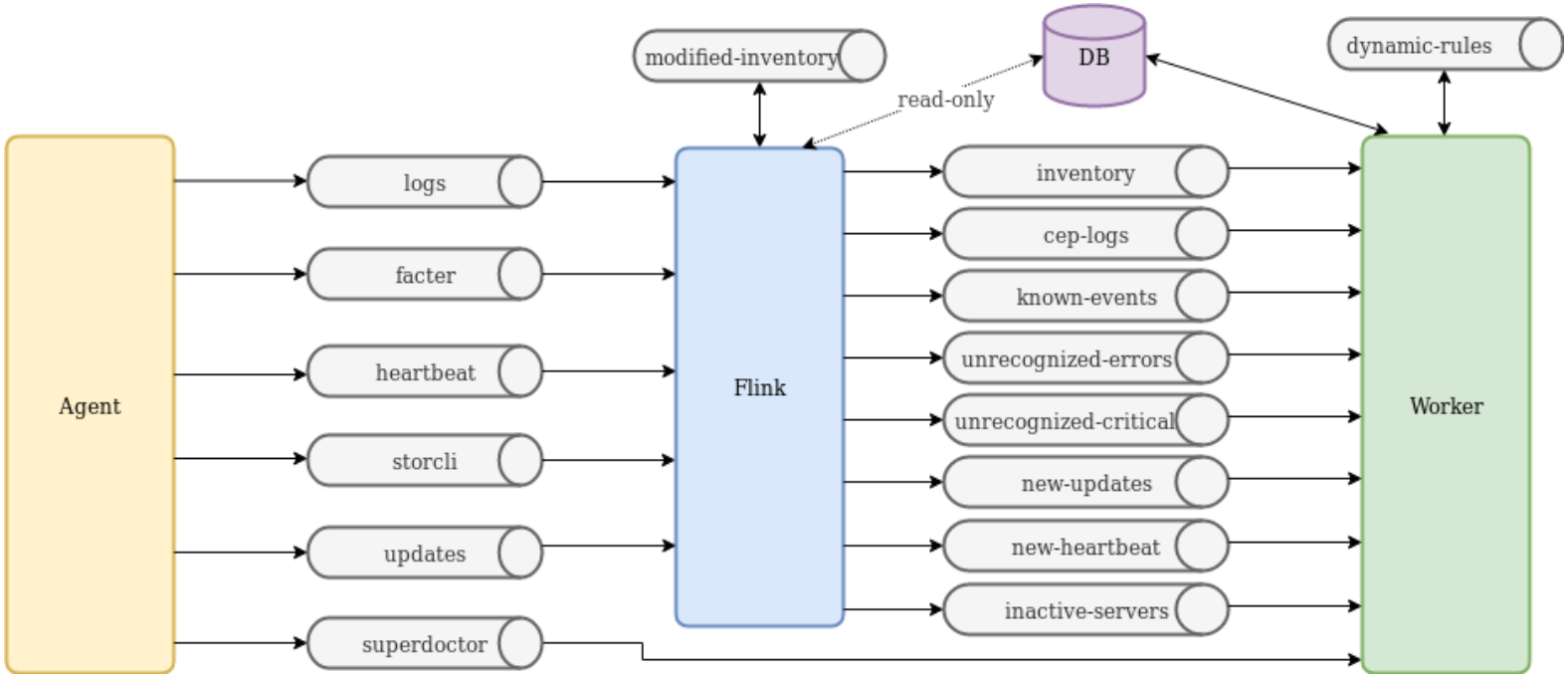
OPENSHIFT
docker
CI/CD

Libraries: Utils and Models. Common code used by the worker and backend modules.

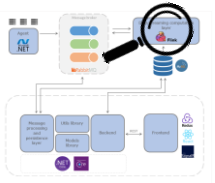
Chopin Agent



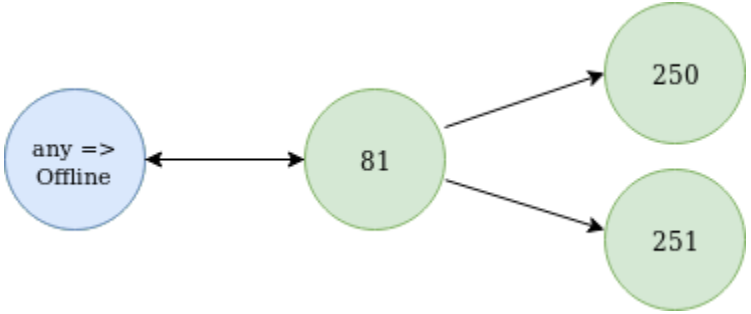
Message flow



Apache Flink



- To detect patterns in log stream the Flink Complex Event Processing (CEP) library is used.
- The CEP library allows to define patterns over data stream by defining the rules using PatternAPI, in a manner similar to defining a finite state machine.



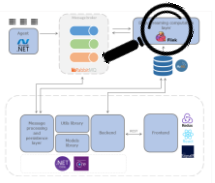
VD degraded, drive offline

81: VD state change

250: VD partially degraded

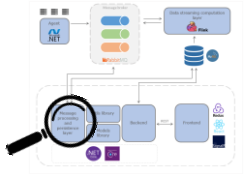
251: VD degraded

Apache Flink



- Detects configuration changes based on both logs and data from StorCli
- Filters data obtained from machines
- Filters logs based on the admin configuration
- Detects inactive servers and shutdowns

Worker



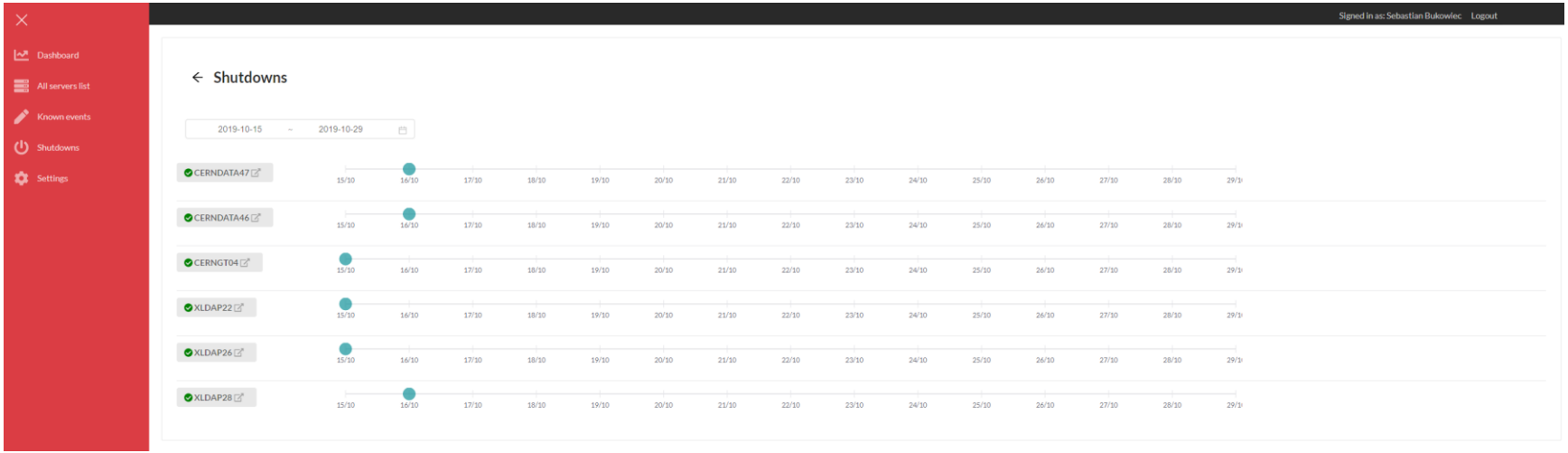
Message persistence and notification generation module

- Saves data to the database
- Generates notifications
- Updates the current state of the server

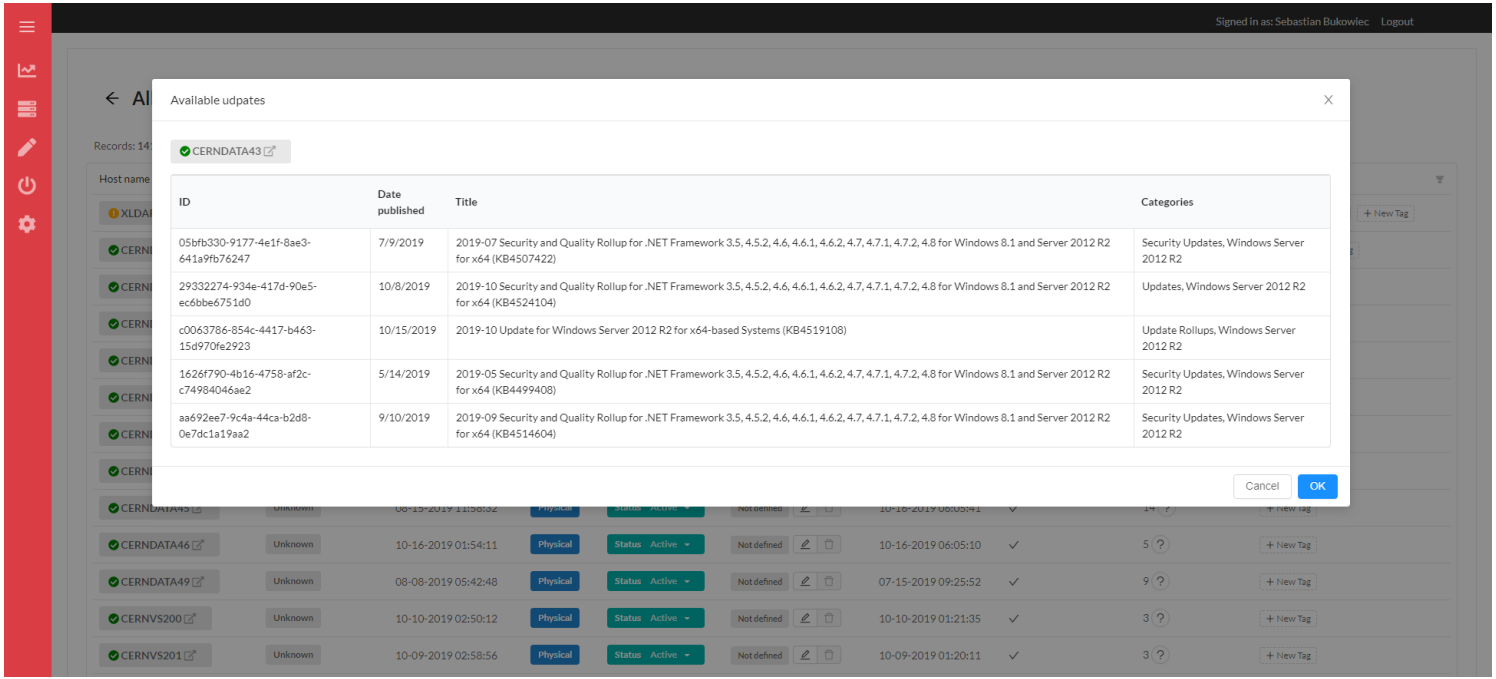
Dashboard

ReactJS, Redux, Redux-Thunk,

Ant Design, Semantic UI React, Reactstrap



Dashboard


Signed in as: Sebastian Bukowiec Logout
Available udpates
CERNDATA43
ID
Date published
Title
Categories
05bfb330-9177-4e1f-8ae3-641a9fb76247
7/9/2019
2019-07 Security and Quality Rollup for .NET Framework 3.5, 4.5.2, 4.6, 4.6.1, 4.6.2, 4.7, 4.7.1, 4.7.2, 4.8 for Windows 8.1 and Server 2012 R2 for x64 (KB4507422)
Security Updates, Windows Server 2012 R2
29332274-934e-417d-90e5-ec6bbe6751d0
10/8/2019
2019-10 Security and Quality Rollup for .NET Framework 3.5, 4.5.2, 4.6, 4.6.1, 4.6.2, 4.7, 4.7.1, 4.7.2, 4.8 for Windows 8.1 and Server 2012 R2 for x64 (KB4524104)
Updates, Windows Server 2012 R2
c0063786-854c-4417-b463-15d970fe2923
10/15/2019
2019-10 Update for Windows Server 2012 R2 for x64-based Systems (KB4519108)
Update Rollups, Windows Server 2012 R2
1626f790-4b16-4758-af2c-c74984046ae2
5/14/2019
2019-05 Security and Quality Rollup for .NET Framework 3.5, 4.5.2, 4.6, 4.6.1, 4.6.2, 4.7, 4.7.1, 4.7.2, 4.8 for Windows 8.1 and Server 2012 R2 for x64 (KB4499408)
Security Updates, Windows Server 2012 R2
aa692ee7-9c4a-44ca-b2d8-0e7dc1a19aa2
9/10/2019
2019-09 Security and Quality Rollup for .NET Framework 3.5, 4.5.2, 4.6, 4.6.1, 4.6.2, 4.7, 4.7.1, 4.7.2, 4.8 for Windows 8.1 and Server 2012 R2 for x64 (KB4514604)
Security Updates, Windows Server 2012 R2
Cancel
OK
CERNDATA46
CERNDATA49
CERNVS200
CERNVS201

Deployment

- Containerised deployment using OpenShift
  - Frontend (dashboard)
  - Backend
  - Apache Flink
  - Worker
- MySQL CERN DBoD

Thank you for your attention!