

System monitoring of a complete VLBI site with ZABBIX 7.0

Alexander Neidhardt (TUM, Wettzell)

Simon Seidl (TUM, Wettzell)

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VLBI Monitoring with ZABBIX

- **What is ZABBIX**
- Monitoring Implementation
 - Antenna
 - Security
 - Central Monitoring Service
- Special ZABBIX 7.x features

What is ZABBIX?

- Created by Alexei Vladishev and distributed by Zabbix SIA.
- Enterprise-class open source distributed monitoring solution.
- Software that collects monitoring data of numerous parameters
- Offers flexible notification mechanism
- Offers reporting and data visualization features
- Supports both polling and trapping for monitoring points
- It is free of cost and open source (AGPL-3.0 license).

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**PHP Web
Interface**

API

**Media
Interfaces**

Server

Requires a **Database**
e.g. PostgreSQL, SQLite
or others

Proxy

Agents

Senders

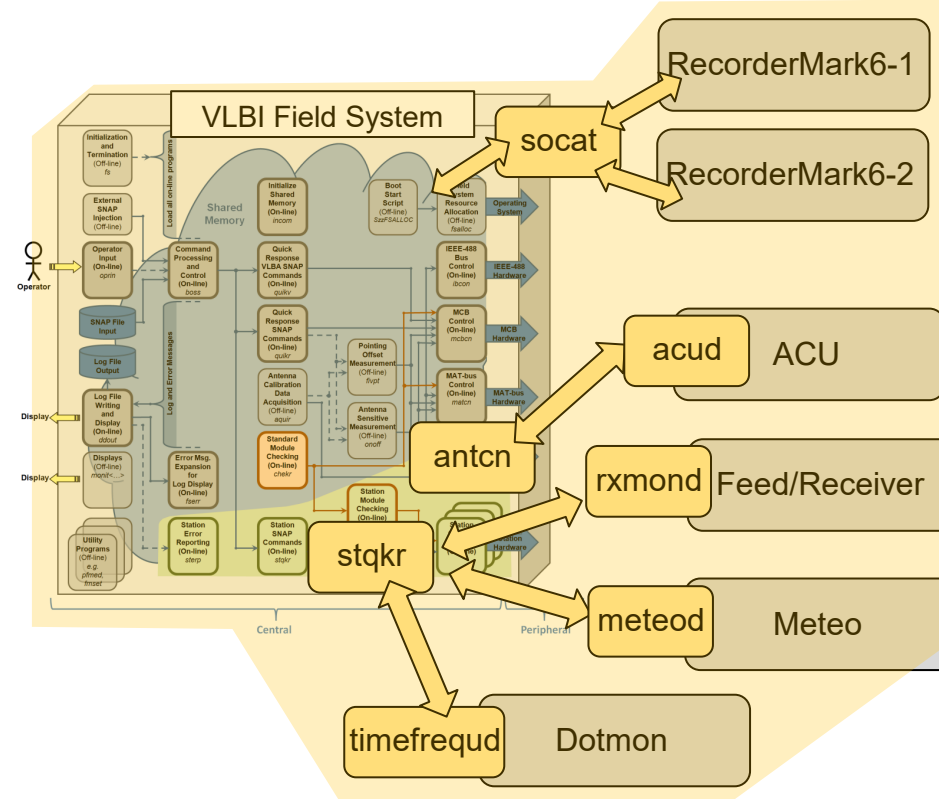
Interfaces

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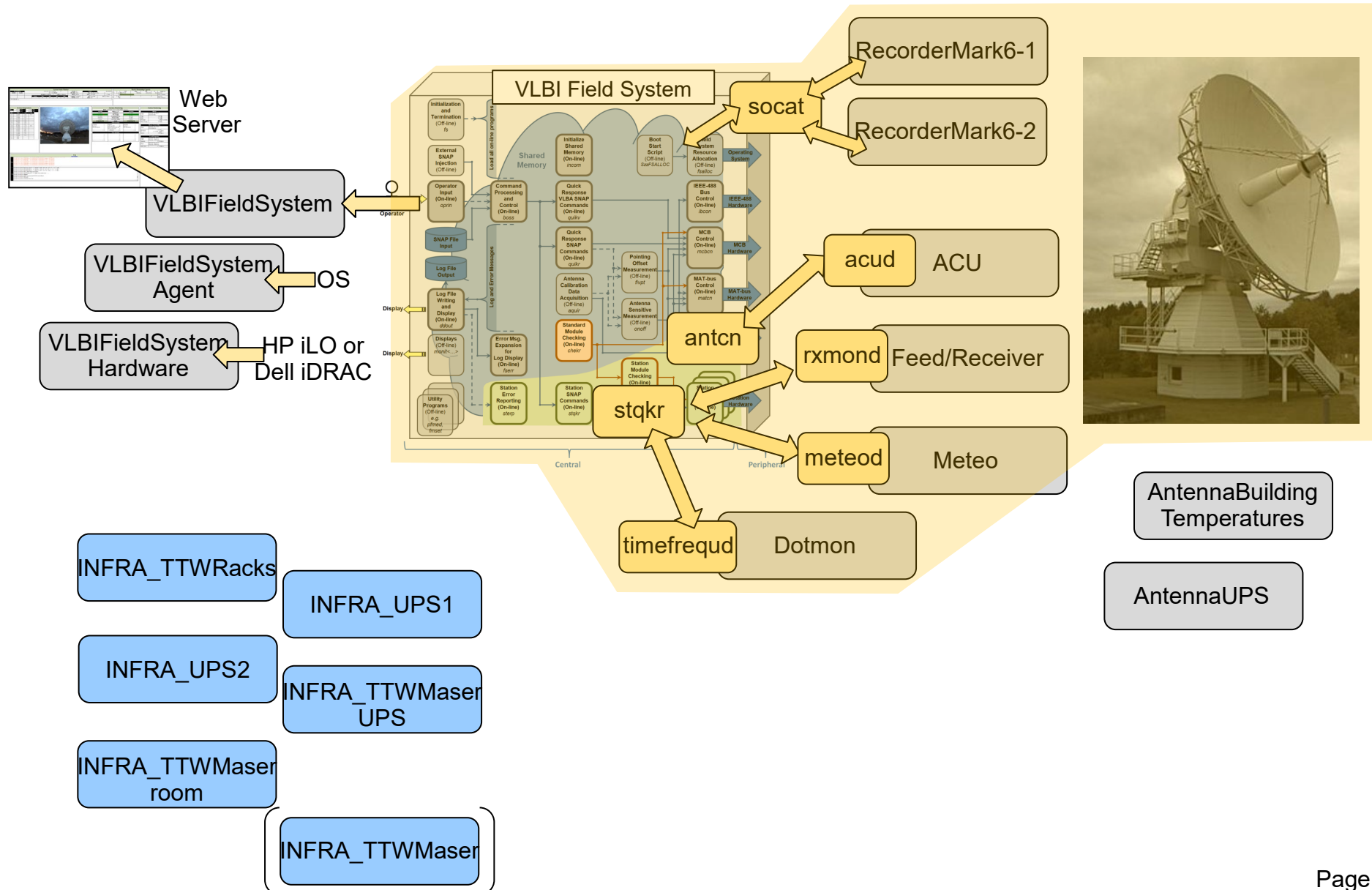
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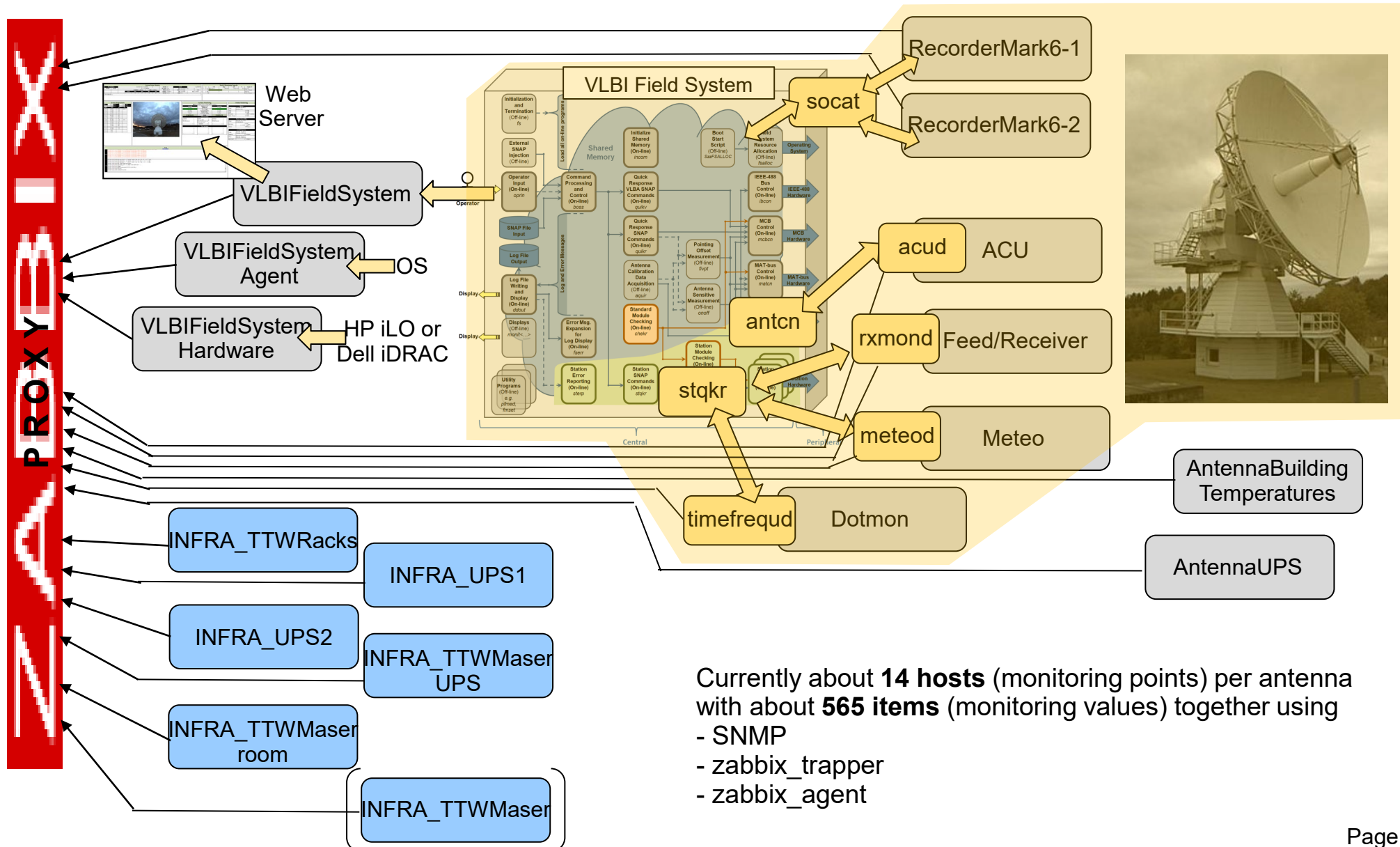
Monitoring Implementation - antenna



Monitoring Implementation - antenna



Monitoring Implementation - antenna

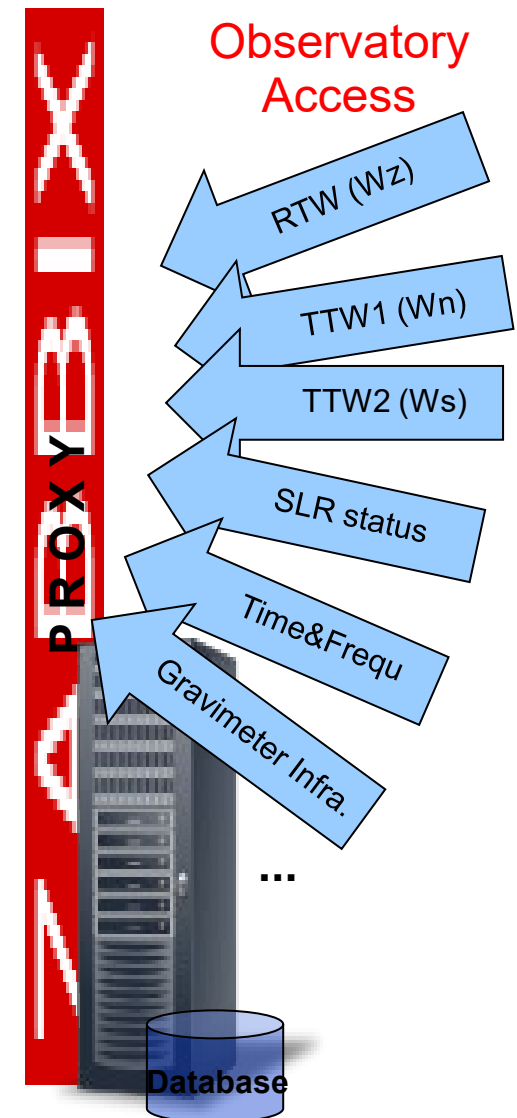


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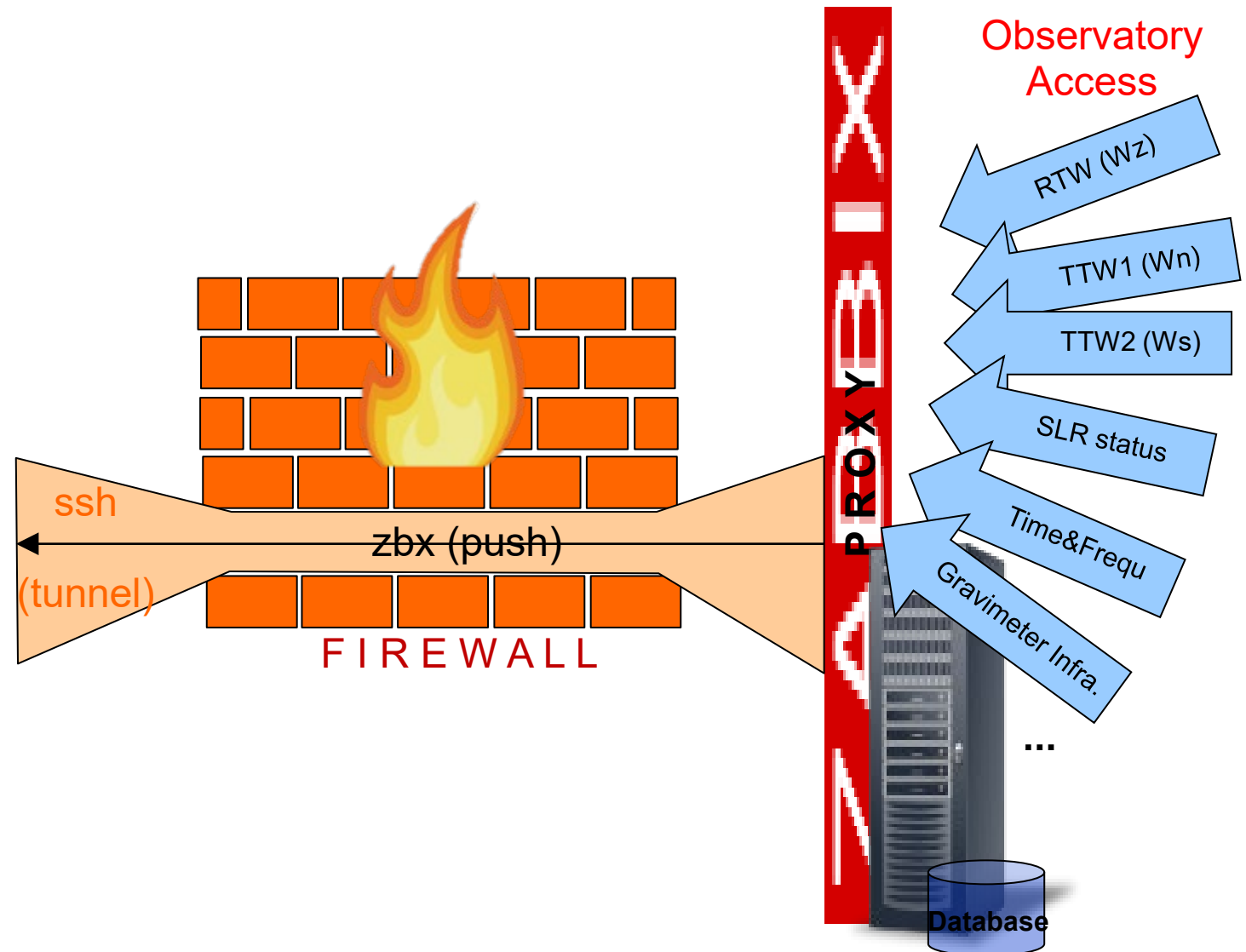
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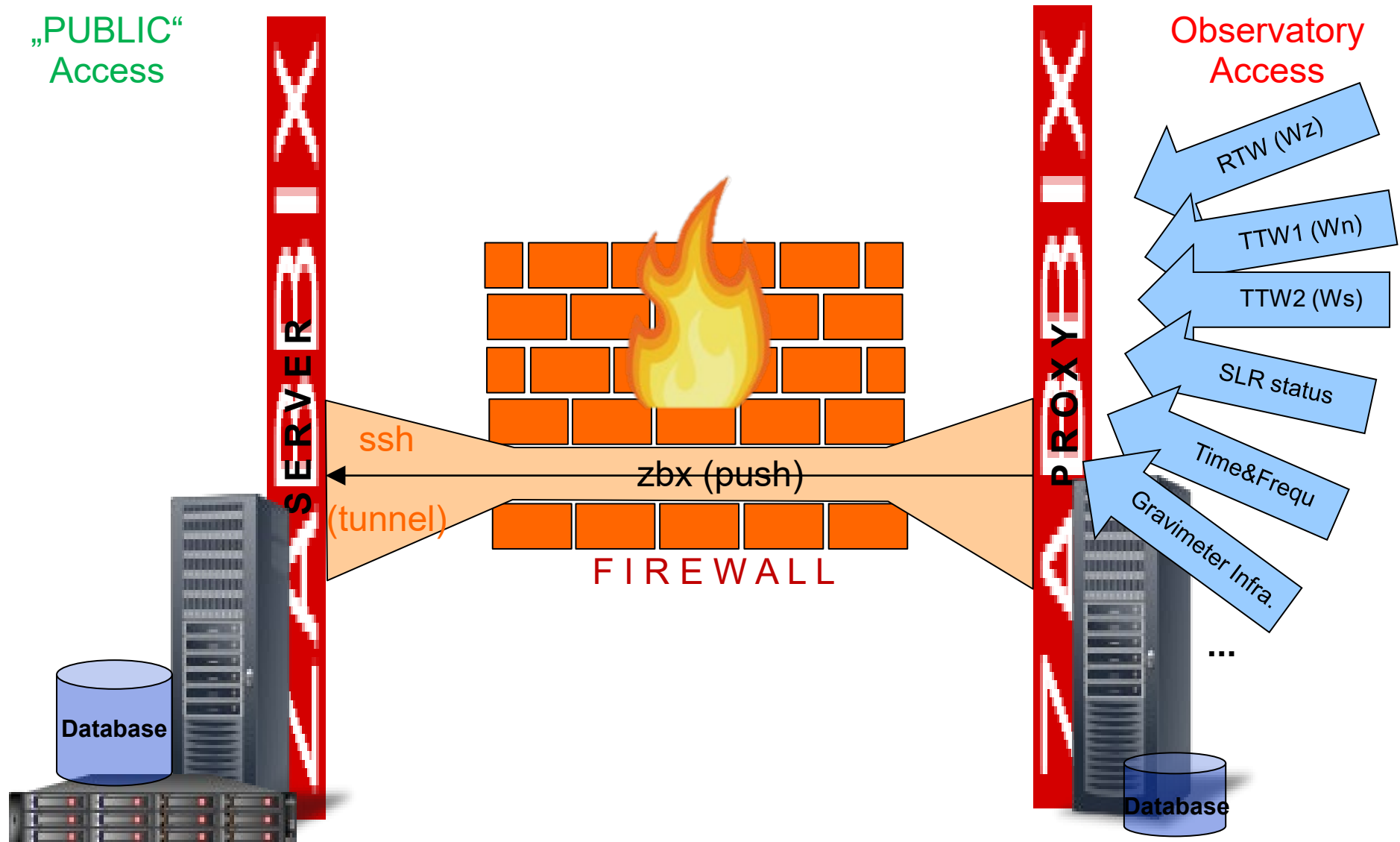
Monitoring Implementation - security



Monitoring Implementation - security



Monitoring Implementation - security

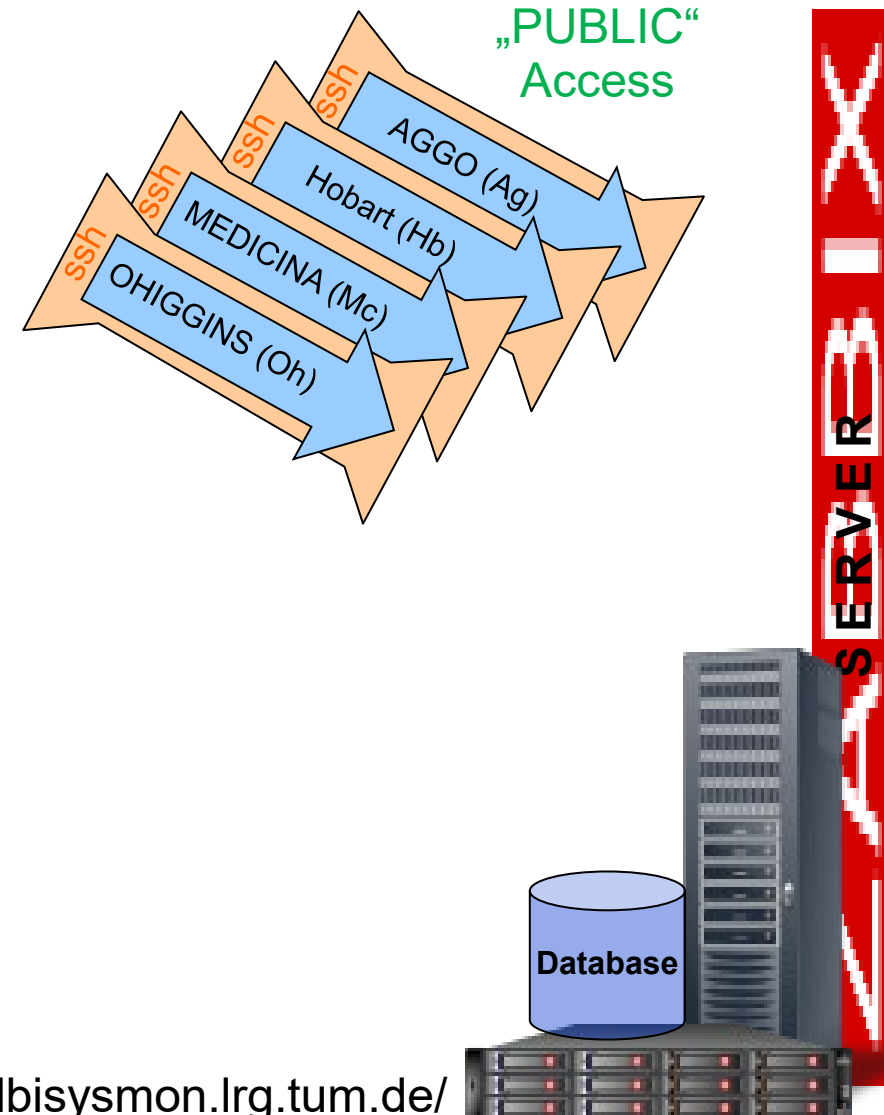


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VLBI Monitoring with ZABBIX

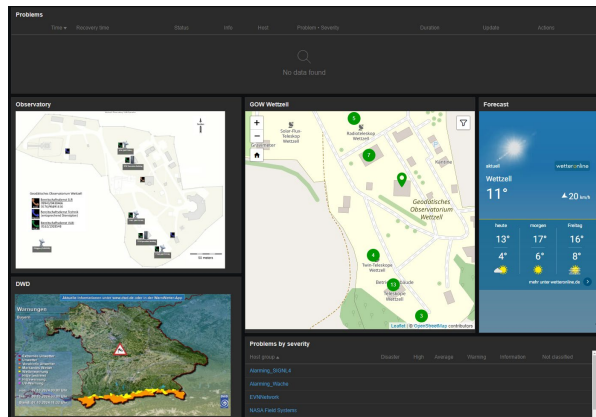
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Monitoring Implementation - central monitoring service

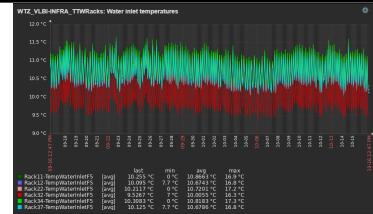


<https://vlbisysmon.lrg.tum.de/>

Monitoring Implementation - central monitoring service



Station Monitoring

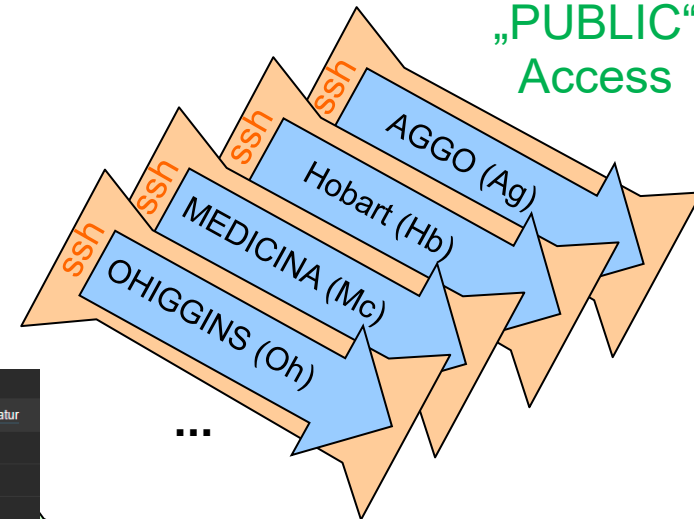
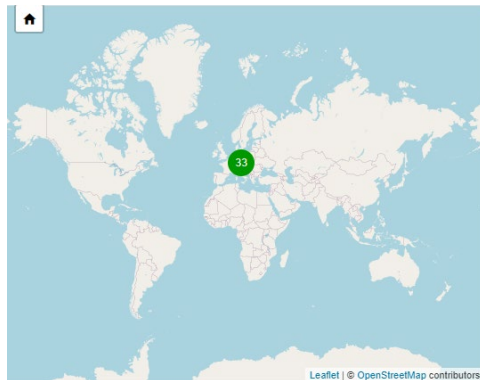


Host Graphs & Trends

Host Monitoring

```
WTZ_WN-WETTZ13N_ACU
WTZ_WN-WETTZ13N_AntennaBuildingTemperatur
WTZ_WN-WETTZ13N_AntennaUPS
WTZ_WN-WETTZ13N_Feed
WTZ_WN-WETTZ13N_Meteo
WTZ_WN-WETTZ13N_VLBIFieldSystem
WTZ_WN-WETTZ13N_VLBIFieldSystemAgent
WTZ_WN-WETTZ13N_VLBIFieldSystemHardware
```

Network Monitoring



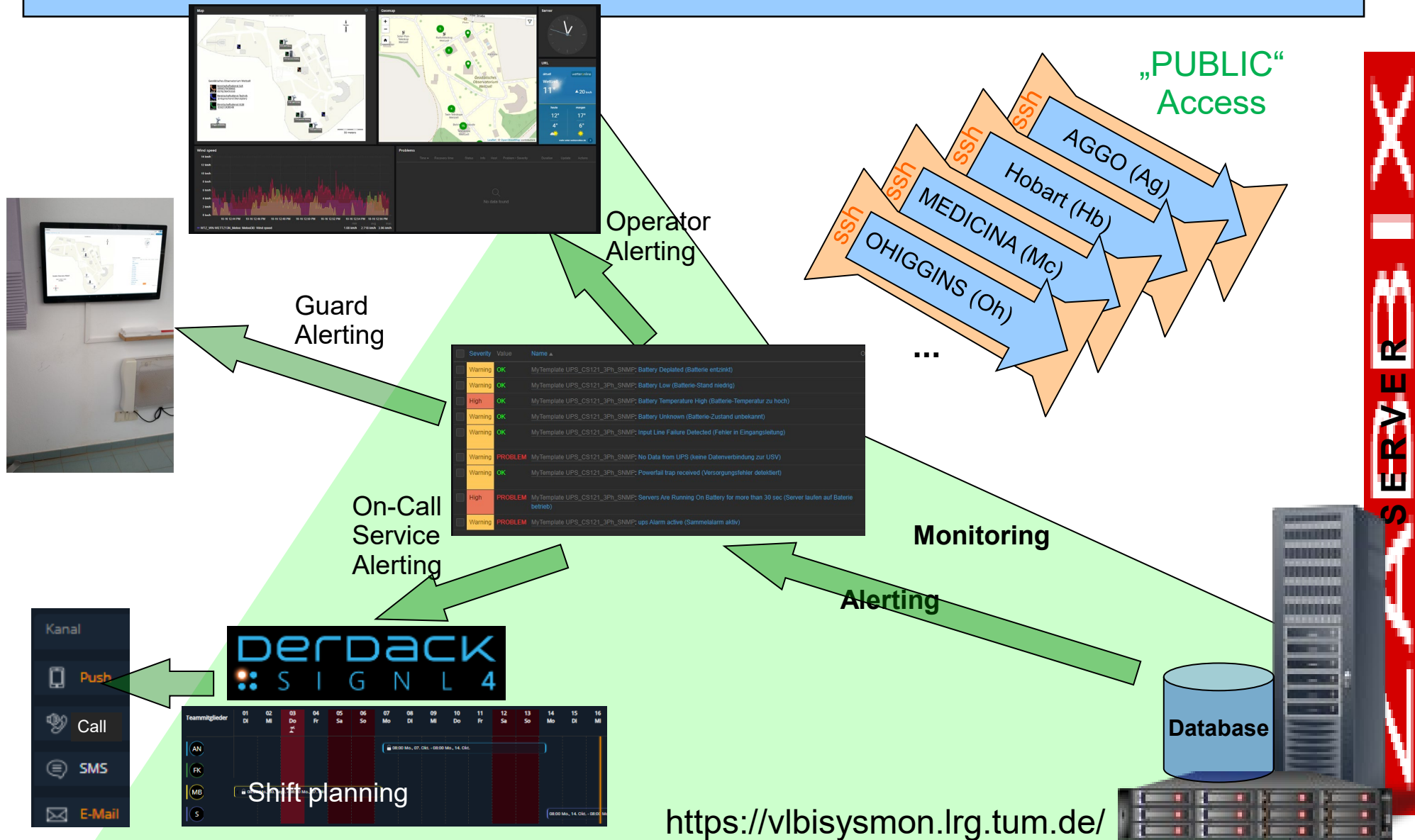
„PUBLIC“ Access

Monitoring

Database

<https://vlbisysmon.lrg.tum.de/>

Monitoring Implementation - central monitoring service



Monitoring Implementation - central monitoring service

python Script "ZabbixAPI.py"

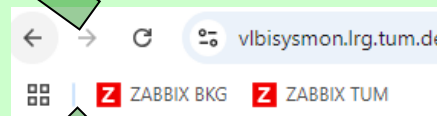
Sample call: seamless request for specific time interval

```
python.exe ZabbixAPI.py -C config_evn.ini -L
-H YEBES_000_NASAFeldSystem -K ERC.PRESSURE
-TS "2022-03-15 18:15:00" -TE "2022-03-15 18:30:00"
```

#Date	Unixtime	Value
2022-03-15 18:29:01	1647368941	911.0114
2022-03-15 18:28:01	1647368881	911.0114
2022-03-15 18:27:01	1647368821	911.0114
2022-03-15 18:26:01	1647368761	911.0114
2022-03-15 18:25:02	1647368702	911.0114
2022-03-15 18:24:02	1647368642	910.9211
2022-03-15 18:23:01	1647368581	910.9211
2022-03-15 18:22:01	1647368521	910.9211
2022-03-15 18:21:01	1647368461	910.9211
2022-03-15 18:20:02	1647368402	910.9211
2022-03-15 18:19:01	1647368341	910.8493
2022-03-15 18:18:02	1647368282	910.8493
2022-03-15 18:17:02	1647368222	910.8493
2022-03-15 18:16:01	1647368161	910.8493
2022-03-15 18:15:02	1647368102	910.8493

(Seamless)
Data
API

Web Content

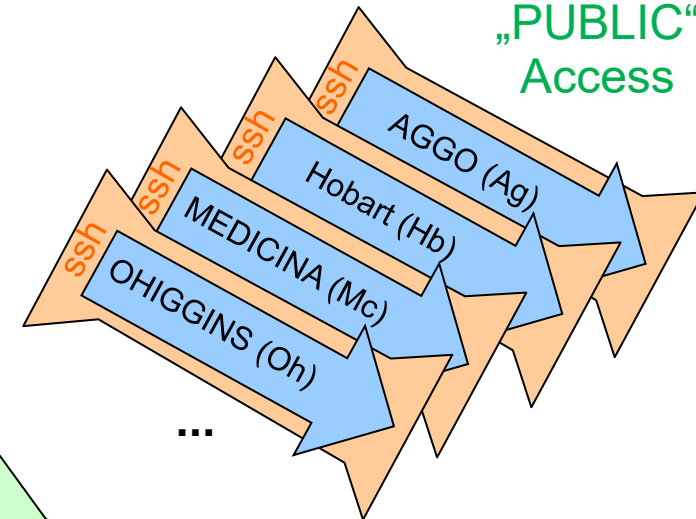


Monitoring

Alerting

Web Presentation

„PUBLIC“
Access



SERVER

Database

<https://vlbisysmon.lrg.tum.de/>

Static and Dynamic
Web Pages

Monitoring Implementation - central monitoring service

#Date	Unixtime	Value
#-----	-----	-----
2024-08-01 23:59:41	1722556781	5.4100
2024-08-01 23:58:54	1722556734	5.3900
2024-08-01 23:58:07	1722556687	5.3500
2024-08-01 23:57:19	1722556639	5.3300
2024-08-01 23:56:32	1722556592	5.3300
2024-08-01 23:55:45	1722556545	5.3000

Historic Data
Files

Index of /monitoring_archive/ivs_archive

Name	Last modified	Size	Description
Parent Directory	-	-	-
HOBART/	2024-01-02 00:05	-	-
MEDICINA/	2024-01-02 00:06	-	-
OHIGGINS/	2024-01-02 00:06	-	-
WARKWORTH/	2024-01-02 00:06	-	-
WETTZ13N/	2024-01-02 00:07	-	-
WETTZ13S/	2024-01-02 00:07	-	-
WETTZELL/	2024-01-02 00:06	-	-

Seamless Data
Archive

Index of /monitoring_archive

Name	Last modified	Size	Description
Parent Directory	-	-	-
cate_ts/	2020-10-30 15:00	-	-
electricity_monitor/	2021-08-11 13:43	-	-
fs_web_pages/	2024-04-23 13:37	-	-
gov_sensors/	2023-11-24 21:07	-	-
ivs_archive/	2023-11-24 21:07	-	-
ivs_historic_workshops/	2023-11-24 21:07	-	-
ivs_realtime/	2019-08-14 15:39	-	-

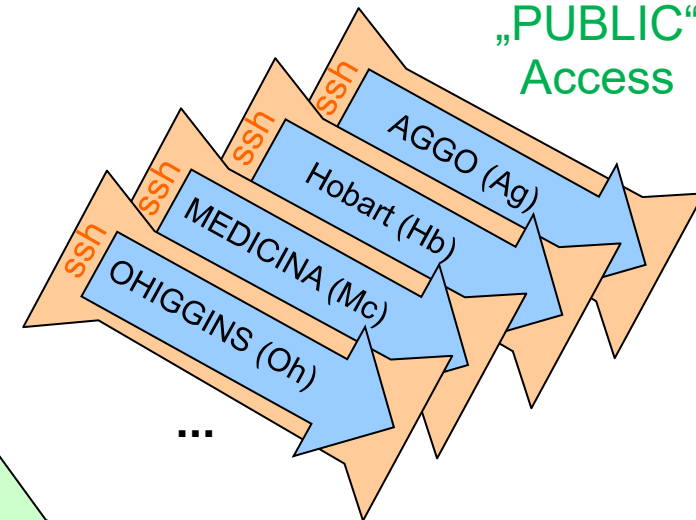
Web File
Archive

Index of /monitoring_archive/session_archive

Name	Last modified	Size	Description
Parent Directory	-	-	-
ftwz_02/	2024-10-08 21:23	-	-
i24275/	2024-10-01 18:31	-	-
i24276/	2024-10-02 18:31	-	-
i24278/	2024-10-04 18:29	-	-
i24281/	2024-10-07 18:30	-	-
i24282/	2024-10-08 18:31	-	-
i24276/	2024-10-03 00:32	-	-
i24281/	2024-10-08 00:31	-	-

Session
Archive

Archiving



„PUBLIC“
Access

Monitoring

Alerting

Web Presentation

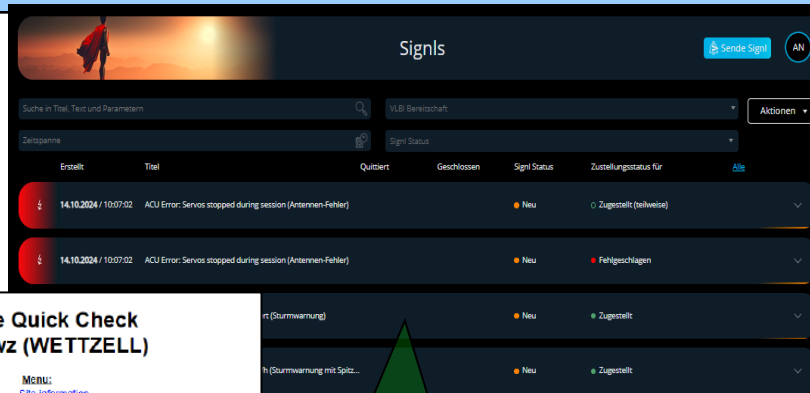
Database

<https://vlbisysmon.lrg.tum.de/>



Monitoring Implementation - central monitoring service

Operating times
of the on-call
services



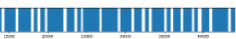
Logfile Quick Check i24123wz (WETTZELL)

- Menu:
- Site information
 - Scan statistic
 - Clock offset
 - Meteorology
 - Cable delays

Site information

- Site name: WETTZELL
- Longitude: -12.88 [°]
- Latitude: 49.15 [°]
- Height: 661.2 [m]
- VLBI Field System Release: 10.2.0
- Linux Version: Linux 5.10.0-26-amd64 SMP Debian 5.10.197-1 (2023-09-29) x86_64

Scan statistics



Clock offsets



Session Performance

Annual quality report 2024

Date: 2024-10-09 01:00:01
Antenna: wz+wn+ws

Quality score: 96.18%
(Goal: 98)
90 95 100

-----**++X*+
A

Scheduled sources: 111765
Operated sources: 112001
Failed sources: 615
Successful sources: 111386
- normal quality: 93307
- reduced quality: 18079

ZABBIX

Problems

dashboards

monitoring

problems

hosts

latest data

maps

discovery

services

inventory

reports

22:00

Severity	Recovery time	Status	Info	Host	Problem	Duration	Update
Warning	10:24:01 PM	Warning	WTZ_WZ-WETTZELL_Meteo	Wetterstation Wettzell keine Veränderung	5s	Update	
Warning	10:24:00 PM	Warning	WTZ_WS-WETTZ135_Meteo	Wetterstation Wettzell keine Veränderung	5s	Update	
Warning	10:23:59 PM	Warning	WTZ_WN-WETTZ13N_Meteo	Wetterstation Wettzell keine Veränderung	5s	Update	
Warning	08:50:04 PM	Warning	WTZ_WN-WETTZ13N_Meteo	Wetterstation Wettzell keine Veränderung	7m	Update	
Warning	08:57:01 PM	Warning	WTZ_WZ-WETTZELL_Meteo	Wetterstation Wettzell keine Veränderung	7m	Update	
Warning	08:50:00 PM	Warning	WTZ_WS-WETTZ135_Meteo	Wetterstation Wettzell keine Veränderung	7m 5s	Update	
Warning	08:49:59 PM	Warning	WTZ_WN-WETTZ13N_Meteo	Wetterstation Wettzell keine Veränderung	0	Update	
Warning	08:49:59 PM	Warning	WTZ_WZ-WETTZELL_Meteo	Wetterstation Wettzell keine Veränderung	0	Update	
Warning	09:21:30 PM	Warning	WTZ_WZ-WETTZELL_Meteo	MeteoBz, keine Veränderung bei Windgeschwindigkeit	43m 6s	Update	
Warning	09:21:41 PM	Warning	WTZ_WN-WETTZ13N_Meteo	MeteoBz, keine Veränderung bei Windgeschwindigkeit	56m 10s	Update	

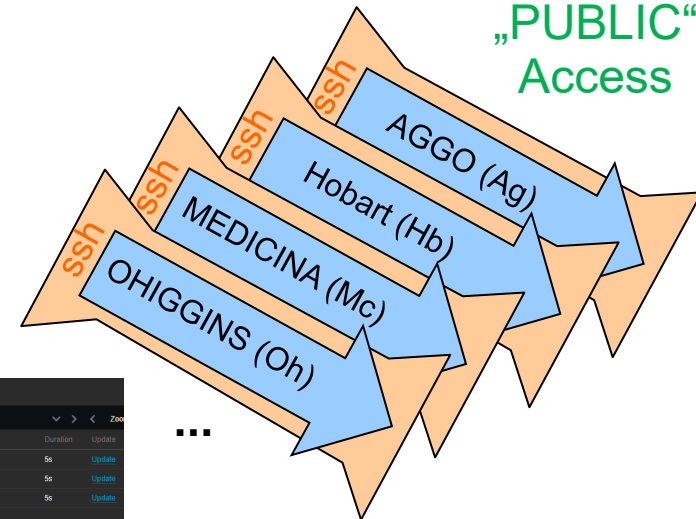
Error, Alerting and
Troubleshooting
Performance

Web Presentation

Archiving

Performance Analysis

„PUBLIC“
Access



Monitoring

Alerting

Database

<https://vlbisysmon.lrg.tum.de/>

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ZABBIX 7.x features

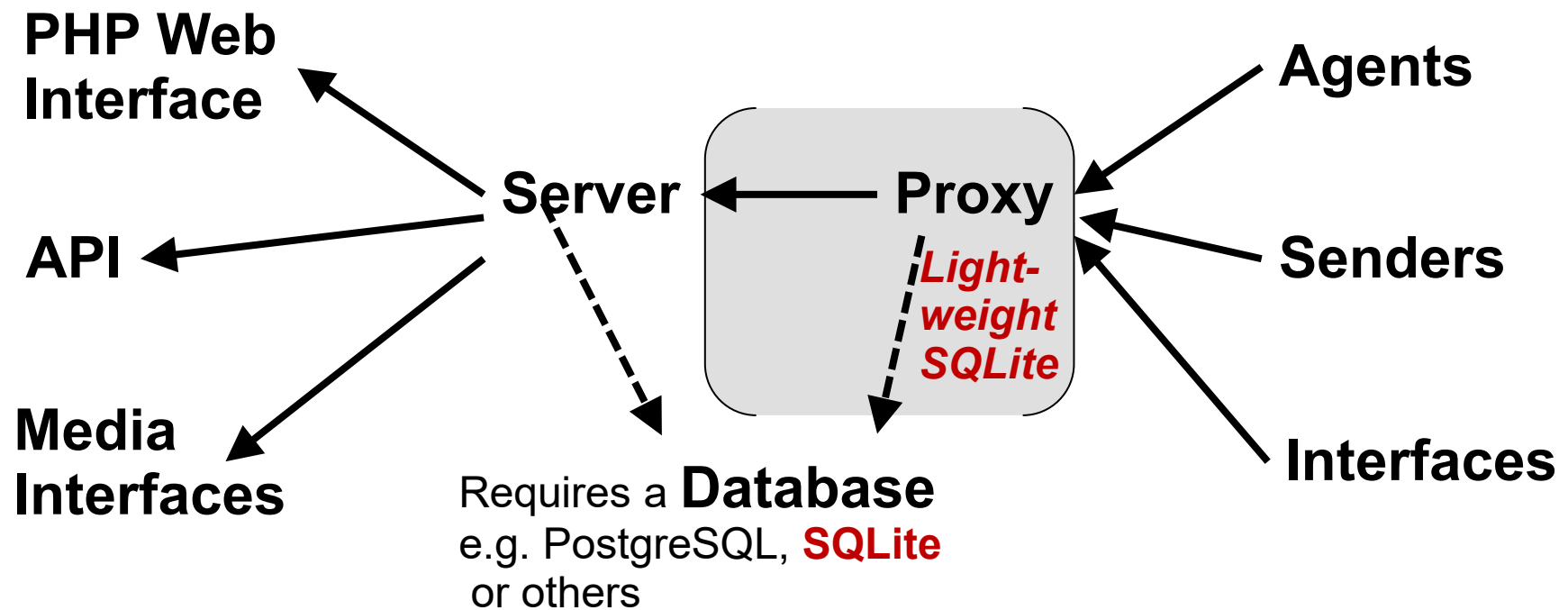
New, clear design

The screenshot displays the ZABBIX 7.x web interface. On the left is a dark sidebar with the ZABBIX logo and a navigation menu including: Dashboards, Monitoring, Services, Inventory, Reports, Data collection, Alerts, Users, Administration, Support, Integrations, and Help. The main content area is titled 'Dashboards' and features a search bar, a filter section with 'Name' and 'Created by me' buttons, and an 'Apply' button. Below this is a table listing various dashboards, each with a checkbox, a name, and a status indicator (green 'M' for monitored).

☐	Name ▲	
☐	WTZ_TUM_ZABBIXServer(vibisysmon.lrg.tum.de)	M
☐	WTZ_VLBI-INFRA_Meteo	M
☐	WTZ_VLBI-INFRA_RTWOperationRoomRacks	
☐	WTZ_VLBI-INFRA_RTWRacksUPS	M
☐	WTZ_VLBI-INFRA_TTW Maserroom	
☐	WTZ_VLBI-INFRA_TTW MaserUPS	
☐	WTZ_VLBI-INFRA_TTW Racks	M
☐	WTZ_VLBI-INFRA_TTW UPS	M
☐	WTZ_VLBI_DB-VLBI Time	
☐	WTZ_VLBI_RecorderMk6-1	
☐	WTZ_VLBI_RecorderMk6-2	M
☐	WTZ_VLBI_WagoTesthardware	

ZABBIX 7.x features

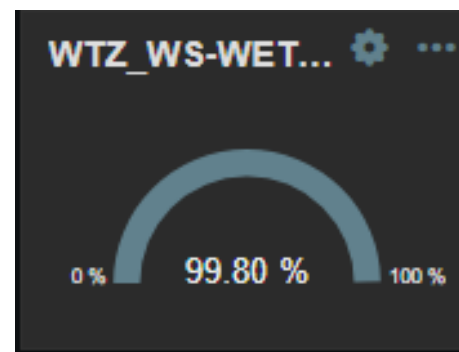
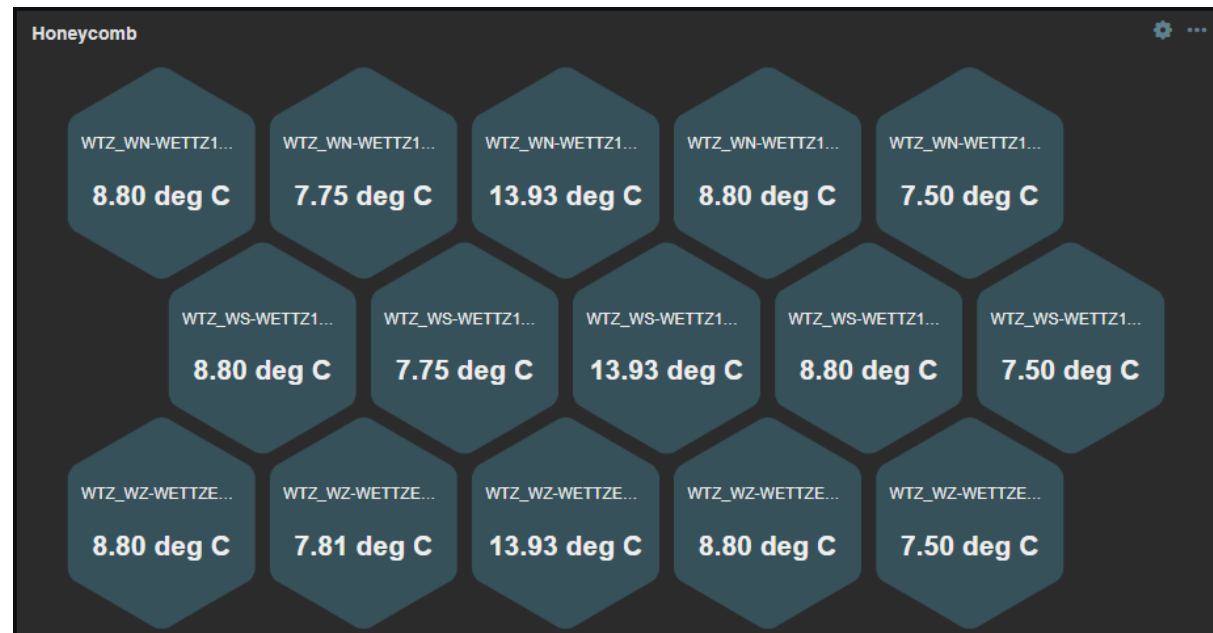
Support of SQLite => ideal for proxy on FS PCs



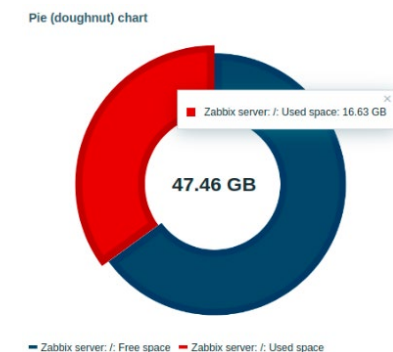
ZABBIX 7.x features

New widgets

Action log	Item value
Clock	Map
Discovery status	Map navigation tree
Favorite graphs	Pie chart
Favorite maps	Problem hosts
Gauge	Problems
Geomap	Problems by severity
Graph	SLA report
Graph (classic)	System information
Graph prototype	Top hosts
Honeycomb	Top triggers
Host availability	Trigger overview
Host navigator	URL
Item history	Web monitoring
Item navigator	Deprecated



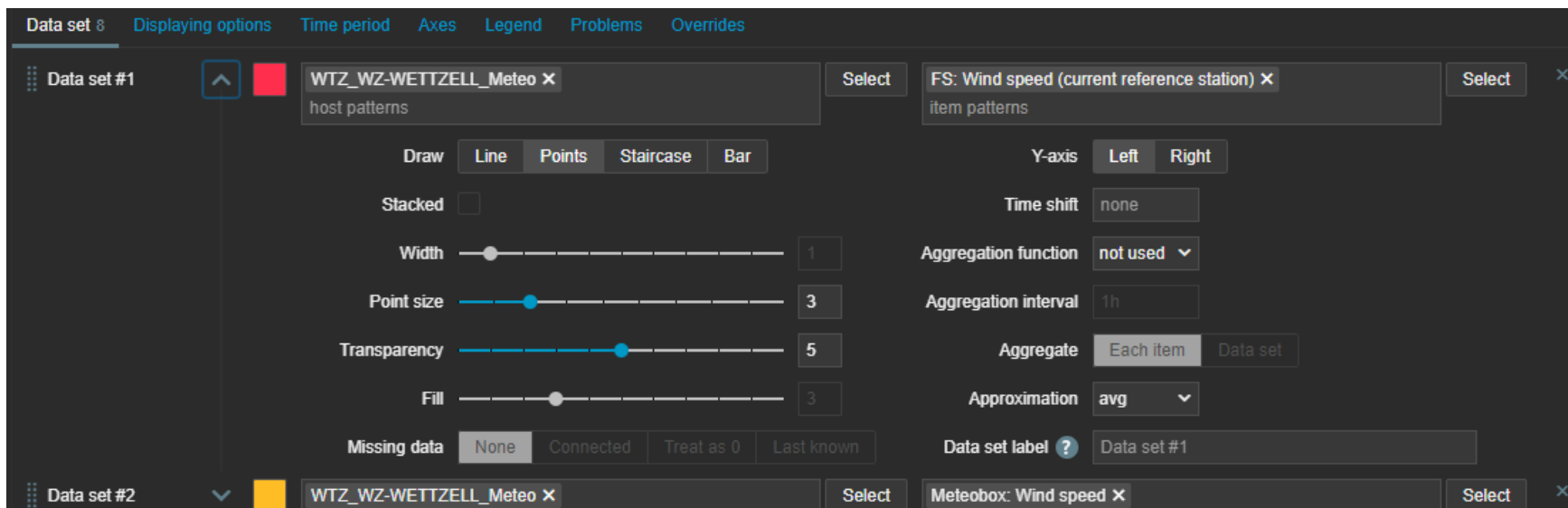
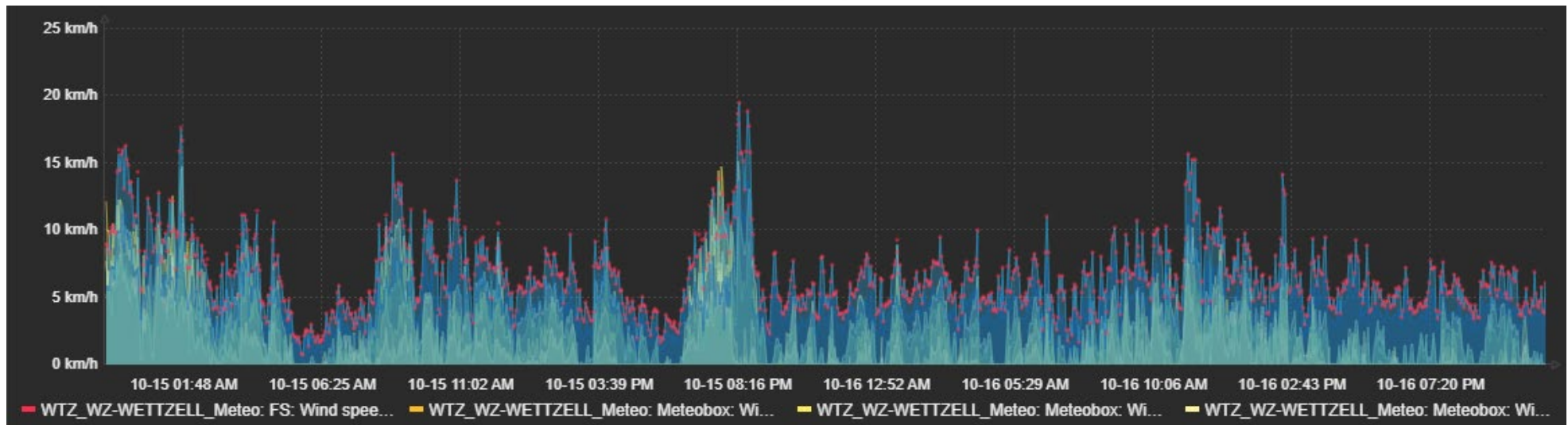
Humidity
gauge



Pie
charts

ZABBIX 7.x features

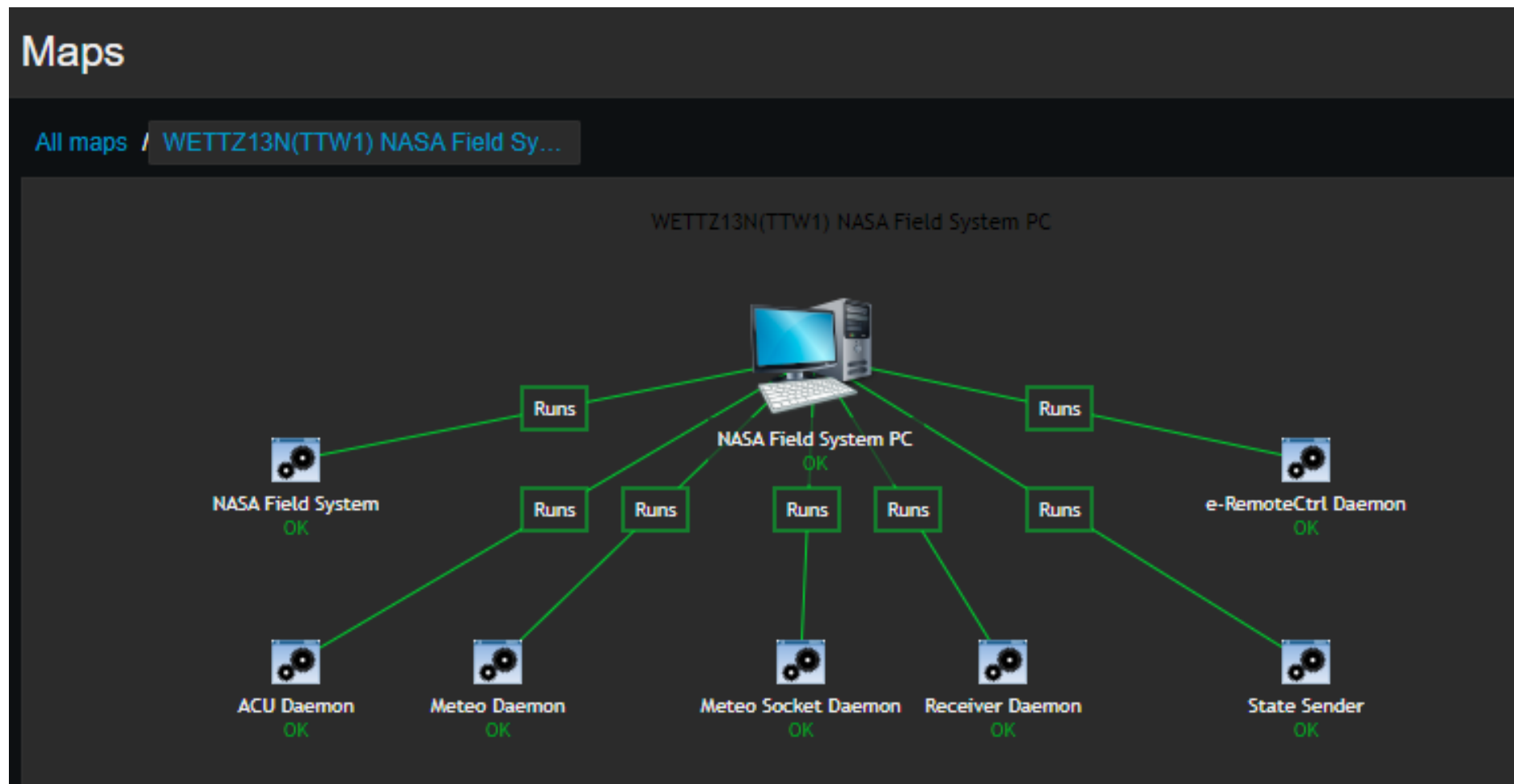
New graphs



Similar to
Grafana

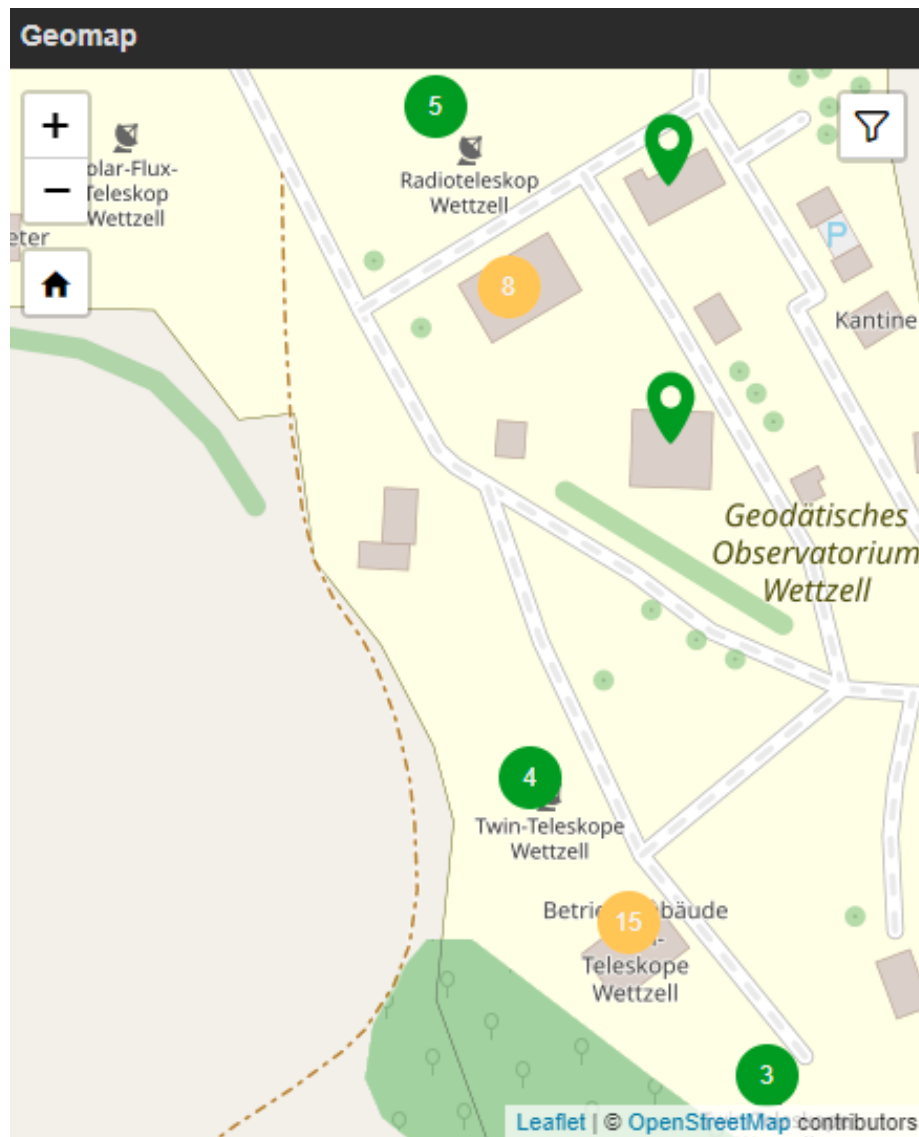
ZABBIX 7.x features

Maps (with navigation trees)



ZABBIX 7.x features

Geo tagging



Host

Host	IPMI	Tags	Macros 1	Inventory ●	Encryption	Value ma
Location latitude		49.1439129279337				
Location longitude		12.8776668661186				
Notes						

ZABBIX 7.x features

Reports

ZABBIX vlbisysmon

Availability report

Mode: By host

From: now-7d To: now Apply

Last 2 days Yesterday Today Last 5 min
Last 7 days Day before yesterday Today so far Last 15 min
Last 30 days This day last week This week Last 30 min
Last 3 months Previous week This week so far Last 1 hour
Last 6 months Previous month This month Last 3 hours
Last 1 year Previous year This month so far Last 6 hours
Last 2 years This year Last 12 hours
This year so far Last 1 day

Host	Name	Problems	Ok
WETTZ_SLR_WLRS	Error in the SLR system (Fehler im SLR-System => SLR-Bereitschaftsdienst rufen)		100.0000%
WETTZ_SLR_WLRS	No logging information (Keine Fehlerinformation verfügbar => SLR-Bereitschaftsdienst rufen)		100.0000%
WTZ_TUM_PCRTWAgent	Free disk space is less than 20% on volume C:		100.0000%
WTZ_TUM_PCRTWAgent	Host information was changed on WTZ_TUM_PCRTWAgent		100.0000%
WTZ_TUM_PCRTWAgent	Host name of zabbix_agentd was changed on WTZ_TUM_PCRTWAgent		100.0000%
WTZ_TUM_PCRTWAgent	Lack of available virtual memory on server WTZ_TUM_PCRTWAgent		100.0000%
WTZ_TUM_PCRTWAgent	Lack of free memory on server WTZ_TUM_PCRTWAgent		100.0000%

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Thank you ...