TOW2023 - Lecture

IVS Seamless Auxiliary Data Archive (SADA) and EVN Monitor

Alexander Neidhardt (TUM Wettzell)

Experience level: Beginners; new material.

Description: This lecture explains the IVS Seamless Auxiliary Data Archive. It shows how to participate and how to extract useful information.

Thanks for input from Aard Keimpema (JIVE)

Code: Sad

TOW2023 - Maintenance Workshops

IVS SADA & EVN Monitor

What is the IVS SADA / EVN Monitor

How to send in data?

How to get out data?

Why?

What is the IVS SADA / EVN Monitor

Why and what?

- Continuous, auxiliary data are of high interest
- Additional data might be interesting for research
- Centralized data repository
- Real-time overview of the observation network
- Preparations for dynamic observations

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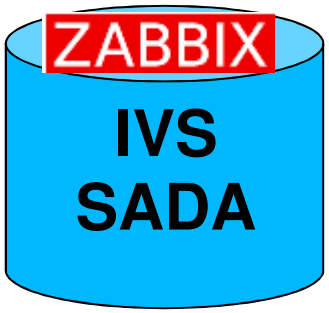

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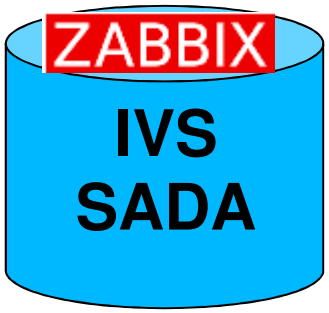

https://vlbisysmon.evlbi.wettzell.de/zabbix/

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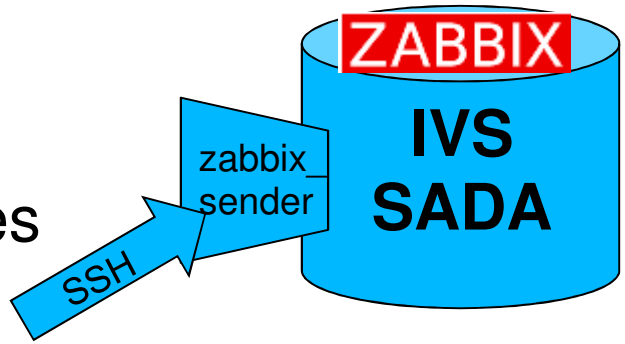
Data Injenction by Sites



ERC.TEMPERATURE => Temperature => unit deg C
ERC.HUMIDITY => Humidity => unit %
ERC.PRESSURE => Pressure => unit hPa
ERC.WINDSPEED => Windspeed => unit km/h
ERC.WINDDIRECTION => Winddirection => unit degree
ERC.DOTMON => Dotmon Clock Offsets (GPSminusFMOUT) => unit usec

(without additional installation of software)

`https://vlbisysmon.evlbi.wettzell.de/zabbix/`

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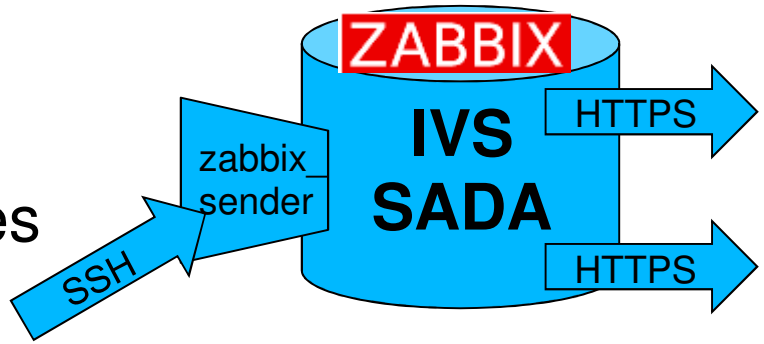

Web Services

Seamless Data Access (python)

https://vlbisysmon.evlbi.wettzell.de/zabbix/

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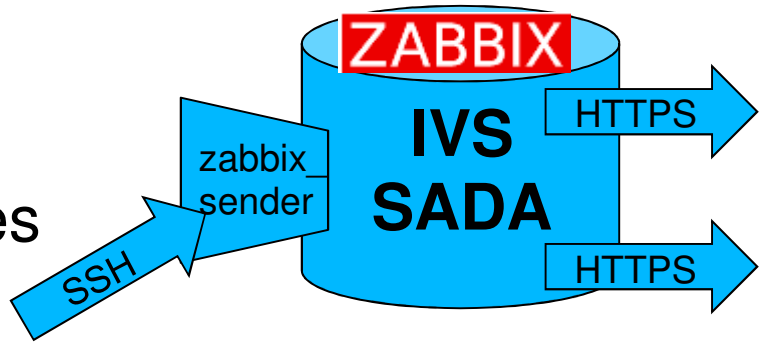

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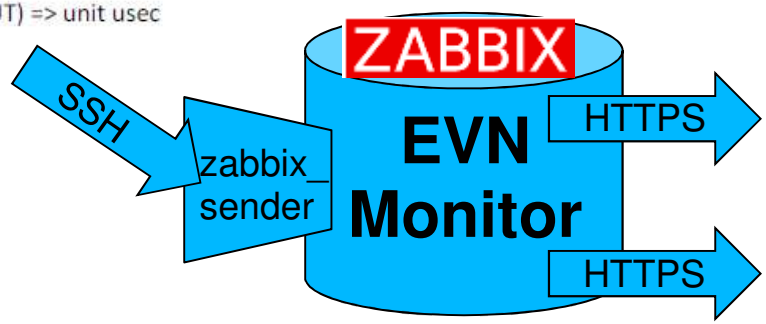

https://evn-monitor.jive.eu/

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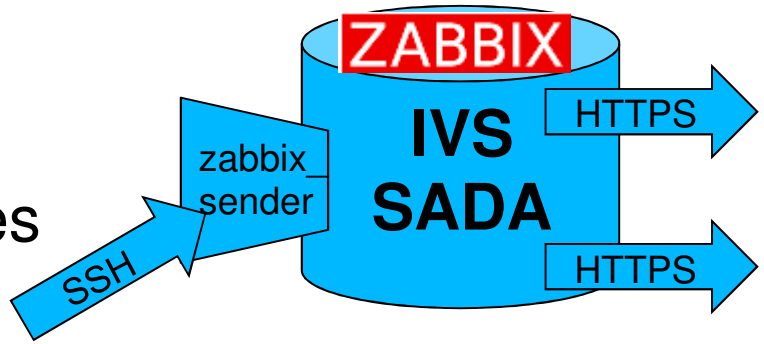

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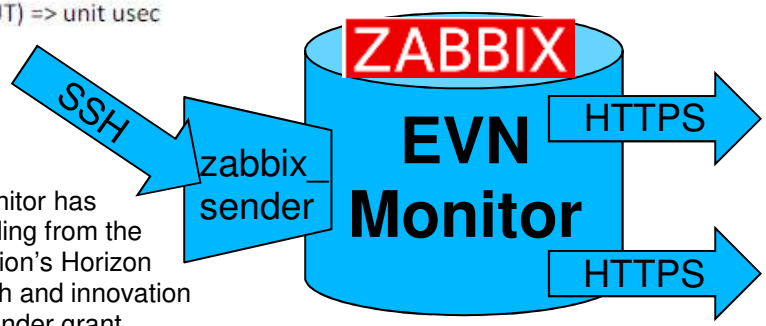

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The EVN Monitor has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 730884.

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IVS SADA & EVN Monitor

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How to send in data?
How to get out data?
Why?

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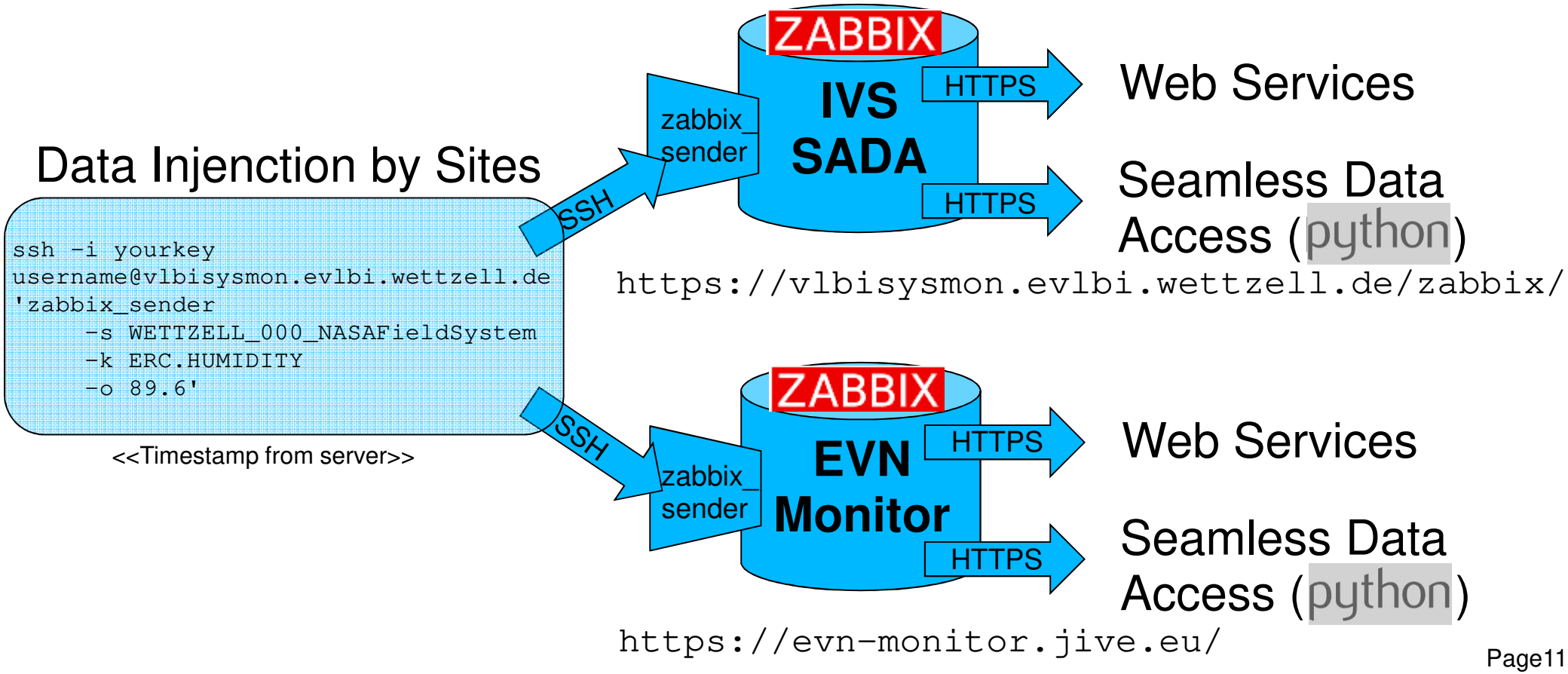

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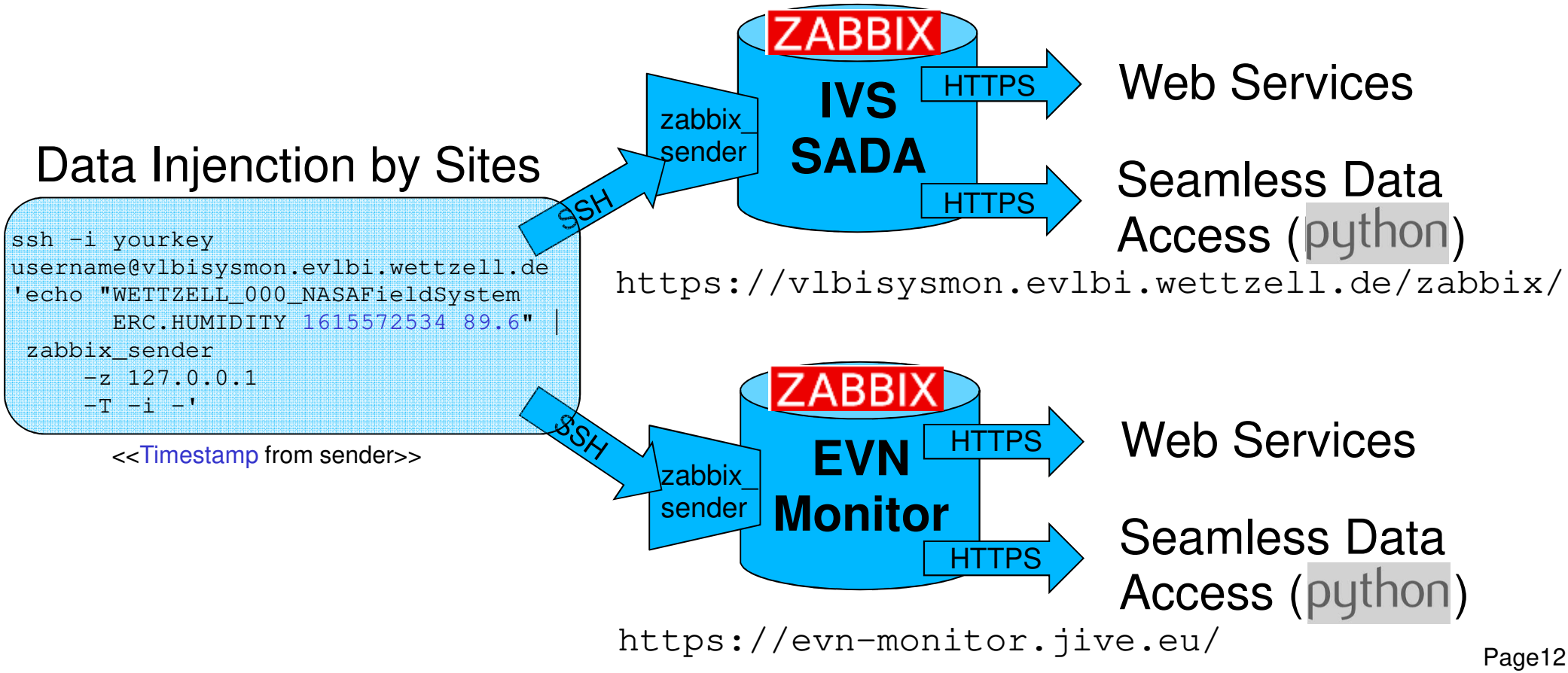

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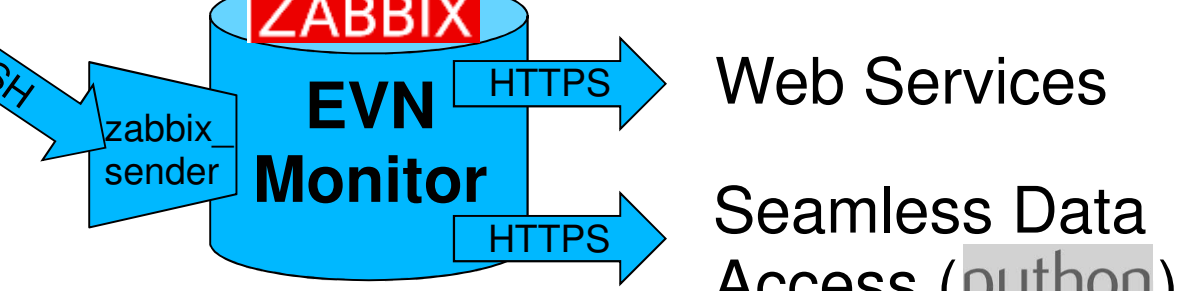
Data Injenction by Sites

```
ssh -i yourkey
username@vlbisysmon.evlbi.wettzell.de
datasender -t 1615572534
           ERC.HUMIDITY 89.6
```

<<Timestamp from sender>>

See Aard Keimpema (JIVE):
https://deki.mpifr-bonn.mpg.de/Working_Groups/EVN_TOG/EVN_Monitor



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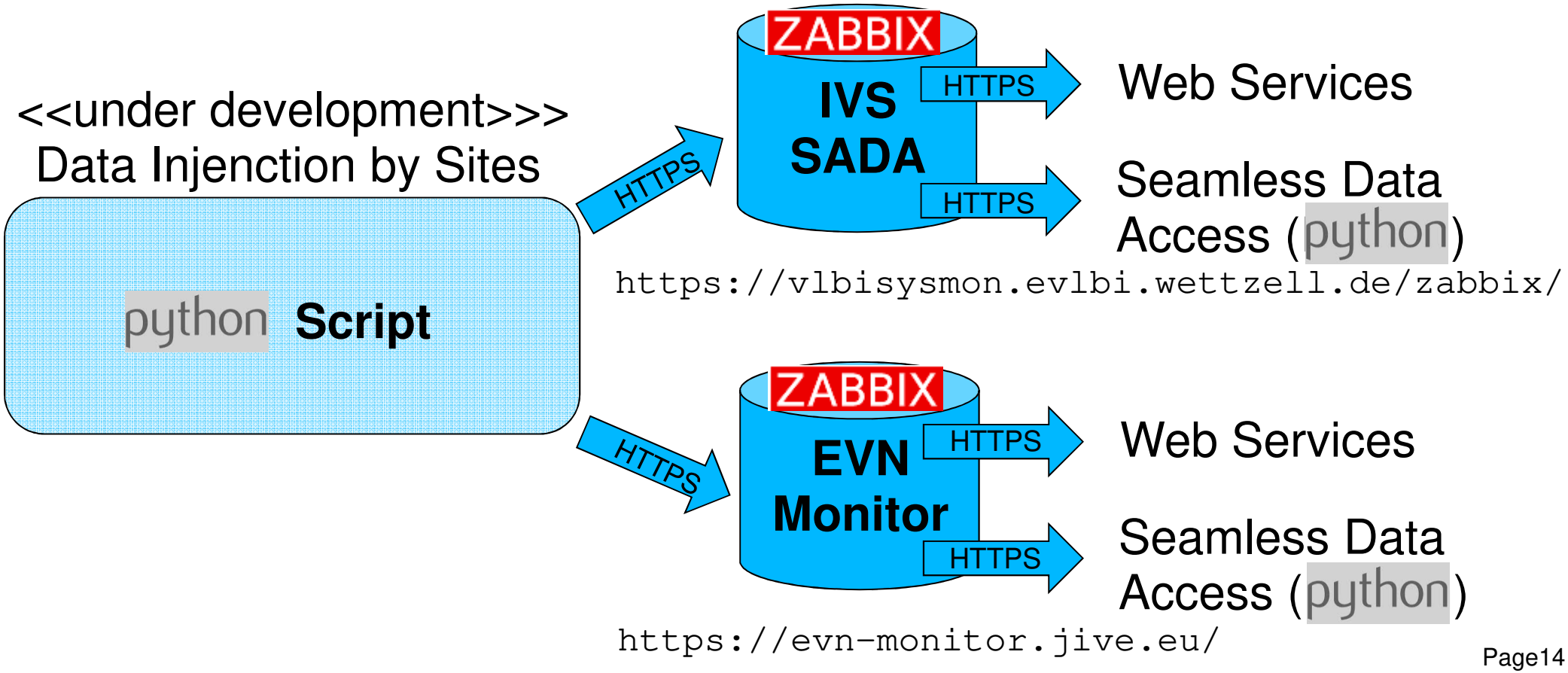

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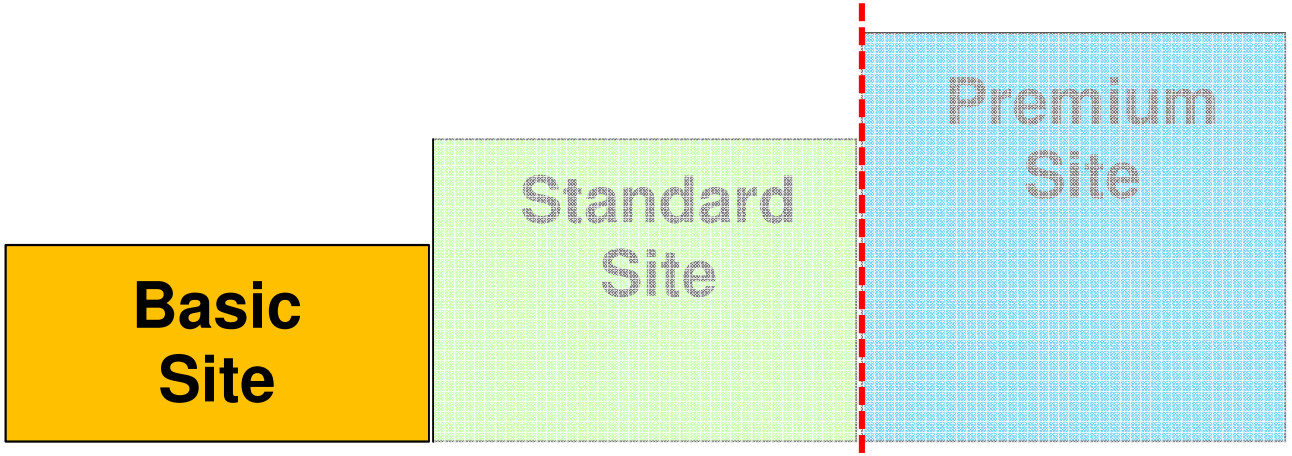

Basic Site	Standard Site	Premium Site
Elementary values - dotmon/dotmon2 - temperature - pressure - humidity - wind speed - wind direction - (cable)	e-RemoteCtrl values: currently 112 values from the Field System	Individual monitoring values, e.g., UPS, sensors, rack monitoring
Basic monitoring screen	Basic monitoring plus Field System screen	Individual monitoring screen
Simple data injection with SSH command	Automatic data injection via e-RemoteCtrl webpages	Data injection via ZABBIX methods

IVS SADA / EVN MONITOR | **Control Center**

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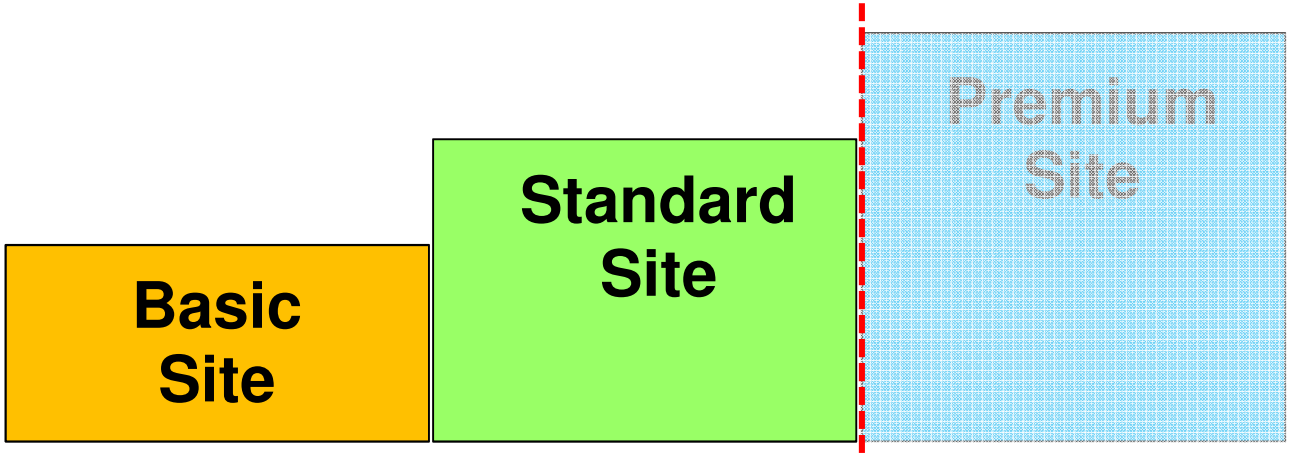

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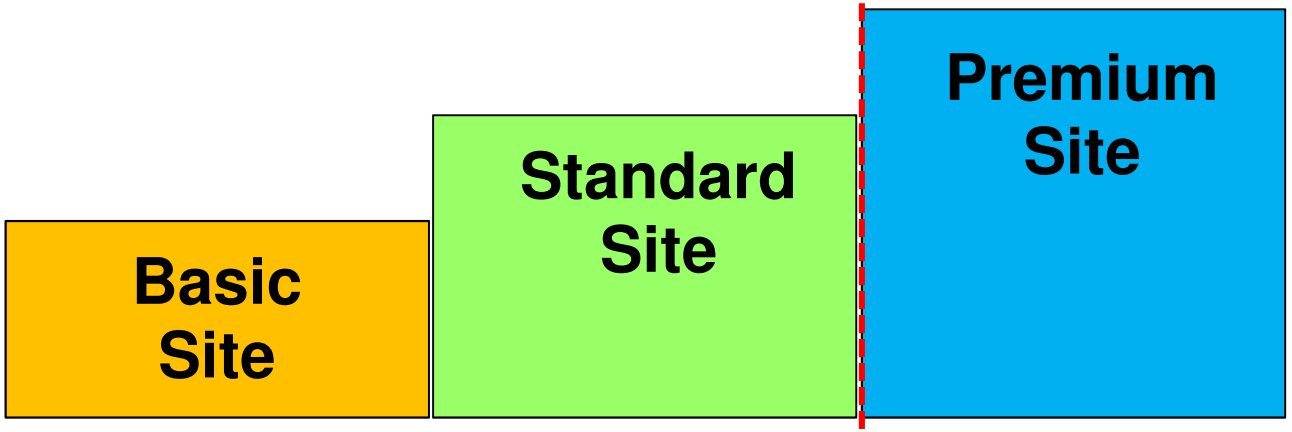

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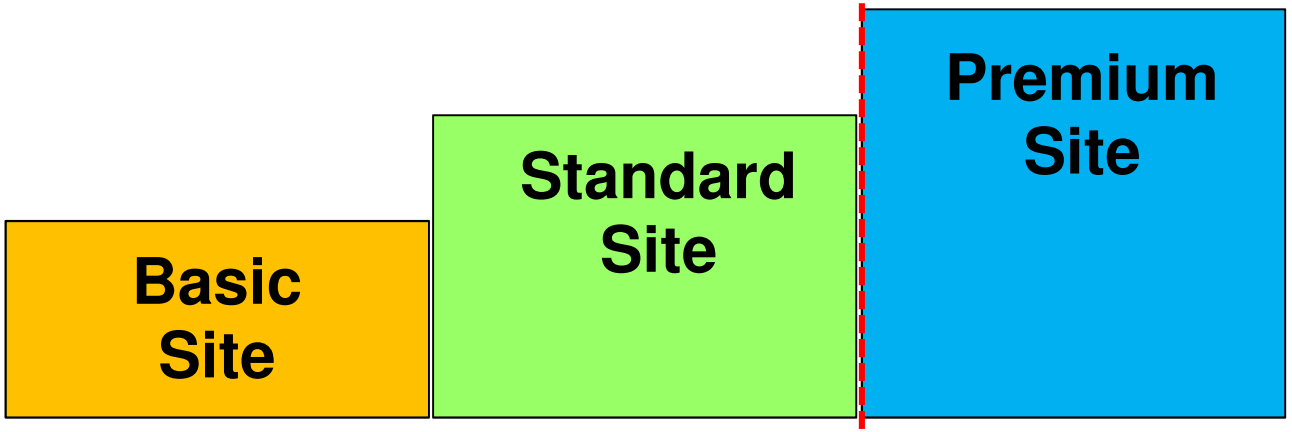

Predefined templates

Name ▲	Applications	Items	Triggers	Graphs	Screens	Discovery	Web
MyTemplate NASA Field System Data - Antenna Control Unit Vertex Type	Applications 1	Items 19	Triggers 65	Graphs 6	Screens 1	Discovery	Web
MyTemplate NASA Field System Data - Cryogenic Dewar	Applications 1	Items 6	Triggers 3	Graphs 5	Screens 1	Discovery	Web
MyTemplate NASA Field System Data - Log	Applications 1	Items 3	Triggers 3977	Graphs	Screens	Discovery	Web
MyTemplate NASA Field System Data - Mark5 Remaining Capacity	Applications 1	Items 16	Triggers	Graphs 2	Screens	Discovery	Web
MyTemplate NASA Field System Data - Phase Cal Monitoring Legacy	Applications 1	Items 48	Triggers	Graphs	Screens	Discovery	Web
MyTemplate NASA Field System Data - System Status Monitor	Applications 2	Items 33	Triggers 8	Graphs 8	Screens 1	Discovery	Web
MyTemplate NASA Field System Data - System Temperatures Legacy	Applications 1	Items 58	Triggers 1	Graphs 4	Screens	Discovery	Web

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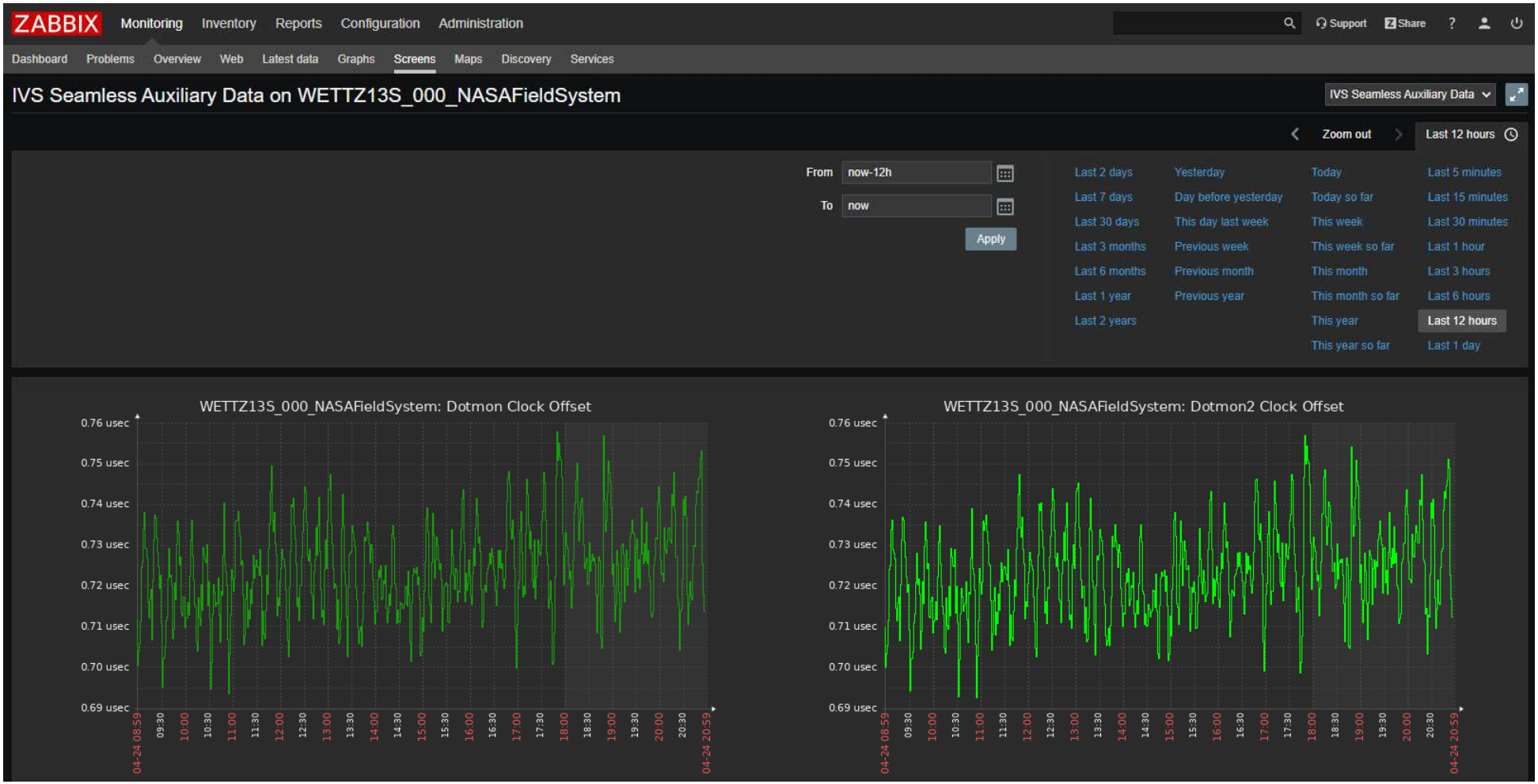
How to get out data?

Web server screens



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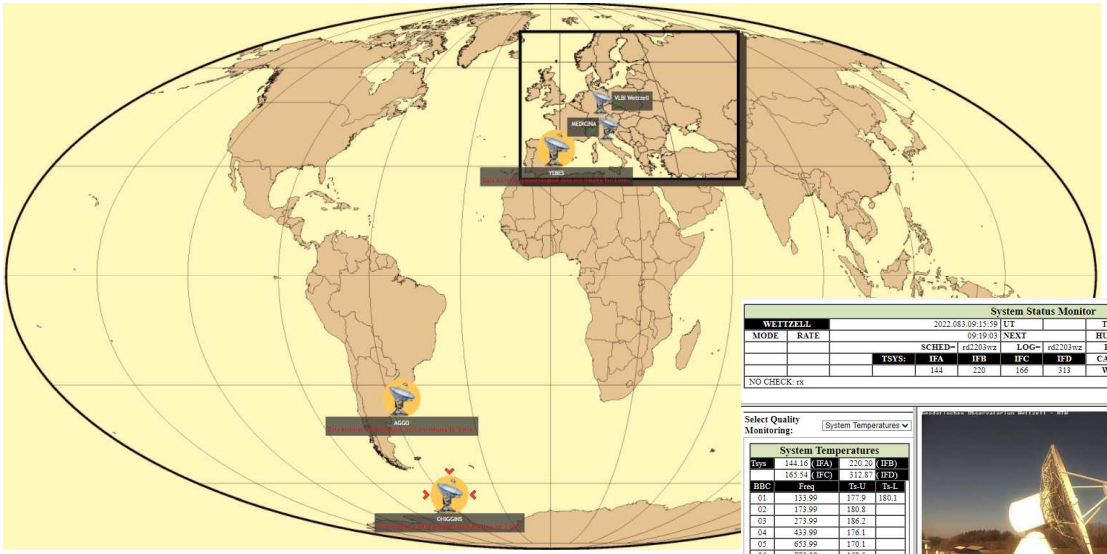
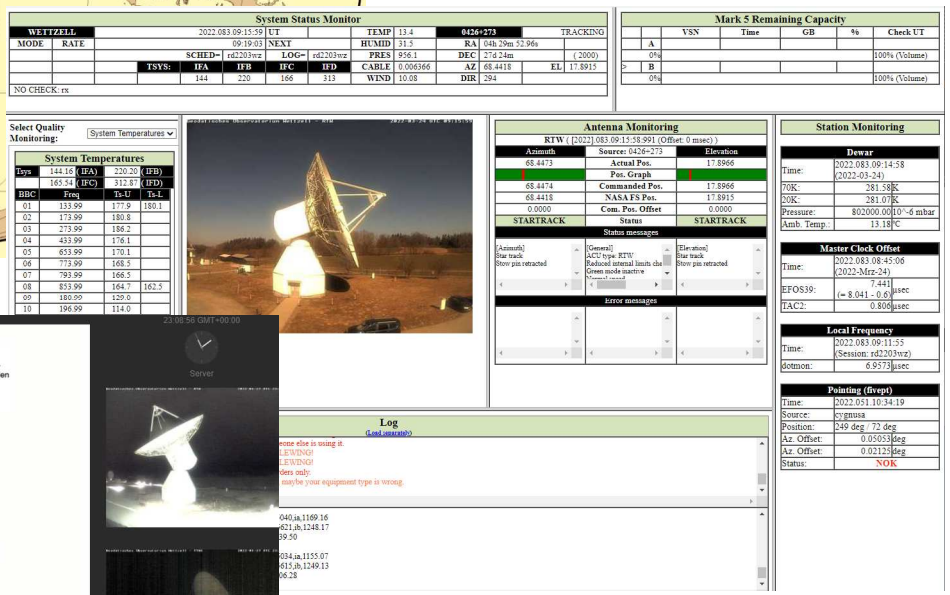
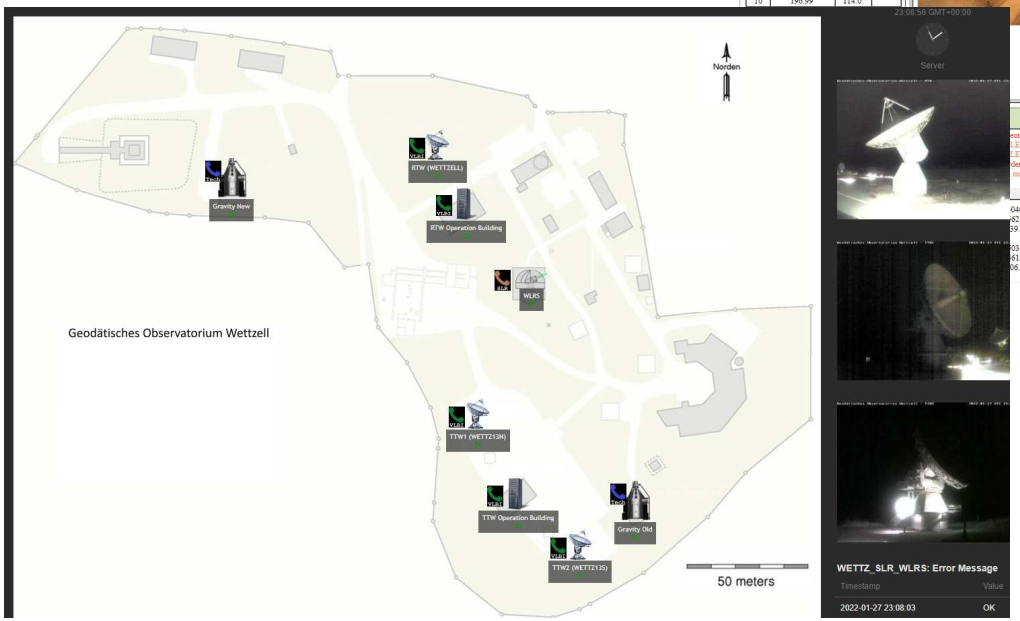


Web server overview





How to get out data?

python **Script**

Sample call: available hosts

```
python.exe ZabbixAPI.py -C config_evn.ini -L
```

```
#HostID Hostname
#-----------------------------------------------
  10289 MEDICINA_000_NASAFieldSystem
  10272 WETTZELL_000_NASAFieldSystem
  10271 YEBES_000_NASAFieldSystem
```

How to get out data?

python **Script**

Sample call: seamless request for specific time interval

```
python.exe ZabbixAPI.py -C config_evn.ini -L
-H YEBES_000_NASAFieldSystem  -K ERC.PRESSURE
-TS "2022-03-15 18:15:00" -TE "2022-03-15 18:30:00"
```

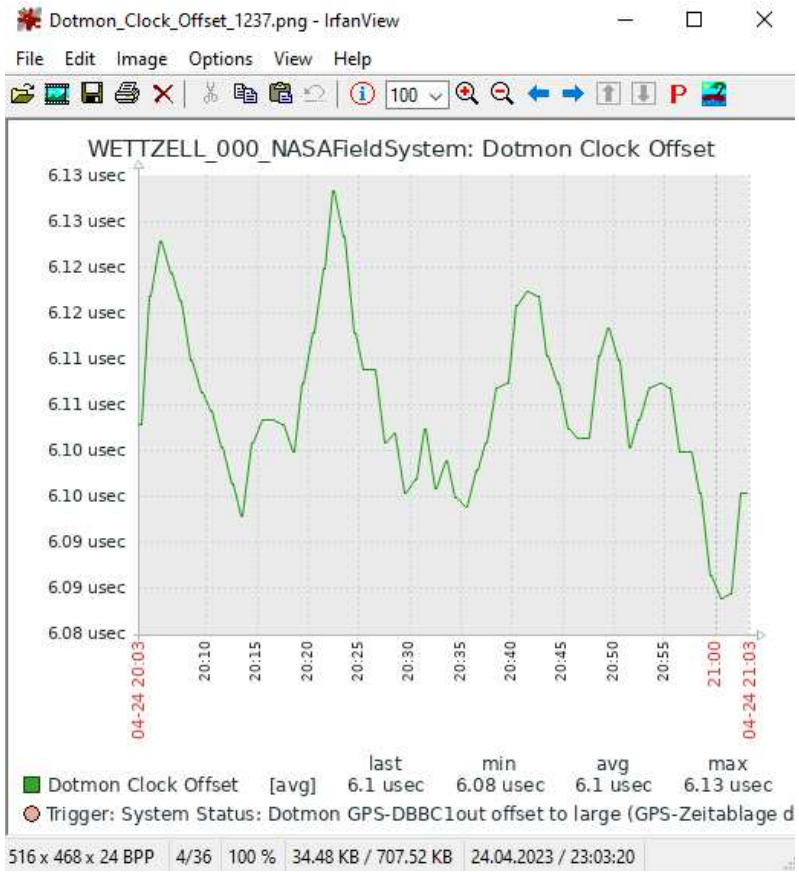
```
#Date                    Unixtime    Value
#-----------------------------------------------
 2022-03-15 18:29:01   1647368941  911.0114
 2022-03-15 18:28:01   1647368881  911.0114
 2022-03-15 18:27:01   1647368821  911.0114
 2022-03-15 18:26:01   1647368761  911.0114
 2022-03-15 18:25:02   1647368702  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
```

How to get out data?

python **Script**

Sample call: seamless request for graph image

```
python.exe ZabbixAPI.py -C config_evn.ini -GID 1237
```



How to get out data?

Monitoring archive files

https://vlbisysmon.evlbi.wettzell.de/monitoring_archive/ivs_archive/

Index of /monitoring_archive/ivs_archive

Name	Last modified	Size	Description
Parent Directory		-	
HOBART/	2023-01-02 00:05	-	
MEDICINA/	2023-01-02 00:05	-	
OHIGGINS/	2023-01-02 00:05	-	
WARKWORTH/	2023-01-02 00:05	-	
WETTZ13N/	2023-01-02 00:05	-	
WETTZ13S/	2023-01-02 00:05	-	
WETTZELL/	2023-01-02 00:05	-	
2021/	2021-12-02 00:05	-	
2022/	2022-12-02 00:05	-	
2023/	2023-04-02 00:05	-	
01/	2023-01-02 00:05	-	
02/	2023-02-02 00:05	-	
03/	2023-03-02 00:05	-	
04/	2023-04-02 00:05	-	
DOTMON/	2023-04-24 00:05	-	
HUMIDITY/	2023-04-24 00:05	-	
PRESSURE/	2023-04-24 00:05	-	
TEMPERATURE/	2023-04-24 00:05	-	
20230401_WETTZELL_DOTMON.txt	2023-04-02 00:05	59K	
20230402_WETTZELL_DOTMON.txt	2023-04-03 00:05	59K	
20230403_WETTZELL_DOTMON.txt	2023-04-04 00:05	59K	
20230404_WETTZELL_DOTMON.txt	2023-04-05 00:05	59K	
20230405_WETTZELL_DOTMON.txt	2023-04-06 00:05	59K	

#Date	Unixtime	Value
2023-04-01 23:59:51	1680393591	6.2093
2023-04-01 23:58:51	1680393531	6.2113
2023-04-01 23:57:51	1680393471	6.2113
2023-04-01 23:56:51	1680393411	6.2103
2023-04-01 23:55:51	1680393351	6.2008
2023-04-01 23:54:51	1680393291	6.1973
2023-04-01 23:53:51	1680393231	6.2023
2023-04-01 23:52:50	1680393170	6.2023
2023-04-01 23:51:50	1680393110	6.2078
2023-04-01 23:50:50	1680393050	6.2198
2023-04-01 23:49:51	1680392991	6.2253
2023-04-01 23:48:51	1680392931	6.2203
2023-04-01 23:47:51	1680392871	6.2143
2023-04-01 23:46:51	1680392811	6.2098
2023-04-01 23:45:51	1680392751	6.2098
2023-04-01 23:44:51	1680392691	6.2108
2023-04-01 23:43:51	1680392631	6.2153
2023-04-01 23:42:51	1680392571	6.2073
2023-04-01 23:41:51	1680392511	6.2048
2023-04-01 23:40:51	1680392451	6.2083
2023-04-01 23:39:51	1680392391	6.2053

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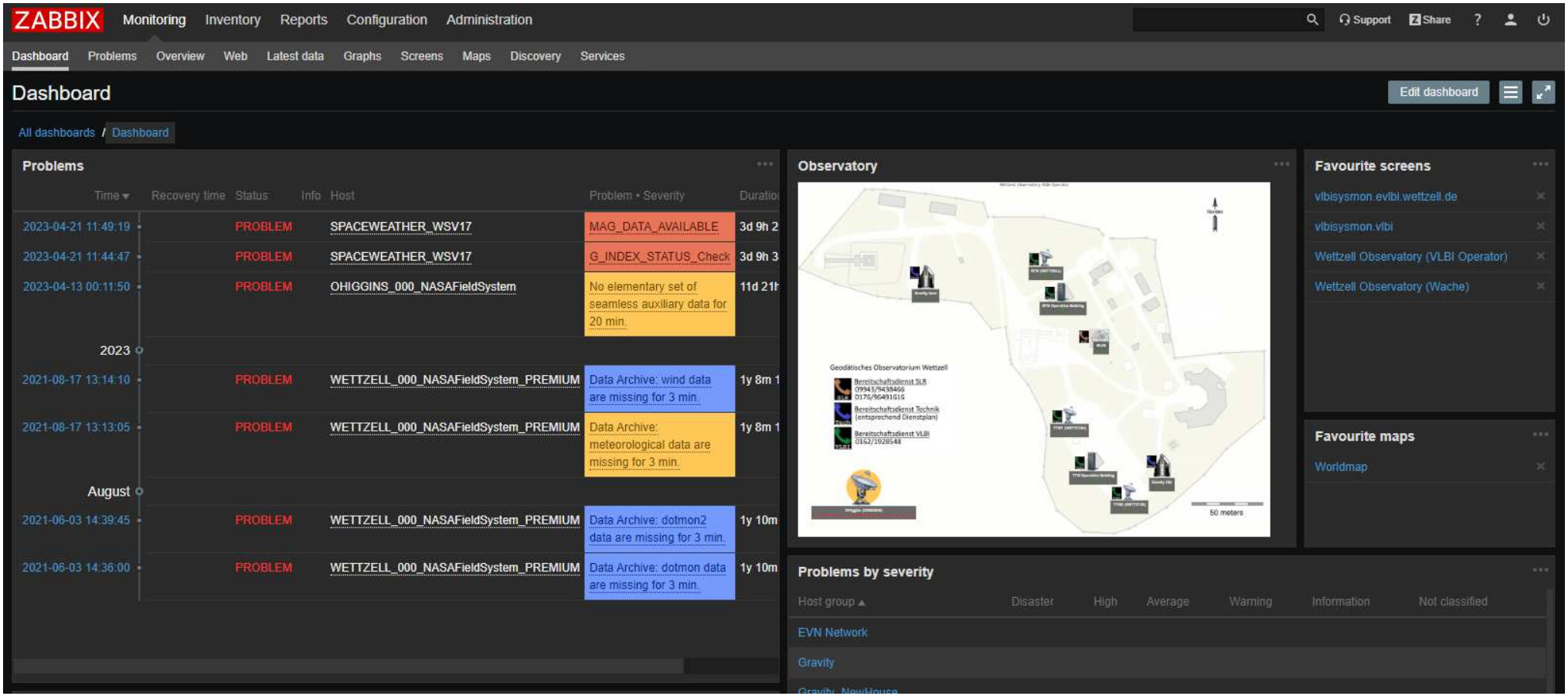
Why?

Live status of the network

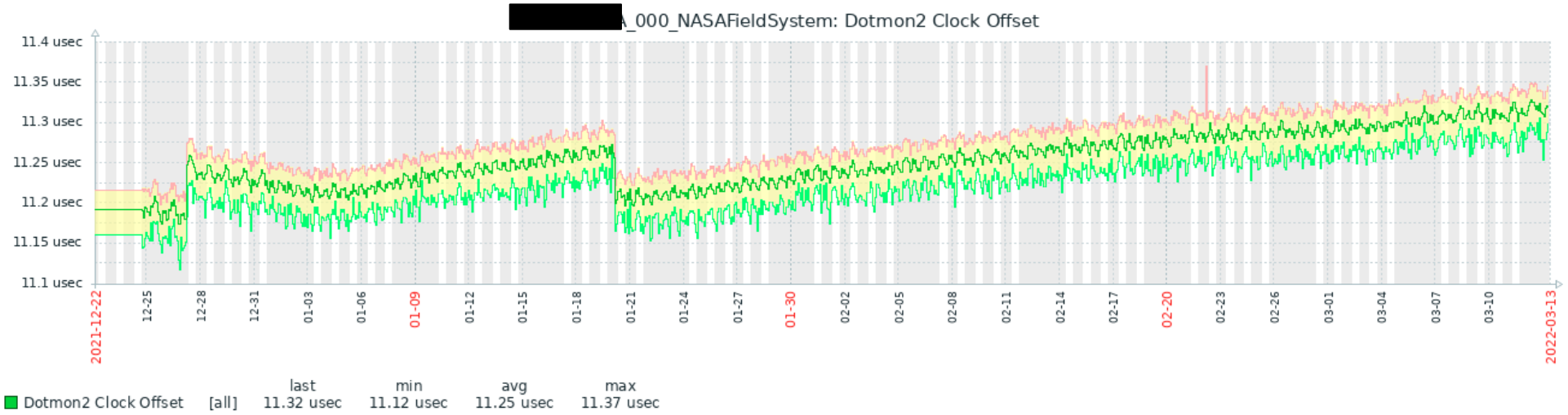


Just makes sence if there are possibilities to interact.

➔ See VCC for information exchange or the tests at AuScope for re-scheduling

Why?

Detection of system changes



Why?

Detection of causes for failures

Email from Haystack: No fringes for about 15 min. in vt2049ws

….

There was a roughly 15 minute period of no fringes at Ws in the middle of the vt2049 test. In the log it looks like the antenna was not pointing (grepping out 'onsource' from log):

<< all before = TRACKING >>

2022.049.20:26:15.08/onsource/TRACKING

2022.049.20:26:57.02/onsource/SLEWING

<< SLEWING from 20:26:57 to 20:42:04 >>

2022.049.20:42:04.02/onsource/SLEWING

2022.049.20:42:06.06/onsource/TRACKING

<< all after = TRACKING >>

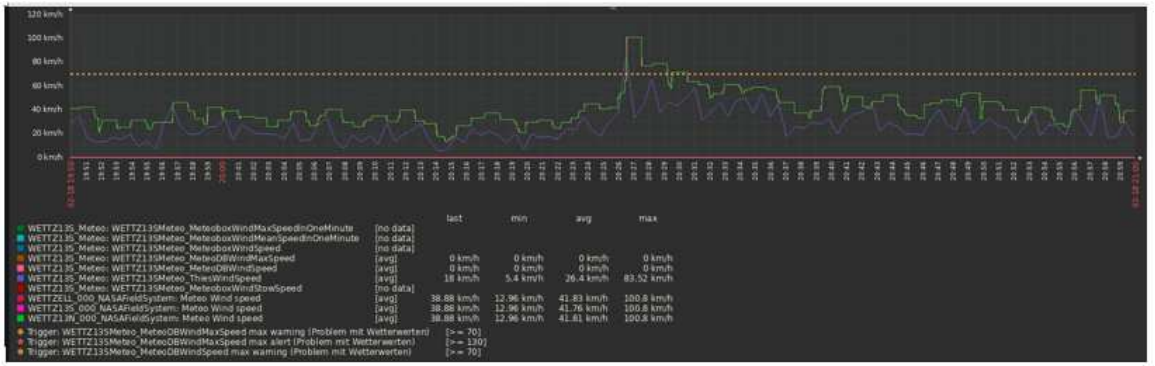
…

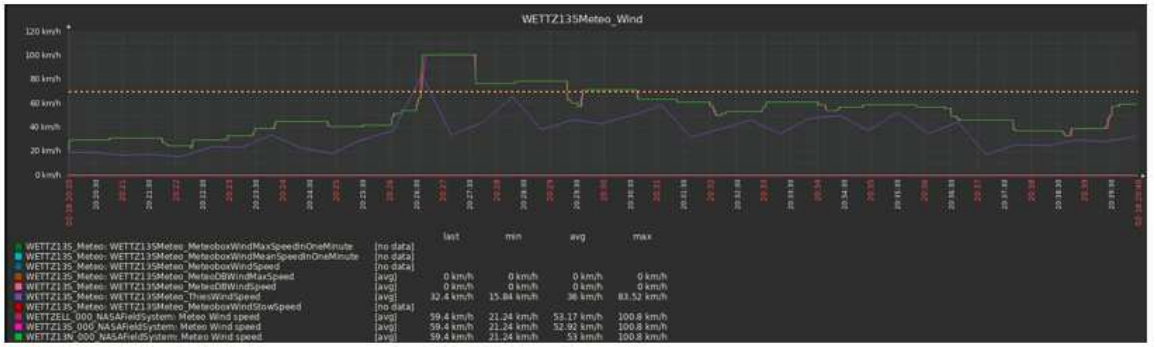
ACU error messages in the system monitoring here:

Timestamp	Value
2022-02-18 20:40:42	[General] Wind stow alert (remaining time: 9.95 min)
2022-02-18 20:39:42	[General] Wind stow alert (remaining time: 10.95 min)
2022-02-18 20:38:43	[General] Wind stow alert (remaining time: 11.95 min)

. . .

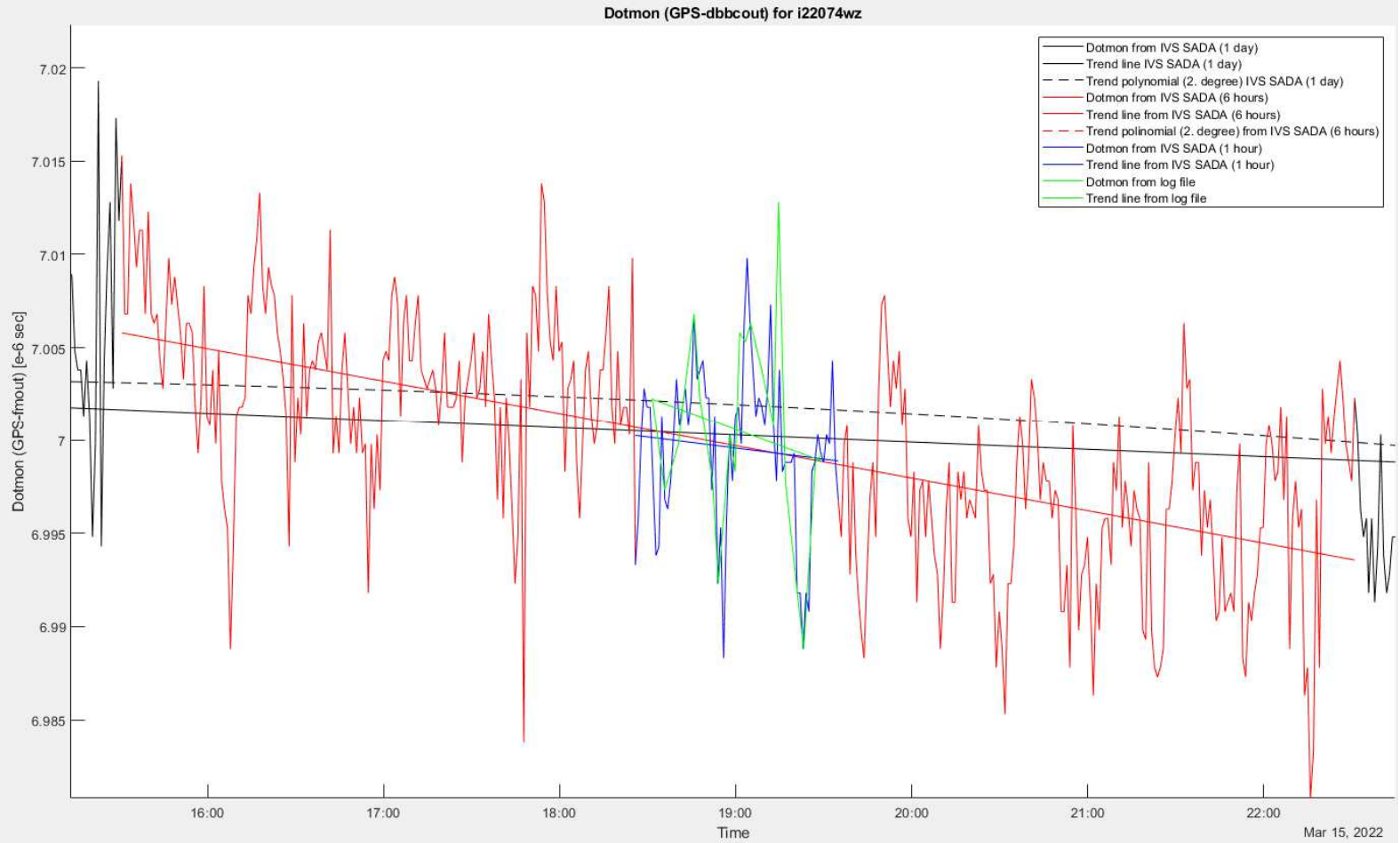
2022-02-18 20:27:43	[General] Wind stow alert (remaining time: 20.00 min)
2022-02-18 20:26:45	[Elevation] Survival stow
2022-02-18 20:26:44	[Azimuth] Survival stow
2022-02-18 20:26:42	[General] Wind stow alert (remaining time: 20.00 min)





Why?

Additional data for correlation and analysis

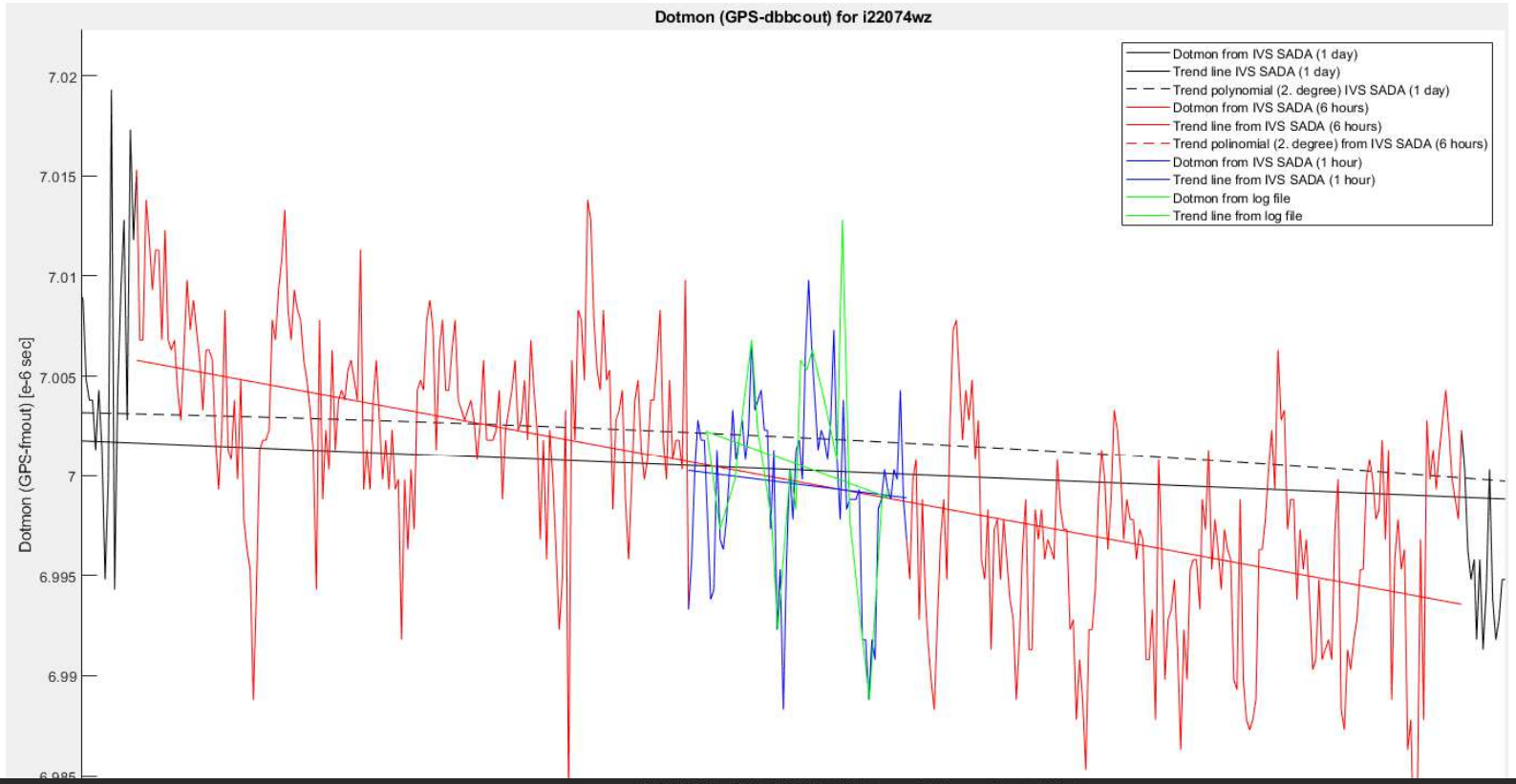


Short-term

TRENDS

Why?

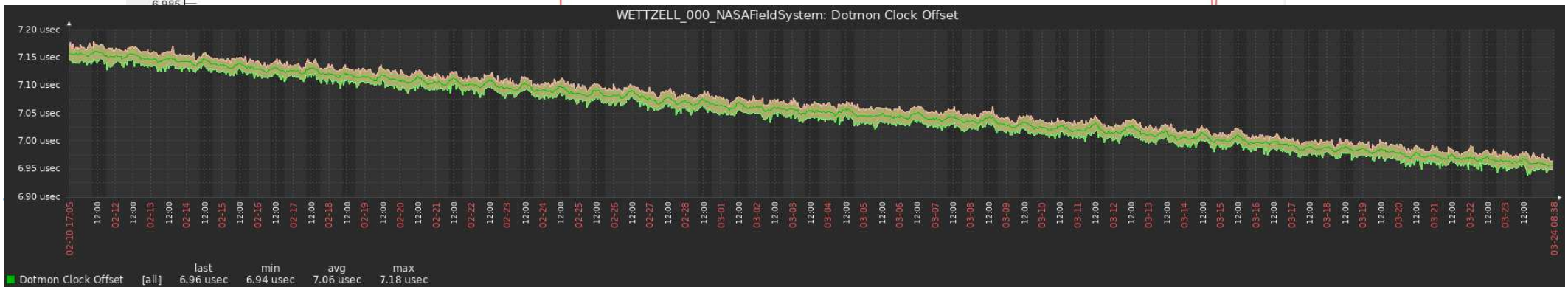
Additional data for correlation and analysis



Short-term

TRENDS

Long-term



Summary

- Completely functional systems at Wettzell, Germany and JIVE ERIC Dwingeloo, The Netherlands
- Easy to handling when importing data
- Already 9 antennas send data
- Nice browser-based web interfaces independent from OS
- Convenient data export with Python script independent OS
- Some first use of data for special projects (auxiliary data for surveying, photogrammetry, and quality checks
- Permanent use for station monitoring at Wettzell observatory

Wish list for the future:
- More participating antennas
- Use of data for correlation and analysis / science
- Extended data sets according to requirements

TOW2023 - Maintenance Workshops

IVS SADA & EVN Monitor

Thank you …

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