

Zabbix in the subway



Next station Zabbix



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Zabbix in the subway

Special thanks



Münchner Verkehrsgesellschaft mbH (MVG)
and
Stadtwerke München GmbH (SWM)

Projectlead: Mr. Sandro Gehlhaar

(Germany, Munich)



Zabbix in the subway

Trams - Everyone knows them



“Strassenbahn” in Munich, Germany

Picture provided by the MVG.



Zabbix in the subway

Trams - Nearly everyone uses them



“Strassenbahn” in Munich, Germany

Picture provided by the MVG.



Zabbix in the subway



There is more ... in the underground



Zabbix in the subway

Subways – Even faster



“U-Bahn Model A2” in Munich, Germany

Picture provided by the MVG.



Zabbix in the subway

Subways – The new ones



“U-Bahn Model C2” in Munich, Germany

Picture provided by the MVG.



Zabbix in the subway



Great – But what about Zabbix?



Zabbix in the subway

Next station Zabbix

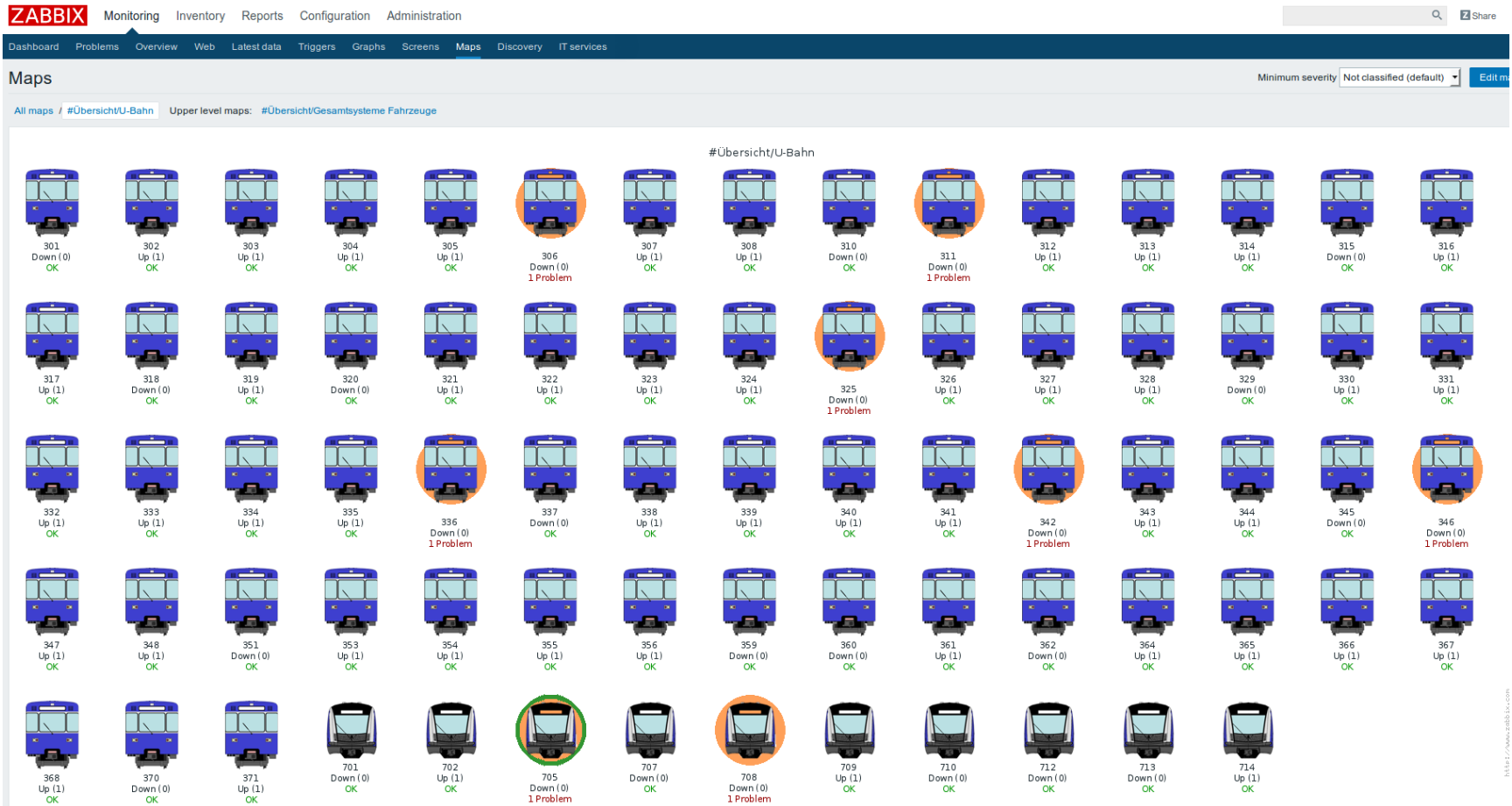


Well ...



Zabbix in the subway

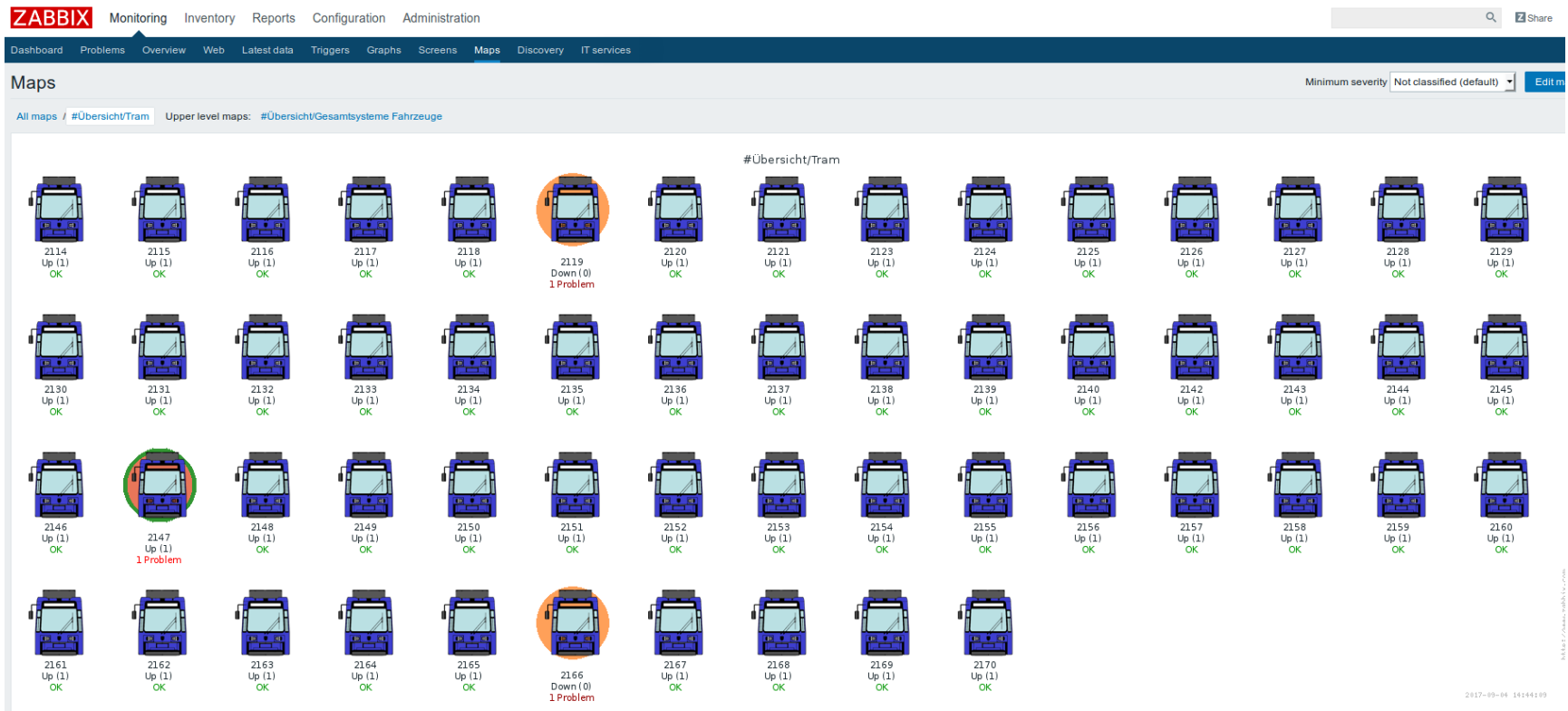
Subways in a Zabbix map



Screenshot provided by the MVG.

Zabbix in the subway

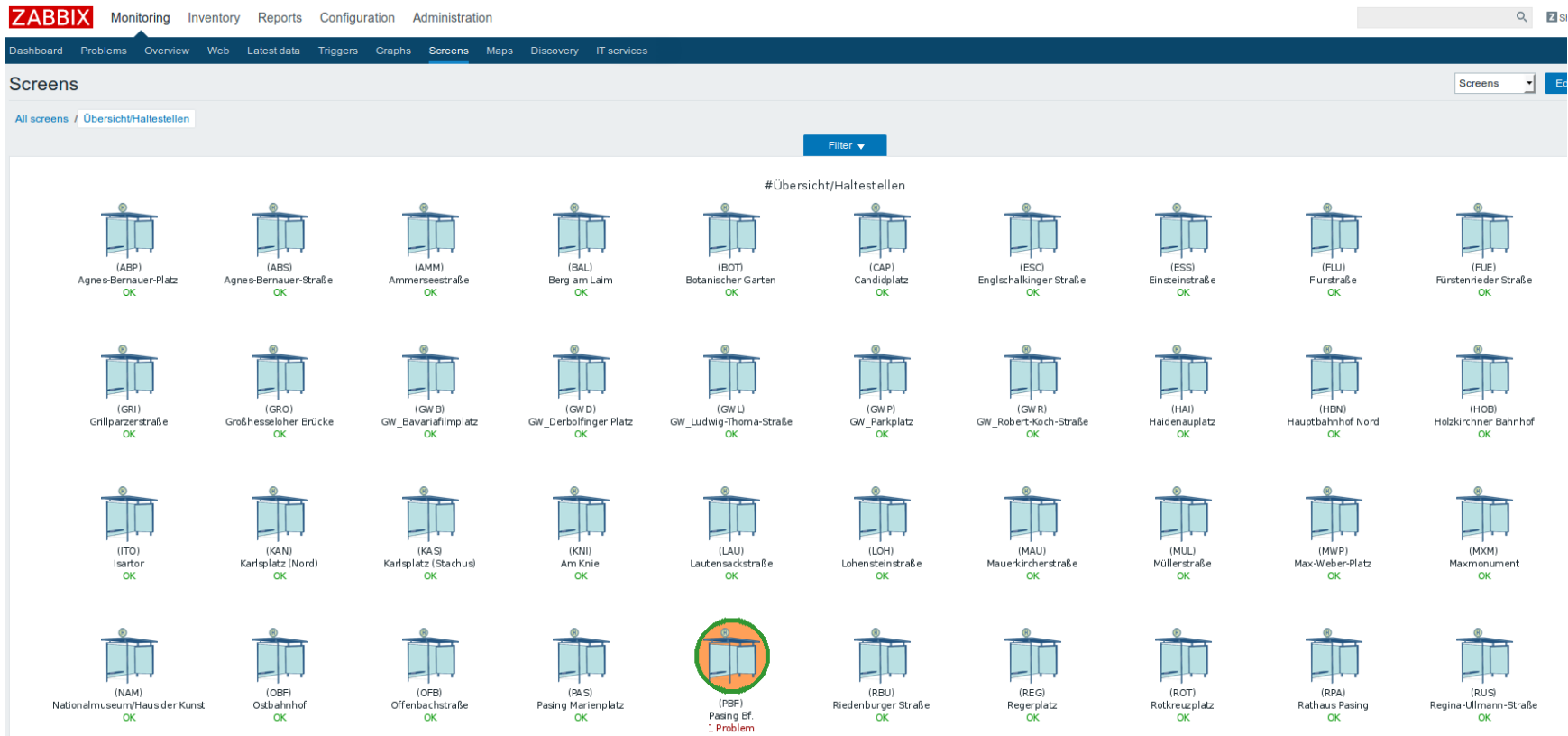
Trams in a Zabbix map



Screenshot provided by the MVG.

Zabbix in the subway

Stations in a Zabbix map



Screenshot provided by the MVG.

Zabbix in the subway



Monitoring trams and subways in the heart of Munich — with Zabbix



Zabbix in the subway

A new tram / subway



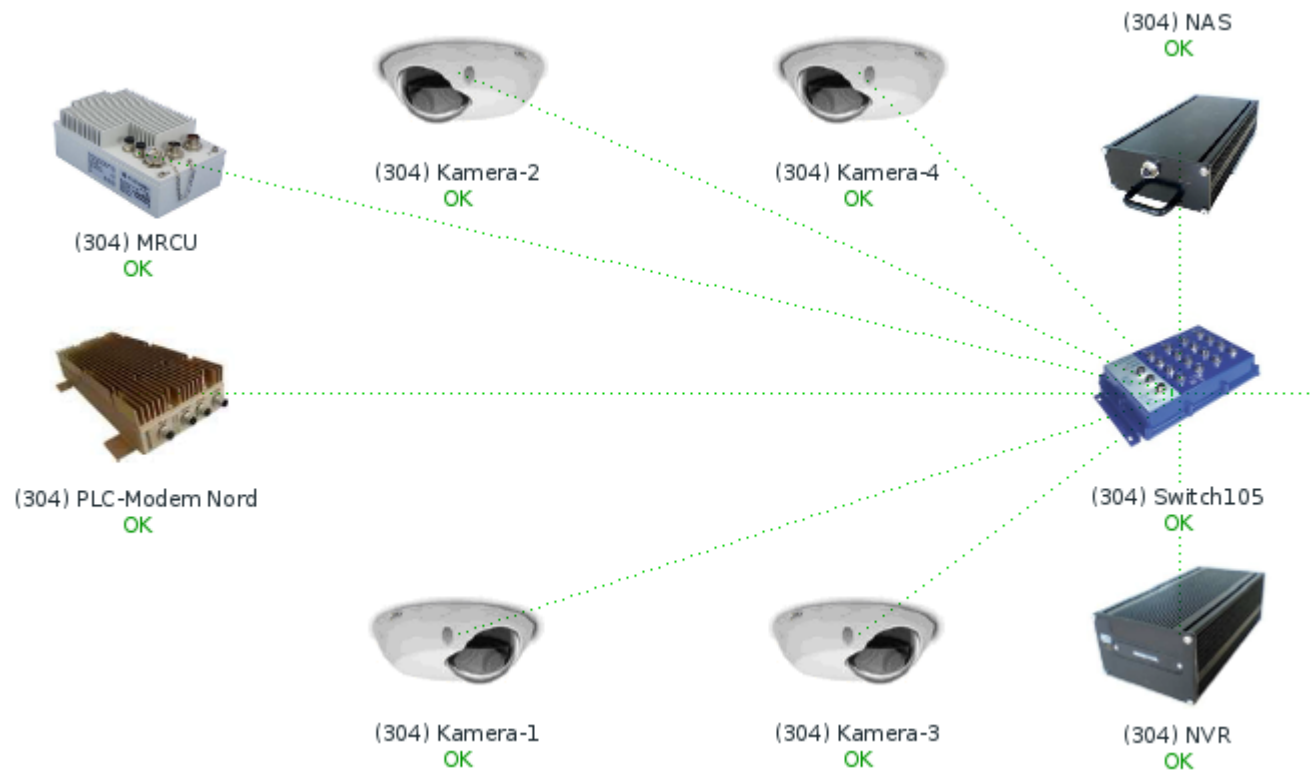
When a new tram / subway goes into service, some equipment needs to be added. Examples:

- Videocameras
- MRCU – Mobile Radio Control Unit (Subways)
- NVR – Network Video Recorder
- PLC-Modem – Connection between vehicles
- LTE-Router – LTE G4 Connectivity (Trams)
- NAS – Network attached Storage for NVR
- Switch



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A new tram / subway



Screenshot provided by the MVG.

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Implementation



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Monitoring setup for trams / subways



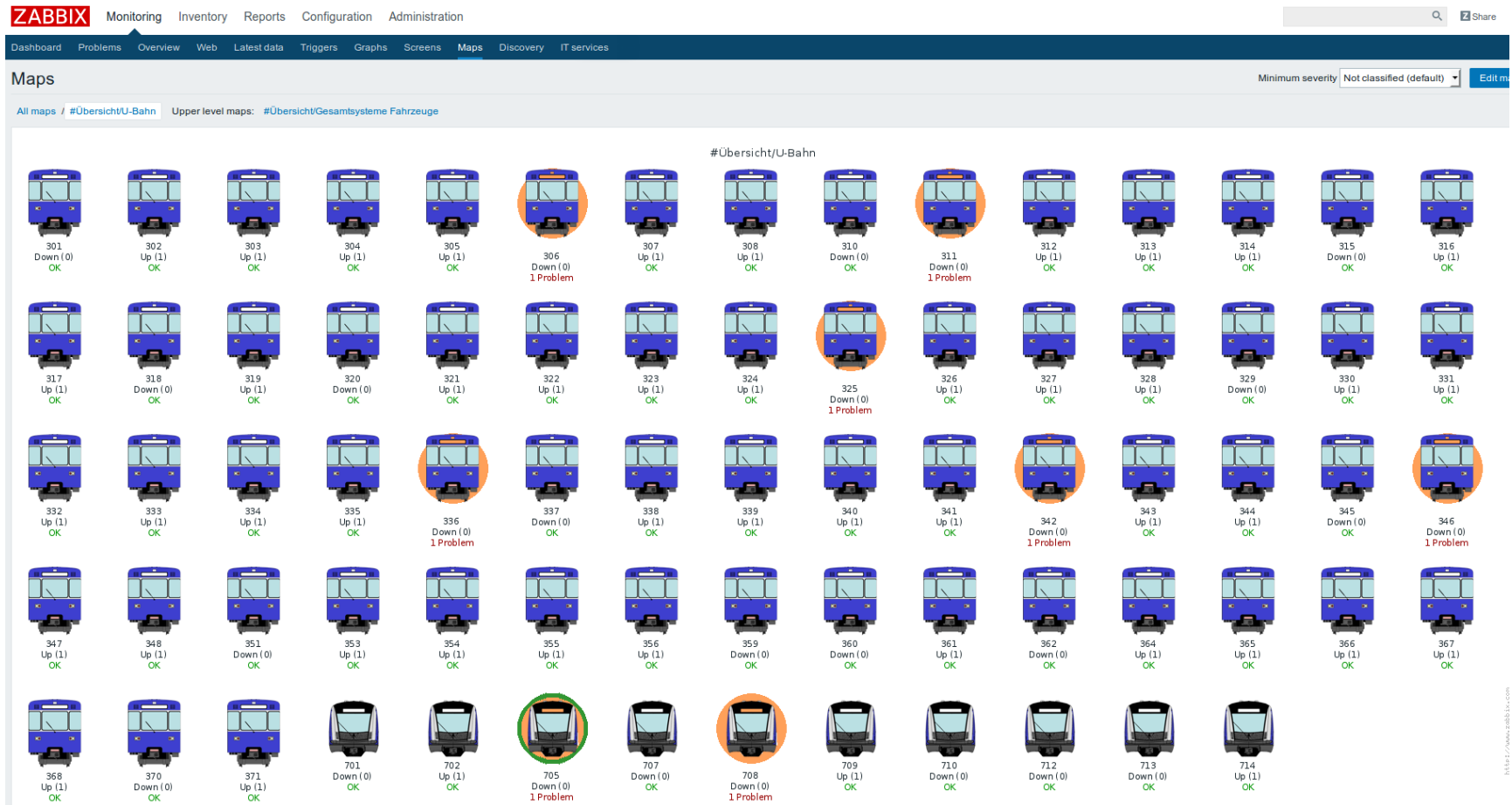
- Each device inside a tram / subway is treated as a host and is monitored for availability.
- Each tram / subway is managed as a hostgroup.
- Hostgroups are nested and organized by the tram / subway lines (using the Zabbix 3 hostgroup nesting feature).
- All devices depend on the connectivity of the MRCU or LTE-Router.
- Maps are automatically created for each tram / subway (using the Zabbix API).
- Maps use submaps to link to a specific tram / subway view.



Zabbix in the subway

Subways in a Zabbix map

Zabbix maps shows each subway as a hostgroup with its state

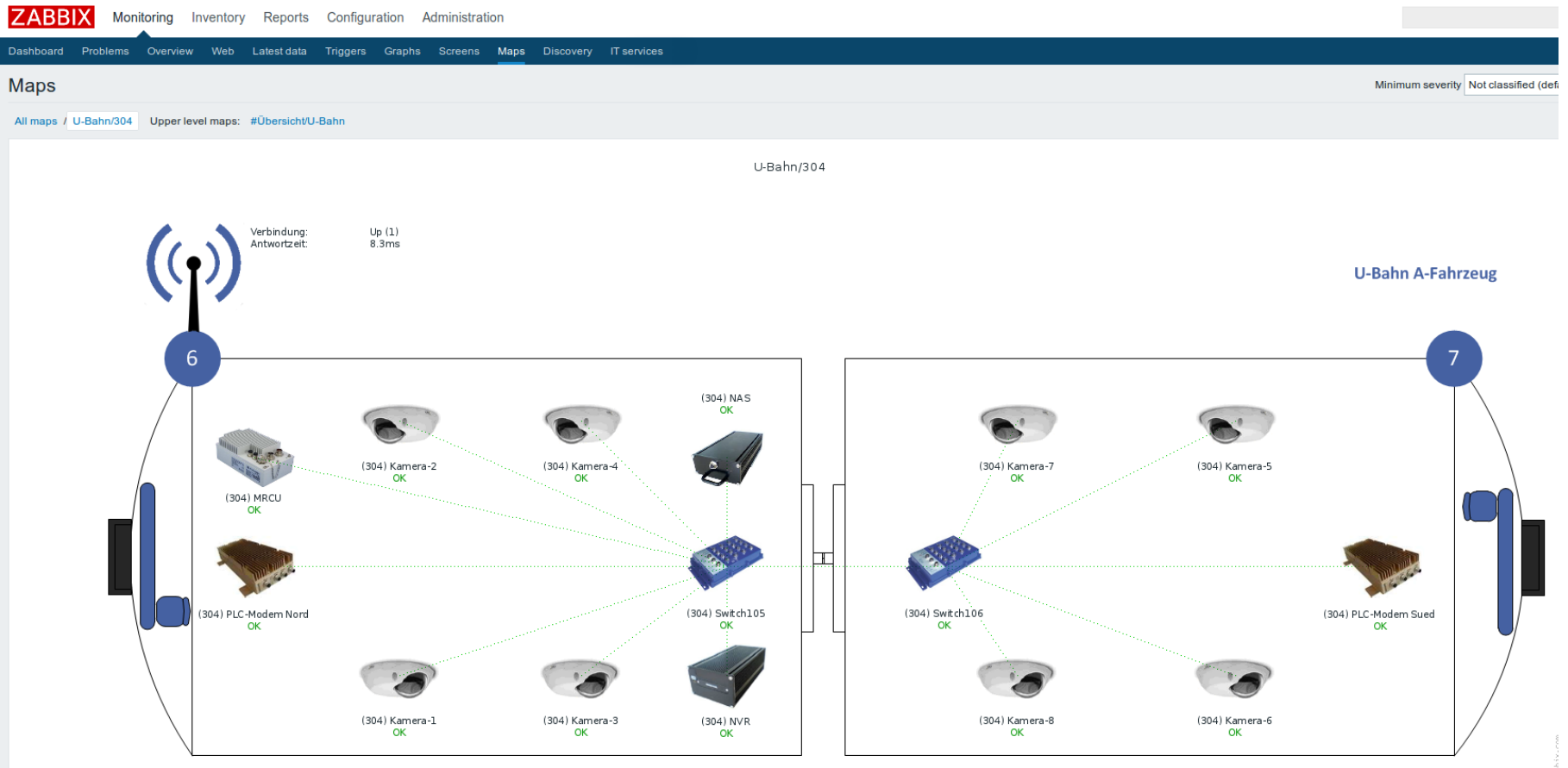


Screenshot provided by the MVG.

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Support for the service staff

Detailed Zabbix maps per tram / subway show components and their state



Screenshot provided by the MVG.



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Notification



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Notification setup for trams / subways



- Trigger based actions are used in the notification process for the service staff and integrate in their workflow.
- Service staff uses event acknowledgements. (Zabbix escalations are configured to consider acknowledgements).



Zabbix in the subway

Problem View – Subways



U-Bahn
5 Problems

Host group issues

Group: U-Bahn

Host	Issue ▼	Last change	Age	Info	Ack	Actions
(311) MRCU	(311) MRCU - Netzwerk: Ping [status] - [72h offline]	2017-09-04 07:33:00	1d 5h 32m		No	Done 3
(342) MRCU	(342) MRCU - Netzwerk: Ping [status] - [72h offline]	2017-09-02 06:49:06	3d 6h 16m		No	Done 3
(306) MRCU	(306) MRCU - Netzwerk: Ping [status] - [72h offline]	2017-08-12 11:21:48	24d 1h 43m		No	Done 3
(705) MRCU	(705) MRCU - Netzwerk: Ping [status] - [72h offline]	2017-08-08 16:16:58	27d 20h 48m		Yes 1	Done 3
(325) MRCU	(325) MRCU - Netzwerk: Ping [status] - [72h offline]	2017-08-08 16:16:54	27d 20h 48m		No events	

5 of 15 issues are shown Updated: 13:05:47



Screenshot provided by the MVG.

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Problem View – Trams



Tram
2 Problems

http://www.zabbix.cc

2017-09-05 13:05:47

Host group issues

						Group: Tram
Host	Issue ▼	Last change	Age	Info	Ack	Actions
(2147) NVR, (2147) LTE Router	(2147) NVR - Netzwerk: Ping [status] - [offline]	2017-08-20 16:14:19	15d 20h 51m		Yes 2	Done 3
(2119) LTE Router	(2119) LTE Router - Netzwerk: Ping [status] - [48h offline]	2017-08-31 08:02:23	5d 5h 3m		No	Done 3

2 of 4 issues are shown Updated: 13:05:47



Screenshot provided by the MVG.

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Support the Service



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Support for the service staff

Operations executed by context menus from the map – installation point

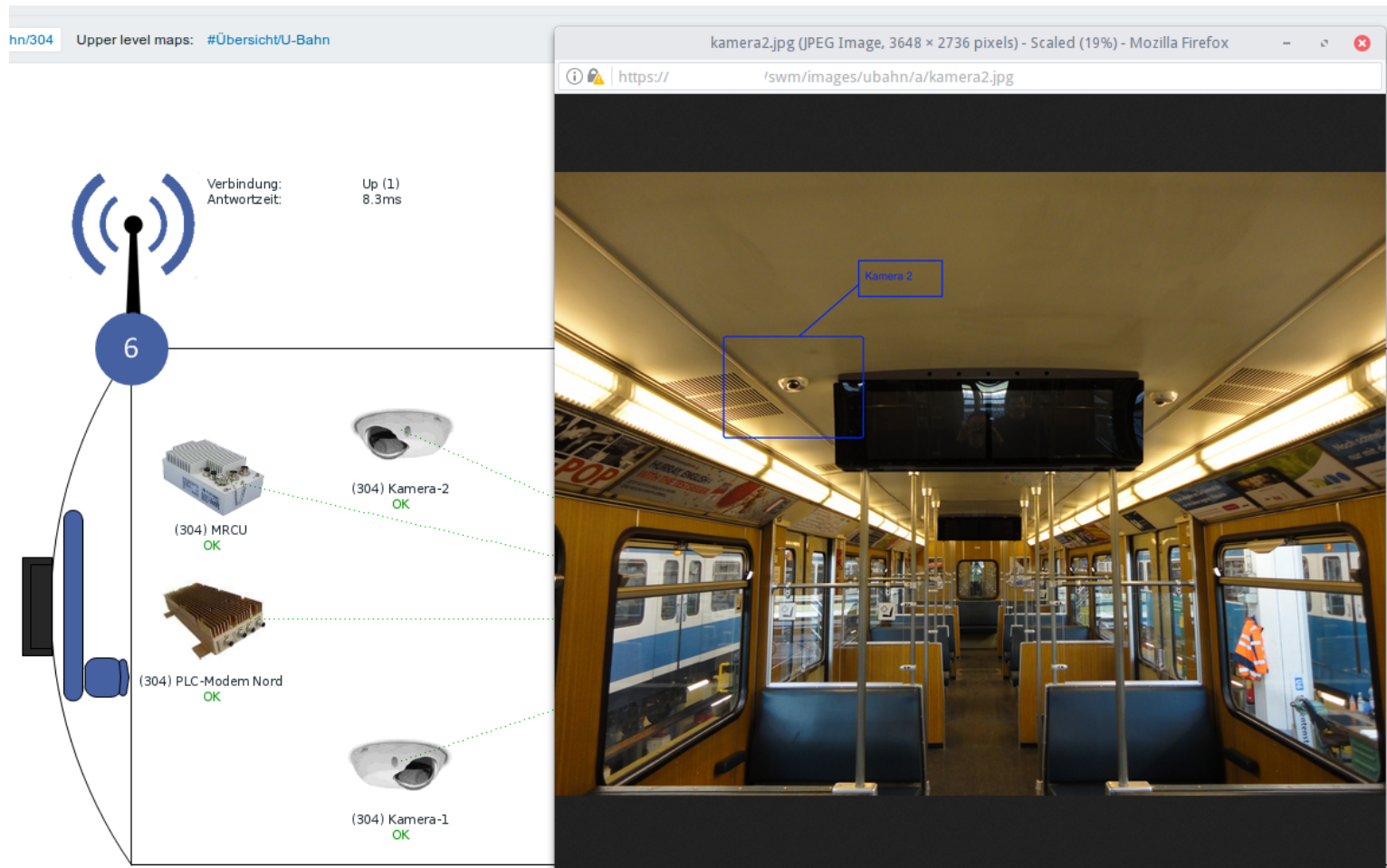


Screenshot provided by the MVG.

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Support for the service staff

Show installation point of device in tram / subway directly from the Zabbix map



Screenshot provided by the MVG.



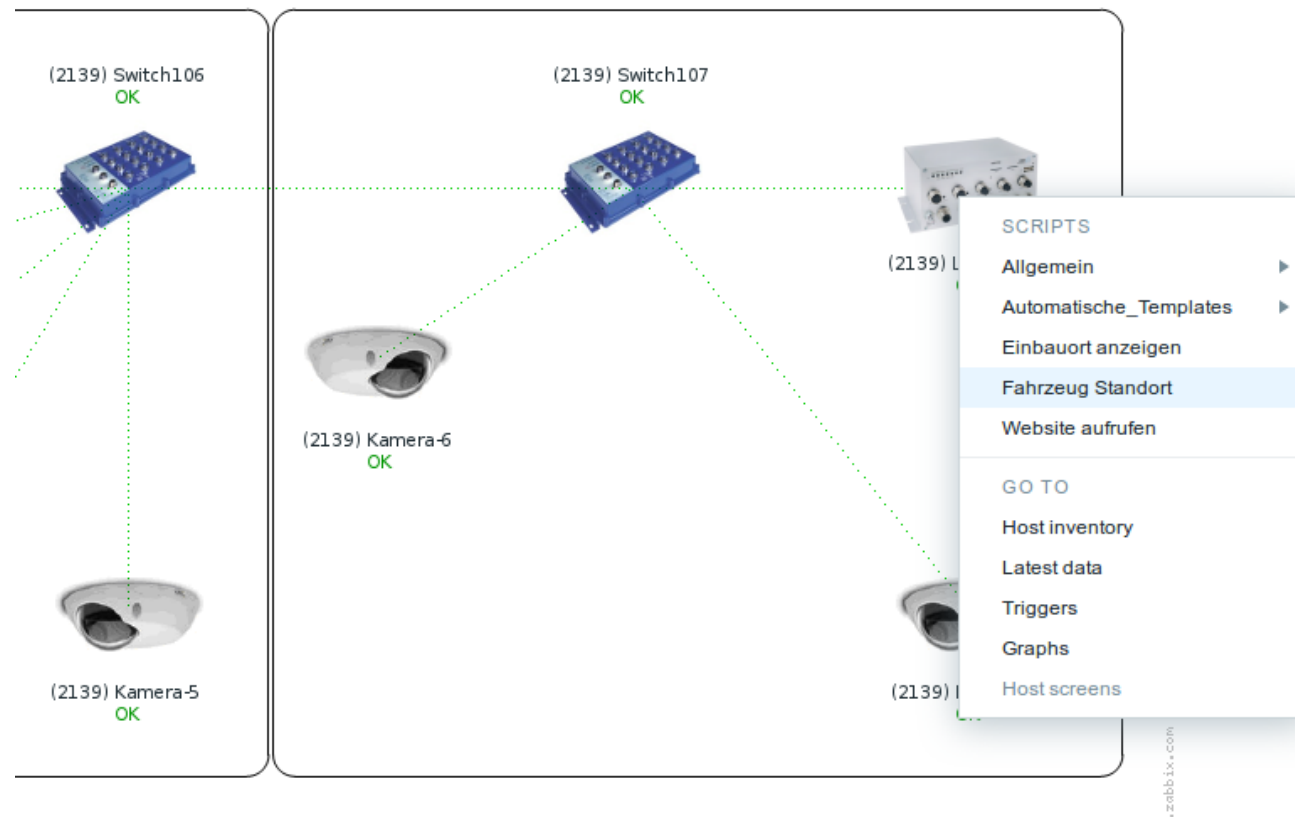
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Support for the service staff

Operations executed by context menus from the map – vehicle location



Tram R2.2 Fahrzeug



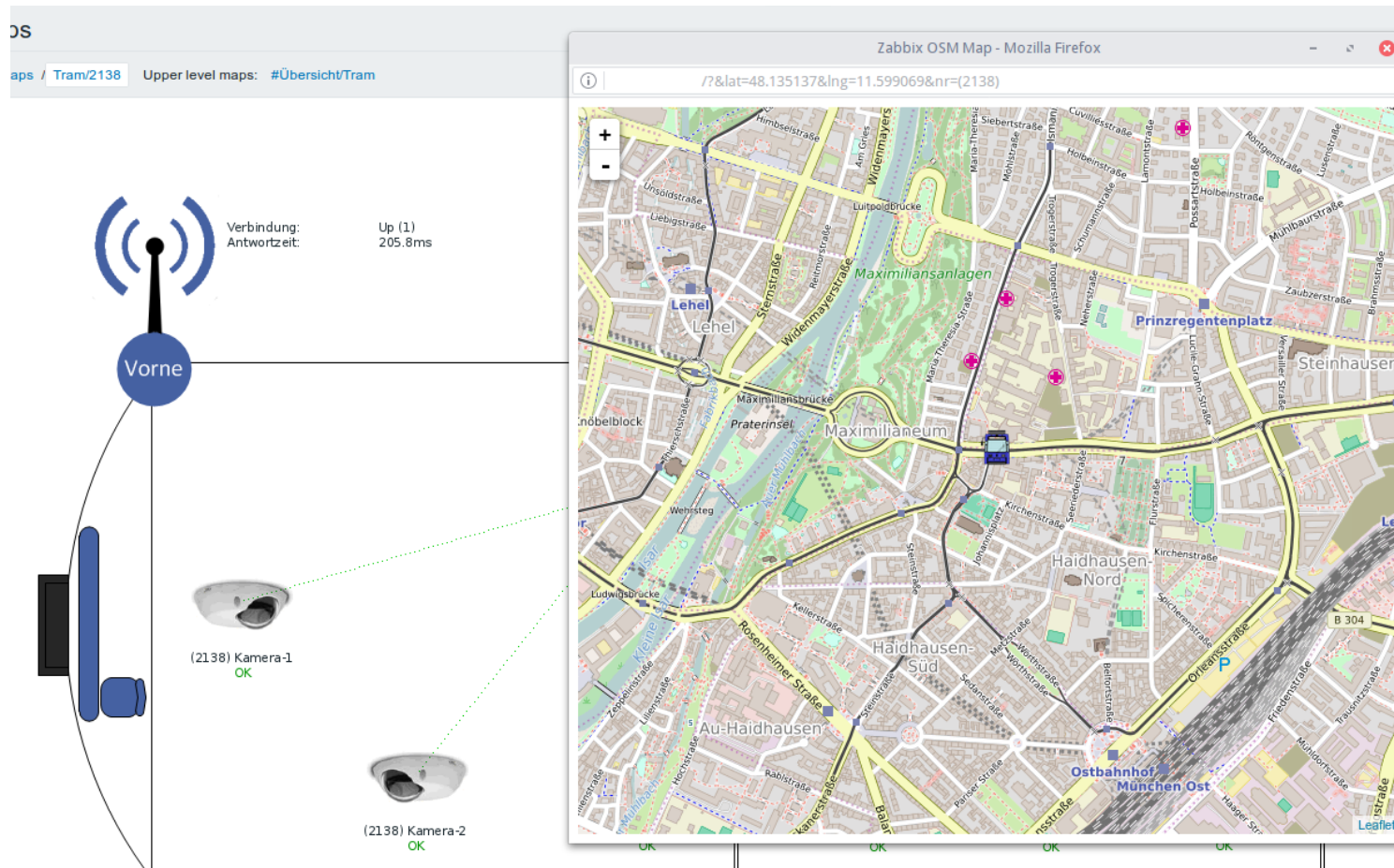
Screenshot provided by the MVG.



Zabbix in the subway

Support for the service staff

Show tram location directly from the Zabbix map



Screenshot provided by the MVG.



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Challenges



Zabbix in the subway

Connectivity



- A tram has hard to predict connection losses due to LTE G4 availability constrains and longer stops in areas without a signal.
- All triggers that fire notifications to the service staff need to depend on the availability of connectivity (MRCU / LTE-Router).



Example trigger definition with explicit recovery condition

Expression

```
Problem: (({ Endgerät :icmping.max(#10)}=0) and ({ Router :icmping.sum(#10)}>=9))  
Recovery: ({ Endgerät :icmping.sum(#10)}>5)
```



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Thank You!

... and again thanks to:

Münchner Verkehrsgesellschaft mbH (MVG), Mr. Sandro Gehlhaar



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