Zabbix meets research institute

Mastering the migration

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ZABBIX PREMIUM PARTNER

Fraunhofer Society
(German: „Fraunhofer Gesellschaft“)
Some background

Fraunhofer Society - Background

- **Founded in 1949**, the "Fraunhofer Society for the Advancement of Applied Research" (German: „Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V“) is a German research organization with 75 institutes spread throughout Germany.
- There are also many facilities around the world, e.g. in Africa, Asia, Europe, Middle East, North America and South America.
- The purpose of the association is to conduct **application-oriented research** for the **direct benefit** of companies and for the benefit of society.
- The majority of the organization’s 29,000 employees are **qualified scientists and engineers**, who work on an annual research budget of 2.8 billion euros.
- The institutes work in practically **all application-relevant fields of technology**, such as microelectronics, information and communications technology, energy technology, medical technology and more.

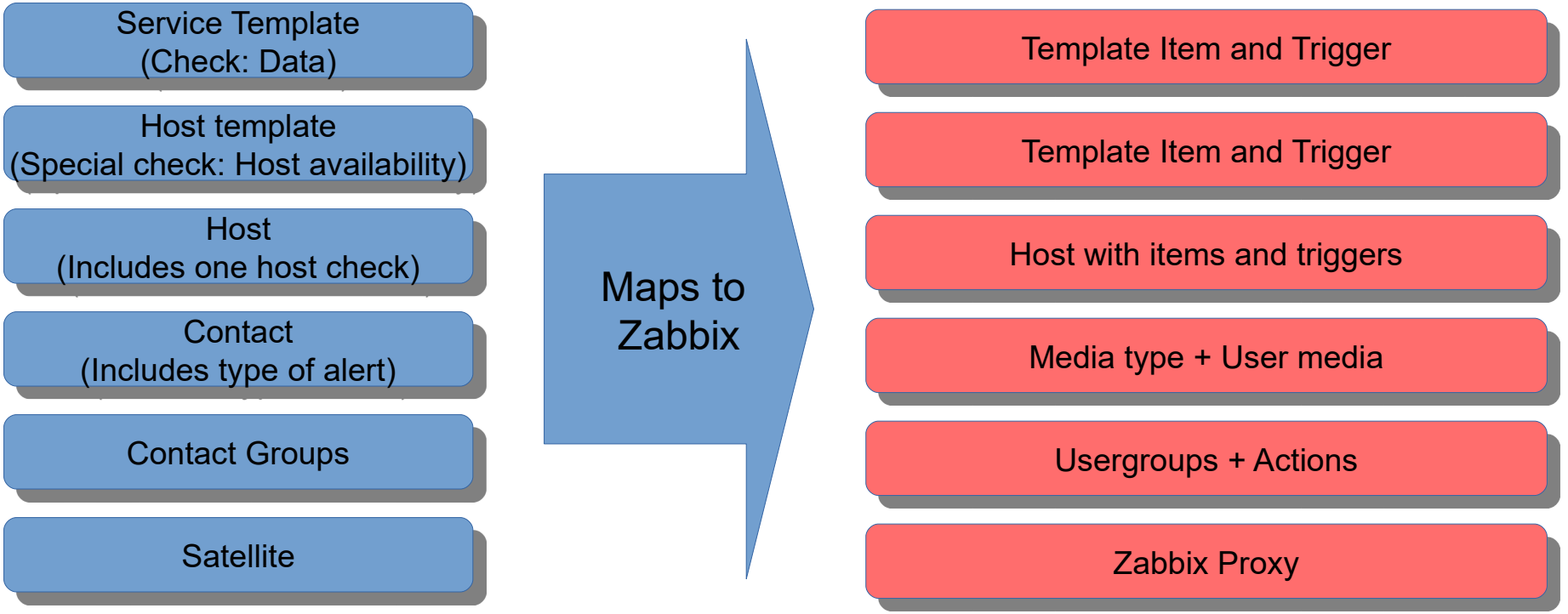
- One of the best-known Fraunhofer developments is the MP3 audio data compression method.
- The Fraunhofer Society it is the **biggest organization** for applied research and development services in **Europe**.

Mastering the migration from „openITCOCKPIT“ (using a „Nagios backend“) to Zabbix

A special thanks to Mr. Sebastian Marquardt for the good cooperation!

Fraunhofer Society – Compare Concepts

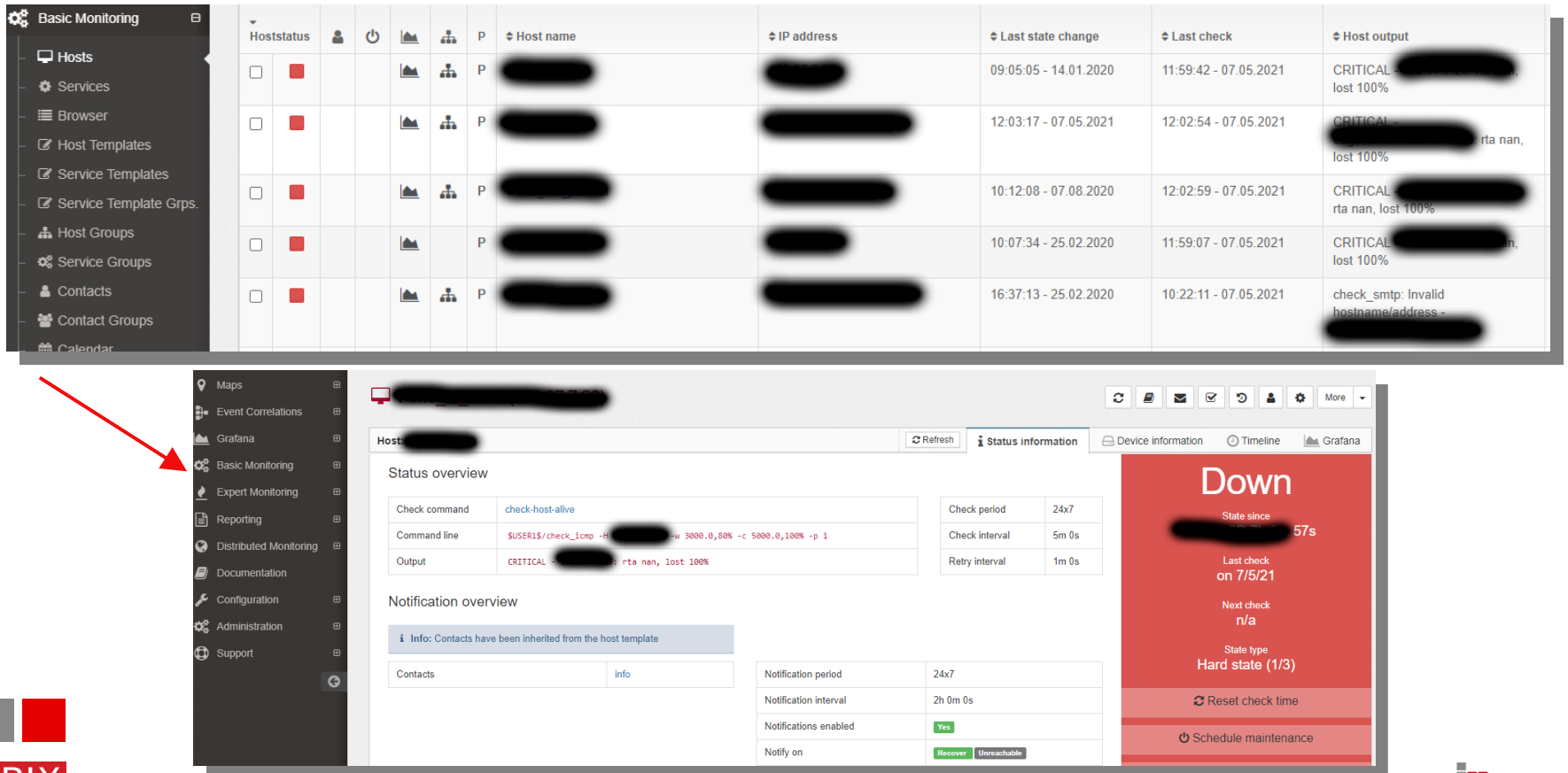
Zabbix uses a different approach to data collection, problem analysis and alerting than openITCOCKPIT



There are more entities involved ...

Fraunhofer Society – Compare Concepts

List of hosts with **host availability status** and details about host availibilty check



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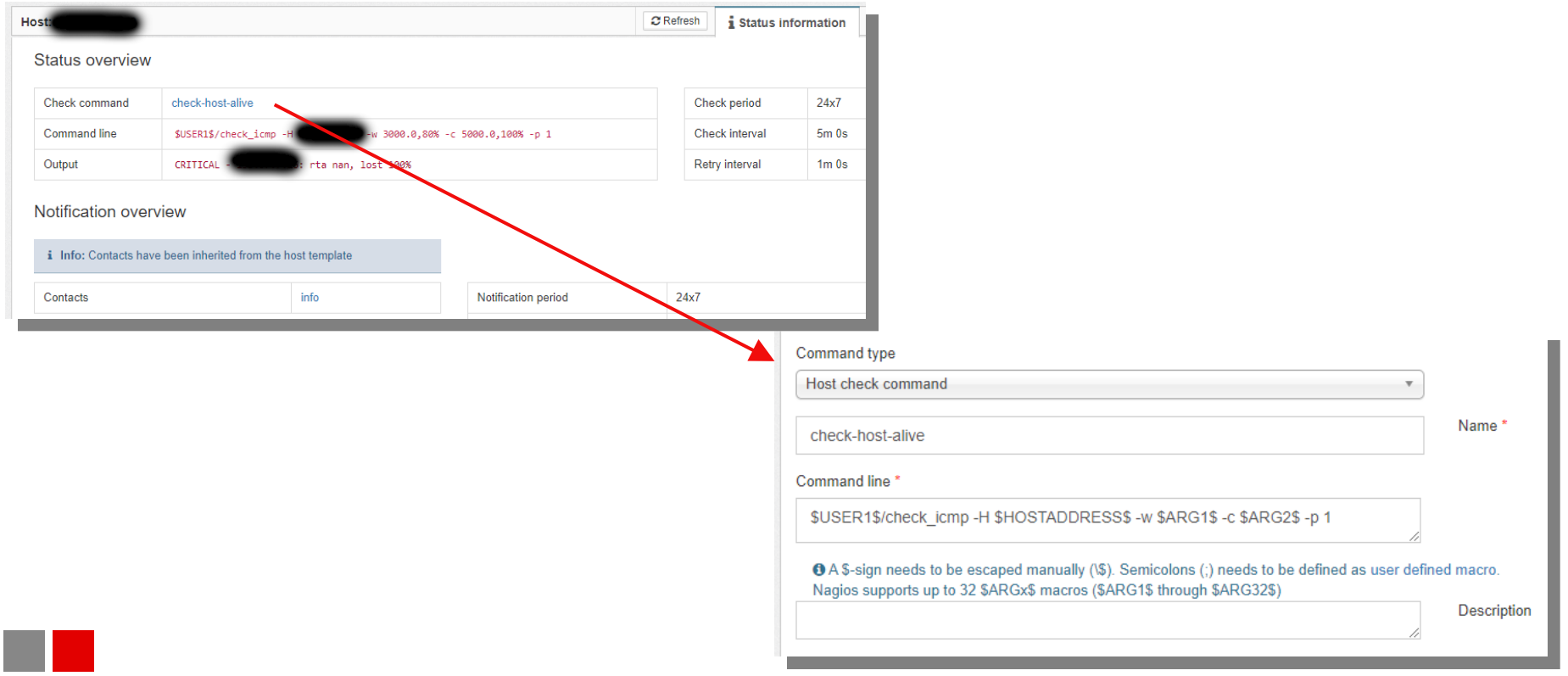
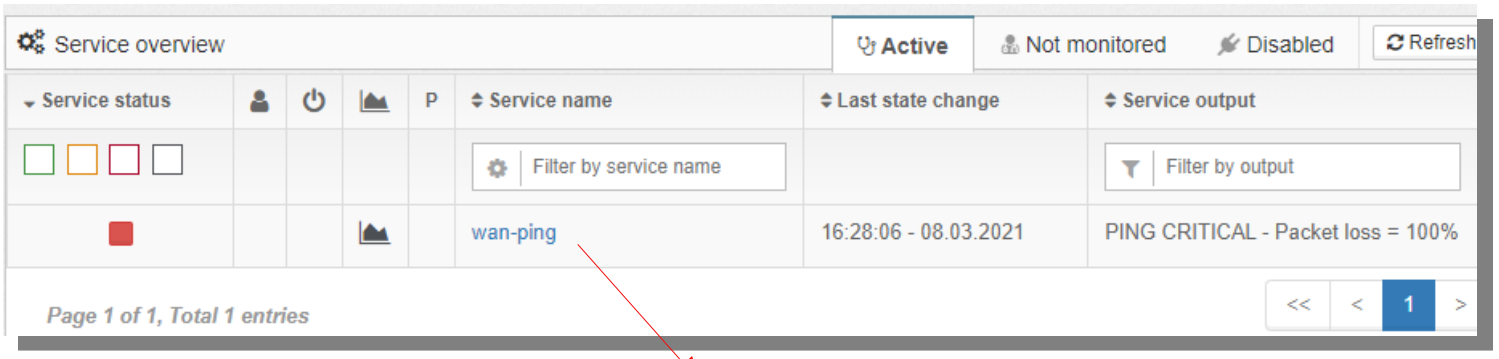
Fraunhofer Society – Compare Concepts

Host availability status definition and details about host availibilty check



Fraunhofer Society – Compare Concepts

Service availability status definition and details about service availibilty check



Check command	v2_check_ping
Command line	$USER1$/check_ping -H [redacted] -w 300.0,20% -c 700.0,60% -p 5
Output	PING CRITICAL - Packet loss = 100%
Performance data	rta=700.000000ms;300.000000;700.000000;0.000000 pl=100%;20;60;0

Check period	v2_24x7
Check interval	1m 0s
Retry interval	1m 0s

Fraunhofer Society

Do the work

-

Migrate host/groups and user/groups

Fraunhofer Society – Do the work

Migrate existing host/groups, user/groups and keep checks

Goal

- Export host/groups from openITCOCKPIT and import them into Zabbix.
- Export user/groups and media from openITCOCKPIT and import them into Zabbix.
- Keep information about the checks per host.

Challenges

- How to get the hosts/groups from openITCOCKPIT?
- How to get the user/groups and media from openITCOCKPIT?
- How to get the information about the checks from openITCOCKPIT and keep them in Zabbix?

Fraunhofer Society – Do the work

Migrate existing host/groups, user/groups and keep checks

Approach

- Use openITCOCKPIT REST-API to get information about host/groups (container) and checks.
- Use openITCOCKPIT REST-API to get information about user/groups and media.
- Create entities in Zabbix via Zabbix API, based on JSON output from openITCOCKPIT.
- Store information about checks in the host description field to facilitate template mapping.

```
Get all hosts: https://<openITCOCKPIT url>/hosts.json

Get specific hosts: https://<openITCOCKPIT url>/hosts/<id>.json

Get all users: https://<openITCOCKPIT url>/contacts.json

Get specific user: https://<openITCOCKPIT url>/contacts/<id>.json
```

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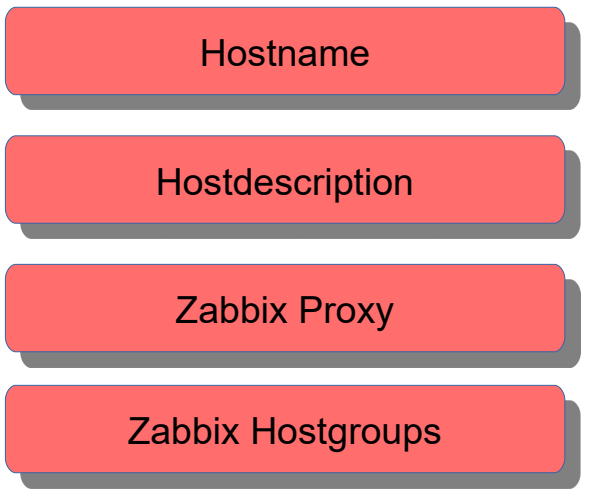
Fraunhofer Society – Do the work

Get all hosts: https://<openITCOCKPIT url>/hosts.json


```
{
  "id": "249",
  "uuid": "xxxx-xxxx-xxxx-xxxx-xxxxxxxx",
  "name": "xxxxxxxx",
  "description": "xxxxxxxx",
  "active_checks_enabled": null,
  "address": "abc.xxxxxx.xyz",
  "satellite_id": "5",
  "container_id": "3",
  "tags": null
},
{
  "id": "337",
  "uuid": "xxxx-xxxx-xxxx-xxxx-xxxxxxxx",
  "name": "xxxxxxxx",
  "description": "xxxxxxxx",
  "active_checks_enabled": null,
  "address": "abc.xxxxxx.xyz",
  "satellite_id": "2",
  "container_id": "3",
  "tags": null
}
```

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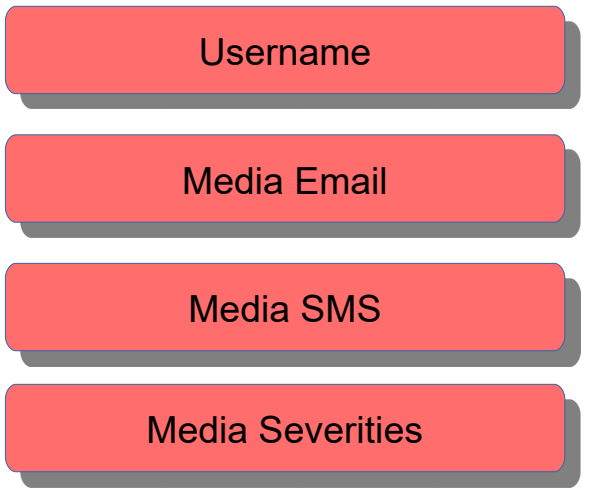
Fraunhofer Society – Do the work

Get all users: https://<openITCOCKPIT url>/contacts.json

```
{
  "id": "135",
  "uuid": "xxxx-xxxx-xxxx-xxxx-xxxxxxxx",
  "name": "xxxxxxxx",
  "description": "",
  "email": "abc@xxxxxxxxx.xxx",
  "phone": "xxxxxxxx",
  "user_id": "121",
  "host_timeperiod_id": "1",
  "service_timeperiod_id": "1",
  "host_notifications_enabled": "1",
  "service_notifications_enabled": "1",
  "notify_service_recovery": "1",
  "notify_service_warning": "1",
  "notify_service_unknown": "1",
  "notify_service_critical": "1",
  ...
},
{
  ...
}
```



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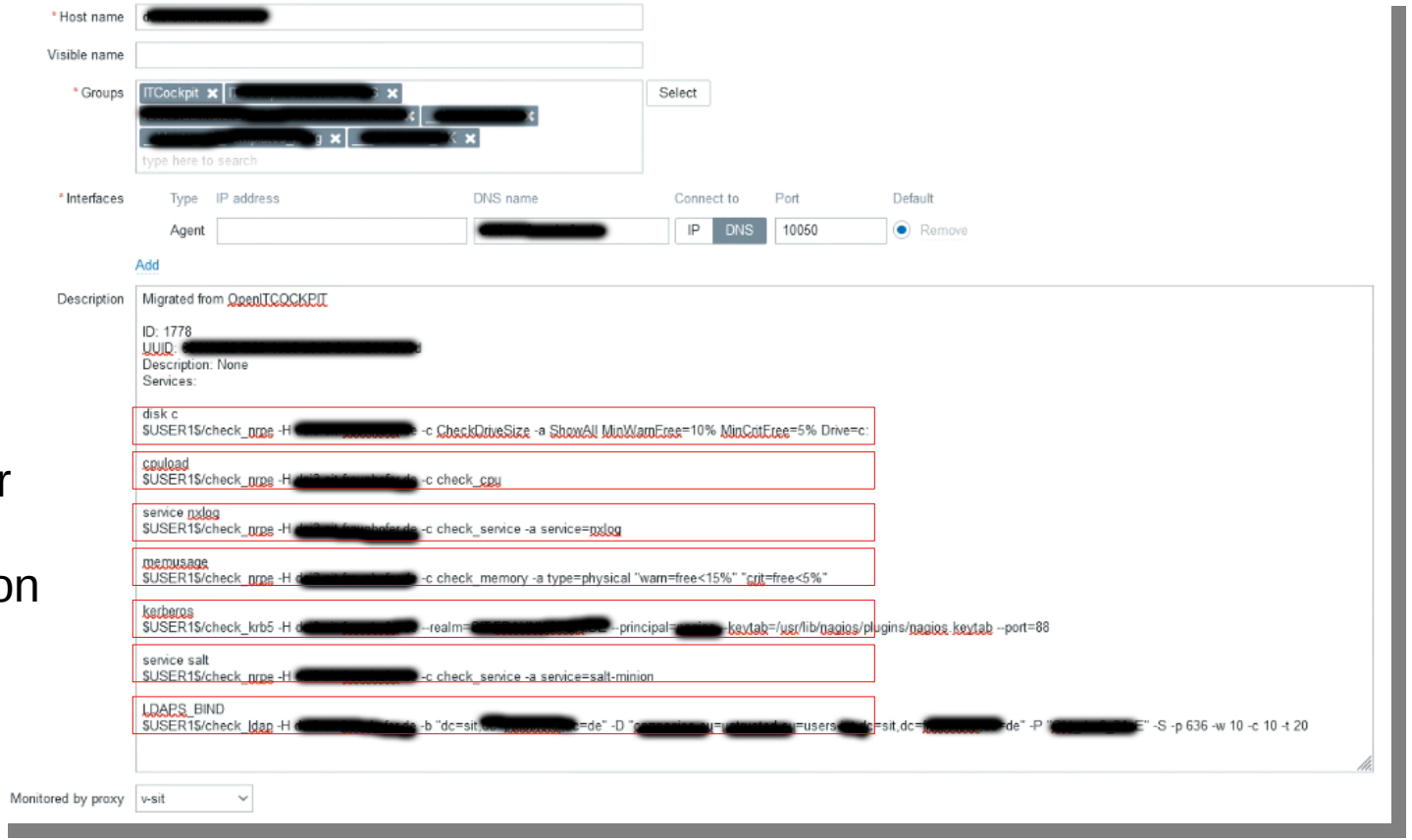
Fraunhofer Society – Do the work

Result of import via Zabbix API using the JSON output from openITCOCKPIT



Help for further migration

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Do the work
-
Migrate checks and templates

Fraunhofer Society – Do the work

Migrate checks and templates

Goal

- Migrate checks and templates to Zabbix.
- Improve monitoring while migrating by utilizing Zabbix features.

Challenges

- How to create Zabbix templates based on data from openITCOCKPIT?
- How to create Zabbix actions based on data from openITCOCKPIT?
- How to assign created Zabbix templates to hosts based on data from openITCOCKPIT?

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Fraunhofer Society – Do the work

Migrate checks and templates

Approach

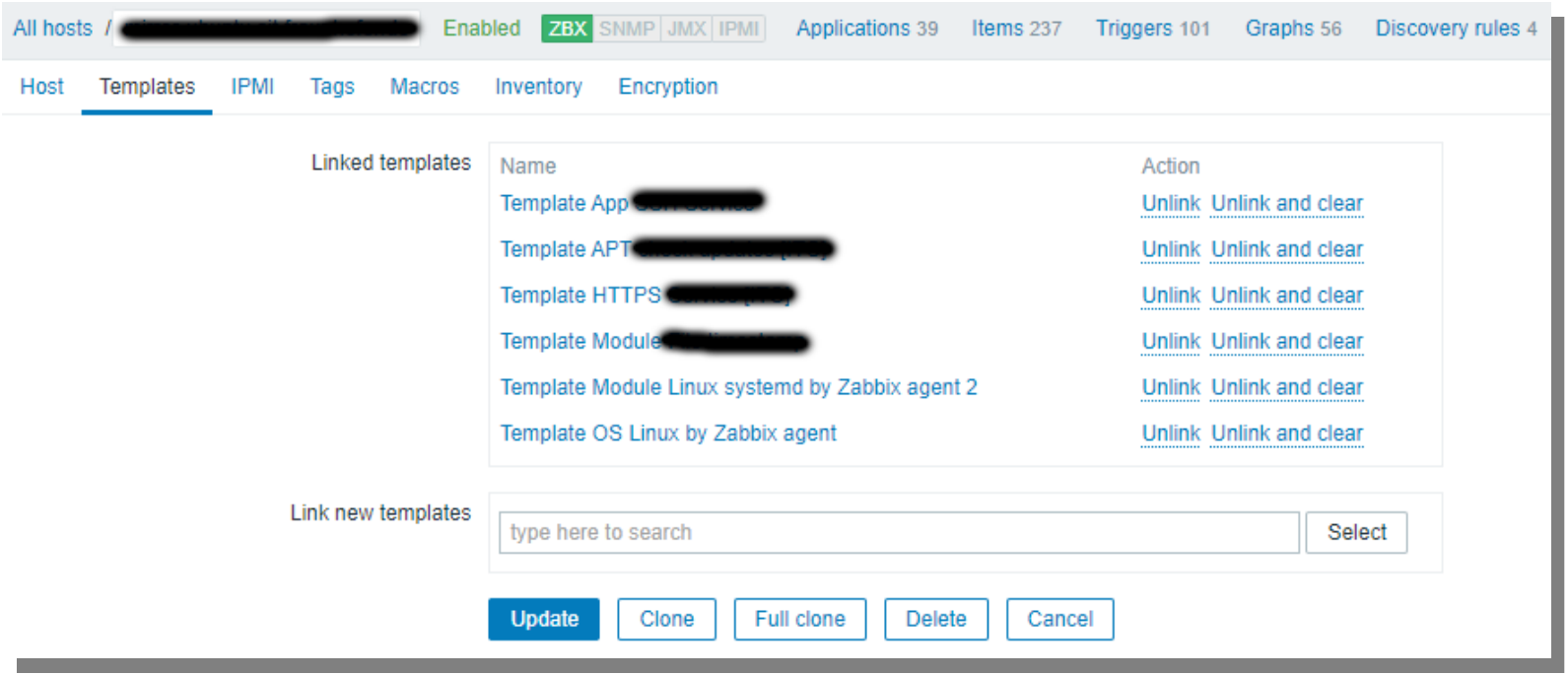
- Use information in imported hostdescription field.
- Use information from openITCOCKPIT templates.
- Create new Zabbix templates, that at minimum cover what was monitored before.
- Assign templates to hosts. For simple checks do it automatically via Zabbix API.
- Create Zabbix Actions.

```
Simple checks: ICMP Ping, SSH Service, Telnet Service, SMTP, TCP
Checks, HTTP/HTTPS Services.

Any non standard checks: Do it manually, case by case :-)
```

Fraunhofer Society – Do the work

Result of import via Zabbix API + manual linking



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Do the work

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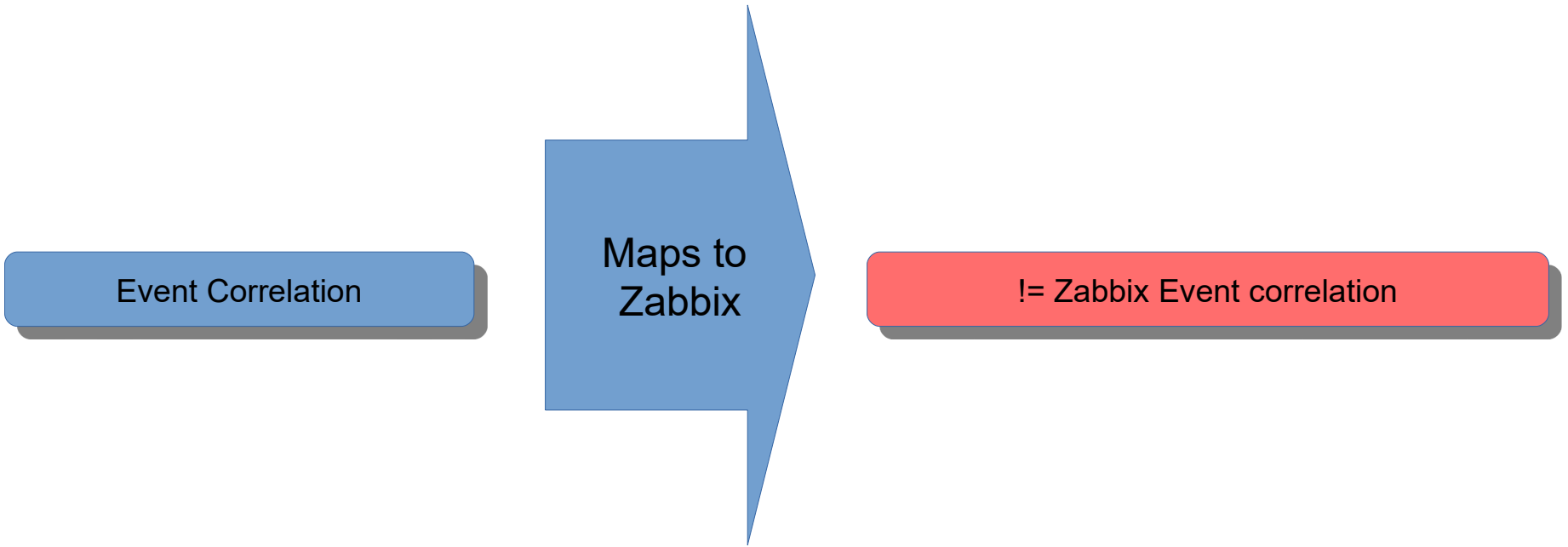
The challenging part

Fraunhofer Society – The challenging part

openITCOCKPIT (with additional enterprise modules) has a special feature that Zabbix does not have



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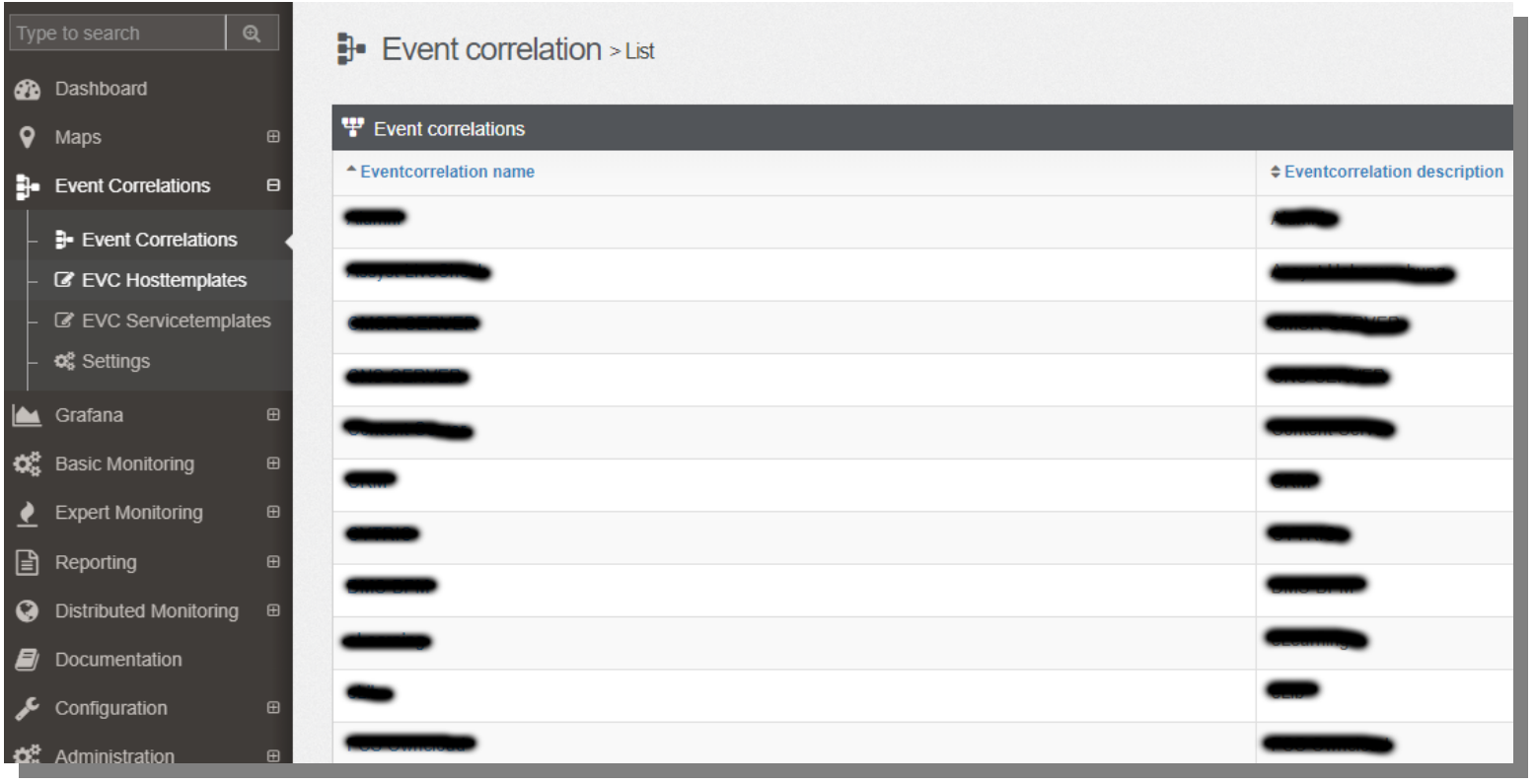
Fraunhofer Society – The challenging part

Event correlation in openITCOCKPIT



Fraunhofer Society – The challenging part

Event correlation in openITCOCKPIT, used to create advanced service monitoring

Host

Check/Trigger

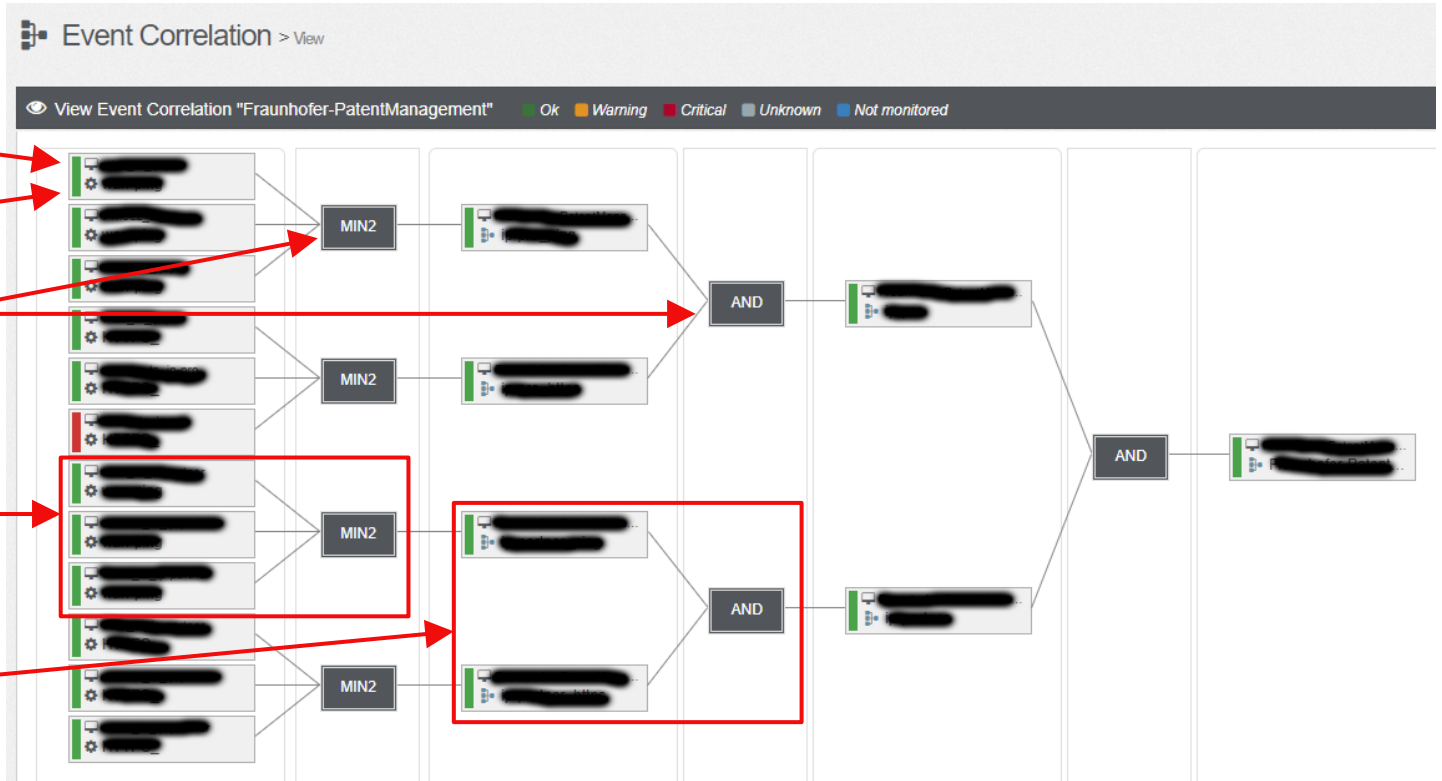
MIN2

AND

Condition/Linking

A minimum of 2 hosts must have a check in „ok“ state

Both previous states must be in „ok“ state



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Event correlation (or better „Advanced Services“) in more detail

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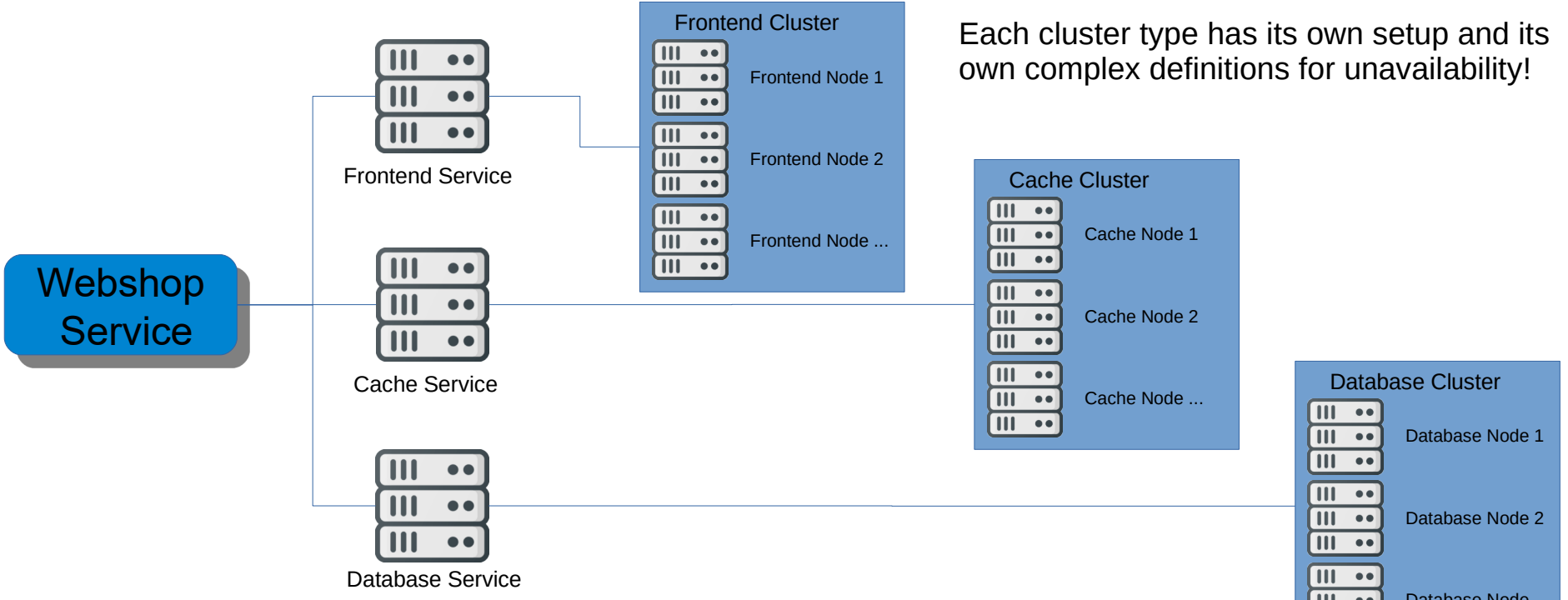

Each cluster type has its own setup and its own complex definitions for unavailability!

Subservices can represent complex environments

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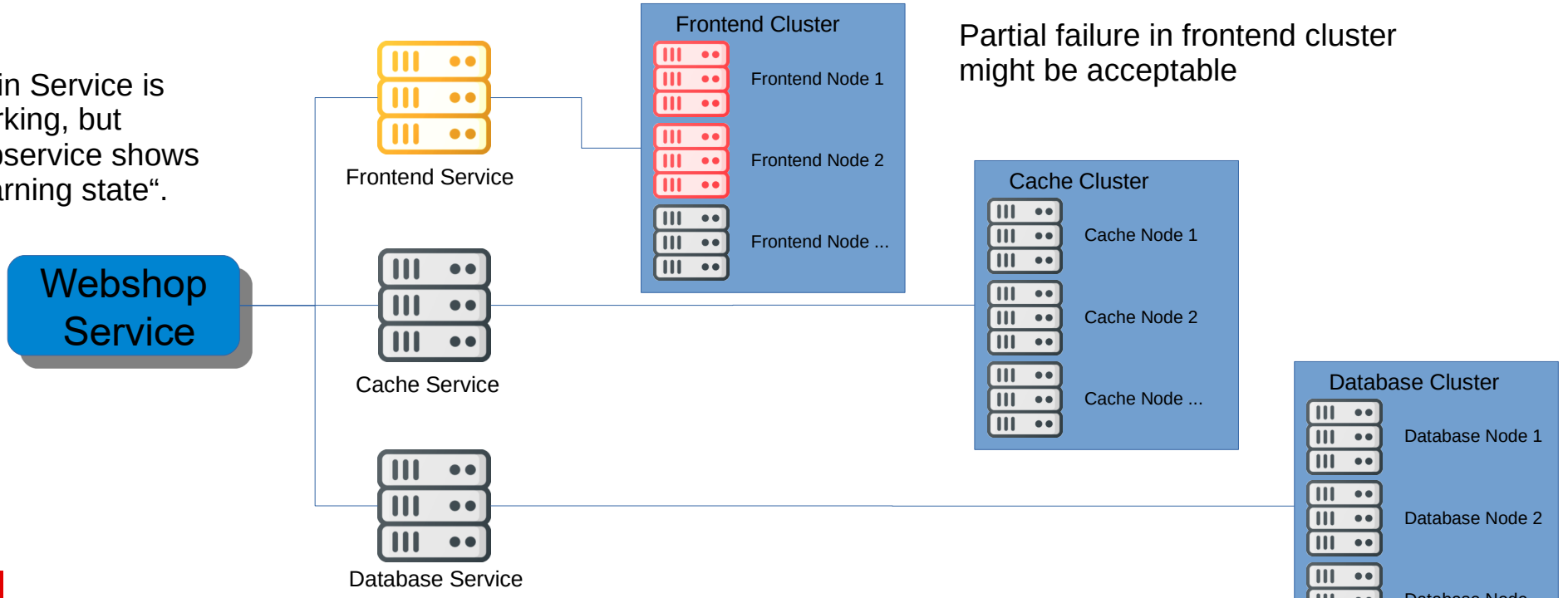
Main Service is working, but subservice shows „warning state“.



Partial failure in frontend cluster might be acceptable

Different acceptance criteria for subservices and services

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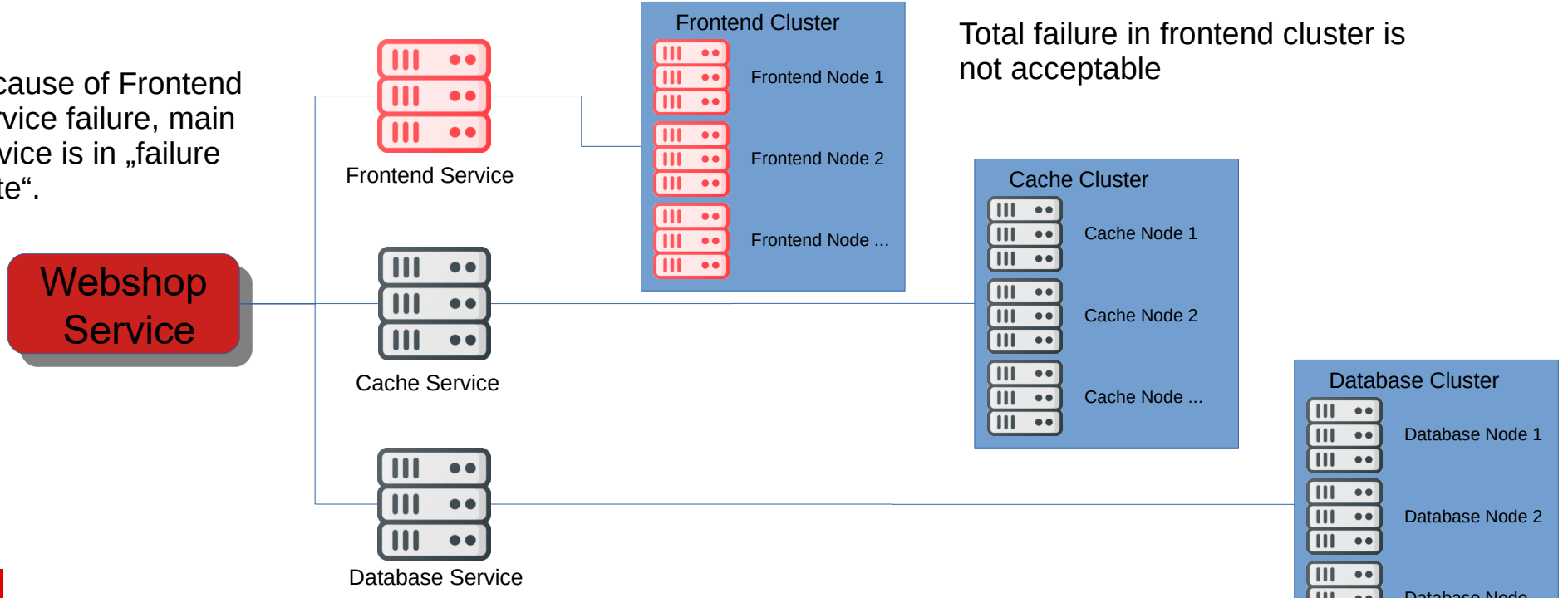
Because of Frontend Service failure, main service is in „failure state“.



Total failure in frontend cluster is not acceptable

Different acceptance criteria for subservices and services

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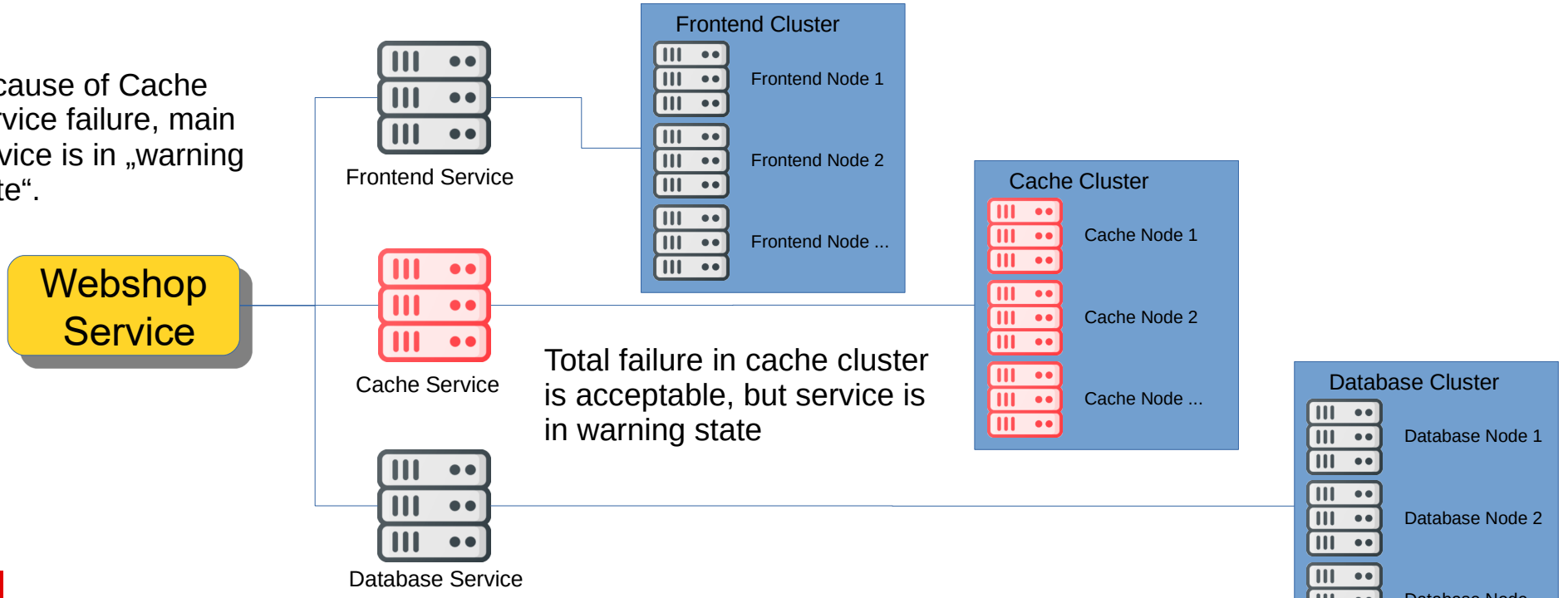
Because of Cache Service failure, main service is in „warning state“.



Total failure in cache cluster is acceptable, but service is in warning state

Different acceptance criteria for subservices and services

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Create a service modul that mimics openITCOCKPIT's event correlation

Goal

- Mimic the funcionallity of openITCOCKPIT's event correlation in Zabbix.
- Use the solution to recreate all existing configurations from the openITCOCKPIT installation.
- Develop the solution update safe, without touching the Zabbix source code.
- Be compatible with Zabbix 5.0, 5.2 and 5.4.

Challenges

- How to integrate into Zabbix (with respect to configuration and visualization)?
- How to make it update safe?

Fraunhofer Society – Advanced Services

Create a service modul that mimics openITCOCKPIT's event correlation

Approach

- Use Zabbix host, trigger and services for configuration.
- Use tags to create relations between hosts.
- Develop a backend service that does the heavy lifting, using the Zabbix API.
- Develop a Zabbix frontend module for visualization and configuration to be update safe.
- The frontend module should communicate with the backend service and show relations as flowcharts.

```
Zabbix frontend module API was introduced in Zabbix 5.0

Zabbix frontend module API != Zabbix JSON-RPC over HTTP API
```

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„Advanced Service monitoring“
The solution in Zabbix

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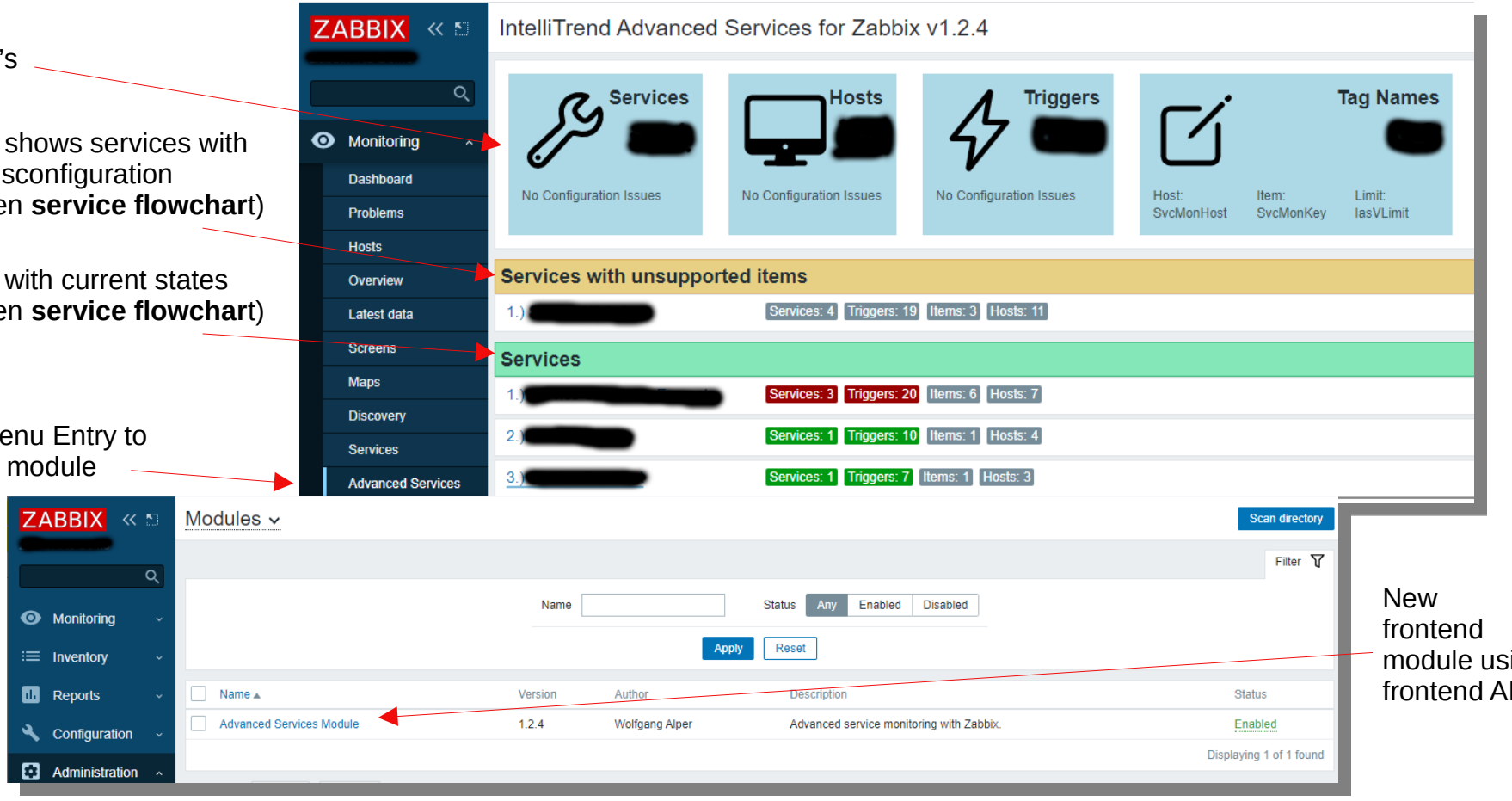
Service KPI's

Service List shows services with issues or misconfiguration (Click to open **service flowchart**)

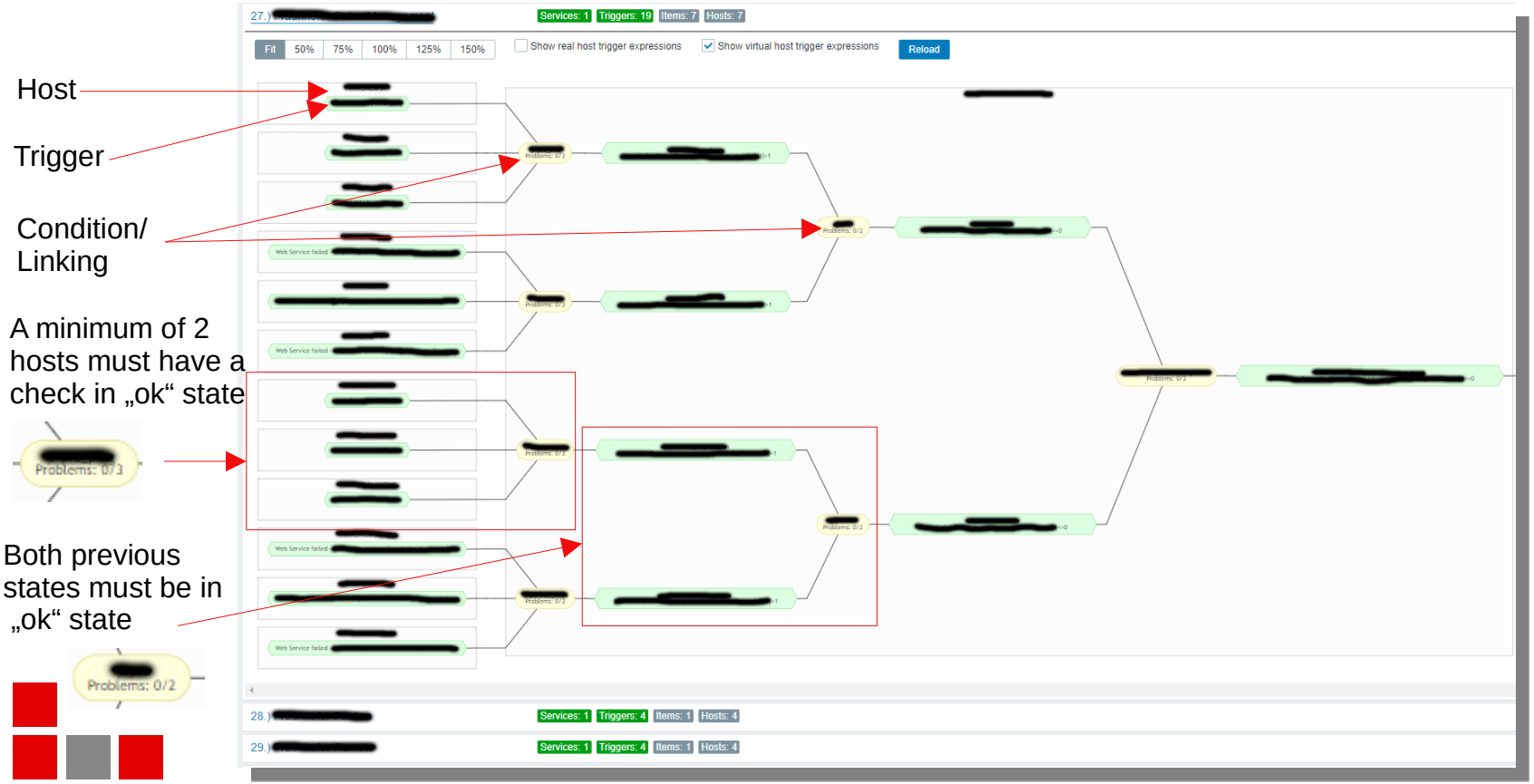
Service List with current states (Click to open **service flowchart**)

New Menu Entry to access module



New frontend module using frontend API

Fraunhofer Society – Implementation



Flowchart **renders in realtime** from actual Zabbix configuration

Flowchart **shows involved entities** like hosts, items, triggers and services

Zoom buttons allow to Zoom in/out **without page reload**

Stats show number of entities involved, including their **current state**

Any entity is **clickable** and opens the corresponding Zabbix configuration

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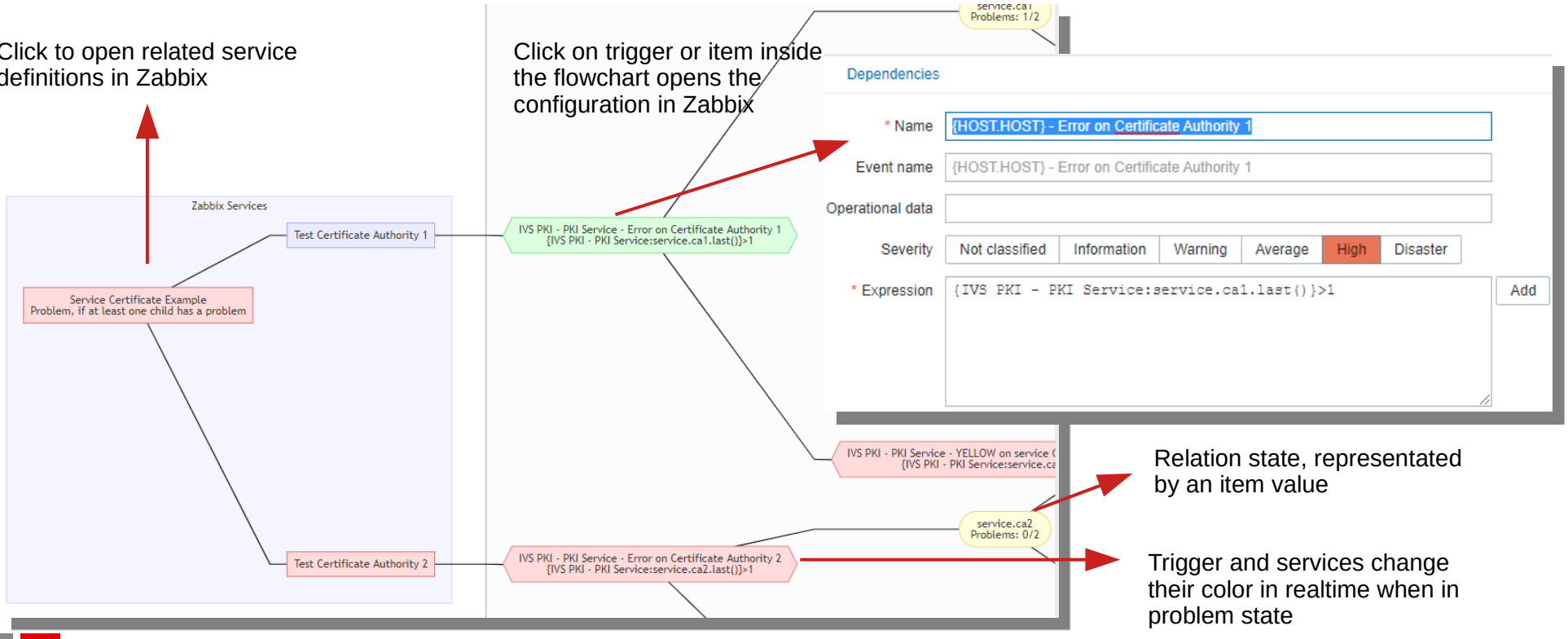
Fraunhofer Society – Design with demo data

Click to open related service definitions in Zabbix

Click on trigger or item inside the flowchart opens the configuration in Zabbix



Relation state, representated by an item value

Trigger and services change their color in realtime when in problem state

Service flowchart with „click to open configuration“

Zabbix meets research institute

Mastering the migration

Thank You!

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