Zabbix meets research institute
Mastering the migration

Contact: Wolfgang Alper
wolfgang.alper@intellitrend.de

IntelliTrend IT-Services GmbH
www.intellitrend.de
Fraunhofer Society

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

Service Template (Check: Data)
Host template (Special check: Host availability)
Host (Includes one host check)
Contact (Includes type of alert)
Contact Groups
Satellite

Maps to Zabbix

Template Item and Trigger
Template Item and Trigger
Host with items and triggers
Media type + User media
Usergroups + Actions
Zabbix Proxy

There are more entities involved ...
List of hosts with host availability status and details about host availability check
Host availability status definition and details about host availability check
Fraunhofer Society – Compare Concepts

**Service availability status** definition and details about service availability check

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**Check command**: v2_check_ping

**Command line**: `USER15/check_ping -t 10000 -w 300.0,0.20% -c 700.0,60% -p 5`

**Output**: `PING CRITICAL - Packet loss = 100%`

**Performance data**: `rtt=700.000000ms;700.000000;700.000000;0.000000;0.000000;0.000000p1=100%;20%;60%;0;`
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Do the work

- Migrate host/groups and user/groups
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
Fraunhofer Society – Do the work

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

```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
}
```
**Fraunhofer Society – Do the work**

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

```json
{
  "id": "135",
  "uuid": "xxxx-xxxx-xxxx-xxxx-xxxxxxxx",
  "name": "xxxxxxxx",
  "description": "",
  "email": "abc@xxxxxxxxxxx.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",
  ...
},
{
  ...
}
```

- **Username**
- **Media Email**
- **Media SMS**
- **Media Severities**
Fraunhofer Society – Do the work

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

Help for further migration
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?
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.


Any non standard checks: Do it manually, case by case :-(
Fraunhofer Society – Do the work

Result of import via Zabbix API + manual linking
Do the work

- The challenging part
Fraunhofer Society – The challenging part

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

Event Correlation

Maps to Zabbix

!= Zabbix Event correlation
Fraunhofer Society – The challenging part

Event correlation in openITCOCKPIT
Fraunhofer Society – The challenging part

Event correlation in openITCOCKPIT, used to create advanced service monitoring

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

Both previous states must be in „ok“ state
Event correlation
(or better „Advanced Services“)
in more detail
Subservices can represent complex environments

Each cluster type has its own setup and its own complex definitions for unavailability!
Main Service is working, but subservice shows "warning state".

Different acceptance criteria for subservices and services.

Partial failure in frontend cluster might be acceptable.
Because of Frontend Service failure, main service is in “failure state”.

Different acceptance criteria for subservices and services.

Total failure in frontend cluster is not acceptable.
Because of Cache Service failure, main service is in „warning state“.

Different acceptance criteria for subservices and services
Create a service module that mimics openITCOCKPIT’s event correlation

Goal
- Mimic the functionality 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?
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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
„Advanced Service monitoring“
The solution in Zabbix
Fraunhofer Society – Implementation

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

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
Host

Trigger

Condition/Linking

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

Both previous states must be in „ok“ state

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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Service flowchart with „click to open configuration“

Click to open related service definitions in Zabbix

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

Relation state, represented by an item value

Trigger and services change their color in realtime when in problem state
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Thank You!

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