

5 Real world examples for Zabbix integrations and extensions



IntelliTrend GmbH

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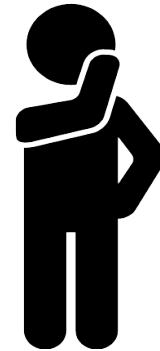
ZABBIX
PREMIUM PARTNER

Introductory comments

How the integrations and extension are build

- Frontend Modules use the official Zabbix frontend module API
<https://www.zabbix.com/documentation/current/en/manual/modules>
- Frontend Modules and Backend Services use the official Zabbix RPC API
<https://www.zabbix.com/documentation/current/en/manual/api>
- Some specific extensions use a mix of the Zabbix frontend module API, the Zabbix RPC API and direct database access

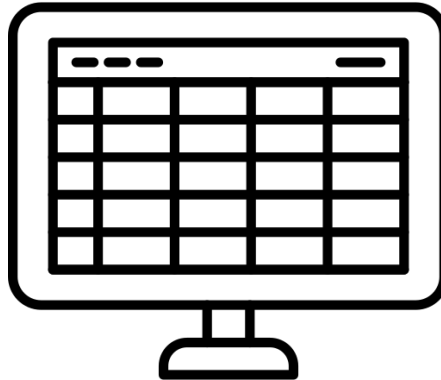
Because of the well-defined APIs, extensions to Zabbix can be created without touching the source code and allow updates when new versions are released



Frontend Module

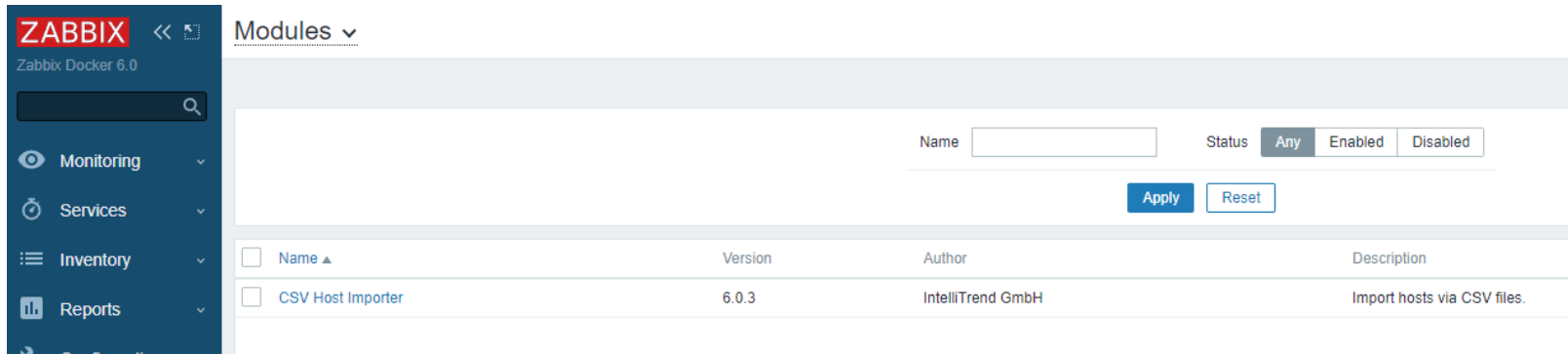
Host CSV Importer

“I want to do it in Excel”

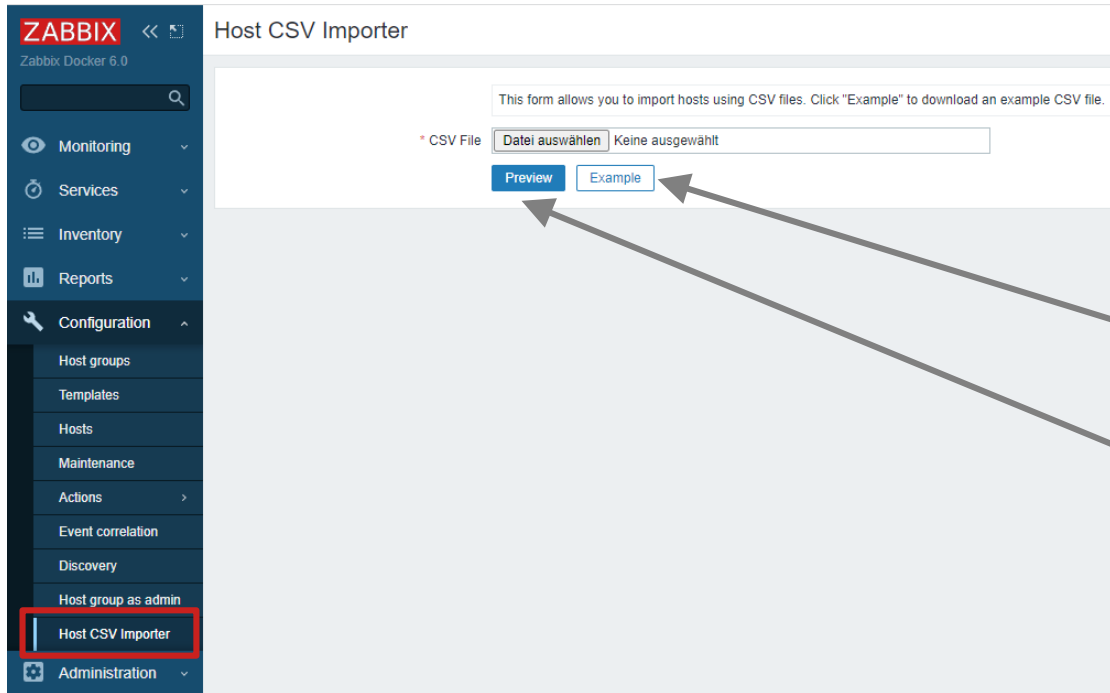


Frontend Module - Host CSV Importer

- Frontend module allows simple import of host from CSV files including template assignments
- Provides example CSV file as a template
- Shows preview before importing the hosts
- Initially developed for a Telecommunications Carrier



Frontend Module – CSV Host Importer



Download
Example CSV

Preview import

Frontend Module – CSV Host Importer

Host CSV Importer

This form allows you to import hosts using CSV files. Click "Example" to download an example CSV file.

* CSV File

Durchsuchen...

Keine Datei ausgewählt.

Preview

Example

	A	B	C	D	E	F	G	H	I	J	K
1	NAME	VISIBLE NAME	HOST GROUPS	TEMPLATES	AGENT IP	AGENT DNS	SNMP IP	SNMP DNS	SNMP VERSION	DESCRIPTION	
2	example1	Example Host Agent	First host group, second host group	Linux by Zabbix agent	127.0.0.1	localhost				Example Zabbix Agent host	
3	example2	Example Host SNMP	Third host group	Generic SNMP			127.0.0.1	localhost		2 Example SNMPv2 host	
4											
5											
6											
7											

Sample Excel/CSV file with fieldnames

Frontend Module – CSV Host Importer

Host CSV Importer

Please review your host import. If you're satisfied with the result, click "Import" to create the hosts as listed here.

Name	Visible name	Host groups	Templates	Agent IP	Agent DNS	SNMP IP	SNMP DNS	SNMP version	Description
example1	Example Host Agent	First host group, second host group	Linux by Zabbix agent	127.0.0.1	localhost				Example Zabbix Agent host
example2	Example Host SNMP	Third host group	Generic SNMP			127.0.0.1	localhost	2	Example SNMPv2 host

Host CSV Importer

Name	Visible Name	Status
example1	Example Host Agent	Created
example2	Example Host SNMP	Created

Preview of uploaded data

Frontend Module – CSV Host Importer

The screenshot shows the GitHub repository page for 'intellitrend/zabbix-csv-host-import-module'. The repository is public and has 2 branches and 6 tags. The main branch is 'main'. The repository contains a file tree with the following files and their commit dates:

File	Commit	Date
images	[INIT] Initial commit	10 months ago
modules/csv-host-importer	[VER] 6.0.3	15 days ago
CHANGELOG.md	[VER] 6.0.3	15 days ago
LICENSE	[INIT] Initial commit	10 months ago
README.md	[DOC] Moved changelog to separate file	15 days ago

The README.md file is selected, showing the title 'IntelliTrend Zabbix CSV Host Importer'. The description states: 'This is a Zabbix frontend module that provides a simplified host import via CSV files.' Below the description, there is a section titled 'Host CSV Importer' which contains a form for importing hosts via CSV files. The form has a text input field with a placeholder 'Durchsuchen...' and a button 'Example'.

On the right side of the repository page, there is an 'About' section with the following information:

- Zabbix frontend module for importing hosts via CSV files
- Tags: php, zabbix, zabbix-frontend, csv-import
- Readme
- License: LGPL-3.0 license
- 8 stars
- 2 watching
- 2 forks

Below the 'About' section, there is a 'Releases' section with the following information:

- 6.0.3 (Zabbix 6.0) (Latest)
- 15 days ago
- + 5 releases

Below the 'Releases' section, there is a 'Packages' section with the following information:

- No packages published

Below the 'Packages' section, there is a 'Languages' section with the following information:

-

GitHub - <https://github.com/intellitrend/zabbix-csv-host-import-module>

Frontend Module

Admin – Host Groups

“I have to manage my IT department myself”



Frontend Module – Admin Host Groups

- Frontend module for creating host groups without superadmin permissions
- Requires Zabbix Admin role
- Scope is limited to existing parent hostgroups with write access
- Initially developed for a TV station

The screenshot shows the Zabbix Frontend Module interface. On the left is a dark blue sidebar with the ZABBIX logo and version 'Zabbix Docker 6.0'. Below the logo are menu items: Monitoring, Services, Inventory, and Reports. The main content area has a 'Modules' dropdown menu. Below it is a form with a 'Name' input field, a 'Status' dropdown menu (set to 'Any'), and 'Apply' and 'Reset' buttons. Below the form is a table with columns: Name, Version, Author, and Description. The table contains one entry: 'Create Host Groups as Zabbix Admin' with version '6.0.1', author 'IntelliTrend GmbH', and description 'Allows non-superadmin users to create hostgroups within their write-accessible hostgroups.'

<input type="checkbox"/> Name ▲	Version	Author	Description
<input type="checkbox"/> Create Host Groups as Zabbix Admin	6.0.1	IntelliTrend GmbH	Allows non-superadmin users to create hostgroups within their write-accessible hostgroups.



Frontend Module – Admin Host Groups

The screenshot shows the Zabbix Frontend interface. On the left is a dark blue sidebar with the ZABBIX logo and version 'Zabbix Docker 6.0'. The sidebar menu includes Monitoring, Services, Inventory, Reports, and Configuration. Under Configuration, 'Host groups' is selected, and 'Host group as admin' is highlighted with a red box. The main content area is titled 'Host group as admin' and features a green success message 'Group added'. Below this is a form with a text box containing 'This form allows you to create host groups as Zabbix admin below host groups you have read/write access to.' The form has a label '* Group name' followed by a dropdown menu showing 'Linux servers/App-Development' and a text input field containing 'Staging'. An 'Add' button is located below the form.



Frontend Module – Admin Host Groups

The screenshot shows the GitHub repository page for 'intellitrend/zabbix-admin-hostgroups-module'. The repository is public and has 1 branch (main) and 1 tag. The file list includes 'images', 'modules/admin-hostgroups', 'LICENSE', and 'README.md'. The 'README.md' file is selected, showing the title 'IntelliTrend Zabbix Admin Hostgroups' and a description: 'This is a Zabbix frontend module that allows Zabbix admins without superadmin permissions to create hostgroups within their write-accessible hostgroups.' Below the description is a screenshot of the Zabbix web interface showing the 'Create user host group' form. The form has a 'Group name' dropdown menu with 'User host groupTest' selected and an 'Add' button. The right sidebar contains 'About' information, including a description of the module, a license (LGPL-3.0), 0 stars, 1 watching, 0 forks, 1 release (6.0.1, Latest, on 14 Mar), and 0 packages published.

GitHub - <https://github.com/intellitrend/zabbix-admin-hostgroups-module>

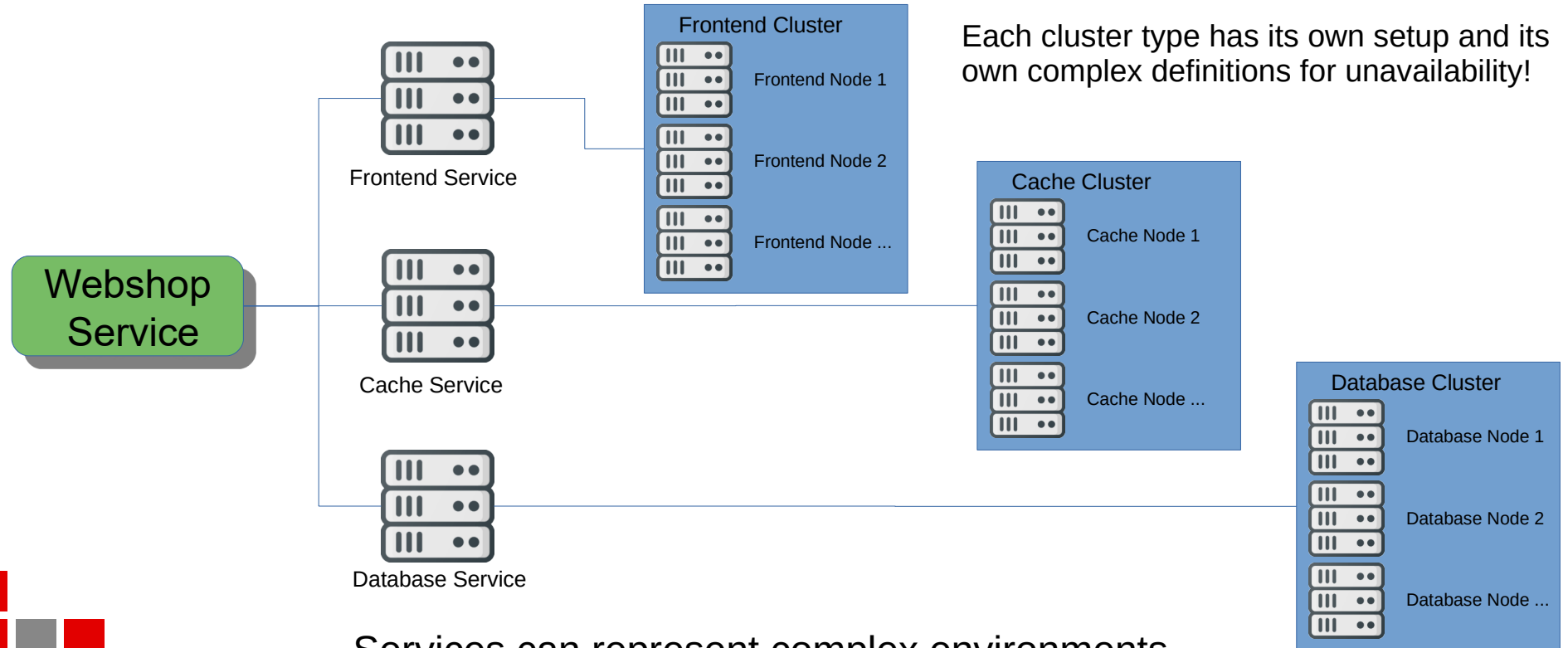
Frontend Module and Backend Server

Service monitoring

“What makes this service”



What is service monitoring?

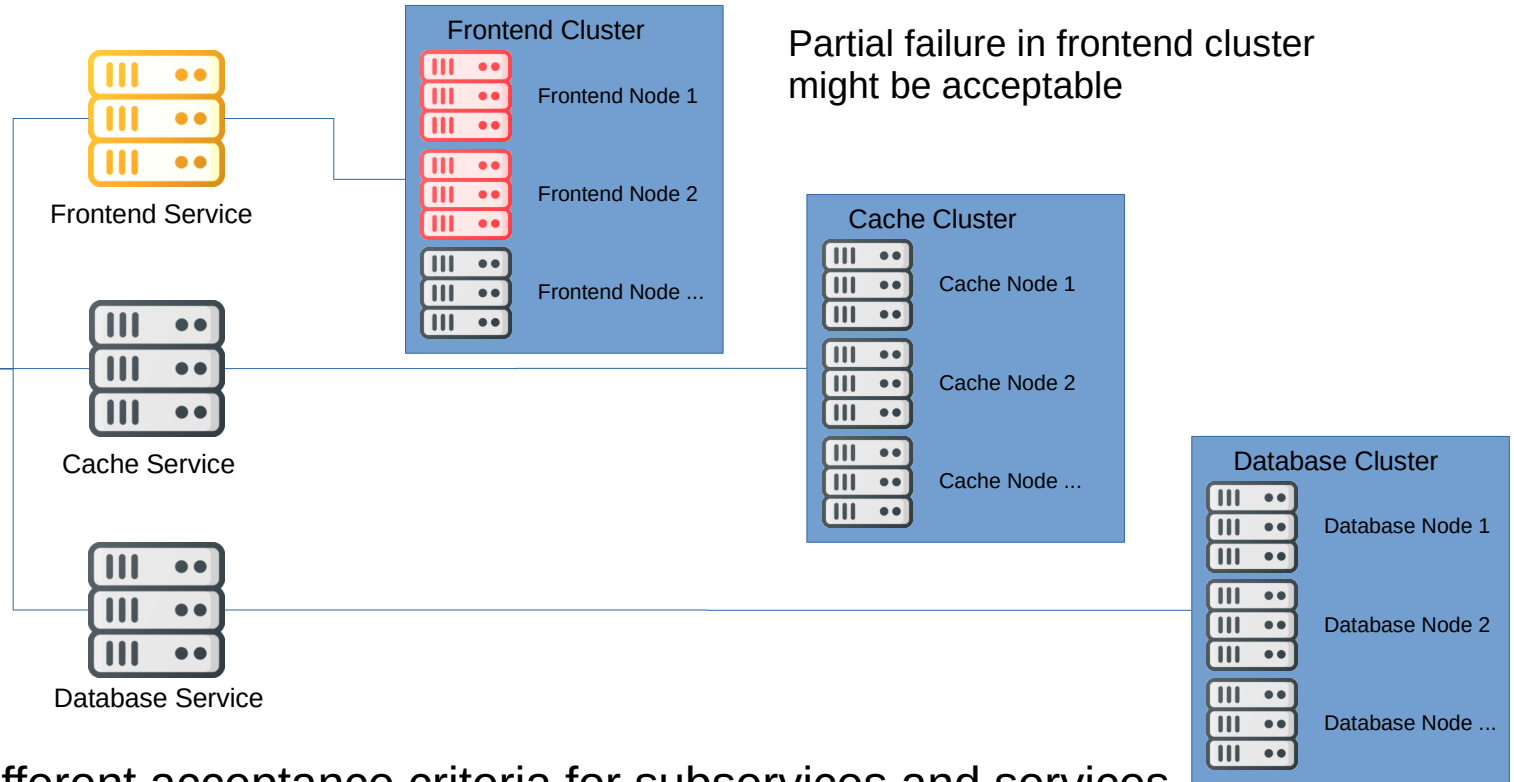


Services can represent complex environments

What is service monitoring?

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

Webshop Service



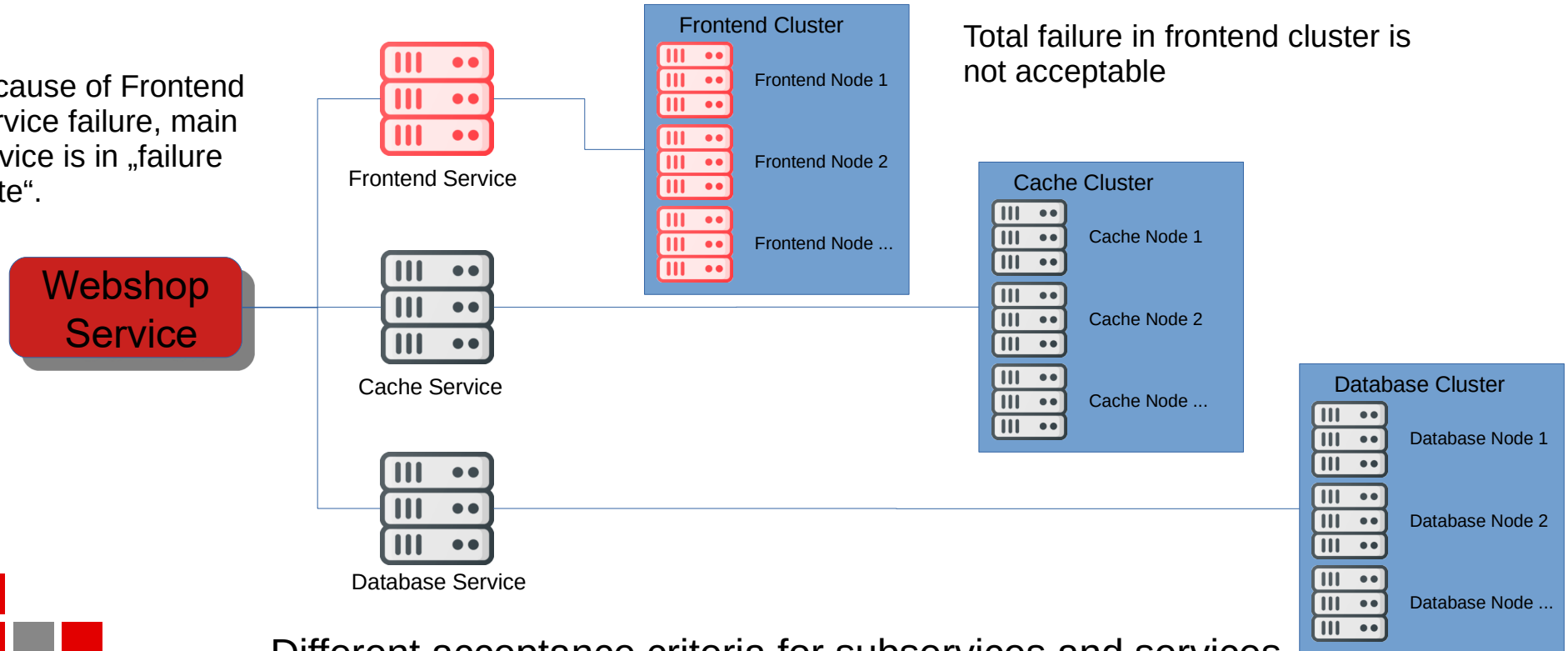
Partial failure in frontend cluster might be acceptable

Different acceptance criteria for subservices and services

What is service monitoring?

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

Total failure in frontend cluster is not acceptable

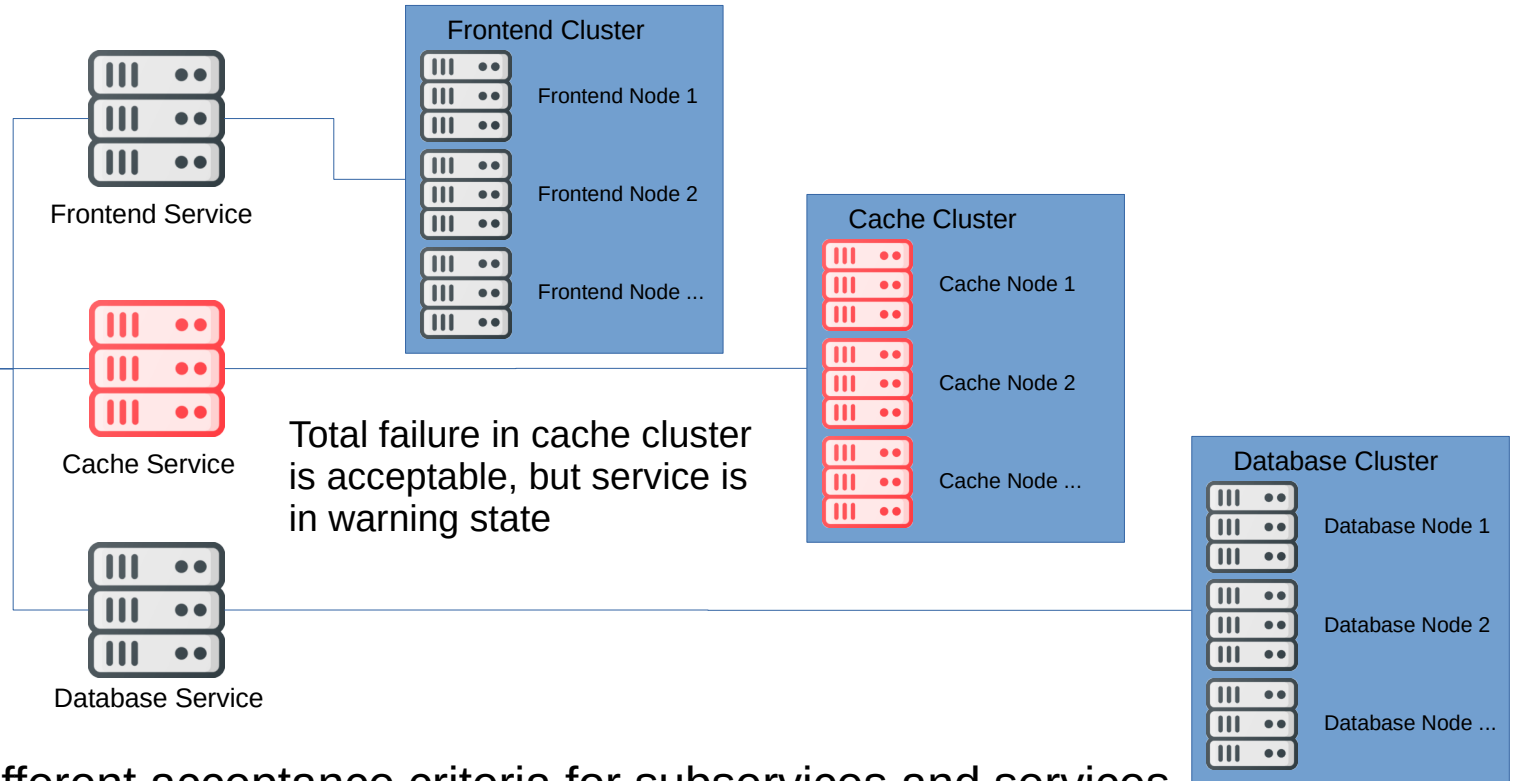


Different acceptance criteria for subservices and services

What is service monitoring?

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

Webshop Service

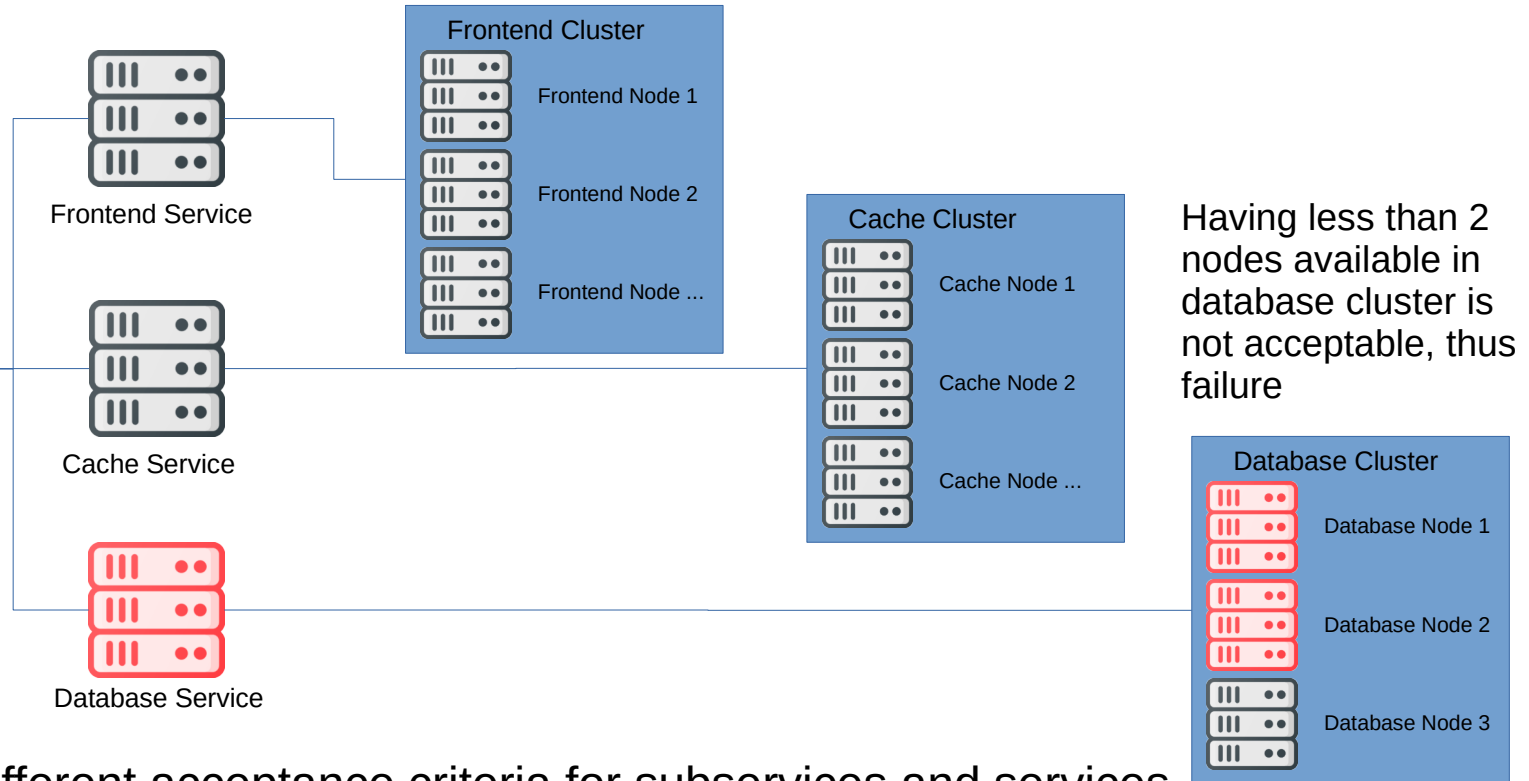


Different acceptance criteria for subservices and services

What is service monitoring?

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

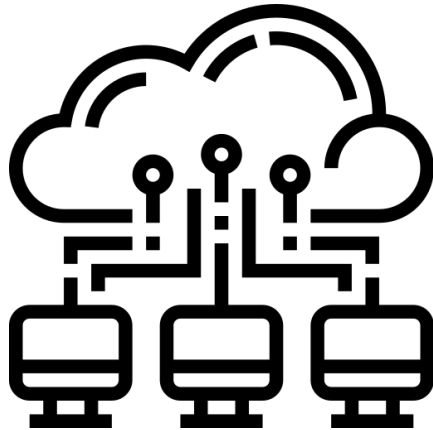
Webshop Service



Different acceptance criteria for subservices and services

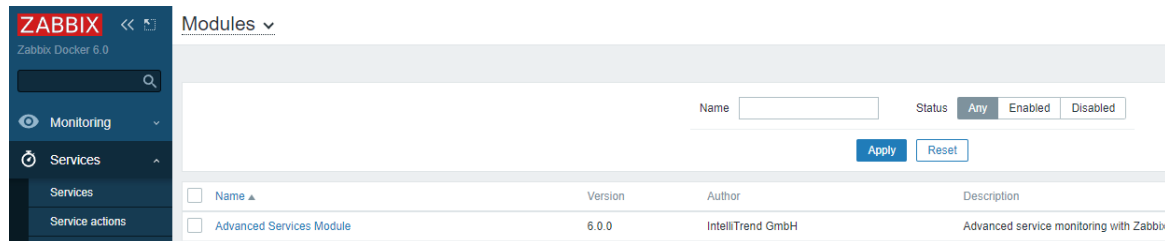
Service Monitoring

Advanced Services for Zabbix

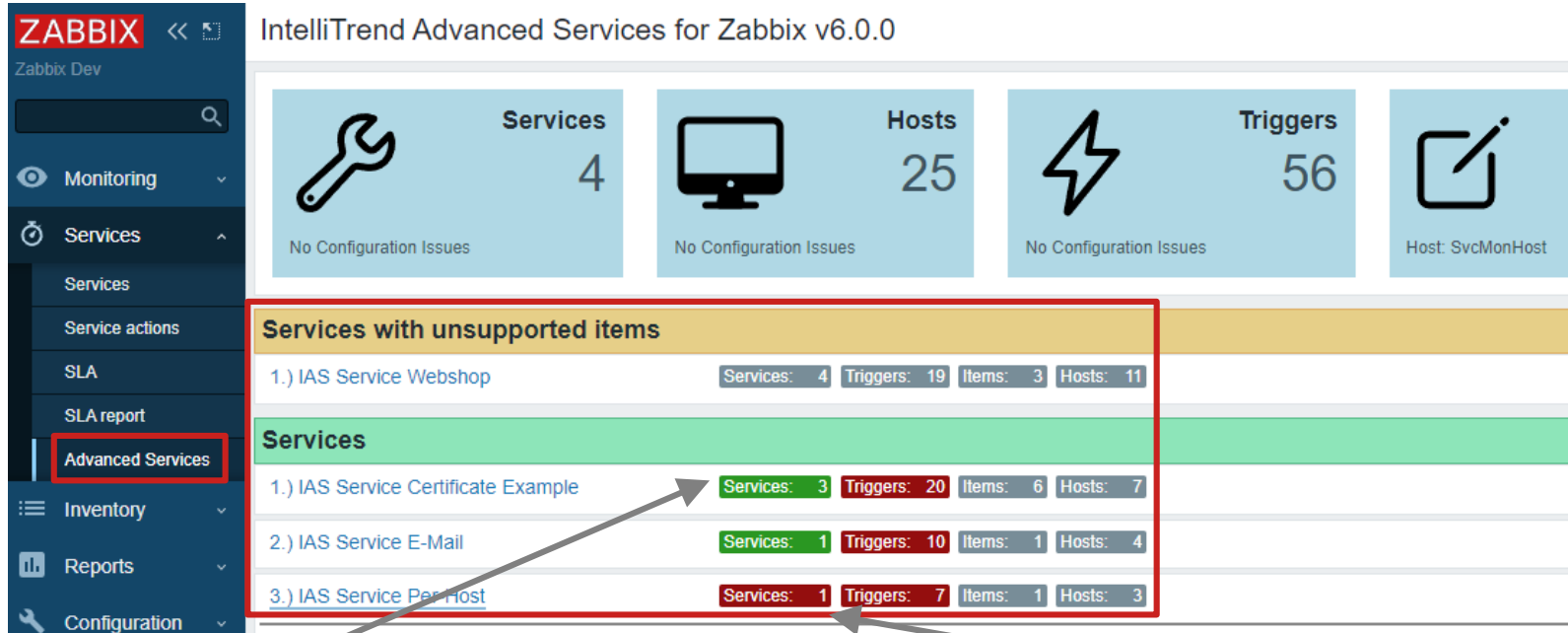


Frontend / Backend Module - Advanced Services

- Works with native Zabbix Services
- Service configuration based on hosts and tags
- Custom frontend module for node-style visualization of services
- Built-in checks for misconfiguration and unsupported items / trigger
- Includes frontend module and backend server
- No modifications to Zabbix Source code
- Initially developed for a Research Institute



Frontend / Backend Module - Advanced Services

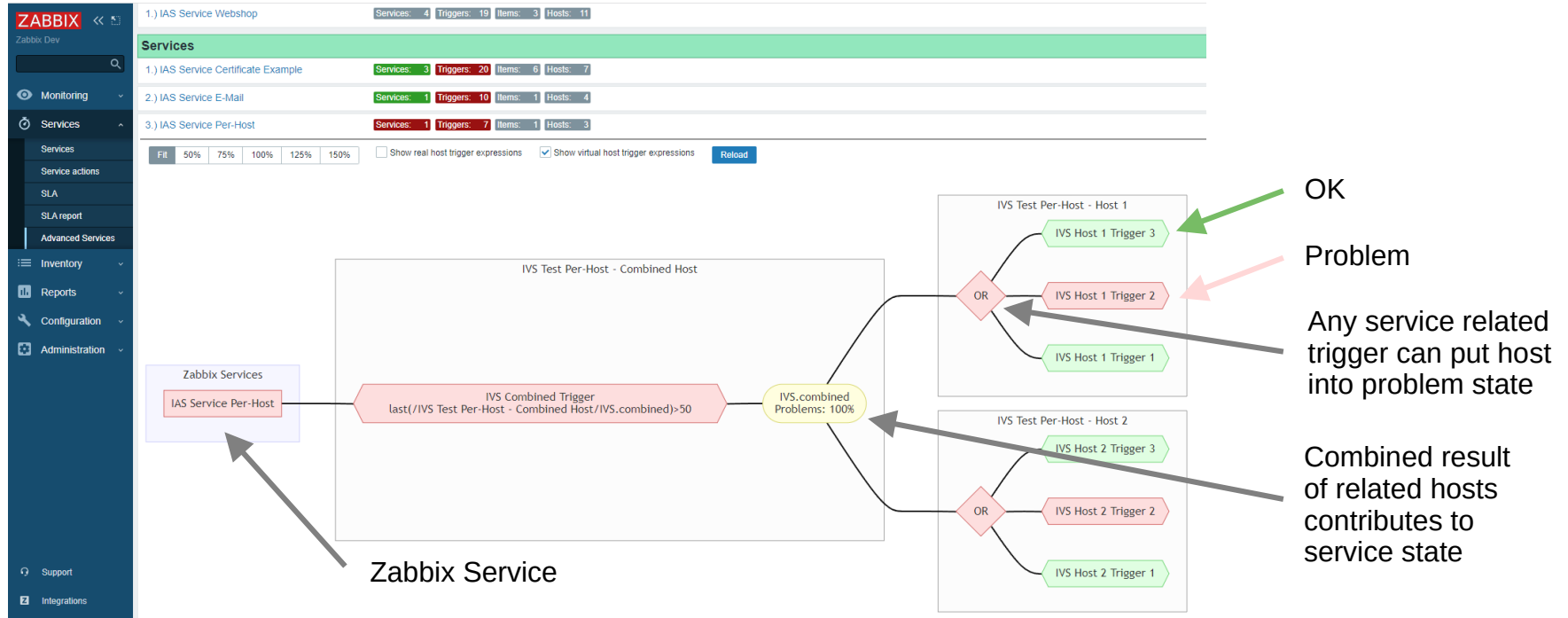


Service ok but at least one issue

Service not ok

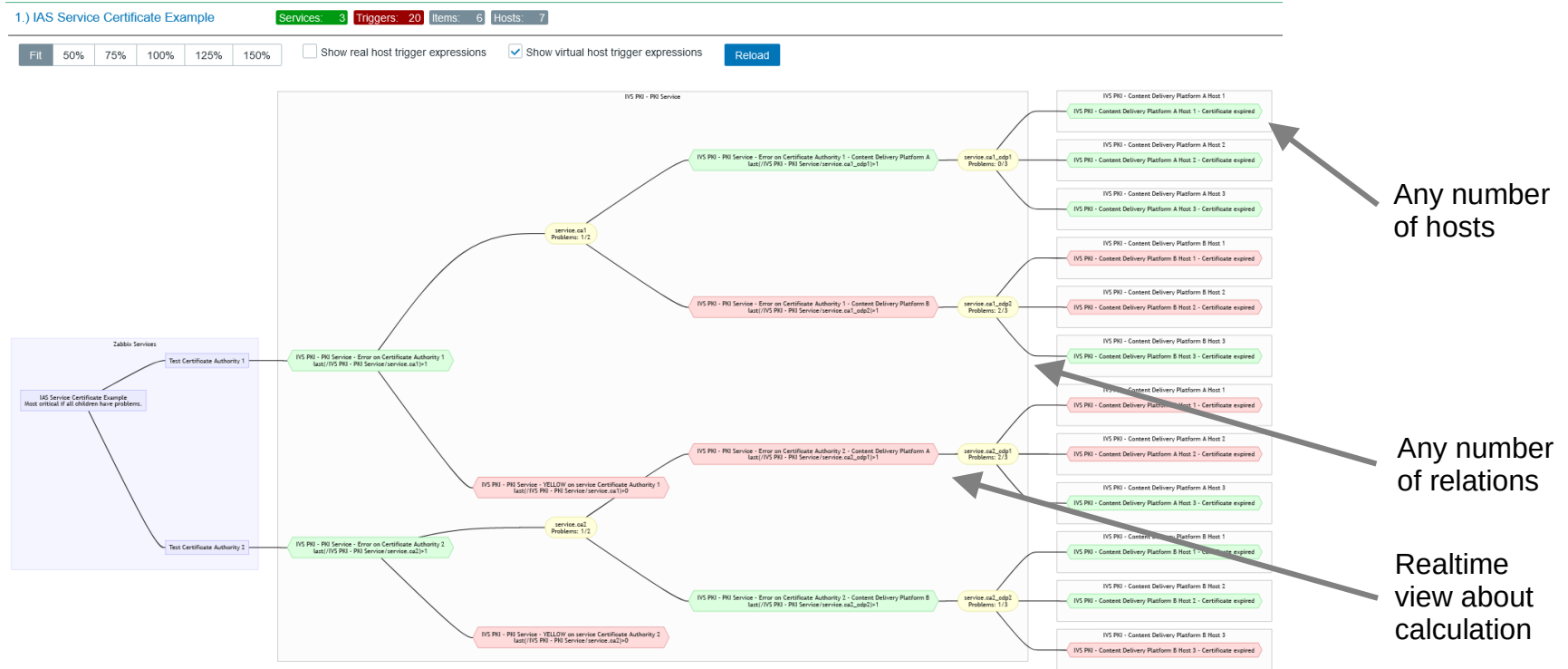
Service overview

Frontend / Backend Module - Advanced Services



Automatically created visual representation of service details in realtime

Frontend / Backend Module - Advanced Services



More complex service setup

Big data in cloud like environments

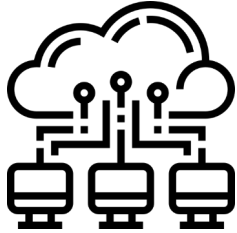
Metric Streamer

-

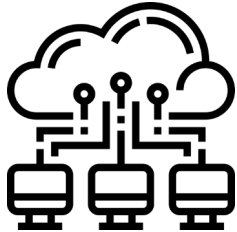
Capture the values of metrics and events
in large data sets

(Many thanks to the Deutsche Telekom Technik team for a great project!)

Big data collection in cloud like environments



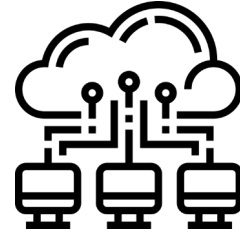
Monitoring System “A”



Monitoring System “B”

Several independent
Monitoring Systems

Each system collects
and processes data
on its own

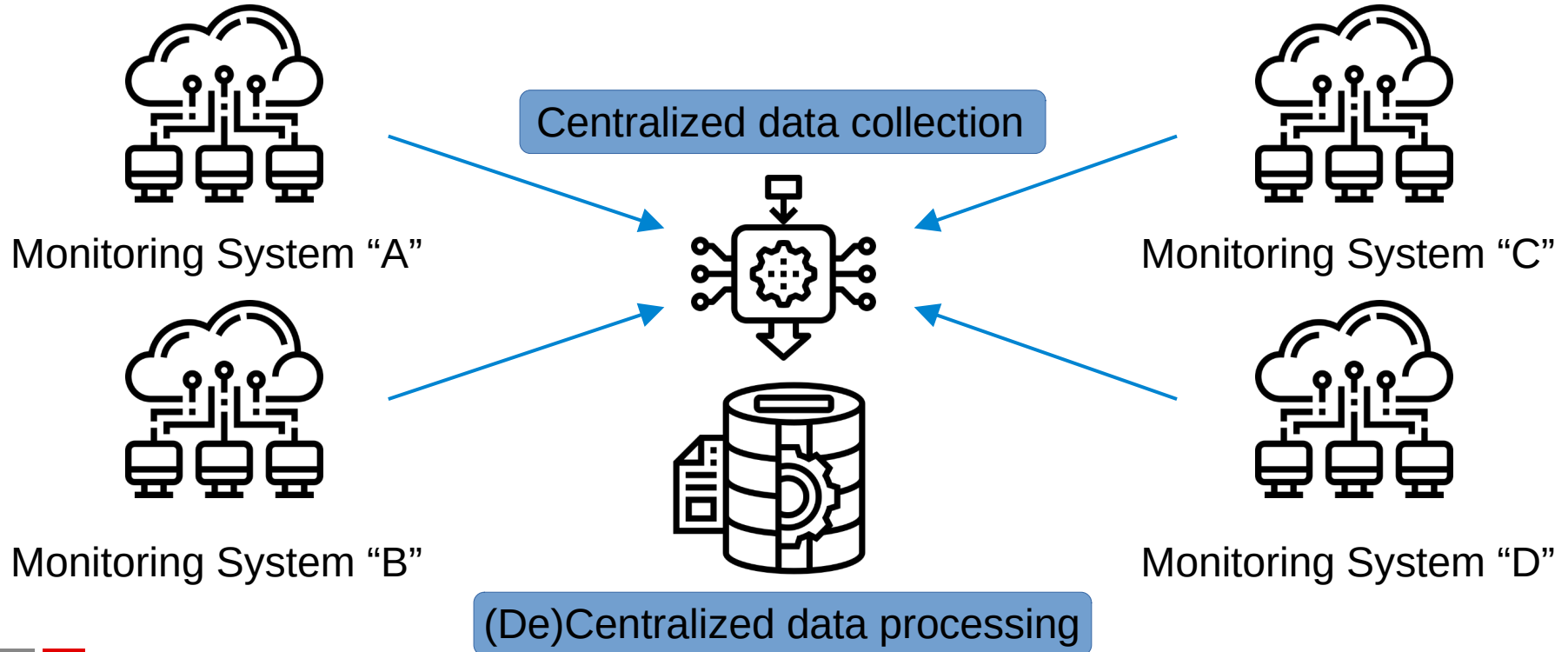


Monitoring System “C”

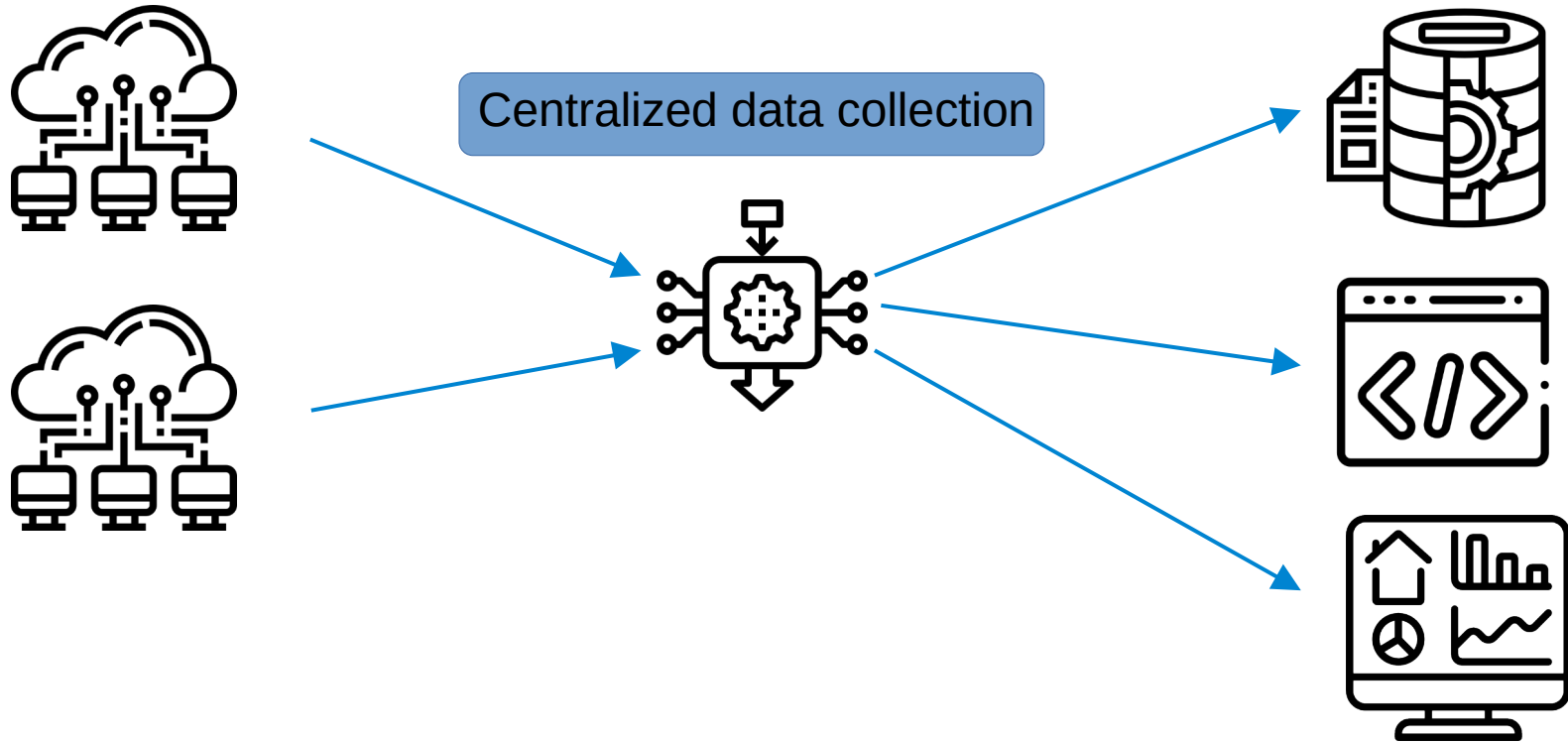


Monitoring System “D”

Big data collection - Metric Streamer Idea

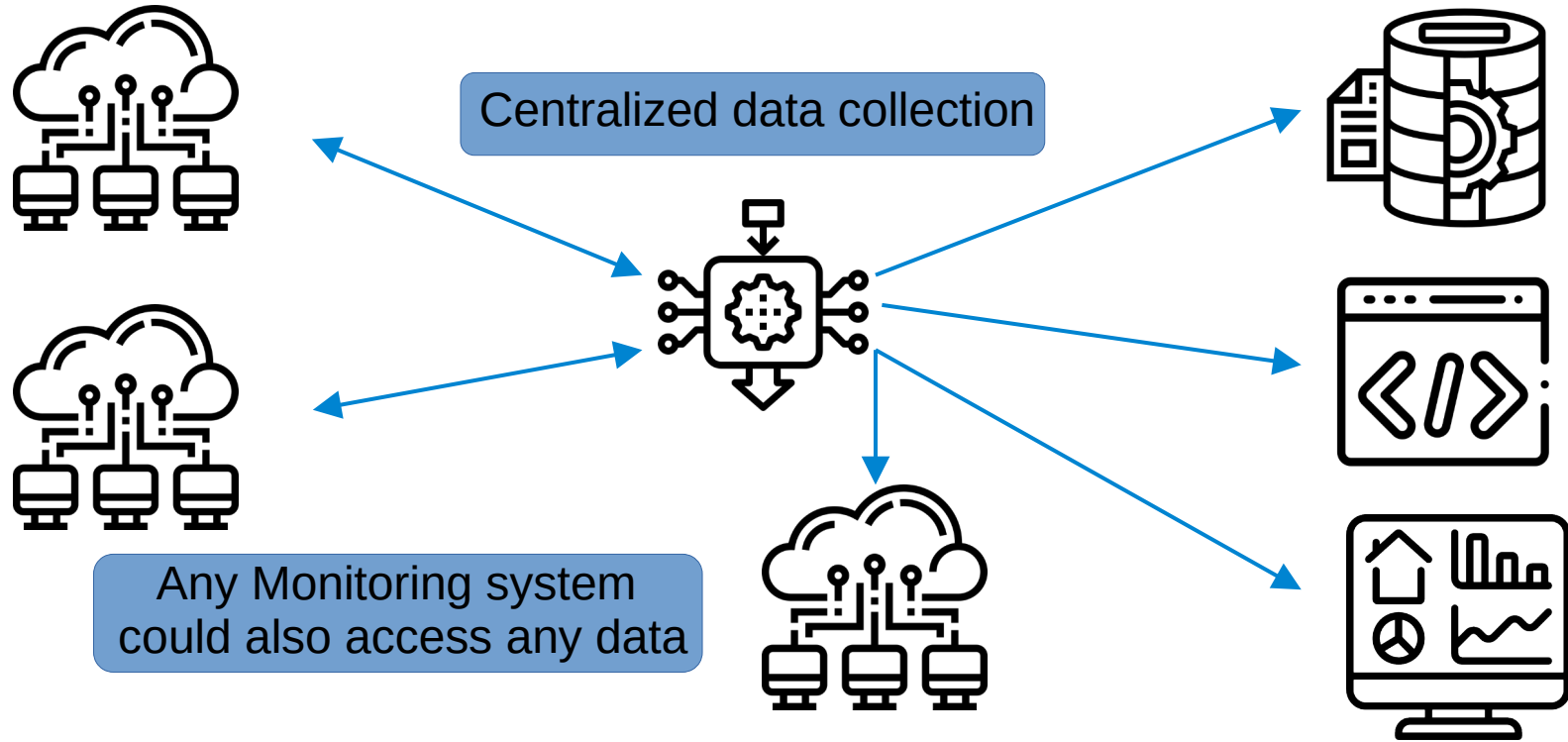


Big data collection - Metric Streamer Idea



Application and services could access data from any system

Big data collection - Metric Streamer Idea



Application and services could access data from any system

Big data collection - Metric Streamer Design



Publish values from Zabbix metrics (i.e. zabbix agent)



Publish values from Zabbix events (i.e. trigger)



Consume metric like values from central data collection



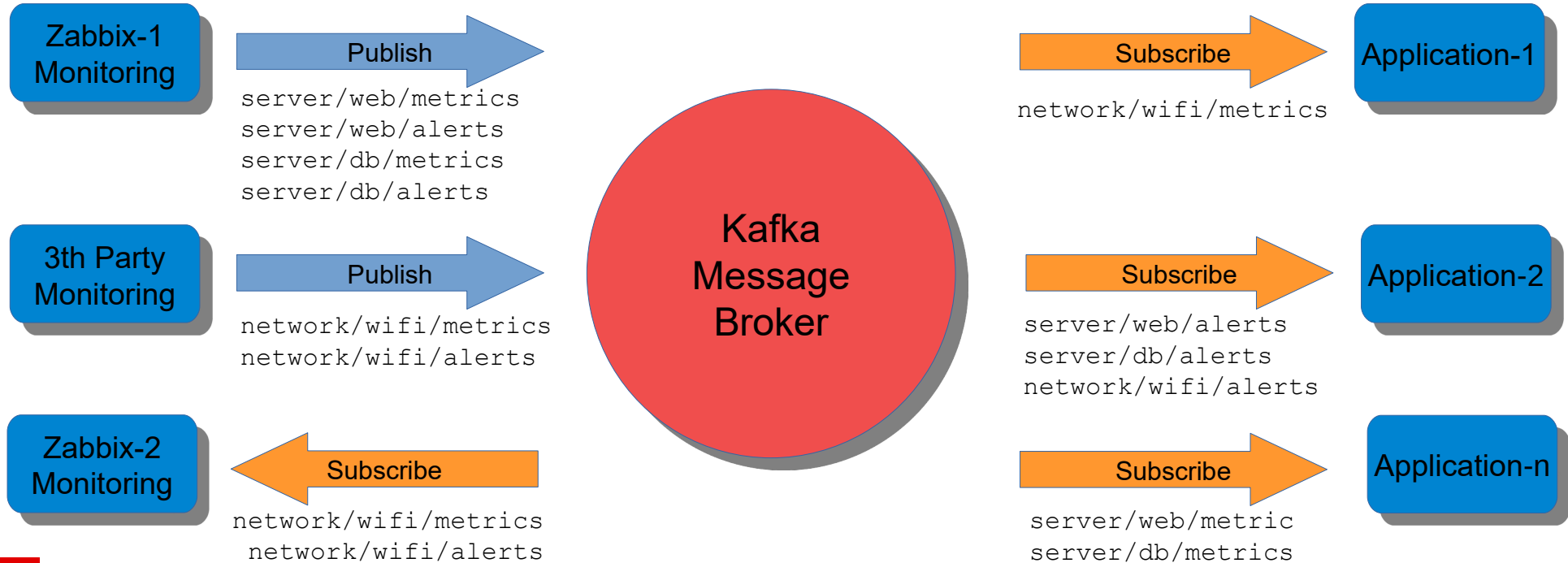
Consume event like values from central data collection

Big data collection - Metric Streamer Requirements

- Values of metrics and events must be exported using JSON data format
- Exported data must be “transformable”, depending on requirements of data sink
- Exported data must be filterable based on hosts, hostgroups and items
- Filter options should support ids, names, keys and tags
- Data sinks: Kafka, NSQ, Database and Flat File
- Support for multiple data source / filter to data sink relations
- Handle up to 40.000 values / sec
- Monitorable with Prometheus / Zabbix
- Work in cloud environments and in Kubernetes Cluster

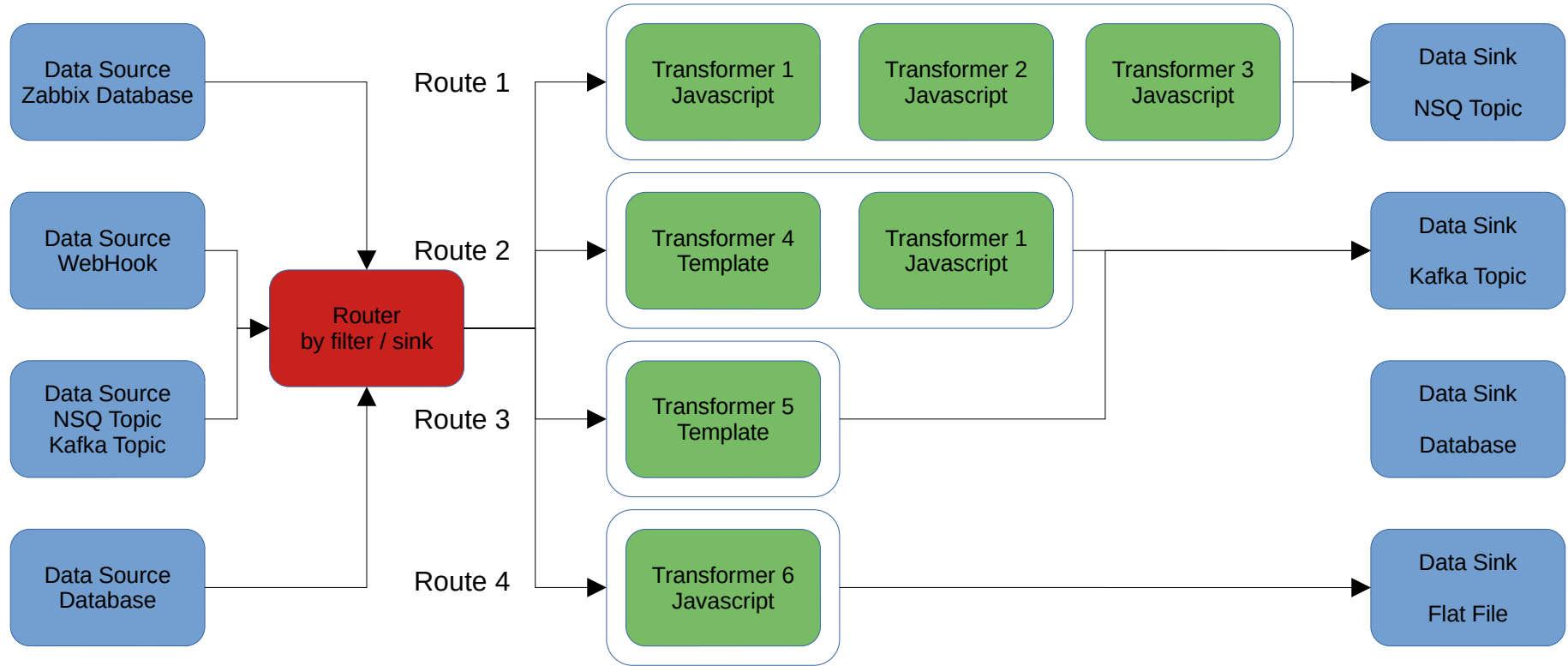


Big data collection - Metric Streamer Design



Example using Kafka Message Broker as data sink

Big data collection - Metric Streamer Implementation



Metric Streamer components and data flow

Big data collection - Metric Streamer Implementation

```
{
  "metric": {
    "ItemID": 23259,
    "Clock": 1662740919,
    "Value": 0.0338810774182619,
    "Ns": 271196201
  },
  "item": {
    "Itemid": 23259,
    "Type": 5,
    "SnmpOid": "",
    "Hostid": 10084,
    "Name": "Zabbix server: Utilization of http poller data collector processes, in %",
    "Key": "zabbix[process,http poller,avg,busy]",
    "Delay": "1m",
    "History": "1w",
    "Trends": "365d",
```

```
},
  "host": {
    "Name": "Zabbix server",
    "HostID": 10084,
    "ProxyHostID": 0,
    "Status": 0,
    "Flags": 0,
    "IPMIAuthtype": 0,
    "IPMIPrivilege": 0,
    "IPMIUsername": "",
    "IPMIPassword": "",
    "MaintenanceID": 0,
    "MaintenanceStatus": 0,
```



Raw data for type Zabbix item – includes all relevant metadata

Big data collection - Metric Streamer Implementation

Example Javascript Transformer – Prepare data for export on Kafka Message Bus

```
function transform(input) {  
    // first we will only select the keys we care about, in the process also renaming them  
    var result = { metric_id: input.metric.ItemID, value: input.metric.Value, timestamp: input.metric.Clock };  
    // then we can inject some additional keys based on the data we have access to  
    result["non_zero"] = input.metric.Value != 0  
    // replace the value with the new one we created  
    return result;  
}
```

Reduced data as defined by transformer – includes also the new field “non-zero”

```
{"metric_id":33025,"non_zero":false,"timestamp":1662741685,"value":0}  
{"metric_id":42266,"non_zero":false,"timestamp":1662741686,"value":0}  
{"metric_id":33026,"non_zero":false,"timestamp":1662741686,"value":0}  
{"metric_id":33027,"non_zero":true,"timestamp":1662741687,"value":0.0033804340477317286}  
{"metric_id":23252,"non_zero":false,"timestamp":1662741692,"value":0}  
{"metric_id":23253,"non_zero":true,"timestamp":1662741693,"value":0.2872592091922947}
```



Big data collection - Metric Streamer Implementation

All templates / Metric Streamer by HTTP Agent Applications 1 Items 8 Triggers Graphs Screens Discovery rules 3 Web scenarios								
<input type="checkbox"/> Wizard	Name ▲	Triggers	Key	Interval	History	Trends	Type	
<input type="checkbox"/> ...	Metric Streamer Master: BytesRead		metricstreamer.bytesread		7d	30d	Dependent item	
<input type="checkbox"/> ...	Metric Streamer Master: BytesRead Per Second		metricstreamer.bytesread.persecond		7d	30d	Dependent item	
<input type="checkbox"/> ...	Metric Streamer Master: BytesWritten		metricstreamer.byteswritten		7d	30d	Dependent item	
<input type="checkbox"/> ...	Metric Streamer Master: BytesWritten Per Second		metricstreamer.byteswritten.ps		7d	30d	Dependent item	
<input type="checkbox"/> ...	Metric Streamer Master: MetricsInFlight		metricstreamer.metricsinflight		7d	30d	Dependent item	
<input type="checkbox"/> ...	Metric Streamer Master: MetricsRead		metricstreamer.metricsread		7d	30d	Dependent item	
<input type="checkbox"/> ...	Metric Streamer Master		metricstreamer.master	10s	0		HTTP agent	
<input type="checkbox"/> ...	Metric Streamer Master: TotalBufferSize		metricstreamer.totalbuffersize		7d	30d	Dependent item	

All templates / Metric Streamer by HTTP Agent Applications 1 Items 8 Triggers Graphs Screens Discovery rules 3 Web scenarios						
<input type="checkbox"/> Host	Name ▲	Items	Triggers	Graphs	Hosts	Key
<input type="checkbox"/> Metric Streamer by HTTP Agent	Metric Streamer Master: Route Discovery	Item prototypes 10	Trigger prototypes	Graph prototypes	Host prototypes	metricstreamer.routeid
<input type="checkbox"/> Metric Streamer by HTTP Agent	Metric Streamer Master: Sink Discovery	Item prototypes 12	Trigger prototypes	Graph prototypes	Host prototypes	metricstreamer.sinkid
<input type="checkbox"/> Metric Streamer by HTTP Agent	Metric Streamer Master: Source Discovery	Item prototypes 4	Trigger prototypes	Graph prototypes	Host prototypes	metricstreamer.sourceid



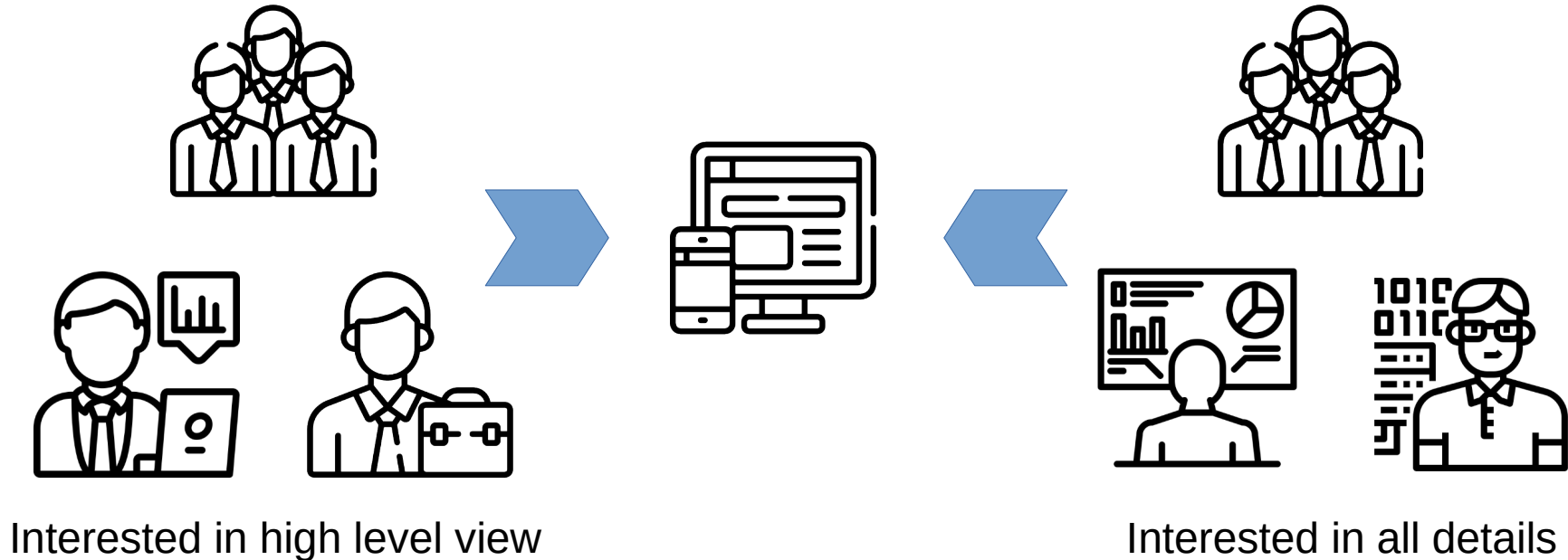
Extensive application monitoring using Zabbix or Prometheus

Simplified Frontend Access

Frontend Access with Self-Provisioning

(Many thanks to the team of ZDF - Zweites Deutsches Fernsehen for the valuable feedback!)

Simplified Frontend Access



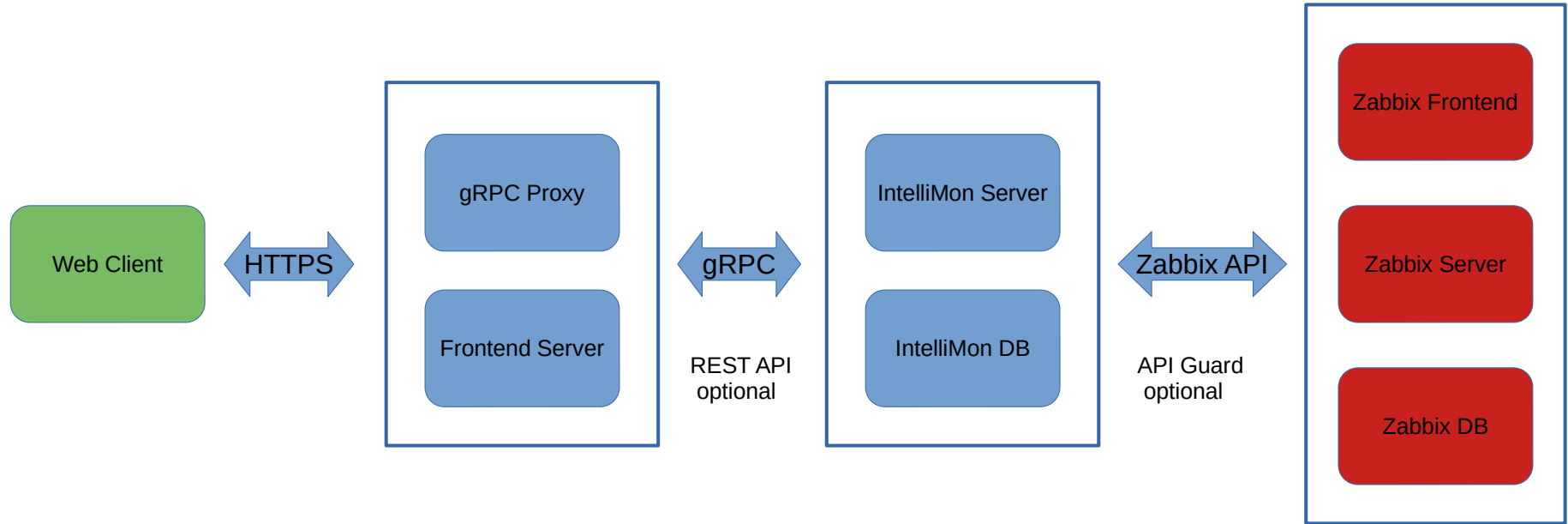
Different requirements for Zabbix for different groups of users

Simplified Frontend Access - Requirements

- Simple Dashboard like view
- Easy access to open and closed problems
- Easy access to related metrics and their values
- Ability to acknowledge or comment on problems
- Configure notifications themselves
- Configure maintenance themselves
- Support for multiple Zabbix Server
- No modification to Zabbix Source code



Simplified Frontend Access - Design



Simplified Frontend Access - Implementation

The screenshot displays the Zabbix 6.2.2 dashboard interface. On the left is a sidebar with navigation links: Dashboard, Zabbix Client, Open problems, Closed problems, Trigger, Hostgroups, Hosts, Items, Self Provisioning, Maintenance, Alerts, and a user profile for 'wolfgang.alper.user'. The main dashboard area is titled 'Dashboard' and shows the following metrics:

- Information:** 4 (blue box with 'i' icon)
- Warning:** 4 (yellow box with warning icon)
- Average:** 0 (orange box with '!' icon)
- High:** 2 (red box with lightning bolt icon)
- Disaster:** 1 (dark red box with heart icon)
- Not classified:** 2 (grey box with 'x' icon)
- Hostgroups:** 27 (folder icon)
- Hosts:** 91 (chip icon)
- Trigger:** 878 (heart rate icon)
- Items:** 3557 (bar chart icon)

Below the metrics are sections for 'My Report Jobs' (No report jobs found), 'My Report Subscriptions' (No subscriptions found), 'Reports' (No reports found), and 'Report Templates' (No templates found). At the bottom, there are two sections: 'My Alert Subscriptions' and 'In Maintenance'. The 'My Alert Subscriptions' section lists three items: 'IntelliTrend/Bielefeld/Server', 'irs-backend', and 'irs-frontend'. The 'In Maintenance' section lists two items: 'IntelliTrend/Staging' and 'IntelliTrend/Test'. The 'My Alert Subscriptions' and 'In Maintenance' section titles are highlighted with red boxes.

Simplified Frontend Access – Open problems

IntelliMON

Open problems

September 16th 2022, 03:36 am 2 days

PROBLEM • Unacknowledged
[IntelliTrend: Datev01] - Arbeitsspeicher: Swap [Belegt] > 80 % [80.25 %]

IntelliTrend: Datev01

September 14th 2022, 14:52 pm 4 days

PROBLEM • Unacknowledged
More than 100 items having missing data for more than 10 minutes

Monitoring Server IntelliMon

September 7th 2022, 22:53 pm 11 days

PROBLEM • Acknowledged
[IMS-Smart Supportraum IntelliTrend] - Sensor: Battery charge low [<50%]

IMS-Smart Supportraum IntelliTrend

August 16th 2022, 04:42 am a month

PROBLEM • Unacknowledged
[Server: David Mailserver [intern]] - HDD: C: [Belegt] > 94 % [94.01 % / 7.18 GB frei von 119.9 GB]

Server: David Mailserver [intern]

July 2nd 2022, 16:40 pm 3 months

PROBLEM • Unacknowledged
[172.20.20.23] - Systeminfo: HW Status [Alarm]

172.20.20.23

Dashboard
Zabbix Client
Open problems
Closed problems
Trigger
Hostgroups
Hosts
Items
Self Provisioning
Maintenance
Alerts
wolfgang.alper.user
Settings
About
Sign out

Opens related information



ZABBIX
PREMIUM PARTNER

Simplified Frontend Access – Problem details

IntelliMON

Dashboard

Zabbix Client

Open problems

Closed problems

Trigger

Hostgroups

Hosts

Items

Self Provisioning

Maintenance

Alerts

wolfgang.alper.user

Settings

About

Sign out

← Problem Details

Information • PROBLEM

[IMS-Smart Supportraum IntelliTrend] - Sensor: Battery charge low [<50%]

Details

Severity

Information

From

September 7th 2022, 22:53:51 pm

To

Ongoing

Duration

11 days

Acknowledges

Wolfgang Alper at September 9th 2022, 15:43 pm

Message: Charger will be replaced next week

Hosts

IMS-Smart Supportraum IntelliTrend

Trigger

[{HOST.NAME}] - Sensor: Battery charge low [<50%]

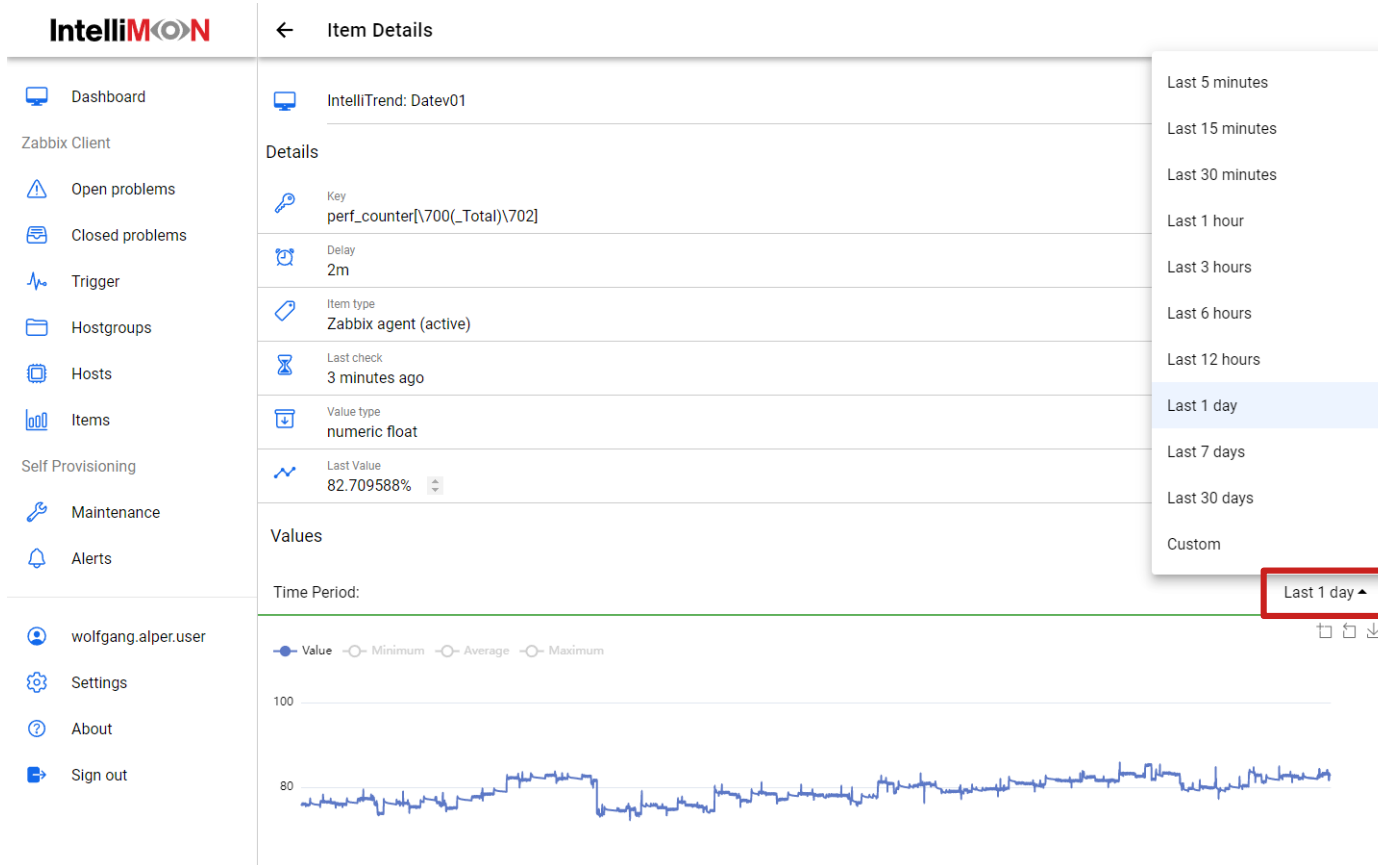
Items

Battery Charge [%]

44 %



Simplified Frontend Access – Item details



Vector graph

Simplified Frontend Access - Maintenance

The screenshot shows the Zabbix web interface with the 'IntelliTrend' logo in the top left. The left sidebar contains navigation links: Dashboard, Zabbix Client, Open problems, Closed problems, Trigger, Hostgroups, Hosts, Items, Self Provisioning, Maintenance, Alerts, and a user profile for 'wolfgang.alper.user'. The main content area is titled 'Maintenance' and displays a list of hostgroups. A modal dialog is open over the 'IntelliTrend/Staging' hostgroup, titled 'Configure maintenance for: IntelliTrend/Staging'. The dialog contains the text 'This hostgroup is currently in maintenance with Data collection', a toggle for 'Apply to subgroups' which is currently off, and a red button labeled 'STOP MAINTENANCE'.

Hostgroup	Action
Demoumgebung	⚙️
IntelliTrend	⚙️
IntelliTrend/Bielefeld/Netzwerk	⚙️
IntelliTrend/Bielefeld/Server	⚙️
IntelliTrend/Hetzner	⚙️
IntelliTrend/Staging	⚙️
IntelliTrend/Staging	▶️
IntelliTrend/T	▶️
IntelliTrend/lxd	⚙️

User with sufficient permissions can manage maintenance

Simplified Frontend Access - Alerts

The screenshot displays the IntelliMON Alerts interface. On the left is a sidebar with navigation links: Dashboard, Zabbix Client, Open problems, Closed problems, Trigger, Hostgroups, Hosts, Items, Self Provisioning, Maintenance, Alerts, and a user profile for 'wolfgang.alper.user'. The main area is titled 'Alerts' and contains a list of hostgroups: Demoumgebung, IntelliTrend, Intellitrend-VMware, irs-backend (expanded), irs-backend/apiserver, irs-backend/c, irs-backend/d, and irs-frontend. A modal window is open over 'irs-backend/apiserver' with the title 'Configure alert for: irs-backend/apiserver'. The modal contains the text 'You are currently not subscribed to this hostgroup', a 'Severity' dropdown set to 'High', an 'Apply to subgroups' toggle switch, and a blue 'SUBSCRIBE' button.

User an configure alerts for host / hostgroups

Simplified Frontend Access – Mobile View



5 Real world examples for Zabbix integrations and extensions

Thank You!



IntelliTrend GmbH

Contact: Wolfgang Alper

 www.intellitrend.de

wolfgang.alper@intellitrend.de



ZABBIX
PREMIUM PARTNER