Telenet

Developing a custom ZABBIX Reporting Solution

Who am I

Nick Corné

- Linux DevOps Engineer with Telenet
- Zabbix Certified Expert
- Co-Founder of Triple-C

Who is Telenet

Leading Belgian telecom and entertainment player

2.8 million mobile customers

1.7 million internet customers

2 million TV subscribers

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How do we use Zabbix?

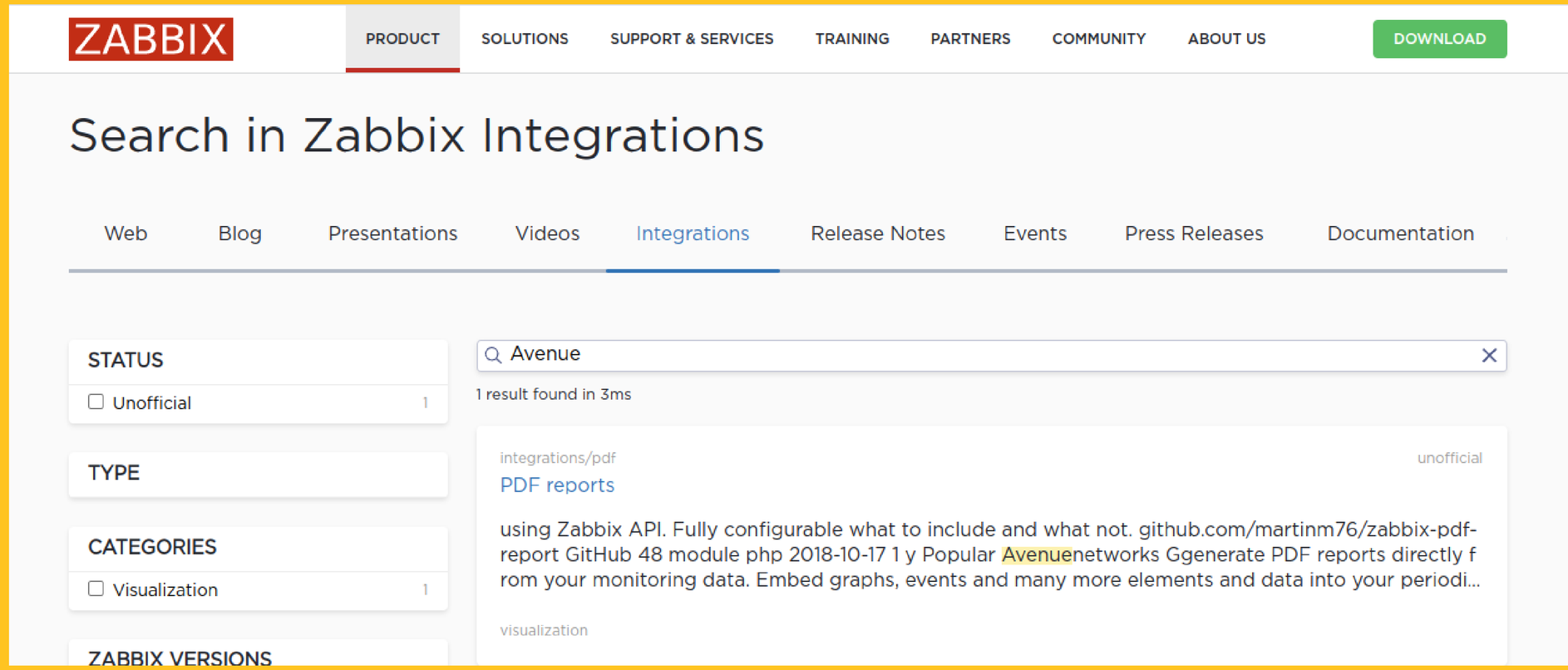
We offer monitoring as a service to our customers

- **multi-tentant** design using hostgroups(*)
- **On-site** proxy nodes
- Daily, weekly, monthly, ... **reporting** for each customer

(*) Deploying Zabbix as a multi-tenant multi-team monitoring tool (Zabbix Conference Benelux 2020) by Sven Putteneers

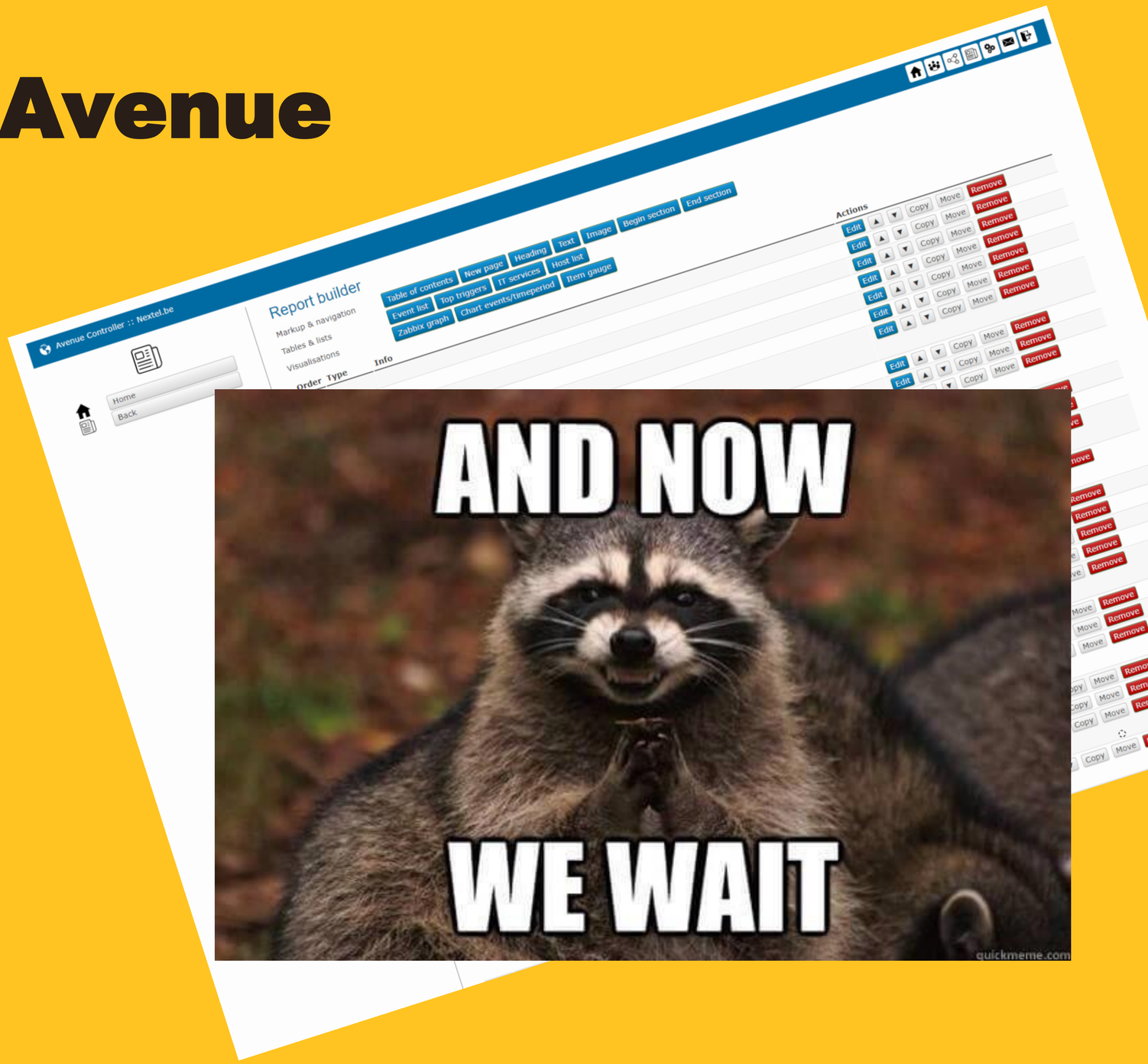
How we handled reporting in the past

- **In the dark corners of Zabbix Integration hub - Avenue**



Shortcomings of Avenue

- **Not user friendly**
- **Not always accurate**
- **Not the fastest application**
- **Error handling**



And we wait...

Error... Try again

Until it became my problem

12/6/2021

BUSINESS BUSINESS BUSINESS BUSINESS BUSINESS BUSINESS BUSINESS BUSI

Weekly report

Report generated on Mon 06 Dec 2021 00:15

12/6/2021

Table of contents

1 Events & Triggers
2 CPU, memory, disk space & traffic
3 server performance
4 cache
5 queue
6 processes busy

2 Alerts

Hostname	Description	Severity	Occurences
RSNEXCH	Tracing Service for Search in Exchange Service is not running	High	0
RSNEXCH	Microsoft Exchange Unified Messaging Call Router Service is not running	High	0
RSNEXCH	World Wide Web Publishing Service Service is not running	High	0
RSNSBS01	DHCP Server Service is not running	High	0
RSNSBS01	Group Policy Client Service is not running	High	0
RSNEXCH	Microsoft Exchange Unified Messaging Service is not running	High	0
RSNEXCH	Microsoft Exchange Transport Log Search Service is not running	High	0
RSNEXCH	Microsoft Exchange Service Host Service is not running	High	0
RSNEXCH	Microsoft Exchange Mailbox Transport Submission Service is not running	High	0
RSNEXCH	Microsoft Exchange Throttling Service is not running	High	0
RSNEXCH	Microsoft Exchange Transport Service is not running	High	0
RSNVC	Disk space < 1% on volume F: [2TB <= vol]	High	0
RSNEXCH	Microsoft Exchange IMAP4 Service is not running	High	0
ESXIserver67	Host is unreachable by SNMP for 10m	High	0
RSNEXCH	Microsoft Exchange IMAP4 Backend Service is not running	High	0

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Looking for a new solution

Consideration

- **Improve on Avenue**
- Zabbix native reporting feature
- Create custom solution

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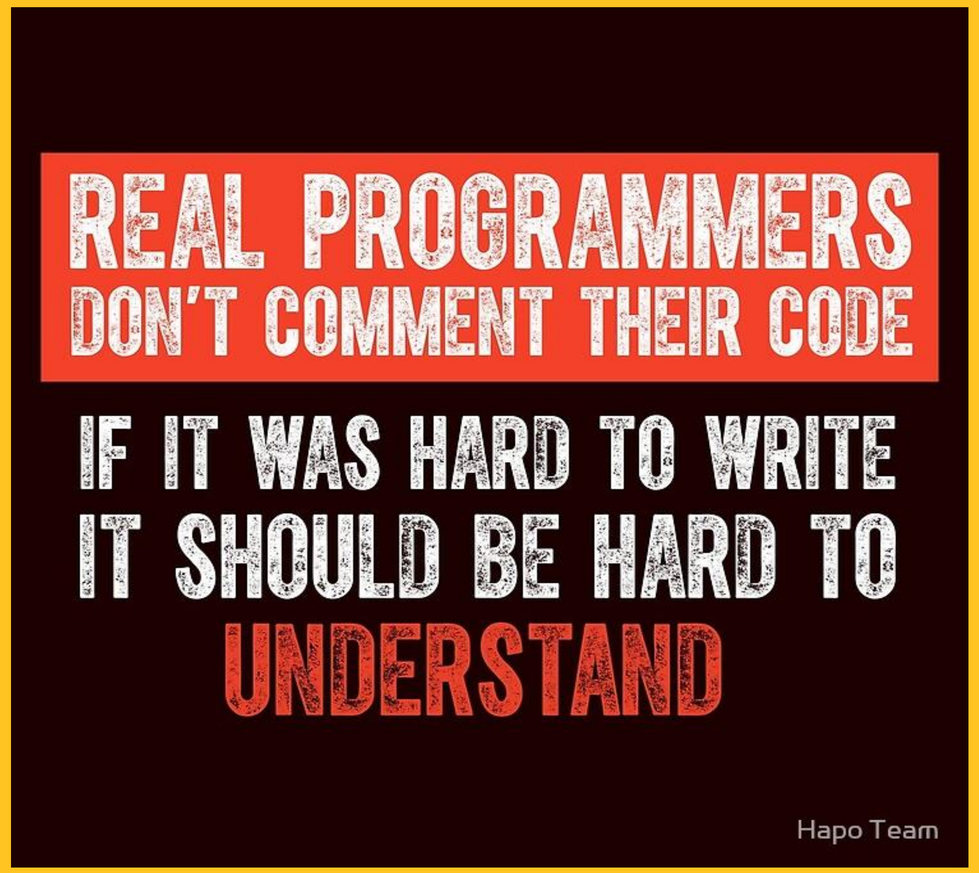
Improve on Avenue

- Reverse engineering
- Time consuming
- Out dated technology

- Less user impact
- Known Evil
- Customer ready
- No extra infra requirements

Improve on Avenue

Cons



Looking for a new solution

Consideration

- ~~Improve on Avenue~~
- **Zabbix native reporting feature**
- Create custom solution

Zabbix native reporting

- **Requires dashboards**
- **Not customer ready for our use case**

- **No custom code**
- **Supported by Zabbix**
- **Dummy proof interface**

Zabbix native reporting

Cons

Looking for a new solution

Consideration

- ~~Improve on Avenue~~
- ~~Zabbix native reporting feature~~
- **Create custom solution**

Custom solution

- **Development time**

- **Self-managed**
- **Customer ready**
- **No extra dependencies**
- **Custom styling**
- **Build on top of our multi-tenant setup**
- **Dummy proof interface**

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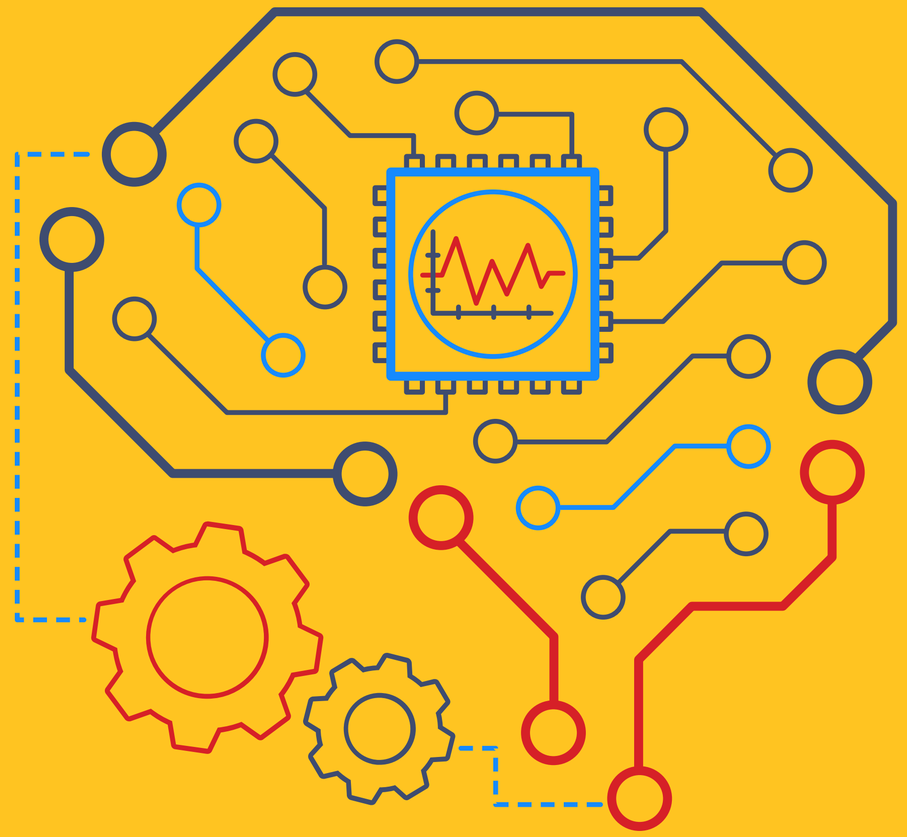
Custom solution

Pros +

How did we implement this

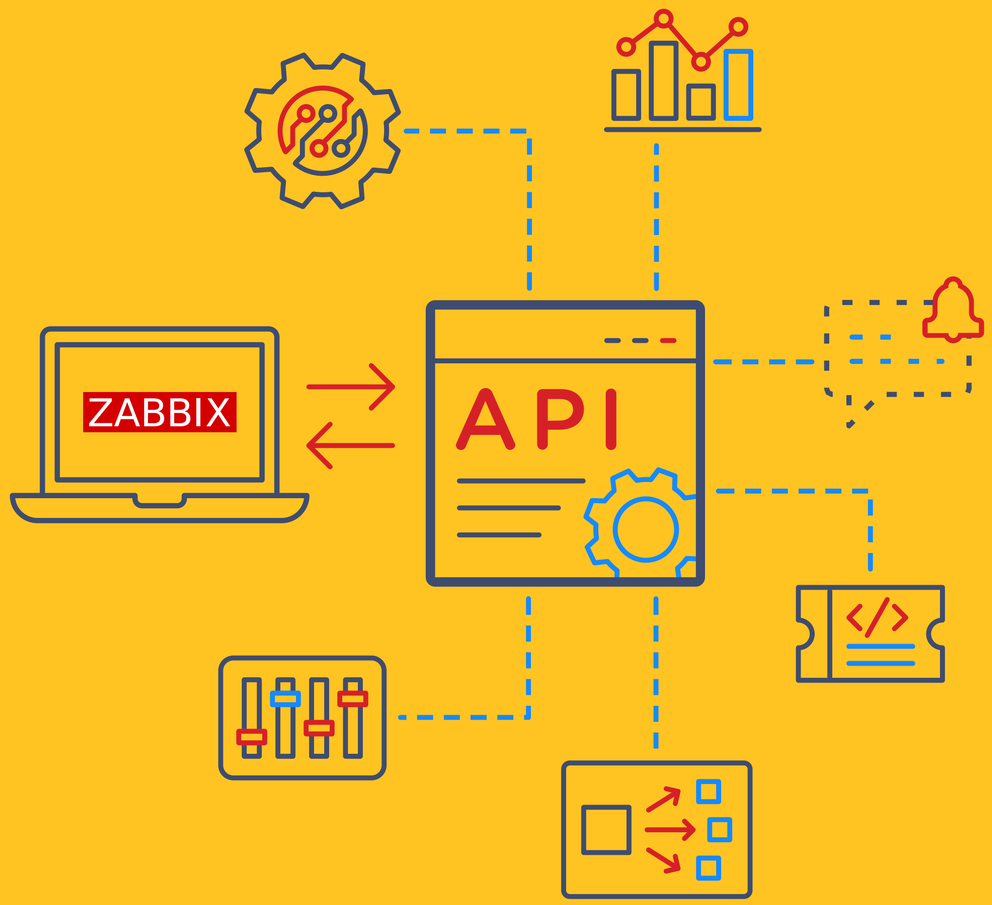
Key requirements

- 100% Zabbix API driven
- No headless-chrome
- Scalability
- Containerized



100% Zabbix API

- **No external dependencies**
- **All information fetched from Zabbix API**
- **Customized calls for multi-tenant setup**
- **Graph rendering**



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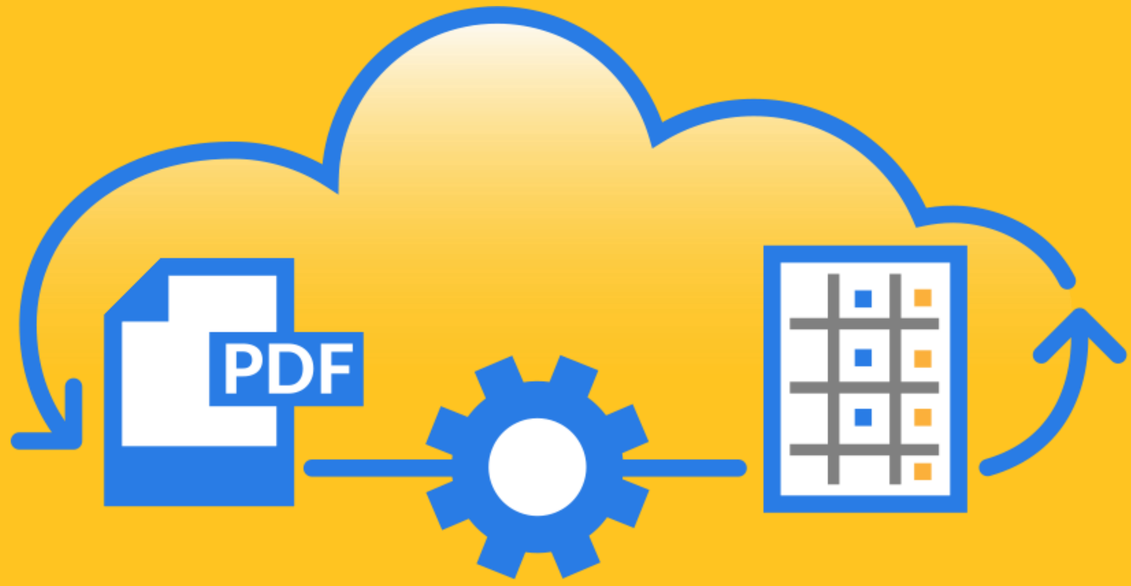
PDF library - no headless-chrome

- No external dependencies
- More flexibility
- Less prone to errors due to upgrades
- Customized styling

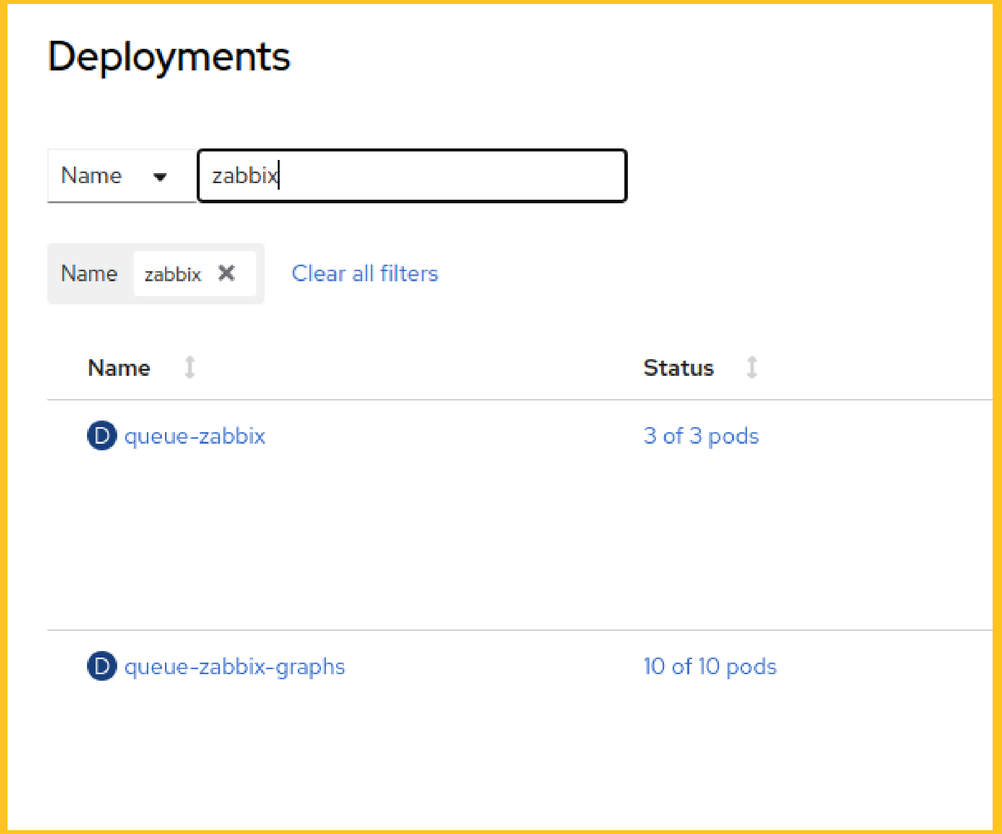


Scalability

- Easy scalable
- No limit on amount of reports and graphs
- Simultaneous report generation
- Scheduling

Containerized

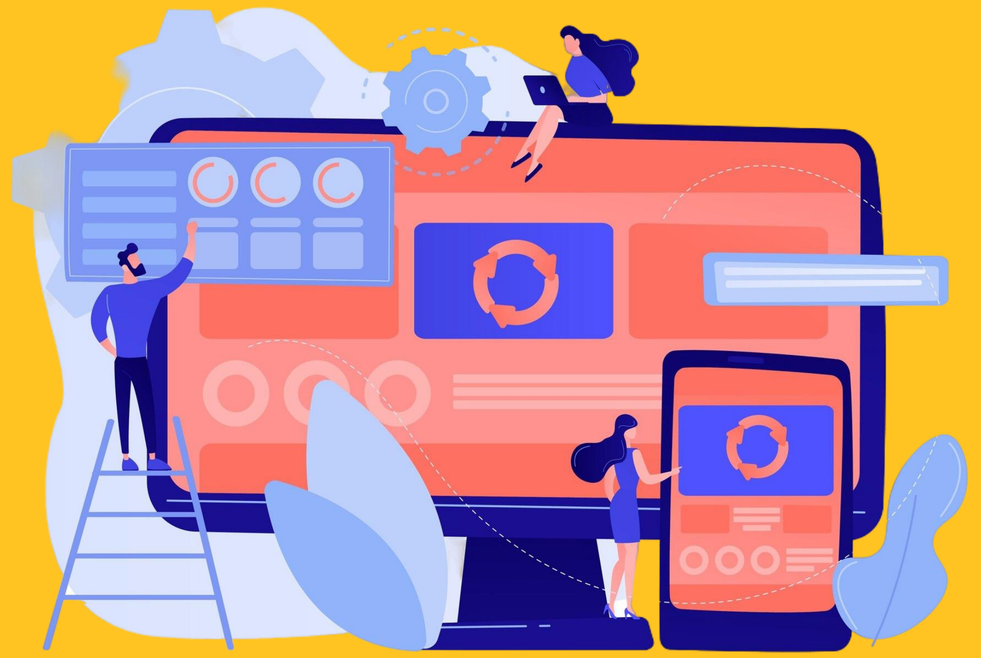
- **CI/CD integrations for build/deployment**
- **High availability**
- **Kubernetes ready**



What does the GUI look like

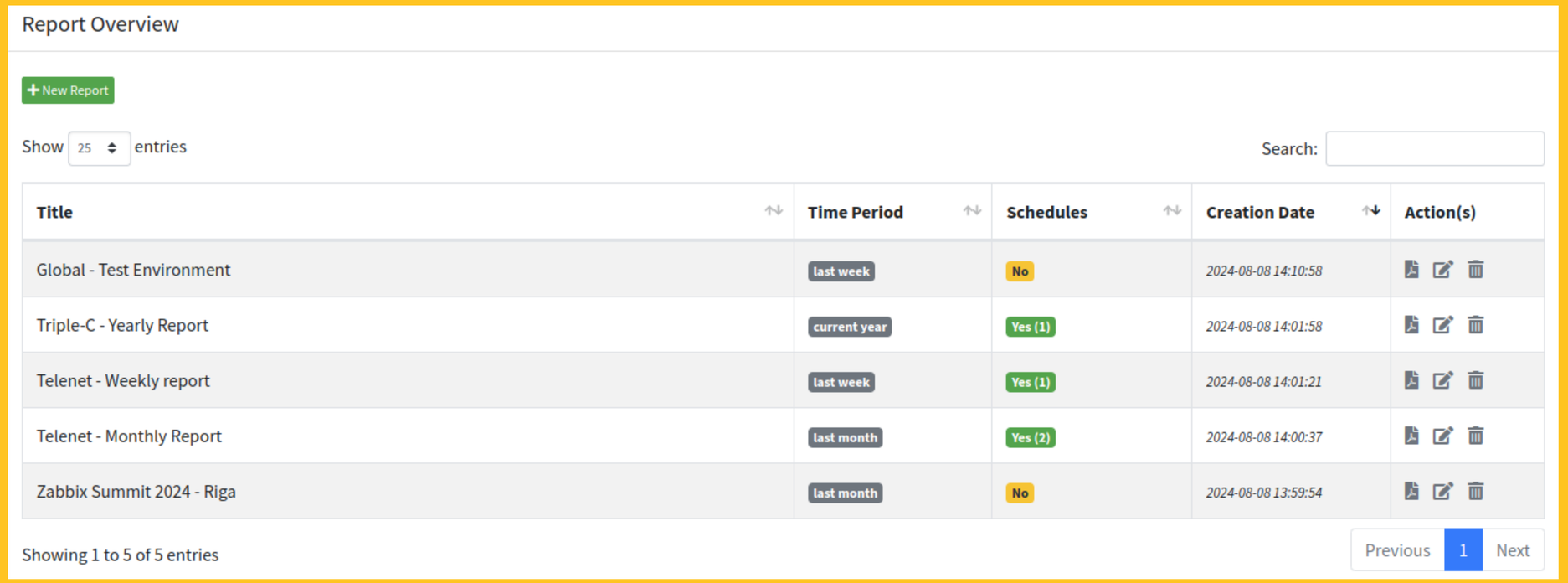
Components

- Report overview
- General information
- Graphs
- Schedules



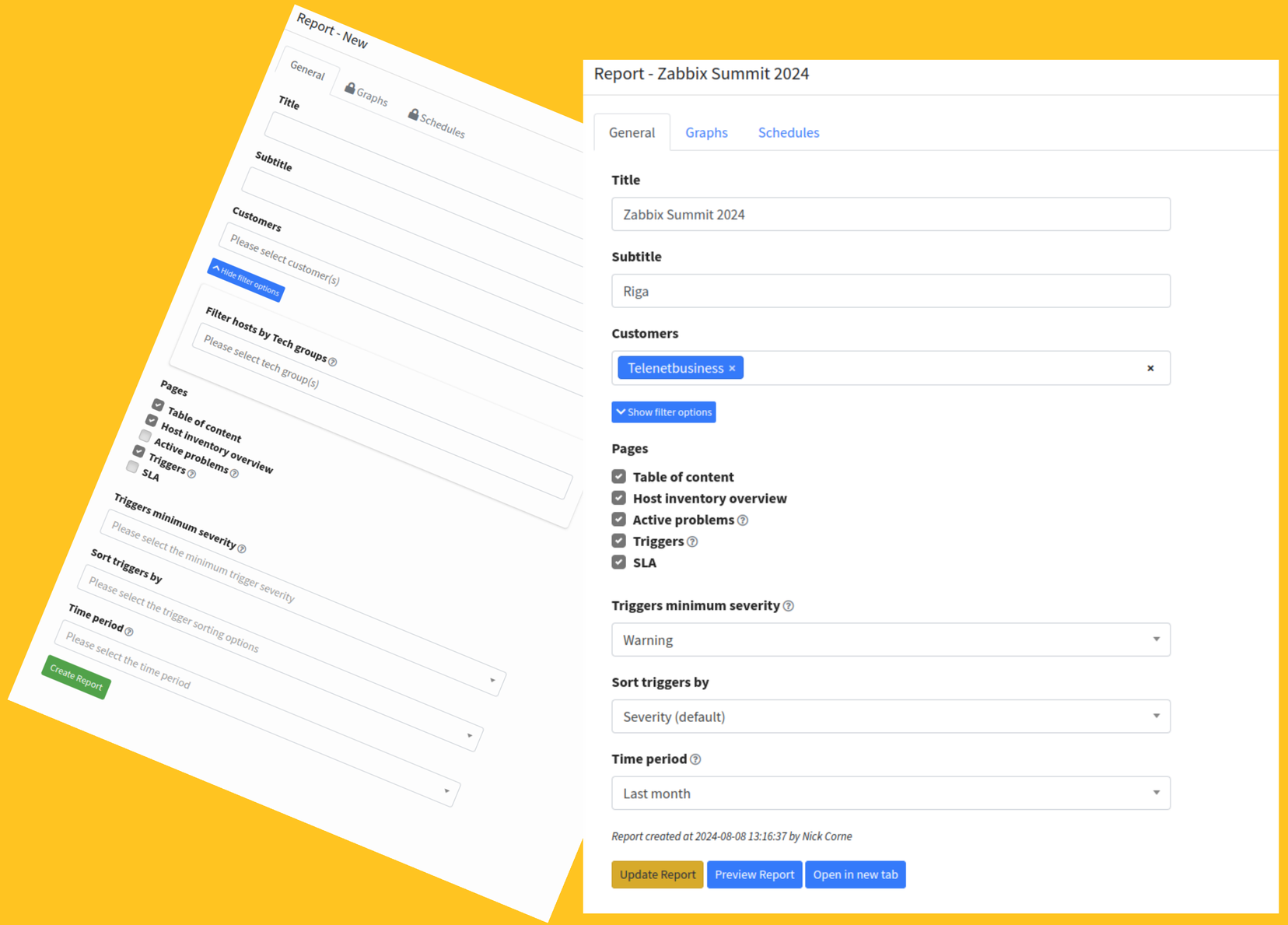
GUI – Report overview

- Title + subtitle
- Time period
- Number of schedules
- Creation date
- Generate now



GUI – General information

- Title + subtitle
- Customers (hostgroups)
- Filter hosts
- Page selection
- Minimum trigger severity
- Sort triggers by
- Time period



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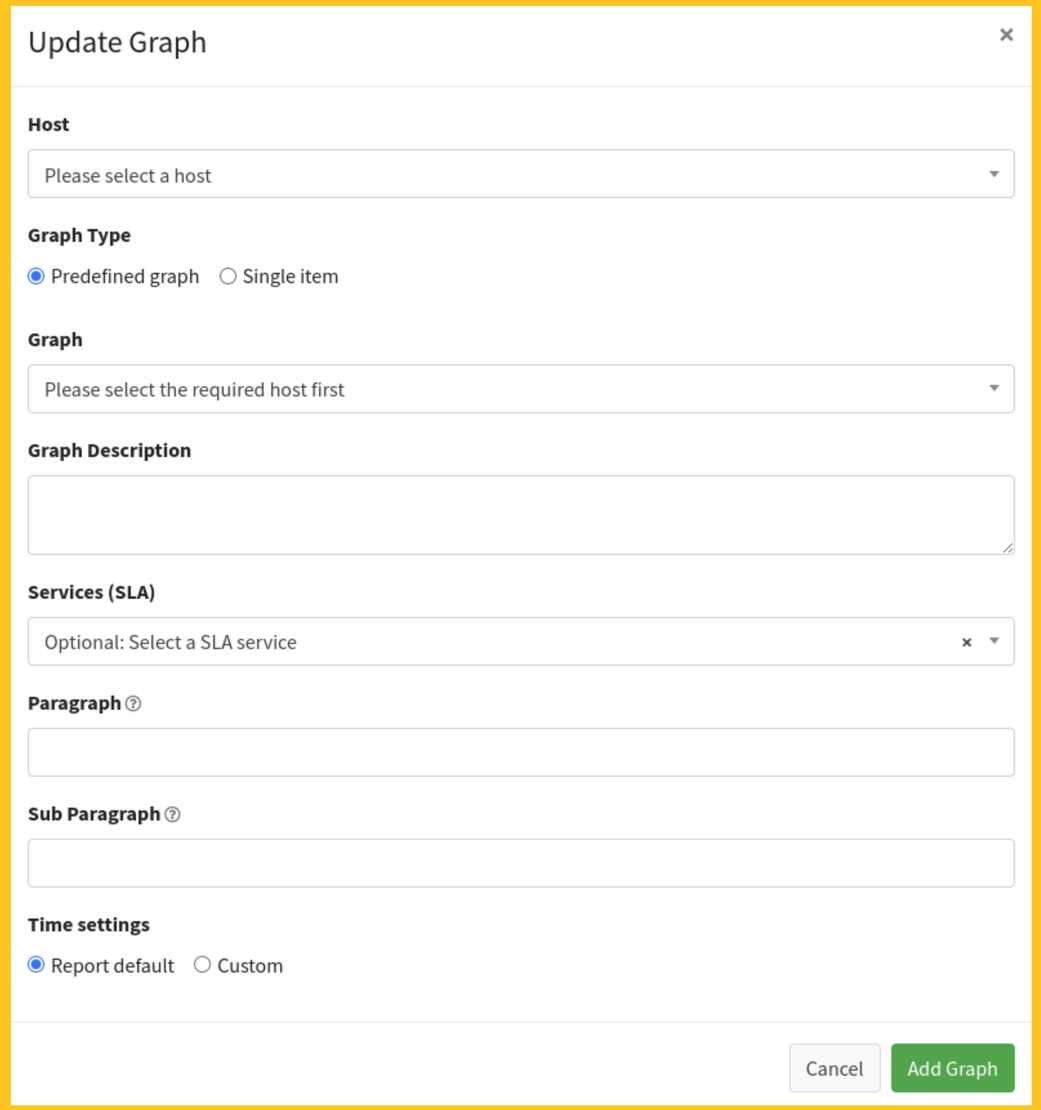
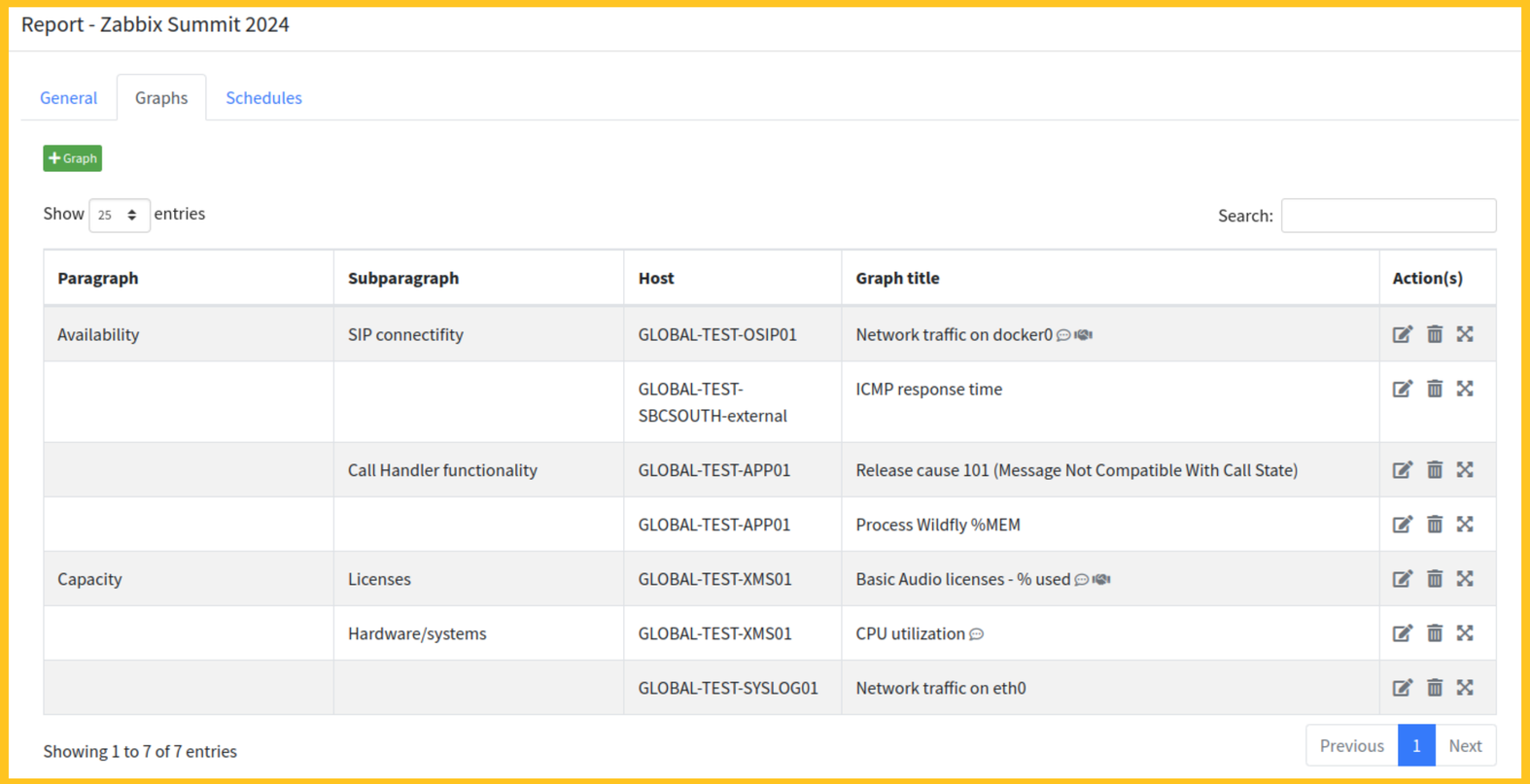
GUI – Create/update graph elements

- Host
- Predefined graph / single item
- Graph
- Description
- SLA information
- Paragraph + sub paragraph
- Time settings



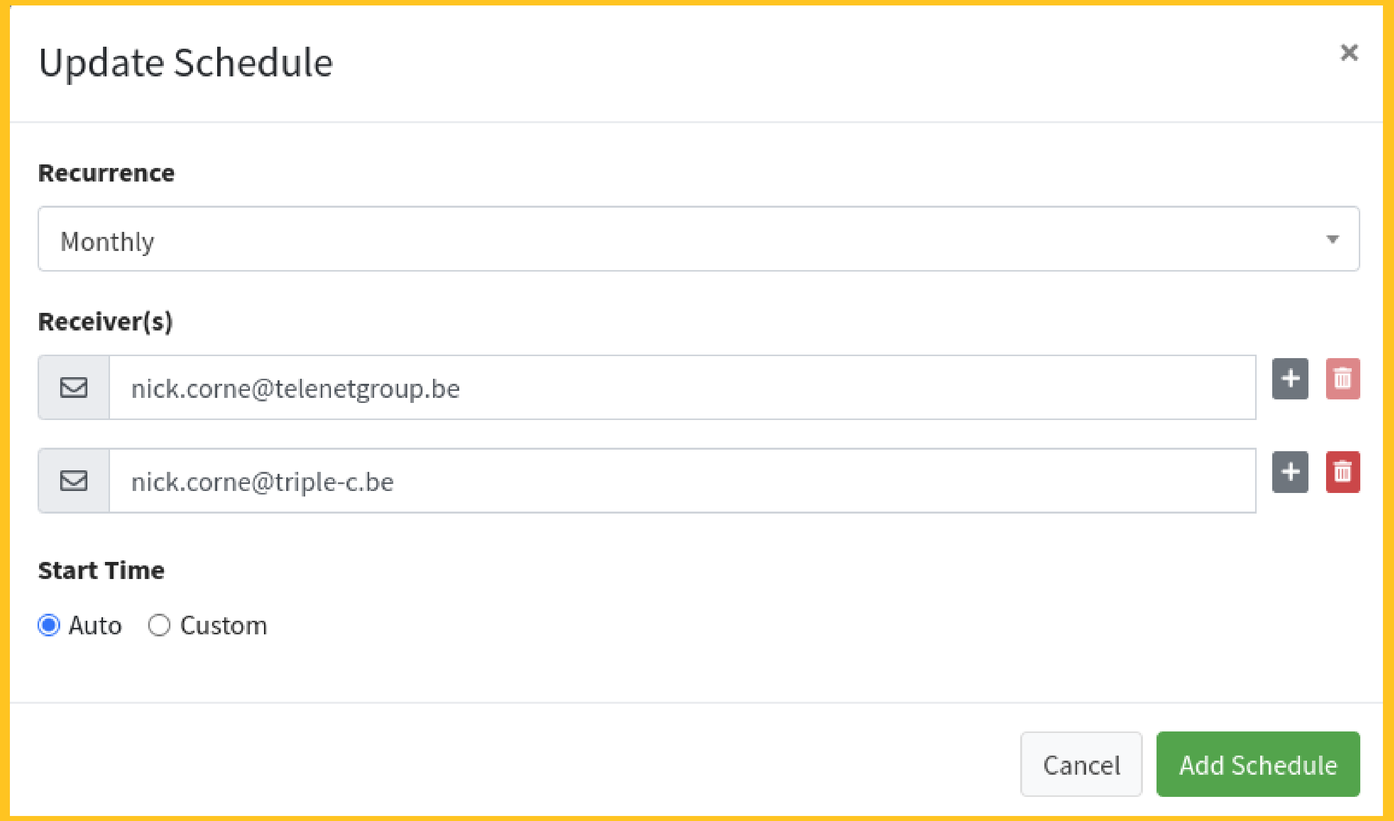
GUI – Graph overview

- Paragraph + sub paragraph
- Host
- Graph title
- Indicator icons
  - description 💬
  - SLA 🤝
- Drag & drop



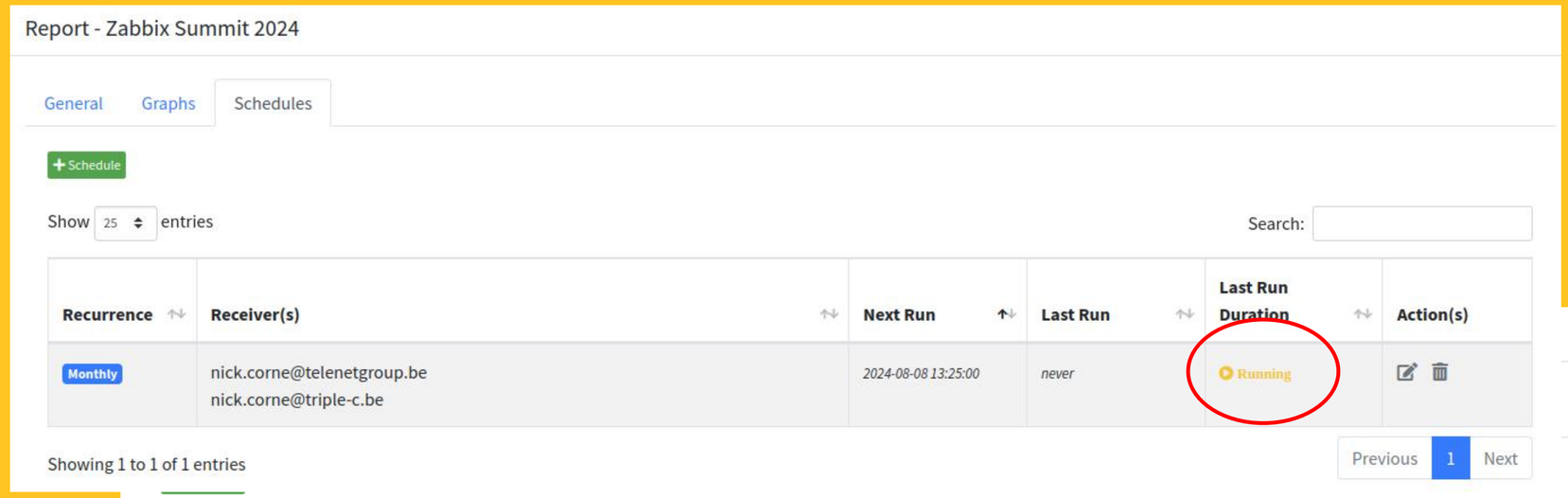
GUI – Create/update schedule

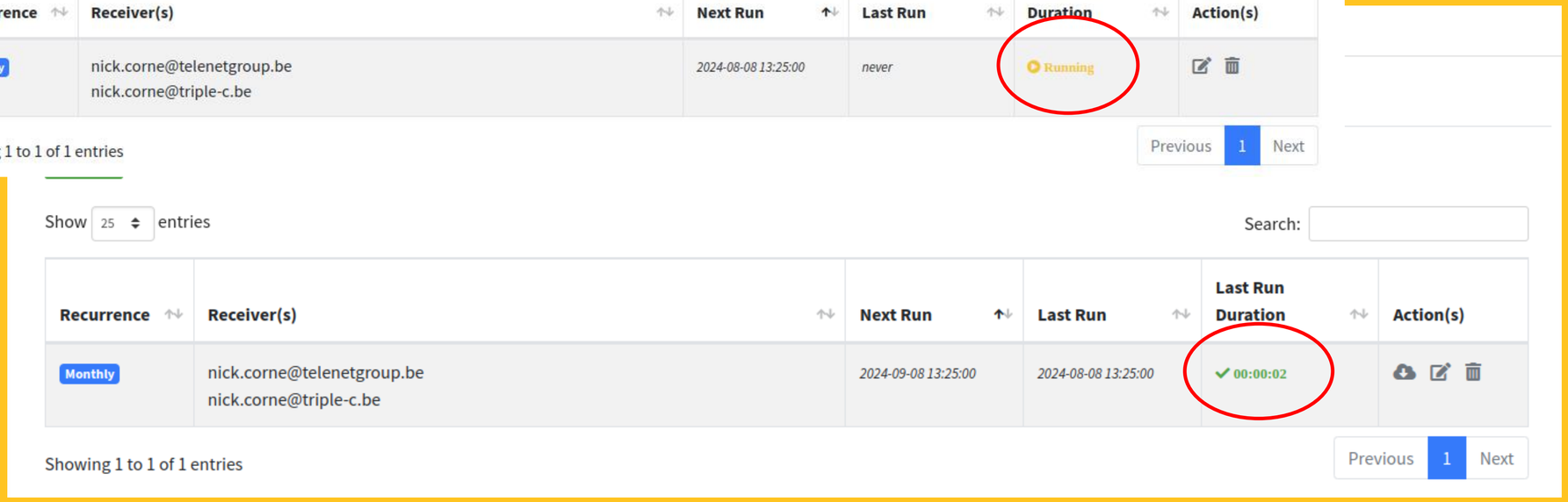
- **Recurrence**
- **Receiver(s)**
- **Start time**



GUI – Schedule overview

- Recurrence
- Receiver(s)
- Next run
- Last run
- Status / duration
- Download copy

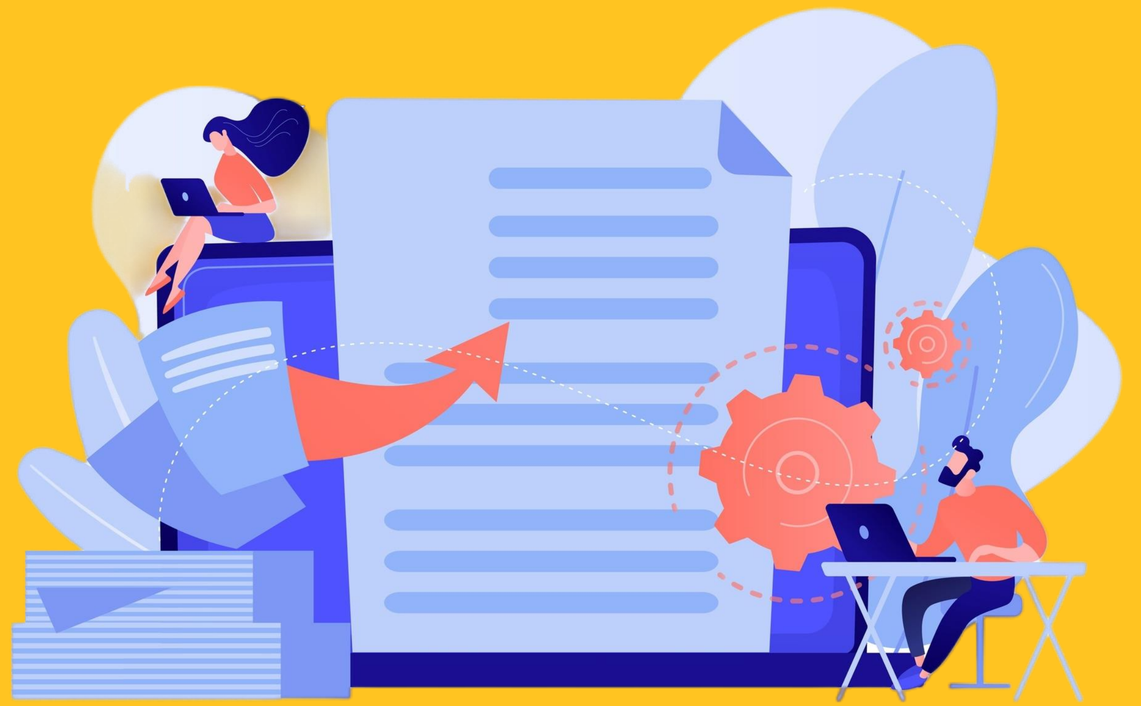




What does a report look like

Available pages

- Front page
- Table of contents
- Host inventory
- (Active) alerts
- Graphs
- SLA



Report – Front page

- **Company logo**
- **Title / subtitle**
- **Reporting period**
- **Timestamp of generation**

Report – Front page

Old solution

12/6/2021

BUSINESS BUSINESS BUSINESS BUSINESS BUSINESS BUSINESS BUSINESS BUSI

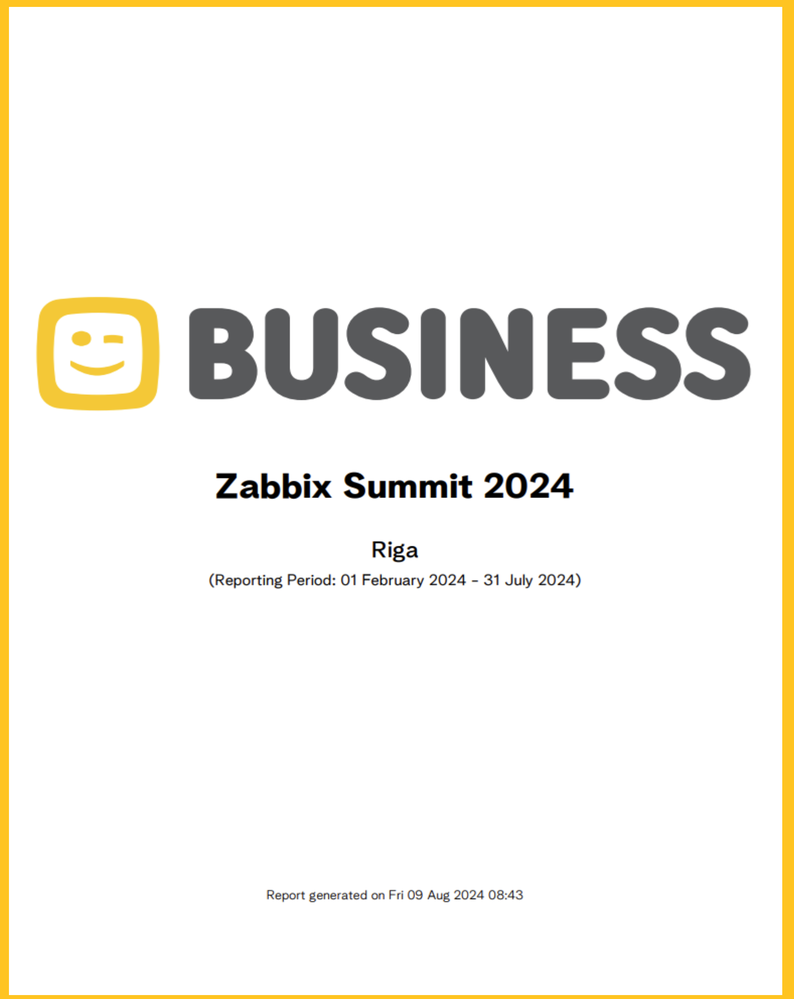
Weekly report

Report generated on Mon 06 Dec 2021 00:15

https://avenue.nxnoc.be/reports/source/1269 1/13

VS

New solution


BUSINESS

Zabbix Summit 2024

Riga

(Reporting Period: 01 February 2024 - 31 July 2024)

Report generated on Fri 09 Aug 2024 08:43

Report – Table of Contents

- **Company font**
- **Company color scheme**
- **Selected pages**
- **Graphs with paragraph and sub paragraph**
- **Uniform table of contents**

Table of contents

1. Inventory Hosts 3
2. Currently Active Problems 5
3. Alerts 6
4. Graphs 7
4.1 Availability 7
4.1.1 SIP connectifity 7
4.1.3 Call Handler functionality 8
4.2 Capacity 9
4.2.1 Licenses 9
4.2.2 Hardware/systems 9
5. SLA 11

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Report – Table of Contents

Old solution

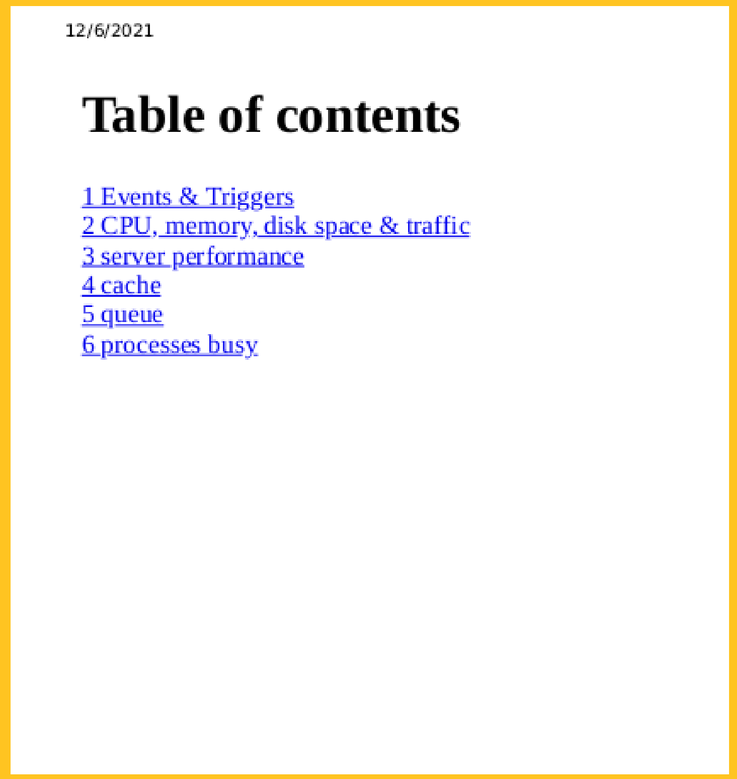
12/6/2021

Table of contents

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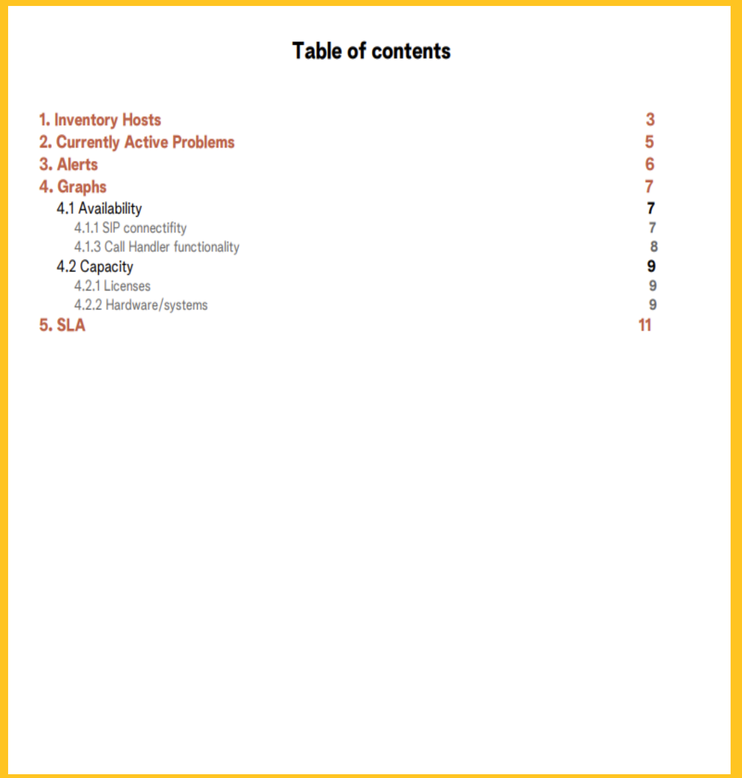
5 queue
6 processes busy

VS

New solution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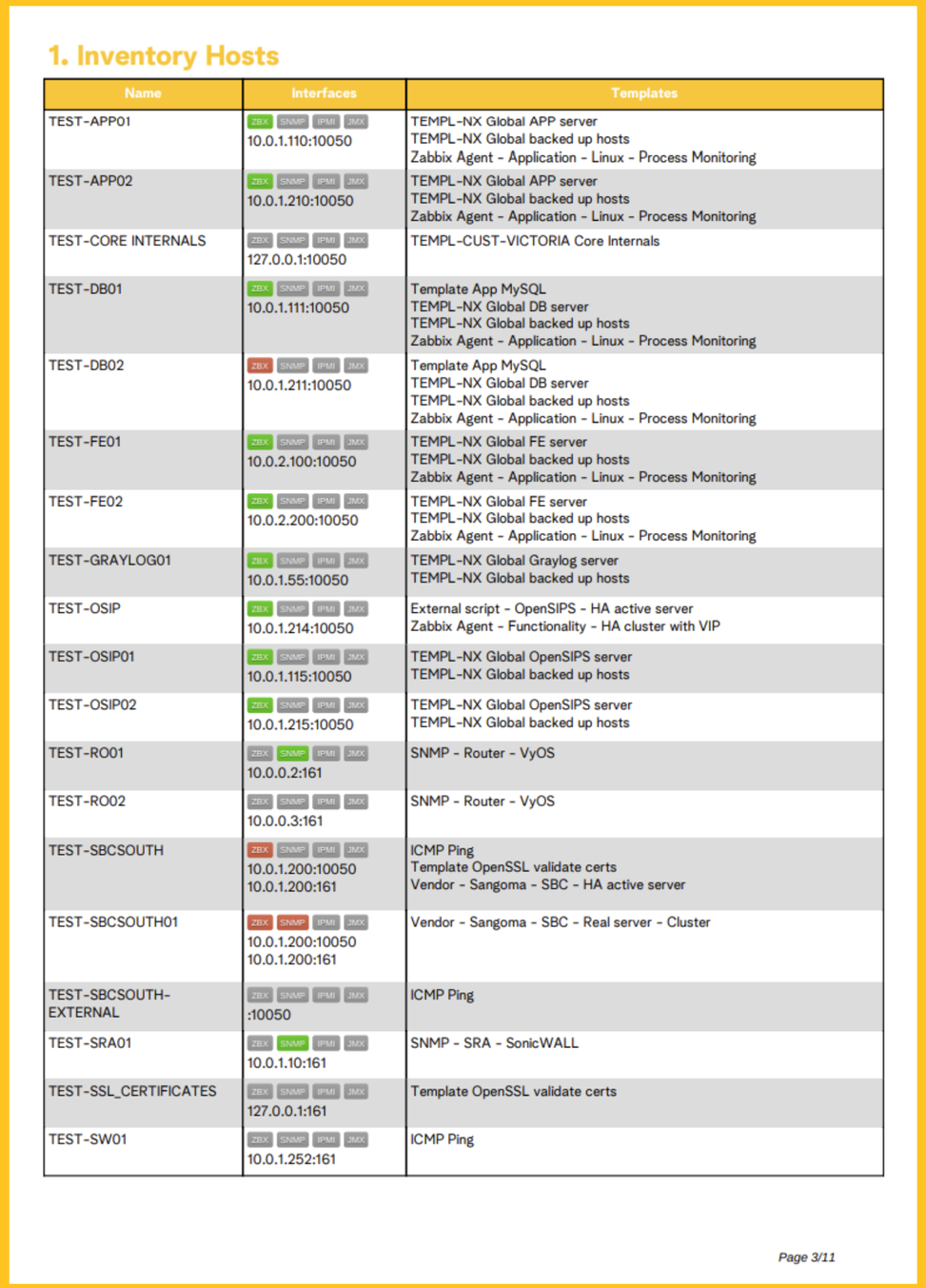
Report – Host Inventory

- **Host name**
- **Interface(s)**
- **Status of interface**
- **Template(s)**



1. Inventory Hosts

Name	Interfaces	Templates
TEST-APP01	ZBX SNMP IPMI JMX 10.0.1.110:10050	TEMPL-NX Global APP server TEMPL-NX Global backed up hosts Zabbix Agent - Application - Linux - Process Monitoring
TEST-APP02	ZBX SNMP IPMI JMX 10.0.1.210:10050	TEMPL-NX Global APP server TEMPL-NX Global backed up hosts Zabbix Agent - Application - Linux - Process Monitoring
TEST-CORE INTERNALS	ZBX SNMP IPMI JMX 127.0.0.1:10050	TEMPL-CUST-VICTORIA Core Internals
TEST-DB01	ZBX SNMP IPMI JMX 10.0.1.111:10050	Template App MySQL TEMPL-NX Global DB server TEMPL-NX Global backed up hosts Zabbix Agent - Application - Linux - Process Monitoring
TEST-DB02	ZBX SNMP IPMI JMX 10.0.1.211:10050	Template App MySQL TEMPL-NX Global DB server TEMPL-NX Global backed up hosts Zabbix Agent - Application - Linux - Process Monitoring
TEST-FE01	ZBX SNMP IPMI JMX 10.0.2.100:10050	TEMPL-NX Global FE server TEMPL-NX Global backed up hosts Zabbix Agent - Application - Linux - Process Monitoring
TEST-FE02	ZBX SNMP IPMI JMX 10.0.2.200:10050	TEMPL-NX Global FE server TEMPL-NX Global backed up hosts Zabbix Agent - Application - Linux - Process Monitoring
TEST-GRAYLOG01	ZBX SNMP IPMI JMX 10.0.1.55:10050	TEMPL-NX Global Graylog server TEMPL-NX Global backed up hosts
TEST-OSIP	ZBX SNMP IPMI JMX 10.0.1.214:10050	External script - OpenSIPS - HA active server Zabbix Agent - Functionality - HA cluster with VIP
TEST-OSIP01	ZBX SNMP IPMI JMX 10.0.1.115:10050	TEMPL-NX Global OpenSIPS server TEMPL-NX Global backed up hosts
TEST-OSIP02	ZBX SNMP IPMI JMX 10.0.1.215:10050	TEMPL-NX Global OpenSIPS server TEMPL-NX Global backed up hosts
TEST-RO01	ZBX SNMP IPMI JMX 10.0.0.2:161	SNMP - Router - VyOS
TEST-RO02	ZBX SNMP IPMI JMX 10.0.0.3:161	SNMP - Router - VyOS
TEST-SBCSOUTH	ZBX SNMP IPMI JMX 10.0.1.200:10050 10.0.1.200:161	ICMP Ping Template OpenSSL validate certs Vendor - Sangoma - SBC - HA active server
TEST-SBCSOUTH01	ZBX SNMP IPMI JMX 10.0.1.200:10050 10.0.1.200:161	Vendor - Sangoma - SBC - Real server - Cluster
TEST-SBCSOUTH-EXTERNAL	ZBX SNMP IPMI JMX :10050	ICMP Ping
TEST-SRA01	ZBX SNMP IPMI JMX 10.0.1.10:161	SNMP - SRA - SonicWALL
TEST-SSL_CERTIFICATES	ZBX SNMP IPMI JMX 127.0.0.1:161	Template OpenSSL validate certs
TEST-SW01	ZBX SNMP IPMI JMX 10.0.1.252:161	ICMP Ping

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Report – Active problems

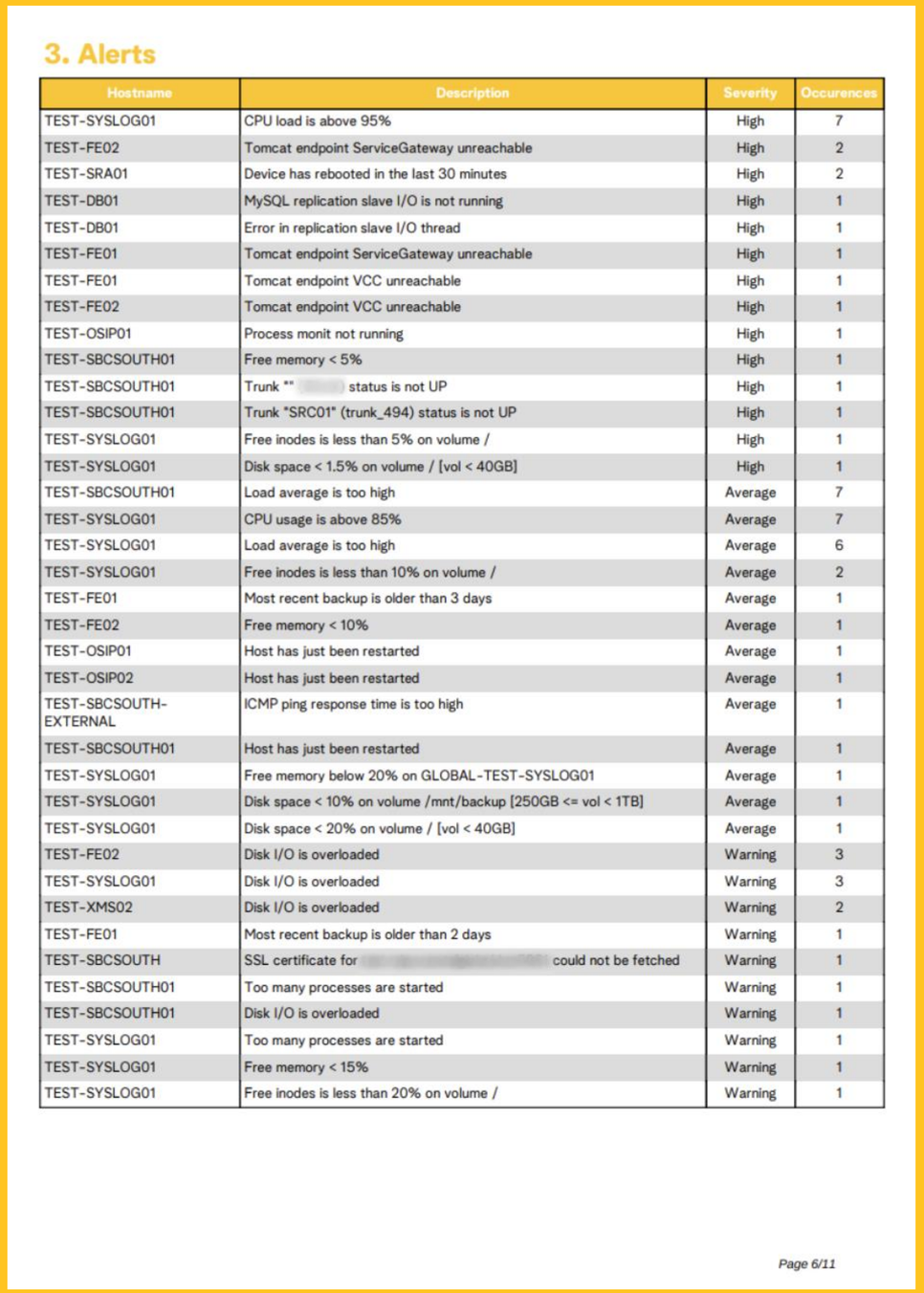
- **Host name**
- **Problem**
- **Severity**
- **Duration**
- **Acknowledged**

2. Currently Active Problems

Host	Problem	Severity	Duration	Acknowledged
TEST-SBCSOUTH01	Zabbix agent is unreachable for 10 minutes	Average	1yr 6mos	No
TEST-SBCSOUTH	SSL certificate for [redacted] expires in less than 30 days	Warning	1yr 2mos	No
TEST-SBCSOUTH	SSL certificate for [redacted] expires in less than 14 days	Average	1yr 2mos	No
TEST-SBCSOUTH	SSL certificate for [redacted] expires in less than 7 days	High	1yr 1mo	No
TEST-SBCSOUTH	SSL certificate for [redacted] is expired	High	1yr 1mo	No
TEST-DB01	Wrongly formatted mobile numbers have been provisioned	Average	5mos 3w	No
TEST-DB02	Wrongly formatted mobile numbers have been provisioned	Average	5mos 3w	No
TEST-XMS02	Disk space < 20% on volume / [vol < 40GB]	Average	3mos 2w	No
TEST-XMS02	CDR Service is not running	High	2mos 1w	No
TEST-FE01	Tomcat endpoint VCC unreachable	High	3w 3d	No
TEST-FE01	Tomcat endpoint ServiceGateway unreachable	High	3w 3d	No
TEST-DB01	MySQL replication slave I/O is not running	High	3w 3d	No
TEST-DB01	Error in replication slave I/O thread	High	3w 3d	No
TEST-OSIP01	Process monit not running	High	3w 3d	No
TEST-DB02	Zabbix agent is unreachable for 10 minutes	High	3w 3d	No
TEST-SBCSOUTH01	Trunk "SRC01" (trunk_494) status is not UP	High	3w 3d	Yes
TEST-SBCSOUTH01	Trunk "" status is not UP	High	3w 3d	No
TEST-FE01	Most recent backup is older than 3 days	Average	2w 1d	No

Report – Alerts

- **Host name**
- **Description**
- **Severity**
- **Occurences**



3. Alerts

Hostname	Description	Severity	Occurences
TEST-SYSLOG01	CPU load is above 95%	High	7
TEST-FE02	Tomcat endpoint ServiceGateway unreachable	High	2
TEST-SRA01	Device has rebooted in the last 30 minutes	High	2
TEST-DB01	MySQL replication slave I/O is not running	High	1
TEST-DB01	Error in replication slave I/O thread	High	1
TEST-FE01	Tomcat endpoint ServiceGateway unreachable	High	1
TEST-FE01	Tomcat endpoint VCC unreachable	High	1
TEST-FE02	Tomcat endpoint VCC unreachable	High	1
TEST-OSIP01	Process monit not running	High	1
TEST-SBCSOUTH01	Free memory < 5%	High	1
TEST-SBCSOUTH01	Trunk "" status is not UP	High	1
TEST-SBCSOUTH01	Trunk "SRC01" (trunk_494) status is not UP	High	1
TEST-SYSLOG01	Free inodes is less than 5% on volume /	High	1
TEST-SYSLOG01	Disk space < 1.5% on volume / [vol < 40GB]	High	1
TEST-SBCSOUTH01	Load average is too high	Average	7
TEST-SYSLOG01	CPU usage is above 85%	Average	7
TEST-SYSLOG01	Load average is too high	Average	6
TEST-SYSLOG01	Free inodes is less than 10% on volume /	Average	2
TEST-FE01	Most recent backup is older than 3 days	Average	1
TEST-FE02	Free memory < 10%	Average	1
TEST-OSIP01	Host has just been restarted	Average	1
TEST-OSIP02	Host has just been restarted	Average	1
TEST-SBCSOUTH-EXTERNAL	ICMP ping response time is too high	Average	1
TEST-SBCSOUTH01	Host has just been restarted	Average	1
TEST-SYSLOG01	Free memory below 20% on GLOBAL-TEST-SYSLOG01	Average	1
TEST-SYSLOG01	Disk space < 10% on volume /mnt/backup [250GB <= vol < 1TB]	Average	1
TEST-SYSLOG01	Disk space < 20% on volume / [vol < 40GB]	Average	1
TEST-FE02	Disk I/O is overloaded	Warning	3
TEST-SYSLOG01	Disk I/O is overloaded	Warning	3
TEST-XMS02	Disk I/O is overloaded	Warning	2
TEST-FE01	Most recent backup is older than 2 days	Warning	1
TEST-SBCSOUTH	SSL certificate for could not be fetched	Warning	1
TEST-SBCSOUTH01	Too many processes are started	Warning	1
TEST-SBCSOUTH01	Disk I/O is overloaded	Warning	1
TEST-SYSLOG01	Too many processes are started	Warning	1
TEST-SYSLOG01	Free memory < 15%	Warning	1
TEST-SYSLOG01	Free inodes is less than 20% on volume /	Warning	1

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Report – Alerts

Old solution

2 Alerts

Hostname	Description	Severity	Occurences
RSNEXCH	Tracing Service for Search in Exchange Service is not running	High	0
RSNEXCH	Microsoft Exchange Unified Messaging Call Router Service is not running	High	0
RSNEXCH	World Wide Web Publishing Service Service is not running	High	0
RSNSBS01	DHCP Server Service is not running	High	0
RSNSBS01	Group Policy Client Service is not running	High	0
RSNEXCH	Microsoft Exchange Unified Messaging Service is not running	High	0
RSNEXCH	Microsoft Exchange Transport Log Search Service is not running	High	0
RSNEXCH	Microsoft Exchange Service Host Service is not running	High	0
RSNEXCH	Microsoft Exchange Mailbox Transport Submission Service is not running	High	0
RSNEXCH	Microsoft Exchange Throttling Service is not running	High	0
RSNEXCH	Microsoft Exchange Transport Service is not running	High	0
RSNVC	Disk space < 1% on volume F: [2TB <= vol]	High	0
RSNEXCH	Microsoft Exchange IMAP4 Service is not running	High	0
ESXIserver67	Host is unreachable by SNMP for 10m	High	0
RSNEXCH	Microsoft Exchange IMAP4 Backend Service is not running	High	0

VS

New solution

3. Alerts

Hostname	Description	Severity	Occurences
TEST-SYSLOG01	CPU load is above 95%	High	7
TEST-FE02	Tomcat endpoint ServiceGateway unreachable	High	2
TEST-SRA01	Device has rebooted in the last 30 minutes	High	2
TEST-DB01	MySQL replication slave I/O is not running	High	1
TEST-DB01	Error in replication slave I/O thread	High	1
TEST-FE01	Tomcat endpoint ServiceGateway unreachable	High	1
TEST-FE01	Tomcat endpoint VCC unreachable	High	1
TEST-FE02	Tomcat endpoint VCC unreachable	High	1
TEST-OSIP01	Process monit not running	High	1
TEST-SBCSOUTH01	Free memory < 5%	High	1
TEST-SBCSOUTH01	Trunk "" status is not UP	High	1
TEST-SBCSOUTH01	Trunk "SRC01" (trunk_494) status is not UP	High	1
TEST-SYSLOG01	Free inodes is less than 5% on volume /	High	1
TEST-SYSLOG01	Disk space < 1.5% on volume / [vol < 40GB]	High	1
TEST-SBCSOUTH01	Load average is too high	Average	7
TEST-SYSLOG01	CPU usage is above 85%	Average	7
TEST-SYSLOG01	Load average is too high	Average	6
TEST-SYSLOG01	Free inodes is less than 10% on volume /	Average	2

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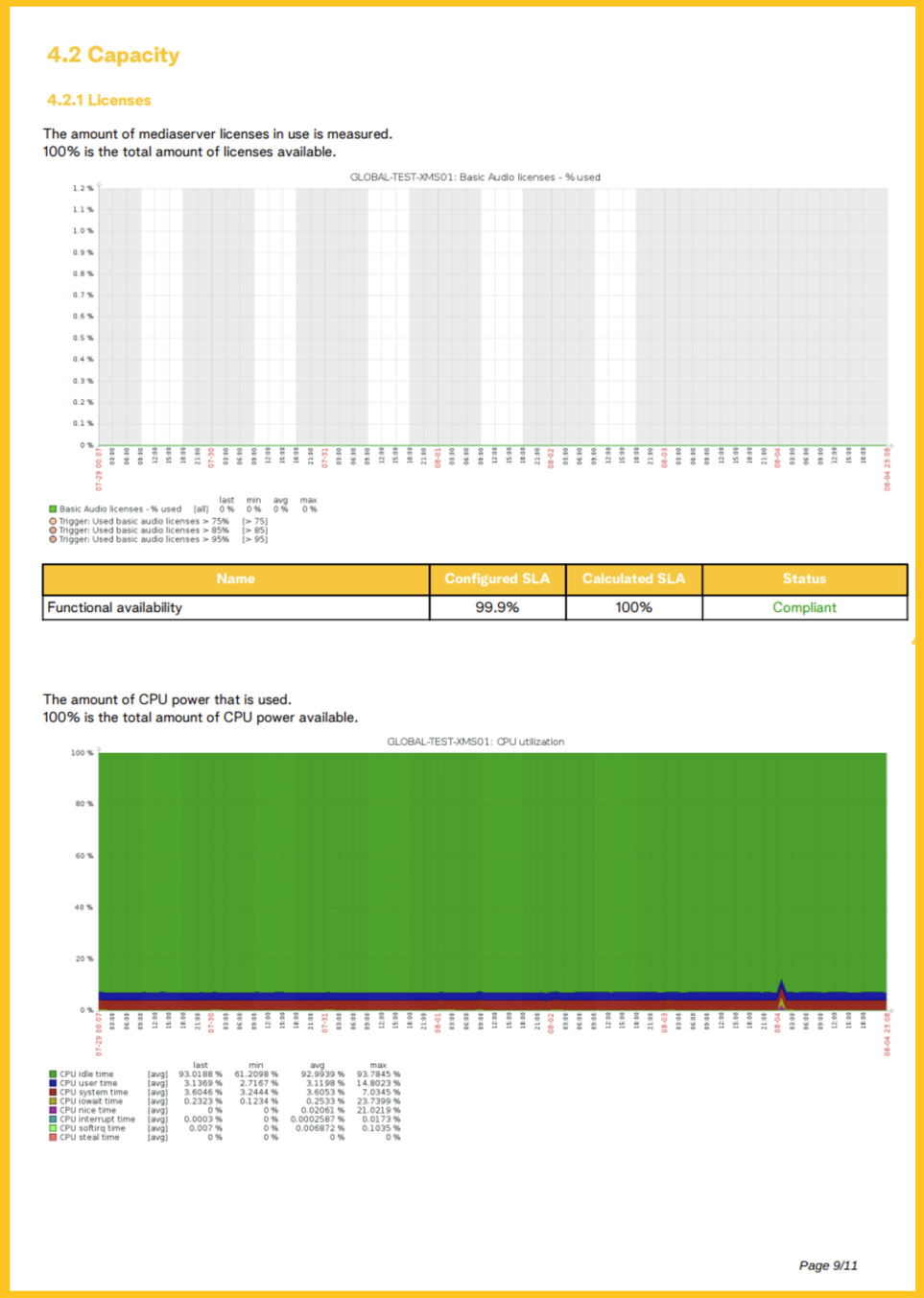
Report – Graphs

- **Paragraph + sub paragraph**
- **Description**
- **Graph**
- **SLA**



4.2 Capacity

4.2.1 Licenses

The amount of mediaserver licenses in use is measured.
100% is the total amount of licenses available.

Name	Configured SLA	Calculated SLA	Status
Functional availability	99.9%	100%	Compliant

The amount of CPU power that is used.
100% is the total amount of CPU power available.

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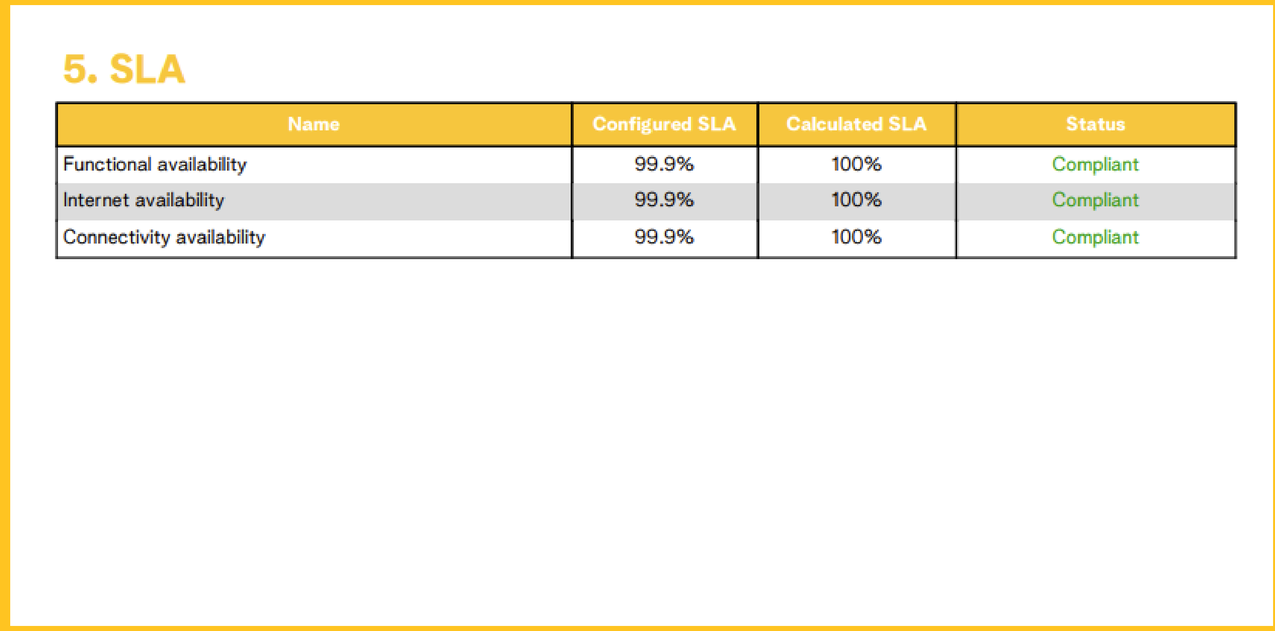
Report – SLA

- SLA name
- Configured SLA
- Calculated SLA
- Status



5. SLA

Name	Configured SLA	Calculated SLA	Status
Functional availability	99.9%	100%	Compliant
Internet availability	99.9%	100%	Compliant
Connectivity availability	99.9%	100%	Compliant

Questions?

Thank you for your time!

CONTACT ME

telenet.be/business

company/telenet/

Nick Corné

TRIPLE-C

triple-c.be/zabbix-summit

company/triple-c-be/

zabbix-summit@triple-c.be

github.com/triple-c-be