

IT Automation With Netbox

SLAC ²⁰/₂₆ Edition

Building a lightweight private cloud platform

The HAHN Automation Group – present in all important Regions



North America

5 Plants

> 300 Work Forces



>1,600

Employees



~20

Locations



Europe

7 Plants

> 1,000 Work Forces



>3,600

Active Lines



>120

Service Staff



Asia

2 Plants

> 200 Work Forces



24/7

Customer Service



>900

Customers

Frank Benke Head of IT

Computer Science
University Tübingen

Entire Supply Chain

- Hewlett-Packard - HPe (1994)
- Certification & Training
- Supplier & System Integrator
- Magenta Service Provider
- Finally End Customer (2014)

Published Author

Open Source Enthusiast



SLAC 2016

A Brief History of Automation

Technologies (touched)

- IGNITE UX
- Altiris Control Tower
- unattended.txt
- Stateless Computing Solutions
 - Hpe Virtual Connect
 - CISCO UCS
- EVA OnCommand CLI Framework
- VMWare methodologies
- then came the cloud

Scopes

- Operating Systems
- Baremetal Infrastructure
- Proprietary Infrastructure Application
- Networking
- Storage
- Virtualization
- Plattform (HCI, Component Xover)
- Cloud (modern solutions)

On The Bridge



Goals And Requirements

Organizational

- Maximize utilization
- Reduce staff hours
- Eliminate repetitive tasks
- Free resources
- Reduce cost

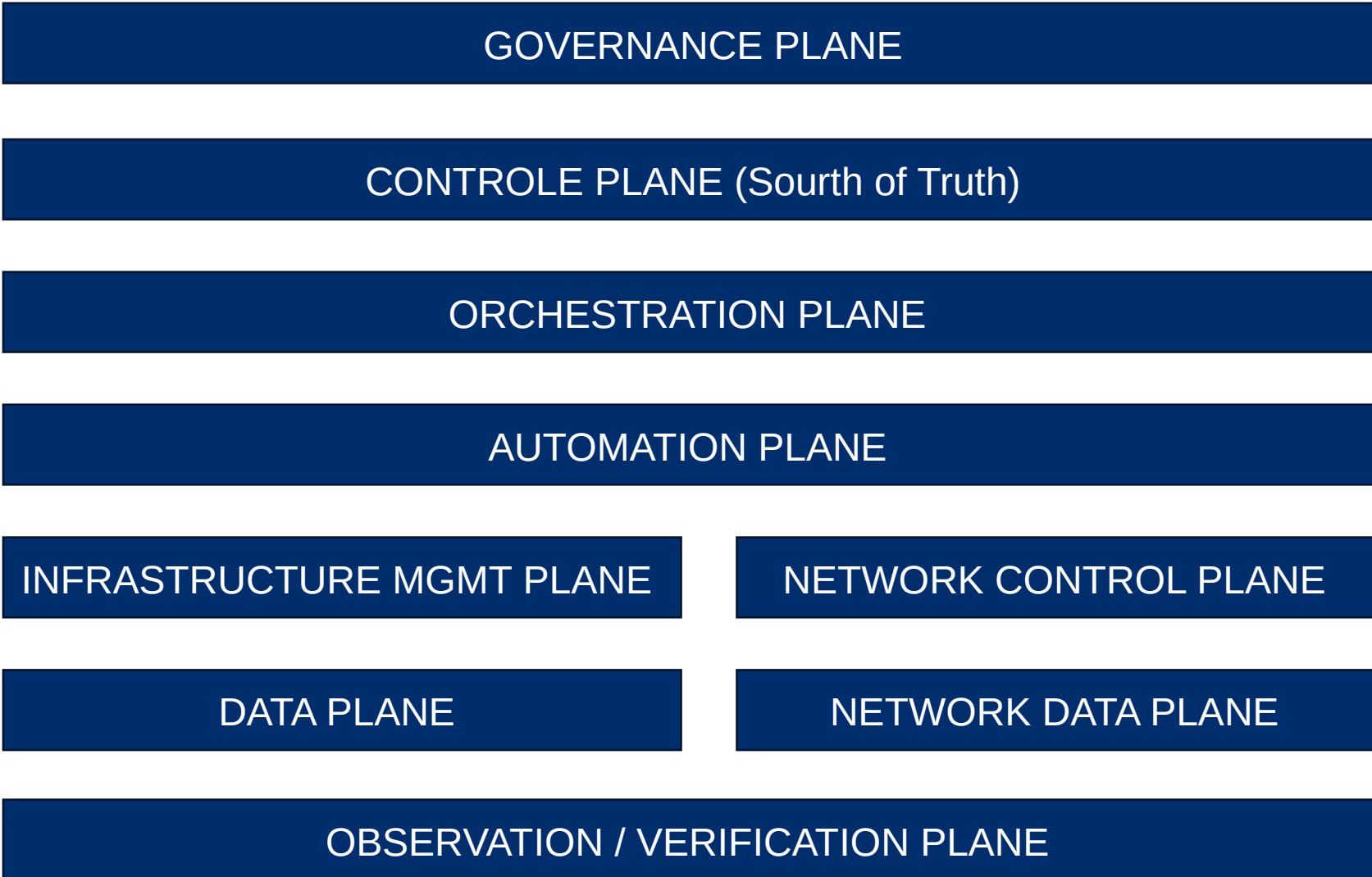
Operational

- Persist quality
- Contiguous improvement
- Improve time to deliver
- Clone and migrate
- Enable agile test & dev
- Ensure rapid provisioning
- Allow relocation

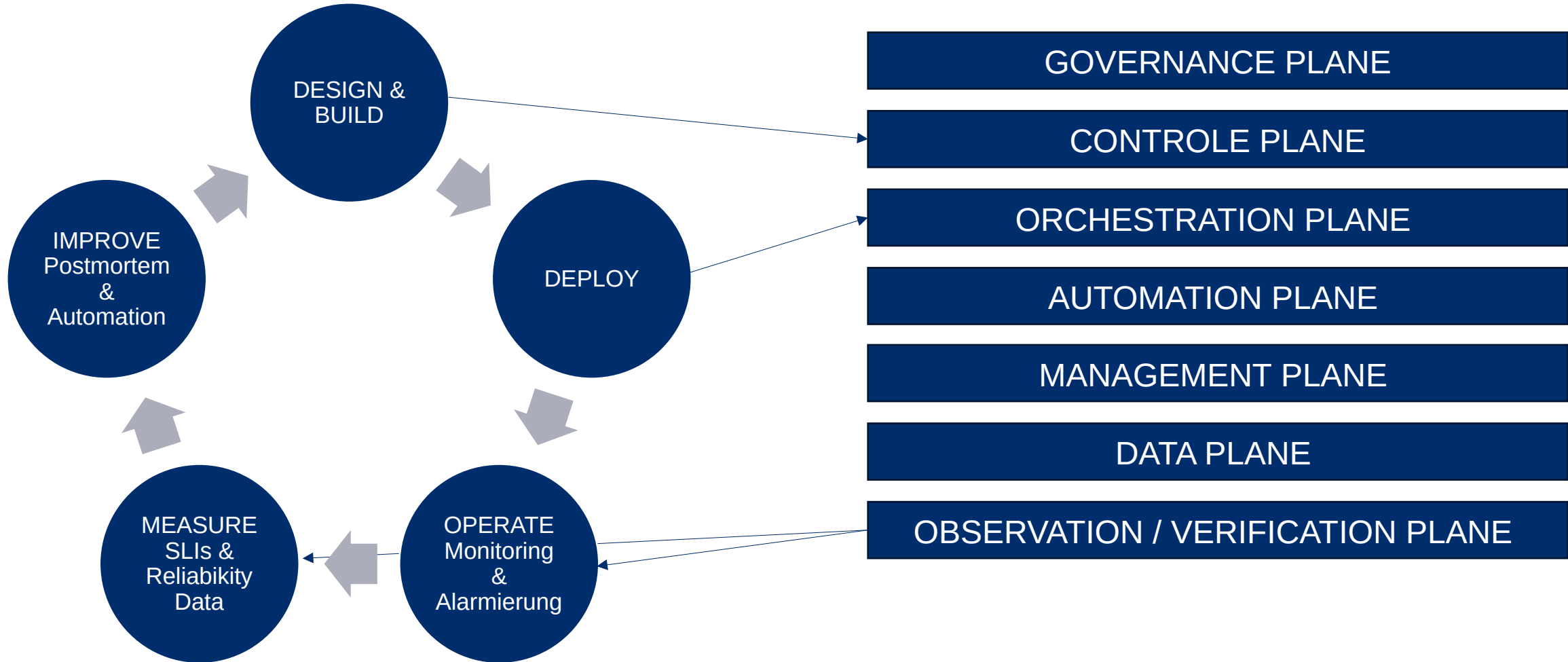
Strategical

- Reduce lock ins
- Allow dry roll outs
- Elevate migrations
- Improve resiliency
- Empower staff

Generalized Architecture



Site Reliability Engineering Operations & Architecture



Just Before Start

SLAC 2020



22.18

00.48

07.21

04.97

General Considerations to Open Source

Software Choices

Code / project maturity
Feature assessment
Project stability & context
Market acceptance
User acceptance
Partnerships & backing

Suitable areas of interest

Operational Aspects

Team knowledge
Reliability & support
Island strategy
User introduction strategy
Software defined strategy

Commercial Perspective

Commercial backing
Support models
Cost transparency
Independent support
Alternate business models
License strategy

Projects & Products The Status Quo

Core Infrastructure

Operations & Support

User Related Systems



Plattform



General Platform Overview

Platform
Manager

Inventory
CMDB

Job-Control

Revision Control

Credential
Manager

Perl

Ansible

Shell

Application &
Monitoring

Hypervisor

Operating System

Network
Components

Primarily Utilized Components

PaloAlto
Panorama

Netbox

Linux
Cronjob

Gitlab / Git

vCenter

Conductor

Ansible

KeyCloak

Icinga Web 2

Grafana
Influxdb

Nextcloud

Free Radius

The Core: Single Source of Truth



Single Source of Truth



- Organization
- Racks
- Devices
- Connections
- Wireless
- IPAM
- VPN
- Virtualization
- Circuits
- Power
- Provisioning
- Customization
- Operations
- Topology Views
- Hardware Lifecycle
- Plugins
- Admin

NetBox Community v4.3.4
Get Cloud | Get Enterprise

Search...

f.benke Admin

Organization

Sites	26
Tenants	23
Contacts	72

DCIM

Sites	26
Racks	81
Device Types	303
Devices	1224
Cables	1433

IPAM

VRFs	24
Aggregates	0
Prefixes	490
IP Ranges	147
IP Addresses	14834
VLANs	388

Circuits

Providers	18
Circuits	22
Provider Networks	0

Virtualization

Clusters	35
Virtual Machines	715

Change Log

TIME	USERNAME	FULL NAME	ACTION	TYPE	OBJECT	REQUEST ID
2025-09-24 09:18	s.zimmermann	Sascha Zimmermann	Updated	Device	DERHAssemblyHall05-01 (13518)	6ed34e65-b719-4a2e-9bff-f27cc93a3b48
2025-09-24 09:18	s.zimmermann	Sascha Zimmermann	Updated	Device	DERHStock02 (16368)	58f0c3c2-a0bd-4292-8cdf-1ec90dd1e6a3
2025-09-24 08:58	b.heitmann	Bastian Heitmann	Updated	Virtual Machine	svrh1gwcon03p	1030cb12-8978-438d-97b5-6f1e148c8a20
2025-09-24 08:57	b.heitmann	Bastian Heitmann	Updated	Virtual Machine	svrh1gwcon02p	e32e72f9-fed9-4994-9689-0658a6a6fd2e
2025-09-24 08:46	t.wuellenweber	Timo Wuellenweber	Updated	IP Address	45.146.84.28/24	8ddf9f10-ab1d-46b5-8a2e-f7d876fd7d8b
2025-09-24 08:45	t.wuellenweber	Timo Wuellenweber	Updated	IP Address	45.146.84.13/24	45981813-04a4-47d9-b1fb-75b8ca034c20
2025-09-24 08:45	t.wuellenweber	Timo Wuellenweber	Updated	Virtual Machine	svrh1gwcon01p	0932a2f4-411a-4c99-85cf-7b2eb86d8ee3
2025-09-24 08:43	t.wuellenweber	Timo Wuellenweber	Created	Tag	firewallobjecttag-gwcon	193dbb7a-56e0-49d6-9a1f-9b4b342112cb



Core Information Assets

Netbox Objects - Customization - Intermediate Data

Devices

Device Types

Platforms

Virtual Machines

Config Context

Tags

SNMP Community

SSH Host Keys

JSON

Interface Configuration

YAML

Offline Inventory

Device

Devices / RH1 - Rheinboellen, Liebshausener Strasse 3

dcim.device:1475

rh1-r8-sw6

Created 2024-07-01 09:40 · Updated 2024-10-28 08:35

- + Add Components
- Bookmark
- Subscribe
- Clone
- Edit
- Delete

- Device
- Interfaces 64
- Console Ports 1
- Power Ports 1
- Config Context
- Render Config
- Status
- LLDP Neighbors
- Config
- Contacts 1
- Journal
- Changelog

Device	
Region	EMEA / Germany
Site	RH1 - Rheinboellen, Liebshausener Strasse 3
Location	Hall-4-Assembly-Mgmt
Rack	8
Position	U27 / Front
GPS Coordinates	—
Tenant	HAHN Automation Group Holding GmbH / HAHN Automation Group GmbH
Device Type	Hewlett-Packard Enterprise GmbH Aruba 2930F 48G PoE+ 4SFP Switch (1U)
Description	Replacement Switch
Airflow	—
Serial Number	CN19HKX294
Asset Tag	—
Config Template	—

Custom Fields	
Shortname ⓘ	—
Ticket no. ⓘ	—
Bmc firmware revision	—

Management	
Status	Active
Role	Access Switch
Platform	ArubaOS
Primary IPv4	172.31.2.198
Primary IPv6	—
Out-of-band IP	—

Services	+ Add a service			
NAME	PARENT	PROTOCOL	PORTS	DESCRIPTION
— No services found —				

Images	+ Attach an image				
OBJECT TYPE	PARENT	IMAGE	NAME	SIZE (BYTES)	CREATED
— No image attachments found —					

Dimensions	
Height	1.0U
Weight	—

8



Platforms

- Decision foundation
- Operating systems
- Versions
- Validation
- Planning

Platforms


Results **36** Filters

Quick search

<input type="checkbox"/>	NAME -	MANUFACTURER	DEVICES	VM	
<input type="checkbox"/>	ArubaOS	Hewlett-Packard Enterprise GmbH	198	0	
<input type="checkbox"/>	ArubaOS AP	Hewlett-Packard Enterprise GmbH	231	0	
<input type="checkbox"/>	ArubaOS CO	Hewlett-Packard Enterprise GmbH	23	0	
<input type="checkbox"/>	ArubaOS CX	Hewlett-Packard Enterprise GmbH	30	0	
<input type="checkbox"/>	ArubaOS VM	—	0	1	
<input type="checkbox"/>	vSphere ESXi 7.0	—	0	0	—
<input type="checkbox"/>	vSphere ESXi 8.0	—	53	0	—
<input type="checkbox"/>	Windows 10	—	2	7	—
<input type="checkbox"/>	Windows 11	—	5	5	—
<input type="checkbox"/>	Windows Server 2003	—	0	0	—
<input type="checkbox"/>	Windows Server 2012 R2	—	0	0	—
<input type="checkbox"/>	Windows Server 2016	—	0	0	—
<input type="checkbox"/>	Windows Server 2019	—	0	25	—
<input type="checkbox"/>	Windows Server 2022	—	0	363	—

Custom Fields

- Missing Features
- Additional Configurations
- Structural Information
- Key Values

Custom Fields	
Shortname 	rh1
dhcpconfig	<pre>{ "option-data": [{ "data": "172.31.100.15, 172.31.100.23", "name": "domain-name-servers" }, { "data": "haehn-automation.de", "name": "domain-search" }] }</pre>
Location - Size	Core-Locations

Configuration Rendering

Devices / RH1 - Rheinboellen, Liebshausener Strasse 3

dcim.device:61

sprh1esx11p

Created 2022-05-31 00:00 - Updated 2025-05-21 15:58

- + Add Components
- Bookmark
- Subscribe
- Clone
- Edit
- Delete

- Device
- Module Bays 13
- Interfaces 19
- Console Ports 6
- Power Ports 2
- Config Context
- Render Config
- Contacts 1
- Journal
- Changelog

Rendered Context

- JSON
- YAML

```
{
  "domain": "haehn-automation.de",
  "domain_controllers": [
    "172.31.100.15",
    "172.31.100.23",
    "172.31.100.249",
    "172.31.100.12"
  ],
  "nameservers": [
    "172.30.130.143",
    "172.31.100.15"
  ],
  "ntp_pools": [
    "0.europe.pool.ntp.org",
    "1.europe.pool.ntp.org",
    "2.europe.pool.ntp.org",
    "3.europe.pool.ntp.org"
  ],
  "ovadeploy__cluster": "CL_RH1_Production",
  "ovadeploy__datacenter": "RH1 - Rheinboellen",
  "ovadeploy__datastore": "nexenta_vm3",
  "ovadeploy__folder": "/RH1 - Rheinboellen/vm/GREEN_LINUX_NEW/Linux_Default",
  "portsecurity_radius": [
    {
      "address": "172.30.130.143",
      "key": "XXXXXXXXXXXXXXXX"
    }
  ],
  "sccm": {
    "bootfile_uefi": "smsboot\\x64\\wdsmgfw.efi",
    "server": "172.31.100.61"
  },
  "wireless_controller": "172.31.3.21"
}
```

Local Context

- JSON
- YAML

null

The local config context overwrites all source contexts.

Source Contexts

- JSON
- YAML

cluster-rh1-CL_RH1_Production 1000

```
{
  "ovadeploy__cluster": "CL_RH1_Production",
  "ovadeploy__datacenter": "RH1 - Rheinboellen",
  "ovadeploy__datastore": "nexenta_vm3",
  "ovadeploy__folder": "/RH1 - Rheinboellen/vm/GREEN_LINUX_NEW/Linux_Default"
}
```

default-portsecurity-radius 1000

```
{
  "portsecurity_radius": [
    {
      "address": "172.30.130.143",
      "key": "XXXXXXXXXXXXXXXX"
    }
  ]
}
```

Interface Configuration

Inherited physical interfaces

Network centric “meta interfaces”

VLAN

Link aggregation group

Server based interpretations

VM port groups

VM kernel ports

Board management controller (BMC)

VLAN assignments

Tagging e.g.

autoconf, port security EAP, infrastructure-link

NAME	LABEL	TAGS	ENABLED	TYPE	PARENT	LAG	DESCRIPTION	IP ADDRESS	UNTAGGED VLAN
1/1			✓	1000BASE-T (1GE)		Trk1			
1/2			✓	1000BASE-T (1GE)				#1417 da2-r101-fw1-oid management	
1/3			✓	1000BASE-T (1GE)		Trk2		#1306 da2-r101-wc1 > ge/0/0/0	
1/4		autoconf	✓	1000BASE-T (1GE)				#1418 SPDA2PM01P > ilo	adminlan (2)
1/5			✓	1000BASE-T (1GE)		Trk7		#1419 SPDA2PM01P > eth0 (eno1)	
1/6			✓	1000BASE-T (1GE)		Trk7		#1420 SPDA2PM01P > eth4 (ens3f0)	
1/7		autoconf	✓	1000BASE-T (1GE)			HAHN Plastics, production server (ILO)		adminlan (2)
1/8		autoconf	✓	1000BASE-T (1GE)			HAHN Plastics Production Server (ESXI Management)		
1/9		autoconf	✓	1000BASE-T (1GE)			HAHN Plastics Prod (vlan8)		
1/10		autoconf Port security EAP	✗	1000BASE-T (1GE)					office (3)
1/11		autoconf Port security EAP	✗	1000BASE-T (1GE)					office (3)
1/12		autoconf Port security EAP	✗	1000BASE-T (1GE)					office (3)

NAME	LABEL	TAGS	ENABLED	TYPE	PARENT	LAG	DESCRIPTION	IP ADDRESS	UNTAGGED VLAN
Trk5			✓	Link Aggregation Group (LAG)			Link Aggregation Group (LAG)		
Trk6			✓	Link Aggregation Group (LAG)			Link Aggregation Group (LAG)		
Trk7			✓	Link Aggregation Group (LAG)			Link Aggregation Group (LAG)		
Trk9		infrastructure-link	✓	Link Aggregation Group (LAG)			Link Aggregation Group (LAG)		
vlan1			✓	Virtual			Virtual		
vlan2			✓	Virtual			Virtual		172.29.56.1/24
vlan3			✓	Virtual			Virtual		172.29.57.1/24
vlan4			✓	Virtual			Virtual		172.29.58.1/24
vlan5			✓	Virtual			Virtual		172.29.59.1/24
vlan6			✓	Virtual			Virtual		172.29.60.1/24
vlan7			✓	Virtual			Virtual		172.29.61.1/24

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Device Customization

Module bays (from device)

Module types

Module entities

Interface bindings to modules

Interface inheritance

Interface naming clashes

Proxy module bays and types

Proxy module entities

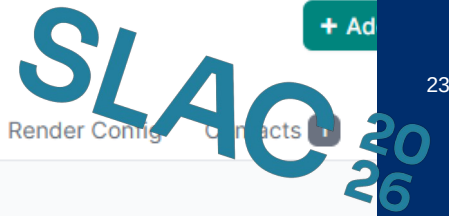
e.g. memory

sprh1esx11p
Created 2022-05-31 00:00 · Updated 2025-05-21 15:58

Device | Module Bays 13 | Interfaces 19 | Console Ports 6 | Power Ports 2 | Config Context | Render Config | Contacts

Quick search

<input type="checkbox"/>	NAME	LABEL	POSITION	INSTALLED MODULE
<input type="checkbox"/>	boss	—	internal	—
<input type="checkbox"/>	cpu-1	—	cpu-1	EPYC 7542 32-Core
<input type="checkbox"/>	cpu-2	—	cpu-2	—
<input type="checkbox"/>	memory	—	internal center	Memory 1024 GB Config
<input type="checkbox"/>	mezzanine-2	—	internal-2	Ethernet BCM5720 - 4 port - mezzanine
<input type="checkbox"/>	pci-1	—	back-1	Ethernet X710 - 4 Port - SFP+ Ethernet Controller
<input type="checkbox"/>	pci-2	—	back-2	HBA355e SAS 12G
<input type="checkbox"/>	pci-3	—	back-3	—
<input type="checkbox"/>	drive-cage-1	—	front-1	—
<input type="checkbox"/>	drive-cage-2	—	front-2	—
<input type="checkbox"/>	drive-cage-3	—	front-3	—
<input type="checkbox"/>	mezzanine-1-net	—	internal-1	Ethernet BCM5720 - 2 port - embedded
<input type="checkbox"/>	mezzanine-3-raid	—	internal-3	PERC H745



Device Attributes

- Names
- Roles
- States
 - Offline
 - Active
 - Planned
 - Decommissioning

Devices

Results 177

Filters 1

× Role: Access Switch Save

Quick search

<input type="checkbox"/>	NAME	SHORTNAME	PLATFORM	RISK CATEGORY	CONTACTS	ROLE	TENANT	TYPE	IP ADDRESS	PARENT DEVICE	STATUS
<input type="checkbox"/>	CN60G9F041	—	ArubaOS	2	Timo Wüllenweber	Access Switch	HAHN Automation Group Holding GmbH	Aruba 2530 48G PoE+ 2SFP+ Switch	—	—	Offline
<input type="checkbox"/>	CN75G9C05J	—	ArubaOS	2	Timo Wüllenweber	Access Switch	HAHN Automation Group Holding GmbH	Aruba 2530 48G PoE+ 2SFP+ Switch	—	—	Offline
<input type="checkbox"/>	col-r101-sw1	—	ArubaOS	2	Timo Wüllenweber	Access Switch	REI Automation, Inc.	Aruba 2930F 48G PoE+ 4SFP+ Switch	172.29.16.3/24	col-r101-fw1 (124964)	Active
<input type="checkbox"/>	col-r101-sw2	sw4	ArubaOS	2	Timo Wüllenweber	Access Switch	REI Automation, Inc.	Aruba 2930F 48G PoE+ 4SFP+ Switch	172.29.16.4/24	col-r101-fw1 (124964)	Active
<input type="checkbox"/>	col-r101-sw3	sw2	ArubaOS	2	Timo Wüllenweber	Access Switch	REI Automation, Inc.	Aruba 2930F 48G PoE+ 4SFP+ Switch	172.29.16.2/24	col-r101-fw1 (124964)	Active
<input type="checkbox"/>	col-r101-sw4	—	ArubaOS	2	Timo Wüllenweber	Access Switch	REI Automation, Inc.	Aruba 2930F 48G PoE+ 4SFP+ Switch	—	col-r101-fw1 (124964)	Active

Tags


- Functional assignment
- Abstraction
- Device vs. function
- Certificate management

Tags

autoconf

Created 2023-04-15 11:22 · Updated 2023-04-27 11:16

Tag Changelog


Tag	
Name	autoconf
Description	Automatically configure this interface
Color	
Weight	1000
Tagged Items	6252

Tags

credential-network-1

Created 2023-04-18 19:38 · Updated 2023-04-18 19:38

Tag Changelog


Tag	
Name	credential-network-1
Description	—
Color	
Weight	1000
Tagged Items	166

Tags

bmc

Created 2022-08-11 00:00 · Updated 2025-02-11 11:17

Tag Changelog


Tag	
Name	bmc
Description	Board Management Controller
Color	
Weight	1000
Tagged Items	82

Tags

esxi-backup

Created 2024-03-26 09:39 · Updated 2024-03-26 09:39

Tag Changelog

Tag	
Name	esxi-backup
Description	Run the ESXI backup on this host
Color	
Weight	1000
Tagged Items	49

Action



Netbox 2 Config

- API Access
- JSON
- Analog structures
- Use rendered configs

- Cronjobs

netbox2keaconfig 7.31 KIB

```
1  #!/usr/bin/perl -w
2
3  package CMDB::Request::Paged;
4      use strict;
5      use LWP::UserAgent;
6      use JSON;
7      use feature 'signatures';
8      no warnings 'experimental::signatures';
9
10     sub new($class, $token, $baseuri) {
11
12         my $ua=LWP::UserAgent->new();
13         $ua->default_header("Authorization" => sprintf("Token %s", $token));
14
15         #$ua->add_handler("request_send", sub { shift->dump; return });
16         #$ua->add_handler("response_done", sub { shift->dump; return });
17
18         my $self = {
19             ua => $ua,
20             baseuri => $baseuri
21         };
22
23         bless $self, $class;
24         return $self;
25     }
26
27     sub _request_single($self, $uri) {
28         my $response=$self->{ua}->get($uri);
29
30         if (!$response->is_success()) {
31             printf("Failed to issue device get command: %s\n", $response->status_line);
32             exit(1);
33         }
34
35         my $data=from_json($response->decoded_content);
36
37         return $data;
38     }
39 }
```

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© HAHN Automation Group



Virtual Machines

- Status planned
- Assign Cluster
- Add memory & disk
- Set tags
- Cron job after status active

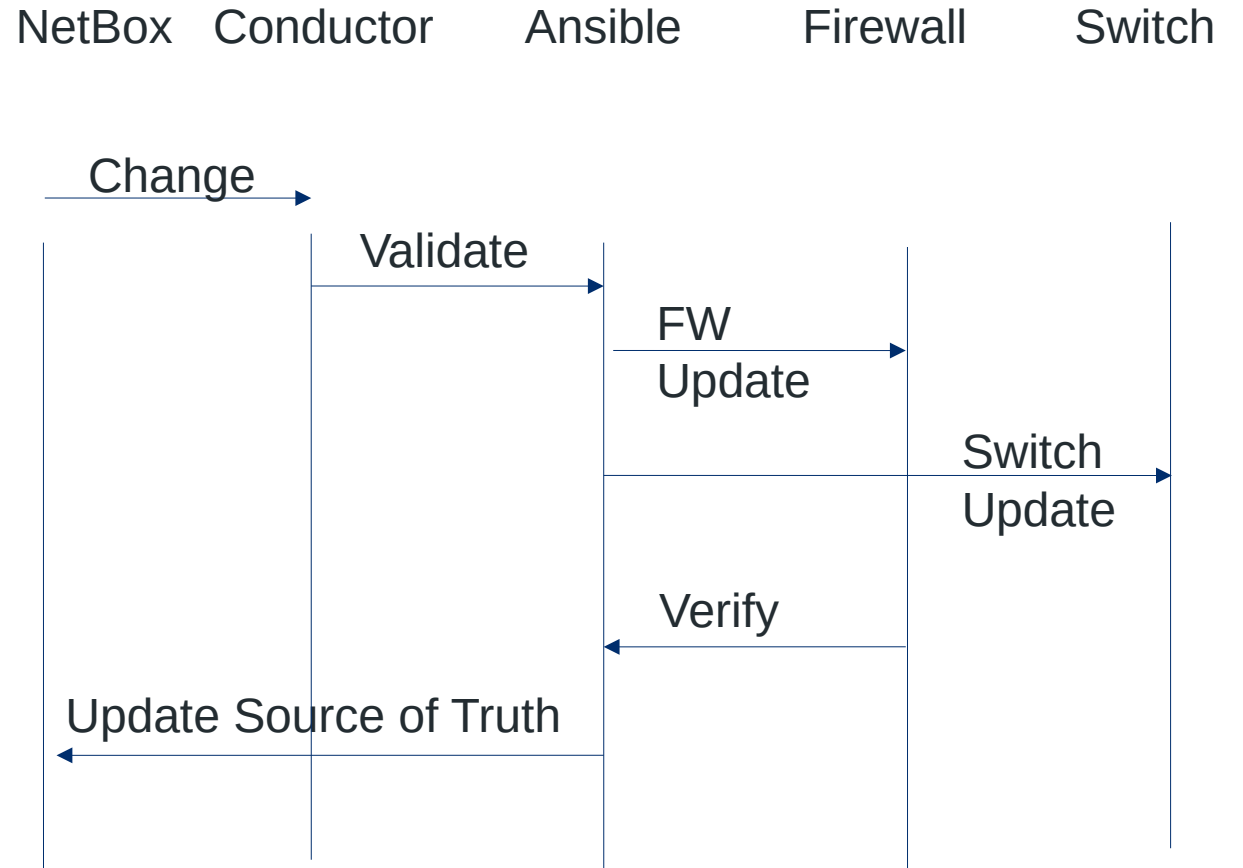
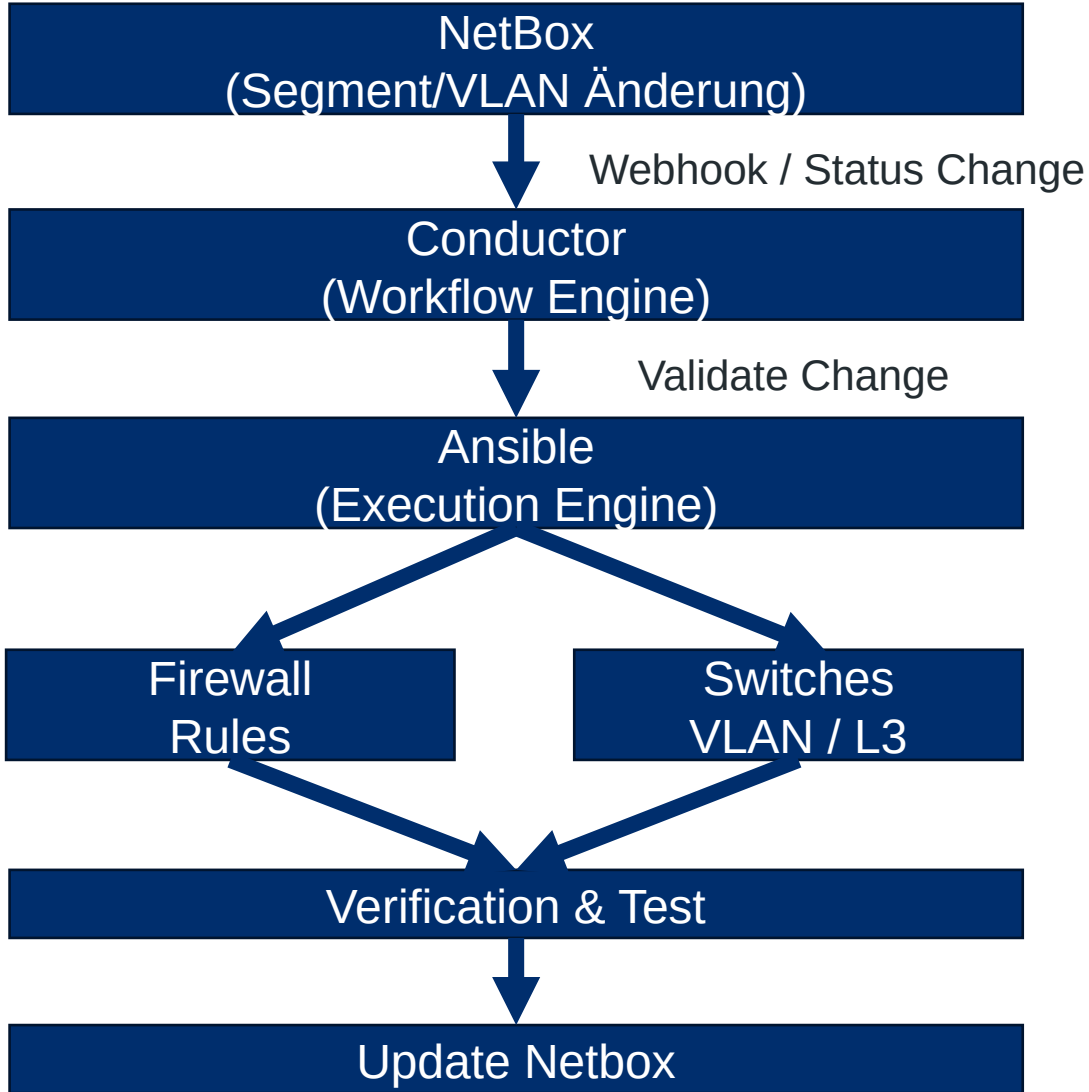
Virtual Machines

Results 16 Filters

netsup

<input type="checkbox"/>	RISK CATEGORY	NAME	CONTACTS	SERVICE	MEMORY (MB)	DISK	STATUS	CLUSTER	ROLE	TAGS
<input type="checkbox"/>	2	svminnetsup01p	—	—	4096	9.00 GB	Active	MIN_Production	—	certificate-deploy, Media Attached, vm-network-support, icinga-agent
<input type="checkbox"/>	2	svkunnetsup01p	—	—	4096	9.00 GB	Active	KUN_Production	—	certificate-deploy, Media Attached, vm-network-support, icinga-agent
<input type="checkbox"/>	2	svkelnetsup01p	—	—	4096	9.00 GB	Active	KEL_Production	—	certificate-deploy, Media Attached, vm-network-support, icinga-agent
<input type="checkbox"/>	2	svkrenetsup01p	—	—	4096	9.00 GB	Active	CL_KRE_Production	—	certificate-deploy, Media Attached, vm-network-support, icinga-agent
<input type="checkbox"/>	2	svda2netsup01p	—	—	4096	10.00 GB	Staged	DA2_Production	—	certificate-deploy, Media Attached, vm-network-support, os-linux, icinga-agent
<input type="checkbox"/>	2	svdi1netsup01p	—	—	4096	9.00 GB	Active	CL_DI1_Production	—	certificate-deploy, Media Attached, vm-network-support, icinga-agent
<input type="checkbox"/>	2	svrh1netsup01p	Aljoscha Oppermann	—	4096	30.00 GB	Active	CL_RH1_Production	—	certificate-deploy, Media Attached, vm-network-support, os-linux, icinga-agent
<input type="checkbox"/>	2	svuvanetsup01p	—	—	4096	9.00 GB	Active	UVA_Production	—	certificate-deploy, Media Attached, vm-network-support, icinga-agent
<input type="checkbox"/>	2	svzagnetsup01p	—	—	4096	9.00 GB	Active	ZAG_Production	—	certificate-deploy, Media Attached, vm-network-support, icinga-agent
<input type="checkbox"/>	2	svdaynetsup01p	—	—	4096	10.00 GB	Active	CL_DAY_Production	—	certificate-deploy, Media Attached, vm-network-support, os-linux, icinga-agent

Workflow Network Change & Sequence with Conductor



Validation & Operation

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(Plaintext) Assets

Revision controlled - GitLab

- Switch configurations
- ESX configuration backup
- MS Active Directory plaintext export
- Documentation export

Non revision controlled - Filesystem

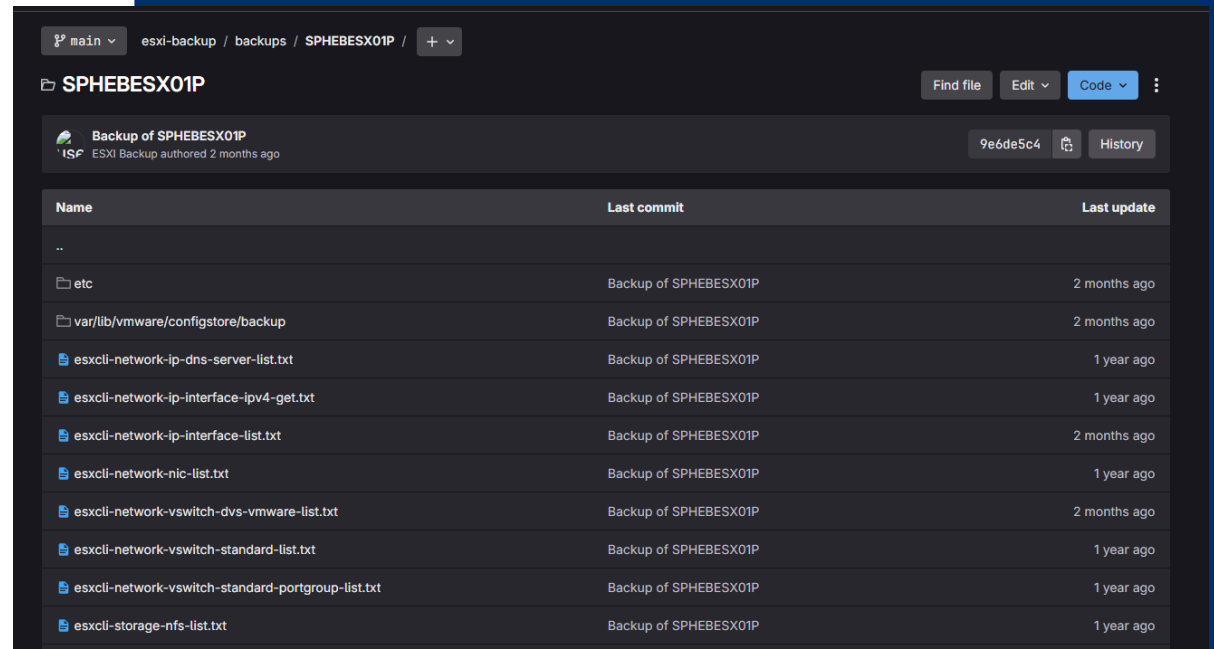
- JSON configuration transfers



```
File swrh1vt02cl01n changed 2023-11-27 14:27:56
ISP Firmware SFP Upgrade user authored 1 year ago

swrh1vt02cl01n 9.90 KIB

1 ; hpStack_MB Configuration Editor; Created on release #KB.16.11.0013
2 ; Ver #14:6f.6f.f8.1d.fb.7f.bf.bb.ff.7c.59.fc.7b.ff.ff.fc.ff.3f.ef:00
3
4 stacking
5 member 1 type "JL075A" mac-address b8d4e7-60f980
6 member 1 priority 129
7 member 1 flexible-module A type JL078A
8 member 1 flexible-module B type JL083A
9 member 2 type "JL075A" mac-address b8d4e7-7f1c80
10 member 2 flexible-module A type JL078A
11 member 2 flexible-module B type JL083A
12 exit
13 hostname "SWRH1VT02CL01N"
14 console idle-timeout 7200
15 console idle-timeout serial-usb 7200
16 aruba-central disable
17 rest-interface session-idle-timeout 120
18 trunk 1/1-1/2,2/1-2/2 trk1 lacp
19 trunk 1/3,1/8,2/3,2/8 trk3 lacp
20 trunk 1/4,2/4 trk4 lacp
21 trunk 1/5,2/5 trk5 lacp
22 trunk 1/6,2/6 trk6 lacp
23 trunk 1/7,2/7 trk7 lacp
24 trunk 1/9,2/9 trk9 lacp
25 trunk 1/10,2/10 trk10 lacp
26 trunk 1/11,2/11 trk11 lacp
27 trunk 1/12,2/12 trk12 lacp
28 trunk 1/13,2/13 trk13 lacp
29 trunk 1/14,2/14 trk14 lacp
30 logging 172.31.100.59
```



Name	Last commit	Last update
..		
etc	Backup of SPHEBESX01P	2 months ago
var/lib/vmware/configstore/backup	Backup of SPHEBESX01P	2 months ago
esxcli-network-ip-dns-server-list.txt	Backup of SPHEBESX01P	1 year ago
esxcli-network-ip-interface-ipv4-get.txt	Backup of SPHEBESX01P	1 year ago
esxcli-network-ip-interface-list.txt	Backup of SPHEBESX01P	2 months ago
esxcli-network-nic-list.txt	Backup of SPHEBESX01P	1 year ago
esxcli-network-vswitch-dvs-vmware-list.txt	Backup of SPHEBESX01P	2 months ago
esxcli-network-vswitch-standard-list.txt	Backup of SPHEBESX01P	1 year ago
esxcli-network-vswitch-standard-portgroup-list.txt	Backup of SPHEBESX01P	1 year ago
esxcli-storage-nfs-list.txt	Backup of SPHEBESX01P	1 year ago

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Setting Standards

- Standardize !!!
- Enforce environment defaults
- Remove factory defaults
- Validate systems
- Prepare Operations

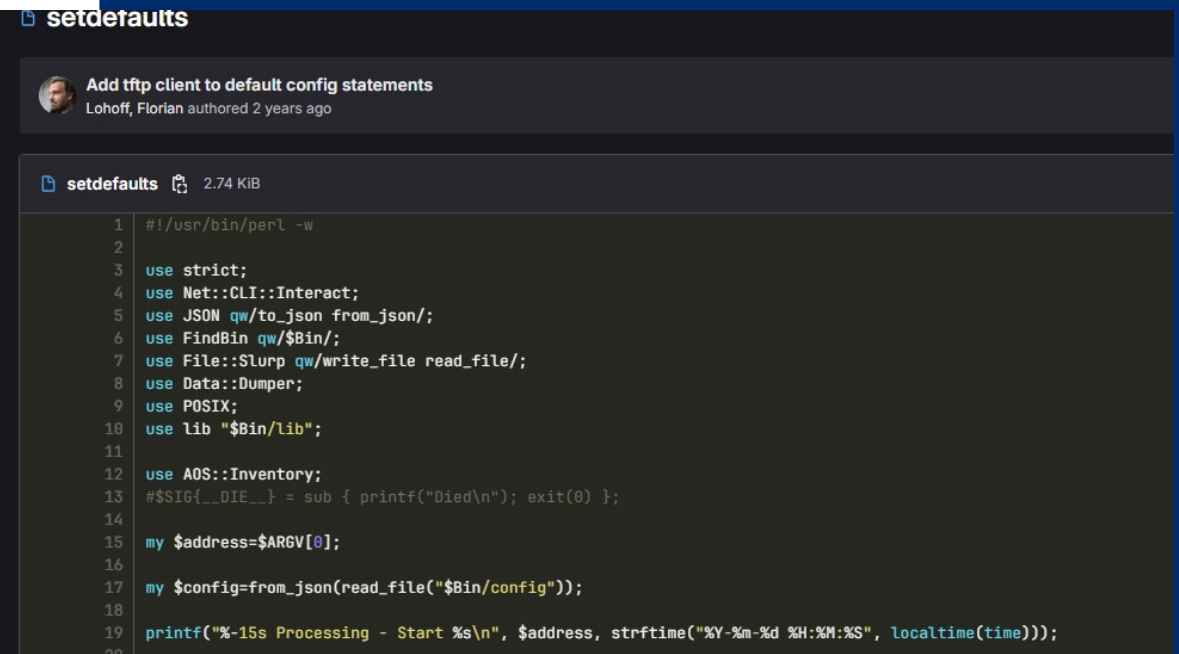
```
"timesync sntp",
"sntp unicast",
"sntp 300",
"sntp server priority 1 172.31.2.111",

"no snmp-server community \"public\"",
"snmp-server community \"hahn-it\" operator",
"snmp-server contact \"it@hahn.group\"",
"snmp-server response-source dst-ip-of-request",

"logging 172.31.100.59",
"no logging 172.30.130.5",
"logging facility syslog",
"logging severity info",
"logging origin-id hostname",

sprintf("crypto pki enroll-self-signed certificate-name %s usage web key-type rsa key-size 2048 valid-start

"web-management ssl",
"rest-interface",
"rest-interface session-idle-timeout 120",
"no web-management plaintext",
```



The screenshot shows a GitHub repository for a project named 'setdefaults'. The repository is owned by 'Lohoff, Florian' and was authored 2 years ago. The file 'setdefaults' is 2.74 KiB in size. The code is a Perl script that uses various modules like 'strict', 'Net::CLI::Interact', 'JSON', 'File::Slurp', 'Data::Dumper', 'POSIX', and 'AOS::Inventory'. It takes an address as an argument and processes a configuration file to generate a report.

```
1 #!/usr/bin/perl -w
2
3 use strict;
4 use Net::CLI::Interact;
5 use JSON qw/to_json from_json/;
6 use FindBin qw/$Bin/;
7 use File::Slurp qw/write_file read_file/;
8 use Data::Dumper;
9 use POSIX;
10 use lib "$Bin/lib";
11
12 use AOS::Inventory;
13 #SIG{__DIE__} = sub { printf("Died\n"); exit(0) };
14
15 my $address=$ARGV[0];
16
17 my $config=from_json(read_file("$Bin/config"));
18
19 printf("%-15s Processing - Start %s\n", $address, strftime("%Y-%m-%d %H:%M:%S", localtime(time)));
20
```

e.g. Firmware Maintenance

Partitionalize complex tasks

- Identify devices of “platform”
- Distribute firmware
- Generate boot priority
- Execute reboot / firmware install

```
loadfirmware
Fix loadfirmware oobm usage
Lohoff, Florian authored 3 years ago

loadfirmware 2.32 KIB
1 #!/usr/bin/perl -w
2
3 use strict;
4 use Net::CLI::Interact;
5 use JSON qw/to_json from_json/;
6 use FindBin qw/$Bin/;
7 use File::Slurp qw/write_file read_file/;
8 use Data::Dumper;
9 use POSIX;
10 use lib "$Bin/lib";
11
12 use AOS::Inventory;
13
14
15 my $address=$ARGV[0];
16
17 my $start=time();
18 printf("%s Processing - Start %s\n", $address, strftime("%Y-%m-%d %H:%M:%S", localtime(time)));
19
20 eval {
21     my $i=Net::CLI::Interact->new({
22         transport => 'SSH',
23         connect_options => {
24             host => $address,
```

```
reloadinorder
Add current directory to "reloadinorder"
Lohoff, Florian authored 2 years ago

reloadinorder 120 B
1 #!/bin/bash
2
3 BASE=$(dirname $(readlink -f $0))
4
5 cat $1 \
6     | awk '{ print $2 }' \
7     | xargs -n1 -P1 ${BASE}/reloadswitch
8
```

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E.g. Monitoring & Alarming

- Triggering netbox object
- Forward to performance monitor
- Apply predefined standards

Service Historie Quelle

iface 2 auf que-r101-sw3 ist CRITICAL IF CRITICAL - ifOutDiscards 7159 of 485102pkts in 296 seconds - limit 0.1%

Bestätigen Jetzt prüfen Kommentieren Benachrichtigung Downtime Neu planen

Plugin-Ausgabe

IF CRITICAL - ifOutDiscards 7159 of 485102pkts in 296 seconds - limit 0.1%,1s / 485pkts

Aktionen

Inspizieren
Ändere

Notizen

<https://cmdb.hahn.group/dcim/interfaces/8929/>
<https://prism.hahn.group/grafana/d/000000005/switches-telegraf-interface-stats?orgId=1&refresh=1m&var-hostname=que-r101-sw3>

Kommentare

Keine Kommentare erstellt.

Downtimes

Keine geplanten Downtimes.

Gruppen

Network

Benachrichtigungen

Benutzer: Timo Wuellenweber
Benutzergruppen: Default Alert Group, Network Alert Group

Check Statistiken

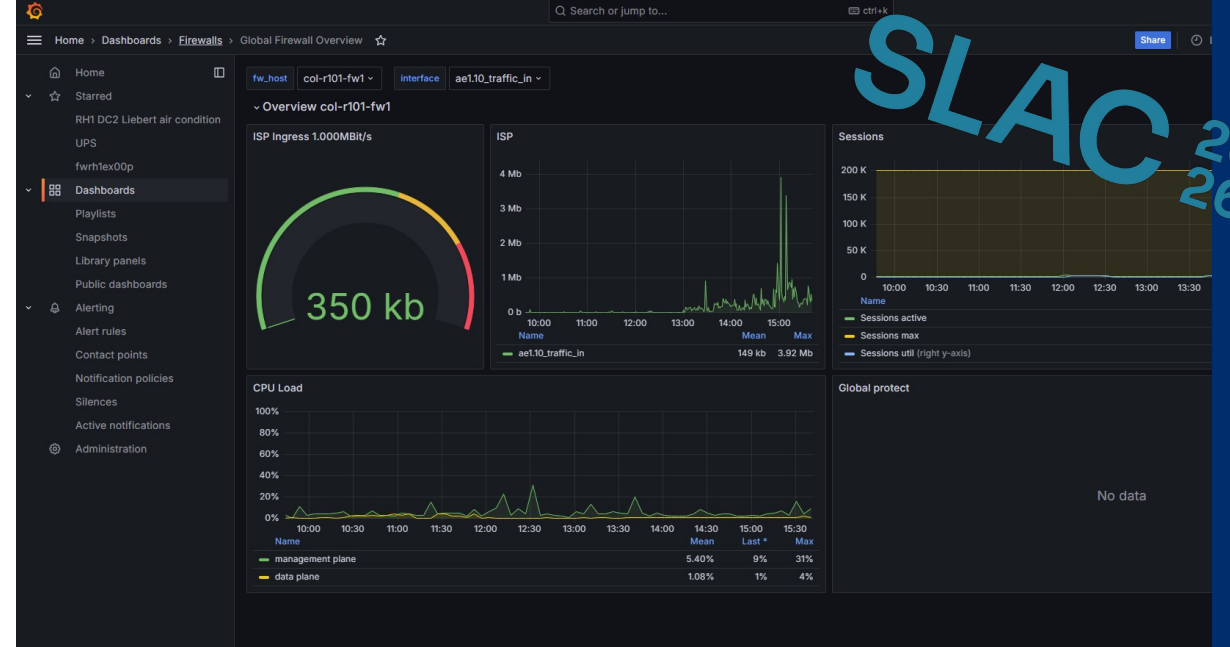
checkif Befehl svrb-prism.haehn-automation.de Check-Scheduler

185,00 ms / 0,00 s
Execution Time / Latenz

vor 1m 44s Execution Start vor 1m 43s Execution End 5,00 m Interval

Performance Analysis

- Context specific dashboards
- Automated integration of entities
- Trigger through netbox tags
- Credential definition



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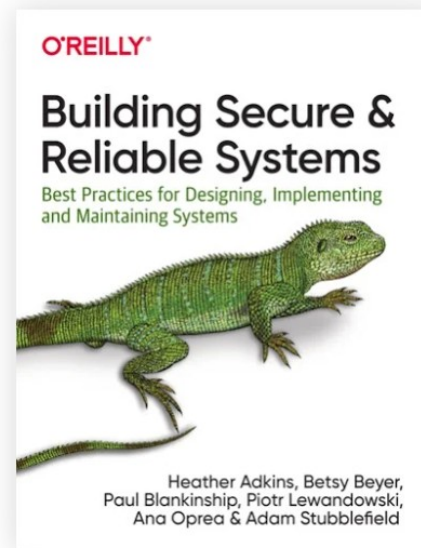


Outlook



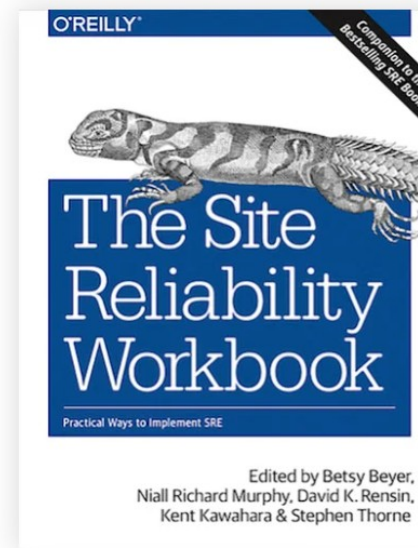
Further Reading

- SRE books with Google
- iX article series 04/26
- dPunkt/
Rheinwerk
tba.



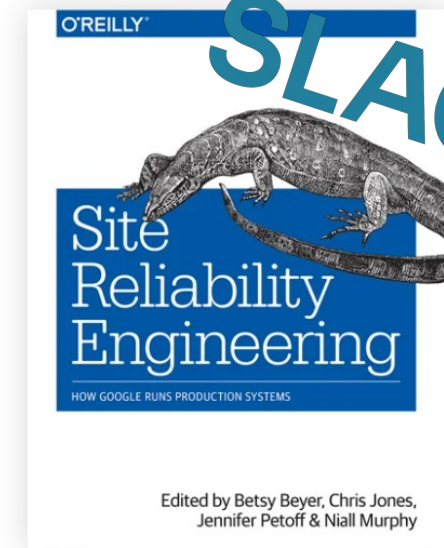
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[Book updates](#)



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My Recommendations

- Start small & with small steps
- Identify “low hanging fruits”
- Plan for the “long shot”
 - E.g. no tool without API access
- Built scalable
- Avoid “lock ins”
- Push open standards

Our Plans

- Automate emergency shutdown
- Integrate Aruba CX platform
- Evaluate SONIC platform
- Complete Active Directory tasks
- Improve Windows deployments
- Enable tenant separation
- Offer external customer products

SLAC²⁰₂₆

HAHN

AUTOMATION GROUP

Frank Benke
Heute privat

+49 1511 788 7261
frank@mybenke.org

www.mybenke.org
www.linkedin.com/in/frank-benke-61743928/