Netbox as a Source of Zabbix Truth

ZABBIX SUMMIT

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Site Reliability Architect

The Problem

Automate the configuration of Zabbix using Netbox as the organization’s source of truth.

- Netbox drives the configuration
- (General principle) If it is not in Netbox it does not exist.
- Process needs to include agent configuration.

What is Netbox

NetBox is an open-source web-based application designed to serve as a centralized source of truth for network infrastructure, primarily functioning as a tool for infrastructure resource modeling (IRM) and data center infrastructure management (DCIM).

(Brave AI summary)

- Not just for network devices!
  - Physical hosts
  - Virtualization
- Extensible data model
- REST and GraphQL API interfaces

The Options

Off the shelf

- Straightforward to implement
- Will require you follow its design philosophy
- May not manage agents

Ansible

- Will require some design and development
- Tooling understood by many in industry
- Very flexible

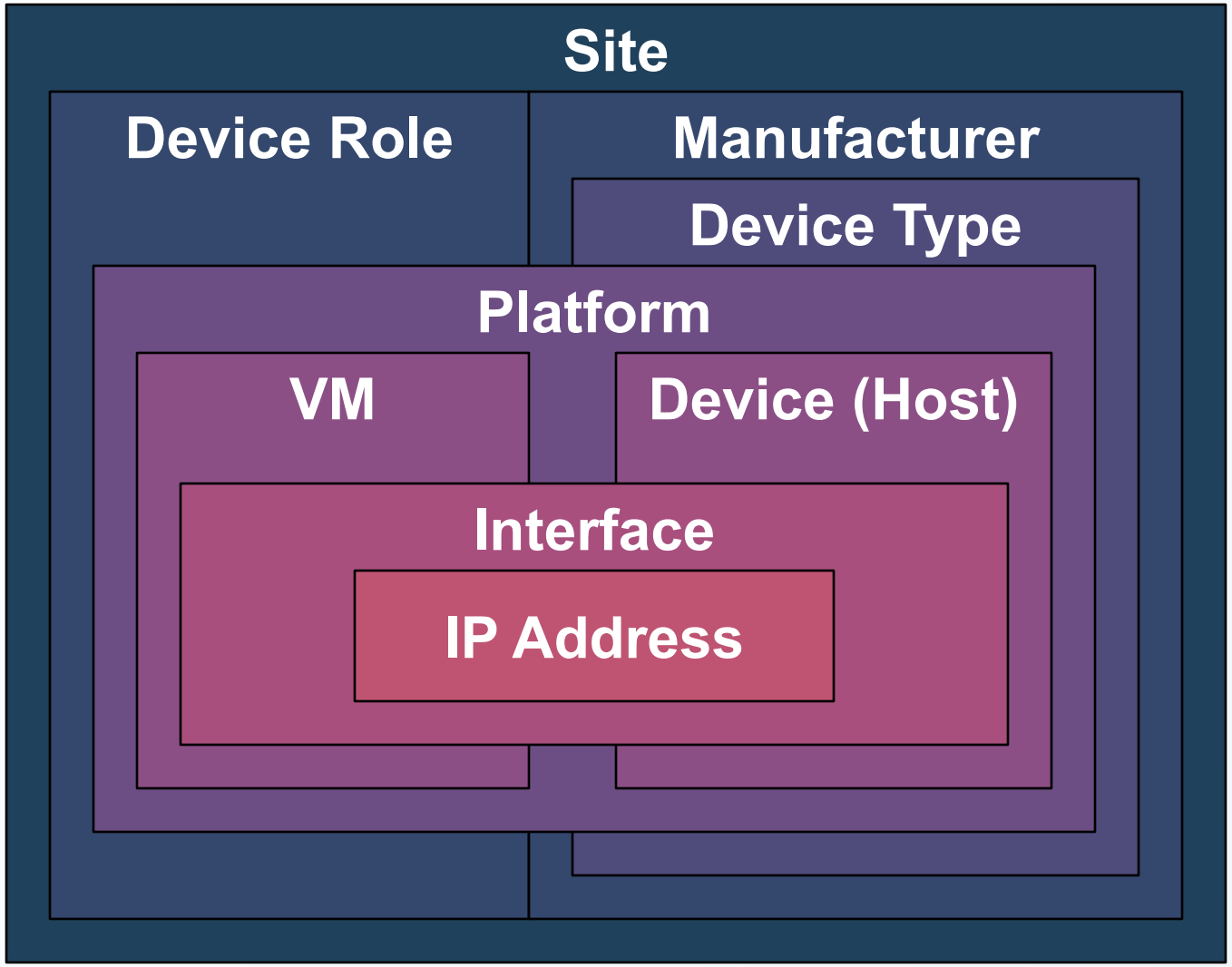
Custom Solution

- Ultimate integration
- Capabilities are limited by the development resources available.

Why Ansible?

- Ansible is declarative and idempotent
- Commonly understood tooling
- Rich ecosystem
- Straightforward to go from command line use to orchestration tooling.

The Netbox Data model



+ Tags

What's needed to model Zabbix

- Host Groups
- Interface types
- Templates
- Macros
- Zabbix Tags

Custom Fields for DCIM Objects

- Site
- Tenant
- Device Role
- Manufacturer
- Platform

What’s needed to model Zabbix

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Custom Fields for DCIM Objects

- Interface
  - Agent
  - SNMP
  - IPMI
  - JMX

What’s needed to model Zabbix

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What’s needed to model Zabbix

- Host Groups
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- Zabbix Tags

Combination of Custom Fields and Configuration Contexts

- Zabbix tag role=CustomerXLinuxWebServerCustomer
  - Tenant == X
  - Platform == Linux
  - Device Role == Web Server

NetBox Configuration Contexts

Source Contexts JSON YAML

Default Zabbix Server 10

```
zabbix:
  server: zabbix-main.example.com
  tags:
    site: default
```

Site2 Zabbix Server 1000

```
zabbix:
  server: site2-zabbix.example.com
  tags:
    site: two
```

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Local Context JSON YAML

```
zabbix:
  tags:
    tag1: value
```

NetBox Configuration Contexts

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  tags:
    site: two
```

Local Context JSON YAML

```
zabbix:
  tags:
    tag1: value
```

Rendered Context JSON YAML

```
zabbix:
  server: site2-zabbix.example.com
  tags:
    site: two
    tag1: value
```

Ansible Inventory Plugin

```
$ cat netbox_inventory.yml
plugin: netbox.netbox.nb_inventory
api_endpoint: << URL TO NETBOX >>
Token: << YOUR TOKEN HERE >>
#validate_certs: false
config_context: true

interfaces: true
fetch_all: true`
group_by:
 - device_roles
site_data: false
rename_variables:
 - pattern: tags
   repl: nb_tags
 - pattern: serial
   repl: host_serial
```

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group_by:
 - device_roles
site_data: false
rename_variables:
 - pattern: tags
   repl: nb_tags
 - pattern: serial
   repl: host_serial
```

```
$ ansible-inventory -i netbox_inventory.yml --graph
@all:
 |--@ungrouped:
 |--@device_roles_hypervisor:
 |   |--s2hv1
 |   |--s2hv2
 |   |--s3hv1
 |   |--s3hv2
 |--@device_roles_zabbix-proxy:
 |   |--s2zbxprx1
 |   |--s3zbxprx1
```

Ansible Inventory Plugin

```
$ ansible-inventory -i netbox_inventory.yml --host s2hv1
{
    "ansible_host": "192.168.25.6",
    "cluster": "s2hv1",
    "cluster_type": "kvm",
    "config_context": [
           { "zabbix": {
               "server": "site2-zabbix.example.com",
               "tags": { "site": "two",
                   "tag1": "value" } } } ],
    "custom_fields": { "zbxgrp": "Custom Group" },
    "device_roles": [ "hypervisor" ],
    "device_types": [ "a" ],
    "interfaces": [
        {
            "custom_fields": {"zbxif": [ "snmpv3" ]},
            "display": "bmc",
            "ip_addresses":
              [{ "address":"192.168.25.5/24" }],
            "name": "bmc",
        },
        {
            "custom_fields": {"zbxif": [ "agent" ]},
            "name": "eth0"
        },
        { "name": "eth1" }
    ],
    "is_virtual": false,
    "local_context_data": [ null
],
    "locations": [],
    "manufacturers": [ "generic"
],
    "nb_tags": [],
    "oob_ip": "192.168.25.5",
    "platforms": [ "linux" ],
    "primary_ip4": "192.168.25.6",
    "regions": [],
    "services": [],
    "site_groups": [],
    "sites": [ "site2" ],
    "status": {
        "label": "Active",
        "value": "active"
    }
}
```

The Code

```
---
- name: Configure Netbox Host in Zabbix
  hosts: all
  connection: local
  gather_facts: false

  # Vault contains variables
  # zbx_url, zbx_api_key, netbox_url, netbox_token

  vars_files:
    - api_keys.yml

  Roles:
    - get_nb_info
    - host_config_zabbix_server
    - role: community.zabbix.zabbix_agent
      zabbix_api_create_hosts: false
      zabbix_agent_server: "{{ zabbix_server }}"
```

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Retrieve data for needed sections

The Code

```
---
- name: Configure Netbox Host in Zabbix
  hosts: all
  conne
  gathe

  # Vau
  # zbx

  vars_
    - a

  Roles
    - g
    - h
    - r
      zabbix_api_create_hosts: false
      zabbix_agent_server: "{{ zabbix_server }}"
```

```
"device_roles": [ "hypervisor" ]
"device_types": [ "a" ]
"manufacturers": [ "generic" ]
"platforms": [ "linux" ]
"sites": [ "site2" ]
```

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Retrieve data for needed sections

Merge Custom Fields

The Code

```
device-roles:
  hypervisor:    zbxgrp: null
  server:        zbxgrp: null
  zabbix-proxy: zbxgrp: "Zabbix Proxy"
Device-types:
  a: zbxtmpl: null
Manufacturers:
  generic:  zbxtmpl: Generic BMC by SNMP
platforms:
  el_linux:
    zbxgrp:  el_linux
    zbxtmpl: "Linux by Zabbix agent"
  linux:
    zbxgrp:  "Linux Hosts"
    zbxtmpl: "Linux by Zabbix agent"
sites:
  Main:  zbxgrp: null
  site2: zbxgrp: site_2
  site3: zbxgrp: null
```

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Group Interfaces by type

The Code

```
---
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  # Vault co
  # zbx_url,

  vars_files
    - api_ke

  Roles:
    - get_nb
    - host_c
    - role:
      zabbix
      zabbix
```

```
zbx_ifinfo:
  - ip: 192.168.25.6
    main: 1
    type: agent
    useip: 1
  - details:
      version: 3
    ip: 192.168.25.5,
    main: 1
    type: snmp
    useip: 1
```

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Merge Custom Fields

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Retrieve data for needed sections

Merge Custom Fields

Group Interfaces by type

Configure host in Zabbix

The Code

```
---
- name: Configure Netbox Host in Zabbix
  hosts: all
  connection: local
  gather_facts: false
```

```
PLAY RECAP *************************
s2hv1      : ok=35 changed=1 skipped=2
s2hv2      : ok=16 changed=1 skipped=5
s2zbxprx1  : ok=16 changed=1 skipped=7
s3hv1      : ok=16 changed=1 skipped=5
s3hv2      : ok=16 changed=1 skipped=5
s3zbxprx1  : ok=16 changed=1 skipped=3
```

```
    zabbix_api_create_hosts: false
    zabbix_agent_server: "{{ zabbix_server }}"
```

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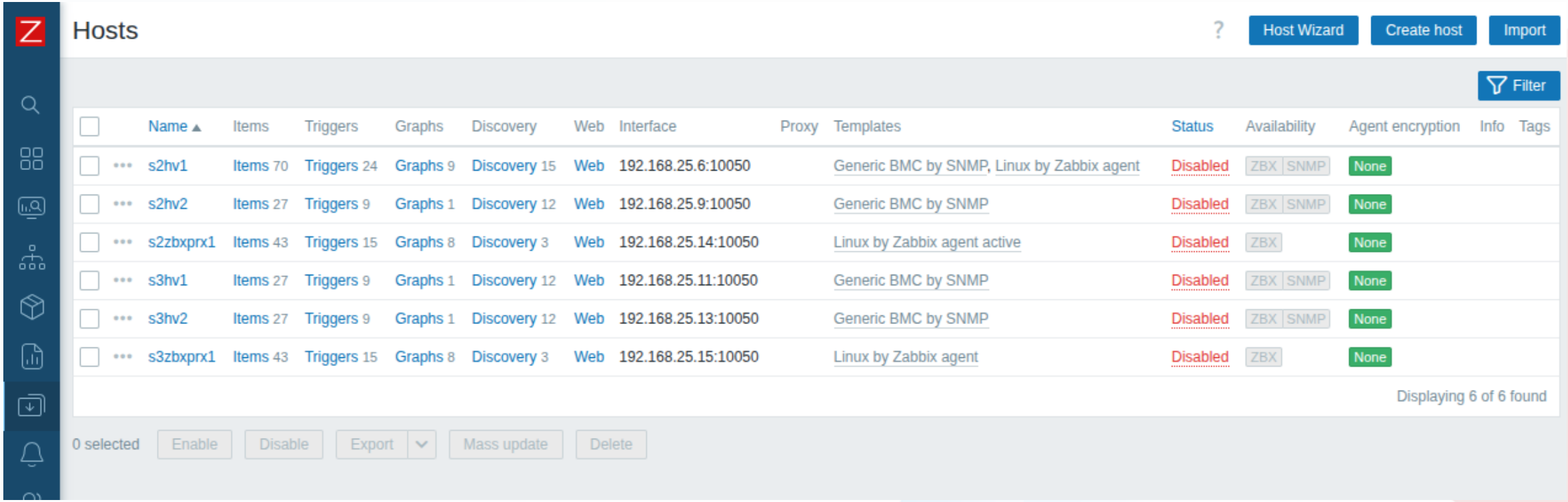
Group Interfaces by type

Configure host in Zabbix

Configure Zabbix Agent

The Result



Some Final thoughts

- This path was chosen to configure hosts with more than one interface type
- Would love to discuss how to efficiently determine interface types needed by a template.
- Leverage inventory groupings for site/role/tenant specific playbook plays.

`https://github.com/red-tux/ZabbixSummit2025`

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