Scale Monitoring Effortlessly: Automated Host Lifecycle Management with Zabbix

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ZABBIX

Monitoring Lifecycle Automation

Why host lifecycle automation is critical at scale?

How Zabbix can handle hosts dynamically?

Autoregistration vs Network Discovery?

Implementing automated deployment with Ansible

ZABBIX

Deployment issues

Rapid growth of devices and applications

Dynamic infrastructure

Multiple environments

Initial monitoring deployment

Common challenges in manual monitoring environments

Configuration

- ❑ Complex management
- ❑ Configuration drift
- ❑ Inconsistent config

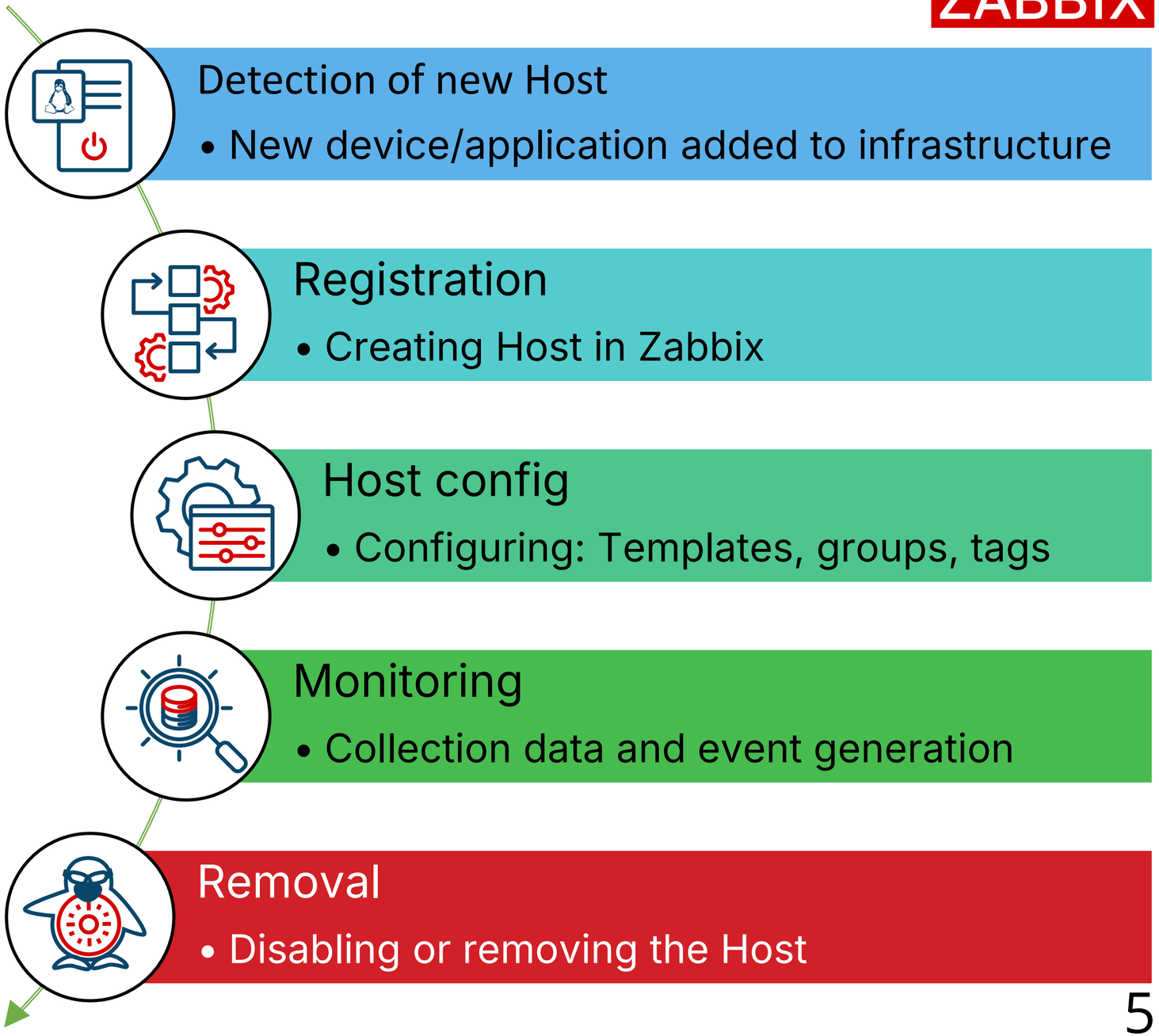
Overhead

- ❑ Manual setup
- ❑ Debugging issues
- ❑ Manual removal

Human errors

- ❑ Missing configuration
- ❑ Incorrect thresholds
- ❑ Typos

Host lifecycle stages



Zabbix Network Discovery

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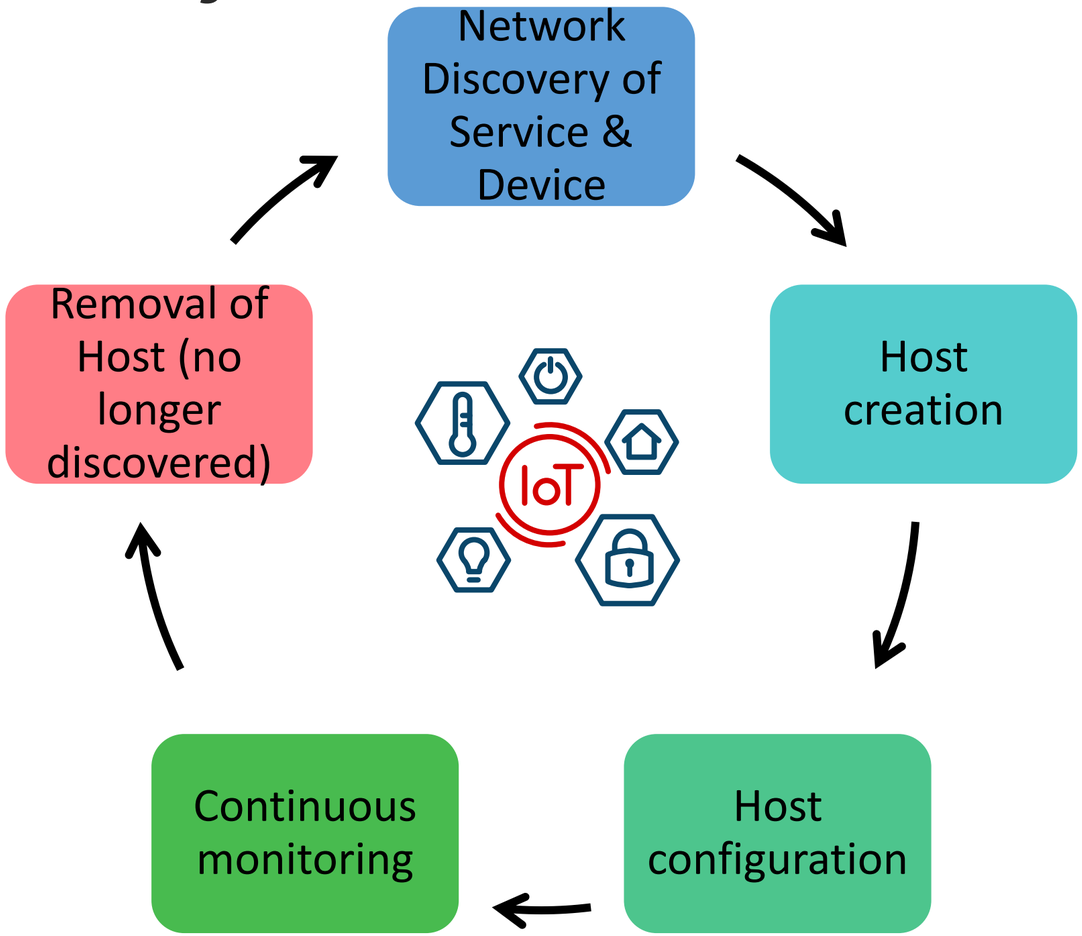
Network Discovery feature: Automatically manage Host lifecycle



Use cases:

- Scanning network for devices/apps
- Monitoring service or device or application
- Immediate metric collection
- Cloud infrastructure monitoring
- Virtual environment monitoring:
  - Hypervisors
  - Virtual machines
  - Containers
  - Services

Network Discovery: How the monitoring will be performed

Scanning network

SSH, LDAP, SMTP, FTP, HTTP, HTTPS, POP, NNTP, IMAP, TCP, Telnet, Zabbix agent, SNMP agent, ICMP ping

Can be discovered by:

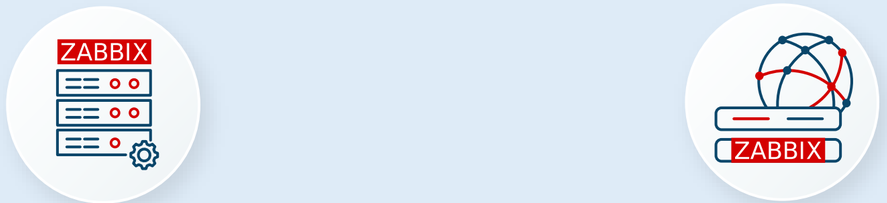
Zabbix server

Zabbix proxies

Host will be monitored by:

Zabbix server — discovered by Zabbix server

Zabbix proxy — discovered by proxy

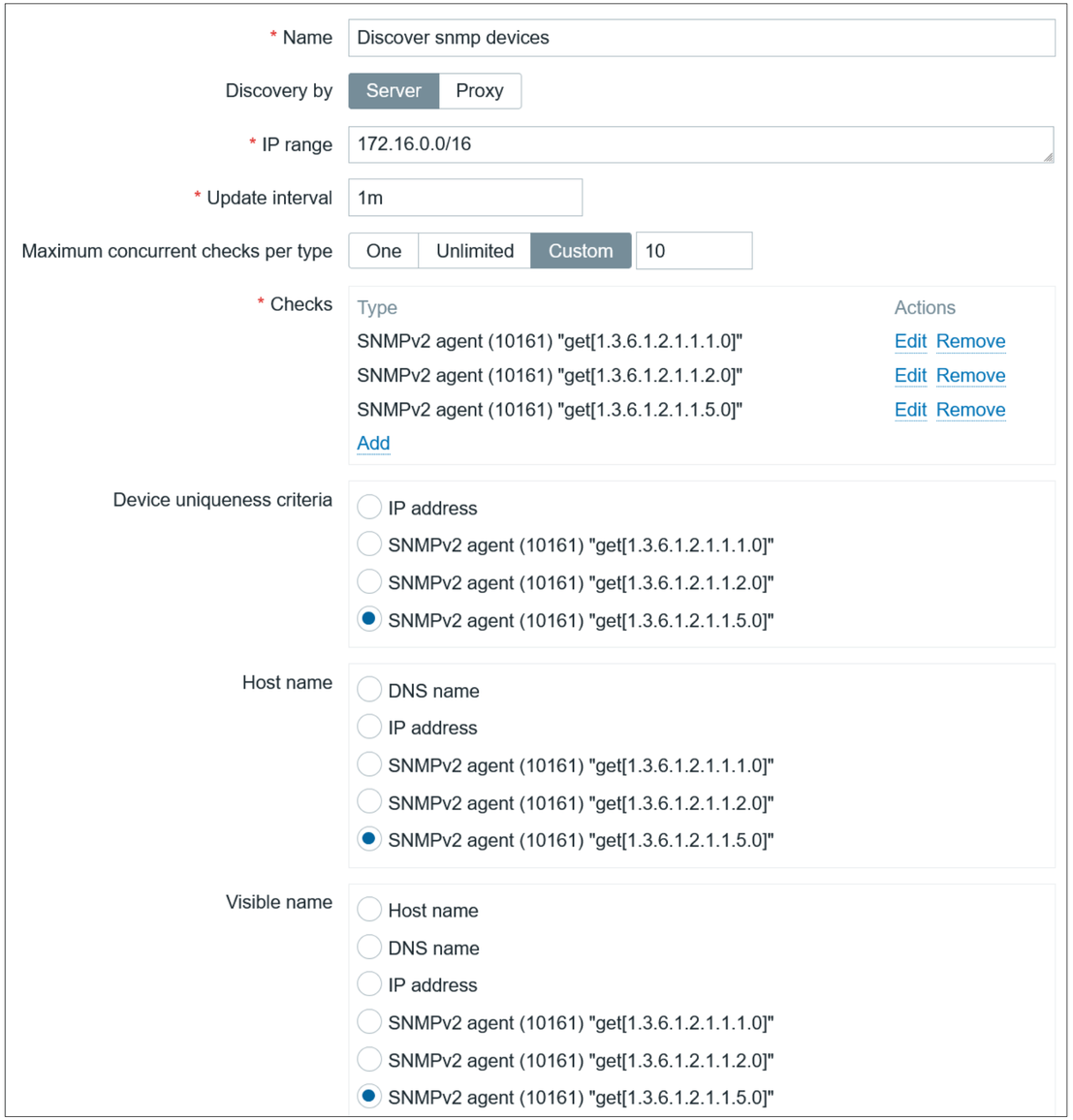


Create Network Discovery rule: Zabbix frontend configuration

Create a Discovery rule

Create a new Discovery rule:
Data collection> Discovery

- Set name
- Discovery by
- IP range
- Update interval
- Concurrency settings
- Checks
- Device uniqueness criteria
- Host name
- Visible name



Network Discovery rule: Checks

Service status

- SSH
- LDAP
- SMTP
- FTP
- HTTP
- HTTPS
- POP
- NNTP
- IMAP
- TCP
- Telnet
- ICMP ping

Retrieving value from Zabbix/SNMP checks

- Zabbix agent
- SNMP agent

*(Discovery action will add Agent/SNMP interface with address when adding a host

Network Discovery rule: Retrieving information about device

Retrieving value from Zabbix agent

- system.uname
- system.hostname
- agent.hostname
- agent.hostmetadata

Name ▼	Last check	Last value
System identification	33s	Linux EU-MYSQL-N15.zabbix.com 5.14.0-…
System hostname	34s	EU-MYSQL-N15.zabbix.com
Agent hostname	35s	EU MYSQL N15
Agent hostmetadata	32s	mysql,production,n15

Retrieving value from SNMP item

- Sys Descr: **get[1.3.6.1.2.1.1.1.0]**
- sysObjectID : **get[1.3.6.1.2.1.1.2.0]**
- sysName: **get[1.3.6.1.2.1.1.5.0]**

Name	Last check	Last value	Change	Tags
sysDescr1	43s	Linux workshop 5.14.0-694.…		device: #1
sysDescr2	42s	Integrated Lights-Out 4 2.80…		device: #2
sysDescr3	41s	RouterOS RBD52G-5HacD2…		device: #3
sysObjectID1	40s	.1.3.6.1.4.1.8072.3.2.10		device: #1
sysObjectID2	39s	.1.3.6.1.4.1.232.9.4.10		device: #2
sysObjectID3	38s	.1.3.6.1.4.1.14988.1		device: #3
sysName1	37s	workshop		device: #1
sysName2	36s	HPE ProLiant DL380 Gen9 …		device: #2
sysName3	35s	Home router		device: #3

Network Discovery rule: **Device** uniqueness criteria

IP address

Unique HOST per IP

Device uniqueness criteria	
	(•) IP address
	( ) Zabbix agent "agent.hostname"
	( ) SNMPv2 agent "get[1.3.6.1.2.1.1.5.0]"

1.3.6.1.2.1.1.5.0 sysName

Zabbix agent key

Unique HOST per Zabbix agent key value

Device uniqueness criteria	
	( ) IP address
	(•) Zabbix agent "system.hostname"
	( ) SNMPv2 agent "get[1.3.6.1.2.1.1.5.0]"

SNMP agent key

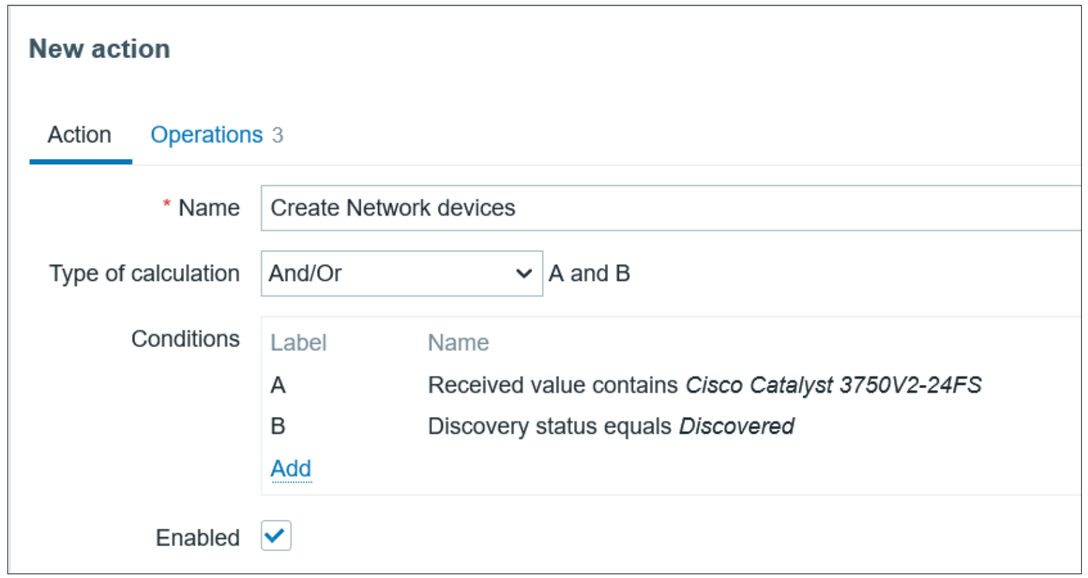
Unique HOST per SNMP agent key value

Device uniqueness criteria	
	( ) IP address
	( ) Zabbix agent "system.hostname"
	(•) SNMPv2 agent "get[1.3.6.1.2.1.1.5.0]"

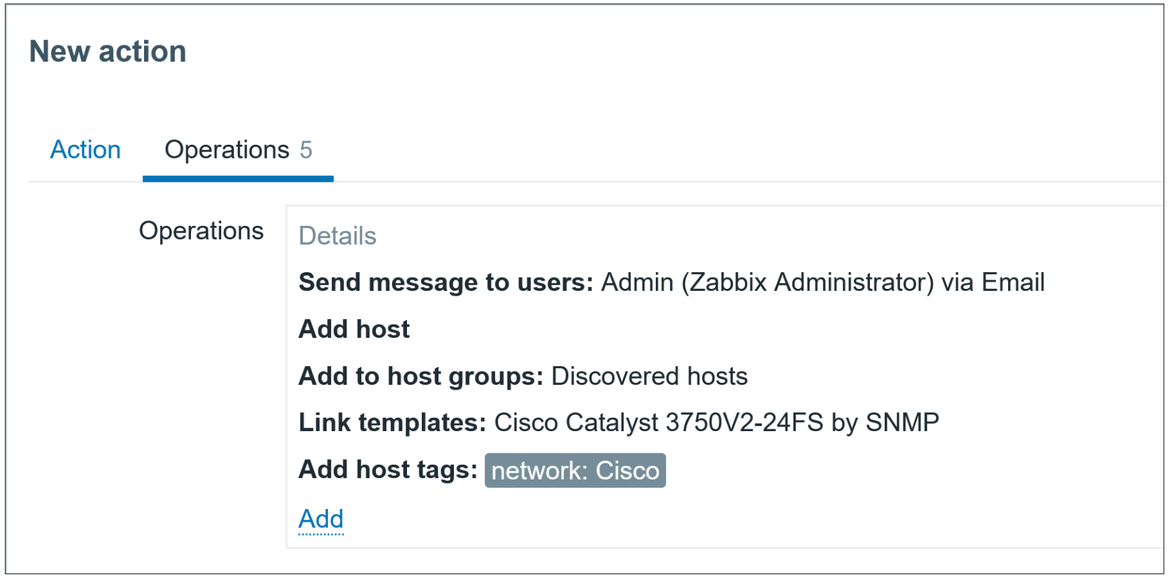
Network Discovery setup: Zabbix frontend configuration (provisioning)

Configure Network Discovery action:

Alerts>Actions> Discovery actions



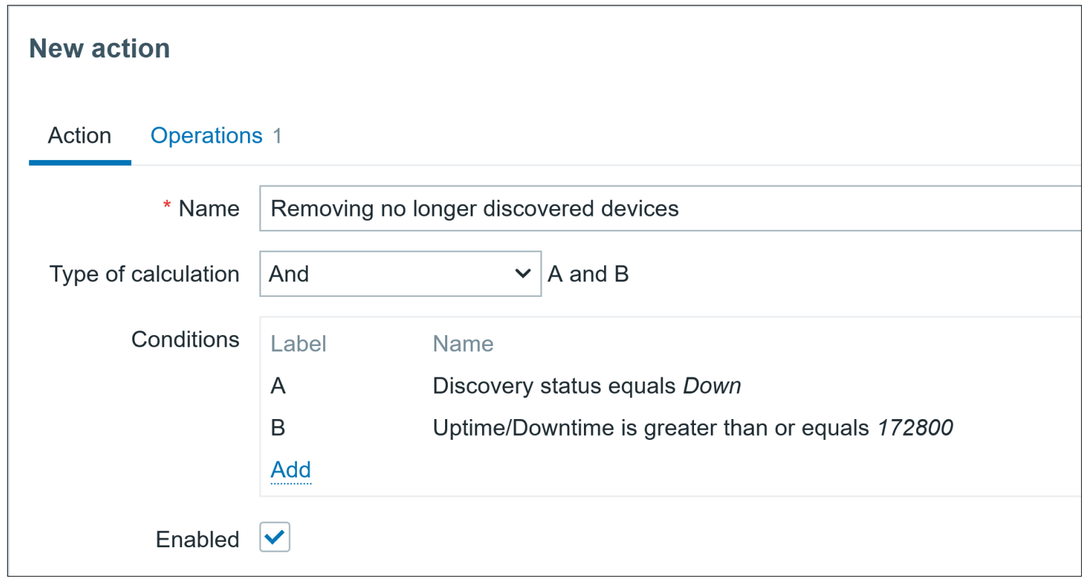
Configure Network Discovery operations



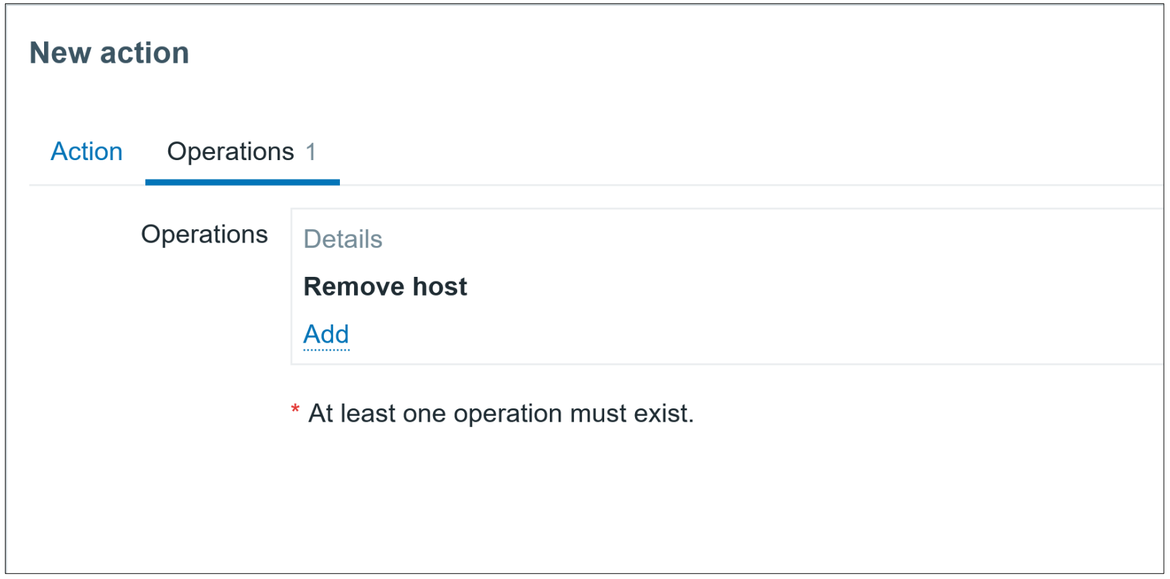
Network Discovery setup: Zabbix frontend configuration (remove)

Configure Network Discovery action:

Alerts>Actions> Discovery actions



Configure Discovery operations



Result

Name ▲	Conditions	Operations
Add Cisco devices	Discovery object equals *Service* Received value contains *Cisco*	**Add host** **Add to host groups:** Mikrotik **Link templates:** Cisco IOS by SNMP
Add HP devices	Discovery object equals *Service* Received value contains *Integrated Lights-Out*	**Add host** **Add to host groups:** Mikrotik **Link templates:** HP iLO by SNMP
Add L		

Discovered device ▲	Monitored host	Uptime/Downtime	SNMPv2
Discover snmp devices (4 devices)			
134.209.250.73	HPE ProLiant DL380 Gen9 Server	00:05:07	5m 7s
138.68.101.217	Office zone14 router	00:05:07	5m 7s
159.65.125.50	Centos-9-dev-node14	00:05:07	5m 7s
165.227.137.207	Office switch_floor 4 zone3	00:05:07	5m 7s

Name ▲	Items	Triggers	Graphs	Discovery	Web	Interface	Proxy	Templates	Status	Availability	Agent encryption
Centos-9-dev-node14	Items 62	Triggers 19	Graphs 9	Discovery 5	Web	159.65.125.50:10161		Linux by SNMP	Enabled	SNMP	None
HPE ProLiant DL380 Gen9 Server	Items 120	Triggers 133	Graphs	Discovery 13	Web	134.209.250.73:10161		HP iLO by SNMP	Enabled	SNMP	None
Office switch_floor 4 zone3	Items 297	Triggers 132	Graphs 30	Discovery 8	Web	165.227.137.207:10161		Cisco IOS by SNMP	Enabled	SNMP	None
Office zone14 router	Items 112	Triggers 48	Graphs 14	Discovery 8	Web	138.68.101.217:10161		Mikrotik by SNMP	Enabled	SNMP	None

Zabbix Autoregistration

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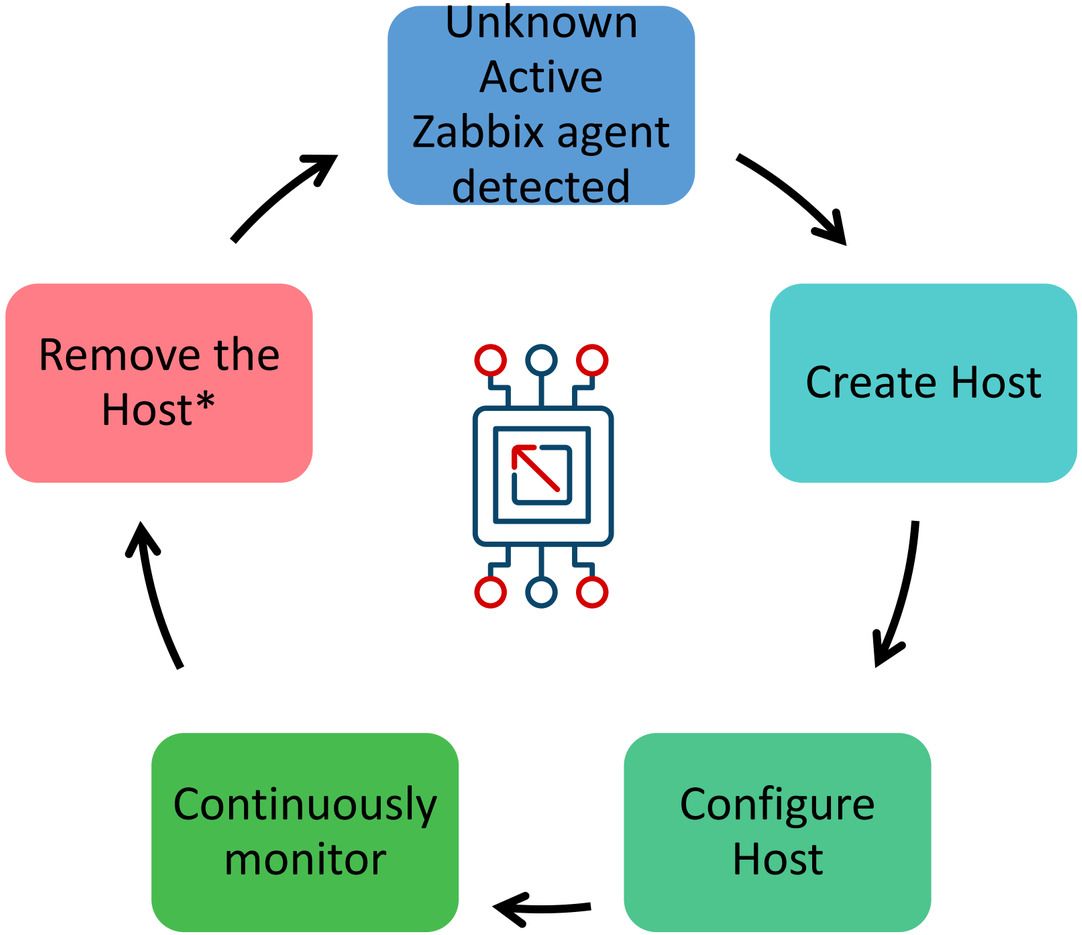
Autoregistration feature: Automatically manage Host lifecycle



Use cases:

- Device is monitored when it’s up and reachable
- Immediate metric collection
- Cloud infrastructure monitoring
- Virtual environment monitoring:
  - Hypervisors
  - Virtual machines
  - Containers
  - Services

*API/Ansible

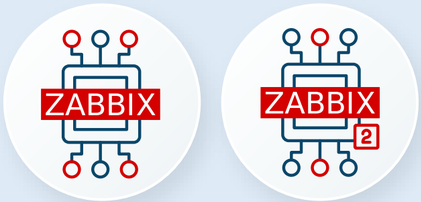
Autoregistration

Automatically create hosts without manual intervention from Zabbix administrator

Requires component:

Zabbix agent or

Zabbix agent2



Can be autoregistered by:

Zabbix server

Zabbix proxies

Zabbix proxy groups

Host will be monitored by:

Zabbix server — autoregistered by Zabbix server

Zabbix proxy — autoregistered by proxy

Proxy group — autoregistered by proxy group)

Autoregistration execution

When Zabbix agent in active mode is started

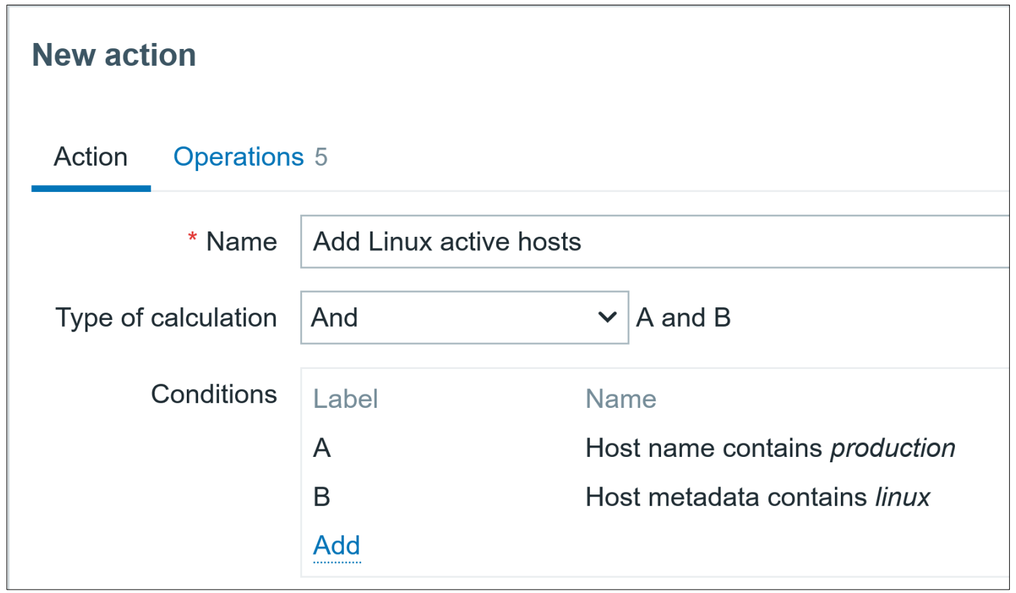
Previously known/unknown Zabbix agent in active mode is configured and started
Every 2 minutes when agent is running

When Host metadata information has been changed

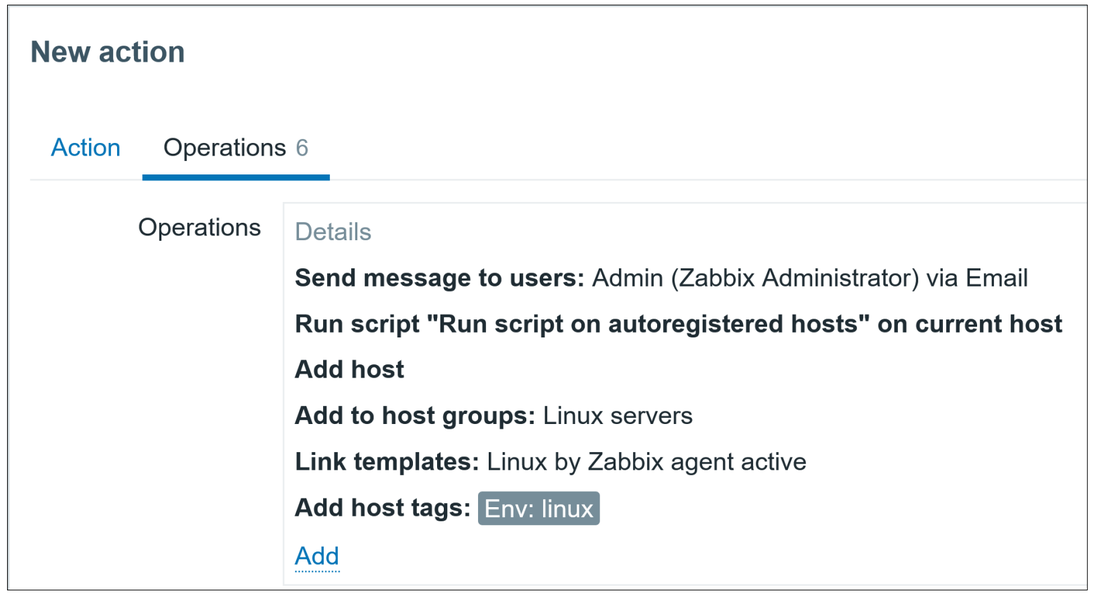
Modified **HostMetadata** parameter and restarted Zabbix agent
Value from **HostMetadataItem** changed

Autoregistration setup: Zabbix frontend configuration (provisioning)

Configure Autoregistration action
Alerts>Actions>Autoregistration actions



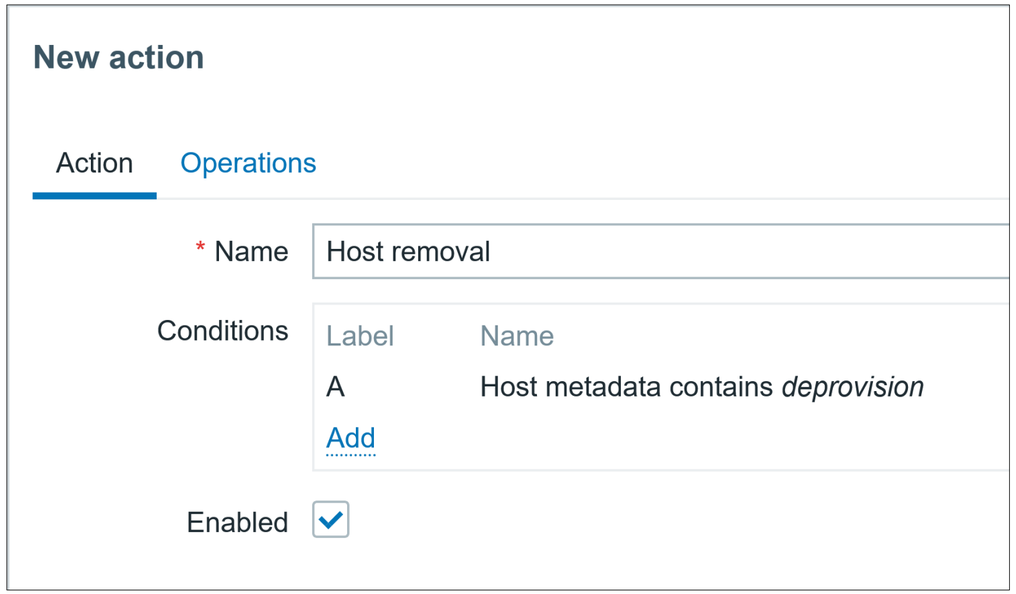
Configure Autoregistration operations



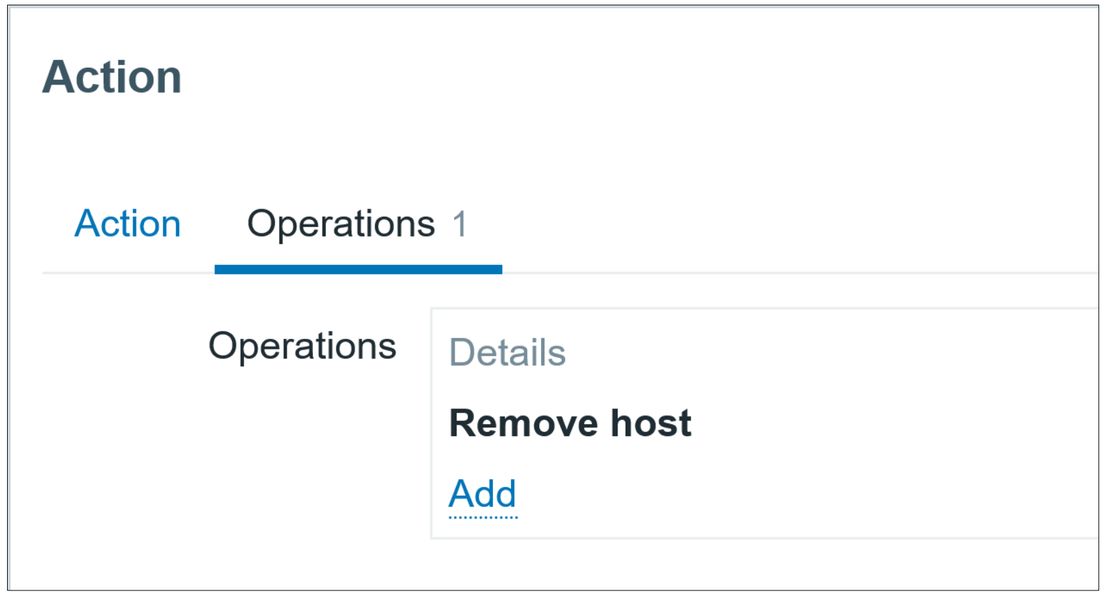
Autoregistration setup: Zabbix frontend configuration (deprovisioning)

Configure Autoregistration action

Alerts>Actions>Autoregistration actions



Configure Autoregistration operations



Autoregistration setup: basic agent configuration (active checks only)

Install appropriate Zabbix repo and Zabbix agent

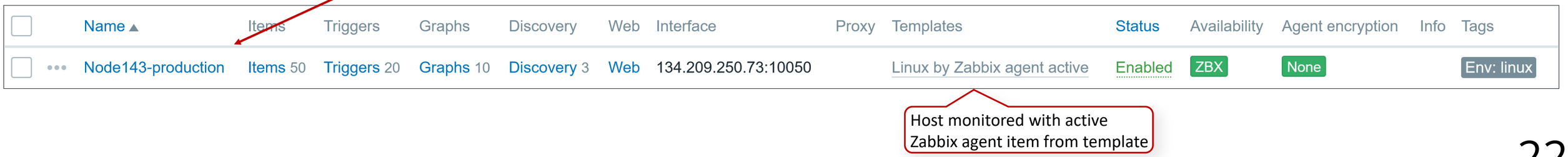
rpm -Uvh
https://repo.zabbix.com/zabbix/7.4/release.....

dnf install zabbix-agent2

Configure Agent in active mode:

Agent must be configured in active mode:

```
# vi /etc/zabbix/zabbix_agent2.conf
ServerActive=165.227.137.207
Hostname=Node143-production
HostMetadata=linux
```



Autoregistration setup:

basic agent configuration (active and passive checks)

Install appropriate Zabbix repo and Zabbix agent

rpm -Uvh
https://repo.zabbix.com/zabbix/7.4/release.....

dnf install zabbix-agent2

Configure Agent in active mode:

Agent must be configured in active mode:

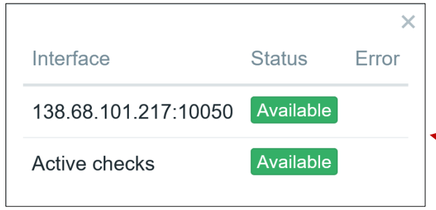
Server= Allowed addresses of server/proxies for passive checks

ServerActive= Adress of server or proxy for agent to connect

Hostname= The name of the host

HostMetadata= database (optional)

```
# vi /etc/zabbix/zabbix_agent2.conf
Server=165.227.137.207
ServerActive=165.227.137.207
Hostname=Node143-production
HostMetadata=linux
```



Autoregistration setup:

dynamic agent configuration

Install appropriate Zabbix repo and Zabbix agent

rpm -Uvh
https://repo.zabbix.com/zabbix/7.4/release.....

dnf install zabbix-agent2

Configure Agent in active mode:

Agent must be configured in active mode:

```
# vi /etc/zabbix/zabbix_agent2.conf
ServerActive=165.227.137.207
HostnameItem=system.hostname[shorthost]
HostMetadataItem=system.run[cat /etc/zabbix/meta]
HostInterfaceItem=system.hostname[shorthost,lower]
```

HostnameItem=system.hostname[<type>,<transform>]

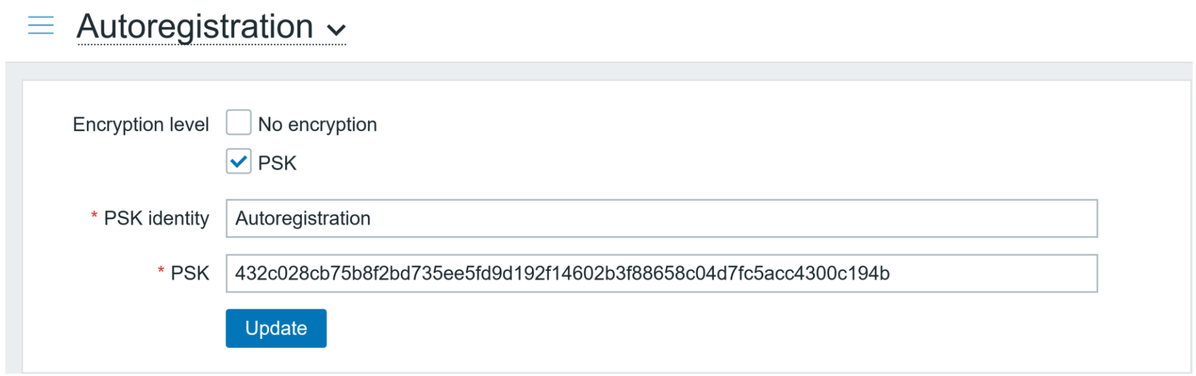
system.hostname[host]	EU-NL-mysql-node23.zabbix.com
system.hostname[shorthost]	EU-NL-mysql-node23
system.hostname[fqdn,lower]	eu-nl-mysql-node23.zabbix.com

Encrypt connection

Configure Zabbix frontend

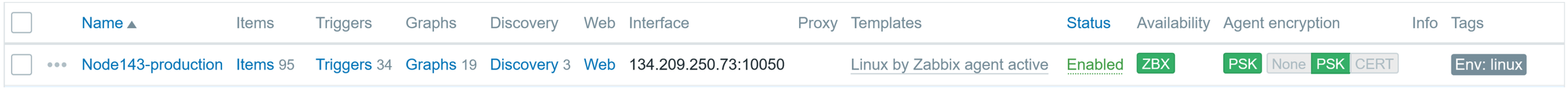
Administration > General > Autoregistration:

- Set encryption level
- Fill PSK identity and key



Configure Zabbix agent

```
TLSConnect=psk
TLSAccept=psk
TLSPSKIdentity=Autoregistration
TLSPSKFile=/etc/zabbix/keys/agent.psk
```



Network Discovery vs Autoregistration

Network Discovery

- Scanning for devices/services
- Can scan Zabbix agents in passive mode
- Encryption is not supported
- Network scanning is periodic

Autoregistration

- Requires Zabbix agent/ Zabbix Agent2
- Zabbix agent configured in active mode
- Encryption is supported*
- Attempted when an active agent connects and the host is unknown or its Hostname or metadata has changed

* Same PSK identity and value for all autoregistered hosts

Automating the deployment of Zabbix agent* with Ansible

* and other components

Deploying Agent effortlessly

- Install repo
- Install Zabbix agent
- Configure Zabbix agent config
- Start the Zabbix agent service

Keep track of configuration

- What parameters are already set?
- Have the settings changed at some point?
- Revert the change

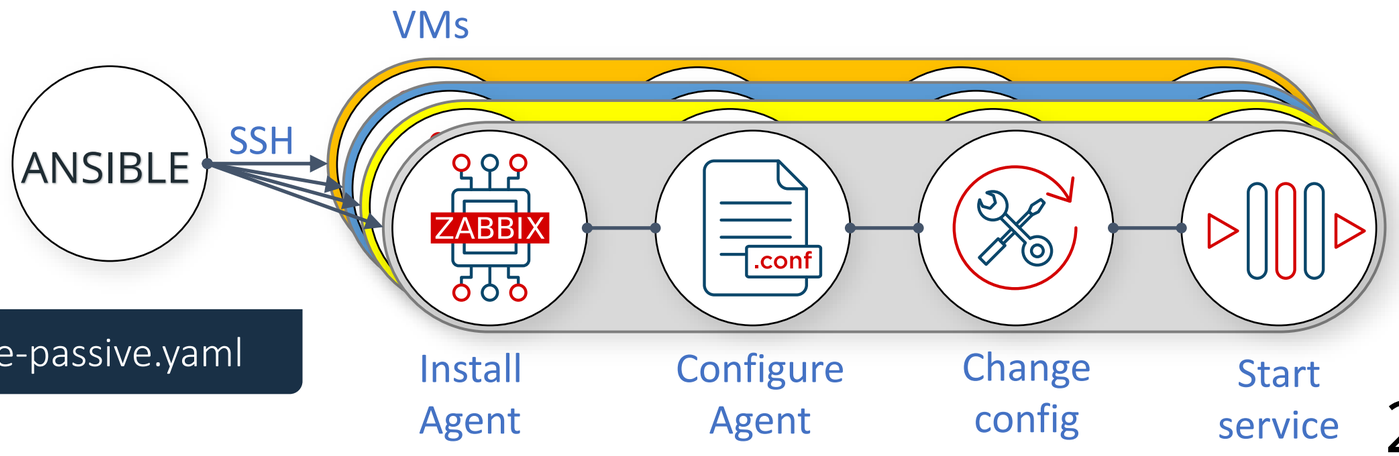
Make changes dynamically

- Make changes to agent configuration
- Set different encryption settings
- Create/ modify host with community Zabbix module (user macro credentials, custom PSK encryption settings)

community.zabbix.zabbix_host module – Create/update/delete Zabbix hosts

```
deploy/
├── playbook-agent2-active-passive.yaml
└── inventory.ini
```

```
# ansible-playbook -i inventory.ini playbook-agent2-active-passive.yaml
```



Ansible: deploying the Zabbix agent in active and passive mode

Using shell commands

```
- name: Install and configure Zabbix Agent 2 active and passive (simple shell)
  hosts: linux
  become: yes
  tasks:
    - name: Setup Zabbix Agent2
      shell: |
        dnf install -y https://repo.zabbix.com/zabbix/7.4/release/centos/9/noarch/zabbix-release-latest-7.4.el9.noarch.rpm
        dnf install -y zabbix-agent2
        sed -i '/^Server=\|^ServerActive=\|^HostnameItem=\|^Hostname=/d' /etc/zabbix/zabbix_agent2.conf
        echo "Server={{ server_ip }}" >> /etc/zabbix/zabbix_agent2.conf
        echo "ServerActive={{ server_ip }}" >> /etc/zabbix/zabbix_agent2.conf
        echo "HostnameItem=system.hostname[shorthost]" >> /etc/zabbix/zabbix_agent2.conf
        echo "HostMetadata={{ host_metadata }}" >> /etc/zabbix/zabbix_agent2.conf
        systemctl enable --now zabbix-agent2
    - name: Show Zabbix Agent2 state
      shell: systemctl is-active zabbix-agent2
      register: agent_status
    - name: Print agent status
      debug:
        msg: "{{ inventory_hostname }} -> {{ agent_status.stdout }}"
```

playbook-shell-agent2-active-passive.yaml

```
[linux]
134.209.250.73
138.68.101.217 host_metadata=mysql,production
# Group variable
[linux:vars]
host_metadata=linux,production
server_ip=165.227.137.207
```

inventory.ini

Using Ansible modules

```
- name: Configure and deploy Zabbix Agent 2
  hosts: linux
  become: yes
  tasks:
    - name: Add Zabbix 7.0 repo for Centos
      dnf:
        name: https://repo.zabbix.com/zabbix/7.4/release/centos/9/noarch/zabbix-release-latest-7.4.el9.noarch.rpm
        state: present
    - name: Install Zabbix agent2
      dnf:
        name: zabbix-agent2
        state: present
        update_cache: yes
    - name: Configure Server & ServerActive, HostMetadata
      lineinfile:
        path: /etc/zabbix/zabbix_agent2.conf
        regexp: "^{{ item.key }}="
        line: "{{ item.key }}={{ item.value }}"
      loop:
        - { key: "Server", value: "{{ server_ip }}" }
        - { key: "ServerActive", value: "{{ server_ip }}" }
        - { key: "HostnameItem", value: "system.hostname[shorthost]" }
        - { key: "HostMetadata", value: "{{ host_metadata }}" }
      notify: restart agent on config change
    - name: Remove Hostname parameter
      lineinfile:
        path: /etc/zabbix/zabbix_agent2.conf
        regexp: "^Hostname="
        state: absent
    - name: Enable and start service
      service:
        name: zabbix-agent2
        state: started
        enabled: yes
  handlers:
    - name: restart agent on config change
      service: { name: zabbix-agent2, state: restarted }
```

playbook-agent2-active-passive.yaml

Deploying the Zabbix agent with Ansible

```
[root@testenv deploy]# ansible-playbook -i inventory.ini playbook-shell-agent2-active-passive.yaml

PLAY [Install and configure Zabbix Agent 2 a

TASK [Gathering Facts] **********************
ok: [138.68.101.217]
ok: [134.209.250.73]

TASK [Setup Zabbix Agent2] ******************
changed: [138.68.101.217]
changed: [134.209.250.73]

TASK [Show Zabbix Agent2 state] *************
changed: [138.68.101.217]
changed: [134.209.250.73]

TASK [Print agent status] ********************
ok: [134.209.250.73] => {
    "msg": "134.209.250.73 -> active"
}
ok: [138.68.101.217] => {
    "msg": "138.68.101.217 -> active"
}

PLAY RECAP **********************************
134.209.250.73             : ok=4    changed
138.68.101.217             : ok=4    changed
```

```
[root@testenv deploy]# ansible-playbook -i inventory.ini playbook-agent2-active-passive.yaml

PLAY [Configure and deploy Zabbix Agent 2] ***************************************************************

TASK [Gathering Facts] ***********************************************************************************
ok: [138.68.101.217]
ok: [134.209.250.73]

TASK [Add Zabbix 7.0 repo for Centos] ********************************************************************
changed: [138.68.101.217]
changed: [134.209.250.73]

TASK [Install Zabbix agent2] *****************************************************************************
changed: [138.68.101.217]
changed: [134.209.250.73]

TASK [Configure Server & ServerActive, HostMetadata] *****************************************************
changed: [138.68.101.217] => (item={'key': 'Server', 'value': '165.227.137.207'})
changed: [134.209.250.73] => (item={'key': 'Server', 'value': '165.227.137.207'})
changed: [138.68.101.217] => (item={'key': 'ServerActive', 'value': '165.227.137.207'})
changed: [134.209.250.73] => (item={'key': 'ServerActive', 'value': '165.227.137.207'})
changed: [138.68.101.217] => (item={'key': 'HostnameItem', 'value': 'system.hostname[shorthost]'})
changed: [134.209.250.73] => (item={'key': 'HostnameItem', 'value': 'system.hostname[shorthost]'})
changed: [138.68.101.217] => (item={'key': 'HostMetadata', 'value': 'logs'})
changed: [134.209.250.73] => (item={'key': 'HostMetadata', 'value': 'linux'})

TASK [Remove Hostname parameter] *************************************************************************
changed: [138.68.101.217]
changed: [134.209.250.73]

TASK [Enable and start service] **************************************************************************
changed: [138.68.101.217]
changed: [134.209.250.73]

RUNNING HANDLER [restart agent on config change] *********************************************************
changed: [138.68.101.217]
changed: [134.209.250.73]

PLAY RECAP ***********************************************************************************************
134.209.250.73             : ok=7    changed=6    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
138.68.101.217             : ok=7    changed=6    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

If something has changed in configuration (shell command) ?

```
[root@testenv deploy]# ansible-playbook -i inventory.ini playbook-shell-agent2-active-passive.yaml

PLAY [Install and configure Zabbix Agent 2 active and passive (simple shell)] ***********************************

TASK [Gathering Facts] ***************************************************************************************
ok: [138.68.101.217]
ok: [134.209.250.73]

TASK [Setup Zabbix Agent2] ***********************************************************************************
changed: [138.68.101.217]
changed: [134.209.250.73]

TASK [Show Zabbix Agent2 state] ******************************************************************************
changed: [138.68.101.217]
changed: [134.209.250.73]

TASK [Print agent status] ************************************************************************************
ok: [134.209.250.73] => {
    "msg": "134.209.250.73 -> active"
}
ok: [138.68.101.217] => {
    "msg": "138.68.101.217 -> active"
}

PLAY RECAP ***************************************************************************************************
134.209.250.73             : ok=4    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
138.68.101.217             : ok=4    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

Shell commands do not have memory of what changed

If something has changed in configuration (modules) ?

```
[root@testenv deploy]# ansible-playbook -i inventory.ini playbook-agent2-active-passive.yaml

PLAY [Configure and deploy Zabbix Agent 2] ************************************************************************

TASK [Gathering Facts] ********************************************************************************************
ok: [138.68.101.217]
ok: [134.209.250.73]

TASK [Add Zabbix 7.0 repo for Centos] *****************************************************************************
ok: [138.68.101.217]
ok: [134.209.250.73]

TASK [Install Zabbix agent2] **************************************************************************************
ok: [134.209.250.73]
ok: [138.68.101.217]

TASK [Configure Server & ServerActive, HostMetadata] **************************************************************
ok: [138.68.101.217] => (item={'key': 'Server', 'value': '165.227.137.207'})
ok: [134.209.250.73] => (item={'key': 'Server', 'value': '165.227.137.207'})
ok: [138.68.101.217] => (item={'key': 'ServerActive', 'value': '165.227.137.207'})
ok: [134.209.250.73] => (item={'key': 'ServerActive', 'value': '165.227.137.207'})
ok: [138.68.101.217] => (item={'key': 'HostnameItem', 'value': 'system.hostname[shorthost]'})
ok: [134.209.250.73] => (item={'key': 'HostnameItem', 'value': 'system.hostname[shorthost]'})
ok: [138.68.101.217] => (item={'key': 'HostMetadata', 'value': 'logs'})
changed: [134.209.250.73] => (item={'key': 'HostMetadata', 'value': 'linux'})

TASK [Remove Hostname parameter] **********************************************************************************
ok: [138.68.101.217]
ok: [134.209.250.73]

TASK [Enable and start service] ***********************************************************************************
ok: [138.68.101.217]
ok: [134.209.250.73]

RUNNING HANDLER [restart agent on config change] ******************************************************************
changed: [134.209.250.73]

PLAY RECAP ********************************************************************************************************
134.209.250.73             : ok=7    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
138.68.101.217             : ok=6    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

Easy to see if anything has been manually changed

Thank you for attention!

ZABBIX '26
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