



Ansible, the missing piece

Managing agents and orchestrating
remediation

Andrew Nelson
Senior Consultant
September 15, 2017

TOC

- Introduction
- What is Ansible and Ansible Tower
- Using Zabbix as an inventory source
- Remediation of issues discovered by Zabbix

whoami

Senior Consultant with Red Hat in North America

Member of the Zabbix community for more than 15 years

Author of ZBXAPI, first ever Zabbix API library.

Maintainer of the original Zabbix bot in #zabbix (now back online)

Linux user since 1996



Ansible and Ansible Tower

Ansible

- Tool for agentless orchestration and configuration management
 - Clients need to have at least Python 2.6
 - Default access method is via SSH
- Design is functional in nature.
- Playbooks use a yaml format which provide the parameters for modules
- Core libraries are written in Ansible, but modules can be written in any language.
- Leverages the Jinja2 templating engine

Ansible Tower

- Web based fronted to Ansible
 - Provides a separation of permissions via a Role Based Access Control model. User may have permissions to run a privileged playbook, but will not have permission to view privileged credentials.
 - Ability to go back in time and review playbook runs
 - Provides a REST API interface
- Upstream project is AWX
 - <https://github.com/ansible/awx>

A *brief* introduction to Ansible

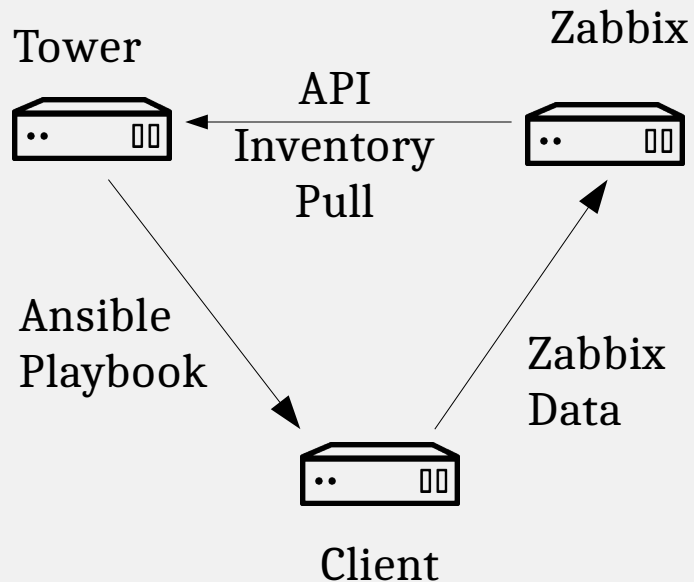
Following snippet will add a welcome message when logging in.

```
---  
- hosts: all  
  become: true  
  
  tasks:  
    - name: Change /etc/issue message  
      copy:  
        contents: "Hello Ansible world!"  
        dest: /etc/issue  
        perms: 0444  
        owner: root  
        seuser: system_u  
        serole: object_r  
        setype: etc_t
```

Using Zabbix as an Inventory Source

The Need

- Zabbix lacks agent configuration management.
- Configure Zabbix agents when hosts are added to Zabbix.
- Deploy additional client configurations if required by for specific templates.

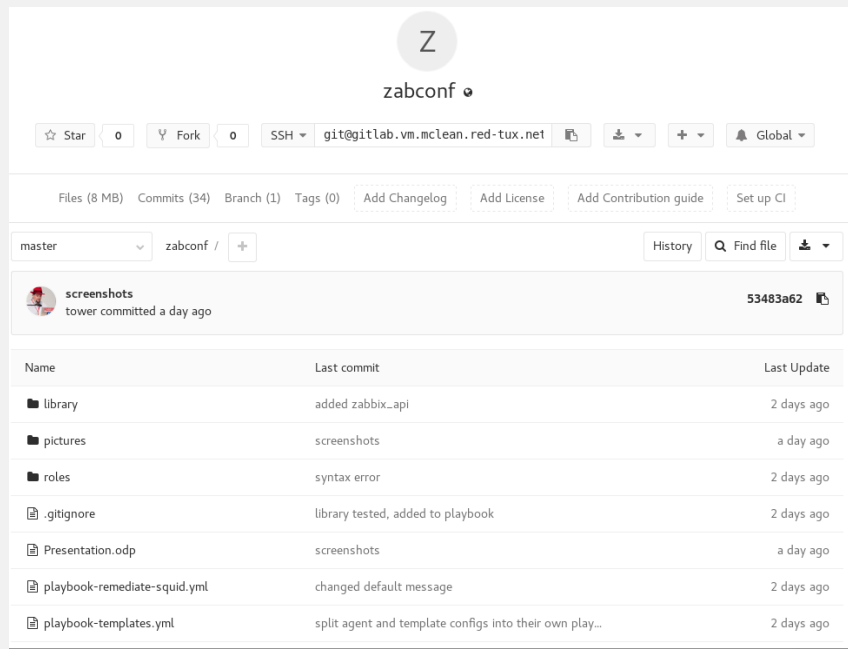


The Components

- Ansible provides a capability for dynamic inventories
- Scripting already exists for Ansible Core to use Zabbix as an inventory source
- Script requires modification to run in the current version of Tower.
 - Tower runs scripts in a dynamic /tmp directory, script needs the full path to it's credential ini file.
- Groups and host names in Zabbix can contain spaces, this may cause challenges in Ansible

The Approach

- Create repository for Zabbix playbooks



The screenshot shows a GitHub repository page for 'zabconf' by user 'Z'. The repository has 0 stars and 0 forks. The SSH URL is 'git@gitlab.vm.mclean.red-tux.net'. The repository contains 8 files (8 MB), 34 commits, 1 branch, and 0 tags. The files listed are: library, pictures, roles, .gitignore, Presentation.odp, playbook-remediate-squid.yml, and playbook-templates.yml. The last commit was made by 'screenshots' (tower) a day ago, with commit hash 53483a62.

Name	Last commit	Last Update
library	added zabbix_api	2 days ago
pictures	screenshots	a day ago
roles	syntax error	2 days ago
.gitignore	library tested, added to playbook	2 days ago
Presentation.odp	screenshots	a day ago
playbook-remediate-squid.yml	changed default message	2 days ago
playbook-templates.yml	split agent and template configs into their own play...	2 days ago

The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent

```
---  
- hosts: all  
  become: true  
  
  roles:  
  - zabbix_agent
```

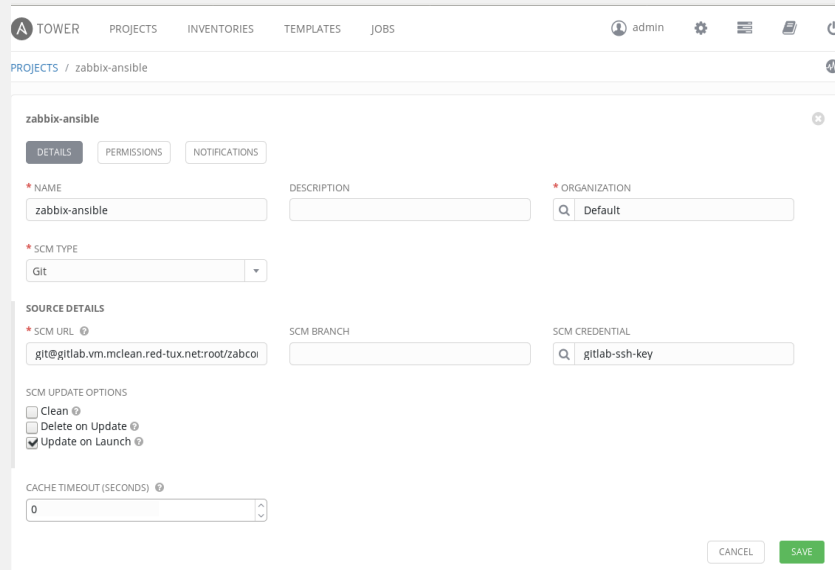
The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent

```
---  
- hosts: templ_Template_Squid  
  become: true  
  
  roles:  
  - zabbix_squid
```

The Approach

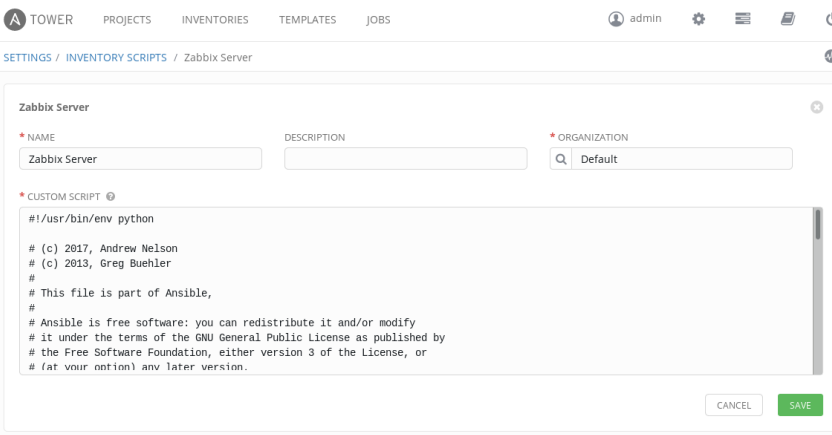
- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent
- Add project to Ansible Tower for playbooks



The screenshot displays the Ansible Tower web interface for configuring a project named 'zabbix-ansible'. The interface includes a top navigation bar with tabs for 'TOWER', 'PROJECTS', 'INVENTORIES', 'TEMPLATES', and 'JOBS'. The 'PROJECTS' tab is active, and the breadcrumb path is 'PROJECTS / zabbix-ansible'. The main content area shows the 'zabbix-ansible' project details, with tabs for 'DETAILS', 'PERMISSIONS', and 'NOTIFICATIONS'. The 'DETAILS' tab is selected, showing fields for NAME (zabbix-ansible), DESCRIPTION, ORGANIZATION (Default), SCM TYPE (Git), SCM URL (git@github.com:vm.mclean:red-tux.netroot/zabbix-ansible), SCM BRANCH, and SCM CREDENTIAL (gitlab-ssh-key). There are also checkboxes for 'Clean', 'Delete on Update', and 'Update on Launch', and a 'CACHE TIMEOUT (SECONDS)' field set to 0. 'CANCEL' and 'SAVE' buttons are at the bottom right.

The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent
- Add project to Ansible Tower for playbooks
- Add Zabbix inventory script to Tower



The screenshot displays the Ansible Tower web interface. The top navigation bar includes 'TOWER', 'PROJECTS', 'INVENTORIES', 'TEMPLATES', and 'JOBS'. The user 'admin' is logged in. The breadcrumb trail shows 'SETTINGS / INVENTORY SCRIPTS / Zabbix Server'. The main form is titled 'Zabbix Server' and contains the following fields:

- NAME:** A text input field containing 'Zabbix Server'.
- DESCRIPTION:** An empty text input field.
- ORGANIZATION:** A dropdown menu with 'Default' selected.
- CUSTOM SCRIPT:** A large text area containing the following text:

```
#!/usr/bin/env python

# (c) 2017, Andrew Nelson
# (c) 2013, Greg Buehler
#
# This file is part of Ansible,
#
# Ansible is free software: you can redistribute it and/or modify
# it under the terms of the GNU General Public License as published by
# the Free Software Foundation, either version 3 of the License, or
# (at your option) any later version.
```

At the bottom right of the form are 'CANCEL' and 'SAVE' buttons.

The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent
- Add project to Ansible Tower for playbooks
- Add Zabbix inventory script to Tower
- Create Job templates for agent playbooks (2 job templates)

TEMPLATES / Zabbix Agent Configuration

Zabbix Agent Configuration

DETAILS COMPLETED JOBS PERMISSIONS NOTIFICATIONS ADD SURVEY

* NAME Zabbix Agent Configuration DESCRIPTION

* JOB TYPE Run ☐ Prompt on launch

* INVENTORY Zabbix ☐ Prompt on launch

* PROJECT zabbix-ansible

* PLAYBOOK playbook-zabbix-agent.yml

* MACHINE CREDENTIAL Ansible User ☐ Prompt on launch

CLOUD CREDENTIAL

NETWORK CREDENTIAL

FORKS 0 ☐ Prompt on launch

LIMIT ☐ Prompt on launch

* VERBOSITY 0 (Normal)

JOB TAGS ☐ Prompt on launch

SKIP TAGS ☐ Prompt on launch

OPTIONS

☐ Enable Privilege Escalation

☐ Allow Provisioning Callbacks

☐ Enable Concurrent Jobs

LABELS

EXTRA VARIABLES ☒ YAML ☐ JSON

1

☐ Prompt on launch

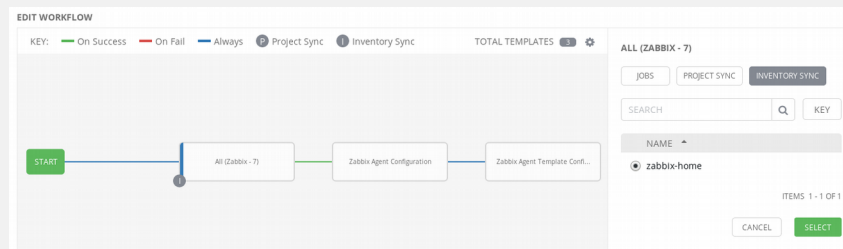
The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent
- Add project to Ansible Tower for playbooks
- Add Zabbix inventory script to Tower
- Create Job templates for agent playbooks (2 job templates)
- Create workflow job to run playbooks (Step 1 of 4)

The screenshot shows the 'Zabbix Agent Configuration Workflow' form in Ansible Tower. The breadcrumb trail at the top is 'TEMPLATES / Zabbix Agent Configuration Workflow'. The form has tabs for 'DETAILS', 'PERMISSIONS', 'NOTIFICATIONS', 'ADD SURVEY', and 'WORKFLOW EDITOR'. The 'DETAILS' tab is active. The form fields include: 'NAME' (Zabbix Agent Configuration Workflow), 'DESCRIPTION' (Workflow to update inventory, then config), 'ORGANIZATION' (Default), 'LABELS' (empty), and 'EXTRA VARIABLES' (YAML selected). The 'EXTRA VARIABLES' section shows a code editor with a single line '1 ---'. At the bottom right are 'CANCEL' and 'SAVE' buttons.

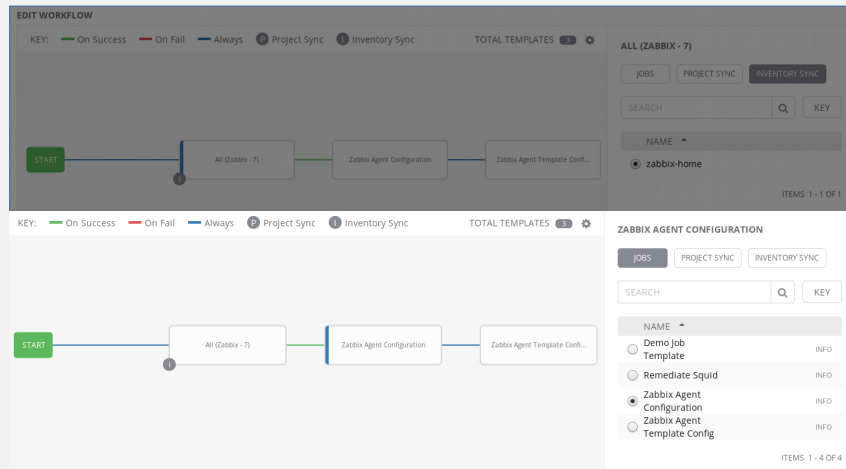
The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent
- Add project to Ansible Tower for playbooks
- Add Zabbix inventory script to Tower
- Create Job templates for agent playbooks (2 job templates)
- Create workflow job to run playbooks (Step 2 of 4)



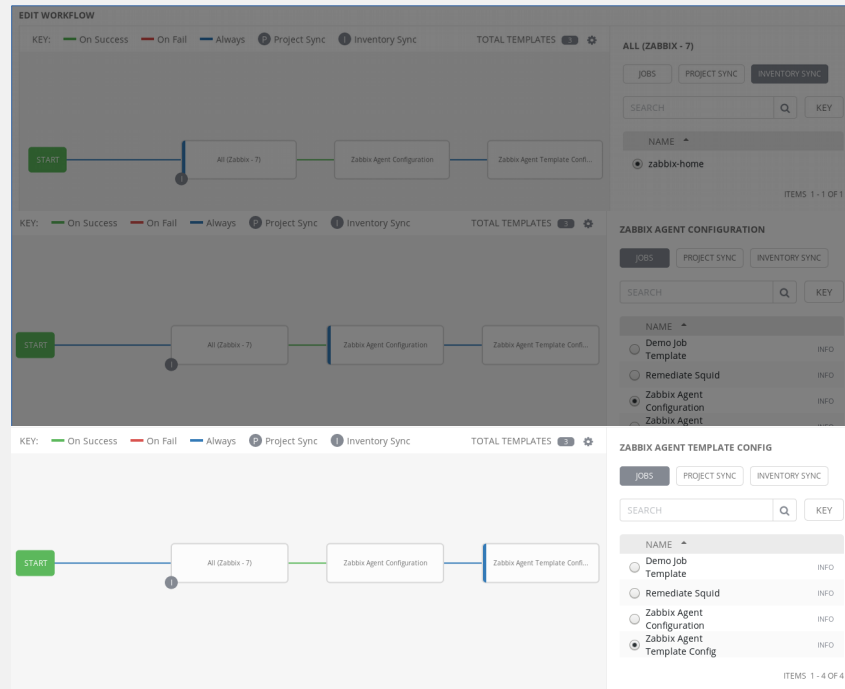
The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent
- Add project to Ansible Tower for playbooks
- Add Zabbix inventory script to Tower
- Create Job templates for agent playbooks (2 job templates)
- Create workflow job to run playbooks (Step 3 of 4)



The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent
- Add project to Ansible Tower for playbooks
- Add Zabbix inventory script to Tower
- Create Job templates for agent playbooks (2 job templates)
- Create workflow job to run playbooks (Step 4 of 4)



The Approach

- Create repository for Zabbix playbooks
- Write playbook to configure agent
- Write playbook to add template items to agent
- Add project to Ansible Tower for playbooks
- Add Zabbix inventory script to Tower
- Create Job templates for agent playbooks (2 job templates)
- Create workflow job to run playbooks
- Configure workflow job to run every hour.

The screenshot displays the 'Hourly Zabbix Agent Configuration' job template configuration page in Ansible Tower. The breadcrumb trail at the top reads: 'TEMPLATES / Zabbix Agent Configuration Workflow / SCHEDULES / Hourly Zabbix Agent Configuration'. The form includes the following fields:

- * NAME:** 'Hourly Zabbix Agent Configuration'
- * START DATE:** '09/11/2017' (with a calendar icon)
- * START TIME (HH:MM:SS):** '00:00:00' (with dropdowns for hours, minutes, and seconds)
- * LOCAL TIME ZONE:** 'America/New_York' (with a dropdown menu)
- * REPEAT FREQUENCY:** 'Hour' (with a dropdown menu)
- FREQUENCY DETAILS:**
 - * EVERY:** '1' (with a dropdown menu) HOURS
 - * END:** 'Never' (with a dropdown menu)
- SCHEDULE DESCRIPTION:**
 - every hour
 - OCCURRENCES (Limited to first 10):
 - 9/11/2017 00:00:00 EDT
 - 9/11/2017 01:00:00 EDT
 - 9/11/2017 02:00:00 EDT
 - DATE FORMAT: ☒ LOCAL TIME ☐ UTC

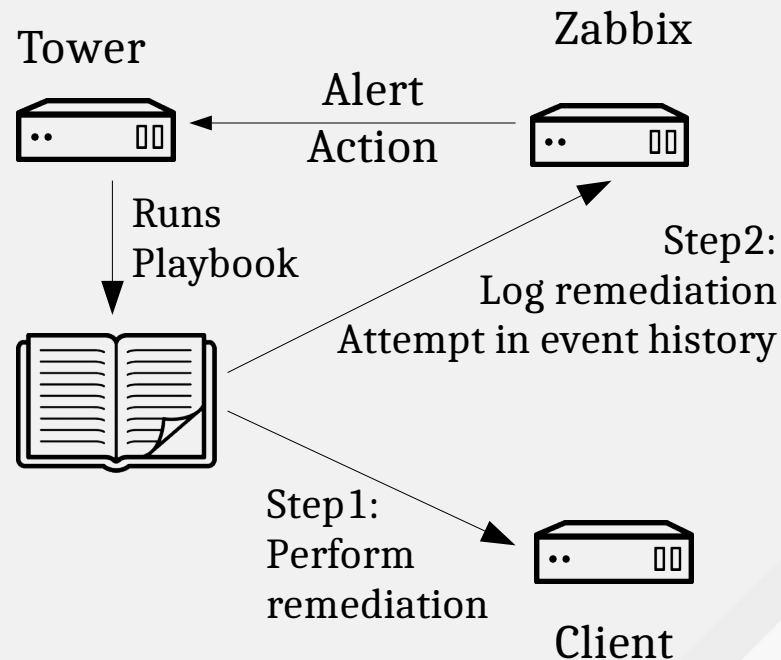
Brief Review

- Host added to Zabbix
- Agent configuration workflow runs hourly
 - Inventory updated
 - Agent configuration playbook is run
 - Playbook for template custom agent items is run
- Configuration workflow can be run at any time manually.

Automating Remediation

Remediating Issues with Tower

- Tower API can be leveraged to run playbooks from Zabbix
- tower-cli needs to be installed on Zabbix server.
- Remediation playbook will leave a message in Zabbix event history



Configuring Remediation

- Create remediation playbook
 - Custom module was required

```
---  
- hosts: all  
  become: true  
  
  tasks:  
    - name: Restart squid  
      service:  
        name: squid  
        state: restarted  
  
    - name: Acknowledge alert  
      become: false  
      local_action:  
        module: zabbix_ack  
        server_url: "{{ server_url }}"  
        login_user: "{{ login_user }}"  
        login_password: "{{ login_password }}"  
        eventid: "{{ eventid }}"  
        message: "Remediation attempted via Ansible  
Playbook ({{ ansible_date_time.date }}  
{{ ansible_date_time.time }})"  
        close_event: False
```


Configuring Remediation

- Create remediation playbook
 - Custom module was required
- Create Job template for remediation

The screenshot shows the 'Remediate Squid' job template configuration page in Ansible Tower. The page is divided into several sections for configuring the job:

- NAME:** 'Remediate Squid'
- DESCRIPTION:** (Empty text area)
- JOB TYPE:** 'Run' (dropdown menu)
- Prompt on launch:** (checkbox, unchecked)
- INVENTORY:** 'Zabbix' (dropdown menu)
- PROJECT:** 'zabbix-ansible' (dropdown menu)
- PLAYBOOK:** 'playbook-remediate-squid.yml' (dropdown menu)
- MACHINE CREDENTIAL:** 'Ansible User' (dropdown menu)
- CLOUD CREDENTIAL:** (Empty dropdown menu)
- NETWORK CREDENTIAL:** (Empty dropdown menu)
- FORKS:** '0' (dropdown menu)
- LIMIT:** (Empty dropdown menu)
- VERBOSITY:** '0 (Normal)' (dropdown menu)
- Prompt on launch:** (checkbox, checked)
- JOB TAGS:** (Empty text area)
- SKIP TAGS:** (Empty text area)
- Prompt on launch:** (checkbox, unchecked)
- LABELS:** (Empty text area)
- EXTRA VARIABLES:** (YAML/JSON tabs, YAML selected)

```
1 ---
2 server_url: http://zabbix.mclean.red-tux.net/zabbix
3 login_user: tower
4 login_password: towerpass
```
- OPTIONS:**
 - ☐ Enable Privilege Escalation
 - ☐ Allow Provisioning Callbacks
 - ☐ Enable Concurrent Jobs

Configuring Remediation

- Create remediation playbook
 - Custom module was required
- Create Job template for remediation
 - Ensure template requires eventid

The screenshot displays the Zabbix web interface for configuring a remediation job template named 'Remediate Squid'. A modal dialog box titled 'Remediate Squid | SURVEY' is open, allowing the user to add a survey prompt. The dialog includes the following fields and options:

- PROMPT:** A text input field.
- DESCRIPTION:** A text input field.
- ANSWER VARIABLE NAME:** A text input field.
- ANSWER TYPE:** A dropdown menu with the option 'Choose an answer type'.
- REQUIRED:** A checked checkbox.
- PREVIEW:** A section showing a preview of the survey prompt, including an 'EVENTID' field.

At the bottom of the dialog, there are buttons for 'CANCEL', 'OK', 'DELETE SURVEY', and 'SAVE'. The background interface shows various configuration tabs like 'DETAILS', 'COMPLETED JOBS', 'PERMISSIONS', 'NOTIFICATIONS', and 'JOB SAVED'.

Configuring Remediation

- Create remediation playbook
 - Custom module was required
- Create Job template for remediation
- Create Zabbix alert

Host groups Templates Hosts Maintenance **Actions** Event correlation Discovery Services

Actions

Action Operations **Recovery operations** Acknowledgement operations

Default operation step duration

Default subject

Default message

Pause operations while in maintenance ☒

Operations	Steps	Details	Start in	Duration	Action
	1	Run remote commands on current host	Immediately	Default	Edit Remove

[New](#)

Zabbix 3.4.0. © 2001–2017, Zabbix SIA

Configuring Remediation

- Create remediation playbook
 - Custom module was required
- Create Job template for remediation
- Create Zabbix alert
 - Make sure “tower-cli” is installed on Zabbix server

Operation details

Steps - (0 - infinitely)

Step duration (0 - use action default)

Operation type

Target list

Target	Action
Current host	Remove
New	

Type

Execute on

Commands

```
tower-cli job launch --job-template=18 --extra-vars="eventid={EVENT.ID}" --limit {HOST.NAME}
```

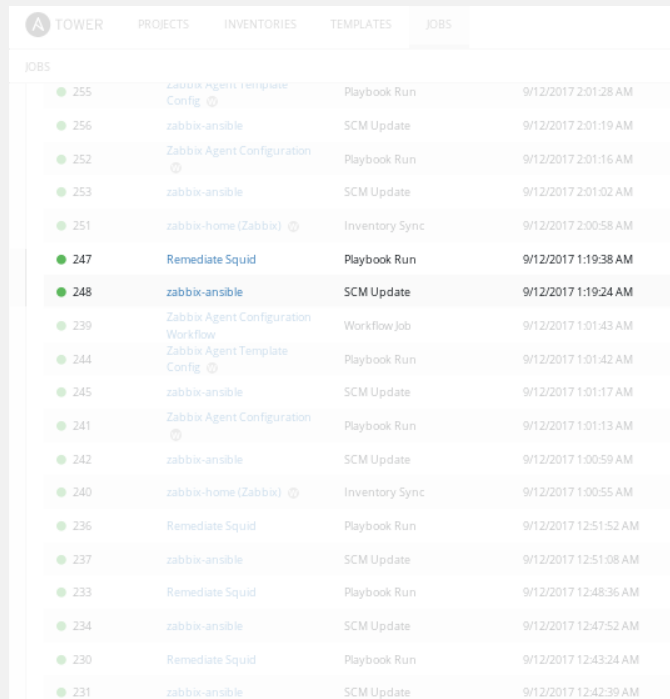
Conditions

Label	Name	Action
New		

[Update](#) [Cancel](#)

Configuring Remediation

- Create remediation playbook
 - Custom module was required
- Create Job template for remediation
- Create Zabbix alert
- Test



The screenshot shows the 'JOBS' tab in the Ansible Tower interface. It displays a table of job templates and their execution history. The table has four columns: ID, Name, Action, and Date. The 'Name' column includes a status icon (green dot for success, red dot for failure) and a link to the job details. The 'Action' column shows the type of job (e.g., Playbook Run, SCM Update, Inventory Sync). The 'Date' column shows the execution time.

ID	Name	Action	Date
255	zabbix-agent-remediate Config	Playbook Run	9/12/2017 2:01:28 AM
256	zabbix-ansible	SCM Update	9/12/2017 2:01:19 AM
252	Zabbix Agent Configuration	Playbook Run	9/12/2017 2:01:16 AM
253	zabbix-ansible	SCM Update	9/12/2017 2:01:02 AM
251	zabbix-home (Zabbix)	Inventory Sync	9/12/2017 2:00:58 AM
247	Remediate Squid	Playbook Run	9/12/2017 1:19:38 AM
248	zabbix-ansible	SCM Update	9/12/2017 1:19:24 AM
239	Zabbix Agent Configuration Workflow	Workflow Job	9/12/2017 1:01:43 AM
244	Zabbix Agent Template Config	Playbook Run	9/12/2017 1:01:42 AM
245	zabbix-ansible	SCM Update	9/12/2017 1:01:17 AM
241	Zabbix Agent Configuration	Playbook Run	9/12/2017 1:01:13 AM
242	zabbix-ansible	SCM Update	9/12/2017 1:00:59 AM
240	zabbix-home (Zabbix)	Inventory Sync	9/12/2017 1:00:55 AM
236	Remediate Squid	Playbook Run	9/12/2017 12:51:52 AM
237	zabbix-ansible	SCM Update	9/12/2017 12:51:08 AM
233	Remediate Squid	Playbook Run	9/12/2017 12:48:36 AM
234	zabbix-ansible	SCM Update	9/12/2017 12:47:52 AM
230	Remediate Squid	Playbook Run	9/12/2017 12:43:24 AM
231	zabbix-ansible	SCM Update	9/12/2017 12:42:39 AM

Configuring Remediation

- Create remediation playbook
 - Custom module was required
- Create Job template for remediation
- Create Zabbix alert
- Test

Event details

Event source details	
Host	akira.mclean.red-tux.net
Trigger	Squid Service not running
Severity	High
Problem expression	{akira.mclean.red-tux.net:tcp.listen[3128].last0}<>1
Recovery expression	
Event generation	Normal
Allow manual close	No
Disabled	No

Event details	
Event	Squid Service not running
Time	2017-09-12 01:19:20
Acknowledged	Yes 1
Resolved by	Trigger
Tags	

Acknowledgements

Time	User	Message	User action
2017-09-12 01:19:33	tower (Tower User)	Remediation attempted via Ansible Playbook (2017-09-12 01:19:30)	

Message actions

Step	Time	Type	Status	Retries left	Recipient	Message	Info
No data found.							

Command actions

Step	Time	Status	Command	Error
Problem				
1	2017-09-12 01:19:21	Executed	akira.mclean.red-tux.net:tower-cli job launch --job-template=18 --extra-vars="eventId=389141" --limit akira.mclean.red-tux.net	

Event list [previous 20]

Time	Recovery time	Status	Age	Duration	Ack	Actions
2017-09-12 01:19:20	2017-09-12 01:20:20	RESOLVED	2d 6h 41m	1m	Yes 1	Done 1
2017-09-12 01:09:20	2017-09-12 01:18:20	RESOLVED	2d 6h 51m	9m	No	Failures 1

Conclusion

Source Code

Scripts are available on github:
<https://github.com/red-tux/zabconf2017>



THANK YOU



plus.google.com/+RedHat



facebook.com/redhatinc



linkedin.com/company/red-hat



twitter.com/RedHatNews



youtube.com/user/RedHatVideos