

# Ansible Automation





## WORKFORCE DEVELOPMENT



# DEBUGGING ANSIBLE



# DEBUGGING ANSIBLE



Ansible offers a task debugger so you can fix errors during execution instead of editing your playbook and running it again to see if your change worked.

You have access to all the features of the debugger in the context of the task. You can check or set the value of variables, update module arguments, and re-run the task with the new variables and arguments.

The debugger lets you resolve the cause of the failure and continue with playbook execution.

# DEBUGGING ANSIBLE



For performance reasons, the debugger is not enabled by default. It must be enabled before playbook execution.

To enable the debugger:

Enable in configuration file:

```
[defaults]
enable_task_debugger = True
```

Enable using environment variable:

```
ANSIBLE_ENABLE_TASK_DEBUGGER=True ansible-playbook playbook.yml
```

# DEBUGGING ANSIBLE



The debugger can be enabled/disabled at the task, block, role, or play level. This is especially useful when developing or extending playbooks, plays, and roles.

You can enable the debugger on new or updated tasks. If they fail, you can fix the errors efficiently.

# DEBUGGING ANSIBLE

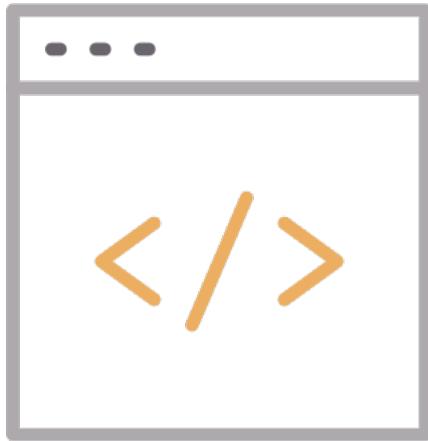


The `debugger` keyword accepts five values.

Invoke the debugger:

- `always`:
  - Always, regardless of the outcome
- `never`:
  - Never, regardless of the outcome
- `on_failed`:
  - Only if a task fails
- `on_unreachable`:
  - Only if a host is unreachable
- `on_skipped`:
  - Only if the task is skipped

# DEBUGGING ANSIBLE



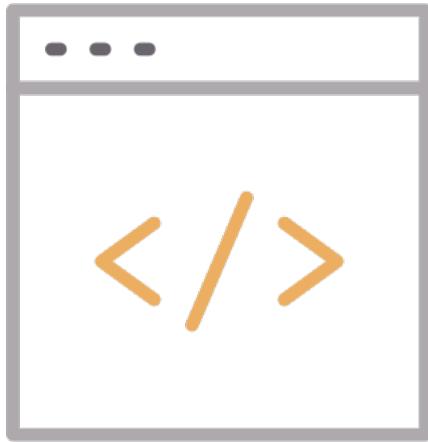
Examples of using the debugger keyword (task)

```
tasks:  
  - name: Execute a command  
    command: "false"  
    debugger: on_failed
```

Examples of using the debugger keyword (play)

```
- name: My play  
hosts: all  
debugger: on_skipped  
tasks:  
  - name: Execute a command  
    command: "true"  
    when: False
```

# DEBUGGING ANSIBLE



Examples of setting the debugger keyword at multiple levels

```
- name: Play
  hosts: all
  debugger: never
  tasks:
    - name: Execute a command
      command: "false"
      debugger: on_failed
```

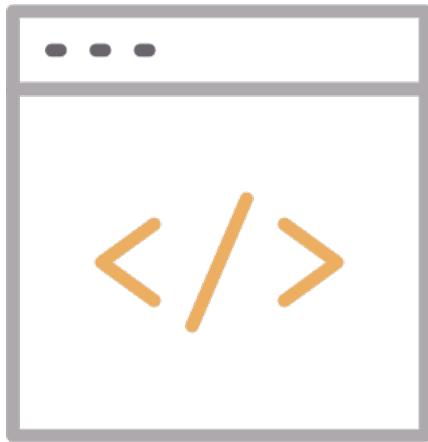
In this example, the debugger is set to never at the play level and to `on_failed` at the task level. If the task fails, Ansible invokes the debugger, because the definition on the task overrides the definition on its parent play.

# DEBUGGER COMMANDS



Command	Shortcut	Action
print	p	Print information
task.args[key] = value	N/A	Update module arguments
task_vars[key] = value	N/A	Update task variables (you must update_task next)
update_task	u	Recreate a task with updated task variables
redo	r	Run the task again
continue	c	Continue executing, starting with the new task
quit	q	Quit the debugger

# DEBUGGING ANSIBLE



After Ansible invokes the debugger, use the commands to resolve the error that Ansible encountered.

Consider this example playbook, which defines the `var1` variable but uses the undefined `wrong_var` variable in a task by mistake.

```
- hosts: test
  debugger: on_failed
  vars:
    var1: value1
  tasks:
    - name: Use wrong variable
      ping: data={{ wrong_var }}
```

# DEBUGGING ANSIBLE

If you run this playbook, Ansible invokes the debugger when the task fails.

From the debug prompt, you can change the module arguments or variables and run task again.

```
PLAY ****  
  
TASK [wrong variable] ****  
fatal: [192.0.2.10]: FAILED! => {"failed": true, "msg": "ERROR! 'wrong_var' is undefined"}  
Debugger invoked  
[192.0.2.10] TASK: wrong variable (debug)> p result._result  
{'failed': True,  
 'msg': 'The task includes an option with an undefined variable. The error '  
     "was: 'wrong_var' is undefined\n"  
     '\n'  
     'The error appears to have been in '  
     "'playbooks/debugger.yml': line 7, "  
     'column 7, but may\n'  
     'be elsewhere in the file depending on the exact syntax problem.\n'  
     '\n'  
     'The offending line appears to be:\n"  
     '\n'  
     ' tasks:\n'  
     '     - name: wrong variable\n'  
     '         ^ here\n'}
```

# POP QUIZ: DEBUGGING

What is the next step?

- A) Print task arguments
- B) Change variable name
- C) Change variable value
- D) Rerun task?



# POP QUIZ: DEBUGGING

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- D) Rerun task?



# DEBUGGING ANSIBLE

Update variable value, and rerun task

```
PLAY *****
...
[192.0.2.10] TASK: wrong variable (debug)> p task.args
{u'data': u'{{ wrong_var }}'}
[192.0.2.10] TASK: wrong variable (debug)> task.args['data'] = '{{ var1 }}'
[192.0.2.10] TASK: wrong variable (debug)> p task.args
{u'data': '{{ var1 }}'}
[192.0.2.10] TASK: wrong variable (debug)> redo
ok: [192.0.2.10]

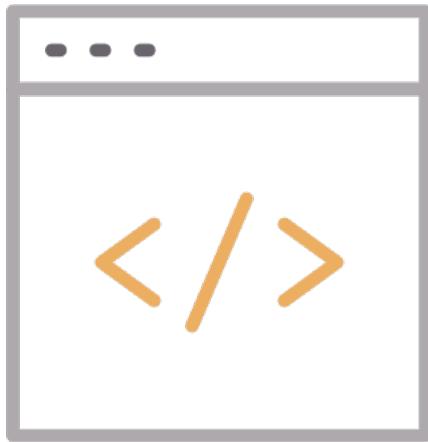
PLAY RECAP *****
192.0.2.10 : ok=1 changed=0 unreachable=0 failed=0
```

# DEBUGGING ANSIBLE

Print command: prints information about the task

```
[192.0.2.10] TASK: install package (debug)> p task
TASK: install package
[192.0.2.10] TASK: install package (debug)> p task.args
{u'name': u'{{ pkg_name }}'}
[192.0.2.10] TASK: install package (debug)> p task_vars
{u'ansible_all_ipv4_addresses': [u'192.0.2.10'],
 u'ansible_architecture': u'x86_64',
...
}
[192.0.2.10] TASK: install package (debug)> p task_vars['pkg_name']
u'bash'
[192.0.2.10] TASK: install package (debug)> p host
192.0.2.10
[192.0.2.10] TASK: install package (debug)> p result._result
{'_ansible_no_log': False,
 'changed': False,
 u'failed': True,
...
u'msg': u"No package matching 'not_exist' is available"}
```

# DEBUGGING ANSIBLE



Update args:

```
- hosts: test
  strategy: debug
  vars:
    pkg_name: not_exist
  tasks:
    - name: Install a package
      win_chocolatey: name={{ pkg_name }}
```

# DEBUGGING ANSIBLE

When you run the playbook, the invalid package name triggers an error.  
You can fix the package name by viewing, then updating the module argument.

```
[192.0.2.10] TASK: install package (debug) > p task.args
{u'name': u'{ { pkg_name } }'}
[192.0.2.10] TASK: install package (debug) > task.args['name'] = 'bash'
[192.0.2.10] TASK: install package (debug) > p task.args
{u'name': 'bash'}
[192.0.2.10] TASK: install package (debug) > redo
```

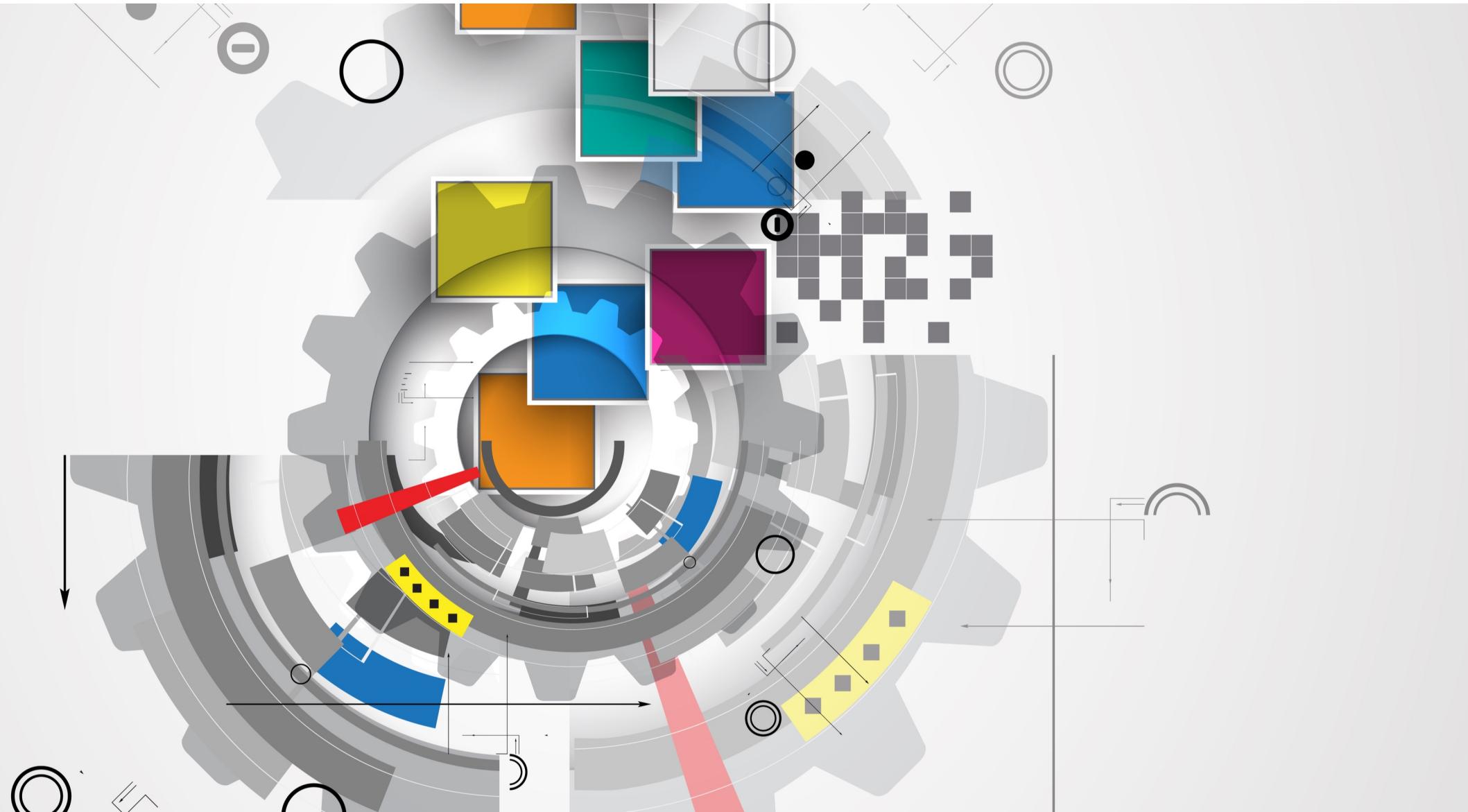
# DEBUGGING ANSIBLE

You can also fix the playbook by viewing, then updating the task variables instead of module args.

```
[192.0.2.10] TASK: install package (debug) > p task_vars['pkg_name']
'not_exist'
[192.0.2.10] TASK: install package (debug) > task.vars['pkg_name'] = 'bash'
[192.0.2.10] TASK: install package (debug) > p task_vars['pkg_name']
'bash'
[192.0.2.10] TASK: install package (debug) > update_task
[192.0.2.10] TASK: install package (debug) > redo
```

After updating task variables, you MUST use `update_task` to load the new variables before running the task again with `redo`

# CONTROLLING WHERE TASKS RUN



# CONTROLLING WHERE TASKS RUN



By default, Ansible gathers facts and executes all tasks on the machines defined in your playbook.

There are times where delegating tasks, facts etc. to a different machine or group is required.

For example, when updating your webservers, you might need to remove them from a load-balanced pool temporarily.

By delegating the task to localhost, you keep all the tasks within the same play.

# CONTROLLING WHERE TASKS RUN



There are some tasks that can not be delegated:

- include
- add\_host
- debug

# DELEGATING TASKS

If you want to perform a task on one host with reference to other hosts, use the `delegate_to` keyword on a task.

This is ideal for managing nodes in a load balanced pool or for controlling outage windows.

```
- hosts: webservers
  serial: 5
  tasks:
    - name: Remove from LB Pool
      command: remove {{ inventory_hostname }}
      delegate_to: 127.0.0.1

    - name: Steps for maintenance
      win_package:
        path: C:\fileshare\app.msi
        state: present

    - name: Add to LB Pool
      command: add {{ inventory_hostname }}
      delegate_to: 127.0.0.1
```

# DELEGATING TASKS

You can also combine `delegate_to` and command:

```
- hosts: webservers
  serial: 5
  tasks:
    - name: Remove from LB Pool
      local_action: command remove {{ inventory_hostname }}
    - name: Steps for maintenance
      win_package:
        path: C:\fileshare\app.msi
        state: present
    - name: Add to LB Pool
      local_action: command add {{ inventory_hostname }}
```

# POP QUIZ: DISCUSSION

What other uses for `delegate_to` can you think of?



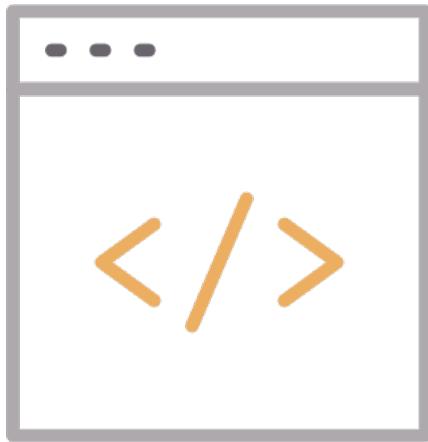
# POP QUIZ: DISCUSSION

What other uses for delegate\_to can you think of?

- Remove from monitoring
- Send notification (slack, teams, email, Pagerduty)
- Confirm dependent service is online (DB, MQ, Caching)



# DELEGATING TASKS



You can specify additional arguments with the following syntax:

```
tasks:  
  - name: Send email  
    local_action:  
      module: community.general.mail  
      subject: "Summary Mail"  
      to: "{{ mail_recipient }}"  
      body: "{{ mail_body }}"  
      run_once: True
```

# Organization

- Newly created users inherit specific roles from their organization based on their user type.
- Assign additional roles to a user after creation to grant permissions to view, use, or change other Ansible Platform objects.

Organizations

The screenshot shows a list of organizations in the Ansible Platform. The interface includes a search bar, an 'Add' button, and a delete button. The table has columns for Name, Members, Teams, and Actions. Two entries are listed: 'Default' and 'NewOrg'. Both entries have 0 members and 0 teams. Each entry has an edit icon (pencil) in the Actions column. The bottom of the screen shows pagination information: 1 - 2 of 2 items, 1 of 1 page.

<input type="checkbox"/> Name	Members	Teams	Actions
<input type="checkbox"/> Default	0	0	
<input type="checkbox"/> NewOrg	0	0	

# Team

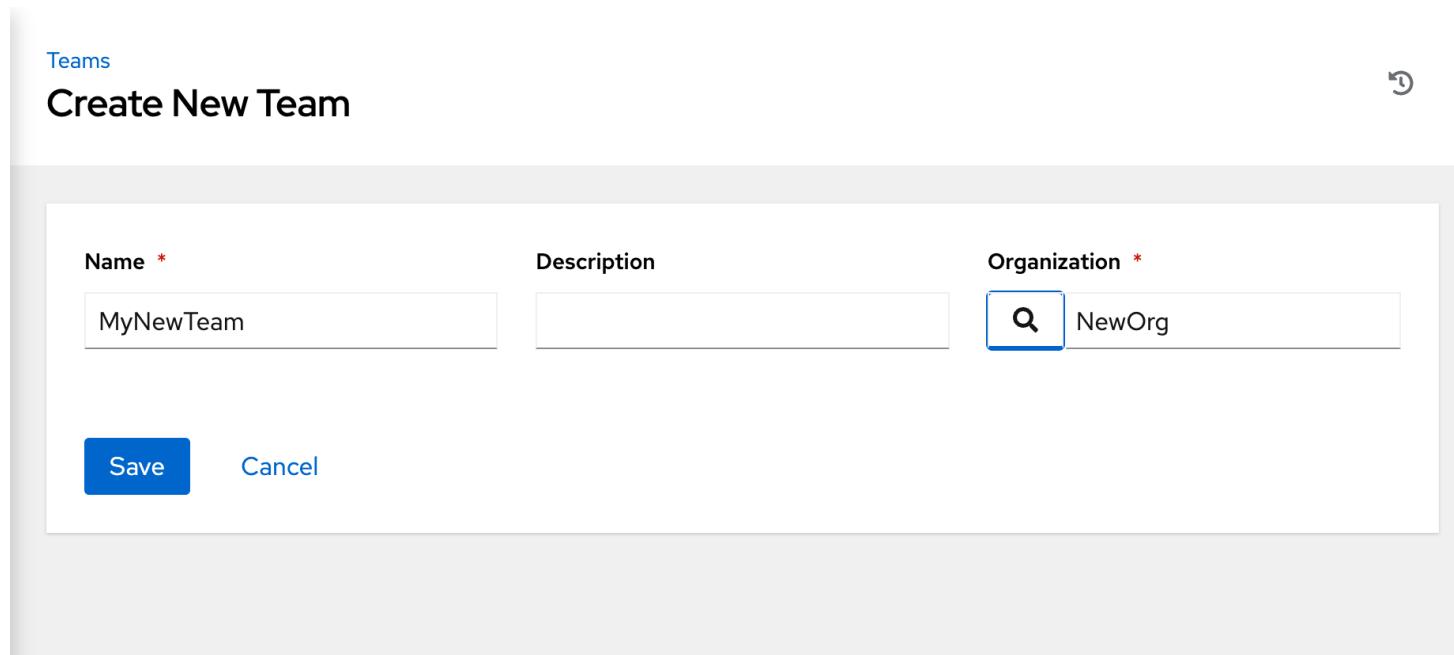
- You can apply permissions at the team level.

Teams

Create New Team

Save Cancel

Name *	Description	Organization *
MyNewTeam		NewOrg



# User Roles

- An organization is also one of these objects.
- There are three roles that users can be assigned:
- Admin
- Auditor
- User

Users

Create New User

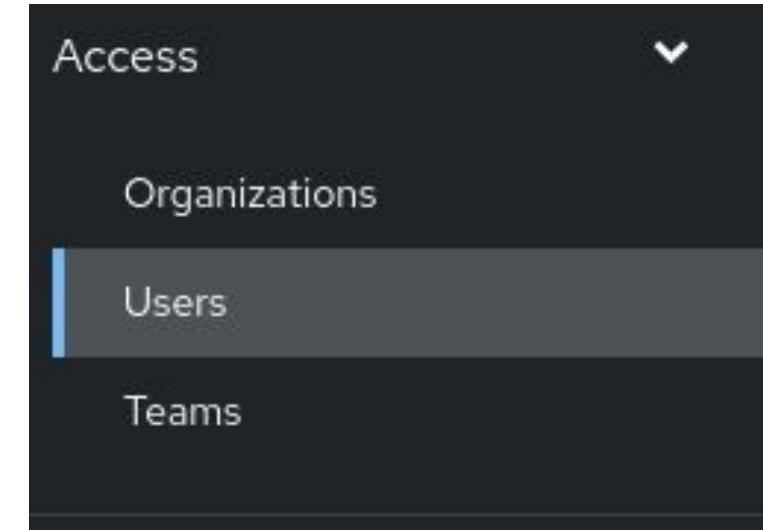
The screenshot shows a user creation interface. At the top, there are fields for First Name (User), Last Name (One), and Email (user1@domain.com). Below these are fields for Username (user1), Password, and Confirm Password, each with a visibility icon. A dropdown menu for User Type is open, showing options: ✓ Normal User (selected), System Auditor, and System Administrator. To the right, there is a field for Organization (NewOrg) with a search icon. At the bottom are Save and Cancel buttons.

First Name	Last Name	Email
User	One	user1@domain.com
Username *	Password *	Confirm Password *
user1	.....	.....
User Type *	Organization *	
✓ Normal User System Auditor System Administrator	NewOrg	

Save Cancel

# User Management

- An **organization** is a logical collection of users, teams, projects, inventories and more. All entities belong to an organization.
- A **user** is an account to access Ansible Automation Controller and its services given the permissions granted to it.
- **Teams** provide a means to implement role-based access control schemes and delegate responsibilities across organizations.



# Inventory Roles

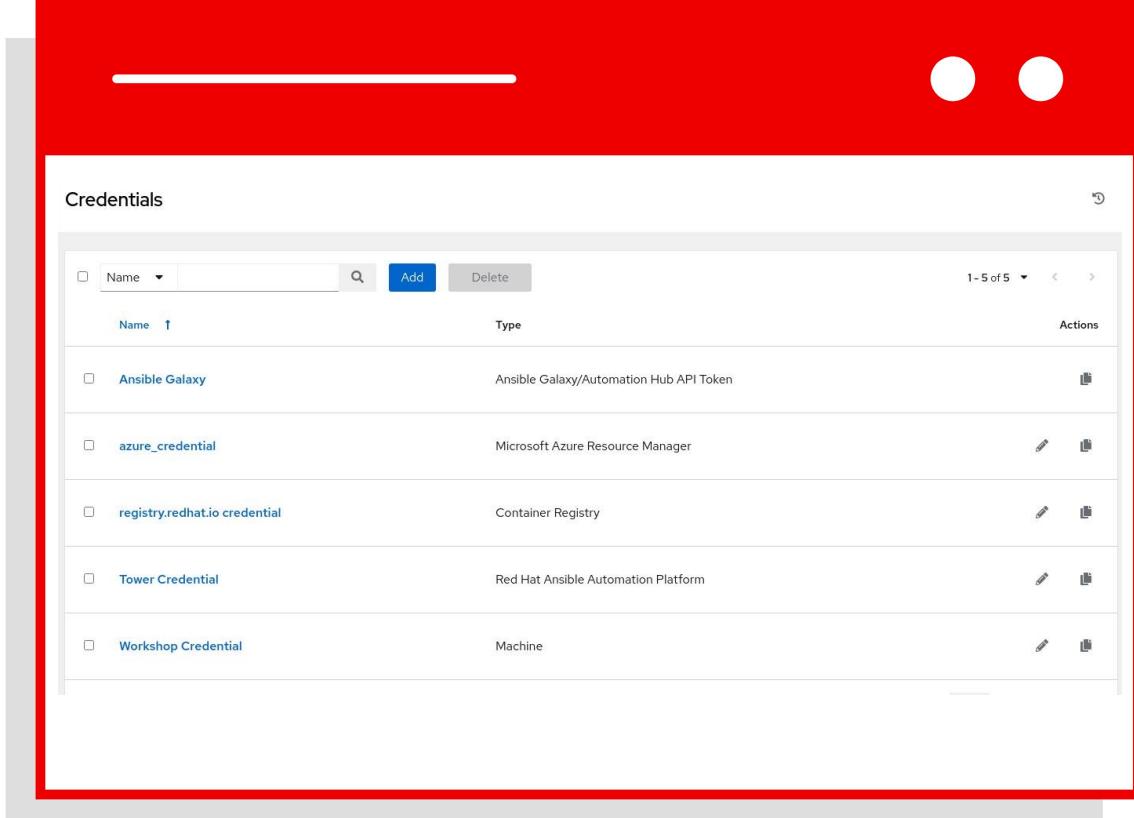
Role	Description
Admin	The inventory <b>Admin</b> role grants users full permissions over an inventory. These permissions include deletion and modification of the inventory. In addition, this role also grants permissions associated with the inventory roles <b>Use</b> , <b>Ad Hoc</b> , and <b>Update</b> .
Use	The inventory <b>Use</b> role grants users the ability to use an inventory in a job template resource. This controls which inventory is used to launch jobs using the job template's playbook.
Ad Hoc	The inventory <b>Ad Hoc</b> role grants users the ability to use the inventory to execute ad hoc commands.
Update	The inventory <b>Update</b> role grants users the ability to update a dynamic inventory from its external data source.
Read	The inventory <b>Read</b> role grants users the ability to view the contents of an inventory.

# Credentials

Credentials are utilized by Automation Controller for authentication with various external resources:

- Connecting to remote machines to run jobs
- Syncing with inventory sources
- Importing project content from version control systems
- Connecting to and managing network devices

Centralized management of various credentials allows end users to leverage a secret without ever exposing that secret to them.



The screenshot shows a table titled 'Credentials' with a red border. The table has columns for 'Name', 'Type', and 'Actions'. There are five rows of data:

Name	Type	Actions
Ansible Galaxy	Ansible Galaxy/Automation Hub API Token	 
azure_credential	Microsoft Azure Resource Manager	 
registry.redhat.io credential	Container Registry	 
Tower Credential	Red Hat Ansible Automation Platform	 
Workshop Credential	Machine	 

# Credentials

- Create credentials in the UI
- This credential contains information that is used to access managed hosts in the **Inventory**.

CREDENTIALS / EDIT CREDENTIAL

Demo Credential

DETAILS    PERMISSIONS

\* NAME ?  
Demo Credential

DESCRIPTION ?  
Organization

ORGANIZATION  
SELECT AN ORGANIZATION

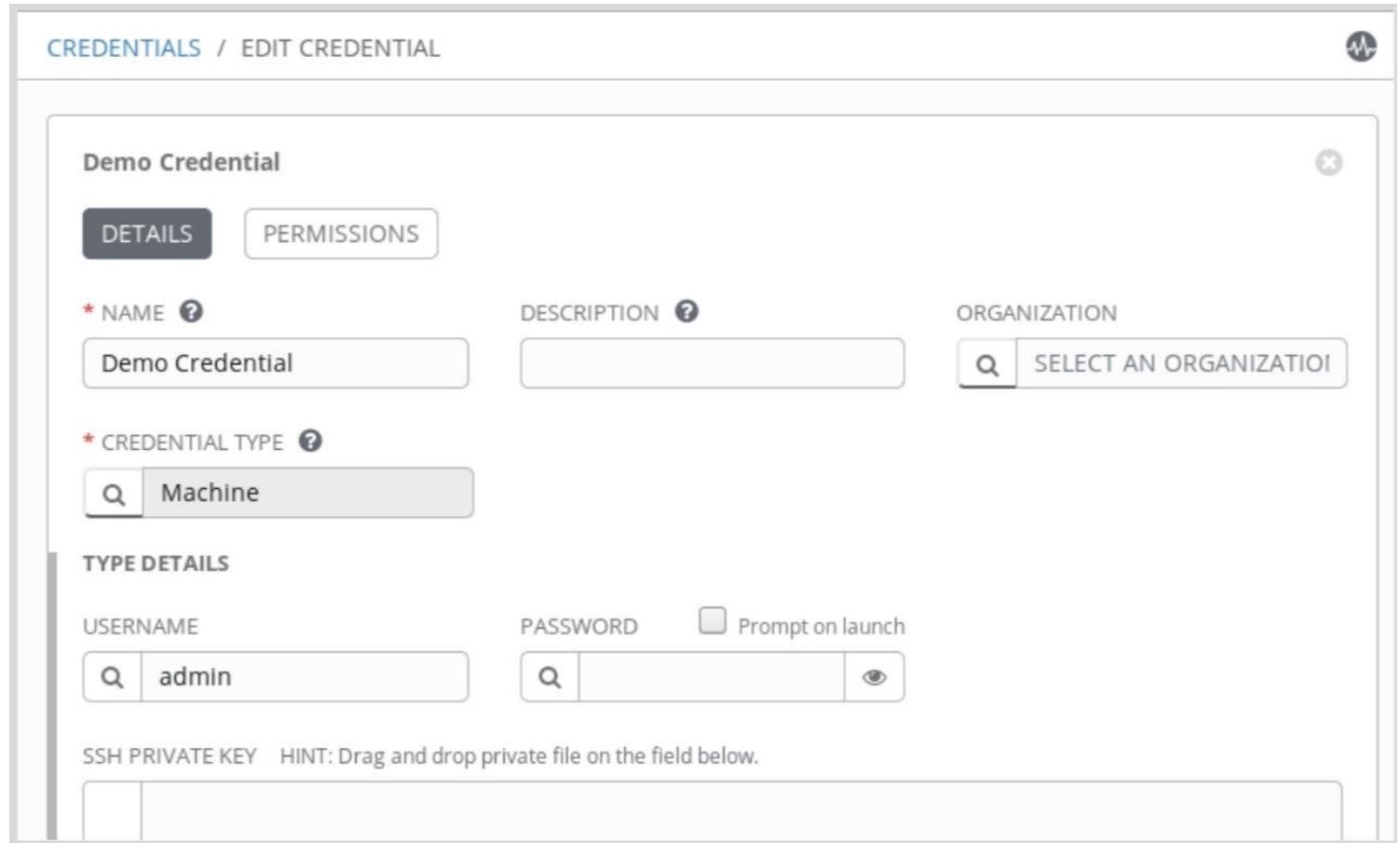
\* CREDENTIAL TYPE ?  
Machine

TYPE DETAILS

USERNAME  
admin

PASSWORD  
Prompt on launch

SSH PRIVATE KEY HINT: Drag and drop private file on the field below.



# Ansible Surveys

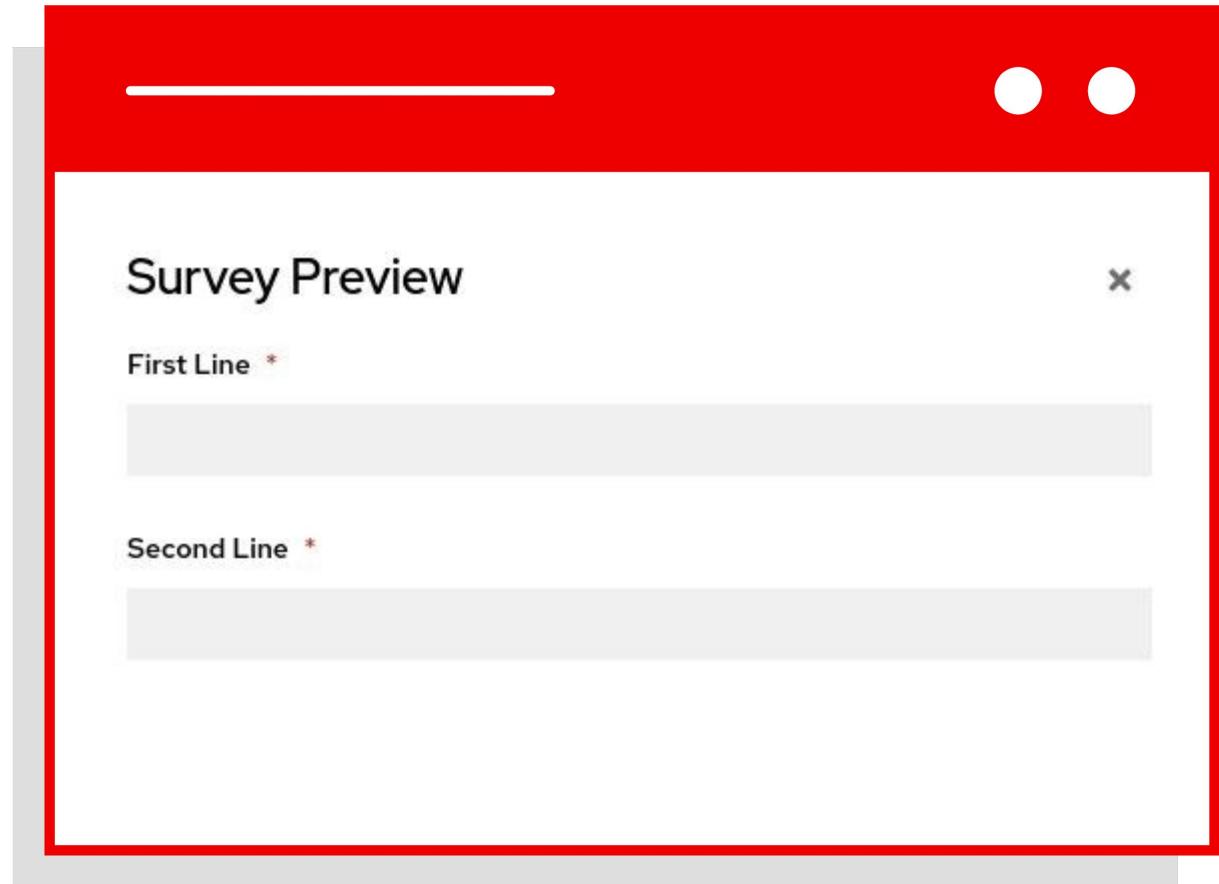


# SURVEYS

Controller surveys allow you to configure how a job runs via a series of questions, making it simple to customize your jobs in a user-friendly way.

An Ansible Controller survey is a simple question-and-answer form that allows users to customize their job runs.

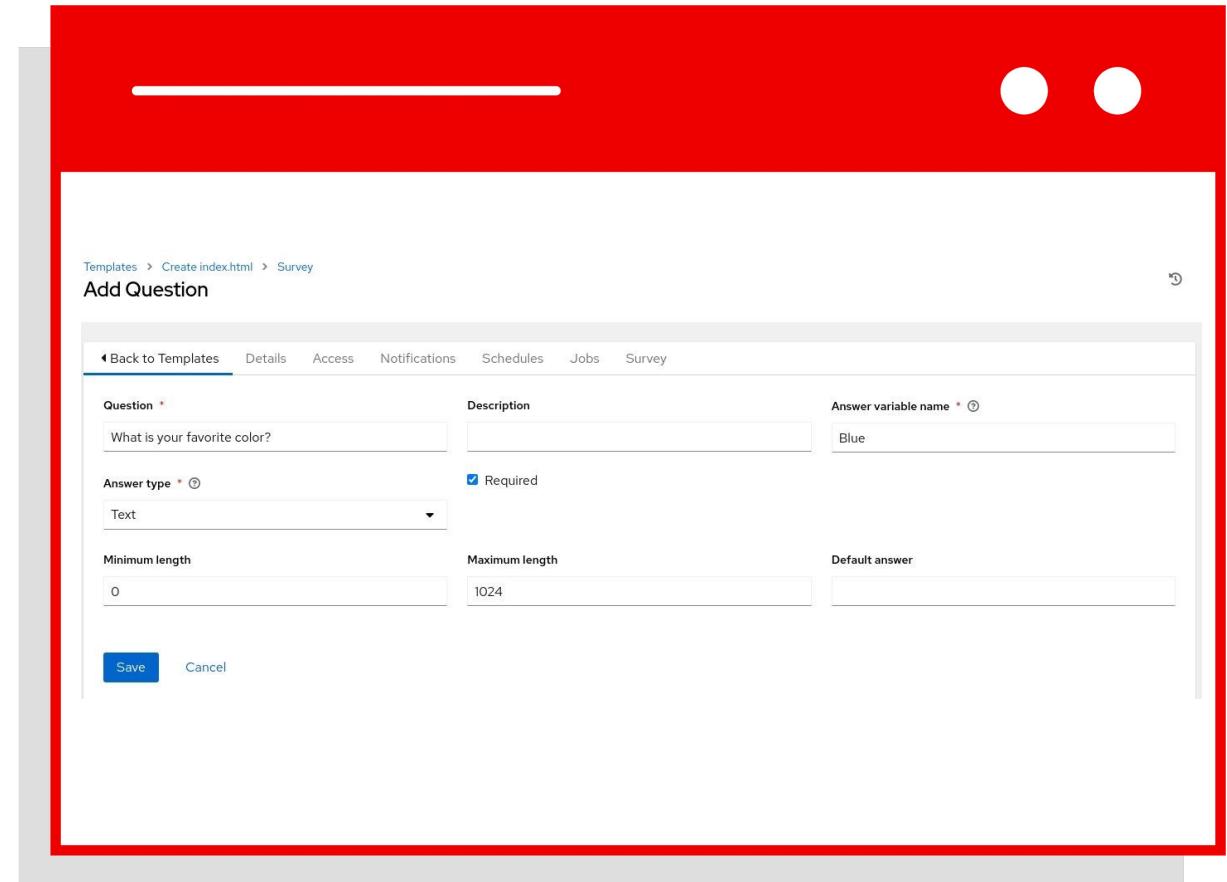
Combine that with Controller's role-based access control, and you can build simple, easy self-service for your users.



# CREATING A SURVEY (1/2)

Once a Job Template is saved, the Survey menu will have an **Add Button**

Click the button to open the Add Survey window.



## CREATING A SURVEY (2/2)

The Add Survey window allows the Job Template to prompt users for one or more questions. The answers provided become variables for use in the Ansible Playbook.

This screenshot shows the 'Add Question' form within a Job Template editor. The top navigation bar includes 'Templates > Create index.html > Survey'. The main title is 'Add Question'. The form fields are as follows:

- Question \***: What is the banner text?
- Description**: (empty field)
- Answer variable name \* ⓘ**: net\_banner
- Answer type \* ⓘ**: Textarea (selected)
- Required**:
- Minimum length**: 0
- Maximum length**: 1024
- Default answer**: (empty field)

At the bottom are 'Save' and 'Cancel' buttons.

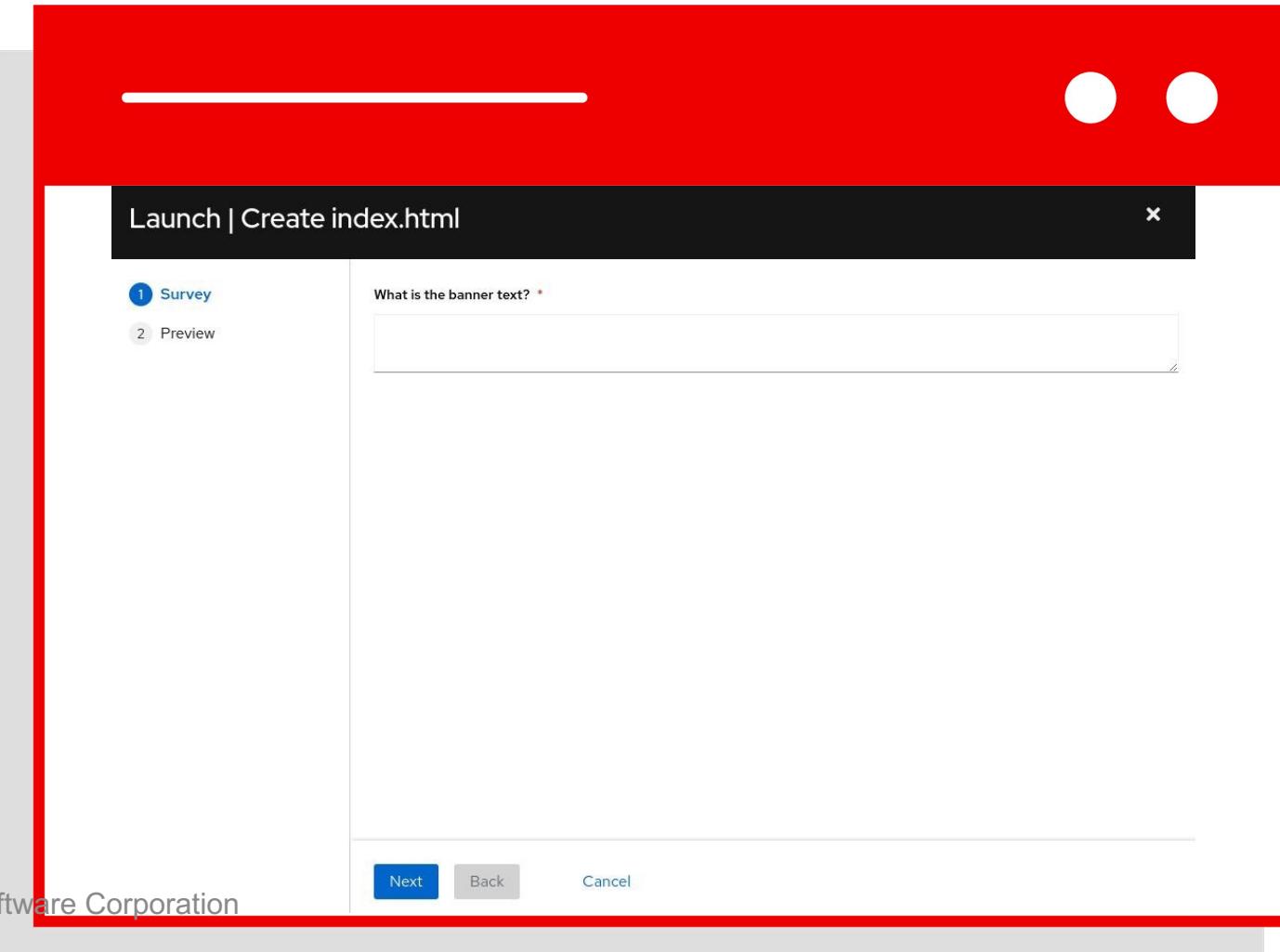
This screenshot shows the 'Survey' configuration page within a Job Template editor. The top navigation bar includes 'Templates > Create index.html'. The main title is 'Survey'. The configuration is as follows:

- On**:
- Add**: (button)
- Delete**: (button)
- Question**: What is the banner text? \*
- Type**: textarea
- Default**: (empty field)

At the bottom is a 'Preview' button.

# USING A SURVEY

When launching a job, the user will now be prompted with the Survey. The user can be required to fill out the Survey before the Job Template will execute.



# Ansible Vault



# Organization

- Newly created users inherit specific roles from their organization based on their user type.
- Assign additional roles to a user after creation to grant permissions to view, use, or change other Ansible Platform objects.

Organizations				
<input type="checkbox"/> Name ▾	<input type="text"/>	<input type="button" value="Search"/>	<input type="button" value="Add"/>	<input type="button" value="Delete"/>
		Members	Teams	Actions
<input type="checkbox"/>	Default	0	0	<input type="button" value="Edit"/>
<input type="checkbox"/>	NewOrg	0	0	<input type="button" value="Edit"/>

# Team

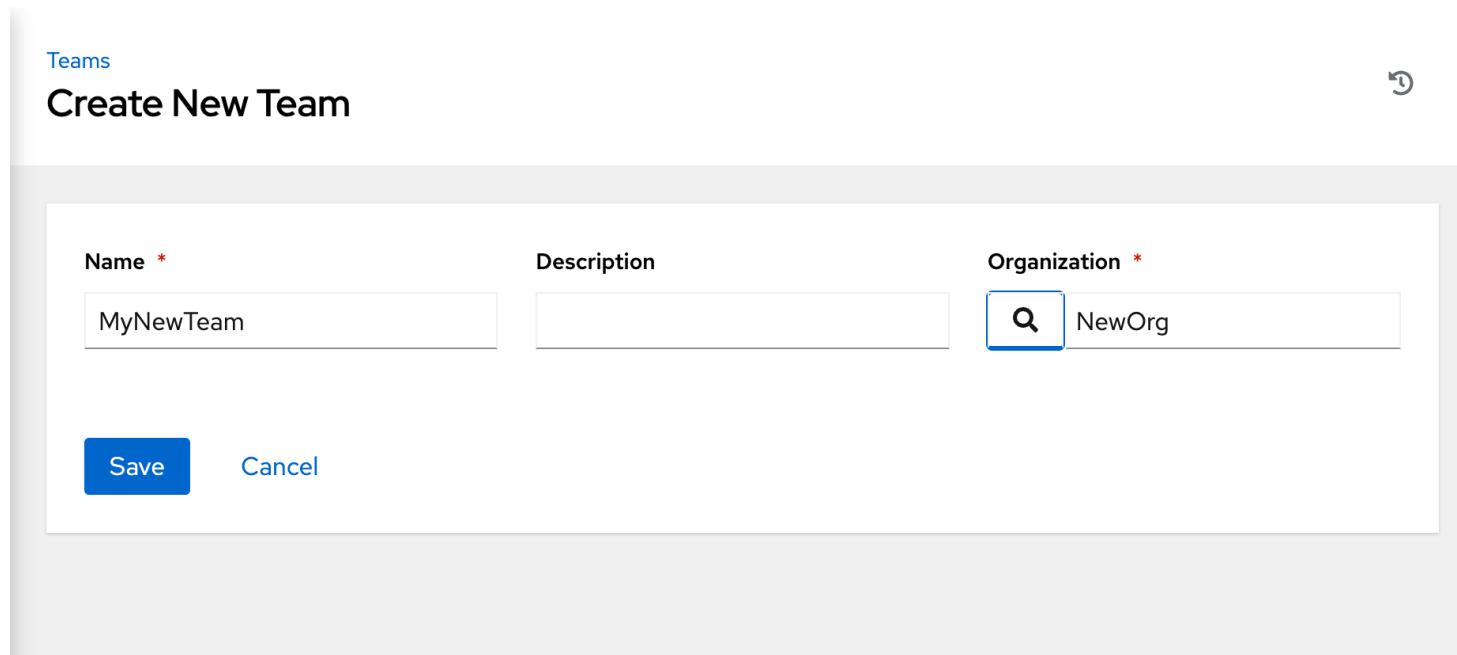
- You can apply permissions at the team level.

Teams

Create New Team

Save Cancel

Name *	Description	Organization *
MyNewTeam		NewOrg



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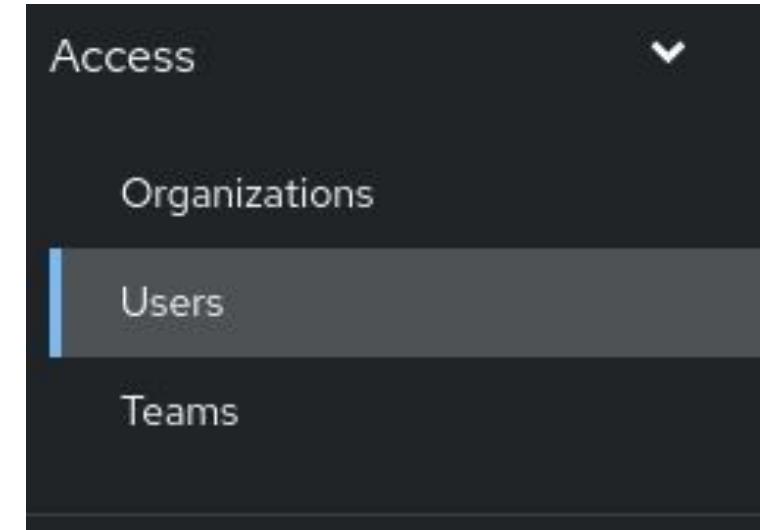
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Username *	Password *	Confirm Password *
user1	.....	.....
User Type *	Organization *	
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Save Cancel

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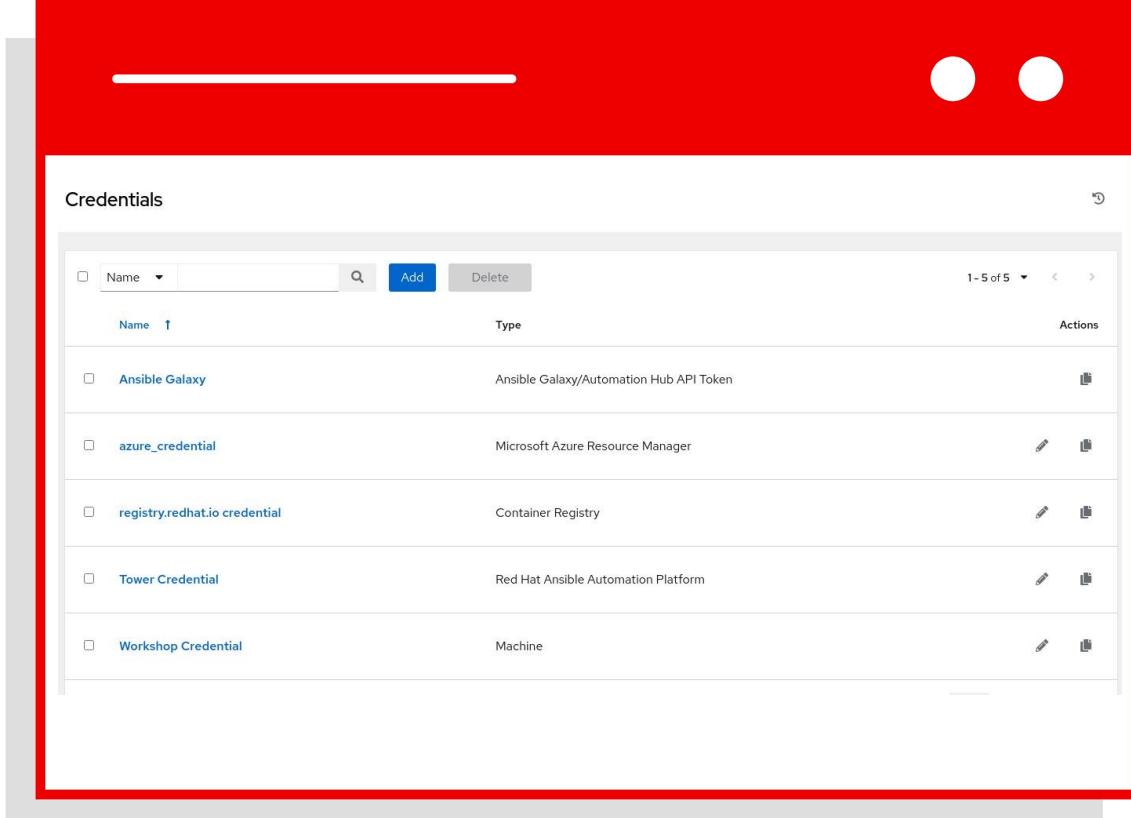
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- This credential contains information that is used to access managed hosts in the **Inventory**.

CREDENTIALS / EDIT CREDENTIAL

Demo Credential

DETAILS    PERMISSIONS

\* NAME ?  
Demo Credential

DESCRIPTION ?  
Organization

ORGANIZATION  
SELECT AN ORGANIZATION

\* CREDENTIAL TYPE ?  
Machine

TYPE DETAILS

USERNAME  
admin

PASSWORD  
Prompt on launch

SSH PRIVATE KEY HINT: Drag and drop private file on the field below.

The screenshot shows a 'CREDENTIALS / EDIT CREDENTIAL' page. At the top, there's a title 'CREDENTIALS / EDIT CREDENTIAL' and a close button. Below it is a section titled 'Demo Credential' with tabs for 'DETAILS' (selected) and 'PERMISSIONS'. Under 'DETAILS', there are fields for 'NAME' (containing 'Demo Credential') and 'DESCRIPTION' (empty). There's also a 'SELECT AN ORGANIZATION' dropdown. In the 'CREDENTIAL TYPE' section, 'Machine' is selected. The 'TYPE DETAILS' section includes 'USERNAME' (set to 'admin') and 'PASSWORD' (with a checkbox for 'Prompt on launch'). At the bottom, there's a note about dragging and dropping an SSH private key file.

# Ansible RBAC

