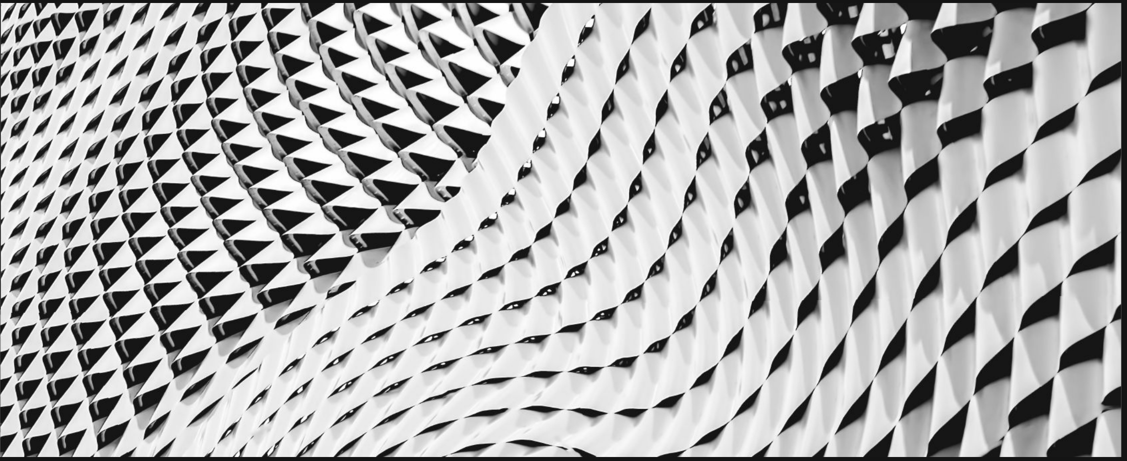
Red Hat
Ansible
Automation

Ansible Best Practices

How to write, how to execute, and how to use in real life

Red Hat

How to use



Treat your Ansible content like code

- Version control your Ansible content
- Iterate
  - Start with a basic playbook and static inventory
  - Refactor and modularize later

Do it with style

- Create a style guide for consistency:
  - Tagging
  - Whitespace
  - Naming of Tasks, Plays, Variables, and Roles
  - Directory Layouts
- Enforce the style
- Nice example: openshift-ansible Style Guide

  example: https://goo.gl/JfWBcW

CODE MUST BE ORGANIZED

USE GIT!

Do it with style

```
site.yml                    # master playbook, calling others
webservers.yml              # playbook for webserver tier
deployonce.yml              # separate playbook for single-shot tasks
inventories/
   production/              # different stages via inventory
      hosts                 # inventory file for production servers
      group_vars/
      host_vars/
   london/                  # additional, alternative grouping if useful
roles/
    requirements.yml        # includes roles from some other place
    common/                 # base line, company wide configuration
    webtier/
```

Start with one Git repository - but when it grows, use multiple!

At the beginning: put everything in one Git repository

In the long term:

- One Git repository per role
- Dedicated repositories for completely separated teams / tasks

New to git? Get your cheat sheet here: https://opensource.com/downloads/cheat-sheet-git

SO, WHAT DO WE HAVE?

Give inventory nodes human-meaningful names rather than IPs or DNS hostnames.

```
10.1.2.75
10.1.5.45
10.1.4.5
10.1.0.40

w14301.acme.com
w17802.acme.com
w19203.acme.com
w19304.acme.com
```

```
db1 ansible_host=10.1.2.75
db2 ansible_host=10.1.5.45
db3 ansible_host=10.1.4.5
db4 ansible_host=10.1.0.40

web1 ansible_host=w14301.acme.com
web2 ansible_host=w17802.acme.com
web3 ansible_host=w19203.acme.com
web4 ansible_host=w19203.acme.com
```

Group hosts for easier inventory selection and less conditional tasks -- the more the better.

```
[db]
db[1:4]

[web]
web[1:4]
```

```
[east]
db1
web1
db3
web3

[west]
db2
web2
db4
web4
```

```
[dev]
db1
web1

[testing]
db3
web3

[prod]
db2
web2
db4
web4
```

Use dynamic sources where possible. Either as a single source of truth - or let Ansible unify multiple sources.

- Stay in sync automatically
- Reduce human error
- No lag when changes occur
- Let others manage the inventory

VARIABLES

JUST WORDS, RIGHT?

Proper variable names can make plays more readable and avoid variable name conflicts

```
a: 25
data: ab
data2: abc
id: 123
```

```
apache_max_keepalive: 25
apache_port: 80
tomcat_port: 8080
```

Avoid collisions and confusion by adding the role name to a variable as a prefix.

```
apache_max_keepalive: 25
apache_port: 80
tomcat_port: 8080
```

Know where your variables are

- Find the appropriate place for your variables based on what, where and when they are set or modified
- Separate logic (tasks) from variables and reduce repetitive patterns
- Do not use every possibility to store variables - settle to a defined scheme and as few places as possible

MAKE YOUR PLAYBOOK READABLE

NO!

```
- name: install telegraf
  yum: name=telegraf-{{ telegraf_version }} state=present update_cache=yes
  notify: restart telegraf

- name: start telegraf
  service: name=telegraf state=started
```

Better, but no

```
- name: install telegraf
  yum: >
      name=telegraf-{{ telegraf_version }}
      state=present
      update_cache=yes
      enablerepo=telegraf
  notify: restart telegraf

- name: start telegraf
  service: name=telegraf state=started
```

Yes!

```
- name: install telegraf
  yum:
    name: “telegraf-{{ telegraf_version }}”
    state: present
    update_cache: yes
    enablerepo: telegraf
  notify: restart telegraf

- name: start telegraf
  service:
    name: telegraf
    state: started
```

Exhibit A

```
- hosts: web
  tasks:
  - yum:
      name: httpd
      state: latest

  - service:
      name: httpd
      state: started
      enabled: yes
```

```
PLAY [web]
********************************

TASK [setup]
********************************
ok: [web1]

TASK [yum]
********************************
ok: [web1]

TASK [service]
********************************
ok: [web1]
```

Exhibit B

```
- hosts: web
  name: installs and starts apache

  tasks:
    - name: install apache packages
      yum:
        name: httpd
        state: latest

    - name: starts apache service
      service:
        name: httpd
        state: started
        enabled: yes
```

```
PLAY [install and starts apache]
********************************

TASK [setup]
********************************
ok: [web1]

TASK [install apache packages]
********************************
ok: [web1]

TASK [starts apache service]
********************************
ok: [web1]
```

POWERFUL BLOCKS

Blocks can help in organizing code, but also enable rollbacks or output data for critical changes.

```
- block:
    copy:
      src: critical.conf
      dest: /etc/critical/crit.conf
    service:
      name: critical
      state: restarted
  rescue:
   command: shutdown -h now
```

How to execute

PROPER LAUNCHING

Ansible provides multiple switches for command line interaction and troubleshooting.

```
-vvvv
--step
--check
--diff
--start-at-task
```

Ansible has switches to show you what will be done

```
Use the power of included options:
    --list-tasks
    --list-tags
    --list-hosts
    --syntax-check
```

If there is a need to launch something without an inventory - just do it!

- For single tasks - note the comma:
  ```
  ansible all -i neon.qxyz.de, -m service -a
  "name=redhat state=present"
  ```
- For playbooks - again, note the comma:
  ```
  ansible-playbook -i neon.qxyz.de, site.yml
  ```

THE RIGHT TOOLS

Don’t just start services -- use smoke tests

```
- name: check for proper response
  uri:
    url: http://localhost/myapp
    return_content: yes
  register: result
  until: '"Hello World" in result.content'
  retries: 10
  delay: 1
```

Try to avoid the command module - always seek out a module first

```
- name: add user
  command: useradd appuser

- name: install apache
  command: yum install httpd

- name: start apache
  shell: |
    service httpd start && chkconfig
httpd on
```

```
- name: add user
  user:
    name: appuser
    state: present

- name: install apache
  yum:
    name: httpd
    state: latest

- name: start apache
  service:
    name: httpd
    state: started
    enabled: yes
```

If managed files are not marked, they might be overwritten accidentally

- Label template output files as being generated by Ansible
- Use the ansible_managed** variable with the comment filter

```
{{ ansible_managed | comment }}
```

ROLES AND GALAXIES

Roles enable you to encapsulate your operations.

- Like playbooks -- keep roles purpose and function focused
- Store roles each in a dedicated Git repository
- Include roles via `roles/requirements.yml` file, import via `ansible-galaxy tool`
- Limit role dependencies

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Get roles from Galaxy, but be careful and adopt them to your needs

- Galaxy provides thousands of roles
- Quality varies drastically
- Take them with a grain of salt
- Pick trusted or well known authors

ACCESS RIGHTS

Root access is harder to track than sudo - use sudo wherever possible

- Ansible can be run as root only
- But login and security reasons often request non-root access
- Use become method - so Ansible scripts are executed via sudo (sudo is easy to track)
- Best: create an Ansible only user
- Don't try to limit sudo rights to certain commands - Ansible does not work that way!

DEBUG YOUR PROBLEM

Check logging on target machine

```
ansible-node sshd[2395]: pam_unix(sshd:session): session
  opened for user liquidat by (uid=0)
ansible-node ansible-yum[2399]: Invoked with name=['httpd']
  list=None install_repoquery=True conf_file=None
  disable_gpg_check=False state=absent disablerepo=None
  update_cache=False enablerepo=None exclude=None
```

How to keep the code executed on the target machine

Look into the logging of your target machine

```
$ ANSIBLE_KEEP_REMOTE_FILES=1 ansible target-node -m yum
  -a "name=httpd state=absent"
```

Execute with:

```
$ /bin/sh -c 'sudo -u $SUDO_USER /bin/sh -c
  "/usr/bin/python /home/liquidat/.ansible/tmp/..."
```

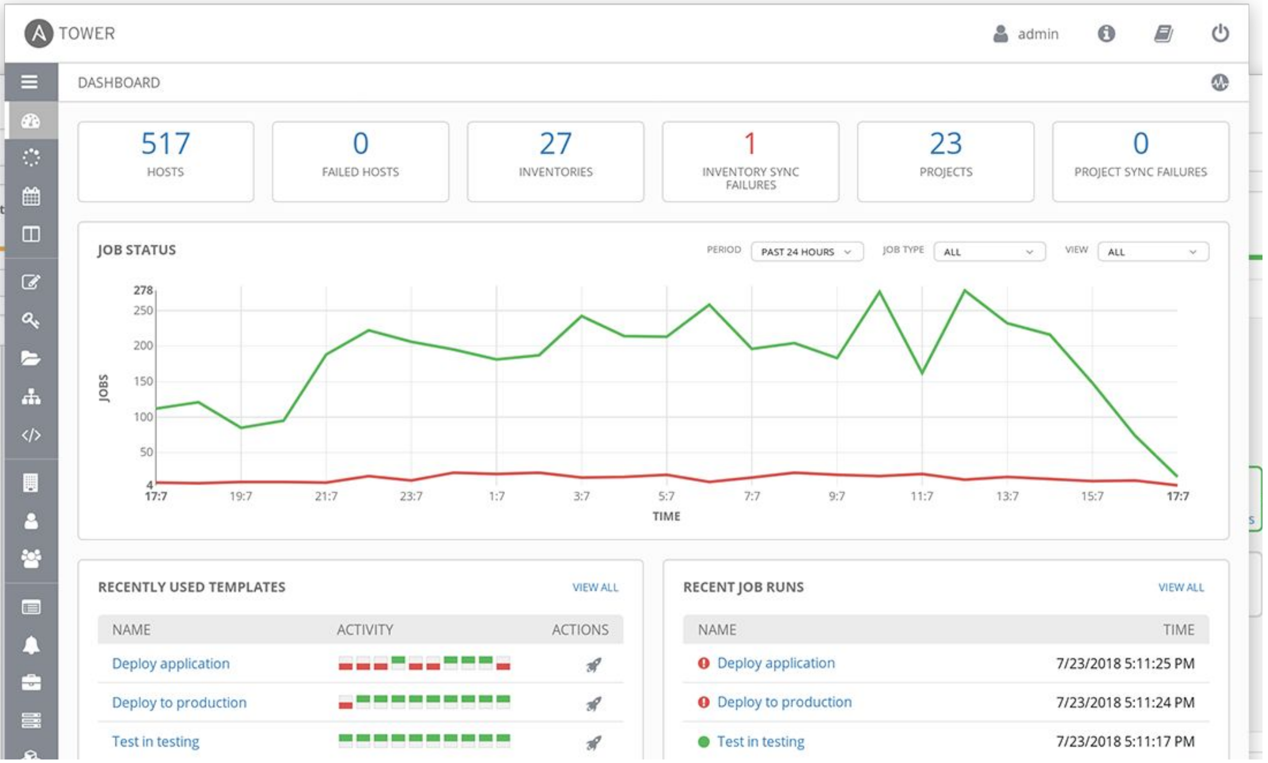
Debugging tasks can clutter the output, apply some housekeeping

```
- name: Output debug message
  debug:
    msg: "This always displays"

- name: Output debug message
  debug:
    msg: "This only displays with ansible-playbook -vv+"
    verbosity: 2
```

How to use in real life

Simple: Use Tower.



517	0	27	1	23	0
HOSTS	FAILED HOSTS	INVENTORIES	INVENTORY SYNC FAILURES	PROJECTS	PROJECT SYNC FAILURES

JOB STATUS — PERIOD: PAST 24 HOURS; JOB TYPE: ALL; VIEW: ALL

RECENTLY USED TEMPLATES — VIEW ALL

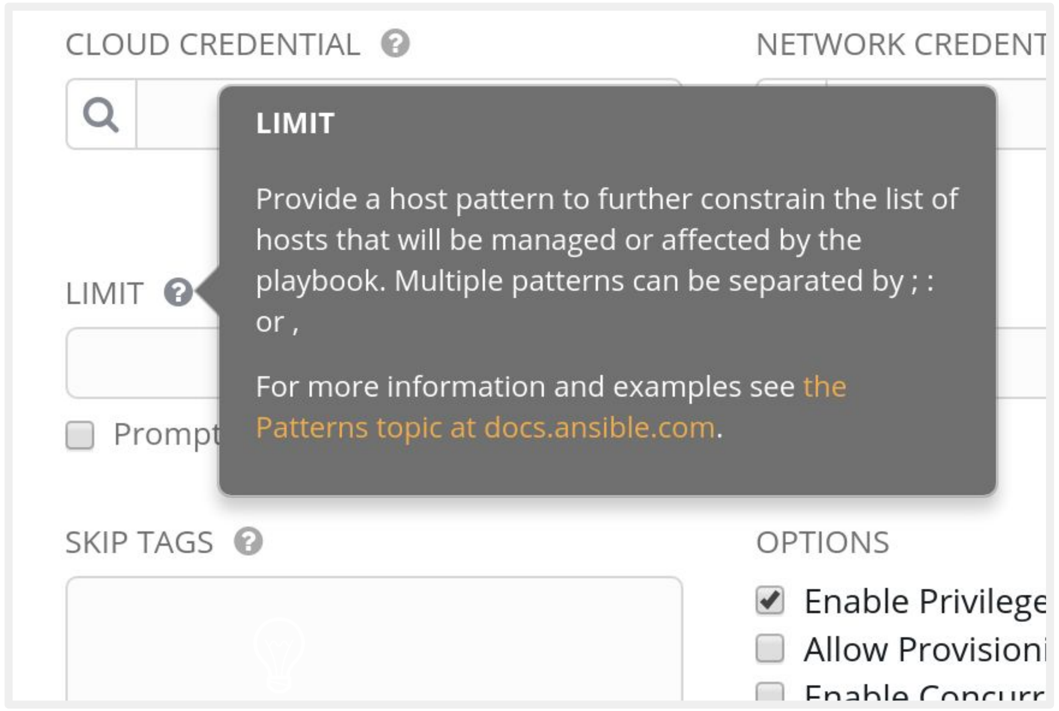
NAME	ACTIVITY	ACTIONS
Deploy application	🟥🟥🟥🟩🟥🟥🟩🟩🟩🟥	
Deploy to production	🟥🟩🟩🟩🟩🟩🟩🟩🟩🟩	
Test in testing	🟩🟩🟩🟩🟩🟩🟩🟩🟩🟩	

RECENT JOB RUNS — VIEW ALL

NAME	TIME
Deploy application	7/23/2018 5:11:25 PM
Deploy to production	7/23/2018 5:11:24 PM
Test in testing	7/23/2018 5:11:17 PM

- Tower was developed with Ansible in mind
- Extends the limits of Ansible to meet enterprise needs:
  Scalability, API, RBAC, aduits, etc.

Tower has inbuilt help



LIMIT

Provide a host pattern to further constrain the list of hosts that will be managed or affected by the playbook. Multiple patterns can be separated by ; : or ,

For more information and examples see the Patterns topic at docs.ansible.com.

- Tower provides in-program help via questionmark bubbles
- Can include examples or links to further docs

BRANCHES, ANYONE?

Tower can import a repository multiple times with different branches

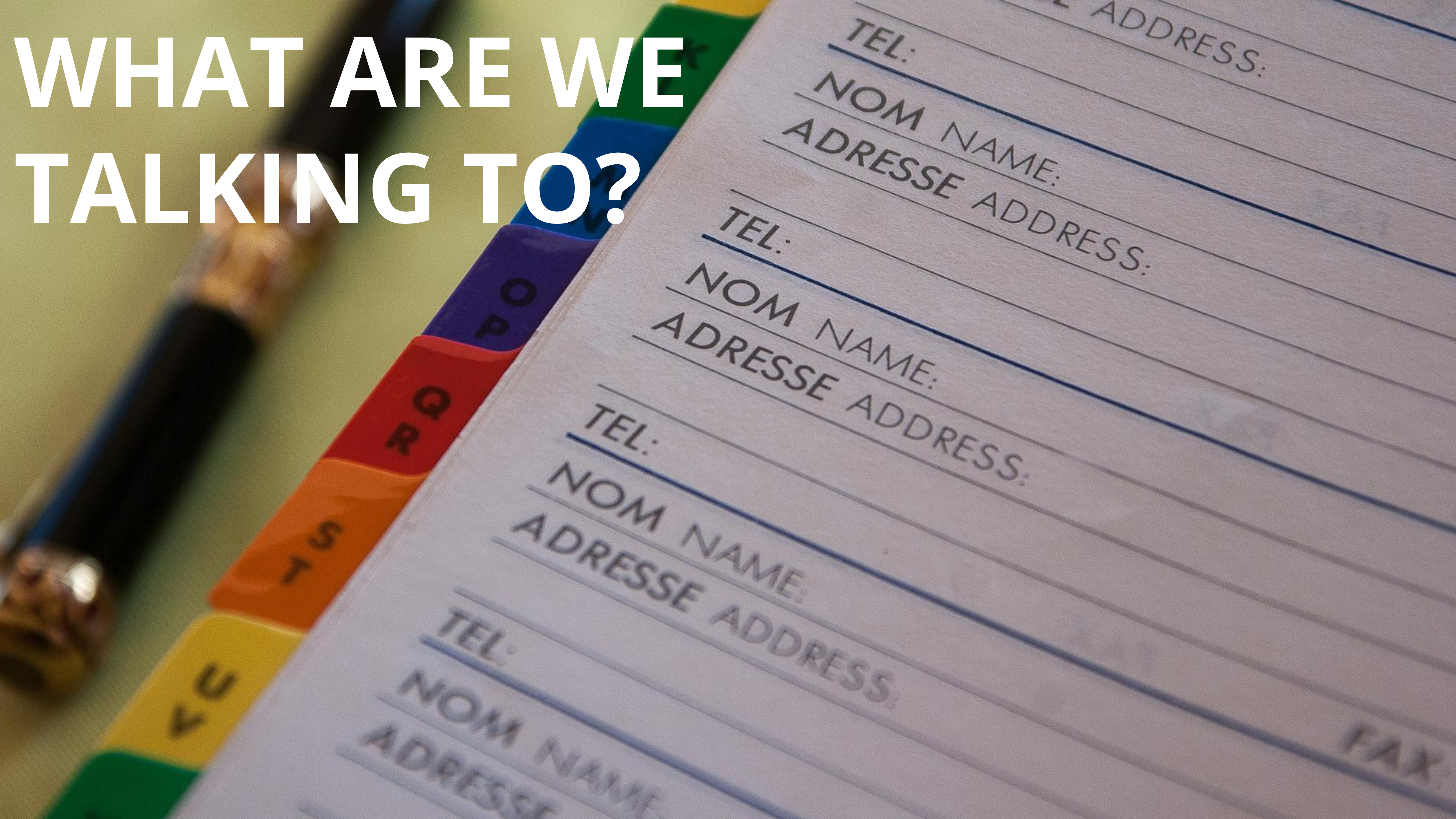
- Use feature or staging branches in your Git
- Import them all separately, address them separately
- Useful for testing of new features but also to move changes through stages

MANY, MANY ROLES

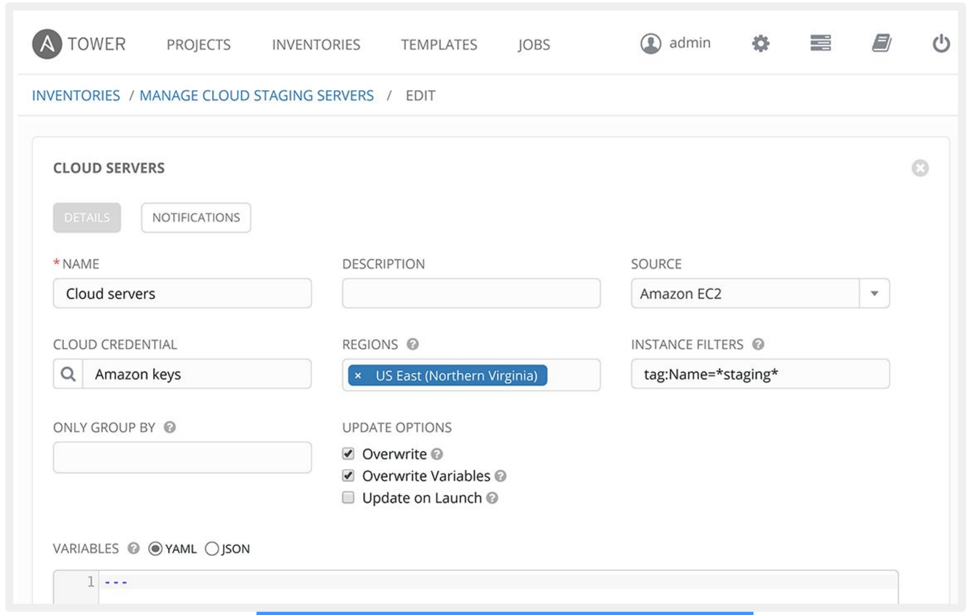
Tower automatically imports Roles during Project update

- Do not copy roles into your playbook repository, just create a roles/requirements.yml
- Tower will automatically import the roles during Project installation
- Mix roles from various sources
- Fix version in roles/requirements.yml to have auditable environment!

WHAT ARE WE TALKING TO?



Use dynamic & smart inventories



* NAME: Cloud servers	DESCRIPTION:	SOURCE: Amazon EC2
CLOUD CREDENTIAL: Amazon keys	REGIONS: US East (Northern Virginia)	INSTANCE FILTERS: tag:Name=*staging*
ONLY GROUP BY:	UPDATE OPTIONS: ☑ Overwrite, ☑ Overwrite Variables, ☐ Update on Launch	

VARIABLES [✓ YAML] JSON

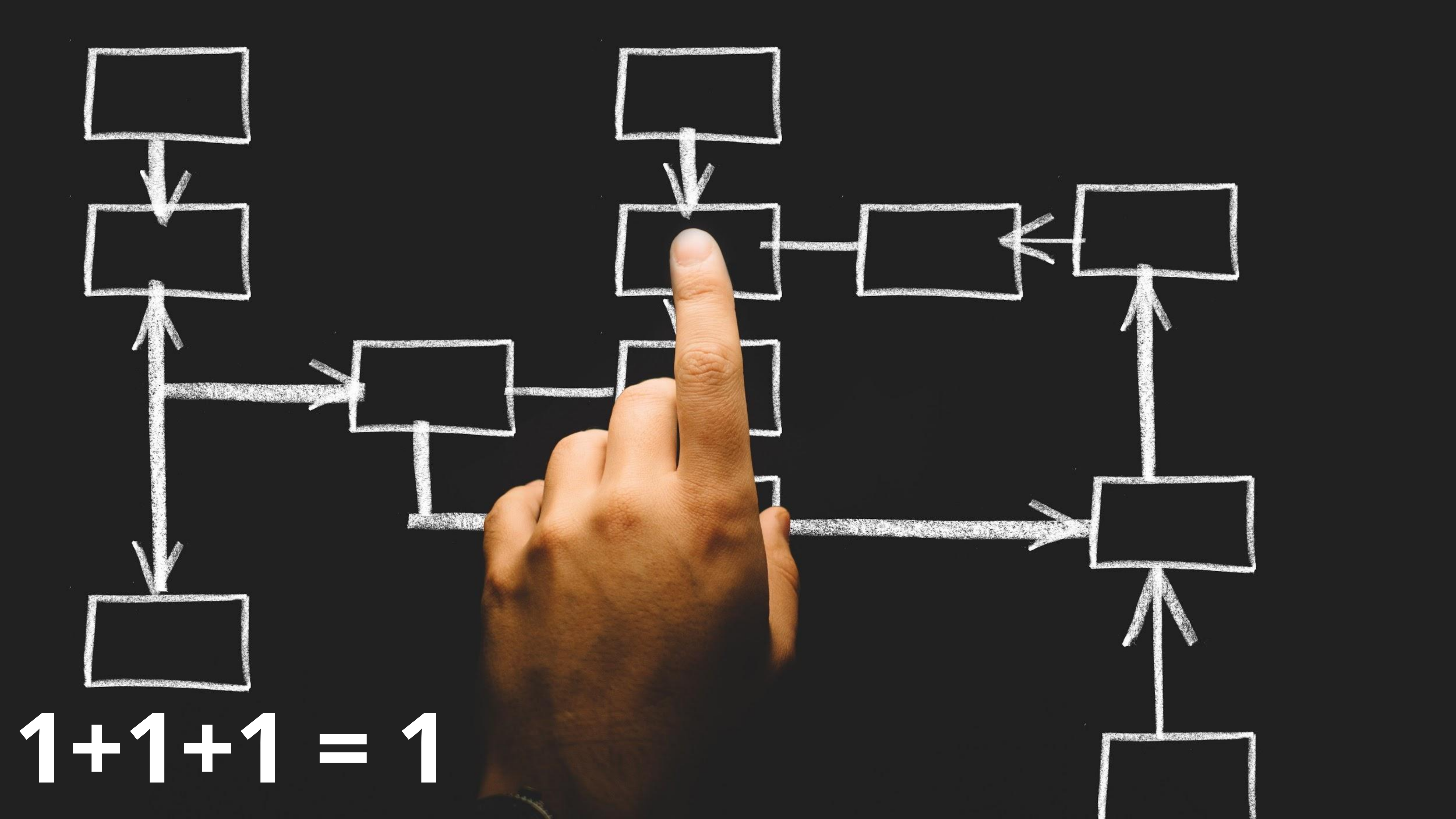
```
---
```

- Combine multiple inventory types
- Let Tower take care of syncing and caching
- Use smart inventories to group nodes

DOING GOOD JOBS

Tower job templates provide multiple options - use them wisely

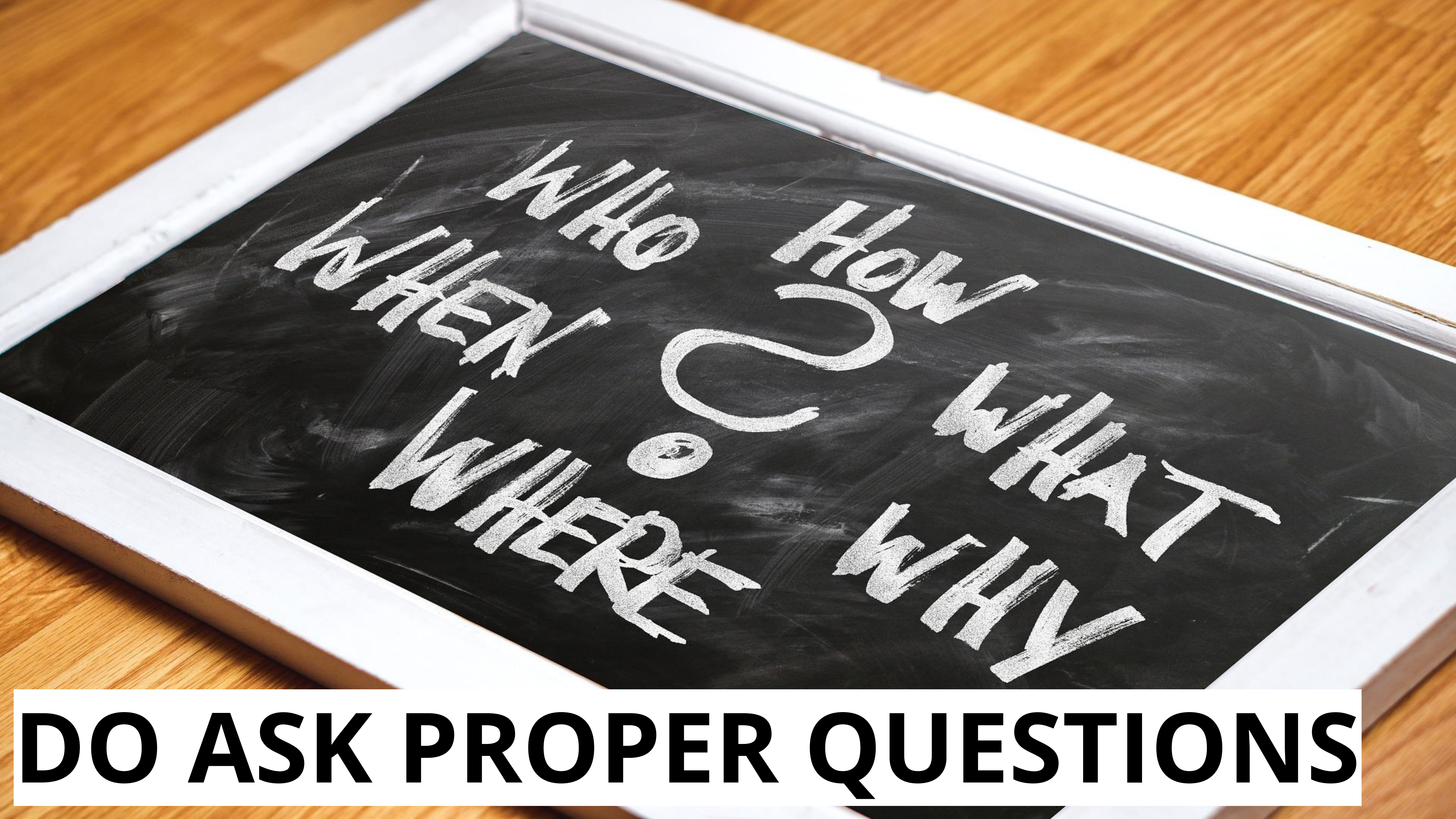
- Keep jobs simple, focussed - as playbooks or roles
- Add labels to them to better filter
- For idempotent jobs, create “check” templates as well - and let them run over night
- Combine with notifications - and get feedback when a “check” failed



1+1+1 = 1

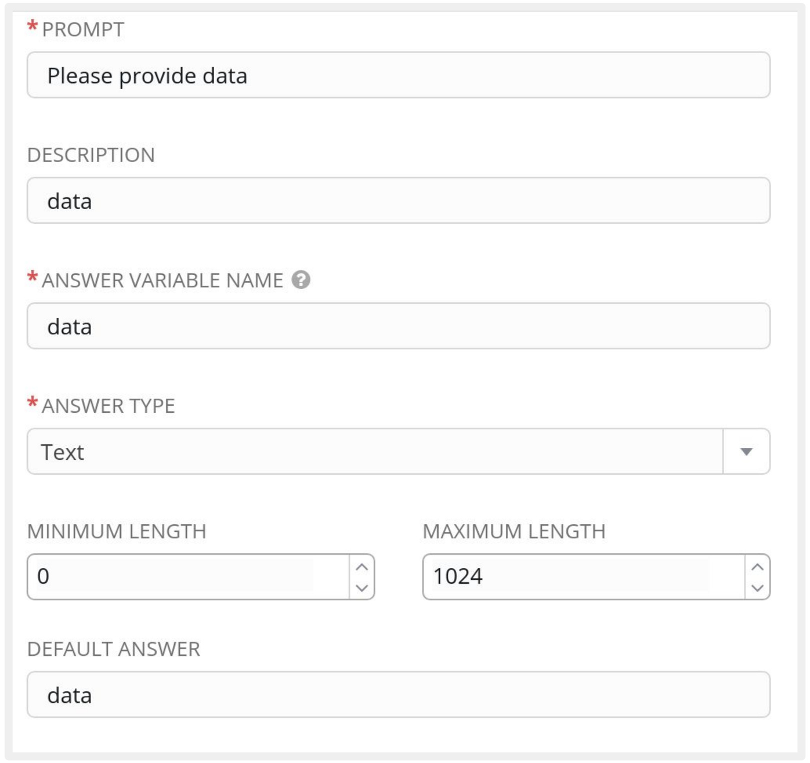
Multiple playbooks can be combined into one workflow

- Simple jobs, complex workflows
- React to problems via workflow
- Combine playbooks of different teams, different repositories
- Re-sync inventories during the play



DO ASK PROPER QUESTIONS

Use surveys to get variable values



* PROMPT	Please provide data
DESCRIPTION	data
* ANSWER VARIABLE NAME	data
* ANSWER TYPE	Text
MINIMUM LENGTH	0
MAXIMUM LENGTH	1024
DEFAULT ANSWER	data

- Use good, meaningful variable names
- Provide a default choice
- Multiple choice > free text
- If answer not required - do you really need it at all?

A POWERFUL TEAM

Tower provides tenants, teams, and users - use them for separation

- Provide automation to others without exposing credentials
- Let others only see what they really need
- Use personal view instead of full Tower interface

ONE KEY TO RULE THEM ALL …

Tower credentials should only be used by Tower - not by others

- Set up a separate user and password/key for Tower
- That way, automation can easily be identified on target machines
- The key/password can be ridiculously ~~complicated~~ secure
- Store key/password in a safe for emergencies

NOTIFY YOURSELF!

Tower can send notifications if a job succeeds, fails or always - as mail, IRC, web hook, and so on

- Let Tower notify you and your team if something breaks
- Send mails/web-hooks automatically to a ticket systems and monitoring if there is a serious problem

LOGS, ANYONE?

Send all logs from Tower to central logging

- Splunk, Loggly, ELK, REST
- Send results from Ansible runs - but also from Tower changes

ALWAYS KEEP THE LIGHTS ON

Tower can be easily set up HA - and for restricted networks, deploy isolated nodes

- Make Tower HA - it is easy! (Well, except the DB part maybe....)
- For distant or restricted networks, use isolated nodes

Thank you

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