RED HAT SUMMIT

Automation and configuration management across hybrid clouds with CloudForms, Satellite 6, Ansible Tower

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About Us

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OVERVIEW

- Why use configuration management in hybrid cloud environments
- Different configuration management solutions
  - Puppet
  - Ansible
- How are they integrated
  - CloudForms + Satellite 6 + Ansible Tower

THE JOURNEY TO CONFIGURATION MANAGEMENT AND AUTOMATION ACROSS HYBRID CLOUDS

The Path To Configuration Management / DevOps

Scripts

#!/bin/sh

Documentation

Atlassian
JIRA
collaborate with
TWiki

Chaos

TO BE MORE AGILE

Traditional Responsibilities Between Dev and Ops

- Operations responsibilities:
    - Work on multiple projects at the same time:
        - Business Projects
        - Internal Projects
        - Planned Changes
        - Unplanned Changes

- While working on multiple projects uptime needs to be 99.9%

Traditional Responsibilities Between Dev and Ops

- Developer responsibilities:
  - Work on one project:
    - Write code for new products
    - New Features
    - Security updates
    - Bugfixes

- Once the code is ready it gets passed on to operations which now needs to deploy and run the code

Traditional Infrastructure / Development Pains

- Communication between teams is non existent as they are in different silos
- Bureaucracy / Approvals
- Slow development lifecycle
- Code is not in version control, collaboration therefore difficult and rollbacks almost impossible
- Applications / services are monolithic and are not api first

Transform Your Organization

OPENNESS +

+

Architect The Enterprise For The Future

- Change is the new normal
- Understand the business strategy and define an IT road map which supports that strategy
- Create a short term 1-2 years strategy (tech is changing fast)
- Keep the agility to change your plan based on technology changes and observe how you and your team operate with it

CONFIGURATION MANAGEMENT

The Configuration Management Tool Of Choice

puppet

- DSL based on Ruby
- ERB, EPP
- Extensions (ruby)
- Puppet Forge
- Red Hat Satellite 6

ANSIBLE

- Configurations in pure YAML
- Jinja2
- Extensions (Python)
- Ansible Galaxy
- Ansible Tower by Red Hat

Configuration Management Learning Curve

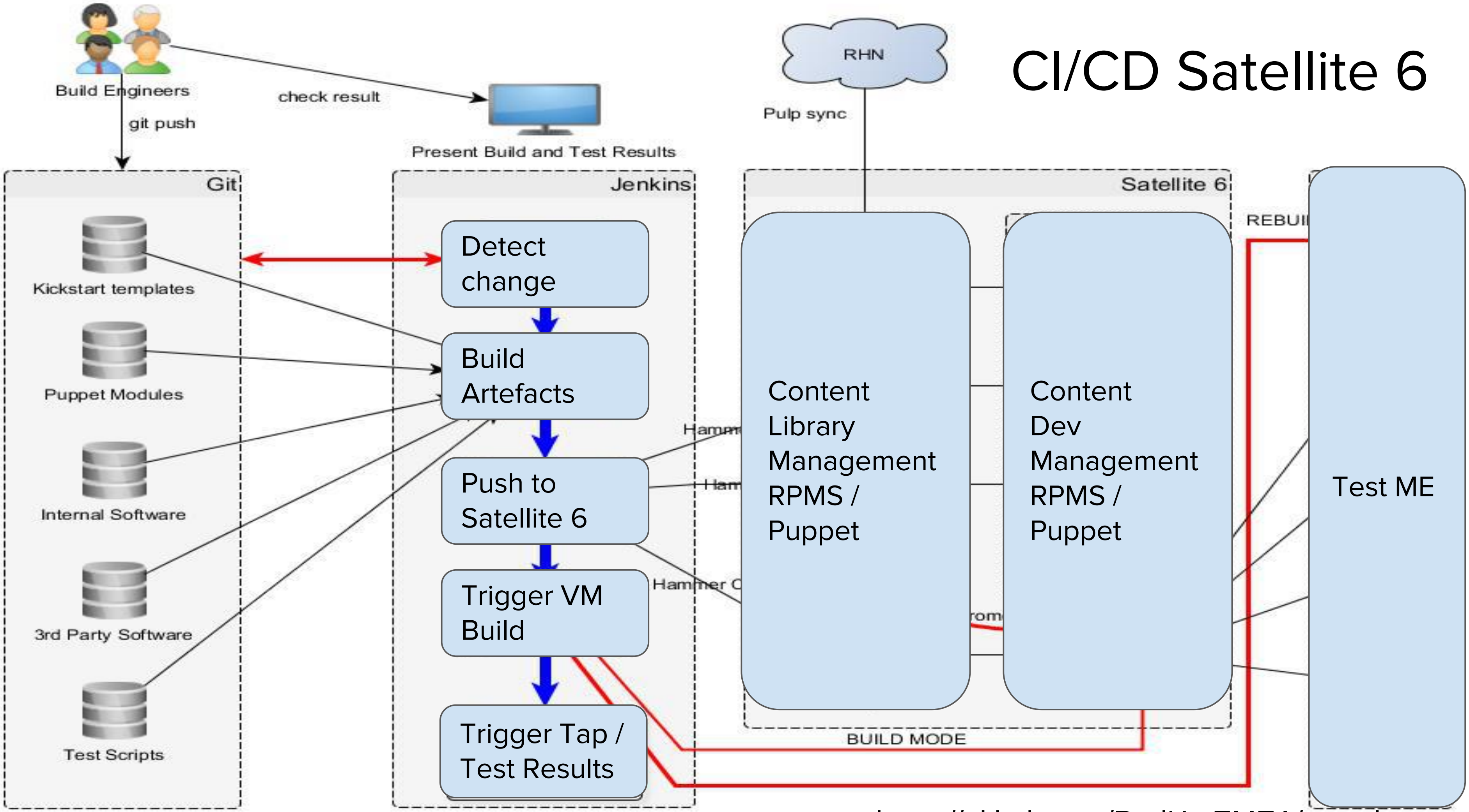
- Not understanding scale
- Write modules without keeping standards
- No linting or validating of code

- Reuse Modules
- Understand DSL/ERB/EPP/Jinja2
- Impact of CF-Mgt
- Parse, Validate Code

- Git / SCM
- Automated testing - Jenkins
- Using tools like Satellite 6 or Ansible Tower
- Cares about clean code

Time 1-3 Month 3-6 Month 6-x Month

CI/CD Satellite 6



Detect change

Build Artefacts

Push to Satellite 6

Trigger VM Build

Trigger Tap / Test Results

Content Library Management RPMS / Puppet

Content Dev Management RPMS / Puppet

Test ME

https://github.com/RedHatEMEA/soe-ci

WHY
CONFIGURATION MANAGEMENT
IN THE CLOUD

Why Configuration Management In Cloud Environments

Provider specific templates build for resource management:

- AWS CloudFormations
- Azure ARM Templates JSON Orchestration Templates
- OpenStack Heat
- GCE
- Cloud-init

Configuration Management for software/configuration management:

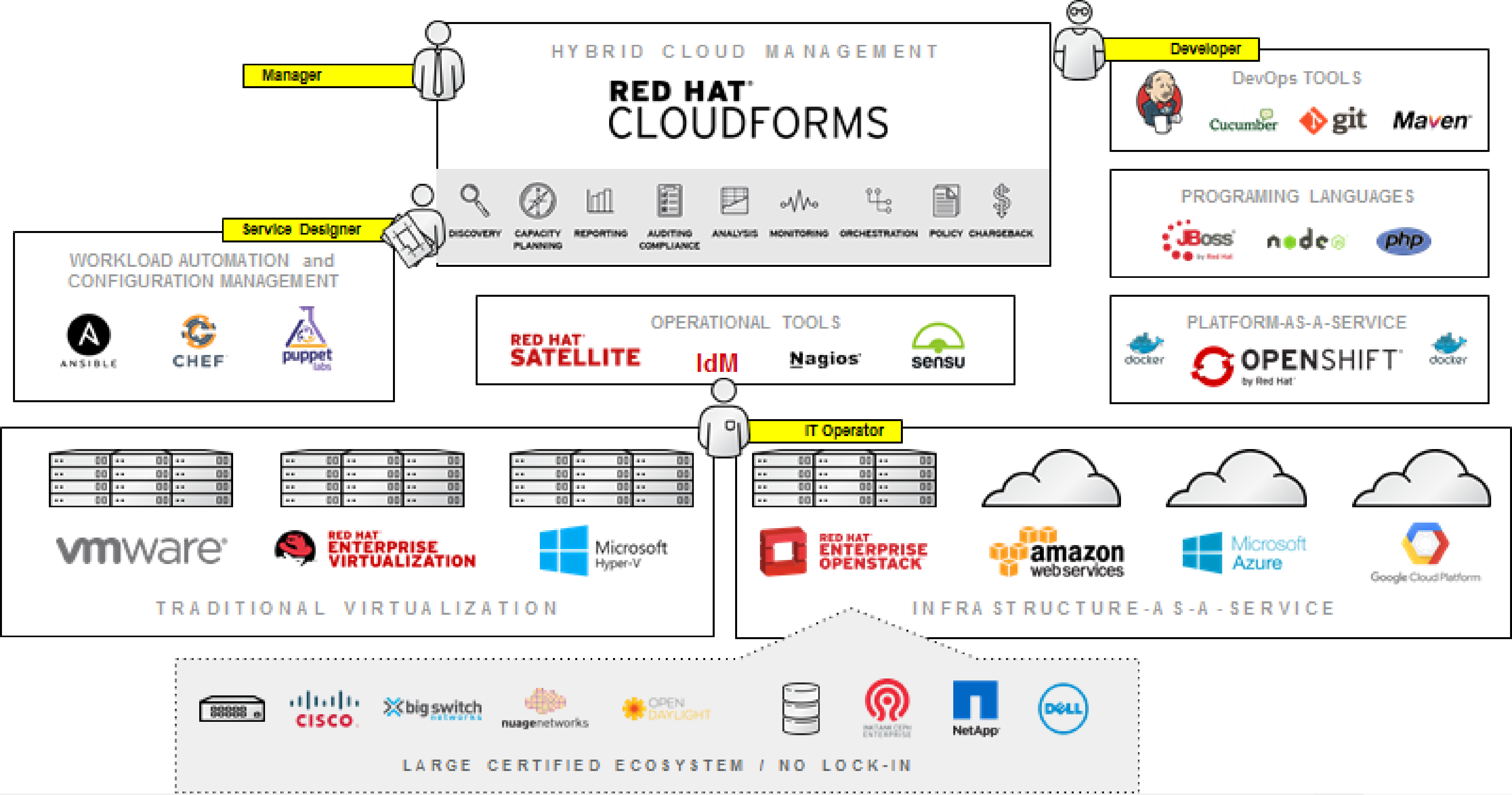
- Puppet / Ansible

Red Hat MANAGEMENT TOOLS

Red Hat Management Tools

Red Hat Satellite 6	Red Hat Satellite 6 delivers your Red Hat software efficiently and securely. Satellite 6 optimizes your Red Hat infrastructure and investment with full software lifecycle control, provisioning & configuration, and subscription management.
Red Hat CloudForms	Red Hat CloudForms controls your hybrid-cloud infrastructure. CloudForms is a single-pane-of-glass for controlling your hybrid-cloud environment that unifies management across clouds, with comprehensive insight & discovery and full operational control.
Ansible Tower by Red Hat	Ansible automates your IT processes and applications deploys. Ansible Tower is an enterprise framework for controlling, securing and managing your Ansible automation. Tower provides automation job control, security and auditing, and delegation of automation jobs.

Automation / Configuration / Orchestration / Governance



Manager

HYBRID CLOUD MANAGEMENT

RED HAT CLOUDFORMS

DISCOVERY · CAPACITY PLANNING · REPORTING · AUDITING COMPLIANCE · ANALYSIS · MONITORING · ORCHESTRATION · POLICY · CHARGEBACK

Developer

DevOps TOOLS

Cucumber · git · Maven

PROGRAMING LANGUAGES

JBoss · node · php

Service Designer

WORKLOAD AUTOMATION and CONFIGURATION MANAGEMENT

ANSIBLE · CHEF · puppet labs

OPERATIONAL TOOLS

RED HAT SATELLITE · IdM · Nagios · sensu

PLATFORM-AS-A-SERVICE

docker · OPENSHIFT by Red Hat · docker

IT Operator

vmware · RED HAT ENTERPRISE VIRTUALIZATION · Microsoft Hyper-V

TRADITIONAL VIRTUALIZATION

RED HAT ENTERPRISE OPENSTACK · amazon web services · Microsoft Azure · Google Cloud Platform

INFRASTRUCTURE-AS-A-SERVICE

CISCO · big switch networks · nuagenetworks · OPEN DAYLIGHT · NetApp · DELL

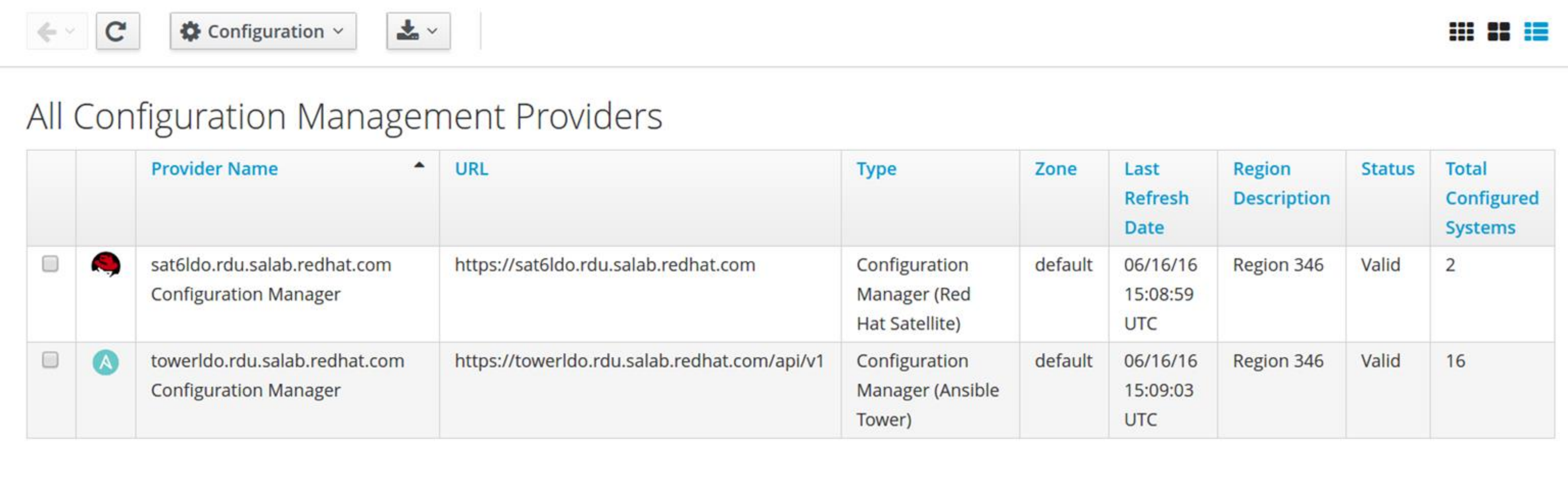
LARGE CERTIFIED ECOSYSTEM / NO LOCK-IN

RED HAT® CLOUDFORMS

+

RED HAT® SATELLITE

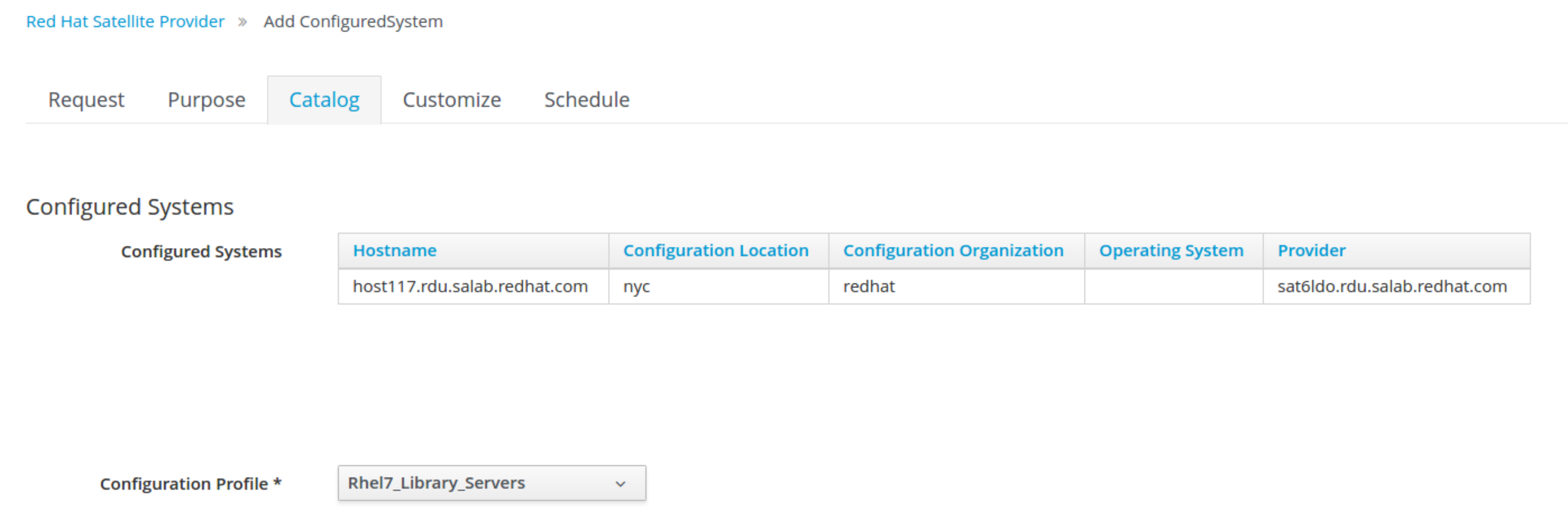
CloudForms Satellite 6 Integration



All Configuration Management Providers

□		Provider Name	URL	Type	Zone	Last Refresh Date	Region Description	Status	Total Configured Systems
□		sat6ldo.rdu.salab.redhat.com Configuration Manager	https://sat6ldo.rdu.salab.redhat.com	Configuration Manager (Red Hat Satellite)	default	06/16/16 15:08:59 UTC	Region 346	Valid	2
□		towerldo.rdu.salab.redhat.com Configuration Manager	https://towerldo.rdu.salab.redhat.com/api/v1	Configuration Manager (Ansible Tower)	default	06/16/16 15:09:03 UTC	Region 346	Valid	16

CloudForms Satellite 6 Integration



Configured Systems

Configured Systems

Hostname	Configuration Location	Configuration Organization	Operating System	Provider
host117.rdu.salab.redhat.com	nyc	redhat		sat6ldo.rdu.salab.redhat.com

Configuration Profile * Rhel7_Library_Servers

CloudForms Satellite 6 Integration

- Integration via configuration bootstrap.py script or api
- Bootstrap.py enables integration of new hosts with satellite 6 no matter where they are
    - Useful for Cloud Deployments where CloudForms manages the host:

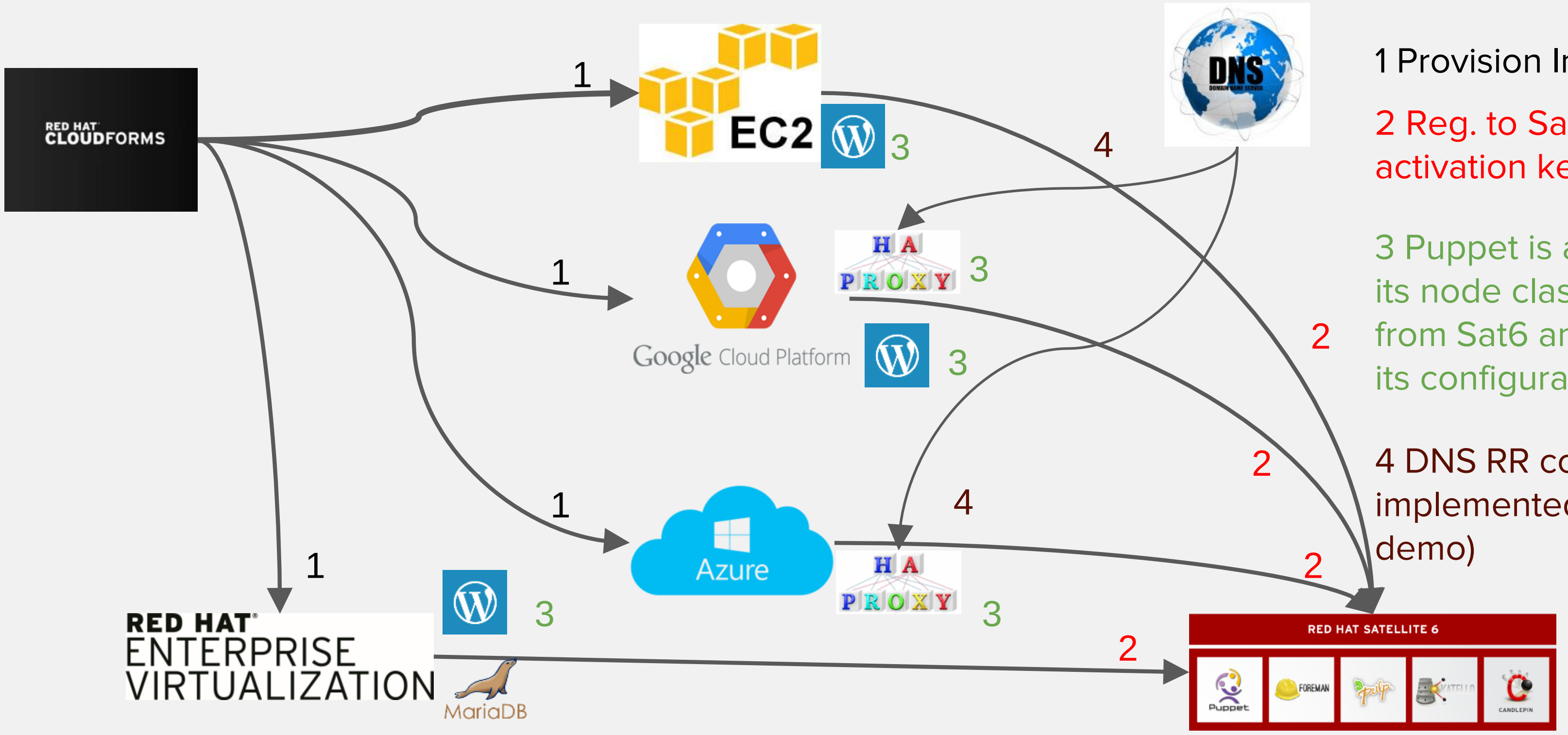
```
# /usr/local/sbin/bootstrap.py -l admin -p PASSWORD -s
 sat6summit.osop.rhcloud.com -o 'redhat' -L 'nyc' -g
 RHEL7_Library_Servers -a ak-Reg_To_Library --unmanaged
```

CloudForms Satellite 6 Integration

This demo is inspired by the outage of a cloud provider in June 2016 in Australia.

It gives you an idea on how to truly do hybrid compute and application provisioning across on premise and all major cloud providers (Azure, AWS, GCE) and triage which clouds you would like to provision to.

CloudForms Satellite 6 Hybrid Cloud Demo



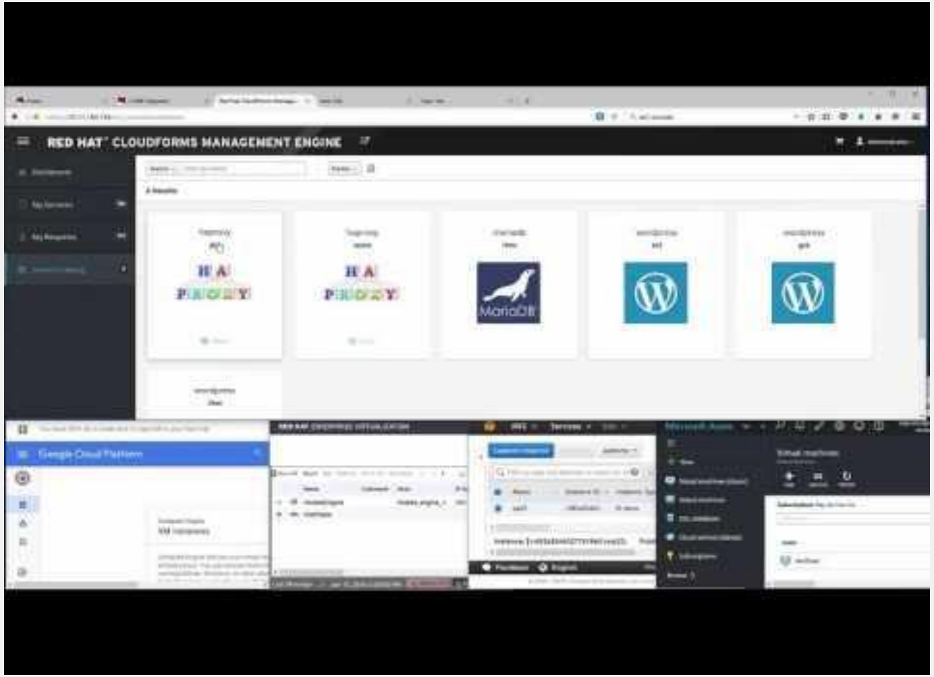
1 Provision Instance

2 Reg. to Sat6 with activation key

3 Puppet is asking for its node classification from Sat6 and applies its configuration

4 DNS RR could be implemented (not in demo)

CloudForms Satellite 6 Integration Demo



https://www.youtube.com/v/nu9wMOIkRqA

+

RED HAT®
CLOUDFORMS

Simple things should be simple and hard things possible

- Alan Kay

SIMPLE

Human readable

No special coding skills

POWERFUL

Application deployment

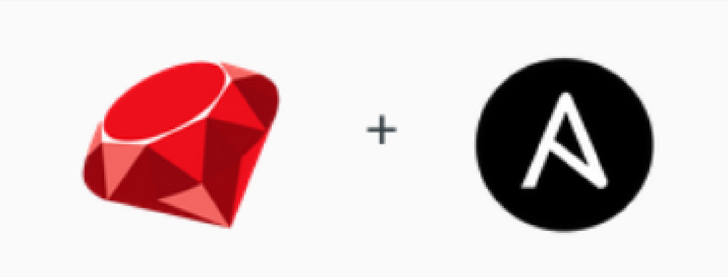
Configuration Management

AGENTLESS

Uses OpenSSH & WinRM

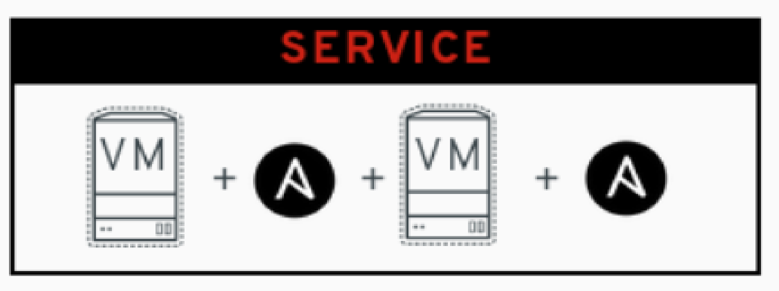
No agents to exploit or update

ANSIBLE MAKES CLOUDFORMS EASIER TO EXTEND



- Ansible is (much) easier to write than Ruby
- Leverage existing Playbooks!

CLOUDFORMS + TOWER SIMPLIFIES SERVICES



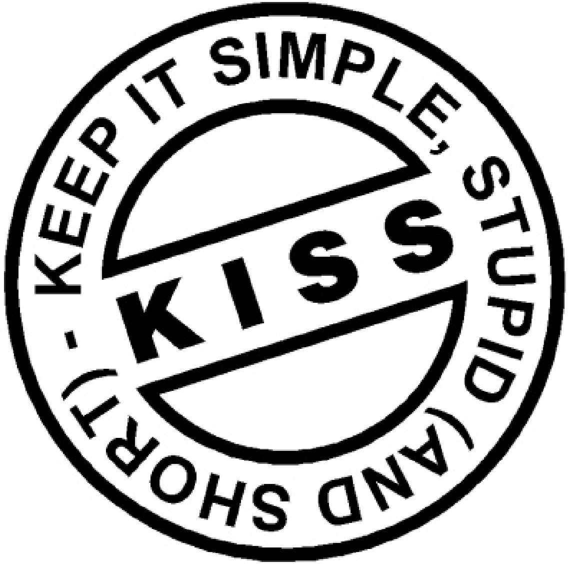
- CloudForms calls Tower
- Basis for cross-cloud portable applications

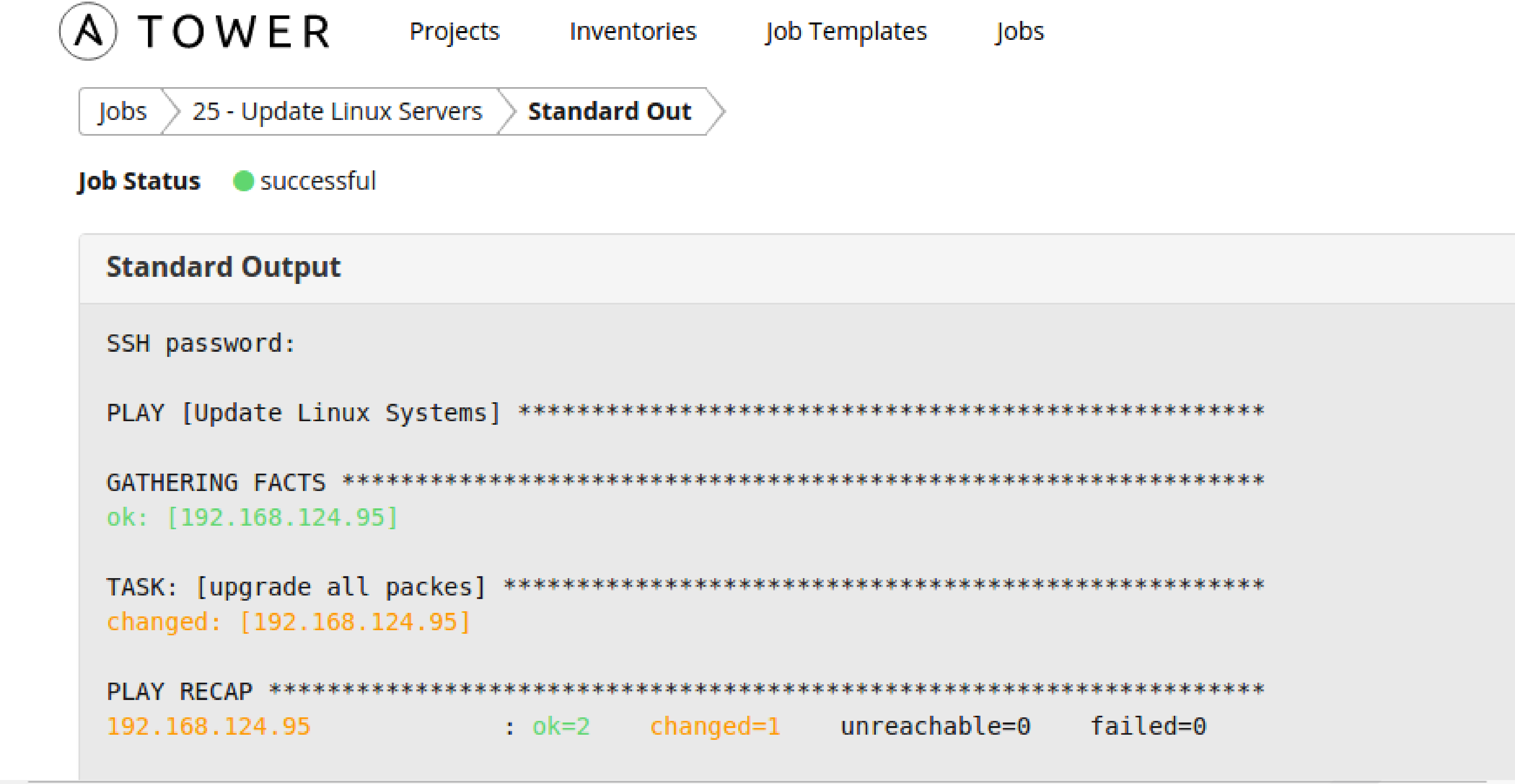
Ansible as a Service

1. Setup playbooks in Tower
2. Attach to CloudForms as a Service
3. Add a button to CloudForms (optional)

Example Playbook

```
---
- name: Update Linux Systems
  hosts: all
  remote_user: root

  tasks:
  - name: upgrade all packages
    yum: name=* state=latest
```

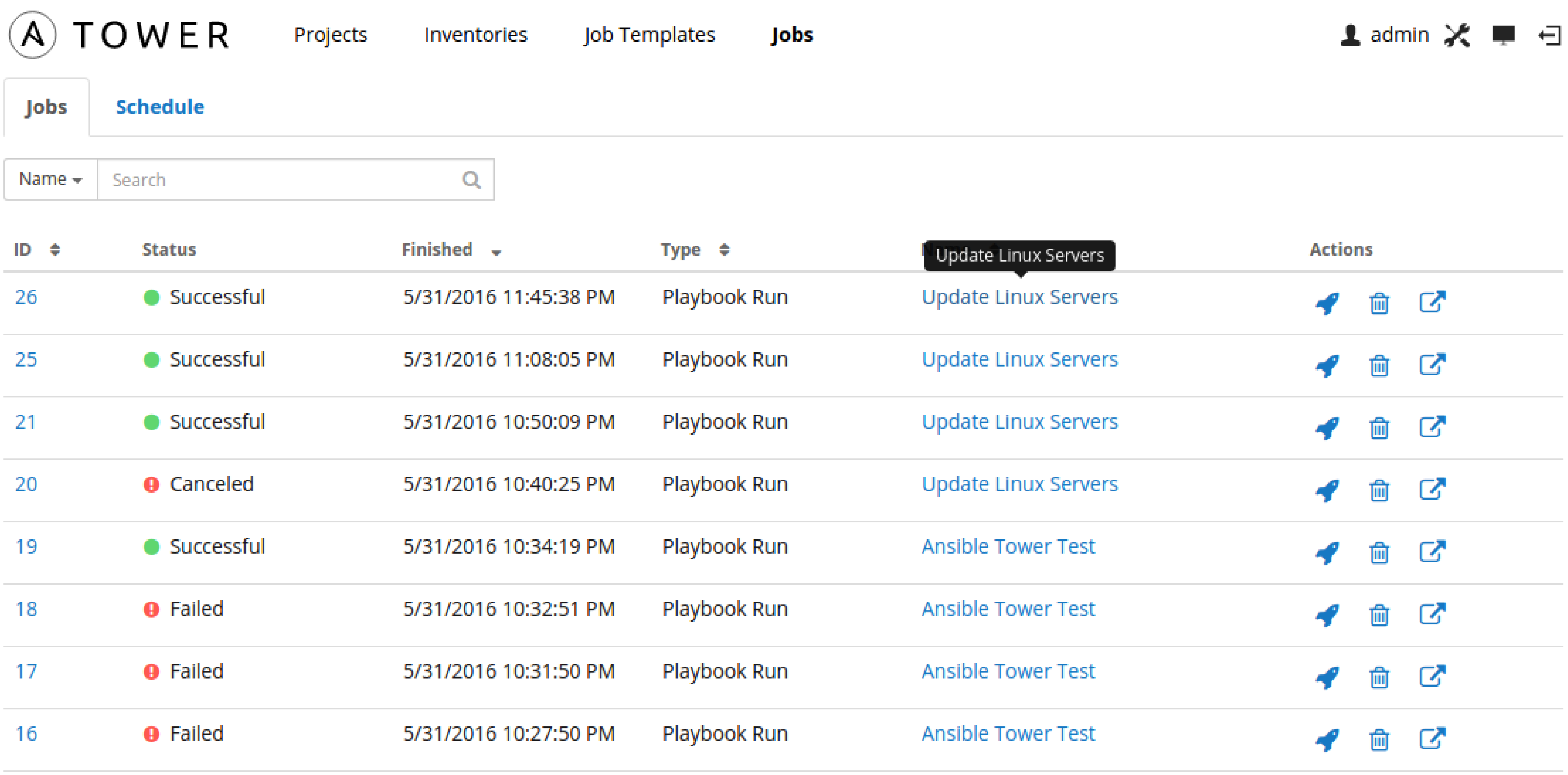




Job Status ● successful

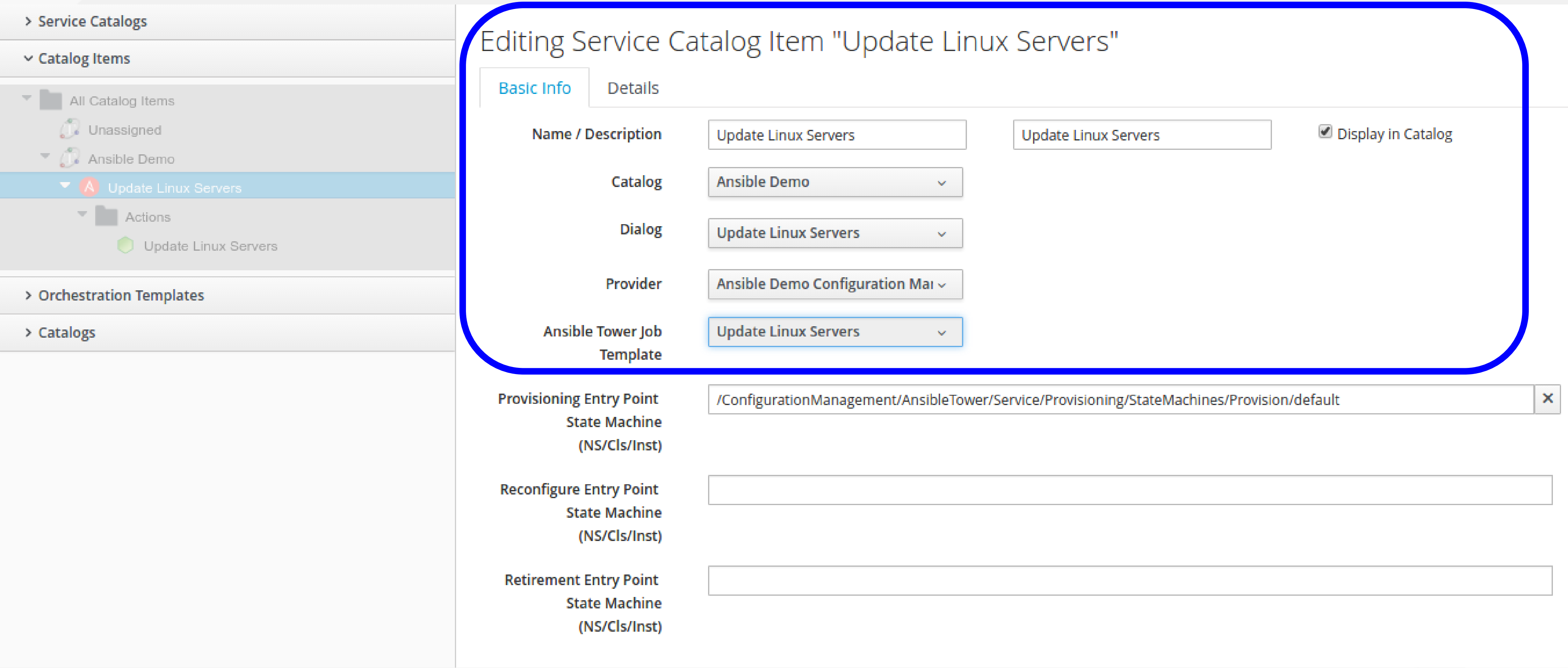
Standard Output

```
SSH password:

PLAY [Update Linux Systems] ***************************************************

GATHERING FACTS ***************************************************************
ok: [192.168.124.95]

TASK: [upgrade all packes] ****************************************************
changed: [192.168.124.95]

PLAY RECAP ********************************************************************
192.168.124.95             : ok=2    changed=1    unreachable=0    failed=0
```



ID	Status	Finished	Type	Name	Actions
26	● Successful	5/31/2016 11:45:38 PM	Playbook Run	Update Linux Servers	
25	● Successful	5/31/2016 11:08:05 PM	Playbook Run	Update Linux Servers	
21	● Successful	5/31/2016 10:50:09 PM	Playbook Run	Update Linux Servers	
20	! Canceled	5/31/2016 10:40:25 PM	Playbook Run	Update Linux Servers	
19	● Successful	5/31/2016 10:34:19 PM	Playbook Run	Ansible Tower Test	
18	! Failed	5/31/2016 10:32:51 PM	Playbook Run	Ansible Tower Test	
17	! Failed	5/31/2016 10:31:50 PM	Playbook Run	Ansible Tower Test	
16	! Failed	5/31/2016 10:27:50 PM	Playbook Run	Ansible Tower Test	

CloudForms Admin UI

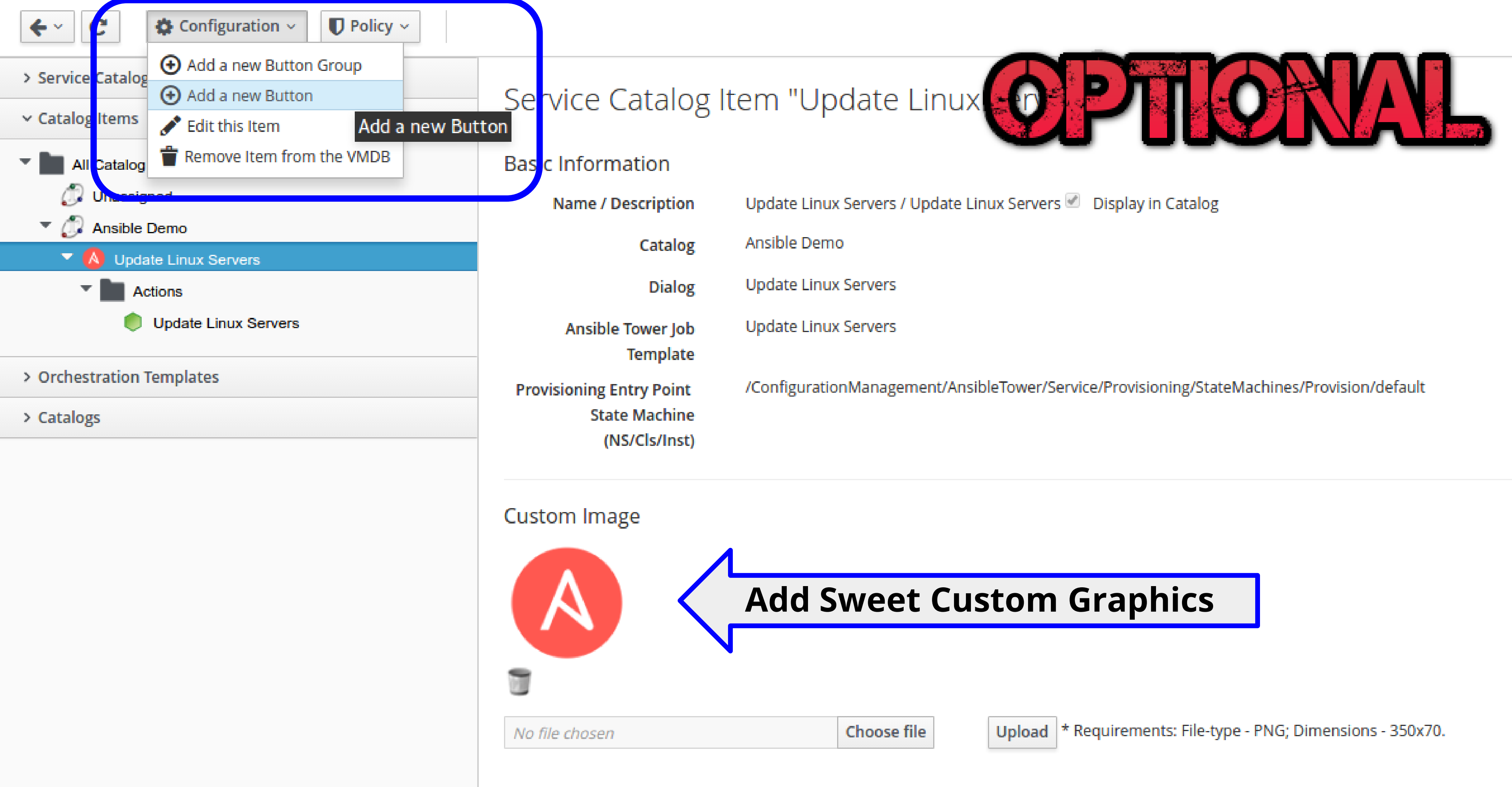


- › Service Catalogs
- ⌄ Catalog Items
  - All Catalog Items
    - Unassigned
    - Ansible Demo
      - Update Linux Servers
        - Actions
          - Update Linux Servers
- › Orchestration Templates
- › Catalogs

Editing Service Catalog Item "Update Linux Servers"

Basic Info | Details

Name / Description	Update Linux Servers	Update Linux Servers ☑ Display in Catalog
Catalog	Ansible Demo	
Dialog	Update Linux Servers	
Provider	Ansible Demo Configuration Mai	
Ansible Tower Job Template	Update Linux Servers	
Provisioning Entry Point State Machine (NS/Cls/Inst)	/ConfigurationManagement/AnsibleTower/Service/Provisioning/StateMachines/Provision/default ✕	
Reconfigure Entry Point State Machine (NS/Cls/Inst)		
Retirement Entry Point State Machine (NS/Cls/Inst)		



OPTIONAL

Service Catalog Item "Update Linux Ser

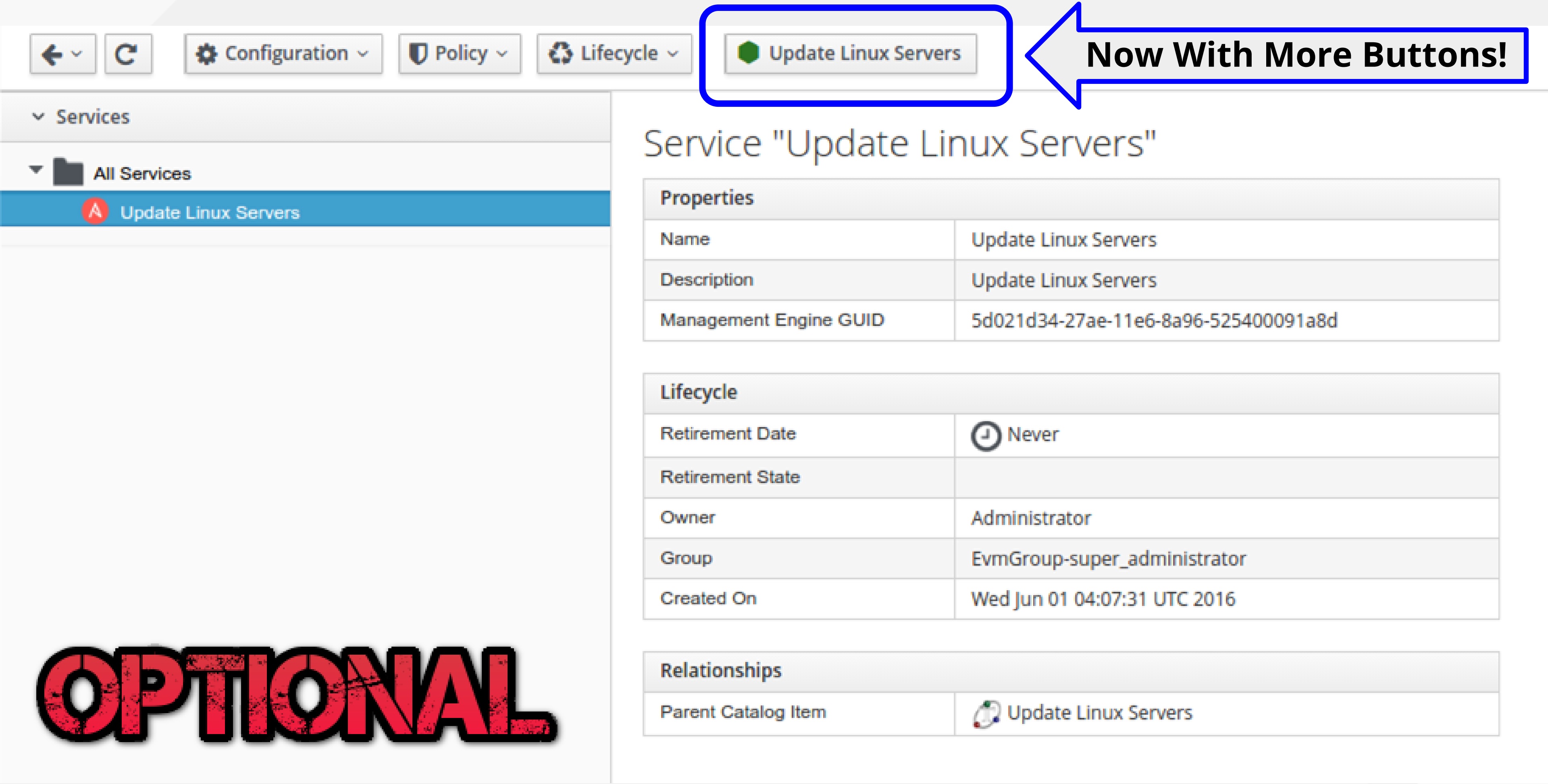
Basic Information

Name / Description	Update Linux Servers / Update Linux Servers ☑ Display in Catalog
Catalog	Ansible Demo
Dialog	Update Linux Servers
Ansible Tower Job Template	Update Linux Servers
Provisioning Entry Point State Machine (NS/Cls/Inst)	/ConfigurationManagement/AnsibleTower/Service/Provisioning/StateMachines/Provision/default

Custom Image

Add Sweet Custom Graphics

* Requirements: File-type - PNG; Dimensions - 350x70.



Now With More Buttons!

Service "Update Linux Servers"

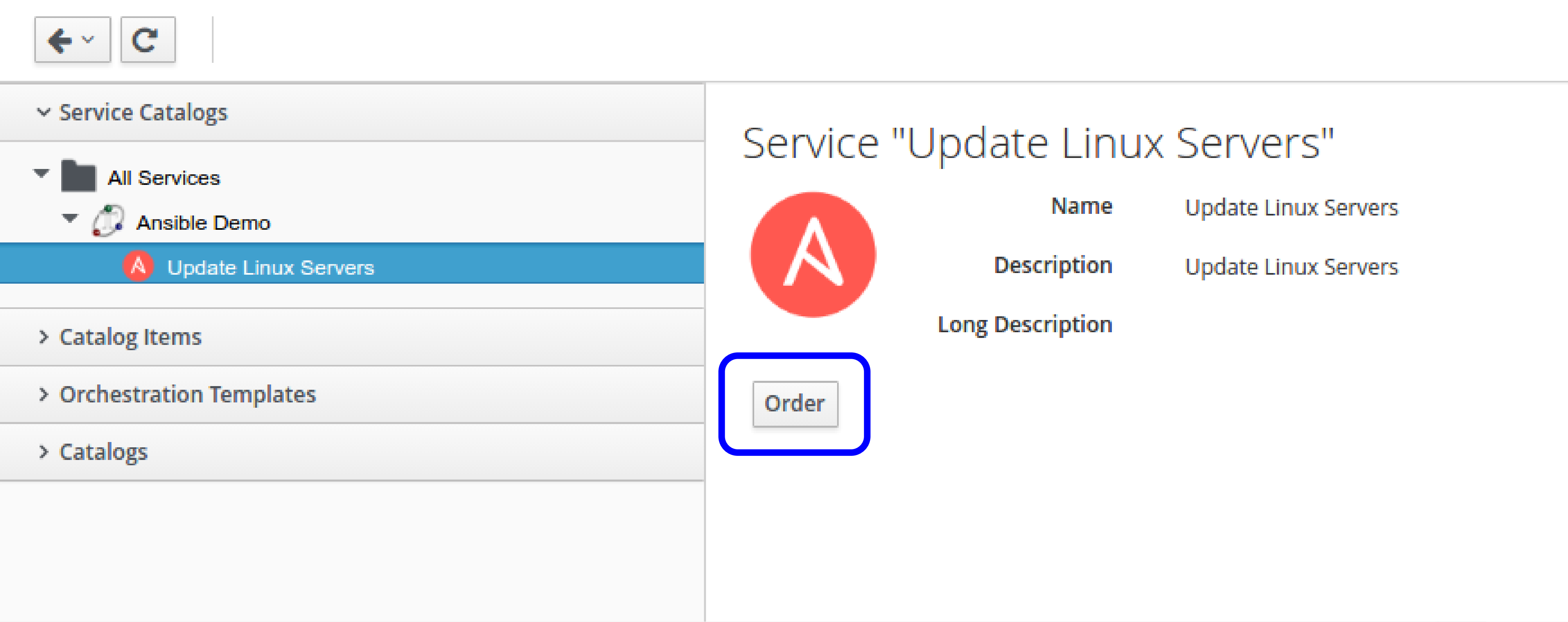
Properties	
Name	Update Linux Servers
Description	Update Linux Servers
Management Engine GUID	5d021d34-27ae-11e6-8a96-525400091a8d

Lifecycle	
Retirement Date	Never
Retirement State	
Owner	Administrator
Group	EvmGroup-super_administrator
Created On	Wed Jun 01 04:07:31 UTC 2016

Relationships	
Parent Catalog Item	Update Linux Servers

OPTIONAL

CloudForms Admin UI



Service Catalogs

All Services

Ansible Demo

Update Linux Servers

Catalog Items

Orchestration Templates

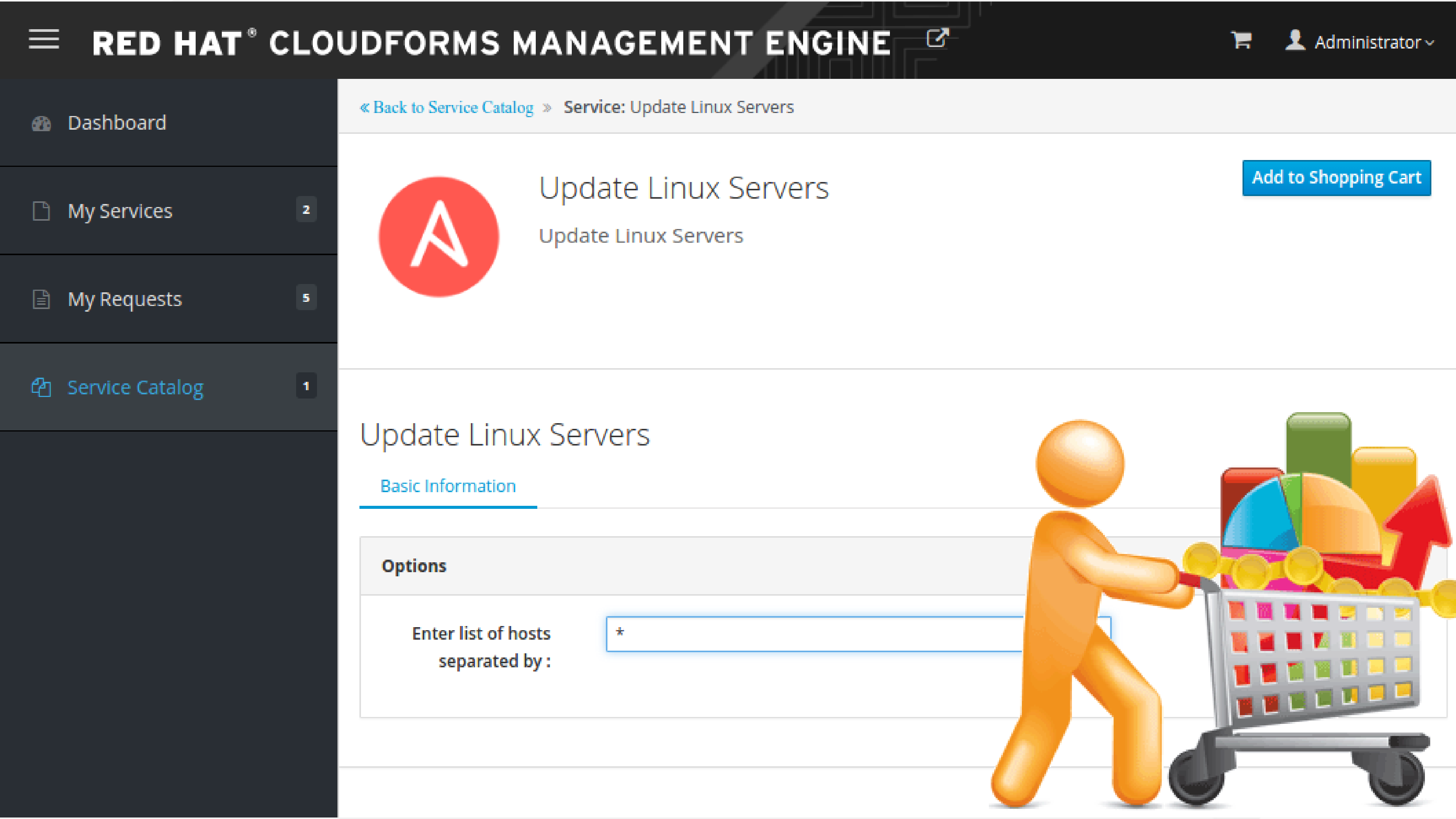
Catalogs

Service "Update Linux Servers"

Name: Update Linux Servers

Description: Update Linux Servers

Long Description:



« Back to Service Catalog » Service: Update Linux Servers

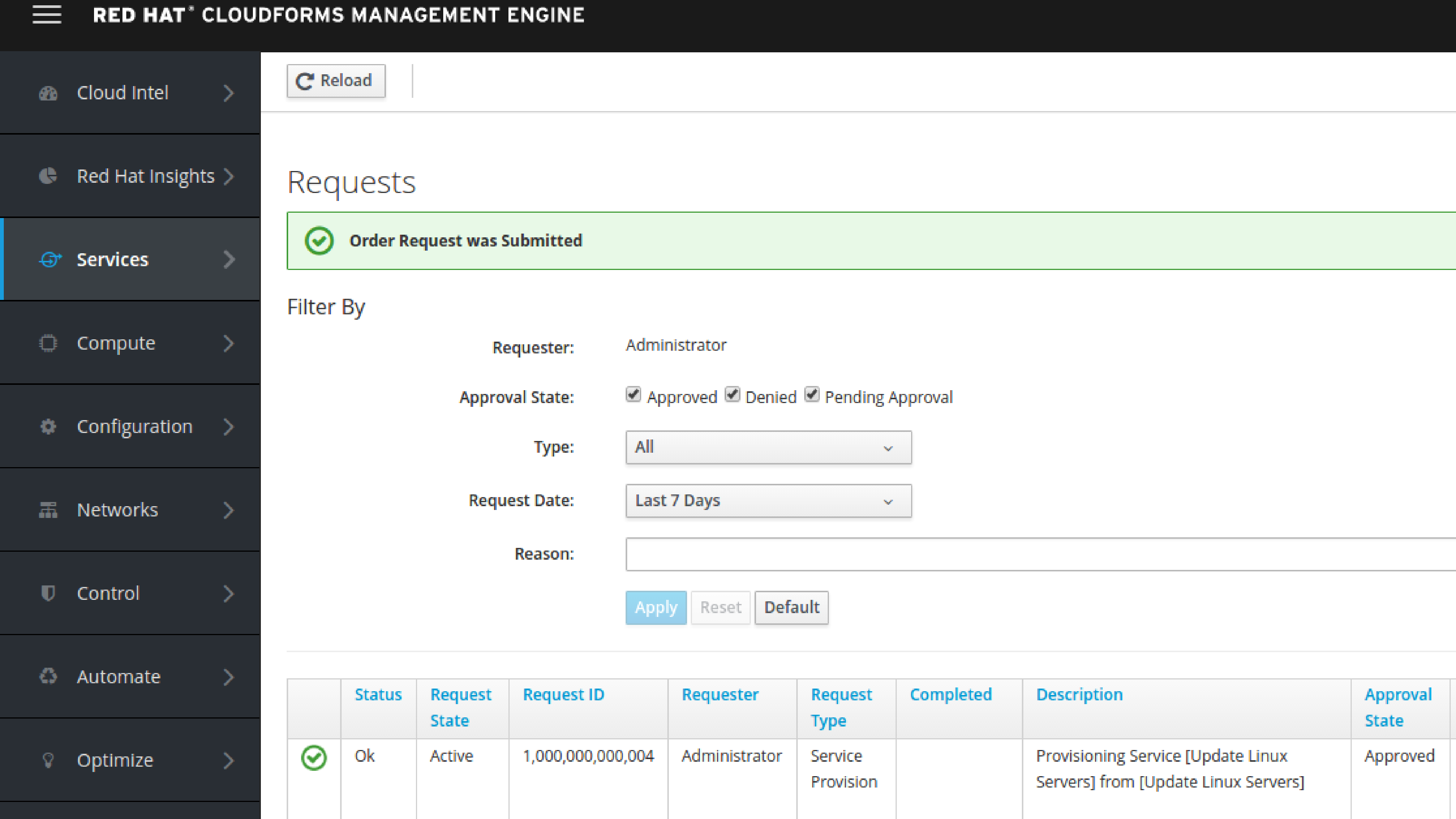
Update Linux Servers

Update Linux Servers

Update Linux Servers

Options

Enter list of hosts separated by : *



Requests

✓ Order Request was Submitted

Filter By

Requester: Administrator

Approval State: ☑ Approved ☑ Denied ☑ Pending Approval

Type: All

Request Date: Last 7 Days

Reason:

Apply Reset Default

	Status	Request State	Request ID	Requester	Request Type	Completed	Description	Approval State
✓	Ok	Active	1,000,000,000,004	Administrator	Service Provision		Provisioning Service [Update Linux Servers] from [Update Linux Servers]	Approved

Hard Problems Solved With One Line Of Ansible

Removing files from servers (Without rm -fR)

```
$ ansible webservers -m file -a "dest=/path/to/file state=absent"
```

Run backup script in background (20 Hr timeout)

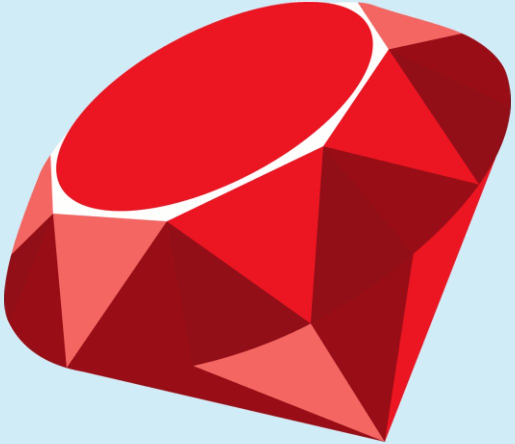
```
$ ansible webserver -B 72000 -P 0 -a "/bin/backup_cmd --do-stuff"
```

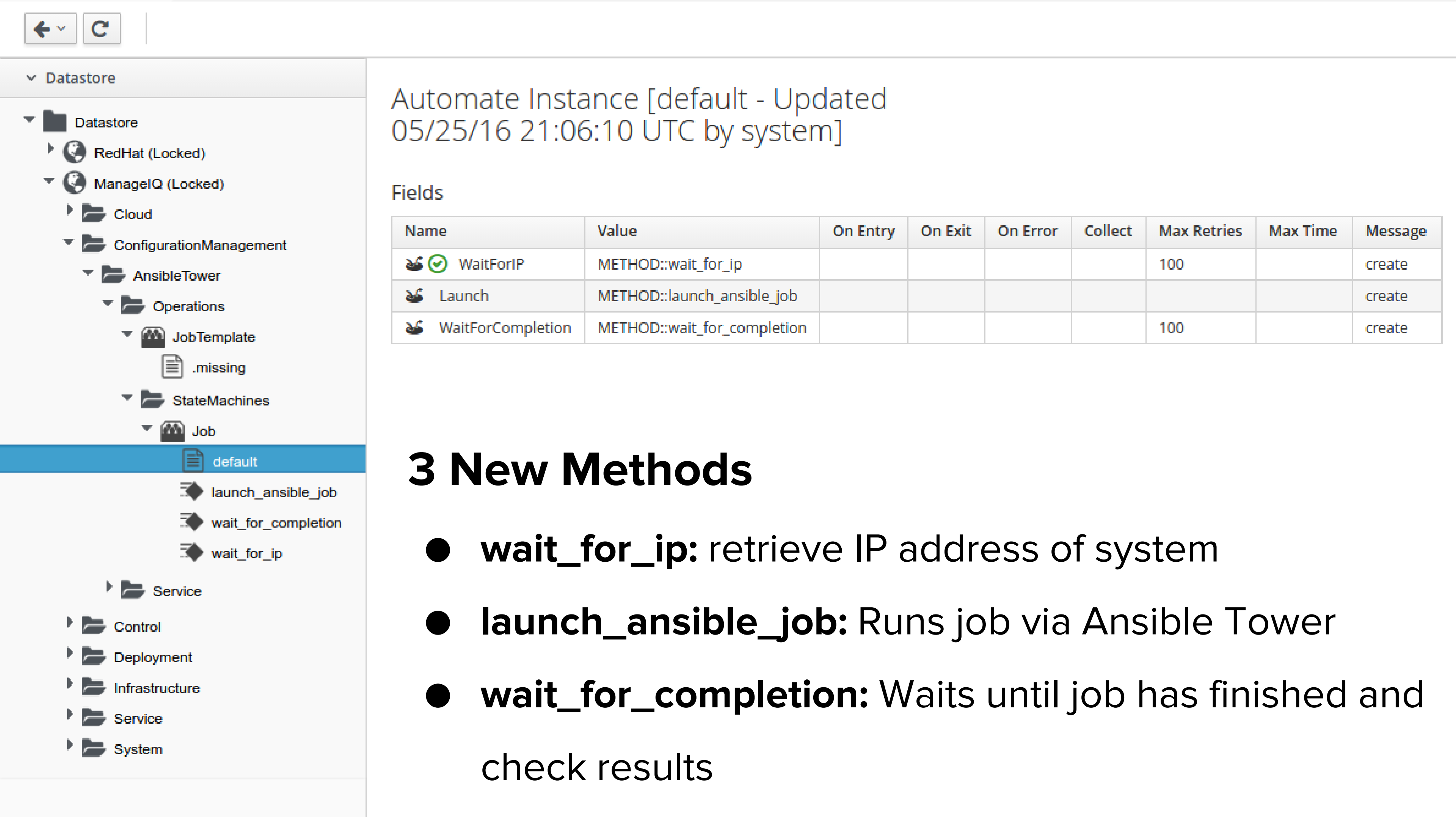
Show status of all web servers (10 in parallel)

```
$ ansible webservers -a "service nginx status " -f 10
```

Ansible as Automation

Direct integration into the CloudForms State machine through new methods





Datastore

- Datastore
  - RedHat (Locked)
  - ManageIQ (Locked)
    - Cloud
    - ConfigurationManagement
      - AnsibleTower
        - Operations
          - JobTemplate
            - .missing
          - StateMachines
            - Job
              - default
              - launch_ansible_job
              - wait_for_completion
              - wait_for_ip
        - Service
    - Control
    - Deployment
    - Infrastructure
    - Service
    - System

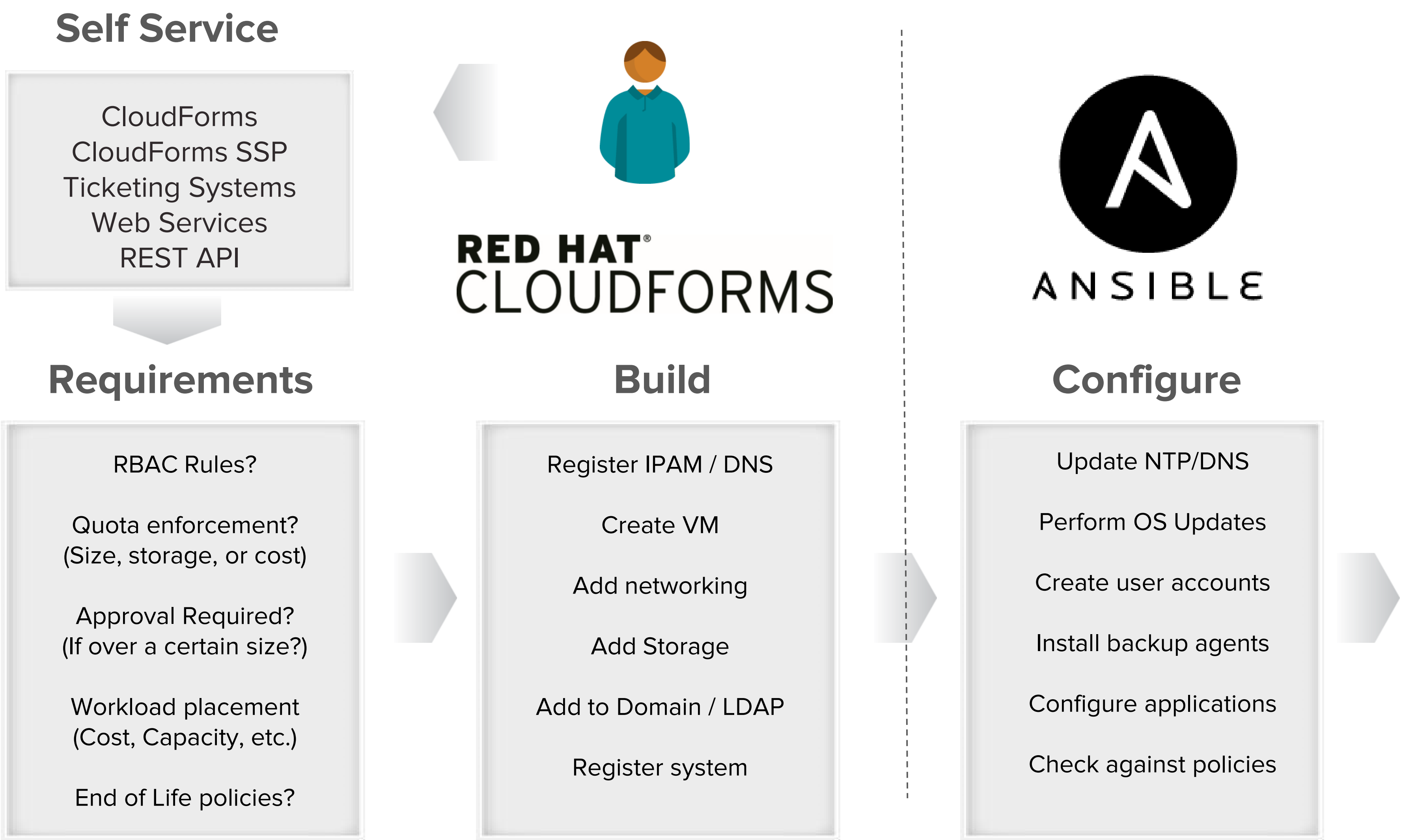
Automate Instance [default - Updated 05/25/16 21:06:10 UTC by system]

Fields

Name	Value	On Entry	On Exit	On Error	Collect	Max Retries	Max Time	Message
✓ WaitForIP	METHOD::wait_for_ip					100		create
Launch	METHOD::launch_ansible_job							create
WaitForCompletion	METHOD::wait_for_completion					100		create

3 New Methods

- **wait_for_ip:** retrieve IP address of system
- **launch_ansible_job:** Runs job via Ansible Tower
- **wait_for_completion:** Waits until job has finished and check results



Self Service

CloudForms
CloudForms SSP
Ticketing Systems
Web Services
REST API

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ANSIBLE

Requirements

RBAC Rules?

Quota enforcement?
(Size, storage, or cost)

Approval Required?
(If over a certain size?)

Workload placement
(Cost, Capacity, etc.)

End of Life policies?

Build

Register IPAM / DNS

Create VM

Add networking

Add Storage

Add to Domain / LDAP

Register system

Configure

Update NTP/DNS

Perform OS Updates

Create user accounts

Install backup agents

Configure applications

Check against policies

SUMMARY

- Configuration tools can provide significant time savings
- There are multiple tools in the Red Hat toolbox
- Anything is possible when combining CloudForms, Satellite 6 and Ansible Tower

Hybrid Cloud Management Sessions

Red Hat CloudForms: Cutting VM creation time by 75% at General Mills	Thurs, Jun 30, 10:15 AM - 11:15 AM – 2004
Compliance, security automation, and remediation with Red Hat CloudForms, Red Hat Satellite, and Ansible Tower by Red Hat	Thurs, Jun 30, 3:30 PM - 4:30 PM – 2005
Automation and configuration management across hybrid clouds with Red Hat CloudForms, Red Hat Satellite 6, and Ansible Tower	Wed, Jun 29, 4:45 PM - 5:45 PM – 2007
Automating Azure public and private clouds with Red Hat CloudForms 4	Wed, Jun 29, 4:45 PM - 5:45 PM – 2004
Red Hat CloudForms 2016 roadmap	Wed, Jun 29, 11:30 AM - 12:30 PM – 2004
Hands-on introduction to Red Hat CloudForms	Wed, Jun 29, 10:15 AM - 12:15 PM – 3016 - Lab II
Enabling digital transformation via the Red Hat management portfolio	Tues, Jun 28, 10:15 AM - 11:15 AM – 2004

QUESTIONS?

THANK YOU

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Material
http://blog.domb.net

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