RED HAT CLOUDFORMS: CUTTING VM CREATION TIME BY 75% AT GENERAL MILLS

Ashley Nelson
Linux Administrator - General Mills

Michael Dahlgren
Cloud Solutions Architect - Red Hat

OVERVIEW

- The Changing IT Landscape
- General Mills Background
- What is CloudForms?
- CloudForms + General Mills
- Future Plans
- Questions

THE CHANGING IT LANDSCAPE

WE LIVE IN UNPRECEDENTED TIMES

The world's largest taxi company, has no vehicles. UBER

facebook **The world's largest media owner, creates no content.**

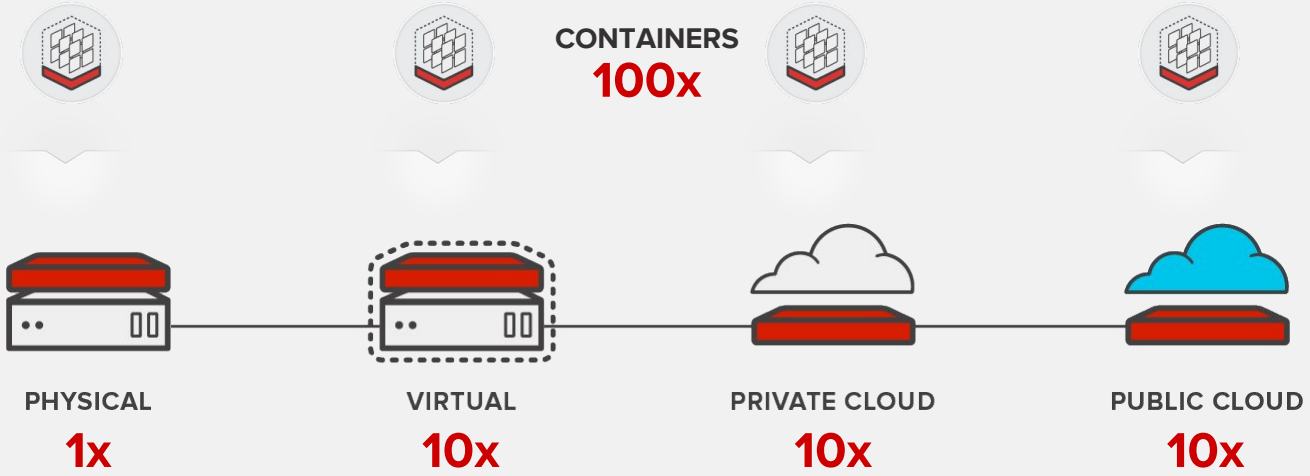
The world's most valuable retailer, has no stores. Alibaba.com™

airbnb **The world's largest hotel provider, has no real estate.**

The differentiator is not what you have, but instead automating business value!

ON THE PATH TO HYBRID ENVIRONMENTS

COMPLEXITY IS GOING THROUGH THE ROOF



SOFTWARE-DEFINED NETWORKING

SOFTWARE-DEFINED STORAGE

Why General Mills?

GENERAL MILLS

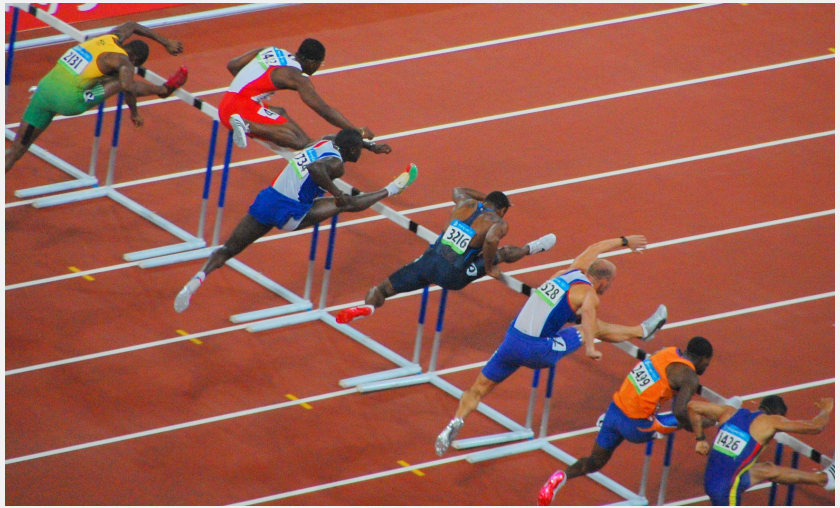
- Fortune 500 food manufacturing company
- Brands such as Big G Cereal, Betty Crocker, Pillsbury
- Headquartered in Minneapolis, Minnesota
- 42,000 employees in more than 100 countries
- Approximately 600 IT employees

LINUX TEAM @ GMI

- System Administration
  - Server provisioning
  - Patching
- Virtualization
- Storage / SAN
- Backups

- Keeping the Lights On
  - Manufacturing plants run 24/7
  - International offices

CHALLENGES



- Recent influx of server requests
- Everything needs to be tracked
- Systems need to be consistent
- Processes are hard to enforce

RED HAT® CLOUDFORMS

RED HAT® CLOUDFORMS

Unified management

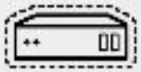
Complete self-service

Operational visibility

Compliance and governance

CONTAINERS

OpenShift by Red Hat | Kubernetes



VIRTUALIZATION

VMware

Microsoft Hyper-V

Red Hat Enterprise Virtualization

PRIVATE CLOUD

OpenStack

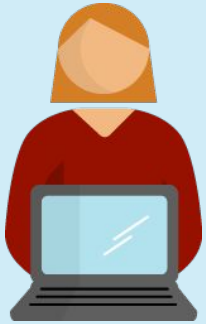
Red Hat Enterprise Linux OpenStack Platform

PUBLIC CLOUD

Amazon Web Services

Windows Azure

BEFORE CLOUDFORMS



REQUEST

"Do we have an IP Address?"

"Do you really need 16GB?"

"What needs to be backed up?"

"What version of Java again?"

"Is it configured securely."

"Who is responsible for it?"

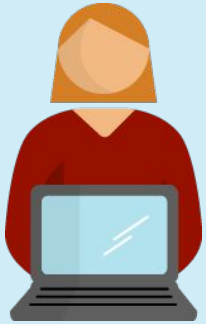
Do we have the capacity?

"Who is paying for this service?"

"How do we know to retire it?"

TASK	TIME (MINS)
Register IPs and DNS	20
Add to directory service	10
Create VM from template	15
Kickstart VM from Satellite	10
Configure with Puppet	15
Add additional storage	10
Update software	10
Reboot	5
Check security compliance	10
Validate	20
ACTIVE WORK TIME	**2 hours**
TIME TO COMPLETION	**1-2 days**

FULLY AUTOMATED DEPLOYMENTS



REQUEST

RESULTS

TASK	TIME (MINS)
Register IPs and DNS	
Add to directory service	
Create VM from template	
Kickstart VM from Satellite	
Configure with Puppet	
Add additional storage	
Update software	
Reboot	
Check security compliance	
Validate	
ACTIVE WORK TIME	**2 hours**
TIME TO COMPLETION	**1-2 days**

VISIBILITY AND MANAGEMENT

Operations Summary | Health / Compliance | Public Cloud

Quick Links

- Order Service
- My Services
- My Workloads

CloudForms Server Status

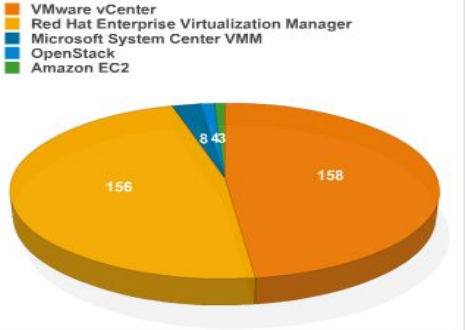
Hostname	CPU %	Memory %	Status
Cloudforms32-loic	0.0%	3.1%	not responding
localhost	0.2%	6.3%	started

Updated 03/15/16 23:15 | Next 03/16/16 02:00

Group CPU Quota Usage

Group	Quota Max CPUs	Allocated vCPUs (Total)
db_team	20	10
web_team	10	4
EvmGroup-super_admi		1

Workload by Provider



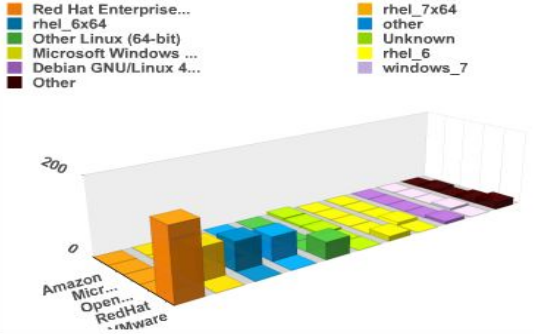
Updated 09/14/15 14:12 | Next 03/16/16 02:00

Top CPU Consumers (weekly)

Asset Name	Cluster Name	CPU - Usage Rate (%) (Avg)
No records found		

Updated 03/15/16 03:44 | Next 03/17/16 00:00

Vendor and Guest OS Chart



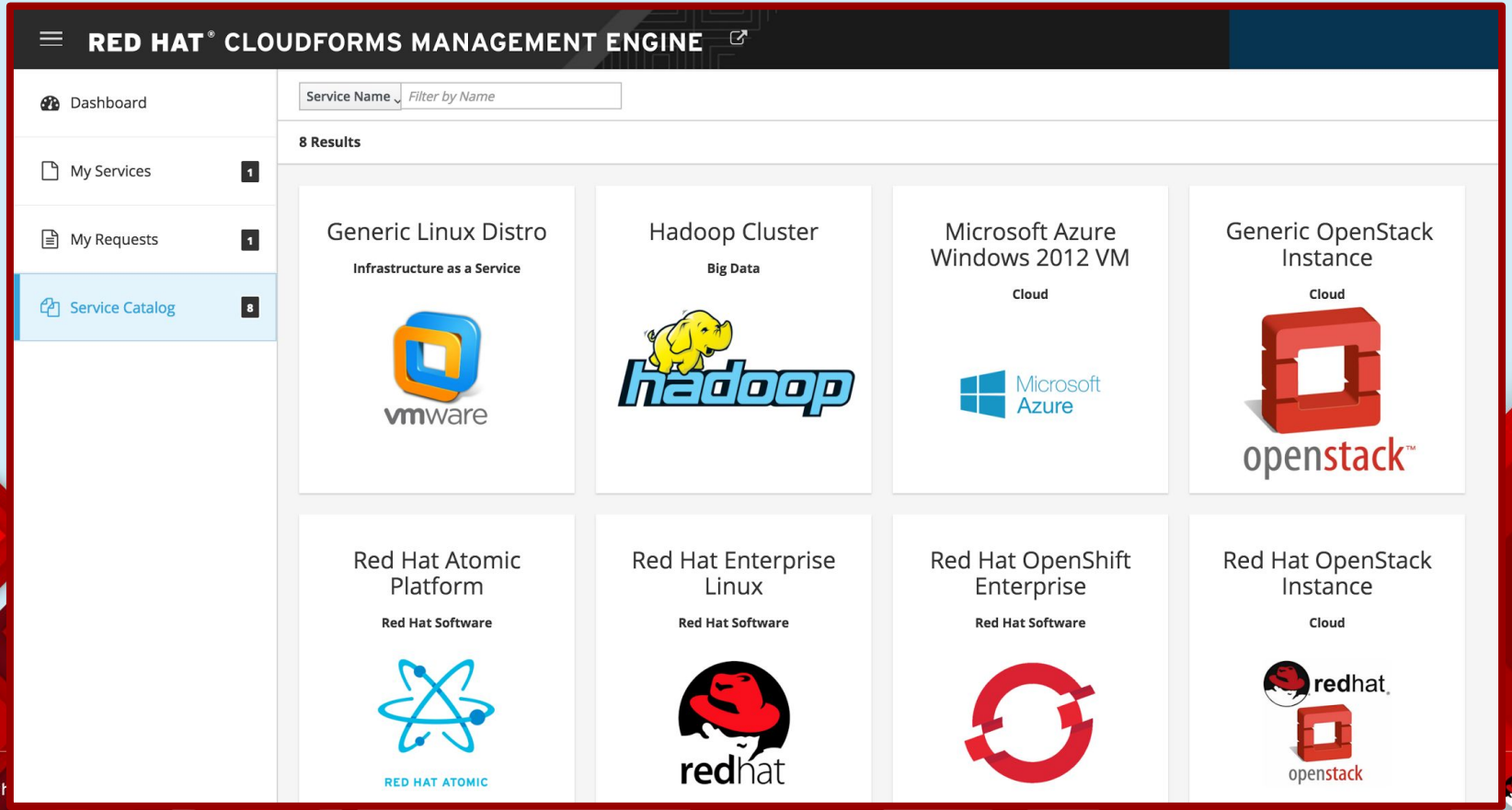
Updated 03/15/16 03:44 | Next 03/17/16 00:00

EVM: Recently Discovered VMs

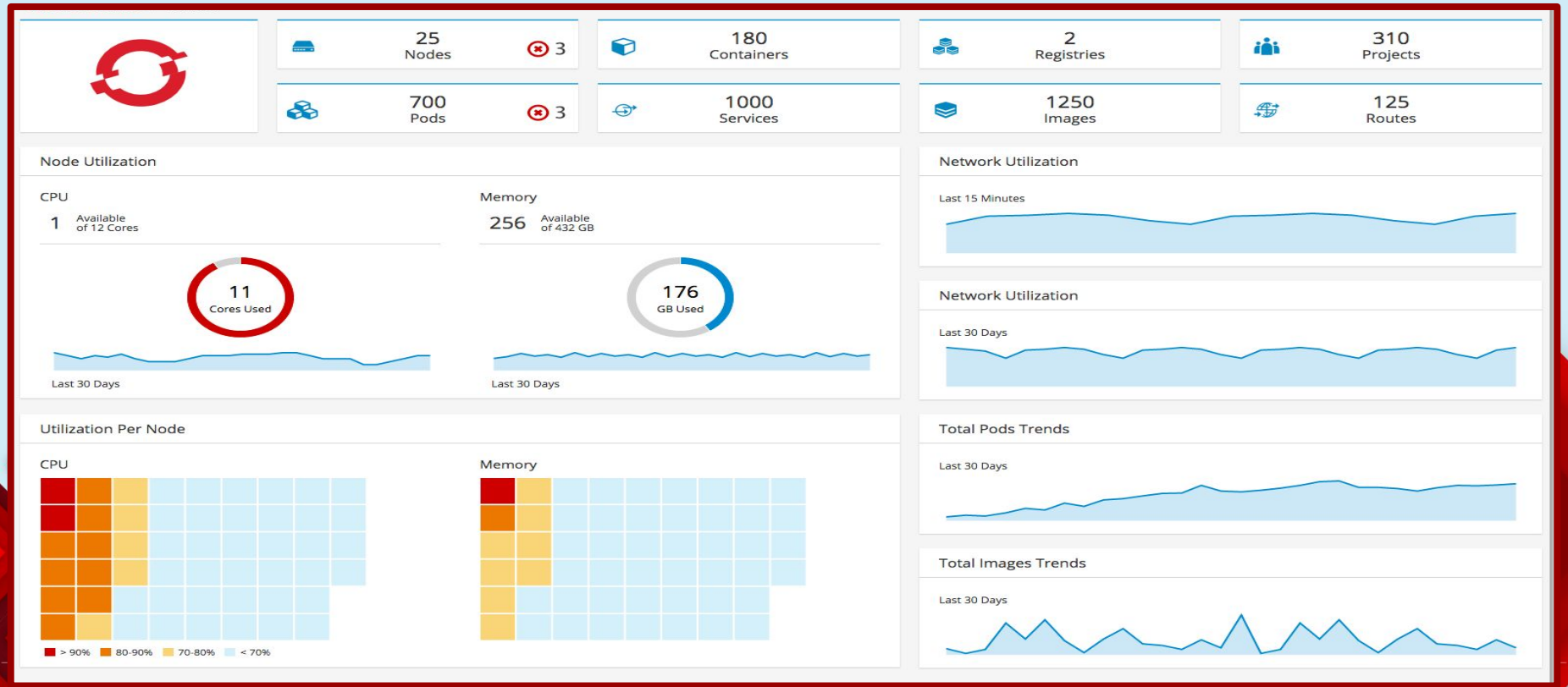
Red Hat CloudForms 4.0 on Host cloud07-acc.gps.hst.ams2.redhat.com
Date : 2015-12-15 17:38:37 UTC

cjung-test1 at iscsi-cloud14
Date : 2015-12-15 17:38:28 UTC

SELF SERVICE



UTILIZATION AND SYSTEM MANAGEMENT



GENERAL MILLS

+

RED HAT® CLOUDFORMS

	CLOUDFORMS 3.2	PRODUCT X
FLEXIBILITY		
COMPLEXITY		
GUI		
CODE		
INTEGRATION		
ROADMAP		
POC		

CLOUDFORMS POC

- 60-day trial period
- Red Hat consultant assisted for three days
  - Educate, assist, and implement
  - Continued assistance after meeting
- Worked through our requirements
- Imported pre-built customizations

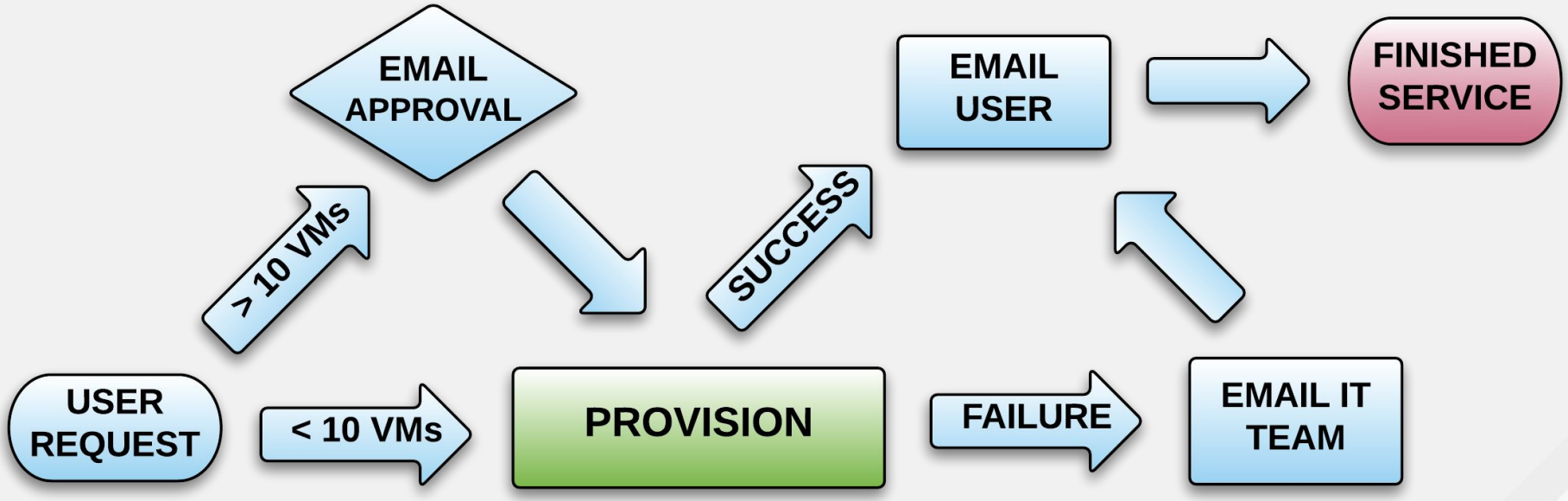
WHY WE CHOSE CLOUDFORMS

- Red Hat strategic partner
- Fit into ecosystem
- Open source (with upstream community)
- Most flexible / versatile
- Not just VMs (service can be anything)

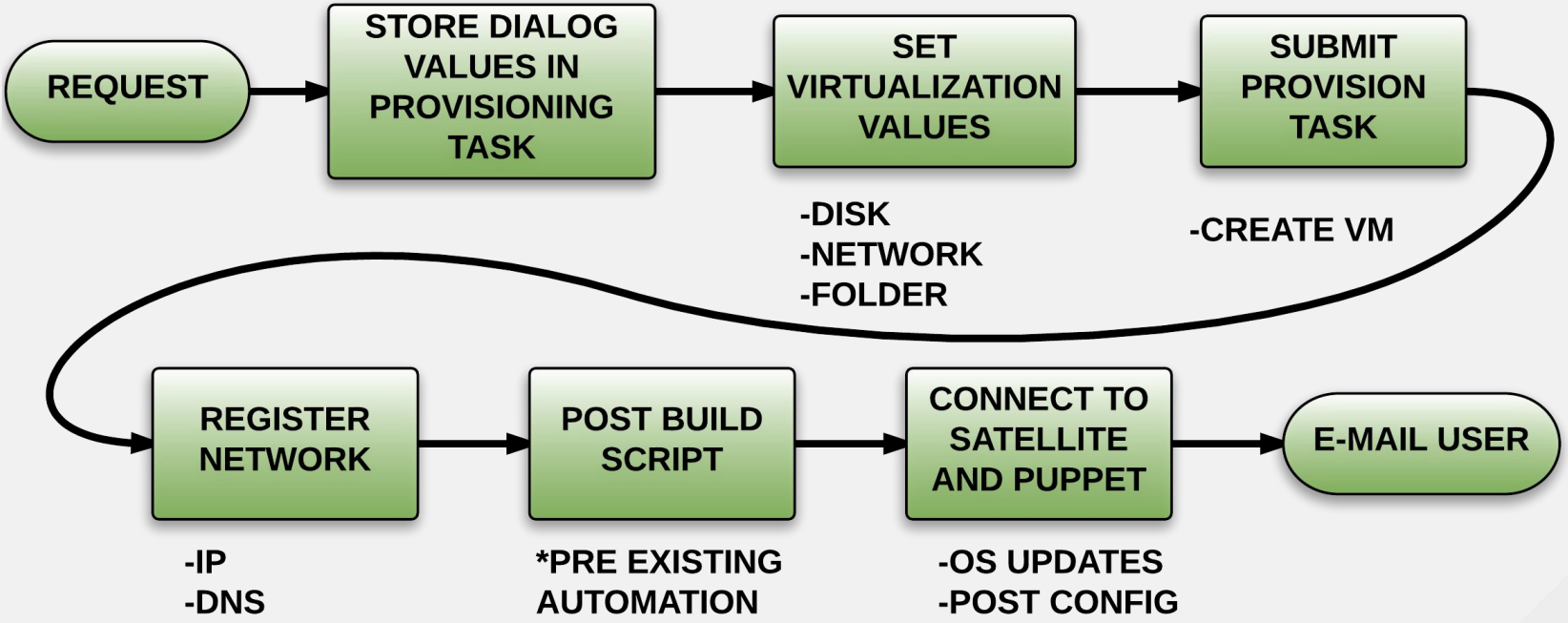
OUR IMPLEMENTATION

- Provision RHEL 6 and 7 VMs
- Automatic approval - under 10 VMs
- Integrated existing scripts
- Email on success / failure
- Retirement workflow

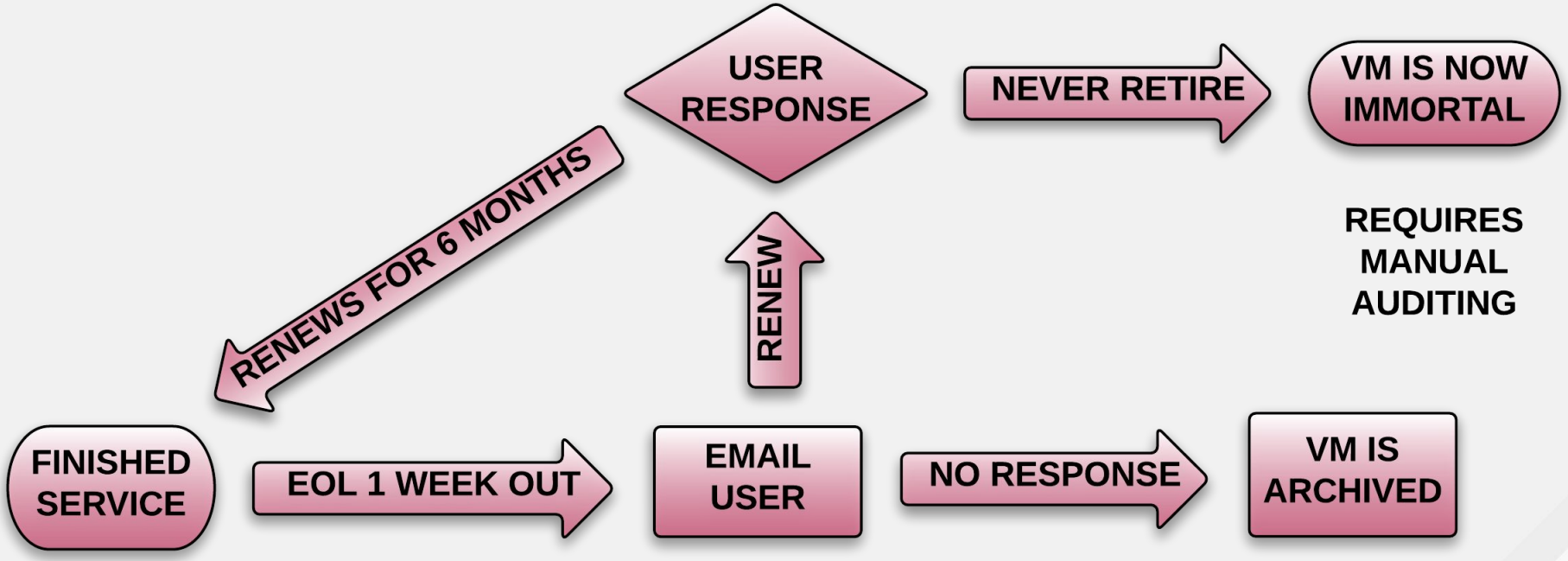
PROVISIONING WORKFLOW



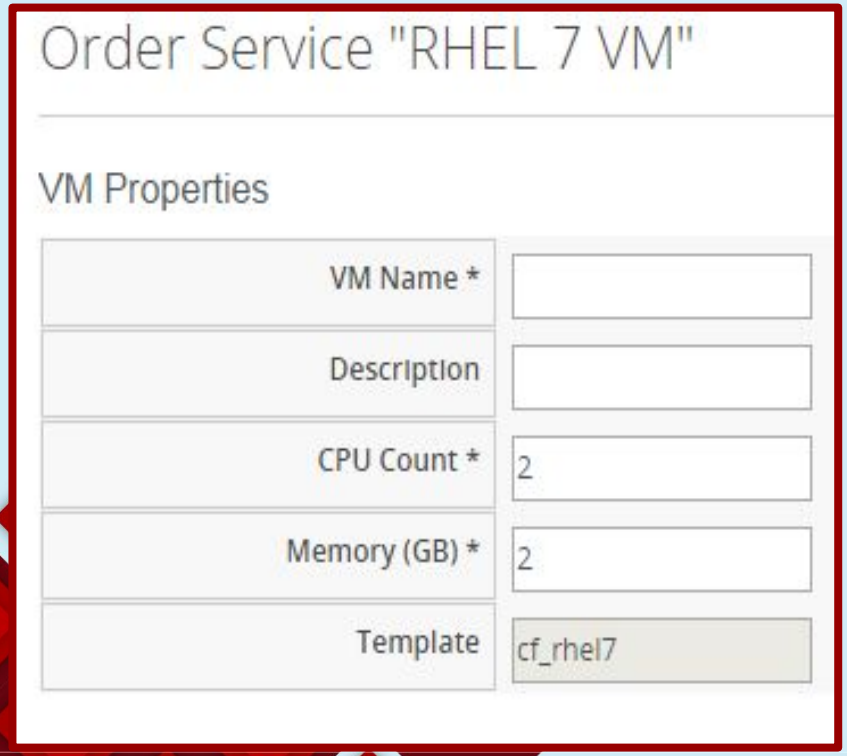
PROVISIONING IN DETAIL

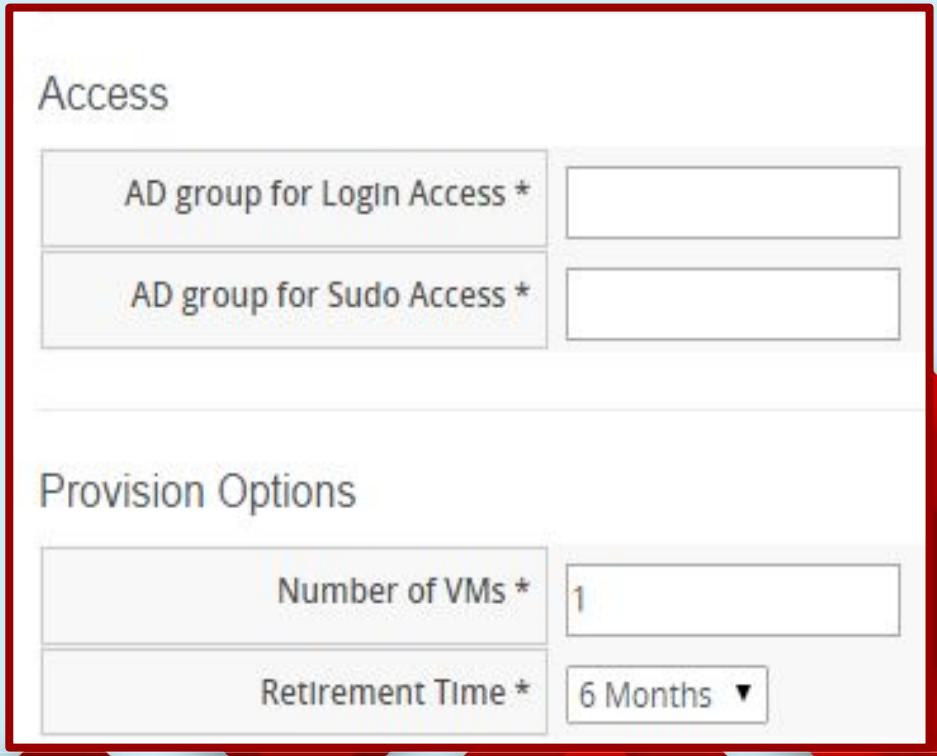


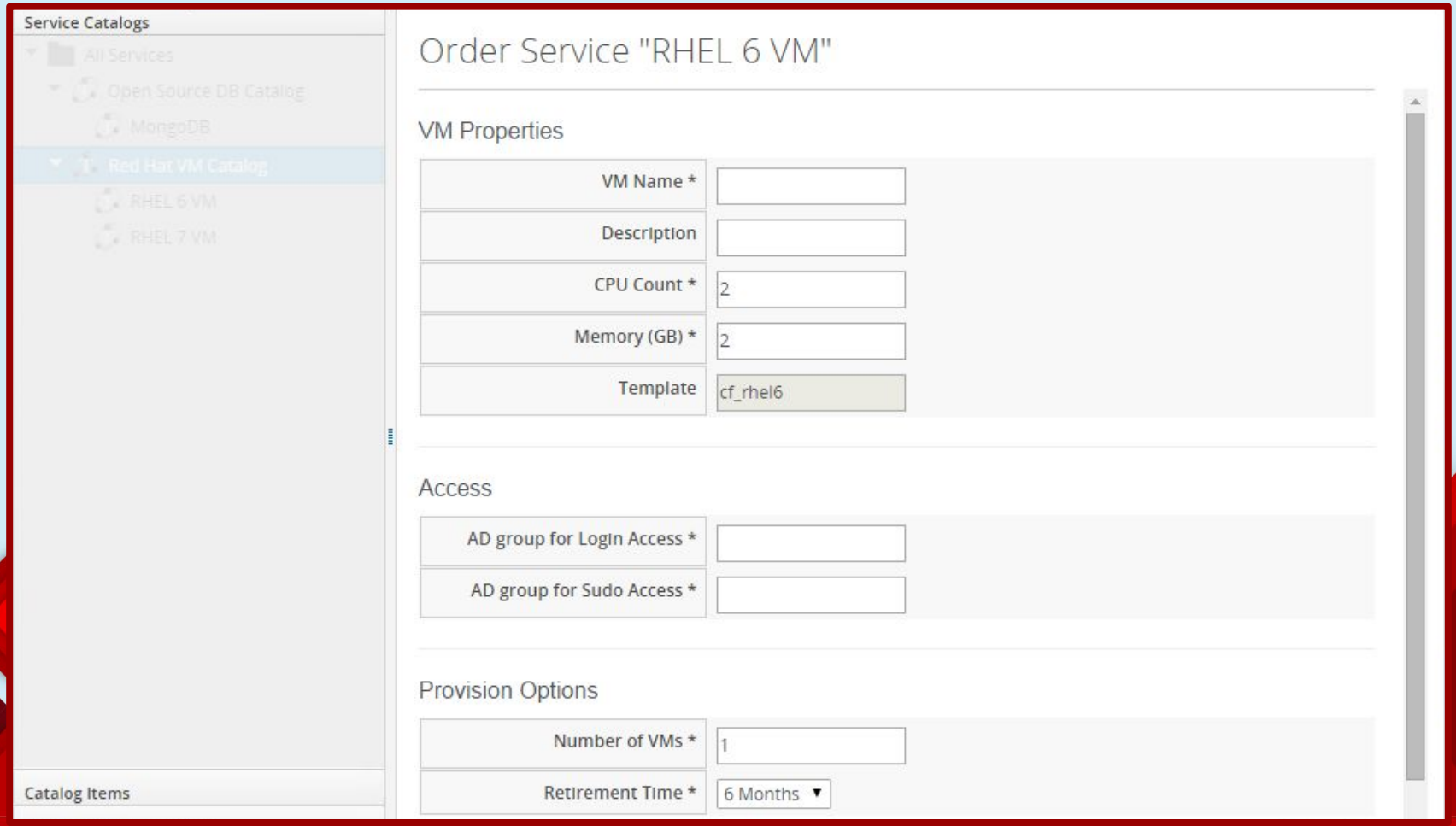
RETIREMENT WORKFLOW



VIRTUAL MACHINE REQUEST DIALOG





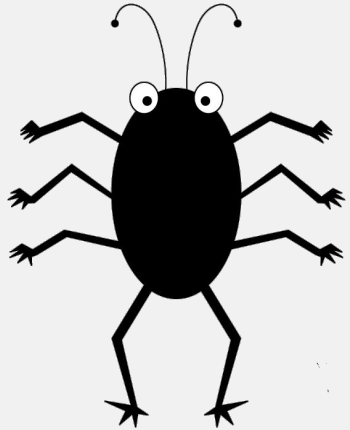

Service Catalogs
All Services
Open Source DB Catalog
MongoDB
Red Hat VM Catalog
RHEL 6 VM
RHEL 7 VM
Catalog Items
Order Service "RHEL 6 VM"
VM Properties
VM Name *
Description
CPU Count *
2
Memory (GB) *
2
Template
cf_rhel6
Access
AD group for Login Access *
AD group for Sudo Access *
Provision Options
Number of VMs *
1
Retirement Time *
6 Months

AUTOMATE ENGINE

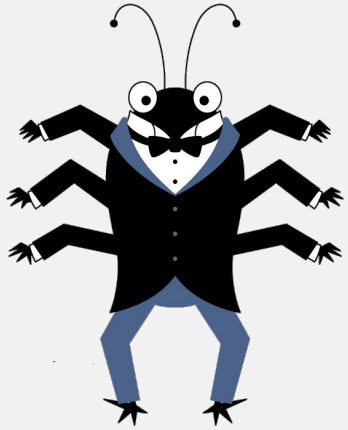
CUSTOMIZATION STEP

```
# Get provisioning object
prov = $evm.root['miq_provision']

# Set customization options
prov.set_customization_spec("dhcp_one_nic")
prov.set_vlan("Tier2 UTL")
prov.set_option(:vm_auto_start, true)
prov.set_folder("WHQ/CloudForms")
prov.set_option(:cores_per_socket, '1')
```



Bug



Feature

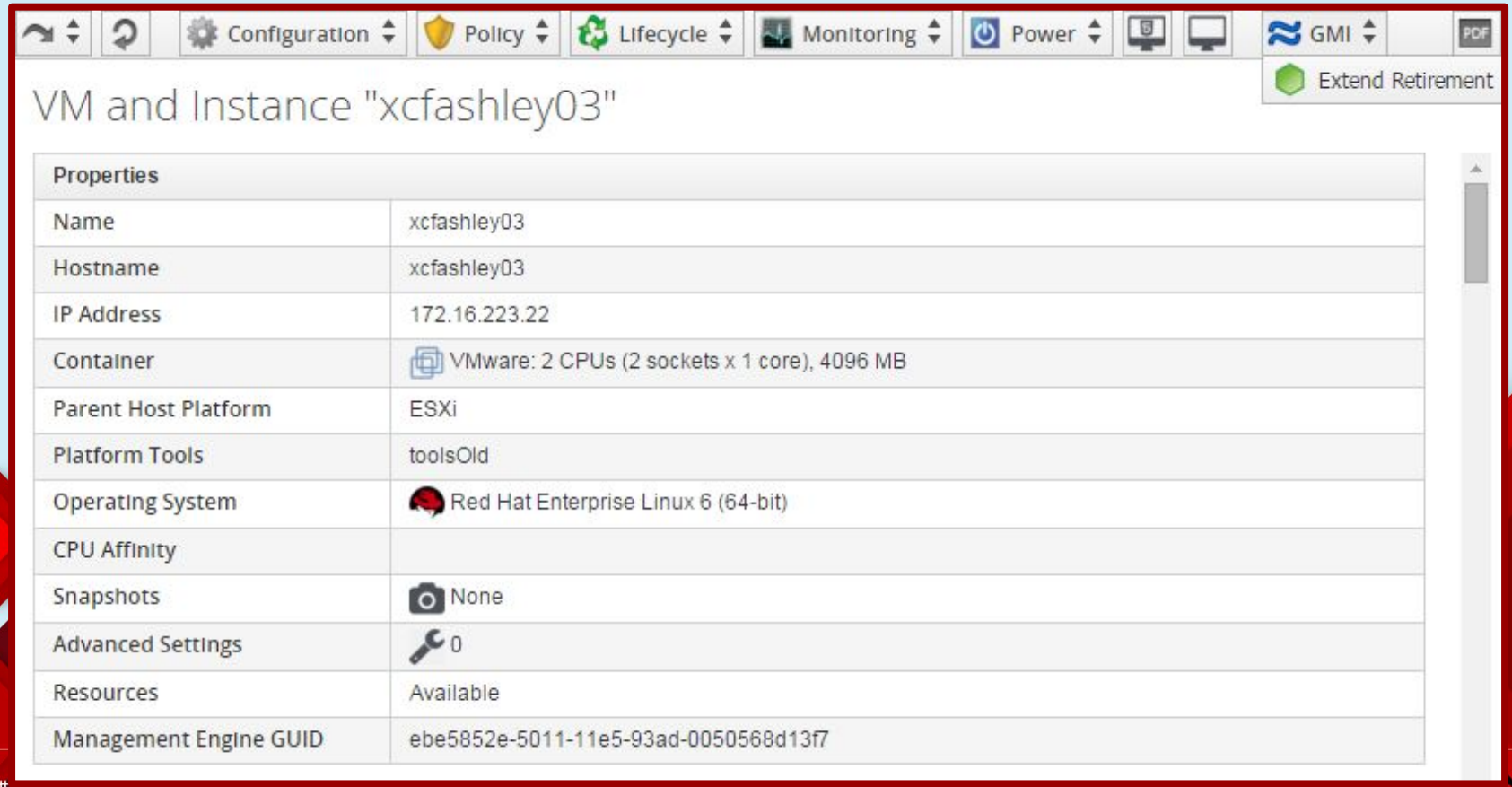
Service Catalog Item "RHEL 7 VM"

Basic Info | Details

Basic Information

Name / Description	RHEL 7 VM / ☑ Display in Catalog
Catalog	Red Hat VM Catalog
Dialog	RHEL 7 VM Request
Provisioning Entry Point State Machine (NS/Cls/Inst)	/Genmills/Service/Provisioning/StateMachines/ServiceProvision_Template/Build_VMProvisionRequest
Reconfigure Entry Point State Machine (NS/Cls/Inst)	
Retirement Entry Point State Machine (NS/Cls/Inst)	/ManageIQ/Service/Retirement/StateMachines/ServiceRetirement/Default

VIRTUAL MACHINE REQUEST DIALOG



HOW WE DID IT

OUT OF THE BOX

- VMware API calls
  - Provision VM from template
  - Read VM metadata
- Best-fit placement
- Service state machine
  - Error detection and retry
  - Email workflow
- Provisioning scope and tags

ON OUR OWN

- VMware templates
- Request dialogs
  - Custom fields
- Retirement state machine
- Puppet and Satellite integration
- Additional VMware API calls

PROVISIONING IMPROVEMENTS

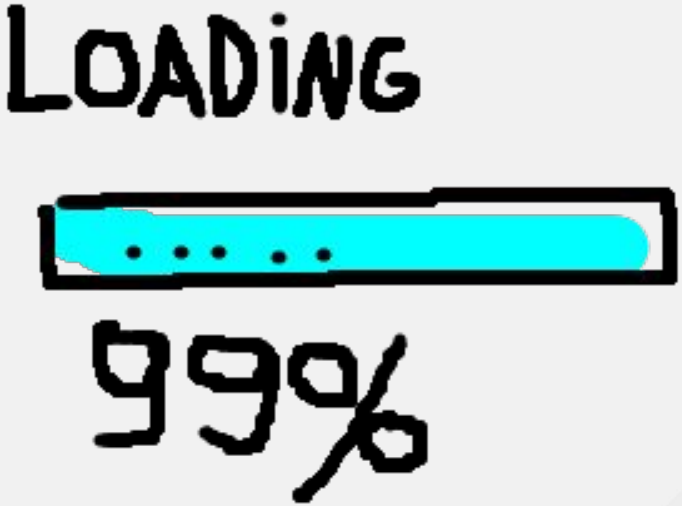
DNS Propagation = 2hrs vs 5 min

Configuration management

- Signing certificate
- Running agent

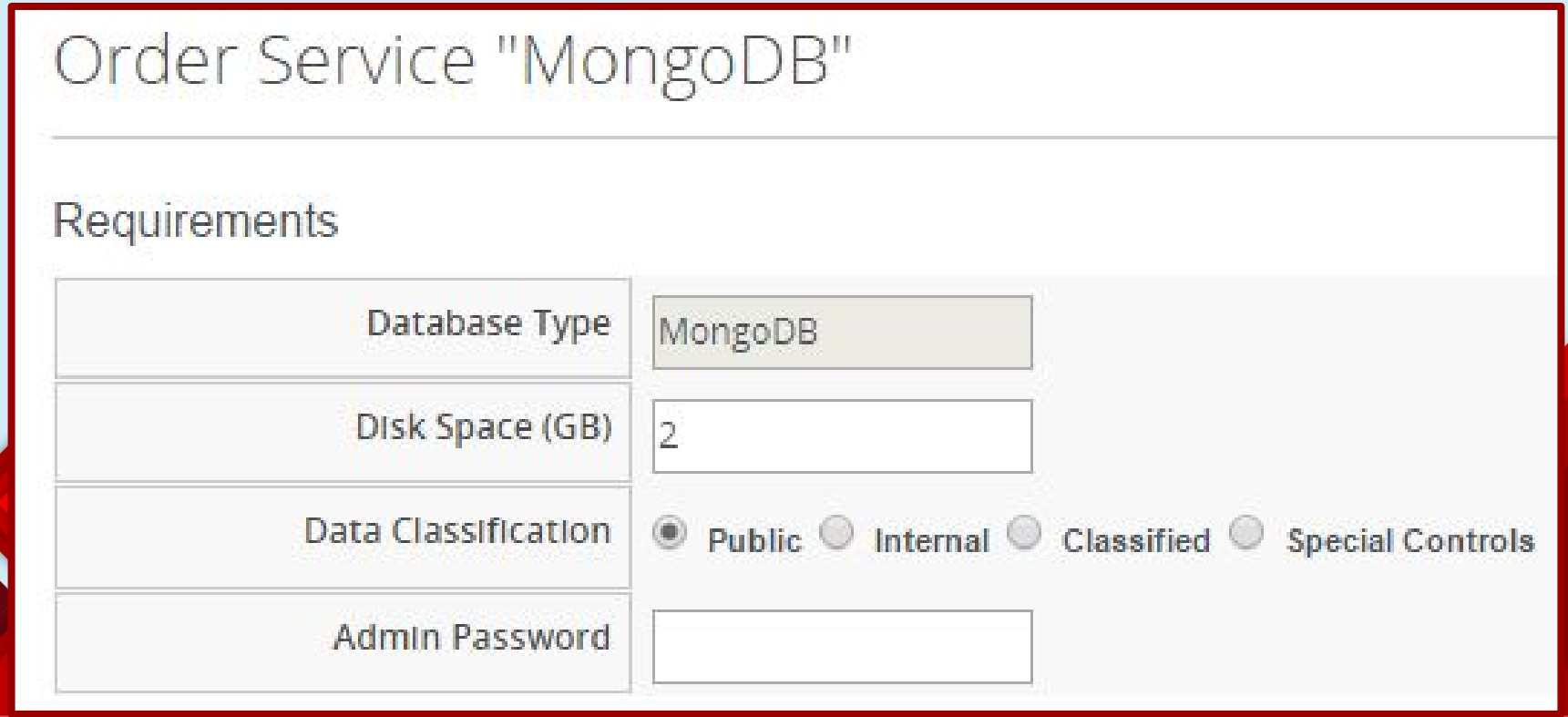
Watching software install....

Responding to requests is immediate.



Service != VM

MONGO CATALOG ITEM



SERVICE “PROVISION” STEP

```
uri = URI.parse('http://xconthost01:2376/containers/create')
json_body = '{
   "Image": "mongo"
   }'
json_headers = {"Content-Type" => "application/json", "Accept" =>
"application/json"}
http = Net::HTTP.new(uri.host, uri.port)
response = http.post(uri.path, json_body, json_headers)
parsed_res = JSON.parse(response.body)
response = http.post("/containers/#{parsed_res['Id']}/start", json_body,
json_headers)
```

BIG PICTURE TIME SAVINGS

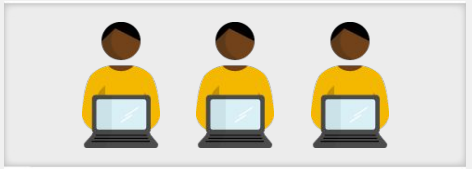
500 VMs x 2 hours =

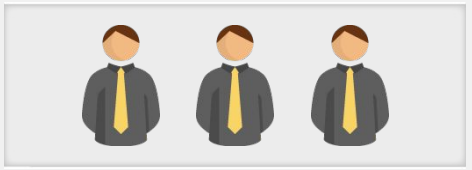
1,000 hours / year!

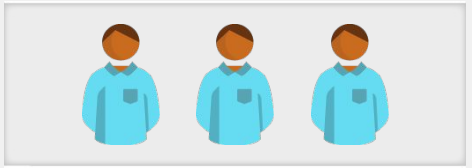
(½ a person from Operations team)

USAGE

- We are our biggest customer!
- Other regular users
  - Enterprise Architects
  - Application Administrators
  - Database Administrators
  - Application Developers
  - Cybersecurity
  - Web Applications







Future Plans
E.g. What did we learn?

LONG-TERM PLANS / IDEAS

- Incorporate external cloud environments
- Manage services (not just VMs)
  - More databases
  - Ansible workflows
- Connect web app to CloudForms API
- Enhance user capabilities around VMs
  - Re-configure CPU, memory, disk

ADVICE

- Crawl, Walk, Run
- Not something implemented overnight
- Consultant is highly encouraged
- Policies are harder than technical issues
- Git repo for automation code
- Utilize the open source ManageIQ community
- Separate sandbox and prod instances

THANK YOU

Contact info:
ashley.nelson2@genmills.com
miked@redhat.com