
# Foreman in Your **Data Center**

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# Agenda

- Introduction
  - Provisioning
  - Configuration
  - Monitoring
- History and Technology
- Architecture and Installation
- Demo: Foreman Basics
- Customizing foreman
  - Automating with CLI + API
  - Plugins (Discovery, Bootdisk, Docker, Katello, Chef, Salt, Hooks, Remote Execution)
- Demo: Foreman Plugins


# Foreman's Realm

Managing the Lifecycle of your Systems

Installation

Initial configuration

Updates and drift management

# Foreman

Provisioning

Configuration

Monitoring

# Provisioning

- Provision new machines or containers to (almost) anything
  - Bare metal, oVirt, libvirt, VMware, Docker, EC2, Rackspace, Digital Ocean, OpenStack, etc.
- If we don't support it today, we can via new plugins

# Provisioning

- Provisioning types:
  - PXE - via PXELinux and kickstart, preseed, AutoYAST, etc
  - Image-based - cloning, configured over SSH or user data (cloudinit)
- For virtualization provider, we create the VM
- For everything we orchestrate related services through Smart Proxies
  - DNS - DHCP / TFTP
  - FreeIPA Realm - Configuration Management

# Configuration

- Puppet
- Via plugins:
  - Chef
  - Salt
  - Ansible

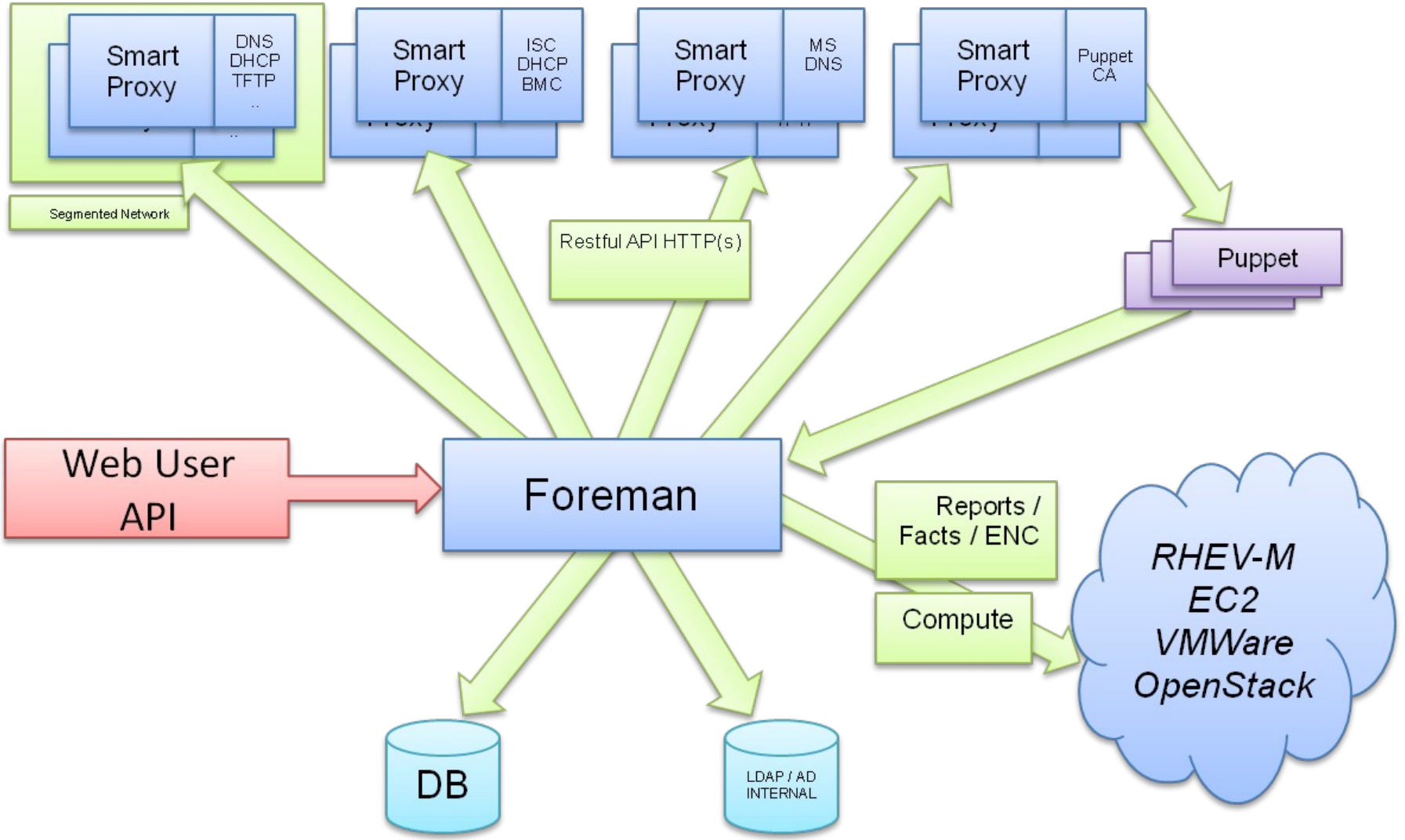
- Automatic registration & setup of clients, including autosigning certs/keys
- Defining:
  - Classes / states
  - Parameters / pillars
- Inventory data:
  - Facts / Grains
  - results of configuration runs

# Monitoring

- Generic **Report API** with graphs/trends:
  - System Inventories
  - Reports from runs
  - Generic reports: ABRT, OpenSCAP
- Context sensitive search:
  - Not full-text (SQL level)
  - Keyword completion
  - Works across whole application

# Distributed Architecture

- **Smart Proxies** located locally on Foreman itself or independent – (orchestration)
- Large organizations and/or multi-tenancy:
  - Organizations (Divisions)
  - Locations
- Strong **RBAC** model
  - Users / Groups
  - Permissions / **Filters**
- **LDAP** / MS-AD integration



Smart Proxy
DNS DHCP TFTP
Smart Proxy
ISC DHCP BMC
Smart Proxy
MS DNS
Smart Proxy
Puppet CA
Segmented Network
Restful API HTTP(s)
Puppet
Web User API
Foreman
Reports / Facts / ENC
Compute
RHEV-M
EC2
VMWare
OpenStack
DB
LDAP / AD INTERNAL

# History

- Project started in July 2009
- Initial set of features: Puppet + PXE provisioning
- 213 unique contributors (winter 2015)
- Core team sponsored by Red Hat (GMT +10 -8)
- Translated to 13 languages
- Healthy and friendly community
- Reported usage: Red Hat, CERN, EMC, Citrix, DHL, BBC, Digg, Good Data, Mozilla, eBay/Paypal (100,000 nodes)


# Technology

Foreman itself

- Ruby on Rails application
- Targeted on UNIX platforms
- Steep learning curve (git clone, bundle install)

- Smart Proxy
  - Ruby / Sinatra application
  - Minimum dependencies
  - Quick start (git clone, bundle install)
  - On all Ruby 1.8+ platforms (incl. MS Windows)


# Installation

- Repositories for RHEL/Fedora, Debian/Ubuntu
- Puppet-based installer
- Sane defaults for POC deployments
- Able to install, configure and manage:
  - Foreman app
  - Smart-proxies
  - Services: DNS, ~~DHCP~~, TFTP, Puppet
  - Selected plugins

```
# foreman-installer -h | wc -l
439
```

# Demo: Foreman Basics

# Customization

- Customize Foreman to support **your** workflows!
  - Configuration options in UI: Adminster → Settings
  - Smart proxy configuration values (features)
  - Automation with API + CLI
  - Foreman Plugins
  - Smart Proxy Plugins
  - Foreman Hooks Plugin


# API & CLI

- Full UI coverage
- All of our API is documented
- Documentation DSL generates dynamic Ruby bindings
- Full RESTful API
  - Docs at /apidoc on your Foreman server
  - Also available at http://www.theforeman.org/api/1.9/index.html

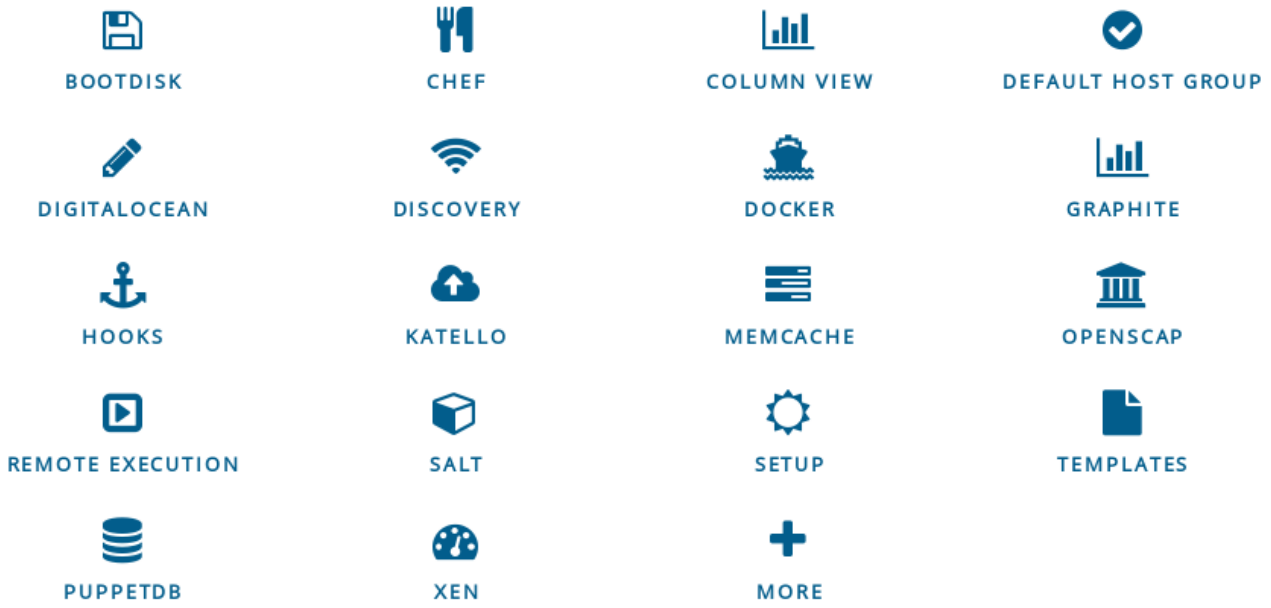

# Hammer CLI

- On par with UI
- Username/Password authentication
- Easy to use, great for working in shell

```
hammer salt-key list --smart-proxy=smartproxy.example.com
```

# Plugins

Rich ecosystem of existing plugins



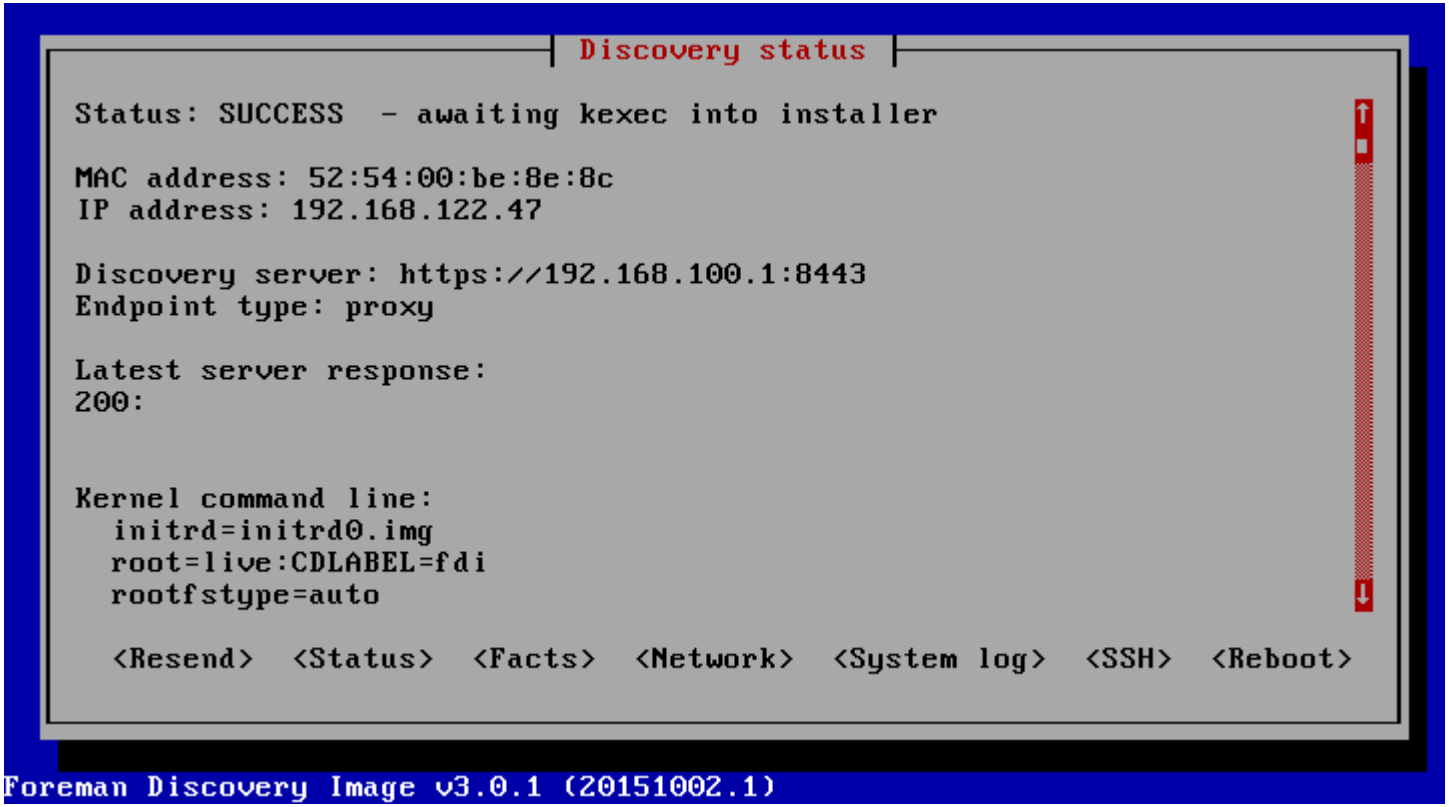

More Info: http://projects.theforeman.org/projects/foreman/wiki/List_of_Plugins

# Discovery plugin

- Unknown host boots via DHCP/PXE
  - Becomes available in Foreman as a “Discovered Host”
  - Workflow remains the same
  - Discovery image is RHEL7/CentOS7-based
- Provision with as few as **NO** clicks
  - Automatic provisioning via rules on arbitrary facts:
    - cpu_count < 8 → web server host group
    - cpu_count >= 8 → db box host group

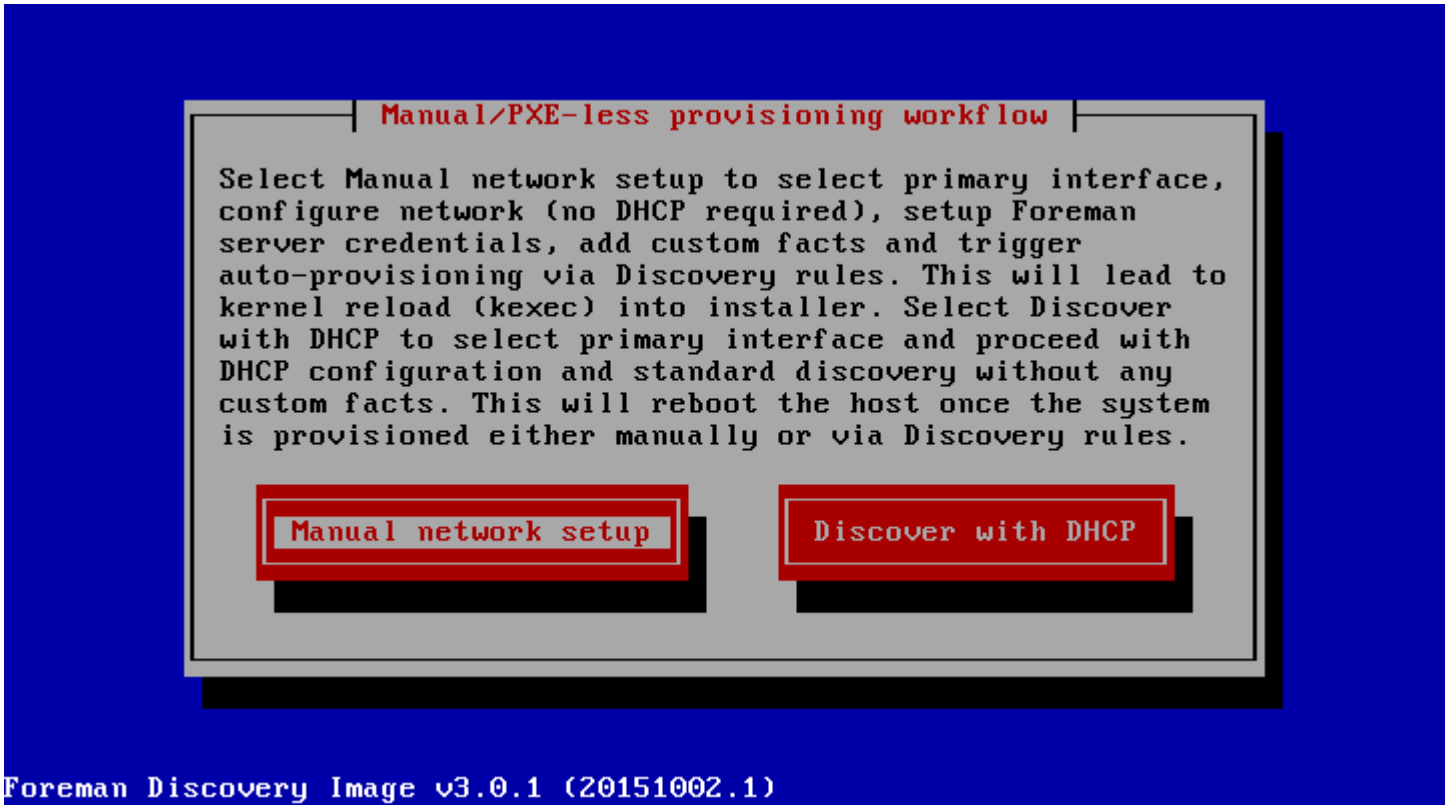
# Discovery plugin

- Metal as a Service – PXE installation




# Discovery plugin

- PXE-less (un)attended workflow (supports EFI)

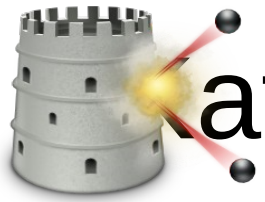



# Bootdisk plugin

- Small hybrid ISO downloaded from Host UI page
- Unknown or pre-registred hosts boot chainloads from Foreman without PXE/TFTP
- Generic image
  - iPXE-based, DHCP required
- Host image
  - iPXE-based, DHCP not required
- Full host image
  - SYSLINUX-based, DHCP required, OS specific


# Docker plugin

- Manage many docker hosts
- Deploy new containers easily & view their status, logs, etc
- Multiple registry support & integration with Katello
- https://github.com/theforeman/foreman-docker

# atello plugin

- Content Lifecycle Management
  - http://www.katello.org/
- Sync RPM, Docker, and Puppet content
- Spin repositories with filters using Content Views

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# Katello plugin

- Manage through a lifecycle
  - Dev → QA → Production (Environments)
- Patch Management
  - Emergency Patches
  - Errata Reports
- And much more!


# Hooks plugin

- Hooks
  - Triggered on actions: on action, do X
    - host create/update/delete, build complete, etc.
    - X could be anything
      - add to nagios
      - send an email
    - Can be shell, python, ruby, etc.
  - More info: https://github.com/theforeman/foreman_hooks


# Salt plugin

- Bootstrapping nodes
- Full interface to keys/autosign
- Define states, pillars via ext_node and ext_pillar
- Import reports (state.highstate results) and grains into Foreman
- API & CLI


# Chef plugin

- Automatic bootstrapping of clients
- Import reports and attributes into Foreman
- Decomission nodes from Chef server when deleted in Foreman

# Remote execution plugin

- Arbitrary commands on hosts
- Job Templates
  - Based on Foreman Templating engine
  - Input parameters
- Collected data available (Facts)
- Multiple providers architecture:
  - SSH (via Smart Proxies)


# Writing Foreman Plugins

- Foreman:
  - Rails Engine
  - Extra Foreman API (plugin registration)
  - Distributed as a Ruby GEM
  - Template and HOWTO available
- Smart Proxy:
  - Sinatra app (REST API)
  - Small plugin registration API
  - Distributed as a Ruby GEM


# What Next?

- Visit us http://theforeman.org/
- If you do something cool with Foreman, let us know!
- Find us:
  - IRC: irc.freenode.net
    - #theforeman
    - #theforeman-dev
  - Mailing Lists on Google groups
    - foreman-users
    - foreman-dev

# Demo: Foreman Plugins