The Foreman

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Agenda

- Introduction
  - Provisioning
  - Configuration
  - Monitoring
- History and Technology
- Architecture and Installation
- Automating with CLI + API
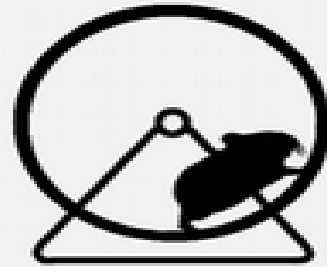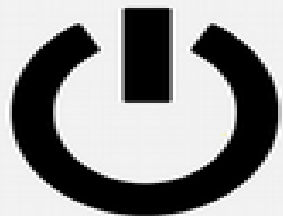- Plugins
- **Demo**

Introduction

Foreman's Realm

Installation

Initial configuration

Updates and drift management

Foreman

Provisioning　　　Configuration　　　Monitoring

Provisioning

- Bare-metal
- Virtualization
- Cloud
- Containers

Provisioning on virtualization

- Libvirt
- Xen
- RHEV / oVirt
- VMWare

Provisioning on cloud

- OpenStack
- EC2
- Rackspace
- Digital Ocean
- Azure

- "1st tier" plugins (team github, docs)
- 100 of other community plugins
- **THANK YOU**

Provisioning

- BOOTP/PXE (bare-metal, virtualization)
- Image-based (bare*, cloud, virt, containers)

  * (well bare-metal is still WIP)

Configuration

- Puppet
- Ansible
- Chef
- Salt

- Automatic registration & setup of clients, including autosigning certs/keys

- Defining:
  - Classes / states
  - Parameters / pillars

- Inventory data:
  - Facts / Grains
  - Reports

Reporting

- Generic **Report API** with graphs/trends:
  - System Inventories
  - Reports from runs
- Generic reports: ABRT, OpenSCAP

- Context sensitive search:
  - Keyword completion
  - Works across whole application

Distributed Architecture

- Remote sites support via Smart-Proxy
- Large organizations and/or multi-tenancy:
  - Organizations (Divisions)
  - Locations
- Strong **RBAC** model
  - Users / Groups
  - Permissions / **Filters**
- **LDAP** / MS-AD integration
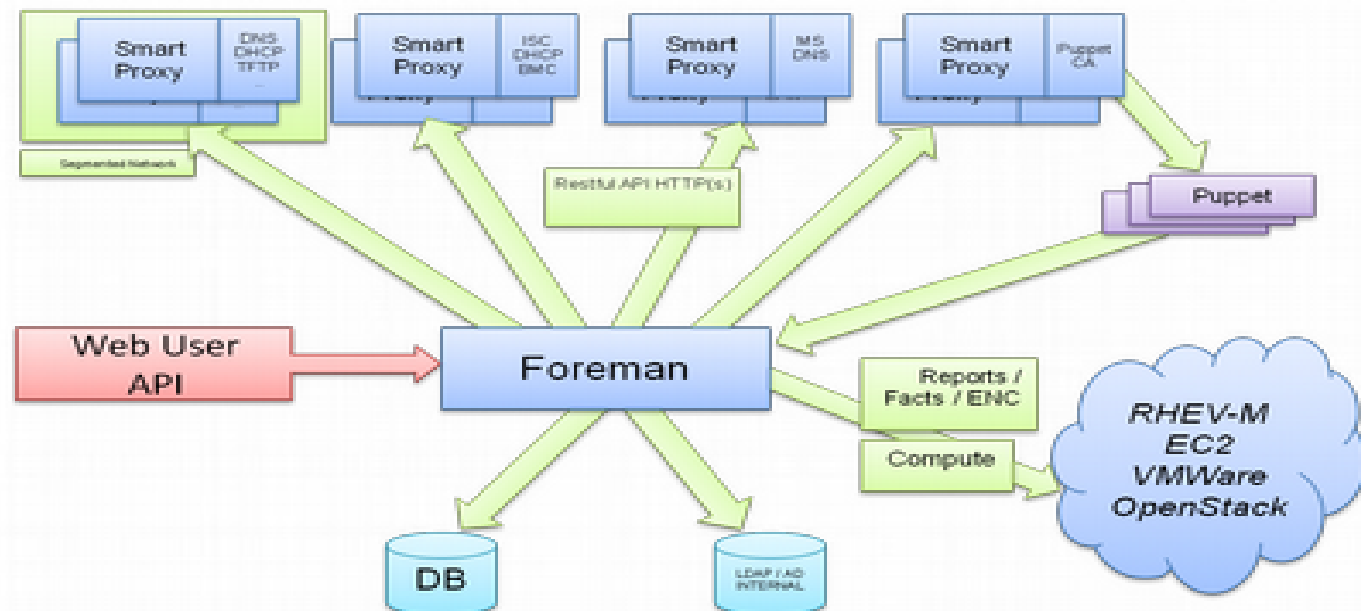
History

- Project started in July 2009
- Initial set of features: Puppet + PXE provisioning
- 300 unique contributors (fall 2017)
- Core team sponsored by Red Hat (GMT +10 -8)
- Translated to 15 languages
- Large, healthy and friendly community
- Reported usage: Red Hat, CERN, EMC, Citrix, DHL, BBC, Digg, Good Data, Mozilla, eBay/Paypal (100,000 nodes)

Professional support

- **Red Hat** Satellite 6
- **Netways**, Germany
- **ATIX**, Germany
- **Credativ**, Germany
- Individuals

Foreman UI, API, orchestrator

- – 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
    ```

Customization

Customization

- Multiple provisioning workflows
- Enable or disable authorization and authentization
- Global configuration options
- 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
- Docs DSL w/ 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
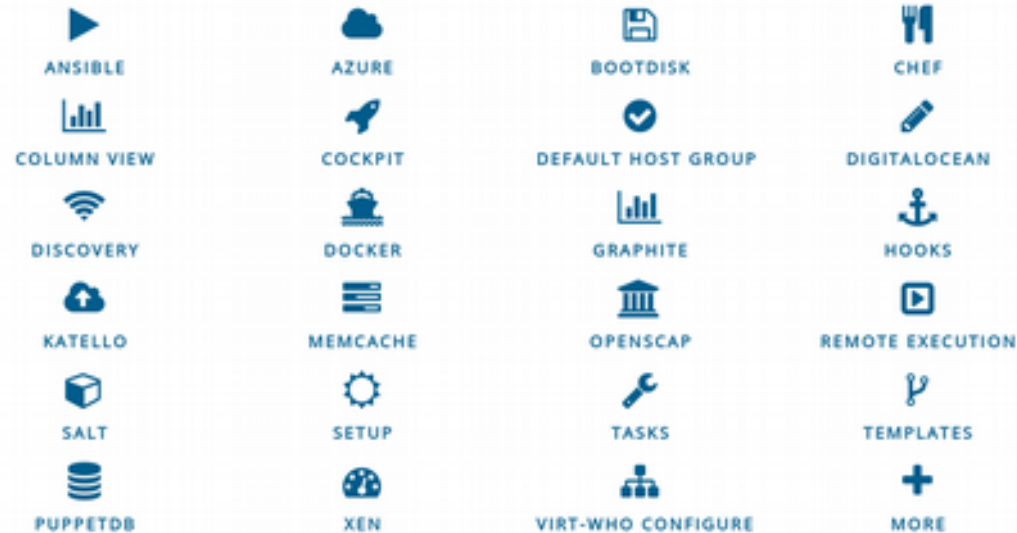
Working from command line

- REST HTTPS JSON API
- On par with UI
- Username/Password authentication
- Session support
- Easy to use, great for working in shell

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

Plugins

Rich ecosystem of existing plugins

▶ ANSIBLE	☁ AZURE	💾 BOOTDISK	🍴 CHEF
COLUMN VIEW	🚀 COCKPIT	✓ DEFAULT HOST GROUP	✏ DIGITALOCEAN
📶 DISCOVERY	DOCKER	GRAPHITE	⚓ HOOKS
KATELLO	MEMCACHE	🏛 OPENSCAP	▶ REMOTE EXECUTION
📦 SALT	⚙ SETUP	🔧 TASKS	TEMPLATES
🗄 PUPPETDB	XEN	VIRT-WHO CONFIGURE	➕ MORE

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

Katello plugin

- Content Lifecycle Management
  - http://www.katello.org/
- Sync RPM, Docker, and Puppet content

Katello plugin

- Manage through a lifecycle environments
  - Dev → QA → Production
- Assign hosts to Content Views
- Filter out/in errata or individual packages
- Patch Management
  - Fast incremental patching (fast-track)
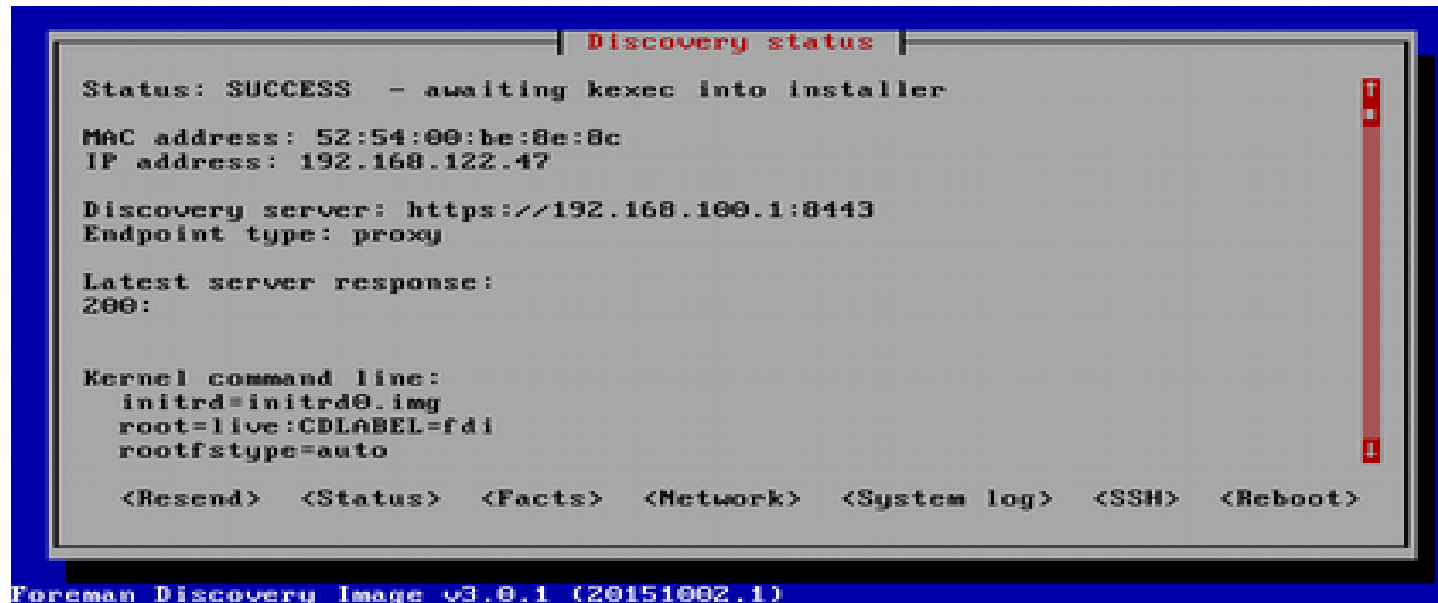 - Errata reporting

Bootdisk plugin

- Small hybrid ISO downloaded from Host UI page or via API
- Unknown or pre-registred host support
- Generic image (or Subnet image)
  - iPXE-based, DHCP required
- Host image
  - iPXE-based, DHCP not required
- Full host image
  - SYSLINUX-based, DHCP required, OS specific

- 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 zero clicks
  - Automatic provisioning via rules on arbitrary facts:
    - cpu_count < 8   →   web server host group
    - cpu_count >= 8 →   database cluster host group

Discovery plugin

- Metal as a Service – PXE installation

Discovery plugin

- PXE-less (un)attended workflow
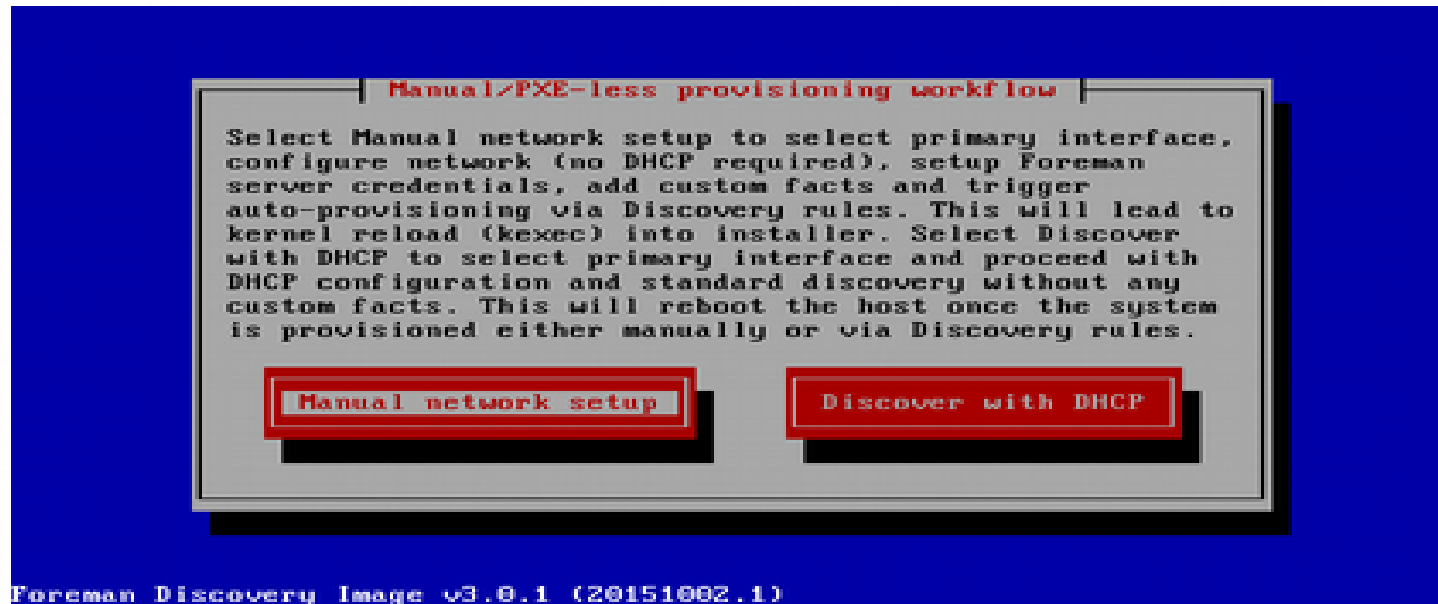
Docker plugin

- Start or stop containers
- Monitor status
- View console
- Multiple registry support
- Integration with Katello

- # Hooks
  - ## Execute arbitrary shell scripts on actions
    - host create/update/delete, build complete, etc.
  - ## Good for missing integration
    - Add host to external monitoring system
    - Perform an extra step after provisioning is done

Ansible plugin

- Bootstrapping nodes
- Facts and reports
- Dynamic inventory
- Role importing
- Running playbooks
- API & CLI

Salt plugin

- Bootstrapping nodes
- Full interface to keys/autosign
- Define states and pillars
- Import reports and grains
- API & CLI

Chef plugin

- Automatic bootstrapping of clients
- Import reports and attributes into Foreman
- Decomission nodes from Chef server
- Same interface and workflow
- CLI & API

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

Credits:

https://commons.wikimedia.org/wiki/File:Oktoberfest_bierzelt.JPG
https://commons.wikimedia.org/wiki/File:K%C5%ABrm%C4%81sana_-_Tortoise_Pose_with_Hands_Facing_Back.jpg

DEMO