

Lifecycle Management mit Puppet und Foreman

Continuous Lifecycle 2016

16. November 2016

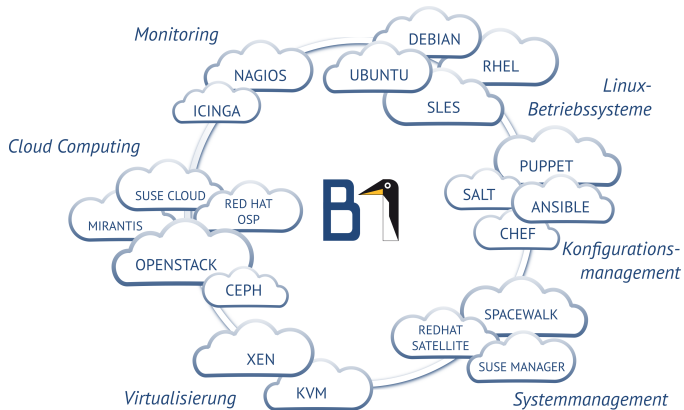


Mattias Giese
System Management & Monitoring Architect
B1 Systems GmbH
giese@b1-systems.de

Vorstellung B1 Systems

- gegründet 2004
- primär Linux/Open Source-Themen
- national & international tätig
- fast 100 Mitarbeiter
- unabhängig von Soft- und Hardware-Herstellern
- Leistungsangebot:
 - Beratung & Consulting
 - Support
 - Entwicklung
 - Training
 - Betrieb
 - Lösungen
- dezentrale Strukturen

Schwerpunkte



Puppet Kurzvorstellung



Puppet 1/2

- Konfigurationsverwaltungssystem
- Entwicklung seit 2005 durch Puppet Labs
- eine der drei „Großen“ neben cfengine/Chef
- unterstützt verschiedene Unixe/Linux, Windows
- Community und Enterprise Variante

Puppet 2/2

- implementiert eine Modellsprache auf Ruby
- wir beschreiben, was getan werden soll, nicht wie
- führt nur benötigte Änderungen am System durch
- abstrahiert Unterschiede zwischen Distributionen/Betriebssystemen
- dynamische Konfiguration basierend auf Hardware/Softwareinfo (facter)

Einfaches Manifest

Einfaches Manifest

```
file{'/etc/myservice.conf':  
  ensure => present,  
  content => "Hallo Welt\n",  
  owner   => 'root',  
  group   => 'root',  
  mode    => '644',  
}  
package{'firefox':  
  ensure => present,  
}
```

Abstraktion des Codes

- Ressource: Datei, Paket, Dienst, Benutzer, Gruppe, usw.
- Manifest: Datei mit Endung `.pp`
 - enthält ein oder mehrere Ressourcen
 - Anwendung: `puppet apply myconfig.pp`
- Klassen bündeln Ressourcen, z.B.: Paket, Datei und Dienst
- Module bündeln Klassen und weitere Dateien

Einfache Klasse

Einfache Klasse

```
class sshserver() {  
  package{'openssh':  
    ensure => present,  
  }  
  file{'/etc/ssh/sshd_config':  
    ensure => present,  
    source => puppet:///sshd_config,  
    [...]  
    notify => Service['sshd'],  
    require => Package['openssh'],  
  }  
  service{'sshd',  
    ensure => running,  
    enable => true,  
  }  
}
```

Deployment-Szenarios

- Puppet benötigt keinen zentralen Server (apply)
- Puppet Master als zentrale Einheit erleichtert Datenhaltung
- zentrale Dienste können genutzt werden um Konfiguration für Systeme vorzugeben (Foreman)

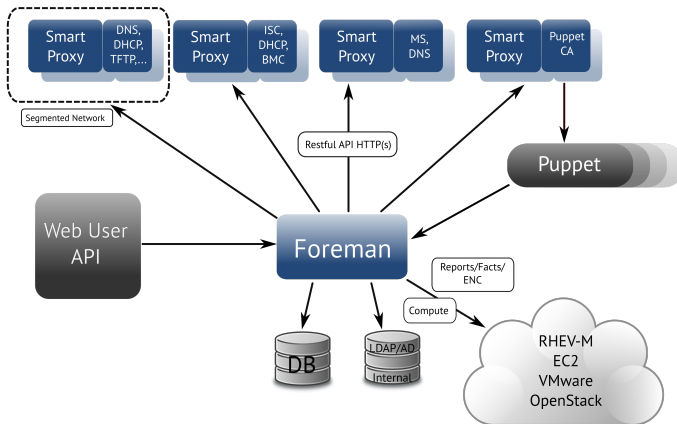
Foreman Vorstellung



Foreman

- System Lifecycle Management Software
- Benutzung via Web-UI/CLI/Restful API
- Verwaltung von DHCP/DNS/TFTP/Puppet und mehr
- modular aufgebaut, erweiterbar durch Plugins
- Rollenbasiertes Zugriffskonzept macht Self-Service Portal möglich

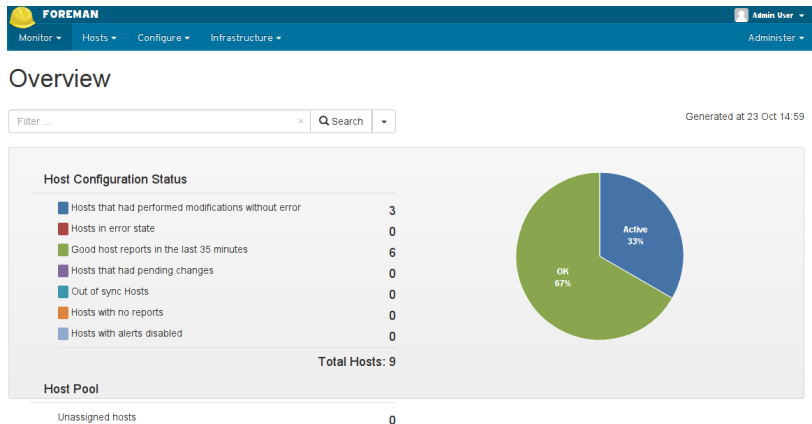
Foreman Architektur



Foreman Architektur

- Provisionierung
 - Bare-Metal via PXE/Bootmedium
 - VM Deployment auf vSphere, libvirt, ovirt (RHEV)
 - Cloud: GCE, EC2, Rackspace, OpenStack, DigitalOcean
- Infrastruktur
 - DHCP: ISC DHCPD, Microsoft DHCP Server
 - DNS: Bind, PowerDNS, Microsoft DNS
 - TFTP (verschiedene)
 - verschiedene Konfigurationsverwaltungen

Foreman GUI: Dashboard



Foreman GUI: Hosts Overview

Hosts

	Name	Operating system	Environment	Model	Host group	Last report	
☐	 foreman.demo.int	 CentOS 6.5	production	Bochs		8 minutes ago	Edit v
☐	 hypervisor.demo.int	 Ubuntu 12....	production	BladeCenter...		12 minutes ago	Edit v
☐	 sles1.demo.int	 SUSE Linux...	production	Bochs	Testmachines	1 minute ago	Edit v
☐	 sles2.demo.int	 SUSE Linux...	production	Bochs	Testmachines	4 minutes ago	Edit v
☐	 spacewalk.demo.int	 CentOS 6.5	production	Bochs		5 minutes ago	Edit v
☐	 ubuntu1.demo.int	 Ubuntu 12....	production	Bochs		4 minutes ago	Edit v
☐	 webserver1.demo.int	 CentOS 6.5	production	Bochs	Web-Server	2 minutes ago	Edit v
☐	 webserver2.demo.int	 CentOS 6.5	production	Bochs	Web-Server	2 minutes ago	Edit v
☐	 windows1.demo.int	 windows 6.3	production	Bochs		about 9 hours ago	Edit v

Foreman GUI: Hosts Detail

🌐 **webserver1.demo.int**

Reports from the last days - 43 reports found

[Edit](#) [Build](#) [Run puppet](#) [Delete](#)

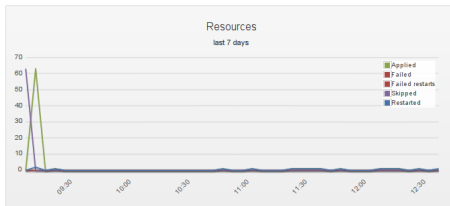
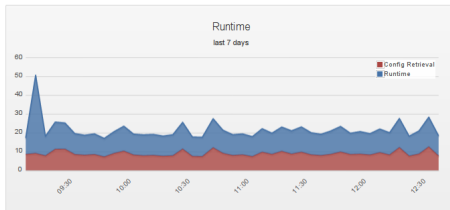
[Properties](#) [Metrics](#) [Templates](#)

Details

[Audits](#) [Facts](#) [Reports](#) [YAML](#)

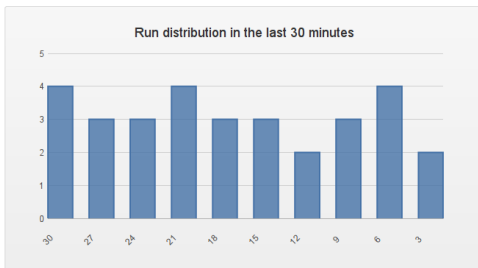
Properties

Domain	demo.int
IP Address	10.30.0.72
MAC Address	52:54:00:1d:17:69
Puppet Environment	production
Host Architecture	x86_64
Operating System	CentOS 6.5
Host group	Web-Server
Owner	Admin User



Foreman GUI: Puppet Overview

Latest Events						
Host	A	R	F	FR	S	P
ubuntu1.dem...	1	1	0	0	0	0
sles1.demo.int	1	1	0	0	0	0
ubuntu1.dem...	1	1	0	0	0	0
sles1.demo.int	1	1	0	0	0	0
ubuntu1.dem...	1	1	0	0	0	0
sles2.demo.int	1	1	0	0	0	0



Foreman GUI: Puppet Reports Overview

Reports

eventful = true

Host	Last report	Applied	Restarted	Failed	Restart Failures	Skipped	Pending	
ubuntu1.demo.int	2 minutes ago	1	1	0	0	0	0	Delete
sles1.demo.int	4 minutes ago	1	1	0	0	0	0	Delete
ubuntu1.demo.int	7 minutes ago	1	1	0	0	0	0	Delete
sles1.demo.int	9 minutes ago	1	1	0	0	0	0	Delete
ubuntu1.demo.int	12 minutes ago	1	1	0	0	0	0	Delete
sles2.demo.int	12 minutes ago	1	1	0	0	0	0	Delete
sles1.demo.int	14 minutes ago	1	1	0	0	0	0	Delete
webserver2.demo.int	15 minutes ago	1	1	0	0	0	0	Delete
webserver1.demo.int	15 minutes ago	1	1	0	0	0	0	Delete
webserver2.demo.int	20 minutes ago	1	1	0	0	0	0	Delete

[an_demo.int/reports?search=eventful+%3D+true#](#)

Foreman GUI: Puppet Report Detail

sles1.demo.int

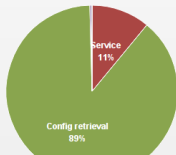
Show log messages: All messages ▼

[Back](#)
[Delete](#)
[Host details](#)
[Other reports for this host](#)

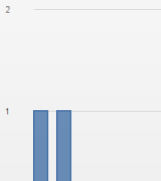
Reported at 2014-10-23 15:01:30 +0200

Level	Resource	message
notice	/Stage[main]/Ssh::Server::Service/Service[sshd]	Triggered 'refresh' from 1 events
notice	/Stage[main]/Ssh::Server::Config/File[/etc/ssh/ssh_config]/content	content changed '[md5]821a028431ed6d3e666f378445f995a5' to '[md5]6d6c8e24fe3e7bd6dd54a936157826d4'

Report Metrics



Report Status



config_retrieval	4.1759
file	0.0167
package	0.0023
schedule	0.0011
service	0.5179

Foreman GUI: Puppet Classes Overview

FOREMAN Admin User

Monitor ▾ Hosts ▾ **Configure ▾** Infrastructure ▾ Administer ▾

Puppet classes

Filter ... × Search ▾

Import ▾ New Puppet class

Host groups
Global parameters

PUPPET
Environments
Puppet classes
Config groups
Smart variables

Class name	Environments and documentation	Host group	Hosts	Parameters	Variables	
apache	production testing		0	46	0	Delete
apache::confd::no_accf	production testing		0	0	0	Delete
apache::default_conf_files	production testing		0	1	0	Delete
apache::default_mods	production testing		0	3	0	Delete
apache::dev	production testing		0	0	0	Delete
apache::mod::actions	production testing		0	0	0	Delete
apache::mod::alias	production testing		0	1	0	Delete
apache::mod::auth_basic	production testing		0	0	0	Delete
apache::mod::auth_kerb	production testing		0	0	0	Delete
apache::mod::authnz_ldap	production testing		0	1	0	Delete

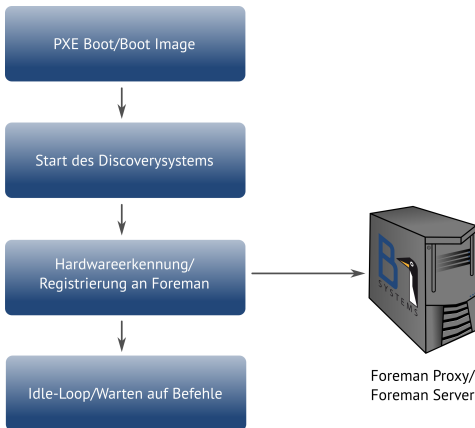
Foreman – Plugins

- erweiterbar durch Plugins
 - Foreman Discovery: Metal as a Service
 - Remote Execution: Tasks auf verwalteten Maschinen ausführen
 - Docker: Verwaltung von Containern auf Docker-Hosts
 - Hooks: Beliebigen Code in verschiedenen Phasen ausführen
 - Chef, Ansible, Salt: Anbindung von Konfigurationsverwaltung neben Puppet
 - Katello: Software-/Patchmanagent (Basis für Satellite 6)
 - u.v.m., siehe <http://theforeman.org/plugins/>

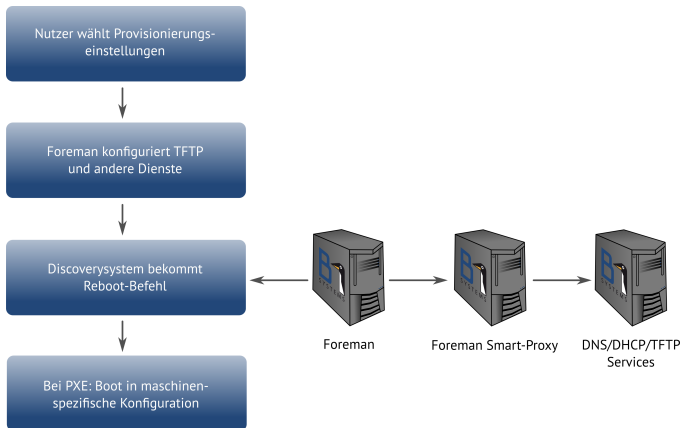
Foreman Discovery 1/4

- besteht aus zwei Teilen
 - Plugin für Foreman Web-Applikation
 - Livesystem basierend auf oVirt-Node

Foreman Discovery 2/4



Foreman Discovery 3/4



Foreman Discovery 4/4

Discovery Rules

Name

Primary ×

Name *

Search * ×

Host Group * ▼ Target host group for this rule with all properties set

Hostname [Template](#)

Hosts limit Maximum hosts provisioned with this rule (0 = unlimited)

Priority * Rule priority (lower integer means higher priority)

Enabled ☒

Foreman Remote Execution 1/9

- Foreman
 - Scheduler (Foreman Tasks/Dynflow)
 - Frontend für Templatedefinition
 - Frontend zur Taskplanung
- Foreman Proxy
 - Executor Plugin (aktuell nur SSH)

Foreman Remote Execution 2/9

Job Templates

Filter ...	×	Q Search	▼	Documentation	New Job Template
Name	Snippet	Locked			
Package Action - SSH Default			Run	▼	
Puppet Run Once - SSH Default			Run	▼	
Run Command - SSH Default			Run	▼	
Service Action - SSH Default			Run	▼	

Displaying **all 4** entries

Foreman Remote Execution 3/9

Name

Package Action - SSH Default

Puppet Run Once - SSH Default

Run Command - SSH Default

Service Action - SSH Default

TemplateJobTypeHistory

Name *Service Action - SSH Default

Warning: This template is locked. You may only change the associations. Please [clone](#) it to customize.

Template editor

InputDiffPreview

ruby

Default

```
<% if @host.operatingsystem.family == "Redhat" && @host.operatingsystem.major.to_i > 6 %>
systemctl <%= input("action") %> <%= input("service") %>
<% else %>
service <%= input("service") %> <%= input("action") %>
<% end -%>
```

Foreman Remote Execution 4/9

Job invocation

Job category *

Commands

▼

Job template *

Run Command - SSH Default

▼

Bookmark

▼

Search query

name = XXXXXXXXXX

Resolves to

1 hosts





Type of query

☒ Static Query

☐ Dynamic Query

[Explanation](#)

command *

Command to run on the host

Foreman Remote Execution 5/9

Job invocations

Filter ...	×	Q Search	▼			Documentation	Run Job
Description	Status	Succeeded	Failed	Pending	Total hosts	Start	
Run date	queued	N/A	N/A	N/A	N/A	in 1 minute	
Run date	succeeded	1	0	0	1	1 minute ago	
Run date	failed	0	1	0	1	3 minutes ago	

Displaying **all 3** entries

Foreman Remote Execution 6/9

Run date

Refresh Rerun Rerun failed Job Task Cancel Job

Overview

Hosts

Recurring logic

Target hosts

Manual selection using Static Query

name =

Evaluated at: 2016-03-11 09:48:08 UTC

Total hosts

1

Providers and templates

Run Command - SSH Default through SSH

Preview for target lemon.colo.b1-systems.de

date

succeeded

100%
Success

Foreman Remote Execution 7/9

Run date

[Refresh](#) [Rerun](#) [Rerun failed](#) [Job Task](#) [Cancel Job](#)

[Overview](#) [Hosts](#) [Recurring logic](#)

Filter ...

Q Search

Host	Status	Actions
[REDACTED]	🟢 success	Host detail ▼

Displaying 1 entry

Foreman Remote Execution 8/9

Detail of Commands run

Target:

[Back to Job](#)[Toggle command](#)[Toggle STDERR](#)[Toggle STDOUT](#)[Toggle DEBUG](#)[Task Details](#)[Cancel Job](#)

```
1: Fri Mar 11 04:48:10 EST 2016
2: Exit status: 0
```

[Scroll to bottom](#)[Scroll to top](#)

Foreman Remote Execution 9/9

Recurring logics

Cronline	Task count	Action	Last occurrence	Next occurrence	Current iteration	Iteration limit	Repeat until	State	
/ * * * *	6	Run hosts job	2016-03-11 09:54:09 UTC	2016-03-11 04:56:00 -0500	6	10	Unlimited	 Active	<button>Cancel</button>

Displaying 1 entry

Foreman Docker Plugin 1/7

- Docker wird zur Compute Resource in Foreman
- Erstellung, Anzeige und Verwaltung von Containern auf verschiedenen Docker-Hosts

Foreman Docker Plugin 2/7

New container



 Compute resource

Resource selection

Where do you want to deploy your container?:

Deploy on *

Foreman-Test (Docker)



Foreman Docker Plugin 3/7

New container

1 Preliminary

2 Image

3 Configuration

4 Environment

Docker hub

External registry

Search

Tag *

[memcached](#)

★ 295

Free & open source, high-perf...

[bitnami/memcached](#)

★ 5

Bitnami Memcached Docker Image

[suboinlasnier/memcached](#)

Foreman Docker Plugin 4/7

New container



Basic options

Name

Command *

Entrypoint

Compute options

CPU sets

[learn more about CPU sets](#)

Foreman Docker Plugin 5/7

1 Preliminary

2 Image

3 Configuration

4 Environment

Environment variables

Add environment variable

Exposed Ports

Add Exposed Port

DNS

Add DNS

Run ?

☐

If selected, the container will start after it is created

Back

Shell

TTY

☐ Allocate a pseudo-tty

Attach STDIN

☒

Attach STDOUT

☒

Attach STDERR

☒

Foreman Docker Plugin 6/7

Containers

[New container](#)

Foreman-Test

Search:

Name ▲	Status ▾	Image ▾	Command ▾	Uptime ▾	Running on ▾	Managed ▾	▾
Somecache	On	memcached:latest	memcached	🕒 1 minute	Foreman-Test (Docker)	Yes	Power Off ▾

Showing 1 to 1 of 1 entries

[← Previous](#) **1** [Next →](#)

Foreman Docker Plugin 7/7

Somecache - /somecache

Properties		
Name	/somecache	
Image Repository	memcached	
Image Tag	latest	
IP Address	172.17.0.2	
CPU shares	0	
CPU set		
UUID	5bd83df0d2839d308259ad088433a...	
Memory	0 Bytes	
Command	memcached	
Exposed ports	11211	top

[Commit](#)[Power Off](#)[Delete](#)[Processes](#)[Logs](#)

memcached

polkitd

```
{
  "UID": "polkitd",
  "PID": "31926",
  "PPID": "2301",
  "C": "0",
  "STIME": "04:27",
  "TTY": "?",
  "TIME": "00:00:00",
  "CMD": "memcached"
}
```

Vielen Dank für Ihre Aufmerksamkeit!

Bei weiteren Fragen wenden Sie sich bitte an info@b1-systems.de
oder +49 (0)8457 - 931096