



Ready To Get Started? Click Here!

#### Why Rōstra?



Develop, run, and manage your  
Production Web Applications in



Deploy with ease under 1  
minute!



Direct access to the server via a  
browser based console!



**Sandia  
National  
Laboratories**

*Exceptional  
service  
in the  
national  
interest*



**U.S. DEPARTMENT OF  
ENERGY**



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# Intro

## ▪ Mathew Anderson

- Middleware Team Lead & Rostra Project Lead
- [mander@sandia.gov](mailto:mander@sandia.gov)
- @ Sandia for 12+ years
- Spare Time? Spend time with my kids and printing 3D models.

## ▪ Elliott Quarles

- Rostra Technical Lead
- [equarle@sandia.gov](mailto:equarle@sandia.gov)
- @ Sandia for 6 years
- Spare time? Working on my quadcopter and skiing.

# Agenda

- Legacy Application Hosting – “This is killing me...”
- Rostra – “We should automate that...”
- Rostra Components – “Do you want fries with that?”
- Rostra Deployments – “Look ma, no hands...”
- Advantages – “Time is money...”

# Legacy Application Hosting – “This is killing me...”



- Current Production Shared Architecture (General Purpose)
  - Applications reside on the same cluster of systems
  - Cross application impact
    - Slow downs, crashes, out of memory errors, run away processes
  - Lack of error and resource usage fidelity on an app by app basis
  - Security concerns

# Legacy Application Hosting – “This is killing me...”



- Current Production Custom Application Systems
  - Usually reserved for problematic/vendor applications
  - Difficult to maintain consistency across environments
  - Development and Production are never really the same
  - Very, very, very manual

# Legacy Application Hosting – “This is killing me...”



- Currently our team maintains:
  - More than 100 distinct applications
  - On over 150 hosts
  - Working across 5 separate networks
  - Other projects...
- Scaling is impossible.

# Rostra

- What in a name?

Rōstra was the name of large platform that stood in Rome during the republican and imperial periods. Purpose built near the Forum for public speaking, speakers would stand on the Rōstra and deliver orations to those assembled. It was designed as a place to be heard and seen.



<https://en.wikipedia.org/wiki/Rostra>

[https://en.wikipedia.org/wiki/Gaius\\_Gracchus](https://en.wikipedia.org/wiki/Gaius_Gracchus) 7

# Rostra – “We should automate that...”

- What is it?
  - Rostra is an on-demand, self-driven application middleware hosting tool that provides web developers a working environment in less than an hour to develop, run, and manage production applications.
- Who is responsible?
  - Enterprise Application Architectures and Cloud Strategies
    - Mathew Anderson
    - Elliott Quarles
    - Randolph Abeyta
    - Brad Andrzejewski
    - Tom Cleal
    - Mike Newquist
    - And other really important people... You know who you are.

# Rostra – “We should automate that...”

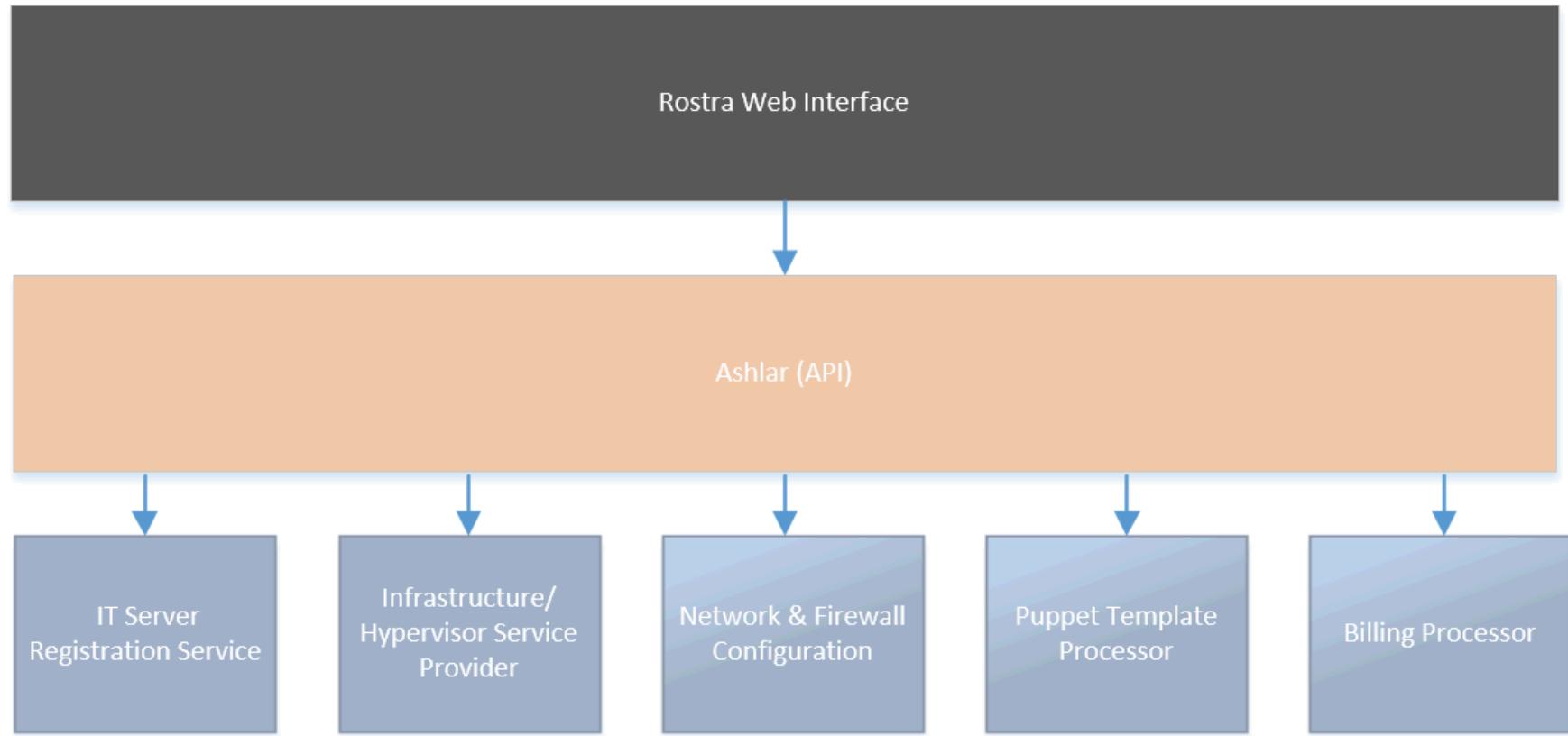


- How? Simply have these things:
  - Vision
    - Just trying to save time and improve quality.
  - Code (glue and core)
    - Build a robust API to manage interactions of many discreet systems (Ashlar).
    - If you automate something you do all the time you should never have to do it again.

# Rostra Components - “Do you want fries with that?”



# Rostra – Overview



# Ashlar (Rostra API)

- What is Ashlar?
  - Ashlar is our glue that ties everything together to provide the expected user experience after they say “I need a platform.”
- How does Ashlar work?
  - It is a REST API supported Java application that performs the necessary actions across all of our interacting technologies and services to make Rostra work in the Sandia environment.

- What is Puppet?
  - Platform for delivering OS and System settings and software.
- How does Puppet work in Rostra?
  - Puppet is the glue for the PaaS operations. When a tenant selects a specific type of platform, puppet will generate and maintain the configurations across all systems with the same type. It can also track sensitive files and returns them to a predetermined state.

<https://puppet.com>

- What is Hiera?
  - It's a part of Puppet that allows us to define a hierarchical configuration chain for the infrastructure.
- How does Hiera work in Rostra?
  - Allows us to have fine grained control of what software, versions, and configuration files are applied to each host or predefined group of hosts.



- What is Katello?

- Provides repository management alongside provisioning and configuration management. It also tracks per-host errata/vulnerability tracking and patching.

- How does Katello work in Rostra?

- Katello is used to track changes to OS packages and make sure that each build is version controlled. This allows the tenant to build and destroy at will and not have to worry about subtle changes to the underlying environment.

<http://www.katello.org>





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ACME\_Corporation ▾ Monitor ▾ Content ▾ Hosts ▾ Configure ▾ Infrastructure ▾ Administer ▾

## Content Hosts

Search... Showing 5 of 5 (5 Total) 0 Selected | Deselect All Bulk Actions Register Content Host

Content Host dhcp129-73.rdu.redhat.com

Unregister Content Host Close

Details Provisioning Details Subscriptions Host Collections Tasks Packages Errata Product Content

Basic Information		Content Host Content	
Name	dhcp129-73.rdu.redhat.com	Release Version	✗
UUID	2df6452c-852d-4a58-b6ac-728362f913c1	Content View	Default Organization View
Description	Initial Registration Params	Environment	✗
Type	Virtual Guest	Library Dev	

Subscriptions		Content Host Status	
Subscription Status	invalid	Registered	6/19/14 10:30 AM
Details	Red Hat Enterprise Linux Server - Not supported by a valid subscription.	Checkin	7/10/14 12:56 PM
Auto-Attach	Yes	Content Host Status	
Service Level	✗	Hostname	dhcp129-73.rdu.redhat.com
Activation Keys	None	IPv4 Address	10.13.129.73

Content Host Properties		Networking	
OS	Red Hat Enterprise Linux Server	IPv6 Address	::1
Release	2.6.32-431.el6.x86_64	Interfaces	+ eth0 + lo
Arch	x86_64	Content Host Properties	

[http://www.katello.org/docs/2.4/user\\_guide/content\\_hosts/](http://www.katello.org/docs/2.4/user_guide/content_hosts/)



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Admin User ▾ Administrator ▾

## Content Hosts

Search... Showing 5 of 5 (5 Total)

0 Selected | Deselect All Bulk Actions Register Content Host

Name

client.devel

dhcp129-73.rdu.redhat.com >

dhcp129-81.rdu.redhat.com

testks.rdu.redhat.com

testks.rdu.redhat.com

### Content Host dhcp129-73.rdu.redhat.com

Unregister Content Host Close

Details Provisioning Details Subscriptions Host Collections Tasks Packages Errata Product Content

#### Package Actions

Package Install Package/Group Name Perform

#### Installed Packages

Filter Showing 416 Packages Update All

Installed Package	Remove
acl-2.2.49-6.el6.x86_64	✖
aic94xx-firmware-30-2.el6.noarch	✖
apr-1.3.9-5.el6_2.x86_64	✖
apr-util-1.3.9-3.el6_0.1.x86_64	✖
apr-util-ldap-1.3.9-3.el6_0.1.x86_64	✖
atmel-firmware-1.3-7.el6.noarch	✖
attr-2.4.44-7.el6.x86_64	✖
audit-2.2-4.el6_5.x86_64	✖

[http://www.katello.org/docs/2.4/user\\_guide/content\\_hosts/](http://www.katello.org/docs/2.4/user_guide/content_hosts/)



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Default Organization ▾ Monitor ▾ Content ▾ Containers ▾ Hosts ▾ Configure ▾ Infrastructure ▾ Administer ▾

Content Hosts

Search... Showing 1 of 1 (1 Total) 0 Selected Bulk Actions Register Content Host

Name
client-devel-foo6

Content Host client-devel-foo6

Unregister Content Host Close

Details Provisioning Details Subscriptions ▾ Host Collections Tasks Packages Errata Product Content

Applicable Errata

Show from: Current Environment (dev/incremental test)

Search... Showing 231 of 231 (231 Total) 0 Selected Apply Selected

Type	Id	Title	Issued
Bug Fix Advisory	RHBA-2014:1909	lvm2 bug fix update	11/25/14
Bug Fix Advisory	RHBA-2014:1734	yum-rhn-plugin bug fix update	10/29/14
Product Enhancement Advisory	RHEA-2014:1733	tzdata enhancement update	10/28/14
Bug Fix Advisory	RHBA-2014:1666	gcc enhancement update	10/19/14
Security Advisory - Moderate	RHSA-2014:1671	Moderate: rsyslog5 and rsyslog security update	10/19/14
Security Advisory - Moderate	RHSA-2014:1655	Moderate: libxml2 security update	10/15/14

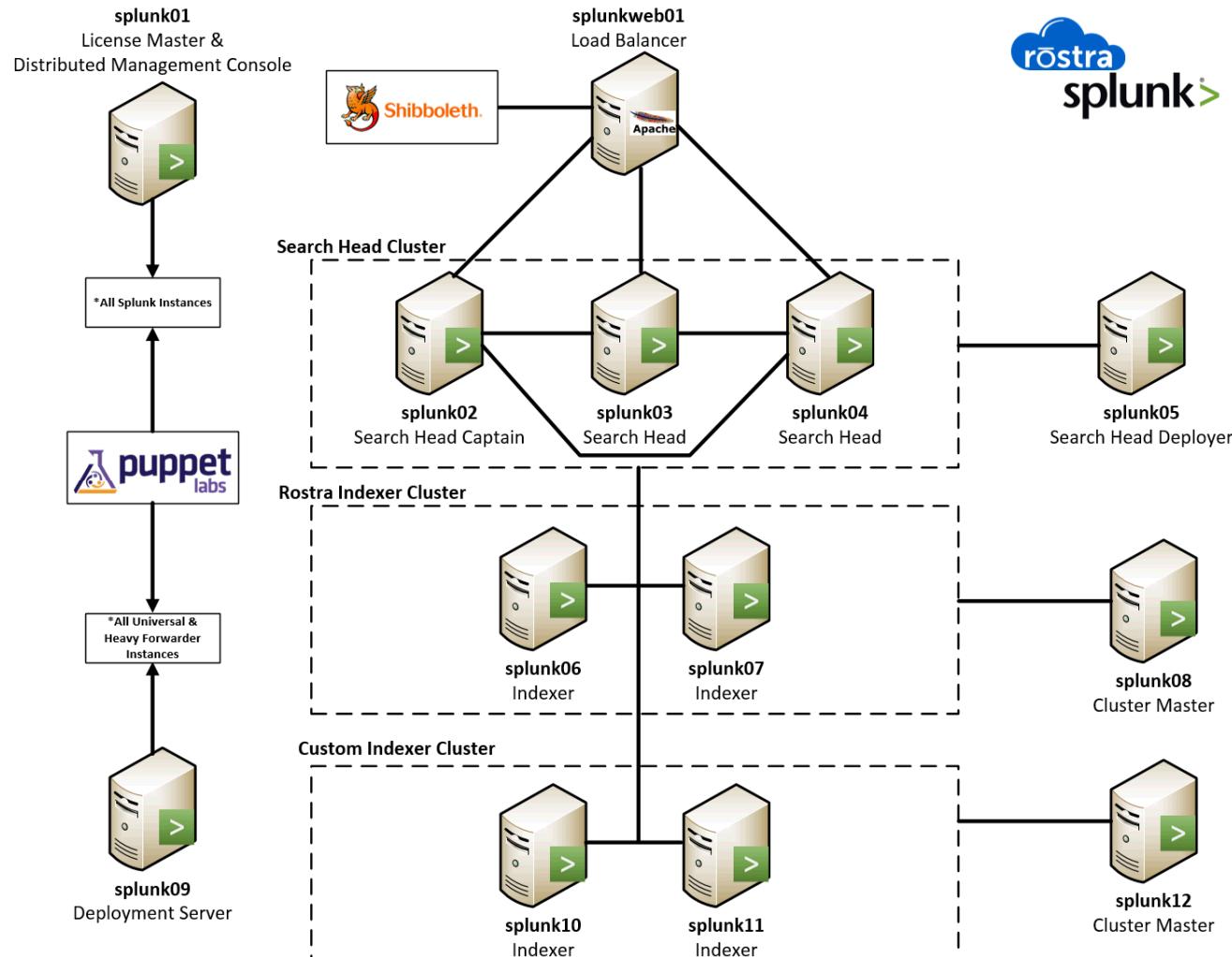
[http://www.katello.org/docs/2.4/user\\_guide/content\\_hosts/](http://www.katello.org/docs/2.4/user_guide/content_hosts/)



- What is Splunk?
  - Splunk is a real time data ingestion and analysis platform designed to simplify collection, sharing, viewing, and correlation of machine generated data.
- How does Splunk work in Rostra?
  - Splunk with automation, scale, and security. Puppet modules and automated template based code injection.
- What's provided to the developer:
  - Automated per tenant ingestion and access to logs using index level security controls. Cool Dashboards...

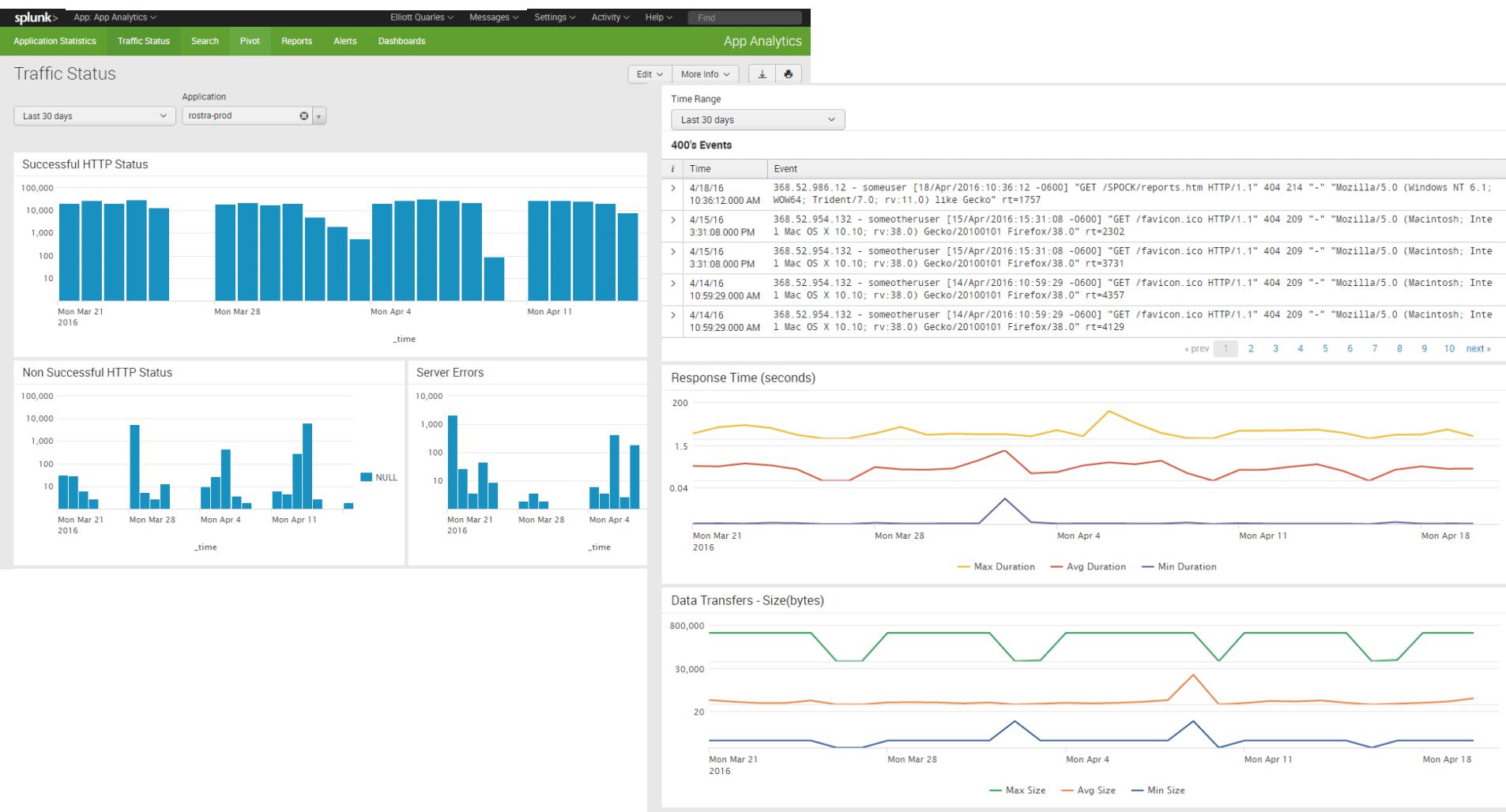
<http://www.splunk.com>

# splunk> Architecture



Based on: <http://docs.splunk.com/Documentation/Splunk/latest/DistSearch/SHCarchitecture> &  
<http://docs.splunk.com/Documentation/Splunk/latest/Indexer/Multisitearchitecture>

# splunk > Dashboards



## Slide 21

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**QE1** IP addresses and Users are fake

Quarles, Elliott, 4/20/2016

# Nagios®

- What is Nagios?
  - Nagios is an IT infrastructure monitoring system. Nagios monitors system properties like CPU, memory, and disk usage and can be extended to monitor many other components.
- How does Nagios work in Rostra?
  - When a host is created in Rostra we use Puppet to add the new host to the main monitoring system. This configuration is done by user/workgroup basis.
- What's provided to the developer:
  - Automated per tenant view of the server status with email alerting capabilities.

<http://www.nagios.org>

# Nagios®

**Current Network Status**  
 Last Updated: Fri Oct 17 18:51:18 UTC 2014  
 Updated every 90 seconds  
 Nagios® Core™ 4.0.8 - [www.nagios.org](http://www.nagios.org)  
 Logged in as `nagiosadmin`

[View History For All hosts](#)  
[View Notifications For All Hosts](#)  
[View Host Status Detail For All Hosts](#)

**Host Status Totals**

Up	Down	Unreachable	Pending
11	0	0	0

[All Problems](#) [All Types](#)

0	11
---	----

**Service Status Totals**

Ok	Warning	Unknown	Critical	Pending
33	1	1	4	0

[All Problems](#) [All Types](#)

6	39
---	----

**Service Status Details For All Hosts**

Host	Service	Status	Last Check	Duration	Attempt	Status Information
NOAA	Auroral Activity	OK	10-17-2014 18:51:09	535d 4h 28m 6s	1/3	Aurora OK: Activity level is 2
	Weather Carteret North Carolina	WARNING	10-17-2014 18:43:15	0d 0h 46m 57s	3/3	Weather Warning: Beach Hazards
	Weather King Washington	OK	10-17-2014 18:45:25	737d 1h 52m 46s	1/3	Weather OK: No watches or warni area.
	Weather Ramsey Minnesota	OK	10-17-2014 18:46:45	59d 20h 47m 12s	1/3	Weather OK: No watches or warni area.
	Weather San Bernardino California	OK	10-17-2014 18:41:45	0d 0h 48m 40s	1/3	Weather OK: No watches or warni area.
	Weather Stratford New Hampshire	OK	10-17-2014 18:43:45	0d 0h 46m 51s	1/3	Weather OK: No watches or warni area.
	Weather Tulsa Oklahoma	OK	10-17-2014 18:45:53	737d 1h 53m 51s	1/3	Weather OK: No watches or warni area.
localhost	Current Load	OK	10-17-2014 18:49:08	0d 0h 46m 9s	1/4	OK - load average: 0.29, 0.49, 0.56
	Current Users	OK	10-17-2014 18:51:02	1710d 15h 36m 24s	1/4	USERS OK - 0 users currently logg
	HTTP	OK	10-17-2014 18:48:25	1019d 2h 7m 58s	1/4	HTTP OK: HTTP/1.1 200 OK - 216 response time
	PING	OK	10-17-2014 18:50:20	1710d 15h 35m 9s	1/4	PING OK - Packet loss = 0%, RTA
	Root Partition	OK	10-17-2014 18:48:32	938d 2h 32m 35s	1/4	DISK OK - free space: /20300 MB
	SSH	OK	10-17-2014 18:48:38	1704d 7h 35m 15s	1/4	SSH OK - OpenSSH_4.3 (protocol
	Swap Usage	OK	10-17-2014 18:48:54	1710d 15h 33m 17s	1/4	SWAP OK - 100% free (255 MB o
	Total Processes	OK	10-17-2014 18:50:49	1706d 8h 22m 2s	1/4	PROCS OK: 147 processes with S

[https://www.nagios.com/products/nagios-core/#\\_ga=1.74654866.1603972211.1461087822](https://www.nagios.com/products/nagios-core/#_ga=1.74654866.1603972211.1461087822)

- What is BackupPC?
  - BackupPC is a web interface based high performance backup system.
- How does BackupPC work in Rostra?
  - A puppet module (<https://forge.puppet.com/wyrie/backuppc>) is used when a host is created that tells the backup server what to backup and who has access to do restoration.
- What's provided to the developer:
  - Allows the tenant to perform at will backups and file restoration from a common web interface.

## BackupPC: Host Summary

This status was generated at 3/13 01:30.

### Hosts with good Backups

There are 19 hosts that have been backed up, for a total of:

- 167 full backups of total size 2490.17GB (prior to pooling and compression),
- 194 incr backups of total size 108.38GB (prior to pooling and compression).

Host	User	Full Count	Full Age (days)	Full Size (GB)	Speed MB/sec	Incr Count	Incr Age (days)	Last Backup (days)	State	Last Attempt
accounts		9	3.2	3.97	1.71	11	1.2	1.2	idle	idle
adam_rsync		9	1.6	0.09	3.34	10	0.2	0.2	idle	done
beast_rsync		10	0.1	14.18	8.99	11	1.5	0.1	idle	done
bugsbunny		9	3.1	18.29	1.54	11	1.1	1.1	idle	idle
calvin		9	0.4	9.12	1.82	11	3.6	0.4	idle	idle
darth		6	28.6	26.54	2.36	1	32.2	28.6	idle	backup failed (No files dumped for share Src)
emperor_rsync		9	3.2	2.51	2.65	11	1.2	1.2	idle	idle
hobbies		8	10.8	23.12	0.82	12	7.1	7.1	semi-disabled	
moe		9	2.8	48.62	2.38	11	0.2	0.2	idle	done
neo		9	1.6	5.85	4.93	10	0.2	0.2	idle	done
penguin_rsync		9	3.8	65.86	6.00	11	1.5	1.5	idle	
roo		8	3.0	35.21	2.16	10	1.0	1.0	idle	idle
saturn		9	1.6	0.25	1.29	10	0.2	0.2	idle	done
snoopy		9	3.2	5.75	2.85	11	1.2	1.2	idle	idle
spiff		9	3.2	17.18	3.33	11	1.2	1.2	idle	idle
tm4		8	4.1	0.16	1.92	10	1.2	1.2	idle	idle
tnacomplier		10	0.2	15.74	2.29	11	1.5	0.2	idle	done
vader_rsync		9	1.6	0.12	2.15	10	0.2	0.2	idle	done
wormwood		9	0.2	13.34	3.10	11	1.5	0.2	idle	done

### Hosts with no Backups

There are 2 hosts with no backups.

Host	User	Full Count	Full Age (days)	Full Size (GB)	Speed MB/sec	Incr Count	Incr Age (days)	Last Backup (days)	State	Last Attempt
asterix		0		0.00		0			idle	backup failed (No files dumped for share cdrive)
linkin		0		0.00		0			backup in progress	

<http://backuppcc.sourceforge.net/info.html>

25

**Backup browse for accounts**

♦ You are browsing backup #85, which started around 3/11 20:00 (1.2 days ago),  
 ♦ This display is merged with backup #84, #83.  
 ♦ Select the backup you wish to view: #85 - (3/11 20:00)

♦ Enter directory: /Program Files/7-Zip

♦ Click on a directory below to navigate into that directory,  
 ♦ Click on a file below to restore that file,  
 ♦ You can view the backup [history](#) of the current directory.

**Contents of C/Program Files/7-Zip**

	Name	Type	Mode	#	Size	Date modified
<input type="checkbox"/>	7-zip.chm	file	0644	83	78576	2006-09-15 08:33:48
<input type="checkbox"/>	7-zip.dll	file	0644	83	143872	2006-09-15 08:07:52
<input type="checkbox"/>	7z.exe	file	0644	83	122368	2006-09-15 08:07:46
<input type="checkbox"/>	7z.sfx	file	0644	83	135168	2006-09-15 08:09:08
<input type="checkbox"/>	7zCon.sfx	file	0644	83	134656	2006-09-15 08:08:56
<input type="checkbox"/>	7zFM.exe	file	0644	83	301056	2006-09-15 08:41:42
<input type="checkbox"/>	7zG.exe	file	0644	83	181760	2006-09-15 08:08:00
<input type="checkbox"/>	7zip.pad.xml	file	0644	83	5544	2006-09-15 08:31:30
<input type="checkbox"/>	Codecs	dir	0755	85	0	2007-01-07 09:44:11
<input type="checkbox"/>	copying.txt	file	0644	83	26948	2001-08-29 22:19:26
<input type="checkbox"/>	description	file	0644	83	528	2005-12-04 15:56:58
<input type="checkbox"/>	file_id.diz	file	0644	83	450	2006-07-03 15:54:48
<input type="checkbox"/>	Formats	dir	0755	85	0	2007-01-07 09:44:10
<input type="checkbox"/>	History.txt	file	0644	83	28389	2006-09-15 08:09:24
<input type="checkbox"/>	Lang	dir	0755	85	0	2007-01-07 09:44:11
<input type="checkbox"/>	License.txt	file	0644	83	1583	2006-09-08 06:44:24
<input type="checkbox"/>	readme.txt	file	0644	83	3457	2006-08-21 07:33:44
<input type="checkbox"/>	Uninstall.exe	file	0644	83	59468	2007-01-07 09:44:11
<input type="checkbox"/>	Select all					<input type="button" value="Restore selected files"/>

<http://backuppcc.sourceforge.net/info.html>

# How Normal Rostra Application Deployments Work



- Standard Rostra Instances
  - Applications are in a privately contained execution space
    - VM's or Containers (eventually)
  - No cross application impact\*
  - Error and resource usage fidelity on an app by app basis
  - Vastly increased security controls
  - Highly automated (Typically no administrative intervention)

\*Hypervisors/Containers are still shared environments. This type of sharing may still influence performance if load is not properly balanced.

# How Specialized Rostra Application Deployments Work



- Specialized Rostra Deployment
  - Rostra instances are centrally managed the same as Normal
  - User will need to submit tickets for administrative commands
  - Application owner can initiate install
  - Middleware moves into a consulting support role
  - We can help automate installation with developer support

# Advantages – “Time is money...”

- Supports a Multi-tenant developer population
- Allow developers to manage life cycle actions like:
  - Start/Stop/Restart Server
  - Start/Stop Primary Engine Service
  - Redeploy Application
  - Let them do what needs to be done without waiting on a ticket response

## Advantages – “Time is money...”

- On demand, self-service.
- Saves time for administrators and developers.
- Performance is better and more predictable.
- Ticket volumes decrease.

# Advantages – “Time is money...”

- Improve the security posture.
  - Better abstraction and security on the sharing of resources.
  - Managed, properly configured, cross architecture encryption and certification configuration.
  - Supporting corporately maintained 3<sup>rd</sup> party authentication infrastructure.
  - Automated security scanning process with trigger action scanning in the future.
  - Centralized per-tenant monitoring and logging infrastructure.

# Rostra Review

***“Up to a 10x faster deployment capability for most applications.”***

- Developer Resource Control
  - Lifecycle Control
  - Searchable Logs (Splunk)
  - Console Access (Guacamole)
  - Centralized Authentication (Shibboleth)
  - Instant Deployment
- More Secure
  - Highly Automated (Puppet w/Hiera)
  - Strict Firewall Controls
  - Automated IPSEC Encryption Capable
- Better Performance
  - Private containers yield much better and more predictable application performance
- Easier to Maintain
  - Configuration Management
    - OS (Patches, Firewalls, etc)
    - Application Container
    - Authentication
  - Automation
    - Log Collection & Reporting
    - External Node Classification (Hiera)
  - Reduction of Service Requests
- Reduce Cost
  - Administrative effort reduced
  - Reduction of licensing costs

# Rostra Roadmap

- Support additional application frameworks
  - Support for Mono (.NET), Ruby, etc.
- OpenStack Integration
  - Provision platforms against OpenStack Heat and connected IaaS providers.
- Docker Application Container Support
  - Support running Docker images on specially configured physical systems for improved speed and scalability.
- Application Clustering and Auto Scaling
  - Application clustering with multiple hardware availability zones with tools to help applications support automated scaling.

# ■ Questions?

Mathew Anderson - [mander@sandia.gov](mailto:mander@sandia.gov)

Elliott Quarles - [equarle@sandia.gov](mailto:equarle@sandia.gov)

# Preview Screens





ROSTRA PRICING APPS MONITORING SUPPORT ABOUT

v0.8-beta

## On Demand Application Hosting

Ready To Get Started? [Click Here!](#)

### Why Rōstra?



Develop, run, and manage your Production Web Applications in less than an hour!



Deploy with ease under 1 minute!



Direct access to the server via a browser based console!

Ready to get Started? Click the Rōstra cloud below!



Hi There,  
Elliott

You will be the Creator and Point of Contact. The Application Master.

You will need the following information  
to create your very own Rostra:

**Application Name, Description, Metagroup, Project/Task**

◀ **Summary** ▶



Provide a Name for your Application

Try not to include postfixes like dev, qual, or prod.  
You cannot change this value after submission.

✓

◀ Summary ▶



## Description

Describe your application. Be as thorough or simplistic as you'd like.

```
This is the SPOCK app it's very logical.|
```

◀ Summary ▶

## Deployment and Access Permissions

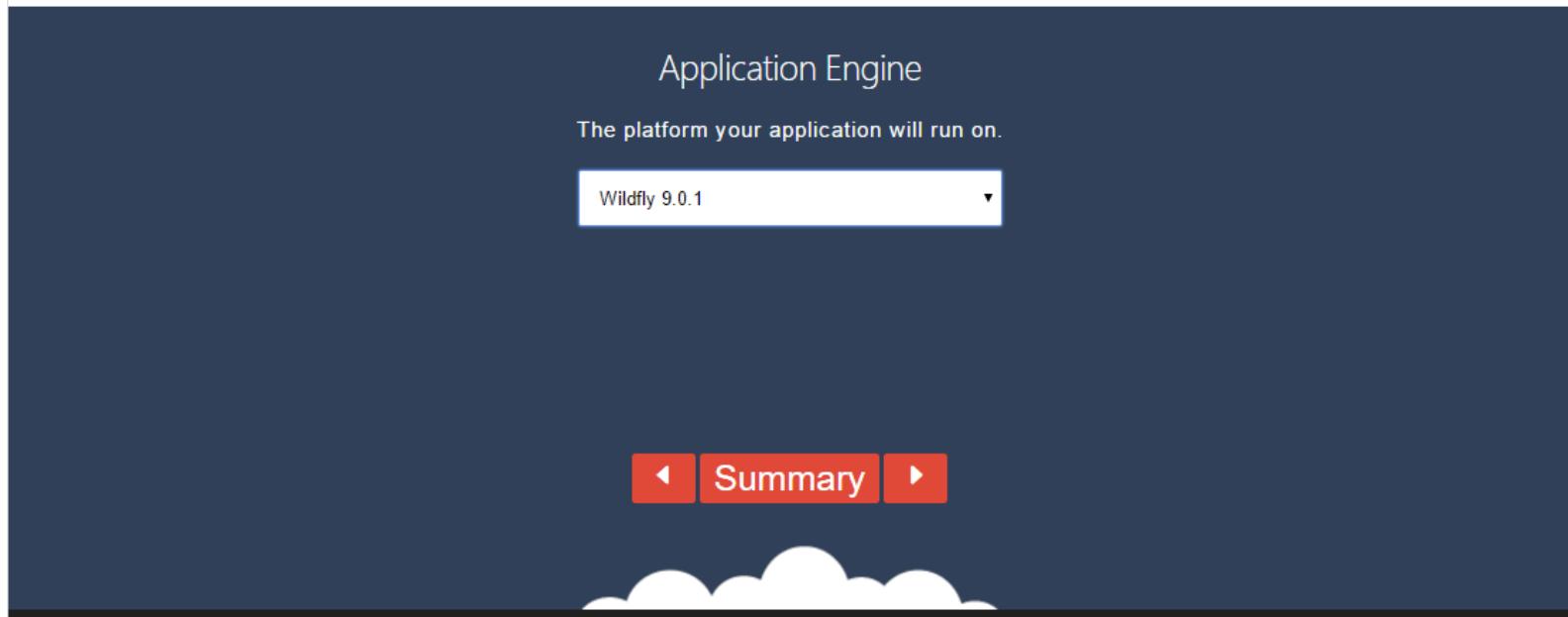
Search and validate a metagroup that has control of the application.

**This Metagroup should be of developers only, not users of the app.**

Members must not exceed 30.

◀ **Summary** ▶





## Server Size

Choose the Size of application Engine.

jboss-medium ▾

**CPU Count: 4 | Memory: 4096 | Disk: 100**

◀ **Summary** ▶



INSIDE SMM Policies Orgs News Sandia  People/Orgs 

 ROSTRA PRICING APPS MONITORING SUPPORT ABOUT

v0.8-beta

## Application Information

**Application Name:** helloworld  
**Description:** this is the hello world java application  
**Type:** tomcat  
**Owner:** userZ  
**Metagroup:** helloworld-developers  
**Project/Task:** 123456 / 123456  
**Expiration:** (Expires on 2017-02-06 )

[Edit / View](#)

Development Quality Production

[Development](#)[Quality](#)[Production](#)

## Deploy:

**Deploy File:**[Browse](#)[Select File](#)**Erase Deploy:**[Erase](#)**Recent:**

ID	Date	User	Content
643	2015-06-19 11:29:49	userA	test1.war
627	2015-06-11 14:56:31	userA	test16.war
626	2015-06-11 14:54:25	userA	test15.war
625	2015-06-11 14:27:02	userA	test13.war
624	2015-06-11 14:25:21	userA	test12.war

## Actions:

**Application Control:**[Start](#)**Launch:**[Console](#)[X Session](#)[Delete Instance](#)

## Links:

Development   Quality   Production

**Instance Has Not Been  
Created**

**Create Instance**

Application Information helloworld-qual +

https://consoleserver.fakeurl.sandia.local/helloworld

Last login: Thu Apr 21 12:36:43 2016

Legal Notice Reminder - SF 2902-NTU (2-2009)

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All users of this system and all information on this system are subject to interception, monitoring, recording, copying, auditing, and inspection at the discretion of Sandia Corporation, and disclosure to Sandia Corporation and third parties, including, but not limited to, the United States Government, any authorized investigative and law enforcement personnel, and officials of other entities, both domestic and foreign. By using or accessing this system, you consent to and permit all of the above without limit as to when such action may be undertaken.

Unauthorized or improper use of this SNL system may result in disciplinary, administrative, civil, and/or criminal penalties.

LOGIN to acknowledge and agree with these terms and conditions or DISCONTINUE all efforts to access or use this SNL information system.

[appuser@helloworld-qual ~]\$ █

Application Information   rdp-helloworld-qual   helloworld-qual

https://consoleserver.fakeurl.sandia.local/helloworldconsole

Search

issue & bash

Legal Notice Reminder - SF 2902-NTU (2-2009)

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bash-4.1\$

Mozilla Firefox

Connecting...

http://localhost:5000/localhostadminconsole

Search

JWM 2 issue & bash Mozilla Firefox 12:40 PM