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Leveraging PaaS to Monitor & Tune Applications in the Cloud

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Overview

Why PaaS?

OpenShift

Case Study/Demo

Q&A

Why PaaS?

Old-Skool, DIY



Old-Skool, DIY



Writes all his own software and maintains a cluster of high-end late-90's servers for running batch-mode computations.

What We All Want



What We All Want

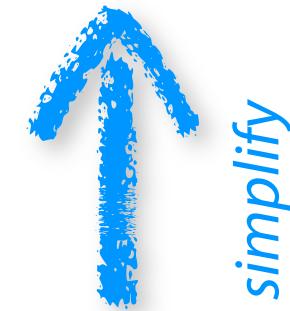


Why PaaS?

Development

- ✓ **Focus** on applications
- ✗ **Stop** dealing with the stack

Ease of use



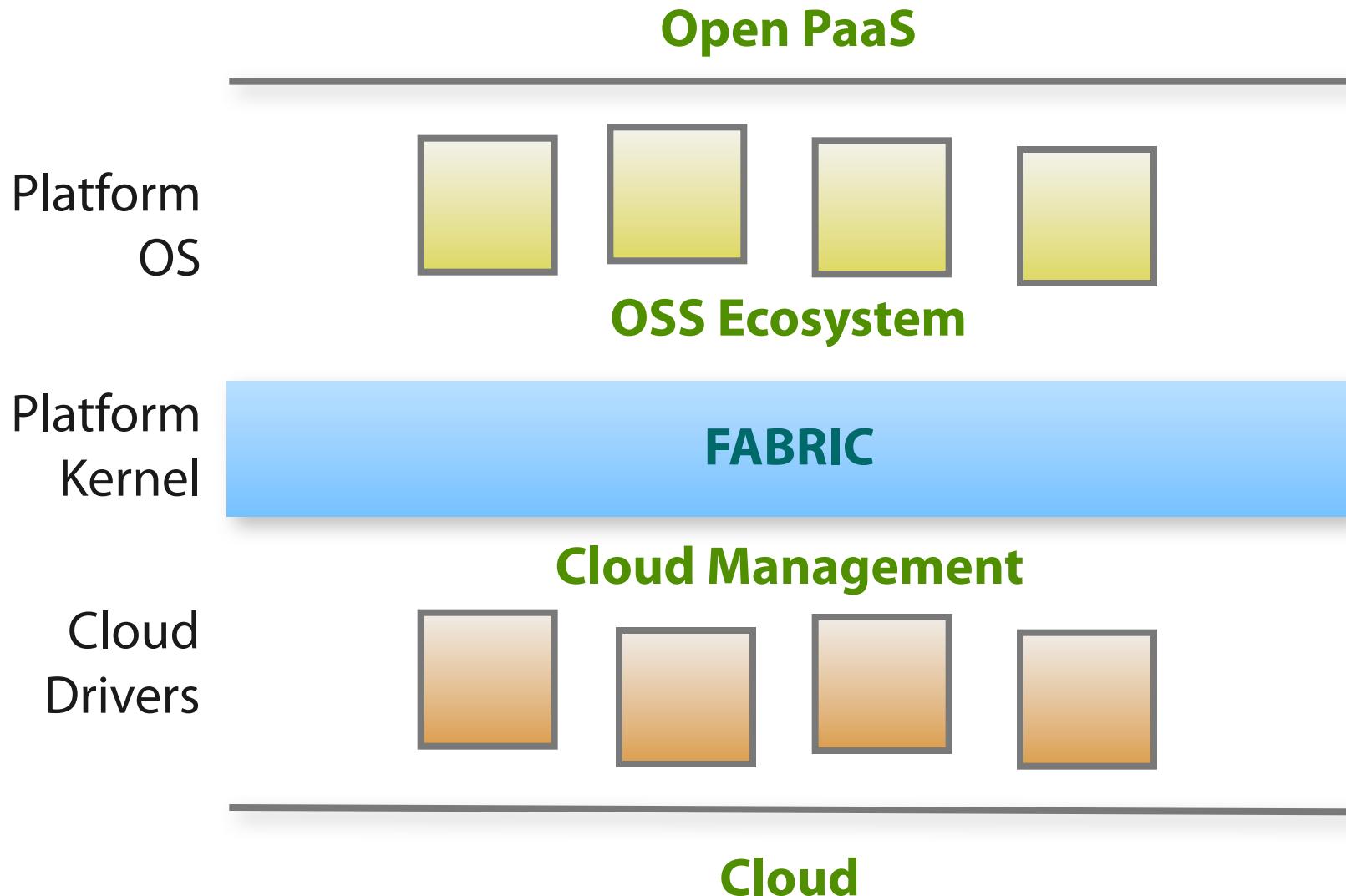
Operations

- ✗ **Stop** dealing with the application
- ✓ **Focus** on infrastructure

Efficiency

A large blue hand-drawn style arrow pointing downwards, positioned next to the Efficiency text.

PaaS: The “New Linux”



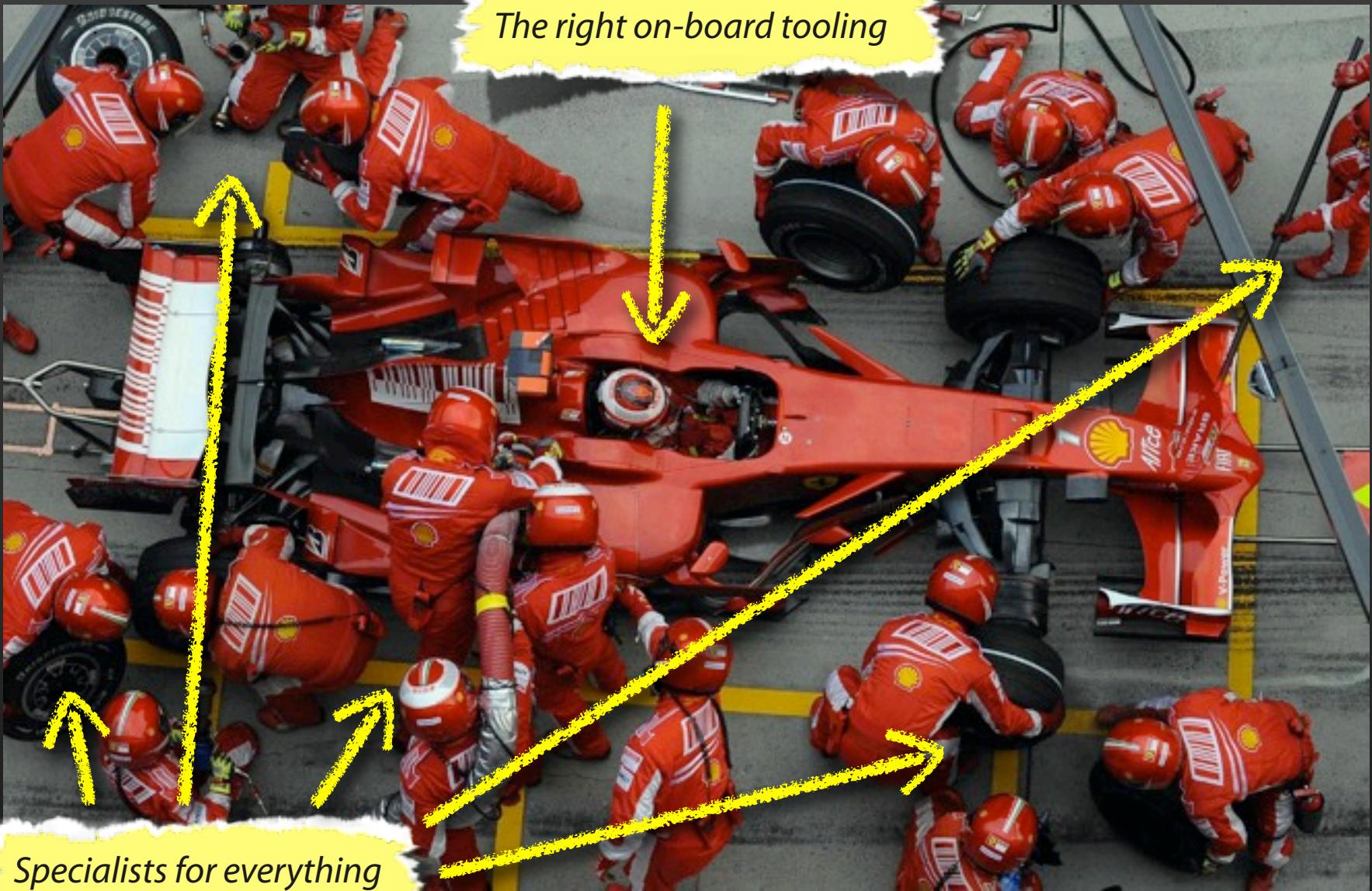
...but can it perform?

Advanced PaaS



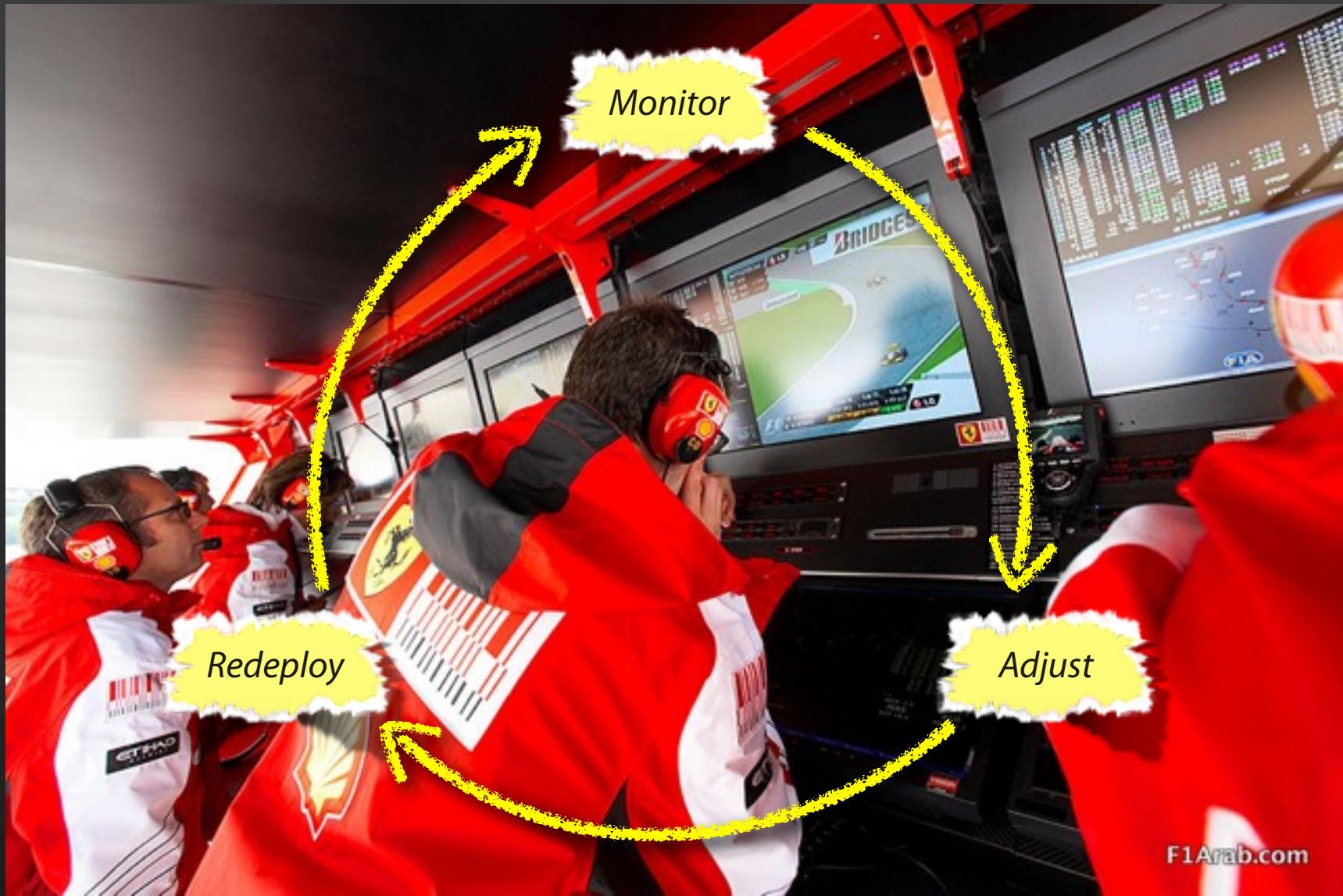
Advanced PaaS

The right on-board tooling



Specialists for everything

Advanced PaaS



OpenShift

OpenShift

Express: “Runtime-as-a-Service”

- “Runtime-as-a-Service”: simple, git-based interaction
- Shared

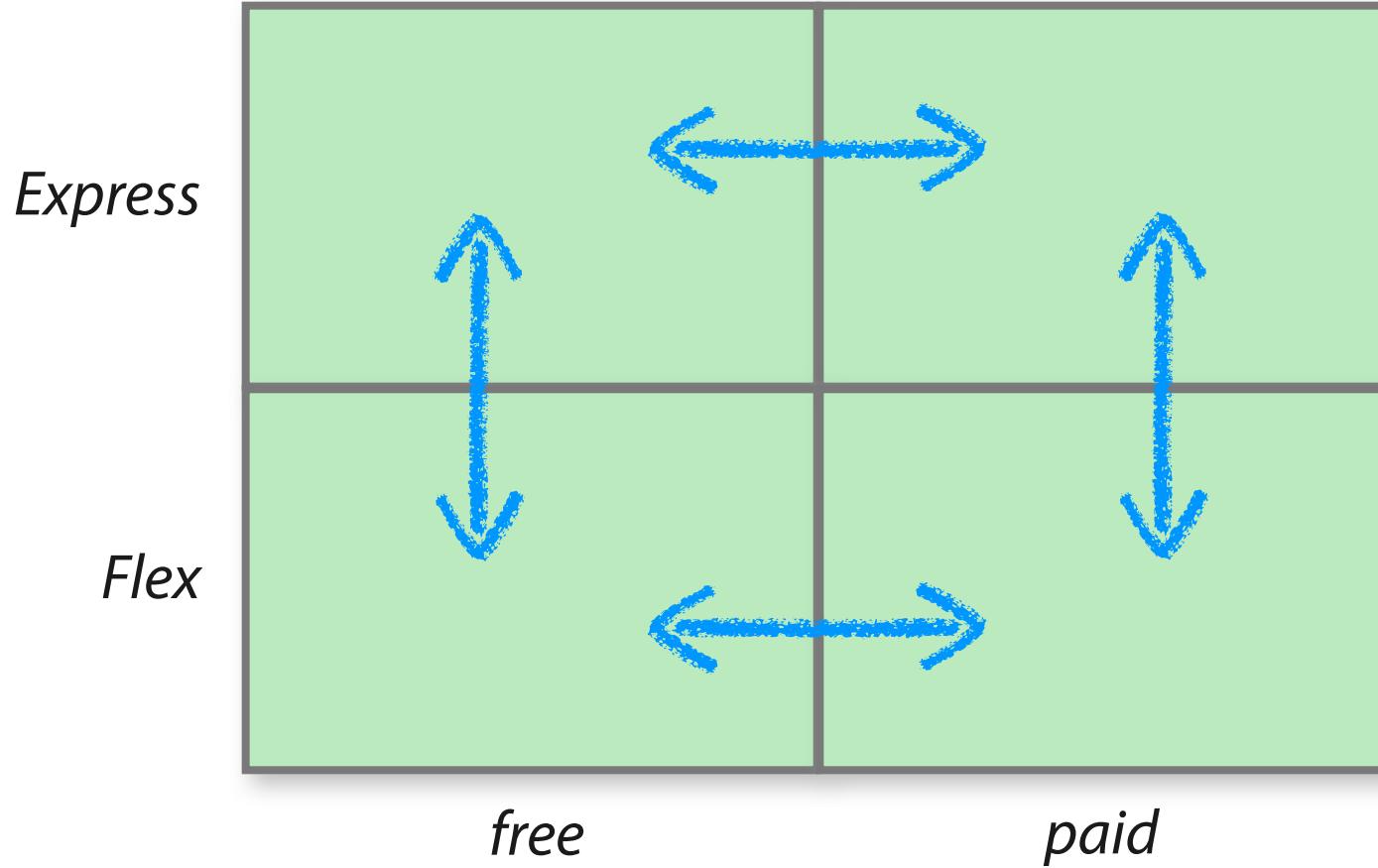
Flex: “Middleware-as-a-Service”

- Optimized for existing models
 - Nodes
 - Middleware, frameworks, services, software ecosystem
- Operations use cases: self-serve, user management
- Dedicated

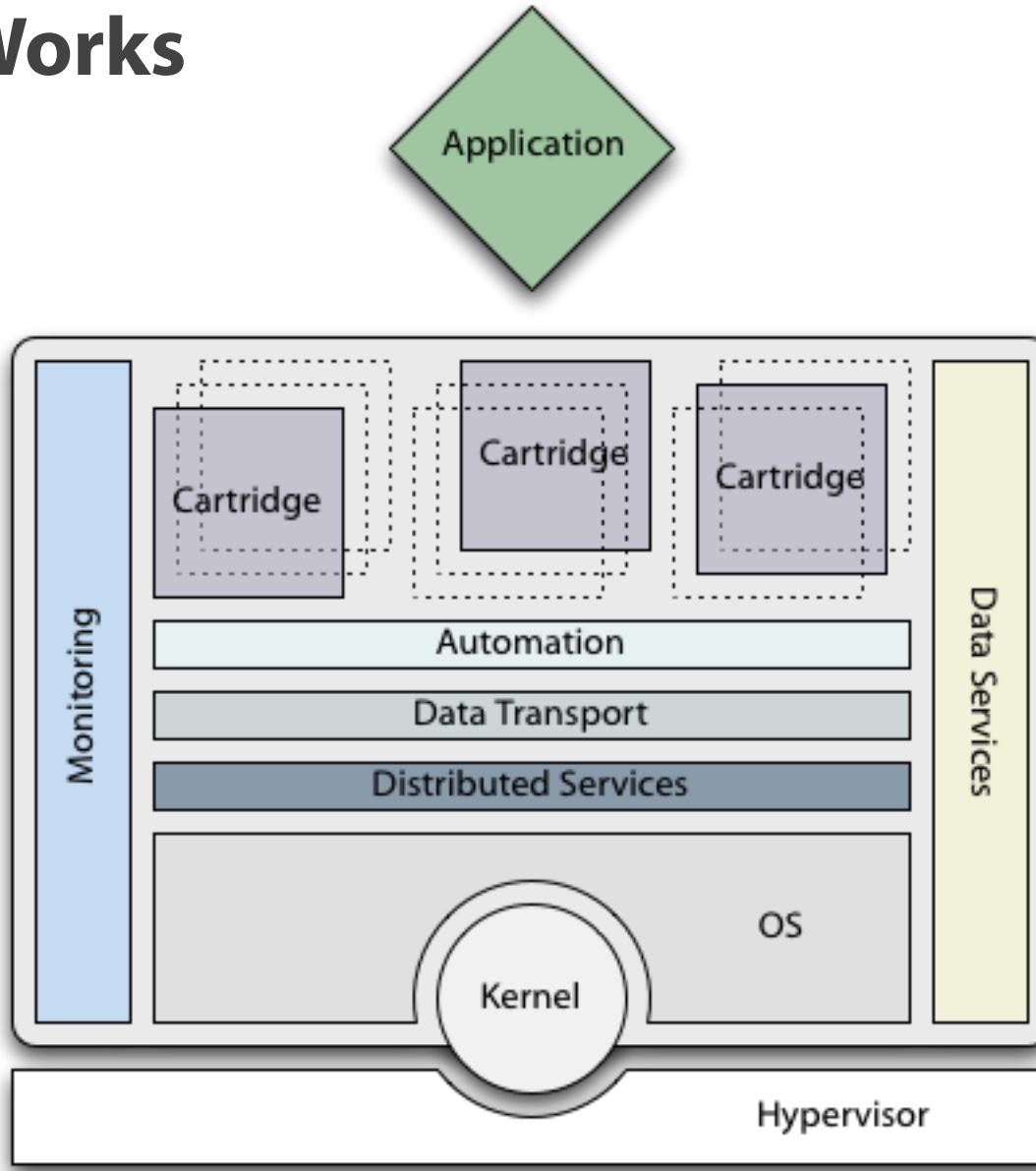
Built Around Monitoring

*Provision, deploy, manage, monitor & scale
existing applications
in the Cloud.*

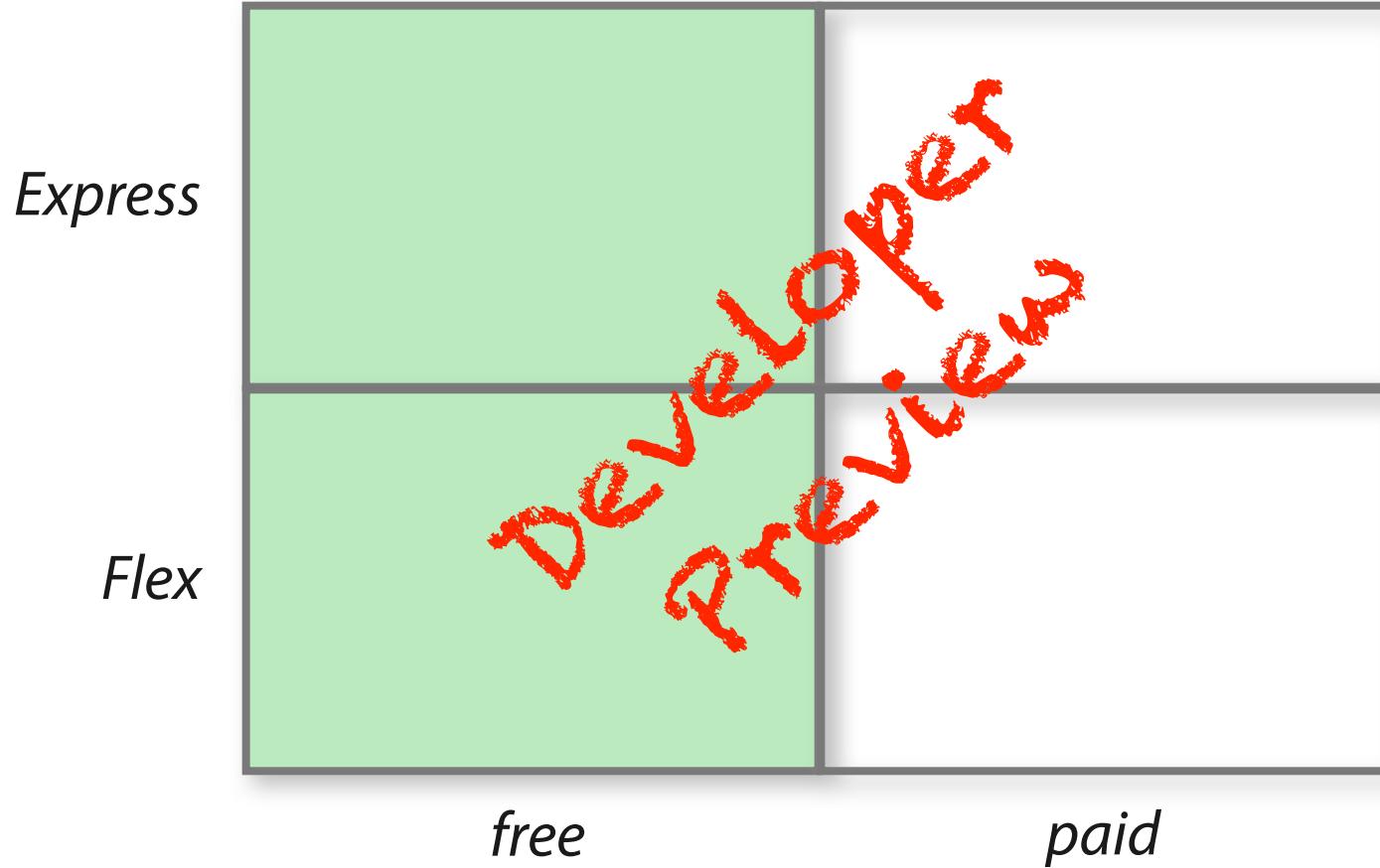
OpenShift PaaS Matrix



How It Works



Status



Status Ecosystem

Express



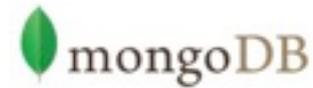
Flex



Qpid



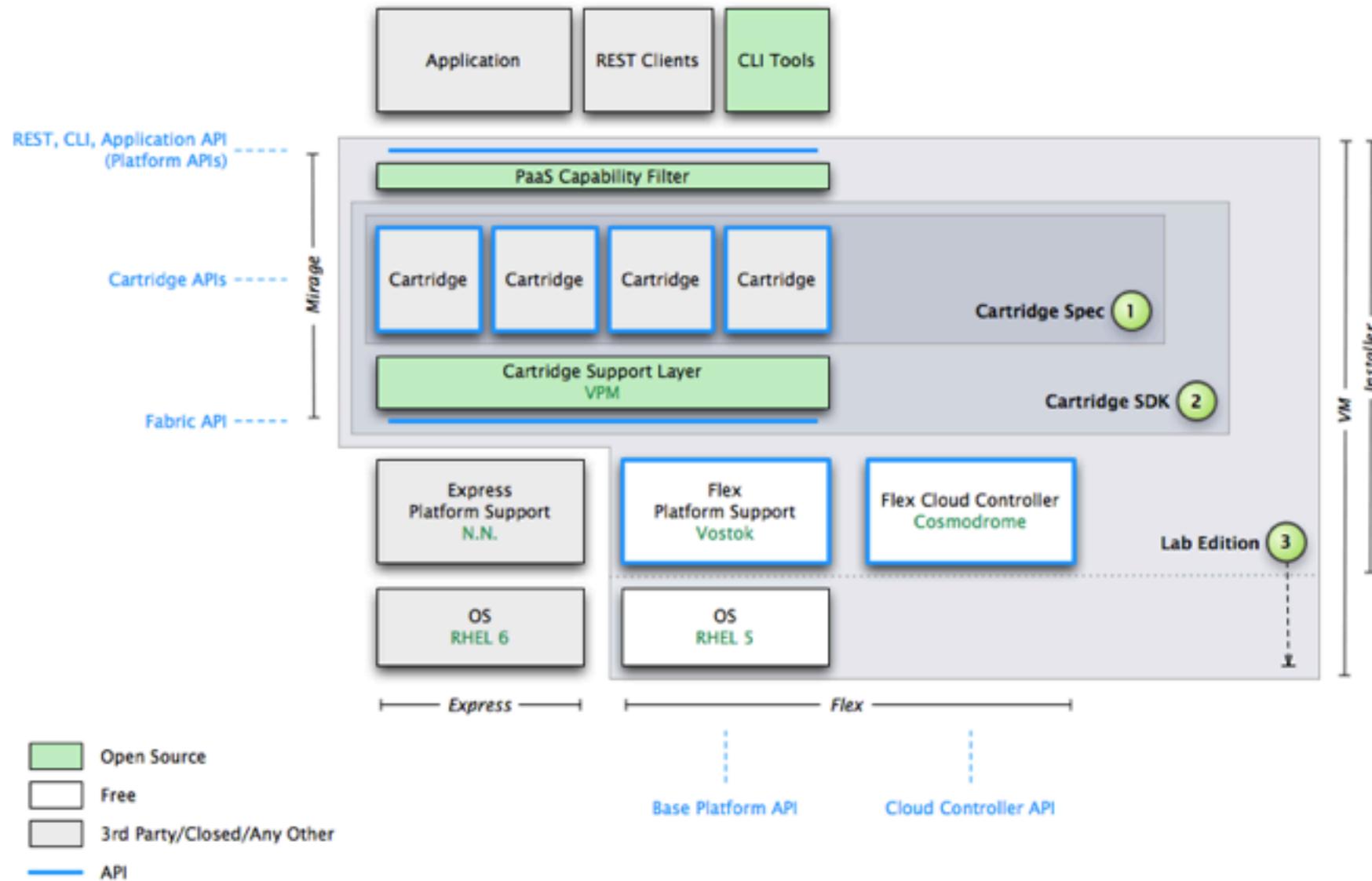
Couchbase



Coming



Open Source Project



redhat

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Open Source

Code

- <http://github.com/openshift/fata-morgana>

Documentation

- <http://mirage-docs.readthedocs.org/>

Mailing List

- openshift-devel@redhat.com

Open Source

Code

- <http://github.com/openshift/fata-morgana>

Documentation

- <http://mirage-docs.readthedocs.org/>

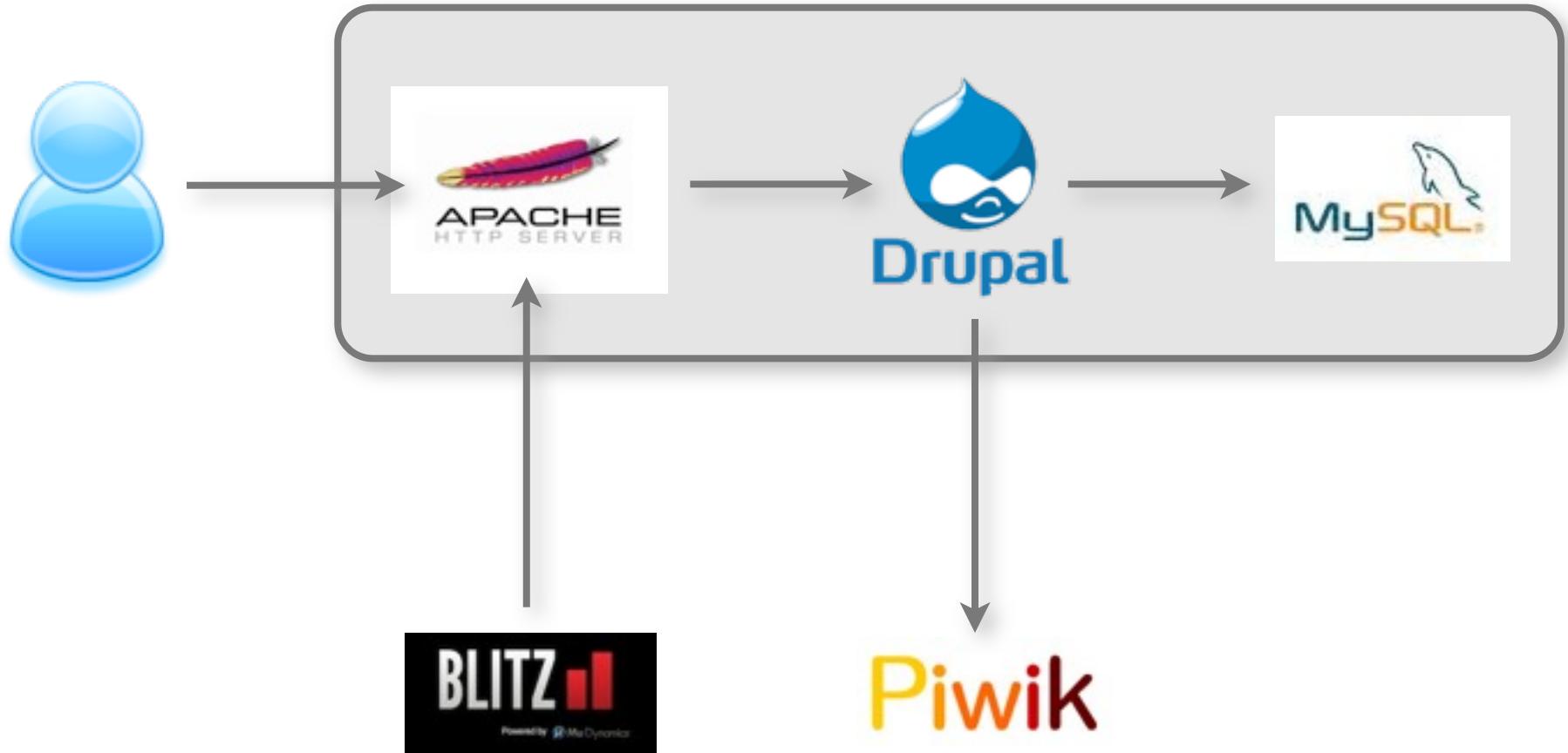
Mailing List

- openshift-devel@redhat.com

Names
subject to
change!

Case Study

Example App



Demo

Create Cluster

The screenshot shows a web browser window for 'Red Hat OpenShift Flex' at the URL <https://openshift.redhat.com/flex/flex/index.html>. The page title is 'Create Cluster'. The navigation bar includes links for 'INTRO', 'CLOUDS', 'CLUSTERS' (which is highlighted in blue), 'SERVERS', 'APPLICATIONS', 'PERFORMANCE', 'LOGS', and 'EVENTS'. The user is logged in as 'source@redhat.com'. The main content area is titled 'DEFINE A SERVER CLUSTER' and contains the following fields:

- SERVER CLUSTER NAME:** prod
- CLOUD PROVIDER ACCOUNT:** OpenShift (tkunze@redhat.com)
- SERVER CLUSTER LOCATION:** US East
- PROCESSOR ARCHITECTURE:** 32-bit
- INITIAL CLOUD SERVERS:** 1
- MINIMUM DISK SIZE (GB):** 10
- MINIMUM CORES PER SERVER:** 1
- MINIMUM MEMORY PER SERVER (MB):** 1024
- ADMIN PASSWORD:** (REDACTED)
- The admin password is used for SSH access and communication from this console to your cloud servers. Your cloud servers will be exposed to the public internet so please choose a secure password that you can remember.
- CONFIRM PASSWORD:** (REDACTED)
- Load Balance Nodes

At the bottom of the dialog are 'CANCEL' and 'SAVE' buttons.

Provisioning in Progress

The screenshot shows a web browser window for "Red Hat OpenShift Flex" at the URL <https://openshift.redhat.com/flex/flex/index.html>. The page displays a table of provisioning tasks. The columns are: Status, Name, Start Time, and Elapsed time. The table lists 26 tasks, mostly completed, with one task currently in progress. The tasks involve building clusters, creating load balancers, and managing cloud servers across various cluster tags like 'prod' and 'autotrack'.

Status	Name	Start Time	Elapsed time
In progress	Building cluster: 'prod' on cloud server: '50.16.129.115'	Sun Oct 09 11:19:25	2 min 47 sec
Completed	Creating load balancer: 'prod403056487'	Sun Oct 09 11:19:25	0 min 3 sec
Completed	Creating 1 cloud server(s) for cluster with tag: 'prod403056487'	Sun Oct 09 11:18:23	0 min 57 sec
In progress	Creating cluster: 'prod'	Sun Oct 09 11:18:23	3 min 49 sec
Completed	Updating load balancer: 'us-east-1/autotrack402443763'	Sat Oct 08 11:56:14	0 min 5 sec
Completed	Joining cloud server: '87.202.8.147' to cluster: 'autotrack'	Sat Oct 08 11:53:12	3 min 2 sec
Completed	Creating 1 cloud server(s) for cluster with tag: 'autotrack402443763'	Sat Oct 08 11:51:01	2 min 11 sec
Completed	Adding cloud server to cluster: 'autotrack'	Sat Oct 08 11:51:00	5 min 19 sec
Completed	Updating load balancer: 'us-east-1/autotrack402443763'	Sat Oct 08 11:44:33	2 min 34 sec
Completed	Joining cloud server: '107.22.13.184' to cluster: 'autotrack'	Sat Oct 08 11:41:48	2 min 45 sec
Completed	Creating 1 cloud server(s) for cluster with tag: 'autotrack402443763'	Sat Oct 08 11:40:54	0 min 54 sec
Completed	Adding cloud server to cluster: 'autotrack'	Sat Oct 08 11:40:53	6 min 14 sec
Completed	Updating load balancer: 'us-east-1/autotrack402443763'	Sat Oct 08 11:30:47	0 min 3 sec
Completed	Joining cloud server: '107.22.5.151' to cluster: 'autotrack'	Sat Oct 08 11:28:14	2 min 33 sec
Completed	Creating 1 cloud server(s) for cluster with tag: 'autotrack402443763'	Sat Oct 08 11:27:26	0 min 48 sec
Completed	Adding cloud server to cluster: 'autotrack'	Sat Oct 08 11:27:25	3 min 25 sec
Completed	Building cluster: 'autotrack' on cloud server: '107.22.8.177'	Sat Oct 08 10:29:38	2 min 36 sec
Completed	Creating load balancer: 'autotrack402443763'	Sat Oct 08 10:29:32	0 min 5 sec
Completed	Creating 1 cloud server(s) for cluster with tag: 'autotrack402443763'	Sat Oct 08 10:28:35	0 min 57 sec
Completed	Creating cluster: 'autotrack'	Sat Oct 08 10:28:35	3 min 40 sec
Completed	Building cluster: 'test' on cloud server: '107.20.69.188'	Wed Oct 05 18:58:37	2 min 57 sec
Completed	Creating 1 cloud server(s) for cluster with tag: 'test721096417'	Wed Oct 05 18:57:43	0 min 53 sec
Completed	Creating cluster: 'test'	Wed Oct 05 18:57:43	3 min 51 sec
Completed	Deleting cloud server: 'us-east-1/82ec25e2'	Wed Sep 21 23:59:29	0 min 30 sec
Completed	Deleting cloud servers in cluster with tag: 'test19171802748'	Wed Sep 21 23:58:56	0 min 33 sec
Completed	Deleting cluster: 'test'	Wed Sep 21 23:58:56	1 min 6 sec
Completed	Building cluster: 'test' on cloud server: '50.16.139.240'	Wed Sep 21 22:48:27	0 min 34 sec

Cluster Created

The screenshot shows the Red Hat OpenShift Flex web interface. At the top, there's a header bar with the title "Red Hat OpenShift Flex" and a URL "https://openshift.redhat.com/flex/flex/index.html;jsessionid=5A1618D094889E8978312A9204500A79.flex-cos3". On the right of the header are "WELCOME" (tkunze@redh), "LOGOUT", and some icons.

The main content area has a navigation bar with tabs: INTRO, CLOUDS, CLUSTERS (which is selected and highlighted in blue), SERVERS, APPLICATIONS, PERFORMANCE, LOGS, and EVENTS. Below the navigation is a "CLUSTER LIST" section with a "ADD CLUSTER" button.

A message at the top of the list says "Click a server cluster name to set the auto-scaling policy, enable email, or import/export the cluster's database." To the right, it says "LAST REFRESHED: 11:22:55 AM".

The cluster list table has the following columns: NAME, LOCATION, CLOUD, OWNER, DNS, STATUS, TOTAL CLOUD SERVERS, LOAD BALANCER, and ACTIONS. The table contains three rows:

NAME	LOCATION	CLOUD	OWNER	DNS	STATUS	TOTAL CLOUD SERVERS	LOAD BALANCER	ACTIONS
test	us-east-1	OpenShift	tkunze@redh	test721096417.prod.rhcloud.com	Started	1	N/A	<button>START</button> <button>STOP</button> <button>DELETE</button>
autotrack	us-east-1	OpenShift	tkunze@redh	autotrack492443763.prod.rhcloud.com	Started	4	autotrack492443763-1141284422.us-east-1.elb.amazonaws.com	<button>START</button> <button>STOP</button> <button>DELETE</button>
prod	us-east-1	OpenShift	tkunze@redh	prod403056487.prod.rhcloud.com	Started	1	prod403056487-2128815957.us-east-1.elb.amazonaws.com	<button>START</button> <button>STOP</button> <button>DELETE</button>

Inspecting Running Servers

Red Hat OpenShift Flex

<https://openshift.redhat.com/flex/flex/index.html;jsessionid=5A1618D094889E8978312A9204500A79.flex-cos3>

WELCOME: source@redhat.com LOGOUT

OPENSHIFT - Powered by Red Hat Cloud

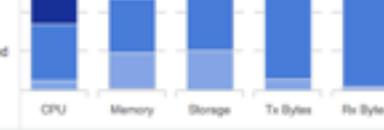
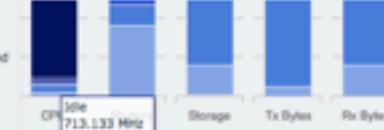
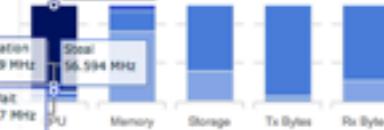
INTRO CLOUDS CLUSTERS SERVERS APPLICATIONS PERFORMANCE LOGS EVENTS

SERVER LIST ADD SERVER

These are the virtual machines in your cluster. You can create a new server by clicking the ADD button to the right. LAST REFRESHED: 11:16:19 AM

FILTER BY CLUSTERS

- OpenShift: test
- OpenShift: autotrack

NAME	CLOUD	CLUSTER	VIRTUAL IP	ADMIN	SERVING	STATUS	RESOURCES (10 MIN AVERAGE)	ACTIVITY	ACTIONS	
197.20.69.188	OpenShift: test			No	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Synched			<button>UNJOIN</button> <button>RESTART</button>
197.22.8.177	OpenShift: autotrack			No	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Synched			<button>UNJOIN</button> <button>RESTART</button>
197.22.5.151	OpenShift: autotrack			No	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Synched			<button>UNJOIN</button> <button>RESTART</button>
197.22.13.184	OpenShift: autotrack			No	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Synched			<button>UNJOIN</button> <button>RESTART</button>
67.202.9.147	OpenShift: autotrack			No	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Synched			<button>UNJOIN</button> <button>RESTART</button>

Application Creation

The screenshot shows the OpenShift web interface with a modal dialog box for creating a new application. The dialog has the following fields:

- SERVER CLUSTER:** OpenShift:test
- APPLICATION NAME:** MyDrupal
- APPLICATION VERSION:** 7.8

Below the application name, there is a radio button labeled "Deploy a Sample Application". At the bottom of the dialog are two buttons: "CANCEL" and "SUBMIT".

The background of the page shows the main OpenShift navigation bar with links for Intro, Clouds, Clusters, Servers, Applications, Performance, Logs, and Events. The Applications link is currently selected.

Application Created

The screenshot shows the OpenShift application list interface. At the top, there is a navigation bar with links for Red Hat OpenShift, Sources, view-source, Blitz, Pivotal Admin, Drupal Tutorials, and Blitz. The URL is https://openshift.redhat.com/flex/flex/index.html;jsessionid=5A1618D094889E8978312A9204500A79.flex-cos3. The top right corner shows a welcome message for 'Sources@redhat.com' and a 'LOGOUT' link.

The main area is titled 'APPLICATION LIST' and features a 'FILTER BY CLUSTERS' dropdown with options: OpenShift:test, OpenShift:autotrack, and OpenShift:prod. The 'OpenShift:prod' option is selected and highlighted with a green background. A message below the dropdown says: 'Select an application. You can create a new application by clicking the ADD button to the right.' To the right of this message is a timestamp: 'LAST REFRESHED: 03:03:50 PM'.

The application list table has columns: NAME (click to configure), CLOUD, CLUSTER, VERSION, DEPLOYMENT, STATUS, and ACTIONS. The table contains the following data:

NAME (click to configure)	CLOUD	CLUSTER	VERSION	DEPLOYMENT	STATUS	ACTIONS
MyDrupal	OpenShift	test	7.8	0	Created	START STOP RESTART EXPORT DELETE COPY TO...
phwik	OpenShift	test	1.5.1	3	Started	START STOP RESTART EXPORT DELETE COPY TO...
monqz	OpenShift	test	1	10	Stopped	START STOP RESTART EXPORT DELETE COPY TO...
autoTrack	OpenShift	autotrack	1.0.0	3	Started	START STOP RESTART EXPORT DELETE COPY TO...
drupal	OpenShift	prod	7.8	2	Started	START STOP RESTART EXPORT DELETE COPY TO...

Application Overview

The screenshot shows the Red Hat OpenShift application management interface. At the top, there's a navigation bar with tabs like 'Red Hat OpenShift', 'Sources | OpenShift', 'Blitz - Making', 'view-source', 'Blitz - Making', 'Blitz - Making', 'Blitz - Making', 'Pivotal - Administ...', 'Drupal Tutorials', and 'Blitz - Making'. On the right of the nav bar are 'WELCOME Sources@redhat.com' and 'LOGOUT' buttons.

The main header features the 'OPENSHIFT' logo and the text 'Powered by Red Hat Cloud'. Below the header, the application name 'MyDrupal' is displayed, along with a status indicator 'Created' and buttons for 'START' and 'RESTART'.

The application overview page includes several sections:

- OVERVIEW:** Shows the application's parameters: CLUSTER DNS (test721096417.prod.rhcloud.com). A note explains that applications can be reached via `http://<host>[:port]<context>`, where '`<host>`' is either a local node IP address, load balancer address, or domain name, '`<port>`' is the port specified in the static web server configuration (default: 80), and '`<context>`' is the application's context path (if any).
- FILES:** A message indicates 86 files were modified in production, with a 'VIEW FILES' button.
- DEPLOYMENT HISTORY:** A section for restoring previous deployments to the development workspace. It contains a table with columns: DEPLOYMENT, LAST MODIFIED, COMMENTS, and ACTIONS.

Component Selection

The screenshot shows the OpenShift web interface for managing an application named "MyDrupal". The top navigation bar includes links for Red Hat OpenShift, Sources, view-source, and various monitoring and administration tools. The main header displays the application name "MyDrupal" and its status as "Created". Below the header, there are tabs for OVERVIEW, COMPONENTS, FILES, CONFIGURE, and DEPLOY CHANGES, with "COMPONENTS" currently selected.

The "APPLICATION COMPONENTS" section contains the following configuration:

- Application Type:** PHP
- Web Server:** Apache HTTP Server (Web Tier) (www-static.apache2_2.2.3-47_i686.vpm)
- Application Server Version:** Apache HTTP Server (Application Tier) (www-dynamic.apache2_2.2.3-43_i686.vpm)
- Language Version:** Select...
PHP 5.2.10 (php-5.2.10_5.2.10-21_i686.vpm)
Zend Server Community Edition 4.0.6 (PHP 5.3.0) (zend-server-ce-4.0.6-php-5.3.0_4.0.6-php-5.3.0-5_i686.vpm)

A checkbox at the bottom indicates if the application sends email, with the note: "you must use the Settings tab to configure the cluster to send email".

To the right, a sidebar titled "Other Components" lists several available options:

- Memcached 1.4.5(memcached-1.4.5_1.4.5-4_i686.vpm)
- Membase Server 1.7.0(membase-server_1.7.0-4_i686.vpm)
- MongoDB 1.8.1 32 bit(mongodb-1.8_1.8.1-5_i686.vpm)
- Infinispan Data Grid Platform 5.0.0(infinispan-5.0.0_5.0.0-4_all.vpm)
- Red Hat Enterprise MRG Messaging 2.0(mrg-messaging_2.0-5_i686.vpm)
- Zend Framework 1.10.8(zend-framework-1.10.8_1.10.8-2_i686.vpm)

At the bottom of the interface are "CANCEL" and "SAVE" buttons.

Code Upload

The screenshot shows the OpenShift web interface for managing an application named "MyDrupal". The "FILES" tab is selected. On the left, there is a file browser with a "UPLOAD FILE" button highlighted by a yellow box. The main area shows a large, empty text editor window labeled "File Name:".

Red Hat OpenShift Sources | OpenShift Blitz - Making Intro view-source pro... Blitz - Making Intro... Blitz - Making Intro... Pivotal - Administ... Drupal Tutorials Blitz - Making Intro...

https://openshift.redhat.com/flex/flex/index.html;jsessionid=5A1618D094889E8978312A9204500A79.flex-cos3

WELCOME sources@redhat.com LOGOUT

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INTRO CLOUDS CLUSTERS SERVERS APPLICATIONS PERFORMANCE LOGS EVENTS

All Applications APPLICATION NAME MyDrupal STATUS Created START RESTART

OVERVIEW COMPONENTS FILES CONFIGURE DEPLOY CHANGES 5

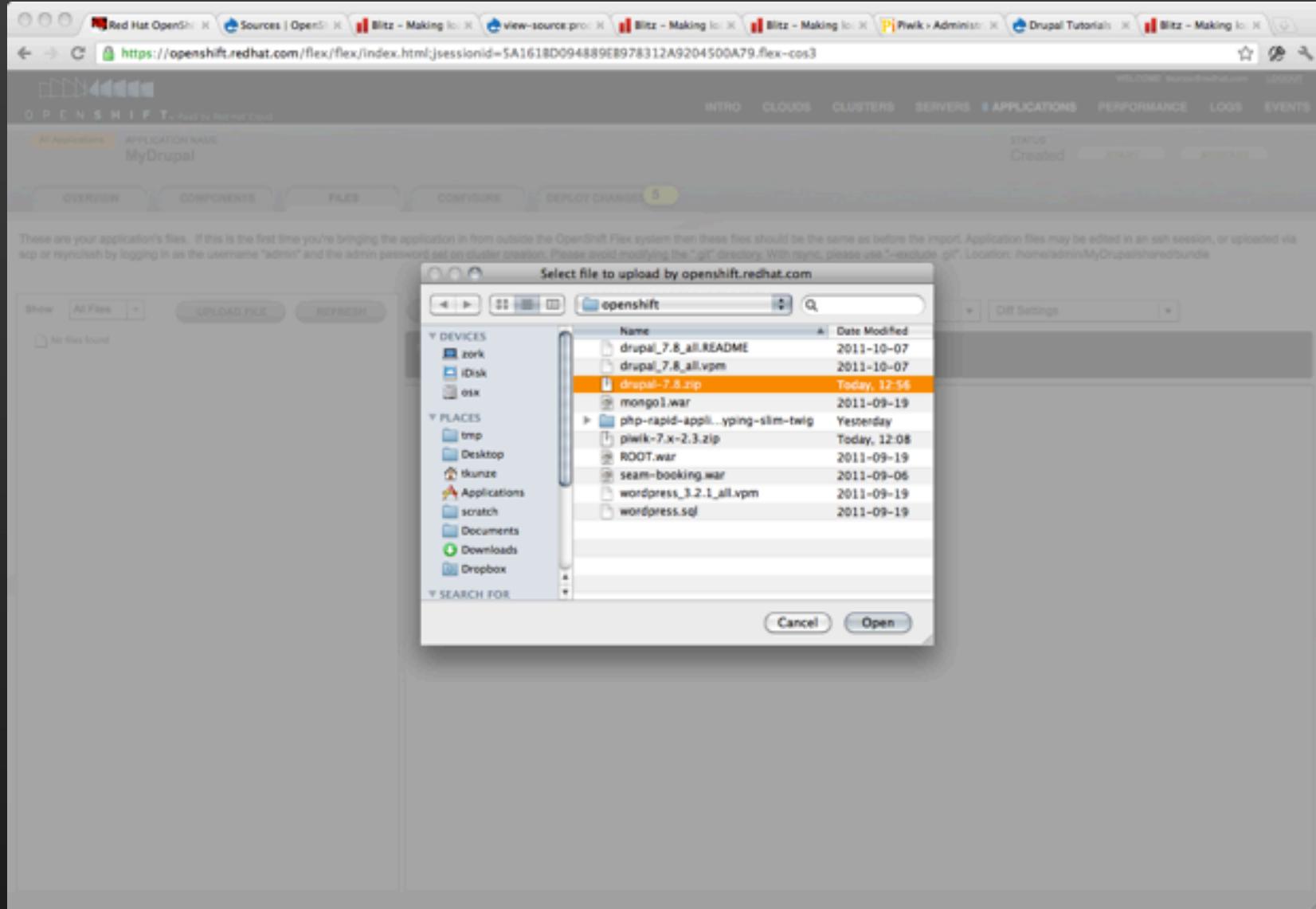
These are your application's files. If this is the first time you're bringing the application in from outside the OpenShift Flex system then these files should be the same as before the import. Application files may be edited in an ssh session, or uploaded via scp or rsync/rsynch by logging in as the username "admin" and the admin password set on cluster creation. Please avoid modifying the ".git" directory. With rsync, please use "--exclude .git". Location: /home/admin/MyDrupal/shared/bundle

Show All Files + UPLOAD FILE REFRESH SAVE CANCEL SAVE & PUBLISH Revert To Diff With Diff Settings

No files found

File Name:

File Upload



Versioning

The screenshot shows the OpenShift web interface for the 'MyDrupal' application. At the top, there are several browser tabs, including 'Red Hat OpenShift', 'Sources | OpenShift', 'Blitz - Making...', 'view-source pro...', 'Blitz - Making...', 'Blitz - Making...', 'Blitz - Making...', 'Pivotal - Administ...', 'Drupal Tutorials', and 'Blitz - Making...'. The main navigation bar includes links for 'INTRO', 'CLOUDS', 'CLUSTERS', 'SERVERS', 'APPLICATIONS' (which is selected), 'PERFORMANCE', 'LOGS', and 'EVENTS'. A 'WELCOME Sources@redhat.com' message and a 'LOGOUT' link are also present.

The application-specific navigation bar shows 'All Applications' and the 'APPLICATION NAME' 'MyDrupal'. It includes status information ('STATUS Created'), and buttons for 'START' and 'RESTART'.

The 'OVERVIEW' tab is selected, showing a summary of the application's files. Below it, the 'FILES' tab is active, displaying a file viewer for 'drupal-7.8/README.txt'. The left sidebar lists the contents of this file:

- File Name: drupal-7.8/README.txt
- CONTENTS OF THIS FILE
-
- * About Drupal
* Configuration and features
* Appearance
* Developing for Drupal
- ABOUT DRUPAL
-
- Drupal is an open source content management platform supporting a variety of websites ranging from personal weblogs to large community-driven websites. For more information, see the Drupal website at <https://drupal.org/>, and join the Drupal community at <http://drupal.org/community>.
- Legal information about Drupal:
 - * Know your rights when using Drupal:
See LICENSE.txt in the same directory as this document.
 - * Learn about the Drupal trademark and logo policy:
<http://drupal.org/trademark>
- CONFIGURATION AND FEATURES
-
- Drupal core (what you get when you download and extract a drupal-x.y.tar.gz or drupal-x.y.zip file from <http://drupal.org/project/drupal>) has what you need to get started with your website. It includes several modules (extensions that add functionality) for common website features, such as managing content, user accounts, image uploading, and search. Core comes with many options that allow site-specific configuration. In addition to the core modules, there are thousands of contributed modules (for functionality not included with Drupal core) available for download.
- More about configuration:
 - * Install, upgrade, and maintain Drupal:
See INSTALL.txt and UPGRADE.txt in the same directory as this document.
 - * Learn about how to use Drupal to create your sites:
<http://drupal.org/documentation>

Component Configuration

The screenshot shows the Red Hat OpenShift web interface for managing applications. The URL is <https://openshift.redhat.com/flex/flex/index.html;jsessionid=5A1618D094889E8978312A9204500A79.flex-cos3>. The application name is "MyDrupal". The "CONFIGURE" tab is selected. A message at the top states: "These files configure the components that your application uses to run. For direct file access, ssh as "admin" with the admin password configured when the cluster was created. Location: /home/admin/MyDrupal/shared/info/setup". Below this, there are configuration settings for "php 5.2.18" (selected), "mysql-server", and "www-dynamic.apache2". The "Internal Variables" button is highlighted.

Max Execution Time: 200

Memory Limit: 60M

Upload File Max Size: 40M

Post Max Size: 40M

Session Save Path: /tmp

Date Timezone: America/Los_Angeles

Extensions to be loaded:

- apc.so :
- bcmath.so :
- curl.so :
- dbase.so :
- dba.so :
- dom.so :
- fileinfo.so :
- gd.so :
- http.so :
- imap.so :
- interbase.so :
- json.so :
- Memcached :
- mailparse.so :
- mbstring.so :
- mcrypt.so :
- memcache.so :
- openssl.so :
- pgsql.so :
- pspell.so :
- readline.so :
- tokenizer.so :
- xml.so :
- xmlreader.so :
- xmlwriter.so :
- xsl.so :

Deployment

The screenshot shows the Red Hat OpenShift web interface for managing applications. The application name is "MyDrupal". The "DEPLOY CHANGES" tab is selected, showing 1019 files modified. The interface displays a deployment summary and allows users to start or revert the deployment.

DEPLOY CHANGES 1019 FILES TO 1 CLOUD SERVER(S)

File Name: drupal-7.8/update.php

```
<?php
/*
 * Root directory of Drupal installation.
 */
define('DRUPAL_ROOT', getcwd());

/**
 * @file
 * Administrative page for handling updates from one Drupal version to another.
 *
 * Point your browser to "http://www.example.com/update.php" and follow the
 * instructions.
 *
 * If you are not logged in using either the site maintenance account or an
 * account with the "Administrator software updates" permission, you will need to
 * modify the access check statement inside your settings.php file. After
 * finishing the upgrade, be sure to open settings.php again, and change it
 * back to its original state!
 */

/**
 * Global flag indicating that update.php is being run.
 *
 * When this flag is set, various operations do not take place, such as invoking
 * hook_init() and hook_exit(), css/js preprocessing, and translation.
 */
define('MAINTENANCE_MODE', 'update');

function update_selection_page() {
  drupal_set_title('Drupal database update');
  $elements = drupal_get_form('update_script_selection_form');
  $output = drupal_render($elements);

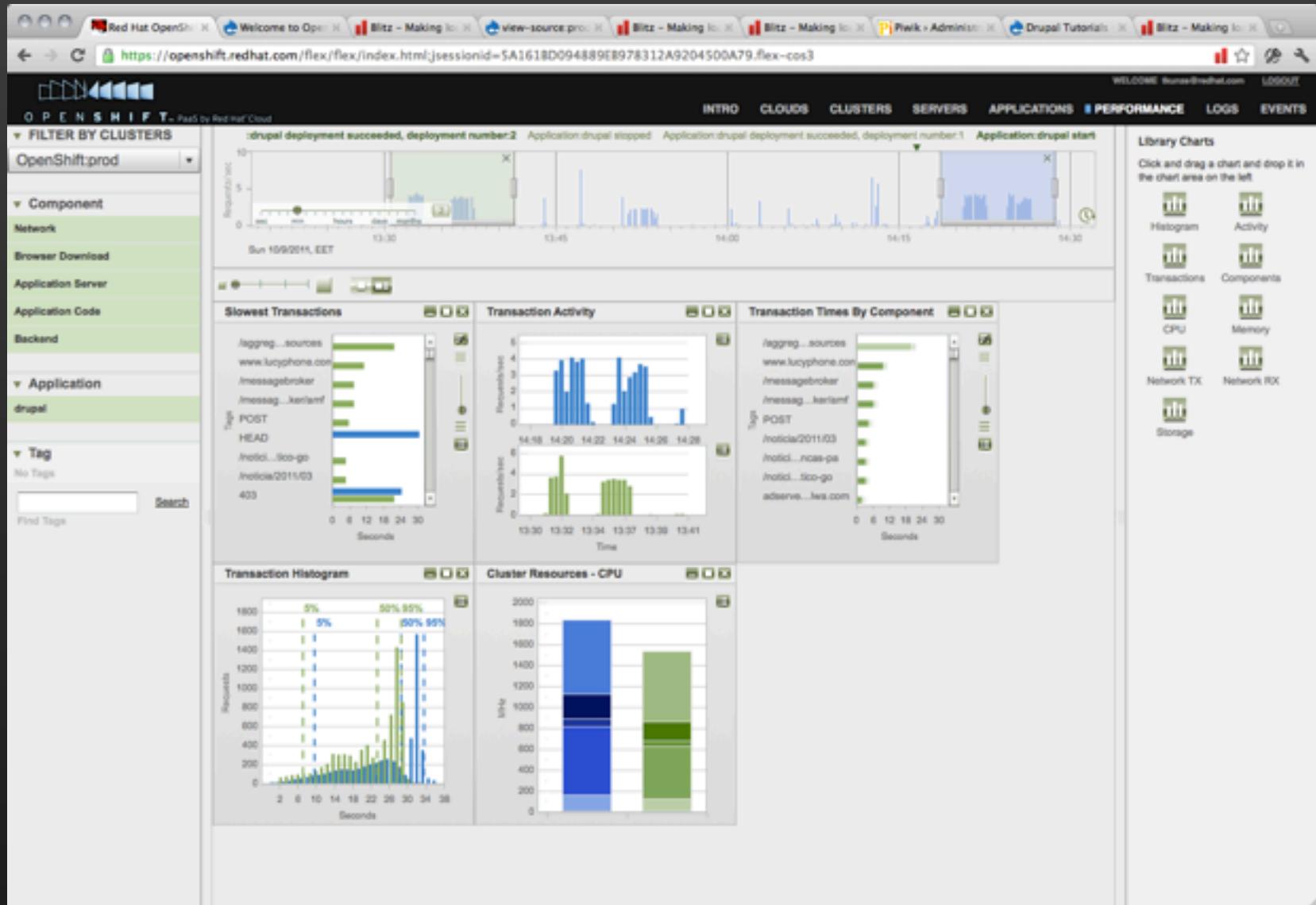
  update_task_list($output);
  return $output;
}

function update_script_selection_form($form, &$form_state) {
  // ...
}
```

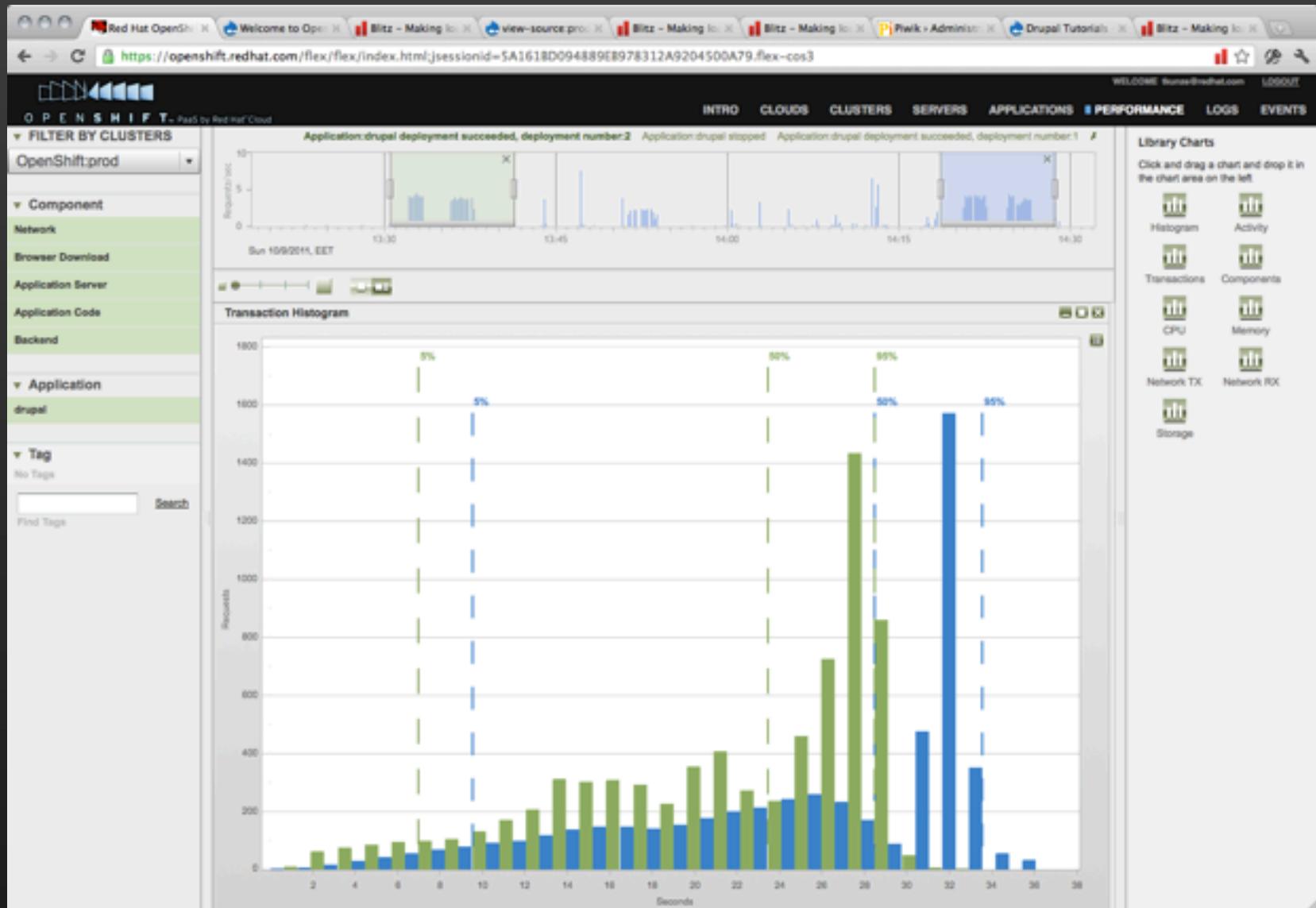
The Application

A screenshot of a web browser displaying a Drupal-based application. The URL in the address bar is `prod403056487.prod.rhcloud.com`. The page title is "OpenShift Flex Drupal Sample App". The main content area displays the message "Welcome to OpenShift Flex Drupal Sample App" and "No front page content has been created yet.", with a link to "Add new content". On the left, there is a sidebar titled "Navigation" containing links for "Add content" and "Feed aggregator". The top navigation bar includes links for Dashboard, Content, Structure, Appearance, People, Modules, Configuration, Reports, Help, and a user account section. The browser interface shows multiple tabs open in the background.

Performance Dashboard



Performance: SLA View



Log Screen

Red Hat OpenShift | Welcome to OpenShift | Blitz - Making it work | view-source proxy | Blitz - Making it work | Blitz - Making it work | Pivotal Administer | Drupal Tutorials | Blitz - Making it work

<https://openshift.redhat.com/flex/flex/index.html;jsessionid=5A1618D094889E8978312A9204500A79.flex-cos3>

WELCOME: source@redhat.com LOGOUT

OPENSHIFT - Powered by Red Hat Cloud

Search String

application:drupal deployment succeeded, deployment number:2 Application:drupal stopped Application:drupal deployment succeeded, deployment number:1 Application:drupal started Application:drupal started

Records/sec

12:45 13:00 13:15 13:30 13:45 14:00 14:15 14:30 14:45 15:00 15:15 15:30

Cluster: OpenShift:prod

Application: drupal

Severity: Emergency, Alert, Fatal/Critical, Error, Warning, Notice, Info, Debug

Component: Web Server, Application Server, Application Code, Miscellaneous

Cluster Member: 50.16.128.115

INTRO CLOUDS CLUSTERS SERVERS APPLICATIONS PERFORMANCE LOGS EVENTS

Collection Time Application Component Detail Select Columns

10/9/11 15:19:15 drupal Web Server 10.198.51.242 - - [09/Oct/2011:09:19:15 -0400] "GET /www/delivery/a.jsp?zoneId=165&cb=427550319504&charset=gb2312&loc=http%3a//www.ortaboo.com/ads/banner300x250.php HTTP/1.1" 404 8248

10/9/11 15:19:15 drupal Application Server 127.0.0.1 - - [09/Oct/2011:09:19:15 -0400] "GET /www/delivery/a.jsp?zoneId=165&cb=427550319504&charset=gb2312&loc=http%3a//www.ortaboo.com/ads/banner300x250.php HTTP/1.1" 404 8248

10/9/11 15:23:57 drupal Web Server 10.198.51.242 - - [09/Oct/2011:09:23:57 -0400] "GET / HTTP/1.1" 200 8299

10/9/11 15:23:57 drupal Application Server 127.0.0.1 - - [09/Oct/2011:09:23:57 -0400] "GET / HTTP/1.1" 200 8299

10/9/11 15:23:57 drupal Web Server 10.198.51.242 - - [09/Oct/2011:09:23:57 -0400] "GET / HTTP/1.1" 200 8299

10/9/11 15:23:57 drupal Application Server 127.0.0.1 - - [09/Oct/2011:09:23:57 -0400] "GET / HTTP/1.1" 200 8299

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:31 -0400] "GET / HTTP/1.1" 200 16297

10/9/11 15:24:32 drupal Application Server 127.0.0.1 - - [09/Oct/2011:09:24:31 -0400] "GET / HTTP/1.1" 200 16297

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/system/system.base.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/system/system.menus.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/system/system.messages.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/system/system.theme.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /misc/ui/jquery.ui.core.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /misc/ui/jquery.ui.theme.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/overlay/overlay-parent.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/contextual/contextual.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/aggregator/aggregator.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/comment/comment.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/field/theme/field.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/node/node.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/search/search.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/user/user.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/shortcut/shortcut.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:32 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:32 -0400] "GET /modules/toolbar/toolbar.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:33 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:33 -0400] "GET /themes/bartik/css/Layout.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:33 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:33 -0400] "GET /themes/bartik/css/style.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:33 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:33 -0400] "GET /themes/bartik/css/colors.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:33 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:33 -0400] "GET /themes/bartik/css/print.css?lsoaoz HTTP/1.1" 304 -

10/9/11 15:24:33 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:33 -0400] "GET /misc/jquery.js?v=1.4.4 HTTP/1.1" 304 -

10/9/11 15:24:33 drupal Web Server 178.26.105.128 - - [09/Oct/2011:09:24:33 -0400] "GET /misc/jquery.js?v=1.4.4 HTTP/1.1" 304 -

First Load Test

Red Hat OpenShift | Sources | OpenShift | Blitz - Making it work | view-source | Blitz - Making it work | Blitz - Making it work | Drupal Administration | Drupal Tutorials | Blitz - Making it work

blitz.io/play

BLITZ 1K plan - expires in 3 weeks

PRICING | CUSTOMERS | SUPPORT | SETTINGS | LOGOUT 

LOAD TEST YOUR SITE, API, IPHONE®, ANDROID® APPS

RESPONSE TIME

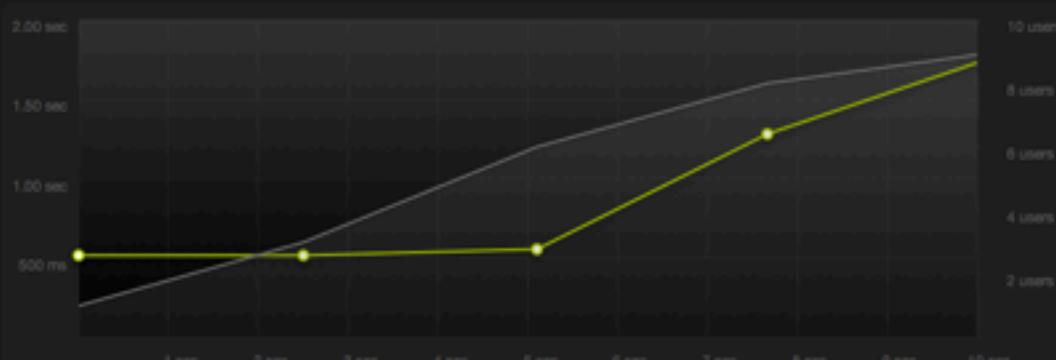
▼ -r virginia -p 1-10:10 -T 2000 -b has_js=1 -b SESSIONS

RUN ! **1.78 SEC FROM VIRGINIA**

Rush Highlights

15 hits, 4 timeouts - Maybe you should increase the timeout?

Response Times



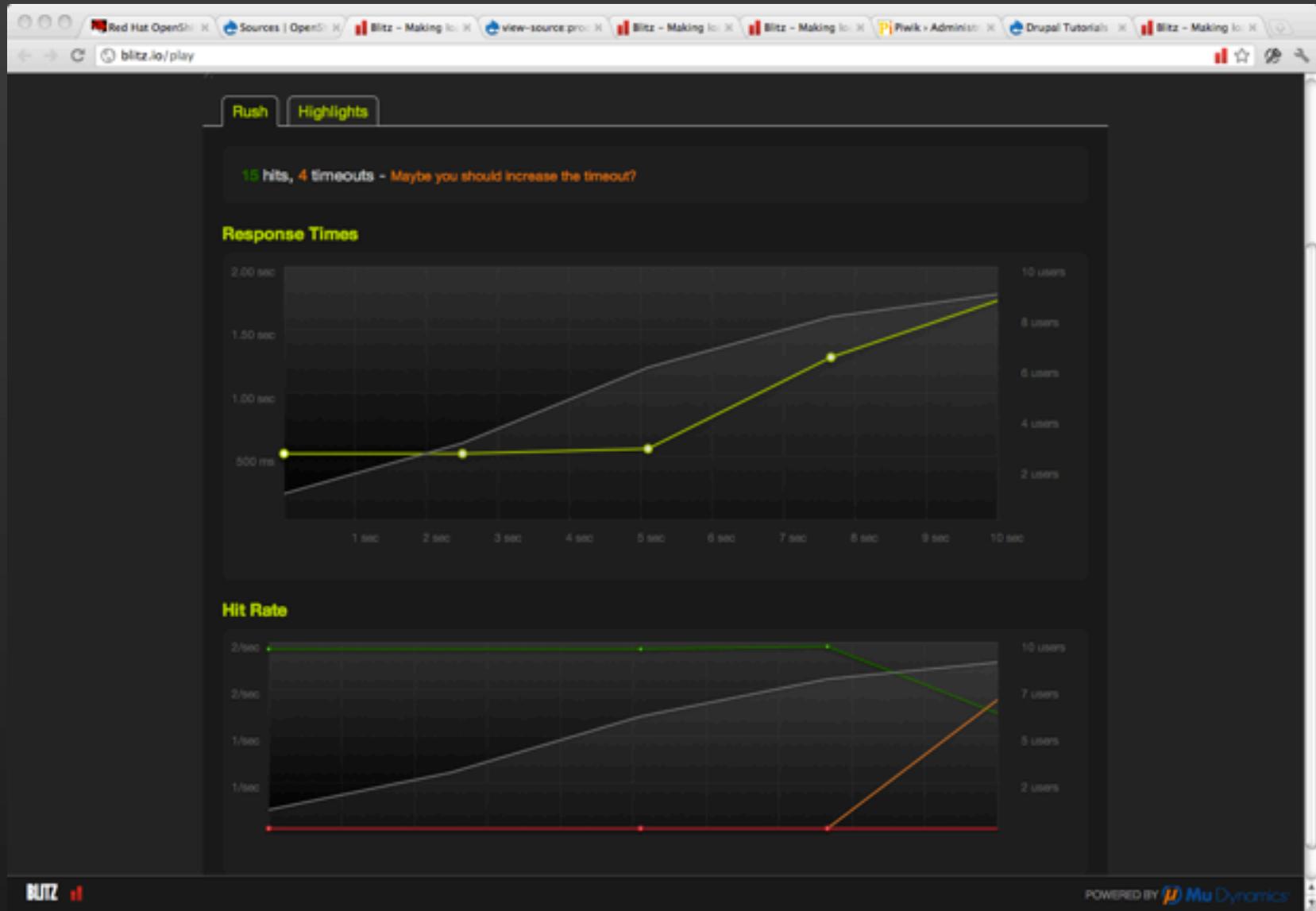
Users	Response Time (ms)
1	500 ms
2	500 ms
3	500 ms
7	1.300 sec

Hit Rate

0 users | 10 users

BLITZ  POWERED BY Mu Dynamics

First Load Test (cont'd)



First Load Test (cont'd)

Red Hat OpenShift | Sources | OpenShift | Blitz - Making it work | view-source | pro | Blitz - Making it work | Blitz - Making it work | Punkt - Administer | Drupal Tutorials | Blitz - Making it work

blitz.io/play

BLITZ

1K plan - expires in 3 weeks

PRICING | CUSTOMERS | SUPPORT | SETTINGS | LIGHT | TOBIAS

LOAD TEST YOUR SITE, API, IPHONE®, ANDROID® APPS

▼ -r virginia -p 1-10:10 -T 2000 -b has_js=1 -b SESSION

RUN ! **1.78 SEC FROM VIRGINIA**

Rush Highlights

SUMMARY

This **rush** generated 15 successful hits in 10.00 seconds and we transferred 308.19 KB of data in and out of your app. The average hit rate of 1.39/second translates to about 120,075 hits/day.

The average response time of 1.18 seconds is considerably higher than most other sites that are built to scale out. Response times less than 250 ms are what the cool kids strive for.

You got bigger problems though: 21.05% of the users during this **rush** experienced timeouts or errors!

TIMEOUTS

The first timeout happened at 10.27 seconds into the test when the number of concurrent users was at 9. Looks like you've been rushing with a timeout of 2.00 seconds. Timeouts tend to increase with concurrency if you have lock contention of sorts. You might want to think about in-memory caching using [Redis](#), [memcached](#) or [varnish](#) to return stale data for a period of time and asynchronously refresh this data.

Category	Percentage
Hits	78.95%
Errors	21.05%
Timeouts	21.05%

blitz

POWERED BY Mu Dynamics

Load Profile (@ 5s Timeout)



Load Profile (cont'd)



Auto-Scaling

(Ex: Amazon)

1. as-create-launch-config ...
2. as-create-auto-scaling-group ...
3. as-put-scaling-policy ... (up and down)
4. mon-put-metric-alarm ...
5. elb-create-elb ...
6. elb-configure-healthcheck ...

Auto-Scaling

The screenshot shows the Red Hat OpenShift Flex web interface. The URL is <https://openshift.redhat.com/flex/flex/index.html>. The page title is "Red Hat OpenShift Flex". The top navigation bar includes links for "INTRO", "CLOUDS", "CLUSTERS" (which is highlighted in blue), "SERVERS", "APPLICATIONS", "PERFORMANCE", "LOGS", and "EVENTS". The user is logged in as "source@redhat.com".

The main content area shows a cluster named "prod : EDIT". There are tabs for "OVERVIEW", "AUTO-SCALING" (which is selected and highlighted in yellow), "DATABASE", and "EMAIL SETTINGS". A message states: "All servers in the cluster will use the settings configured here."

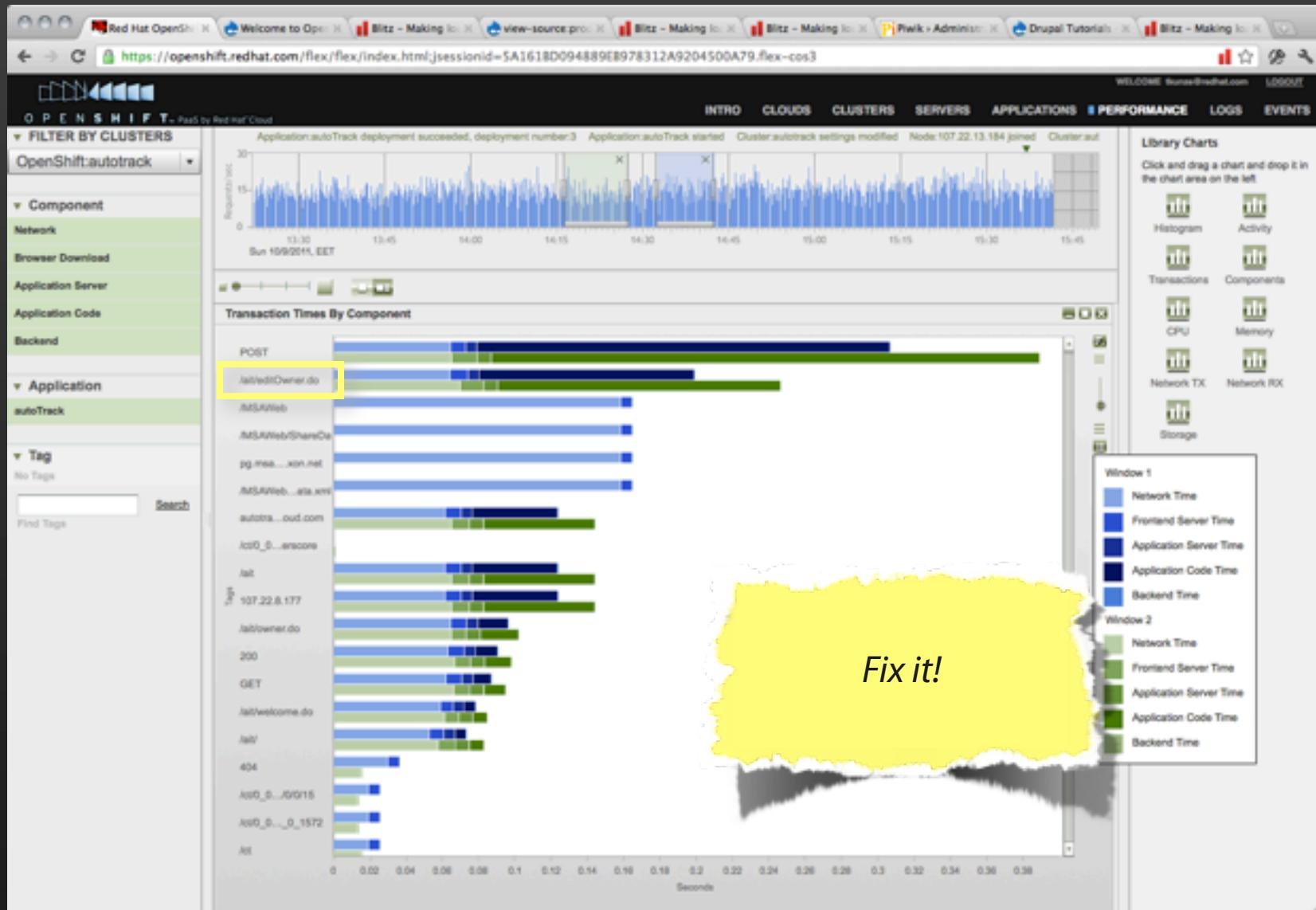
A modal dialog box titled "Auto-Scale Settings" contains the following information:

- A note: "Clusters created through our Free Flex program are limited to 1 Cloud Server. If you'd like to evaluate the auto-scaling capabilities of OpenShift Flex, contact us at openshift@redhat.com to increase the number of Cloud Servers available."
- A checked checkbox labeled "Enable Auto-Scaling".
- Input fields for "MINIMUM CLOUD SERVERS" (set to 1) and "MAXIMUM CLOUD SERVERS" (set to 4).
- A section titled "Scaling Threshold Configuration" with a dropdown menu set to "Requests per Node".
- Scaling rules:
 - "Scale up if Requests greater than requests / second for minutes (evaluated every 10 minutes)"
 - "Scale down if Requests less than requests / second for minutes (evaluated every 20 minutes)"
- Buttons at the bottom: "CANCEL" and "SAVE" (highlighted in yellow).

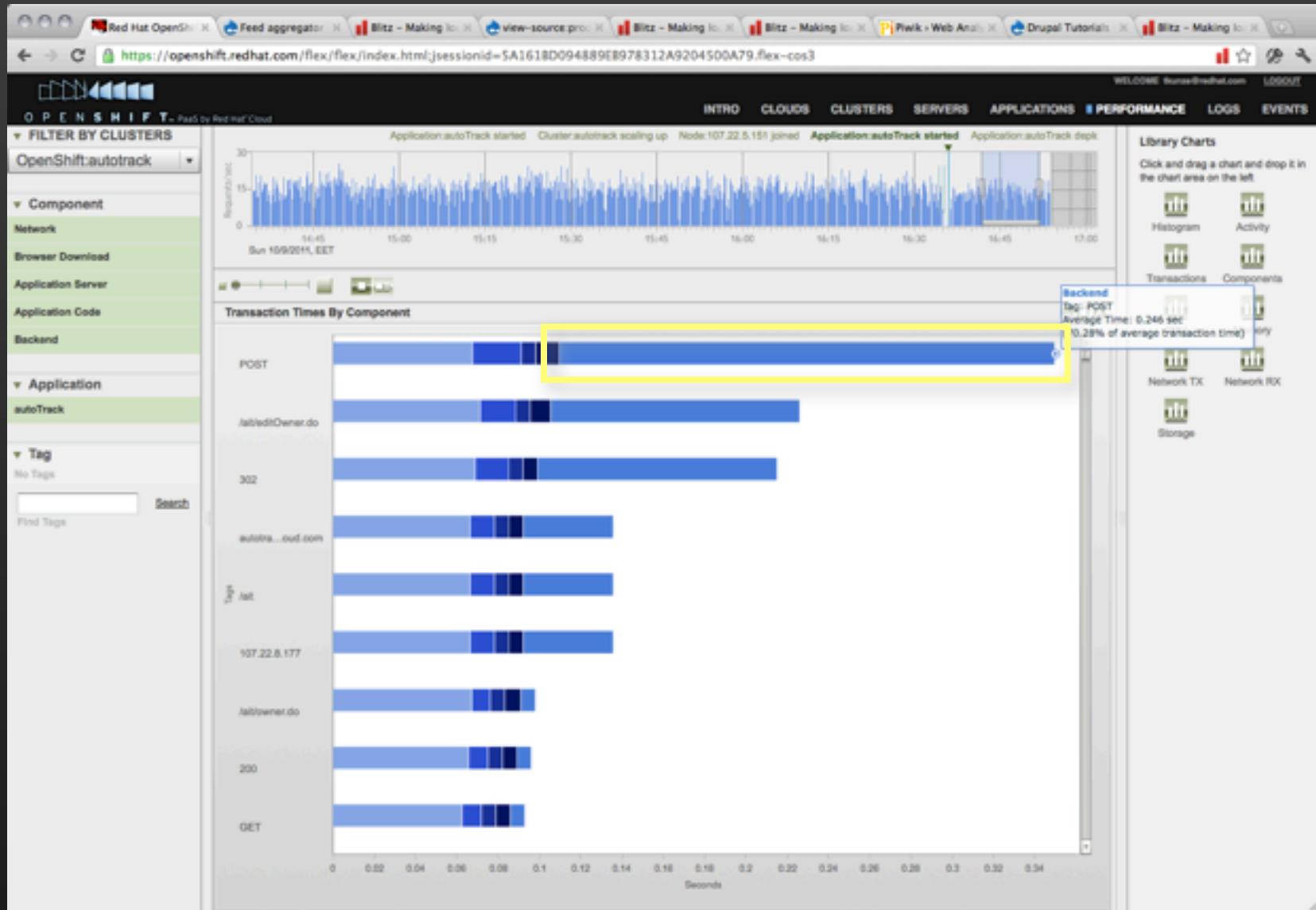
Spot Bad Code



Spot Bad Code



Slow Backend



Got Memcached?

The screenshot shows the OpenShift web interface for managing applications. The URL is <https://openshift.redhat.com/flex/flex/index.html;jsessionid=SA1618D094889E8978312A9204500A79.flex-cos3>. The application name is 'drupal'. The 'APPLICATION COMPONENTS' tab is selected. The 'Memcached' component is checked and highlighted with a yellow box.

APPLICATION COMPONENTS

Application Type: PHP

Web Server: Apache HTTP Server (Web Tier) (www-static.apache2_2.2.3-47_i686.vpm)

Application Server Version: Apache HTTP Server (Application Tier) (www-dynamic.apache2_2.2.3-43_i686.vpm)

Language Version: PHP 5.2.10 (php-5.2.10_5.2.10-21_i686.vpm)

Database: MySQL Server 5.5.13 (mysql-server_5.5.13-3_i686.vpm)

This application sends email (you must use the Settings tab to configure the cluster to send email)

Memcached 1.4.5(memcached-1.4.5_1.4.5-4_i686.vpm)

- Memcached 1.4.5(memcached-1.4.5_1.4.5-4_i686.vpm)
- membase server 1.7.0(membase-server_1.7.0-0_i686.vpm)
- MongoDB 1.8.1 32 bit(mongodb-1.8_1.8.1-5_i686.vpm)
- Infinispan Data Grid Platform 5.0.0(infinispan-5.0.0_5.0.0-4_all.vpm)
- Red Hat Enterprise MRG Messaging 2.0(mrg-messaging_2.0-5_i686.vpm)
- Zend Framework 1.10.8(zend-framework-1.10.8_1.10.8-2_i686.vpm)

CANCEL **SAVE**

DB too Slow?

The screenshot shows the OpenShift Performance dashboard. On the left, a sidebar lists filters: 'FILTER BY CLUSTERS' (OpenShift:autotrack), 'Component' (Network, Browser Download, Application Server, Application Code, Backend), 'Application' (autoTrack), and 'Tag' (No Tags). A search bar and a 'Find Tags' button are also present.

The main area features a performance timeline chart from Sunday, October 9, 2011, at 14:45 to 17:00. The chart displays various system events and metrics. A specific event is highlighted with a yellow box:

Backend Call Times
Transaction: POST
commit
UPDATE ... E id=37
UPDATE ... E id=39
UPDATE ... E id=38
UPDATE ... E id=39
UPDATE ... E id=39
UPDATE ... E id=36
UPDATE ... E id=39
UPDATE ... E id=39
UPDATE ... E id=37
UPDATE ... E id=38
SET autocommit=0
SET autocommit=1
UPDATE ... E id=37
UPDATE ... E id=37
UPDATE ... E id=39
UPDATE ... E id=38
UPDATE ... E id=36
UPDATE ... E id=37
UPDATE ... E id=39
UPDATE ... E id=36
UPDATE ... E id=36
UPDATE ... E id=37
UPDATE ... E id=37

A tooltip for the UPDATE ... E id=37 transaction shows the SQL query: `UPDATE owners SET first_name='John', last_name='Doe', address='P.O. Box 779', city='Redwood City', telephone='6508881212' WHERE id=37`. It also indicates a Transaction Count of 19 and an Average Time/Transaction of 0.036 sec.

To the right, a 'Library Charts' section offers icons for various monitoring categories: Histogram, Activity, Transactions, Components, CPU, Memory, Network TX, Network RX, and Storage. The 'Transactions' icon is highlighted.

Maybe use MongoDB?

The screenshot shows the 'COMPONENTS' tab of the Red Hat OpenShift application configuration interface. The 'APPLICATION NAME' is 'drupal'. The 'COMPONENTS' section lists several PHP extensions and components. One component, 'MongoDB 1.8.1 32 bit(mongodb-1.8_1.8.1-5_i686.rpm)', is highlighted with a yellow box and has a checked checkbox next to it, indicating it is selected or installed.

Component	Status
MongoDB 1.8.1 32 bit(mongodb-1.8_1.8.1-5_i686.rpm)	Selected
memcached.so	Unselected
memcache.so	Unselected
mmhash.so	Unselected
mongo.so	Selected
mysql.so	Unselected
mysqli.so	Selected
mcrypt.so	Unselected
memcached.so	Unselected
memcache.so	Unselected
pdo_mysql.so	Unselected
pdo_pgsql.so	Unselected
pdo.so	Unselected
pdo_sqlite.so	Unselected
pgsql.so	Unselected
phar.so	Unselected
posix.so	Unselected
pspell.so	Unselected
radius.so	Unselected
recode.so	Unselected
snmp.so	Unselected
zlib.so	Unselected

The screenshot shows the 'COMPONENTS' tab of the Red Hat OpenShift application configuration interface for the 'drupal' application. The 'COMPONENTS' section lists various PHP extensions. Several components are highlighted with yellow boxes and have checked checkboxes next to them, indicating they are selected or installed. These include mongo.so, mysqli.so, and pdo_mysql.so.

Component	Status
mcrypt.so	Unselected
memcached.so	Unselected
memcache.so	Unselected
mmhash.so	Unselected
mongo.so	Selected
mysql.so	Unselected
mysqli.so	Selected
mcrypt.so	Unselected
memcached.so	Unselected
memcache.so	Unselected
pdo_mysql.so	Selected
pdo_pgsql.so	Unselected
pdo.so	Unselected
pdo_sqlite.so	Unselected
pgsql.so	Unselected
phar.so	Unselected
posix.so	Unselected
pspell.so	Unselected
radius.so	Unselected
recode.so	Unselected
snmp.so	Unselected
zlib.so	Unselected

Maybe use MongoDB?

The image displays two side-by-side screenshots of application configuration interfaces, likely from Red Hat OpenShift. The left screenshot shows a list of 'Other Components' with 'MongoDB 1.8.1 32 bit(mongodb-1.8_1.8.1)' checked and highlighted with a yellow box. The right screenshot shows a list of PHP extension files with 'pdo_mysql.so' checked and highlighted with a yellow box. A large yellow speech bubble is overlaid on the left side, containing the text: 'Or use MySQL master/slave or MongoDB sharding(replicas (coming soon)).'

Or use MySQL master/slave or
MongoDB sharding/replicas
(coming soon).

Disaster Recovery/Variants

APPLICATION LIST

LAST REFRESHED: 03:03:56 PM

NAME (click to configure)	CLOUD	CLUSTER	VERSION	DEPLOYMENT	STATUS	ACTIONS
MyDrupal	OpenShift	test	7.8	0	Created	START STOP RESTART EXPORT DELETE COPY TO...
phwik	OpenShift	test	1.5.1	3	Started	START STOP RESTART EXPORT DELETE COPY TO...
mongo	OpenShift	test	1	10	Stopped	START STOP RESTART EXPORT DELETE COPY TO...
autoTrack	OpenShift	autotrack	1.0.0	3	Started	START STOP RESTART EXPORT DELETE COPY TO...
drupal	OpenShift	prod	7.8	2	Started	START STOP RESTART EXPORT DELETE COPY TO...

Application Migration

The screenshot shows the OpenShift application management interface. A modal dialog titled "Migrate Application" is open in the foreground, prompting the user to enter cluster information for migration. The dialog contains fields for "Cluster IP" (50.234.112.39) and "Cluster Password" (redacted). The background shows a list of applications in the "APPLICATION LIST" section, including "flex", "minion", "autoTrack", and "druid". The "flex" application is currently selected, indicated by a yellow highlight.

APPLICATION LIST

FILTER BY CLUSTERS

NAME (link to configure)	CLOUD	CLUSTER	VERSION	DEPLOYMENT	STATUS	ACTIONS
flex	OpenShift	user	1.5.1	3	Started	<button>STOP</button> <button>RESUME</button> <button>REPORT</button> <button>DELETE</button> <button>COPY TO...</button>
minion	OpenShift	user	1.5.1	3	Started	<button>STOP</button> <button>RESUME</button> <button>REPORT</button> <button>DELETE</button> <button>COPY TO...</button>
autoTrack	OpenShift	autoTrack	1.5.1	3	Started	<button>STOP</button> <button>RESUME</button> <button>REPORT</button> <button>DELETE</button> <button>COPY TO...</button>
druid	OpenShift	prod	1.5.1	3	Started	<button>STOP</button> <button>RESUME</button> <button>REPORT</button> <button>DELETE</button> <button>COPY TO...</button>

Migrate Application

Enter the cluster information where you want to copy this application.

Cluster IP: 50.234.112.39

Cluster Password: [REDACTED]

Reset Copy

LAST REFRESHED: 05-18-13 PM

INTRO CLOUDS CLUSTERS SERVERS APPLICATIONS PERFORMANCE LOGS EVENTS ADD APPLICATION

Disaster Recovery/Variants

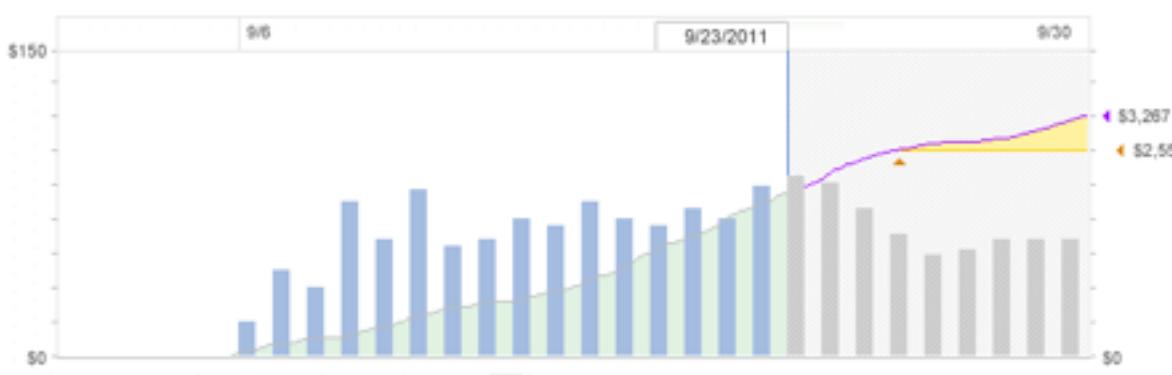
The screenshot shows the OpenShift application list interface. On the left, there's a sidebar with a 'FILTER BY CLUSTERS' dropdown containing 'OpenShift:test', 'OpenShift:autotrack', and 'OpenShift:prod'. The 'OpenShift:prod' option is highlighted with a green background. The main area displays a table of applications:

NAME (click to configure)	CLOUD	CLUSTER	VERSION	DEPLOYMENT	STATUS	ACTIONS
MyDrupal	OpenShift	test	7.8	0	Created	<button>START</button> <button>STOP</button> <button>RESTART</button> <button>EXPORT</button> <button>DELETE</button> <button>COPY TO...</button>
phwik	OpenShift	test	1.5.1	3	Started	<button>START</button> <button>STOP</button> <button>RESTART</button> <button>EXPORT</button> <button>DELETE</button> <button>COPY TO...</button>
monog	OpenShift	test	1	10	Stopped	<button>START</button> <button>STOP</button> <button>RESTART</button> <button>EXPORT</button> <button>DELETE</button> <button>COPY TO...</button>
autoTrack	OpenShift	autotrack	1.0.0	3	Started	<button>START</button> <button>STOP</button> <button>RESTART</button> <button>EXPORT</button> <button>DELETE</button> <button>COPY TO...</button>
drupal	OpenShift	prod	7.8	2	Started	<button>START</button> <button>STOP</button> <button>RESTART</button> <button>EXPORT</button> <button>DELETE</button> <button>COPY TO...</button>

A yellow box highlights the 'DELETE' and 'COPY TO...' buttons in the actions column for each row. Below the table, a yellow speech bubble contains the text: 'It's cheap & easy to clone environments!'

Alerting: Budget Control

(Coming in November)

Dev-cluster		STARTED	CLUSTER SIZE	MIN 2	MAX 10	CLUSTER COST ESTIMATOR i
Cloud9 (Amazon EC2) US West						APPROXIMATE COST IN US\$.
PROVIDER INSTANCE			INSTANCE COST	CLUSTER INSTANCE COST		
Small	32 BIT	1 CORE(S)	\$124 /MONTH	\$372 /MONTH		
DISK SIZE	LOAD BALANCER		EST. USAGE COST	EST. CLUSTER USAGE COST		
10 GB	<input checked="" type="checkbox"/> (devcluster12345678.amazon.com)		\$2 /MONTH	\$4 /MONTH		
September 2011 ▼		SEP. 6 - SEP. 31	DATA OUT	645 GB	\$1,036 i	
SEPTEMBER 23, 2011						PROJECT COST \$3,267 /MONTH
TOTAL SPENT	\$1891		\$3,267			
BUDGET	71%		\$2,550 PRORATED			
						\$2,550 PRORATED (SEP. 6-30)
						BUDGET OVERRUN WARNINGS
						DAILY ▾
						BUDGET ENFORCEMENT
						<input type="checkbox"/> SCALE TO FIT BUDGET
						<input checked="" type="checkbox"/> STOP CLUSTER IF NECESSARY
						<input checked="" type="checkbox"/> SEND NOTIFICATION

Future

OpenShift:

- More Alerting

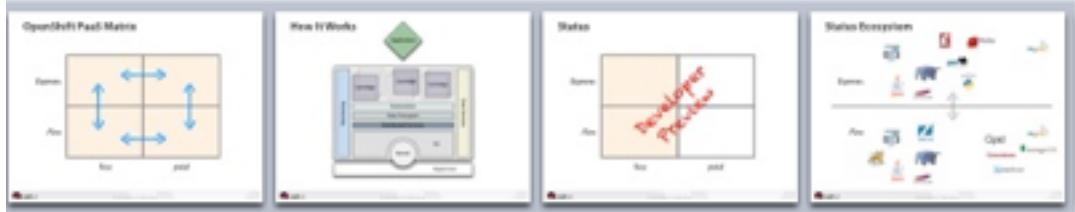
Integrations:

- Static requests drowning out content creation: CDN
- Geographic Regions slow: Geo-aware site acceleration



Summary

Recapitulation



Application adaptations:

- Code (e.g. optimizations, bugs)
- Middleware (e.g. switch data store)
- Architecture (e.g. add caching layer)

Processes:

- Automation (e.g. auto-scaling, "auto"-monitoring)
- Alerts (e.g. budgeting)

Conclusion

Use a PaaS:

- Because the stack is undifferentiated
- The right abstraction matters
- Architecture doesn't scale
 - Expect changes
 - Make sure changes are cheap

Thanks!

@openshift

<http://openshift.com/>

Tobias Kunze <tkunze@redhat.com>

@tkunze

