



SpringSource, VMware and The Enterprise Java Cloud

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Agenda



- Is Cloud Real?
- Definitions
 - What does cloud mean in practice?
 - Some surprising impacts
- Goals
- SpringSource/VMware solutions
 - SpringSource/VMware synergy
 - SpringSource Cloud Foundry

Is Cloud Real?



The interesting thing about cloud computing is that we've redefined cloud computing to include everything that we already do. I can't think of anything that isn't cloud computing with all of these announcements. The computer industry is the only industry that is more fashion-driven than women's fashion. Maybe I'm an idiot, but I have no idea what anyone is talking about. What is it? It's complete gibberish. It's insane. When is this idiocy going to stop?

Is Cloud Evil?

- Profoundly changes how software is distributed
- Stallman, AGPL reaction



Richard Stallman, founder of the Free Software Foundation, stated that cloud computing "was simply a trap aimed at forcing more people to buy into locked, proprietary systems that would cost them more and more over time"

Is Cloud Beneficial?



Definitions: Four Essential Characteristics



Abstracted

- Applications are abstracted away from underlying resources
- Typically virtualized from hardware

Integrated

- Components decided for you in order to fulfill a need

Dynamically scalable

- Dynamic provisioning of resources without users needing to over-provision to handle peak load

Consumed as a service

- Self-service model lowers barriers to moving applications into production
- Consumption-based billing

What Cloud is *Not*— But can build on



Grid computing:

- Using a cluster of networked computers to act together to accomplish a task

Utility computing:

- Packaging compute resources such as CPU or storage as a metered service like electricity

What Cloud *May* Be



PaaS

- Platform as a Service
- Cloud may be a PaaS, but need not be
- A PaaS is
 - Prescriptive/opinionated
 - Complete – self-contained

Cloud Applications
SaaS

Cloud Platforms
PaaS

Cloud Infrastructure
IaaS

Clouds come in two flavors



Internal

"On premise" at an enterprise

The diagram for Internal clouds consists of a green circle containing the word "Internal" in white text. To its right is a light green rectangular box with a fine grid pattern containing the text "On premise" at an enterprise in black text.

Public

Hosted and operated by a third party "off premise"

The diagram for Public clouds consists of a green circle containing the word "Public" in white text. To its right is a light green rectangular box with a fine grid pattern containing the text "Hosted and operated by a third party" off premise in black text.

Public vs Internal Cloud



- Public cloud gets most attention
 - Sexier
 - More technology choices available
 - EC2
 - Google App Engine
- But is of interest primarily to small and medium businesses and at a departmental level
 - Still many concerns around transitioning enterprise workloads
 - Architectural changes typically too great to migrate existing apps

...Public vs Internal Cloud



- Internal cloud (or *private* or *on-premise* cloud) is more interesting to larger organizations
 - Can be built with existing hardware
 - Keeps ownership of data
 - Still delivers key cloud benefits
 - Can manage centrally with departments as internal customers
- Technologies less mature, but progressing rapidly
 - VMware vSphere
 - IBM WebSphere CloudBurst Appliance
 - ...

Public/Internal Cloud: Key Differences



- Public cloud typically a PaaS
 - Prescriptive
 - Complete
- Internal Cloud more like a specialized appliance
 - Needs to be able to integrate with existing IT assets like databases and message queues
- Public cloud operated *for* the customer by a service provider
- Internal cloud more traditional enterprise support model

Why Cloud Makes Sense: Real Business Benefits



- Can allow more efficient use of infrastructure
 - Including move to commodity hardware
- Greener – Avoid wasting capacity

- In the long term, can help SMEs get out of the business of operating data centers altogether
 - SME = Department in a larger organization
- But also benefits for larger businesses

Perhaps The Biggest Benefit



-
- Can simplify the application lifecycle
 - Make it easier to get from developer desktop to production
 - Get out of the installation and integration game

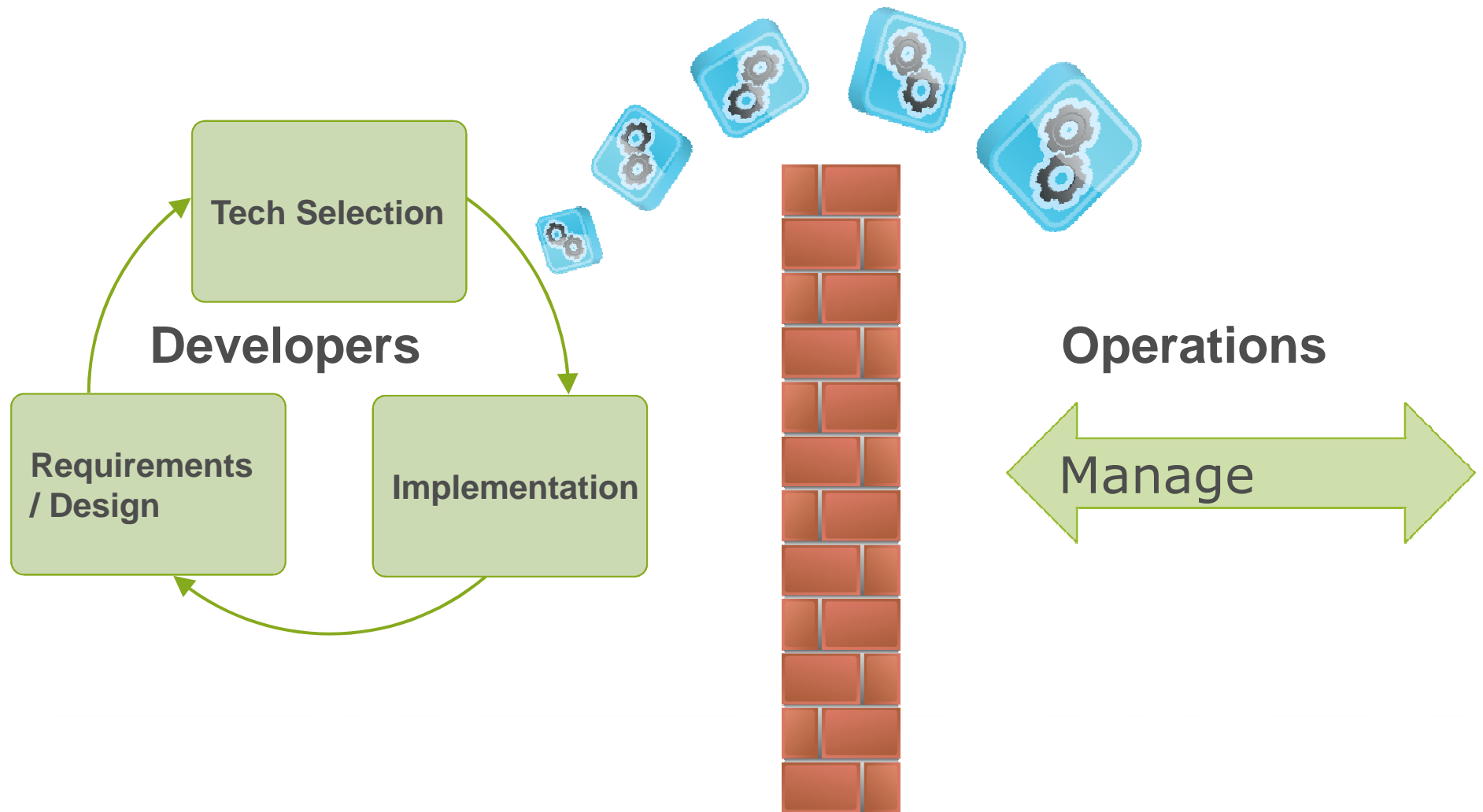
WHAT DOES CLOUD MEAN IN PRACTICE?

Consequences

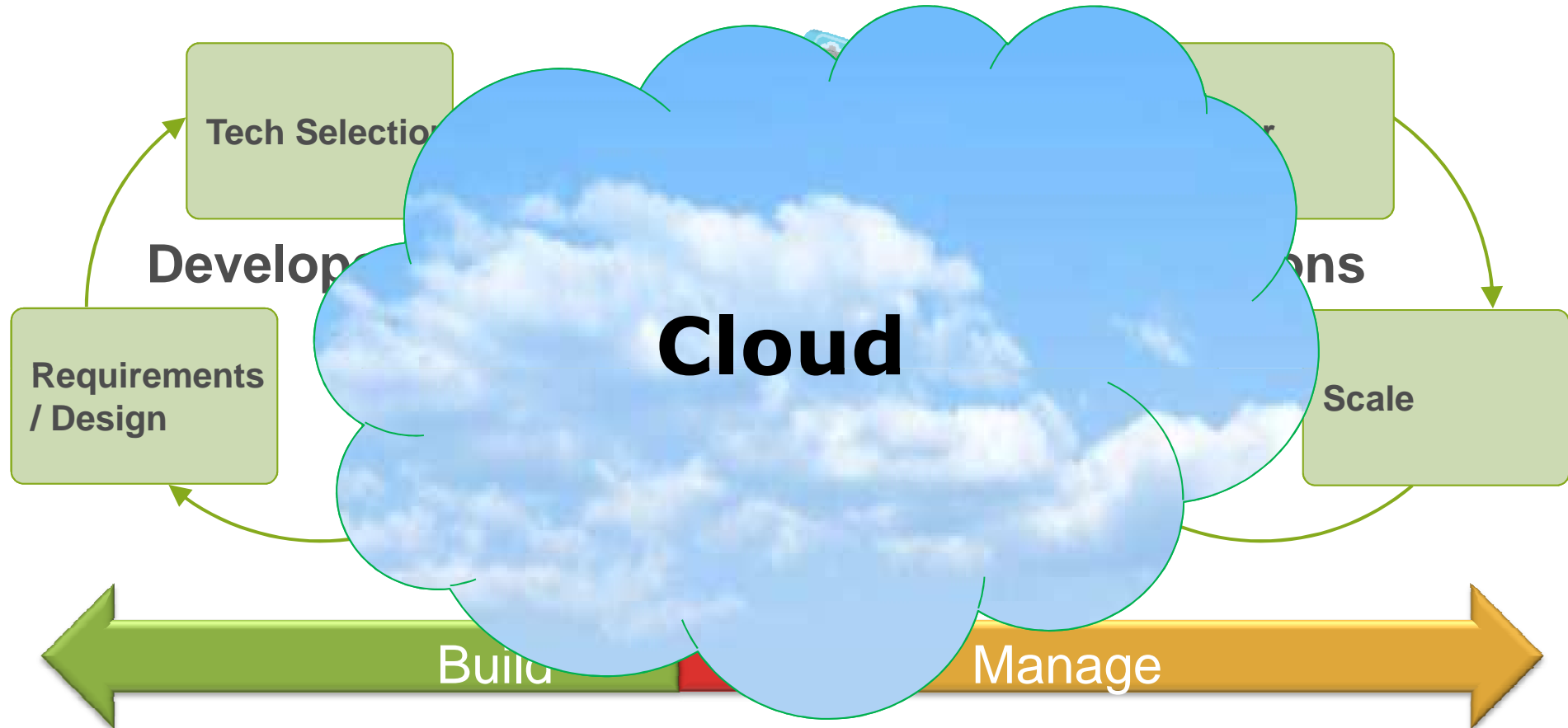


- Can circumvent organizational bureaucracy
 - Benefit in itself
 - No longer need 10 signatures to make a release
- Continues empowerment of developers
 - Less mediation between developers and operations
- ...But forces developers to take operations into account

Traditional Application Lifecycle



Cloud Application Lifecycle



...Consequences



- Will further drive trend toward virtualization
 - Has to be quicker to provision servers, easy to move workloads around
 - Need to be able to make use of existing hardware

...Some Consequences



- Hand in hand with the empowerment of developers, *frameworks* become more important
 - Especially in a PaaS approach, the surface area is the framework and programming model

VMWARE AND SPRINGSOURCE: UNDERSTANDING THE SYNERGY

Underlying Forces



- Rise of cloud computing
- Increased demand for integrated solutions
 - Ruby on Rails
 - WebSphere CloudBurst
 - ...
- Substantial customer overlap
 - Customers asking both companies for internal cloud solution

VMware and SpringSource Have Important, Complementary Building Blocks



VMware

- Underlying infrastructure
 - Most advanced internal cloud infrastructure (vSphere)
 - Newer public cloud infrastructure available to partners (vCloud Express)

SpringSource

- Development framework, large community
- Expertise in developer productivity
- Growing middleware portfolio
- Experience bridging development/ops gap
 - Hyperic

VMware Internal Cloud Technology



- vSphere provides internal “cloud OS”
- Far more than a hypervisor
 - Ability to move workloads around
 - Perform sophisticated security
 - vApp concept
 - ...



vCloud Public Cloud Infrastructure

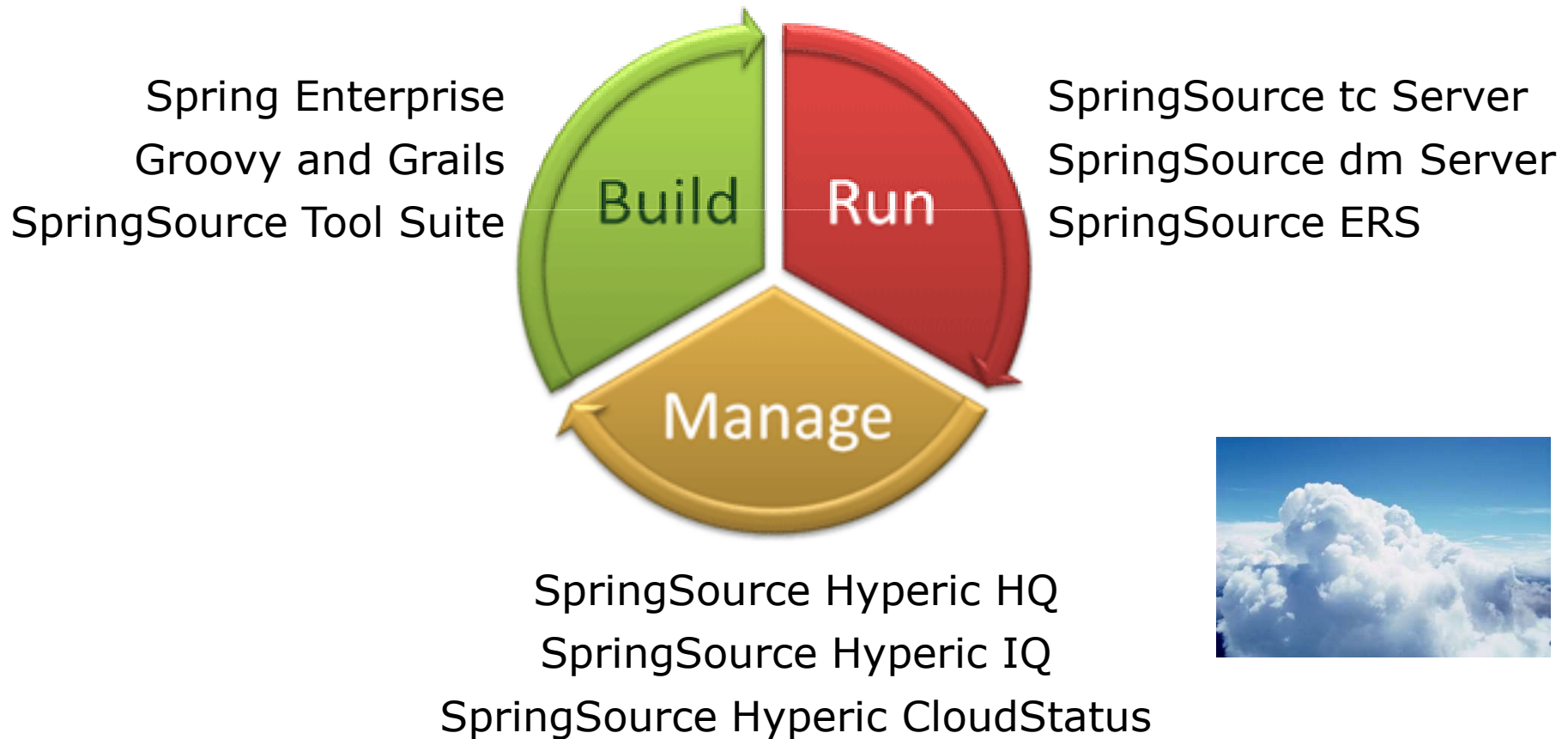


- IaaS technology based on VMware platform
- Partnerships with service providers to provide cost-effective public cloud infrastructure
 - Terremark
 - Savvis
 - AT&T...

SpringSource Integrated Approach to Application Lifecycle



Delivering the complete application lifecycle: from Developer to Datacenter



SPRINGSOURCE/VMWARE CLOUD STRATEGY

VMware/SpringSource Aims



- Primary goal of cloud initiative is to deliver **simplification**
- Consistent solution for public and private cloud
 - Give customers choice
 - Help them form long-term strategy
- Developer-led approach
 - We see a big opportunity around the JVM
 - To support Spring, Grails frameworks on VMware platform
 - But will also support other developer choices
 - We don't know all the answers

Avoiding Lock-In



1. Emphasis on open source
2. Recognition that components of a cloud solution must be able to run outside it as well
 - Not everyone is interested in cloud
 - We continue to embrace choice
 - Plenty of Spring running on WebSphere
 - SpringSource Cloud Foundry will continue to run on EC2 as well as VMware cloud technologies

Danger: Risk of Vendors Holding Customers to Ransom



- Stallman has a point
- Just when software has become more open, may be closed again
 - As closed as the mainframe
- Risk of customers being held to ransom for their data



SPRINGSOURCE CLOUD FOUNDRY

The Vision



Cloud Foundry provides the simplest and fastest platform for deploying Java web applications to the Cloud



Cloud Foundry Principles

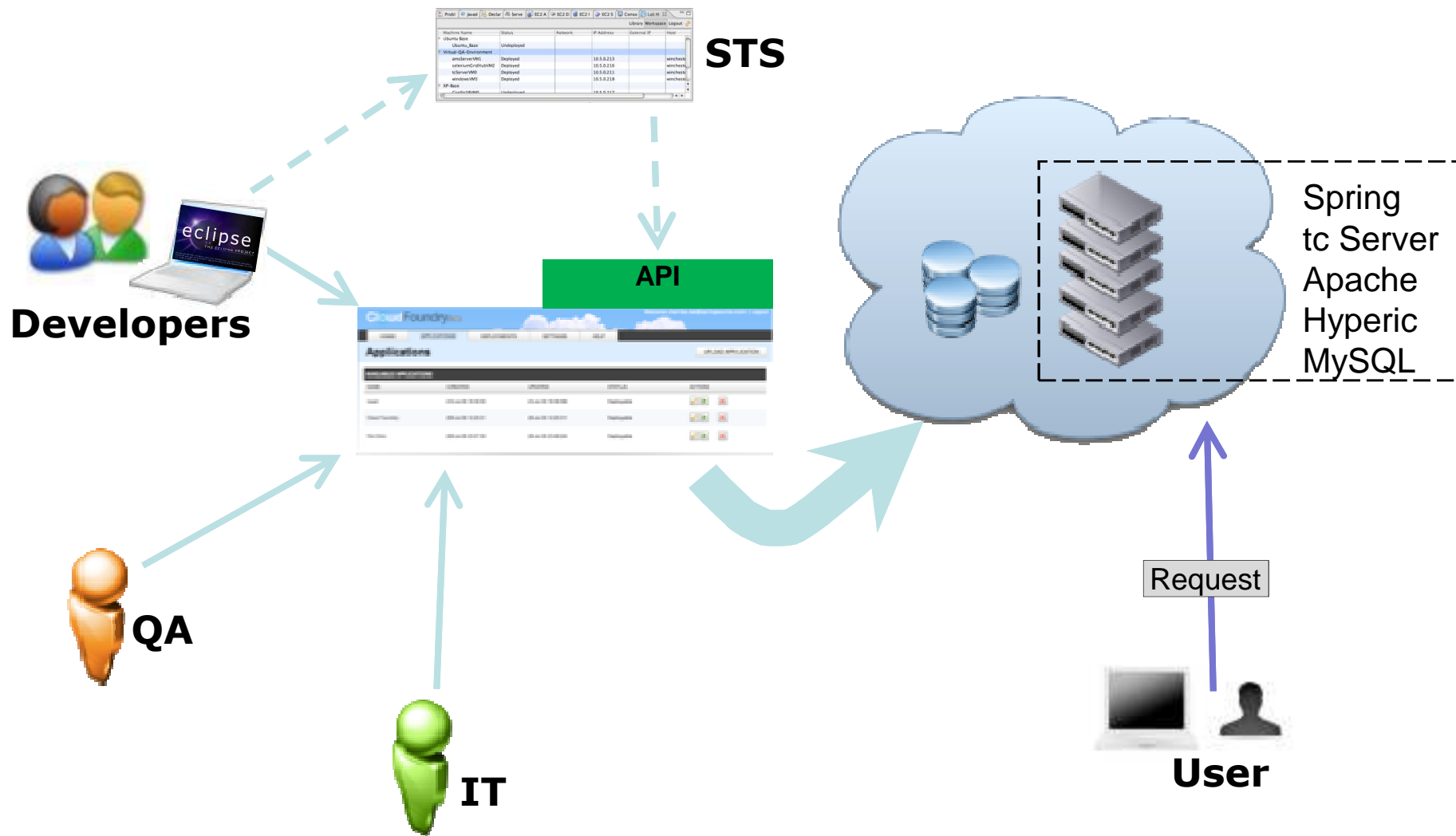


- User experience tailored to the Java developer
- Support for standard Java web applications
- Compress Java application lifecycle for developers
 - Fast & easy application deployment
 - Automated failure detection & recovery
 - Automated load monitoring & scaling
- Standard deployment topologies and components
- Enable creation of scalable applications

World's most popular Java Web application technologies delivered as a platform

- Deploy Spring, Grails and Java applications to a scalable, managed cloud environment in minutes
- No platform or technology lock-in
- Rapidly deliver business applications without operations bottlenecks
 - Productive and familiar development experience
 - Integrated monitoring and management for applications and web infrastructure
- Automatic scaling and infrastructure repair
- Pay-as-you-go pricing; consumption-based metering

Cloud Foundry Spring & Grails Applications in the Cloud



Cloud Foundry Technology



- Service is built on Cloud Tools open source project
 - <http://code.google.com/p/cloudtools/>
- Object model (written in Groovy) provides an abstraction over underlying cloud infrastructure
 - Like Spring

Joined-Up Vision



- The cloud starts at the developer desktop
 - IDE
 - SpringSource Tool Suite
 - RAD tools
 - Grails
 - Roo
- Experience as transparent for developer as possible

CloudFoundry.com Today



NAME	APPLICATION	STATUS	UPTIME	HEALTH	ALERT	COST (HR/MO)	TOTAL COST		ACTIONS
							HOURLY	MONTHLY	
ctest	RSVP	STOPPED		-	-	\$0.00 / \$0.00	\$0.10	\$72.00	
health	RSVP	STOPPED		-	-	\$0.00 / \$0.00			
Demo-1	Travel	LAUNCHED	1 week, 2 days, 12 hours, 21 minutes		-	\$0.10 / \$72.00			
demo-2	Booking	STOPPED		-	-	\$0.00 / \$0.00			

- Available on Amazon EC2
- Very few clicks to upload and deploy Java web applications
- Branded software stack
 - Apache HTTP Server
 - SpringSource tc Server
 - MySQL
- Monitor and heal/scale instances

Key Choices



- “Branded software”
 - Apache Web Server
 - SpringSource tc Server (Tomcat)
 - MySQL
- Familiar components
- Standard WAR deployment model

Consequences



Pros

- Easy to evaluate and adopt
- Preserve existing skillset
- Enables familiar approaches to persistence
- No lock-in to Cloud Foundry or even to running in a cloud

Cons

- Relational database less scalable (but more business-friendly) than alternatives
 - But should not confuse scaling the *cloud* with scaling an *application* within it
- Data access approach may constrain multi-tenancy

Customer Success with Cloud Foundry



“Cloud Foundry really solves many of the hosting headaches I have been having with traditional hosting. Automatic scaling, continuous backup and fantastic support enables running a worry-free online business.”

Andrew Junkuhn, CEO, 1234Cast.com

“Dramatic cost reduction in both cost of server space and cost of labor for moretasteleague.com (MillerCoors site that ran during football season) and theuniformproject.com (social media site).”

Dustin Whitney, Principal Software Engineer, Digitas

Future Goals



Multi-cloud support

Enterprise level SLA

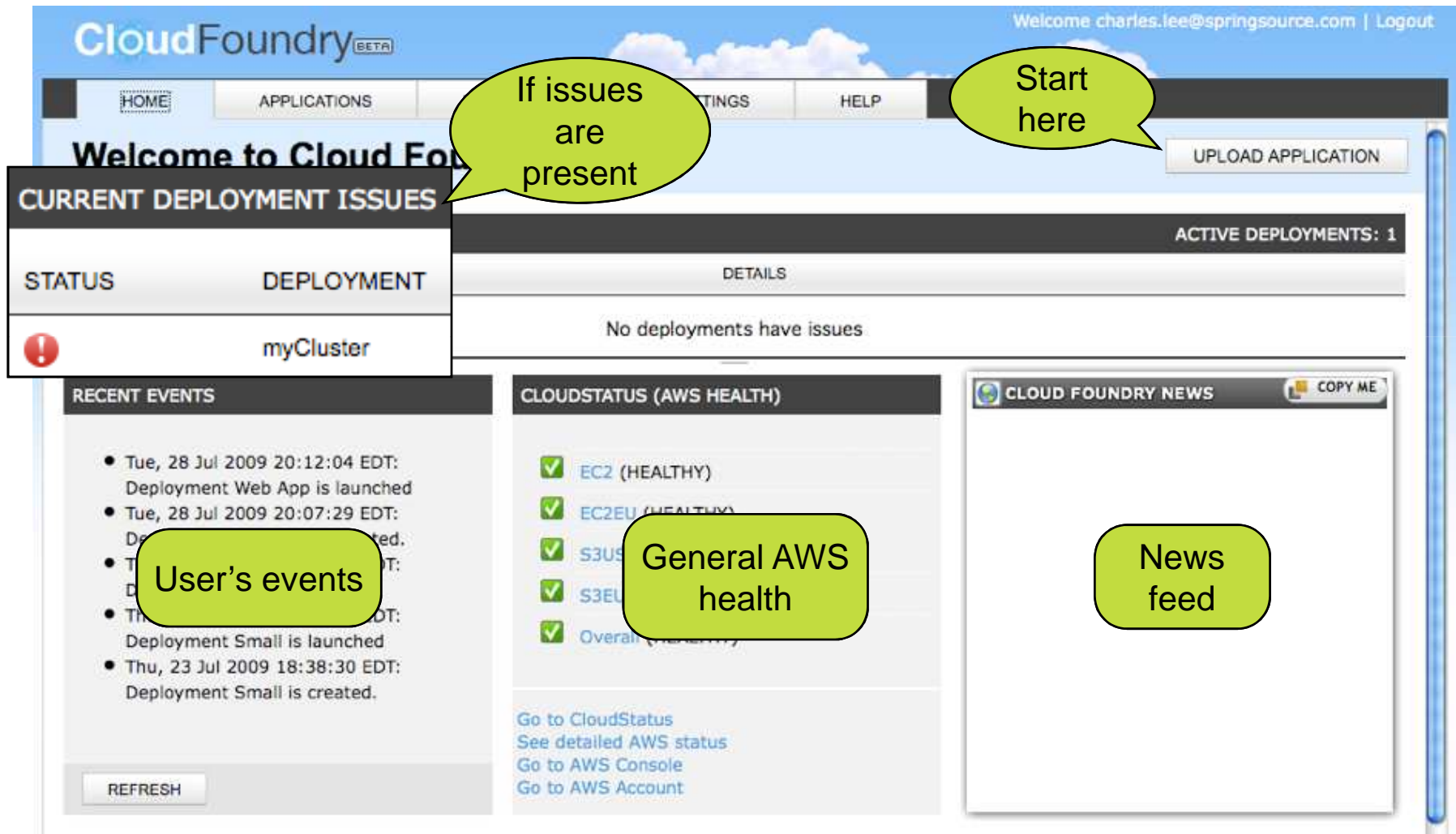
Facilitate internal to external migration

Ecosystem of partnered & supported technologies

Full application development & deployment lifecycle support

CLOUD FOUNDRY WALKTHROUGH

Home Screen



The screenshot shows the CloudFoundry home screen with several callouts:

- Start here**: Points to the navigation menu.
- If issues are present**: Points to the 'CURRENT DEPLOYMENT ISSUES' section.
- User's events**: Points to the 'RECENT EVENTS' section.
- General AWS health**: Points to the 'CLOUDSTATUS (AWS HEALTH)' section.
- News feed**: Points to the 'CLOUD FOUNDRY NEWS' section.

The interface includes a navigation bar with 'HOME', 'APPLICATIONS', 'SETTINGS', and 'HELP'. A 'WELCOME' message is displayed at the top right. The main content area features a 'CURRENT DEPLOYMENT ISSUES' table with a red exclamation mark icon and a 'myCluster' entry. Below this is a 'RECENT EVENTS' list with a 'REFRESH' button. The 'CLOUDSTATUS (AWS HEALTH)' section shows a list of services with green checkmarks indicating they are healthy. The 'CLOUD FOUNDRY NEWS' section has a 'COPY ME' button.

Upload Application



The screenshot shows the 'Upload Application' form in the CloudFoundry interface. The form is divided into several sections: APPLICATION INFORMATION, STATIC CONTENT, WEB APPLICATION, SHARED JARS, ENDORSED JARS, and DATABASE. Callouts provide additional context for several fields:

- Static content deployed on Apache:** Points to the 'STATIC CONTENT' section, which includes 'DEPLOY?' and 'ARCHIVE' checkboxes.
- WAR file (multiple WARs and contexts supported):** Points to the 'WAR FILE' field, which includes a 'Browse...' button.
- Database configuration and DDL scripts:** Points to the 'DATABASE' section, which includes 'DATABASE NAME' and 'USER ID' fields.

The form fields are as follows:

- APPLICATION INFORMATION:** APPLICATION NAME: My Application; REGION: us-east-1
- WEB APPLICATION:** JVM OPTIONS: -Xmx512m; WAR FILE: cloudfoundryui/webapp/target/cfapp.war; CONTEXT: (empty)
- DATABASE:** DATABASE NAME: cfdb; USER ID: cleel

Applications Screen



- List of previously uploaded applications
- Actions: Upload, View/Edit, Launch, and Delete

CloudFoundry BETA Welcome charles.lee@springsource.com | Logout

HOME APPLICATIONS DEPLOYMENTS SETTINGS HELP

Applications

UPLOAD APPLICATION

AVAILABLE APPLICATIONS				
NAME	CREATED	UPDATED	STATUS	ACTIONS
rsvp2	23-Jul-09 18:36:56	23-Jul-09 18:36:56	Deployable	
Cloud Foundry	28-Jul-09 12:25:31	28-Jul-09 12:25:31	Deployable	
Pet Clinic	28-Jul-09 23:07:59	28-Jul-09 23:48:24	Deployable	

Launch Application



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HOME APPLICATIONS DEPLOYMENTS SETTINGS HELP

Launch Deployment

COST TO RUN THIS DEPLOYMENT

DEPLOYMENT DETAILS

NAME

APPLICATION

REGION

TOPOLOGY Single instance Multiple instances
Deploy on a single instance vs. multiple instances

WEB SERVER

PUBLIC IP
The Elastic IP address of the Apache Server

SSL SECURITY

REQUIRE SSL

CERTIFICATE
File containing the SSL certificate. Must have .crt extension

PRIVATE KEY
Private key for the SSL Certificate. Must have .key extension

EXTRA APACHE CONFIGURATION

DIRECTIVES
httpd.conf directives

Selected topology is graphically illustrated

Select topology

Multiple Instances

- 1 instance
Apache
Instance type: Small
- 1 instance
tc Server
Instance type: Small
- 1 instance
MySQL-master
Instance type: Small
- 0 instance
MySQL-slave
Instance type: Small
- 0 instance
MySQL-slave
Instance type: Small

Single Instance

- 1 instance
Apache
tc Server
MySQL-master
Instance type: Small
- 0 instance
MySQL-slave
Instance type: Small

Launch Application continued



The screenshot shows the CloudFoundry application settings page. The page is titled "CloudFoundry" and includes a navigation bar with "HOME", "APPLICATIONS", "SETTINGS", and "HELP". The user is logged in as "charles.lee@springsource.com". The settings are organized into several sections:

- SSL Settings:** Includes "REQUIRE SSL" (checkbox), "CERTIFICATE" (text input with "Browse..." button), and "PRIVATE KEY" (text input with "Browse..." button). A callout bubble points to the "REQUIRE SSL" checkbox with the text "Apache SSL support".
- EXTRA APACHE CONFIGURATION:** Includes "DIRECTIVES" (text input). A callout bubble points to this section with the text "Additional User-defined Apache configuration".
- CONTAINER:** Includes "CONTAINER" (dropdown menu showing "tc Server") and "JVM OPTIONS" (text input). A callout bubble points to the "JVM OPTIONS" field with the text "Additional JVM options".
- CONTAINER INITIALIZATION SCRIPT:** Includes "RUN SCRIPT" (checkbox) and "SCRIPT" (text input with "Browse..." button). A callout bubble points to the "SCRIPT" field with the text "MySQL Master/Slave support".
- DATABASE:** Includes "DATABASE STORAGE" (text input), "HA MYSQL SLAVE" (checkbox), and "EXTRA MYSQL CONFIGURATION" (text input). A callout bubble points to the "EXTRA MYSQL CONFIGURATION" field with the text "Additional User-defined MySQL configuration".

Launch Application continued



- Monitoring powered by Hyperic
- Management includes automatic repair
- Intelligent autoscaling with option to set limits

MONITORING AND MANAGEMENT powered by HYPERIC

EVENT	IGNORE	NOTIFY	FIX	AUTOSCALE SETTINGS
INSTANCE TERMINATES	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	MIN SERVERS <input type="text" value="1"/>
INSTANCE UNRESPONSIVE	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	MAX SERVERS <input type="text" value="2"/>
PROCESS DIES	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
WEB APP. UNRESPONSIVE	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
DATABASE UNRESPONSIVE	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
APP SERVERS IDLE/OVERLOADED	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Deployments Screen



- List of current and previous deployments
- Actions: Launch New Deployment, View, Show Log

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HOME APPLICATIONS DEPLOYMENTS SETTINGS HELP

Deployments

LAUNCH NEW DEPLOYMENT

AVAILABLE DEPLOYMENTS

SEARCH CLEAR

Active Only

NAME	APPLICATION	STATUS	UPTIME	HEALTH	ALERT	COST (HR/MO)	ACTIONS
Small	rsvp2	STOPPED		-	-	\$0.00 / \$0.00	
Web App	rsvp2	LAUNCHED	6 minutes		-	\$0.10 / \$72.00	

TOTAL COST
HOURLY \$0.10
MONTHLY \$72.00

Deployment Details



The screenshot shows the CloudFoundry 'Deployment Details' page. At the top, there are navigation tabs for HOME, APPLICATIONS, and DEPLOYMENT. The page title is 'Deployment Details' with a 'BACK' button. A 'RECENT ACTIVITIES' section shows a 'Launch : COMPLETED (2 hours, 47 minutes ago)'. The 'DETAILS' section contains two columns of information: application metadata (NAME, APPLICATION, REGION, EXTERNAL IP, SSL, STATE) and operational metrics (TOPOLOGY, HOURLY COST, STARTED ON, UPTIME, HEALTH). Below the details are buttons for SHOW LOG, STOP, RESTART, and DELETE. A 'Applications' section is partially visible with a 'REDEPLOY' button. At the bottom, a table lists the application 'rsvp' with a 'HEALTH' status of 'OK' and an 'ACTIONS' link 'Go To Home Page'.

Recent Activities, Queued Tasks, Executing Tasks, Alerts

Stop or Restart entire deployment

Direct link to live web application

Deployment Details Continued



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HOME APPLICATIONS DEPLOYMENTS SETTINGS HELP

▼ Web Servers - Apache

INSTANCEID	STATE	PUBLIC DNS NAME	CPU UTILIZATION	HEALTH	ACTIONS
i-99242bf0	running	ec2-67-202-21-222.compu 1.amazonaws.com	0	✓	SERVICE_FAILURE

▼ Application Servers - tc Server

JVM OPTIONS: -

INSTANCEID	STATE	PUBLIC DNS NAME	CPU UTILIZATION	HEALTH	CONTEXT ROOT	ACTIONS
i-87242bee	running	ec2-75-101-222-7.comput 1.amazonaws.com	0	✓	SERVICE_FAILURE	

▼ Database Tier - MySQL

STORAGE local

INSTANCEID	TYPE	STATE	PUBLIC DNS NAME	CPU UTILIZATION	HEALTH	ACTIONS
i-83242bea	master	running	ec2-174-129-95-122.or 1.amazonaws.com	0	✓	✓

Health indicator on each web tier

Actions available based on tier and configuration

Instance Details



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HOME APPLICATIONS ALERTS

Instance Details for [Application Name]

Alerts shown on Deployment Details

Deployment Pet Clinic - context unavailable - 28-Jul-09 23:19:52
Deployment Pet Clinic - context unavailable - 28-Jul-09 23:19:54

GENERAL

INSTANCE ID	i-87242bee	HEALTH	<input checked="" type="checkbox"/>
INSTANCE TYPE:	Small	CPU %	0
PUBLIC DNS	ec2-75-101-222-7.compute-1.amazonaws.com	STATE	running
PRIVATE DNS	ip-10-251-90-97.ec2.internal	LAUNCHED	28-Jul-09 23:11:16
		UPTIME	15 minutes

APP SERVER TIER

TC SERVER

SERVER PROCESS	<input checked="" type="checkbox"/>
CURRENT THREADS	-
BUSY THREADS	-

JVM

HEAP U	
HEAP P	

CONTEXTS

ROOT:

Web context issues

WHAT NEXT?

What Next?



- Enhanced Cloud Foundry integration with other SpringSource software
 - Grails
 - Roo
 - SpringSource Tool Suite
 - dm Server as Cloud Foundry runtime option
- Cloud Foundry running on VMware infrastructure as well as EC2
 - vCloud Express
 - Allow choice of service providers
 - No change from developer perspective

What Next?



-
- Looking at Cloud Foundry on vSphere for internal cloud solution
 - Consistent experience for developers and business owners
 - Further additions to VMware vCloud Express IaaS offering

Q&A