Being in the Clouds

Elastic Server

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http://elasticserver.com
OGF23

• "Being in the clouds - how to make two clouds look like one cloud even when they use different VM technology"

• Why one, two, many clouds?

• Portability and location is good enough

• How can you get involved?
Clouds?
the origins of GRID computing
Google AppEngine
Slice
Host
Engine
Yard
Mosso
FlexiScale
Amazon EC2
• Virtualization
• Virtualization
• Unbounded resource
• Virtualization
• Unbounded resource
• Green tape
• Virtualization
• Unbounded resource
• Green tape
• Retail and research
• Virtualization
• Unbounded resource
• Green tape
• Retail and research
• Rise of the simple
• Virtualization
• Unbounded resource
• Green tape
• Retail and research
• Rise of the simple
• App granularity
- Virtualization
- Unbounded resource
- Green tape
- Retail and research
- Rise of the simple
- App granularity
- “It’s working”
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http://www.johnmwillis.com/groundwork/cloud-vendors-a-to-z/
Animoto scales 50 slices to 3,500 over 3 days with Amazon EC2
Virtualization
• What is Virtualization
• What is Virtualization
• Why should I care?
• What is Virtualization
• Why should I care?
• How can I get started?
Virtualization
Virtualization

• Run multiple virtual computers on one physical box.
Virtualization

- Run multiple virtual computers on one physical box.
- Desktop
Virtualization

- Run multiple virtual computers on one physical box.
- Desktop
- Server
Virtualization

- Run multiple virtual computers on one physical box.
- Desktop
- Server
- Data Center
Virtualization

- Run multiple virtual computers on one physical box.
- Desktop
- Server
- Data Center
- Cloud
Lots of ways to do it

• Xen
• VMWare
• Parallels
• Amazon AMI
• And many more...
Desktop
Who Can Benefit?
Who Can Benefit?

Developers
Who Can Benefit?

Developers

Develop on a VM to avoid fubaring your environment.
Who Can Benefit?

Developers

Develop on a VM to avoid fubaring your environment.

Get new developers started quickly.
Who Can Benefit?

Developers

Develop on a VM to avoid fubaring your environment.

Get new developers started quickly.

Consulting companies: work for multiple clients.
We're able to save **time and money** by having 'standard' VMs for windows dev, rails dev, build machine, windows QA, etc. [...] It was really great when the customer handed over two VMs at the beginning of the project, and we were able to just load up those VMs and start our development.

John McCaffrey, pathf.com
Server
Who Can Benefit?
Who Can Benefit?

Software Vendors
Who Can Benefit?

Software Vendors

Everyone knows how to run a Rails server right?
Who Can Benefit?

Software Vendors

Everyone knows how to run a Rails server right?

Absolutely NOT.
Who Can Benefit?

Software Vendors

Everyone knows how to run a Rails server right?

Absolutely NOT.

Ship it virtualized!
Data Center
Server Virtualization

Diagram showing layers of software and hardware, with 'App', 'OS', and 'Hardware' layers.
Server Virtualization

App
OS
Hardware

App
OS
Hardware

App
OS
Hardware

5 to 15% Utilization
Server Virtualization

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5 to 15% Utilization
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Virtualization Layer

Hardware

Consolidation
VMware has over 20,000 enterprise customers
90% are in production
You quickly forget about the virtualization except when you need it. When you need to migrate to new hardware or increase RAM on a moment's notice. I’ll never [again] install a Linux instance that doesn't start with Xen.

Tom Mornini, EngineYard

We provide you a product that is free from traditional hosting constraints. An object that becomes larger or smaller as needed, is duplicated at will and free to move around.

Matt Tanase, SliceHost
Who Can Benefit?
Who Can Benefit?

Everyone
Who Can Benefit?

Everyone

Your boss is risk averse.
Who Can Benefit?

Everyone

Your boss is risk averse.
You want to use ‘your’ stack.
Who Can Benefit?

Everyone

Your boss is risk averse.
You want to use ‘your’ stack.
No money for hardware.
Who Can Benefit?

Everyone

Your boss is risk averse.

You want to use ‘your’ stack.

No money for hardware.

Run it in the cloud!
Sweet! But...
Making EC2 Images

dd if=/dev/zero of=ubuntu.fs count=1024 bs=1M

mke2fs -F -j ubuntu.fs
sudo mount -o loop ubuntu.fs /mnt
sudo debootstrap dapper /mnt
sudo cp /etc/apt/sources.list /mnt/etc/apt/sources.list
sudo chroot /mnt

now in the image:

passwd
aptitude update
aptitude upgrade
aptitude install openssh-server
aptitude install [more packages ... ]
cat > /etc/network/interfaces

auto lo
iface lo inet loopback
[hit ctrl^D]

auto eth0
iface eth0 inet dhcp

sudo umount /mnt
e2-bundle-image -i ubuntu.fs -k [MYKEYFILE] -u [MYUSERID]
e2-upload-bundle -b my-ubuntu -m image.manifest -a [MYKEY] -s [MYSECRET]
e2-register my-ubuntu/image.manifest
Making EC2 Images

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ec2-upload-bundle -b my-ubuntu -m image.manifest -a [MYKEY] -s [MYSECRET]
ec2-register my-ubuntu/image.manifest
```

This is Hard,
Annoying,
and not
Easily Reproducible
Making VMs Today
Making VMs Today

- Create new VM, install new OS or start with a base image
Making VMs Today

• Create new VM, install new OS or start with a base image
• Tweak, tweak, tweak, snapshot
Making VMs Today

• Create new VM, install new OS or start with a base image
• Tweak, tweak, tweak, snapshot
• Hopefully write down what you did and where it’s running
Is one cloud ‘best’
• EngineYard - Rails stack
• EngineYard - Rails stack
• SliceHost - Choice of base OS images
• EngineYard - Rails stack
• SliceHost - Choice of base OS images
• Google AppEngine - Python stack (for now)
• EngineYard - Rails stack
• SliceHost - Choice of base OS images
• Google AppEngine - Python stack (for now)
• Amazon EC2 - roll your own image
Interoperability?
Portability or interoperability?
Portability or interoperability?
Portability or interoperability?

- Network - UDP, TCP, SCTP - GOOD
Portability or interoperability?

- Network - UDP, TCP, SCTP - **GOOD**
- HTTP, XMPP, AMQP for communication interop. and WS-* for ‘Service level interop’ - **NOT BAD**
Portability or interoperability?

- Network - UDP, TCP, SCTP - **GOOD**
- HTTP, XMPP, AMQP for communication interop. and WS-* for ‘Service level interop’ - **NOT BAD**
- OVF and application/VM metadata - **COMING**
Portability or interoperability?

- Network - UDP, TCP, SCTP - GOOD
- HTTP, XMPP, AMQP for communication interop. and WS-* for ‘Service level interop’ - NOT BAD
- OVF and application/VM metadata - COMING
- App behaviour guarantees? EX FALSO QUODLIBET
What We Need
What We Need

• Consistent and quick VM (re)creation
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- Tracking contents and patches
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• Consistent and quick VM (re)creation
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• Freedom of choice: any host/cloud/grid
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• Consistent and quick VM (re)creation
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• Testing locally, deploying globally
What We Need

- Consistent and quick VM (re)creation
- Tracking contents and patches
- Freedom of choice: any host/cloud/grid
- Testing locally, deploying globally
- Manage running instances
Elastic Server
On Demand

http://elasticserver.com
Elastic Server On Demand
Elastic Server On Demand

- Virtualization manufacturing plant
Elastic Server On Demand

- Virtualization manufacturing plant
- Component repositories
Elastic Server On Demand

• Virtualization manufacturing plant
• Component repositories
• Agnostic about OS, virtualization, app stack
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- Agnostic about OS, virtualization, app stack
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- Agnostic about OS, virtualization, app stack
- Track server assemblies and instances
- Provisioning portals
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- Virtualization manufacturing plant
- Component repositories
- Agnostic about OS, virtualization, app stack
- Track server assemblies and instances
- Provisioning portals
- Management console and API
Provisioning Portals

Community
ISVs
SI’s
Teams
People
More...

Manufacturing

Components
examples:

RabbitMQ
TIBCO
bea
IBM
Xerces
WSO2
JBoss
Mule
Ruby on Rails 2.x Elastic Server

Build Your Ruby on Rails 2.x Elastic Server and Experience Development Bliss.

Learn more about CFT and the Elastic Server Factory
Visit the Ruby on Rails Home
Check out all the Ruby Gems at Ruby Forge

Rails *

- **Rails 2.0.2**
  
  Ruby 1.8.5, Rails 2.0.2, and an assortment of dependencies.

- **Rails 2.0.1**
  
  Ruby 1.8.5, Rails 2.0.1, and an assortment of dependencies.

Web Container *

- **Mongrel Cluster + nginx (stable)**
  
  mongrel-cluster 1.0.5, 2 instances of mongrel 1.1.4, nginx 0.5.35 (stable) reverse proxy

Getting Started

Choose your components
Use this page to select the components of your rails stack.

Build your server
The next page will ask you about some hardware choices and a virtualization platform.

Download and start your server
When the server starts, you will be able to access the admin console at http://serverip:2999. You'll get more instructions in your email.

Deploy with Capistrano 2.3.0

1. Follow basic capistrano installation
capify [rails root]
2. Download our deploy.rb
3. Edit deploy.rb and enter your repository information or stick with the defaults - deploy from local.
4. Type cap deploy from your Rails application root

Deploy using rsync
We recommend using Capistrano, but
Bundles
- MySQL 5 - CFT Rubberband [5.0.32] [x]
- Base Ruby Stack [1.0.1-1] [x]
- Ruby SQLite3 Gem [1.0.1-1] [x]
- Ruby on Rails [2.0.2] [x]
- mongrel_cluster + stable nginx [1] [x]
- cttf-ruby-mysql [1.0.1-1] [x]
- Apache + Passenger (mod_rails [1.0] [x]

Add more bundles

Virtualization Format
Choose a format for downloading or deploying your server directly to a cloud.

- Download
  - VMware
  - Parallels
  - XenSource
  - PXE (Coming Soon)

- Cloud
  - Amazon EC2 Small

System Configuration
- Memory: 512 MB
- Operating System: DaisY Linux
- Network Type: NAT
- Hard Drive: 1024 MB
- Download Format: Zip file

Ready To Build?
- Elastic Server name
- Rails/WFH
- Description
- Use a static password.
- Share server in public directory
- Build Now
- Save as Template
Elastic Server Manufacturing

Rails/WFH  
created 05/31/08 06:27:32 AM
Components
- Base Ruby Stack [1.0.1-1]
- Ruby SQLite3 Gem [1.0.1-1]
- Ruby on Rails [2.0.2]
- mongrel_cluster + stable nginx [1]
- Working From Home [1.0]

Stage 4
Converting server image to final format.

New Servers Created

In The Factory
- 777 users
- 1,985 elastic servers
- 310 saved templates
- 624 bundles
- 751 packages

Recent Downloads

New Community Servers

Google AppEngine Development Server - 2008-04-10
by goof 1 day ago
lift-test
by mcqv 2 days ago
elastic server: Rails/WFH

Build Status

**Shipped** — This VM has been built and an email has been sent to you.

Download

This server has been downloaded 1 time

![VMware 85.3 MB](VMware 85.3 MB)

Description **Click to edit.**

Click here to edit description.

Tags

Tags help make your server more easy to find in searches.

Add a tag

Template History

This server was created from:

![Rails/WFH](Rails/WFH)

Privacy

Turn sharing **ON**

Delete

Delete this server

Save As Template

Save as a template

Software Bundles

- Base Ruby Stack [1.0.1-1]
- Ruby SQLite3 Gem [1.0.1-1]
- Ruby on Rails [2.0.2]
- mongrel_cluster + stable nginx [1]
- Working From Home [1.0]

Add bundles to my cart

Licenses

<table>
<thead>
<tr>
<th>Date</th>
<th>guid</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/31/08</td>
<td>1d3fa4b9224e5e8f8b9ee6d6bd53eee9</td>
</tr>
<tr>
<td>06:27:32 AM</td>
<td></td>
</tr>
</tbody>
</table>
Download & Deploy
starting port 2999
** Ruby version is not up-to-date; loading cgi_multipart_eof_fix

Welcome to your Virtual server
Created by CohesiveFT
Enjoy... in moderation

The IP address of this Appliance is:
192.168.227.129

This server contains:
- Rails Server (nginx/mongrel) : Rails Mongrel Cluster with Nginx proxy

The Administration console (rubymin) is at:

Debian GNU/Linux 4.0 rails20server tty1

rails20server login: _

VMware Tools is out of date. Choose the Virtual Machine > Install VMware Tools menu.

yan@skwp-mbp:~/dev/cft/wfh/trunk (master) $ cap deploy
Elastic Server IP: 192.168.227.1279
Create A Package
Build Your Own Package: Step 1 of 2

Package type:  
Ruby on Rails Application Archive

Package name:  
Package version:  
Package description:  

Bundling
If you’d like to immediately make your package available as a bundle in order make it easier for others to find and use this checkbox. Otherwise, you may bundle the package later from your Package Details page.

☑ Make it a bundle

Save and Proceed to File Upload

My Packages
Working From Home [1.0]  
created 19 Apr 17:43

My Unfinished Packages
You have not started building any packages yet.

Build New Package

My Bundles
By creating bundles from your packages you can make them available to be used with the LeanPROT Local Explorer or build new provisioning portals to enable other users to build and deploy LeanPROT Local based applications.
Into The Clouds
Elastic Server Manager

There are 3 software updates available.

Services

- RAM: 51% Available (258 MB)
- Swap: 100% Available (268 MB)
- Disk: sda1: 80% Available (48.1 MB)
- Disk: sda2: 30% Available (21 MB)
- Disk: sdb1: 75% Available (714.8 MB)

Select a service to change its settings.

Rails Server (nginx/mongrel) 1.0.0
- Start
- Stop
- Reload

Uptime: about 2 hours. Load: 0.62, 0.27, 0.12. Running processes: 1/48. Network Received: 9.9 MB. Network Sent: 0.3 MB.

You are using the default password. Please change it.

14 updates available to install.
PORTABLE IS GOOD ENOUGH
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• A common way to build and talk about VMs for clouds, grids, across ‘context’
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• App portability not service interop
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• YOUR applications (stacks, builds, O/S)
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• ONE UNIFORM template
PORTABLE IS GOOD ENOUGH

• A common way to build and talk about VMs for clouds, grids, across ‘context’

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• YOUR applications (stacks, builds, O/S)

• ONE UNIFORM template

• ANY cloud or VM format
elasticserver.com
Business Infrastructure

- We need a Wiki
- We need document management
- We need a shared task
- How do we get 3 999s?
- How do I scale to peak demand?
- What size computer server do we need?
- How do we avoid vendor lock in?
- We want single sign on
- How do we scale to peak demand?
FEDERATION
FEDERATION

• Deploy ‘whole app’ to one cloud?
FEDERATION

• Deploy ‘whole app’ to one cloud?
• If cloud changes, can I move?
• Deploy ‘whole app’ to one cloud?
• If cloud changes, can I move?
• No “center” - federated
• Deploy ‘whole app’ to one cloud?
• If cloud changes, can I move?
• No “center” - federated
• Uniform predictable behaviour?
• Deploy ‘whole app’ to one cloud?
• If cloud changes, can I move?
• No “center” - federated
• Uniform predictable behaviour?
• Fault tolerance and security?
some problems are not obvious
“Context” for app level granularity

- Some problems are not obvious
• “Context” for app level granularity
• Moving from cloud A to cloud B

some
problems
are not
obvious
• “Context” for app level granularity
• Moving from cloud A to cloud B
• One app over many clouds or nodes

some problems are not obvious
• “Context” for app level granularity
• Moving from cloud A to cloud B
• One app over many clouds or nodes
• Clouds use different standards

some problems are not obvious
virtualizing the VPN

Multisourced Infrastructure: OpenVPN Virtual Links
Location and distribution
Location and distribution

• Cross cloud VPNs
Location and distribution

- Cross cloud VPNs
- “Cube routing” - one address, two VPNs
Location and distribution

- Cross cloud VPNs
- “Cube routing” - one address, two VPNs
- Works over open internet (UDP tunnel)
Location and distribution

• Cross cloud VPNs
• “Cube routing” - one address, two VPNs
• Works over open internet (UDP tunnel)
• Not a complete solution - do help!
Location and distribution

- Cross cloud VPNs
- “Cube routing” - one address, two VPNs
- Works over open internet (UDP tunnel)
- Not a complete solution - do help!
- Business cubes - composite apps
One grid - two clouds

VcubeV

Grid Container

Grid Controller

AMQP Monitoring

Amazon EC2

Grid Users

Your Cloud
How you can help