

18. konferenca
Dnevi slovenske informatike

POSTAVITEV ZASEBNEGA OBLAKA Z ODPRTOKODNIMI REŠITVAMI

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19. 04. 2011

O predavateljih

- Javanska navdušenca
- Aktivna člana društva OpenBlend
- V zadnjem času se aktivno ukvarjava s platformami v oblaku s poudarkom na Google App Engine in JBoss Makara
- Matej sodeluje pri razvoju JBoss Makara
- Marko dela za Red Hat, večinoma na razvoju odprtokodnega portala GateIn in portalskega produkta EPP



OPEN BLEND, OPEN MIND!

- Društvo navdušencev nad odprtokodnimi tehnologijami
- De-facto slovenski JUG
- Vsakoletna konferenca na Ljubljanskem gradu
- Odlični tuji predavatelji in super vzdušje
- Sredi septembra
- Kmalu "call for papers"

www.openblend.org

Agenda

- Na splošno o oblakih
- Javni in zasebni oblaki
- Postavitev IaaS / PaaS zasebnega oblaka
- Kaj smo se naučili

Na splošno o oblakih



Vir: www.ourinternet.us

Na splošno o oblakih

Virtualizacija

- Temeljna tehnologija – oblaki so zgolj nadgradnja z avtomatizacijo
- Boljši izkoristek strežniških zmogljivosti
- Večja fleksibilnost
- Večja produktivnost IT administratorjev
- Nižji stroški upravljanja z IT infrastrukturo
- Možnosti novih storitev – storitve oblaka

Na splošno o oblakih

Kaj ponuja oblak?

- Povsem nove zmogljivosti
- Nadziranje in upravljanje velikega števila fizičnih in virtualnih strežnikov preko centralnega administracijskega vmesnika
- HA – visoka razpoložljivost in QoS zmogljivosti
- Izraba virtualizacijske tehnologije za dinamične, samodejno prilagajajoče se sisteme
- Aplikativna okolja, ki skrijejo razvijalcem detajle fizične strežniške arhitekture (PaaS)

Javni in zasebni oblaki

Kaj ponujajo javni oblaki?

- Ni potrebe po lastništvu nad IT infrastrukturo - ta postane storitev
- Plačevanje po porabi
- Nizki začetni stroški, namesto začetne velike investicije
- Hiter in preprost dostop do dodatnih zmogljivosti

Javni in zasebni oblaki

Kaj pogosto ponujajo javni oblaki?

- Globalno hitre internetne povezave
- HA storitve - zanesljivost delovanja
- Elastično odzivanje na konice porabe

Javni in zasebni oblaki

Zakaj privatni oblak, namesto javni?

- Bojazen glede zagotavljanja ravni storitev
(aplikacije v javnem oblaku sobivajo z aplikacijami ostalih uporabnikov oblaka)
- Bojazen glede izpadov in glede varnosti podatkov
(pomanjkanje QoS zagotovil)
- V zasebnem oblaku se ohrani popoln nadzor nad podatki in varnostjo
- Bolj prilagojen specifičnim obstoječim IT sistemom in potrebam podjetja
- Javni oblaki cenovno neugodni zaradi specifičnih potreb podjetja
- Javni oblaki še ne ponujajo dovolj celovite storitve, ki bi pokrile specifične zahteve podjetja

Javni in zasebni oblaki

Resnični svet: privatni oblaki + različni javni oblaki

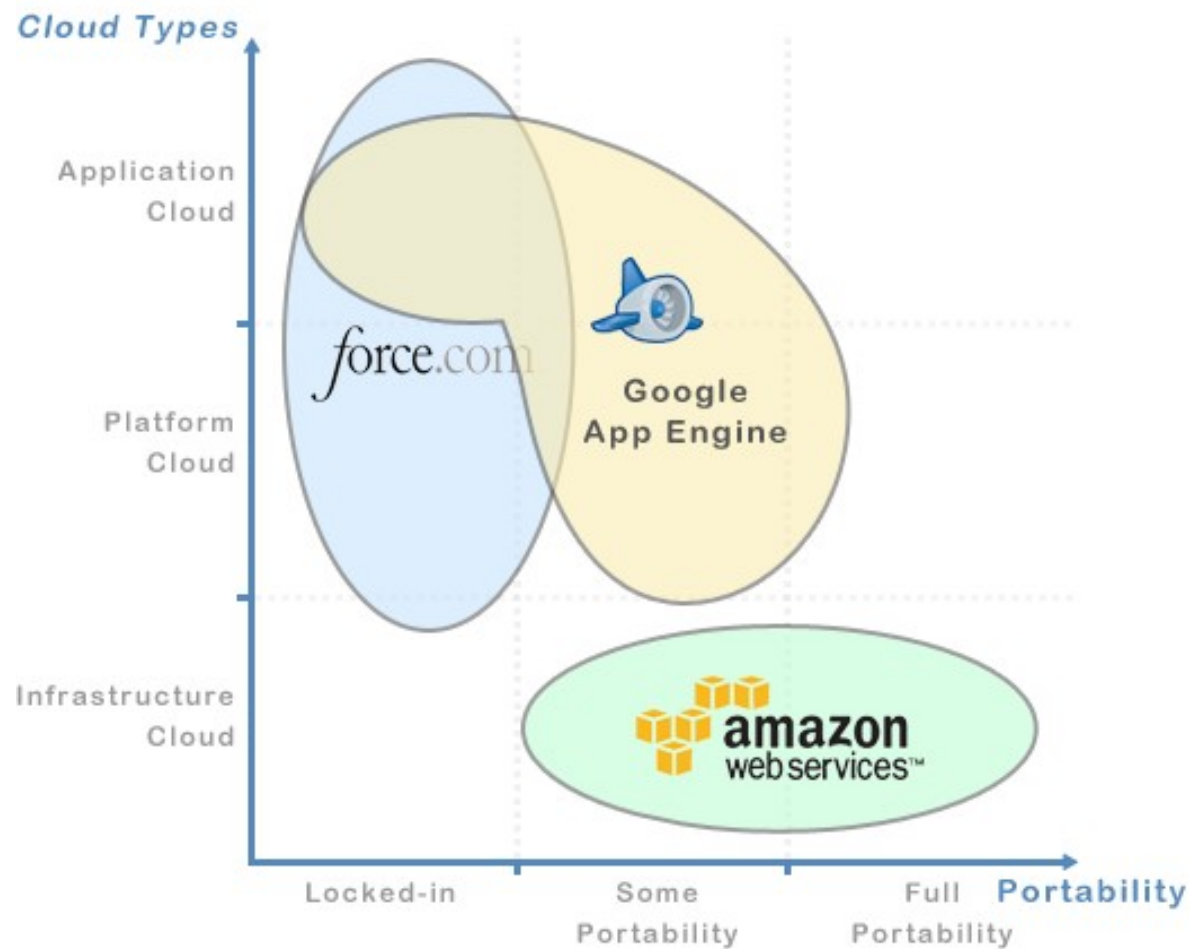
- Glavni trend: interoperabilnost in prenosljivost med privatnimi in javnimi oblaki
- Storitve in funkcionalnosti oblaka so v resnici precej podobne med različnimi oblaki
- Odprtokodne rešitve za interoperabilnost
 - Javanska knjižnica JClouds
 - REST API knjižnica Delta Cloud

Javni in zasebni oblaki

Najbolj uveljavljeni javni oblaki

- Amazon EC2
- Force.com
- Google App Engine
- Vedno več novih ponudnikov, ki ponujajo storitve javnega oblaka in stremijo za interoperabilnostjo z vodilnimi javnimi oblaki (trenutno zlasti z Amazon EC2)

Javni in zasebni oblaki



Vir: www.bitsandbuzz.com

Javni in zasebni oblaki

Tehnologije zasebnih oblakov

- Morje komercialnih – tako zaprtih, kot odprtokodnih virtualizacijskih tehnologij
- Vertikalni ekosistemi zgrajeni okrog njih (Vmware, Hyper-V, KVM, Xen)
- Enterprise cloud rešitve različnih ponudnikov
- Google App Engine
- Vedno več novih ponudnikov, ki ponujajo storitve javnega oblaka in stremijo za interoperabilnostjo z vodilnimi javnimi oblaki (trenutno zlasti z Amazon EC2)

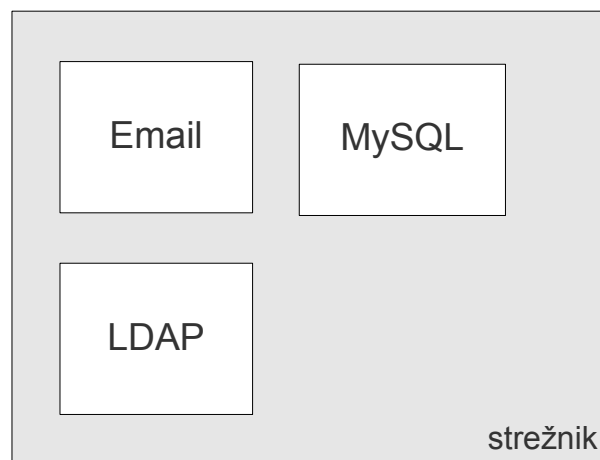
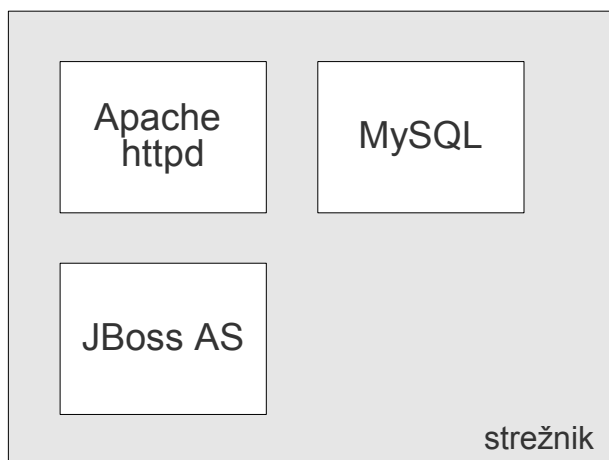
Javni in zasebni oblaki

Odprtokodne implementacije oblakov

- Eucalyptus – odprtokodna implementacija Amazon EC2 / S3
- Appscale – odprtokodna implementacija Google App Engine
- OpenNebula – odprtokodna implementacija oblaka, ki implementira med drugim tudi Amazon EC2 Query API
- OpenStack
- Kmalu tudi Makara

Postavitev IaaS / PaaS zasebnega oblaka

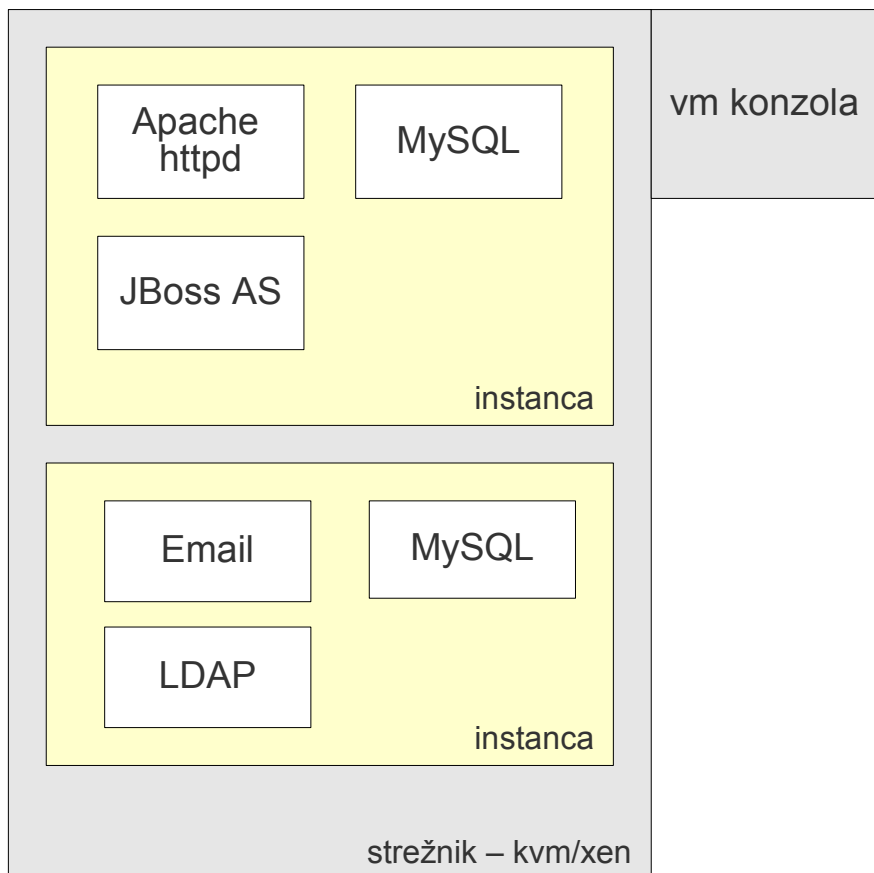
Klasična postavitve strežnikov



-  aplikacijski strežnik
-  fizični strežnik

Postavitev IaaS / PaaS zasebnega oblaka

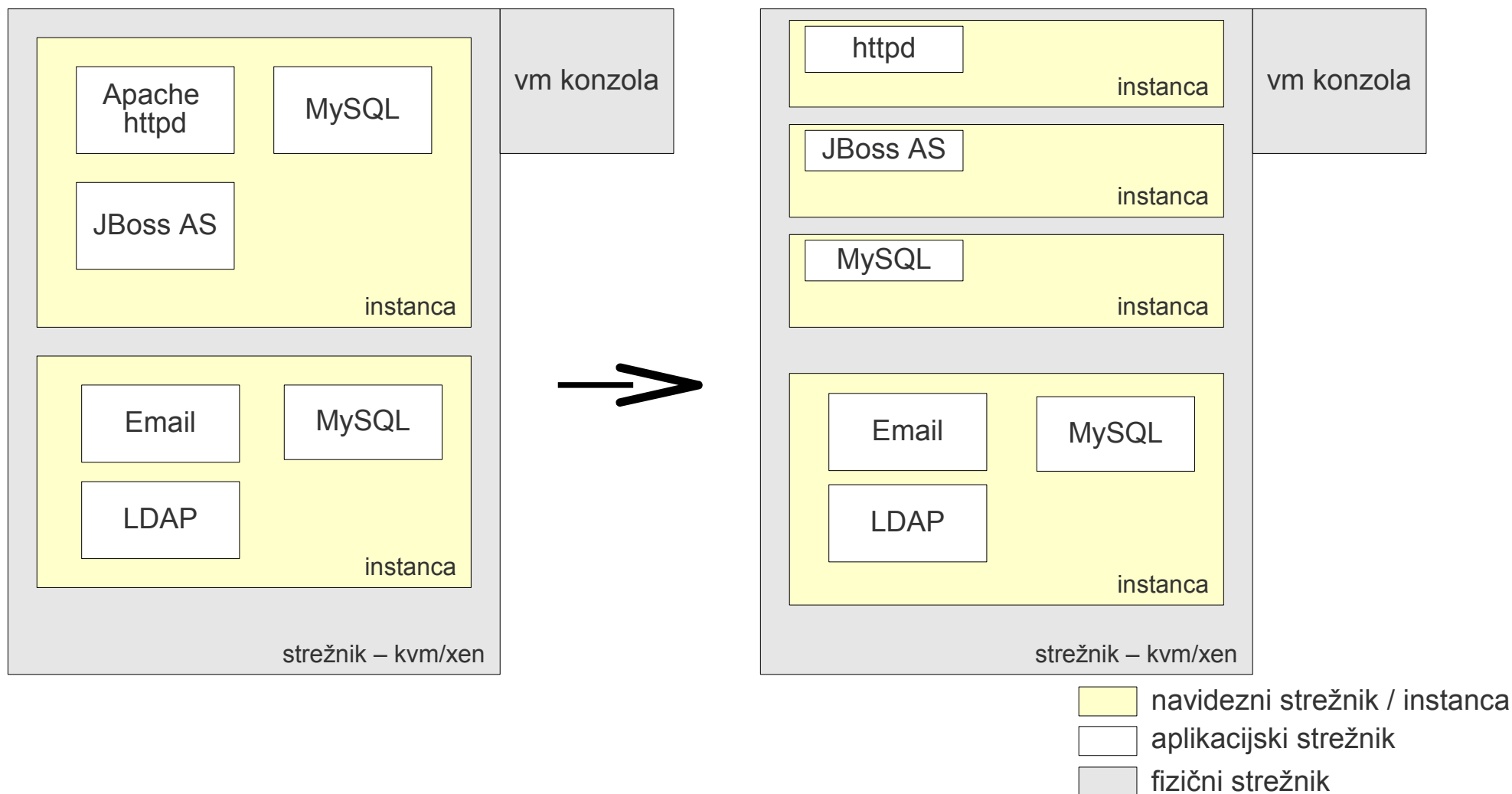
Virtualizacija strežnikov



-  navidezni strežnik / instanca
-  aplikacijski strežnik
-  fizični strežnik

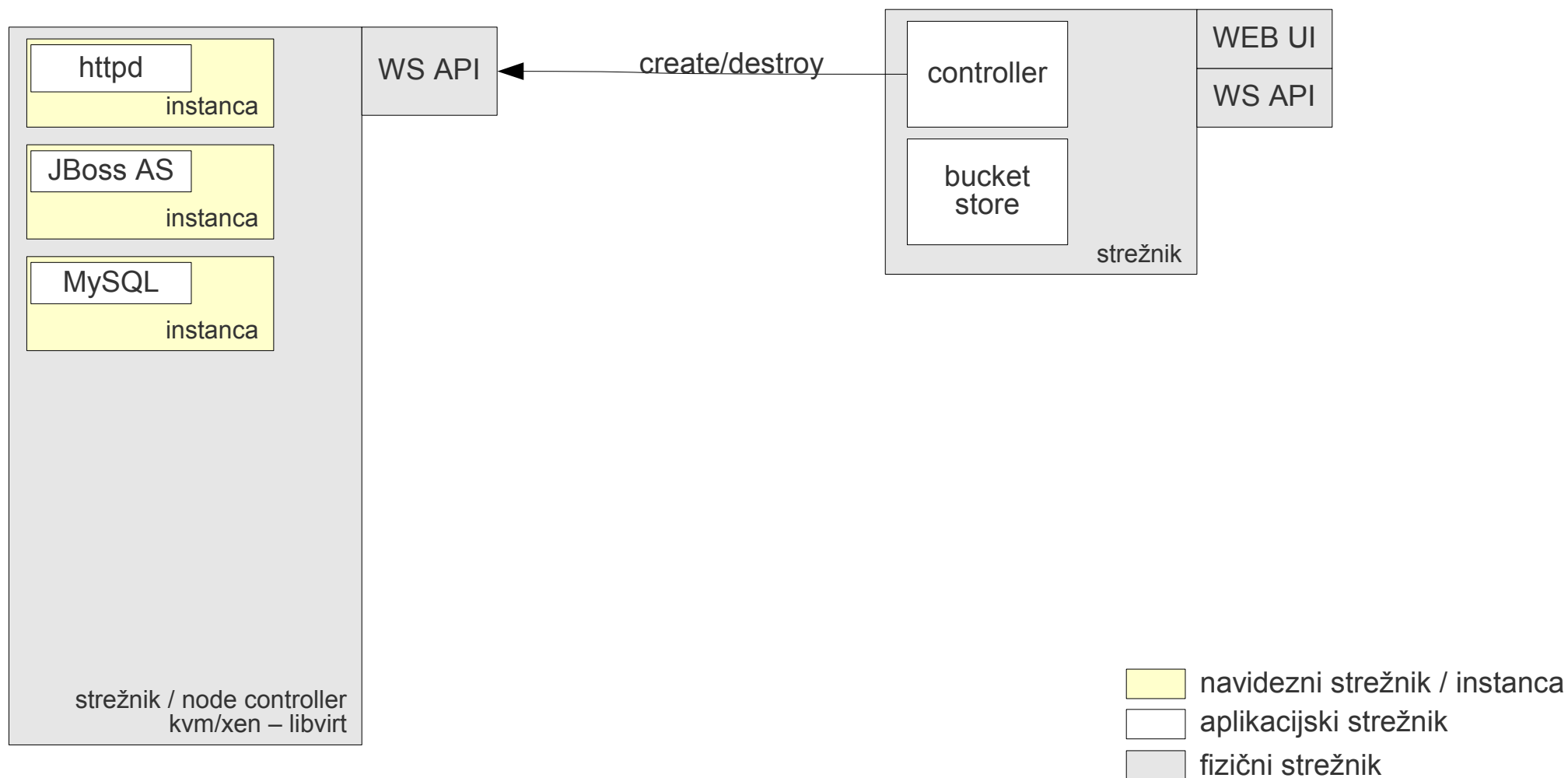
Postavitev IaaS / PaaS zasebnega oblaka

Virtualizacija strežnikov



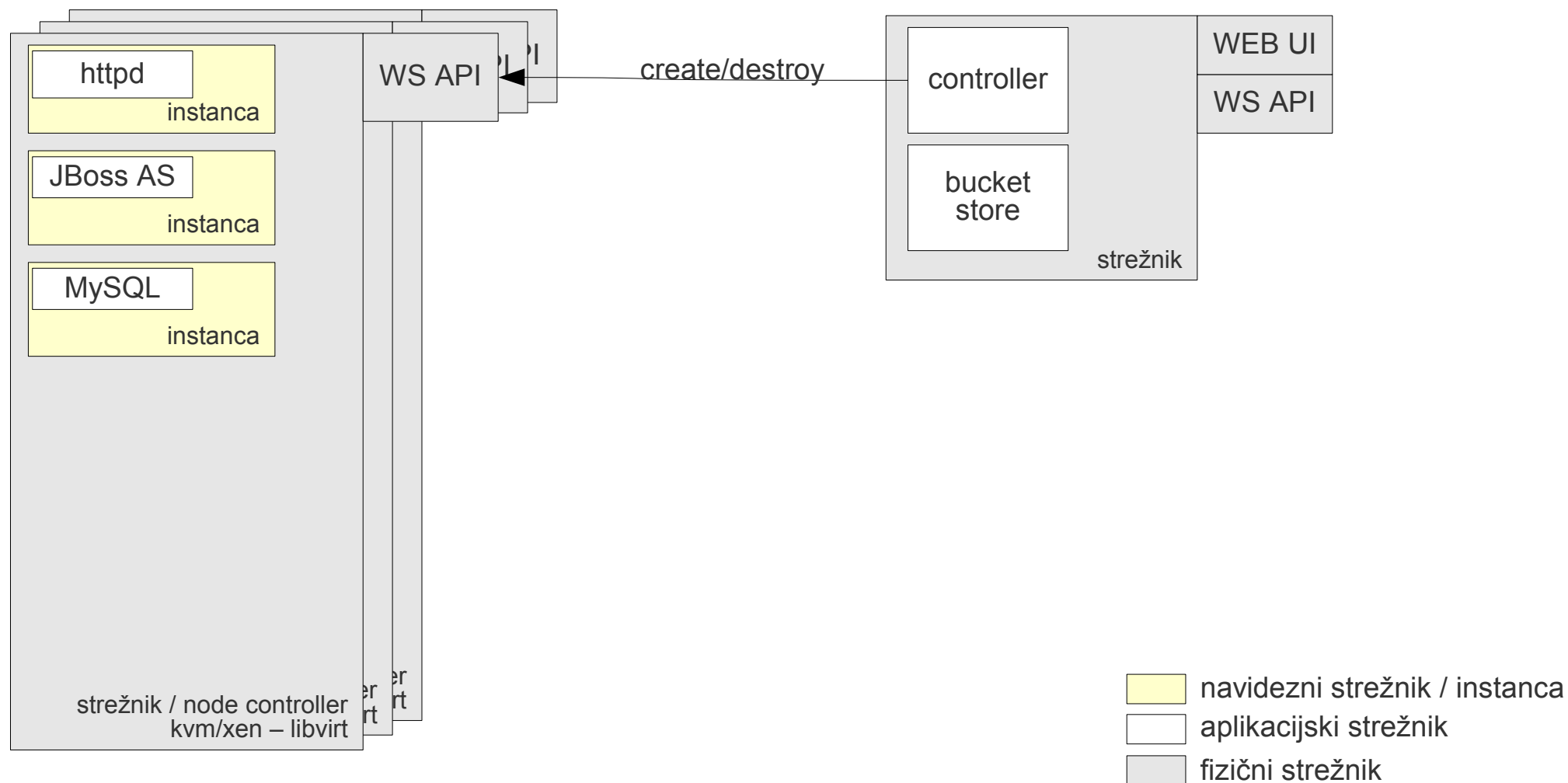
Postavitev IaaS / PaaS zasebnega oblaka

IaaS / PaaS



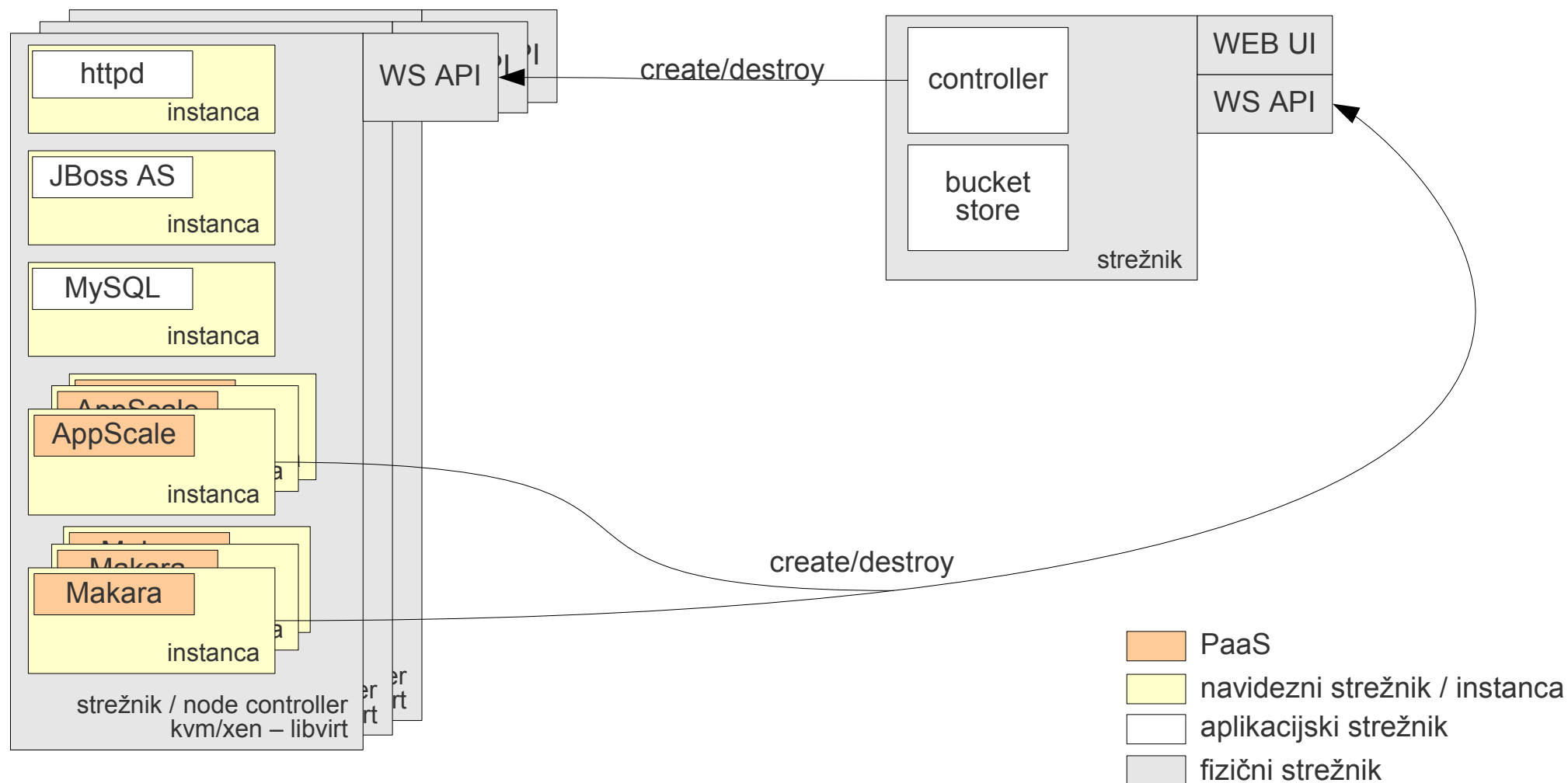
Postavitev IaaS / PaaS zasebnega oblaka

IaaS / PaaS



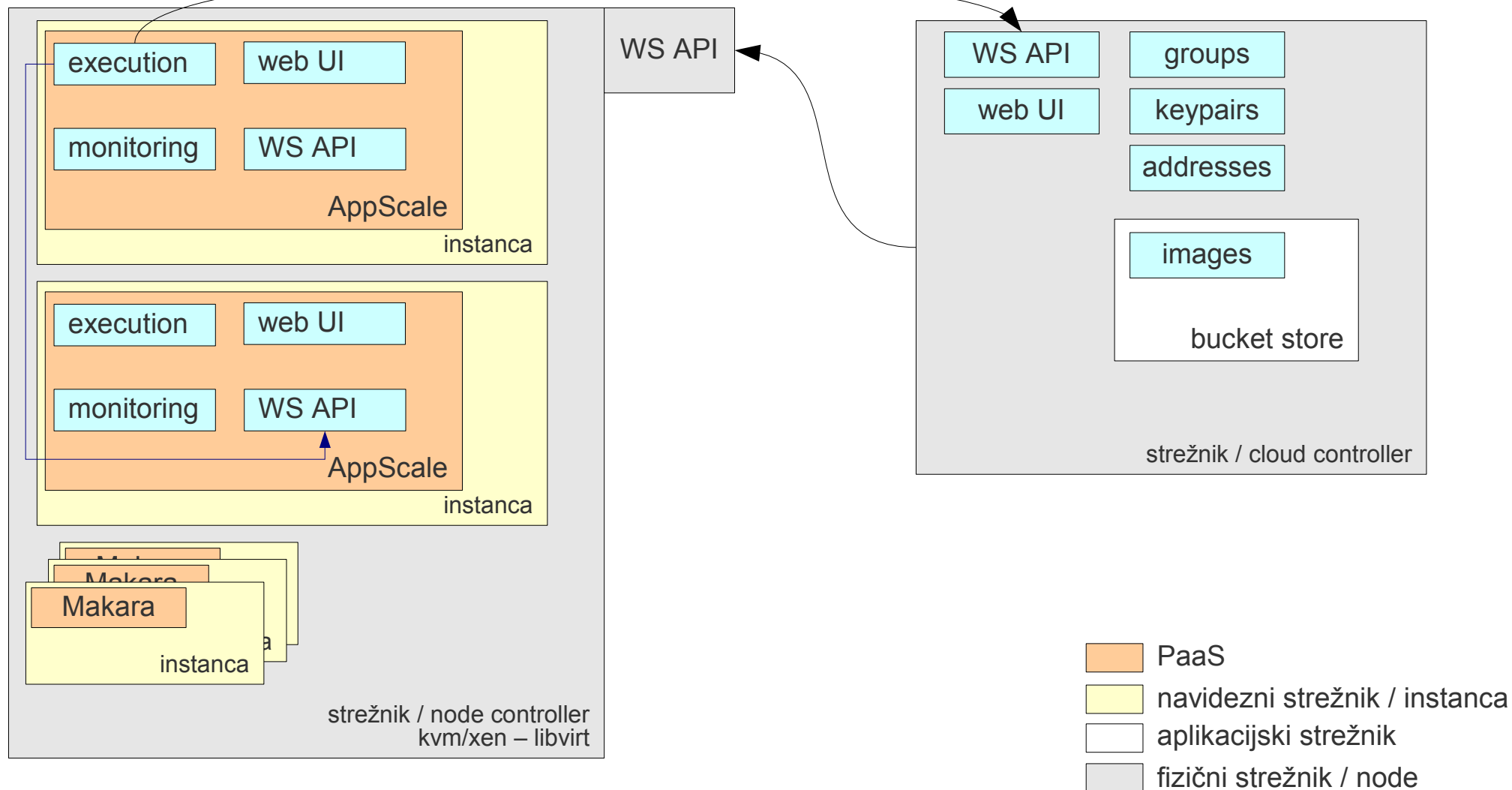
Postavitev IaaS / PaaS zasebnega oblaka

IaaS / PaaS



Postavitev IaaS / PaaS zasebnega oblaka

IaaS / PaaS



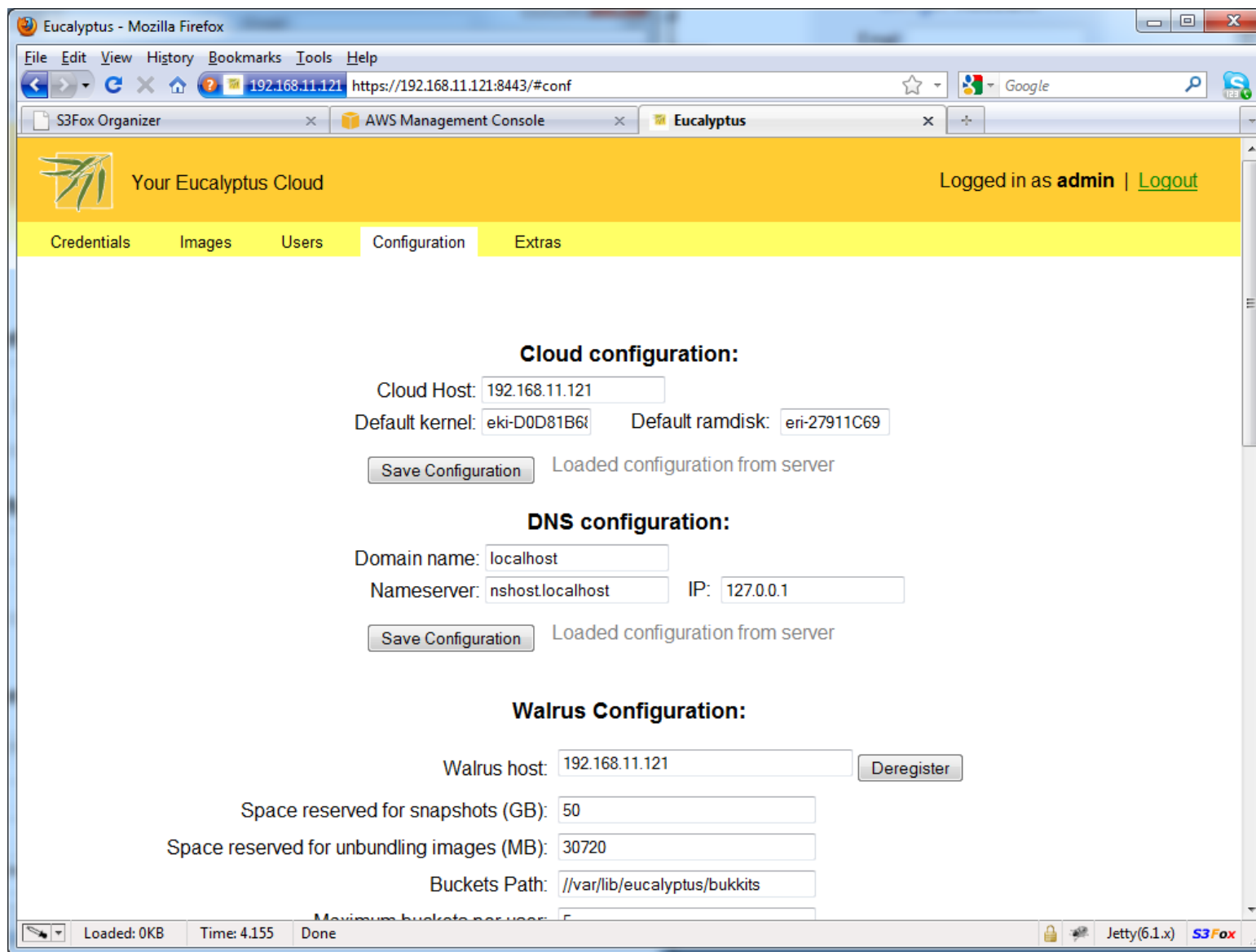
Kaj smo se naučili

```

root@centos-clc64:~
[root@centos-clc64 ~]# . .euca/eucarc
[root@centos-clc64 ~]# euca-
euca-add-group                euca-deregister              euca-disassociate-address
euca-add-keypair              euca-deregister-cluster      euca-download-bundle
euca-add-user                 euca-deregister-storage-controller euca-get-console-output
euca-add-user-group           euca-deregister-walrus        euca-get-credentials
euca-allocate-address         euca-describe-addresses      euca-get-password
euca-associate-address        euca-describe-availability-zones euca-get-password-data
euca-attach-volume            euca-describe-bundle-tasks    euca-modify-image-attribute
euca-authorize                 euca-describe-clusters        euca-modify-property
euca-bundle-image              euca-describe-groups          euca-reboot-instances
euca-bundle-instance          euca-describe-image-attribute euca-register
euca-bundle-vol                euca-describe-images          euca-register-cluster
euca-cancel-bundle-task       euca-describe-instances       euca-register-storage-controller
euca-confirm-product-instance euca-describe-keypairs        euca-register-walrus
euca-create-snapshot          euca-describe-properties      euca-release-address
euca-create-volume            euca-describe-regions         euca-reset-image-attribute
euca-delete-bundle            euca-describe-snapshots       euca-revoke
euca-delete-group              euca-describe-storage-controllers euca-run-instances
euca-delete-keypair           euca-describe-user-groups     euca-terminate-instances
euca-delete-snapshot          euca-describe-users           euca-unbundle
euca-delete-user              euca-describe-volumes         euca-upload-bundle
euca-delete-user-group        euca-describe-walruses        euca-version
euca-delete-volume            euca-detach-volume
[root@centos-clc64 ~]#
[root@centos-clc64 ~]#
[root@centos-clc64 ~]#
[root@centos-clc64 ~]# euca-describe-availability-zones verbose
AVAILABILITYZONE    moodcluster    192.168.11.121
AVAILABILITYZONE    |- vm types    free / max    cpu    ram    disk
AVAILABILITYZONE    |- m1.small    0002 / 0002    1     128    2
AVAILABILITYZONE    |- c1.medium    0002 / 0002    1     396    4
AVAILABILITYZONE    |- m1.large     0002 / 0002    1     768    12
AVAILABILITYZONE    |- m1.xlarge    0000 / 0000    1     1024   15
AVAILABILITYZONE    |- c1.xlarge    0000 / 0000    2     2048   20
[root@centos-clc64 ~]#

```

Kaj smo se naučili



Kaj smo se naučili

Amazon Web Services - Mozilla Firefox

File Edit View History Bookmarks Tools Help

amazon.com <https://aws-portal.amazonaws.com/gp/aws/developer/account/index.html>

S3Fox Organizer x AWS Management Cons... x Amazon Web Services x Eucalyptus x Hybridfox x

Sign in to the AWS Management Console | Create an AWS Account | English

Search: AWS Product Information

Account

- Account Activity
- Usage Reports
- Security Credentials
- Personal Information
- Payment Method
- Consolidated Billing
- AWS Identity and Access Management
- AWS Management Console
- DevPay

Account Activity

Welcome matej | Sign Out
Account Number 8442-3406-8650

[View Previous Statement](#)

This Month's Activity as of April 12, 2011

The billing cycle for this report is April 1 - April 30, 2011. The AWS service usage charges on this page currently show activity through approximately 04/12/2011 09:59 GMT.

[Expand All Services](#) | [Collapse All Services](#) [Printer Friendly Version](#)

		Totals
Amazon Simple Storage Service		
View/Edit Service		
US Standard Region		
\$0.000 per GB - storage under the monthly global free tier	0.000000 GB-Mo	0.00
\$0.00 per request - PUT, COPY, POST, or LIST requests under the monthly global free tier	2,000 Requests	0.00
\$0.00 per request - GET and all other requests under the monthly global free tier	1,601 Requests	0.00
\$0.01 per 1,000 PUT, COPY, POST, or LIST requests beyond the global free tier	2,156 Requests	0.02
Download Usage Report »		0.02
AWS Data Transfer (excluding Amazon CloudFront)		
View/Edit Service		

Loaded: 57 KB Time: 1.791 Done

Server S3Fox

Kaj smo se naučili

The screenshot shows the AWS Management Console interface in a Mozilla Firefox browser window. The address bar displays the URL <https://console.aws.amazon.com/s3/home?>. The console is titled "AWS Management Console - Mozilla Firefox" and shows the user "Welcome, matej" with a "Sign Out" link.

The main content area is divided into two sections: "Buckets" and "Objects and Folders".

Buckets: This section lists three buckets: "jgroups-s3-ping", "lazo", and "matejlazar". The "matejlazar" bucket is selected.

Objects and Folders: This section shows the contents of the "matejlazar" bucket. It includes a table with the following columns: "Name", "Size", and "Last Modified".

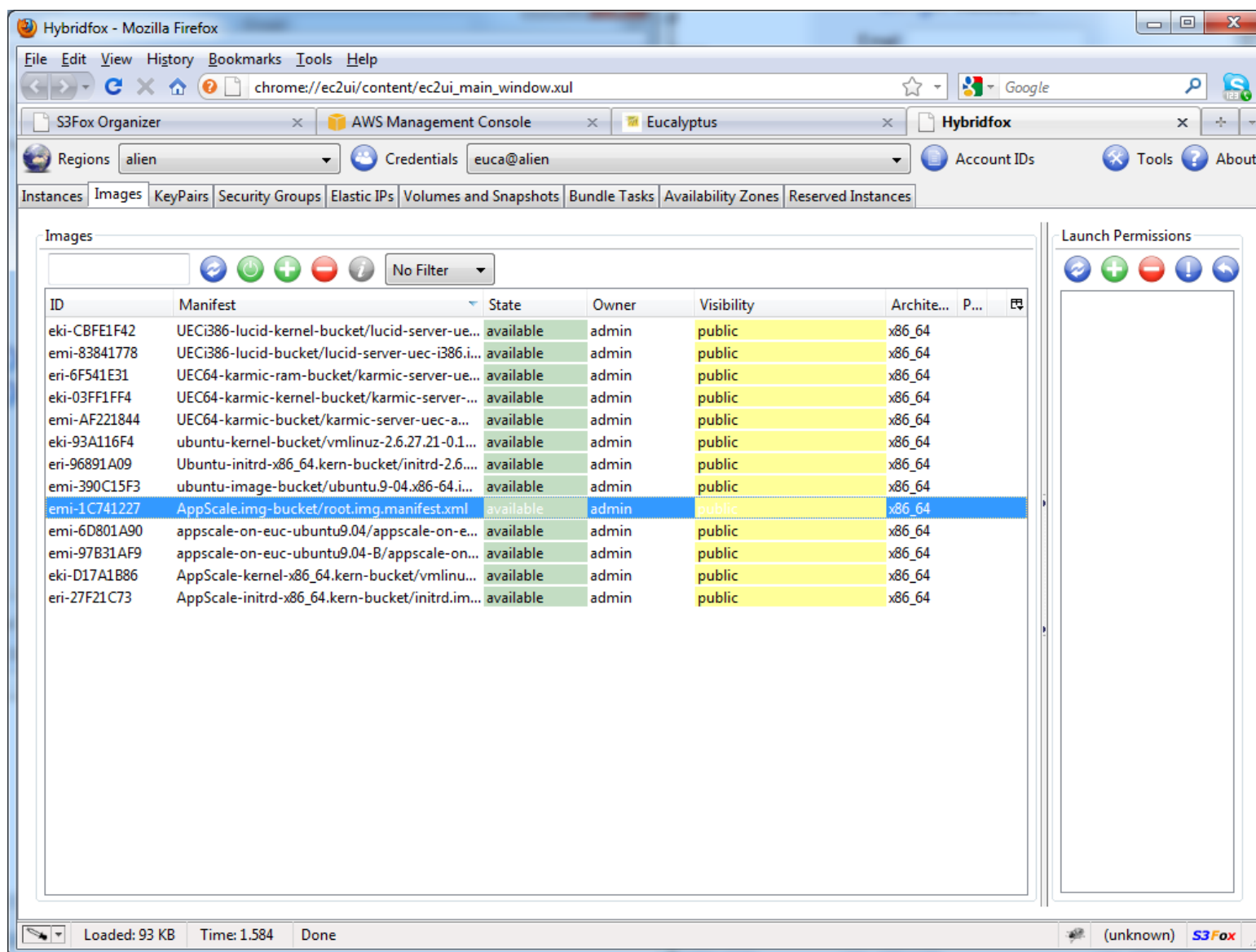
Name	Size	Last Modified
AppScale	--	--
makara	--	--
s3-ping	--	--

Below the "Objects and Folders" section, there is a "Transfers" section. It shows two transfer operations, both marked as "Done":

- Delete: Deleting folder from matejlazar
- Delete: Deleting 3 objects from matejlazar

The footer of the console displays copyright information: "© 2008 - 2011, Amazon Web Services LLC or its affiliates. All right reserved." and links to "Feedback", "Support", "Privacy Policy", and "Terms of Use". It also mentions "An amazon.com. comp".

Kaj smo se naučili

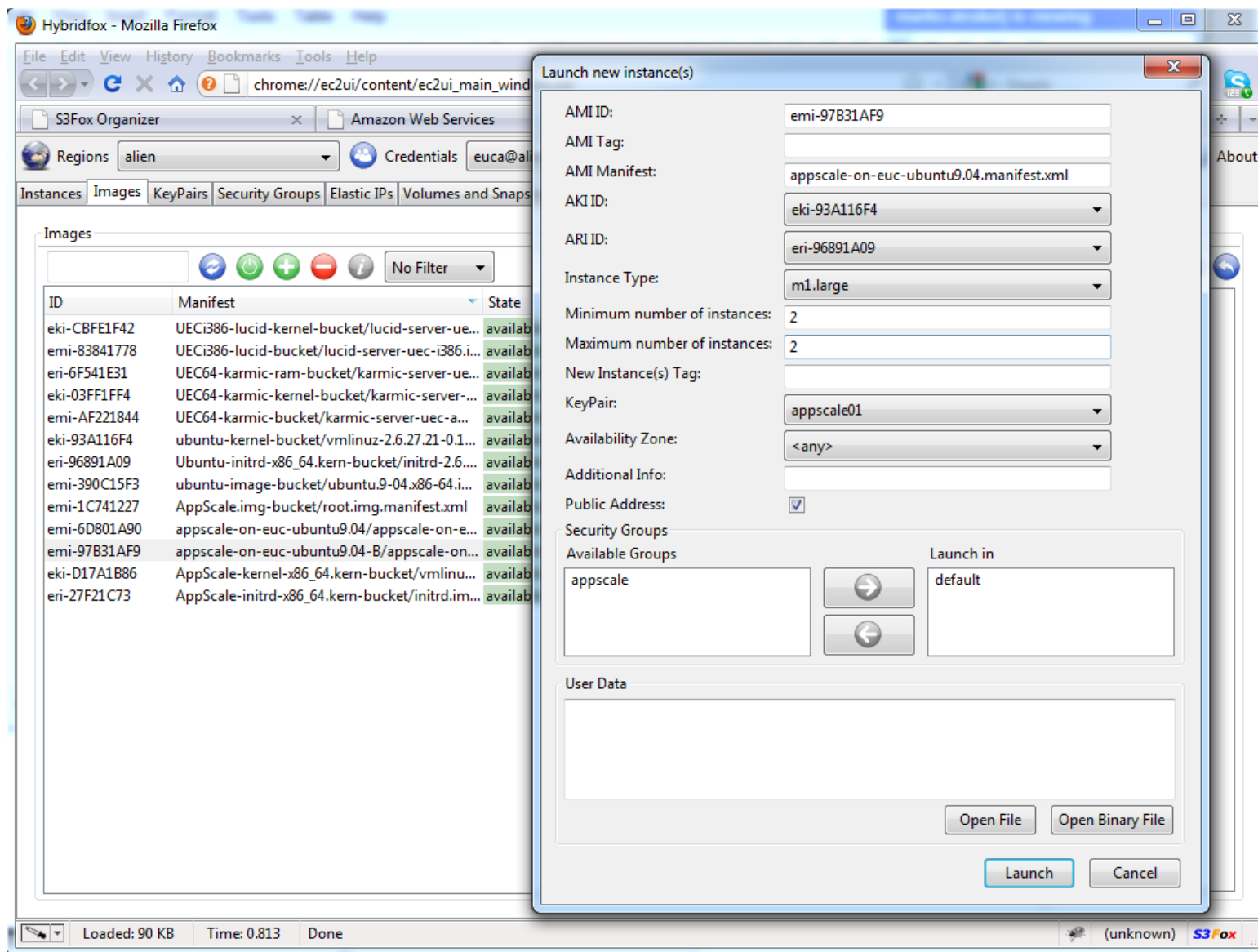


The screenshot shows the Hybridfox interface within a Mozilla Firefox browser. The browser's address bar displays the URL `chrome://ec2ui/content/ec2ui_main_window.xul`. The interface includes a menu bar (File, Edit, View, History, Bookmarks, Tools, Help) and a toolbar with navigation buttons. Below the toolbar, there are tabs for 'S3Fox Organizer', 'AWS Management Console', 'Eucalyptus', and 'Hybridfox'. The 'AWS Management Console' tab is active, showing a navigation pane on the left with options like 'Regions', 'Credentials', 'Account IDs', 'Tools', and 'About'. The main content area displays a list of EC2 images under the 'Images' tab. The list includes columns for ID, Manifest, State, Owner, Visibility, and Architecture. The image with ID 'emi-1C741227' is highlighted. On the right side, there is a 'Launch Permissions' panel.

ID	Manifest	State	Owner	Visibility	Archite...	P...
eki-C8FE1F42	UECi386-lucid-kernel-bucket/lucid-server-ue...	available	admin	public	x86_64	
emi-83841778	UECi386-lucid-bucket/lucid-server-uec-i386.i...	available	admin	public	x86_64	
eri-6F541E31	UEC64-karmic-ram-bucket/karmic-server-ue...	available	admin	public	x86_64	
eki-03FF1FF4	UEC64-karmic-kernel-bucket/karmic-server-ue...	available	admin	public	x86_64	
emi-AF221844	UEC64-karmic-bucket/karmic-server-uec-a...	available	admin	public	x86_64	
eki-93A116F4	ubuntu-kernel-bucket/vmlinuz-2.6.27.21-0.1...	available	admin	public	x86_64	
eri-96891A09	Ubuntu-initrd-x86_64.kern-bucket/initrd-2.6....	available	admin	public	x86_64	
emi-390C15F3	ubuntu-image-bucket/ubuntu.9-04.x86-64.i...	available	admin	public	x86_64	
emi-1C741227	AppScale.img-bucket/root.img.manifest.xml	available	admin	public	x86_64	
emi-6D801A90	appscale-on-euc-ubuntu9.04/appscale-on-e...	available	admin	public	x86_64	
emi-97B31AF9	appscale-on-euc-ubuntu9.04-B/appscale-on...	available	admin	public	x86_64	
eki-D17A1B86	AppScale-kernel-x86_64.kern-bucket/vmlinu...	available	admin	public	x86_64	
eri-27F21C73	AppScale-initrd-x86_64.kern-bucket/initrd.im...	available	admin	public	x86_64	

At the bottom of the window, a status bar shows 'Loaded: 93 KB', 'Time: 1.584', and 'Done'. The bottom right corner displays '(unknown)' and the 'S3Fox' logo.

Kaj smo se naučili



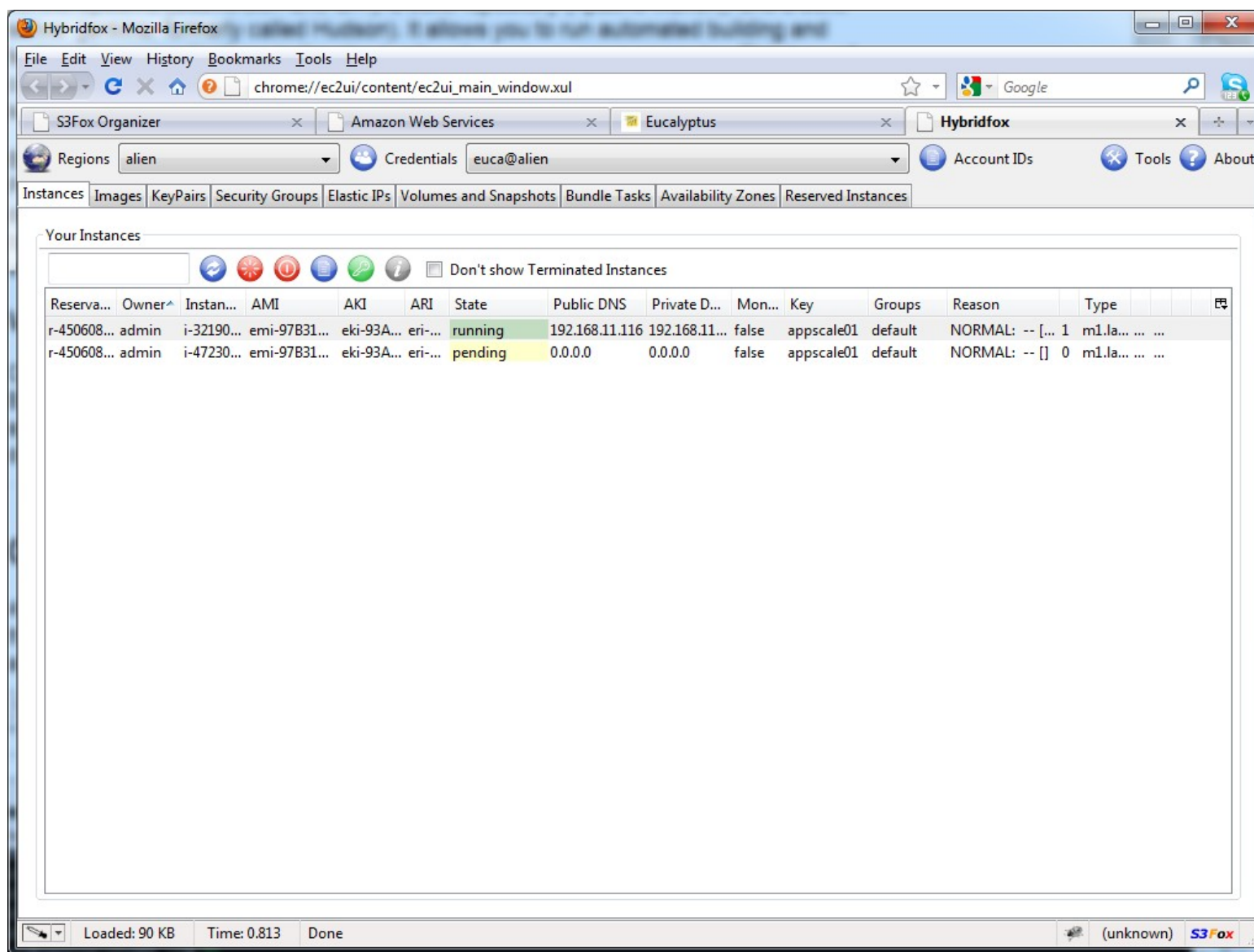
Kaj smo se naučili

The screenshot shows the Hybridfox web interface running in Mozilla Firefox. The browser address bar displays `chrome://ec2ui/content/ec2ui_main_window.xul`. The interface includes a menu bar (File, Edit, View, History, Bookmarks, Tools, Help) and a toolbar with navigation buttons. Below the toolbar, there are tabs for 'S3Fox Organizer', 'Amazon Web Services', 'Eucalyptus', and 'Hybridfox'. The 'Hybridfox' tab is active, showing a 'Regions' dropdown set to 'alien' and 'Credentials' set to 'euca@alien'. A navigation bar at the top of the main content area lists various AWS services: Instances, Images, KeyPairs, Security Groups, Elastic IPs, Volumes and Snapshots, Bundle Tasks, Availability Zones, and Reserved Instances. The 'Instances' tab is selected, displaying a section titled 'Your Instances'. This section includes a search bar, a 'Don't show Terminated Instances' checkbox, and a table of instances.

Reserva...	Owner	Instan...	AMI	AKI	ARI	State	Public DNS	Private DNS	Mon...	Key	Groups	Reason	Type
r-450608...	admin	i-32190...	emi-97B31...	eki-93A...	eri-...	pending	0.0.0.0	0.0.0.0	false	appscale01	default	NORMAL: -- []	1 m1.la... ..
r-450608...	admin	i-47230...	emi-97B31...	eki-93A...	eri-...	pending	0.0.0.0	0.0.0.0	false	appscale01	default	NORMAL: -- []	0 m1.la... ..

The status bar at the bottom of the browser window shows 'Loaded: 90 KB', 'Time: 0.813', and 'Done'. The status bar of the application window shows '(unknown)' and the 'S3Fox' logo.

Kaj smo se naučili



Hybridfox - Mozilla Firefox

chrome://ec2ui/content/ec2ui_main_window.xul

S3Fox Organizer Amazon Web Services Eucalyptus Hybridfox

Regions: alien Credentials: euca@alien Account IDs Tools About

Instances Images KeyPairs Security Groups Elastic IPs Volumes and Snapshots Bundle Tasks Availability Zones Reserved Instances

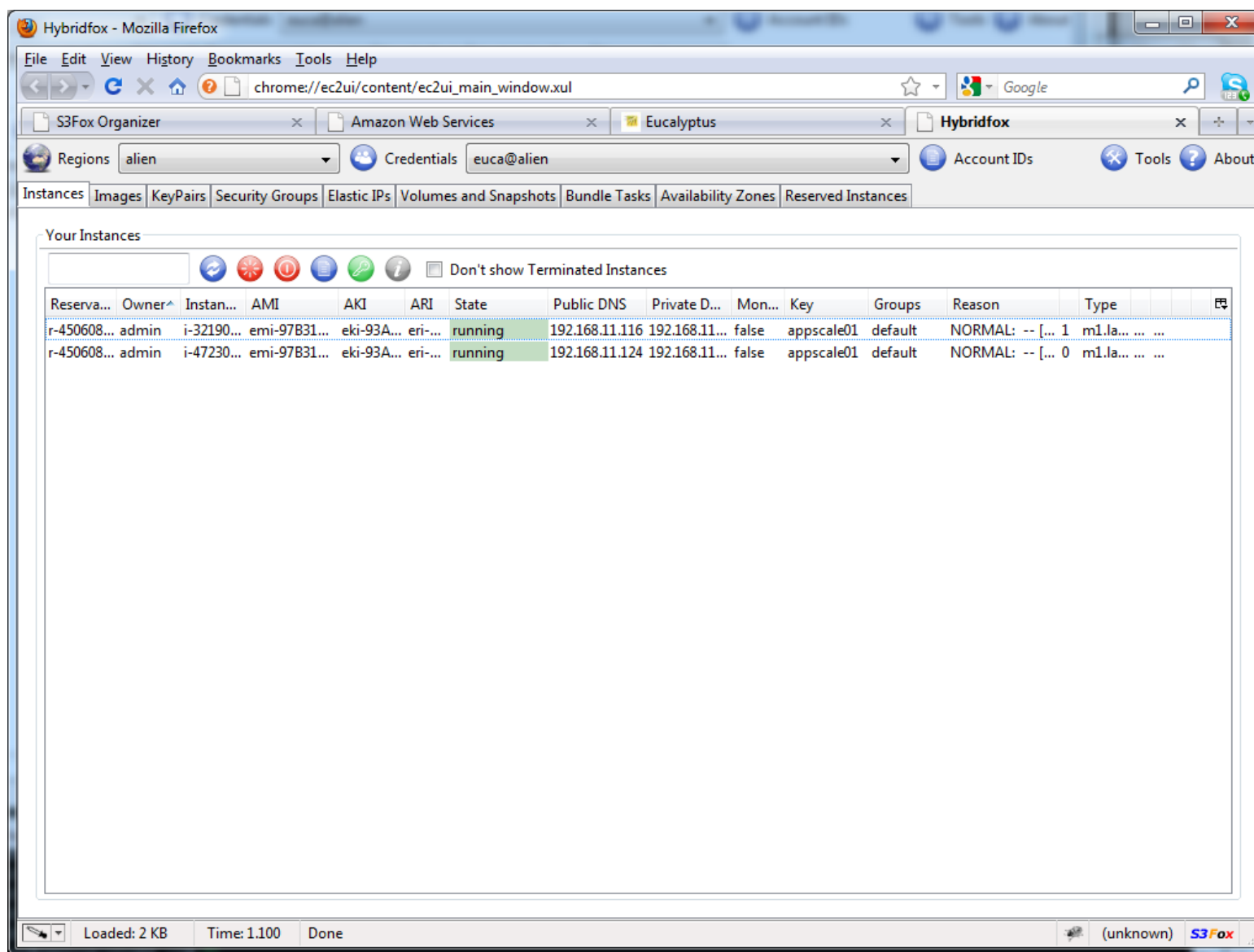
Your Instances

☐ Don't show Terminated Instances

Reserva...	Owner	Instan...	AMI	AKI	ARI	State	Public DNS	Private D...	Mon...	Key	Groups	Reason	Type
r-450608...	admin	i-32190...	emi-97B31...	eki-93A...	eri-...	running	192.168.11.116	192.168.11...	false	appscale01	default	NORMAL: -- [... 1	m1.la... ..
r-450608...	admin	i-47230...	emi-97B31...	eki-93A...	eri-...	pending	0.0.0.0	0.0.0.0	false	appscale01	default	NORMAL: -- [] 0	m1.la... ..

Loaded: 90 KB Time: 0.813 Done (unknown) S3Fox

Kaj smo se naučili

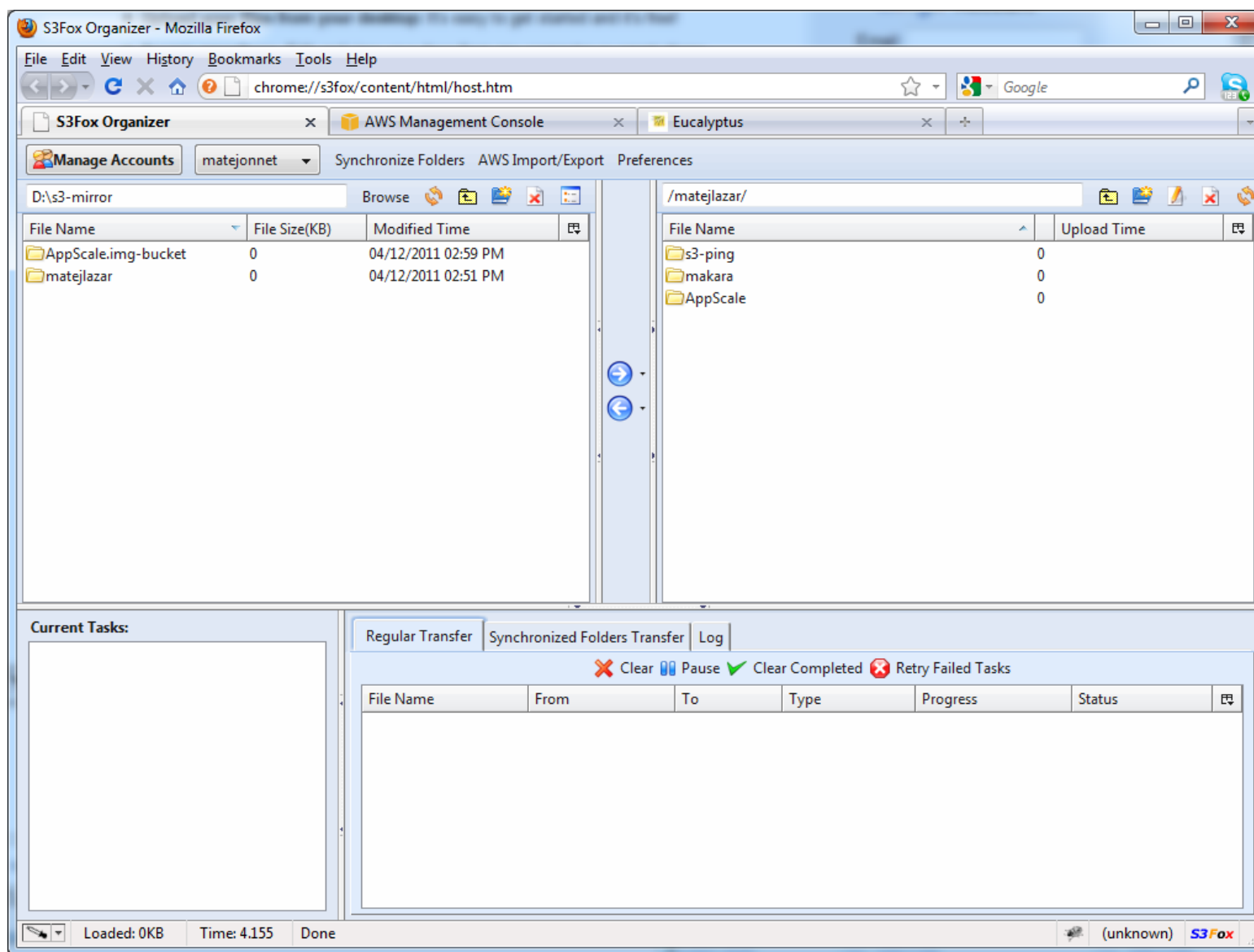


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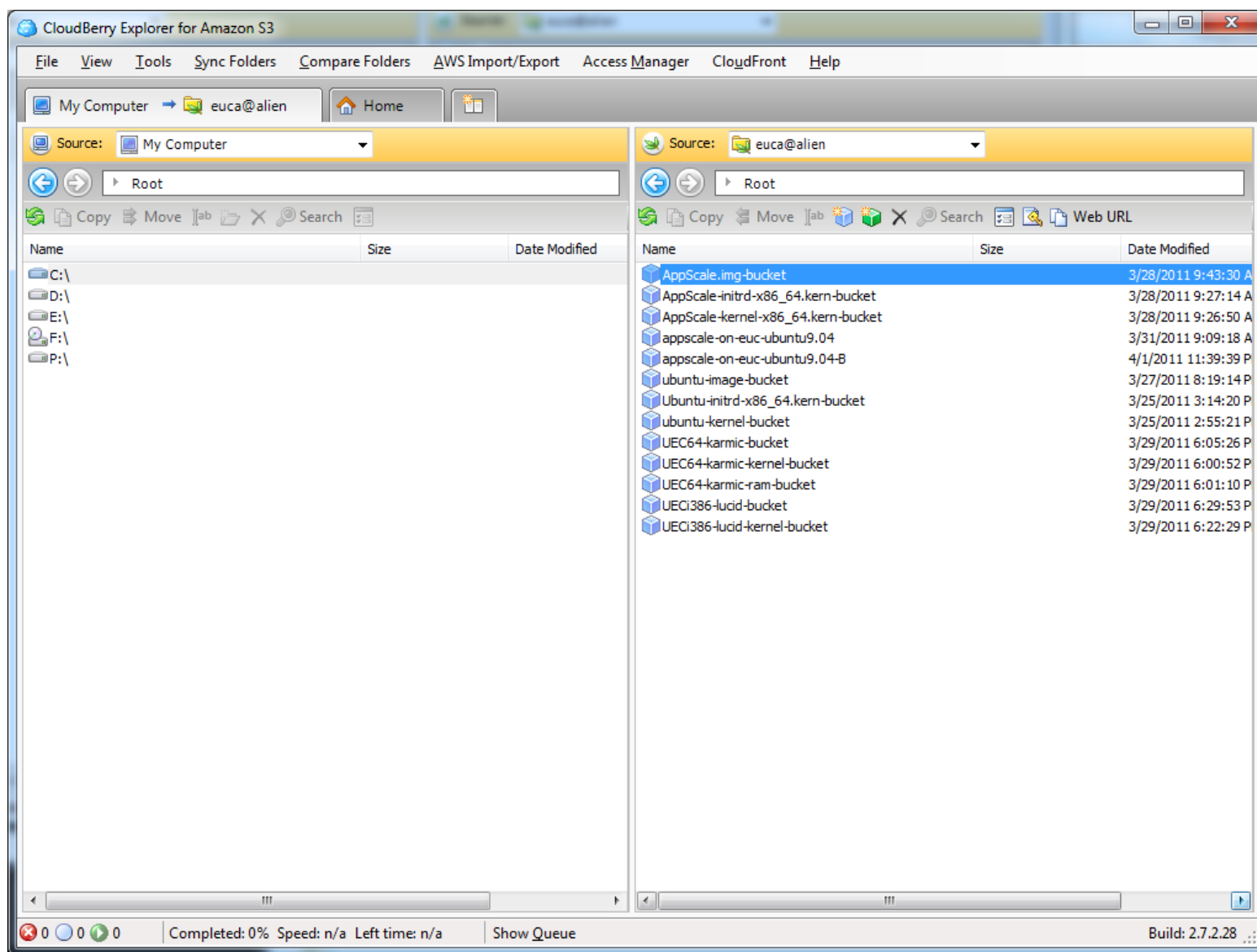
Reserva...	Owner	Instan...	AMI	AKI	ARI	State	Public DNS	Private D...	Mon...	Key	Groups	Reason	Type
r-450608...	admin	i-32190...	emi-97B31...	eki-93A...	eri-...	running	192.168.11.116	192.168.11...	false	appscale01	default	NORMAL: -- [... 1	m1.la... ..
r-450608...	admin	i-47230...	emi-97B31...	eki-93A...	eri-...	running	192.168.11.124	192.168.11...	false	appscale01	default	NORMAL: -- [... 0	m1.la... ..

At the bottom of the browser window, the status bar shows 'Loaded: 2 KB', 'Time: 1.100', 'Done', and a '(unknown)' status next to the S3Fox logo.

Kaj smo se naučili



Kaj smo se naučili



Kaj smo se naučili

```

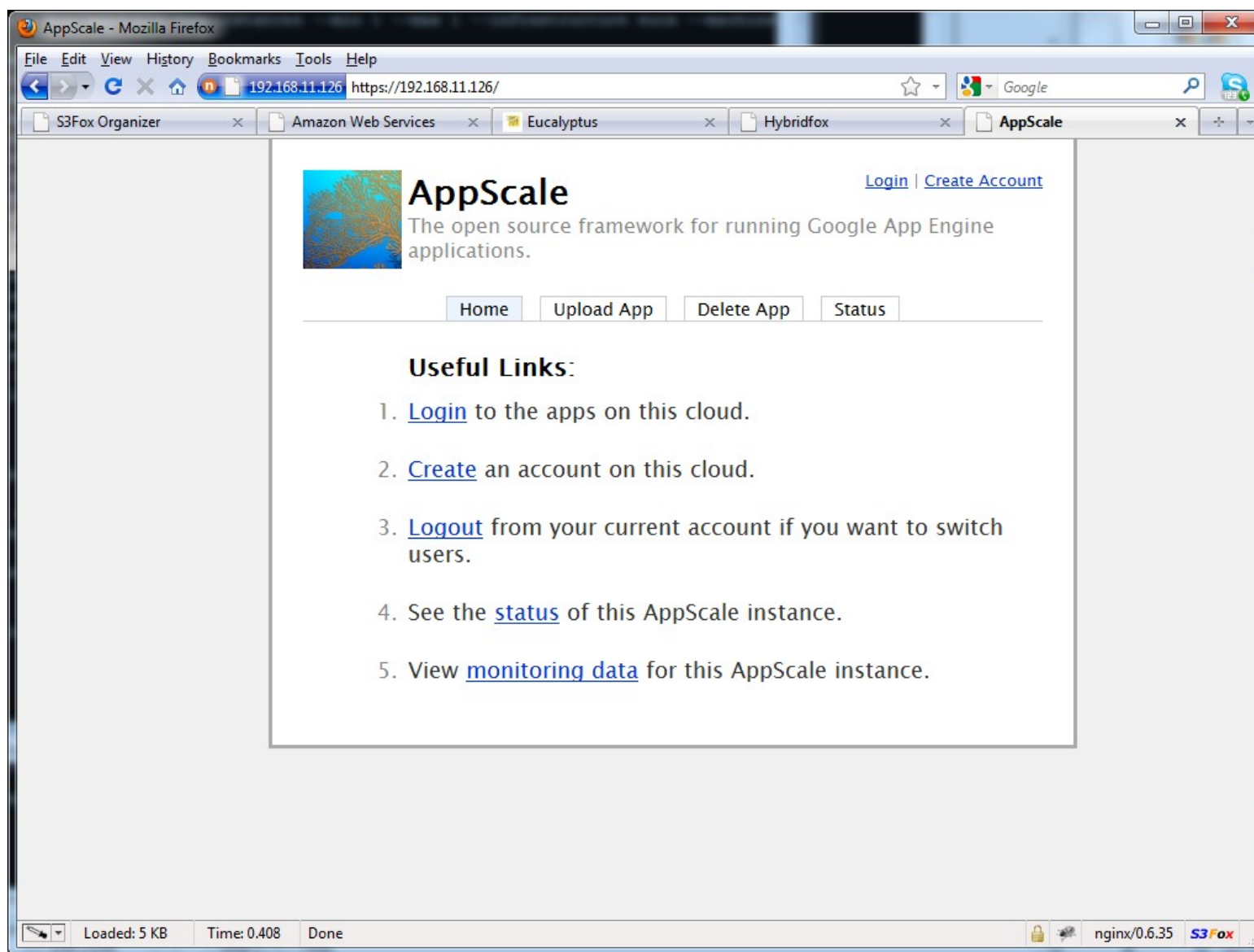
root@centos-clc64:~
[root@centos-clc64 ~]# ll /usr/local/appscale-tools/bin/
total 40
-rwxr-xr-x 1 root root 2413 Sep 7 2010 appscale-add-keypair
-rwxr-xr-x 1 root root 1325 Sep 7 2010 appscale-describe-instances
-rwxr-xr-x 1 root root 2388 Sep 7 2010 appscale-remove-app
-rwxr-xr-x 1 root root 1277 Sep 7 2010 appscale-reset-pwd
-rwxr-xr-x 1 root root 13676 Sep 7 2010 appscale-run-instances
-rwxr-xr-x 1 root root 4095 Sep 7 2010 appscale-terminate-instances
-rwxr-xr-x 1 root root 3566 Sep 7 2010 appscale-upload-app
[root@centos-clc64 ~]# /usr/local/appscale-tools/bin/appscale-run-instances --min 1 --max 1 --infrastructure euca --machine
emi-97B31AF9 --keyname appscale21
About to start AppScale over a cloud environment with the euca tools with instance type m1.large.
Run instances message sent successfully. Waiting for the image to start up.
[Tue Apr 12 16:31:38 +0200 2011] 1799.999857 seconds left until timeout...
[Tue Apr 12 16:31:59 +0200 2011] 1779.731611 seconds left until timeout...
[Tue Apr 12 16:32:20 +0200 2011] 1758.326012 seconds left until timeout...
[Tue Apr 12 16:32:40 +0200 2011] 1738.193773 seconds left until timeout...
[Tue Apr 12 16:33:01 +0200 2011] 1718.067627 seconds left until timeout...
[Tue Apr 12 16:33:24 +0200 2011] 1696.23738 seconds left until timeout...
[Tue Apr 12 16:33:55 +0200 2011] 1673.595711 seconds left until timeout...
[Tue Apr 12 16:34:19 +0200 2011] 1642.385331 seconds left until timeout...
[Tue Apr 12 16:35:11 +0200 2011] 1618.592678 seconds left until timeout...
[Tue Apr 12 16:35:31 +0200 2011] 1566.988372 seconds left until timeout...
[Tue Apr 12 16:35:51 +0200 2011] 1546.822855 seconds left until timeout...
[Tue Apr 12 16:36:12 +0200 2011] 1526.306834 seconds left until timeout...
[Tue Apr 12 16:36:32 +0200 2011] 1506.181644 seconds left until timeout...
[Tue Apr 12 16:36:52 +0200 2011] 1486.008192 seconds left until timeout...
Please wait for your instance to complete the bootup process.
Head node successfully created at 192.168.11.126. It is now starting up voldemort via the command line arguments given.
Generating certificate and private key
Copying over credentials for cloud
Starting server at 192.168.11.126
Please wait for the controller to finish pre-processing tasks.

This AppScale instance is linked to an e-mail address giving it administrator privileges.
Enter your desired administrator e-mail address: matej.lazar@openblend.org

The new administrator password must be at least six characters long and can include non-alphanumeric characters.
Enter your new password:
Enter again to verify:
Please wait for AppScale to prepare your machines for use.

```

Kaj smo se naučili



Kaj smo se naučili

AppScale - Mozilla Firefox

File Edit View History Bookmarks Tools Help

192.168.11.126 https://192.168.11.126/status

S3Fox Organizer Amazon Web Services Eucalyptus Hybridfox AppScale

AppScale [Login](#) [Create Account](#)

The open source framework for running Google App Engine applications.

Home Upload App Delete App Status

CPU / Memory Usage:

IP Address	CPU Usage	Mem Usage	Hard Disk Usage	Role(s)
192.168.11.126	4.1%	83.96%	85%	load_balancer, shadow, db_master, zookeeper, login, appengine

[View More Monitoring Data](#)

Database Information:

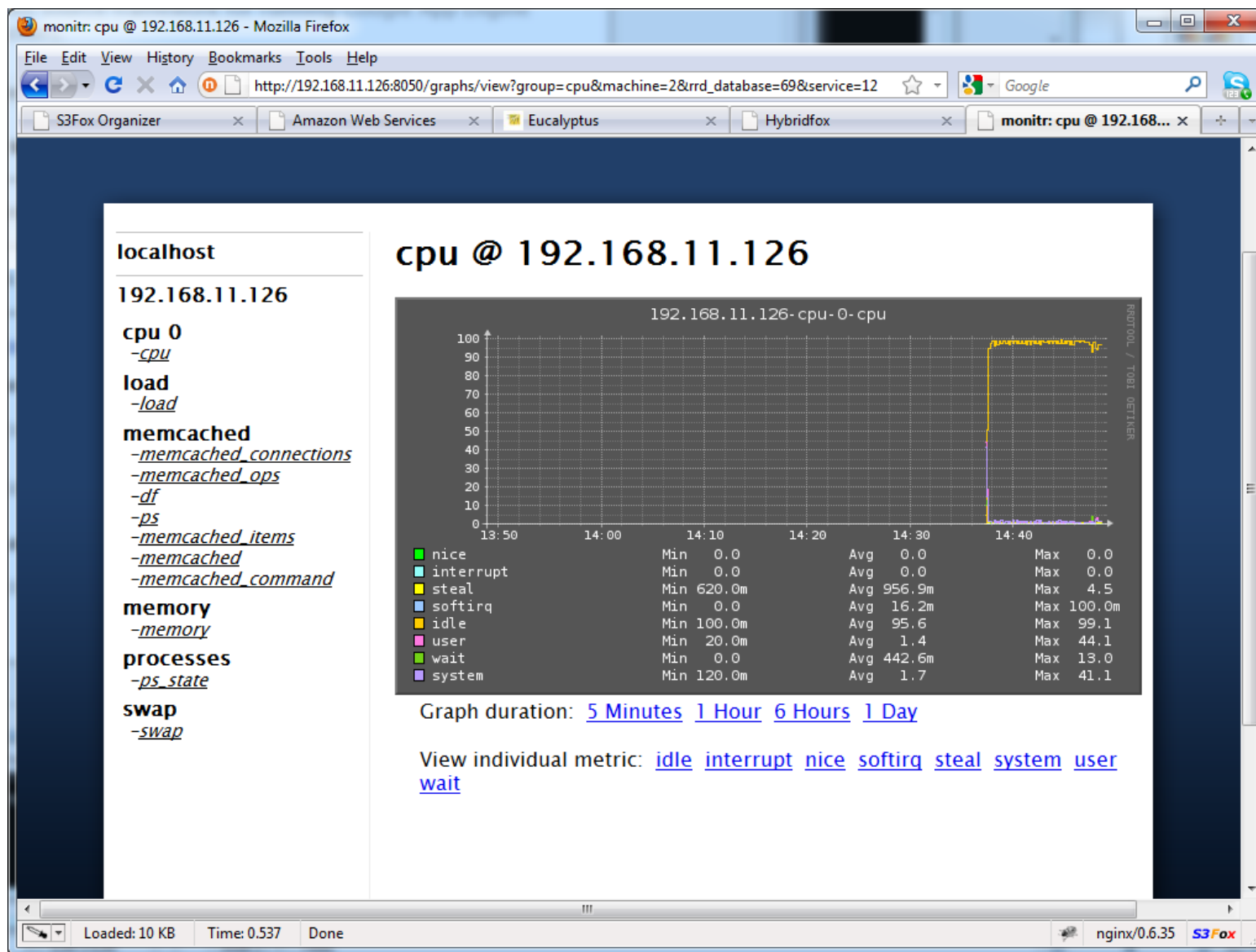
- Powered by voldemort
- Data is replicated 1 times

Applications Hosted in This Cloud:

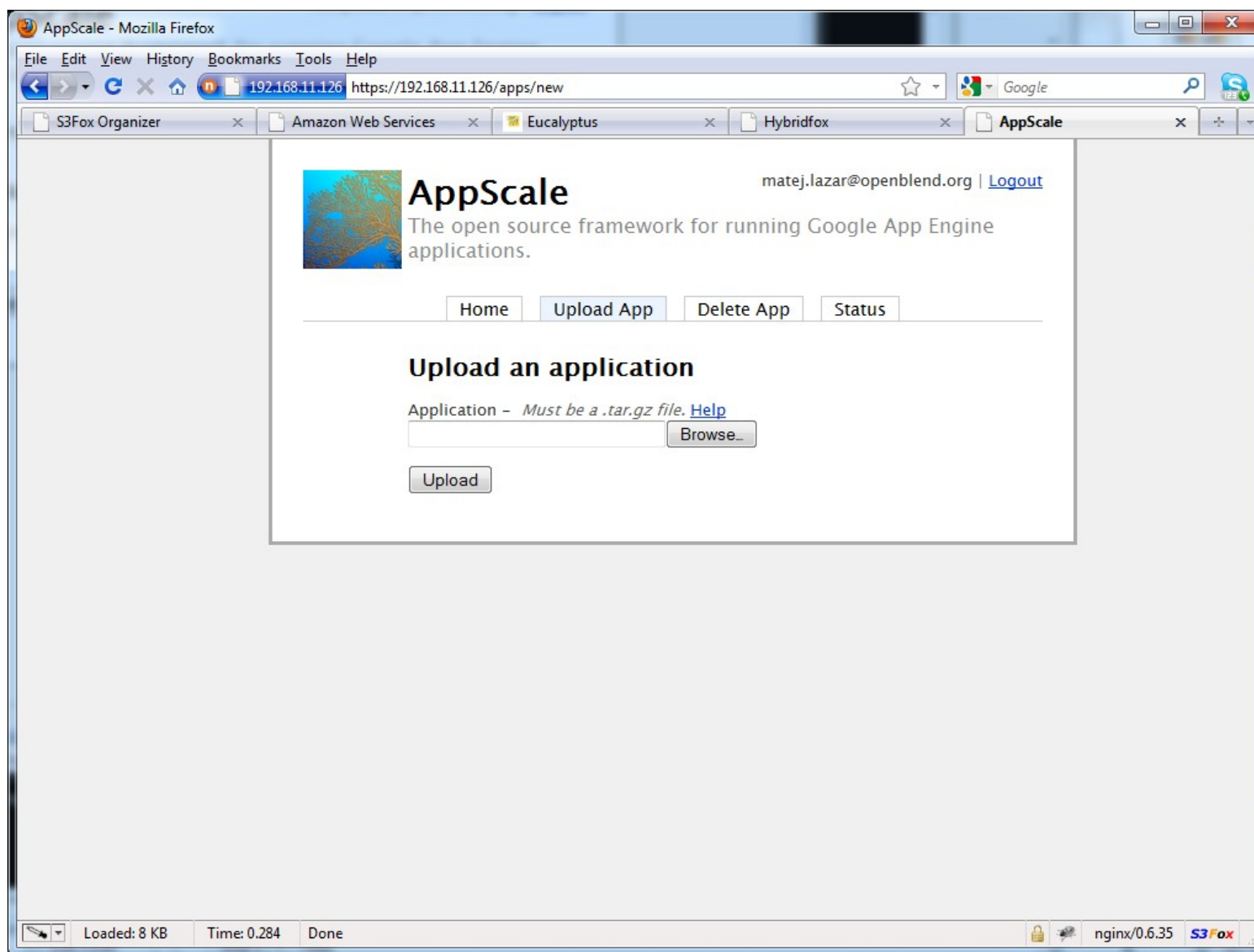
- none

Loaded: 5 KB Time: 0.627 Done nginx/0.6.35 S3Fox

Kaj smo se naučili



Kaj smo se naučili



Kaj smo se naučili

All Applications
Application Details

AMZEC2 : testclust : autoTrack
1. Overview
2. Components
3. Files
4. Configure
5. Deploy

Your application depends on some components for support. You'll need a language runtime and application server.

Select the components needed to run your application

Application Type
Tomcat

Web Server
Apache HTTP Server (Web Tier) (www-static.apache2 2.2.3-42 i686.vpm)

Application Server Version
Apache Tomcat 5.5 (tomcat-5.5.27 5.5.27-17 i686.vpm)

Language Version
JDK 6.0 (jdk6-1.6.0 1.6.0-11-13 i686.vpm)

Database
MySQL Server 5.1.52 (mysql-server 5.1.52-4 amd64.vpm)

Other Components

- ☐ Apache ActiveMQ 5.3.2(apache-activemq_5.3.2-5_i686.vpm)
- ☐ Memcached 1.4.5(memcached-1.4.5_1.4.5-4_i686.vpm)
- ☐ mongoDB-1.6.3(mongodb_1.6.3-17_i686.vpm)
- ☐ mongoDB-1.6.4(mongodb_1.6.4-20_amd64.vpm)
- ☐ Zend Framework 1.10.8(zend-framework-1.10.8_1.10.8-2_i686.vpm)

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

Cancel
Save

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Kaj smo se naučili

All Clusters **testclust : EDIT**

AMZEC2 : testclust Overview **Auto-Scaling** Database Operations Email Settings

All servers in the cluster will use the settings configured here.

Auto-Scale Settings

Enable Auto-Scaling ☒

Minimum Nodes

Maximum Nodes

Scaling Threshold Configuration

Scaling Strategy **CPU and Requests** ▼

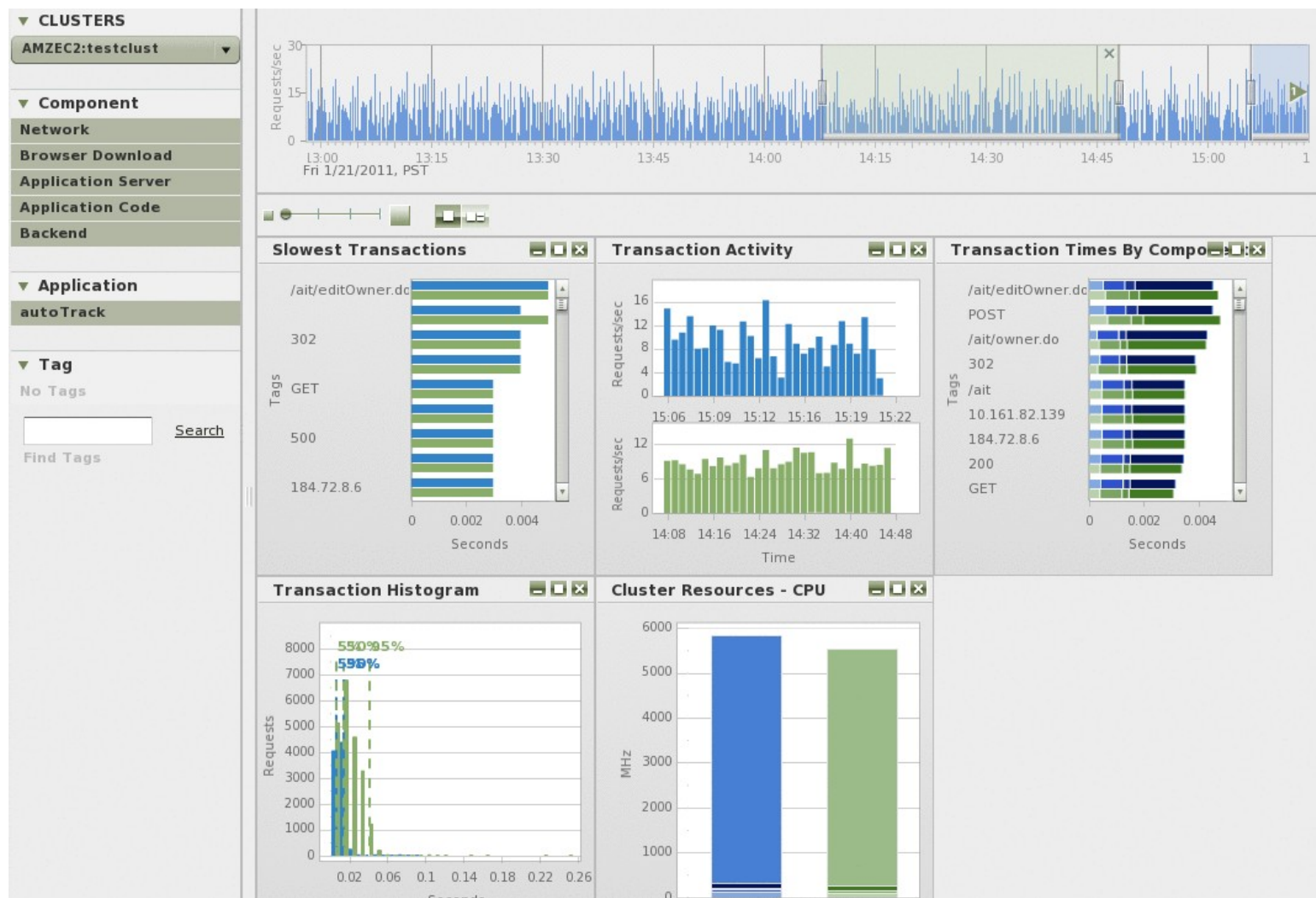
Scale up if CPU greater than % for minutes (evaluated every 10 minutes)

Scale up if Requests greater than requests / second for minutes (evaluated every 10 minutes)

Scale down if CPU less than % for minutes (evaluated every 20 minutes)

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Kaj smo se naučili



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Hvala za pozornost!

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