Apache CloudStack

Sebastien Goasguen @sebgoa

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Muscat, Oman

- I work for Citrix
- Open Source Cloud Computing Evangelist
- Former Associate Professor at Clemson University –USA
- http://sebgoa.blogpost.com
- Find me on Linkedin

Definition

"Cloud computing is a model for enabling ubiquitous, convenient, **on-demand network access** to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be **rapidly provisioned and released with minimal management** effort or service provider interaction"

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

CSA cloud security alliance SM

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SaaS

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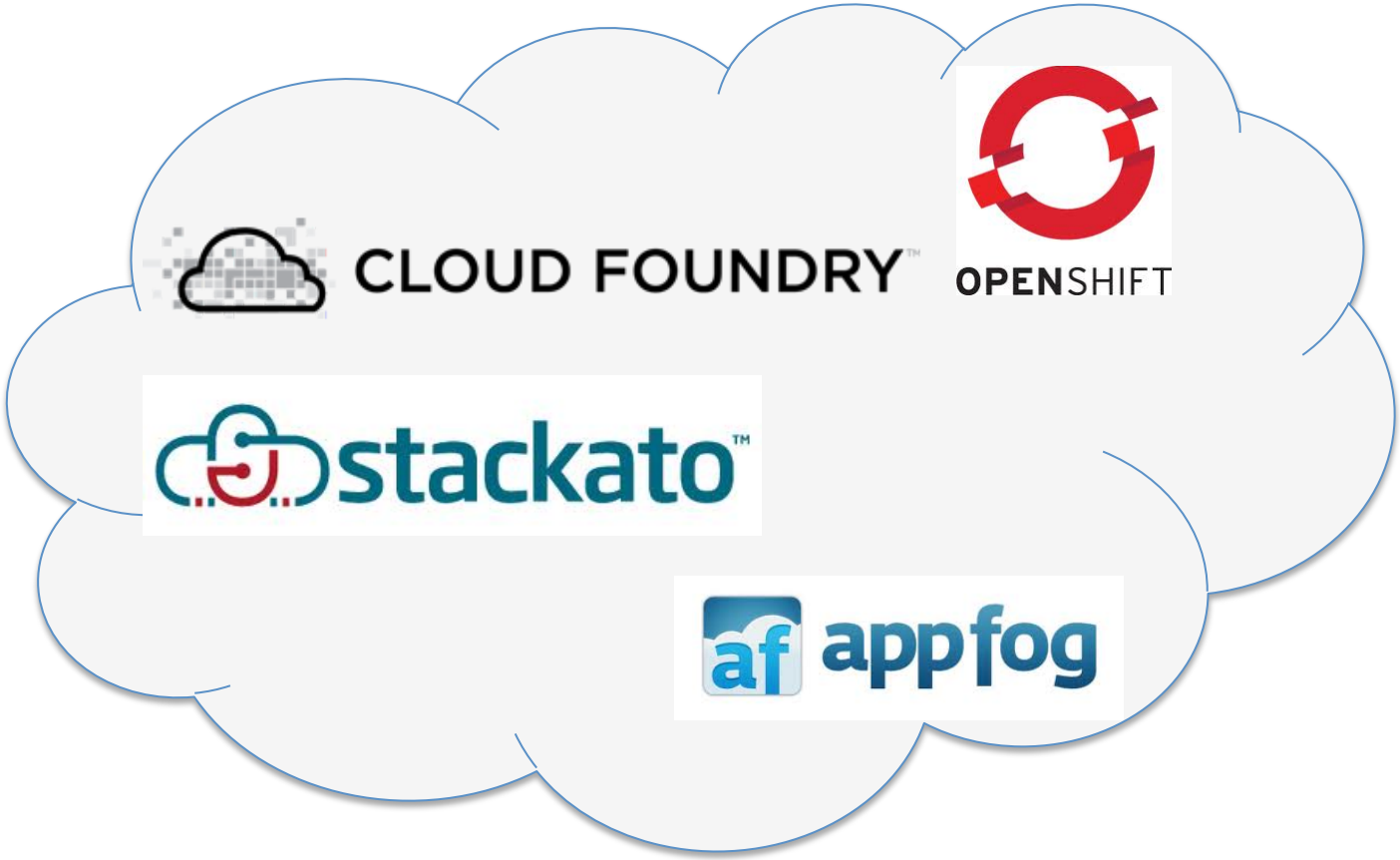
PaaS…



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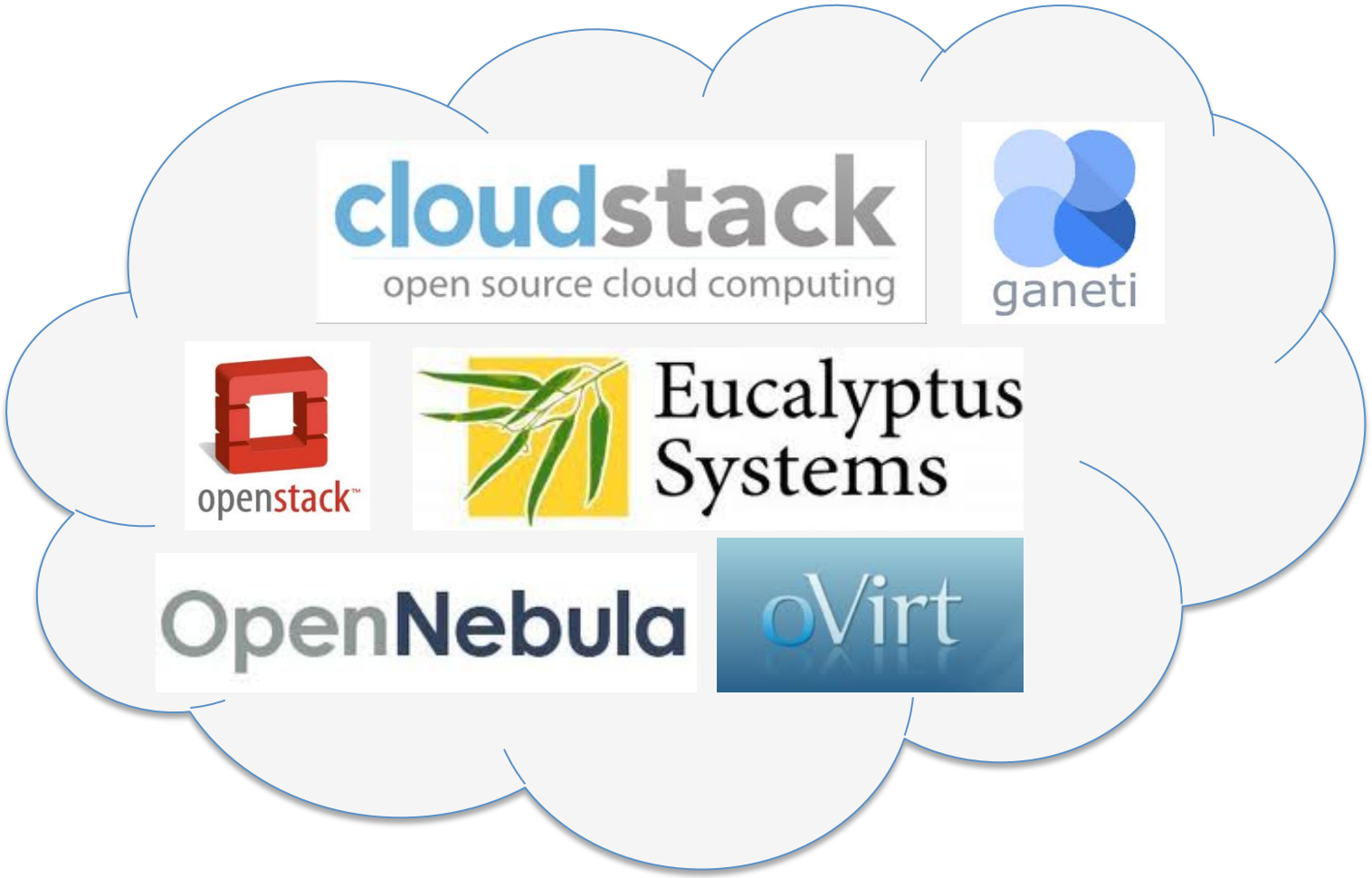
IaaS…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Quizz

- How does SaaS, PaaS, IaaS relate to the OSI model and Grid Computing ?

IaaS challenges

- Not out of the box by itself
- Need a farm of hypervisors
  - Xen, KVM, VMware…
- Need storage
  - For image catalogue
  - For volume/snapshot management
- Need flexible network that can be configured on-demand
  - VLANS, no VLANS, existing net infra, SDN…

IaaS is really:

- **A Data Center Orchestrator**
  - Data storage
  - Data movement
  - Data processing

- **That can:**
  - Handle failures
  - Support large scale
  - Be programmed

What is CloudStack ?

- Open source Infrastructure as a Service (IaaS) solution.
- **“Programmable” Data Center orchestrator**
- Hypervisor agnostic (with addition of bare metal provisioning)
- Support scalable storage (Ceph, RIAK CS…)
- Support complex enterprise networking (e.g Firewall, load balancer, VPN, VPC…)
- Multi-tenant

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Service provider installations

The **Apache Software Foundation**

http://www.apache.org/

ASF

We consider ourselves
not simply a group of projects sharing a server, but rather a community of developers and users.

The Apache Software Foundation
provides support for the Apache community of open-source software projects, which provide software products for the public good.

The Apache projects are defined
by collaborative consensus based processes, an open, pragmatic software license and a desire to create high quality software that leads the way in its field.

Apache Way

- **“Transparency, consensus, non-affiliation,respect for fellow developers, and meritocracy, in no specific order “**

Apache Processes

- 100% community driven
- New ideas, decisions only taken on mailing lists. Votes taken by community
- Project led by Project Management Committee (PMC):
- Non committers get invited as committers:

- **“A little bit about the internals”**

A Very Flexible IaaS Platform

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Compute

Hypervisor

- XenServer
- VMware
- Oracle VM
- KVM
- Bare metal

Storage

Block & Object

- Local Disk
- iSCSI
- Fiber Channel
- NFS
- Swift

Primary Storage

Secondary Storage

Network

Network & Network Services

- Network Type
- Isolation
- Firewall
- Load balancer
- VPN

http://www.slideshare.net/cloudstack/cloudstack-architecture

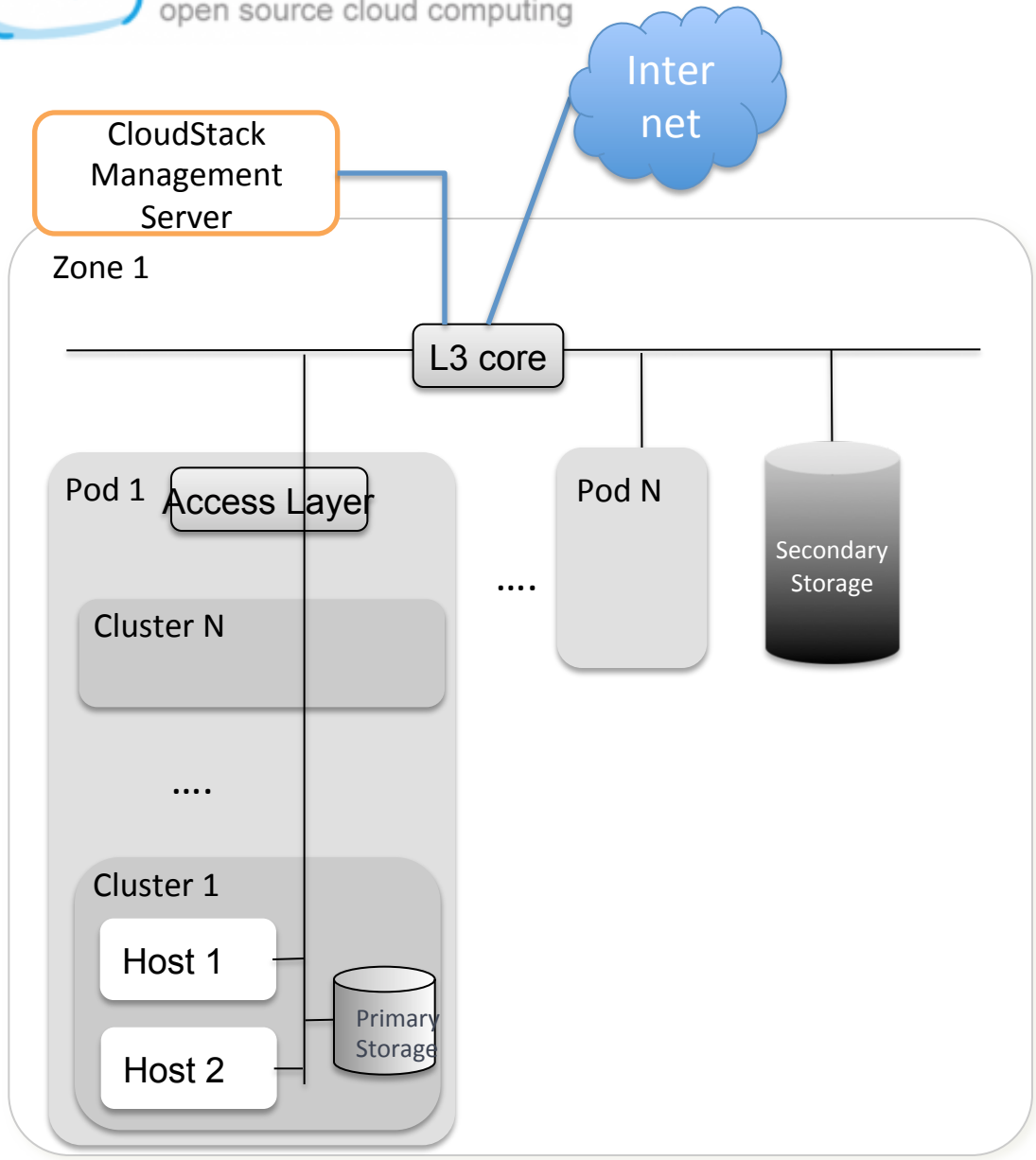
Architecture / Language

- Java application
- Tomcat6, Axis2, Maven build + ant
  - Ant going away in 4.1

Releases

- **Apache CloudStack 4.0 released in November**
- Time based releases
  - Rather slip features but guarantee release
- **Apache CloudStack 4.1 planned for March 22nd. Feature Freeze Yesterday...**
- **4.2 most likely in July**

CloudStack Cloud Architecture



- Hypervisor is the basic unit of scale.
- Cluster consists of one ore more hosts of same hypervisor
- All hosts in cluster have access to shared (primary) storage
- Pod is one or more clusters, usually with L2 switches.
- Availability Zone has one or more pods, has access to secondary storage.
- One or more zones represent cloud

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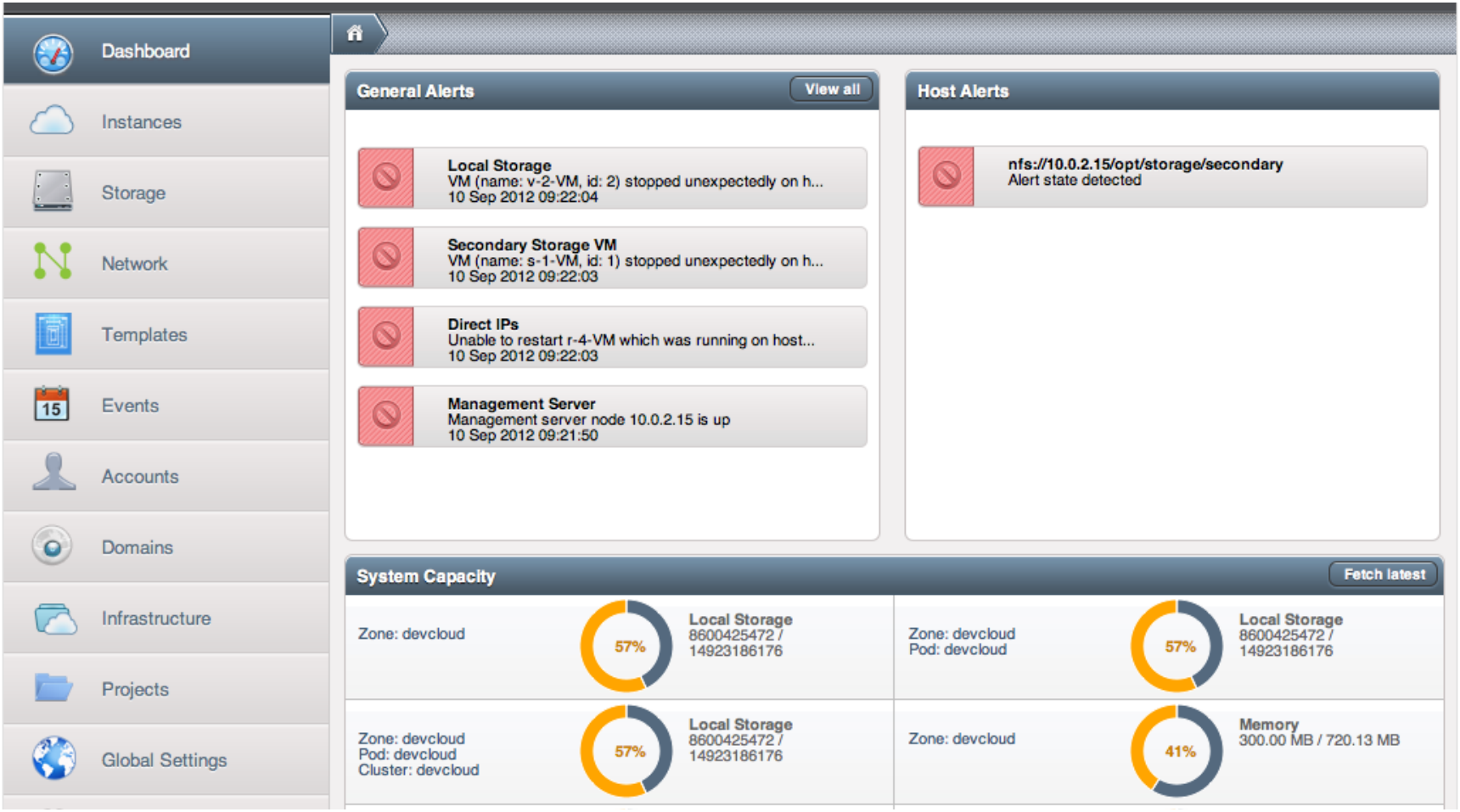
A powerful UI



An extensive API

Firewall

- listPortForwardingRules
- createPortForwardingRule (A)
- deletePortForwardingRule (A)
- createFirewallRule (A)
- deleteFirewallRule (A)
- listFirewallRules
- addSrxFirewall (A)
- deleteSrxFirewall (A)
- configureSrxFirewall (A)
- listSrxFirewalls

Account

- createAccount
- deleteAccount (A)
- updateAccount
- disableAccount (A)
- enableAccount
- listAccounts
- markDefaultZoneForAccount (A)
- addAccountToProject (A)
- deleteAccountFromProject (A)
- listProjectAccounts

Router

- startRouter (A)
- rebootRouter (A)
- stopRouter (A)
- destroyRouter (A)
- changeServiceForRouter
- listRouters
- createVirtualRouterElement (A)
- configureVirtualRouterElement (A)
- listVirtualRouterElements

Project

- createProject (A)
- deleteProject (A)
- updateProject (A)
- activateProject (A)
- suspendProject (A)
- listProjects
- listProjectInvitations
- updateProjectInvitation (A)
- deleteProjectInvitation (A)

Host

- addHost
- reconnectHost (A)
- updateHost
- deleteHost
- prepareHostForMaintenance (A)
- cancelHostMaintenance (A)
- listHosts
- addSecondaryStorage
- updateHostPassword

Pool

- listStoragePools
- createStoragePool
- updateStoragePool
- deleteStoragePool
- createPool
- deletePool
- modifyPool
- listPools

System VM

- startSystemVm (A)
- rebootSystemVm (A)
- stopSystemVm (A)
- destroySystemVm (A)
- listSystemVms
- migrateSystemVm (A)
- changeServiceForSystemVm

Security Group

- createSecurityGroup
- deleteSecurityGroup
- authorizeSecurityGroupIngress (A)
- revokeSecurityGroupIngress (A)
- authorizeSecurityGroupEgress (A)
- revokeSecurityGroupEgress (A)
- listSecurityGroups

Snapshot

- createSnapshot (A)
- listSnapshots
- deleteSnapshot (A)
- createSnapshotPolicy

Storage

- createLunOnFiler
- destroyLunOnFiler
- listLunsOnFiler
- associateLun

NAT

- enableStaticNat
- createIpForwardingRule (A)
- deleteIpForwardingRule (A)
- listIpForwardingRules

Domain

- createDomain
- updateDomain
- deleteDomain (A)
- listDomains

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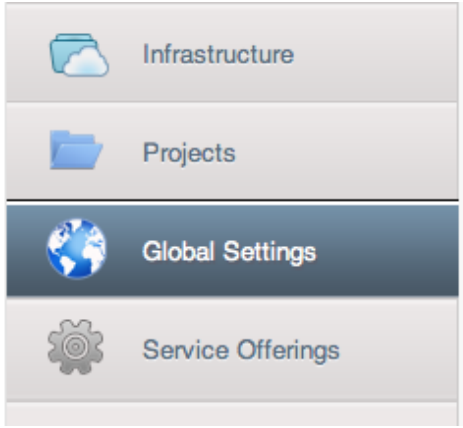
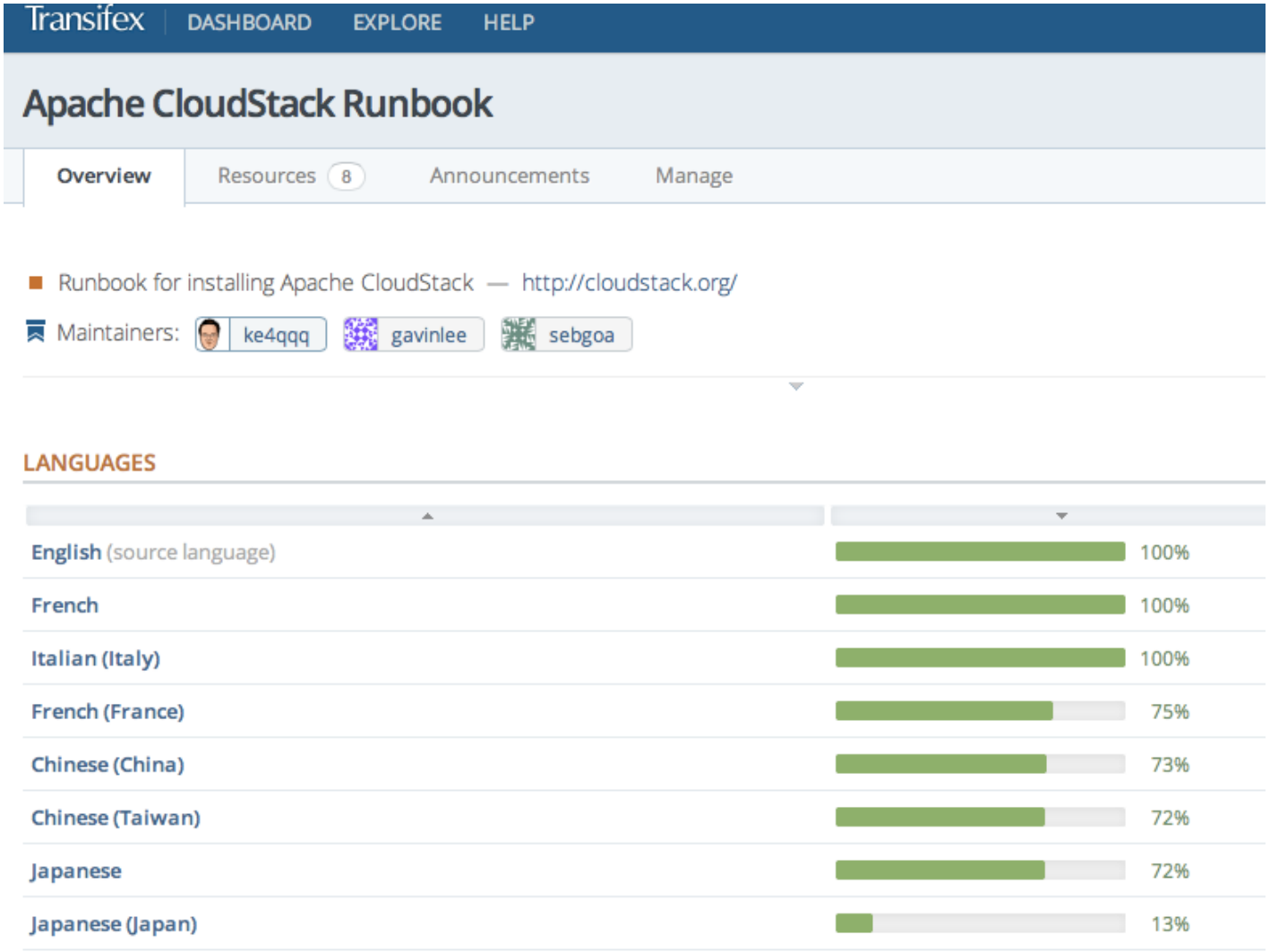
Enabling EC2 and S3



enable.ec2.api	enable EC2 API on CloudStack	true	
enable.s3.api	enable Amazon S3 API on CloudStack	true ✓ ✗	
enable.usage.server	Flag for enabling usage	true	
encode.api.response	Do UTF-8 encoding for the api response, false by default	false	
endpointe.url	Endpointe Url	http://localhost:8080/client/api	

- “How to get involved ?”
- “Let me issue a challenge…”

Translation



Info

- Apache incubator project
- http://incubator.apache.org/cloudstack
- #cloudstack and #cloudstack-dev on irc.freenode.net
- @CloudStack on Twitter
- http://www.slideshare.net/cloudstack
- http://incubator.apache.org/cloudstack/mailing-lists.html
- Collaboration Conference, Nov 30th -Dec 2nd
  - http://collab12.cloudstack.org/
  - http://www.youtube.com/diycloudcomputing

Welcoming contributions and feedback, Join the fun !