

# Open Source Multi-Cloud, Multi-Tenant Automation in the cloud with SlipStream PaaS

**A professional open source solution**

Robert Branchat, SixSq  
5 July 2014  
Lyon, France



# Based in Geneva, Switzerland

## Founded in 2007

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POST TENEBRAS LUX



swiss made  
software





# A European cloud computing partnership: big science teams up with big business



## Strategic Plan

- ▶ Establish multi-tenant, multi-provider cloud infrastructure
- ▶ Identify and adopt policies for trust, security and privacy
- ▶ Create governance structure
- ▶ Define funding schemes



To support the computing capacity needs for the ATLAS experiment



Setting up a new service to simplify analysis of large genomes, for a deeper insight into evolution and biodiversity



To create an Earth Observation platform, focusing on earthquake and volcano research

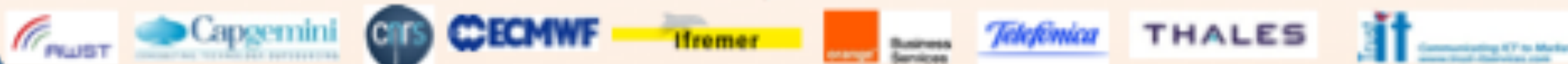


To improve the speed and quality of research for finding surrogate biomarkers based on brain images

## Suppliers



## Adopters





## **PaaS**

Open Source

Multi-Cloud

Multi-Tenant

...it's all about automation...



# IaaS

IaaS

IaaS

PaaS



**IaaS**

**PaaS**

**SaaS**



IaaS

PaaS

SlipStream.

SaaS

IaaS

PaaS



is a

**SlipStream.**

SaaS

IaaS

PaaS

uses

is a

**SlipStream.**

SaaS

IaaS

PaaS

uses

is a

**SlipStream.**

used as a

SaaS

# IaaS

# PaaS

**SlipStream**🏠 ⓘ 👤 ➡

➡ **Single Click Application Deployment**

< **Coordinate the deployment of any application** >

With this feature you can (self-)provision applications and/or let colleagues. No more chasing down the corridor overworked system administrators.

🏠 > login

**Login** ^

**Username**


user

**Password**

.....

➡ Login

**Register** v





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# IaaS

# PaaS

SlipStream




 **Single Click Application Deployment**

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 Copyright © 200

```
$ pip install slipstream-client
Downloading/unpacking slipstream-client
  Downloading slipstream-client-1.3-1.tar.gz
  Running setup.py egg_info for package slipstream-client

...

$ ss-execute -h
Usage: usage: ss-execute [options] <module-uri>

<module-uri>    Full URL to the module to execute. For example Public/Tutorials/HelloWorld/client_server

Options:
  -h, --help            show this help message and exit
  -v, --verbose          verbose level. Add more to get more details.
  -u USERNAME, --username=USERNAME
                        SlipStream username
  -p PASSWORD, --password=PASSWORD
                        SlipStream password
  --cookie=FILE          SlipStream cookie
  --endpoint=URL         SlipStream server endpoint
  --parameters=KEY1=VALUE1,KEY2=VALUE2
                        Deployment or image parameters override. The key must
                        be in a form: <node-name>:<parameter-name>. Several
                        pairs can be provided comma separated.
```

# Features

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- Cloud agnostic

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- Cloud agnostic
- Multi-cloud

# Features

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- Cloud agnostic
- Multi-cloud
- Multi-tenant



# Features

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- Cloud agnostic
- Multi-cloud
- Multi-tenant
- Configuration management agnostic

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- Persistent configuration of deployments

# Features

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- Cloud agnostic
- Multi-cloud
- Multi-tenant
- Configuration management agnostic
- Persistent configuration of deployments
- Everything is version-controlled

# Uses cases

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- Deploy simple and complex applications



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# Uses cases

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- Deploy simple and complex applications
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- Build images (templates) on multiple clouds
- Build your own app store

# Uses cases

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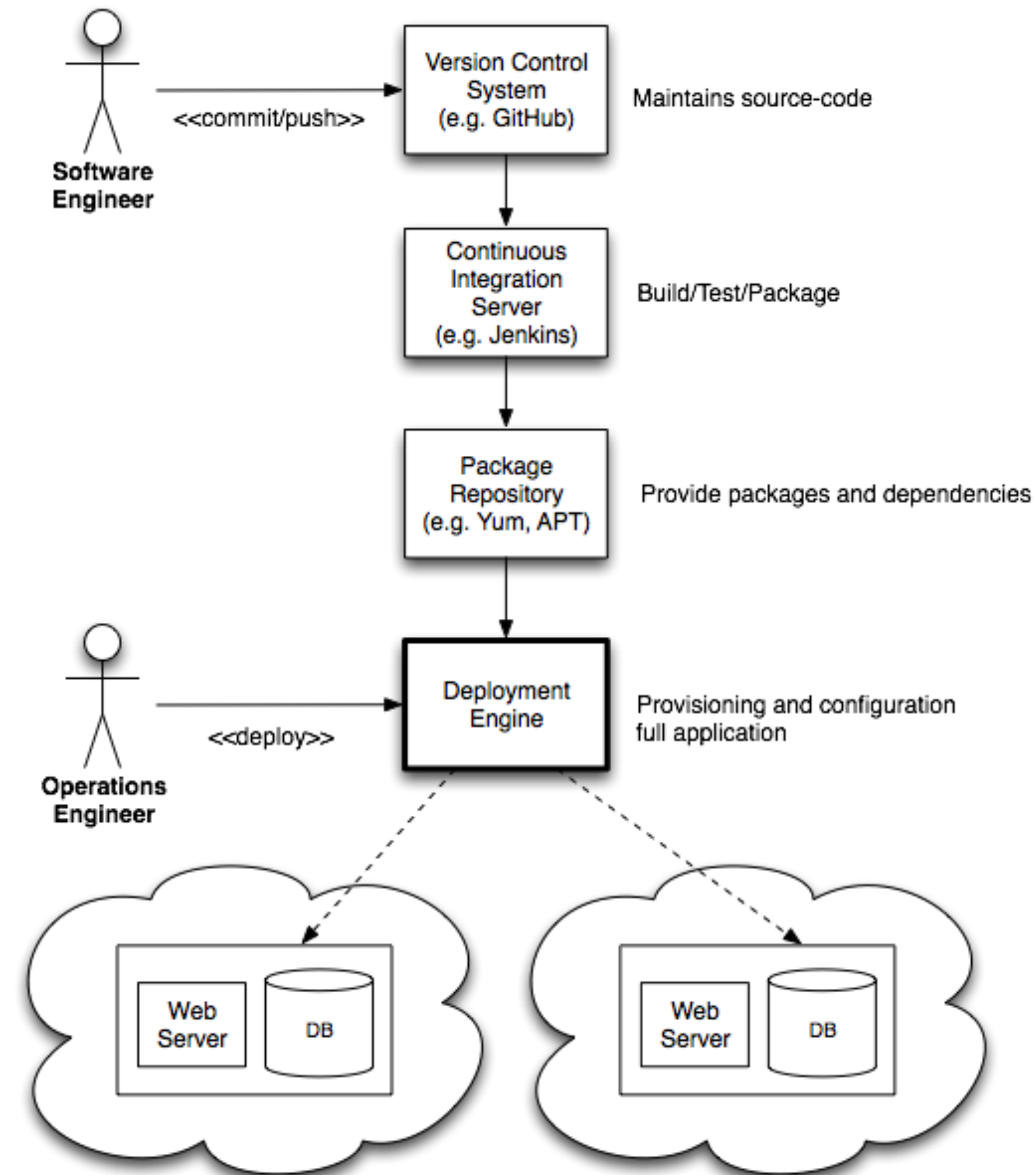
- Deploy simple and complex applications
- Use the cloud of your choice
- Perform multi-cloud deployments
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- Build your own app store
- Define quotas per cloud and per user

# Uses cases

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- Deploy simple and complex applications
- Use the cloud of your choice
- Perform multi-cloud deployments
- Facilitate migration from one cloud to another
- Automate your DevOps process
- Build images (templates) on multiple clouds
- Build your own app store
- Define quotas per cloud and per user
- Reduce costs!

# DevOps



Private cloud (e.g. CloudStack, StratusLab)    Public cloud (e.g. AWS EC2, Interoute VDC, ExoScale)

## Deployment Recipes and Coordination Parameters

Execute

Parameters

Standard recipe (fires during Running phase)

```
1  #!/bin/sh
2
3  set -e
4
5  ss-display "Updating package index"
6  apt-get clean
7  apt-get update
8
9  ss-display "Installing Puppet client"
10
11 apt-get install -y puppet-common
12 apt-get install -y rubygems
13 gem install puppet-module
14
15 ss-display "Installing WordPress manifest"
16 cd /etc/puppet/modules/
17 puppet module install jonhadfield/wordpress
18
19 export admin_username=`ss-get admin_username`
20 export admin_password=`ss-get admin_password`
21 export admin_email=`ss-get admin_email`
22 export wordpress_title=`ss-get wordpress_title`
23 export FACTER_mysql_password=`ss-get mysql_password`
24 export public_hostname=`ss-get hostname`
```

Runs

Authorization

Build...

Run...

Edit

Copy...

Publish

# Managing deployed apps

# Managing Deployed Apps

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- Managed (aka mutable deployment)
  - I.e upgrade, migrate (, test?) in situ
  - Need Server / Managed Puppet / Chef support
  - Always needed?
  - Worth the complexity?
- Coordinated (aka immutable deployment)
  - I.e. re-deploy, test, (migrate,) switch, scratch
  - Simpler
  - Data handling constraints



# SlipStream data model



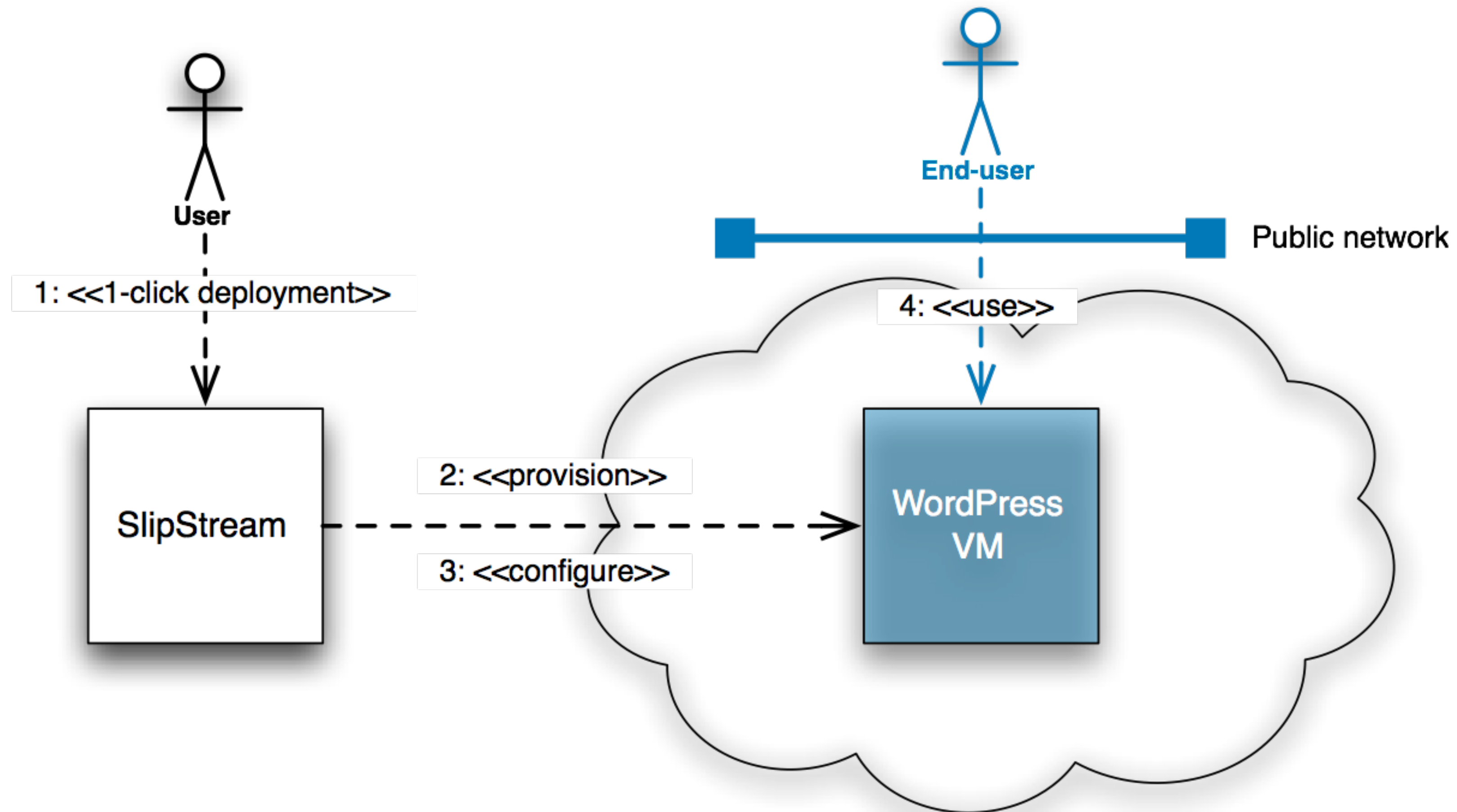
# Data model

---

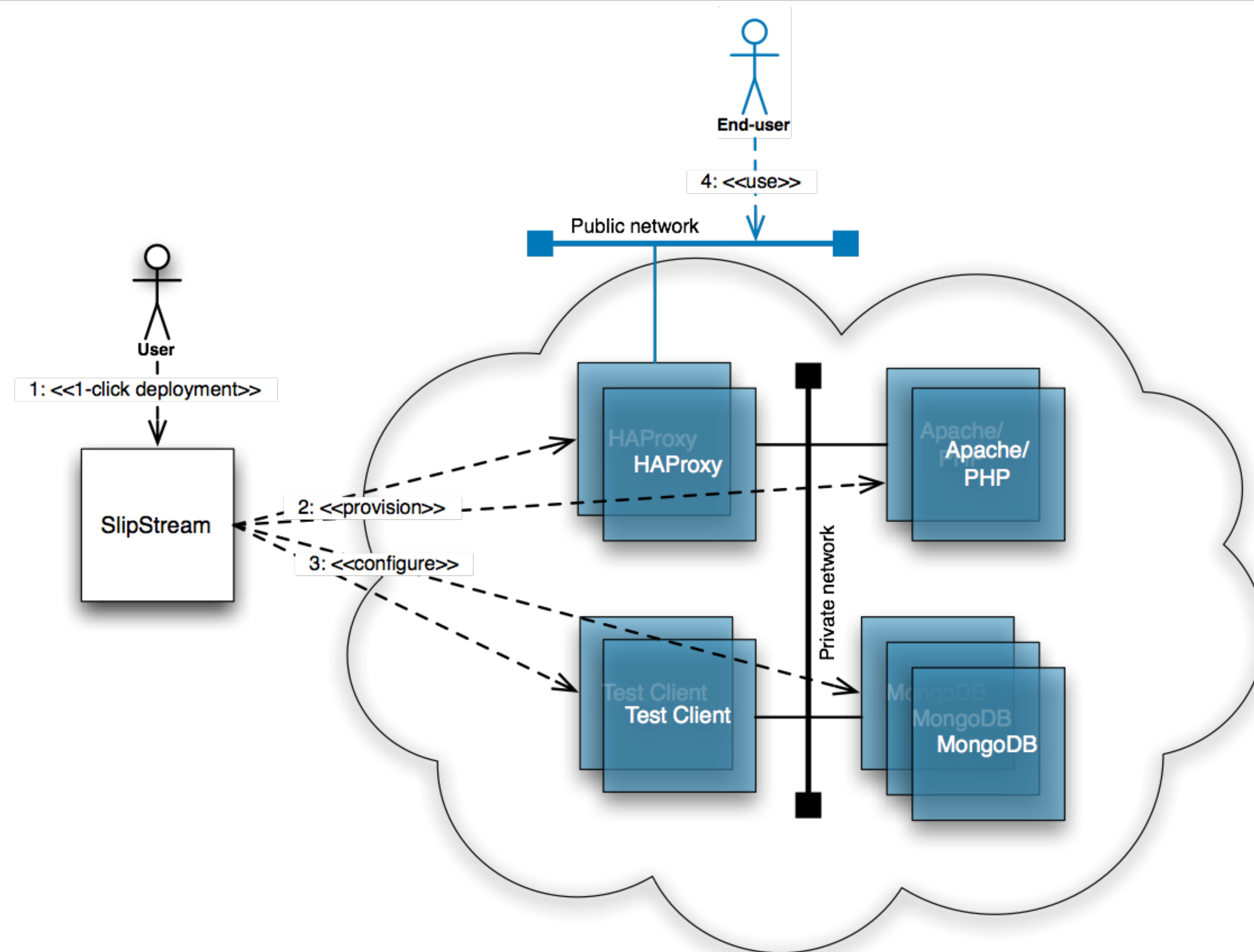
- **Image:** inheritance
- **Deployment:** aggregation
- **Project:** containment
- **Run:** execution
  
- All changes are **version controlled**

# Application Deployment Examples

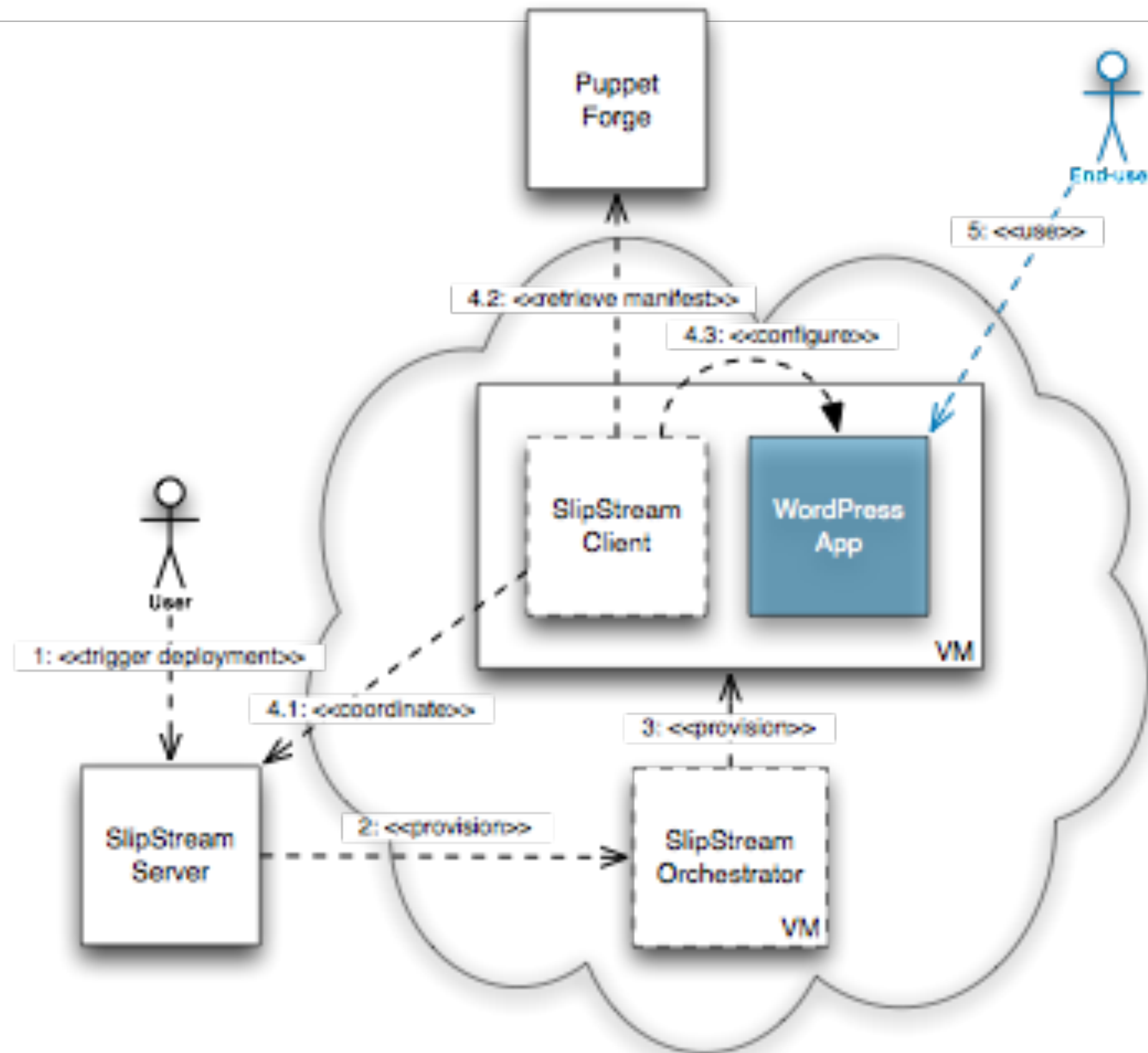
# WordPress deployment - simple



# LAMP++ deployment - more complex



# WordPress Deployment (detailed)



# WordPress Deployment (detailed)

The screenshot shows a deployment tool interface. At the top, there is a 'Nodes' section with a table:

Name	Image link
testclient	Reference image: <a href="#">Public/Tutorials/HelloWorld/testclient</a>

Below the table, there is a 'Default multiplicity' field set to 1.

An 'Execute Deployment' dialog box is open, showing configuration for two services:

- testclient**
  - Multiplicity: 1 (circled in red)
  - Cloud service: stratuslab
- apache**
  - Multiplicity: 1 (circled in red)
  - Cloud service: stratuslab

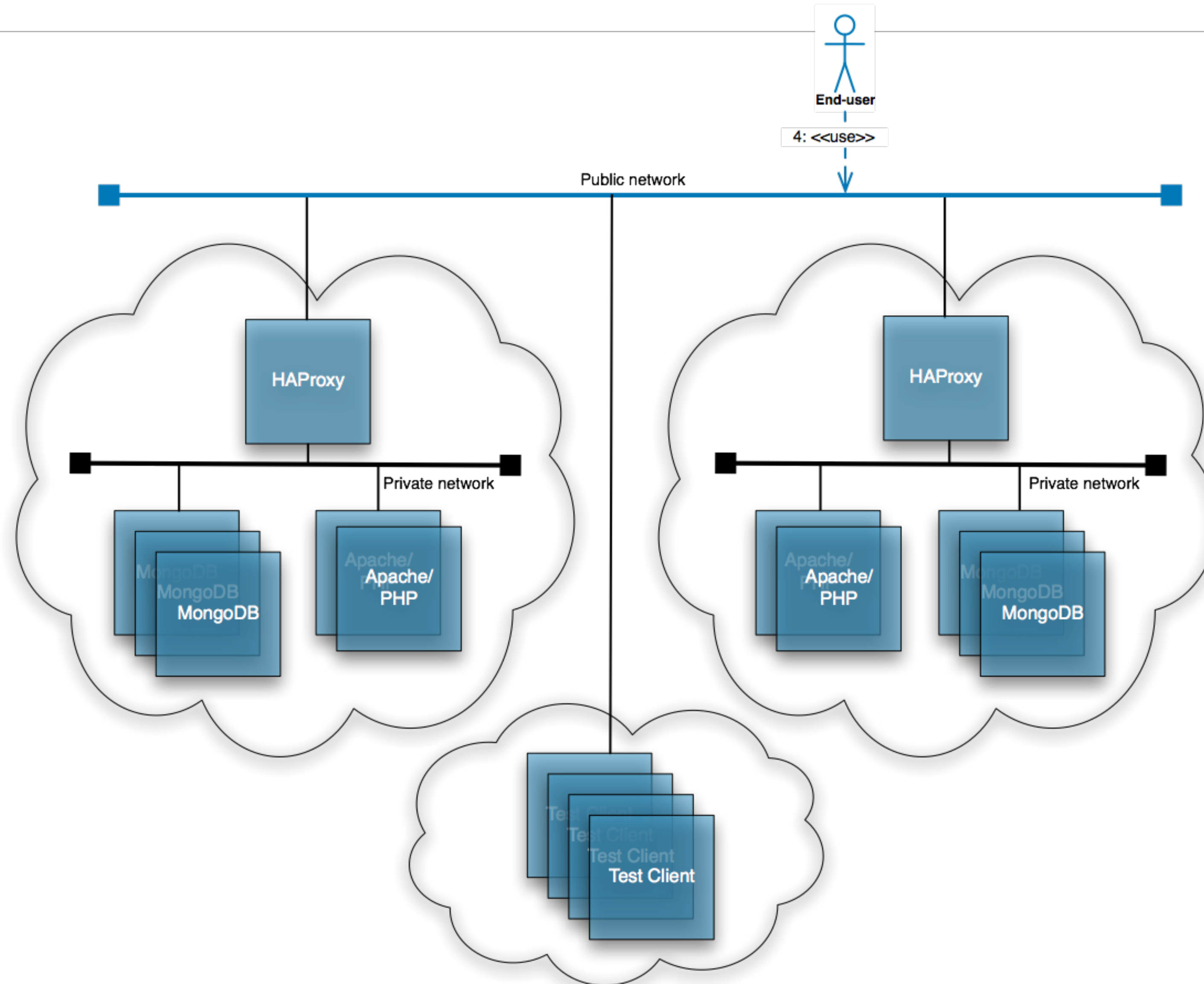
At the bottom of the dialog box, there are 'Cancel' and 'Run' buttons.

Below the dialog box, there is a 'Default cloud service' field set to 'default'.

At the bottom of the main interface, there is an 'Authorization' section and a row of buttons: Run, Run..., Edit, Copy..., and Publish.



# Simultaneous Multi-Cloud Provisioning



**Dashboard: one view to all**



# Dashboard

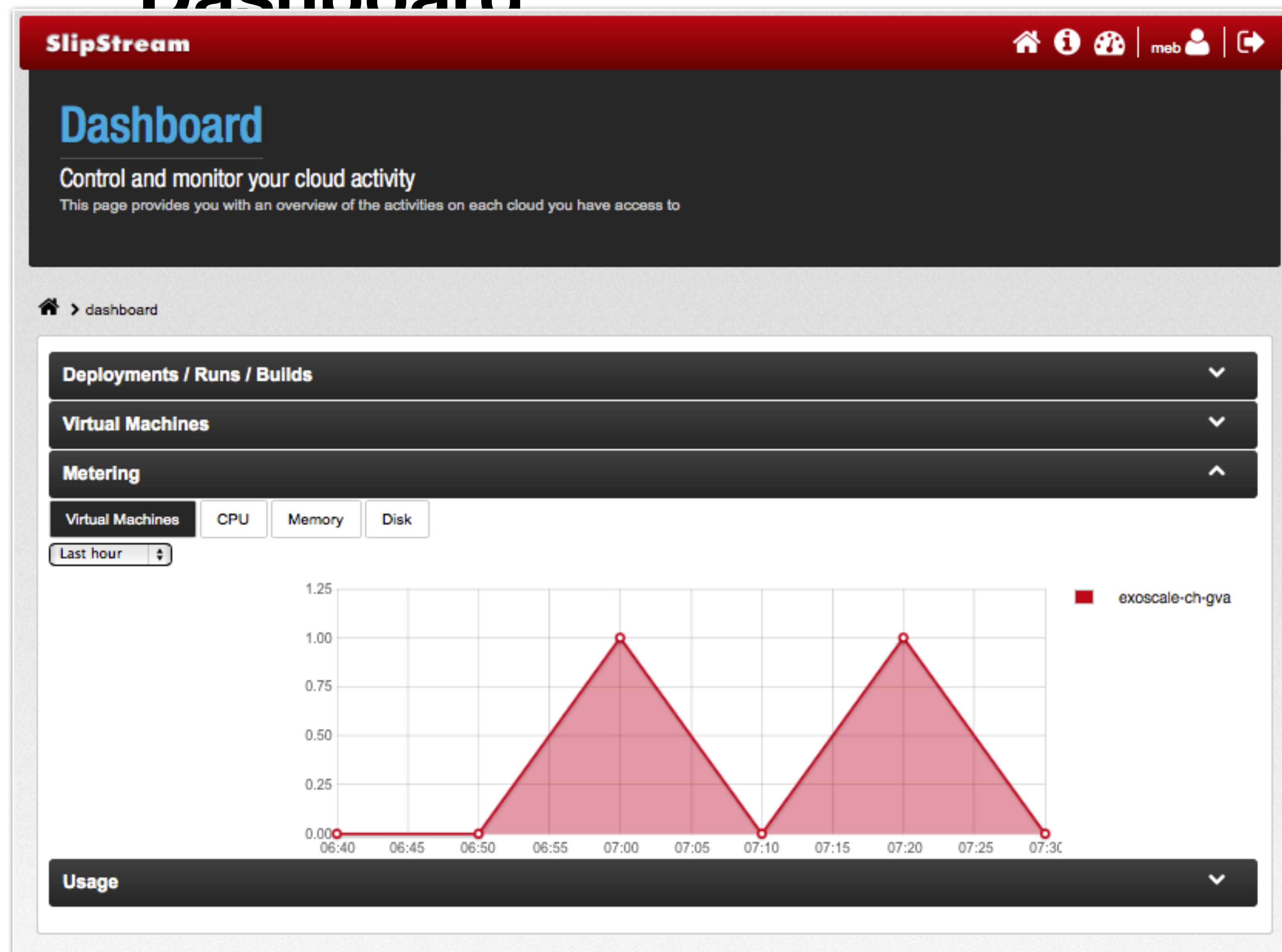
---

- Monitoring VM activities on a regular basis: all users x all clouds (~4 minutes)
- More often for online users: all clouds (~10 seconds)
- Pull implementation works for all clouds
- Push would be great!

# Dashboard

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# Dashboard



Das

**SlipStream**

# Dashboard

Control and monitor your cloud activity

This page provides you with an overview of the activities on each cloud you have access to

home > dashboard

- Deployments / Runs / Builds
- Virtual Machines
- Metering

Virtual Machines CPU

Last hour

**SlipStream**

home info users meb

# Dashboard

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Usage

exoscale-ch-gva

ec2-eu-west

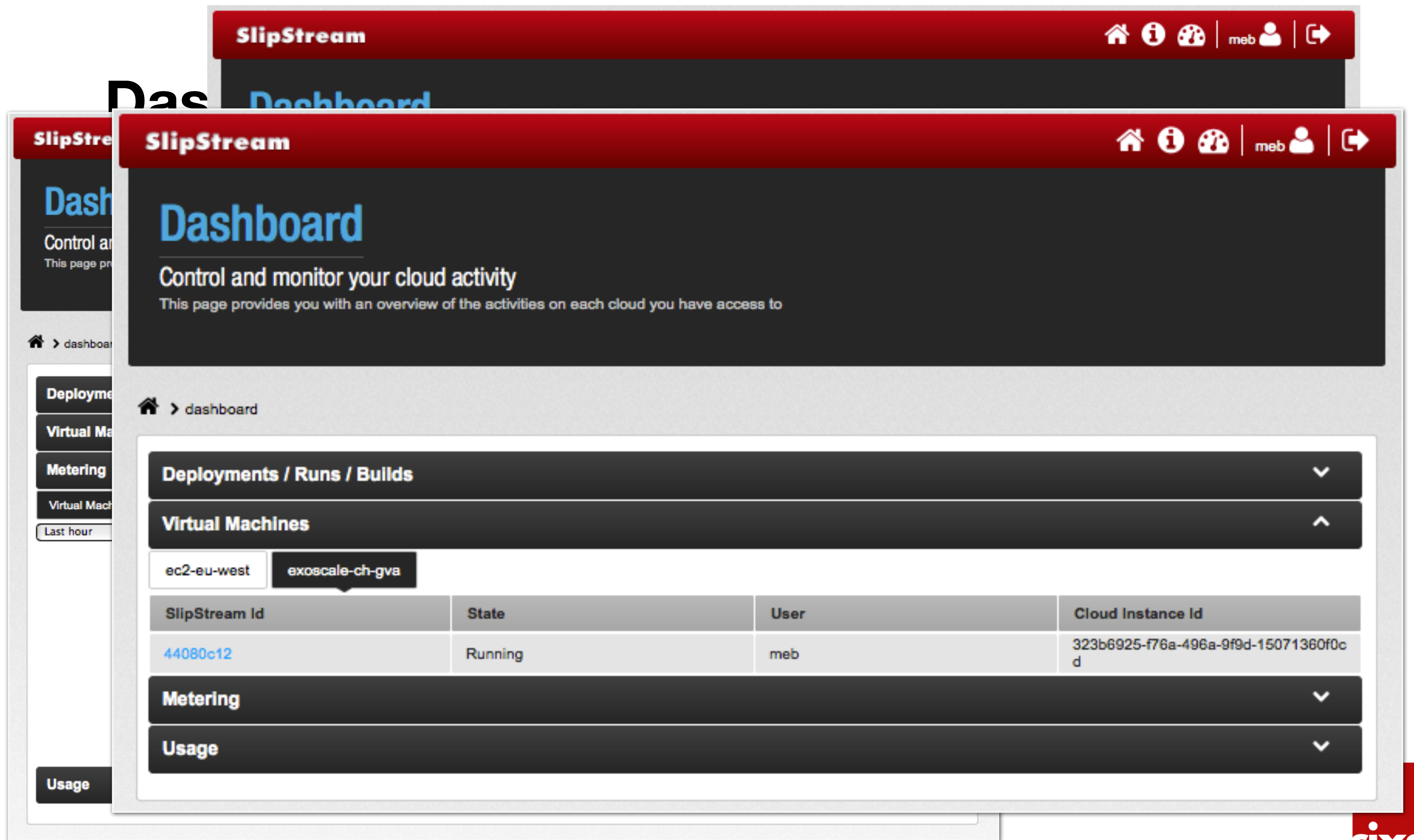
1

0







Usage











SlipStream

meb

SlipStream


meb


SlipStream

# Dashboard

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This page provides you with an overview of the activities on each cloud you have access to

 > dashboard

 > dashboard

Deployments

Virtual Machines

Metering

Virtual Machines






Last hour

Usage

Deployments / Runs / Builds

ec2-eu-west


exoscale-ch-gva


	Run Id	Module	State	Start Time	User	Tags
	<a href="#">0b6c98d5</a>	<a href="#">examples/images/ubuntu-12.04/167</a>	Cancelled	2014-01-30 12:09:11.207 UTC	meb	
	<a href="#">e444212f</a>	<a href="#">SlipStream/client-server-deployment/206</a>	Done	2014-01-28 14:39:22.837 UTC	meb	
	<a href="#">112ff1ab</a>	<a href="#">examples/images/ubuntu-12.04/167</a>	Cancelled	2014-01-28 14:28:20.732 UTC	meb	
	<a href="#">40d5d158</a>	<a href="#">examples/tutorials/wordpress/wordpress/180</a>	Done	2014-01-28 14:25:07.667 UTC	meb	
	<a href="#">cdf2e6b5</a>	<a href="#">SlipStream/all-in-one-slipstream/202</a>	Inactive	2014-01-28 13:51:34.38 UTC	meb	

Virtual Machines


Metering


Usage



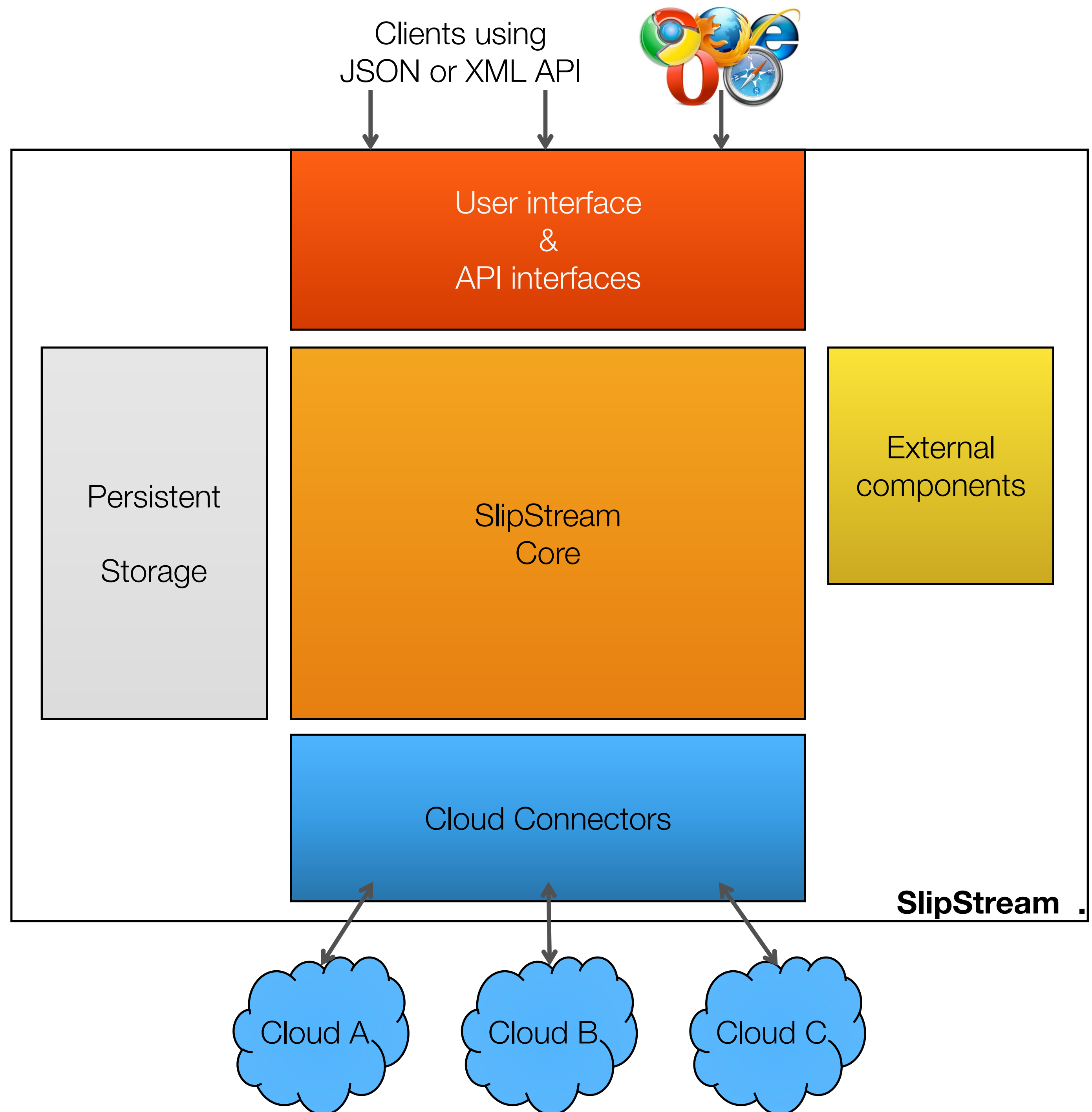


id-15071360f0c

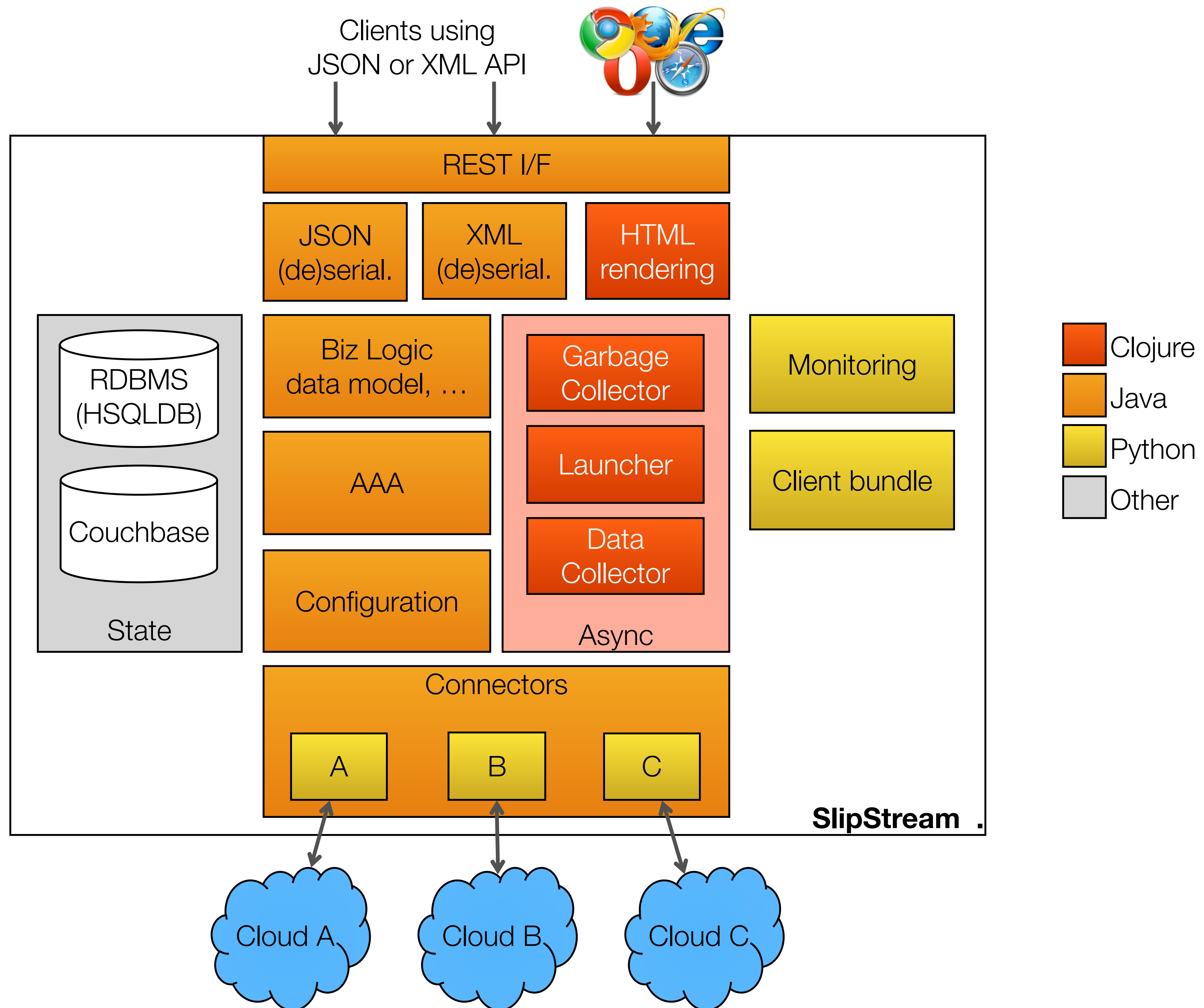




# Architecture







# Open Source

# Open Source

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- License: Apache 2.0
- Hosted: GitHub - <http://github.com/slipstream>
- Dev Community:
  - Coordinated (and mainly contributed) by SixSq
  - Contribution from enterprise and academia
  - Growing!
- Building, testing and deploying:
  - We use Jenkins and... SlipStream :-)

# Open / Close Source Model

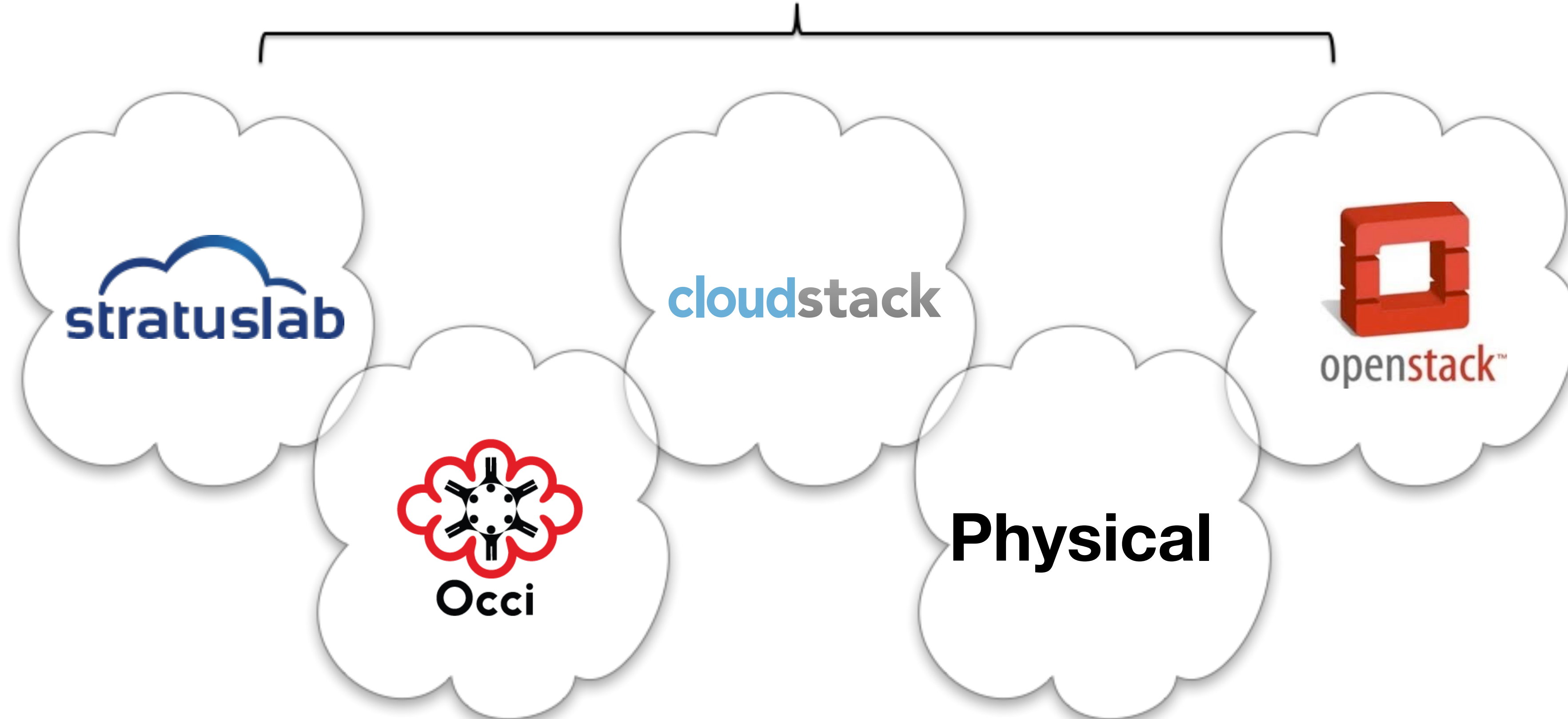
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- Open Source
  - Core Systems
  - Connectors interfacing with open source IaaS solutions
- Proprietary
  - Connectors interfacing with proprietary IaaS solutions

# Open Source Connectors

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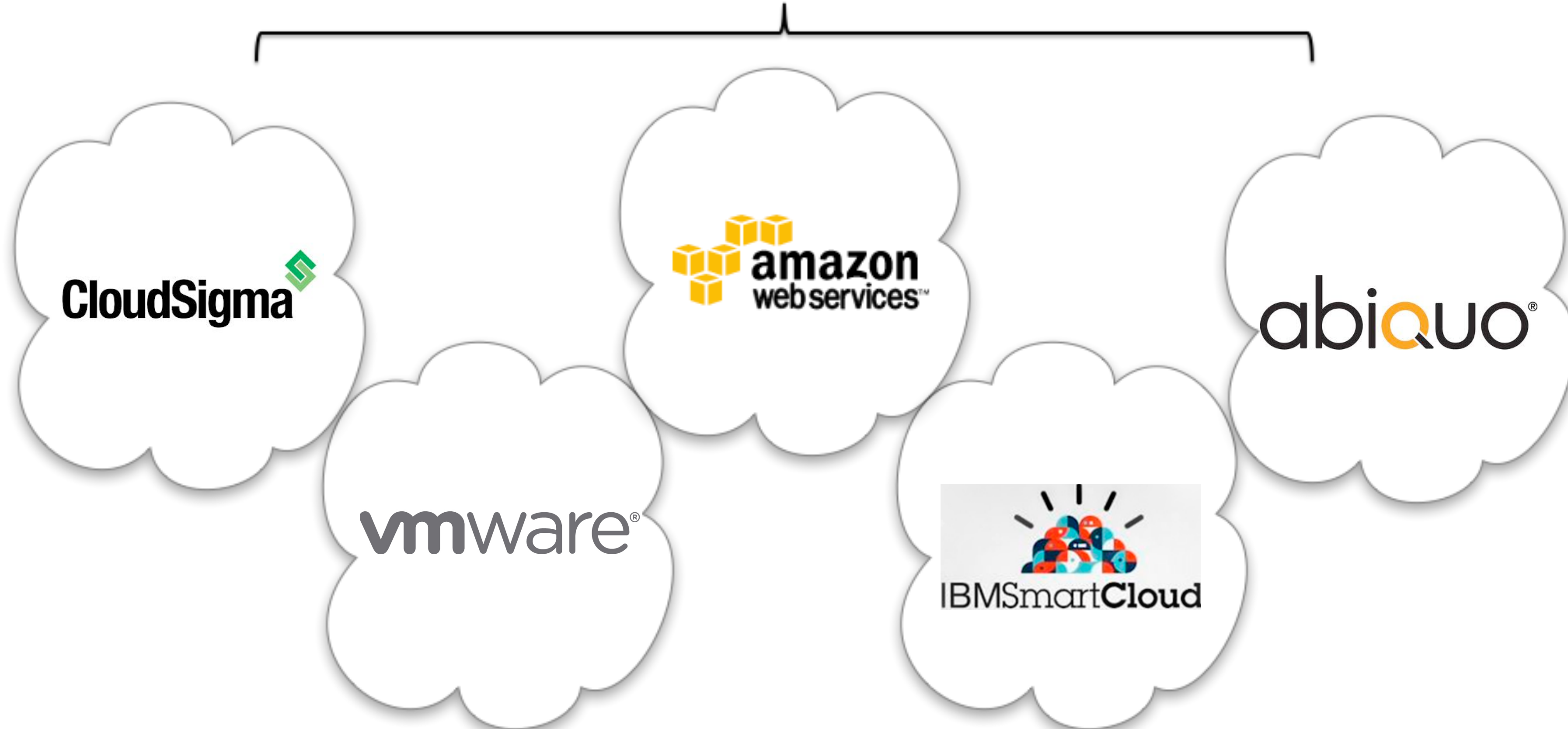
**SlipStream.**



# Proprietary Connectors

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**SlipStream.**



**Where next?**

# Technology Roadmap

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- Connectors
  - Microsoft Windows Azure
  - CIMI
- Auto-scale/Elastic support
- Unified Monitoring
- Advanced Roles for Enterprise deployment (e.g. Account Managers)
- Billing
- We are listening :-)




## Version Controlled Image Factory



# Create installation recipes and let SlipStream do the rest



Using your favourite recipes (e.g. bash, Puppet, Chef) you can now create version controlled custom images on the clouds of your choice.

 > login



Login



Username

Password

 Login

Reset Password



Register



# Products and Technologies

**SlipStream.**

  
stratuslab

# Products and Technologies

# Products and Technologies

=

# Products and Technologies

**NuvlaBox.**

# Products and Technologies







# ets and Technologies



# Demo



# SlipStream SaaS - It's free... Try it!!

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**[slipstream.sixsq.com](http://slipstream.sixsq.com)**



# SlipStream SaaS - It's free... Try it!!

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**[slipstream.sixsq.com](http://slipstream.sixsq.com)**



# Resources

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- **SixSq Blogs:** [sixsq.com/blog](https://sixsq.com/blog)
  - See Through Cloud series
  - Tech Corner series
- **SlipStream product description:**  
[sixsq.com/products/slipstream.html](https://sixsq.com/products/slipstream.html)
- **SlipStream documentation:**  
[slipstream.sixsq.com/documentation](https://slipstream.sixsq.com/documentation)
- **SlipStream client:** `pip install slipstream-client`
- **GitHub:** [github.com/slipstream](https://github.com/slipstream)

# Call for Action

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- **Contribute**
  - Looking for community support for new connector
  - Bug fixes
  - Enhancements
- **Download, install, shout and share!!**

A flock of birds, possibly swans or geese, is flying in a circular pattern around a bright sun in a blue sky with wispy clouds. The sun is positioned in the center of the frame, and the birds are arranged in a ring around it, creating a sense of movement and harmony. The overall mood is peaceful and uplifting.

# Thanks!

[support@sixsq.com](mailto:support@sixsq.com)