Service Orchestration

with any cloud using Juju

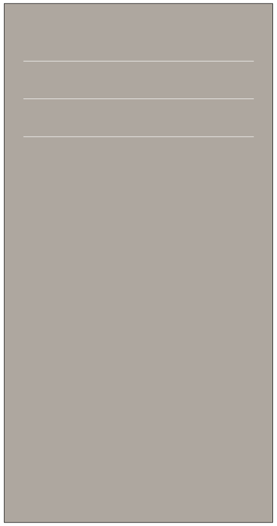
Orchestration

Contemporary computer jargon meaning:

the arrangement, coordination and management of complex computer systems and **services**.

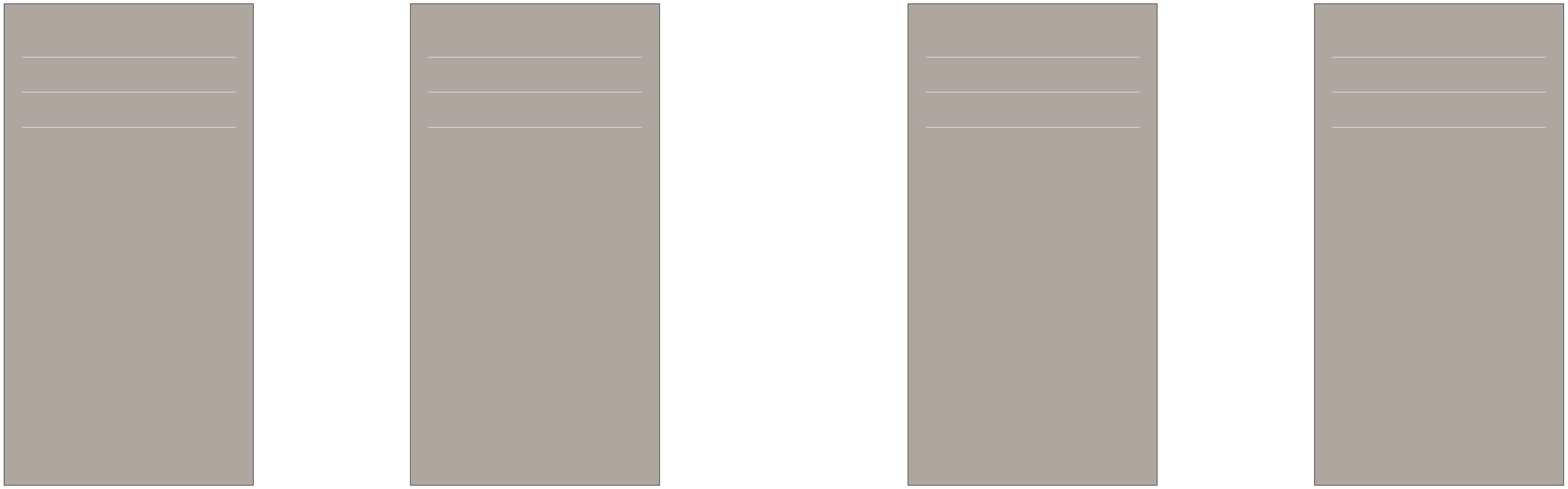
Complexity?

- One server



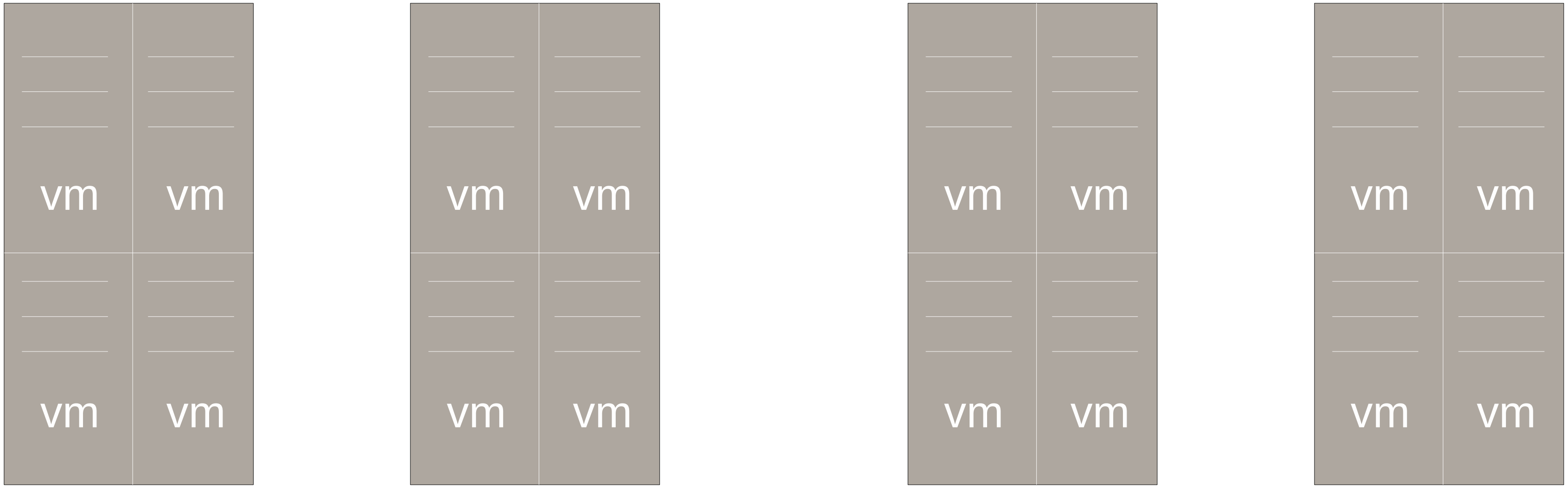
Increasing complexity

- Many servers



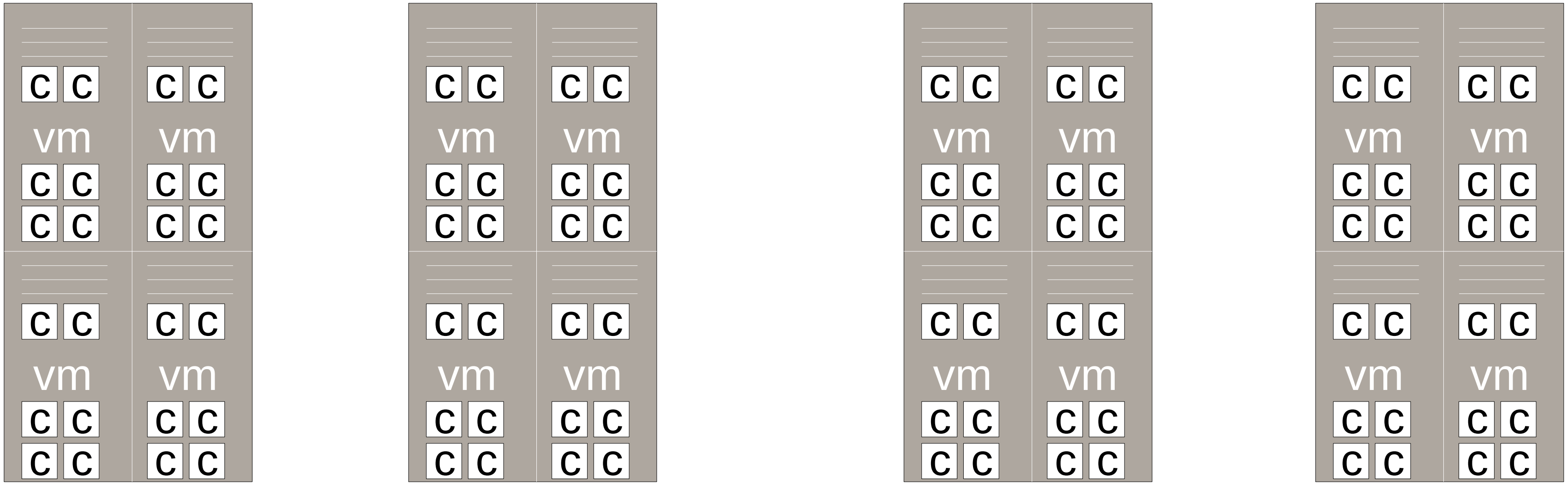
Virtualization complexity

- Virtualization makes your computers look huge!



LinuX Container complexity

- LinuX Containers (LXC) inside VMs.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vm vm vm vm vm vm vm vm
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What is Juju?

Juju is a free open source configuration management software project written in “Go” maintained by Canonical.

Juju's Goal

Encapsulate ops knowledge in
any cloud environment:
public or private

To provide a dynamic infrastructure
With interchangeable services

So you can focus on being an expert in using the service, not on deployment and life cycle management.

Stop treating your servers like pets!

- Each one with their own cute name
- When one is sick everything grinds to a halt.

Treat your servers like cattle

- No one is more important than the other
- When one goes down replace it with others

Develop

Consistent

Shareable

Readily Available

High production parity

Deploy

Start and configure Servers / services

Deploy and run application

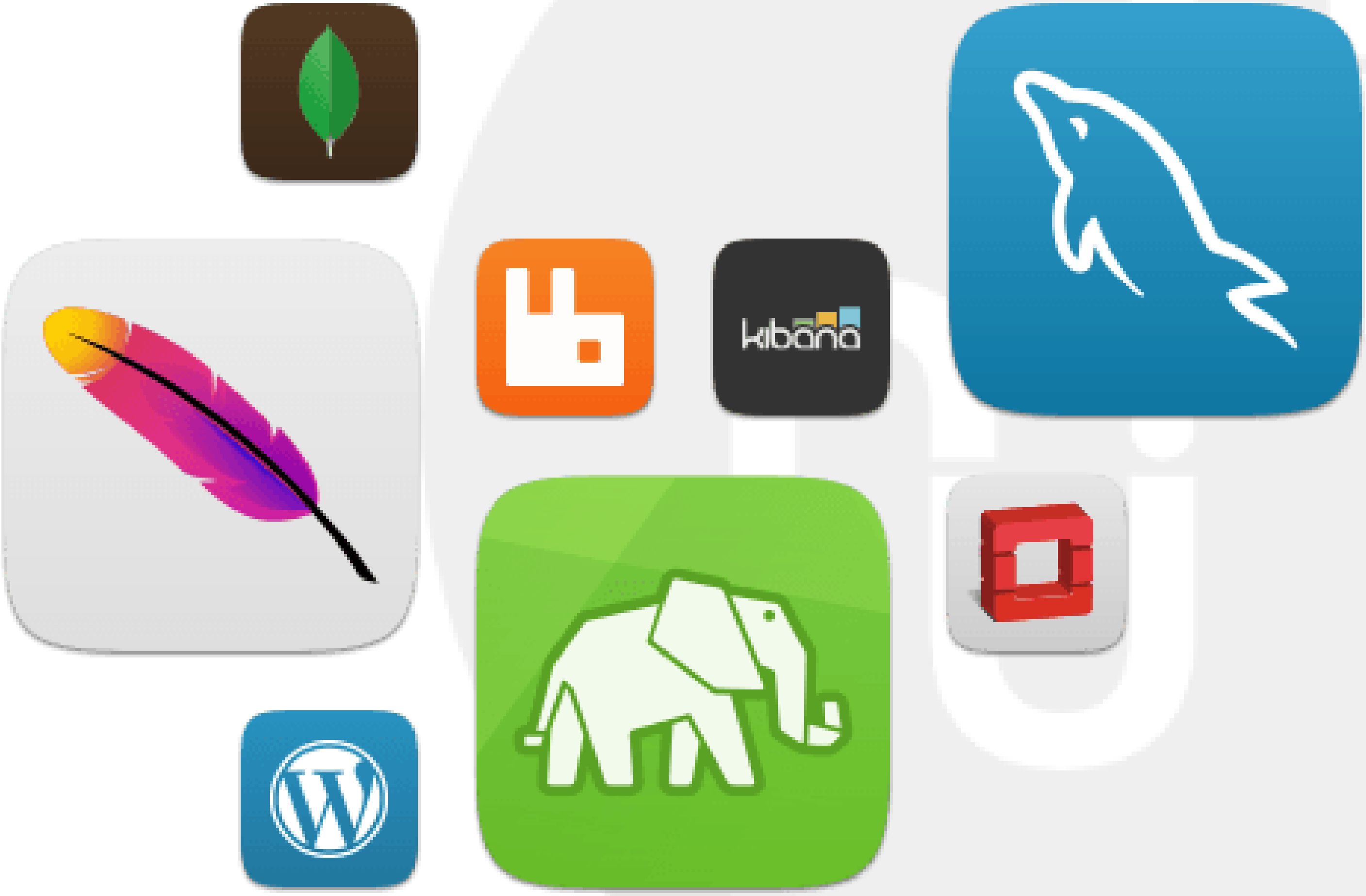
Operate

Update servers and applications

Reconfigure services

Orchestrate Interactions between services

Charms are more than Services



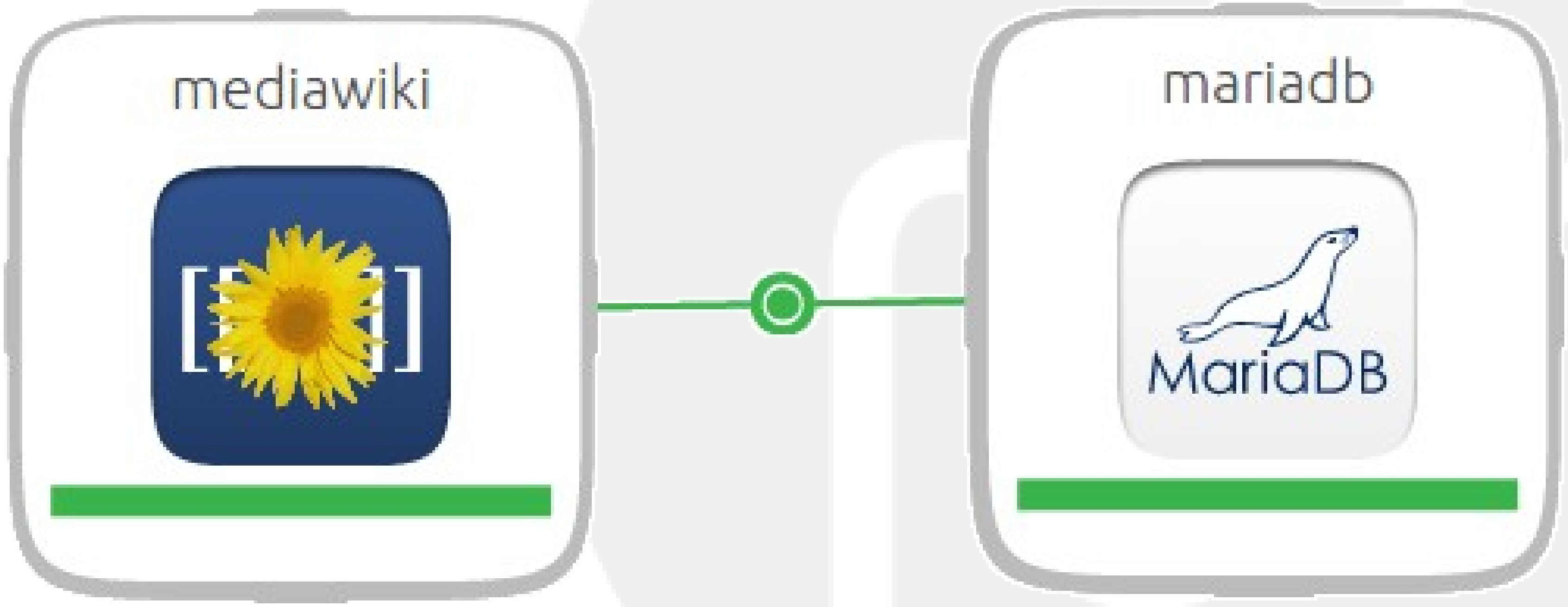
Define charms:

- Configuration management
  - version X of service Y
- Language independence
  - Charms can be written in any language you want
- Operational Intelligence
  - How one charm relates to another.

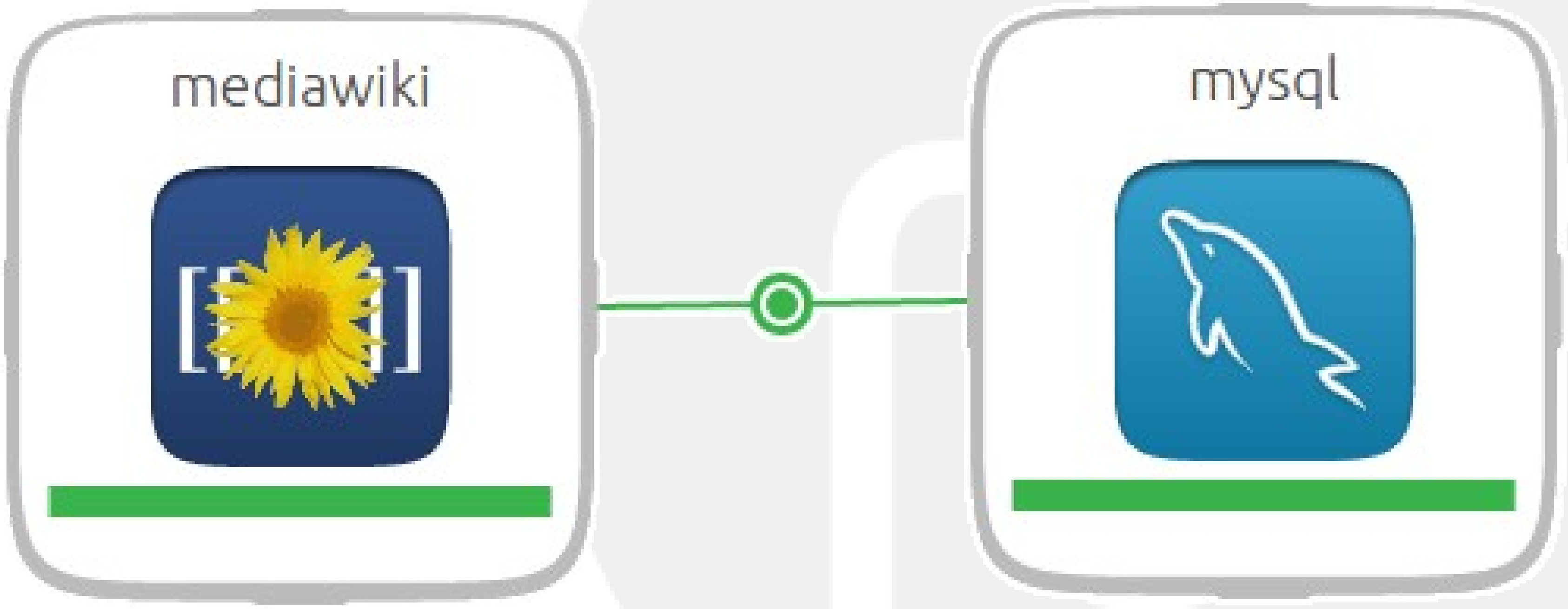
Define charms without buzz words

- Collection of files with a specific directory structure including a **metadata.yaml** file
- Download the service software (if needed)
- Configure the service software
- Start the software
- Handle relations to other charms
- Handle the data and details for the service

Relationships



Relationships



What clouds does Juju work with?

amazon web services™
Google Compute Engine
Windows Azure™
DigitalOcean
hp Cloud
Joyent

What if my cloud was not listed?

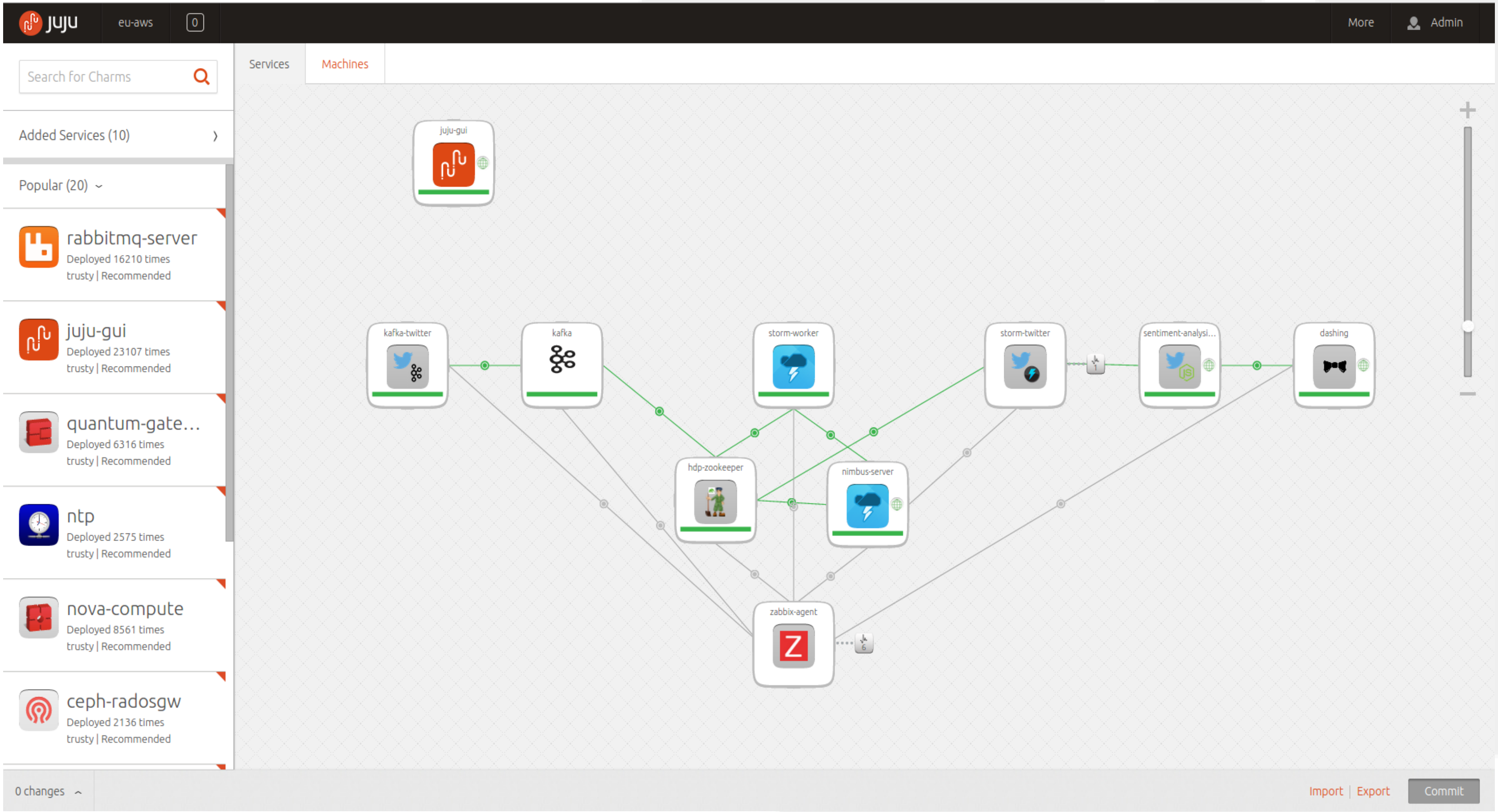
- Using the manual provider you can deploy to other private or public clouds.
  - It loses some features and automation but can be done.

- With Ubuntu Metal as a Service (MAAS) you can orchestrate bare metal (real servers).

Juju tools

- Juju GUI
- Juju Quickstart
- The Charm store
  - http://jujucharms.com

Juju GUI



Added Services (10)

Popular (20)

rabbitmq-server
Deployed 16210 times
trusty | Recommended

juju-gui
Deployed 23107 times
trusty | Recommended

quantum-gate...
Deployed 6316 times
trusty | Recommended

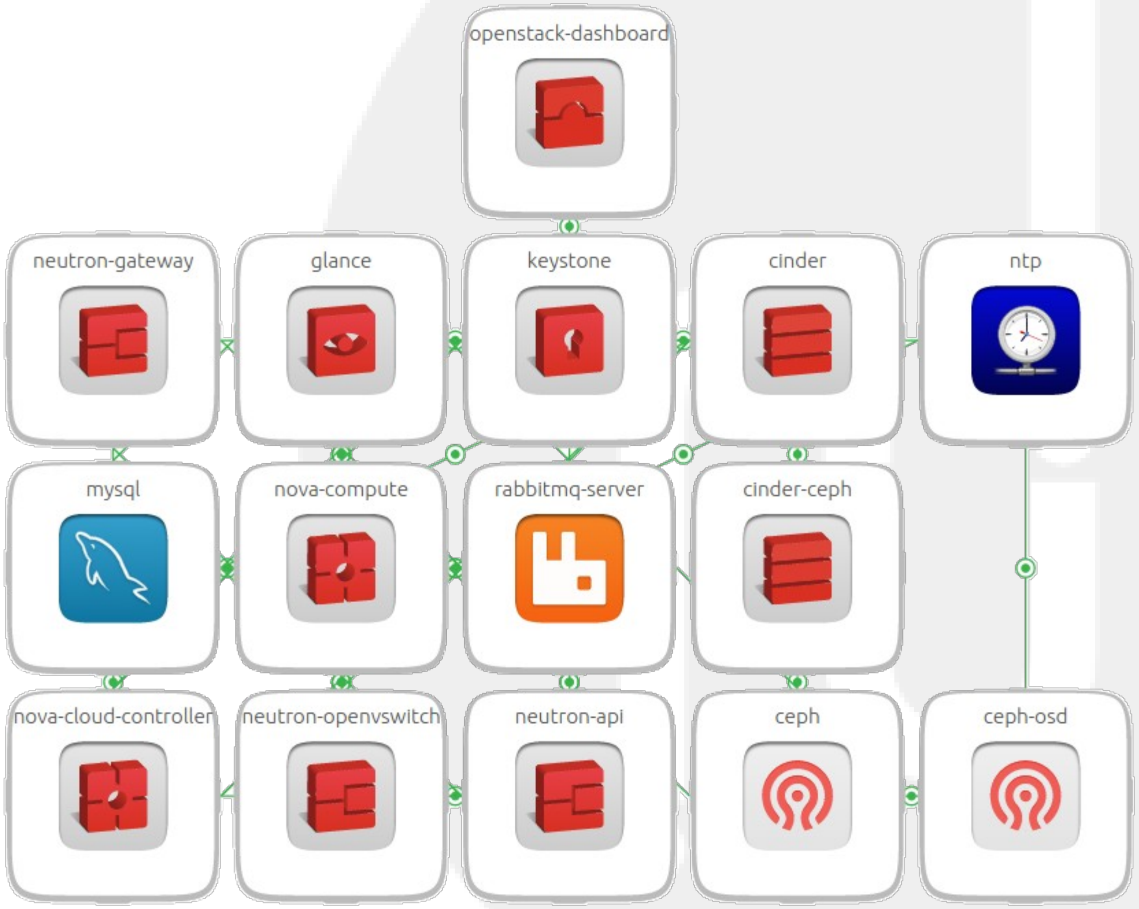
ntp
Deployed 2575 times
trusty | Recommended

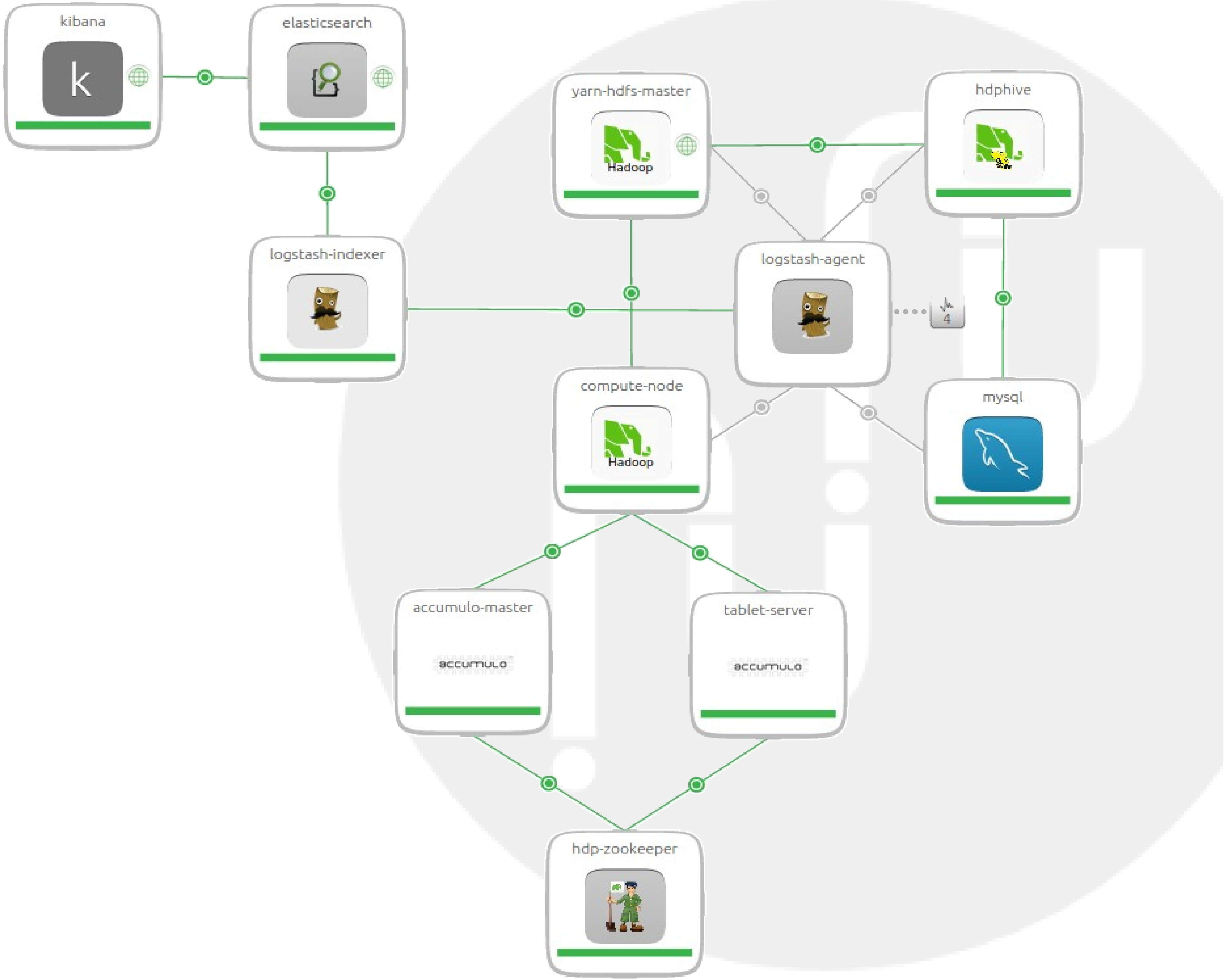
nova-compute
Deployed 8561 times
trusty | Recommended

ceph-radosgw
Deployed 2136 times
trusty | Recommended

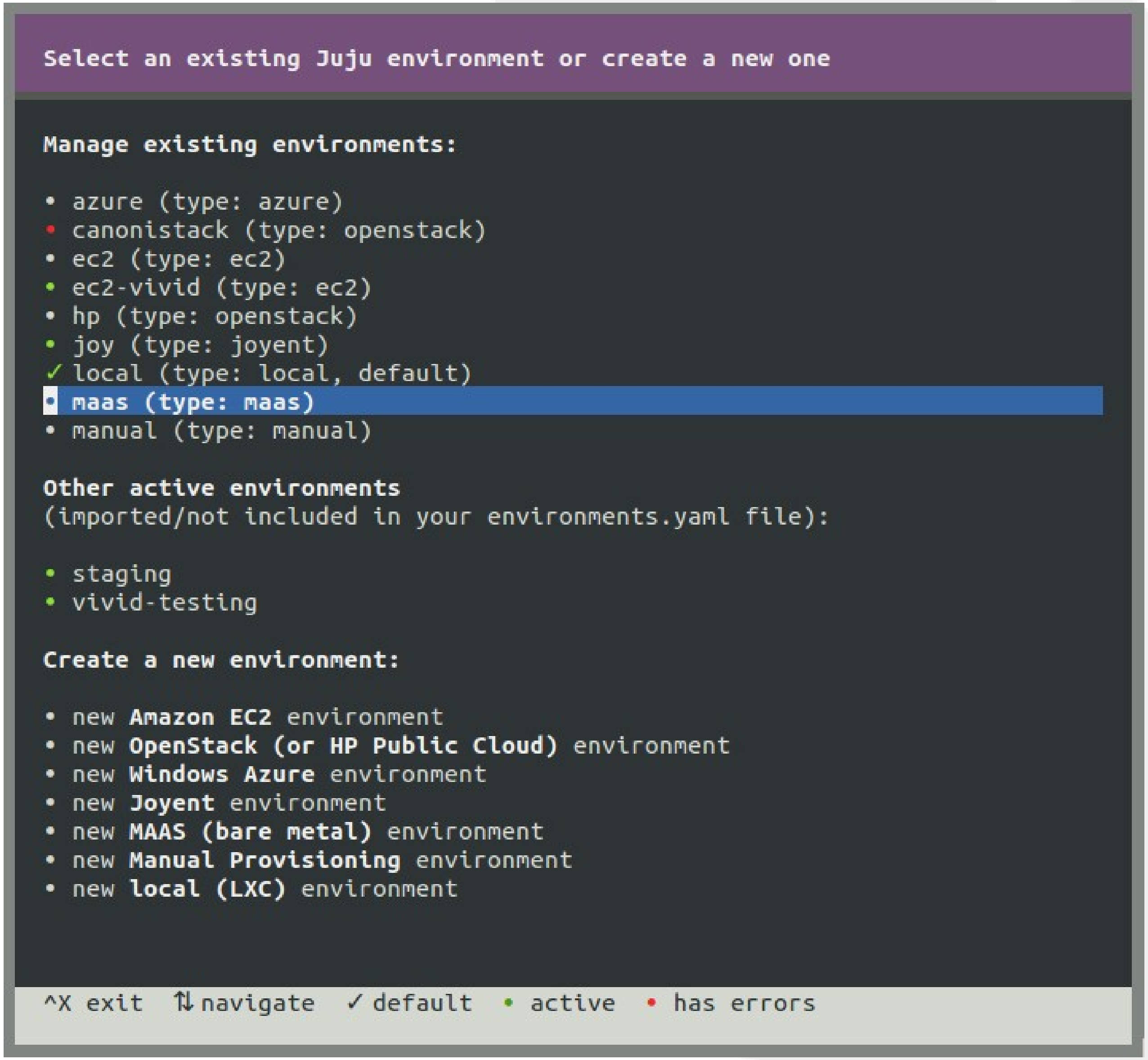
0 changes

Juju deploys OpenStack




kibana
elasticsearch
yarn-hdfs-master
hdphive
logstash-indexer
logstash-agent
4
compute-node
mysql
accumulo-master
tablet-server
hdp-zookeeper
Hadoop
Hadoop
accumulo
accumulo

Juju Quickstart



```
Select an existing Juju environment or create a new one

Manage existing environments:

• azure (type: azure)
• canonistack (type: openstack)
• ec2 (type: ec2)
• ec2-vivid (type: ec2)
• hp (type: openstack)
• joy (type: joyent)
✓ local (type: local, default)
• maas (type: maas)
• manual (type: manual)

Other active environments
(imported/not included in your environments.yaml file):

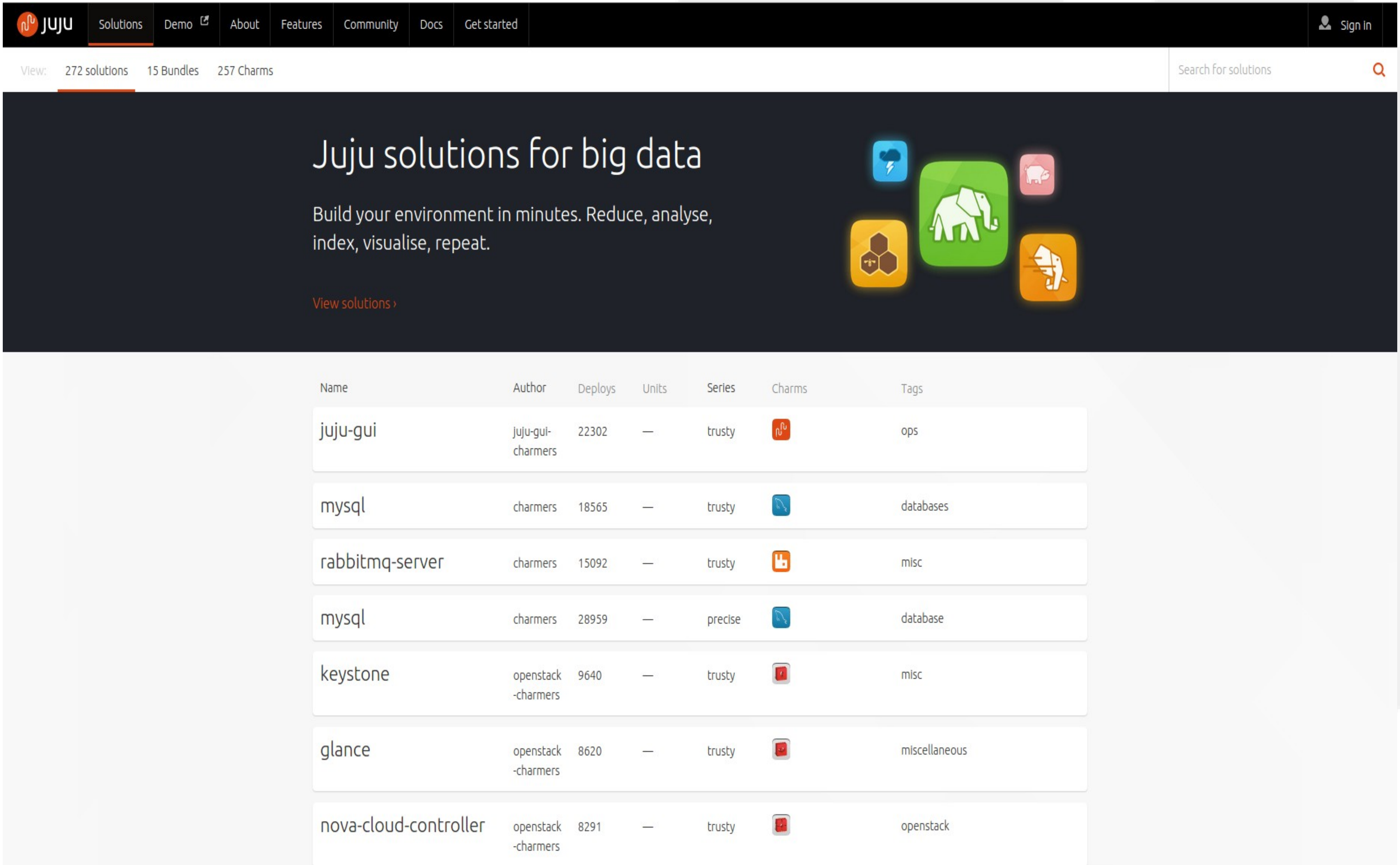
• staging
• vivid-testing

Create a new environment:

• new Amazon EC2 environment
• new OpenStack (or HP Public Cloud) environment
• new Windows Azure environment
• new Joyent environment
• new MAAS (bare metal) environment
• new Manual Provisioning environment
• new local (LXC) environment

^X exit  ⇅ navigate  ✓ default  • active  • has errors
```

The Charm Store



View: 272 solutions 15 Bundles 257 Charms

Juju solutions for big data

Build your environment in minutes. Reduce, analyse, index, visualise, repeat.

View solutions ›

Name	Author	Deploys	Units	Series	Charms	Tags
juju-gui	juju-gui-charmers	22302	—	trusty		ops
mysql	charmers	18565	—	trusty		databases
rabbitmq-server	charmers	15092	—	trusty		misc
mysql	charmers	28959	—	precise		database
keystone	openstack-charmers	9640	—	trusty		misc
glance	openstack-charmers	8620	—	trusty		miscellaneous
nova-cloud-controller	openstack-charmers	8291	—	trusty		openstack

Get in touch

- **#juju** on irc.freenode.net
- Sign up for the mailing list: juju@lists.ubuntu.com
  - https://lists.ubuntu.com/mailman/listinfo/juju
- We are always looking for new charms
  - https://jujucharms.com/docs/authors-intro
- You can branch the juju code from github and contribute that way.
  - https://github.com/juju/juju

More information

- https://jujucharms.com
- https://jujucharms.com/docs/
- https://github.com/juju/juju
- https://launchpad.net/charms

Install Juju on Ubuntu

- `sudo add-apt-repository ppa:juju/stable`
- `sudo apt-get update`
- `sudo apt-get install juju-quickstart`

- Also available for mac and windows
  - Check https://jujucharms.com/get-started for more details on other platforms.

Demo

- Show a deployment
- Create a charm
- Answer questions

Extra time slides

- Charm hooks
- Relationships between charms explained in further detail.
  - Requires
  - Provides

Charm Hooks

- Juju is an event driven architecture, those events are realized with hooks.
- Each hook is tied to an event that occurs.
- Hooks are run as root
- Hooks can be written in any language.
- Located in the hooks/ directory of the charm.

Charm Hooks

- install
- config-changed
- start
- stop
- upgrade-charm
- * relation hooks (described in further slides)

Charm Relations

- How charms interact with each other
- Are loosely based contracts between charms
  - No RFC
- No reserved names
  - Go crazy this is the wild west!

metadata.yaml

```
name: mediawiki
summary: "Website engine for collaborative work"
maintainer: Clint Byrum <clint@ubuntu.com>
description: |
 MediaWiki is a wiki engine (a program for creating a collaboratively
 edited website). It is designed to handle heavy websites containing
 library-like document collections, and supports user uploads of
 images/sounds, multilingual content, TOC autogeneration, ISBN links,
 etc.
tags: ["applications"]
requires:
  db:
    interface: mysql
  slave:
    interface: mysql
  cache:
    interface: memcache
provides:
  website:
    interface: http
```

Each relation has 4 events

- *<relation-name>*-**relation-joined**
  - Run before the relation is created, prepare for handshake.
- *<relation-name>*-**relation-changed**
  - Run when data changes, new data sent.
- *<relation-name>*-**relation-departed**
  - Run while the relationship still exists but is going away.
- *<relation-name>*-**relation-broken**
  - Run when the relationship is gone. No more communication.

Requires

```
requires:
  db:
    interface: mysql
  slave:
    interface: mysql
  cache:
    interface: memcache
provides:
  website:
    interface: http
```

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requires:
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Provides

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```