RDO Manager OpenStack Installer

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October 2015

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Halloween Edition

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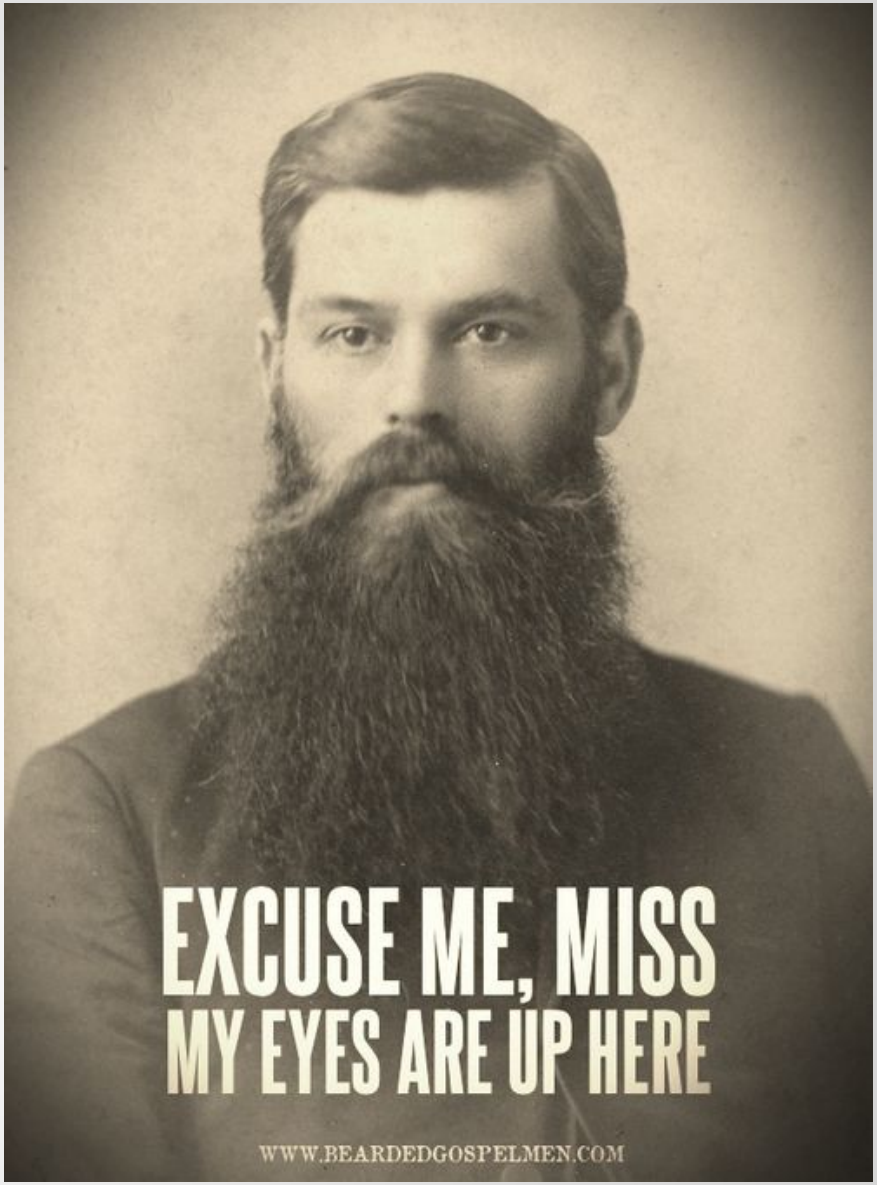
What am I not?

Not a salesperson
(See beard)

Not here to say Red Hat
is awesome (They are)

Not an OpenStack
developer
(Thank goodness)



Why are we here?

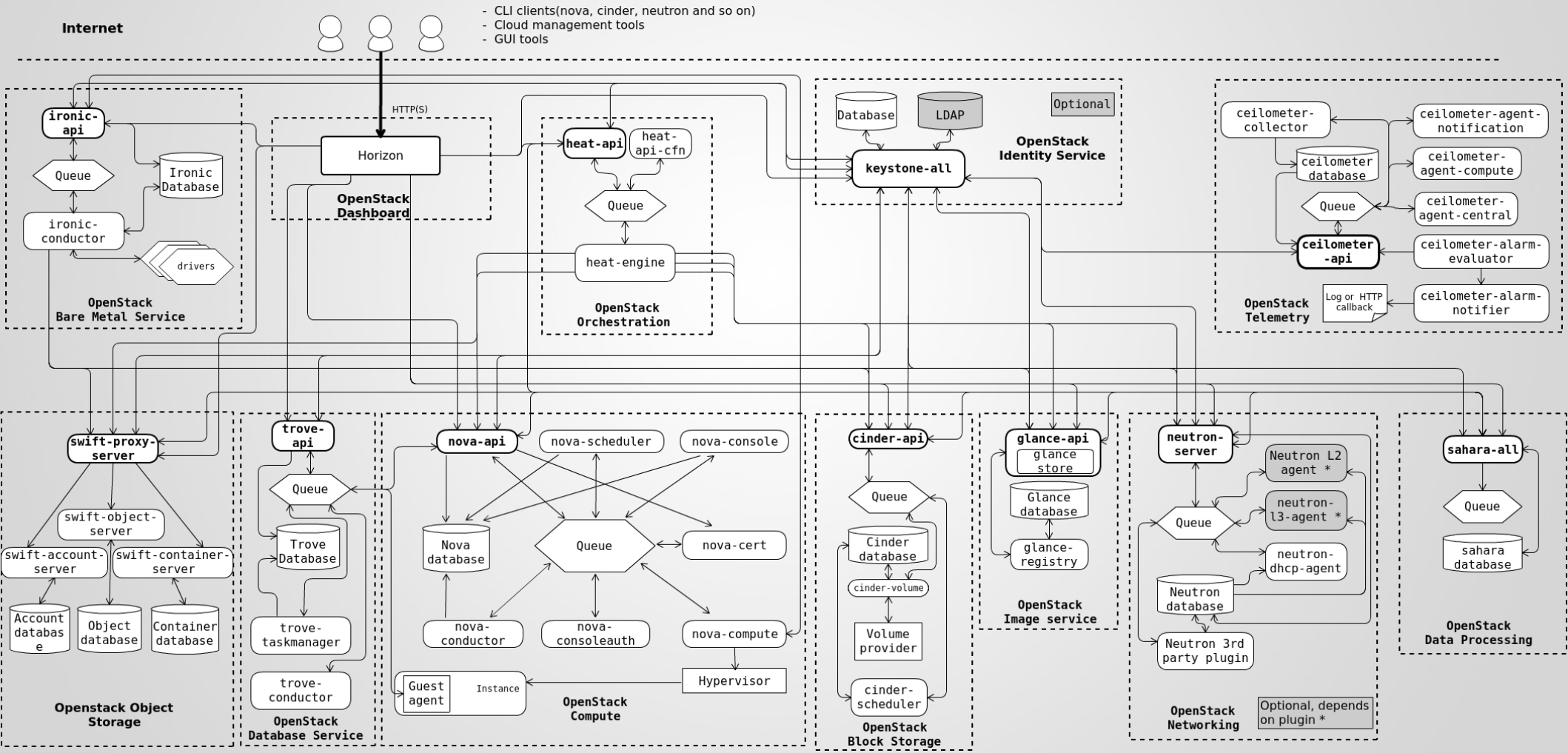
Why are there so many OpenStack installers?

What is RDO Manager / OSP Director?

- How does it work?
- What in the world is an Undercloud/Overcloud?
- How does it make my life better?

How many video clips can I use and still call it fair use?

OpenStack installers - simplify the deployment of this



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~~Necronomicon~~ OpenStack Installation Manual

Don't forget all the incantations

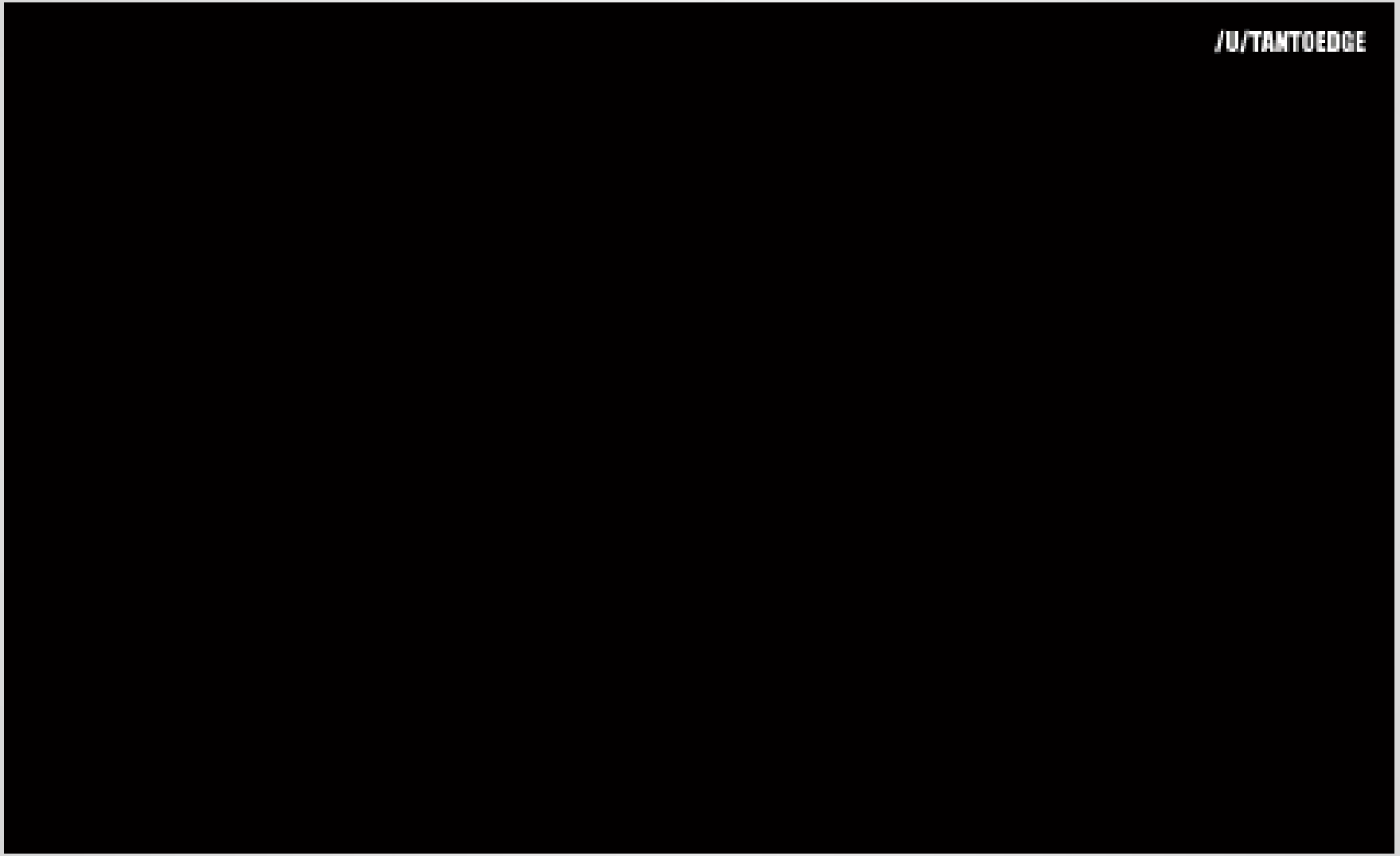
PDF of install instructions from docs.openstack.org is 177 pages

Do you know when it doesn't work?

15,000 questions on ask.openstack.org/en/questions

Manually Installing OpenStack is not about being “close enough”

Touching the system directly is dangerous



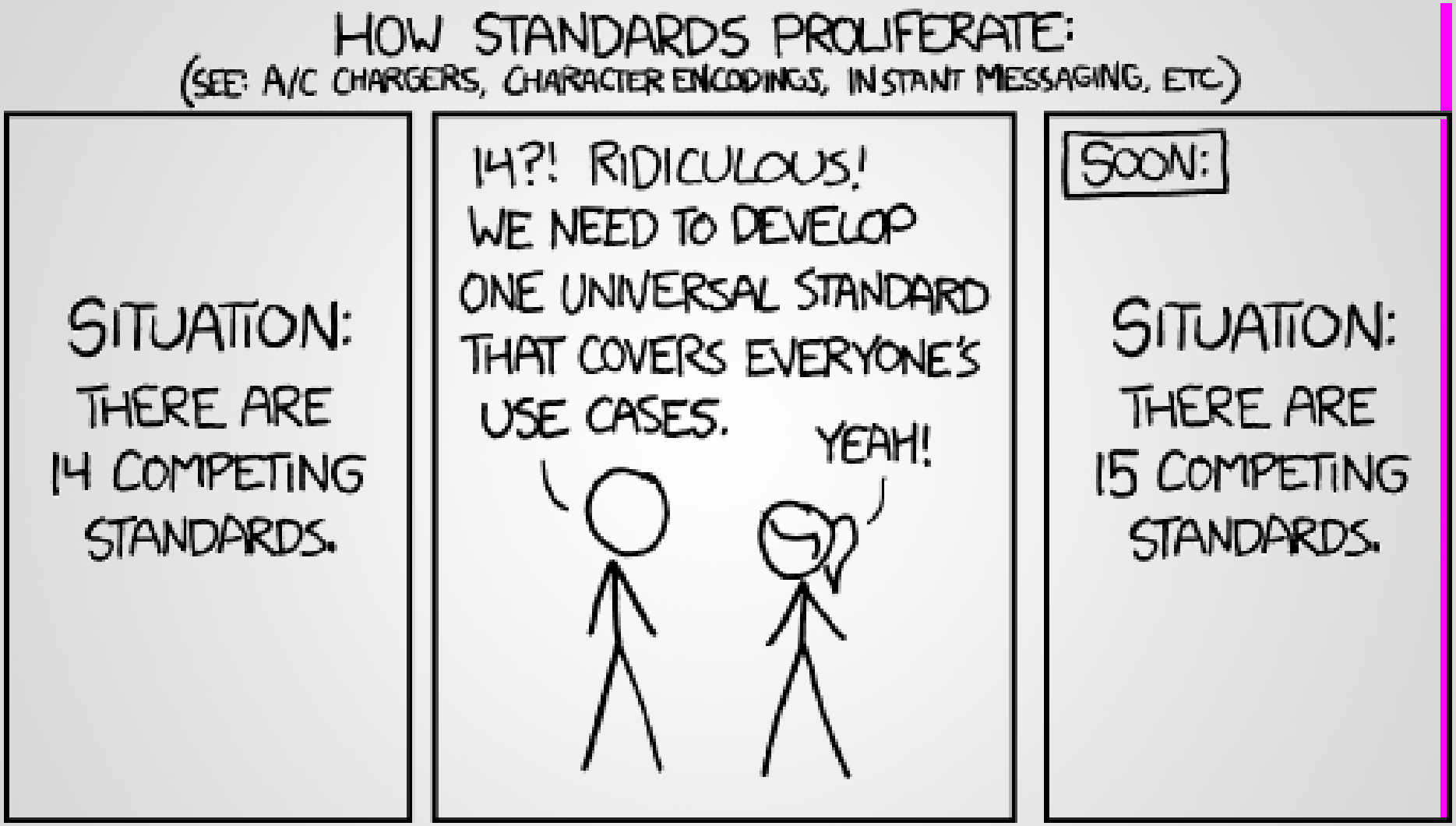
What works for 10s of nodes is not the same as 100's

But, we can do it with automation!

The many choices of installing OpenStack

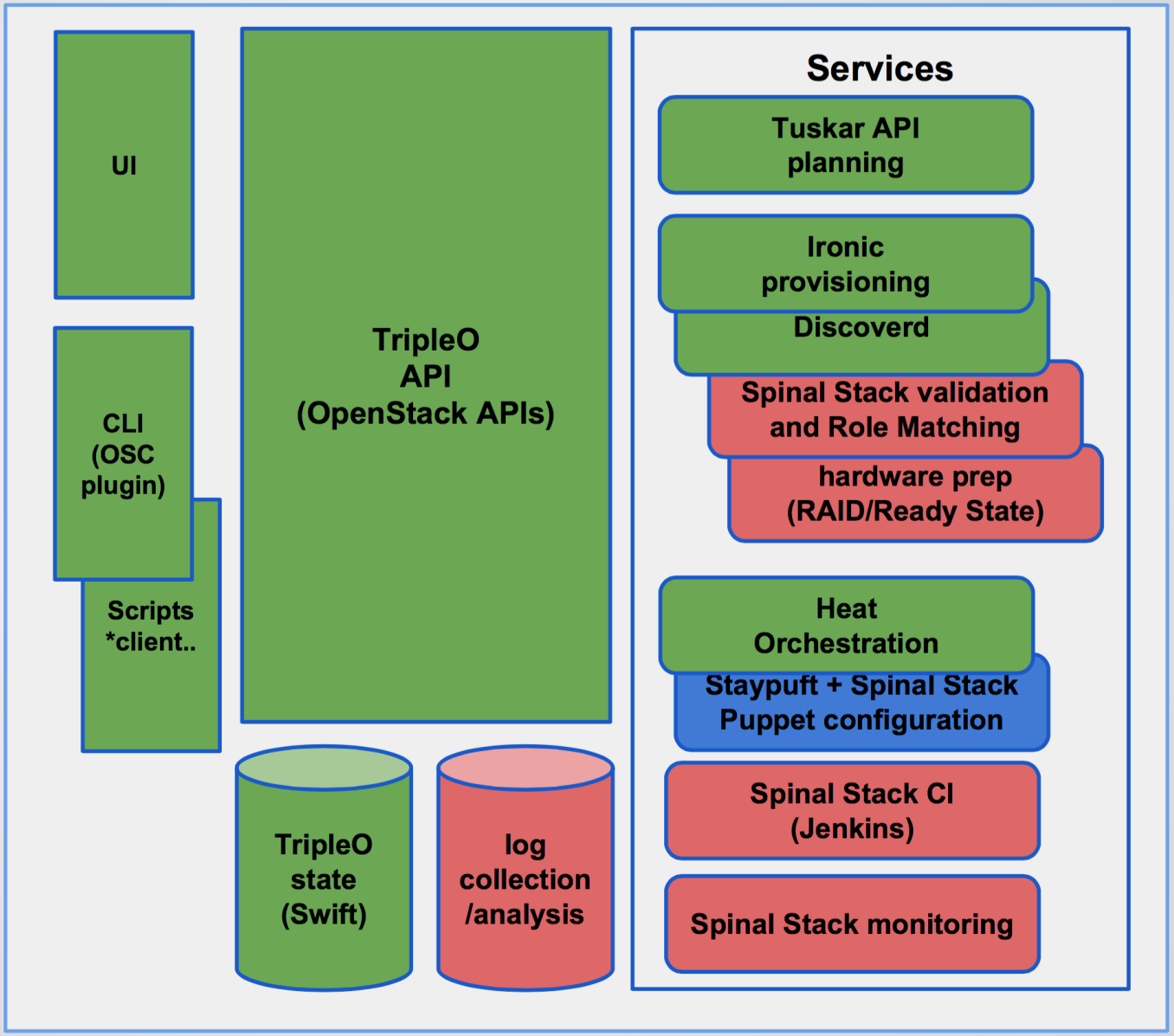
Manual Install = Time consuming, dangerous
Simple install (No HA) = Packstack
Other Installers:

- Triple-O
- Spinal Stack
- Instack
- Fuel
- Juju / MaaS
- Chef
- SpinalStack
- Foreman
- Etc...



https://xkcd.com/927/

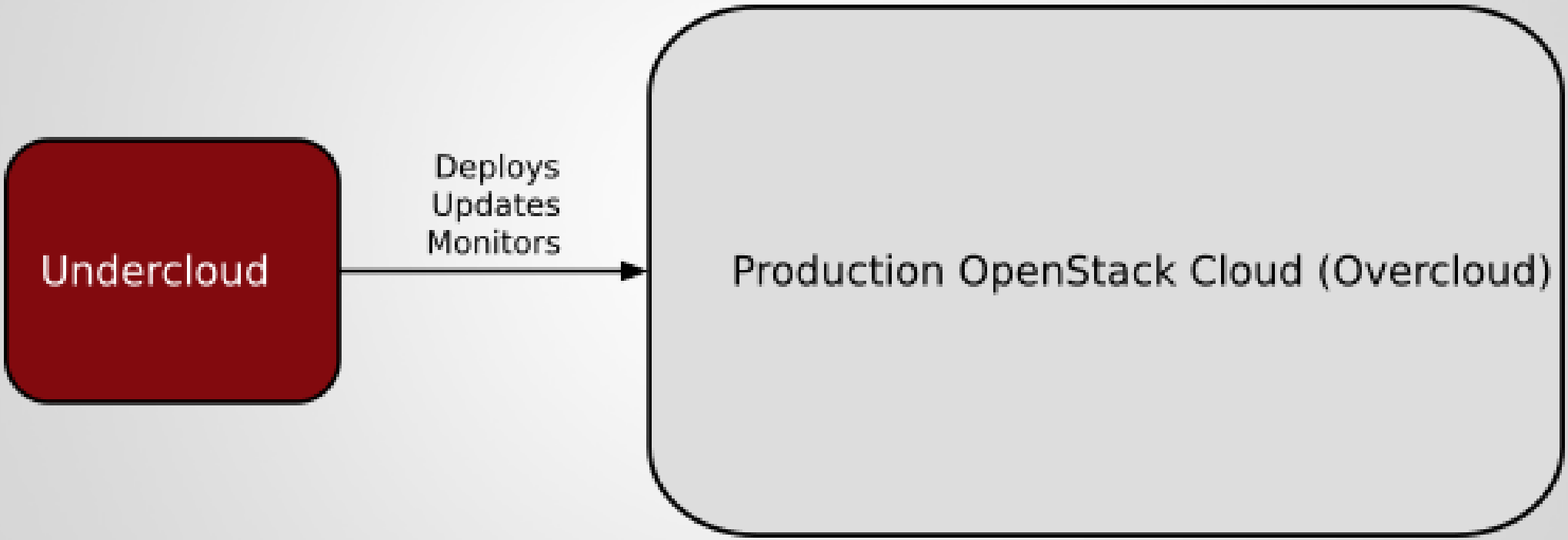
RDO Manager: reuse what works



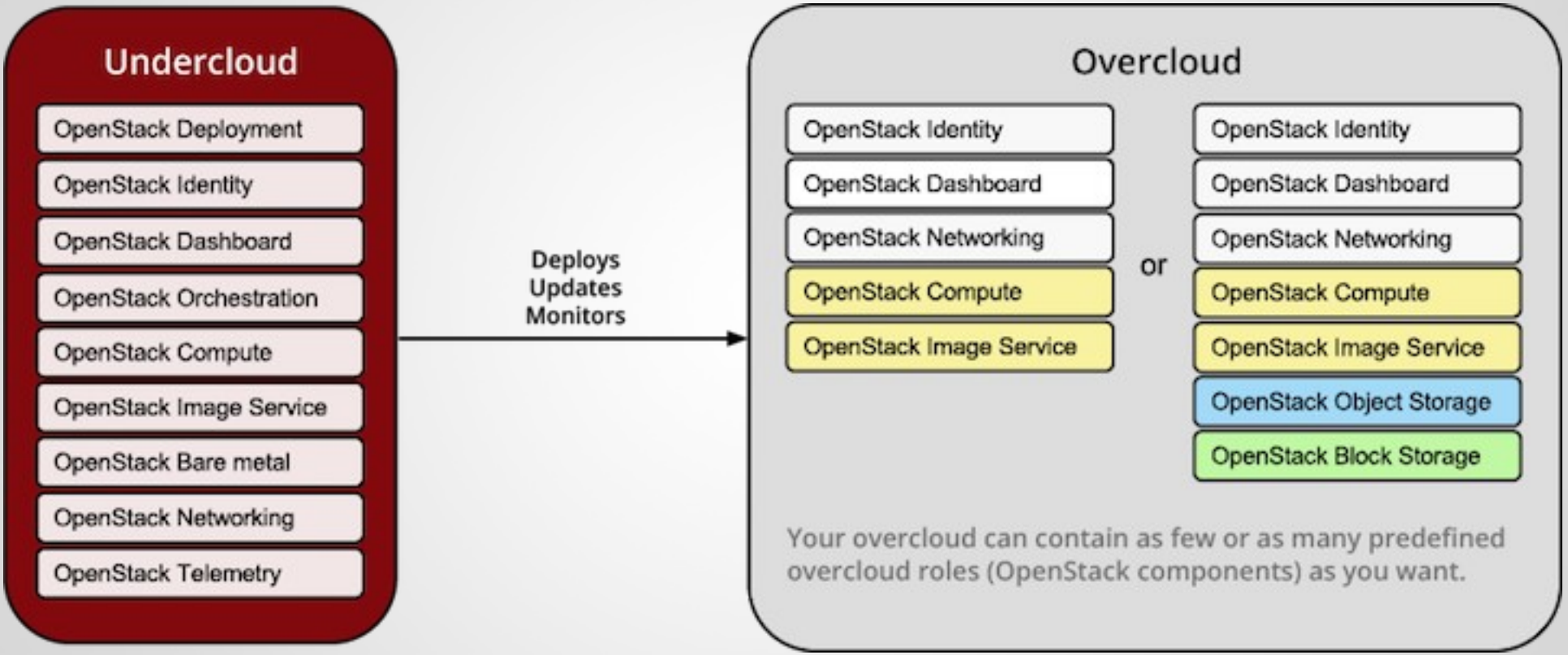
Combination of many upstream components

TripleO for the creation of images and environment templates
Ironic for bare metal control (IPMI)
Heat for component definition, ordering, and deployment
Puppet for post-instantiation configuration

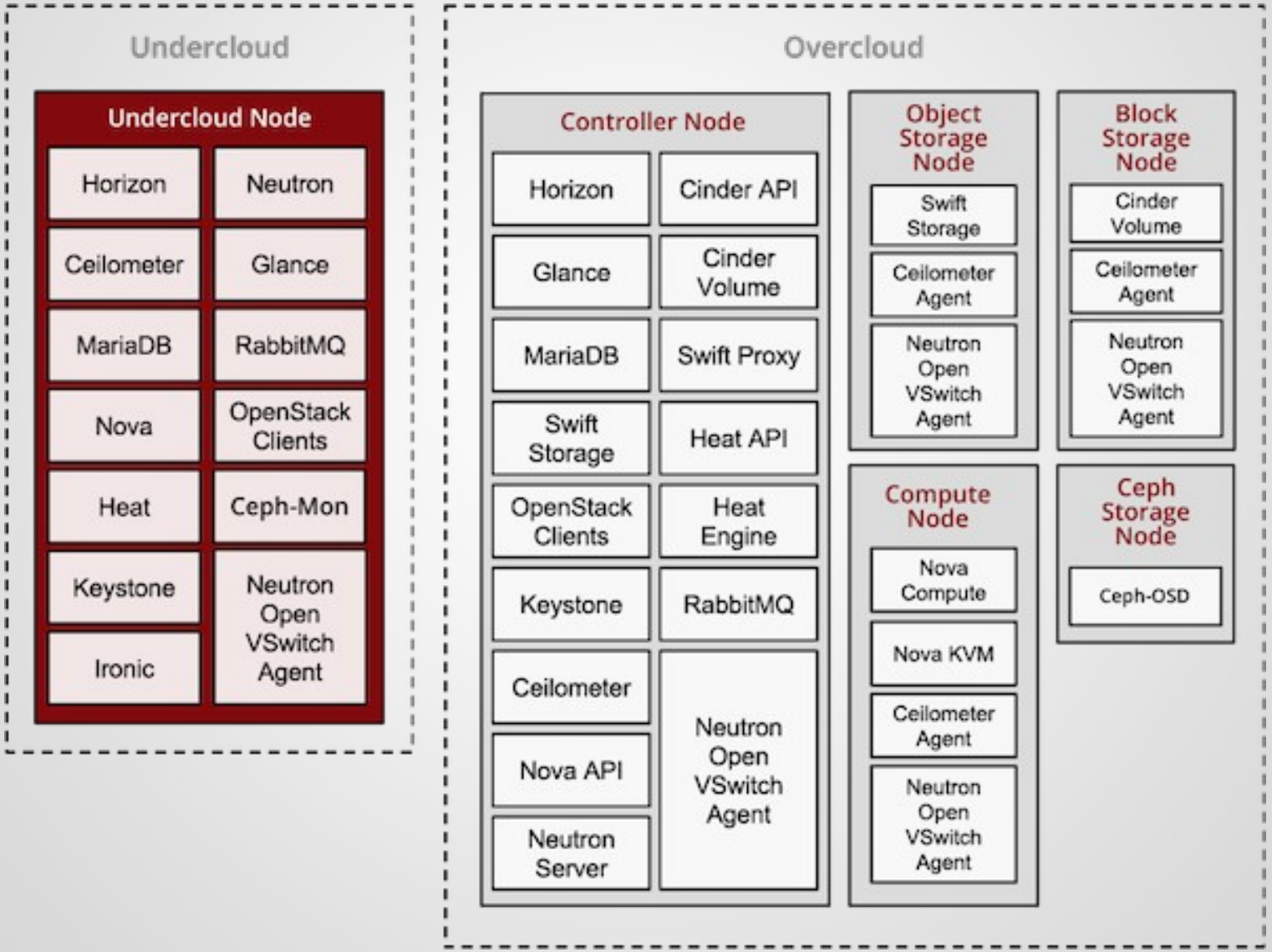
RDO Manager in a nut shell



Use the OpenStack API to deploy OpenStack



Deployed in a just enough manner



Why is this better?

Consistency!
- No unique snowflakes

Full Life cycle Management
- Not fire and forget
- Upgrades and enhancements to OpenStack also upgrade the installer

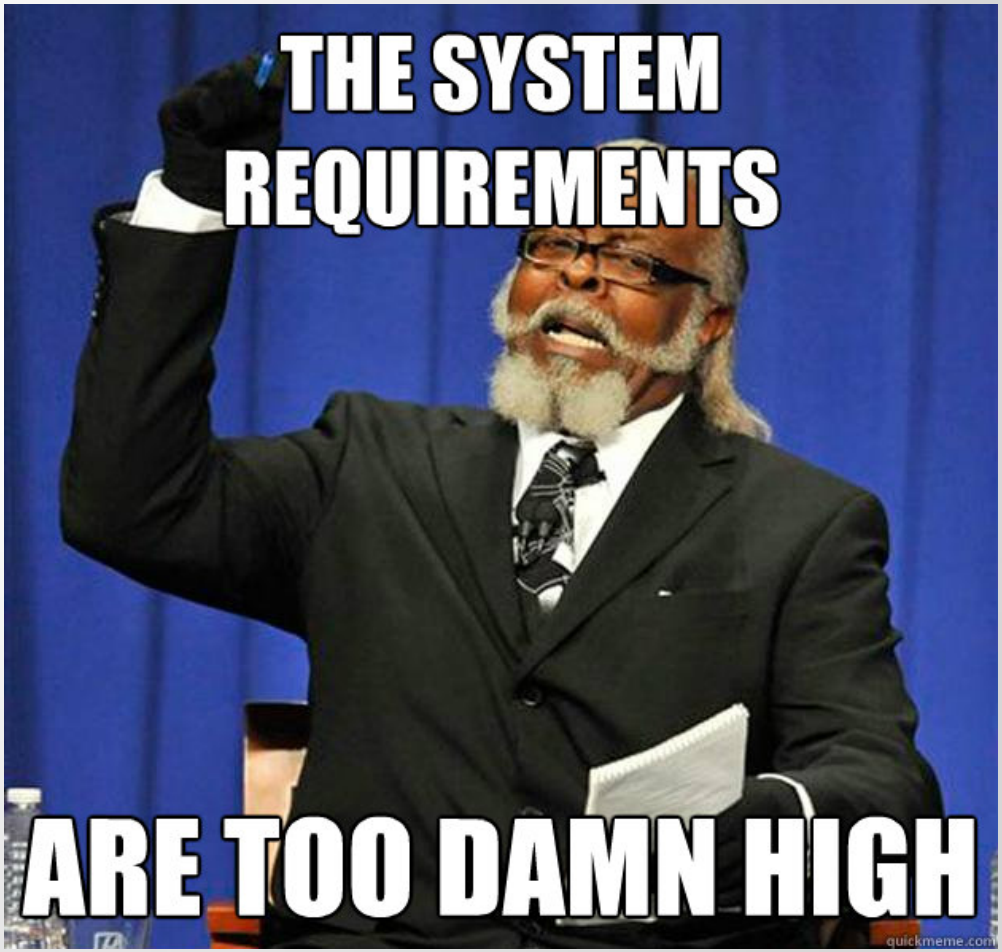
Integration with other products
- Red Hat Ceph Storage, Red Hat Satellite 6, CloudForms, etc.

RDO Manager vs OSP Director

Upstream	Downstream (Product)	Cadence
RDO	RHEL OpenStack Platform	6 Months
RDO Manager	RHEL OSP Director	2 Months

RDO Manager(Undercloud) Requirements

- Virtual or physical machine
  - 4 CPU
  - 12GB Ram
  - 120GB disk
- RPM based distribution
  - Fedora 21/22,
  - CentOS/RHEL 7
- Network access
  - IPMI
  - Provisioning

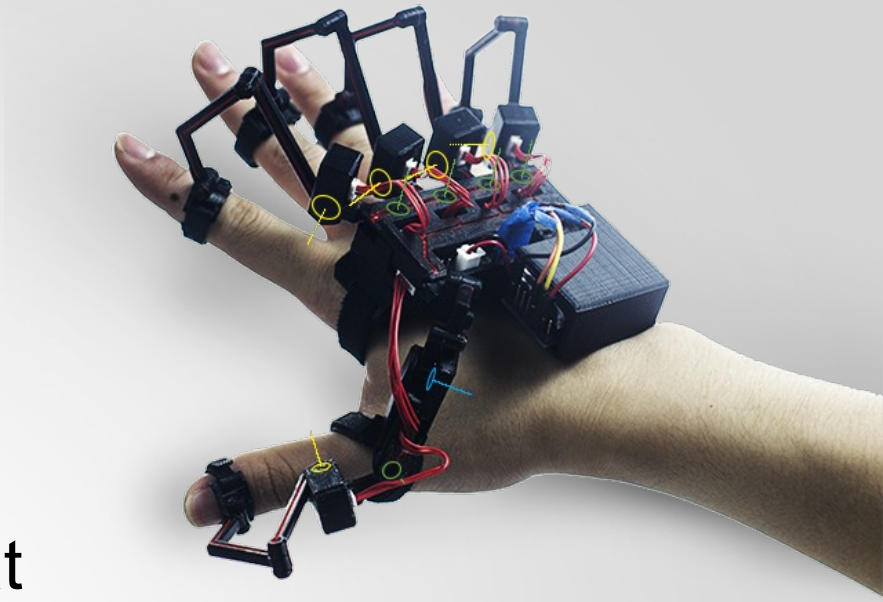


Supported Power Management devices

IPMI Compatible device:

- Dell Remote Access Controller(DRAC)
- HP Integrated Lights-out (ILO)
- iBoot from Dataprobe
- Cisco Unified Computing System (UCS)
- Fake PXE* (Not recommend for production)

RDO Utilizes the Unified CLI



OpenStackClient (aka OSC)

- Provide consistent output format
- Single shell with a uniform command structure.
- Consistent naming and structure for commands and arguments
- Combines command set for (Compute, Identity, Image, Object Store and Volume APIs)
- Use the OpenStack Python API libraries, extending or replacing them as required

Deployment Workflow Overview

1. **Install undercloud**
2. **Build or download images for the overcloud**
3. **Configure overcloud roles and assign flavors (node profile to match desired hardware specs)**
4. Heat will use Nova to identify the appropriate nodes and deploy the correct templates and images.
5. When each node starts it gathers configuration metadata from Heat Template and applies puppet manifests to configure the services on the nodes
6. Services on nodes of the overcloud are registered with Keystone

RDO Manager Configuration (Step 1)

Define the servers for ironic to control
 # openstack baremetal import --json instackenv.json

Prepare for install – assign the discovery disk to all nodes
 # openstack baremetal configure boot

Start powering on nodes (or configure ironic to take control if no HA running)

RDO Manager Ready-State (Optional)

Change BIOS settings

```
'bios_settings': {'ProcVirtualization': 'Enabled'}
```

RAID controller

```
'logical_disks': [
            {'controller': 'RAID.Integrated.1-1',
             'size_gb': 100,
             'physical_disks': [
                 'Disk.Bay.0:Enclosure.Internal.0-1:RAID.Integrated.1-1',
                 'Disk.Bay.1:Enclosure.Internal.0-1:RAID.Integrated.1-1',
                 'Disk.Bay.2:Enclosure.Internal.0-1:RAID.Integrated.1-1'],
             'raid_level': '5'},
        ]
```

*DRAC only today

RDO Manager Installation Starts (Step 2)

Introspection

- Gather information in RDO manager about the hardware via booting and running code on the discovery disk

#openstack baremetal introspection bulk start

- CPU
- RAM
- Disk
- Network cards
- Hardware Health

How does this work?

Boots node with PXE enabled
Provides DHCP and TFTP server for discovery image
“Interrogates” nodes

RDO Manager Automated Health Check (Optional)

Run benchmarks and catch outliers

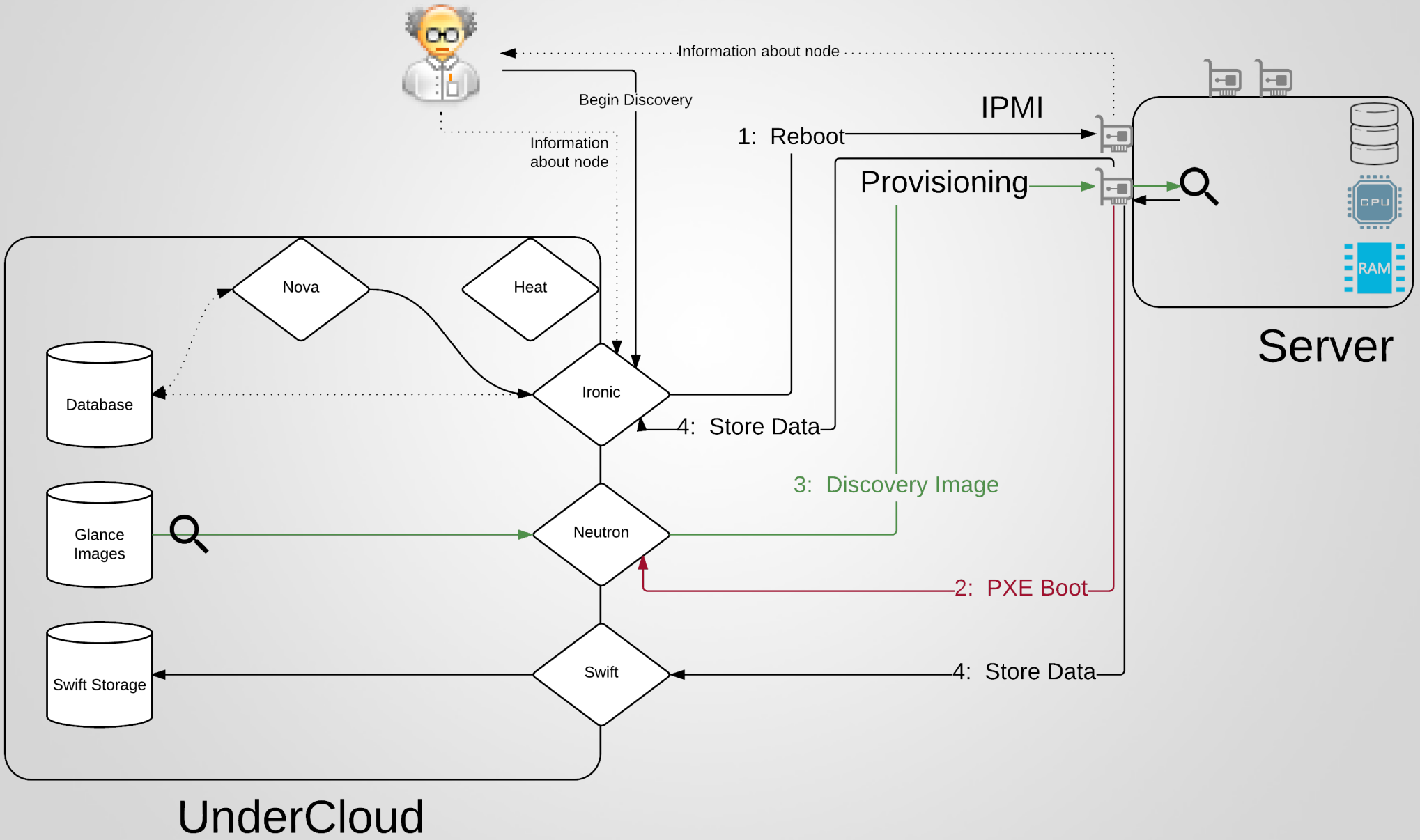
Set "**discovery_runbench = true**" in the undercloud.conf

#ahc-report –outliers

```
Group 0 : Checking logical disks perf
<SNIP>
standalone_read_1M_KBps          : INFO    : sda          : Group performance : min=1231155.00, mean=1292799.67,
max=1393152.00, stddev=87661.11
standalone_read_1M_KBps          : INFO    : sda          : Group performance = 1292799.67   : CONSISTENT


Group 0 : Checking CPU perf
bogomips                         : INFO    : logical_0    : Group performance : min= 4199.99, mean= 4199.99, max= 4199.99,
stddev=    0.00
bogomips                         : INFO    : logical_0    : Group performance = 4199.99   : CONSISTENT
<SNIP>
Group 0 : Checking Memory perf
Memory benchmark 1K              : INFO    : logical_0    : Group performance : min= 1677.00, mean= 1698.33, max= 1739.00,
stddev=   35.23
Memory benchmark 1K              : INFO    : logical_0    : Group performance = 1698.33   : CONSISTENT
```

RDO Manager Discovery

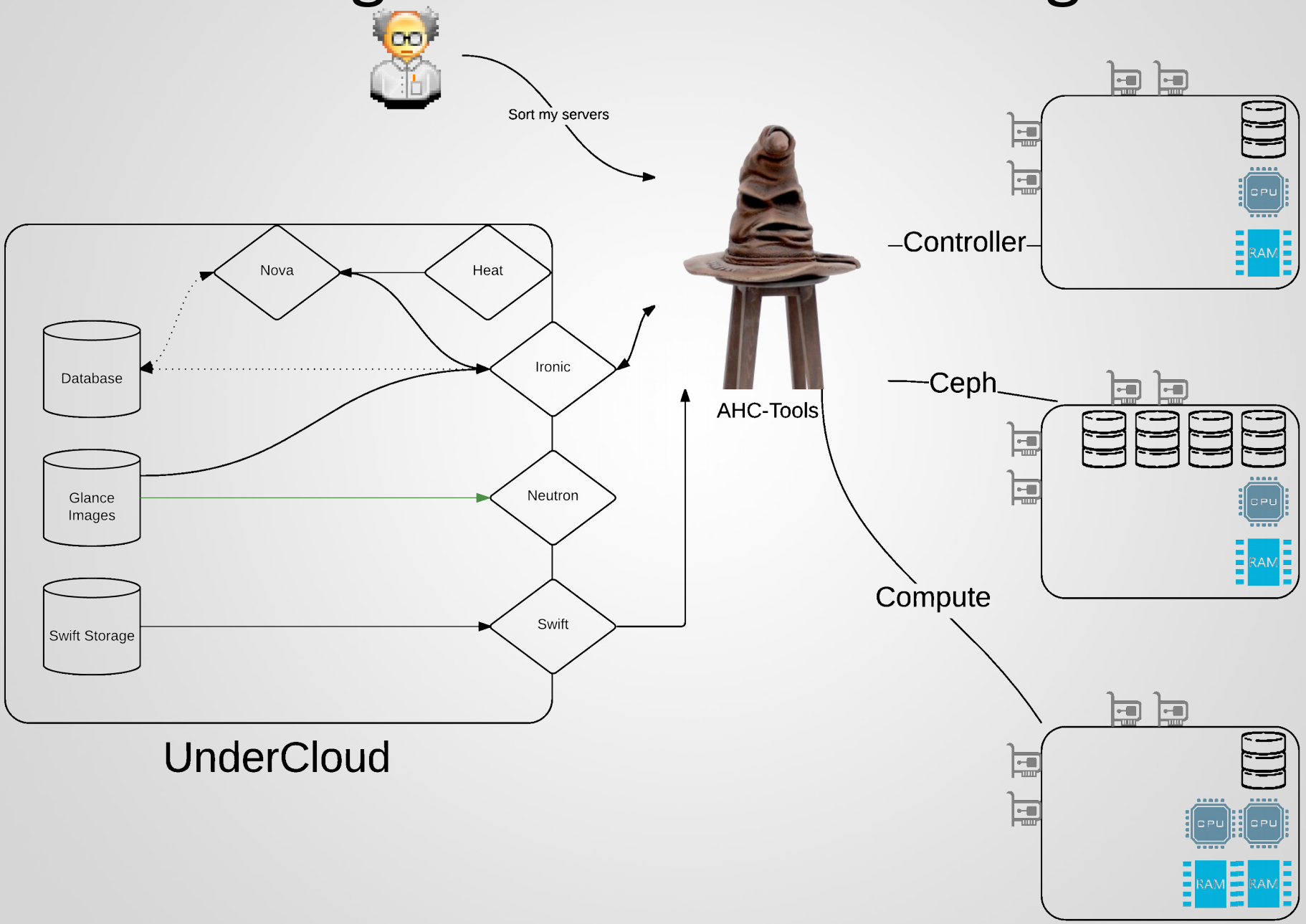


RDO Manager Configure Overcloud (Step 3)

Flavors – match hardware to roles

```
#openstack flavor create --id auto --ram
4096 --disk 40 --vcpus 1 baremetal
#openstack flavor set --property
"cpu_arch"="x86_64" --property
"capabilities:boot_option"="local" baremetal
```

RDO Manager Advanced Matching



RDO Manager Install Overcloud (Step 4)

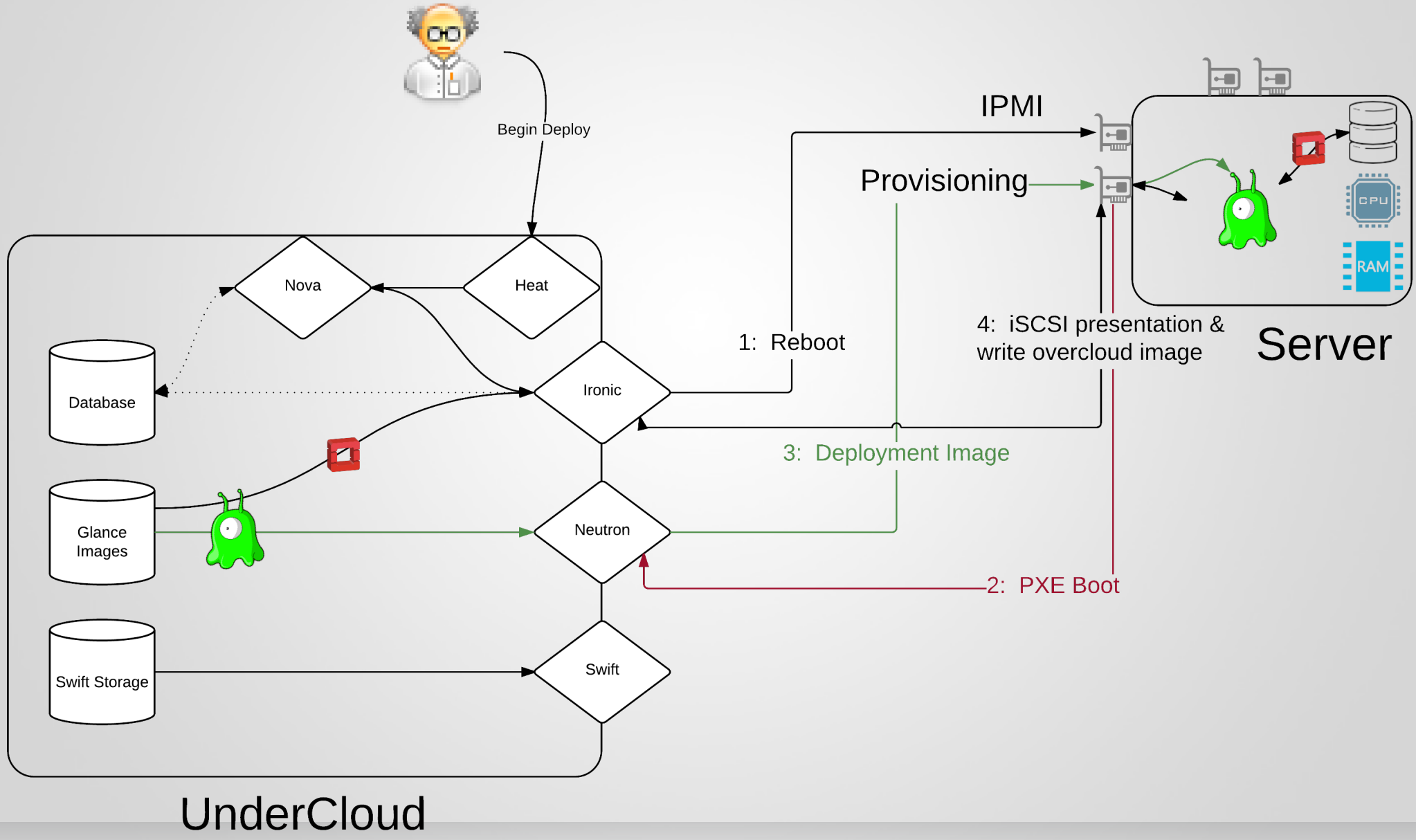
Modify the default of 1 compute and 1 controller

#openstack help overcloud deploy

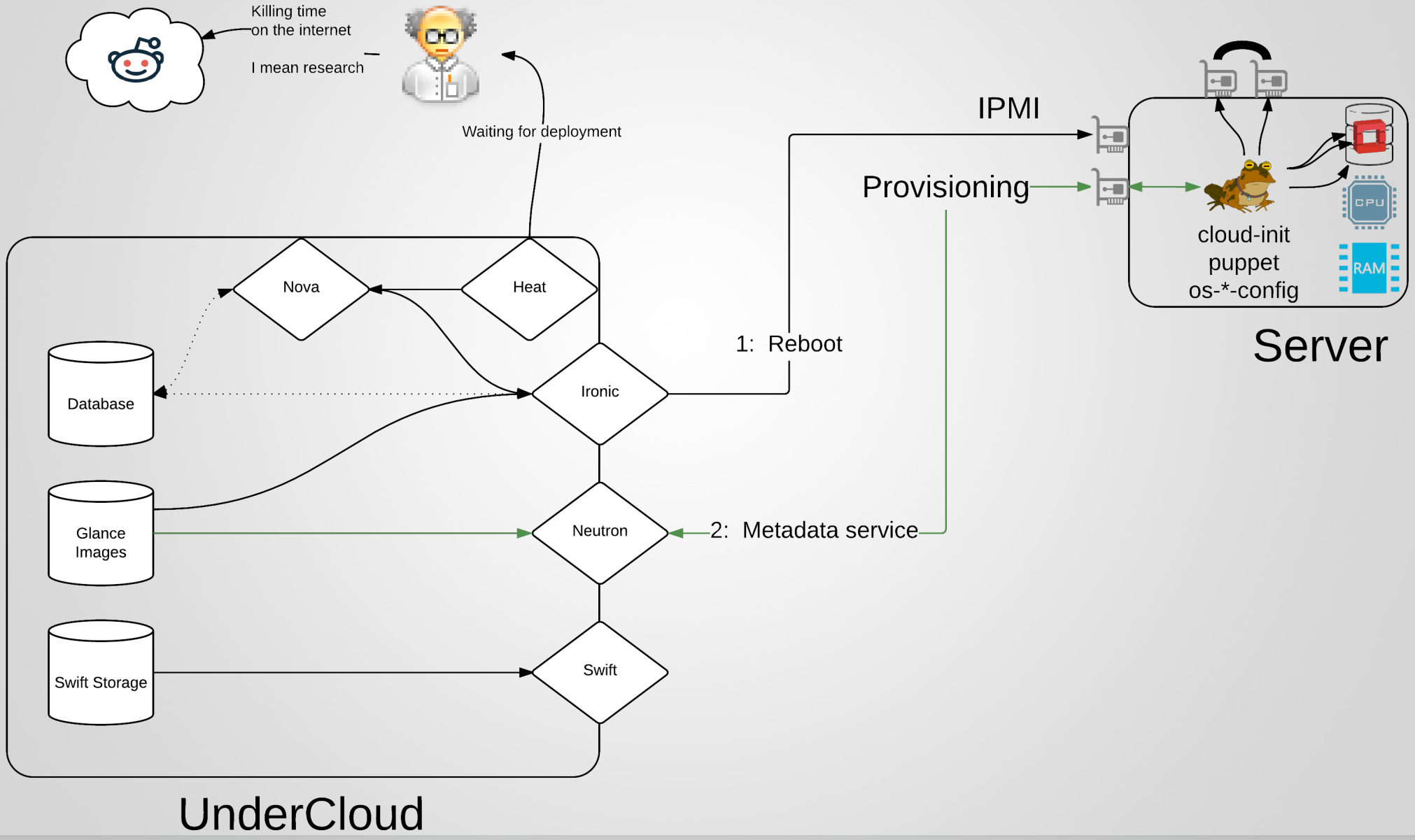
Deploy

#openstack overcloud deploy --templates

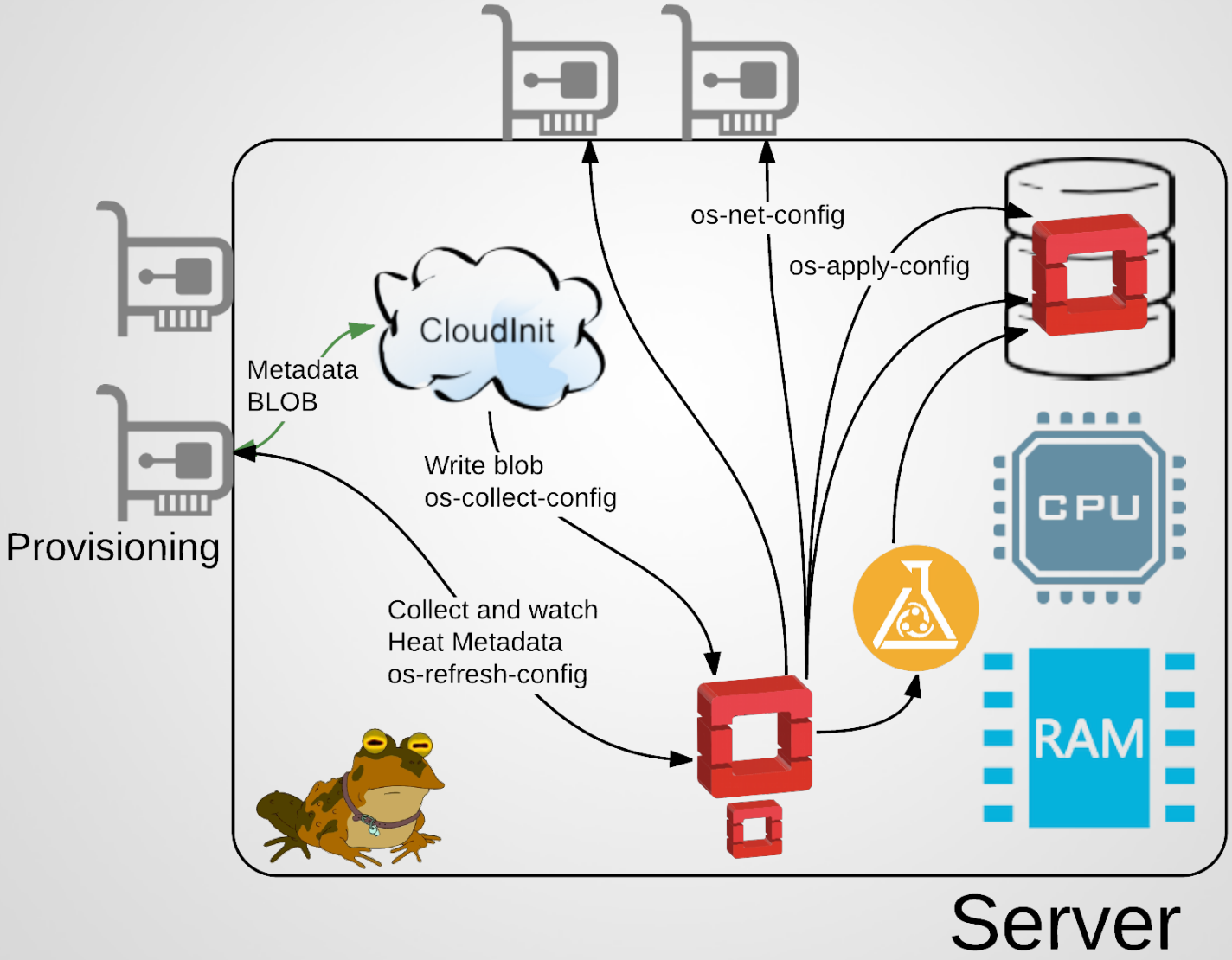
RDO Manager Installing Overcloud

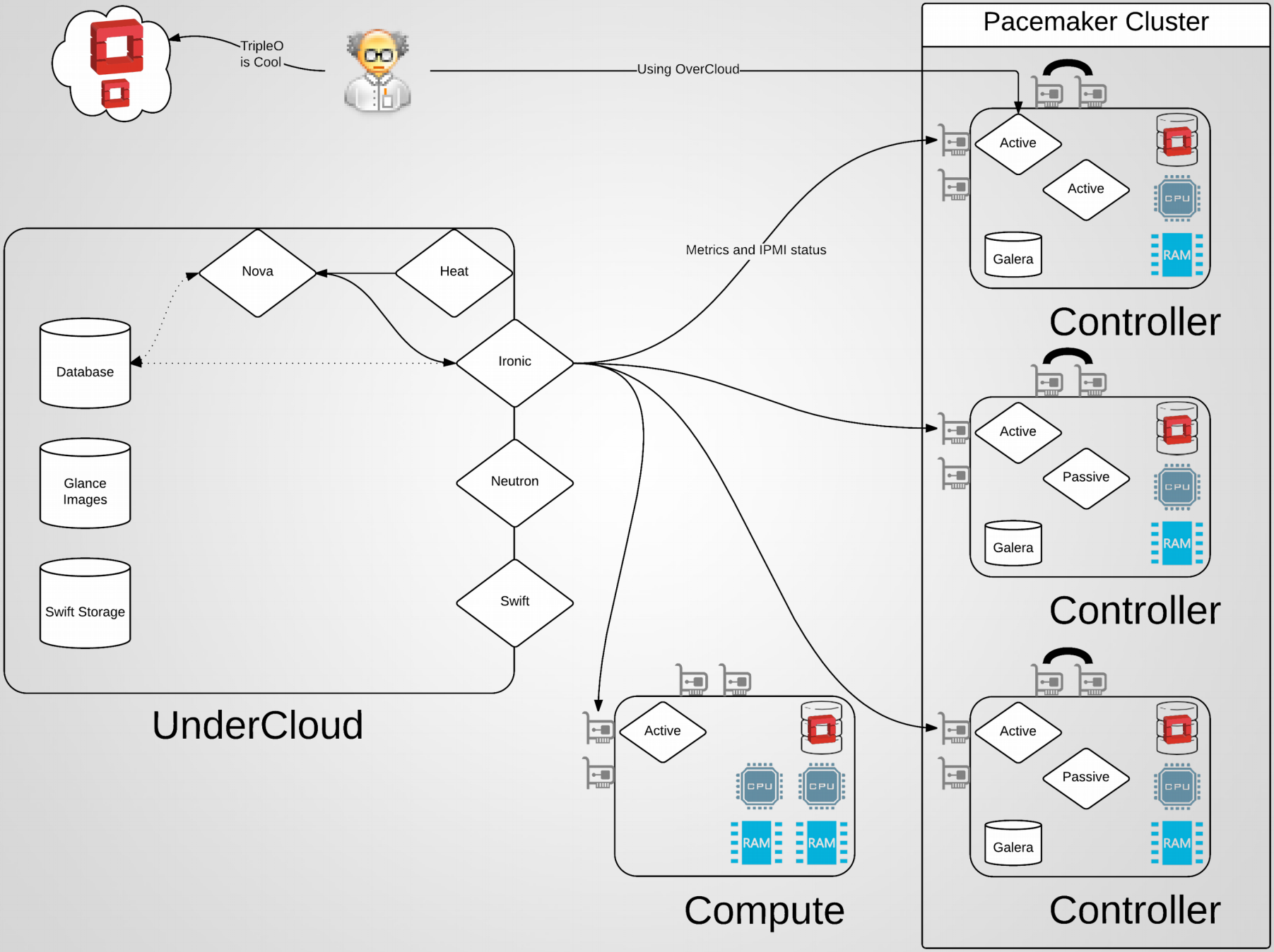


RDO Manager Installing Overcloud



RDO Manager Installing Overcloud




TripleO
is Cool
Using OverCloud
Pacemaker Cluster
Active
Active
CPU
Galera
RAM
Controller
Metrics and IPMI status
Nova
Heat
Database
Ironic
Glance
Images
Neutron
Swift Storage
Swift
Active
Passive
CPU
Galera
RAM
Controller
UnderCloud
Active
CPU
CPU
RAM
RAM
Compute
Active
Passive
CPU
Galera
RAM
Controller

RDO Manager Scale Overcloud

Add 2 more compute to the overcloud

```
#openstack overcloud scale stack overcloud overcloud -r Compute-1 -n 2
```

Take node(s) out of service

```
#openstack overcloud node delete --stack overcloud --templates <list of nova instance IDs>
```

RDO Manager Re-install Overcloud

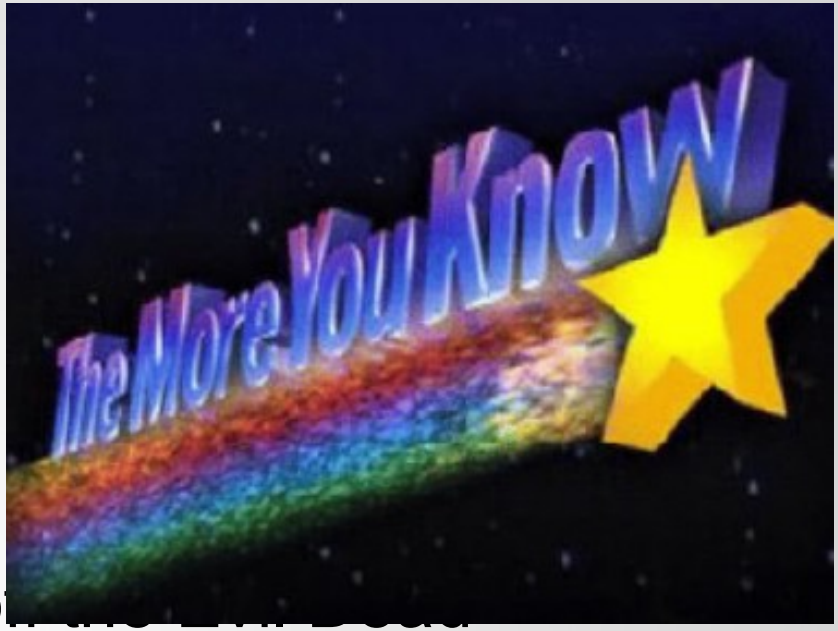
Delete the existing overcloud

```
#heat stack-delete overcloud
```

Deploy a new overcloud

```
#openstack overcloud deploy --templates
```

What have we learned?



Installing OpenStack doesn't have to be like the Necronomicon.

Through automation you can fight o[illegible] and/or scale infrastructure to massive size.

Don't reinvent the wheel and work in upstream to leverage existing API's for the benefit of all.

LibreOffice can handle 100+ Mb presentations...

Special thanks to Dr. Mike Heldebrant for help with the presentation material and all the open source contributors and supporters that makes this possible.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