# Kamailio World 2014

Kamailio and OpenStack
Together to build a truly scalable solution

**Ruben Sousa**

- CTO and co-founder of ITCenter
- Deploying solutions using Asterisk since 2004 and Kamailio since 2008
- Attended several Kamailio and Asterisk courses
- Expert in designing large scale VoIP solutions

(others interests includes wine, travel and photography)


## ITCenter quick facts

- Founded in 2003
- Located in Portugal, working with African and European markets
- Open source mentality
- Expertise and development of VoIP and Virtualization solutions
- Experienced staff with various training and certifications:

- Digium Asterisk training / dCAP
- Kamailio Advanced Training
- SIP Master Class
- Citrix Xen certification
- Openstack training

Digium Innovation Award | 2010 - EUA

voip2day - Best Case Study | 2010 - Spain

"The distinction was awarded for VoIP solution present in Portuguese universities"

Kamailio Awards | 2011 - Germany

“VoIP Services - Portugal Academic Network”

Exame Magazine| 2012/2013/2014 - Portugal

Best Companies to Work in Portugal

**Full featured VoIP solution**

**Open standards**

**Low bandwidth consumption**

**Scalable**

**Resilient**

**Distributed**

**No single point of failure**

**Full featured VoIP solution**

**Open standards**

**Low bandwidth consumption**

Scalable

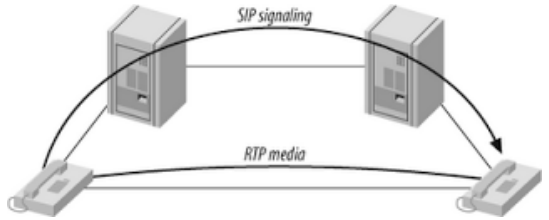
Resilient

Distributed

No single point of failure

**Solution**


FreeSWITCH




**Peer to Peer Media**

Full featured VoIP solution

Open standards

Low bandwidth consumption

**Scalable**

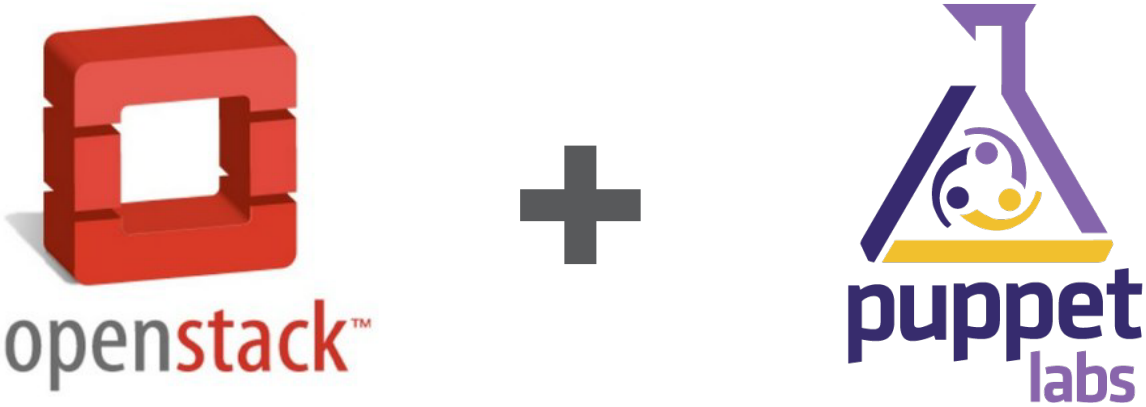
**Resilient**

**Distributed**

**No single point of failure**

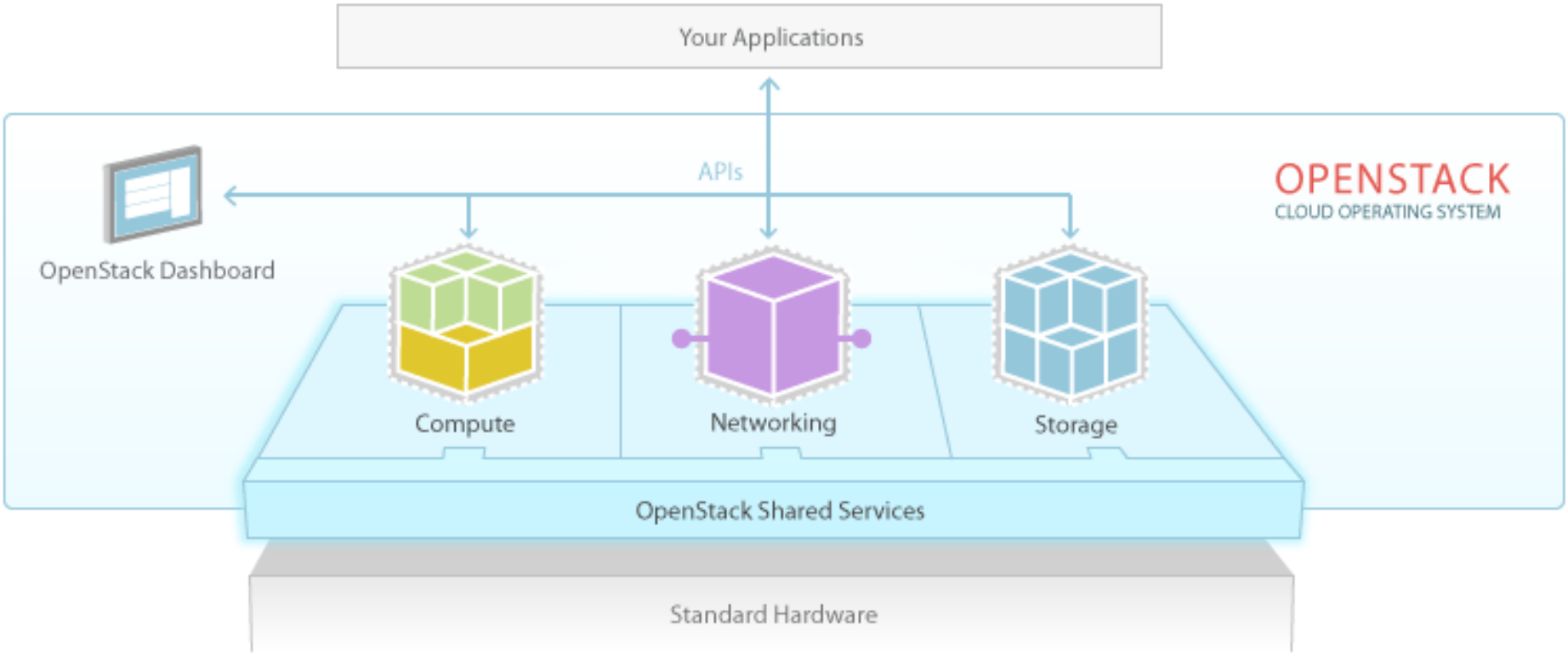
**Solution**

# Our Solution




**Cloud deployment + orchestration**

## OpenStack: The Open Source Cloud Operating System




OpenStack is a cloud operating system that controls large pools of compute, storage, and networking resources throughout a datacenter.

**Web / SaaS/ eCommerce**
- PayPal
- Wikimedia
- Cisco WebEx

**Academic / Research / Government**
- CERN
- Harvard University
- MIT
- NSA

**Film / Media / Gaming**
- Comcast
- Sony Network Entertainment

**Information Technology**
- Intel
- IBM
- SUSE
- HP
- Dell

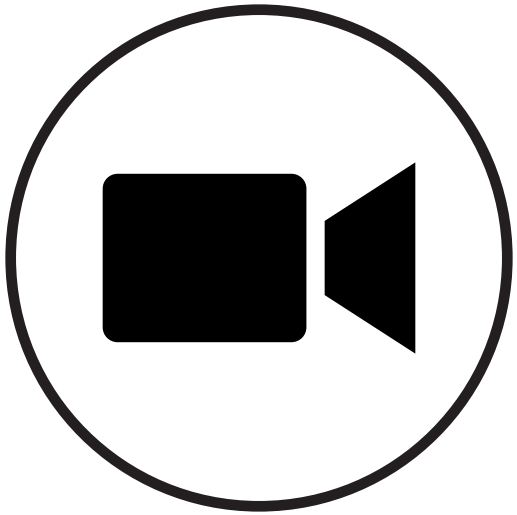
**Cloud Hosting / MSP / Telco**
- Rackspace
- CloudUP

**OpenStack is on a mission:**

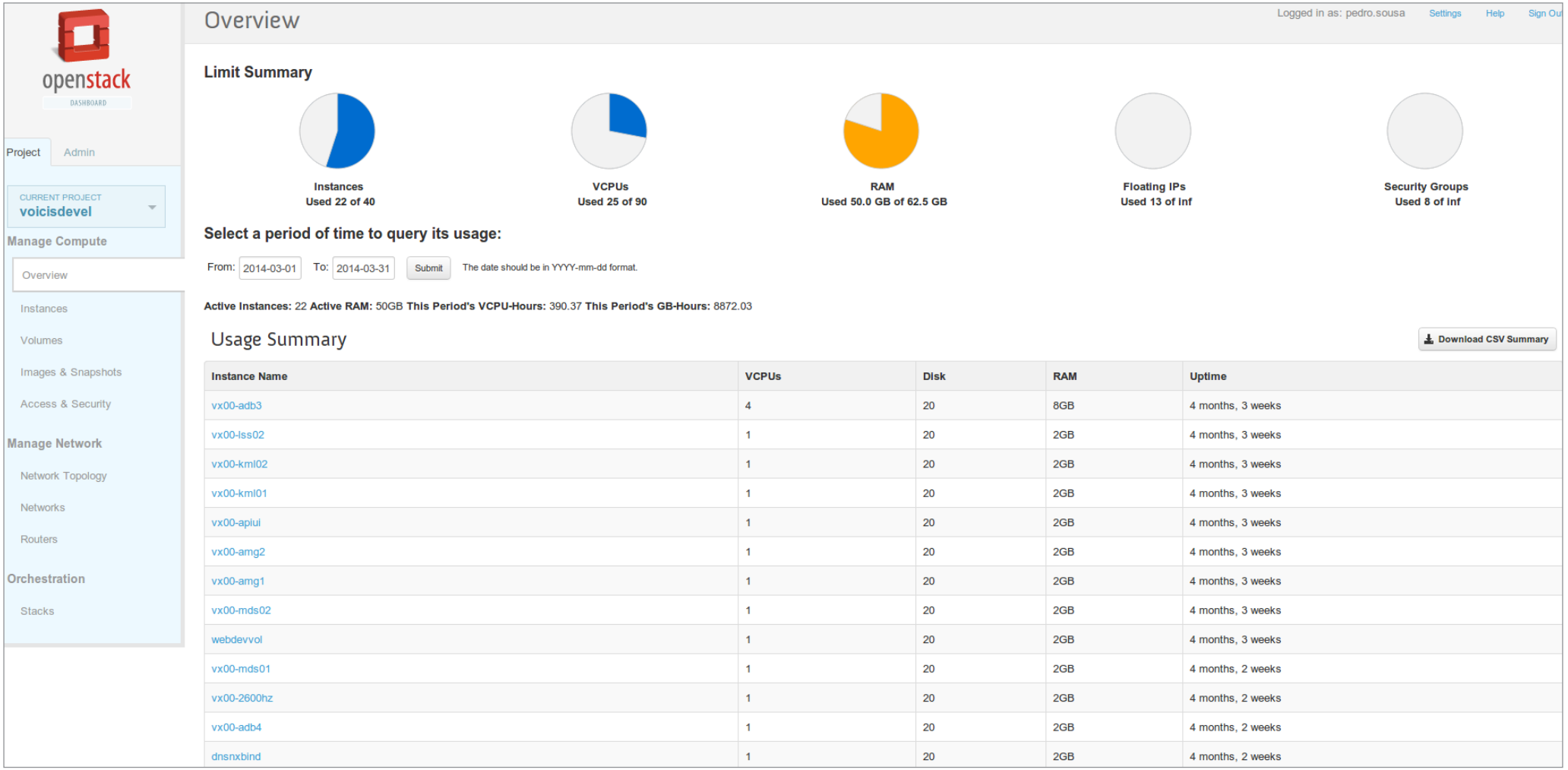
To **provide scalable, elastic cloud computing**
for both public and private clouds, large and small.

At the heart of our mission is a pair of basic requirements:
**clouds must be simple to implement and massively scalable**.

Source:
http://docs.openstack.org/grizzly/openstack-compute/admin/content/what-is-openstack.html

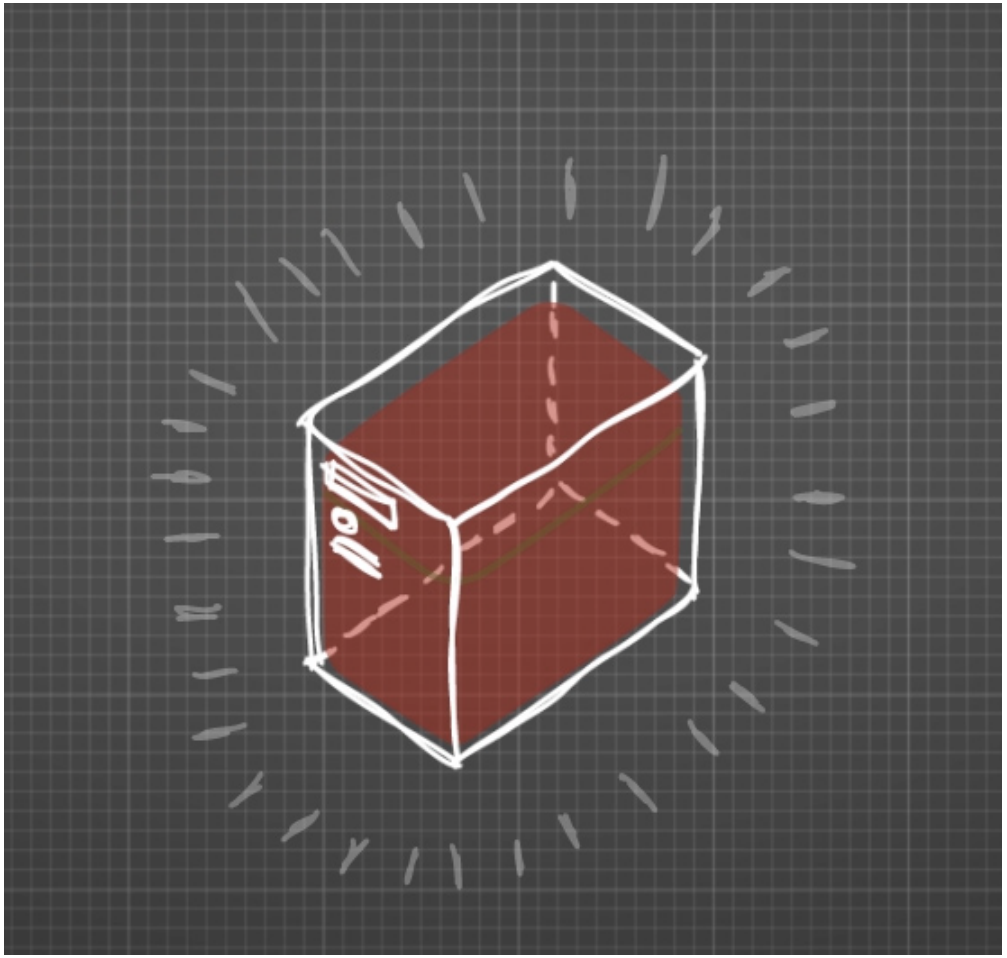


The **OpenStack** dashboard provides administrators and users a graphical interface to access, provision and automate cloud-based resources




| Instance Name | VCPUs | Disk | RAM | Uptime |
|---|---|---|---|---|
| vx00-adb3 | 4 | 20 | 8GB | 4 months, 3 weeks |
| vx00-lss02 | 1 | 20 | 2GB | 4 months, 3 weeks |
| vx00-kml02 | 1 | 20 | 2GB | 4 months, 3 weeks |
| vx00-kml01 | 1 | 20 | 2GB | 4 months, 3 weeks |
| vx00-apiui | 1 | 20 | 2GB | 4 months, 3 weeks |
| vx00-amg2 | 1 | 20 | 2GB | 4 months, 3 weeks |
| vx00-amg1 | 1 | 20 | 2GB | 4 months, 3 weeks |
| vx00-mds02 | 1 | 20 | 2GB | 4 months, 3 weeks |
| webdevvol | 1 | 20 | 2GB | 4 months, 3 weeks |
| vx00-mds01 | 1 | 20 | 2GB | 4 months, 2 weeks |
| vx00-2600hz | 1 | 20 | 2GB | 4 months, 2 weeks |
| vx00-adb4 | 1 | 20 | 2GB | 4 months, 2 weeks |
| dnsnxbind | 1 | 20 | 2GB | 4 months, 2 weeks |

# HEAT



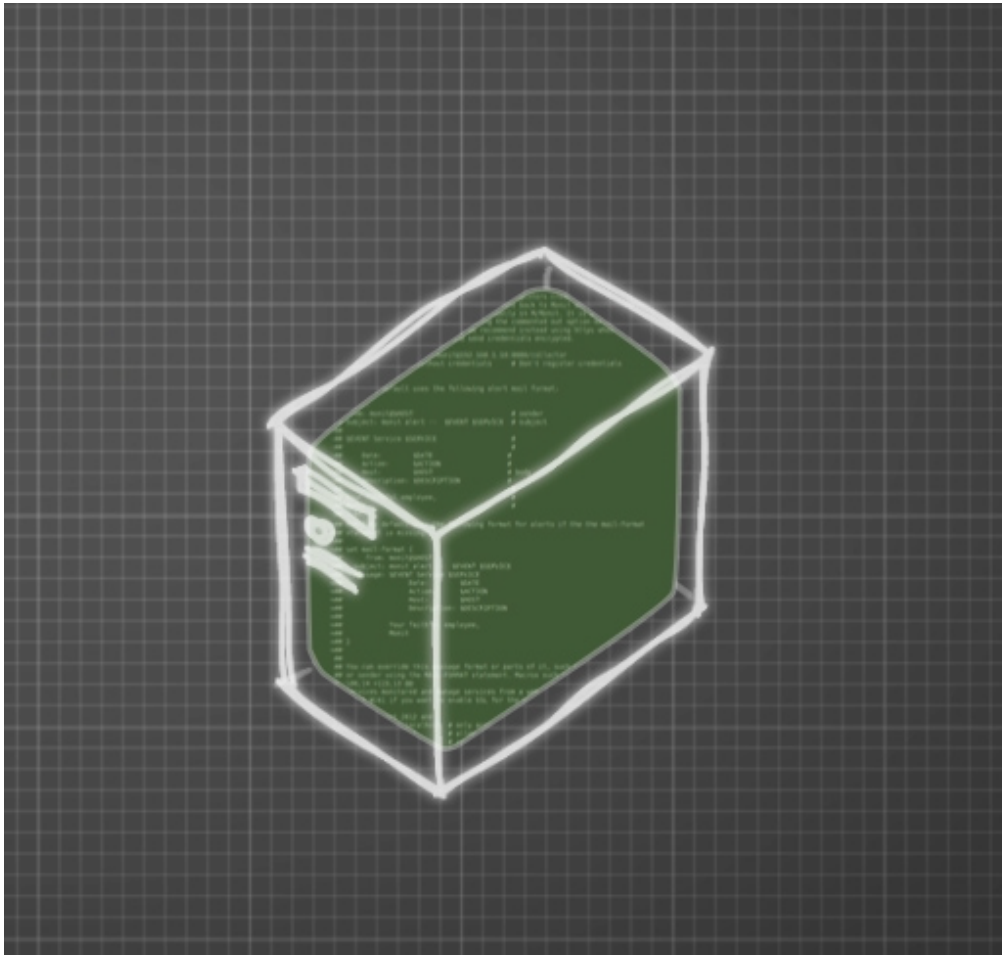
**HEAT overview**

- Orchestration service for OpenStack
- Template mechanism - integration with Puppet and Chef
- Creates and deletes infrastructure resources
- Heat provides an autoscaling service that integrates with Ceilometer

**Ceilometer overview**

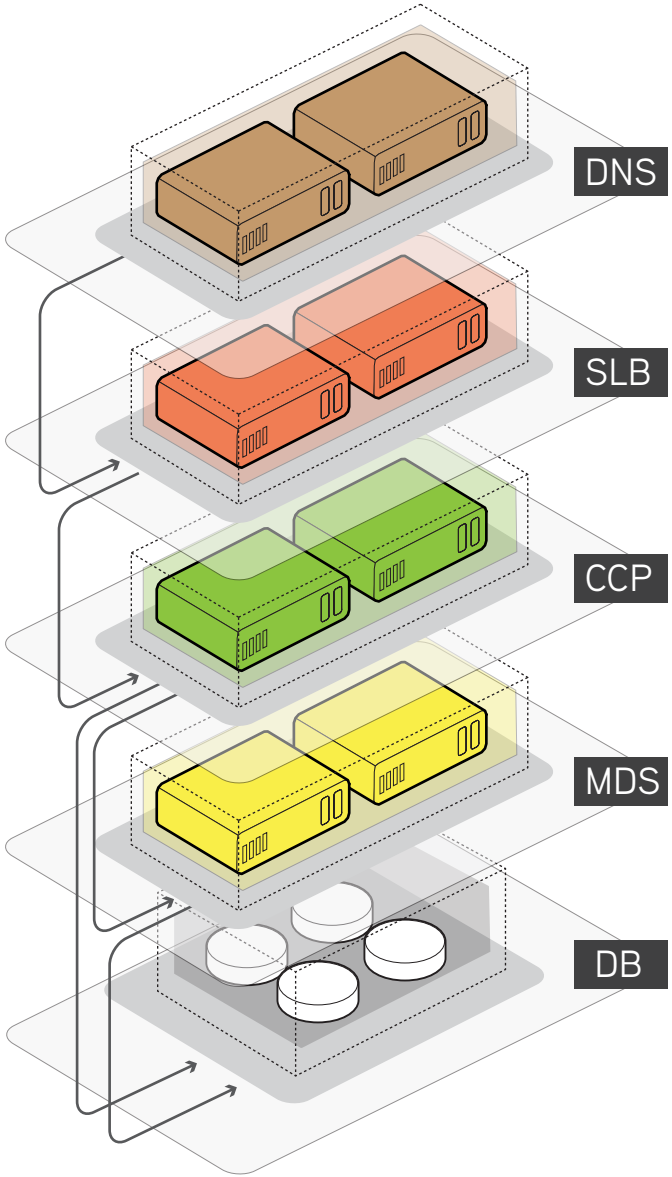
- Collection of metering data, in terms of resources usage;
- Ceilometer triggers Heat to create new instances based on defined alarms / thresholds;
  *example*: CPU; MEM; Network load > 50%

# PUPPET



**PUPPET overview**

- Configuration deployment
- Patching / Management
- Integrate new resources on existing infrastructure configuration:
  - DNS records
  - DB records
  - SIP Load Balancers




**DNS Server**
- SRV
- NAPTR

**Kamailio (SIP Load Balancer)**
- Load Balance all SIP traffic to and from internal system
- Security
- Far-end NAT traversal
- Dispatcher server to CCP (Core Call Process)

**Kamailio - CCP (Core Call Process)**
- SIP core proxy
- Authenticates the endpoints
- Handles SIP registrations
- Call routing
- Presence server
- Dispatcher server to Freeswitch

**Media Server/Aplication Server (MDS)**
- Transcoding
- SIP Back-to-Back User-Agent
- Voicemail
- Conference queues
- Call queues
- IVR

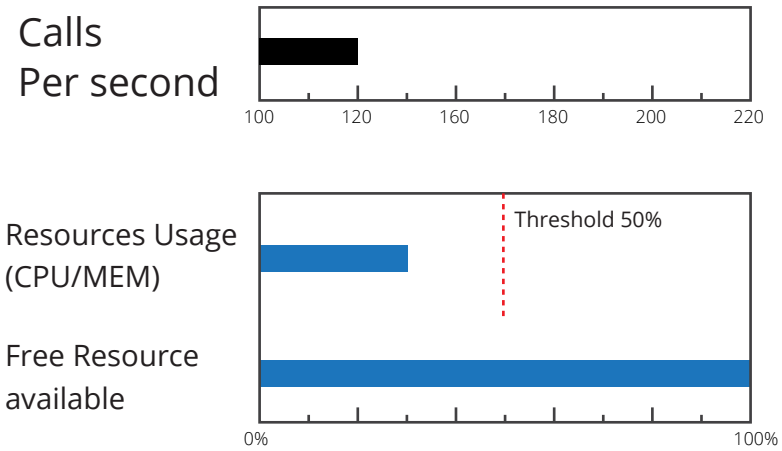
**MySQL Cluster**
- Architecture distributed DB
- HAProxy to load balance DB requests

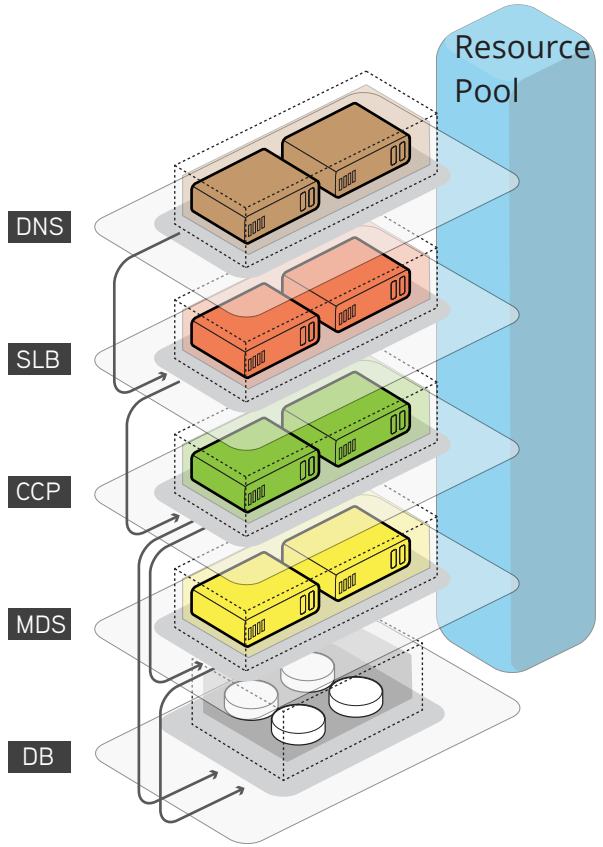
# Autoscaling
# by Stack

## Autoscaling by Stack (Machine or Group of machines by type)

### Possible scenario:

- Your BIGGEST customer network goes down! (natural disasters, UFOs, NSA, how knows?...)
- When the network comes back again, you get flooded by SIP requests:
  - Registrations
  - Call routing
  - Presence / BLFs
  - and more...
- Kamailio (CCP) is struggling to process all the requests
- Load / Resources usage starts to rise beyond... 50%...70%...90%..

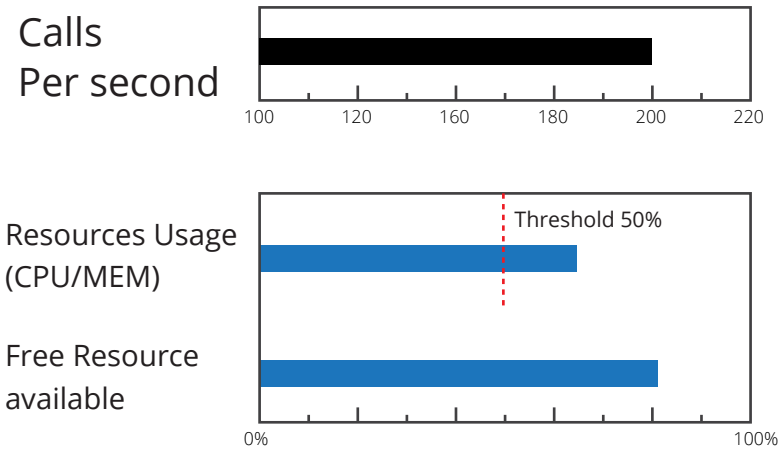


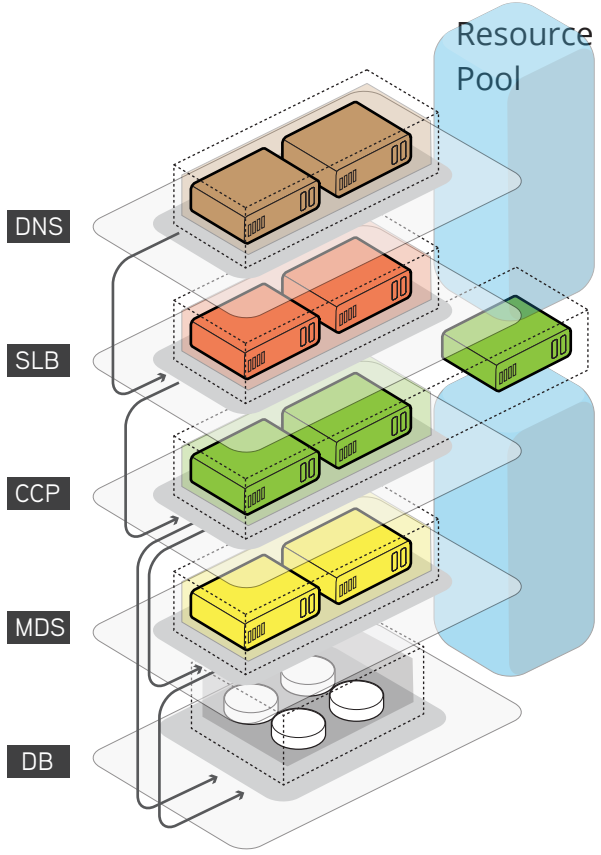



## Autoscaling by Stack (Machine or Group of machines by type)

**Autoscaling action**s:

- Ceilometer monitorization system checks that your system usage is over 50% in CCP stack (CCP1 & CCP2) – alarm!
- Heat gets triggered to create a new CCP stack - “CCP3”
- Puppet applies CCP template configuration to “CCP3”
- Puppet adds the new “CCP3” configuration to existing infraestructure
- When Ceilometer checks that the usage is below 50% triggers Heat to delete “CCP3”
- Puppet removes the new “CCP3” from the existing infraestructure

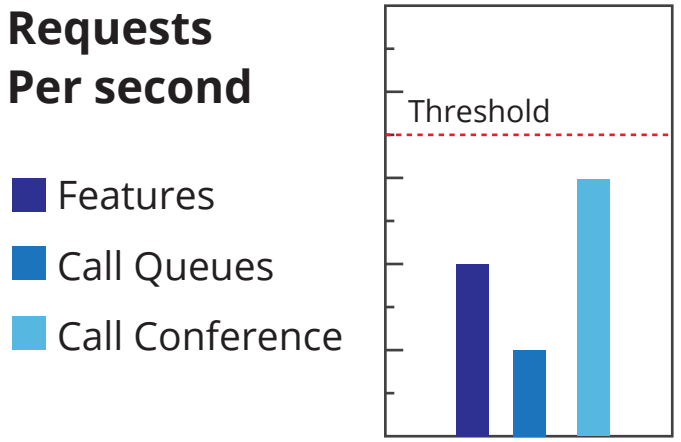


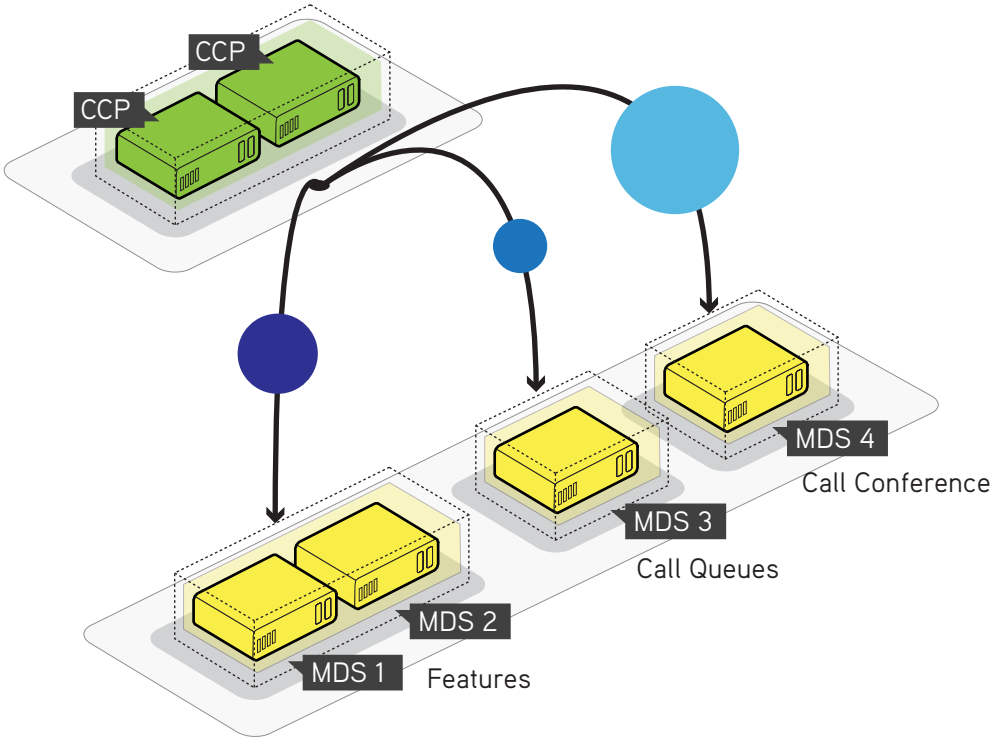



# Autoscaling
# by Feature Demand

**Possible scenario:**

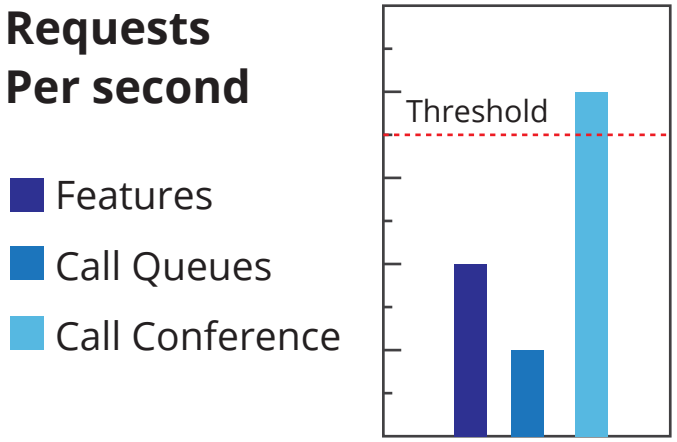
- For some (strange) reason all your customers book conference calls to the same day and hour – “Conference call day”;
- In this scenario, we have Kamailio (CCP) dividing the features by type, sending Call Queues and Call Conference to a dedicated pool.
- The load / resources usage of the Call Conference pool starts to rise… 50%…70%…90%..

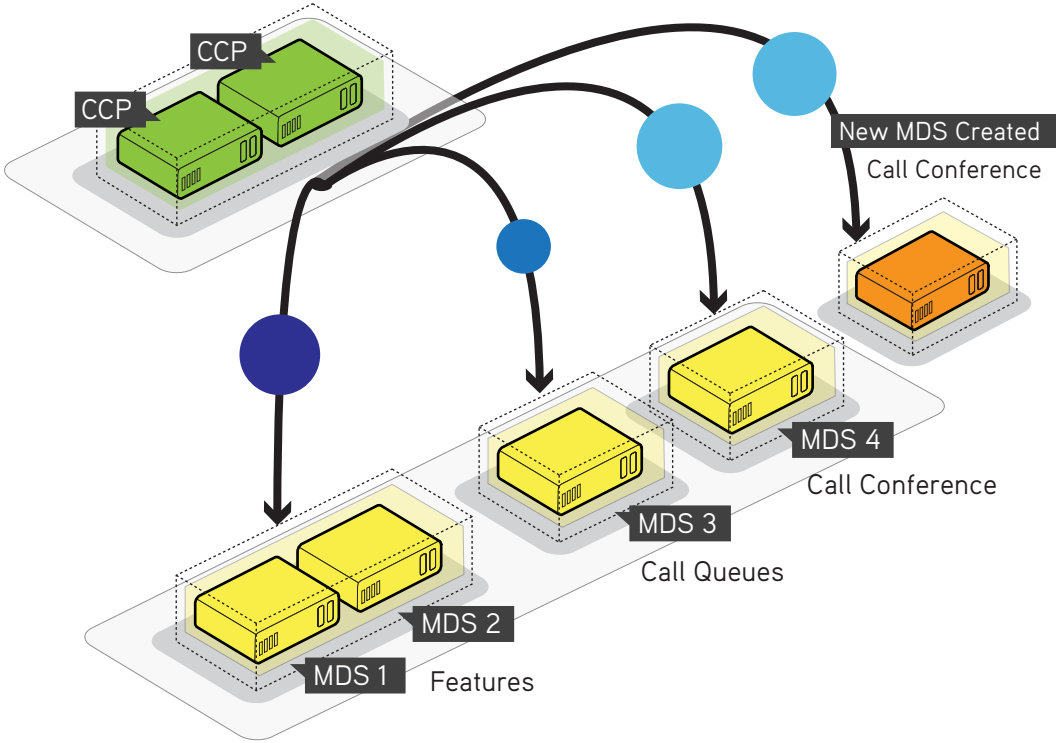


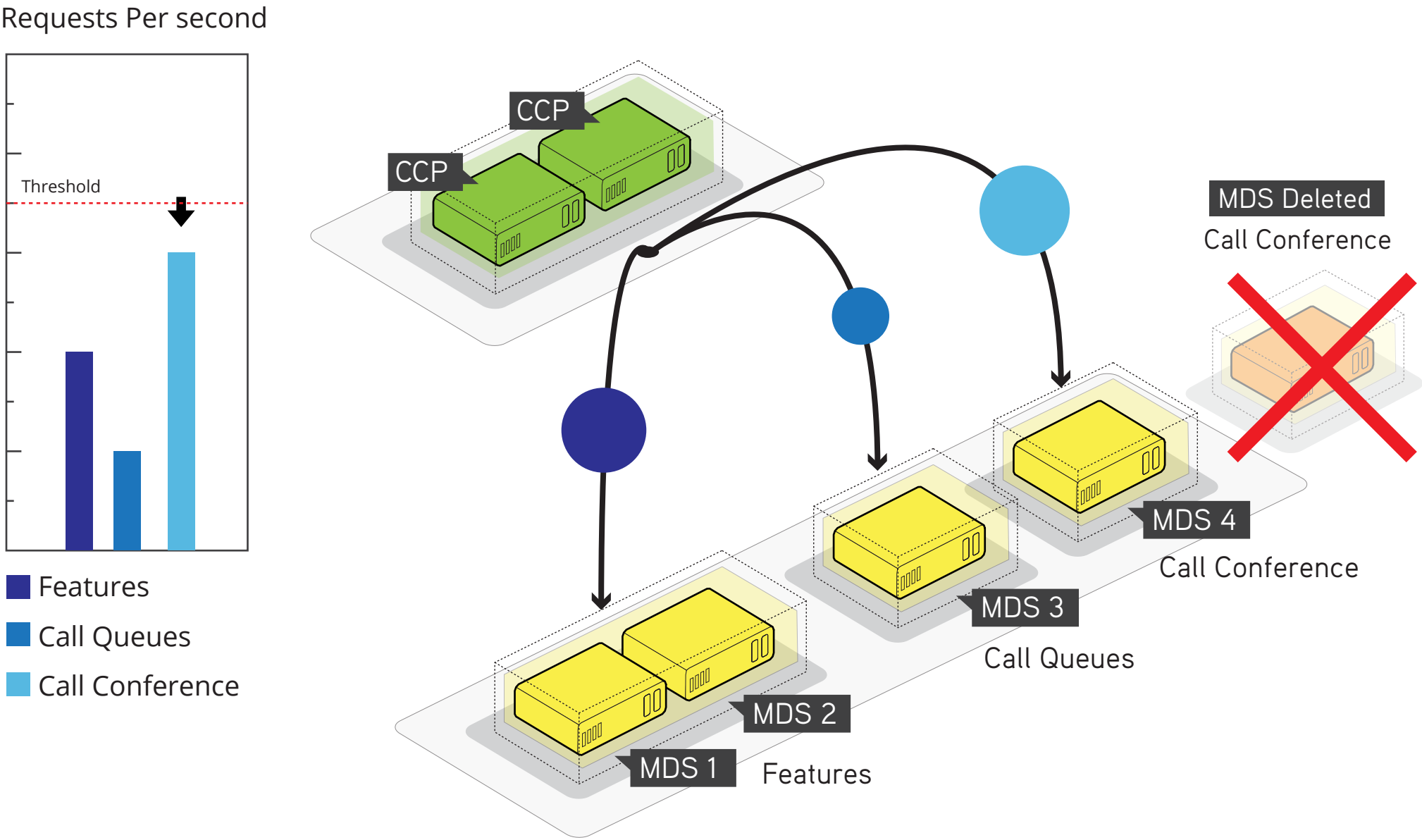
**Autoscaling actions:**

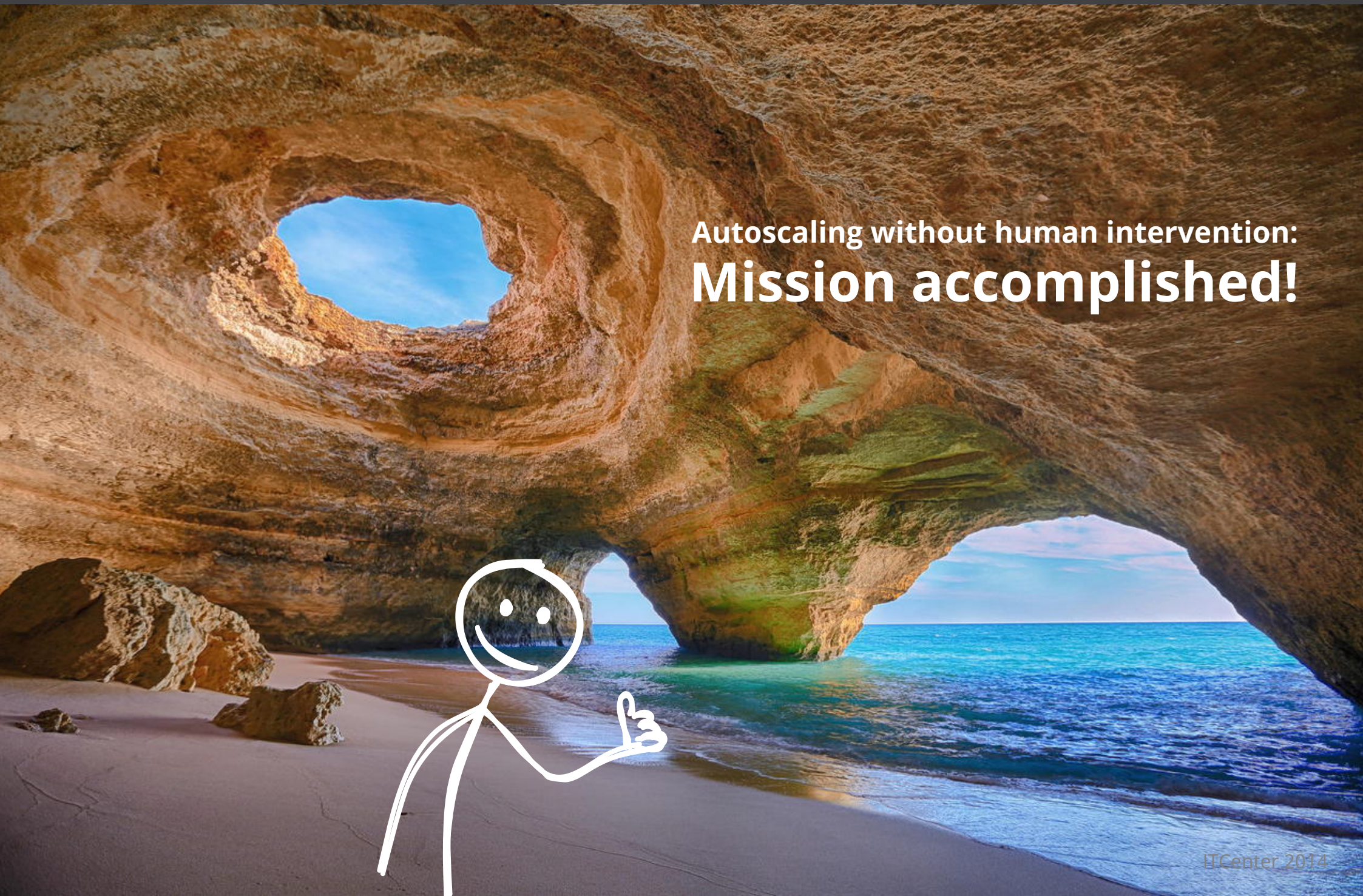
- Ceilometer monitorization system checks that your Call Conference server is getting a load over 70% – alarm!
- Heat gets triggered to create a new Call Conference stack - “CC2”
- Puppet applies Call Conference template configuration to “CC2”
- Puppet adds the new “CC2” configuration to existing infraestructure, specifically:
  Adds CC2 IP/Hostname to Kamailio CCP Call Conference Feature Pool servers
- When Ceilometer checks that the usage is below 50% triggers Heat to delete “CC2”
- Puppet removes the “CC2” from the Kamailio configuration



# Autoscaling - by feature demand




Autoscaling without human intervention:
Mission accomplished!
ITCenter 2014

**Kamailio and OpenStack**
**Together to build a truly scalable solution**

**Ruben Sousa**

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