RMLAB

Agile management of a Distributed datacenter

Antonio Budano (INFN-RM3) - Federico Zani (INFN-RM2)

“Agile” what ??

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

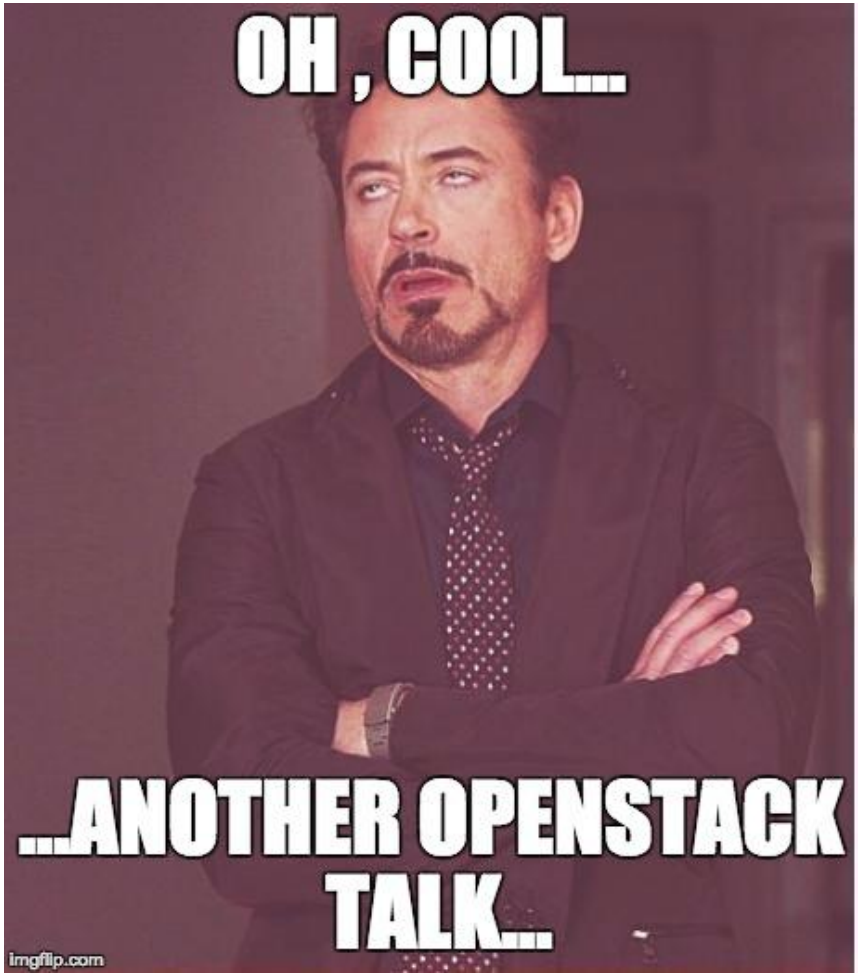
In a few words...

How it all began...

- Distributed admins with different backgrounds
- Sparse heterogeneous hardware resources
- Network setup NOT agile
- Many cool ideas

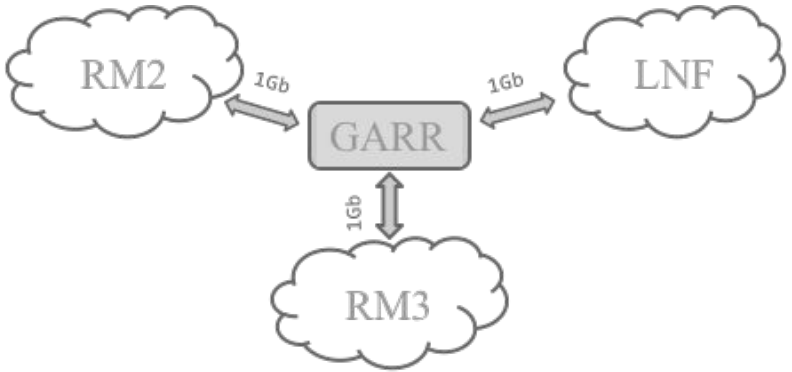
About those cool ideas...

- Private cloud
- Remote encrypted backup
- Disaster recovery
- Distributed file system
- ...space *(and $$$)* is the limit...


OH , COOL...
...ANOTHER OPENSTACK TALK...
imgflip.com

Network Model

- **Distributed** Layer 3 Private Network
- **Low latency** connection
- Security by **isolation**



* Easily upgradable to 10Gb/sec

Network Benchmark

Some numbers ….

Latency (ms.)	RM2	RM3	LNF
RM2	--	1.12	1.24
RM3	1.09	--	1.42
LNF	1.26	1.51	--

Bandwidth (Mb/sec)	RM2	RM3	LNF
RM2	--	916	921
RM3	816	--	903
LNF	920	905	--

Distributed private cloud

- Single OpenStack environment (Mitaka release)
- Keystone multi domain
- AAI ldap authentication
- 350 core/750GB RAM/3.5TB local disks
- 36TB ceph cluster (replica 3) for volumes

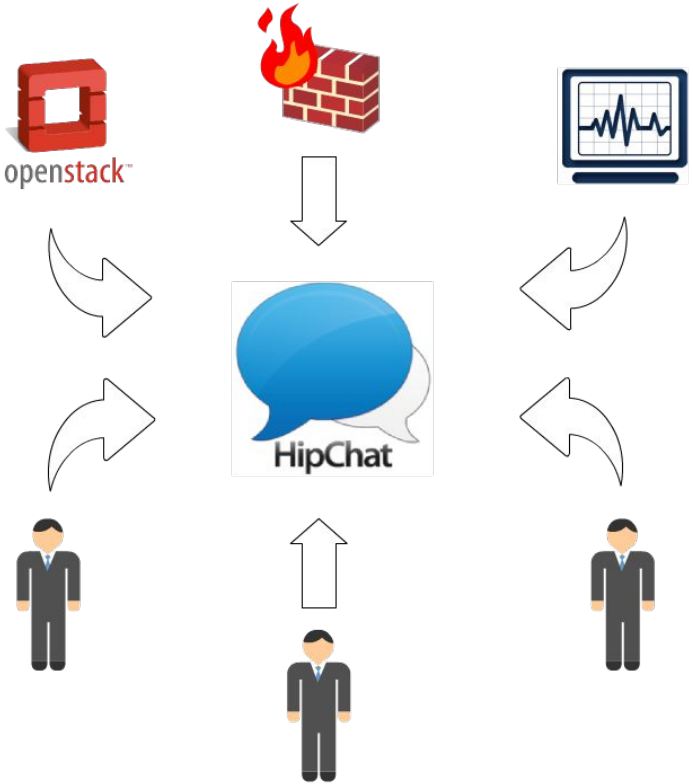
Exploiting the cloud...

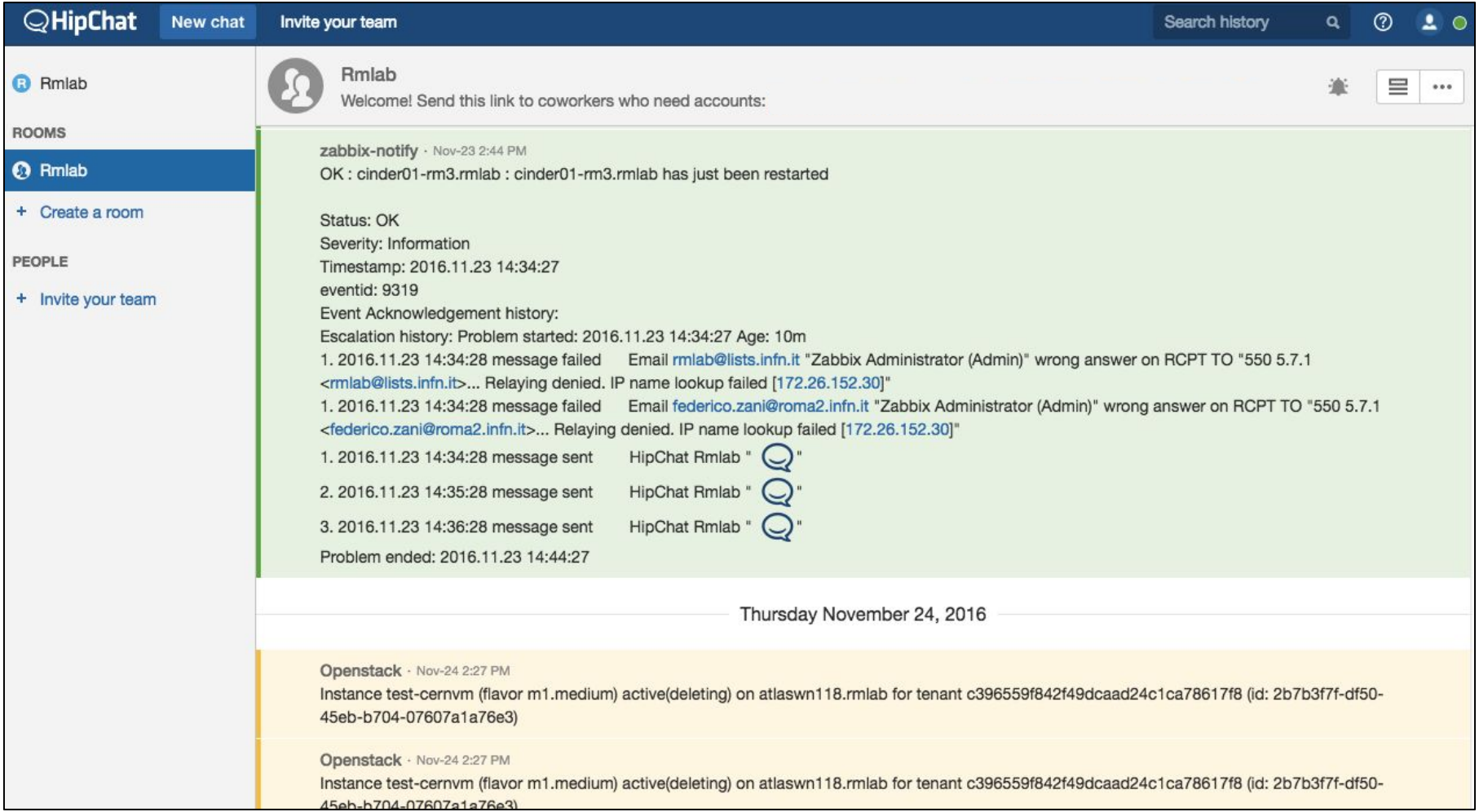
- **Computing farm** for small working groups
- **Scale out workloads** of existing computing farms
- **Virtual labs** for students
- **VDI** infrastructure
- Docker based **CMS provisioning**
- **Sync ‘n share** platform *(owncloud)*

How we work

- Every admin is **root** everywhere
- No passwords, just **ssh keys**
- Less ssh clients, more **puppet agents**
- Infrastructure as **code**
- Everything is **replicable** *(almost)* everywhere
- **Wiki** is the bible & **Git** is the vault

HAL, is that you ?

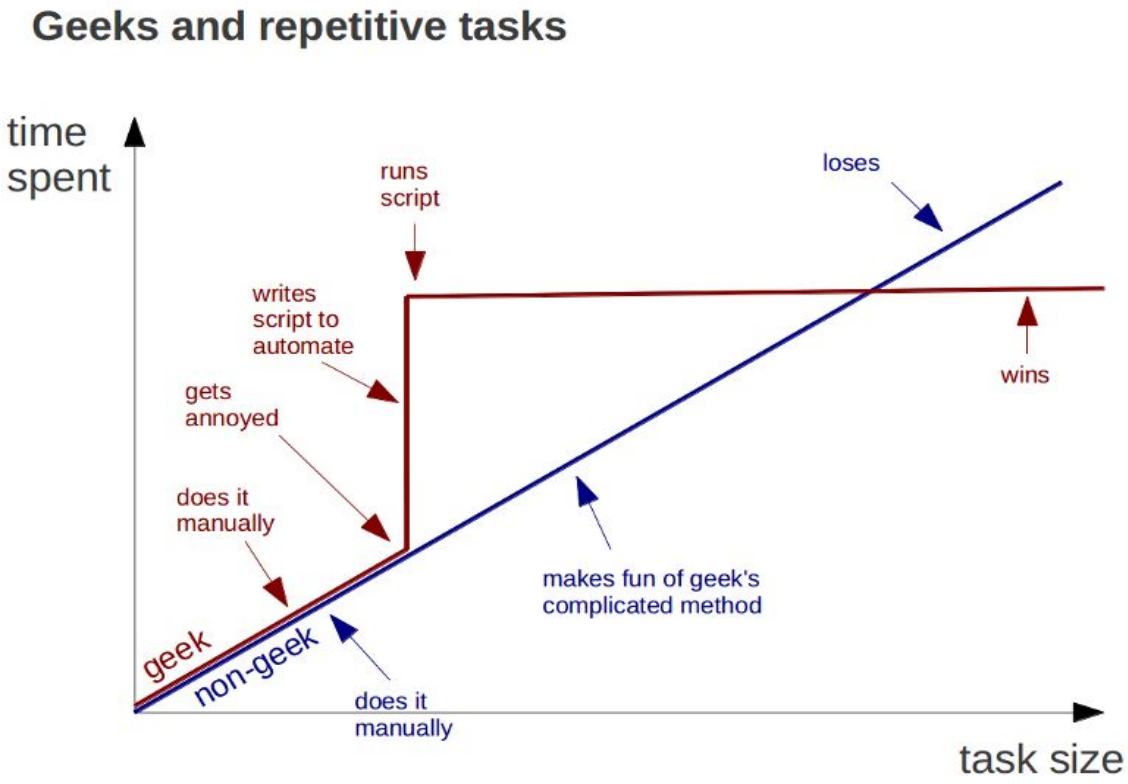



HipChat
New chat
Invite your team
Search history
Rmlab
ROOMS
Rmlab
+ Create a room
PEOPLE
+ Invite your team
Rmlab
Welcome! Send this link to coworkers who need accounts:
zabbix-notify · Nov-23 2:44 PM
OK : cinder01-rm3.rmlab : cinder01-rm3.rmlab has just been restarted
Status: OK
Severity: Information
Timestamp: 2016.11.23 14:34:27
eventid: 9319
Event Acknowledgement history:
Escalation history: Problem started: 2016.11.23 14:34:27 Age: 10m
1. 2016.11.23 14:34:28 message failed Email rmlab@lists.infn.it "Zabbix Administrator (Admin)" wrong answer on RCPT TO "550 5.7.1 <rmlab@lists.infn.it>... Relaying denied. IP name lookup failed [172.26.152.30]"
1. 2016.11.23 14:34:28 message failed Email federico.zani@roma2.infn.it "Zabbix Administrator (Admin)" wrong answer on RCPT TO "550 5.7.1 <federico.zani@roma2.infn.it>... Relaying denied. IP name lookup failed [172.26.152.30]"
1. 2016.11.23 14:34:28 message sent HipChat Rmlab "
2. 2016.11.23 14:35:28 message sent HipChat Rmlab "
3. 2016.11.23 14:36:28 message sent HipChat Rmlab "
Problem ended: 2016.11.23 14:44:27
Thursday November 24, 2016
Openstack · Nov-24 2:27 PM
Instance test-cernvm (flavor m1.medium) active(deleting) on atlaswn118.rmlab for tenant c396559f842f49dcaad24c1ca78617f8 (id: 2b7b3f7f-df50-45eb-b704-07607a1a76e3)
Openstack · Nov-24 2:27 PM
Instance test-cernvm (flavor m1.medium) active(deleting) on atlaswn118.rmlab for tenant c396559f842f49dcaad24c1ca78617f8 (id: 2b7b3f7f-df50-45eb-b704-07607a1a76e3)

Management tools

- Infrastructure automation with **Puppet**
- Environment versioning with **Git**
- Bare metal/VM remote provisioning with **Foreman**
- Host role management with **Foreman**
- Self-contained services with **Docker**

Automation, anyone ?



Everything worked as expected ?

- Different expectation
- Moving fast...
- ...we took some wrong decisions.
- Not everything is meant to be geographically distributed
- Too optimistic about users

Was it worth the effort ?

- Data center consolidation
- We learned a lot from each other
- Exploiting every single resource
- Scale out is now as easy as buying new hardware

Next steps...

- **10Gb** for everyone
- Getting the end users more **involved**...
- ...and get more **$$$** out of them!
- Build a **PaaS** upon OpenStack...
- ...to get **self provisioning** available also to unskilled users.

Conclusions

- **Private isolated networks** were fundamentals for our needs
- **GARR** is an important asset...let's use it!
- **Automation** *is the new* ssh
- **Distributed management** makes the difference

Thank you...