Progress Review Meeting
École Polytechnique, Dec 2014

OpenStack Assessment : Profiling & Tracing

Presentation by

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Outline

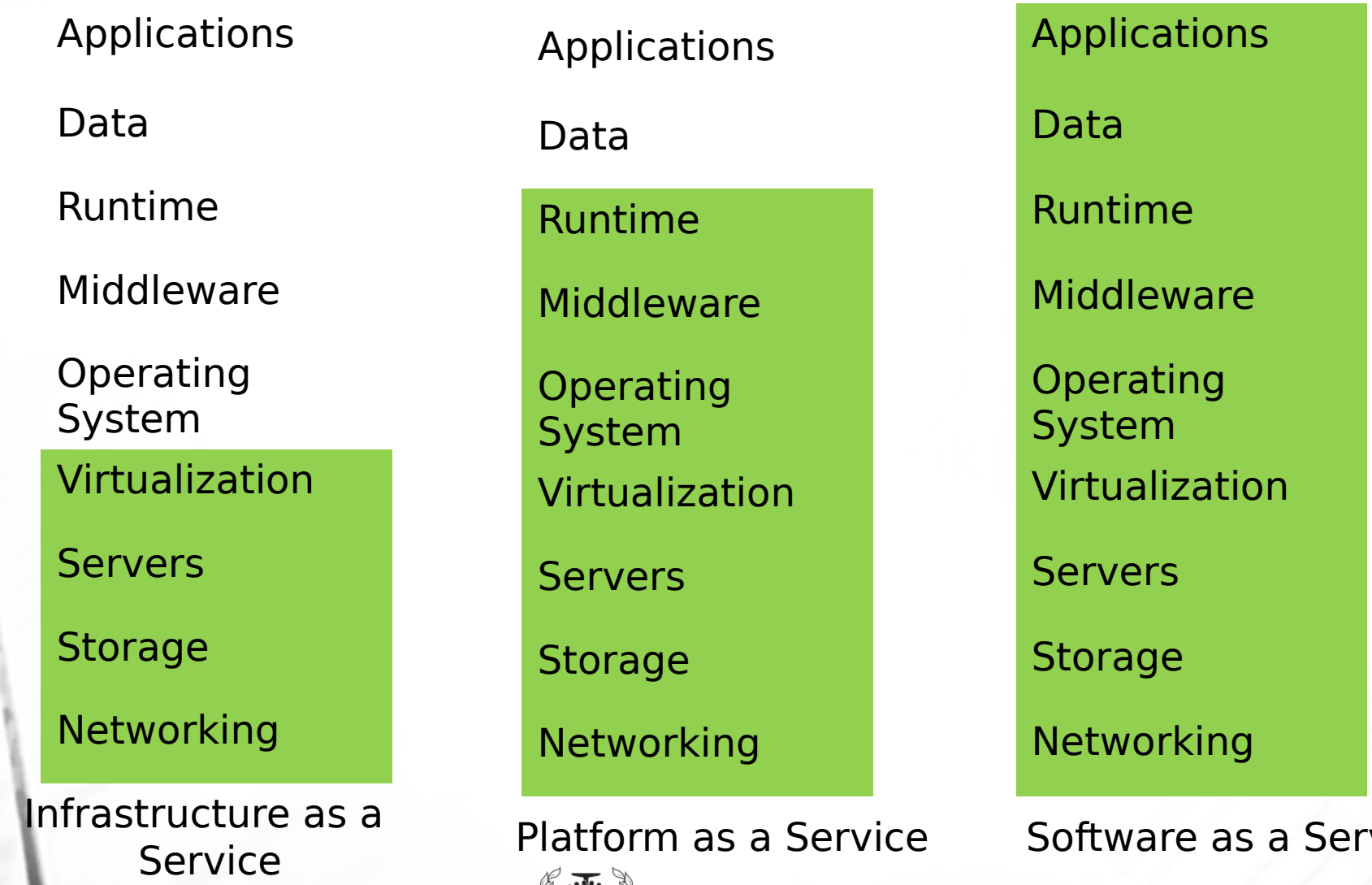
- Introduction
- OpenStack
- Issues
- Rally
- Perspectives

Definition

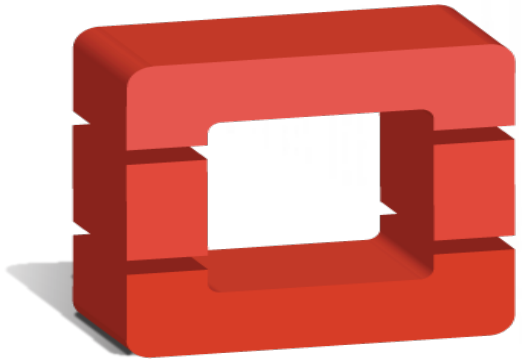
*"Cloud computing is a model for enabling **ubiquitous**, **convenient**, **on demand** network access to a **shared pool** of configurable computing resources [...] that can be **rapidly provisioned** and **released** with **minimal** management effort or service provider interaction."*

— NIST

Delivery models



OPENSTACK



openstack™

CLOUD SOFTWARE

OpenStack

*"OpenStack is a cloud operating system that **controls large pools of compute, storage, and networking resources** throughout a data center, all **managed through a dashboard** that gives administrators control while empowering users to provision resources through a **web interface**."*

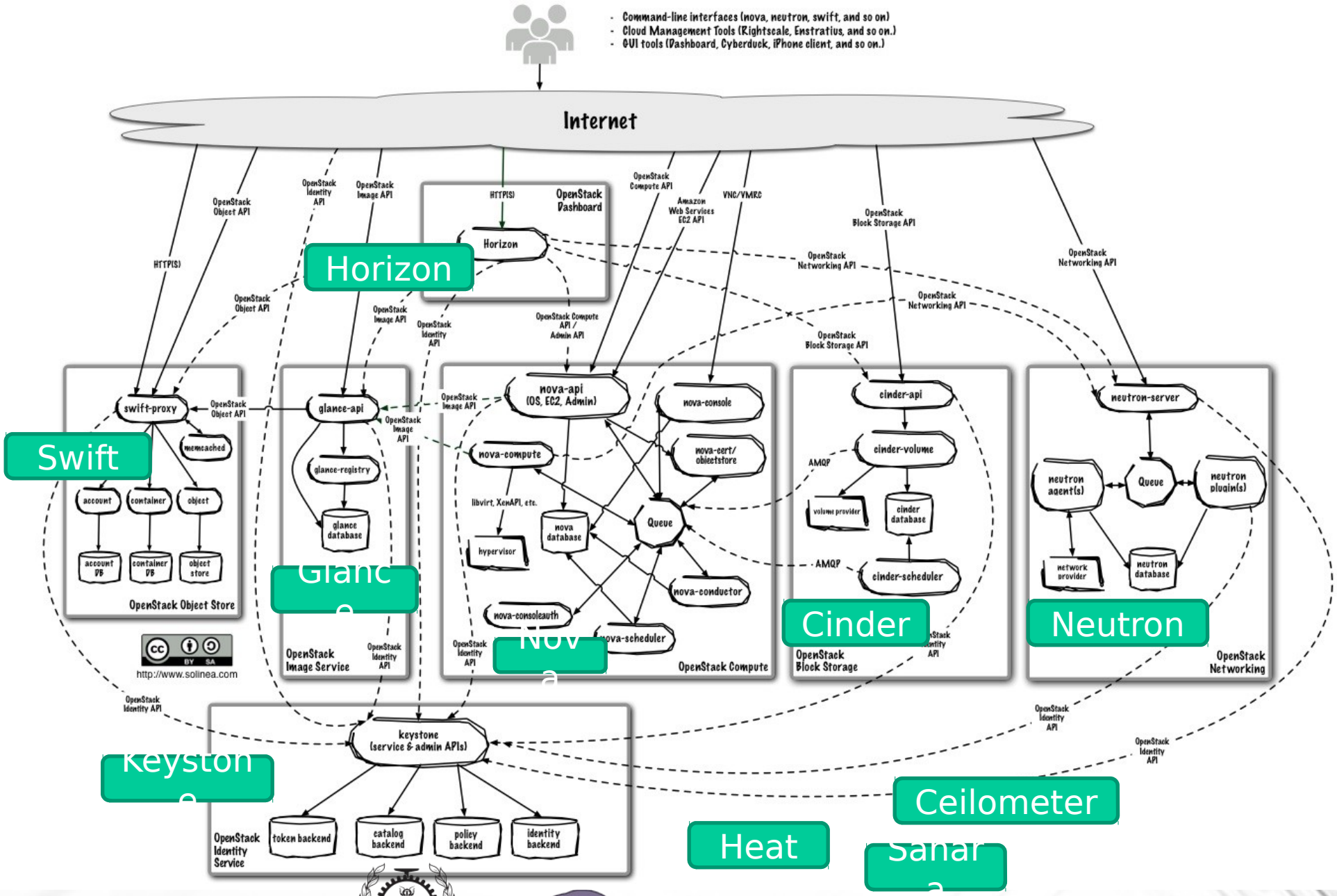
— OpenStack Foundation

Release History

Austin	22 October 2010
Bexar	3 February 2011
Cactus	15 April 2011
Diablo	22 September 2011
Essex	5 April 2012
Folsom	27 September 2012
Grizzly	4 April 2013
Havana	17 October 2013
Icehouse	17 April 2014
Juno	16 October 2014
Kilo	30 April 2015

Codenames alphabetically ordered
6 month development cycle

https://wiki.openstack.org/wiki/Release_Naming
https://wiki.openstack.org/wiki/Releases



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Issues And Operator’s wishes

- How Operators can verify their cloud works well **easily in a short time**
    - During/After setting up
    - After adding compute/controller nodes
    - Minor software update
    - …
- How we can ensure that OpenStack work at scale ?
- How we can detect performance issues quickly and improve OpenStack scalability ?

Which element should be improved ?

Is it ..

Hardware ?

Deploy ?

Code ?

BUT ...

How deployment topology influences performances ?

Which piece of the code is a bottleneck ?

What hardware limits are hit ?

List of Metrics

Metric	Description
Availability Rate	Percentage of service uptime; measured as total uptime against total time"
Mean-Time Between Failures (MTBF)	Expected time between consecutive service failures"; measured by normal operational period duration and number of failures
Network Capacity	"Measurable characteristics of network capacity"; measured by bandwidth, throughput in bits per second; expressed as number of megabits per second.
Storage Device Capacity	"Measurable characteristics of storage device capacity"; measured and expressed in storage size in gigabytes.
Server Capacity	"Measurable characteristics of server capacity"; measured and expressed as number of CPUs, CPU frequency in GHz, RAM and storage size in GBs.
Instance Starting Time	"Length of time required to initialize a new instance"; measured by data and time the instance was up and the date and time of the start request.

Cloud Computing: Concepts, Technology & Architecture, - authors Thomas Erl, Zaigham Mahmood and Ricardo

List of Metrics

Response Time	"Time required to perform synchronous operation"; measured by date and time of response and total number of requests, expressed as averages in milliseconds.
Storage Scalability (Horizontal)	"Permissible storage device capacity changes in response to increased workloads"; measured and expressed in storage size in gigabytes.
Server Scalability (Horizontal)	"Permissible server capacity changes in response to increased workloads"; measured and expressed as number of virtual servers in resource pool.
Server Scalability (Vertical)	"Permissible server capacity fluctuations in response to workload fluctuations"; measured and expressed as number of CPUs, RAM size in gigabytes.

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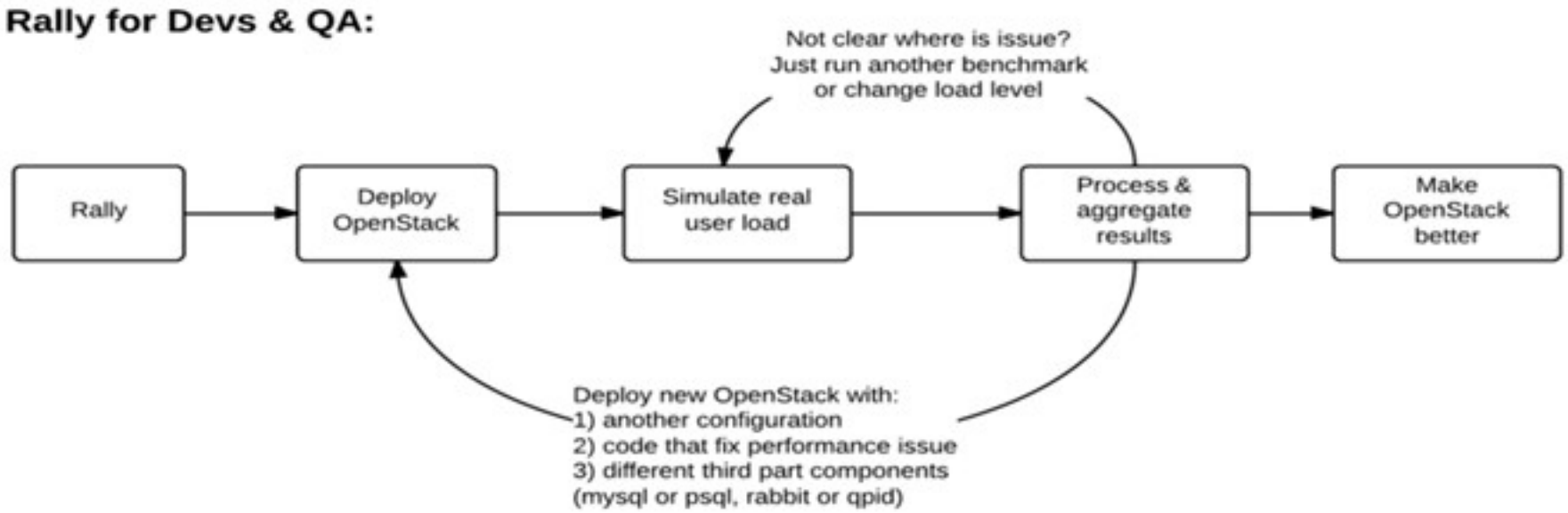
What is Rally ?

Rally is a community-based project that allows OpenStack developers and operators to get relevant and repeatable benchmarking data of how their cloud operates at scale.

https://wiki.openstack.org/wiki/Rally

Use Case



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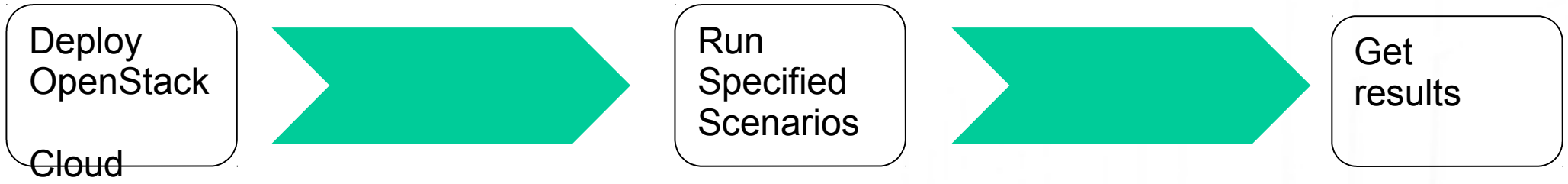
How Rally works



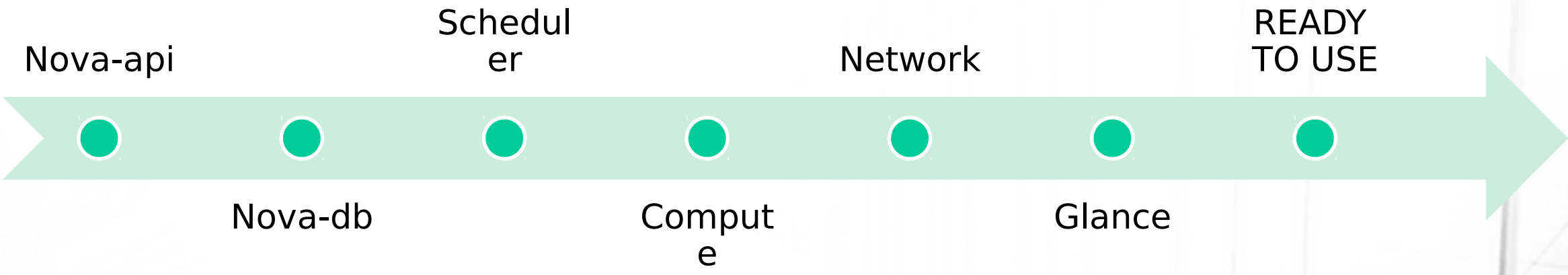
Parameters

- Number of users
- Number of tenants
- Concurrency
- Duration

Get results

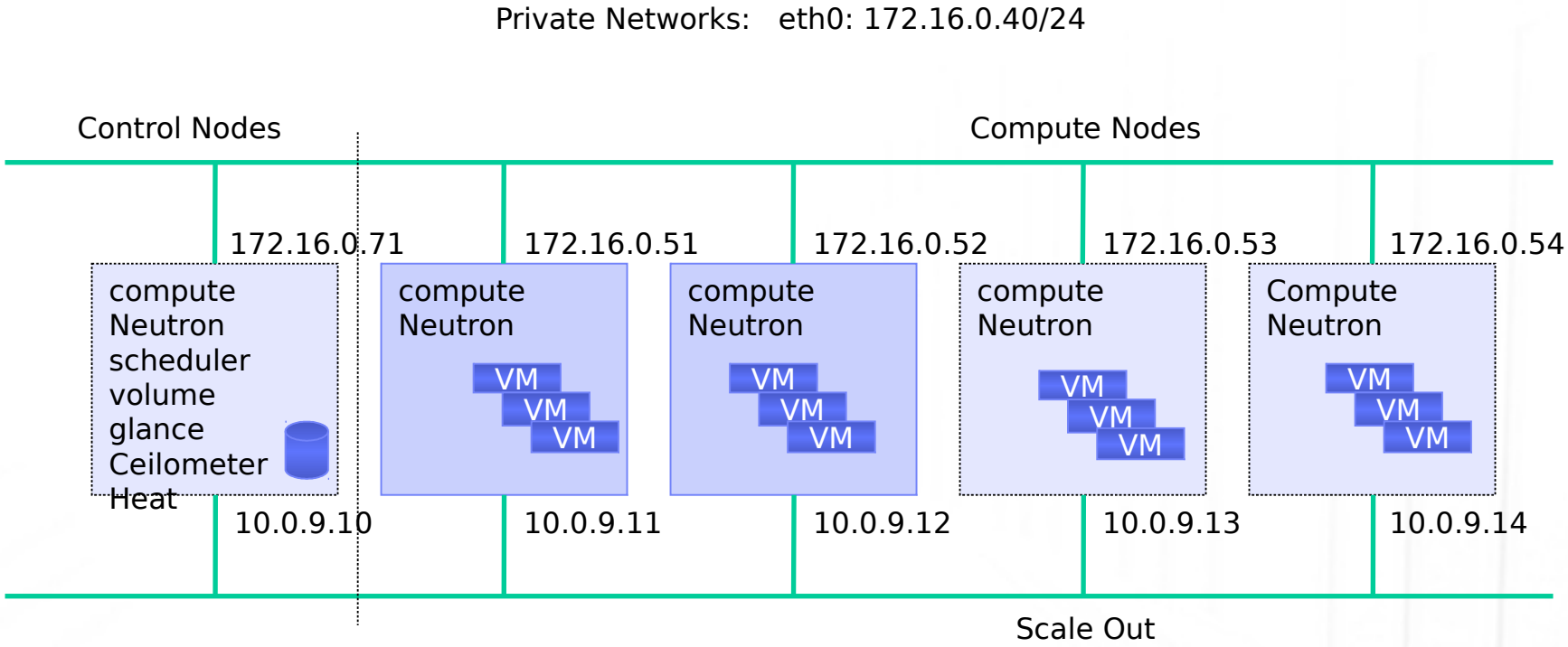
- Execution time breakdown
- Failure rates
- Graphics
- Profiling data

Next Step



How many seconds/minutes were spent in every component !?

Next Step : OpenStack Demo Setup



Q&A