Accounting in the CloudVeneto private cloud
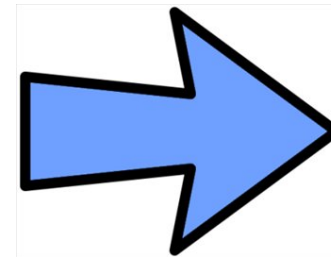
Massimo Sgaravatto - INFN Padova
on behalf of the CloudVeneto team

CloudVeneto

CloudVeneto is the result of the merging, done in 2018, of two Cloud infrastructures:

- Cloud Area Padovana
- University of Padova Cloud

www.cloudveneto.it

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Cloud Area Padovana: computing infrastructure shared between 2 INFN units (Padova and Legnaro Nat. Labs) In production since end of 2014

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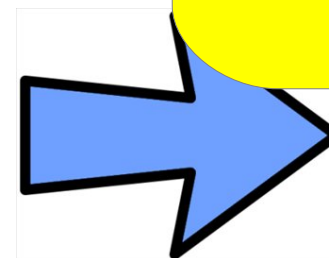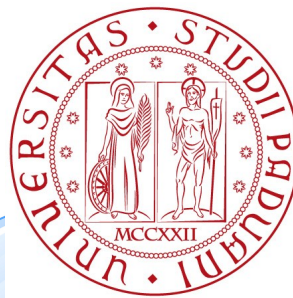
- Cloud Area Padovana
- University of Padova Cloud

Cloud infrastructure owned by 10 dept.s of University of Padova
In production since end of 2015

www.cloudveneto.it

CloudVeneto: resources and services

Compute Nodes	Cores (in HT)	GPUs	RAM (GB)	Storage (TB)
65	2880	20	12064	~ 800

CloudVeneto is a IaaS Cloud (OpenStack)

It provides also higher level services (e.g. batch cluster on demand, services for big data analytics, etc.)

~ 350 registered users
85 projects

Tools and technologies

Accounting
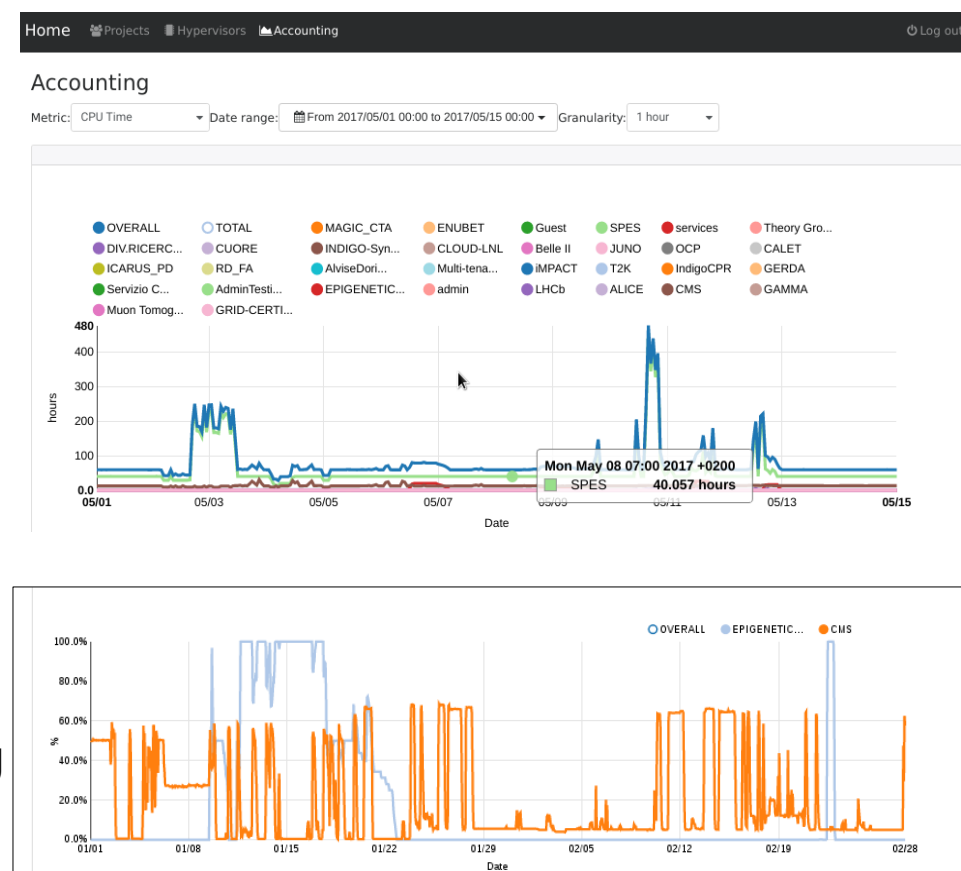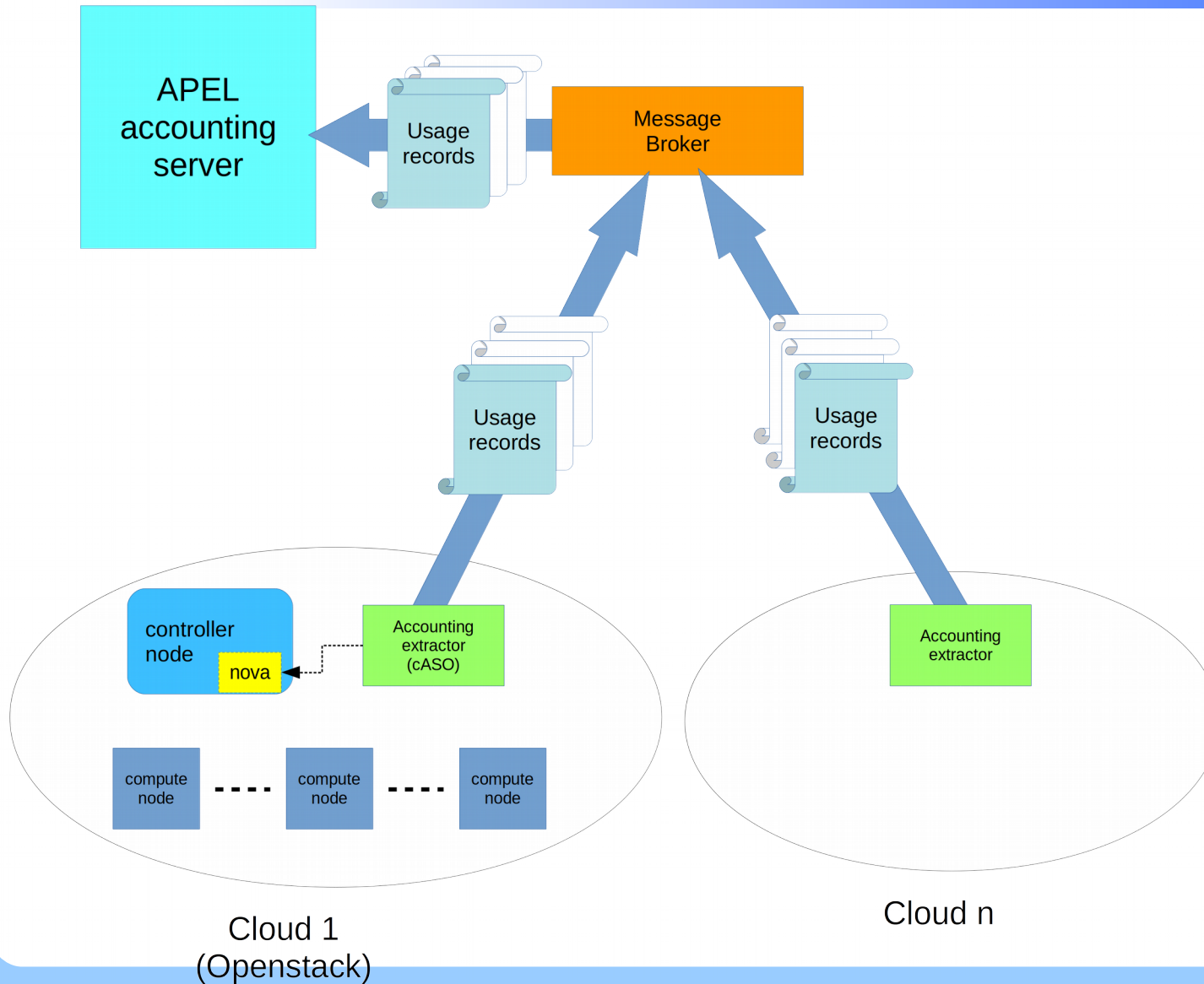
- Why ?

  - To check how resources are being used
  - To improve resource allocation
  - To support capacity planning

- What ?

  - WallClockTime and CPUTime
  - Nice to have other metrics but not really mandatory

- How ?

  - Try to rely on components maintained by the community
  - Limit as much as much as possible home-made developments

Accounting: implementation

- In the past we were relying on the OpenStack Ceilometer and Gnocchi services

  - We also implemented a tool, called CAOS, to overcome some issues and to present the accounting data according to our needs

- This accounting system was eventually dismissed

  - Because of some scalability problems and for some concerns about the future of the Ceilometer and Gnocchi

- We needed an alternative solution

  - We decided to evalute the accounting system used in the EGI FedCloud

EGI FedCloud accounting system

APEL accounting server

Usage records

Message Broker

Usage records

Usage records

controller node

nova

Accounting extractor (cASO)

compute node - - - - compute node - - - - compute node

Accounting extractor

Cloud 1 (Openstack)

Cloud n

EGI FedCloud accounting system

APEL accounting server

Usage records

Message Broker

Usage records

Usage records

Usage records include both WallClockTime and CPUTime

CPUTime is calculated simply as WallClockTime * NumCores
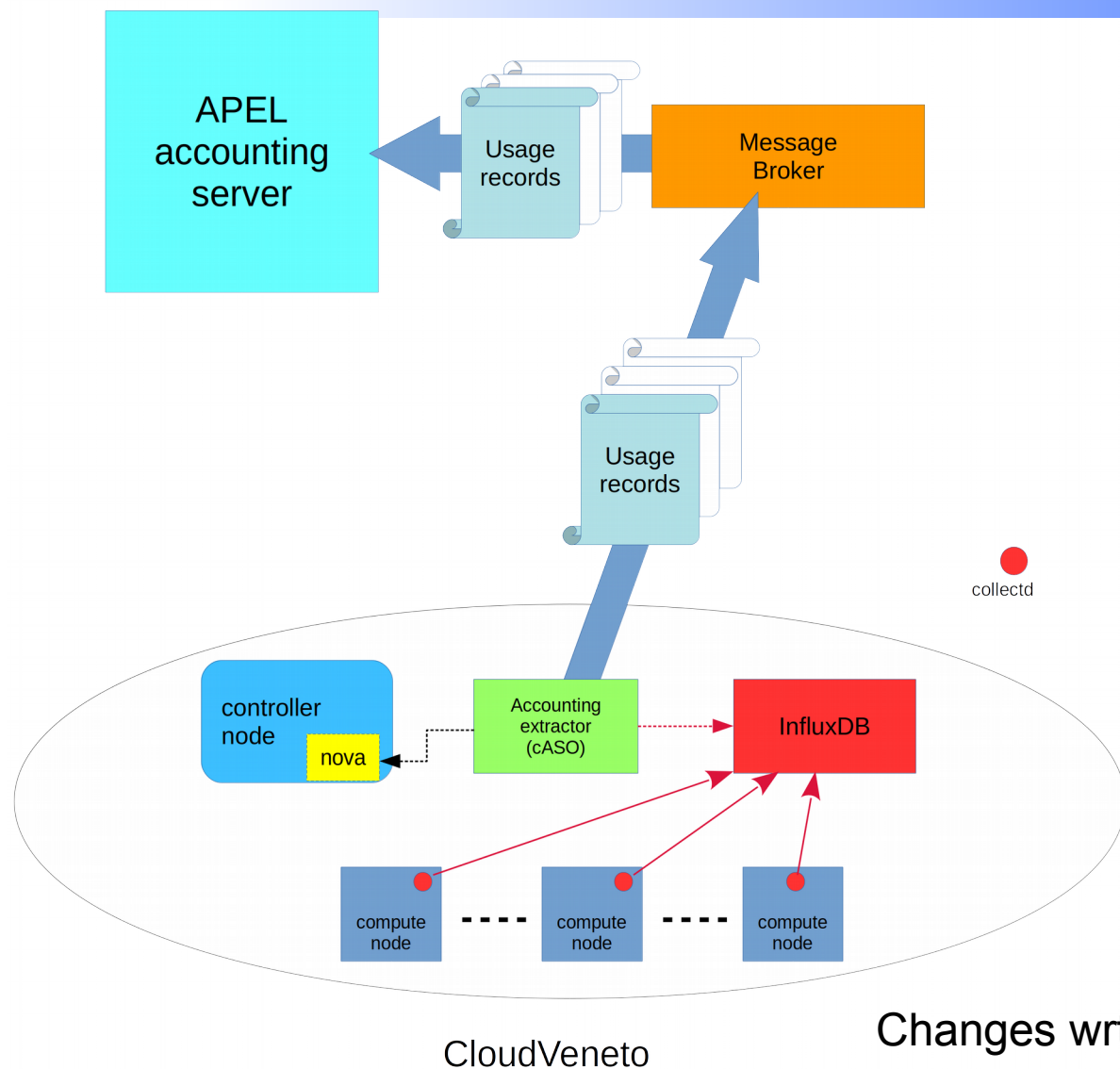
controller node

nova

Accounting extractor (cASO)

compute node

- - - -

compute node

- - - -

compute node

Accounting extractor

Cloud 1 (Openstack)

Cloud n

Accounting in CloudVeneto

APEL accounting server

Usage records

Message Broker

Usage records

collectd

controller node

nova

Accounting extractor (cASO)

InfluxDB

compute node
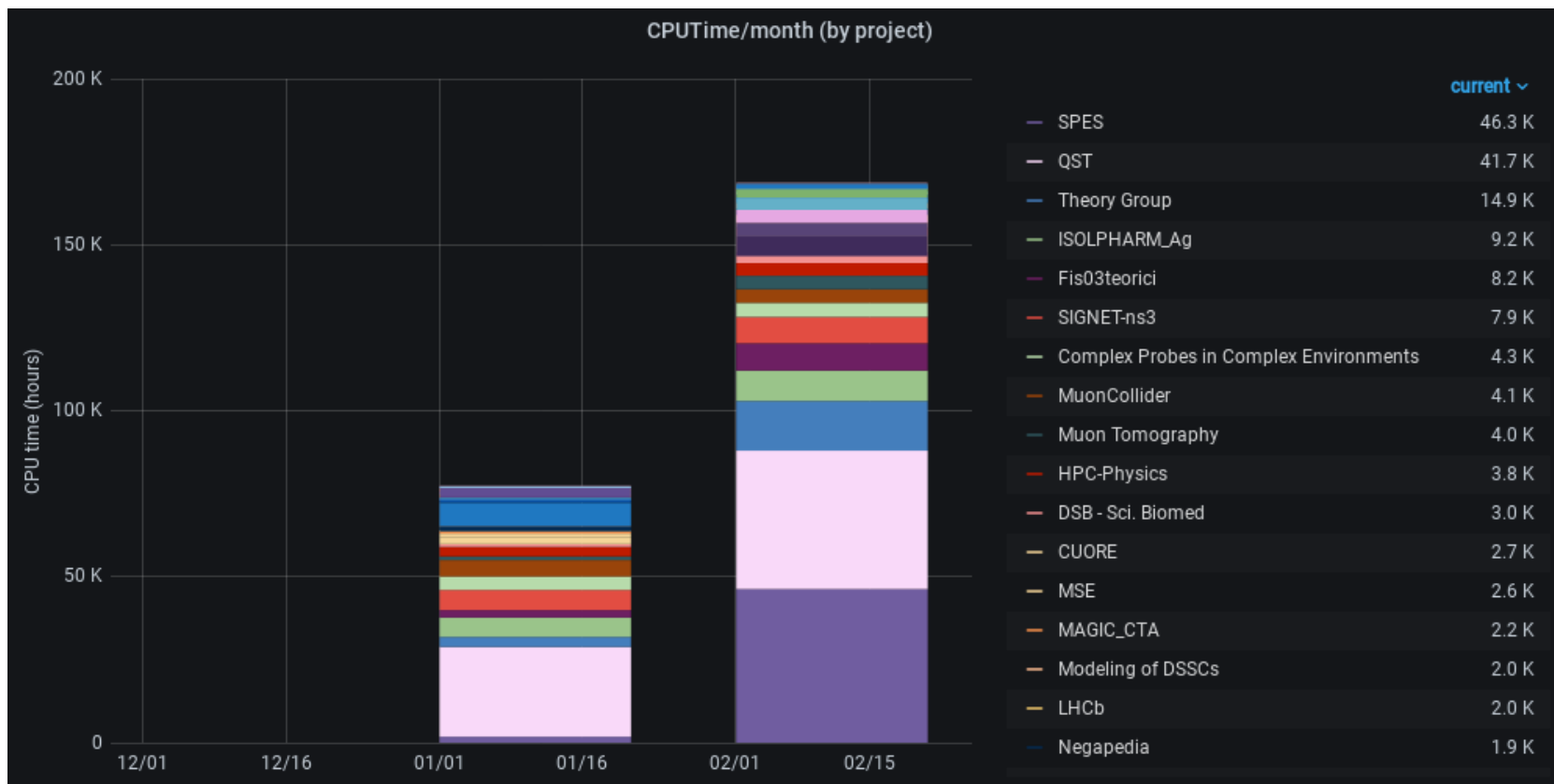
compute node

compute node

CloudVeneto

Each compute node instrumented via collectd (virt plugin)

Collected collects CPUTime consumed by each instance, and send these data to a InfluxDB

cASO modified to get CPUTime information querying the InfluxDB

Not needed to install anything on the Cloud virtual machines

Changes wrt EGI FedCloud architecture are in red

Accounting dashboard

CPUTime/month (by project)

	current ⌄
SPES	46.3 K
QST	41.7 K
Theory Group	14.9 K
ISOLPHARM_Ag	9.2 K
Fis03teorici	8.2 K
SIGNET-ns3	7.9 K
Complex Probes in Complex Environments	4.3 K
MuonCollider	4.1 K
Muon Tomography	4.0 K
HPC-Physics	3.8 K
DSB - Sci. Biomed	3.0 K
CUORE	2.7 K
MSE	2.6 K
MAGIC_CTA	2.2 K
Modeling of DSSCs	2.0 K
LHCb	2.0 K
Negapedia	1.9 K

Grafana dashboards that read data from the APEL MySQL database

Conclusions

- Accounting system implemented by integrating existing components

- Very few changes were needed

- This accounting system is also used in the INFN-Cloud federation

- Some foreseen evolutions

  - Augment CPUTime data with benchmark information
  - Track GPUs usage

We thank the APEL and cASO developers for their support.

THE END

Questions?

Backup slides

CloudVeneto architecture

https

HAProxy keepalived

Mysql Percona cluster

RabbitMQ cluster

Controller & Network nodes

http

Compute nodes

Cinder

DELL EQUALLOGIC

ceph

Glance

Cinder

Object Storage

Nova

CloudVeneto architecture