



Ceilometer, CloudKitty, and Gnocchi: a dynamic and agnostic cloud monitoring and billing solution

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CLOUD BILLING

Outline

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 - Ceilometer
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 - CloudKitty
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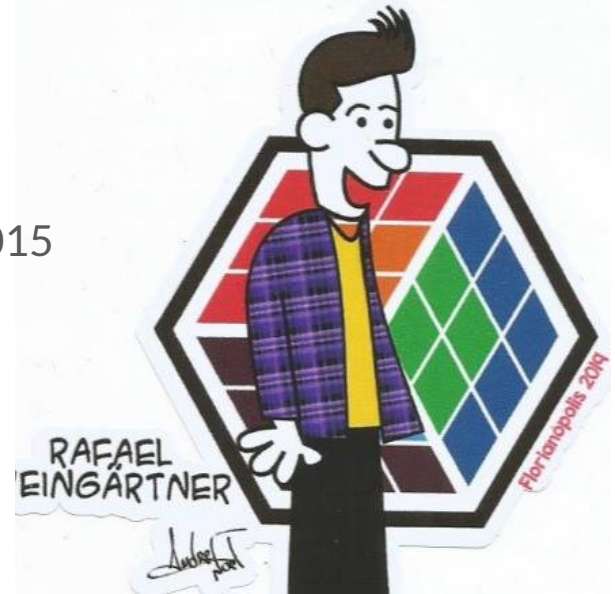


Introduction



I am a cloud consultant & enthusiast

- PMC and committer for the Apache CloudStack since 2015
- Contributor for OpenStack since 2018
- CloudKitty core reviewer and PTL since 2020



Introduction



The driver/sponsor

- ❖ The **leading cloud provider** in Switzerland
- ❖ **+3,000 business customers**
- ❖ over **20 years of expertise** on state-of-the-art business-critical platforms
- ❖ Their business require a heterogeneous, **highly secure**, and vast cloud computing setup
- ❖ Run at the same time CloudStack, OpenStack, vCloud, and many other different systems



Introduction



The cloud environment

- > heterogeneous
- > Vast
- > Complex
- > Dynamic



Introduction



Constant collect usage data:

- ❖ Storage
- ❖ Network
- ❖ Processing
- ❖ VPN
- ❖ Users
- ❖ And others

Data processing and rating:

- ❖ Has to easily scale
- ❖ On the fly metrics
- ❖ Different pricing for different consumptions
- ❖ Support data transformations
- ❖ Able to change between data scale

**What are the option to implement Cloud
billing with such requirements?**



CLOUD BILLING

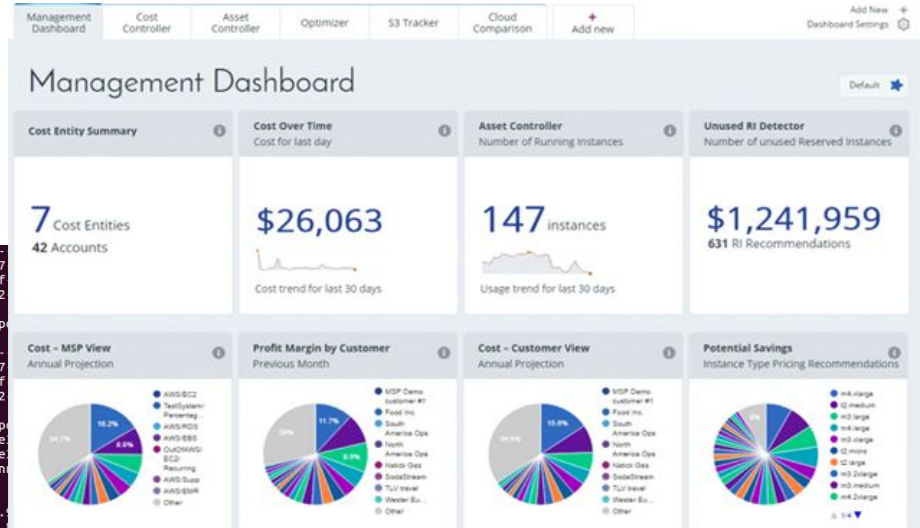
Billing portals

Provide a custom cloud interface

- ❖ Connect and abstract all systems
- ❖ Perform data collection
- ❖ Rate processing
- ❖ Billing and invoicing
- ❖ Client onboarding
- ❖ Users management
- ❖ And many other

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4be3988c-1d6f-3917
5960d7a1-a4ff-38ef
e7ef8b06-0cc5-4042
root@n01:~# virsh p
Name:
4be3988c-1d6f-3917
5960d7a1-a4ff-38ef
e7ef8b06-0cc5-4042
root@n01:~# virsh p
Name: 4be3988c-1d6f-3917
UUID: 4be3988c-1d6f-3917-5960d7a1-a4ff-38ef-e7ef8b06-0cc5-4042
State: running
Persistent: no
Autostart: no
Capacity: 13.96 TiB
Allocation: 43.12 MiB
Available: 13.64 TiB
root@n01:~# virsh pool-info 5960d7a1-a4ff-38ef-91e0-f88b504c5019
Name: 5960d7a1-a4ff-38ef-91e0-f88b504c5019
UUID: 5960d7a1-a4ff-38ef-91e0-f88b504c5019
State: running
Persistent: no
Autostart: no
Capacity: 13.96 TiB
Allocation: 27.52 MiB
Available: 13.64 TiB
root@n01:~# virsh list
-----
Id Name State
-----
54 r-1896-VM running
90 l-2-1880-VM running
91 l-2-1885-VM running
92 l-2-1890-VM running
165 r-1911-VM running
    
```



Billing portals



Why organizations do not adopt a cloud portal system?

- ❖ Proprietary solutions
- ❖ Not easily customizable
- ❖ Limited devices and systems support

Monetary quota



The process of limiting consumption of a computational resource via monetary values

Why not using monetary quota?

- ❖ The model is intended for a private cloud use
- ❖ It does not fit a public cloud model (pay as you go)
- ❖ OpenStack does not have such capability (as far as I know)

Rating



It is the process of assigning a price for a computational resource that is consumed by the client in a time-interval and generating consumption reports

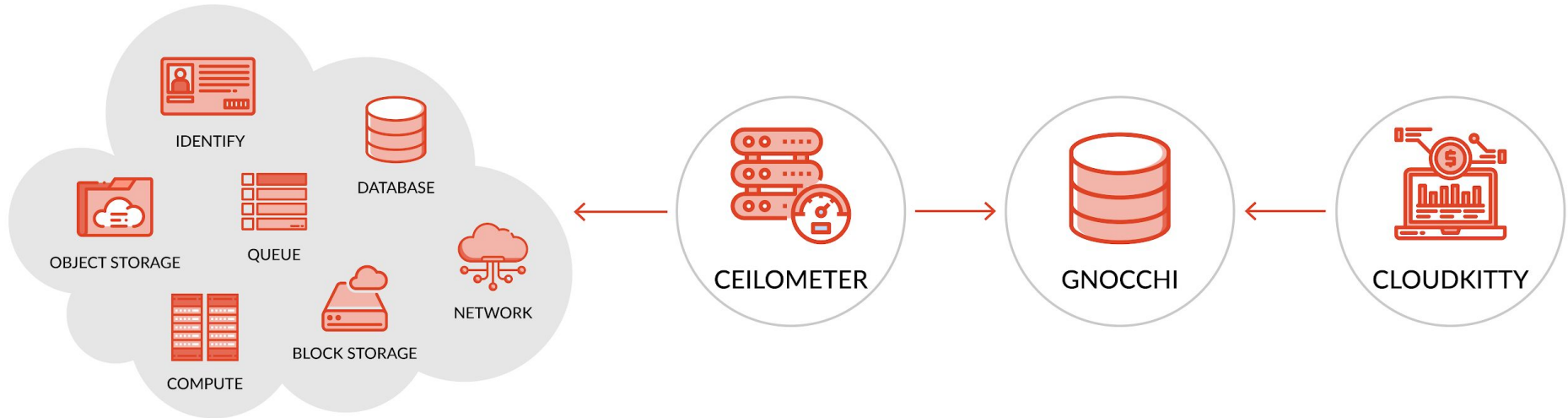
That is the model we adopted

- ❖ It fits nicely in a public cloud model (pay as you go)
- ❖ OpenStack has Cloudkitty, which is a rating-as-a-service module

Billing with OpenStack



The chain we implemented



Billing with OpenStack



The limitations faced

- ❖ Ceilometer was only able to collect pre-defined and coded metrics
- ❖ Ceilometer could not monitor non-openstack systems
- ❖ Gnocchi was not able to use return versioned attributes
- ❖ Gnocchi performance problems with massive data volumes
- ❖ CloudKitty did not support the rate:xxx aggregation from Gnocchi
- ❖ CloudKitty did not allow custom usage reports to be generated
- ❖ And many other features that had to be developed and added to Gnocchi, Ceilometer, and CloudKitty

Conclusion



Ceilometer + Gnocchi + CloudKitty

- ❖ Enabled us to implement an OpenSource billing pipeline
- ❖ We are able to monitor and “bill” all cloud resources
- ❖ Solid and stable setup that has been up and running for 4+ years

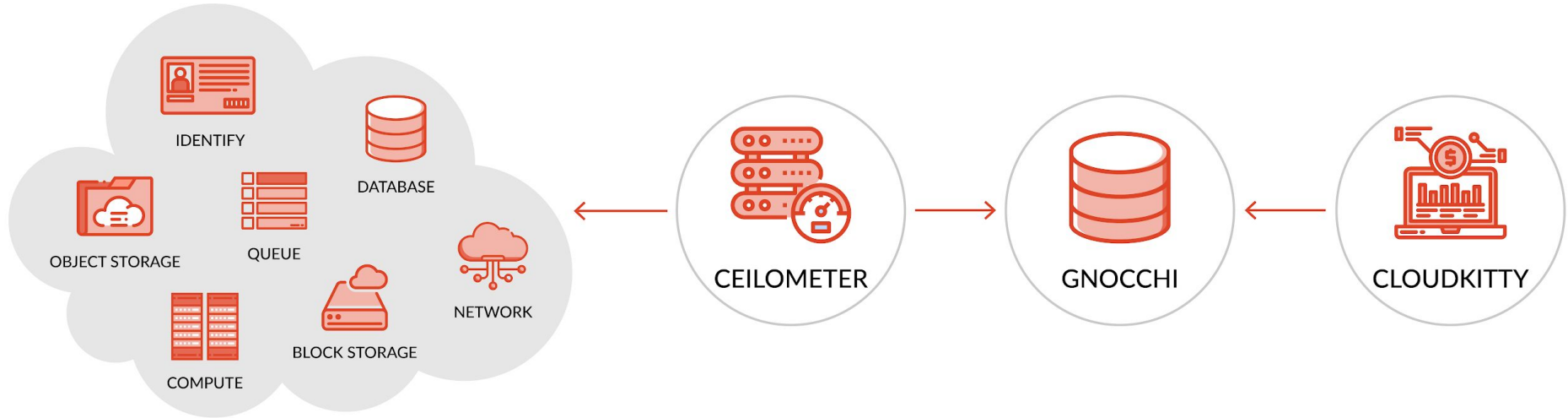
For the future

- ❖ We created a cloud customer on-boarding and management portal
 - YML base dashboards and panels
 - The system will be open sourced in the coming months

Conclusion



Let's how everything works together!





Thank you!

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