Monitoring OVH: 300k servers, 28 DCs... and one Metrics platform

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Who are we?

Introducing myself and introducing OVH

Horacio Gonzalez

@LostInBrittany

Spaniard lost in Brittany,
developer, dreamer and
all-around geek

OVH
Team DevRel

DevFest du
Bout du Monde

Finist
Devs

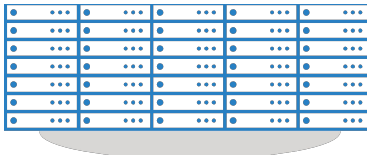
WARP 10
MEETUP

Google Developers
Experts
2019
Web Technologies
GDE
Flutter

OVH: A Global Leader on Cloud

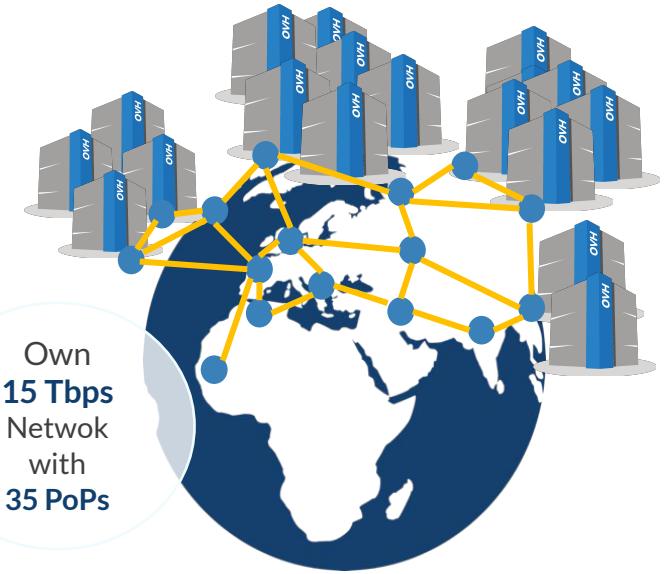
200k Private cloud VMs running

1 **Dedicated IaaS Europe**



Hosting capacity : **1.3M** Physical Servers

360k Servers already deployed



Own **15 Tbps** Netwok with **35 PoPs**

2018
27 Datacenters

2020
50 Datacenters

> **1.3M** Customers in **138** Countries

OVH : Key Figures

1.3M Customers worldwide in 138 Countries
1.5 Billions euros investment over five years
28 Datacenters (growing)
350k Dedicated Servers
200k Private cloud VMs running
650k Public cloud Instances created in a month
20TB bandwidth capacity
35 Points of presence
4TB Anti DDoS capacity
Hosting capacity : 1.3M Physical Servers

+ 2 500 Employees in 19 countries
18 Years of Innovation

Ranking & Recognition

1st **European** Cloud Provider*

1st **Hosting** provider in Europe

1st **Provider** Microsoft Exchange

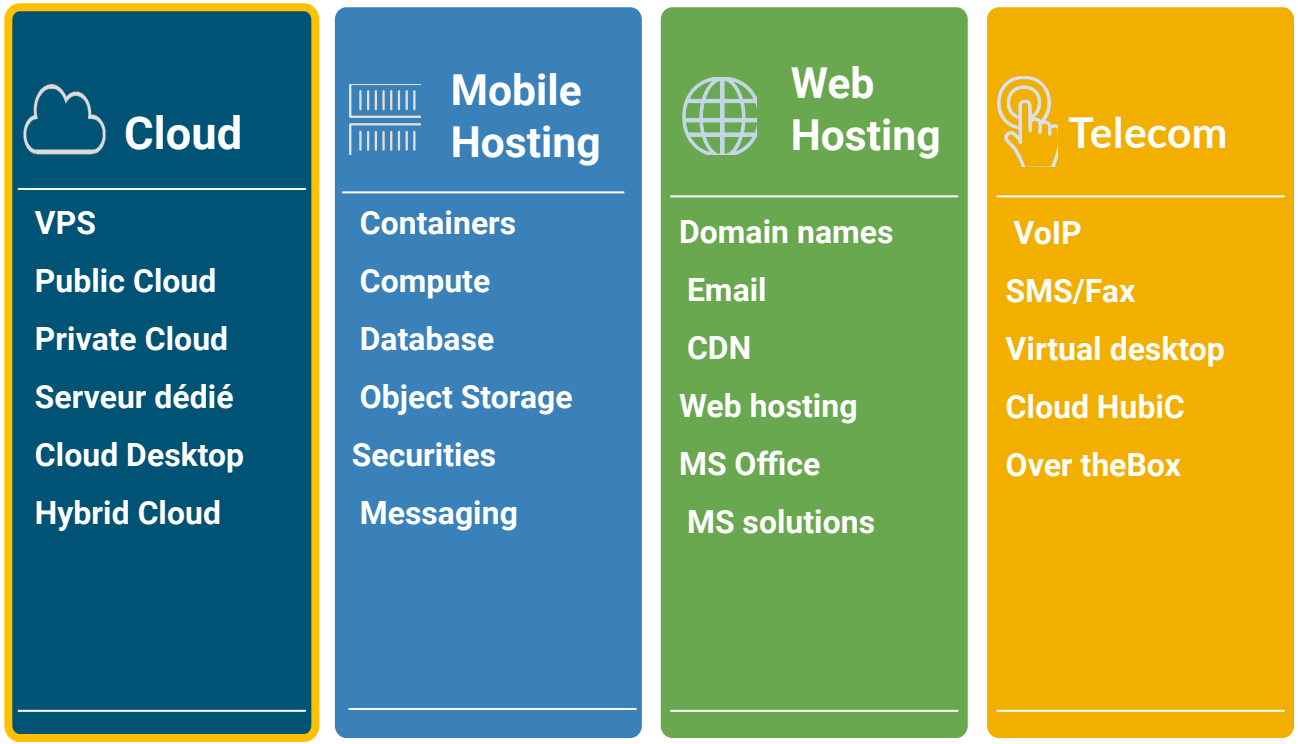
Certified vCloud Datacenter

Certified Kubernetes platform (CNCF)

Vmware **Global Service Provider** 2013-2016

Veeam Best Cloud Partner of the year (2018)

OVH: Our solutions



Once upon a time...

Because I love telling tales

This talk is about a tale...

A true one nevertheless

And as in most tales

It begins with a mission

And a band of heroes

Engulfed into the adventure

They fight against mishaps

And all kind of foes

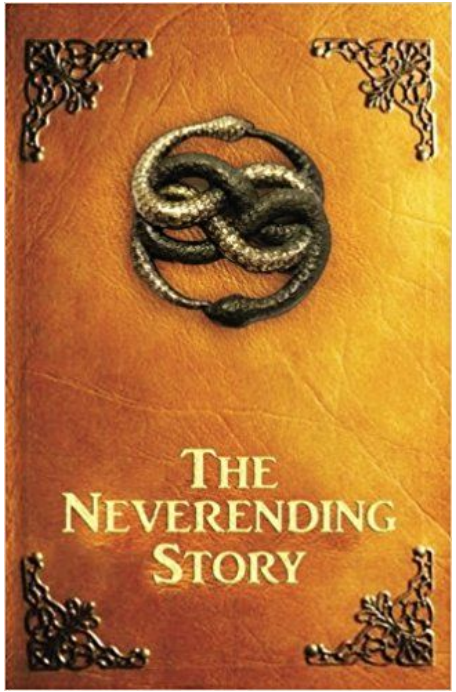
They build mighty fortresses

Pushing the limits of possible

And defend them day after day

Against all odds

But we don't know yet the end



Because this tale isn't finished yet

It begins with a mission

Build a metrics platform for OVH

Why do we need metrics?

To make better **decisions**
by using **numbers**

Why do we need metrics?

We want our **code** to add **value**

Why do we need metrics?

We need to make better
decisions about our **code**

Why do we need metrics?

Code adds **value** when it **runs**
not when we write it

Why do we need metrics?

We need to know what our code **does** when it **runs**

Why do we need metrics?

We can’t do this
unless we **measure** it

Why do we need metrics?

We have a **mental model**
of what our code **does**

Why do we need metrics?

This **representation**
can be **wrong**

Why do we need metrics?

We can't **know** until
we **measure** it

Find the bottleneck

“The app is slow.” - User

Find the bottleneck

“The app is slow.” - User

“The page takes 500ms!” - Ops

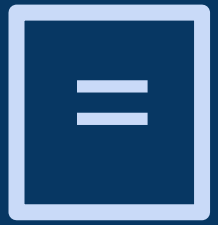
Find the bottleneck

SQL Query?
Template Rendering?
Session Storage?

Find the bottleneck

We don't know

Find the bottleneck



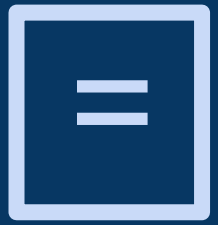
With observability:

SQL Query.....53ms

Template Rendering.....1ms

Session Storage.....315ms

Find the bottleneck



With observability:

SQL Query.....53ms

Template Rendering.....1ms

Session Storage.....315ms

Why do we need metrics?

We improve our mental model by **measuring** what our code **does**

Why do we need metrics?

We use our **mental model**
to **decide** what to do

Why do we need metrics?

A better **mental model** makes us better at **deciding** what to do

Why do we need metrics?

Better **decisions** makes us
better at generating **value**

Why do we need metrics?

Measuring make your
App **better**

It began with a mission

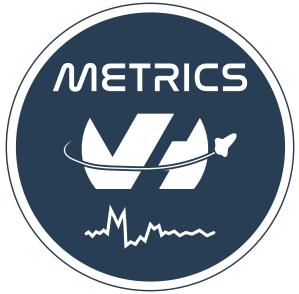
Build a **metrics** platform for **OVH**

A metrics platform for OVH

For **all** OVH

Building OVH Metrics

One Platform to unify them all,
One Platform to find them,
One Platform to bring them all
and in the Metrics monitor them



What is OVH Metrics?

Managed Cloud Platform
for Time Series

OVH monitoring story

We had lots of partial solutions...

OpenTSDB

mongoDB.

graphite

influxdb

OVH monitoring story

One Platform to unify them all

What should we build it on?

OVH monitoring story

Including a really big

OPENTSDB

OpenTSDB drawbacks

OpenTSDB RowKey Design

metrics timestamp tagk1 tagv1 tagk2 tagv2

OpenTSDB Rowkey design flaws

- .*regex.* => full table scans
- High cardinality issues (Query latencies)

We needed something able to manage

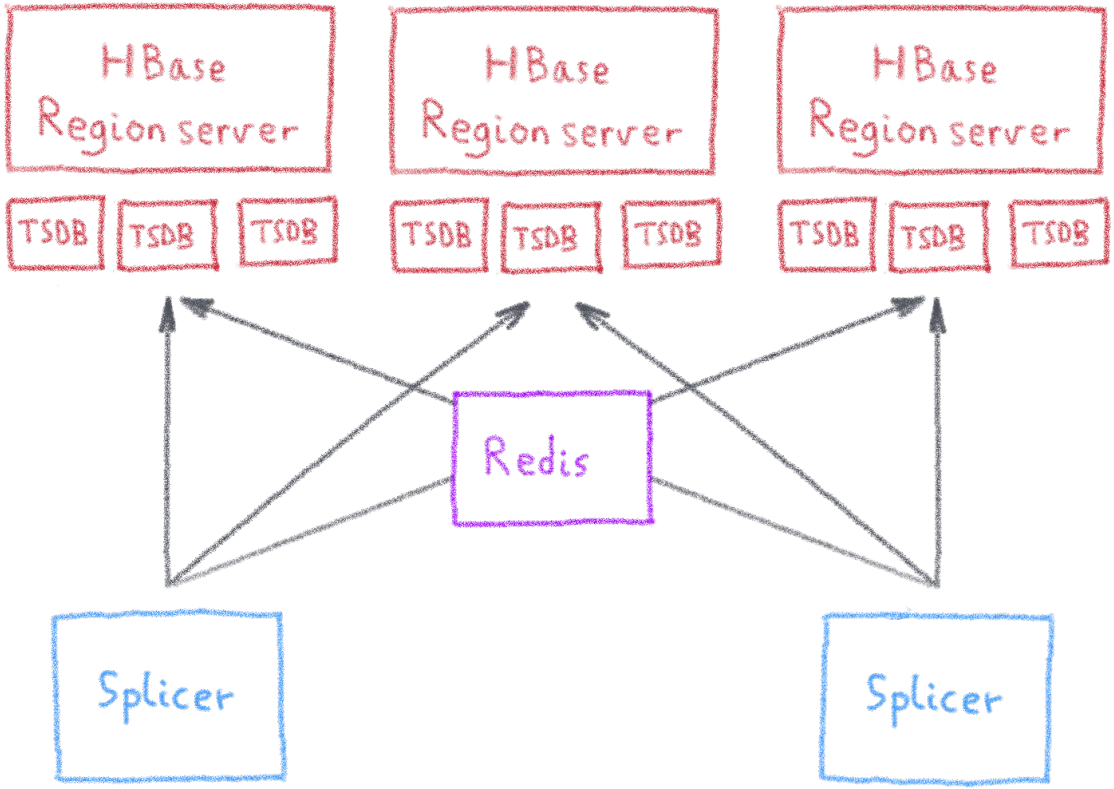
hundreds of millions time series

OpenTSBD didn't **scale** for us

OpenTSDB other flaws

- Compaction (or append writes)
- /api/query : 1 endpoint per function?
- Asynchronous
- Unauthenticated
- ...

Scaling OpenTSDB



Metrics needs

First **need**:

To be **massively** scalable

Analytics is the key to success

Fetching data is only the tip of the iceberg

Analysing metrics data

To be scalable, analysis must be done in the database, not in user's computer

Metrics needs

Second **need**:

To have **rich query** capabilities

Enter Warp 10...

Open-source
Time series
Database

More than a Time Series DB

Warp 10 is a software platform that

- Ingests and stores time series
- Manipulates and analyzes time series

Manipulating Time Series with Warp 10

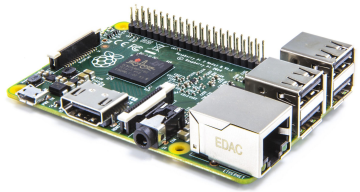
A true Time Series analysis toolbox

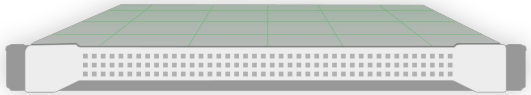
- Hundreds of functions
- Manipulation frameworks
- Analysis workflow

Manipulating Time Series with Warp 10

A Time Series manipulation language

Did you say scalability?





From the smallest to the largest...

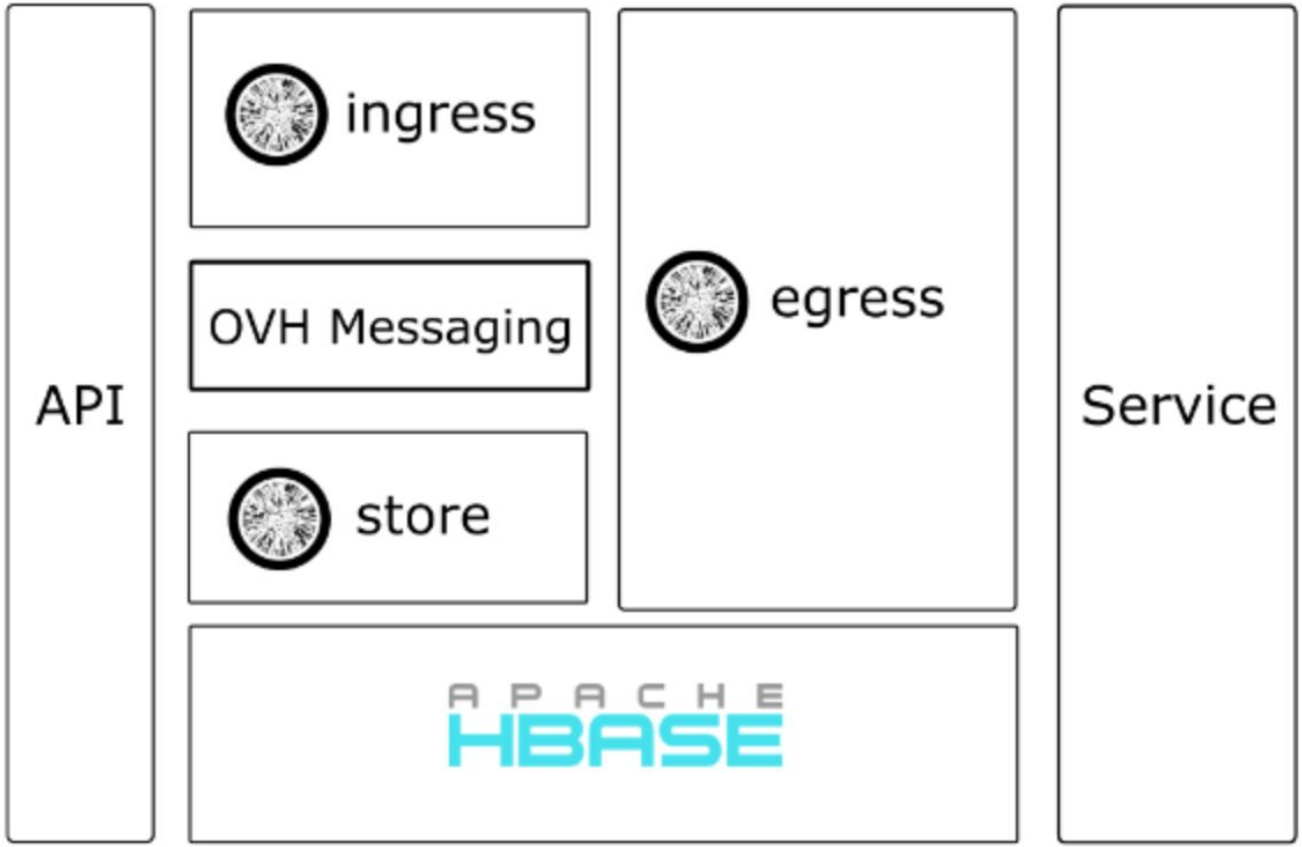
More Warp 10 goodness

- Secured & multi tenant
- In memory Index
- No cardinality issues
- Lockfree ingestion
- WarpScript Query Language
- Support more data types
- Synchronous (transactions)
- Better Performance
- Better Scalability
- Versatile

  (standalone, distributed)

OVH Observability Metrics Platform

Metrics Data Platform



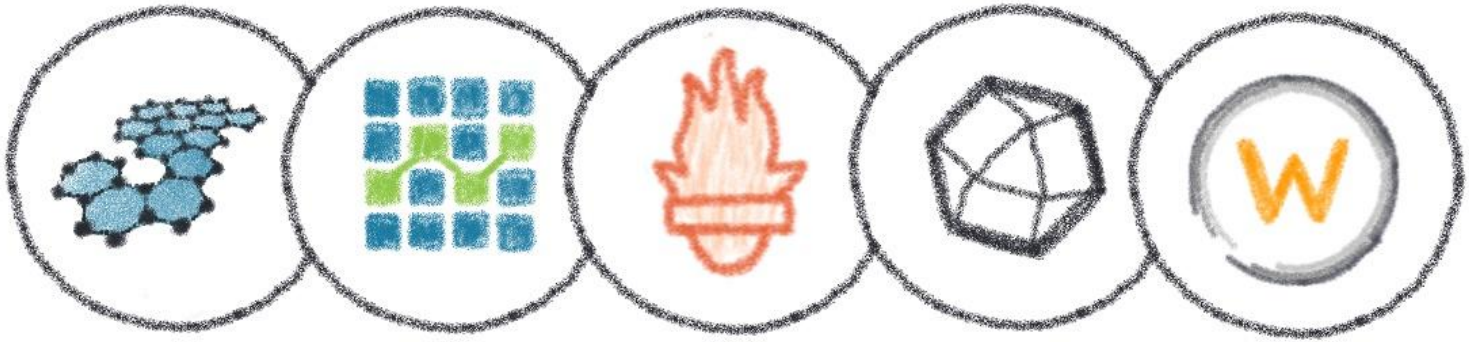
Building an ecosystem

From Warp 10 to OVH Metrics

Multi-protocol

Why to choose? We need them all!

Open source monitoring tools



Open source monitoring tools

Open source monitoring tools

Open source monitoring tools

Open source monitoring tools

Open source monitoring tools

Open source monitoring tools

Why choose?

Let’s support all of them!

Metrics Platform

OVH
Innovation for Freedom

Metrics Platform

https://

graphite

influx

opentsdb

prometheus

warp10

...

.<region>.metrics.ovh.net

Metrics Live

In-memory, high-performance Metrics instances

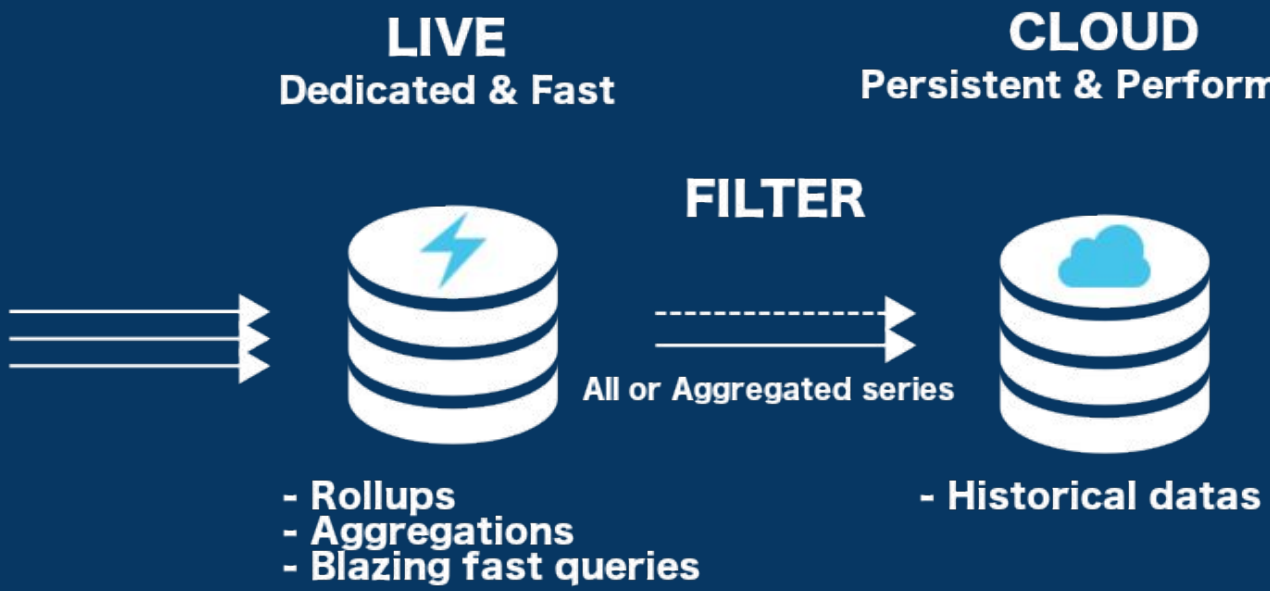
In-memory: Metrics live

OVH
Innovation for Freedom

+120 million of writes/s

In-memory: Metrics live

OVH
Innovation for Freedom



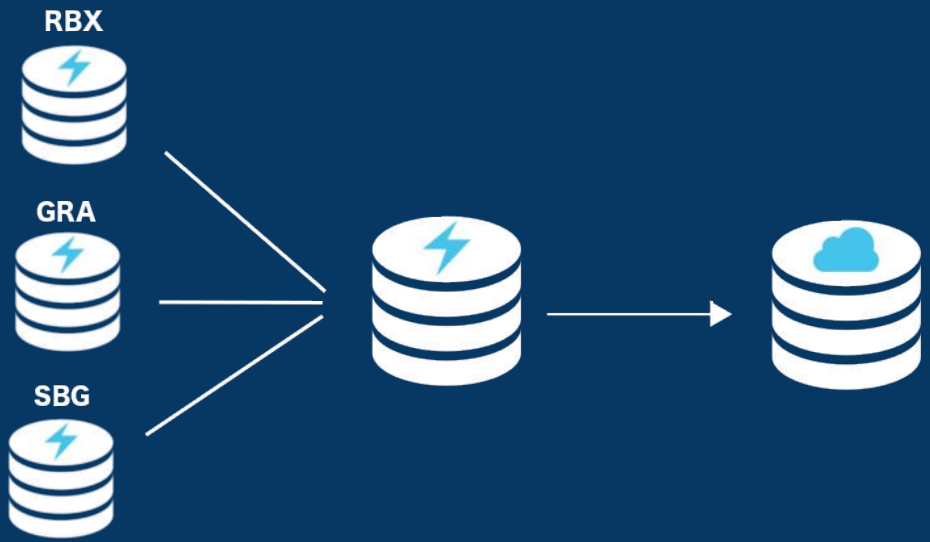
In-memory: Metrics live

OVH
Innovation for Freedom

STAGE 1
- Short retention - hours
- Fine grained monitoring
- Raw data

STAGE 2
- Short retention - days
- Consolidated aggregations
- Global infra monitoring

STAGE 3
- Customer metrics
- Historical datas



Monitoring is only the beginning

OVH Metrics answer to many other use cases

Use cases families

- Billing ..... (e.g. bill on monthly max consumption)
- Monitoring ..... (APM, infrastructure,appliances,...)
- IoT ..... (Manage devices, operator integration, ...)
- Geo Location ..... (Manage localized fleets)

Use cases

- DC Temperature/Elec/Cooling map
- Pay as you go billing (PCI/IPLB)
- GSCAN
- Monitoring
- ML Model scoring (Anti-Fraude)
- Pattern Detection for medical applications

SREing Metrics

With a great power comes a great responsibility

Metrics' own metrics

432 000 000 000
datapoints / day

Metrics' own metrics

10 Tb / day

Metrics' own metrics

5 000 000 dp/s

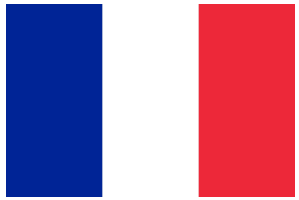
Metrics' own metrics

500 000 000 series

Our clusters size

GRA:

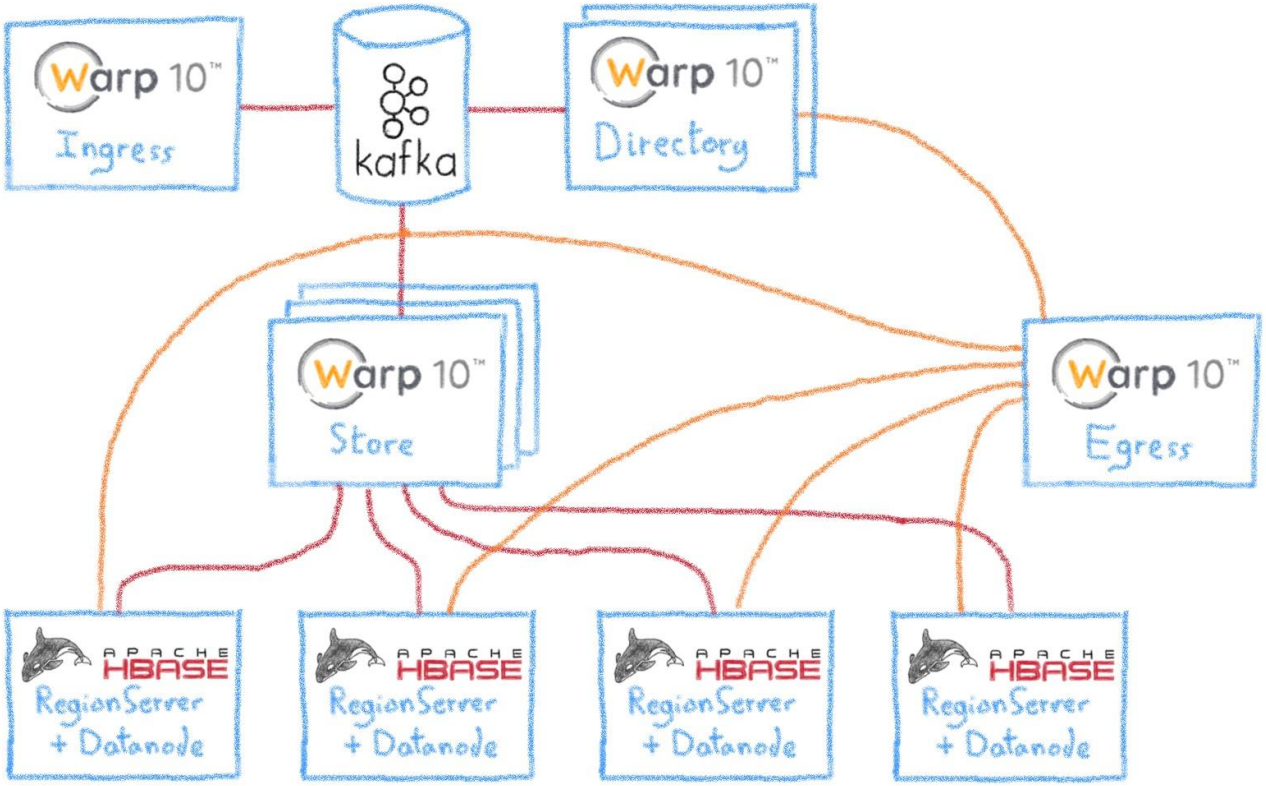
- 150 nodes
- 2 PB
- 1.1 Gbps



BHS:

- 30 nodes
- 400 TB
- 120 Mbps

Our cluster architecture



Detecting errors

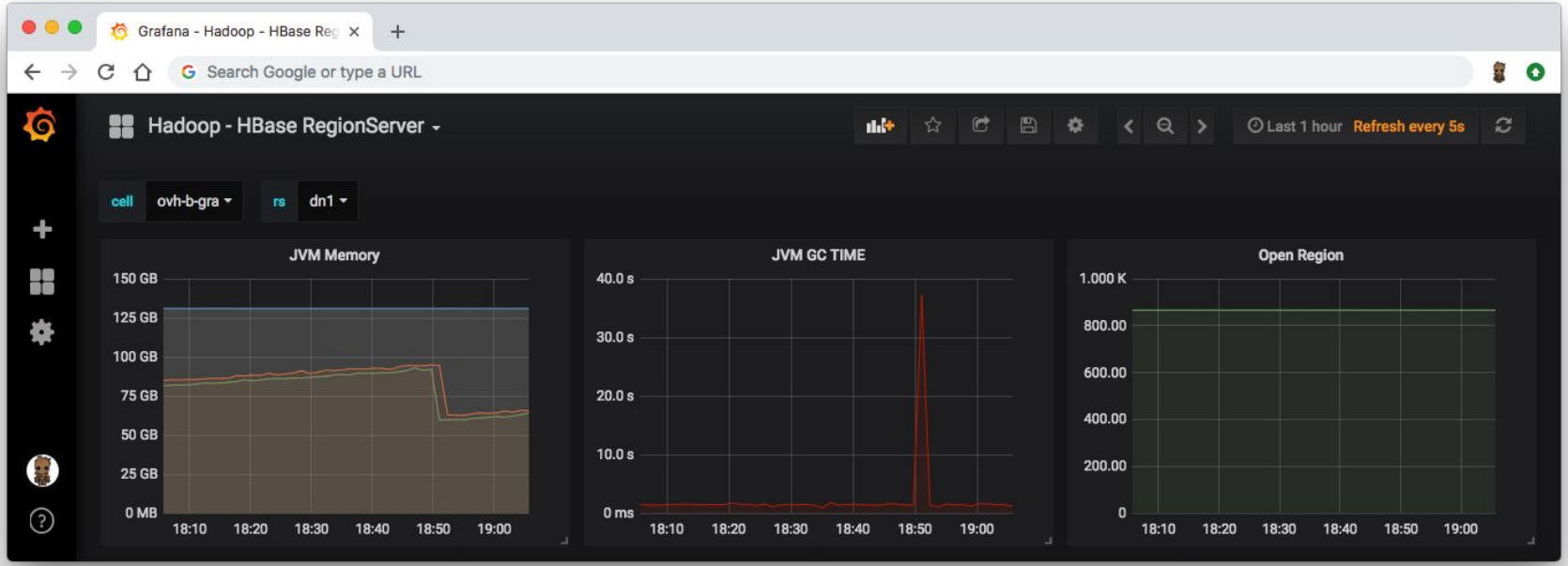
Before it's too late

Extract errors from logs

Tailor

Forward logs and extract metrics!

Monitoring the JVM

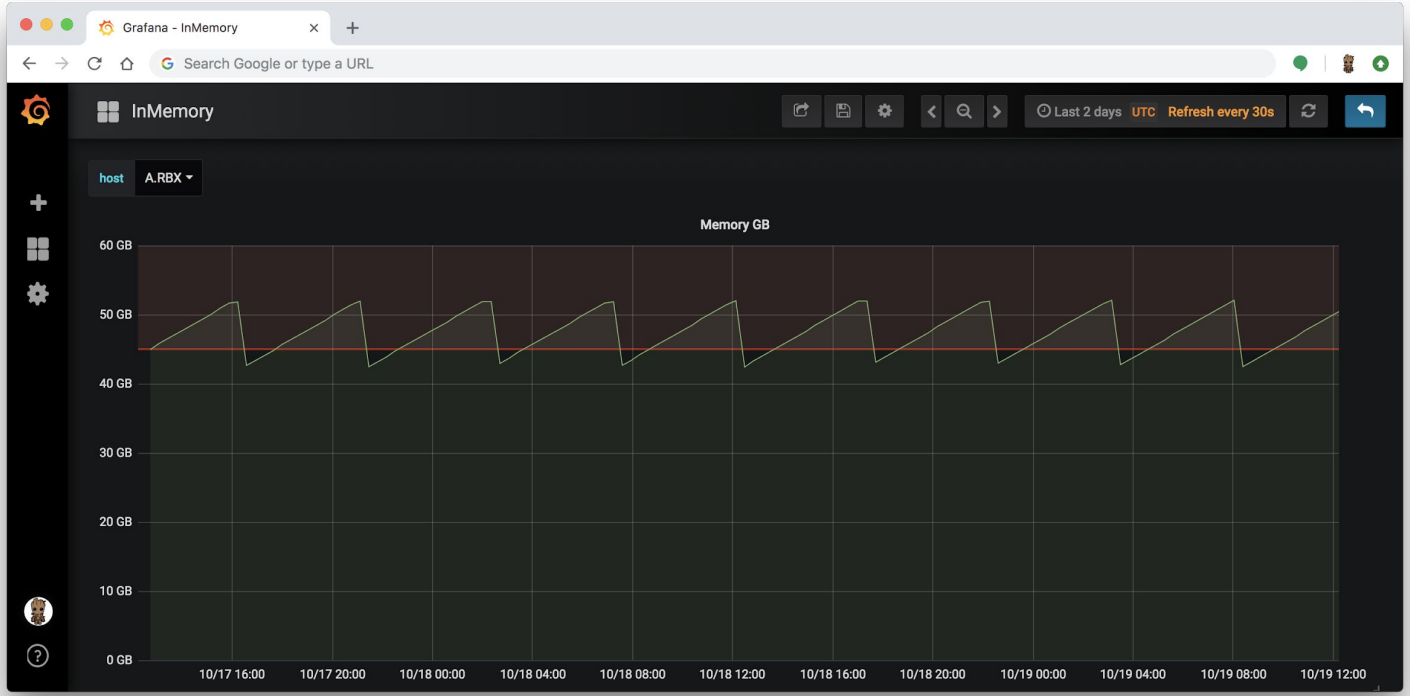


Documentation

JVM GC

The good, the bad and the ugly

The good


Grafana - InMemory
Search Google or type a URL
InMemory
Last 2 days
UTC
Refresh every 30s
host
A.RBX
Memory GB
60 GB
50 GB
40 GB
30 GB
20 GB
10 GB
0 GB
10/17 16:00
10/17 20:00
10/18 00:00
10/18 04:00
10/18 08:00
10/18 12:00
10/18 16:00
10/18 20:00
10/19 00:00
10/19 04:00
10/19 08:00
10/19 12:00

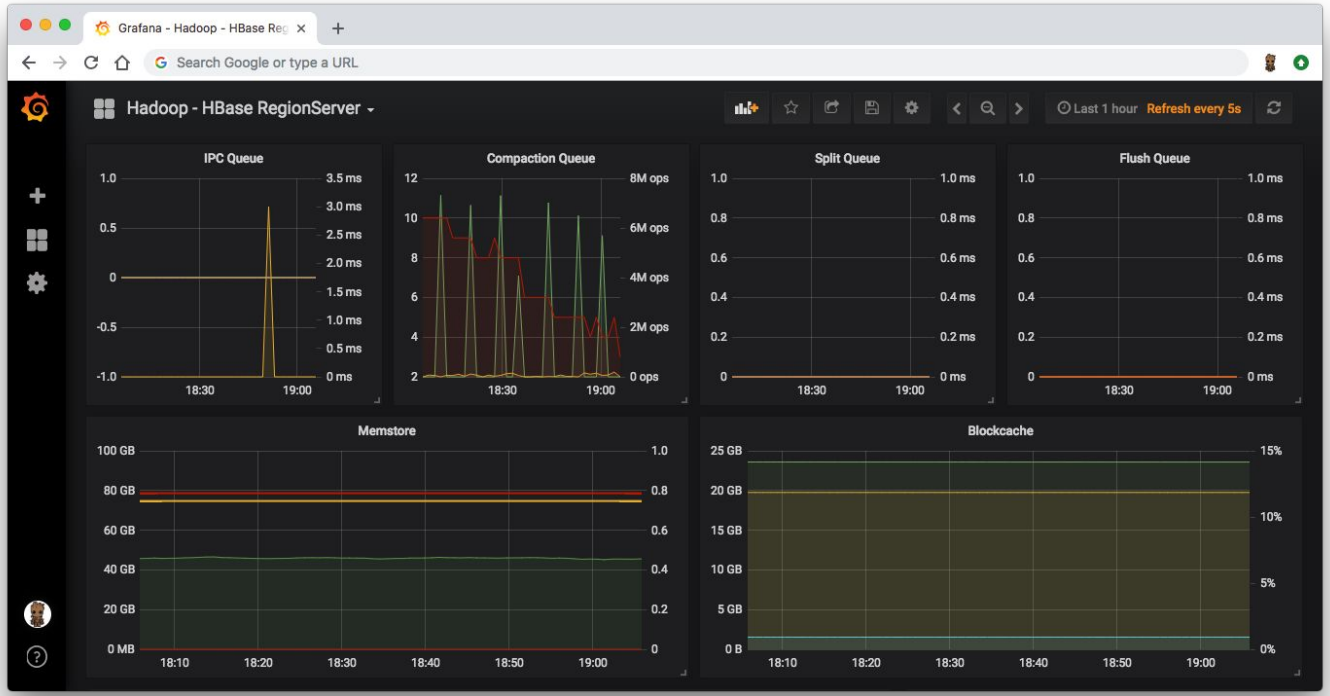
The bad


Grafana - Hadoop - HBase Re
Secure
grafana-ovh.metrics.ovh.net/d/000001835/hadoop-hbase-regionserver?refresh=5s&panelId=5&fullscreen&orgId=15&var-cell=ovh-b-gra&var-rs=d...
Hadoop - HBase RegionServer
Last 2 days
Refresh every 5s
cell
ovh-b-gra
rs
dn1
JVM Memory
120 GB
100 GB
80 GB
60 GB
40 GB
20 GB
0 MB
10/17 16:00
10/17 20:00
10/18 00:00
10/18 04:00
10/18 08:00
10/18 12:00
10/18 16:00
10/18 20:00
10/19 00:00
10/19 04:00
10/19 08:00
10/19 12:00

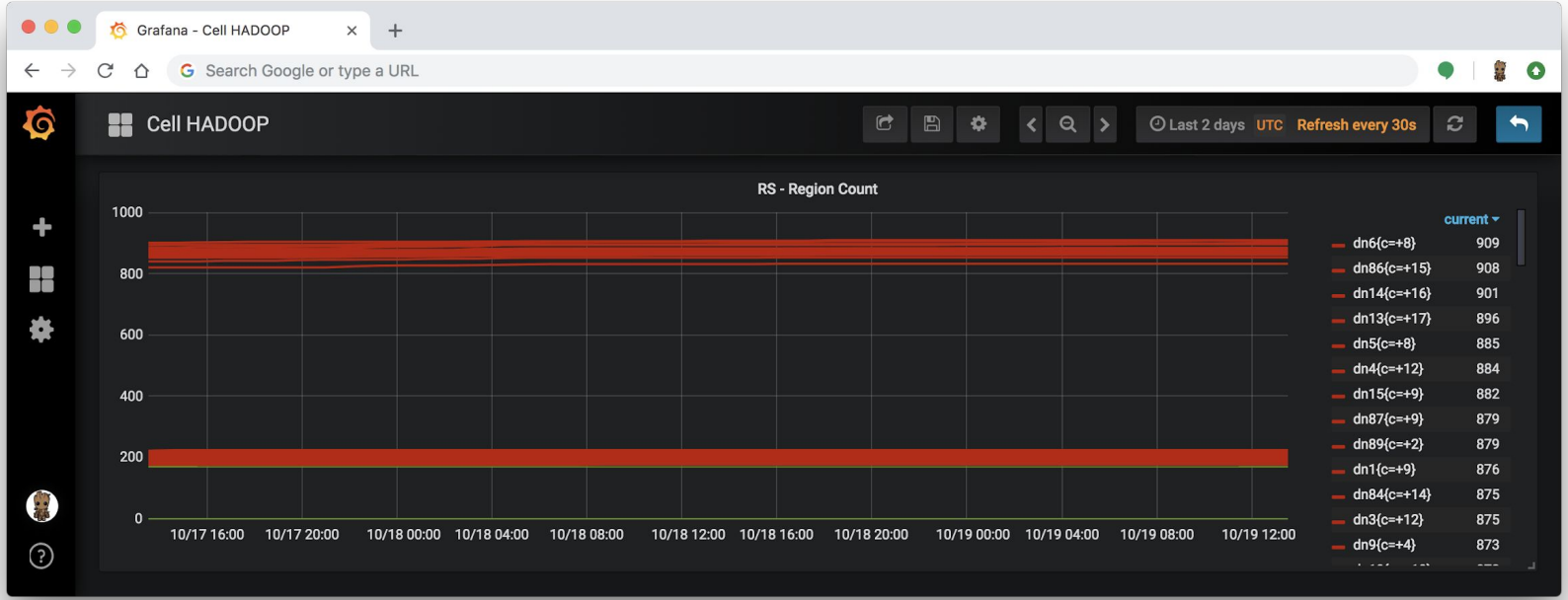
… and the ugly

#java #jdk11 #zgc

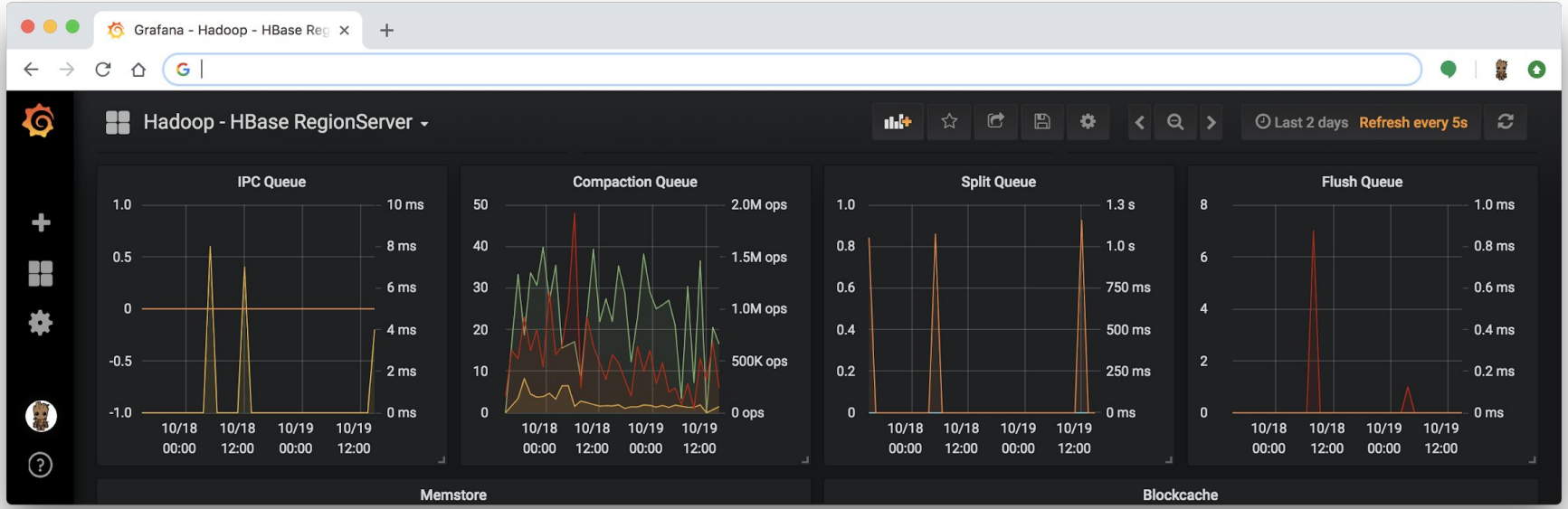
Monitoring HBase



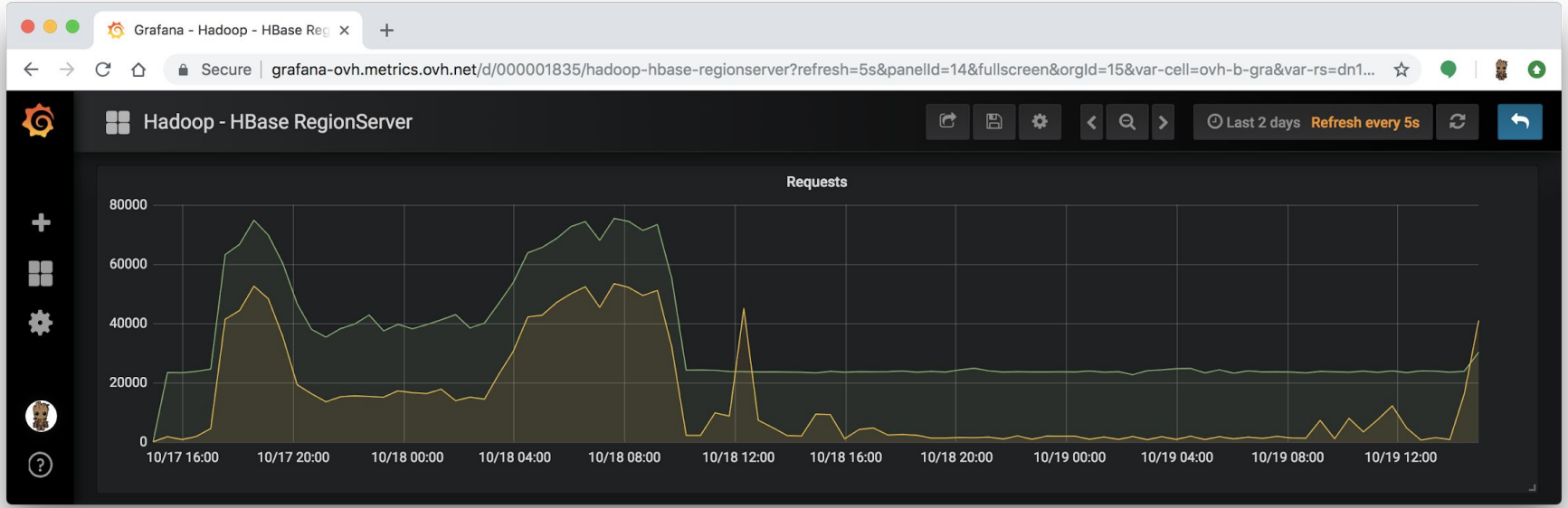
Number of open regions



Queues length

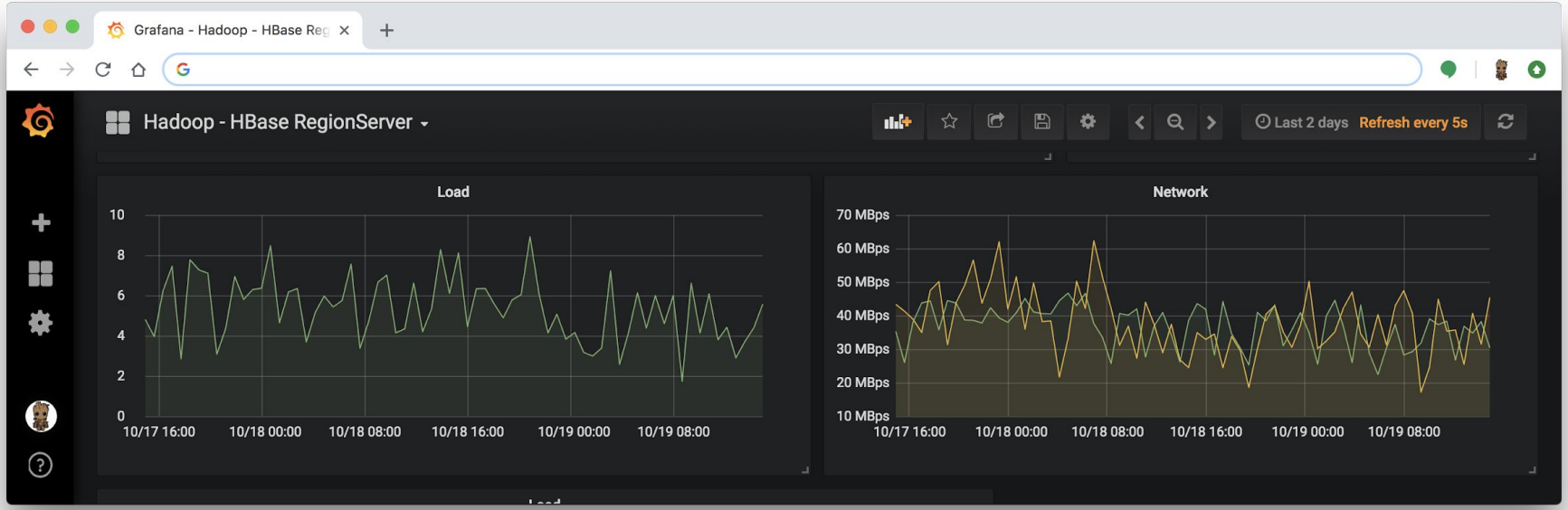


Number of read and write requests



Preserve data locality

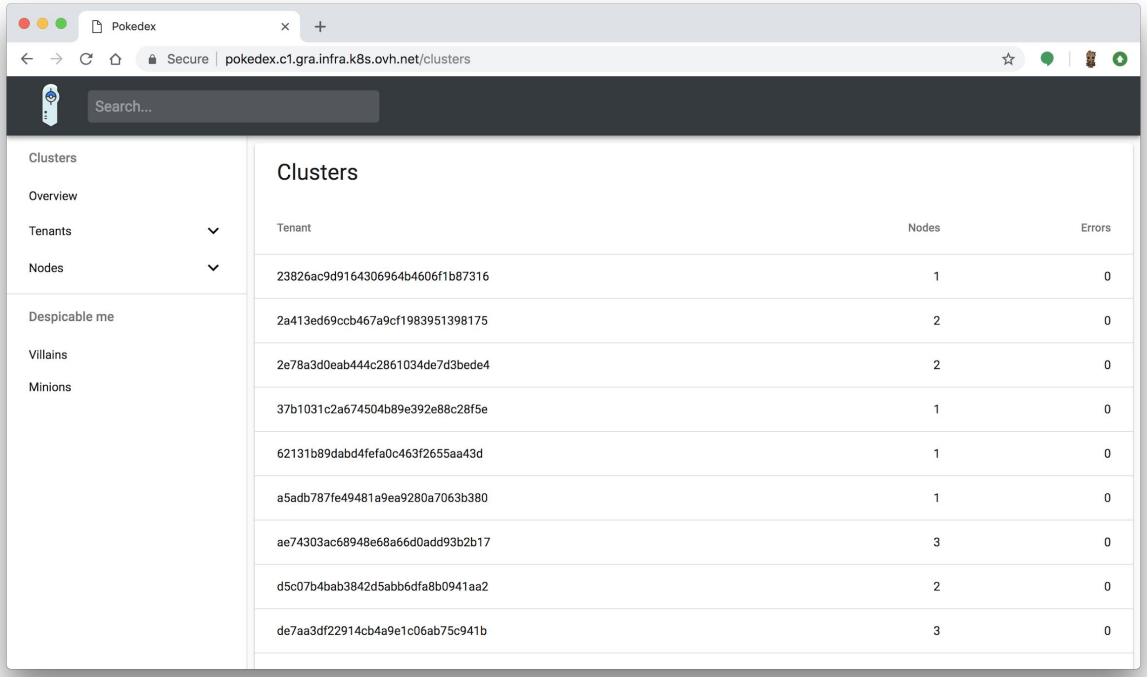
Host health


Grafana - Hadoop - HBase Reg
Hadoop - HBase RegionServer
Last 2 days
Refresh every 5s
Load
10
8
6
4
2
0
10/17 16:00
10/18 00:00
10/18 08:00
10/18 16:00
10/19 00:00
10/19 08:00
Network
70 MBps
60 MBps
50 MBps
40 MBps
30 MBps
20 MBps
10 MBps
10/17 16:00
10/18 00:00
10/18 08:00
10/18 16:00
10/19 00:00
10/19 08:00

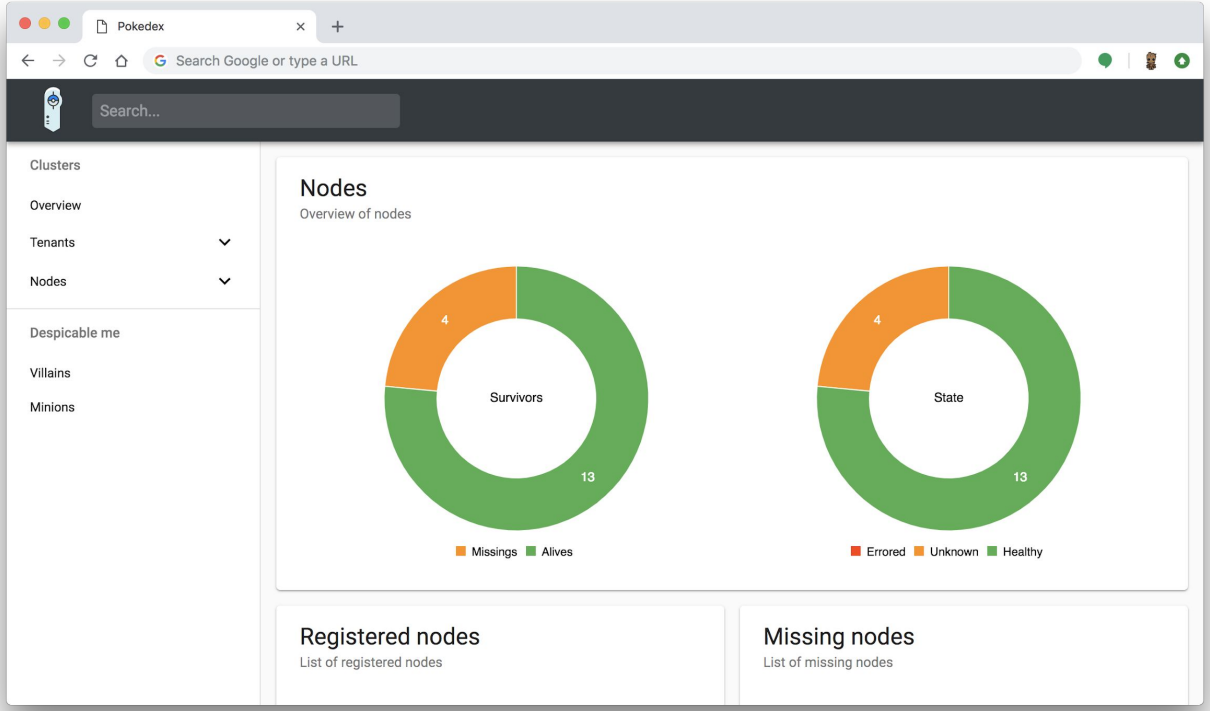
Pokédex

Inventory all animals.

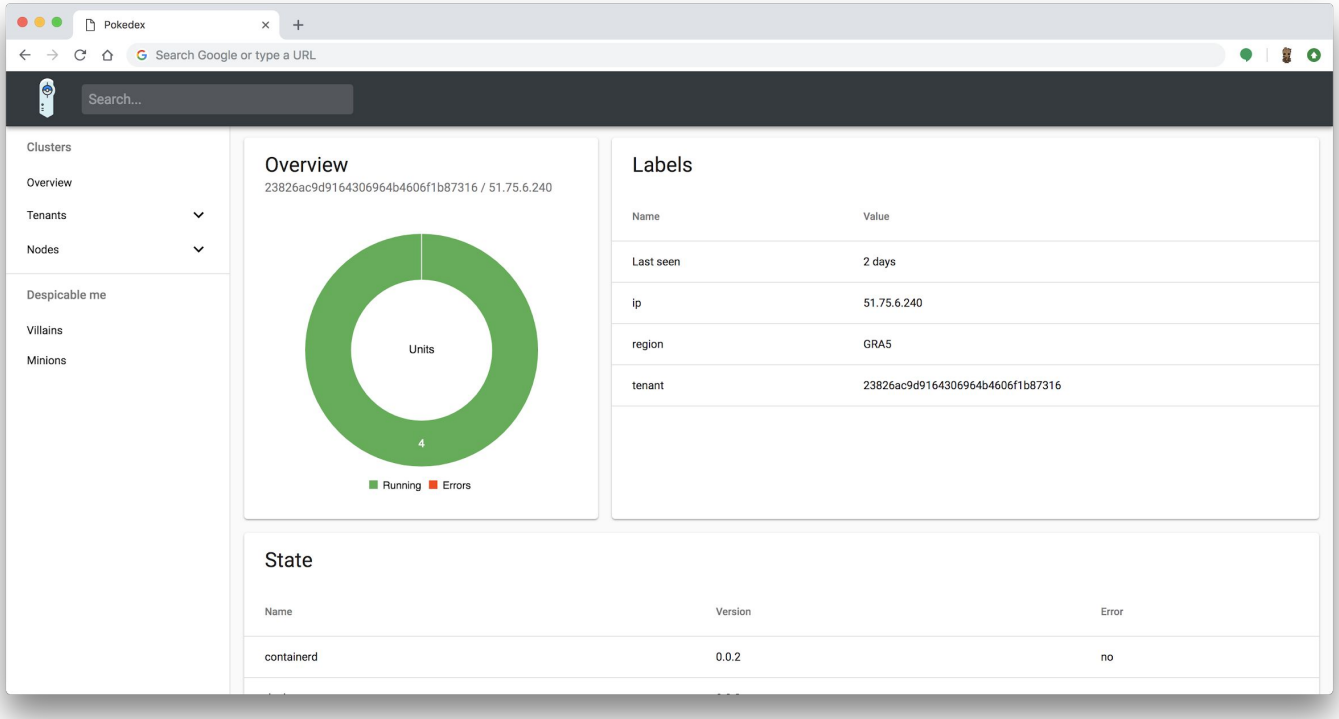
Merging all data sources



Global visualization



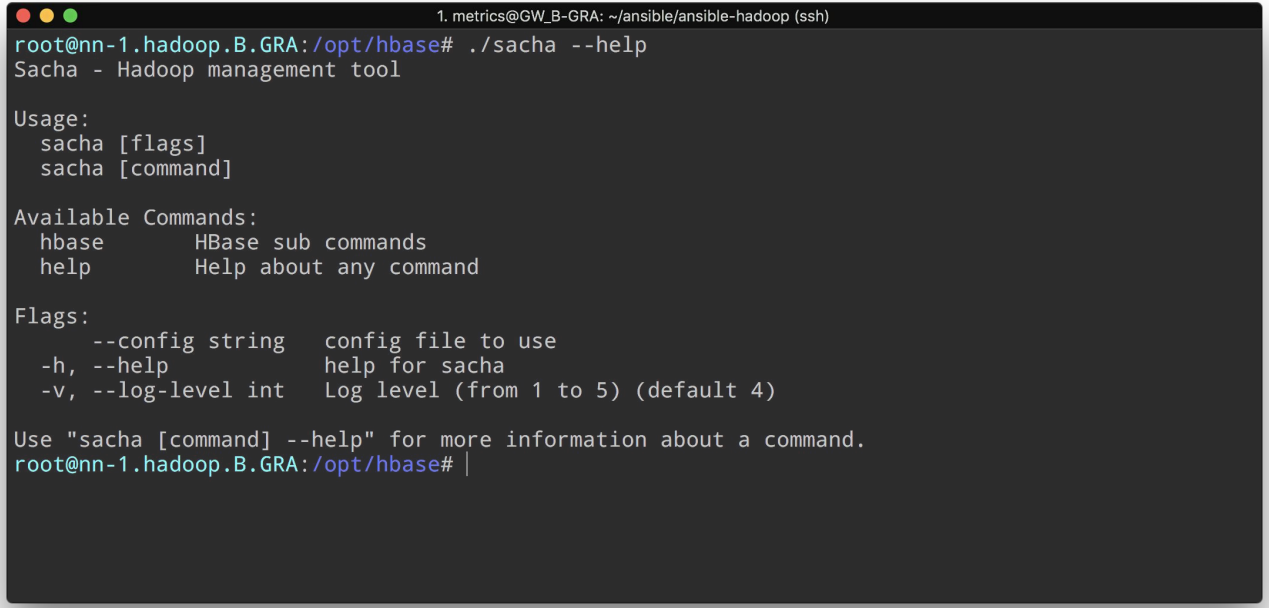
Correlate information



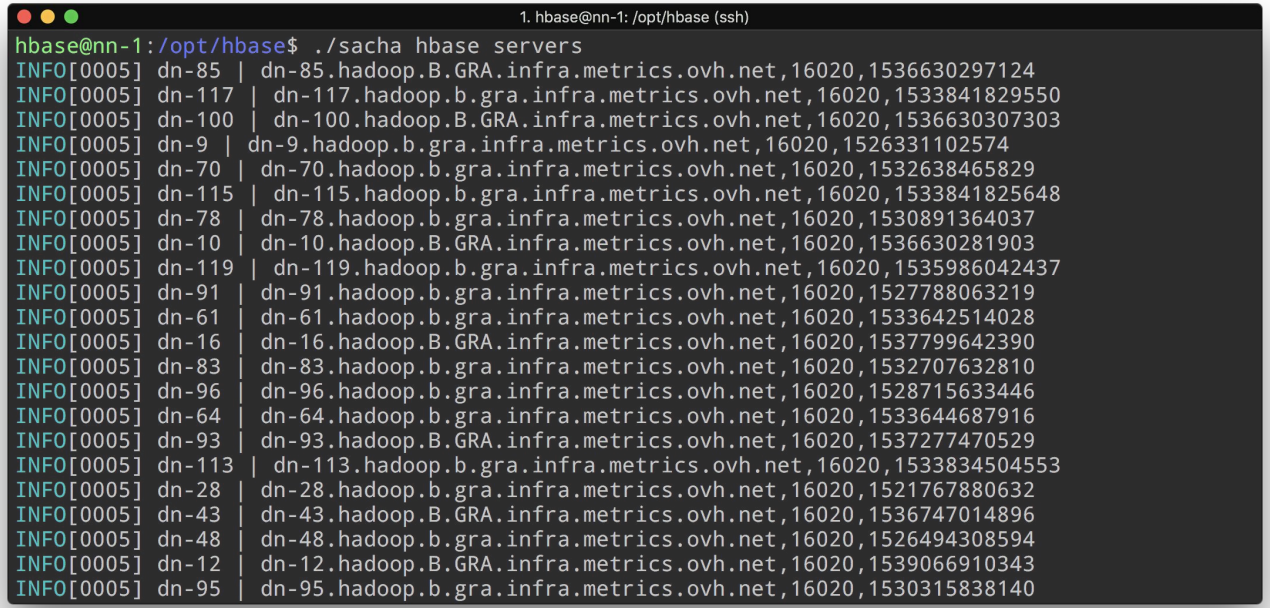
Sacha

The best tamer

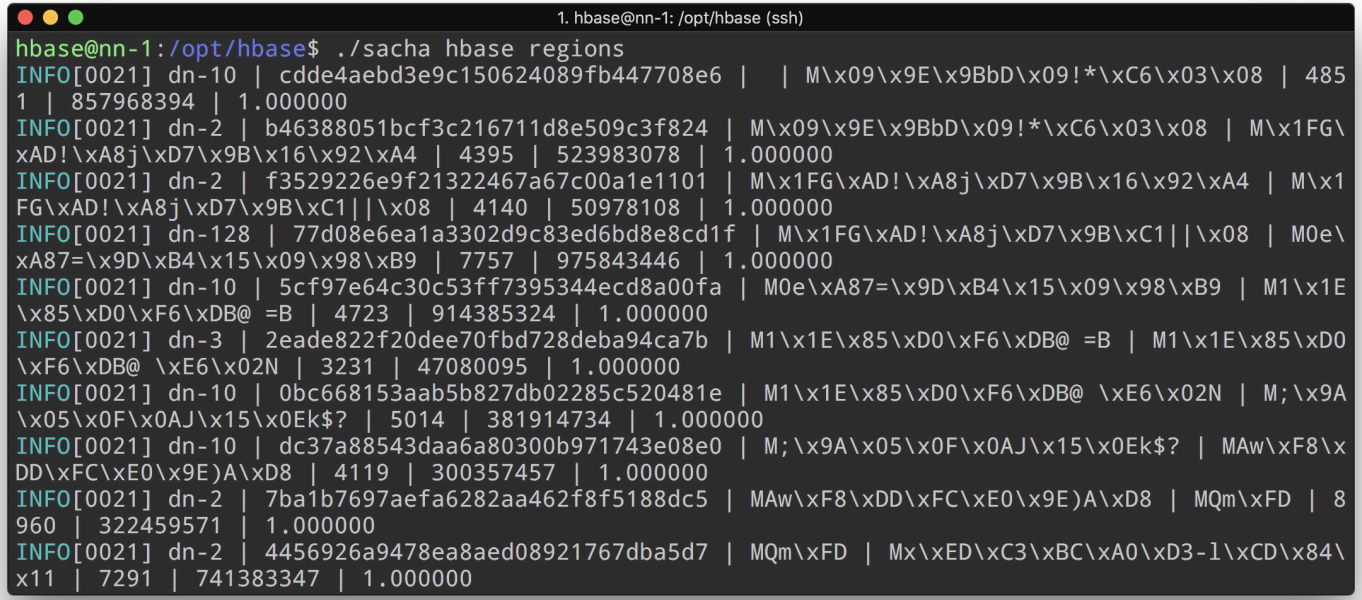
An awesome CLI



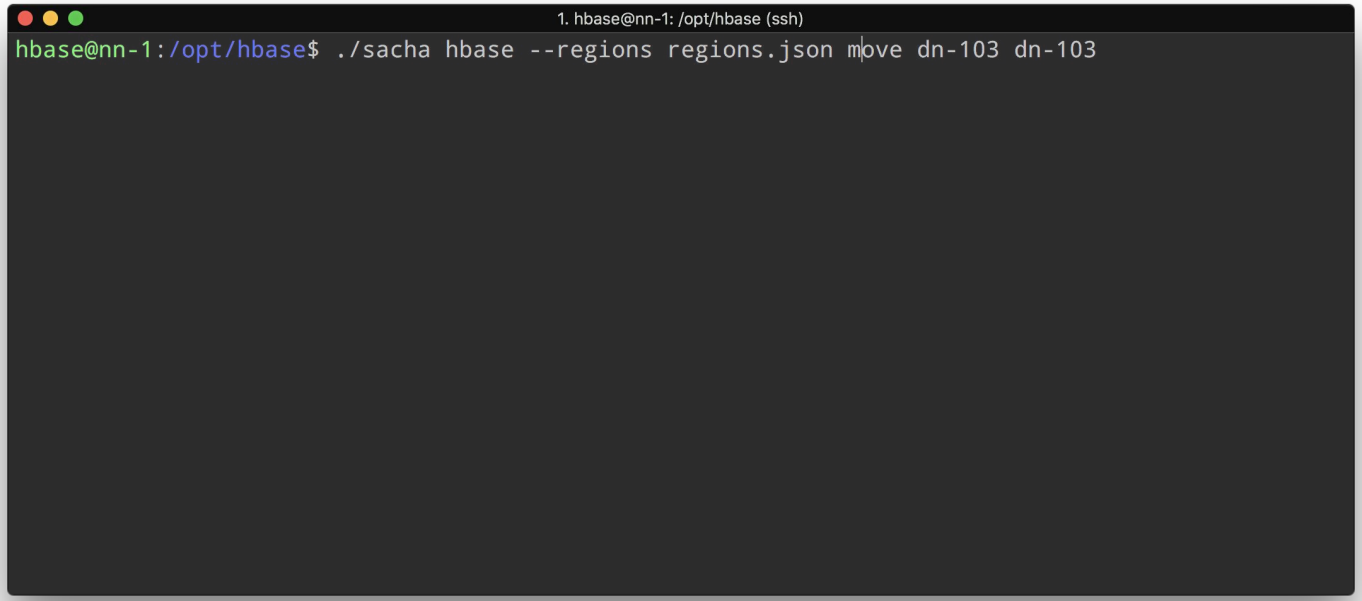
Retrieving bare informations



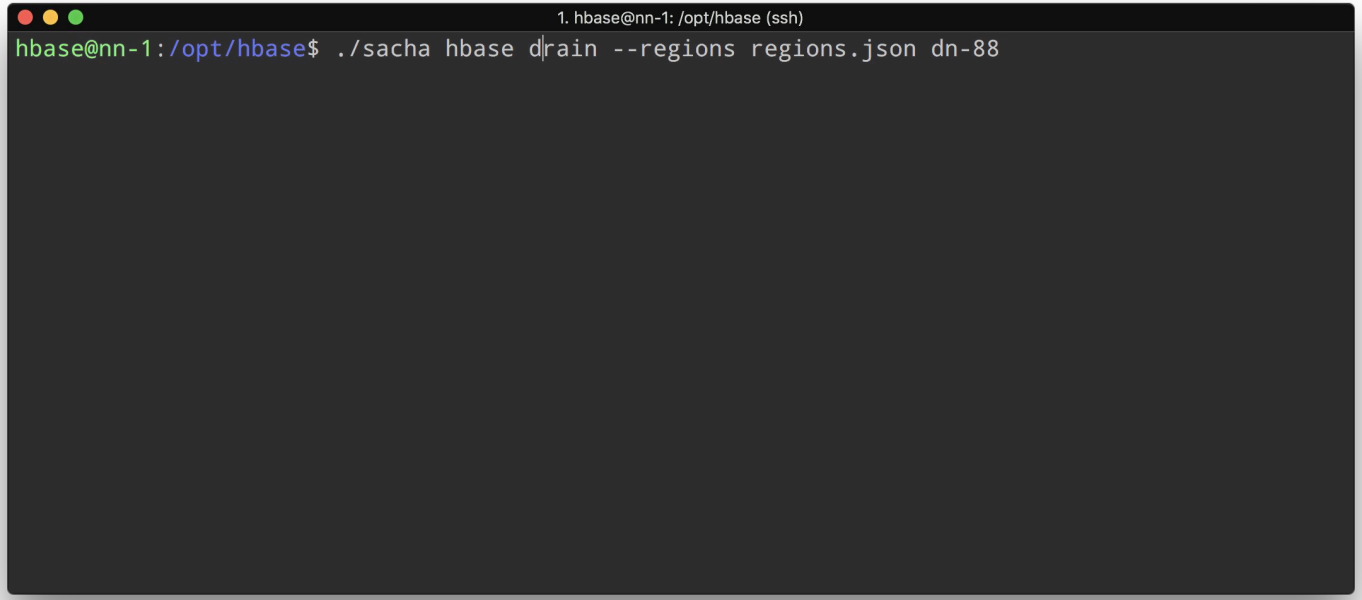
Create region map



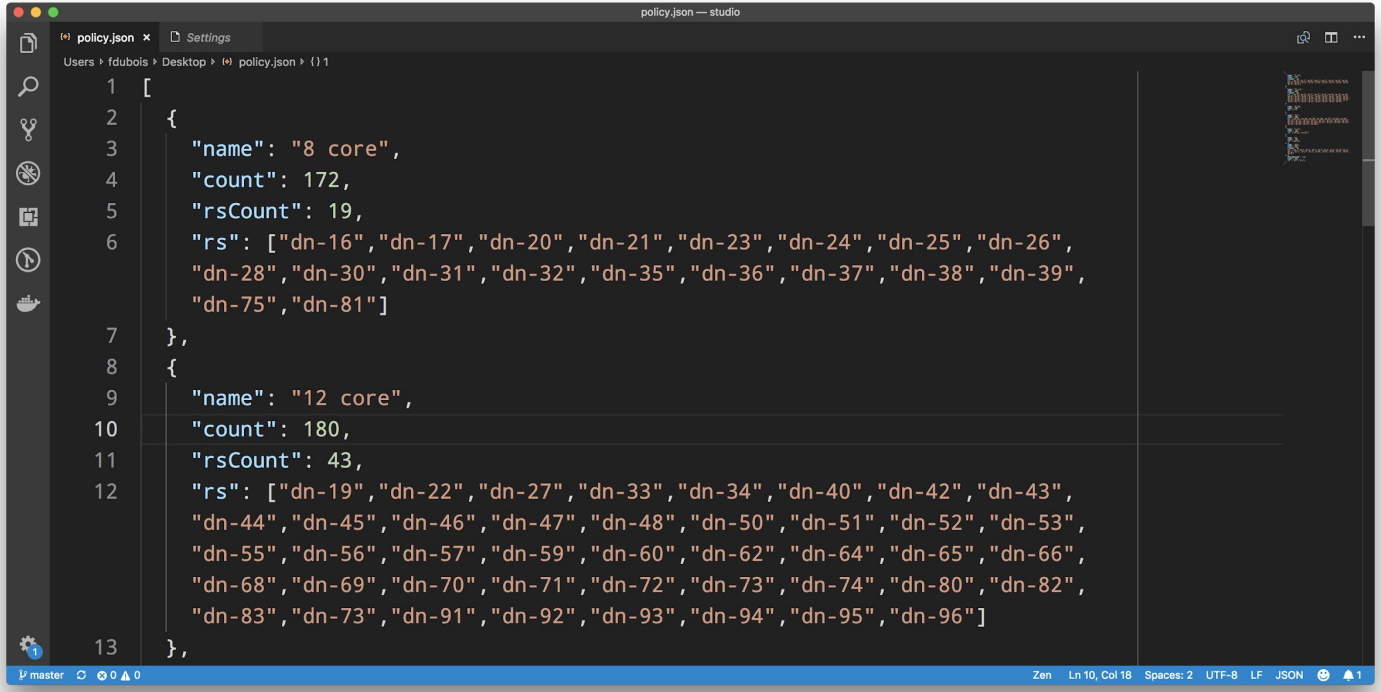
Move region to another region server



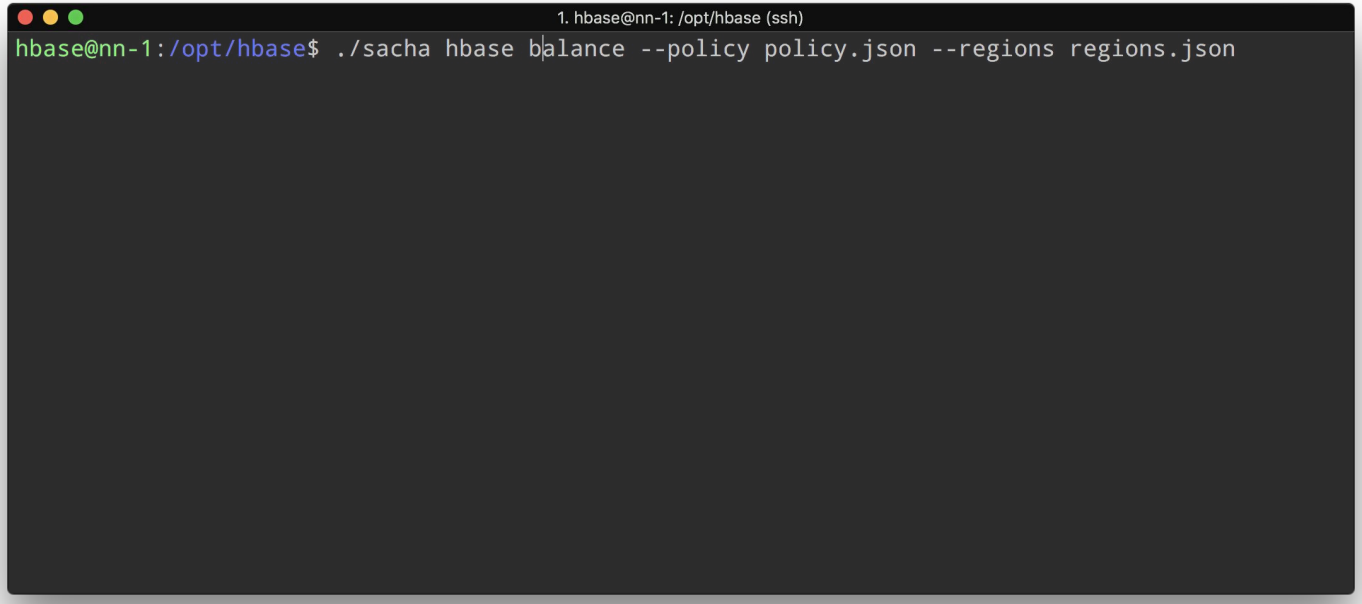
Drain regions of the region server



Managing multiple hardware profiles



Balance the cluster



Conclusion

That's all folks!