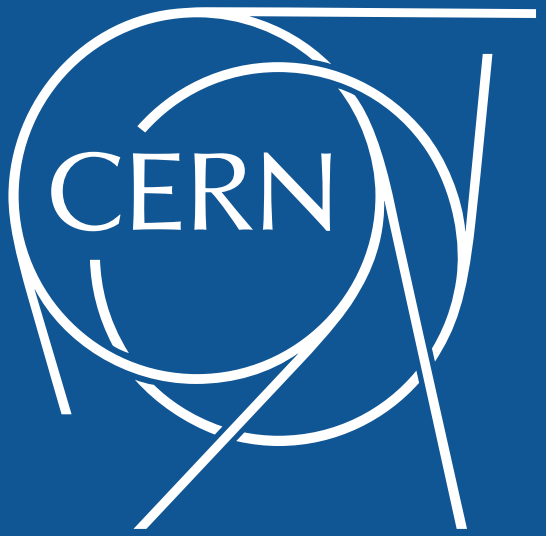

CERN

Streaming Service @CERN

IT-DB-SAS

Jose C. Luna
Manuel Martin Marquez

Why?

Growing interest @CERN

In many occasions for central data backbone, buffering, and data enrichment.
Then sending this data to other platform (elastic, hadoop, other databases).

Examples

- Security Team integrated platform
- Central Monitoring of linux hosts, both physical and virtual in data centers
- Central Monitoring of windows servers
- New Accelerator Logging
- …

What we currently offer

Managed Kafka Clusters

Dedicated kafka clusters, client retains admin access.

Virtual Machines, persistance in Netapp => moving to ceph

Kerberos and certificate support for clients.

We provide:

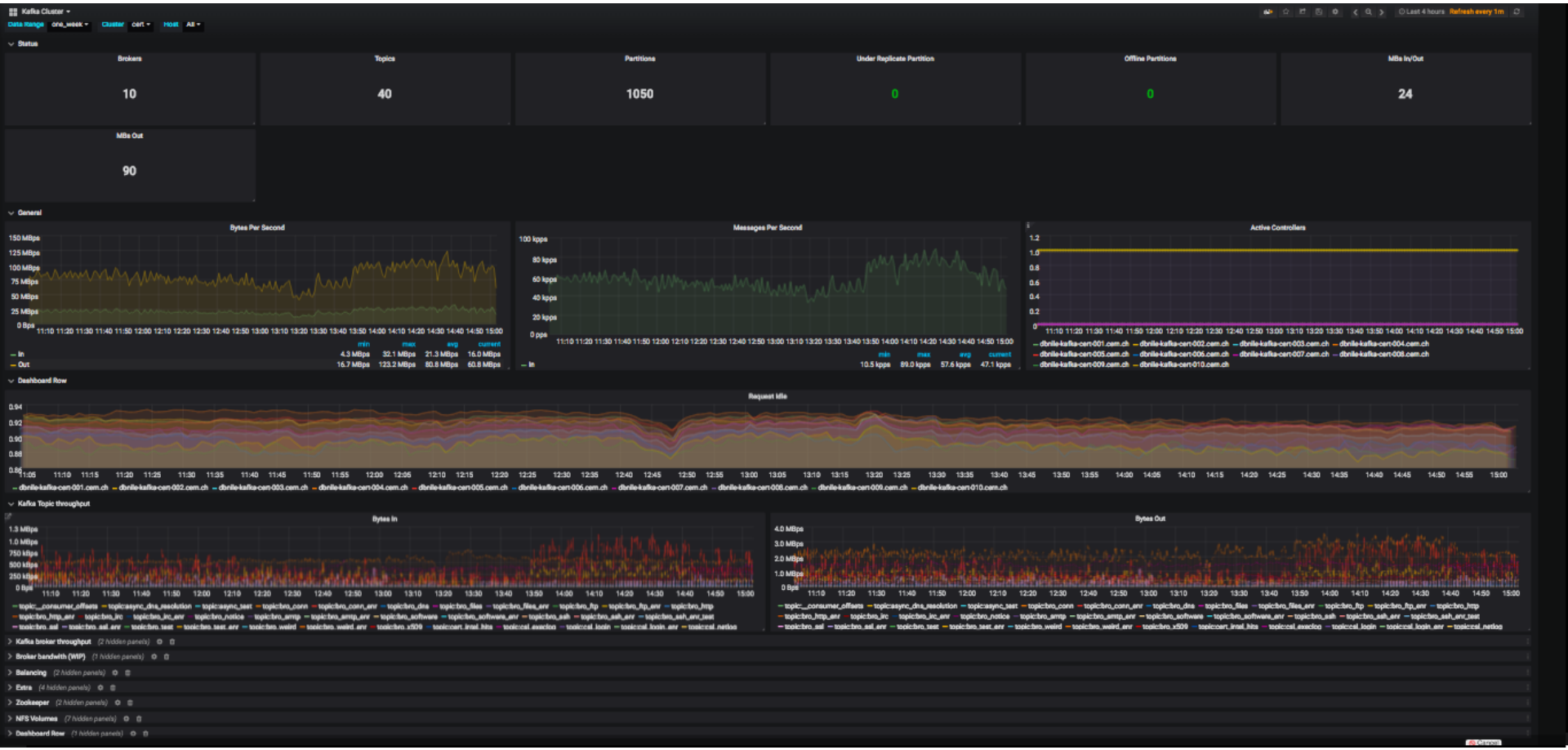
- Configuration: Integrated in central CERN IT (puppet based configuration)
- Monitoring: central IT pipeline (collectd+influx+grafana). Also testing kapacitor.
- Upgrades
- Expertise

Eg: Security-Team

Just started last year in test mode:

- 60K IN messages per second
- Aggregated bandwith of around 200 MBps. Clients 20MB/s in 80MB/s out
- 10 Brokers, around 100 partitions per broker. -> 4VCPU / 8GB
- 72 hours retention policy. ~12TB persistence total as of now

Type of content: connections crossing firewall, dns requests, commands executed in shared linux clusters...


Kafka Cluster
Data Range one_week
Cluster cern
Host All
Status
Brokers
10
Topics
40
Partitions
1050
Under Replicate Partition
0
Offline Partitions
0
MBs In/Out
24
MBs Out
90
General
Bytes Per Second
150 MBps
125 MBps
100 MBps
75 MBps
50 MBps
25 MBps
0 Bps
11:10 11:20 11:30 11:40 11:50 12:00 12:10 12:20 12:30 12:40 12:50 13:00 13:10 13:20 13:30 13:40 13:50 14:00 14:10 14:20 14:30 14:40 14:50 15:00
min max avg current
In 4.3 MBps 32.1 MBps 21.3 MBps 16.0 MBps
Out 16.7 MBps 123.2 MBps 80.8 MBps 60.8 MBps
Messages Per Second
100 kpps
80 kpps
60 kpps
40 kpps
20 kpps
0 pps
11:10 11:20 11:30 11:40 11:50 12:00 12:10 12:20 12:30 12:40 12:50 13:00 13:10 13:20 13:30 13:40 13:50 14:00 14:10 14:20 14:30 14:40 14:50 15:00
min max avg current
In 10.5 kpps 89.0 kpps 57.6 kpps 47.1 kpps
Active Controllers
1.2
1.0
0.8
0.6
0.4
0.2
0
11:10 11:20 11:30 11:40 11:50 12:00 12:10 12:20 12:30 12:40 12:50 13:00 13:10 13:20 13:30 13:40 13:50 14:00 14:10 14:20 14:30 14:40 14:50 15:00
dbnile-kafka-cern-001.cern.ch dbnile-kafka-cern-002.cern.ch dbnile-kafka-cern-003.cern.ch dbnile-kafka-cern-004.cern.ch
dbnile-kafka-cern-005.cern.ch dbnile-kafka-cern-006.cern.ch dbnile-kafka-cern-007.cern.ch dbnile-kafka-cern-008.cern.ch
dbnile-kafka-cern-009.cern.ch dbnile-kafka-cern-010.cern.ch
Dashboard Row
Request Idle
0.94
0.92
0.90
0.88
0.86
11:05 11:10 11:15 11:20 11:25 11:30 11:35 11:40 11:45 11:50 11:55 12:00 12:05 12:10 12:15 12:20 12:25 12:30 12:35 12:40 12:45 12:50 12:55 13:00 13:05 13:10 13:15 13:20 13:25 13:30 13:35 13:40 13:45 13:50 13:55 14:00 14:05 14:10 14:15 14:20 14:25 14:30 14:35 14:40 14:45 14:50 14:55 15:00
dbnile-kafka-cern-001.cern.ch dbnile-kafka-cern-002.cern.ch dbnile-kafka-cern-003.cern.ch dbnile-kafka-cern-004.cern.ch dbnile-kafka-cern-005.cern.ch dbnile-kafka-cern-006.cern.ch dbnile-kafka-cern-007.cern.ch dbnile-kafka-cern-008.cern.ch dbnile-kafka-cern-009.cern.ch dbnile-kafka-cern-010.cern.ch
Kafka Topic throughput
Bytes In
1.3 MBps
1.0 MBps
750 kBps
500 kBps
250 kBps
0 Bps
11:10 11:20 11:30 11:40 11:50 12:00 12:10 12:20 12:30 12:40 12:50 13:00 13:10 13:20 13:30 13:40 13:50 14:00 14:10 14:20 14:30 14:40 14:50 15:00
topic:__consumer_offsets topic:async_dns_resolution topic:async_test topic:bro_conn topic:bro_conn_enr topic:bro_dns topic:bro_files topic:bro_files_enr topic:bro_ftp topic:bro_ftp_enr topic:bro_http
topic:bro_http_enr topic:bro_irc topic:bro_irc_enr topic:bro_notice topic:bro_smtp topic:bro_smtp_enr topic:bro_software topic:bro_software_enr topic:bro_ssh topic:bro_ssh_enr topic:bro_ssh_enr_test
topic:bro_ssl topic:bro_ssl_enr topic:bro_test topic:bro_test_enr topic:bro_weird topic:bro_weird_enr topic:bro_x509 topic:corr_lmal_hits topic:csl_exaclog topic:csl_login topic:csl_login_enr topic:csl_netlog
Bytes Out
4.0 MBps
3.0 MBps
2.0 MBps
1.0 MBps
0 Bps
11:10 11:20 11:30 11:40 11:50 12:00 12:10 12:20 12:30 12:40 12:50 13:00 13:10 13:20 13:30 13:40 13:50 14:00 14:10 14:20 14:30 14:40 14:50 15:00
topic:__consumer_offsets topic:async_dns_resolution topic:async_test topic:bro_conn topic:bro_conn_enr topic:bro_dns topic:bro_files topic:bro_files_enr topic:bro_ftp topic:bro_ftp_enr topic:bro_http
topic:bro_http_enr topic:bro_irc topic:bro_irc_enr topic:bro_notice topic:bro_smtp topic:bro_smtp_enr topic:bro_software topic:bro_software_enr topic:bro_ssh topic:bro_ssh_enr topic:bro_ssh_enr_test
topic:bro_ssl topic:bro_ssl_enr topic:bro_test topic:bro_test_enr topic:bro_weird topic:bro_weird_enr topic:bro_x509 topic:corr_lmal_hits topic:csl_exaclog topic:csl_login topic:csl_login_enr topic:csl_netlog
Kafka broker throughput (2 hidden panels)
Broker bandwith (WIP) (1 hidden panels)
Balancing (2 hidden panels)
Extra (4 hidden panels)
Zookeeper (2 hidden panels)
NFS Volumes (7 hidden panels)
Dashboard Row (1 hidden panels)

Evolution Plans

Shared Kafka Clusters

Substitute admin access through web/api

Small sized customers

Popularize streaming

Build solutions on top. Eg: IoT

IoT

- LoRa -> MQTT (internal) -> Shared Kafka
  - Offer also integration with influx and then grafana

Other

Integrations (kafka connect)