TORNADO: A NEW COMPLEX EVENT PROCESSING ENGINE DEVELOPED IN RUST TO INNOVATE NETEYE

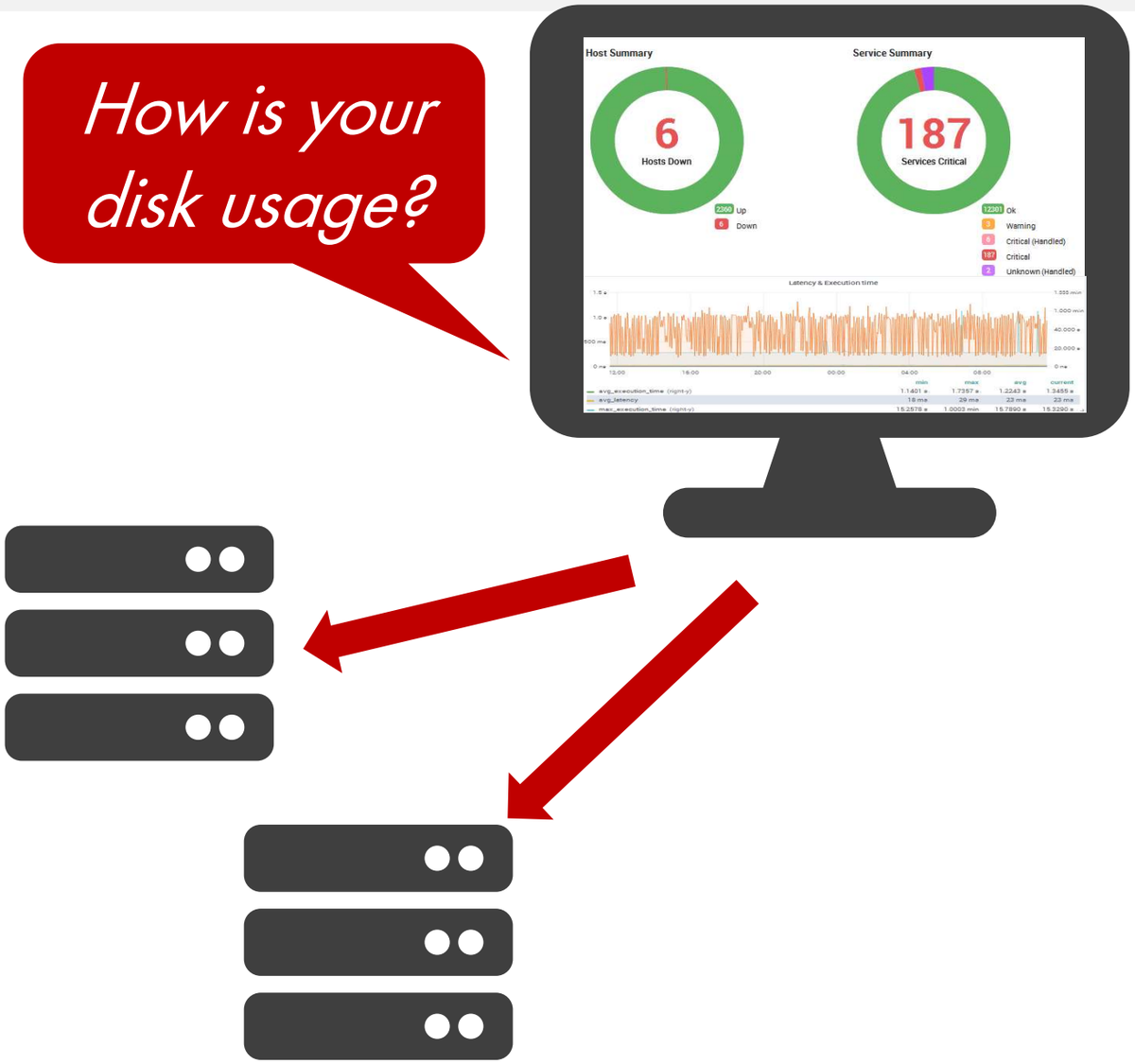
Open Source Innovation as integral part of NetEye 4

Michele Santuari

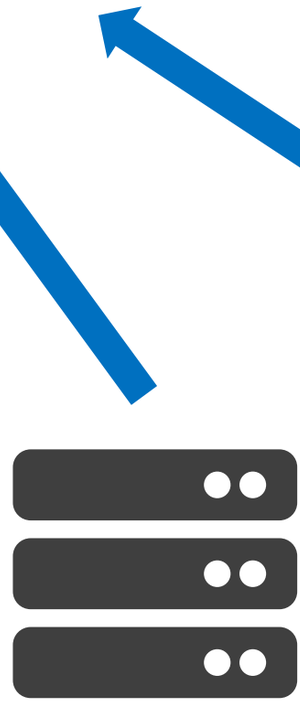
"If you cannot measure it,
you cannot improve it"

William Thomson, Lord Kelvin, 1824-1907

MEASURE THE INFRASTRUCTURE: POLLING



MEASURE THE INFRASTRUCTURE: EVENT-BASED



POLL VS EVENT DRIVEN MONITORING

More control on the infrastructure

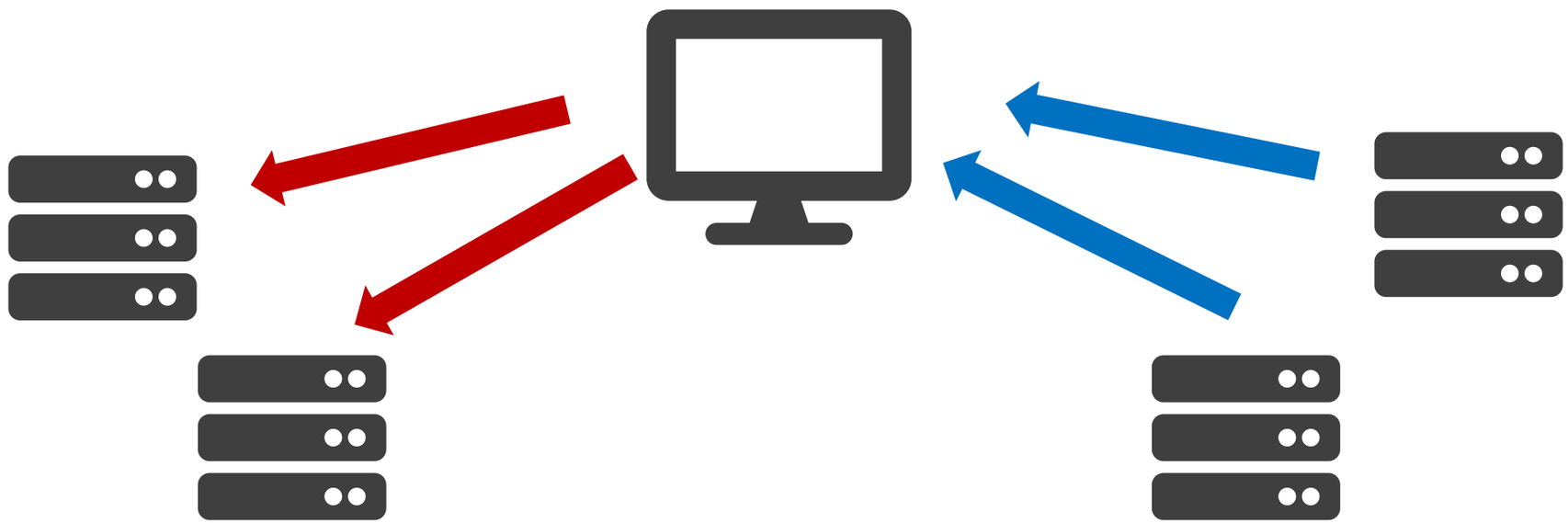
Static configurations

Continuous resources usage

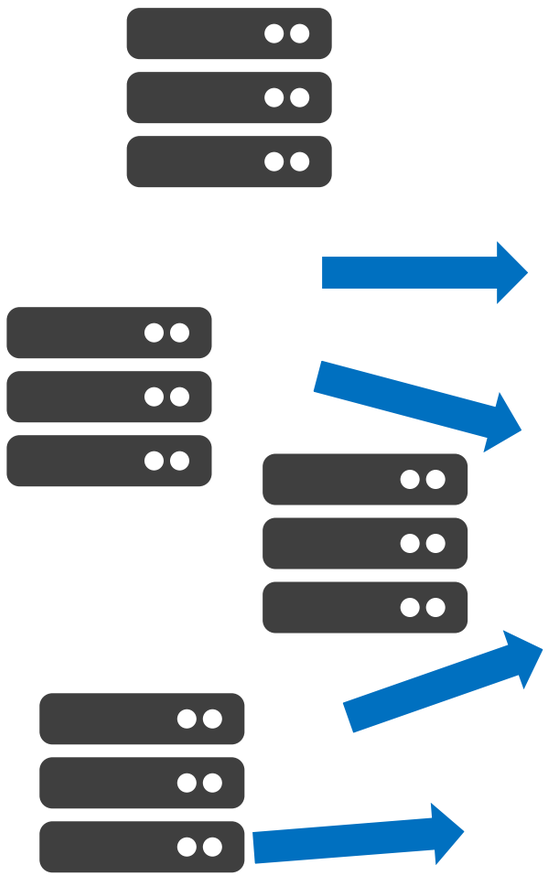
Real-time monitoring

Adapt automatic to the infrastructure

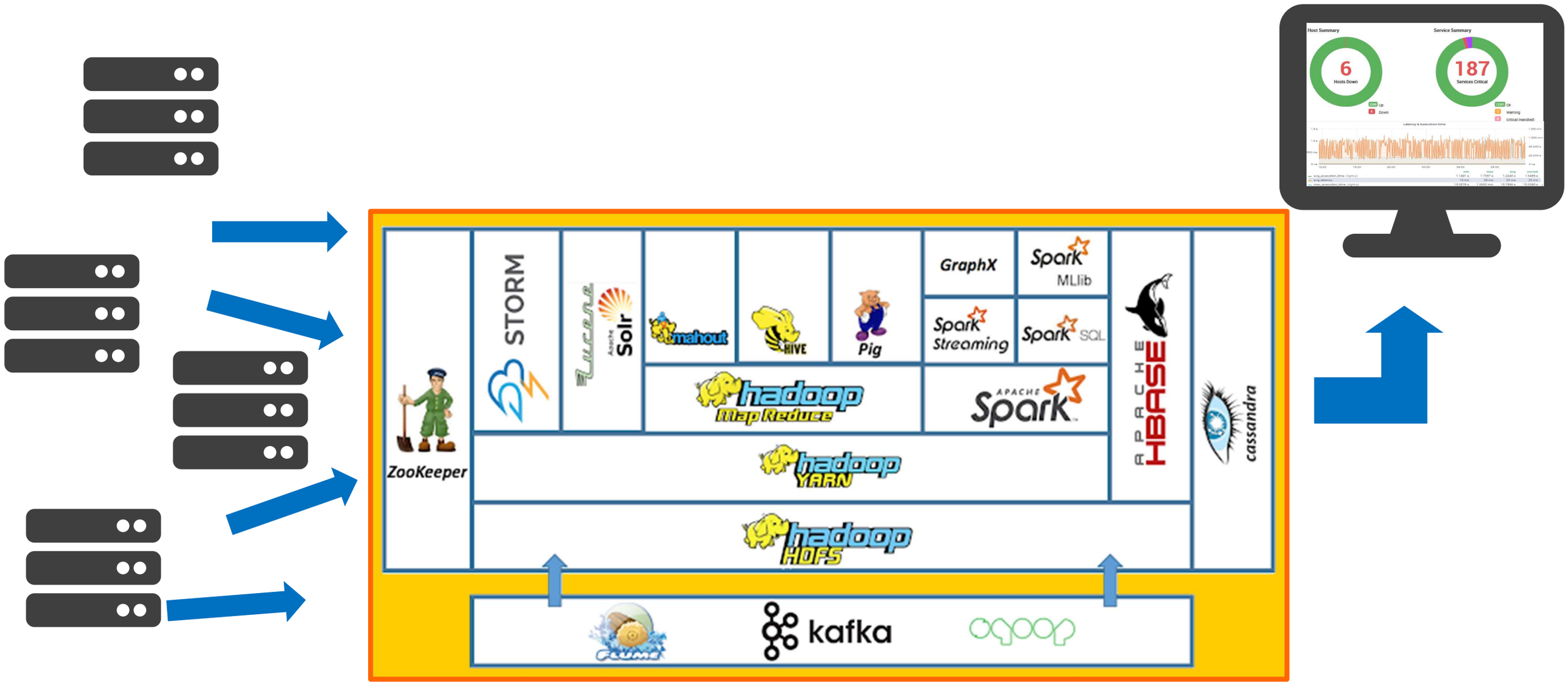
Peaks of data



LOAD INCREASES



HANDLING THE INCREASED LOAD



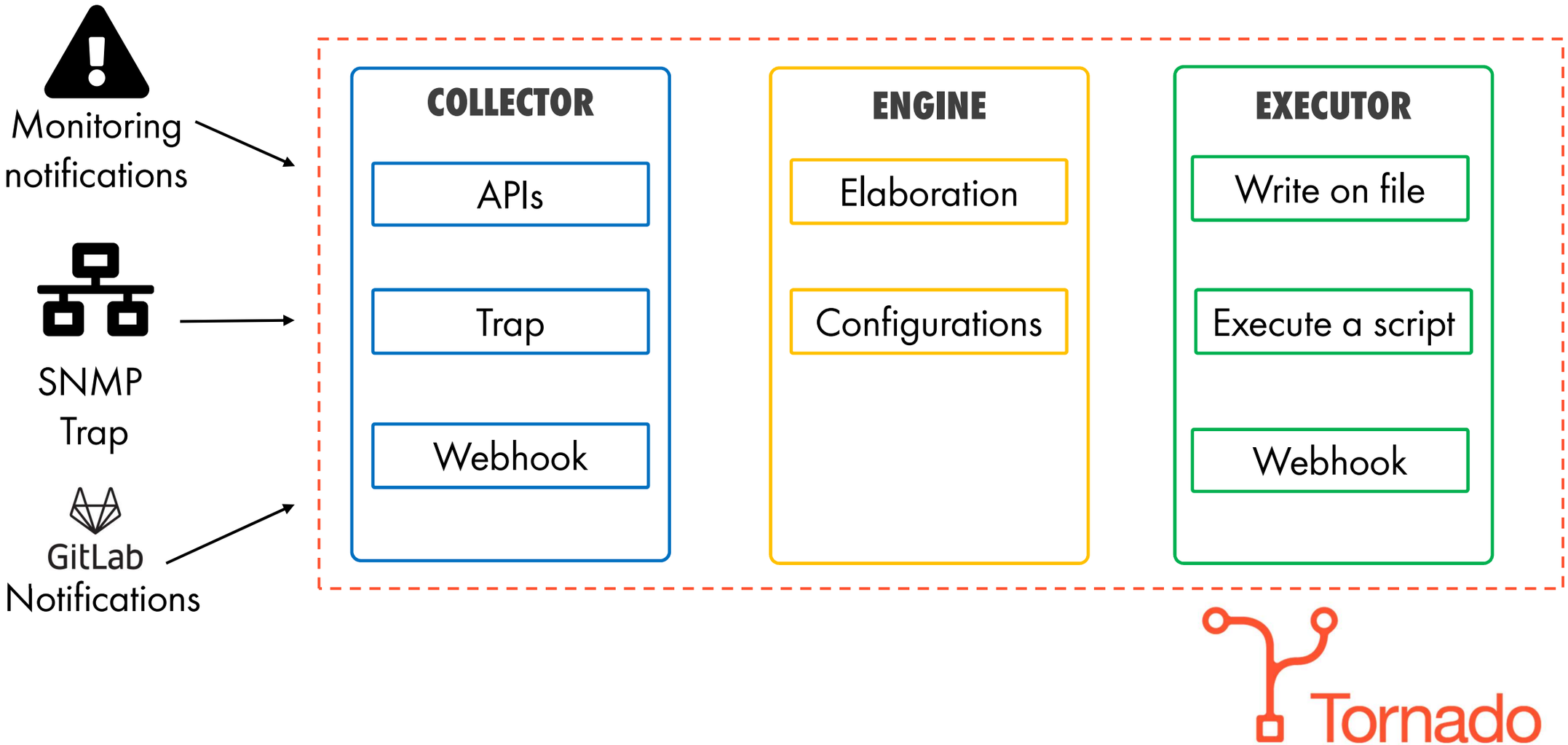
SIMPLICITY

"Lots of people struggle with the complexities of getting big data systems up and running, when they possibly shouldn't be using the systems in the first place"

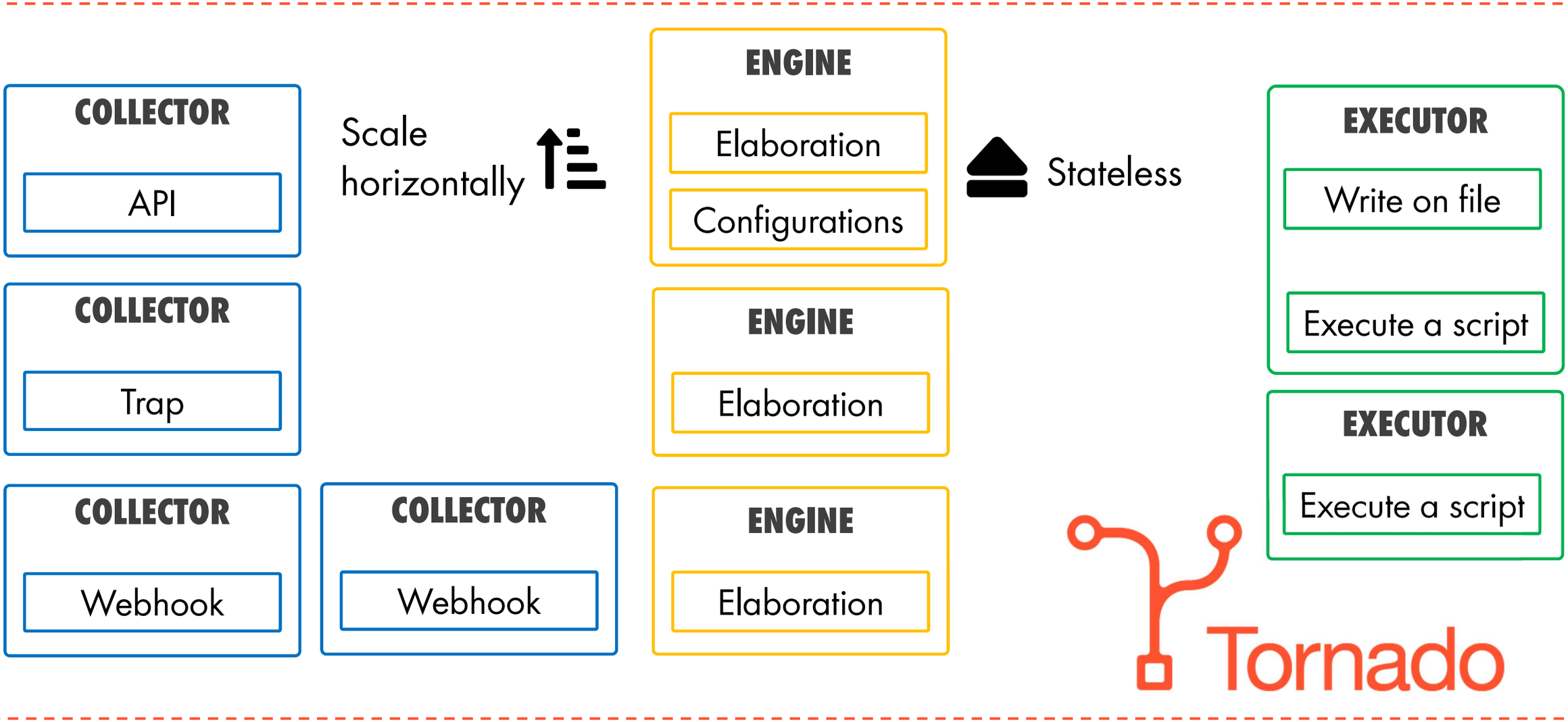
http://www.frankmcsherry.org/graph/scalability/cost/2015/01/15/COST.html

... Something simple, lightweight and cheap

TORNADO


Monitoring notifications
SNMP Trap
GitLab Notifications
COLLECTOR
APIs
Trap
Webhook
ENGINE
Elaboration
Configurations
EXECUTOR
Write on file
Execute a script
Webhook
Tornado

TORNADO


COLLECTOR
API
COLLECTOR
Trap
COLLECTOR
Webhook
COLLECTOR
Webhook
Scale horizontally
ENGINE
Elaboration
Configurations
ENGINE
Elaboration
ENGINE
Elaboration
Stateless
EXECUTOR
Write on file
Execute a script
EXECUTOR
Execute a script
Tornado

RUST

- Safe

java.lang.NullPointerException

Go: panic: runtime error: invalid memory address or nil pointer dereference

RUST

- Safe
- Concurrent

```
error[E0502]: cannot borrow `v` as mutable because it is also borrowed as immutable
 --> src/main.rs:4:5
  |
3 |     let first = &v[0];
  |                  - immutable borrow occurs here
4 |     v.push(8);
  |     ^^^^^^^^^ mutable borrow occurs here
5 |     println!("{:?}", first);
  |                      ----- immutable borrow later used here

error: aborting due to previous error

For more information about this error, try `rustc --explain E0502`.
error: Could not compile `variables`.
```

RUST

- Safe
- Concurrent
- Fast

No garbage collector

Non-blocking IO

RUST

- Safe
- Concurrent
- Fast
- Learning curve

TECHNOLOGICAL FOCUS

All code written with “safe” paradigm: no F@*#$#@! memory errors at run-time

Millions of events per second per CPU: no laggy moments

Minimal resource consumption: I can even scale on my Raspberry

JOIN US

WÜRTHPHOENIX

Tornado

The SIMPLE Complex Event Processing Engine

https://github.com/WuerthPhoenix/tornado