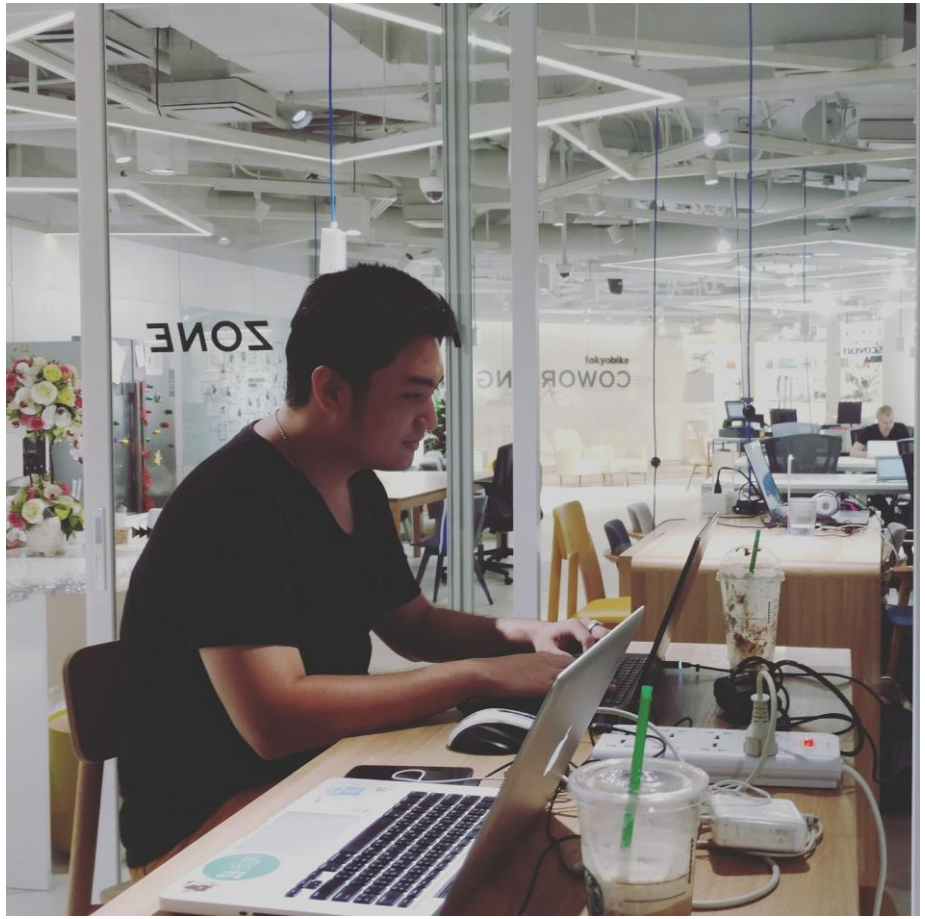
Basic Monitoring System in practical

About Speaker



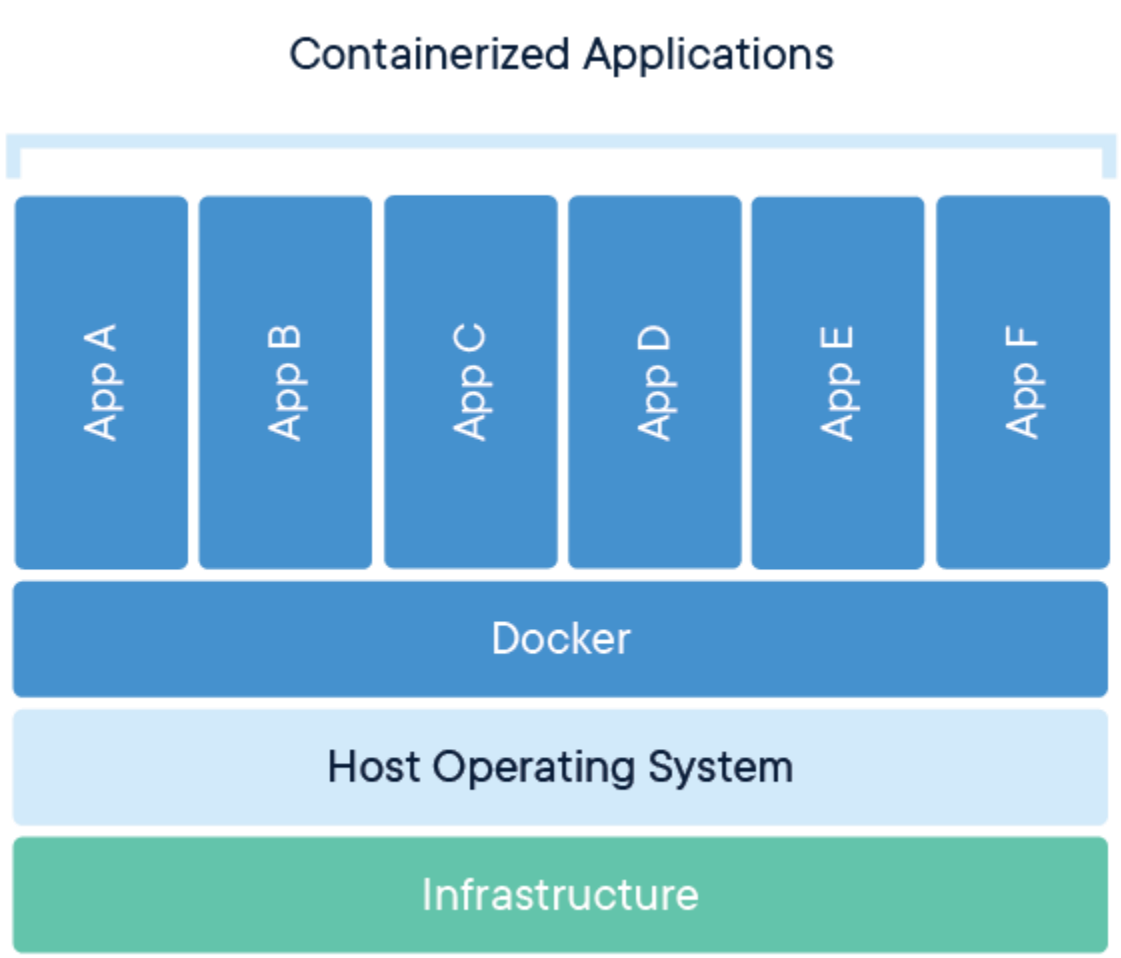
Mr. Kant Suwannasit
DevOps Engineer

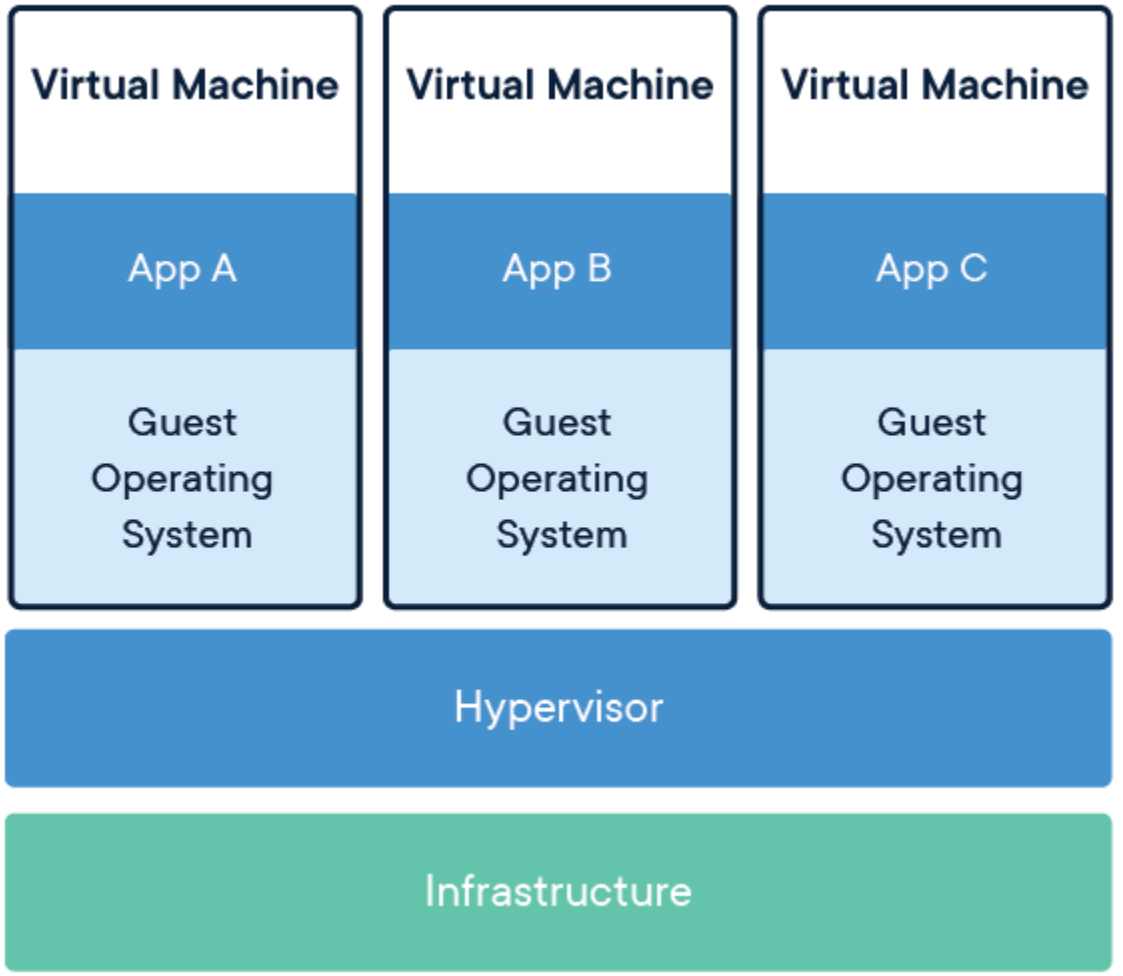
- 5 Years of experience in “Monitoring System”
- 3 Years in DevOps Engineer
- 2 Years in DBA-Ops Engineer
- 1 Year in Incident Management

Workshop Prerequisite : Docker

https://www.docker.com/get-started

ใครไม่มี Docker อาจไม่ได้ทำบาง workshop

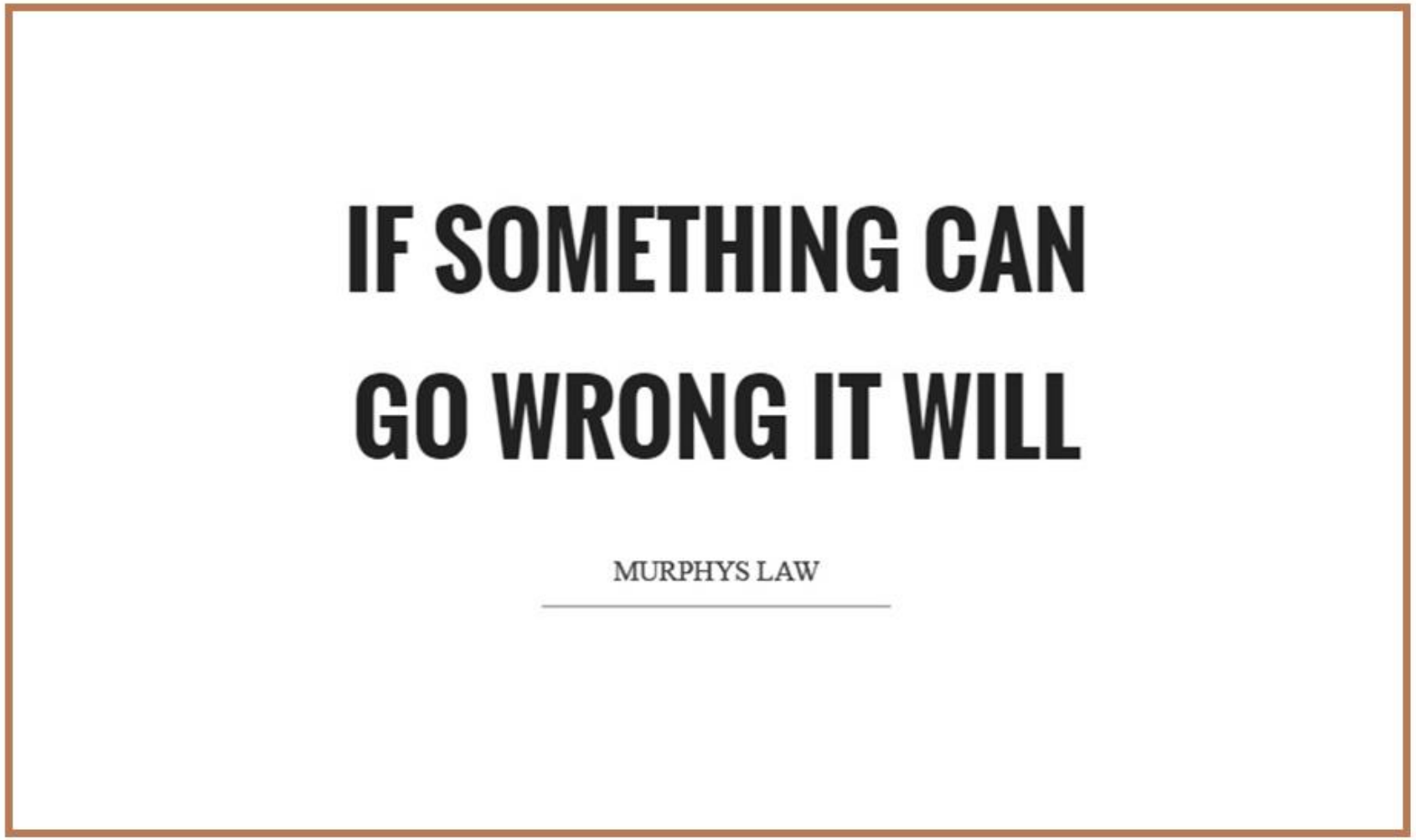




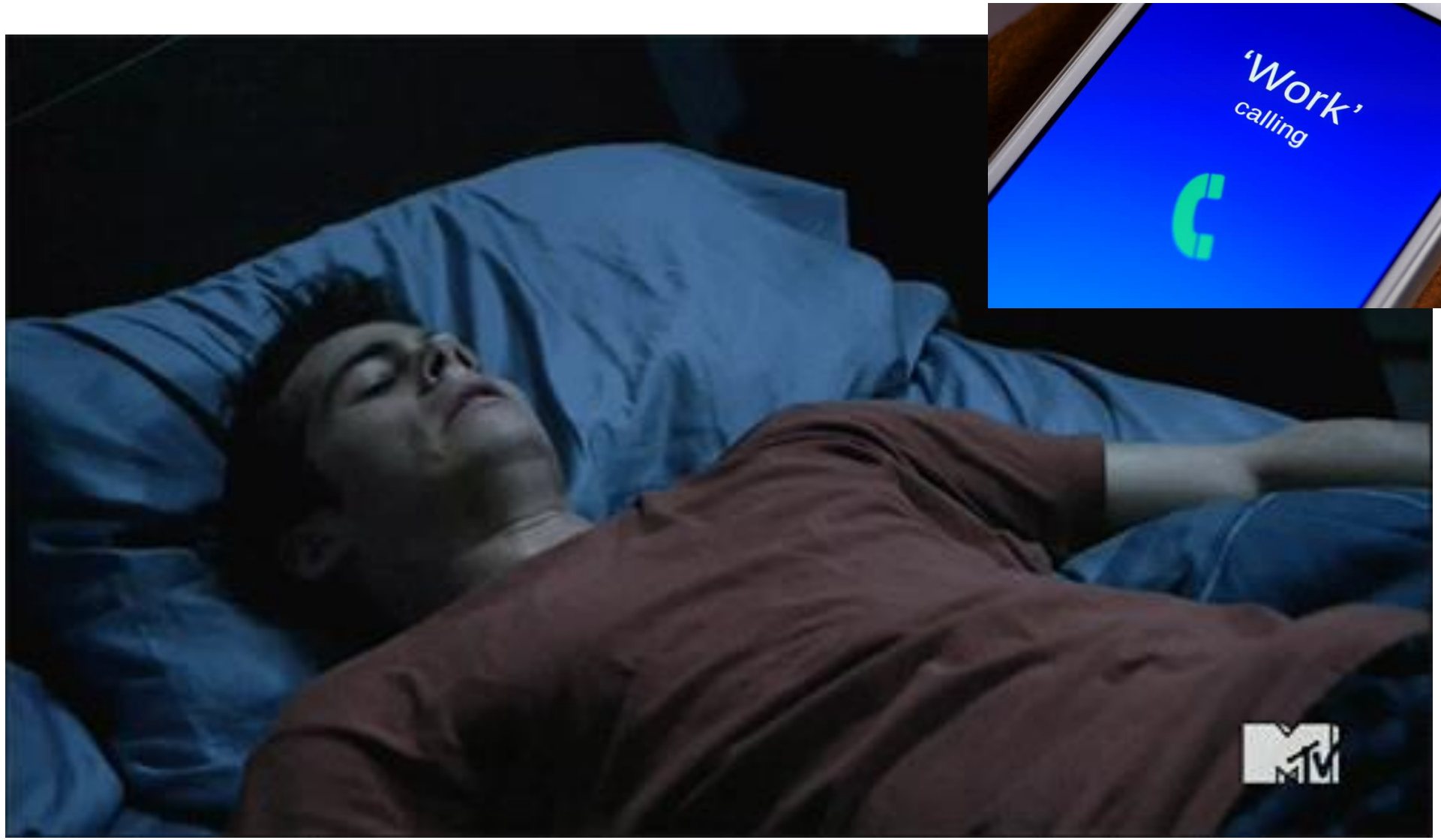
Download Slide

https://github.com/kantsuw/codemania1001

Murphy’s Law



Developer Nightmare



The worst nightmare

Try to restart service, but problem still there

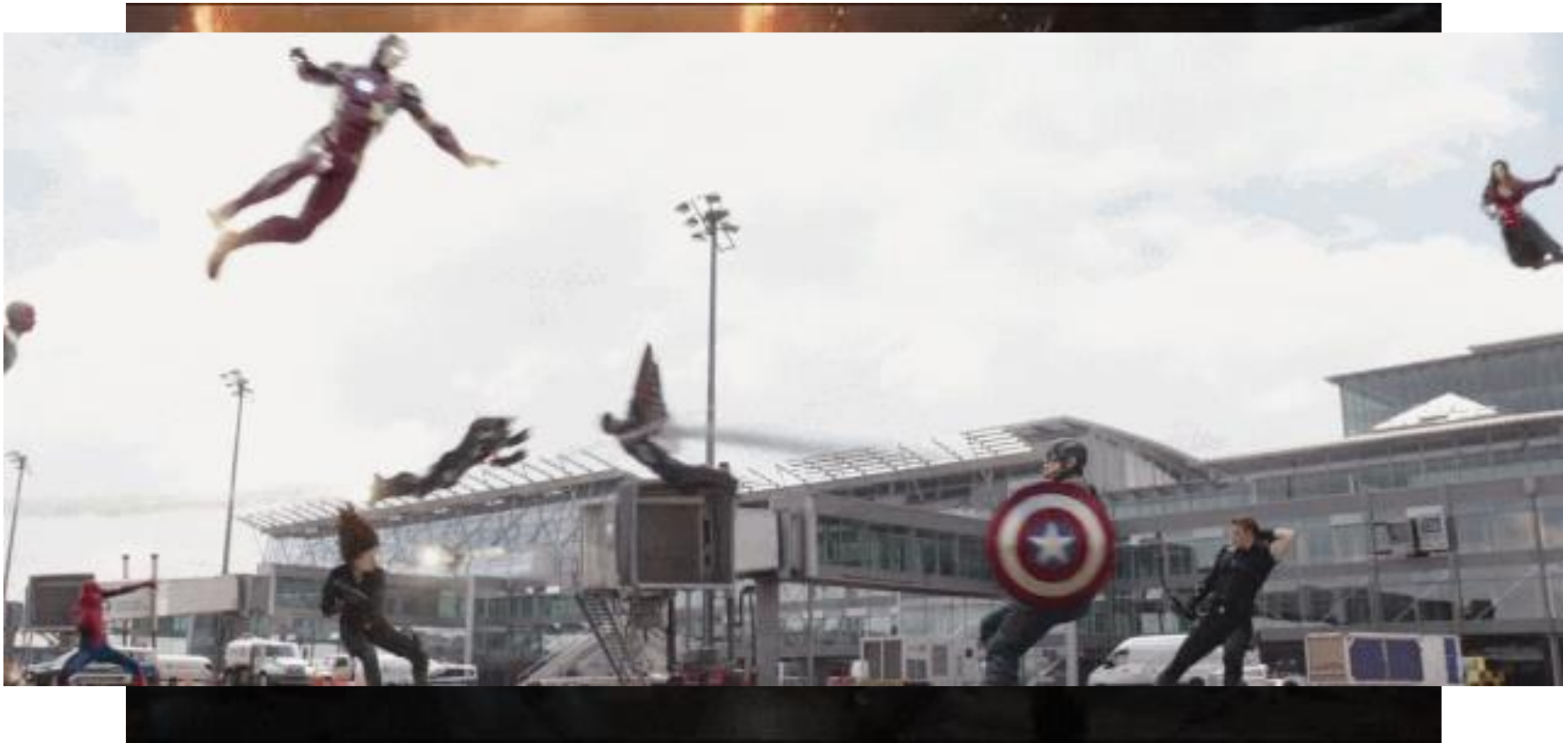
……..

6 Hours passed, incident not resolved

……..

War room !!!

War room !!!



Lesson from the nightmare

How to know when something went wrong ?

……..

Without data, you’re blind

……..

Who have data will win the war !!

and also sleep well….

Agenda

Introduction to DevOps

Introduction to Monitoring System

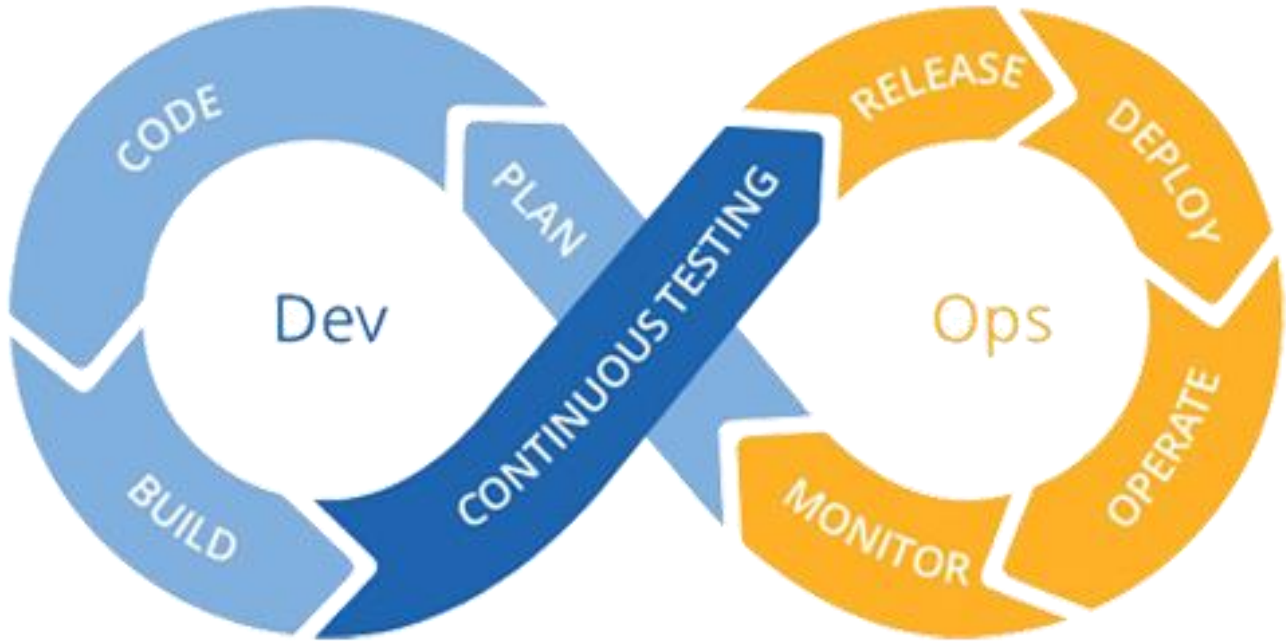
- What is Monitoring System ?
- Core Concept
- Monitoring Components
  - Workshop 1 - 7

Automate Problem Detection

- Prerequisite & Baseline
- Alerting & Processing
  - Workshop 8

DevOps

DevOps LifeCycle and Features



Maintainability
Resilience
Disaster Recovery
Scalability
OPERABILITY
Supportability
Deployability
Monitoring
Alerting

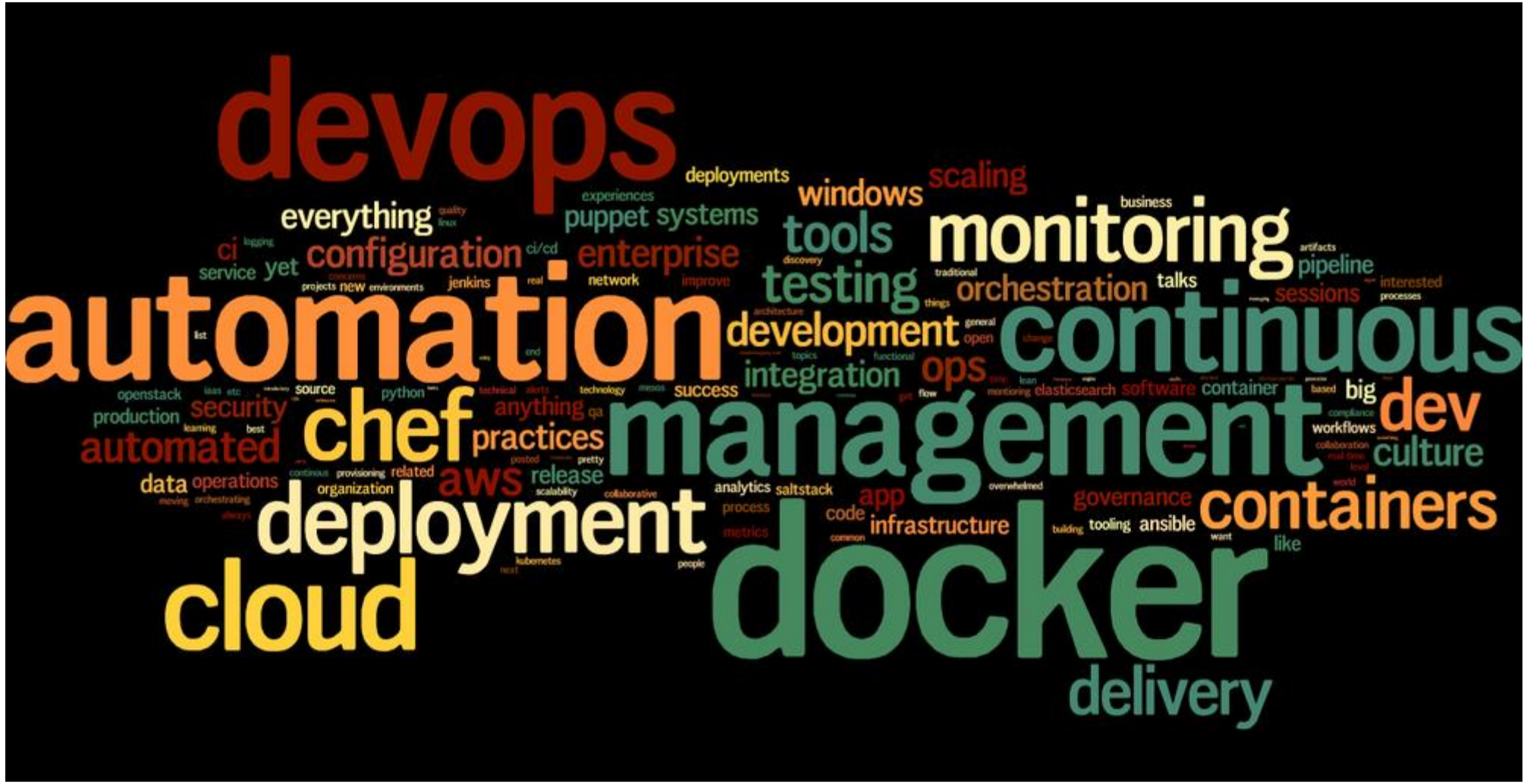
Why DevOps

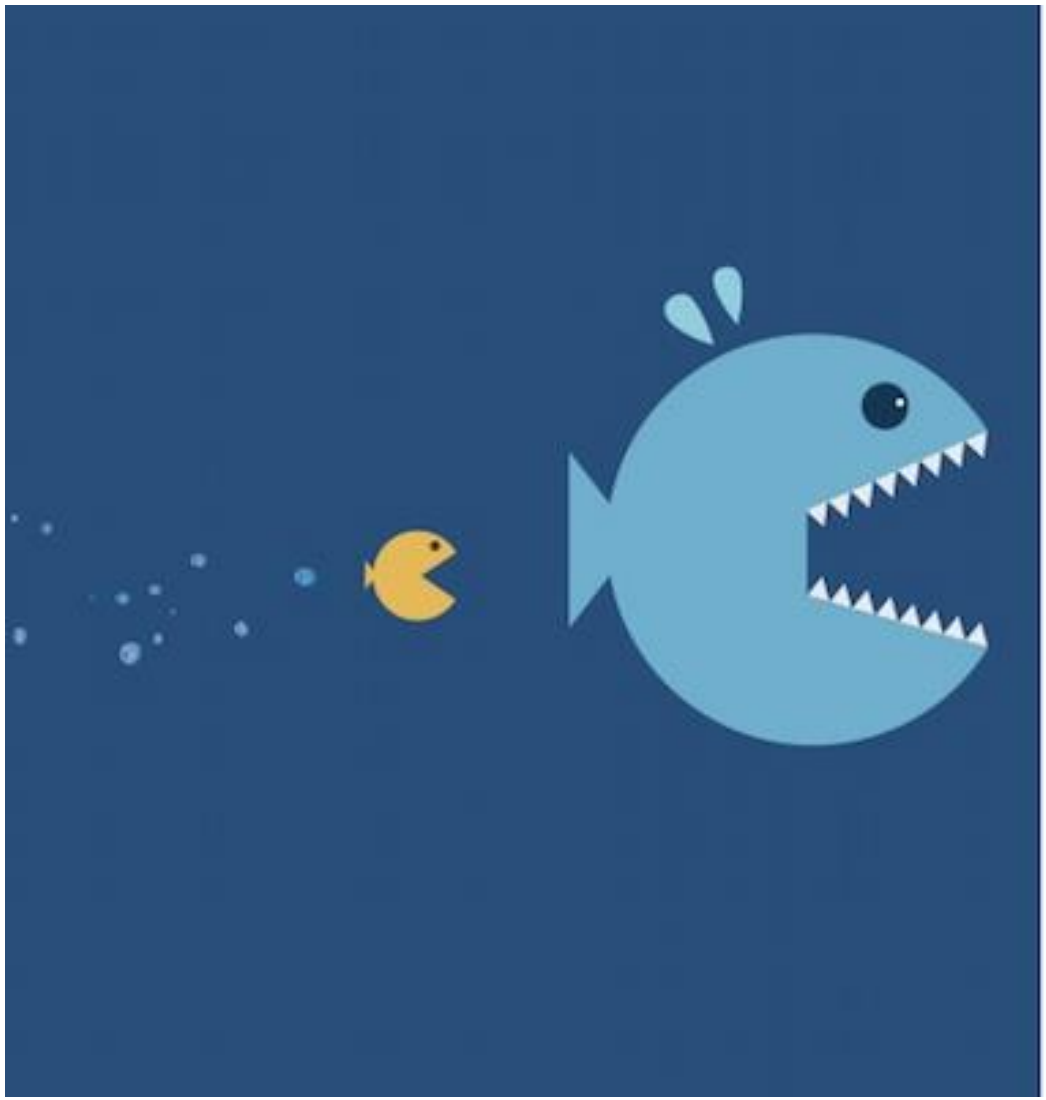
Scalability

Flexibility

Automation

Reliability

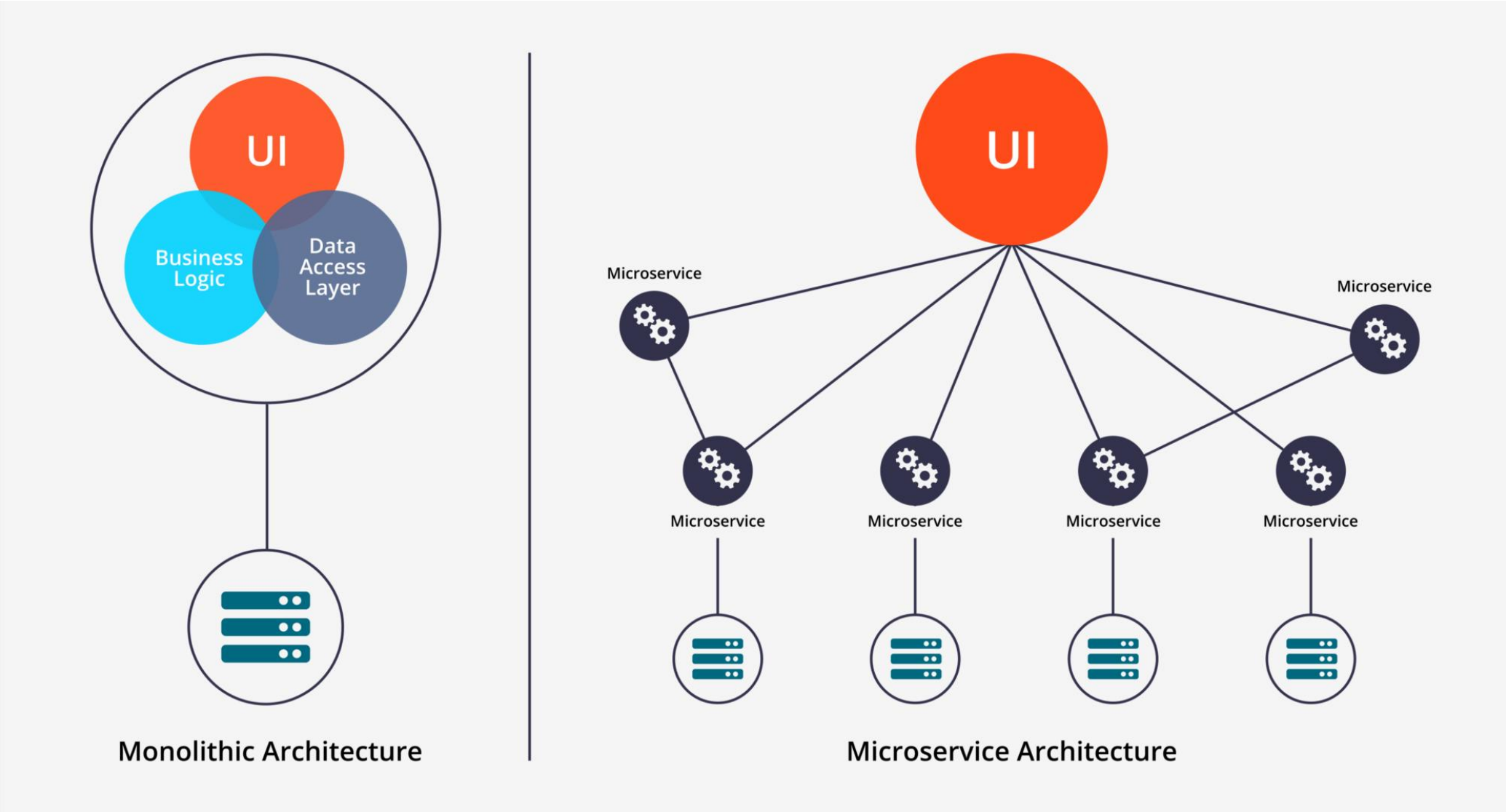

devops
automation
management
continuous
docker
deployment
cloud
containers
monitoring
tools
testing
development
chef
dev
delivery
configuration
enterprise
orchestration
integration
ops
aws
practices
security
automated
culture
infrastructure
governance
app
release
data
operations
production
everything
puppet
systems
windows
scaling
deployments
pipeline
sessions
talks
software
container
elasticsearch
big
workflows
tooling
ansible
like
analytics
saltstack
code
process
metrics
success
anything
python
source
jenkins
network
service
yet
ci
openstack
organization
related
provisioning
overwhelmed
building
want
people
kubernetes
architecture
open
general
topics
functional
flow
monitoring
based
compliance
collaboration
real-time
level
world
collaborative
scalability
posted
pretty
technology
mesos
technical
alerts
qa
learning
best
continous
moving
orchestrating
always
list
end
projects
new
environments
concerns
ci/cd
real
improve
discovery
traditional
things
artifacts
interested
processes
business
experiences
quality
linux
logging
lean
rights
talks
sessions



"In the new world, it is not the big fish which eats the small fish, it's the **fast fish** which eats the **slow fish**"

Klaus Schwab
Founder and Executive Chairman
World Economic Forum

Monolith VS Microservice



Introduction to Monitoring System

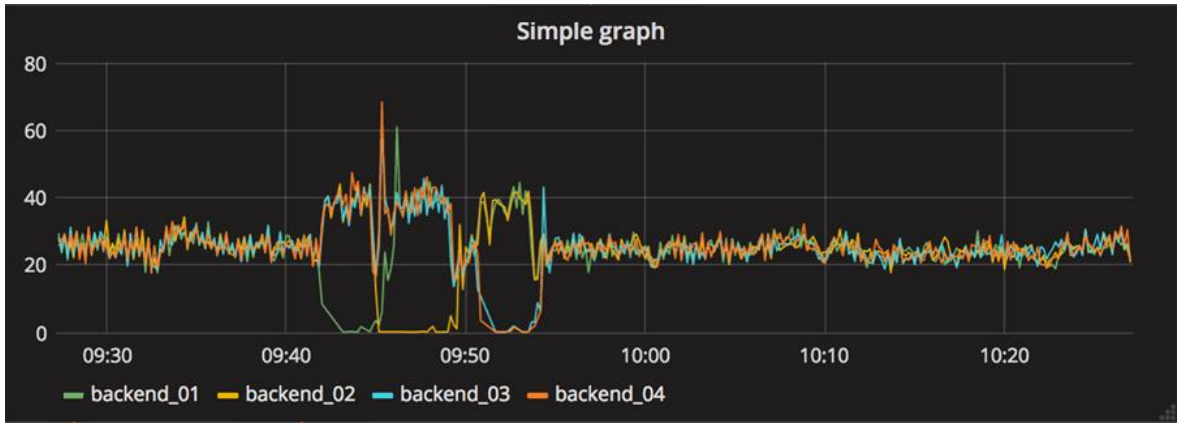
What is Monitoring System

Monitoring is the tools and processes which you can measure and manage your systems

- Business value
- Information Technology
- Processes
- Everything

Why do we need Monitoring

1. Analysis in real time



2. Problem Detection

3. Incident Management

4. Feedback , Planning

7

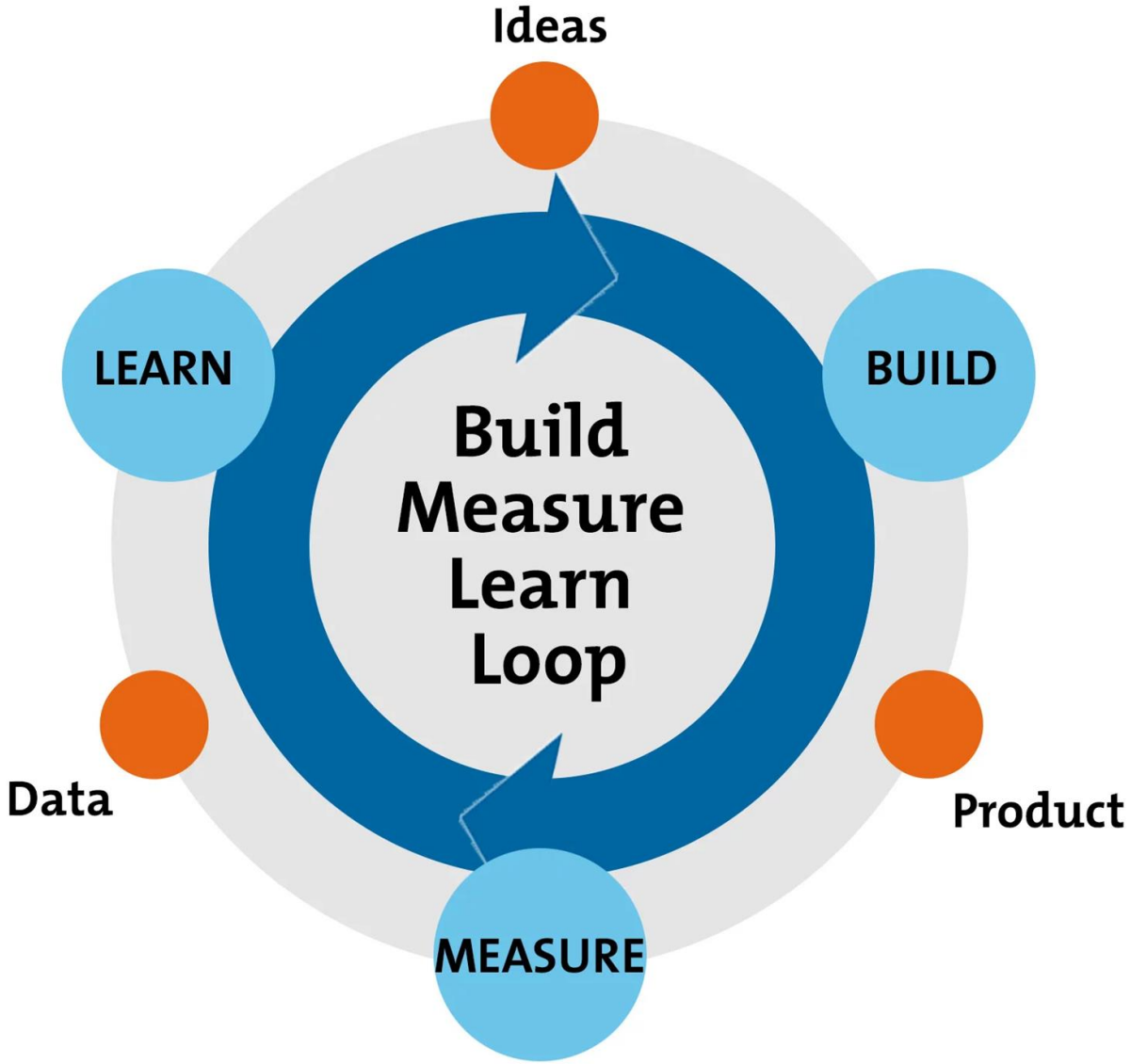
"Data can tell you what opinions to hear; and conversely, opinions can tell you what data to read."

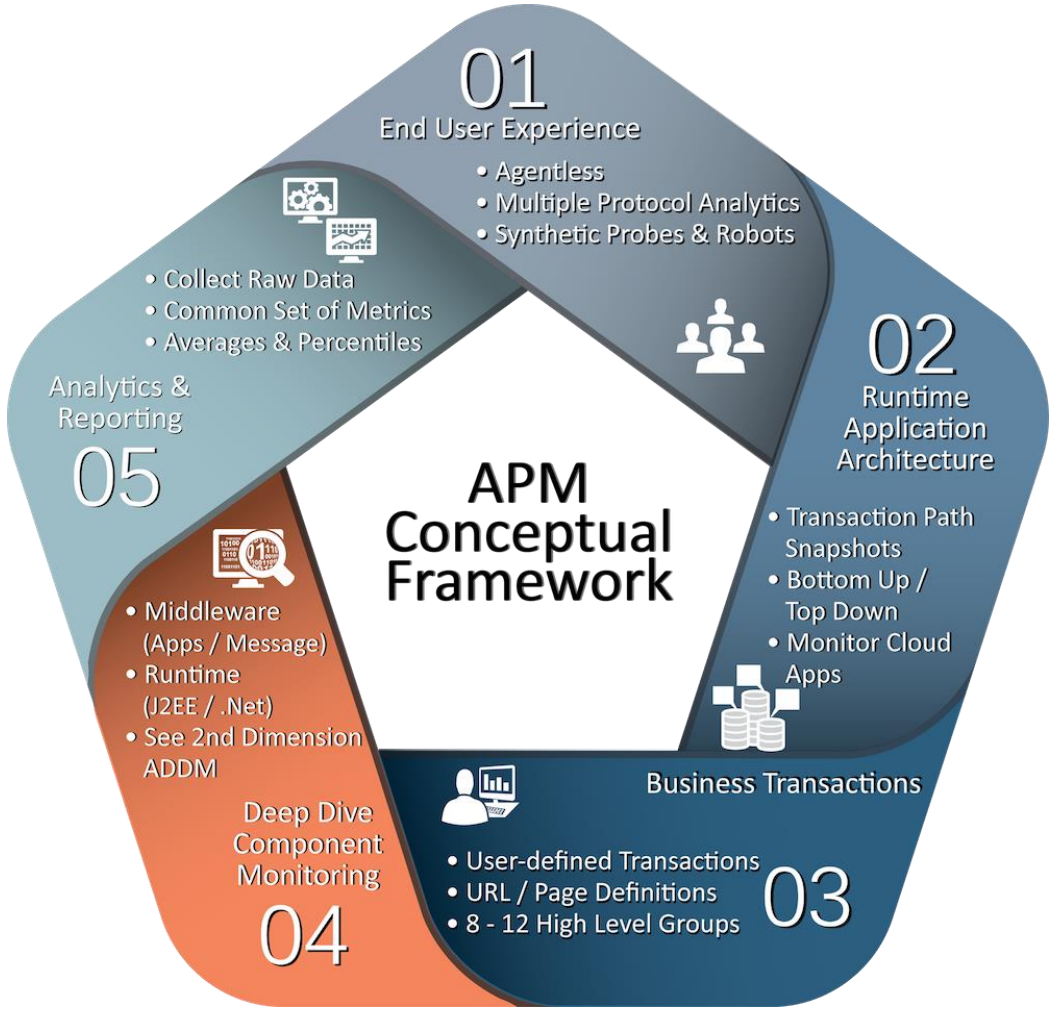
J.T. Trollman, @jtroll at @Facebook

In God we trust, all others bring data.

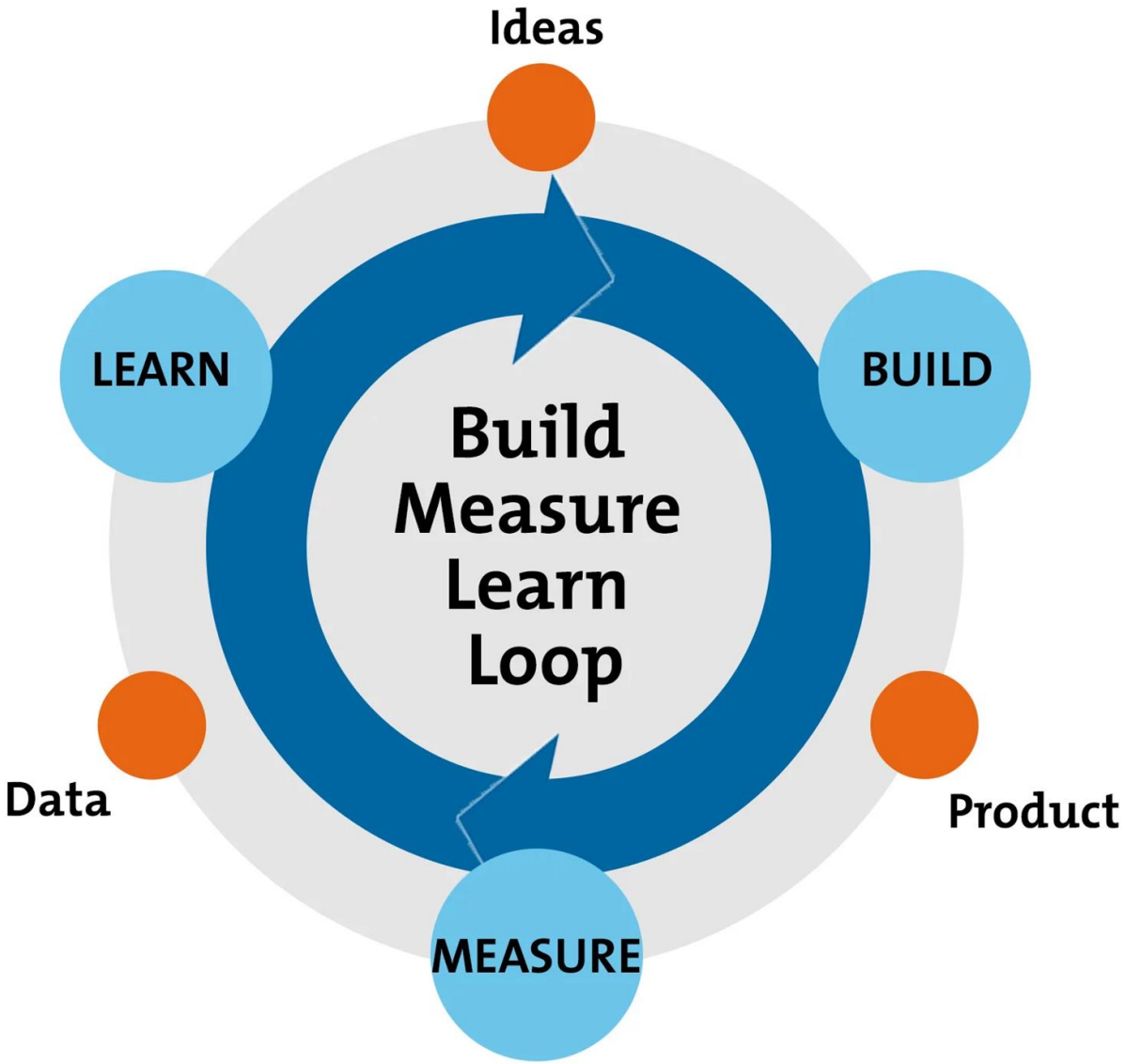
–William E. Deming

Core Concepts

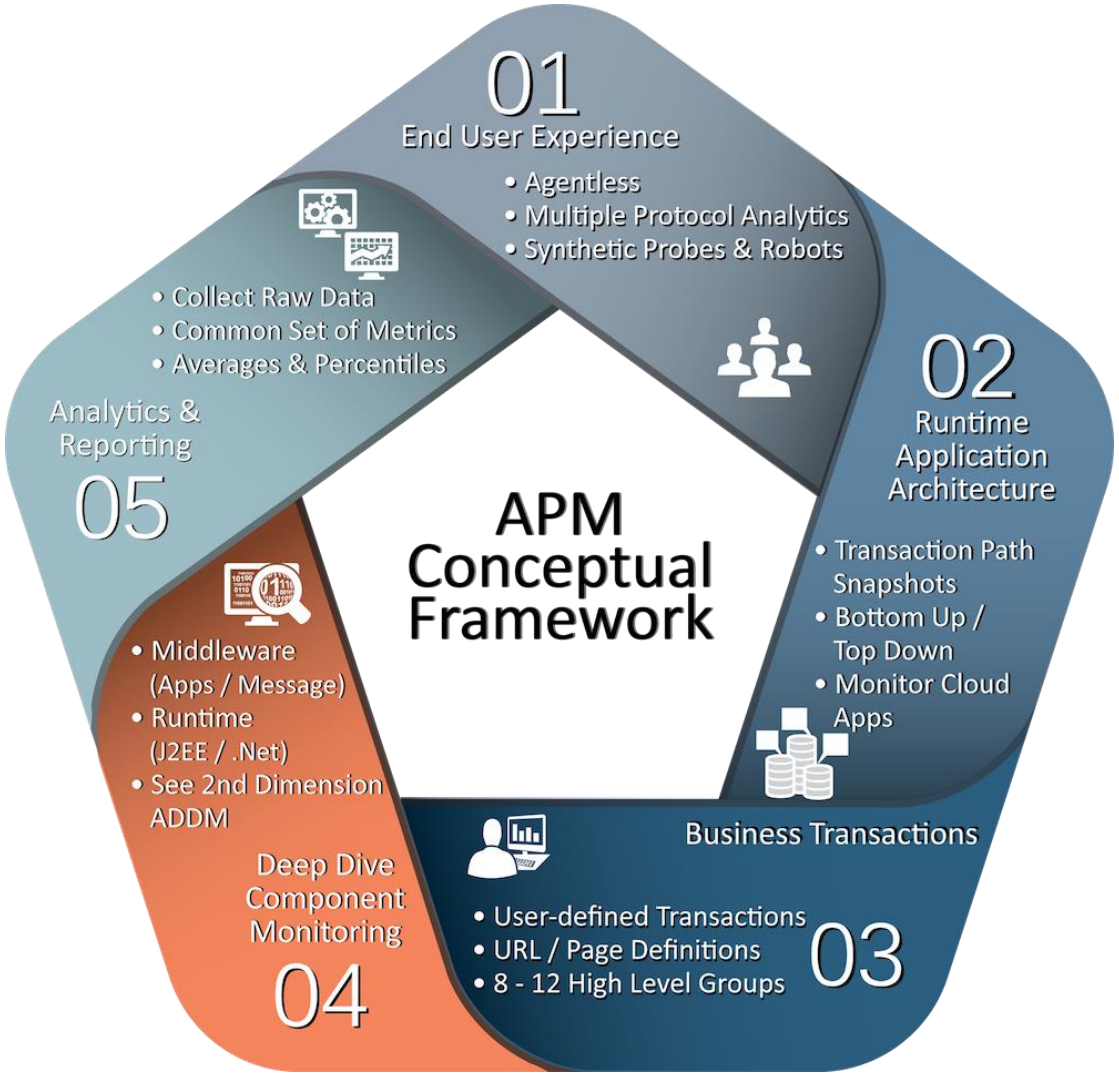




Measurement Driven Development (MDD)

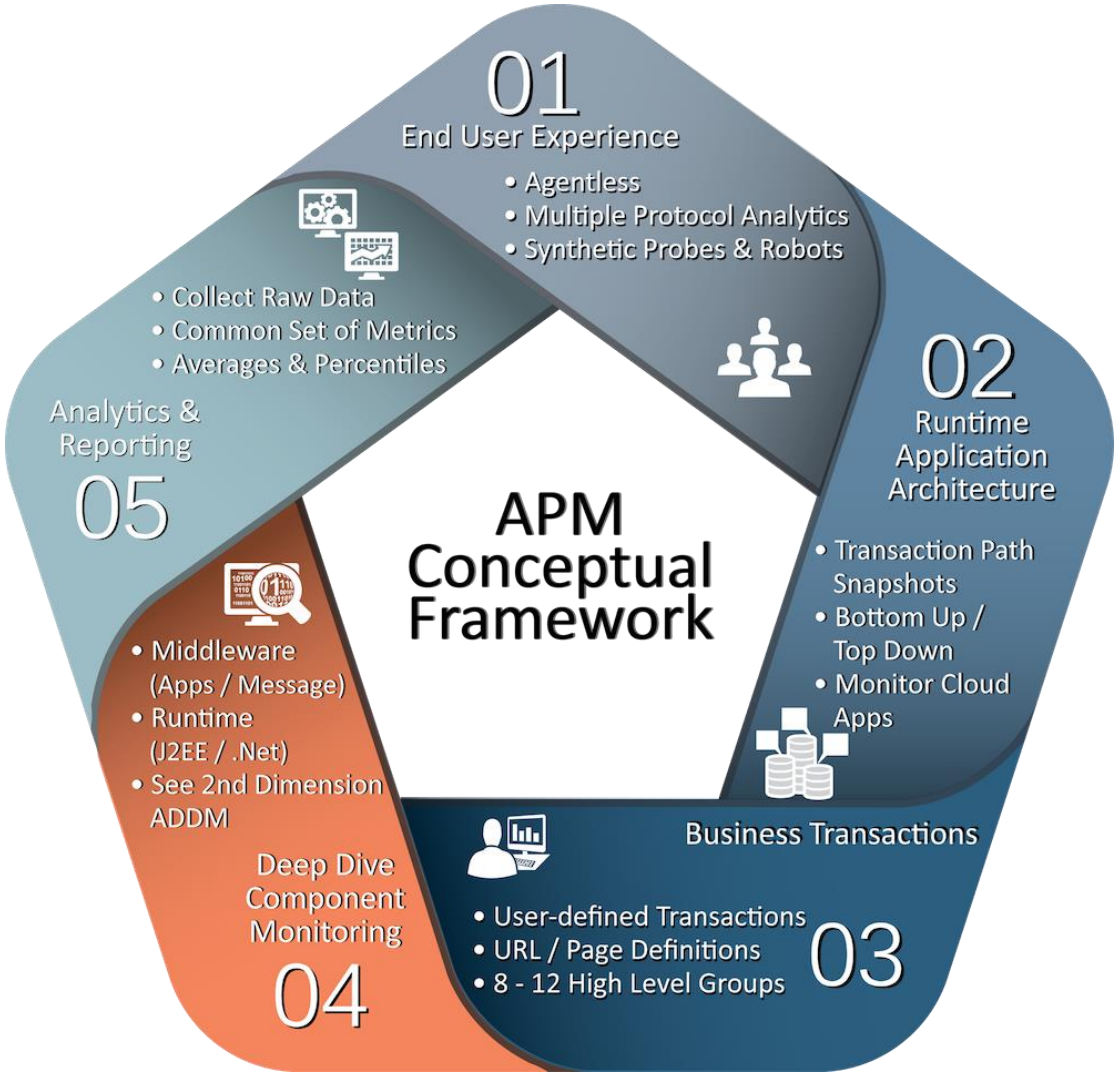


Application Performance Monitoring (1)



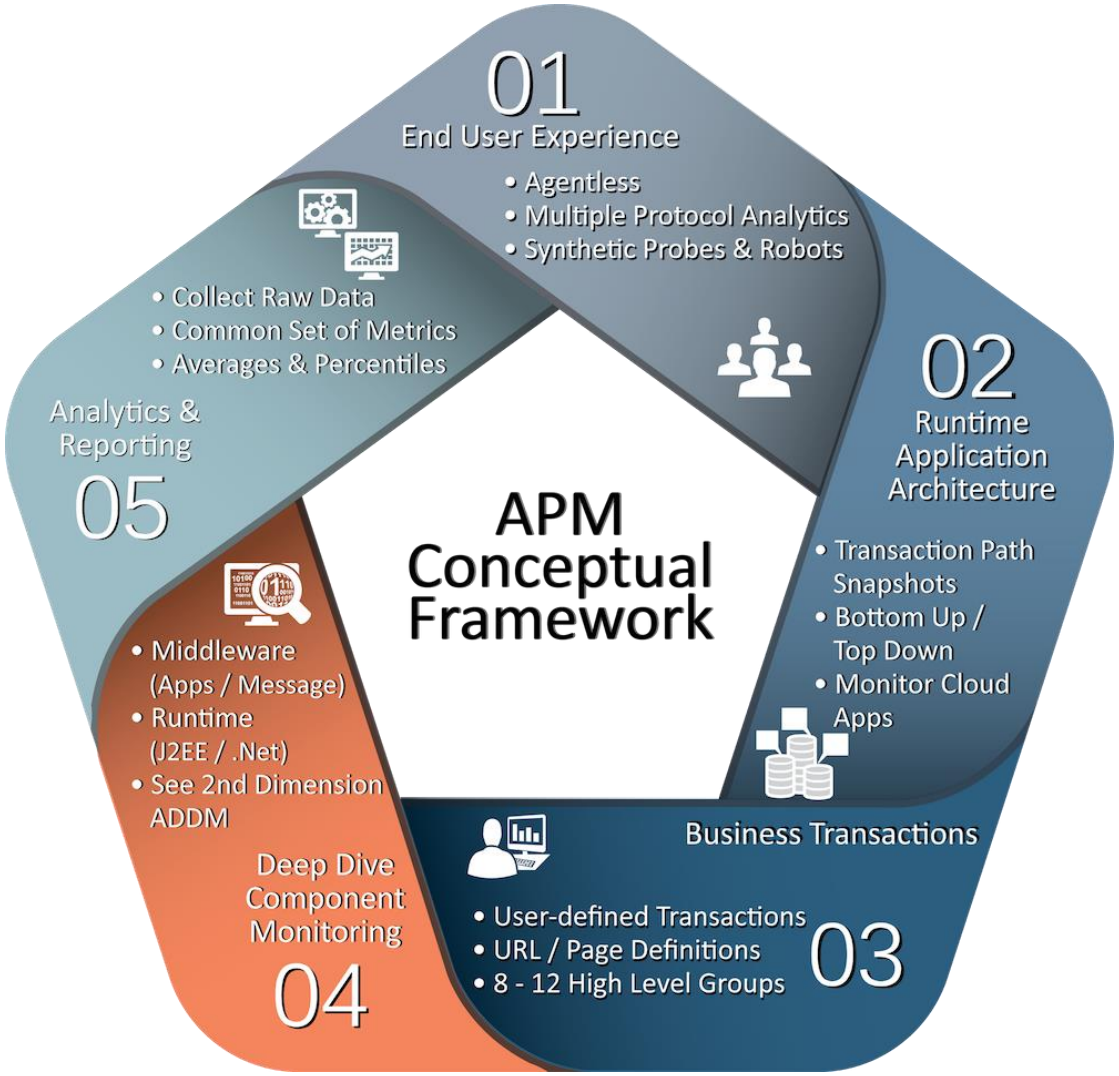
- End User Experience
  - Page load time
  - Runtime Error
  - Clicks & Conversion
  - etc.

Application Performance Monitoring (2)



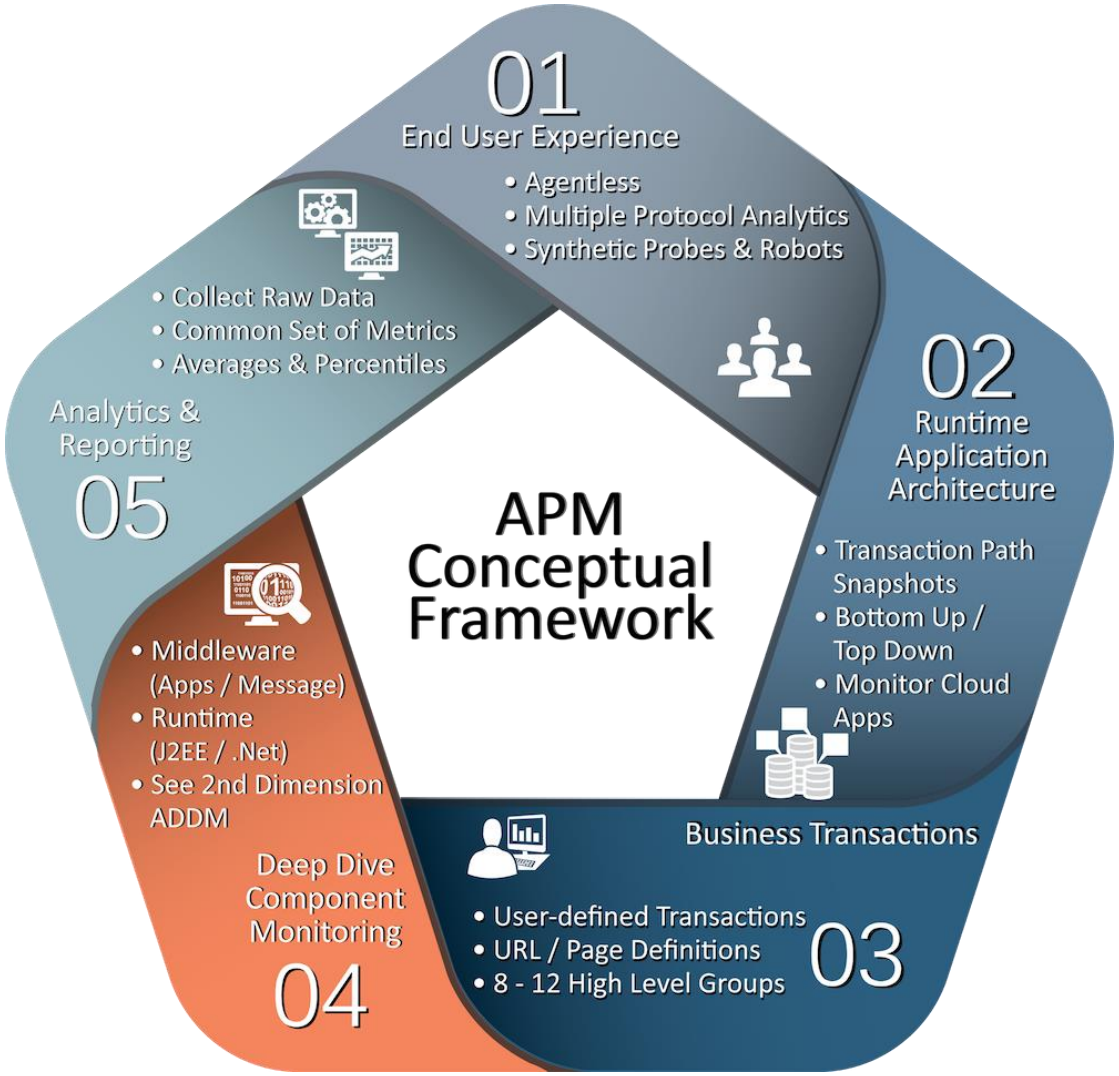
- Runtime Application Architecture
  - Application Server(s)
  - APIs
  - Database
  - Networks
  - Caching

Application Performance Monitoring (3)



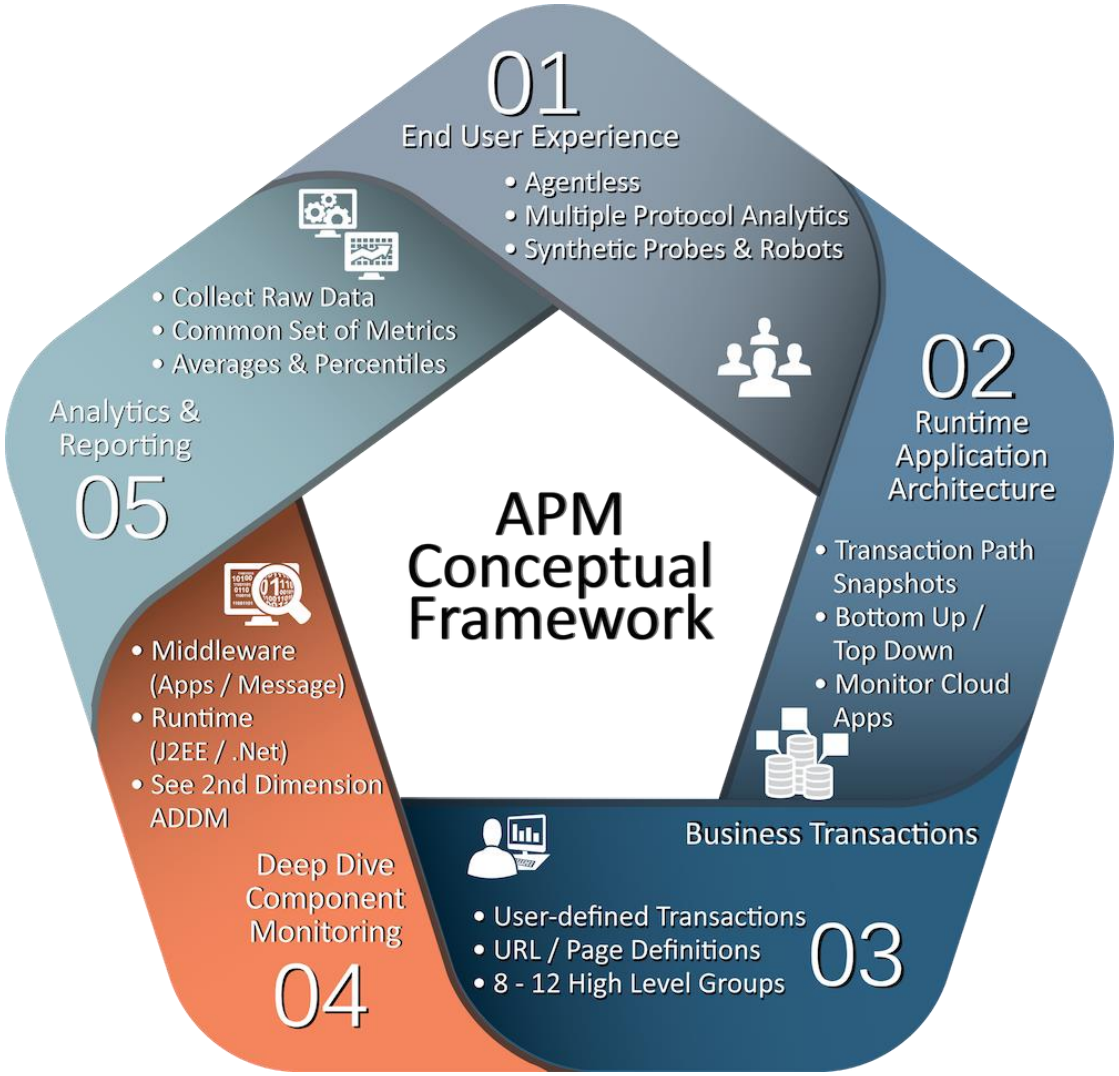
- Business Transaction
  - Buy/Sell
  - Cancel
  - Claim
  - Rewards Programs

Application Performance Monitoring (4)



- Deep Drive Component Monitoring
  - Middleware
  - Dependencies service
  - Third party

Application Performance Monitoring (5)



- Analytics & Report
  - Main funnels
  - Conversion rates
  - SLAs

Monitoring Components

1. Data (Measurement)

2. Collector

3. Storage

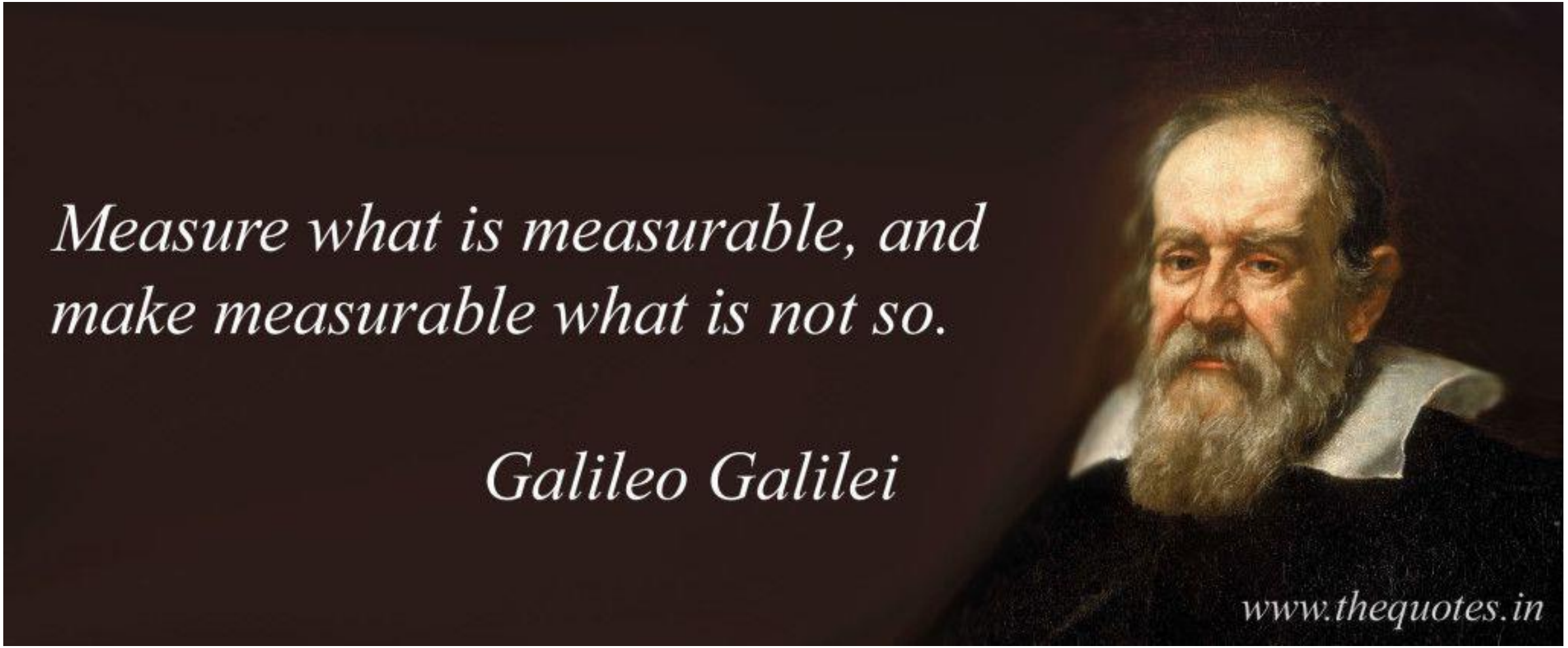
4. Visualization tools

Data

WWW
iDeA 45% is SALE!
25% time
TEAM
internet
MARKETING
SUCCESS
CLOUD
ANALYSIS

DATA
IS THE MOST ABUNDANT
ELEMENT IN THE
NONPROFIT SECTOR

Data


Measure what is measurable, and
make measurable what is not so.
Galileo Galilei
www.thequotes.in

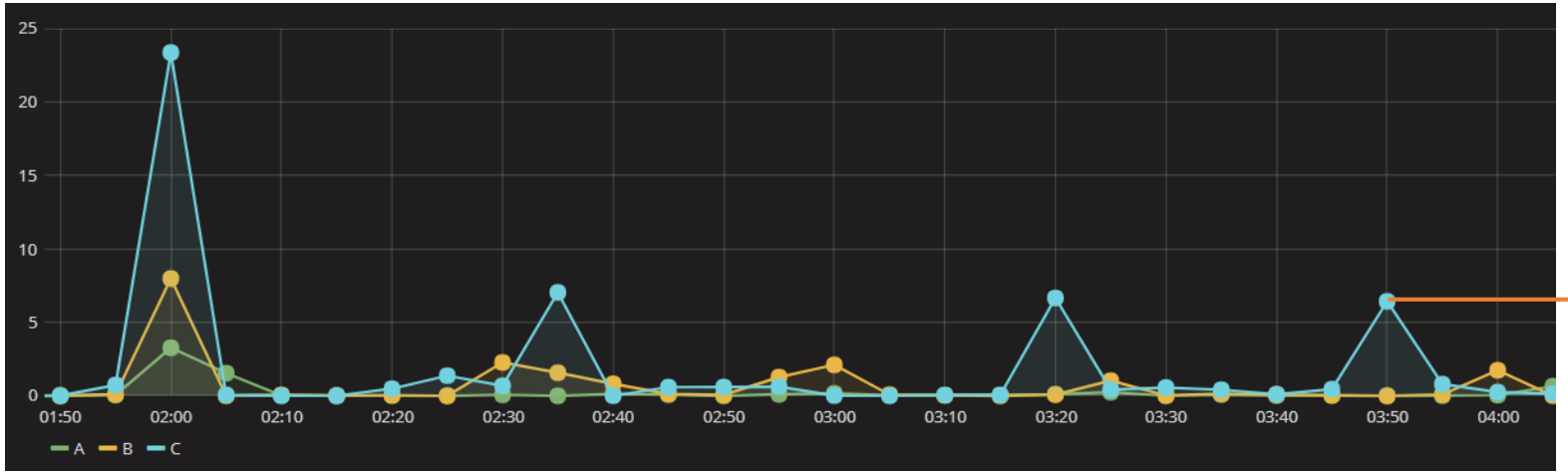
Collector

Metrics metrics are a measurement at a point in time for the system it repletely

Logs *logs are messages* that system generated when an event has happened to describe the event

Logs may be collected any time an event happened , but metrics are collected at fixed-time intervals

Storage – Time Series Databases



Short description for TSD:

Data that happen in the period of time

Prometheus

OpenTSDB

influxdb

CloudWatch

elasticsearch

Elasticsearch

- Written in Java - No cross-platform issue
  - An open-source “Search engine”
  - Build on top of Apache Lucene
- Document store with JSON
  - Every field is indexed and searchable
- Source for download
  - https://www.elastic.co/downloads/elasticsearch

MAC

- brew update
- brew install elasticsearch

Windows

- https://artifacts.elastic.co/downloads/elasticsearch/elasticsearch-6.2.4.msi
- Easy install with UI

Elasticsearch – Keyword , Data

Term	Description
Cluster	Group of ElasticSearch nodes
Node	Instance of ElasticSearch
Index	Databases
Type	Table
Document	Row (JSON)
Fields	Columns

Example of JSON :
{“name”: “Kant” , “age” : 27 , “timestamp”: 20190622T14:00:00Z}
{“name”: “Bin” , “age” : 25 , “timestamp”: 20190617T15:00:00Z}

Data type :

- String
- Bigint
- Datetime

Workshop 1.0 Install Elasticsearch

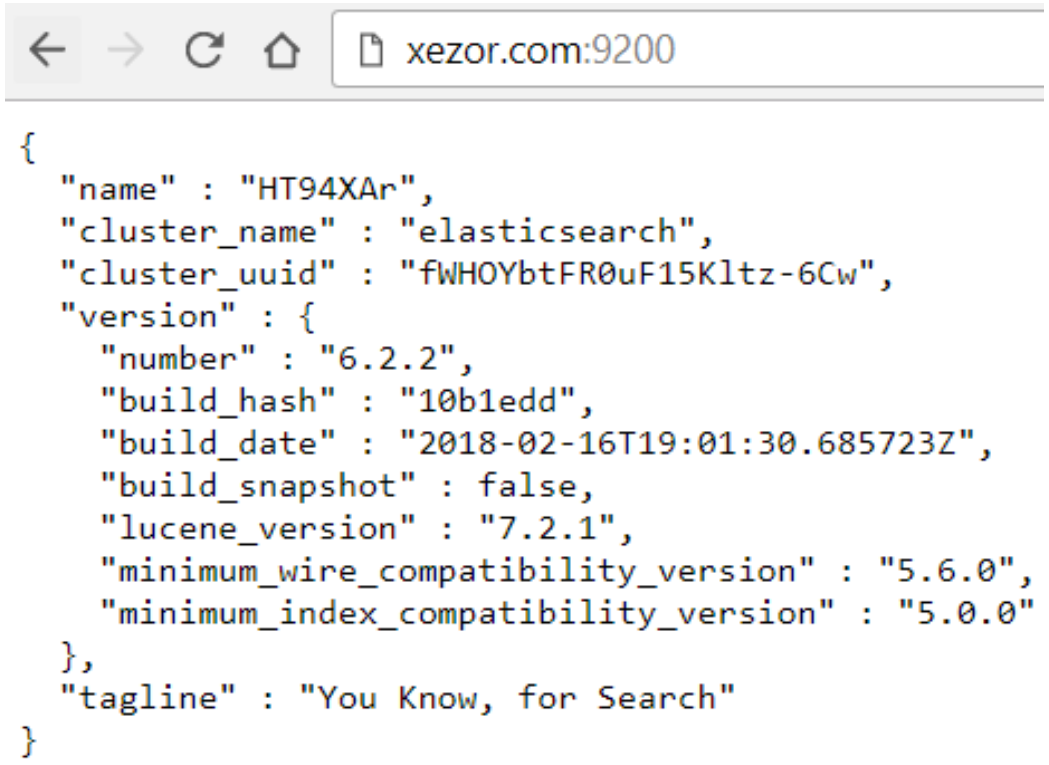
https://bit.ly/2ZEt6s5

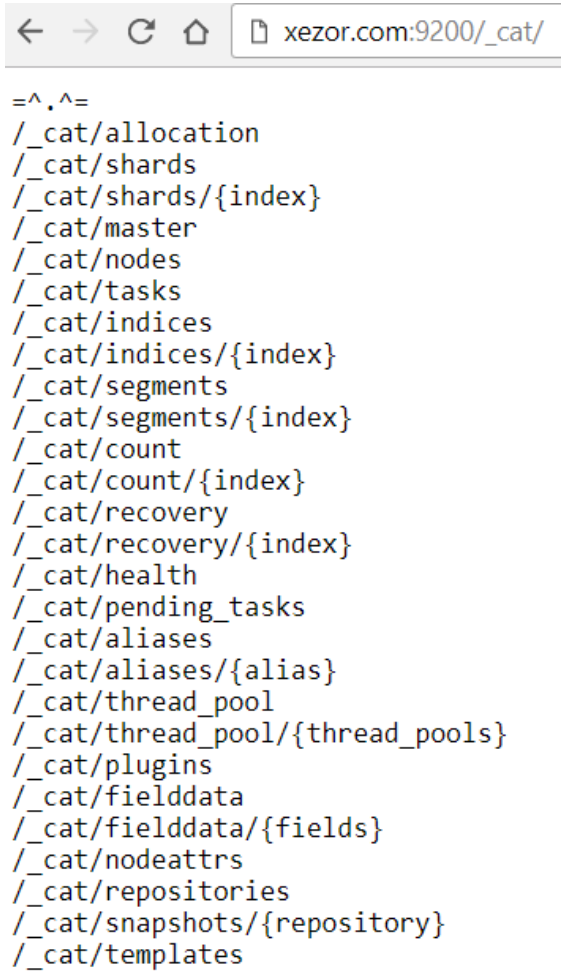
Workshop 1.1 Elasticsearch.yml

https://bit.ly/2FkYoMF

Workshop 1.2 restful-api, Cluster info, cat

Restful API : Web Service allow HTTP Method GET, POST, DELETE, UPDATE

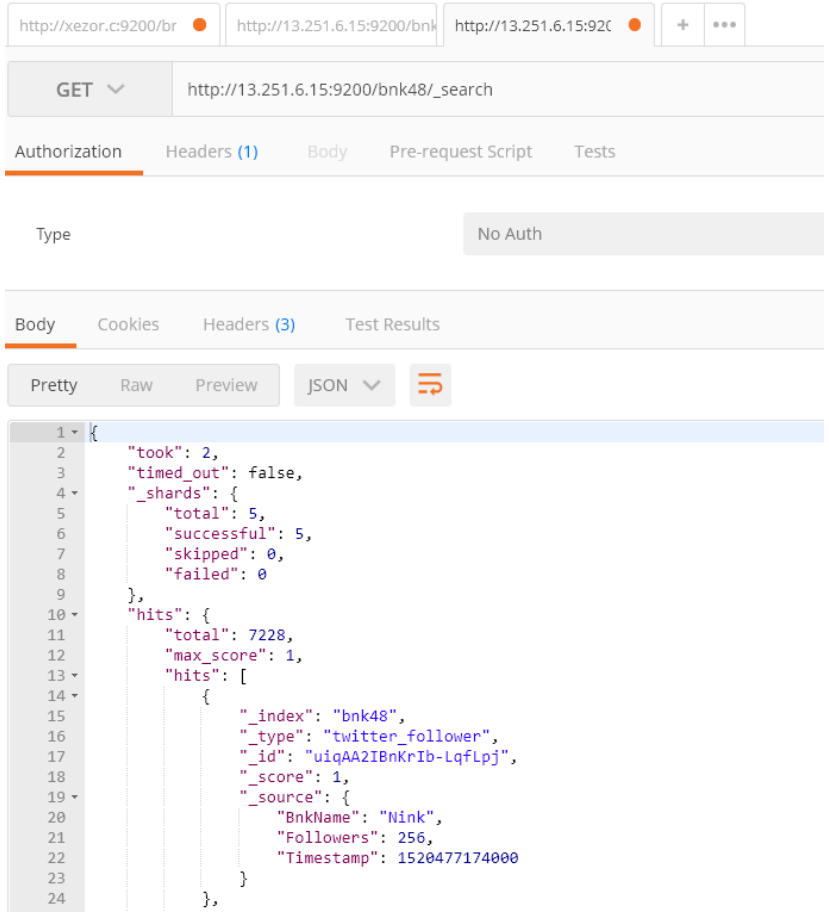




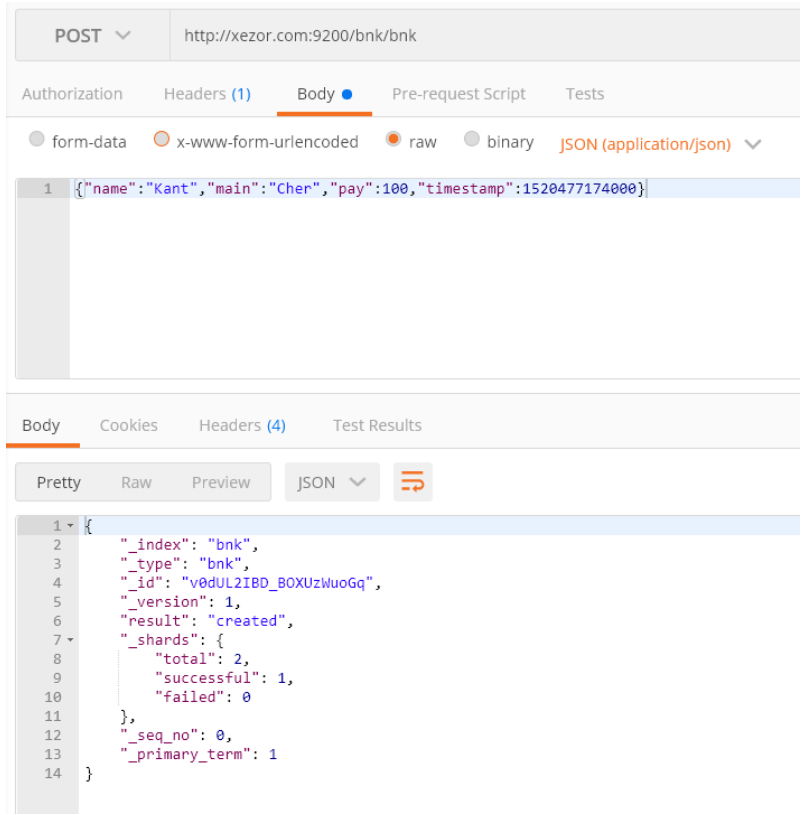
https://bit.ly/2L9EBUv

Workshop 1.3 Create Index , insert data , search

- GET : Search data
- POST : Create Index , Insert data



Postman



https://bit.ly/2XYqAfV

Workshop 1.3 Create Index , insert data , search

Create Index :

Post : url : localhost:9200/test/test
body :
{
“name”: “your_name”,
“age”: 30,
“timestamp":"2018-04-28T14:30:00Z"
}

Insert more rows :

Post : url : localhost:9200/test/test
body :
{
“name”: “your_friend_name”,
“age”: 30,
“timestamp":"2018-04-28T14:31:00Z"
}

Workshop 1.4 Update data , delete data and index

PUT : Update data to specific id

DELETE : Delete data, Delete Index

Update rows :

Put : url : localhost:9200/test/test/U3stCGMBeamp-RSSI4vm

body :

{

“name”: “your_friend_name”,
“age”: 40, <- New age
“timestamp":"2018-04-28T14:35:00Z“
<- New time

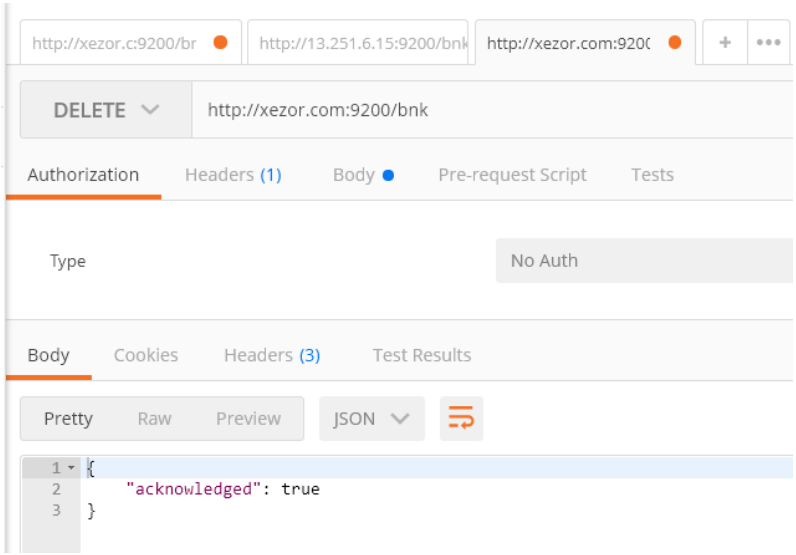
}

Delete rows :

Delete : url : localhost:9200/test/test/U3stCGMBeamp-RSSI4vm

Delete Index :

Delete : url : localhost:9200/test/



https://bit.ly/2x3CCJ5

Workshop 1.5 basic query condition

GET : localhost:9200/info

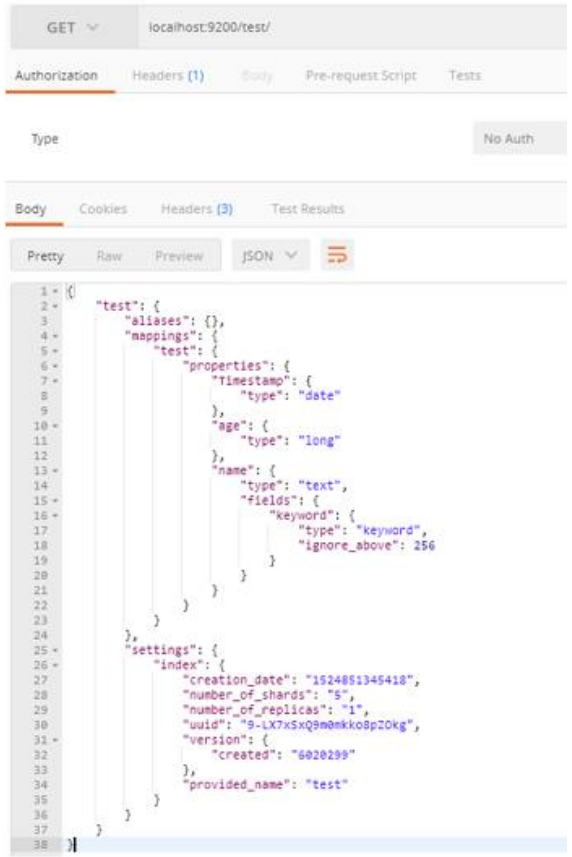
GET : localhost:9200/info/_search

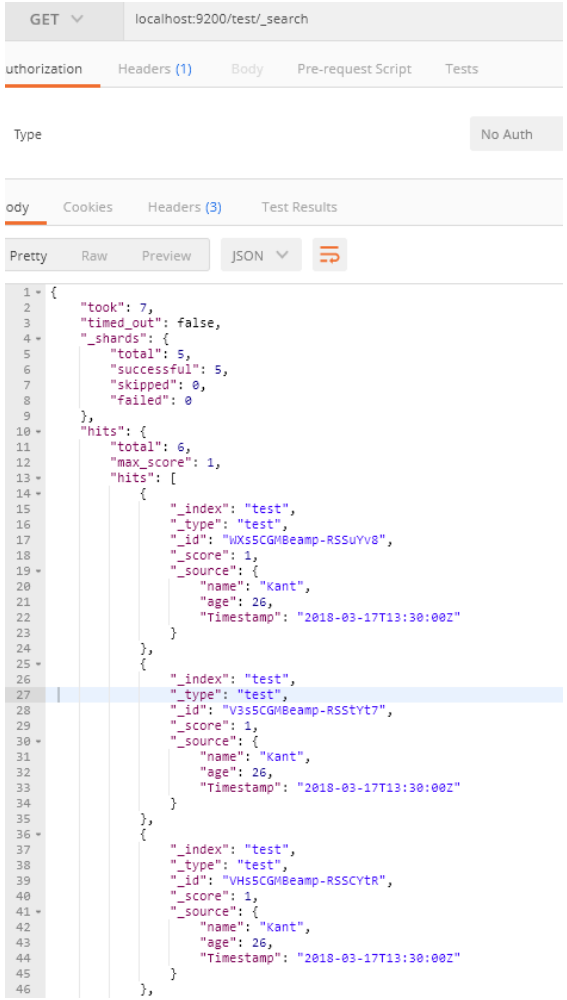
GET : localhost:9200/info/_search?&size=10000

GET : localhost:9200/info/_search?q=name:Kant

GET : localhost:9200/info/info/_search?q=name:Kant

https://bit.ly/2XYBdiH





https://www.elastic.co/guide/en/elasticsearch/reference/current/search.html

Workshop 1.6 Export, import data with nodejs

https://bit.ly/2WO07jL

Workshop 1.7 Example Application

https://github.com/kantsuw/BXtoES

Influxdb

- Written in Golang , can run in all of platform

- Value store database
  - Measurement Name , Tag , value , timestamp

- Source for download
  - https://portal.influxdata.com/downloads/

    MAC

    https://dl.influxdata.com/influxdb/releases/influxdb-1.7.6_darwin_amd64.tar.gz
    tar zxvf influxdb-1.7.6_darwin_amd64.tar.gz

    Windows

    https://dl.influxdata.com/influxdb/releases/influxdb-1.7.6_windows_amd64.zip
    unzip influxdb-1.7.6_windows_amd64.zip

Telegraf

- Written in Golang , can run in all of platform

- Collector that can collect many data type, many services

  Ex. Server Metric , SQL , Redis , Mongo , Http-api

- Source for download

  - https://portal.influxdata.com/downloads/

    MAC

    brew update
    brew install telegraf

    Windows

    https://dl.influxdata.com/telegraf/releases/telegraf-1.11.0_windows_amd64.zip unzip telegraf-1.11.0_windows_amd64.zip

Workshop 2.0 Install Influxdb

https://bit.ly/31Huo7t

https://bit.ly/2XXL9Ji

Workshop 2.1 Create Database , Insert data

https://bit.ly/2IZS52q

Workshop 2.2 Install Telegraf + Conf

https://bit.ly/2MTzOsy

https://bit.ly/31JR7zR

https://bit.ly/2WNOPRc

https://bit.ly/2WNP2Uu

Workshop 2.3 Data from Telegraf in Influxdb

https://bit.ly/2WTQmp2

Prometheus

- Written in Golang , can run in all of platform

- Prometheus is storage and also collector by itself

  Concept of pulling metrics

- Source for download
  - https://prometheus.io/download/

    MAC

    brew update
    brew install prometheus

    Windows

    https://github.com/prometheus/prometheus/releases/download/v2.10.0/prometheus-2.10.0.windows-amd64.tar.gz
    telegraf-1.11.0_windows_amd64.zip

Workshop 3.1 Install Prometheus

https://bit.ly/2L78XGO

Workshop 3.2 Application Metric

https://github.com/kantsuw/example-prometheus-nodejs

http://kantz.space:3001/metrics

http://kantz.space:9090/metrics

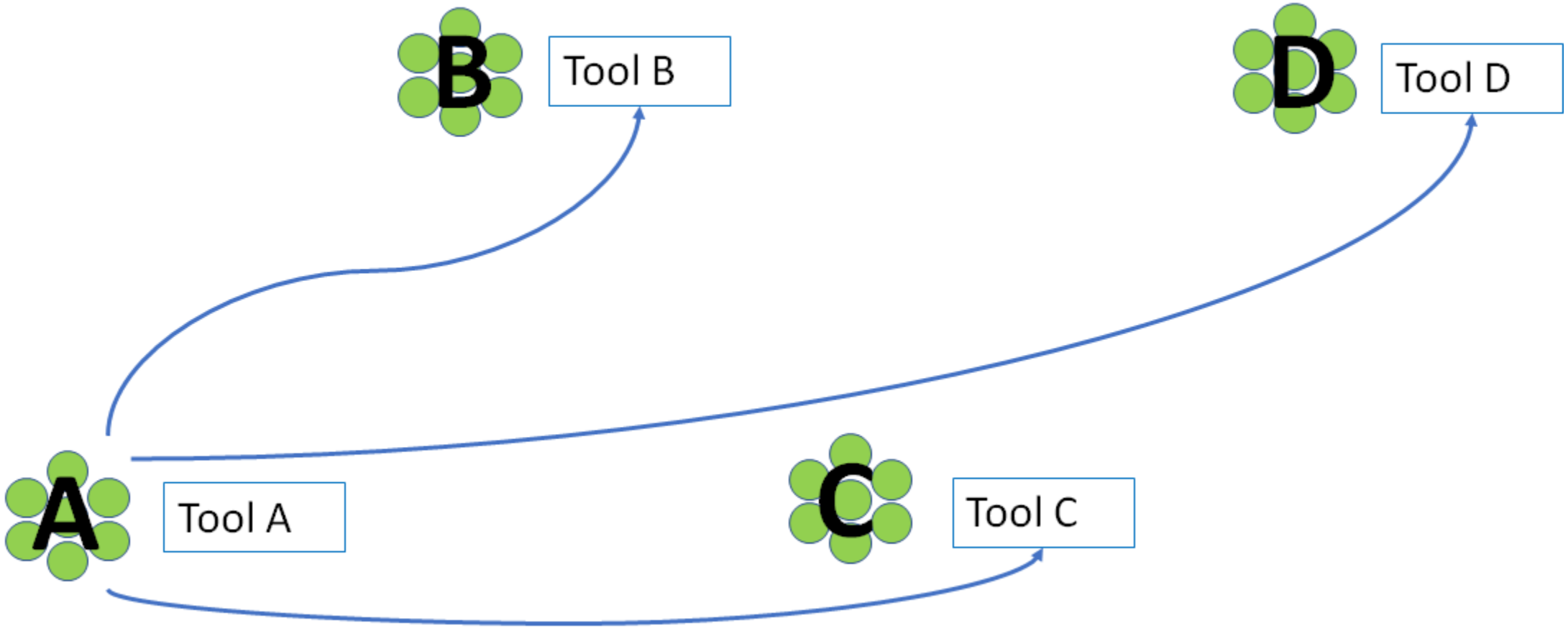
Workshop 3.3 Prometheus Configuration

https://bit.ly/2XULkVO

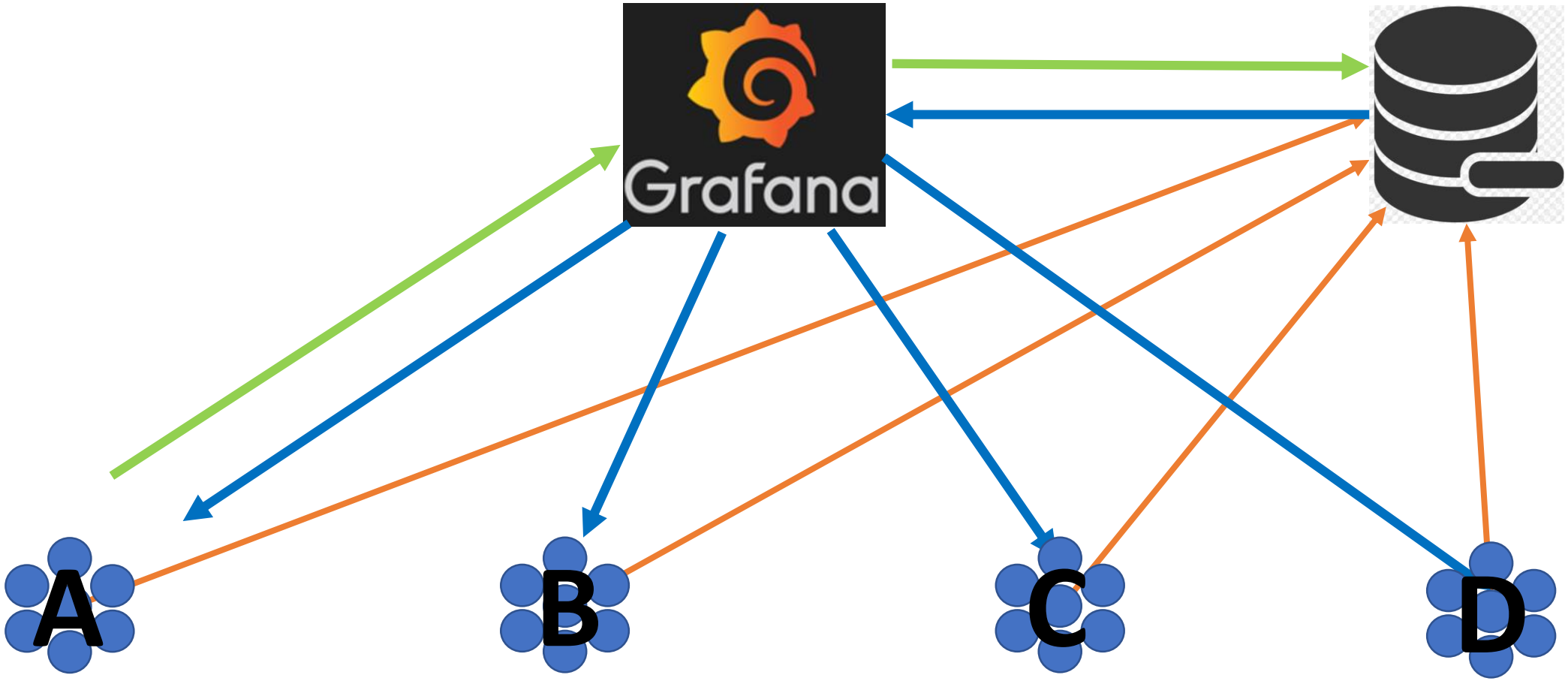
Workshop 3.4 Prometheus UI

http://kantz.space:9090/graph

Visualization tools - traditional



Visualization tools - Grafana



Grafana

- Written in Golang , can run in all of platform

  Visualization Tool , not storage , not collector

- Source for download

  https://www.grafana.com/grafana/download

  - MAC

    brew install grafana
    brew services start grafana-server

  - Windows

    Unzip
    Grafana-server.exe

  - Grafana UI

    http://localhost:3000
    admin/admin

Workshop 4.1 Grafana Configuration

https://bit.ly/2FkvZGP

https://bit.ly/2Zztk3G

Workshop 4.2 Grafana create datasource

http://localhost:3000/datasources

http://kantz.space:3000/datasources

Workshop 4.3 Create graph with elasticsearch

http://localhost:3000/dashboard/new?orgId=0

http://kantz.space:3000/dashboard/new?orgId=0

Workshop 4.4 Create graph with influxdb

http://localhost:3000/dashboard/new?orgId=0

http://kantz.space:3000/dashboard/new?orgId=0

Workshop 4.5 Create graph with prometheus

http://localhost:3000/dashboard/new?orgId=0

http://kantz.space:3000/dashboard/new?orgId=0

Workshop 4.6 Access Control

http://localhost:3000/admin/users

http://kantz.space:3000/admin/users

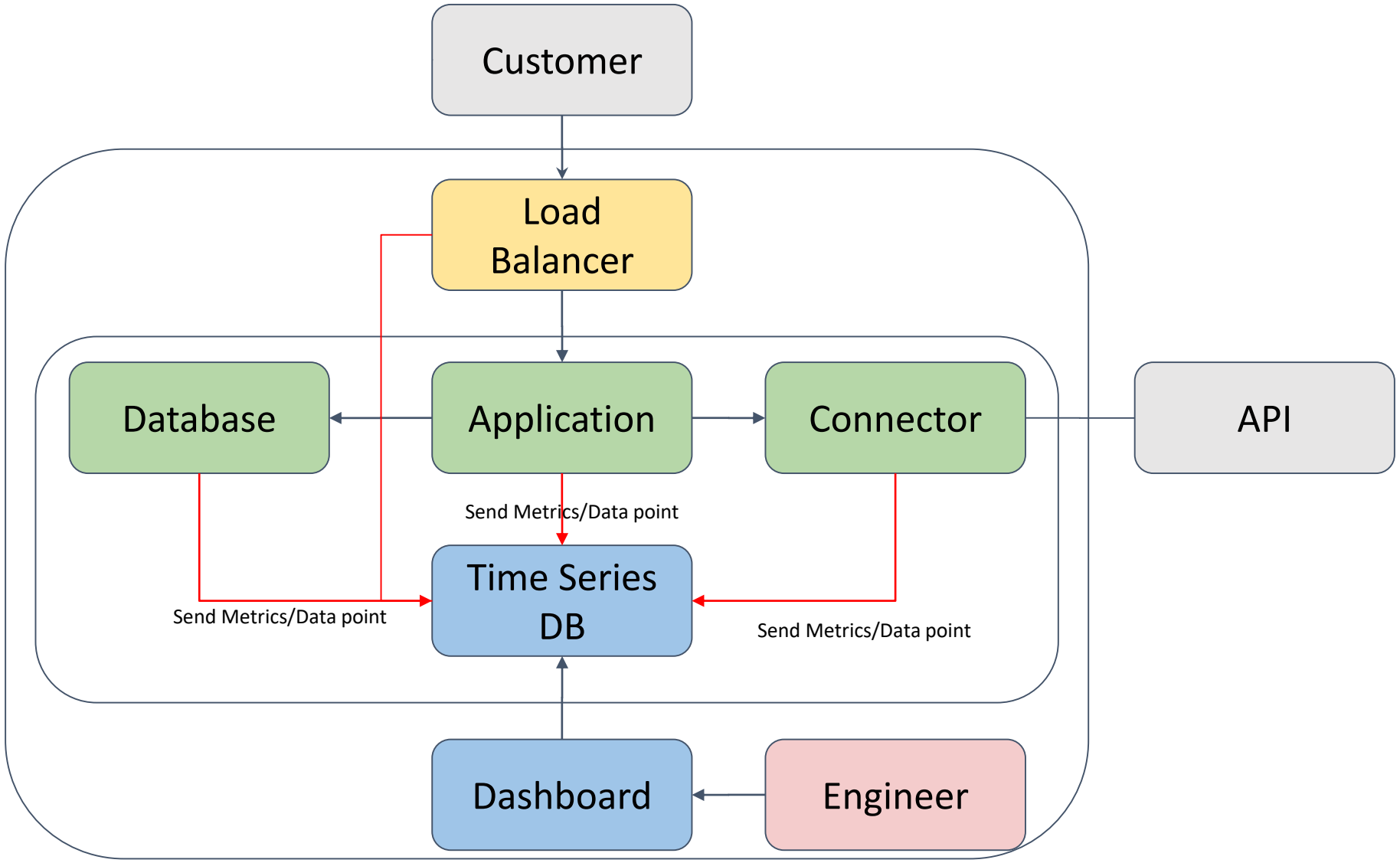
Workshop 4.6 Grafana Plugin

https://grafana.com/plugins

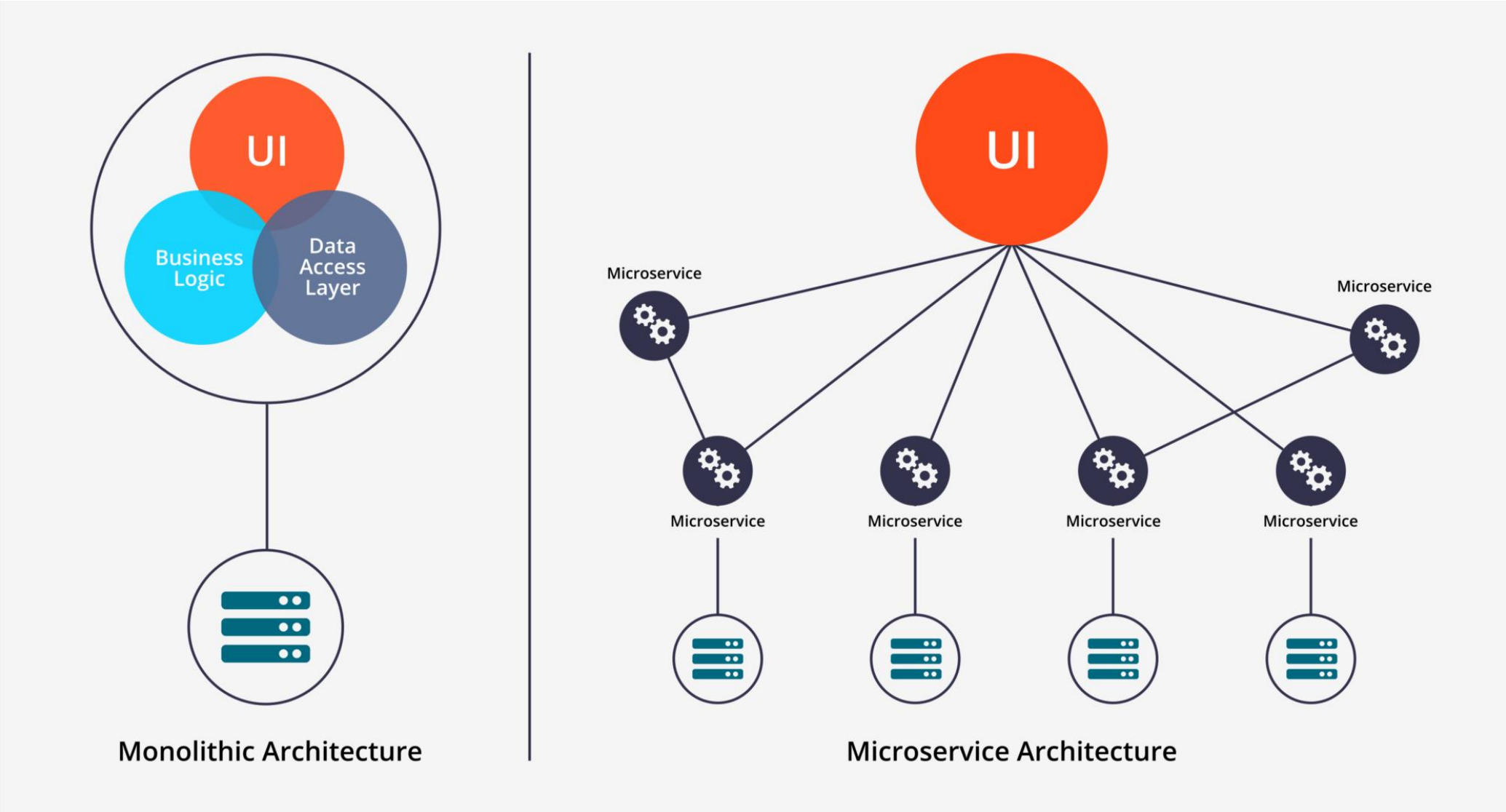
https://grafana.com/plugins/grafana-clock-panel

https://grafana.com/plugins/grafana-piechart-panel

Sample Application Architecture



Monolith VS Microservice



Showcase 1 Sample Monolith VS Microservice

https://github.com/kantsuw/selector_api

https://github.com/kantsuw/BXtoES

https://github.com/kantsuw/keeper_api

https://github.com/kantsuw/crypto_currency_api

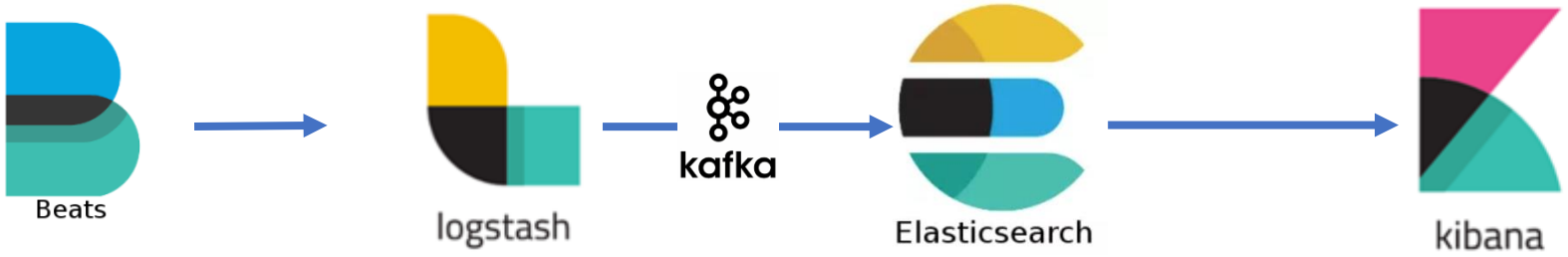
Showcase 2 CICD with TeamCity

http://kantz.space:8111/overview

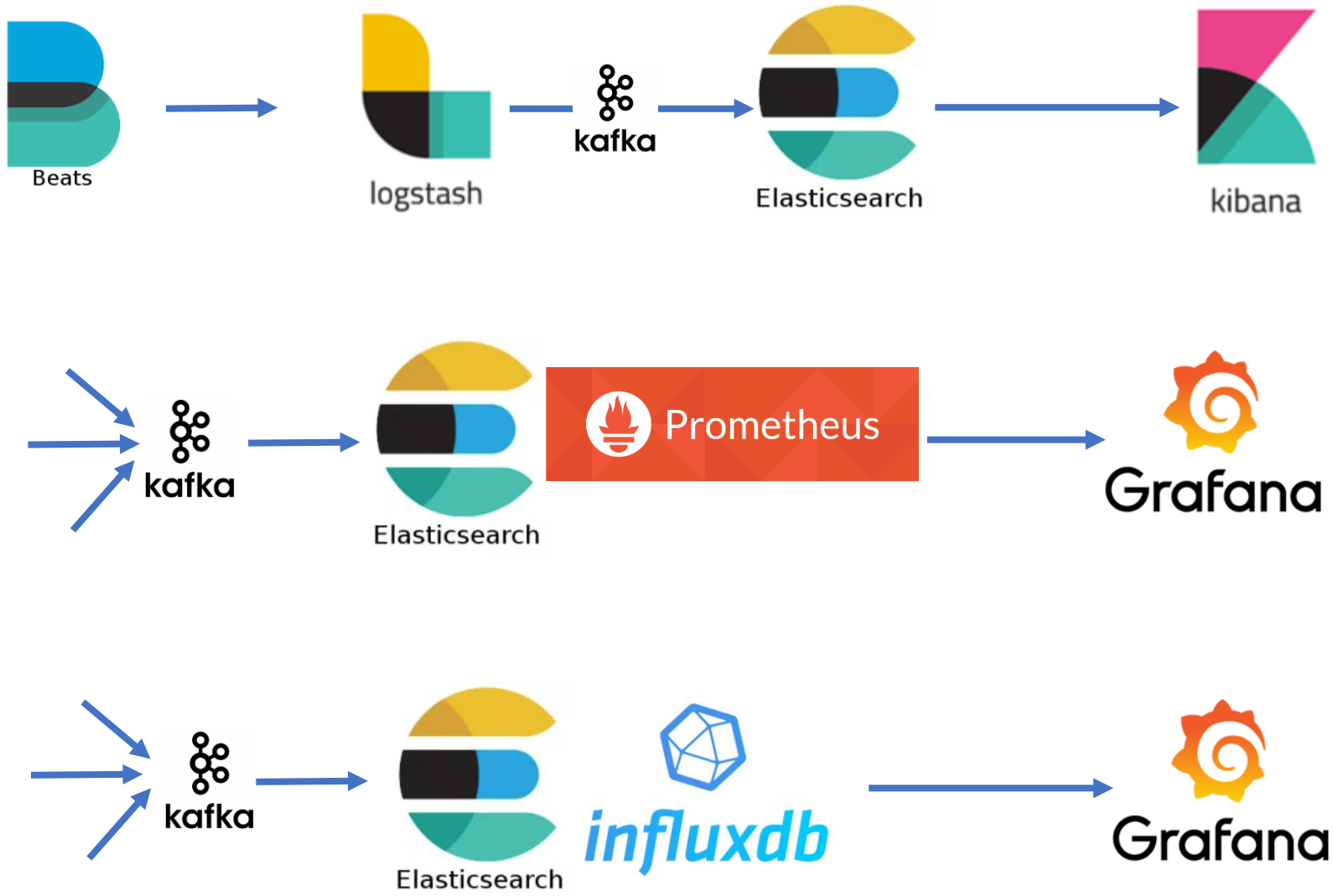
Showcase 3 Service Version Dashboard

Showcase 4 Sample Business Dashboard

Another stack : Beat Logstash Elasticsearch Kibana



Monitoring Stack

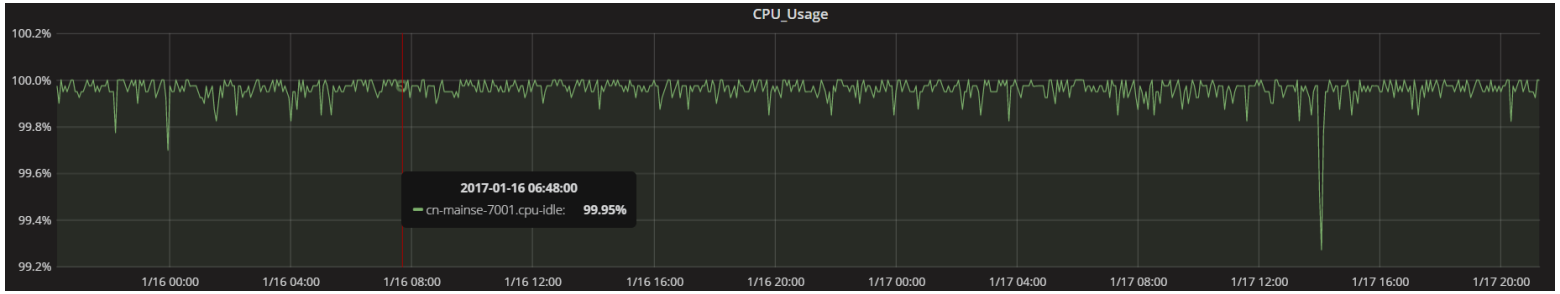


Automation
Problem Detection

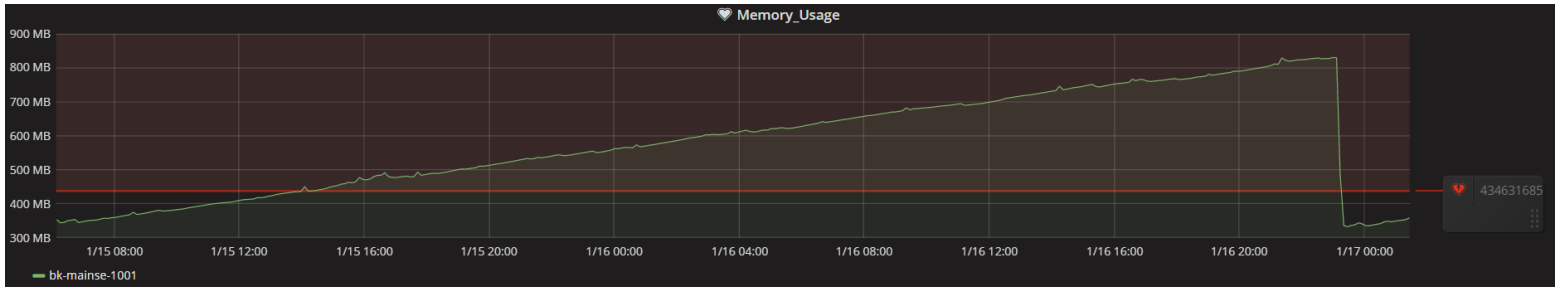
Prerequisite & Baseline

Prerequisite – What we should do before start monitoring,

1. Collecting the data to build data historical and statistics
2. Understanding nature of data

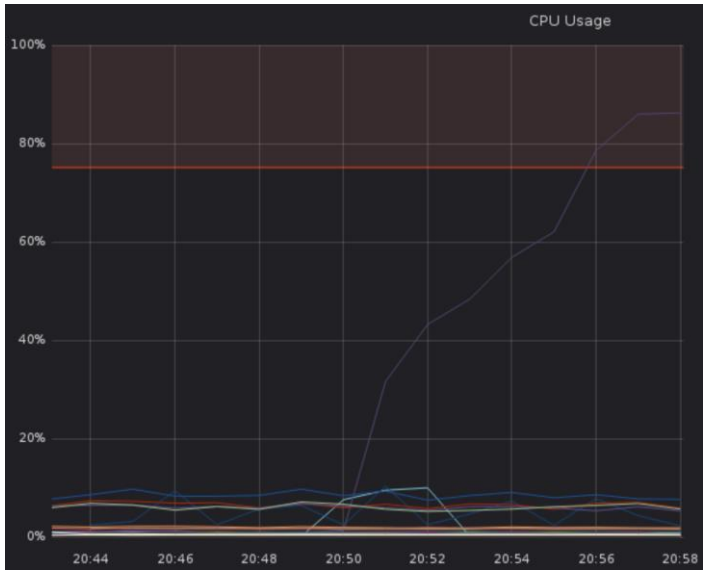


Baseline – A point or line that we used for comparisons



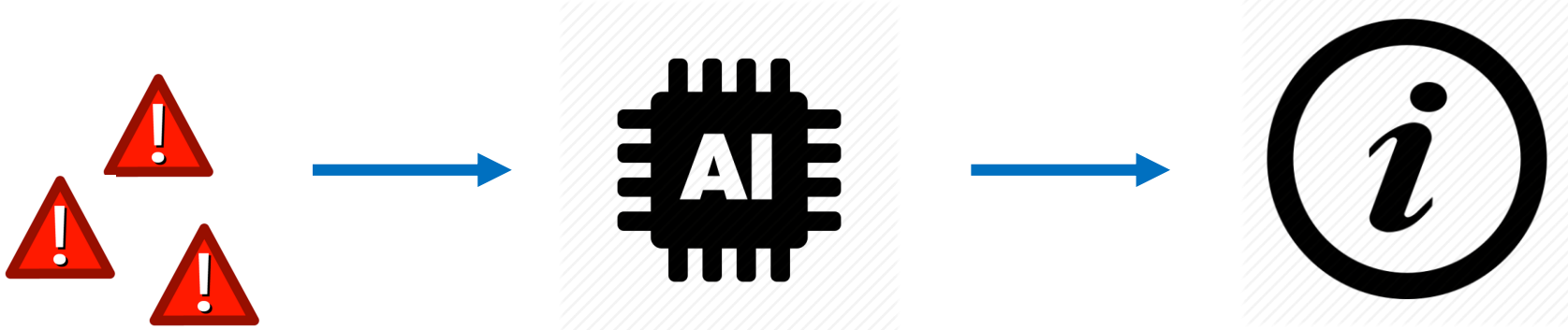
Alerting & Processing

When ever measurement go above baseline it will be alerting



Alerting can be receive by multi receivers

Let imagine , if we have processing that can correlation between alerts



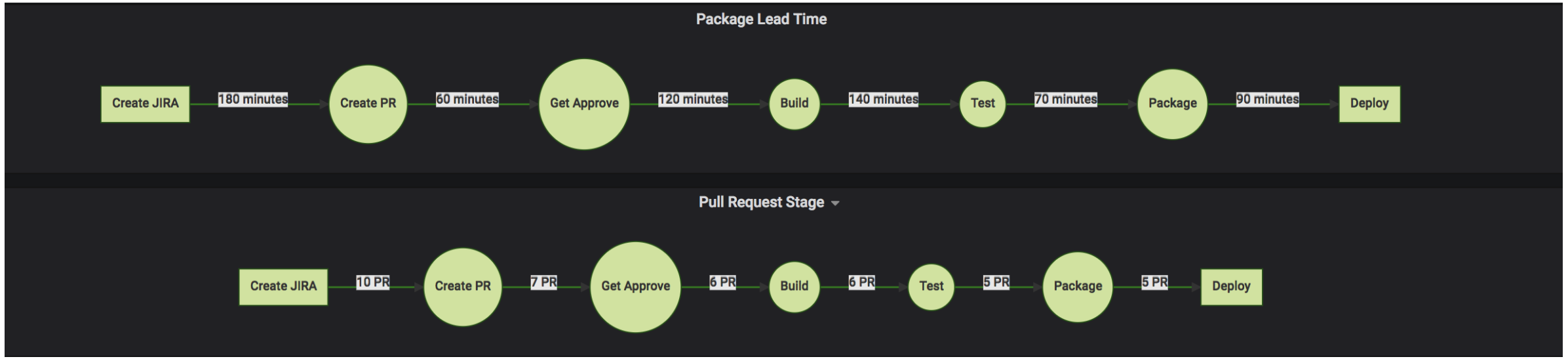
Workshop 5 Grafana Slack Notification

http://kantz.space:3000/alerting/notifications

https://bit.ly/2N7XIAW

Benefit of better monitoring (1)

Measuring Development process



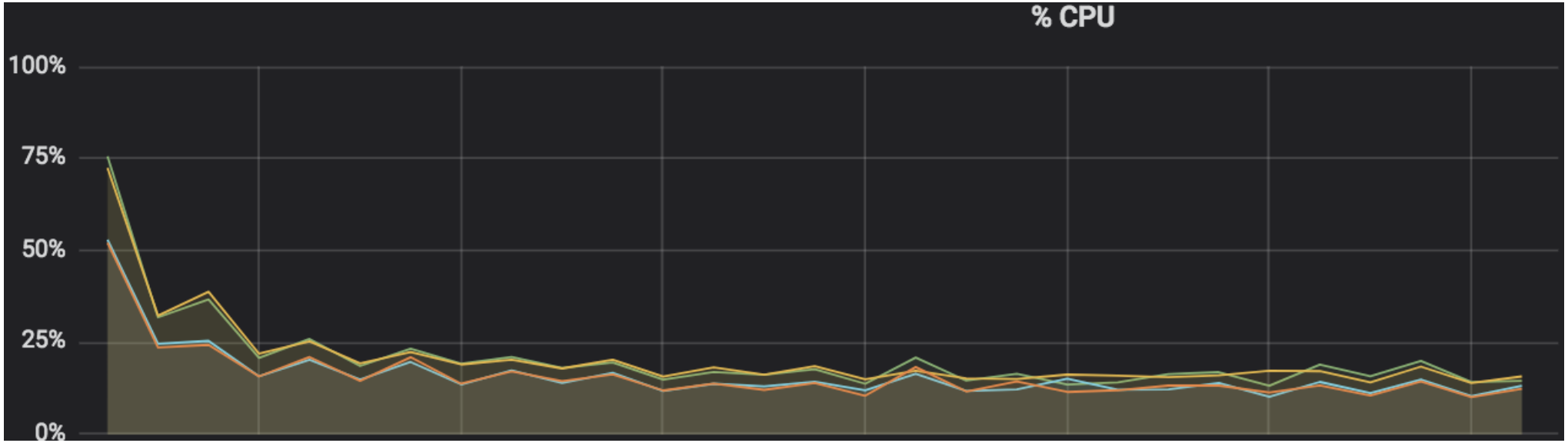
Reduce development time & improve productivity

Reduce 60% development time

Improve 370% productivity

Benefit of better monitoring (2)

Measuring operation performance



Improve Server Capacity & Reduce Operation Cost

Improve 60% of server capacity

Reduce 50% of Operation Cost

Benefit of better monitoring (3)

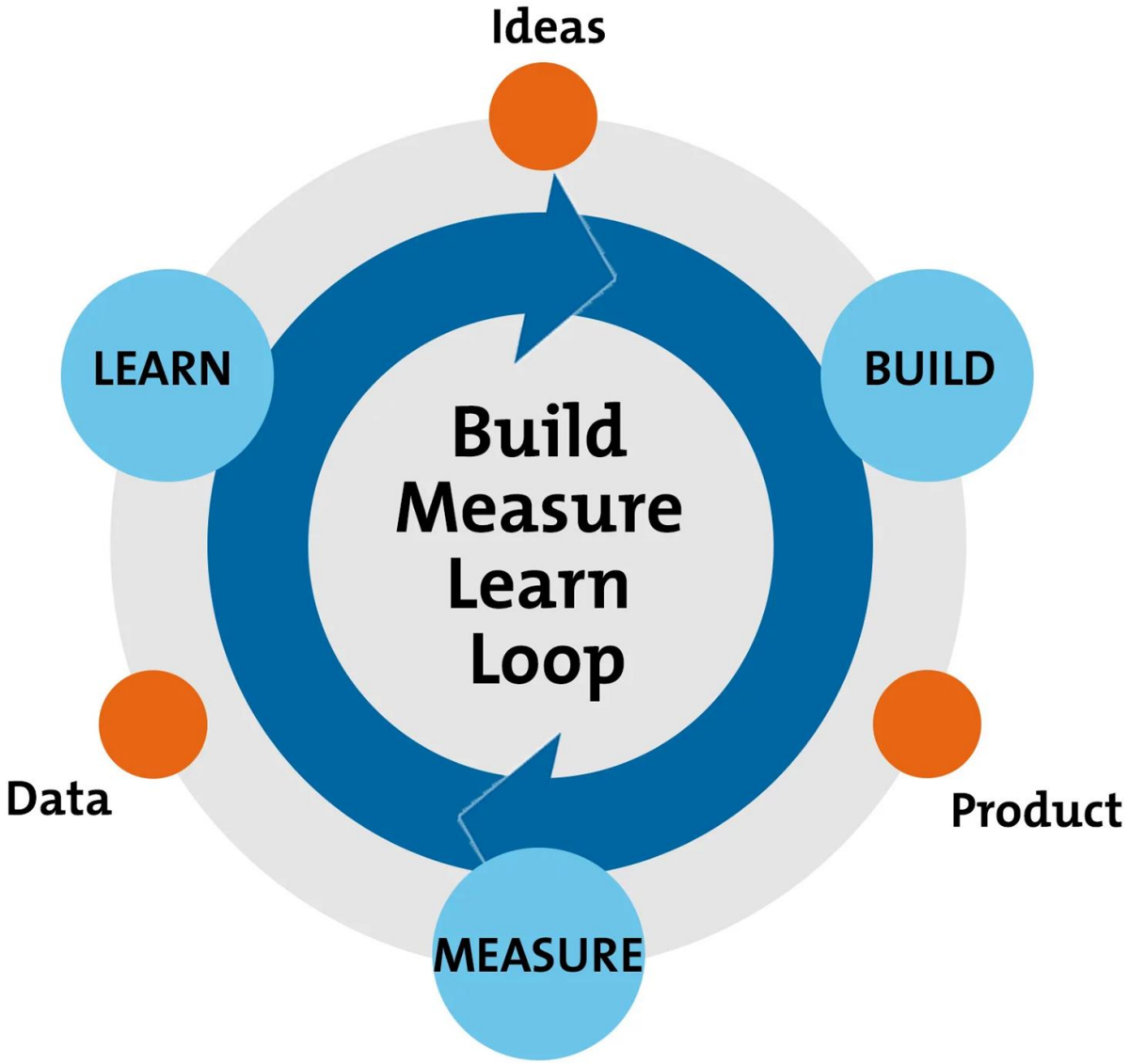
Measuring Code Quality

Period	Total Test	Test Passed	Test Failed	Test Passed (%)
Before-create	300	243	57	81.5
During-create	600	555	45	92.50
After-create	1000	980	20	99.80

Better Incident management

Period	Incident per week	Investigation time (day)	Down time (minutes) Per week	Availability (%)
Before-create	7	4.3	187	98.14
During-create	5	2.1	96	99.04
After-create	2	0.5	30	99.70

Summary


Ideas
LEARN
BUILD
Build
Measure
Learn
Loop
Data
Product
MEASURE

Special Thanks :

Varokas P.

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Norbor (Nuboat)

Tirana J.

Q & A