Visualize And Predict Product Information Processing at B/S/H/ In Real Time

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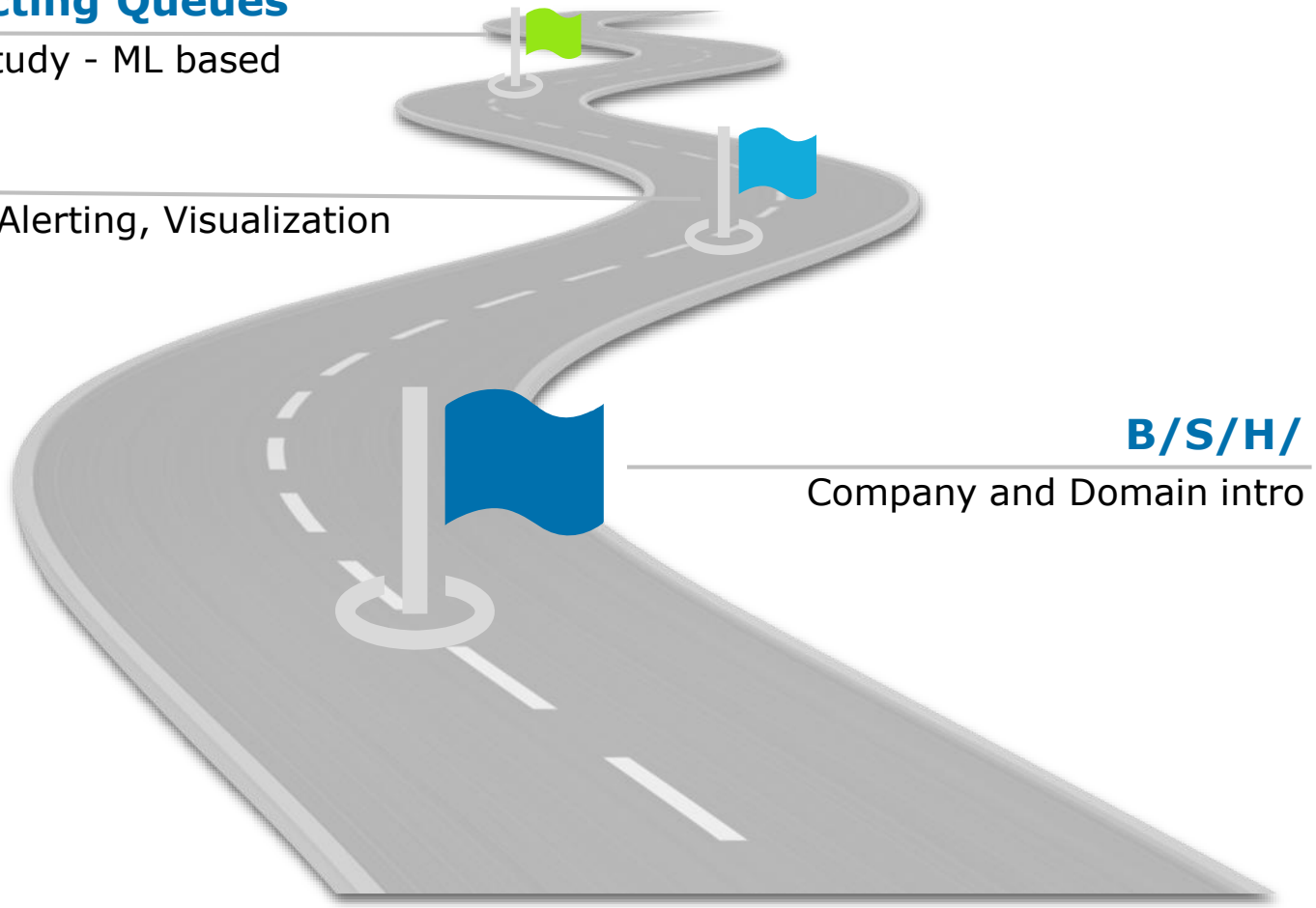
Agenda

Predicting Queues

Case Study - ML based

DevOps

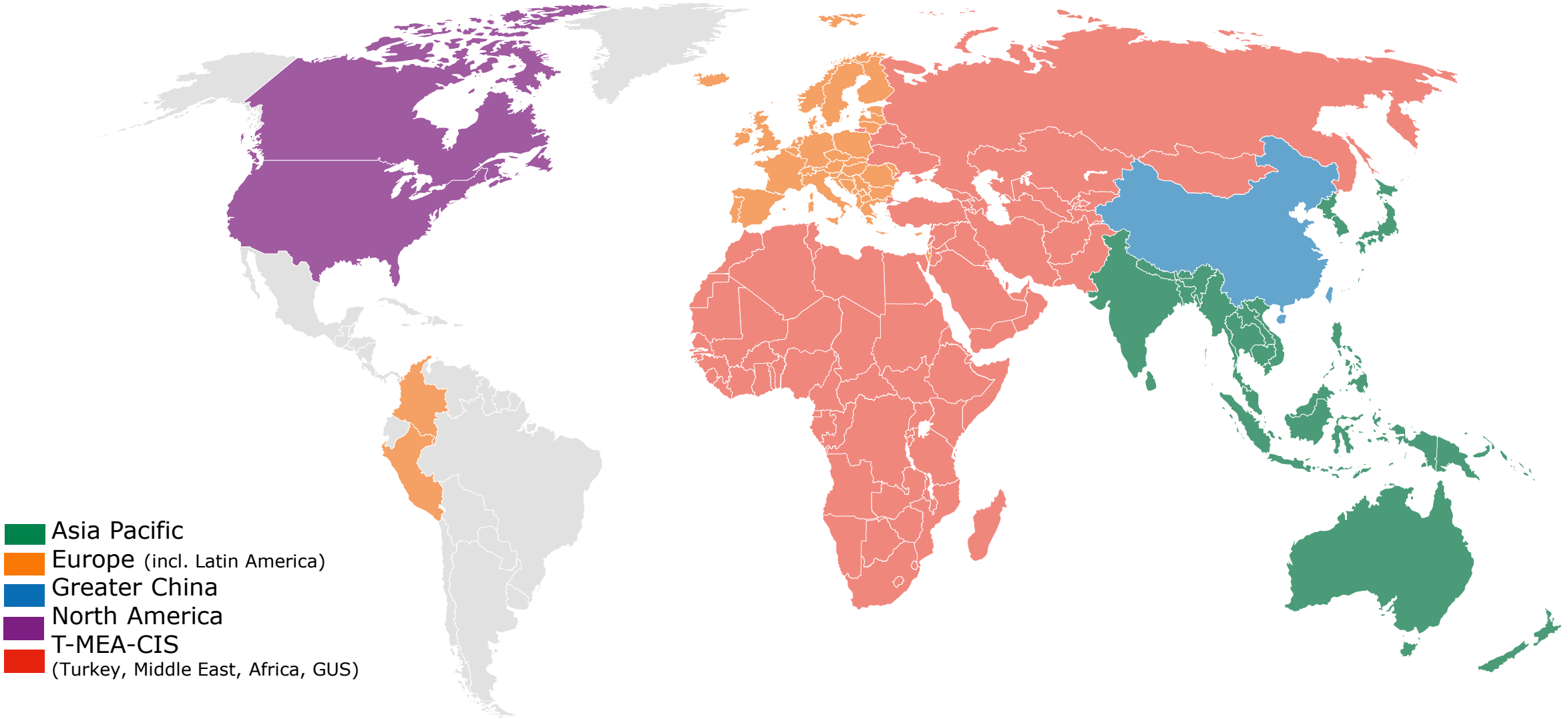
Operating, Alerting, Visualization



B/S/H/

Company and Domain intro

BSH | The Company
BSH and its Regions



Portfolio | Brands – Products – Solutions
17 Strong Brands in the BSH Brand Portfolio

Appliance brands
Home appliances under the brands

Global brands: BOSCH, SIEMENS, GAGGENAU, NEFF

Local Heroes: Thermador, Balay, Coldex, Constructa, PITSOS, PROFILO, zelmer

Label brands: JUNKER, viva

Service brands

Kitchen Stories.

SIMPLY YUMMY

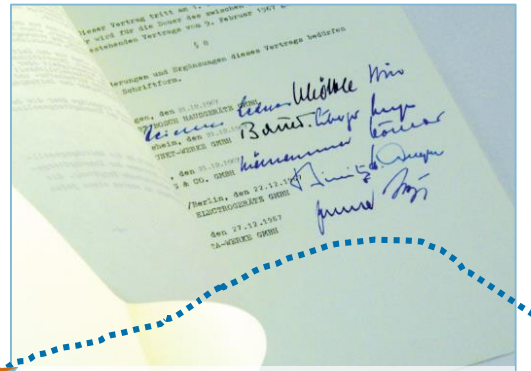
WeWash

Ecosystem brand

Home Connect

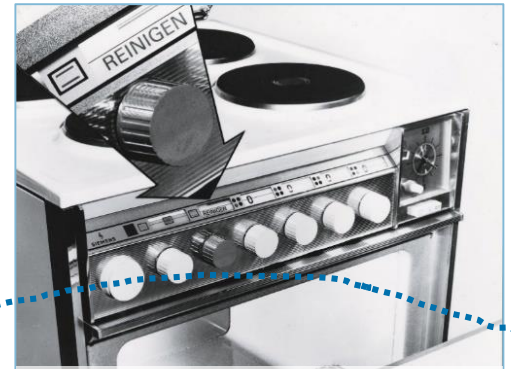
BSH | The Company
History and Milestones

1967
3 production sites in Germany, 14,000 employees, €0.5 billion revenues



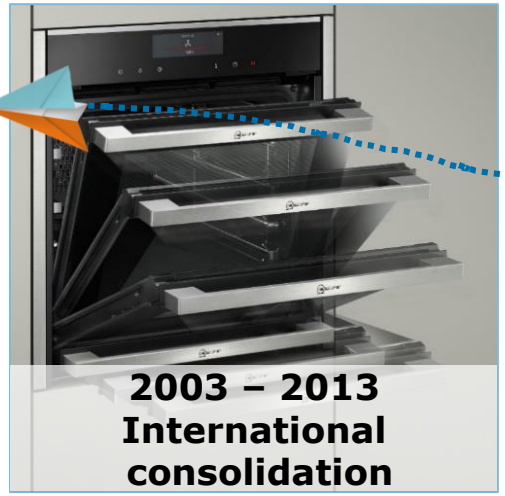
1967 – 1978
Founding and national consolidation

1979 – 1983
National growth



1984 – 2002
Sustainability and internationalization

1990
13 production sites in Europe, 23,000 employees, €3.3 billion revenues



2003 – 2013
International consolidation

2014 – today
Digital transformation

2018
42 production sites worldwide, 61,000 employees, €13.4 billion revenues

BSH | The Company
Fiscal Year 2018

Europe

No. 1

Revenues
13.4 billion €

Employees
61,000

Production Sites
42

Investments
4.6%

Research & Development
5.0%

Product Information Management

350K+ Products

300K+ User manuals

600K+ Images

350K+ Energy labels

60 Countries

102 Languages

10K+ User manuals

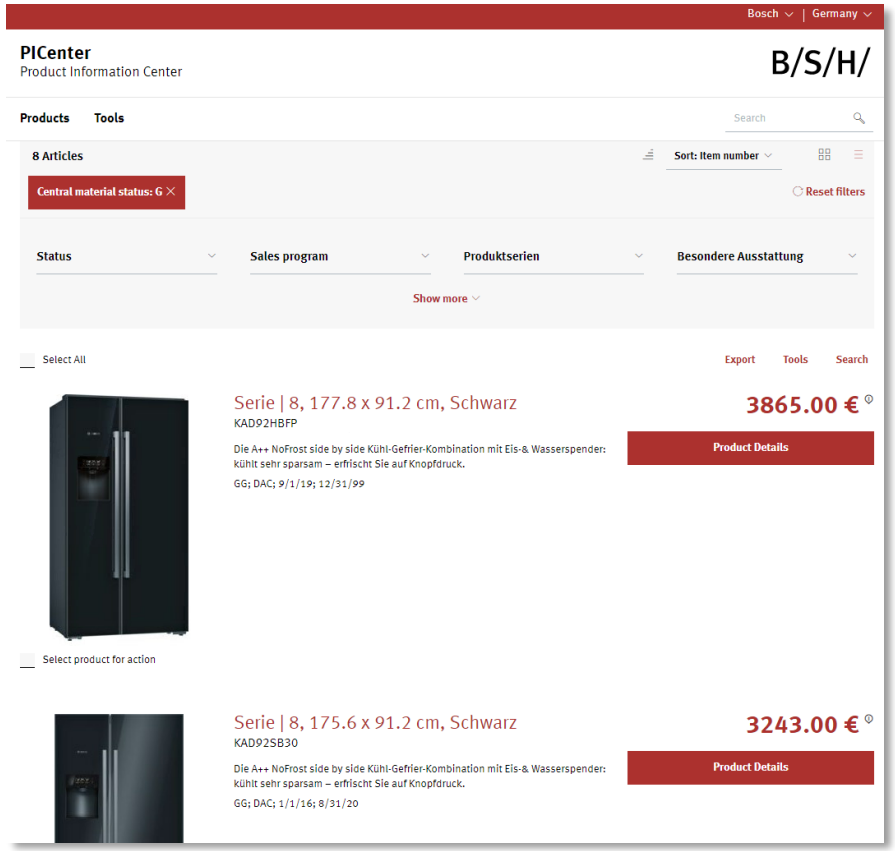
50K+ Videos

350K+ Specification sheets

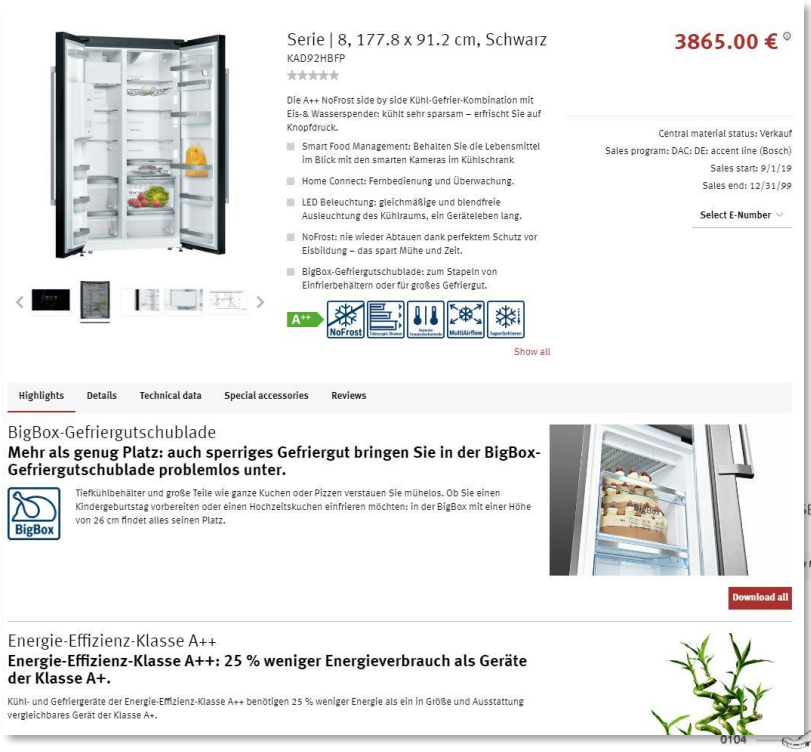
5M+ Images

Product Information Center

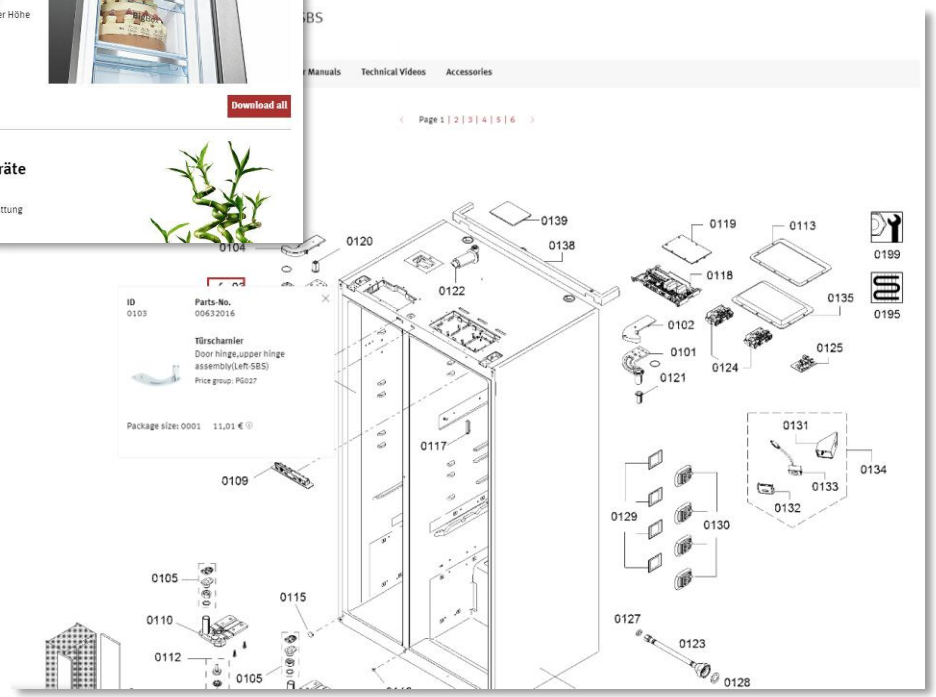
Product list



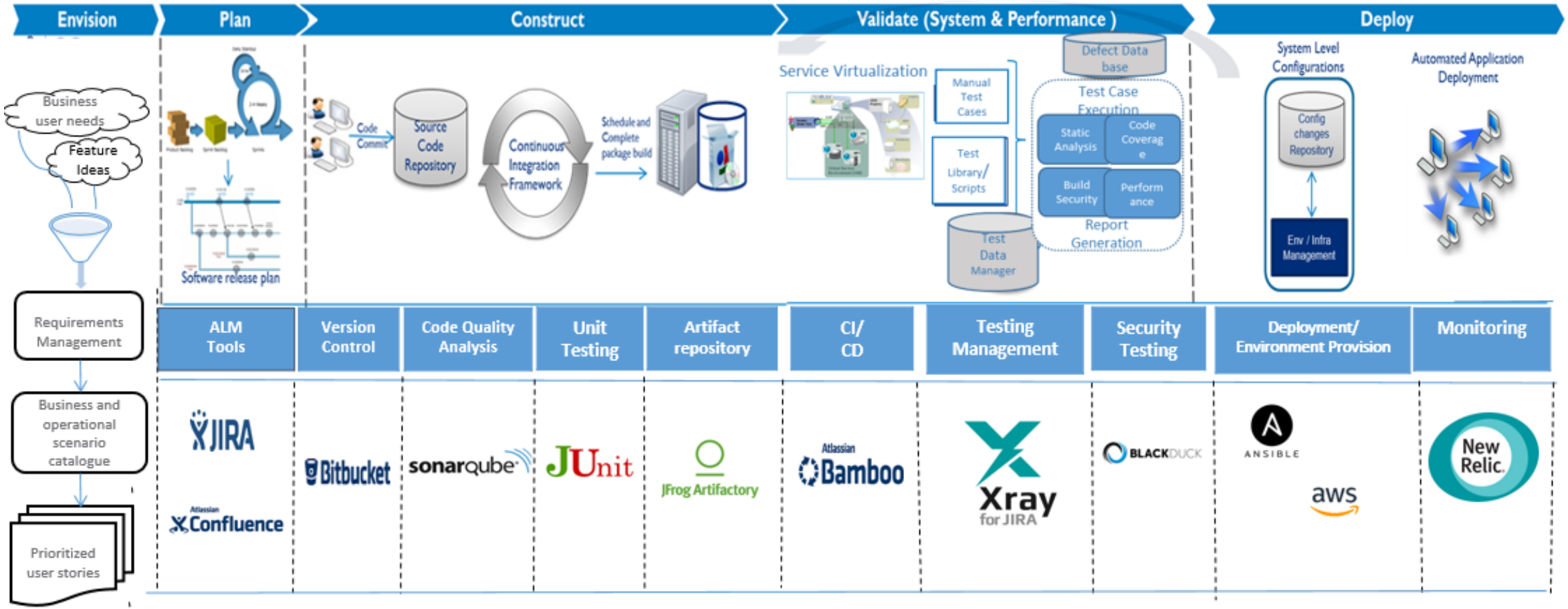
Detail view



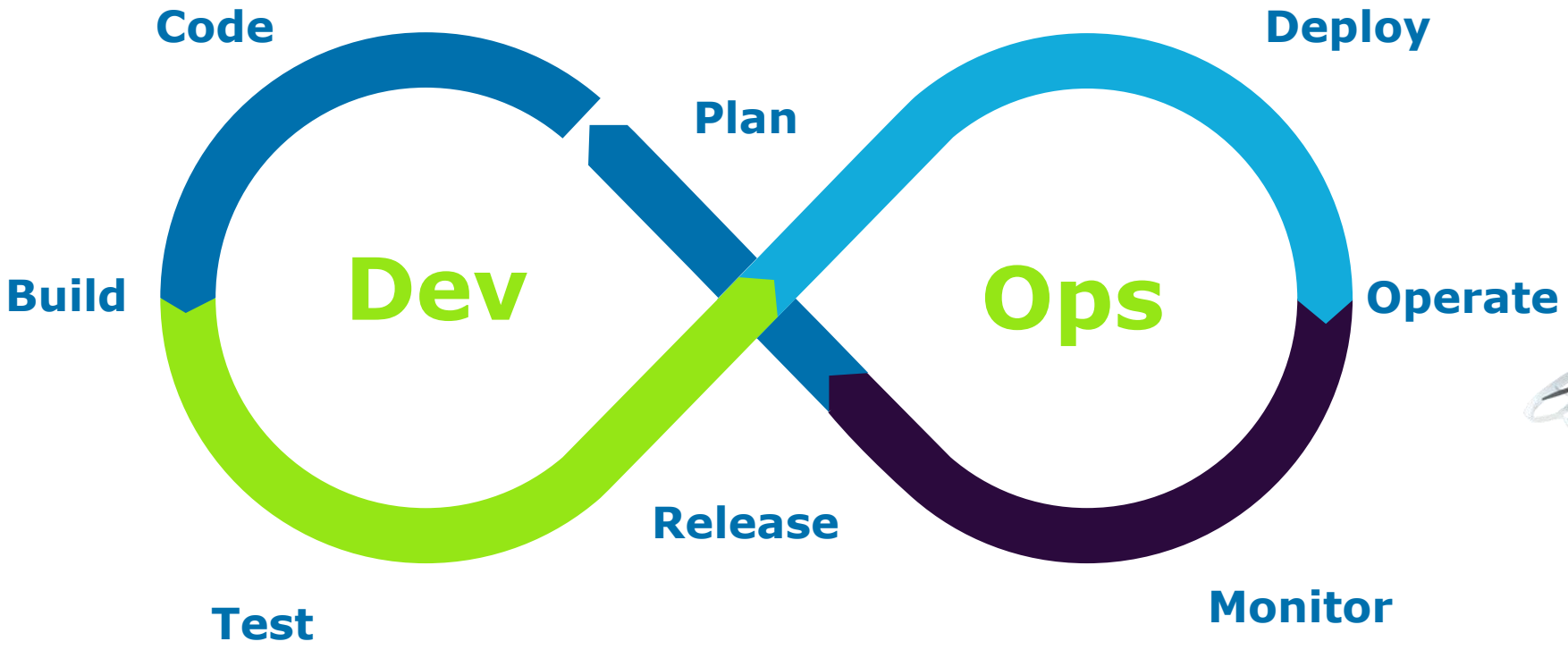
Part lists



Sample CI/CD pipeline



We build it – we run it!



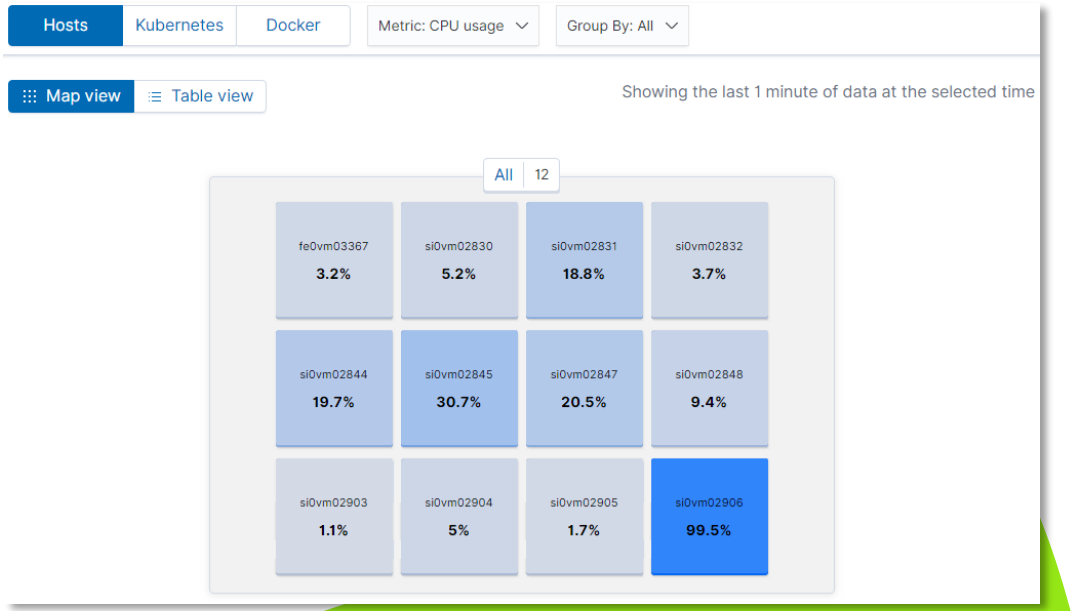
Infrastructure monitoring – the dev ops view

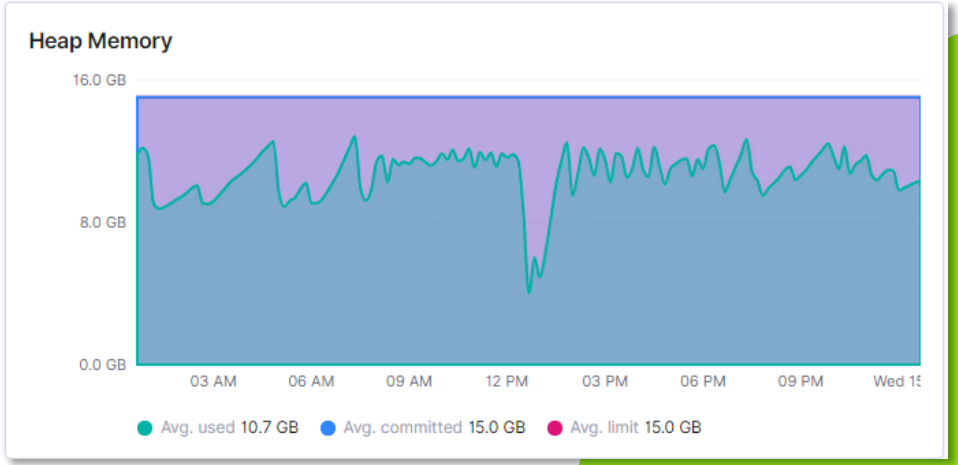
Well done

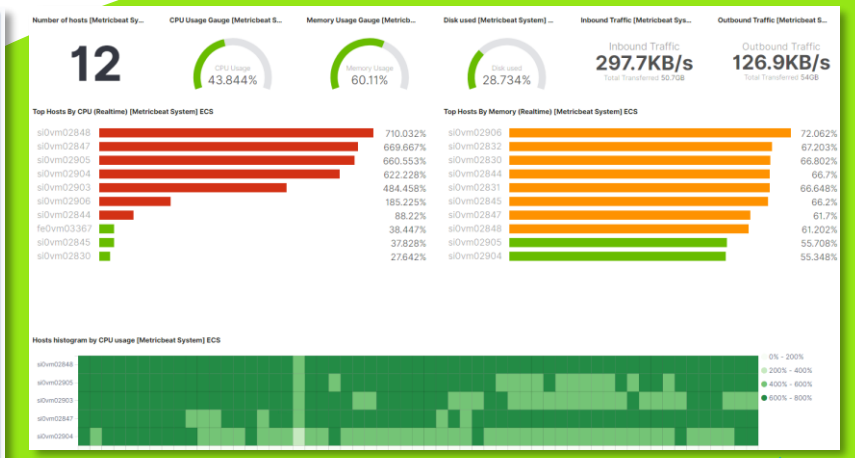
- SLAs available for servers, storage, network
- Alarming tools (AWS Cloudwatch, Nagios)
- Backups
- Security (Patching)

Dev Ops chances

- Optimize resource utilization
  - Lower operational costs
  - Increase performance or efficiency
- JVM Heap Usage and Garbage Collection







Create your own Business Dashboard(s)

Traffic distribution

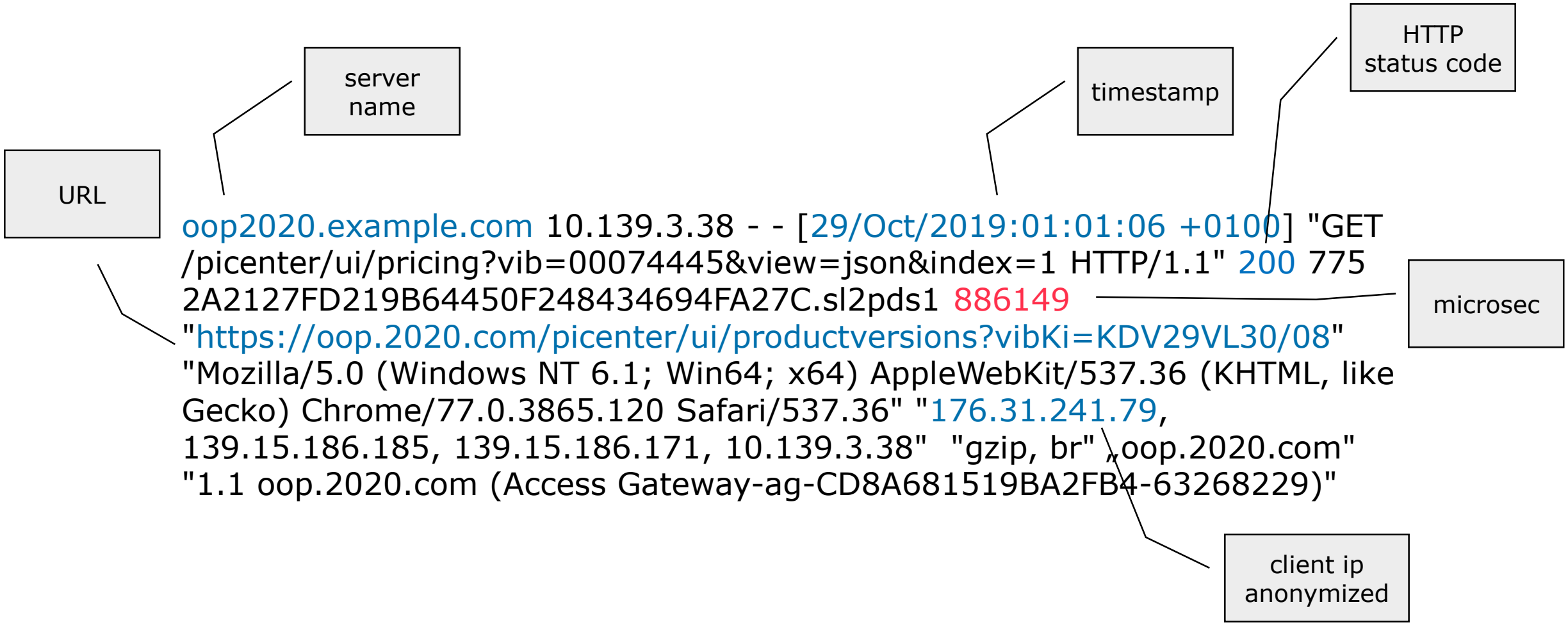
Distribution of application errors

SLAs (response time) of services offered

SLAs (response time) of external services

"Everything fails all the time"
Werner Vogels, Amazon CTO

Sample apache logfile



https://httpd.apache.org/docs/2.4/logs.html#combined

Smoke Tests

XRAY

<< manual >>

	Key	Summary	Requirements	#Test Executions	Issue Assignee	Latest Status
▼	PIST-343	PICENTER-615 : Extend tracking for error handling : Validation	PICENTER-615, PICENTER-606	1	*Unassigned*	PASS

Key	Summary	Environment	Status
PIST-346	Test Execution for Test Plan PIST-341	BSH_Q de-mucbsh06	PASS

▶	PIST-344	PICENTER-615 : Extend tracking for error handling : Error pages	PICENTER-615, PICENTER-606	1	*Unassigned*	PASS
▶	PIST-345	PICENTER-615 : Extend tracking for error handling : Ajax	PICENTER-615, PICENTER-606	1	*Unassigned*	PASS

Showing 1 to 3 of 3 entries

<< automated >>

Scenario: Loading tab Bill of materials from E-number details page (1 1 5)

- **When** the user searches for a product named 'WAN28062NL' by entering it in the search field, and hitting enter
- **And** the corresponding product details page is displayed + Show Error
- **When** the user clicks on the e-number button
- **And** the user selects the last item from drop down list
- **Then** the user gets redirected to e-number details page
- **And** the user navigates on 'Bill of materials' tab
- **Then** the corresponding Bill of materials tab is displayed with a list of product parts

Bamboo

cucumber

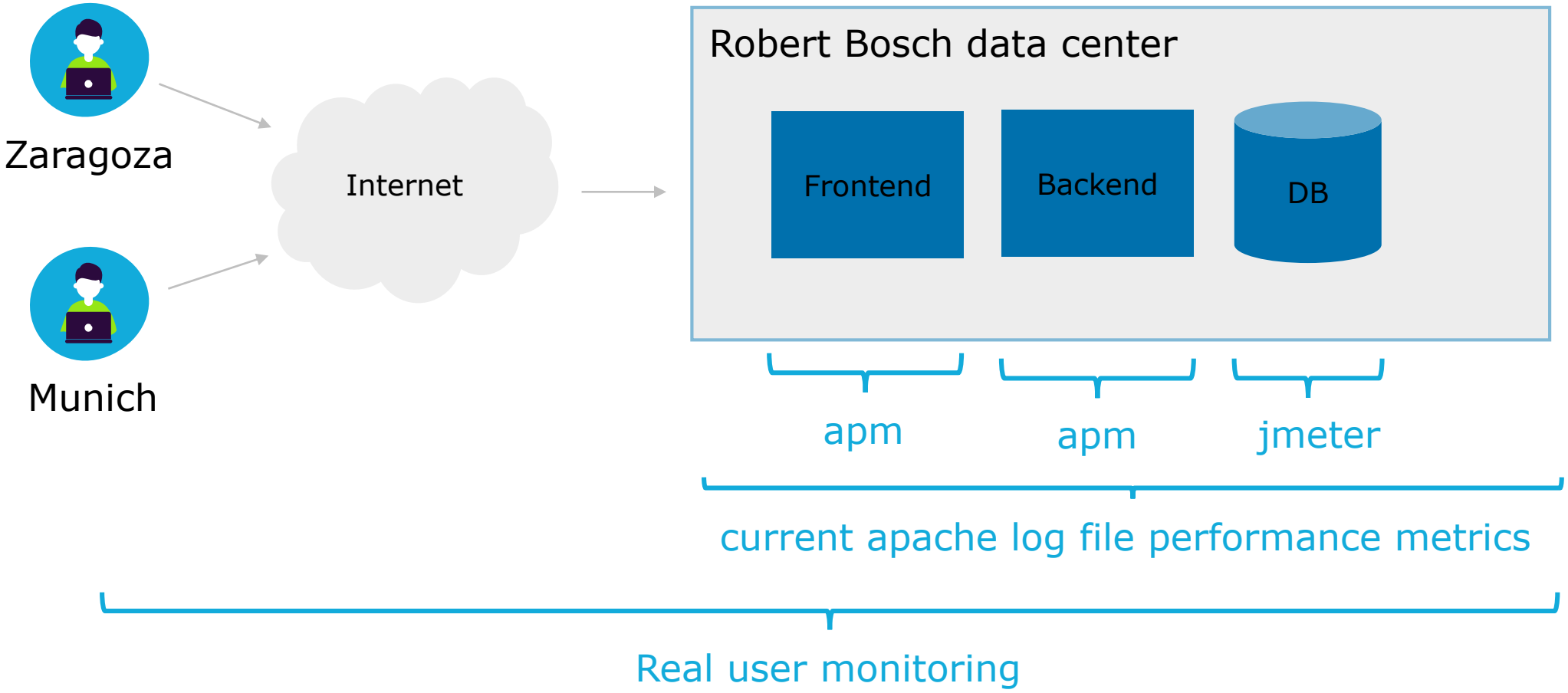
Se

Incident

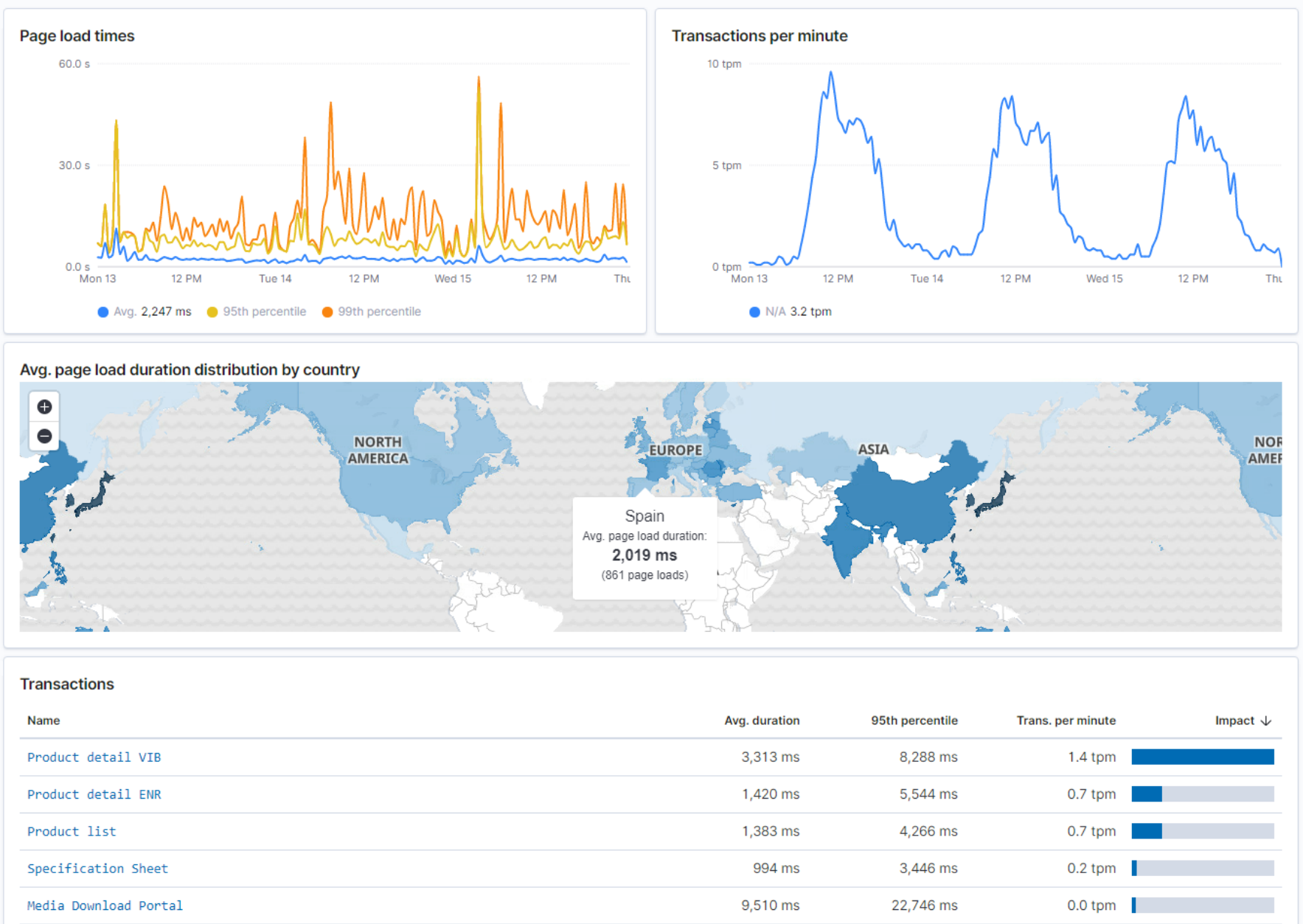
Ticket-1234 : PICenter connection. Performance problems.

[…] **complains from corporate business** about the performance problems from PIC. [...] What they have verified is the **leased bandwidth and / or general speed to Stuttgart is not everywhere the same**, e.g. **Munich** and **Zaragoza** may widely differ (Zaragoza significantly worse).

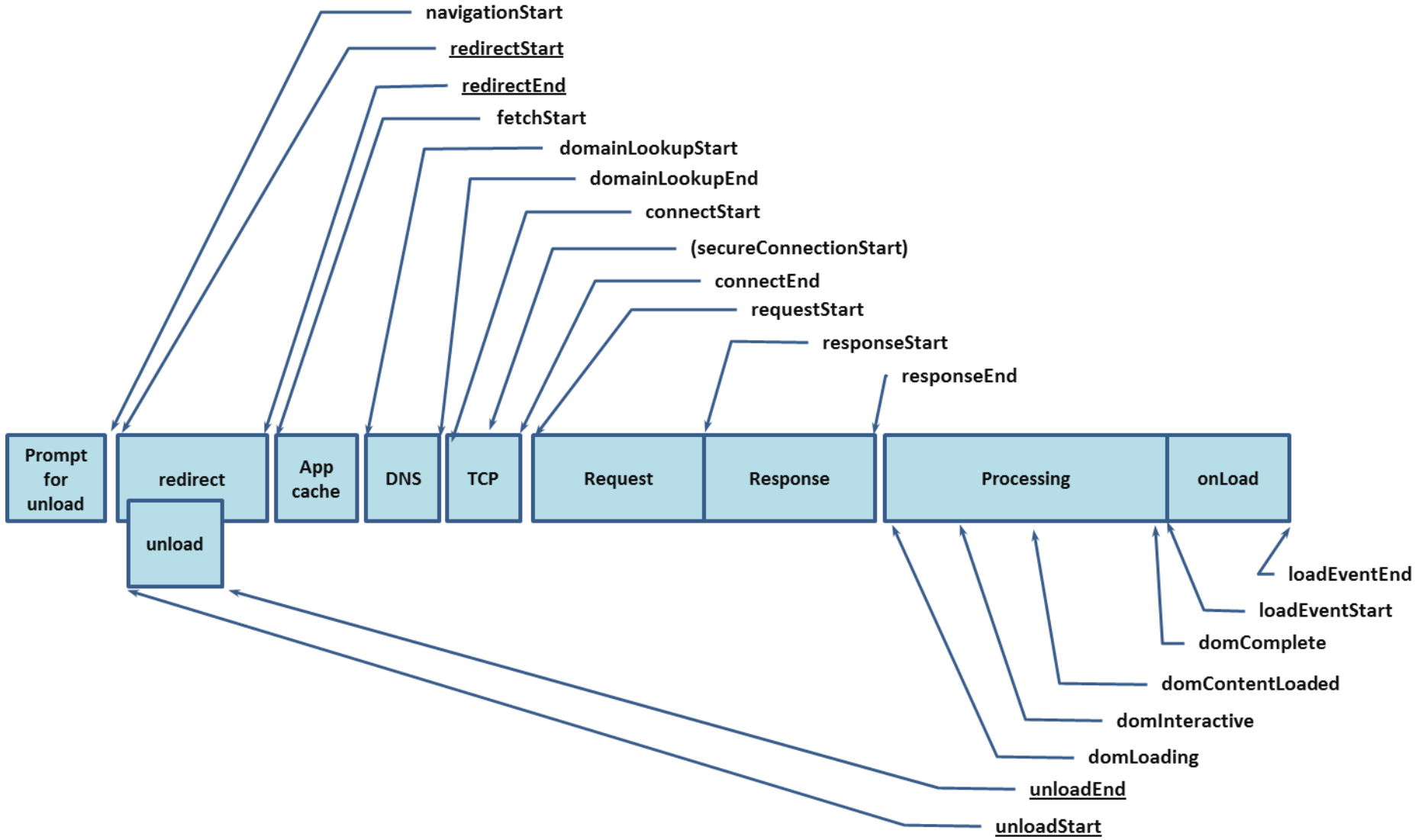
Performance monitoring with RUM



Real User Monitoring

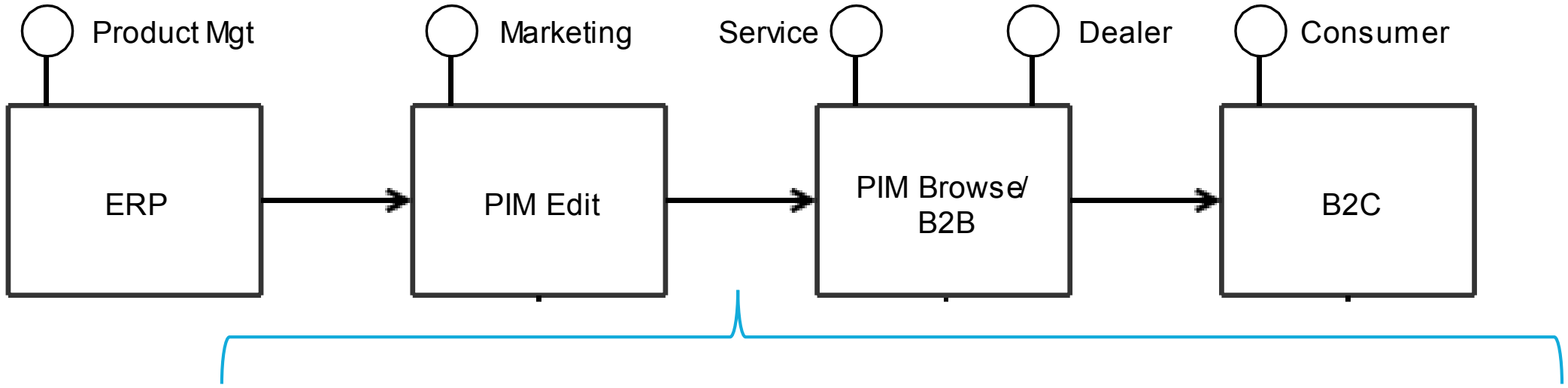


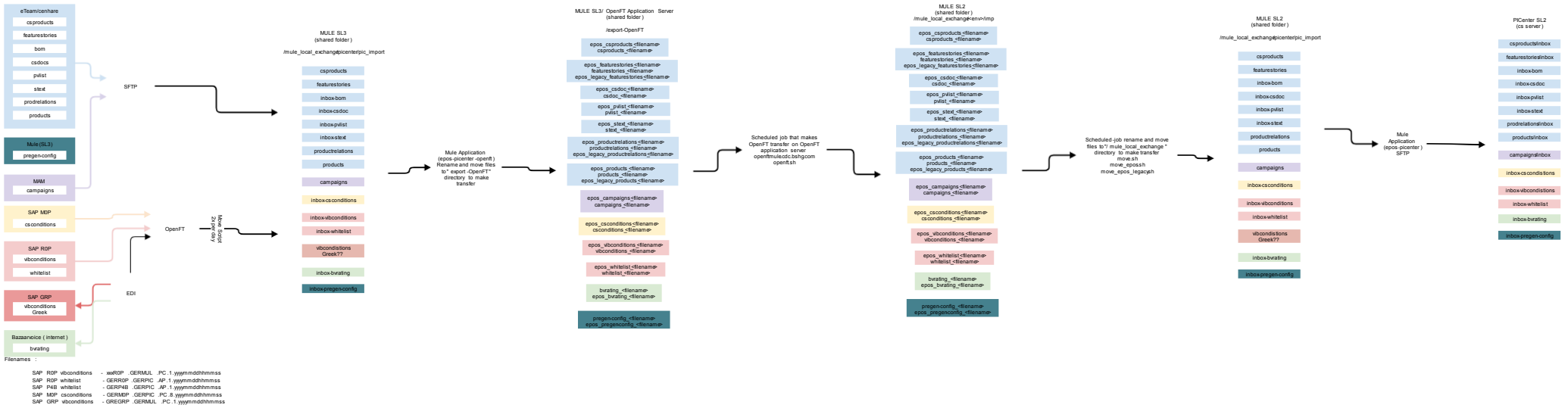
Navigation API (implemented in browser)



https://www.w3.org/TR/navigation-timing/

Product Information Management – Functional decomposition





Digital description of a product

PICenter
Product Information Center

Products **Tools**

Back

Serie | 8, Wärmepumpen-Trockner, 8 kg

WTW875W0

★★★★★ 4.7 | 55 Bewertungen

40 von 41 (98%) der Rezensenten empfehlen dieses Produkt

Unser Wärmepumpentrockner mit A+++ und SelfCleaning Condenser™: Beste Leistung garantiert - bei dauerhaft niedrigem Energieverbrauch.

- Energieeffizienz A+++: trocknet am sparsamsten.
- SelfCleaning Condenser™: nie wieder manuell reinigen, ein Geräteleben lang mit bester Energieeffizienz.
- SensitiveDrying System: gleichmäßiges, sanftes Trocknen dank einzigartiger Trommelstruktur.
- ComfortControl: leichte Übersicht und Bedienung dank intuitiver Benutzeroberfläche.
- Betriebsgeräusch 62 dB: trocknet besonders leise.

Highlights **Details** **Technical data** **Special accessories** **Reviews**

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   ▼<Text-Item textblock-name="TBPVM_H00_EU2010_Nennkapazität Baumwolle_rated capacity cotton">
      Nennkapazität für das Standard-Baumwollprogramm bei vollständiger Befüllung: 8 kg Baumwollwäsche
    </Text-Item>
   ▼<Text-Item textblock-name="TBPVM_H_EU2010_Kondensation_mit_Wärempumpmentechnologie">
      Trocknerart: Kondensation mit Wärmepumpentechnologie
    </Text-Item>
   ▼<Text-Item textblock-name="TBPVM_H00_EU2010_Energieeffizienklasse_Energy efficiency class">
      Energieeffizienzklasse: A+++ auf einer Energieeffizienzklasse-Skala von A+++ bis D
    </Text-Item>
   ▼<Text-Item textblock-name="TBPVM_H00_EU2010_VerbrauchJahr-Energie_ConsumptionAnnual-Energy">
      Energieverbrauch von 176.0 kWh/Jahr auf der Grundlage von 160 Trocknungszyklen für das Standard-Baumwollprogr
      Betriebsarten mit geringer Leistungsaufnahme. Der tatsächliche Energieverbrauch je Zyklus hängt von der Art d
    </Text-Item>
   ▼<Text-Item textblock-name="TBPVM_H00_EU2010_Verbrauch-Energie_Consumption-Energy">
      Energieverbrauch des Standard-Baumwollprogramms bei vollständiger Befüllung 1.46 kWh und Energieverbrauch des
    </Text-Item>
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      Leistungsaufnahme im Aus-Zustand 0.1 W und im nichtausgeschalteten Zustand 0.1 W
    </Text-Item>
    <Text-Item textblock-name="TBPVM_H00_EU2010_Dauer des ungeschalteten Zustands_Duration of left-on mode">Dauer d
   ▼<Text-Item textblock-name="TBPVM_H00_EU2010_Hinweis-VergleichsProgramm_Indication-StandardProgramme">
      Das Programm Baumwolle schranktrocken ist das Standard-Trockenprogramm, auf die sich die Informationen auf de
      nasser Baumwolltextilien geeignet und in Bezug auf den Energieverbrauch für Baumwolle am effizientesten.
    </Text-Item>
   ▼<Text-Item textblock-name="TBPVM_H00_EU2010_Gewichtete ProgrammDauer_Weighted ProgrammeDuration">
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    </Text-Item>
   ▼<Text-Item textblock-name="TBPVM_H00_EU2010_durchschnittliche Kondensationseffizienz_AverageCondensationEfficie
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      Teilbefüllung 89 %.
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      Feinwäsche
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```

From scripts to graphs

Scripts executed twice a day

```
Importer                        Inbox (part)    Failed          Update Time (log)
campaigns/inbox                 0               0               Feb 2 16:48
csproducts/inbox                0               0               Feb 2 16:49
featurestories/inbox            1 (1)           0               Feb 2 16:49
inbox-bom                       0               0               Feb 2 16:49
inbox-bvrating                  0               0               Feb 2 16:49
inbox-csconditions              0               0               Feb 2 16:49
inbox-csdoc                     0               0               Feb 2 16:49
inbox-pvlist                    0               0               Feb 2 16:49
inbox-safetyinformation         0               0               Feb 2 16:49
inbox-stext                     0               0               Feb 2 16:49
ls: cannot access /coremedia/var/log/pic-cms-tools/pic-itext-importer.log: No such file or directory
inbox-text                      0               0
inbox-vibconditions             0               0               Feb 2 16:49
inbox-whitelist                 1 (1)           0               Feb 2 16:49
productrelations/inbox          2 (2)           0               Feb 2 16:49
products/inbox                  0               1               Feb 2 16:49
products/inbox-epos             1 (1)           3               Feb 2 16:45     PID count: 0
Get last update time for logs
Feeder                          si0vm02830      si0vm02831      si0vm02832      si0vm02844      si0vm02845
feeder-ceobject-observer        Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-ceobject-process         Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-bom-db-process           Jan 31 23:51    Jan 21 10:58    Jan 21 11:01    Jan 20 17:15    Jan 21 10:53
feeder-bom-observer             Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-bom-process              Jan 31 23:51    Jan 31 23:53    Jan 31 23:51    Jan 31 23:54    Jan 31 23:51
feeder-csdocument-db-process    Jan 31 14:52    Jan 21 10:59    Jan 21 11:01    Jan 20 17:16    Jan 21 10:54
feeder-csdocument-observer      Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-csdocument-process       Jan 31 14:52    Jan 31 14:56    Feb 2 16:49     Jan 31 14:56    Feb 2 16:49
feeder-product-observer         Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-product-process          Feb 2 16:49     Feb 2 16:48     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-pvlist-db-process        Jan 27 15:01    Jan 21 11:00    Jan 21 11:03    Jan 20 17:17    Jan 21 10:55
feeder-pvlist-observer          Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-pvlist-process           Jan 27 15:01    Jan 27 15:02    Jan 27 15:01    Jan 27 15:02    Jan 27 15:01
Get last update time for heartbeats
Feeder                          si0vm02830      si0vm02831      si0vm02832      si0vm02844      si0vm02845
feeder-ceobject-observer        Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-ceobject-process         Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-bom-db-process           Feb 2 16:49
feeder-bom-observer             Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-bom-process              Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-csdocument-db-process    Feb 2 16:49
feeder-csdocument-observer      Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-csdocument-process       Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-product-observer         Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-product-process          Feb 2 16:48     Feb 2 07:26     Feb 2 12:49     Jan 31 17:27    Feb 2 07:26
feeder-pvlist-db-process        Feb 2 16:49
feeder-pvlist-observer          Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
feeder-pvlist-process           Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49     Feb 2 16:49
```

Visualizations

Searching in Queues

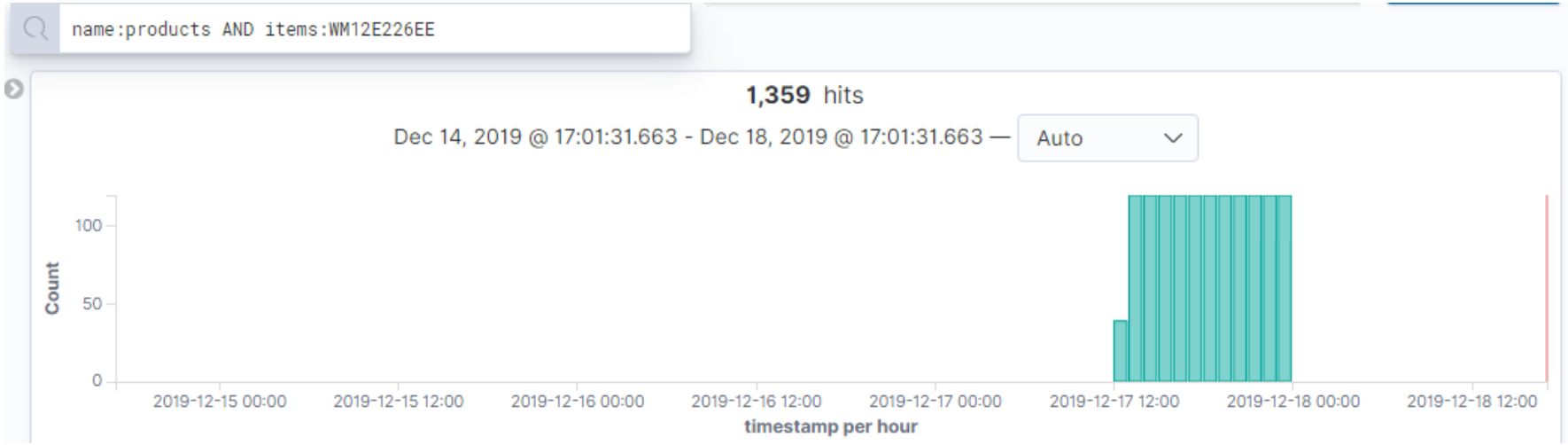
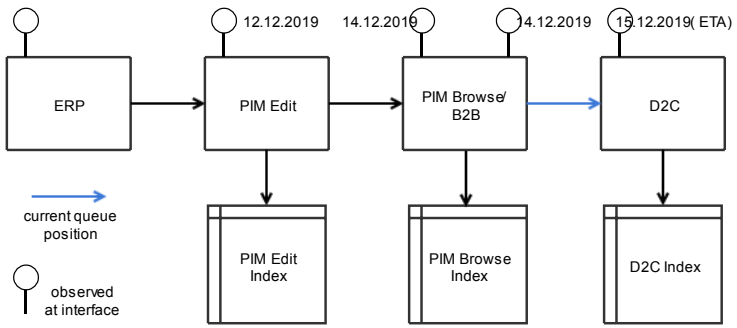


Table JSON

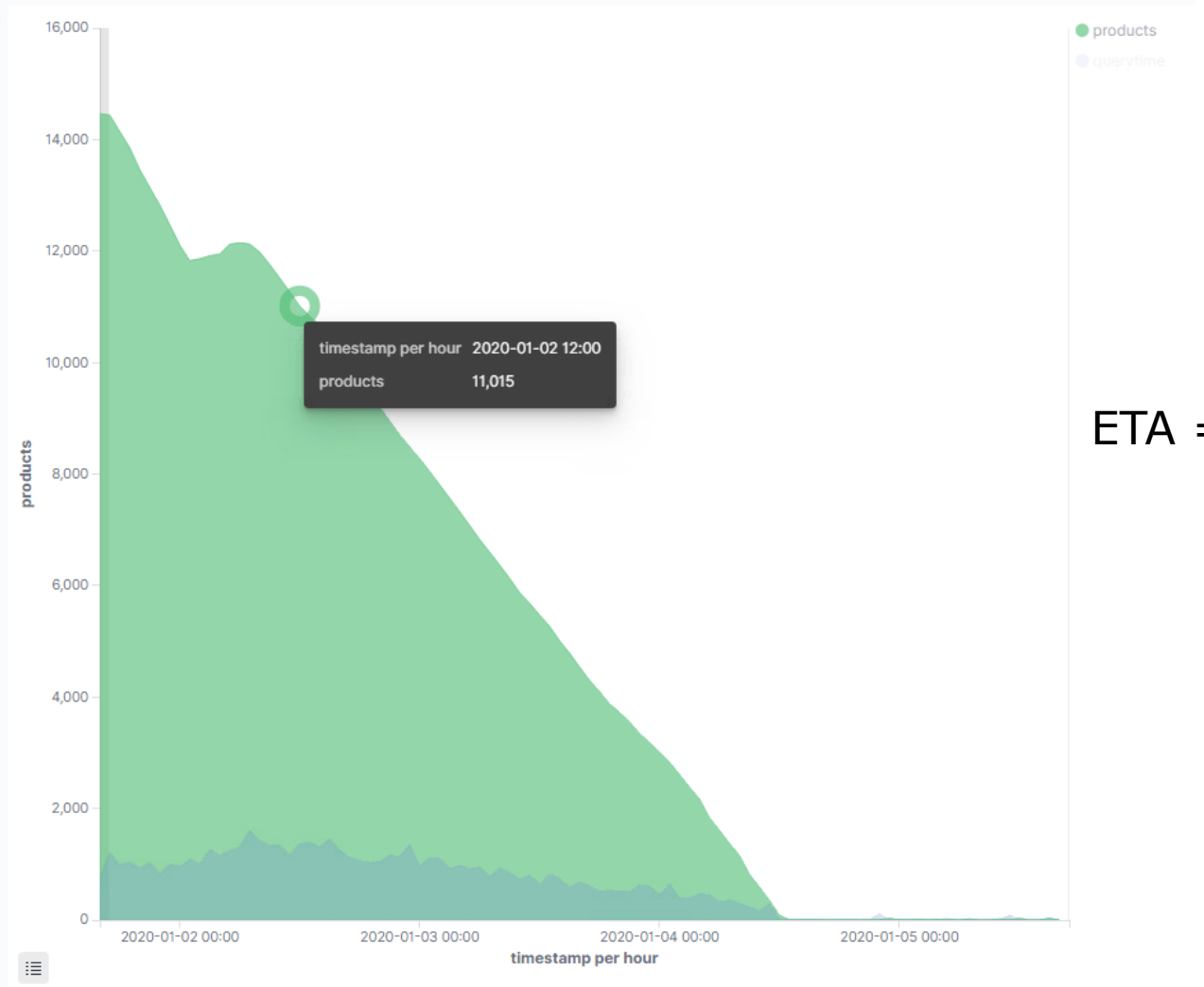
t _id	OJu--G8BHMxyWyfi0lif
t _index	queues
# _score	-
t _type	_doc
t items	> BCH6ATH25 BBH73275 3TS988BP 3VN303IA HM676G0S6 BSGL32116 3VN303BA ED711FU60 BGLS4SIL1 CV282100CN KUL15A65L KUL15A65Y AC250121 CE291100 CM636GBW1 BHN20110 GS36VVW3VW GSV36V W3VW KF16L450L KF24LA60L SHVM4AYB3N KU15LA65L KU15RA6Y KU15LA65Y BBH216CR BSG62022 BB H214LA BBH21830L BHN14090 AC250190 CG280110 WAV28KH9GB BI830CNB1 KGN36NLEB KG260134F 3BF267EX TAT3A001 CB675GBS3 3TS992XD CI414103 MUZ4FW3 BGLS4K432 CE261212 BGB2UCARP BE 555LMS0 BM451110 KFR18A60L SHX84AYD5N KU15RA65L WM14Q478BU 3FF3762XE BBH2P163R DDD97B M60B DFL064W53 BCH87POW1 KGV392LEA BMP225110 KG291110 TAT3A011 EO351BK01 CE291110 GFD
t name	products
# querytime	272
# size	3,616
t tier	pic
timestamp	Jan 31, 2020 @ 00:17:32.890

product id 123456

queue	entered	left
pim edit inbox	12.12.2019 08:15 CET	12.12.2019 20:23 CET
pim browse inbox	12.12.2019 20:30 CET	14.12.2019 08:05 CET
d2c inbox	14.12.2019 08:10 CET	15.12.2019 08:00(ETA)

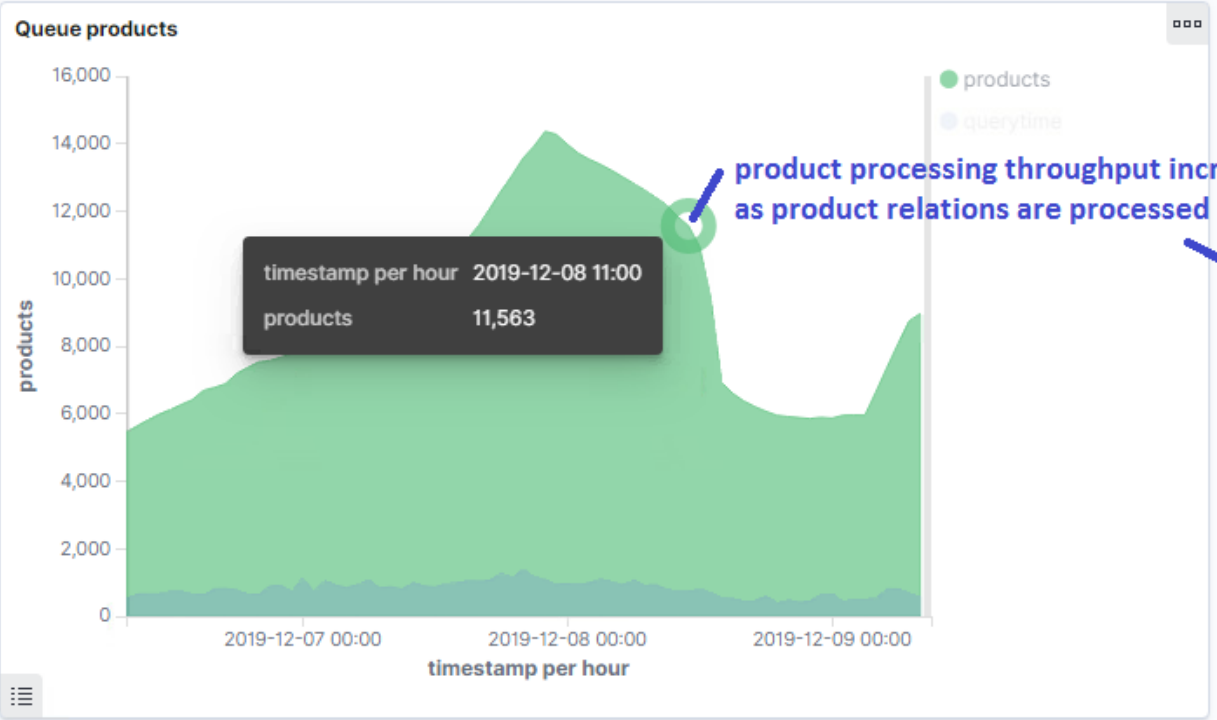


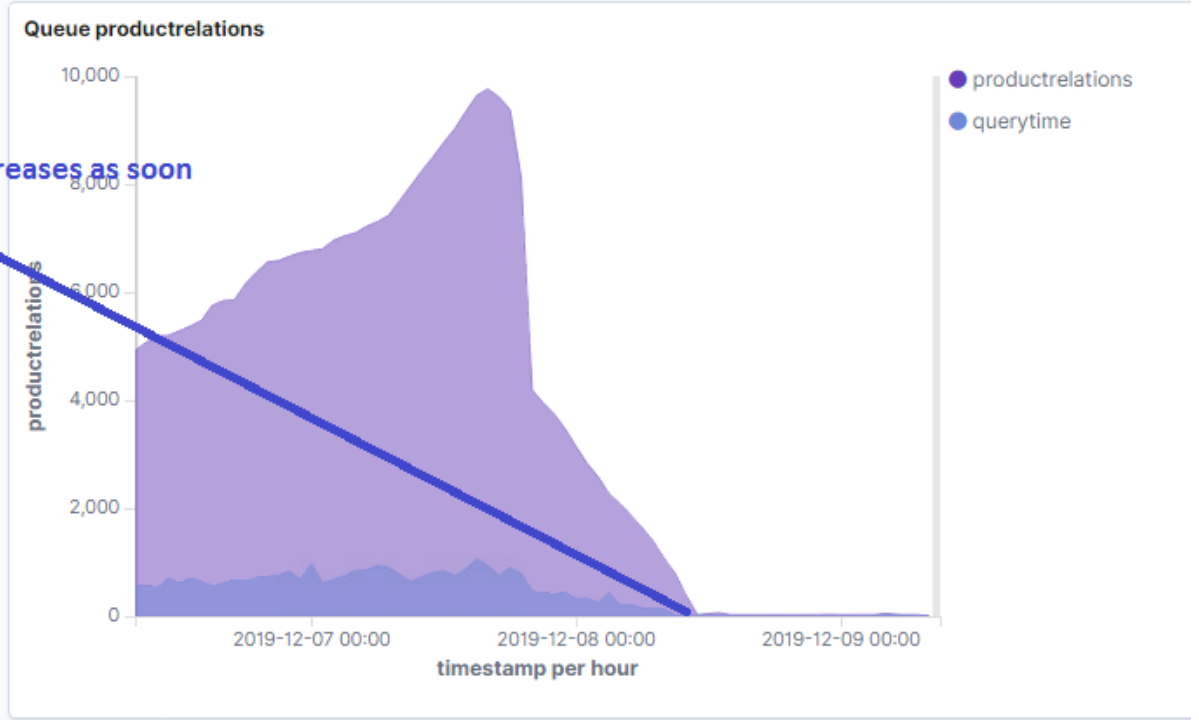
Predicting linear



ETA = queue items / processing throughput

Queue processing correlations



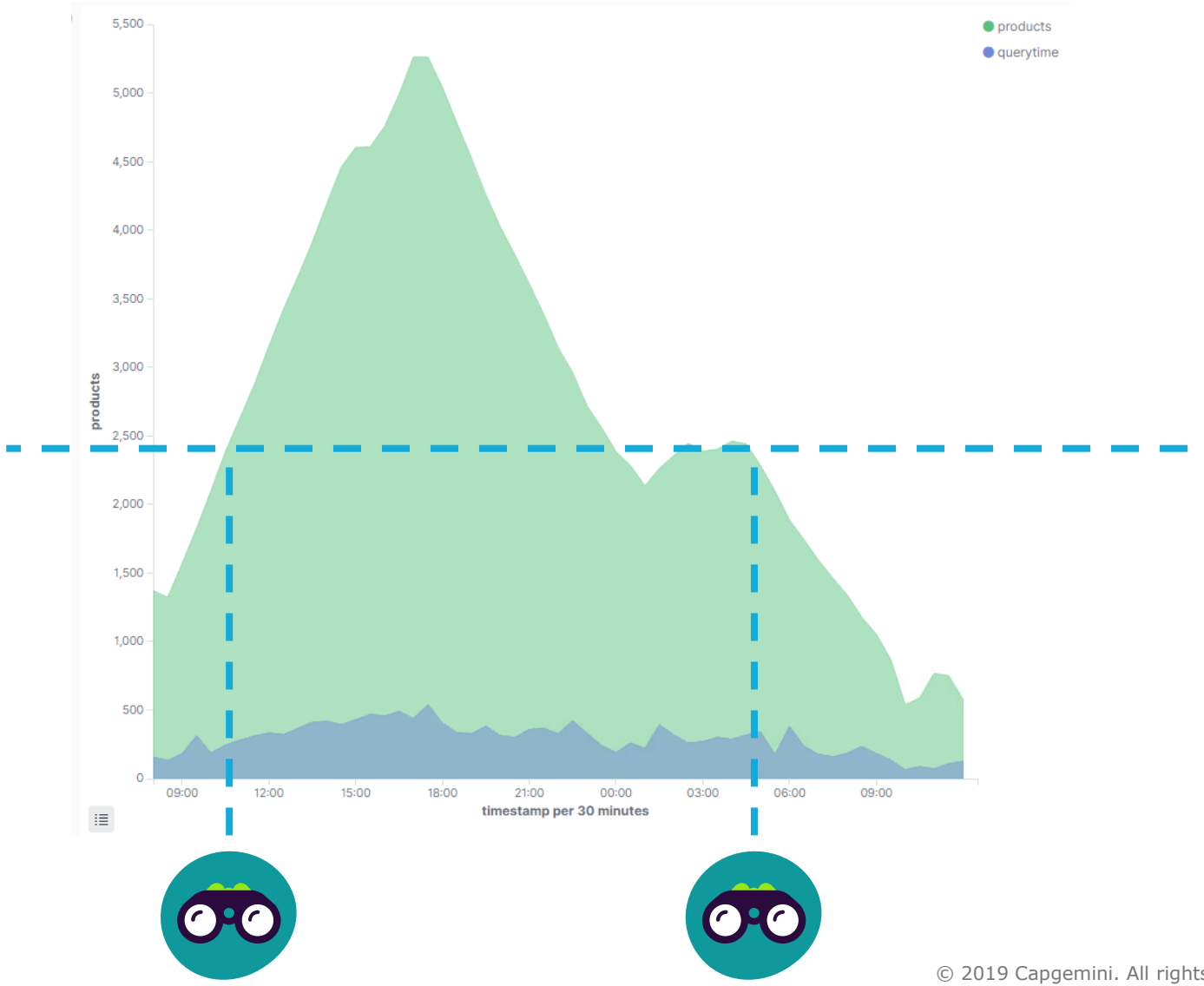


Queue processing depending on predecessor queue

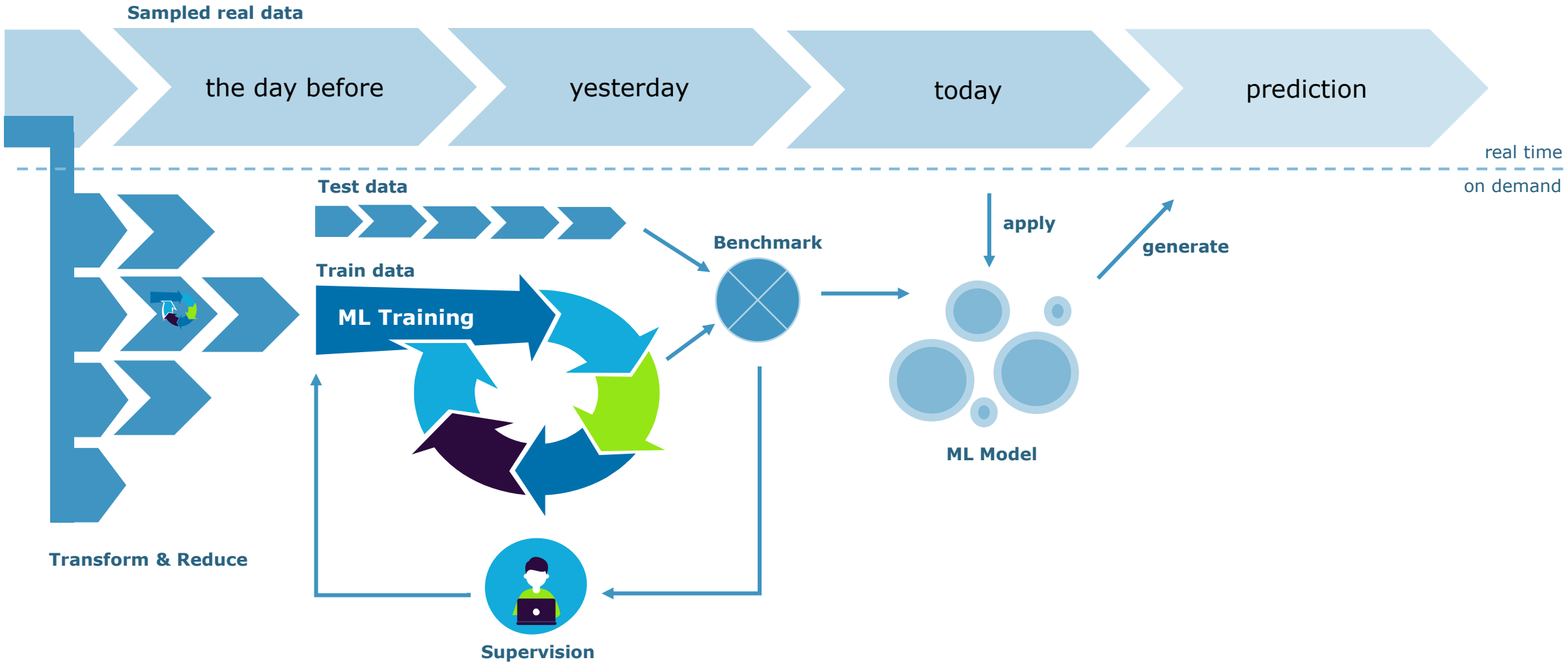
Watermark level is the same for both observation points.

Actual direction will depend on predecessor queue.

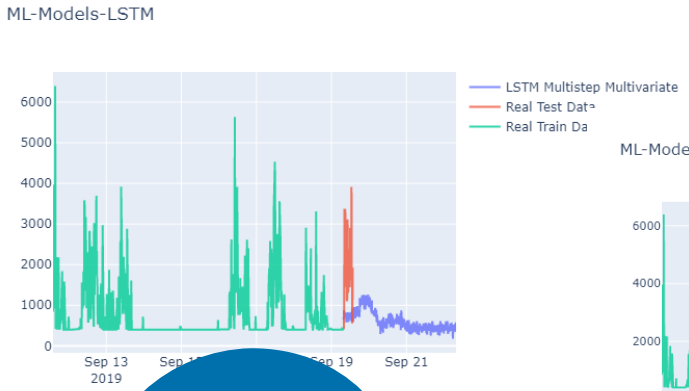
You'd have to consider all queues and run a drain to estimate the ETA.

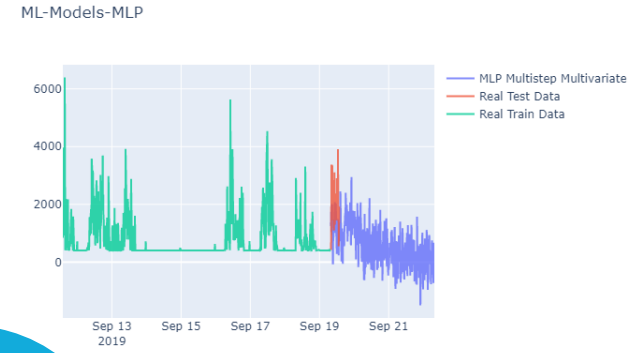


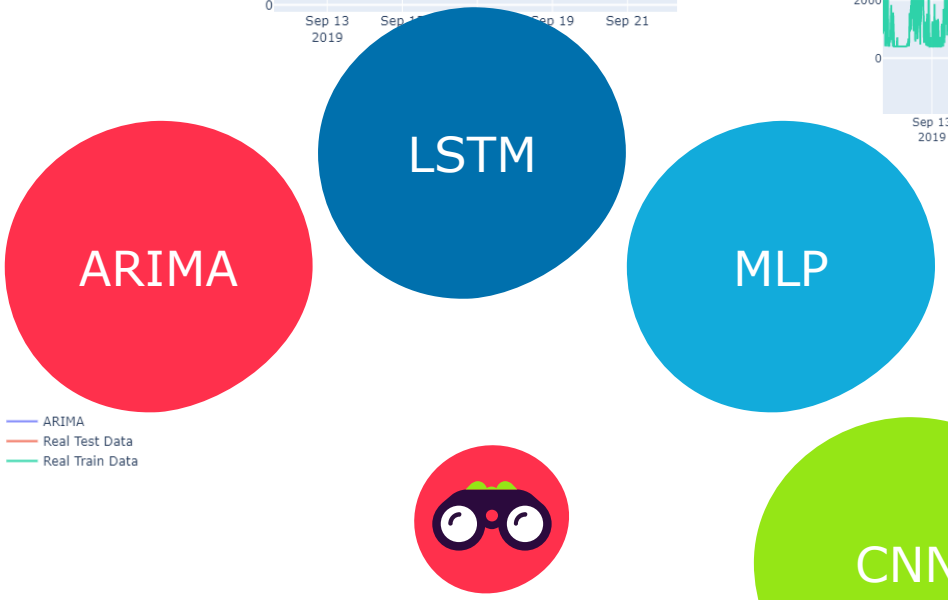
Machine learning process for time series data

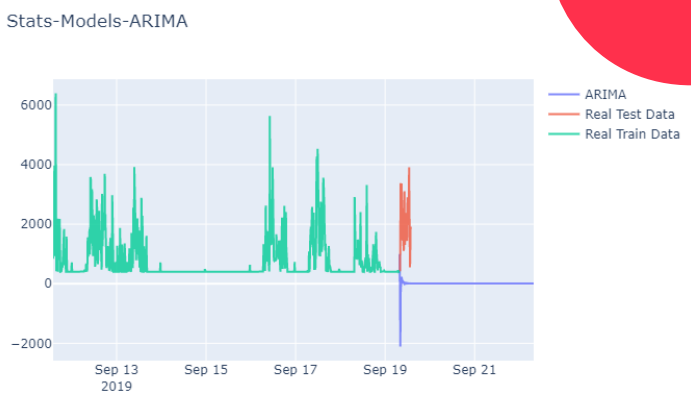


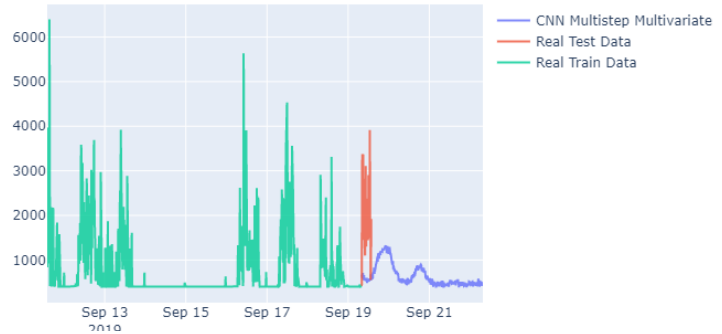
Supervision Process

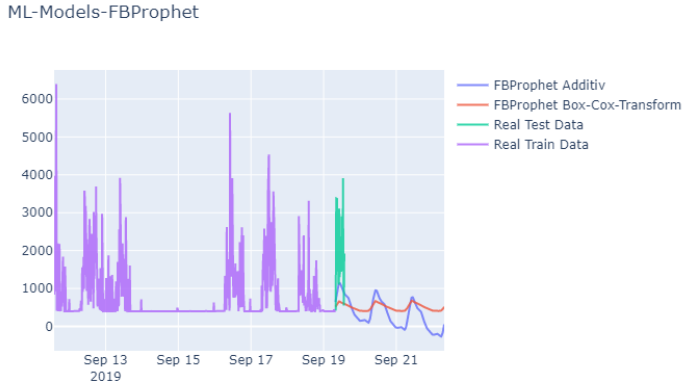






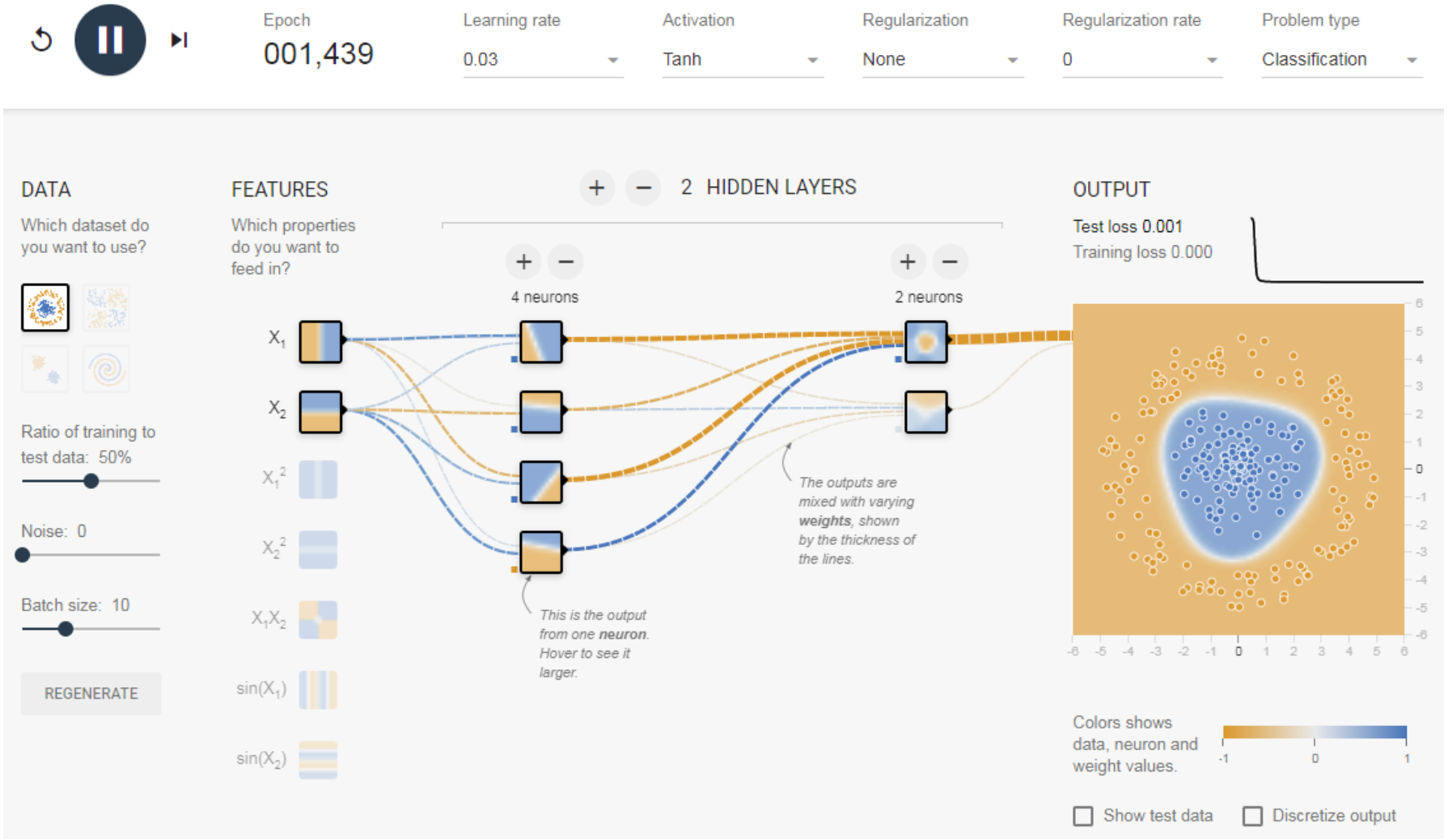






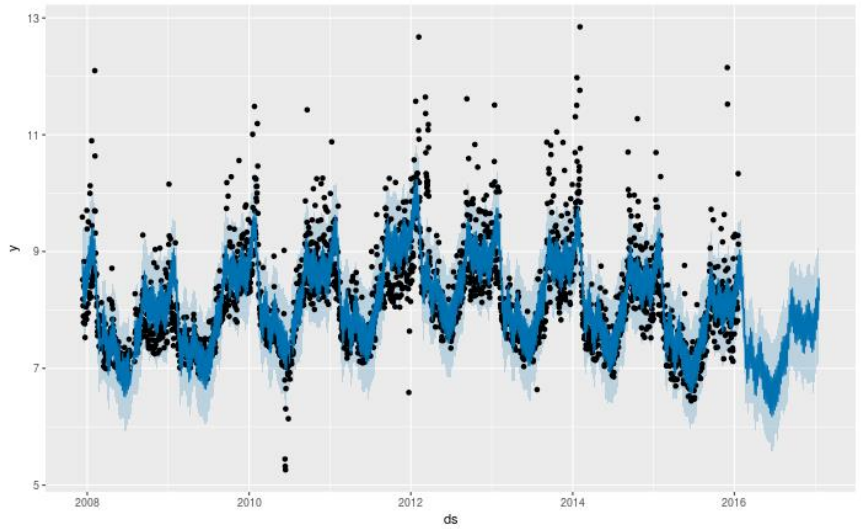
https://github.com/Sultanow/dc_cubes/tree/master/research

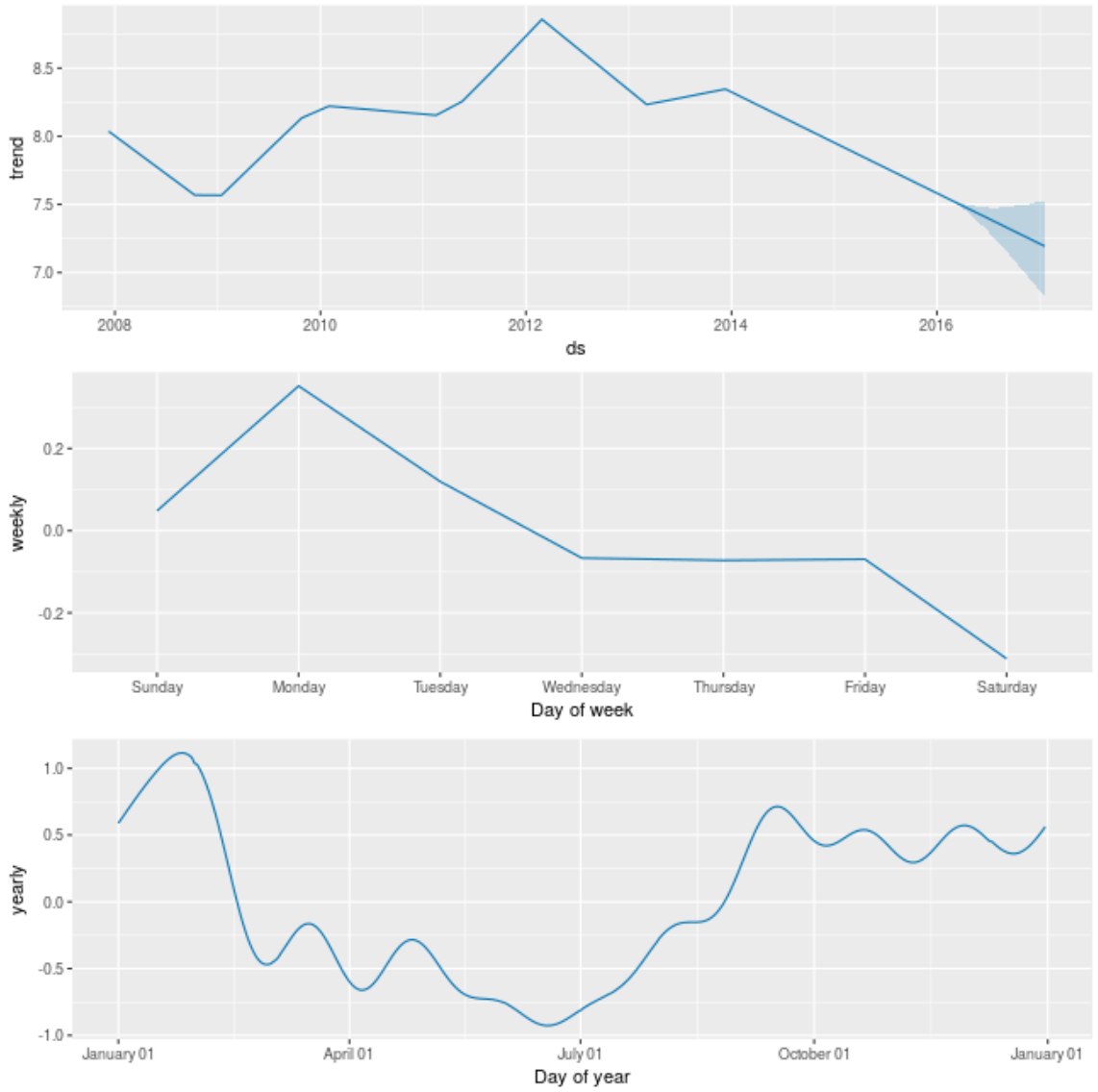
Artificial neural network



https://playground.tensorflow.org

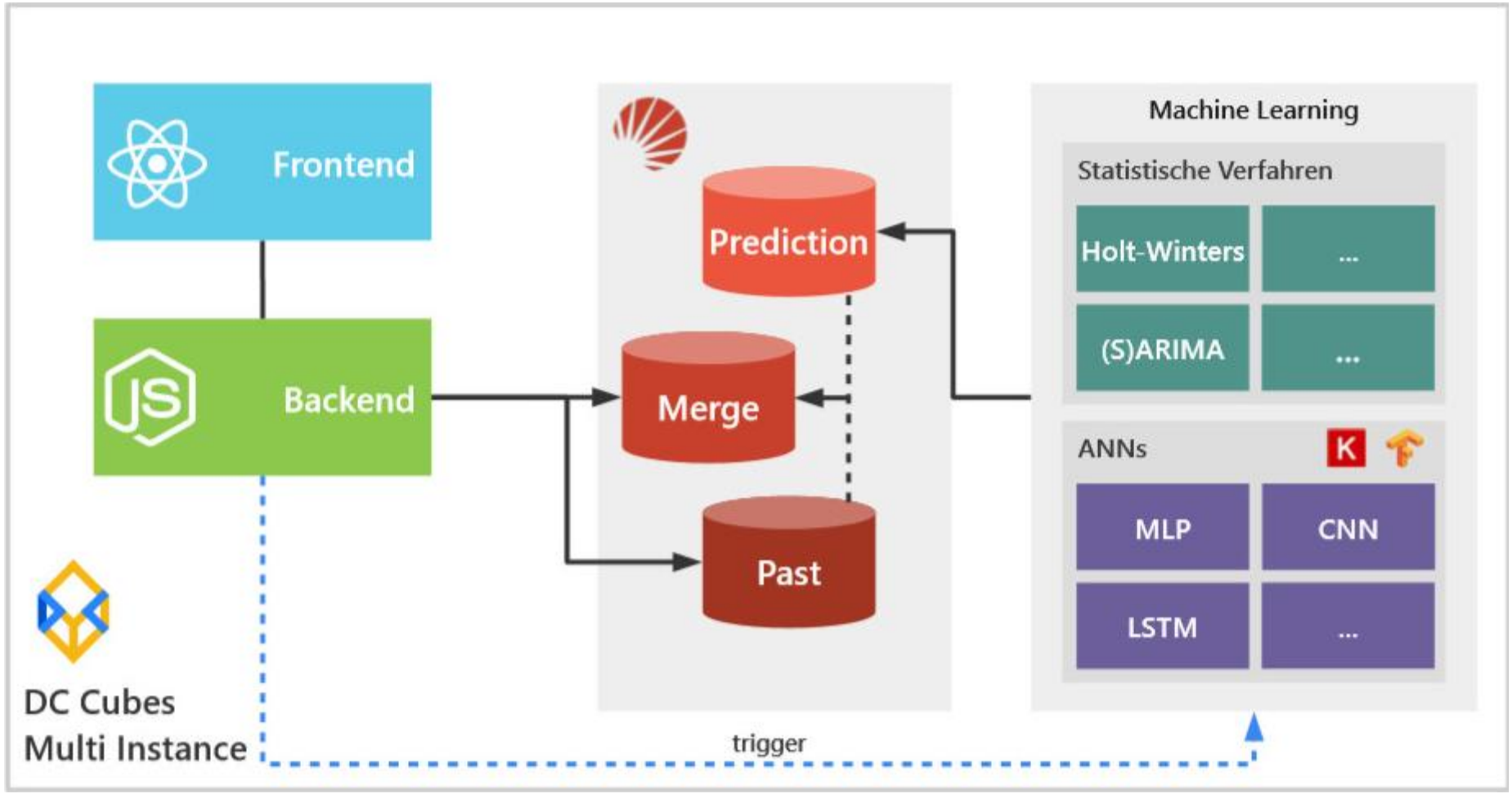
Statistical models : example Prophet



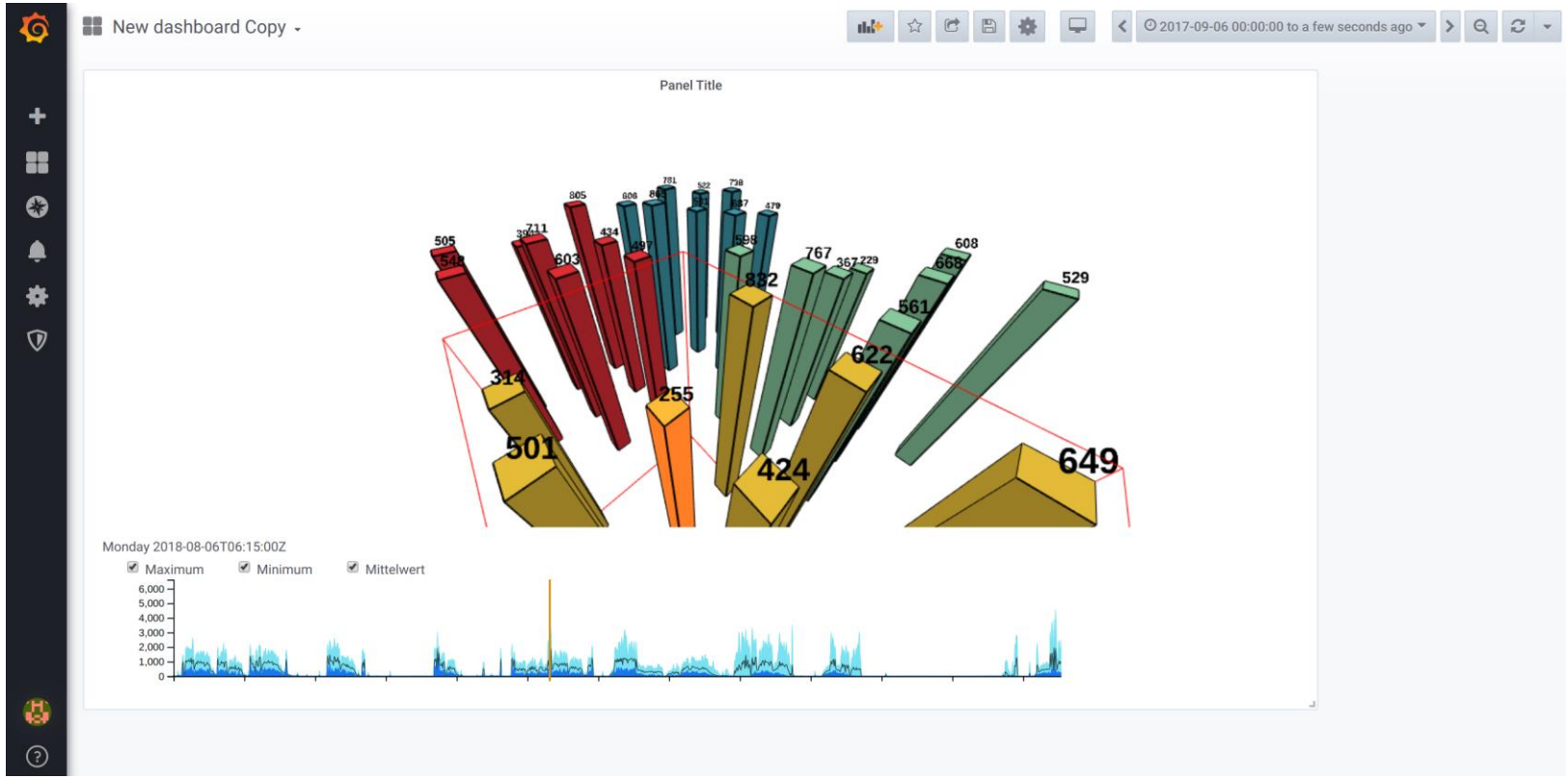


https://research.fb.com/blog/2017/02/prophet-forecasting-at-scale/

DC Cubes - High Level Architecture



DC Cubes – Live Demo



Available as

- Standalone
- Grafana Plugin

Recent work

- Elasticsearch Backend
- Kibana Plugin
- additional ML algorithms

https://github.com/Sultanow/dc_cubes

Summary – lessons learned

Visualize your operational data – it has never been easier

Identify operational optimization potential

Encounter new business value in your data

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tobias.hain@capgemini.com

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