RED HAT SUMMIT

MACHINE LEARNING WORKFLOWS FOR APPLICATION DEVELOPERS

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What you’ll learn today

Processes and principles to solve problems with ML

Some tricks to visualize complex data

How to train, evaluate, and deploy ML models

How OpenShift makes it all easier

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Forecast

What is machine learning?

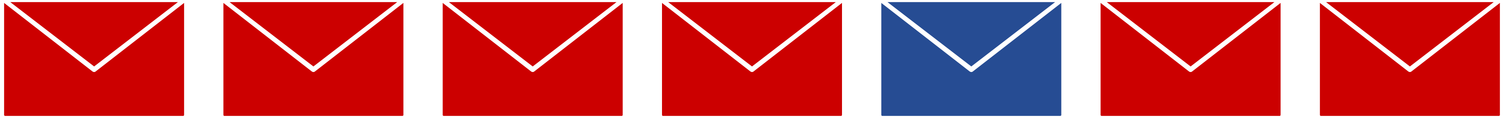
What workflow do machine learning practitioners use?

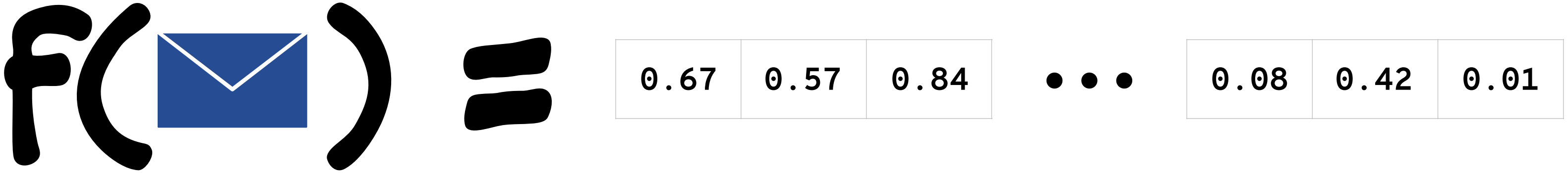
How can we incorporate machine learning into apps?

What do we have to look forward to?

What is machine learning?

Machine learning is a family of techniques to automatically derive executable functions from example inputs and outputs.





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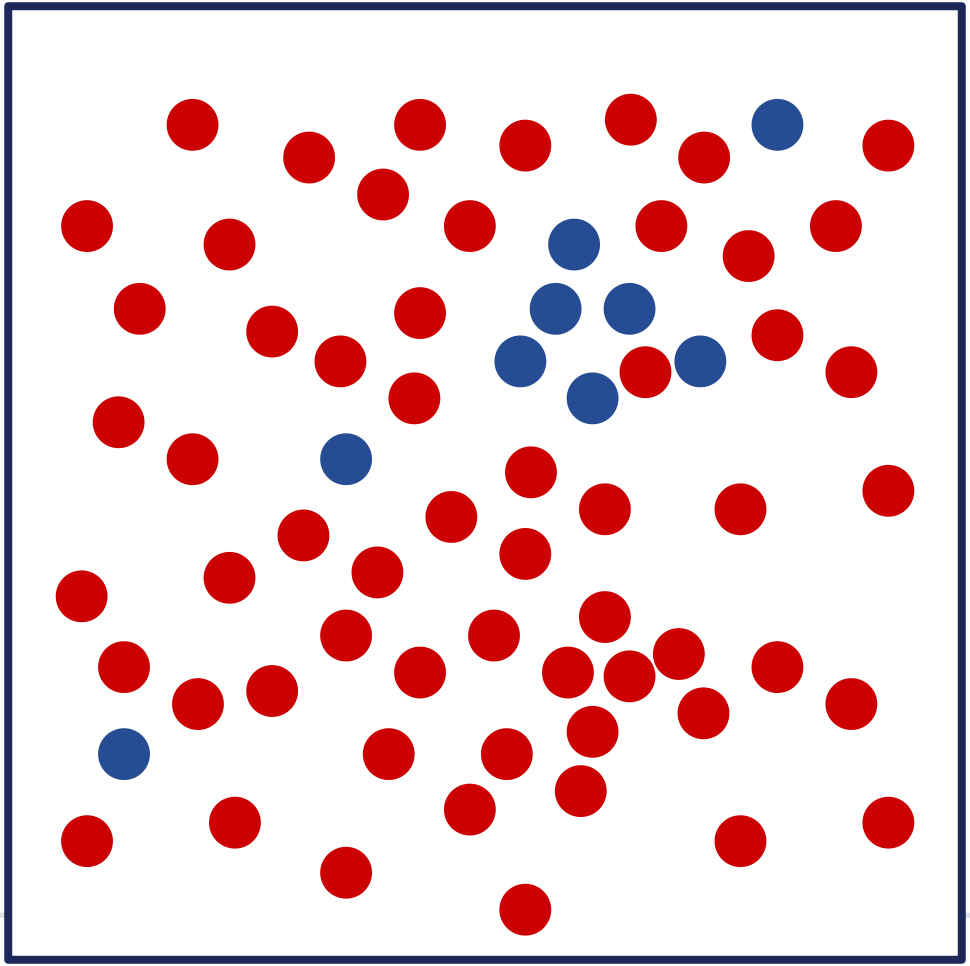
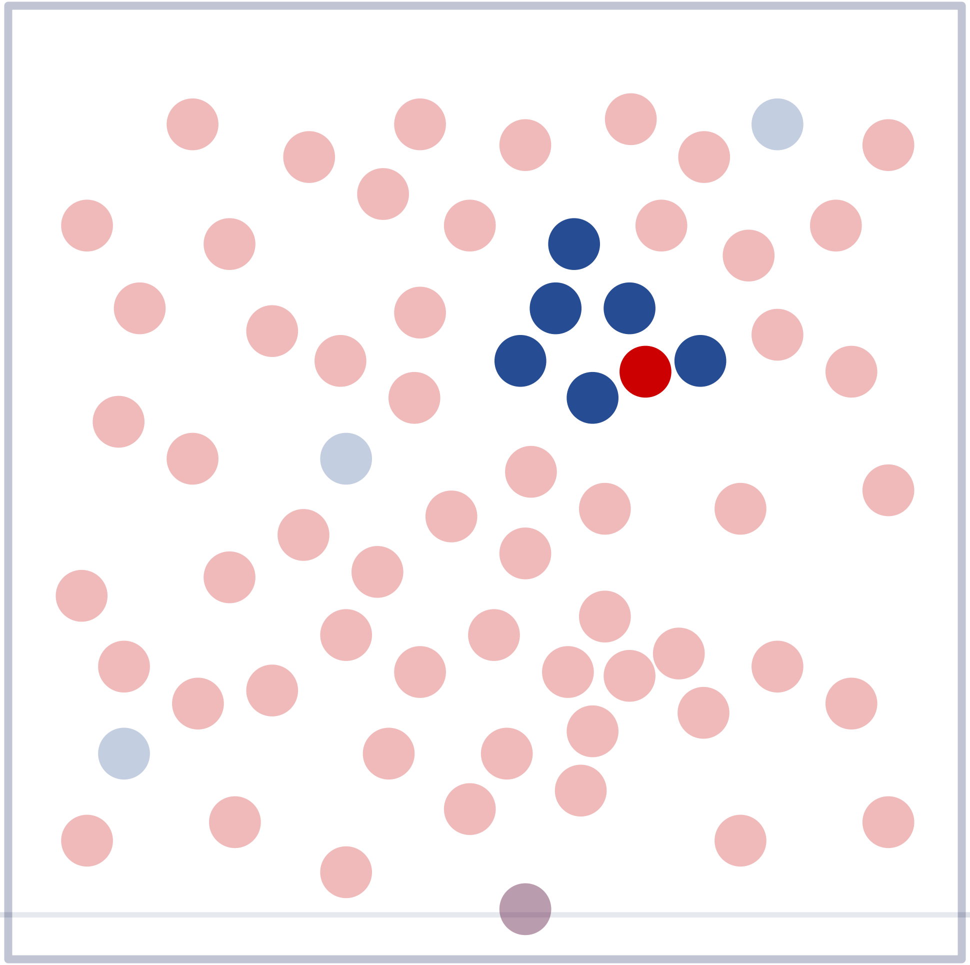
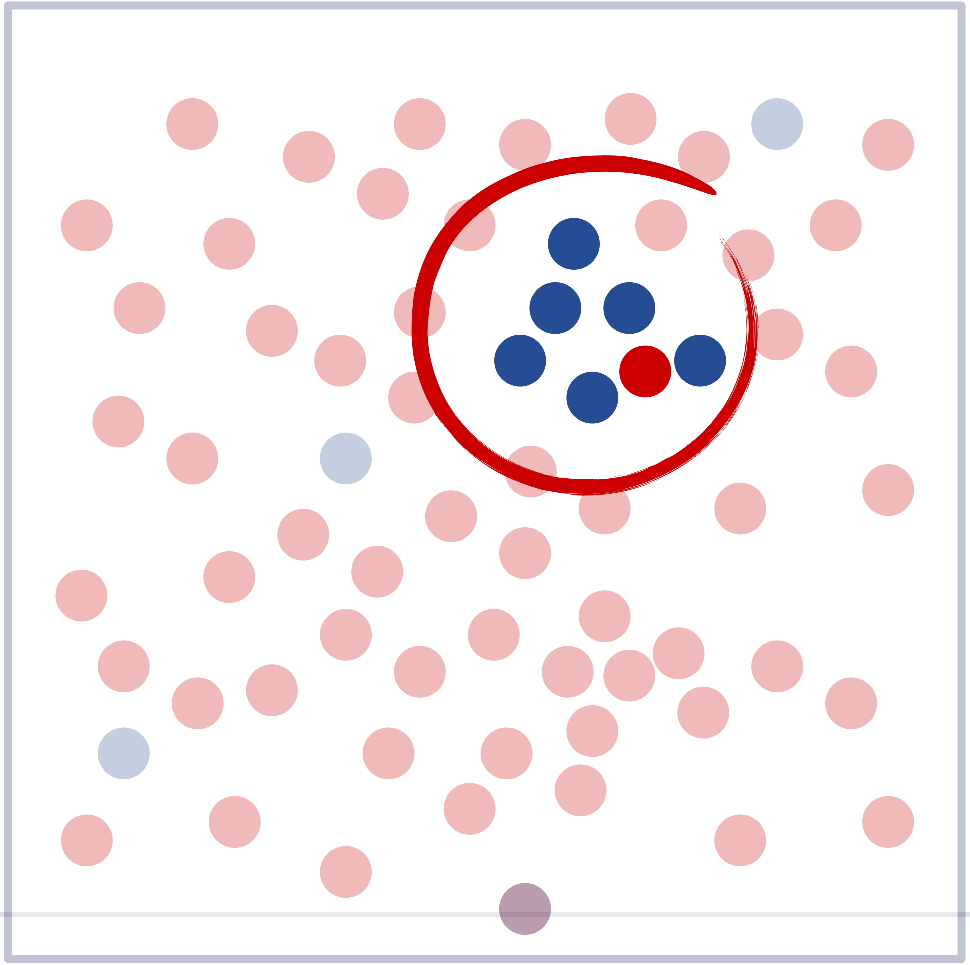
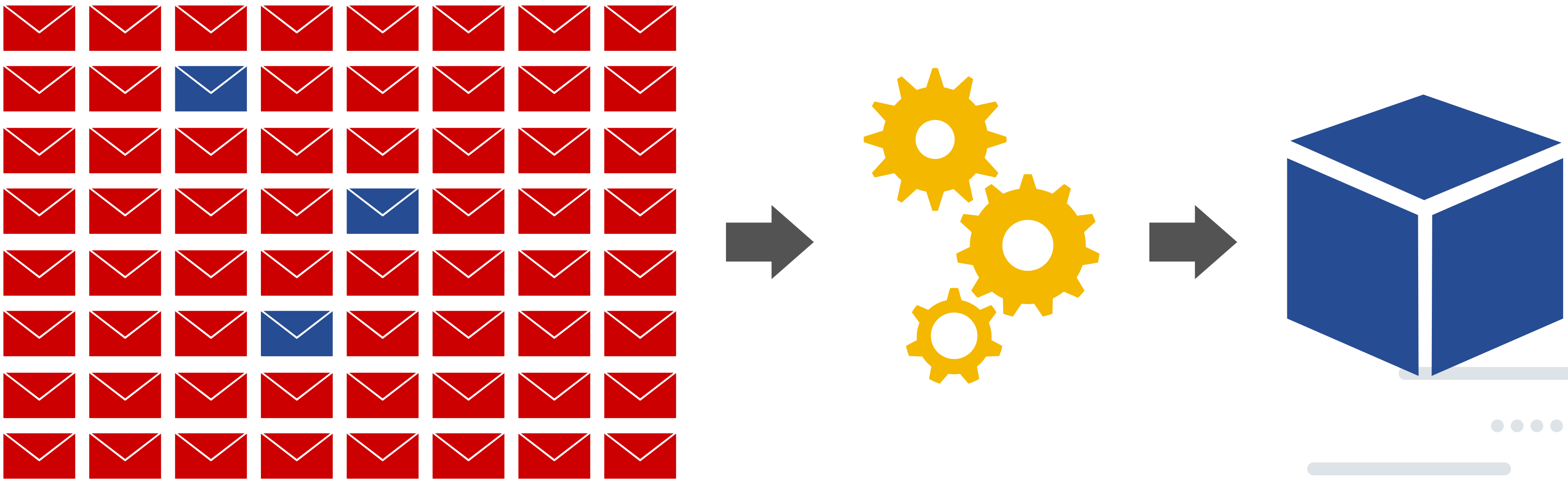
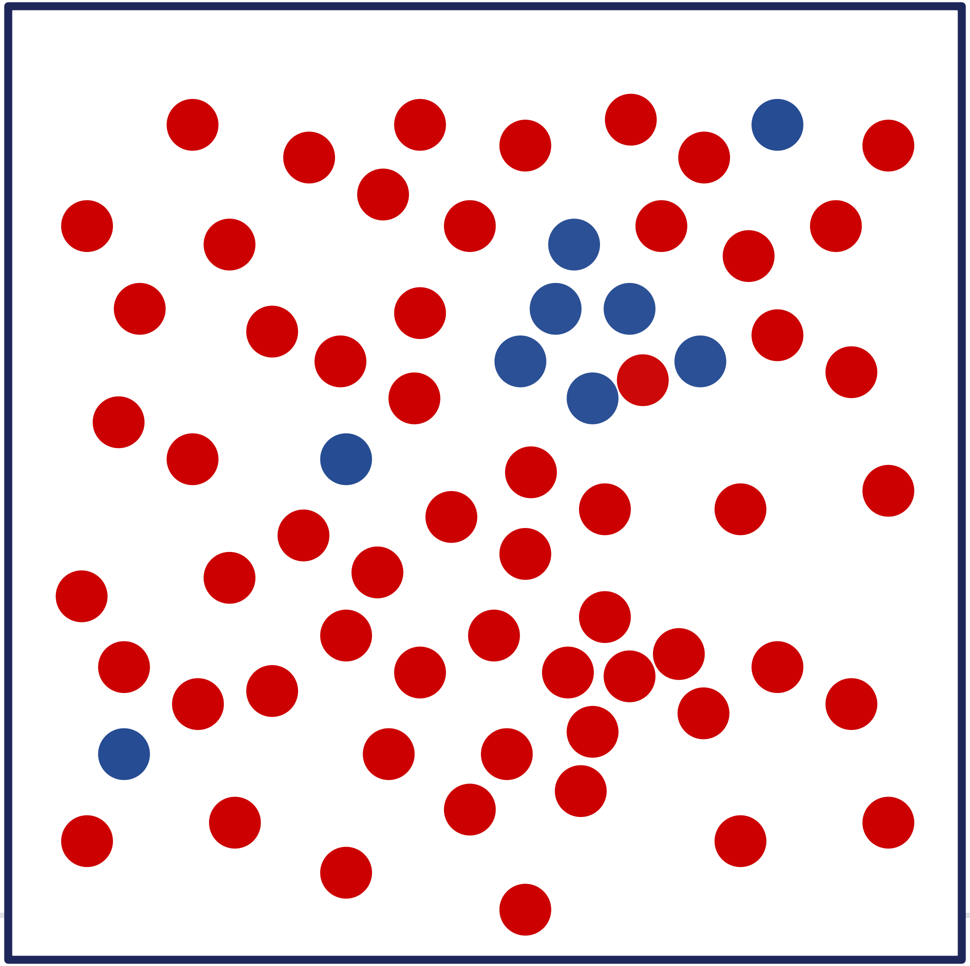
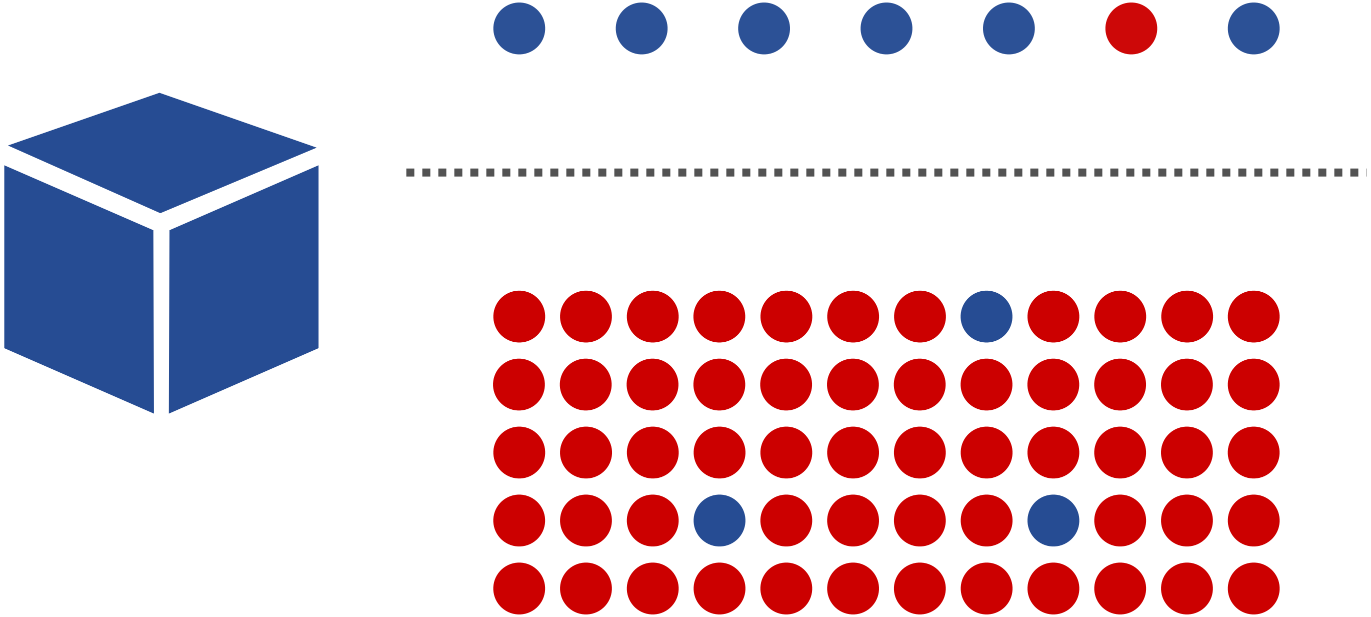












Machine learning workflows

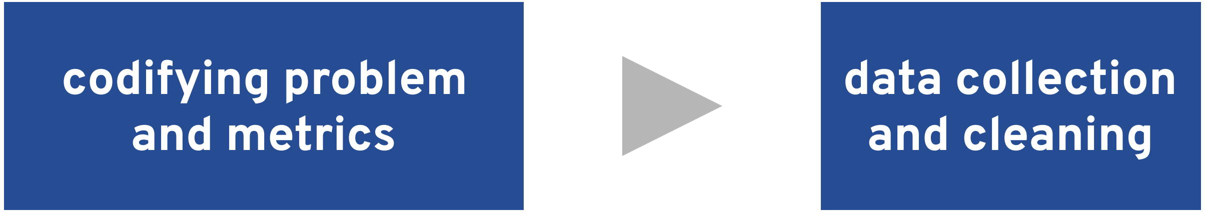
Machine learning checklist

Example data

A training objective and a business metric

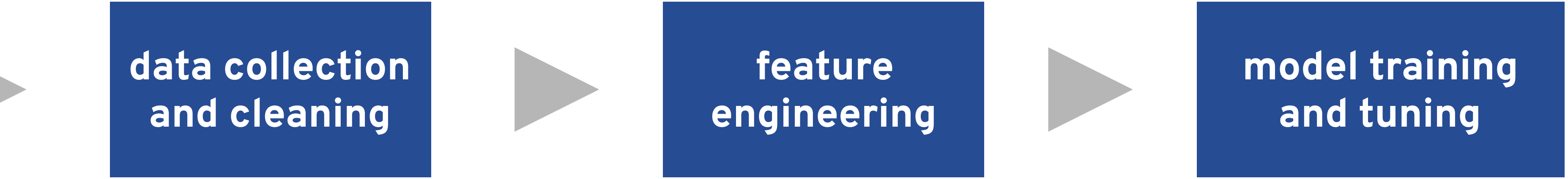
A concrete learning technique

A way to encode data



codifying problem and metrics

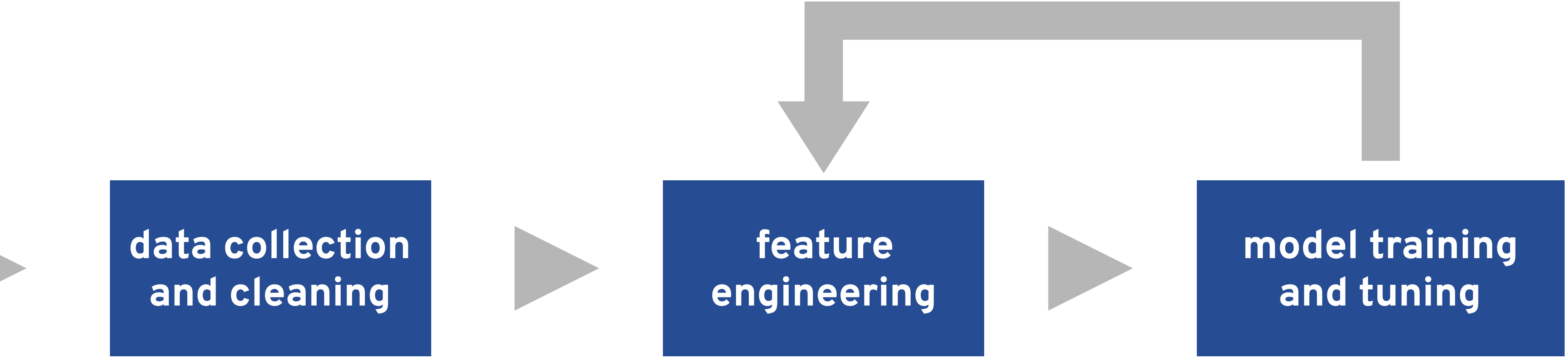
data collection and cleaning



data collection and cleaning

feature engineering

model training and tuning



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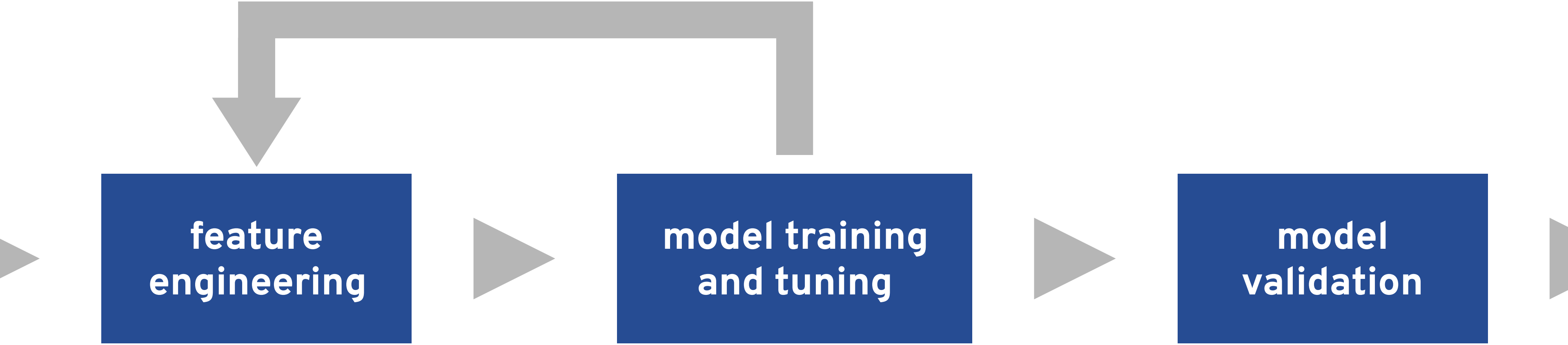
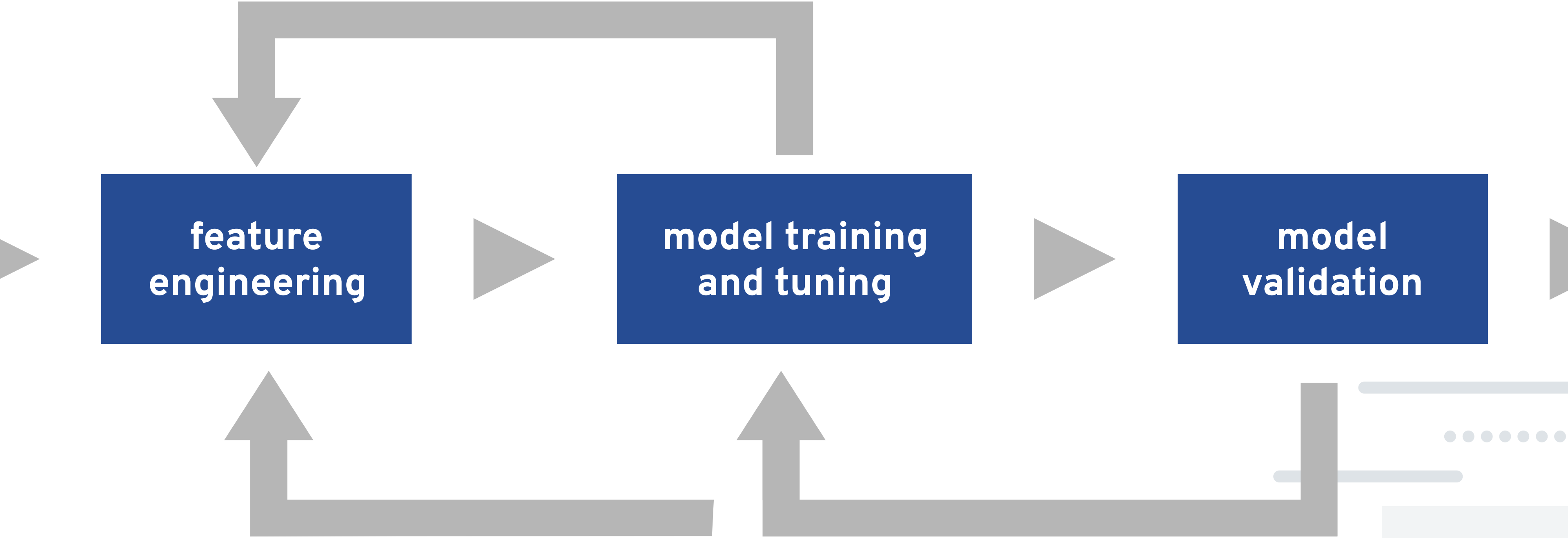


feature engineering

model training and tuning

model validation



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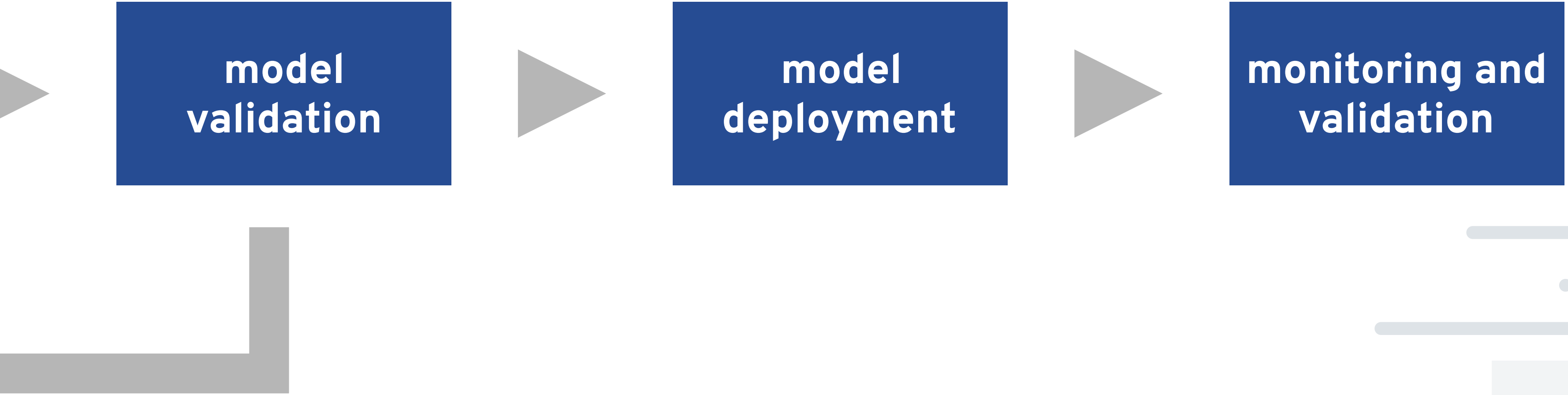
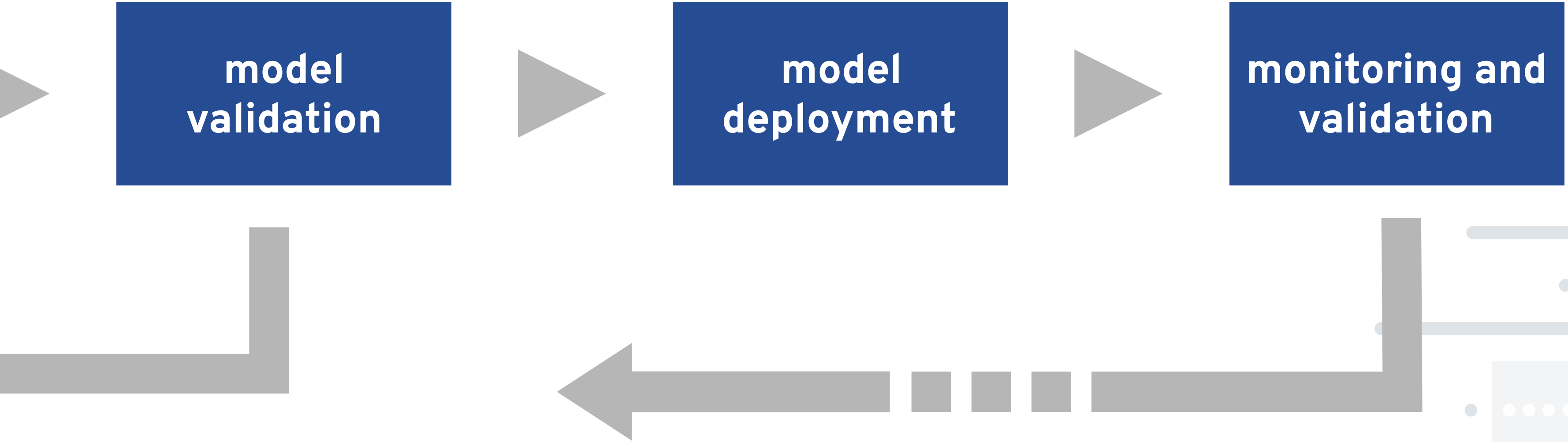


model validation

model deployment

monitoring and validation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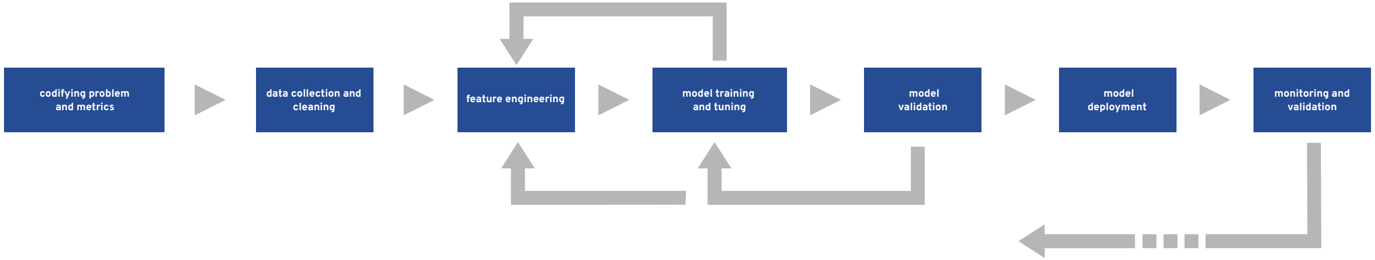
model deployment
monitoring and validation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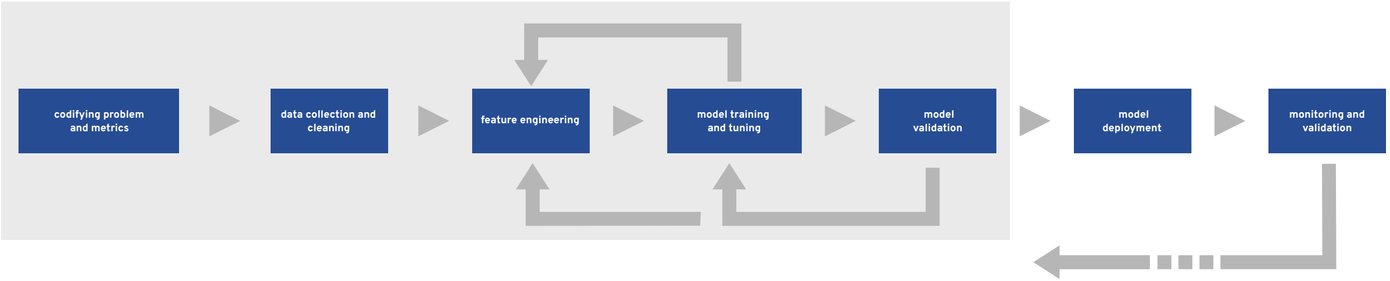
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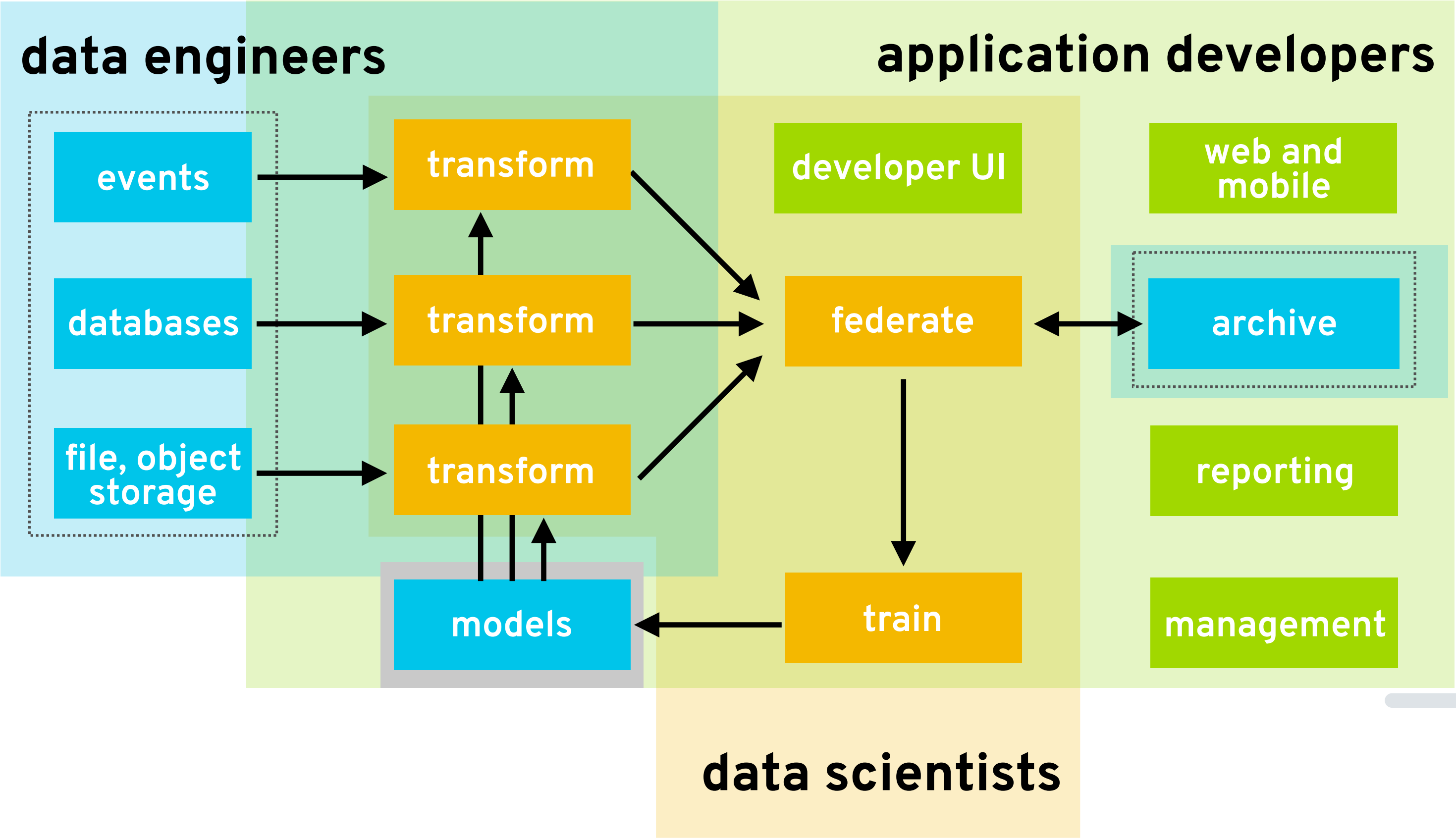
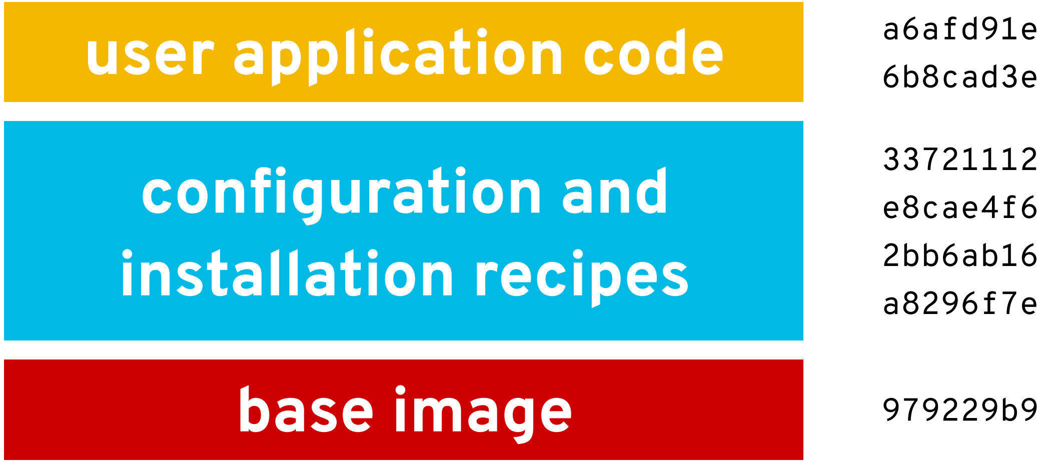
Machine learning, apps, and OpenShift


data engineers
application developers
events
databases
file, object storage
transform
transform
transform
developer UI
federate
train
models
web and mobile
archive
reporting
management
data scientists

Immutable images



user application code

configuration and installation recipes

base image

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e8cae4f6
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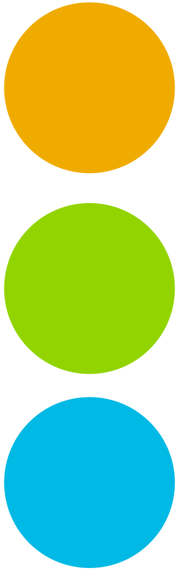
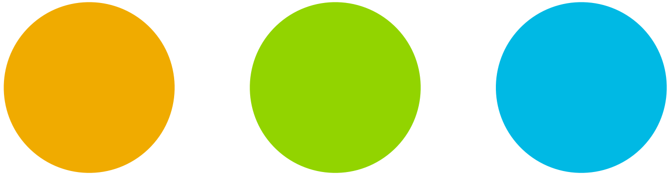
a8296f7e

979229b9

Stateless microservices

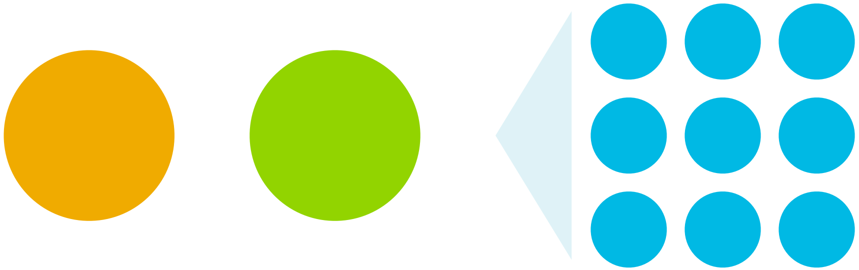


Stateless microservices

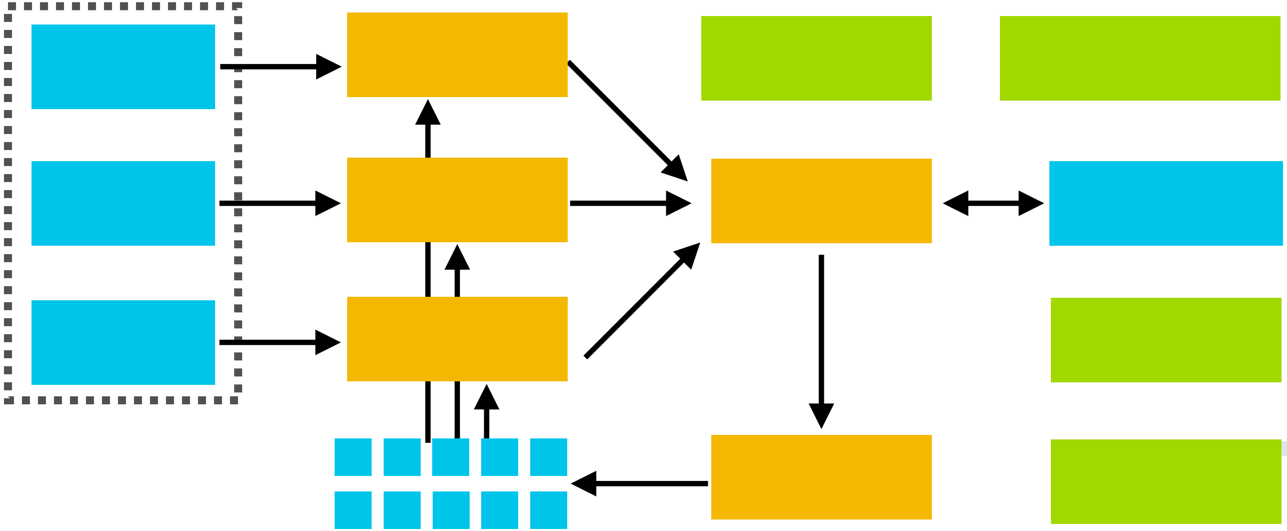


Stateless microservices

Stateless microservices



Declarative app configuration



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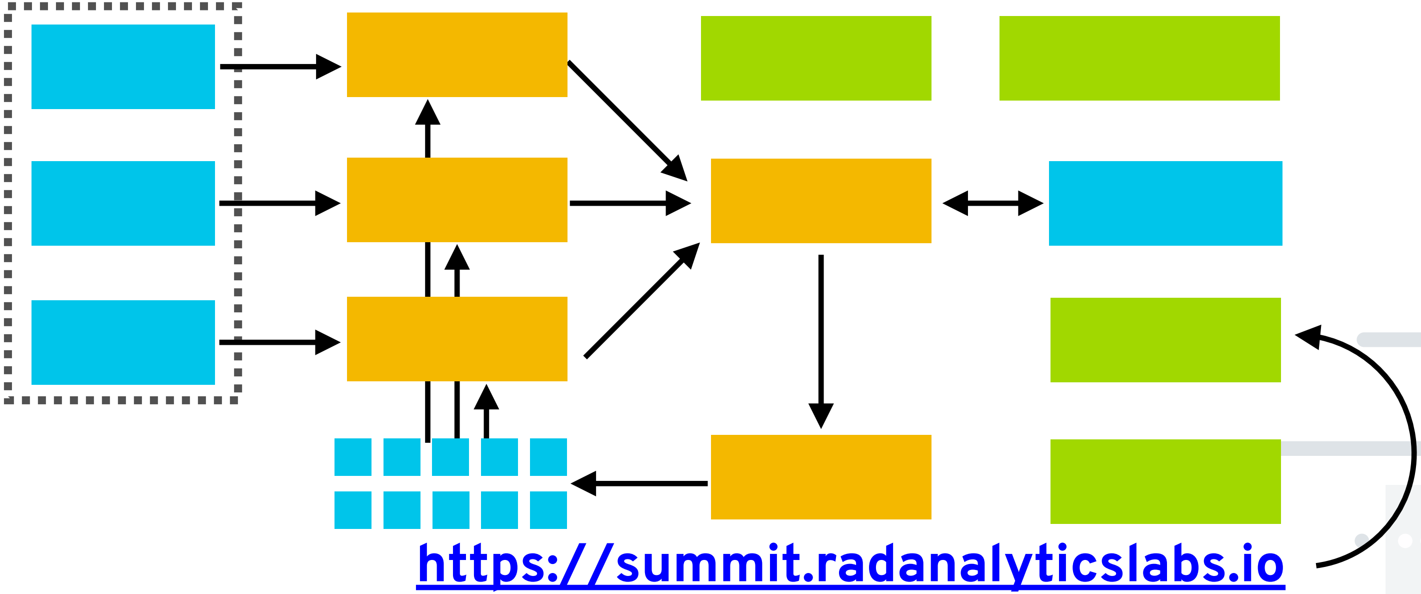

https://summit.radanalyticslabs.io

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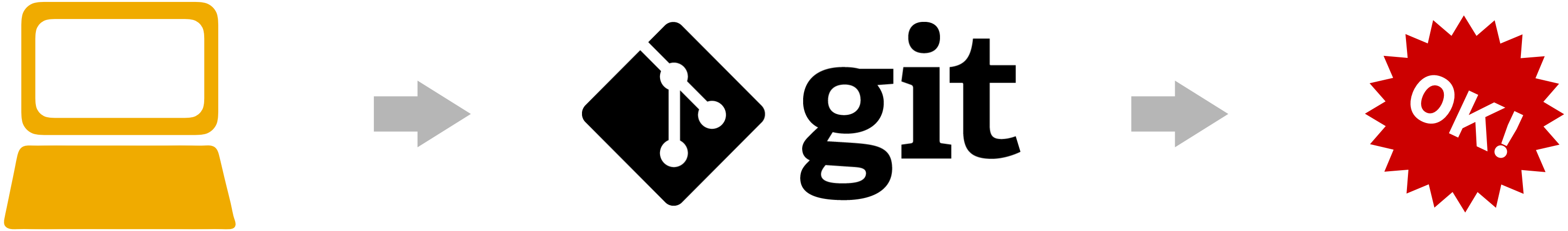
Integration and deployment

Integration and deployment



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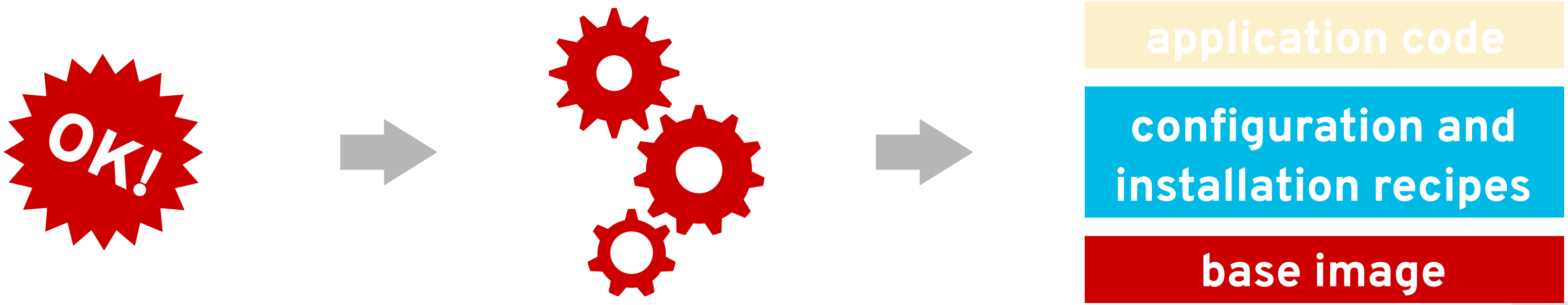
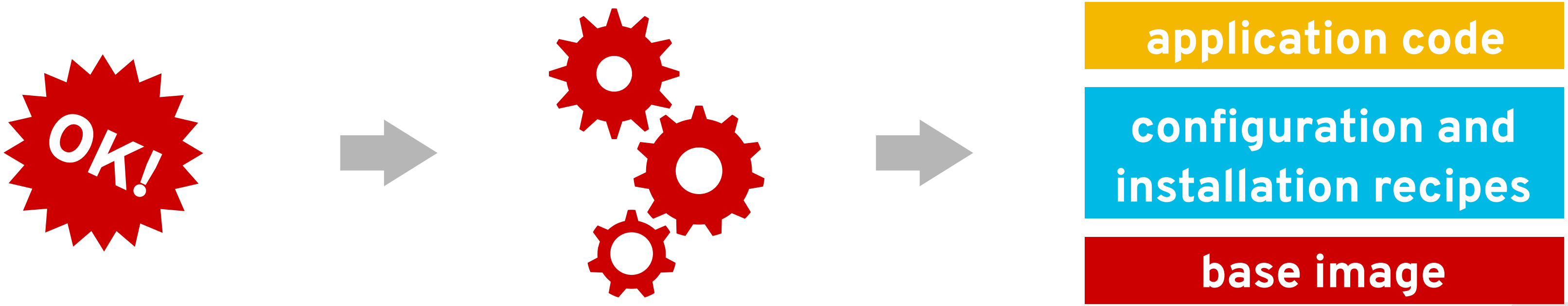


application code

configuration and installation recipes

base image

Integration and deployment



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base image

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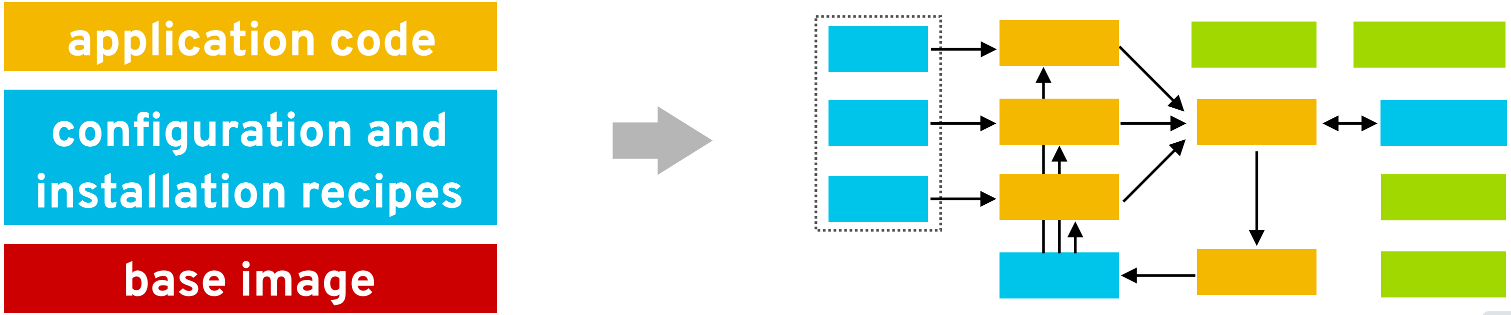

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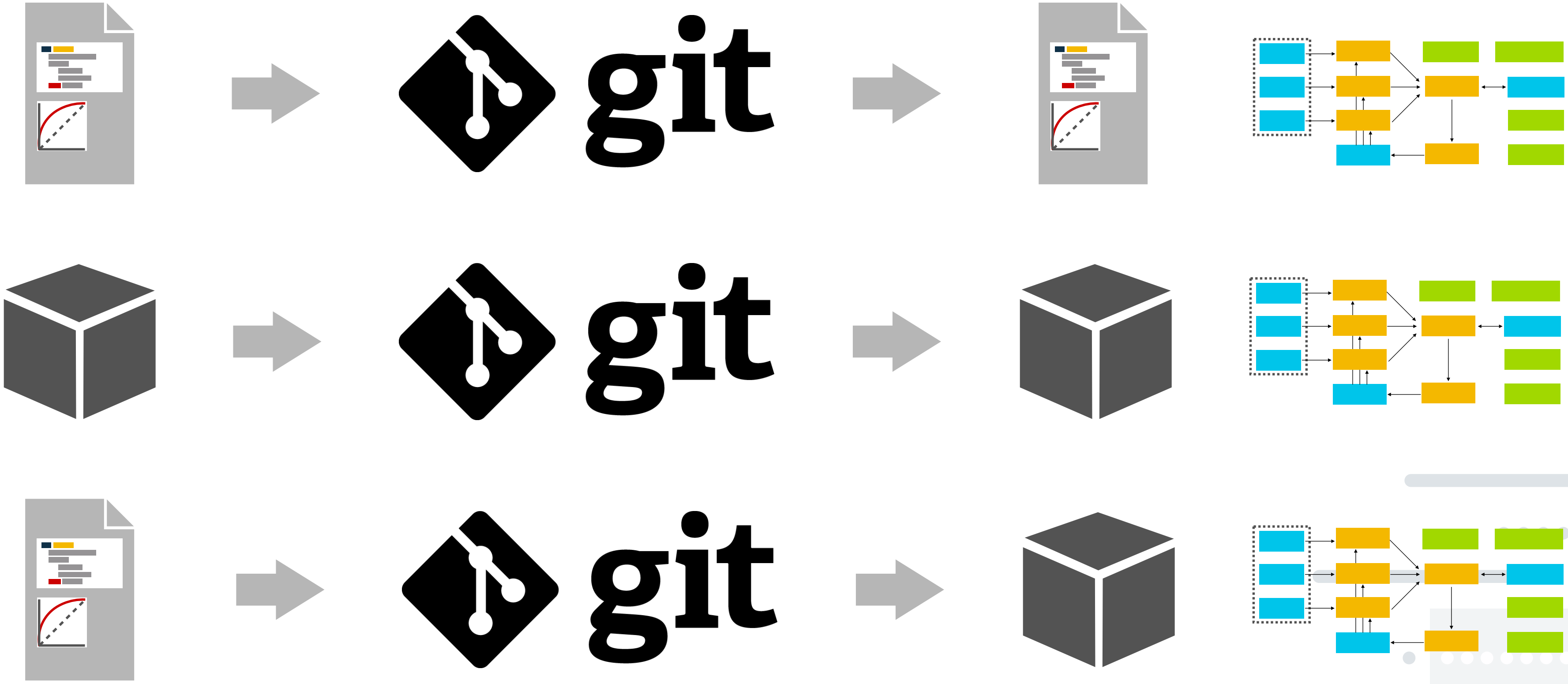
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git
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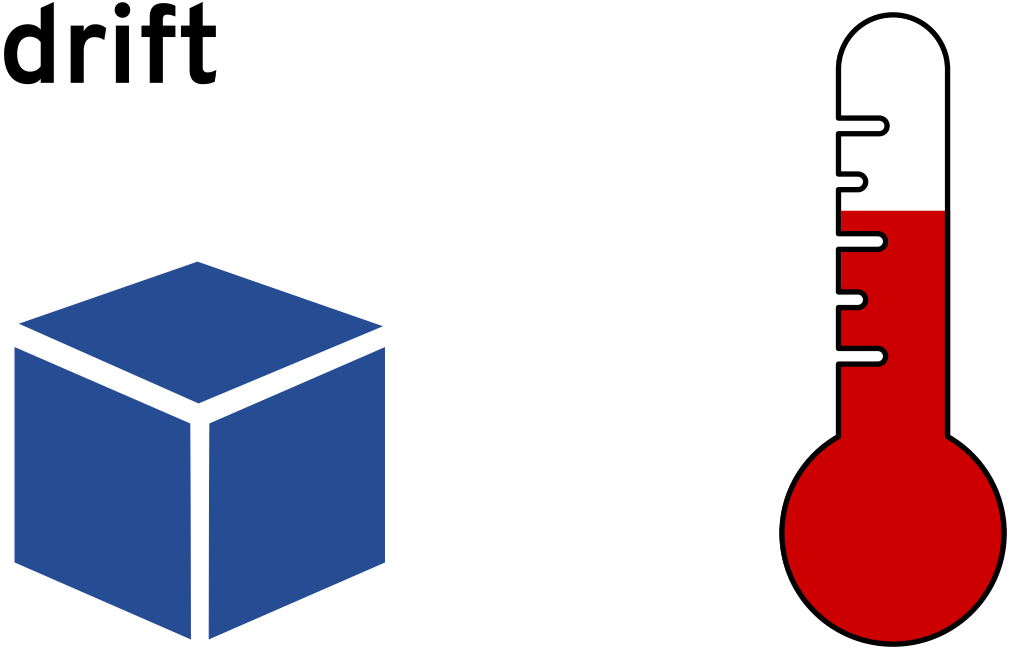
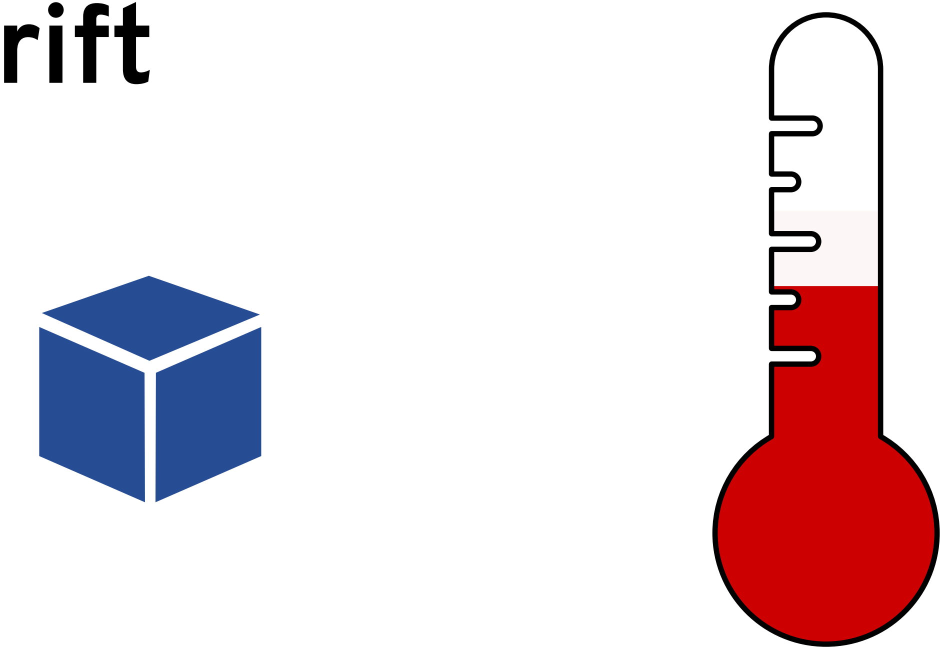
Data drift



Data drift



Looking forward

Other frameworks

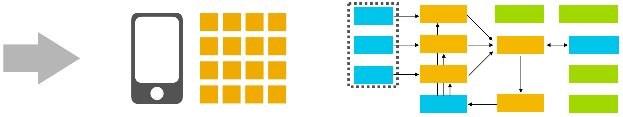
APACHE
Spark™

radanalytics.io

APACHE Spark™

jupyter

git



Open Data Hub

Kubeflow

jupyter

PyTorch

Other technologies

$$\mathbf{x} \cdot \mathbf{y} = x_1 \cdot y_1 + \cdots + x_n \cdot y_n$$

Other technologies

$$\mathbf{x} \cdot \mathbf{y} = x_1 \cdot y_1 + \cdots + x_n \cdot y_n$$

```
def dot(xs, ys):
  return sum([x * y for x, y in zip(xs, ys)])
```

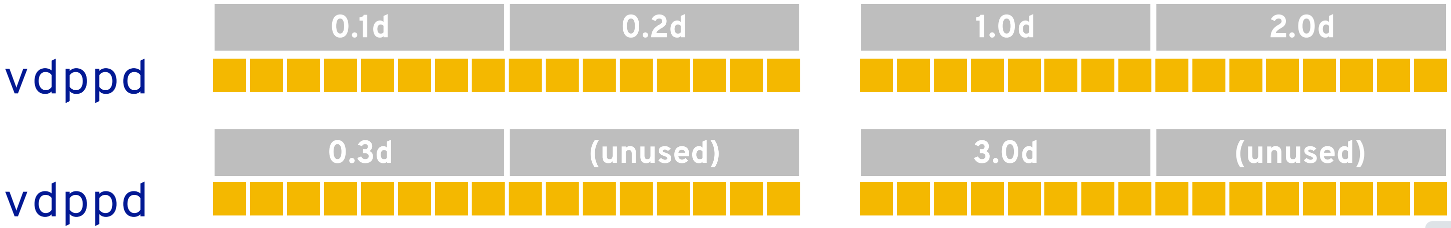
Other technologies

$$\mathbf{x} \cdot \mathbf{y} = x_1 \cdot y_1 + \cdots + x_n \cdot y_n$$

```
def dot(xs, ys):
  return sum([x * y for x, y in zip(xs, ys)])

dot([0.1, 0.2, 0.3], [1.0, 2.0, 3.0])
```

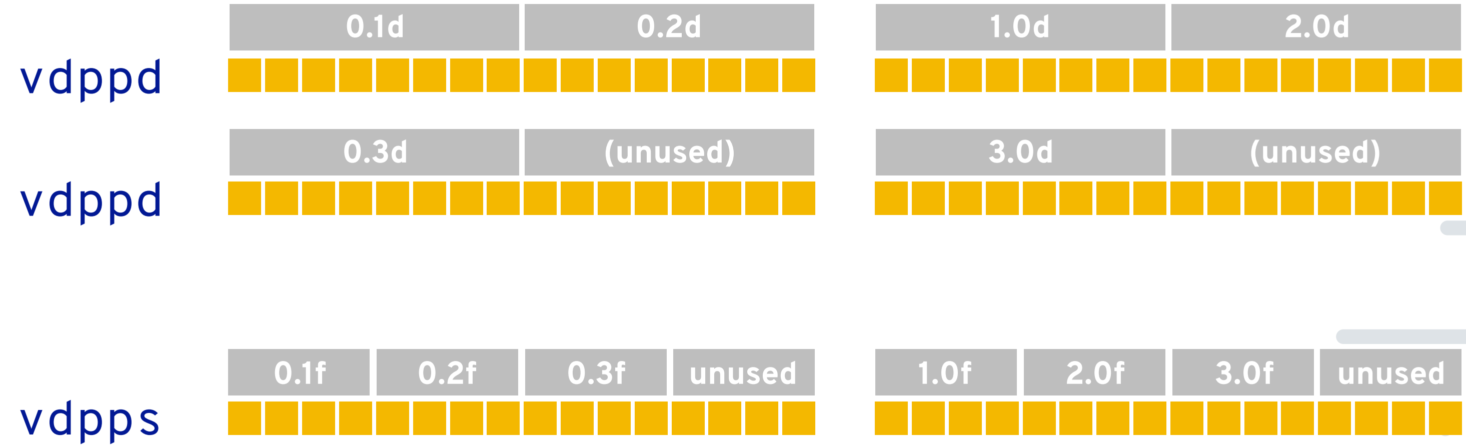
```
def dot(xs, ys):
  return sum([x * y for x, y in zip(xs, ys)])
```



vdppd 0.1d 0.2d 1.0d 2.0d

vdppd 0.3d (unused) 3.0d (unused)

```
def dot(xs, ys):
  return sum([x * y for x, y in zip(xs, ys)])
```

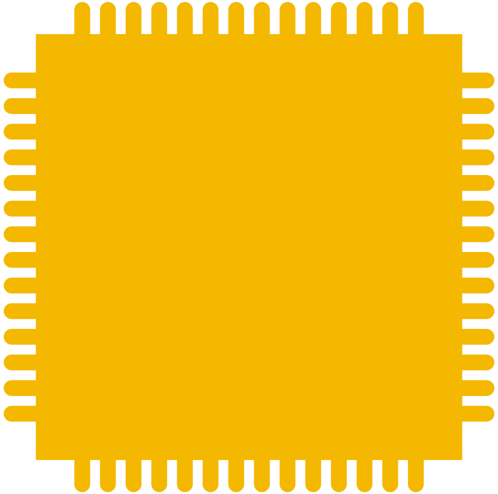


vdppd 0.1d 0.2d 1.0d 2.0d

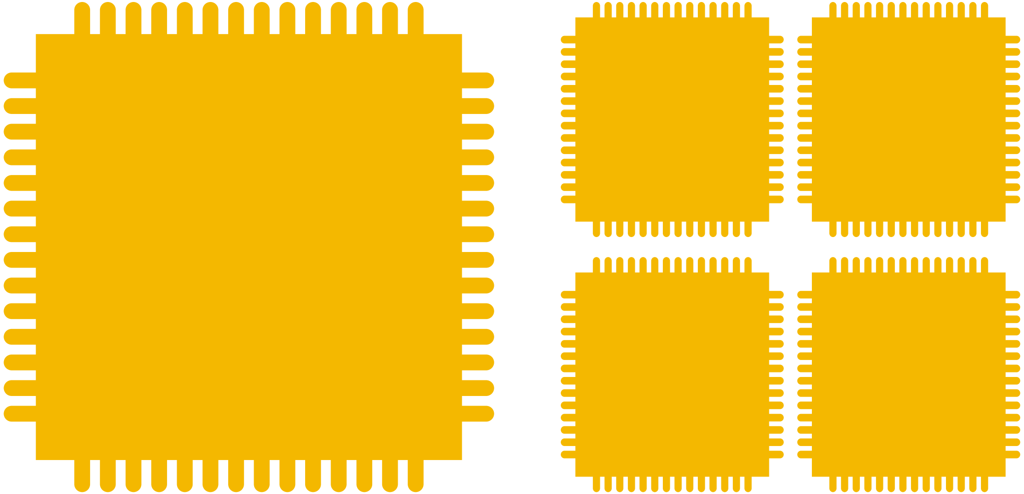
vdppd 0.3d (unused) 3.0d (unused)

vdpps 0.1f 0.2f 0.3f unused 1.0f 2.0f 3.0f unused

Other technologies



Other technologies



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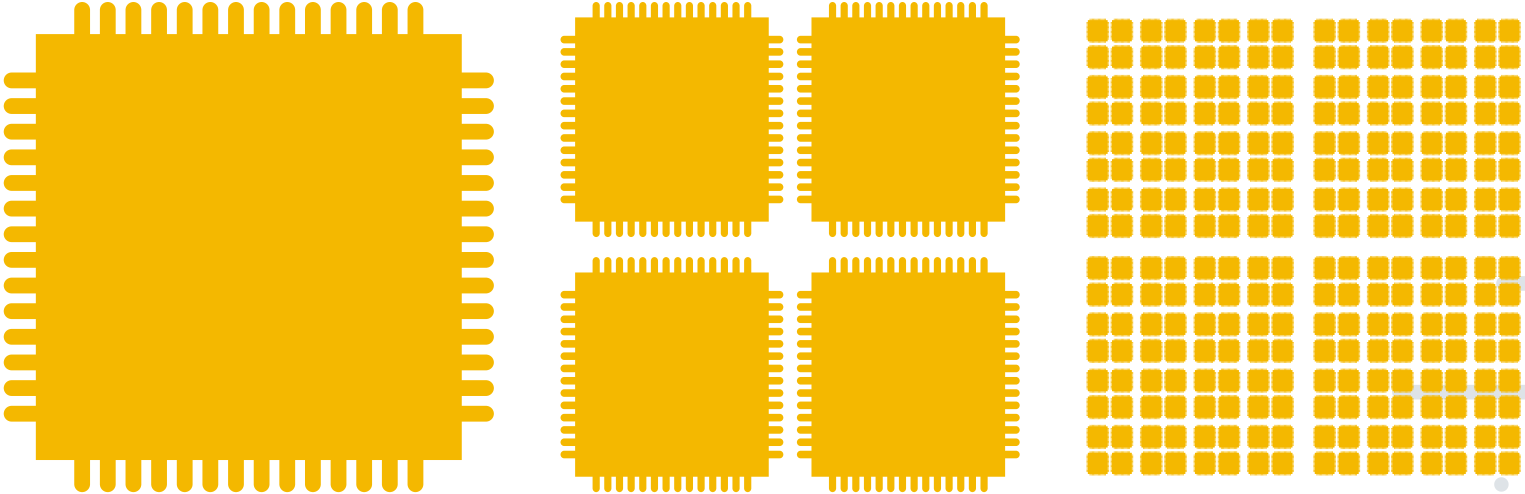

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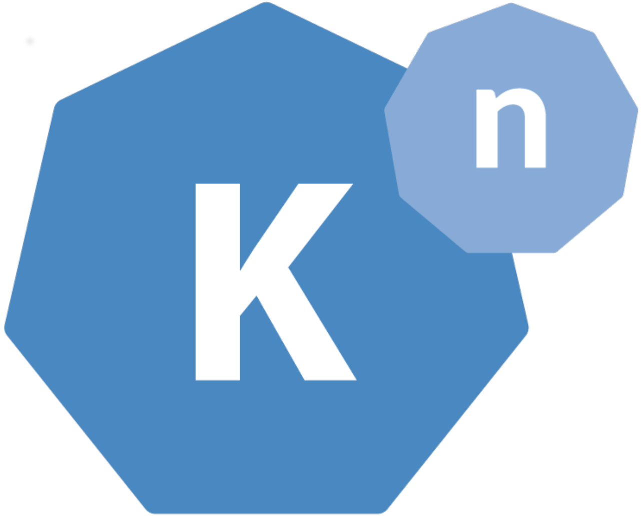
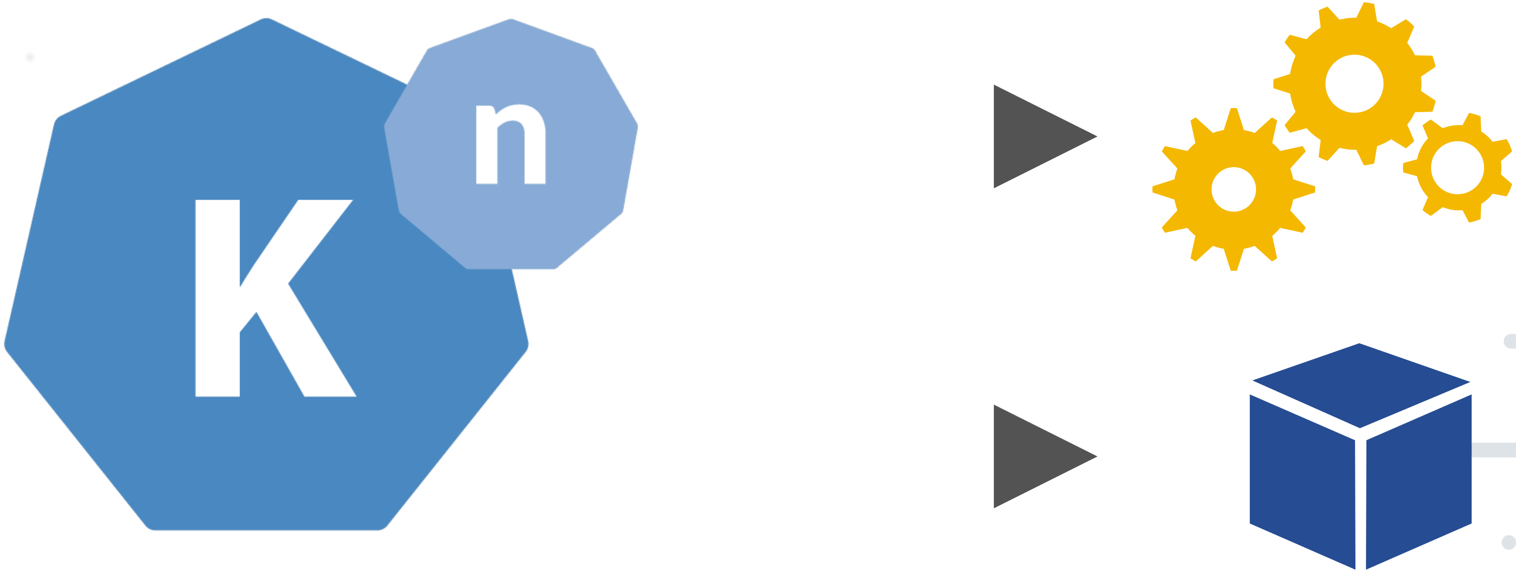
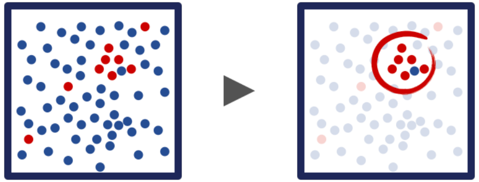
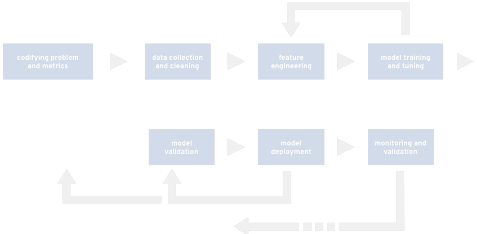


Other technologies



Conclusions





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data collection and cleaning

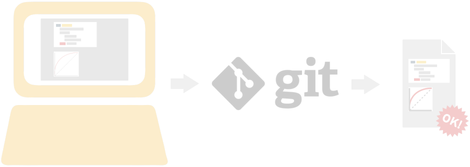
feature engineering

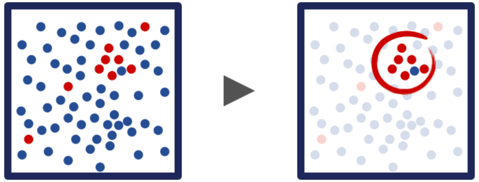
model training and tuning

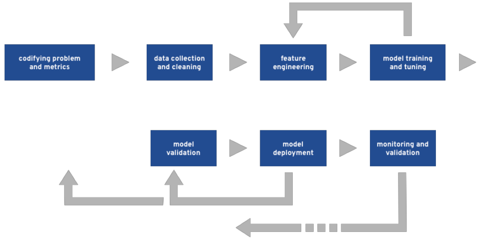
model validation

model deployment

monitoring and validation







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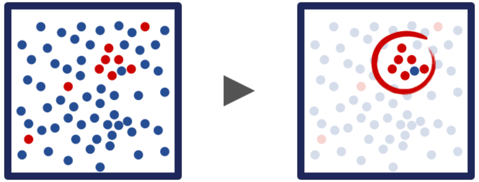

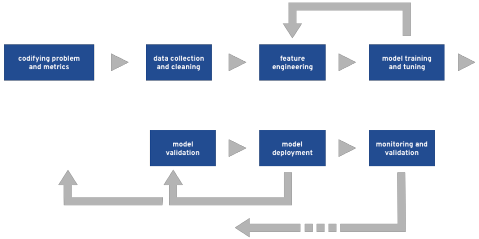

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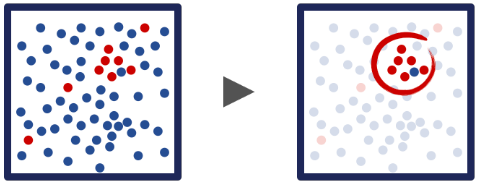

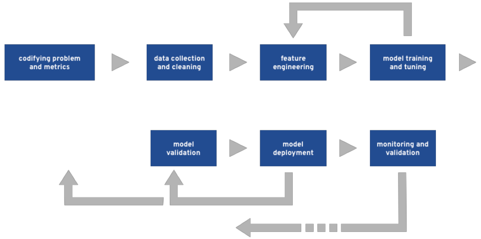

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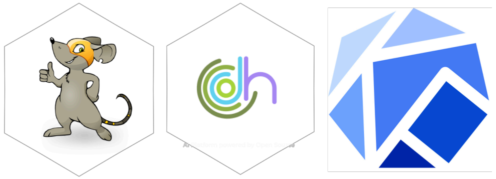

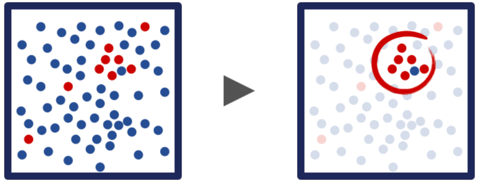

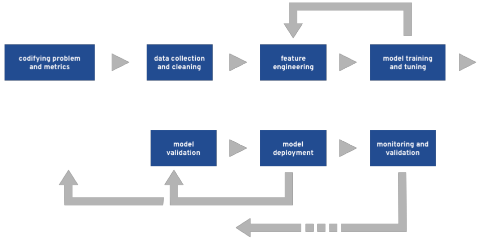

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THANKS!

@sophwats • @willb • @FOSSJunkie