Machine Learning in the Elastic Stack

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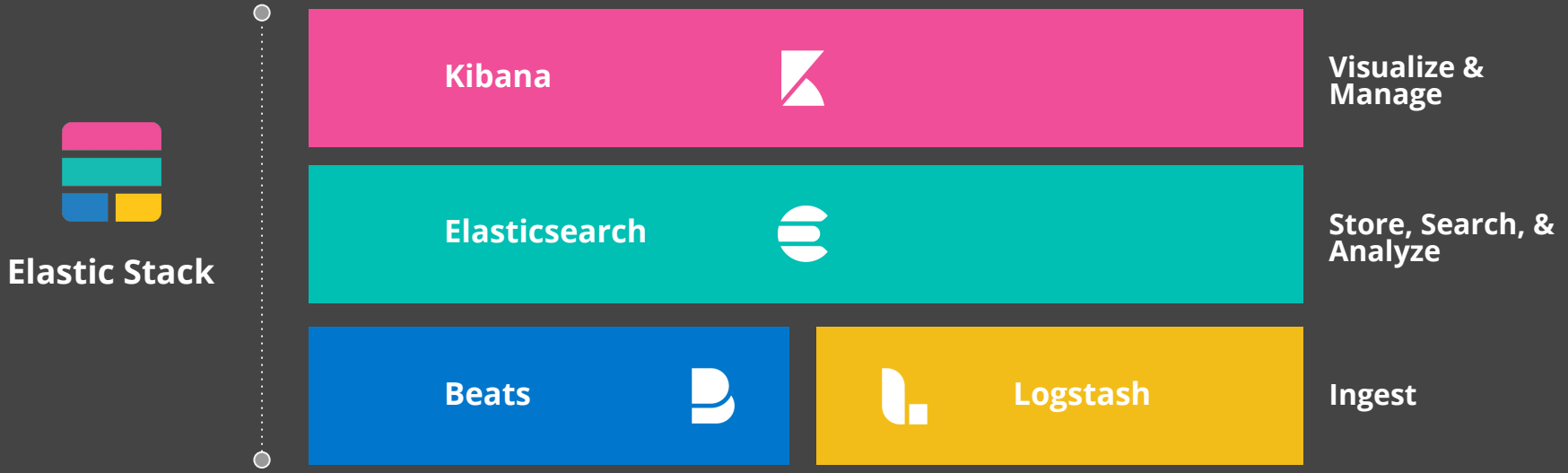
Elastic Stack

Search, Observe, and Protect



elastic

Machine Learning with the Elastic Stack

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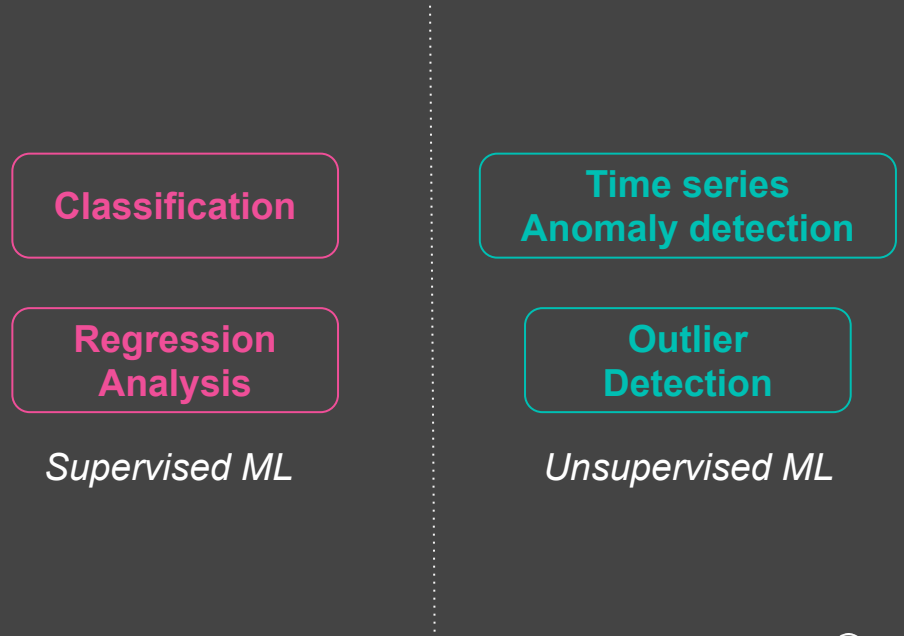
Machine Learning in the Elastic Stack

An Elasticsearch cluster can contain an ML node with the following capabilities*:

- Data visualizer
- Data transformation
- Modeling
- Evaluation
- Visualization



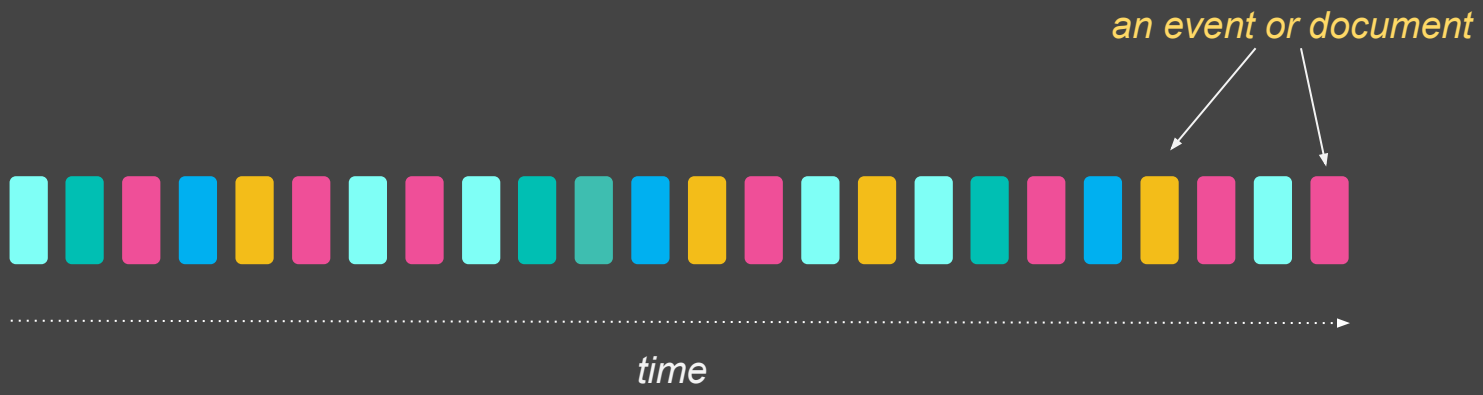
*ML requires a Platinum License

Data Transformation

Event-Centric vs Entity-Centric Data

We typically store data as *event-centric*:

- tweets
- web apache logs
- network activity
- customer transactions



Aggregations

Using aggregations (metrics or buckets) we can summarize our data in different ways and obtain insights

Typical Aggregations

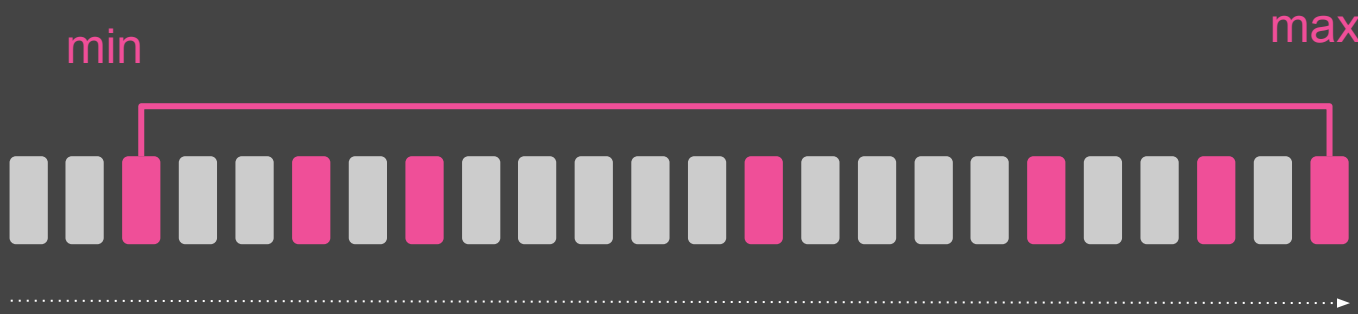
most frequent URLs?
blogs?
terms?
user?
agent?

terms aggregation

page views per minute?
published blogs per month?
published comments per day?

date histogram aggregation

Clickstream data



how long was session x?

scripted aggregations
(**max** - **min**)

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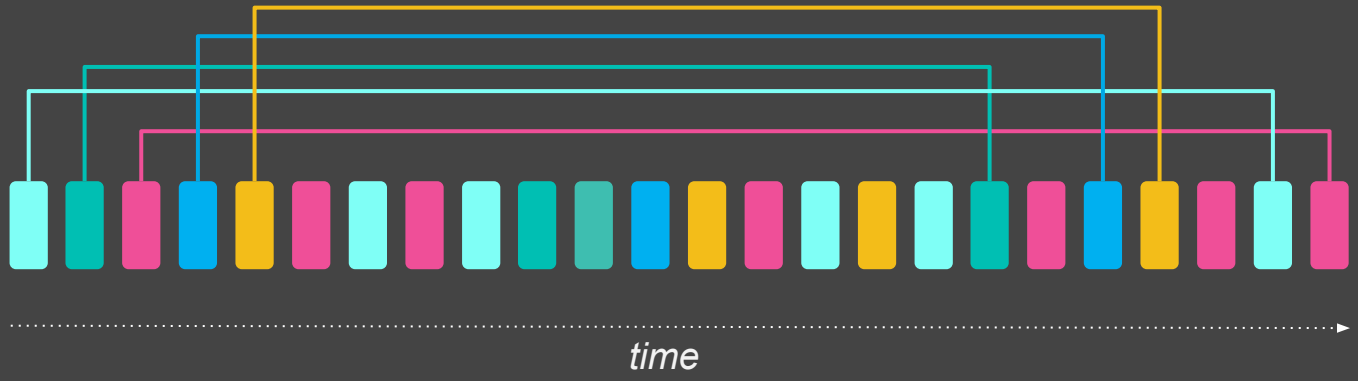
Clickstream data



Average session duration?

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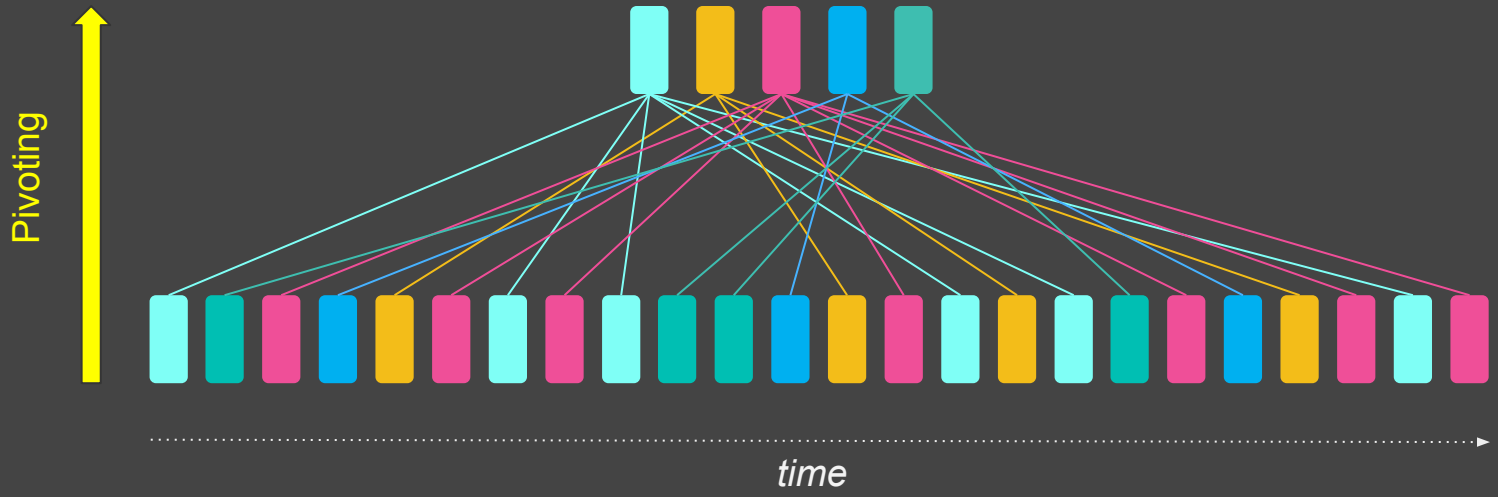
We are doing behavioral analytics!

Transform


```
{
        “session_id” : “yellow”,
        “duration”: 15.00
        “count_hits”:: “4”
}
```


```
{
        “session_id” : “yellow”,
        “timestamp”:”2019-30-09,
        “url”:”http://elastic.com/home”
}
```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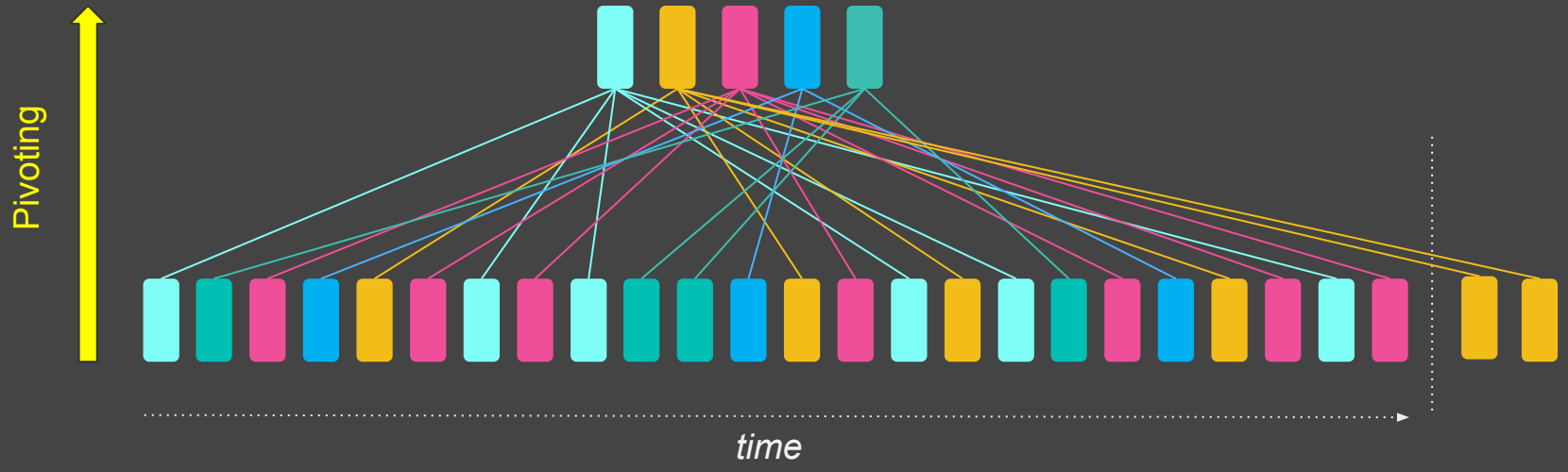
Continuous Pivot Transform


```
{
        “session_id” : “yellow”,
        “duration”: 16.50
        “count_hits”:: “6”
}
```


```
{
        “session_id” : “yellow”,
        “timestamp”:”2019-30-09,
        “url”:”http://elastic.com/home”
}
```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ML Modeling

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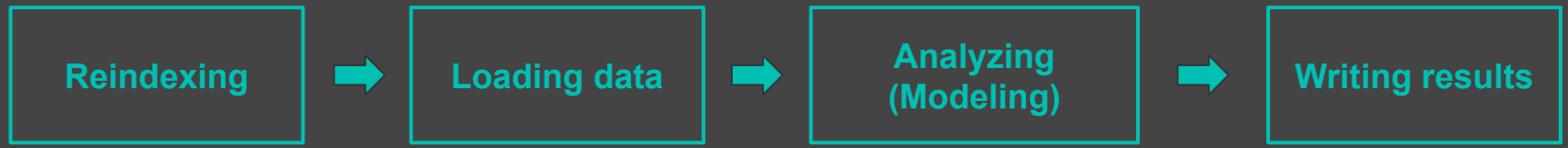
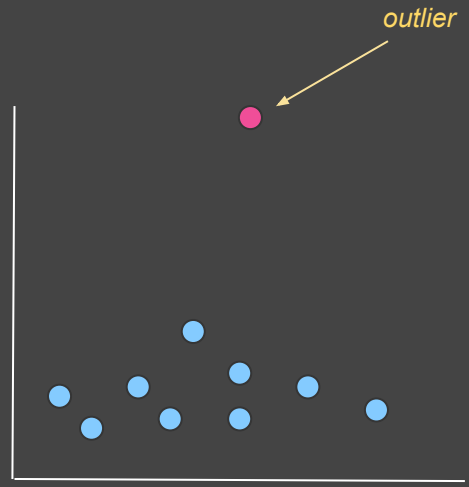
Data Frame Analytics

- Allows different analyses of the data to gather insights
- Allows to train a model and evaluate it:
  - Outlier Detection (*unsupervised*)
  - Anomaly Detection (*unsupervised*)
  - Regression Analysis (*supervised*)
  - Classification (*supervised*)



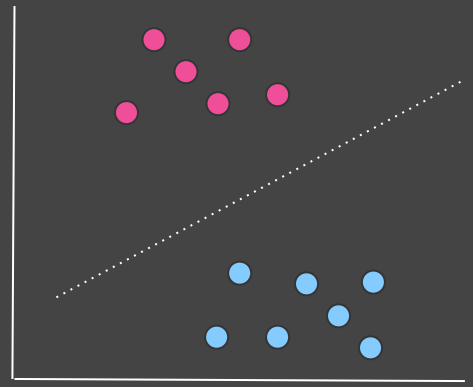
Outlier Detection

- The goal is to identify data points that do not follow the model of the data
- Uses an ensemble of distance and density based outlier detection methods
- Outputs an **outlier score** and the **feature influence score**
- Applications:
  - Bank fraud
  - Threat detection
  - Medical problems



Classification

- The goal is to predict the category/class of a given data point in a dataset
- Users a boosted tree regression model
- Requires **feature variables** and a **dependent variable**
- Applications:
  - Detect cancer
  - Classifying music or text
  - Predict loan risk



References

Demos

Data Transforms Overview

Machine Learning Data Frame Analytics

Transforms API

Elastic Stack 7.3 Release

Introducing Transforms in Elastic Machine Learning