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I See Metrics: Anomaly Detection on OpenShift

AI Ops in the AI Center of Excellence

DevConf.CZ 2020

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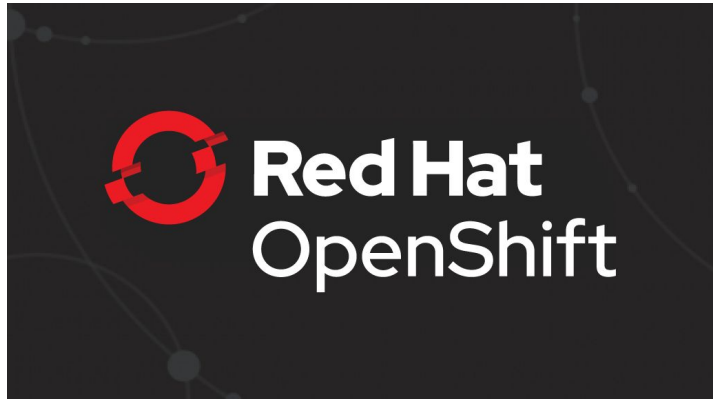

Monitoring → Applications → Prometheus

AI-backed anomaly detection for prometheus metrics.

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Goals of Workshop

- Understanding Prometheus
- Monitoring applications and its challenges
- Leveraging AI for better monitoring
- Data Science toolkit
- Anatomy of an anomaly
- Integrating anomaly detection pipeline into monitoring setup

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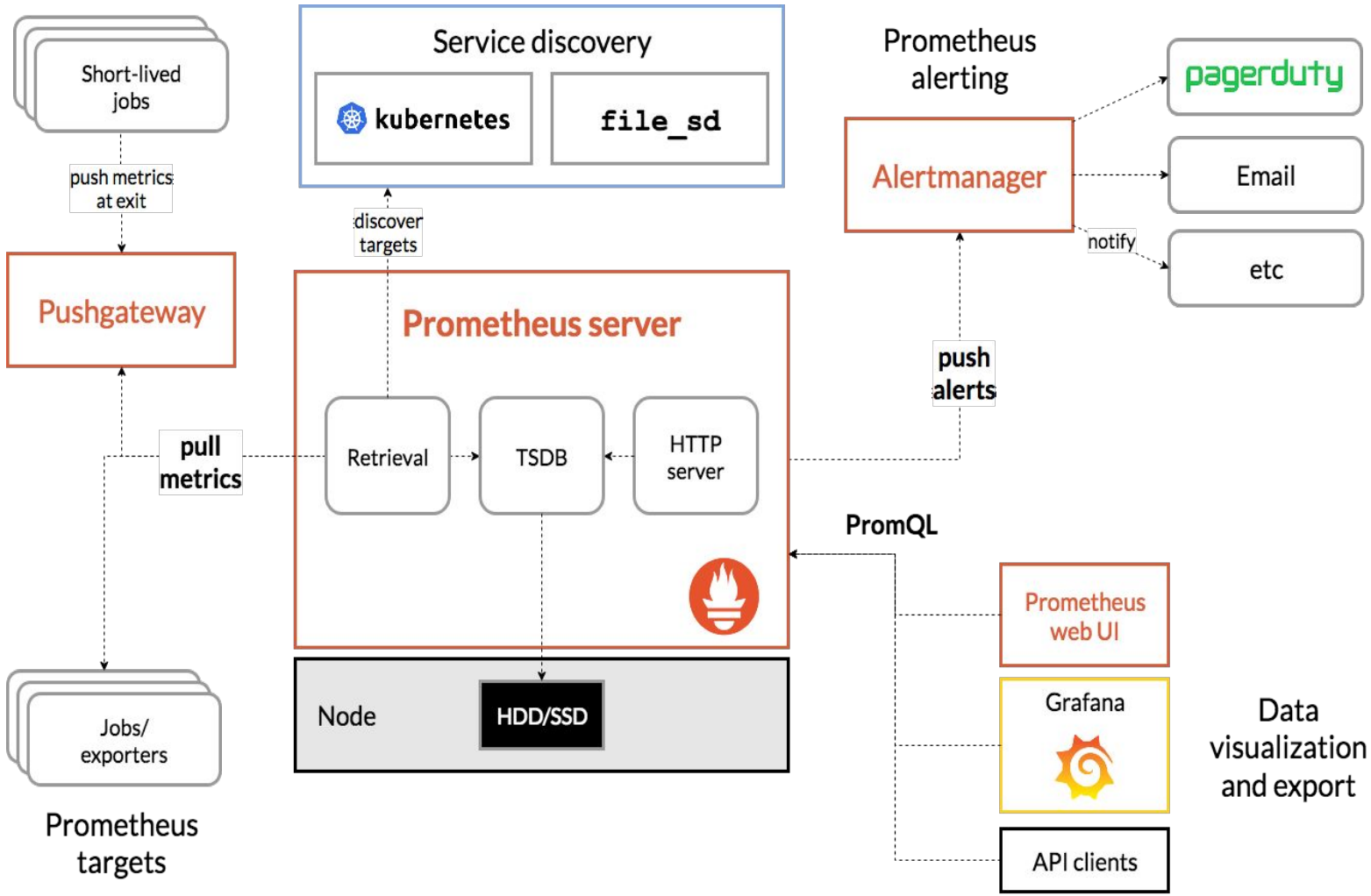
Prometheus



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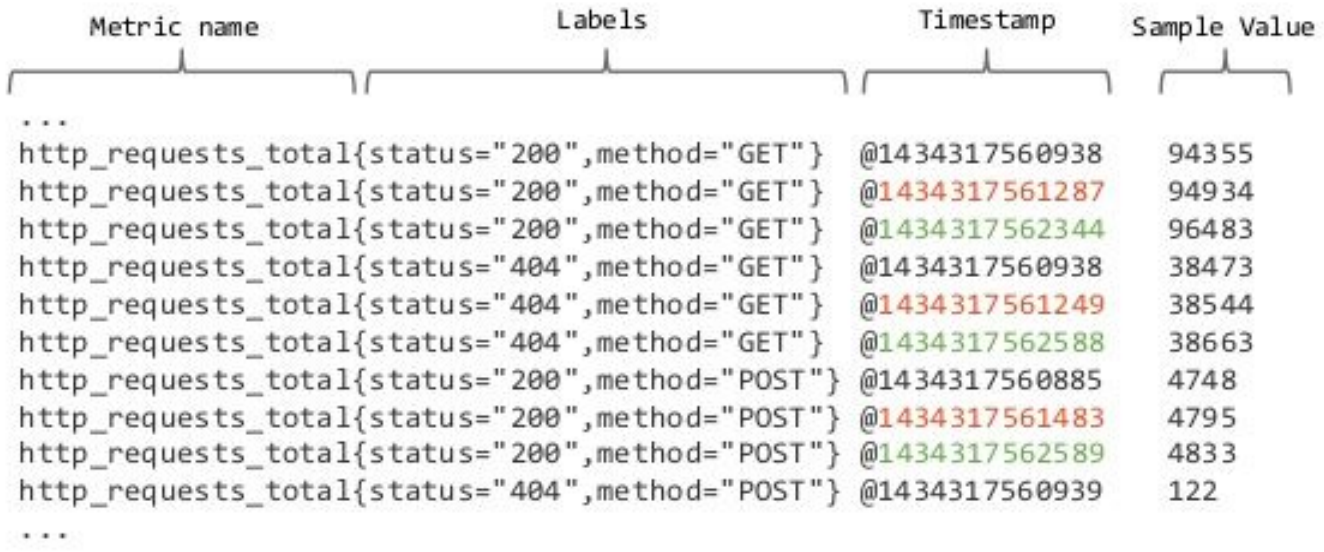
Prometheus Metrics



- **Gauge** - Arbitrary up and down value
- **Counter** - Monotonically Increasing
- **Histogram** - Cumulative samples of values
- **Summary** - Snapshot of values in a time window

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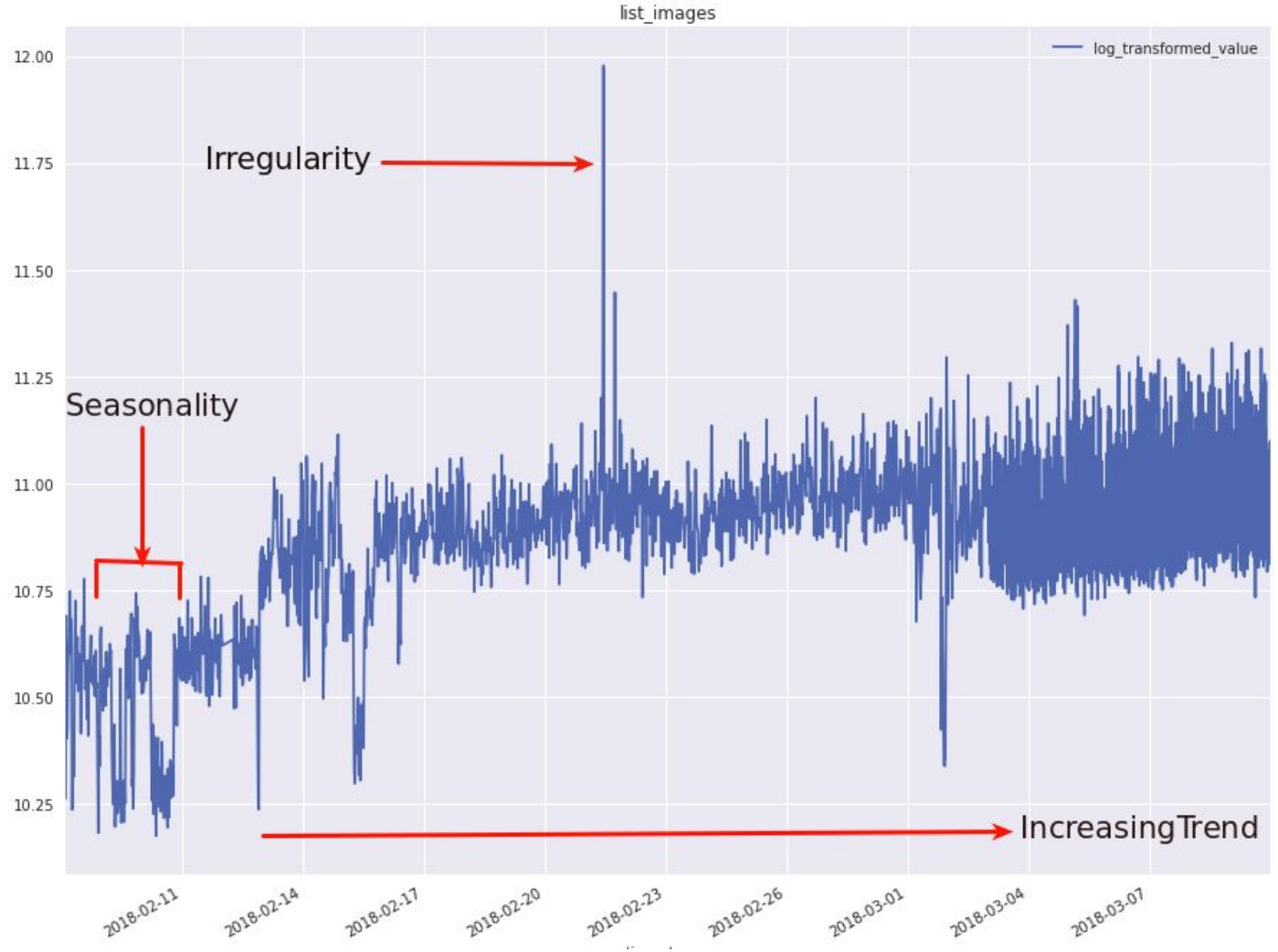
Components of Time Series

Trend

Increase or decrease in the series over a period of time.

Seasonality

Regular pattern of up and down fluctuations. It is a short-term variation occurring due to seasonal factors.



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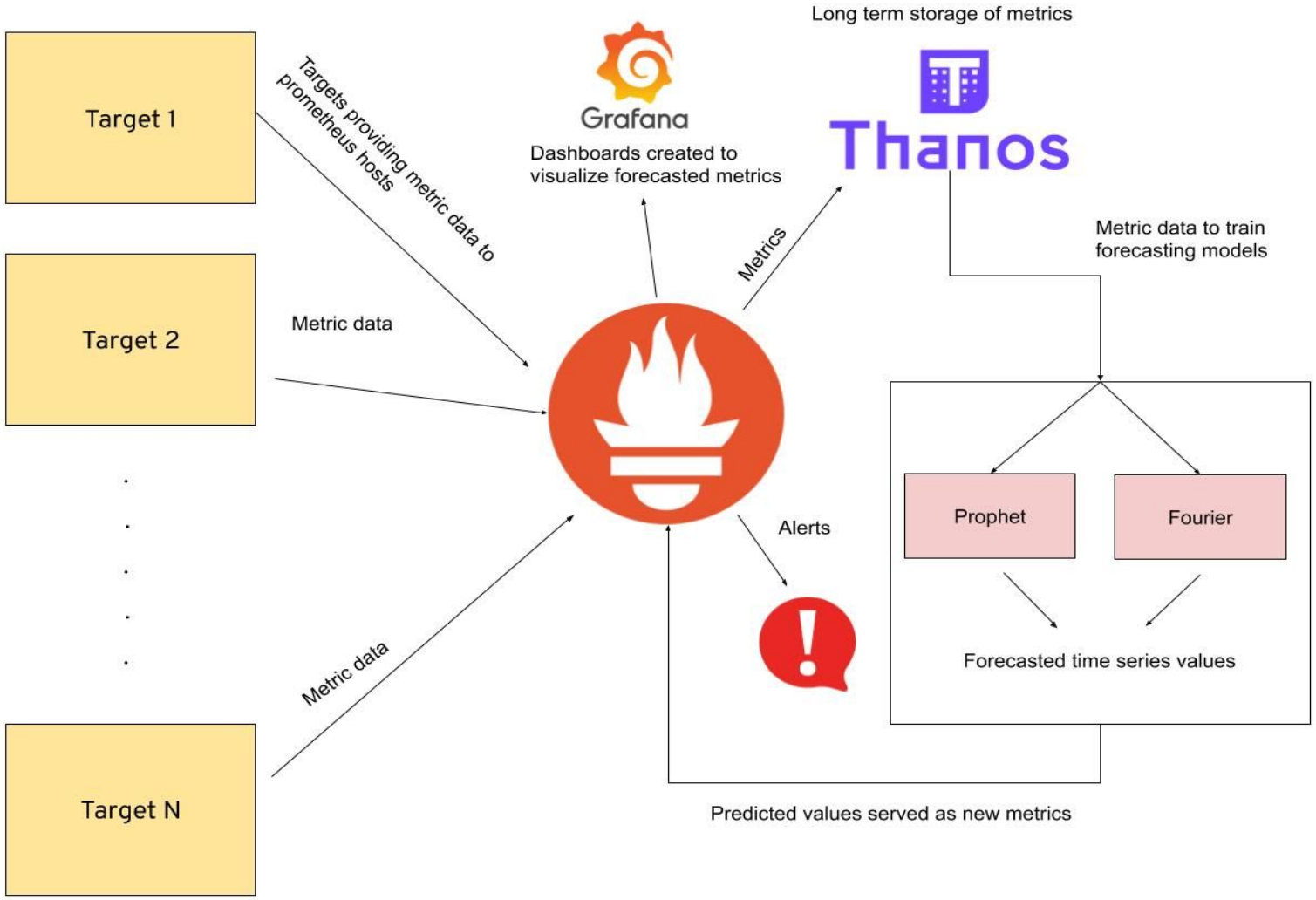
Implementation



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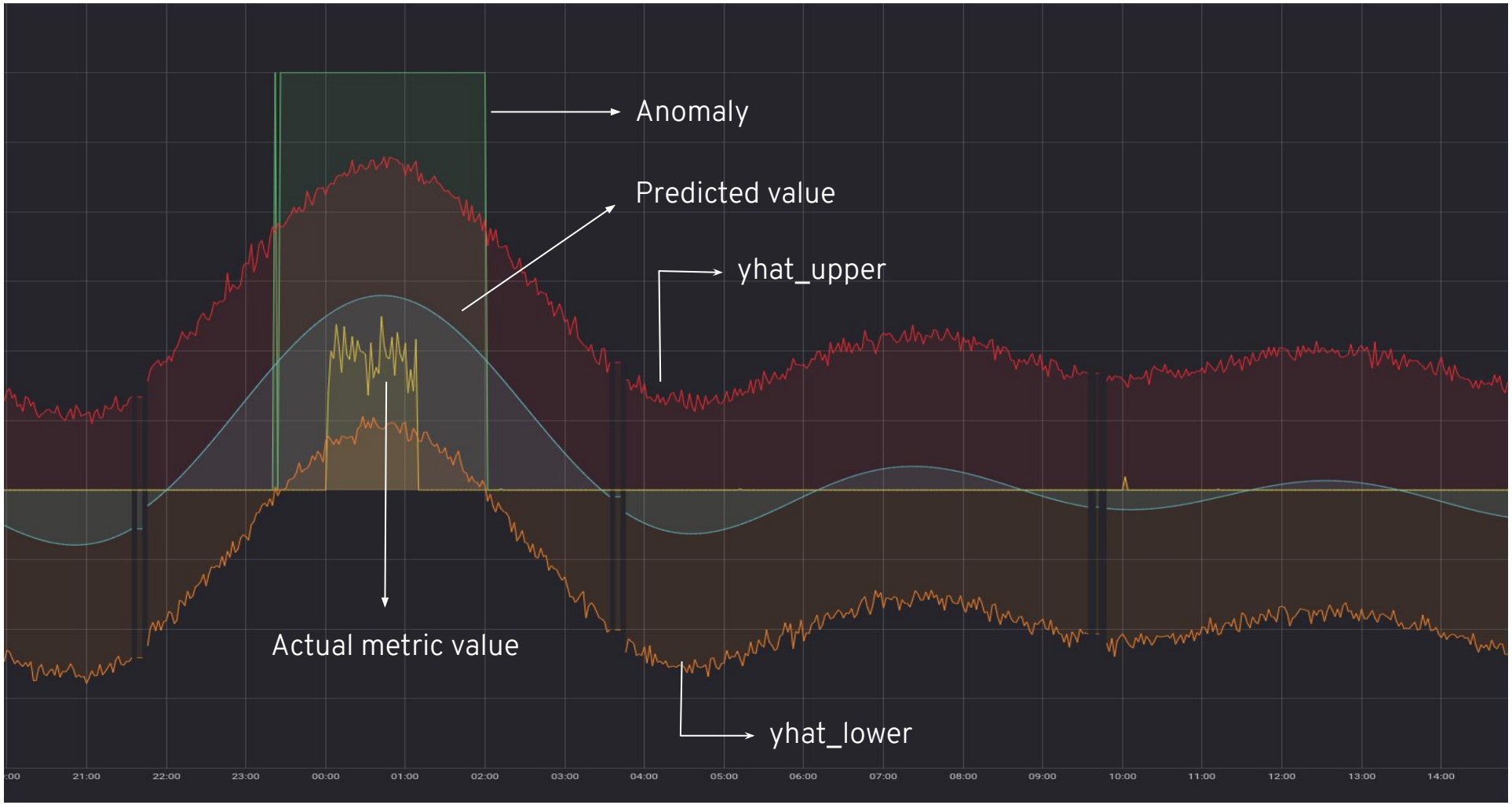
Grafana Dashboard Visualization



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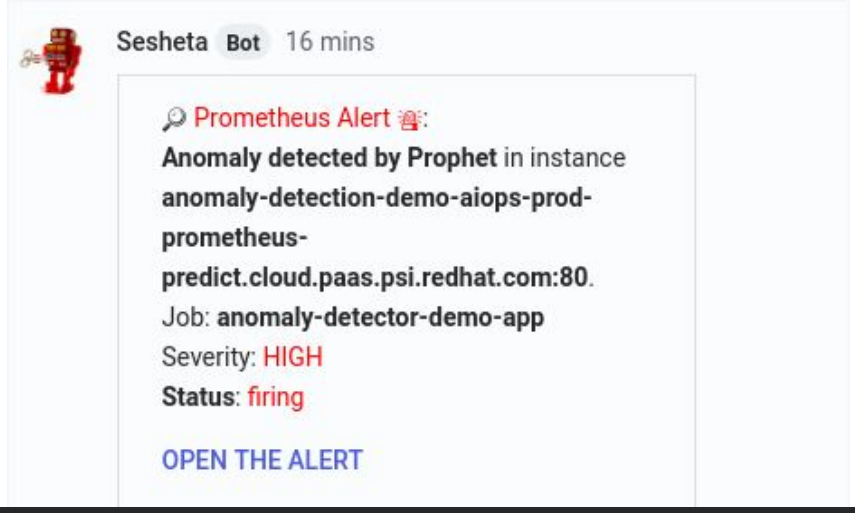
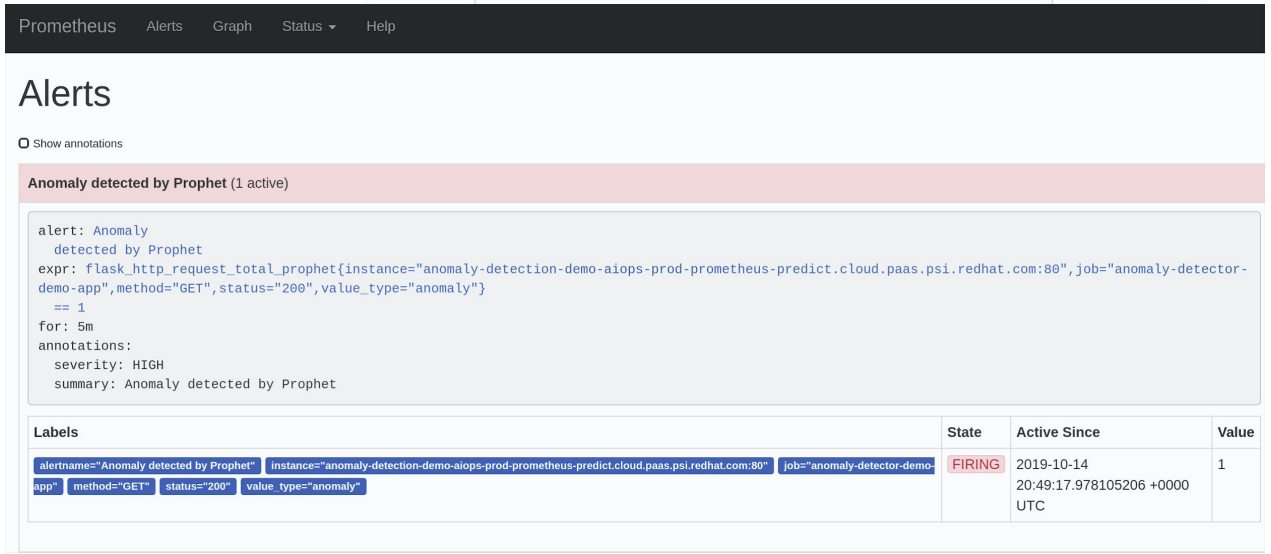
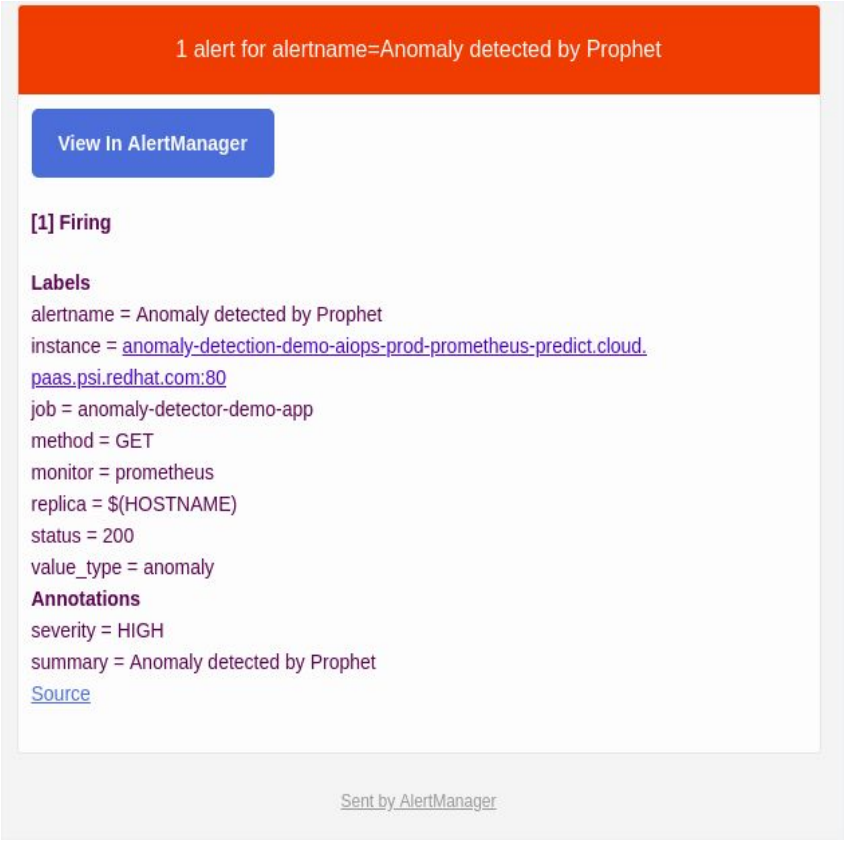
Alerting on Anomalies







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Model Testing

- For a given timeframe of a metric, with known anomalies, the PAD can also be run in ***test-mode*** to check whether the models reported back these anomalies. The accuracy and performance of the models can then be logged as metrics to MLFlow for comparing the results.

MLFlow: https://mlflow.org/

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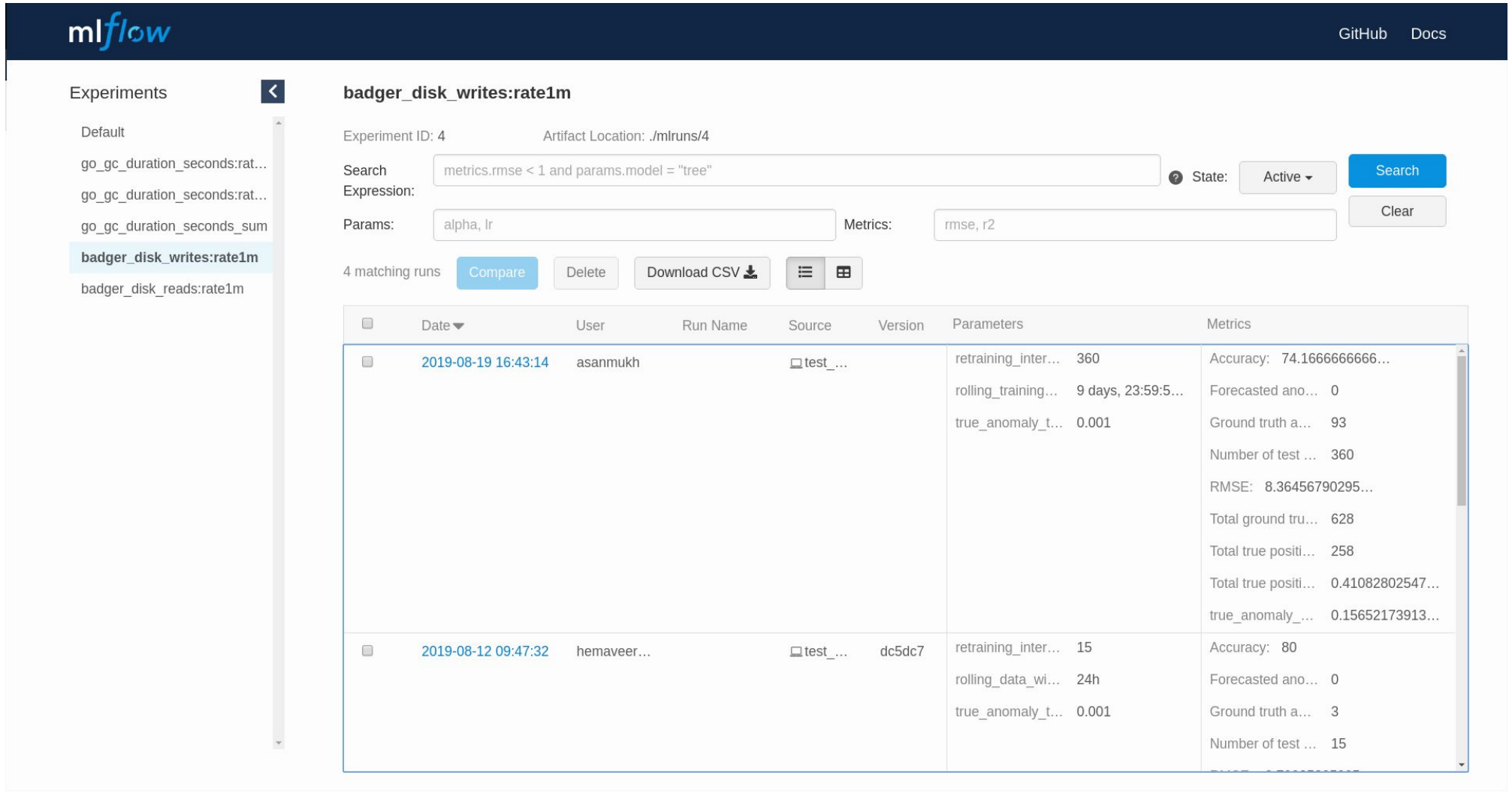
mlflow
GitHub
Docs
Experiments
Default
go_gc_duration_seconds:rat…
go_gc_duration_seconds:rat…
go_gc_duration_seconds_sum
badger_disk_writes:rate1m
badger_disk_reads:rate1m
badger_disk_writes:rate1m
Experiment ID: 4
Artifact Location: ./mlruns/4
Search Expression:
metrics.rmse < 1 and params.model = "tree"
State:
Active
Search
Clear
Params:
alpha, lr
Metrics:
rmse, r2
4 matching runs
Compare
Delete
Download CSV
Date
User
Run Name
Source
Version
Parameters
Metrics
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asanmukh
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retraining_inter… 360
rolling_training… 9 days, 23:59:5…
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Forecasted ano… 0
Ground truth a… 93
Number of test … 360
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Total true positi… 258
Total true positi… 0.41082802547…
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test_…
dc5dc7
retraining_inter… 15
rolling_data_wi… 24h
true_anomaly_t… 0.001
Accuracy: 80
Forecasted ano… 0
Ground truth a… 3
Number of test … 15

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References

- Project Repository: https://github.com/AICoE/prometheus-anomaly-detector
- Prometheus API Client: https://github.com/AICoE/prometheus-api-client-python
- Mojo blog post: https://mojo.redhat.com/groups/red-hat-artificial-intelligence-center-of-excellence-ai-coe/blog/2019/09/10/prometheus-anomaly-detection-for-thoth-dgraph-metrics
- Team Mail list: aicoe-aiops@redhat.com
- GChat: AICoE - AIOps

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