

# I See Metrics: Anomaly Detection on OpenShift

AI Ops in the AI Center of Excellence

DevConf.CZ 2020

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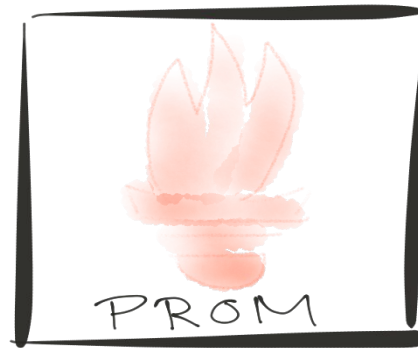


Monitoring → Applications → Prometheus

AI-backed anomaly  
detection for prometheus  
metrics.

## 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

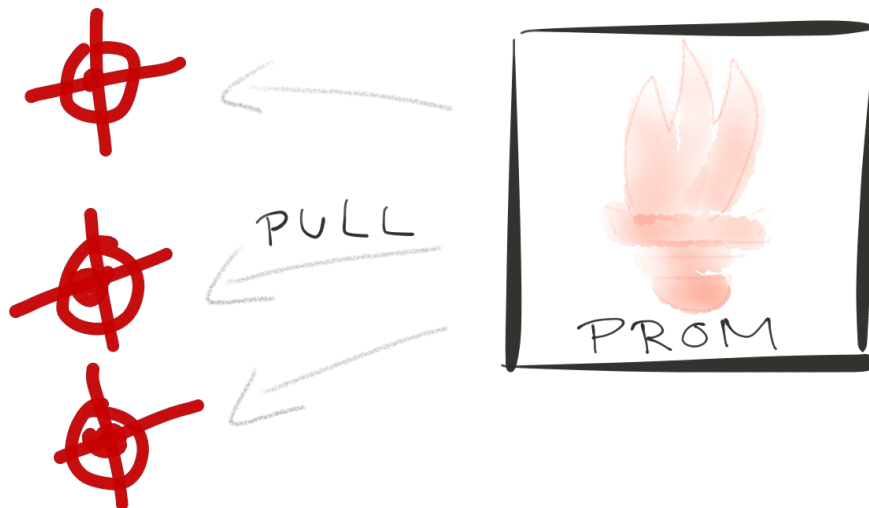


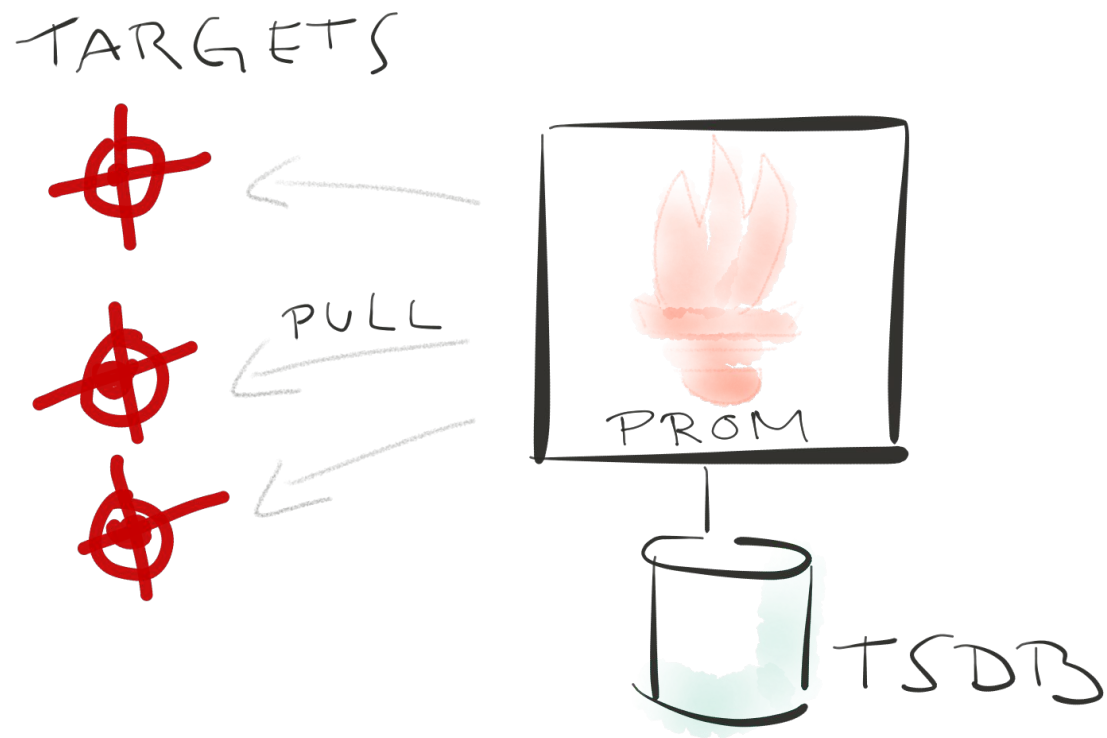
Simplistic world  
view

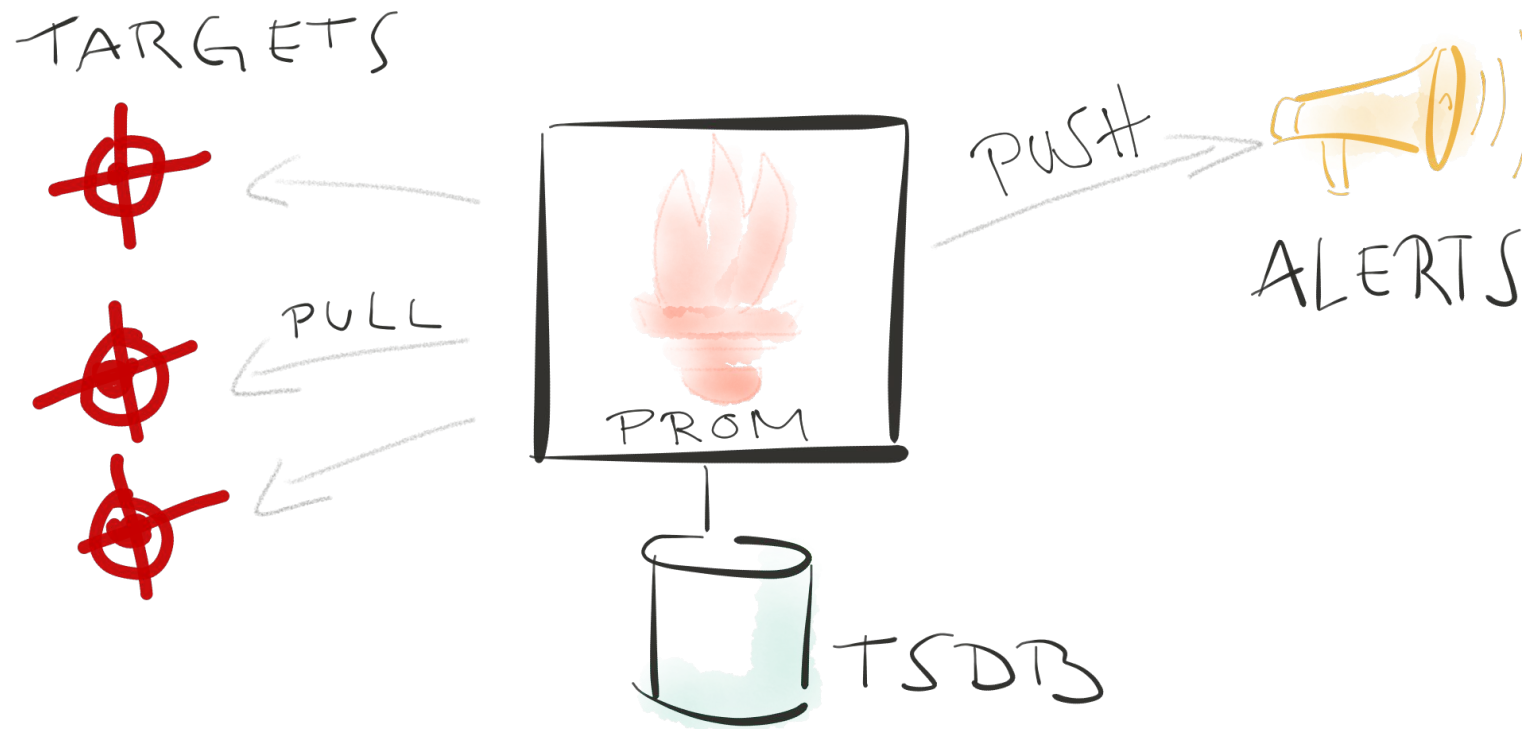
TARGETS



TARGETS









## Prometheus Metrics

Metric name	Labels	Timestamp	Sample Value
...			
http_requests_total{status="200",method="GET"}		@1434317560938	94355
http_requests_total{status="200",method="GET"}		@1434317561287	94934
http_requests_total{status="200",method="GET"}		@1434317562344	96483
http_requests_total{status="404",method="GET"}		@1434317560938	38473
http_requests_total{status="404",method="GET"}		@1434317561249	38544
http_requests_total{status="404",method="GET"}		@1434317562588	38663
http_requests_total{status="200",method="POST"}		@1434317560885	4748
http_requests_total{status="200",method="POST"}		@1434317561483	4795
http_requests_total{status="200",method="POST"}		@1434317562589	4833
http_requests_total{status="404",method="POST"}		@1434317560939	122
...			

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

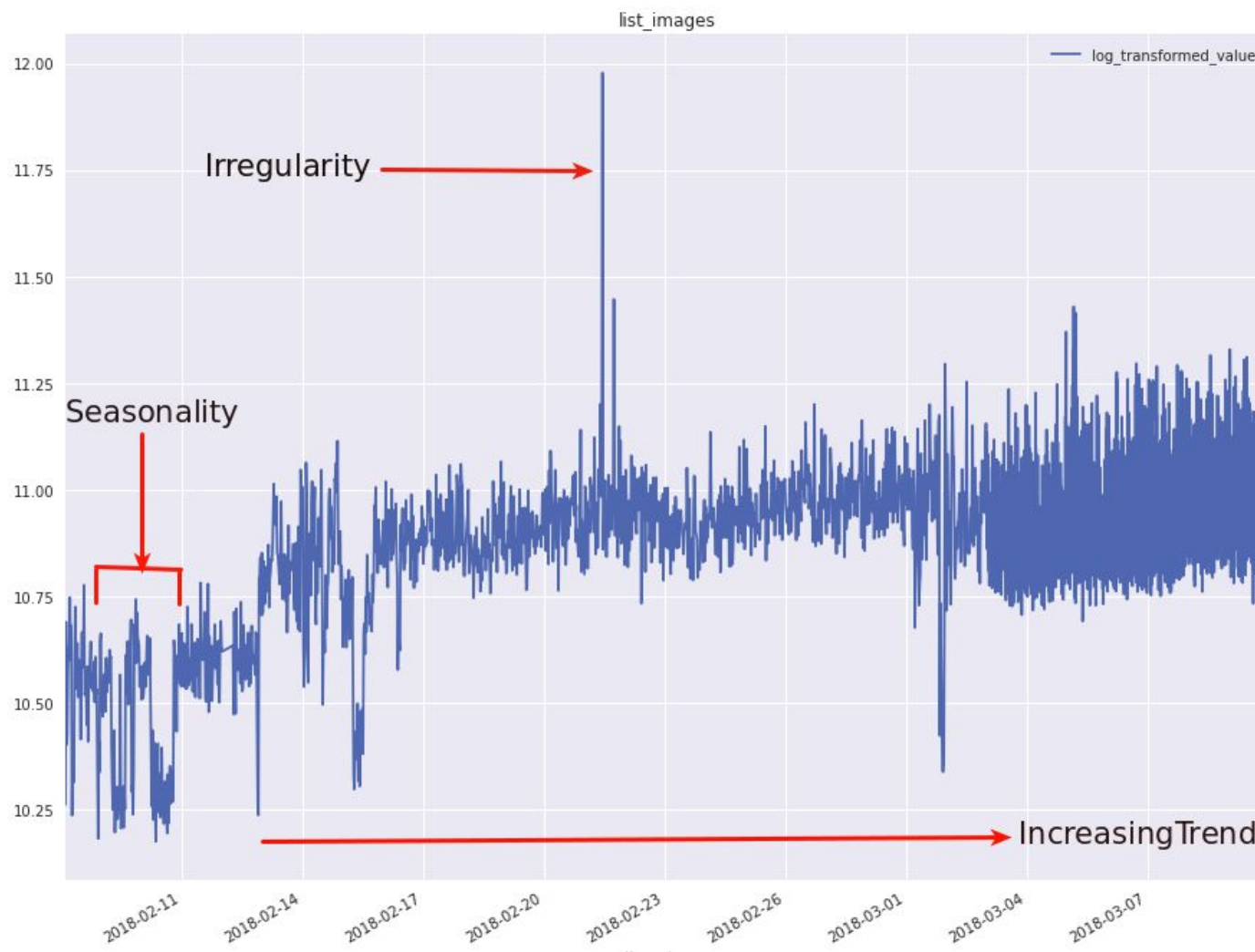
# Components of Time Series

## Trend

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

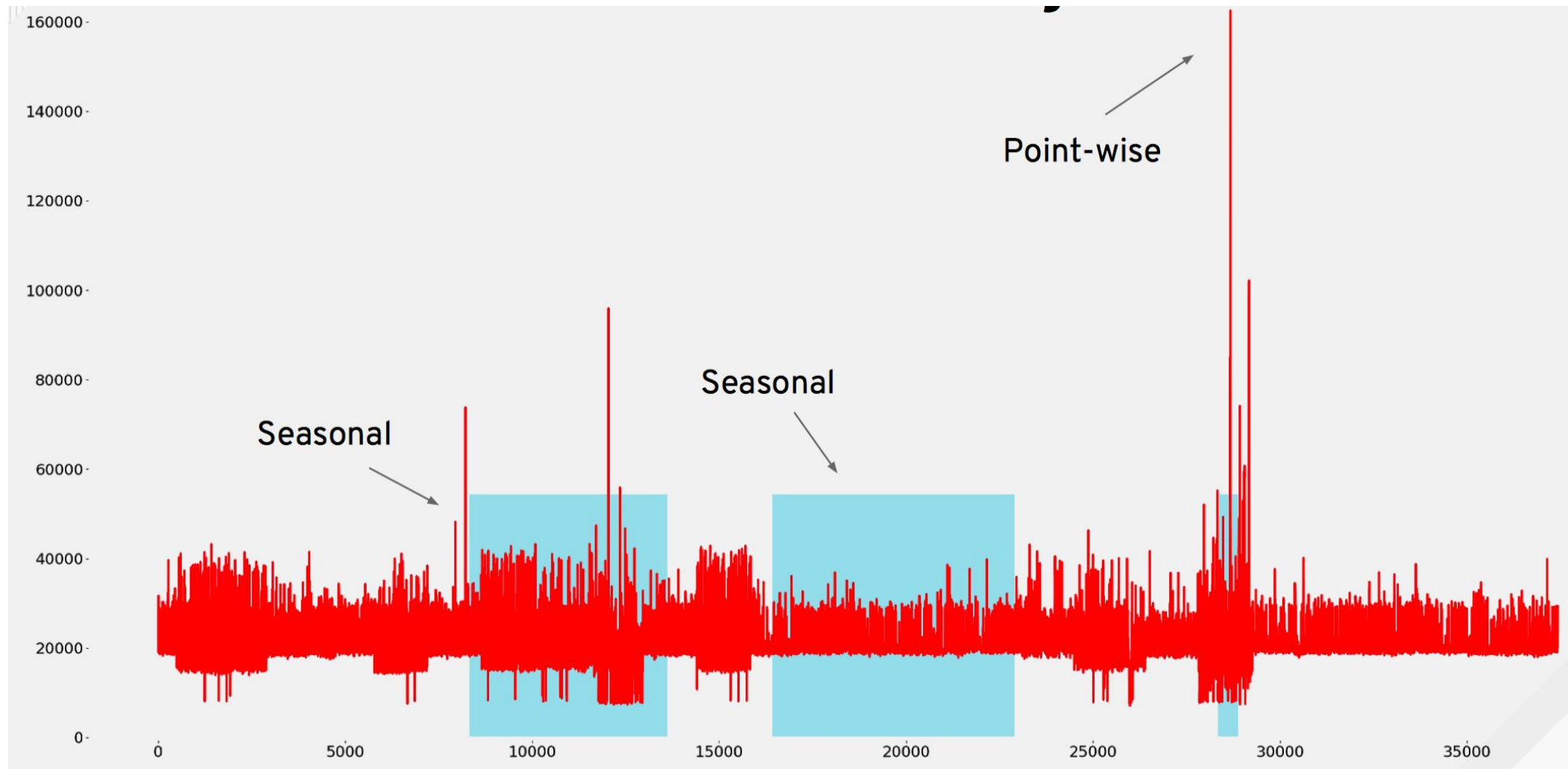
## Seasonality

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



# Anomaly Types

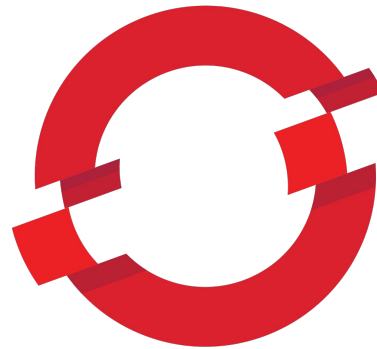
CONFIDENTIAL Red Hat associates only



# Toolkit



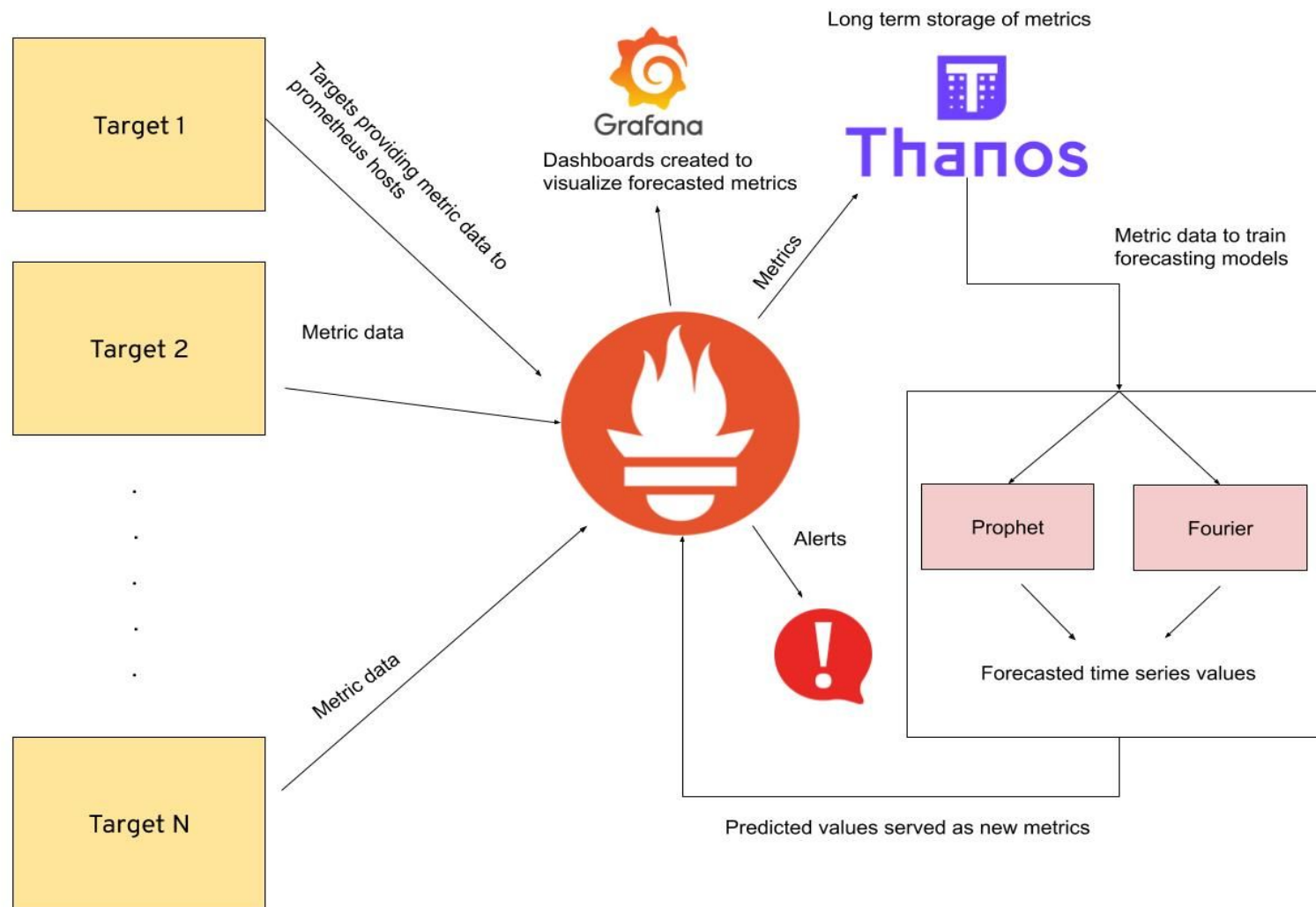
Prometheus



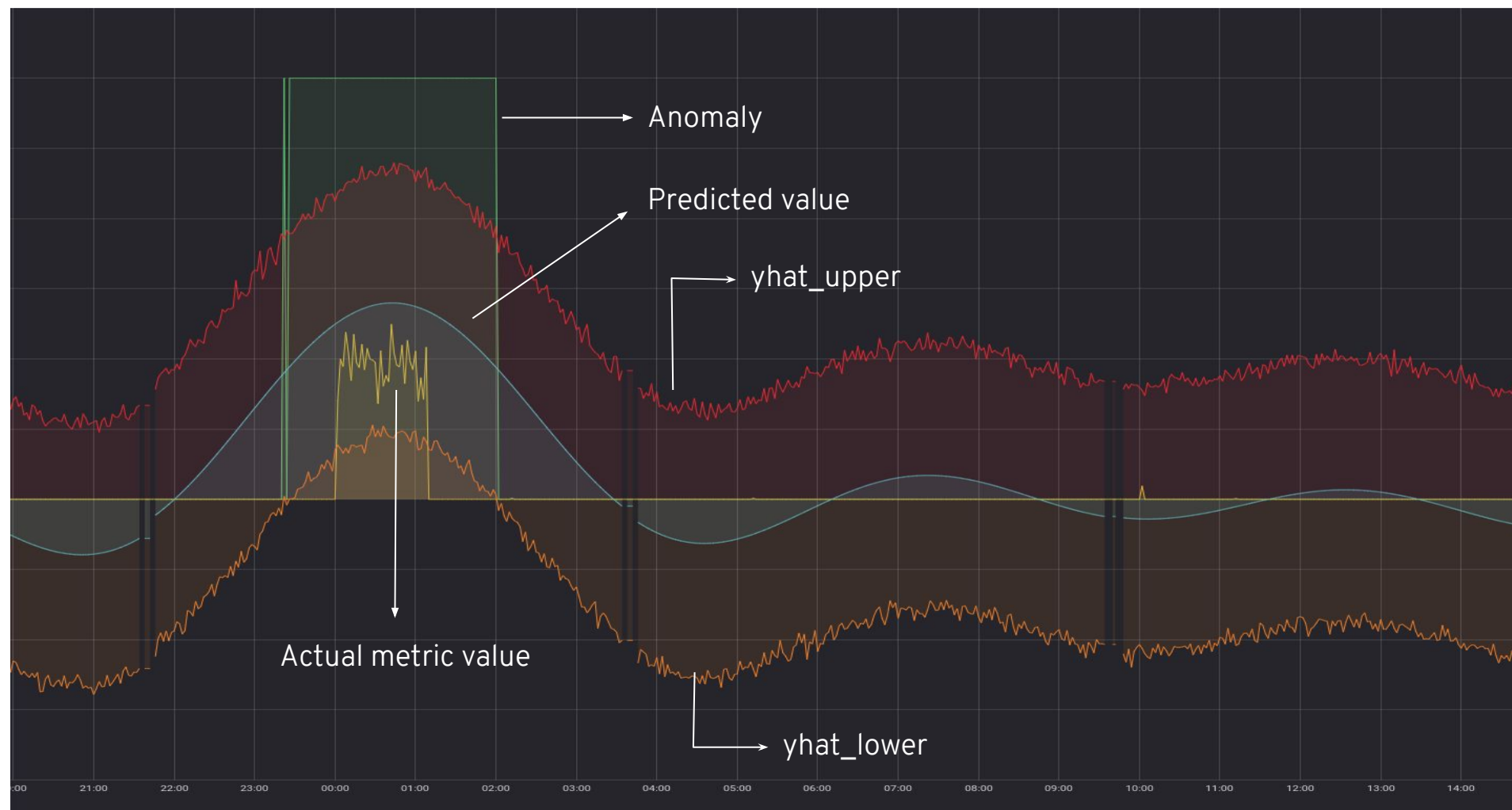
**OPENSIFT**




# Implementation setup so far





# Grafana Dashboard Visualization



# Alerting on Anomalies

 **Sesheta Bot** 16 mins

 **Prometheus Alert** 

**Anomaly detected by Prophet in instance anomaly-detection-demo-aiops-prod-prometheus-predict.cloud.paas.psi.redhat.com:80.**

Job: anomaly-detector-demo-app

Severity: **HIGH**

Status: **firing**

[OPEN THE ALERT](#)

Prometheus Alerts Graph Status Help

Alerts

☐ Show annotations

Anomaly detected by Prophet (1 active)

```
alert: Anomaly
  detected by Prophet
expr: flask_http_request_total_prophet{instance="anomaly-detection-demo-aiops-prod-prometheus-predict.cloud.paas.psi.redhat.com:80",job="anomaly-detector-demo-app",method="GET",status="200",value_type="anomaly"}
== 1
for: 5m
annotations:
  severity: HIGH
  summary: Anomaly detected by Prophet
```

Labels	State	Active Since	Value
<code>alertname="Anomaly detected by Prophet"</code> <code>instance="anomaly-detection-demo-aiops-prod-prometheus-predict.cloud.paas.psi.redhat.com:80"</code> <code>job="anomaly-detector-demo-app"</code> <code>method="GET"</code> <code>status="200"</code> <code>value_type="anomaly"</code>	<b>FIRING</b>	2019-10-14 20:49:17.978105206 +0000 UTC	1

1 alert for alertname=Anomaly detected by Prophet

[View In AlertManager](#)

[1] Firing

**Labels**  
alertname = Anomaly detected by Prophet  
instance = [anomaly-detection-demo-aiops-prod-prometheus-predict.cloud.paas.psi.redhat.com:80](#)  
job = anomaly-detector-demo-app  
method = GET  
monitor = prometheus  
replica = \$(HOSTNAME)  
status = 200  
value\_type = anomaly

**Annotations**  
severity = HIGH  
summary = Anomaly detected by Prophet  
[Source](#)

[Sent by AlertManager](#)

# References

- Project Repository: <https://github.com/AICoE/prometheus-anomaly-detector>
- Workshop Repository: <https://github.com/hemajv/prometheus-anomaly-detection-workshop>
- Prometheus API Client: <https://github.com/AICoE/prometheus-api-client-python>
- Team Mail list: [aicoe-aiops@redhat.com](mailto:aicoe-aiops@redhat.com)
- GChat: AICoE - AIOps



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