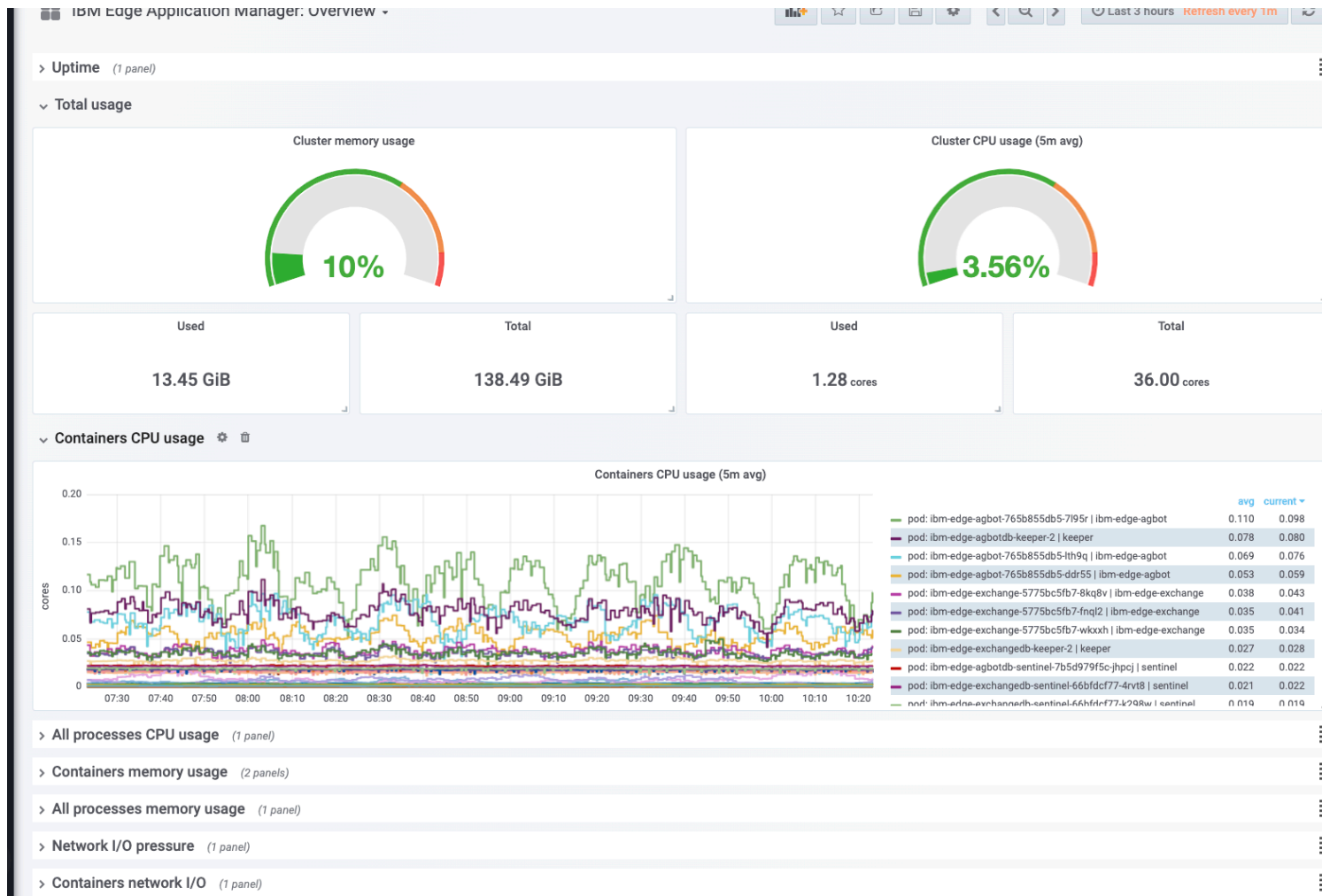# Agent Registration Use Case

Ivan Portilla

Data Scientist
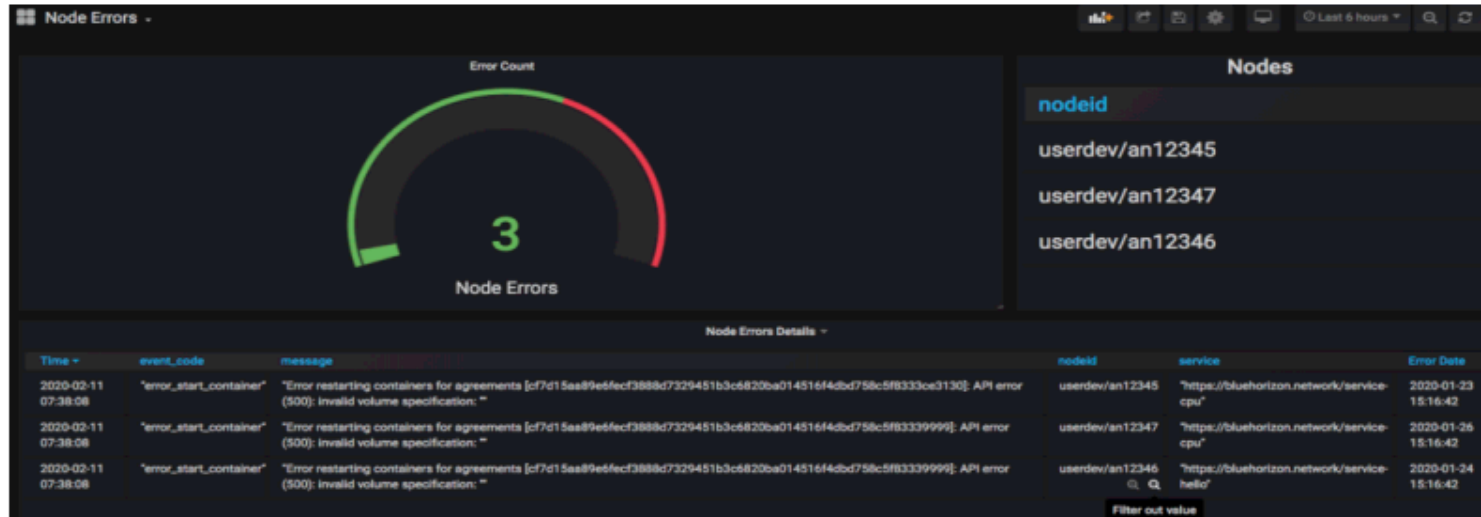
IBM Edge Computing

IEAM Metrics Overview
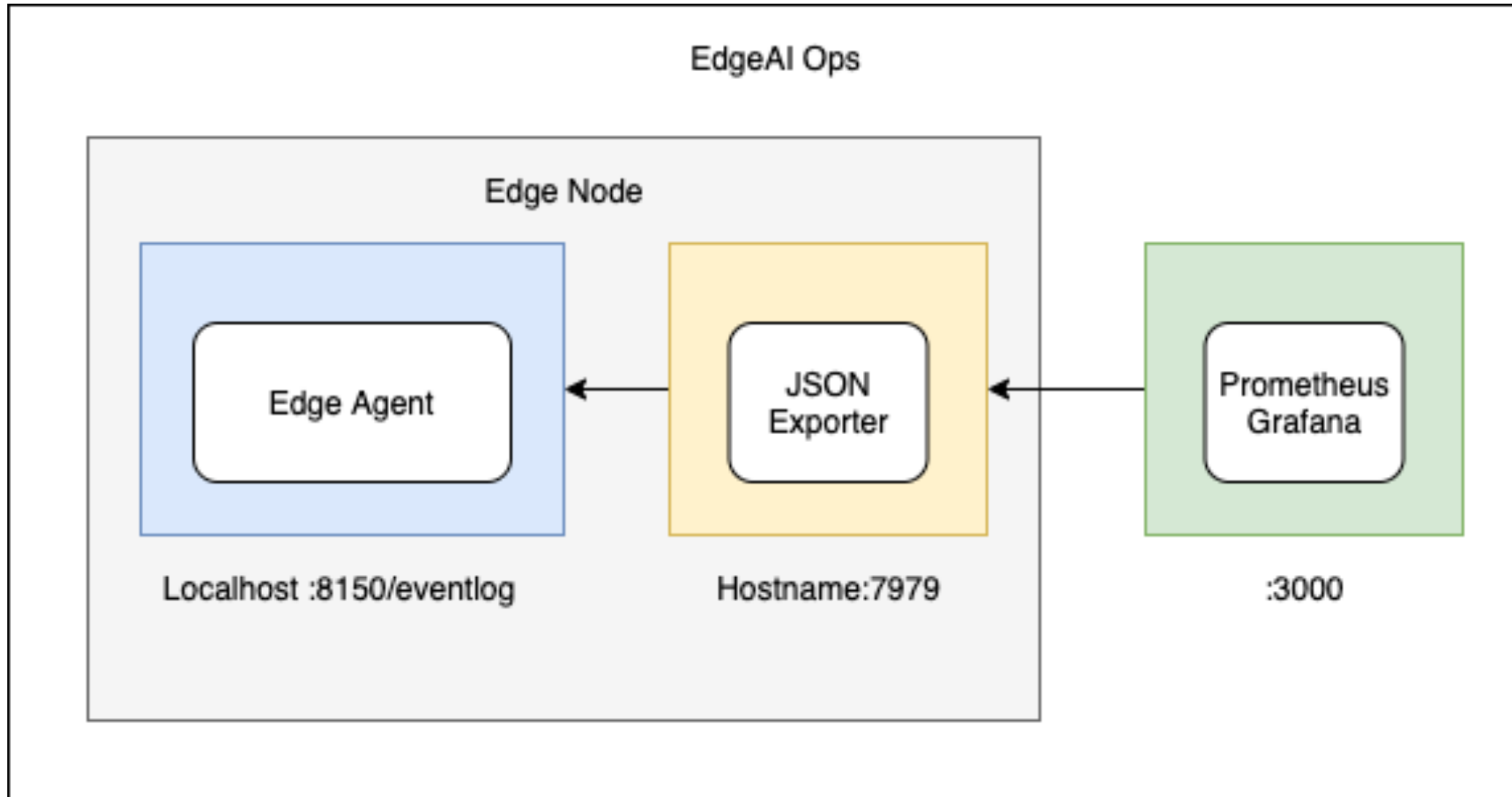
Use Case 1 – Flapping

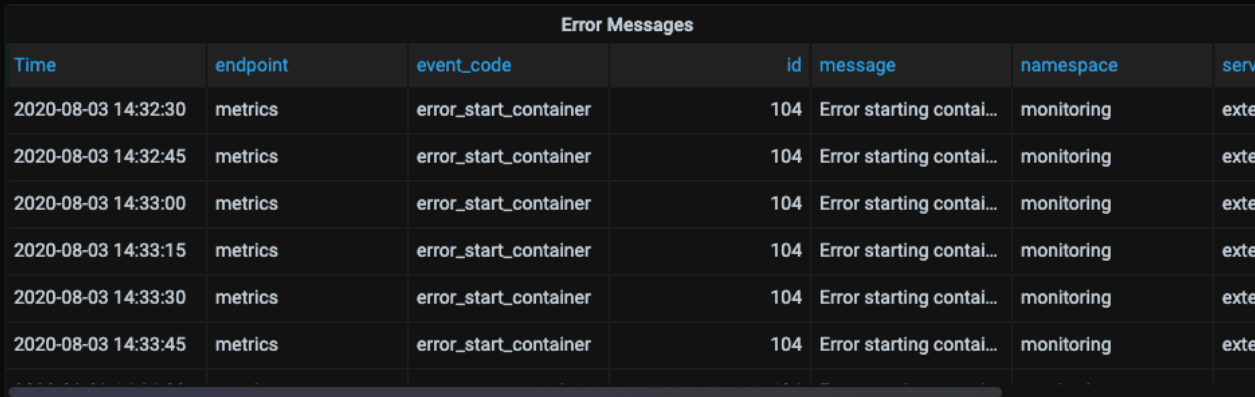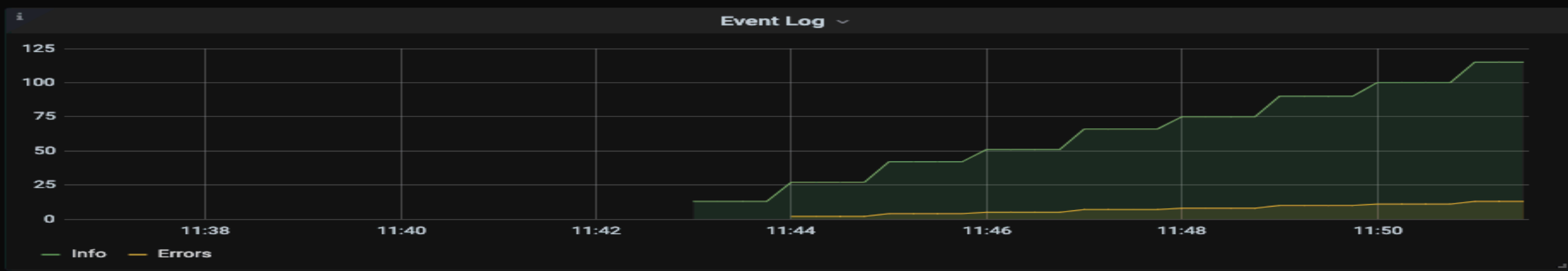| Metric	Value/Action
Time of agreement inception	The agbot makes a proposal to an edge node
Time of agreement creation	The node concedes (agrees) to the agreement
Time of start of service in the node	The node starts the service(s) defined in the agreement
Number of agreements without finalized time	When the service does not start and the Edge system has to cancel the agreement (agreement timeout)

IEAM
Custom
Metrics

Edge AIOps

Edge Network

Edge Node

Edge Agent

Localhost :8150/eventlog

JSON Exporter

Hostname:7979

Prometheus (Grafana)

:3000

Adapter

Prometheus Grafana

:3000

TMSDB

InfluxDB

Firewall

Cloud

Errors

2020-07-11 12:57:15
— Value: 35.00
— Value:

— Value — Value
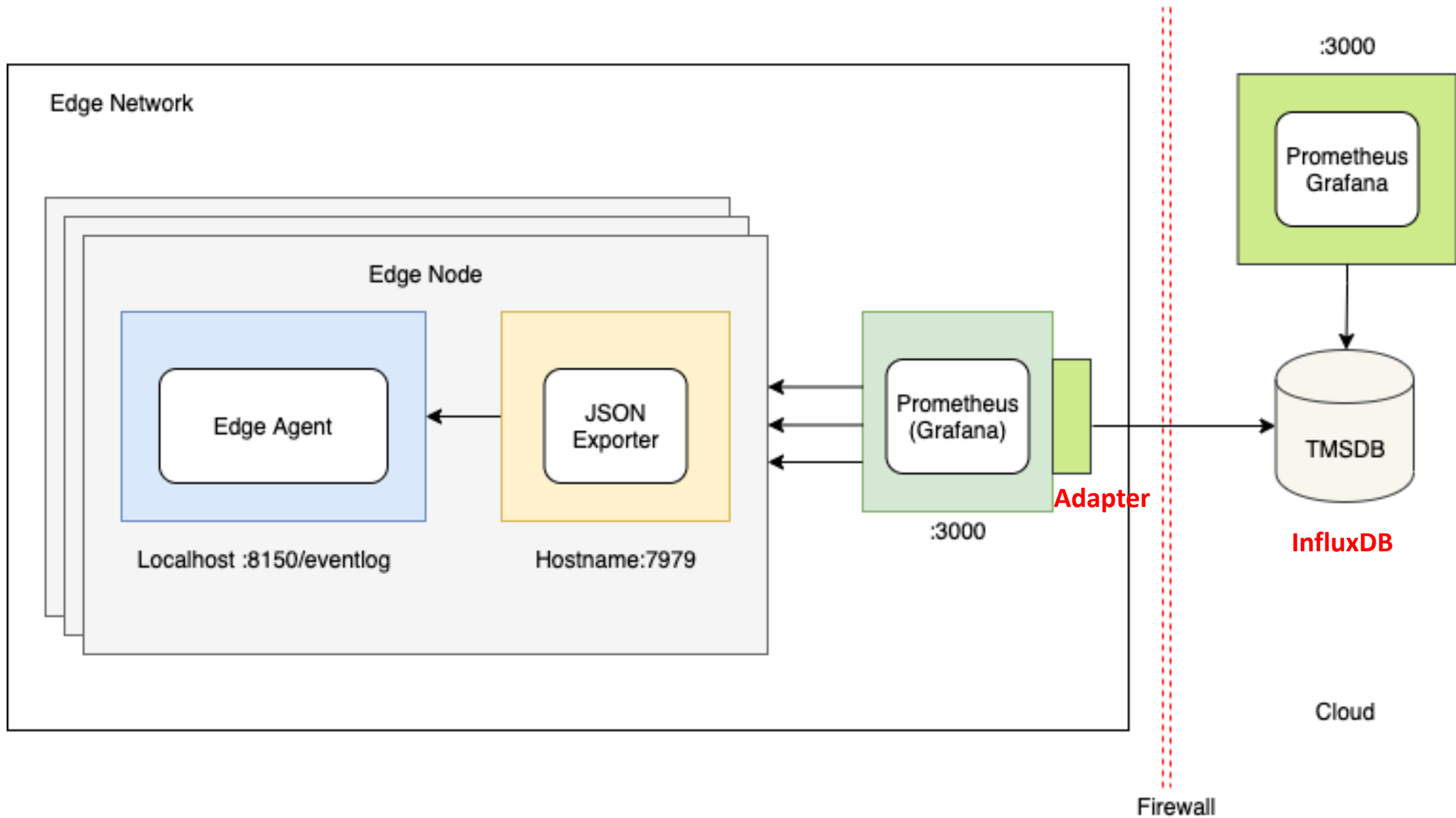
Error Messages

Time	event_code	id	message	source_type
2020-07-11 13:05:02	error_start_container	10	Error starting containers: API e…	agreement
2020-07-11 13:05:02	node_heartbeat_failed	20	Node heartbeat failed for node…	node
2020-07-11 13:05:02	node_heartbeat_failed	22	Node heartbeat failed for node…	node
2020-07-11 13:05:02	node_heartbeat_failed	24	Node heartbeat failed for node…	node
2020-07-11 13:05:02	node_heartbeat_failed	38	Node heartbeat failed for node…	node
2020-07-11 13:05:02	node_heartbeat_failed	40	Node heartbeat failed for node…	node

Details

Messages

| Time	Event Code	Record ID	Message	Source Type
2020-07-11 13:05:02	agreement_canceled	12	Complete terminating agreement for acme-motion-detection-service-gpu. Termination reason: service terminated	agreement
2020-07-11 13:05:02	agreement_canceled	28	Complete terminating agreement for acme-motion-detection-service-gpu. Termination reason: node policy changed	agreement
2020-07-11 13:05:02	agreement_reached	15	Agreement reached for service acme-motion-detection-service-gpu. The agreement id is 18b6ffbc0a8c79d4214fe0232103729e58170e4376b895935ddcc467…	agreement
2020-07-11 13:05:02	agreement_reached	33	Agreement reached for service acme-motion-detection-service-gpu. The agreement id is 9590605e2a9980fa921b13712c7207274275dafb53333cf36a3f6b04…	agreement
2020-07-11 13:05:02	agreement_reached	6	Agreement reached for service acme-motion-detection-service-gpu. The agreement id is 7996f592634d22c5583f74b0404cc77fd69969879fa5ec321e0cf2c70…	agreement
2020-07-11 13:05:02	cancel_agreement	11	Start terminating agreement for acme-motion-detection-service-gpu. Termination reason: service terminated	agreement

EventLog

Last 5 minutes   10s

Errors

— Value — Value

Error Messages

Time	endpoint	event_code	id	message	namespace	servic
2020-08-03 14:32:30	metrics	error_start_container	104	Error starting contai...	monitoring	extern
2020-08-03 14:32:45	metrics	error_start_container	104	Error starting contai...	monitoring	extern
2020-08-03 14:33:00	metrics	error_start_container	104	Error starting contai...	monitoring	extern
2020-08-03 14:33:15	metrics	error_start_container	104	Error starting contai...	monitoring	extern
2020-08-03 14:33:30	metrics	error_start_container	104	Error starting contai...	monitoring	extern
2020-08-03 14:33:45	metrics	error_start_container	104	Error starting contai...	monitoring	extern

∨ Details

Messages ∨

	endpoint	Event Code	Record ID	Message	namespace	service	Source Type
32:30	metrics	agreement_canceled	106	Complete terminating agreement for acme-motion-detection-service. Termination reason: service terminated	monitoring	external-server	agreement
32:45	metrics	agreement_canceled	106	Complete terminating agreement for acme-motion-detection-service. Termination reason: service terminated	monitoring	external-server	agreement
33:00	metrics	agreement_canceled	106	Complete terminating agreement for acme-motion-detection-service. Termination reason: service terminated	monitoring	external-server	agreement
33:15	metrics	agreement_canceled	106	Complete terminating agreement for acme-motion-detection-service. Termination reason: service terminated	monitoring	external-server	agreement
33:30	metrics	agreement_canceled	106	Complete terminating agreement for acme-motion-detection-service. Termination reason: service terminated	monitoring	external-server	agreement
33:45	metrics	agreement_canceled	106	Complete terminating agreement for acme-motion-detection-service. Termination reason: service terminated	monitoring	external-server	agreement

Edge Node Monitoring ⭐ ⟨⟩

Event Log ⌄

```
125
100
 75
 50
 25
  0
        11:38        11:40        11:42        11:44        11:46        11:48        11:50
```

— Info — Errors

Errors

Time	Event Code	Event ID ⌃	Instance	Message	namespace
2020-08-09 11:51:34	error_start_container	3284	52.116.2.26:7979	Error starting contai...	monitoring
2020-08-09 11:51:34	error_start_container	3293	52.116.2.26:7979	Error starting contai...	monitoring
2020-08-09 11:51:34	error_start_container	3302	52.116.2.26:7979	Error starting contai...	monitoring
2020-08-09 11:51:34	error_start_container	3311	52.116.2.26:7979	Error starting contai...	monitoring
2020-08-09 11:51:34	error_start_container	3320	52.116.2.26:7979	Error starting contai...	monitoring
2020-08-09 11:51:34	error_start_container	3329	52.116.2.26:7979	Error starting contai...	monitoring

Info Messages

Time	Event Code	Event ID	Instance	Message	Source Type
2020-08-09 11:44:00	agreement_canceled	3286	52.116.2.26:7979	Complete terminatin...	agreement
2020-08-09 11:44:15	agreement_canceled	3286	52.116.2.26:7979	Complete terminatin...	agreement
2020-08-09 11:44:30	agreement_canceled	3286	52.116.2.26:7979	Complete terminatin...	agreement
2020-08-09 11:44:45	agreement_canceled	3286	52.116.2.26:7979	Complete terminatin...	agreement
2020-08-09 11:45:00	agreement_canceled	3286	52.116.2.26:7979	Complete terminatin...	agreement
2020-08-09 11:45:15	agreement_canceled	3286	52.116.2.26:7979	Complete terminatin...	agreement

Edge Monitoring with Prometheus Operators

Prometheus   Alerts Graph Status ▾ Help
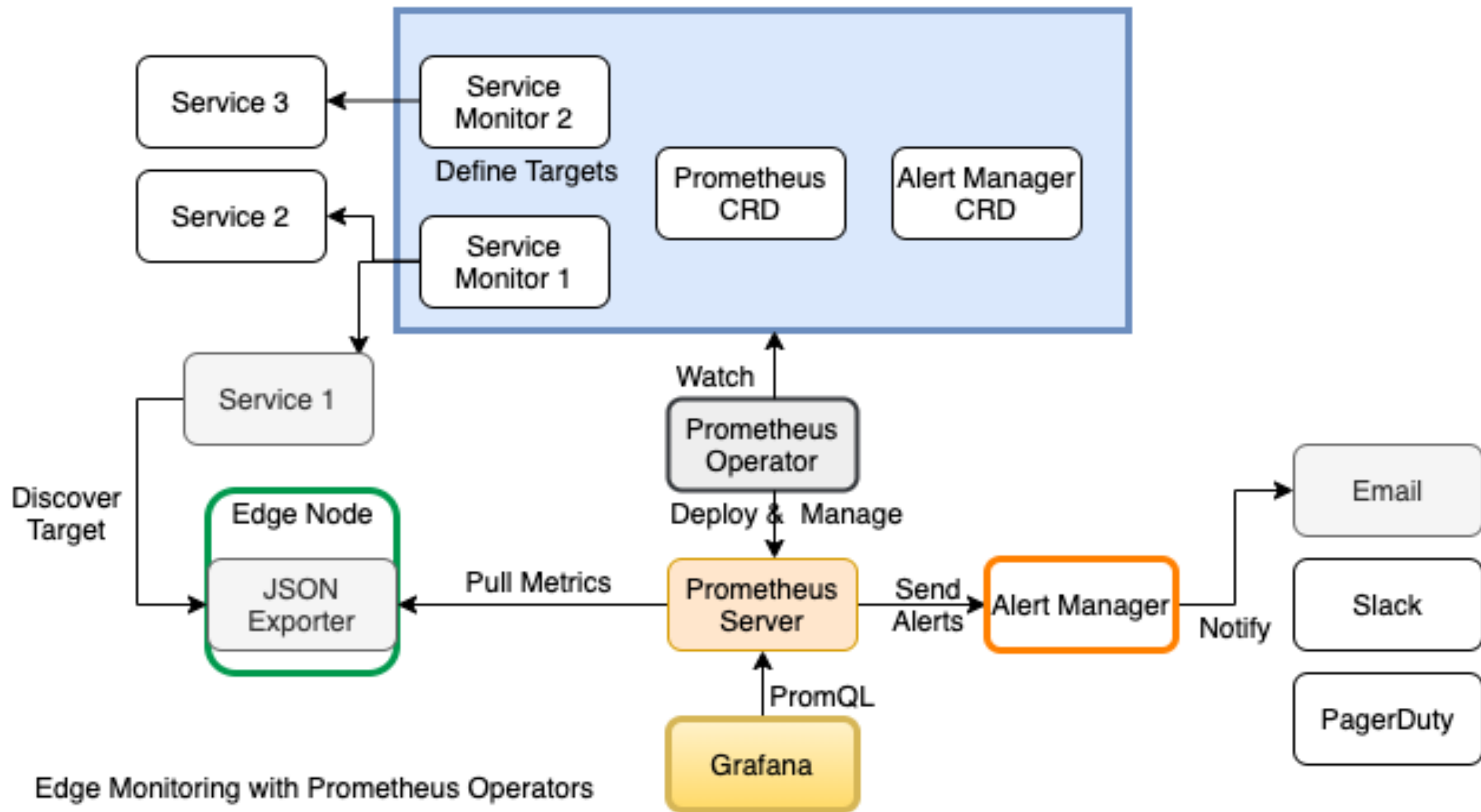
Alerts

[Inactive (80)] [Pending (1)] [Firing (6)]

☐ Show annotations

/etc/prometheus/rules/prometheus-k8s-rulefiles-0/monitoring-prometheus-k8s-rules.yaml > alertmanager.rules

/etc/prometheus/rules/prometheus-k8s-rulefiles-0/monitoring-prometheus-k8s-rules.yaml > edge.rules

EventLog (1 active)

```
alert: EventLog
expr: count(example_error_info{instance="52.116.2.26:7979"}) > 5
for: 5m
labels:
  severity: critical
annotations:
  message: |
    Errors from EventLog in {{ $labels.namespace }} Namespace, {{ $labels.service }} Service, {{ $labels.instance }} Instance.
  summary: Edge Node EventLog is reporting errors.
```

Labels	State	Active Since	Value
alertname="EventLog" severity="critical"	PENDING	2020-08-09 17:57:26.868961881 +0000 UTC	23

Prometheus   Alerts Graph Status ▾ Help

Alerts

[Inactive (80)] [Pending (0)] [Firing (7)]

☐ Show annotations

/etc/prometheus/rules/prometheus-k8s-rulefiles-0/monitoring-prometheus-k8s-rules.yaml > alertmanager.rules

/etc/prometheus/rules/prometheus-k8s-rulefiles-0/monitoring-prometheus-k8s-rules.yaml > edge.rules

EventLog (1 active)

```
alert: EventLog
expr: count(example_error_info{instance="52.116.2.26:7979"}) > 5
for: 5m
labels:
  severity: critical
annotations:
  message: Errors from EventLog in {{ $labels.namespace }} Namespace, at {{ $labels.service }} Service, in {{ $labels.instance }} Instance.
  runbook_url: https://github.com/kubernetes-monitoring/kubernetes-mixin/tree/master/runbook.md#alert-name-nodefilesystemfilesfillingup
  summary: The Edge Node EventLog is reporting errors.
```

Labels	State	Active Since	Value
alertname="EventLog" severity="critical"	FIRING	2020-08-09 17:57:26.868961881 +0000 UTC	99

Filter   Group

Receiver: All   ☐ Silenced   ☐ Inhibited

[   ] [+]   ✑ Silence

Custom matcher, e.g.   env="production"

+ Expand all groups

− Not grouped   3 alerts

18:02:26, 2020-08-09 (UTC)   − Info   ⬚ Source   ✑ Silence

message: Errors from EventLog in Namespace, at Service, in Instance.

runbook_url: https://github.com/kubernetes-monitoring/kubernetes-mixin/tree/master/runbook.md#alert-name-nodefilesystemfillingup

summary: The Edge Node EventLog is reporting errors.

alertname="EventLog" +   prometheus="monitoring/k8s" +   severity="critical" +

Version Information

Branch: HEAD

BuildDate: 20200617-08:54:02

BuildUser: root@dee35927357f

GoVersion: go1.14.4

Revision: 4c6c03ebfe21009c546e4d1e9b92c371d67c021d

Version: 0.21.0

Config

```
global:
  resolve_timeout: 5m
  http_config: {}
  smtp_hello: localhost
  smtp_require_tls: true
  pagerduty_url: https://events.pagerduty.com/v2/enqueue
  opsgenie_api_url: https://api.opsgenie.com/
  wechat_api_url: https://qyapi.weixin.qq.com/cgi-bin/
  victorops_api_url: https://alert.victorops.com/integrations/generic/20131114/alert/
route:
  receiver: edge-alert
  group_by:
  - Alertname
  routes:
  - receiver: Watchdog
    match:
      alertname: Watchdog
  - receiver: Critical
    match:
      severity: critical
  - receiver: edge-alert
    match:
      alertname: EventLog
  group_wait: 30s
  group_interval: 5m
  repeat_interval: 12h
inhibit_rules:
- source_match:
    severity: critical
  target_match_re:
    severity: warning|info
  equal:
  - namespace
  - alertname
- source_match:
    severity: warning
  target_match_re:
    severity: info
  equal:
  - namespace
  - alertname
receivers:
- name: Default
- name: Watchdog
- name: Critical
- name: edge-alert
  email_configs:
  - send_resolved: false
    to: portilla@gmail.com
    from: edge.node.alerts@gmail.com
    hello: localhost
    smarthost: smtp.gmail.com:587
    auth_username: edge.node.alerts@gmail.com
    auth_password: <secret>
    auth_identity: edge.node.alerts@gmail.com
    headers:
      From: edge.node.alerts@gmail.com
      Subject: Edge EventLog alert
      To: portilla@gmail.com
    html: '{{ template "email.default.html" . }}'
    require_tls: true
templates: []
```

---

3 alerts for alertname=EventLog

View In AlertManager

[3] Firing

Labels

alertname = EventLog

instance = 9.30.118.108:7979

namespace = monitoring

prometheus = monitoring/k8s

service = edge-manufacturing

severity = critical

Annotations

message = Errors from EventLog in monitoring Namespace, at edge-manufacturing Service, in 9.30.118.108:7979 Instance

runbook_url = https://github.com/kubernetes-monitoring/kubernetes-mixin/tree/master/runbook.md

summary = Edge Node EventLog is reporting errors.

Source

Labels

alertname = EventLog

instance = 9.30.118.108:7979

namespace = monitoring

prometheus = monitoring/k8s

service = edge-monitoring

severity = critical

Annotations

message = Errors from EventLog in monitoring Namespace, at edge-monitoring Service, in 9.30.118.108:7979 Instance

runbook_url = https://github.com/kubernetes-monitoring/kubernetes-mixin/tree/master/runbook.md

summary = Edge Node EventLog is reporting errors.

Source

🎛️ CAM-B.demo.acme.com

Node details

Name	CAM-B.demo.acme.com	📋	**Last Heartbeat**	🟢 a few seconds ago	✏️
Organization	mycluster		**Architecture**	amd64	
Node ID	mycluster/CAM-B.demo.acme.com	📋	**Owner**	mycluster/ivan	

Edge agent errors

🚫 **1 agent errors**

⌄ 📟	**acme-motion-detection-service** mycluster	1.0.0	🚫 start container	2020-07-31 00:33:16 +0000 UTC ✕

Node properties

[Learn more about properties]

Properties
Facts about your node   ✏️

`openhorizon.hardwareId="b389e7e2fa2e76d2b45d7265ed92378b3317a079"` `openhorizon.cpu=2`

`openhorizon.arch="amd64"` `openhorizon.memory=3938` `state="configured"` `openhorizon.allowPrivileged=true`

`type="Security-Cam"` `GPU-enabled="false"`

Node constraints

[Learn more about constraints ↗]

Constraints
Properties of compatible nodes   ✏️

```
[
    "purpose == monitoring OR purpose == security-monitoring"
]
```
📋

Services

1 running service

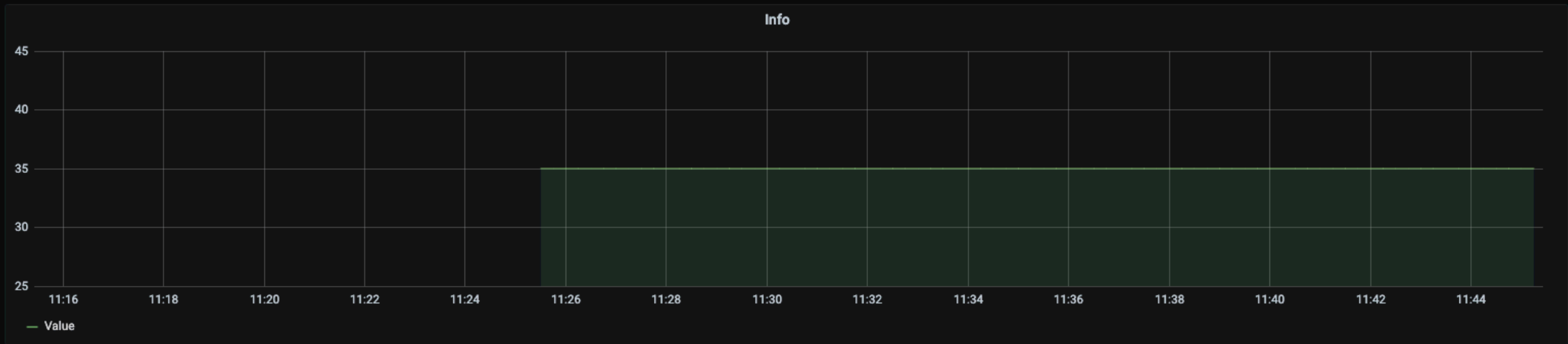| Service ID	Owner	Version	Last Updated
json.exporter_1.0.0_amd64	ivan mycluster	1.0.0	14 minutes ago

Node Errors

Edge AIOps

1. **Descriptive Analytics** tells you what happened in the past.
2. **Diagnostic Analytics** helps you understand why something happened in the past.

3. **Predictive Analytics** predicts what is most likely to happen in the future.

4. **Prescriptive Analytics** recommends actions you can take to affect those outcomes.

Monitoring use case Timeline

Monitoring & Alerts with Prometheus & Grafana use case		
Environment setup	3 WKS	06/29 - 07/17
.Hub set up		
.Cluster Agent setup		
. Prometheus, Grafana, SQL Exporter pod setup		
. Agbot db setup Hub , local, e2edev envs		
Prometheus Queries for Agent registration issues	4 WKS	7/19 - 8/14
.SQL queries		
.Access to Agbot db		
.SQL exporter design, dev, test		
Test setup	2 WK	8/17 - 8/28
.Test agent sh design, dev, test		
.Test metrics handling		
UI Design	1 WK	8/31 -09/04
. Grafana dashboards & pannels		
Documentation	1 WK	09/07 -09/11
. Configuration documentation		
. Github sample code		
. Documentation tests		

⌄ Row title

Info

45

40

35

30

25

11:16   11:18   11:20   11:22   11:24   11:26   11:28   11:30   11:32   11:34   11:36   11:38   11:40   11:42   11:44

— Value

Messages ⌄

Time ^	Event Code	Record ID	Message	Source Type
2020-07-11 11:45:26	agreement_canceled	12	Complete terminating agreement for acme-motion-detection-service-gpu. Termination reason: service terminated	agreement
2020-07-11 11:45:26	agreement_canceled	28	Complete terminating agreement for acme-motion-detection-service-gpu. Termination reason: node policy changed	agreement
2020-07-11 11:45:26	agreement_reached	15	Agreement reached for service acme-motion-detection-service-gpu. The agreement id is 18b6ffbc0a8c79d4214fe0232103729e58170e4376b895935ddcc467...	agreement
2020-07-11 11:45:26	agreement_reached	33	Agreement reached for service acme-motion-detection-service-gpu. The agreement id is 9590605e2a9980fa921b13712c7207274275dafb53333cf36a3f6b04...	agreement
2020-07-11 11:45:26	agreement_reached	6	Agreement reached for service acme-motion-detection-service-gpu. The agreement id is 7996f592634d22c5583f74b0404cc77fd69969879fa5ec321e0cf2c70...	agreement
2020-07-11 11:45:26	cancel_agreement	11	Start terminating agreement for acme-motion-detection-service-gpu. Termination reason: service terminated	agreement

Edge AIOps

Overview

Prometheus integrates with remote storage systems in two ways:

- Prometheus can write samples that it ingests to a remote URL in a standardized format.
- Prometheus can read (back) sample data from a remote URL in a standardized format.