Packet and Sprint IoT

Use Open Source, Bare Metal, & 5G to achieve autonomous drone delivery!

March 2020 / Cody Hill, Field CTO

packet

Cody Hill

- 15+ years all-around technologist, operating at scale
- Network, storage, compute, virtualization, Kubernetes!
- Background at GE (Cloud Architect) and Platform9
- Joined Packet in the Fall of 2019 as Field CTO

Fun facts: I'm a huge sports fan (football) and spend my free time hacking on Raspberry Pi's and 3D Printers.

Ask me questions!

What are we covering today?

- Introduction to Packet
- Sprint Curiosity™
- Getting physical servers on the Edge
- The software needed to turn servers on the Edge into an IoT warehouse and analytics tool!
- Putting the software on the hardware
- Demo!

Packet Overview

Packet is the go-to cloud partner for today's developer-led Enterprises, empowering SaaS companies and Fortune 100's alike to make infrastructure their competitive advantage.

- Founded in 2014 by infrastructure veterans.
- 130+ employees focused on bare metal automation.
- Based in NYC with offices in Dallas, Palo Alto & Manila.
- Backed by Softbank, Dell Technologies Capital, Samsung, Battery Ventures and Third Point Ventures.

20+
PUBLIC CLOUD & EDGE LOCATIONS

130
TEAM MEMBERS

60
SECOND DEPLOYS

60k
INSTALLS PER MONTH

15+
SUPPORTED OS'S

Architecting for Success at the Edge

Curiosity IoT puts intelligence at the edge of the network by combining Curiosity™ Core, the first dedicated, distributed and virtualized IoT network — a network built for software.

"With Packet's developer-friendly bare metal, we're able to take our Curiosity IoT platform to any city in the United States in 90 days or less. This is simply unheard of."

Ivo Rook, SVP of IoT, Sprint

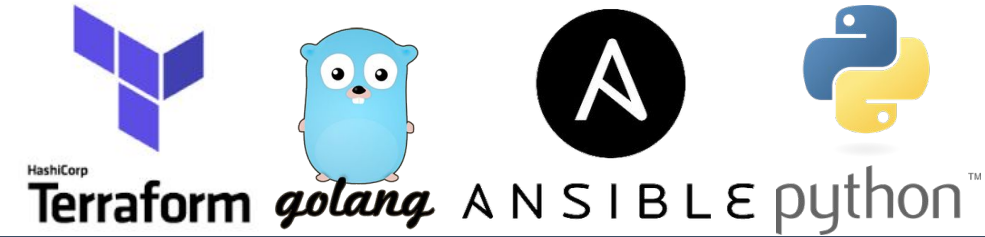
Sprint

Deploy physical servers to the Edge!

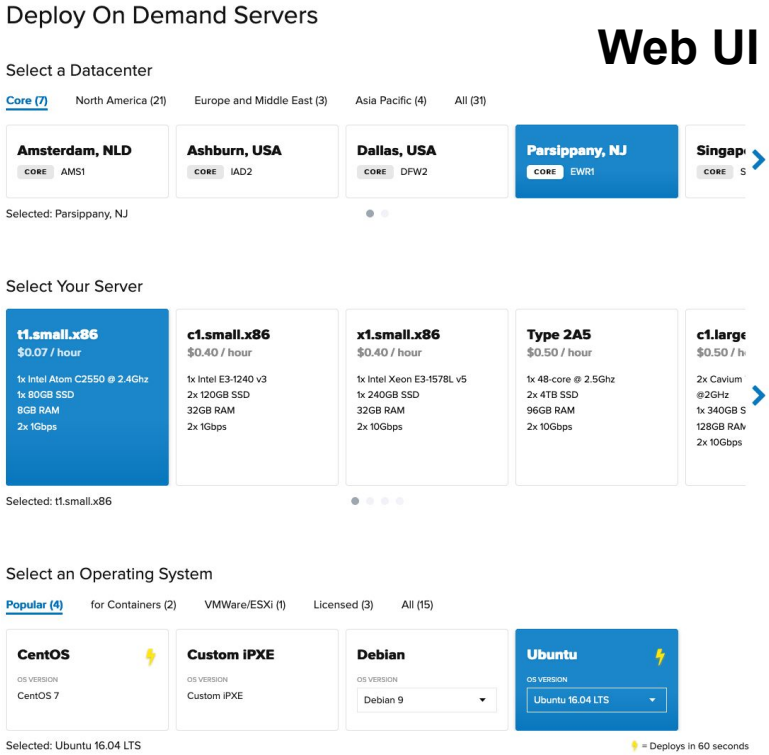
Create your own server!

```
curl https://api.packet.net/projects/3f8a9706-55b4-6d07-839c-4541df89ace0/devices \
  -X POST \
  -H 'X-Auth-Token: FKzRghCafmhEu3HQHHwh9WZD5drjw45z' \
  -H 'Accept: application/json' \
  -H 'Content-Type: application/json' \
  -d '{
      "hostname": "k3s-01",
      "facility": "ewr1",
      "plan": "baremetal_0",
      "operating_system": "ubuntu_16_04"
  }'
```

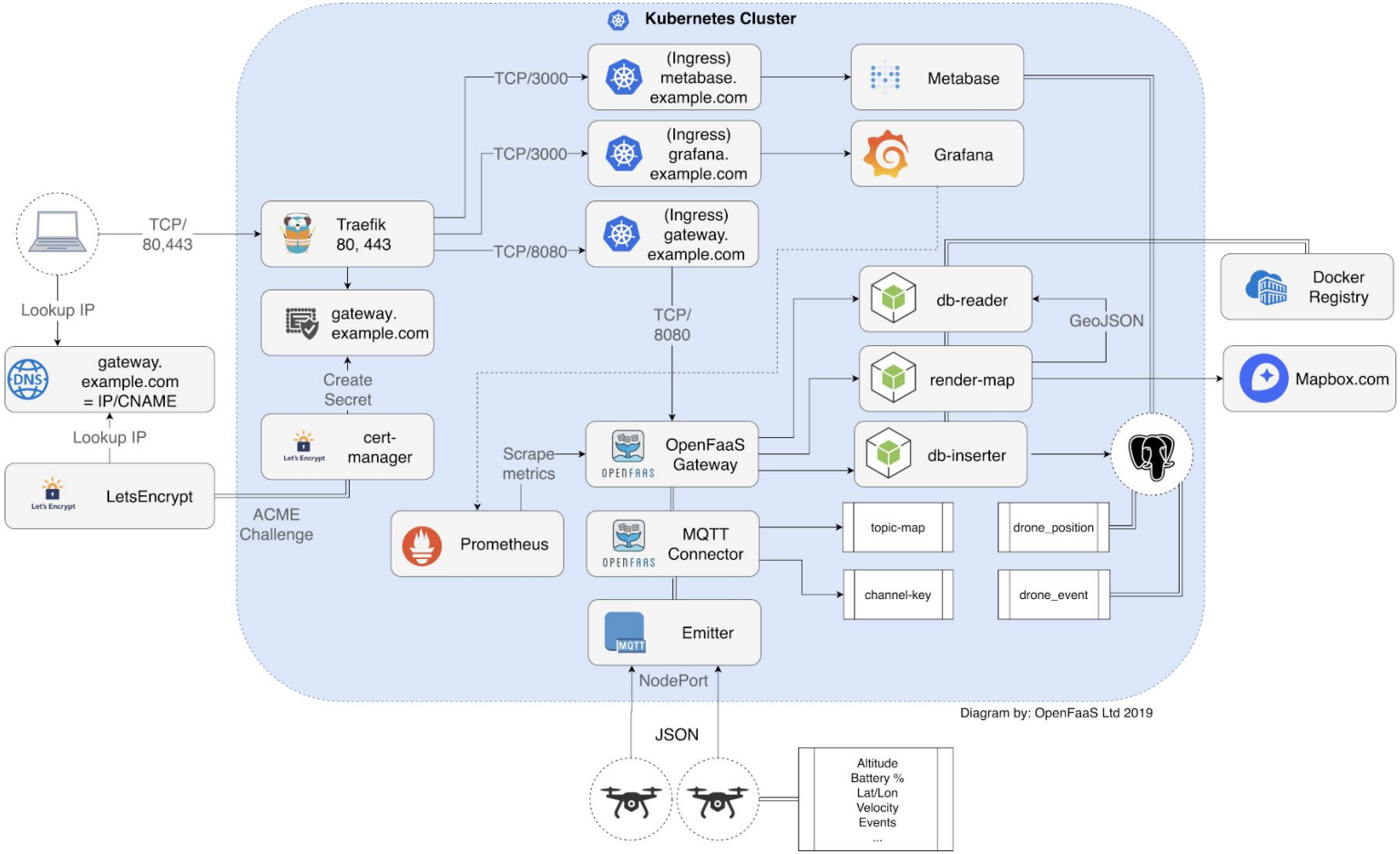
Rest API



Web UI



Open Source IoT Software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Velocity
Events
...
Diagram by: OpenFaaS Ltd 2019

Kubernetes

Kubernetes(commonly stylized as **k8s**) is an open-source container-orchestration system for automating application deployment, scaling, and management. It was originally designed by Google, and is now maintained by the Cloud Native Computing Foundation. It aims to provide a "platform for automating deployment, scaling, and operations of application containers across clusters of hosts". It works with a range of container tools, including Docker. Many cloud services offer a Kubernetes-based platform or infrastructure as a service (PaaS or IaaS) on which Kubernetes can be deployed as a platform-providing service. Many vendors also provide their own branded Kubernetes distributions.

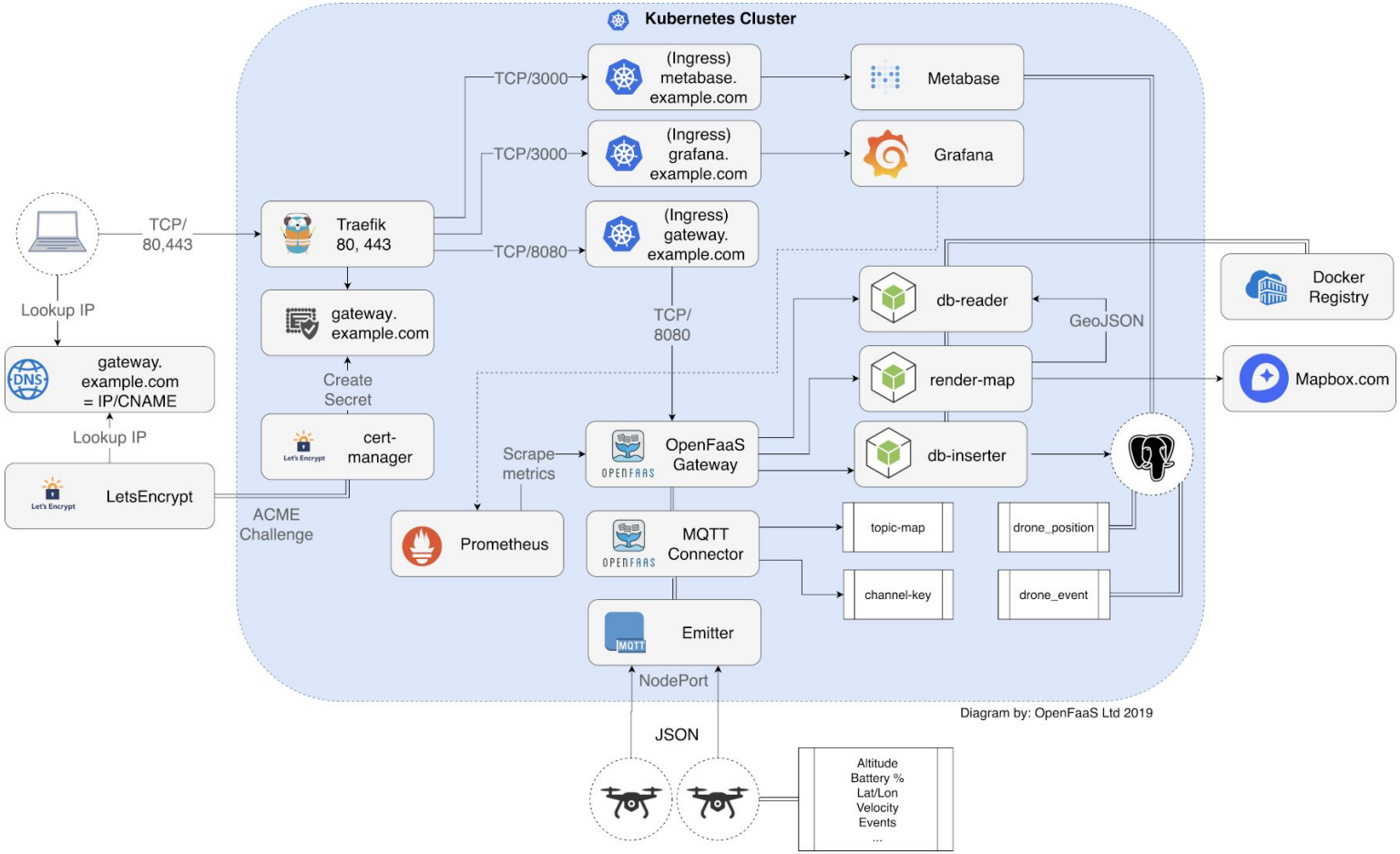
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Diagram by: OpenFaaS Ltd 2019

Emitter

Emitter is a real-time communication service for connecting online devices. The Publish-Subscribe messaging API is built for speed and security. It is a distributed, scalable and fault-tolerant publish-subscribe platform built with MQTT protocol and featuring message storage, security, monitoring and more...

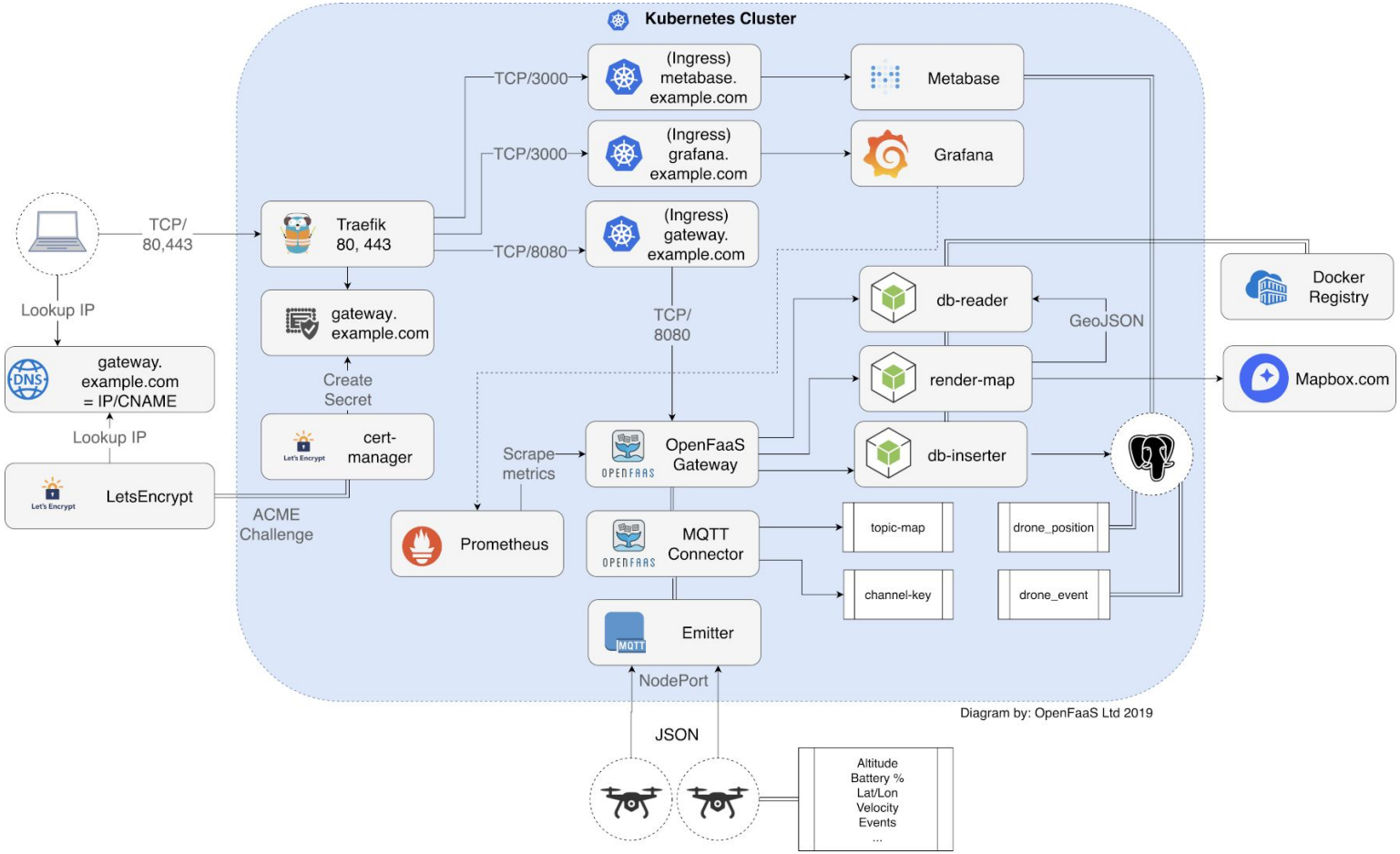
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Diagram by: OpenFaaS Ltd 2019

OpenFaaS

OpenFaaS (Functions as a Service) is a framework for building serverless functions with Docker and Kubernetes which has first class support for metrics. Any process can be packaged as a function enabling you to consume a range of web events without repetitive boiler-plate coding.

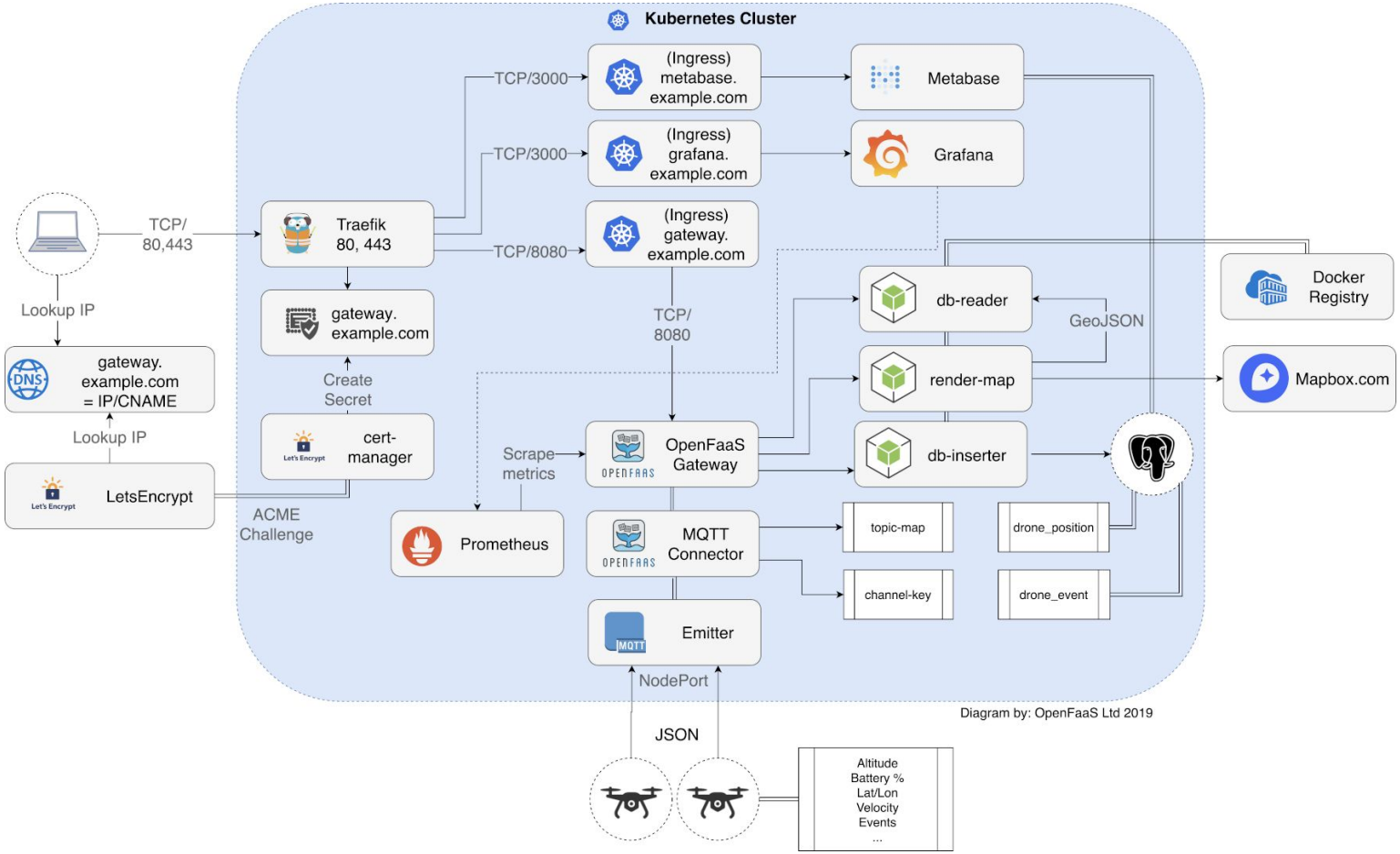
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Diagram by: OpenFaaS Ltd 2019

Prometheus

Prometheus, a Cloud Native Computing Foundation project, is a systems and service monitoring system. It collects metrics from configured targets at given intervals, evaluates rule expressions, displays the results, and can trigger alerts if some condition is observed to be true.

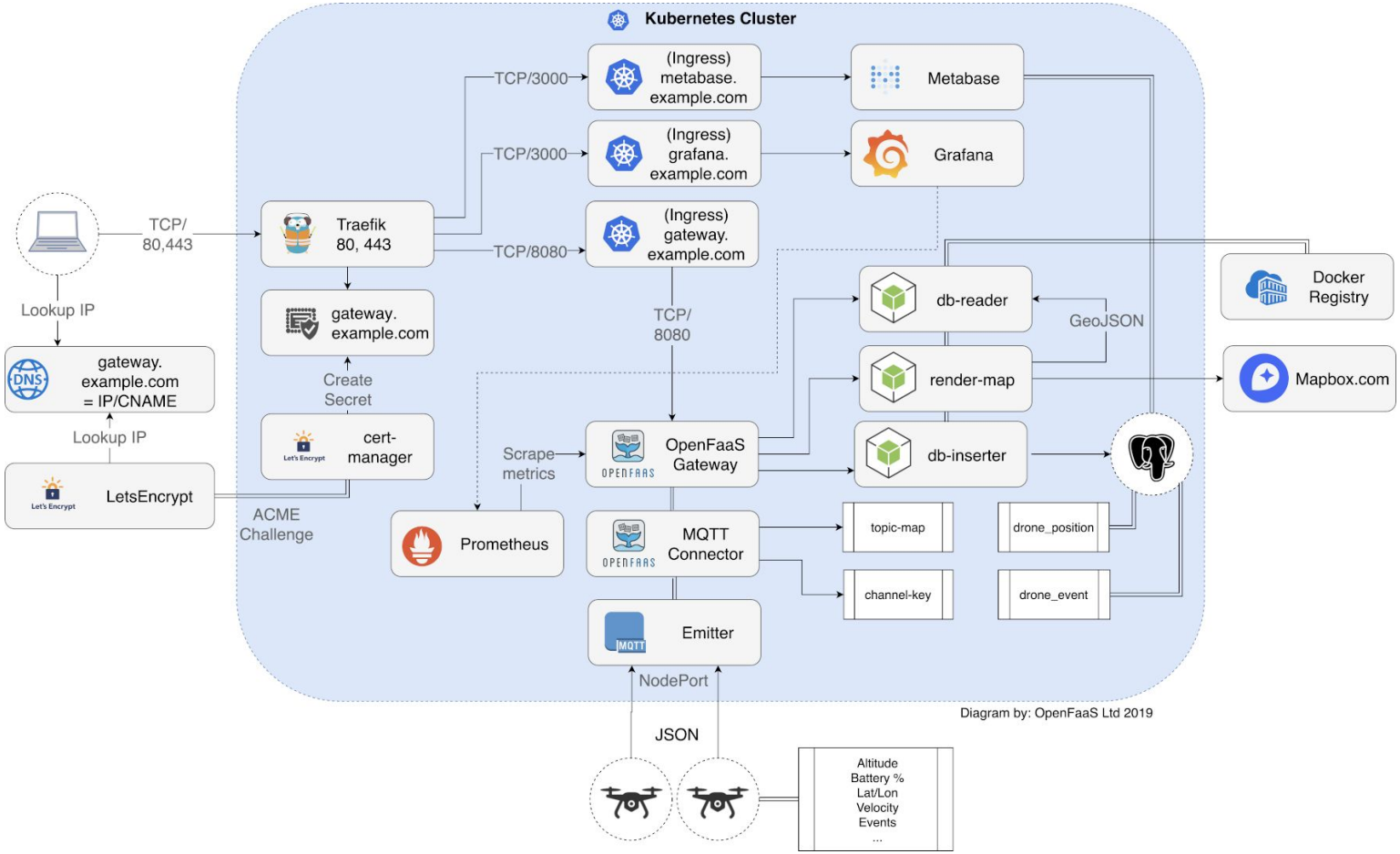
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Diagram by: OpenFaaS Ltd 2019

Grafana

Grafana is an open source metric analytics & visualization suite. It is most commonly used for visualizing time series data for infrastructure and application analytics but many use it in other domains including industrial sensors, home automation, weather, and process control.

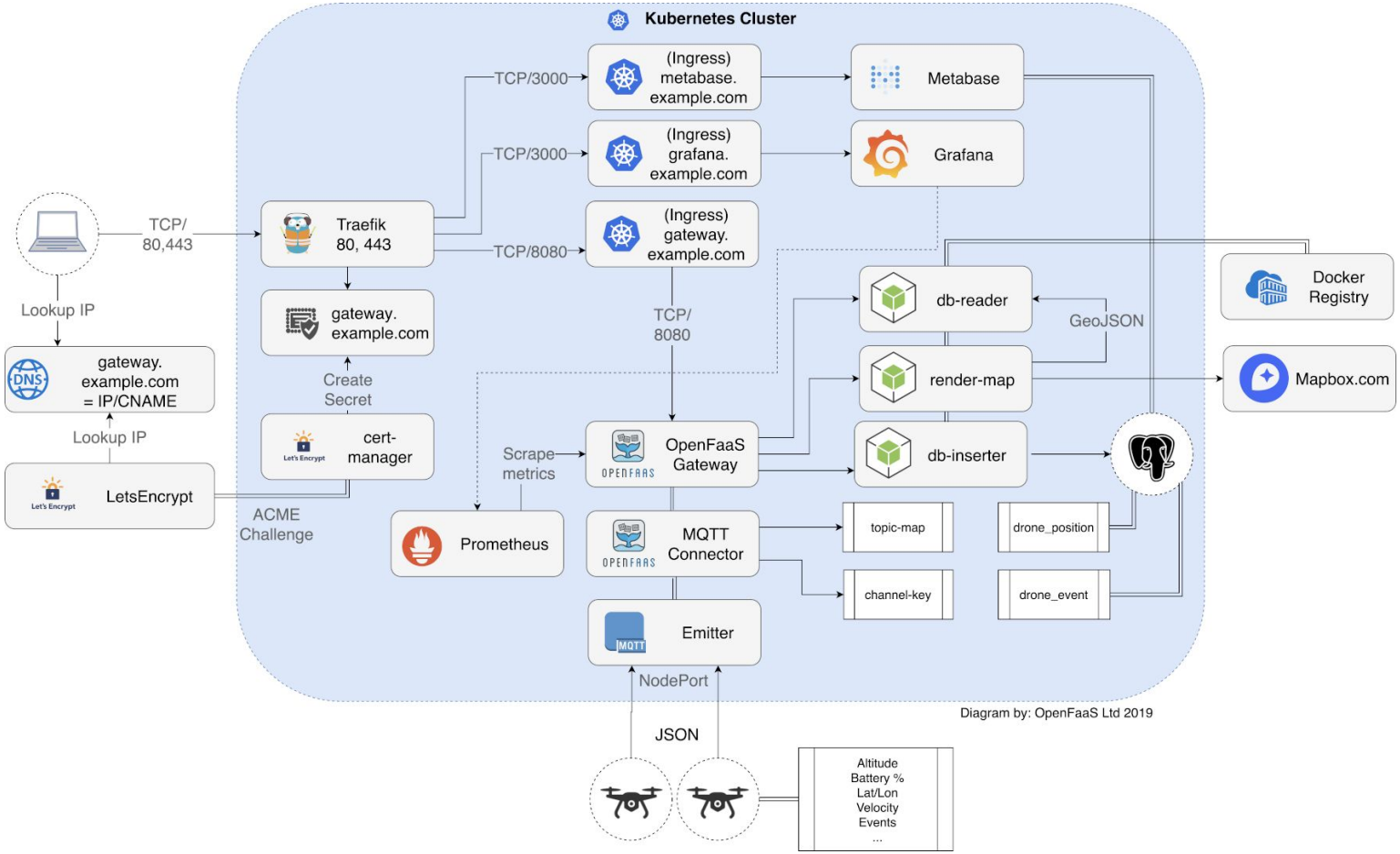
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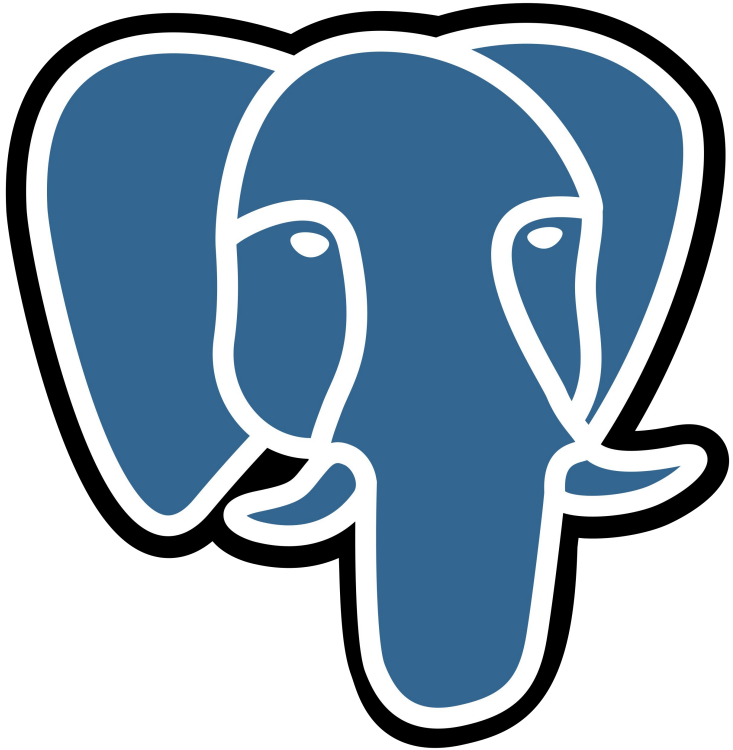
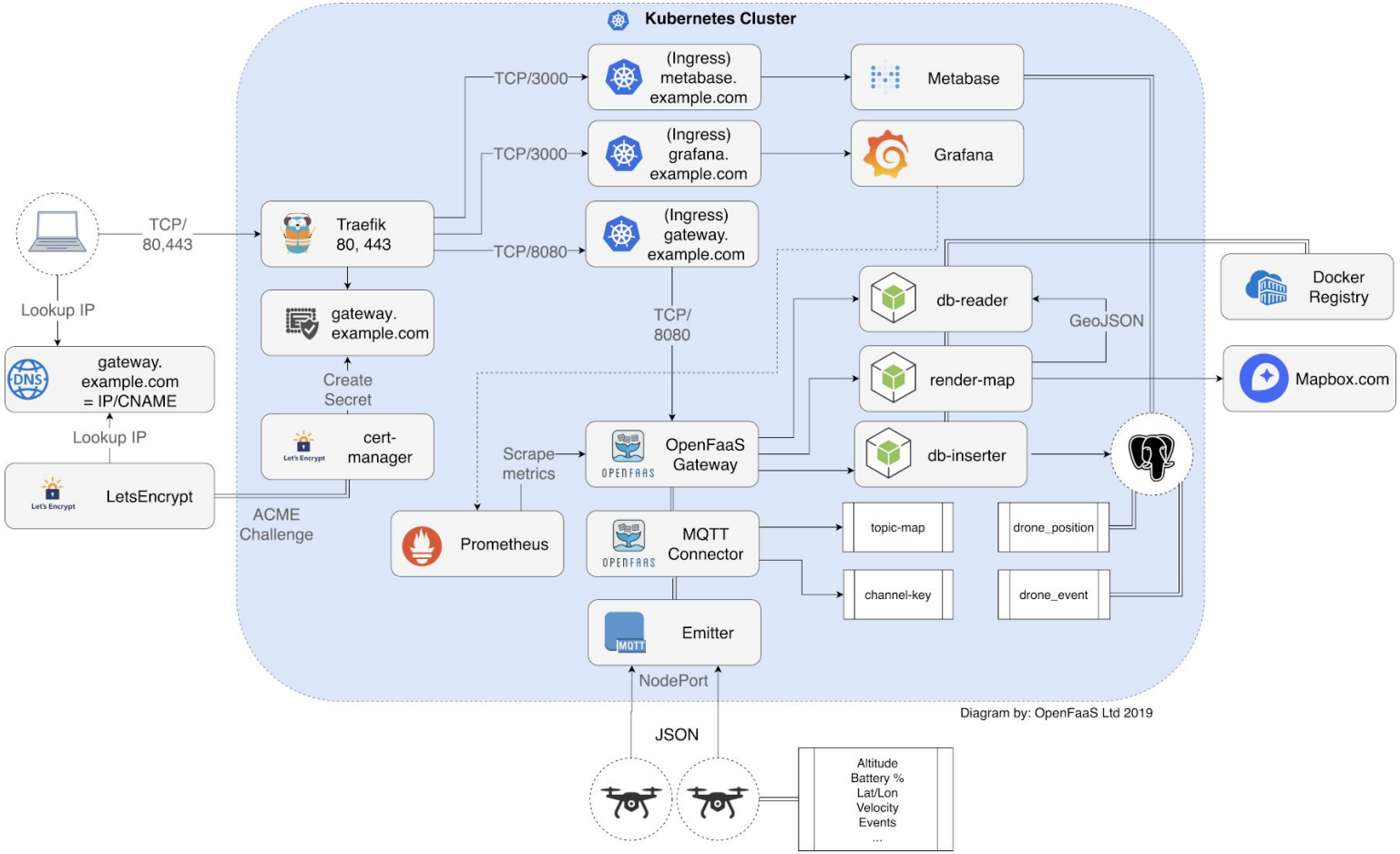
Diagram by: OpenFaaS Ltd 2019

PostgreSQL

PostgreSQL, also known as Postgres, is a free and open-source relational database management system emphasizing extensibility and technical standards compliance. It is designed to handle a range of workloads, from single machines to data warehouses or Web services with many concurrent users.

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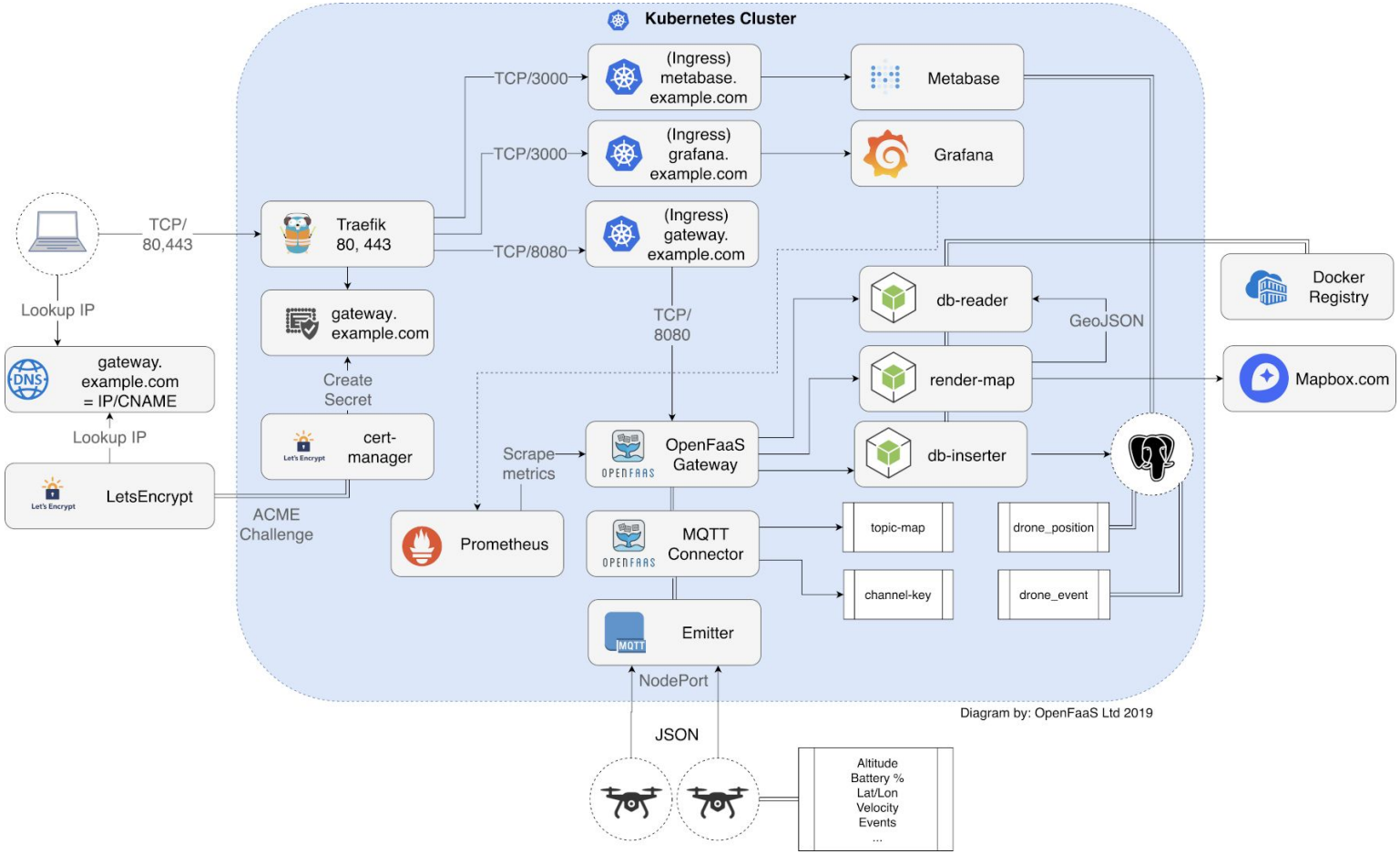
Mapbox

Mapbox is an American provider of custom online maps for websites and applications such as Foursquare, Lonely Planet, Facebook, the Financial Times, The Weather Channel and Snapchat.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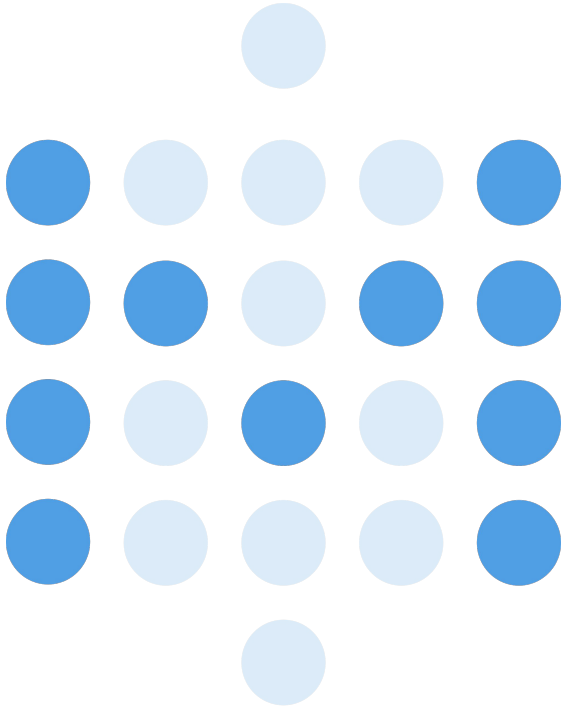
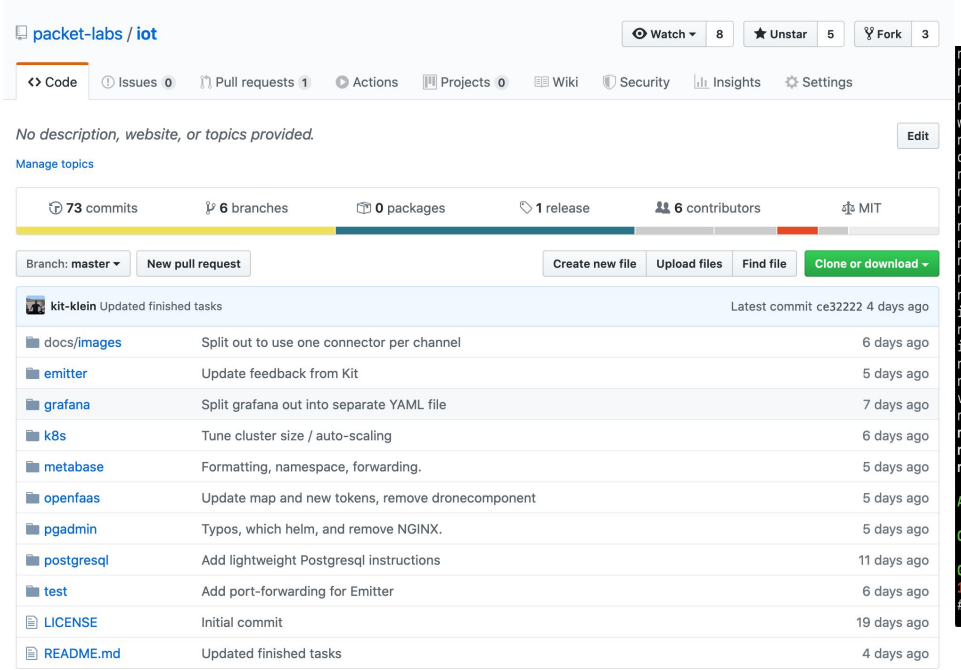
Metabase

Metabase is an open source business intelligence tool. It lets you ask questions about your data, and displays answers in formats that make sense, whether that's a bar graph or a detailed table.



Marrying the Software to the Hardware

Marrying the software to the hardware!



packet-labs / iot

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73 commits | 6 branches | 0 packages | 1 release | 6 contributors | MIT

Branch: master | New pull request | Create new file | Upload files | Find file | Clone or download

kit-klein Updated finished tasks — Latest commit ce32222 4 days ago

docs/images	Split out to use one connector per channel	6 days ago
emitter	Update feedback from Kit	5 days ago
grafana	Split grafana out into separate YAML file	7 days ago
k8s	Tune cluster size / auto-scaling	6 days ago
metabase	Formatting, namespace, forwarding.	5 days ago
openfaas	Update map and new tokens, remove dronecomponent	5 days ago
pgadmin	Typos, which helm, and remove NGINX.	5 days ago
postgresql	Add lightweight Postgresql instructions	11 days ago
test	Add port-forwarding for Emitter	6 days ago
LICENSE	Initial commit	19 days ago
README.md	Updated finished tasks	4 days ago

```
null_resource.install_k3s[0] (remote-exec):   Checking Host Key: false
null_resource.install_k3s[0] (remote-exec): Connected!
null_resource.install_k3s[0] (remote-exec): [INFO]  Using v1.0.0 as release
null_resource.install_k3s[0] (remote-exec): [INFO]  Downloading hash https://github.com/rancher/k3s/releases/download/v1.0.0/sha256sum-amd64.txt
null_resource.install_k3s[0] (remote-exec): [INFO]  Downloading binary https://github.com/rancher/k3s/releases/download/v1.0.0/k3s
null_resource.install_k3s[0] (remote-exec): [INFO]  Verifying binary download
null_resource.install_k3s[0] (remote-exec): [INFO]  Installing k3s to /usr/local/bin/k3s
null_resource.install_k3s[0] (remote-exec): [INFO]  Creating /usr/local/bin/kubectl symlink to k3s
null_resource.install_k3s[0] (remote-exec): [INFO]  Creating /usr/local/bin/crictl symlink to k3s
null_resource.install_k3s[0] (remote-exec): [INFO]  Creating /usr/local/bin/ctr symlink to k3s
null_resource.install_k3s[0] (remote-exec): [INFO]  Creating killall script /usr/local/bin/k3s-killall.sh
null_resource.install_k3s[0] (remote-exec): [INFO]  Creating uninstall script /usr/local/bin/k3s-uninstall.sh
null_resource.install_k3s[0] (remote-exec): [INFO]  env: Creating environment file /etc/systemd/system/k3s.service.env
null_resource.install_k3s[0] (remote-exec): [INFO]  systemd: Creating service file /etc/systemd/system/k3s.service
null_resource.install_k3s[0] (remote-exec): [INFO]  systemd: Enabling k3s unit
null_resource.install_k3s[0] (remote-exec): Created symlink /etc/systemd/system/multi-user.target.wants/k3s.service → /etc/systemd/system/k3s.service.
null_resource.install_k3s[0] (remote-exec): [INFO]  systemd: Starting k3s
null_resource.install_k3s[0]: Still creating... [10s elapsed]
null_resource.install_k3s[0]: Still creating... [20s elapsed]
null_resource.install_k3s[0]: Creation complete after 21s [id=8980650490243723987]

Apply complete! Resources: 4 added, 0 changed, 0 destroyed.

Outputs:

Get_Access = ssh -i ssh_priv_key root@147.75.65.91
14:21:27 root@cody-dev-box ~/git/iot/k8s master
#
```

packet

Demo!

Deploy an end to end data pipeline and warehouse for IoT, using Kubernetes and FaaS!

Thank you.

Visit **baremet.al/iot** to get started!

Promo Code: CURIOSITY100

(For $100 In Free Cloud Credits)