



Introduction to the **MING** stack

Charles Mahler



Agenda

- MING stack overview
- Why is the MING stack needed?
- MING stack component overview
- MING stack production tips
- Case studies
- Q/A

Goal of IoT



What is the MING stack?



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MING stack benefits

- Create value without costs up front
- Integrate with existing projects
- Increase productivity
- Empower non-engineer subject matter experts
- Reduced vendor lock-in
- Open architecture

MING stack components

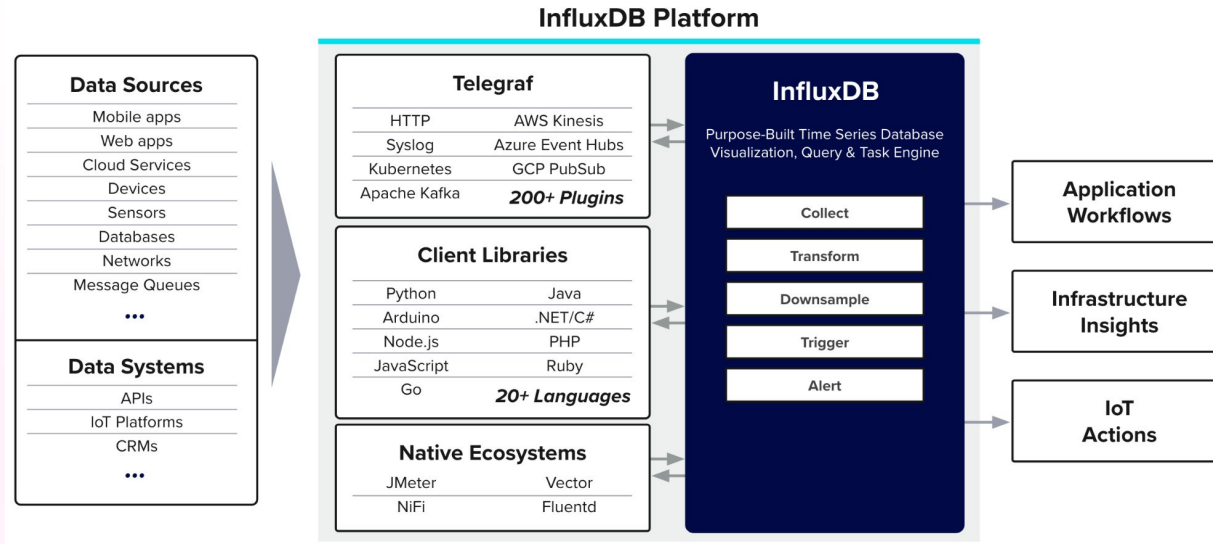
MQTT

- Lightweight, efficient protocol designed for IoT
- Operates in low bandwidth conditions
- Flexible data model
- Scalable



InfluxDB

- Great performance for IoT data
- Ecosystem integrations
- Developer productivity
- Open source



Data Explorer

+ New Script OPEN SAVE

Schema Browser SQL Sync

Bucket: flowforge

Measurement: sensor_data

Search fields and tag keys

Fields

- humidity
- light
- moisture
- temperature

Tag Keys

- device
 - deviceName
 - demo-pi-jay
 - demo-pi-rob
 - deviceType

```
1 SELECT *
2 FROM "sensor_data"
3 WHERE
4 time >= now() - interval '1 hour'
5
6
```

Ready (90ms) CSV Past 1h RUN

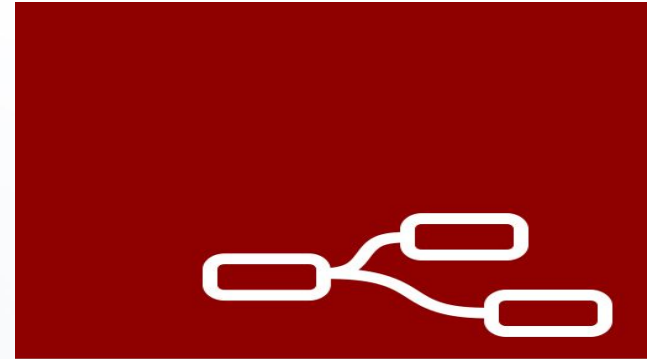
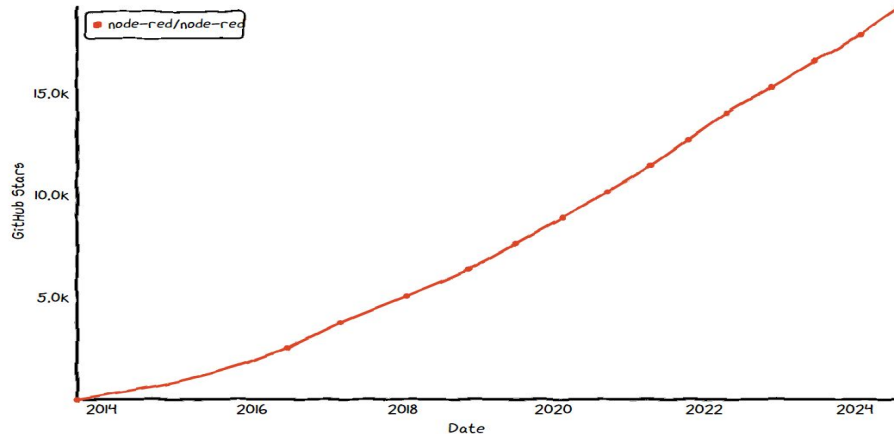
Search results... 1 tables 480 rows TABLE GRAPH

table	device	deviceName	deviceType	humidity	light	moisture	temperature	time
_result	no group	no group	no group	no group	no group	no group	no group	no group
	string	string	string	double	double	double	double	dateTime:RFC3339
0	dQBgXeWLRE	demo-pi-jay	Pi4	41	100	45.61	24	2023-06-21T09
0	dQBgXeWLRE	demo-pi-jay	Pi4	41	100	45.61	24	2023-06-21T09
0	dQBgXeWLRE	demo-pi-jay	Pi4	41	100	45.59	24	2023-06-21T09

1 2 3 4 5 ... 160

Node-RED

- Low-code programming tool for event-driven applications
- Created by IBM for IoT development
- Open sourced in 2013, founding JS Foundation project in 2016
- Used by companies like Samsung, Bosch, and Siemens



Node-RED

Node-RED concepts

- Nodes
- Flows
- Messages

filter nodes

MQTT

Basic Flow

HTTP Flow

InfluxDB

scheduled task

+

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common

inject

debug

complete

catch

status

link in

link call

link out

comment

function

function

switch

change

nodered
connected

function

[v2.0] cloud account temperature

msg.payload

Search flows

Flows

MQTT

Basic Flow

HTTP Flow

InfluxDB

scheduled task

Subflows

Global Configuration Nodes

MQTT

Flow

"cdaa1258669ccb4d"

Types of Nodes



Storage



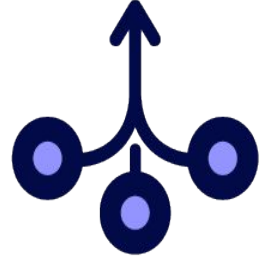
Utility



Control



Integration



Protocol

Grafana

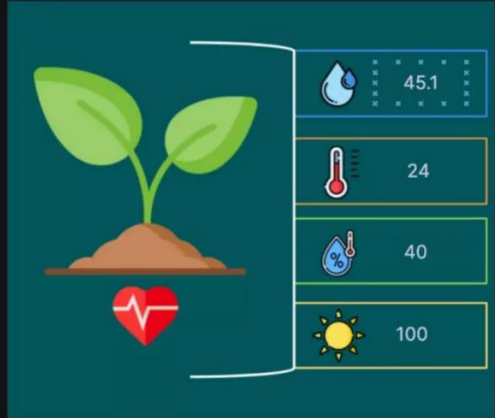
- Open source data visualization and analytics platform
- Supports multiple data sources
- Data transformation
- Alerting



device demo-pi-jay

Plant Health

Plant Health



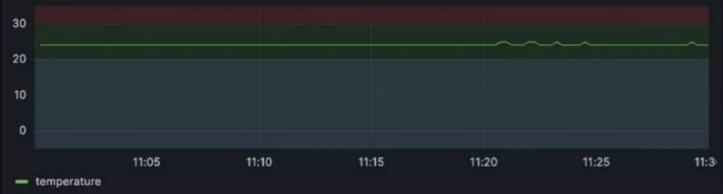
Device Log

```

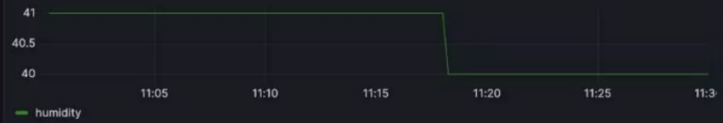
> 2023-06-21 11:30:00.000 dQBgXeWLR
> 2023-06-21 11:29:45.000 dQBgXeWLR
> 2023-06-21 11:29:30.000 dQBgXeWLR
> 2023-06-21 11:29:15.000 dQBgXeWLR
> 2023-06-21 11:29:00.000 dQBgXeWLR
> 2023-06-21 11:28:45.000 dQBgXeWLR
> 2023-06-21 11:28:30.000 dQBgXeWLR
> 2023-06-21 11:28:15.000 dQBgXeWLR
> 2023-06-21 11:28:00.000 dQBgXeWLR
> 2023-06-21 11:27:45.000 dQBgXeWLR
> 2023-06-21 11:27:30.000 dQBgXeWLR
> 2023-06-21 11:27:15.000 dQBgXeWLR
> 2023-06-21 11:27:00.000 dQBgXeWLR
> 2023-06-21 11:26:45.000 dQBgXeWLR
> 2023-06-21 11:26:30.000 dQBgXeWLR
> 2023-06-21 11:26:15.000 dQBgXeWLR
> 2023-06-21 11:26:00.000 dQBgXeWLR
> 2023-06-21 11:25:45.000 dQBgXeWLR
> 2023-06-21 11:25:30.000 dQBgXeWLR
> 2023-06-21 11:25:15.000 dQBgXeWLR
> 2023-06-21 11:25:00.000 dQBgXeWLR
> 2023-06-21 11:24:45.000 dQBgXeWLR

```

Temperature



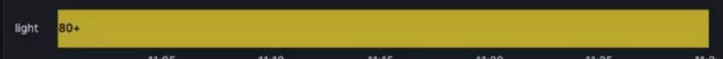
Humidity



Moisture



Light

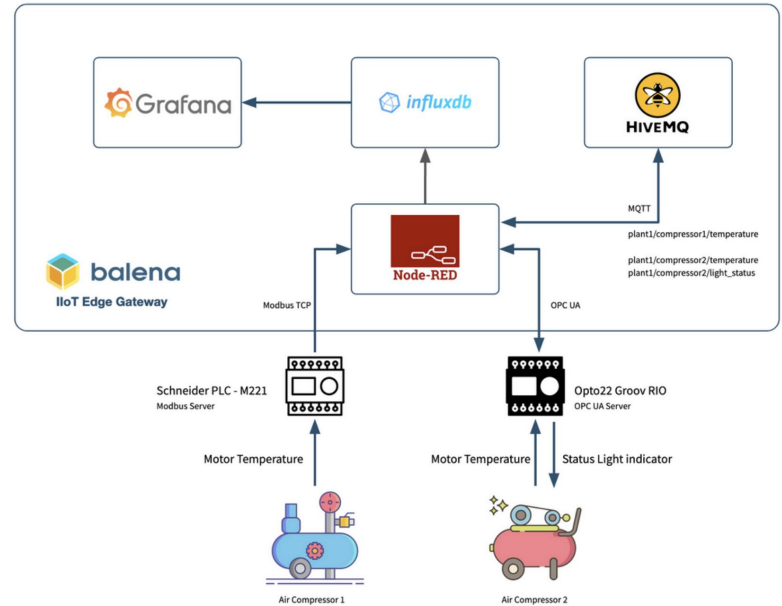


Plant Health Timeline



Deployment options

- Docker
- Portainer
- Balena



MING stack in production

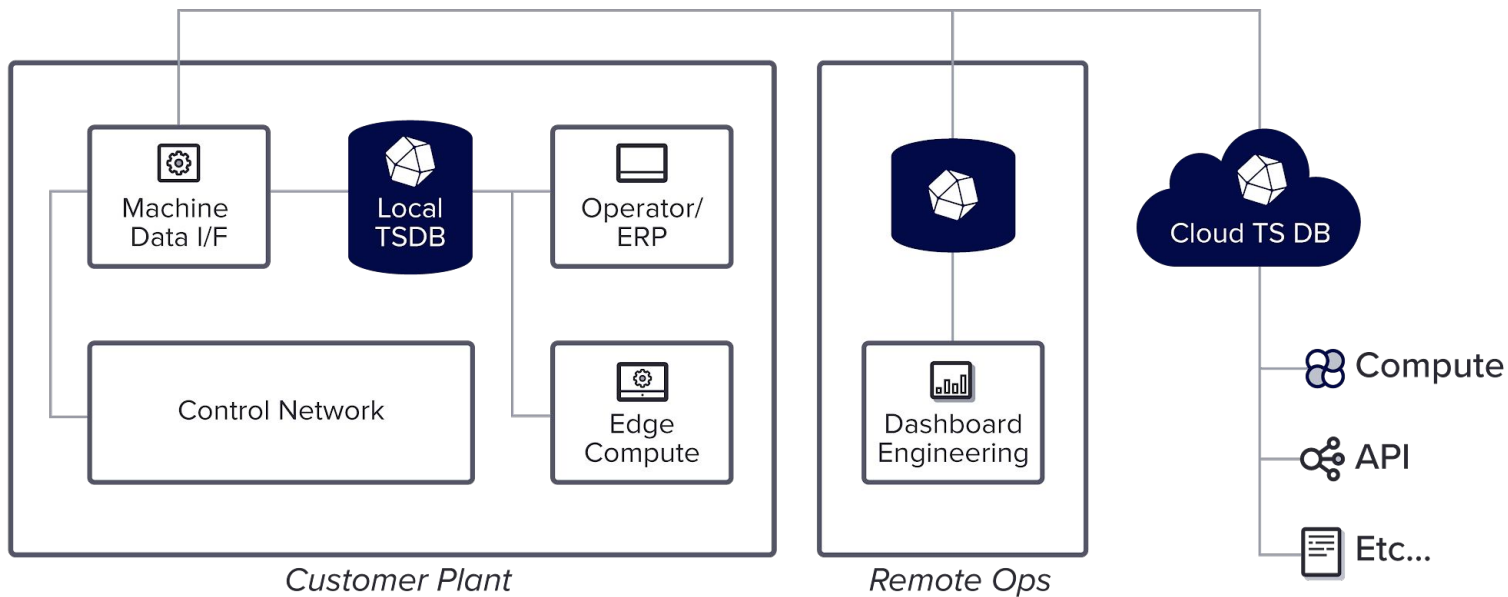
- DevOps
- Scaling
- Security
- Edge device management

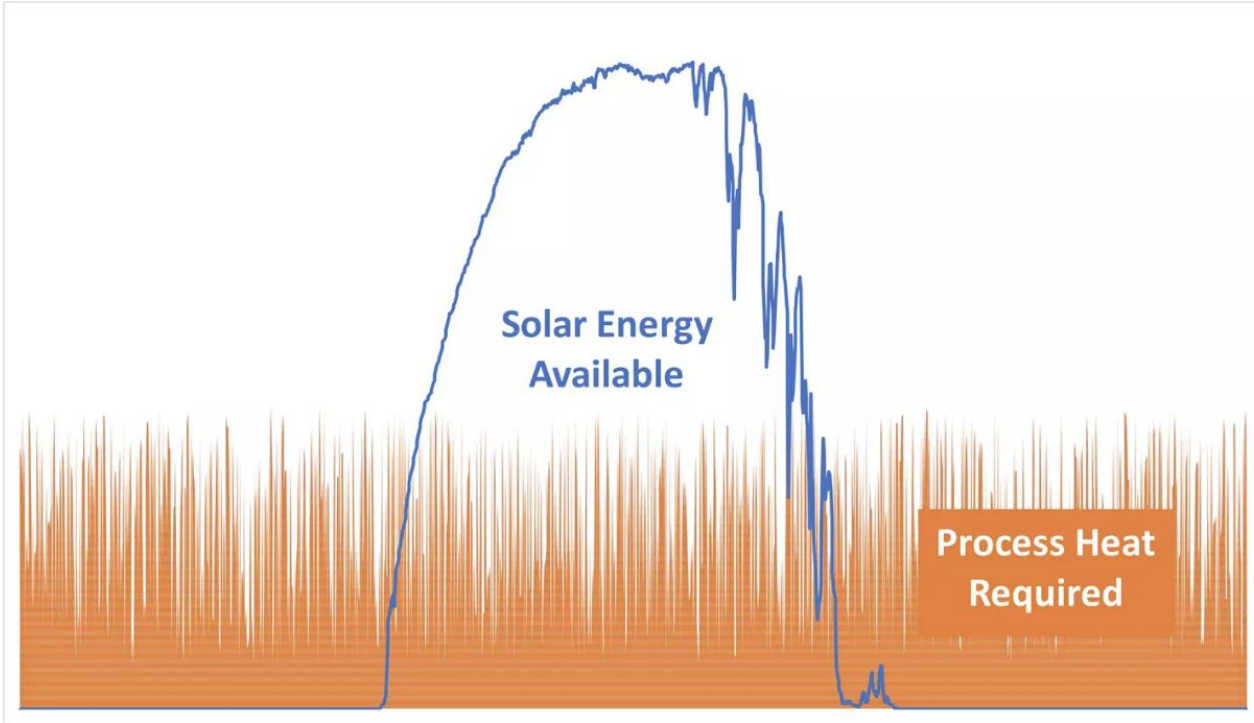
Case studies

Graphite Energy

- Provide energy to industrial customers by capturing variable rate renewable energy and making it reliable
- Node-Red used at the edge for data collection and processing
- InfluxDB used for storing and querying their data
- Grafana for visualization



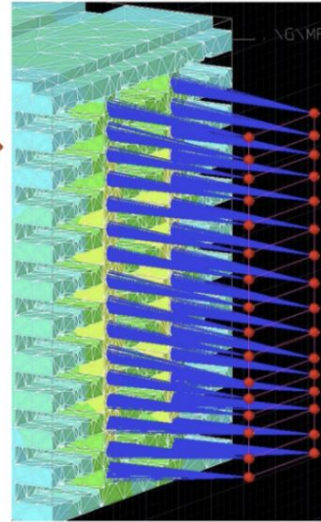




IN-SERVICE MACHINE

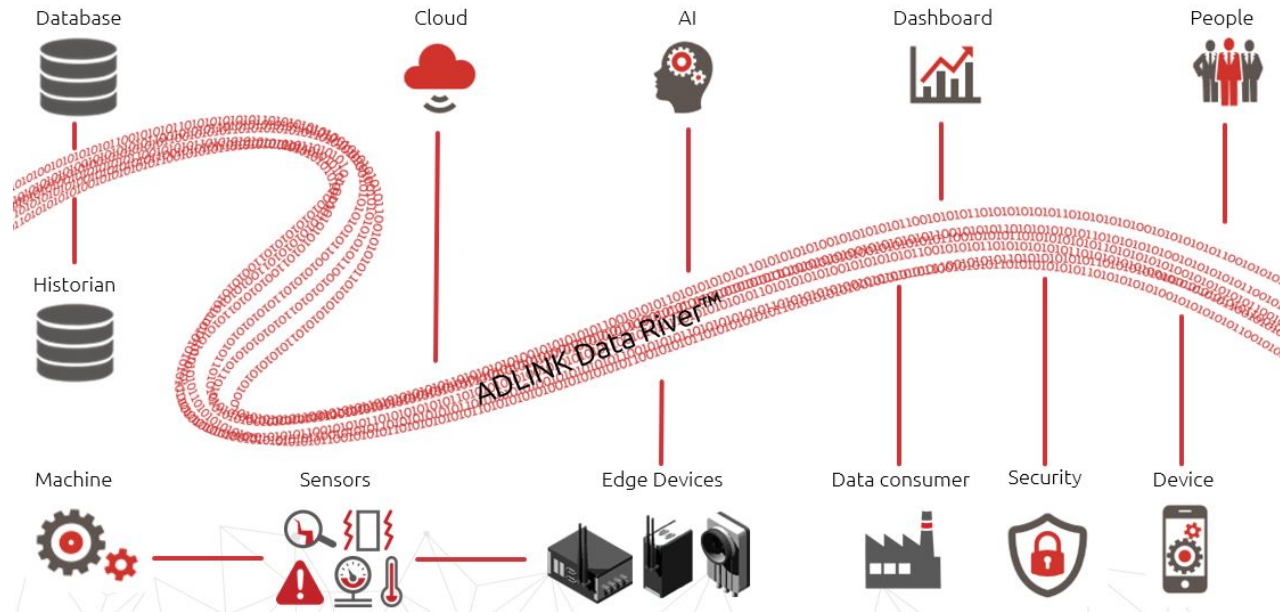


DIGITAL TWIN @ EDGE AND REMOTE



ADLINK

- Industrial IoT service provider
- Node-RED used for transforming data and dashboards



Enterprise Cloud Services

IT Network



Data Acquisition



Data Computing and Analysis



Data Upload



Cloud Service Providers



Dashboard

ADLINK Edge Demo



LAN Connection



App Services



ExpertDaq EX9018/9



Temperature Sensor

Wi-Fi Network

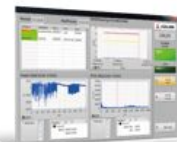


Tablet

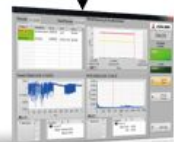
Mobile



InfluxDB Time Series Database



NodeRed Dashboard



Grafana Dashboard



Raspberry Pi 3

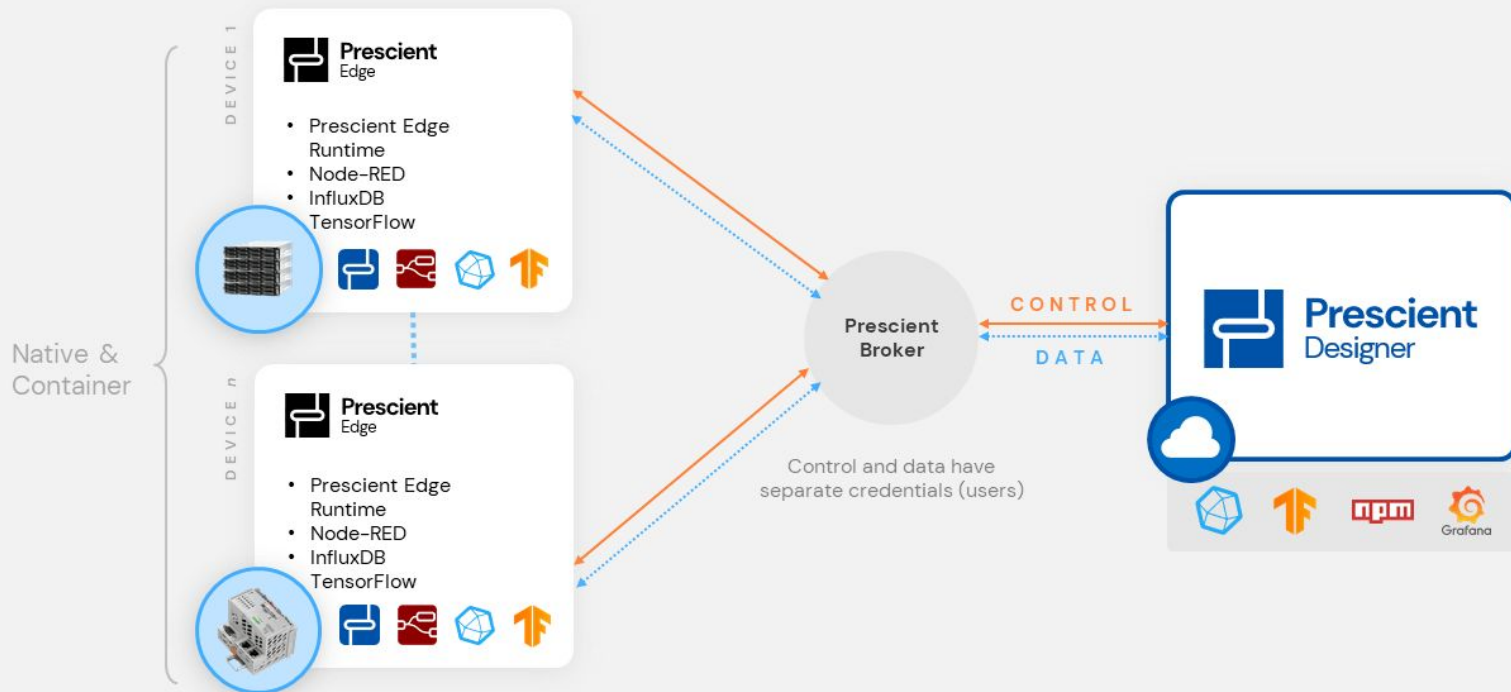


Variable Input

Prescient devices

- Platform for deploying and managing edge computing
- Build in the cloud with Node-Red and deploy to edge devices
- Customer development speed increases 12x on average

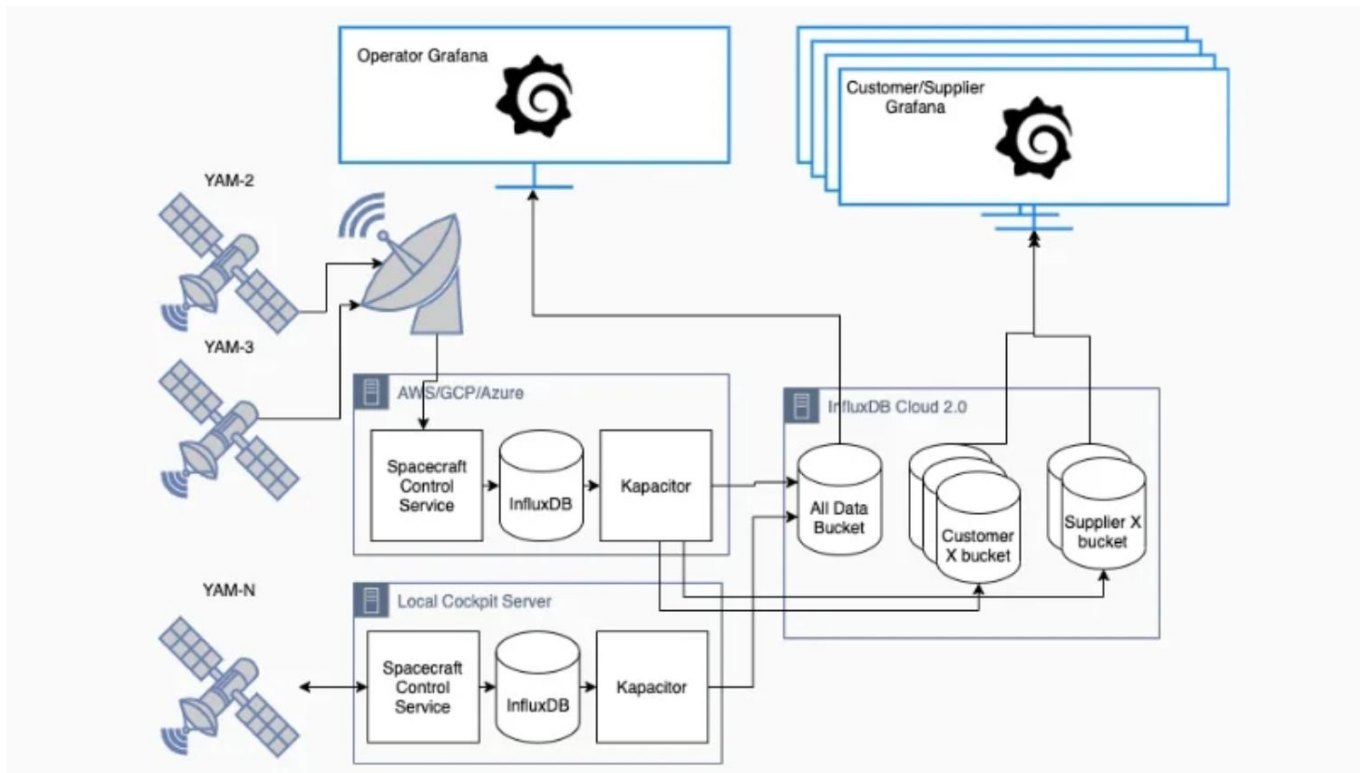




Loft Orbital

- Satellites as a service
- Allow companies to rideshare satellites and transfer data over their platform





Questions?

Website - influxdata.com

Slack - influxdata.com/slack

InfluxDB University - university.influxdata.com