



Enterprise AV: Monitoring Meeting Rooms



Who am I?

Frederick Loucks, CTS-D

Currently: CTO @ Level 3 Audiovisual

Ex-Micron, Ex-VMware

Previously:

Commercial AV Design Engineer -> Engineering Manager

Enterprise AV Solutions Architect

SaaS AV Applications Engineer

Obsessed with managing AV at scale



Education with AVIXA in 2023



CTS: 9|CTS-D: 9|CTS-I: 9|Max: 9

AV Monitoring Masterclass (virtual)

- March 29-31, 1-4pm EST
- Identify the **business case**, **personas**, and **teams involved** in monitoring
- Explore the factors involved in **properly designing, specifying, and implementing a monitoring platform for AV systems**
- Learn **the secrets** of **collecting good** data from your AV systems, and learn how to **design AV systems** that simplify this process
- Target audience:
 - AV Technology Managers
 - Integration Service Providers



CTS: 24|CTS-D: 24|CTS-I: 24|Max: 24

Applied Monitoring for AV (in-person)

- @ Infocomm pre-show
- ← Everything in the Masterclass **plus...**
- Go **deeper** into the topics and technologies with **extended content** and **collaborative sessions**
- Using **free** and open-source software, **develop functional monitoring templates** for a working reference meeting room through several **guided practical labs**
- Build **community** around opensource monitoring in AV and **meet your peers**
- Gain the skills and resources to **evolve your monitoring practice back home!**



Poll results – Applied Monitoring

Over half of respondents monitor fewer than 20% of their AV devices

Half of respondents are using 2-5 distinct monitoring tools

Satisfaction with current tools averaged 2.3 / 5

Completeness of implementation averaged 2.1 / 5

Urgency of monitoring averaged 4.4 / 5

One in four respondents needed monitoring operational “yesterday”

81% of respondents were seeking a “single pane of glass”



Objectives

1. Clearly define **monitoring**
2. Reinforce the main **benefits** of monitoring
3. Identify the core **issues** with room monitoring **today**
4. Learn the fundamental **implementation** requirements for a **successful** monitoring practice
5. Review an **example** in screenshots



Define

How do **you define monitoring?**



Monitoring: Answering 3 questions

Is it **working**?

How often is it working?

Why **isn't it** working?



Start with “why”

Why do you want to **monitor**?



Start with “why” - outcomes

What is the **outcome** want to achieve?

Different between **integrators** & **end user** orgs!!

“**Reduce the cost** of providing customer support.”

“Build **trust** with my users.”

“Provide and **maintain** an **SLA** for system **health**/uptime.”



Benefits

What are the **benefits** of monitoring?



Benefits

Security

Firmware
versions

Open
insecure
ports

Recurring
Revenue

Cost-
avoidance

Trust

Trends

Money

Reputation

Improve
experience

Inventory

Default
passwords
Make business
decisions

Data

Utilization

More...



The ultimate why

Serving the **business.**



KPIs – Key Performance Indicators

Monitored **regularly** to ensure that the **business** performance targets are **achieved** and **maintained**.

What **KPIs** do we use in **AV** to **measure** our performance?



KPIs – Key Performance Indicators

Room **Uptime** SLA

Ghost Meeting Minutes

Room **Utilization** Ratio

Warranty Exposure

Room **Occupancy** Ratio

Remote **Accessibility** Ratio

Default Password Exposure

...others?

Customer **Satisfaction** Score



So...

Why isn't **everybody** monitoring?



Why not monitor?

It's really **hard** to do it **well**...

*...in **AV**.*



Why is monitoring AV so hard?

Lack of **viable** AV industry **tools** due to “**walled gardens**”

Lack of **AV support** natively in **IT monitoring tools**

Utter **lack** of standardized monitoring **protocols**

Lack of **commercial pressure** & **transactional business models**

AV/IT/SecOps segmentation & **IT skills gap**

Lack of **urgency**...until now



Success in 3 steps

The right **team**

working with the right **tools**

surfacing and acting upon meaningful **data**



The right team – who cares?

The engineer (bus. value > data > insight > action)

The developer (AV APIs > code / scripts > data & actions, “instrumentation”)

The eyes-on-glass (monitoring > remediation > success)

The IT engineer (collection + infrastructure + security + ...)

The champion (tech > business > hearts + minds + wallets)

Other Stakeholders (anyone with significant interest / power over monitoring)



The right team – why do they care?

Stakeholder management – *why* are we doing this?

Outcomes & KPIs

“Reduce the cost of providing customer support.”

“Minimize user disruptions.”

“Provide and maintain an SLA KPI for system health/uptime.”



The right team - reflection

Do you have the right **team** today? Build v buy?

Do you **know what they care about?**



Success in 3 steps - Tools

The right team

working with the right **tools**

acting on meaningful data



The right tools - objective

Collect and present all the data required for monitoring within
a **single pane of glass**



Define single pane of glass

1 interface

in which you can view 99% of your systems,

99% of your devices, and

99% of the data you care about.



Not all tools are created equally

You must build accurate **requirements** based on...

The **business requirements** of your **stakeholders**.

(Outcomes, goals, KPIs!!)

Your **knowledge** of **AV Monitoring practices**.

(Protocols, topologies, legacy data extraction & transformation,
system/service health monitoring)

The **technical details** of your **systems**.

(Devices, platforms, any middleware you may use, etc.)



Monitoring tool landscape

Vendor point tools

Traditional control system-based

All-in-one control & monitoring products

IT network monitoring

IoT platforms

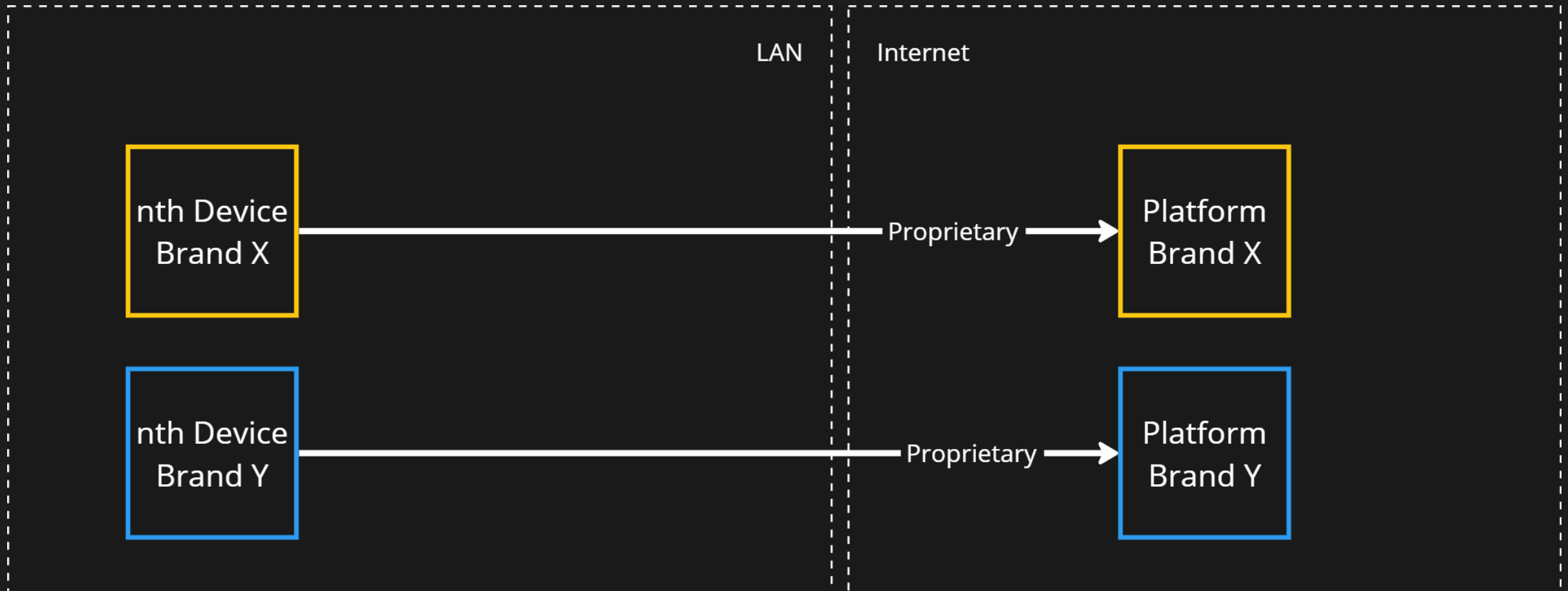
Status pages

Database + Dashboard

Middleware + All of the Above

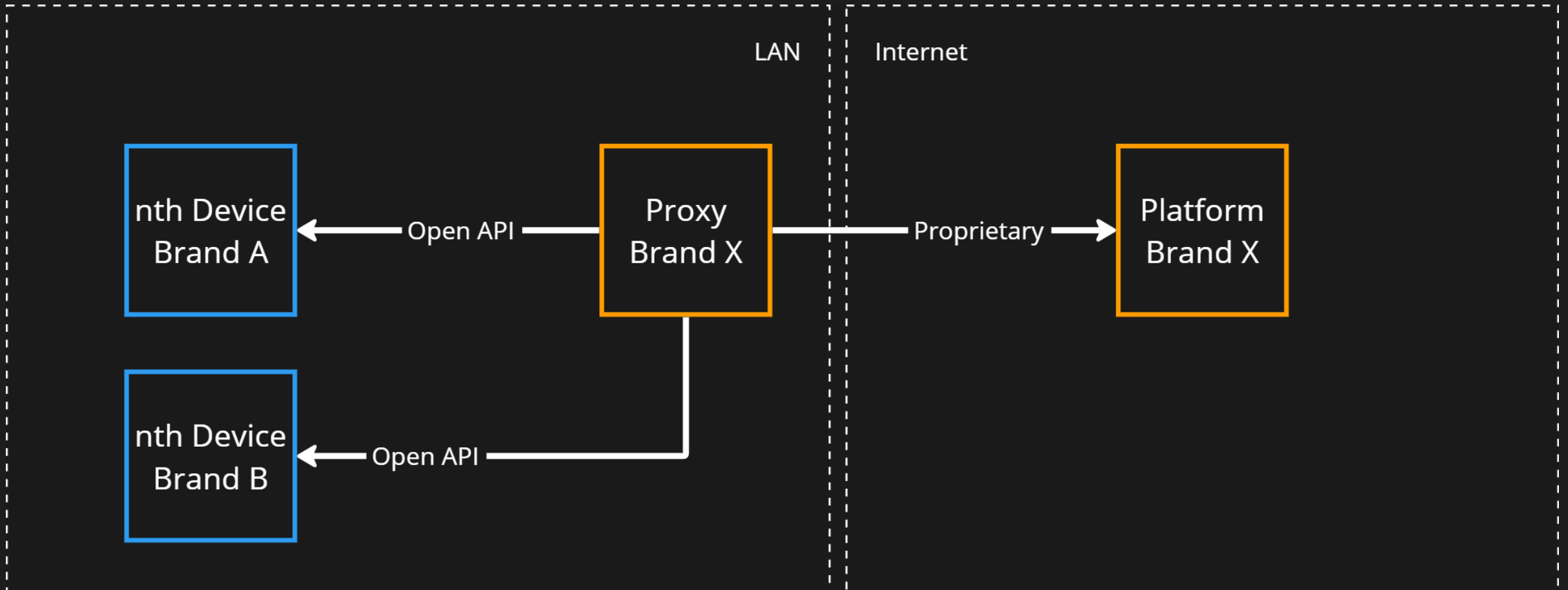


Topologies: Direct



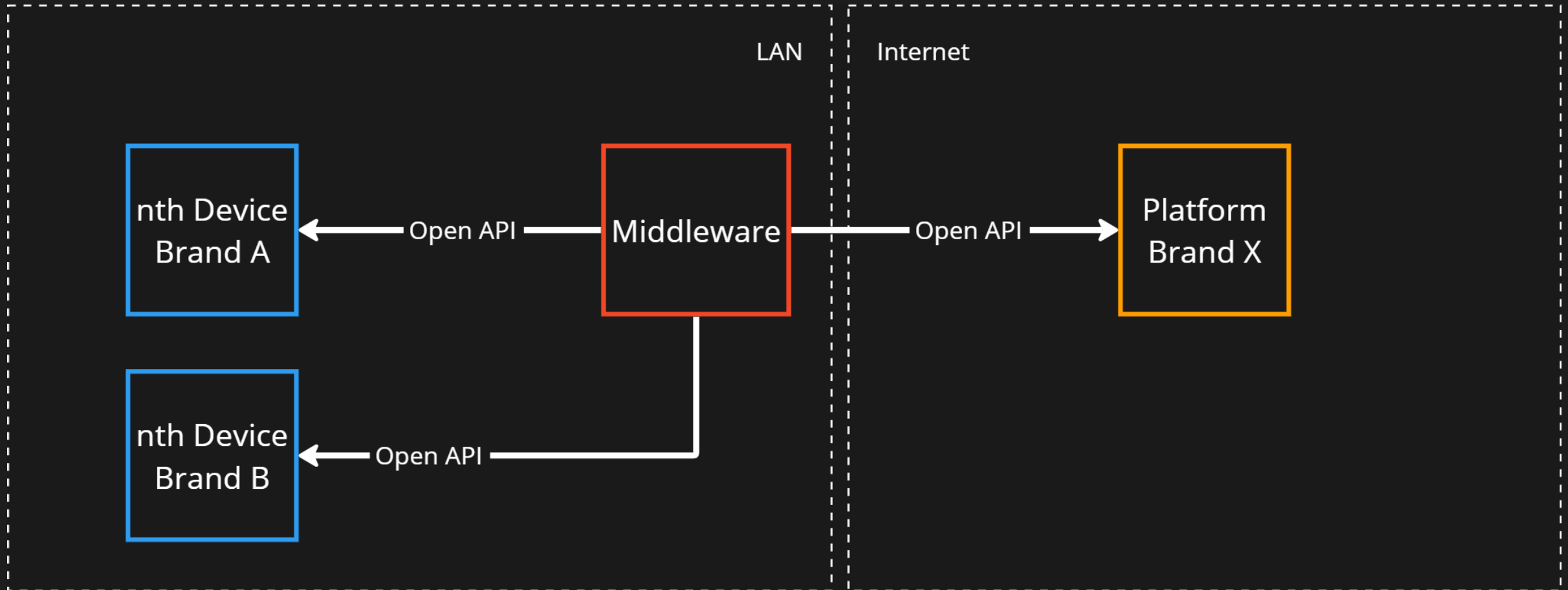


Topologies: Proxied Monolith



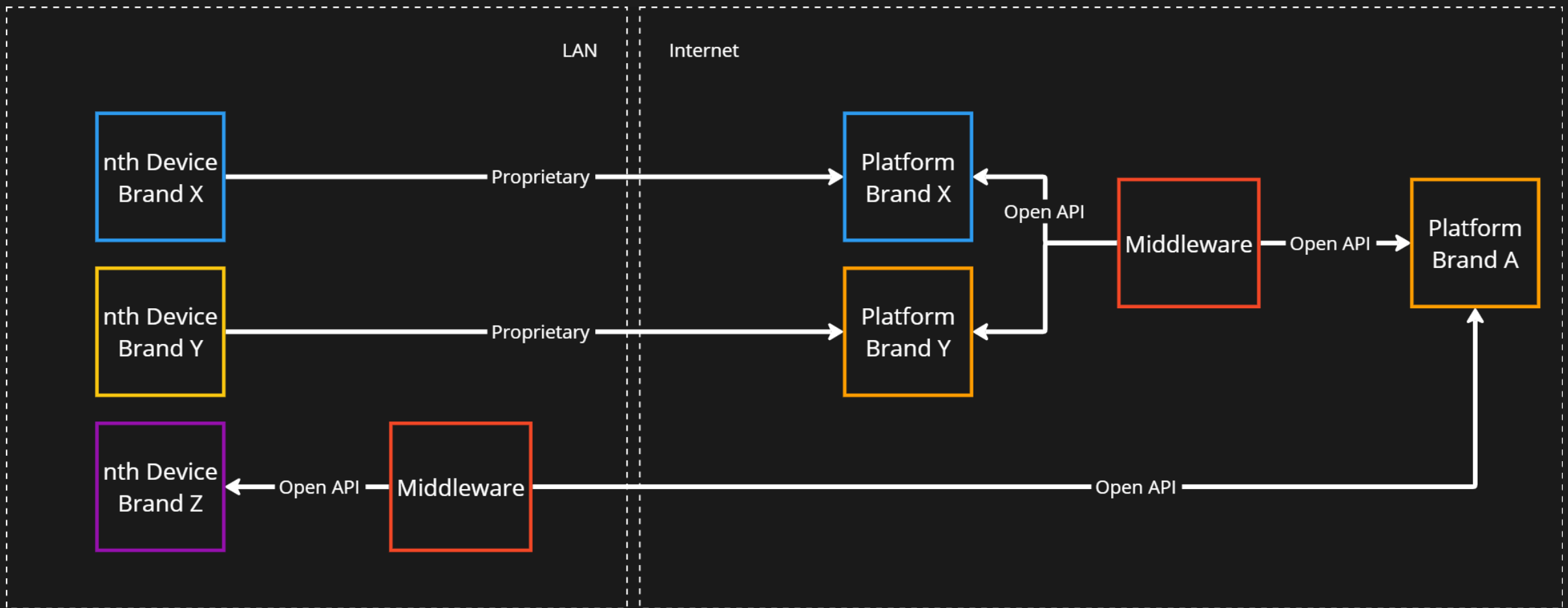


Topologies: Middleware





Topologies: Multi-Middleware





The right tools – things to look for

Mature (established customers, features, docs)

Powerful (templates, inheritance, service monitoring)

Community (broad user base, stack overflow, hiring)

Flexibility (cust. monitors, APIs & SDKs, scripts, freedom)

Activity (current releases, updated marketing materials)

Scalability (many devices, many customers, pricing, mass management)



The right tools – specific features

Health (difference between reachability & health)

Agentless (sits alongside AV devices, firewall friendly)

Templates (collection drivers, build once, use forever, enhance easily)

Services (rollup, business value, dashboards, SLAs)

Flexible Collection Methods (OOTB: SSH TN HTTP JS)

Ask once, write many (one request, many data points)



The right tools - reflection

Does your tool give you the **freedom** to get the data you want,
when you want it?

If one of your **developers quit**, or your **favorite manufacturer**
was **unable to deliver**, are you still able to deliver your **service**?



Success in 3 steps - Data

The right team

working with the right tools

acting on meaningful **data**



Meaningful data

What does **meaningful** mean in this instance?

Depends on your **objective**!



Business objective – Trust

“I want my **users** to **trust** their **meeting rooms**...
and by extension **trust** the AV/UCC **team**.”

KPI: Uptime / Availability **Service Level Agreement**



Uptime SLA – what can go wrong?

Flat Panel Display (disconnected, powered off, wrong source, AV mute, broken cable)

Video Bar & Touch Control (disconnected, wrong app-mode, disconnected from UCC, network performance problems, touch control not paired / reachable)

UCC Platform (outage, wrong configuration, bad license, network performance problems, meeting not scheduled properly)



Uptime SLA - data we may want

Flat Panel Display (reachability, power state, network info, temperature, error log, input source, AV mute status, firmware version, S/N, etc.)

Video Bar & Touch Control (reachability, network info, app-mode, UCC registration status, call status, touch control connection status, firmware version, S/N, etc.)

UCC Platform (online, configuration, call statistics, quality score, etc.)



Uptime SLA – truth table

Devices	Operational (base)	Degraded (mid)	Critical (top)
any	Ping ok	Ping some loss	Ping 1%+ loss
Display	Power On		Power Off
Display	Input 1		Not input 1
Display	7142 listening		7142 not listening
Video bar	Using Zoom		Not in zoom mode
Video bar	Touchpanel online		Touchpanel offline
Zoom	Status=noissue		Status!=noissue
People counter		Over occupancy	



Displayed in a meaningful way

Visualize (dashboards, graphs, reports)

Trigger (when a threshold is breached, raise a problem event, and trigger cascading actions like scripts, alerts, etc)

Correlate (multiple similar triggers/alerts correlated to be seen as one linked issue where applicable, reduce alert overload)



Meaningful data - reflection

Do you know what data you **should** be collecting?

Does your tool **support** you or **hinder** you in collecting and showing **meaningful** data and meeting your **objectives**?



Success in 3 steps - reflection

The right **team**

working with the right **tools**

acting on meaningful **data**

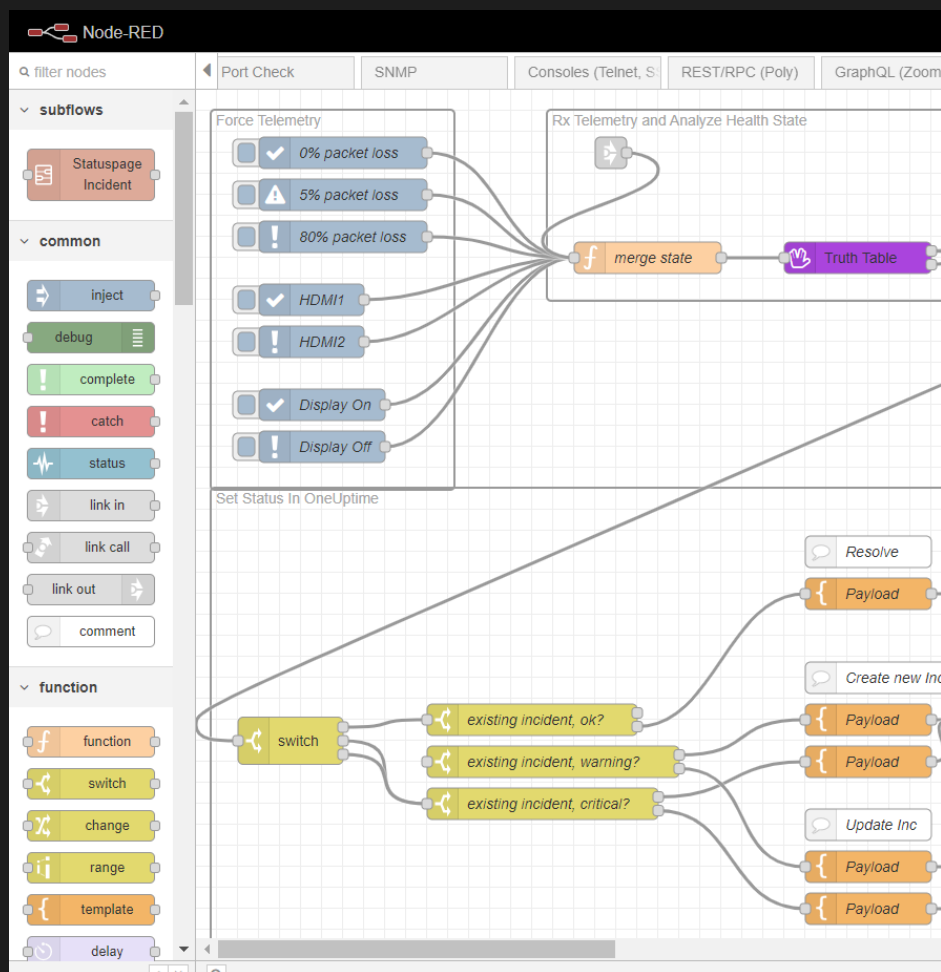


Bringing it all together





We Node-RED



Free and Opensource Software (FOSS)

Developed by IBM, maint. By OpenJSF

4000+ community nodes

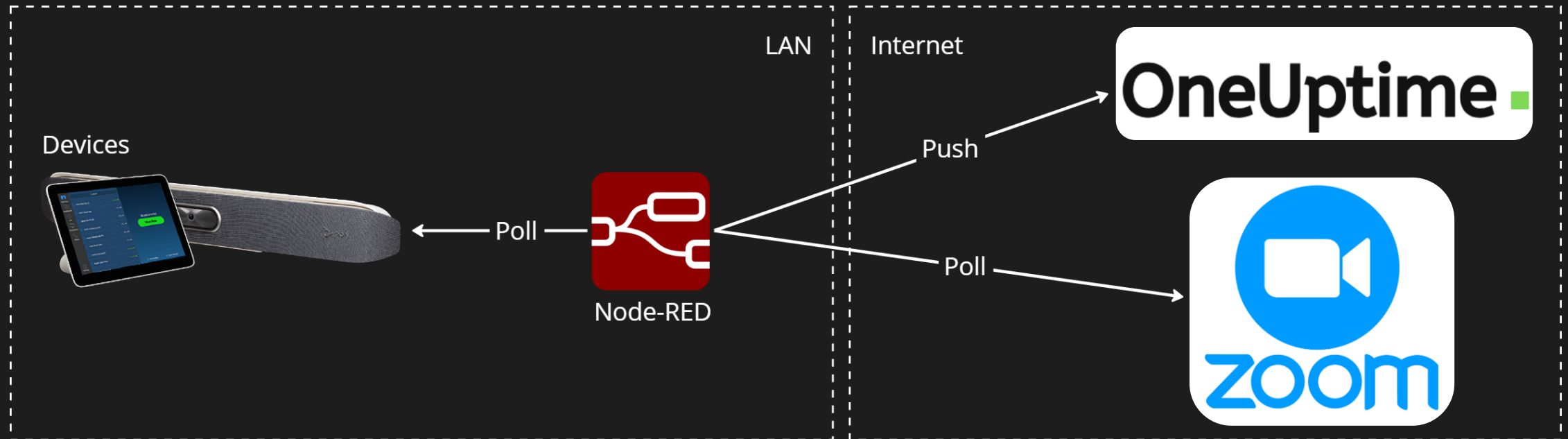
Low-code editor in your web browser

Thousands of users across industries

<https://nodered.org>

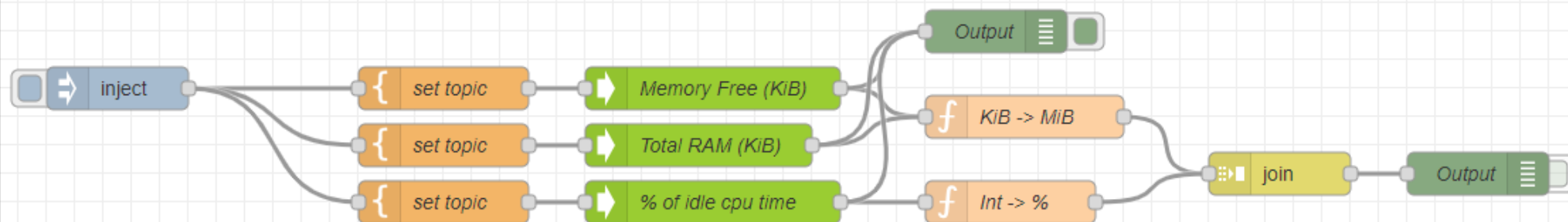
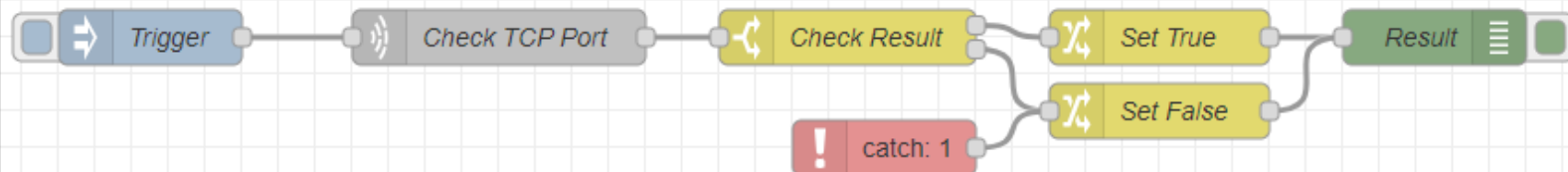


Example toolchain



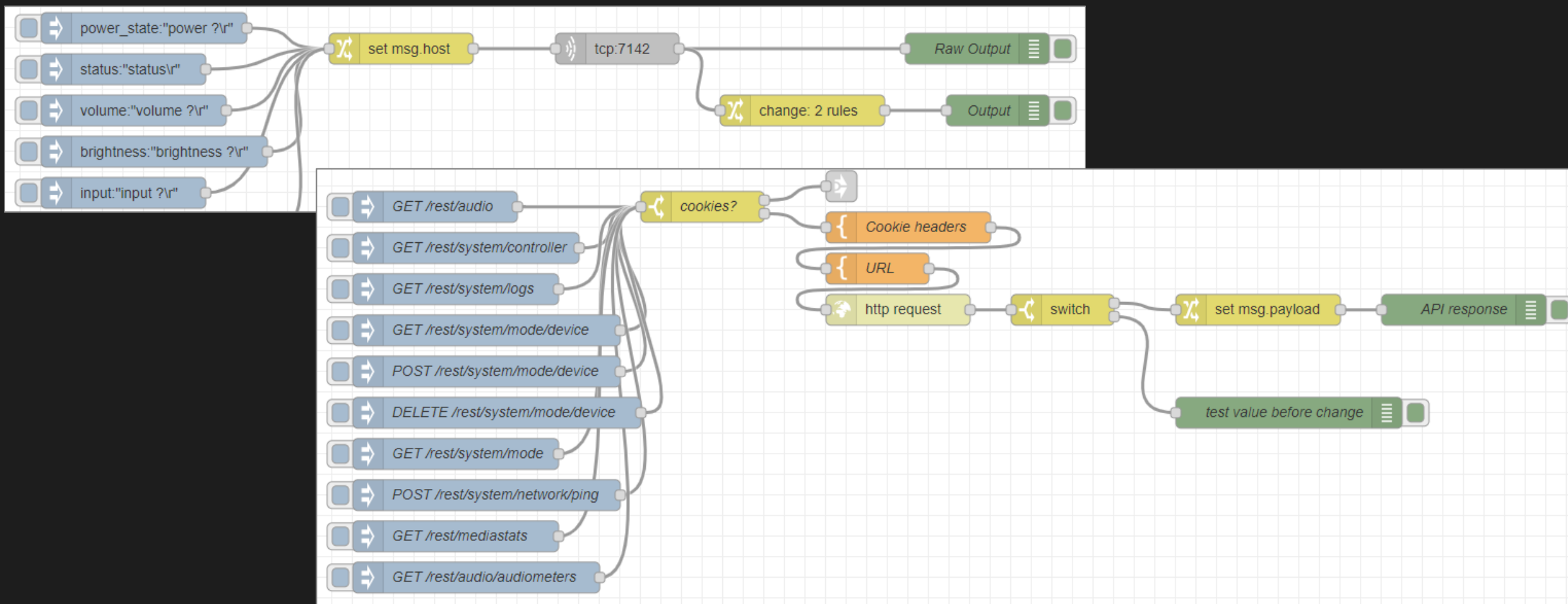


Ping, TCP check, SNMP



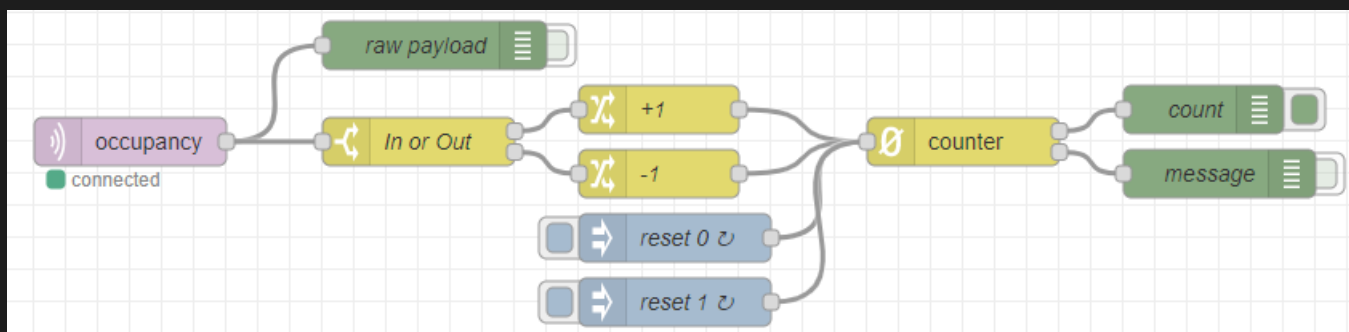
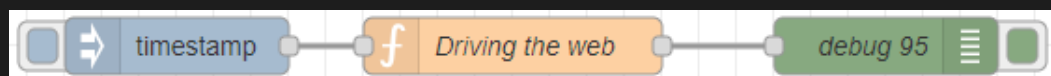
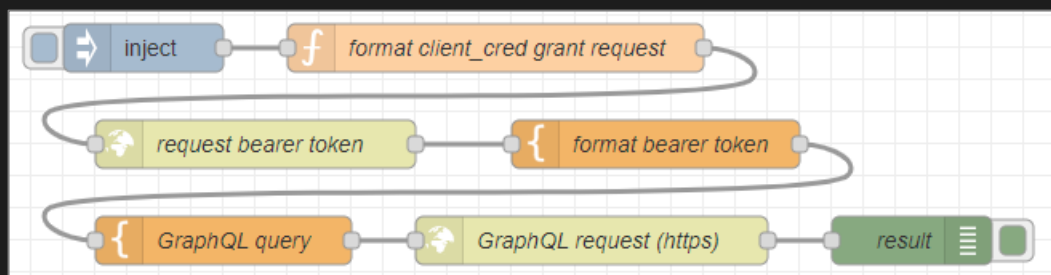


Consoles & HTTP (REST/RPC)





GraphQL, Webdriver, MQTT



Properties

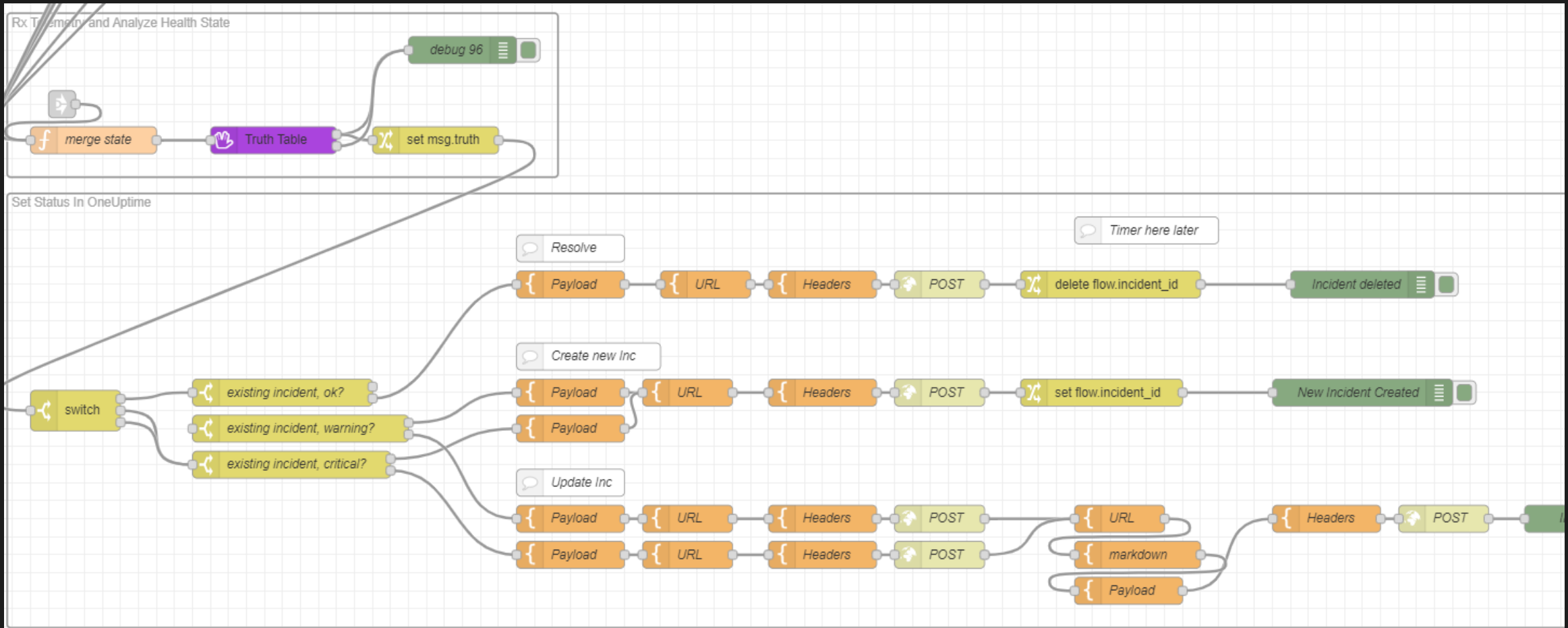
Name: Driving the web

Setup On Start On Message On Stop

```
1 const p = global.get('puppeteer')
2
3 console.log(p)
4
5 // Create the browser connection instance by connecting to ne
6 const browser = await p.connect({ browserWSEndpoint: 'ws://lo
7 console.log(browser)
8 const page = await browser.newPage();
9
10 // await page.authenticate(
11 //   { 'username': global.get('vars.display.username'),
12 //     'password': global.get('vars.display.password')
13 //   })
14
15 await page.goto(global.get('vars.display.host'));
16 await page.waitForTimeout(500)
17 const text = await page.$eval('#home_serial', e => e.innerHTM
18 msg["payload"] = text
19 await browser.close()
20 delete msg["browser"]
21 return msg;
22
```



Truth Table & OneUptime Load





Status page via OneUptime

Some Resources are Offline

room1

Offline

Some markdown



90 days ago

Today

room1

Operational

Some markdown



90 days ago

Today



OneUptime Incident

• Incident • Identified • Major Incident

Room outage: room1

This room may not be usable at this time

Created at Jun 12 2023, 10:21 EDT

Affected resources room1



Incident state changed to • Identified

Jun 12 2023, 10:21 EDT



Update to this Incident

posted on Jun 12 2023, 16:35 EDT

The following issues have been detected:

- Display is experiencing extreme packet loss: 100%
- Video Bar Touch Control is experiencing extreme packet loss: 100%



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Q&A



Cause change and lead; accept
change and survive; resist change
and die.

— Ray Noorda —

AZ QUOTES



“Progress, not perfection”



Thank you!!!