

Fighting fires with DevOps

DevOps Days Wellington 2018

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<https://github.com/disordinary>

Verifone[®]



PURCHASE TOTAL NZD14.00

(001) APPROVE WITH SIGNATURE

SIGN: _____

VeriFone YX 520C

19:38
Friday 26 October 2015
eftpos
NEW ZEALAND LIMITED
Menu

1 OZ.	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PRS	8 TUV	9 WXY
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X ← →



NEW ZEALAND LIMITED

Automation saves projects.

Projects that save lives.

Therefore...

Automation saves lives.





WHAKARATONGA IWI

FIRE
EMERGENCY

NEW ZEALAND



FIRE

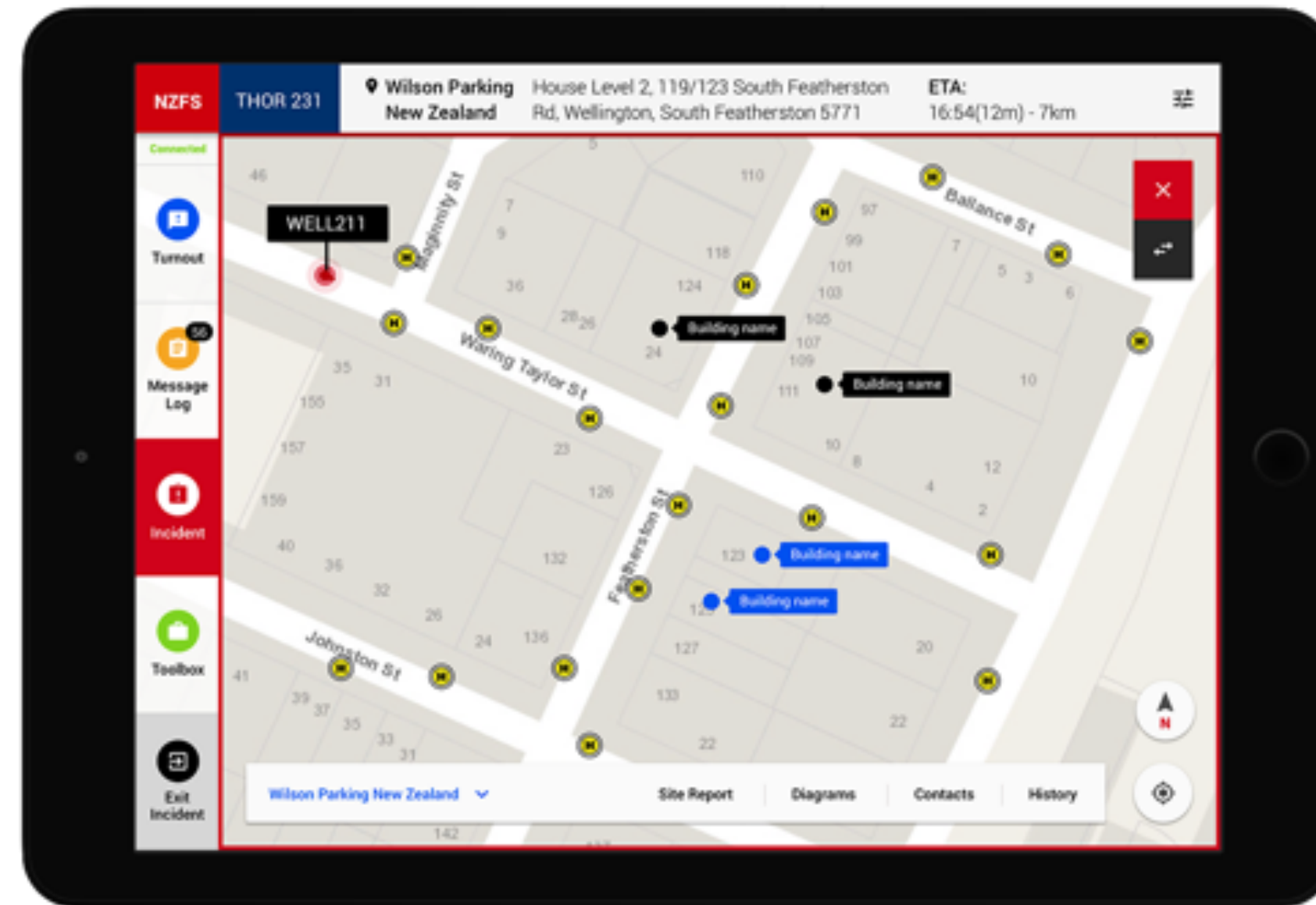
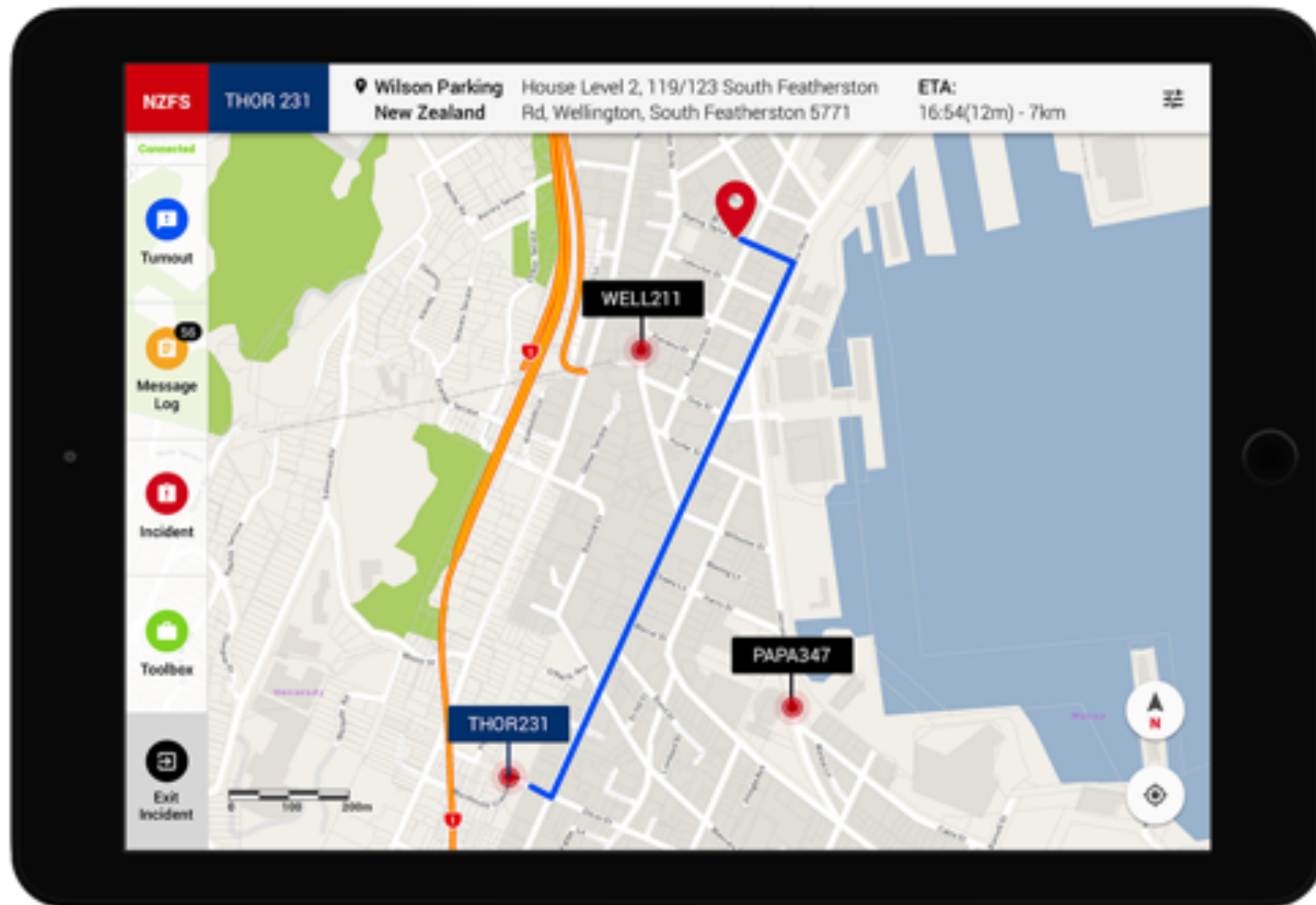
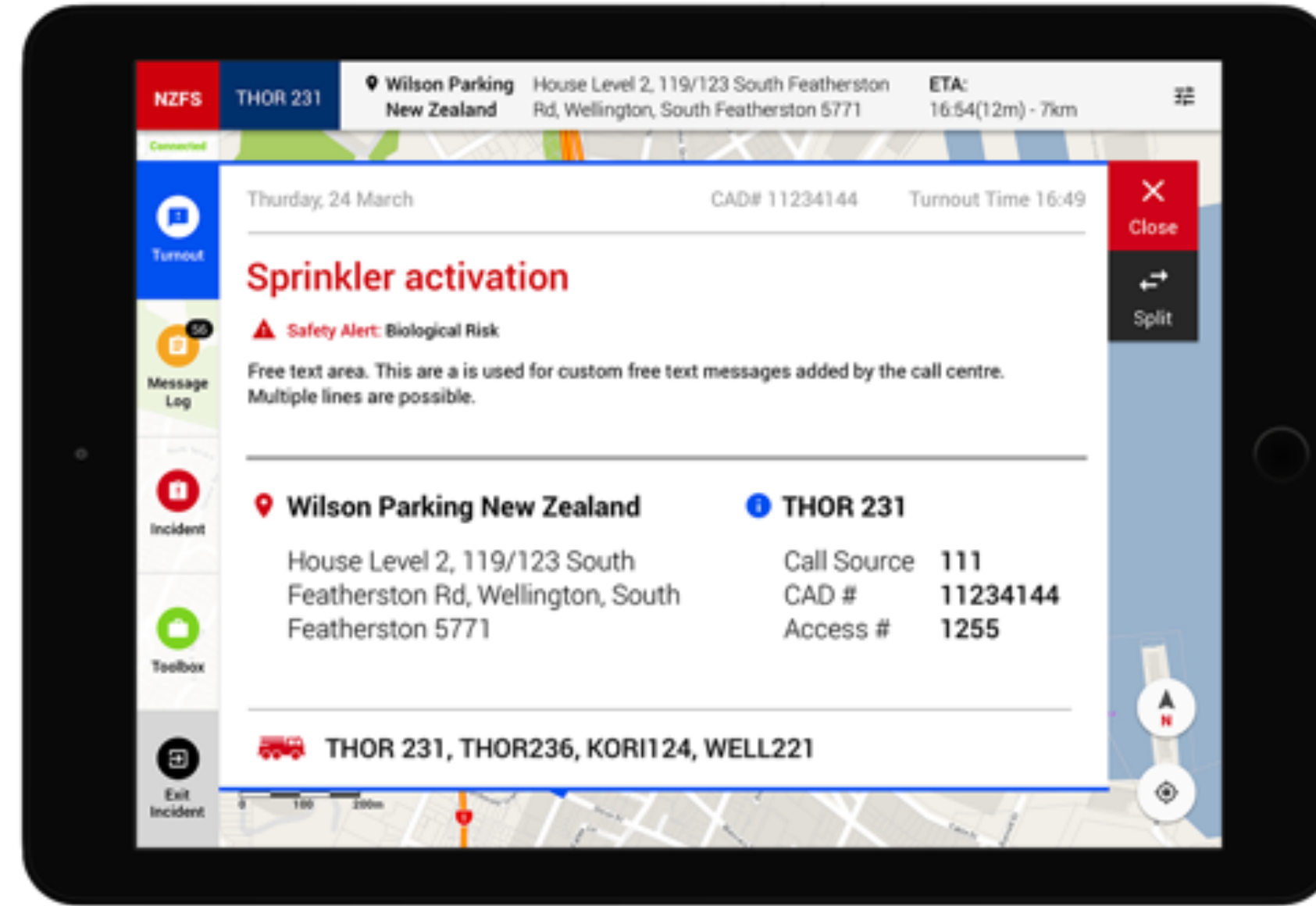
FIRE

MAN

HPG145

FIRE RESCUE CALL 111









MIH0011

SIERRA WIRELESS
MIH0011

MSA

MSA

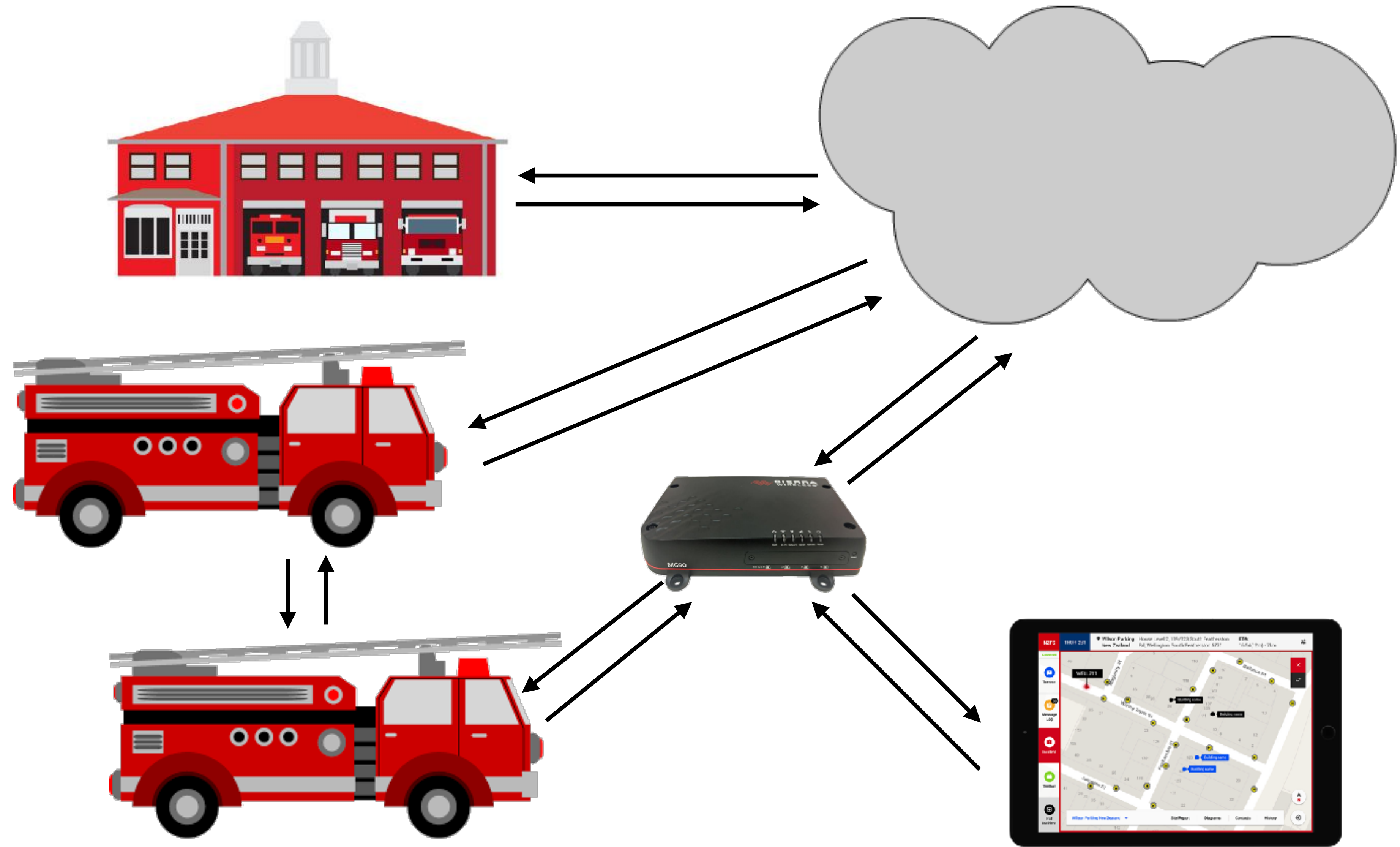
MSA

DANGER
230 VOLTS



Requirements

- Redundant communications channels, wifi, cell, mesh-network
- Realtime information on the incident
- Offline maps
- Offline documentation, site reports, building information, photos
- Offline hazard and useful information about the area around the vehicle and incident
- Allow firefighters to update and create site and hazard information and also attach media
- Track appliance (firetruck) and firefighter status
- Be a hub for an incident
- Ultra secure, multiple layers of encryption, conforms to SIS and Police security standards



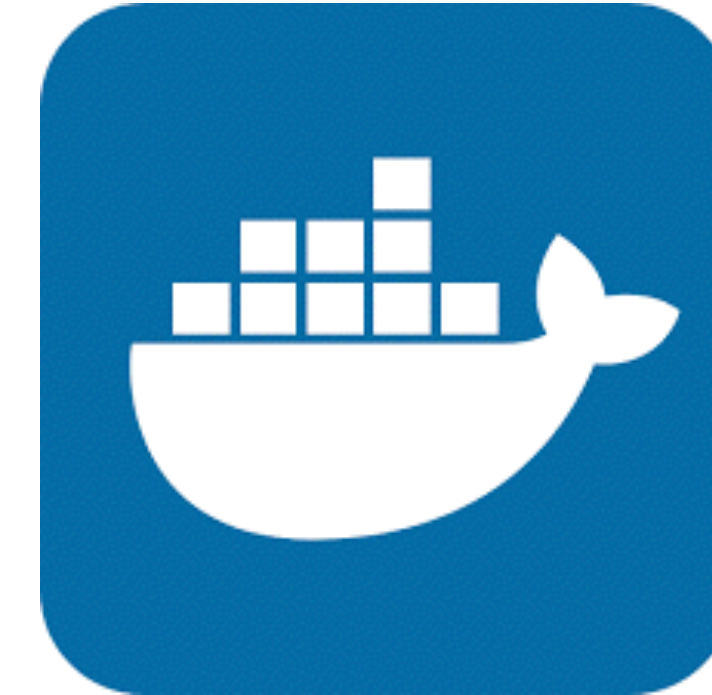
On truck stack



GIT



Ansible



Docker



.NET Core



MongoDB



Redis

**Turns out a firetruck isn't a server in
a datacenter**

What if an incident happens during an update?

What happens if an update fails?

How do we manage 1,000 or more trucks?

**How do we manage vehicles which may be
offline for months at a time?**

How do we keep this secure?

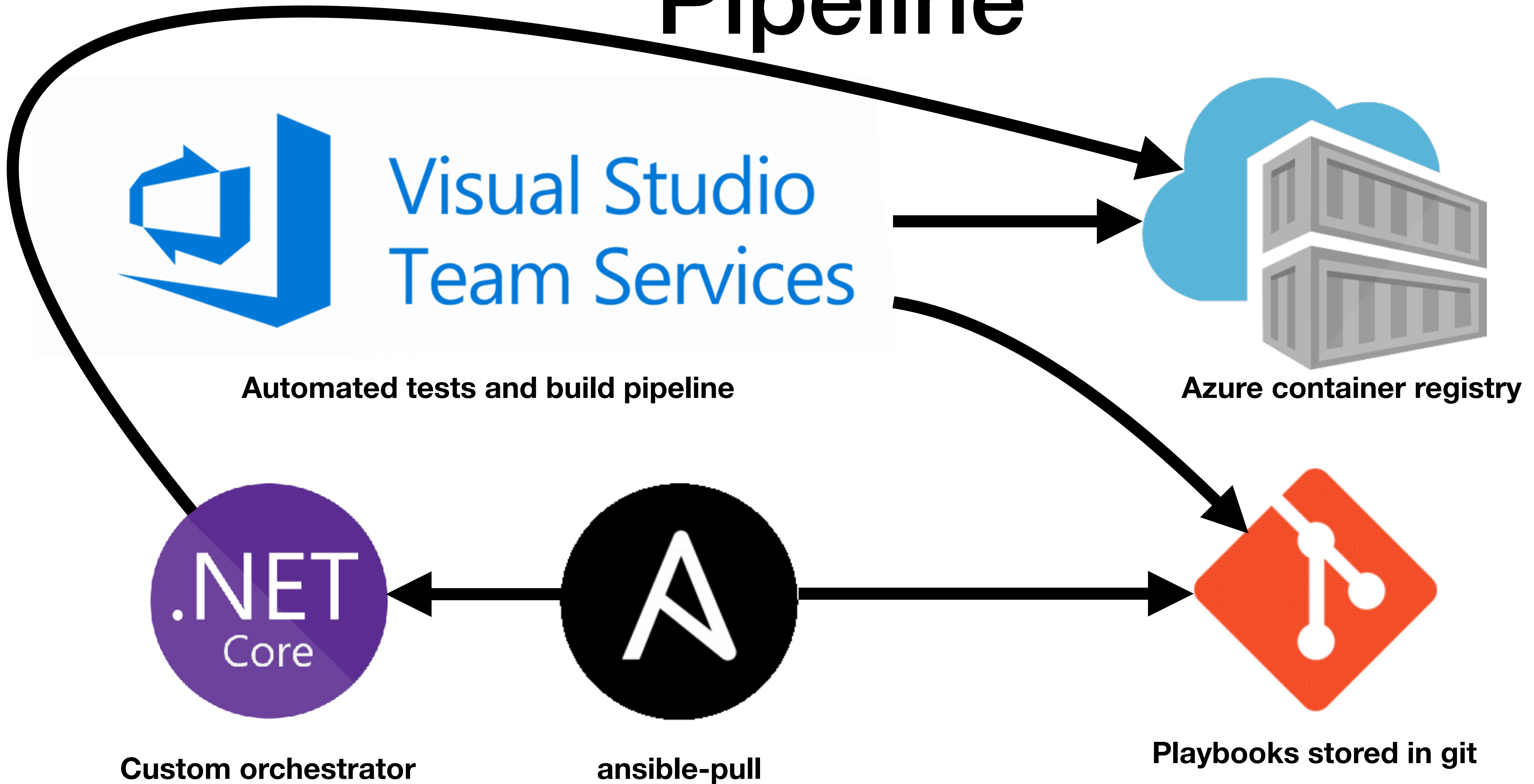
How do we iterate quickly?

Automation!

Continuous Delivery and Orchestration

- Only update when appliance (firetruck) is in it's home station
- Don't update if appliance (firetruck) is moving or has its lights on
- Blue/Green updates
- Always able to roll-back to known good state
- Health probes also look at temperature and power usage

Pipeline



Blue/Green deployment



Custom orchestrator

File API	UDP Listener	Sync service	GPS Listener	CAN Bus Listener
Sync service	Encryption Service	IOT Hub Listener	Redis	Mongo

NGINX

File API	UDP Listener	Sync service	GPS Listener	CAN Bus Listener
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Blue/Green deployment



Custom orchestrator

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There were problems

It overheated



MIH0011

SIERRA WIRELESS
MIH0011

MSA

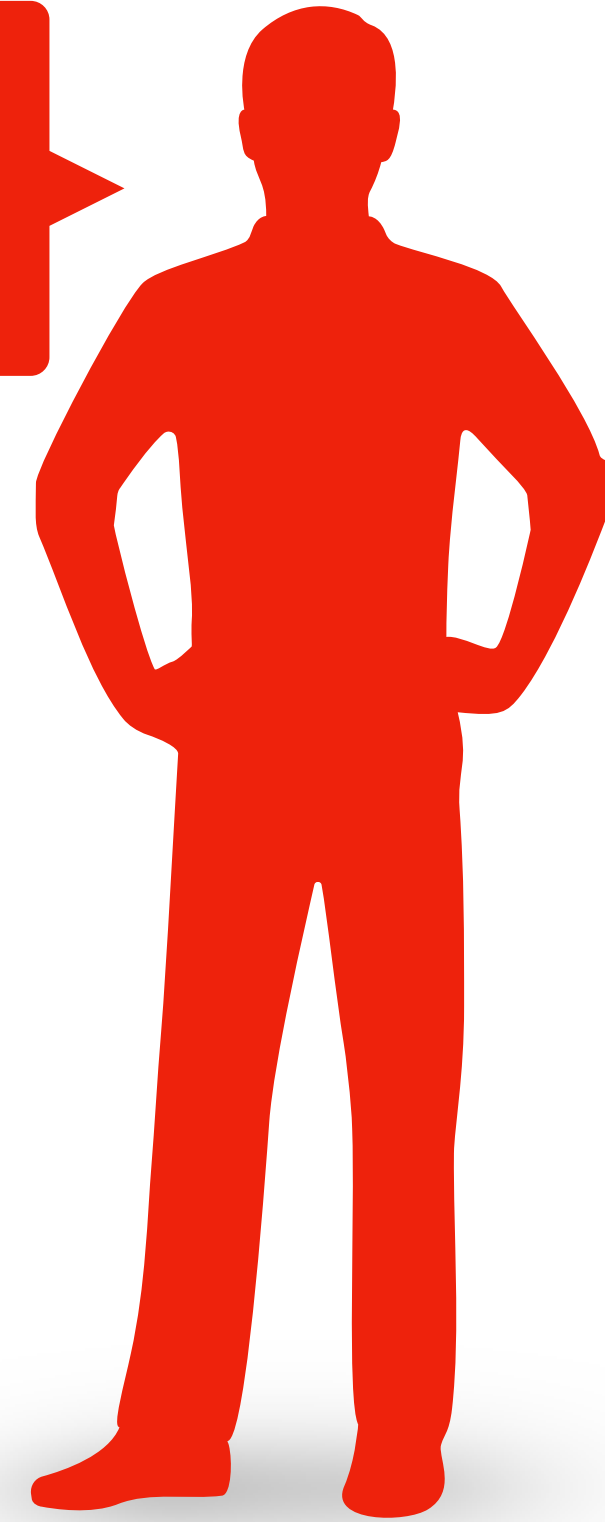
DANGER
230 VOLT

ME



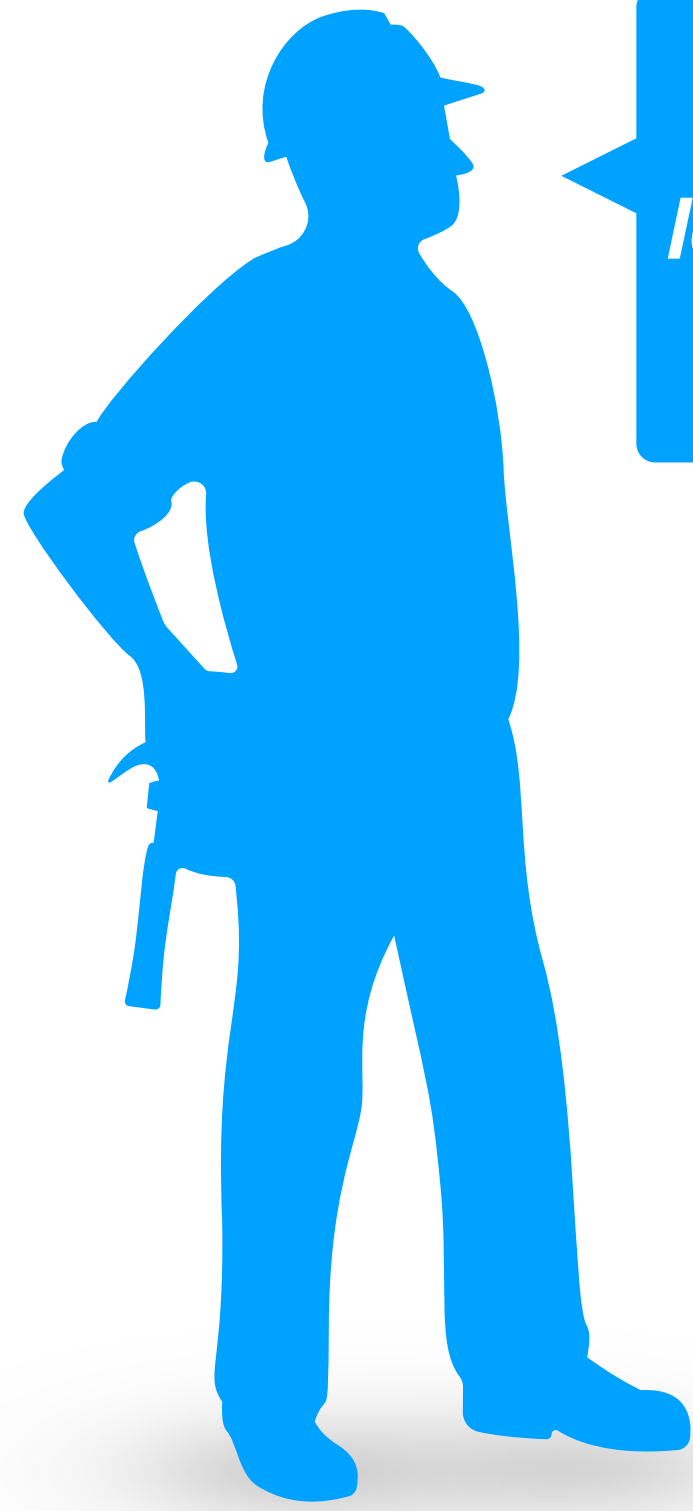
“So, I suppose we’re not doing offline then?”

BOSS



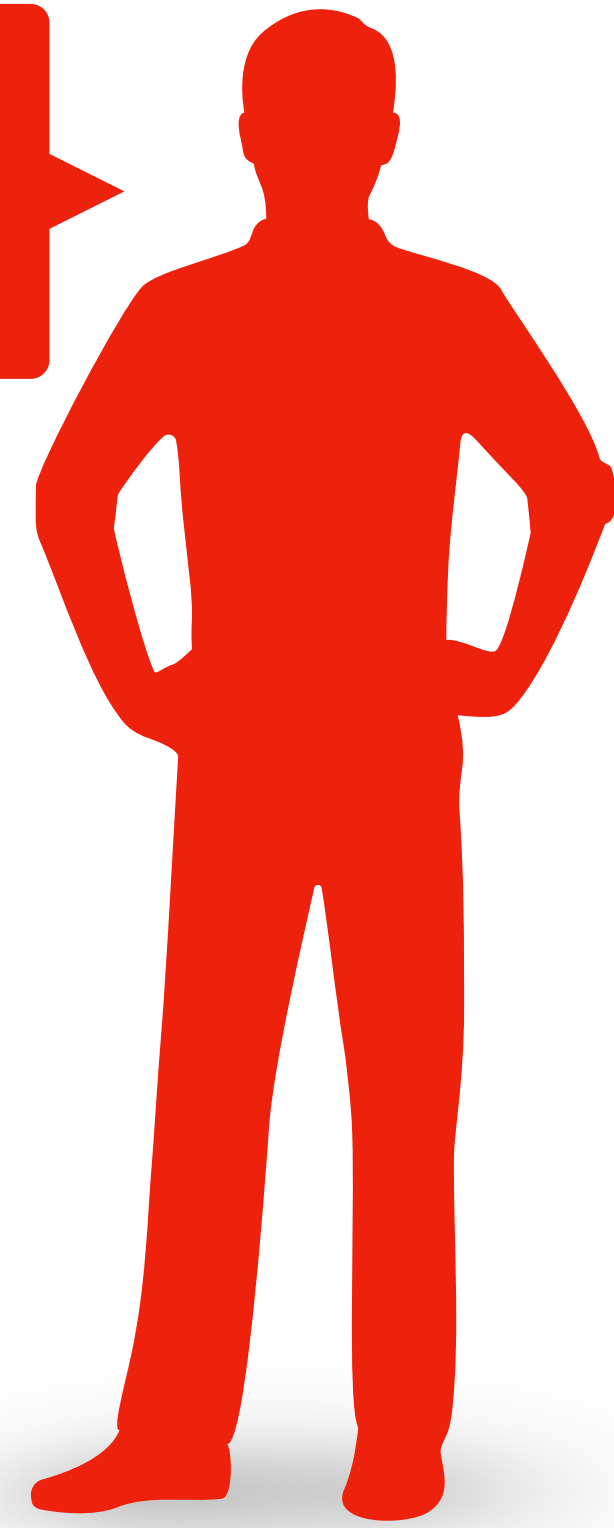
“We sure are, it’s a core requirement.”

ME



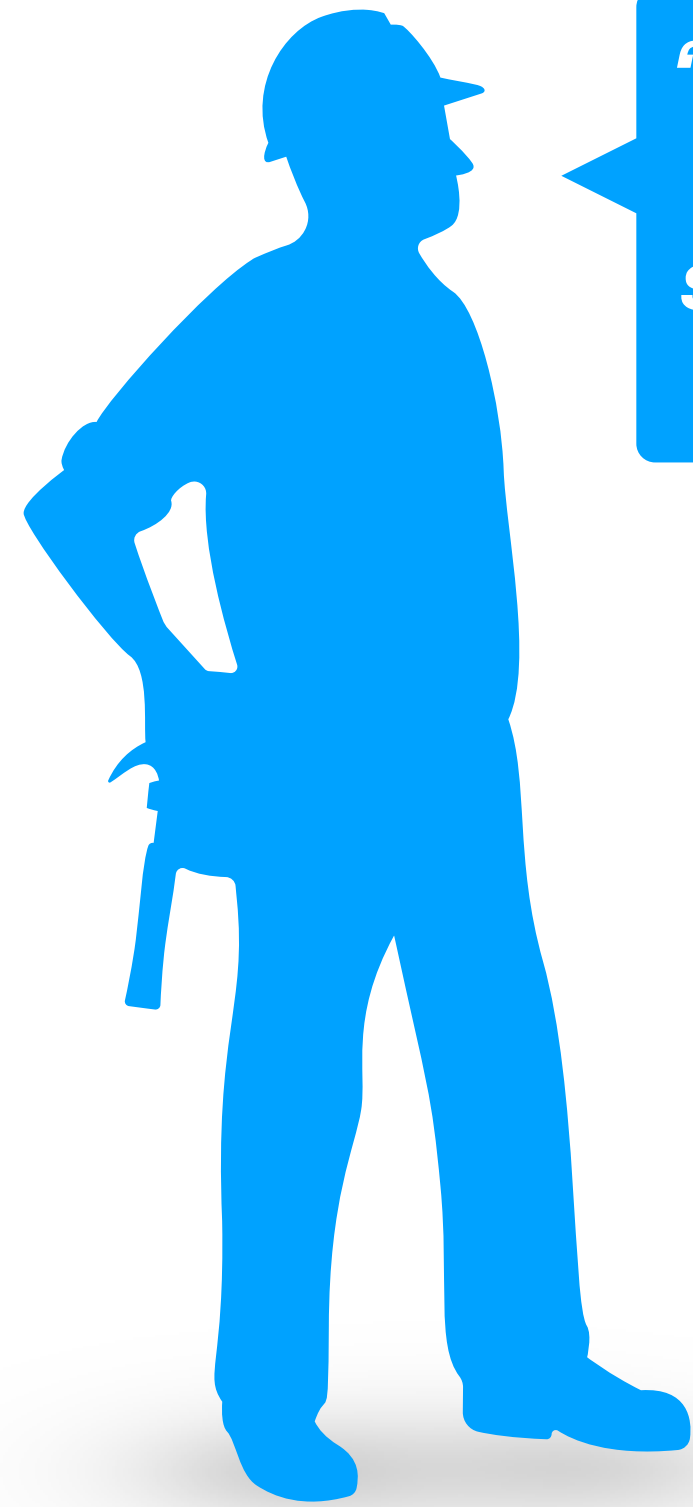
*“But we’ve
lost our offline
hardware.”*

BOSS



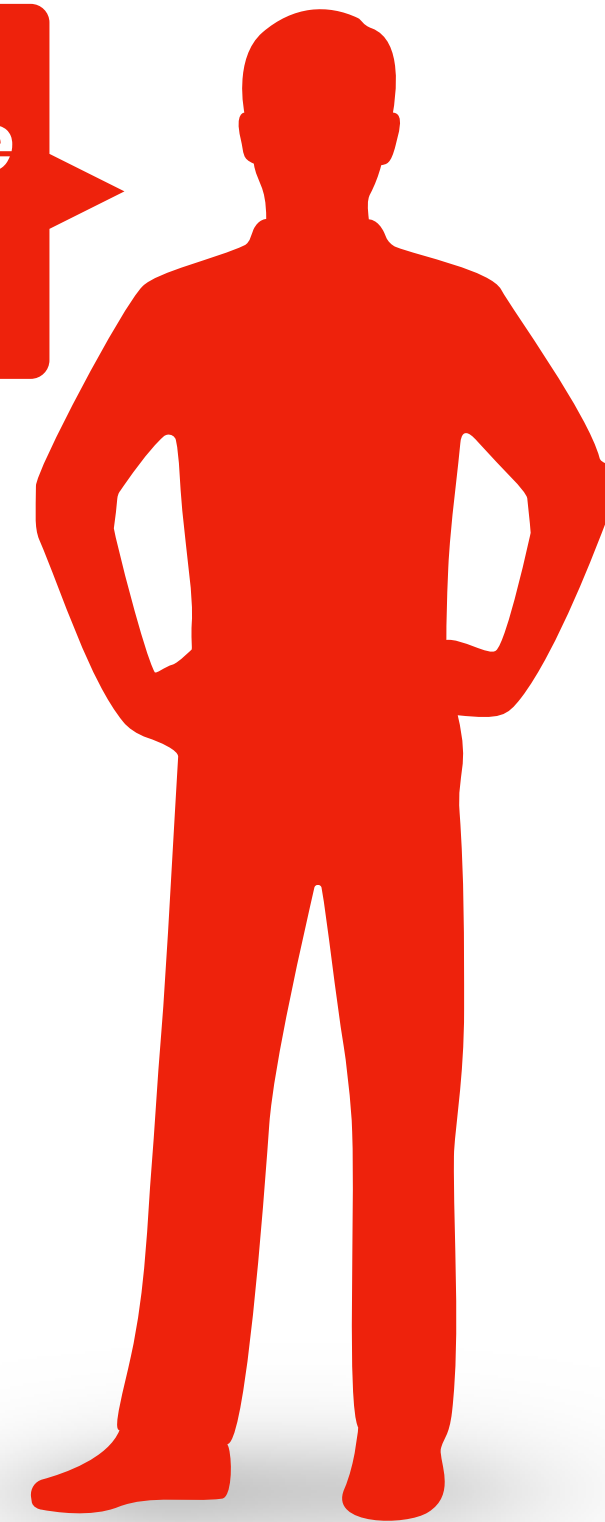
*“Is that a
problem?”*

ME



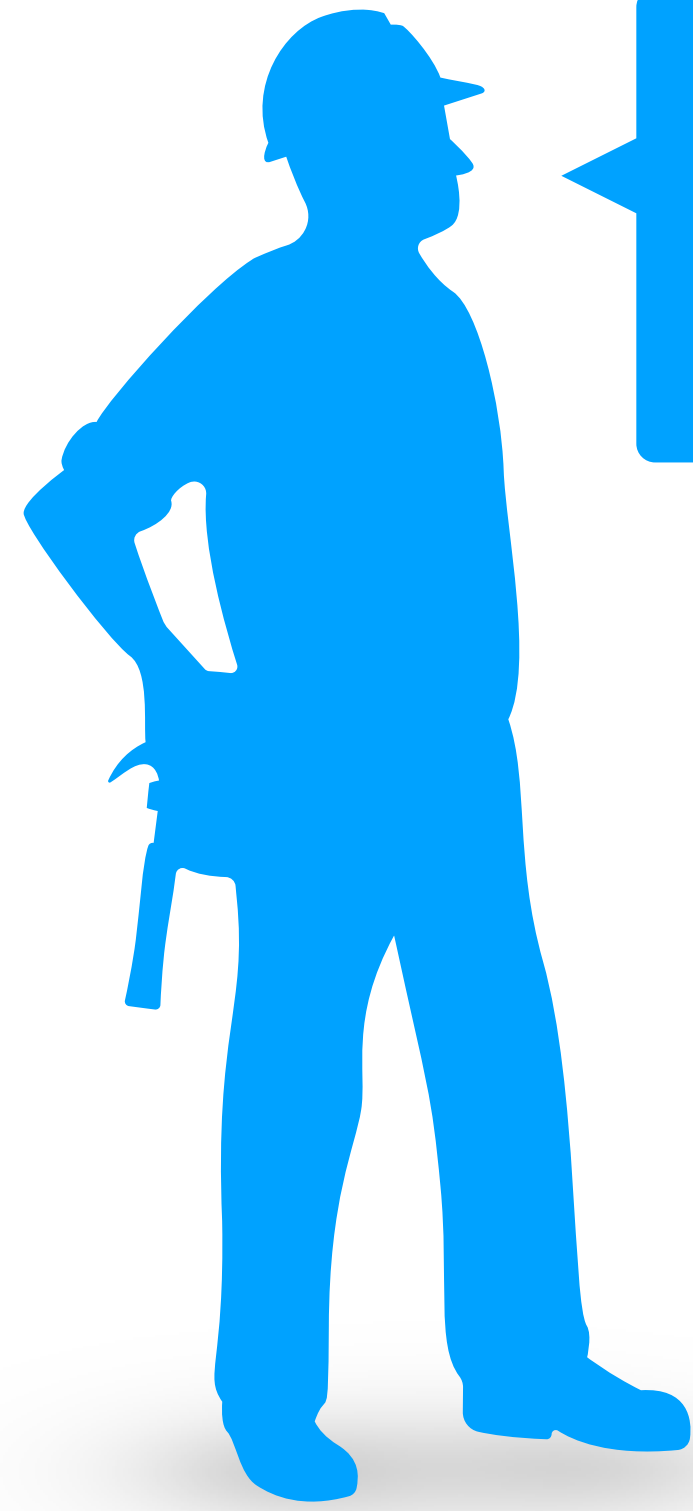
*"I suppose we
can buy
something off
the shelf."*

BOSS



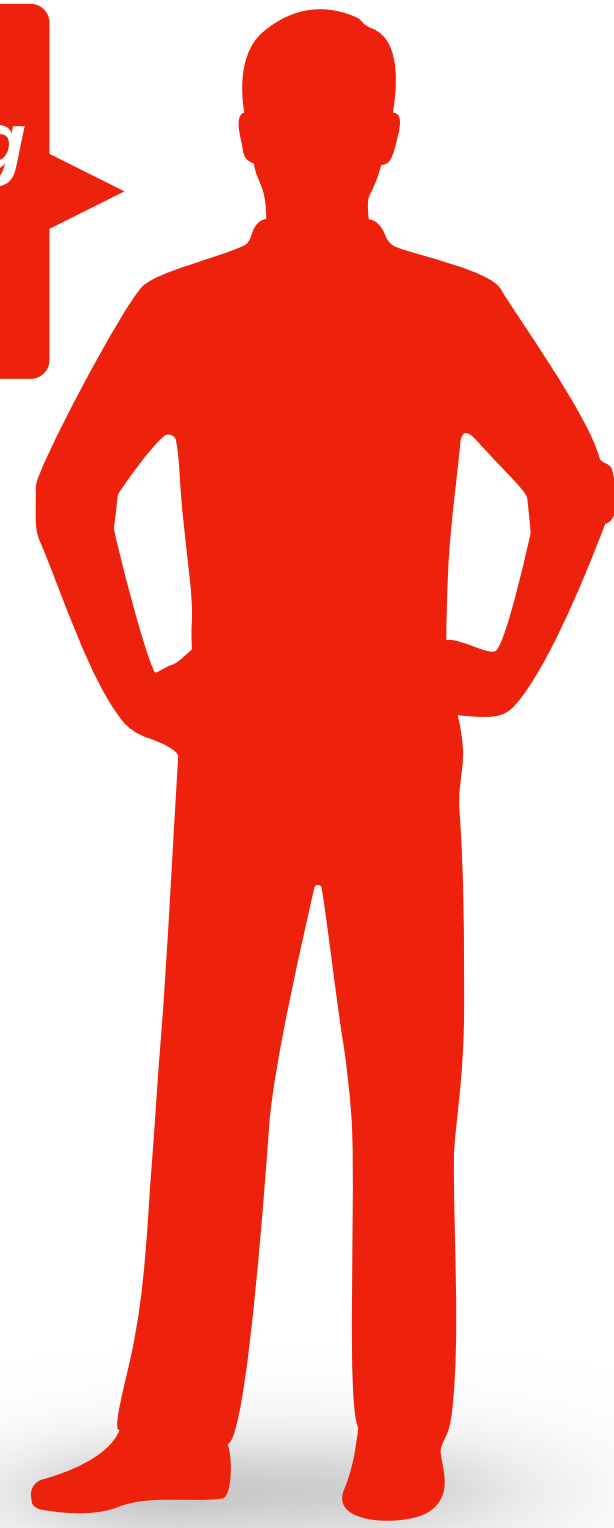
*"We don't have
the budget."*

ME



*"A Raspberry
PI?"*

BOSS



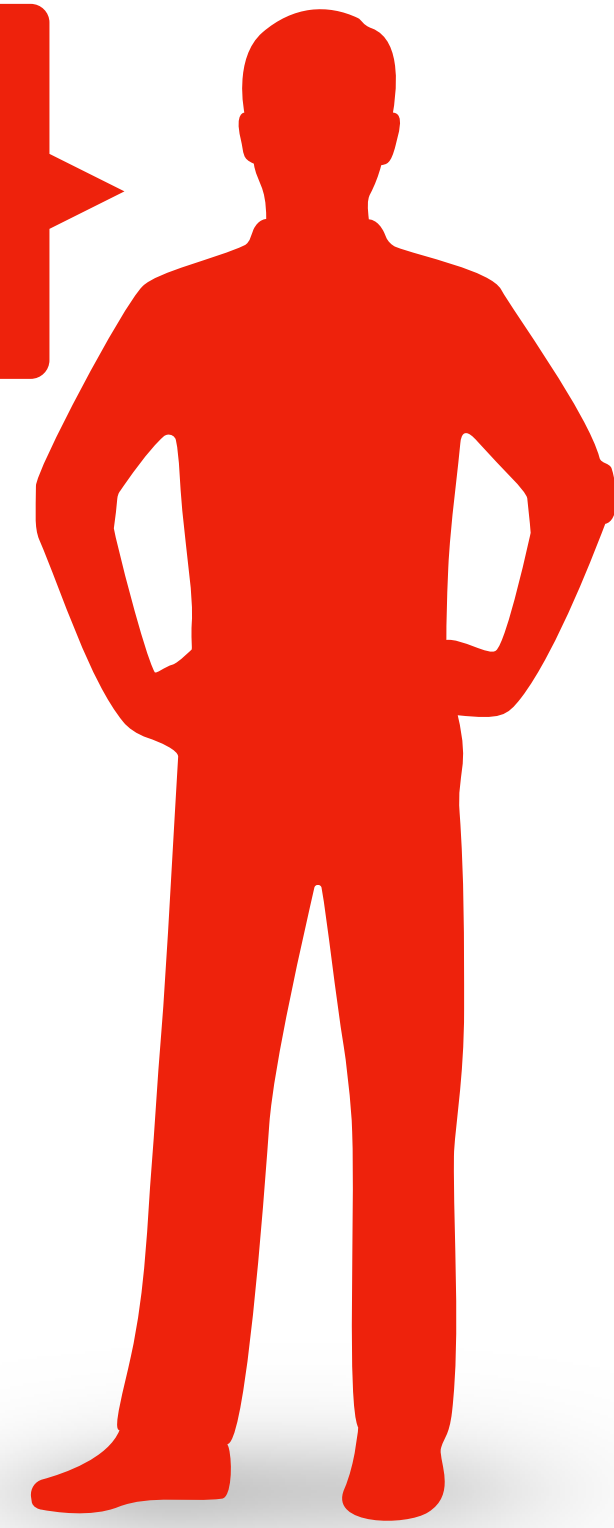
*"Am I not being
clear?"*

ME



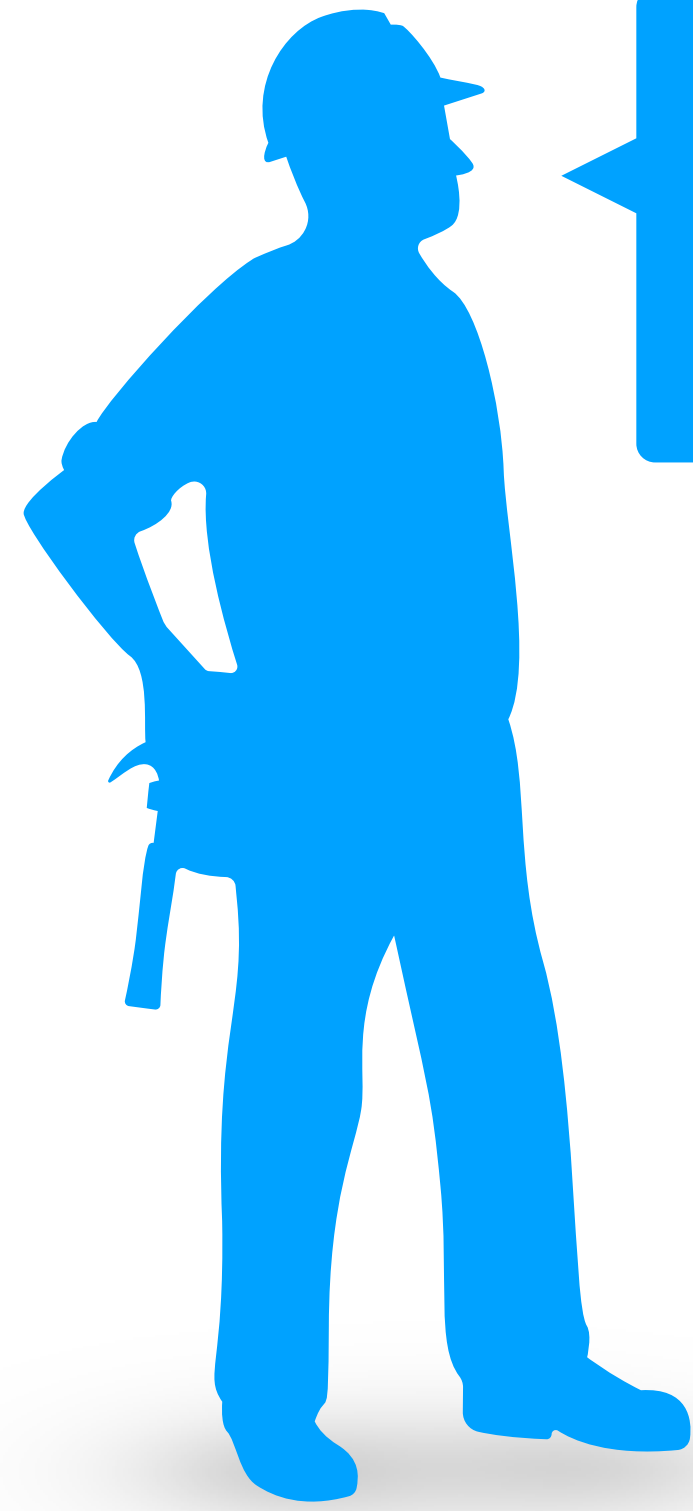
“Let me get this straight, we have no money.”

BOSS



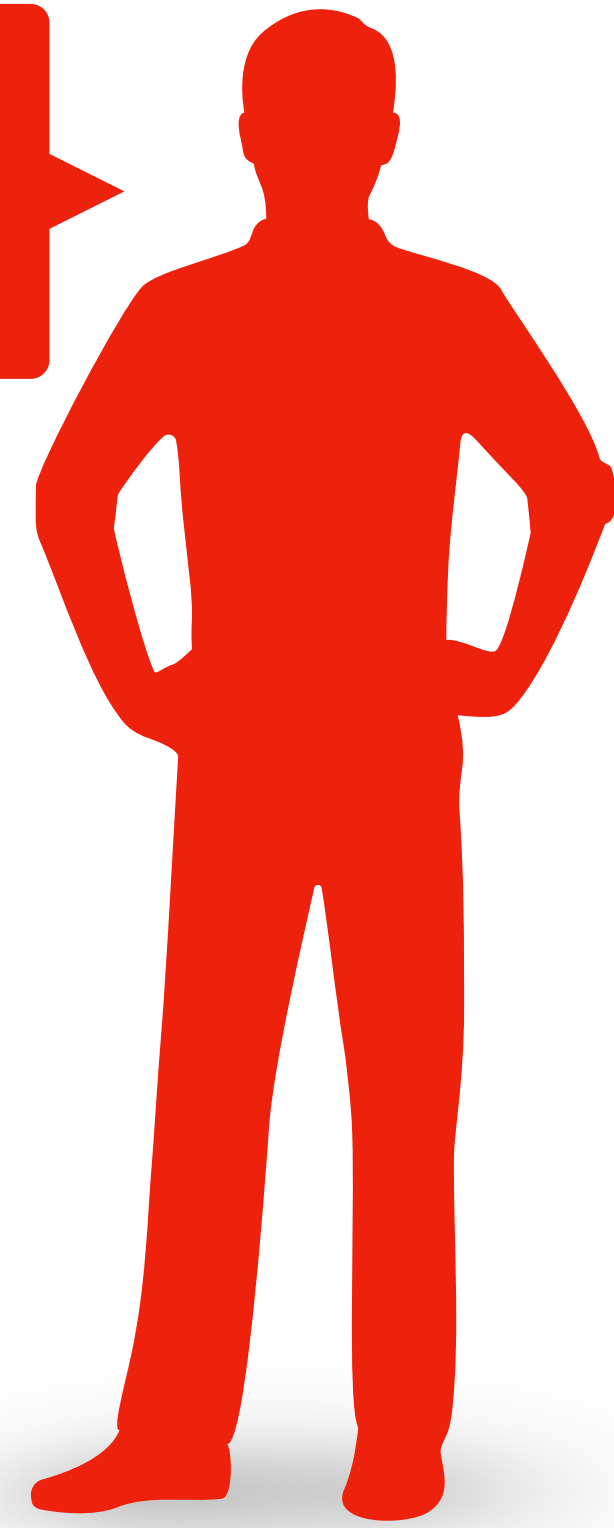
“Nope.”

ME



*“And we’ve
lost
capability.”*

BOSS



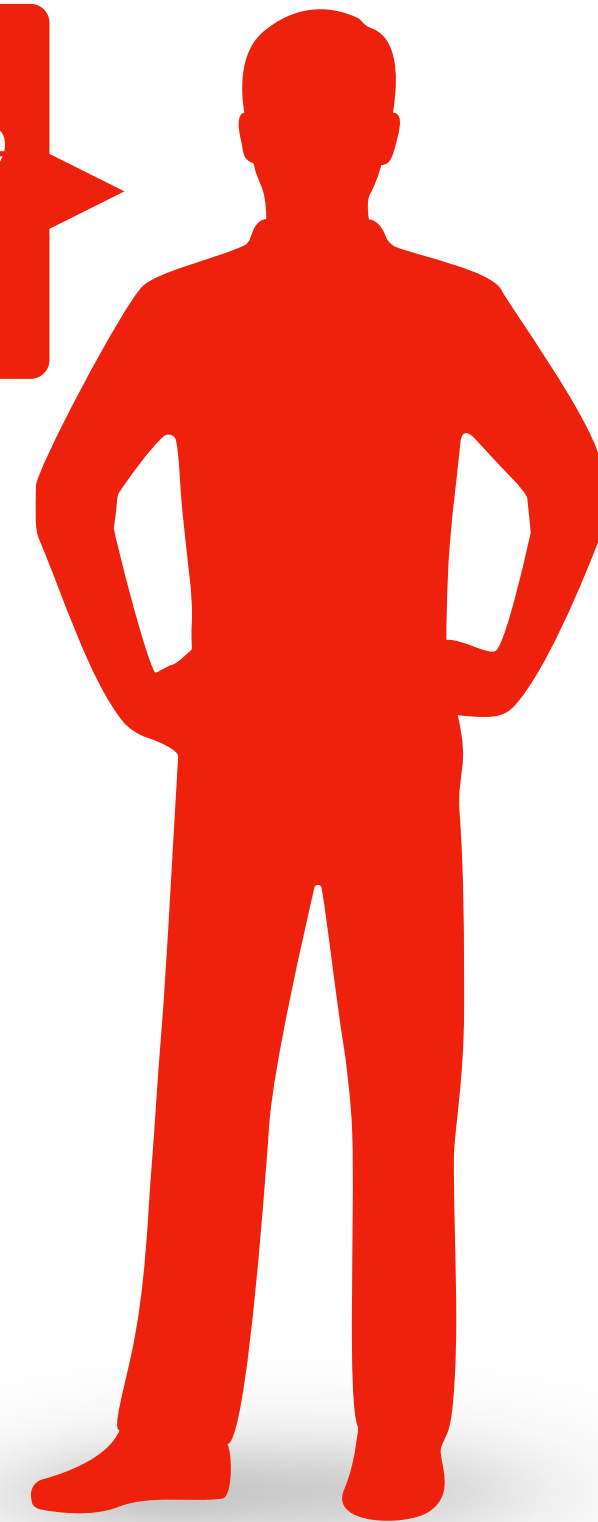
“Yep.”

ME



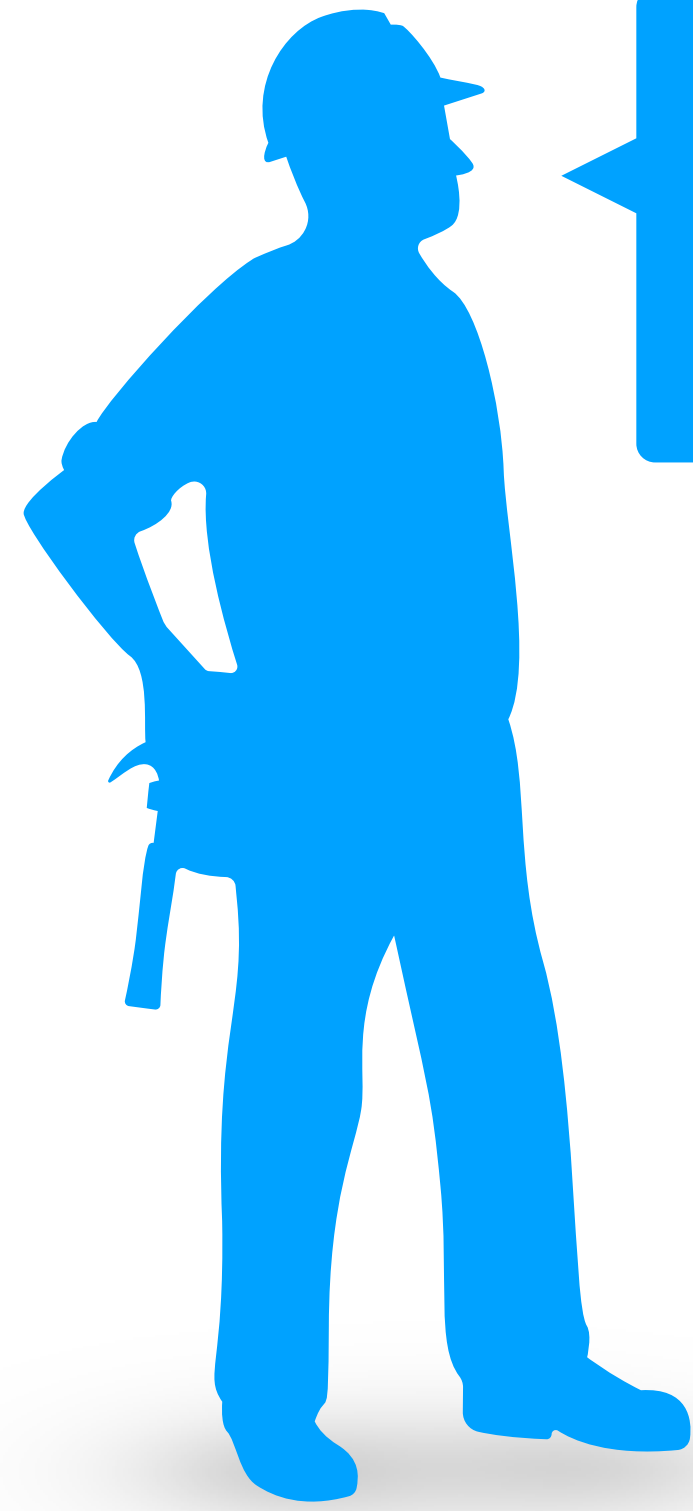
*“But we have
the same
requirements?”*

BOSS



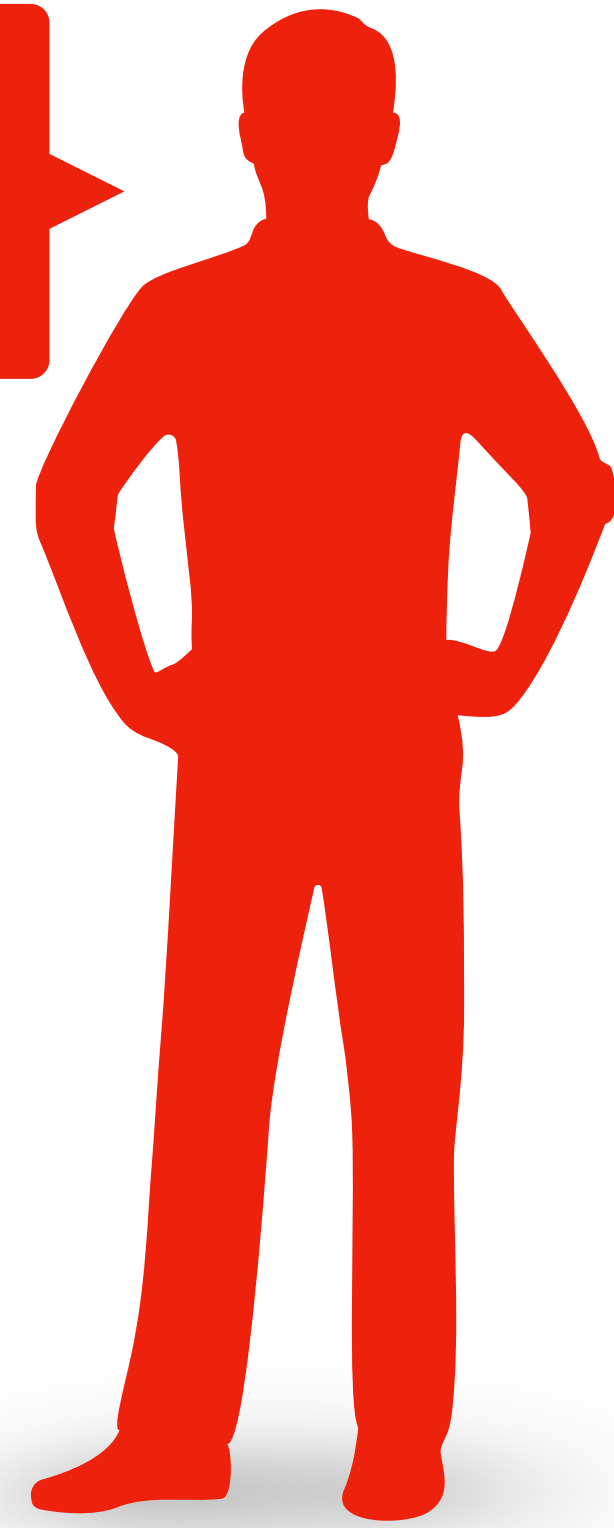
*“And the same
deadlines.”*

ME



"Oh S#@!"

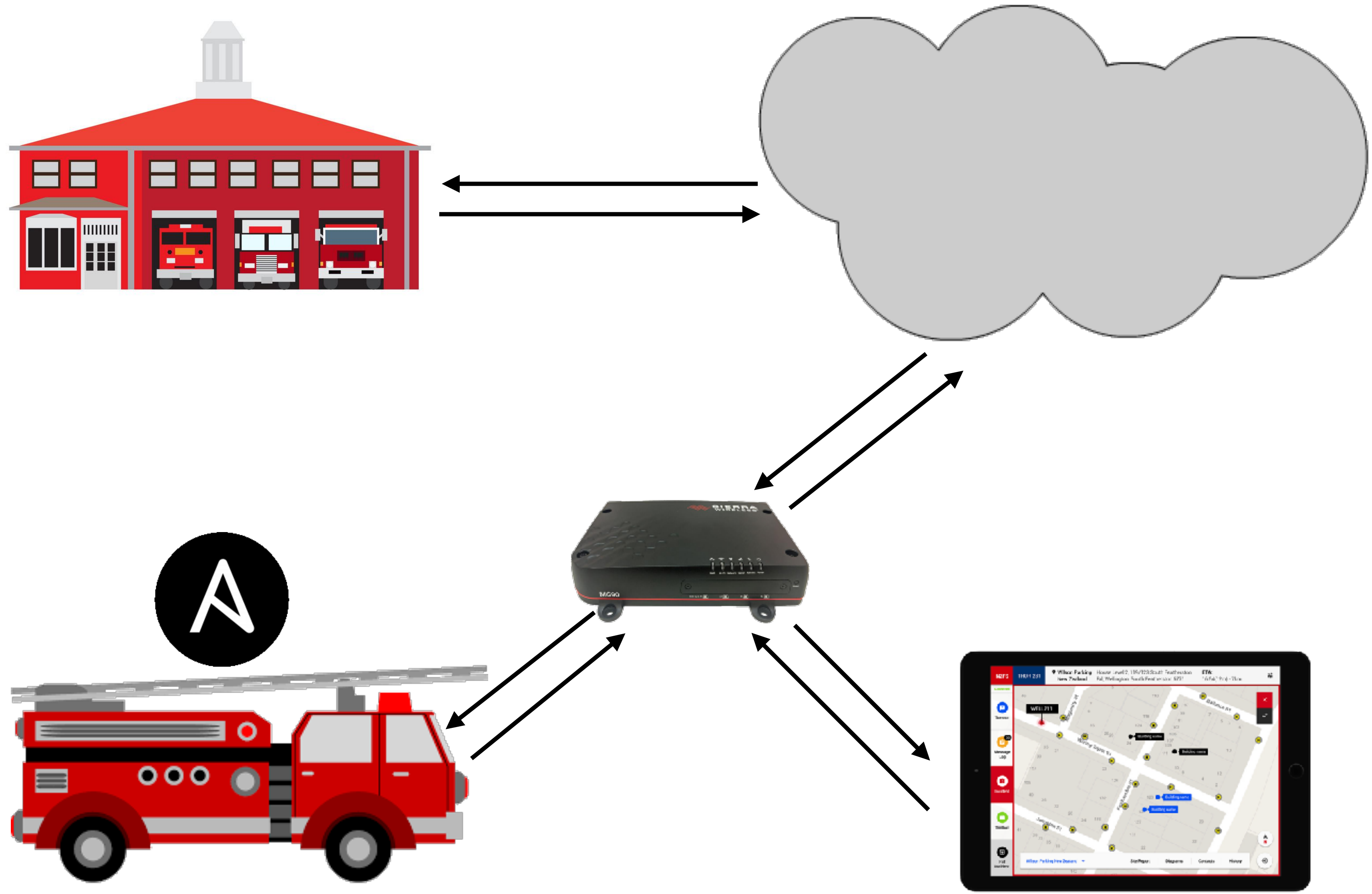
BOSS

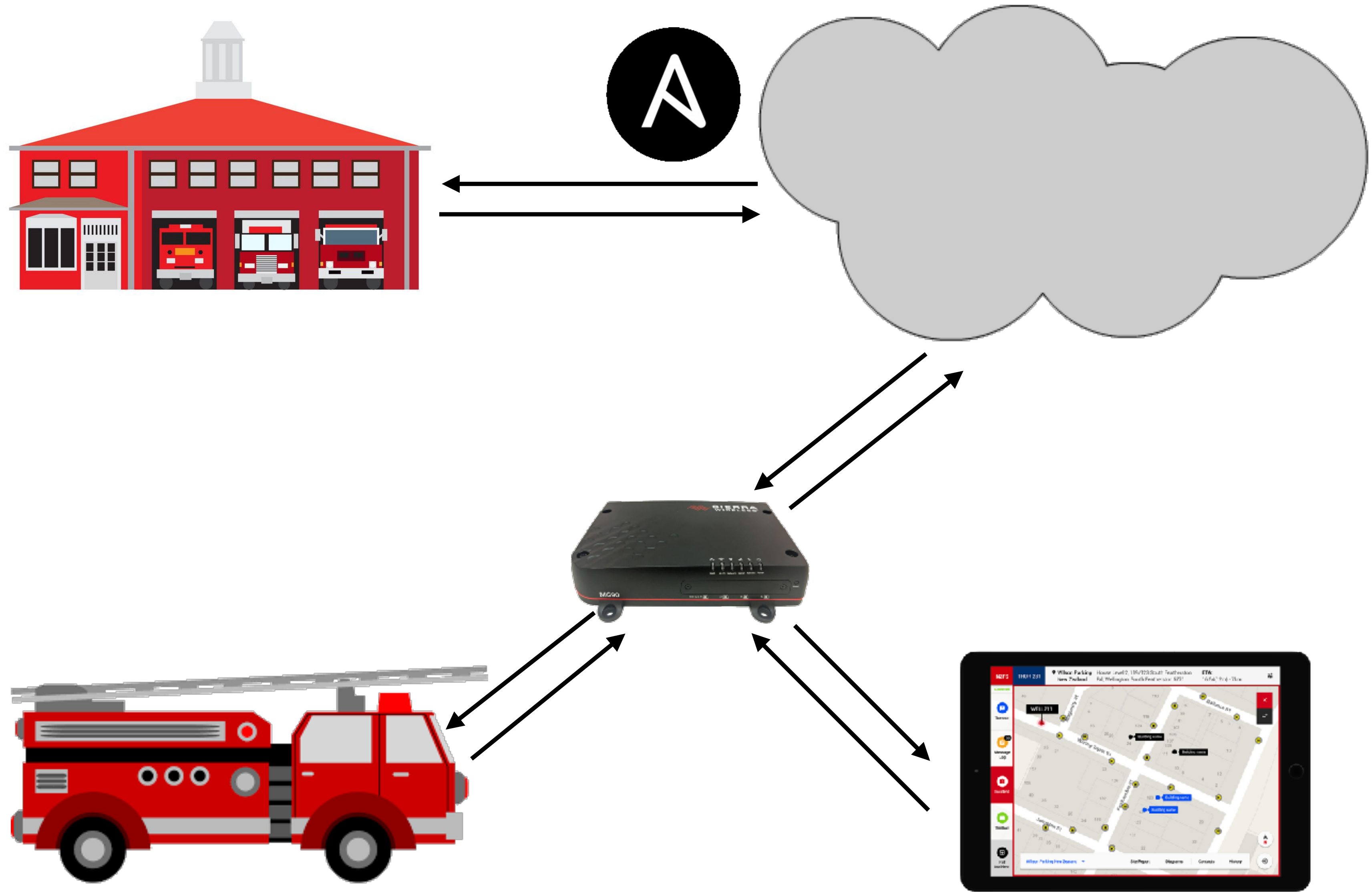


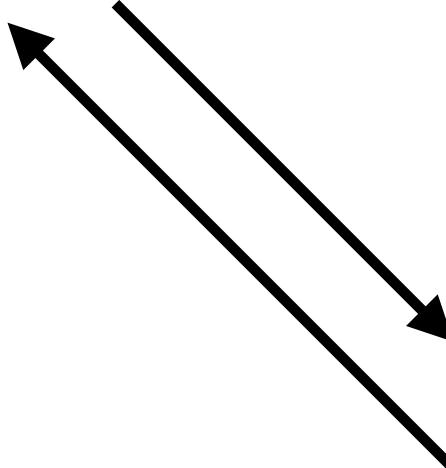
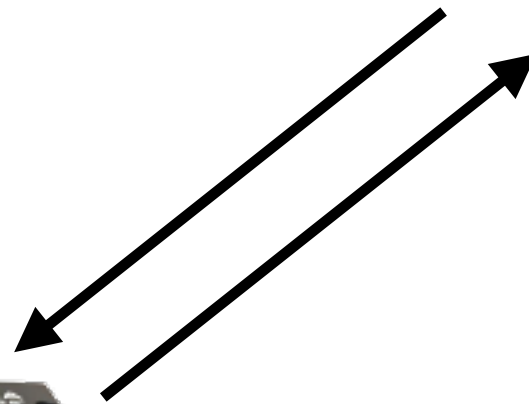
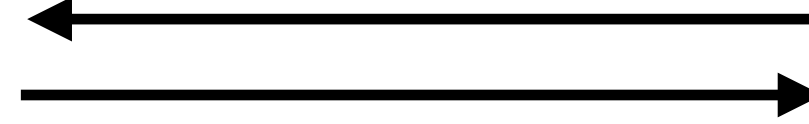
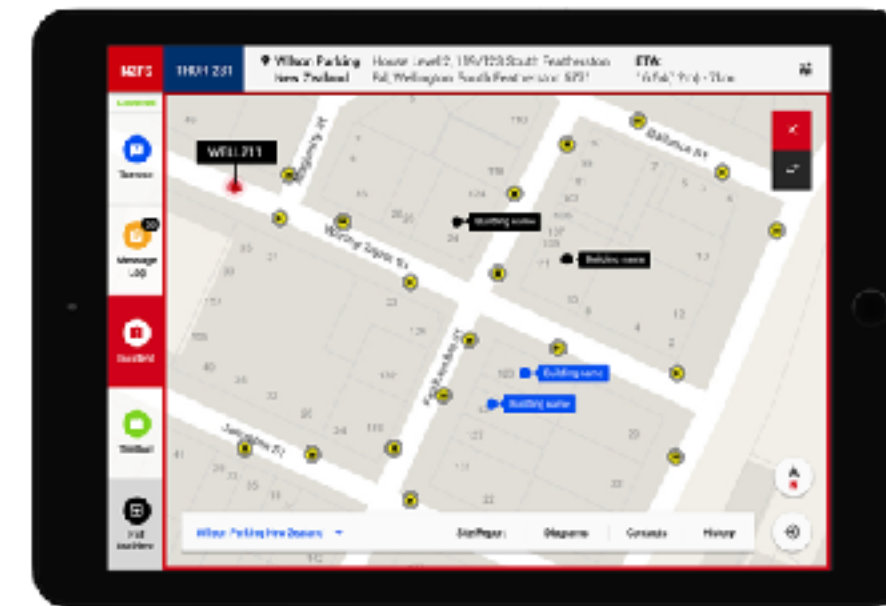
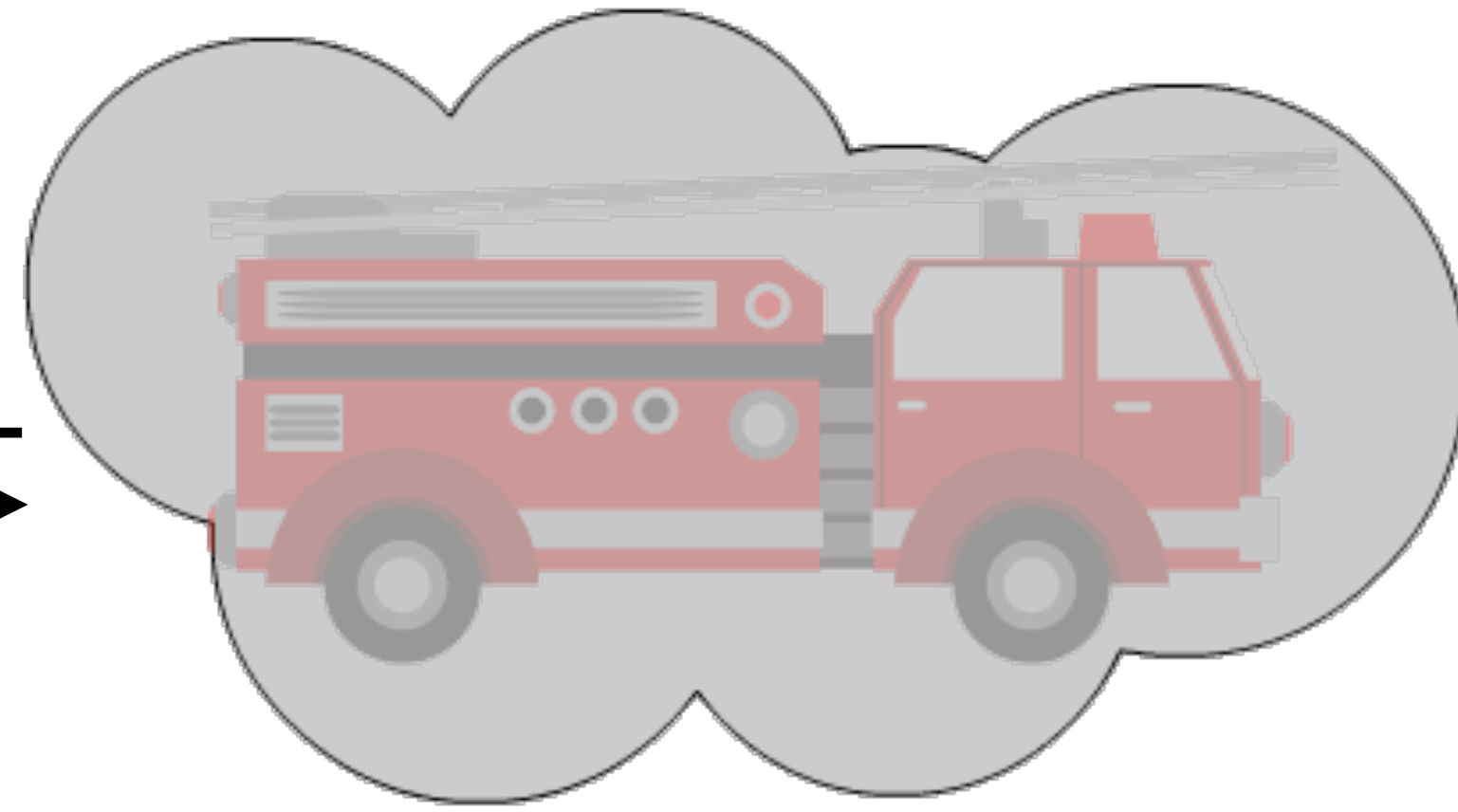
"You have two weeks."

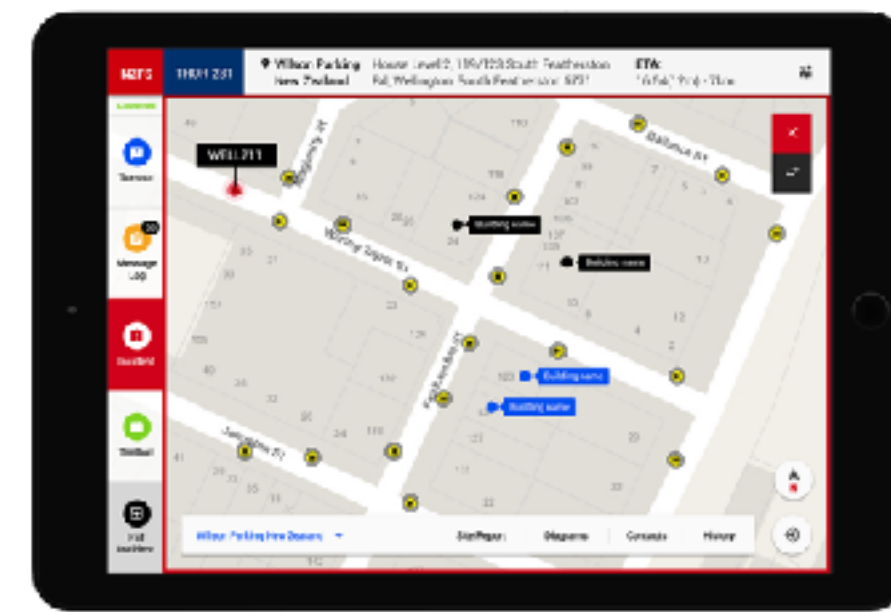
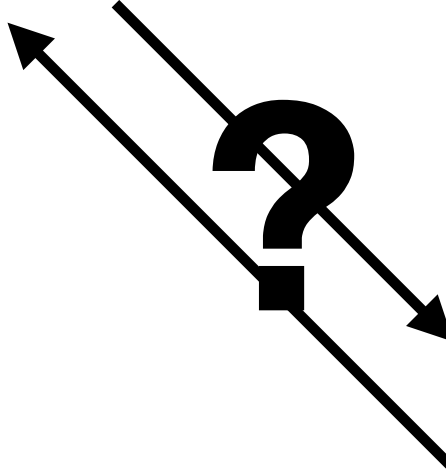
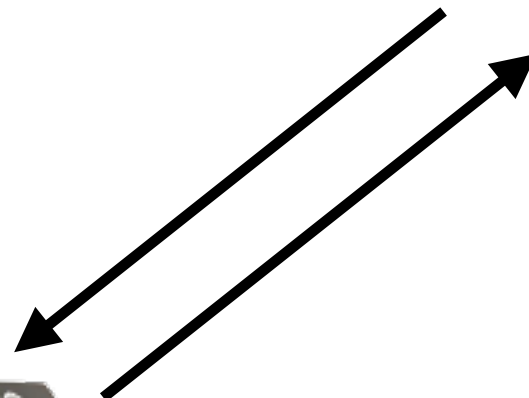
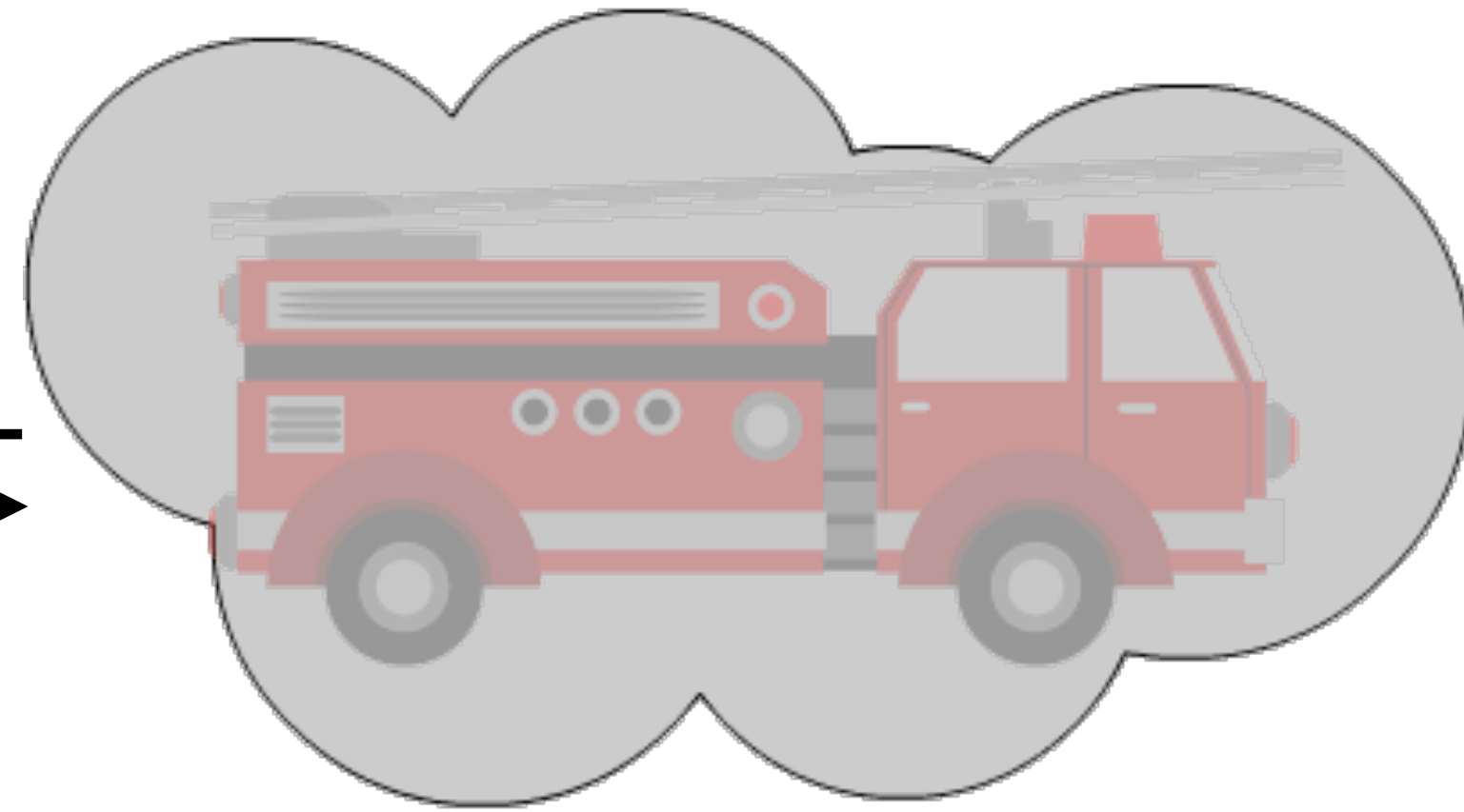
MVP Requirements

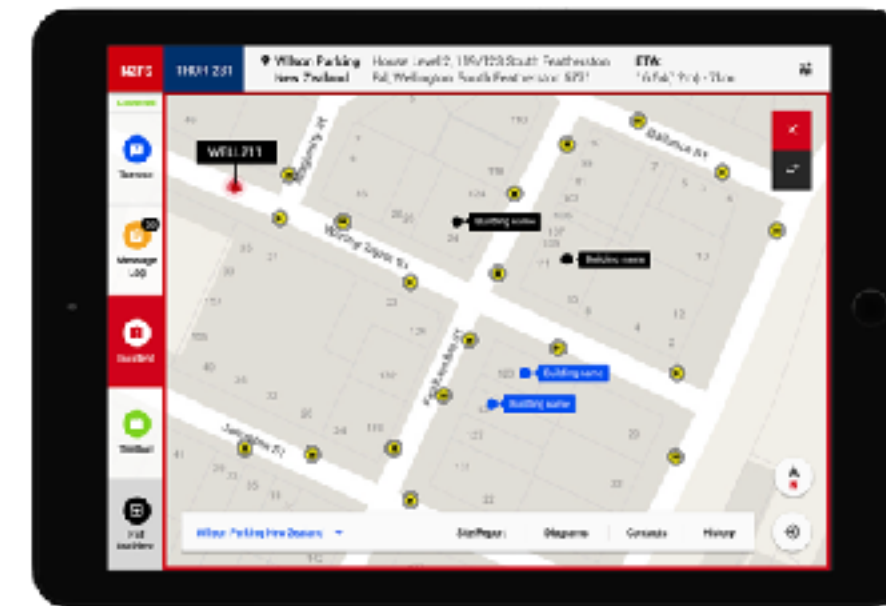
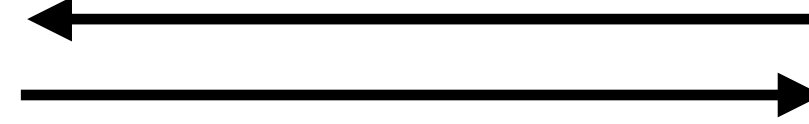
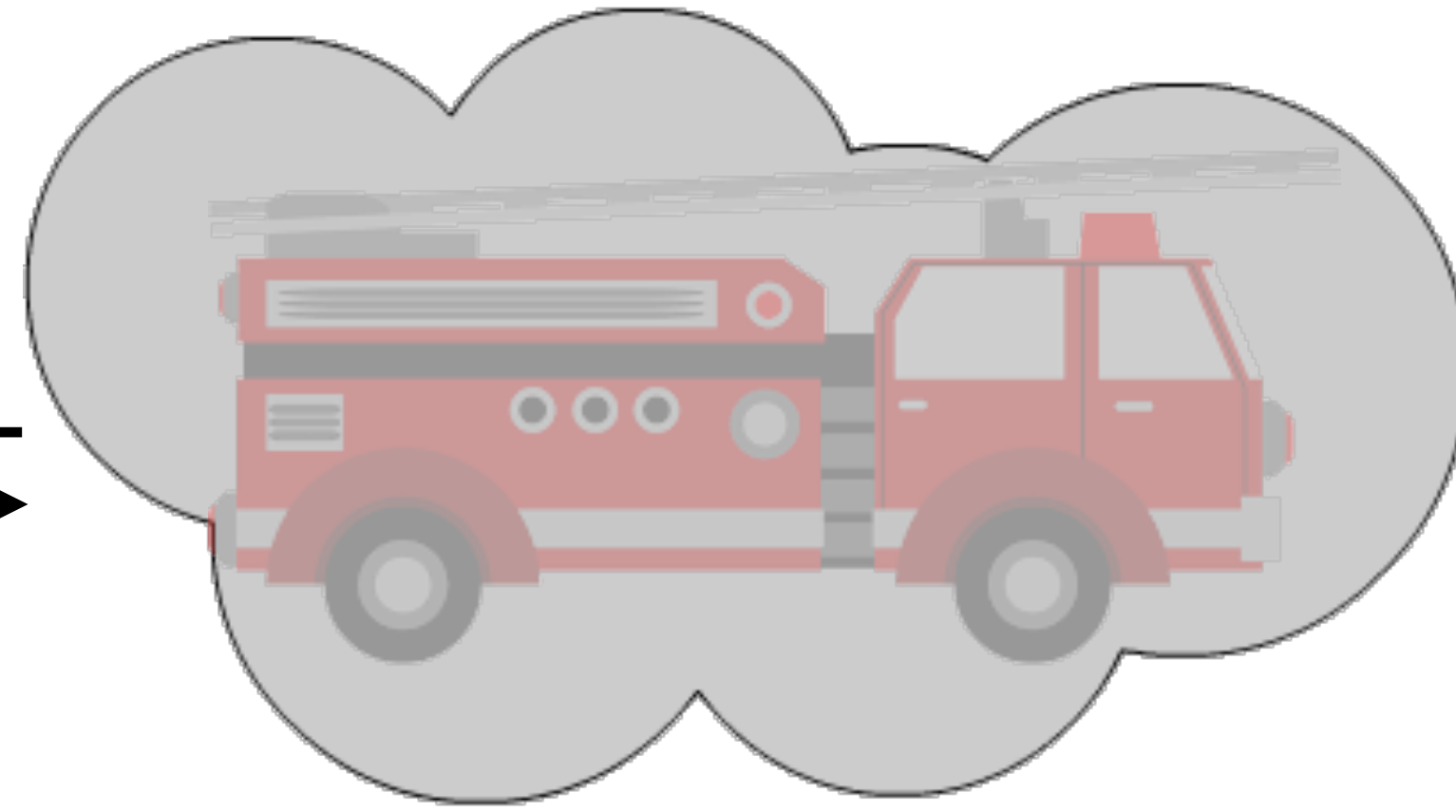
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- Be a hub for an incident
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SIERRA
WIRELESS

MG90

GNSS Wi-Fi Network Signal Activity Power

Reset

SIM Card A1 A2 B1 B2



MIH0011

SIERRA WIRELESS
MIH0011

MSA

DANGER
230 VOLT

HTTP Status 500 - Something went horribly wrong.

type Exception report

message Something went horribly wrong.

description The server encountered an internal error that prevented it from fulfilling this request.

exception

```
java.lang.RuntimeException: Something went horribly wrong.  
    TestServlet.doGet(TestServlet.java:29)  
    javax.servlet.http.HttpServlet.service(HttpServlet.java:621)  
    javax.servlet.http.HttpServlet.service(HttpServlet.java:728)  
    org.apache.tomcat.websocket.server.WsFilter.doFilter(WsFilter.java:52)
```

note The full stack trace of the root cause is available in the Apache Tomcat/7.0.50 logs.

Apache Tomcat/7.0.50

Hazard search

- Search through millions of records to find and display hazard information in the area around the truck to the tablets
- Real time
- Can't use too many resources (can't impact comms)
- Built with the technology on the MG90, there's no package management
- Secure and encrypted conforming to the standards of the SIS and Police
- Offline (of course)

Hazard search



Hazard search



Hazard search

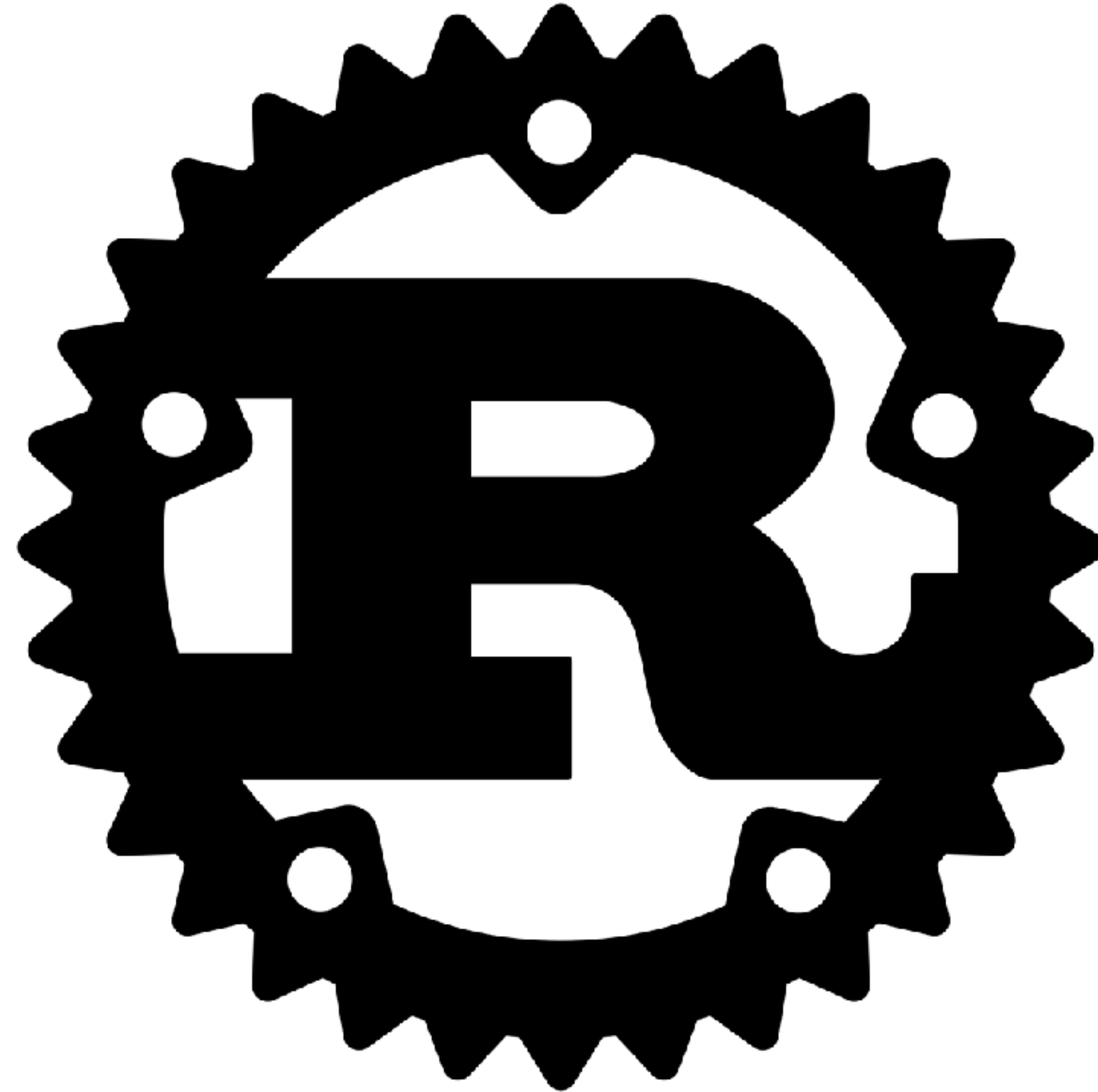


Hazard search



Hazard search

Hazard search



Continuous Delivery



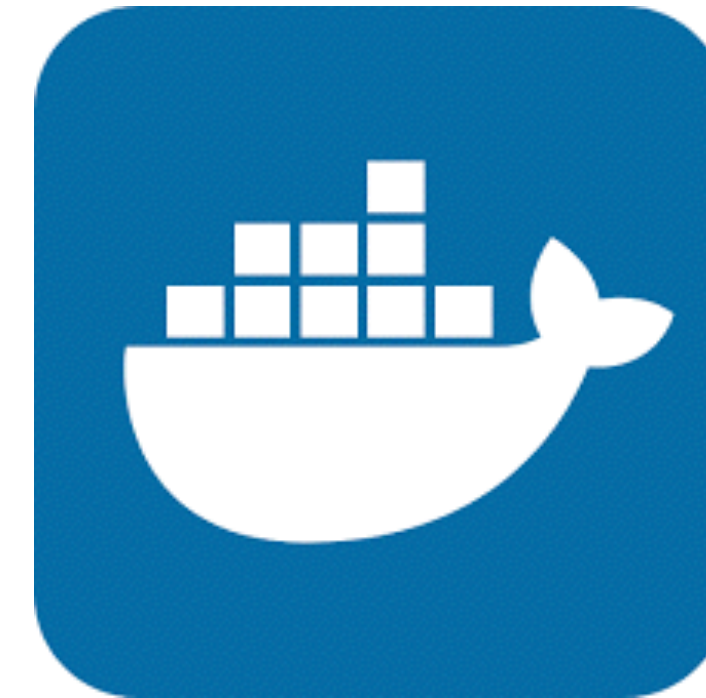
Stack



GIT



Ansible



Docker



.NET Core



MongoDB



Redis

Stack



GIT



Ansible



Docker



Java



rsync



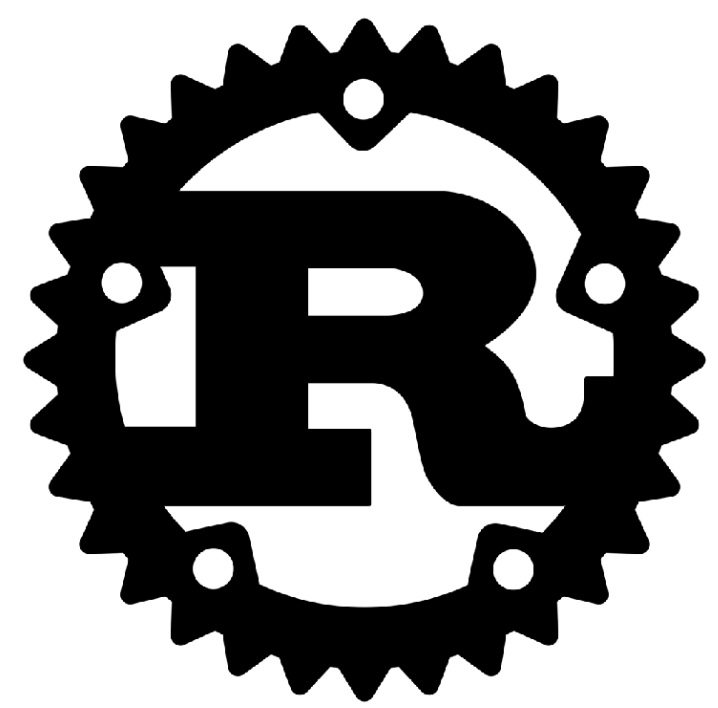
.NET Core



MongoDB



Redis



Rust



.sh

On Azure

On Truck

Lessons:

- Automation gives us the flexibility to change
- Automation gives us the flexibility to grow
- Creativity can solve any problem
- You can solve new problems with old technology
- Sometimes the only way to get buy in is to just do it
- Fire appliances put out real fires, but automation can help us put out technical ones

THANKS!