Team Wise Riders

Eclipse SDV
Hackathon Chapter Two

ThreadX loves uProtocol

ThreadX Loves uProtocol

Challenge: To ThreadX and Beyond!

Problem / initial situation:
- **uProtocol** (UP) enables unified service mesh and message / signal communication,
  but **misses** lower level support for devices like **Microcontroller**
- ThreadX is powerful and lightweight RTOS for Microcontroller

Vision: Teach ThreadX (TX) talking uProtocol (UP)

Mission:
- Understand TX and MXChip/AZ3166
- Remote Honk & Flash
- Crash Detection

Unique Selling Point (USP):
unified and complete software stack
- unified by uProtocol Message standard
- covers high computing and low level devices

Wise Riders

Bendikt Illich – uProtocol Rust / Backend

Jan Jongen – uProtocol MXChip, Documentation, Test Strategy

Matthias Busch – MXChip Views / Modes, Android Application

Oliver Thailmair – MXChip Views / Modes

Daniel Elhs - MXChip Views / Modes, Presentation and Business

Our Approach

Utilize MXChip/AZ3166 including codebase provided by coaches (Frederic)

- Display & LEDs
- Logger (MacOS / CoolTerm)
- C Programming
- uProcol message specification
- MQTT / Protobuf

Leverage and extend existing uProtocol codebase as „Backend“

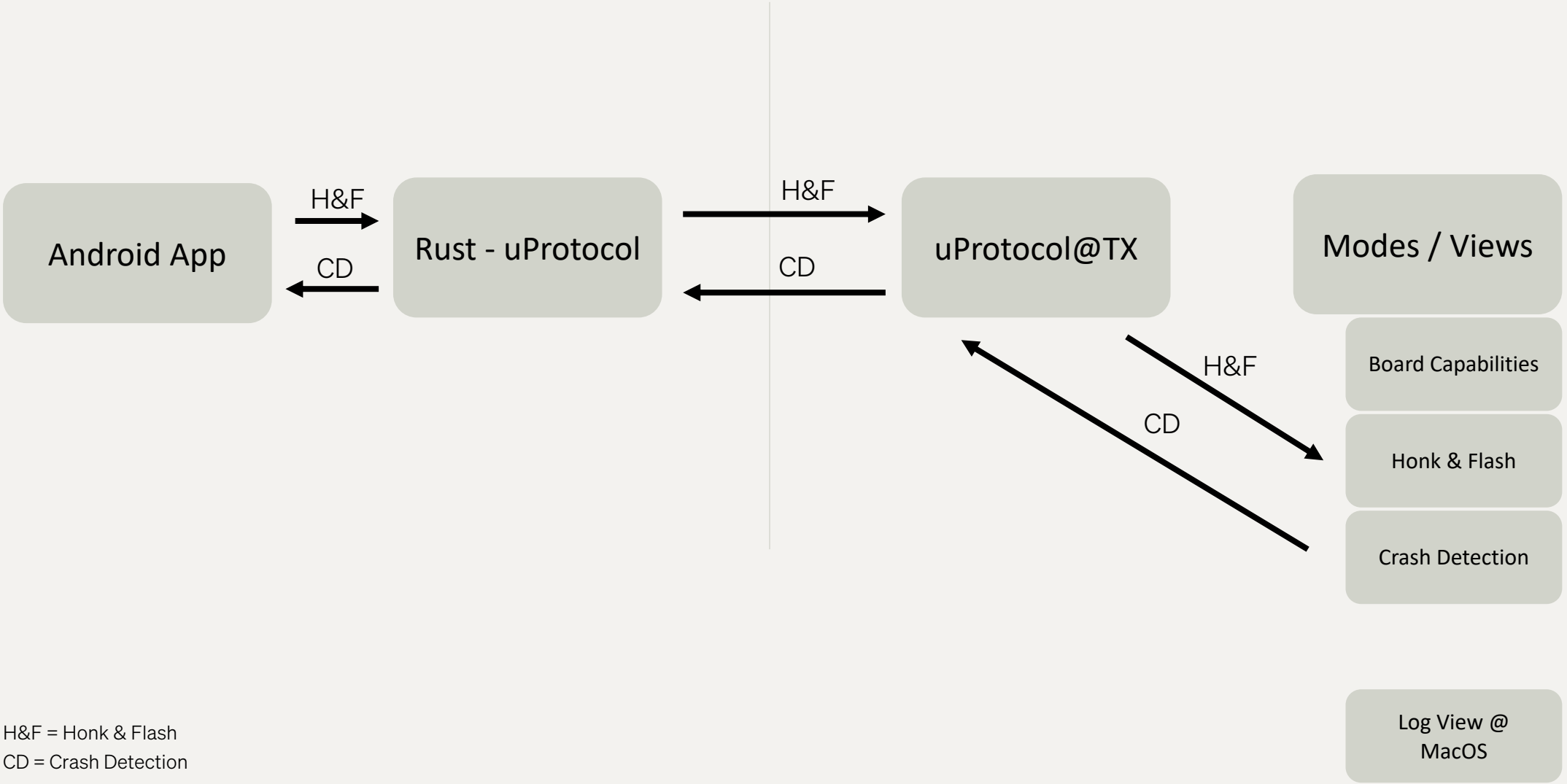
- Simulates HPC or Cloud

Android Demo App

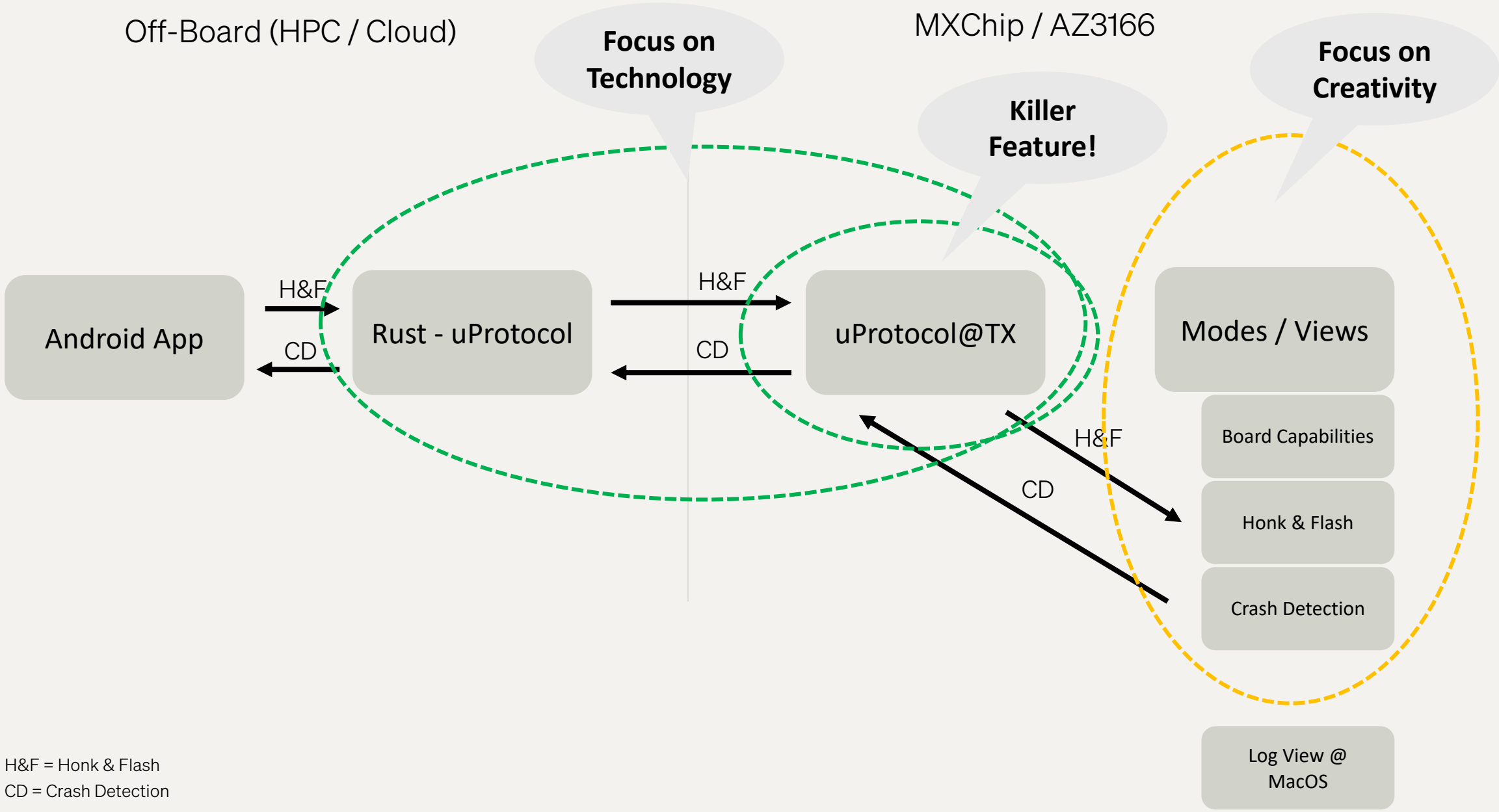
- Triggers Honk & Flash
- Receives Crash Detection event

Off-Board (HPC / Cloud)

MXChip / AZ3166

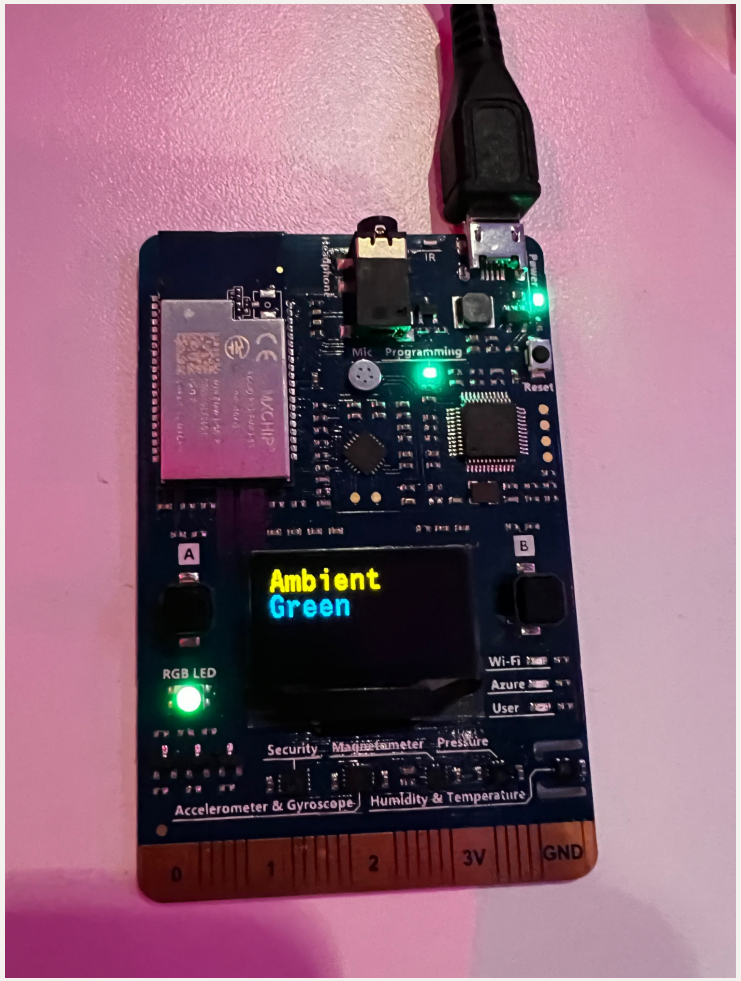


H&F = Honk & Flash
CD = Crash Detection

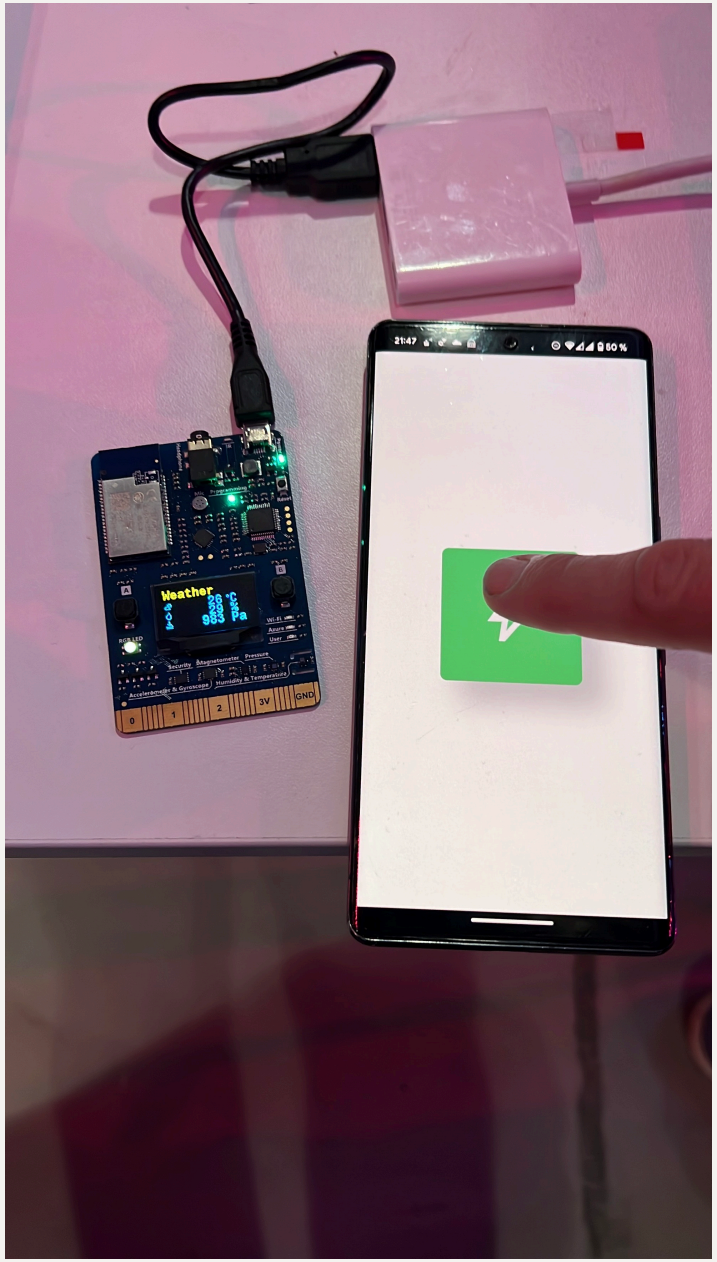


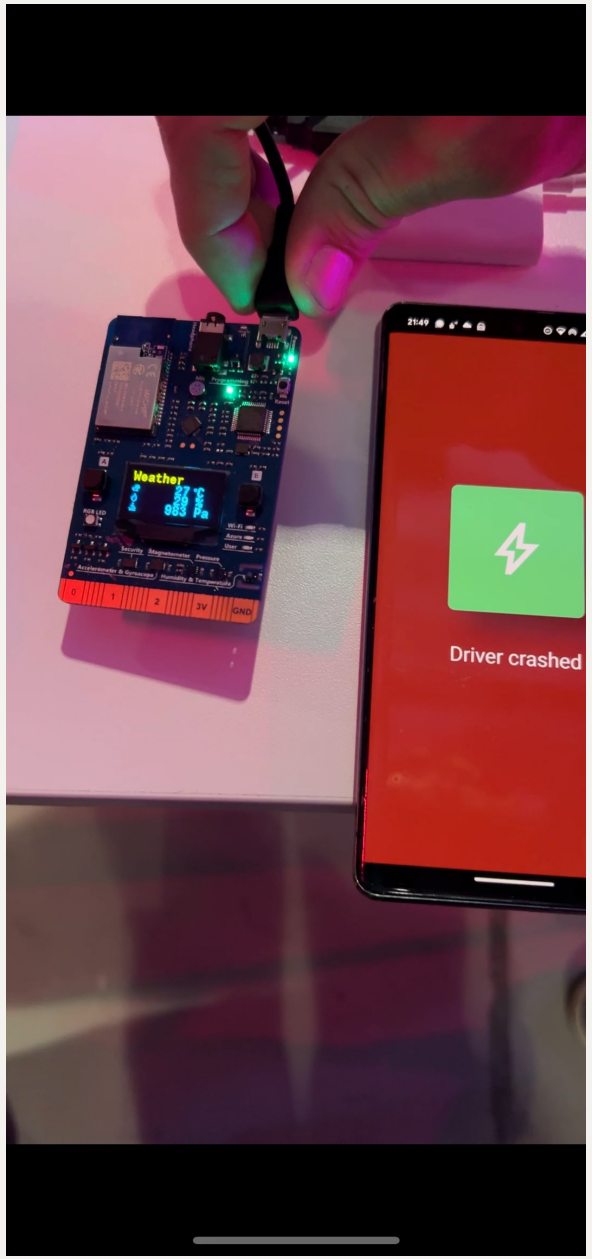
H&F = Honk & Flash
CD = Crash Detection

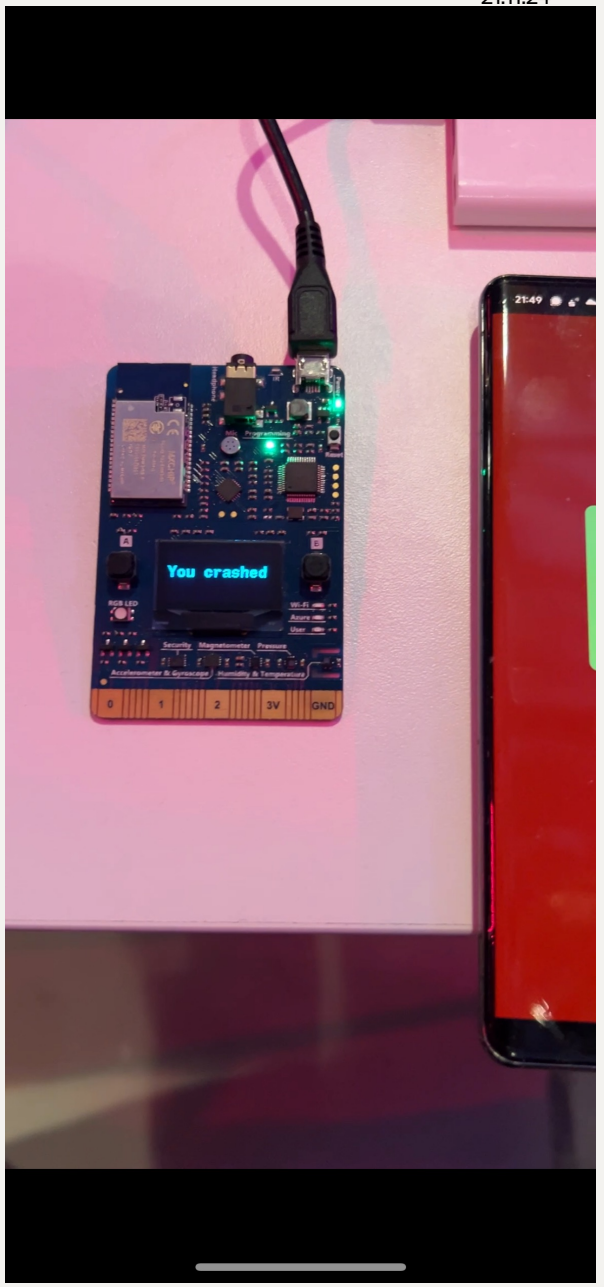

Weather
26 °C
30 %
983 Pa
RGB LED
Wi-Fi
Azure
User
Security
Magnetometer
Pressure
Accelerometer & Gyroscope
Humidity & Temperature
3V
GND


Ambient
Green
RGB LED
Wi-Fi
Azure
User
Security
Magnetometer
Pressure
Accelerometer & Gyroscope
Humidity & Temperature
3V
GND

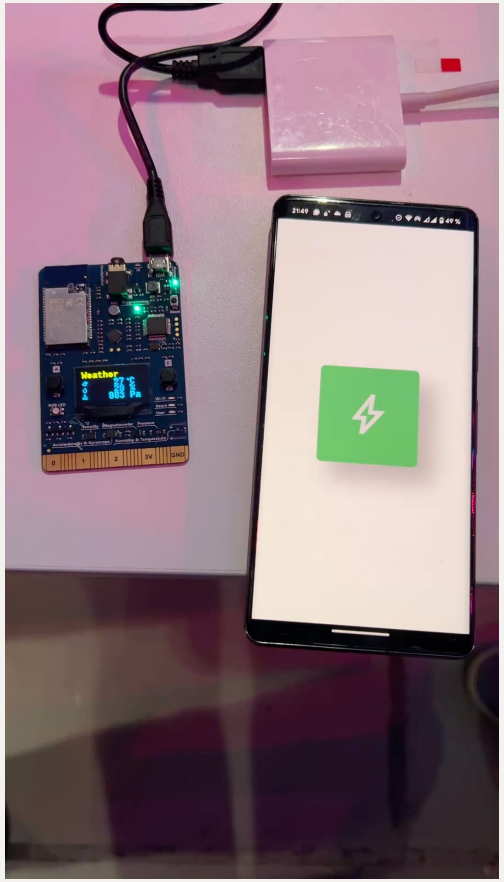

Orientation
X: 1
Y: -6
Z: 1034
RGB LED
Wi-Fi
Azure
User
Security
Magnetometer
Pressure
Accelerometer & Gyroscope
Humidity & Temperature
3V
GND

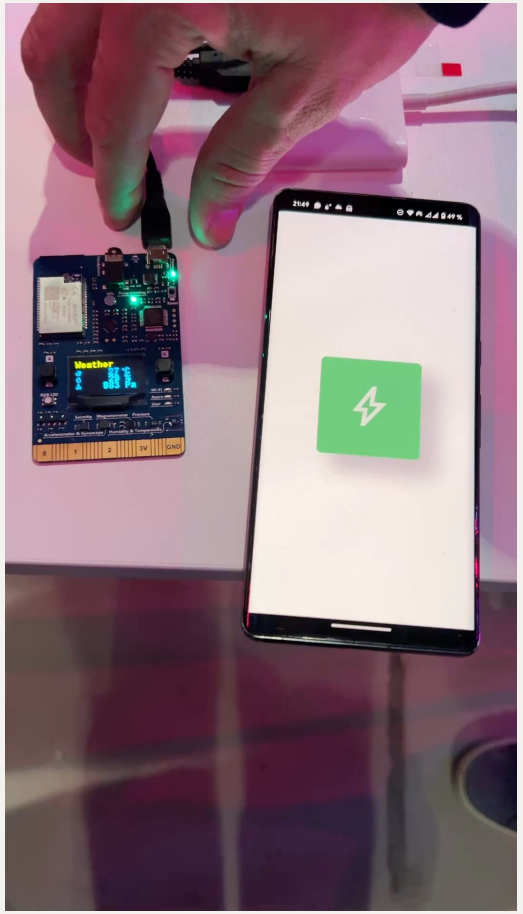

Weather


Weather
Driver crashed


You crashed


Weather
28 °C
33 %
983 Pa
RGB LED
Security
Magnetometer
Pressure
Accelerometer & Gyroscope
Humidity & Temperature
0
1
2
3V
GND





Achievement And Learnings

Achievements
- End-2-End running software (Demo!)
- MQTT – uProtocol – ThreadX@MXChip
- Good understanding of TX essentials
- Lot of fun with MXChip/AZ3166

Deliveries
- C-Code & ThreadX@MXChip Image
- Rust-Code uProtocol Application
- Simple Android Application
- Documentation

Challenges
- New technical area: Microcontroller and C
- MQTT Client/uProtocol → see documentation for more details
- Development and testing strategy – regular small increments of running software + manual tests
- Networking issues with Android Devices

Learnings
- Essential understanding how uProtocol works on ThreadX / Microcontroller
- Satisfaction with the outcome, but still way to go for production readiness and safety
- Good code foundation from Frederic – THX!

Market And Competition

Market

Technological proof of concept for an extended open source software stack

Further steps required to address market needs

Our Spirit: „Don‘t get tired convincing the market about the power of open source“

Competition

Well known closed source software stacks

Typically: vendor lock-in, license costs, limited innovation

But: well established in the market

Business Model, Plan and Funding requirements

„Business Model“

Consultancy / Professional services on open source utilization

Attract OEMs by
- Cost saving due to utilization of open source standards and components
- Shorter Time to Market
- Shorter innovation cycles

„Business Plan“

attract community:
- Contribution to existing projects
- Contribution to blueprint or new blueprint
- Demos on real hardware and vehicles

Win an OEM as first partner

Establish ThreadX and uProtocol as successful software stack

Potential funding reuirements

Developer support to proceed next steps

Marketing campaign to address OEMs

Maintenance

Potential Funding Contacts

CTOs, technical Managers / lead Architects, SDV departments

Thank you ☺

Meet us on Eclipse SDV touchpoints, linkedin...

Live Demo on our desk