
unity
Unite
Copenhagen
2019

Project MARS: What You Need to Know

Charles Migos, Global Director of Design
Andrew Maneri, Data + Content Lead, MARS
Timoni West, Director of XR, Labs


Charles Migos
Global Director of Design
unity
Unite
Copenhagen
2019

“A problem well-stated
is a problem half-solved.”

– Charles Kettering

Former Head of Research @ GM

Design isn’t about product look and feel

It is a methodology.

Every great product has a voice.

A set of principles that are reflected in information architecture, workflows, interaction patterns, and visual systems designed to communicate to an end user.

The Process

- Homework – define the problem, the users and assumptions
- Investigate the technology to understand constraints
- Lead discussion, identify and curate best ideas in service of the end user
- Synthesize the above through ideation, concepting and experimentation
- Review. Test. Iterate. Repeat.
- Execute design with thoroughness

Case Study Project MARS

First Step: Homework

We met with game development studios, app developers, AEC solutions companies, and creative agencies to profile the user and understand their goals.

Key insights

- Most developers were from app or VR development backgrounds
- Many were developing location specific content and faced unique issues
- Much of the concepting happened real-time with clients and designers
- Iteration cycles and no AR specific profiling hugely impacted productivity (See points 2&3)

Problem Statement

AR is rapidly expanding and developers are looking for tools to meet demand. Existing, purpose-built AR tools are easy, but lack depth. Unity provides this depth, but with significant added complexity.

How do we enable game, enterprise, and creative agency developers and designers to author AR experiences in the Unity Editor, in a way that feels natural and intuitive for the platform and the medium?

User Profiles

Primary Developer

A Unity developer working in gaming, enterprise, or agency spaces.
We assume they are experienced users familiar with Unity and its conventions.

Secondary Agency Creative

Technical design professionals without coding ability, who may use the toolset at various stages during project development.

MARS Design Principles

- **Create in context**

  Visualize and show the user the outcome
- **Keep it flexible**

  MARS should adapt itself to a broad range of expected AR applications
- **Make it discoverable & understandable**

  Use Unity conventions, progressively lead the user to the next step
- **Be assistive**

  Aid the user by providing instructive feedback when troubleshooting

Scenario Modelling

We used representative scenarios in every design exploration.

This enabled product, engineering and design to focus our conversations.

Examples

1. **General application layout**

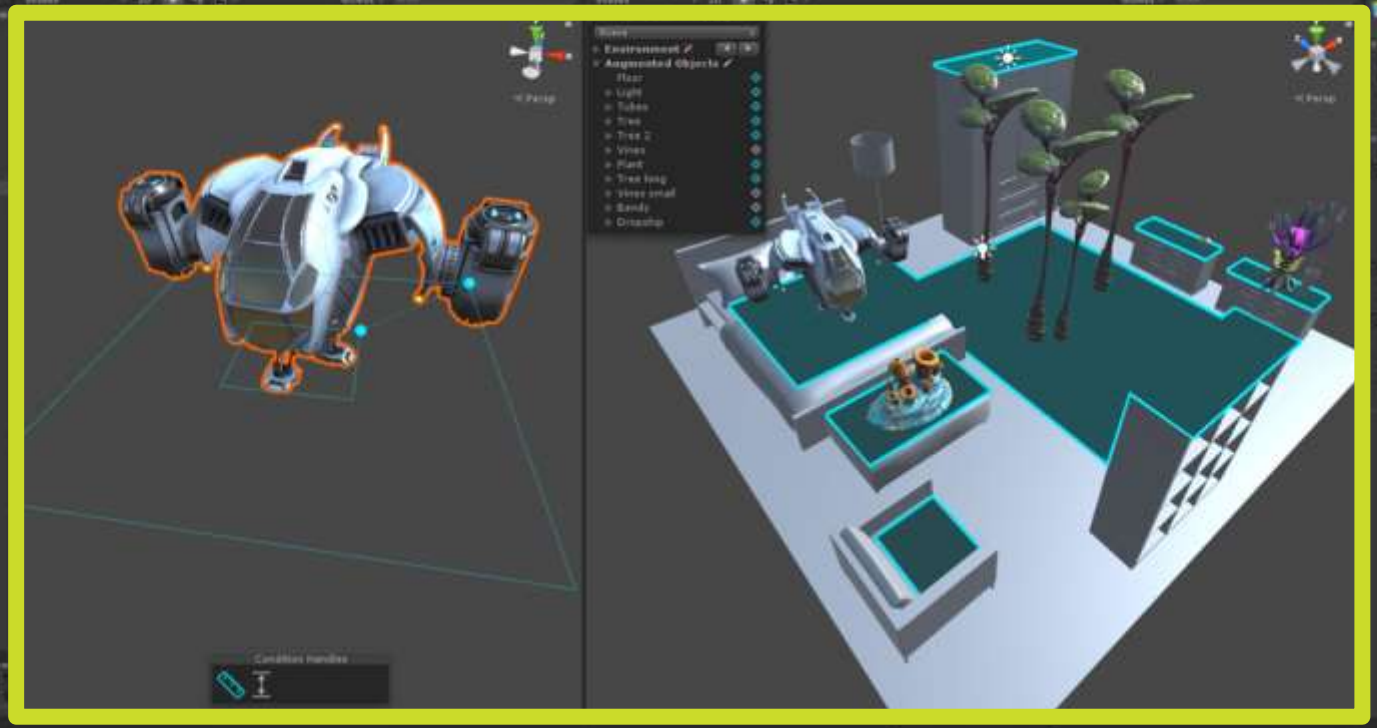
   Addressing the needs primary and secondary users

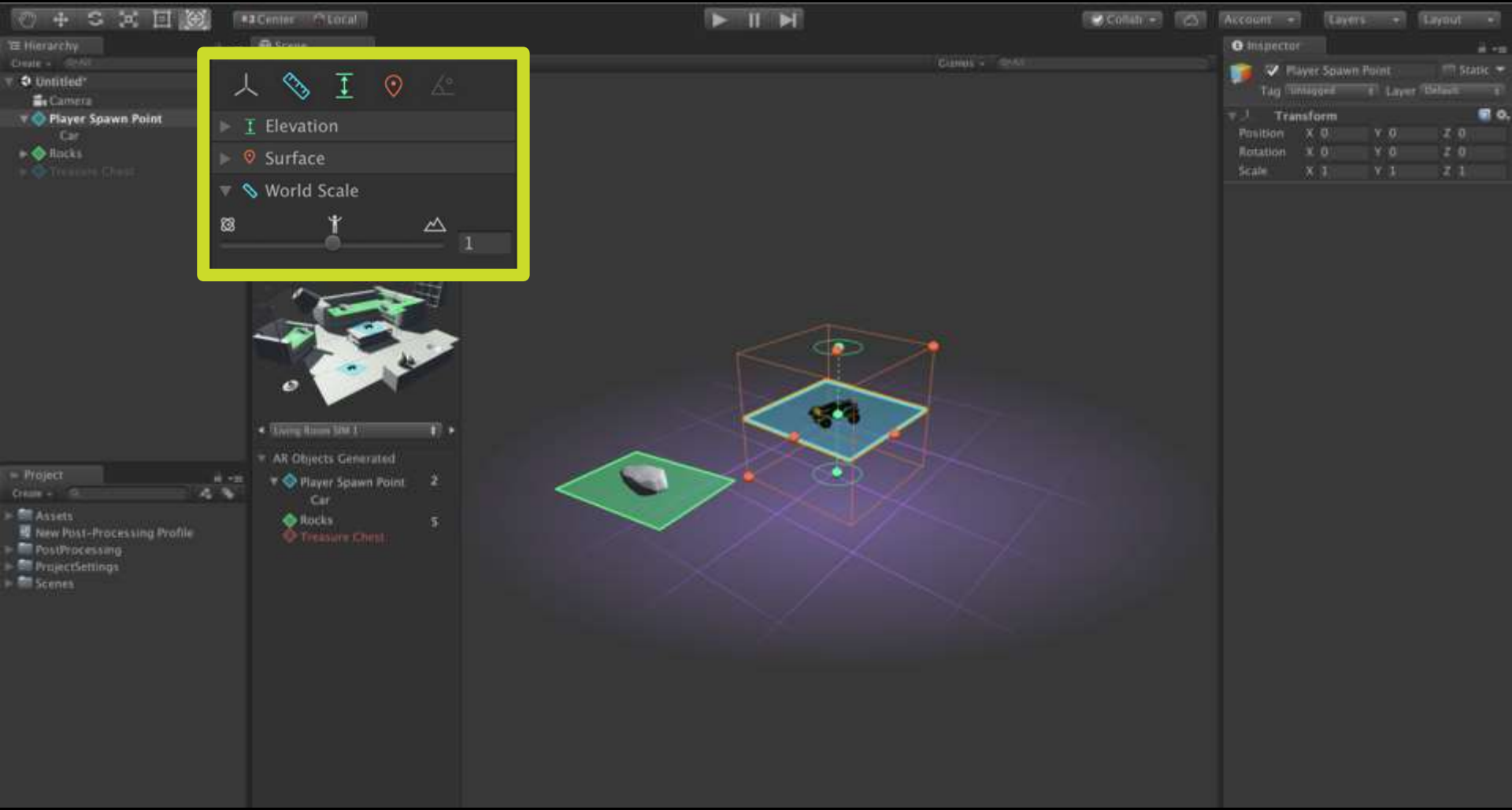
1. **Gizmos**

   Designing tools that help integrate with real-world features

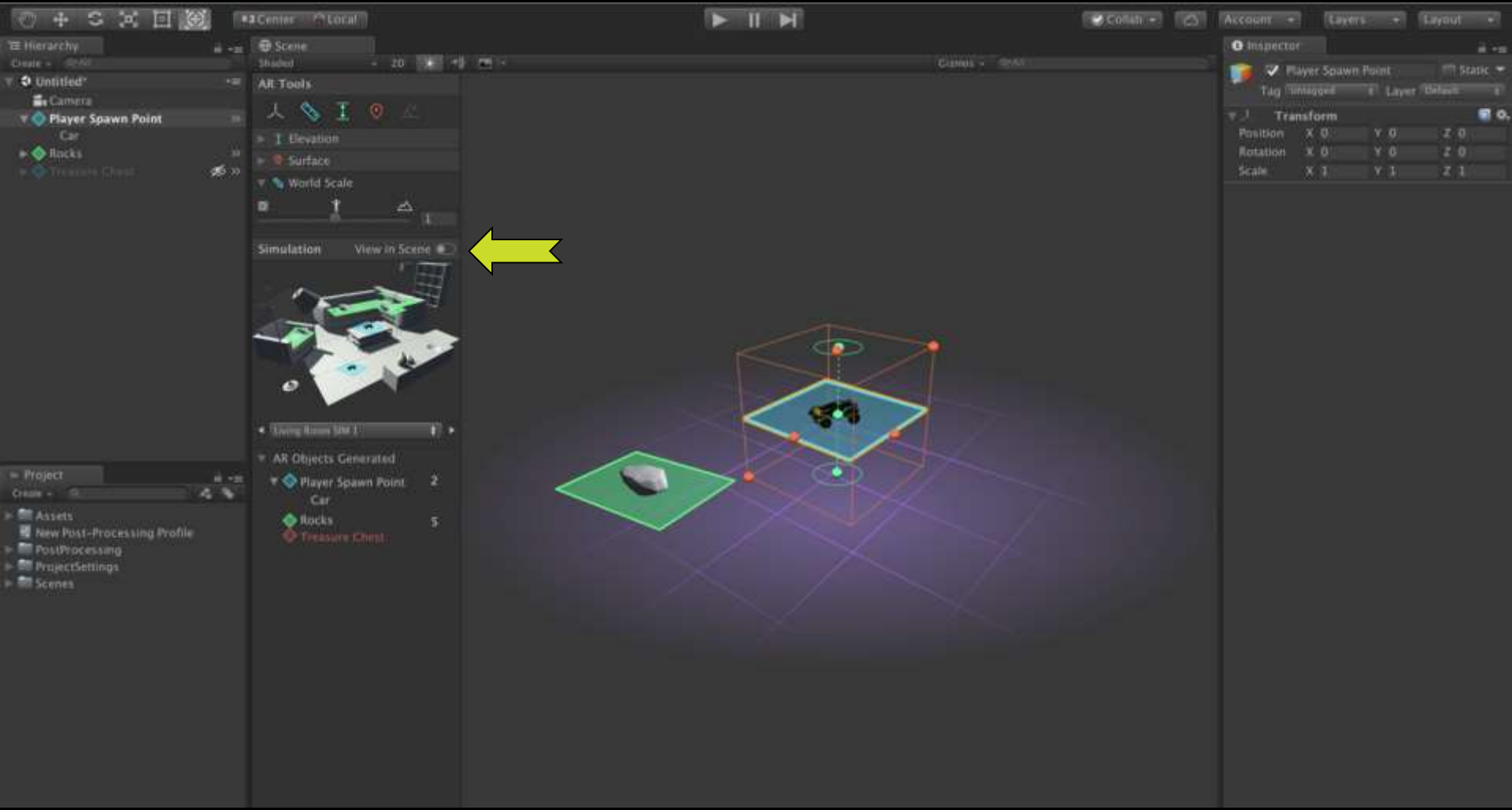
1. **MARS Companion App**

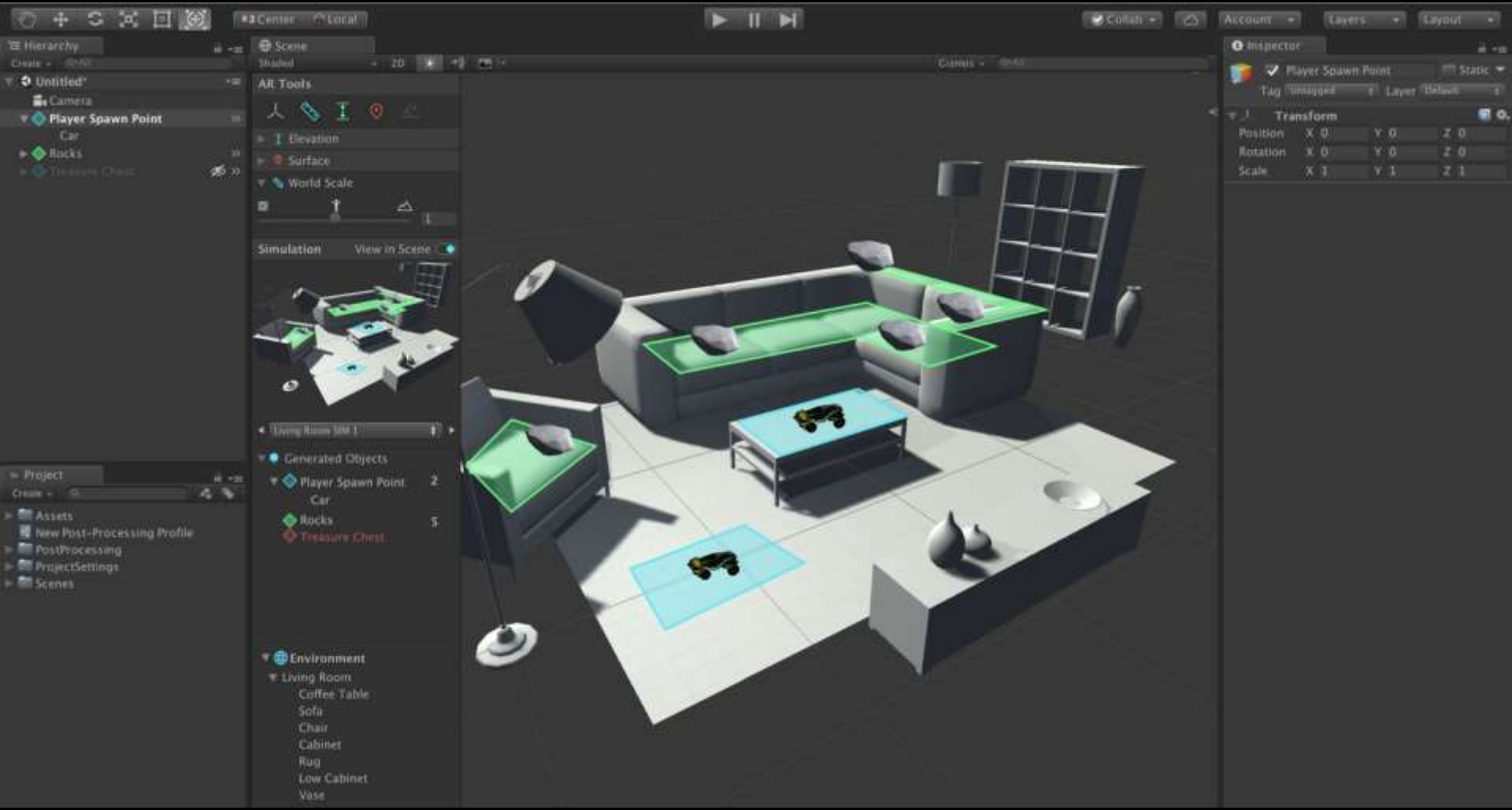
   Making it easy to acquire and import real-world data




Elevation
Surface
World Scale
1
Hierarchy
Untitled*
Camera
Player Spawn Point
Car
Rocks
Treasure Chest
Project
Assets
New Post-Processing Profile
PostProcessing
ProjectSettings
Scenes
AR Objects Generated
Player Spawn Point 2
Car
Rocks 5
Treasure Chest
Inspector
Player Spawn Point
Transform
Position
Rotation
Scale


Simulation
View in Scene
Living Room SIM 1
AR Objects Generated
Player Spawn Point 2
Car
Rocks 5
Treasure Chest

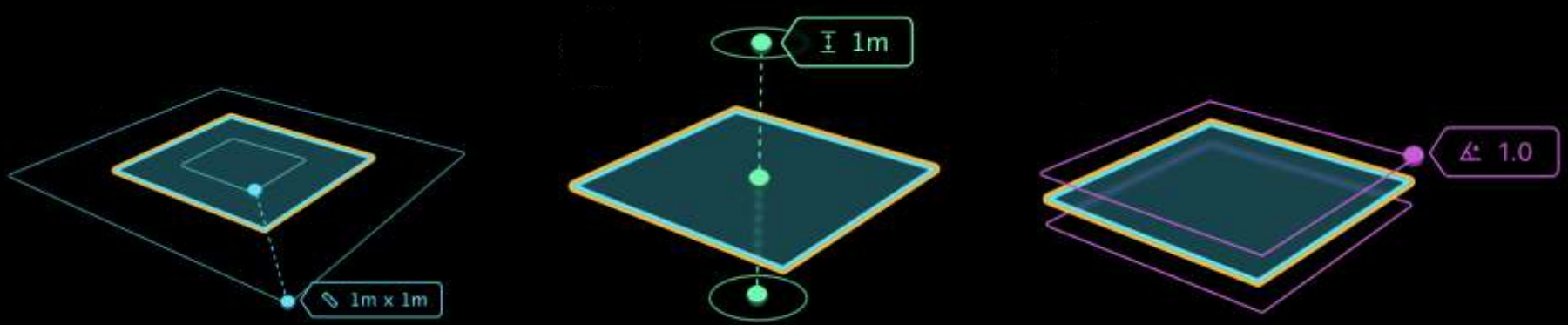

Hierarchy
Untitled*
Camera
Player Spawn Point
Car
Rocks
Treasure Chest
Project
Assets
New Post-Processing Profile
PostProcessing
ProjectSettings
Scenes
Scene
AR Tools
Elevation
Surface
World Scale
Simulation
View in Scene
Living Room SM 1
AR Objects Generated
Player Spawn Point 2
Car
Rocks 5
Treasure Chest
Inspector
Player Spawn Point
Static
Tag
Layer
Transform
Position
Rotation
Scale


Hierarchy
Untitled*
Camera
Player Spawn Point
Car
Rocks
Scene
Shaded
AR Tools
Elevation
Surface
World Scale
Simulation
View in Scene
Generated Objects
Player Spawn Point 2
Car
Rocks 5
Treasure Chest
Environment
Living Room
Coffee Table
Sofa
Chair
Cabinet
Rug
Low Cabinet
Vase
Project
Assets
New Post-Processing Profile
PostProcessing
ProjectSettings
Scenes
Inspector
Player Spawn Point
Static
Tag
Layer
Transform
Position
Rotation
Scale

Interactive Prototype

A quick study of first-time use, meant to give a sense of the overall workflow.

Queries + Conditions



Because our customers are looking to integrate into the real world, we designed the tools to reflect that purpose. Here we show a set of condition Gizmos using real world units that telegraph the condition type.

Dogfooding

Designers on the team put the tools into practice.
We built several example experiences along the way.

unity

Innovation: Companion App

We learned in research that many users are building location-specific AR experiences, and that existing workflows for these applications were very time intensive for two reasons:

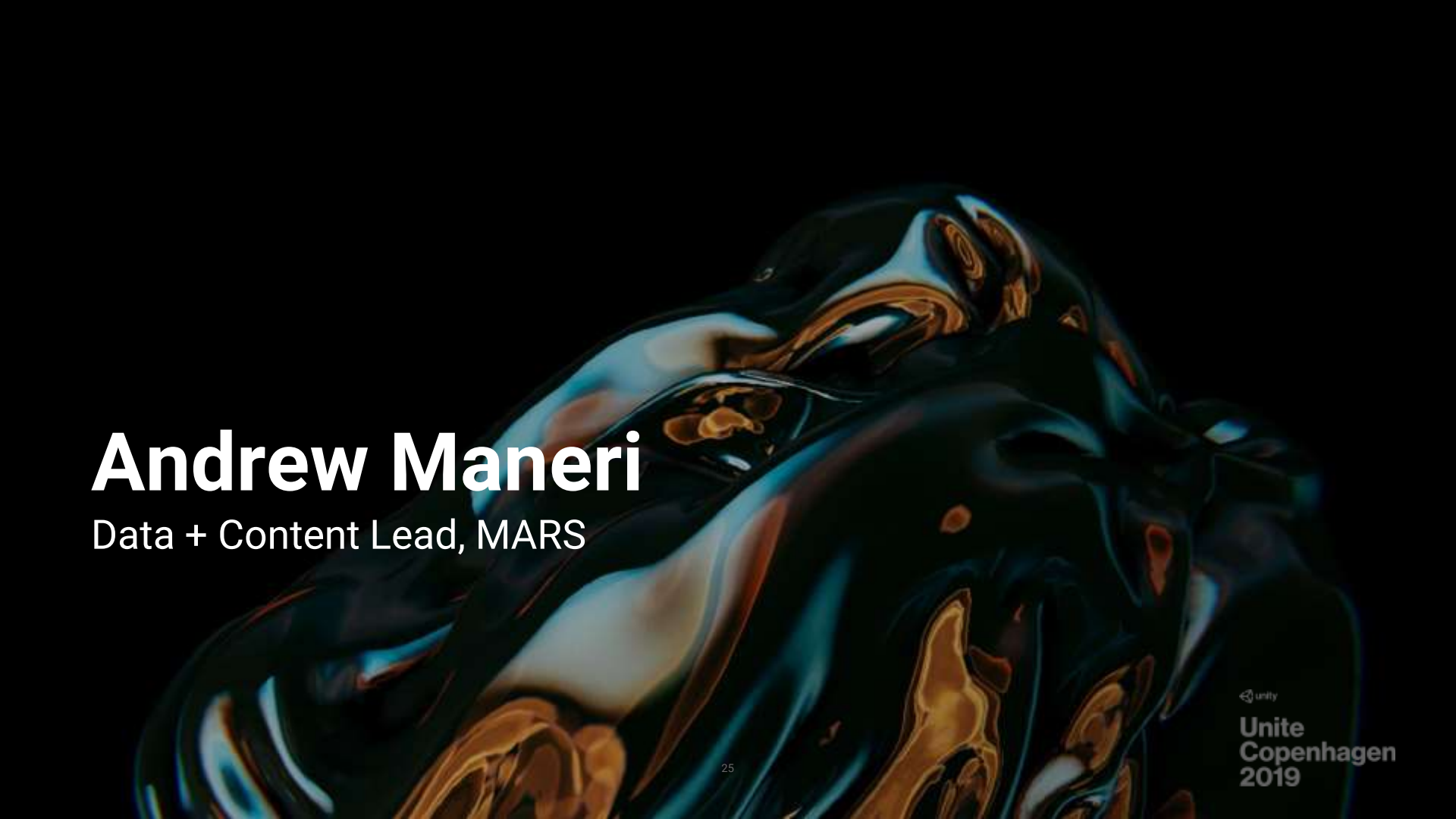
1. Getting real-world data into a Unity project is a difficult process

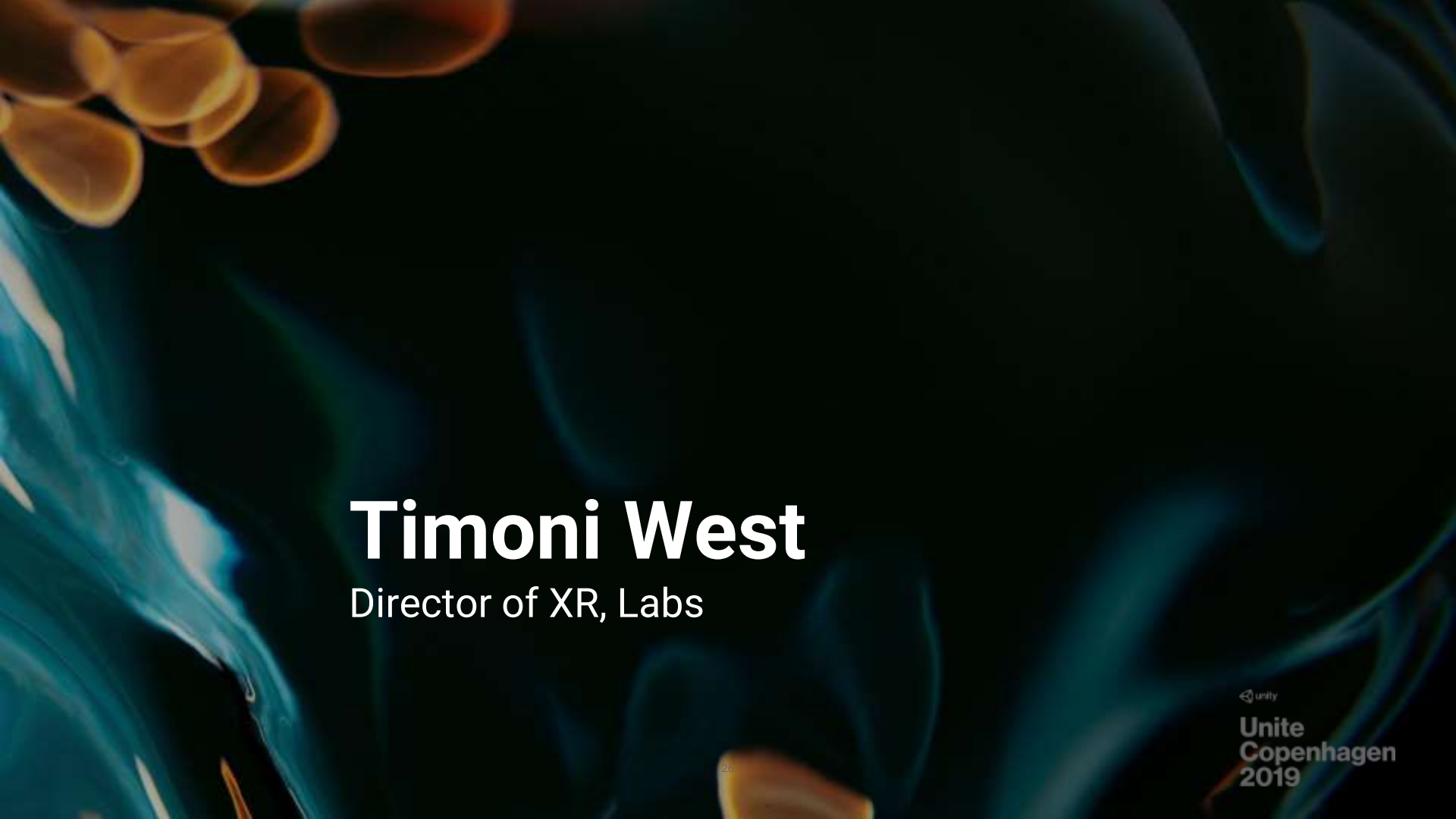
1. Iteration cycles were too long, requiring semi-complete code to test.

Concept Video

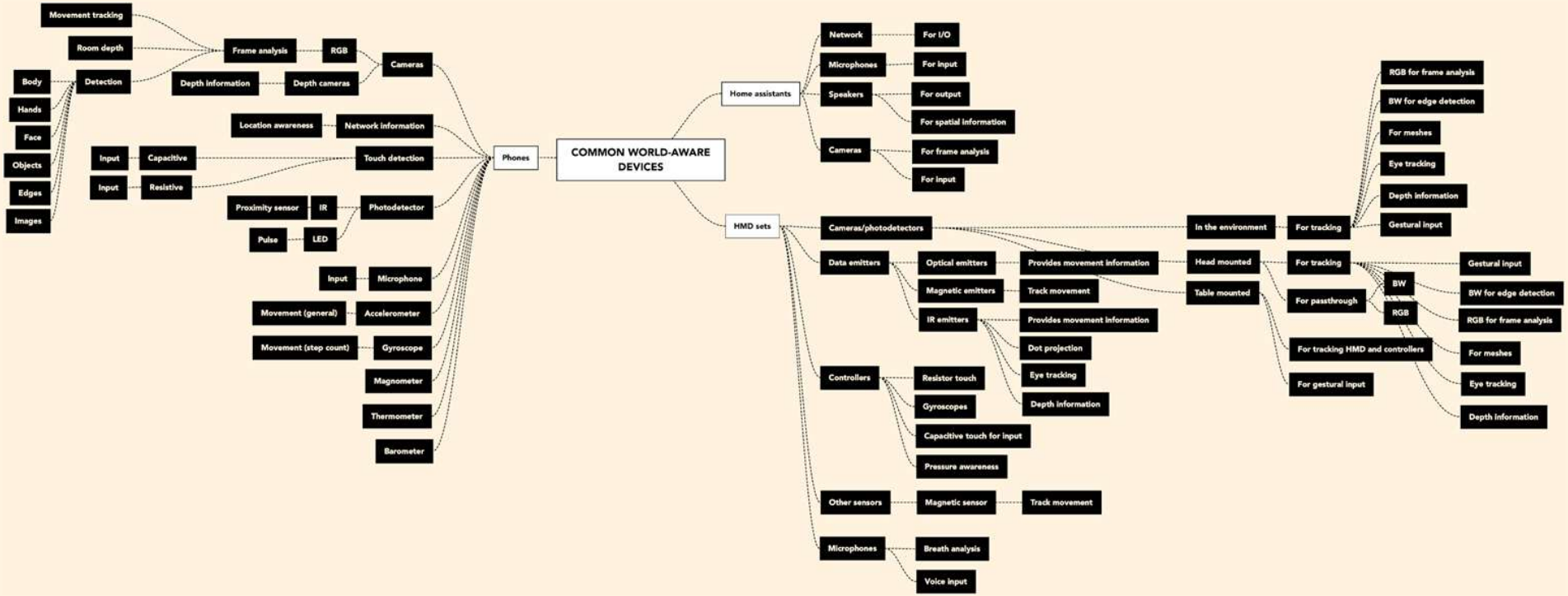
Here we show the basic concept of scanning for real-world surfaces, defining a query and conditions, and placing content from a Unity project.

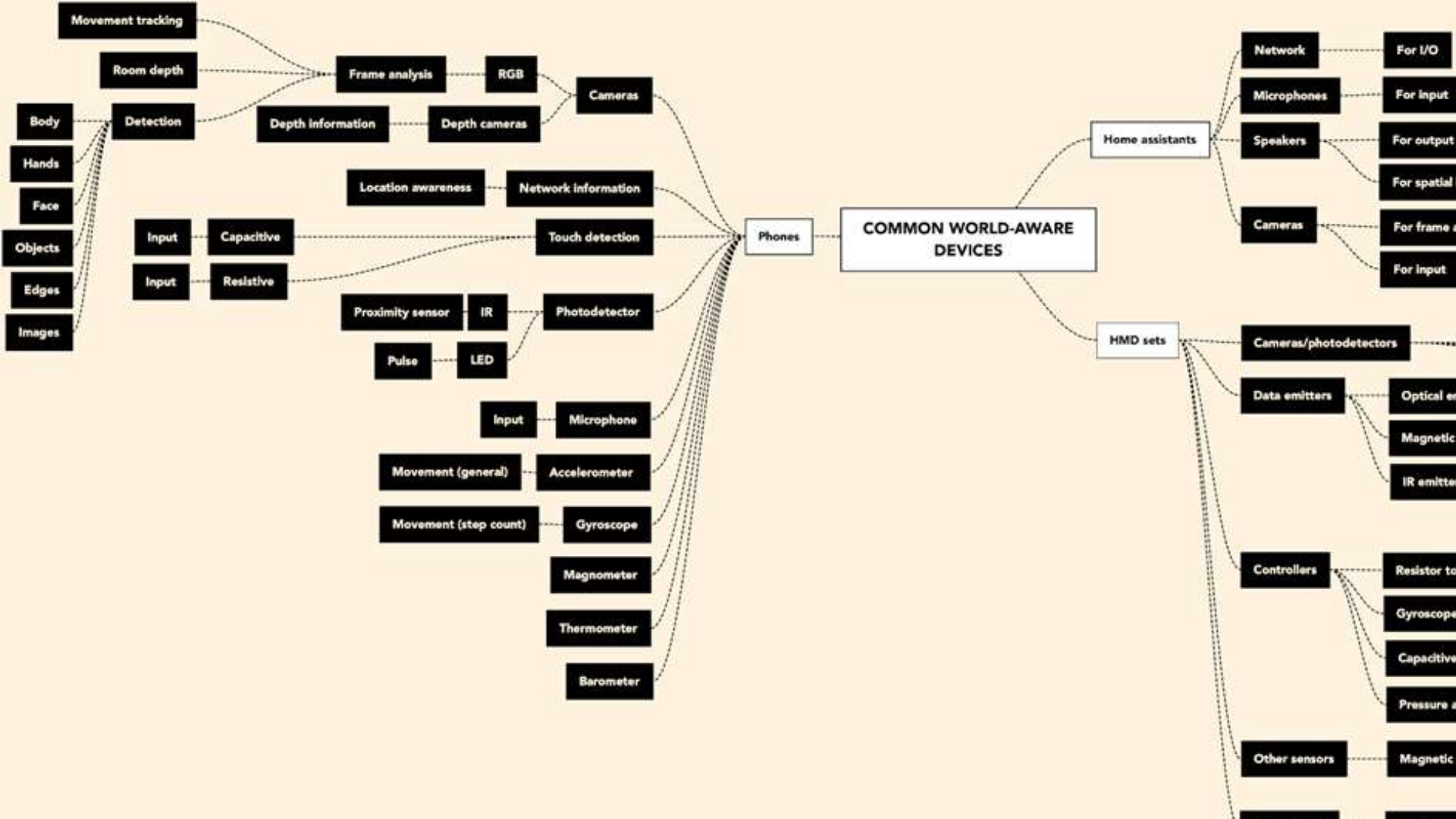
unity


Andrew Maneri
Data + Content Lead, MARS
unity
Unite
Copenhagen
2019

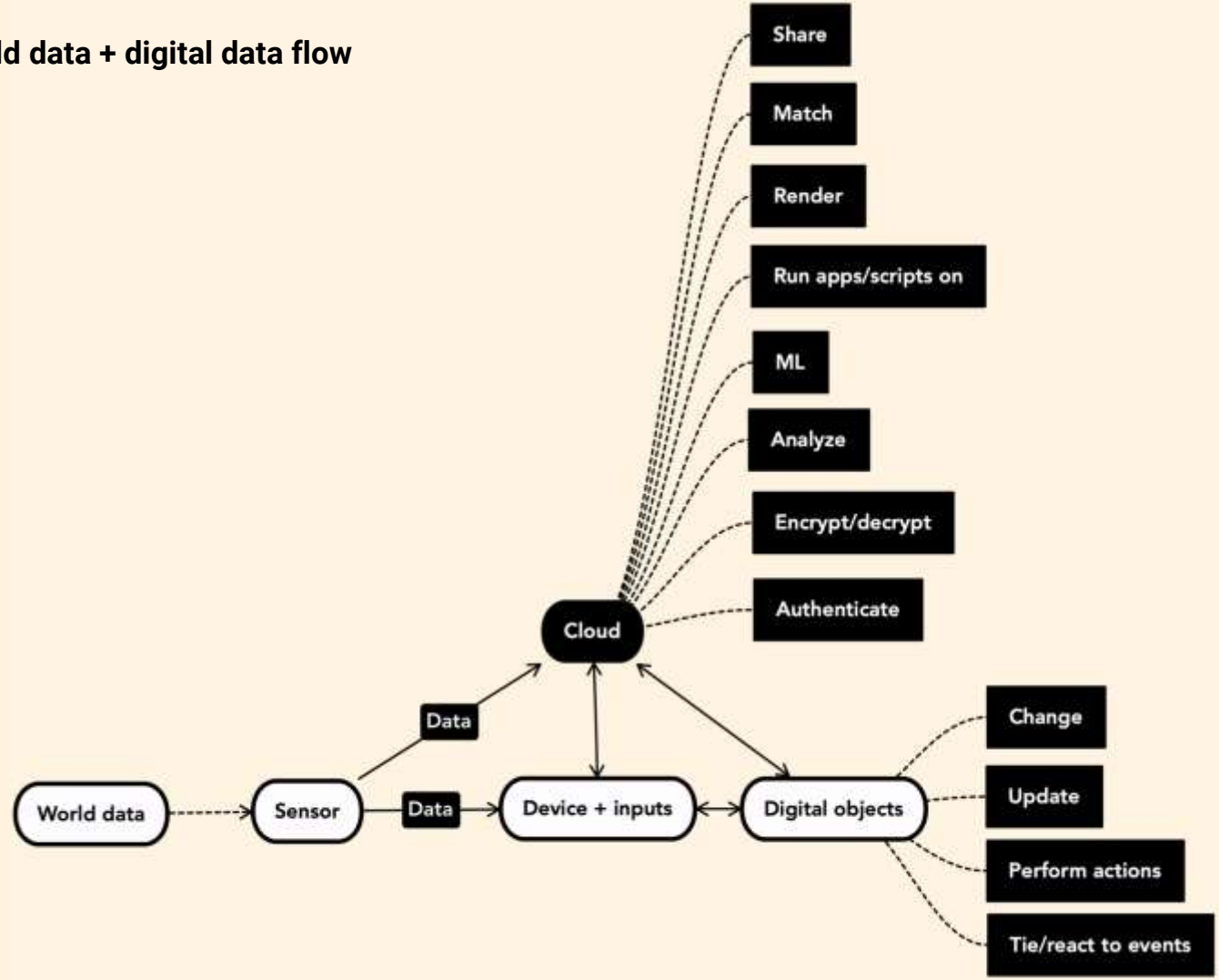

Timoni West
Director of XR, Labs
unity
Unite
Copenhagen
2019

Example sensors and data types for common devices (not comprehensive)

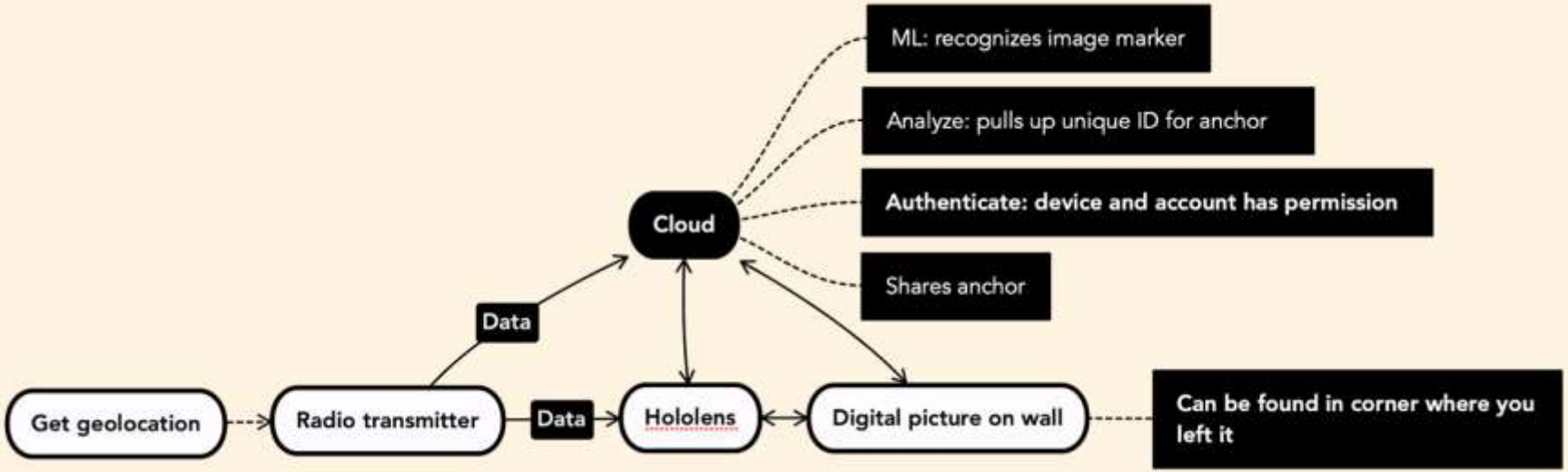



COMMON WORLD-AWARE DEVICES
Phones
Home assistants
Network
For I/O
Microphones
For input
Speakers
For output
For spatial
Cameras
For frame
For input
HMD sets
Cameras/photodetectors
Data emitters
Optical e
Magnetic
IR emitte
Controllers
Resistor to
Gyroscope
Capacitive
Pressure
Other sensors
Magnetic
Movement tracking
Room depth
Frame analysis
RGB
Cameras
Body
Detection
Depth information
Depth cameras
Hands
Face
Objects
Edges
Images
Location awareness
Network information
Input
Capacitive
Touch detection
Input
Resistive
Proximity sensor
IR
Photodetector
Pulse
LED
Input
Microphone
Movement (general)
Accelerometer
Movement (step count)
Gyroscope
Magnometer
Thermometer
Barometer

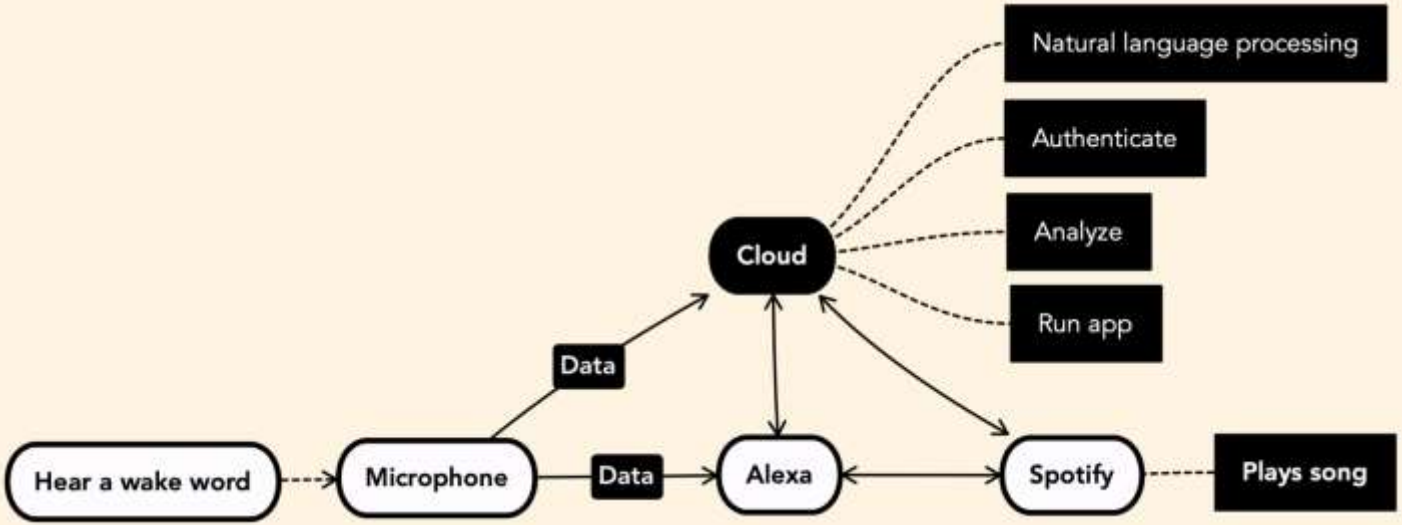
Basic world data + digital data flow



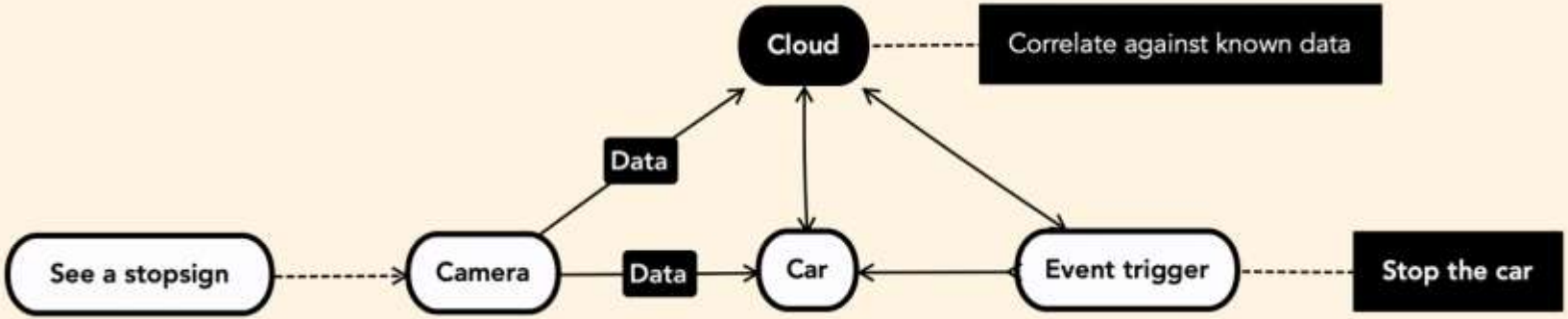
Flow applied to geolocation



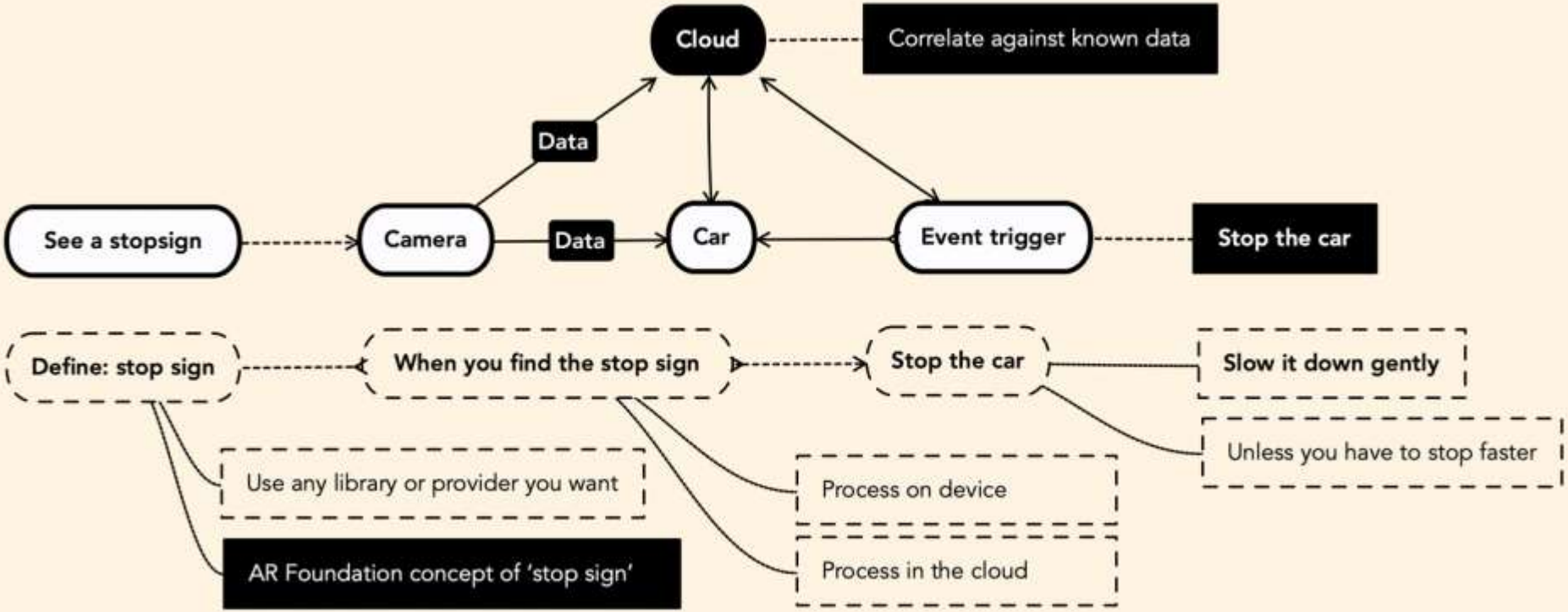
Flow applied to smart speaker + networked NLP



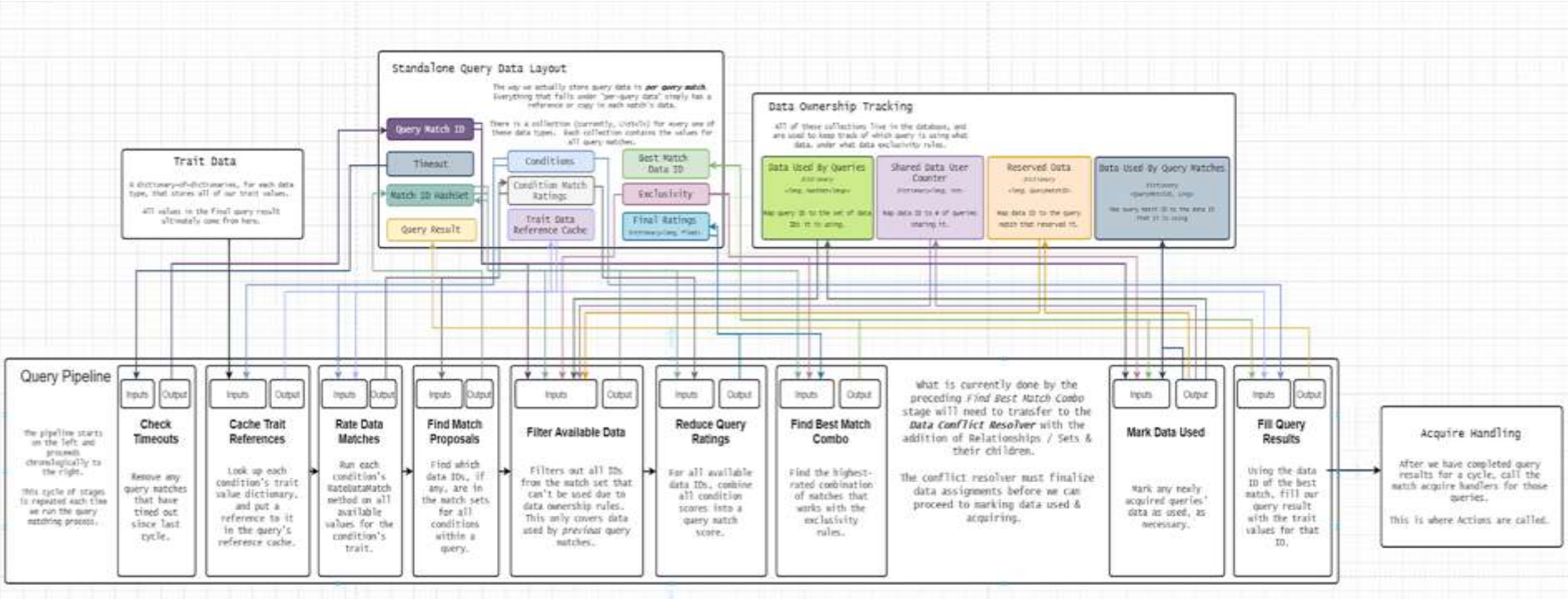
Flow applied to a self-driving car scenario



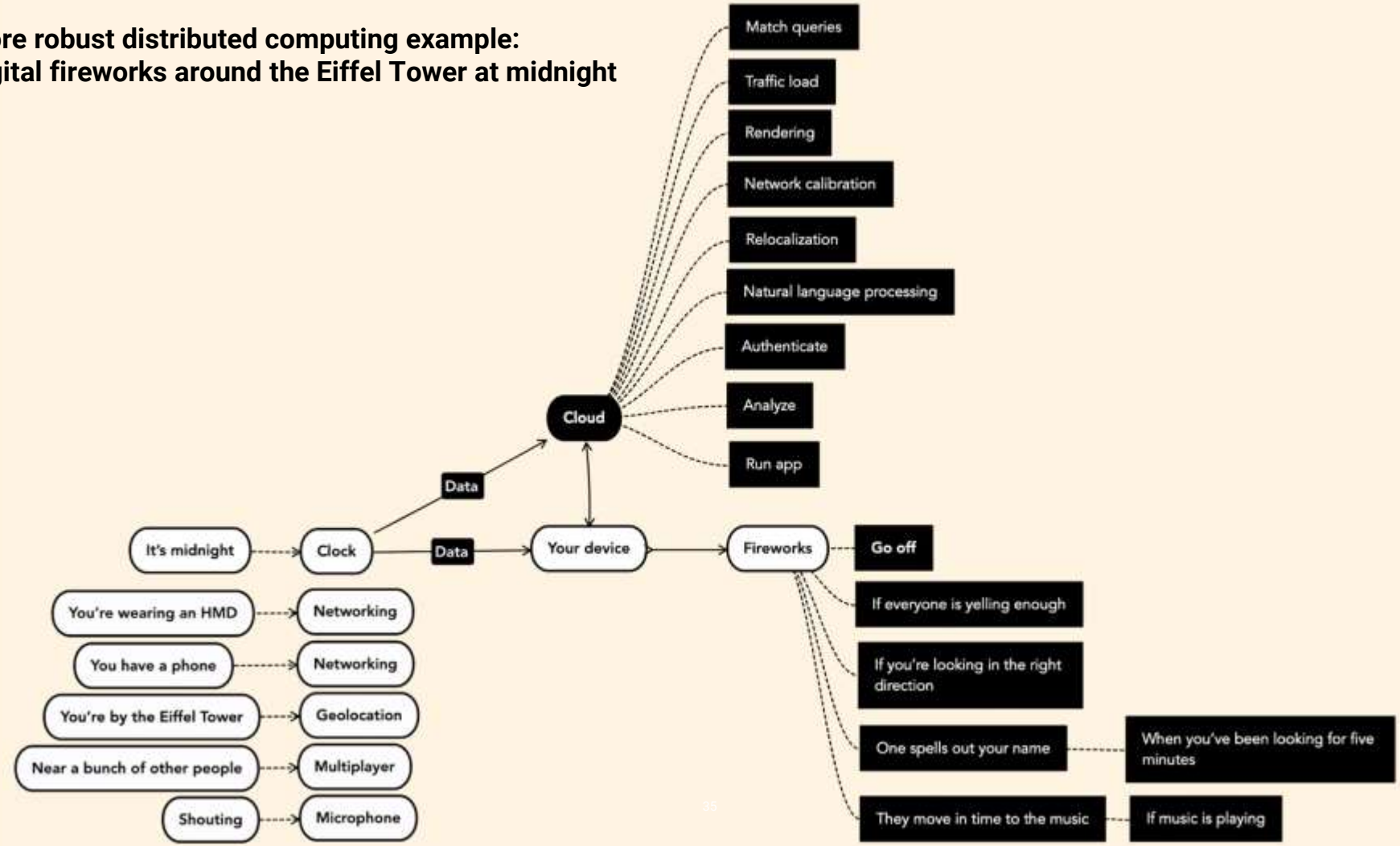
Where MARS fits in



“When you find the stop sign” is a MARS query. Here’s the pipeline.



More robust distributed computing example:
Digital fireworks around the Eiffel Tower at midnight




Project MARS:
What You Need to Know
https://unity.com/unity/features/mars
labs@unity3d.com
unity
Unite
Copenhagen
2019