Rapid UI Prototyping

JOHAN THELIN // NOV 11 2015 – CHALMERS, GOTHENBURG

PELAGICORE
Experience Change

Pelagicore At a Glance

- Founded in 2009
- We provide products and services for Open Source Infotainment
- Our customers are car makers and their suppliers
- We are passionate about
  - Open Source Infotainment Software & GENIVI
  - User Experience development using Qt & HTML
  - Connecting mobile experiences to the car
  - Vehicle integration and networking
  - Supporting great hardware
- Owned by employees and Fouriertransform
- Offices in Gothenburg, Sweden and Munich, Germany
- Approximately 45 employees and growing

Stunning User Experiences

bridging the gap between designers and developers

- Software Architecture designed for UX performance

- Best Qt expertise in the automotive industry

- Agile processes and tools enabling your designers to work close to the developers

- Strong engagement with Silicon Vendors ensuring maximum performance

- Delivery experience from expert assignments to full software stack delivery to production projects

Experience CHANGE

How we work – faster, cheaper, smarter

- We leverage **Open Source Software** the way it was intended
- We focus competence that represents a vertical slice through an Infotainment system – **from pixel to silicon**
- We deliver through **agile** processes – enabling engineering excellence
- We will not lock you in, our business model is **transparent**
- We work with a large **eco-systems** of partners to enable the best user experience for the end-customer

In-Vehicle Infotainment

© Mercedes-Benz

Legal Challenges

- There is a difference between building a screen into a car and bringing a screen into the car

- Safety requirements
- Driver disruptions
- Driver workload management

- Driven by liability and legal requirements

Automotive Challenges

- Sudden loss of power
- Boot time requirements
- Aborted shutdown requirements
- FLASH wear
- Latency requirements
- Expected life of product

- Length of projects
- Size of projects
- Complex supplier relationships
- Purchasing processes
- …

Open Source Stacks

- There are two major open source efforts in the IVI space
  - GENIVI
  - AGL (Automotive Grade Linux)

- GENIVI defines a standard automotive platform
  - Identifying existing components
  - Developing components to fill the gaps

- Both project build demonstrator platforms

The PELUX Stack
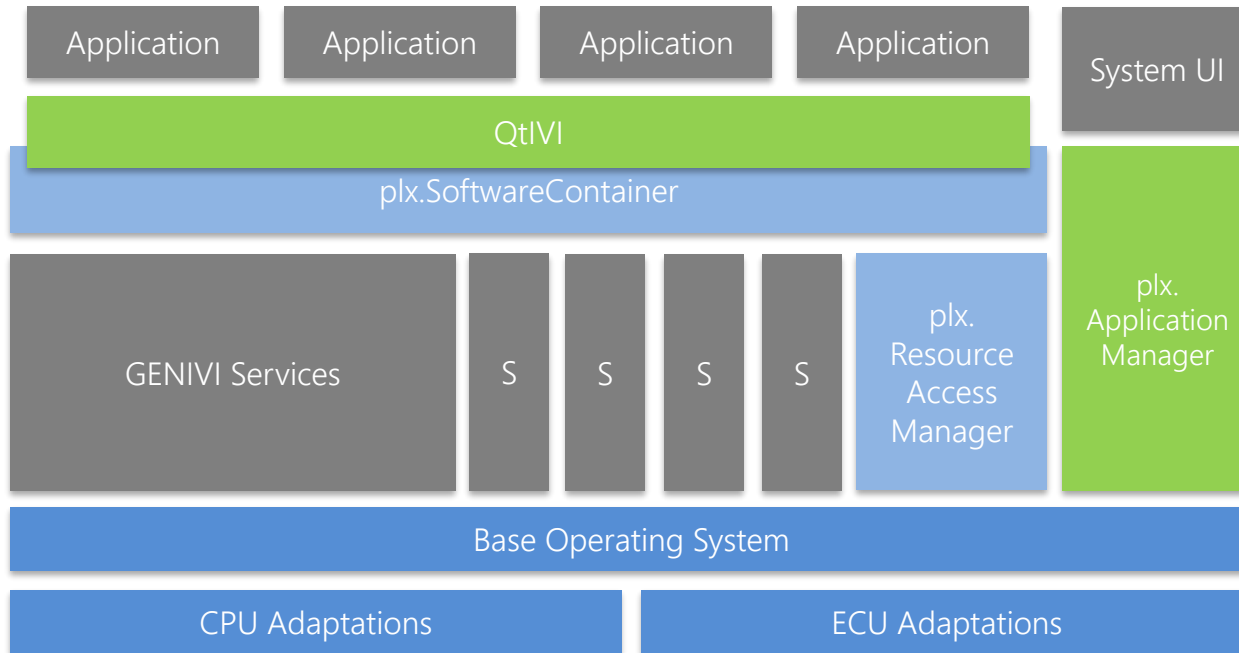
Apps in Cars

- Remember MirrorLink?

- Who owns the data?

- Native applications
  - We see a large demand for this
  - Possible to add functions during the vehicle life-time
  - Matches the customer expectations

- Side effects
  - Partitioning the UI in exchangeable parts
  - Smaller updates

plx.ApplicationManager
Qt Compositing using Wayland

- Modern, multi-process architecture
- Application Lifecycle Management
- Security model to protect integrity
- Hardware accelerated compositing using Wayland
- OpenGL and HTML applications can be seamlessly composited

- Elevates Qt from being a UI and application framework to being a fully-fledged automotive UI software platform

Assembled views

Notification infrastructure

Input Management
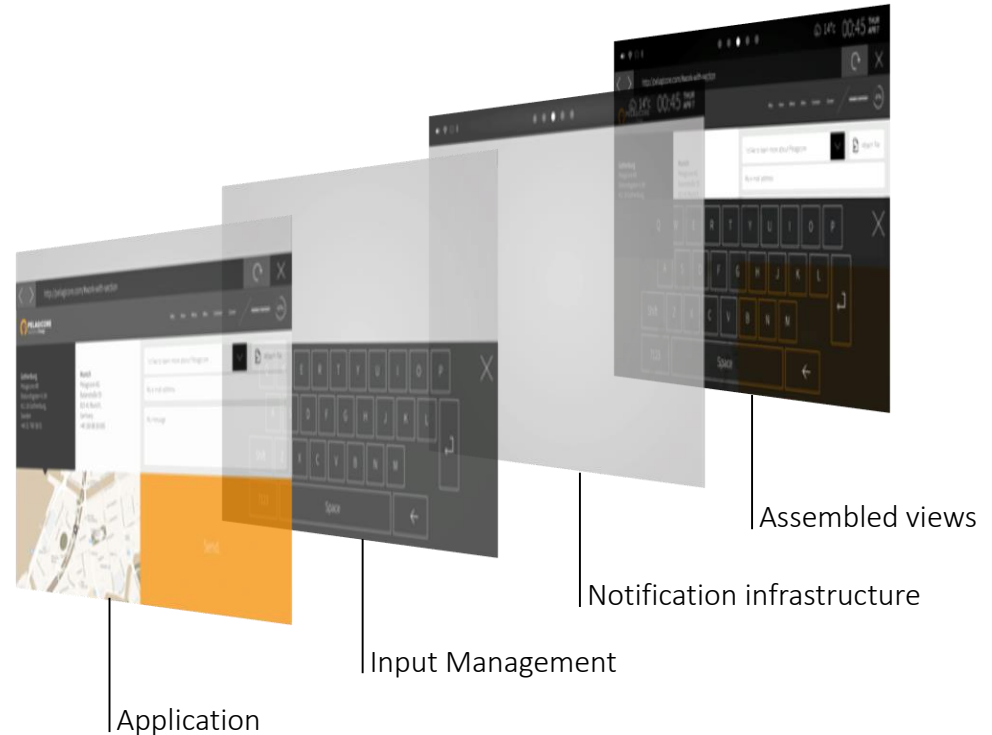
Application

Application SDK
Software development kit

- Qt Creator based – supports Windows/OSX/Linux

- Integrated with your System UI and UI Components

- QmlLive – enables quick round-trip to target hardware

- QtEmulator – enables evaluation on desktop against simulated service APIs

- Reference UI – provides a starting point
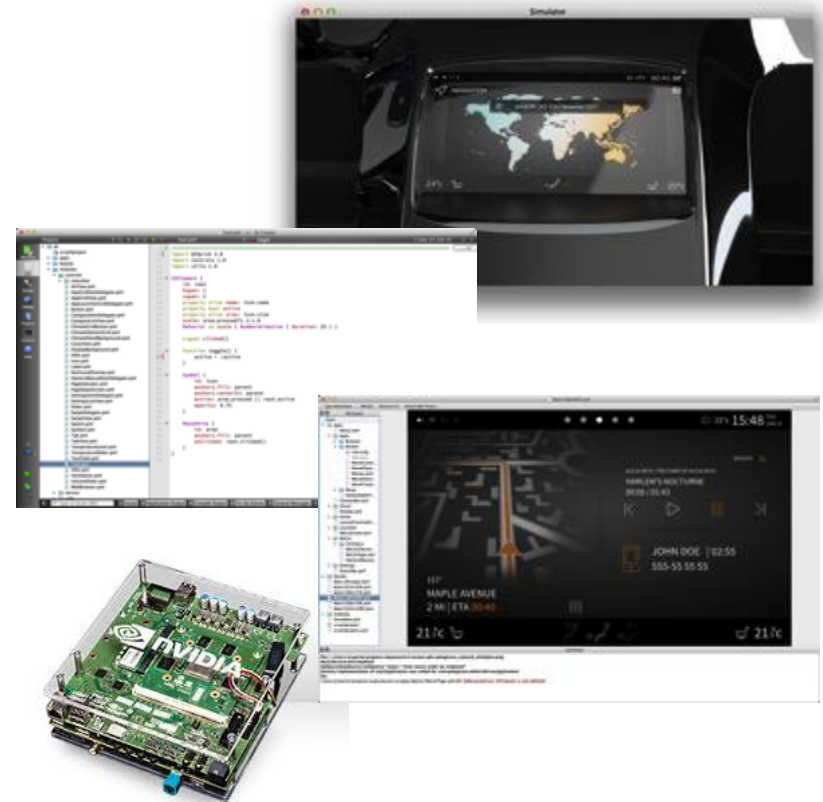
QmlLive

- Live reloader – simply save an see the changes
- Client / server – run it on your target
- Open source – grab it and improve it!

https://github.com/Pelagicore/qmllive

- Enables rapid UI prototyping
- Quickest turn around times around!

Prototyping

Prototyping

- Allow users to evaluate design proposals
- Feedback based on try-out
  - in contrast to read a descriptions

Evolutionary Prototyping

- Build a structured prototype
- Constantly refine it
- Can become the product

…evolutionary prototyping acknowledges that we do not understand all the requirements and builds only those that are well understood.

Elements of User Experience

Surface
- Images, Text
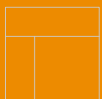
Skeleton
- Placement of Buttons, Tabs, Photos, …

Structure
- Navigation and Data Hierarchy

Scope
- Features and Functions

Strategy
- Business Benefits

Source: THE ELEMENTS OF USER EXPERIENCE, Jesse James Garrett

UI Development

Wireframes	Graphics	Motion	Prototype
Structure Skeleton	Surface	Surface	Tool
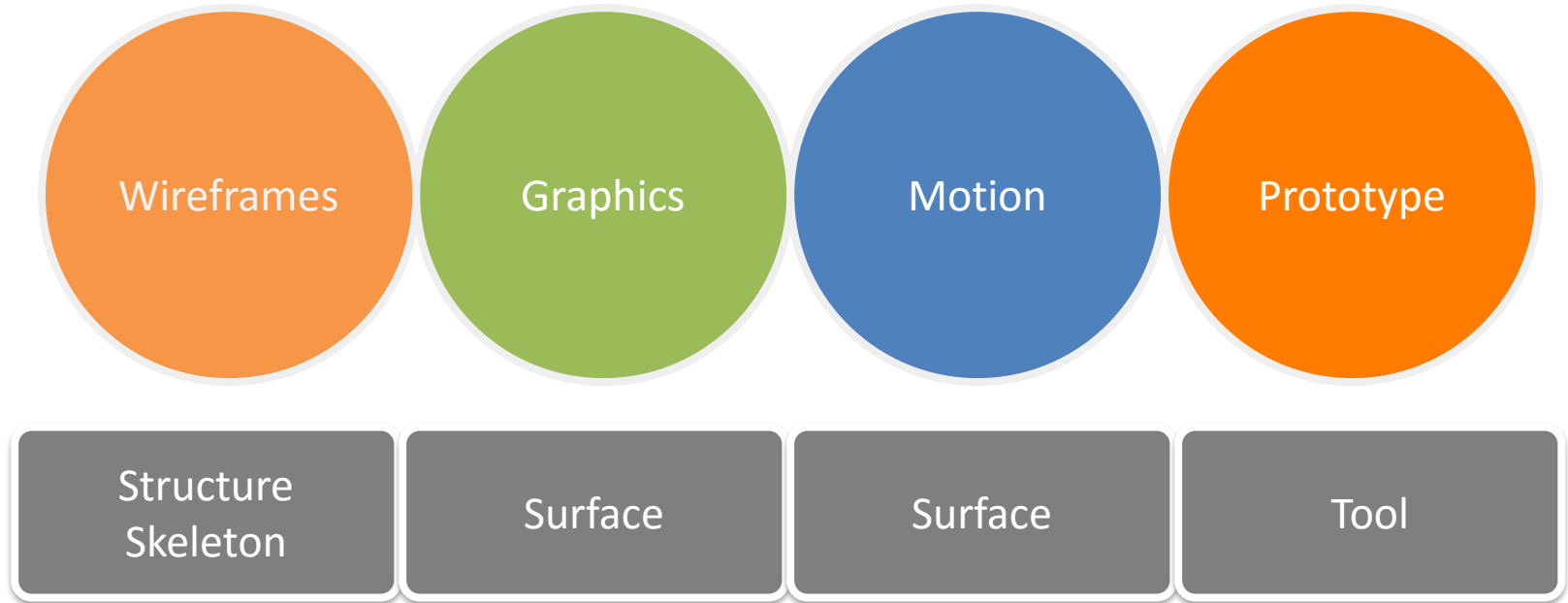
HMI Stack
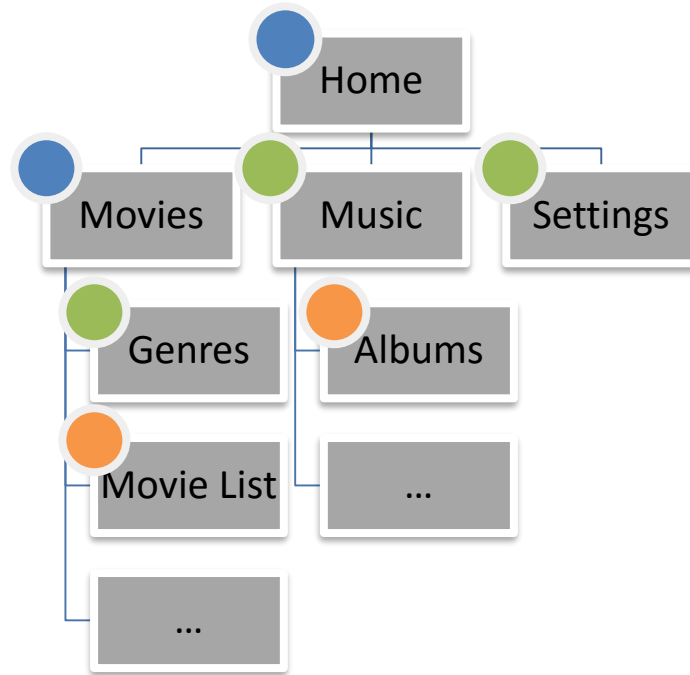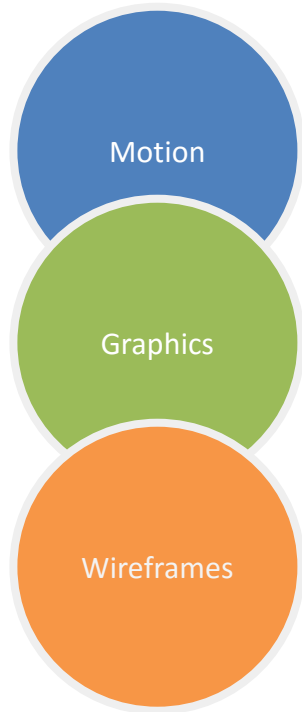
Evolutionary Prototype
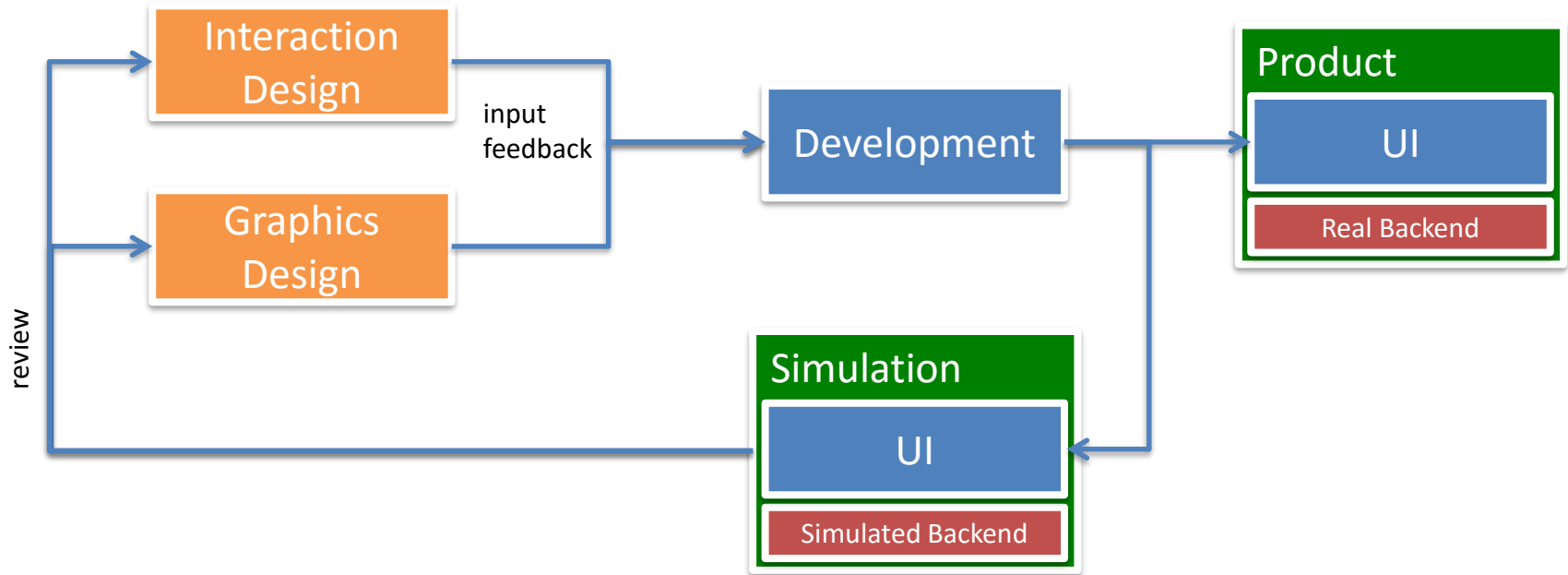
Prototyping with QML

Information Flow
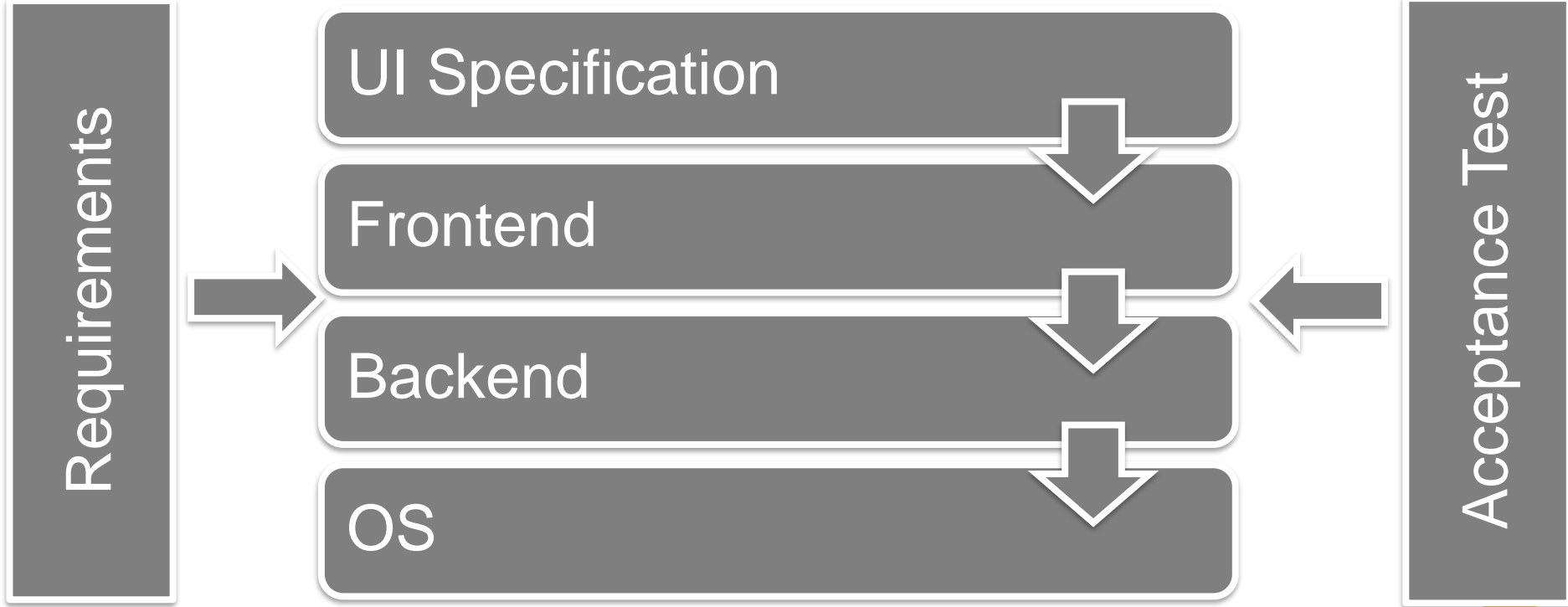
Typical QML Based System
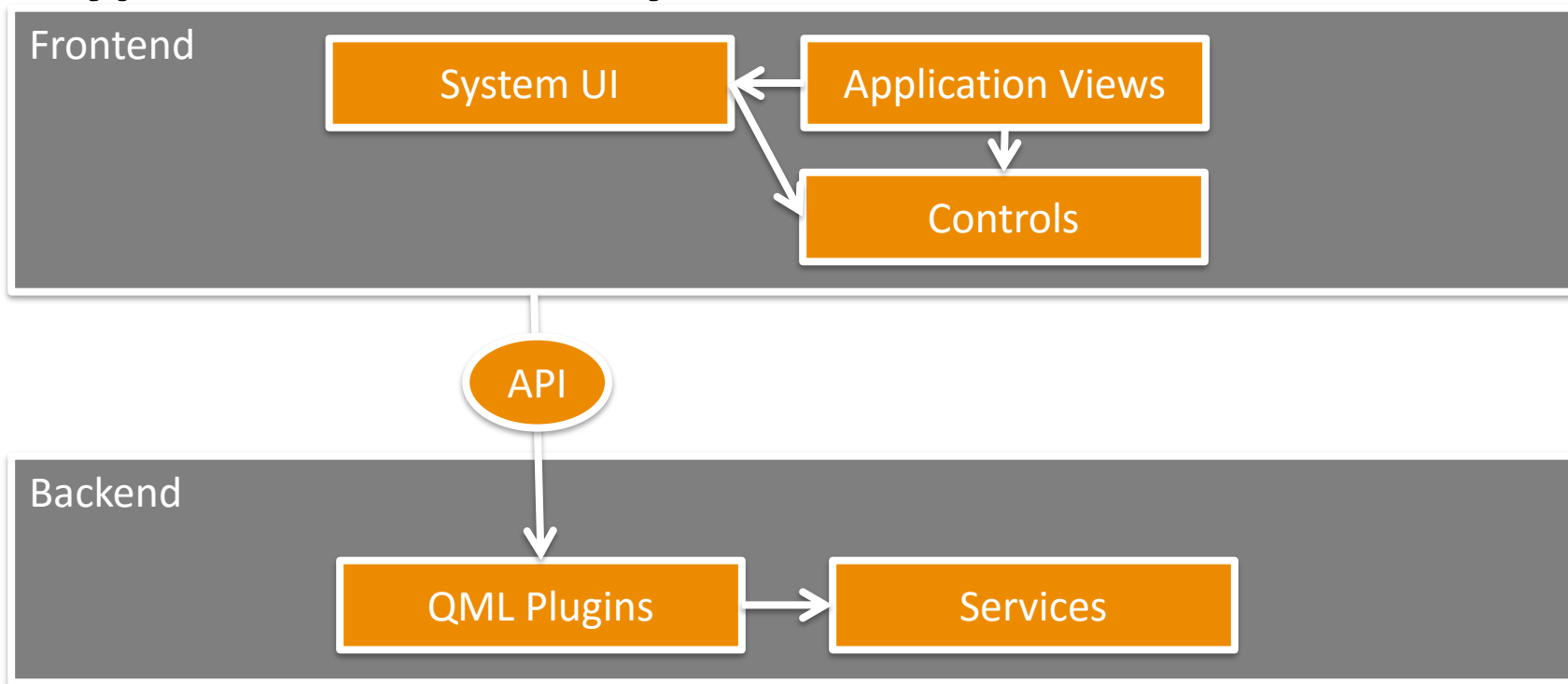
Prototyping Environment
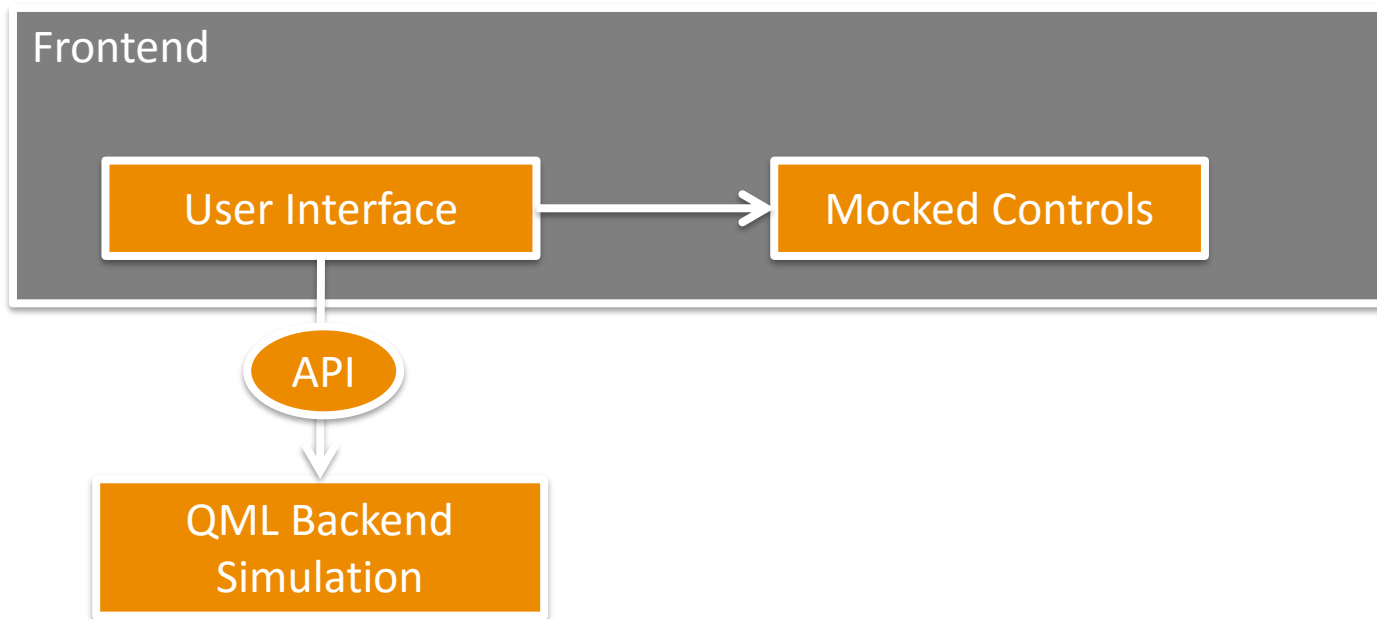
Practical Considerations

- Fast round trip time

- Simplified user interface

- Easy export of assets

- Easy access to data

- Verifiable on hardware

- Open to evolve

Toolset

- Balsamiq – UI Wireframing
- PNG Express – Photoshop export
- Sketch – Vector Drawing (Mac only)
- Qt Creator – The IDE for Qt
- QmlLive – live code viewer
- JSON data via REST API
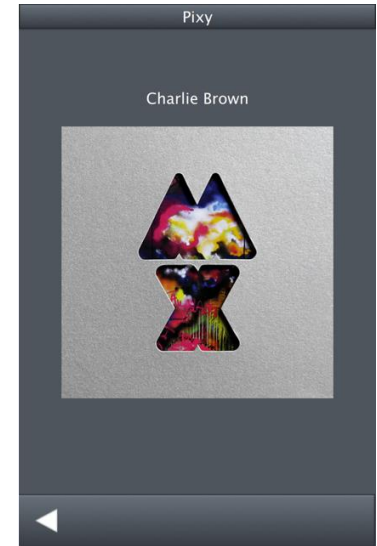- Many QML techniques
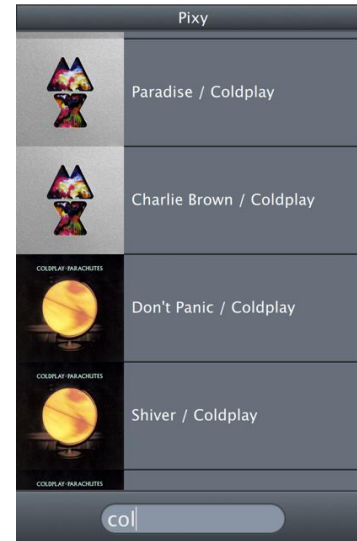
DEMO

Prototyping with QML

Pixy
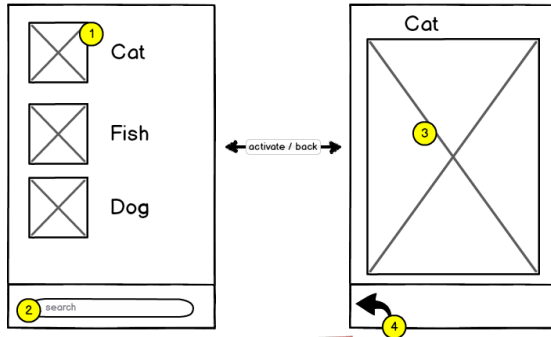
Demo

- Part 1 – Structure, Skeleton
  - Mocking a Wireframe UI

- Part 2 – Surface
  - Adding Graphics, Polishing
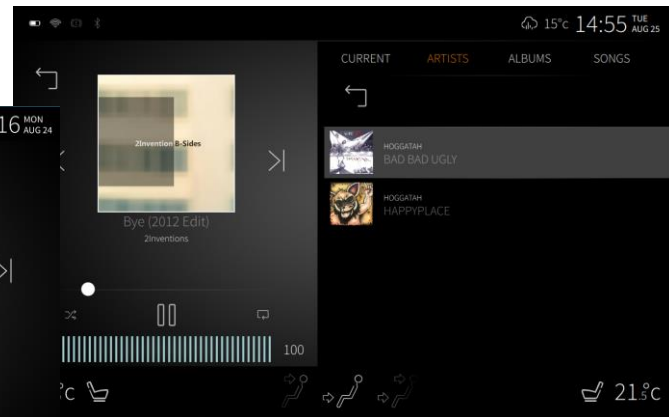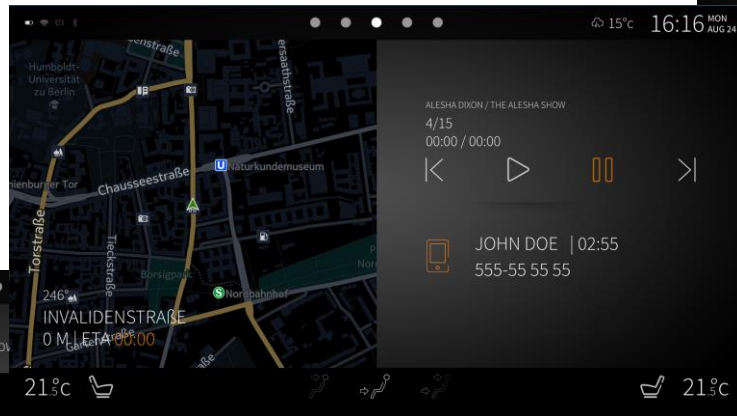
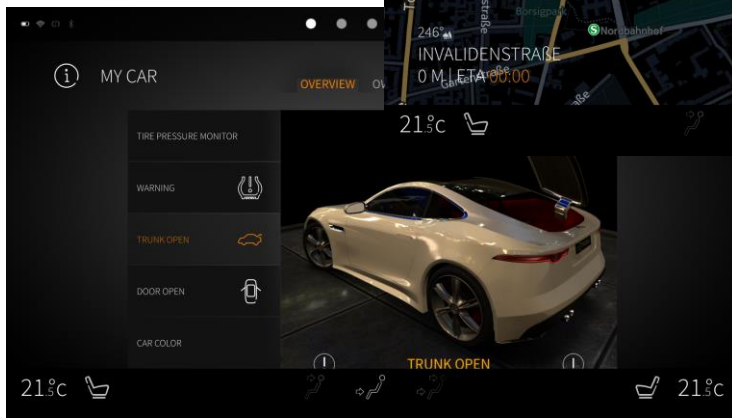- Part 3 – Backend API
  - Enabling Data

Conclusion

- Work close with Designers
- Inject yourself early in the creation pipeline
- Evolutionary Prototype becomes Product
- Clear separation between Frontend and Backend
- Prioritize communication
- Qt is often only one of many options for UI

Neptune

Let's meet!

- Win a Raspberry Pi kit – develop your own embedded Uis with Qt QML
  - We will draw five winner on Friday the 13/11

http://goo.gl/forms/NTLywP2OTx

- We are looking for talent from pixel to silicon – career.pelagicore.com
- We host foss-gbg.se frequently – come visit tomorrow!

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johan.thelin@pelagicore.com // www.pelagicore.com