



**UI Evolving  
Platform Evolving  
Architecture Evolving**

ThoughtWorks®



# About Me



## **Xianning** (Pronunciation 'Shining') **Liu** **Full Stack Developer, Mobile SME, Lead Consultant** **@ThoughtWorks**

- Tech Lead & Solution Architect. Recently focusing on scale mobile delivery & the architecture evolving beyond mobile era.
- Tech evangelist, Tech writer & Conference speaker



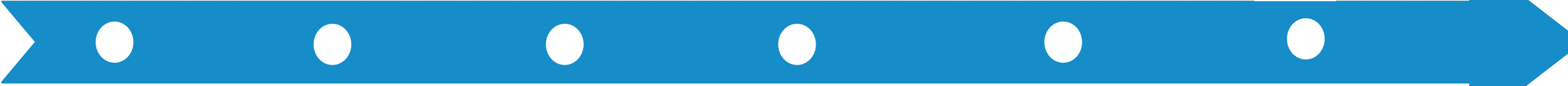
<https://www.linkedin.com/in/xianning-liu-17027846/>



<https://github.com/xianlinbox>

A person in a blue shirt is seen from behind, interacting with a futuristic digital interface. The interface consists of various icons connected by lines, including a smartphone, a cloud, a Wi-Fi symbol, a car, a house, a building, a heart, a laptop, and a group of people. The background is a deep blue with a grid pattern and a large circular graphic element.

# UI Evolving



**Machinery UI**      **Command UI**      **Graphic UI**      **Natural UI v1**      **Natural UI v2**      **Natural UI v3**



Ignore

Script Dev

Desktop Dev  
Web Dev




Mobile App Dev

Chatbot Dev  
Skills Dev

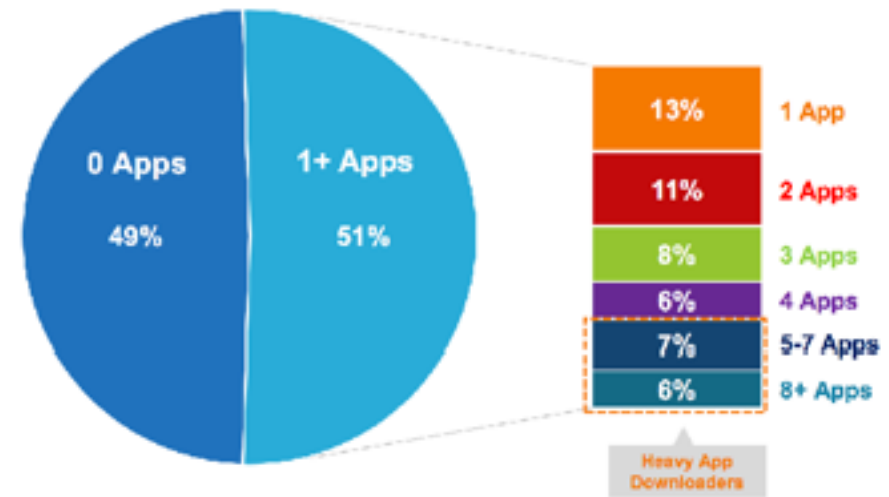
IoT Dev

# Platform Evolving

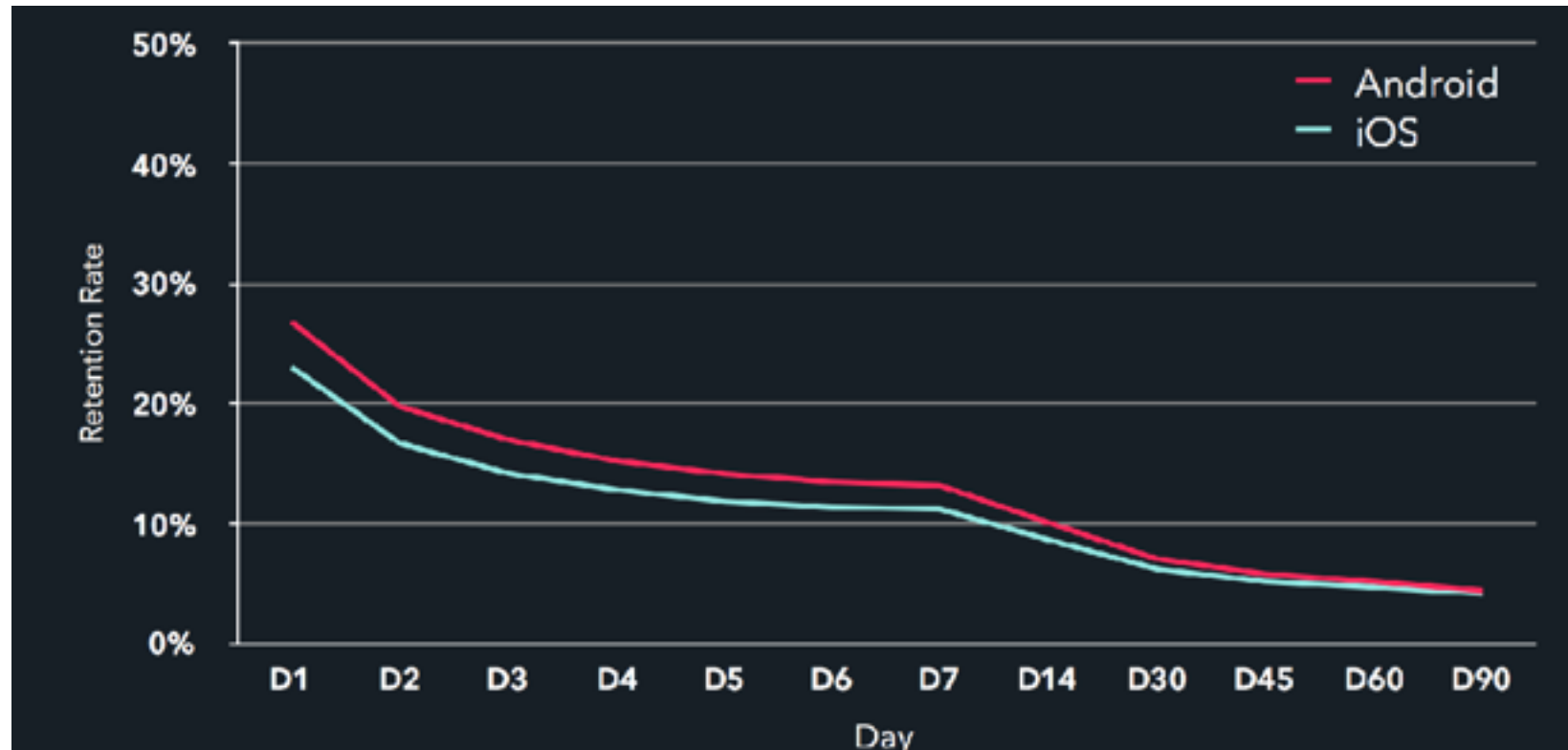
The background is a solid teal color with a network of white lines and circular nodes. Several nodes contain icons: a person silhouette, a folder, a gear, and a speech bubble. The overall theme is digital connectivity and evolution.

	1980's	1990's	2008's
<b>Platform</b>			
<b>Key Players</b>	<ul style="list-style-type: none"> <li>▶ Microsoft,</li> <li>▶ Oracle,</li> <li>▶ SAP</li> </ul>	<ul style="list-style-type: none"> <li>▶ Facebook,</li> <li>▶ Google</li> <li>▶ Amazon</li> </ul>	<ul style="list-style-type: none"> <li>▶ Apple,</li> <li>▶ Google</li> </ul>
<b>Development Paradigm</b>	<i>Client Dominant Development</i>	<i>Server Dominant Development</i>	<i>Client Dominant Development</i>
<b>Product Form</b>	<ul style="list-style-type: none"> <li>▶ <i>Packaged Software</i></li> </ul>	<ul style="list-style-type: none"> <li>▶ <i>Web App</i></li> <li>▶ <i>SaaS</i></li> </ul>	<ul style="list-style-type: none"> <li>▶ <i>Mobile App</i></li> </ul>
<b>Service Accessibility</b>	<i>Buy Disks &amp; Licenses</i>	<i>Access directly through browser</i>	<i>Install from App store</i>

Smartphone Users' Number of App Downloads Per Month  
 Source: comScore MobiLens, U.S., Age 13+, 3 Month Average Ending June 2016

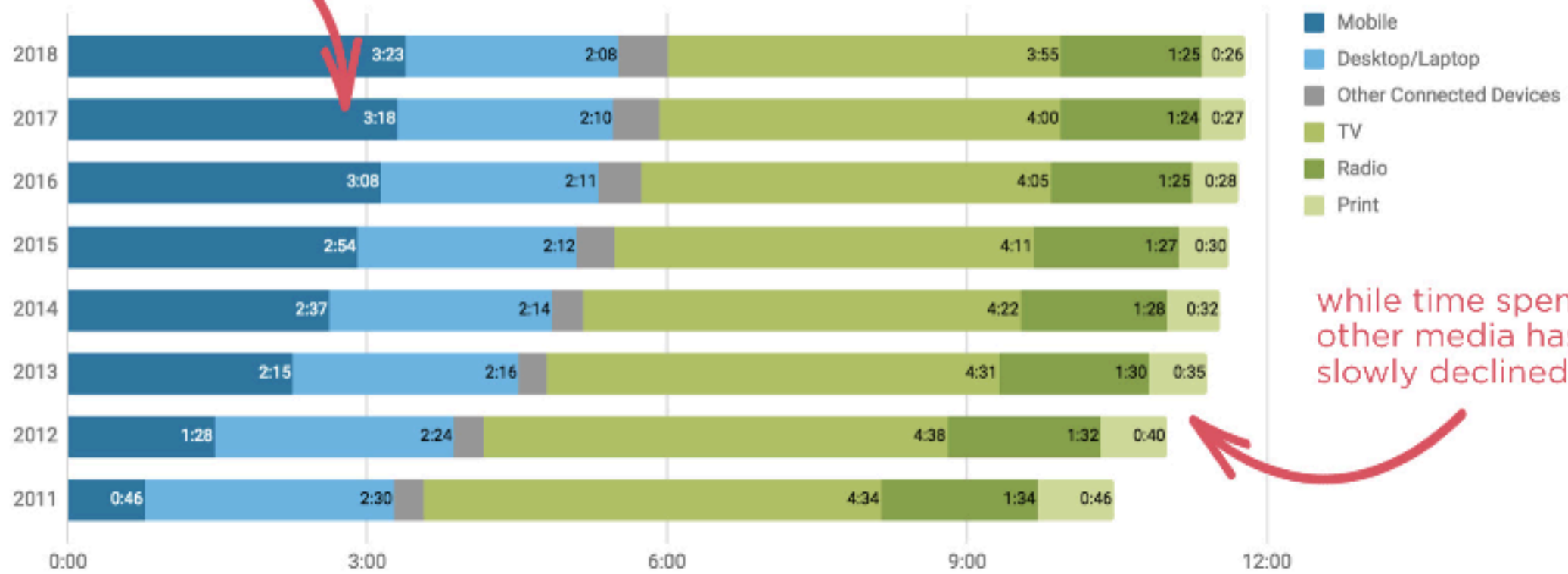


# App Fatigue



# Average Time Spent Per Day by US Adults

time spent on mobile has surged

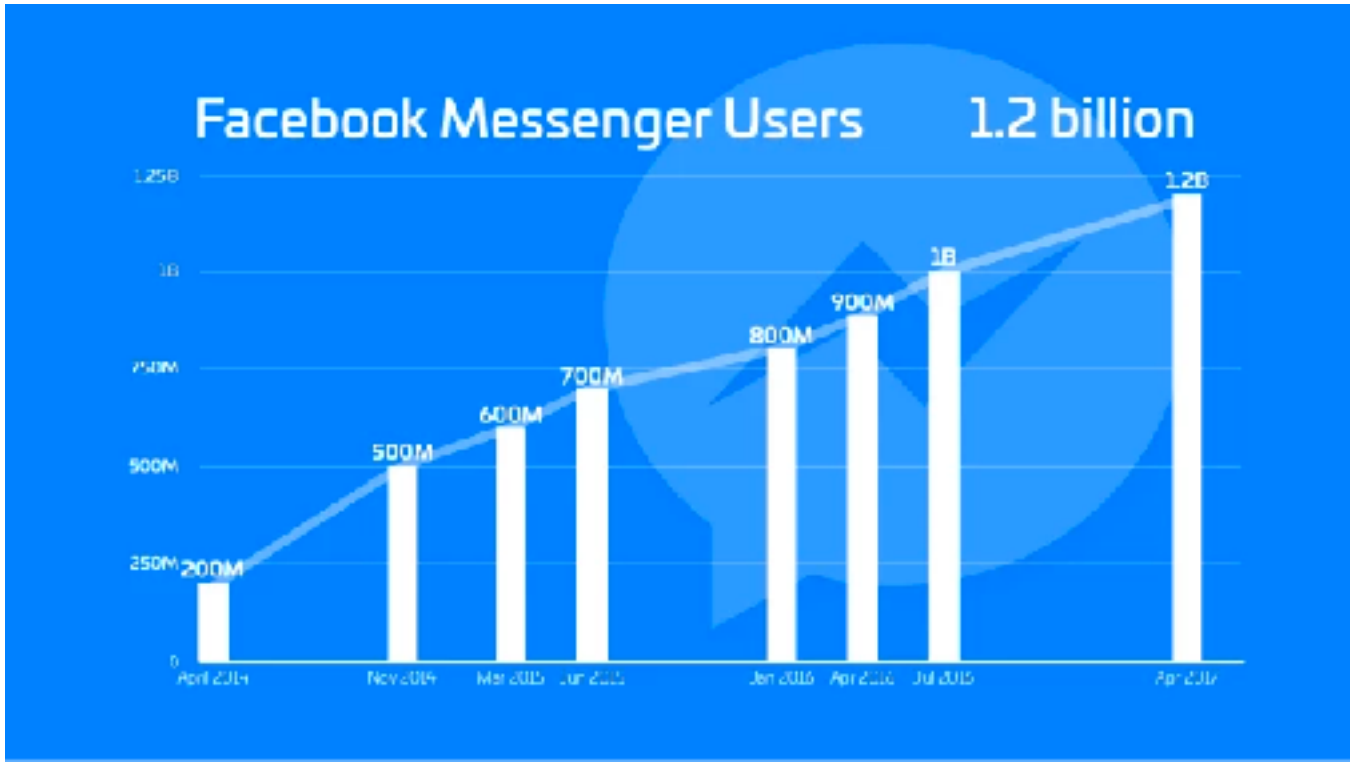
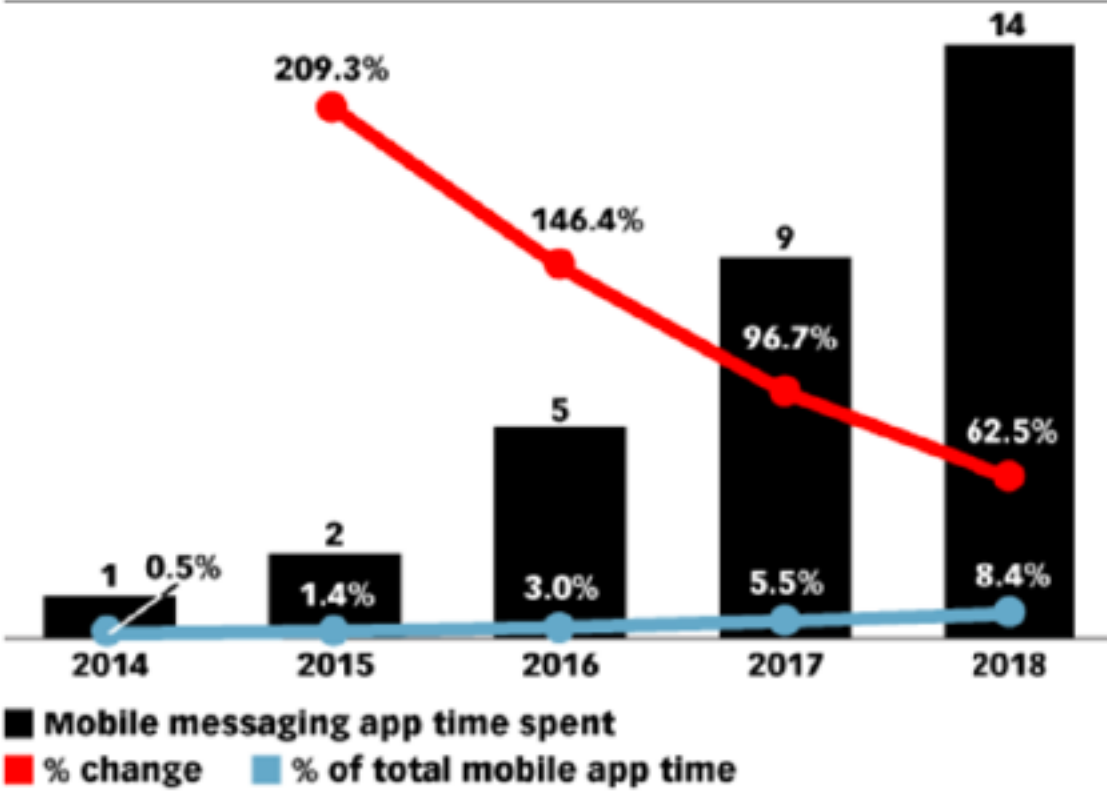


while time spent on other media has only slowly declined



**Average Time Spent per Day with Mobile Messaging Apps by US Adults, 2014-2018**

*minutes, % change and % of total mobile app time*





Facebook split Messenger out to be a standalone app, then enhance its functionality to be Messenger Platform which allow service provider to build their own chatbot to connect with facebook users through conversation.



Slack build its own Bot store, Let service provider to build their own chatbot to connect with facebook users through conversation.



**Benedict Evans**

@BenedictEvans

 Follow

Old: all software expands until it includes messaging  
New: all messaging expands until it includes software

7:13 PM - 12 Mar 2015



713



740



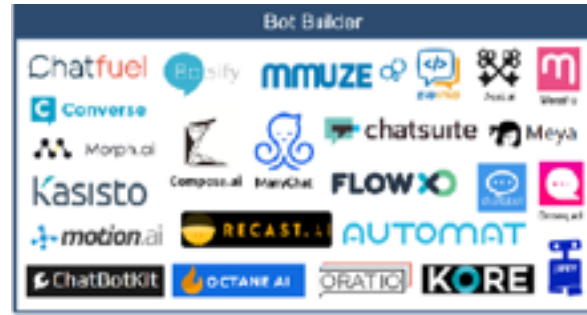
**2016: Beginning of conversational App**



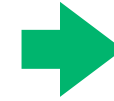
# Ecosystem



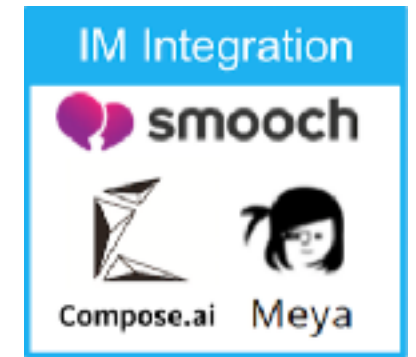
Channels



Building Tools



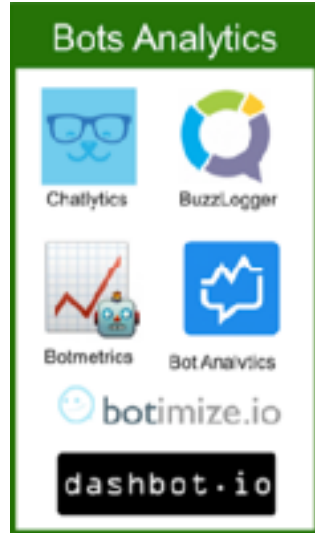
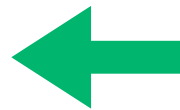
AI Platform



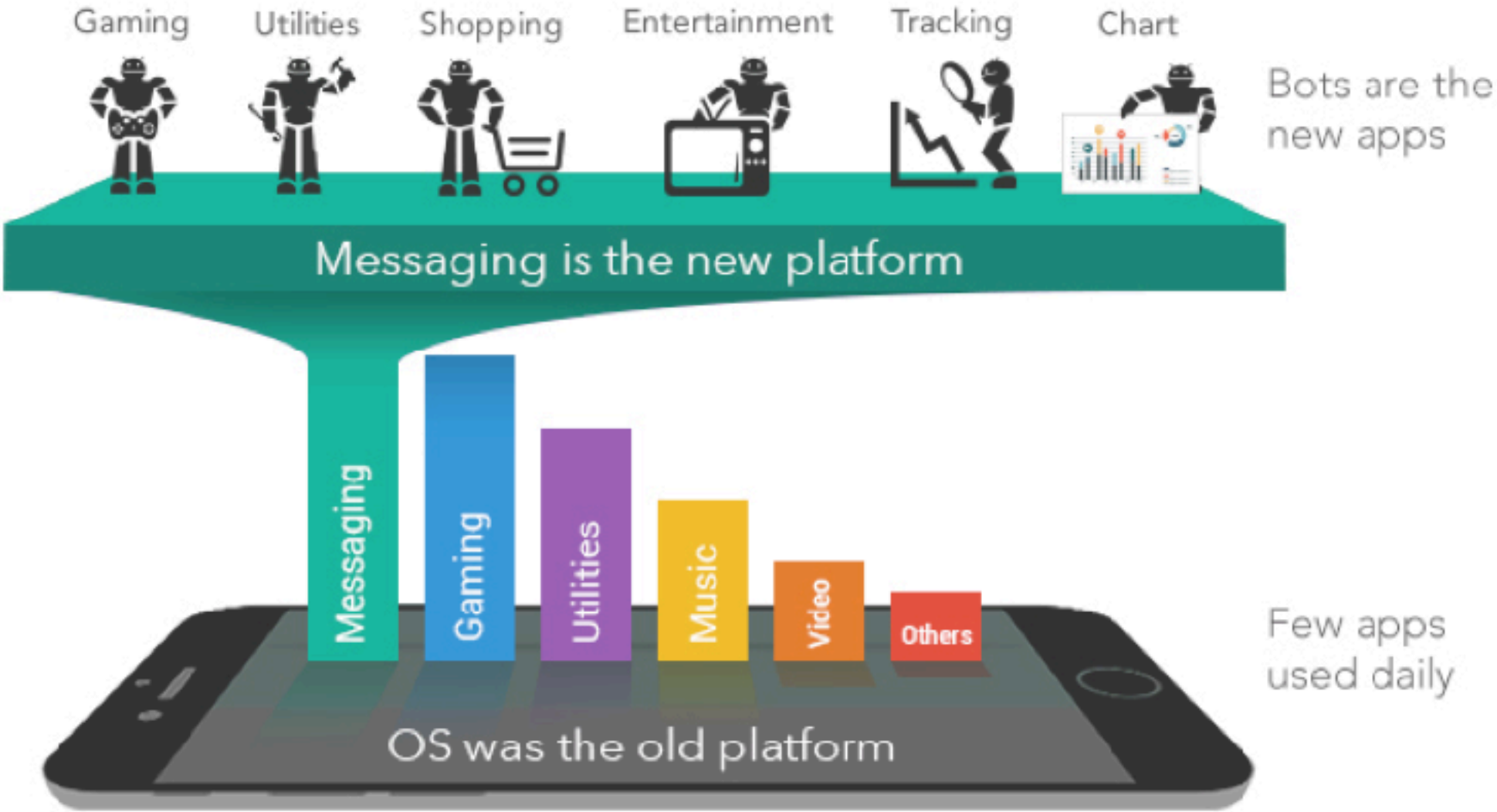
Channels Integration







Chatbot discovery & promotion



Monitor & Analytics



	1980's	1990's	2008's	2016's
<b>Platform</b>				
<b>Key Players</b>	<ul style="list-style-type: none"> <li>▶ Microsoft,</li> <li>▶ Oracle,</li> <li>▶ SAP</li> </ul>	<ul style="list-style-type: none"> <li>▶ Facebook,</li> <li>▶ Google</li> <li>▶ Amazon</li> </ul>	<ul style="list-style-type: none"> <li>▶ Apple,</li> <li>▶ Google</li> </ul>	<ul style="list-style-type: none"> <li>▶ Facebook</li> <li>▶ Amazon</li> <li>▶ Google</li> <li>▶ Microsoft</li> <li>▶ Slack</li> </ul>
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<b>Service Accessibility</b>	<i>Buy Disks &amp; Licenses</i>	<i>Access directly through browser</i>	<i>Install from App store</i>	<b>Access directly through messenger platform</b>

NO CASH AT CHECKOUT  
BY AMAZON

**JUST  
WALK  
OUT**

SHOPPING

amazon

## Computer Vision



### QR Code Scanner

Scan the QR code on the user's phone to authorize them to enter

## Sensor Vision



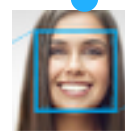
### Camera

Identifies the customer



### Pressure Sensor

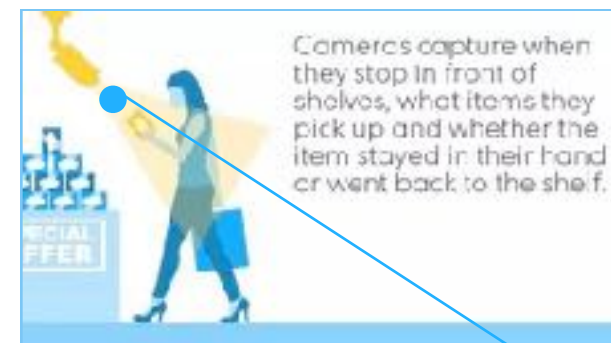
Detect whether an item has been picked up an item and put back.



### Face Recognition AI

Identifies the customer and captures their action.

## Deep Learning





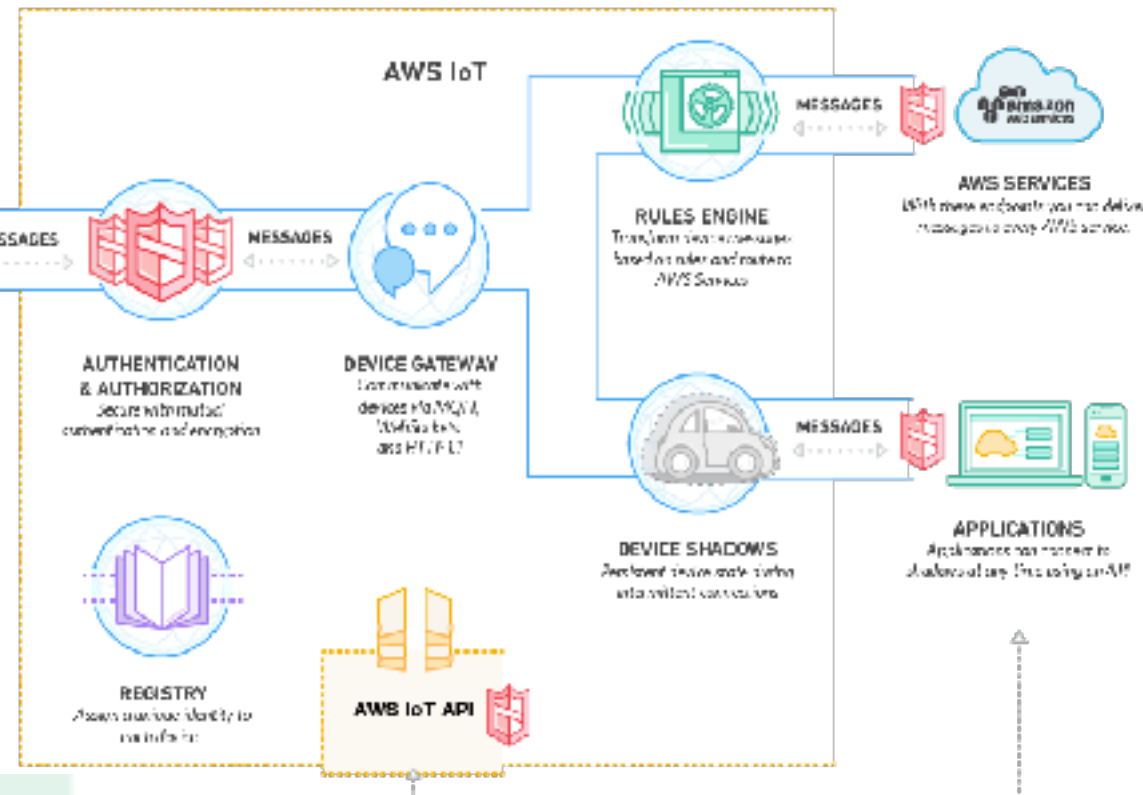
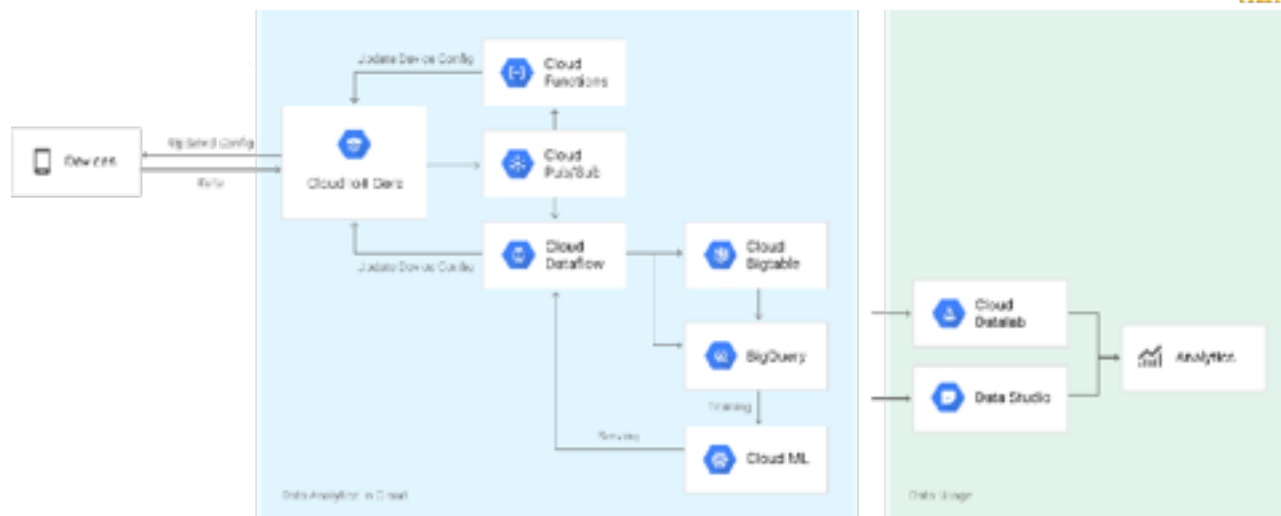
# “ 2018 ”

## Azure IoT Hub





- Ubiquitous computing
- Artificial Intelligence
- Multi-sense, multi-device experiences



## Google IoT Core



## AWS IoT Hub

	1980's	1990's	2008's	2016's	2018's
<b>Platform</b>					???
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<b>Service Accessibility</b>	Buy Disks & Licenses	Access directly through browser	Install from App store	Access directly through messenger platform	<b>Buy devices</b>



# Architecture Evolving

*From Mobile to Conversational to IoT*

## ADDITIONAL PLATFORM

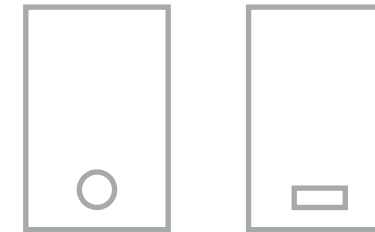
*Already has iOS or Android app and API is ready.  
Need to build app for the other mobile channel.*



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## MOBILE ENABLEMENT

Already have backend services built for website,  
need to extend services to mobile platform with  
mobile specific API (BFF).



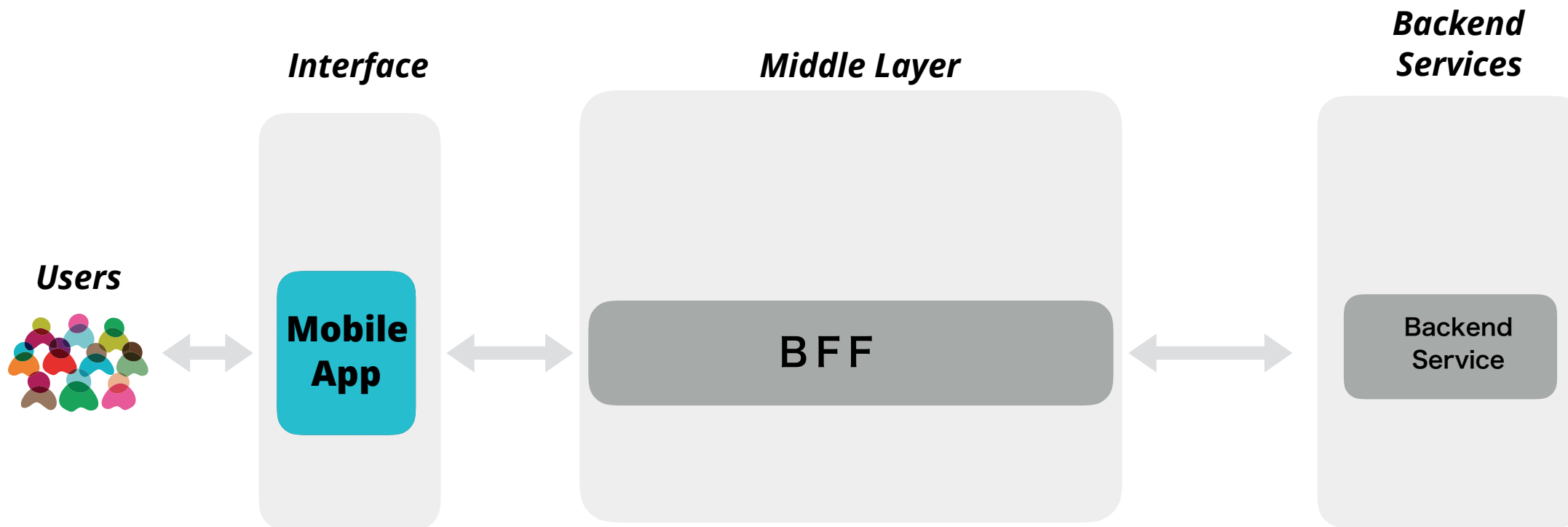
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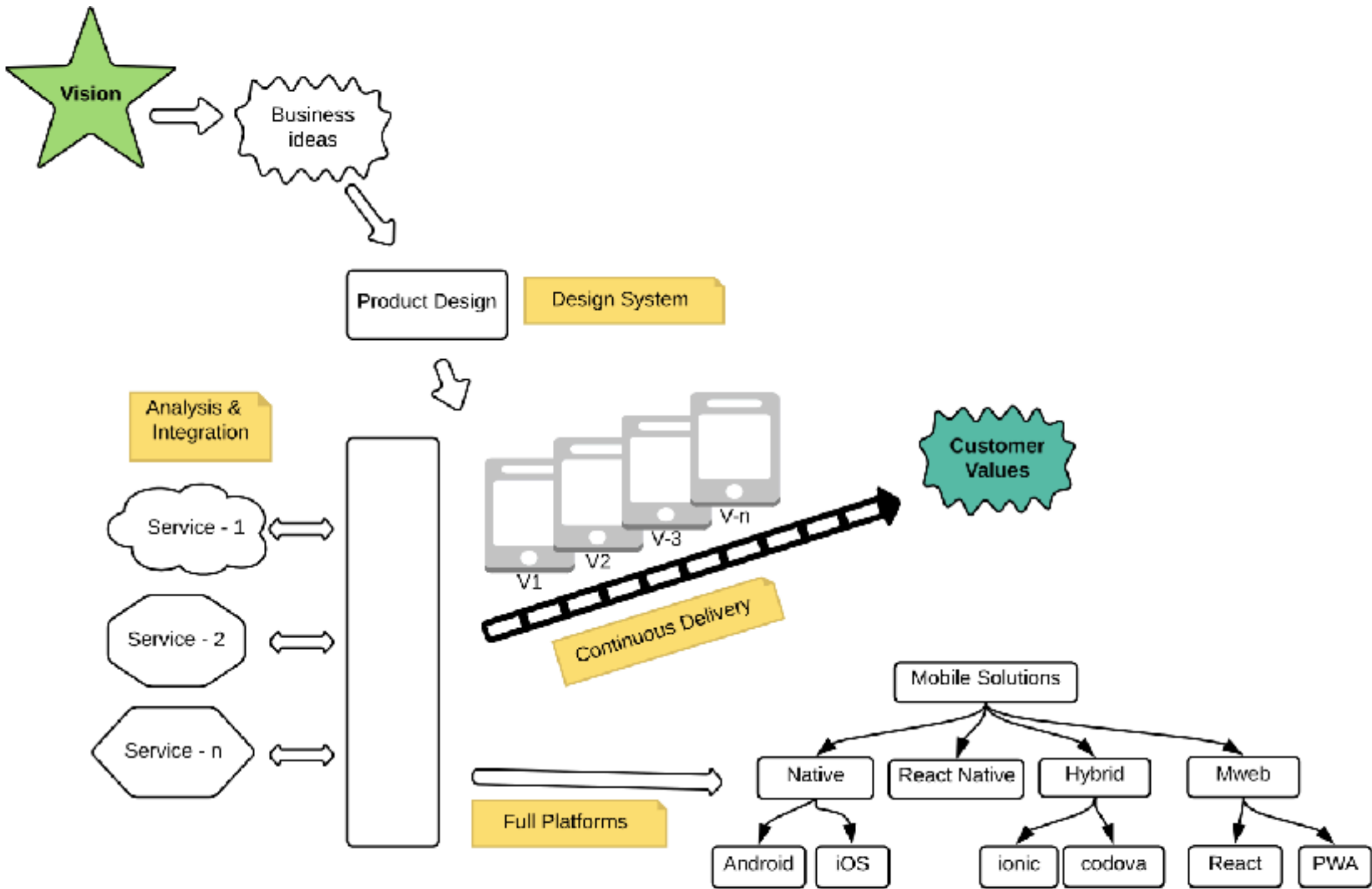
## MOBILE SERVICES

Need to build mobile first features.



Backend Services







# Atomic Design



ATOMS	MOLECULES	ORGANISMS	TEMPLATES	PAGES

**Fonts**

Praesent ullamcorper ultricies lectus, eu pulvinar turpis. Ut consequat semper elit in condimentum. Nullam ultrices gravida libero, vitae consequat ex ultrices non. ultricies lectus, eu pulvinar turpis. Ut consequat semper elit in condimentum. Nullam ultrices gravida libero, vitae consequat ex ultrices non.

**Header tags**  
Here is our range of header tags

- H1** The quick, bro...
- H2** The quick, brow...
- H3** The quick, brown f...
- H4** The quick, brown fox

**Design**

- Base Elements >
- Components
- Modules
- Development
- Templates

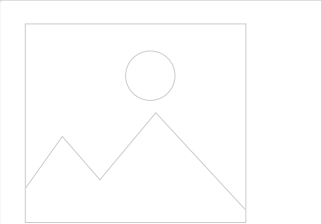
**Design**

- Design
- Colours
- Typography
- Logo
- Design Principles
- Imagery Guidelines
- Base Elements >
- Components
- Modules
- Development

**Containers**

Praesent ullamcorper ultricies lectus, eu pulvinar turpis. Ut consequat semper elit in condimentum. Nullam ultrices gravida libero, vitae consequat ex ultrices non. ultricies lectus, eu pulvinar turpis. Ut consequat semper elit in condimentum. Nullam ultrices gravida libero, vitae consequat ex ultrices non.

**Container one**  
This container is used when there is an image on the LHS



Praesent ullamcorper ultricies lectus, eu pulvinar turpis. Ut consequat semper elit in condimentum. Nullam ultrices gravida libero, vitae consequat ex ultrices non. Cras aliquam eu velit at venenatis. Phasellus eu nisl metus. Praesent sed vestibulum felis, eu suscipit libero.

```
<table style="width:100%">
<tr>
<td>Jill</td>
<td>Smith</td>
<td>50</td>
</tr>
<tr>
<td>Eve</td>
<td>Jackson</td>
<td>94</td>
</tr>
</table>
```

**Buttons**

Praesent ullamcorper ultricies lectus, eu pulvinar turpis. Ut consequat semper elit in condimentum. Nullam ultrices gravida libero, vitae consequat ex ultrices non. ultricies lectus, eu pulvinar turpis. Ut consequat semper elit in condimentum. Nullam ultrices gravida libero, vitae consequat ex ultrices non.

**Large buttons**  
Here is our range of large buttons

**More**

```
<table style="width:100%">
<tr>
<td>Jill</td>
<td>Smith</td>
<td>50</td>
</tr>
<tr>
<td>Eve</td>
<td>Jackson</td>
<td>94</td>
</tr>
</table>
```

**More**

```
<table style="width:100%">
<tr>
<td>Jill</td>
<td>Smith</td>
<td>50</td>
</tr>
<tr>
<td>Eve</td>
<td>Jackson</td>
<td>94</td>
</tr>
</table>
```

**More**

```
<table style="width:100%">
<tr>
<td>Jill</td>
<td>Smith</td>
<td>50</td>
</tr>
```



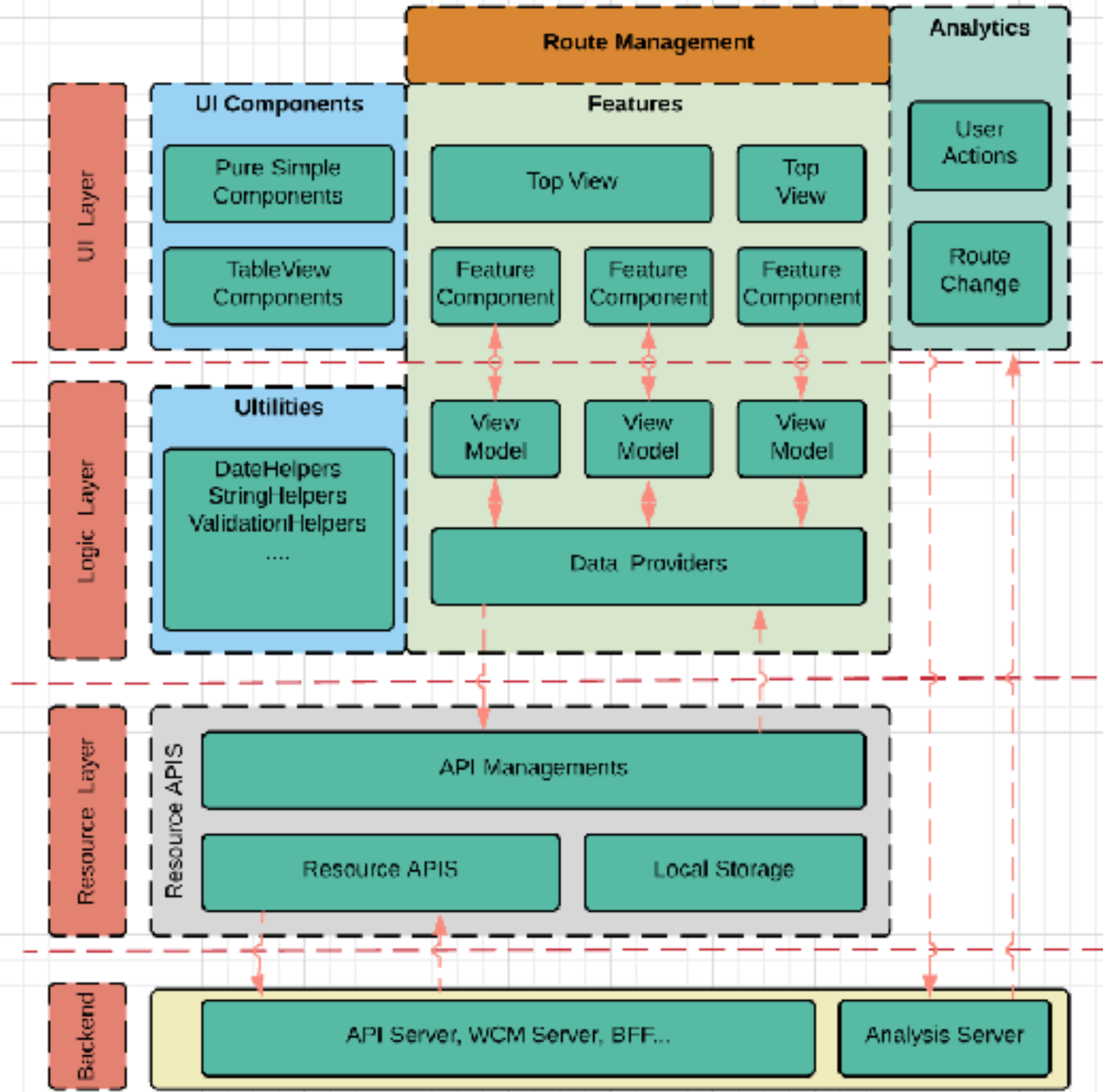
# Living Style Guide

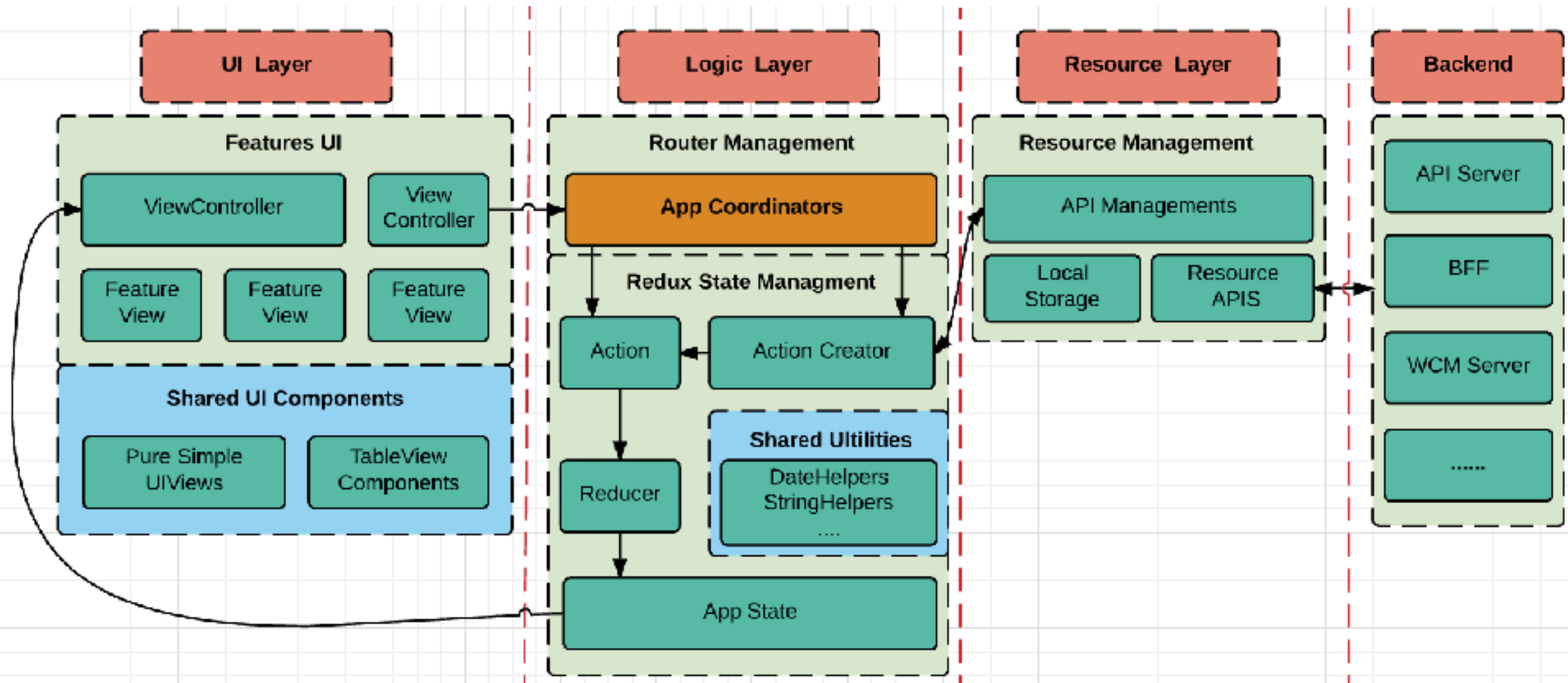


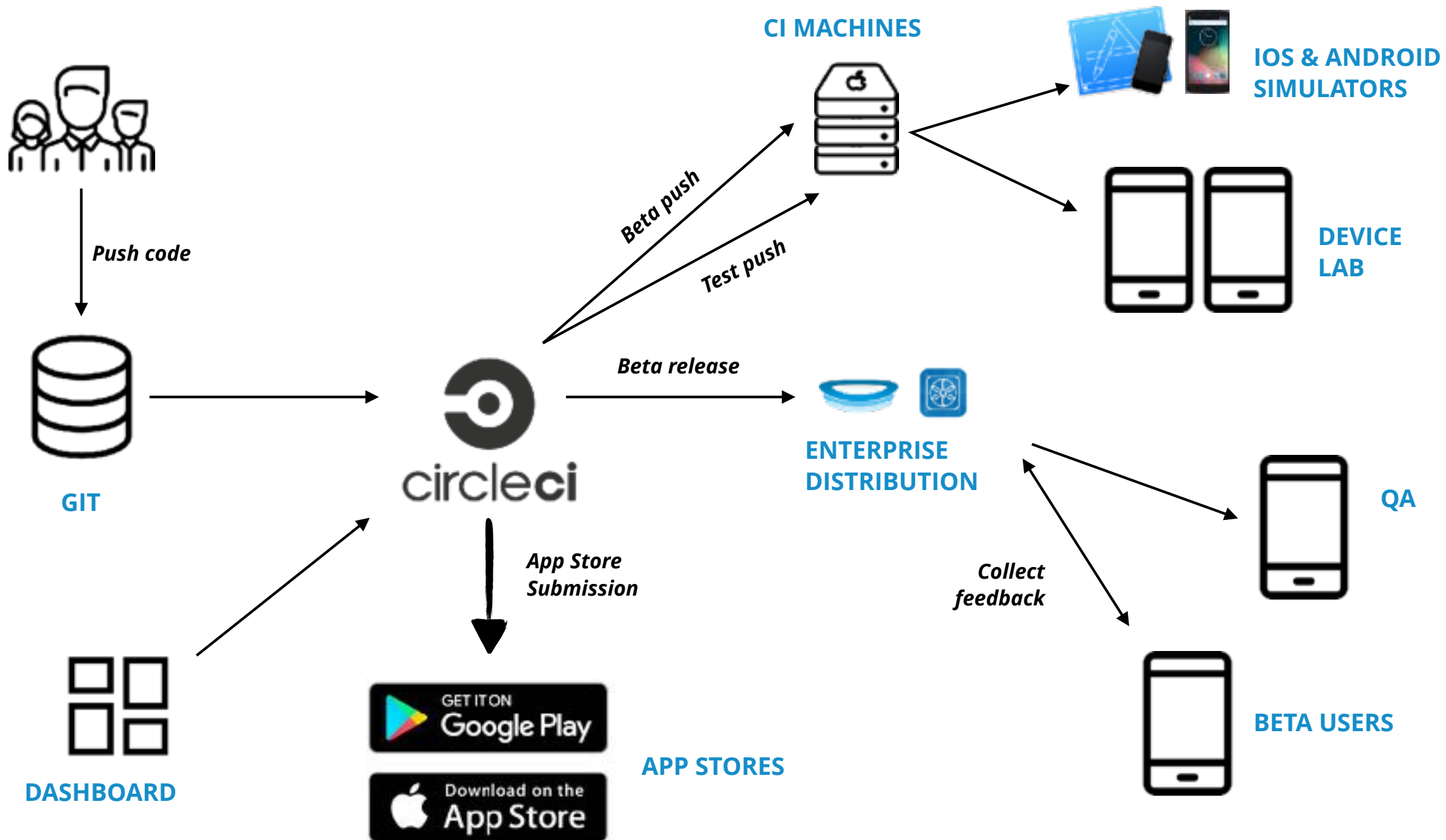


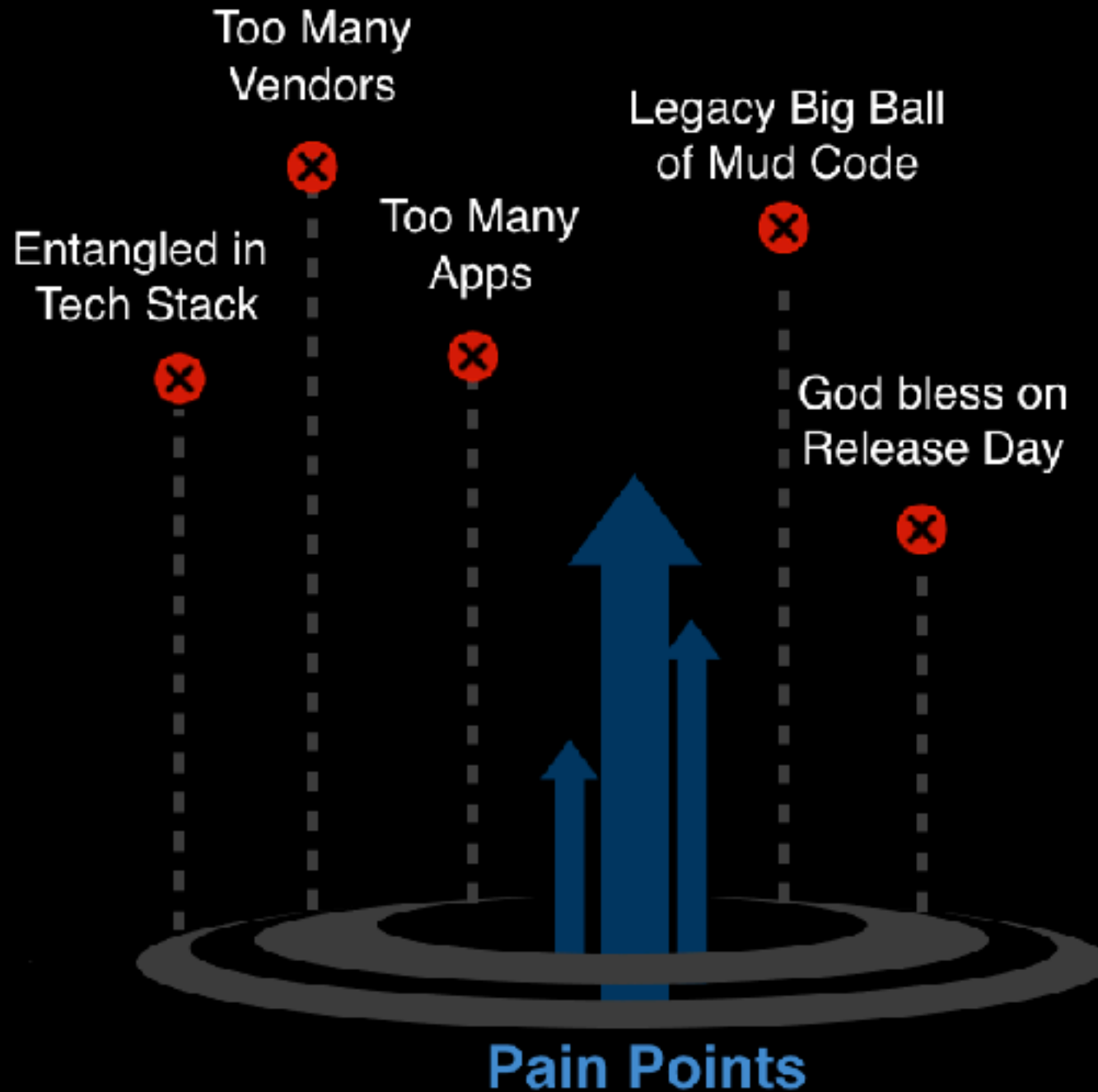
	Native	H5	React Native
Cost	High	Low	
Reusability	iOS/Android 2 Codebase	iOS/Android/Web 1 Codebase	iOS/Android Component Reuse
Dynamic Update	Limited by App Store	Controlled By Dev	Controlled By Dev With Design
User Experience	Best	Just so so	Better
Community	Apple, Google, 10 years	W3C, Standards comes very slow	Facebook & Huge JS Community

## *Choosing the Right Mobile Tech Stack - By Aaron Brager*



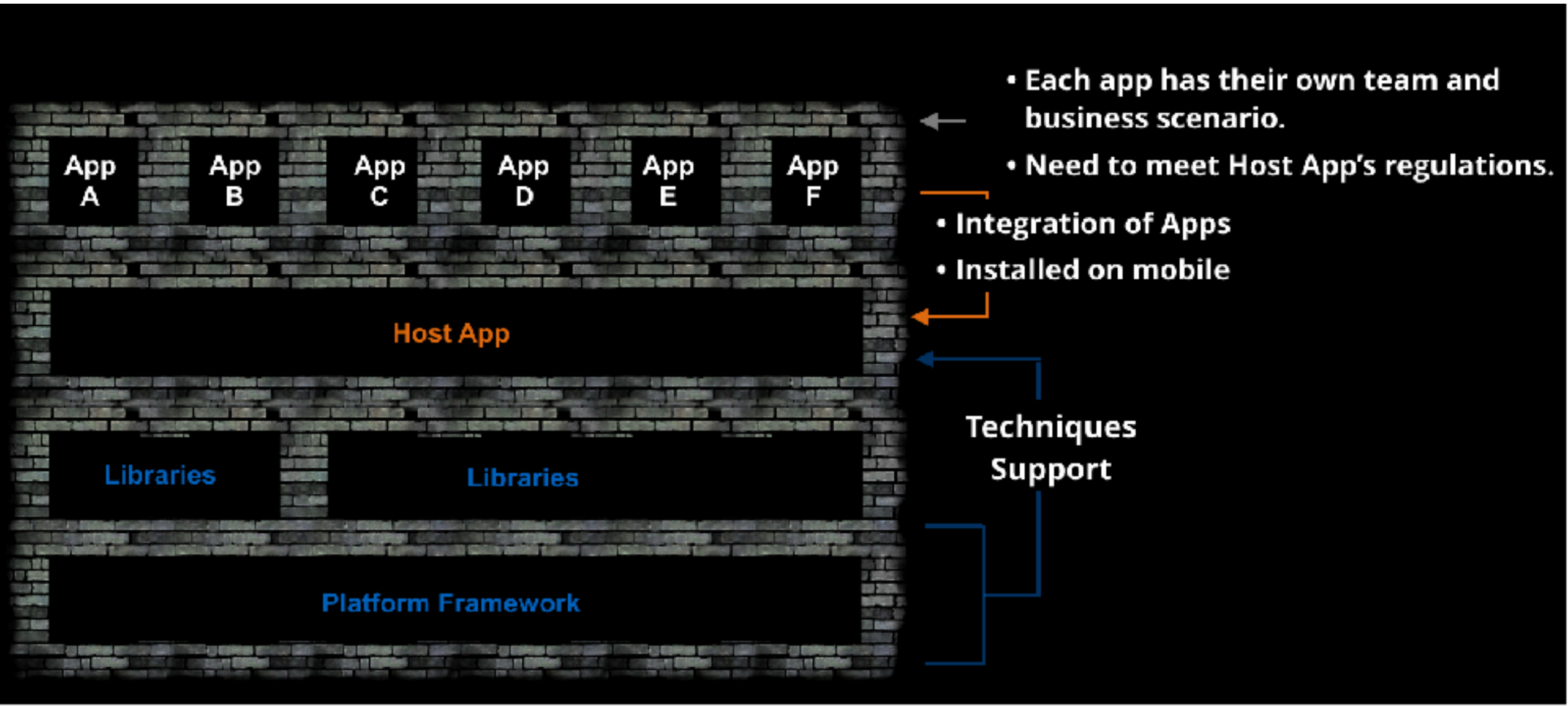








# Mobile Development Platform



- Each app has their own team and business scenario.
- Need to meet Host App's regulations.

- Integration of Apps
- Installed on mobile

Techniques Support

Platform Framework

Libraries

Libraries

Host App

App A

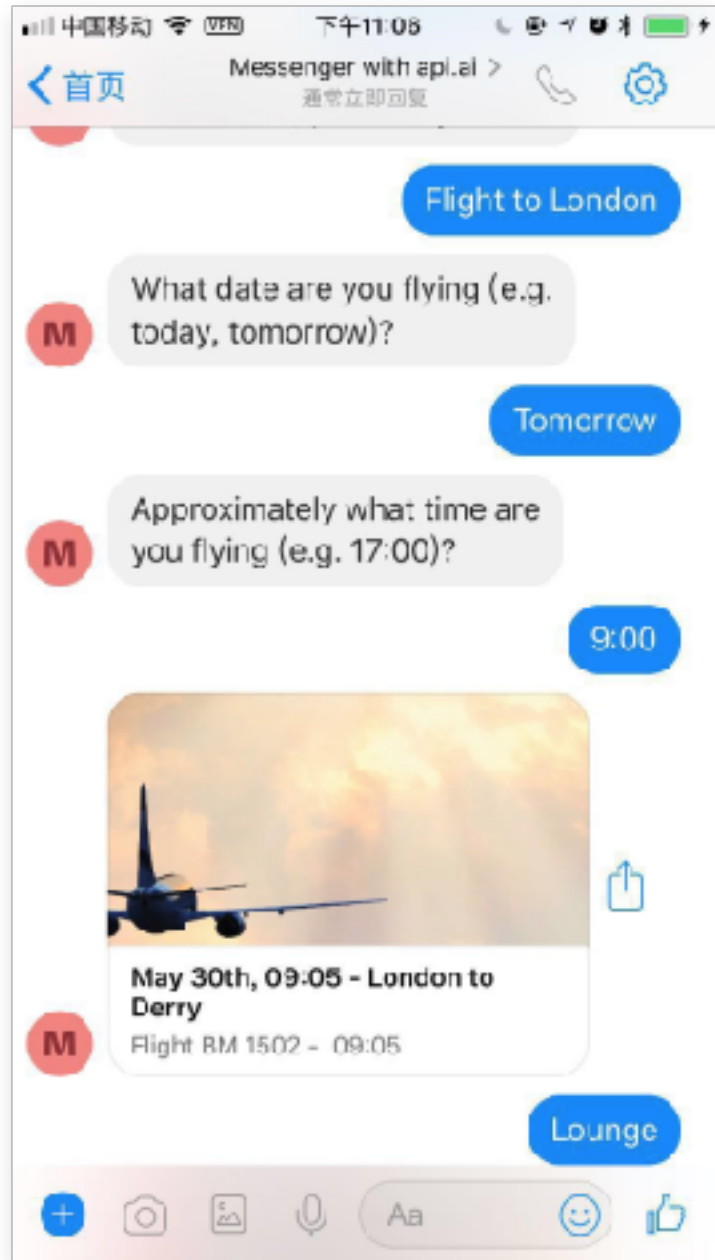
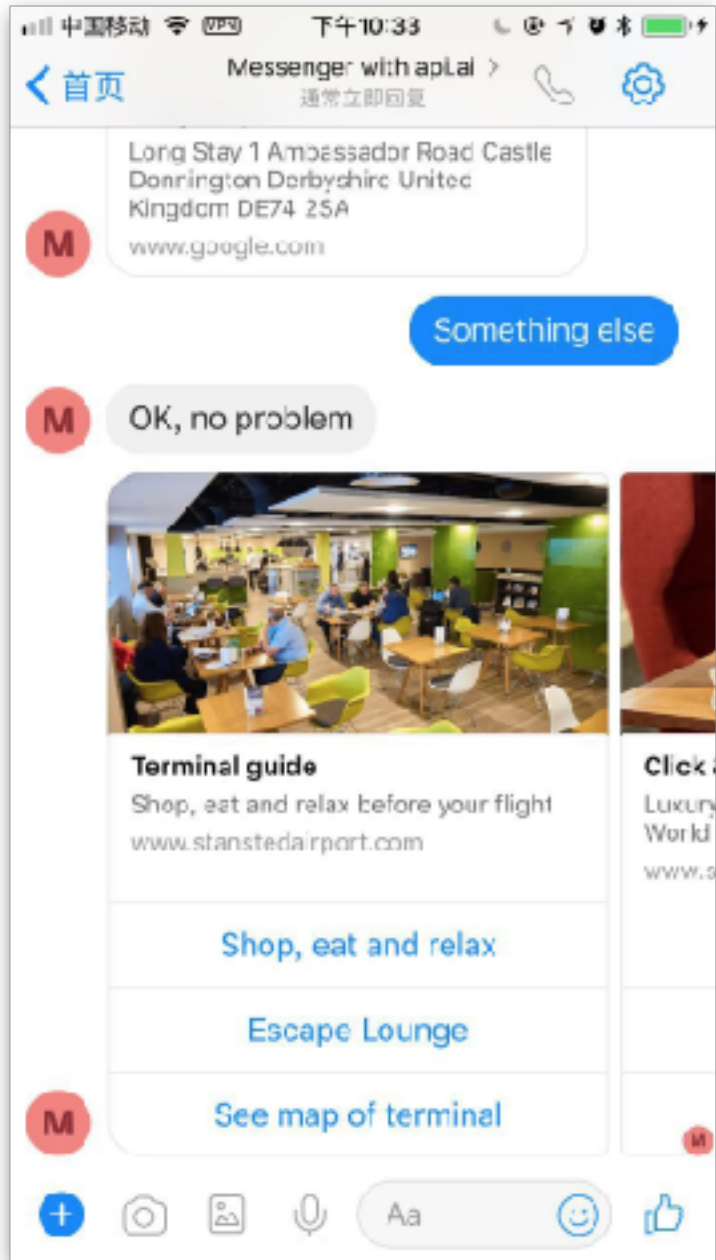
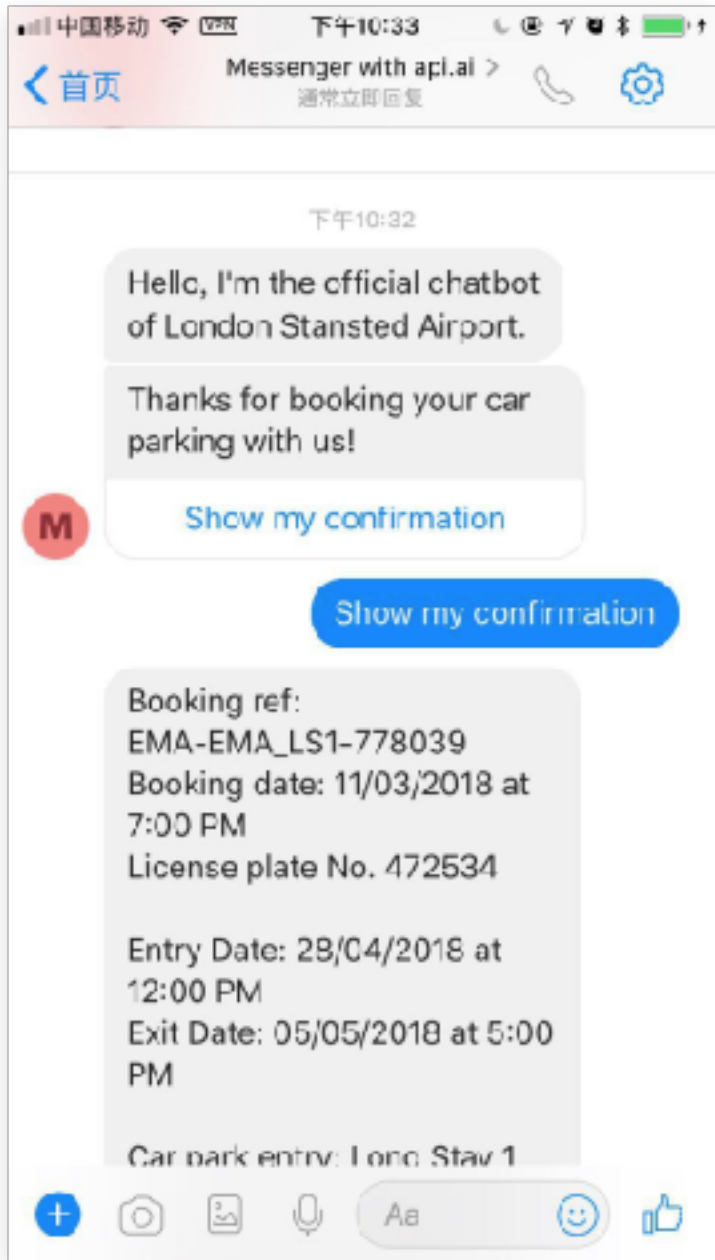
App B

App C

App D

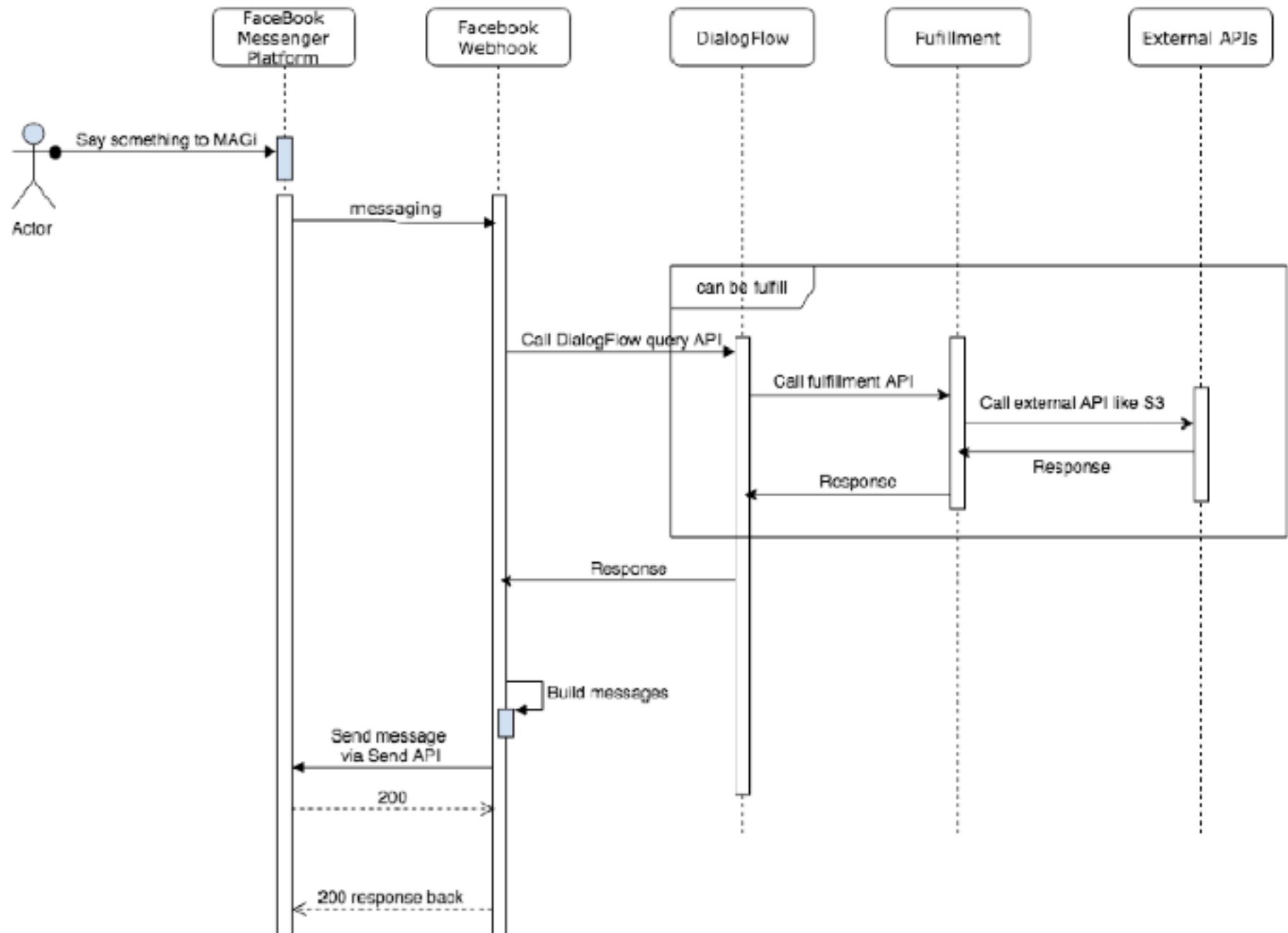
App E

App F

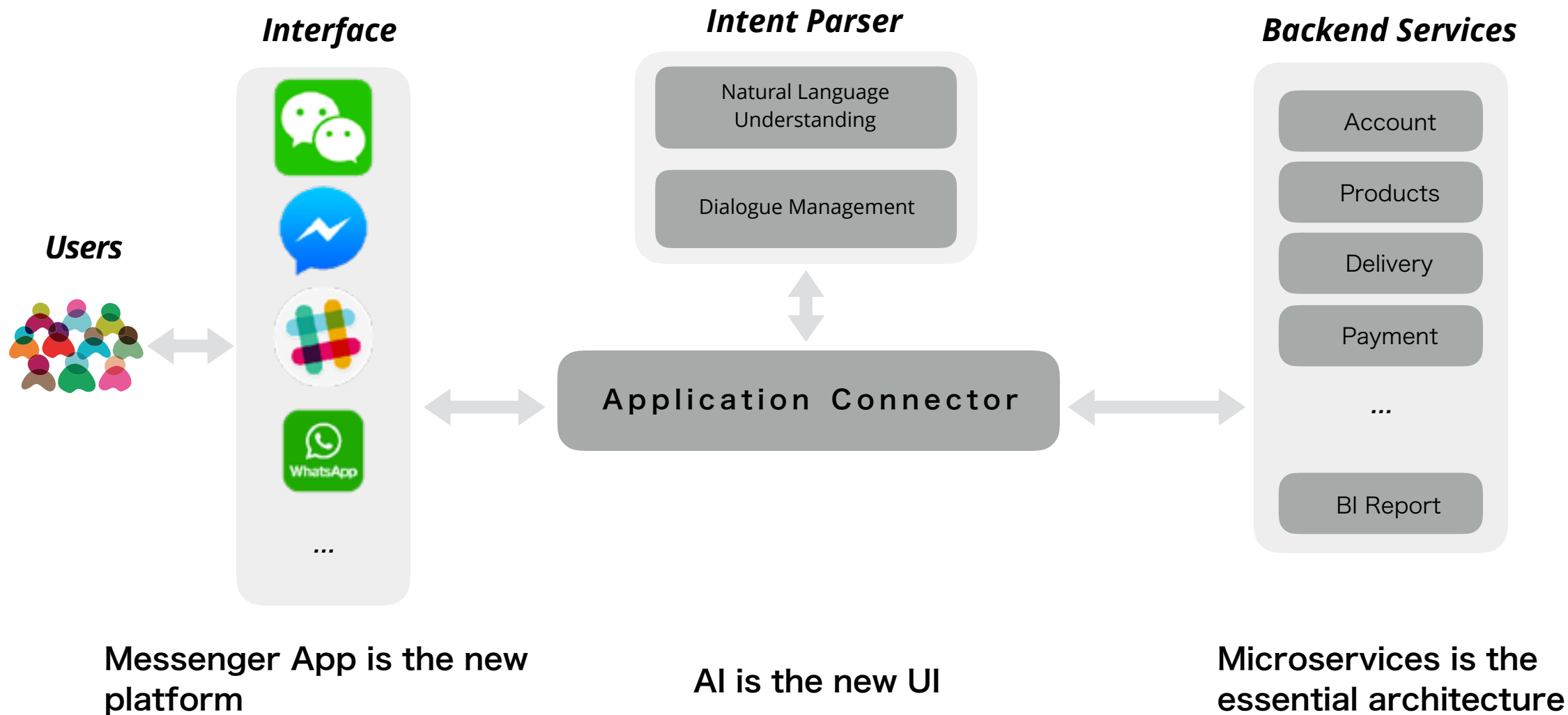


Common Message

Facebook Router Lambda









SlackPizza

Intents

Entities

Logs

Slack integration

Domains

Docs

Account

Logout

Order a large pizza

I would like to order 2 large pepperoni pizzas to 443 Waverley St at 2pm

Add user expression...

+ Add

Action

PizzaDelivery

REQUIRED	PARAMETER NAME	ENTITY	VALUE	PROMPTS
<input checked="" type="checkbox"/>	PizzaType	@PizzaType	\$PizzaType	Hi! What kind of a pizzas are you looking for today? [2]
<input checked="" type="checkbox"/>	PizzaSize	@PizzaSize	\$PizzaSize	Size? [1]
<input checked="" type="checkbox"/>	customtime	@customtime	\$customtime	When would you like it to be delivered? [1]
<input checked="" type="checkbox"/>	address	@sys.address	\$address	Where should we deliver this amazing pizza to? [2]
<input type="checkbox"/>	number	@sys.number	\$number	-

Support Company

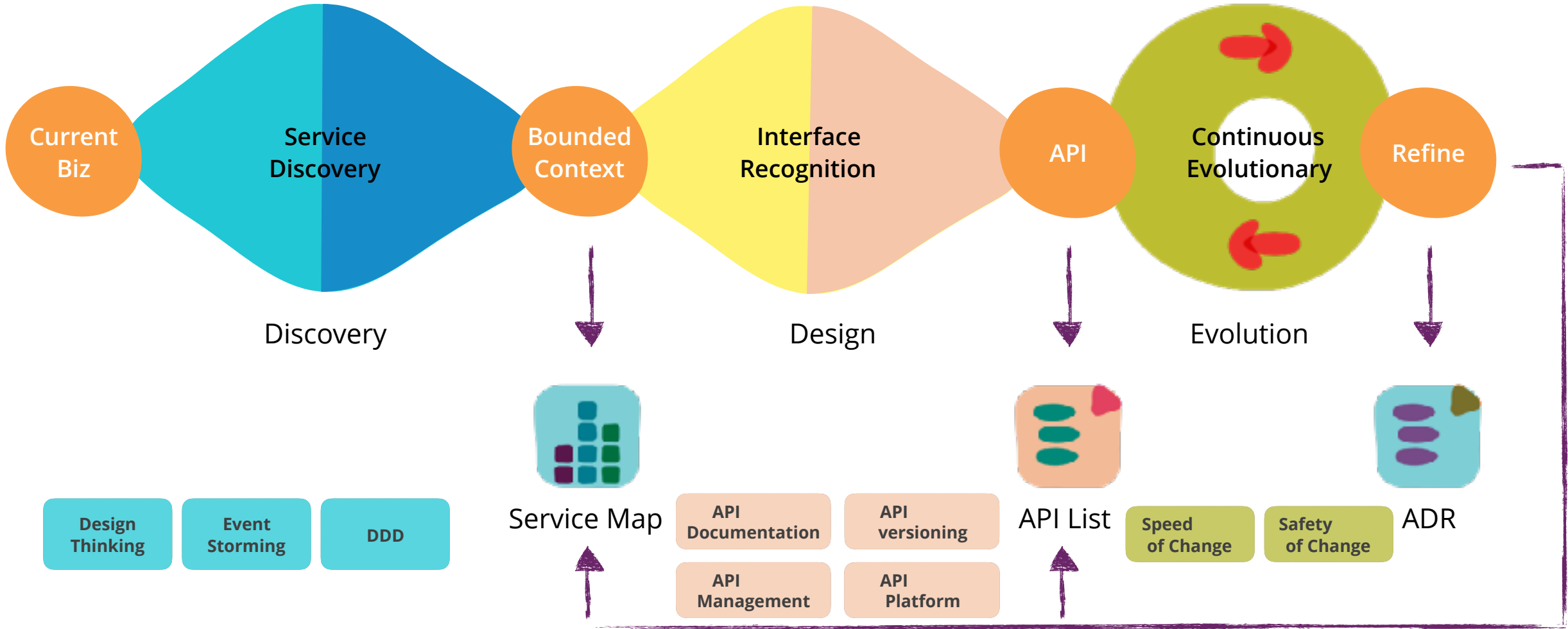
Google

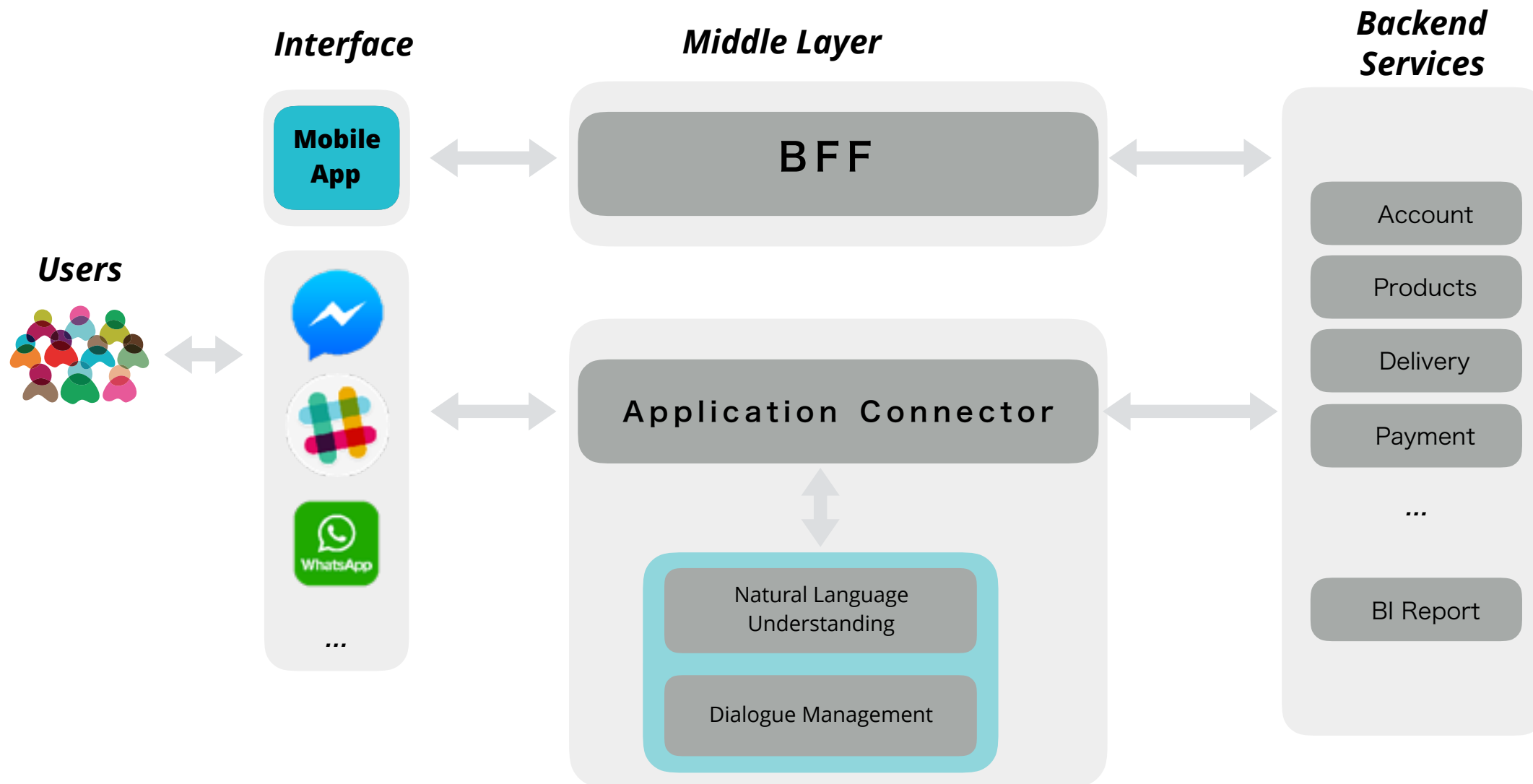
Facebook

Microsoft

Amazon

IBM





# "Alexa..."

## **MVP**

*Play lesson*

*Pause*

*Stop*

*Go back 10 seconds*

*Next lesson*

*Start over*



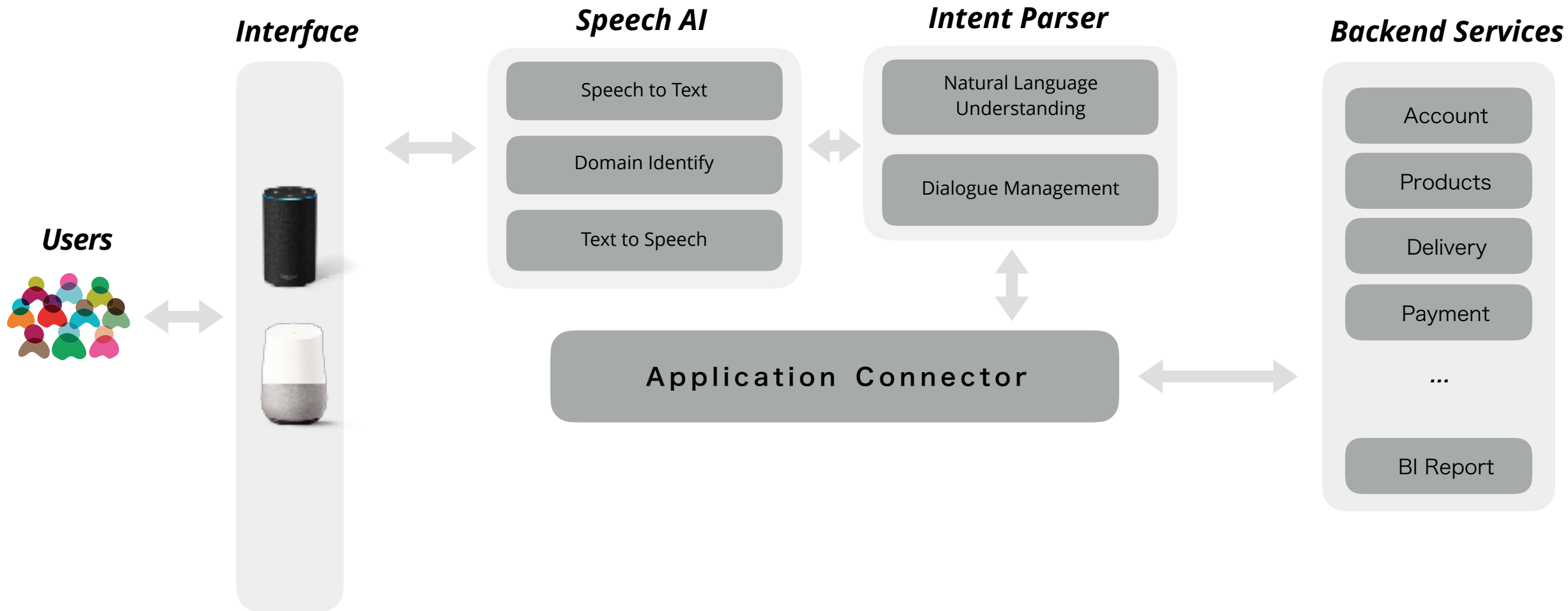
## **FUTURE**

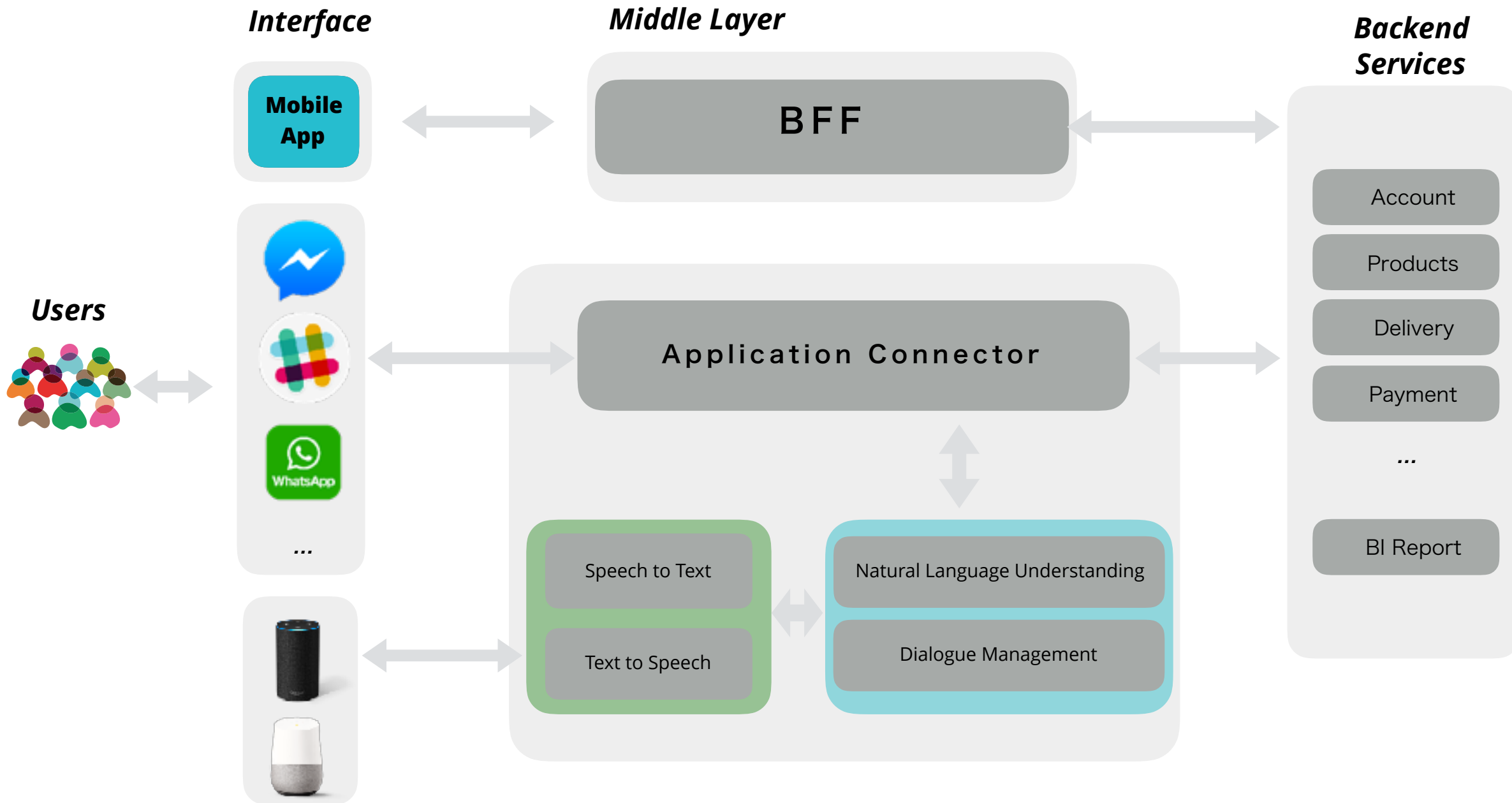
*Repeat last phrase*

*Repeat slowly*

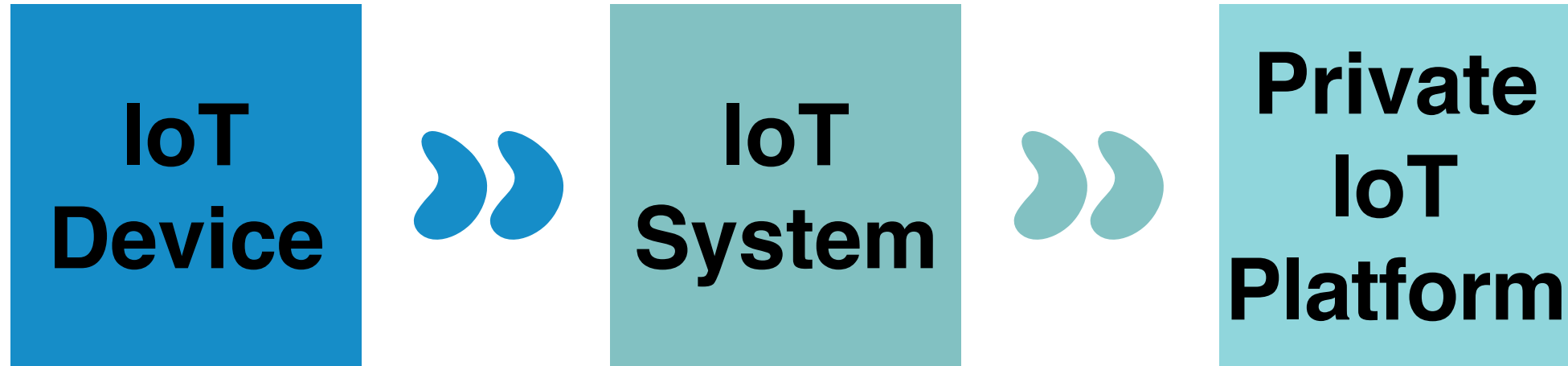
*Slow motion*

*How was my pronunciation?*



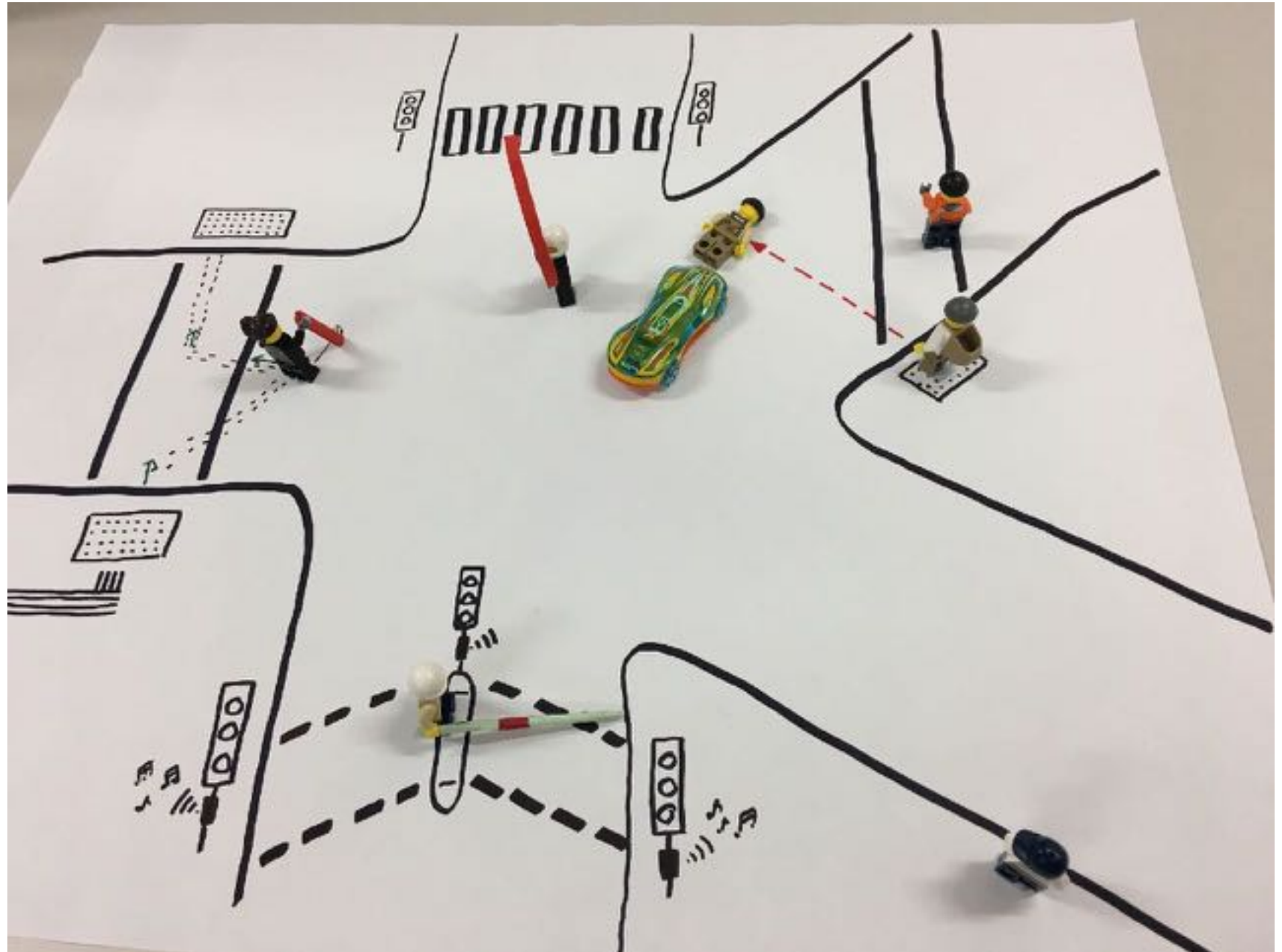




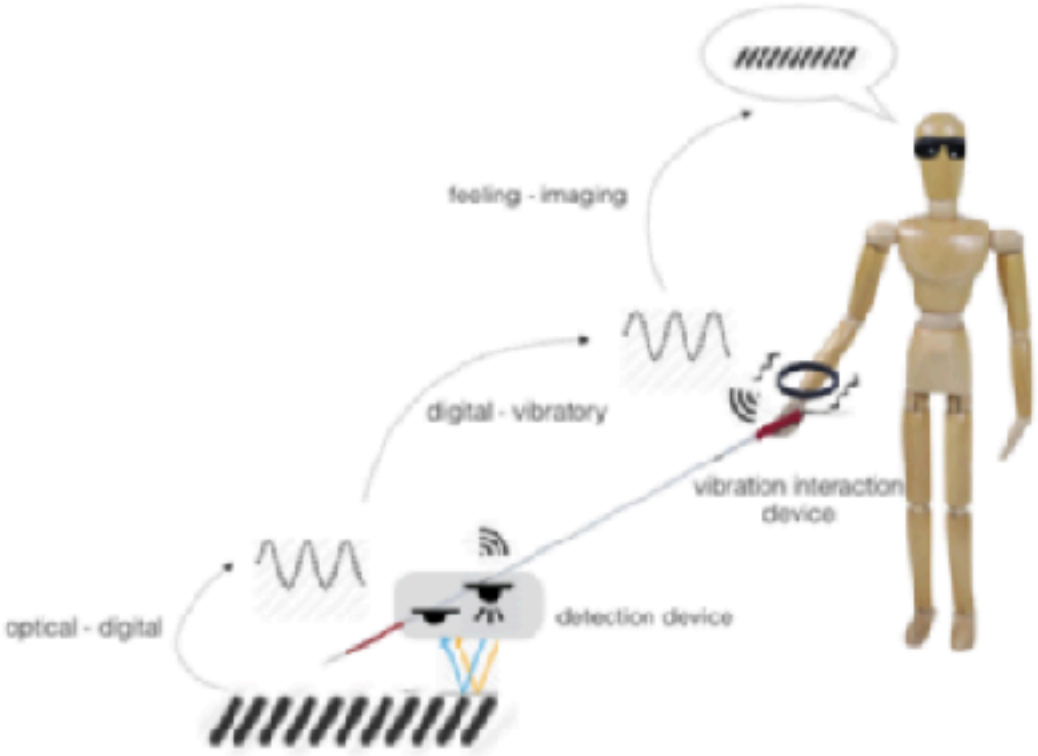




# Smart Cane for Blinds

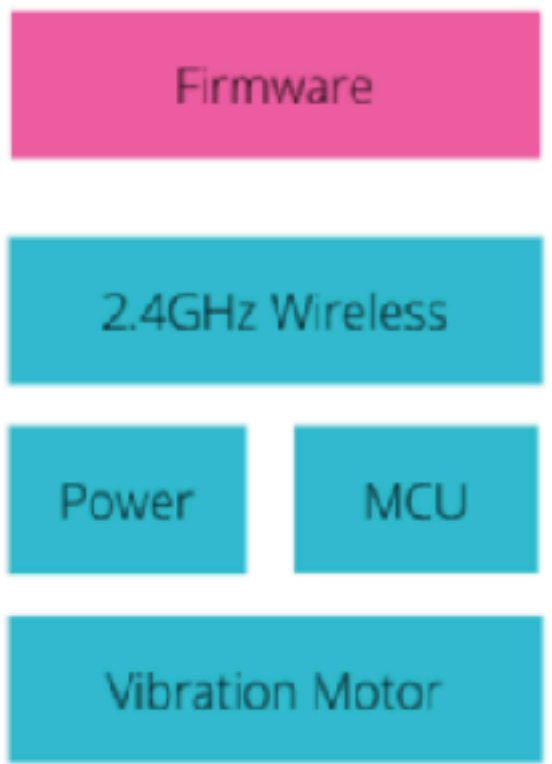


*detection device*



● SW ● HW

*vibration interaction device*





# Remote Health Control System



Bluetooth Gateway



Heart Rate Band



Sleep Sensor



FII Box



ZigBee Gateway



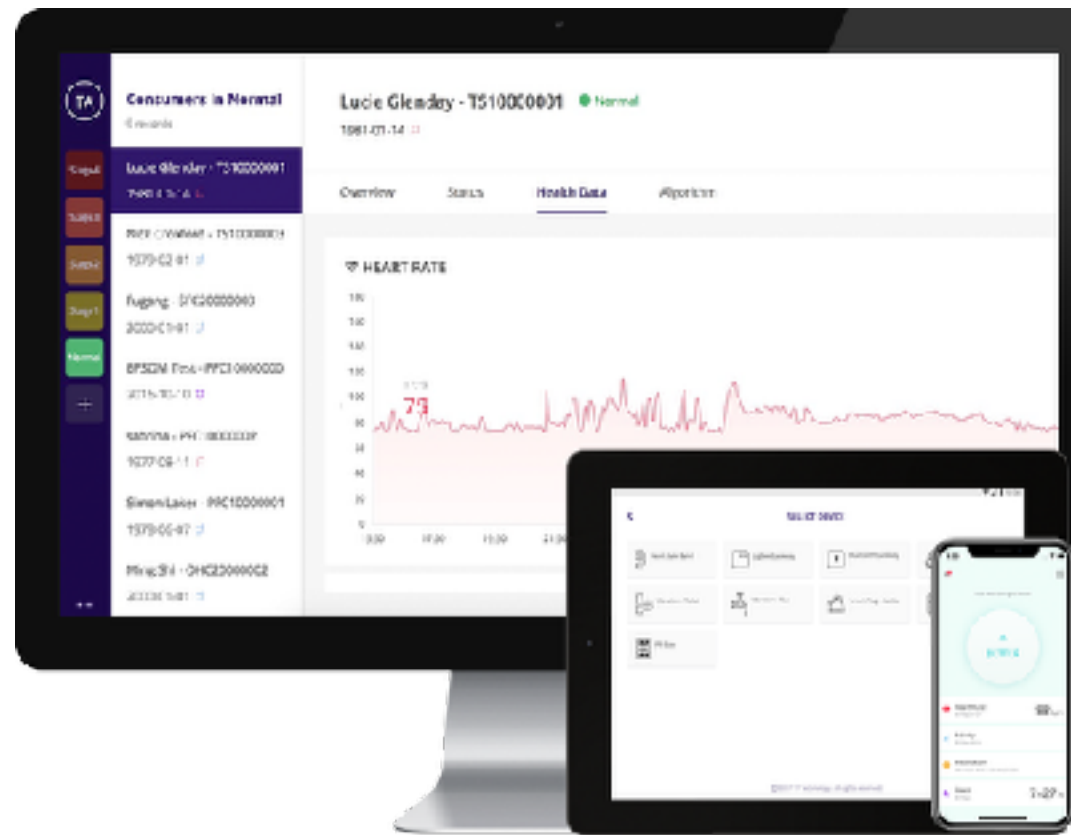
Smart Plug

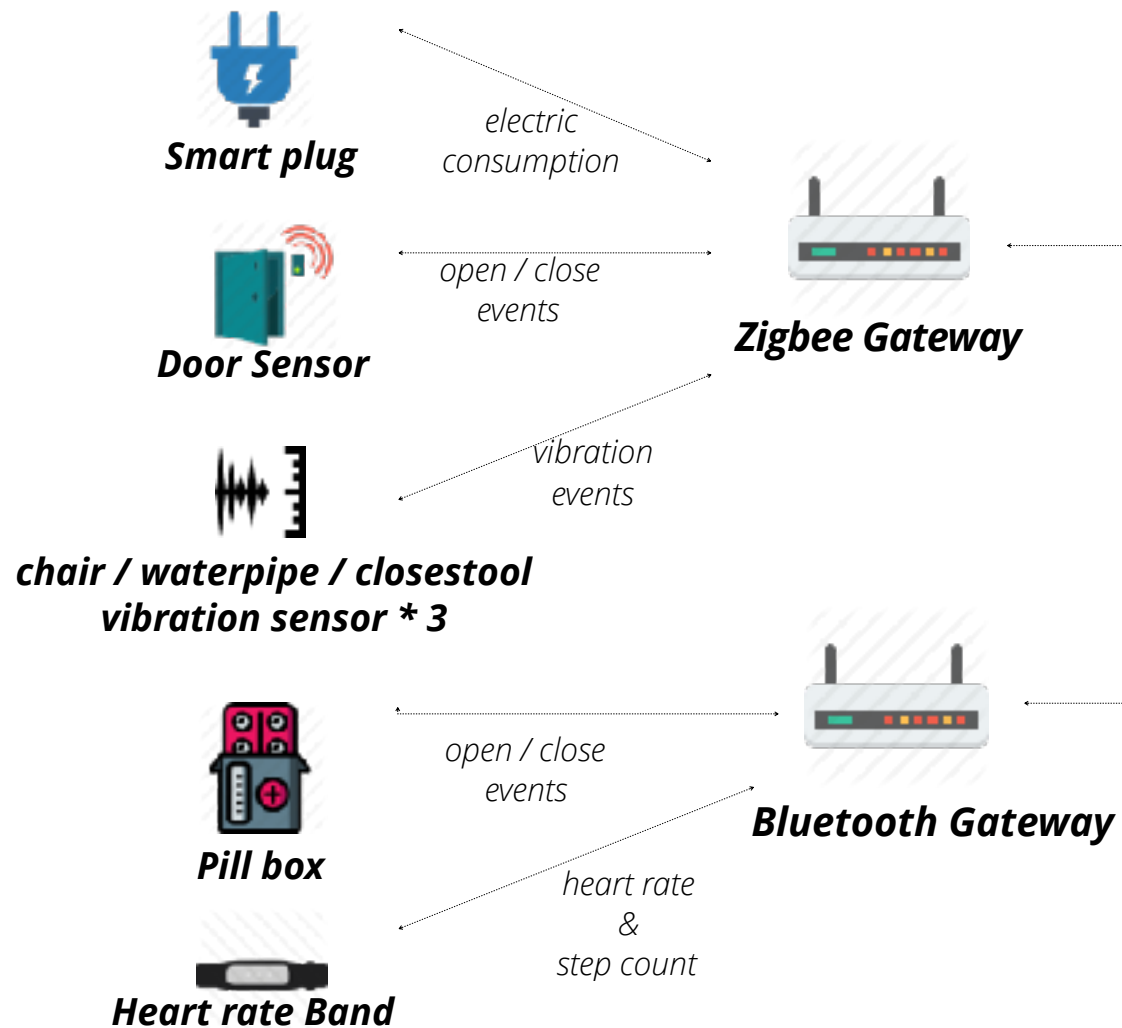


Vibration Sensor

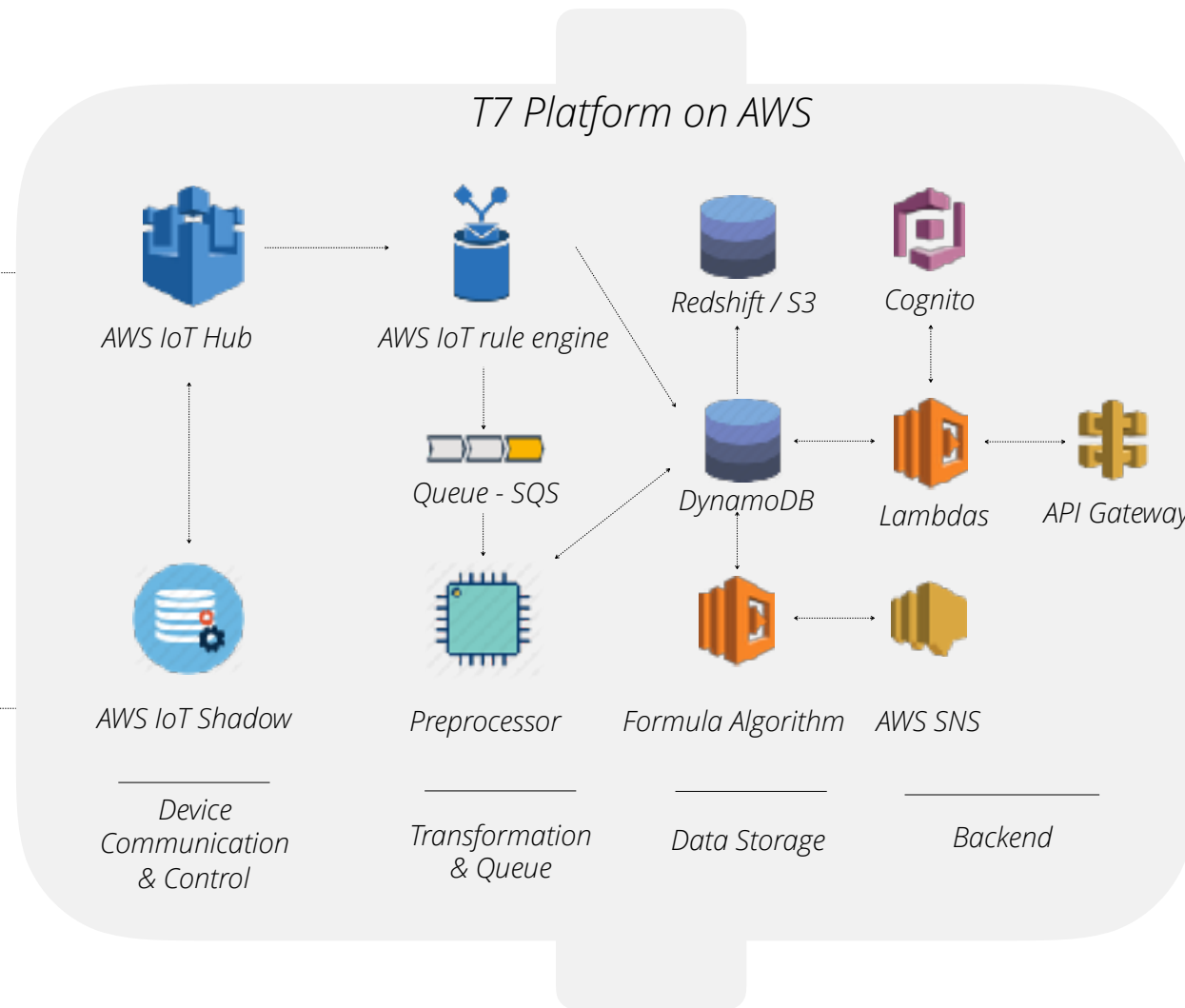


Door Sensor





**In-Field**



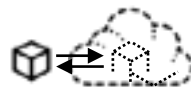
**Cloud**



# Private IoT Platform



Message Hub



Device shadow



Rule engine



Security



SDK & API

*Business*

Applications

*IoT Module*

Edge Device SDK

Message Hub

Thing Model

Time Series Storage

Rules Engine

Management UI

Data Pipeline

Developer CLI

Identity

Security

Monitor

Log

API

*PaaS*

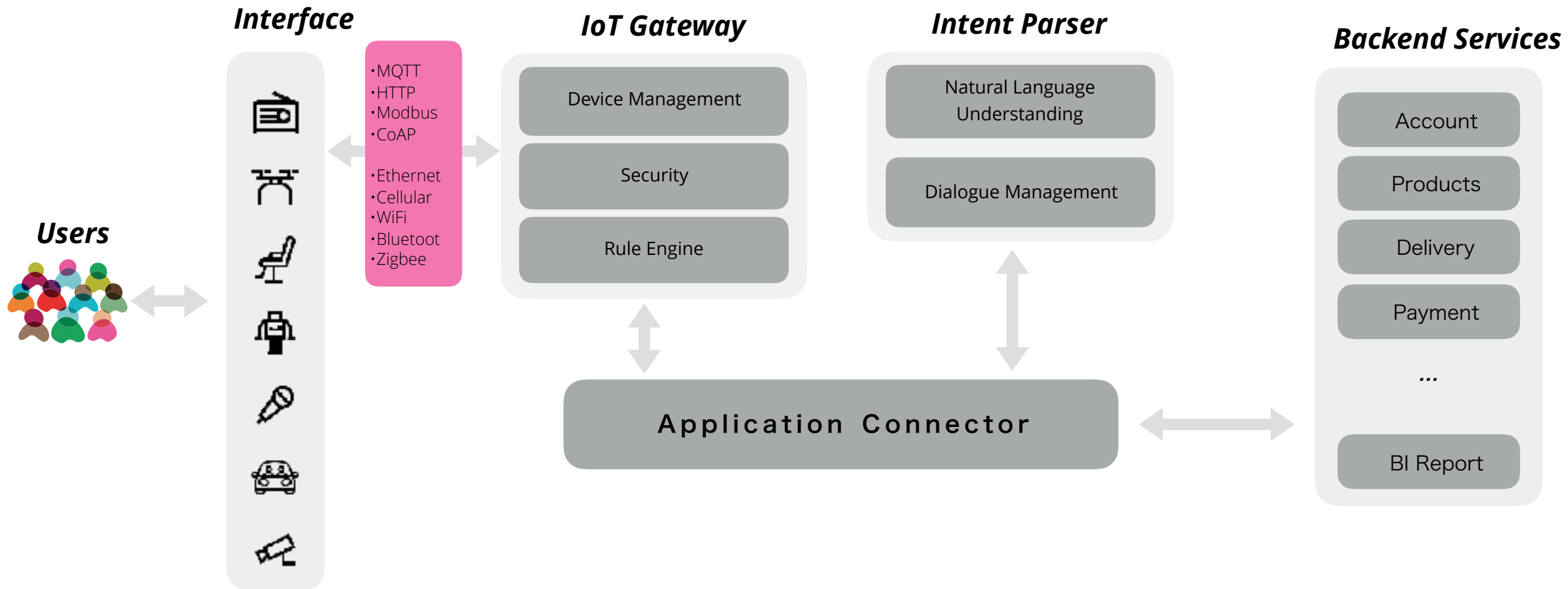
DaoCloud (DCE)

Docker Swarm

Container

Container

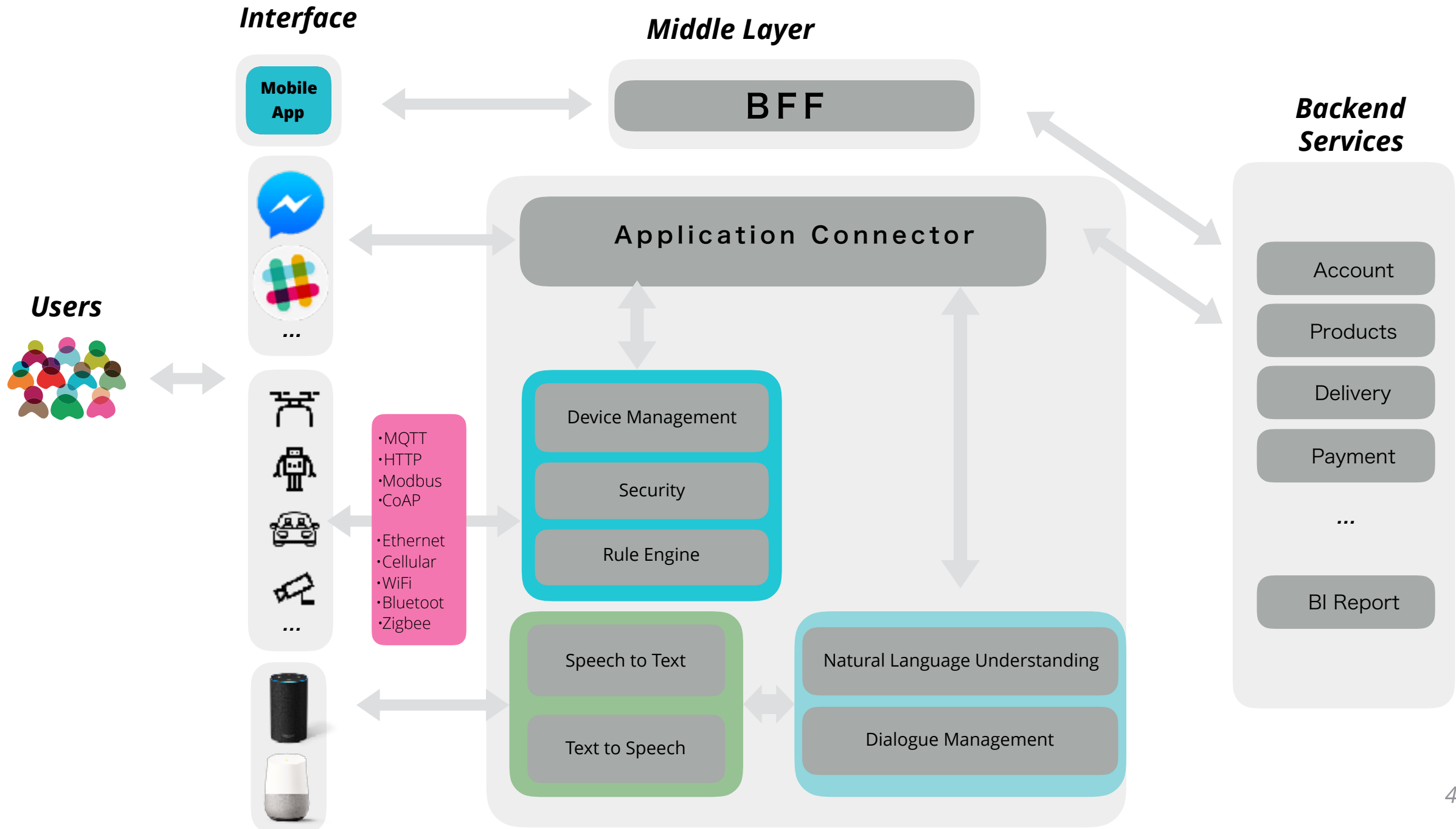
Container



- ▶ Business Model Exploration
- ▶ Device Sourcing
- ▶ Gateway In Field

- ▶ Multi Device Integration
- ▶ Stability!
- ▶ Security!

- ▶ Data! Data! Data!





# THANK YOU!

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Q&A

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