EXTENDING MOWEBA FOR MOBILEAPPS WITH FUNCTIONS IN THE CLOUD

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CIbSE - SET
DEI - FCyT - UC

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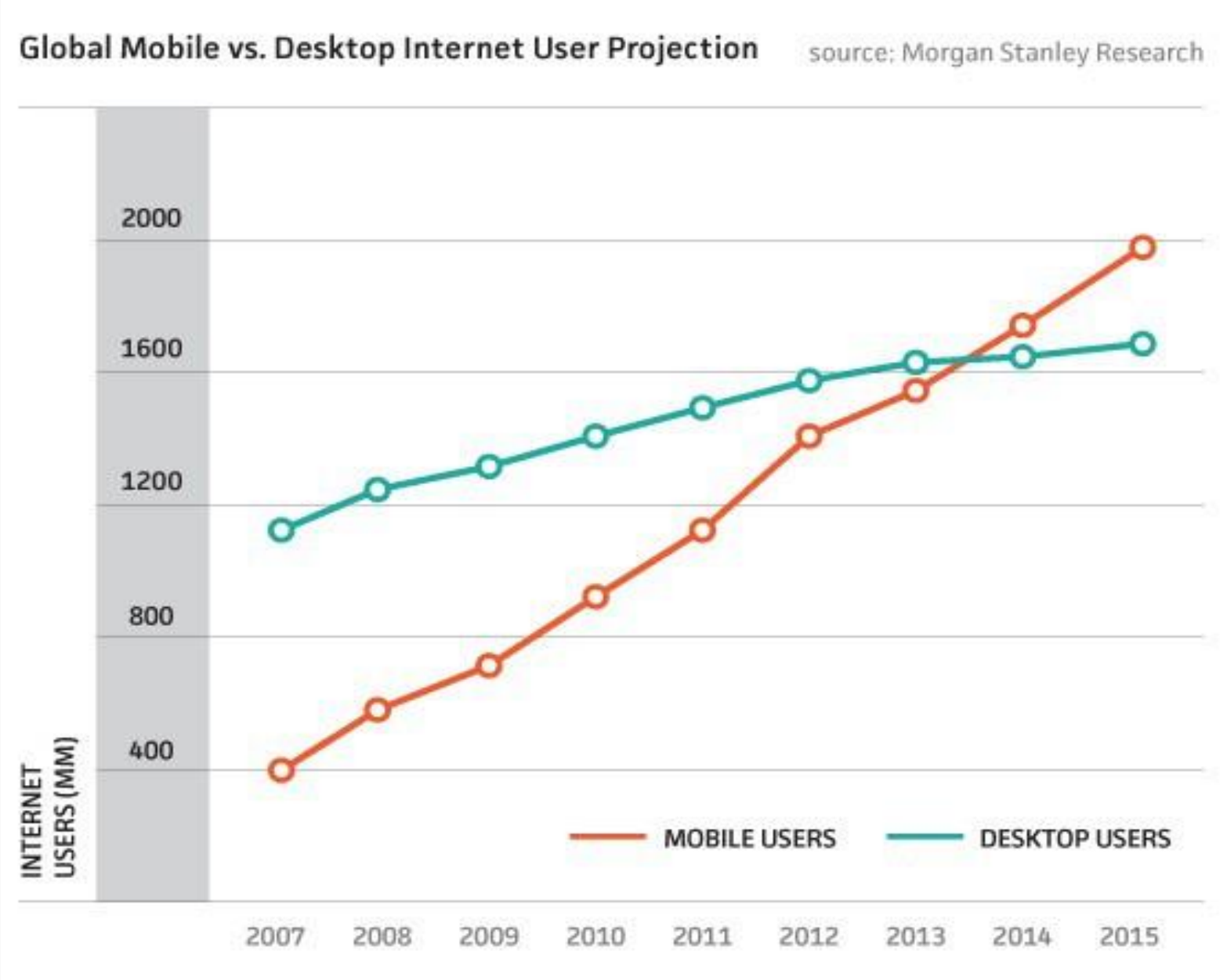
Motivation

Motivation - Mobile Apps

Popularity of Mobile Applications

Motivation - Mobile Apps

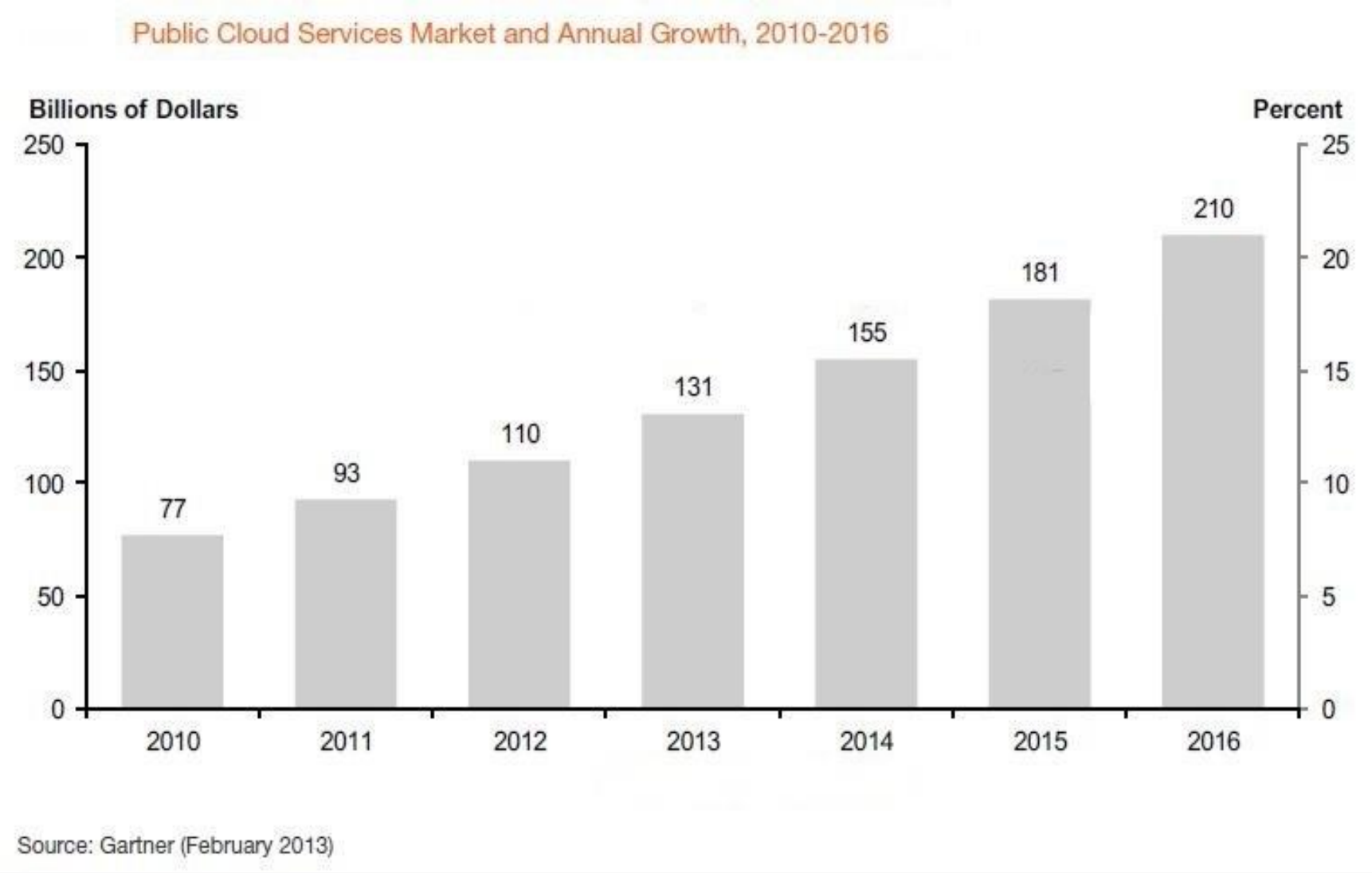


Motivation - Cloud

Popularity of Mobile Devices and Applications

Growth of the Public Cloud Services

Motivation - Cloud



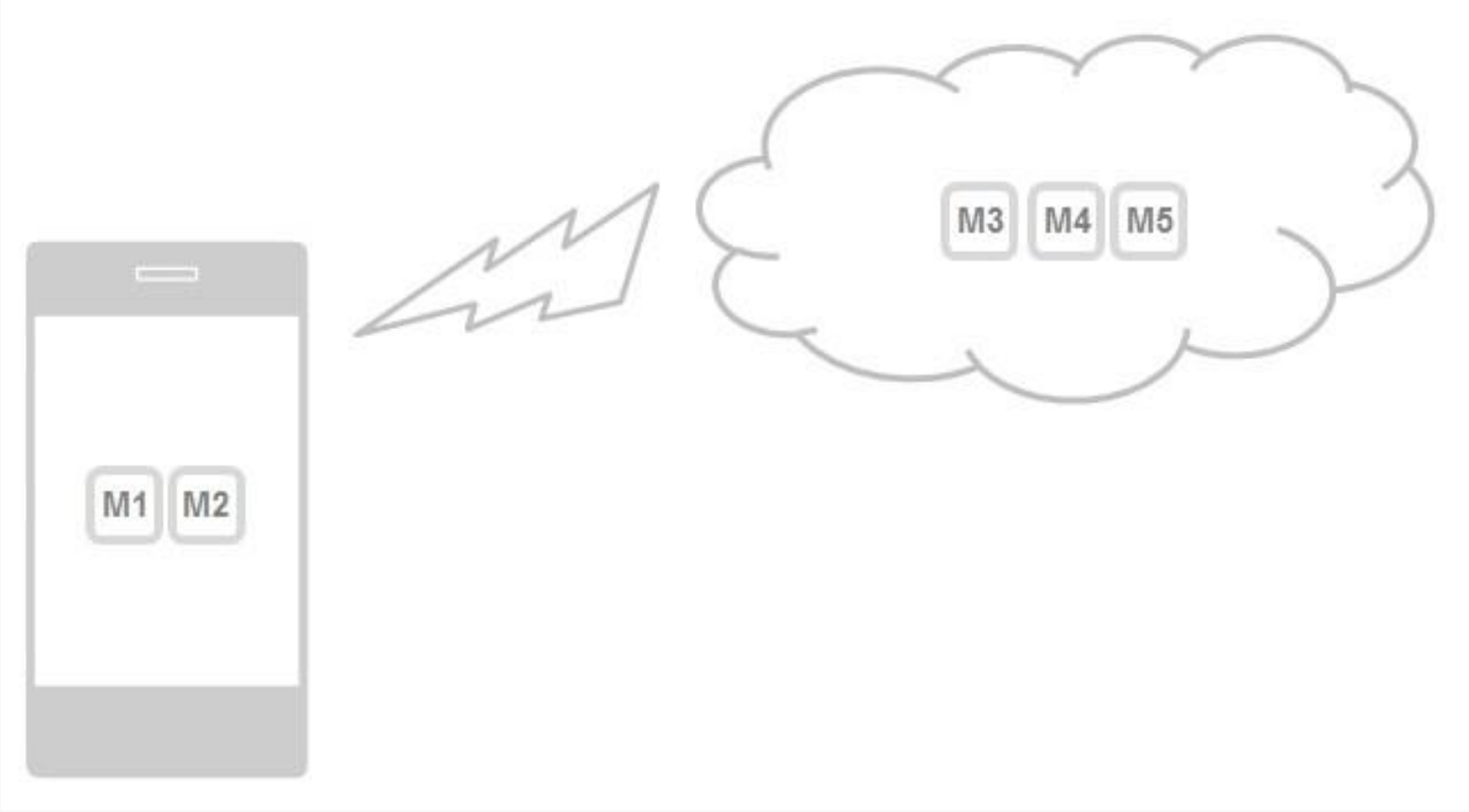
Motivation - MobileApps-FC

Popularity of Mobile Devices and Applications

Growth of the Public Cloud Services

Mobile Applications with Functions in the Cloud

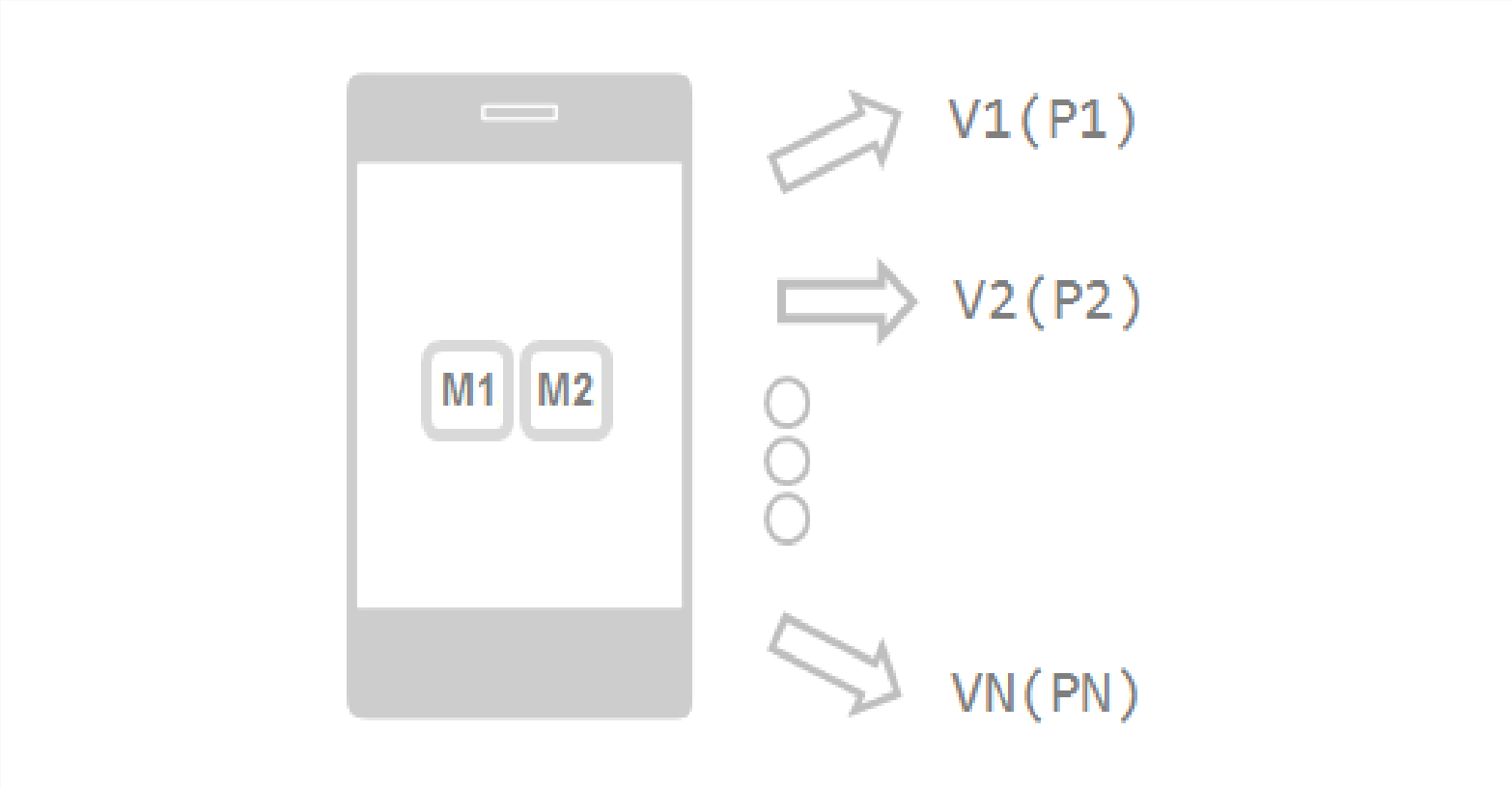
Motivation - MobileApps-FC



Motivation - Portability Challenge

- **Popularity of Mobile Devices and Applications**
- **Growth of the Public Cloud Services**
- **Mobile Applications with Functions in the Cloud**
- **Challenge of the Platform Portability**

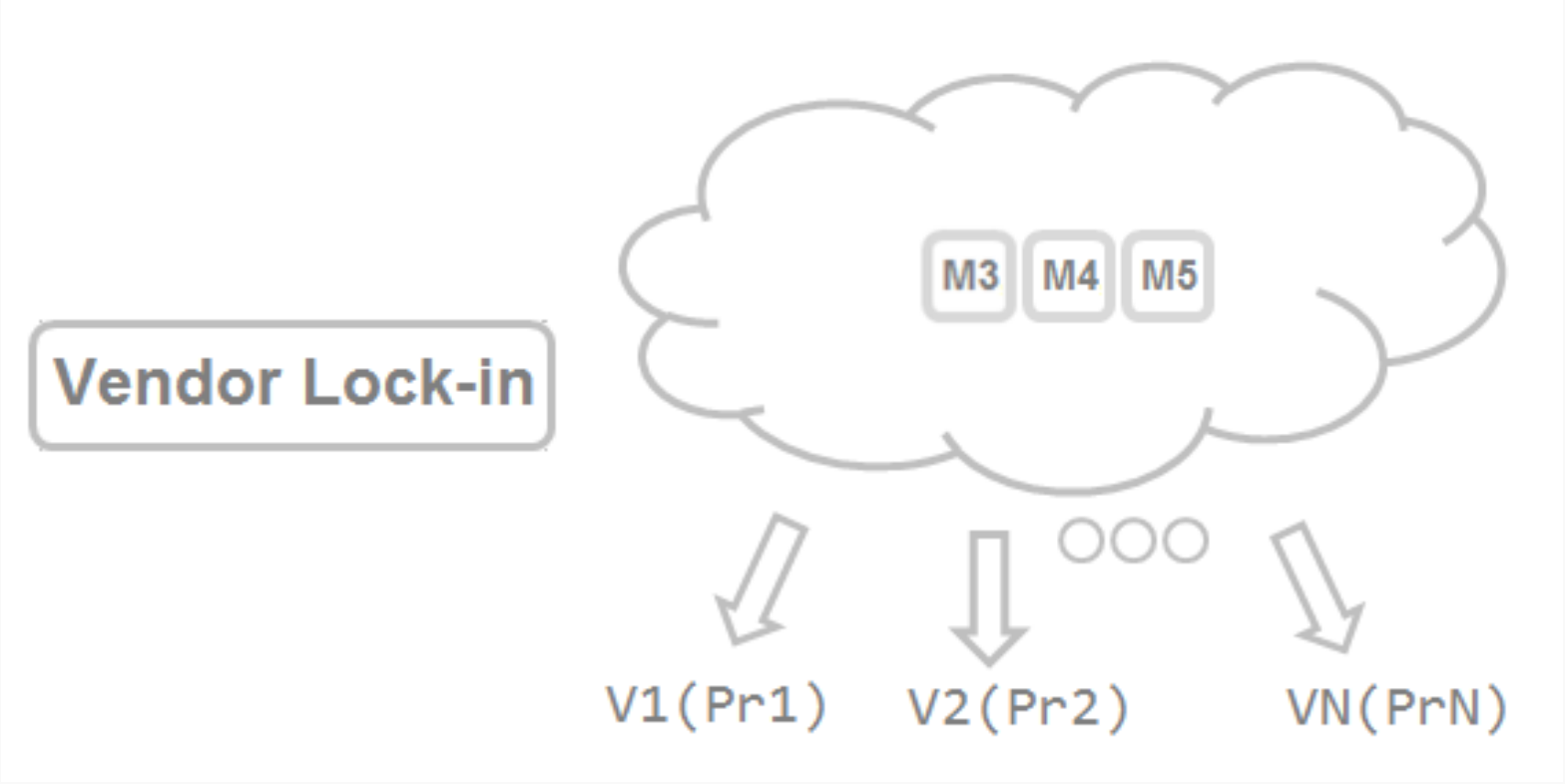
Motivation - Portability Challenge



Greater effort in the development

Observations: VX = Version X, PX = Platform X.

Motivation - Portability Challenge



Considerable effort to migrate

Observations: VX = Version X, PrX = Provider X.

Motivation - MDD as a Solution

Popularity of Mobile Devices and Applications

Growth of the Public Cloud Services

Mobile Applications with Functions in the

Cloud Challenge of the Platform Portability

MDD as a Solution

Motivation - MDD as a Solution

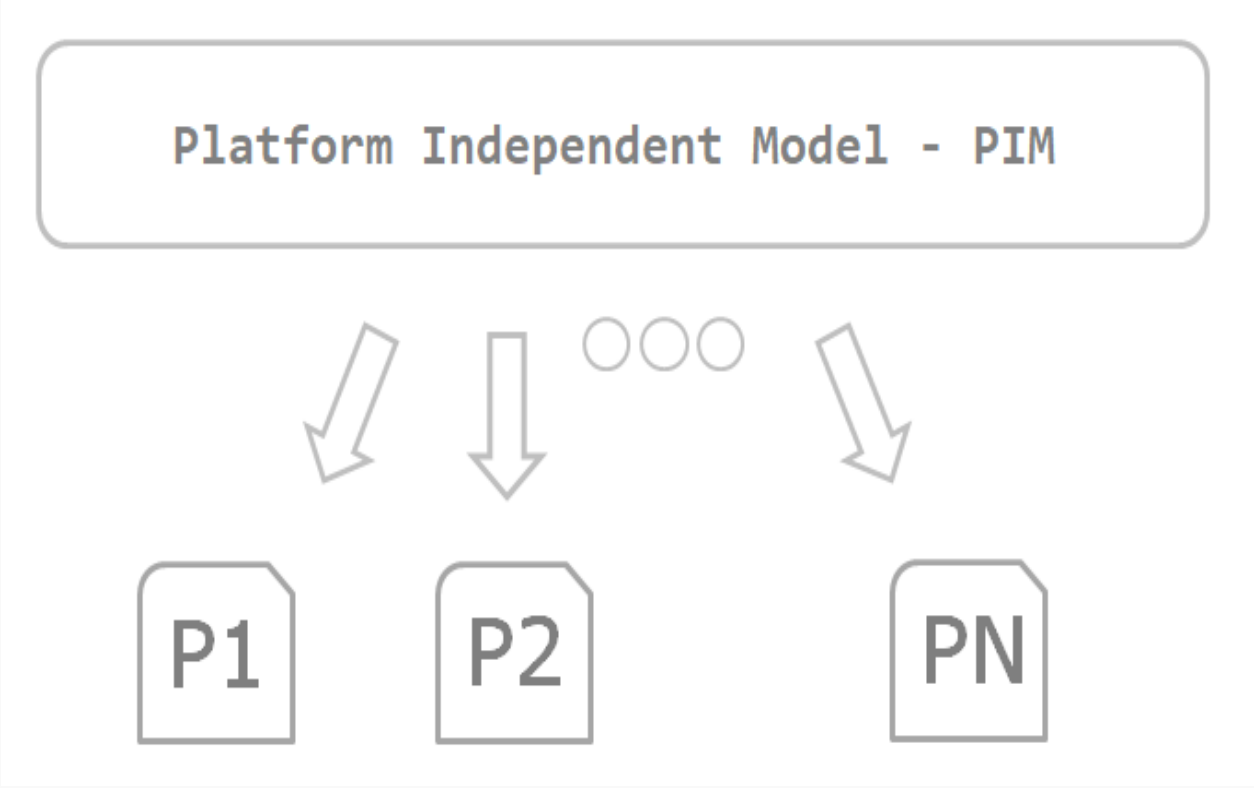
Model Driven Development - MDD

Motivation - MDD as a Solution

Model Driven Development - MDD

Improvement of Portability

Motivation - Improvement of Portability



Motivation - Previous Work

Popularity of Mobile Devices and Applications

Growth of the Public Cloud Services

Mobile Applications with Functions in the

Cloud Challenge of the Platform Portability

MDD as a Solution

Previous Work

Motivation - Previous Work

Architecture Specific Model - ASM

Motivation - Previous Work

Architecture Specific Model - ASM

Clear Separation of Presentation and Behaviour

Motivation - Previous Work

Architecture Specific Model - ASM

Clear Separation of Presentation and Behaviour

Layers Function Oriented Navigation

Motivation

- Popularity of Mobile Devices and Applications
- Growth of the Public Cloud Services
- Mobile Applications with Functions in the
- Cloud Challenge of the Platform Portability
- MDD as a Solution
- Previous Work

SMS - State of the Art

SMS of the State of the Art[1]

There isn't a work including:

- ASM
- Separation of Pres. & Beh.
- Function Oriented Nav.

Additional aspects:

- Unified Modeling
- Standard Language
- MDD and Open Source
- Native Mobile Applications

Common aspects:

- MVC Schema
- REST Architecture

Additional Comments:

- Low graphical modeling
- Cloud implemented in JAVA

[1]Publications in CLEI 2016 and CLEIej 2017

Goal

Propose a model driven approach for the modeling and generation of the network communication of the MobileApps-FC as an alternative for addressing the extra effort caused by the difficulty of platform portability

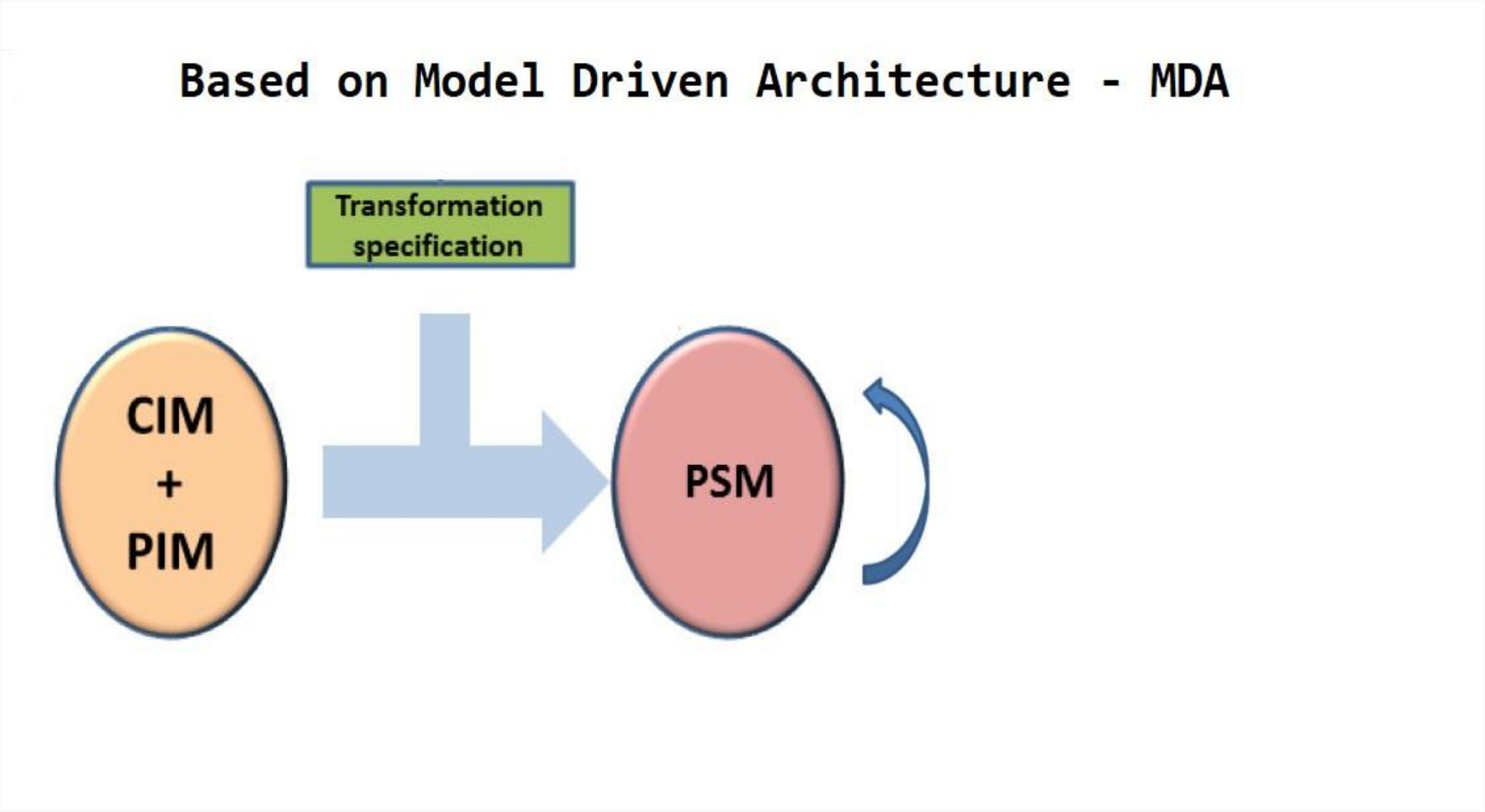
Proposed Solution

Proposed Solution

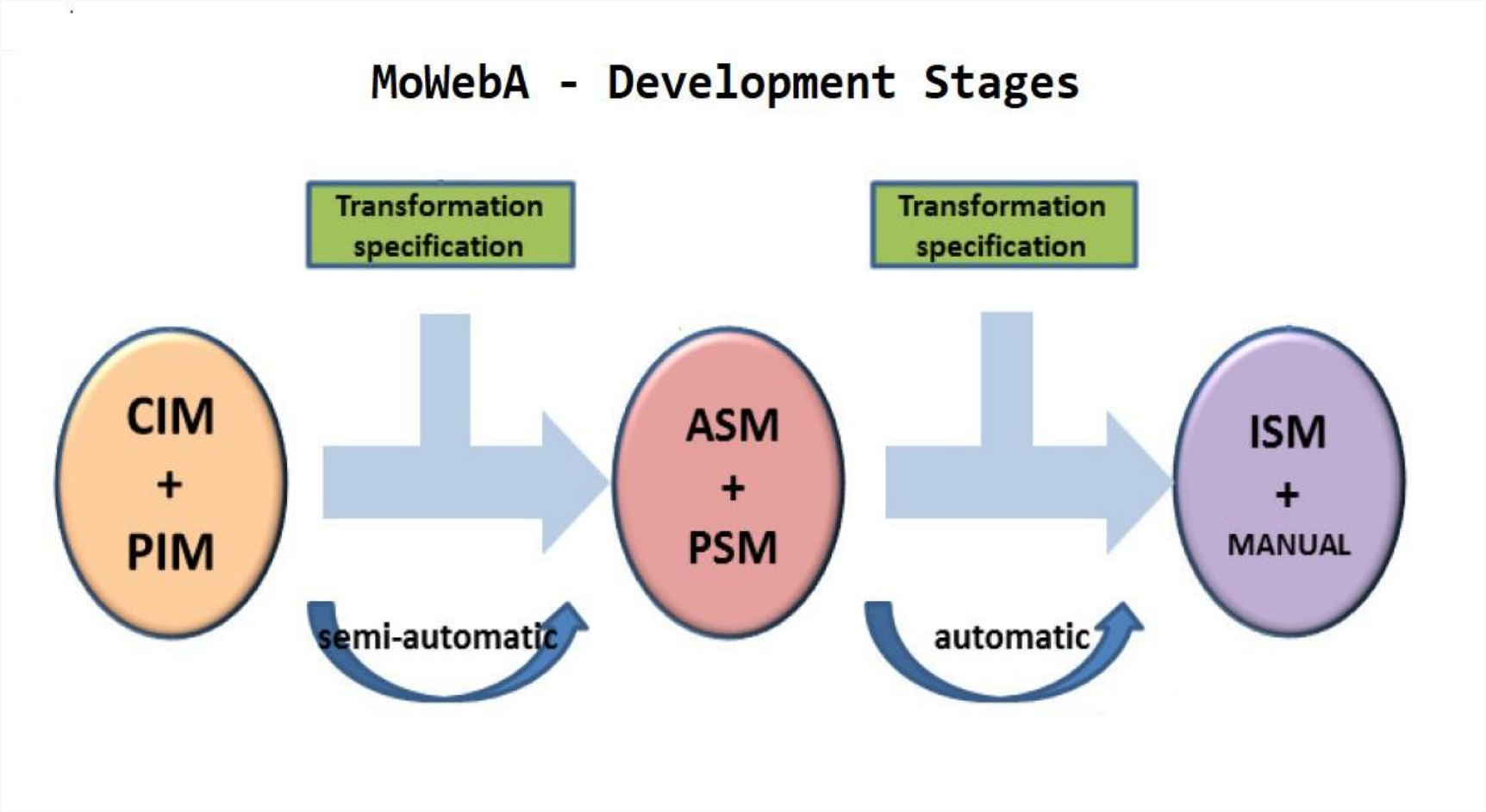
Adoption of MoWebA

- **ASM**
- **Separation of Pres. & Beh.**
- **Function Oriented Nav.**
- **MVC Schema**
- **Standard Language**
- **Graphical Modeling**

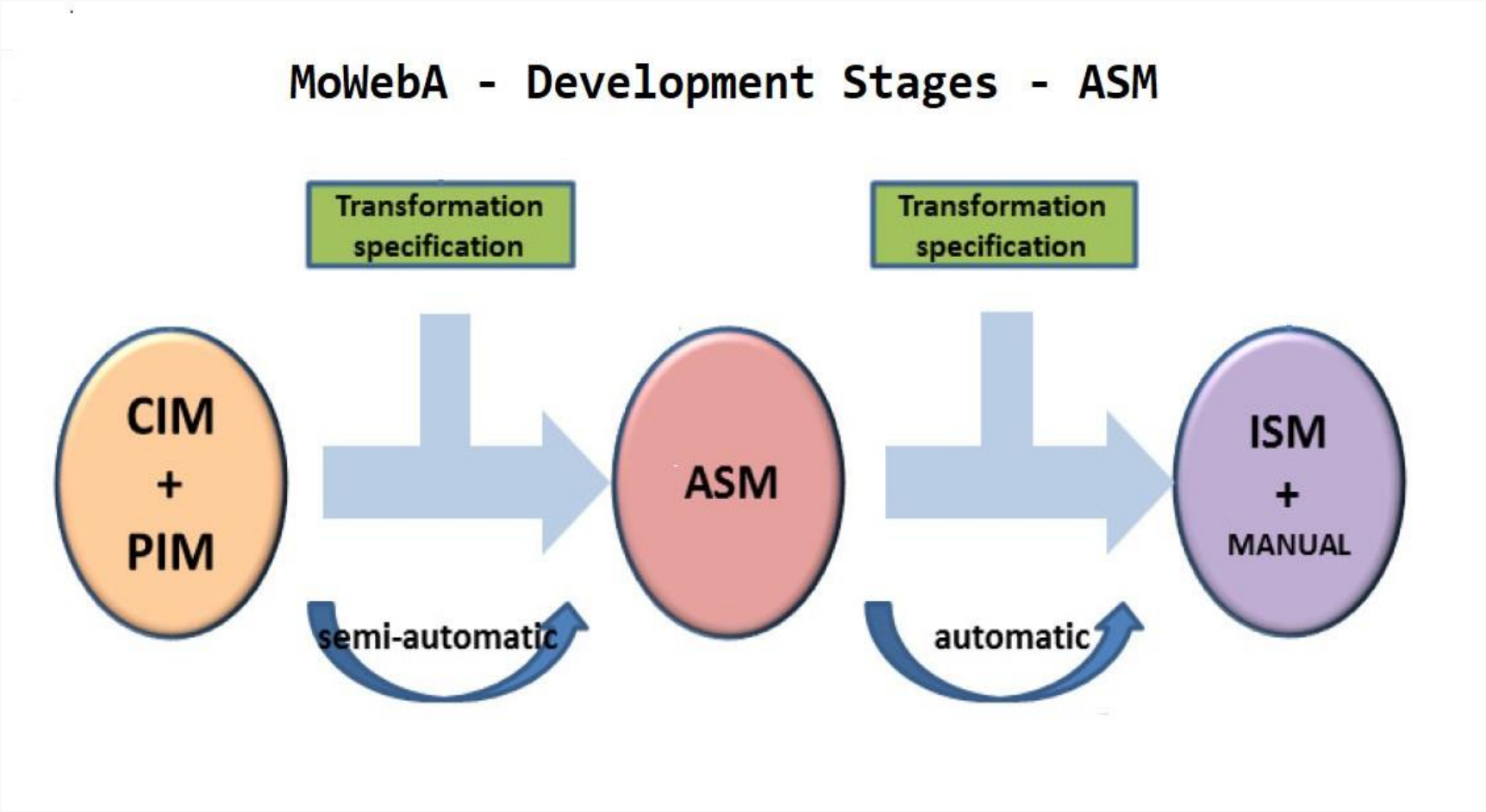
Proposed Solution - Adoption of MoWebA



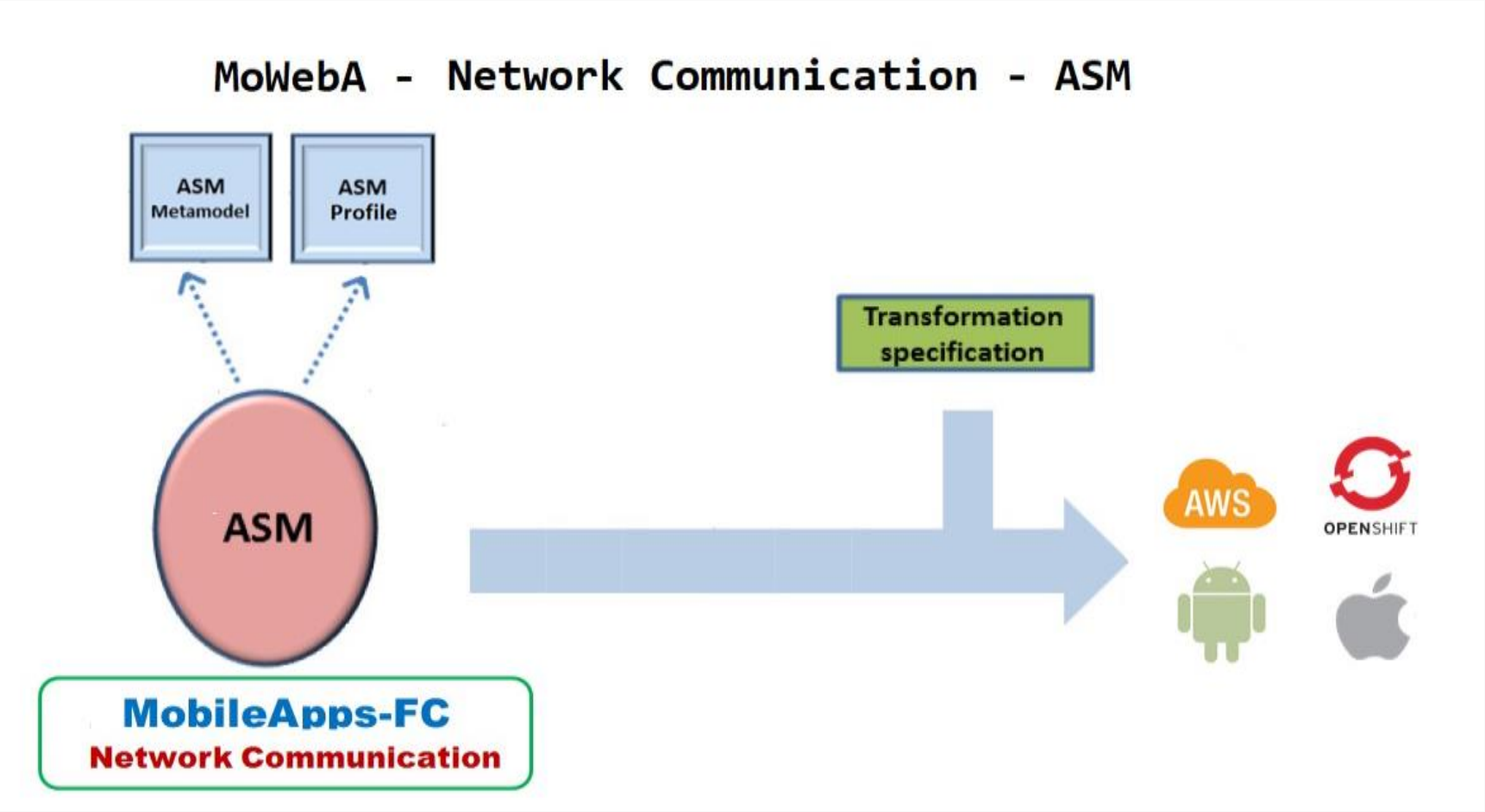
Proposed Solution - Adoption of MoWebA



Proposed Solution - Adoption of MoWebA



Proposed Solution - MoWebA Mobile



Proposed Solution - Extension Process

Proposed Solution

Extension of MoWebA

MoWebA Mobile

- **Unified Modeling**
- **REST Architecture**
- **MDD and Open Source for cloud**
- **Native Mobile Applications**
- **Javascript - Node.js for the cloud**

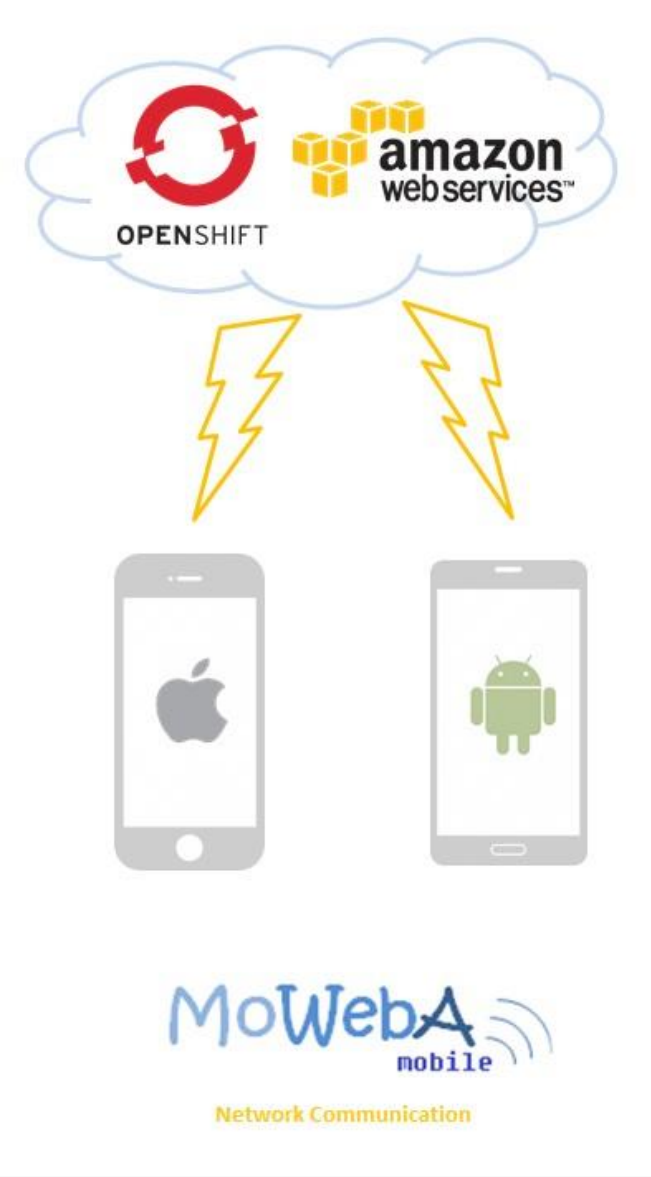
Proposed Solution

Extension of MoWebA

MoWebA Mobile

Network Communication

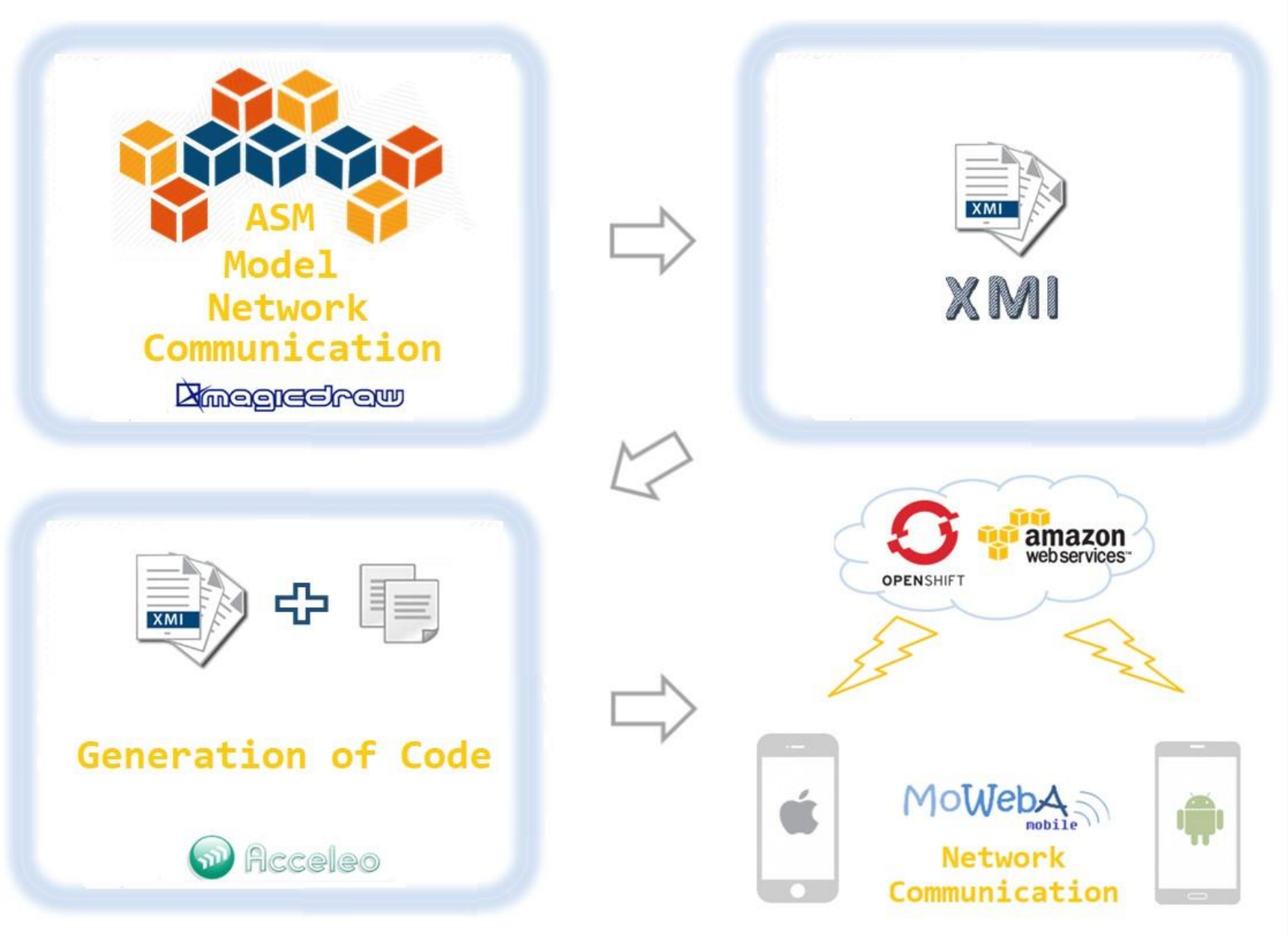
Proposed Solution - Network Communication



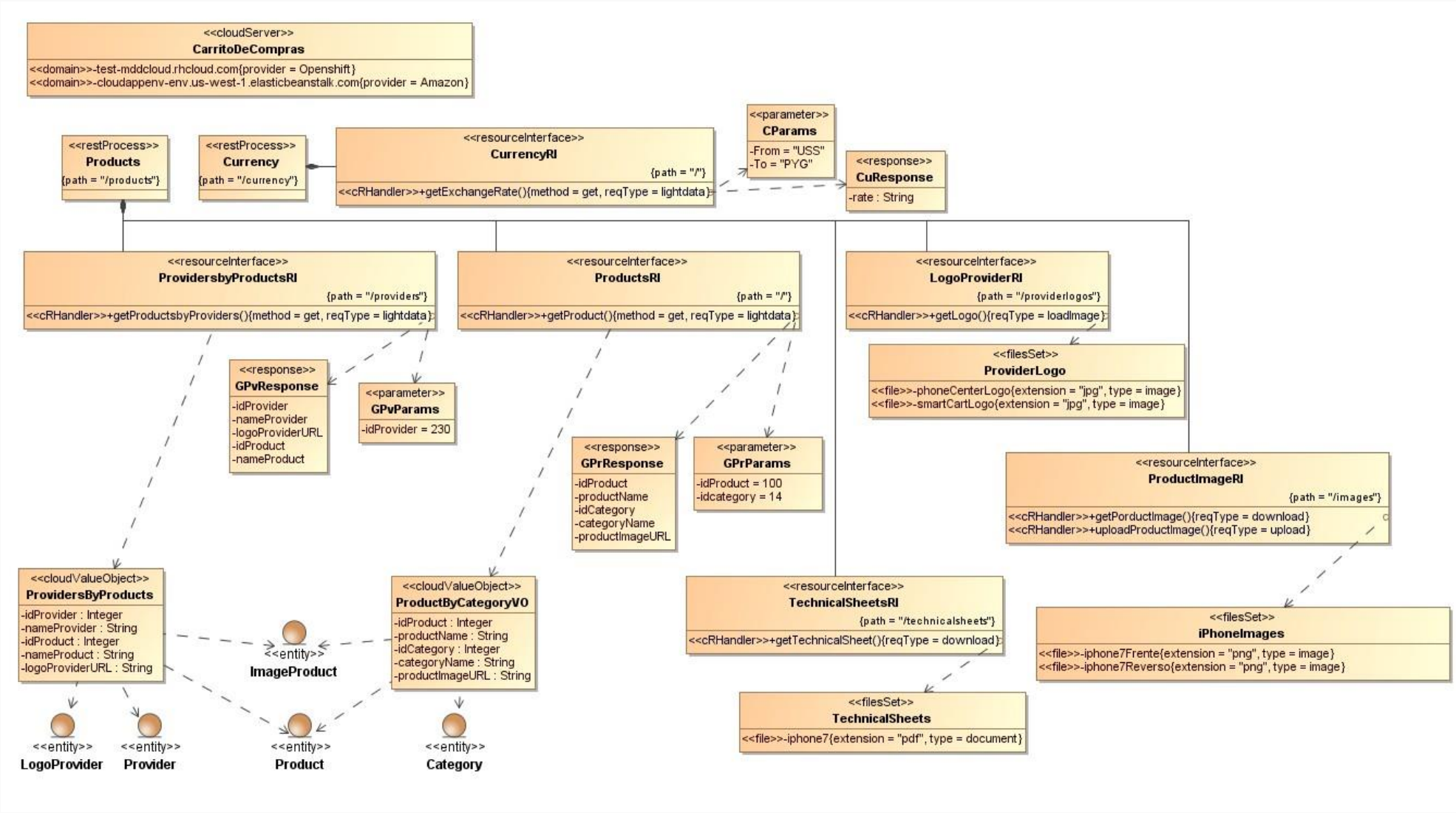
Based on:

- **REST Architecture**
- **Communication Functions**
  - **Light-data**
  - **Load-image**
  - **Download-files**
  - **Upload-files**

Proposed Solution - Development Process



Proposed Solution - Example



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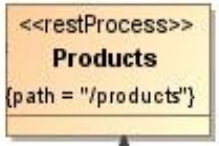
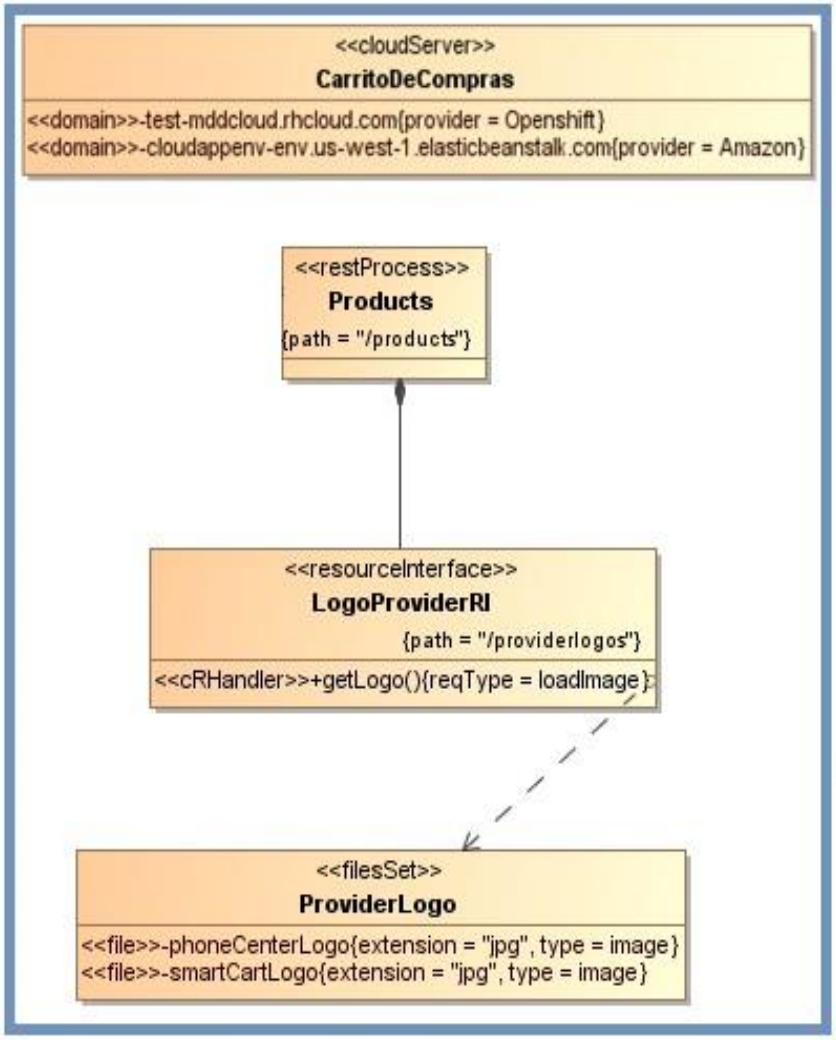


OPENSHIFT

AWS

Proposed Solution - Example



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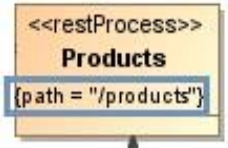

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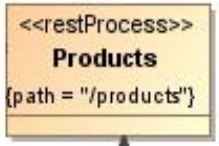

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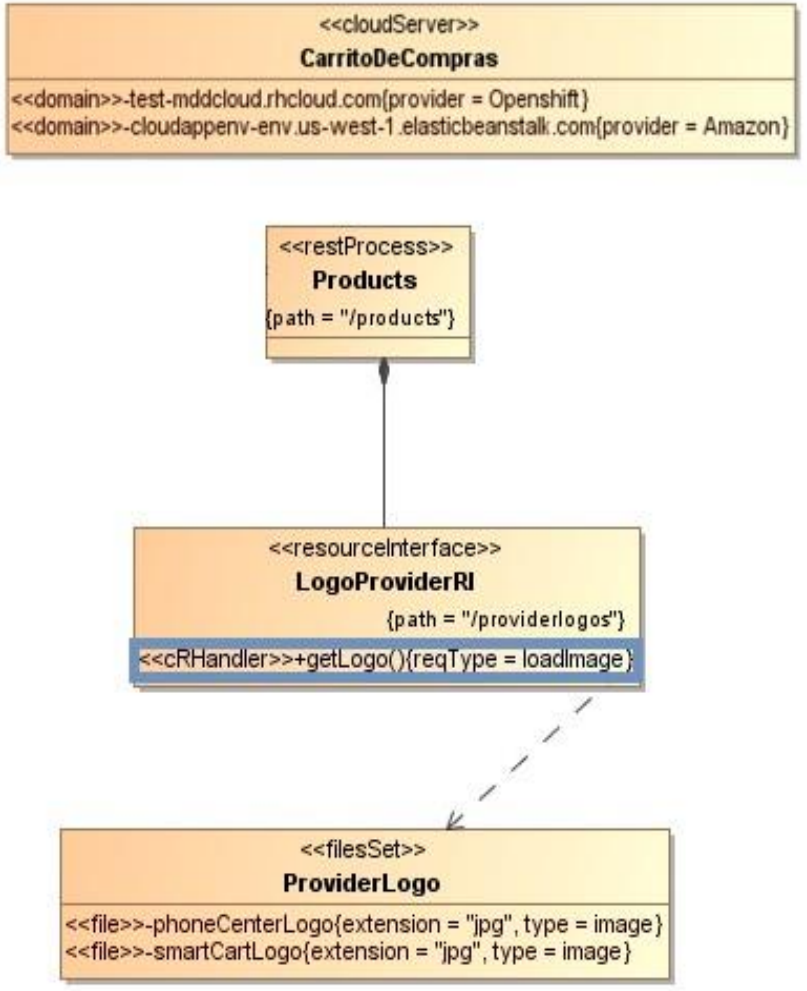

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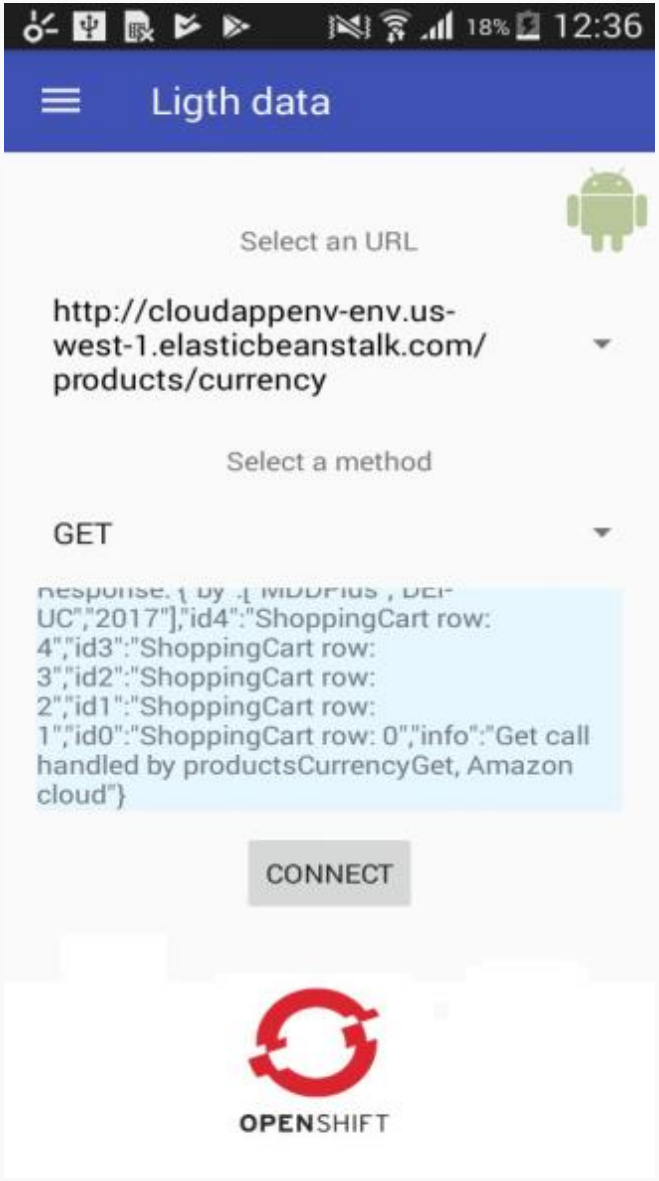

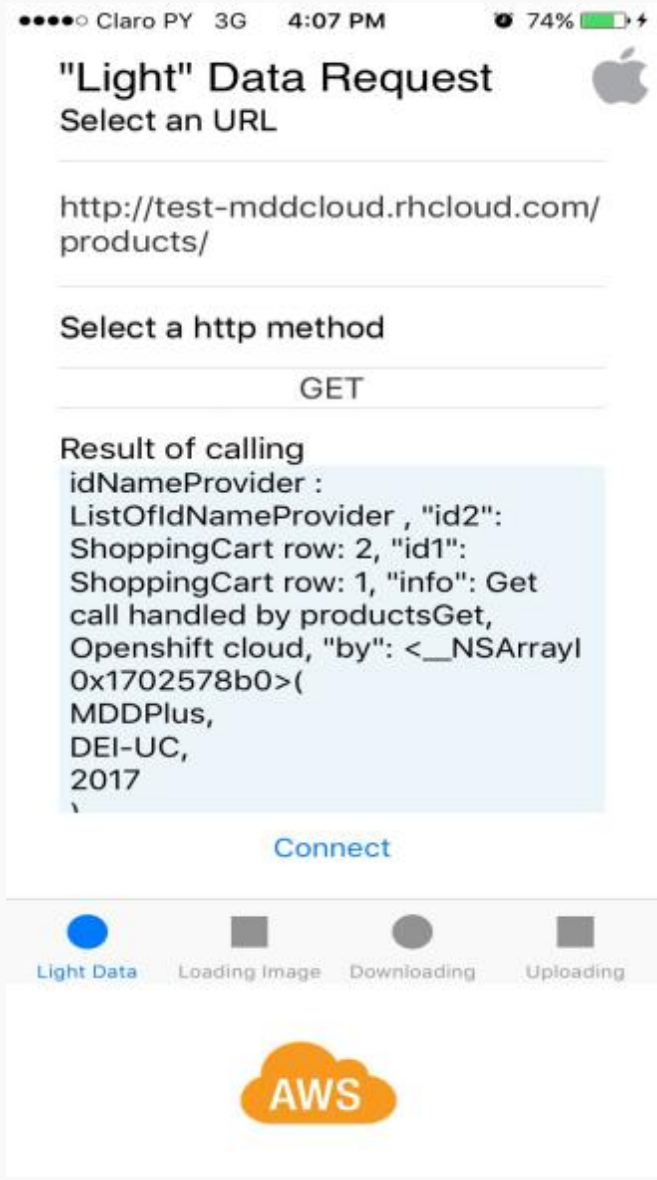

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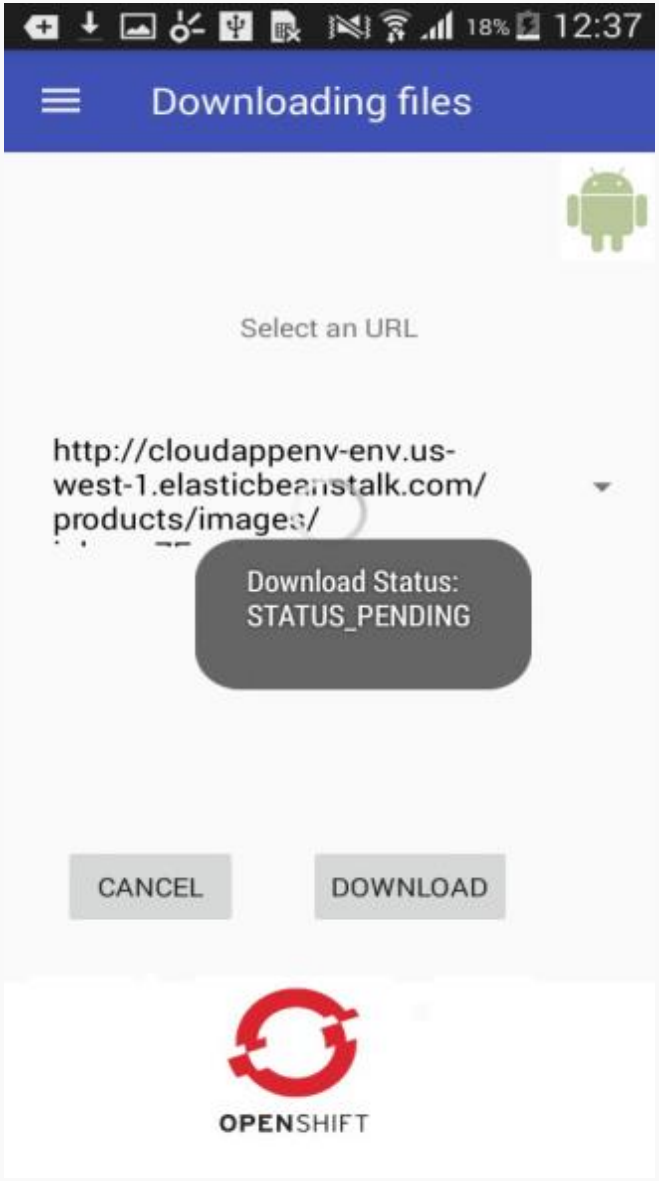

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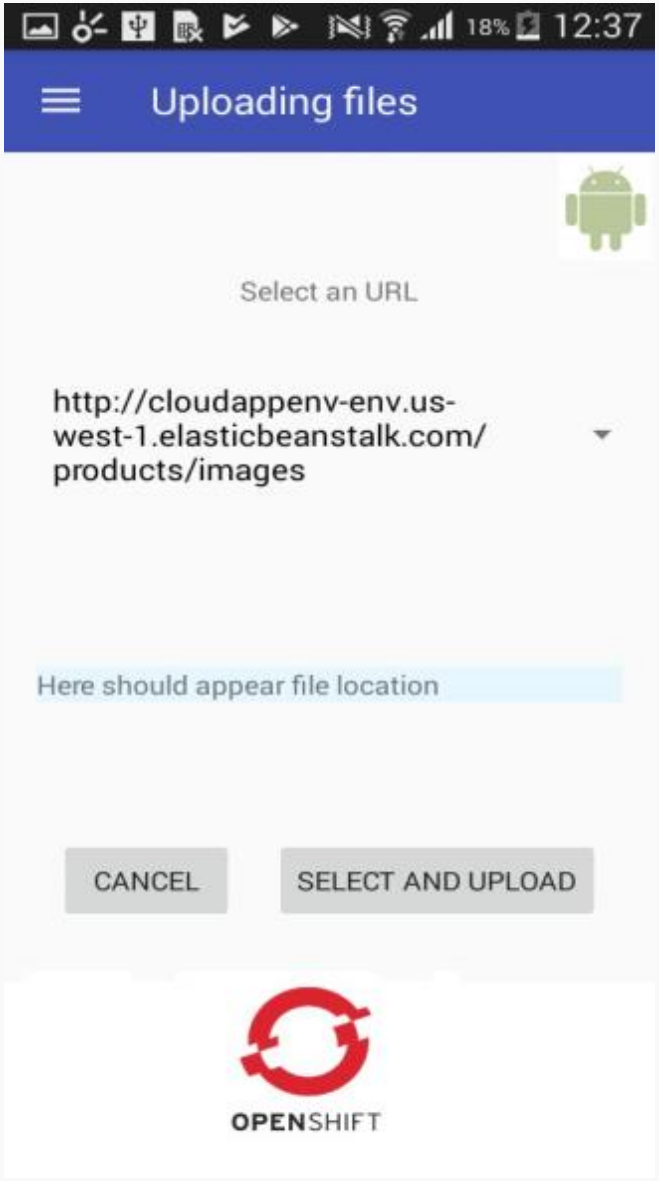
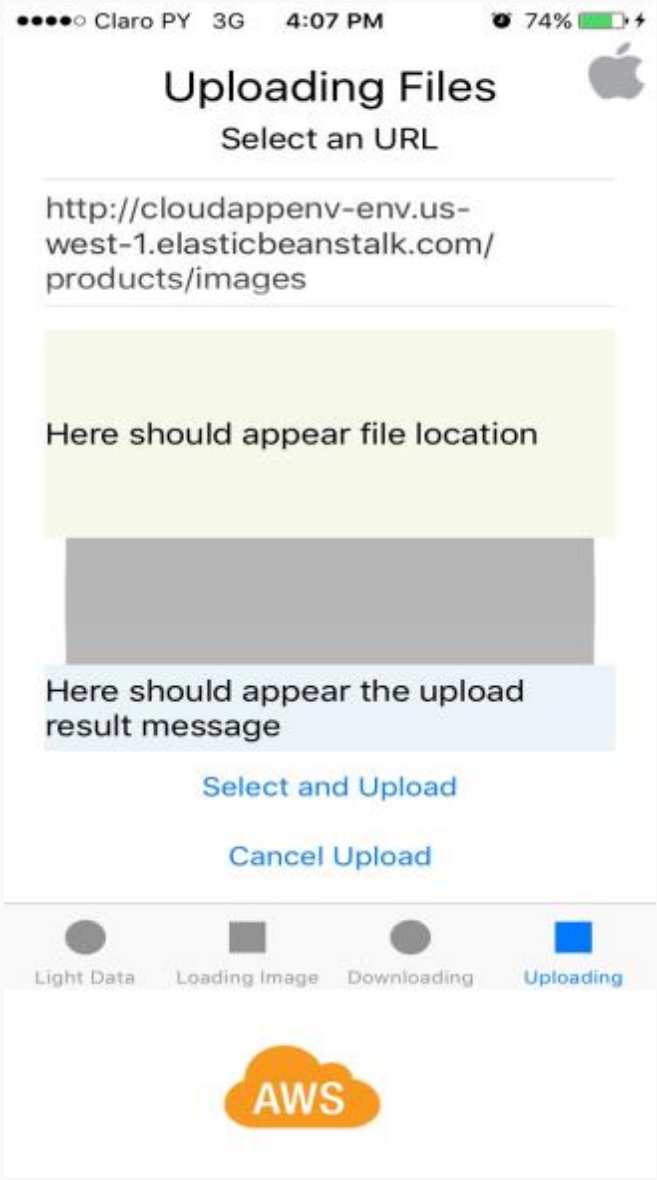
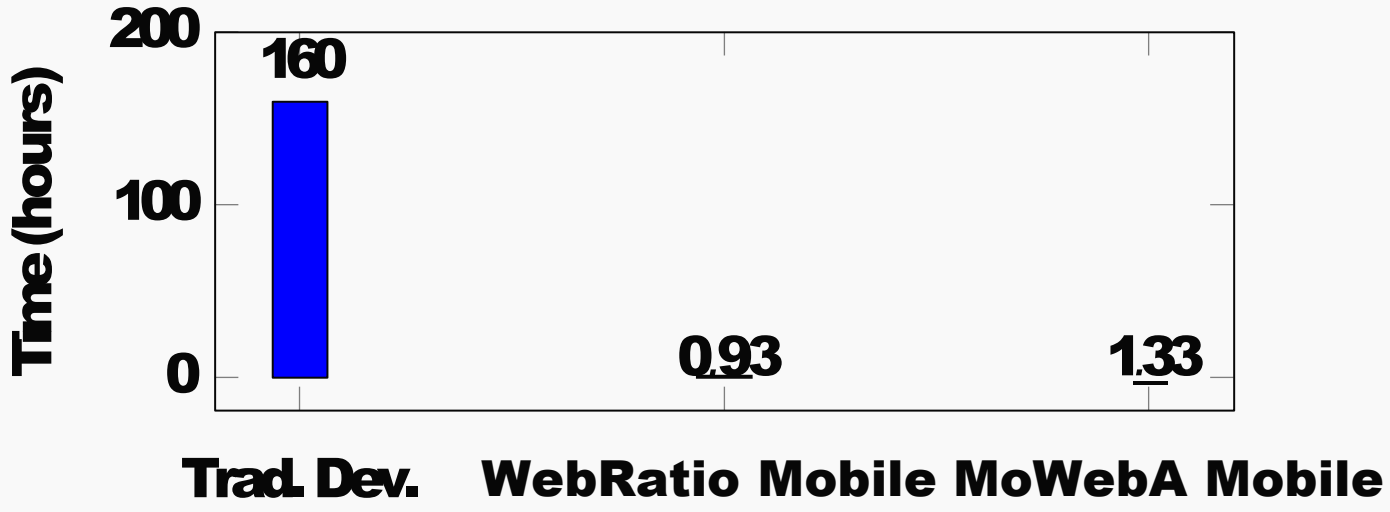




Comparative Study

Comparative Study

RQ1- Effort difference through development time



- Substantial difference of effort in favor of MDD approaches
- WebRatio Mobile had a better time, but ...
- MoWebA's develepment time can be improved

Comparative Study

RQ2- Differences which could affect the modeling effort

- MoWebA Mobile considers a unified modeling

- WebRatio Mobile considers two models: mobile and cloud

The unified modeling helps to save design effort

- MoWebA Mobile considers M2M semi-automatic rules

- WebRatio Mobile does not consider such M2M rules

The M2M rules can help to save effort in the modeling process

Comparative Study

RQ3- Number of platforms considered

- MoWebA Mobile considers:

-Two mobile platforms

-Two cloud platforms

- MoWebA Mobile considers:

-Two mobile platforms

-One cloud platform

MoWeba's cloud code is based on Docker, which eases the code portability

Conclusions

Conclusions

Extension of MoWebA to develop the MobileApps-FC

ASM to design and to generate the network communication

Comparative study with MoWebA Mobile

Future Works

Future Works

Build a specific tool for making simpler and faster the modeling

Build transformation rules between the PIM and the ASM

Improve validations of our proposal

Thanks

Questions?

Contact

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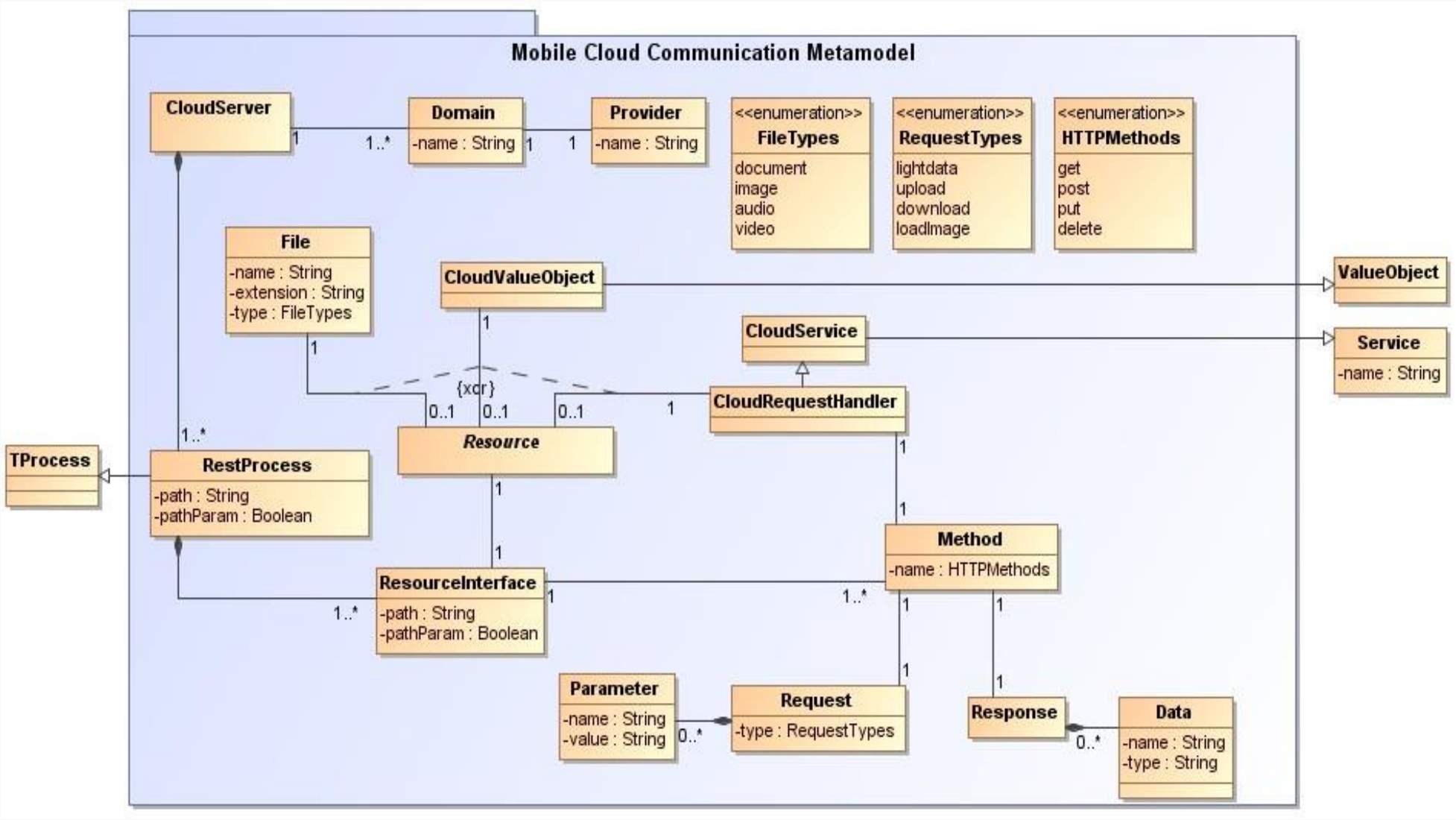
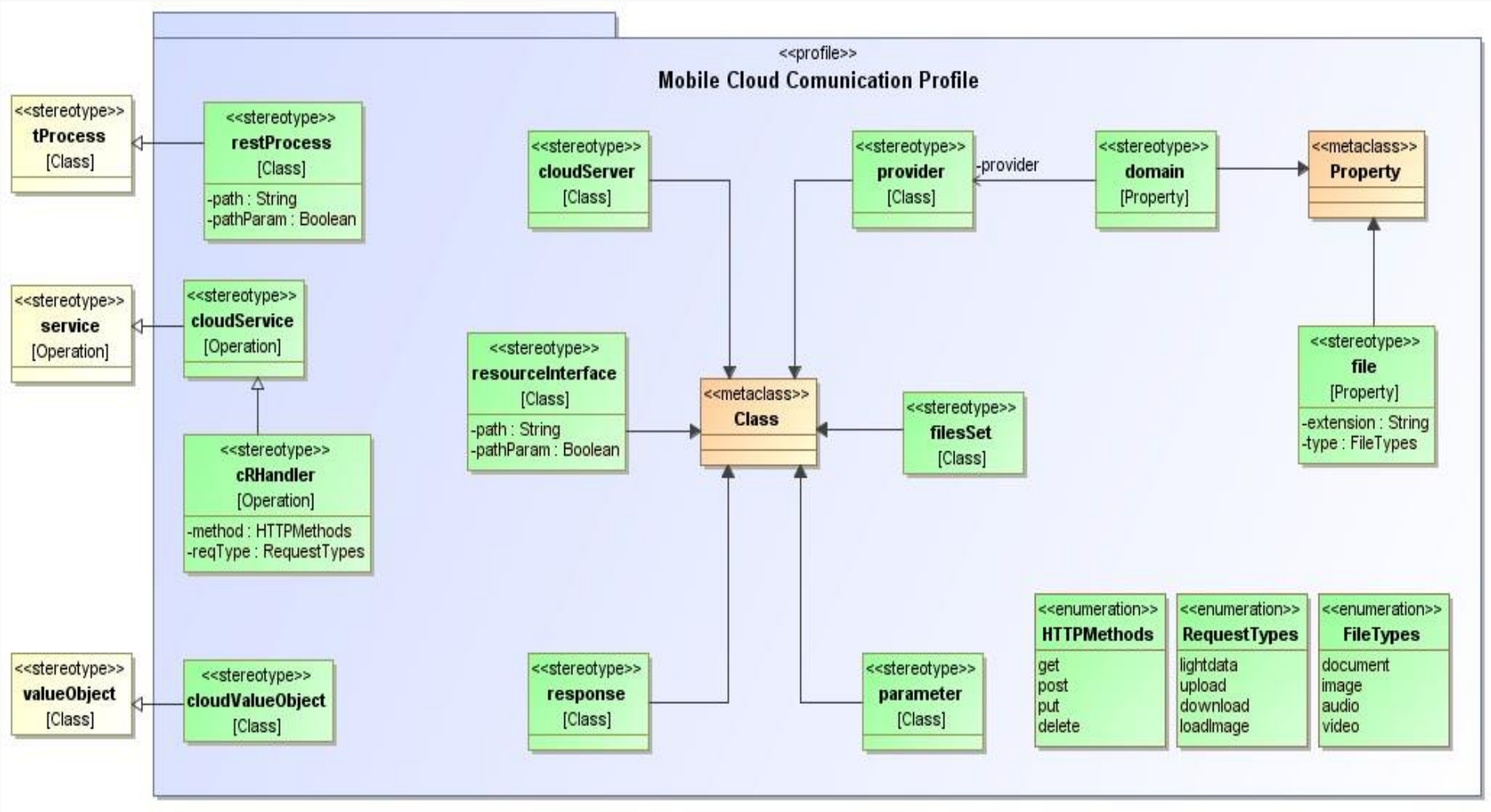
Proposed Solution - ASM Metamodel



Proposed Solution - ASM Profile



Proposed Solution - Transformation Rules

Mapping between the model and the target code

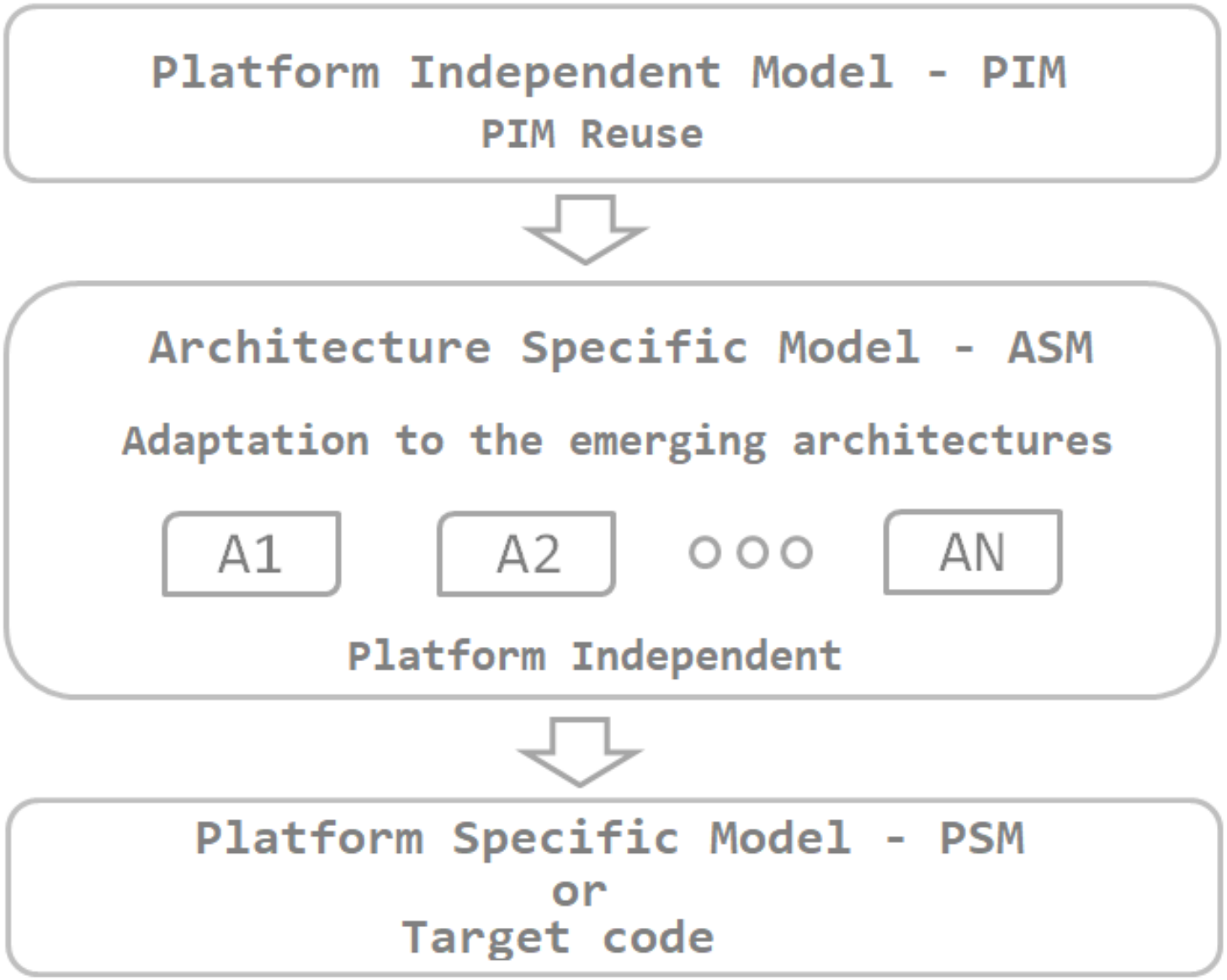
M2T transformation rules

Languages: MTL, OCL and Java

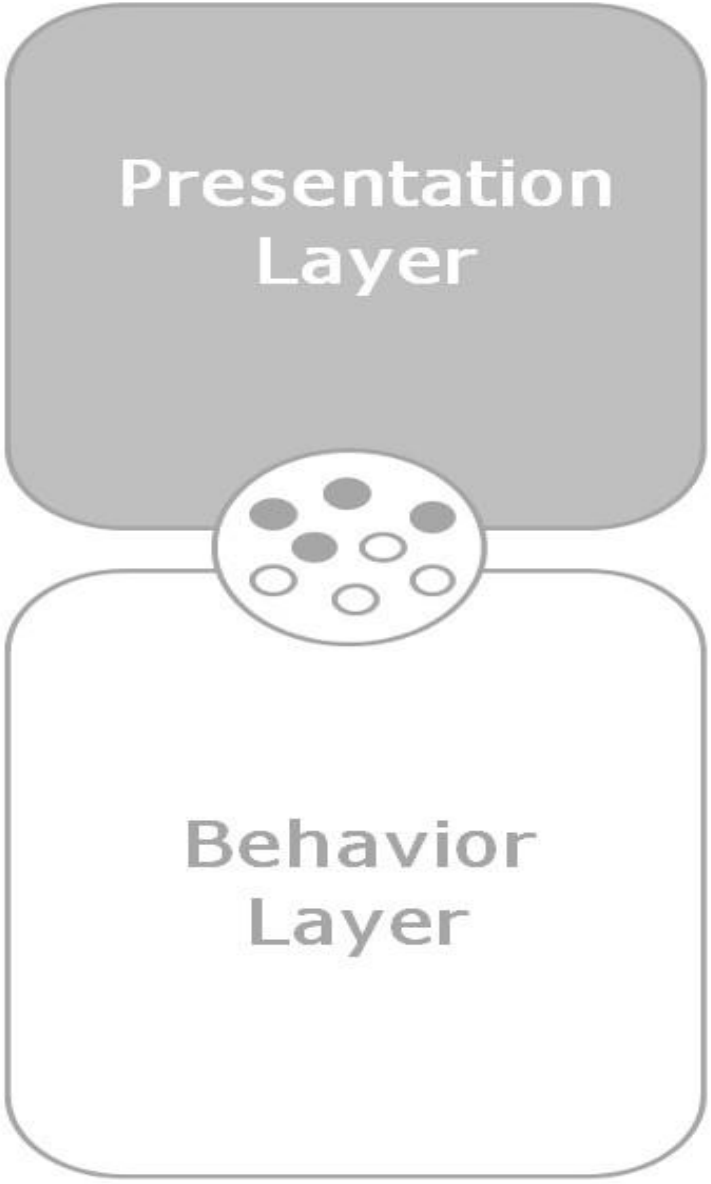
Target code generated:

- **Mobile: Swift for iOS, Java for Android**
- **Cloud: Javascript - Node.js for Openshift and AWS**

Previous Work - ASM



Previous Work - Separation of Pres. y Beh.



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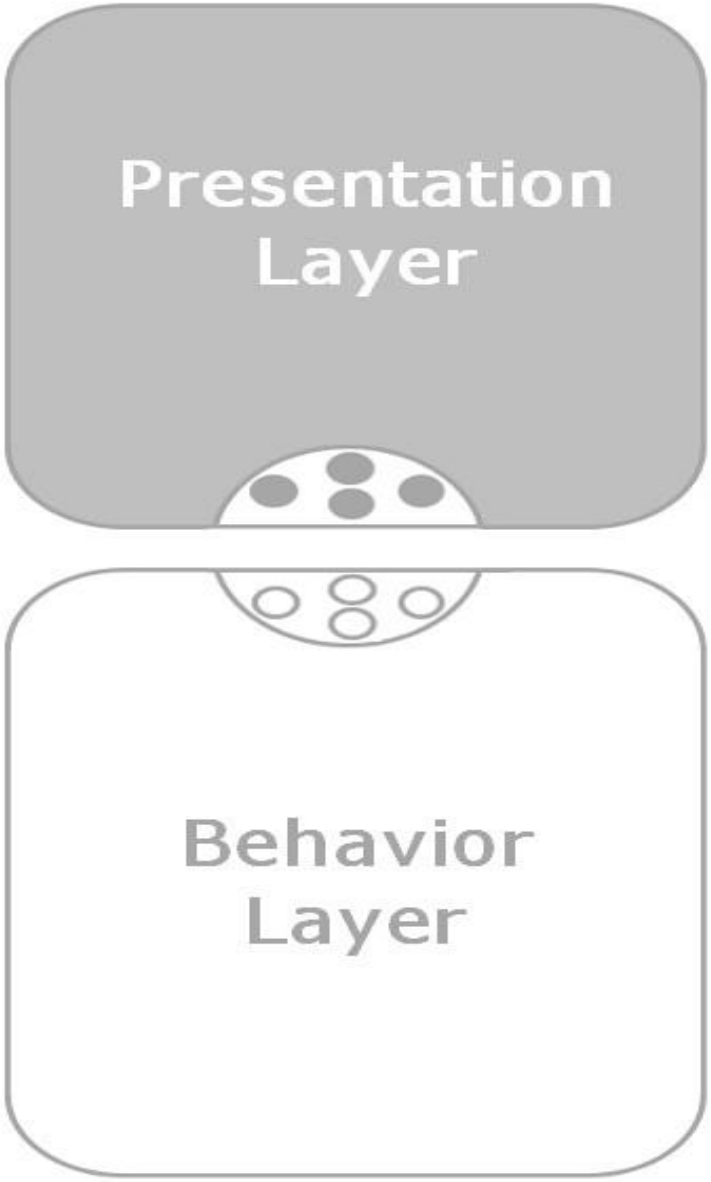
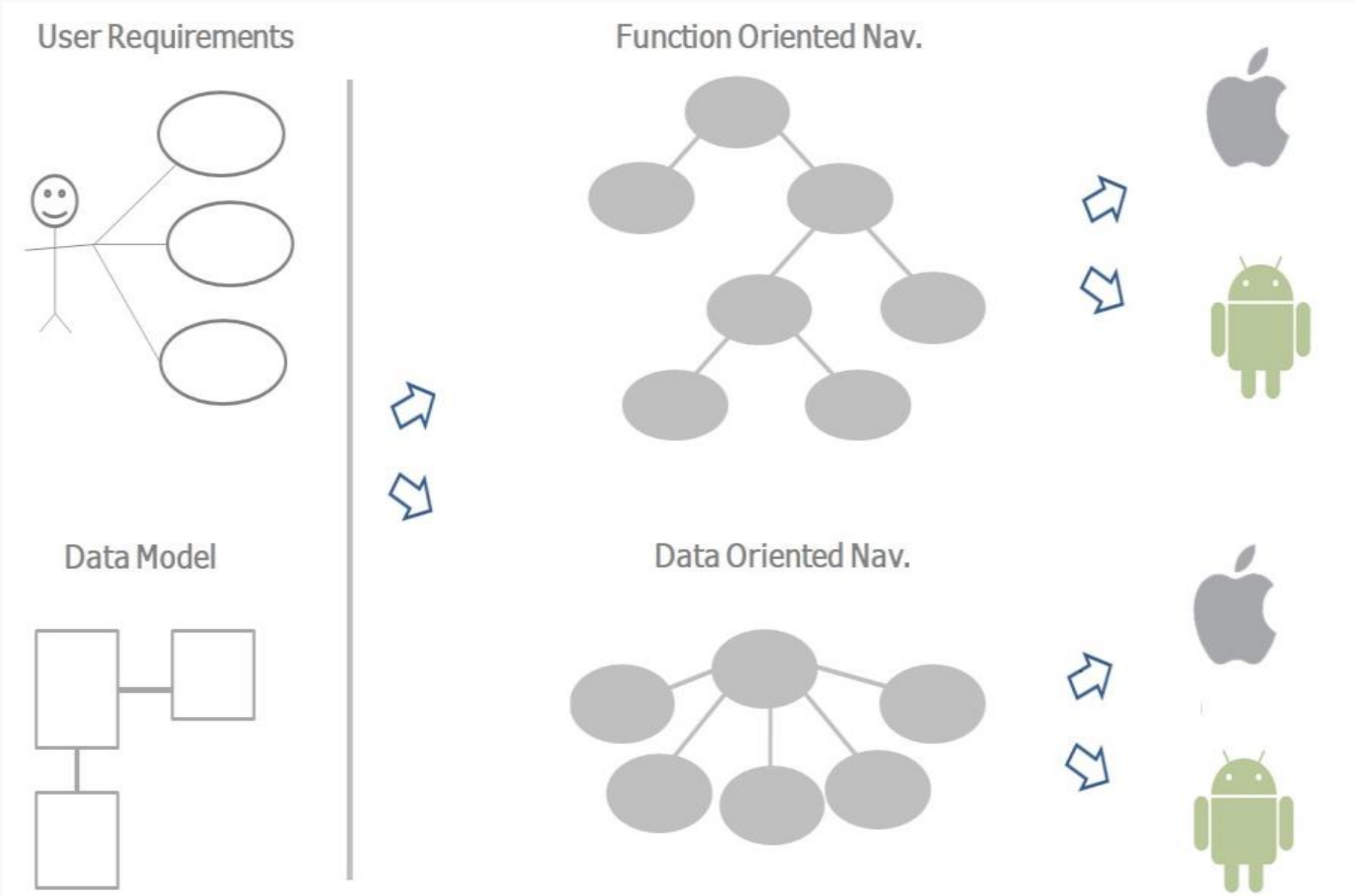
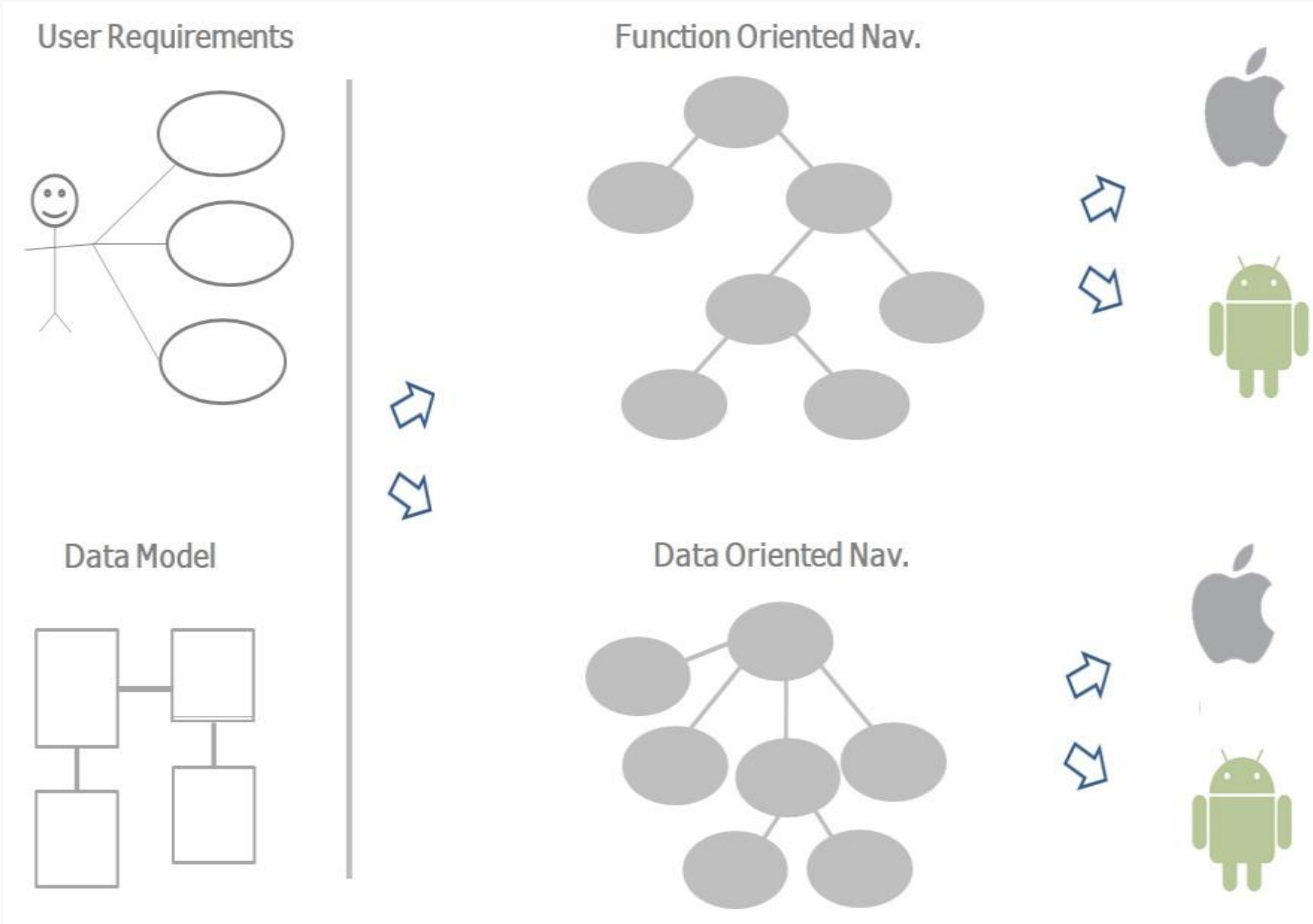


Previous Work - Function Oriented Nav.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