# Response

## Our understanding of your requirements

XXXX wants to develop a mobile application which will **offer extended services for the Connected Car vehicle**. As a part of this extension of functionality XXXX wants to get feedback from the customer as well as from the system itself. My XXXX App will be smart enough to support analysis of the customer behaviour and the XXXX connected services.

XXXX wants to bring following experience for Connected Car Owners through XXXX Mobile app 3.0

* **Personalized, Software-Driven Consumer Experience**
* **Data Analytics**
* **Security**

We also understand existing infrastructure and components (MBB Backend and Audi Framework) will be reused and enhanced (If required) to develop My XXXX mobile app. Analysing and incorporating usable code from existing 2.0 mobile app is also required to increase reusability.

## Solution

**Our understanding and approach depends on provided documents during proposal stage. We have reached into this approach after analysing requirements and implementing following best practices and considerations. Although our approach is flexible to incorporate any XXXX enterprise level guideline and architectural roadmap.**

Key Architectural Consideration for My XXXX App

Separation of Responsibility

Loose Coupling at all levels

Data Security ( On Rest and in Transit )

Following Service oriented Architecture

Configurable

Device Agnostics (Will work in different devices of particular OS)

**My XXXX App will use following component diagram to develop Mobile Application**

* 1. Here is component representation of Mobile Application Components for Android Application.



* Fragments: This will represent behaviour or a portion of user interface in an Activity. This help to develop application user interface which could be easily arrange itself depend on different device size.
* Activity: This dictates the UI and handles the user interaction to the smartphone screen.
* Content Provider: A content provider component supplies data from different source to destination on request. Such requests are handled by the methods of the Content Resolver class. The data may be stored in the database or can be fetched through service or other communication mechanism. A content provider is implemented as a subclass of Content Provider class and must implement a standard set of APIs that enable other applications to perform transactions.
* Content Aggregation: This will aggregate the contents which we gather from different sources
* WIFI Finder: This will use mobile hard ware capability to find available WIFI’s and connect if available. This will also allow exchanging data from external devices.
* Service Connector: This component will use to connect external services and exchange data with external services
* DB Connection Manager: DB Connection manager will help to connect and manage CURD operation with mobile local database (SQLite)
* Image Capture: Image Capture will use Mobile Device Hardware to capture and format image as per requirement
* File Manager: File Manager component will help to get log files from device.
* Broadcast Receiver: Broadcast Receiver will receive notification massages and will display on device
  1. Here is component representation of Mobile Application Components for IOS Application.

<< I have talked with Chiranjib he will add iOS diagram >>

## Architecture

**My XXXX App will use following high level Architecture and technical implementation strategy for Enterprise system integration. Which will in-turn implement all required functional requirements.**

High level architecture will differ for different set of use cases. But border categorization of architectural components can be categorised into following three set of functional bucket.

1. **General Use Case** implementation
2. Provide **Remote Management of Car** using MBB Middleware Services
3. Provide **Entertainment Services to Head Unit** through XXXX Mobile App using APP 2 CAR communication methodology

These buckets will follow different approach for implementation and integration. Below is the functional use-case mapping with technical implementation approach and strategy. Grey and Green Services are covered under Remote Management of Car Section.



Beside above high level functionality My XXXX App will also be capable to provide following features.

* Capture App Metrics and user behaviour
* Capture App Performance Metrics
* Capture and Provide app running state info (log file) for better and efficient customer service.

Below is the overall component integration diagram to implement high level functionalities for my XXXX App



## 

* General Use Case implementation : This will use existing services to implement business functionality
* Remote Management of Car / Middleware Services: This will integrate with backed MBB services and will provide remote management services.
* Provide Entertainment Services to Head Unit: This will use Audi App Framework to communicate and provide entertainment services to Head Unit using Car WLAN connectivity.

Each component has been elaborate in sections below

* 1. **Here is graphical representation of Technical Solution Overview for General Use Cases [User Registration and Login with Car Management and Virtual Garage]**



* My XXXX Mobile App and Smart Watch App

These are XXXX Mobile Applications (Native Application) which will be developed and deployed using Android and iOS platform for Handheld and Smart Watch device.

* XXXX IT Middleware Services

XXXX Middleware Services are existing micro services hosted in XXXX Enterprise domain and exposed to internet using Service oriented Architecture. XXXX Middleware Services will be re-used in my XXXX app and will be access using HTTPS protocol. Data exchanged between Mobile Application and Middleware Services will be in predefined format (JSON format)

* Security and Data Exchange Mechanism: Connect with micro services will be done using HTTPS protocol. HTTPS will ensure security of data on transmit. Data exchange will be done using JSON format. Authentication and Authorization is required before using protected services / functionality through XXXX Microservices.
  1. **Here is graphical representation of Technical Solution Overview for implementation of Middleware service features in Mobile Application and Smart Watch**



* XXXX MBB / Backend Services

XXXX MBB services are internet services provided on top of car MIB Head unit and allow user to operate / manage specific features remotely. MBB services are available in internet over HTTPS. And consumption of MBB services is restricted only to My XXXX Car users. User will be able to consume these services after authentication and pairing with Car only.

XXXX MBB services send command to MIB Head Unit to operate on Car. These services will be accessible using internet

* My XXXX Mobile App and Smart Watch App

These are XXXX Mobile Applications (Native Application) which will be developed and deployed using Android and iOS platform for Handheld and Smart Watch device. Mobile app will consume exposed HTTPS MBB services and send command to operate on car remotely.

* 1. **Here is graphical representation of Technical Solution Overview for implementation of MEDIA and Entertainment feature using My XXXX Mobile Application.**



* Audi App Framework

Audi App framework is another middle ware service framework will be used for app to car communication. The App Framework provided by Audi for the MIB Projects shall be integrated in the App focussed on the function and code reusability. Interfaces provided by the Audi App Framework for communication to the MIB Head Unit, Connected Gateway unit will be used for APP 2 CAR communication.

* My XXXX Mobile App

These are XXXX Mobile Applications (Native Application) which will be developed and deployed using Android and iOS platform for Handheld and Smart Watch device. Mobile app will consume exposed HTTPS MBB services and send command to operate on car remotely.

APP 2 CAR communication feature is available when User is within proximity of Car so that Car WLAN is available and accessible to Mobile App.

* WLAN

My XXXX app will connect to MIB Head Unit using CAR WLAN system. This will use Audi Framework for Service discovery and data exchange in SCXML format

* Internet Cloud Services

Radio.de and napster are internet services will be integrated with My XXXX App to provide services within MIB Head Unit