**Broadcast Feature between**

**FOTA and Cloud Gateway with AIDL**

**(Version 1.0.0)**

**System Requirements Specification (SRS)**

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**1.1 Introduction**

This document outlines the requirements for a new broadcast feature that enables communication between the FOTA (Firmware Over-The-Air) manager and the Cloud Gateway using Android Interface Definition Language (AIDL). This feature will allow the FOTA manager to initiate update checks, downloads, and installations, and receive updates and notifications from the Cloud Gateway. The Cloud Gateway will handle communication with a separate cloud application.

**1.2** **System Overview**

The system consists of the following components:

* **FOTA Manager**: Initiates update requests and receives updates from the Cloud Gateway.
* **Cloud Gateway**: Interacts with the FOTA manager using AIDL and communicates with the cloud application using its own APIs/protocols.
* **CloudGatewayInterface**: AIDL interface defining methods for the FOTA manager to interact with the Cloud Gateway.

**1.3 System Features**

* The FOTA manager can initiate checks for available updates by calling methods on the CloudGatewayInterface.
* The Cloud Gateway can trigger update downloads from the cloud based on information received from the cloud application.
* The Cloud Gateway can notify the FOTA manager about the download status and provide the download URL when available.
* The FOTA manager can instruct the Cloud Gateway to initiate the installation of a downloaded update package.
* The Cloud Gateway can provide the FOTA manager with the current update status (idle, checking, downloading, installing, etc.).

**1.4 System Interfaces**

* **AIDL Interface**: The CloudGatewayInterface class defines the communication channel between FOTA and Cloud Gateway.

**1.5 System Requirements**

* The system shall support initiating checks for available updates.
* The FOTA manager shall be able to trigger update downloads based on information received from the Cloud Gateway.
* The Cloud Gateway shall be responsible for downloading update packages from the cloud.
* The FOTA manager shall be able to initiate update installations.
* The Cloud Gateway shall provide the FOTA manager with the current update status.
* The Cloud Gateway shall implement mechanisms to communicate with the cloud application using its own APIs/protocols (details not covered in this SRS).

**System Design Document (SDD)**

**2.1 System Architecture**

The system will leverage AIDL for inter-process communication between the FOTA manager and Cloud Gateway residing in separate Android processes. The CloudGatewayInterface defines methods for the FOTA manager to interact with the Cloud Gateway.

**2.2 Data Flow**

1. The FOTA manager calls the checkForUpdates method on the CloudGatewayInterface object to initiate an update check.

2. The Cloud Gateway communicates with the cloud application using its own protocols (not shown in this SDD).

3. The cloud application determines if an update is available and informs the Cloud Gateway.

4. If an update is available, the Cloud Gateway receives the update URL from the cloud application.

5. The Cloud Gateway calls methods on the CloudGatewayInterface to notify the FOTA manager about the update status and provide the download URL (if available).

6. The FOTA manager can then call the downloadUpdatePackage method on the CloudGatewayInterface to trigger the download process using the provided URL.

7. The Cloud Gateway handles the download process using its own mechanisms (not shown in this SDD).

8. The Cloud Gateway updates the FOTA manager on the download progress and completion status.

9. Once downloaded, the FOTA manager can call the installUpdatePackage method on the CloudGatewayInterface to initiate the installation.

10. The Cloud Gateway interacts with the system (potentially using separate APIs) to perform the update installation.

11. The Cloud Gateway keeps the FOTA manager informed about the installation progress and completion status.

**2.3 Error Handling**

• The Cloud Gateway shall return appropriate error codes or messages to the FOTA manager through the AIDL interface in case of communication failures with the cloud or errors during download/installation.

• The FOTA manager shall implement logic to handle error notifications and display user-friendly error messages.

**2.4 Security Considerations**

* AIDL enforces security by restricting communication between processes with the same user ID.
* Additional security measures might be implemented within the Cloud Gateway to handle authentication and authorization for communication with the cloud application (details not covered in this SDD).

**2.5 Testing**

• Unit tests should be implemented to verify the functionality of the CloudGatewayInterface class and its interaction with the FOTA manager.

• Integration tests should be designed to simulate communication with the cloud application through the Cloud Gateway (testing the Cloud Gateway's own communication mechanisms is outside the scope of this SDD).