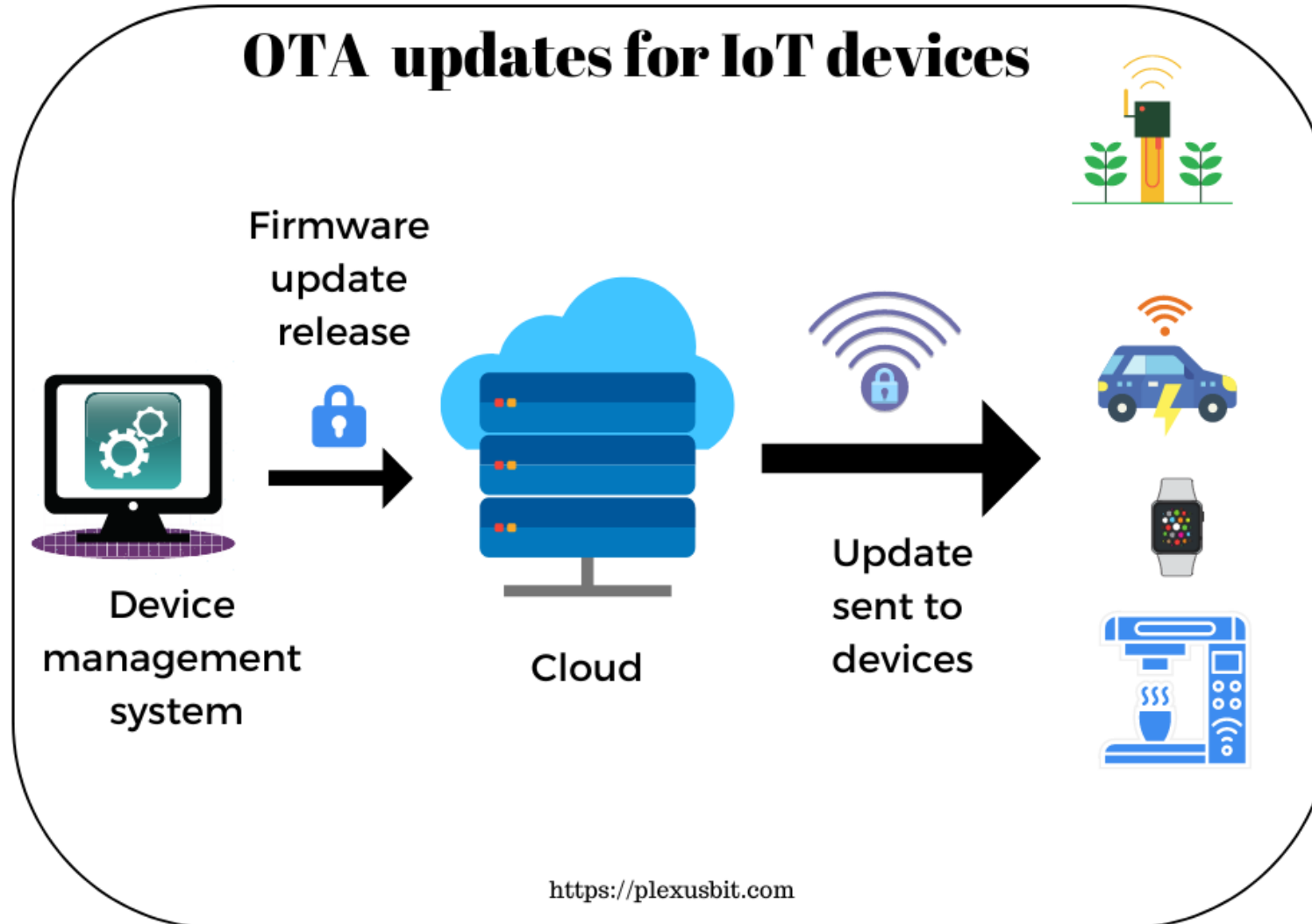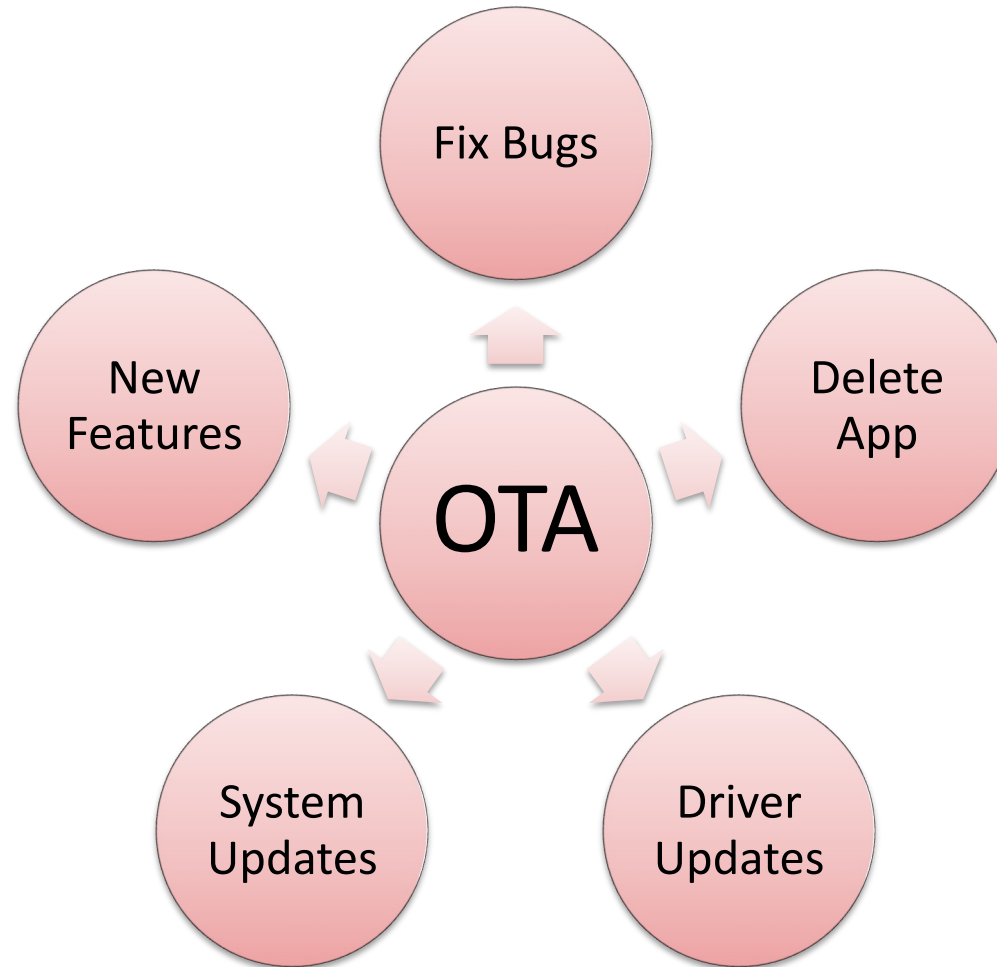# OTA

IoT Spring 2024

Suresh Purini, IIT Hyderabad
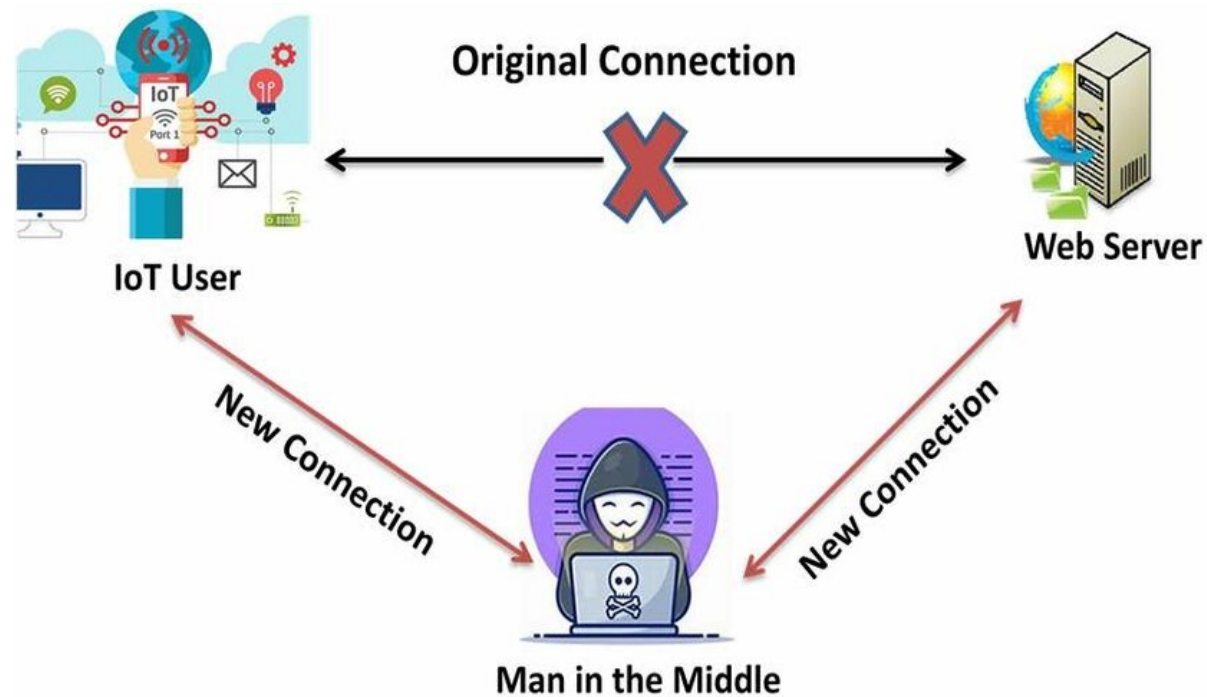
What is OTA?

Why OTA?

Risks – Security Vulnerabilities

Risks – Update Failures

1. **Power failures**

2. **Loss of network connectivity**

3. **Etc.**

Key Challenges

1. **Connectivity and Bandwidth Limitations**

2. **Device Heterogeneity**

3. **OTA Update Reliability**

4. **Power and Resource Constraints**

5. **Error Handling and Rollback**

6. **Regulatory Compliance**

Key Checklist

Automatic Recovery

Encrypted OTA Channel

Code Integrity Check
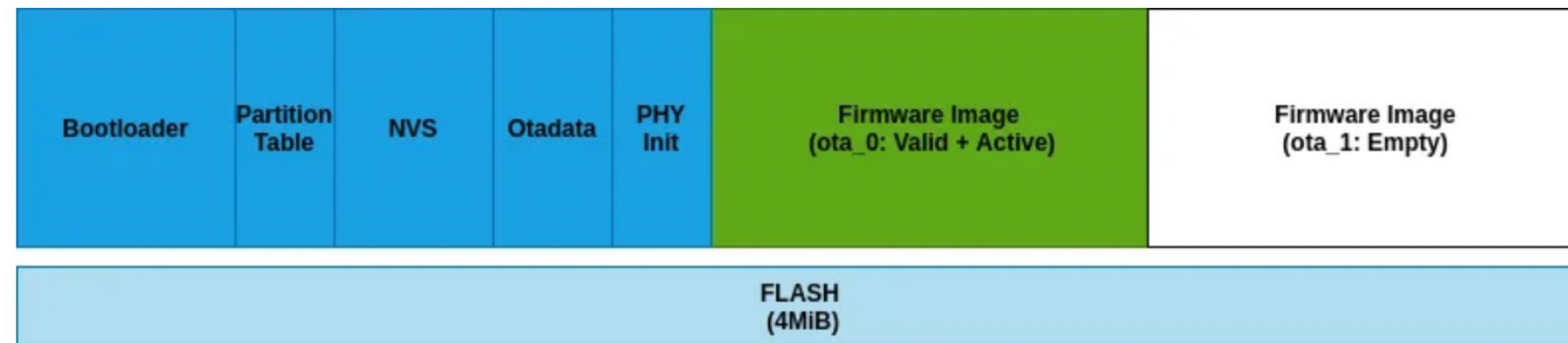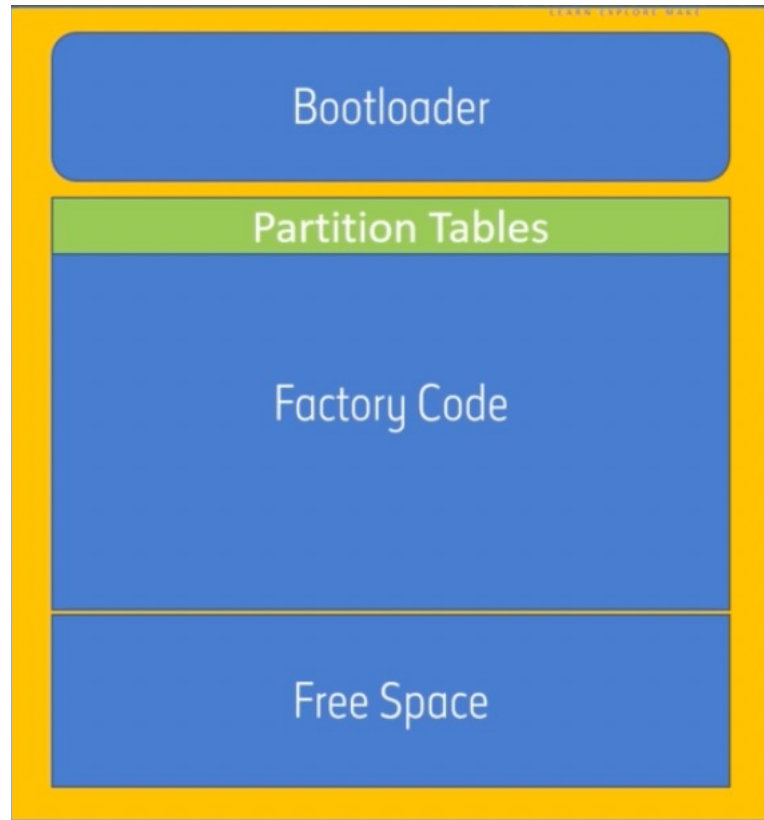
Code Compatibility Check

Partial Update Support

OTA Architectures

1. Edge-to-Cloud OTA Updates (E2C)

2. Gateway-to-Cloud OTA Updates (G2C)

3. Edge-to-Gateway-to-Cloud OTA Updates (E2G2C)
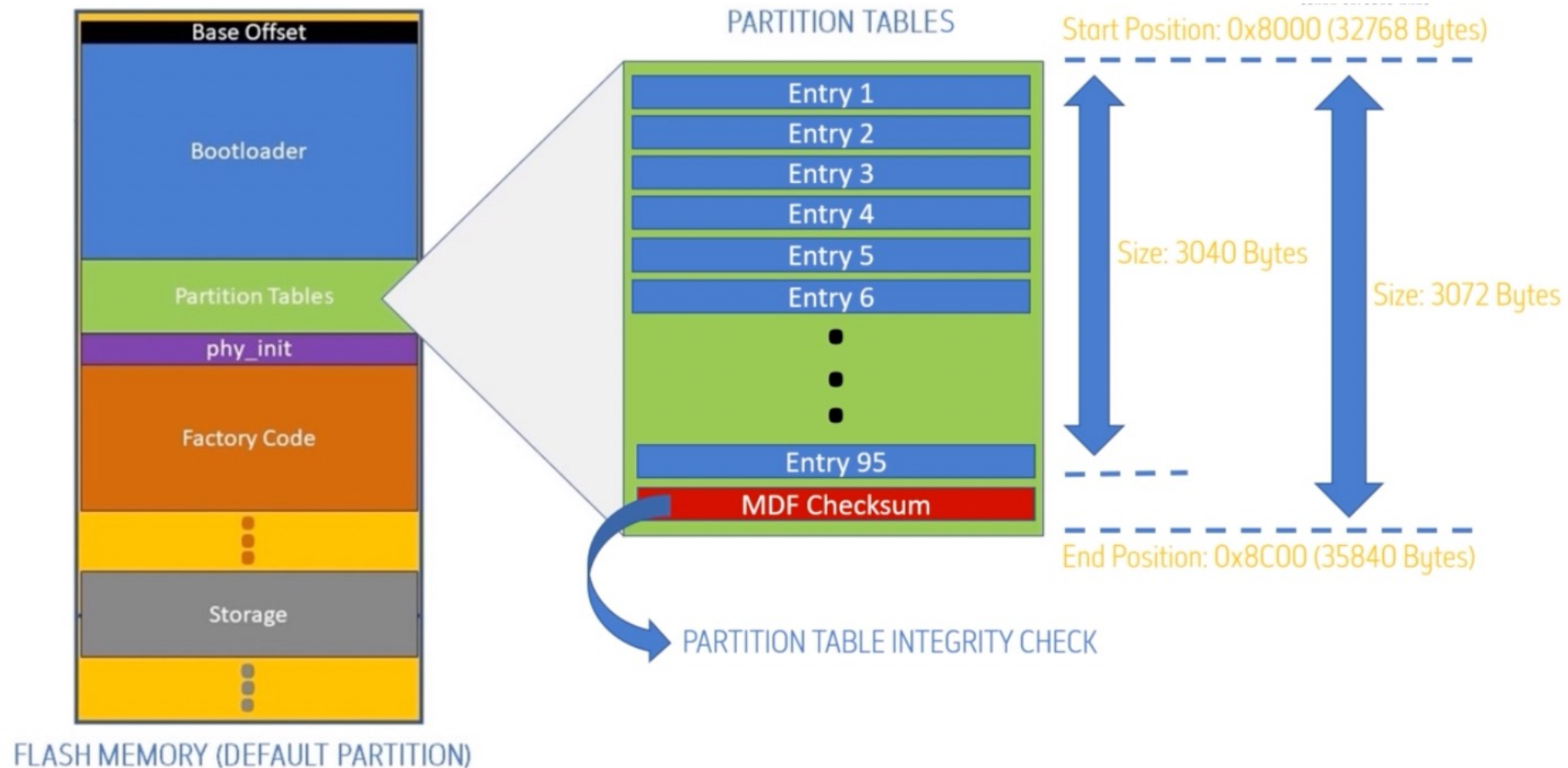
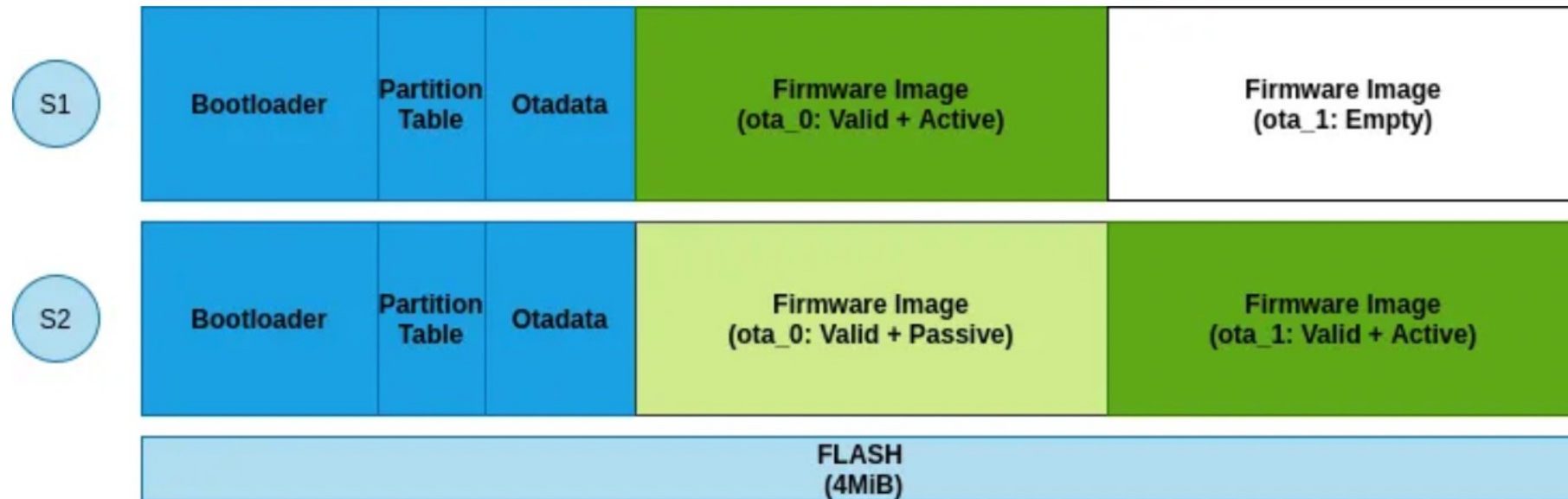# Self Updating Systems?

Logical Flash Memory Layout

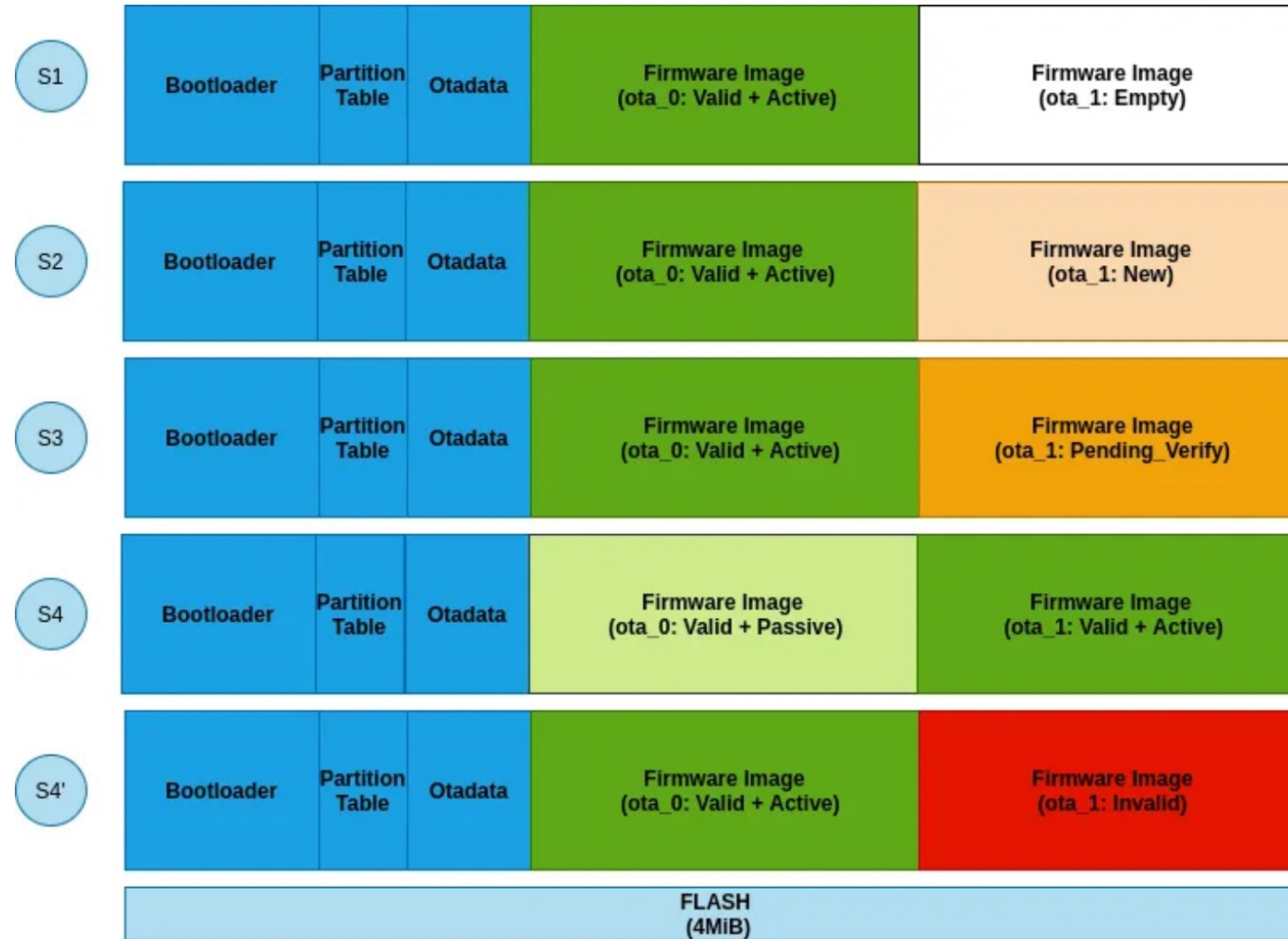Typical application flash layout

Image Source: https://blog.espressif.com/ota-updates-framework-ab5438e30c12

Partition Tables

FLASH MEMORY (DEFAULT PARTITION)

PARTITION TABLES

Entry 1
Entry 2
Entry 3
Entry 4
Entry 5
Entry 6
⋮
Entry 95
MDF Checksum

PARTITION TABLE INTEGRITY CHECK

Start Position: 0x8000 (32768 Bytes)
Size: 3040 Bytes
Size: 3072 Bytes
End Position: 0x8C00 (35840 Bytes)

Flash Layout Transition

Flash layout transition in normal OTA update

Flash layout transition with rollback OTA update

THANK YOU