Cybersecurity for Embedded Systems (01UDNOV)

Academic Year: 2021/2022

Project Track

Track 16 – Secure Over the Air update (OTA)

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1 Introduction

An over-the-air (OTA) update is the wireless delivery of new software, firmware, or other data to mobile devices. Wireless carriers and original equipment manufacturers (OEMs) typically use over-the-air updates to deploy firmware and configure phones for use on their networks over Wi-Fi or mobile broadband. The initialization of a newly purchased phone, for example, requires an over-the-air update. With the rise of smartphones, tablets and internet of things (IoT) devices, carriers and manufacturers have turned to different over-the-air update architecture methods for deploying new operating systems (OSes) to these devices.

2 Goal of the Project

Defining and implementation of an inter-cluster protocol where nodes verify the binary of other nodes by means of co-operative hash checking. Defining/Implementation of mechanism to receive/execute the updates.

3 References

There are many reference implementations like RIOT secure OTA update that can be studied/adapted.

4 Constraints

The target design/implementation is for IoT devices that are communication within cluster of nodes which are using RTOSs and GPOS.

5 Material

The development boards from ST and Raspberry which will be provided to the students.

6 Deliverables

Students are expected to provide the following deliverables:

1. All the source code related to the project. The source code must be commented so that it can serve as a starting point for other people to begin building a more complex application leveraging the code developed by the group.
2. A complete documentation about the project, written with LaTeX, including a user manual and a technical manual. The user manual should explain how to use the software that has been developed, while the technical manual should describe in detail the features of what has been implemented, as well as the architecture of the solution and the challenges that were faced during the development. The user manual shall be more compact and less verbose than the technical manual.
3. PPTX or PDF slides to present your work at the final examination.

All files and deliverables must be organized in folders and packed into a suitable archive file (i.e., .zip, .rar, or .tar.gz) that must be uploaded to the “Portale della Didattica” according to the following naming rule:

`<ID>_<ID>_<ID>_<nameoftheproject>.zip`

where the three ID numbers are the student IDs of the members of the team.