Designing and Launching an Embedded Product

Class 3: Scalability, Architectures and the Minimally Viable Product (MVP)

November 20, 2019

Jacob Beningo

DesignNews

CEC CONTINUING EDUCATION CENTER

Presented by: Digi-Key ELECTRONICS

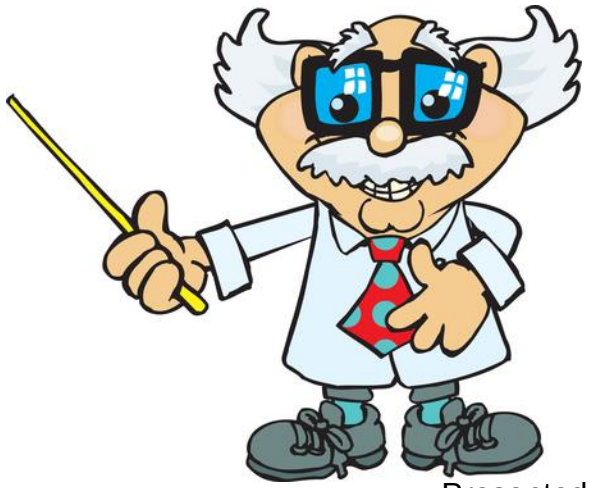
Course Overview

Topics:

- The Business of Product Development
- Success through Design and Development Processes
- **Scalability, Architectures and the MVP**
- Achieving Quality and Reasonable Time to Market
- Techniques for Accelerating Time to Market

Session Overview

- Minimum Viable Product
- Software Architecture
- Ensuring Scalability



A Case Study

The Minimum Viable Product (MVP)

Minimum Feature Set

- Security Capabilities
  - Asset Protection
  - Secure Communication
  - Access Policies
- Firmware Updates
  - Over-the-Air
- Cloud Integration
- Application

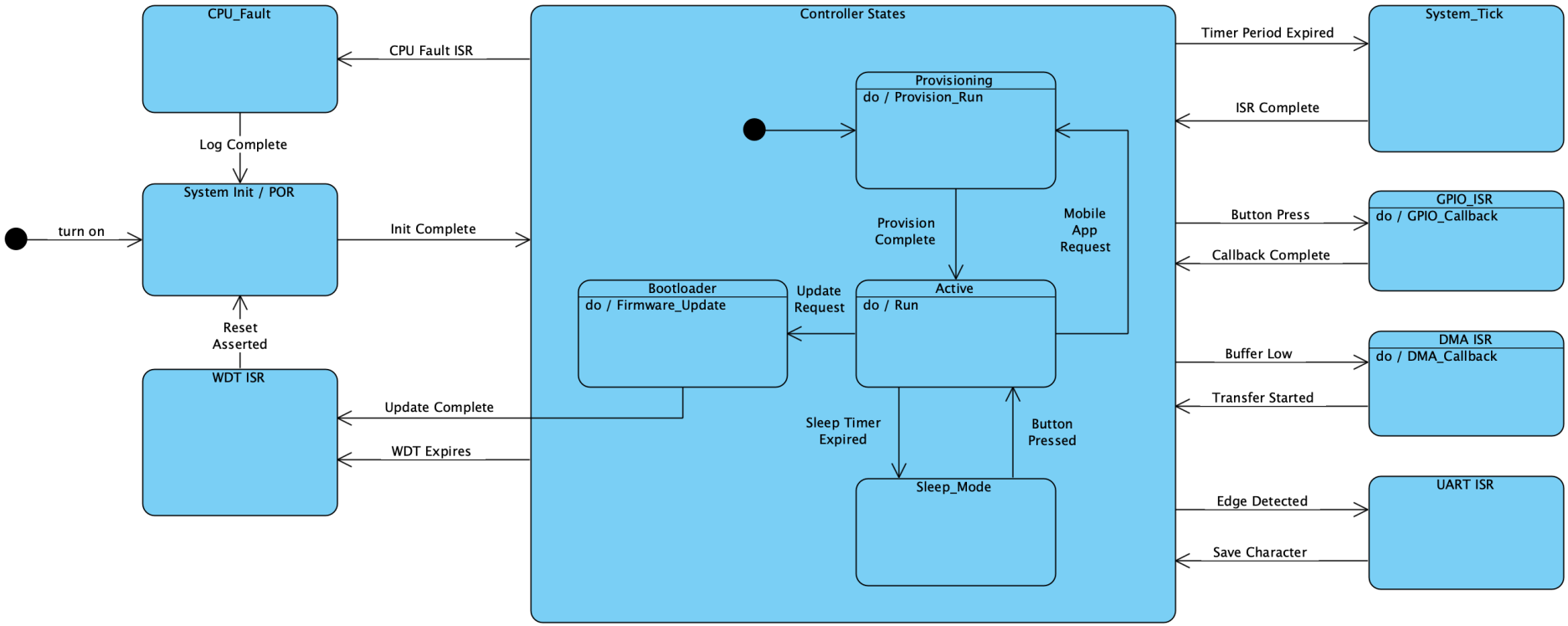
Software Architecture Overview

- Software Architecture Definition Review
  - Encompasses decisions about the organization of a software system
  - Considerations include
    - Usage
    - Performance
    - Functionality
    - Reuse
    - Technology Constraints

Software Architecture

- What can a software architecture really do?
  - It can speed up development
  - It can help to reduce bugs
  - It can ease software maintenance
  - Simplify software testing
  - Improve diagnostics
  - Save company money
  - Provide a long robust life for the software

Architectural Template



Securing Embedded Systems

Hackers Remotely Kill a Jeep on the Highway – With Me in It

Source: Andy Greenberg / Wired

Hacking risk leads to recall of 500,000 pacemakers due to patient death fears

FDA overseeing crucial firmware update in US to patch security holes and prevent hijacking of pacemakers implanted in half a million people

Source: Abbott / St Jude Medical, theguardian.com

LILY HAY NEWMAN SECURITY 07.16.19 02:13 PM

THESE HACKERS MADE AN APP THAT KILLS TO PROVE A POINT

Source: Lily Hay Newman / Wired

Platform Security Architecture (PSA)

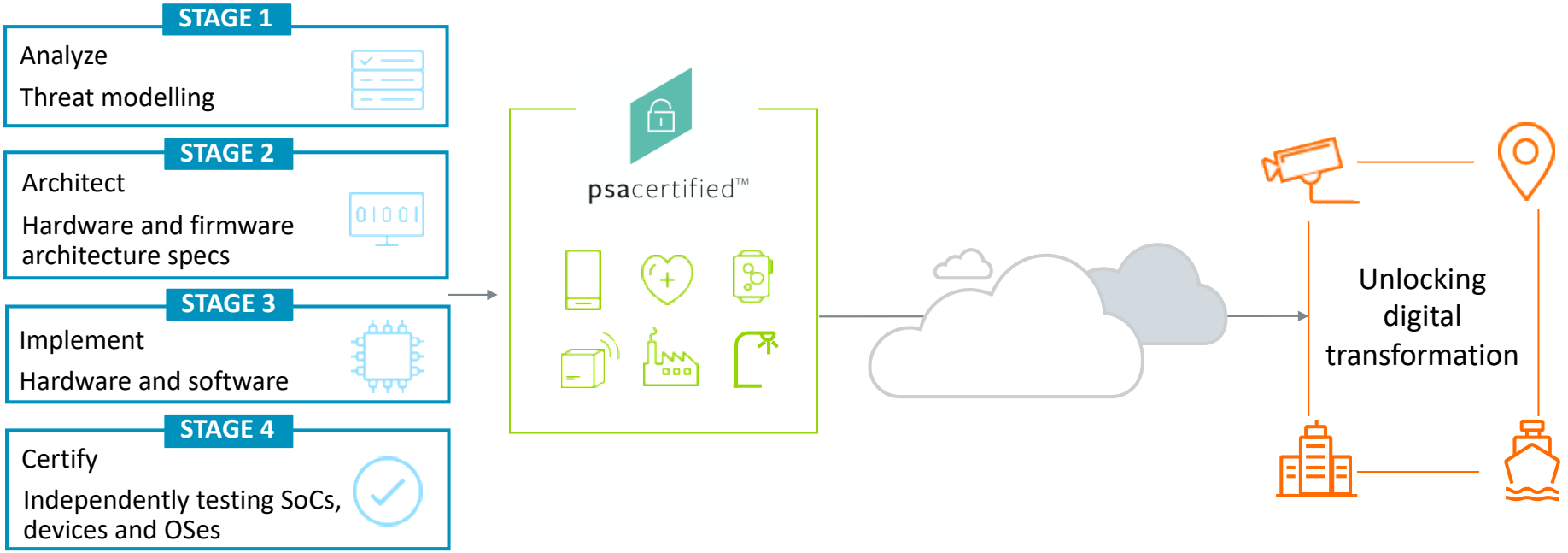
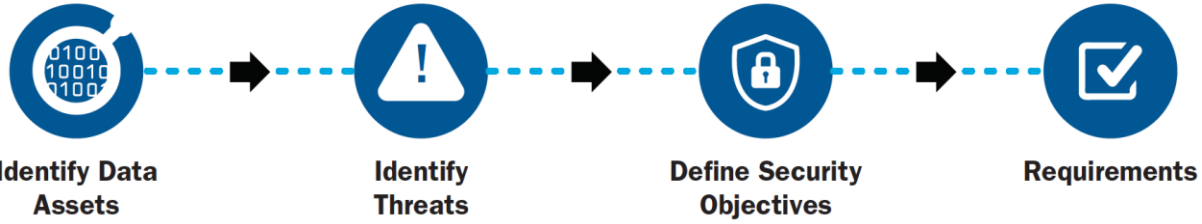


Image Source: Arm

Analyzing Threats



System requirements drive implementation, including microcontroller selection

Example:	*Firmware*	*Malware Attack*	*Device Attestation*	*Isolated Root of Trust*

Joint white paper at:
www.cypress.com/psoc6security

arm CYPRESS EMBEDDED IN TOMORROW™

MCU Selection

- Cost vs Longevity
  - Flash
  - RAM
- Capabilities
  - Hardware
  - Software
- Security

Scaling through Bootloaders

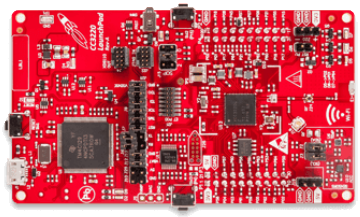
Cloud - AWS

RTOS
Wi-Fi
TCP/IP
Certificate

Private Key
MQTT
TLS/SSL
Application

Gateway

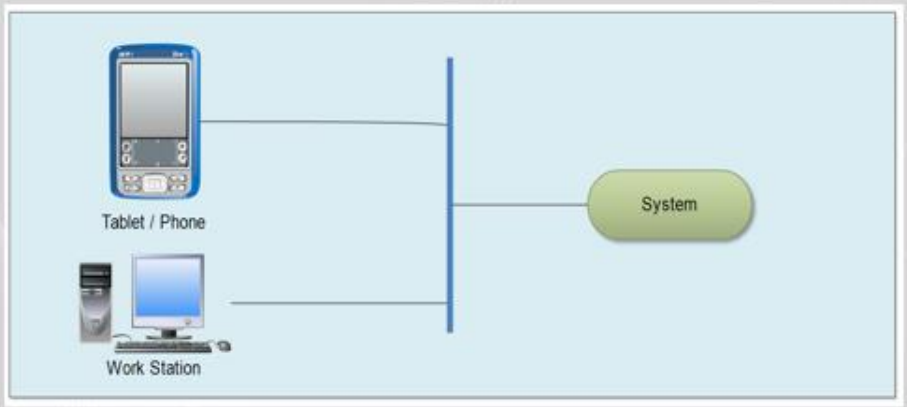
Edge Node

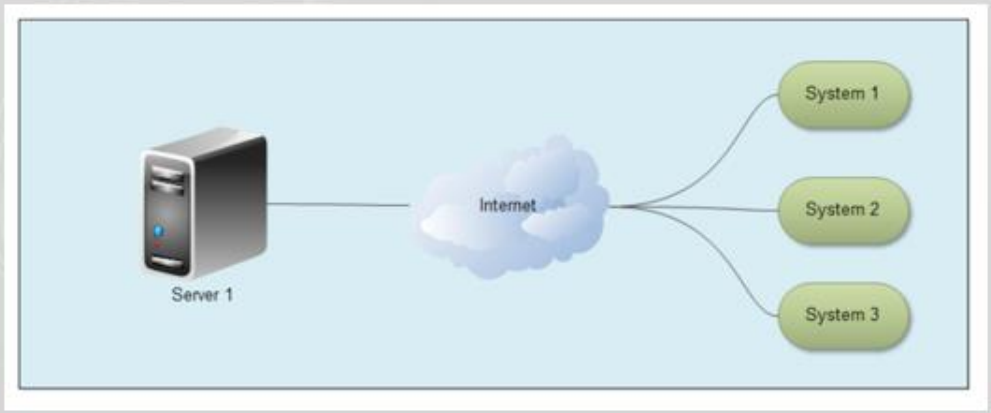


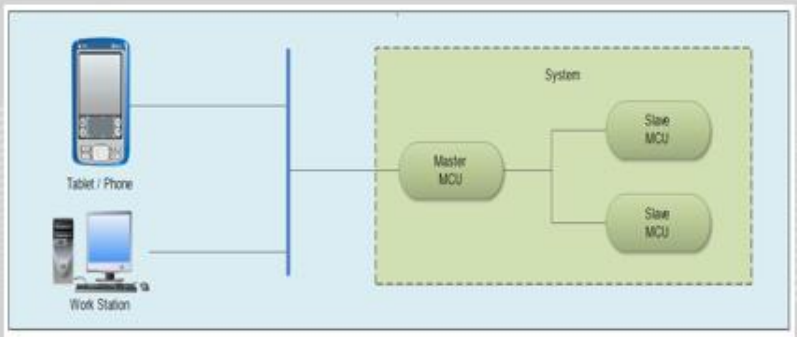
Things
Groups
Jobs
Certificates

Policies
Keys
CA

Bootloader Models







Additional Resources

- Supporting Materials
  - Beningo.com
  - Blog
  - Code, White Papers, Courses
- Embedded Bytes Newsletter
  - http://bit.ly/1BAHYXm

From www.beningo.com under

- Blog > CEC – Designing and Launching an Embedded Product