95-733 Internet of Things
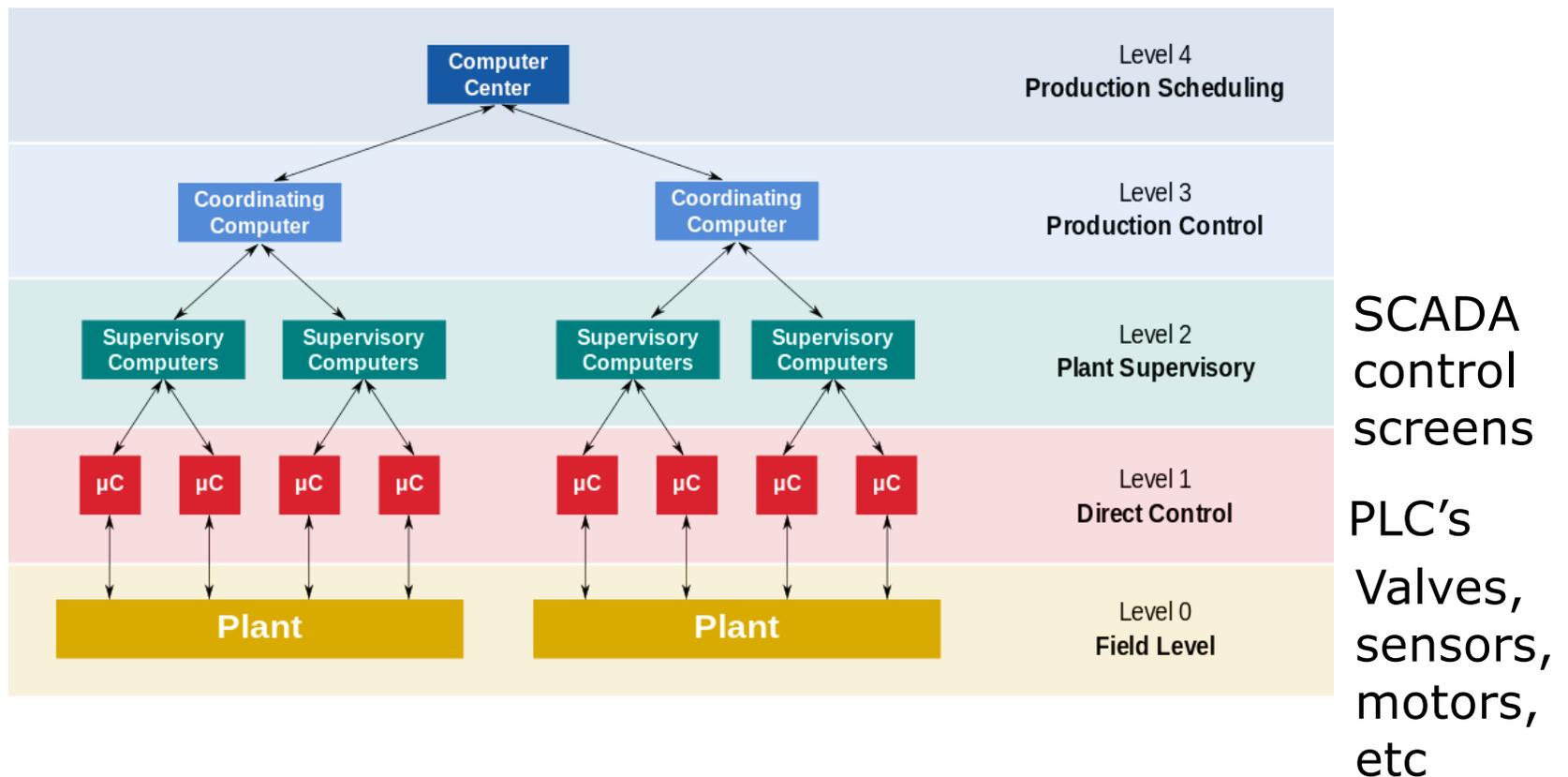# Week 4 Industrial Internet of Things and SCADA

95-733 Internet of Things

Carnegie Mellon Heinz College

Programmable Logic Controller (PLC)

- What does a roller coaster have in common with a cement mixer?
- Both are controlled by a PLC.
- A PLC is a ruggedized computer. First one built in 1969.
- Able to thrive in harsh environments.
- Used to replace hard-wired relay logic.
- Early ones were programmed with ladder logic. (Familiar to technicians trained to work with hard-wired systems)
- Ladder logic is a visual programming language.
- Many are "hard" real-time systems. Output must be generated as a result of changes in input within a limited time frame.
- SCADA is an acronym for Supervisory Control and Data Acquisition. The inputs to a SCADA system is often a shop floor of PLC's.
- SCADA provides HMI (Human Machine Interaction)

Functional Manufacturing Levels

SCADA control screens

PLC's

Valves, sensors, motors, etc

Smart products. The next step is to connect to the internet.

SCADA Screen Animation

https://en.wikipedia.org/wiki/File:Scada_Animation.ogv

A PLC Speaks MQTT to Azure or AWS

Major PLC manufacturers include Siemans and Allen-Bradley (Rockwell). Siemans provides MindSphere product for IoT. It uses digital twins.