Distributed Control Systems

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Definition

- A **distributed control system** (DCS) refers to a control system in which the controller elements are not central in location but are distributed throughout the system with each component sub-system controlled by one or more controllers. The entire system of controllers are connected by a network for communication and monitoring.

Applications

- Electrical Generation and Transmission
- Environmental control systems
- Traffic signals
- Water management systems
- Oil Refining plants
- Chemical plants
- Pharmaceutical manufacturing
- Sensor Networks
- Dry cargo and bulk oil carrier ships

Glossary

- DCS - Distributed Control System
- SCADA - Supervisory Control and Data Acquisition
- PLC - Programmable Logic Controller
- HMI - Human Machine Interface
- RTU - Remote Transmission Unit
- DCU - Digital Communication Unit

Human Machine Interface (HMI)

Central Control Panel

Remote Control Panel

Programmable Logic Controllers

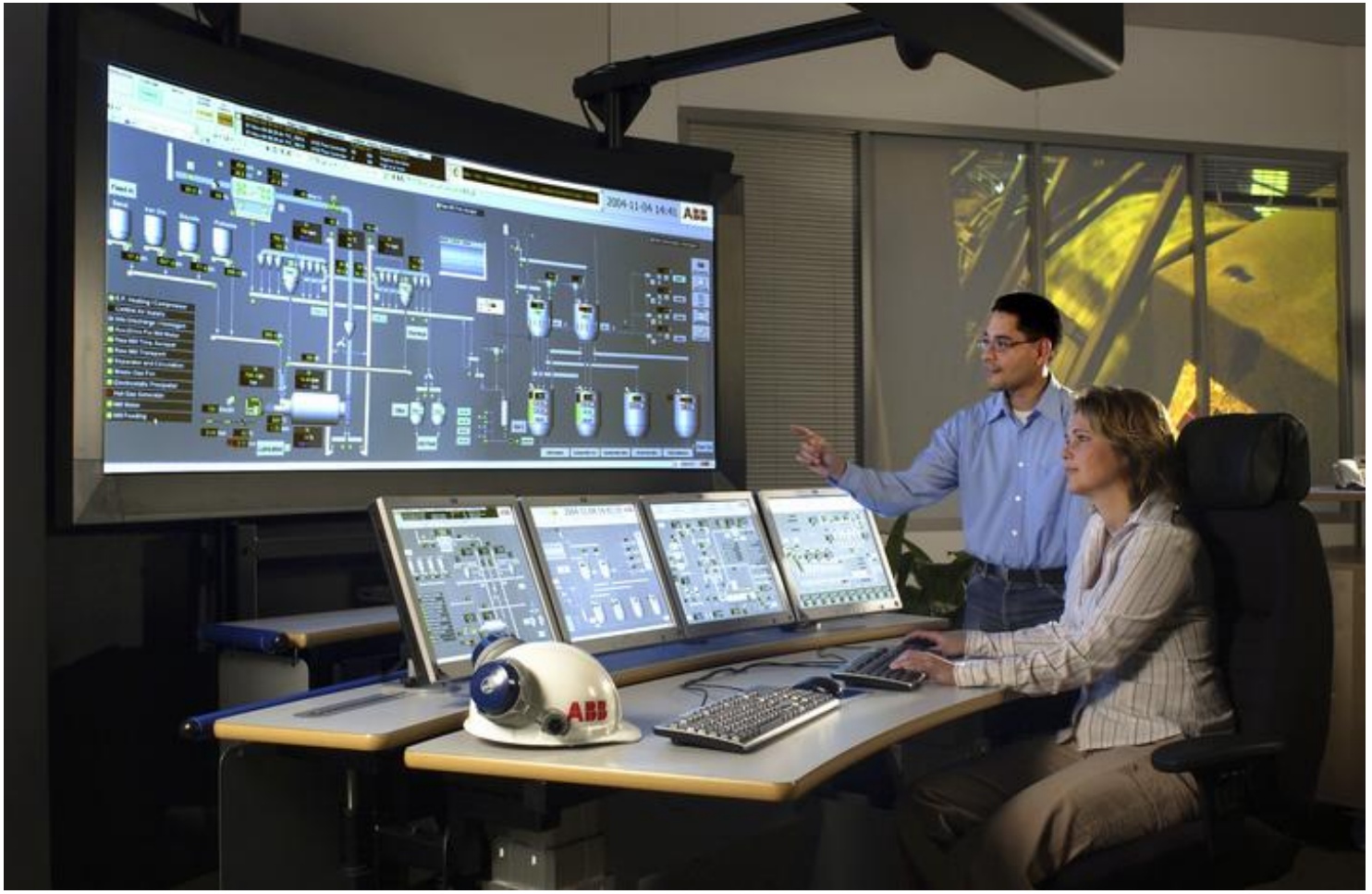
I/O Rack and Signal Conditioning

Controlled Device

Simplified Component Diagram of a Distributed Control System

Elements

- A DCS typically uses computers as controllers and uses both proprietary interconnections and protocols for communication.
- The processor receives information from input modules and sends information to output modules. The input modules receive information from input instruments in the process (a.k.a. field) and output modules transmit instructions to the output instruments in the field.
- Computer buses or electrical buses connect the processor and modules through multiplexers/demultiplexers. Buses also connect the distributed controllers with the central controller and finally to the Human-Machine Interface (HMI) or control consoles.
- Elements of a distributed control system may directly connect to physical equipment such as switches, pumps and valves or may work through an intermediate system such as a SCADA system.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EXAMPLE APPLICATION