



# **Building an Industrial ARM™**

## **AM65xx Architecture Differentiations for Industrial Applications**

**Processing for Control Loops**

# Real World Example from IEC60802 Use Cases v13

Siemens baggage handling system at Dubai International Airport, United Arab Emirates

<https://www.youtube.com/watch?v=Pu9K8qCk0cY>



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- The “Baggage Warehouse”
- IEC60802 – Time-Sensitive Networking Profile for Industrial Automation



# Real World Example from IEC60802 Use Cases v13

Siemens baggage handling system at Dubai International Airport, United Arab Emirates

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- >90 km conveyor length
- >200 check-in counters
- Max. tray speed: 7.5 m/s
- 49 make-up carousels
- 14 baggage claim carousels
- 24 transfer laterals
- Storage for 9,800 Early Bags



# Real World Example from IEC60802 Use Cases v13

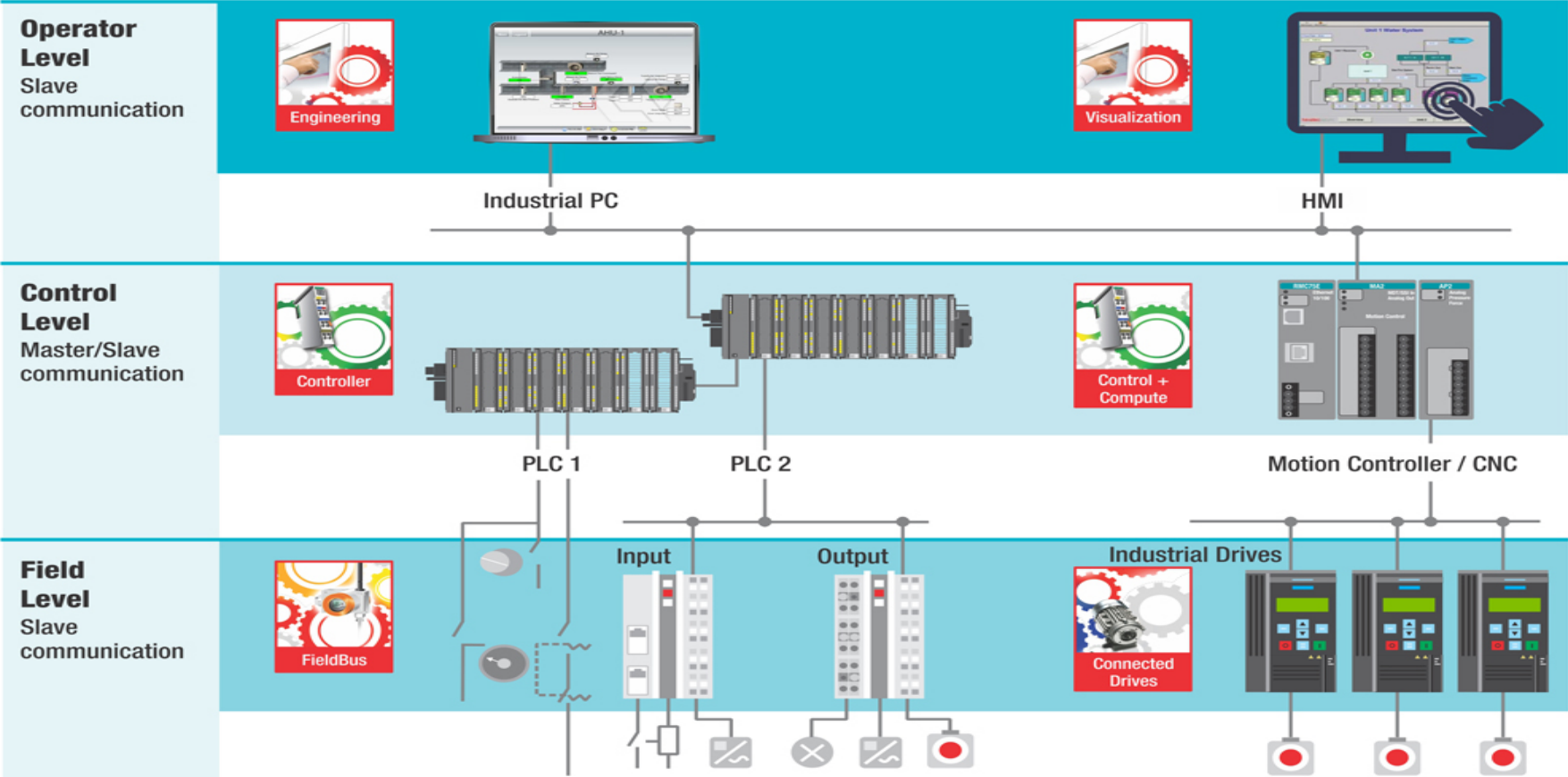
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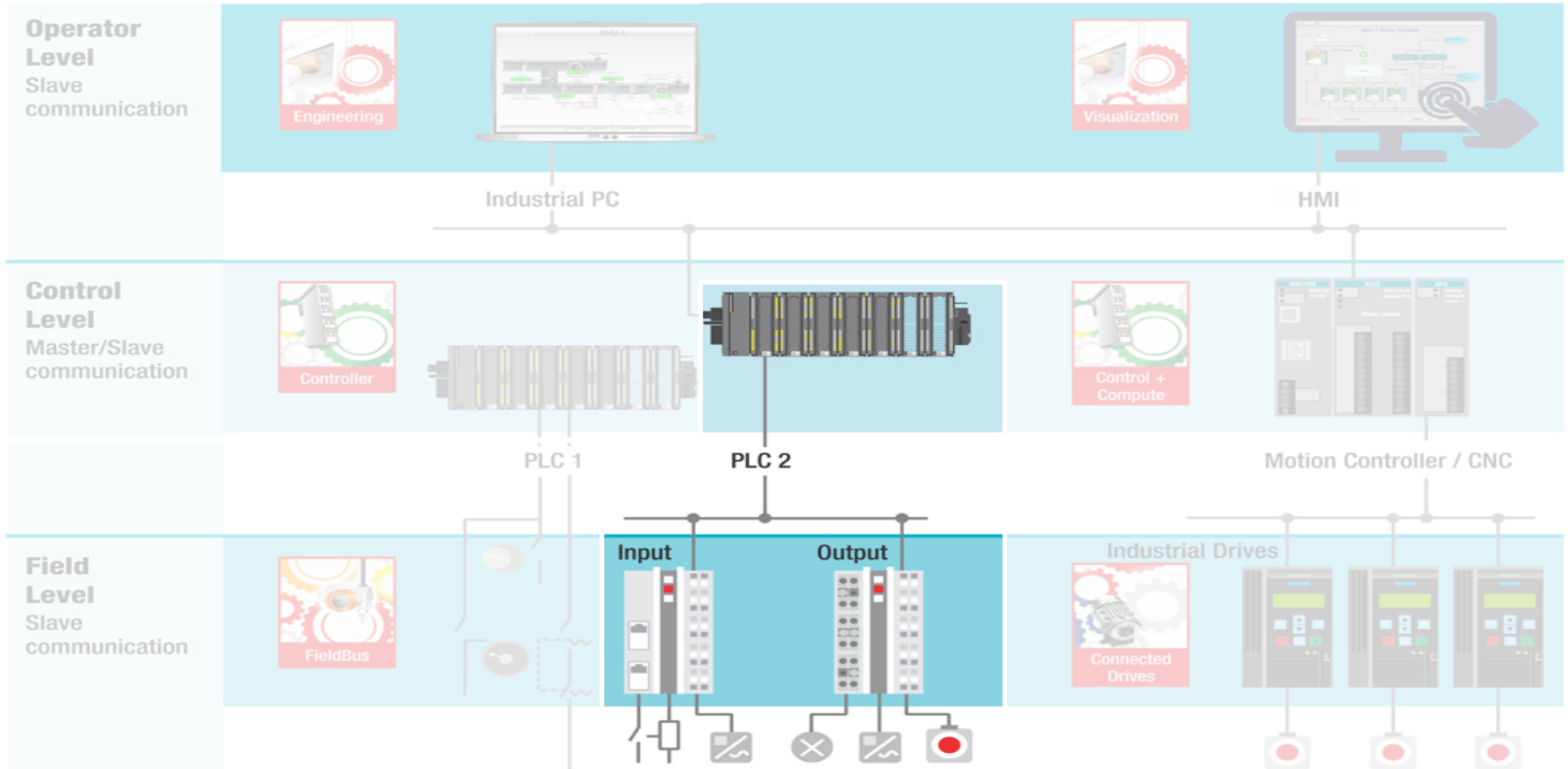
- >90 km conveyor length
- >200 check-in counters
- Max. tray speed: 7.5 m/s
- 49 make-up carousels
- 14 baggage claim carousels
- 24 transfer laterals
- Storage for 9,800 Early Bags
- **234 PLC's**
- **16,500 geared drives**
- **Lots of digital IOs**



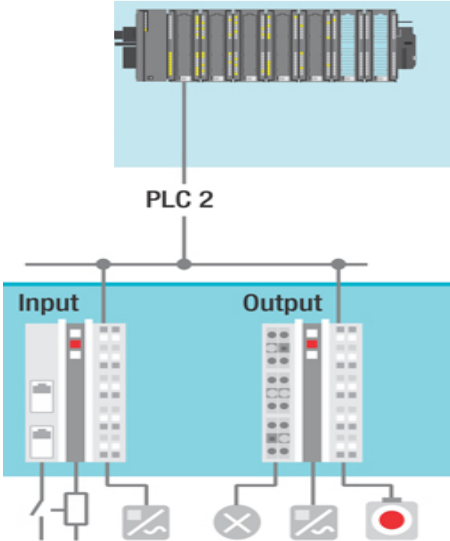
# A Different View of Modern Factory Automation



# Focusing in on a Single PLC

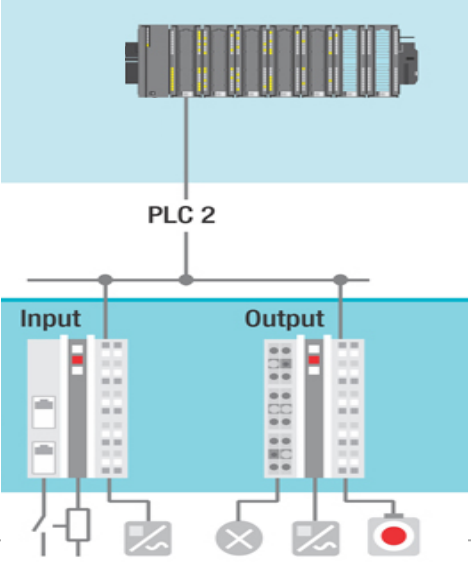


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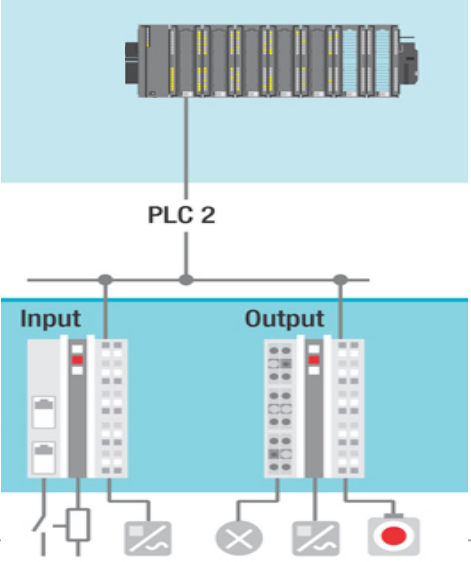




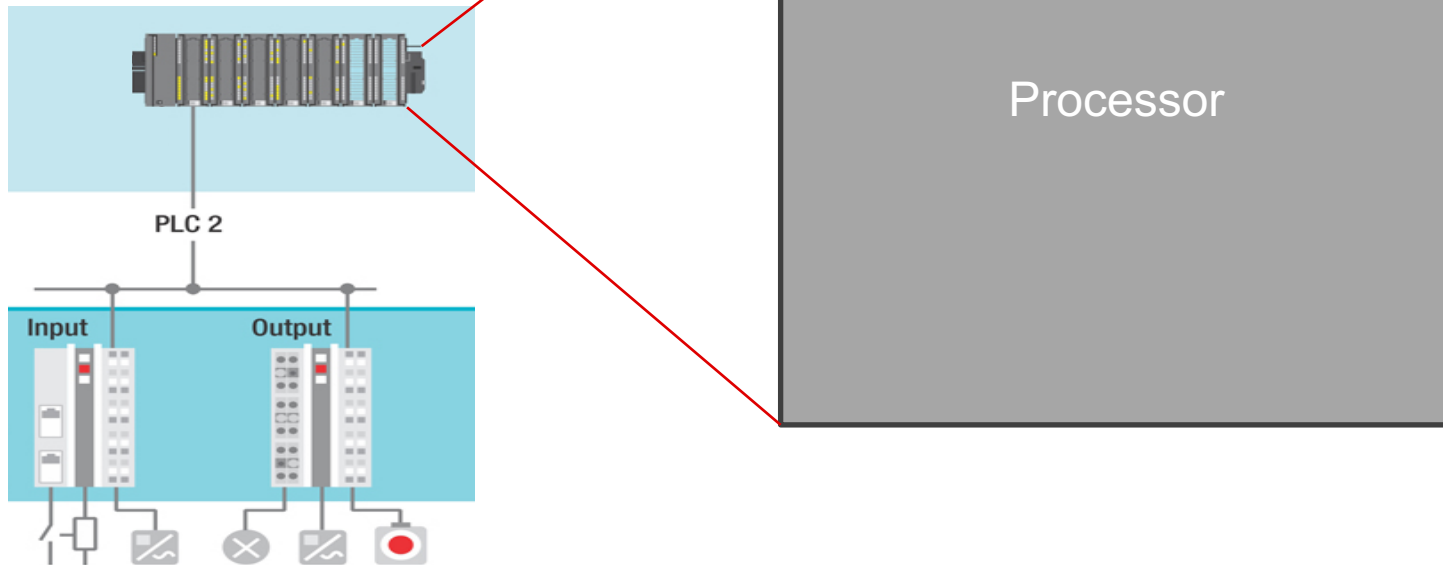
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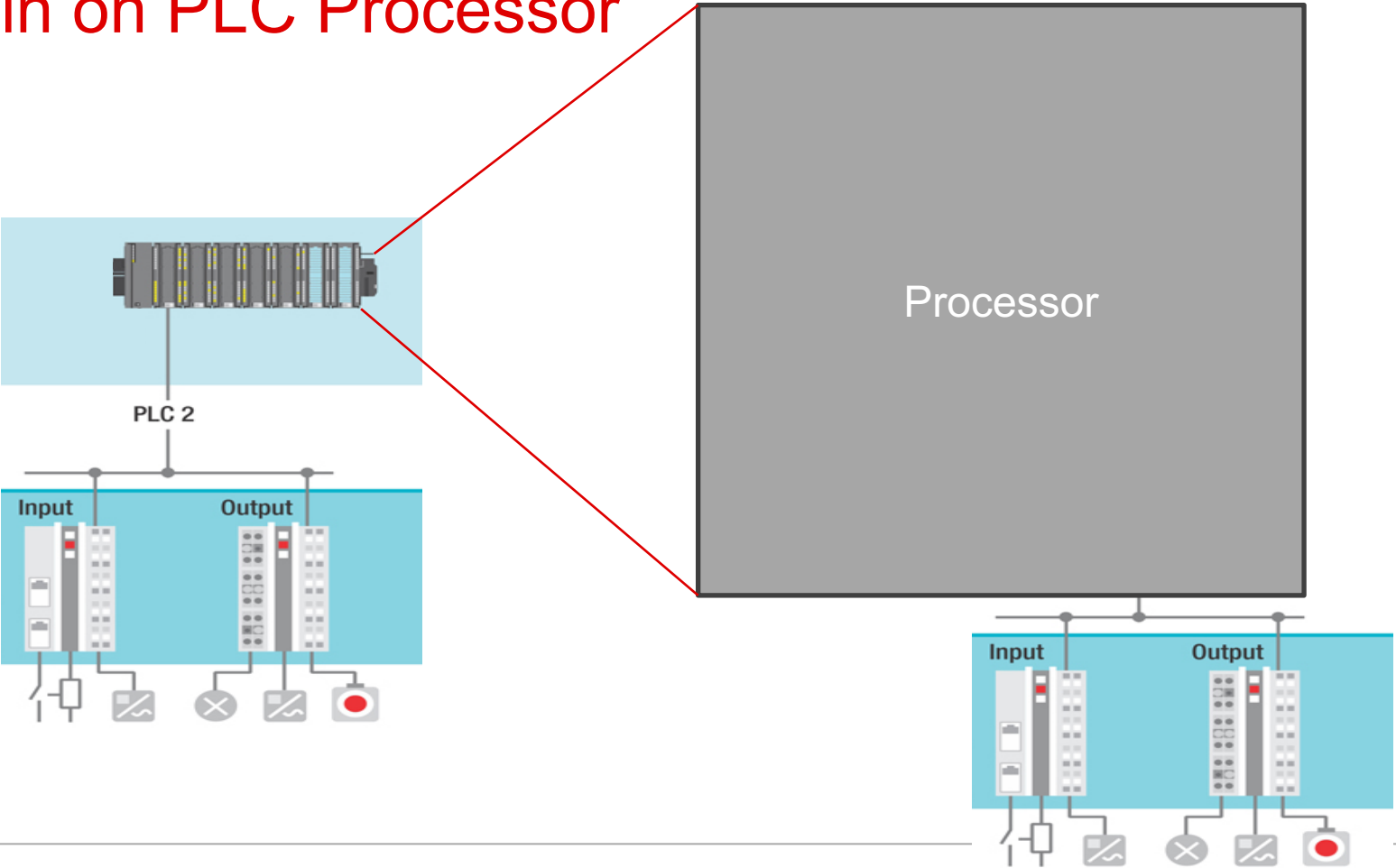
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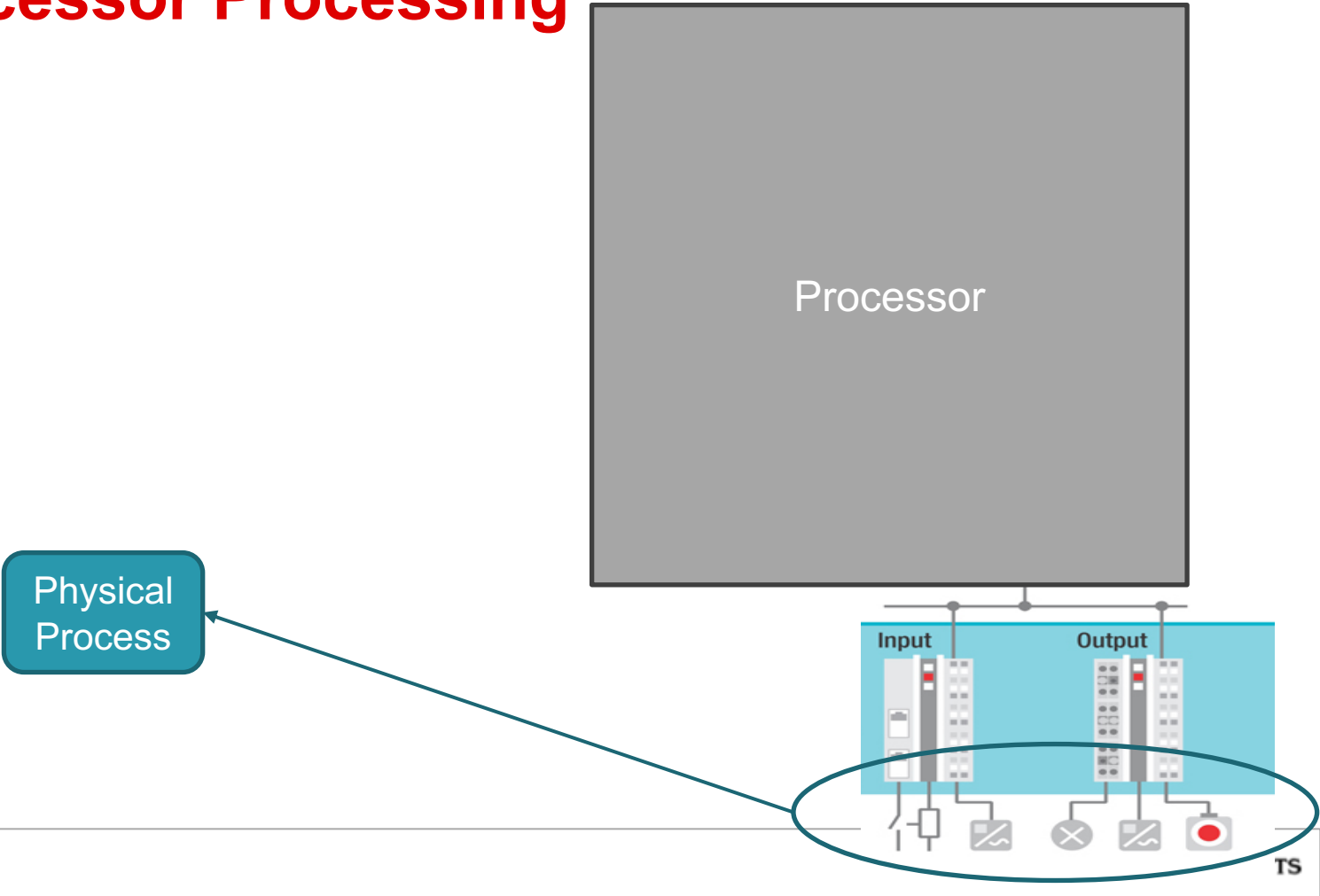
# Zoom in on PLC Processor



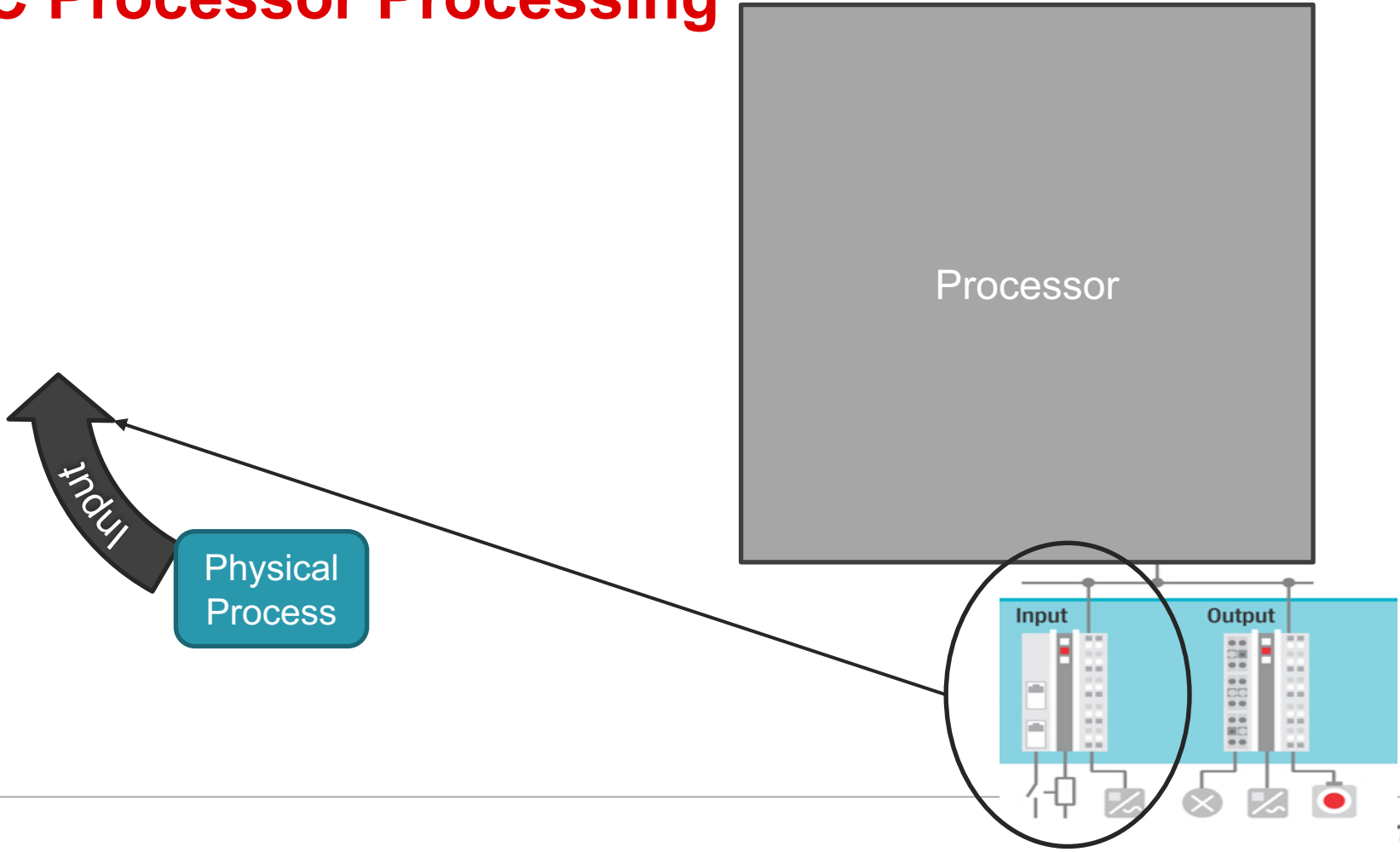
# Zoom in on PLC Processor



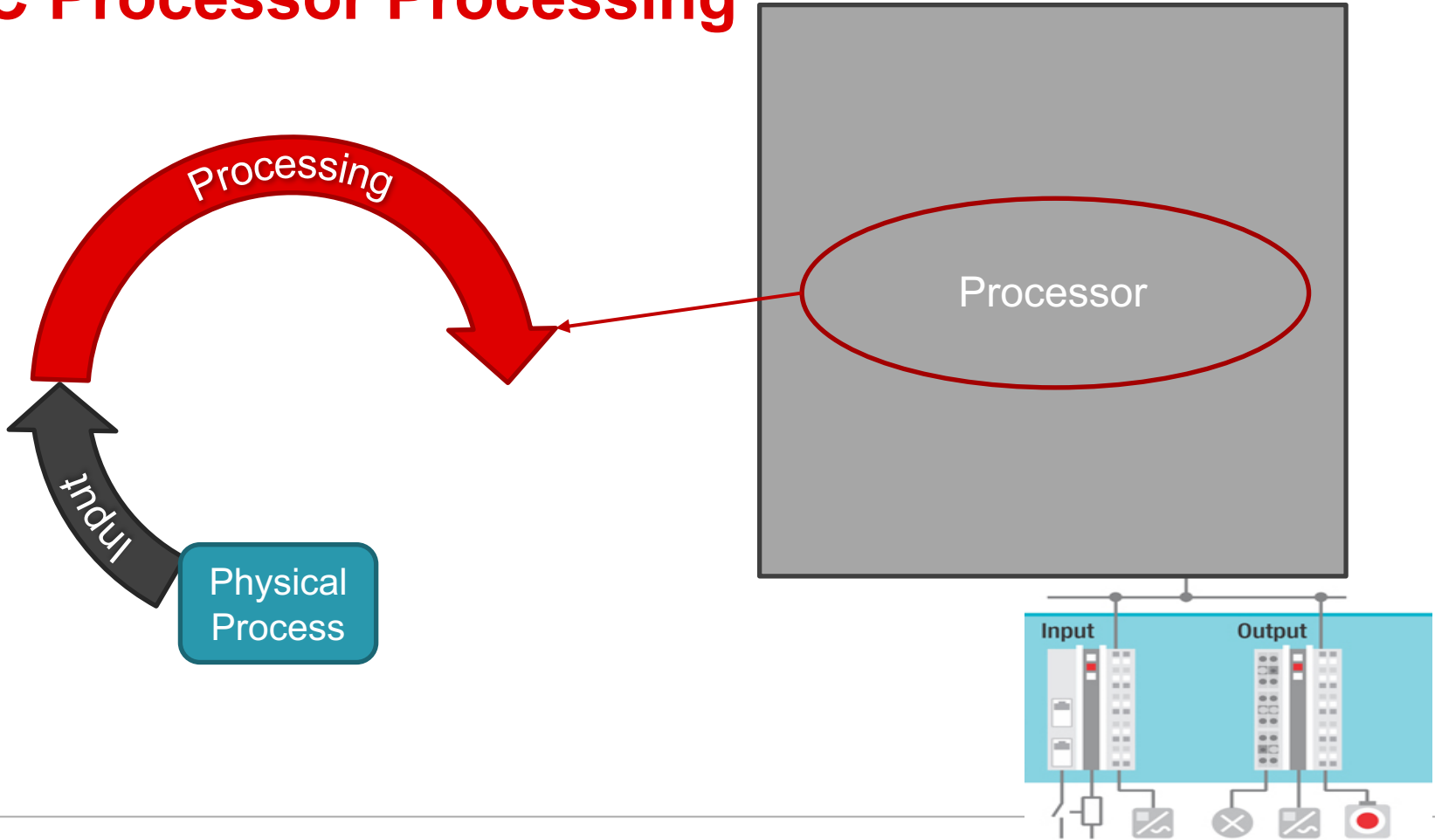
# PLC Processor Processing



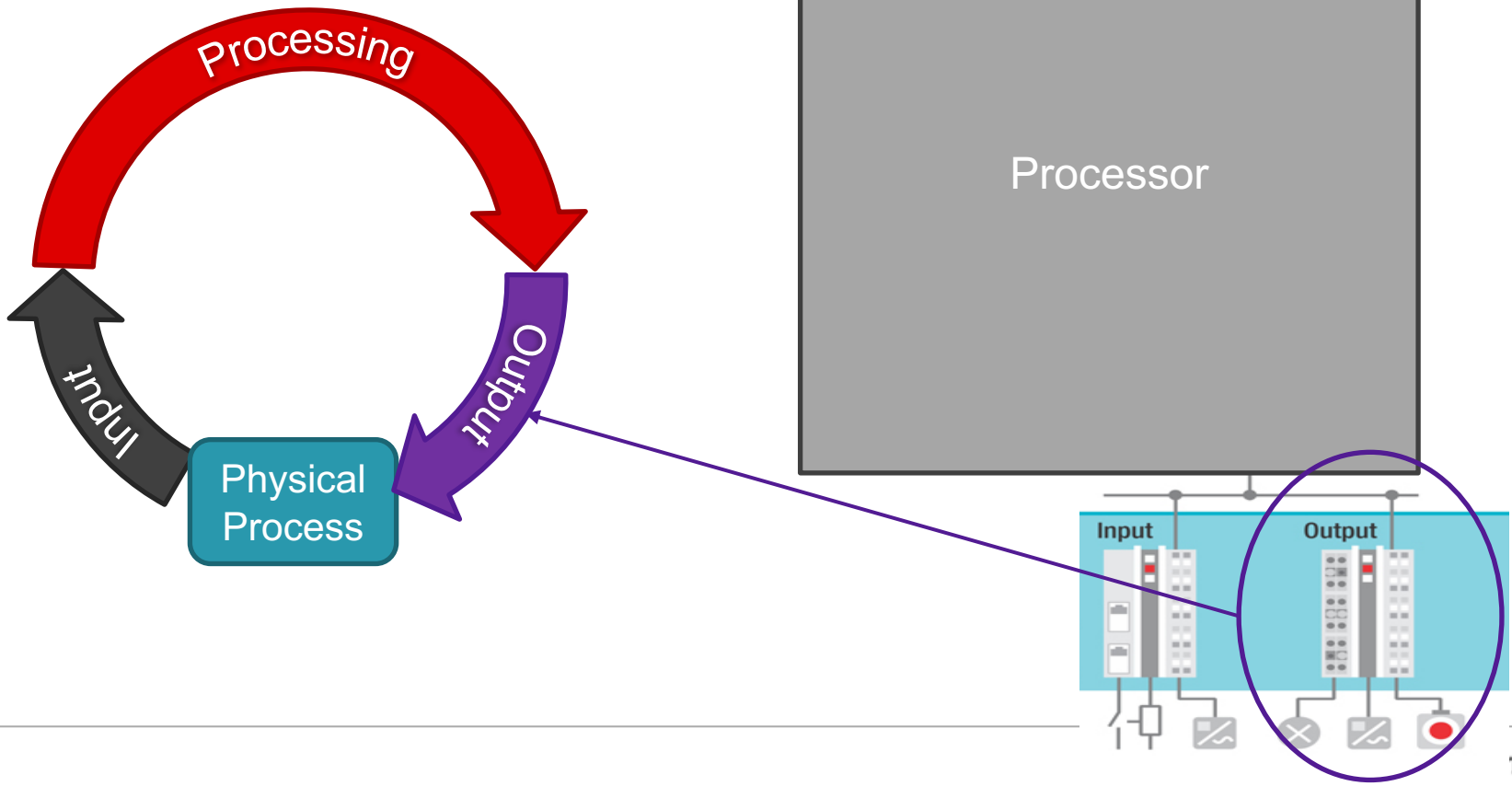
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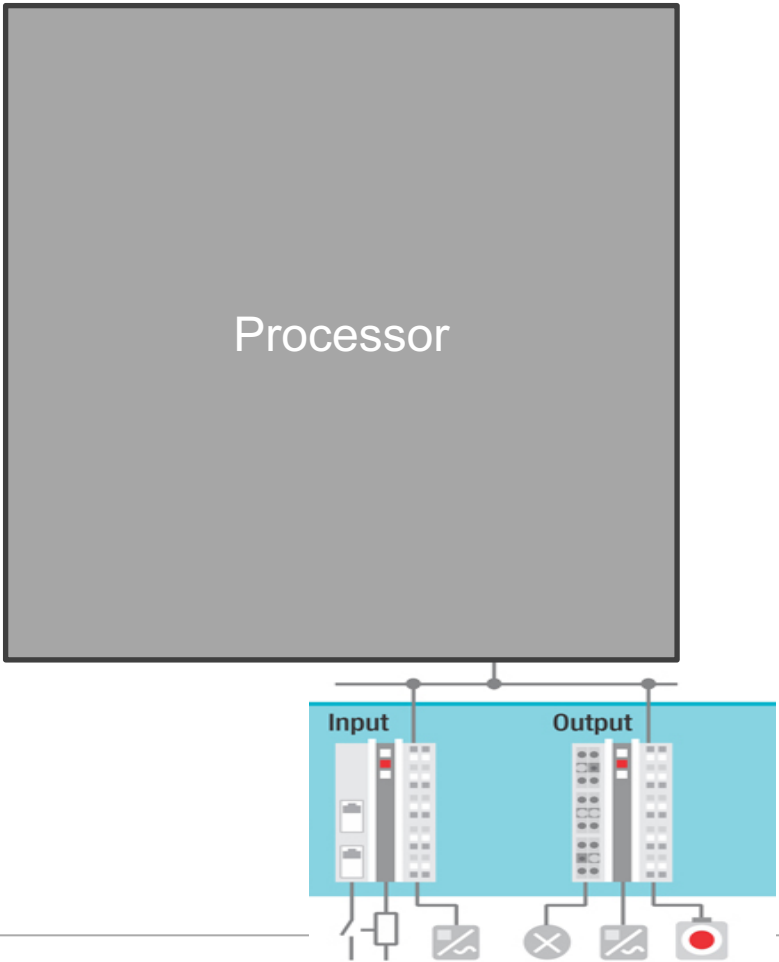
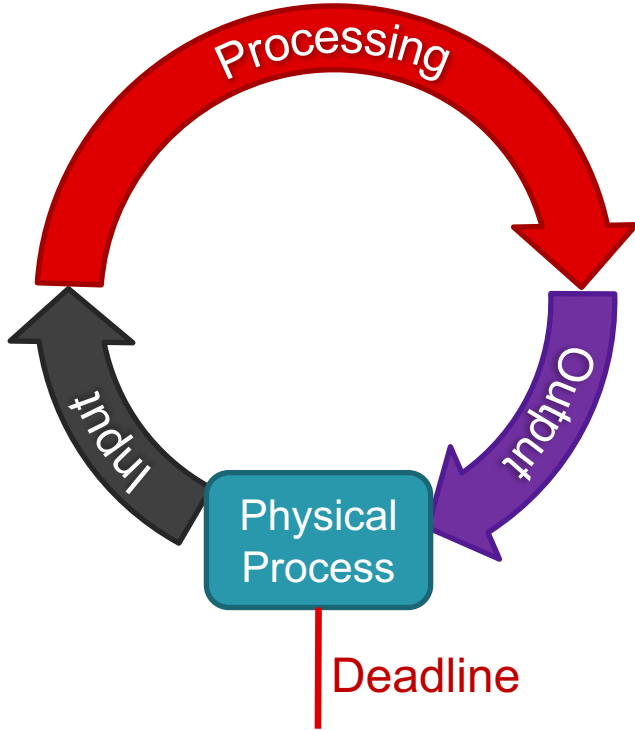


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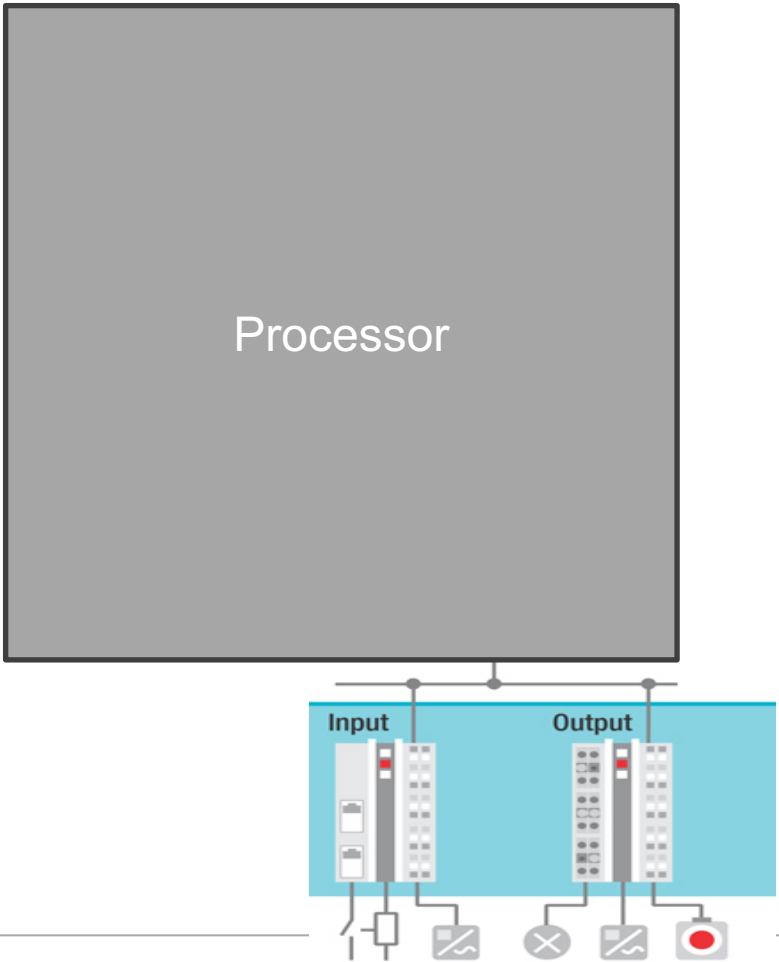
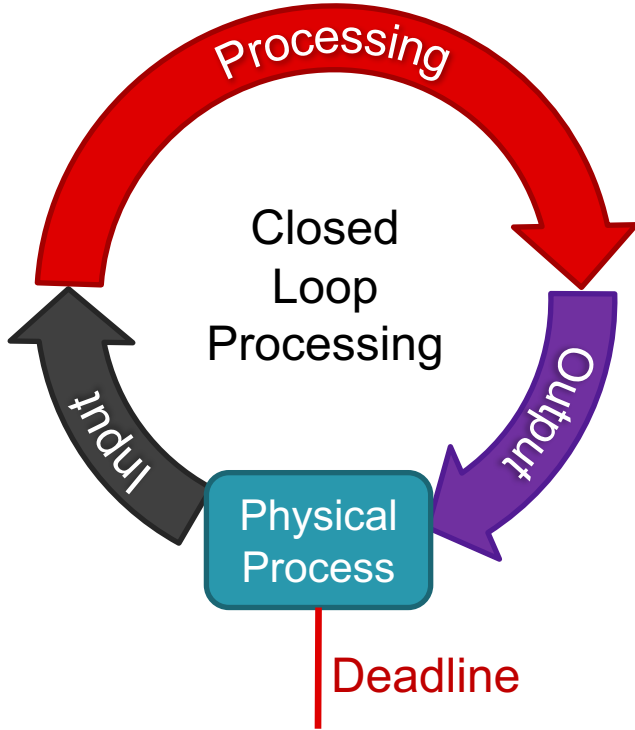




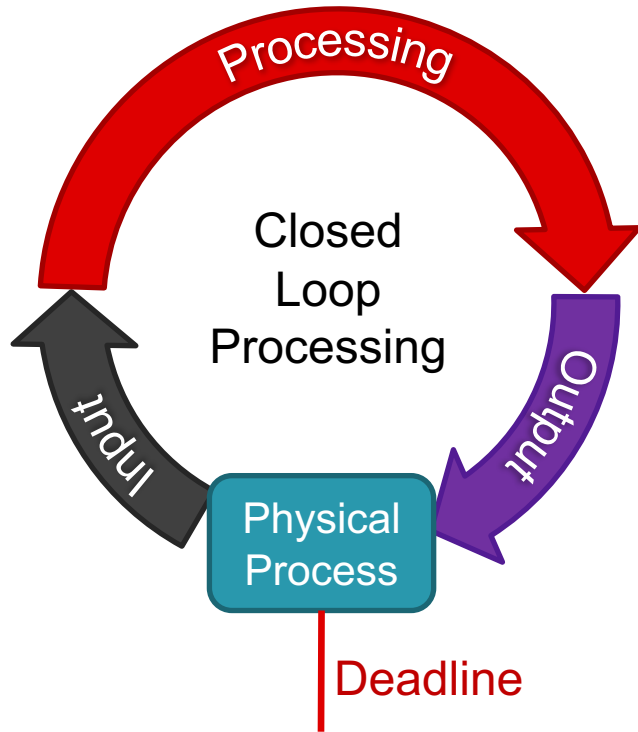
# Deadlines



# Closed Loop Processing



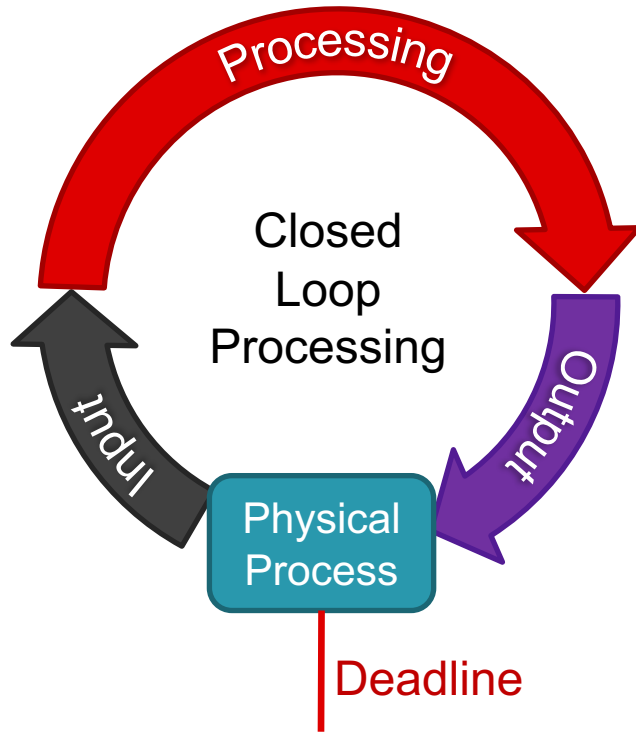
# Closed Loop Processing



VS.

Throughput Processing

# Closed Loop Processing

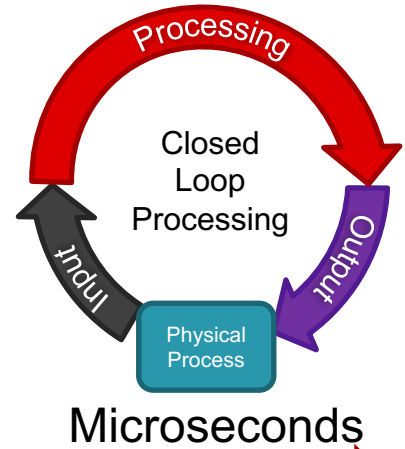
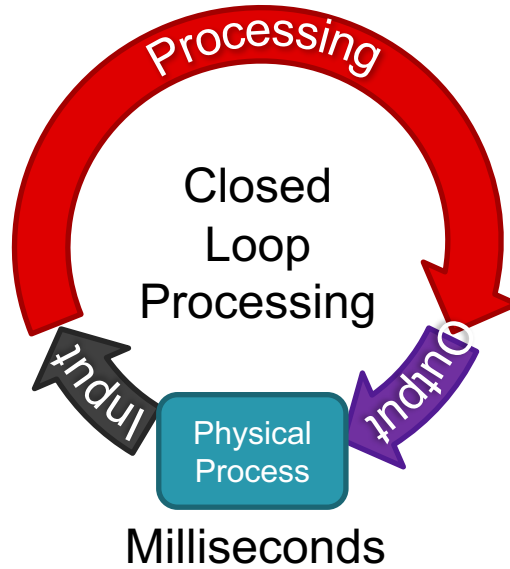
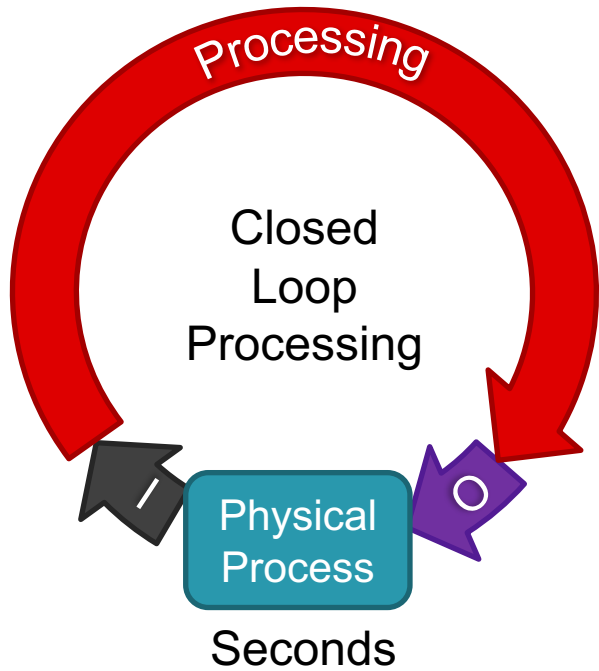


VS.

Throughput Processing

- As much data as fast as possible

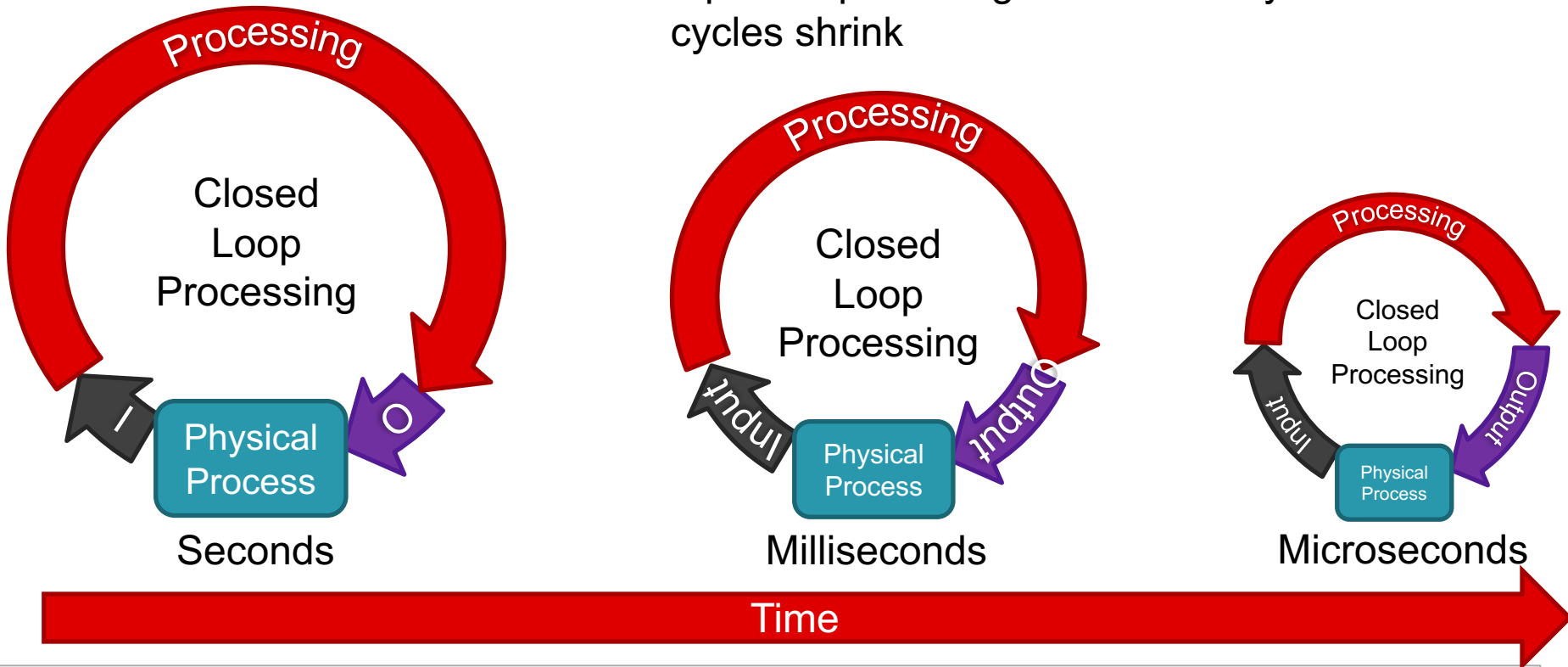
# Closed Loop Processing Cycle Times



Time

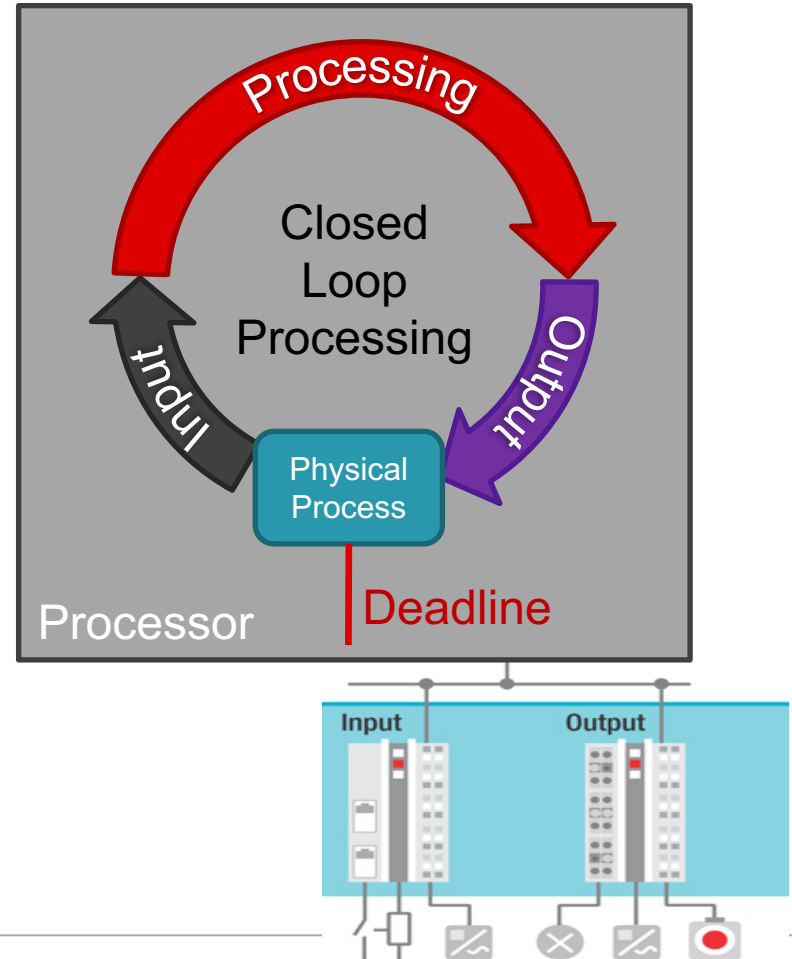
# Input/Output Taking More of the Cycle

- Input/Output taking more of the cycle as cycles shrink



# Summary

- Industry 4.0 is driving change at the processor level
- Processors fit for this space must be able to accomplish Closed Loop Processing
- Latencies must be managed across the system
- Must be able to achieve some level of determinism
- Cycle times are decreasing over time



# For more information...

- [AM654x Training Series](#)
- [AM654x on the web](#)
  - [Data Sheet](#)
  - [Technical Reference Manual](#)
- [Processor Software Development Kit \(SDK\)](#)
- [Evaluation Module](#)
- [Industrial Development Kit](#)
- [Support Forum](#)





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