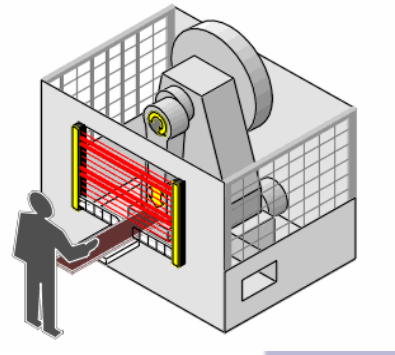
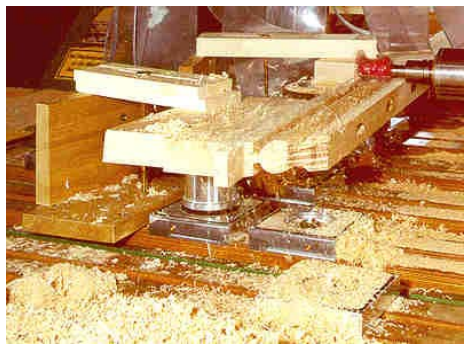
New Features

PROFIDrive





PROFISafe

New Features

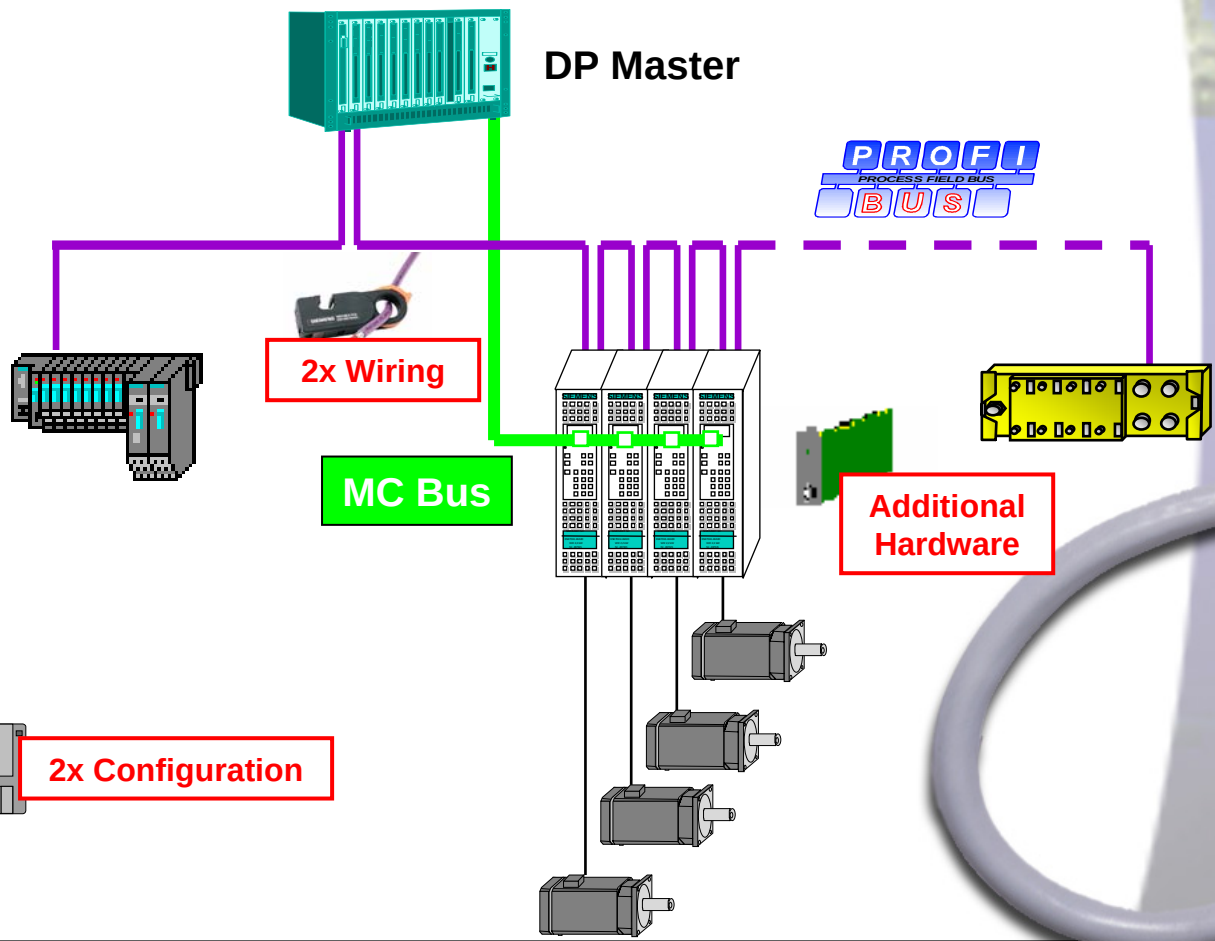
PROFIBUS in Motion Control Applications

- ✓ **PROFIBUS used for**
  - × **Read status and parameter information from the drives**
  - × **Write parameters and download general commands (for example “Enable Application”)**
  - × **Handling of diagnostic messages**
- ✓ **“Real” MC communication is handled via an additional bus system**

New Features

Motion Control - Solution Today (continued)

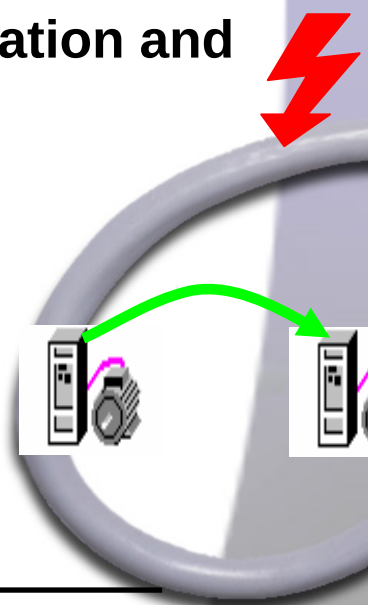
What can be improved?



New Features

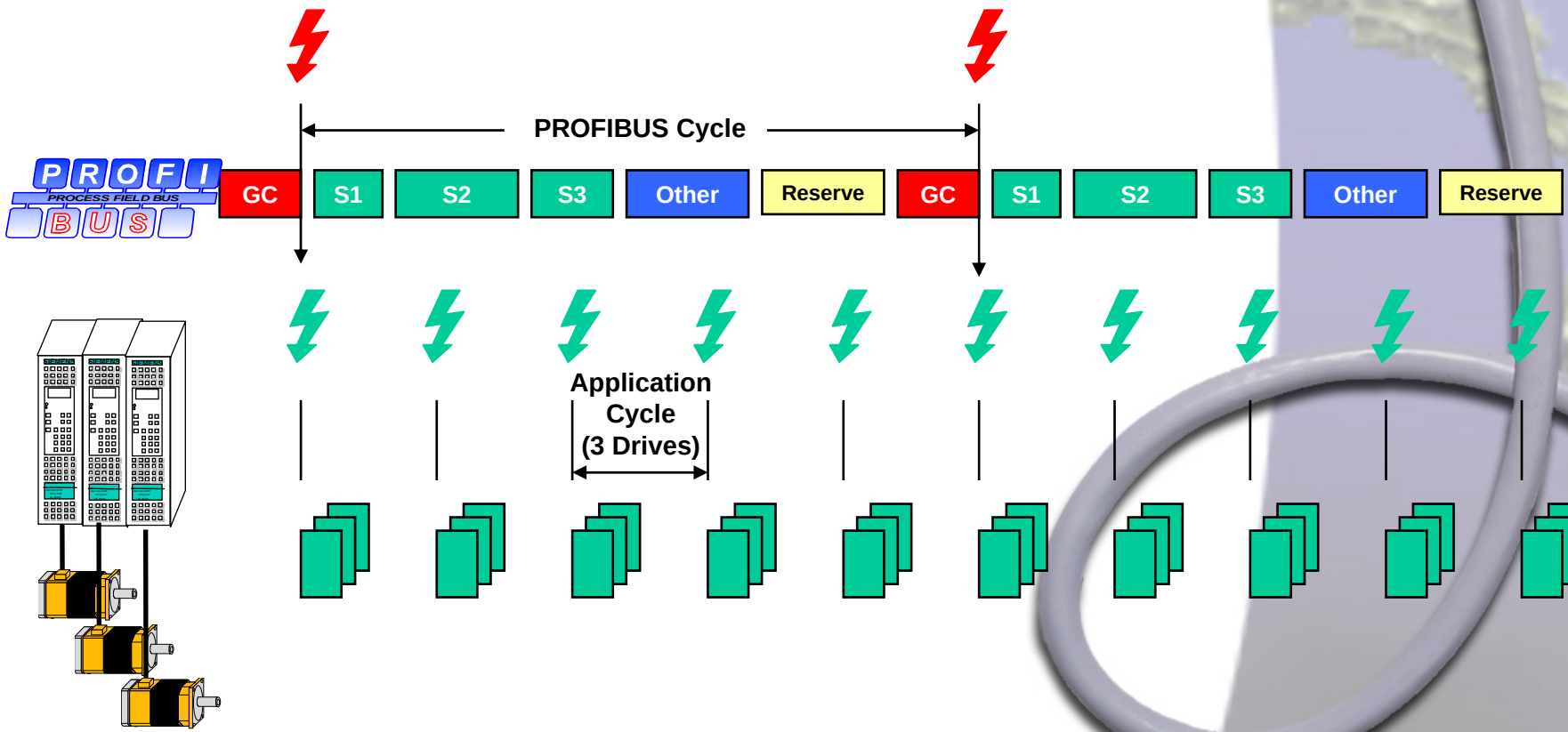
Requirements to use DP in MC Applications

- ✓ **Constant (equidistant) DP cycle time**
  - × including master class2
  - × including DPV1 communication
  - × including a reserve for telegram repetition
- ✓ **Clock synchronization between application and DP cycle**
  - × jitter < 1 µs
  - × compensation of temporary clock failure
- ✓ **Data exchange between slave devices**



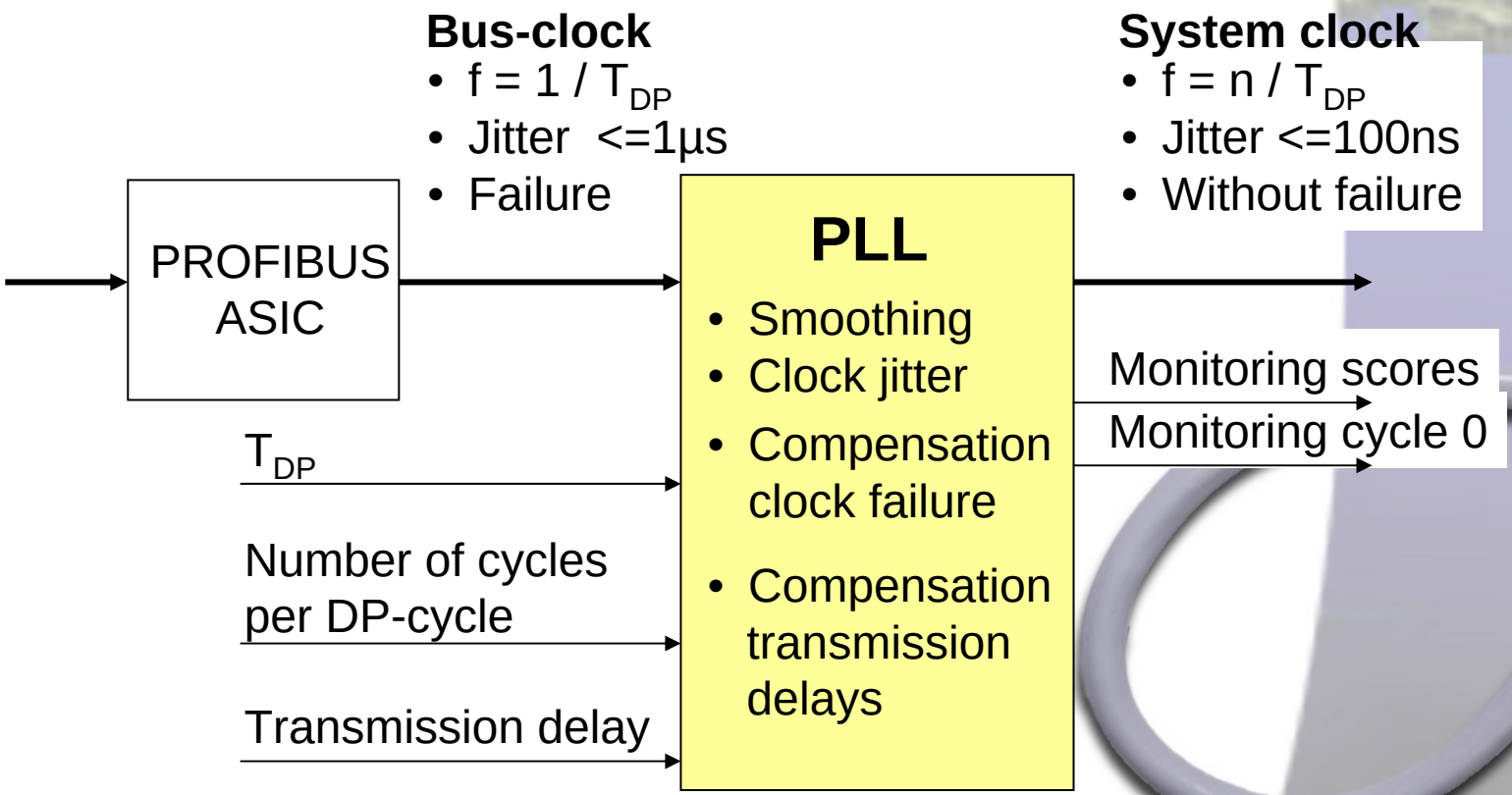
New Features

❑ Constant Cycle Time & Synchronization



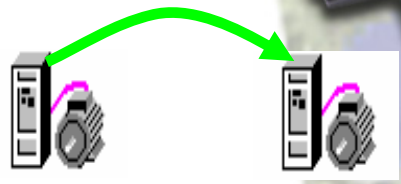
New Features

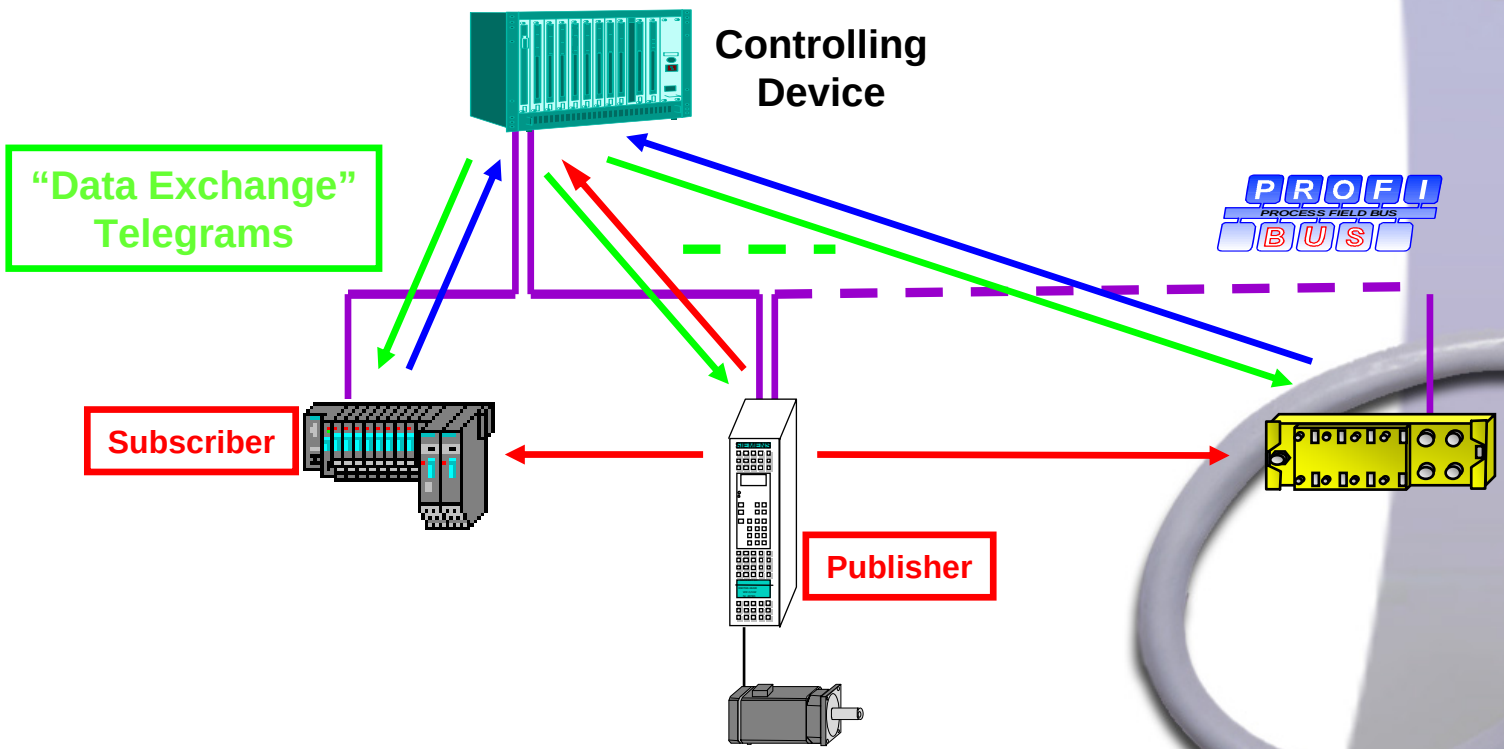
Constant Cycle Time & Synchronization (continued)



New Features

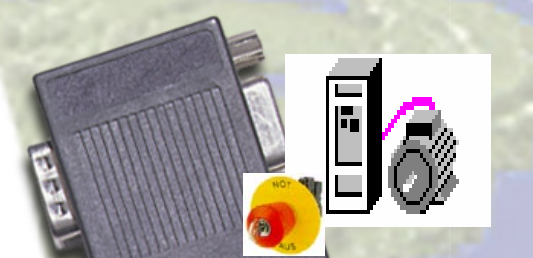
Data Exchange between Slaves



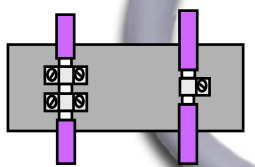


New Features

- **Requirements fulfilled with V3 of the PROFIDrive Profile**
  - ☑ **Up to 31 nodes (12 drives and additional I/O)**
  - ☑ **1x controlling master and max. 1x class 2 master**
  - ☑ **Transmission rate = 12Mbaud**
  - ☑ **Up to 100m/328ft - no FO or repeaters**
  - ☑ **Proper installation is CRITICAL**





New Features

- **Requirements fulfilled with V3 of the PROFIDrive Profile (continued)**
  - ☑ **Compatibility is ensured**
  - ☑ **No new communication method necessary**
  - ☑ **Additional FC in telegram header for Publisher**
  - ☑ **Information needs to be included into the GSD file**
  - ☑ **Configuration tool handles set-up of the constant bus cycle and also the filter tables for Subscriber**
  - ☑ **MC supported by ASPC2 Step E2 & DPC31**
  - ☑ **Publisher/Subscriber also by SPC3 & LSPM2**

New Features

Performance Data

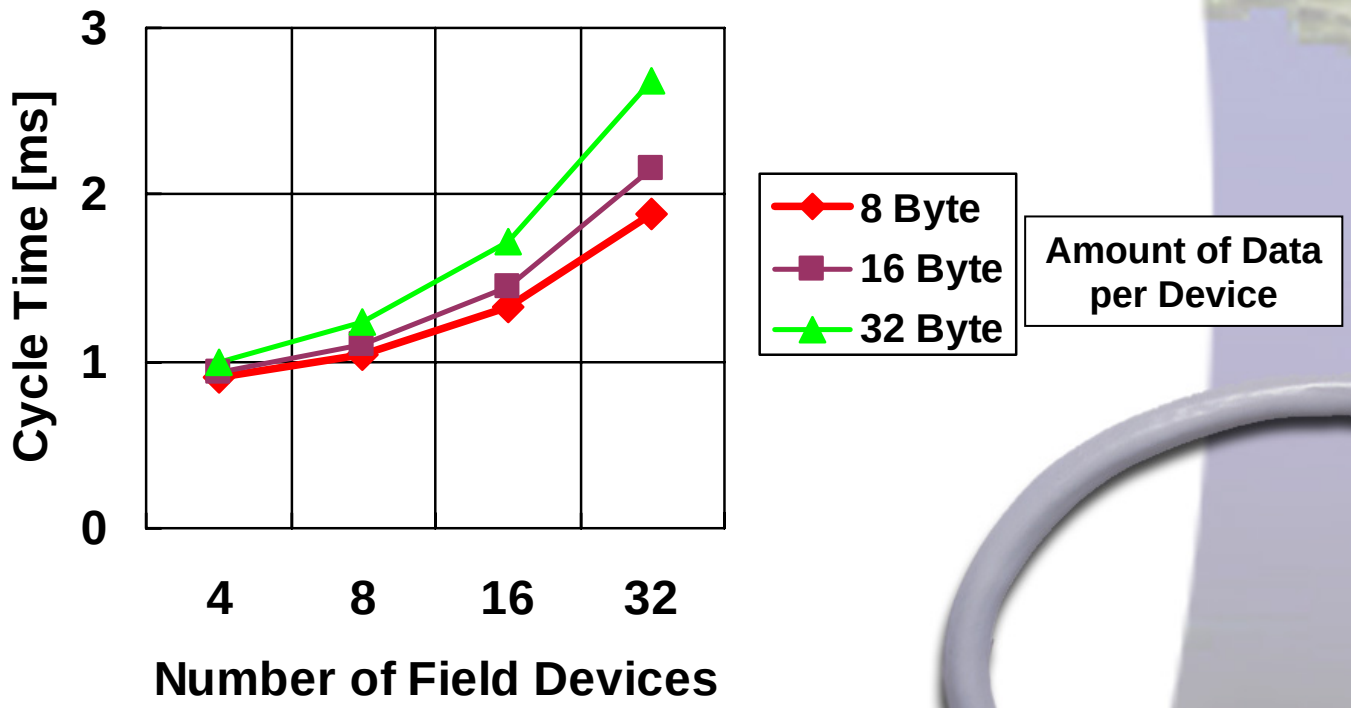
- ✓ Basic amount 300µs
- ✓ Add 20µs per Field Device
- ✓ Add 1.5µs per byte of I/O data
- ✓ (Additional 500µs for Class 2 device)
- ☑ Example 1: 1x1 axis + 2x 2 axis + 3x I/O + 208 byte data total

  300µs + 6x 20µs + 208x 1.5µs = 0.73ms (0.65 measured)
- ☑ Example 2: 2x1 axis + 9x 2 axis + 3x I/O + 688 byte data total

  300µs + 14x 20µs + 688x 1.5µs = 1.61ms (1.34 measured)

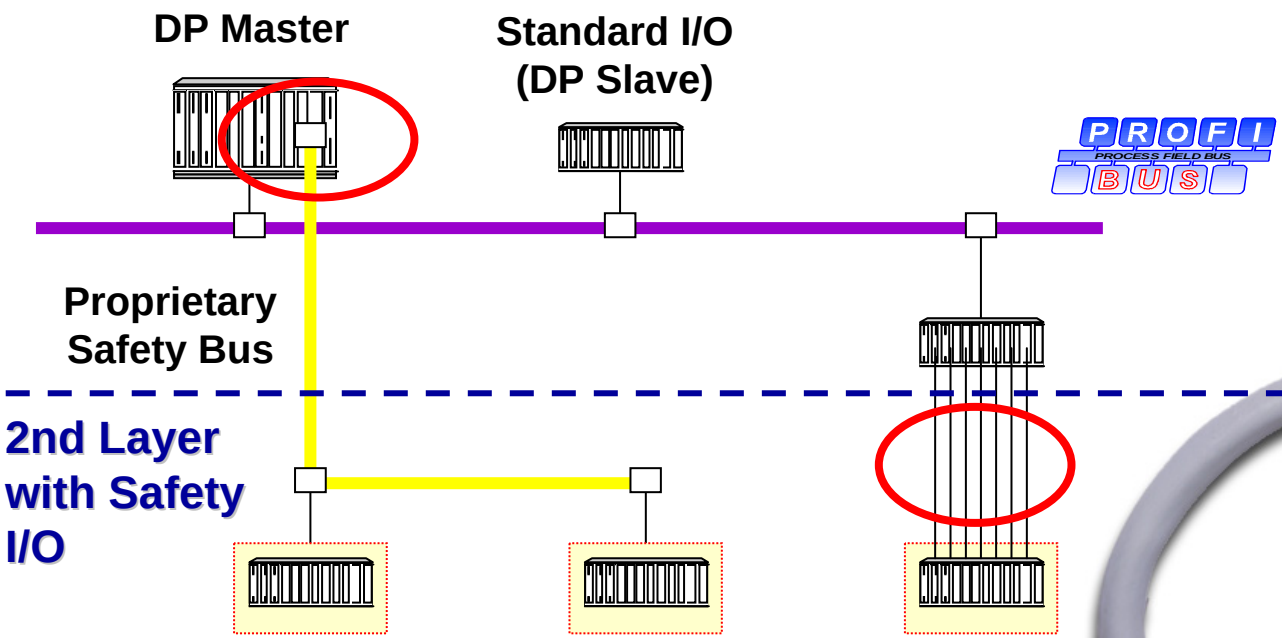
New Features

Performance Data (continued)



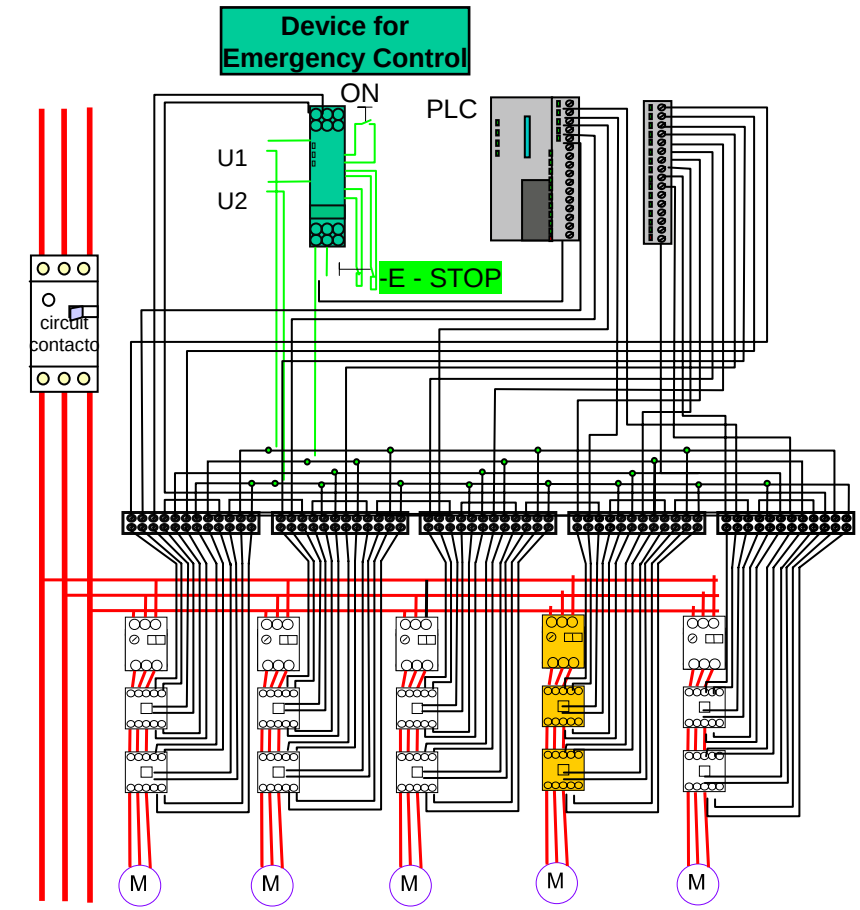
New Features

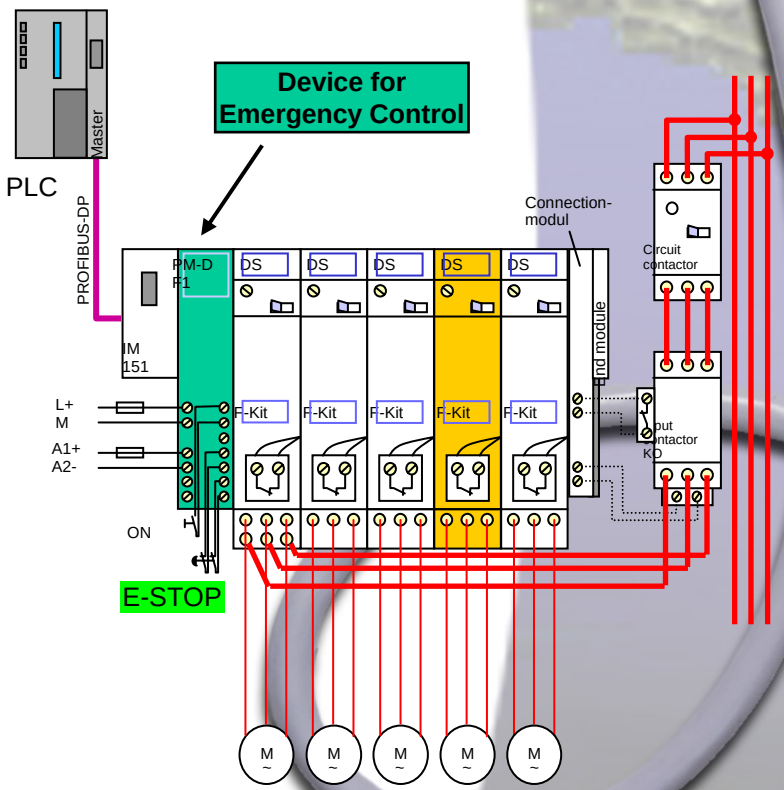
Safety - Situation today



New Features

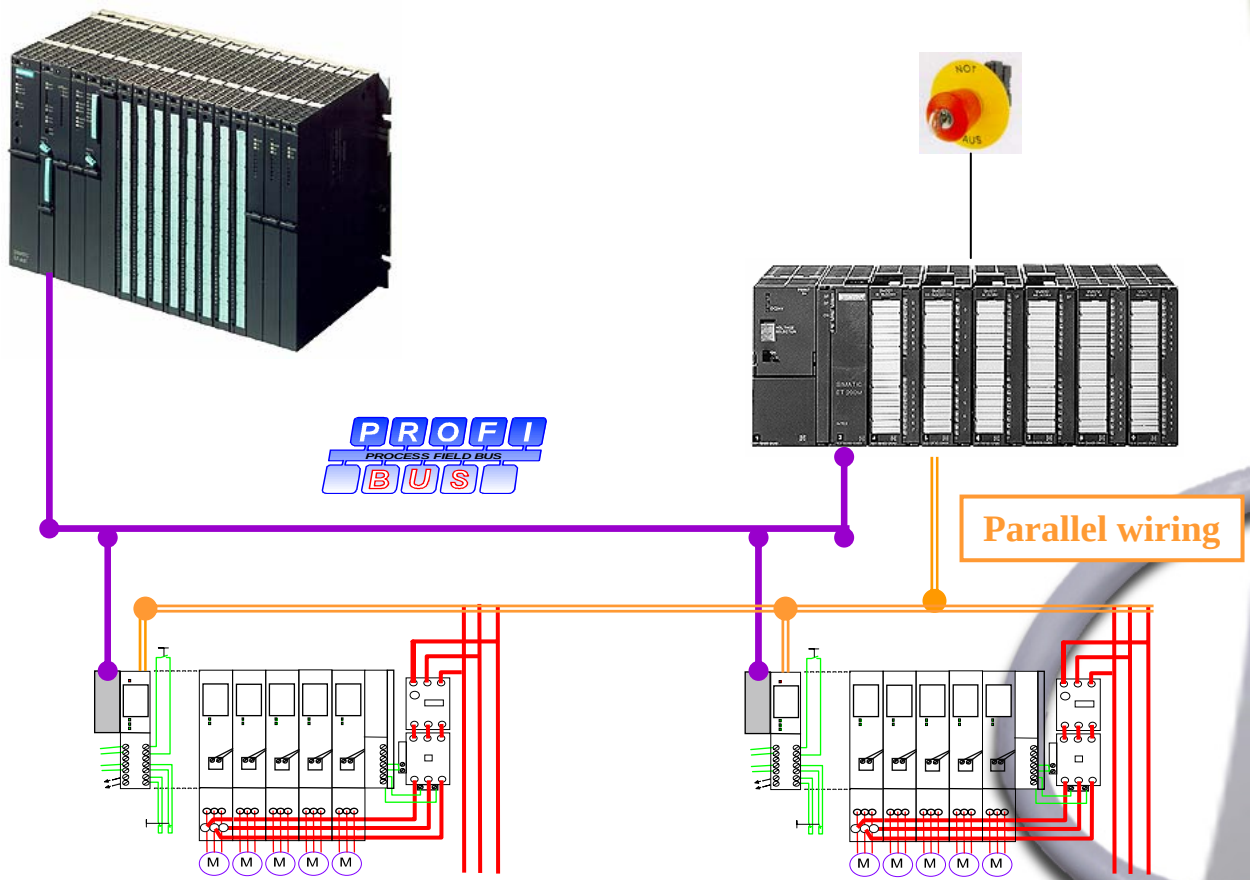
Safety - Situation today (continued)





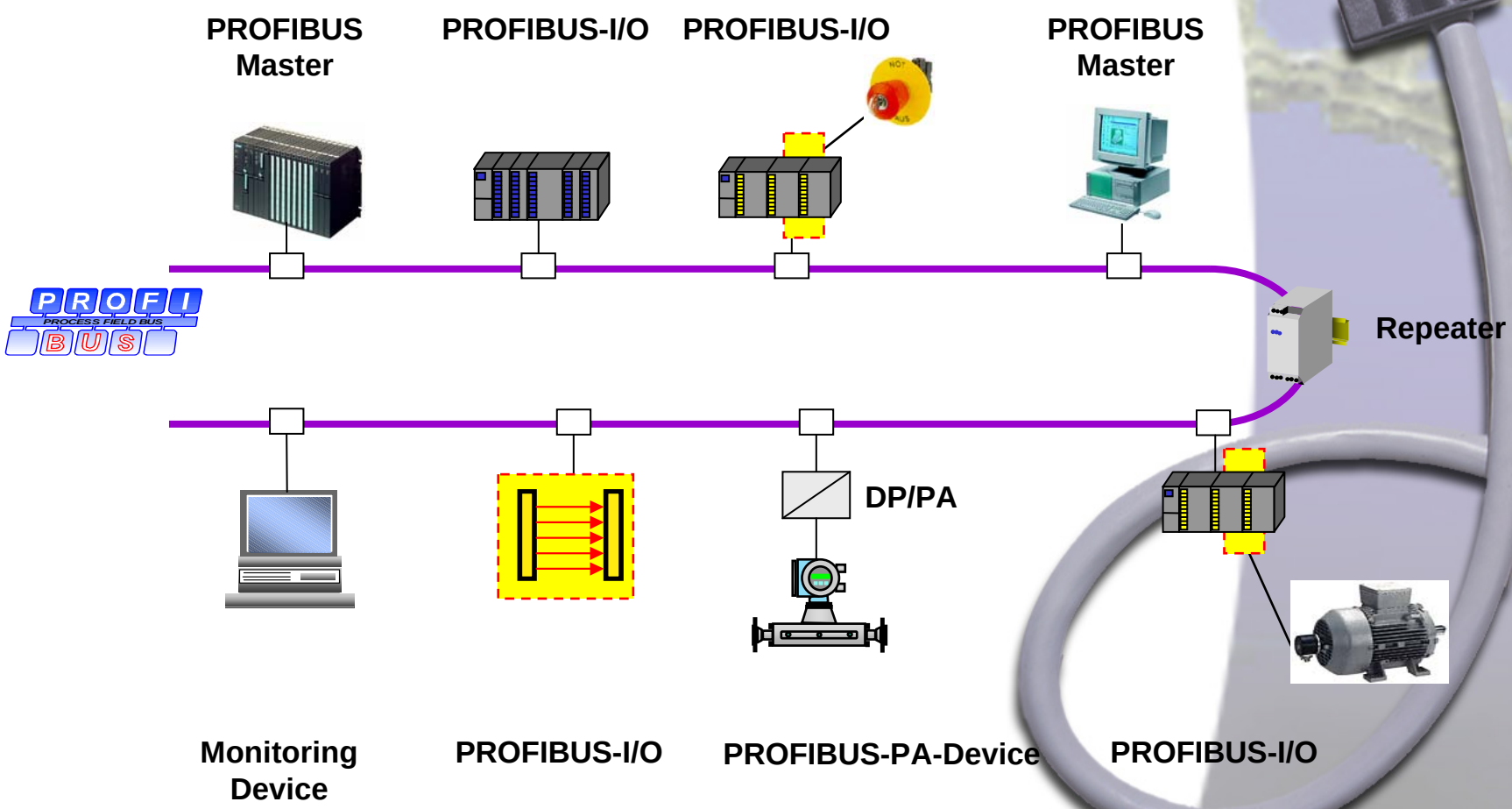
New Features

Safety - Situation today (continued)



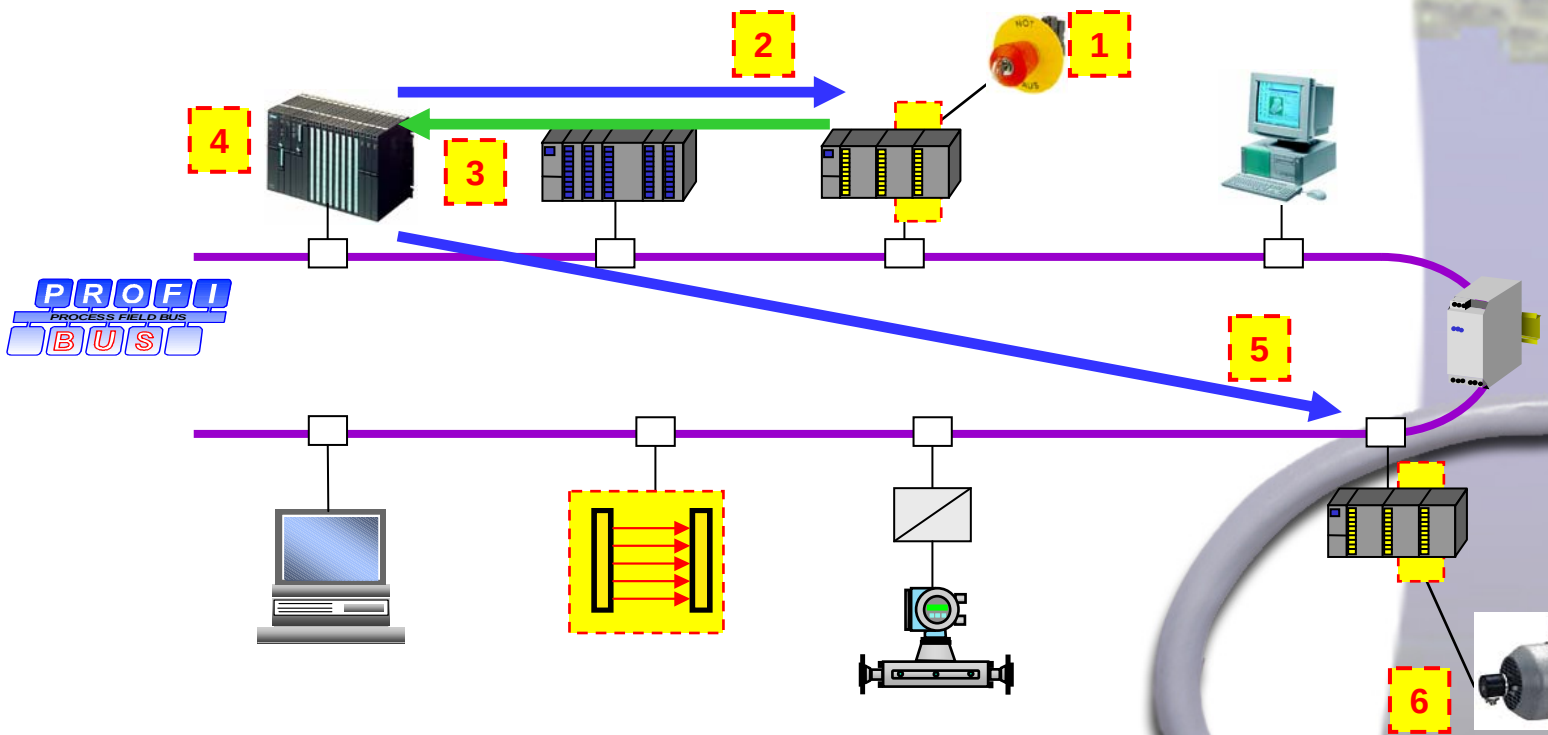
New Features

Safety - How it should be!

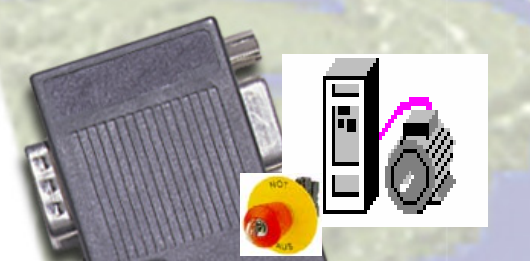


New Features

Safety - Step 1



New Features



Safety - How does it work?

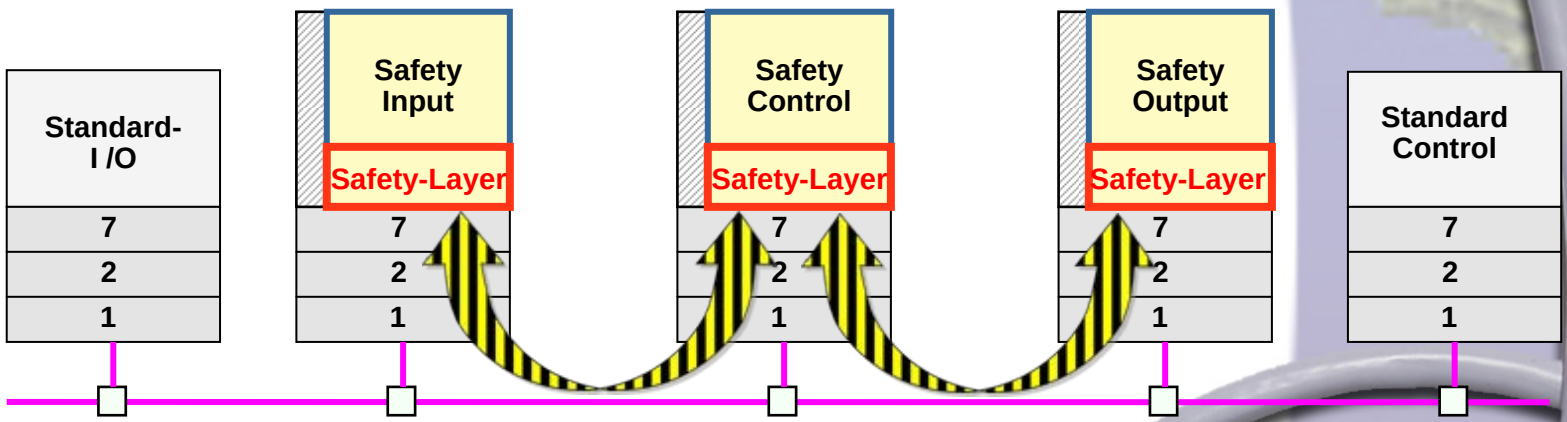
Standard PROFIBUS Telegram for Data Exchange

Up to 244 Bytes

Standard I/O Data	Failsafe I/O Data (up to 122 Bytes)	Control/ Status Byte	Sequence # (1 Byte)	CRC (2/4 Bytes)	Standard I/O Data

New Features

Safety - How does it work? (continued)



= ASICs, Links, Cables, etc.(NOT safety relevant)

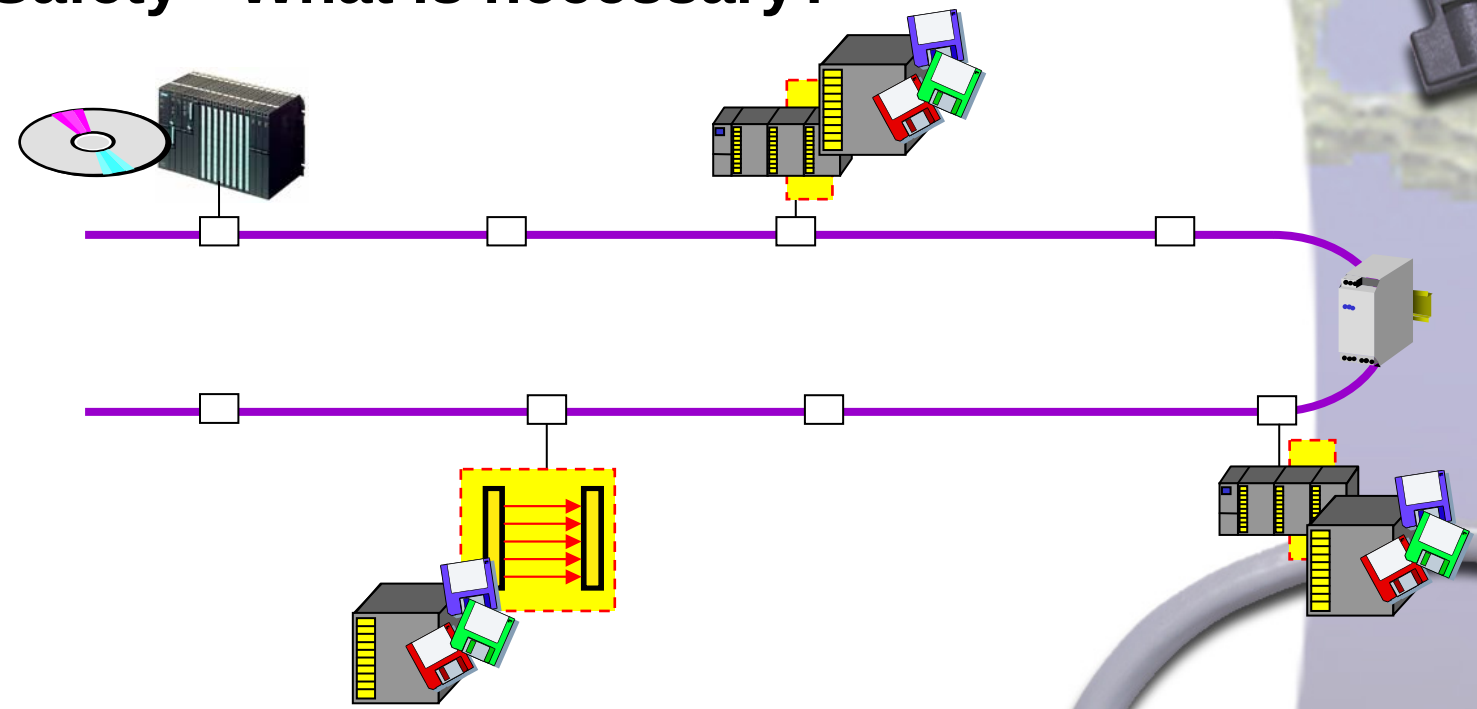
= Non safety critical functions, like e.g. diagnostic

= "PROFIsafe": Parts of the safety critical communications systems, e.g. Watchdog timers

= Safety relevant, but not part of the profile, e.g. Safety I/O

New Features

Safety - What is necessary?



Safety Controller

Special Hardware & Firmware in Field Devices

New Features

Safety - Step 2: Data Exchange Broadcast