PI UK
Conference 23/24 June 2015

# PROFIBUS & PROFINET
# A match made in Karlsruhe

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PI UK
PROFIBUS • PROFINET

**PROFIBUS and PROFINET – two protocols, both alike in dignity, in fair Stradford, where we lay our scene.**

# Agenda

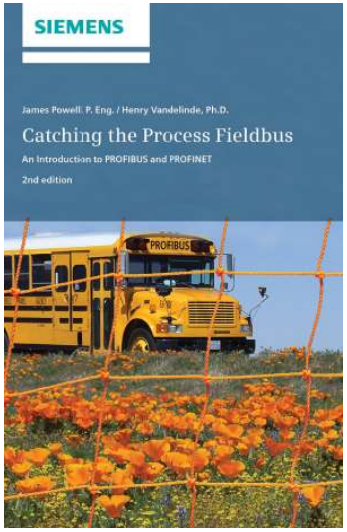


- Introduction
- Shared history and organization
- Similarities in setup procedure
- Shared identification
- Similar communications priorities
- Similar data maps
- Similar design question
- Same grounding rules
- Similar troubleshooting
- Conclusions
- Questions and answers

# Introduction

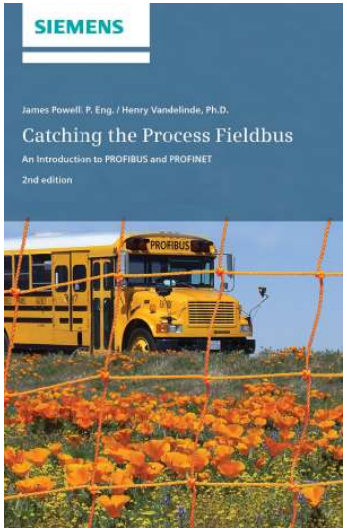


- Personal journey:
  - 1999 – certified PROFIBUS DP network Engineer
  - 2000 – neck deep in first major PROFIBUS network problem
  - 2009 – Published a book on PROFIBUS for process automation
  - 2011 – certified PROFIBUS DP and PA instructor
  - 2012 – certified PROFINET network Engineer
  - 2013 – worked on my first PROFINET network problems
  - 2015 – published 2nd edition – added PROFINET



# Introduction






PROFIBUS®

PROFINET®

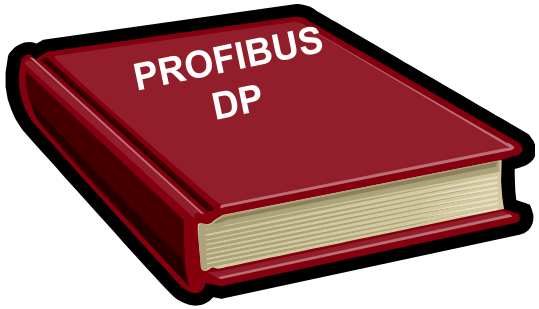
# Shared history and organization



- PROFINET was developed from PROFIBUS

PROFIBUS is like a book with many chapters:

- PROFIdrive
- PROFIsafe
- PROFIBUS PA




PROFINET is like a book with many chapters:

- PROFIdrive
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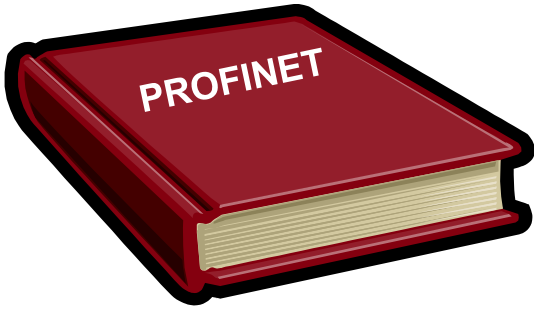


# Shared history and organization



## Innovation

- A Profile is a standarization of a particular type of field device from the bus point of view, regulating how the information is presented on the bus and in what format, as well as defining standard parameters and setup.
- Profiles for:
  - Drive systems
  - Process automation
  - Robots and numerical control
  - Encoders
  - Hydraulic drives
  - Low voltage switchgear
  - Dosing and weighing
  - Liquid pumps

# Shared history and organization



- One organization to rule them all ...

# Similarities in setup procedure

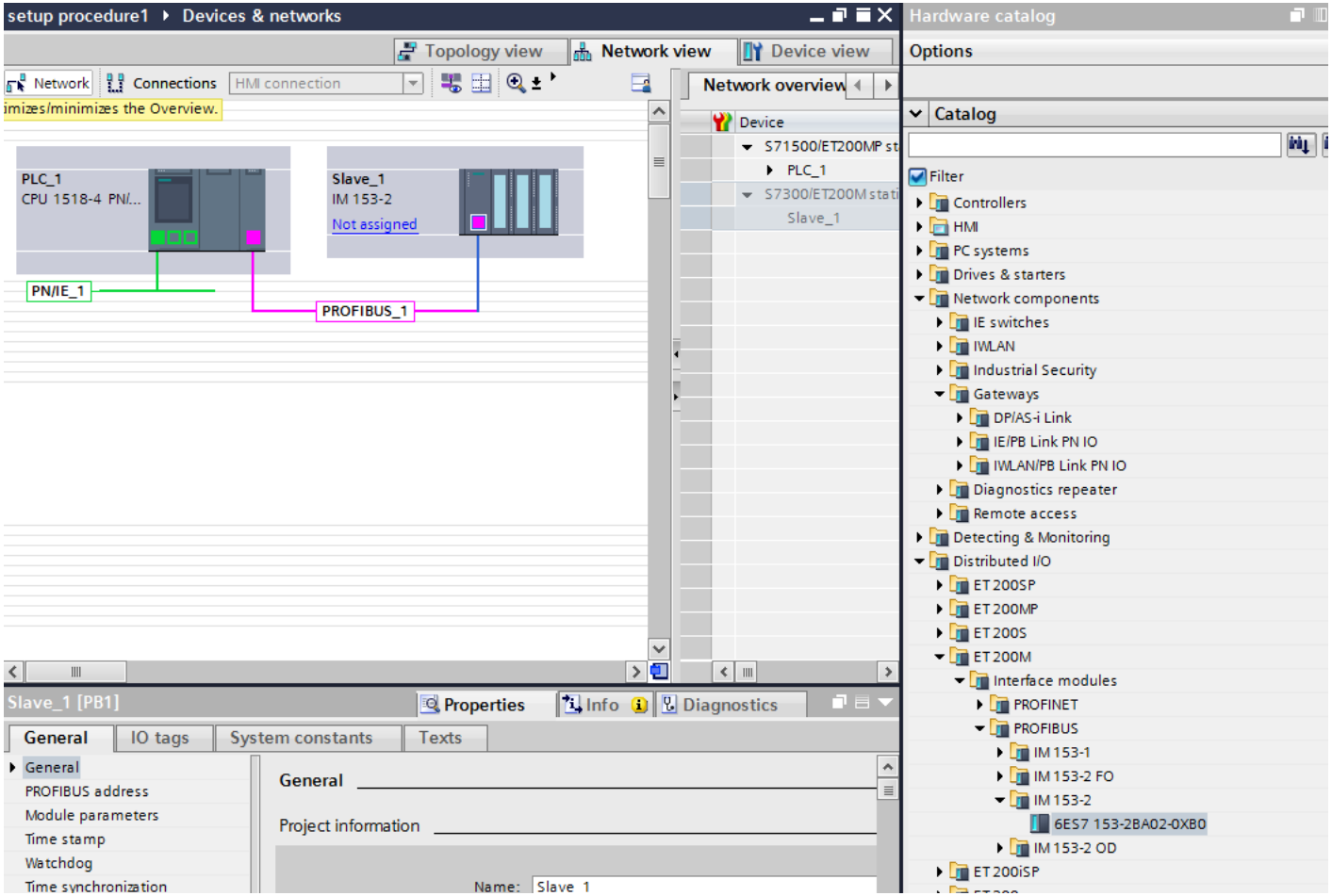


- With PROFIBUS:
  - Import the GSD file into the network configuration software
  - Drag the device onto the network
  - Setup the modules
  - Download to controller
- With PROFINET
  - Import the GSD file into the network configuration software
  - Drag the device onto the network
  - Setup the modules
  - Download to controller

# Similarities in setup procedure



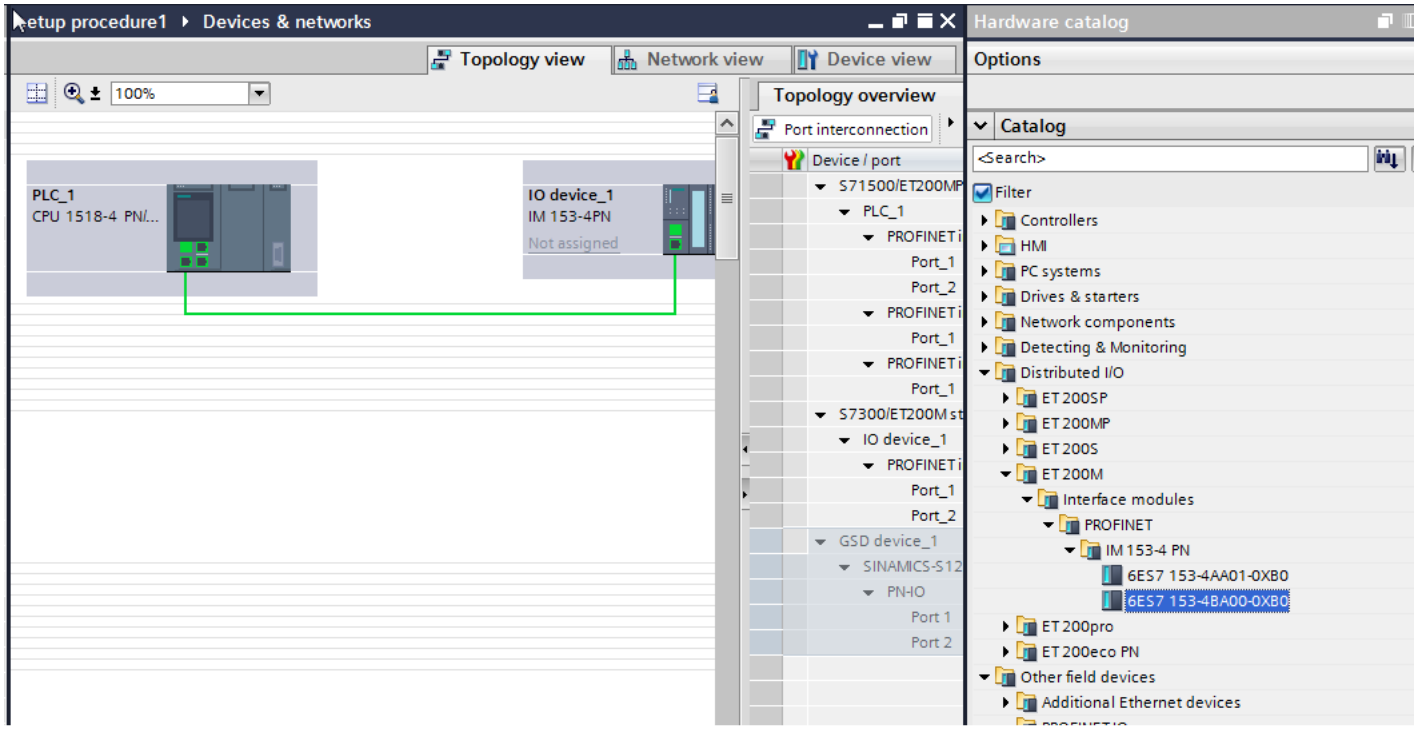
## With PROFIBUS the line is purple



# Similarities in setup procedure



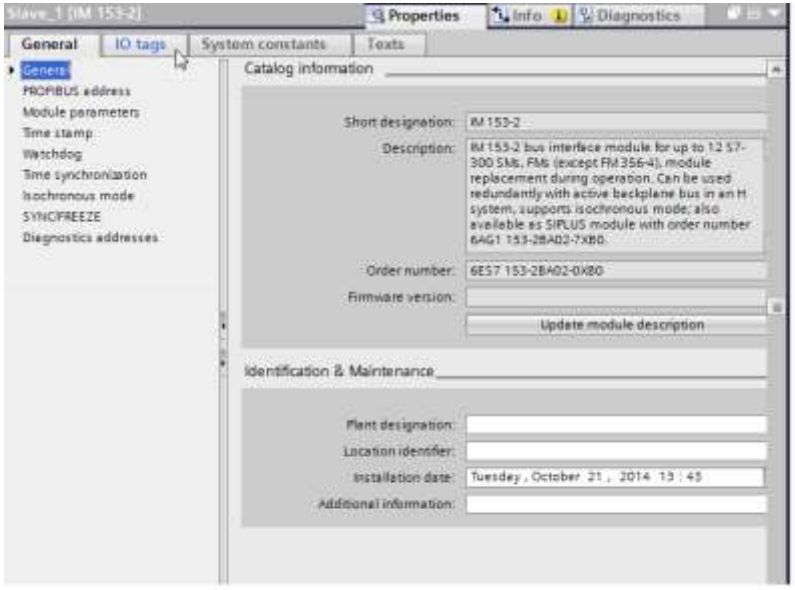
## With PROFINET the line is green

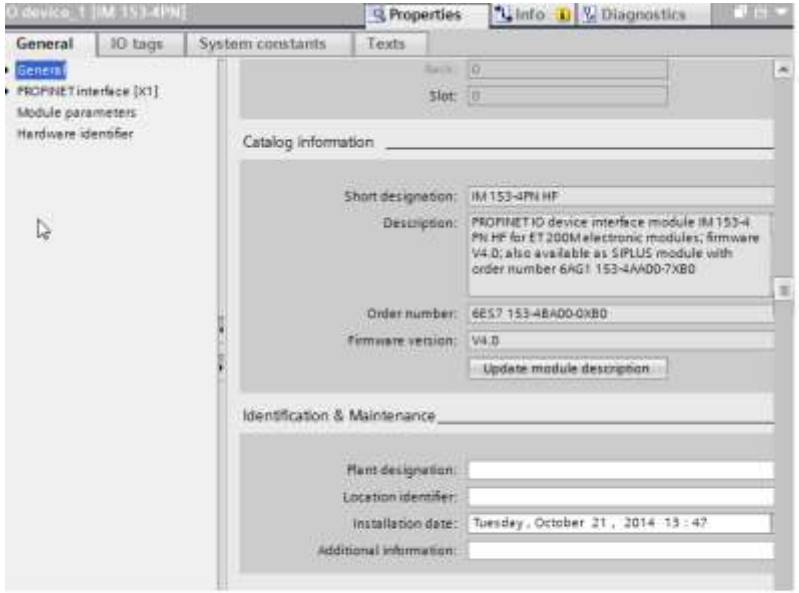


# Shared Identification



- Devices look the same:



# Shared Identification



- Identification and maintenance information:
  - Order number of the field device
  - MAC address
  - Hardware version
  - Software version
  - Device type
  - Vendor ID

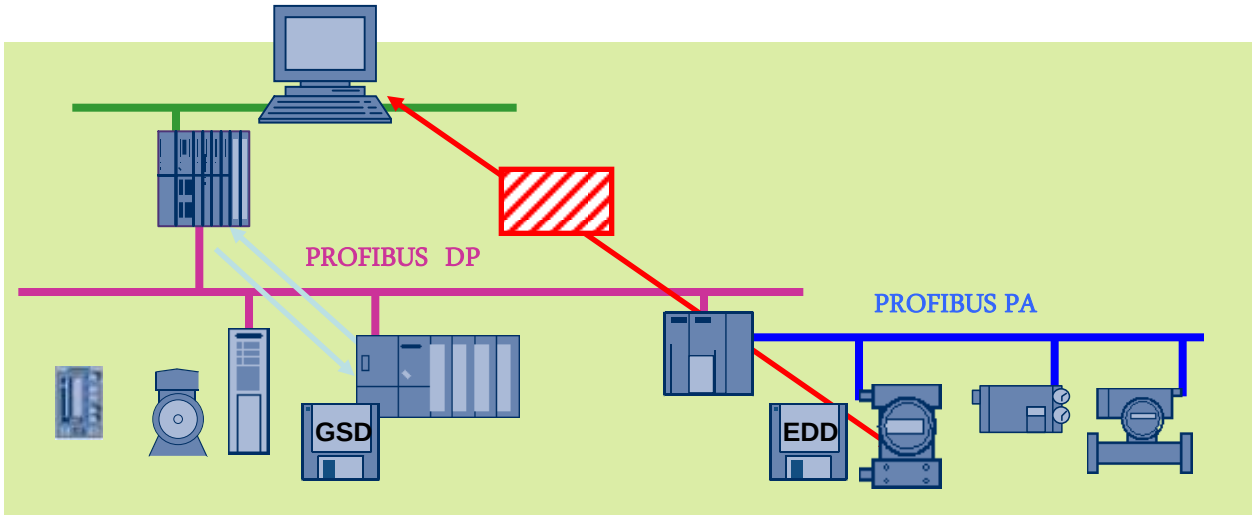
# Similar Communication Priorities

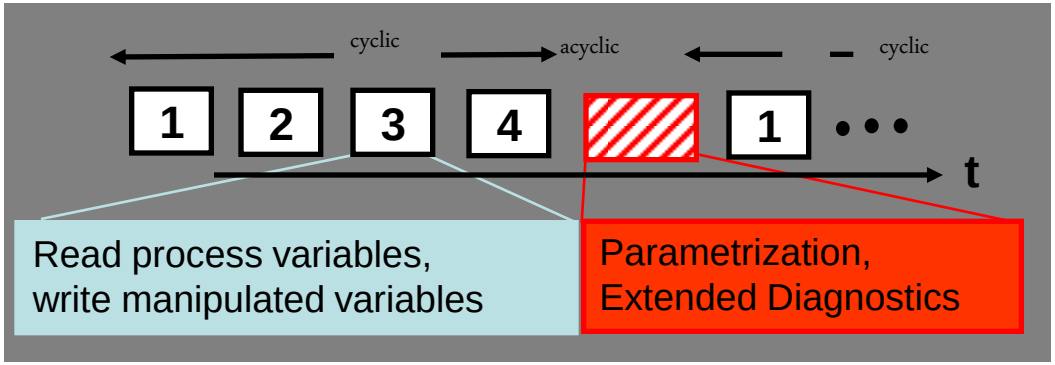
- Cyclic communications – top priority
- Acyclic communications – lower priority

PLC
CLASS 1 MASTER
IO-Controller

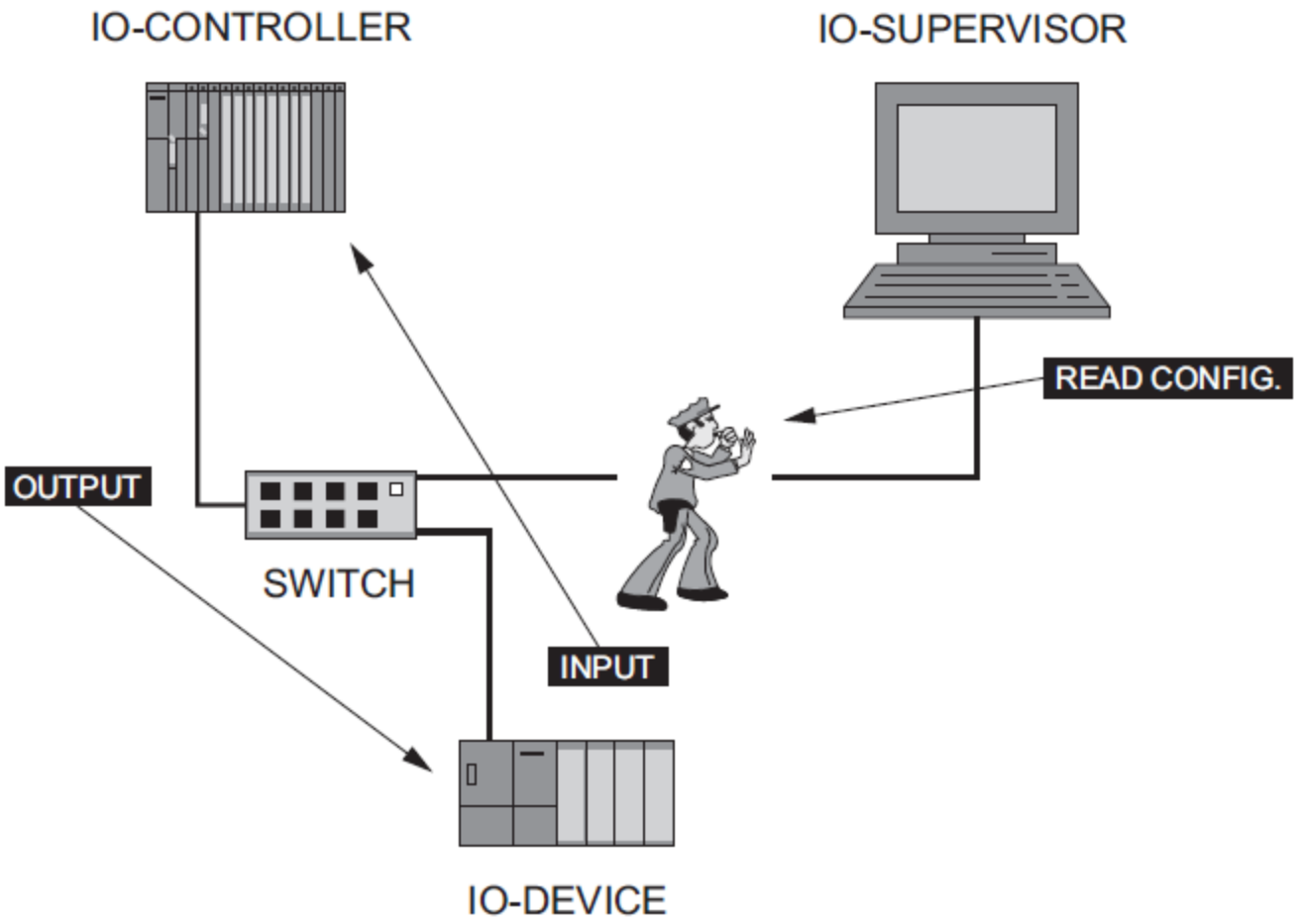
ENGINEERING STATION
CLASS 2 MASTER, IO-Supervisor

# PROFIBUS Cyclic and acyclic



# PROFINET Cyclic and Acyclic



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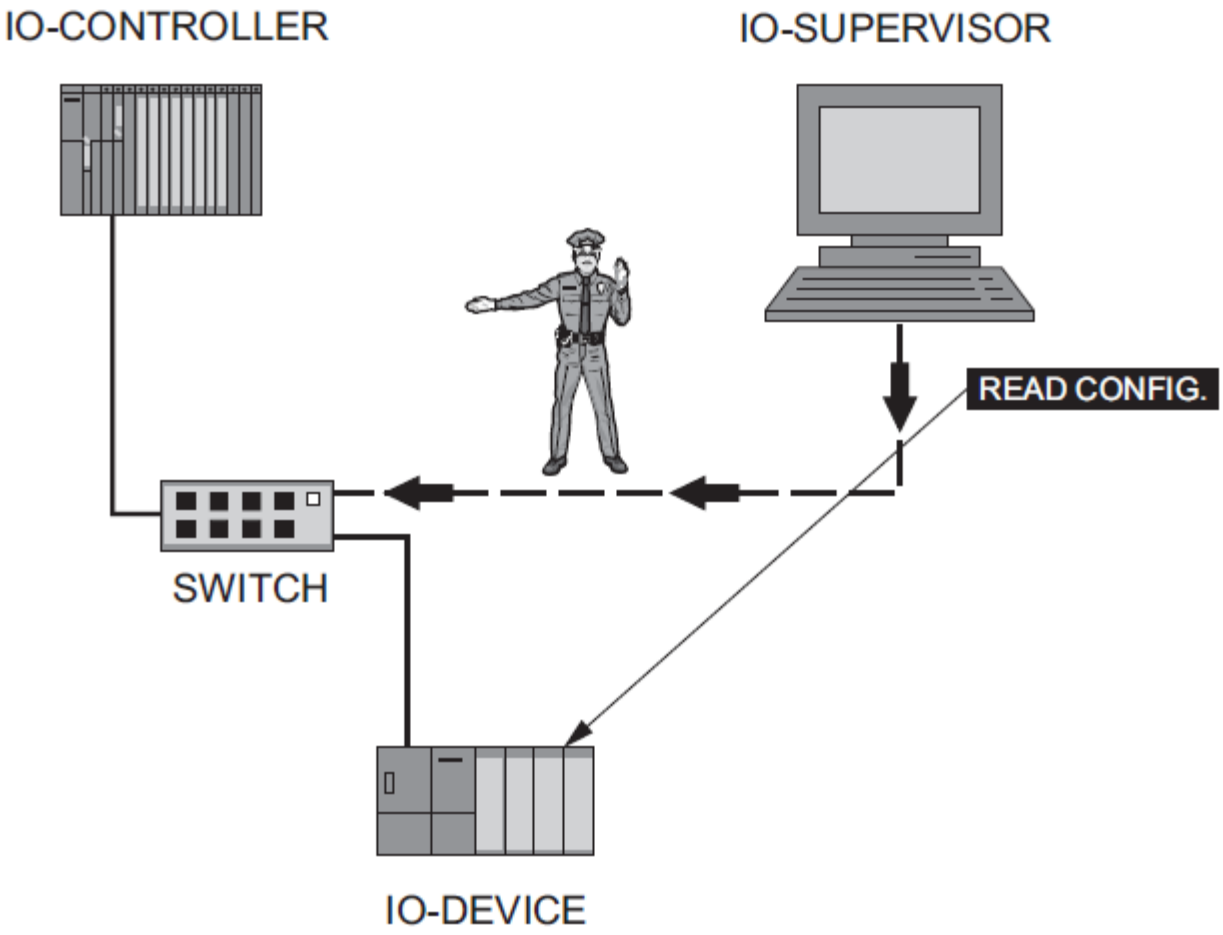
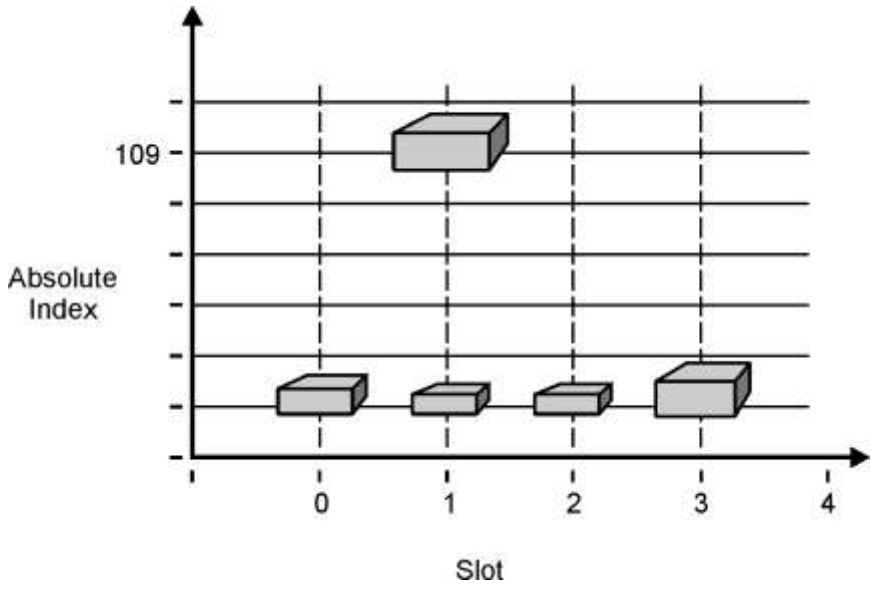
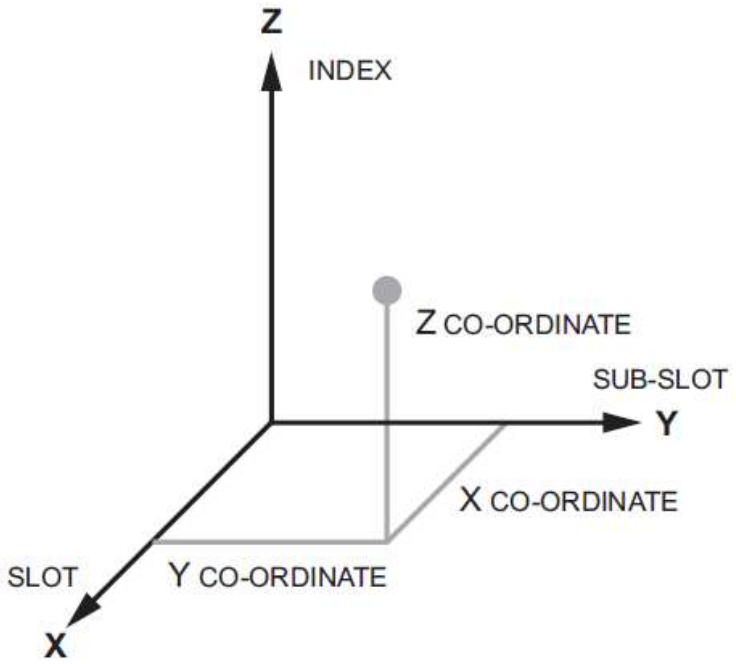


# Similar Data Maps






PROFIBUS




PROFINET

# Similar Design Questions

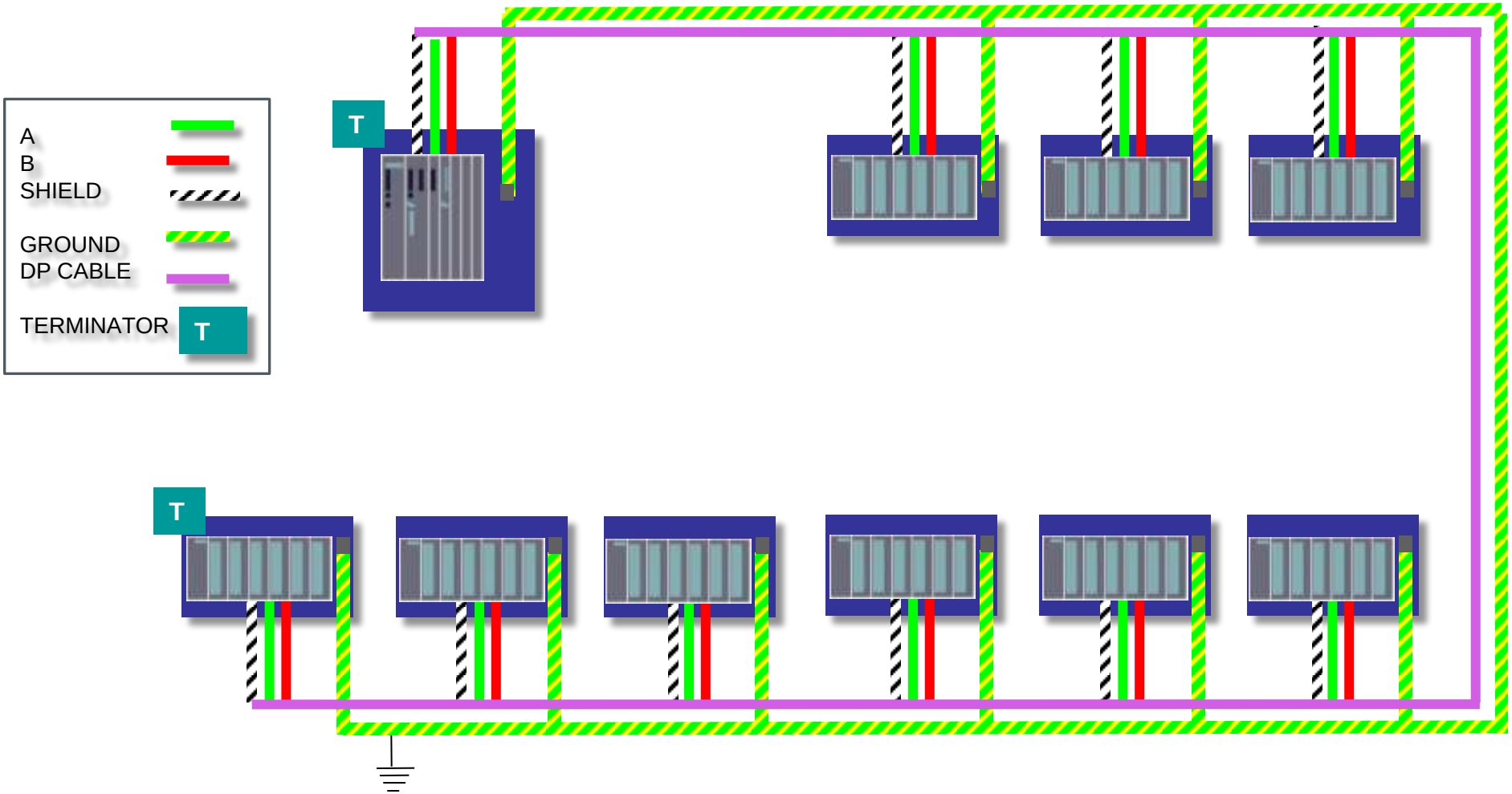


- Designing any network you have a similar process:
  - Locate the equipment
  - Group the equipment from a network point of view
  - Select best pacement of network equipment
  - Be ready to modify

- PROFIBUS DP, PA and PROFINET also a question about constant monitoring?
  - With DP – Do I design in a bus monitor (COMbrick or SoftingTH-scope)
  - With PA – Do I use dumb terminal strips or an advanced junction box with short circuit protection and a built in repeater
  - With PROFINET – Do I use a managed switch?

# Grounding rules!

- Ground at every point
- Use grounding grid and possibly a grounding cable as well



# Riddle me this batman!

- What are the three most common causes of PROFIBUS and PROFINET network Issues?

1. Physical layer problems!

2. Physical layer problems!

3. Physical layer problems!

# Troubleshooting



- Physical layer checking is similar:
  - Check grounding
  - Check cables
- Tools are different:
  - PROFIBUS DP and PA – use a meter to check cables
  - PROFINET - use a cable tester

- Bus Monitors:
  - PROFIBUS is mature – Tools like ProfiTrace and Softing‘s bus tester
  - PROFINET – Netilities NetProfi, netAnalyzer

# Conclusion

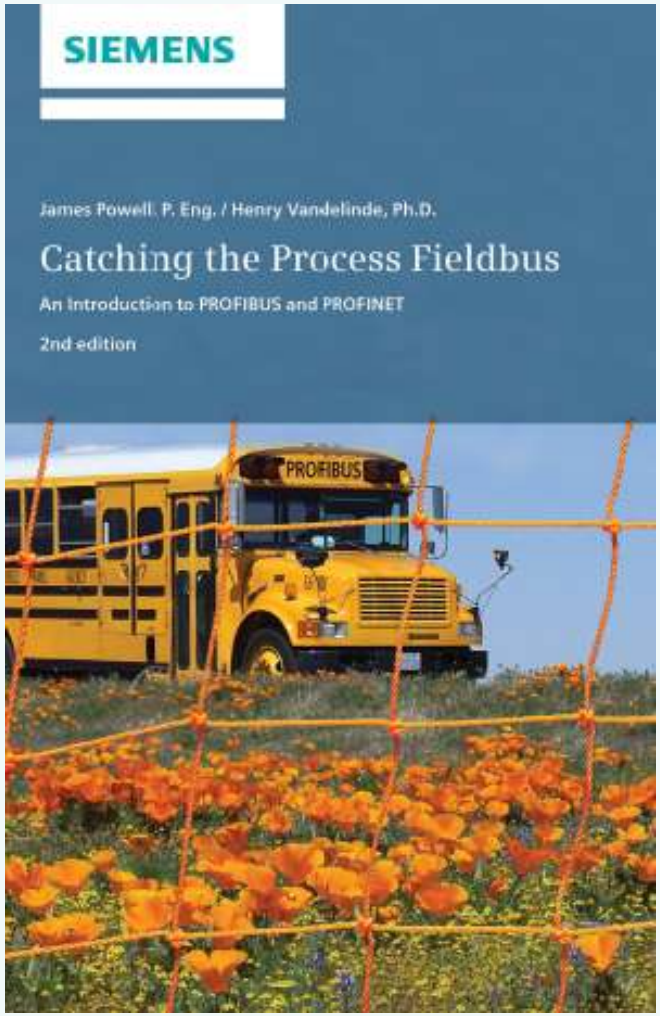


- The two protocols have
  - Shared history and organization
  - Similarities in setup procedure
  - Shared identification
  - Similar communication priorities
  - Similar data maps
  - Similar design question
  - Same grounding rules
  - Similar troubleshooting


# Questions?



# Thank you!

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