THE BIG LEAP: Migrating PCS7 V5 to V8 and still connecting to TI505

Harry Pigler Pigler Automation, LLC

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2013 Automation Summit

Title: The Big Leap
Migrating PCS7 V5 to V8 and still connecting to TI505

Track: Novel Approaches to Problem
Resolutions, Including Tips and Tricks

Topic: PCS7 Migration

Presenter: Harry Pigler

Company: Pigler Automation, LLC

- Pigler Automation, LLC was founded in 2005 by Karen and Harry Pigler after 17/20 years of employment with various Siemens organizations in both Germany and the United States
- System Integrator for PCS7 and S7 Process Control Applications
- Located in Firestone, Colorado -- 30 miles north of Denver
- 7 Employees and Growing
- Industries Served: Oil and Gas, Power, Pharmaceutical and Mining

For more information please visit:
www.piglerautomation.com
Or call : (866) 871-1456

Harry Pigler

Education and Employment

- Born and raised in Germany
- Electrical Engineering Degree from Universität Erlangen-Nürnberg, Germany
- 20+ years employment with Siemens in Germany and the US
- Chief Operating Officer with Pigler Automation, LLC since 2005

PCS7 Experience

- First contact with PCS7 in 1996 : Developing add-ons for PCS7 to be applied in the Power Industry (PCS7 V3)
- Lead System Engineer in the TVA Hydro Automation Project:
  Retrofitted 29 Hydro Plants with PCS7 to be Operated from one Central Headquarter
- Chief Operating Officer with Pigler Automation:
  Execute PCS7/S7 Projects, provide Technical Support including Service Contracts, Customized Training

The Challenge

Problem: Legacy equipment failing

NT-Computer

- Only one Operation Station was still operational
- No replacement equipment available

Outdated Network Hardware

- Utilizing AUI connectors (15 pin)
- TI505 system Ethernet Modules only support AUI.
- “SIMATIC TI Ethernet Layer 4” is not part of the PCS7 OS release.

The Circumstances

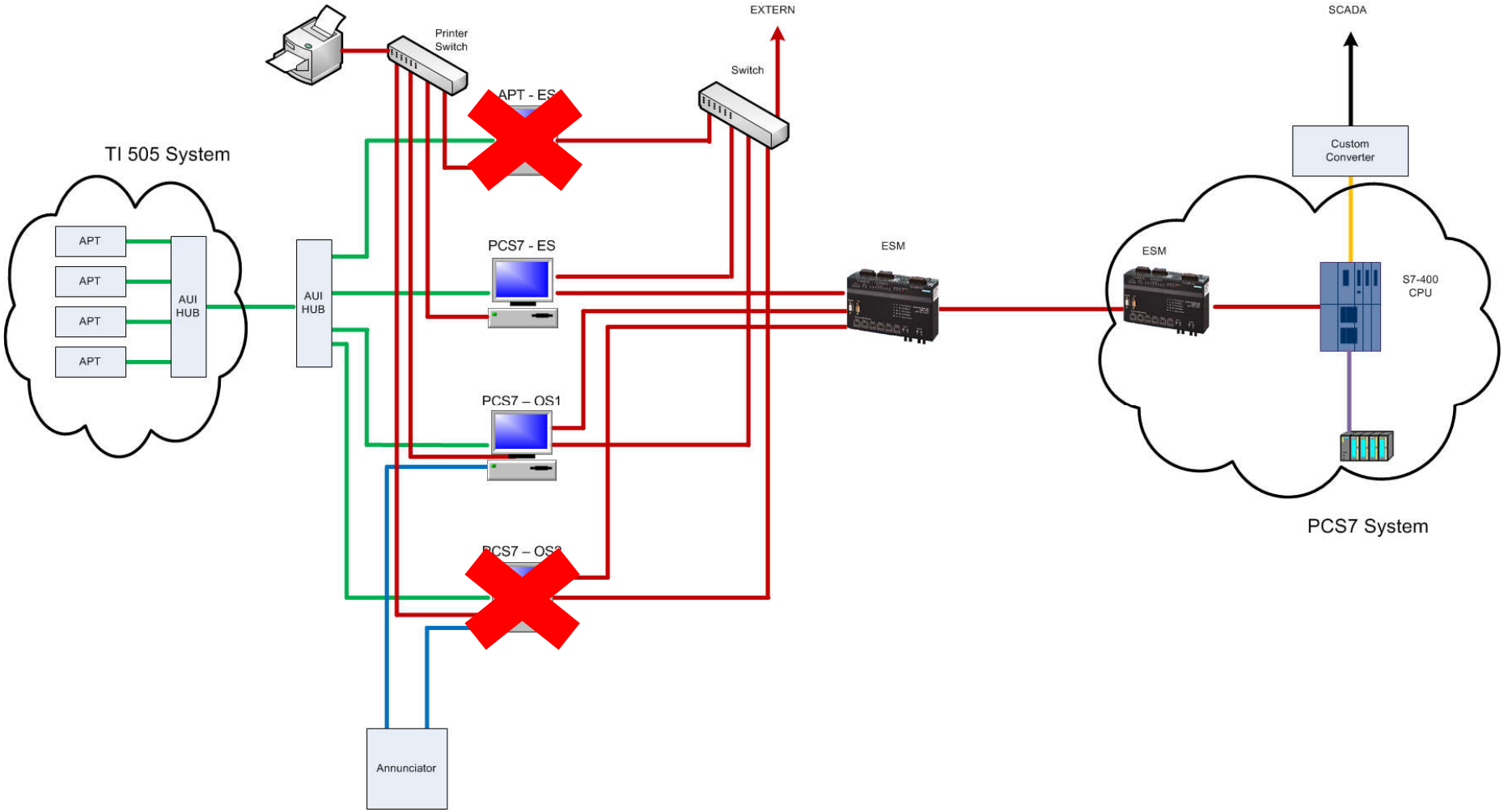
Plant actually consists of two plants:

- Old plant is TI505 controlled
- New plant is PCS7 V5 controlled
- Both plants are controlled from the same Control Room / Operator

Visualization:

- A PCS7 V5 WinCC Station with manually entered TI 505 Tags
- No TI-OS

Old System Structure



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Project Expectations

- Minimum Downtime: no downtime of the old Plant (TI system)
- Provide an up-to-date computer system include spare parts
- Keep the TI 505 in place (“Don’t touch it”)
- No changes to field wiring
- Allow for future use of Advanced Controls (Model Predictive Controller)
- Utilize up-to-date network equipment with RJ45
- De-clutter PCS7 control software:
  PCS7 software was done “TI” style which does not utilize PCS7 best practice.
  - all Inputs on one chart,
  - all PID controller on one chart

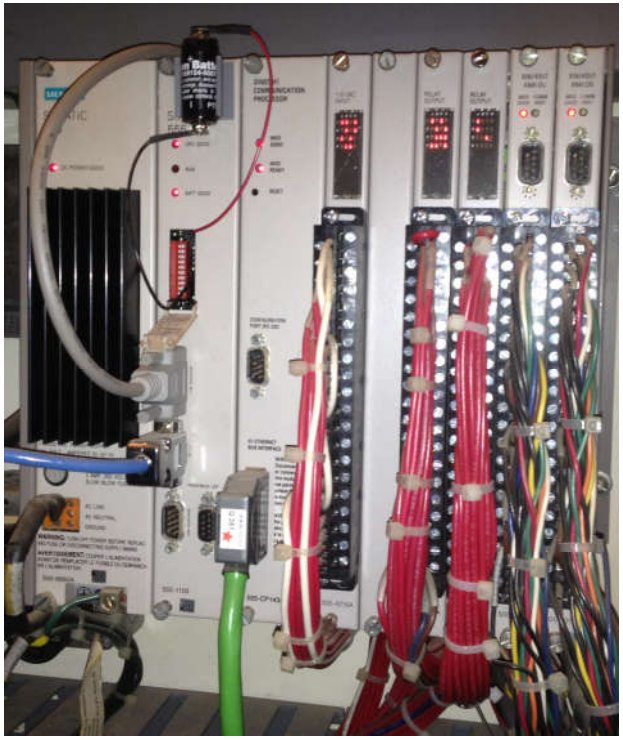
Upgrade PCS7 V5 to V8

Upgrade project in steps without new features:

- PCS7 V5 -> PCS7 V6 (HW-Config, CFC/SFC, WinCC)
  Change from Sybase to MS-SQL
- PCS7 V6 -> PCS7 V7 (HW-Config, CFC/SFC, WinCC)
- PCS7 V7 -> PCS7 V8:
  - HW-Config: New, more powerful CPU (417-5H)
  - CFC: Update to latest Function Blocks (not APL)
  - WinCC: Migrate WinCC part, complete OS compile.
    - Re-Do Alarm logging settings: Color, Event Text, Column width, ….
    - Re-Do Alarm Screens
    - Re-Do Trend Screens

TI 505 System

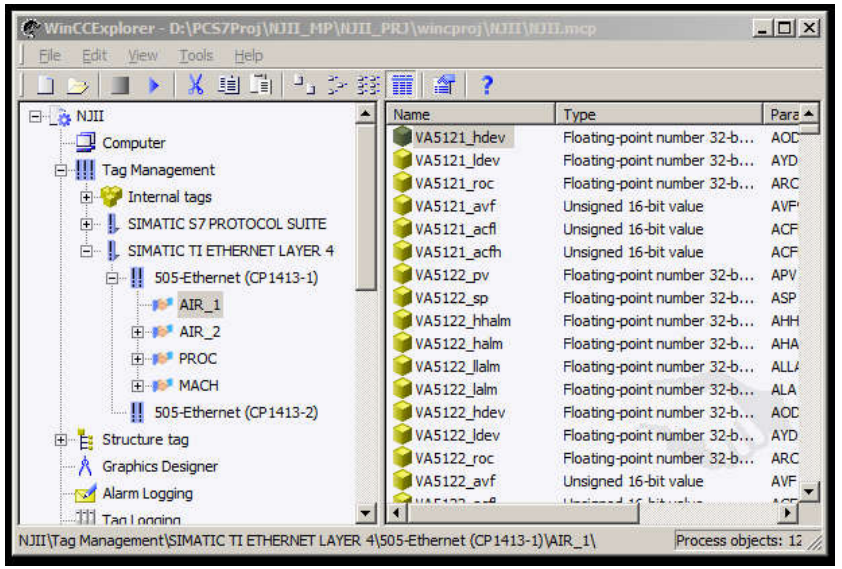
- TI-505 System consist of 4 processors



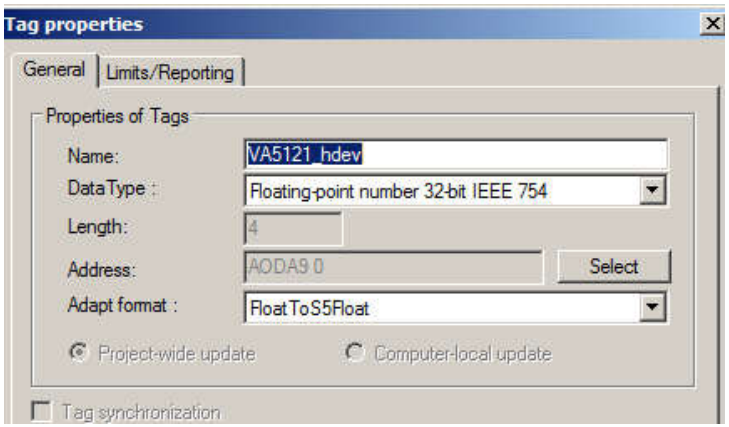
- Ethernet Connection utilizes the AUI Connector

TI 505 System: HMI interface

- HMI used is WinCC utilizing ‘SIMATIC TI Ethernet Layer 4’ instead of the 505 OS option for PCS7.



- Every Tag is manually entered



- The migration maintained the connections and tags!

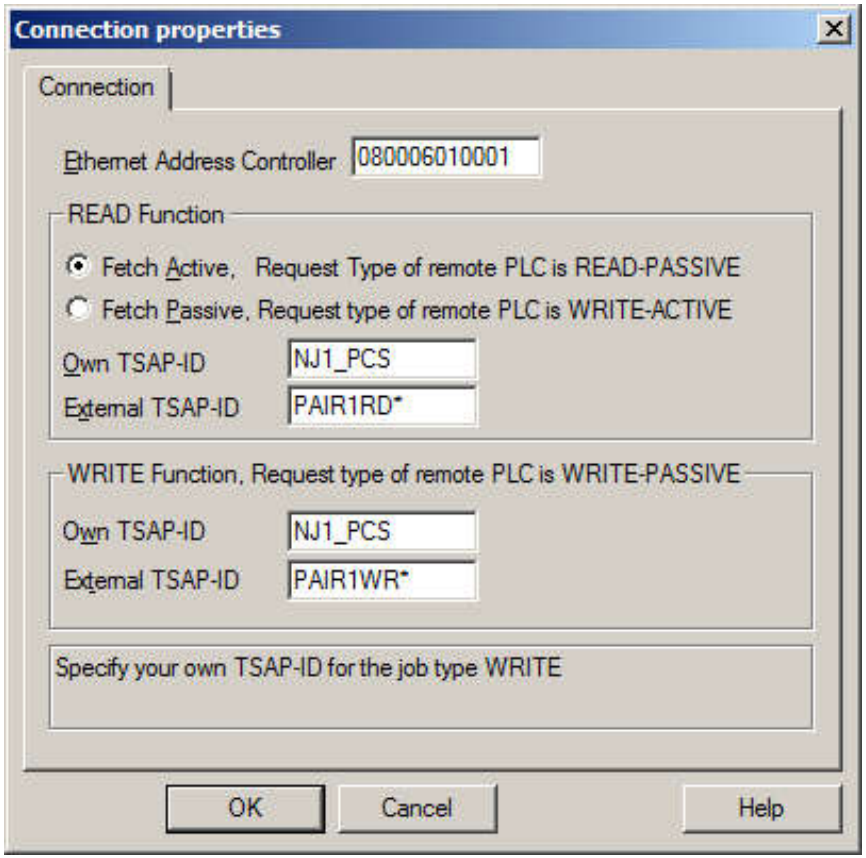
TI 505 System: HMI migration

- No additional work necessary for TI 505 HMI tags.
- Screens worked without further modification.
  Custom made graphics continued to work as required.
  - Except binary indications coming from one test CPU. Worked in the field.
- CP1623 is required as a NIC for the TI 505 communication and needs to maintain the MAC address of the old OS. Otherwise the connection in the TI changes -> interruption of the old Plant
- COML TF tool needed for retrieve the COM1413 TF connection information

TI 505 System: HMI migration

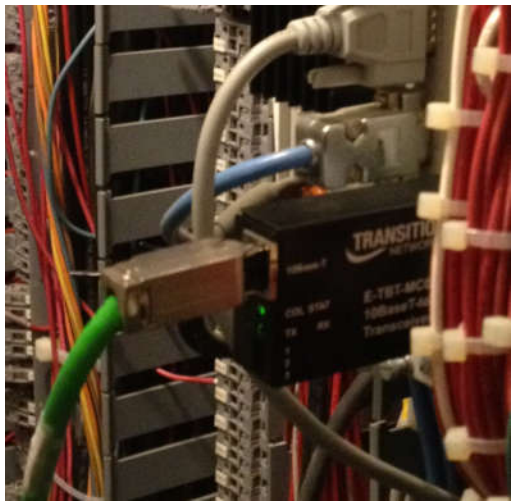
- TSAPs had to be re-entered.
  - Problem:
    For redundant WinCC two sets of TSAPs are required per TI processor.
    ONLY ONE SET TSAPs CAN BE ENTERED IN THE PROJECT.

    Every time a complete download to the OS is performed the TSAPs of the standby have to be updated manually!

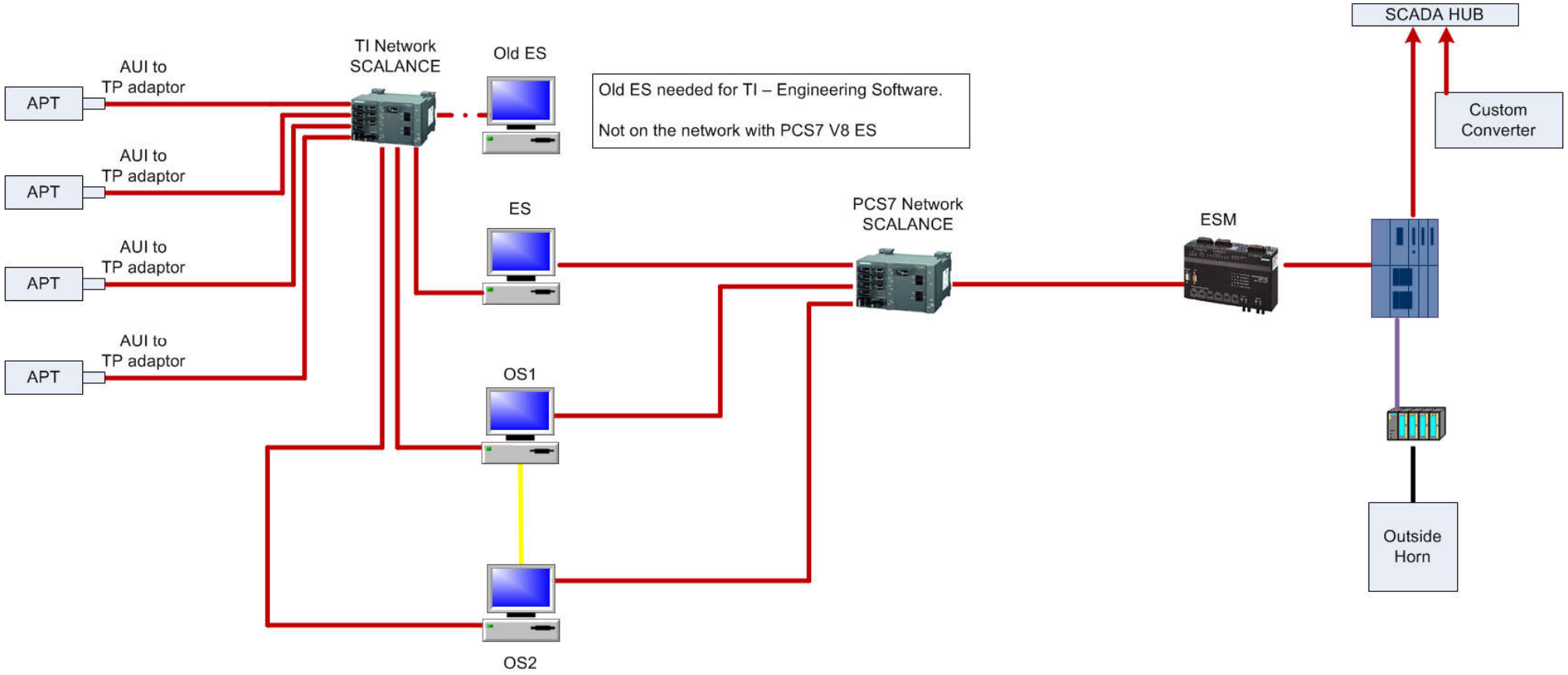


AUI - Network

- Ethernet Communication Processor CP1434 TF only supports AUI (15 pin D-Sub).
- Replace AUI-Hubs with SCALANCE Network Switches to alleviate AUI-Hub spare part problem.
- By utilizing a AUI to TP converter the TI 505 CP can connect to a RJ45 network.



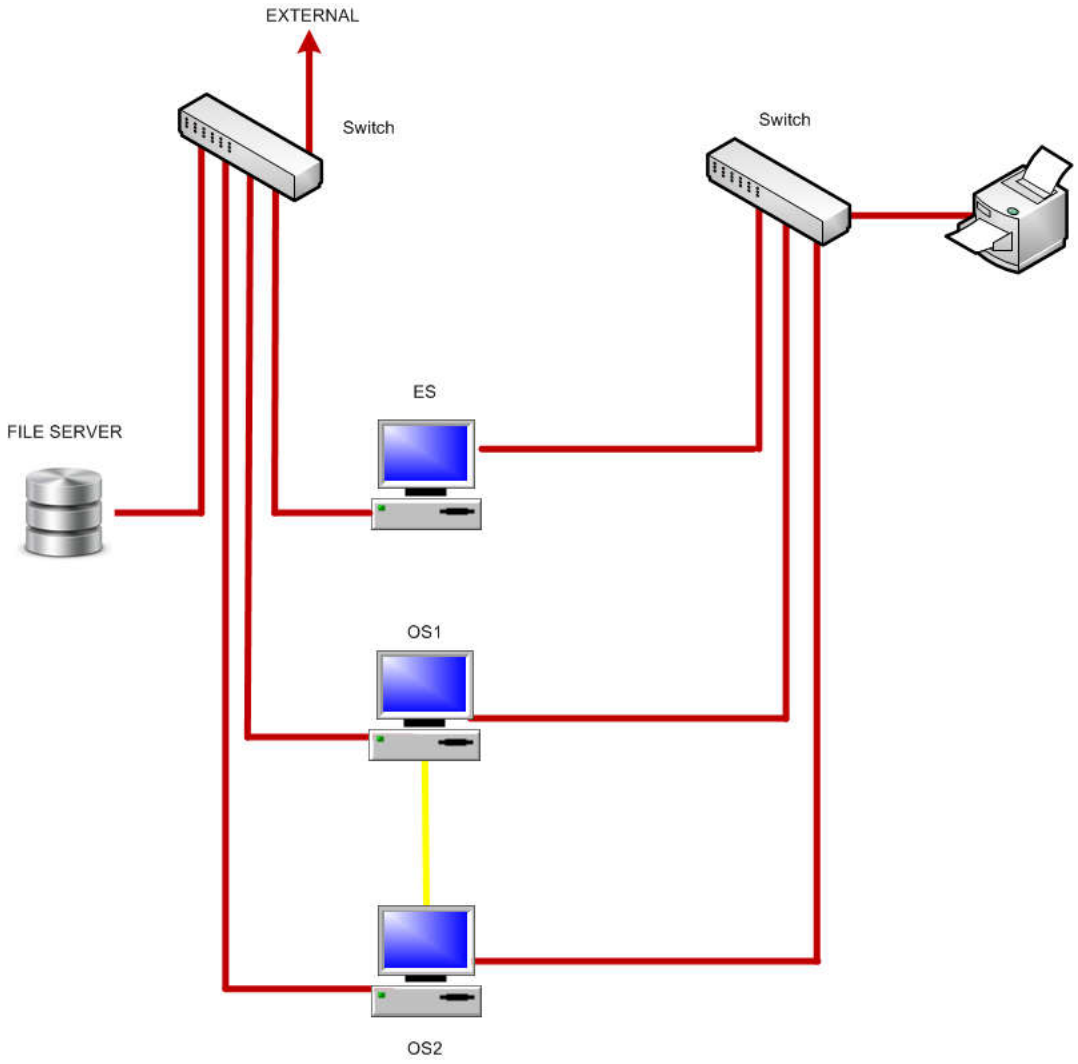
New Plant Bus(ses)



APT Software cannot be installed on Windows 2008 Server

Other Networks

- Remote connection utilizing RealVnC (Company VPN).
- SCADA Connection:
  - Could not use the PCS7 Add-On MODBUS over TCP/IP since only Server supported.
  - Previous data access could not communicate with new Processor.
  - Solution: utilize the OPC Server feature of the OS Station.



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Challenges

- Delivery of Siemens Computer was delayed by a couple of weeks.
- No bulk engineering in reports (find / replace like in Graphic Designer).
  Reorganization of CFC content resulted in changed tags in WinCC.
- CH_AI Function Block has range problem when using RTDs at very low temperature and configured for Fahrenheit. Temperature below -243 Degree Fahrenheit is shown as bad. If substitute values are configured, they will kick in pre-mature.
- Issues with Diagnostic Indication: still trying to resolve the issue with the Siemens Helpdesk.

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Future Outlook

- Possible use of Model Predictive Controller to further improve the efficiency of the Plant.

- Migration of the TI system into PCS7 by replacing the TI 505 processor with a DP Slave module and convert all logic and screens to PCS7.
  - ➡ H1 – Communication Processor is no longer available as spare part.

Thank you

For more information please visit:
www.PiglerAutomation.com
Or call : (866) 871-1456
Email: Service@PiglerAutomation.com

Thank You!