# Hall C - SHMS/HMS
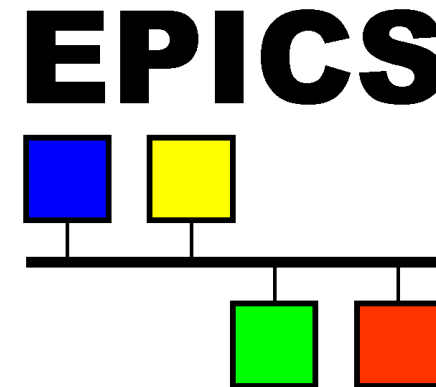# Data Transfer Simulation
# Between PLC and EPICS

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# Simulation of PLC Tag to EPICS Process Variables (PVs) Conversion

- Simulation of conversion of PLC tags to EPICS process variables (PVs) of Hall C's SHMS and HMS spectrometers for a better understanding of:
  - Actual software and hardware components
  - Implemented processes and steps

- Knowledge imperative for efficient support of setup
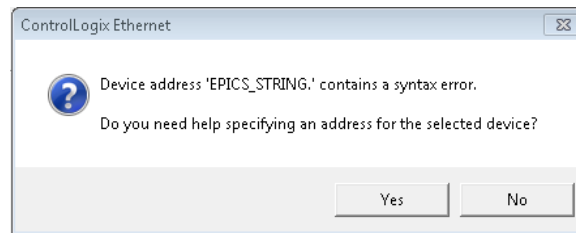  - Replace old by new technologies and applications

# Basic Setup of Components and Procedures

## Simulation Software/Hardware components

- ## Programmable Logic Controller (PLC)
  - AB-1756-L72 : DSG-Test station PLC
  - PLC code written to generate random values for different PLC data types

- ## Host server computer
  - *DSH-HALLC-2 PC* : Runs OPC client/server

- ## Object Linking Embedding (OLE) Process Control (OPC) Server
  - KEPSERVEREX v.4.5
  - Channel access and device driver configurations

- ## OPC Client
  - EPICS OPC-IOC-Shell v.3.8.0.1
  - Database file creation
  - St.cmd file configurations

- ## EPICS CSS BOY
  - OPI screen to set and read back PLC tags and EPICS PVs



SHMS/HMS conversion process diagram from PLC tags to EPICS PVs
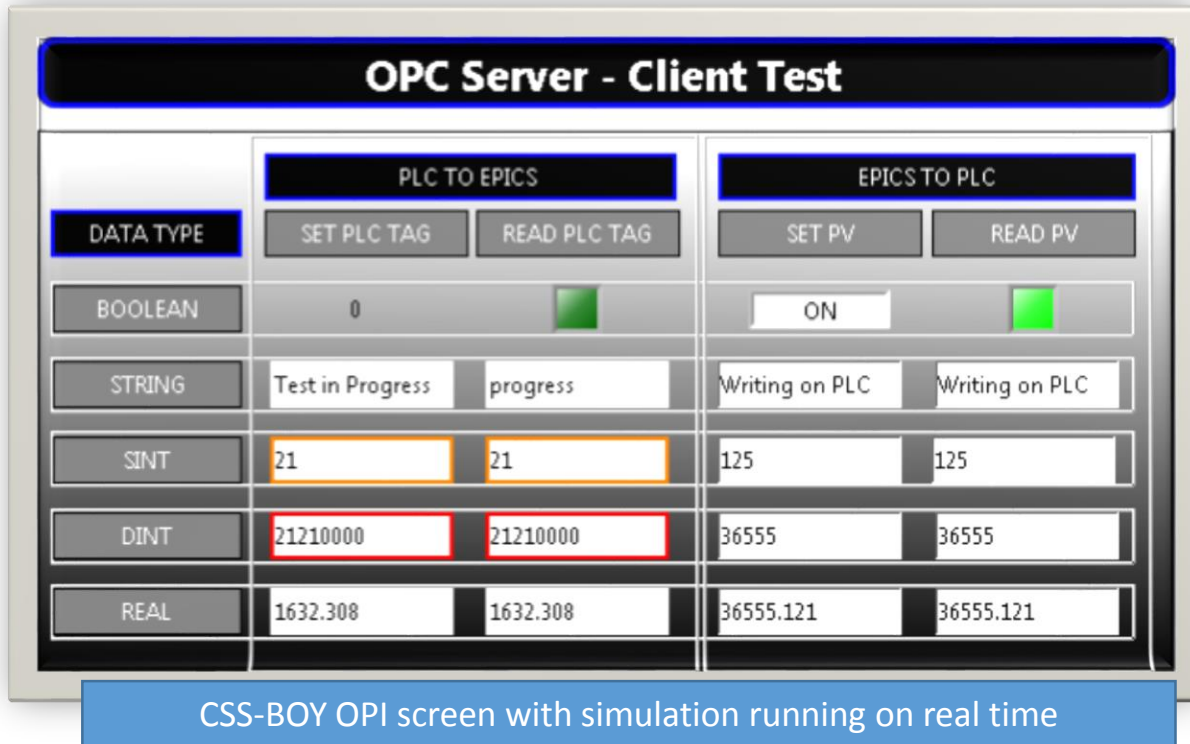
# Encountered Issues and Solutions

- Unable to write/set DINT, Boolean, and real values from EPICS to PLC
  - Wrong format and syntax used in database file created
  - Incorrect Output Mode Select (OMLS) used : close loop mode
  - Issue solved by changing OMLS from close loop to supervisory mode
- OPC server error when string data type was configured
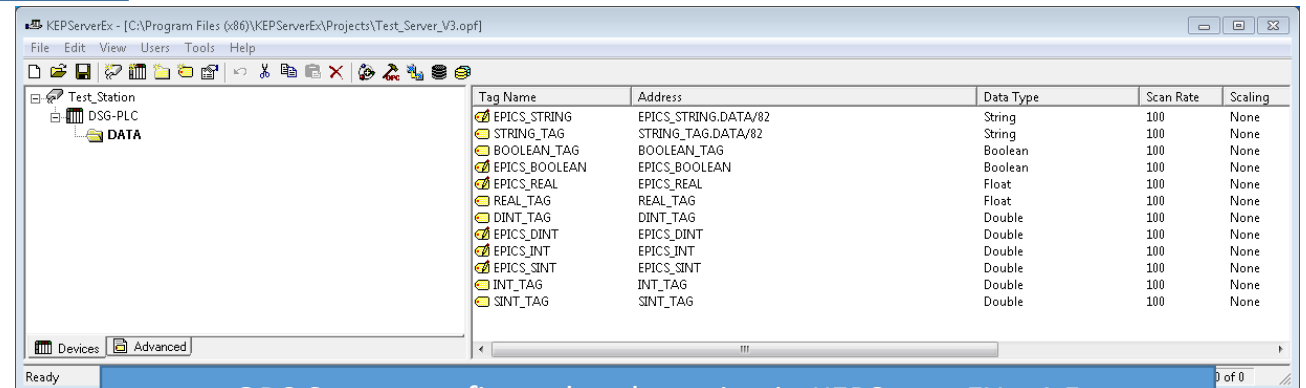  - Incorrect syntax used to configure number of characters  on KEPServerEX



  - Used recommended format and parameters to write/read string values from/to PLC

# Results



CSS-BOY OPI screen with simulation running on real time

- OPC server and OPC client configured and ran with no issues on *DSG-HALLC-2* computer server.
- Communication between OPC server, OPC client, EPICS GUI and PLC controller completely tested.
- Successfully simulated each hardware and software component of the current SHMS/HMS PLC tag to EPICS PV conversion setup.

- SHMS/HMS data transferring between PLC and EPICS was fully understood, and now DSG is able to support system and implement future EPICS applications



OPC Server configured and running in KEPServerEX v.4.5

# THANK YOU