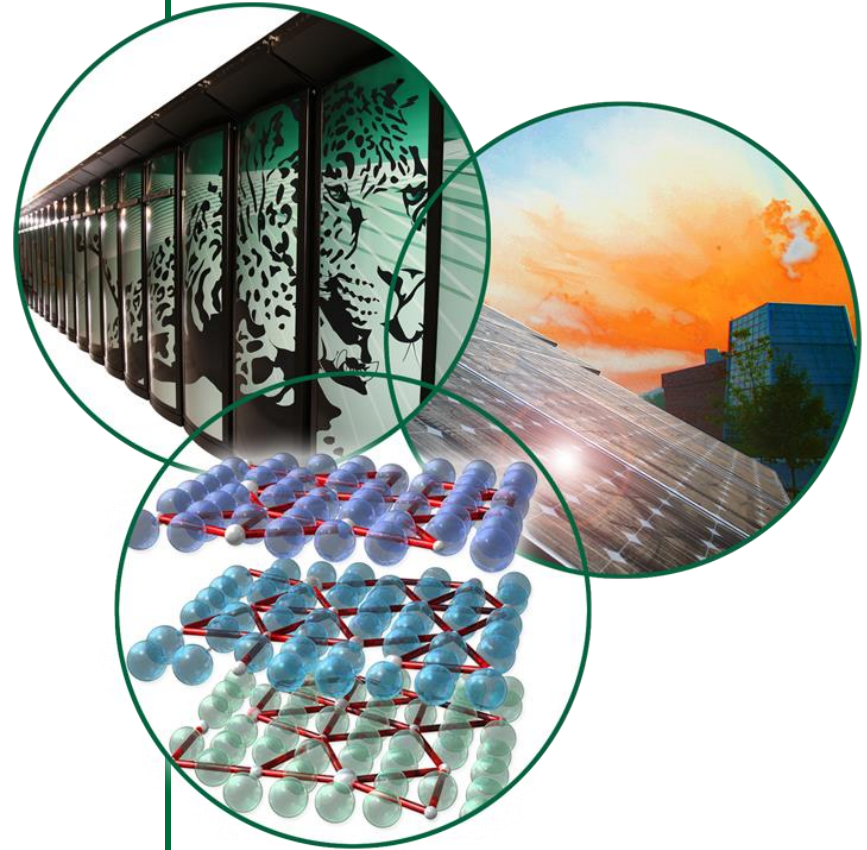# PLC Application Management (ORNL)

ORNL: Spallation Neutron Source

Derrick Williams

SNS uses Rockwell Allen-Bradley PLCs

- **Over ~150 PLC processors in the Controls Group**

- **<u>ControlLogix</u>, CompactLogix, MicroLogix**
  - **RF systems**
  - **Vacuum**
  - **Water cooling**
  - **Cryomodules**
  - **Conventional Facilities**
  - **Personal Safety Systems**
  - **Beam Line Instruments**
  - **Test facilities**

- **Miscellaneous PLCs (vender supplied equipment)**

- **Several subsystems use PanelView along with EPICS for HMI**
  - **PanelView, PanelView Plus 6, PanelView Plus 7**

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PLC code files in the wild west days

- **Files were stored in various locations**
  - Servers on the accelerator network
  - Servers on the enterprise network
  - Some code in personal folders on machines
  - PanelView code was worse
    - Runtime or archive files saved?
    - Several firmware versions
  - Where are the communication configuration files?

- Several firmware versions running in the facility on PLC processors
- Several PanelView version in the field

Managed by UT-Battelle
for the U.S. Department of Energy

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Reining in the herd

- **Central location to store PLC files**
  - **First choice was server on accelerator network**
    - **PLC file naming and folder naming conventions were not established initially – this was a problem!**

- **Standardize on PLC & PanelView firmware versions**
  - **Updated communication configuration to the PLC firmware recommendations**
  - **Tried to standardized on PanelView firmware**
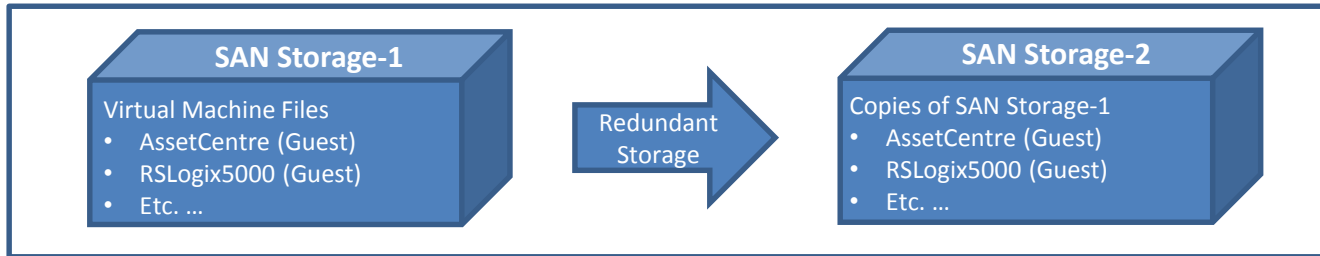   - **Rockwell hardware binds you to certain firmware versions**

Corralling the herd

- **Once engineers agreed to PLC code file storage location it was time to find a system to manage all this code that we had corralled**

- **SNS uses Rockwell's FactoryTalk AssetCentre**
  - Centralized tool for securing, managing, versioning, tracking and reporting assets

AssetCentre architecture

Network Storage Media

SAN Storage-1

Virtual Machine Files
- AssetCentre (Guest)
- RSLogix5000 (Guest)
- Etc. …

Redundant Storage →

SAN Storage-2

Copies of SAN Storage-1
- AssetCentre (Guest)
- RSLogix5000 (Guest)
- Etc. …

➢ All virtual machines reside on SAN hardware

➢ VM files get copied to redundant SAN hardware

Hardware Machines

Hardware
VMware ESXi Host-1

Hardware
VMware ESXi Host-2

Hardware
VMware ESXi Host-3
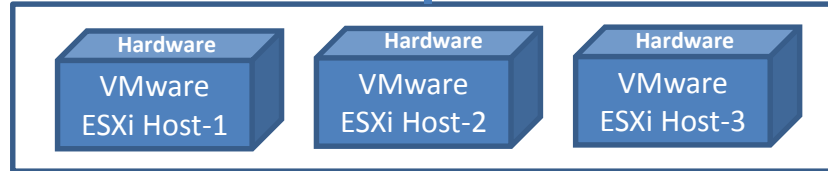
➢ ESXi Hosts are redundant
➢ ESXi Hosts execute VMs on SAN

Windows Domain Controller

➢ **Virtual Windows Network Needed for Rockwell Software Tools**

Windows Domain (plc Domain)

AssetCentre

Laptops using AssetCentre Client

RSLogix5000 32bit

RSLogix5000 64Bit

Data Sources
- ControlLogix
- CompactLogix
- Etc.

Data Sources
- ControlLogix
- CompactLogix
- Etc.

FT Activation Server
FT Directory Services

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Create PLC file naming standards

Next step was to create PLC file and folder naming conventions

File Name

SSS_BBBB_PPPPPPPPP_~~YYYY_MM_DD~~

System/Subsystem   PLC   ~~Date~~
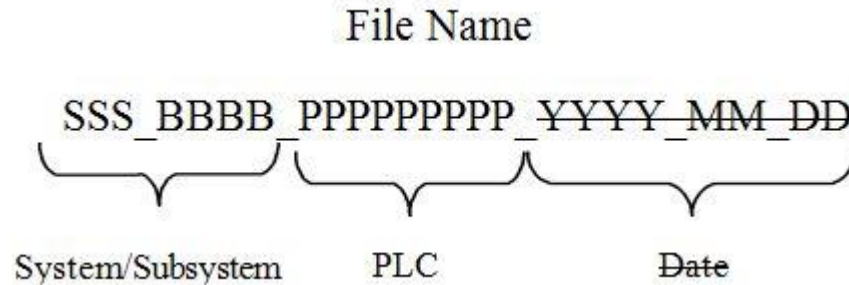
Figure 1: Format and Syntax

Table 1. Name Components

Naming Part	Description	Requirements	Controlled by
Format and Syntax	Entire name	Figure 1 and Syntax rules in Table 2	Project Engineer
SSS	System	Names in Table 3	Lead Engineer
BBBB	Subsystem	Names in Table 4	Lead Engineer
PPPPP	PLC Name	Name determine by engineer	Lead Engineer

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Example of folder structure in AssetCentre

Folders using naming convention that is meaningful e.g. system, subsystem

PLC code
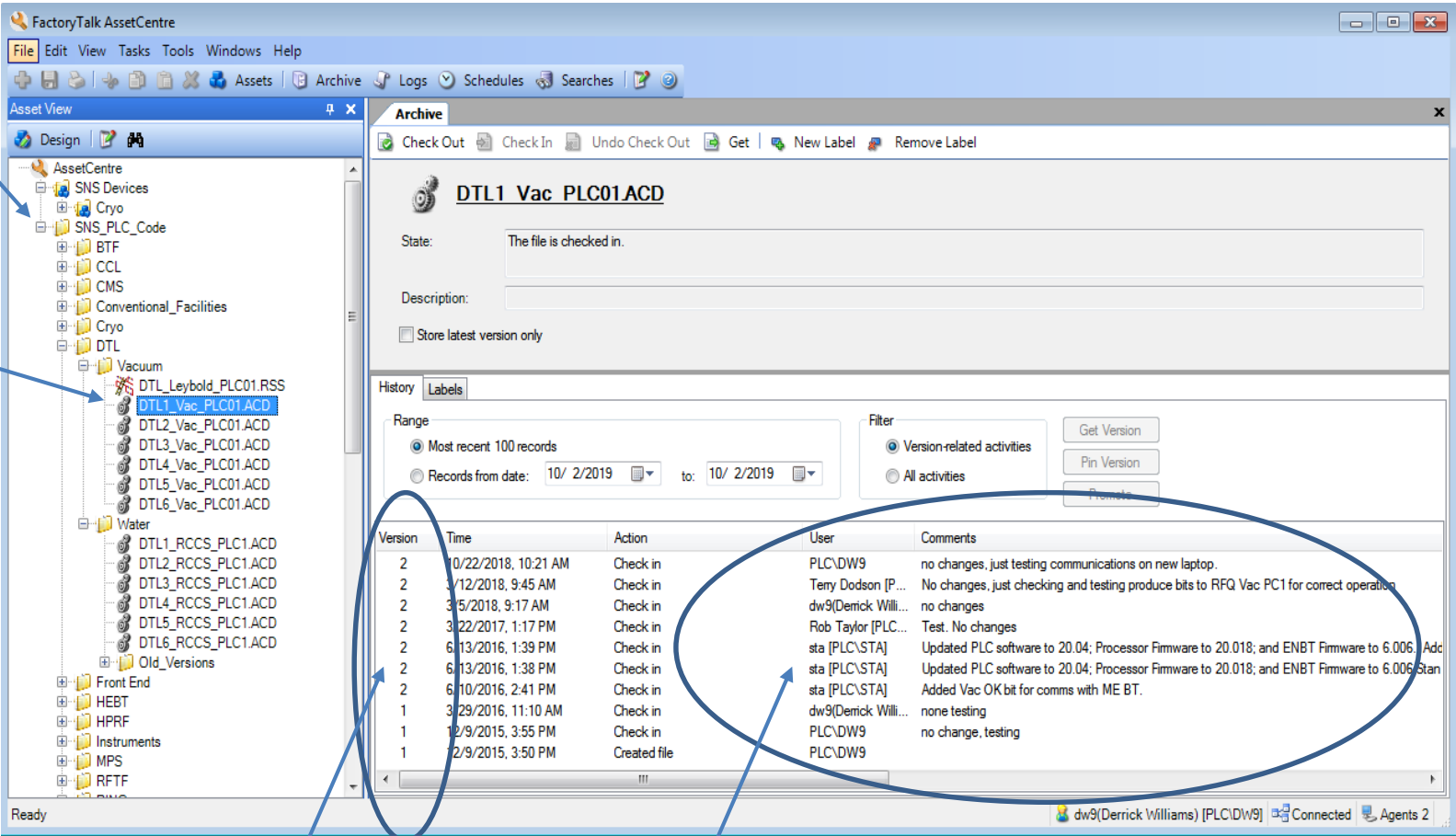
Version of file

User and comments on any changes

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Accessing AssetCentre

- **Laptops dedicated to accelerator network only**
  - Laptops join the PLC domain with AssetCentre Client installed
  - Rockwell software tools are installed

- **Remote desktop into Windows VMs**
  - VMs use AssetCentre Client V5.00 Build:9 and Rockwell software applications
    - RSLogix5000 V13.04, 15.02, 16.04, 17.01, 18.02, 19.01, 20.04
    - Factory Talk Studio Machine Addition V8.1, Panel Builder 32 V3.83.01
    - RSNetworx 24.01 (ControlNet, DeviceNet)
    - RSLinks Professional 3.74

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Areas of struggle

- **Laptop machines**
  - Maintaining several laptops with correct software versions
  - Converting from 32bit OS to 64bit OS

- **Rockwell software management**
  - Managing ~180 Rockwell licenses
    - Logix, ControlNet, DeviceNet, FactoryTalk ME, ………
  - Managing different version of software

- **Dedicated person to manage AssetCentre**
  - Maintaining architecture configuration
  - Develop a plan to update to newer version of AssetCentre
  - Utilizing more features: processor monitoring for code changes

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Discussion

We look forward to learning how others manage their PLC applications!!!