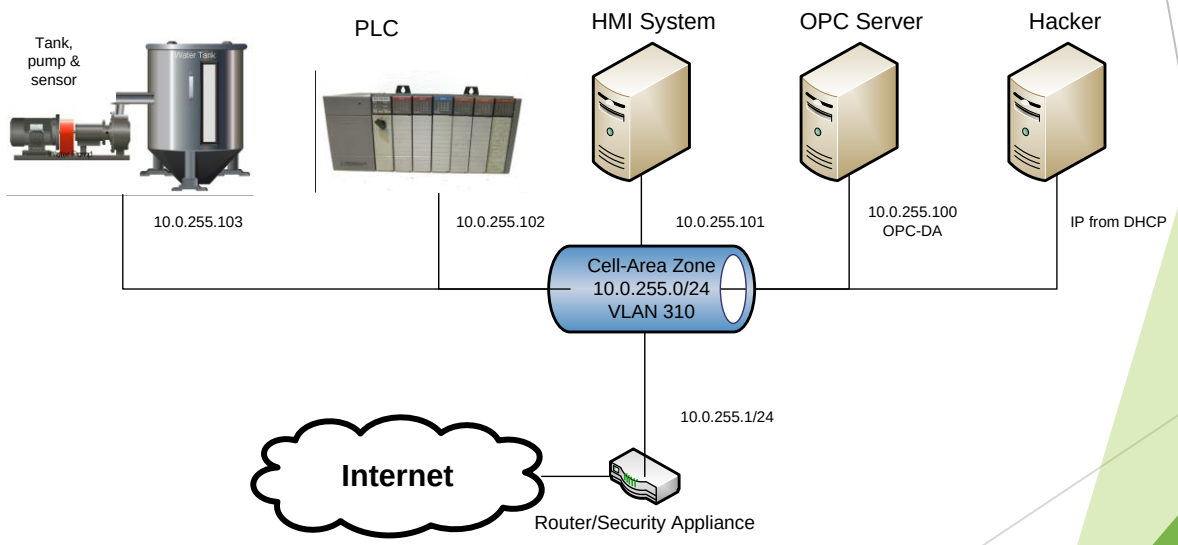
Northwest State Community College

Cyber Security Education for Advanced Manufacturing Organizations (CAMO)

Made possible through support from the National Science Foundation (NSF) award number 1800929

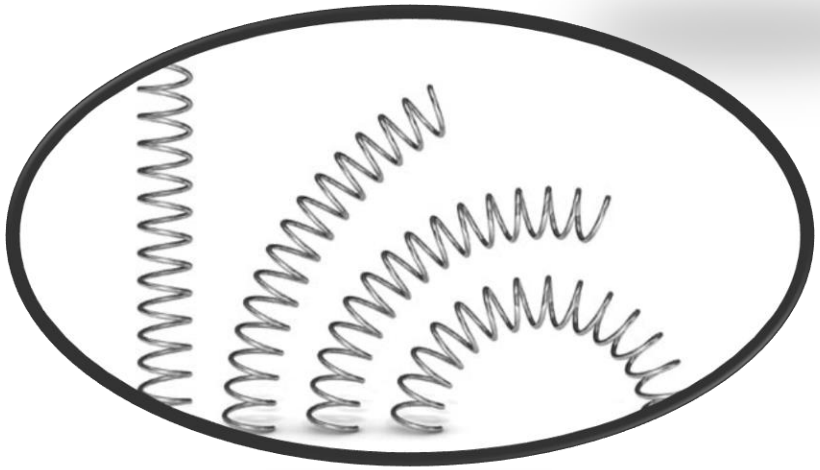
Industrial Control System (ICS)

- What is an Industrial Control System (ICS)
  - The electronic devices, software, and networking protocols which enable the monitoring and control of industrial equipment
    - For example
      - Sensors/motors/actuators
      - Programmable Logic Controller (PLC)
      - Open Platform Computing Servers (OPC)
      - Human Machine Interfaces (HMI)
      - Network switches/routers



Why Virtual

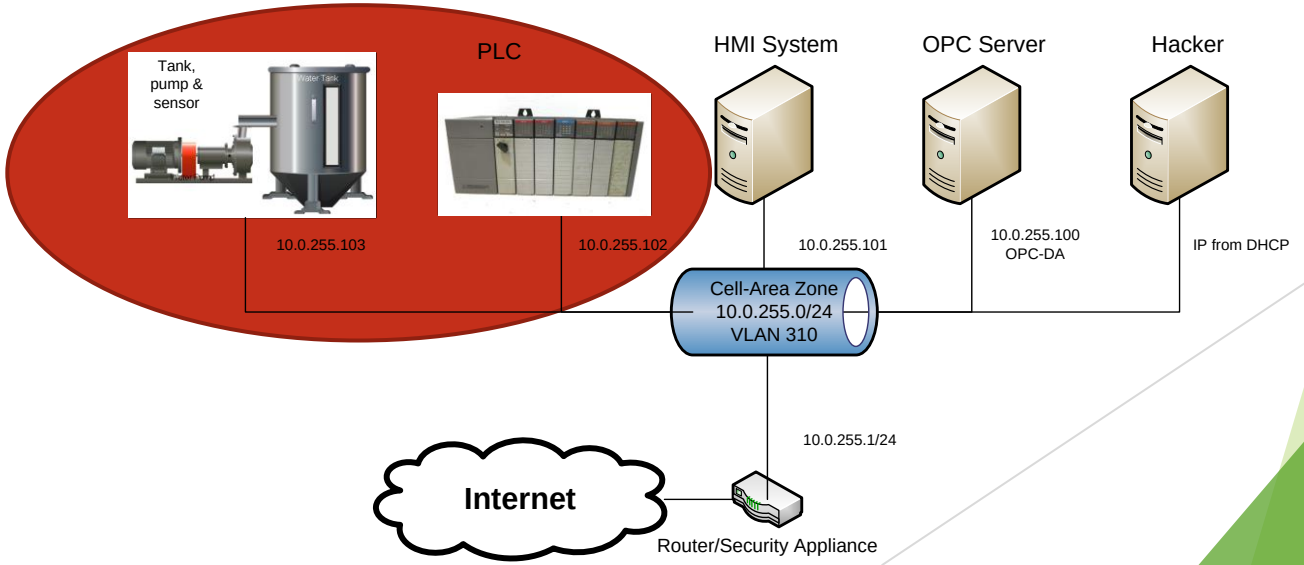
- Lower cost
- Flexibility
- Safety



System Configuration

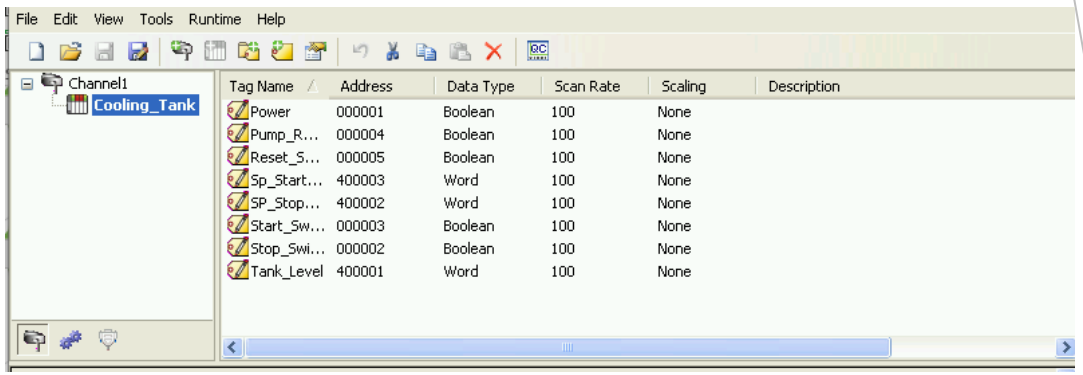
- Sensors/motors/actuators and PLC
  - Implemented on Linux
    - Simulated using python programs
      - PyModbus – https://pymodbus.readthedocs.io/en/latest/
      - python-snap7 - https://pypi.org/project/python-snap7/

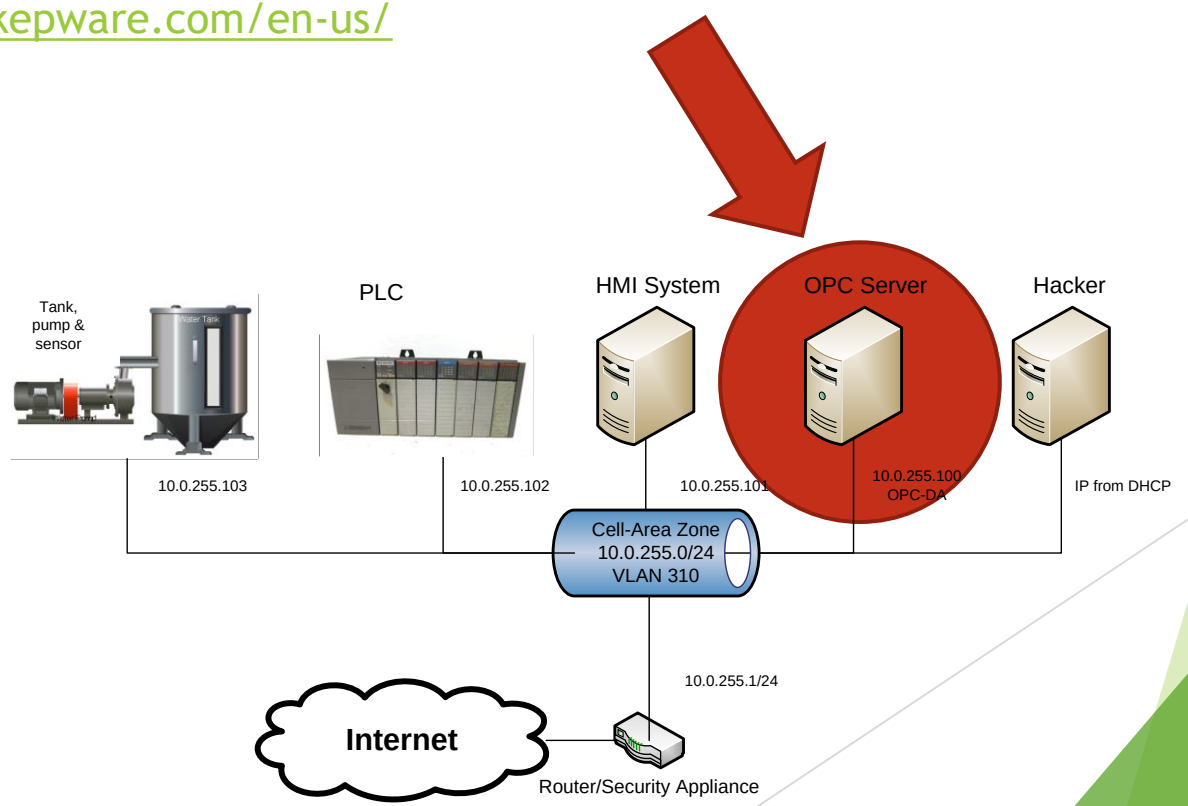
```
    address=400003
    value=SP_Start
    plc_sensor_pump.write_data(address, value, client)

def scan():
    # Check reset
    if plc_sensor_pump.read_data(5, 1, client)[0]:
        initialize()
```



System Configuration

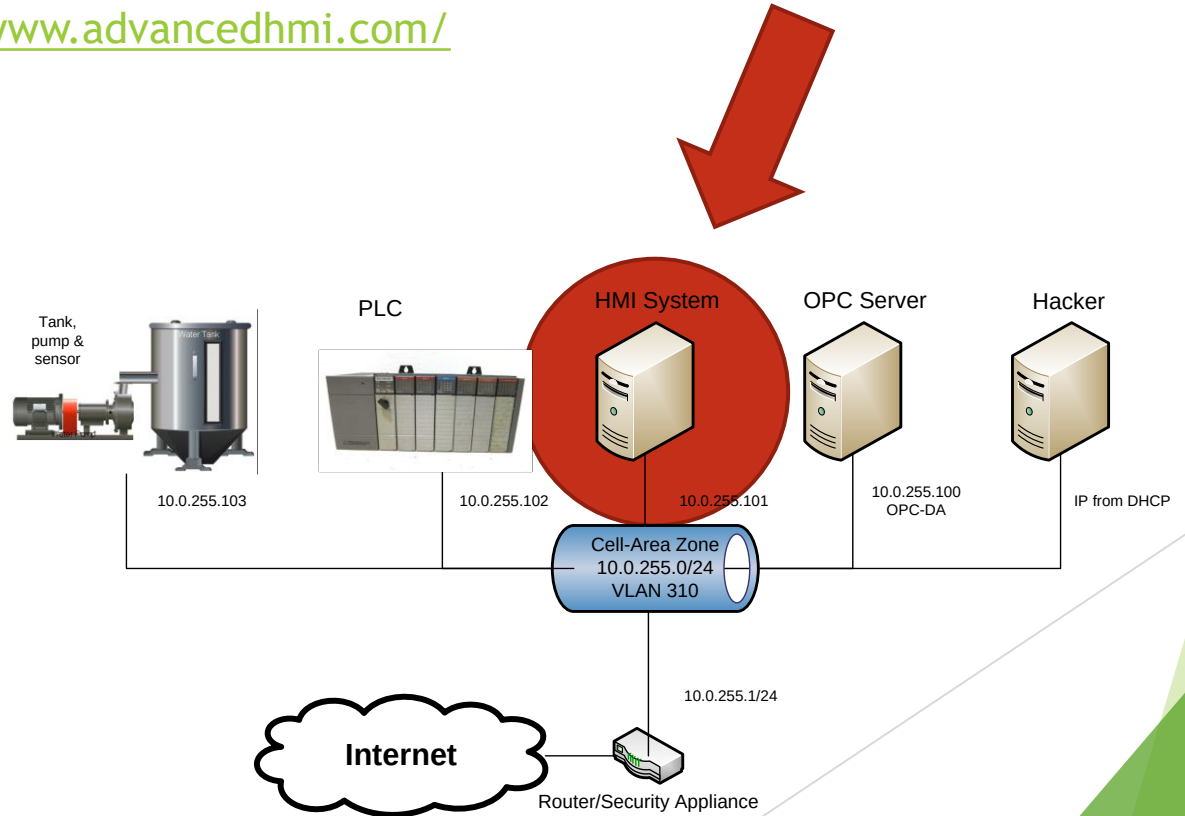
- OPC Server
  - Implemented on Windows XP
  - Kepware - https://www.kepware.com/en-us/



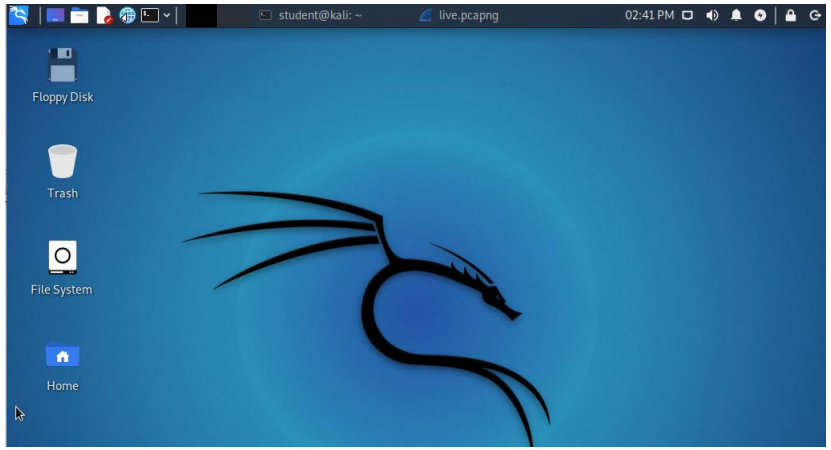


System Configuration

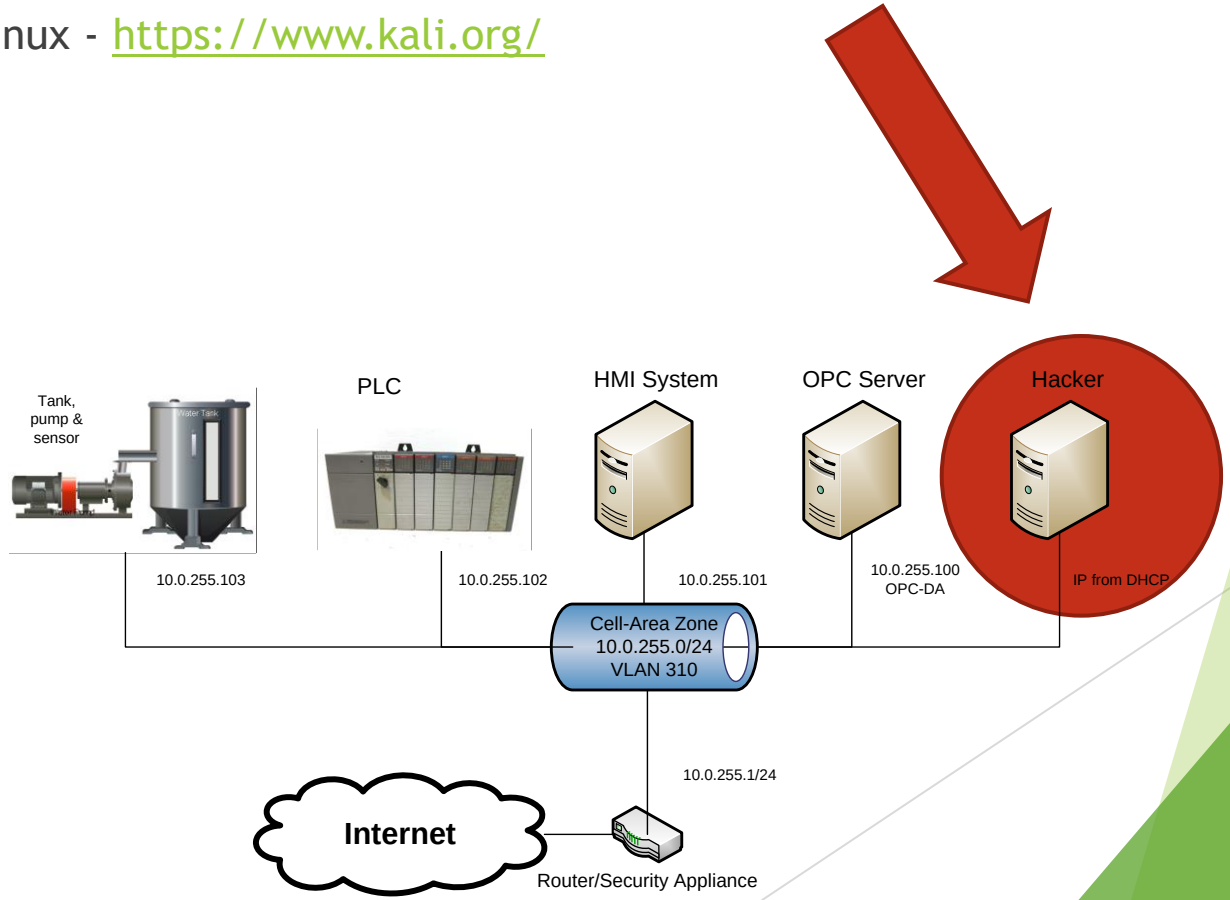
- HMI System
  - Implemented on Windows XP
  - AdvancedHMI - https://www.advancedhmi.com/



System Configuration

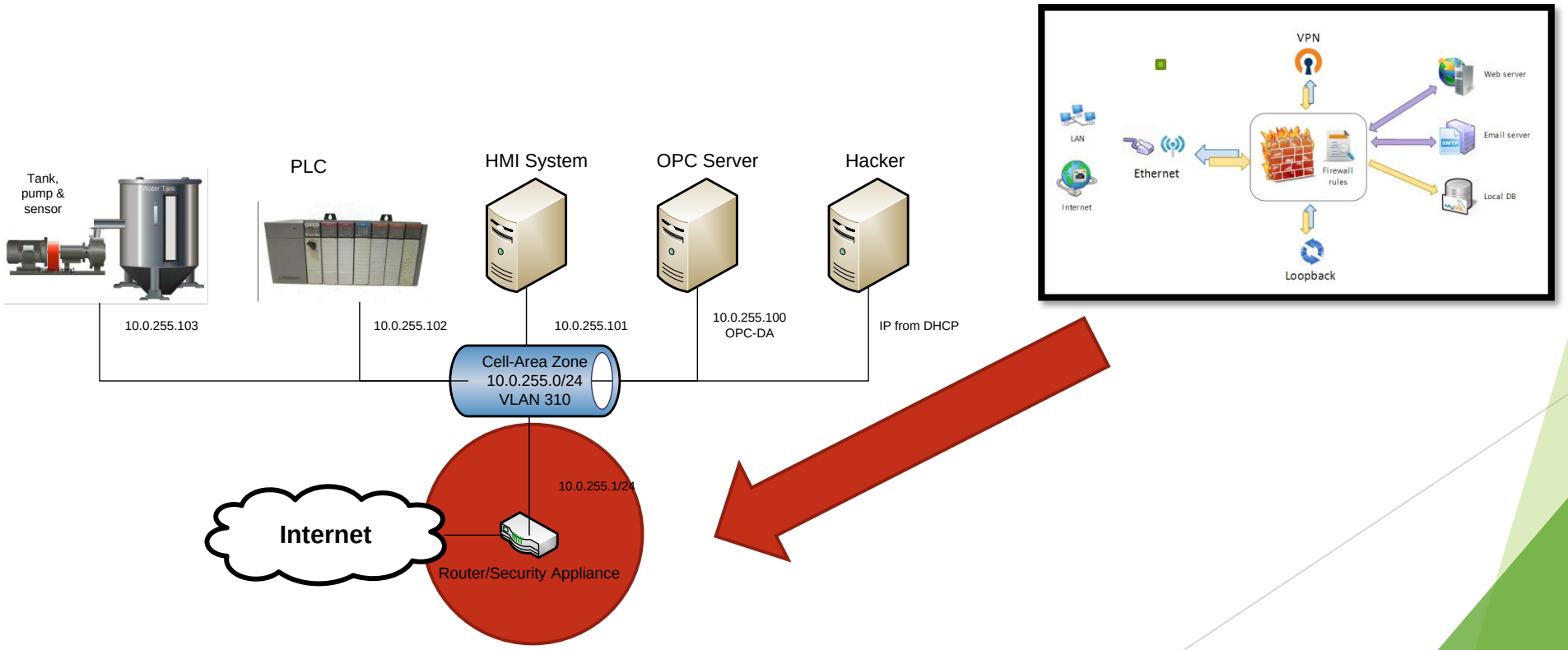


- Security Workstation (Hacker)
  - Implemented with Kali Linux - https://www.kali.org/



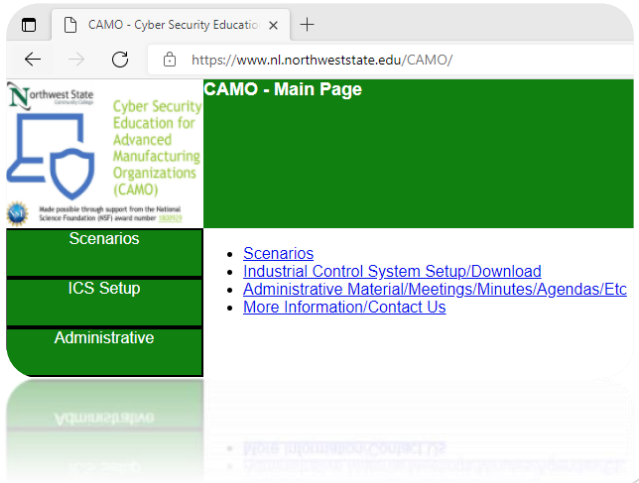
System Configuration

- Security Appliance (switch/router/firewall/etc)
  - Implemented using pfSense - https://www.pfsense.org/



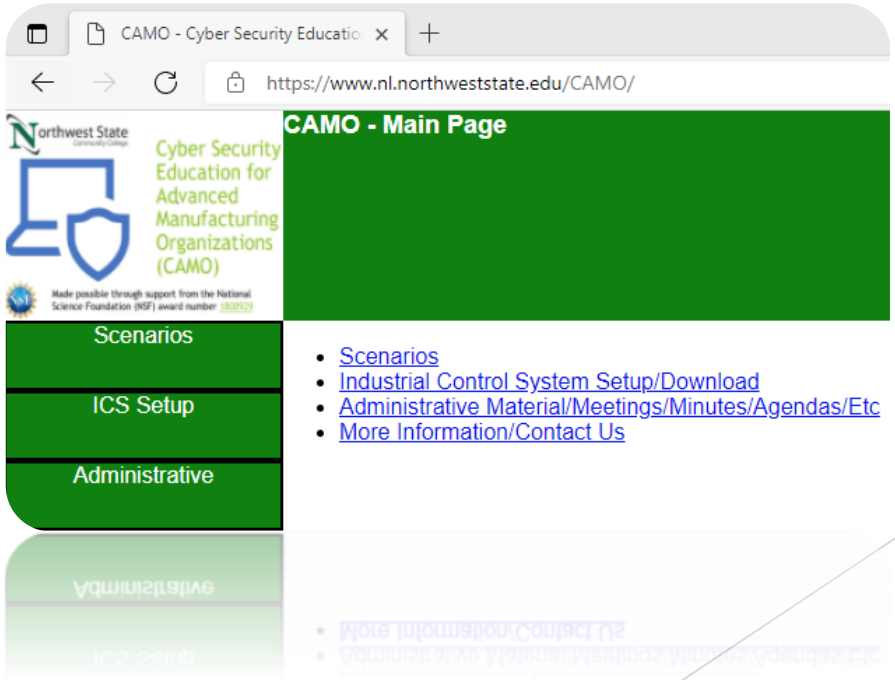
Accessing the ICS

- Prebuilt Virtual Machines are Available for
  - VMWare Player/Workstation/ESXi
  - VirtualBox
  - Hyper-V
- Download for free from: https://www.nl.northweststate.edu/CAMO



Accessing the ICS

- Instructions detailing how systems were configured including all source code can also be download for free from: https://www.nl.northweststate.edu/CAMO



For More Information

- If you wish to know more about this project, please go to https://www.nl.northweststate.edu/CAMO or contact any of the following people:
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