



WECC openPDC Implementation

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GPA User Group Meeting
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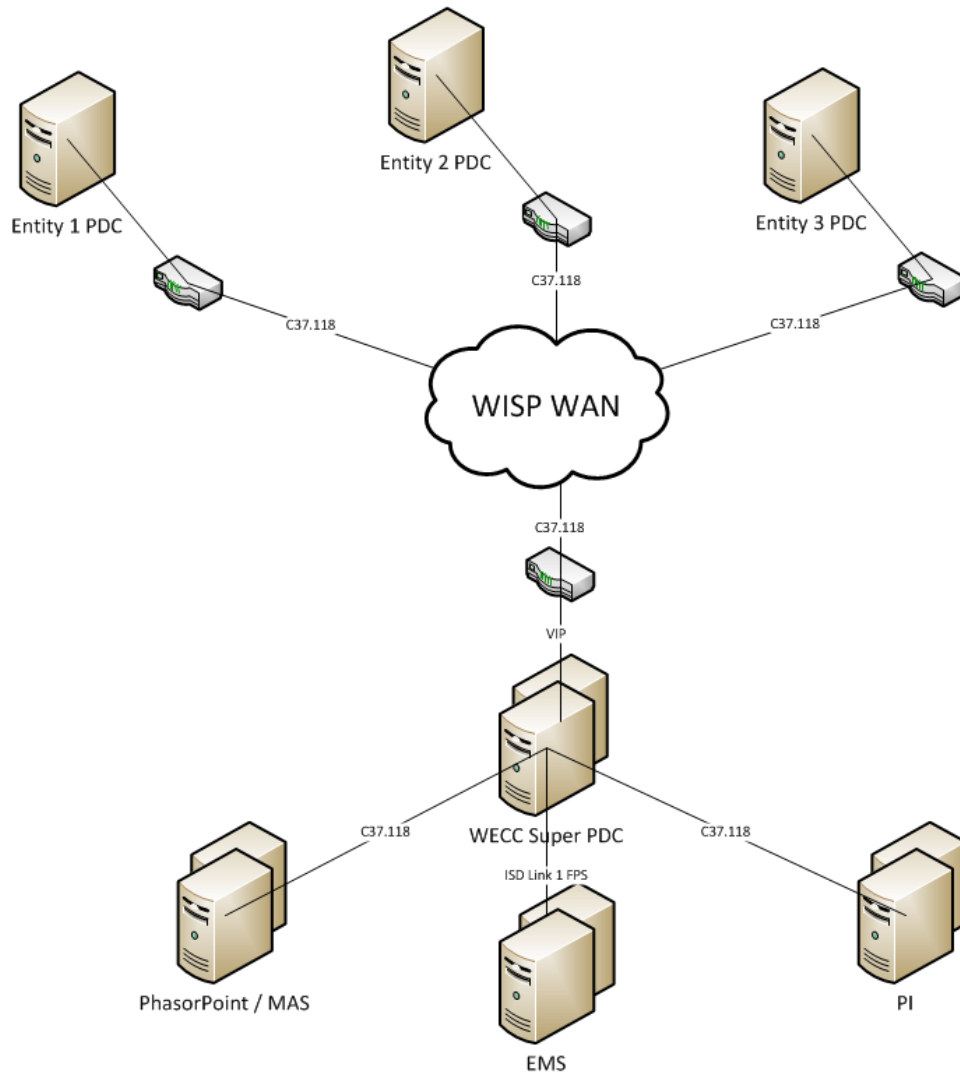
Highlighted Requirements

- Manage High-Speed C37.118 Data
- Transfer data to consumers such as PI, PhasorPoint, and EMS.
- Communication shall support Spontaneous UDP, Mixed Mode, and Multi-Casting
- NERC CIP Compliant

WISP Progress

- 18 Entities Participating (8 cost share / 10 other volunteers)
- Where we are now:
 - ~75 PMUs
 - ~150 freq/dFreq
 - ~448 Phasors
- Where we want to get to:
 - ~350 PMUs
 - ~700 freq/dFreq
 - ~1750 Phasors

Architecture (Phasor Apps)



- PhasorPoint / MAS
- PI
- EMS
- Failover
 - NLB / VIP

openPDC Lessons Learned

- Administration Issues (Need for Alarming)
 - ID code changes
 - New PMUs Added
 - Latencies
 - Dead Streams
 - Stream Statistics
- Pre-emptive Publishing
- OpenPDC Console

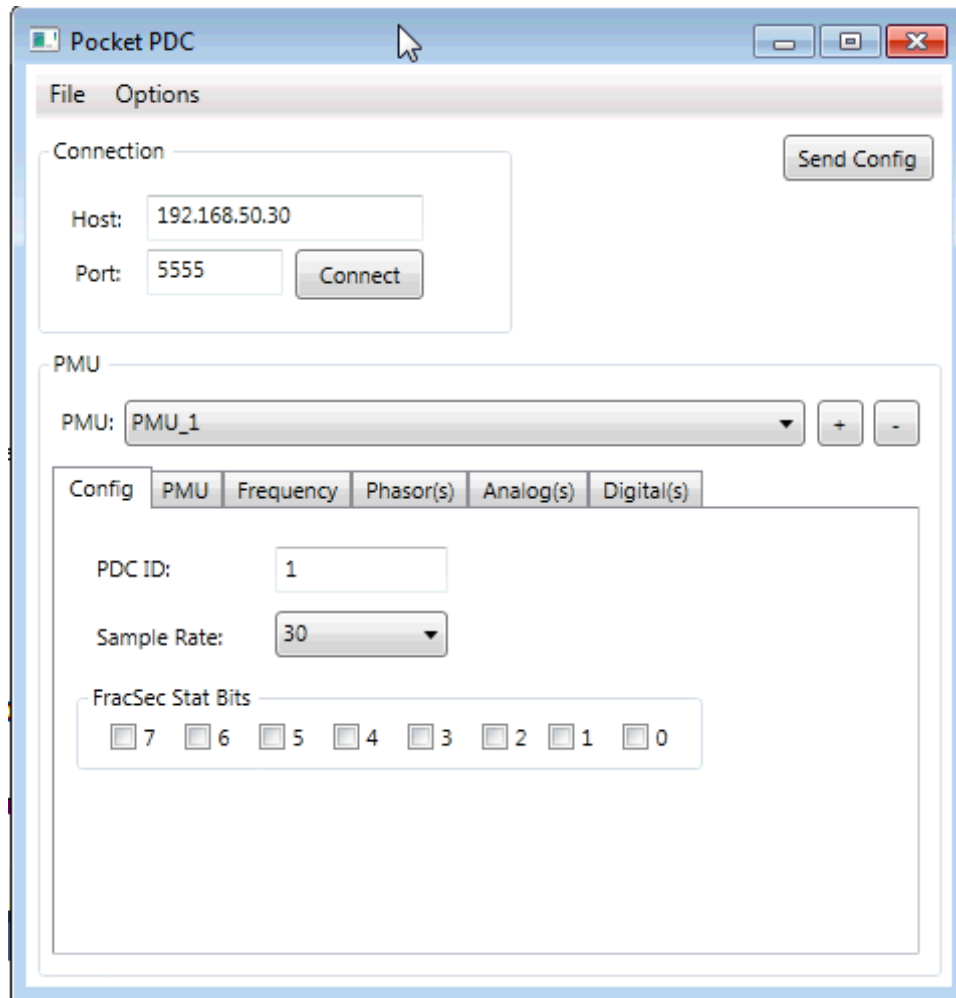
Other Apps

- WECC Registry
- PocketPDC (Refactoring)
- Config 2 Sniffer
- Splitter
- C37 Reader
 - COMTRADE
 - CSV
- C37 Admin (Under Construction)

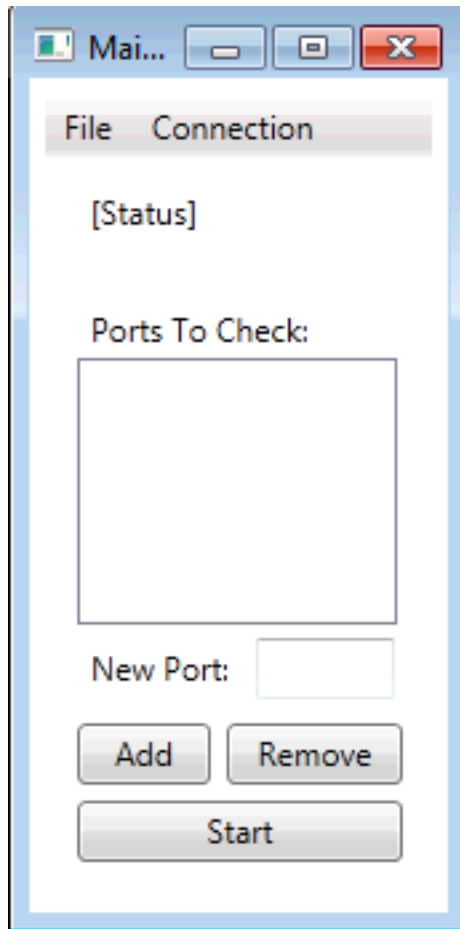
WECC Registry

- History
 - More than just a PMU registry
 - Will store configuration for all devices
- Uses
 - Entities can access and update their devices
 - Single source of device information
- Built on Asset Framework
 - Possibly auto configure devices
 - COMTRADE Files
- APIs
 - Why PI AF?

PocketPDC



Config 2 Sniffer

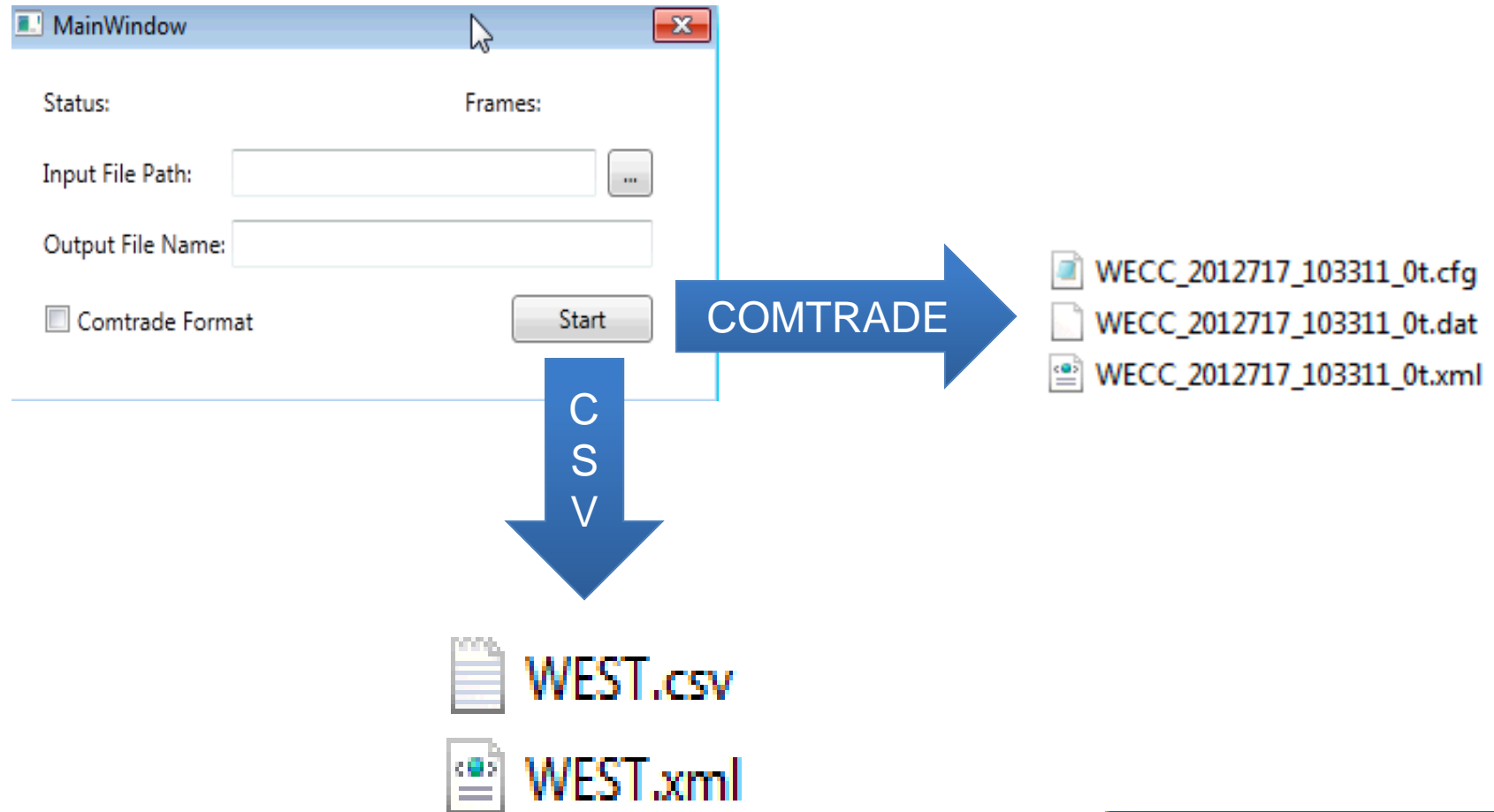


```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <PDC>
  <Sync>AA-31</Sync>
  <FrameSize>884</FrameSize>
  <IDCode>34363</IDCode>
  <SOC>1341262980</SOC>
  <FRACSEC>251658240</FRACSEC>
  <TimeBase>1000000</TimeBase>
  <NumPMU>10</NumPMU>
- <PMUs>
  - <PMU PmuIdCode="34294" StationName="W073BROWNIRD__01">
    - <Format>
      <PhasorCoordinateType>Polar</PhasorCoordinateType>
      <PhasorFormat>Float</PhasorFormat>
      <FrequencyFormat>Float</FrequencyFormat>
      <AnalogFormat>Float</AnalogFormat>
    </Format>
    <PhNmr>2</PhNmr>
    <AnNmr>0</AnNmr>
    <DgNmr>0</DgNmr>
    - <ChanNames>
      <ChanName>L230RANDSRP__1VP</ChanName>
      <ChanName>L230RANDSRP__1IP</ChanName>
    </ChanNames>
    - <PhUnits>
      <PhUnit>0.00001</PhUnit>
      <PhUnit>0.00001</PhUnit>
    </PhUnits>
    <FNom>60</FNom>
    <Cfgcnt>1</Cfgcnt>
  </PMU>
  + <PMU PmuIdCode="34295" StationName="W073CORBLREC__01">
  + <PMU PmuIdCode="34298" StationName="W073JOJOBA__01">
  + <PMU PmuIdCode="34299" StationName="W073KYREN500__01">
  + <PMU PmuIdCode="34296" StationName="W073CORONADO__02">
  + <PMU PmuIdCode="34303" StationName="W073PERKINS__01">
  + <PMU PmuIdCode="34190" StationName="W073PINALW__01">
  + <PMU PmuIdCode="34160" StationName="W066FOURCORN__01">
  + <PMU PmuIdCode="34162" StationName="W066NAVAJO__01">
  + <PMU PmuIdCode="34189" StationName="W066PALVERDE__01">
</PMUs>
<DataRate>30</DataRate>
```

Splitter

The screenshot shows the 'UDP MultiCaster' application window. It features a title bar with standard Windows window controls. The main interface includes a 'Local Port' field set to '3333'. Below this is a 'Destination(s)' section with two columns: 'IP(s)' containing '192.168.1.100' and 'Port(s)' containing '2222'. A 'Remove Selected' button is positioned below these columns. At the bottom of the window is a 'Save Config' button. An 'Add Destination' section is also present, with 'Dest. IP:' set to '192.168.1.100' and 'Dest. Port:' set to '2222', accompanied by an 'Add' button.

C37 Reader



C37 Admin (Under Construction)

The screenshot shows the 'MainWindow' application. At the top, there is a dropdown menu for 'Entities' set to 'Bonneville Power Administration SCADA' and a 'View' button. Below this are several tabs: 'Tree View', 'Stations 'n' Devices', 'PMUs 'n' Signals', 'PMUs 'n' PDCs', and 'Search'. The 'Stations 'n' Devices' tab is active. It displays two columns: 'Stations: 83 Station(s) Loaded.' and 'Devices: 2 Device(s) Loaded.'. The station list includes ALLSTON, ALVEY, ASHE, BELL, BIG_EDDY, BOUNDARY, BUCKLEY, CAPTJACK, CELILO, CENTFERY, CHEH_PWR, CHIEF_JO, COLUMBIA, COVINGTN, COYOTE_S, CUSTER, DITTMER, DODGEJCT, DOOLEY, DWORSHAK, ECHOLAKE, ENERGIZE, FAIRMONT, FREDCOGN, and G_COULEE. The device list shows W001ALLSTON__01 and W001ALLSTON__02. At the bottom, there are '+', '-', and 'View' buttons for both columns, and 'View Reports' and 'Live Data' buttons.

The screenshot shows the 'ViewLiveData' application. At the top, there is a 'Listen' button. Below it are tabs: 'Tree', 'PDC Manager', and 'PMUs 'n' PDCs'. The 'PMUs 'n' PDCs' tab is active. It displays 'Lost Children: 2 Loaded.' with a list containing SLOT01UNCONFIG and SLOT12UNCONFIG. To the right, there is a 'Live PDCs:' dropdown menu set to 'W001DITTMERPDC01'. Below this is a list of PDCs: W001ALLSTON__01, W001KEELER__03, W001KEELER__05, W001KEELER__01, W001MARION__01, W001MARION__03, W001PEARL__01, W001ROCKCREK__03, W001ROCKCREK__01, W001TROUTDAL__01, W001WAUTOMA__01, W001ALVEY__01, W001SLATT__03, W001SLATT__01, W001N_BONNVL__01, and W001N_BONNVL__03. At the bottom right, it shows '10 PDC(s) Loaded.' and '16 PMU(s) Loaded.'.