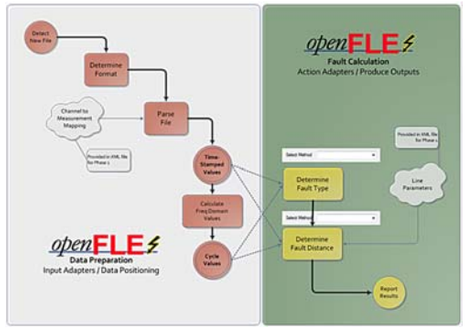
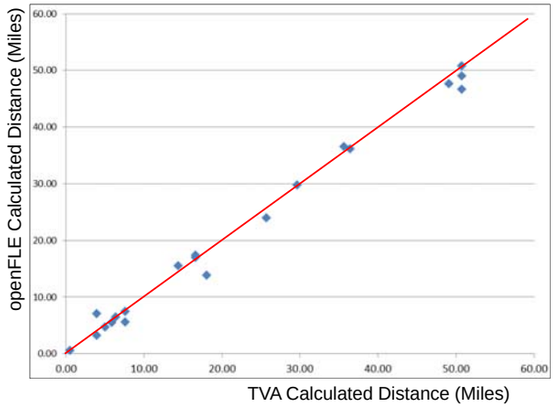
Open Fault Location Engine

How it Works

- **Two Major Components**
  - An automated back-office "service" which runs continuously on a server
  - A configuration manager
- **The openFLE Service**
  - Discovers PQDIF or COMTRADE event files placed in a user-specified folder
  - Parses these files into timestamp-value sets
  - Reliability calculates frequency domain values for each cycle of measured data
    - *True RMS voltage and current magnitudes*
    - *Sine wave curve fit to determine phase angles*
  - Determines fault type
  - Calculates fault type and fault distance
  - Places results, calculations, and source data in a results folder
  - Emails results to selected users
- **The openFLE Manager**
  - Configures the openFLE service



Results



Using only textbook fault location methods, openFLE matches TVA calculated results.

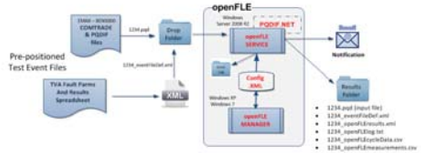
- 4 Line-Ground Fault Cases
- 5 Line-Line Fault Cases
- 3 Line-Line-Ground Fault Cases
- 8 Three-Phase Fault Cases

C# Open Source PQDIF Parser

- PQDIF parser posted as a separate project to jump start open source community for power quality
- http://openPQDIF.codeplex.com

The Value of the openFLE Platform

- **As an extensible platform, openFLE has two major layers:**
  - Get event data:
    - *Frees developers from the chore of reliably parsing and positioning event data for analysis*
    - *Automatically converts time domain data from meters into frequency domain values*
  - Perform the calculations:
    - *openFLE can be extended with new algorithms*
- As a "service" designed to be easily converted to an automated fault location tool
- File-centric process simplifies testing and evaluation through use of companion configuration files



openFLE (Beta) Data Flows

Beta Version to be evaluated by TVA

- openFLE was developed under the auspices of EPRI with requirements established by TVA.
- TVA is planning to test openFLE and determine its value to TVA operations