

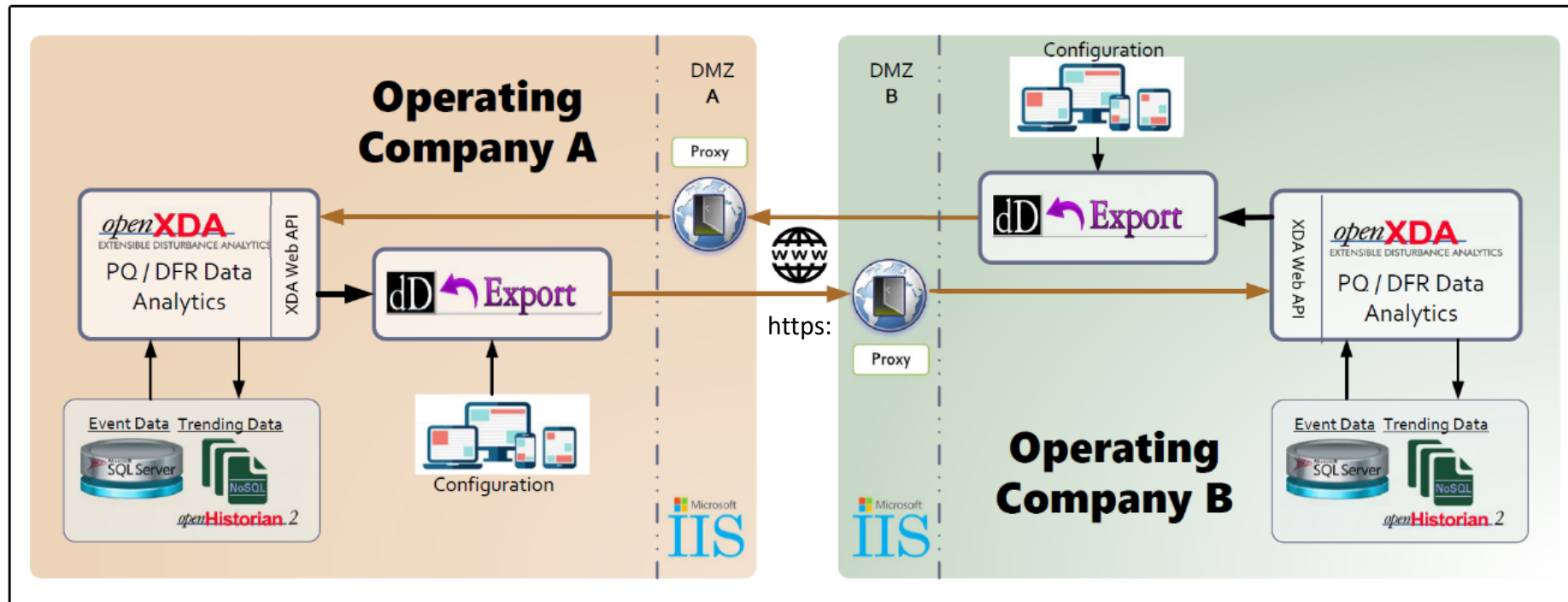


openXDA Automated Data Exchange

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Event Data Exchange



openXDA Data Exchange – How does it work?

■ Step 1 - Data Receiver

- Establish user name and password in openXDA for Data Sender
- Work with IT to establish secure path to openXDA server (NAT translation / Proxy)
- Provide Data Sender IP Address and credentials

■ Step 2 - Data Sender

- Use dD-Tools, dD-Export
- Setup a “remote instance” of openXDA with info provided by the Data Receiver (the same user must exist in both instances of openXDA)
- Select the meters for which data will be exchanged
- “Sync Config” to push meter configuration data to receiver
- Select the type of events to sync – just faults or all
- Select a data exchange method
 - On a schedule (via cron syntax)
 - On change / event
 - Manually, from time-to-time.

Status

- Developed to support EPRI PQ Mark
 - For participants to push benchmarking data to EPRI
 - Automatically on a schedule
 - From time-to-time manually with low hassle.
 - Will be refined during PQ Mark testing in 2018

- Candidate for use for adjacent company coordination
 - Currently being tested between GPA and GTC

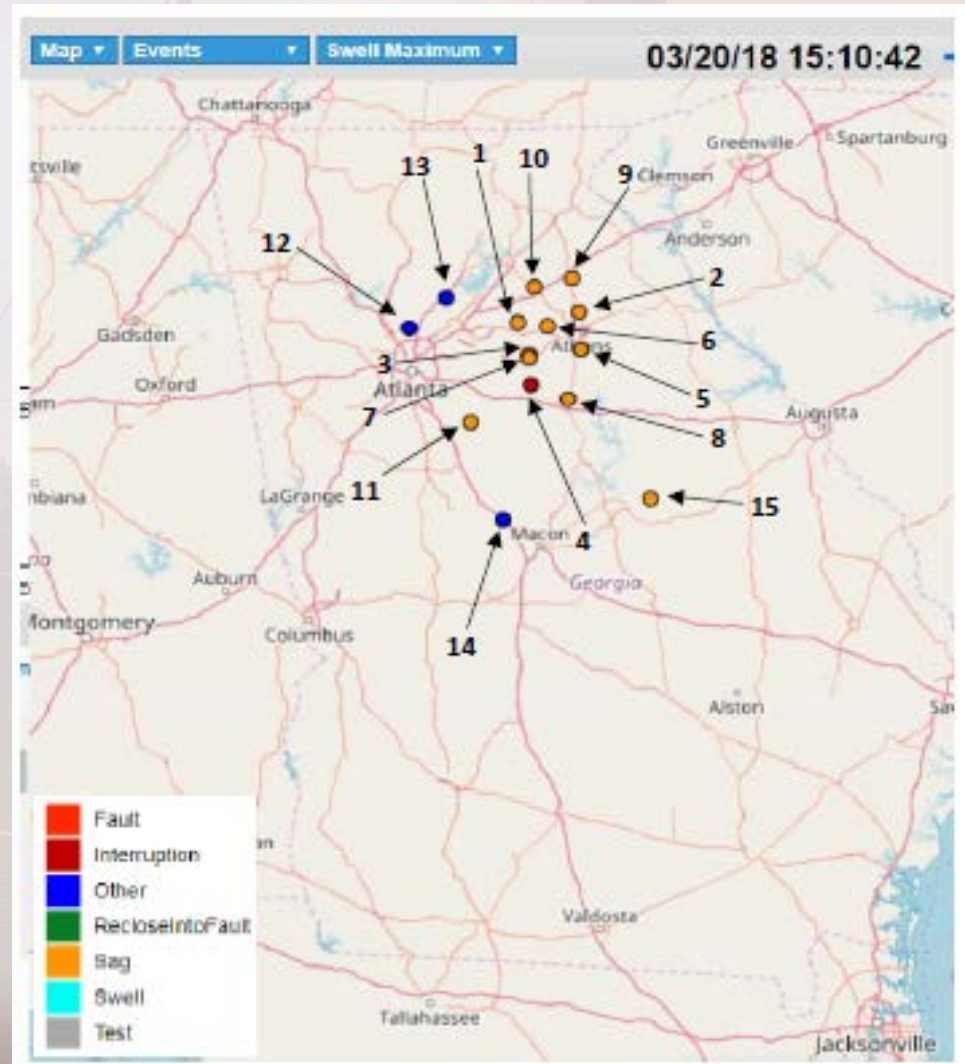
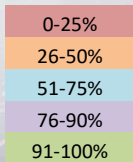
Automated Data Exchange Goals

Why is near real-time data sharing between GTC and Georgia Power Company (GPC) PQ Dashboards so important?

- It will allow GTC and GPC to do double-ended fault location calculations. This is more accurate than single-ended fault distance calculations. This more accurate data is important to both companies control centers for doing switching at the time of a fault. It is also important to both company's maintenance crews who need to go to the faulted location to inspect for damage.
- GTC has about 80 DFRs and GPC has about 120 DFRs and each company would like to see Faults and Events at each other's substations. GTC has customers off of GPC lines and GPC has customers off of GTC lines.
- GTC and GPC will be able to analyze system events that affect our customers as well as the whole Integrated Transmission System (ITS). Large systems faults can have far reaching effects on the system and we can better understand their impact to the ITS.

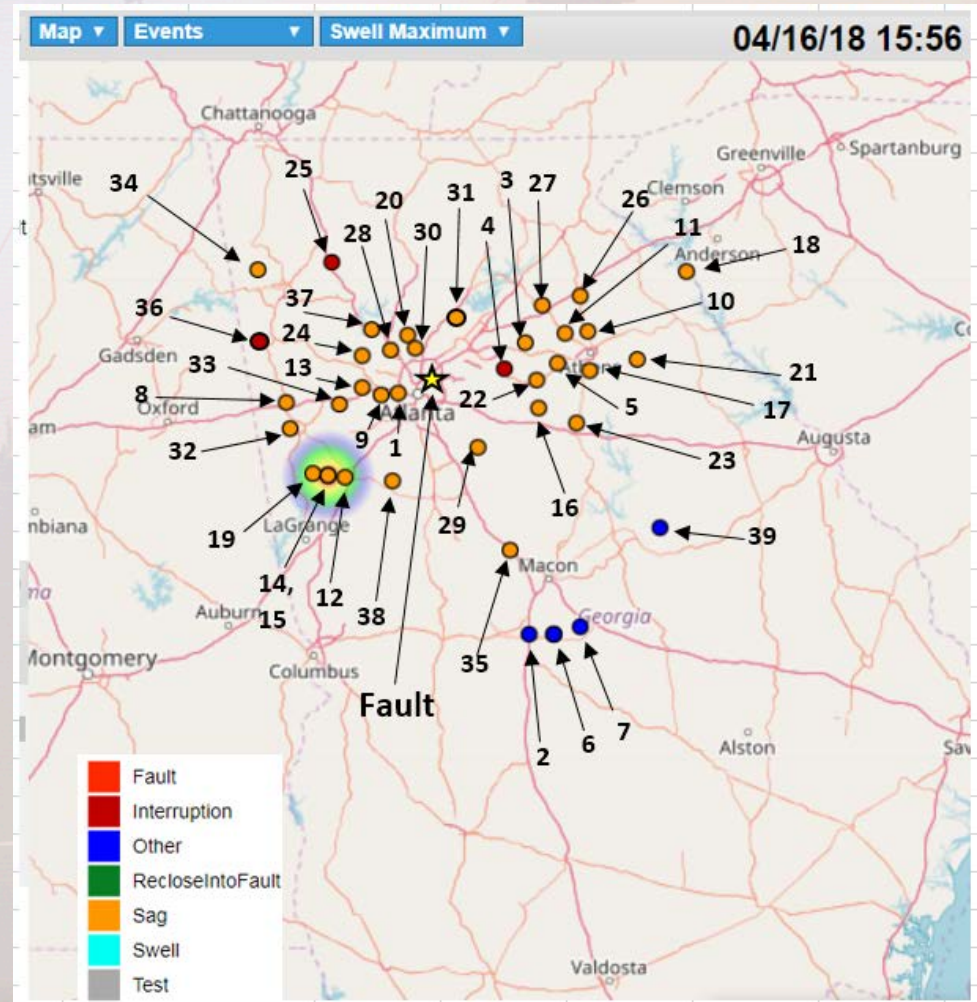
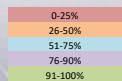
PQ Dashboard User Group Meeting – Automatic Data Exchange – GTC Fault

| | Voltage (kV) | Fault | Other | Sag | Voltage Sag to % of nominal |
|----|--------------|-------|-------|-----|-----------------------------|
| 1 | 230 | | | 1 | 81.8% |
| 2 | 230 | | | 6 | 82.5% |
| 3 | 115 | | | 5 | 81.3% |
| 4 | 230 | | | 2 | 73.0% |
| 5 | 115 | | | 2 | 46.8% |
| 6 | 230 | | | 5 | 63.9% |
| 7 | 115 | 1 | | 4 | 14.5% |
| 8 | 230 | | | 3 | 75.2% |
| 9 | 115 | | | 3 | 77.7% |
| 10 | 115 | | | 3 | 78.1% |
| 11 | 230 | | | 3 | 72.5% |
| 12 | 115 | | | 2 | 24.1% |
| 13 | 46 | | | 2 | 25.7% |
| 14 | 46 | | | 2 | 81.5% |
| 15 | 46 | | | 3 | 88.0% |
| 16 | 230 | | | 1 | 86.8% |
| 17 | 115 | | | 3 | 84.9% |
| 18 | 230 | | 2 | | 92.4% |
| 19 | 115 | | 2 | | 92.2% |
| 20 | 230 | | 1 | | 91.4% |
| 21 | 115 | | 2 | | 90.9% |
| 22 | 115 | | 2 | | 93.0% |
| 23 | 230 | | | 4 | 88.6% |



PQ Dashboard User Group Meeting – Automatic Data Exchange – GPC Fault

| Voltage (kV) | Interruption | Other | Sag | Swell | Voltage Sag to % of nominal |
|--------------|--------------|-------|-----|-------|-----------------------------|
| 230 | | | 6 | | 71% |
| 46 | | | 4 | | 83% |
| 115 | | 3 | | | 89% |
| 230 | | | 2 | | 85% |
| 230 | 2 | | 4 | | 80% |
| 115 | | | 6 | | 81% |
| 230 | | 1 | 1 | | 70% |
| 115 | | 2 | 2 | | 70% |
| 230 | | 5 | | | 90% |
| 115 | | 9 | | | 89% |
| 500 | | 2 | | | 87% |
| 230 | | | 4 | | 87% |
| 115 | | 5 | 5 | | 77% |
| 46 | | 3 | 3 | | 78% |
| 230 | | | 6 | | 78% |
| 230 | | 6 | 6 | | 72% |
| 115 | | 5 | 5 | | 72% |
| 230 | | | 6 | | 87% |
| 230 | | | 4 | | 88% |
| 115 | | 5 | 5 | | 76% |
| 230 | | | 4 | | 81% |
| 115 | | | 6 | | 82% |
| 46 | | | 6 | | 86% |
| 230 | | 3 | 3 | 2 | 81% |
| 500 | | | 1 | | 80% |
| 230 | | | 10 | | 85% |
| 115 | | | 10 | | 86% |
| 230 | | 1 | 5 | | 88% |
| 115 | | 3 | 3 | | 72% |
| 230 | | | 2 | | 80% |
| 500 | | | 4 | | 81% |
| 115 | | | 6 | | 96% |
| 46 | | | 2 | | 81% |
| 230 | | | 5 | | 84% |
| 115 | | 2 | 2 | | 70% |
| 46 | | 2 | 2 | | 71% |
| 230 | | | 4 | | 83% |
| 115 | | | 8 | | 83% |
| 500 | 1 | | 2 | | 85% |
| 46 | | 2 | 2 | | 73% |
| 46 | | 3 | 3 | | 72% |
| 230 | | | 10 | | 80% |
| 115 | | | 14 | | 79% |
| 230 | | | 2 | | 75% |
| 115 | | | 6 | | 78% |
| 230 | | | 4 | | 74% |
| 115 | | | 4 | | 76% |
| 230 | | | 2 | | 86% |
| 115 | | | 2 | | 85% |
| 115 | | | 4 | | 88% |
| 115 | | | 8 | | 85% |
| 230 | | 7 | 7 | | 80% |
| 115 | | | 2 | | 85% |
| 230 | 2 | 1 | 1 | | 77% |
| 230 | | | 6 | | 82% |
| 115 | | | 8 | | 83% |
| 230 | | 1 | 1 | | 76% |
| 115 | | | 8 | | 87% |
| 46 | | | 1 | 1 | 77% |
| 230 | | | 4 | | 90% |



PQ Dashboard User Group Meeting – Automatic Data Exchange

The screenshot shows the 'dD Export' dashboard. The main heading is 'Remote XDA Instances' with a 'Records' count on the right. Below the heading is a search bar. A table lists the instances with columns for Name, Remote Address, and Frequency. The first entry is 'GPA' with the address 'https://gridprotectionalliance.org:8988 *'. To the right of this entry are buttons for 'Config Data' and 'Files', and a 'Meters' counter showing '22'. There is also a 'Log Out' button in the top right corner.

| Name | Remote Address | Frequency | Export |
|------|---|-----------|-------------------|
| GPA | https://gridprotectionalliance.org:8988 * | | Config Data Files |

- GTC added 22 meters to GPA's remote connection
- Faults on some of the 22 meters proved remote connection worked – still ironing out logic details