

PingThings

GPA + Dominion Energy
STTP at Scale

Justin Gilmer – PingThings, Inc.



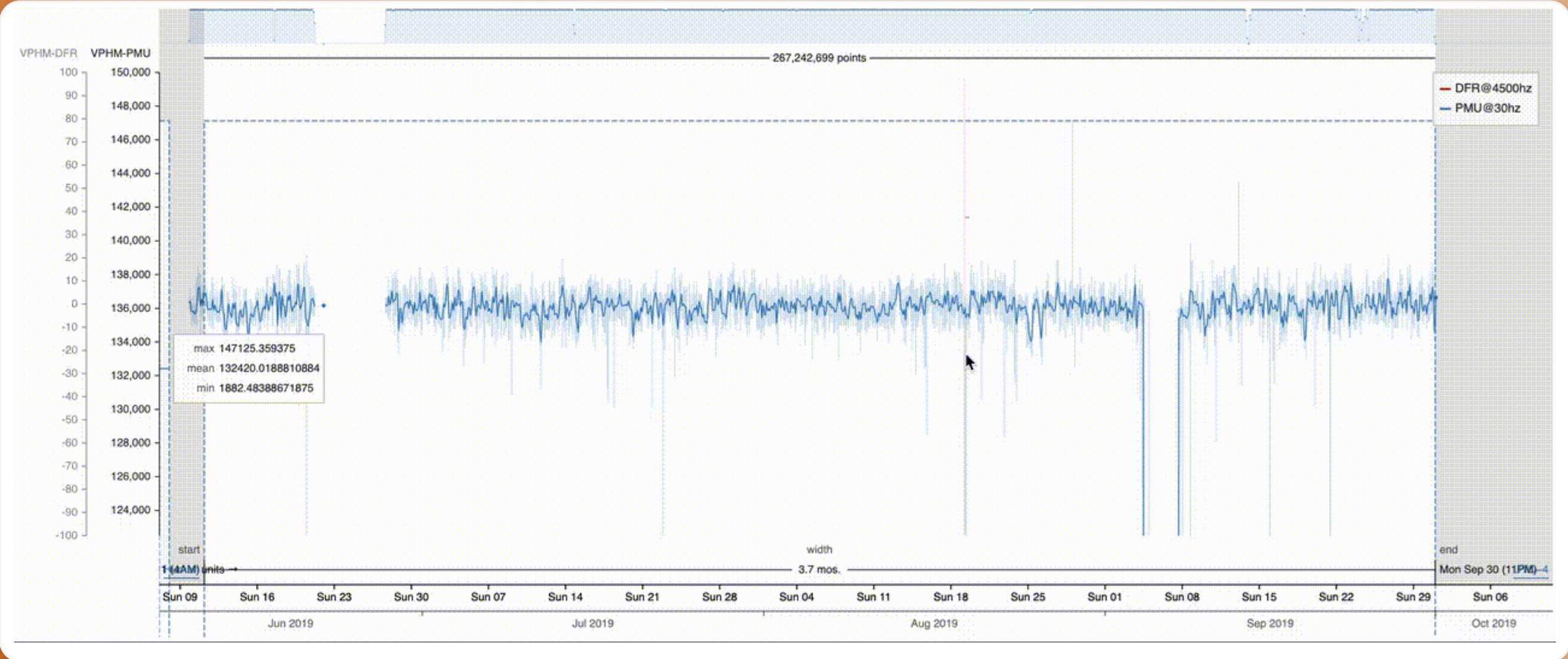
GPA Users Group
Conference
October 2024

PingThings Overview and STTP at Scale



Justin Gilmer
Data Scientist

GPA Users Group Conference
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Outline

Intro: PingThings and Partners

- **Who We Are:** Collaboration between PingThings, GPA, and Dominion Energy
- **What We Do:** Solving real-world challenges through data-driven solutions

What We Solve

- The PredictiveGrid makes all of your data easy to use to solve a large variety of problems faced by electric utilities; we enable your teams to be superhuman

The PredictiveGrid™

- **What is the PredictiveGrid?** - A time series platform to use and understand all of your sensor data, including AMI, PQ, SCADA, PMU, and CPOW, GIS, Events, and more

GPA Partnership

- **Scaling Study:** PingThings + GPA's STTP Scaling Study for real-time data processing

Demo

- The PredictiveGrid in action

Company Overview



Silicon Valley-
based tech startup



Backed by venture
capital



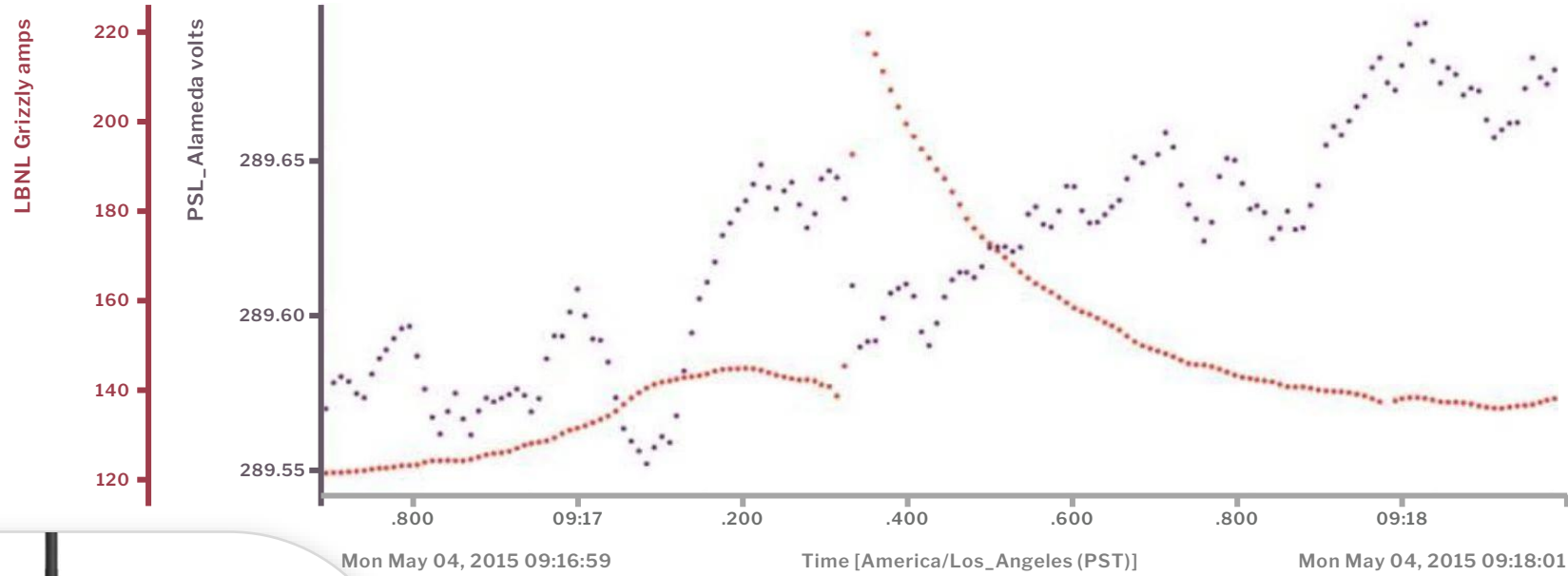
Team of 24+ full-
time professionals



Focused on energy
sector innovation

PingThings Origin

As part of the **arpa-e** Open Innovation 2012 program, **Dr. Alexandra Von Meier** and **Dr. Alex McEachern** invented and built an inexpensive distribution **PMU** with high precision measurement capabilities that could measure the minute angle differences between adjacent points on the distribution power grid.



Dr. Alexandra von Meier
UC Berkeley



Dr. David Culler
UC Berkeley



Dr. Alex McEachern
Power Standards Lab



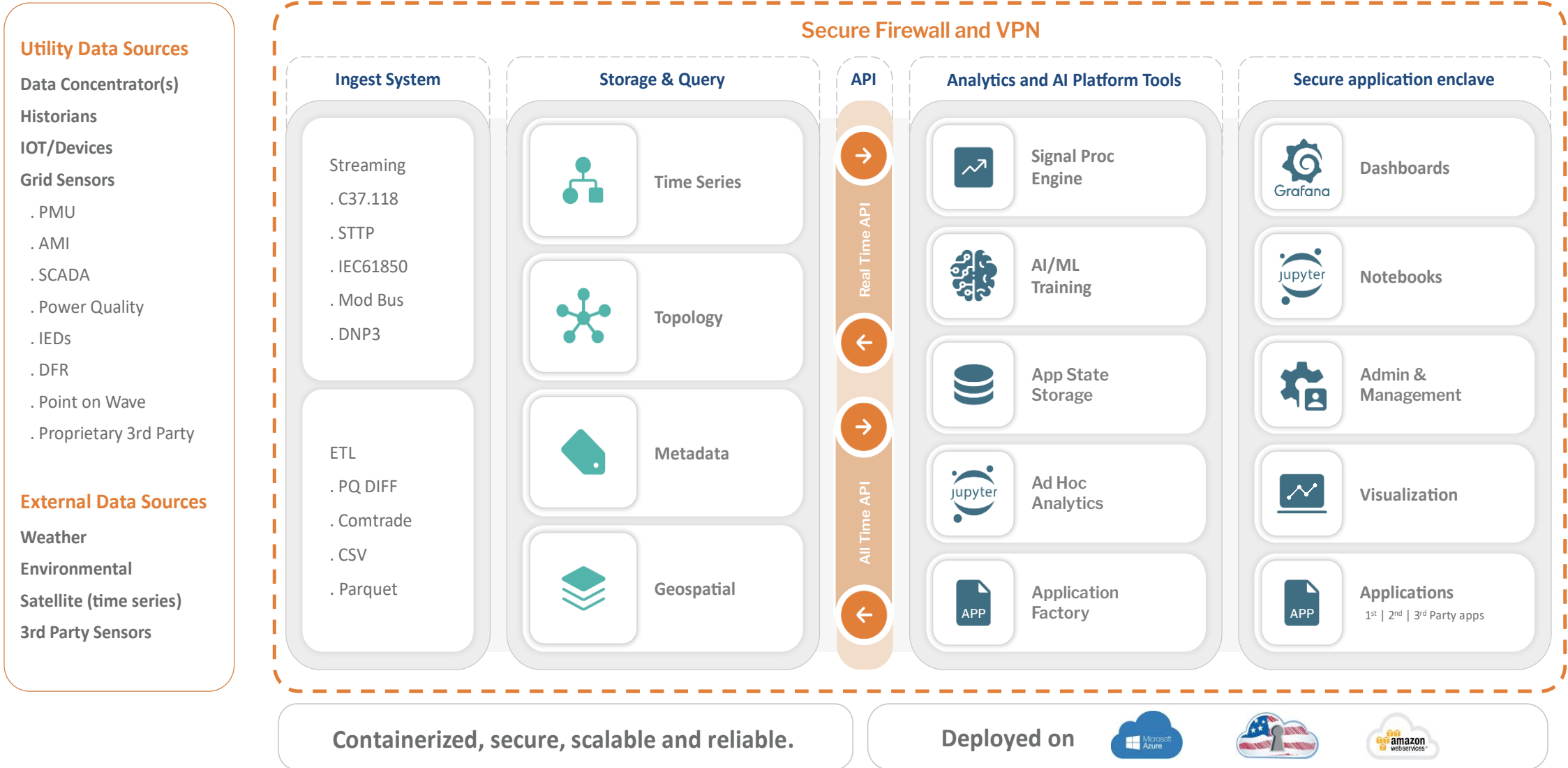
Sample μ PMU data illustrating the impact of a small current surge at two different locations approximately 40km apart. Precise time synchronization and ultrahigh resolution is required to observe these kinds of relationships in distribution systems.

Envisioned a digital distribution system made fully transparent with ubiquitous high frequency sensing.



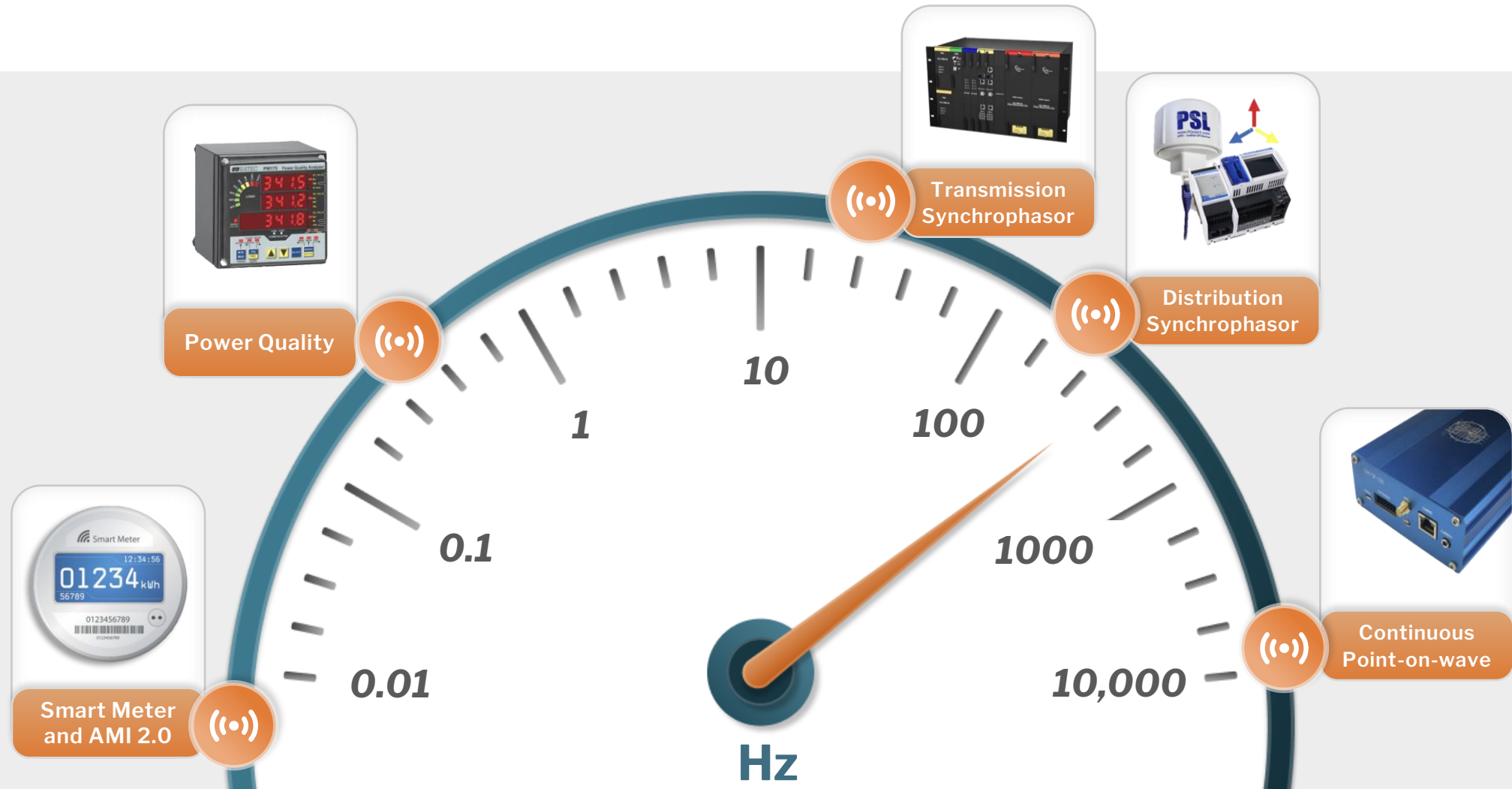
One Platform, All Data, Any Analytics

One platform for any type of utility sensor data, either from internal or external to the utility.



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"All Time" vs "Real Time" Data Processing

"All Time" Data

- enables you to understand the system behavior under a variety of
 - time-varying loads,
 - environmental conditions, and in a variety of states.
- allows real time use cases to be developed, tested, and refined.
- is the only way the organization can learn and evolve.

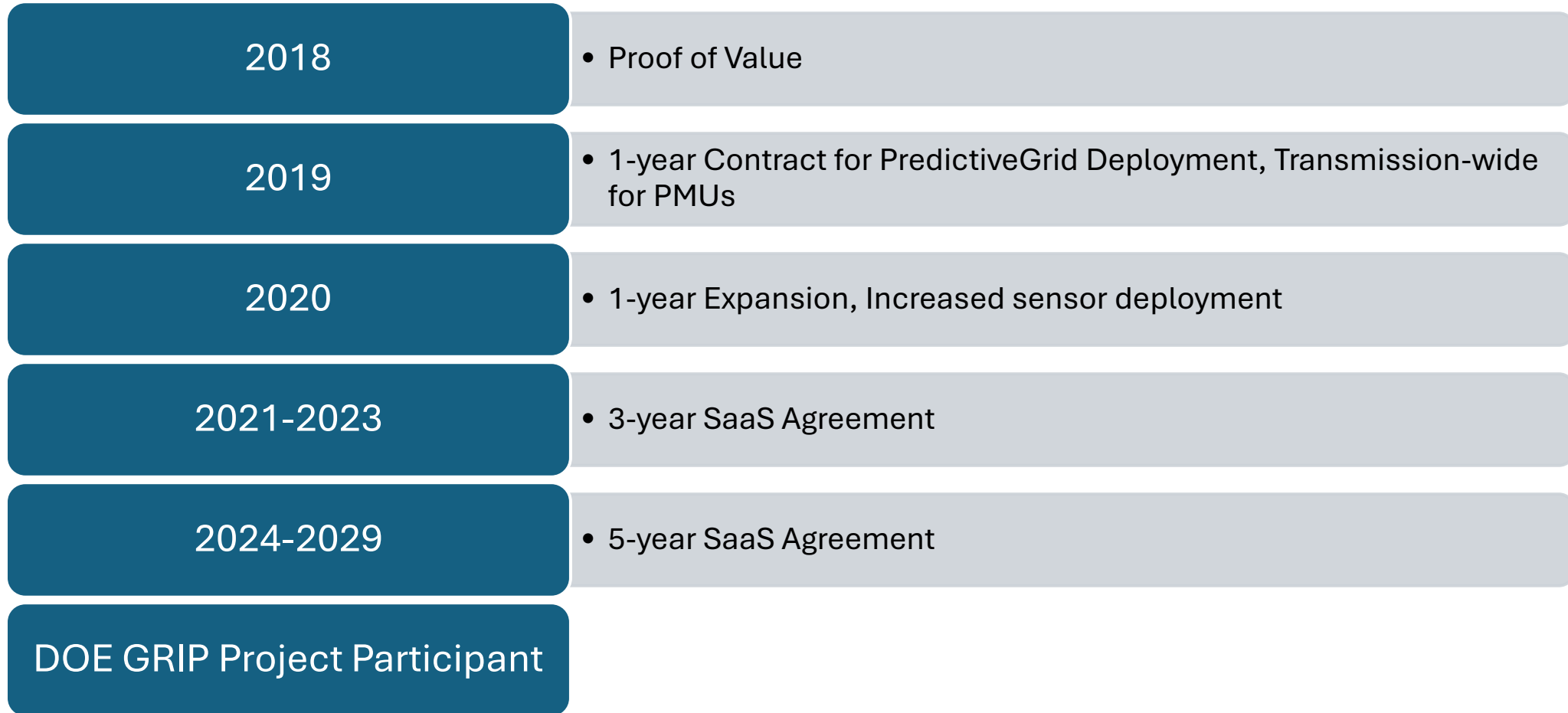


"Real Time" Data

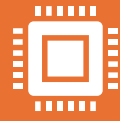
Use Cases

- Tackle every new problem that arises
- Event detection
- Alarming
- Anomaly understanding and training
- Root cause analysis
- Automated reporting
- Model validation and verification
- Literally everything else

Timeline PingThings, Dominion & GPA



PingThings + GPA: STTP Contributions and Scale



PingThings has been using and contributing back to the open source STTP (now IEEE standard) library developed by GPA



We use it to ingest 1M+ streaming measurements per second from the synchrophasor devices in Dominion and other utility customers 24x7x365

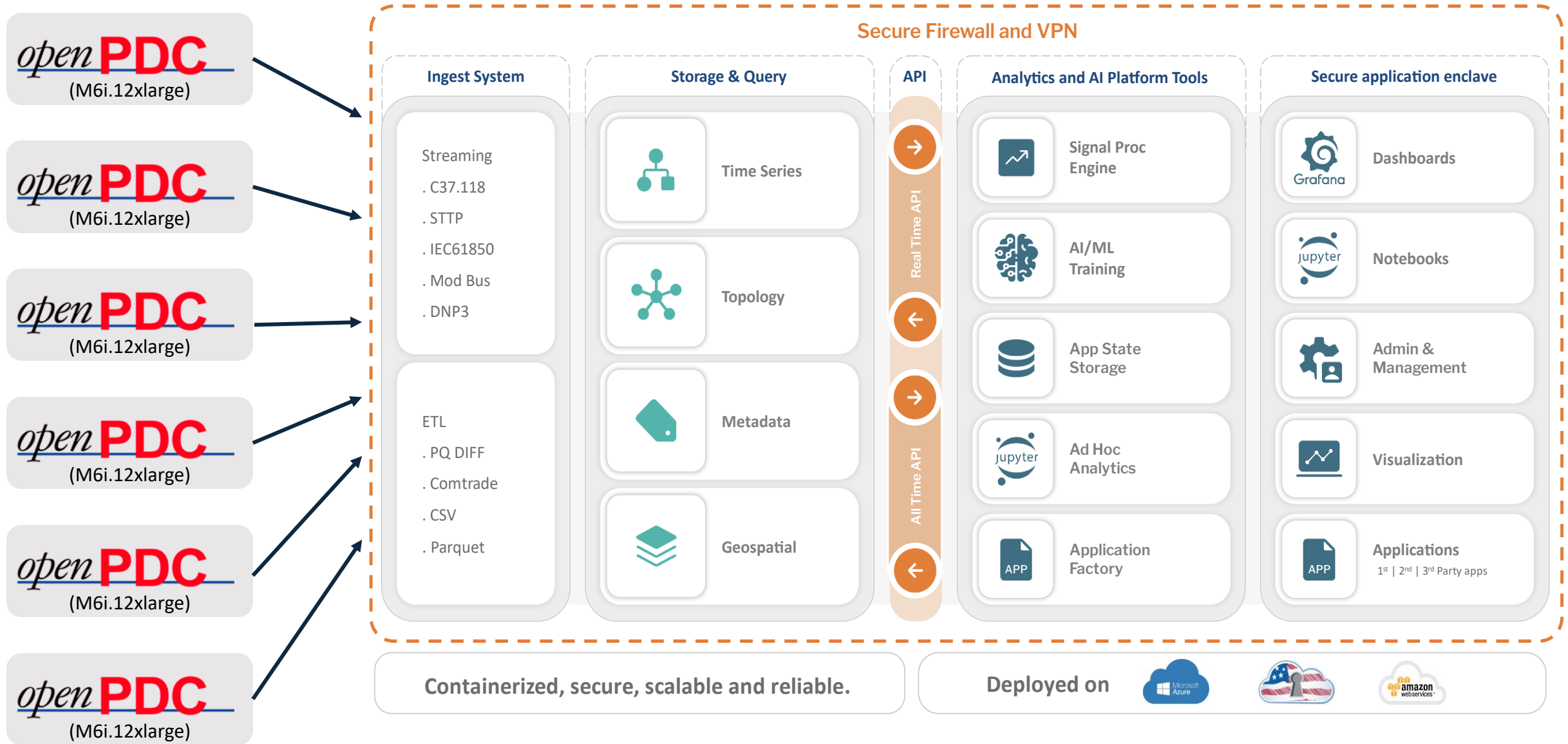


Upstreamed various improvements to the golang api



Was crucial for our success in the PingThings + GPA joint performance test of the STTP

Demo System System Diagram – STTP at Scale





PingThings + GPA: STTP at Scale

- PingThings and GPA conducted a scale-out test using each others' platforms
 - OpenPDC – Open Source, PDC Platform
 - PredictiveGrid – Grid scale data storage and analytics platform
- Goal was to reliably ingest and store 120M pps of sensor data transmitted over STTP
 - **achieved 124M pps**
 - Equivalent to **200,000 PMUs, 21 channels, at 30Hz sampling rate**