OPAI AI Use Case Work Stream – AMI Data Use Case

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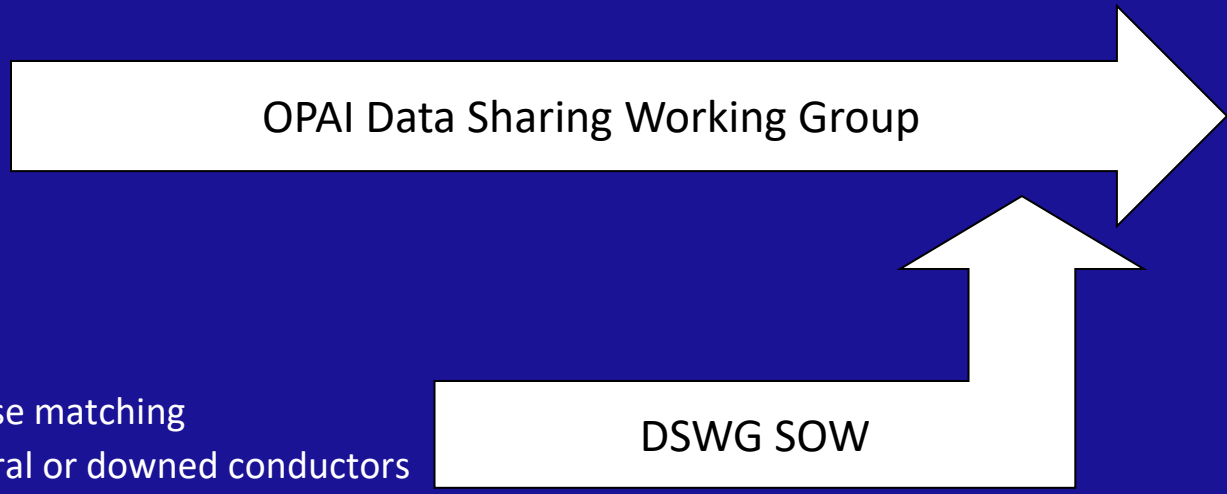
Discussion from Kickoff Meeting AMI – *Draft Objective Statement Refinements*

Data

- Utilities: Share AMI data with the broader collaborative.
- CNZ: Leverage synthetic datasets if appropriate.
- CNZ: Solution to synthesize and anonymize the shared AMI data



1. OPAI Co-Dev Objectives

- Using AMI Data - All to Co-Develop:
  - Methods and solutions to detect incorrect customer voltage phase matching
  - Methods and solutions to detect active faults, such as open neutral or downed conductors (SCADA-AMI Matching)
  - Methods and solutions to detect potential future faults based on anomalous data
  - Benchmarks for detection algorithms
- Technology Providers:
  - Demonstrate *State of the Art,* with focus on:
    - End-end workflow pipelines AMI Data → Operational Decision

2. Longer Term Objectives

- Develop:
  - Root cause analysis for the faults
  - Load disaggregation and domestic device matching for forecasting and other use cases
  - Compute capabilities of advanced edge meters. Assessment of tradeoffs, cost benefits

Objective and Agenda

Discuss the AMI Outage Detection problem statement to define a problem statement and solution pathways

Participant	Action	Time
All	Brief Individual and Company Introductions - Roundtable	5 Mins
Adrian Kelly (EPRI)	Define potential outcomes and requirements of participants	5 Mins
Utilities	Round Table Perspectives on the Problem Statement / Use Case Current Experiences Data Availability	15 Mins
EPRI Matt Wakefield	Perspectives on current research and challenges and guidance on achievable outcomes	10 Mins
Technology Providers	Round Table Perspectives on the Problem Statement / Use Case Current Experiences Data Requirements	15 Mins
Adrian Kelly and All	Refine the problem statement and data requirements	10 Mins

Interactive Session – Please Contribute Verbally – We will Take Notes and Follow Up

Use Case Team and Problem Description

Asset	Use Case	Utilities Interested	Technology Providers Interested	Team Member Count
Distribution	Domestic Outage Detection and Analytics using Advanced Metering Infrastructure (AMI)	OPPD, NRECA, Alliant, Duke Energy, Consumers, SEC	Microsoft, Dviz, UtilityAPI, Impresa AI+ / Abjayon, Landis&Gyr, Biospheric, CNZ	13

AI detects and analyzes customer-level outages using real-time AMI ping data, consumption drops, and voltage anomalies. The system automatically clusters affected meters and identifies likely fault zones. Insights support faster fault localization and crew dispatch. Historical data is used to identify patterns in domestic outage behavior.

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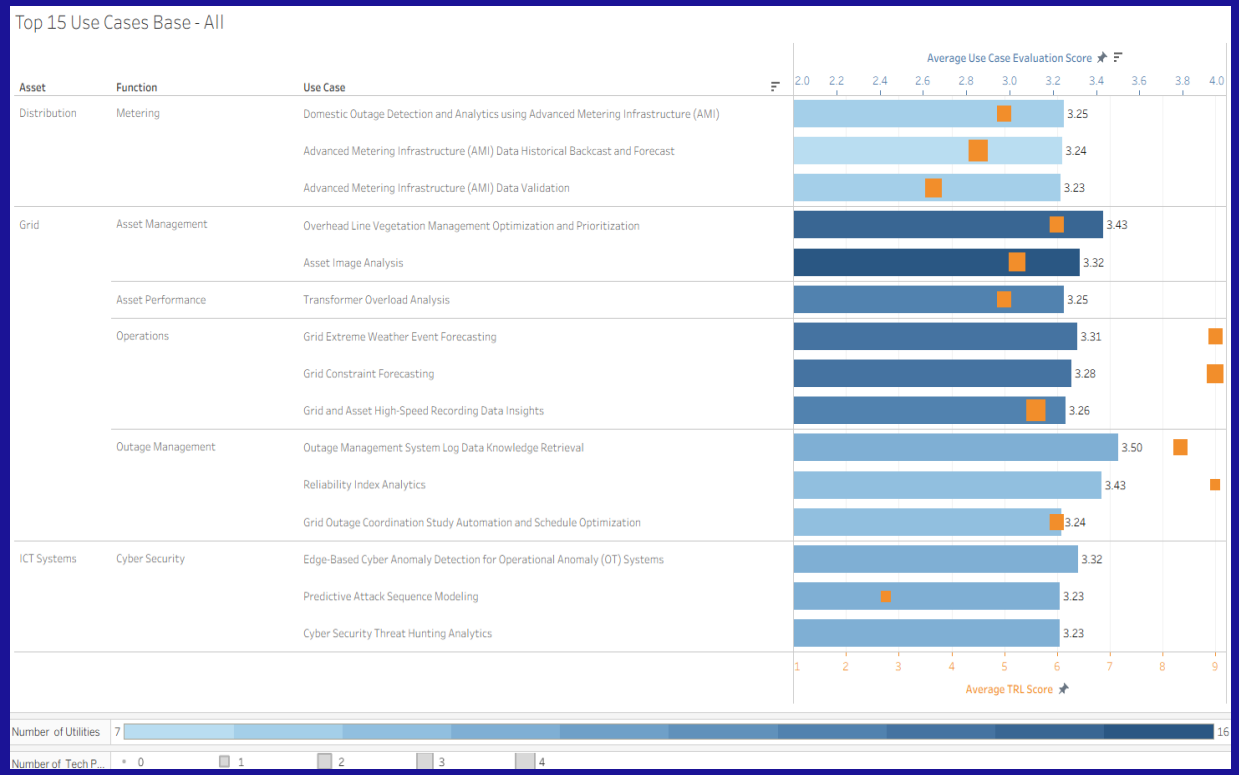

Introductions

Introduce yourself and company briefly with a note on what you would like to get from the collaborative co-development project

Utilities Perspective

- Round Table Perspectives on the Problem Statement / Use Case
- Current Experiences with this problem
- Data availability

EPRI Perspective

- EPRI SME Perspectives On:
  - Current research applications and
  - Challenges in this domain
  - Guidance on achievable outcomes

Technology Provider Perspective

- Round Table Perspectives on the Problem Statement / Use Case
  - Very quick demonstration if time available
- Current experiences in this domain
- Data Requirements

Define the Question to Be Answers

Questions

1. Demonstration of state of the art?

Proposed Outcomes

Data Availability and Requirements

Data Availability - Utilities

Data Requirements – Tech Providers

Domestic Outage Detection and Analytics using Advanced Metering Infrastructure (AMI)

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Situation (Context and background)

- Lots of AMI smart meter data available
- Usually well structured, time series, locational

Complication (Main issues with the situation, challenges)

- Difficult to gain insights from the data beyond commercial insights and behaviours and patterns Losses
- Not well linked to operational processes such as fault detection or crew dispatch? Linked to planning, asset maintenance, etc? Integration with GIS DMS/EMS
- Data privacy Anonymization or synthesization, availability?

Question (The specific problem to be solved)

- Insights → Actions (comms) interlinking / interoperability/integration with other systems. Electrical model aligned to meter data – validation of model data, Matching to OMS/ADMS, phase balancing. ID→ fault classification→response (potential for more granular data sharing for fault classificaiton)

Answers (What solutions could OPAI technology providers supply, what data can utilities provide)

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What Does This Look Like for a Typical Use Case?

Use Case Priority Domestic Outage Detection and Analytics using Advanced Metering Infrastructure (AMI)

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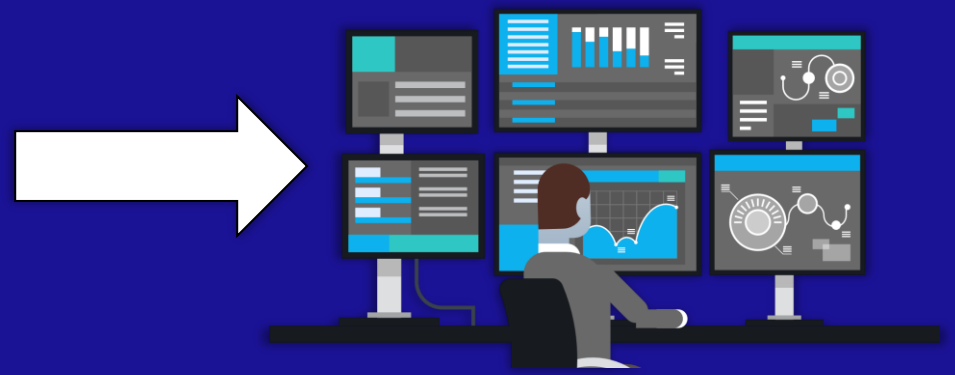


Development Phase	Energy Utility Contributions	Technology Provider Contribution
Requirements Discovery & Prototyping	Define the problem, scope, personas, define data, define end state.	Defining architecture, app requirements, building blocks available.
Environment Setup & Data Engineering	Data provision, synthesization, quality checking	Compute resource design and allocation
Core Development & Model Integration	Oversight on product direction, features	App and AI model development, CI/CD pipelines
QA, Security, and UAT	User testing and feedback, integration oversight and design (IT/OT teams)	Test harness development, cyber security, AI model validation
Deployment & Operational Monitoring	Demo of application, sandboxing, feedback on prototype	Deploy and troubleshoot protype application

What is the Ask of OPAI Members

Energy Utilities

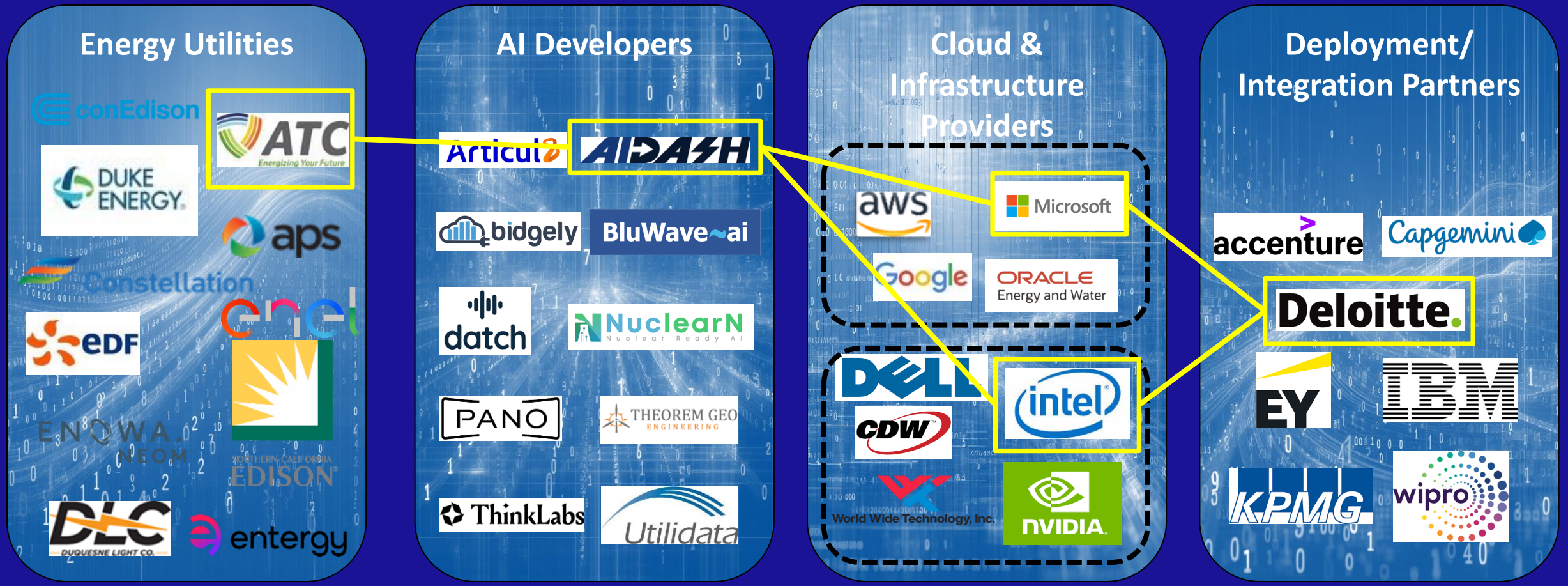
- Review the top use case lists based on your asset and functional responsibilities
- Cross reference with your company specific results.
- Huddle internally to determine which use cases you would be interested in contributing to.
- Is there data available that can be brought to OPAI either real or synthetic to co-develop.

Technology Providers

- Review the high priority use cases with reference to your technology.
- How mature is the technology ? Can it be used as part of a co-development effort.
- What resources can you bring to the co-development effort?

Co-Developing and Deploying AI Solutions with Partners

Priority Use Case #1: Interested OPAI Members commit to developing, piloting, and (potentially) deploying solutions (hypothetical example for Use Case #1)



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