

Assessment of the Matter Protocol for Utility Applications



PROJECT HIGHLIGHTS

- In-depth investigation and understanding of the Matter protocol standard
- Hands-on assessment of Matter certified products to gauge capabilities and interoperability
- Architectural assessment and repository of use to capture how Matter can be utilized for grid support.
- Recurring working group to coordinate with peers also investigating the Matter protocol.

Background, Objectives, and New Learnings

Utilities are facing rising peaks and a need for greater flexibility due to changing load profiles, increased penetration of variable resources, and the rising popularity of electric vehicles. Traditional demand management programs focused on peak reduction and the ~4% of US load that is manageable. Most of this manageable load is large industrial loads and is managed by simple on/off control via load control switches.

Fortunately, the advancement of smart, communication-connected appliances now makes load management possible in residential and small commercial sectors. These advances bring the potential to produce variable responses, both increases and decreases in load, to help compensate for DER and to enable grid services. Thus far, however, the lack of interoperability has hampered progress.

Independently from utilities, technology companies are marketing smart appliances that provide customer-facing benefits such as remote control and intelligent flexibility. These capabilities can be useful for customers and utilities, but utility side benefits are limited by two main barriers. First, smart device ecosystems tend to be isolated and proprietary so it is difficult for utilities to choose platforms to support. Second, smart device platforms often have short lifespans and regular updates. If a utility makes investments to integrate with a particular platform, they have no guarantee it will be available in the future. The Matter protocol is a new standard from the Connectivity Standards Alliance (CSA) that attempts to address these challenges.

CSA's Matter Protocol is an open standard developed by major tech companies including Amazon, Apple, Google, and Samsung. Launched in December 2019, Matter aims to enhance interoperability and security among smart home devices from different manufacturers. It operates via Internet Protocol (IP) and supports various networking technologies like Wi-Fi, Thread, and Ethernet. Matter allows devices to communicate seamlessly, reducing the need for multiple proprietary hubs and ensuring local control without relying on cloud services.

If Matter performs as designed, electric utility companies might be able to link it to their telecom, SCADA, or advanced metering infrastructure (AMI) systems. By integrating Matter-enabled devices, utilities can achieve seamless interoperability and secure communication across various smart meters, customer technologies, and control systems. This can facilitate real-time monitoring and management of energy consumption, improve demand response capabilities, and enhance grid reliability. However, no utility-centric applications of Matter exist today.

The goal of this project is to address this gap by exploring and prototyping applications for the Matter protocol. This project may also help manage gaps and risks associated with the Matter protocol to inform utility decision-making and to direct future research.

This research effort aims to:

- Improve understanding of models that allow utilities to leverage the adoption of Matter-compliant devices to help their customers manage energy use.
- Connect existing research on standard services, communication protocols, and cyber security requirements to the work by the Connectivity Standards Alliance (CSA).
- Identify and manage risks associated with leveraging MATTER for IoT-based distributed energy resources and loads. This includes cyber, integration requirements, and longevity of solutions provided.

Benefits

Public and funder benefits include:

- Increasing options for customers to support grid constraints which helps achieve grid reliability and resiliency.
- Enable new mechanisms for grid-edge devices to participate in bulk-system operations through FERC Order 2222.
- Greater understanding of the need for IoT technologies to interoperate with the grid.

Project Approach and Summary

1. The project builds upon research previously conducted by EPRI and others in the areas of demand response, DERMS, DER group management, DER-related communication protocols, and cyber security.
2. The project will involve periodic project team meetings, during which EPRI will understand and document the needs, use cases, and concerns of participating utilities and identify solutions.
3. EPRI intends to perform assessments of experiences with Matter protocol including hands-on assessments in the EPRI Knoxville Laboratory.
4. Funders are expected to be active participants in the project, participating in the periodic meetings.

Deliverables

- **Matter Use Cases.** EPRI will document key applications for the Matter protocol in customer and utility-owned technology. Use cases will identify integration requirements and considerations.

- **Laboratory Assessment of Matter Platforms.** A comparison of the functionality of the Matter protocol to the requirements for utility use cases.
- **Matter Application Guide.** Outlines key considerations for leveraging the Matter protocol for utility programs. It will include security, integration, and matching Matter functions to demand response functions.
- **Working group** where utilities can exchange ideas and experiences with each other. EPRI will also present findings through the working group.

Price of Project

\$65k. This project qualifies for Self-Directed Funding (SDF) or Co-funding and can be paid over two years.

Project Status and Schedule

The project is expected to continue for 12 months from initiation to completion. Findings will be shared at regular intervals throughout the project through the project working group.

Who Should Join

- Utilities considering broader integration of customer-facing DERs and flexible loads for distribution and bulk-system services.
- Utilities considering the use of the Matter protocol for grid-edge applications not currently covered by other utility application-level protocols.

Contact Information

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