Technology Innovation Project

Project Brief

TIP 404: EPRI P161 Persistent WiFi

Context

Utilities are challenged to effectively manage consumer loads found in a variety of devices such as thermostats, water heaters, charging stations, and other residential and commercial appliances. New utility programs for energy efficiency and demand response using connected devices can issues with persistence of the connection that can reduce program effectiveness over time. This in turn can reduce cost effectiveness of programs and make them less attractive to utilities, ratepayers and the PUCs.

Device connectivity may be lost when Wi-Fi network parameters [Service Set Identifier (SSID) and security key] are changed by the consumer. This lack of connection durability creates communications challenges as well as potential for increased customer support burdens to re-establish connectivity. The Internet of Things (loT) and Internet-connected devices may be compromised by attackers, presenting increased attack surfaces for potential intrusion into grid operations.

Description

BPA has joined this program as an Observer participant. The project defines and demonstrates a communications platform that can facilitate secure integration of customer systems with grid operations (both distribution and system operator) as well as enabling third parties, service providers and equipment manufacturers to maintain their own interfaces.

There is significant expense associated with creating new utility communications networks to integrate consumer devices with grid operations for DER, storage, and load management.

Project tasks include:

1. *Use Case Definition:* Observer members are involved with use case definition discussion and planning with participant members.
2. *Provisioning Server Development:* A generic provisioning server is expected to be made available for observers to use with the baseline routers, for internal testing.
3. *Back End Server and Data Repository:* A generic back end server with VPN server capability is expected to be made available for observers to use with the baseline routers, for internal testing.
4. *Project Webcasts and Meetings*: Observers are invited to participate in periodic project webcasts and meetings to plan activities and review participant demonstrations and results.
5. *Updates on standardization progress in Wi-Fi Alliance:* Following Wi-Fi Alliance member meetings (three (3) per year), an update on progress standardization the functionality will be provided (subject to confidentiality requirements imposed by Wi-Fi Alliance)
6. *Final Report:* Observers are to receive the final report documenting the results from the participant demonstrations.

Why It Matters

This research demonstrates the tremendous advantage of using existing networks such as customer broadband and Wi-Fi to integrate these technologies, enabling the connection to offer durability and security. The outcome is an improved ability to manage loads and DER devices and possibly provide customers more reliable connected device connections without incurring the capital and operating expenses required by new utility networks.

Goals and Objectives

Communication challenges this project addresses:

- Avoiding device drop-off
- Understanding of root cause of any loss of connection
- Reducing security concerns
- Automated provisioning of customer devices and networks

Deliverables

The non-proprietary results of this work will be incorporated into EPRI R&D Programs P161 (Information and Communication Technologies), P183 (Cyber Security), P170 (End-Use Energy Efficiency and Demand Response), P174 (Integration of Distributed Energy Resources), P18 (Electric Transportation), and P94 (Energy Storage and Distributed Generation) and made available to the public.

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Project Start Date: January, 2019

Project End Date: March, 2020

Participating Organizations

Electric Power Research Institute (EPRI)
Duke Energy
Bonneville Power Administration
Dairyland Power

Reports & References

Funding

FY2019: $30,000

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