IEEE P1547.10 Working Group Meeting

"IEEE P1547.10 Recommended Practice for DER Gateway Platforms"

IEEE P1547.10 Houston WG Meeting
Minutes (DRAFT)
Wednesday, July 12th, 2023, 10:30am – 4:30pm ET
Thursday, July 13th, 2023, 10:30am – 12:30pm ET
Virtual

Chair: Abrez Mondal
Secretary: Daniel Freeman
Vice Chairs: Yashar Kenarangui, John Berdner
IEEE SA Liaison: Michael Kipness

1. **Call to Order**
   - Start at 10:31 AM with reminder to record attendance (iMAT)

   A. Meeting Goals and Context
   - Approval of minutes from April meeting
   - Coordination with P1547 revision and other WG
   - Updates from the sub-groups

2. **Roll call of Individuals and Declaration of Affiliation**

   - Attendees completed the roll call via the Teams chat

3. **IEEE Policies**
   - **IEEE SA** Call for Patents
   - **IEEE SA** Copyright Policy Presentation
   - **IEEE SA** Individual Participation
   - **eTools: myProject, Listserve, iMeet Center, WorkSpace**

   Jens Boemer reviewed the IEEE SA Call for Patents, Copyright Policy, and Individual Participation slides, then opened the floor for essential patents. No potentially essential patents were claimed. The WG Chair, Abrez Mondal, presented an overview of the eTools being used for P1547.10 activities, as well as the rules for obtaining voting rights.

4. **Check for Quorum**

   At 10:49am, the WG secretary, Daniel Freeman, confirmed that quorum was established.

5. **Approval of Agenda**

   The meeting agenda was presented by the WG chair. Mark Siira made the motion to move forward with the agenda and Daniel Freeman seconded the motion. No further discussion requests were raised. No opposition and no abstained votes were made, and Agenda was approved for the meeting at 10:51 AM.

6. **Approval of Minutes from Kick-off Meeting**

The WG chair, Abrez Mondal, presented the meeting minutes from the previous meeting held on April 5-6, 2023 at Houston, TX + Virtual. Daniel Freeman made the motion to move forward with the agenda and Marc Patterson seconded the motion. Jens Boemer made a clarification that the IEEE Policies should list No potentially essential patents were claimed. Abrez made the correction. No opposition and no abstained votes were made, and minutes from the April meeting were approved at 11:00 AM.

7. **SG1: Overall Document and General Requirements**
    - **A. Scope and participation**
    - **B. Meeting schedules**
    - **C. Discussions**
        - **i.** The sub-group structure and the corresponding Listserver mailing lists were presented by the WG Chair.
        - **ii.** Abrez Mondal presented on the sub-group 1 activities on "Overall Document and General Requirements."
        - **iii.** Specific important notes detail that 1547.10 is dedicated to DER Gateways and not on interconnection requirements.
            - The main discussion point was the need to have a written definition of DER Gateway that can be refined over time as needed.
        - **iv.** Existing definitions – there are some differences in definitions for DER unit between 1547 and 1547.1. – It was decided by the WG to use the 1547-2018 definitions in this project.
        - **v.** Defining the DER Gateway – A working definition was presented and the process of gathering consensus among members and interested parties is ongoing. There was a recommendation to create a matrix for use cases and functions.

8. **Break - Lunch**

    - **Break from 12:34pm – 1:32pm**

9. **SG2: DER Grid-Intelligence Functions in Gateways**
    - **A. Scope and participation**
    - **B. Meeting schedules**
    - **C. Discussions**
        - **i.** The sub-group structure and the corresponding Listserver mailing lists were presented by the facilitators.
        - **i.** Some discussions regarding the overall functionality of a DER gateway, specifically schedules and dispatching.
        - **ii.** Other functions mentioned are engineering access, jump host, logging, alarms, settings monitoring, and site metering.
10. **SG4: Communications**
    - **A. Scope and participation**
    - **B. Meeting schedules**
    - **C. Discussions**
        - **i.** The sub-group structure and the corresponding Listserver mailing lists were presented by the facilitators.
        - **ii.** There is the option for any protocol that is agreed upon by all parties. Need to ensure this is covered in some fashion.

iii. There may need to be a consideration for whether the gateway can bring non-compliant DER's into 1547-2018 compliance.
iv. Once the full list of protocols is determined the protocol conversion will be built out. There are some conversations being held in 1547 SG4 that may impact this.
v. DER information model is a discussion that needs clarification between 1547 and 1547.10.
    1. May also be cyber security considerations.
    2. 1547.1 has additional information on the DER model and should be reviewed.
vi. Telemetry and SCADA need to be discussed to understand if these are in scope and what other IEEE standards to interface with.

11. Closing discussions for the day

The meeting was adjourned at 4:03 PM.

IEEE P1547.10 Houston WG Meeting
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Virtual

12. Recap of Day 1 and review of agenda/call to order

- The activities on Day 2 started at 10:30 AM with reminder to record attendance (iMAT). The agenda for the day was presented by WG Chair.
- Attendees completed their introductions through the Teams chat.
- Next, the WG chair presented the recap from Day 1.

13. SG3: Security Functions in Gateways
A. Scope and participation
B. Meeting schedules
C. Discussions
i. The sub-group structure and the corresponding Listserver mailing lists were presented by the facilitators.
ii. Progress so far includes scoping and defining the high level objectives.
iii. Data in rest, data in flight, and logging security functions are considered in scope.
iv. Detailed threat analysis may be helpful to determining full scoping
v. Jens showed a new diagram as a discussion piece and brought up the concept of regular/frequent updates to 1547.10 and 1547.
    i. Does 1547.10 need to consider a DER Gateway to be used to bring an existing DER into compliance with 1547?

14. Future Meetings

It was announced by the WG chair that future meetings will follow the schedule of P1547 Revision WG with hybrid participation allowed. Proposed meetings dates are a hybrid meeting in October 2-5 2023 in Wilsonville, OR. Pending dates for spring, summer, and fall 2024 to be communicated at a later date.

15. Adjourn

Jedidiah Bartlett moved the motion to adjourn the meeting. Mark Siira seconded the motion. No discussion nor objections or abstinence votes were made. Meeting was adjourned at 12:32 PM.

Appendices

- **Appendix 1. Meeting Attendance List**
- **Appendix 2. Meeting Slides**

Appendix 1. Meeting Attendance List

First Name	Last Name	Affiliation	July WG	Voting Rights
Kashif	Abdullah	National Grid	**x**	
Bora	Akyol	PNNL	x	Yes
Ali	Syed Qaseem	Quanta Technology	x	
Fares	Aljajeh	Eaton Corporation	x	
Jedidiah	Bartlett	Schweitzer Engineering Laboratories, Inc	x	
John	Berdner	Enphase	x	Yes
Pankaj	Bhowmik	TAE Power Solutions, Inc.	x	
Jens	Boemer	EPRI	x	Yes
Simon	Boka	EPRI	x	
Rob	Bridges	CenterPoint Energy	x	Yes
Bruce	Campbell	Eaton Corporation	x	
Sean	Carr	ComEd	x	Yes
Andrew	Cifala	Keysight Technologies	x	
Nancy	Connelly	Duke Energy	x	Yes
Jose	Cordova	EPRI	x	Yes
Mamadou	Diong	Dominion Energy	x	Yes
Ben	Ealey	EPRI	x	Yes
Christian	Eder	Fronius USA LLC	x	Yes

Peter	Evans	New Power Technologies Inc.	x	Yes
Jason	Fisher	STC	x	Yes
Bob	Fox	SunSpec Alliance	x	Yes
Daniel	Freeman	Schneider Electric	x	Yes
Haile	Gashaw	Georgia Power Company	x	Yes
Prasanth	Gopalakrishnan	Kalkitech Inc.	x	
Craig	Groeling	Xcel Energy	x	
Luca	Guenzi	Solar Turbines	x	
Amirhossein	Hajimiragha	Schneider Electric	x	
Joseph	Hall	Schneider Electric	x	
Nima	Hejazi	Black & Veatch	x	
Eric	Herman	EPC Power Corp	x	
Mohammad	Huque	EPRI	x	Yes
Andi	Jakupi	Schneider Electric	x	
Anthony	Johnson	Southern California Edison	x	Yes
Harshad	Joshi	Lunar Energy, Inc	x	Yes
Kudrat	Kaur	SunSpec Alliance	x	
Yashar	Kenarangui	Xcel Energy	x	Yes
David	Koll	UL Solutions	x	
Jaime	Kolln	Pacific Northwest National Laboratory	x	
Bruce	Kraemer	Self Employed	x	
Stuart	Laval	Eaton	x	Yes
Eric	Le Coutois	Hydro-Quebec	x	
Thomas	Lee	Derapi	x	Yes
Brian	Lydic	IREC	x	Yes
Jonatan	Malaver	National Grid	x	
Charles	McGaughy	Schneider Electric	x	
Trent	Miller	Duke Energy	x	
Abrez	Mondal	EPRI	x	Yes
Lyman	Morikawa	Morikawa and Associates	x	
Farzam	Nejabatkhah	Eaton Corporation	x	
Kyle	Noss	Schneider Electric	x	
Jason	Page	Xcel Energy	x	Yes
Alexandros	Paspatis	National Technical University of Athens	x	Yes
Marc	Patterson	Idaho Power	x	Yes
Karen	Quackenbush	FCHEA	x	
Michael	Ropp	Sandia National Laboratories	x	
Nachum	Sadan	GridEdge Networks	x	
Guy	Sagy	SolarEdge Technologies	x	
Nicolas	Salazar	NextEra Energy	x	
Janette	Sandberg	Portland General Electric	x	Yes
Joseph	Schafer	FPL	x	Yes
Parag	Shah	Enchanted Rock Electric	x	
Mehrdad	Sheikholeslami	Quanta Technology	x	Yes

Mark	Siira	Power Innovation	x	Yes
Robby	Simpson	DER Security Corp	x	Yes
Glenn	Skutt	Fermata Eneregy	x	
Humayun	Tariq	AEP	x	
Nirmal	Thaliyil	Kalkitech Inc.	x	Yes
Kiran	Thomas	ASE Systems	x	
Brian	Waldron	Schweitzer Engineering Laboratories, Inc	x	
Matthew	Wallace	PPL Corporation	x	
Kevin	Whitener	Portland General Electric	x	Yes
Stephen	Wurmlinger	SMA	x	Yes
Mina	Yousef	NAVFAC	x	

Appendix 2. Meeting Slides

IEEE P1547.10 3RD WORKING GROUP MEETING

RECOMMENDED PRACTICE FOR DER GATEWAY PLATFORMS

ABREZ MONDAL, WG CHAIR
DANIEL FREEMAN, SECRETARY
MIKE KIPNESS, IEEE SA PROGRAM MANAGER

VIRTUAL MEETING
JULY 12, 2023

MEETING GOALS

- Approval of minutes from Houston Working group meeting
- Review PAR and Scope of P1547.10
- Updates on Sub-working group activities
- Review and discuss Sub-working scopes and next activities (may be adjusted later as needed)

USE OF IEEE MYPROJECT AND IMAT

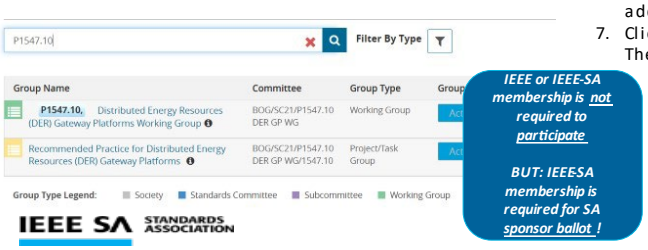
How To Log WG Meeting Attendance via IEEE iMAT?

- Anyone with a (free) IEEE account can sign up at https://development.standards.ieee.org/myhome to receive P1547.10 Working Group updates ("Participant").
- Participants can attend WG meetings and log their attendance via https://imat.ieee.org/

  Pre-requisite to use iMAT: Need to express interest in list on IEEE myProject!
- Once attended 2 of last 4 meetings, ask the Secretary to become "Voting Member" and get iMeet access.
- Only IEEE SA members can ballot P1547.10.

How to *Express Interest in IEEE myProject* to Receive the Invitation to Joint the Ballot Group for IEEE -SA Ballot

1. On the myProject™ Home Screen, click on Menu and then on Manage Profile and Interests.
2. Click on the Interests tab and then on Add Groups.
3. On the Add/Search Interested Groups screen enter "WSPI" into the Search box and click the search button.
4. Click in the Groups I am Interested In column to indicate interest in the applicable group and project.
5. On the Add Interested Group I want to follow screen, indicate if you want to *Participate* or *Follow* the group. Then click Declare Affiliations.
6. On the next screen, confirm your current affiliation and add additional affiliations as necessary.
7. Click Save or Return to Level of Interest to change your selection. Then click OK and then click DONE.

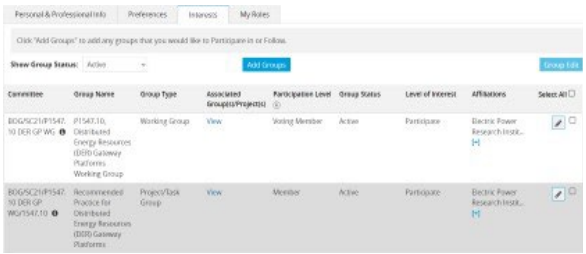


IEEE or IEEE-SA membership is not required to participate

BUT: IEEE-SA membership is required for SA sponsor ballot !

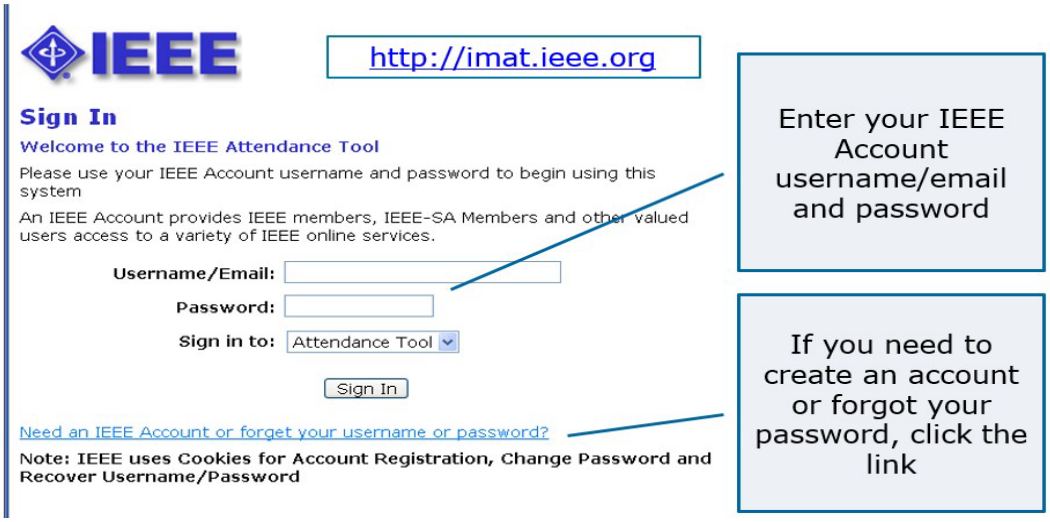
HOW TO CHECK PARTICIPATION LEVEL IN MYPROJECT?

1. **On the myProject™ Home Screen, click on Menu and then on Manage Profile and Interests.**
2. **Click on the Interests tab**
3. **Column "Participation Level" shows your level of involvement based on participation and voting rights as assigned by a group officer/administrator**



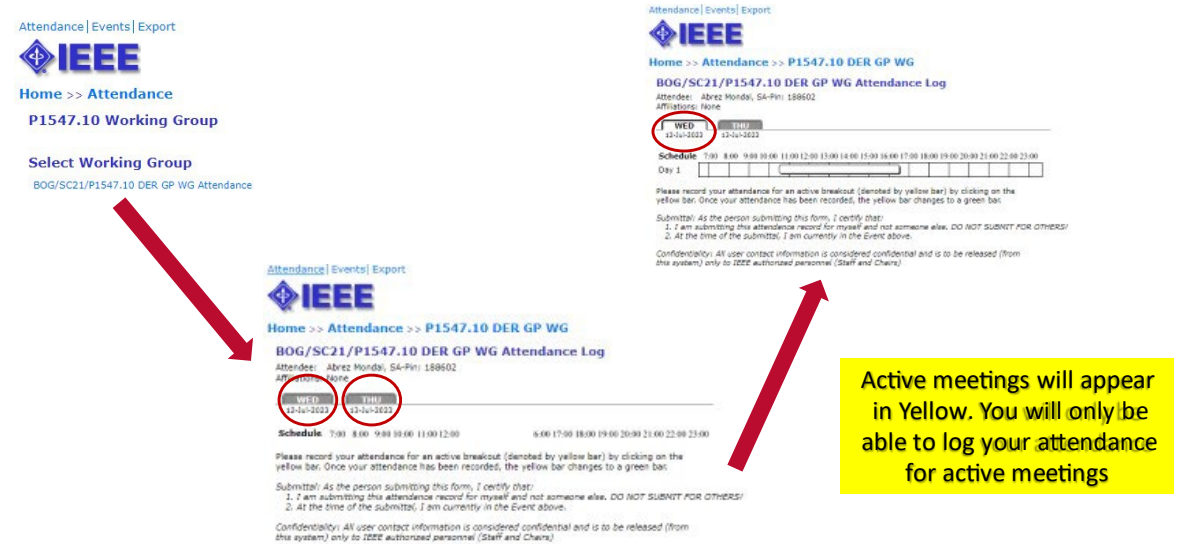
- If your voting rights are not correctly reflected on myProject, send a request to the secretary with your WG meeting attendance record to update the Participation Level
- **Need to be either "Participant" or "Observer" to receive invitation to join the IEEE SA ballot group!!!**
- **Indicating participation here is not equal to joining the ballot pool ➔ extra step.**

SIGN IN TO ATTENDANCE TOOL



SELECT THE MEETING YOU ARE ATTENDING

SELECT WG THEN CLICK TO LOG ATTENDANCE



INTRODUCTIONS

Please enter Name and Affiliation in Chat

IEEE SA
STANDARDS ASSOCIATION

IEEE SA PATENT POLICY

NOVEMBER 2019

IEEE

PARTICIPANTS HAVE A DUTY TO INFORM THE IEEE

- **Participants shall inform the IEEE (or cause the IEEE to be informed) of the identity of each holder of any potential Essential Patent Claims of which they are personally aware if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents**
- **Participants should inform the IEEE (or cause the IEEE to be informed) of the identity of any other holders of potential Essential Patent Claims**
- **Early identification of holders of potential Essential Patent Claims is encouraged**

WAYS TO INFORM IEEE

1. **Cause an LOA to be submitted to the IEEE SA (patcom@ieee.org); or**
2. **Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible; or**
3. **Speak up now and respond to this Call for Potentially Essential Patents**

- **If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair**

OTHER GUIDELINES FOR IEEE WORKING GROUP MEETINGS

- **All IEEE SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**
  - **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**
  - **Don't discuss specific license rates, terms, or conditions.**
    - Relative costs of different technical approaches that include relative costs of patent licensing terms may be discussed in standards development meetings.
      - **Technical considerations remain the primary focus.**
  - **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**
  - **Don't discuss the status or substance of ongoing or threatened litigation.**
  - **Don't be silent if inappropriate topics are discussed. Formally object to the discussion immediately.**

For more details, see *IEEE SA Standards Board Operations Manual*, clause 5.3.10 and *Antitrust and Competition Policy: What You Need to Know* at http://standards.ieee.org/develop/policies/antitrust.pdf

PATENT-RELATED INFORMATION

- The patent policy and the procedures used to execute that policy are documented in the:
  - *IEEE SA Standards Board Bylaws* (http://standards.ieee.org/develop/policies/bylaws/sect6 -7.html#6)
  - *IEEE SA Standards Board Operations Manual* (http://standards.ieee.org/develop/policies/opman/sect6.html#6.3)
- Material about the patent policy is available at *http://standards.ieee.org/about/sasb/patcom/materials.html*
- If you have questions, contact the IEEE SA Standards Board Patent Committee Administrator at patcom@ieee.org

IEEE SA
STANDARDS ASSOCIATION

IEEE SA COPYRIGHT POLICY

NOVEMBER 2019

IEEE SA COPYRIGHT POLICY

By participating in this activity, you agree to comply with the IEEE Code of Ethics, all applicable laws, and all IEEE policies and procedures including, but not limited to, the IEEE SA Copyright Policy.

- Previously Published material (copyright assertion indicated) shall not be presented/submitted to the Working Group nor incorporated into a Working Group draft unless permission is granted.
- Prior to presentation or submission, you shall notify the Working Group Chair of previously Published material and should assist the Chair in obtaining copyright permission acceptable to IEEE SA.
- For material that is not previously Published, IEEE is automatically granted a license to use any material that is presented or submitted.

IEEE SA COPYRIGHT POLICY - LINKS

- The IEEE SA Copyright Policy is described in the IEEE SA Standards Board Bylaws and IEEE SA Standards Board Operations Manual
  - IEEE SA Copyright Policy, see
    Clause 7 of the IEEE SA Standards Board Bylaws
    https://standards.ieee.org/about/policies/bylaws/sect6-7.html#7
    Clause 6.1 of the IEEE SA Standards Board Operations Manual
    https://standards.ieee.org/about/policies/opman/sect6.html
- IEEE SA Copyright Permission
  - https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/permissionltrs.zip
- IEEE SA Copyright FAQs
  - https://standards.ieee.org/faqs/copyrights/
- IEEE SA Best Practices for IEEE Standards Development
  - http://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/best_practices_for_ieee_standards_development_051215.pdf
- Distribution of Draft Standards (see 6.1.3 of the SASB Operations Manual)
  - https://standards.ieee.org/about/policies/opman/sect6.html

PARTICIPANT BEHAVIOR

PARTICIPANT BEHAVIOR IN IEEE-SA ACTIVITIES IS GUIDED BY THE IEEE CODES OF ETHICS & CONDUCT

- **All participants in IEEE-SA activities are expected to adhere to the core principles underlying the:**
  - IEEE Code of Ethics
  - IEEE Code of Conduct
- **The core principles of the IEEE Codes of Ethics & Conduct are to:**
  - *Uphold the highest standards of integrity, responsible behavior, and ethical and professional conduct*
  - *Treat people fairly and with respect, to not engage in harassment, discrimination, or retaliation, and to protect people's privacy.*
  - *Avoid injuring others, their property, reputation, or employment by false or malicious action*
- **The most recent versions of these Codes are available at http://www.ieee.org/about/corporate/governance**

Internal

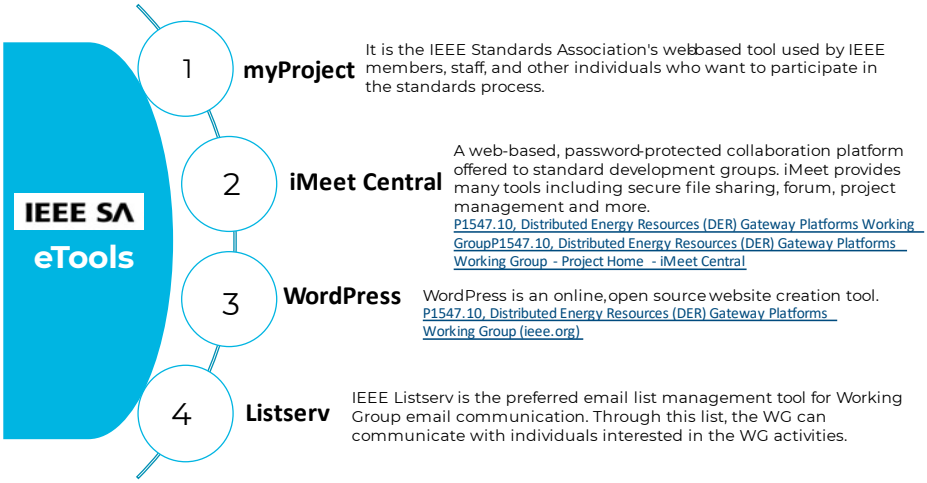
PARTICIPANTS IN THE IEEE-SA "*INDIVIDUAL PROCESS*" SHALL ACT INDEPENDENTLY OF OTHERS, INCLUDING EMPLOYERS

- **The IEEE-SA Standards Board Bylaws require that "*participants in the IEEE standards development individual process shall act based on their qualifications and experience*"**
- **This means participants:**
  - **Shall act & vote** based on their personal & independent opinions derived from their expertise, knowledge, and qualifications
  - **Shall not act or vote** based on any obligation to or any direction from any other person or organization, including an employer or client, regardless of any external commitments, agreements, contracts, or orders
  - **Shall not direct** the actions or votes of other participants or retaliate against other participants for fulfilling their responsibility to act & vote based on their personal & independently developed opinions
- **By participating in standards activities using the "*individual process*", you are deemed to accept these requirements; if you are unable to satisfy these requirements then you shall immediately cease any participation**

IEEE-SA STANDARDS ACTIVITIES SHALL ALLOW THE FAIR & EQUITABLE CONSIDERATION OF ALL VIEWPOINTS

- **The IEEE-SA Standards Board Bylaws (clause 5.2.1.3) specifies that "*the standards development process shall not be dominated by any single interest category, individual, or organization*"**
  - **This means no participant may exercise "*authority, leadership, or influence by reason of superior leverage, strength, or representation to the exclusion of fair and equitable consideration of other viewpoints*" or "*to hinder the progress of the standards development activity*"**
- **This rule applies equally to those participating in a standards development project and to that project's leadership group**
- **Any person who reasonably suspects that dominance is occurring in a standards development project is encouraged to bring the issue to the attention of the Standards Committee or the project's IEEE-SA Program Manager**

ETOOLS



QUORUM

- Quorum shall be defined as **10% of the current total voting membership** or 26, whichever is greater.

APPROVAL OF AGENDA

Wednesday 7/12/23: 10:30AM– 4:30PM ET		
10:30-10:50am	Welcome, roll call, meeting goals, IEEE policies and procedures	Chair
10:50-11:00am	Quorum check, Approval of agenda, Approval of minutes from April 2023 WG	Chair
11:00am-12:30pm	Subgroup 1 - Overall Document and General Requirements update/discussion	SG 1 Lead and Facilitators
12:30pm-1:30pm	Lunch	
1:30pm-3:00pm	Subgroup 2 - DER Grid-Edge Intelligence Functions update/discussions	SG 2 Lead and Facilitators
3:00pm-4:30pm	Subgroup 4 - Communications discussions	SG 4 Lead and Facilitators
4:30pm	Closing for the day	

Thursday 7/13/23: 10:30AM – 12:30PM ET		
10:30am-10:45am	Welcome, Call to order, Recap of day 1	Chair
10:45am-12:15pm	Subgroup 3 – Security Functions update/discussion	SG 3 Lead and Facilitators
12:15pm-12:30pm	Future Meetings	Chair
12:30pm	Adjourn	

APPROVAL OF MINUTES FROM SECOND WG MEETING AT HOUSTON, TX

Draft meeting minutes and post -meeting slides available at:

P1547.10, Distributed Energy Resources (DER) Gateway Platforms Working GroupP1547.10, Distributed Energy Resources (DER) Gateway Platforms Working Group - Files & Discussions - iMeet Central

SUB-GROUP 1 : OVERALL DOCUMENT AND GENERAL REQUIREMENTS

Overview

Sub-Group : **Overall Document and General Requirements**

Sub-Group Lead : **Abrez Mondal**
Sub-Group Facilitator :**Daniel Freeman**

Sub-Group Mailing List:STDS-P1547-10-SG1@LISTSERV.IEEE.ORG

Click here to sign up for SG1listserver

iMeet Folder Link :https://ieee-sa.imeetcentral.com/p/ZgAAAAAA_Nuj

Sub-Group meets monthly on first Friday at 12:30pm EDT/ 10:00-11:30am PDT

IMPORTANT NOTES

- **1547.10 is a recommended practice**
- **1547.10 is dedicated to DER Gateways, and not on interconnection requirements**
- **December 2024 – Project completion goal**

PAR SCOPE

5.2 Scope of proposed standard: This document defines recommended specifications for a Distributed Energy Resources (DER) gateway platform in grid applications across various domains. A description of DER gateway implementation options (local or distributed platform, for legacy or intelligent DERs) is included. Gateway platform functions and communications, including operational procedures and data collection recommendations are described. Recommended procedures for cybersecurity, centralized manageability, monitoring, grid edge intelligence and control, multiple entities management, error detection and mitigation, events tracking and notification, communication protocol translation, and communication network performance monitoring are also described.

5.4 Purpose: The purpose of the project is to create and maintain coherency between P1547/.x, P2030/.x, and other related projects for DER and Distributed Energy Resources Management Systems (DERMS) within the evolving smart grid interoperability reference model (SGIRM) with a focus on Distributed Energy Resources (DER) Gateway Platforms. The recommended practice enables utilities deploying DERMS and other DER integration systems to integrate DER with grid edge intelligence, while DER devices serve their core functions focusing on simplicity, interoperability, and long-term stability.

5.5 Need for the Project: The smart inverter functionalities specified in IEEE 1547-2018, and the associated communication interfaces are not suitable for direct integration with the monitoring and control systems of grid operators. The standard inverter functionalities were designed only to expose the raw, inherent capabilities of the DER, but (intentionally) omitted additional logic or management features because these were believed to vary by utility and region. This gap can be addressed by deploying a DER gateway platform with a range of grid edge-intelligence functions that provides opportunities to improve system functionality as grid needs evolve over time.

PAR EXAMPLE FUNCTIONS

The following provides some example functions for each of the DER Gateway functional categories listed in section 5.2 (Scope of the proposed standard):
FUNCTIONAL CATEGORY: Example Function(s)
* CYBERSECURITY: Transport Layer Security (TLS), Role Based Access Control (RBAC)
* CENTRALIZED MANAGEABILITY: Firmware management, Upgradeability
* MONITORING: Real time status monitoring, Report by exception, Interval data, Lost energy calculation

* GRID-EDGE INTELLIGENCE AND CONTROL: Recurring schedules, New and transparent smart inverter functions handling, Advanced notification and synchronized actions, Smart inverter function implementation for legacy DER, Availability at night and during outages
* MULTIPLE ENTITIES MANAGEMENT: DER providing grid services to multiple entities (local utility, ISO etc.), Command prioritization
* ERROR DETECTION AND MITIGATION: Report unexpected DER settings change, Loss of communication detection and reversion to defaults
* EVENTS TRACKING AND NOTIFICATION: Events and alarms logging and retrieval, Supervision of voltage sags
* COMMUNICATION PROTOCOL TRANSLATION: Translation of messages between DER and upstream managing entity
* COMMUNICATION NETWORK PERFORMANCE MONITORING: Network diagnostics such as detection of packet loss, latency, errors etc.

SUB-GROUP 1

Priority Scope Items

- Define DER Gateway
- Provide guiderails on the DER Gateway functionalities
  - Minimum recommended vs. advanced
  - Differentiate from plant controllers and other devices
- Provide guidance on what is in and out of scope to all SG's.
- Consolidate definitions from existing standards to use
- Provide strawman for the standard document

SOME EXISTING DEFINITIONS

- Distributed Energy Resource (DER) ** IEEE 1547-2018

A source of electric power that is not directly connected to a bulk power system. DER includes both generators and energy storage technologies capable of exporting active power to an EPS. An interconnection system or a supplemental DER device that is necessary for compliance with this standard is part of a DER.

Controllable loads used for demand response are not included in the definition of DER ** IEEE 1547.1-2020

- Plant Controller ** IEEE 1547.1-2020

A control system that manages and commands other devices in the DER system or DER composite, including the DER units and any supplemental DER devices, as well as collects measurement and status information of the aggregated DER units and other supplemental DER devices. The plant controller may function as the DER's interoperability interface. The plant controller may also perform any of the IEEE 1547 control functions as designed by the DER operator. Also referred to as system controller or master controller.

- DER Unit ** IEEE 1547.1-2020

A fully compliant DER that does not require supplemental DER devices to meet the requirements of IEEE Std 1547.

- DER System ** IEEE 1547.1-2020

A system that consists of DER unit(s) and supplemental DER device(s) that is type tested as a system and installed in accordance with the DER manufacturer's instructions and that, as a whole, is fully compliant with IEEE Std 1547.

- DER Composite ** IEEE 1547.1-2020

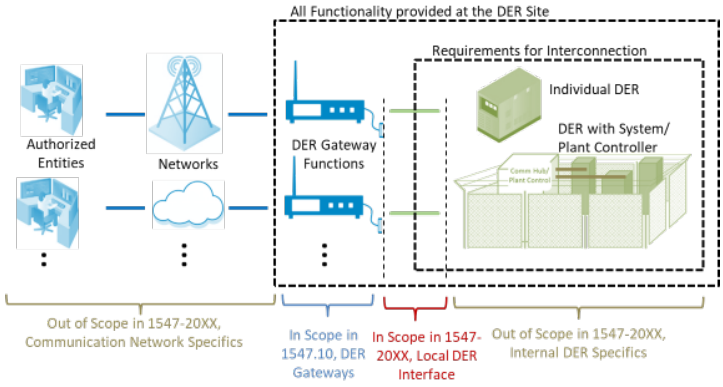
A system that consists of partially compliant DER components and supplemental DER device(s), and requires detailed design evaluation, installation evaluation, and commissioning tests to determine full compliance to IEEE Std 1547 requirements.

- Supplemental DER Device ** IEEE 1547.1-2020

Any equipment that is used to obtain compliance with some or all of the interconnection requirements of this standard.

DEFINING THE DER GATEWAY

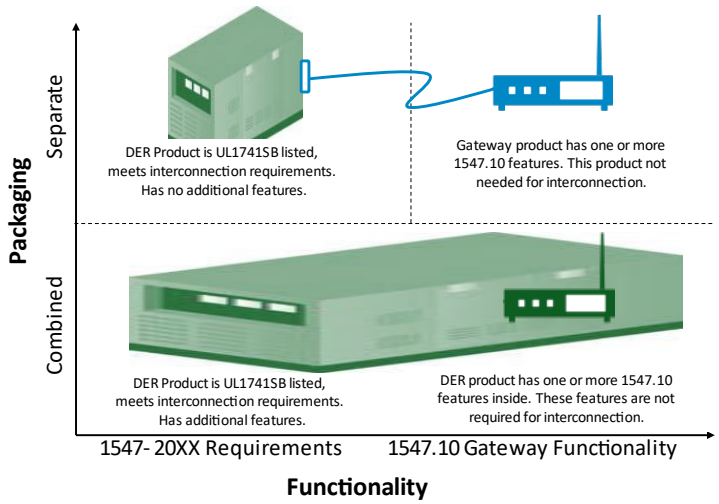
A DER Gateway is a set of advanced functions such as intelligence, monitoring, control, protocol translation and cybersecurity at the grid-edge, that augments IEEE 1547.



DER (as interconnected)

DER monitoring and management (subsequently deployed)

DER GATEWAY AND THE DER



SUB-GROUP 2

Overview

Sub-Group : **DER Grid-Intelligence Functions in Gateways**

Sub-Group Lead : **Yashar Kenarangui**
Sub-Group Facilitators : **Brian Waldron, Jedidiah Bartlett**

Sub-Group Mailing List: STDS-P1547-10-SG2@LISTSERV.IEEE.ORG

Click here to sign up for SG2listserver

iMeet Folder Link : https://ieee-sa.imeetcentral.com/p/ZgAAAAAA_Nul

AGENDA

July, 2023

- Previous Sub group 2 meeting summaries
- Future Sub group 2 meeting plans

REVIEW – MAY 2023 SUB GROUP 2 MEETING

- **Covered initial suggested function topics from prior 1547.10 meeting**
- **Solicited feedback for additional standards documents gateway functions may interact with**

- IEEE 1547
- IEEE 1547.1
- IEEE 1686
- 1815.2 DER profile
- 61850-7-420 DER profile
- IEEE 1547.3
- UL 1741 SA, SB, SC
- IEEE P2688
- IEEE 2030.5
- UL 5500
- IEC 62351-8 RBAC
- EN – 5049-10

REVIEW – JUNE 2023 SUB GROUP 2 MEETING

Facilitators proposed following questions for feedback:

Are all agents that interact with the gateway managing entities?

Managing entities definition from IEEE 1547 " distributed energy resource managing entity (DER Managing Entity): An entity that monitors and manages the DER through the local DER communication interface. The DER managing entity could be for example a utility, an aggregator, a building energy management system, or other. "

Various feedback on management aspect of the various actors that interact with a gateway. Would be beneficial to have a list of stake holders and their need for data access for various functions

How should reconciliation of multiple managing entities work? For example for schedules or export limits.

Various feedback and discussion on distinction between gateway and plant controller. Good comment on resolving schedules covered in IEEE 2030.5

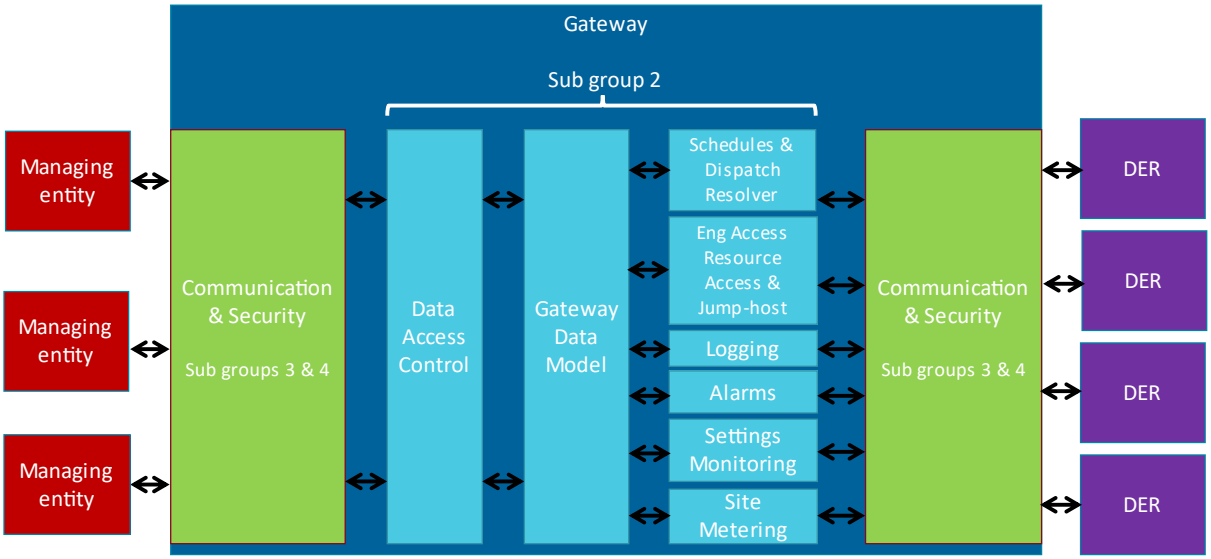
Lots of discussion on data access and who should have the ability to view/read/write data between functions

FUTURE SUB GROUP 2 MEETING TOPICS

- **Definition of Gateway is focusing around functions which expand/enhance functionality described in IEEE 1547**
- **Will start to focus on the high level functions listed in IEEE 1547 and collect feedback on how those functions can be enhanced with a gateway**
- **Will consider the placement of the gateway and how that may affect the function. Ie cloud based or physically on site.**

FUTURE SUB GROUP 2 MEETING TOPICS

Picture purely for conversation visual about list of potential 1547.10 listed functions



Internal

SUB-GROUP 4

Overview

Sub-Group : **Communications**

Sub-Group Lead : **Yashar Kenarangui**
Sub-Group Facilitators :**Galina Antonova, Fares al Jajeh**

Sub-Group Mailing List:STDS-P1547-10-SG4@LISTSERV.IEEE.ORG

Click here to sign up for SG4listserver

iMeet Folder Link :https://ieee-sa.imeetcentral.com/p/ZgAAAAAA_Nun

Sub-Group meets monthly on first Thursday, 9am -10:30am EDT, noon-1:30pm PDT

Internal

SUB-GROUP 4: COMMUNICATIONS

Discussion topics

1. **DER definition**
   Assuming 1547-2018 definition, and tracking 1547 revision work for any changes, e.g., if loads are included

2. **Gateway definition**
   Reviewed, proposed and discussed multiple to assist reaching a consensus

3. **DER Information model**
   Discussion is needed on whether this is in 1547.10 SG4 scope or is covered by other 1547 or 1547.10 Sub-Group(s).

SUB-GROUP 4: COMMUNICATIONS

Discussion topics

4. **Local DER com protocols**
   Were briefly presented updates to Table 41, proposed by 1547 SG4. Coordination and commenting is encouraged as input to 1547 revision.

   4a. Legacy local DER com protocols
   Adding support for legacy local DER com protocols to be discussed.

5. **Network com protocols**
   Discussions evolved around not limiting network/cloud side com protocols

6. **Protocols conversion**
   A classical gateway feature that belongs to 1547.10 SG4 scope. Work on drafting could start once protocols to be converted to/from are clarified.

SUB-GROUP 4: COMMUNICATIONS

Discussion topics

7. **Local DER protocols mapping**
   Should mapping between local DER protocols be provided ? How does this relate to information model(s) and protocol conversion ? To be discussed.

8. **Com performance requirements**
   Consider input to 1547 revision on expanding/clarifying com performance requirements

9. **Interoperability**
   Consider input to 1547 revision on content on 1547 clause 10

10. **Com performance monitoring**
    Appears to be in this SG scope. Details to be discussed, material could be drafted.

SUB-GROUP 4: COMMUNICATIONS

Discussion topics

11. **Network management**
    Consider input to 1547 Clause 10 revision or material in 1547.10 ?

12. **Com testing**
    Appears to be in this SG scope. Details to be discussed, material can be drafted.

13. **Informative Annexes**
    Consider covering examples of protocol conversion with different com requirements

Special considerations: an educational SG4 session was suggested on protocols, information models and mappings. Content details and schedule to be discussed

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CLOSING FOR THE DAY

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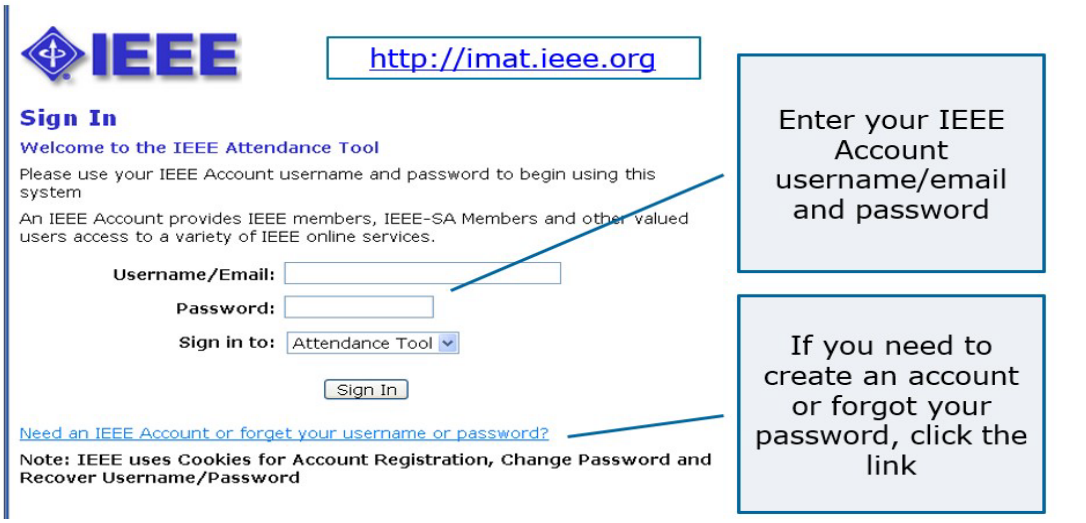
TODAY'S AGENDA

Thursday 7/13/23: 10:30AM – 12:30PM ET		
10:30am-10:45am	Welcome, Call to order, Recap of day 1	Chair
10:45am-12:15pm	Subgroup 3 – Security Functions update/discussion	SG 3 Lead and Facilitators
12:15pm-12:30pm	Future Meetings	Chair
12:30pm	Adjourn	

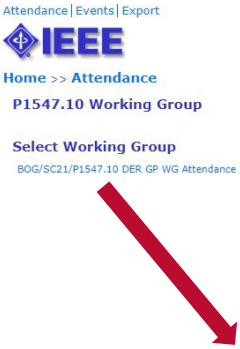
SIGN IN TO ATTENDANCE TOOL

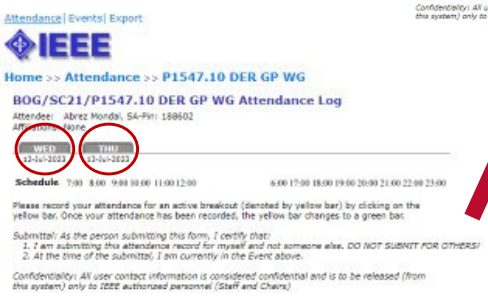


SELECT THE MEETING YOU ARE ATTENDING

Look under Active Meetings

SELECT WG THEN CLICK TO LOG ATTENDANCE





Active meetings will appear in Yellow. You will only be able to log your attendance for active meetings

SUB-GROUP 3

Overview

Sub-Group : **Security Functions in Gateways**

Sub-Group Lead : **John Berdner**
Sub-Group Facilitators : **Prasanth Gopalakrishnan, Kiran Thomas**
Sub-Group Mailing List: STDS-P1547-10-SG3@LISTSERV.IEEE.ORG

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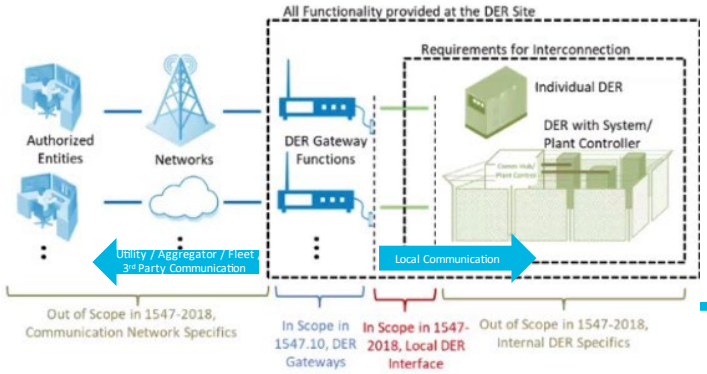
SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

UPDATES FROM SUBGROUP

- **Subgroup meets on the last Thursday of every month.**
- **Held two meetings – May, June**
- **Progress so far:**
  - **High level Gateway Security Objectives**
  - **High level Gateway use cases.**
  - **Add additional use cases based on work from other sub-groups.**
  - **Started reaching out with other working groups within IEEE 1547Rev/CPUC+NREL efforts.**

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

GATEWAY SECURITY OBJECTIVE DISCUSSION AREAS

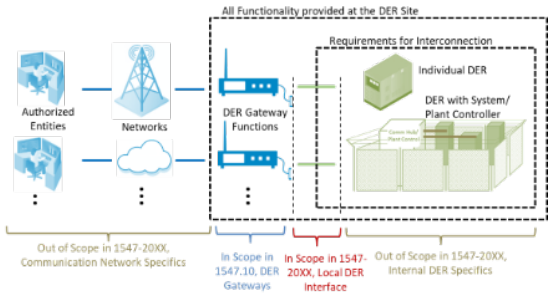


Secure communications to the DER site

- Communication to Authorized Entities
- Communication to DER Local Interface

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

GATEWAY SECURITY OBJECTIVE DISCUSSION AREAS

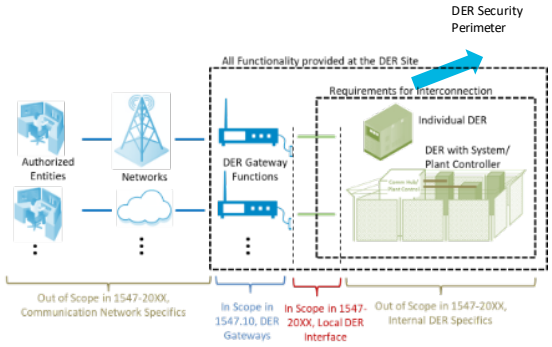


Advanced Security Functions in the DER Gateway

- Firewall support. Need to define the firewall feature support.
- Security Logs of itself and covered DER equipment's at the DER site.

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

GATEWAY SECURITY OBJECTIVE DISCUSSION AREAS

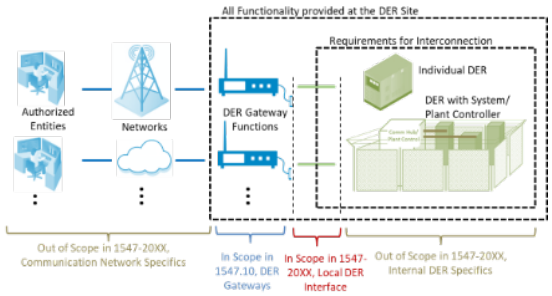


Secure access to the DER Site

- Secure access to the DER perimeter. Need to define perimeter of a DER site.
- Secure access to the DER equipment. Need to define covered DER equipment's
- Secure access to the data (In transit and at rest)

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

GATEWAY SECURITY OBJECTIVE DISCUSSION AREAS



Secure the gateway functions

- Physical Security
- Securing Local access
- Securing access over communication network
- Securing the firmware and applications of Gateway Functions

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

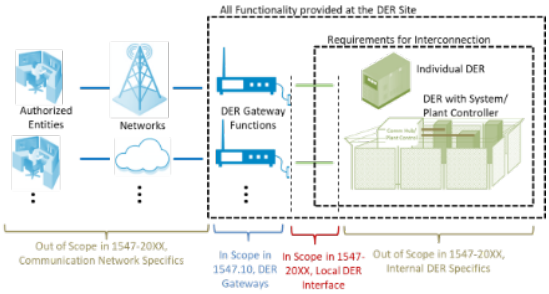
GATEWAY USE CASES/INTERACTION SCENARIOS

Secure Communication to Authorized Entities
- Communication for grid operations / Utility interface
- Communication for OEM Fleet Management
- Communication for VPP / Aggregator / Markets
- Additional Entities (from discussions or outcomes of other Subgroups)

Secure Communication to Local DER Interface
- Communication interface for Inverters, PCS, Meters
- Communication interface for Battery Controller, BESS
- Communication interface for Local EMS, Equipment Gateway, Meters, Weather Sensors

Secure Operational Management Access
- Communication for Management Interface of Gateway / DER
- Communication interface for configuration and settings update for DER.
- Communication for authorized 3rd parties to support & troubleshoot for limited duration

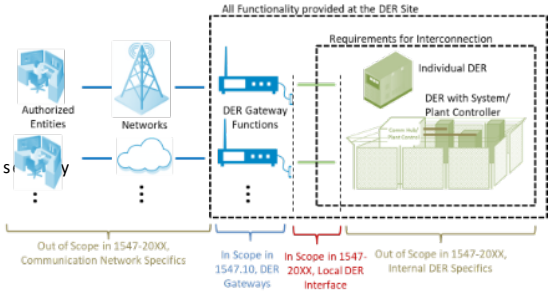
Secure Local Perimeter
- Perimeter Security for DER Asset comms that the Gateway is responsible for
- Communication Gateway to the DER – (All comms go through the gateway)
- Security Gateway – DER asset security, including Identity, Access management and Encryption of all data that flow Northbound.



SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

GATEWAY USE CASES/INTERACTION SCENARIOS

- **Logging of security events**
  - Log management of itself and other DER assets that share logs
- **Securing Commissioning Access**
  - Commissioning access
  - Commissioning change management and logs
  - Securing the Gateway post commissioning including physical / logical s[illegible]y
  - As is commissioning configuration / image storage
- **Securing Manufacturing Device Provisioning**
  - Securing the device
  - Securing the firmware and certificates/keys.
  - Uniquely identifying the device
- **Securing Supply Chain**
  - Software BOM
  - Securing component supply chain



SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

ENTITY DISCUSSION – SECURITY CONSIDERATION

In the SG3 group, what we are trying to do is to consider all possible managing entities, entities requiring access (selective) and ensuring that we are defining the security requirements for them. On the Roles /Responsibilities, the idea is to use RBAC (with fine grained permissions), that a llows specific entities and actors within entities, specific fine grained access permissions.

For eg: A C& I DER participating in ISO market, Utility DSO emergency ancillary services, Utility Telemetry and with Battery / PV Vendor remote access for maintenance and Optimization provider handling Battery + PV + Load optimization could have the following actors & use-cases having some level of access / control / telemetry:

Actors
- ISO
- DSO
- Optimization Service Provider
- DER equipment Vendor
- Aggregators
- Developer
- Owner

Use Cases
- Utility Ancillary Services
- Utility SCADA Telemetry
- C&I RemoteManagement
- PV/Battery/Load Optimization

So – all these entities will access the DER in different capacities to deliver different services or to perform different contrds.

The thought process is – each of these entities will have specified roles / permissions to access the DER – and will be allowed / permitted by the OWNER (Or owner approved Managing entity) secure access. The OWNER (directly or through a managing entity) share / provide access to entities above for limited time or permanently based on contractual requirements.

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

NEXT STEPS

- **Review/expand use-cases.**
- **Draw Upon the Recommendations of IEEE 1547.3**
  - Our approach is to consider IEEE 1547.3 Guide recommendations as starting point and select sections that will be applicable to the Gateway / DER Site.
  - IEEE 1547.3 provides recommendations on
    - Risk Assessment/Management
    - Communication Network Engineering
    - Access Control
    - Data Security
    - Security Management .
  - Pick recommendations that is relevant to the DER gateway. For Example:

1547.3	1547.10 Security recommendation for comments / feedback
NE-27. Workstation or DER device security logs are enabled and stored .	DER Gateway should enable and store device security Logs. DER Gateway should support collecting and storing security Logs of DER equipment if they are made available over a standard syslog service [RFC 5424] or equivalent

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

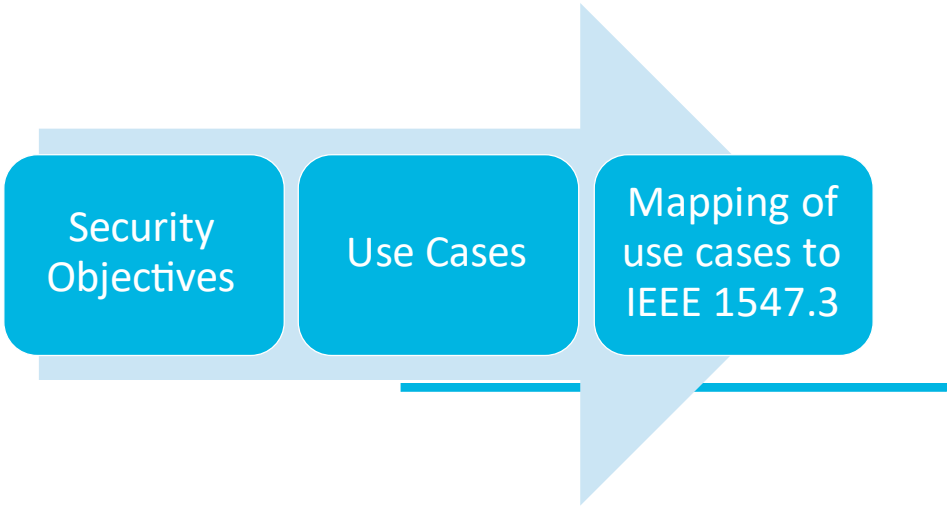
NEXT STEPS

- Pick recommendations that is relevant to the DER gateway Contd:

1547.3	1547.10 Security recommendation for comments / feedback
NE-20: The types of communication protocols and ports are limited to the minimum set required for functional operations.	The DER Gateway should limit the communication protocols and ports to minimum set required for its functional operation
NE-37. Equipment requires unique username and password, programmed on commissioning.	The DER Gateway should have unique username and password, programmed on commissioning. The password should be unique and not same across multiple sites.
AC-3: User accountability and nonrepudiation – User actions are logged so events can be traced, timesynchronized with other events, and/or audited.	The DER Gateway should log User actions so events can be traced, time - synchronized with other events, and/or audited.
AC-19: Role-Based Access Control (RBAC) is supported for all interactions between users, systems, software applications, and devices.	The DER Gateway should support Role -Based Access Control (RBAC). RBAC should be supported for all interactions between users, systems, software applications, and devices. The DER Gateway RBAC should have fine grained attributes to ensure access permissions for different entities can be assigned individually and for specific actions (write / read / control / firmware updates / security updates / log upload etc.,)
DS-12 TLS v1.3 is used where practical, as specified in IEC 62351 recognizing that some installations may still need to use TLS 1.2.	The DER Gateway to Entity communication is encrypted using TLS v 1.3 or above. The DER Gateway should support the latest version of TLS that is released.
DS-13 X.509v3 digital certificates are used as specified in IEC 62351.	The DER Gateway should support digital certificates as specified in IEC 62351 -9

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

APPROACH



SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

NEXT STEPS

- **Based on all possible / Potential Gateway use cases and Entity interactions (Actor Interactions), develop security requirements. Narrow it down based on SG1/SG2/ SG4 outcomes.**
- **Review existing standards and compare / contrast or adopt relevant details to add or augment 1547.3 recommendations**
  - IEEE 1686
  - IEC 62351
  - IEC 62443
  - UL 5500
  - UL 2941

- **Explore avenues of collaboration**
  - Potential for collaborative work exists - IEEE 1547-Rev Subgroup, CPUC (SIOWG-CS) / NREL efforts.

DISCUSSIONS ON DER GATEWAYS

- DER Gateway is not part of the interconnection requirements for a DER
- DER Gateway is functionally (need not be hardware) located past the local interface, as per interconnection requirements, and connects to the local interface defined in IEEE 1547
- DER Gateway is deployed as a part of DER management systems to connect to DERs of different vintages (latest 1547 -20XX conforming ones and legacy ones interconnected prior)

- Will use definitions provided in 1547 -2018 for reference
- Use the latest DER gateway definition for other SG activities (may be refined)
- Will start defining functionalities and where should it reside (probably as a matrix/ updated diagram)
- For communications, have a focus on data models and begin with protocols in 1547 -2018
- Risk/ threat analysis may be useful to determine cybersecurity

IEEE P1547.10 WORKING GROUP
PLANNING OF FUTURE MEETINGS

Proposal for full WG meetings in 2023 following July Meeting:

3rd Full WG meeting in in Wilsonville, OR – Fall 2023
- To be hosted by PGE – Kevin Whitener (Point of Contact)
- Dates: Oct 25, 2023 – Confirmed
- Joint WG Meetings (P1547 Rev, P1547.10, P1547.4, P1547.1a)

Proposal for full WG meetings in 2024:

1st Full WG meeting – Hybrid / FULLY VIRTUAL ? (Pending Final Decision)
- Dates: March 4-8, 2024
- Alternative Date: March 11-15, 2024
- Joint WG Meetings (P1547 Rev, P1547.10, P1547.4, P1547.1a, etc.)

2nd Full WG meeting in Andover, MA – Summer 2024 ? (Tentative)
- To be hosted by Schneider Electric - Dan Sabin is POC (To be confirmed)
- Proposed dates and time for future (full) WG meeting: identification of potential conflicts in Summer of 2024
- Joint WG Meetings (P1547 Rev, P1547.10, P1547.4, P1547.1a, etc.)

3rd Full WG meeting in Atlanta, GA / MidWest – Fall 2024 (Tentative)
- To be hosted by NERC / TBD – (To be confirmed)
- Proposed dates and time for future (full) WG meeting: identification of potential conflicts in Fall of 2024
- Joint WG Meetings (P1547 Rev, P1547.10, P1547.4, P1547.1a, etc.)

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MEETING ADJOURNED

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