



SunSpec Express Test™ Program Launch

Feb 14, 2024

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Agenda

- IEEE 1547-2018 interoperability challenge
- Introducing SunSpec Express Test
- DERSec LabTest demonstration
- SunSpec Express Test logistics and costs
- Q&A

IEEE 1547-2018 Interoperability Challenge

- SunSpec Modbus is a “communication protocol option” specified and required by the IEEE 1547-2018 standard
 - Interconnection standards for US and Canada
 - SunSpec Alliance is the “normative reference” in IEEE 1547
- SunSpec Modbus has seen widespread adoption
 - ~80% of UL 1741 SB listed products use the SunSpec Interface
- Poor compliance with SunSpec interface requirements has resulted in low interoperability, high integration costs, and disappointed customers

Table 41—Standard communication protocol options

IEEE Std 1547-2018 protocol option	Required version/revision
IEEE Std 2030.5™	This protocol option shall refer to IEEE Std 2030.5-2018.
IEEE Std 1815™ (DNP3)	This protocol option shall refer to IEEE Std 1815-2012 and DNP3-AN-2018-001.
SunSpec Modbus ^a	This protocol option addresses revisioning through new information model numbers and shall refer to the specific models called out in 6.8.1.

^a The SunSpec Alliance manages the SunSpec Modbus specification.

IEEE 1547.1-2020 Communication Protocol Options

A Grid Operator...

- Reports widespread problems with SunSpec Interfaces for DER products sold in the U.S.
- Just some of the issues
 - Mandatory functions are inoperable
 - Incorrect power factor sign convention
 - No reactive power measurement
 - Incorrect precision on some points (i.e., badly selected scale factors)
 - No support for single and multiple register writes
 - Broadcast does not work for serial devices
 - Use of input registers, not holding registers
 - Incorrect endianness (i.e. read message left-to-right or right-to-left)
 - No local communication interface of any kind
- Nine vendors and 107 product models evaluated to date

SunSpec Express Test: A Practical Solution

- Eliminates DER communication interoperability problems
- Removes a major bottleneck in the UL 1741 SB test regime
- Enhances product quality and user experience
- What it includes
 - SunSpec Modbus implementation training
 - DERSec LabTest Plus for development and pre-testing
 - SunSpec Express Test service
 - SunSpec Modbus for IEEE 1547 Certification



SunSpec Modbus for IEEE 1547 Requirements & Resources



- Implement SunSpec models 1 + 701-712
- Pass SunSpec device-level tests
 - DEV-1 General Discovery
 - DEV-2 Model 1 Support
 - RTU-1 – RTU Interface
 - RTU-2 – Baud Rate
 - RTU-3 – Partial Request
 - TCP-1 – TCP Interface
 - TCP-2 – Partial Request
 - TCP-3 – Multiple TCP Packets
- Pass SunSpec model-level tests
 - MOD-1 Model Implementation
 - MOD-2 Model Read
 - MOD-3 Point Write
 - CRV-1 Curve 1
 - CRV-2 Apply Settings
 - CRV-3 Apply Settings Error
 - REV-1 Reversion Timeout
 - REV-2 Reversion Time Update
 - REV-3 Reversion Cancel

SunSpec Conformance Test Procedures and Reporting Requirements

Version: 1.0
Status: Draft

SunSpec Modbus Conformance Test Procedures Results Reporting
SunSpec Specification



Abstract
This document specifies the contents and format of SunSpec Modbus Test report format. SunSpec Modbus certification testing partners are required to use SunSpec in this format.




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Status: Approved
Version: 1.1

SunSpec Modbus Conformance Test Procedures
SunSpec Specification

Version: 1.0

SunSpec Modbus IEEE 1547-2018 Profile Specification and Implementation Guide
SunSpec Profile Specification



Abstract
This document describes considerations for SunSpec Modbus IEEE 1547-2018 Profile implementations.

sunspec.org

DERSec LabTest Plus For Development & Pre-Test

- A member of the DERSec LabTest family
- Automated testing for SunSpec Modbus protocol compliance*
- The engine driving the SunSpec Express Test solution

* Includes DERSec IEEE 1547 DER Simulator



DERsec
LABTEST
PRO



DERsec
LABTEST
PLUS



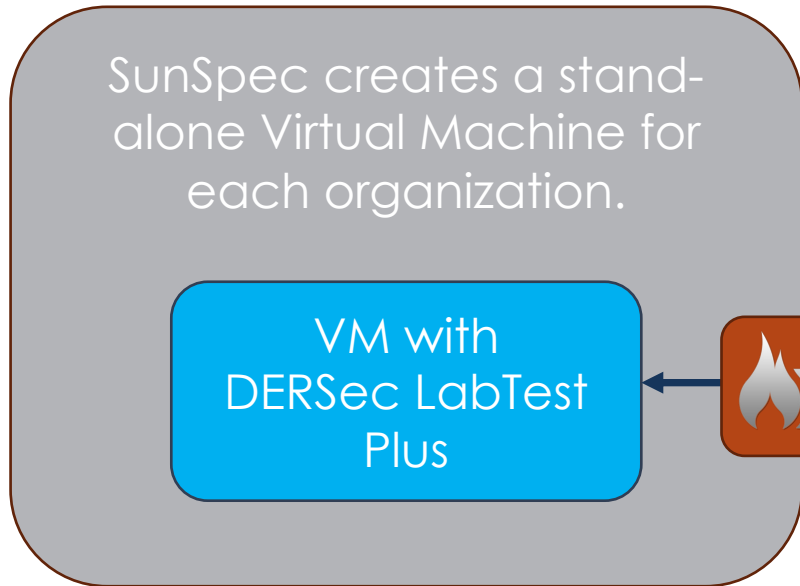
SUNSPEC
DASHBOARD
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DERSec LabTest Plus DEMO

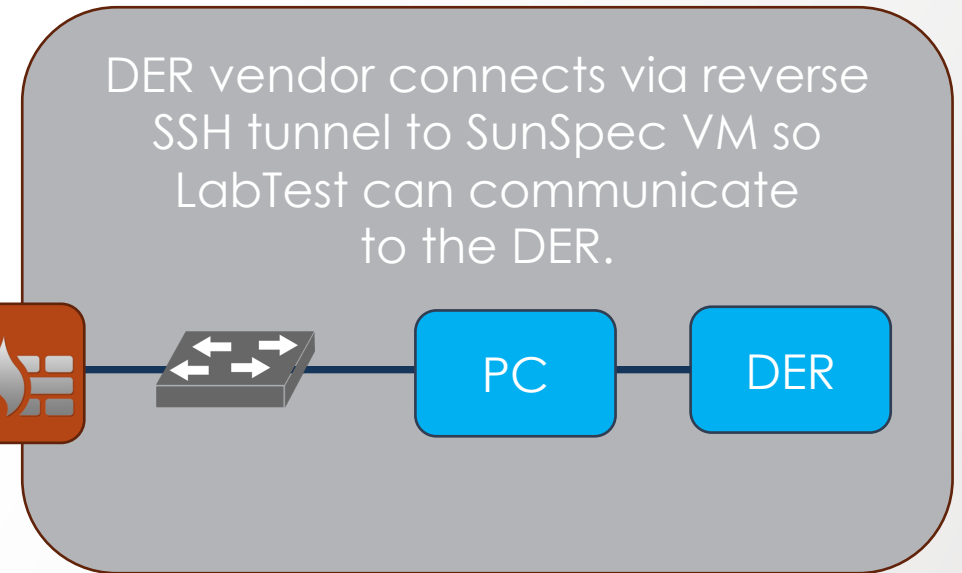
SunSpec Express Test Methodology

SunSpec



After testing, results will be captured and the VM will be destroyed.

DER Vendor



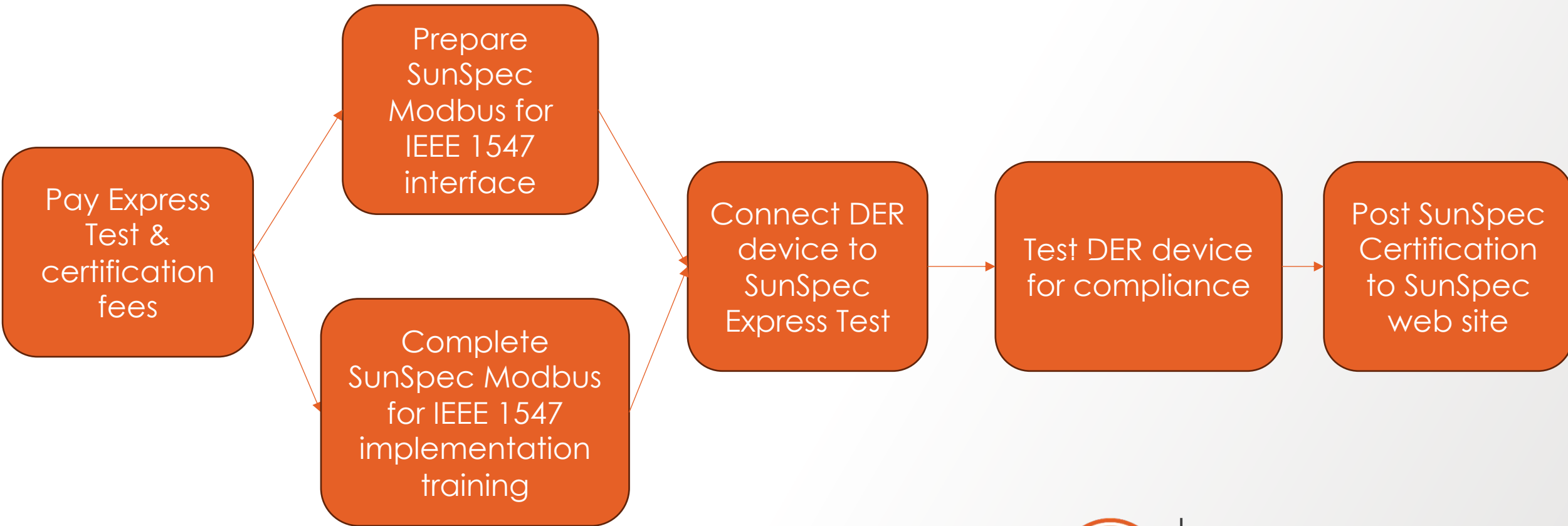
Port forwarding allows LabTest Plus to communicate Modbus to the DER.

Focus on security, privacy, and accuracy



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EXPRESS TEST

How To Engage With SunSpec Express Test



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EXPRESS TEST

SunSpec Express Test Cost

- SunSpec Certification: \$5,000/one time for SunSpec members
 - \$10,000 for non-members
 - Lifetime listing
 - Up to three recertifications included in first year
- SunSpec Express Test: \$5,000/one time
 - Pre-certification consultation
 - SunSpec Modbus for IEEE 1547 testing
 - Includes up to three rounds of testing to be completed in 12 months
- DERSec LabTest Plus: \$9,999/year for SunSpec members
 - \$14,999 for non-members
 - Includes all updates during term of service



DERsec
LABTEST
PLUS

+



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EXPRESS TEST

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SunSpec Modbus
for IEEE 1547
CERTIFIED



Q&A

Certification Tests

- SunSpec tests for IEEE 1547 compliance

Model	MOD-1 (Model Implementation)	MOD-2 (Read)	MOD-3 (Write)	Curve Tests (CRV-1, CRV-2, CRV-3)	Reversion Tests (REV-1, REV-2, REV-3)
1	x	x	x		
701	x	x			
702	x	x	x		
703	x	x	x		
704	x	x	x		x
705	x	x	x	x	x
706	x	x	x	x	x
707	x	x	x	x	
708	x	x	x	x	
709	x	x	x	x	
710	x	x	x	x	
711	x	x	x	x	x
712	x	x	x		x

- Suggested expansion of SunSpec conformance test requirements
 - Verify all IEEE 1547.1 required points are implemented in the products
 - Verify scale factors provide the appropriate precision and ranges of adjustability
 - Validate devices reject undefined enum and bitfield writes
 - Modbus.org requirements tests, e.g., checks for serial Broadcast functionality