DNP3 and SunSpec

Two nerds

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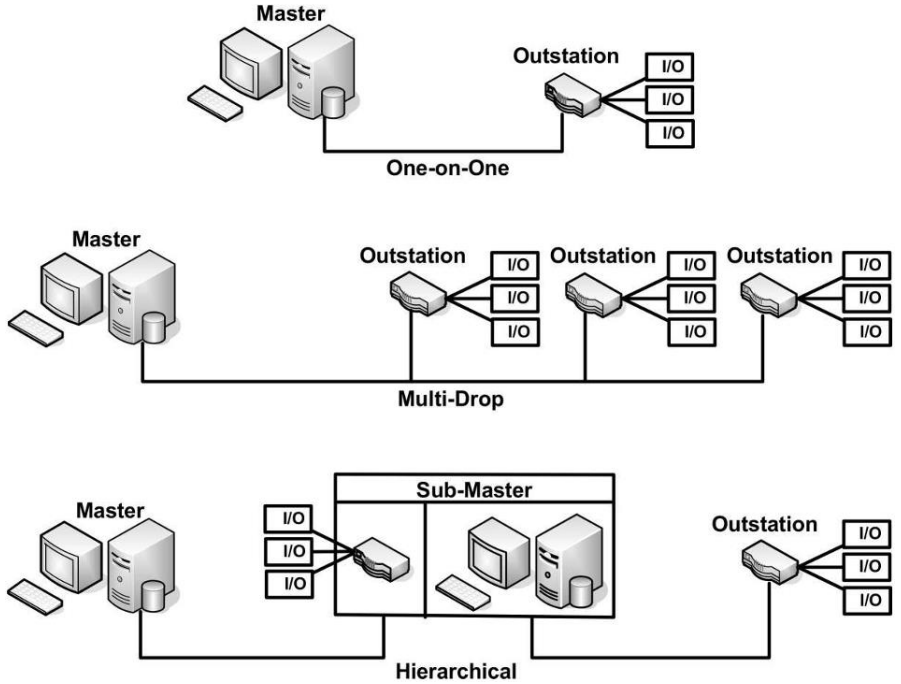
Sometimes to better understand the forest

You need to look at the trees.

- Developed in the early ‘90’s
- Defines communication between master stations, RTUs, and other intelligent electronic devices (IEDs)
- Dominant utility SCADA protocol in North America and other parts of the world.
- Increasingly SCADA master stations and RTUs using **TCP/IP**



iPhone

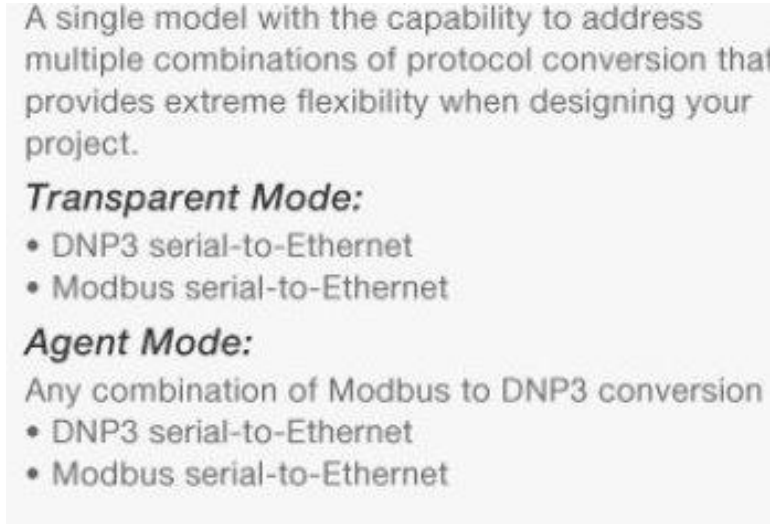
Intelligent End Devices have gotten a bit smarter.

Introducing iPhone

iPhone combines three products — a revolutionary mobile phone, a widescreen iPod with touch controls, and a breakthrough Internet communications device with desktop-class email, web browsing, maps, and searching — into one small and lightweight handheld device. iPhone also introduces an entirely new user interface based on a large multi-touch display and pioneering new software, letting you control everything with just your fingers. So it ushers in an era of software power and sophistication never before seen in a mobile device, completely redefining what you can do on a mobile phone.

- Widescreen iPod
- Revolutionary Phone
- Breakthrough Internet Device
- High Technology

From a DNP3 vendor web site



A single model with the capability to address multiple combinations of protocol conversion that provides extreme flexibility when designing your project.

Transparent Mode:

- DNP3 serial-to-Ethernet
- Modbus serial-to-Ethernet

Agent Mode:

Any combination of Modbus to DNP3 conversion

- DNP3 serial-to-Ethernet
- Modbus serial-to-Ethernet

"DNP3 has **two main advantages**. First, **it supports unsolicited responses**, so a DNP3 field device (or outstation) can actively send messages when a specific event occurs. Second, **it supports the timestamp feature**, so data can be tracked regardless of the frequency of polling. Because of these advantages, DNP3 is very popular in telemetry systems and a significant number of field devices and control equipment are already utilizing it.

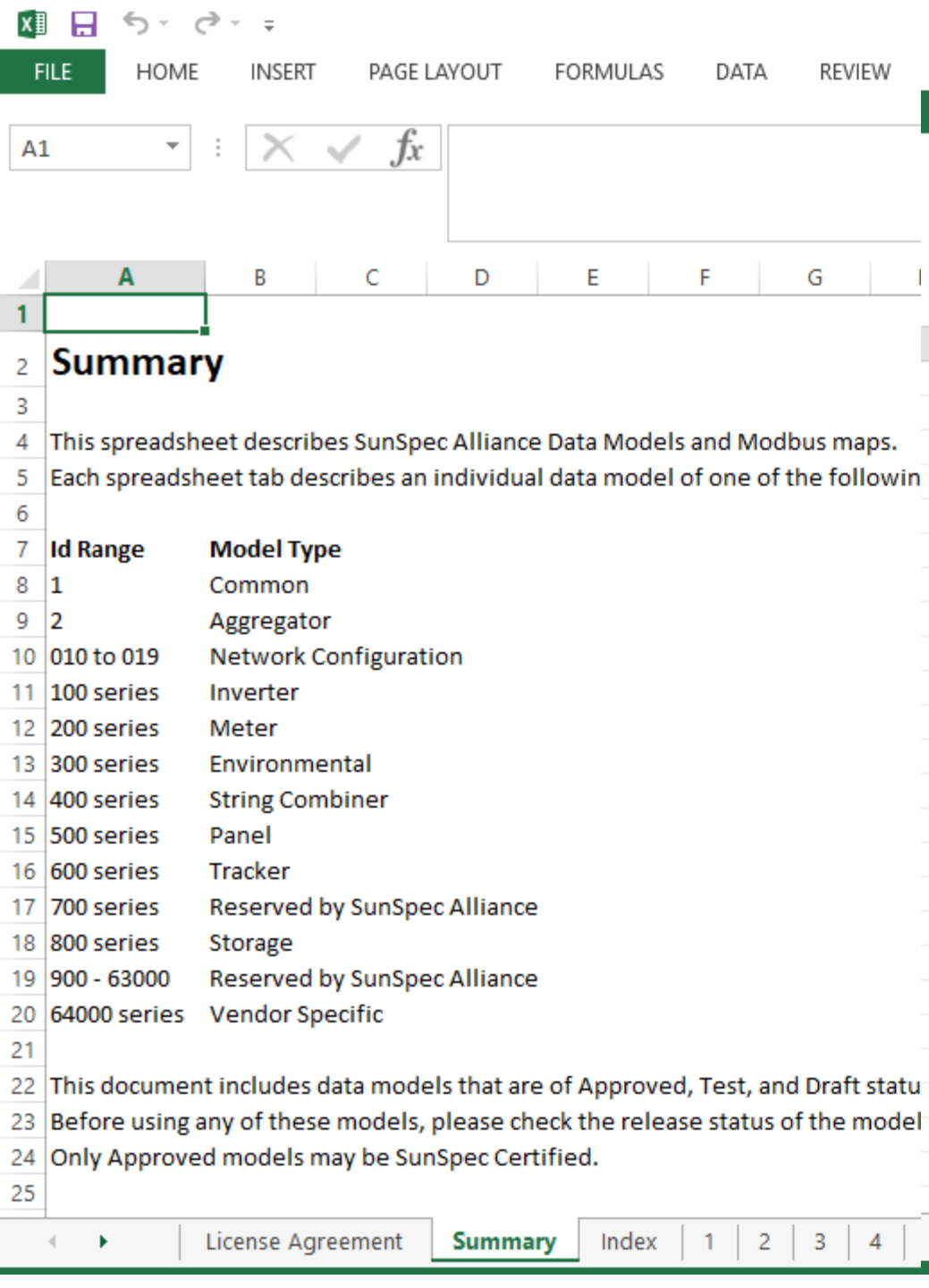
When a project deployment is underway, the system integrator must overcome several challenges. First, **there are multiple requirements for either bridging serial-based DNP3 to Ethernet-based DNP3, or cross-converting DNP3 protocols to other protocols such as Modbus.** Second, when embedded computers are used for serial-to-Ethernet commissioning, **engineers have to spend a lot of time on protocol conversion as opposed to system automation**, which is the main task that engineers have been hired to perform. Last, as **the majority of engineers who work on these deployments are not familiar with the protocols** that are used to solve communication issues, the deployment will typically take longer and therefore incur increased operational costs.

DNP3 is relatively dumb

"In **DNP3**, **the data model is "flat"**. Each data point is simply numbered and there is **no indication within the protocol itself of how one point relates to another**."

DNP Application Note AN2013-001

DNP3 Profile for Advanced Photovoltaic Generation and Storage



FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW

A1

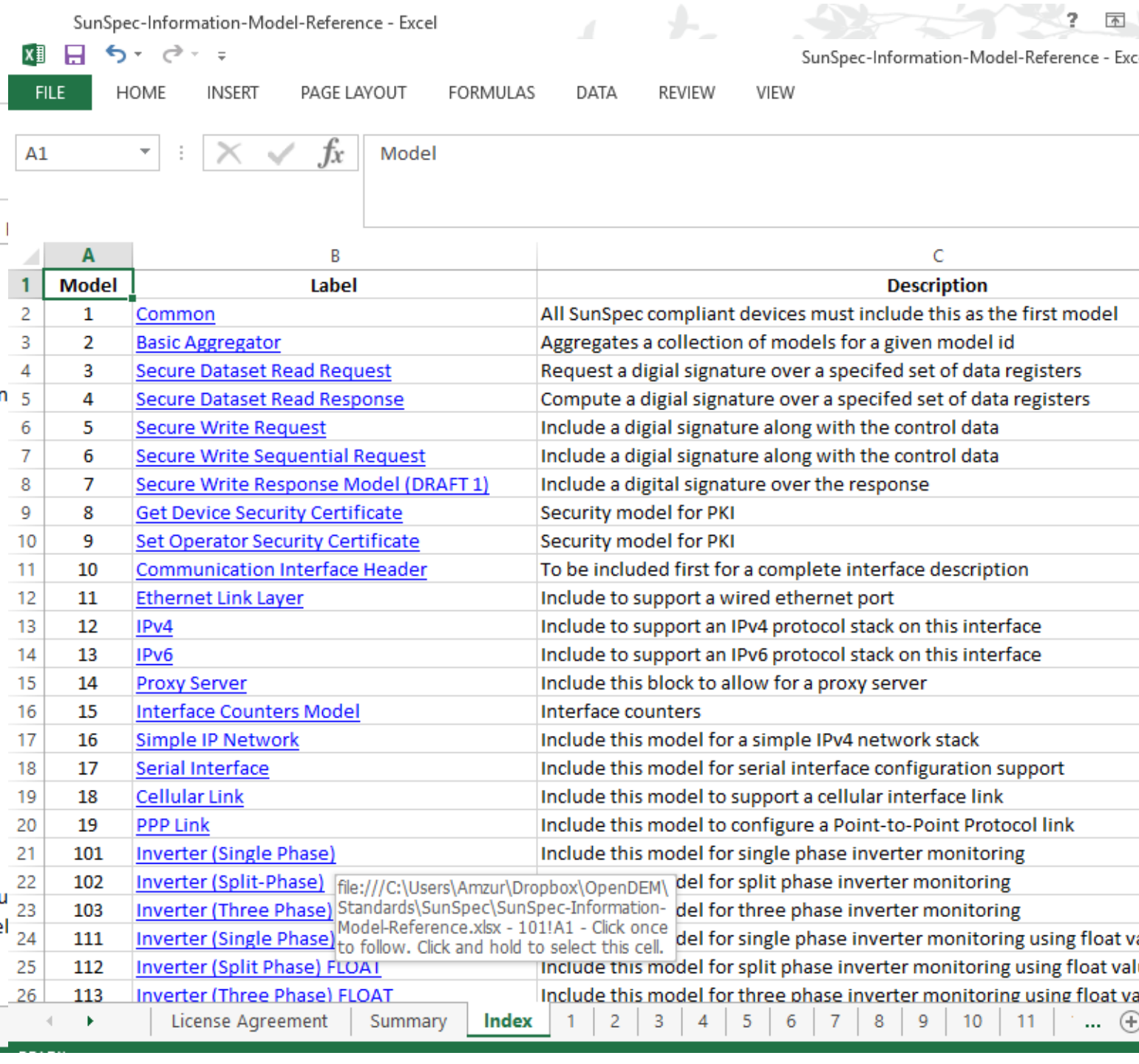
Summary

This spreadsheet describes SunSpec Alliance Data Models and Modbus maps.
Each spreadsheet tab describes an individual data model of one of the followin

Id Range	Model Type
1	Common
2	Aggregator
010 to 019	Network Configuration
100 series	Inverter
200 series	Meter
300 series	Environmental
400 series	String Combiner
500 series	Panel
600 series	Tracker
700 series	Reserved by SunSpec Alliance
800 series	Storage
900 - 63000	Reserved by SunSpec Alliance
64000 series	Vendor Specific

This document includes data models that are of Approved, Test, and Draft statu
Before using any of these models, please check the release status of the model
Only Approved models may be SunSpec Certified.

License Agreement | Summary | Index | 1 | 2 | 3 | 4



SunSpec-Information-Model-Reference - Excel

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A1 Model

Model	Label	Description
1	Common	All SunSpec compliant devices must include this as the first model
2	Basic Aggregator	Aggregates a collection of models for a given model id
3	Secure Dataset Read Request	Request a digial signature over a specifed set of data registers
4	Secure Dataset Read Response	Compute a digial signature over a specifed set of data registers
5	Secure Write Request	Include a digial signature along with the control data
6	Secure Write Sequential Request	Include a digial signature along with the control data
7	Secure Write Response Model (DRAFT 1)	Include a digital signature over the response
8	Get Device Security Certificate	Security model for PKI
9	Set Operator Security Certificate	Security model for PKI
10	Communication Interface Header	To be included first for a complete interface description
11	Ethernet Link Layer	Include to support a wired ethernet port
12	IPv4	Include to support an IPv4 protocol stack on this interface
13	IPv6	Include to support an IPv6 protocol stack on this interface
14	Proxy Server	Include this block to allow for a proxy server
15	Interface Counters Model	Interface counters
16	Simple IP Network	Include this model for a simple IPv4 network stack
17	Serial Interface	Include this model for serial interface configuration support
18	Cellular Link	Include this model to support a cellular interface link
19	PPP Link	Include this model to configure a Point-to-Point Protocol link
21	Inverter (Single Phase)	Include this model for single phase inverter monitoring
22	Inverter (Split-Phase)	del for split phase inverter monitoring
23	Inverter (Three Phase)	del for three phase inverter monitoring
24	Inverter (Single Phase)	del for single phase inverter monitoring using float va
25	Inverter (Split Phase) FLOAT	Include this model for split phase inverter monitoring using float val
26	Inverter (Three Phase) FLOAT	Include this model for three phase inverter monitoring using float va

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License Agreement | Summary | Index | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | ...

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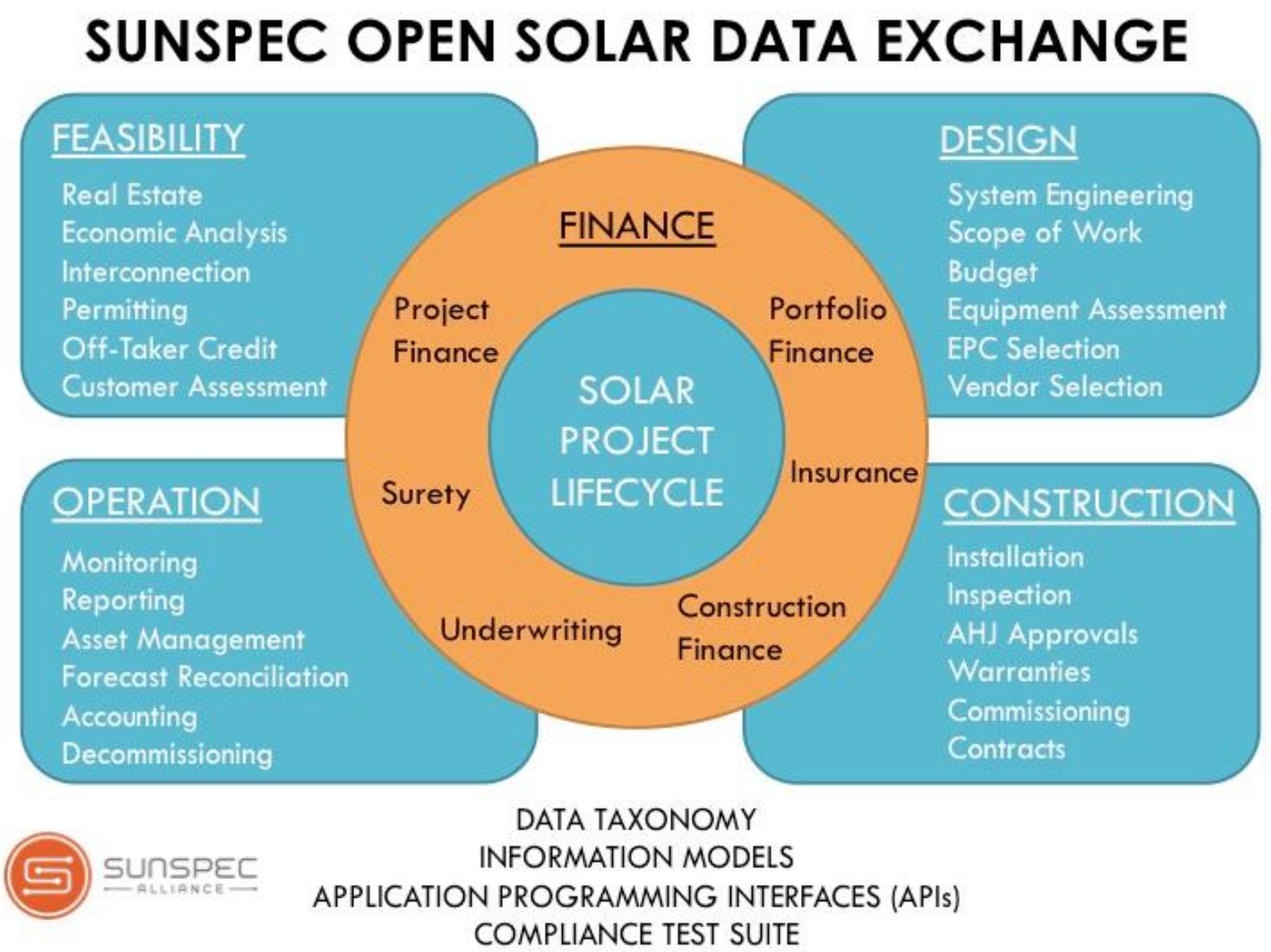
A solar and energy storage data model and open APIs



Together…Shaping the Future of Electricity