

Nest Weave

Power Source Capabilities, Power Source, and Power Sources Traits

Design Specification

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Revision History

Revision	Date	Modified By	Description
1	2016-02-08	Grant Erickson	Initial revision.
2	2016-02-10	Grant Erickson	Review draft.
3	2016-02-11	Grant Erickson	Final draft.
4	2016-04-13	Grant Erickson	Bifurcated the Power Source trait into a static, read-only trait and another dynamic, read-only trait.
5	2016-04-14	Grant Erickson	Added clarifying language regarding optionality and nullability of the Description, Maximum Current, Assessed Voltage, Assessed Current, and Assessed Frequency properties.
6	2016-05-02	Grant Erickson	Resolved trait identifier conflict by reassigning new, non-conflicting trait identifiers.

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Typographic and Syntactic Conventions

The following syntactic conventions are used throughout this document:

shall

is used to indicate a mandatory rule or guideline that must be adhered to without exception to claim compliance with this specification.

should

is used to indicate a rule or guideline that serves as a strong preference to suggested practice and is to be followed in the absence of a compelling reason to do otherwise.

may

is used to indicate a rule or guideline that serves as a reference to suggested practice.

Summary

Weave is the Nest communications home area network (HAN) application protocol stack designed to enable asynchronous, symmetric, device-to-device, device-to-service and service-to-device networking among Nest and Nest-enabled ecosystem devices for the purposes of both control- and data-path messaging. For specific network media in the HAN, Weave enables wireless, low-power, battery-friendly communication by leveraging appropriate, standards-based technologies such as Wi-Fi, 802.15.4, 6LoWPAN, IP, TCP and UDP.

This document introduces the specification for Weave Common traits that generalize how any Weave device resource presents both basic and extended power source information common to any such device.

1. Introduction

This document introduces the specification for Weave Common traits that generalize how any Weave device resource presents both basic and extended power source information common to any such device.

2. Goals

The broad goals of the Nest Weave Power Source and Power Sources traits are to standardize across all device resources the means by which such resources publish and encode power source and power sources information for view or subscription by other resources in the system.

3. Trait Identifiers

3.1. Trait Names

The Power Source trait shall be named the *PowerSourceTrait*.

The Power Source Capabilities trait shall be named *PowerSourceCapabilitiesTrait*.

The Power Sources trait shall be named the *PowerSourcesTrait*.

3.2. Weave Profile Identifiers

The Power Source Capabilities trait Weave profile identifier shall be 0x0000 0018.

The Power Source trait Weave profile identifier shall be 0x0000 0019.

The Power Sources trait Weave profile identifier shall be 0x0000 001A.

4. Byte Ordering

As with all trait data, the byte ordering shall be little endian unless otherwise specified.

5. Schemas

This section describes in detail the data schema supported by this profile. Figure 1 and Figure 2 below provides an abstract, graphical representation of the schemas for the Power Source Capabilities, Power Source, and Power Sources traits.

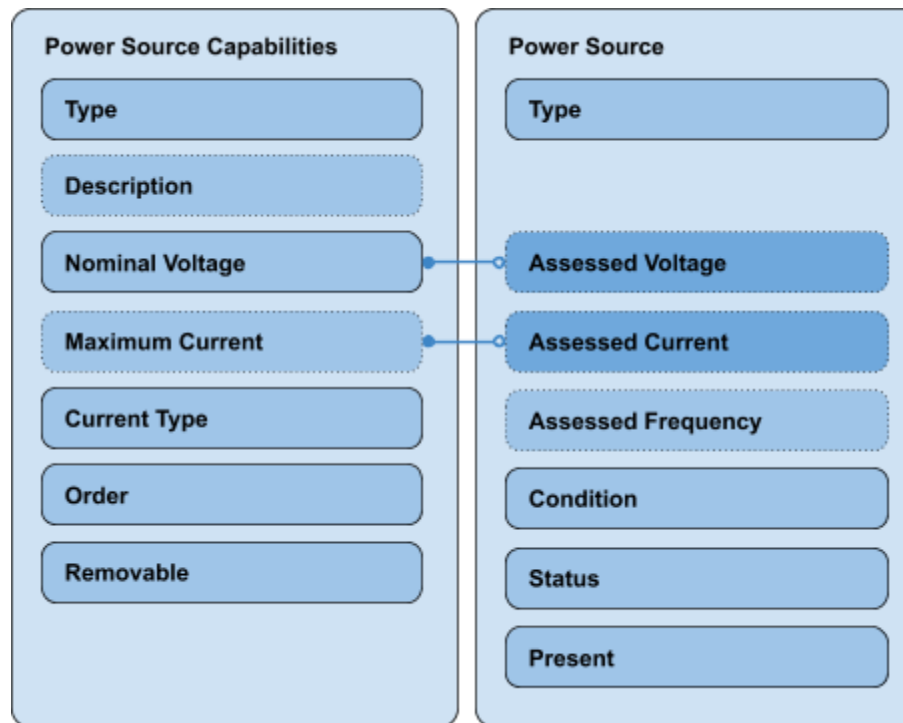


Figure 1. Graphical illustration of the Power Source Capabilities and Power Source trait data schema.

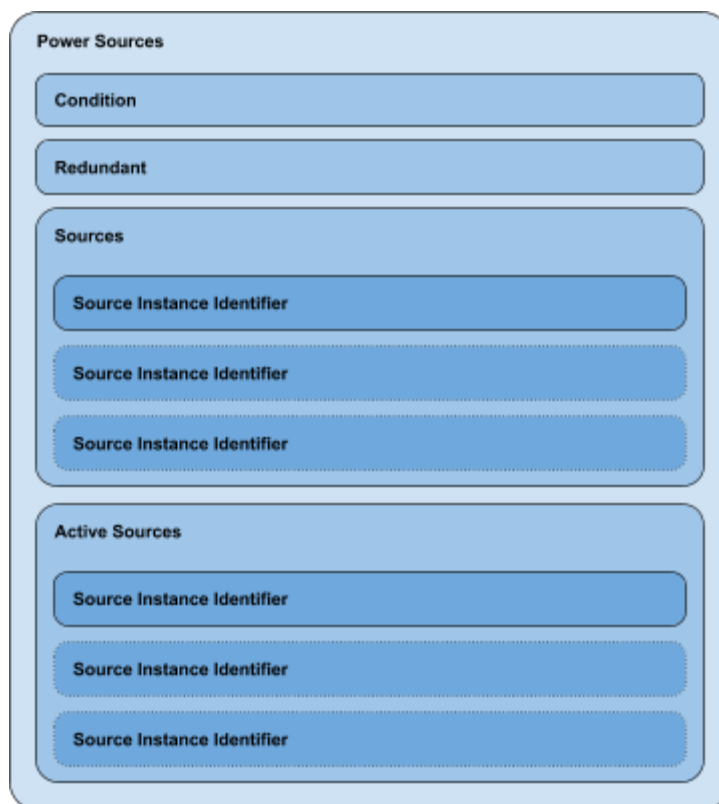


Figure 2. Graphical illustration of the Power Sources trait data schema.

5.1. Power Source Capabilities

5.1.1. Summary

Name	Trait Applicability	Weave Tag Profile	Weave Tag Category	Weave Tag Number	Element Type	Constraints	Disposition	Mutability
Type	Power Source Capabilities	Power Source Capabilities	Context-specific	0x0001	Unsigned Fixed Point	32-bits	Required	Read-only

Description	Power Source Capabilities	Power Source Capabilities	Context-specific	0x0002	UTF-8 String or Unsigned Fixed Point	1-32 characters or 1-128 bytes	Optional	Read-only
Nominal Voltage	Power Source Capabilities	Power Source Capabilities	Context-specific	0x0003	Unsigned	32-bits 0 to at least 700 Volts 0.001 Volt Precision	Required	Read-only
Maximum Current	Power Source Capabilities	Power Source Capabilities	Context-specific	0x0004	Unsigned	32-bits 0 to at least 1000 Amperes 0.001 Ampere Precision	Optional	Read-only
Current Type	Power Source Capabilities	Power Source Capabilities	Context-specific	0x0005	Unsigned Fixed Point	AC or DC	Required	Read-only
Order	Power Source Capabilities	Power Source Capabilities	Context-specific	0x0006	Unsigned Fixed Point	-	Required	Read-only
Removable	Power Source Capabilities	Power Source Capabilities	Context-specific	0x0007	Boolean	-	Required	Read-only

Table 1. Summary of the *Power Source Capabilities* trait data schema.

5.1.2. Detail

5.1.2.1. Type

The *Type* property is a required property representing an indication of the type or class of power source for the trait instance published by the resource. The value may be one of those enumerations listed in Table 2 below.

- **Trait Applicability:** Power Source Capabilities
- **Weave Tag Profile:** Power Source Capabilities
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0001
- **Element Type:** Unsigned Fixed Point
- **Constraints:** 32-bits
- **Disposition:** Required
- **Mutability:** Read-only

Type	Description
Unspecified	The power source type is unspecified or unknown.

Table 2. Supported enumerations for the power source Type property.

5.1.2.1.1. Extending the Type

The type power source property enumeration should be extended by entities outside of Nest Labs by adding the vendor identifier to the high order 16-bits of the enumeration and then using the low order 16-bits as the extended power source type.

Let us assume that Acme Company (with a presumed Weave vendor identifier 0xAC3E) is making a new product with a squirrel-based power source in which they need a property for acorn capacity. To do so, they'll need to extend the base power source trait, adding the acorn capacity property and extend the type enumeration to do this. Listing 1 below shows how this might be done both with and without this requirement.

```
enum PowerSourceType {  
    POWER_SOURCE_TYPE_UNSPECIFIED = 0;  
    POWER_SOURCE_TYPE_SQUIRREL = 0xAC3E0001;
```

```
};
```

Listing 1. Extending the power source type property with a Weave vendor identifier.

5.1.2.2. Description

The *Description* property is an optional property encoded as a UTF-8 String or unsigned fixed point number (string reference) that describes the power source in a human-readable format in the vendor's preferred language localization. This value is assigned and administered by the vendor.

The UTF-8 String is used when the description is a non-localized string literal. The string reference is used when the string, localized or not, is located in a string table associated with the device resource containing this trait instance.

- **Trait Applicability:** Power Source Capabilities
- **Weave Tag Profile:** Power Source Capabilities
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0002
- **Element Type:** UTF-8 String or Unsigned Fixed Point
- **Constraints:** 1-32 characters or 1-128 bytes
- **Disposition:** Optional
- **Mutability:** Read-only

Absence of this property implies a NULL value and a NULL value implies that the device resource has provided no description of the power source.

5.1.2.3. Nominal Voltage

The *Nominal Voltage* property is a required property that represents an unsigned number in Volts, constrained from 0 to at least 700 Volts, in 0.001 Volt precision used to indicate the nominal output voltage for a power source.

- **Trait Applicability:** Power Source Capabilities
- **Weave Tag Profile:** Power Source Capabilities
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0003
- **Element Type:** Unsigned

- **Constraints:** 32-bits, 0 to at least 700 Volts, 0.001 Volt Precision
- **Disposition:** Required
- **Mutability:** Read-only

This value should match that printed on the regulatory compliance label for the device resource publishing the trait instance, an example of which is shown in Figure 3 below.

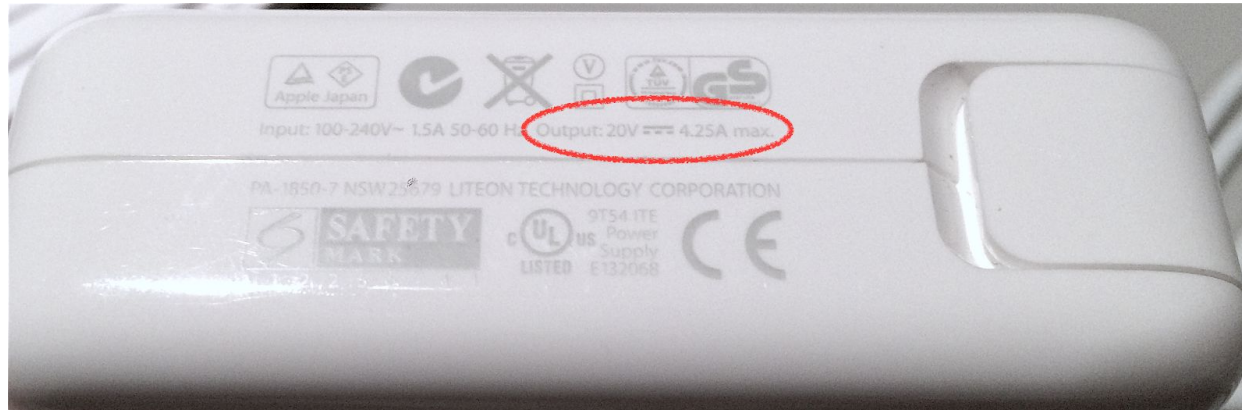


Figure 3. Nominal output voltage listed on a power source regulatory label.

5.1.2.4. Maximum Current

The *Maximum Current* property is an optional property that represents an unsigned number in Amperes, constrained from 0 to at least 1000 Amperes, in 0.001 Ampere precision used to indicate the maximum output current or current draw for a power source.

- **Trait Applicability:** Power Source Capabilities
- **Weave Tag Profile:** Power Source Capabilities
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0004
- **Element Type:** Unsigned
- **Constraints:** 32-bits, 0 to at least 1000 Amperes, 0.001 Ampere Precision
- **Disposition:** Optional
- **Mutability:** Read-only

This value should match that printed on the regulatory compliance label for the device resource publishing the trait instance, an example of which is shown in Figure 3 above.

Absence of this property implies a NULL value and a NULL value implies that the device resource has no known or published maximum current.

5.1.2.5. Current Type

The *Current Type* property is a required property that represents the current type of the power source. The value may be one of those enumerations listed in Table 3 below.

- **Trait Applicability:** Power Source Capabilities
- **Weave Tag Profile:** Power Source Capabilities
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0005
- **Element Type:** Unsigned Fixed Point
- **Constraints:** AC or DC
- **Disposition:** Required
- **Mutability:** Read-only

Current Type	Description
Unspecified	The power source current type is unspecified or unknown.
AC	The power source current type is alternating current.
DC	The power source current type is direct current.

Table 3. Supported enumerations for the power source Current Type property.

5.1.2.6. Order

The *Order* property is a required property that represents, as an unsigned integer in which 0 is the highest order (i.e. primary), 1 the next highest (i.e. secondary), etc., the system usage order of a power source. This is used along with the [Status](#) property to

determine how a system that supports multiple power sources will use them, either concurrently (many sources of the same order) or serially (many sources of ascending order).

- **Trait Applicability:** Power Source Capabilities
- **Weave Tag Profile:** Power Source Capabilities
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0006
- **Element Type:** Unsigned Fixed Point
- **Constraints:** -
- **Disposition:** Required
- **Mutability:** Read-only

Table 4 provides some suggested examples for assigning order to some sample power sources:

Sources	Order	Description
Mains Power Mains Power	0 0	Design with symmetric, dual-redundant mains power sources. The system is powered by either one of the power sources.
Built-in Battery Power Mains Power	0 1	Design in which the system is always running from a built-in battery and the mains power merely serves to keep the battery charged unless the battery fails at which point mains power would power the system.
Mains Power Back-up Battery Power	0 1	Design in which the system is always running from a mains power and the back-up battery is out-of-circuit until mains power fails at which point the back-up battery powers the system.
Built-in Battery Power DC Adapter Power USB Power	0 1 1	Design in which the system is always running from a built-in battery and the mains or USB power merely serve to keep the battery charged. If the battery fails, then either mains or USB power would power the system.

Table 4. Examples of applying the Order property to power sources.

5.1.2.7. Removable

The *Removable* property is an optional property that represents as a Boolean whether a power source is removable, such as a battery or plug-in DC adapter.

- **Trait Applicability:** Power Source Capabilities
- **Weave Tag Profile:** Power Source Capabilities
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0007
- **Element Type:** Boolean
- **Constraints:** -
- **Disposition:** Optional
- **Mutability:** Read-only

5.1.3. Status Codes

There are no status codes defined by the *Power Source Capabilities* trait.

5.1.4. Commands

There are no commands defined by the *Power Source Capabilities* trait.

5.1.5. Extendability

This trait reserves those unused tags in the range 0-31 for future trait extendability. Derived traits may use tags outside that range for extending this trait.

5.2. Power Source

5.2.1. Summary

Name	Trait Applicability	Weave Tag Profile	Weave Tag Category	Weave Tag Number	Element Type	Constraints	Disposition	Mutability
Type	Power Source Capabilities	Power Source Capabilities	Context-specific	0x0001	Unsigned Fixed Point	32-bits	Required	Read-only
Assessed Voltage	Power Source	Power Source	Context-specific	0x0002	Unsigned	32-bits	Optional	Read-only

						0 to at least 700 Volts 0.001 Volt Precision		
Assessed Current	Power Source	Power Source	Context- specific	0x0003	Unsigned	32-bits 0 to at least 1000 Amperes 0.001 Ampere Precision	Optional	Read-only
Assessed Frequency	Power Source	Power Source	Context- specific	0x0004	Unsigned	16-bits 0 to at least 60 Hertz 1 Hertz Precision	Optional	Read-only
Condition	Power Source	Power Source	Context- specific	0x0005	Unsigned Fixed Point	Critical or Nominal	Required	Read-only
Status	Power Source	Power Source	Context- specific	0x0006	Unsigned Fixed Point	Active, Standby, or Inactive	Required	Read-only
Present	Power Source	Power Source	Context- specific	0x0007	Boolean	-	Required	Read-only

Table 5. Summary of the *Power Source* trait data schema.

5.2.2. Detail

5.2.2.1. Assessed Voltage

The *Assessed Voltage* property is an optional property that represents an unsigned number in Volts, constrained from 0 to at least 700 Volts, in 0.001 Volt precision and is used to indicate either a measured or estimated value of the instantaneous voltage of a power supply.

- **Trait Applicability:** Power Source
- **Weave Tag Profile:** Power Source
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0002
- **Element Type:** Unsigned
- **Constraints:** 32-bits, 0 to at least 700 Volts, 0.001 Volt Precision
- **Disposition:** Optional
- **Mutability:** Read-only

A measurement may be made with any number of metrology techniques. However, the value may also be estimated based on system operating states.

Absence of this property implies that this device resource does not make any assessment of voltage and the value is unknown. A NULL value implies that the device may make an assessment of voltage; however, is unable to transiently provide one and the value is presently unknown.

5.2.2.2. Assessed Current

The *Assessed Current* property is an optional property that represents an unsigned number in Amperes, constrained from 0 to at least 1000 Amperes, in 0.001 Ampere precision used to indicate either a measured or estimated value of the instantaneous current of a power supply.

- **Trait Applicability:** Power Source
- **Weave Tag Profile:** Power Source
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0003
- **Element Type:** Unsigned

- **Constraints:** 32-bits, 0 to at least 1000 Amperes, 0.001 Ampere Precision
- **Disposition:** Optional
- **Mutability:** Read-only

A measurement may be made with any number of metrology techniques. However, the value may also be estimated based on system operating states.

Absence of this property implies that this device resource does not make any assessment of current and the value is unknown. A NULL value implies that the device may make an assessment of current; however, is unable to transiently provide one and the value is presently unknown.

5.2.2.3. Assessed Frequency

The *Assessed Frequency* property is an optional property that represents an unsigned number in Hertz, constrained from 0 to at least 60 Hertz, in 1 Hertz precision used to indicate either a measured or estimated value of the instantaneous frequency of an AC *Current Type* power source.

- **Trait Applicability:** Power Source
- **Weave Tag Profile:** Power Source
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0004
- **Element Type:** Unsigned
- **Constraints:** 16-bits, 0 to at least 60 Hertz, 1 Hertz Precision
- **Disposition:** Optional
- **Mutability:** Read-only

Absence of this property implies that this device resource does not make any assessment of frequency and the value is unknown. A NULL value implies that the device may make an assessment of frequency; however, is unable to transiently provide one and the value is presently unknown.

5.2.2.4. Condition

The *Condition* property is a required property that represents as an enumeration the condition of the power source and, in particular, whether it is operating normally and requires no intervention or attention or warrants intervention or attention. Table 6 below describes the allowed enumeration values for the property.

- **Trait Applicability:** Power Source
- **Weave Tag Profile:** Power Source
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0005
- **Element Type:** Unsigned Fixed Point
- **Constraints:** Critical or Nominal
- **Disposition:** Required
- **Mutability:** Read-only

Condition	Description
Unspecified	The power source condition is unspecified or unknown.
Nominal	The power source condition is operating normally and no intervention or attention is required.
Critical	The power source condition is operating in a manner warranting intervention or attention.

Table 6. Supported enumerations for the power source Condition property.

The determination of Nominal and Critical are power source- and system-dependent and are left to the discretion of the system implementer.

This property may be used, for example, to support the localization of user interfaces and resource management event warnings. Consider a battery power source rendered to a user interface. So long as the charge level of the battery does not warrant user attention, its status is *Nominal* and its user interface rendering is such that it does not demand attention. However, when the battery reaches a charge level, say 10% or 20% remaining of its capacity, the status changes to *Critical* and the user interface rendering changes. This is illustrated in Figure 4 below.



Figure 4. User interface rendering of *Nominal* and *Critical* power source status.

5.2.2.5. Status

The *Status* property is a required property that represents as an enumeration the participation of the source in supplying power for the system. Table 7 below describes the allowed enumeration values for the property.

- **Trait Applicability:** Power Source
- **Weave Tag Profile:** Power Source
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0006
- **Element Type:** Unsigned Fixed Point
- **Constraints:** Active, Standby, or Inactive
- **Disposition:** Required
- **Mutability:** Read-only

Status	Description
Unspecified	The power source status is unspecified or unknown.
Active	The power source is being actively used to power the system.
Standby	The power source is available for use to power the system but is not actively being used to do so.
Inactive	The power source is not available for use to power the system.

Table 7. Supported enumerations for the power source Status property.

As an illustrative example of this property, consider the system with redundant mains power sources, as shown in Figure 5 below and the reflection of the *Status* property based on the power supply scenarios.

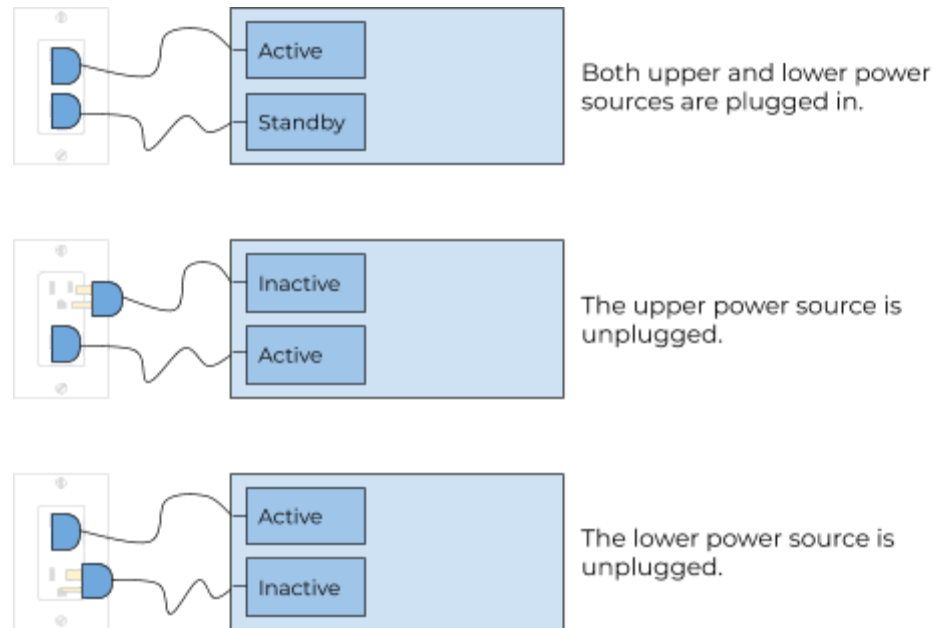


Figure 5. Illustration of the status power source property under several usage scenarios.

5.2.2.6. Present

The *Present* property is an optional property that represents as a Boolean whether a removable power source is present.

- **Trait Applicability:** Power Source
- **Weave Tag Profile:** Power Source
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0007
- **Element Type:** Boolean
- **Constraints:** -
- **Disposition:** Optional

- **Mutability:** Read-only

Many power sources, such as batteries or external power sources, are removable. Consequently, this provides a dynamic indication of whether the power source is present. This provides a further degree of nuance relative to the *Status* property, indicating not only whether it is inactive or active but also whether it exists or is present. Consider, as an illustrative example, the *Present* and *Status* properties for the redundant, removable power supplies and usage scenarios illustrated in Figure 6 below.

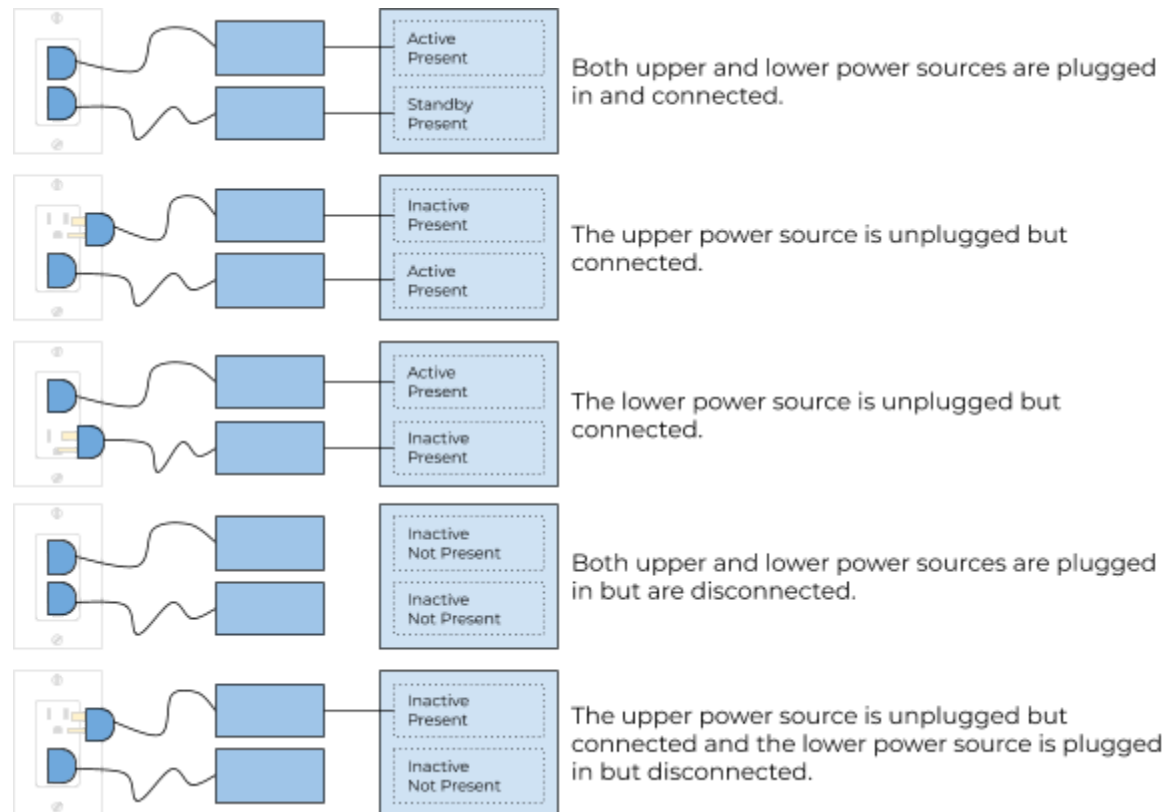


Figure 6. Illustration of the Present and status power source properties under several usage scenarios.

5.2.3. Status Codes

There are no status codes defined by the *Power Source* trait.

5.2.4. Commands

There are no commands defined by the *Power Source* trait.

5.2.5. Extendability

This trait reserves those unused tags in the range 0-31 for future trait extendability. Derived traits may use tags outside that range for extending this trait.

5.3. Power Sources

5.3.1. Summary

Name	Trait Applicability	Weave Tag Profile	Weave Tag Category	Weave Tag Number	Element Type	Constraints	Disposition	Mutability
Condition	Power Sources	Power Sources	Context-specific	0x0001	Unsigned Fixed Point	Critical or Nominal	Required	Read-only
Redundant	Power Sources	Power Sources	Context-specific	0x0002	Boolean	-	Required	Read-only
Sources	Power Sources	Power Sources	Context-specific	0x0003	Array	-	Required	Read-only
Active Sources	Power Sources	Power Sources	Context-specific	0x0004	Array	-	Required	Read-only

Table 8. Summary of the *Power Sources* trait data schema.

5.3.2. Detail

5.3.2.1. Condition

The *Condition* property is a required property that represents as an enumeration the condition of the power sources in the device resource and, in particular, whether they are operating normally and require no intervention or attention or warrant intervention or attention. The values are identical to that of the Power Source trait and are summarized in Table 6 above.

- **Trait Applicability:** Power Sources
- **Weave Tag Profile:** Power Sources
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0001
- **Element Type:** Unsigned Fixed Point
- **Constraints:** Critical or Nominal
- **Disposition:** Required
- **Mutability:** Read-only

This property, in the context of this trait, provides a quick, at-a-glance up-leveling for interested clients of the condition state of power for a particular device resource that is consistent for all devices and independent of the combination and types of power sources for a particular device.

5.3.2.1.1. Calculation

Listing 2 below illustrates in pseudocode the calculation that a trait implementer should employ to populate and publish this trait property.

```
PowerSourcesCondition CalculatePowerSourcesCondition(void)
{
    PowerSources sources = System().GetPowerSources();
    PowerSourcesCondition condition = Nominal;
    PowerSource source;

    foreach source in sources
    {
        condition = source.GetCondition();
    }
}
```

```

        if (condition == Critical)
        {
            break;
        }
    }

    return condition;
}

```

Listing 2. Calculation of the Power Sources Condition property.

5.3.2.2. Redundant

The *Redundant* property is a required property that represents as a Boolean the redundancy of the power sources in the device resource.

- **Trait Applicability:** Power Sources
- **Weave Tag Profile:** Power Sources
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0002
- **Element Type:** Boolean
- **Constraints:** -
- **Disposition:** Required
- **Mutability:** Read-only

This provides a quick, at-a-glance up-leveling for interested clients of the redundancy state of power for a particular device resource that is consistent for all devices and independent of the combination and types of power sources for a particular device.

5.3.2.2.1. Calculation

Listing 2 below illustrates in pseudocode the calculation that a trait implementer should employ to populate and publish this trait property.

```

Boolean CalculatePowerSourcesRedunancy(void)
{

```

```

PowerSources sources = System().GetPowerSources();
Boolean redundant = true;
PowerSource source;

if (sources.GetCount() <= 1)
{
    redundant = false;
}
else
{
    foreach source in sources
    {
        PowerSourceStatus status = source.GetStatus();

        if (status != Active && status != Standby)
        {
            redundant = false;
            break;
        }
    }
}

return redundant;
}

```

Listing 2. Calculation of the Power Sources Redundant property.

5.3.2.3. Sources

The *Sources* property is a required property that represents as an array **all** of the published power sources in a device resource, sorted ascending on the power source order as the primary key and the power source status as the secondary sort key. The array values are the instance identifiers of the respective power sources.

- **Trait Applicability:** Power Sources
- **Weave Tag Profile:** Power Sources
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0003

- **Element Type:** Array
- **Constraints:** -
- **Disposition:** Required
- **Mutability:** Read-only

By using the instance identifiers of each power source as the array values, this allows publisher clients to easily and directly place the instance identifier into a subsequent publisher observation request to dive into additional details about a power source.

5.3.2.4. Active Sources

The *Active Sources* property is a required property that represents represents as an array **all** of the active power sources in a device resource, sorted ascending on the power source order as the primary key and the power source status, filtering out Inactive status, as the secondary sort key. The array values are the instance identifiers of the respective power sources.

- **Trait Applicability:** Power Sources
- **Weave Tag Profile:** Power Sources
- **Weave Tag Category:** Context-specific
- **Weave Tag Number:** 0x0004
- **Element Type:** Array
- **Constraints:** -
- **Disposition:** Required
- **Mutability:** Read-only

By using the instance identifiers of each power source as the array values, this allows publisher clients to easily and directly place the instance identifier into a subsequent publisher observation request to dive into additional details about a power source.

This representation also allows trait observers to easily dereference to the most important source, that in the first array slot, the primary, active source.

A rich user interface client might use this trait property to help key rendering changes among power sources, for a device that has a removable rechargeable battery and a mains power source (and charger), as shown in Figure 7 below.

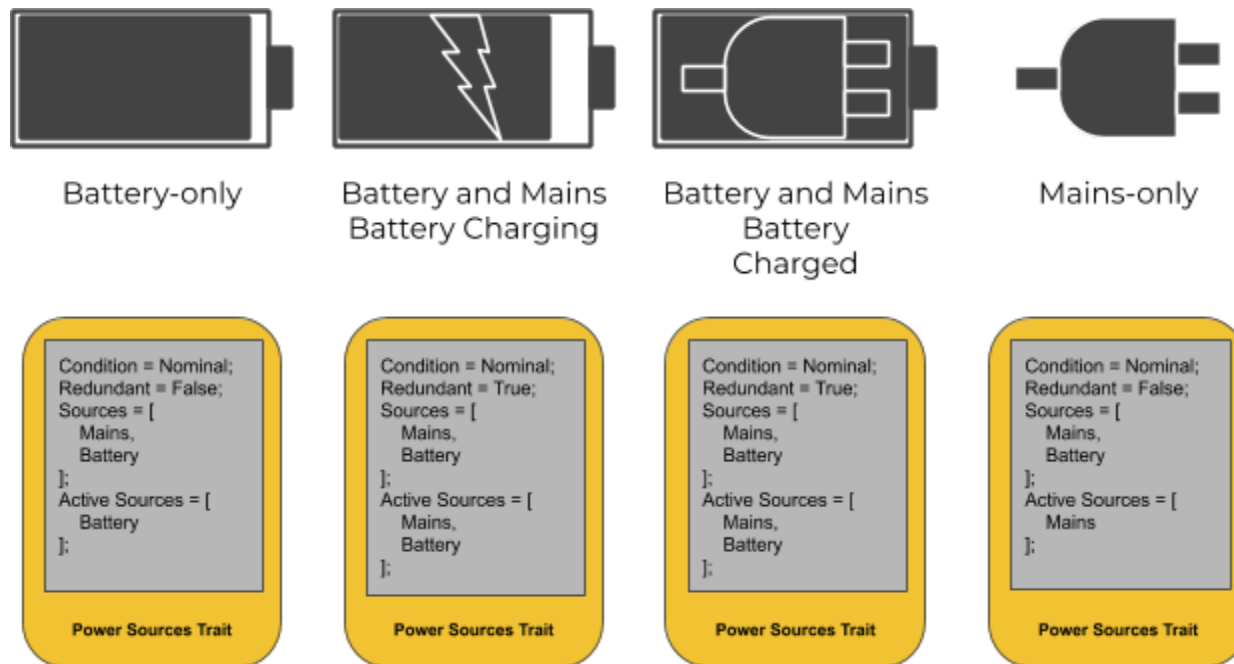


Figure 7. Example of observing the Active Sources property to render a device power user interface.

5.3.3. Status Codes

There are no status codes defined by the *Power Sources* trait.

5.3.4. Commands

There are no commands defined by the *Power Sources* trait.

5.3.5. Extendability

This trait is not extendable.

6. References

1. Google LLC. [*Nest Weave: Power Source Capabilities, Power Source, and Power Sources Traits: Functional Requirements.*](#) Revision 4. 2016-04-13.
2. Google LLC. [*Weave TLV Format.*](#) Revision 4. May 20, 2013.

Appendix A. Use Case Examples

In this appendix, one use cases is illustrated:

- A device resource in paired-with-the-service with a mobile-based resource

A.1. Device Resource Paired-with-the-service

Consider a use case, as shown in Figure 8 below, in which a mobile-based resource would like to determine the power capabilities and state for a particular device-based resource.

The process begins with the service resource subscribing to the device resource's Power Sources trait (1) and then, in turn, subscribing to each of the sources enumerated (2). Likewise, the mobile resource subscribes to or views the device resource's Power Sources trait as published by the service (3) and then subscribes to or views a particular enumerated power source.



Figure 8. Instantiation and use of the Power Sources trait by a mobile-based resource to perform detailed introspection of a particular Power Source Capabilities trait published by a device-based resource.

Appendix B. Weave TLV Examples

In this example, we consider the Nest Protect (Second Generation), Wired.

B.1. Nest Protect (Second Generation)

Tables 9, 10, 11, 12 and 13 below illustrate an example encoding of two Power Source Capabilities and Power Source instances and a Power Sources instance for the Nest Protect (Second Generation), Wired using context tags¹.

Element	Notes	Tag	Length	Value
Type	Unknown	0x24 01	-	0x00
Description	“Wired”	0x2c 02	5	0x57 69 72 65 64
Nominal Voltage	120	0x26 03	-	0x00 01 e0 00
Maximum Current	3	0x26 04	-	0x00 00 0c 00
Current Type	AC	0x24 05	-	0x02
Order	0	0x24 06	-	0x00
Removable	True	0x29 07	-	-

Table 9. A Power Source Capabilities trait data schema example for the Nest Protect (Second Generation), Wired for its wired power source encoded in Weave TLV with context-specific tags.

Element	Notes	Tag	Length	Value
Type	Unknown	0x24 01	-	0x00

¹ While Weave TLV data is encoded in little endian byte order, values in the tag column are shown in big endian byte order to aid human readability.

Assessed Frequency	60	0x24 04	-	0x00 3c
Condition	Nominal	0x24 05	-	0x01
Status	Active	0x24 06	-	0x01
Present	True	0x29 07	-	-

Table 10. A Power Source trait data schema example for the Nest Protect (Second Generation), Wired for its wired power source encoded in Weave TLV with context-specific tags.

Element	Notes	Tag	Length	Value
Type	Unknown	0x24 01	-	0x00
Description	“Back-up Battery”	0x2c 02	15	0x42 61 63 6b 2d 75 70 20 42 61 74 74 65 72 79
Nominal Voltage	4.5	0x26 03	-	0x00 00 12 00
Maximum Current	3	0x26 04	-	0x00 00 0c 00
Current Type	DC	0x24 05	-	0x01
Order	1	0x24 06	-	0x01
Removable	True	0x29 07	-	-

Table 11. A Power Source Capabilities trait data schema example for the Nest Protect (Second Generation), Wired for its back-up battery power source encoded in Weave TLV with context-specific tags.

Element	Notes	Tag	Length	Value
Type	Unknown	0x24 01	-	0x00

Description	“Back-up Battery”	0x2c 02	15	0x42 61 63 6b 2d 75 70 20 42 61 74 74 65 72 79
Condition	Nominal	0x24 05	-	0x01
Status	Standby	0x24 06	-	0x02
Present	True	0x29 07	-	-

Table 12. A Power Source trait data schema example for the Nest Protect (Second Generation), Wired for its back-up battery power source encoded in Weave TLV with context-specific tags.

Element	Notes	Tag	Length	Value
Condition	Nominal	0x24 01	-	0x01
Redundant	True	0x29 02	-	-
Sources	0, 1	0x36 03	-	0x04 00 04 01 18
Active Sources	0, 1	0x36 04		0x04 00 04 01 18

Table 13. A Power Sources trait data schema example for the Nest Protect (Second Generation), Wired encoded in Weave TLV with context-specific tags.