
**Document Identifier: DSP2064**

**Date: 2023-02-24**

**Version: 1.0.0WIP95**

# Redfish for Thermal Equipment

**Information for Work-in-Progress version:**

**IMPORTANT:** This document is not a standard. It does not necessarily reflect the views of DMTF or its members. Because this document is a Work in Progress, this document may still change, perhaps profoundly and without notice. This document is available for public review and comment until superseded.

**Provide any comments through the DMTF Feedback Portal:** http://www.dmtf.org/standards/feedback

**Supersedes: 0.9a**

**Document Class: Informational**

**Document Status: Work in Progress**

**Document Language: en-US**

DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems management and interoperability. Members and non-members may reproduce DMTF specifications and documents, provided that correct attribution is given. As DMTF specifications may be revised from time to time, the particular version and release date should always be noted.

Implementation of certain elements of this standard or proposed standard may be subject to third party patent rights, including provisional patent rights (herein "patent rights"). DMTF makes no representations to users of the standard as to the existence of such rights, and is not responsible to recognize, disclose, or identify any or all such third party patent right, owners or claimants, nor for any incomplete or inaccurate identification or disclosure of such rights, owners or claimants. DMTF shall have no liability to any party, in any manner or circumstance, under any legal theory whatsoever, for failure to recognize, disclose, or identify any such third party patent rights, or for such party's reliance on the standard or incorporation thereof in its product, protocols or testing procedures. DMTF shall have no liability to any party implementing such standard, whether such implementation is foreseeable or not, nor to any patent owner or claimant, and shall have no liability or responsibility for costs or losses incurred if a standard is withdrawn or modified after publication, and shall be indemnified and held harmless by any party implementing the standard from any and all claims of infringement by a patent owner for such implementations.

For information about patents held by third-parties which have notified DMTF that, in their opinion, such patent may relate to or impact implementations of DMTF standards, visit http://www.dmtf.org/about/policies/disclosures.php.

This document's normative language is English. Translation into other languages is permitted.

CONTENTS

# 1 Foreword

This white paper covers Redfish schema support for managing cooling distribution equipment and infrastructure. This includes liquid cooling distribution units, air handlers, air conditioners, immersion cooling units, and facility cooling loops.

The Redfish standard has expanded its coverage of data center components, having started with server management and added storage systems, networking and fabric support. As this provides a consistent protocol and data model for managing the bulk of the IT equipment in a data center, it was natural to further extend the data model to include cooling systems, power distribution and other facility services. This allows the utilization of a common set of tools to manage the entire infrastructure, and enable development of tools that can integrate data across the various subsystems to optimize resource utilization.

## 1.1 Where can I find more information?

The following web sites provide more information about the Redfish standard:

- **Redfish Developer Hub:** http://redfish.dmtf.org Resources for developers building applications using Redfish. Contains an interactive schema explorer, hosted schema and other links.
- **Redfish User Forum:** http://www.redfishforum.com User forum monitored by DMTF Redfish personnel to answer questions about any Redfish-related topics:
- **DMTF Github Repositories:** http://www.github.com/DMTF Open source tools and libraries for working with the Redfish API.
- **Redfish Standards:** http://www.dmtf.org/standards/redfish Schemas, specs, mockups, white papers, FAQ, educational material and more.
- **DMTF Redfish Forum** (Working group that maintains the Redfish standard): http://www.dmtf.org/standards/spmf Companies involved, upcoming schedules and future work, charter, and information about joining.

## 1.2 Using the reference guide

The cooling distribution-related schemas are listed in the following section for reference. This section should be considered an extension to the contents of DSP2046, the Redfish Resource and Schema Guide, which lists the common Redfish properties, other object definitions, and all released Redfish schemas (including those shown here).

This guide was produced using the contents of the schema files from DMTF Redfish Schema bundle DSP8010 and merged with supplemental text using the DMTF's Redfish Documentation Generator.

## 1.3 Common Properties

Properties and objects defined for all Redfish schemas, or referenced by this white paper are detailed in the Redfish

Resource and Schema Guide (DSP2046), available for download at the Redfish Standards site: http://www.dmtf.org/standards/redfish

# 2 Central data model concepts

The Redfish data models for air and liquid cooling distribution equipment are heavily leveraged from previous work to model power distribution in the data center. As the management and control of cooling equipment follows similar use cases to data center power infrastructure, many of the concepts developed, including the Facility, Sensor, and Control models, apply directly to this class of equipment.

## 2.1 Chassis

To keep the data model consistent across devices managed via Redfish, it is expected that most products will include at least one Chassis resource, to describe the physical product or container. This is important to show the "contains" and "contained by" relationships among components, especially when attempting to model a full cooling domain.

The recommendation to always include a Chassis resource is a change from the guidance given when the PowerDistribution model was released. At the time, it was deemed duplicative with the functional model provided by the `PowerDistribution` schema. But as those model matured, it has become clear that the pure physical model view provided by a `Chassis` resource is needed to ensure client software can, for example, discover all of the equipment contained within a rack. This becomes vital for immersion cooling systems, where `ComputerSystem` units and their associated `Chassis` are contained within the immersion tank. A new `ChassisType` value of "ImmersionTank" has also been added for this reason.

## 2.2 Facility

One of the basic model constructs for Redfish is the presentation of both a "Functional" and a "Physical" view of the managed systems or devices. For Computer Systems (servers) this results in resources for both a `ComputerSystem` (functional view) and a `Chassis` (physical view). The chassis model works well for equipment that is "contained within a sheet metal box", but the terminology and concept becomes confusing when describing equipment placed in a room.

This was addressed by the addition of the `Facility` schema to describe a room or other physical location that can contain equipment and likely has relationships to other facilities. Many of the concepts from the `Chassis` schema were applied to `Facility`, including the ability to nest facilities (e.g., a Room is contained by a Floor or Building).

Some equipment may be truly contained by a room, rather than a chassis, and so the data model allows some equipment, including `CoolingLoop`, to be contained directly by a `Facility`.

### 2.2.1 Cooling Domain

One of the primary associations within a facility is the physical relationship of equipment connected to external or

facility-level cooling loops, or otherwise affected by environmental conditions within a physical space. The CoolingDomain schema allows the user to map a cooling "zone" or fault domain to a list of gear that are served by a cooling system.

# 3 Thermal Equipment resource tree

Below is a diagram of the resource tree, starting at the Redfish Service Root, containing all resources used to model a rack-based Cooling Distribution Unit (CDU). Other types of cooling systems, such as immersion cooling units, follow the same model. The individual resources are detailed in the following sections.

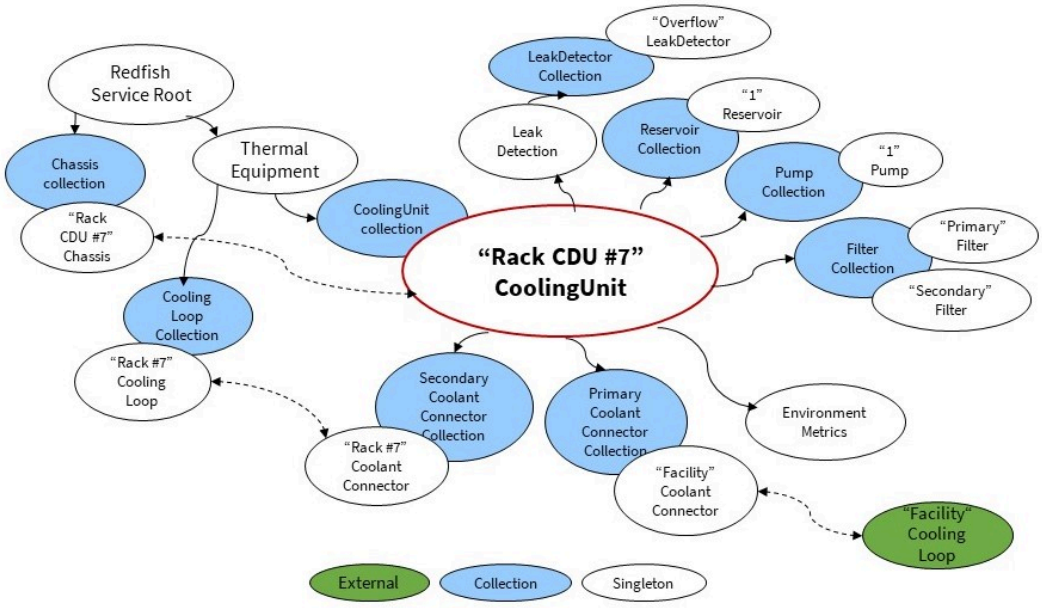


*Figure 1: Resource Tree for Thermal Equipment*

## 3.1 Thermal Equipment

A new resource, linked from the Service Root, was added to contain all links to cooling equipment and any future properties that may relate to cooling, heating, or environmental systems in general. The `ThermalEquipment` resource can be used to quickly determine the types of equipment supported by the Service. It also allows for future additions to the schema without requiring changes to the `ServiceRoot` schema.

## 3.2 Cooling Unit

The main resource for describing a cooling system component is the `CoolingUnit` schema and resource. As various types of cooling distribution gear follow a very similar model (cooling loop connections, temperature and pressure measurements, and general product identification), these are all modeled using a single schema. This schema is

then used to populate a number of Resource Collections, grouped by the type of equipment, but all sharing the same schema definition.

In this work-in-progress release of the schema, there are separate Resource Collections for Cooling Distribution Units (CDUs), Immersion Cooling units, Air Conditioners (also known as CRAC units), and Air Handlers. These proposed collections are intended to allow similar gear to be grouped together to match common management use cases. The list of collections for the v1.0 release will depend on feedback, with collections added or removed for the initial release.

For each cooling unit instance, there are a number of subordinate resources and resource collections that describe the various components, connections, and subsystems that may be present.

## 3.3 Cooling Loops

Large-scale cooling equipment are generally connected through "loops", which can describe either a primary or facility level system (e.g. chilled water loop) or a secondary or "technology" loop that services the IT equipment in a single rack. These are modeled by a `CoolingLoop` resource, which contains both product information and shows the connections (as links to other resources) to and from the loop. Besides providing the basic inventory functions, this resource is intended to enable software to follow the flow of coolant through its entire cycle in a facility-level cooling system.

## 3.4 Coolant Connectors

The primary monitoring points within a cooling system are at the supply and return connections for a particular piece of equipment. These are treated similar to a `Circuit` or `Outlet` in a power distribution system. A `CoolantConnector` can model both a supply and return in a single resource instance, as in general, a user is concerned with the change in coolant condition, so providing measurements for both is efficient for client software.

# 4 Schema Guide (Work in Progress)

## 4.1 Chassis 1.23.0

| **Version** | *v1.23* | *v1.22* | *v1.21* | *v1.20* | *v1.19* | *v1.18* | *v1.17* | *v1.16* | *v1.15* | *v1.14* | *v1.13* | ... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Release** | 2023.1 | 2022.3 | 2022.2 | 2022.1 | 2021.4 | 2021.3 | 2021.2 | 2021.1 | 2020.4 | 2020.3 | 2020.2 | ... |

### 4.1.1 Description

The Chassis schema represents the physical components of a system. This resource represents the sheet-metal confined spaces and logical zones such as racks, enclosures, chassis and all other containers. Subsystems, such as sensors, that operate outside of a system's data plane are linked either directly or indirectly through this resource. A subsystem that operates outside of a system's data plane are not accessible to software that runs on the system. It also describes the location, such as a slot, socket, or bay, where a unit can be installed, by populating a resource instance with an absent state if a unit is not present.

### 4.1.2 URIs

/redfish/v1/Chassis/*{ChassisId}*

### 4.1.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Assembly** *(v1.6+)* {} | object | | The link to the assembly associated with this chassis. See the *Assembly* schema for details on this property. |
| **AssetTag** | string | *read-write (null)* | The user-assigned asset tag of this chassis. |
| **Certificates** *(v1.15+)* { | object | | The link to a collection of certificates for device identity and attestation. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Certificate*. See the Certificate schema for details. |
| } | | | |
| **ChassisType** | string (enum) | *read-only required* | The type of physical form factor of the chassis. *For the possible property values, see ChassisType in Property details.* |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Controls** *(v1.17+)* { | object | | The link to the collection of controls located in this chassis. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Control*. See the Control schema for details. |
| } | | | |
| **DepthMm** *(v1.4+)* | number (mm) | *read-only (null)* | The depth of the chassis. |
| **Drives** *(v1.14+)* { | object | | The link to the collection of drives within this chassis. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Drive*. See the Drive schema for details. |
| } | | | |
| **ElectricalSourceManagerURIs** *(v1.18+)* [ ] | array (URI) (string, null) | *read-write* | The URIs of the management interfaces for the upstream electrical source connections for this chassis. |
| **ElectricalSourceNames** *(v1.18+)* [ ] | array (string, null) | *read-write* | The names of the upstream electrical sources, such as circuits or outlets, connected to this chassis. |
| **EnvironmentalClass** *(v1.9+)* | string (enum) | *read-write (null)* | The ASHRAE Environmental Class for this chassis. *For the possible property values, see EnvironmentalClass in Property details.* |
| **EnvironmentMetrics** *(v1.15+)* { | object | | The link to the environment metrics for this chassis. See the *EnvironmentMetrics* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a EnvironmentMetrics resource. See the Links section and the *EnvironmentMetrics* schema for details. |
| } | | | |
| **FabricAdapters** *(v1.20+)* { | object | | The link to the collection of fabric adapters located in this chassis that provide access to fabric-related resource pools. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *FabricAdapter*. See the FabricAdapter schema for details. |
| } | | | |
| **HeightMm** *(v1.4+)* | number (mm) | *read-only (null)* | The height of the chassis. |
| **HotPluggable** *(v1.21+)* | boolean | *read-only (null)* | An indication of whether this component can be inserted or removed while the equipment is in operation. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **IndicatorLED** *(deprecated v1.14)* | string (enum) | *read-write (null)* | The state of the indicator LED, which identifies the chassis. *For the possible property values, see IndicatorLED in Property details. Deprecated in v1.14 and later. This property has been deprecated in favor of the LocationIndicatorActive property.* |
| **Links** { | object | | The links to other resources that are related to this resource. |
| **Cables** *(v1.17+)* [ { } ] | array (object) | | An array of links to the cables connected to this chassis. See the *Cable* schema for details on this property. |
| **Cables@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ComputerSystems** [ { } ] | array (object) | | An array of links to the computer systems that this chassis directly and wholly contains. See the *ComputerSystem* schema for details on this property. |
| **ComputerSystems@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ContainedBy** { | object | | The link to the chassis that contains this chassis. |
| **@odata.id** | string | *read-write* | Link to another Chassis resource. |
| } | | | |
| **Contains** [ { | array | | An array of links to any other chassis that this chassis has in it. |
| **@odata.id** | string | *read-write* | Link to another Chassis resource. |
| } ] | | | |
| **Contains@odata.count** | integer | *read-only* | The number of items in a collection. |
| **CooledBy** *(deprecated v1.20)* [ { | array | | An array of links to resources or objects that cool this chassis. Normally, the link is for either a chassis or a specific set of fans. *Deprecated in v1.20 and later. This property has been deprecated in favor of the Fans link property, and details provided in the ThermalSubsystem resource.* |
| **@odata.id** | string (URI) | *read-only* | The unique identifier for a resource. |
| } ] | | | |
| **CooledBy@odata.count** | integer | *read-only* | The number of items in a collection. |
| **CoolingLoops** *(v1.23+)* [ { | array | | An array of links to cooling loops contained in this chassis. |
| **@odata.id** | string | *read-write* | Link to a CoolingLoop resource. See the Links section and the *CoolingLoop* schema for details. |
| } ] | | | |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **CoolingLoops@odata.count** | integer | *read-only* | The number of items in a collection. |
| **CoolingUnit** *(v1.23+)* { | object | *(null)* | A link to cooling unit functionality contained in this chassis. See the *CoolingUnit* schema for details on this property. |
| **@odata.id** | string | *read-write* | Link to a CoolingUnit resource. See the Links section and the *CoolingUnit* schema for details. |
| } | | | |
| **Drives** *(v1.2+)* [ { } ] | array (object) | | An array of links to the drives located in this chassis. See the *Drive* schema for details on this property. |
| **Drives@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Facility** *(v1.11+)* { | object | | The link to the facility that contains this chassis. See the *Facility* schema for details on this property. |
| **@odata.id** | string | *read-write* | Link to a Facility resource. See the Links section and the *Facility* schema for details. |
| } | | | |
| **Fans** *(v1.20+)* [ { } ] | array (object) | | An array of links to the fans that cool this chassis. See the *Fan* schema for details on this property. |
| **Fans@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ManagedBy** [ { } ] | array (object) | | An array of links to the managers responsible for managing this chassis. See the *Manager* schema for details on this property. |
| **ManagedBy@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ManagersInChassis** *(v1.2+)* [ { } ] | array (object) | | An array of links to the managers located in this chassis. See the *Manager* schema for details on this property. |
| **ManagersInChassis@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| **PCIeDevices** *(v1.4+, deprecated v1.10* [ { } ] | array (object) | | An array of links to the PCIe devices located in this chassis. See the *PCIeDevice* schema for details on this property. *Deprecated in v1.10 and later. This property has been deprecated in favor of the PCIeDevices resource collection in the root of this resource.* |
| **PCIeDevices@odata.count** | integer | *read-only* | The number of items in a collection. |
| **PowerDistribution** *(v1.20+)* {} | object | *(null)* | A link to power distribution functionality contained in this chassis. See the *PowerDistribution* schema for details on this property. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **PowerOutlets** *(v1.18+)* [ { } ] | array (object) | | An array of links to the outlets that provide power to this chassis. See the *Outlet* schema for details on this property. |
| **PowerOutlets@odata.count** | integer | *read-only* | The number of items in a collection. |
| **PowerSupplies** *(v1.20+)* [ { } ] | array (object) | | An array of links to the power supplies that provide power to this chassis. See the *PowerSupply* schema for details on this property. |
| **PowerSupplies@odata.count** | integer | *read-only* | The number of items in a collection. |
| **PoweredBy** *(deprecated v1.20)* [ { | array | | An array of links to resources or objects that power this chassis. Normally, the link is for either a chassis or a specific set of power supplies. *Deprecated in v1.20 and later. This property has been deprecated in favor of the PowerOutlets and PowerSupplies link properties, and details provided in the PowerSubsystem resource.* |
| **@odata.id** | string (URI) | *read-only* | The unique identifier for a resource. |
| } ] | | | |
| **PoweredBy@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Processors** *(v1.9+)* [ { } ] | array (object) | | An array of links to the processors located in this chassis. See the *Processor* schema for details on this property. |
| **Processors@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ResourceBlocks** *(v1.5+)* [ { } ] | array (object) | | An array of links to the resource blocks located in this chassis. See the *ResourceBlock* schema for details on this property. |
| **ResourceBlocks@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Storage** *(v1.2+)* [ { } ] | array (object) | | An array of links to the storage subsystems connected to or inside this chassis. See the *Storage* schema for details on this property. |
| **Storage@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Switches** *(v1.7+)* [ { } ] | array (object) | | An array of links to the switches located in this chassis. See the *Switch* schema for details on this property. |
| **Switches@odata.count** | integer | *read-only* | The number of items in a collection. |
| } | | | |
| **Location** *(v1.2+)* {} | object | | The location of the chassis. See the *Resource* schema for details on this property. |
| **LocationIndicatorActive** *(v1.14+)* | boolean | *read-write (null)* | An indicator allowing an operator to physically locate this resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **LogServices** { | object | | The link to the logs for this chassis. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *LogService*. See the LogService schema for details. |
| } | | | |
| **Manufacturer** | string | *read-only (null)* | The manufacturer of this chassis. |
| **MaxPowerWatts** *(v1.12+)* | number (Watts) | *read-only (null)* | The upper bound of the total power consumed by the chassis. |
| **Measurements** *(v1.15+, deprecated v1.19* [ { } ] | array (object) | | An array of DSP0274-defined measurement blocks. See the *SoftwareInventory* schema for details on this property. *Deprecated in v1.19 and later. This property has been deprecated in favor of the ComponentIntegrity resource.* |
| **MediaControllers** *(v1.11+, deprecated v1.20* { | object | | The link to the collection of media controllers located in this chassis. Contains a link to a resource. *Deprecated in v1.20 and later. This property has been deprecated in favor of FabricAdapters.* |
| **@odata.id** | string | *read-only* | Link to Collection of *MediaController*. See the MediaController schema for details. |
| } | | | |
| **Memory** *(v1.11+)* { | object | | The link to the collection of memory located in this chassis that belong to fabric-related resource pools. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Memory*. See the Memory schema for details. |
| } | | | |
| **MemoryDomains** *(v1.11+)* { | object | | The link to the collection of memory domains located in this chassis that belong to fabric-related resource pools. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *MemoryDomain*. See the MemoryDomain schema for details. |
| } | | | |
| **MinPowerWatts** *(v1.12+)* | number (Watts) | *read-only (null)* | The lower bound of the total power consumed by the chassis. |
| **Model** | string | *read-only (null)* | The model number of the chassis. |
| **NetworkAdapters** *(v1.4+)* { | object | | The link to the collection of network adapters associated with this chassis. Contains a link to a resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-only* | Link to Collection of *NetworkAdapter*. See the NetworkAdapter schema for details. |
| } | | | |
| **PartNumber** | string | *read-only (null)* | The part number of the chassis. |
| **PCIeDevices** *(v1.10+)* { | object | | The link to the collection of PCIe devices located in this chassis. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *PCIeDevice*. See the PCIeDevice schema for details. |
| } | | | |
| **PCIeSlots** *(v1.8+)* {} | object | | The link to the PCIe slot properties for this chassis. See the *PCIeSlots* schema for details on this property. |
| **PhysicalSecurity** *(v1.1+)* { | object | | The physical security state of the chassis. |
| **IntrusionSensor** *(v1.1+)* | string (enum) | *read-write (null)* | The physical security state of the chassis, such as if hardware intrusion is detected. *For the possible property values, see IntrusionSensor in Property details.* |
| **IntrusionSensorNumber** *(v1.1+, deprecated v1.22* | integer | *read-only (null)* | A numerical identifier to represent the physical security sensor. *Deprecated in v1.22 and later. This property has been deprecated in order to allow for multiple physical sensors to construct this object.* |
| **IntrusionSensorReArm** *(v1.1+)* | string (enum) | *read-only (null)* | The policy that describes how the physical security state of the chassis returns to a normal state. *For the possible property values, see IntrusionSensorReArm in Property details.* |
| } | | | |
| **Power** *(deprecated v1.15)* {} | object | | The link to the power properties, or power supplies, power policies, and sensors, for this chassis. See the *Power* schema for details on this property. *Deprecated in v1.15 and later. This link has been deprecated in favor of the PowerSubsystem link property.* |
| **PoweredByParent** *(v1.20+)* | boolean | *read-only (null)* | Indicates that the chassis receives power from the containing chassis. |
| **PowerState** *(v1.0.1+)* | string (enum) | *read-only (null)* | The current power state of the chassis. *For the possible property values, see PowerState in Property details.* |
| **PowerSubsystem** *(v1.15+)* {} | object | | The link to the power subsystem properties for this chassis. See the *PowerSubsystem* schema for details on this property. |
| **Processors** *(v1.22+)* { | object | | The link to the collection of processors located in this chassis that belong to fabric-related resource pools. Contains a link to a resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-only* | Link to Collection of *Processor*. See the Processor schema for details. |
| } | | | |
| **Replaceable** *(v1.21+)* | boolean | *read-only (null)* | An indication of whether this component can be independently replaced as allowed by the vendor's replacement policy. |
| **Sensors** *(v1.9+)* { | object | | The link to the collection of sensors located in the equipment and sub-components. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Sensor*. See the Sensor schema for details. |
| } | | | |
| **SerialNumber** | string | *read-only (null)* | The serial number of the chassis. |
| **SKU** | string | *read-only (null)* | The SKU of the chassis. |
| **SparePartNumber** *(v1.16+)* | string | *read-only (null)* | The spare part number of the chassis. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **Thermal** *(deprecated v1.15)* {} | object | | The link to the thermal properties, such as fans, cooling, and sensors, for this chassis. See the *Thermal* schema for details on this property. *Deprecated in v1.15 and later. This link has been deprecated in favor of the ThermalSubsystem link property.* |
| **ThermalDirection** *(v1.20+)* | string (enum) | *read-only (null)* | Indicates the thermal management path through the chassis. *For the possible property values, see ThermalDirection in Property details.* |
| **ThermalManagedByParent** *(v1.20+)* | boolean | *read-only (null)* | Indicates that the chassis is thermally managed by the parent chassis. |
| **ThermalSubsystem** *(v1.15+)* { | object | | The link to the thermal subsystem properties for this chassis. See the *ThermalSubsystem* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a ThermalSubsystem resource. See the Links section and the *ThermalSubsystem* schema for details. |
| } | | | |
| **TrustedComponents** *(v1.21+)* { | object | | The link to the trusted components in this chassis. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *TrustedComponent*. See the TrustedComponent schema for details. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| } | | | |
| **UUID** *(v1.7+)* | string (uuid) | *read-only (null)* | The UUID for this chassis. |
| **Version** *(v1.21+)* | string | *read-only (null)* | The hardware version of this chassis. |
| **WeightKg** *(v1.4+)* | number (kg) | *read-only (null)* | The weight of the chassis. |
| **WidthMm** *(v1.4+)* | number (mm) | *read-only (null)* | The width of the chassis. |

## 4.1.4 Actions

### 4.1.4.1 Reset

**Description**

This action resets the chassis but does not reset systems or other contained resources, although side effects can occur that affect those resources.

**Action URI: {Base URI of target resource}/Actions/Chassis.Reset**

**Action parameters**

| Parameter Name | Type | Attributes | Notes |
|---|---|---|---|
| **ResetType** | string (enum) | *optional* | The type of reset. *For the possible property values, see ResetType in Property details.* |

**Request Example**

```
{
    "ResetType": "ForceRestart"
}
```

## 4.1.5 Property details

### 4.1.5.1 ChassisType:

The type of physical form factor of the chassis.

| string | Description |
|---|---|
| Blade | An enclosed or semi-enclosed, typically vertically-oriented, system chassis that must be plugged into a multi-system chassis to function normally. |
| Card | A loose device or circuit board intended to be installed in a system or other enclosure. |
| Cartridge | A small self-contained system intended to be plugged into a multi-system chassis. |
| Component | A small chassis, card, or device that contains devices for a particular subsystem or function. |
| Drawer | An enclosed or semi-enclosed, typically horizontally-oriented, system chassis that can be slid into a multi-system chassis. |
| Enclosure | A generic term for a chassis that does not fit any other description. |
| Expansion | A chassis that expands the capabilities or capacity of another chassis. |
| HeatExchanger *(v1.23+)* | A heat exchanger. |
| ImmersionTank *(v1.23+)* | An immersion cooling tank. |
| IPBasedDrive *(v1.3+)* | A chassis in a drive form factor with IP-based network connections. |
| Module | A small, typically removable, chassis or card that contains devices for a particular subsystem or function. |
| Other | A chassis that does not fit any of these definitions. |
| Pod | A collection of equipment racks in a large, likely transportable, container. |
| Rack | An equipment rack, typically a 19-inch wide freestanding unit. |
| RackGroup *(v1.4+)* | A group of racks that form a single entity or share infrastructure. |
| RackMount | A single-system chassis designed specifically for mounting in an equipment rack. |
| Row | A collection of equipment racks. |
| Shelf | An enclosed or semi-enclosed, typically horizontally-oriented, system chassis that must be plugged into a multi-system chassis to function normally. |

| string | Description |
|---|---|
| Sidecar | A chassis that mates mechanically with another chassis to expand its capabilities or capacity. |
| Sled | An enclosed or semi-enclosed, system chassis that must be plugged into a multi-system chassis to function normally similar to a blade type chassis. |
| StandAlone | A single, free-standing system, commonly called a tower or desktop chassis. |
| StorageEnclosure *(v1.6+)* | A chassis that encloses storage. |
| Zone | A logical division or portion of a physical chassis that contains multiple devices or systems that cannot be physically separated. |

#### 4.1.5.2 EnvironmentalClass:

The ASHRAE Environmental Class for this chassis.

| string | Description |
|---|---|
| A1 | ASHRAE Environmental Class 'A1'. |
| A2 | ASHRAE Environmental Class 'A2'. |
| A3 | ASHRAE Environmental Class 'A3'. |
| A4 | ASHRAE Environmental Class 'A4'. |

#### 4.1.5.3 IndicatorLED:

The state of the indicator LED, which identifies the chassis.

| string | Description |
|---|---|
| Blinking | The indicator LED is blinking. |
| Lit | The indicator LED is lit. |
| Off | The indicator LED is off. |
| Unknown *(deprecated v1.2)* | The state of the indicator LED cannot be determined. *Deprecated in v1.2 and later. This value has been deprecated in favor of returning null if the state is unknown.* |

#### 4.1.5.4 IntrusionSensor:

The physical security state of the chassis, such as if hardware intrusion is detected.

| string | Description |
|---|---|
| HardwareIntrusion | A door, lock, or other mechanism protecting the internal system hardware from being accessed is detected to be in an insecure state. |
| Normal | No abnormal physical security condition is detected at this time. |
| TamperingDetected | Physical tampering of the monitored entity is detected. |

#### 4.1.5.5 IntrusionSensorReArm:

The policy that describes how the physical security state of the chassis returns to a normal state.

| string | Description |
|---|---|
| Automatic | The sensor is automatically restored to the normal state when no security condition is detected. |
| Manual | A user is required to clear the sensor to restore it to the normal state. |

#### 4.1.5.6 PowerState:

The current power state of the chassis.

| string | Description |
|---|---|
| Off | The resource is powered off. The components within the resource might continue to have AUX power. |
| On | The resource is powered on. |
| Paused | The resource is paused. |
| PoweringOff | A temporary state between on and off. The components within the resource can take time to process the power off action. |
| PoweringOn | A temporary state between off and on. The components within the resource can take time to process the power on action. |

#### 4.1.5.7 ResetType:

The type of reset.

| string | Description |
|---|---|
| ForceOff | Turn off the unit immediately (non-graceful shutdown). |
| ForceOn | Turn on the unit immediately. |
| ForceRestart | Shut down immediately and non-gracefully and restart the system. |
| GracefulRestart | Shut down gracefully and restart the system. |
| GracefulShutdown | Shut down gracefully and power off. |
| Nmi | Generate a diagnostic interrupt, which is usually an NMI on x86 systems, to stop normal operations, complete diagnostic actions, and, typically, halt the system. |
| On | Turn on the unit. |
| Pause | Pause execution on the unit but do not remove power. This is typically a feature of virtual machine hypervisors. |
| PowerCycle | Power cycle the unit. Behaves like a full power removal, followed by a power restore to the resource. |
| PushPowerButton | Simulate the pressing of the physical power button on this unit. |
| Resume | Resume execution on the paused unit. This is typically a feature of virtual machine hypervisors. |
| Suspend | Write the state of the unit to disk before powering off. This allows for the state to be restored when powered back on. |

#### 4.1.5.8 ThermalDirection:

Indicates the thermal management path through the chassis.

| string | Description |
|---|---|
| BackToFront | A chassis with the air intake in the back and exhaust out the front. |
| FrontToBack | A chassis with the air intake in the front and exhaust out the back. |
| Sealed | A sealed chassis with no air pathway. |
| TopExhaust | A chassis with air exhaust on the top. |

### 4.1.6 Example response


```
{
    "@odata.type": "#Chassis.v1_22_0.Chassis",
    "Id": "1U",
    "Name": "Computer System Chassis",
```

```
    "ChassisType": "RackMount",
    "AssetTag": "Chicago-45Z-2381",
    "Manufacturer": "Contoso",
    "Model": "3500RX",
    "SKU": "8675309",
    "SerialNumber": "437XR1138R2",
    "PartNumber": "224071-J23",
    "PowerState": "On",
    "LocationIndicatorActive": true,
    "Location": {
        "Placement": {
            "Row": "North",
            "Rack": "WEB43",
            "RackOffsetUnits": "EIA_310",
            "RackOffset": 12
        }
    },
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "HeightMm": 44.45,
    "WidthMm": 431.8,
    "DepthMm": 711,
    "WeightKg": 15.31,
    "EnvironmentalClass": "A3",
    "Sensors": {
        "@odata.id": "/redfish/v1/Chassis/1U/Sensors"
    },
    "PowerSubsystem": {
        "@odata.id": "/redfish/v1/Chassis/1U/PowerSubsystem"
    },
    "ThermalSubsystem": {
        "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem"
    },
    "EnvironmentMetrics": {
        "@odata.id": "/redfish/v1/Chassis/1U/EnvironmentMetrics"
    },
    "Links": {
        "ComputerSystems": [
            {
                "@odata.id": "/redfish/v1/Systems/437XR1138R2"
            }
        ],
        "ManagedBy": [
            {
                "@odata.id": "/redfish/v1/Managers/BMC"
            }
        ],
        "ManagersInChassis": [
```

```
            {
                "@odata.id": "/redfish/v1/Managers/BMC"
            }
        ],
        "Oem": {}
    },
    "Oem": {},
    "@odata.id": "/redfish/v1/Chassis/1U"
}
```

## 4.2 Control 1.3.0

| **Version** | *v1.3* | *v1.2* | *v1.1* | *v1.0* |
|---|---|---|---|---|
| **Release** | 2023.1 | 2022.2 | 2021.4 | 2021.2 |

### 4.2.1 Description

The Control schema describes a control point and its properties.

### 4.2.2 URIs

/redfish/v1/Chassis/*{ChassisId}*/Controls/*{ControlId}*

### 4.2.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Accuracy** | number (%) | *read-only (null)* | The estimated percent error of measured versus actual values. |
| **AllowableMax** | number | *read-only (null)* | The maximum possible setting for this control. |
| **AllowableMin** | number | *read-only (null)* | The minimum possible setting for this control. |
| **AllowableNumericValues** [ ] | array (number, null) | *read-only* | The supported values for the set point. |
| **AssociatedSensors** [ { | array | | An array of links to the sensors associated with this control. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-only* | Link to a Sensor resource. See the Links section and the *Sensor* schema for details. |
| } ] | | | |
| **ControlDelaySeconds** | number | *read-write (null)* | The time delay in seconds before the control will activate once the value has deviated from the set point. |
| **ControlLoop** { | object | *(null)* | The control loop details. |
| **CoefficientUpdateTime** | string (date-time) | *read-only (null)* | The date and time that the control loop coefficients were changed. |
| **Differential** | number | *read-write (null)* | The differential coefficient. |
| **Integral** | number | *read-write (null)* | The integral coefficient. |
| **Proportional** | number | *read-write (null)* | The proportional coefficient. |
| } | | | |
| **ControlMode** | string (enum) | *read-write (null)* | The current operating mode of the control. *For the possible property values, see ControlMode in Property details.* |
| **ControlType** | string (enum) | *read-only (null)* | The type of control. *For the possible property values, see ControlType in Property details.* |
| **DeadBand** | number | *read-write (null)* | The maximum deviation from the set point allowed before the control will activate. |
| **DefaultSetPoint** *(v1.3+)* | number | *read-only (null)* | The default set point of the control. |
| **Implementation** | string (enum) | *read-only (null)* | The implementation of the control. *For the possible property values, see Implementation in Property details.* |
| **Increment** | number | *read-only (null)* | The smallest increment supported for the set point. |
| **Location** {} | object | | The location information for this control. See the *Resource* schema for details on this property. |
| **PhysicalContext** | string (enum) | *read-only (null)* | The area or device to which this control applies. *For the possible property values, see PhysicalContext in Property details.* |
| **PhysicalSubContext** | string (enum) | *read-only (null)* | The usage or location within a device to which this control applies. *For the possible property values, see PhysicalSubContext in Property details.* |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **RelatedItem** [ { | array | | An array of links to resources that this control services. |
| **@odata.id** | string (URI) | *read-only* | The unique identifier for a resource. |
| } ] | | | |
| **Sensor** { | object (excerpt) | | The sensor reading associated with this control. This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri. |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this sensor. |
| **Reading** | number | *read-only (null)* | The sensor value. |
| } | | | |
| **SetPoint** | number | *read-write (null)* | The desired set point of the control. |
| **SetPointType** | string (enum) | *read-only (null)* | The set point type used to operate the control. *For the possible property values, see SetPointType in Property details.* |
| **SetPointUnits** | string | *read-only (null)* | The units of the set point. |
| **SetPointUpdateTime** | string (date-time) | *read-only (null)* | The date and time that the set point was changed. |
| **SettingMax** | number | *read-write (null)* | The maximum set point in the allowed range. |
| **SettingMin** | number | *read-write (null)* | The minimum set point in the allowed range. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |

## 4.2.4 Actions

### 4.2.4.1 ResetToDefaults *(v1.2+)*

**Description**

The action resets the values of writable properties to factory defaults.

**Action URI: {Base URI of target resource}/Actions/Control.ResetToDefaults**

**Action parameters**

This action takes no parameters.

## 4.2.5 Property details

### 4.2.5.1 ControlMode:

The current operating mode of the control.

| string | Description |
|---|---|
| Automatic | Automatically adjust control to meet the set point. |
| Disabled | The control has been disabled. |
| Manual | No automatic adjustments are made to the control. |
| Override | User override of the automatic set point value. |

### 4.2.5.2 ControlType:

The type of control.

| string | Description |
|---|---|
| Frequency | Frequency (Hz) control. |
| FrequencyMHz *(v1.1+)* | Frequency (MHz) control. |
| Power | Power (W) control or power limit. |
| Pressure *(v1.1+, deprecated v1.3)* | Pressure (kPa) control. *Deprecated in v1.3 and later. This value has been deprecated in favor of* `PressurekPa` *for units consistency with the equivalent Sensor resource ReadingType value.* |
| PressurekPa *(v1.3+)* | Pressure (kPa) control. |
| Temperature | Temperature (C) control or thermostat. |
| Valve *(v1.3+)* | Valve (% open) control. |

### 4.2.5.3 Implementation:

The implementation of the control.

| string | Description |
|---|---|
| Direct | The set point directly affects the control value. |
| Monitored | A physical control that cannot be adjusted through this interface. |
| Programmable | The set point can be adjusted through this interface. |

#### 4.2.5.4 PhysicalContext:

The area or device to which this control applies.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |
| Backplane | A backplane within the chassis. |
| Battery | A battery. |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |

| string | Description |
| --- | --- |
| Fan | A fan. |
| FPGA | An FPGA. |
| Front | The front of the chassis. |
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |

| string | Description |
|---|---|
| Upper | The upper portion of the chassis. |
| VoltageRegulator | A voltage regulator device. |

#### 4.2.5.5 PhysicalSubContext:

The usage or location within a device to which this control applies.

| string | Description |
|---|---|
| Input | The input. |
| Output | The output. |

#### 4.2.5.6 SetPointType:

The set point type used to operate the control.

| string | Description |
|---|---|
| Range | Control uses a range of values. |
| Single | Control uses a single set point. |

### 4.2.6 Example response

```
{
    "@odata.type": "#Control.v1_2_0.Control",
    "Id": "PowerLimit",
    "Name": "System Power Limit",
    "PhysicalContext": "Chassis",
    "ControlType": "Power",
    "ControlMode": "Automatic",
    "SetPoint": 500,
    "SetPointUnits": "W",
    "AllowableMax": 1000,
    "AllowableMin": 150,
    "Sensor": {
        "Reading": 374,
        "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/TotalPower"
    },
```

```
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "@odata.id": "/redfish/v1/Chassis/1U/Controls/PowerLimit"
}
```


## 4.3 CoolantConnector 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2023.1 |

### 4.3.1 Description

This schema describes a liquid coolant connector, including any associated instrumentation.

### 4.3.2 URIs

/redfish/v1/Chassis/*{ChassisId}*/ThermalSubsystem/CoolantConnectors/*{CoolantConnectorId}*
/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/PrimaryCoolantConnectors/*{CoolantConnectorId}*
/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/SecondaryCoolantConnectors/*{CoolantConnectorId}*
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/PrimaryCoolantConnectors/*{CoolantConnectorId}*
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/SecondaryCoolantConnectors/*{CoolantConnectorId}*

### 4.3.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Coolant** { | object | | Details about the coolant used in this unit. See the *CoolingLoop* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a Coolant resource. See the Links section and the *CoolingLoop* schema for details. |
| } | | | |
| **CoolantConnectorType** | string (enum) | *read-only* *(null)* | The type of CoolantConnector. *For the possible property values, see CoolantConnectorType in Property details.* |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **CoolingLoopName** | string | *read-write (null)* | The name of the cooling loop attached to this interface. |
| **CoolingLoopType** | string (enum) | *read-only (null)* | The type of cooling loop connected. *For the possible property values, see CoolingLoopType in Property details.* |
| **CoolingManagerUri** | string (URI) | *read-write (null)* | The link to the application that manages the cooling loop. |
| **DeltaPressurekPa** {} | object | | The differential pressure (kPa). For more information about this property, see SensorExcerpt in Property Details. |
| **DeltaTemperatureCelsius** {} | object | | The differential temperature (C). For more information about this property, see SensorExcerpt in Property Details. |
| **DrainValvePercent** { | object (excerpt) | | The drain valve control. This object is an excerpt of the *Control* resource located at the URI shown in DataSourceUri. |
| **AllowableMax** | number | *read-only (null)* | The maximum possible setting for this control. |
| **AllowableMin** | number | *read-only (null)* | The minimum possible setting for this control. |
| **ControlMode** | string (enum) | *read-write (null)* | The current operating mode of the control. *For the possible property values, see ControlMode in Property details.* |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this control. |
| **Reading** | number | *read-only (null)* | The reading of the sensor associated with this control. |
| } | | | |
| **FlowLitersPerMinute** {} | object | | The liquid flow (L/min). For more information about this property, see SensorExcerpt in Property Details. |
| **Links** { | object | | The links to other resources that are related to this resource. |
| **Chassis** [ { | array | | Any array of links to chassis connected by this coolant connector. |
| **@odata.id** | string | *read-write* | Link to a Chassis resource. See the Links section and the *Chassis* schema for details. |
| } ] | | | |
| **Chassis@odata.count** | integer | *read-only* | The number of items in a collection. |
| **CoolingLoop** { | object | *(null)* | A link to the connected cooling loop. See the *CoolingLoop* schema for details on this property. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-write* | Link to a CoolingLoop resource. See the Links section and the *CoolingLoop* schema for details. |
| } | | | |
| **CoolingUnit** { | object | *(null)* | A link to the connected cooling unit. See the *CoolingUnit* schema for details on this property. |
| **@odata.id** | string | *read-write* | Link to a CoolingUnit resource. See the Links section and the *CoolingUnit* schema for details. |
| } | | | |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **LocationIndicatorActive** | boolean | *read-write* *(null)* | An indicator allowing an operator to physically locate this resource. |
| **RatedFlowLitersPerMinute** | number (L/min) | *read-only* *(null)* | The rated liquid flow (L/min) for this loop interface. |
| **RatedFlowPressurekPa** | number (kPa) | *read-only* *(null)* | The pressure (kPa) at which the rated liquid flow is valid. |
| **RatedPressurekPa** | number (kPa) | *read-only* *(null)* | The rated pressure (kPa) for this connector. |
| **ReturnFlowValve** {} | object | | The supply flow control. For more information about this property, see ControlMixedUnitsExcerpt in Property Details. |
| **ReturnPressurekPa** {} | object | | The return pressure (kPa). For more information about this property, see SensorExcerpt in Property Details. |
| **ReturnTemperatureCelsius** {} | object | | The return temperature (C). For more information about this property, see SensorExcerpt in Property Details. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **SupplyFlowValve** {} | object | | The supply flow control. For more information about this property, see ControlMixedUnitsExcerpt in Property Details. |
| **SupplyPressurekPa** {} | object | | The supply pressure (kPa). For more information about this property, see SensorExcerpt in Property Details. |
| **SupplyTemperatureCelsius** {} | object | | The supply temperature (C). For more information about this property, see SensorExcerpt in Property Details. |

## 4.3.4 Actions

#### 4.3.4.1 ResetMetrics

**Description**

This action resets metrics related to this CoolantConnector.

**Action URI: {Base URI of target resource}/Actions/CoolantConnector.ResetMetrics**

**Action parameters**

This action takes no parameters.

## 4.3.5 Property details

#### 4.3.5.1 ControlMixedUnitsExcerpt:

The Control schema describes a control point and its properties. This object is an excerpt of the *Control* resource located at the URI shown in DataSourceUri.

| | | | |
|---|---|---|---|
| **AllowableMax** | number | *read-only (null)* | The maximum possible setting for this control. |
| **AllowableMin** | number | *read-only (null)* | The minimum possible setting for this control. |
| **ControlMode** | string (enum) | *read-write (null)* | The current operating mode of the control. *For the possible property values, see ControlMode in Property details.* |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this control. |
| **Reading** | number | *read-only (null)* | The reading of the sensor associated with this control. |
| **ReadingUnits** | string | *read-only (null)* | The units of the sensor reading associated with this control. |

| | | | |
|---|---|---|---|
| **SetPointUnits** | string | *read-only (null)* | The units of the set point. |

#### 4.3.5.2 ControlMode:

The current operating mode of the control.

| string | Description |
|---|---|
| Automatic | Automatically adjust control to meet the set point. |
| Disabled | The control has been disabled. |
| Manual | No automatic adjustments are made to the control. |
| Override | User override of the automatic set point value. |

#### 4.3.5.3 CoolantConnectorType:

The type of CoolantConnector.

| string | Description |
|---|---|
| Closed | A closed or self-contained loop. |
| Inline | An inline connection or measurement point. |
| Pair | A connection pair. |
| Return | A return or outflow connection. |
| Supply | A supply or intake connection. |

#### 4.3.5.4 CoolingLoopType:

The type of cooling loop connected.

| string | Description |
|---|---|
| Condenser | A Condenser Water System (CWS). |
| Facility | A Facilities Water System (FWS). |

| string | Description |
|---|---|
| Immersion | A tank or other form of immersion cooling. |
| Internal | A loop fully contained within a chassis. |
| Manifold | A manifold. |
| Technology | A Technology Cooling System (TCS). |

#### 4.3.5.5 SensorExcerpt:

The Sensor schema describes a sensor and its properties. This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri.

| | | | |
|---|---|---|---|
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this sensor. |
| **Reading** | number | *read-only (null)* | The sensor value. |

### 4.3.6 Example response


```
{
    "@odata.type": "#CoolantConnector.v1_0_0.CoolantConnector",
    "Id": "A",
    "Name": "Rack Cooling Loop A",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "CoolantConnectorType": "Pair",
    "CoolingLoopType": "Technology",
    "RatedFlowLitersPerMinute": 30,
    "SupplyFlowValve": {
        "SetPoint": 50,
        "SetPointUnits": "%",
        "Reading": 24.5,
        "ReadingUnits": "L/s"
    },
    "SupplyTemperatureCelsius": {
        "Reading": 14.8
    },
    "ReturnTemperatureCelsius": {
        "Reading": 38.2
```

```
    },
    "DeltaTemperatureCelsius": {
        "Reading": 23.4
    },
    "SupplyPressurekPa": {
        "Reading": 426.6
    },
    "ReturnPressurekPa": {
        "Reading": 409.9
    },
    "DeltaPressurekPa": {
        "Reading": 31.7
    },
    "Links": {
        "CoolingLoop": {
            "@odata.id": "/redfish/v1/ThermalEquipment/CoolingLoops/Rack4"
        }
    },
    "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/SecondaryCoolantConnectors/A",
    "@Redfish.Copyright": "Copyright 2014-2020 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```


## 4.4 CoolingDomain 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2023.1 |

### 4.4.1 Description

The CoolingDomain schema contains definition for the DCIM cooling domain.

### 4.4.2 URIs

/redfish/v1/Facilities/*{FacilityId}*/CoolingDomains/*{CoolingDomainId}*

### 4.4.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Links** { | object | | The links to other resources that are related to this resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **CDUs** [{ | array | | An array of links to the rack-level cooling distribution units in this cooling domain. |
| **@odata.id** | string | *read-write* | Link to a CoolingUnit resource. See the Links section and the *CoolingUnit* schema for details. |
| }] | | | |
| **CDUs@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ImmersionUnits** [{ | array | | An array of links to immersion cooling units in this cooling domain. |
| **@odata.id** | string | *read-write* | Link to a CoolingUnit resource. See the Links section and the *CoolingUnit* schema for details. |
| }] | | | |
| **ImmersionUnits@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ManagedBy** [{}] | array (object) | | An array of links to the managers responsible for managing this cooling domain. See the *Manager* schema for details on this property. |
| **ManagedBy@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |

### 4.4.4 Example response


```
{
    "@odata.type": "#CoolingDomain.v1_0_0.CoolingDomain",
    "Id": "Row1",
    "Name": "Row #1 Domain",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Links": {
        "ManagedBy": [
            {
                "@odata.id": "/redfish/v1/Managers/CDU"
            }
        ],
        "CDUs": [
```

```
            {
                "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1"
            }
        ]
    },
    "@odata.id": "/redfish/v1/Facilities/Room237/CoolingDomains/Row1",
    "@Redfish.Copyright": "Copyright 2014-2021 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```


## 4.5 CoolingLoop 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2023.1 |

### 4.5.1 Description

This schema describes a cooling loop. A cooling loop may be any coolant-carrying vessel, such as facility-level pipe work, an immersion cooling tank, or a manifold. A loop may describe its connectors and instrumentation, but does not generally include active cooling components or subsystems.

### 4.5.2 URIs

/redfish/v1/ThermalEquipment/CoolingLoops/*{CoolingLoopId}*

### 4.5.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **ConsumingEquipmentNames** [ ] | array (string, null) | *read-write* | An array of names of downstream devices that receive coolant from this loop. |
| **Coolant** { | object | | The coolant details for this CoolingLoop. |
| **AdditiveName** | string | *read-write (null)* | The name of the additive. |
| **AdditivePercent** | number (%) | *read-write (null)* | The percent additives contained in the coolant. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **CoolantType** | string (enum) | *read-write (null)* | The type of coolant. *For the possible property values, see CoolantType in Property details.* |
| **DensityKgPerCubicMeter** | number (kg/m3) | *read-write (null)* | The density (kg/m^3) of the coolant. |
| **RatedServiceHours** | number | *read-write (null)* | The rated hours of service life for this coolant. |
| **ServiceHours** | number | *read-write (null)* | The hours of service this coolant has provided. |
| **ServicedDate** | string (date-time) | *read-write (null)* | The date the coolant was last serviced. |
| **SpecificHeatkJoulesPerKgK** | number (kJ/kg/K) | *read-write (null)* | The specific heat capacity (kJ/(kg*K)) of the coolant. |
| } | | | |
| **CoolantLevelPercent** {} | object | | The percent of coolant capacity filled. For more information about this property, see SensorExcerpt in Property Details. |
| **CoolantLevelStatus** | string (enum) | *read-only (null)* | The status of the coolant level. *For the possible property values, see CoolantLevelStatus in Property details.* |
| **CoolantQuality** | string (enum) | *read-only (null)* | The quality of the coolant. *For the possible property values, see CoolantQuality in Property details.* |
| **CoolingLoopType** | string (enum) | *read-only (null)* | The type of CoolingLoop. *For the possible property values, see CoolingLoopType in Property details.* |
| **CoolingManagerUri** | string (URI) | *read-write (null)* | The link to the application that manages the cooling loop. |
| **DrainValvePercent** { | object (excerpt) | | The drain valve control. This object is an excerpt of the *Control* resource located at the URI shown in DataSourceUri. |
| **AllowableMax** | number | *read-only (null)* | The maximum possible setting for this control. |
| **AllowableMin** | number | *read-only (null)* | The minimum possible setting for this control. |
| **ControlMode** | string (enum) | *read-write (null)* | The current operating mode of the control. *For the possible property values, see ControlMode in Property details.* |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this control. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Reading** | number | *read-only* *(null)* | The reading of the sensor associated with this control. |
| } | | | |
| **HeatRemovedkW** {} | object | | The heat removed (kW) by the cooling loop. For more information about this property, see SensorExcerpt in Property Details. |
| **Links** { | object | | The links to other resources that are related to this resource. |
| **Chassis** [ { | array | | An array of links to the chassis that contain this equipment. |
| **@odata.id** | string | *read-only* | Link to a Chassis resource. See the Links section and the *Chassis* schema for details. |
| } ] | | | |
| **Chassis@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ConsumingEquipment** [ { | array | | Any array of links to equipment receiving coolant from this loop. |
| **@odata.id** | string (URI) | *read-only* | The unique identifier for a resource. |
| } ] | | | |
| **ConsumingEquipment@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Facility** { | object | | A link to the facility that contains this equipment. See the *Facility* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a Facility resource. See the Links section and the *Facility* schema for details. |
| } | | | |
| **ManagedBy** [ { } ] | array (object) | | An array of links to the managers responsible for managing this equipment. See the *Manager* schema for details on this property. |
| **ManagedBy@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **LocationIndicatorActive** | boolean | *read-write* *(null)* | An indicator allowing an operator to physically locate this resource. |
| **PrimaryCoolantConnectors** { | object | | A link to the primary coolant connectors for this equipment. Contains a link to a resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-only* | Link to Collection of *CoolantConnector*. See the CoolantConnector schema for details. |
| } | | | |
| **RatedFlowLitersPerMinute** | number (L/min) | *read-only (null)* | The rated liquid flow (L/min) for this loop. |
| **RatedPressurekPa** | number (kPa) | *read-only (null)* | The rated pressure (kPa) for this loop. |
| **SecondaryCoolantConnectors** { | object | | A link to the secondary coolant connectors for this equipment. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolantConnector*. See the CoolantConnector schema for details. |
| } | | | |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **SupplyEquipmentNames** [ ] | array (string, null) | *read-write* | An array of names of upstream devices that supply coolant to this loop. |
| **UserLabel** | string | *read-write* | A user-assigned label. |

## 4.5.4 Actions

### 4.5.4.1 ResetMetrics

**Description**

This action resets metrics related to this CoolingLoop.

**Action URI: {Base URI of target resource}/Actions/CoolingLoop.ResetMetrics**

**Action parameters**

This action takes no parameters.

## 4.5.5 Property details

#### 4.5.5.1 ControlMode:

The current operating mode of the control.

| string | Description |
|---|---|
| Automatic | Automatically adjust control to meet the set point. |
| Disabled | The control has been disabled. |
| Manual | No automatic adjustments are made to the control. |
| Override | User override of the automatic set point value. |

#### 4.5.5.2 CoolantLevelStatus:

The status of the coolant level.

| string | Description |
|---|---|
| Critical | A critical condition requires immediate attention. |
| OK | Normal. |
| Warning | A condition requires attention. |

#### 4.5.5.3 CoolantQuality:

The quality of the coolant.

| string | Description |
|---|---|
| Abnormal | Abnormal coolant quality. |
| Normal | Normal coolant quality. |

#### 4.5.5.4 CoolantType:

The type of coolant.

| string | Description |
|---|---|
| Dielectric | Dielectric fluid. |
| Fluorocarbon | Fluorocarbon-based. |
| Hydrocarbon | Hydrocarbon-based. |
| Water | Water or glycol mixture (including additives). |

#### 4.5.5.5 CoolingLoopType:

The type of CoolingLoop.

| string | Description |
|---|---|
| Condenser | A Condenser Water System (CWS). |
| Facility | A Facilities Water System (FWS). |
| Immersion | A tank or other form of immersion cooling. |
| Internal | A loop fully contained within a chassis. |
| Manifold | A manifold. |
| Technology | A Technology Cooling System (TCS). |

#### 4.5.5.6 SensorExcerpt:

The Sensor schema describes a sensor and its properties. This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri.

| | | | |
|---|---|---|---|
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this sensor. |
| **Reading** | number | *read-only (null)* | The sensor value. |

### 4.5.6 Example response

```
{
    "@odata.type": "#CoolingLoop.v1_0_0.CoolingLoop",
```

```
    "Id": "BuildingChiller",
    "Name": "Feed from building chiller",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "CoolingLoopType": "Facility",
    "UserLabel": "Building Chiller",
    "Coolant": {
        "CoolantType": "Water",
        "AdditiveName": "Generic cooling water biocide",
        "AdditivePercent": 0
    },
    "CoolantLevelStatus": "OK",
    "CoolantQuality": "Normal",
    "CoolantLevelPercent": {
        "Reading": 95
    },
    "HeatRemovedkW": {
        "Reading": 47.4
    },
    "SupplyEquipmentNames": ["Chiller"],
    "ConsumingEquipmentNames": ["Rack #1 CDU", "Rack #2 CDU", "Rack #3 CDU", "Rack #4 CDU"],
    "Links": {
        "ConsumingEquipment": [{
            "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1"
        }]
    },
    "@odata.id": "/redfish/v1/ThermalEquipment/CoolingLoops/BuildingChiller",
    "@Redfish.Copyright": "Copyright 2014-2022 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```


## 4.6 CoolingUnit 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2023.1 |

### 4.6.1 Description

This is the schema definition for a cooling distribution component or unit, such as a cooling distribution unit (CDU) or a heat exchanger.

### 4.6.2 URIs

/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*
/redfish/v1/ThermalEquipment/CRACs/*{CoolingUnitId}*
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*

### 4.6.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **AssetTag** | string | *read-write (null)* | The user-assigned asset tag for this equipment. |
| **Coolant** { | object | | Details about the coolant used in this unit. See the *CoolingLoop* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a Coolant resource. See the Links section and the *CoolingLoop* schema for details. |
| } | | | |
| **CoolingCapacityWatts** | number | *read-only (null)* | The cooling capacity (W) of this equipment. |
| **EnvironmentMetrics** { | object | | The link to the environment metrics for this equipment. See the *EnvironmentMetrics* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a EnvironmentMetrics resource. See the Links section and the *EnvironmentMetrics* schema for details. |
| } | | | |
| **EquipmentType** | string (enum) | *read-only required* | The type of equipment this resource represents. *For the possible property values, see EquipmentType in Property details.* |
| **FilterRedundancy** [ { } ] | array (object) | | The redundancy information for the groups of filters in this unit. See the *v1_4_1.v1_4_1* schema for details on this property. |
| **Filters** { | object | | A link to the filters for this equipment. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Filter*. See the Filter schema for details. |
| } | | | |
| **FirmwareVersion** | string | *read-only* | The firmware version of this equipment. |
| **LeakDetection** { | object | | A link to the leak detection components associated with this equipment. See the *LeakDetection* schema for details on this property. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-only* | Link to a LeakDetection resource. See the Links section and the *LeakDetection* schema for details. |
| } | | | |
| **Links** { | object | | The links to other resources that are related to this resource. |
| **Chassis** [ { | array | | An array of links to the chassis that contain this equipment. |
| **@odata.id** | string | *read-only* | Link to a Chassis resource. See the Links section and the *Chassis* schema for details. |
| } ] | | | |
| **Chassis@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Facility** { | object | | A link to the facility that contains this equipment. See the *Facility* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a Facility resource. See the Links section and the *Facility* schema for details. |
| } | | | |
| **ManagedBy** [ { } ] | array (object) | | An array of links to the managers responsible for managing this equipment. See the *Manager* schema for details on this property. |
| **ManagedBy@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **Location** {} | object | | The location of the equipment. See the *Resource* schema for details on this property. |
| **Manufacturer** | string | *read-only (null)* | The manufacturer of this equipment. |
| **Model** | string | *read-only (null)* | The product model number of this equipment. |
| **PartNumber** | string | *read-only (null)* | The part number for this equipment. |
| **PrimaryCoolantConnectors** { | object | | A link to the primary coolant connectors for this equipment. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolantConnector*. See the CoolantConnector schema for details. |
| } | | | |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **ProductionDate** | string (date-time) | *read-only (null)* | The production or manufacturing date of this equipment. |
| **PumpRedundancy** [ { } ] | array (object) | | The redundancy information for the groups of pumps in this unit. See the *v1_4_1.v1_4_1* schema for details on this property. |
| **Pumps** { | object | | A link to the pumps for this equipment. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Pump*. See the Pump schema for details. |
| } | | | |
| **Reservoirs** { | object | | A link to the reservoirs for this equipment. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Reservoir*. See the Reservoir schema for details. |
| } | | | |
| **SecondaryCoolantConnectors** { | object | | A link to the secondary coolant connectors for this equipment. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolantConnector*. See the CoolantConnector schema for details. |
| } | | | |
| **SerialNumber** | string | *read-only (null)* | The serial number for this equipment. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **UserLabel** | string | *read-write* | A user-assigned label. |
| **Version** | string | *read-only (null)* | The hardware version of this equipment. |

## 4.6.4 Property details

### 4.6.4.1 EquipmentType:

The type of equipment this resource represents.

| string | Description |
|---|---|
| CDU | A cooling distribution unit. |

| string | Description |
|---|---|
| HeatExchanger | A heat exchanger. |
| HeatPump | A heat pump. |
| ImmersionUnit | An immersion cooling unit. |

### 4.6.5 Example response


```
{
    "@odata.type": "#CoolingUnit.v1_0_0.CoolingUnit",
    "Id": "1",
    "EquipmentType": "CDU",
    "Name": "Rack #4 Cooling Distribution Unit",
    "FirmwareVersion": "3.2.0",
    "Version": "1.03b",
    "ProductionDate": "2020-12-24T08:00:00Z",
    "Manufacturer": "Contoso",
    "Model": "BRRR4000",
    "SerialNumber": "29347ZT536",
    "PartNumber": "ICE-9",
    "AssetTag": "PDX5-92381",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Location": {
        "Placement": {
            "Row": "North 1"
        }
    },
    "PrimaryCoolantConnectors": {
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/PrimaryCoolantConnectors"
    },
    "SecondaryCoolantConnectors": {
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/SecondaryCoolantConnectors"
    },
    "Pumps": {
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/Pumps"
    },
    "Filters": {
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/Filters"
    },
    "EnvironmentMetrics": {
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/EnvironmentMetrics"
    },
    "LeakDetection": {
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/LeakDetection"
```

```
    },
    "Links": {
        "Facility": {
            "@odata.id": "/redfish/v1/Facilities/Room237"
        }
    },
    "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1",
    "@Redfish.Copyright": "Copyright 2014-2021 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```


## 4.7 EnvironmentMetrics 1.3.0

| **Version** | *v1.3* | *v1.2* | *v1.1* | *v1.0* |
|---|---|---|---|---|
| **Release** | 2022.2 | 2021.4 | 2021.2 | 2020.4 |

### 4.7.1 Description

The EnvironmentMetrics schema represents the environmental metrics of a device.

### 4.7.2 URIs

/redfish/v1/Chassis/*{ChassisId}*/Drives/*{DriveId}*/EnvironmentMetrics
/redfish/v1/Chassis/*{ChassisId}*/EnvironmentMetrics
/redfish/v1/Chassis/*{ChassisId}*/FabricAdapters/*{FabricAdapterId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Chassis/*{ChassisId}*/MediaControllers/*{MediaControllerId}*/EnvironmentMetrics
/redfish/v1/Chassis/*{ChassisId}*/MediaControllers/*{MediaControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Chassis/*{ChassisId}*/Memory/*{MemoryId}*/EnvironmentMetrics
/redfish/v1/Chassis/*{ChassisId}*/NetworkAdapters/*{NetworkAdapterId}*/EnvironmentMetrics
/redfish/v1/Chassis/*{ChassisId}*/NetworkAdapters/*{NetworkAdapterId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Chassis/*{ChassisId}*/PCIeDevices/*{PCIeDeviceId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Drives/*{DriveId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Memory/*{MemoryId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Processors/*{ProcessorId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Processors/*{ProcessorId}*/Ports/*{PortId}*/
EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Storage/*{StorageId}*/Controllers/*{ControllerId}*/
EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Storage/*{StorageId}*/Controllers/
*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Storage/*{StorageId}*/Drives/*{DriveId}*/

EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Storage/*{StorageId}*/StorageControllers/*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/FabricAdapters/*{FabricAdapterId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/GraphicsControllers/*{ControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Memory/*{MemoryId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/PCIeDevices/*{PCIeDeviceId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Processors/*{ProcessorId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Processors/*{ProcessorId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Controllers/*{ControllerId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Controllers/*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Drives/*{DriveId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/StorageControllers/*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/CompositionService/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/USBControllers/*{ControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Fabrics/*{FabricId}*/Switches/*{SwitchId}*/EnvironmentMetrics
/redfish/v1/Fabrics/*{FabricId}*/Switches/*{SwitchId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Facilities/*{FacilityId}*/AmbientMetrics
/redfish/v1/Facilities/*{FacilityId}*/EnvironmentMetrics
/redfish/v1/Managers/*{ManagerId}*/DedicatedNetworkPorts/*{PortId}*/EnvironmentMetrics
/redfish/v1/Managers/*{ManagerId}*/USBPorts/*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Drives/*{DriveId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Memory/*{MemoryId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Processors/*{ProcessorId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Processors/*{ProcessorId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Storage/*{StorageId}*/Controllers/*{ControllerId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Storage/*{StorageId}*/Controllers/*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Storage/*{StorageId}*/Drives/*{DriveId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Storage/*{StorageId}*/StorageControllers/*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/FabricAdapters/*{FabricAdapterId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/GraphicsControllers/*{ControllerId}*/

Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Memory/*{MemoryId}*/
EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/PCIeDevices/*{PCIeDeviceId}*/
EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Processors/*{ProcessorId}*/
EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Processors/*{ProcessorId}*/Ports/
*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Controllers/
*{ControllerId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Controllers/
*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Drives/*{DriveId}*/
EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/
StorageControllers/*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/ResourceBlocks/*{ResourceBlockId}*/Systems/*{ComputerSystemId}*/USBControllers/*{ControllerId}*/Ports/
*{PortId}*/EnvironmentMetrics
/redfish/v1/Storage/*{StorageId}*/Controllers/*{ControllerId}*/EnvironmentMetrics
/redfish/v1/Storage/*{StorageId}*/Controllers/*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Storage/*{StorageId}*/StorageControllers/*{StorageControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/FabricAdapters/*{FabricAdapterId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/GraphicsControllers/*{ControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/Memory/*{MemoryId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/PCIeDevices/*{PCIeDeviceId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/Processors/*{ProcessorId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/Processors/*{ProcessorId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Controllers/*{ControllerId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Controllers/*{StorageControllerId}*/Ports/*{PortId}*/
EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/Drives/*{DriveId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/Storage/*{StorageId}*/StorageControllers/*{StorageControllerId}*/Ports/
*{PortId}*/EnvironmentMetrics
/redfish/v1/Systems/*{ComputerSystemId}*/USBControllers/*{ControllerId}*/Ports/*{PortId}*/EnvironmentMetrics
/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/EnvironmentMetrics
/redfish/v1/ThermalEquipment/CRACs/*{CoolingUnitId}*/EnvironmentMetrics
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/EnvironmentMetrics

### 4.7.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **AbsoluteHumidity** *(v1.2+)* {} | object | | Absolute humidity (g/cu m). For more information about this property, see SensorExcerpt in Property Details. |
| **DewPointCelsius** *(v1.1+)* {} | object | | The dew point temperature (C). For more information about this property, see SensorExcerpt in Property Details. |
| **EnergyJoules** *(v1.2+)* {} | object | | Energy consumption (J). For more information about this property, see SensorExcerpt in Property Details. |
| **EnergykWh** { | object (excerpt) | | Energy consumption (kWh). This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri. |
| **ApparentkVAh** *(v1.5+)* | number (kV.A.h) | *read-only* *(null)* | Apparent energy (kVAh). |
| **DataSourceUri** | string (URI) | *read-only* *(null)* | The link to the resource that provides the data for this sensor. |
| **LifetimeReading** *(v1.1+)* | number | *read-only* *(null)* | The total accumulation value for this sensor. |
| **ReactivekVARh** *(v1.5+)* | number (kV.A.h) | *read-only* *(null)* | Reactive energy (kVARh). |
| **Reading** | number | *read-only* *(null)* | The sensor value. |
| **SensorResetTime** | string (date-time) | *read-only* *(null)* | The date and time when the time-based properties were last reset. |
| } | | | |
| **FanSpeedsPercent** [ { | array (excerpt) | | Fan speeds (percent). This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri. |
| **DataSourceUri** | string (URI) | *read-only* *(null)* | The link to the resource that provides the data for this sensor. |
| **DeviceName** *(v1.2+)* | string | *read-only* *(null)* | The name of the device. |
| **PhysicalContext** | string (enum) | *read-only* *(null)* | The area or device to which this sensor measurement applies. *For the possible property values, see PhysicalContext in Property details.* |
| **PhysicalSubContext** | string (enum) | *read-only* *(null)* | The usage or location within a device to which this sensor measurement applies. *For the possible property values, see PhysicalSubContext in Property details.* |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Reading** | number | *read-only (null)* | The sensor value. |
| **SpeedRPM** *(v1.2+)* | number ({rev}/min) | *read-only (null)* | The rotational speed. |
| } ] | | | |
| **HumidityPercent** {} | object | | Humidity (percent). For more information about this property, see SensorExcerpt in Property Details. |
| **PowerLimitWatts** *(v1.1+)* { | object (excerpt) | | Power limit (W). This object is an excerpt of the *Control* resource located at the URI shown in DataSourceUri. |
| **AllowableMax** | number | *read-only (null)* | The maximum possible setting for this control. |
| **AllowableMin** | number | *read-only (null)* | The minimum possible setting for this control. |
| **ControlMode** | string (enum) | *read-write (null)* | The current operating mode of the control. *For the possible property values, see ControlMode in Property details.* |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this control. |
| **DefaultSetPoint** *(v1.3+)* | number | *read-only (null)* | The default set point of the control. |
| **Reading** | number | *read-only (null)* | The reading of the sensor associated with this control. |
| **SetPoint** | number | *read-write (null)* | The desired set point of the control. |
| } | | | |
| **PowerLoadPercent** *(v1.1+)* {} | object | | The power load (percent) for this device. For more information about this property, see SensorExcerpt in Property Details. |
| **PowerWatts** { | object (excerpt) | | Power consumption (W). This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri. |
| **ApparentVA** | number (V.A) | *read-only (null)* | The product of voltage and current for an AC circuit, in volt-ampere units. |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this sensor. |
| **PhaseAngleDegrees** *(v1.5+)* | number | *read-only (null)* | The phase angle (degrees) between the current and voltage waveforms. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **PowerFactor** | number | *read-only (null)* | The power factor for this sensor. |
| **ReactiveVAR** | number (V.A) | *read-only (null)* | The square root of the difference term of squared apparent VA and squared power (Reading) for a circuit, in VAR units. |
| **Reading** | number | *read-only (null)* | The sensor value. |
| } | | | |
| **TemperatureCelsius** {} | object | | Temperature (Celsius). For more information about this property, see SensorExcerpt in Property Details. |

## 4.7.4 Actions

### 4.7.4.1 ResetMetrics

**Description**

This action resets the summary metrics related to this equipment.

**Action URI: {Base URI of target resource}/Actions/EnvironmentMetrics.ResetMetrics**

**Action parameters**

This action takes no parameters.

### 4.7.4.2 ResetToDefaults *(v1.3+)*

**Description**

The action resets the values of writable properties to factory defaults.

**Action URI: {Base URI of target resource}/Actions/EnvironmentMetrics.ResetToDefaults**

**Action parameters**

This action takes no parameters.

## 4.7.5 Property details

### 4.7.5.1 ControlMode:

The current operating mode of the control.

| string | Description |
|---|---|
| Automatic | Automatically adjust control to meet the set point. |
| Disabled | The control has been disabled. |
| Manual | No automatic adjustments are made to the control. |
| Override | User override of the automatic set point value. |

### 4.7.5.2 PhysicalContext:

The area or device to which this sensor measurement applies.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |
| Backplane | A backplane within the chassis. |
| Battery | A battery. |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |

| string | Description |
| --- | --- |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |
| Fan | A fan. |
| FPGA | An FPGA. |
| Front | The front of the chassis. |
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |

| string | Description |
|---|---|
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |
| Upper | The upper portion of the chassis. |
| VoltageRegulator | A voltage regulator device. |

#### 4.7.5.3 PhysicalSubContext:

The usage or location within a device to which this sensor measurement applies.

| string | Description |
|---|---|
| Input | The input. |
| Output | The output. |

#### 4.7.5.4 SensorExcerpt:

The Sensor schema describes a sensor and its properties. This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri.

| | | | |
|---|---|---|---|
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this sensor. |
| **Reading** | number | *read-only (null)* | The sensor value. |

### 4.7.6 Example response

```
{
    "@odata.type": "#EnvironmentMetrics.v1_3_0.EnvironmentMetrics",
```

```
    "Name": "Processor Environment Metrics",
    "TemperatureCelsius": {
        "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/CPU1Temp",
        "Reading": 44
    },
    "PowerWatts": {
        "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/CPU1Power",
        "Reading": 12.87
    },
    "FanSpeedsPercent": [
        {
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/CPUFan1",
            "DeviceName": "CPU #1 Fan Speed",
            "Reading": 80
        }
    ],
    "Oem": {},
    "@odata.id": "/redfish/v1/Systems/437XR1138R2/Processors/1/EnvironmentMetrics"
}
```


## 4.8 Facility 1.4.0

| **Version** | *v1.4* | *v1.3* | *v1.2* | *v1.1* | *v1.0* |
|---|---|---|---|---|---|
| **Release** | 2023.1 | 2021.3 | 2021.2 | 2020.4 | 2019.4 |

### 4.8.1 Description

The Facility schema represents the physical location containing equipment, such as a room, building, or campus.

### 4.8.2 URIs

/redfish/v1/Facilities/*{FacilityId}*

### 4.8.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **AmbientMetrics** *(v1.1+)* { | object | | The link to the ambient environment metrics for this facility. See the *EnvironmentMetrics* schema for details on this property. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-only* | Link to a EnvironmentMetrics resource. See the Links section and the *EnvironmentMetrics* schema for details. |
| } | | | |
| **CoolingDomains** *(v1.4+)* { | object | | Link to the cooling domains in this facility. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolingDomain*. See the CoolingDomain schema for details. |
| } | | | |
| **EnvironmentMetrics** *(v1.1+)* { | object | | The link to the environment metrics for this facility. See the *EnvironmentMetrics* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a EnvironmentMetrics resource. See the Links section and the *EnvironmentMetrics* schema for details. |
| } | | | |
| **FacilityType** | string (enum) | *read-only* *required* | The type of location this resource represents. *For the possible property values, see FacilityType in Property details.* |
| **Links** { | object | | The links to other resources that are related to this resource. |
| **CDUs** *(v1.4+)* [ { | array | | An array of links to the rack-based cooling distribution units in this facility. |
| **@odata.id** | string | *read-write* | Link to a CoolingUnit resource. See the Links section and the *CoolingUnit* schema for details. |
| } ] | | | |
| **CDUs@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ContainedByFacility** { | object | | The link to the facility that contains this facility. |
| **@odata.id** | string | *read-write* | Link to another Facility resource. |
| } | | | |
| **ContainsChassis** [ { | array | | An array of links to outermost chassis contained within this facility. |
| **@odata.id** | string | *read-write* | Link to a Chassis resource. See the Links section and the *Chassis* schema for details. |
| } ] | | | |
| **ContainsChassis@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ContainsFacilities** [ { | array | | An array of links to other facilities contained within this facility. |
| **@odata.id** | string | *read-write* | Link to another Facility resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| } ] | | | |
| **ContainsFacilities@odata.count** | integer | *read-only* | The number of items in a collection. |
| **CoolingLoops** *(v1.4+)* [ { | array | | An array of links to the cooling loops in this facility. |
| **@odata.id** | string | *read-write* | Link to a CoolingLoop resource. See the Links section and the *CoolingLoop* schema for details. |
| } ] | | | |
| **CoolingLoops@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ElectricalBuses** *(v1.3+)* [ { } ] | array (object) | | An array of links to the electrical buses in this facility. See the *PowerDistribution* schema for details on this property. |
| **ElectricalBuses@odata.count** | integer | *read-only* | The number of items in a collection. |
| **FloorPDUs** [ { } ] | array (object) | | An array of links to the floor power distribution units in this facility. See the *PowerDistribution* schema for details on this property. |
| **FloorPDUs@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ImmersionUnits** *(v1.4+)* [ { | array | | An array of links to the immersion cooling units in this facility. |
| **@odata.id** | string | *read-write* | Link to a CoolingUnit resource. See the Links section and the *CoolingUnit* schema for details. |
| } ] | | | |
| **ImmersionUnits@odata.count** | integer | *read-only* | The number of items in a collection. |
| **ManagedBy** [ { } ] | array (object) | | An array of links to the managers responsible for managing this facility. See the *Manager* schema for details on this property. |
| **ManagedBy@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| **PowerShelves** *(v1.2+)* [ { } ] | array (object) | | An array of links to the power shelves in this facility. See the *PowerDistribution* schema for details on this property. |
| **PowerShelves@odata.count** | integer | *read-only* | The number of items in a collection. |
| **RackPDUs** [ { } ] | array (object) | | An array of links to the rack-level power distribution units in this facility. See the *PowerDistribution* schema for details on this property. |
| **RackPDUs@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Switchgear** [ { } ] | array (object) | | An array of links to the switchgear in this facility. See the *PowerDistribution* schema for details on this property. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Switchgear@odata.count** | integer | *read-only* | The number of items in a collection. |
| **TransferSwitches** [ { } ] | array (object) | | An array of links to the transfer switches in this facility. See the *PowerDistribution* schema for details on this property. |
| **TransferSwitches@odata.count** | integer | *read-only* | The number of items in a collection. |
| } | | | |
| **Location** {} | object | | The location of the facility. See the *Resource* schema for details on this property. |
| **PowerDomains** { | object | | Link to the power domains in this facility. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *PowerDomain*. See the PowerDomain schema for details. |
| } | | | |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |

## 4.8.4 Property details

### 4.8.4.1 FacilityType:

The type of location this resource represents.

| string | Description |
|---|---|
| Building | A structure with a roof and walls. |
| Floor | A floor inside of a building. |
| Room | A room inside of a building or floor. |
| Site | A small area consisting of several buildings. |

## 4.8.5 Example response

```
{
    "@odata.type": "#Facility.v1_3_0.Facility",
    "Id": "Room237",
    "Name": "Room #237, 2nd Floor",
    "FacilityType": "Room",
```

```
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Location": {
        "PostalAddress": {
            "Country": "US",
            "Territory": "OR",
            "City": "Portland",
            "Street": "1001 SW 5th Avenue",
            "HouseNumber": 1100,
            "Name": "DMTF, Inc.",
            "PostalCode": "97204",
            "Floor": "2",
            "Room": "237"
        }
    },
    "PowerDomains": {
        "@odata.id": "/redfish/v1/Facilities/Room237/PowerDomains"
    },
    "Links": {
        "ContainedByFacility": {
            "@odata.id": "/redfish/v1/Facilities/Building"
        },
        "RackPDUs": [
            {
                "@odata.id": "/redfish/v1/PowerEquipment/RackPDUs/1"
            }
        ]
    },
    "@odata.id": "/redfish/v1/Facilities/Room237"
}
```


## 4.9 Filter 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2023.1 |

### 4.9.1 Description

The Filter schema describes a Filter unit for a cooling system or similar device.

### 4.9.2 URIs

/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/Filters/*{FilterId}*
/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/Pumps/*{PumpId}*/Filters/*{FilterId}*
/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/Reservoirs/*{ReservoirId}*/Filters/*{FilterId}*
/redfish/v1/ThermalEquipment/CRACs/*{CoolingUnitId}*/Filters/*{FilterId}*
/redfish/v1/ThermalEquipment/Filters/*{FilterId}*
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/Filters/*{FilterId}*
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/Pumps/*{PumpId}*/Filters/*{FilterId}*
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/Reservoirs/*{ReservoirId}*/Filters/*{FilterId}*

### 4.9.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Assembly** {} | object | | The link to the assembly associated with this Filter. See the *Assembly* schema for details on this property. |
| **FilterType** | string | *read-only (null)* | The type of filter. |
| **HotPluggable** | boolean | *read-only (null)* | An indication of whether this device can be inserted or removed while the equipment is in operation. |
| **Links** { | object | | The links to other resources that are related to this resource. |
| **CoolingLoop** { | object | *(null)* | A link to the cooling loop associated with this filter. See the *CoolingLoop* schema for details on this property. |
| **@odata.id** | string | *read-write* | Link to a CoolingLoop resource. See the Links section and the *CoolingLoop* schema for details. |
| } | | | |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **Location** {} | object | | The location of the Filter. See the *Resource* schema for details on this property. |
| **LocationIndicatorActive** | boolean | *read-write (null)* | An indicator allowing an operator to physically locate this resource. |
| **Manufacturer** | string | *read-only (null)* | The manufacturer of this Filter. |
| **Model** | string | *read-only (null)* | The model number for this Filter. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **PartNumber** | string | *read-only (null)* | The part number for this Filter. |
| **PhysicalContext** | string (enum) | *read-only* | The area or device associated with this Filter. *For the possible property values, see PhysicalContext in Property details.* |
| **RatedServiceHours** | number | *read-only (null)* | The rated hours of service life for this filter. |
| **Replaceable** | boolean | *read-only (null)* | An indication of whether this component can be independently replaced as allowed by the vendor's replacement policy. |
| **SerialNumber** | string | *read-only (null)* | The serial number for this Filter. |
| **ServicedDate** | string (date-time) | *read-write (null)* | The date this filter was put into service. |
| **ServiceHours** | number | *read-write (null)* | The hours of service this filter has provided. |
| **SparePartNumber** | string | *read-only (null)* | The spare part number for this Filter. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **UserLabel** | string | *read-write* | A user-assigned label. |

## 4.9.4 Property details

### 4.9.4.1 PhysicalContext:

The area or device associated with this Filter.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |

| string | Description |
|---|---|
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |
| Backplane | A backplane within the chassis. |
| Battery | A battery. |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |
| Fan | A fan. |
| FPGA | An FPGA. |
| Front | The front of the chassis. |
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |

| string | Description |
|---|---|
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |
| Upper | The upper portion of the chassis. |
| VoltageRegulator | A voltage regulator device. |

### 4.9.5 Example response


```
{
    "@odata.type": "#Filter.v1_0_0.Filter",
    "Id": "1",
    "FilterType": "Cartridge",
    "Name": "Cooling Loop Filter",
    "ServicedDate": "2020-12-24T08:00:00Z",
    "ServiceHours": 5791,
    "RatedServiceHours": 10000,
    "Manufacturer": "Contoso",
    "Model": "MrCoffee",
    "PartNumber": "Cone4",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
```

```
    },
    "Location": {
        "Placement": {
            "Row": "North 1"
        }
    },
    "Links": {
        "CoolingLoop": {
            "@odata.id": "/redfish/v1/ThermalEquipment/CoolingLoops/BuildingChiller"
        }
    },
    "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/Filters/1",
    "@Redfish.Copyright": "Copyright 2014-2022 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```


## 4.10 LeakDetection 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2022.3 |

### 4.10.1 Description

The LeakDetection schema contains definitions for reporting leaks in liquid cooling systems or other equipment.

### 4.10.2 URIs

/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/LeakDetection
/redfish/v1/ThermalEquipment/CoolingLoops/*{CoolingUnitId}*/LeakDetection
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/LeakDetection
/redfish/v1/ThermalEquipment/LeakDetection

### 4.10.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **LeakDetectorGroups** [ { | array | | The groups of leak detection equipment. |
| **Detectors** [ { | array (excerpt) | | The leak detection states from all related leak detection devices in this group. This object is an excerpt of the *LeakDetector* resource located at the URI shown in DataSourceUri. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this sensor. |
| **DetectorState** | string (enum) | *read-only (null)* | The state of the leak detector. *For the possible property values, see DetectorState in Property details.* |
| **PhysicalContext** | string (enum) | *read-only (null)* | The area or device to which this sensor applies. *For the possible property values, see PhysicalContext in Property details.* |
| **PhysicalSubContext** | string (enum) | *read-only (null)* | The usage or location within a device to which this sensor applies. *For the possible property values, see PhysicalSubContext in Property details.* |
| } ] | | | |
| **Detectors@odata.count** | integer | *read-only* | The number of items in a collection. |
| **GroupName** | string | *read-only* | The name of this leak detector group. |
| **HumidityPercent** { | object (excerpt) | | Humidity (percent). This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri. |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this sensor. |
| **Reading** | number | *read-only (null)* | The sensor value. |
| } | | | |
| } ] | | | |
| **LeakDetectors** { | object | | The link to the collection of leak detectors within this subsystem. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *LeakDetector*. See the LeakDetector schema for details. |
| } | | | |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |

## 4.10.4 Property details

### 4.10.4.1 DetectorState:

The state of the leak detector.

| string | Description |
|---|---|
| Alert | Alert state. |
| OK | Normal operating state. |

#### 4.10.4.2 PhysicalContext:

The area or device to which this sensor applies.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |
| Backplane | A backplane within the chassis. |
| Battery | A battery. |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |
| Fan | A fan. |

| string | Description |
|---|---|
| FPGA | An FPGA. |
| Front | The front of the chassis. |
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |
| Upper | The upper portion of the chassis. |

| string | Description |
|---|---|
| VoltageRegulator | A voltage regulator device. |

#### 4.10.4.3 PhysicalSubContext:

The usage or location within a device to which this sensor applies.

| string | Description |
|---|---|
| Input | The input. |
| Output | The output. |

### 4.10.5 Example response


```
{
    "@odata.type": "#LeakDetection.v1_0_0.LeakDetection",
    "Id": "LeakDetection",
    "Name": "Leak Detection Systems",
    "Status": {
        "State": "Enabled",
        "Health": "OK",
        "Conditions": []
    },
    "LeakDetectorGroups": [{
        "GroupName": "Detectors under and around the CDU",
        "HumidityPercent": {
            "Reading": 45
        },
        "Detectors": [{
                "DataSourceUri": "/redfish/v1/ThermalEquipment/CDUs/1/LeakDetection/LeakDetectors/Moisture",
                "DeviceName": "Moisture-type Leak Detector",
                "DetectorState": "OK"
            },
            {
                "DeviceName": "Leak Detection Rope 1",
                "DetectorState": "OK"
            },
            {
                "DataSourceUri": "/redfish/v1/ThermalEquipment/CDUs/1/LeakDetection/LeakDetectors/Overflow",
                "DeviceName": "Overflow Float Switch",
                "DetectorState": "OK"
            }
        ]
```

```
    }],
    "LeakDetectors": {
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/LeakDetection/LeakDetectors"
    },
    "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/LeakDetection",
    "@Redfish.Copyright": "Copyright 2014-2022 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```


## 4.11 LeakDetector 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2022.3 |

### 4.11.1 Description

The LeakDetector schema describes a state-based or digital value leak detector and its properties.

### 4.11.2 URIs

/redfish/v1/Chassis/*{ChassisId}*/LeakDetection/LeakDetectors/*{LeakDetectorId}*
/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/LeakDetection/LeakDetectors/*{LeakDetectorId}*
/redfish/v1/ThermalEquipment/CoolingLoops/*{CoolingUnitId}*/LeakDetection/LeakDetectors/*{LeakDetectorId}*
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/LeakDetection/LeakDetectors/*{LeakDetectorId}*

### 4.11.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **DetectorState** | string (enum) | *read-only (null)* | The state of the leak detector. *For the possible property values, see DetectorState in Property details.* |
| **LeakDetectorType** | string (enum) | *read-only (null)* | The type of leak detection sensor. *For the possible property values, see LeakDetectorType in Property details.* |
| **Location** {} | object | | The location information for this sensor. See the *Resource* schema for details on this property. |
| **Manufacturer** | string | *read-only (null)* | The manufacturer of this sensor. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Model** | string | *read-only (null)* | The model number of the sensor. |
| **PartNumber** | string | *read-only (null)* | The part number of the sensor. |
| **PhysicalContext** | string (enum) | *read-only (null)* | The area or device to which this sensor applies. *For the possible property values, see PhysicalContext in Property details.* |
| **PhysicalSubContext** | string (enum) | *read-only (null)* | The usage or location within a device to which this sensor applies. *For the possible property values, see PhysicalSubContext in Property details.* |
| **SensingFrequency** | number | *read-only (null)* | The time interval between readings of the physical sensor. |
| **SerialNumber** | string | *read-only (null)* | The serial number of the sensor. |
| **SKU** | string | *read-only (null)* | The SKU of the sensor. |
| **SparePartNumber** | string | *read-only (null)* | The spare part number of the sensor. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **SupportedStates** [ ] | array (string (enum)) | *read-only (null)* | The supported states of the detector. *For the possible property values, see SupportedStates in Property details.* |

## 4.11.4 Actions

### 4.11.4.1 ResetMetrics

**Description**

Resets metrics related to this sensor.

**Action URI: {Base URI of target resource}/Actions/LeakDetector.ResetMetrics**

**Action parameters**

This action takes no parameters.

## 4.11.5 Property details

### 4.11.5.1 DetectorState:

The state of the leak detector.

| string | Description |
|---|---|
| Alert | Alert state. |
| OK | Normal operating state. |

### 4.11.5.2 LeakDetectorType:

The type of leak detection sensor.

| string | Description |
|---|---|
| FloatSwitch | A float switch. |
| Moisture | A moisture sensor. |

### 4.11.5.3 PhysicalContext:

The area or device to which this sensor applies.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |

| string | Description |
|---|---|
| Backplane | A backplane within the chassis. |
| Battery | A battery. |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |
| Fan | A fan. |
| FPGA | An FPGA. |
| Front | The front of the chassis. |
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |

| string | Description |
|---|---|
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |
| Upper | The upper portion of the chassis. |
| VoltageRegulator | A voltage regulator device. |

#### 4.11.5.4 PhysicalSubContext:

The usage or location within a device to which this sensor applies.

| string | Description |
|---|---|
| Input | The input. |
| Output | The output. |

#### 4.11.5.5 SupportedStates:

The supported states of the detector.

| string | Description |
|---|---|
| Alert | Alert state. |
| OK | Normal operating state. |

### 4.11.6 Example response


```
{
    "@odata.type": "#LeakDetector.v1_0_0.LeakDetector",
    "Id": "Moisture",
    "Name": "Moisture-type Leak Detector",
    "LeakDetectorType": "Moisture",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "DetectorState": "OK",
    "SupportedStates": [ "OK", "Alert" ],
    "PartNumber": "3493-A44",
    "SerialNumber": "916239",
    "Manufacturer": "Contoso Water Detection Systems",
    "Model": "Depends 3000",
    "Location": {
        "PartLocation": {
            "Reference": "Bottom",
            "ServiceLabel": "Leak Detector"
        }
    },
    "PhysicalContext": "Chassis",
    "Oem": {},
    "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/LeakDetection/LeakDetectors/Moisture",
    "@Redfish.Copyright": "Copyright 2018-2022 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```


## 4.12 Pump 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2023.1 |

### 4.12.1 Description

The Pump schema describes a Pump unit for a cooling system or similar device.

### 4.12.2 URIs

/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/Pumps/*{PumpId}*
/redfish/v1/ThermalEquipment/CRACs/*{CoolingUnitId}*/Pumps/*{PumpId}*

/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/Pumps/*{PumpId}*
/redfish/v1/ThermalEquipment/Pumps/*{PumpId}*

### 4.12.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Assembly** {} | object | | The link to the assembly associated with this Pump. See the *Assembly* schema for details on this property. |
| **AssetTag** | string | *read-write (null)* | The user-assigned asset tag for this equipment. |
| **Filters** { | object | | A link to a collection of filters. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Filter*. See the Filter schema for details. |
| } | | | |
| **FirmwareVersion** | string | *read-only* | The firmware version of this equipment. |
| **FrequencyControlHz** { | object (excerpt) | | The operating speed (Hz). This object is an excerpt of the *Control* resource located at the URI shown in DataSourceUri. |
| **AllowableMax** | number | *read-only (null)* | The maximum possible setting for this control. |
| **AllowableMin** | number | *read-only (null)* | The minimum possible setting for this control. |
| **ControlMode** | string (enum) | *read-write (null)* | The current operating mode of the control. *For the possible property values, see ControlMode in Property details.* |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this control. |
| **Reading** | number | *read-only (null)* | The reading of the sensor associated with this control. |
| } | | | |
| **Links** { | object | | The links to other resources that are related to this resource. |
| **Chassis** { | object | | The link to the chassis that contains this pump. See the *Chassis* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a Chassis resource. See the Links section and the *Chassis* schema for details. |
| } | | | |
| **CoolingLoop** { | object | *(null)* | A reference to the CoolingLoop related to this CoolantConnector. See the *CoolingLoop* schema for details on this property. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-write* | Link to a CoolingLoop resource. See the Links section and the *CoolingLoop* schema for details. |
| } | | | |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **Location** {} | object | | The location of the Pump. See the *Resource* schema for details on this property. |
| **LocationIndicatorActive** | boolean | *read-write (null)* | An indicator allowing an operator to physically locate this resource. |
| **Manufacturer** | string | *read-only (null)* | The manufacturer of this Pump. |
| **Model** | string | *read-only (null)* | The model number for this Pump. |
| **PartNumber** | string | *read-only (null)* | The part number for this Pump. |
| **PhysicalContext** | string (enum) | *read-only* | The area or device associated with this Pump. *For the possible property values, see PhysicalContext in Property details.* |
| **ProductionDate** | string (date-time) | *read-only (null)* | The production or manufacturing date of this equipment. |
| **PumpType** | string (enum) | *read-only (null)* | The type of pump. *For the possible property values, see PumpType in Property details.* |
| **SerialNumber** | string | *read-only (null)* | The serial number for this Pump. |
| **ServiceHours** | number | *read-write (null)* | The hours of service this pump has provided. |
| **SparePartNumber** | string | *read-only (null)* | The spare part number for this Pump. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **UserLabel** | string | *read-write* | A user-assigned label. |
| **Version** | string | *read-only (null)* | The hardware version of this equipment. |

## 4.12.4 Property details

#### 4.12.4.1 ControlMode:

The current operating mode of the control.

| string | Description |
|---|---|
| Automatic | Automatically adjust control to meet the set point. |
| Disabled | The control has been disabled. |
| Manual | No automatic adjustments are made to the control. |
| Override | User override of the automatic set point value. |

#### 4.12.4.2 PhysicalContext:

The area or device associated with this Pump.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |
| Backplane | A backplane within the chassis. |
| Battery | A battery. |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |

| string | Description |
| --- | --- |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |
| Fan | A fan. |
| FPGA | An FPGA. |
| Front | The front of the chassis. |
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |

| string | Description |
|---|---|
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |
| Upper | The upper portion of the chassis. |
| VoltageRegulator | A voltage regulator device. |

#### 4.12.4.3 PumpType:

The type of pump.

| string | Description |
|---|---|
| Compressor | A compressor. |
| Liquid | A water or liquid pump. |

### 4.12.5 Example response

```
{
    "@odata.type": "#Pump.v1_0_0.Pump",
    "Id": "1",
    "PumpType": "Liquid",
    "Name": "CDU Pump",
    "Version": "1.03b",
    "ProductionDate": "2020-12-24T08:00:00Z",
    "Manufacturer": "Contoso",
    "Model": "UP-JAM",
    "SerialNumber": "29347ZT536",
    "PartNumber": "MAARS",
    "AssetTag": "PDX5-92381",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
```

```
    "FrequencyControlHz": {
        "OperatingMode": "Automatic",
        "SetPoint": 68,
        "Reading": 68
    },
    "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/Pumps/1",
    "@Redfish.Copyright": "Copyright 2014-2020 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```


## 4.13 Reservoir 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2023.1 |

### 4.13.1 Description

The Reservoir schema describes a Reservoir unit for a cooling system or similar device.

### 4.13.2 URIs

/redfish/v1/ThermalEquipment/CDUs/*{CoolingUnitId}*/Reservoirs/*{ReservoirId}*
/redfish/v1/ThermalEquipment/CRACs/*{CoolingUnitId}*/Reservoirs/*{ReservoirId}*
/redfish/v1/ThermalEquipment/ImmersionUnits/*{CoolingUnitId}*/Reservoirs/*{ReservoirId}*

### 4.13.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **AirBleedValvePercent** { | object (excerpt) | | The air bleed (percent) valve control. This object is an excerpt of the *Control* resource located at the URI shown in DataSourceUri. |
| **AllowableMax** | number | *read-only (null)* | The maximum possible setting for this control. |
| **AllowableMin** | number | *read-only (null)* | The minimum possible setting for this control. |
| **ControlMode** | string (enum) | *read-write (null)* | The current operating mode of the control. *For the possible property values, see ControlMode in Property details.* |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this control. |
| **Reading** | number | *read-only (null)* | The reading of the sensor associated with this control. |
| } | | | |
| **Assembly** {} | object | | The link to the assembly associated with this Reservoir. See the *Assembly* schema for details on this property. |
| **CapacityLiters** | number | *read-only (null)* | The capacity of the reservoir (l). |
| **Coolant** { | object | | Details about the coolant used in this unit. See the *CoolingLoop* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a Coolant resource. See the Links section and the *CoolingLoop* schema for details. |
| } | | | |
| **DrainValvePercent** {} | object | | The drain valve (percent) control. For more information about this property, see ControlMixedUnitsExcerpt in Property Details. |
| **FillValvePercent** {} | object | | The fill valve (percent) control. For more information about this property, see ControlMixedUnitsExcerpt in Property Details. |
| **Filters** { | object | | A link to a collection of filters. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Filter*. See the Filter schema for details. |
| } | | | |
| **FluidLevel** | string (enum) | *read-only (null)* | The level of the fluid in the reservoir. *For the possible property values, see FluidLevel in Property details.* |
| **FluidLevelPercent** {} | object | | The percent of fluid capacity filled. For more information about this property, see SensorExcerpt in Property Details. |
| **InternalPressurekPa** {} | object | | The internal pressure (kPa) reading. For more information about this property, see SensorExcerpt in Property Details. |
| **Links** { | object | | The links to other resources that are related to this resource. |
| **Chassis** { | object | | The link to the chassis that contains this reservoir. See the *Chassis* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a Chassis resource. See the Links section and the *Chassis* schema for details. |
| } | | | |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **CoolingLoop** { | object | *(null)* | A link to the cooling loop associated with this reservoir. See the *CoolingLoop* schema for details on this property. |
| **@odata.id** | string | *read-write* | Link to a CoolingLoop resource. See the Links section and the *CoolingLoop* schema for details. |
| } | | | |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **Location** {} | object | | The location of the reservoir. See the *Resource* schema for details on this property. |
| **LocationIndicatorActive** | boolean | *read-write (null)* | An indicator allowing an operator to physically locate this resource. |
| **Manufacturer** | string | *read-only (null)* | The manufacturer of this reservoir. |
| **Model** | string | *read-only (null)* | The model number for this reservoir. |
| **PartNumber** | string | *read-only (null)* | The part number for this reservoir. |
| **PhysicalContext** | string (enum) | *read-only* | The area or device associated with this Reservoir. *For the possible property values, see PhysicalContext in Property details.* |
| **ReservoirType** | string (enum) | *read-only (null)* | The type of reservoir. *For the possible property values, see ReservoirType in Property details.* |
| **SerialNumber** | string | *read-only (null)* | The serial number for this reservoir. |
| **SparePartNumber** | string | *read-only (null)* | The spare part number for this reservoir. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **UserLabel** | string | *read-write* | A user-assigned label. |

## 4.13.4 Property details

#### 4.13.4.1 ControlMixedUnitsExcerpt:

The Control schema describes a control point and its properties. This object is an excerpt of the *Control* resource located at the URI shown in DataSourceUri.

| | | | |
|---|---|---|---|
| **AllowableMax** | number | *read-only (null)* | The maximum possible setting for this control. |
| **AllowableMin** | number | *read-only (null)* | The minimum possible setting for this control. |
| **ControlMode** | string (enum) | *read-write (null)* | The current operating mode of the control. *For the possible property values, see ControlMode in Property details.* |
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this control. |
| **Reading** | number | *read-only (null)* | The reading of the sensor associated with this control. |
| **ReadingUnits** | string | *read-only (null)* | The units of the sensor reading associated with this control. |
| **SetPointUnits** | string | *read-only (null)* | The units of the set point. |

#### 4.13.4.2 ControlMode:

The current operating mode of the control.

| string | Description |
|---|---|
| Automatic | Automatically adjust control to meet the set point. |
| Disabled | The control has been disabled. |
| Manual | No automatic adjustments are made to the control. |
| Override | User override of the automatic set point value. |

#### 4.13.4.3 FluidLevel:

The level of the fluid in the reservoir.

| string | Description |
|---|---|
| Critical | A critical condition requires immediate attention. |
| OK | Normal. |
| Warning | A condition requires attention. |

#### 4.13.4.4 PhysicalContext:

The area or device associated with this Reservoir.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |
| Backplane | A backplane within the chassis. |
| Battery | A battery. |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |

| string | Description |
| --- | --- |
| Fan | A fan. |
| FPGA | An FPGA. |
| Front | The front of the chassis. |
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |

| string | Description |
|---|---|
| Upper | The upper portion of the chassis. |
| VoltageRegulator | A voltage regulator device. |

#### 4.13.4.5 ReservoirType:

The type of reservoir.

| string | Description |
|---|---|
| Immersion | An immersion cooling tank. |
| Inline | An inline or integrated reservoir. |
| Overflow | An overflow reservoir for excess fluid. |
| Reserve | A reservoir providing reserve fluid capacity. |

#### 4.13.4.6 SensorExcerpt:

The Sensor schema describes a sensor and its properties. This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri.

| | | | |
|---|---|---|---|
| **DataSourceUri** | string (URI) | *read-only (null)* | The link to the resource that provides the data for this sensor. |
| **Reading** | number | *read-only (null)* | The sensor value. |

### 4.13.5 Example response


```
{
    "@odata.type": "#Reservoir.v1_0_0.Reservoir",
    "Id": "1",
    "ReservoirType": "Reserve",
    "Name": "Cooling Loop Reservoir",
    "Manufacturer": "Contoso",
    "Model": "Tarantino",
    "CapacityLiters": 10,
    "PartNumber": "Pink",
    "Status": {
```

```
            "State": "Enabled",
            "Health": "OK"
        },
        "Location": {
            "Placement": {
                "Row": "North 1"
            }
        },
        "FluidLevelPercent": {
            "Reading": 64.8
        },
        "InternalPressurekPa": {
            "Reading": 138.7
        },
        "FillValve": {
            "State": "Open",
            "Reading": 4.2,
            "ReadingUnits": "L/min"
        },
        "DrainValve": {
            "State": "Closed"
        },
        "AirBleedValve": {
            "State": "Closed"
        },
        "Links": {
            "CoolingLoop": {
                "@odata.id": "/redfish/v1/ThermalEquipment/CoolingLoops/Rack4"
            }
        },
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs/1/Reservoirs/1",
        "@Redfish.Copyright": "Copyright 2014-2020 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
    }
```


## 4.14 Sensor 1.7.0

| **Version** | *v1.7* | *v1.6* | *v1.5* | *v1.4* | *v1.3* | *v1.2* | *v1.1* | *v1.0* |
|---|---|---|---|---|---|---|---|---|
| **Release** | 2023.1 | 2022.2 | 2021.4 | 2021.2 | 2021.1 | 2020.4 | 2019.4 | 2018.3 |

### 4.14.1 Description

The Sensor schema describes a sensor and its properties.

### 4.14.2 URIs

/redfish/v1/Chassis/*{ChassisId}*/Sensors/*{SensorId}*
/redfish/v1/PowerEquipment/FloorPDUs/*{PowerDistributionId}*/Sensors/*{SensorId}*
/redfish/v1/PowerEquipment/PowerShelves/*{PowerDistributionId}*/Sensors/*{SensorId}*
/redfish/v1/PowerEquipment/RackPDUs/*{PowerDistributionId}*/Sensors/*{SensorId}*
/redfish/v1/PowerEquipment/Switchgear/*{PowerDistributionId}*/Sensors/*{SensorId}*
/redfish/v1/PowerEquipment/TransferSwitches/*{PowerDistributionId}*/Sensors/*{SensorId}*

### 4.14.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **Accuracy** | number (%) | *read-only (null)* | The estimated percent error of measured versus actual values. |
| **AdjustedMaxAllowableOperatingValue** | number | *read-only (null)* | The adjusted maximum allowable operating value for this equipment based on the environmental conditions. |
| **AdjustedMinAllowableOperatingValue** | number | *read-only (null)* | The adjusted minimum allowable operating value for this equipment based on the environmental conditions. |
| **ApparentkVAh** *(v1.5+)* | number (kV.A.h) | *read-only (null)* | Apparent energy (kVAh). |
| **ApparentVA** | number (V.A) | *read-only (null)* | The product of voltage and current for an AC circuit, in volt-ampere units. |
| **AverageReading** *(v1.4+)* | number | *read-only (null)* | The average sensor value. |
| **AveragingInterval** *(v1.4+)* | string (duration) | *read-write (null)* | The interval over which the average sensor value is calculated. |
| **AveragingIntervalAchieved** *(v1.4+)* | boolean | *read-only (null)* | Indicates that enough readings were collected to calculate the average sensor reading over the averaging interval time. |
| **Calibration** *(v1.4+)* | number | *read-write (null)* | The calibration offset applied to the Reading. |
| **CalibrationTime** *(v1.4+)* | string (date-time) | *read-write (null)* | The date and time that the sensor was last calibrated. |
| **CrestFactor** *(v1.1+)* | number | *read-only (null)* | The crest factor for this sensor. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **ElectricalContext** | string (enum) | *read-only (null)* | The combination of current-carrying conductors. *For the possible property values, see ElectricalContext in Property details.* |
| **Implementation** *(v1.1+)* | string (enum) | *read-only (null)* | The implementation of the sensor. *For the possible property values, see Implementation in Property details.* |
| **LifetimeReading** *(v1.1+)* | number | *read-only (null)* | The total accumulation value for this sensor. |
| **Links** *(v1.3+)* { | object | | The links to other resources that are related to this resource. |
| **AssociatedControls** *(v1.4+)* [ { | array | | An array of links to the controls that can affect this sensor. |
| **@odata.id** | string | *read-only* | Link to a Control resource. See the Links section and the *Control* schema for details. |
| } ] | | | |
| **AssociatedControls@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **LoadPercent** *(deprecated v1.1)* | number (%) | *read-only (null)* | The power load utilization for this sensor. *Deprecated in v1.1 and later. This property has been deprecated in favor of using a sensor instance with a ReadingType of* `Percent` *to show utilization values when needed.* |
| **Location** {} | object | | The location information for this sensor. See the *Resource* schema for details on this property. |
| **LowestReading** *(v1.4+)* | number | *read-only (null)* | The lowest sensor value. |
| **LowestReadingTime** *(v1.4+)* | string (date-time) | *read-only (null)* | The time when the lowest sensor value occurred. |
| **MaxAllowableOperatingValue** | number | *read-only (null)* | The maximum allowable operating value for this equipment. |
| **MinAllowableOperatingValue** | number | *read-only (null)* | The minimum allowable operating value for this equipment. |
| **PeakReading** | number | *read-only (null)* | The peak sensor value. |
| **PeakReadingTime** | string (date-time) | *read-only (null)* | The time when the peak sensor value occurred. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **PhaseAngleDegrees** *(v1.5+)* | number | *read-only (null)* | The phase angle (degrees) between the current and voltage waveforms. |
| **PhysicalContext** | string (enum) | *read-only (null)* | The area or device to which this sensor measurement applies. *For the possible property values, see PhysicalContext in Property details.* |
| **PhysicalSubContext** | string (enum) | *read-only (null)* | The usage or location within a device to which this sensor measurement applies. *For the possible property values, see PhysicalSubContext in Property details.* |
| **PowerFactor** | number | *read-only (null)* | The power factor for this sensor. |
| **Precision** | number | *read-only (null)* | The number of significant digits in the reading. |
| **ReactivekVARh** *(v1.5+)* | number (kV.A.h) | *read-only (null)* | Reactive energy (kVARh). |
| **ReactiveVAR** | number (V.A) | *read-only (null)* | The square root of the difference term of squared apparent VA and squared power (Reading) for a circuit, in VAR units. |
| **Reading** | number | *read-only (null)* | The sensor value. |
| **ReadingRangeMax** | number | *read-only (null)* | The maximum possible value for this sensor. |
| **ReadingRangeMin** | number | *read-only (null)* | The minimum possible value for this sensor. |
| **ReadingTime** *(v1.1+)* | string (date-time) | *read-only (null)* | The date and time that the reading was acquired from the sensor. |
| **ReadingType** | string (enum) | *read-only (null)* | The type of sensor. *For the possible property values, see ReadingType in Property details.* |
| **ReadingUnits** | string | *read-only (null)* | The units of the reading and thresholds. |
| **RelatedItem** *(v1.2+)* [ { | array | | An array of links to resources or objects that this sensor services. |
| **@odata.id** | string (URI) | *read-only* | The unique identifier for a resource. |
| } ] | | | |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **SensingFrequency** *(deprecated v1.1)* | number | *read-only (null)* | The time interval between readings of the physical sensor. *Deprecated in v1.1 and later. This property has been deprecated in favor of the SensingInterval property, which uses the duration time format for interoperability.* |
| **SensingInterval** *(v1.1+)* | string (duration) | *read-only (null)* | The time interval between readings of the sensor. |
| **SensorGroup** *(v1.4+)* {} | object | | The group of sensors that provide readings for this sensor. See the *v1_4_1.v1_4_1* schema for details on this property. |
| **SensorResetTime** | string (date-time) | *read-only (null)* | The date and time when the time-based properties were last reset. |
| **SpeedRPM** *(v1.2+)* | number ({rev}/min) | *read-only (null)* | The rotational speed. |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **THDPercent** *(v1.1+)* | number | *read-only (null)* | The total harmonic distortion (THD). |
| **Thresholds** { | object | | The set of thresholds defined for this sensor. |
| **LowerCaution** {} | object | | The value at which the reading is below normal range. For more information about this property, see Threshold in Property Details. |
| **LowerCautionUser** *(v1.2+)* {} | object | | A user-defined value at which the reading is considered below normal range. For more information about this property, see Threshold in Property Details. |
| **LowerCritical** {} | object | | The value at which the reading is below normal range but not yet fatal. For more information about this property, see Threshold in Property Details. |
| **LowerCriticalUser** *(v1.2+)* {} | object | | A user-defined value at which the reading is considered below normal range but not yet fatal. For more information about this property, see Threshold in Property Details. |
| **LowerFatal** {} | object | | The value at which the reading is below normal range and fatal. For more information about this property, see Threshold in Property Details. |
| **UpperCaution** {} | object | | The value at which the reading is above normal range. For more information about this property, see Threshold in Property Details. |
| **UpperCautionUser** *(v1.2+)* {} | object | | A user-defined value at which the reading is considered above normal range. For more information about this property, see Threshold in Property Details. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **UpperCritical** {} | object | | The value at which the reading is above normal range but not yet fatal. For more information about this property, see Threshold in Property Details. |
| **UpperCriticalUser** *(v1.2+)* {} | object | | A user-defined value at which the reading is considered above normal range but not yet fatal. For more information about this property, see Threshold in Property Details. |
| **UpperFatal** {} | object | | The value at which the reading is above normal range and fatal. For more information about this property, see Threshold in Property Details. |
| } | | | |
| **VoltageType** | string (enum) | *read-only (null)* | The voltage type for this sensor. *For the possible property values, see VoltageType in Property details.* |

## 4.14.4 Actions

### 4.14.4.1 ResetMetrics

**Description**

Resets metrics related to this sensor.

**Action URI: {Base URI of target resource}/Actions/Sensor.ResetMetrics**

**Action parameters**

This action takes no parameters.

### 4.14.4.2 ResetToDefaults *(v1.6+)*

**Description**

The action resets the values of writable properties to factory defaults.

**Action URI: {Base URI of target resource}/Actions/Sensor.ResetToDefaults**

**Action parameters**

This action takes no parameters.

## 4.14.5 Property details

### 4.14.5.1 Activation:

The direction of crossing that activates this threshold.

| string | Description |
|---|---|
| Decreasing | Value decreases below the threshold. |
| Either | Value crosses the threshold in either direction. |
| Increasing | Value increases above the threshold. |

### 4.14.5.2 ElectricalContext:

The combination of current-carrying conductors.

| string | Description |
|---|---|
| Line1 | The circuits that share the L1 current-carrying conductor. |
| Line1ToLine2 | The circuit formed by L1 and L2 current-carrying conductors. |
| Line1ToNeutral | The circuit formed by L1 and neutral current-carrying conductors. |
| Line1ToNeutralAndL1L2 | The circuit formed by L1, L2, and neutral current-carrying conductors. |
| Line2 | The circuits that share the L2 current-carrying conductor. |
| Line2ToLine3 | The circuit formed by L2 and L3 current-carrying conductors. |
| Line2ToNeutral | The circuit formed by L2 and neutral current-carrying conductors. |
| Line2ToNeutralAndL1L2 | The circuit formed by L1, L2, and Neutral current-carrying conductors. |
| Line2ToNeutralAndL2L3 | The circuits formed by L2, L3, and neutral current-carrying conductors. |
| Line3 | The circuits that share the L3 current-carrying conductor. |
| Line3ToLine1 | The circuit formed by L3 and L1 current-carrying conductors. |
| Line3ToNeutral | The circuit formed by L3 and neutral current-carrying conductors. |
| Line3ToNeutralAndL3L1 | The circuit formed by L3, L1, and neutral current-carrying conductors. |
| LineToLine | The circuit formed by two current-carrying conductors. |

| string | Description |
|---|---|
| LineToNeutral | The circuit formed by a line and neutral current-carrying conductor. |
| Neutral | The grounded current-carrying return circuit of current-carrying conductors. |
| Total | The circuit formed by all current-carrying conductors. |

#### 4.14.5.3 Implementation:

The implementation of the sensor.

| string | Description |
|---|---|
| PhysicalSensor | The reading is acquired from a physical sensor. |
| Reported | The reading is obtained from software or a device. |
| Synthesized | The reading is obtained by applying a calculation on one or more properties or multiple sensors. The calculation is not provided. |

#### 4.14.5.4 PhysicalContext:

The area or device to which this sensor measurement applies.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |
| Backplane | A backplane within the chassis. |
| Battery | A battery. |

| string | Description |
| --- | --- |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |
| Fan | A fan. |
| FPGA | An FPGA. |
| Front | The front of the chassis. |
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |

| string | Description |
|---|---|
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |
| Upper | The upper portion of the chassis. |
| VoltageRegulator | A voltage regulator device. |

#### 4.14.5.5 PhysicalSubContext:

The usage or location within a device to which this sensor measurement applies.

| string | Description |
|---|---|
| Input | The input. |
| Output | The output. |

#### 4.14.5.6 ReadingType:

The type of sensor.

| string | Description |
|---|---|
| AbsoluteHumidity *(v1.5+)* | Absolute humidity (g/cu m). |
| AirFlow | Airflow (cu ft/min). |
| Altitude | Altitude (m). |

| string | Description |
|---|---|
| Barometric | Barometric pressure (mm). |
| ChargeAh *(v1.4+)* | Charge (Ah). |
| Current | Current (A). |
| EnergyJoules | Energy (J). |
| EnergykWh | Energy (kWh). |
| EnergyWh *(v1.4+)* | Energy (Wh). |
| Frequency | Frequency (Hz). |
| Heat *(v1.7+)* | Heat (kW). |
| Humidity | Relative humidity (percent). |
| LiquidFlow | Liquid flow (L/s). |
| LiquidLevel | Liquid level (cm). |
| Percent *(v1.1+)* | Percent (%). |
| Power | Power (W). |
| Pressure *(deprecated v1.7)* | Pressure (Pa). *Deprecated in v1.7 and later. This value has been deprecated in favor of* `PressurePa` *or* `PressurekPa` *for consistency of units between Sensor and Control resources.* |
| PressurekPa *(v1.5+)* | Pressure (kPa). |
| PressurePa *(v1.7+)* | Pressure (Pa). |
| Rotational | Rotational (RPM). |
| Temperature | Temperature (C). |
| Voltage | Voltage (VAC or VDC). |

#### 4.14.5.7 Threshold:

The threshold definition for a sensor.

| | | | |
|---|---|---|---|
| **Activation** | string (enum) | *read-write (null)* | The direction of crossing that activates this threshold. *For the possible property values, see Activation in Property details.* |
| **DwellTime** | string (duration) | *read-write (null)* | The duration the sensor value must violate the threshold before the threshold is activated. |
| **HysteresisDuration** *(v1.7+)* | string (duration) | *read-write (null)* | The duration the sensor value must not violate the threshold before the threshold is de-activated. |
| **HysteresisReading** *(v1.7+)* | number | *read-write (null)* | The reading offset from the threshold value required to clear the threshold. |
| **Reading** | number | *read-write (null)* | The threshold value. |

#### 4.14.5.8 VoltageType:

The voltage type for this sensor.

| string | Description |
|---|---|
| AC | Alternating current. |
| DC | Direct current. |

## 4.14.6 Example response

```
{
    "@odata.type": "#Sensor.v1_6_0.Sensor",
    "Id": "CabinetTemp",
    "Name": "Rack Temperature",
    "ReadingType": "Temperature",
    "ReadingTime": "2019-12-25T04:14:33+06:00",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Reading": 31.6,
    "ReadingUnits": "C",
    "ReadingRangeMin": 0,
    "ReadingRangeMax": 70,
```

```
    "Accuracy": 0.25,
    "Precision": 1,
    "SensingInterval": "PT3S",
    "PhysicalContext": "Chassis",
    "Thresholds": {
        "UpperCritical": {
            "Reading": 40,
            "Activation": "Increasing"
        },
        "UpperCaution": {
            "Reading": 35,
            "Activation": "Increasing"
        },
        "LowerCaution": {
            "Reading": 10,
            "Activation": "Increasing"
        }
    },
    "Oem": {},
    "@odata.id": "/redfish/v1/Chassis/1/Sensors/CabinetTemp"
}
```


## 4.15 ServiceRoot 1.16.0

| **Version** | *v1.16* | *v1.15* | *v1.14* | *v1.13* | *v1.12* | *v1.11* | *v1.10* | *v1.9* | *v1.8* | *v1.7* | *v1.6* | ... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Release** | 2023.1 | 2022.3 | 2022.1 | 2021.4 | 2021.3 | 2021.2 | 2021.1 | 2020.3 | 2020.2 | 2020.1 | 2019.4 | ... |

### 4.15.1 Description

The ServiceRoot schema describes the root of the Redfish service, located at the '/redfish/v1' URI. All other resources accessible through the Redfish interface on this device are linked directly or indirectly from the service root.

### 4.15.2 URIs

/redfish/v1
/redfish/v1/

### 4.15.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **AccountService** {} | object | | The link to the account service. See the *AccountService* schema for details on this property. |
| **AggregationService** *(v1.8+)* {} | object | | The link to the aggregation service. See the *AggregationService* schema for details on this property. |
| **Cables** *(v1.11+)* { | object | | The link to a collection of cables. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Cable*. See the Cable schema for details. |
| } | | | |
| **CertificateService** *(v1.5+)* {} | object | | The link to the certificate service. See the *CertificateService* schema for details on this property. |
| **Chassis** { | object | | The link to a collection of chassis. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Chassis*. See the Chassis schema for details. |
| } | | | |
| **ComponentIntegrity** *(v1.13+)* { | object | | The link to a collection of component integrity information. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *ComponentIntegrity*. See the ComponentIntegrity schema for details. |
| } | | | |
| **CompositionService** *(v1.2+)* {} | object | | The link to the composition service. See the *CompositionService* schema for details on this property. |
| **EventService** {} | object | | The link to the event service. See the *EventService* schema for details on this property. |
| **Fabrics** *(v1.1+)* { | object | | The link to a collection of fabrics. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Fabric*. See the Fabric schema for details. |
| } | | | |
| **Facilities** *(v1.6+)* { | object | | The link to a collection of facilities. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Facility*. See the Facility schema for details. |
| } | | | |
| **JobService** *(v1.4+)* {} | object | | The link to the job service. See the *JobService* schema for details on this property. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **JsonSchemas** { | object | | The link to a collection of JSON Schema files. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *JsonSchemaFile*. See the JsonSchemaFile schema for details. |
| } | | | |
| **KeyService** *(v1.11+)* {} | object | | The link to the key service. See the *KeyService* schema for details on this property. |
| **LicenseService** *(v1.12+)* {} | object | | The link to the license service. See the *LicenseService* schema for details on this property. |
| **Links** { | object | *required* | The links to other resources that are related to this resource. |
| **ManagerProvidingService** *(v1.15+)* {} | object | | The link to the manager that is providing this Redfish service. See the *Manager* schema for details on this property. |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| **Sessions** { | object | *required* | The link to a collection of sessions. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Session*. See the Session schema for details. |
| } | | | |
| } | | | |
| **Managers** { | object | | The link to a collection of managers. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Manager*. See the Manager schema for details. |
| } | | | |
| **NVMeDomains** *(v1.10+)* {} | object | | The link to a collection of NVMe domains. |
| **PowerEquipment** *(v1.6+)* {} | object | | The link to a set of power equipment. See the *PowerEquipment* schema for details on this property. |
| **Product** *(v1.3+)* | string | *read-only (null)* | The product associated with this Redfish service. |
| **ProtocolFeaturesSupported** *(v1.3+)* { | object | | The information about protocol features that the service supports. |
| **DeepOperations** *(v1.7+)* { | object | | The information about deep operations that the service supports. |
| **DeepPATCH** *(v1.7+)* | boolean | *read-only* | An indication of whether the service supports the deep PATCH operation. |
| **DeepPOST** *(v1.7+)* | boolean | *read-only* | An indication of whether the service supports the deep POST operation. |
| **MaxLevels** *(v1.7+)* | integer | *read-only* | The maximum levels of resources allowed in deep operations. |
| } | | | |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **ExcerptQuery** *(v1.4+)* | boolean | *read-only* | An indication of whether the service supports the excerpt query parameter. |
| **ExpandQuery** *(v1.3+)* { | object | | The information about the use of $expand in the service. |
| **ExpandAll** *(v1.3+)* | boolean | *read-only* | An indication of whether the service supports the asterisk ( `*` ) option of the $expand query parameter. |
| **Levels** *(v1.3+)* | boolean | *read-only* | An indication of whether the service supports the $levels option of the $expand query parameter. |
| **Links** *(v1.3+)* | boolean | *read-only* | An indication of whether this service supports the tilde ( `~` ) option of the $expand query parameter. |
| **MaxLevels** *(v1.3+)* | integer | *read-only* | The maximum $levels option value in the $expand query parameter. |
| **NoLinks** *(v1.3+)* | boolean | *read-only* | An indication of whether the service supports the period ( `.` ) option of the $expand query parameter. |
| } | | | |
| **FilterQuery** *(v1.3+)* | boolean | *read-only* | An indication of whether the service supports the $filter query parameter. |
| **MultipleHTTPRequests** *(v1.14+)* | boolean | *read-only* | An indication of whether the service supports multiple outstanding HTTP requests. |
| **OnlyMemberQuery** *(v1.4+)* | boolean | *read-only* | An indication of whether the service supports the only query parameter. |
| **SelectQuery** *(v1.3+)* | boolean | *read-only* | An indication of whether the service supports the $select query parameter. |
| } | | | |
| **RedfishVersion** | string | *read-only* | The version of the Redfish service. |
| **RegisteredClients** *(v1.13+)* { | object | | The link to a collection of registered clients. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *RegisteredClient*. See the RegisteredClient schema for details. |
| } | | | |
| **Registries** { | object | | The link to a collection of registries. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *MessageRegistryFile*. See the MessageRegistryFile schema for details. |
| } | | | |
| **ResourceBlocks** *(v1.5+)* { | object | | The link to a collection of resource blocks. This collection is intended for implementations that do not contain a composition service but that expose resources to an orchestrator that implements a composition service. Contains a link to a resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-only* | Link to Collection of *ResourceBlock*. See the ResourceBlock schema for details. |
| } | | | |
| **ServiceConditions** *(v1.13+)* {} | object | | The link to the service conditions. See the *ServiceConditions* schema for details on this property. |
| **ServiceIdentification** *(v1.14+)* | string | *read-only* | The vendor or user-provided product and service identifier. |
| **SessionService** {} | object | | The link to the sessions service. See the *SessionService* schema for details on this property. |
| **Storage** *(v1.9+)* { | object | | The link to a collection of storage subsystems. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Storage*. See the Storage schema for details. |
| } | | | |
| **StorageServices** *(v1.1+)* {} | object | | The link to a collection of storage services. |
| **StorageSystems** *(v1.1+)* {} | object | | The link to a collection of storage systems. |
| **Systems** { | object | | The link to a collection of systems. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *ComputerSystem*. See the ComputerSystem schema for details. |
| } | | | |
| **Tasks** {} | object | | The link to the task service. See the *TaskService* schema for details on this property. |
| **TelemetryService** *(v1.4+)* {} | object | | The link to the telemetry service. See the *TelemetryService* schema for details on this property. |
| **ThermalEquipment** *(v1.16+)* { | object | | The link to a set of cooling equipment. See the *ThermalEquipment* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a ThermalEquipment resource. See the Links section and the *ThermalEquipment* schema for details. |
| } | | | |
| **UpdateService** *(v1.1+)* {} | object | | The link to the update service. See the *UpdateService* schema for details on this property. |
| **UUID** | string (uuid) | *read-only (null)* | Unique identifier for a service instance. When SSDP is used, this value contains the same UUID returned in an HTTP `200 OK` response from an SSDP `M-SEARCH` request during discovery. |
| **Vendor** *(v1.5+)* | string | *read-only (null)* | The vendor or manufacturer associated with this Redfish service. |

### 4.15.4 Property details

#### 4.15.4.1 idRef:

| | | | |
|---|---|---|---|
| **@odata.id** | string (URI) | *read-only* | The unique identifier for a resource. |

### 4.15.5 Example response


```
{
    "@odata.type": "#ServiceRoot.v1_15_0.ServiceRoot",
    "Id": "RootService",
    "Name": "Root Service",
    "RedfishVersion": "1.15.0",
    "UUID": "92384634-2938-2342-8820-489239905423",
    "Product": "UR99 1U Server",
    "ProtocolFeaturesSupported": {
        "ExpandQuery": {
            "ExpandAll": true,
            "Levels": true,
            "MaxLevels": 6,
            "Links": true,
            "NoLinks": true
        },
        "SelectQuery": false,
        "FilterQuery": false,
        "OnlyMemberQuery": true,
        "ExcerptQuery": true,
        "MultipleHTTPRequests": true
    },
    "ServiceConditions": {
        "@odata.id": "/redfish/v1/ServiceConditions"
    },
    "Systems": {
        "@odata.id": "/redfish/v1/Systems"
    },
    "Chassis": {
        "@odata.id": "/redfish/v1/Chassis"
    },
    "Managers": {
        "@odata.id": "/redfish/v1/Managers"
    },
    "UpdateService": {
        "@odata.id": "/redfish/v1/UpdateService"
    },
    "CompositionService": {
```

```
        "@odata.id": "/redfish/v1/CompositionService"
    },
    "Tasks": {
        "@odata.id": "/redfish/v1/TaskService"
    },
    "SessionService": {
        "@odata.id": "/redfish/v1/SessionService"
    },
    "AccountService": {
        "@odata.id": "/redfish/v1/AccountService"
    },
    "EventService": {
        "@odata.id": "/redfish/v1/EventService"
    },
    "Links": {
        "Sessions": {
            "@odata.id": "/redfish/v1/SessionService/Sessions"
        }
    },
    "Oem": {},
    "@odata.id": "/redfish/v1/"
}
```


## 4.16 ThermalEquipment 1.0.0

| | |
|---|---|
| **Version** | *v1.0* |
| **Release** | 2023.1 |

### 4.16.1 Description

This is the schema definition for the set of cooling equipment.

### 4.16.2 URIs

/redfish/v1/ThermalEquipment

### 4.16.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **AirConditioners** { | object | | A link to a collection of Air Conditioning units. Contains a link to a resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **@odata.id** | string | *read-only* | Link to Collection of *CoolingUnit*. See the CoolingUnit schema for details. |
| } | | | |
| **AirHandlers** { | object | | A link to a collection of Air Handler units. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolingUnit*. See the CoolingUnit schema for details. |
| } | | | |
| **CDUs** { | object | | A link to a collection of rack-level cooling distribution units. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolingUnit*. See the CoolingUnit schema for details. |
| } | | | |
| **CoolingLoops** { | object | | A link to a collection of cooling loops. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolingLoop*. See the CoolingLoop schema for details. |
| } | | | |
| **Filters** { | object | | A link to a collection of filters. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Filter*. See the Filter schema for details. |
| } | | | |
| **HeatExchangers** { | object | | A link to a collection of heat exchanger units. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolingUnit*. See the CoolingUnit schema for details. |
| } | | | |
| **ImmersionUnits** { | object | | A link to a collection of immersion cooling units. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolingUnit*. See the CoolingUnit schema for details. |
| } | | | |
| **LeakDetection** { | object | | A link to the leak detection components associated with this equipment. See the *LeakDetection* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a LeakDetection resource. See the Links section and the *LeakDetection* schema for details. |
| } | | | |
| **Links** { | object | | The links to other resources that are related to this resource. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **ManagedBy** [{}] | array (object) | | An array of links to the managers responsible for managing this equipment. See the *Manager* schema for details on this property. |
| **ManagedBy@odata.count** | integer | *read-only* | The number of items in a collection. |
| **Oem** {} | object | | The OEM extension property. See the *Resource* schema for details on this property. |
| } | | | |
| **Pumps** { | object | | A link to a collection of pumps. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Pump*. See the Pump schema for details. |
| } | | | |
| **Reservoirs** { | object | | A link to a collection of reservoirs. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Reservoir*. See the Reservoir schema for details. |
| } | | | |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |

### 4.16.4 Example response


```
{
    "@odata.type": "#ThermalEquipment.v1_0_0.ThermalEquipment",
    "Id": "ThermalEquipment",
    "Name": "Cooling Equipment",
    "Status": {
        "State": "Enabled",
        "HealthRollup": "OK"
    },
    "CDUs": {
        "@odata.id": "/redfish/v1/ThermalEquipment/CDUs"
    },
    "Links": {},
    "@odata.id": "/redfish/v1/ThermalEquipment",
    "@Redfish.Copyright": "Copyright 2014-2021 DMTF. For the full DMTF copyright policy, see http://www.dmtf.org/about/policie
}
```

## 4.17 ThermalMetrics 1.2.0

| **Version** | *v1.2* | *v1.1* | *v1.0* |
|---|---|---|---|
| **Release** | 2023.1 | 2022.3 | 2020.4 |

### 4.17.1 Description

The ThermalMetrics schema represents the thermal metrics of a chassis.

### 4.17.2 URIs

/redfish/v1/Chassis/*{ChassisId}*/ThermalSubsystem/ThermalMetrics

### 4.17.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **AirflowCubicMetersPerMinute** *(v1.2+)* {} | object | | The airflow through the chassis (m^3/min). For more information about this property, see SensorExcerpt in Property Details. |
| **DeltaPressurekPa** *(v1.2+)* {} | object | | The differential pressure (kPa). For more information about this property, see SensorExcerpt in Property Details. |
| **HeaterSummary** *(v1.1+)* { | object | *(null)* | The summary of heater metrics for this chassis. |
| **TotalPrePowerOnHeatingTimeSeconds** *(v1.1+)* | integer | *read-only* *(null)* | The total number of seconds all the heaters in the thermal subsystem were active while the respective devices they heat were powered off. |
| **TotalRuntimeHeatingTimeSeconds** *(v1.1+)* | integer | *read-only* *(null)* | The total number of seconds all the heaters in the thermal subsystem were active while the respective devices they heat were powered on. |
| } | | | |
| **TemperatureReadingsCelsius** [ { | array (excerpt) | | The temperatures (Celsius) from all related sensors for this device. This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri. |
| **DataSourceUri** | string (URI) | *read-only* *(null)* | The link to the resource that provides the data for this sensor. |
| **DeviceName** *(v1.2+)* | string | *read-only* *(null)* | The name of the device. |

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **PhysicalContext** | string (enum) | *read-only (null)* | The area or device to which this sensor measurement applies. *For the possible property values, see PhysicalContext in Property details.* |
| **PhysicalSubContext** | string (enum) | *read-only (null)* | The usage or location within a device to which this sensor measurement applies. *For the possible property values, see PhysicalSubContext in Property details.* |
| **Reading** | number | *read-only (null)* | The sensor value. |
| } ] | | | |
| **TemperatureSummaryCelsius** { | object | *(null)* | The summary temperature readings for this chassis. |
| **Ambient** {} | object | | The ambient temperature (Celsius) of this subsystem. For more information about this property, see SensorExcerpt in Property Details. |
| **Exhaust** {} | object | | The exhaust temperature (Celsius) of this subsystem. For more information about this property, see SensorExcerpt in Property Details. |
| **Intake** {} | object | | The intake temperature (Celsius) of this subsystem. For more information about this property, see SensorExcerpt in Property Details. |
| **Internal** {} | object | | The internal temperature (Celsius) of this subsystem. For more information about this property, see SensorExcerpt in Property Details. |
| } | | | |

## 4.17.4 Actions

### 4.17.4.1 ResetMetrics

**Description**

This action resets the summary metrics related to this equipment.

**Action URI: {Base URI of target resource}/Actions/ThermalMetrics.ResetMetrics**

**Action parameters**

This action takes no parameters.

## 4.17.5 Property details

### 4.17.5.1 PhysicalContext:

The area or device to which this sensor measurement applies.

| string | Description |
|---|---|
| Accelerator | An accelerator. |
| ACInput | An AC input. |
| ACMaintenanceBypassInput | An AC maintenance bypass input. |
| ACOutput | An AC output. |
| ACStaticBypassInput | An AC static bypass input. |
| ACUtilityInput | An AC utility input. |
| ASIC | An ASIC device, such as a networking chip or chipset component. |
| Back | The back of the chassis. |
| Backplane | A backplane within the chassis. |
| Battery | A battery. |
| Board | A circuit board. |
| Chassis | The entire chassis. |
| ComputeBay | Within a compute bay. |
| CoolingSubsystem | The entire cooling, or air and liquid, subsystem. |
| CPU | A processor (CPU). |
| CPUSubsystem | The entire processor (CPU) subsystem. |
| DCBus | A DC bus. |
| Exhaust | The air exhaust point or points or region of the chassis. |
| ExpansionBay | Within an expansion bay. |
| Fan | A fan. |
| FPGA | An FPGA. |
| Front | The front of the chassis. |

| string | Description |
|---|---|
| GPU | A graphics processor (GPU). |
| GPUSubsystem | The entire graphics processor (GPU) subsystem. |
| Intake | The air intake point or points or region of the chassis. |
| LiquidInlet | The liquid inlet point of the chassis. |
| LiquidOutlet | The liquid outlet point of the chassis. |
| Lower | The lower portion of the chassis. |
| Memory | A memory device. |
| MemorySubsystem | The entire memory subsystem. |
| Motor | A motor. |
| NetworkBay | Within a networking bay. |
| NetworkingDevice | A networking device. |
| PowerSubsystem | The entire power subsystem. |
| PowerSupply | A power supply. |
| PowerSupplyBay | Within a power supply bay. |
| Pump | A pump. |
| Rectifier | A rectifier device. |
| Room | The room. |
| StorageBay | Within a storage bay. |
| StorageDevice | A storage device. |
| SystemBoard | The system board (PCB). |
| Transceiver | A transceiver. |
| Transformer | A transformer. |
| TrustedModule | A trusted module. |
| Upper | The upper portion of the chassis. |
| VoltageRegulator | A voltage regulator device. |

#### 4.17.5.2 PhysicalSubContext:

The usage or location within a device to which this sensor measurement applies.

| string | Description |
|---|---|
| Input | The input. |
| Output | The output. |

#### 4.17.5.3 SensorExcerpt:

The Sensor schema describes a sensor and its properties. This object is an excerpt of the *Sensor* resource located at the URI shown in DataSourceUri.

| | | | |
|---|---|---|---|
| **DataSourceUri** | string (URI) | *read-only* *(null)* | The link to the resource that provides the data for this sensor. |
| **Reading** | number | *read-only* *(null)* | The sensor value. |

### 4.17.6 Example response


```
{
    "@odata.type": "#ThermalMetrics.v1_1_0.ThermalMetrics",
    "Id": "ThermalMetrics",
    "Name": "Chassis Thermal Metrics",
    "TemperatureSummaryCelsius": {
        "Internal": {
            "Reading": 39,
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/CPU1Temp"
        },
        "Intake": {
            "Reading": 24.8,
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/IntakeTemp"
        },
        "Ambient": {
            "Reading": 22.5,
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/AmbientTemp"
        },
        "Exhaust": {
            "Reading": 40.5,
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/ExhaustTemp"
```

```
        }
    },
    "TemperatureReadingsCelsius": [
        {
            "Reading": 40,
            "DeviceName": "SystemBoard",
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/SysBrdTemp"
        },
        {
            "Reading": 24.8,
            "DeviceName": "Intake",
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/IntakeTemp"
        },
        {
            "Reading": 39,
            "DeviceName": "CPUSubsystem",
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/CPUTemps"
        },
        {
            "Reading": 42,
            "DeviceName": "MemorySubsystem",
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/MemoryTemp"
        },
        {
            "Reading": 33,
            "DeviceName": "PowerSupply",
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/PSTemp"
        },
        {
            "Reading": 40.5,
            "DeviceName": "Exhaust",
            "DataSourceUri": "/redfish/v1/Chassis/1U/Sensors/ExhaustTemp"
        }
    ],
    "Oem": {},
    "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem/ThermalMetrics"
}
```


## 4.18 ThermalSubsystem 1.2.0

| **Version** | *v1.2* | *v1.1* | *v1.0* |
|---|---|---|---|
| **Release** | 2023.1 | 2022.3 | 2020.4 |

### 4.18.1 Description

This ThermalSubsystem schema contains the definition for the thermal subsystem of a chassis.

### 4.18.2 URIs

/redfish/v1/Chassis/*{ChassisId}*/ThermalSubsystem

### 4.18.3 Properties

| Property | Type | Attributes | Notes |
|---|---|---|---|
| **CoolantConnectors** *(v1.2+)* { | object | | A link to the coolant connectors for this equipment. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *CoolantConnector*. See the CoolantConnector schema for details. |
| } | | | |
| **FanRedundancy** [ { } ] | array (object) | | The redundancy information for the groups of fans in this subsystem. See the *v1_4_1.v1_4_1* schema for details on this property. |
| **Fans** { | object | | The link to the collection of fans within this subsystem. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Fan*. See the Fan schema for details. |
| } | | | |
| **Heaters** *(v1.1+)* { | object | | The link to the collection of heaters within this subsystem. Contains a link to a resource. |
| **@odata.id** | string | *read-only* | Link to Collection of *Heater*. See the Heater schema for details. |
| } | | | |
| **Status** {} | object | | The status and health of the resource and its subordinate or dependent resources. See the *Resource* schema for details on this property. |
| **ThermalMetrics** { | object | | The link to the summary of thermal metrics for this subsystem. See the *ThermalMetrics* schema for details on this property. |
| **@odata.id** | string | *read-only* | Link to a ThermalMetrics resource. See the Links section and the *ThermalMetrics* schema for details. |
| } | | | |

### 4.18.4 Example response


```
{
    "@odata.type": "#ThermalSubsystem.v1_1_0.ThermalSubsystem",
    "Id": "ThermalSubsystem",
    "Name": "Thermal Subsystem for Chassis",
    "FanRedundancy": [
        {
            "RedundancyType": "NPlusM",
            "MaxSupportedInGroup": 2,
            "MinNeededInGroup": 1,
            "RedundancyGroup": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem/Fans/Bay1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem/Fans/Bay2"
                }
            ],
            "Status": {
                "State": "Enabled",
                "Health": "OK"
            }
        },
        {
            "RedundancyType": "NPlusM",
            "MaxSupportedInGroup": 2,
            "MinNeededInGroup": 1,
            "RedundancyGroup": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem/Fans/CPU1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem/Fans/CPU2"
                }
            ],
            "Status": {
                "State": "Disabled"
            }
        }
    ],
    "Fans": {
        "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem/Fans"
    },
    "ThermalMetrics": {
        "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem/ThermalMetrics"
    },
    "Status": {
        "State": "Enabled",
```

```
        "Health": "OK"
    },
    "Oem": {},
    "@odata.id": "/redfish/v1/Chassis/1U/ThermalSubsystem"
}
```

# 5 Redfish documentation generator

This document was created using the Redfish Documentation Generator utility, which uses the contents of the Redfish schema files (in JSON schema format) to automatically generate the bulk of the text. The source code for the utility is available for download at the DMTF's Github repository located at http://www.github.com/DMTF/Redfish-Tools.