Base Metrics Profile

Document Number: DCIM1036
Document Type: Specification
Document Status: Draft
Document Language: E
Date: 2012-03-08

Version: 1.0.0

THIS PROFILE IS FOR INFORMATIONAL PURPOSES ONLY, AND MAY CONTAIN TYPOGRAPHICAL ERRORS AND TECHNICAL INACCURACIES. THE CONTENT IS PROVIDED AS IS, WITHOUT EXPRESS OR IMPLIED WARRANTIES OF ANY KIND. ABSENT A SEPARATE AGREEMENT BETWEEN YOU AND DELL™ WITH REGARD TO FEEDBACK TO DELL ON THIS PROFILE SPECIFICATION, YOU AGREE ANY FEEDBACK YOU PROVIDE TO DELL REGARDING THIS PROFILE SPECIFICATION WILL BE OWNED AND CAN BE FREELY USED BY DELL.

© 2008 – 2012 Dell Inc. All rights reserved. Reproduction in any manner whatsoever without the express written permission of Dell, Inc. is strictly forbidden. For more information, contact Dell.

Dell and the *DELL* logo are trademarks of Dell Inc. Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Dell disclaims proprietary interest in the marks and names of others.

CONTENTS

1 Scope 7
2 Normative References 7
3 Terms and Definitions 7
4 Symbols and Abbreviated Terms 8
5 Synopsis 8
6 Description 9
7 Implementation Requirements 13
7.1 Maximum Power Consumption Metric in Watts 14
7.2 Maximum Headroom Power Consumption Metric in Watts 17
7.3 Maximum Power Consumption Metric in Amperes 18
7.4 Maximum Power Consumption Metric for Last Minute, Hour, Day and Week 21
7.5 Minimum Power Consumption Metric for Last Minute, Hour, Day and Week 24
7.6 Average Power Consumption Metric for Last Minute, Hour, Day and Week 27
7.7 Energy Consumption Metric 30
7.8 Instantaneous Power Consumption Headroom Metric 33
7.9 DCIM_MetricDefForME 35
7.10 DCIM_MetricServiceCapabilities 36
7.11 DCIM_MetricService 38
7.12 DMTF Base Metrics Profile Registration 39
7.13 Dell Base Metrics Profile Registration 40
8 Methods 41
8.1 CIM_MetricService.ControlMetrics( ) 41
8.2 DCIM_MetricService. GetAvgPowerConsumptionByInterval () 42
9 Use Cases 43
10 CIM Elements 44
11 Privilege and License Requirement 44
ANNEX A Change Log 46

Figures

Figure 1 – Class Diagram 9
Figure 2 – Maximum, Headroom Power and Energy Consumption Metrics 10
Figure 3 – Minimum Power Consumption for Last Minute, Hour, Day and Week 11
Figure 4 – Maximum Power Consumption for Last Minute, Hour, Day and Week 12
Figure 5 – Average Power Consumption for Last Minute, Hour, Day and Week 13

Tables

Table 1 – Related Profiles 9
Table 2 – Class Requirements: Base Metrics Profile 13
Table 3 – DCIM_AggregationMetricDefinition Operations 15
Table 4 – DCIM_AggregationMetricDefinition: Maximum Power Consumption Metric in Watts Properties 15
Table 5 – DCIM_AggregationMetricValue Operations 16
Table 3 – DCIM_AggregationMetricDefinition Operations 17
Table 6 – DCIM_AggregationMetricValue Operations 18
Table 7 – DCIM_AggregationMetricValue: Maximum Power Consumption Metric in Watts Properties 18
Table 8 – DCIM_AggregationMetricDefinition Operations 19
Table 9 – DCIM_AggregationMetricDefinition: Maximum Power Consumption Metric in Amperes Properties 19
Table 10 – DCIM_AggregationMetricValue Operations 20
Table 11 – DCIM_AggregationMetricValue: Maximum Power Consumption Metric in Amperes Properties 21
Table 12 – DCIM_AggregationMetricDefinition Operations 22
Table 13 – DCIM_AggregationMetricDefinition: Maximum Power Consumption Metric for Last Minute, Hour, Day and Week Properties 22
Table 14 – DCIM_AggregationMetricValue Operations 23
Table 15 – DCIM_AggregationMetricValue: Maximum Power Consumption Metric for Last Minute, Hour, Day and Week Properties 23
Table 16 – DCIM_AggregationMetricDefinition Operations 25
Table 17 – DCIM_AggregationMetricDefinition: Minimum Power Consumption Metric in Watts for Last Minute, Hour, Day and Week Properties 25
Table 18 – DCIM_AggregationMetricValue Operations 26
Table 19 – DCIM_AggregationMetricValue: Minimum Power Consumption Metric in Watts for Last Minute, Hour, Day and Week Properties 27
Table 20 – DCIM_AggregationMetricDefinition Operations 28
Table 21 – DCIM_AggregationMetricDefinition: Average Power Consumption Metric in Watts for Last Minute, Hour, Day and Week Properties 28
Table 22 – DCIM_AggregationMetricValue Operations 29
Table 23 – DCIM_AggregationMetricValue: Average Power Consumption Metric in Watts for Last Minute, Hour, Day and Week Properties 30
Table 24 – DCIM_BaseMetricDefinition Operations 31
Table 25 – DCIM_BaseMetricDefinition: Energy Consumption Metric Properties 31
Table 26 – DCIM_BaseMetricValue Operations 32
Table 27 – DCIM_BaseMetricValue: Energy Consumption Metric in Amperes Properties 32
Table 28 – DCIM_BaseMetricDefinition Operations 33
Table 29 – DCIM_BaseMetricDefinition: Instantaneous Power Metric Properties 33
Table 30 – DCIM_BaseMetricValue Operations 34

Table 31 – DCIM_BaseMetricValue: Instantaneous Power Consumption Headroom Metric in Amperes Properties 35
Table 44 – DCIM_MetricDefForME Operations 36
Table 45 – DCIM_MetricDefForME Properties 36
Table 46 – DCIM_MetricServiceCapabilities Operations 37
Table 47 – DCIM_MetricServiceCapabilities Properties 37
Table 48 – DCIM_MetricService Operations 38
Table 49 – DCIM_MetricService Properties 39
Table 50 – DCIM_RegisteredProfile - Operations 39
Table 51 – DCIM_RegisteredProfile - Properties 40
Table 52 – DCIM_LCRegisteredProfile - Operations 40
Table 53 – DCIM_LCRegisteredProfile - Properties 41
Table 54 – CIM_MetricService.ControlMetrics( ) Method: Return Code Values 41
Table 55 – CIM_MetricService.ControlMetrics( ) Method: Standard Messages 41
Table 56 – CIM_MetricService.ControlMetrics( ) Method: Parameters 42
Table 57 – DCIM_MetricService.GetAvgPowerConsumptionByInterval() Method: Return Code Values 42
Table 58 – DCIM_MetricService.GetAvgPowerConsumptionByInterval() Method: Parameters 43
Table 59 – DCIM_MetricService.ExportThermalHistory() Method: Standard Messages 43
Table 60 – Privilege and License Requirements 44

Base Metrics Profile

1 Scope

The DCIM Base Metrics Profile extends the DMTF Base Metrics Profile to add Dell specific implementation requirements for power related metrics. The profile standardizes the units and description for the metrics as well as provides static methodology for the clients to query the metrics without substantial traversal of the model.

The metrics covered in this profile are:

- For power:
  - Maximum power consumption metric in Watts,
  - Maximum power consumption metric in Amperes,
  - Minimum power consumption metric in Watts,
  - Energy consumption metric in kilowatt-hours (kWh),
  - Maximum power consumption metric in Watts for last minute, hour, day, week,
  - Minimum power consumption metric in Watts for last minute, hour, day, week,
  - Average power consumption metric in Watts for last minute, hour, day, week,
  - Maximum headroom power consumption metric,
  - Instantaneous headroom power consumption metric.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

DMTF DSP1053, *Base Metrics Profile 1.0.1*

DMTF DSP1033, *Profile Registration Profile 1.0.0*

Dell Lifecycle Controller Best Practices Guide 1.0,
http://en.community.dell.com/techcenter/extras/m/white_papers/20066173.aspx

Dell WSMAN Licenses and Privileges 1.0

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1

conditional

indicates requirements to be followed strictly in order to conform to the document when the specified conditions are met

3.2
mandatory
indicates requirements to be followed strictly in order to conform to the document and from which no deviation is permitted

3.3
may
indicates a course of action permissible within the limits of the document

3.4
optional
indicates a course of action permissible within the limits of the document

3.5
referencing profile
indicates a profile that owns the definition of this class and can include a reference to this profile in its "Related Profiles" table

3.6
shall
indicates requirements to be followed strictly in order to conform to the document and from which no deviation is permitted

4 Symbols and Abbreviated Terms

4.1
CIM
Common Information Model

4.2
iDRAC
integrated Dell Remote Access Controller – management controller for blades and monolithic servers

4.3
CMC
Chassis Manager Controller – management controller for the modular chassis

5 Synopsis

Profile Name: Base Metrics

Version: 1.0.0

Organization: Dell

CIM Schema Version: 2.26.0

Central Class: DCIM_MetricService

Scoping Class: DCIM_ComputerSystem

The Dell Base Metrics Profile is derived from the DMTF Base Metrics Profile and contains additional Dell specific implementation requirements.

Table 1 identifies profiles that are related to this profile.

Table 1 – Related Profiles

Profile Name	Organization	Version	Relationship
Base Metrics Profile	DMTF	1.0	Specializes

6 Description

The Dell Base Metrics Profile describes platform's power related metrics required to represent power monitoring information using the CIM and DCIM model.

Figure 1 represents the class diagram of the profile.

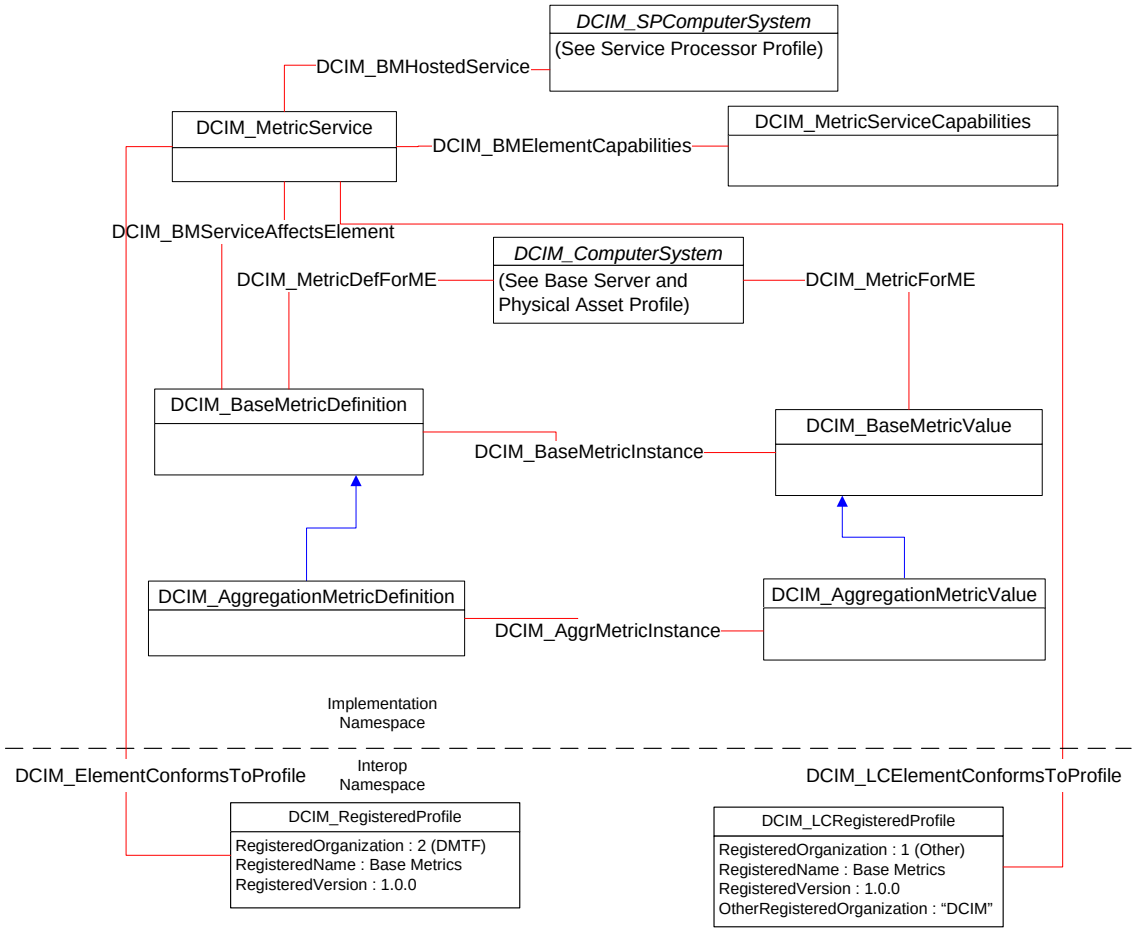


Figure 1 – Class Diagram

Figure 2 details maximum power and energy consumption metrics for a platform.

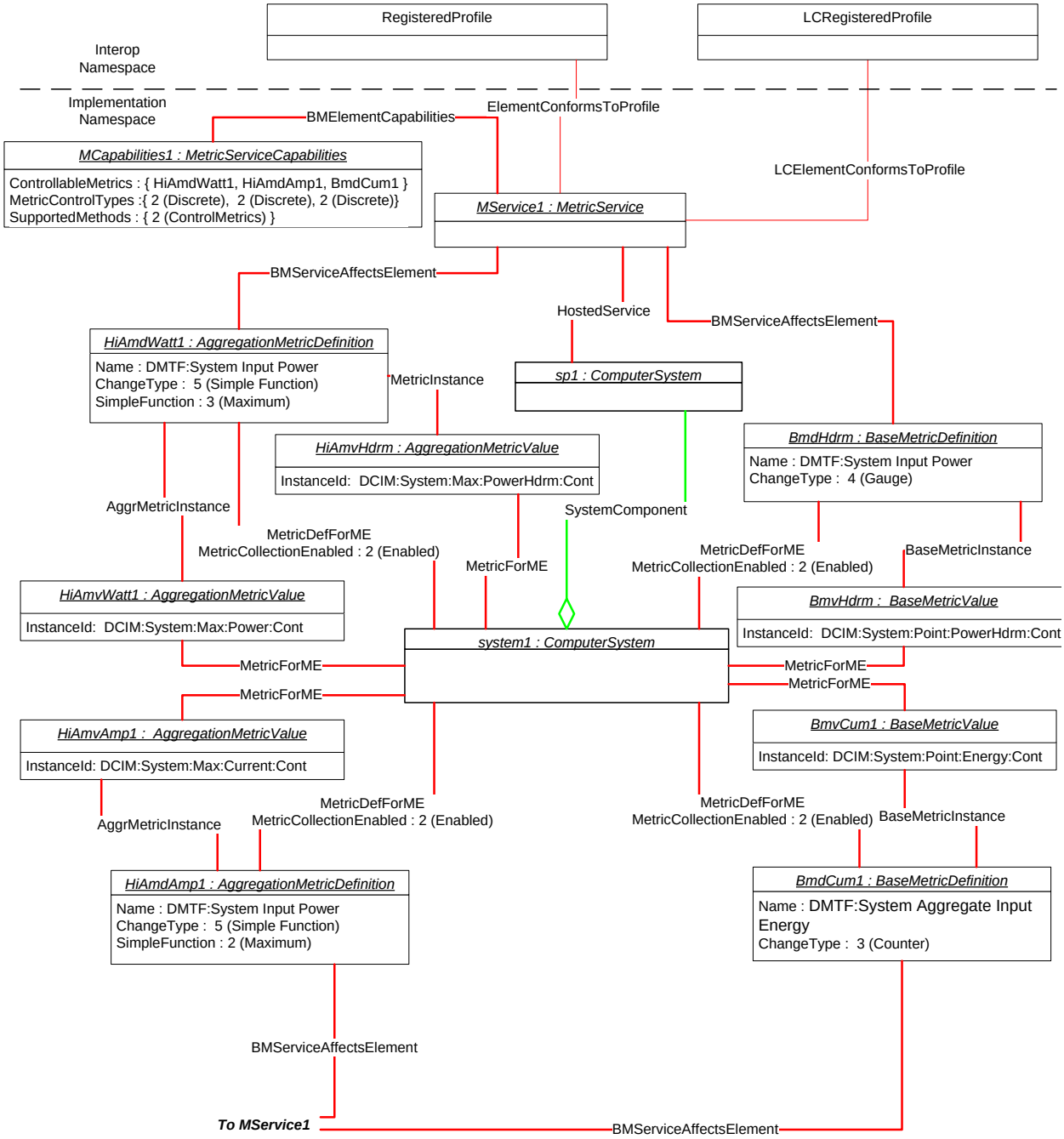
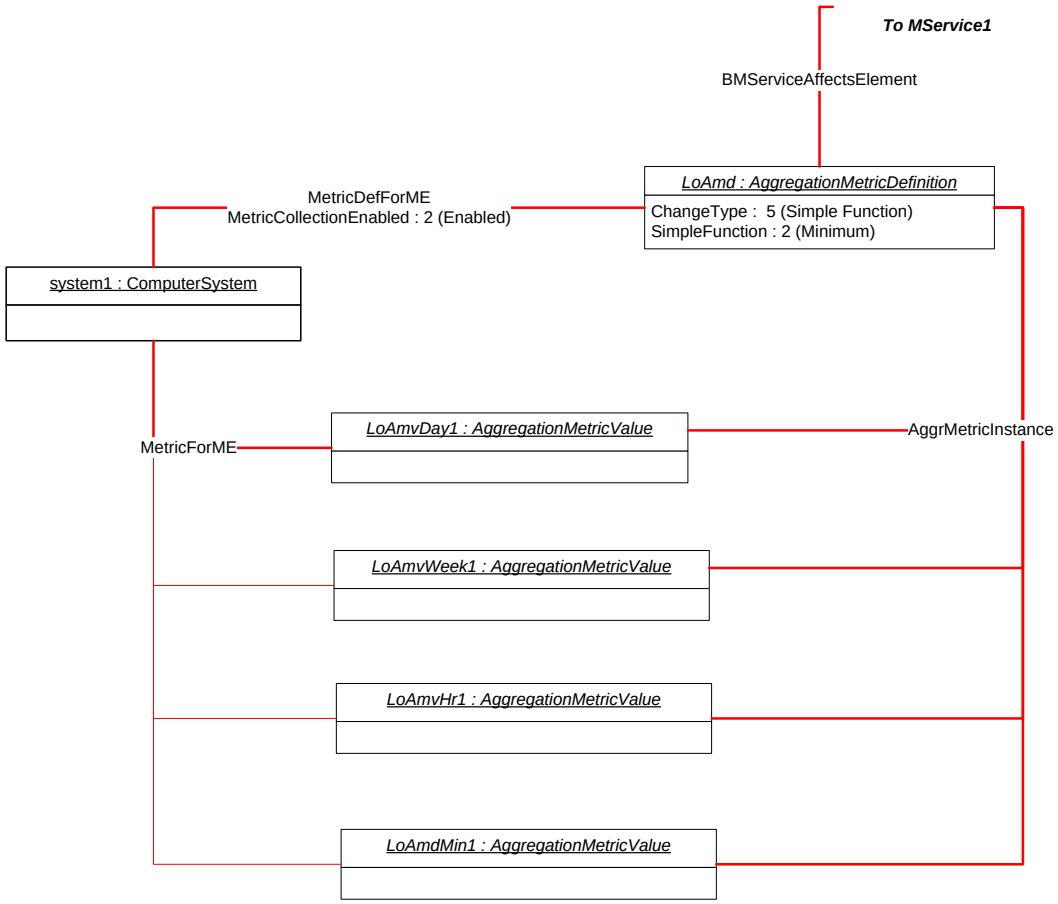


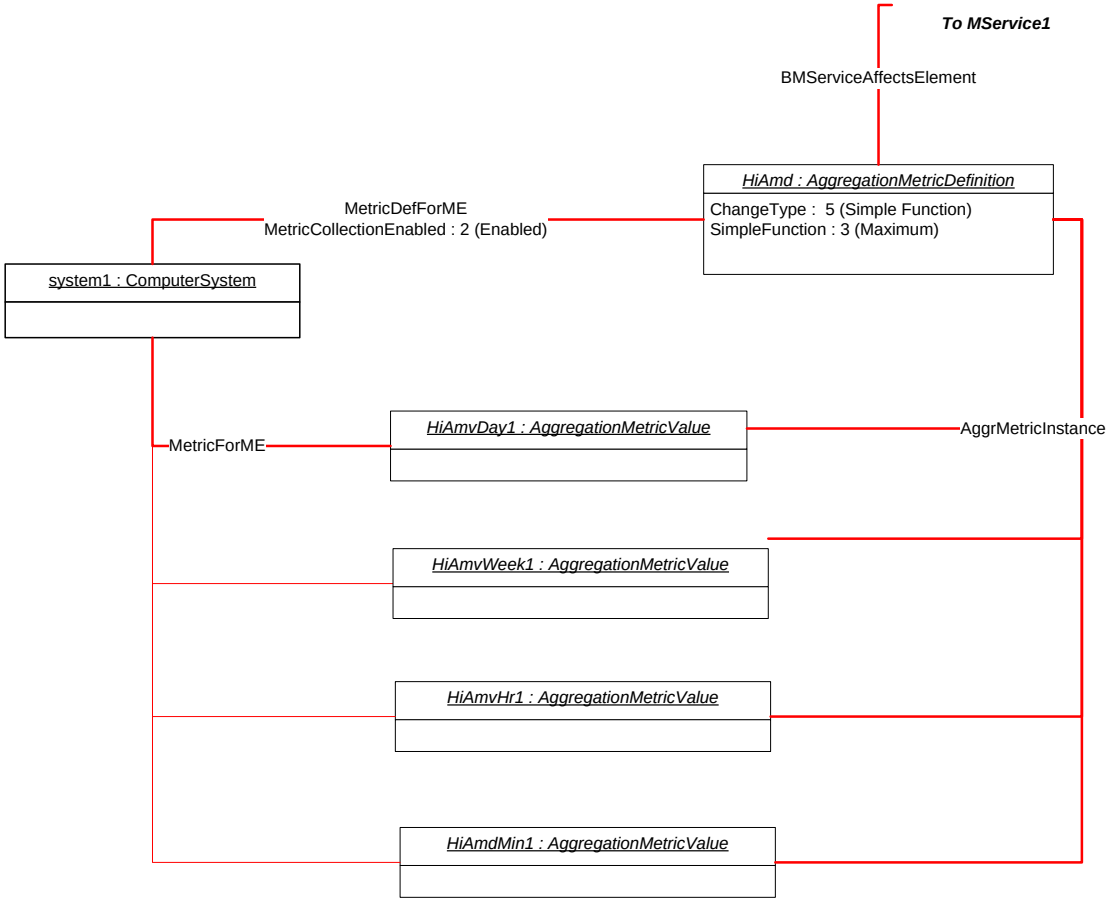
Figure 2 – Maximum, Headroom Power and Energy Consumption Metrics

The below figures describe the maximum, minimum and average power consumption for the last minute, hour, day and week.



247

248 **Figure 3 – Minimum Power Consumption for Last Minute, Hour, Day and Week**



249

250 **Figure 4 – Maximum Power Consumption for Last Minute, Hour, Day and Week**

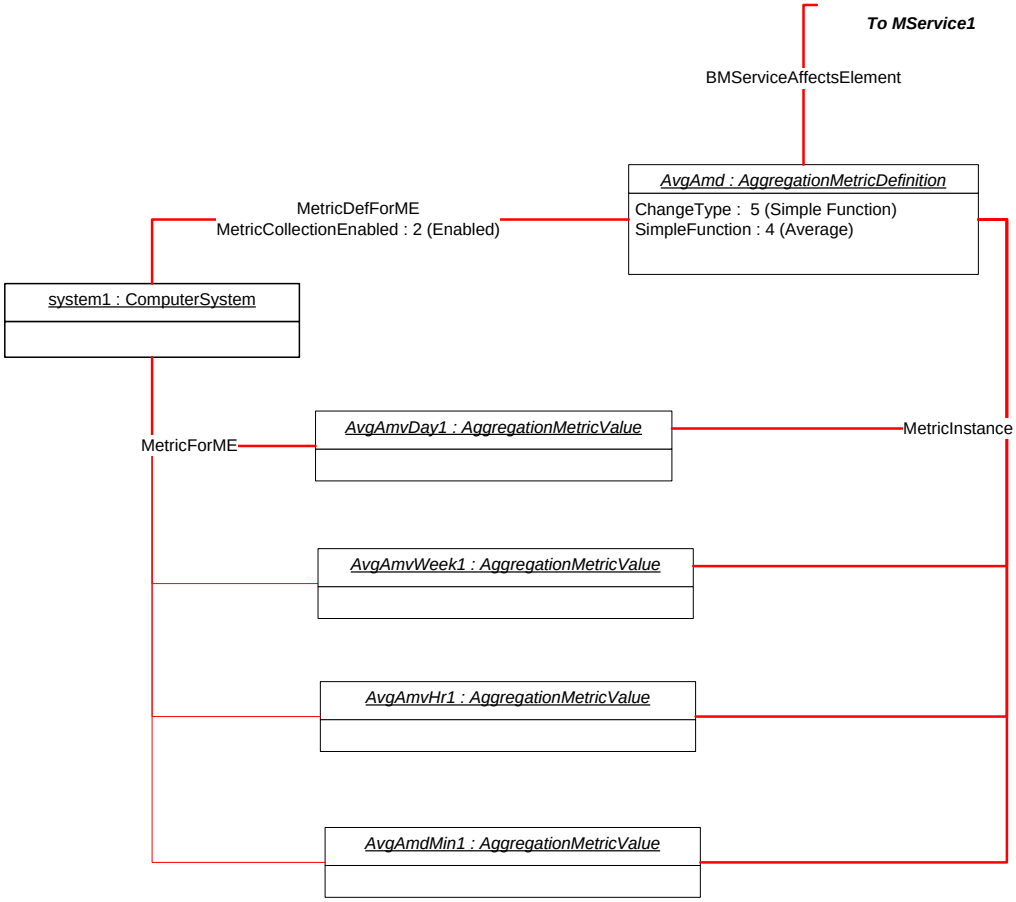


Figure 5 – Average Power Consumption for Last Minute, Hour, Day and Week

7 Implementation Requirements

The requirements and guidelines for propagating and formulating certain properties of the classes discussed in this section are the Dell extensions to the requirements in the parent profile: DMTF Base Metric Profile 1.0.

Table 2 – Class Requirements: Base Metrics Profile

Class Name	Requirement	Description
DCIM_AggregationMetricDefinition	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.1.1, 7.2.1, 7.3.1, 7.4.1, 7.5.1, and 7.6.1.
DCIM_AggregationMetricValue	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.1.2, 7.2.2, 7.3.2, 7.4.2, 7.5.2, and 7.6.2.
DCIM_BaseMetricDefinition	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.7.1, and 7.8.1.

Class Name	Requirement	Description
DCIM_BaseMetricValue	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.7.2, and 7.8.2.
DCIM_AggrMetricInstance	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.1.1, 7.3.1, 7.4.1, 7.5.1, 7.6.1, 7.1.2, 7.3.2, 7.4.2, 7.5.2 and 7.6.2.
DCIM_BaseMetricInstance	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.7.1, 7.8.1, 7.7.2, and 7.8.2.
DCIM_BMElementCapabilities	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.10 and 7.11.
DCIM_MetricDefForME	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.9.
DCIM_MetricForME	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.1.2, 7.3.2, 7.4.2, 7.5.2, 7.6.2, 7.7.2 and 7.8.2.
DCIM_BMServiceAffectsElement	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.1.1, 7.3.1, 7.4.1, 7.5.1, 7.6.1, 7.7.1 and 7.8.1.
DCIM_MetricServiceCapabilities	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.10.
DCIM_MetricService	Mandatory	The class shall be implemented in the *Implementation Namespaces*. See section 7.11.
DCIM_ElementConformsToProfile	Mandatory	The class shall be implemented in both the *Interop* and *Implementation Namespaces*. See section 7.11 and 7.12
DCIM_RegisteredProfile	Mandatory	The class shall be implemented in the *Interop Namespace*. See section 7.12
DCIM_LCElementConformsToProfile	Mandatory	The class shall be implemented in both the *Interop* and *Implementation Namespaces*. See section 7.11 and 7.13.
DCIM_LCRegisteredProfile	Mandatory	The class shall be implemented in the *Interop Namespace*. See section 7.13.

259

260 7.1 Maximum Power Consumption Metric in Watts

261 The following defines the requirements of the DCIM_AggregationMetricDefinition instance for the
262 maximum power consumption metric in watts.

7.1.1 DCIM_AggregationMetricDefinition

The following clauses define the requirements for the DCIM_AggregationMetricDefinition class. DCIM_AggregationMetricDefinition is a derivation of CIM_AggregationMetricDefinition.

The DCIM_BMServiceAffectsElement association's AffectedElement property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_BMServiceAffectsElement association's ElementEffects property shall have value 5 (Manages).

The DCIM_MetricDefForME association's Dependant property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_AggrMetricInstance association's Antecedent property shall reference DCIM_AggregationMetricDefinition instances.

7.1.1.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition?__cimnamespace= root/dcim"

The key property shall be the Id.

The instance Resource URI DCIM_AggregationMetricDefinition instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition? ?__cimnamespace=root/dcim+Id=<Id>"

7.1.1.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricDefinition.

Table 3 – DCIM_AggregationMetricDefinition Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.1.1.3 Properties

The following table details the requirements for implementing the DCIM_AggregationMetricDefinition instance representing maximum power consumption metric in Watts. The most derived class name of this instance shall be DCIM_AggregationMetricDefinition.

If the column "Property Name" matches the property name, the property either shall have the value denoted in the corresponding column "Additional Requirements", or shall be implemented according to the requirements in the corresponding column "Additional Requirements".

Table 4 – DCIM_AggregationMetricDefinition: Maximum Power Consumption Metric in Watts Properties

Property Name	Type	Requirement	Additional Requirement
ChangeType	uint16	Mandatory	The property shall have value 5 (Simple Function).
DataType	uint16	Mandatory	The property shall have value 12 (uint32)
ElementName	string	Mandatory	The property shall have value

			“Peak Watt Power Consumption”
GatheringType	uint16	Mandatory	The property shall have value 3 (periodic)
Id	string	Mandatory	The property is the key and shall have value “AggrMetricDef:0”
IsContinuous	boolean	Mandatory	The property shall have value TRUE
Name	string	Mandatory	The property shall have value "DMTF:System Input Power"
ProgrammaticUnits	string	Mandatory	The property shall have value "watt"
SampleInterval	datetime	Mandatory	The property value shall be in W3C representation in WS-CIM with the corresponding value equal to CIM datetime 00000000000500.000000:000.
SimpleFunction	uint16	Mandatory	The property shall have value 3 (Maximum)
TimeScope	uint16	Mandatory	The property shall have value 2 (Point)

7.1.2 DCIM_AggregationMetricValue

The following clauses define the requirements for the DCIM_AggregationMetricValue class. DCIM_AggregationMetricValue is a derivation of CIM_AggregationMetricValue.

The DCIM_AggrMetricInstance association’s Dependent property shall reference DCIM_AggregationMetricValue instances.

The DCIM_MetricForME association’s Dependent property shall reference DCIM_AggregationMetricValue instances.

7.1.2.1 Resource URIs for WinRM®

The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue?__cimnamespace=root/dcim”

The key property shall be the InstanceID.

The instance Resource URI for this DCIM_AggregationMetricValue instance shall be: “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue? ?__cimnamespace=root/dcim+InstanceID=<InstanceID>”

7.1.2.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricValue.

Table 5 – DCIM_AggregationMetricValue Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.2 Maximum Headroom Power Consumption Metric in Watts

The following defines the requirements for the maximum headroom power consumption metric.

7.2.1 DCIM_AggregationMetricDefinition

The following clauses define the requirements for the DCIM_AggregationMetricDefinition class. DCIM_AggregationMetricDefinition is a derivation of CIM_AggregationMetricDefinition.

7.2.1.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition?__cimnamespace= root/dcim"

The key property shall be the Id.

The instance Resource URI DCIM_AggregationMetricDefinition instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition? ?__cimnamespace=root/dcim+Id=<Id>"

7.2.1.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricDefinition.

Table 6 – DCIM_AggregationMetricDefinition Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.2.2 DCIM_AggregationMetricValue

The following clauses define the requirements for the DCIM_AggregationMetricValue class. DCIM_AggregationMetricValue is a derivation of CIM_AggregationMetricValue.

The DCIM_AggrMetricInstance association's Dependent property shall reference DCIM_AggregationMetricValue instances.

The DCIM_MetricForME association's Dependent property shall reference DCIM_AggregationMetricValue instances.

7.2.2.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue?__cimnamespace=root/dcim"

The key property shall be the InstanceID.

The instance Resource URI for this DCIM_AggregationMetricValue instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue? ?__cimnamespace=root/dcim+InstanceID=<InstanceID>"

7.2.2.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricValue.

Table 7 – DCIM_AggregationMetricValue Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.2.2.3 Properties

The following table details the requirements for implementing DCIM_AggregationMetricValue instance representing peak (maximum) headroom power metric in Watts. The most derived class name of this instance shall be DCIM_AggregationMetricValue.

If the column “Property Name” matches the property name, the property either shall have the value denoted in the corresponding column “Additional Requirements”, or shall be implemented according to the requirements in the corresponding column “Additional Requirements”.

Table 8 – DCIM_AggregationMetricValue: Maximum Power Consumption Metric in Watts Properties

Property Name	Type	Requirement	Additional Requirements
AggregationDuration	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to Current Time minus Start time of MaxPeak Reading.
AggregationTimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to Current timestamp.
BreakdownDimension	string	Mandatory	The property shall be NULL
BreakdownValue	string	Mandatory	The property shall be NULL
InstanceID	string	Mandatory	The property shall have value “DCIM:System:Max:PowerHdrm:Cont”
MetricDefinitionId	string	Mandatory	The property shall have value "AggrMetricDef:0"
MetricValue	string	Mandatory	The property shall have value equal to the Peak Headroom Watts Reading in whole watts
TimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to the Current Time.
Volatile	boolean	Mandatory	The property shall have value TRUE.

7.3 Maximum Power Consumption Metric in Amperes

The following defines the requirements of the DCIM_AggregationMetricDefinition instance for the maximum power consumption metric in amperes.

7.3.1 DCIM_AggregationMetricDefinition

The following clauses define the requirements for the DCIM_AggregationMetricDefinition class. DCIM_AggregationMetricDefinition is a derivation of CIM_AggregationMetricDefinition.

The DCIM_BMServiceAffectsElement association's AffectedElement property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_BMServiceAffectsElement association's ElementEffects property shall have value 5 (Manages).

The DCIM_MetricDefForME association's Dependant property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_AggrMetricInstance association's Antecedent property shall reference DCIM_AggregationMetricDefinition instances.

7.3.1.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition?__cimnamespace= root/dcim"

The key property shall be the Id.

The instance Resource URI DCIM_AggregationMetricDefinition instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition? ?__cimnamespace=root/dcim+Id=<Id>"

7.3.1.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricDefinition.

Table 9 – DCIM_AggregationMetricDefinition Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.3.1.3 Properties

The following table details the requirements for implementing the DCIM_AggregationMetricDefinition instance representing max power consumption metric in Amperes. The most derived class name of this instance shall be DCIM_AggregationMetricDefinition.

If the column "Property Name" matches the property name, the property either shall have the value denoted in the corresponding column "Additional Requirements", or shall be implemented according to the requirements in the corresponding column "Additional Requirements".

Table 10 – DCIM_AggregationMetricDefinition: Maximum Power Consumption Metric in Amperes Properties

Property Name	Type	Requirement	Additional Requirements
ChangeType	uint16	Mandatory	The property shall have value 5 (Simple Function)
DataType	uint16	Mandatory	The property shall have value 12 (uint32)
ElementName	string	Mandatory	The property shall have value "Peak Amp Power Consumption"

GatheringType	uint16	Mandatory	The property shall have value 3 (periodic)
Id	string	Mandatory	The property shall have value “AggrMetricDef:3”
IsContinuous	boolean	Mandatory	The property shall have value TRUE
Name	string	Mandatory	The property shall have value "DMTF:System Input Power"
ProgrammaticUnits	string	Mandatory	The property shall have value "ampere * 10^-1"
SampleInterval	datetime	Mandatory	The property value shall be in W3C representation in WS-CIM with the corresponding value equal to CIM datetime 00000000000500.000000:000.
SimpleFunction	uint16	Mandatory	The property shall have value 3 (Maximum)
TimeScope	uint16	Mandatory	The property shall have value 2 (Point)

7.3.2 DCIM_AggregationMetricValue

The following clauses define the requirements for the DCIM_AggregationMetricValue class. DCIM_AggregationMetricValue is a derivation of CIM_AggregationMetricValue.

The DCIM_AggrMetricInstance association’s Dependent property shall reference DCIM_AggregationMetricValue instances.

The DCIM_MetricForME association’s Dependent property shall reference DCIM_AggregationMetricValue instances.

7.3.2.1 Resource URIs for WinRM®

The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue?__cimnamespace=root/dcim”

The key property shall be the InstanceID.

The instance Resource URI for this DCIM_AggregationMetricValue instance shall be: “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue? ?__cimnamespace=root/dcim+InstanceID=<InstanceID>”

7.3.2.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricValue.

Table 11 – DCIM_AggregationMetricValue Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.3.2.3 Properties

The following table details the requirements for implementing DCIM_AggregationMetricValue instance representing max power consumption metric in amperes. The most derived class name of this instance shall be DCIM_AggregationMetricValue.

If the column “Property Name” matches the property name, the property either shall have the value denoted in the corresponding column “Additional Requirements”, or shall be implemented according to the requirements in the corresponding column “Additional Requirements”.

409 **Table 12 – DCIM_AggregationMetricValue: Maximum Power Consumption Metric in Amperes**
410 **Properties**

Property Name	Type	Requirement	Additional Requirements
AggregationDuration	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to Current Time minus Start time of MaxPeak Reading
AggregationTimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to Current timestamp.
InstanceID	string	Mandatory	The property shall have value “DCIM:System:Max:Current:Cont”
MetricDefinitionId	string	Mandatory	The property shall have value "AggrMetricDef:3"
MetricValue	string	Mandatory	The property shall have value equal to the MaxPeak Amp Reading in 100 mAmps.
TimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to Current Time
Volatile	boolean	Mandatory	The property shall have value TRUE

411 ## 7.4 Maximum Power Consumption Metric for Last Minute, Hour, Day and Week

412 The following defines the requirements of the DCIM_AggregationMetricValue instance for the maximum
413 power consumption metric for last minute, hour, day, and week.

414 One instance of DCIM_AggregationMetricValue shall be instantiated for maximum power consumption
415 last minute.

416 One instance of DCIM_AggregationMetricValue shall be instantiated for maximum power consumption
417 last hour.

418 One instance of DCIM_AggregationMetricValue shall be instantiated for maximum power consumption
419 last day.

420 One instance of DCIM_AggregationMetricValue shall be instantiated for maximum power consumption
421 last week.

7.4.1 DCIM_AggregationMetricDefinition

The following clauses define the requirements for the DCIM_AggregationMetricDefinition class. DCIM_AggregationMetricDefinition is a derivation of CIM_AggregationMetricDefinition.

The DCIM_BMServiceAffectsElement association's AffectedElement property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_BMServiceAffectsElement association's ElementEffects property shall have value 5 (Manages).

The DCIM_MetricDefForME association's Dependant property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_AggrMetricInstance association's Antecedent property shall reference DCIM_AggregationMetricDefinition instances.

7.4.1.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition?__cimnamespace= root/dcim"

The key property shall be the Id.

The instance Resource URI DCIM_AggregationMetricDefinition instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition? ?__cimnamespace=root/dcim+Id=<Id>"

7.4.1.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricDefinition.

Table 13 – DCIM_AggregationMetricDefinition Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.4.1.3 Properties

The following table details the requirements for implementing DCIM_AggregationMetricDefinition instance representing maximum power consumption metric in Watts for Last Minute, Hour, Day and Week. The most derived class name of this instance shall be DCIM_AggregationMetricDefinition.

If the column "Property Name" matches the property name, the property either shall have the value denoted in the corresponding column "Additional Requirements", or shall be implemented according to the requirements in the corresponding column "Additional Requirements".

Table 14 – DCIM_AggregationMetricDefinition: Maximum Power Consumption Metric for Last Minute, Hour, Day and Week Properties

Property Name	Type	Requirement	Additional Requirements
ChangeType	uint16	Mandatory	The property shall have value 5 (Simple Function)
DataType	uint16	Mandatory	The property shall have value 12 (uint32)
ElementName	string	Mandatory	The property shall have value "Timed Peak Power Consumption"

GatheringType	uint16	Mandatory	The property shall have value 3 (periodic)
Id	string	Mandatory	The property shall have value “AggrMetricDef:4”
IsContinuous	boolean	Mandatory	The property shall have value TRUE
Name	string	Mandatory	The property shall have value "DMTF:System Input Power"
ProgrammaticUnits	string	Mandatory	The property shall have value "watt"
SimpleFunction	uint16	Mandatory	The property shall have value 3 (Maximum)
TimeScope	uint16	Mandatory	The property shall have value 2 (Point)

7.4.2 DCIM_AggregationMetricValue

The following clauses define the requirements for the DCIM_AggregationMetricValue class. DCIM_AggregationMetricValue is a derivation of CIM_AggregationMetricValue.

The DCIM_AggrMetricInstance association’s Dependent property shall reference DCIM_AggregationMetricValue instances.

The DCIM_MetricForME association’s Dependent property shall reference DCIM_AggregationMetricValue instances.

7.4.2.1 Resource URIs for WinRM®

The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue?__cimnamespace=root/dcim”

The key property shall be the InstanceID.

The instance Resource URI for this DCIM_AggregationMetricValue instance shall be: “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue?
?__cimnamespace=root/dcim+InstanceID=<InstanceID>”

7.4.2.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricValue.

Table 15 – DCIM_AggregationMetricValue Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.4.2.3 Properties

The following table details the requirements for implementing DCIM_AggregationMetricValue instance representing maximum power consumption metric in Watts for Last Minute, Hour, Day and Week. The most derived class name of this instance shall be DCIM_AggregationMetricValue.

If the column “Property Name” matches the property name, the property either shall have the value denoted in the corresponding column “Additional Requirements”, or shall be implemented according to the requirements in the corresponding column “Additional Requirements”.

Table 16 – DCIM_AggregationMetricValue: Maximum Power Consumption Metric for Last Minute, Hour, Day and Week Properties

Property Name	Type	Requirement	Additional Requirements

Property Name	Type	Requirement	Additional Requirements
AggregationDuration	datetime	Mandatory	shall be in W3C representation in WS-CIM with the corresponding value equal to 1 minute or 1 hour or 1 day or 1 week.
AggregationTimeStamp	datetime	Mandatory	shall be in W3C representation in WS-CIM with the corresponding value equal to current timestamp.
InstanceID	string	Mandatory	shall have one of the following values: DCIM:System:Max:Power:1M DCIM:System:Max:Power:1H DCIM:System:Max:Power:1D DCIM:System:Max:Power:1W
MetricDefinitionId	string	Mandatory	"AggrMetricDef:4"
MetricValue	string	Mandatory	shall be equal to the collection value for last 1 minute or 1 hour or 1 day or 1 week in whole watts
TimeStamp	datetime	Mandatory	shall be in W3C representation in WS-CIM with the corresponding value equal to the value collection timestamp.
Volatile	boolean	Mandatory	TRUE

7.5 Minimum Power Consumption Metric for Last Minute, Hour, Day and Week

The following defines the requirements of the DCIM_AggregationMetricValue instance for the minimum power consumption metric for last minute, hour, day, and week.

One instance of DCIM_AggregationMetricValue shall be instantiated for minimum power consumption last minute.

One instance of DCIM_AggregationMetricValue shall be instantiated for minimum power consumption last hour.

One instance of DCIM AggregationMetricValue shall be instantiated for minimum power consumption last day.

One instance of DCIM_AggregationMetricValue shall be instantiated for minimum power consumption last week.

7.5.1 DCIM_AggregationMetricDefinition

The following clauses define the requirements for the DCIM_AggregationMetricDefinition class. DCIM_AggregationMetricDefinition is a derivation of CIM_AggregationMetricDefinition.

The DCIM_BMServiceAffectsElement association's AffectedElement property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_BMServiceAffectsElement association's ElementEffects property shall have value 5 (Manages).

The DCIM_MetricDefForME association's Dependant property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_AggrMetricInstance association's Antecedent property shall reference DCIM_AggregationMetricDefinition instances.

7.5.1.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition?__cimnamespace= root/dcim"

The key property shall be the Id.

The instance Resource URI DCIM_AggregationMetricDefinition instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition? ?__cimnamespace=root/dcim+Id=<Id>"

7.5.1.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricDefinition.

Table 17 – DCIM_AggregationMetricDefinition Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.5.1.3 Properties

The following table details the requirements for implementing DCIM_AggregationMetricDefinition instance representing minimum power consumption metric in Watts for Last Minute, Hour, Day and Week. The most derived class name of this instance shall be DCIM_AggregationMetricDefinition.

If the column "Property Name" matches the property name, the property either shall have the value denoted in the corresponding column "Additional Requirements", or shall be implemented according to the requirements in the corresponding column "Additional Requirements".

Table 18 – DCIM_AggregationMetricDefinition: Minimum Power Consumption Metric in Watts for Last Minute, Hour, Day and Week Properties

Property Name	Type	Requirement	Additional Requirements
ChangeType	uint16	Mandatory	The property shall have value 5 (Simple Function)
DataType	uint16	Mandatory	The property shall have value 12 (uint32)
ElementName	string	Mandatory	The property shall have value "Timed Minimum Power Consumption"

Property Name	Type	Requirement	Additional Requirements
GatheringType	uint16	Mandatory	The property shall have value 3 (periodic)
Id	string	Mandatory	The property shall have value “AggrMetricDef:1”
IsContinuous	boolean	Mandatory	The property shall have value TRUE
Name	string	Mandatory	The property shall have value "DMTF:System Input Power"
ProgrammaticUnits	string	Mandatory	The property shall have value "watt"
SimpleFunction	uint16	Mandatory	The property shall have value 2 (Minimum)
TimeScope	uint16	Mandatory	The property shall have value 2 (Point)

519 ## 7.5.2 DCIM_AggregationMetricValue

520 The following clauses define the requirements for the DCIM_AggregationMetricValue class.
521 DCIM_AggregationMetricValue is a derivation of CIM_AggregationMetricValue.

522 The DCIM_AggrMetricInstance association’s Dependent property shall reference
523 DCIM_AggregationMetricValue instances.

524 The DCIM_MetricForME association’s Dependent property shall reference
525 DCIM_AggregationMetricValue instances.

526 ### 7.5.2.1 Resource URIs for WinRM®

527 The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-
528 schema/2/DCIM_AggregationMetricValue?__cimnamespace=root/dcim”

529 The key property shall be the InstanceID.

530 The instance Resource URI for this DCIM_AggregationMetricValue instance shall be:
531 “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue?
532 ?__cimnamespace=root/dcim+InstanceID=<InstanceID>”

533 ### 7.5.2.2 Operations

534 The following table details the implemented operations on DCIM_AggregationMetricValue.

535 **Table 19 – DCIM_AggregationMetricValue Operations**

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

536 ### 7.5.2.3 Properties

537 The following table details the requirements for implementing DCIM_AggregationMetricValue instance
538 representing minimum power consumption metric in Watts for Last Minute, Hour, Day and Week. The
539 most derived class name of this instance shall be DCIM_AggregationMetricValue.

540 If the column “Property Name” matches the property name, the property either shall have the value
541 denoted in the corresponding column “Additional Requirements”, or shall be implemented according to
542 the requirements in the corresponding column “Additional Requirements”.

543

544 **Table 20 – DCIM_AggregationMetricValue: Minimum Power Consumption Metric in Watts for Last**
545 **Minute, Hour, Day and Week Properties**

Property Name	Type	Requirement	Additional Requirements
AggregationDuration	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to 1 minute or 1 hour or 1 day or 1 week.
AggregationTimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to current timestamp.
InstanceID	string	Mandatory	The property shall have value have one of the following values: “DCIM:System:Min:Power:1M”, “DCIM:System:Min:Power:1H”, “DCIM:System:Min:Power:1D”, “DCIM:System:Min:Power:1W”
MetricDefinitionId	string	Mandatory	The property shall have value "AggrMetricDef:1"
MetricValue	string	Mandatory	The property shall have value equal to the collection value for last 1 minute or 1 hour or 1 day or 1 week in whole watts
TimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to the value collection timestamp.
Volatile	boolean	Mandatory	The property shall have value TRUE.

546 ## 7.6 Average Power Consumption Metric for Last Minute, Hour, Day and Week

547 The following defines the requirements of the DCIM_AggregationMetricValue instance for the average
548 power consumption metric for last minute, hour, day, and week.

549 One instance of DCIM_AggregationMetricValue shall be instantiated for average power consumption last
550 minute.

551 One instance of DCIM_AggregationMetricValue shall be instantiated for average power consumption last
552 hour.

553 One instance of DCIM_AggregationMetricValue shall be instantiated for average power consumption last
554 day.

555 One instance of DCIM_AggregationMetricValue shall be instantiated for average power consumption last
556 week.

7.6.1 DCIM_AggregationMetricDefinition

The following clauses define the requirements for the DCIM_AggregationMetricDefinition class. DCIM_AggregationMetricDefinition is a derivation of CIM_AggregationMetricDefinition.

The DCIM_BMServiceAffectsElement association's AffectedElement property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_BMServiceAffectsElement association's ElementEffects property shall have value 5 (Manages).

The DCIM_MetricDefForME association's Dependant property shall reference DCIM_AggregationMetricDefinition instances.

The DCIM_AggrMetricInstance association's Antecedent property shall reference DCIM_AggregationMetricDefinition instances.

7.6.1.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition?__cimnamespace= root/dcim"

The key property shall be the Id.

The instance Resource URI DCIM_AggregationMetricDefinition instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/ DCIM_AggregationMetricDefinition? ?__cimnamespace=root/dcim+Id=<Id>"

7.6.1.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricDefinition.

Table 21 – DCIM_AggregationMetricDefinition Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.6.1.3 Properties

The following table details the requirements for implementing DCIM_AggregationMetricDefinition instance representing average power consumption metric in Watts for Last Minute, Hour, Day and Week. The most derived class name of this instance shall be DCIM_AggregationMetricDefinition.

If the column "Property Name" matches the property name, the property either shall have the value denoted in the corresponding column "Additional Requirements", or shall be implemented according to the requirements in the corresponding column "Additional Requirements".

Table 22 – DCIM_AggregationMetricDefinition: Average Power Consumption Metric in Watts for Last Minute, Hour, Day and Week Properties

Property Name	Type	Requirement	Additional Requirements
ChangeType	uint16	Mandatory	The property shall have value 5 (Simple Function)
DataType	uint16	Mandatory	The property shall have value 12 (uint32)
ElementName	string	Mandatory	The property shall have value "Timed Average Power Consumption"

Property Name	Type	Requirement	Additional Requirements
GatheringType	uint16	Mandatory	The property shall have value 3 (periodic)
Id	string	Mandatory	The property shall have value “AggrMetricDef:2”
IsContinuous	boolean	Mandatory	The property shall have value TRUE
Name	string	Mandatory	The property shall have value "DMTF:System Input Power"
ProgrammaticUnits	string	Mandatory	The property shall have value "watt"
SimpleFunction	uint16	Mandatory	The property shall have value 4 (Average)
TimeScope	uint16	Mandatory	The property shall have value 2 (Point)

7.6.2 DCIM_AggregationMetricValue

The following clauses define the requirements for the DCIM_AggregationMetricValue class. DCIM_AggregationMetricValue is a derivation of CIM_AggregationMetricValue.

The DCIM_AggrMetricInstance association’s Dependent property shall reference DCIM_AggregationMetricValue instances.

The DCIM_MetricForME association’s Dependent property shall reference DCIM_AggregationMetricValue instances.

7.6.2.1 Resource URIs for WinRM®

The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue?__cimnamespace=root/dcim”

The key property shall be the InstanceID.

The instance Resource URI for this DCIM_AggregationMetricValue instance shall be: “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AggregationMetricValue? ?__cimnamespace=root/dcim+InstanceID=<InstanceID>”

7.6.2.2 Operations

The following table details the implemented operations on DCIM_AggregationMetricValue.

Table 23 – DCIM_AggregationMetricValue Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.6.2.3 Properties

The following table details the requirements for implementing DCIM_AggregationMetricValue instance representing average power consumption metric in Watts for Last Minute, Hour, Day and Week. The most derived class name of this instance shall be DCIM_AggregationMetricValue.

If the column “Property Name” matches the property name, the property either shall have the value denoted in the corresponding column “Additional Requirements”, or shall be implemented according to the requirements in the corresponding column “Additional Requirements”.

612 **Table 24 – DCIM_AggregationMetricValue: Average Power Consumption Metric in Watts for Last**
613 **Minute, Hour, Day and Week Properties**

Property Name	Type	Requirement	Additional Requirements
AggregationDuration	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to 1 minute or 1 hour or 1 day or 1 week.
AggregationTimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to current timestamp.
InstanceID	string	Mandatory	The property shall have one of the below values: “DCIM:System:Avg:Power:1M” “DCIM:System:Avg:Power:1H” “DCIM:System:Avg:Power:1D” “DCIM:System:Avg:Power:1W”
MetricDefinitionId	string	Mandatory	The property shall have value "AggrMetricDef:2"
MetricValue	datetime	Mandatory	The property shall be equal to the collection value for last 1 minute or 1 hour or 1 day or 1 week in whole watts
Volatile	boolean	Mandatory	The property shall have value TRUE.

614 ## 7.7 Energy Consumption Metric

615 The following defines the requirements of the DCIM_BaseMetricDefinition instance of the energy
616 consumption metric.

617 ### 7.7.1 DCIM_BaseMetricDefinition

618 The following clauses define the requirements for the DCIM_BaseMetricDefinition class.
619 DCIM_BaseMetricDefinition is derived from CIM_BaseMetricDefinition.

620 The DCIM_BMServiceAffectsElement association’s AffectedElement property shall reference
621 DCIM_BaseMetricDefinition instances.

622 The DCIM_BMServiceAffectsElement association’s ElementEffects property shall have value 5
623 (Manages).

624 The DCIM_MetricDefForME association’s Dependent property shall reference
625 DCIM_BaseMetricDefinition instances.

626 The DCIM_MetricDefForME association’s MetricCollectionEnabled property shall have value 2 (Enabled).

627 The DCIM_BaseMEtricInstance association’s Antecedent property shall reference
628 DCIM_BaseMetricDefition instances.

629 #### 7.7.1.1 Resource URIs for WinRM®

630 The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-
631 schema/2/DCIM_BaseMetricDefinition?__cimnamespace=root/dcim”

632 The key property shall be the Id.

633 The instance Resource URI for DCIM_BaseMetricDefinition instance shall be:
634 “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BaseMetricDefinition?
635 ?__cimnamespace=root/dcim+Id=<Id>”

7.7.1.2 Operations

The following table details the implemented operations on DCIM_BaseMetricDefinition.

Table 25 – DCIM_BaseMetricDefinition Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.7.1.3 Properties

The following table details the requirements for implementing DCIM_BaseMetricDefinition instance representing energy consumption metric. The most derived class name of this instance shall be DCIM_BaseMetricDefinition.

If the column “Property Name” matches the property name, the property either shall have the value denoted in the corresponding column “Additional Requirements”, or shall be implemented according to the requirements in the corresponding column “Additional Requirements”.

Table 26 – DCIM_BaseMetricDefinition: Energy Consumption Metric Properties

Property Name	Type	Requirement	Additional Requirements
ChangeType	uint16	Mandatory	The property shall have value 3 (Counter)
DataType	uint16	Mandatory	The property shall have value 12 (uint32)
ElementName	string	Mandatory	The property shall have value “Energy Consumption”
GatheringType	uint16	Mandatory	The property shall have value 3 (periodic)
Id	string	Mandatory	The property shall have value “DCIM:BaseMetricDefinition:1”
IsContinuous	boolean	Mandatory	The property shall have value TRUE.
Name	string	Mandatory	The property shall have value "DMTF:System Aggregate Input Energy"
ProgrammaticUnits	string	Mandatory	The property shall have value "watt * hour * 10^3"
SampleInterval	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to 00000000000500.000000:000 in CIM datetime format.
TimeScope	uint16	Mandatory	The property shall have value 4 (Startup Interval).

7.7.2 DCIM_BaseMetricValue

The following clauses define the requirements for the DCIM_BaseMetricValue class. DCIM_BaseMetricValue is derived from CIM_BaseMetricValue.

The DCIM_BaseMetricInstance association's Dependent property shall reference DCIM_AggregationMetricValue instances.

The DCIM_MetricForME association's Dependent property shall reference DCIM_AggregationMetricValue instances.

7.7.2.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BaseMetricValue?__cimnamespace=root/dcim"

The key property shall be the InstanceID.

The instance Resource URI for this DCIM_BaseMetricValue instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BaseMetricValue? ?__cimnamespace=root/dcim+InstanceID=<InstanceID>"

7.7.2.2 Operations

The following table details the implemented operations on DCIM_BaseMetricValue.

Table 27 – DCIM_BaseMetricValue Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.7.2.3 Properties

The following table details the requirements for implementing DCIM_BaseMetricValue instance representing energy consumption metric. The most derived class name of this instance shall be DCIM_BaseMetricValue.

If the column "Property Name" matches the property name, the property either shall have the value denoted in the corresponding column "Additional Requirements", or shall be implemented according to the requirements in the corresponding column "Additional Requirements".

Table 28 – DCIM_BaseMetricValue: Energy Consumption Metric in Amperes Properties

Property Name	Type	Requirement	Additional Requirements
Duration	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to Current timestamp minus Start Time of cumulative reading
InstanceID	string	Mandatory	The property shall have value "DCIM:System:Point:Energy:Cont"
MetricDefinitionId	string	Mandatory	The property shall have value "DCIM:BaseMetricDefinition:1"
MetricValue	string	Mandatory	The property shall have value be equal to the value of the

Property Name	Type	Requirement	Additional Requirements
			cumulative reading in kilowatt-hour (kWh).
TimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to Current timestamp
Volatile	boolean	Mandatory	The property shall have value TRUE

7.8 Instantaneous Power Consumption Headroom Metric

The following defines the requirements for the instantaneous power consumption headroom metric.

7.8.1 DCIM_BaseMetricDefinition

The following clauses define the requirements for the DCIM_BaseMetricDefinition class. DCIM_BaseMetricDefinition is derived from CIM_BaseMetricDefinition.

7.8.1.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BaseMetricDefinition?__cimnamespace=root/dcim"

The key property shall be the Id.

The instance Resource URI for DCIM_BaseMetricDefinition instance shall be: "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BaseMetricDefinition? ?__cimnamespace=root/dcim+Id=<Id>"

7.8.1.2 Operations

The following table details the implemented operations on DCIM_BaseMetricDefinition.

Table 29 – DCIM_BaseMetricDefinition Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.8.1.3 Properties

The following table details the requirements for implementing DCIM_BaseMetricDefinition instance representing the instantaneous power consumption metric. The most derived class name of this instance shall be DCIM_BaseMetricDefinition.

If the column "Property Name" matches the property name, the property either shall have the value denoted in the corresponding column "Additional Requirements", or shall be implemented according to the requirements in the corresponding column "Additional Requirements".

Table 30 – DCIM_BaseMetricDefinition: Instantaneous Power Metric Properties

Property Name	Type	Requirement	Additional Requirements

Property Name	Type	Requirement	Additional Requirements
ChangeType	uint16	Mandatory	The property shall have value 4 (Gauge)
DataType	uint16	Mandatory	The property shall have value 12 (uint32)
ElementName	string	Mandatory	The property shall have value “Instantaneous Power”
GatheringType	uint16	Mandatory	The property shall have value 3 (periodic)
Id	string	Mandatory	The property shall have value “DCIM:System:Point:Power”
IsContinuous	boolean	Mandatory	The property shall have value TRUE
Name	string	Mandatory	The property shall have value "DMTF:System Input Power"
ProgrammaticUnits	string	Mandatory	The property shall have value "watt"
SampleInterval	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to 00000000000500.000000:000 in CIM datetime format.
TimeScope	uint16	Mandatory	The property shall have value 2 (Point)

695

696

697 ## 7.8.2 DCIM_BaseMetricValue

698 The following clauses define the requirements for the DCIM_BaseMetricValue class.
699 DCIM_BaseMetricValue is derived from CIM_BaseMetricValue.

700 ### 7.8.2.1 Resource URIs for WinRM®

701 The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-
702 schema/2/DCIM_BaseMetricValue?__cimnamespace=root/dcim”

703 The key property shall be the InstanceID.

704 The instance Resource URI for this DCIM_BaseMetricValue instance shall be:
705 “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BaseMetricValue?
706 ?__cimnamespace=root/dcim+InstanceID=<InstanceID>”

707 ### 7.8.2.2 Operations

708 The following table details the implemented operations on DCIM_BaseMetricValue.

709 **Table 31 – DCIM_BaseMetricValue Operations**

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI

Operation Name	Requirements	Required Input
References	Mandatory	Instance URI

710 #### 7.8.2.3 Properties

711 The following table details the requirements for implementing DCIM_BaseMetricValue instance
712 representing the instantaneous power consumption headroom metric. The most derived class name of
713 this instance shall be DCIM_BaseMetricValue.

714 If the column “Property Name” matches the property name, the property either shall have the value
715 denoted in the corresponding column “Additional Requirements”, or shall be implemented according to
716 the requirements in the corresponding column “Additional Requirements”.

717 **Table 32 – DCIM_BaseMetricValue: Instantaneous Power Consumption Headroom Metric in**
718 **Amperes Properties**

Property Name	Type	Requirement	Additional Requirements
Duration	datetime	Mandatory	The property shall be NULL.
InstanceID	string	Mandatory	The property shall have value “DCIM:System:Point:PowerHdrm:Cont”
MetricDefinitionId	string	Mandatory	The property shall have value “DCIM:System:Point:Power”
MetricValue	string	Mandatory	The property shall have value equal to the value of the instantaneous power headroom in watts.
TimeStamp	datetime	Mandatory	The property shall be in W3C representation in WS-CIM with the corresponding value equal to Current timestamp
Volatile	boolean	Mandatory	The property shall have value TRUE

719 ## 7.9 DCIM_MetricDefForME

720 The following clauses define the requirements for the DCIM_MetricDefForME class.
721 DCIM_MetricDefForME is derived from CIM_MetricDefForME.

722 ### 7.9.1 Resource URIs for WinRM®

723 The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-
724 schema/2/DCIM_MetricDefForME?__cimnamespace=root/dcim”

725 The key properties shall be the Antecedent and Dependent.

726 The instance Resource URI for this DCIM_MetricDefForME instance shall be:
727 http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_MetricDefForME?
728 ?__cimnamespace=root/dcim+Antecedent=<Reference To
729 DCIM_ComputerSystem>+Dependent=<Reference to DCIM_BaseMetricDefinition or
730 DCIM_AggregationMetricDefinition>

7.9.2 Operations

The following table details the implemented operations on DCIM_MetricDefForME.

Table 33 – DCIM_MetricDefForME Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.9.3 Properties

The following table details the requirements for implementing DCIM_MetricDefForME instance representing an association between DCIM_ComputerSystem and both DCIM_BaseMetricDefinition and DCIM_AggregationMetricDefinition.

If the column “Property Name” matches the property name, the property either shall have the value denoted in the corresponding column “Additional Requirements”, or shall be implemented according to the requirements in the corresponding column “Additional Requirements”.

Table 34 – DCIM_MetricDefForME Properties

Properties	Type	Requirement	Additional Requirements
Antecedent	Reference	Mandatory	The property value is the Instance URI of DCIM_ComputerSystem class.
Dependent	Reference	Mandatory	The property value is the Instance URI of DCIM_BaseMetricDefinition or DCIM_AggregationMetricDefinition.
MetricCollectionEnabled	uint16	Mandatory	The property shall have value of 2 (Enabled).

7.10 DCIM_MetricServiceCapabilities

The following clauses define the requirements for the DCIM_MetricServiceCapabilities class. DCIM_MetricServiceCapabilities is derived from CIM_MetricServiceCapabilities.

The DCIM_BMElementCapabilities association’s Capabilities property shall reference DCIM_MetricServiceCapabilities instances.

7.10.1 Resource URIs for WinRM®

The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_MetricServiceCapabilities?__cimnamespace=root/dcim”

The key properties shall be the InstanceID.

The instance Resource URI for this DCIM_MetricServiceCapabilities instance shall be:
http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_MetricServiceCapabilities?__cimnamespace=root/dcim+InstanceID=<InstanceID>

7.10.2 Operations

The following table details the implemented operations on DCIM_MetricServiceCapabilities.

Table 35 – DCIM_MetricServiceCapabilities Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.10.3 Properties

The following table details the requirements for implementing DCIM_MetricServiceCapabilities instance representing an association between DCIM_ComputerSystem and both DCIM_BaseMetricValue and DCIM_AggregationMetricValue.

If the column “Property Name” matches the property name, the property either shall have the value denoted in the corresponding column “Additional Requirements”, or shall be implemented according to the requirements in the corresponding column “Additional Requirements”.

Table 36 – DCIM_MetricServiceCapabilities Properties

Property Name	Type	Requirement	Additional Requirements
ControllableMetrics[]	string	Mandatory	The property array shall have the following elements: “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/root/dcim/DCIM_AggregationMetricDefinition?Id=AggrMetricDef:0” , “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/root/dcim/DCIM_AggregationMetricDefinition?Id=AggrMetricDef:3” , “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/root/dcim/DCIM_BaseMetricDefinition?Id=DCIM:BaseMetricDefinition:1”
MetricsControlTypes[]	uint16	Mandatory	The property array shall have the following elements:4(Both),4(Both),4(Both)
ControllableManagedElement[]	string	Mandatory	The property array shall be an empty array.
ManagedElementControlTypes[]	uint16	Mandatory	The property array shall be an empty array.
SupportedMethods[]	uint16	Mandatory	The property array shall have the following elements:2 (ControlMetrics)
InstanceID	string	Mandatory	The property shall have value “DCIM:MetricServiceCapabilities:1”
ElementName	string	Mandatory	The property shall have value “Metric Service Capabilities”

7.11 DCIM_MetricService

The following clauses define the requirements for the DCIM_MetricService class. DCIM_MetricService is derived from CIM_MetricService.

The DCIM_BMElementCapabilities association's ManagedElement property shall reference the DCIM_MetricService instance.

The DCIM_BMServiceAffectsElement association's AffectingElement property shall reference the DCIM_MetricService instance.

The DCIM_BMServiceAffectsElement association's ElementEffects property shall have value 5 (Manages).

The DCIM_BMHostedService association's Dependent property shall reference the DCIM_MetricService instance.

The DCIM_ElementConformsToProfile association's ManagedElement property shall reference the DCIM_MetricService instance.

The DCIM_LCElementConformsToProfile association's ManagedElement property shall reference the DCIM_MetricService instance.

7.11.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_MetricService?__cimnamespace=root/dcim"

The key properties shall be the SystemCreationClassName, CreationClassName, SystemName, and Name.

The instance Resource URI for this DCIM_MetricService instance shall be:
http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_MetricService?__cimnamespace=root/dcim+SystemCreationClassName=<SystemCreationClassName>+CreationClassName=<CreationClassName>+SystemName=<SystemName>+Name=<Name>.

7.11.2 Operations

The following table details the implemented operations on DCIM_MetricService.

Table 37 – DCIM_MetricService Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Invoke	Mandatory	Instance URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.11.3 Properties

The following table details the requirements for implementing DCIM_MetricService. If the column "Property Name" matches the property name, the property either shall have the value denoted in the

798 corresponding column “Additional Requirements”, or shall be implemented according to the requirements
799 in the corresponding column “Additional Requirements”.

800 **Table 38 – DCIM_MetricService Properties**

Property Name	Type	Requirement	Additional Requirements
SystemCreationClassName	string	Mandatory	The property shall have value “DCIM_SPComputerSystem”
CreationClassName	string	Mandatory	The property shall have value “DCIM_MetricService”
SystemName	string	Mandatory	The property shall have value “systemmc”
Name	string	Mandatory	The property shall have value “DCIM MetricService 1”
ElementName	string	Mandatory	The property shall have value “Metric Service”

801 ## 7.12 DMTF Base Metrics Profile Registration

802 This section describes the implementation for the DCIM_RegisteredProfile class.

803 This class is instantiated in the Interop Namespace.

804 The DCIM_ElementConformsToProfile association(s) shall reference the DCIM_RegisteredProfile
805 instance.

806 ### 7.12.1 Resource URIs for WinRM®

807 The class Resource URI is:

808 *"http://schemas.dmtf.org/wbem/wscim/1/cim-*
809 *schema/2/CIM_RegisteredProfile?__cimnamespace=root/interop"*

810 The key property shall be the InstanceID property.

811 The instance Resource URI is:

812 *“http://schemas.dell.com/wbem/wscim/1/cim-*
813 *schema/2/DCIM_RegisteredProfile?__cimnamespace=root/interop+InstanceID=DCIM:BaseMetricsR*
814 *egisteredProfile:1”*

815 ### 7.12.2 Operations

816 The following table details the implemented operations on for DCIM_RegisteredProfile.

817 **Table 39 – DCIM_RegisteredProfile - Operations**

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

818

7.12.3 Properties

The following table details the implemented properties for DCIM_LCRegisteredProfile instance representing Base Metrics Profile implementation.

Table 40 – DCIM_RegisteredProfile - Properties

Property Name	Requirement	Type	Additional Requirements
InstanceID	Mandatory	String	The property value shall be "DCIM:BaseMetricsRegisteredProfile:1"
RegisteredName	Mandatory	String	This property value shall be "Base Metrics"
RegisteredVersion	Mandatory	String	This property value shall be "1.0.0".
RegisteredOrganization	Mandatory	Uint16	This property value shall be 2 (DMTF).

7.13 Dell Base Metrics Profile Registration

This section describes the implementation for the DCIM_LCRegisteredProfile class.

This class is instantiated in the Interop Namespace.

The DCIM_LCElementConformsToProfile association(s) shall reference the DCIM_LCRegisteredProfile instance.

7.13.1 Resource URIs for WinRM®

The class Resource URI is:

"http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM_RegisteredProfile?__cimnamespace=root/interop"

The key property shall be the InstanceID property.

The instance Resource URI is:

"http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_LCRegisteredProfile?__cimnamespace=root/interop+InstanceID=DMTF:BaseMetrics:1.0.0*"*

7.13.2 Operations

The following table details the implemented operations on for DCIM_LCRegisteredProfile.

Table 41 – DCIM_LCRegisteredProfile - Operations

Operation Name	Requirements	Required Input
Get	Mandatory	Instance URI
Enumerate	Mandatory	Class URI
Associators	Mandatory	Instance URI
References	Mandatory	Instance URI

7.13.3 Properties

The following table details the implemented properties for DCIM_LCRegisteredProfile instance representing Base Metrics Profile implementation.

844 **Table 42 – DCIM_LCRegisteredProfile - Properties**

Property Name	Requirement	Type	Additional Requirements
InstanceID	Mandatory	String	This property value shall be “DMTF:BaseMetrics:1.0.0”
RegisteredName	Mandatory	String	This property value is "Base Metrics”
RegisteredVersion	Mandatory	String	This property value is "1.0.0".
RegisteredOrganization	Mandatory	Uint16	This property value is 1 (Other).
OtherRegisteredOrganization	Mandatory	String	The property value is “DCIM”.

845 # 8 Methods

846 This section details the requirements for supporting extrinsic methods for the CIM elements defined by
847 this profile.

848 ## 8.1 CIM_MetricService.ControlMetrics( )

849 The ControlMetrics( ) method provides the ability to reset the metric collection for a particular metric or
850 metrics.

851 The ControlMetrics( ) method’s return code values shall be as specified in Table 43 where the method
852 execution behavior matches the return code description. The ControlMetrics( ) method’s parameters are
853 in specified in Table 45.

854 **Table 43 – CIM_MetricService.ControlMetrics( ) Method: Return Code Values**

Value	Description
0	Operation completed successfully
2	Failed

855

856 **Table 44 – CIM_MetricService.ControlMetrics( ) Method: Standard Messages**

MessageID (OUT parameter)	Message	MessageArguments[]
SYS001	The command was successful	
SYS003	Missing parameter(s) %s	MetricCollectionEnabled, Definition
SYS004	Invalid parameter value for %s	MetricCollectionEnabled, Definition
SYS022	Resource allocation failure	

857

858 **Table 45 – CIM_MetricService.ControlMetrics( ) Method: Parameters**

Qualifiers	Name	Type	Description/Values
IN	Subject	CIM_ManagedElement REF	The parameter shall be NULL.
IN	Definition	CIM_BaseMetricDefinition REF	Reference to the DCIM_BaseMetricDefinition or DCIM_AggregationMetricDefinition for which collection is to be enabled or disabled
IN, REQ	MetricCollectionEnabled	uint16	The parameter value shall be 4 (Reset).
OUT	MessageID	String	Error MessageID
OUT	Message	String	Error Message
OUT	MessageArguments[]	String	Error MessageArguments

859 ## 8.2 DCIM_MetricService. GetAvgPowerConsumptionByInterval ()

860 The GetAvgPowerConsumptionByInterval() method is used to retrieve the average, minimum and
861 maximum power consumption in watts for the specified interval for a particular device or a system as a
862 whole.

863 The ControlMetrics( ) method's return code values shall be as specified in Table 46where the method
864 execution behavior matches the return code description. The ControlMetrics( ) method's parameters are
865 in specified in Table 47.

866 **Table 46 – DCIM_MetricService.GetAvgPowerConsumptionByInterval() Method: Return Code**
867 **Values**

Value	Description
0	Operation completed successfully

Value	Description
2	Error occurred

868 **Table 47 – DCIM_MetricService.GetAvgPowerConsumptionByInterval() Method: Parameters**

Qualifiers	Name	Type	Description/Values
IN, REQ	Interval	Datetime	The parameter shall represent the interval for which the average power is requested. The interval value shall be between 30 seconds to 15 minutes.
IN	Device	Uint16	The parameter shall represent the device for which the power consumption information is requested. The following shall be the values: • 0 – System
OUT	Min	Uint32	The parameter shall represent the minimum power consumed in watts during the specified interval.
OUT	Max	Uint32	The parameter shall represent the maximum power consumed in watts during the specified interval.
OUT	Average	Uint32	The parameter shall represent the average power consumed in watts during the specified interval.
OUT	MessageID	String	Error Message ID may be used to look-up in the Dell Message registry files. For more information, see Error Message Registry.
OUT	Message	String	Error Message in English corresponding to MessageID is returned if the method fails to execute.
OUT	MessageArguments[]	string	Substitution variables for dynamic error messages.

869

870

871 **Table 48 – DCIM_MetricService.ExportThermalHistory() Method: Standard Messages**

MessageID (OUT parameter)	Message	MessageArguments[]
SYS001	The command was successful	
SYS003	Missing parameter(s) %s	Interval
SYS004	Invalid parameter value for %s	Interval
SYS022	Resource allocation failure	

872

873 9 Use Cases

874 See *Lifecycle Controller (LC) Integration Best Practices Guide*.

10 CIM Elements

No additional requirements are specified.

11 Privilege and License Requirement

The following table describes the privilege and license requirements for the listed operations. For the detailed explanation of the privileges and licenses, refer to the Dell WSMAN Licenses and Privileges specification.

Table 49 – Privilege and License Requirements

Class and Method	Operation	User Privilege Required	License Required
DCIM_AggregationMetricDefinition	ENUMERATE, GET	Login	None.
DCIM_AggregationMetricValue	ENUMERATE, GET	Login	LM_POWER_MONITORING
DCIM_BaseMetricDefinition	ENUMERATE, GET	Login	None.
DCIM_BaseMetricValue	ENUMERATE, GET	Login	LM_POWER_MONITORING
DCIM_AggrMetricInstance	ENUMERATE, GET	Login	LM_POWER_MONITORING
DCIM_BaseMetricInstance	ENUMERATE, GET	Login	LM_POWER_MONITORING
DCIM_BMElementCapabilities	ENUMERATE, GET	Login	None.
DCIM_MetricDefForME	ENUMERATE, GET	Login	None.
DCIM_MetricForME	ENUMERATE, GET	Login	None.
DCIM_BMServiceAffectsElement	ENUMERATE, GET	Login	None.
DCIM_MetricServiceCapabilities	ENUMERATE, GET	Login	None.
DCIM_MetricService	ENUMERATE, GET	Login	None.
DCIM_MetricService. ControlMetrics()	INVOKE	Login, System Control	LM_POWER_MONITORING
DCIM_MetricService. GetAvgPowerConsumptionByInterval()	INVOKE	Login	LM_POWER_MONITORING
DCIM_ElementConformsToProfile	ENUMERATE, GET	Login	None.
DCIM_RegisteredProfile	ENUMERATE, GET	Login	None.
DCIM_LCRegisteredProfile	ENUMERATE, GET	Login	None.

Class and Method	Operation	User Privilege Required	License Required
DCIM_LCElementConformsToProfile	ENUMERATE, GET	Login	None.

882

ANNEX A

Change Log

Version	Date	Description
0.0.0	01/20/2009	Initial Draft.
0.1.0	10/20/09	Extended to add specific requirements for Power Metrics and Sensors