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RAID Controller Diagnostics Profile

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Foreword

The *RAID Controller Diagnostics Profile* (DSP1114) was prepared by the Diagnostics Working Group of the DMTF.

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Introduction

A *profile* is a collection of Common Information Model (CIM) elements and behavior rules that represent a specific area of management. The purpose of the profile is to ensure interoperability of Web-Based Enterprise Management (WBEM) services for a specific subset of the CIM schema — in this case, RAID controller diagnostics.

Diagnostics is a critical component of systems management. Diagnostic services are used in problem containment to maintain availability, achieve fault isolation for system recovery, establish system integrity during boot, increase system reliability, and perform routine proactive system verification. The goal of the Common Diagnostic Model (CDM) is to define industry-standard building blocks, based on and consistent with the DMTF CIM, that enable seamless integration of vendor-supplied diagnostic services into system management frameworks.

The goal of the *RAID Controller Diagnostics Profile* is to define industry-standard building blocks that enable seamless problem determination of RAID controllers. The *RAID Controller Diagnostics Profile* extends the *Diagnostics Profile* by identifying a base set of RAID controller functions that should be diagnosed by provider implementations. Suppliers can differentiate their diagnostic offering by providing this base set of diagnostics and developing diagnostics to analyze proprietary features of the RAID controller.

Document conventions

Typographical conventions

The following typographical conventions are used in this document:

- Document titles are marked in *italics*.
- Important terms that are used for the first time are marked in *italics*.

ABNF usage conventions

Format definitions in this document are specified using ABNF (see RFC5234), with the following deviations:

- Literal strings are to be interpreted as case-sensitive Unicode characters, as opposed to the definition in RFC5234 that interprets literal strings as case-insensitive US-ASCII characters.

RAID Controller Diagnostics Profile

1 Scope

The *RAID Controller Diagnostics Profile* specializes the *Diagnostics Profile* by defining the diagnostic tests needed to determine the health of an RAID controller. The diagnostic tests are defined as subclasses of CIM_DiagnosticTest.

The target audience for this specification is implementers who are writing CIM-based providers or consumers of management interfaces that represent the component described in this document.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated or versioned references, only the edition cited (including any corrigenda or DMTF update versions) applies. For references without a date or version, the latest published edition of the referenced document (including any corrigenda or DMTF update versions) applies.

DMTF DSP0004, *CIM Infrastructure Specification 2.6*,
http://dmtf.org/sites/default/files/standards/documents/DSP0004_2.6.pdf

DMTF DSP0200, *CIM Operations over HTTP 1.3*,
http://dmtf.org/sites/default/files/standards/documents/DSP0200_1.3.pdf

DMTF DSP1001, *Management Profile Specification Usage Guide 1.0*,
http://dmtf.org/sites/default/files/standards/documents/DSP1001_1.0.pdf

DMTF DSP1002, *Diagnostics Profile 2.0*,
http://dmtf.org/sites/default/files/standards/documents/DSP1002_2.0.pdf

DMTF DSP1033, *Profile Registration Profile 1.0*,
http://dmtf.org/sites/default/files/standards/documents/DSP1033_1.0.pdf

DMTF DSP1113, *Disk Drive Diagnostics Profile 1.0*,
http://dmtf.org/sites/default/files/standards/documents/DSP1113_1.0.pdf

IETF RFC5234, *ABNF: Augmented BNF for Syntax Specifications, January 2008*,
http://tools.ietf.org/html/rfc5234

ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*,
http://isotc.iso.org/livelink/livelink.exe?func=ll&objId=4230456&objAction=browse&sort=subtype

3 Terms and definitions

In this document, some terms have a specific meaning beyond the normal English meaning. Those terms are defined in this clause.

The terms "shall" ("required"), "shall not," "should" ("recommended"), "should not" ("not recommended"), "may," "need not" ("not required"), "can" and "cannot" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Annex H. The terms in parenthesis are alternatives for the preceding term, for use in exceptional cases when the preceding term cannot be used for linguistic reasons. Note that

ISO/IEC Directives, Part 2, Annex H specifies additional alternatives. Occurrences of such additional alternatives shall be interpreted in their normal English meaning.

The terms "clause," "subclause," "paragraph," and "annex" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 5.

The terms "normative" and "informative" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 3. In this document, clauses, subclauses, or annexes labeled "(informative)" do not contain normative content. Notes and examples are always informative elements.

The terms defined in DSP0004, DSP0200, and DSP1001 apply to this document.

4 Symbols and abbreviated terms

The following symbols and abbreviations are used in this document.

4.1
CDM
Common Diagnostic Model

4.2
CIM
Common Information Model

4.3
CIMOM
CIM Object Manager

4.4
CRU
Customer Replaceable Unit

4.5
FRU
Field Replaceable Unit

4.6
HDD
Hard Disk Drive

4.7
LBA
Logical Block Addressing

4.8
LED
Light Emitting Diode

4.9
ME
Managed Element

4.10

MOF
Managed Object Format

4.11
OS
Operating System

4.12
PD
Problem Determination

4.13
PFA
Predictive Failure Analysis

4.14
POST
Power-On Self-Test

4.15
RAID
Redundant Array of Independent Disks

4.16
SLP
Service Location Protocol

4.17
WBEM
Web-Based Enterprise Management

5 Synopsis

Profile Name: RAID Controller Diagnostics

Version: 1.0.0

Organization: DMTF

CIM schema version: 2.30

Central Class: CIM_RAIDDiagnosticTest

Scoping Class: CIM_ComputerSystem

Specializes: Diagnostics Profile 2.0.0

The *RAID Controller Diagnostics Profile* extends the management capability of referencing profiles by adding common methods for determining that the RAID controller is operating in a managed system.

CIM_RAIDDiagnosticTest shall be the Central Class of this profile. The instance of CIM_RAIDDiagnosticTest shall be the Central Instance of this profile. CIM_ComputerSystem shall be the Scoping Class of this profile. The instance of CIM_ComputerSystem with which the Central Instance is associated through an instance of CIM_HostedService shall be the Scoping Instance of this profile.

The CIM_ManagedElement is CIM_PortController or a subclass of it.

253 Table 1 identifies profiles on which this profile has a dependency.

254 **Table 1 – Referenced profiles**

Profile name	Organization	Version	Description
Diagnostics	DMTF	2.0	Specializes
Disk Drive Diagnostics	DMTF	1.0.0	Optional
Profile Registration	DMTF	1.0	Mandatory
Host Hardware RAID Controller	SNIA	1.5	Optional

255 # 6 Description

256 Diagnostic programs can be developed to support two primary diagnostic modes.

257 One mode tests the RAID controller in an operational state after its operating system has started. In this
258 mode, diagnostic tests exercise various functional components or collect metrics within the context of a
259 running system. Typically, most diagnostics in this mode are launched concurrently with other user
260 programs atop a fully functioning general purpose operating system.

261 The other mode tests the RAID controller in a pre-boot state before a general purpose operating system
262 has been started. In this mode, it is understood that the system is not under normal usage. Thus, invasive
263 and destructive tests can be executed. Typically, diagnostics are launched in this environment for
264 manufacturing quality assurance to test operating system functions and other low-level components.
265 Diagnostics are also run in this mode when serious component errors are suspected in a commercial
266 environment.

267 There may also be a third type of hybrid diagnostic test that is able to provide reduced levels of coverage
268 in a normal running environment and enhanced coverage in a preboot environment.

269 Figure 1 represents the class schema for the *RAID Controller Diagnostics Profile*. For simplicity, the prefix
270 CIM_ has been removed from the names of the classes.

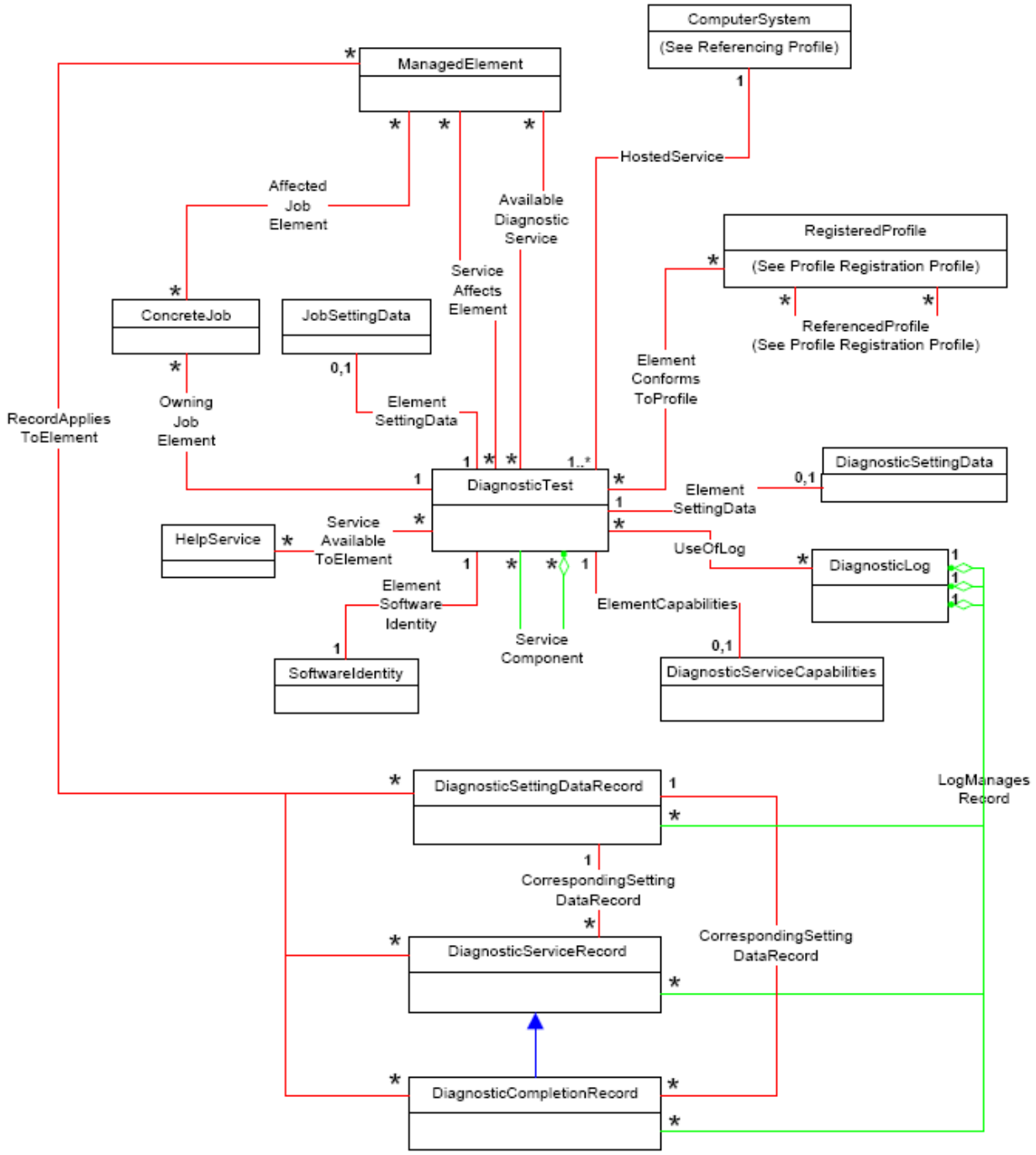

Figure 1 – RAID Controller Diagnostics Profile: Profile class diagram

7 Implementation

This clause details the requirements related to the arrangement of instances and their properties for implementations of this profile.

7.1 RAID controller test information

Table 2 provides general information for each test type.

Table 2 – RAID controller test type information

Test name	Test information	
Battery	**Description**	This diagnostic verifies the presence and charge of the battery.
	Coverage Range	Only the battery component of the RAID controller is covered.
	User Control	None
	Execution Time	The diagnostic runs on the order of seconds.
	Built into Device	Yes
	Details	
Internal Registers	**Coverage Area**	This diagnostic verifies that read and write operations can be performed on the internal registers.
	Coverage Range	The entire RAID controller is covered.
	User Control	None
	Execution Time	The diagnostic runs on the order of seconds.
	Built into Device	Yes
	Details	
Controller Status	**Coverage Area**	This diagnostic verifies the overall status of the RAID controller.
	Coverage Range	The entire RAID controller is covered.
	User Control	None
	Execution Time	The diagnostic runs on the order of seconds.
	Built into Device	Yes
	Details	
Controller Self-Test	**Coverage Area**	This diagnostic performs an extended set of vendor-specific tests to verify that the RAID controller is operating properly.
	Coverage Range	The entire RAID controller is covered.
	User Control	None
	Execution Time	The diagnostic runs on the order of seconds.
	Built into Device	Yes
	Details	
Cache Memory	**Coverage Area**	This diagnostic verifies that the cache memory is operating properly.
	Coverage Range	Only the cache memory subsystem of the RAID controller is covered.
	User Control	
	Execution Time	The diagnostic runs on the order of seconds.
	Built into Device	
	Details	

Test name	Test information	
Hard Drive Status	**Coverage Area**	This diagnostic returns information about the relative health of the disk drive based on internal analysis of failure statistics.
	Coverage Range	The entire disk drive is covered.
	User Control	The user can specify the target HDD.
	Execution Time	The diagnostic runs on the order of seconds.
	Built into Device	Yes
	Details	Analysis of failure statistics is performed by the disk drive, not by the diagnostic test, which simply returns an overall status value.
Hard Drive Self-Test	**Coverage Area**	This diagnostic performs a set of vendor-specific tests to verify that the disk is operating properly.
	Coverage Range	The entire disk is covered.
	User Control	The user can specify the target HDD and duration (short, extended, or SMART).
	Execution Time	Execution time depends on the disk size and speed.
	Built into Device	Yes
	Details	
Hard Drive Random Read	**Coverage Area**	This diagnostic performs a read operation from disk sectors in random order for a specific region of the disk.
	Coverage Range	The entire disk is covered.
	User Control	The user can specify the target HDD, the region, and the seed to use to generate the random sequence of LBAs.
	Execution Time	Execution time depends on the disk size, speed, and the region selected.
	Built into Device	Yes
	Details	Transfer rates are measured in Kbytes/sec.
Hard Drive Grown Defect	**Coverage Area**	This diagnostic retrieves statistics collected by the disk drive regarding its sector remap mechanism, such as the number of remapped sectors.
	Coverage Range	The entire disk is covered.
	User Control	The user can specify the target HDD.
	Execution Time	The diagnostic returns results immediately.
	Built into Device	Yes
	Details	

7.2 CIM_RAIDDiagnosticTest

The CIM_RAIDDiagnosticTest class can be used for a variety of tests necessary for diagnosing RAID controller issues. Table 3 defines the valid property values and whether the test is mandatory or optional. An implementation may extend this class and add vendor-defined tests using the Vendor Defined range of the RAIDDriveTestType value map.

284 **Table 3 – CIM_RAIDDiagnosticTest property requirements**

Test name	Criteria	ElementName*	RAIDTestType	TestType*
Battery	Optional	RAID Battery	2	2 (Functional)
Internal Registers	Mandatory	RAID Internal Registers	3	2 (Functional)
Controller Status	Mandatory	RAID Controller Status	4	4 (Health Check)
Controller Self-Test	Mandatory	RAID Controller Self-Test	5	2 (Functional)
Cache Memory	Optional	RAID Cache Memory	6	2 (Functional)
Hard Drive Status	Mandatory	RAID Hard Drive Status	7	4 (Health Check)
Hard Drive Self-Test	Mandatory	RAID Hard Drive Self-Test	8	2 (Functional)
Hard Drive Random Read	Optional	RAID Hard Drive Random Read	9	2 (Functional)
Hard Drive Grown Defect	Optional	RAID Hard Drive Grown Defect	10	2 (Functional)

285 * An asterisk indicates that the property is inherited from CIM_DiagnosticTest.

286 7.3 CIM_RAIDDiagnosticSettingData

287 One or more instances of CIM_RAIDDiagnosticSettingData may be implemented. They are associated to
288 CIM_RAIDDiagnosticTest using CIM_ElementSettingData. The vendor-defined default values may be
289 specified and advertised using an instance of CIM_RAIDDiagnosticSettingData that is referenced by the
290 instance of CIM_ElementSettingData whose value for the IsDefault property is 1 (Is Default).

291 A diagnostic test may require parameters to run. Some parameters may affect how the test is run, while
292 other parameters provide the values to be used by the test.

293 The CIM_DiagnosticSettingData class contains properties that affect how a diagnostic test is run (for
294 example, LoopControl, QuickMode), how errors are handled (for example, HaltOnError), or how results
295 are logged (for example, LogOptions). CIM_DiagnosticSettingData is an argument to the
296 CIM_DiagnosticTest.RunDiagnosticService( ) extrinsic method. If additional properties are needed that
297 control the behavior of the diagnostic test, they should be defined in a subclass of
298 CIM_DiagnosticSettingData.

299 The client may use the vendor-defined default CIM_RAIDDiagnosticSettingData instance as an argument
300 to the CIM_RAIDDiagnosticTest.RunDiagnosticService( ) extrinsic method. Alternatively, the client may
301 create its own instance of CIM_RAIDDiagnosticSettingData and use it instead.

302 The CIM_RAIDDiagnosticSettingData class defines the parameters that may be used by some of the
303 RAID controller tests. Table 4 lists these test parameters and shows which tests might use them. An
304 implementation may extend this class and define additional parameters for any other vendor-defined
305 tests.

306 **Table 4 – CIM_RAIDDiagnosticSettingData property requirements**

Test name	ElementName*	LBAStart	LBAEnd	Seed	TargetHDDs
Battery	RAID Battery				
Internal Registers	RAID Internal Registers				
Controller Status	RAID Controller Status				
Controller Self-Test	RAID Controller Self-Test				
Cache Memory	RAID Cache Memory				
Hard Drive Status	RAID Hard Drive Status				Used
Hard Drive Self-Test	RAID Hard Drive Self-Test				Used
Hard Drive Random Read	RAID Hard Drive Random Read	Used	Used	Used	Used
Hard Drive Grown Defect	RAID Hard Drive Grown Defect				Used

307 * An asterisk indicates that the property is inherited from CIM_DiagnosticSettingData.

308 ### 7.3.1 CIM_RAIDDiagnosticSettingData.LBAStart

309 This property is used by a client to specify the start of a region to be tested. If LBAStart is NULL, then the
310 default value of 0 is used. If multiple target HDDs are selected, then the same start address is used for
311 each.

312 ### 7.3.2 CIM_RAIDDiagnosticSettingData.LBAEnd

313 This property is used by a client to specify the end of a region to be tested. If LBAEnd is NULL, then the
314 default value is the number of the last disk sector. If multiple target HDDs are selected, then the same
315 end address is used for each.

316 ### 7.3.3 CIM_RAIDDiagnosticSettingData.Seed

317 This property is used by a client to specify the seed that initiates the random number sequence used by
318 the test. In order to replicate the same random number sequence for successive tests, one should use
319 the same seed value. If this property is NULL, then the diagnostic randomly selects its own seed using a
320 vendor-specific algorithm. If multiple target HDDs are selected, then the same seed is used for each.

321 ### 7.3.4 CIM_RAIDDiagnosticSettingData.TargetHDDs

322 This array property is used by a client to specify the HDDs managed by the RAID controller to be tested.
323 If this property is NULL, then all HDDs are tested. Otherwise, the value of each array entry shall be the
324 value of the DeviceID property for the corresponding CIM_DiskDrive instance to be tested.

7.4 CIM_RAIDDiagnosticServiceCapabilities

One instance of CIM_RAIDDiagnosticServiceCapabilities may be implemented. It is associated to CIM_RAIDDiagnosticTest using CIM_ElementCapabilities. The property values in the instance of CIM_RAIDDiagnosticServiceCapabilities defines the possible values that a client can use when it uses an instance of CIM_RAIDDiagnosticSettingData as an argument in the execution of CIM_RAIDDiagnosticTest.RunDiagnosticService( ).

Table 5 – CIM_RAIDDiagnosticServiceCapabilities property requirements

Test name	ElementName*	Region	Seed	TargetHDDs
Battery	RAID Battery			
Internal Registers	RAID Internal Registers			
Controller Status	RAID Controller Status			
Controller Self-Test	RAID Controller Self-Test			
Cache Memory	RAID Cache Memory			
Hard Drive Status	RAID Hard Drive Status			Used
Hard Drive Self-Test	RAID Hard Drive Self-Test			Used
Hard Drive Random Read	RAID Hard Drive Random Read	Used	Used	Used
Hard Drive Grown Defect	RAID Hard Drive Grown Defect			Used

* An asterisk (*) indicates that the property is inherited from the parent class CIM_DiagnosticServiceCapabilities.

7.4.1 CIM_RAIDDiagnosticServiceCapabilities.RegionSupported

This property is used by a provider to define whether the client can specify start and end disk sectors for the region tests defined in Table 5.

If this property is TRUE, then the provider uses the values of CIM_DiskDriveDiagnosticSettingData.LBAStart and CIM_DiskDriveDiagnosticSettingData.LBAEnd to specify the disk sectors to be tested.

7.4.2 CIM_RAIDDiagnosticServiceCapabilities.SeedSupported

This property is used by a provider to define whether the client can specify the seed for the tests defined in Table 5 that generate a random number sequence for testing.

If this property is TRUE, then the provider uses the value of CIM_DiskDriveDiagnosticSettingData.Seed.

7.4.3 CIM_RAIDDiagnosticServiceCapabilities.TargetHDDsSupported

This property is used by a provider to define whether the client can specify a target HDD for the tests defined in Table 5 that test individual HDDs managed by the RAID controller. If this property is TRUE, then the provider uses the value of CIM_DiskDriveDiagnosticSettingData.TargetHDDs to specify the individual HDDs to be tested.

8 Methods

This clause details the requirements for supporting intrinsic operations and extrinsic methods for the CIM elements defined by this profile.

8.1 CIM_RAIDDiagnosticTest.RunDiagnosticService( )

The RunDiagnosticService ( ) method shall return one of the return code values defined in DSP1002, Table 2 – RunDiagnosticService ( ) Method: Return Code Values.

When failures occur during the execution of a diagnostic test, the failure shall be recorded in the instance of CIM_DiagnosticServiceRecord associated with the test. The reason for the failure shall be recorded in CIM_DiagnosticServiceRecord.ErrorCode[ ] and the corresponding CIM_DiagnosticServiceRecord.ErrorCount[ ] shall be incremented. Other occurrences of the same failure during the same test shall not create additional entries in CIM_DiagnosticServiceRecord.ErrorCode[ ], but shall cause the corresponding CIM_DiagnosticServiceRecord.ErrorCount[ ] to be incremented.

8.2 Profile conventions for operations

Support for operations for each profile class (including associations) shall be as mandated in the *Diagnostics Profile*, clauses 8.5 through 8.29.

9 Use cases

This clause contains use cases for the *RAID Controller Diagnostics Profile*.

How to discover, configure, and run the individual diagnostic tests is detailed in the *Diagnostics Profile*. This clause focuses on how to use the RAID controller diagnostic tests to diagnose common memory issues.

9.1 Use case summary

Table 6 summarizes the use cases that are described in this clause. The use cases are categorized and named, and references are provided to the subclause that describes the use case.

NOTE: Although use case names follow the convention for naming classes, properties and methods in the schema, this naming was done for readability only and does not imply any functionality attached to the name.

The CIM_ prefix has been omitted from the class names in the use cases for readability.

374 **Table 6 – RAID Controller Diagnostics Profile use cases**

Category	Test name	Description
Core Controller Verification	RAID Controller Status RAID Controller Self-Test	
Full Functional Controller Verification	RAID Controller Status RAID Controller Self-Test RAID Battery RAID Internal Registers RAID Cache Memory	
Core Disk Drive Verification	Hard Drive Status Hard Drive Self-Test	The tests are run for each hard drive.
Full Functional Disk Drive Verification	Hard Drive Status Hard Drive Self-Test Hard Drive Random Read Hard Drive Grown Defect	The tests are run for each hard drive.

375 NOTE: The configuration of the RAID controller is based upon the information described in DSP1113.

376 Before performing the use cases in this profile, it is assumed that a client has already utilized the use
377 case methodology defined in the *Diagnostics Profile* to discover the following instances:

378 • ManagedSystemElement (that is, the RAID controller instances to be tested)

379 • RAIDDiagnosticTest instances to be used by this profile

380 • RAIDDiagnosticSettingData instances to be used by this profile that will be passed to the
381 RAIDDiagnosticTest.RunDiagnosticService( ) extrinsic method

382 ## 9.2 Steps to perform a use case

383 To run a category of use cases (for example, Core RAID Controller Verification), a client performs the
384 following steps:

385 1) Select the ManagedSystemElement instance to be tested.

386 2) Initialize the property values of RAIDDiagnosticSettingData as desired (for example,
387 HaltOnError, LogOptions, etc.).

388 3) Initialize the RAIDDiagnosticTest instance to select the test to run, for example, RAIDTestType
389 = 1 (RAID Battery).

390 4) Optionally, initialize a JobSettingData instance to specify the job settings for the test.

391 5) Invoke the RAIDDiagnosticTest.RunDiagnosticService( ) extrinsic method using the instances
392 from steps 1, 2, and 3 as arguments.

393 6) Repeat steps 2, 3, and 4 for running the other tests listed in Table 6 for the use case category.

10 CIM elements

Table 7 shows the instances of CIM elements for this profile. Instances of the CIM elements shall be implemented as described in Table 7. Clause 7 (“Implementation”) and Clause 8 (“Methods”) may impose additional requirements on these elements.

Table 7 – CIM elements: RAID Controller Diagnostics Profile

Element name	Requirement	Description
Classes		
CIM_RAIDDiagnosticTest	Mandatory	See 10.1.
CIM_RAIDDiagnosticSettingData	Optional	See 10.2.
CIM_RAIDDiagnosticServiceCapabilities	Optional	See 10.3.
CIM_RegisteredProfile	Mandatory	See 10.4.
CIM_AffectedJobElement	Optional	See 10.5.
CIM_AvailableDiagnosticService	Mandatory	See 10.6.
CIM_ElementCapabilities	Optional	See 10.7.
CIM_ElementSettingData (DiagnosticSettingData)	Optional	See 10.8.
CIM_ElementSettingData (JobSettingData)	Optional	See 10.9.
CIM_ElementSoftwareIdentity	Mandatory	See 10.10.
CIM_HostedService	Mandatory	See 10.11.
CIM_OwningJobElement	Mandatory	See 10.12.
CIM_RecordAppliesToElement	Optional	See 10.13.
CIM_ServiceAffectsElement	Mandatory	See 10.14.
CIM_ServiceAvailableToElement	Optional	See 10.15.
CIM_ServiceComponent	Optional	See 10.16.
CIM_UseOfLog	Mandatory	See 10.17.
Indications		
None defined in this profile		

10.1 CIM_RAIDDIagnosticTest

The CIM_RAIDDIagnosticTest class is used to represent the diagnostic testing for a RAID controller. This class specializes CIM_DiagnosticTest as defined in the *Diagnostics Profile*. The constraints listed in Table 8 are in addition to those specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory elements that must be implemented.

404 **Table 8 – Class: CIM_RAIDDiagnosticTest**

Elements	Requirement	Notes
ElementName	Mandatory	See 7.2.
Characteristics	Mandatory	See 7.2.
OtherCharacteristicsDescriptions	Conditional	If Characteristics includes the value of 1 (Other), this property is Mandatory.
RAIDTestType	Mandatory	See 7.2.
OtherRAIDTestTypeDescription	Conditional	If RAIDTestType has a value of 1 (Other), this property is Mandatory.

405 ## 10.2 CIM_RAIDDiagnosticSettingData

406 The CIM_RAIDDiagnosticSettingData class is used to pass in test parameters and to specify other test
407 control parameters. This class specializes CIM_DiagnosticSettingData as defined in the *Diagnostics*
408 *Profile*. The constraints listed in Table 9 are in addition to those specified in the *Diagnostics Profile*. See
409 the *Diagnostics Profile* for other mandatory elements that must be implemented.

410 **Table 9 – Class: CIM_RAIDDiagnosticSettingData**

Elements	Requirement	Notes
ElementName	Mandatory	See 7.3.
StartLBA	Optional	See 7.3.1.
EndLBA	Optional	See 7.3.2.
Seed	Optional	See 7.3.3.
TargetHDDs	Optional	See 7.3.4.

411 ## 10.3 CIM_RAIDDiagnosticServiceCapabilities

412 The CIM_RAIDDiagnosticServiceCapabilities class is used to provide information on the capabilities for
413 the System Memory Diagnostic Service. This class specializes CIM_DiagnosticServiceCapabilities as
414 defined in the *Diagnostics Profile*. The constraints listed in Table 10 are in addition to those specified in
415 the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory elements that must be
416 implemented.

417 **Table 10 – Class: CIM_RAIDDiagnosticServiceCapabilities**

Elements	Requirement	Notes
ElementName	Mandatory	See 7.4.
RegionSupported	Optional	See 7.4.1.
SeedSupported	Optional	See 7.4.2.
TargetHDDsSupported	Optional	See 7.4.3.

418 ## 10.4 CIM_RegisteredProfile

419 The CIM_RegisteredProfile class is defined by the *Profile Registration Profile*. The requirements denoted
420 in Table 11 are in addition to those mandated by the *Profile Registration Profile*. See the *Profile*
421 *Registration Profile* for the other mandatory elements that must be implemented.

422 **Table 11 – Class: CIM_RegisteredProfile**

Elements	Requirement	Notes
RegisteredName	Mandatory	The value of this property shall be “RAID Controller Diagnostics”.
RegisteredVersion	Mandatory	The value of this property shall be “1.0.0”.
RegisteredOrganization	Mandatory	The value of this property shall be 2 (DMTF).

423 ## 10.5 CIM_AffectedJobElement

424 Although defined in the *Diagnostics Profile*, the CIM_AffectedJobElement class is listed here because the
425 AffectedElement reference is scoped down to a subclass of CIM_ManagedElement as specified in clause
426 5. The constraints listed in Table 12 are in addition to those specified in the *Diagnostics Profile*. See the
427 *Diagnostics Profile* for other mandatory properties of CIM_AffectedJobElement that must be
428 implemented.

429 **Table 12 – Class: CIM_AffectedJobElement**

Properties	Requirement	Notes
AffectedElement (overridden)	Mandatory	This property shall be a reference to an instance of the CIM_ManagedElement subclass specified in clause 5.
AffectingElement	Mandatory	This property shall be a reference to an instance of CIM_ConcreteJob.

430 ## 10.6 CIM_AvailableDiagnosticService

431 Although defined in the *Diagnostics Profile*, the CIM_AvailableDiagnosticService class is listed here
432 because the ServiceProvided reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass
433 of CIM_DiagnosticTest, and the UserOfService reference is scoped down to a subclass of
434 CIM_ManagedElement as specified in clause 5. The constraints listed in Table 13 are in addition to those
435 specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of
436 CIM_AvailableDiagnosticService that must be implemented.

437 **Table 13 – Class: CIM_AvailableDiagnosticService**

Properties	Requirement	Notes
ServiceProvided (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.
UserOfService (overridden)	Mandatory	This property shall be a reference to an instance of the CIM_ManagedElement subclass specified in clause 5.

438 ## 10.7 CIM_ElementCapabilities

439 Although defined in the *Diagnostics Profile*, the CIM_ElementCapabilities class is listed here because the
440 ManagedElement reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of
441 CIM_DiagnosticTest, and the Capabilities reference is scoped down to
442 CIM_RAIDDiagnosticServiceCapabilities, which is a subclass of CIM_DiagnosticServiceCapabilities. The
443 constraints listed in Table 14 are in addition to those specified in the *Diagnostics Profile*. See the
444 *Diagnostics Profile* for other mandatory properties of CIM_ElementCapabilities that must be implemented.

445 **Table 14 – Class: CIM_ElementCapabilities**

Properties	Requirement	Notes
ManagedElement (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.
Capabilities (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticServiceCapabilities.

446 10.8 CIM_ElementSettingData (DiagnosticSettingData)

447 Although defined in the *Diagnostics Profile*, the CIM_ElementSettingData class is listed here because the
448 ManagedElement reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of
449 CIM_DiagnosticTest, and the SettingData reference is scoped down to CIM_RAIDDiagnosticSettingData,
450 which is a subclass of CIM_DiagnosticSettingData. The constraints listed in Table 15 are in addition to
451 those specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of
452 CIM_ElementSettingData that must be implemented.

453 **Table 15 – Class: CIM_ElementSettingData**

Properties	Requirement	Notes
ManagedElement (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.
SettingData (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticSettingData.
IsDefault	Mandatory	If the instance of CIM_RAIDDiagnosticSettingData is the default setting, this property shall have the value of TRUE.

454 10.9 CIM_ElementSettingData (JobSettingData)

455 Although defined in the *Diagnostics Profile*, the CIM_ElementSettingData class is listed here because the
456 Dependent reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of
457 CIM_DiagnosticTest, and the SettingData reference is scoped down to CIM_JobSettingData, which is a
458 subclass of CIM_SettingData. The constraints listed in Table 16 are in addition to those specified in the
459 *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of
460 CIM_ElementSettingData that must be implemented.

461 **Table 16 – Class: CIM_ElementSettingData**

Properties	Requirement	Notes
ManagedElement (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.
SettingData (overridden)	Mandatory	This property shall be a reference to an instance of CIM_JobSettingData.
IsDefault	Mandatory	If the instance of CIM_JobSettingData is the default setting, this property shall have the value of TRUE.

10.10 CIM_ElementSoftwareIdentity

Although defined in the *Diagnostics Profile*, the CIM_ElementSoftwareIdentity class is listed here because the Dependent reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of CIM_DiagnosticTest. The constraints listed in Table 17 are in addition to those specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of CIM_ElementSoftwareIdentity that must be implemented.

Table 17 – Class: CIM_ElementSoftwareIdentity

Properties	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to an instance of CIM_SoftwareIdentity.
Dependent (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.

10.11 CIM_HostedService

Although defined in the *Diagnostics Profile*, the CIM_HostedService class is listed here because the Dependent reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of CIM_DiagnosticTest. The constraints listed in Table 18 are in addition to those specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of CIM_HostedService that must be implemented.

Table 18 – Class: CIM_HostedService

Properties	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to an instance of CIM_ComputerSystem.
Dependent (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.

10.12 CIM_OwningJobElement

Although defined in the *Diagnostics Profile*, the CIM_OwningJobElement class is listed here because the OwningElement reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of CIM_DiagnosticTest. The constraints listed in Table 19 are in addition to those specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of CIM_OwningJobElement that must be implemented.

Table 19 – Class: CIM_OwningJobElement

Properties	Requirement	Notes
OwningElement (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.
OwnedElement	Mandatory	This property shall be a reference to an instance of CIM_ConcreteJob.

10.13 CIM_RecordAppliesToElement

Although defined in the *Diagnostics Profile*, the CIM_RecordAppliesToElement class is listed here because the Dependent reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of

CIM_DiagnosticTest. The constraints listed in Table 20 are in addition to those specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of CIM_RecordAppliesToElement that must be implemented.

Table 20 – Class: CIM_RecordAppliesToElement

Properties	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to an instance of CIM_RecordForLog.
Dependent (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.

10.14 CIM_ServiceAffectsElement

Although defined in the *Diagnostics Profile*, the CIM_ServiceAffectsElement class is listed here because the AffectedElement reference is scoped down to a subclass of CIM_ManagedElement as specified in clause 5, and the AffectingElement reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of CIM_DiagnosticTest. The constraints listed in Table 21 are in addition to those specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of CIM_ServiceAffectsElement that must be implemented.

Table 21 – Class: CIM_ServiceAffectsElement

Properties	Requirement	Notes
AffectedElement (overridden)	Mandatory	This property shall be a reference to an instance of the CIM_ManagedElement subclass specified in clause 5.
AffectingElement (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.

10.15 CIM_ServiceAvailableToElement

Although defined in the *Diagnostics Profile*, the CIM_ServiceAvailableToElement class is listed here because the UsersOfService reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of CIM_DiagnosticTest. The constraints listed in Table 22 are in addition to those specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of CIM_ServiceAvailableToElement that must be implemented.

Table 22 – Class: CIM_ServiceAvailableToElement

Properties	Requirement	Notes
ServiceProvided	Mandatory	This property shall be a reference to an instance of CIM_HelpService.
UsersOfService (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.

10.16 CIM_ServiceComponent

Although defined in the *Diagnostics Profile*, the CIM_ServiceComponent class is listed here because the GroupComponent reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of CIM_DiagnosticTest, and the PartComponent reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of CIM_DiagnosticTest. The constraints listed in Table 23 are in addition to those

510 specified in the *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of
511 CIM_ServiceComponent that must be implemented.

512 **Table 23 – Class: CIM_ServiceComponent**

Properties	Requirement	Notes
GroupComponent (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.
PartComponent (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.

513 10.17 CIM_UseOfLog

514 Although defined in the *Diagnostics Profile*, the CIM_UseOfLog class is listed here because the
515 Dependent reference is scoped down to CIM_RAIDDiagnosticTest, which is a subclass of
516 CIM_DiagnosticTest. The constraints listed in Table 24 are in addition to those specified in the
517 *Diagnostics Profile*. See the *Diagnostics Profile* for other mandatory properties of CIM_UseOfLog that
518 must be implemented.

519 **Table 24 – Class: CIM_UseOfLog**

Properties	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to an instance of CIM_DiagnosticLog.
Dependent (overridden)	Mandatory	This property shall be a reference to an instance of CIM_RAIDDiagnosticTest.

Annex A
(informative)

Change Log

Version	Date	Description
1.0.0	2011-12-15	