# Diagnostics and Monitoring Management Object

Candidate Version 1.0 – 27 May 2011

**Open Mobile Alliance**

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[OMA-Template-Spec-20090101-I]

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# 1. Scope

This document describes DiagMonMO employed in Diagnostics and Monitoring management that builds on and leverages the OMA DM v1.2 protocol [DMPRO]. It provides standard DM Management Objects and associated client-side and server-side behaviour necessary to conduct Diagnostics and Monitoring activities on mobile devices.

The DiagMonMO defined in this specification will provide the Diagnostics and Monitoring System with a generic framework and interface to the device functions that perform different Diagnostics and Monitoring activities. These functions are not specified in this enabler release.

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# 2. References

## 2.1 Normative References


**[DMPRO]** "OMA Device Management Protocol, Version 1.2". Open Mobile Alliance™. OMA-TS-DM-Protocol-V1_2, URL: http://www.openmobilealliance.org/

**[DMREPRO]** "OMA Device Management Representation Protocol, Version 1.2". Open Mobile Alliance™.OMA-TS-DM_Protocol-V1_2. URL: http://www.openmobilealliance.org/

**[IOPPROC]** "OMA Interoperability Policy and Process", Version 1.1, Open Mobile Alliance™, OMA-IOP-Process-V1_1, URL: http://www.openmobilealliance.org/

**[RFC2119]** "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL: http://www.ietf.org/rfc/rfc2119.txt

**[RFC4234]** "Augmented BNF for Syntax Specifications: ABNF". D. Crocker, Ed., P. Overell. October 2005, URL: http://www.ietf.org/rfc/rfc4234.txt


## 2.2 Informative References


**[ACMO]** "White Paper on Provisioning Objects", Open Mobile Alliance™, OMA-WP-AC_MO URL: http://www.openmobilealliance.org

**[DMSTDOBJ]** "OMA Device Management Standardized Objects, Version 1.2". Open Mobile Alliance™. OMA-TS-DM-StdObj-V1_2. URL: http://www.openmobilealliance.org

**[RFC2616]** "Hypertext Transfer Protocol – HTTP/1.1". Network Working group. June 1999. URL: http://www.ietf.org/rfc/rfc2616.txt

**[RFC3986]** "Uniform Resource Identifier (URI): Generic Syntax". Network Working Group. January 2005. URL: http://www.ietf.org/rfc/rfc3986.txt


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# 3. Terminology and Conventions

## 3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

## 3.2 Definitions

| | |
|---|---|
| **Device Description Framework** | A specification for how to describe the management syntax and semantics for a particular device type. |
| **Device Management** | Management of the Device configuration and other managed objects of Devices from the point of view of the various Management Authorities. Device Management includes, but is not restricted to setting initial configuration information in Devices, subsequent updates of persistent information in Devices, retrieval of management information from Devices and processing events and alarms generated by Devices. |
| **Device Management Server** | A network based entity that issues OMA DM commands to devices and correctly interprets responses sent from the devices. |
| **Diagnostics and Monitoring Function** | Functions in a device that can be remotely invoked by a Diagnostics and Monitoring System, that, when invoked, executes a diagnostics related logic to return results |
| **Diagnostics and Monitoring System** | A system that is associated with the Device Management System and is also under the administration of a management authority. It employs the standard Device Management System interaction with a (set of) device(s). The Diagnostics and Monitoring System provides enhancements to the Device Management System to support Diagnostics and Monitoring. |
| **Interior Node** | A node that may have child nodes, but cannot store any value. The Format property of an interior node is node. |
| **Leaf Node** | A node that can store a value, but cannot have child nodes. The Format property of a leaf node is not node. |
| **Management Object** | A MO is the data model for information which is a logical part of the interfaces exposed by DM components |
| **Management Tree** | The mechanism by which the management client interacts with the device, e.g. by storing and retrieving values from it and by manipulating the properties of it, for example the access control lists. |
| **Node** | A node is a single element in a management tree. There can be two kinds of nodes in a management tree: interior nodes and leaf nodes. The Format property of a node provides information about whether a node is a leaf or an interior node. |

## 3.3 Abbreviations

| | |
|---|---|
| **DDF** | Device Description Framework |
| **DiagMonMO** | Diagnostics and Monitoring MO |
| **DM** | Device Management |
| **MO** | Management Object |
| **OMA** | Open Mobile Alliance |
| **URI** | Uniform Resource Identifier |
| **URL** | Uniform Resource Locator |

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# 4. Introduction

The Diagnostics and Monitoring (DiagMon) Functions perform various Diagnostics and Monitoring activities in order to diagnose problems, report data, or collect measurements data associated with a device, with applications on the device, with the network in which the device operates or with access to services provided by the network.

The purpose of the DiagMonMO is to provide a generic framework and interface for different Diagnostics and Monitoring Functions so that they can be managed in a consistent manner by using the same description framework. The specific Diagnostics and Monitoring functions will not be defined in this specification.

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# 5. The DiagMon Framework

The generic management interface for Diagnostics and Monitoring Functions can be broadly divided into two parts: the DiagMon Management Objects and the Alert message. Through this interface a server can configure or invoke the functions behind it, and retrieve results of Diagnostics or monitored information. Note that this interface framework does not present any specific function. Instead, it is intended to be used to define a wide range of DiagMon functions. For this purpose, all the different Diagnostics and Monitoring Functions will have its own MO Identifiers which is used to identify the function represented by this framework. With this identifier, the server is able to get further information of the function.

In addition, this generic management interface is designed to cover different processing types of various functions – synchronous, asynchronous or always running - and also to allow multiple instantiation of the same function. In case of multiple instantiation, separate management objects need to be created for each instantiation. And each instantiation can be distinguished by the URIs of the management objects.

As explained above, this generic management interface provides a common template that can be reused among a wide range of functions, whilst allowing flexible extensions (or customization) for different functions.

## 5.1 DiagMonMO

A Diagnostics and Monitoring function is resident on the device. The DiagMonMO makes this function remotely callable by the Diagnostics and Monitoring System. The DiagMonMO is used as the means to expose the Diagnostic and Monitoring function to the Diagnostics and Monitoring System. The DiagMonMO will provide the following management capabilities and diagnostics and monitoring operations.

- Invoke the Diagnostics and Monitoring functions
- Stop the Diagnostics and Monitoring functions
- Configure the Diagnostics and Monitoring functions for reporting, execution, etc.
- Retrieves the Diagnostics and Monitoring data or the results
- Notifications using the Generic Alert

## 5.2 Diagnostics and Monitoring Management Object

The management objects associated with Diagnostics and Monitoring management are assembled under an internal node *x* (dynamically or statically created).

**Management Object identifier:** urn:oma:mo:oma-diagmon:1.0. This identifier SHALL be replaced by the identifier specified in the different DiagMon functions and registered with OMNA (Open Mobile Naming Authority).

This MO is the design pattern for various DiagMon functions. DiagMon functions are recommended to conform to the structure specified in this specification and are allowed to include or exclude certain nodes if necessary. DiagMon functions can also add function specific nodes. Additionally the DiagMon functions can override the status and occurrence of the DiagMonMO nodes but SHOULD NOT change the format of the DiagMonMO nodes.

**Protocol Compatibility:** This object is compatible with OMA Device Management protocol specifications, version 1.2 [DMPRO].

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## 5.3 Figure of the Management Object (Informative)

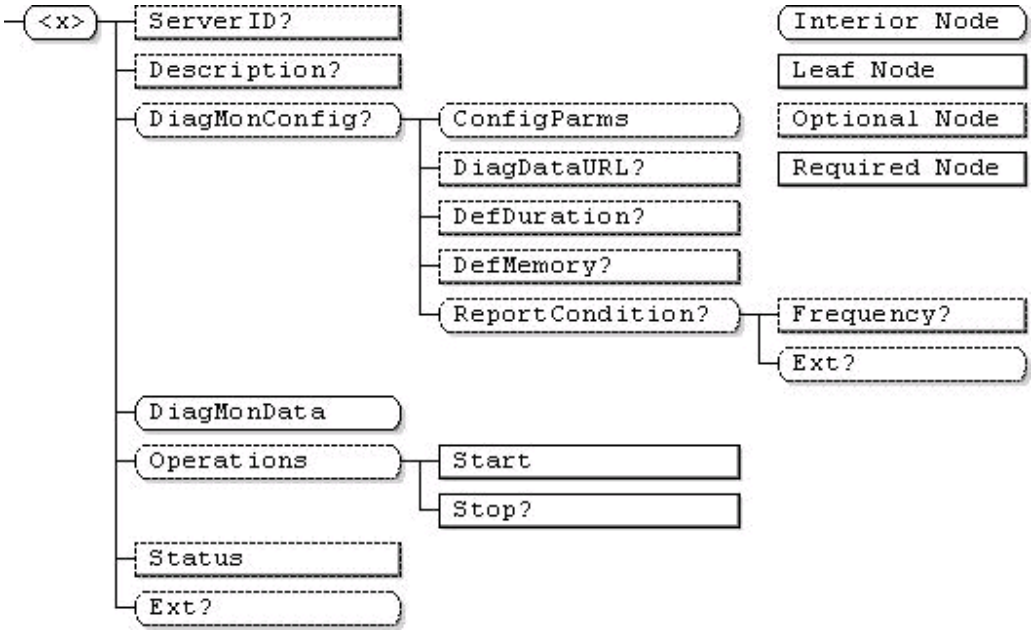


**Figure 1: Diagnostics and Monitoring Management Object**

## 5.4 Diagnostics and Monitoring Management Object Parameters

This section describes the properties for DiagMonMO.

**<x>**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Required | ZeroOrMore | node | Get |

This interior node groups together the parameters of the DiagMon MO. The ancestor elements of this node define the position in the DM tree of this MO.

**<x>/ServerID**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | chr | Get |

The ServerID leaf node is used to identify the DiagMon server where the alert and collected Diagnostics and Monitoring data SHALL be sent if the node is present.

| Values |
|---|
| Leaf values are in URI format [RFC3986] |

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**<x>/Description**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | chr | Get |

This optional leaf node provides a description of the Diagnostics and Monitoring function.

**<x>/DiagMonConfig**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | node | Get |

This interior node is a placeholder for the configuration information associated with the invocation and reporting of the DiagMon Function.

**<x>/DiagMonConfig/ConfigParms**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | One | node | Get |

This interior node is a placeholder for any extensions to the configuration information associated with the invocation and reporting of the DiagMon Function.

**<x>/DiagMonConfig/DiagDataURL**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | chr | Get |

This leaf node contains the URL [RFC3986] of an alternate data server that the client MAY use to deliver the Diagnostics and Monitoring data.

**<x>/DiagMonConfig/DefDuration**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | int | Get |

This node specifies the time-limit threshold for running of the Diagnostics and Monitoring functions. When the time-limit threshold is exceeded the DiagMon Client MUST stop the Diagnostics and Monitoring function. This time is expressed in seconds, presented as a 32bit unsigned non-negative integer.

**<x>/DiagMonConfig/DefMemory**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | int | Get |

This optional node specifies the Diagnostics and Monitoring memory-size-limit threshold for running the Diagnostics and Monitoring function. When the memory-size-limit is exceeded, the DiagMon Client MUST stop the Diagnostics and Monitoring function. The amount of memory is expressed in bytes, presented as a 32bit unsigned non-negative integer.

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**<x>/DiagMonConfig/ReportCondition**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | node | Get |

This interior node acts as a placeholder to contain different reporting conditions which indicates when Diagnostics and Monitoring data is reported back to the Diagnostics and Monitoring System via Generic Alert and subsequent Get commands mechanism.

**<x>/DiagMonConfig/ReportCondition/Frequency**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | int | Get |

This leaf node contains an integer value indicating the frequency at which alert about Diagnostics and Monitoring data is reported back to the Diagnostics and Monitoring System. The Diagnostics and Monitoring System MAY use Get command on the 'DiagMonData' node to retrieve diagnostics data.

Note: Each diagnostic function will define what the set of diagnostic data is to be collected.

| Values | Description |
|---|---|
| 0 | The Device SHOULD NOT send generic alert to Diagnostics and Monitoring System when the set of diagnostics data has been completely collected. |
| 1 | The Device MUST send generic alert as soon as practical to Diagnostics and Monitoring System when the set of diagnostics data has been completely collected. |
| any other value greater than 1 | The Device MUST send generic alert as soon as practical to Diagnostics and Monitoring System after the $n^{th}$ set of diagnostics data has been completely collected. |

**<x>/DiagMonConfig/ReportCondition/Ext**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | node | Get |

This interior node allows for the extensions on report configurations.

**<x>/DiagMonData**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Required | One | node | Get |

This node is a placeholder for the data associated with the DiagMon Function. Sub-nodes of this node identify the collected Diagnostics and Monitoring data and are DiagMon Function specific. Therefore the tree structure under this node is outside the scope of this specification. Depending upon the nature of the DiagMon Function, sub-nodes may either be always present, or created dynamically. For DiagMon Functions that generate data at run-time, Devices MUST support adding of leaf nodes under this node.

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**<x>/Operations**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | One | node | Get |

This node is a placeholder for operations that can be executed to start or stop Diagnostics and Monitoring function.

**<x>/Operations/Start**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Required | One | null | Exec |

This leaf node is the target of an 'Exec' command to start the Diagnostics and Monitoring function resident on the device. This node is required and MUST be present if the Operations node is supported.

**<x>/Operations/Stop**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Required | ZeroOrOne | null | Exec |

This leaf node is the target of an 'Exec' command to stop the Diagnostics and Monitoring function resident on the device. This node is required if the Operations node is supported.

**<x>/Status**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | One | chr | Get |

This leaf node specifies the operational state of the Diagnostics and Monitoring function. The value of this node MUST be one of the following , although all values might not be applicable to a specific diagnostic function:

| State | Meaning |
|---|---|
| Stopped | The Diagnostics and Monitoring function is stopped. |
| Running | The Diagnostics and Monitoring function is running, following explicit invocation. |
| Continuous | The Diagnostics and Monitoring function is a continuously available function that is always running. Running and Stopped states are not applicable. |

**<x>/Ext**

| Status | Tree Occurrence | Format | Min. Access Types |
|---|---|---|---|
| Optional | ZeroOrOne | node | Get |

This interior node is a placeholder for platform or vendor specific extensions.

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# 6. Invocation and Reporting Behavior

DiagMon Functions fall into two broad categories: those that are continuously available and those that have to be explicitly invoked. The invocation and reporting behavior of a DiagMon MO depends on which of the two broad categories it falls into.

## 6.1 Invoking Diagnostic Functions

A DiagMon function that is not continuously available SHALL be invoked by sending an Exec command to the <x/>Operations/Start node.

For functions that are continuously available an explicit invocation using the <x>/Operations node is not required. The MO definitions for such functions MUST NOT support the <x/>Operations/Start node.

## 6.2 Result Reporting

### 6.2.1 Explicitly Invoked Functions

Explicitly invoked DiagMon Functions can report their results in two modes: synchronously or asynchronously, as described in the following sub-sections.

The server SHALL support retrieval of result in both modes. The Client SHALL support either synchronous or asynchronous reporting. The Client MAY support both modes.

It is up to the Client to decide in which mode to operate. Client MAY change its mode between subsequent calls and server MUST NOT assume that client operates always in same mode.

#### 6.2.1.1 Asynchronous Execution (Use of the Generic Alert)

Explicitly invoked DiagMon Functions that execute asynchronously MUST report their results by issuing an alert with type “urn:oma:at:diagmon:1.0:OperationComplete” in the same or new DM session, according to the Generic Alert mechanism defined in section 8.7 of [DMPRO]. The Generic Alert message includes the following data:

- An alert type “urn:oma:at:diagmon:1.0:OperationComplete” – Used to identify the result type of the operation; MUST be included in <Meta>/<Type> element.
- The URI of the operation node on which the Exec command was invoked– Used to identify the source. This information MUST be included in the Source/LocURI element within the Generic Alert.
- The URI of the DiagMonData node or its child node provides the location at which the output data associated with the DiagMon Function is present. This information MUST be included in the Target/LocURI element within the Generic Alert if the Diagnostics and Monitoring function generates DiagMonData. If no DiagMonData is generated then the Target element MUST NOT be present within the Generic Alert.
- An integer result code – Used to report result of the invocation of the Diagnostics and Monitoring function, as defined in section 6.4. This information MUST be included in an Item/Data element within the Generic Alert.

The Diagnostics and Monitoring System MAY retrieve the collected DiagMon Data by sending a Get command to DiagMonData or its child nodes.

-

The following is an example message:

```
<Alert>
  <CmdID>2</CmdID>
  <Data>1226</Data>       <!-- Alert Code for Generic Alert -->
  <Item>
     <Source>
```

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```
            <LocURI>./DiagMon/abc/Operations/Start</LocURI>
        </Source>
        <Target>
            <LocURI>./DiagMon/abc/DiagMonData/LoggedData</LocURI>
        </Target>
        <Meta>
          <Type xmlns="syncml:metinf">urn:oma:at:diagmon:1.0:OperationComplete</Type>
          <Format xmlns="syncml:metinf">int</Format>

        </Meta>
        <Data>1200</Data>     <!-- DiagMon Result Code -->
    </Item>

  </Alert
```

#### 6.2.1.2 Synchronous Reporting

For explicitly invoked DiagMon functions that execute synchronously, the Diagnostics and Monitoring System MAY retrieve the collected DiagMon Data by sending a Get command to DiagMonData or its child nodes.

If the DiagMon function is executed synchronously by Exec command, the DiagMon Client MUST send result for Exec command as described below:

- The <Data> element MUST contain a valid DiagMon Result Code defined in section 6.4.
- The URI of the operation node on which the Exec command was invoked – Used to identify the source; MUST be included in the <Source>/<LocURI> of <Status>/<Item> element.
- The URI of the DiagMonData node or its child node provides the location at which the output data associated with the DiagMon Function is present. This information MUST be included in the <Target>/<LocURI> of <Status>/<Item> element if the Diagnostics and Monitoring function generates DiagMonData. If no DiagMonData is generated then the Target element MUST NOT be present.

The following is an example message:

```
<Status>
   <MsgRef>1</MsgRef>
   <CmdRef>2</CmdRef>
   <Cmd>Exec</Cmd>
   <Data>1200</Data>       <!--DiagMon Result status Code -->
   <Item>
      <Source>
         <LocURI>./DiagMon/abc/Operations/Start</LocURI>
      </Source>
      <Target>
          <LocURI>./DiagMon/abc/DiagMonData</LocURI>
      </Target>
   </Item>
</Status>
```

These functions SHALL NOT report any results via Generic Alerts.

### 6.2.2 Continuously Available Functions

For diagnostic functions that are continuously available, the Diagnostics and Monitoring System MAY retrieve the DiagMon Data by sending a Get command to DiagMonData or its child nodes. These functions SHALL NOT report any results via Generic Alerts.

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## 6.3 Proposed Alert Type

The following is the Alert Type for the Diagnostics and Monitoring specific Generic Alert to be sent from device to Diagnostics and Monitoring System at the end of the invocation of the Diagnostics and Monitoring functions:

- "urn:oma:at:diagmon:1.0:OperationComplete"

## 6.4 Result Codes

The Result Code of the DiagMon operation MUST be sent as an integer value in Item/Data element of the Generic Alert [DMPRO] message or in response to an Exec command. The Result Code MUST be one of the values defined below:

| Code | Meaning | Usage |
|---|---|---|
| 1200 | Successful | Successful - The Request has Succeeded |
| 1201 | Successful – Data Available | Successful – DiagMon Data is available |
| 1240-1249 | Successful – Vendor Specified | Successful Operation with Vendor Specified Result Code. Note: this extension applies to DiagMon framework. |
| 1250-1259 | Successful - DiagMon Framework Future Releases Specified | Successful Operation.<br><br>Note: this extension is for future DiagMon framework releases. |
| 1260-1299 | Successful - DiagMon Function Specified | Successful Operation.<br><br>Note: this extension is for DiagMon Function Specified Result Code. |
| 1400 | Operation Failed | Operation failed to start or stop Diagnostics and Monitoring function |
| 1401 | Not authorized | The server is not authorized to conduct this operation. |
| 1402 | Not Implemented | The device does not support the requested operation. |
| 1403 | Out of memory | The operation failed due to insufficient memory in the device to execute the Diagnostics and Monitoring function |
| 1404 | Storage is Full | The operation failed due to insufficient storage in the recipient device to store events or data for Diagnostics and Monitoring function. |
| 1440-1449 | Operation Failed – Vendor Specified | Operation Failure with Vendor Specified Result Code.<br><br>Note: this extension applies to DiagMon framework. |
| 1450-1459 | Operation Failed – DiagMon Framework Future Releases Specified | Operation Failure.<br><br>Note: this extension is for future DiagMon framework releases. |

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| | | |
|---|---|---|
| 1460-1499 | Operation Failed – DiagMon Function Specified | Operation Failure.<br><br>Note: this extension is for DiagMon Function Specified Result Code. |

**Table 1 - DiagMon Result Codes**

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# Appendix A. Change History (Informative)

## A.1 Approved Version History

| Reference | Date | Description |
|---|---|---|
| n/a | n/a | No prior version |

## A.2 Draft/Candidate Version 1.0 History

| Document Identifier | Date | Sections | Description |
|---|---|---|---|
| Draft Versions<br>OMA-TS-DiagMonMO-V1_0 | 26 Mar 2006 | All | For discussion of Baseline document |
| | 12 Jun 2006 | All | Draft to be proposed as baseline |
| | 11 Nov 2006 | 6 | Accommodated agreed CRs 43R01 & 49R02 |
| | 27 Feb 2007 | 6.4<br>5 | Accommodated agreed CR 2007-0008<br>Accommodated agreed CR 2007-0003R01 |
| | 12 Mar 2007 | 5 | agreed CR 2007-004R03 |
| | 01 May 2007 | 5 | Accommodated agreed CR 2007-0013R03 and 2007-0019R02 |
| | 20 Jun 2007 | All | Accommodated agreed CR 2007-0021R01 and 2007-0024 |
| | 02 Oct 2007 | All | Accommodated agreed CR 2007-0045 & 46 |
| | 02 Nov 2007 | All | Accommodated agreed CR 2007-0048 & 49 |
| | 28 Dec 2007 | 5 | Accommodated agreed CR 2007-0052 |
| | 05 Mar 2008 | 5 | Accommodated agreed CR 2007-0053R02 |
| | 26 Jun 2008 | All | Accommodated agreed CR 2008-0004R02, 0005, 0011R01, 0014R01, 0018R01, 0019 |
| | 30 Aug 2008 | 5.4, 6.1 | Accommodated agreed CR 2008-0025, 0040R01, editorial changes |
| | 1 Sep 2008 | 5.1, 6.* | OMA-DM-Diag-2008-0026R02 |
| | 17 Sep 2008 | 2.2<br>6<br>6.*<br>Appendix B<br>Appendix C | OMA-DM-Diag-2008-0032R01<br>OMA-DM-Diag-2008-0045R02<br>OMA-DM-Diag-2008-0047<br>OMA-DM-Diag-2008-0049<br>Editorial changes |
| | 11 Oct 2008 | 5.4.15 | OMA-DM-Diag-2008-0027R01 |
| | 15 Oct 2008 | 5.4.* | Editorial changes (to support automatic generation of DDF and diagram) |
| | 22 Oct 2008 | 5.4<br>6.2.1.1<br>6.3 | OMA-DM-Diag-2008-0059<br>Editorial changes<br>OMA-DM-Diag-2008-0062 |
| | 01 Dec 2008 | 5.4 | OMA-DM-Diag-2008-0071R01<br>Editorial changes |

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| Document Identifier | Date | Sections | Description |
|---|---|---|---|
| | 03 Mar 2009 | -<br>4, 5.3<br>6<br>6.2.1.1, 6.3<br>5.3, 5.4<br>5.3, 5.4<br>6.2.1.1, 6.3<br><br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>6.4<br><br>6.2, 6.3 | Incorporated agreed CRs:<br>OMA-DM-Diag-2008-57R01<br>OMA-DM-Diag-2008-0061R03<br>OMA-DM-Diag-2008-0062<br><br>OMA-DM-Diag-2009-0003<br>OMA-DM-Diag-2009-0004<br>OMA-DM-Diag-2009-0018R01<br><br>Editorial changes:<br>1. Document language set to English<br>2. Spelling errors were fixed<br>3. Some texts were corrected to use Times New Roman font<br>4. Table of Contents, List of Figures and List of Tables were updated<br>5. Headers and footers were updated - document name and dates<br>6. This table (A.2) was updated – all document identifiers were incorrect<br>7. Changed 'fails' to 'failed' in all result codes descriptions<br>8. Alert type was fixed from:<br>"urn:oma:mo:diagmon:1.0:OperationComplete"<br>to:<br>"urn:oma:at:diagmon:1.0:OperationComplete" |
| | 12 Mar 2009 | 5<br>6.4<br>A.2 | Incorporated agreed CRs:<br>OMA-DM-Diag-2009-0002R04<br>OMA-DM-Diag-2009-0016R02<br>Clerical changes |
| | 18 Mar 2009 | All | Editorial Cleanup |
| Candidate Version<br>OMA-TS-DiagMonMO-V1_0 | 14 Apr 2009 | N/A | Status changed to Candidate by TP<br>TP ref# OMA-TP-2009-0138-INP_DiagMon_V1_0_ERP_for_Candidate_Approval |
| Draft Version<br>OMA-TS-DiagMonMO-V1_0 | 03 Jun 2009 | 5.3 | Incorporated agreed CR:<br>OMA-DM-Diag-2009-0032 |
| Candidate Version<br>OMA-TS-DiagMonMO-V1_0 | 10 Jun 2009 | N/A | Status changed to Candidate by TP<br>TP ref# OMA-TP-2009-0268R02-INP_DiagMon_V1_0_ERP_for_Notification |
| Draft Versions<br>OMA-TS-DiagMonMO-V1_0 | 11 Dec 2009 | 3.2, 3.3, 5, 5.2, 5.3, 5.4 | Incorporated agreed CRs:<br>OMA-DM-Diag-2009-0042R03<br>OMA-DM-Diag-2009-0067R01<br>Editorial clean up by DSO |
| | 26 Mar 2010 | 5.2, 5.4, 6, App B, App C | Incorporated agreed CRs:<br>OMA-DM-Diag-2010-0031R01<br>OMA-DM-Diag-2010-0035R01<br>OMA-DM-Diag-2010-0040<br>Set language to English UK, formatting of fonts |
| Candidate Version<br>OMA-TS-DiagMonMO-V1_0 | 20 Apr 2010 | N/A | Status changed to Candidate by TP<br>TP ref# OMA-TP-2010-0177-INP_DiagMon_V1.0_ERP_for_Candidate_re_approval |
| Draft Version<br>OMA-TS-DiagMonMO-V1_0 | 18 May 2010 | 5.3, 5.4 | Incorporated agreed CR:<br>OMA-DM-Diag-2010-0065-CR_DiagMon_Framework_bug_fix |
| Candidate Version<br>OMA-TS-DiagMonMO-V1_0 | 02 Nov 2010 | N/A | Status changed to Candidate by TP<br>TP ref# OMA-TP-2010-0452-INP_DiagMon_V1.0_ERP_for_Notification |
| Draft Version<br>OMA-TS-DiagMonMO-V1_0 | 07 Jan 2011 | 6.2.1.1 | Incorporated agreed CR:<br>OMA-DM-Diag-2010-0136-CR_TS_1.0_Fix_Generic_Alert_Example |

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| | 28 Apr 2011 | 2.1, 5.3, 5.4, 6.2.1.1 | Incorporated agreed CRs:<br>OMA-DM-Diag-2011-0007R04-CR_Convey_DiagMon_Data_in_Alert_Message<br>OMA-DM-Diag-2011-0013-CR_Remove_Source_LocURI_in_Alert_Message |
| Draft Version<br>OMA-TS-DiagMonMO-V1_0 | 25 May 2011 | 2.1,5.3, 5.4, 6.2.1.1 | Incorporated agreed CR:<br>OMA-DM-Diag-2011-0015-CR_RestoreDiagMonMO10 |
| Candidate Version<br>OMA-TS-DiagMonMO-V1_0 | 27 May 2011 | N/A | Status changed to Candidate by TP<br>TP ref# OMA-TP-2011-0178-INP_DiagMon_V1_0_ERP_for_Notification |

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# Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [IOPPROC].

## B.1 SCR for DiagMon Tree Structure

| Item | Function | Reference | Requirement |
|---|---|---|---|
| DIAG-T-001-M | Use of appropriate Management Object identifier for the DiagMon node | Section 5.2 | |
| DIAG-T-002-M | Support for Required nodes under root node | Section 5.3 | |
| DIAG-T-003-O | Support for Optional nodes | Section 5.3 | |
| DIAG-T-004-M | Support for Required nodes under an Optional node if the Optional node is supported | Section 5.3 | |

## B.2 SCR for DiagMon Client

| Item | Function | Reference | Requirement |
|---|---|---|---|
| DIAG-C-001-M | DM Client allows Diagnostics and Monitoring System to invoke diagnostic functions via DiagMon MO | Section 5 | |
| DIAG-C-002-M | DiagMon functions result reporting | Section 6.2 | DIAG-C-003-O OR DIAG-C-004-O |
| DIAG-C-003-O | DiagMon functions are executed asynchronously and results are reported to Diagnostics and Monitoring Server using Generic Alert | Section 6.2.1 | |
| DIAG-C-004-O | DiagMon functions are executed synchronously and results are reported using a Status message | Section 6.2.1.2 | |
| DIAG-C-005-M | Alert Type provides information on MO | Section 6.3 | |

## B.3 SCR for DiagMon System

| Item | Function | Reference | Requirement |
|---|---|---|---|
| DIAG-S-001-M | Support for the DiagMon Management Object | Section 5.4 | |

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| | | | |
|---|---|---|---|
| DIAG-S-002-M | Diagnostics and Monitoring System can invoke DiagMon Functions via DiagMon MO | Section 6.2.1 | |
| DIAG-S-003-M | DiagMon Functions are executed asynchronously by Diagnostics and Monitoring System and report the result using Generic Alert | Section 6.2.1 | |
| DIAG-S-004-M | DiagMon Functions are executed synchronously by Diagnostics and Monitoring System and report the result using Status message | Section 6.2.1 | |
| DIAG-S-005-M | Server sends a Get command to retrieve collected DiagMon data | Section 6.2.1.2 | |
| DIAG-S-005-M | Alert Type is received that provides information on MO | Section 6.3 | |

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# Appendix C. Best Practices for defining DiagMon Functions (Informative)

DiagMon Functions are essentially MOs, and therefore all the best practices for defining MOs, as documented in [ACMO], apply to them as well. There are also some additional best practices that apply to DiagMon Functions.

The following is a list of best practices to be followed for documenting DiagMon Functions. These best practices are also applicable to external Standards Developing Organizations (SDOs) that may define their own DiagMon Functions.

1. Identify the broad category and the subcategory, under the broad category, into which the DiagMon Function falls. If the DiagMon Function does not fall into one of the existing categories, create a new one.
2. Create a new subsection for the DiagMon function under the section pertaining to its subcategory. Let us assume this section is Section *x*.
3. Under Section *x* create the following subsections:

**x.1 Introduction**

This subsection provides a brief description of the DiagMon Function and highlights its salient features.

**x.2 MOID**

This subsection provides the MOID of the DiagMon Function.

**x.3 Non-applicable nodes from DiagMon MO definition**

This subsection lists the nodes from the DiagMon MO definition that do not apply to the DiagMon function, if any.

For DiagMon Functions that are continuously available, the following nodes generally do not apply:

- ServerID
- DiagMonConfig
- Operations

For explicitly invoked DiagMon Functions that do not report their results asynchronously, the following node generally does not apply:

- ServerID

**x.4 Function Description**

This subsection includes a figure that gives the complete structure of the DiagMon Function, preferably in the enhanced graphical notation, as described in [ACMO]. A description of the various nodes in the MO definition is also included, as per [ACMO] guidelines. However, nodes that are not different from the DiagMon framework description are not described in this section.

**x.5 Additional Information**

This optional subsection provides any additional information that is specific to the DiagMon Function.

*Note: If the DiagMon Function is defined by an external SDO, only subsection x.1 should be present. In that case, subsection x.1 should only provide a reference to the pertinent document that describes the DiagMon Function.*

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