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# Requirements – Management Using Web Services

## Working Draft 6, 12 Sep. 2003

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**Editors:**

Pankaj Kumar, Hewlett-Packard Co. (pankaj\_kumar@hp.com)

John DeCarlo, The MITRE Corp. (jdecarlo@mitre.org)

Nick Swart, Computer Associates (Nic.Swart@ca.com)

Sanjeev Kumar (sakumar@attbi.com)

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**Contributors:**

**Abstract:**

This document lists the requirements for the Management Using Web Services (MUWS) specification.

**Status:**

This document is a working draft of the OASIS Web Services Distributed Management (WSDM) Technical Committee. Comments are most welcome.

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# 11 Introduction

2 This document lists the requirements to be satisfied by *Management Using Web Services*  
3 *Architecture*, part of an OASIS standard to be developed by WSDM-TC, as per the TC charter.

## 4 TC Charter

5 To define web services management. This includes using web services  
6 architecture and technology to manage distributed resources. This TC  
7 will also develop the model of a web service as a manageable resource.  
8 This TC will collaborate with various evolving activities within other  
9 standards groups, including, but not limited to, DMTF (working with its  
10 technical work groups regarding relevant CIM Schema), GGF (on the OGSA  
11 common resource model and OGSI regarding infrastructure), and W3C (the  
12 web services architecture committee). Also liaison with other OASIS  
13 TCs, including the security TC and other management oriented TCs.

14

## 15 **Relationship to Management Of Web Services (MOWS)**

16 This set of requirements concerns management using web services. As such, it is expected to  
17 cover management of any type of manageable resource, as long as it has a Web Services  
18 manageability interface, provided by the manageable resource or by another entity on behalf of  
19 the manageable resource. The MOWS requirements should drive the definition of a  
20 manageability model, specific to a Web Services endpoint, that will be exposed using MUWS.

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## 1.1 Basic Concepts Required for Management Using Web Services

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**NOTE: This section describes some basic concepts required for MUWS, but the definitions in use by the WSDM TC are contained in the WSDM Glossary.**

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An enterprise deploying a management solution would typically have the following components:

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- *Manageable resources* capable of being monitored, configured, and/or controlled via one or more remote or local applications, known as *manager(s)*.

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- *Manager*, an application that is capable of monitoring, configuring, and/or controlling a *manageable resource*.

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- *Manageability interface*, the place of interaction between manageable resources and the manager(s).

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- Model of manageable resources describing:

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- Attributes

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- Operations

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- Event Notifications

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- Relations with other manageable resources

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## 11.2 Existing Management Frameworks

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A number of standard management frameworks are currently in wide use

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- SNMP (SNMPv1, SNMPv2 and SNMPv3) and related standards developed by IETF.

6

- CIM/WBEM developed by DMTF

7

- Open Management Interface (OMI) – submitted to OASIS MPTC by HP and webMethods.

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Besides these, there are many proprietary frameworks developed by various vendors.

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Though OMI is XML based and uses SOAP for packaging, none of these frameworks are based on Web Services architecture and leverage its benefits.

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## 141.3 Scope

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The scope of the MUWS requirements, particularly in relation to the MOWS requirements, must be as clear as possible. To achieve this goal, this section contains both a description of the scope, and key concepts discussed during the process that have been determined to be out of scope.

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The scope of the MUWS requirements is the manageability interface and the related description of the manageability interface (using WSDL). Because the MOWS requirements only address manageable resources that are Web Services Endpoints, there may be a need to model a more abstract manageable resource.

What is out of scope for the MUWS requirements is the management information model for a Web Service, requirements on the manager, and the following specific items identified during the requirements development process:

- Ensure that the specification makes it easy to develop an adapter to existing systems for managing manageable resources.
- Definition of management applications.
- Should support transactionality, i.e. consistency on a unit of work.
- Management system conflict resolution is out of scope.

**The specification developed from the MUWS requirements should outline:**

- the architecture for Management Using Web Services
- the management patterns
- how a manager uses the manageability interface
- how a ~~managed resource~~[manageable resource](#) uses the manageability interface
- how to self manage



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## 21.4 Notation

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The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this specification are to be interpreted as described in IETF RFC 2119.

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## 12 MUWS Requirements

### 2.1 Functional Requirements

#### 3.1.1 Web Services Based (A) [WS-BASE]

4 **Guiding principle: Do not reinvent the “wheel” or the infrastructure.**

5 **[WS-BASE.001]** The Manageability Interface **MUST** leverage existing Internet infrastructure and  
6 standards as defined by the Web Services Architecture developed by W3C WSA Working Group,  
7 as well as related standards from WS-I and OASIS. {#1, #11, #45, #96, 128, 125, 39, 22}.

8 For the purpose of this section, the standards include, but are not limited to:

- 9 • XML
- 10 • HTTP, HTTPS
- 11 • SOAP
- 12 • WSDL (1.1 or 1.2)
- 13 • WS-I Basic Profile (as a goal for interoperability)

14 **Note:** Some of these standards are more mature than others, which will require close attention.

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<EDITOR'S NOTE: Need to make sure this aligns with the WS-SOS work.>

- **[WS-BASE.001.1]** The Manageability Interface messages **MUST** be expressable in XML infoset messages.
- **[WS-BASE.001.2]** The Manageability Interface and Description **MUST** allow discovery of manageable resources through Web services discovery mechanisms. These mechanisms could be based on a central registry like UDDI and/or decentralized, out-of-band gathering of WSDL documents (such as retrieving WSDL documents through a crawler). {#6, #76}
- **[WS-BASE.001.3]** The Manageability Interface **MUST** require description of management capabilities of a manageable resource using WSDL and the documents the WSDL refers to. WSDL should be used for:
  - capabilities {#122}
  - manageability interface - properties and operations that represent the management capabilities {#2, #15}
  - access – description of the binding of the interface to the wire format (including message packaging) {#3, #15}
  - addressability description – information necessary to send a message to invoke the interface described using the access described. {#2, #3, #4, #15}
  - **NOTE:** some of the capabilities may not be fully described in the WSDL interface at design time; the details of some capabilities may only be accessible during runtime.
- **[WS-BASE.001.4] Goal: Leverage, do not invent, non-management specific Web services infrastructure.** If non-management specific services/infrastructure is

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required then it is placed as a requirement on the Web services community. This TC may need to assist in the development of the infrastructure services. Required services/infrastructure include, but are not limited to:

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o notifications

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o relationships

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o registry

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o policy

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o reliable messaging

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o security {#1, #11, #22, #39, #57, #90, #125, #128}

10

- **[WS-BASE.001.5]** The Manageability Interface MUST enable interoperability between vendors. **Goal: WS-I basic profile conformance.** {#71}

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### 12.1.2 Message Exchange Patterns (B) [MEP]

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The [Manageability interface](#):

14

**[MEP.001]** MUST support request-response styles. {#38}

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**[MEP.001.1]** MUST support synchronous delivery of messages and request/response styles.

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{#142}

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**[MEP.001.2]** SHOULD support asynchronous delivery of messages and request/response styles.

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**[MEP.002]** SHOULD support asynchronous interactions.

19

**[MEP.003]** SHOULD support one-way style interaction (asynchronously).

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**[MEP.004]** MUST support delivery of notifications. {#98, #33}

- **[MEP.004.1]** The notification receiver SHOULD be able to control what notifications are sent to it- (for example, using filtering and/or subscription at [managed resourcemanageable resource](#) side).-
- **[MEP.004.2]** The notification receiver SHOULD be able to indicate whether it wants to receive notifications asynchronously as and when they happen or poll them periodically. {#90}
- **[MEP.004.3]** SHOULD support asynchronous delivery of notifications
- **[MEP.004.4]** MUST support synchronous polling for notifications
- **[MEP.004.5]** MUST be able to indicate if it supports asynchronous and/or polling notification mechanisms.
- **[MEP.004.6]** MUST support guaranteed notifications and be able to indicate that support. {#90}
- **[MEP.004.7]** MUST support ordering of notifications from a [managed resourcemanageable resource](#)'s perspective. (If event A happens before event B then the notification receiver should be able to use the ordering mechanism to determine that A was before B) {#90}

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### 12.1.3 Consistency with Other Management Standards (C) [STD-CON]

2 **[STD-CON.001]** The Manageability Interface SHOULD be consistent with existing management  
3 specifications such that it can be used/applied in those communities. Including, but not limited to:  
4 GGF, DMTF. {#12, #20, #130}

5 **[STD-CON.002]** The Manageability Interface SHOULD consider consistency with upcoming  
6 (draft) management specifications such that it can be used/applied in those communities.  
7 Including, but not limited to: GGF, DMTF. {#12, #20, #130}

8 **[STD-CON.003]** The Manageability Interface SHOULD not inhibit the simultaneous usage with  
9 existing management environments and protocols in a common environment.

10 **[STD-CON.004]** The Manageability Interface SHOULD be specified to allow other standards to  
11 use this standard. {#12, #130, #57}

12 **[STD-CON.004.1]** The Manageability Interface SHOULD, wherever reasonable, be specified so  
13 that it is possible to use modules of this standard and not only the standard as a whole.

### 142.1.4 Distributed Management (D) [DIST-M]

15 **[DIST-M.001]** The Manageability Interface MUST not preclude use in highly distributed  
16 environments. {#18, #81, #85, #101}

17• **[DIST-M.001.1]** The Manageability Interface SHOULD be able to be used over the  
18 public Internet.

19• **[DIST-M.001.2]** The Manageability Interface MUST not force a central point of control  
20 or failure for implementations of this specification

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- 1• **[DIST-M.001.3]** The Manageability Interface MUST allow a manager to manage  
2 multiple manageable resources
- 3• **[DIST-M.001.4]** The Manageability Interface MUST allow a manageable resource to  
4 be managed by multiple managers {#42, #98}
- 5• **[DIST-M.001.5]** The Manageability Interface MUST enable support of scalable  
6 volumes of [managed-resource](#)[manageable resources](#) {#101}
- 7• **[DIST-M.001.6]** The Manageability Interface MUST enable support of scalable  
8 volumes of manager interactions {#101}
- 9• **[DIST-M.001.7]** The Manageability Interface MUST enable access to aggregates of  
10 manageable resources. Allowing: {#33, #132, #24}
  - 11 ○ Support for global actions (#111)
  - 12 ○ It SHOULD be possible to retrieve management information or carry out  
13 management operations on more than one manageable resource with a  
14 single request. {69, 72}
- 15• **[DIST-M.001.8]** The Manageability Interface MUST support management of  
16 occasionally connected resources, including the recovery of state. {#85, #101}
- 17• **[DIST-M.001.9]** The Manageability Interface MUST define proper exceptions so that  
18 implementations can tolerate failures, such as a connection failure, in a distributed  
19 environment. {#117}
  - 20 • **[DIST-M.001.10]** The Manageability Interface SHOULD not prohibit local autonomy  
21 (respect local overrides) {#111}
  - 22 • **[DIST-M.001.11]** The Manageability Interface SHOULD ensure that time sensitive  
23 specifications define how to calibrate time or be time difference tolerant

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- 1• **[DIST-M.001.12]** The Manageability Interface MUST work with loose data consistency. Not all interactions need to be atomic or transactional. {#114}
- 3• **[DIST-M.001.13]** The Manageability Interface MUST support role collapsing [as noted in the subrequirements](#).
- 5○ **[DIST-M.001.13.1]** The Manageability Interface MUST not preclude an entity acting as a manager from also being a manageable resource. {#85}
- 7○ **[DIST-M.001.13.2]** The Manageability Interface MUST not preclude manageability interface aware proxies and chains. {#24}
- 9• **[DIST-M.001.14]** The Manageability Interface MUST not preclude Manager of Managers (Hierarchical Manager) {#32, #43, #126, #133}.
- 11○ **[DIST-M.001.14.1]** Across enterprise boundaries. {#133}
- 12
  - **[DIST-M.001.15]** The Manageability Interface MUST not preclude Collaboration/Federation among managers. {#52}
- 14○ **[DIST-M.001.15.1]** Cooperative, peer to peer, managers {#98}

### 172.1.5 Security (E) [SEC]

- 18 **[SEC.001]** The Manageability Interface MUST enable secure management at the manageability interface. {#25, #19, #30}
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  - **[SEC.001.1]** The Manageability Interface SHOULD support having the manager authenticate the [managed resource](#) [manageable resource](#).

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- **[SEC.001.2]** The Manageability Interface SHOULD support having the [managed resourcemanageable resource](#) authenticate the manager.
- **[SEC.001.3]** The Manageability Interface SHOULD support an underlying mechanism that guarantees the integrity of the messages exchanged. {#82}
- **[SEC 001.4]** The Manageability Interface SHOULD support an underlying mechanism that guarantees the confidentiality of the messages exchanged. {#82}
- **[SEC 001.5]** The Manageability Interface SHOULD not preclude establishing, using, and managing trust relationships. {#82}
- **[SEC.001.6]** The Manageability Interface SHOULD support access control (such as distinguishing between the ability to view and the ability to change) for management information, operations and event notifications at appropriate granularity. Access SHOULD be controllable by role ([the security mechanism being used will determine what "role" means](#)). For example, an internal manager should have greater control than a manager being run by a partner. {#74, #99, #116, #83, #82}

**[SEC.002]** The Manageability Interface MUST be firewall friendly, i.e. work across enterprises. {#99}

**[SEC.003]** The Manageability Interface MUST not increase security risks or enlarge security exposures. {#112}

**[SEC.004]** The Manageability Interface MUST allow a standalone security model {#41}

**[SEC.005]** The Manageability Interface MUST be able to be used to manage a Security Infrastructure {#34}

- **[SEC.005.1]** The Manageability Interface MUST allow operational capabilities on security features (enable, disable), {#70}

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### 12.1.6 Model Neutrality (F) [MDL-NEUT]

2       **[MDL-NEUT.001]** The Manageability Interface MUST be model neutral and be able to work with  
3 multiple existing, domain specific models. {#68, #36, #122}

4       [\[MDL-NEUT.002\] The Manageability Interface MUST support enough functionality to allow](#)  
5 [consumers of multiple existing models to switch over to it".](#)

6

### 72.1.7 Model Exposure (G) [MDL-EXP]

8       **[MDL-EXP.001]** The Manageability Interface MUST expose the manageability capabilities †  
9 (management information, operations, and capabilities) of the manageable resource using a  
10 WSDL description or operations defined in the WSDL. {#76, #7}

11               • **[MDL-EXP.001.1]** The Manageability Interface MUST expose the Identity of the  
12 manageable resource.

13               • **[MDL-EXP.001.2]** The Manageability Interface MUST expose [relevant the](#)  
14 management lifecycle state of the manageable resource.

15               • **[MDL-EXP.001.3]** The Manageability Interface MUST expose [relevant the](#)  
16 management performance metrics of the manageable resource.

17               • **[MDL-EXP.001.4]** The Manageability Interface MUST expose [relevant the](#)  
18 management configuration of the manageable resource.

19               • **[MDL-EXP.001.5]** The Manageability Interface MUST expose [relevant the](#)  
20 management operations of the manageable resource.

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- **[MDL-EXP.001.6]** The Manageability Interface MUST expose the events of the manageable resource through notifications.
  - **[MDL-EXP.001.6.1]** Events MUST be extensions of a standard XML management event format {#38}
- **[MDL-EXP.001.7]** The Manageability Interface MUST expose the relationships of the manageable resource with other manageable resources.
  - [MDL-EXP.001.7.1]** The Manageability Interface SHOULD expose relationships with other management interfaces
  - [MDL-EXP.001.7.2]** The Manageability Interface SHOULD expose relationships between portTypes
  - [MDL-EXP.001.7.3]** The Manageability Interface SHOULD expose relationships between service instances {#89}
  - [MDL-EXP.001.7.4]** The Manageability Interface SHOULD enable relationships between manageable resources to be discoverable from the manageable resources {#8}
  - [MDL-EXP.001.7.5]** The Manageability Interface SHOULD enable relationships between manageable resources to be discoverable from Web Services discovery mechanisms {#8}
- **[MDL-EXP.001.8]** The Manageability Interface SHOULD enable exposure of other associated descriptions, including work flows and policies. {#9}
- **[MDL-EXP.001.9 ]** The Manageability Interface SHOULD enable exposure of existing standard management models and runtimes {#65, #50}
  - **[MDL-EXP.001.9.1]** The Manageability Interface SHOULD consider and leverage current models of service {#23}

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- **[MDL-EXP.001.10]** The Manageability Interface MUST be able to associate metadata with the operations, attributes and notifications of the manageable resource.
  - **[MDL-EXP.001.10.1 ]** The Manageability Interface MUST be able to associate categories with information, operations, notifications, and relations {#5}
  - **[MDL-EXP.001.10.2 ]** The Manageability Interface MUST be able to associate read/~~and~~-write ~~ability~~characteristics ~~with-of~~ attributes {#91}
  - **[MDL-EXP.001.10.3]** The Manageability Interface MUST be able to associate information for internationalization of values in the model {#91}
  - **[MDL-EXP.001.10.4]** The Manageability Interface MUST be able to associate semantics with the model {#16}

**[MDL-EXP.002]** The Manageability Interface MUST support exposing changes to management information in the model during runtime.

### 142.1.8 Manageable Resource (H) [MNGBL-RES]

15 **[MNGBL-RES.001]** The Manageability Interface MUST support management of varieties of  
16 resources:

- 17 • **[MNGBL-RES.001.1]** Including hardware related resources (such as machines,  
18 networking elements, devices, application software) as well as software related  
19 resources (such as a Web Service, a business process, SLA). {#60, #29}
- 20 • **[MNGBL-RES.001.2]** Including physical resources {#31} and logical resources {#31}
- 21 • **[MNGBL-RES.001.3]** Including transient and long-lived/persistent resources {#64}

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- **[MNGBL-RES.001.4]** Web ~~services~~ [Services](#) and ~~elements of the~~ [Web services Services architecture](#) [Architecture](#)

**[MNGBL-RES.002]** The Manageability Interface MUST support [a modular approach to providing](#) ~~some~~ management capabilities. [For example, a manageability interface may support Monitor but not Control.](#)

- **[MNGBL-RES.002.1]** The Manageability Interface SHOULD support [Monitoring](#) management capabilities {#79}
- **[MNGBL-RES.002.2]** The Manageability Interface SHOULD support [Configure](#) management capabilities {#81}
- **[MNGBL-RES.002.3]** The Manageability Interface SHOULD support [Control](#) management capabilities {#80}

**[MNGBL-RES.003]** The Manageability Interface MUST support identification of the manageable resource ~~where the~~ and be uniquely identifiable (where identifiers can be recreatable) {#95, #46}

**[MNGBL-RES.004]** The Manageability Interface MUST support finding a description ( and therefore an invocable reference to the [management endpoint](#) [Manageability Interface](#)) for an identity {#95}

**[MNGBL-RES.005]** The Manageability Interface MUST support expressing groupings of resources {#73, #93}

**[MNGBL-RES.006]** The Manageability Interface MUST ~~be able to~~ support [incremental implementation of](#) manageability ~~incrementally~~. (Ranges from minimally Identifiable ~~to Monitorable to Controllable~~ to Fully Manageable) [The specification must identify the increments supported.](#) {#103}

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### 12.1.9 Life-cycle Management (I) [LC-MGMT]

2 [LC-MGMT.001] The Manageability Interface MUST allow monitoring of life-cycle states of  
3 [managed-resourcemanageable resources](#).

4 [LC-MGMT.002] The Manageability Interface MUST allow control of life-cycle states of [managed](#)  
5 [resourcemanageable resources](#).

6 [LC-MGMT.003] The Manageability Interface SHOULD allow creation and deletion of new  
7 manageability interfaces for [managed-resourcemanageable resources](#) {#92}

8 [LC-MGMT.004] The Manageability Interface MUST not define a canonical lifecycle for all  
9 [managed-resourcemanageable resources](#). (Note: this is a modeling exercise) {#131}

### 102.1.10 Management Manageability (S) [MAN-MGMT]

11 [MAN-MGMT.001] The Manageability Interface MUST not preclude a manager from being a  
12 manageable resource.

13 [MAN-MGMT.002] The Manageability Interface MUST enable resources that are part of a  
14 management infrastructure to be manageable resources. {#58, #102}

15 [MAN-MGMT.003] The Manageability Interface MUST not preclude manageable resources from  
16 using their own manageability interfaces.

17 [MAN-MGMT.004] The Manageability Interface MUST not preclude the ability of a system to  
18 explain its own workings via the manageability interface. {#106}

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### 12.1.11 Federation (T) [FED]

2       **[FED.001]** The Manageability Interface MUST not preclude the development of federated  
3       managers {#100, #141}

### 12.1.12 Co-existence (U,V) [CO-EXIST]

5       **[CO-EXIST.001]** The Manageability Interface SHOULD make use of existing specifications where  
6       appropriate to avoid duplication and conflict, e.g. GGF OGSi, DMTF CIM/WBEM – {#12, #130,  
7       #20}

8       **[CO-EXIST.002]** The Manageability Interface SHOULD be usable by other specifications where  
9       there are similar requirements. {#12, #130, #20}.

10       **[CO-EXIST.003]** The Manageability Interface MUST not preclude having implementations co-  
11       exist without interfering with existing standardized management infrastructures {138, 35}

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### 12.1.13 Discovery [DISC]

14       **[DISC.001]** The [mManageability interface-Interface](#) MUST be described in WSDL documents and  
15       XML Schema so that it can be discoverable (like any other Web service). {#6, #76}

16       **[DISC.002]** The Manageability Interface MUST not require a manager to have all resources  
17       explicitly defined to it. {#104}

18       **[DISC.003]** The Manageability Interface and Description MUST enable the discovery of  
19       appropriate relationships between manageable resources via Web services discovery  
20       mechanisms. {#8}

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1 **[DISC.004]** The Manageability Interface and Description MUST enable discovery of manageability  
2 capabilities of resources.

### 32.1.14 Miscellaneous (J) [MISC]

4 **[MISC.001]** The Manageability Interface MUST use XML schema types available for [attributes](#),  
5 [such as](#) Time and Date when representing a time.

6 **[MISC.002]** [The Manageability Interface MUST advance the definition of XML array types so that](#)  
7 [they become independent of the web services binding \(currently, SOAP shines through\)."](#)

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## 2.2 Non-Functional Requirements

### 3.2.2.1 Interoperability (K) [INTEROP]

- 4       **[INTEROP.001]** The Manageability Interface specification MUST define one standard WS-I  
5       compliant binding required. {#67, #47, #40}
- 6       **[INTEROP.002]** The Manageability Interface specification [MUST define the set of minimal](#)  
7       [compliance requirements and SHOULD define additional, recommended compliance](#)  
8       [requirements. SHOULD define the set of compliance requirements.](#) {#123, #75}

### 9.2.2.2 Evolvability (L) [EVOLV]

- 10       **[EVOLV.001]** The Manageability Interface SHOULD be designed so that it can be evolved without  
11       breaking backward compatibility.
- 12       **[EVOLV.002]** The Manageability Interface SHOULD not preclude multiple versions of the MUWS  
13       specification executing simultaneously in the same system. {#127, #109}
- 14       **[EVOLV.002.1]** The Manageability Interface MUST enable upgrades {#108}
- 15       **[EVOLV.002.2]** The Manageability Interface MUST enable maintenance

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### 12.2.3 Extensibility (M) [EXTN]

2       **[EXTN.001]** The Manageability Interface **MUST** enable extension of the management models  
3 exposed by adding additional model elements, management information, operations, event  
4 notifications and relations. {#13, #49, #17}

### 52.2.4 Scalability (N) [SCAL]

6       **[SCAL.001]** The Manageability Interface **MUST** not preclude scalable deployment. {#110}

7       **[SCAL.002]** The Manageability Interface **SHOULD** make it possible to specify filtering/processing  
8 through the manageability interface to reduce network traffic and distribute computation.

9       **[SCAL.003]** The Manageability Interface **MUST** not preclude scalability of events (event storm  
10 handling in large scale systems, event aggregation) {#137}

### 112.2.5 Useability (O) [USE]

12       **[USE.001]** The Manageability Interface Specification **MUST** address usability of WSDM  
13 specification to implementers. This is important for rapid adoption.

14               • **[USE.001.1]** The Manageability Interface specification **SHOULD** make it possible to  
15 create a minimally compliant implementation with relatively small amount of effort  
16 including gradual adoption. {#62, #55}

17               • **[USE.001.2]** The specification **SHOULD** provide sufficient clarity to implementers.

18       **[USE.002]** The Manageability Interface **SHOULD** provide diagnostic capabilities.{#107}

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## 12.2.6 Internationalization (P) [I18N]

2       **[I18N.001]** The Manageability Interface MUST allow compliant implementations to be localized.  
3       {#66, #134}

4       **[I18N.002]** The Manageability Interface MUST leverage internationalization support that is part of  
5       the Web Services standards. {#87}

## 62.2.7 Performance Impact (R) [PERF]

7       **[PERF.001]** The Manageability Interface SHOULD be supportable with minimal impact on  
8       resource performance {#113, #27}

9       **[PERF.002]** The Manageability Interface SHOULD be supportable in resource constrained  
10       systems {#118}

11       **[PERF.003]** The Manageability Interface MUST not preclude [managed-resource](#) [manageable](#)  
12       [resources](#) from controlling the impact of management on their environments.

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## 13 Use Cases

- 2 Peer managers
- 3 Multiple, diverse managers
- 4 International Supply chain scenario
- 5 Dynamically assembled Composite applications
- 6
  - ManyMillion managed objects
- 7 Capable and constrained managed resources
- 8 Billing (Utility computing)
- 9 WSMF: Distributed auction
- 10 WSMF: End to End management
- 11 Service Access Points deployment
- 12 Adapter to existing technologies (CIM, JMX, SNMP)
- 13 OGSA Use cases
- 14 Managing field service org with mobile devices
- 15 Use mgmt protocol to communicate logical filters to managed resources

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Coexisting versions

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Do it all Securely

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Implementing manageability

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Controlling a resource (upgrade/change)

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Feedback loop

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Human override

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## 14 References

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## 1 **Appendix A.Acknowledgments**

2       The editors would like to acknowledge the contributions of the OASIS WSDM Technical  
3       Committee, whose voting members at the time of publication were:

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## 1 Appendix B. Brainstorming

2 Requirements identified in WSDM-TC F2F brainstorming session.

Requirement	Number
(A) Access to manageability capabilities of manageable resources is described using WSDL (Binding)	3.
(A) Addressability or access point for manageability capabilities of manageable resources is described using WSDL (Port)	4.
(A) based on ws standards	128.
(A) be a GOOD web service (wsdl, use messaging efforts avail for ws allowing multiple transports, interoperability efforts underway)	45.
(A) composability, independently written put together so can understand the result, like continuity principles, understanding semantics of change	105.
(A) Leverages, does not invent, non-management specific Web services infrastructure. If non-management specific services/infrastructure is required then it is placed as a requirement on the Web services community. Required infrastructure includes: notifications, relationships, registry, etc.	11.

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(A) loose coupling	48.
(A) Manageability capabilities of manageable resources described using WSDL (PortType)	2.
(A) Manageable resources are discoverable in a manner consistent with the Web services architecture.	6.
(A) Use existing internet infrastructures	1.
(A) work in ws platform medium	96.
(A) ws management architecture – identify facilities that allow management using ws for management applications	28.
(A) wsdl based, portTypes, bindings	15.
(A, G) discovery	76.
(A,C) consistent w/ existing and future ws, don't break ws	125.
(A,C) ws-I compliant	71.
(A,C,E) support current ws security models	25.
(A,G,H) discovery oriented, use whatever tools in other models too to figure out whats around	104.
(B) support event mechanism	38.
(B) support pull and push notification models, also guaranteed delivery in order	90.
(B) Synch and asynch usage	142.

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(C) Is defined consistently with existing Web services management specifications such that it can be used/applied in those communities, i.e. GGF, DMTF	12.
(C) leverage existing ws standards	39.
(C) management using vs/ cim/soap overlaps	130.
(C,K) offer a framework for comprehensive management solution – allow other standards to plug in and complete this picture (i.e. other ws standards, etc. )	57.
(C1) defined consistently w/ existing management specs including ggf, dmtf	20.
(C1) develop/support latest ws standards	22.
(C1) extend current models of a service	23.
(D) ability to normalize time for data sources and data sinks	135.
(D) aggregate up to higher level user so can see end to end management, depth and breadth	132.
(D) availablility of time synchronization service	136.
(D) cooperative expectations – manager must expect are not alone	98.
(D) distributed, disconnected, scalability	101.
(D) exception handling for large scale systems, any part of nw unavail, but can't talk to who you need to to do job, cope with reconnection, unexpected	117.

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(D) global and local – respect for local autonomy, global actions	111.
(D) highly distributed	18.
(D) loose consistency – data gathering, not all in transactions or atomic	114.
(D) operates in distrib environment, occasional connectivity, hierarchy of management collection, (list in DisMan on distrib env?)	85.
(D) support for hierarchical and heterogeneous managers	43.
(D) support heirarchical infrastructure for management, not single layered	126.
(D) support more than one manager for a managed resource	42.
(D, T) hierarchy of manager (federated) – across and within enterprises	133.
(D,H) support aggregation and representation of resources	33.
(D,N) can be multilayered (can have aggregations and proxy and chains)	24.
(D,T) support distribution and federated management	52.
(D,T) support federated and hierarchical manager approaches (mgr to mgr)	32.

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(E) access control, acl mechanism for accessing mgmt info of managed resources, tie into roles from management of ws.	74.
(E) build in security consciousness, awareness, adaptability, esp. cross enterprise.. We both monitor, but for different reasons.	99.
(E) deal with privacy issues – who's allowed to see what	116.
(E) design infrastructure to uh, to be cognizant of denial of service attacks	139.
(E) do no harm – guard against attacks	112.
(E) provide diff levels of access, what controls and data can access	83.
(E) secure	19.
(E) secure mechanism, protecting data AND management interface	82.
(E) security – possible for operator to enable/disable security features	70.
(E) security management	34.
(E) stand alone security model that doesn't require separate saml authorities, ldap directories, etc.	41.
(E) ws mgmt arch is securable	30.
(F) ability to map between models, platform a way to describe model in higher level terms and then others can see how to map in	97.

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(F) act as model normalizing/neutralizing layer so it can support various tiers, domains	56.
(F) apply management to diff domain specific models	68.
(F) should be model agnostic, able to expose snmp mib,	36.
(F,H) managed object agnostic	122.
(G) Additional descriptions, work flows and/or policies can be associated with a manageable resource	9.
(G) Additional interfaces for the manageable resource can be associated with the manageable resource (i.e. security, administration, etc.)	10.
(G) Manageability capabilities can be categorized according to their purpose, i.e. properties can be categorized as identification information, description, metrics, capabilities, configuration information, etc.	5.
(G) Manageability capabilities of a manageable resource are discoverable from the WSDL.	7.
(G) metadata for attributes and operations, like i18n name, read writeable, etc.	91.
(G) model based, if support a model, completely support it, can support part of this one and that one, if support multiple models support all parts of those models	124.

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(G) relationships – on the fly, Managed resources need relationships from runtime, static not enough	89.
(G) Relationships between manageable resources are discoverable from the manageable resources or Web services discovery mechanisms	8.
(G, H) ability to do auditing and accounting	115.
(G, Q) support for monitoring, config, eventing, etc, (read/write, ops, events) consistent so that you have an event get semantic content and when invoke an operation have semantic	21.
(G, V) possible to expose mgmt of existing ws mgmt models and runtime systems	65.
(G,A) support new methodology for management based on web services use. Thru this framework enable exposure of management info in standard external way without wanting to interfere with internal implementations of the managed objects.	50.
(G,Q) need to address semantic content as well as operations (no blobs)	16.
(H) ability of sys to explain own workings	106.
(H) able to monitor ws, including status info/metrics	79.
(H) configure ws	81.
(H) control ws,	80.

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(H) extensions for unique ids, recreatable ids – I am a managed object in one area and create a relationship between myself and someone in another area, need to be able to find that other object/ handle	95.
(H) grouping of resources based on type, locality, and other factors (usability)	73.
(H) groupings/collections	93.
(H) need a unique ID for resources, whether is a business process, disk, etc. so can see relationships between these resources	46.
(H) search criteria - search mgd domain for types of objects	94.
(H) support management of web services as resources	60.
(H) support mgmt of longlived and shortlived resources	64.
(H) ws mgmt arch applies equally to physical and logical resources	31.
(H,L) awareness and capabilities piecewise, resources monitorable to fully capable	103.
(H,S) ws mgmt arch is manageable as a resource	29.
(I) do we want features to allow object creation and deletion (new managed objects)	92.
(I) lifecycle management of diverse components in various domains	131.
(I) support deployment/lifecycle management	26.

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(J) ability to have some manager capabilities collocated w/ managed element	44.
(J) Be able to support various deployment models – agent based, agentless	51.
(J) management application agnostic	121.
(J) management infrastructure, not management application	120.
(J) meet a timing window of ??, urgency of meaningful contribution window	63.
(J) transactional – consistency on a unit of work	143.
(J) work closely w/ of and using. Do using first, where mgmt of is an instance of this	129.
(J) ws u ws is implementable w/o dependency on work yet to happen that we don't have control of	35.
(K) ability for a compliant manager to work with a compliant agent in a predictable way	67.
(K) define one and only one standard binding required for compliance	40.
(K) interoperability	47.
(K) interoperability – compliant mgr interop w/ compliant manageable resource for all the resources capabilities	75.
(K) provides for standard set of operations for compliance	123.

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(L) must allow world of management upgradeable and maintainable thru multiple versions in same system in parallel and together	127.
(L) tolerate multiple versions of same thing in same systems	109.
(L) versioning and piece-wise upgrade	108.
(M) adapt to various management needs that different domains have... allow for different capabilities that they need, i.e. security, other protocols, etc.	54.
(M) Extensibility	13.
(M) extensibility	49.
(M) extensible	17.
(N) discovery – scalability issue here too, advertising many objects, or hierarchies in a registry	88.
(N) fw should allow scaleable (on operation to 15000 res shouldn't force 15000 requests)	69.
(N) potentially highly scalable and available	110.
(N) scalability – across objects, and w/in an object. Don't want to have to do a sep ws request to get every value of every attr, rather get all attr values together	86.
(N) scalability of events (event storm handling in large scale systems, event aggregation)	137.
(N) small to large number of objects	119.
(N) support grouping of managed resources for bulk config and operations	72.

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(O) simple and easy to plug into by various supplier and developers	62.
(O) testability and debuggability	107.
(O) usable in a way that makes adoption of it easy and people can gradually comply with it	55.
(O,K ) At least one standard binding is defined (but not required to be supported by all compliant implementations): SOAP/HTTP.	14.
(O,V) enable, easy to develop ws agents for other resources (like snmp,etc.)	84.
(P) fw should support internationalization	66.
(P) i18n, consider cross locale; management is around the world, managed resources may be in diff locale domains than managers	87.
(P) internationalization	134.
(Q) semantic intelligence built into it (chewable bite sizes)	53.
(R) developed so cognizant of system overhead/requirements	27.
(R) minimally intrusive, mgmt system not have unnecessary effects on ability to do work	113.
(R) scalable footprint – small devices and large devices	118.
(S) needs to be self-managed management infrastructure	58.

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(S) self aware, self management, recursive	102.
(T) federated management fundamental	100.
(T) intervention by humans that can be dealt with – override-ability	140.
(T) understanding effect of your actions on other systems, management system conflict resolution	141.
(U) support legacy systems, able to build a proxy for existing systems	37.
(V) Accommodate existing middleware architectures (J2EE, .net)	61.
(V) allow existing deployed resource in enterprise to be part of the ws management fw, wrap existing, legacy applications	59.
(V) coexist w/ other existing mgmt infrastructures	138.
(V) inclusion of other protocol bridge, interact w/ non ws endpoints	77.
(V) keep a biased eye on existing implementations	78.

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•2.1 Functional Requirements

•(A) 2.1.1 WSA Compliance

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•(C) 2.1.3 Conformance/Consistency with Other Standards

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•(D) 2.1.4 Distributed Management – multiple managers, hierarchical

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•(E) 2.1.5 Security

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•(F) 2.1.6 Model Neutrality

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•(G) 2.1.7 Model Exposure

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•(H) 2.1.8 Manageable Resources

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- 2.2.2 (L) Evolvability
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1 •(S) Self Management.

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3 •(T) Federation.

4 •32, 53, 100, 103, 133, 140, 141

5 •(U,V) Coexistence

6 •37, 50, 51, 59, 61, 77, 78, 84, 13

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## 1 Appendix C.

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## 1 Appendix E.Revision History

Date	Lead Author	Description
May 13, 2003	Pankaj Kumar	Initial Draft.
May 27, 2003	Pankaj Kumar	Draft#2 -- Incorporated requirements identified in the F2F brainstorming into the main text. Used the classification agreed upon in the phone conf. With Heather, John and Veena.
Aug. 1, 2003	Pankaj Kumar	Draft#4 – Accepted the changes proposed by the TC (as marked by Heather). Added Out of Scope Section. Removed table fragments from within the main part of the document. Made minor formatting related changes.
Aug. 11, 2003	John DeCarlo	Draft #5 – Made the changes proposed by TC. Reworked Section 1. Made formatting changes for consistency and some grammar changes for consistency.

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Note:

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When we get to creating a glossary, define 'monitoring'

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