



Web Service Reliability Requirements

Draft Version 0.91

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Document history	
Version 0.02	Document created by Szabolcs Payrits. Inputs: <ul style="list-style-type: none">• Web Services Reliability Ver1.0, January 8, 2003, C. Evans, D. Chappel, D. Bunting et al.• Nokia Web Service Reliability requirements, March 2003, Sz. Payrits, M. Gerendai
Version 0.03	Requirements separated to accepted Requirements and Proposals. "Transport bindings" and "Compatibility" sections added.
Version 0.1	Open issues removed. Basic functional requirements remained.
Version 0.3	Requirements accepted on on 6-May-2003 and 20-May-2003 phone conferences were added.
Version 0.4	Definitions and requirements added based on 28-May-2003 day of the face-to-face meeting.
Version 0.5	Changes added based on 29-May-2003 day of the face-to-face meeting
Version 0.6	Changes added based on discussion on 30-May-2003 day of the face-to-face meeting
Version 0.7	Changes according to 17-Jun-2003 and 01-Jul-2003 conference calls.
Version 0.8	Changes according to 15-Jul-2003, 29-Jul-2003 and 11-Aug-2003 conference calls.
Version 0.9	Changes made based on 03-Sep-2003 face-to-face meeting
Version 0.91	Changes based on the review on 05-Sep-2003 f2f meeting.



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1. Scope

This document provides requirements for the OASIS WS-Reliability standard.

The requirements based on the submitted input papers to the OASIS WSRM Technical Committee.

The requirements specified in this document shall be adhered to by the:

- OASIS WS-Reliability specification



2. References

2.1. Normative references

[RFC2119]	“Key word for use in RFCs to Indicate Requirement Levels” S. Bradner, March 1997. http://www.ietf.org/rfc/rfc2119.txt
[SOAP11]	Simple Object Access Protocol version 1.1, W3C Note Don Box et al. , 8 May 2000
[SOAP12-1]	SOAP Version 1.2 Part 1: Messaging Framework, W3C Candidate Recommendation Martin Gudgin et al., 19 December 2002 http://www.w3.org/TR/soap12-part1/
[SOAP12-2]	SOAP Version 1.2 Part 2: Adjuncts, W3C Candidate Recommendation Martin Gudgin et al., 19 December 2002 http://www.w3.org/TR/soap12-part1/
[WS-I Basic Profile]	Web Service Interoperability Group Basic Profile

2.2. Informative references



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 text in all sections and appendices are normative in their scope unless they are explicitly indicated to be informative.

3.2. Definitions

The Specification	Denotes the future WS-Reliability specification that is the output document of the Technical Committee.
Reponse RM-Reply Pattern	We say that a response RM-Reply pattern is in use if the outbound Reliable Message is sent in the underlying protocol request and the Acknowledgment Message (or RM-Fault message) is contained in the underlying protocol response message corresponding to the original request.
Callback RM-Reply Pattern	We say that a callback RM-Reply pattern is in use if the Acknowledgment Message (or RM-Fault message) is contained in an underlying protocol request of a second request/response exchange (or a second one-way message), operating in the opposite direction to the message containing the outbound Reliable Message.
Polling RM-Reply Pattern	We say that the polling RM-Reply pattern is being used if a second underlying protocol request is issued in the same direction as the one containing the outbound Reliable Message to act as a request for acknowledgement. The Acknowledgment Message (or RM-Fault message) is contained in the underlying protocol response to this request. This polling pattern is expected to be used in situations where it is inappropriate for the sender of reliable messages to receive underlying protocol requests.
Fault	A fault is a physical defect, imperfection, or flaw that occurs within somw hardware or software component.
Error	An error is a manifestation of a fault. Specifically, an error is a deviation from accuracy or correctness.
Failure	If an error results in the system performing one of its functions incorrectly then a system failure has ocured.
Fail-stop model	A fault is said to be fail-stop if whenever it occurs, the only visible effect is that the affected component stops functioning. Thus, any component affected by a fail-stop failure can show no incorrect or arbitrary behavior.
Byzantine fault model	A failure is said to be byzantine if whenever it occurs, the affected component can show any arbitrary, thus possibly malicious, behavior.
Crash failure	Crash failure (or simply Crash): Any failure that is consequence of a fail-stop fault.



Crash Tolerance	Crash Tolerance is the ability of a system (either only specified or a software/hardware implementation) to ensure predetermined properties despite the occurrence of one or more unpredictable crash failure.
Failure Recovery	Failure recovery is the process of regaining operational status or restoring the system's integrity after the occurrence of a failure.

3.3. Structuring of requirements

Requirements set by this document are structured in a way that all requirements can contain any number of sub-requirements that refine, clarify or specialize a general requirement for a special case.

This classification of requirements are denoted by numbering of the requirements. The number associated with a requirement consists of numbers separated by dots. The dot-separated numbers are to be read from left to right. The identifier associated with a requirements consist of a capital letter 'R' and the number above. This identifier should be in **bold**.

For example:

R1.23 and **R1.8** are two requirements defined by this specification, both being a sub-requirement of **R1**.



4. Requirements

4.1. Architectural requirements

R1.1	The implementation of the specification must fit into a layered architecture where WS-Reliability is a communication layer between the application and the SOAP layer.
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R1.2	The Specification must only support end-to-end reliable messaging, where one end is the sender, and the other end is the ultimate destination.
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4.2.Usage of XML

R2.1	XML Schemas delivered by the Specification must accommodate additional attributes and elements from a different namespace than the target namespace.
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4.3.Usage of SOAP and WSDL

R3.1	The Specification must adhere to the SOAP message construction rules. The basic messages generated by any implementation of the Specification must be compliant to the either the SOAP 1.1 or SOAP 1.2 message format.	
	R3.1.1	The Specification must prescribe the usage of the different SOAP versions in a consistent way. Therefore, it must be forbidden to mix different SOAP versions
	R3.1.1.1	The Specification must define separate XML Schemas for use with SOAP version 1.1 and for use with SOAP version 1.2.

R3.2	The Specification must support services with WSDL 1.1 One-Way operations.
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R3.3	The Specification must support services with WSDL 1.1 Request-Response operations.
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R3.4	The Specification must support the Response RM-Reply Pattern for WSDL 1.1 Request-Response operations.
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R3.5	The Specification must support the Callback RM-Reply Pattern for WSDL 1.1 One-Way operations.
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R3.6	The Specification must support the Polling RM-Reply Pattern for WSDL 1.1 One-Way operations.
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R3.7	The Specification must support the Polling RM-Reply Pattern for WSDL 1.1 Request-Reply operations.
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4.4. Transport bindings

R4.1	The Specification must be SOAP transport binding neutral.	
	R4.1.1	The Specification must support standard HTTP bindings defined in [SOAP11] and [SOAP12-2].
	R4.1.2	The Specification must not preclude other SOAP bindings.

R4.2	All that is expected of the transport layer is that it will not deliver a corrupted message to the reliability layer.
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4.5. Reliability features

R5.1	The Specification must address Guaranteed Delivery as a reliability feature. The participating entities must be able to ensure that all application-level information to be sent to the party has actually been received or error reported.
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R5.2	The Specification must address Duplicate Elimination as a reliability feature. The participating entities must be able to ensure that all duplicated application-level information is filtered out during the information exchange and is <u>not</u> received as duplicated.
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R5.3	The Specification must address Ordering as a reliability feature.	
	R5.3.1	Ordering feature is associated with a pair of WSRM-capable, communicating nodes. Order of MEPs must be guaranteed to be preserved between these two nodes.
	R5.3.2	Multiple concurrent sequences of messages between same two endpoints must be supported by the Specification.

R5.4	It must be possible to use different combinations of the functionalities in R5.1 , R5.2 , R5.3 .	
	R5.4.1	Duplicate Elimination must be possible to be used without Ordering.
	R5.4.2	Duplicate Elimination must be possible to be used without Guaranteed delivery.
	R5.4.3	Guaranteed delivery must be possible to be used without Duplicate Elimination.
	R5.4.4	Guaranteed delivery must be possible to be used without Ordering.



4.6.Backward compatibility

R6.1	A Web Services stack with an implementation of the Standard must not offer less capabilities than a Web Services stack without the implementation of the standard.
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R6.2	Specification should ensure WS-Reliability sender know "immediately" that it is interacting with a non-WS-Reliability recipient.
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4.7.Realization requirements

R7.1	The Specification shall allow bundling an acknowledgment for an earlier message with a request for an acknowledgment for another message.
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R7.2	The Specification must support the multiple acknowledgement feature, where several SOAP messages are acknowledged in one SOAP message.
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R7.3	Spec must support ability of sender to ask the receiver if one or more of its sent messages have been received.
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R7.4	The Specification must describe the semantics of Reliable Messaging processing parameters that affect both sides of the protocol.
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R7.5	The Specification must have a conformance section which clarifies what is required to claim conformance of the specification.
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4.8.Compatibility requirements

R8.1	The Specification should be usable with other open standard technologies, if appropriate.	
	R8.1.1	The Specification shall not preclude the use of Web Service message attachments.
	R8.1.2	Insure that the Specification is usable in combination with WSS SOAP Message Security to implement secure reliable messaging.

R8.2	The Specification must be conformant to [WS-I Basic Profile].
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4.9.Fault handling

R9.1	WSRM spec must identify fault cases and WSRM protocol must support the reporting of these identified faults.
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