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Information technology — Web Services Interoperability — WS-I Attachments Profile Version 1.0

Technologies de l'information — Interopérabilité des services du Web — Profil des fichiers joints WS-I, version 1.0

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 29362 was prepared by the Web Services Interoperability Organization (WS-I) and was adopted, under the PAS procedure, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

This corrected version of ISO/IEC 29362:2008 includes characters which were missing from the sample code in 3.1, 3.4 and 4.4 of the original version.

Information technology — Web Services Interoperability — WS-I Attachments Profile Version 1.0

1 Scope and introduction

1.1 Scope

This International Standard defines the WS-I Attachments Profile 1.0 (hereafter, "Profile"), consisting of a set of non-proprietary Web services specifications, along with clarifications to and amplifications of those specifications that are intended to promote interoperability. This profile complements the WS-I Basic Profile 1.1 to add support for conveying interoperable SOAP Messages with Attachments-based attachments with SOAP messages.

SOAP Messages with Attachments (SwA) defines a MIME multipart/related structure for packaging attachments with SOAP messages. This profile complements the WS-I Basic Profile 1.1 to add support for conveying interoperable SwA-based attachments with SOAP messages.

Section 1 introduces the Profile, and explains its relationships to other profiles.

Section 2, "Profile Conformance," explains what it means to be conformant to the Profile.

Each subsequent section addresses a component of the Profile, and consists of two parts: an overview detailing the component specifications and their extensibility points, followed by subsections that address individual parts of the component specifications.

1.2 Relationship to other Profiles

This Profile adds support for SOAP with Attachments and MIME bindings, and is intended to be used in combination with the Basic Profile 1.1.

1.3 Notational Conventions

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as in RFC2119.

Normative statements of requirements in the Profile (i.e., those impacting conformance, as outlined in "Conformance Requirements") are presented in the following manner:

Rnnnn*Statement text here.*

where "nnnn" is replaced by a number that is unique among the requirements in the Profile, thereby forming a unique requirement identifier.

Requirement identifiers can be considered to be namespace qualified, in such a way as to be compatible with QNames from Namespaces in XML. If there is no explicit namespace prefix on a requirement's identifier (e.g., "R9999" as opposed to "bp10:R9999"), it should be interpreted as being in the namespace identified by the conformance URI of the document section it occurs in. If it is qualified, the prefix should be interpreted according to the namespace mappings in effect, as documented below.

Some requirements clarify the referenced specification(s), but do not place additional constraints upon implementations. For convenience, clarifications are annotated in the following manner: c

Some requirements are derived from ongoing standardization work on the referenced specification(s). For convenience, such forward-derived statements are annotated in the following manner: xxxx, where "xxxx" is an identifier for the specification (e.g., "WSDL20" for WSDL Version 2.0). Note that because such work was not complete when this document was published, the specification that the requirement is derived from may change; this information is included only as a convenience to implementers.

Extensibility points in underlying specifications (see "Conformance Scope") are presented in a similar manner:

Ennnn*Extensibility Point Name - Description*

where "nnnn" is replaced by a number that is unique among the extensibility points in the Profile. As with requirement statements, extensibility statements can be considered namespace-qualified.

This specification uses a number of namespace prefixes throughout; their associated URIs are listed below. Note that the choice of any namespace prefix is arbitrary and not semantically significant.

- **soap** - "http://schemas.xmlsoap.org/soap/envelope/"
- **xsi** - "http://www.w3.org/2001/XMLSchema-instance"
- **xsd** - "http://www.w3.org/2001/XMLSchema"
- **soapenc** - "http://schemas.xmlsoap.org/soap/encoding/"
- **wsdl** - "http://schemas.xmlsoap.org/wsdl/"
- **soapbind** - "http://schemas.xmlsoap.org/wsdl/soap/"
- **mime** - "http://schemas.xmlsoap.org/wsdl/mime/"
- **uddi** - "urn:uddi-org:api_v2"
- **wsi** - "http://www.ws-i.org/schemas/conformanceClaim"
- **ref** - "http://ws-i.org/profiles/basic/1.1/xsd"

1.4 Profile Identification and Versioning

This document is identified by a name (in this case, Attachments Profile) and a version number (here, 1.0). Together, they identify a particular *profile instance*.

Version numbers are composed of a major and minor portion, in the form "major.minor". They can be used to determine the precedence of a profile instance; a higher version number (considering both the major and minor components) indicates that an instance is more recent, and therefore supersedes earlier instances.

Instances of profiles with the same name (e.g., "Example Profile 1.1" and "Example Profile 5.0") address interoperability problems in the same general scope (although some developments may require the exact scope of a profile to change between instances).

One can also use this information to determine whether two instances of a profile are backwards-compatible; that is, whether one can assume that conformance to an earlier profile instance implies conformance to a later one. Profile instances with the same name and major version number (e.g., "Example Profile 1.0" and "Example Profile 1.1") MAY be considered compatible. Note that this does not imply anything about compatibility in the other direction; that is, one cannot assume that conformance with a later profile instance implies conformance to an earlier one.

2 Profile Conformance

Conformance to the Profile is defined by adherence to the set of *requirements* defined for a specific *target*, within the *scope* of the Profile. This section explains these terms and describes how conformance is defined and used.

2.1 Conformance Requirements

Requirements state the criteria for conformance to the Profile. They typically refer to an existing specification and embody refinements, amplifications, interpretations and clarifications to it in order to improve interoperability. All requirements in the Profile are considered normative, and those in the specifications it references that are in-scope (see "Conformance Scope") should likewise be considered normative. When requirements in the Profile and its referenced specifications contradict each other, the Profile's requirements take precedence for purposes of Profile conformance.

Requirement levels, using RFC2119 language (e.g., MUST, MAY, SHOULD) indicate the nature of the requirement and its impact on conformance. Each requirement is individually identified (e.g., R9999) for convenience.

For example;

> R9999 *WIDGETs SHOULD be round in shape.*

This requirement is identified by "R9999", applies to the target WIDGET (see below), and places a conditional requirement upon widgets; i.e., although this requirement must be met to maintain conformance in most cases, there are some situations where there may be valid reasons for it not being met (which are explained in the requirement itself, or in its accompanying text).

Each requirement statement contains exactly one requirement level keyword (e.g., "MUST") and one conformance target keyword (e.g., "MESSAGE"). The conformance target keyword appears in bold text (e.g. "**MESSAGE**"). Other conformance targets appearing in non-bold text are being used strictly for their definition and NOT as a conformance target. Additional text may be included to illuminate a requirement or group of requirements (e.g., rationale and examples); however, prose surrounding requirement statements must not be considered in determining conformance.

Definitions of terms in the Profile are considered authoritative for the purposes of determining conformance.

None of the requirements in the Profile, regardless of their conformance level, should be interpreted as limiting the ability of an otherwise conforming implementation to apply security countermeasures in response to a real or perceived threat (e.g., a denial of service attack).

2.2 Conformance Targets

Conformance targets identify what artifacts (e.g., SOAP message, WSDL description, UDDI registry data) or parties (e.g., SOAP processor, end user) requirements apply to.

This allows for the definition of conformance in different contexts, to assure unambiguous interpretation of the applicability of requirements, and to allow conformance testing of artifacts (e.g., SOAP messages and WSDL descriptions) and the behavior of various parties to a Web service (e.g., clients and service instances).

Requirements' conformance targets are physical artifacts wherever possible, to simplify testing and avoid ambiguity.

The following conformance targets are used in the Profile:

- **MESSAGE** - protocol elements that transport the ENVELOPE (e.g., SOAP/HTTP messages) (from ISO/IEC 29361)
- **ENVELOPE** - the serialization of the soap:Envelope element and its content (from ISO/IEC 29361)
- **DESCRIPTION** - descriptions of types, messages, interfaces and their concrete protocol and data format bindings, and the network access points associated with Web services (e.g., WSDL descriptions) (from ISO/IEC 29361)

- **INSTANCE** - software that implements a wsdl:port or a uddi:bindingTemplate (from ISO/IEC 29361)
- **CONSUMER** - software that invokes an INSTANCE (from ISO/IEC 29361)
- **SENDER** - software that generates a message according to the protocol(s) associated with it (from ISO/IEC 29361)
- **RECEIVER** - software that consumes a message according to the protocol(s) associated with it (e.g., SOAP processors) (from ISO/IEC 29361)

2.3 Conformance Scope

The scope of the Profile delineates the technologies that it addresses; in other words, the Profile only attempts to improve interoperability within its own scope. Generally, the Profile's scope is bounded by the specifications referenced by it.

The Profile's scope is further refined by extensibility points. Referenced specifications often provide extension mechanisms and unspecified or open-ended configuration parameters; when identified in the Profile as an extensibility point, such a mechanism or parameter is outside the scope of the Profile, and its use or non-use is not relevant to conformance.

Note that the Profile may still place requirements on the use of an extensibility point. Also, specific uses of extensibility points may be further restricted by other profiles, to improve interoperability when used in conjunction with the Profile.

Because the use of extensibility points may impair interoperability, their use should be negotiated or documented in some fashion by the parties to a Web service; for example, this could take the form of an out-of-band agreement.

The Profile's scope is defined by the referenced specifications in Appendix A, as refined by the extensibility points in Appendix B.

2.4 Claiming Conformance

Claims of conformance to the Profile can be made using the following mechanisms, as described in Conformance Claim Attachment Mechanisms, when the applicable Profile requirements associated with the listed targets have been met:

- **WSDL 1.1 Claim Attachment Mechanism for Web Services Instances** - MESSAGE DESCRIPTION INSTANCE RECEIVER
- **WSDL 1.1 Claim Attachment Mechanism for Description Constructs** - DESCRIPTION
- **UDDI Claim Attachment Mechanism for Web Services Instances** - MESSAGE DESCRIPTION INSTANCE RECEIVER

The conformance claim URI for this Profile is "http://ws-i.org/profiles/attachments/1.0" .

3 Attachments Packaging

This section of the Profile incorporates the following specifications by reference, and defines extensibility points within them:

- SOAP Messages with Attachments
  Extensibility points:
  - E0001 - MIME parts - SOAP Messages with Attachments places no restriction on the type of any non-root part in a multipart/related message.
- Extensible Markup Language (XML) 1.0 (Second Edition)
- Namespaces in XML 1.0
- RFC2557 MIME Encapsulation of Aggregate Documents, such as HTML (MHTML)
- RFC2045 Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies
- RFC2046 Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types
- RFC2392 Content-ID and Message-ID Uniform Resource Locators

SOAP Messages with Attachments defines a MIME `multipart/related` structure for packaging SOAP envelope with attachments. The Profile mandates the use of that structure, and places the following constraints on its use:

3.1 Root Part

R2931 *The entity body of the root part of multipart/related* **MESSAGE** *MUST be a soap:Envelope.*

R2945 *The Content-Type HTTP header field-value in a* **MESSAGE** *MUST be either "multipart/related" or "text/xml".* C

R2932 *If the Content-Type HTTP header field-value in a* **MESSAGE** *has a media-type of "multipart/related" then the Content-Type HTTP header field-value in that message MUST have the* `type` *parameter with a value of "text/xml".* C

Any MIME part may contain a soap:Envelope, but only the entity body of the root-part of the MIME package is treated as the primary SOAP envelope. Non-root parts are referred to as attachments.

For example,

CORRECT:

In the message below the the Content-Type HTTP header field-value has a media-type of 'Multipart/Related' and a parameter 'type' with value of 'text/xml'.

```
MIME-Version: 1.0
Content-Type: Multipart/Related; boundary=MIME_boundary; type=text/xml;
Content-Description: This is the optional message description.
```