This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

BSI Standards Publication

Intelligent transport systems — Using web services (machine–machine delivery) for ITS service delivery

Part 1: Realization of interoperable web services

bsi.

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

National foreword

This British Standard is the UK implementation of ISO 24097-1:2017. It supersedes BS ISO 24097-1:2009, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017
Published by BSI Standards Limited 2017

ISBN 978 0 580 90706 7

ICS 35.240.60

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2017.

Amendments/corrigenda issued since publication

Date	Text affected

INTERNATIONAL ISO

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

Second edition
2017-07

Intelligent transport systems — Using web services (machine-machine delivery) for ITS service delivery —

Part 1: Realization of interoperable web services

Utilisation des services du Web (livraison de machine à machine) pour la livraison de services ITS —

Partie 1: Réalisation des services du Web interopérables

Reference number
ISO 24097-1:2017(E)

© ISO 2017

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

© ISO 2017 – All rights reserved

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **2**

3 Terms, definitions and abbreviated terms **2**
3.1 Terms and definitions 2
3.2 Abbreviated terms 3

4 Conformance **3**

5 Notation **4**
5.1 Prefixes and namespace URI used in core specification 4
5.2 Web service syntax notation: BNF pseudo-schemas 4
5.3 XPath 1.0 notation 5
5.4 Notation of service provider, service consumer combination 5
5.5 SOA stack name notation 5
5.6 Set notation 5
5.7 Tentative IRI expression 5
5.8 Rnnnn (nnnn: digits integer) 5

6 Requirements **6**
6.1 Basic concept of web services standardization 6
6.1.1 Web services architecture 6
6.1.2 International standard web service standardization 7
6.2 Web service metadata 8
6.2.1 Common requirements and recommendations for metadata 9

7 Service description layer **11**
7.1 Service description layer structure 11
7.2 Service description layer: Requirement and recommendation for interface description sublayer 11
7.2.1 Role of WSDL 11
7.2.2 Multiple WSDL specifications 11
7.2.3 WSDL and SOAP relationship 13
7.2.4 ITS web service ***interface*** metadata (WSDL) versioning rule 13
7.2.5 Requirement and recommendation for applying WSDL 2.0 13
7.3 Service description layer: Requirement and recommendation for policy description sublayer 14
7.3.1 WS-Policy role and syntax 14
7.3.2 Requirement and recommendation for policy description 17
7.4 Service description layer: Requirement and recommendation for addressing sublayer 18

8 Quality of service layer **18**
8.1 Quality of service layer: Requirement and recommendation for reliable messaging sublayer 18
8.1.1 Requirement and recommendation for reliable messaging policy description 18
8.2 Quality of service layer: Requirement and recommendation for security sublayer 20
8.3 Quality of service layer: Requirement and recommendation for transaction sublayer 20

9 Messaging layer **20**
9.1 Messaging layer: Requirement and recommendation for XML messaging 20
9.1.1 Role of SOAP 20
9.1.2 SOAP Structure 21
9.1.3 SOAP 1.2 relationship to WSDL 1.2 21
9.1.4 SOAP message transmission optimization (MTOM) policy 21

10 Service publication/discovery layer **21**

© ISO 2017 – All rights reserved

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

10.1 Service publication/discovery layer: requirement and recommendation for universal description, discovery, and integration 21
10.1.1 Role of UDDI 21
10.1.2 UDDI components 22
10.1.3 Public UDDI 22
10.1.4 Requirement and recommendation for ***service registration*** stack 24

Annex A (normative) **Principles and evolution of WSDL from version 1.1 to 2.0** **25**

Annex B (informative) **WSDL syntax** **36**

Bibliography **39**

© ISO 2017 – All rights reserved

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 204, *Intelligent transport systems*.

This second edition cancels and replaces the first edition (ISO 24097-1:2009), which has been technically revised.

A list of all the parts in the ISO 24097- series, can be found on the ISO website.

© ISO 2017 – All rights reserved

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

Introduction

ITS services have been evolving from single functional and limited area specific services, to a broad range of services in which many systems co-operate to provide effective and efficient service provision across a wide area. Today, ITS services are required to communicate not just with other parts of the same ITS service, but between different ITS services, and even with non-ITS services or a user's system directly, e.g. traffic management systems, route guidance systems, homeland security systems, environment protection systems, private freight management systems, etc.

These systems (even those limited to ITS services) are usually deployed in a heterogeneous environment that may use different hardware, operating systems (OS), middleware, and/or development languages. This creates a challenge to realize system coordination across the organizations in a way that is flexible and quick, at a reasonable cost. Web services (WS) are a recent methodology that overcomes these difficulties. Using web service technology for ITS services can significantly simplify and reduce the cost of internet based service provision, which may well affect the speed at which ITS services are deployed.

The World Wide Web Consortium (W3C) defines web services as follows:

"A web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL (Web Services Description Language)). Other systems interact with the web service in a manner prescribed by its description using SOAP-messages, typically conveyed using HTTP with an XML serialization in conjunction with other web-related standards."

Web services require significant functionality, and as a result, an architecture is indispensable. Web service standardization organizations construct standards by SOA. SOA is the evolutional form of distributed computing and object orientation.

By applying SOA-based standards to the ITS services, the following benefits are expected.

From a business viewpoint:

— Increased service value;

— Internationalization; and

— Expansion towards business automation.

From a system development viewpoint:

— Easy and quick development of ITS service coordination and service area expansion;

— More efficient service development (web services enable system developers to focus on the "what" rather than the "how." "How" is covered by a set of standard base tools. This enables quick and easy system software development;

— More reusable software because web service standards have a composable structure, and

— Easier connections to legacy systems.

In the ITS sector, a significant number of messages have been or are being developed (and in some cases standardized). Message standardization is intended to improve system coordination, interoperability and re-use, so the conditions for web services are already considered mature. In addition, the use of web services will increase the flexibility of ITS services to interoperate and communicate beyond the ITS sector and in areas where the delineation between ITS services and general commercial services converge.

From the perspective of web services standards evolution, 2007 was an epoch-making year. WSDL 2.0 became the W3C recommendation. Correspondingly, relevant web service specifications were standardized by open standards bodies (W3C and OASIS). These standards cover all functional layers. By using these standards, the ITS sector has a rigid base for interoperable web services.

 © ISO 2017 – All rights reserved

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

ITS service collaboration with other sectors is expected to increase mutual effectiveness. Economic globalization also requires communication across the country, often across the world. All of these collaborations rely on interoperability of services. Interoperability is only achieved based on open international standards.

Web services were developed to use distributed network resources in an interoperable way. However, to realize interoperable web services various capabilities are required.

Using web services (machine-machine delivery) for ITS service delivery has been developed considering these circumstances. ISO 24097 consists of two parts: ISO 24097-1 and ISO/TR 24097-2.

This document focuses on a way to realize interoperable ITS web services. ISO/TR 24097-2 will be an example-based document which will show how to realize interoperable web services.

© ISO 2017 – All rights reserved

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

INTERNATIONAL STANDARD ISO 24097-1:2017(E)

This is a preview of "BS ISO 24097-1:2017". Click here to purchase the full version from the ANSI store.

Intelligent transport systems — Using web services (machine-machine delivery) for ITS service delivery —

Part 1: Realization of interoperable web services

1 Scope

This document establishes a Service Oriented Architecture (SOA) for the realization of interoperable web services for Intelligent Transport Systems (ITS).

Web service behaviour is described at the metadata level, i.e. a higher level of abstraction, to enable auto-generation of both a 'service requester' program as well as a 'service provider' program. Figure 1 presents the principal entities involved in a web service scenario. They are service provider, service requester, and 'registry'. The registry includes business information and technical information such as interface and policy. Figure 1 also depicts the actions of the service provider and the service requester. A service provider interacts with the registry to enable it to "publish" the provided service. The service is characterized in the form of a web service interface describer in the form of a standardized web service description language (WSDL) and policy (WS-Policy). A service requester interacts with the registry to "discover" a provider for the service he is seeking. That interaction takes place through "Universal Description Discovery, and Integration" (UDDI) dialogue and endpoint reference (EPR). Once the service requester identifies a service provider, he "binds" to the service provider via an SOA protocol.

This document is applicable to inter-ITS sector web services as well as ITS web services for non-ITS users.

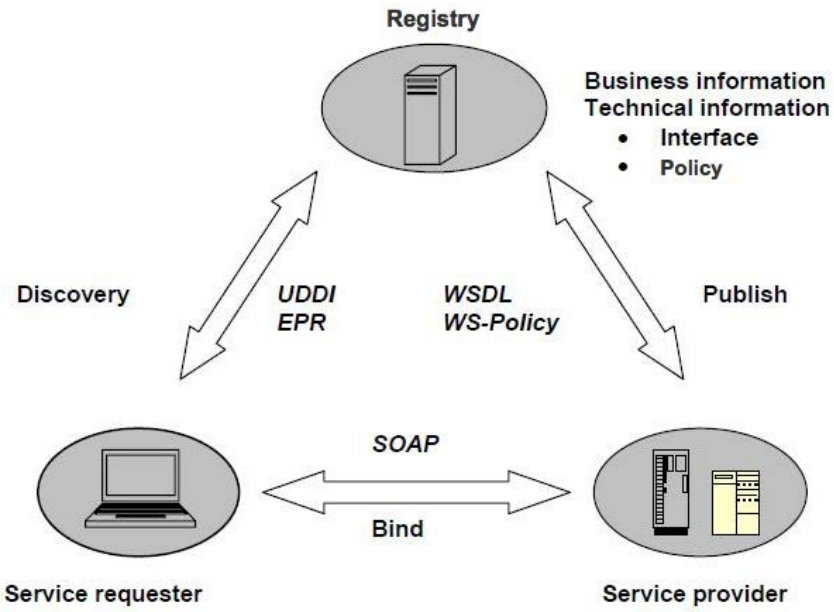

Figure 1 — Web service entities and their relationships

© ISO 2017 – All rights reserved