



# Bindings for OBIX: REST Bindings Version 1.0

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Related work:

This specification is related to:

- *OBIX Version 1.1*. Edited by Craig Gemmill. Latest version. <http://docs.oasis-open.org/obix/obix/v1.1/obix-v1.1.html>.
- *Encodings for OBIX: Common Encodings Version 1.0*. Edited by Markus Jung. Latest version. <http://docs.oasis-open.org/obix/obix-encodings/v1.0/obix-encodings-v1.0.html>.
- *Bindings for OBIX: SOAP Bindings Version 1.0*. Edited by Markus Jung. Latest version. <http://docs.oasis-open.org/obix/obix-soap/v1.0/obix-soap-v1.0.html>.
- *Bindings for OBIX: ~~Web Socket~~WebSocket Bindings Version 1.0*. Edited by Matthias Hub. Latest version. <http://docs.oasis-open.org/obix/obix-websocket/v1.0/obix-websocket-v1.0.html>.
- ~~*Encodings for OBIX: Common Encodings Version 1.0*. Edited by Marcus Jung. Latest version.~~

**Abstract:**

This document specifies REST bindings for OBIX. OBIX provides the core information model and interaction pattern for communication with building control systems. Specific implementations of OBIX must choose how to bind OBIX interactions. This document describes the REST Binding, an interaction pattern that can be used in conjunction with XML, EXI, CoAP, and JSON encodings, as well as other encodings that may be specified elsewhere.

**Status:**

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# 1 Introduction

This document specifies the REST bindings for OBIX.

## 1.1 Terminology

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](#). When used in the non-capitalized form, these words are to be interpreted with their normal English meaning.

## 1.2 Normative References

- RFC2119** Bradner, S., “Key words for use in RFCs to Indicate Requirement Levels”, BCP 14, RFC 2119, March 1997. <http://www.ietf.org/rfc/rfc2119.txt>.
- ~~**OBIX 1.1** *OBIX Version 1.1.*  
See link in “Related work” section on cover page.~~
- RFC2616** Fielding, R., Gettys, J., Mogul, J., Frystyk, H., Masinter, L., Leach, P., Berners-Lee, T., “Hypertext Transfer Protocol – HTTP/1.1”, RFC2616, June 1999. <http://www.ietf.org/rfc/rfc2616.txt>.
- RFC2617** Franks, J., Hallam-Baker, P., Hostetler, J., Lawrence, S., Leach, P., Luotonen, A., Stewart, L., “HTTP Authentication: Basic and Digest Access Authentication”, RFC2617, June 1999. <http://www.ietf.org/rfc/rfc2617.txt>.
- ~~**RFC2818** Rescorla, E., “HTTP over TLS”, RFC 2818, May 2000.  
<http://www.ietf.org/rfc/rfc2818.txt>**RFC2618** Aboba, B., Zorn, G., “RADIUS Authentication Client MIB”, RFC2618, June 1999.~~
- ~~.~~
- RFC2246** Dierks, T., Allen, C., “The TLS Protocol”, RFC2246, January 1999. <http://www.ietf.org/rfc/rfc2246.txt>.
- RFC4346** Dierks, T., Rescorla, E., “The Transport Layer Security (TLS) Protocol Version 1.1”, RFC4346, April 2006. <http://www.ietf.org/rfc/rfc4346.txt>.
- ~~**RFC5246** Dierks, T. and E. Rescorla, “The Transport Layer Security (TLS) Protocol Version 1.2”, RFC 5246, August 2008. <http://www.ietf.org/rfc/rfc5246.txt>**COAP**,  
Shelby, Z., Hartke, K., Bormann, C., “Constrained Application Protocol (CoAP)”, IETF Internet Draft, Version 18, 28 June 2013.~~
- OBIX Encodings** *Encodings for OBIX: Common Encodings Version 1.0.*  
See link in “Related work” section on cover page.

## 1.3 Non-Normative References

- REST** **RT Fielding Architectural Styles and the Design of Network-based Software Architectures**, Dissertation, University of California at Irvine, 2000, <http://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm>
- ~~**CoAP** Shelby, Z., Hartke, K., Bormann, C., “The Constrained Application Protocol (CoAP)”, IETF Internet Draft, June 2014. <http://tools.ietf.org/search/rfc7252>~~
- CoAP-OBSERVE** Hartke, K., “Observing Resources in CoAP”, IETF Internet-Draft ~~08, February 25, 2013~~ Version 15, October 27, 2014. <http://www.ietf.org/id/draft-ietf-core-observe-15.txt>
- ~~**OBIX 1.1** *OBIX Version 1.1.*  
See link in “Related work” section on cover page.~~

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## **1.4 Editing Conventions**

45

All sections of this specification SHALL be considered normative, unless specifically identified as non-

46

normative.

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## 47 2 HTTP Binding

### 48 2.1 Description

49 The HTTP binding specifies a simple REST mapping of OBIX requests to HTTP. A read request is a  
50 simple HTTP GET, which means that you can simply read an Object by typing its URI into your browser.  
51 Refer to “RFC2616” for the full specification of HTTP 1.1.

### 52 2.1.2 Requests

53 The following table summarizes how OBIX requests map to HTTP methods:

OBIX Request	HTTP Method	Target
Read	GET	Any Object with an href
Write	PUT	Any Object with an href and <code>writable=true</code>
Invoke	POST	Any op Object
Delete	DELETE	Any Object with an href and <code>writable=true</code>

54 *Table 2-1. Mapping of OBIX Requests to HTTP Methods.*

55 The URI used for an HTTP request MUST map to the URI of the Object being read, written, or invoked.  
56 Read requests use a simple HTTP GET and return the resulting OBIX document. Write and invoke are  
57 implemented with the PUT and POST methods respectively. The input is passed to the server as an OBIX  
58 document and the result is returned as an OBIX document.

59 If the OBIX server processes a request, then it MUST return the resulting OBIX document with an HTTP  
60 status code of 200 OK. The 200 status code MUST be used even if the request failed and the server is  
61 returning an `err` Object as the result.

### 62 2.2 MIME Type

### 63 2.3 Content Negotiation

64

65 The HTTP client MAY specify the MIME type of the encoding according to the **OBIX Encodings**  
66 specification for the payload of a PUT or POST request using the HTTP content type header.

#### 67 2.2.1 Content Negotiation

68 OBIX resources MUST be encoded using MIME types defined by the corresponding encoding as defined  
69 by the **OBIX Encodings** specification. Clients and servers SHOULD follow Section 12 of **RFC2616** for  
70 content negotiation.

71 If a client wishes to GET a resource using a specific encoding, then it SHOULD specify the desired MIME  
72 type in the Accept header.

73 If the server does not support the MIME type of a client request, then it SHOULD respond with the 406  
74 Not Acceptable status code. There are two use cases for a 406 failure: 1) the client specifies an  
75 unsupported MIME type in the Accept header of a GET (read) request, or 2) the client specifies an  
76 unsupported MIME type in the Content-Type of a PUT (write) or POST (invoke) request.

## 77 **2.32.4 Security**

78 Numerous standards are designed to provide authentication and encryption services for HTTP. Existing  
79 standards SHOULD be used when applicable for OBIX HTTP implementations including:

- 80 • **RFC2617** - HTTP Authentication: Basic and Digest Access Authentication
- 81 • **RFC2818** - HTTP Over TLS (HTTPS)
- 82 • ~~**RFC5246**~~ – The TLS Protocol (Transport Layer Security). An OBIX HTTP implementation  
83 MAY support superseded versions of this standard, including **RFC2246** and **RFC4346**.

## 84 **2.42.5 Localization**

85 Servers SHOULD follow the localization approach outlined in the core OBIX Specification. If the desired  
86 locale of the client cannot be determined through authentication, it SHOULD be determined via the  
87 Accept-Language HTTP header. As a fallback, the locale MAY be derived from the Accept-Language  
88 header.

## 89 3 CoAP Binding

### 90 3.1 Description

91 The Constrained Application Protocol (CoAP) is a specialized Web transfer protocol for use within  
92 constrained nodes and constrained (e.g., low-power, lossy) networks [CoAP]. CoAP is designed for  
93 nodes operated by microcontrollers and networks such as 6LoWPAN, which often have a high packet  
94 error rate and low bandwidth (10s of kbits/s). It is intended to be used within building automation systems.

95 CoAP can be seen as optimized HTTP equivalent that uses UDP for packet exchange instead of TCP.  
96 Since UDP is a non-reliable packet oriented transport protocol CoAP provides custom facilities for reliable  
97 messaging and includes a CoAP specific acknowledgement mechanism to provide reliable point-to-point  
98 communication. Through the use of UDP it enables additional interaction patterns like asynchronous and  
99 group communication.

### 100 3-13.2 Requests

101 The following table summarizes how OBIX requests map to CoAP methods:

OBIX Request	CoAP Method	Target
Read	GET	Any Object with an href
Write	PUT	Any Object with an href and <code>writable=true</code>
Invoke	POST	Any op Object
Delete	DELETE	Any Object with an href and <code>writable=true</code>

102 *Table 3-1. Mapping of OBIX Requests to CoAP Methods.*

### 103 3.2 MIME Type

### 104 3.3 Content Negotiation

105 The CoAP client MAY specify the MIME type of the encoding according to the **OBIX Encodings**  
106 specification for the payload of a PUT or POST request using the CoAP header content format option to a  
107 value according to the CoAP content-format registry defined by **CoAP** which maps standard MIME types  
108 to a numeric value. Content negotiation

109 OBIX resources may be encoded using either the “text/xml” or the “application/x-obix-binary” MIME types  
110 defined by the corresponding encoding defined by the **OBIX Encodings** specification. Clients and  
111 servers SHOULD follow Section 12 of **RFC2616** for content negotiation.

112 If a client wishes to GET a resource using a specific encoding, then it SHOULD specify the desired MIME  
113 type content-format identifier in the Accept header CoAP header accept option according to the CoAP  
114 content-format registry which maps standard MIME types to a numeric value..

115 If the server does not support the MIME type of a client request, then it SHOULD respond with the 406  
116 Not Acceptable status code. There are two use cases for a 406 failure: 1) the client specifies an  
117 unsupported MIME type in the Accept header of a GET (read) request, or 2) the client specifies an  
118 unsupported MIME type in the Content-Type of a PUT (write) or POST (invoke) request.

### 119 3-33.4 Observing resources [non-normative]

120 An OBIX server that provides a CoAP binding ~~should~~SHOULD also support the CoAP **e**Observe option  
121 on CoAP GET requests. This provides an alternative to the concept of OBIX watches, since no polling for  
122 updates on a resource is required. If the client issues a CoAP GET request with the **e**Observe option set,

123 | an observation relationship ~~is~~SHOULD be established on the server. If an observed OBIX Object is  
124 | updated, a CoAP response message ~~is~~SHOULD be sent to the client according to the **CoAP-OBSERVE**  
125 | specification.

### 126 | **3.43.5 Security**

127 | For securing the CoAP binding the DTLS binding of CoAP as specified in ~~CoAP-should~~ SHOULD be  
128 | used.

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## 129 4 Conformance

### 130 4.1 Conditions for a Conforming Server Binding

131 An implementation ~~is compliant with~~ conforms to this specification as a Server if it ~~implements~~ provides  
132 one of the bindings described in this specification, and meets all of the requirements specified in the  
133 Section describing that binding. All MUST and REQUIRED elements MUST be implemented in order to  
134 comply with the binding specification. In particular, a Server MUST be able to perform content  
135 negotiation as described in Sections 1.1 and 1.1~~0~~ to arrive at a common agreement for the MIME type to  
136 be used in encoding OBIX requests and responses.

### 137 4.2 Conditions for a Conforming Client Binding

138 An implementation conforms to this specification as a Client if it makes requests using one of the bindings  
139 described in this specification, and meets all of the MUST and REQUIRED level requirements described  
140 for the client request generation and response processing. In particular, a Client MUST be able to  
141 perform content negotiation as described in Sections 1.1 and 1.1 to arrive at a common agreement for the  
142 MIME type to be used in encoding OBIX requests and responses.

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## Appendix A. Acknowledgments

144 The following individuals have participated in the creation of this specification and are gratefully  
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146 **Participants:**

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175

## Appendix B. Revision History

176

Revision	Date	Editor	Changes Made
wd01	26 Mar 13	Markus Jung	Initial creation with HTTP binding taken out of OBIX 1.1 WD07 working draft.
wd02	27 Mar 2013	Craig Gemmill	Add HTTP DELETE, references
wd03	10 Apr 2013	Craig Gemmill	Upper case SHOULD keywords
wd04	23 May 2013	Markus Jung	First draft on CoAP binding, Updated MIME and content negotiation of HTTP binding to reference the encodings document.
wd05	13 Jun 2013	Markus Jung	Updated CoAP reference
wd06	28 Jun 2013	Markus Jung	Updated reference section
wd07	04 Dec 2013	Craig Gemmill	Localization moved to core spec
wd08	16 Dec 2013	Markus Jung	Merge with changes of Craig
<a href="#">wd09</a>	<a href="#">16 Dec 2013</a>	<a href="#">Markus Jung</a>	<a href="#">PR doc</a>
<a href="#">wd10</a>	<a href="#">5 Nov 2014</a>	<a href="#">Craig Gemmill</a>	<a href="#">Address several PR issues</a>
<a href="#">wd11</a>	<a href="#">6 Nov 2014</a>	<a href="#">Craig Gemmill</a>	<a href="#">Address remaining PR issues</a>
<a href="#">wd12</a>	<a href="#">6 Nov 2014</a>	<a href="#">Craig Gemmill</a>	<a href="#">Fix references in Section 4</a>

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