

ISO/IEC 20802-1:2016-12 (E)

Information technology - Open data protocol (OData) v4.0 - Part 1: Core

Contents	Page
1 Introduction.....	10
1.1 Terminology.....	10
1.2 Normative References.....	10
1.3 Typographical Conventions.....	11
2 Overview.....	12
3 Data Model.....	13
3.1 Annotations.....	13
4 Service Model.....	15
4.1 Entity-Ids and Entity References.....	15
4.2 Read URLs and Edit URLs.....	15
4.3 Transient Entities.....	15
5 Versioning.....	16
5.1 Protocol Versioning.....	16
5.2 Model Versioning.....	16
6 Extensibility.....	17
6.1 Query Option Extensibility.....	17
6.2 Payload Extensibility.....	17
6.3 Action/Function Extensibility.....	17
6.4 Vocabulary Extensibility.....	17
6.5 Header Field Extensibility.....	18
6.6 Format Extensibility.....	18
7 Formats.....	19
8 Header Fields.....	20
8.1 Common Headers.....	20
8.1.1 Header Content-Type.....	20
8.1.2 Header Content-Encoding.....	20
8.1.3 Header Content-Language.....	20
8.1.4 Header Content-Length.....	20
8.1.5 Header OData-Version.....	20
8.2 Request Headers.....	21
8.2.1 Header Accept.....	21
8.2.2 Header Accept-Charset.....	21
8.2.3 Header Accept-Language.....	21
8.2.4 Header If-Match.....	21
8.2.5 Header If-None-Match.....	21
8.2.6 Header OData-Isolation.....	22
8.2.7 Header OData-MaxVersion.....	22
8.2.8 Header Prefer.....	22
8.2.8.1 Preference odata.allow-entityreferences.....	23
8.2.8.2 Preference odata.callback.....	23
8.2.8.3 Preference odata.continue-on-error.....	24
8.2.8.4 Preference odata.include-annotations.....	24

8.2.8.5 Preference odata.maxpagesize.....	25
8.2.8.6 Preference odata.track-changes.....	25
8.2.8.7 Preference return=representation and return=minimal	25
8.2.8.8 Preference respond-async	26
8.2.8.9 Preference wait.....	26
8.3 Response Headers	26
8.3.1 Header ETag	26
8.3.2 Header Location	27
8.3.3 Header OData-EntityId	27
8.3.4 Header Preference-Applied.....	27
8.3.5 Header Retry-After.....	27
9 Common Response Status Codes	28
9.1 Success Responses	28
9.1.1 Response Code 200 OK	28
9.1.2 Response Code 201 Created.....	28
9.1.3 Response Code 202 Accepted	28
9.1.4 Response Code 204 No Content	28
9.1.5 Response Code 3xx Redirection.....	28
9.1.6 Response Code 304 Not Modified.....	28
9.2 Client Error Responses.....	29
9.2.1 Response Code 404 Not Found	29
9.2.2 Response Code 405 Method Not Allowed.....	29
9.2.3 Response Code 410 Gone	29
9.2.4 Response Code 412 Precondition Failed.....	29
9.3 Server Error Responses	29
9.3.1 Response Code 501 Not Implemented.....	29
9.4 In-Stream Errors	29
10 Context URL	30
10.1 Service Document	30
10.2 Collection of Entities	30
10.3 Entity	31
10.4 Singleton	31
10.5 Collection of Derived Entities.....	31
10.6 Derived Entity	32
10.7 Collection of Projected Entities	32
10.8 Projected Entity.....	32
10.9 Collection of Projected Expanded Entities.....	33
10.10 Projected Expanded Entity	33
10.11 Collection of Entity References	33
10.12 Entity Reference	34
10.13 Property Value	34
10.14 Collection of Complex or Primitive Types	34
10.15 Complex or Primitive Type.....	34
10.16 Operation Result.....	34

10.17	Delta Response	35
10.18	Item in a Delta Response	35
10.19	\$all Response	35
10.20	\$crossjoin Response	35
11	Data Service Requests	36
11.1	Metadata Requests	36
11.1.1	Service Document Request	36
11.1.2	Metadata Document Request	36
11.1.3	Metadata Service Document Request	36
11.2	Requesting Data	36
11.2.1	Evaluating System Query Options	37
11.2.2	Requesting Individual Entities	37
11.2.3	Requesting Individual Properties	37
11.2.3.1	Requesting a Property's Raw Value using \$value	38
11.2.4	Specifying Properties to Return	38
11.2.4.1	System Query Option \$select	38
11.2.4.2	System Query Option \$expand	39
11.2.4.2.1	Expand Options	39
11.2.5	Querying Collections	40
11.2.5.1	System Query Option \$filter	40
11.2.5.1.1	Built-in Filter Operations	40
11.2.5.1.2	Built-in Query Functions	41
11.2.5.1.3	Parameter Aliases	43
11.2.5.2	System Query Option \$orderby	43
11.2.5.3	System Query Option \$top	44
11.2.5.4	System Query Option \$skip	44
11.2.5.5	System Query Option \$count	44
11.2.5.6	System Query Option \$search	45
11.2.5.7	Server-Driven Paging	45
11.2.6	Requesting Related Entities	46
11.2.7	Requesting Entity References	46
11.2.8	Resolving an Entity-Id	46
11.2.9	Requesting the Number of Items in a Collection	47
11.2.10	System Query Option \$format	47
11.3	Requesting Changes	48
11.3.1	Delta Links	48
11.3.2	Using Delta Links	48
11.4	Data Modification	49
11.4.1	Common Data Modification Semantics	49
11.4.1.1	Use of ETags for Avoiding Update Conflicts	49
11.4.1.2	Handling of DateTimeOffset Values	49
11.4.1.3	Handling of Properties Not Advertised in Metadata	49
11.4.1.4	Handling of Consistency Constraints	49
11.4.1.5	Returning Results from Data Modification Requests	50
11.4.2	Create an Entity	50
11.4.2.1	Link to Related Entities When Creating an Entity	50

11.4.2.2 Create Related Entities When Creating an Entity	51
11.4.3 Update an Entity	51
11.4.4 Upsert an Entity	52
11.4.5 Delete an Entity	52
11.4.6 Modifying Relationships between Entities	53
11.4.6.1 Add a Reference to a Collection-Valued Navigation Property	53
11.4.6.2 Remove a Reference to an Entity	53
11.4.6.3 Change the Reference in a Single-Valued Navigation Property	53
11.4.7 Managing Media Entities	53
11.4.7.1 Creating a Media Entity	53
11.4.7.2 Editing a Media Entity Stream	54
11.4.7.3 Deleting a Media Entity	54
11.4.8 Managing Stream Properties	54
11.4.8.1 Editing Stream Values	54
11.4.8.2 Deleting Stream Values	54
11.4.9 Managing Values and Properties Directly	54
11.4.9.1 Update a Primitive Property	54
11.4.9.2 Set a Value to Null	55
11.4.9.3 Update a Complex Property	55
11.4.9.4 Update a Collection Property	55
11.5 Operations	55
11.5.1 Binding an Operation to a Resource	55
11.5.2 Advertising Available Operations within a Payload	56
11.5.3 Functions	56
11.5.3.1 Invoking a Function	56
11.5.3.1.1 Inline Parameter Syntax	57
11.5.3.2 Function overload resolution	57
11.5.4 Actions	58
11.5.4.1 Invoking an Action	58
11.5.4.2 Action Overload Resolution	58
11.6 Asynchronous Requests	59
11.7 Batch Requests	59
11.7.1 Batch Request Headers	59
11.7.2 Batch Request Body	60
11.7.3 Change Sets	62
11.7.3.1 Referencing New Entities in a Change Set	62
11.7.4 Responding to a Batch Request	63
11.7.5 Asynchronous Batch Requests	65
12 Security Considerations	67
12.1 Authentication	67
13 Conformance	68
13.1 OData Service Conformance Levels	68
13.1.1 OData Minimal Conformance Level	68
13.1.2 OData Intermediate Conformance Level	69
13.1.3 OData Advanced Conformance Level	70
13.2 Interoperable OData Clients	70
Appendix A. Acknowledgments	72
Appendix B. Revision History	73