

Network Working Group
Internet Draft
Expires: July 2003

J. Slein
Xerox
J. Whitehead
U.C. Santa Cruz
J. Crawford
IBM
J. F. Reschke
greenbytes
January 2003

WebDAV Ordered Collections Protocol
draft-ietf-webdav-ordering-protocol-04

Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of [Section 10 of RFC2026](#). Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress".

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/1id-abstracts.txt>.

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>.

This Internet-Draft will expire in July 2003.

Copyright Notice

Copyright (C) The Internet Society (2003). All Rights Reserved.

Abstract

This specification extends the WebDAV Distributed Authoring Protocol to support server-side ordering of collection members. Of particular interest are orderings that are not based on property values, and so

cannot be achieved using a search protocol's ordering option and cannot be maintained automatically by the server. Protocol elements are defined to let clients specify the position in the ordering of each collection member, as well as the semantics governing the ordering.

Distribution of this document is unlimited. Please send comments to the Distributed Authoring and Versioning (WebDAV) working group at w3c-dist-auth@w3.org, which may be joined by sending a message with subject "subscribe" to w3c-dist-auth-request@w3.org.

Discussions of the WEBDAV working group are archived at URL:
<http://lists.w3.org/Archives/Public/w3c-dist-auth/>.

Table of Contents

Abstract	1
Table of Contents	3
1 Notational Conventions	4
2 Introduction	5
3 Terminology	6
4 Overview of Ordered Collections	7
4.1 Additional Collection properties	7
4.1.1 DAV:orderingtype (protected)	8
5 Creating an Ordered Collection	9
5.1 Overview	9
5.2 Example: Creating an Ordered Collection	10
6 Setting the Position of a Collection Member	11
6.1 Overview	11
6.2 Examples: Setting the Position of a Collection Member	12
7 Changing a Collection Ordering: ORDERPATCH method	14
7.1 Example: Changing a Collection Ordering	16
7.2 Example: Failure of an ORDERPATCH Request	18
8 Listing the Members of an Ordered Collection	20
8.1 Example: PROPFIND on an Ordered Collection	20
9 Relationship to versioned collections	24
9.1 Additional semantics for collection version properties	24
10 Capability Discovery	25
10.1 Example: Using OPTIONS for the Discovery of Support for Ordering	25
10.2 Example: Using Live Properties for the Discovery of Ordering	26
11 Security Considerations	28
11.1 Denial of Service and DAV:orderingtype	28
12 Internationalization Considerations	29
13 IANA Considerations	30
14 Copyright	31
15 Intellectual Property	32
16 Acknowledgements	33
Normative References	34
Author's Addresses	34
A Extensions to the WebDAV Document Type Definition	36
B Change Log	37
B.1 Since draft-ietf-webdav-ordering-protocol dated December 1999	37
B.2 Since draft-ietf-webdav-ordering-protocol-02	37
B.3 Since draft-ietf-webdav-ordering-protocol-03	37
Index	38

1 Notational Conventions

Since this document describes a set of extensions to the WebDAV Distributed Authoring Protocol [[RFC2518](#)], itself an extension to the HTTP/1.1 protocol, the augmented BNF used here to describe protocol elements is exactly the same as described in [Section 2.1](#) of HTTP [[RFC2616](#)]. Since this augmented BNF uses the basic production rules provided in [Section 2.2](#) of HTTP, these rules apply to this document as well.

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](#)].

2 Introduction

This specification builds on the collection infrastructure provided by the WebDAV Distributed Authoring Protocol, adding support for the server-side ordering of collection members.

There are many scenarios where it is useful to impose an ordering on a collection at the server, such as expressing a recommended access order, or a revision history order. The members of a collection might represent the pages of a book, which need to be presented in order if they are to make sense. Or an instructor might create a collection of course readings, which she wants to be displayed in the order they are to be read.

Orderings may be based on property values, but this is not always the case. The resources in the collection may not have properties that can be used to support the desired ordering. Orderings based on properties can be obtained using a search protocol's ordering option, but orderings not based on properties cannot. These orderings generally need to be maintained by a human user.

The ordering protocol defined here focuses on support for such human-maintained orderings. Its protocol elements allow clients to specify the position of each collection member in the collection's ordering, as well as the semantics governing the ordering. The protocol is designed to allow support to be added in the future for orderings that are maintained automatically by the server.

The remainder of this document is structured as follows: [section 3](#) defines terminology that will be used throughout the specification. [Section 4](#) provides an overview of ordered collections. [Section 5](#) describes how to create an ordered collection, and [section 6](#) discusses how to set a member's position in the ordering of a collection. [Section 7](#) explains how to change a collection ordering. [Section 8](#) discusses listing the members of an ordered collection. [section 9](#) discusses the impact on version-controlled collections (as defined in [RFC3253]). [Section 10](#) describes capability discovery. [Section 11](#) through [section 13](#) discuss security, internationalization, and IANA considerations. The remaining sections provide supporting information.

3 Terminology

The terminology used here follows that in [[RFC2518](#)] and [[RFC3253](#)]. Definitions of the terms resource, Uniform Resource Identifier (URI), and Uniform Resource Locator (URL) are provided in [[RFC2396](#)].

Ordered Collection

A collection for which the results from a PROPFIND request are guaranteed to be in the order specified for that collection

Unordered Collection

A collection for which the client cannot depend on the repeatability of the ordering of results from a PROPFIND request

Client-Maintained Ordering

An ordering of collection members that is maintained on the server based on client requests specifying the position of each collection member in the ordering

Server-Maintained Ordering

An ordering of collection members that is maintained automatically by the server, based on a client's choice of ordering semantics

This document uses the terms "precondition" as "postcondition" as defined in [[RFC3253](#)]. Servers should report pre-/postcondition failures as described in [section 1.6](#) of this document.

4 Overview of Ordered Collections

If a collection is unordered, the client cannot depend on the repeatability of the ordering of results from a PROPFIND request. By specifying an ordering for a collection, a client requires the server to follow that ordering whenever it responds to a PROPFIND request on that collection.

Server-side orderings may be client-maintained or server-maintained. For client-maintained orderings, a client must specify the ordering position of each of the collection's members, either when the member is added to the collection (using the Position header) or later (using the ORDERPATCH method). For server-maintained orderings, the server automatically positions each of the collection's members according to the ordering semantics. This specification supports only client-maintained orderings, but is designed to allow future extension to server-maintained orderings.

A collection that supports ordering is not required to be ordered.

If a collection is ordered, each of its internal member URIs MUST be in the ordering exactly once, and the ordering MUST NOT include any URI that is not an internal member of the collection. The server is responsible for enforcing these constraints on orderings. The server MUST remove an internal member URI from the ordering when it is removed from the collection. The server MUST add an internal member URI to the ordering when it is added to the collection.

Only one ordering can be attached to any collection. Multiple orderings of the same resources can be achieved by creating multiple collections referencing those resources, and attaching a different ordering to each collection.

An ordering is considered to be part of the state of a collection resource. Consequently, the ordering is the same no matter which URI is used to access the collection and is protected by locks or access control constraints on the collection.

4.1 Additional Collection properties

A DAV:allprop PROPFIND request SHOULD NOT return any of the properties defined in this document.

4.1.1 DAV:orderingtype (protected)

Indicates whether the collection is ordered and, if so, uniquely identifies the semantics of the ordering being used. May also point to an explanation of the semantics in human and / or machine-readable form. At a minimum, this allows human users who add members to the collection to understand where to position them in the ordering. This property cannot be set using PROPPATCH. Its value can only be set by including the Ordered header with a MKCOL request or by submitting an ORDERPATCH request.

The value DAV:unordered indicates that the collection is not ordered. That is, the client cannot depend on the repeatability of the ordering of results from a PROPFIND request.

The value DAV:custom indicates that the collection is ordered, but the semantics governing the ordering are not being advertised.

If the value is a DAV:href element, it contains a URI that uniquely identifies the semantics of the collection's ordering.

An ordering-aware client interacting with an ordering-unaware server (e.g., one that is implemented only according to [\[RFC2518\]](#)) SHOULD assume that if a collection does not have the DAV:orderingtype property, the collection is unordered.

```
<!ELEMENT orderingtype (unordered | custom | href) >
<!ELEMENT custom EMPTY >
<!ELEMENT unordered EMPTY >
```


5 Creating an Ordered Collection

5.1 Overview

When a collection is created, the client MAY request that it be ordered and specify the semantics of the ordering by using the new Ordered header (defined below) with a MKCOL request.

For collections that are ordered, the client SHOULD identify the semantics of the ordering with a URI in the Ordered header, although the client MAY simply set the header value to DAV:custom to indicate that the collection is ordered but the semantics of the ordering are not being advertised. Setting the value to a URI that identifies the ordering semantics provides the information a human user or software package needs to insert new collection members into the ordering intelligently. Although the URI in the Ordered header MAY point to a resource that contains a definition of the semantics of the ordering, clients SHOULD NOT access that resource, in order to avoid overburdening its server. A value of DAV:unordered in the Ordering header indicates that the client wants the collection to be unordered. If the Ordered header is not present, the collection will be unordered.

Additional Marshalling:

```
Ordered = "Ordered" ":" ("DAV:unordered" | "DAV:custom" | Coded-url)
```

A value of "DAV:unordered" indicates that the collection is not ordered. A value of "DAV:custom" indicates that the collection is to be ordered, but the semantics of the ordering is not being advertised. Any other Coded-url value indicates that the collection is ordered, and identifies the semantics of the ordering.

Additional Preconditions:

(DAV:ordered-collections-supported): the server must support ordered collections where the new collection is to be created.

Additional Postconditions:

(DAV:orderingtype-set): the collection was created with the specified ordering semantics.

5.2 Example: Creating an Ordered Collection

>> Request:

MKCOL /theNorth/ HTTP/1.1

Host: example.org

Ordered: <http://example.org/orderings/compass.html>

>> Response:

HTTP/1.1 201 Created

In this example a new, ordered collection was created. Its DAV:orderingtype property has as its value the URI from the Ordered header, <http://example.org/orderings/compass.html>. In this case, the URI identifies the semantics governing a client-maintained ordering. As new members are added to the collection, clients or end users can use the semantics to determine where to position the new members in the ordering.

6 Setting the Position of a Collection Member

6.1 Overview

When a new member is added to a collection with a client-maintained ordering (for example, with PUT, COPY, or MKCOL), its position in the ordering can be set with the new Position header. The Position header allows the client to specify that an internal member URI should be first in the collection's ordering, last in the collection's ordering, immediately before some other internal member URI in the collection's ordering, or immediately after some other internal member URI in the collection's ordering.

If the Position request header is not used when adding a member to an ordered collection, then:

- o If the request is replacing an existing resource, the server MUST preserve the present ordering.
- o If the request is adding a new internal member URI to the collection, the server MUST append the new member to the end of the ordering.

Additional Marshalling:

```
Position = "Position" ":" ("first" | "last" |  
                           (("before" | "after") segment))
```

segment is defined in [Section 3.3 of \[RFC2396\]](#).

The segment is interpreted relative to the collection to which the new member is being added.

The server MUST insert the new member into the ordering at the location specified in the Position header, if one is present (and if the collection is ordered).

The "first" keyword indicates the new member is put in the beginning position in the collection's ordering, while "last" indicates the new member is put in the final position in the collection's ordering. The "before" keyword indicates the new member is added to the collection's ordering immediately prior to

the position of the member identified in the segment. Likewise, the "after" keyword indicates the new member is added to the collection's ordering immediately following the position of the member identified in the segment.

If the request is replacing an existing resource, and the Position header is present, the server **MUST** remove the internal member URI from its previous position, and then insert it at the requested position.

Additional Preconditions:

(DAV:collection-must-be-ordered): the target collection must be ordered.

(DAV:segment-must-identify-member): the referenced segment must identify a resource that exists and is different from the affected resource.

Additional Postconditions:

(DAV:position-set): the newly created collection member was created at the specified position.

6.2 Examples: Setting the Position of a Collection Member

>> Request:

```
COPY /~user/dav/spec08.html HTTP/1.1
Host: example.org
Destination: http://example.org/~slein/dav/spec08.html
Position: after requirements.html
```

>> Response:

```
HTTP/1.1 201 Created
```


This request resulted in the creation of a new resource at example.org/~slein/dav/spec08.html. The Position header in this example caused the server to set its position in the ordering of the /~slein/dav/ collection immediately after requirements.html.

>> Request:

```
MOVE /i-d/draft-webdav-prot-08.txt HTTP/1.1
Host: example.org
Destination: http://example.org/~user/dav/draft-webdav-prot-08.txt
Position: first
```

>> Response:

```
HTTP/1.1 409 Conflict
Content-Type: text/xml; charset="utf-8"
Content-Length: xxxx

<?xml version="1.0" encoding="utf-8" ?>
<D:error xmlns:D="DAV:">
  <D:collection-must-be-ordered/>
</D:error>
```

In this case, the server returned a 409 (Conflict) status code because the /~user/dav/ collection is an unordered collection. Consequently, the server was unable to satisfy the Position header.

7 Changing a Collection Ordering: ORDERPATCH method

The ORDERPATCH method is used to change the ordering semantics of a collection or to change the order of the collection's members in the ordering or both.

The server **MUST** apply the changes in the order they appear in the order XML element. The server **MUST** either apply all the changes or apply none of them. If any error occurs during processing, all executed changes **MUST** be undone and a proper error result returned.

If an ORDERPATCH request changes the ordering semantics, but does not completely specify the order of the collection members, the server **MUST** assign a position in the ordering to each collection member for which a position was not specified. These server-assigned positions **MUST** all follow the last one specified by the client. The result is that all members for which the client specified a position are at the beginning of the ordering, followed by any members for which the server assigned positions.

If an ORDERPATCH request does not change the ordering semantics, any member positions not specified in the request **MUST** remain unchanged.

A request to reposition a collection member at the same place in the ordering is not an error.

Additional Marshalling:

The request body **MUST** be DAV:order element.

```
<!ELEMENT order (orderingtype?, ordermember*) >

<!ELEMENT ordermember (href, position) >
<!ELEMENT position (first | last | before | after)>
<!ELEMENT first EMPTY >
<!ELEMENT last EMPTY >
<!ELEMENT before segment >
<!ELEMENT after segment >
<!ELEMENT segment (#PCDATA)>
```

PCDATA value: segment, as defined in [section 3.3 of \[RFC2396\]](#).

DAV:href value: segment part of collection member.

The DAV:orderingtype property is modified according to the DAV:orderingtype element.

The ordering of internal member URIs in the collection identified by the Request-URI is changed based on instructions in the ordermember XML elements. The ordermember XML elements identify the internal member URIs whose positions are to be changed, and describe their new positions in the ordering. Each new position can be specified as first in the ordering, last in the ordering, immediately before some other internal member URI, or immediately after some other internal member URI.

If a response body for a successful request is included, it MUST be a DAV:orderpatch-response XML element. Note that this document does not define any elements for the ORDERPATCH response body, but the DAV:orderpatch-response element is defined to ensure interoperability between future extensions that do define elements for the ORDERPATCH response body.

<!ELEMENT orderpatch-response ANY>

Since multiple changes can be requested in a single ORDERPATCH request, if any problems are encountered, the server MUST return a 207 (Multi-Status) response (defined in [[RFC2518](#)]), containing DAV:response elements for either the request-URI (when the DAV:orderingtype could not be modified) or URIs of collection members to be repositioned (when an individual positioning request expressed as DAV:ordermember could not be fulfilled).

Preconditions:

(DAV:collection-must-be-ordered): see [section 6.1](#).

(DAV:segment-must-identify-member): see [section 6.1](#).

Postconditions:

(DAV:orderingtype-set): if the request body contained a DAV:orderingtype element, the DAV:orderingtype property (see

[section 4.1.1](#)) of the collection identified by the request-URI was set accordingly.

(DAV:ordering-modified): if the request body contained DAV:ordermember elements, the ordering of internal member URIs in the collection identified by the request-URI has been changed based on instructions in the DAV:ordermember elements.

7.1 Example: Changing a Collection Ordering

Consider a collection /coll-1/ whose DAV:orderingtype is DAV:whim, with bindings ordered as follows:

```
three.html
four.html
one.html
two.html
```

>> Request:

```
ORDERPATCH /coll-1/ HTTP/1.1
Host: example.org
Content-Type: text/xml; charset="utf-8"
Content-Length: xxx
```

```
<?xml version="1.0" ?>
<d:order xmlns:d="DAV:">
  <d:orderingtype>
    <d:href>http://example.org/inorder.ord</d:href>
  </d:orderingtype>
  <d:ordermember>
    <d:href>two.html</d:href>
    <d:position>
      <d:first/>
    </d:position>
  </d:ordermember>
  <d:ordermember>
    <d:href>one.html</d:href>
    <d:position>
      <d:first/>
```



```
    </d:position>
  </d:ordermember>
  <d:ordermember>
    <d:href>three.html</d:href>
    <d:position>
      <d:last/>
    </d:position>
  </d:ordermember>
  <d:ordermember>
    <d:href>four.html</d:href>
    <d:position>
      <d:last/>
    </d:position>
  </d:ordermember>
</d:order>
```

>> Response:

HTTP/1.1 200 OK

In this example, after the request has been processed, the collection's ordering semantics are identified by the URI `http://example.org/inorder.ord`. The value of the collection's `DAV:orderingtype` property has been set to this URI. The request also contains instructions for changing the positions of the collection's internal member URIs in the ordering to comply with the new ordering semantics. If href elements are relative URIs, as in this example, they are interpreted relative to the collection whose ordering is being modified. The `DAV:ordermember` elements are required to be processed in the order they appear in the request. Consequently, `two.html` is moved to the beginning of the ordering, and then `one.html` is moved to the beginning of the ordering. Then `three.html` is moved to the end of the ordering, and finally `four.html` is moved to the end of the ordering. After the request has been processed, the collection's ordering is as follows:

```
one.html
two.html
three.html
four.html
```


7.2 Example: Failure of an ORDERPATCH Request

Consider a collection /coll-1/ with members ordered as follows:

```
nunavut.map
nunavut.img
baffin.map
baffin.desc
baffin.img
iqaluit.map
nunavut.desc
iqaluit.img
iqaluit.desc
```

>> Request:

```
ORDERPATCH /coll-1/ HTTP/1.1
```

```
Host: www.nunanet.com
```

```
Content-Type: text/xml; charset="utf-8"
```

```
Content-Length: xxx
```

```
<?xml version="1.0" ?>
```

```
<d:order xmlns:d="DAV:">
```

```
  <d:ordermember>
```

```
    <d:href>nunavut.desc</d:href>
```

```
    <d:position>
```

```
      <d:after>
```

```
        <d:segment>nunavut.map</d:segment>
```

```
      </d:after>
```

```
    </d:position>
```

```
  </d:ordermember>
```

```
  <d:ordermember>
```

```
    <d:href>iqaluit.map</d:href>
```

```
    <d:position>
```

```
      <d:after>
```

```
        <d:segment>pangnirtung.img</d:segment>
```

```
      </d:after>
```

```
    </d:position>
```

```
  </d:ordermember>
```

```
</d:order>
```


>> Response:

HTTP/1.1 207 Multi-Status

Content-Type: text/xml; charset="utf-8"

Content-Length: xxx

```
<?xml version="1.0" ?>
```

```
<d:multistatus xmlns:d="DAV:">
```

```
  <d:response>
```

```
    <d:href>http://www.nunanet.com/coll-1/iqaluit.map</d:href>
```

```
    <d:status>HTTP/1.1 403 Forbidden</d:status>
```

```
    <d:responsedescription>
```

```
      <d:error><d:segment-must-identify-member/></d:error>
```

```
      pangnirtung.img is not a collection member.
```

```
    </d:responsedescription>
```

```
  </d:response>
```

```
</d:multistatus>
```

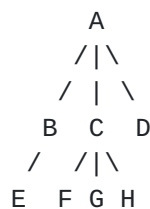
In this example, the client attempted to position iqaluit.map after a URI that is not an internal member of the collection /coll-1/. The server responded to this client error with a 403 (Forbidden) status code, indicating the failed precondition DAV:segment-must-identify-member. Because ORDERPATCH is an atomic method, the request to reposition nunavut.desc (which would otherwise have succeeded) failed as well, but doesn't need to be expressed in the multistatus response body.

8 Listing the Members of an Ordered Collection

A PROPFIND request is used to retrieve a listing of the members of an ordered collection, just as it is used to retrieve a listing of the members of an unordered collection.

However, when responding to a PROPFIND on an ordered collection, the server **MUST** order the response elements according to the ordering defined on the collection. If a collection is unordered, the client cannot depend on the repeatability of the ordering of results from a PROPFIND request.

In a response to a PROPFIND with Depth: infinity, members of different collections may be interleaved. That is, the server is not required to do a breadth-first traversal. The only requirement is that the members of any ordered collection appear in the order defined for the collection. Thus for the hierarchy illustrated in the following figure, where collection A is an ordered collection with the ordering B C D,



it would be acceptable for the server to return response elements in the order A B E C F G H D. In this response, B, C, and D appear in the correct order, separated by members of other collections. Clients can use a series of Depth: 1 PROPFIND requests to avoid the complexity of processing Depth: infinity responses based on depth-first traversals.

8.1 Example: PROPFIND on an Ordered Collection

Suppose a PROPFIND request is submitted to /MyColl/, which has its members ordered as follows.


```
/MyColl/  
  lakehazen.html  
  siorapaluk.html  
  iqaluit.html  
  newyork.html
```

>> Request:

```
PROPFIND /MyColl/ HTTP/1.1  
Host: example.org  
Depth: 1  
Content-Type: text/xml; charset="utf-8"  
Content-Length: xxxx
```

```
<?xml version="1.0" ?>  
<D:propfind xmlns:D="DAV:">  
  <D:prop xmlns:J="http://example.org/jsprops/">  
    <D:orderingtype/>  
    <D:resourcetype/>  
    <J:latitude/>  
  </D:prop>  
</D:propfind>
```

>> Response:

```
HTTP/1.1 207 Multi-Status  
Content-Type: text/xml; charset="utf-8"  
Content-Length: xxxx
```

```
<?xml version="1.0" ?>  
<D:multistatus xmlns:D="DAV:"  
  xmlns:J="http://example.org/jsprops/">  
  <D:response>  
    <D:href>http://example.org/MyColl/</D:href>  
    <D:propstat>  
      <D:prop>  
        <D:orderingtype><D:custom/></D:orderingtype>  
        <D:resourcetype><D:collection/></D:resourcetype>  
      </D:prop>  
      <D:status>HTTP/1.1 200 OK</D:status>  
    </D:propstat>  
    <D:propstat>
```



```
<D:prop>
  <J:latitude/>
</D:prop>
<D:status>HTTP/1.1 404 Not Found</D:status>
</D:propstat>
</D:response>
<D:response>
  <D:href>http://example.org/MyColl/lakehazen.html</D:href>
  <D:propstat>
    <D:prop>
      <D:resourcetype/>
      <J:latitude>82N</J:latitude>
    </D:prop>
    <D:status>HTTP/1.1 200 OK</D:status>
  </D:propstat>
  <D:propstat>
    <D:prop>
      <D:orderingtype/>
    </D:prop>
    <D:status>HTTP/1.1 404 Not Found</D:status>
  </D:propstat>
</D:response>
<D:response>
  <D:href>
>http://example.org/MyColl/siorapaluk.html</D:href>
  <D:propstat>
    <D:prop>
      <D:resourcetype/>
      <J:latitude>78N</J:latitude>
    </D:prop>
    <D:status>HTTP/1.1 200 OK</D:status>
  </D:propstat>
  <D:propstat>
    <D:prop>
      <D:orderingtype/>
    </D:prop>
    <D:status>HTTP/1.1 404 Not Found</D:status>
  </D:propstat>
</D:response>
<D:response>
  <D:href>http://example.org/MyColl/iquiluit.html</D:href>
  <D:propstat>
    <D:prop>
      <D:resourcetype/>
      <J:latitude>62N</J:latitude>
    </D:prop>
    <D:status>HTTP/1.1 200 OK</D:status>
  </D:propstat>
```



```
<D:propstat>
  <D:prop>
    <D:orderingtype/>
  </D:prop>
  <D:status>HTTP/1.1 404 Not Found</D:status>
</D:propstat>
</D:response>
<D:response>
  <D:href>http://example.org/MyColl/newyork.html</D:href>
  <D:propstat>
    <D:prop>
      <D:resourcetype/>
      <J:latitude>45N</J:latitude>
    </D:prop>
    <D:status>HTTP/1.1 200 OK</D:status>
  <D:propstat>
    <D:prop>
      <D:orderingtype/>
    </D:prop>
    <D:status>HTTP/1.1 404 Not Found</D:status>
  </D:propstat>
</D:propstat>
</D:response>
</D:multistatus>
```

In this example, the server responded with a list of the collection members in the order defined for the collection.

9 Relationship to versioned collections

The Versioning Extensions to WebDAV [[RFC3253](#)] introduce the concept of versioned collections, recording both the dead properties and the set of internal version-controlled bindings. This section defines how this feature interacts with ordered collections.

This specification considers both the ordering type (DAV:orderingtype property) and the ordering of collection members to be part of the state of a collection. Therefore both MUST be recorded upon CHECKIN or VERSION-CONTROL, and both MUST be restored upon CHECKOUT, UNCHECKOUT or UPDATE (where for compatibility with [RFC3253](#), only the ordering of version-controlled members needs to be maintained).

9.1 Additional semantics for collection version properties

Although this specification defines the property DAV:orderingtype to be protected, it MUST be recorded in a collection version.

The property DAV:version-controlled-binding-set ([[RFC3253](#)], [section 14.2.1](#)) records the set of version-controlled bindings in the collection. For ordered collections, the DAV:version-controlled-binding elements MUST appear in the ordering defined for the checked-in ordered collection.

10 Capability Discovery

Sections [9.1](#) and [15](#) of [\[RFC2518\]](#) describe the use of compliance classes with the DAV header in responses to OPTIONS, to indicate which parts of the Web Distributed Authoring protocols the resource supports. This specification defines an OPTIONAL extension to [\[RFC2518\]](#). It defines a new compliance class, called orderedcoll, for use with the DAV header in responses to OPTIONS requests. If a collection resource does support ordering, its response to an OPTIONS request may indicate that it does, by listing the new ORDERPATCH method as one it supports, and by listing the new orderedcoll compliance class in the DAV header.

When responding to an OPTIONS request, only a collection or a null resource can include orderedcoll in the value of the DAV header. By including orderedcoll, the resource indicates that its internal member URIs can be ordered. It implies nothing about whether any collections identified by its internal member URIs can be ordered.

Furthermore, [RFC 3253](#) [\[RFC3253\]](#) introduces the live properties DAV:supported-method-set ([section 3.1.3](#)) and DAV:supported-live-property-set ([section 3.1.4](#)). Servers MUST support these properties as defined in [RFC 3253](#).

10.1 Example: Using OPTIONS for the Discovery of Support for Ordering

>> Request:

```
OPTIONS /somecollection/ HTTP/1.1
Host: example.org
```

>> Response:

```
HTTP/1.1 200 OK
Allow: OPTIONS, GET, HEAD, POST, PUT, DELETE, TRACE, COPY, MOVE
Allow: MKCOL, PROPFIND, PROPPATCH, LOCK, UNLOCK, ORDERPATCH
DAV: 1, 2, orderedcoll
```

The DAV header in the response indicates that the resource /somecollection/ is level 1 and level 2 compliant, as defined in [\[RFC2518\]](#). In addition, /somecollection/ supports ordering. The Allow

header indicates that ORDERPATCH requests can be submitted to /somecollection/.

10.2 Example: Using Live Properties for the Discovery of Ordering

>> Request:

```
PROPFIND /somecollection HTTP/1.1
Depth: 0
Content-Type: text/xml; charset="utf-8"
Content-Length: xxx
```

```
<?xml version="1.0" encoding="UTF-8" ?>
<propfind xmlns="DAV:">
  <prop>
    <supported-live-property-set/>
    <supported-method-set/>
  </prop>
</propfind>
```

>> Response:

```
HTTP/1.1 207 Multi-Status
Content-Type: text/xml; charset="utf-8"
Content-Length: xxx
```

```
<?xml version="1.0" encoding="utf-8" ?>
<multistatus xmlns="DAV:">
  <response>
    <href>http://example.org/somecollection</href>
    <propstat>
      <prop>
        <supported-live-property-set>
          <supported-live-property>
            <prop><orderingtype/></prop>
          </supported-live-property>
          ... other live properties omitted for brevity ...
        </supported-live-property-set>
        <supported-method-set>
          <supported-method name="COPY" />
          <supported-method name="DELETE" />
          <supported-method name="GET" />
          <supported-method name="HEAD" />
        </supported-method-set>
      </prop>
    </propstat>
  </response>
</multistatus>
```



```
<supported-method name="LOCK" />
<supported-method name="MKCOL" />
<supported-method name="MOVE" />
<supported-method name="OPTIONS" />
<supported-method name="ORDERPATCH" />
<supported-method name="POST" />
<supported-method name="PROPFIND" />
<supported-method name="PROPPATCH" />
<supported-method name="PUT" />
<supported-method name="TRACE" />
<supported-method name="UNLOCK" />
</supported-method-set>
</prop>
<status>HTTP/1.1 200 OK</status>
</propstat>
</response>
</multistatus>
```

Note that actual responses MUST contain a complete list of supported live properties.

11 Security Considerations

This section is provided to make WebDAV applications aware of the security implications of this protocol.

All of the security considerations of HTTP/1.1 and the WebDAV Distributed Authoring Protocol specification also apply to this protocol specification. In addition, ordered collections introduce a new security concern. This issue is detailed here.

11.1 Denial of Service and DAV:orderingtype

There may be some risk of denial of service at sites that are advertised in the DAV:orderingtype property of collections. However, it is anticipated that widely-deployed applications will use hard-coded values for frequently-used ordering semantics rather than looking up the semantics at the location specified by DAV:orderingtype. This risk will be further reduced if clients observe the recommendation of [section 5.1](#) that they not send requests to the URI in DAV:orderingtype.

12 Internationalization Considerations

This specification follows the practices of [\[RFC2518\]](#) in encoding all human-readable content using [\[XML\]](#) and in the treatment of names. Consequently, this specification complies with the IETF Character Set Policy [\[RFC2277\]](#).

WebDAV applications MUST support the character set tagging, character set encoding, and the language tagging functionality of the XML specification. This constraint ensures that the human-readable content of this specification complies with [\[RFC2277\]](#).

As in [\[RFC2518\]](#), names in this specification fall into three categories: names of protocol elements such as methods and headers, names of XML elements, and names of properties. Naming of protocol elements follows the precedent of HTTP, using English names encoded in USASCII for methods and headers. The names of XML elements used in this specification are English names encoded in UTF-8.

For error reporting, [\[RFC2518\]](#) follows the convention of HTTP/1.1 status codes, including with each status code a short, English description of the code (e.g., 423 Locked). Internationalized applications will ignore this message, and display an appropriate message in the user's language and character set.

This specification introduces no new strings that are displayed to users as part of normal, error-free operation of the protocol.

For rationales for these decisions and advice for application implementors, see [\[RFC2518\]](#).

13 IANA Considerations

This document uses the namespaces defined by [[RFC2518](#)] for properties and XML elements. All other IANA considerations mentioned in [[RFC2518](#)] also apply to this document.

14 Copyright

To be supplied by the RFC Editor.

15 Intellectual Property

To be supplied by the RFC Editor.

16 Acknowledgements

This draft has benefited from thoughtful discussion by Jim Amsden, Steve Carter, Tyson Chihaya, Geoff Clemm, Ken Coar, Ellis Cohen, Bruce Cragun, Jim Davis, Spencer Dawkins, Mark Day, Rajiv Dulepet, David Durand, Chuck Fay, Roy Fielding, Yaron Goland, Fred Hitt, Alex Hopmann, Marcus Jager, Chris Kaler, Manoj Kasichainula, Rohit Khare, Daniel LaLiberte, Lisa Lippert, Steve Martin, Larry Masinter, Jeff McAffer, Surendra Koduru Reddy, Max Rible, Sam Ruby, Bradley Sergeant, Nick Shelness, John Stracke, John Tigue, John Turner, Kevin Wigger, and others.

Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2277] Alvestrand, H.T., "IETF Policy on Character Sets and Languages", [BCP 18](#), [RFC 2277](#), January 1998.
- [RFC2396] Berners-Lee, T., Fielding, R.T. and Masinter, L., "Uniform Resource Identifiers (URI): Generic Syntax", [RFC 2396](#), August 1998.
- [RFC2518] Goland, Y., Whitehead, E., Faizi, A., Carter, S.R. and Jensen, D., "HTTP Extensions for Distributed Authoring -- WEBDAV", [RFC 2518](#), February 1999.
- [RFC2616] Fielding, R., Gettys, J., Mogul, J., Frystyk, H., Masinter, L., Leach, P. and Berners-Lee, T., "Hypertext Transfer Protocol -- HTTP/1.1", [RFC 2616](#), June 1999.
- [RFC3253] Clemm, G., Amsden, J., Ellison, T., Kaler, C. and Whitehead, J., "Versioning Extensions to WebDAV", [RFC 3253](#), March 2002.
- [XML] World Wide Web Consortium, "Extensible Markup Language (XML) 1.0", W3C XML, February 1998.

Author's Addresses

Judith Slein
Xerox Corporation
800 Phillips Road, 105-50C
Webster, NY 14580

EMail: jslein@crt.xerox.com

Jim Whitehead
UC Santa Cruz, Dept. of Computer Science
1156 High Street
Santa Cruz, CA 95064
US

EMail: ejw@cse.ucsc.edu

Jason Crawford
IBM Research
P.O. Box 704
Yorktown Heights, NY 10598

EMail: ccjason@us.ibm.com

Julian F. Reschke
greenbytes GmbH
Salzmannstrasse 152
Muenster, NW 48159
Germany

Phone: +49 251 2807760

Fax: +49 251 2807761

EMail: julian.reschke@greenbytes.de

URI: <http://greenbytes.de/tech/webdav/>

A Extensions to the WebDAV Document Type Definition

```
<!--===== XML Elements from Section 11 =====-->
<!ELEMENT unordered EMPTY >
<!ELEMENT custom EMPTY >
<!ELEMENT order (orderingtype?, ordermember*) >
<!ELEMENT ordermember (href, position) >
<!ELEMENT position (first | last | before | after)>
<!ELEMENT first EMPTY >
<!ELEMENT last EMPTY >
<!ELEMENT before segment >
<!ELEMENT after segment >
<!ELEMENT segment (#PCDATA)>
<!--===== Property Elements from Section 10 =====-->
<!ELEMENT orderingtype (unordered | custom | href) >
```


B Change Log

B.1 Since [draft-ietf-webdav-ordering-protocol](#) dated December 1999

Updated contact information for all previous authors.
Specify charset when using text/xml media type.
Made sure artwork fits into 72 columns.
Removed "Public" header from OPTIONS example.
Added Julian Reschke to list of authors.
Fixed broken XML in PROPFIND example and added DAV:orderingtype to list of requested properties.
Added support for DAV:supported-live-property-set and DAV:supported-method-set as mandatory features.

B.2 Since [draft-ietf-webdav-ordering-protocol-02](#)

Updated change log to refer to expired draft version as "December 1999" version.
Started rewrite marshalling in [RFC3253](#)-style and added precondition and postcondition definitions.
On his request, removed Geoff Clemm's name from the author list (moved to Acknowledgments).
Renamed "References" to "Normative References".
Removed reference to "MKREF" method.

B.3 Since [draft-ietf-webdav-ordering-protocol-03](#)

Added a set of issues regarding marshalling.
Changed host names to use proper "example" domain names (no change tracking). Fixed host/destination header conflicts. Fixed "allow" header (multiline). Removed irrelevant response headers. Abbreviated some URIs (no change tracking).
Removed Jim Davis and Chuck Fay from the author list (and added them to the Acknowledgements section).
Updated section on setting the position when adding new members, removed old section on Position header.
Started work on Index section.
Changed structure for [section 7](#) (no change tracking).
Removed header and XML elements section (contents moved to other sections).
Started new section on relation to versioned collections as per [RFC3253](#).
Do not return 424's for in ODERPATCH multistatus (it's atomic anyway).

Index

C

Client-Maintained Ordering
3

D

DAV:collection-must-be-ordered
precondition
6.1

DAV:custom ordering type
4.1.1

DAV:ordered-collections-
supported precondition
5.1

DAV:ordering-modified
postcondition
7

DAV:orderingtype property
4.1.1

DAV:orderingtype-set
postcondition
5.1,7

DAV:position-set postcondition
6.1

DAV:segment-must-identify-
member precondition
6.1

DAV:unordered ordering type
4.1.1

H

Headers

Ordered 5.1

O

Ordered Collection
3
Ordered header
5.1
ORDERPATCH method
7

P

Postconditions

DAV:orderingtype-set 5.1,7
DAV:position-set 6.1
DAV:orderingtype-set 5.1,7
DAV:ordering-modified 7

Preconditions

DAV:ordered-collections-
supported 5.1
DAV:collection-must-be-
ordered 6.1
DAV:segment-must-identify-
member 6.1

Protected properties

DAV:orderingtype 4.1.1

S

Server-Maintained Ordering
3

U

Unordered Collection

3

Full Copyright Statement

Copyright (C) The Internet Society (2003). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Acknowledgement

Funding for the RFC editor function is currently provided by the Internet Society.

