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The Atom Publishing Protocol
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Abstract

The Atom Publishing Protocol (APP) is an application-level protocol for publishing and editing Web resources. The protocol is based on HTTP transport of Atom-formatted representations. The Atom format is documented in the Atom Syndication Format (RFC4287).

Editorial Note

To provide feedback on this Internet-Draft, join the atom-protocol mailing list (http://www.imc.org/atom-protocol/index.html) [1].

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1. Introduction

The Atom Publishing Protocol is an application-level protocol for publishing and editing Web resources using HTTP [RFC2616] and XML 1.0 [W3C.REC-xml-20040204]. The protocol supports the creation of arbitrary web resources and provides facilities for:

- Collections: Sets of resources, which can be retrieved in whole or in part.
- Service: Discovering and describing Collections.
- Editing: Creating, updating and deleting resources.

2. Notational Conventions

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].

Atom Protocol documents allow the use of IRIs [RFC3987], as well as URIs [RFC3986]. Before an IRI found in a document is used by HTTP, the IRI is first converted to a URI according the procedure defined in [RFC3987] (Section 3.1). The resource identified by the URI after conversion is the same as the one identified by the IRI.

2.1 XML-related Conventions

2.1.1 Referring to Information Items

Atom Protocol Document formats are specified in terms of the XML Information Set [W3C.REC-xml-infoset-20040204], serialized as XML 1.0 [W3C.REC-xml-20040204].

The Infoset terms "Element Information Item" and "Attribute Information Item" are shortened to "element" and "attribute" respectively. Therefore, when this specification uses the term "element", it is referring to an Element Information Item, and when it uses the term "attribute", it is referring to an Attribute Information Item.

2.1.2 RELAX NG Schema

Some sections of this specification are illustrated with fragments of a non-normative RELAX NG Compact schema [RNC]. However, the text of this specification provides the definition of conformance. Complete schemas appear in Appendix B.

2.1.3 Use of xml:base and xml:lang

XML elements defined by this specification MAY have an xml:base attribute [W3C.REC-xmlbase-20010627]. When xml:base is used, it serves the function described in section 5.1.1 of URI Generic Syntax [RFC3986], by establishing the base URI (or IRI) for resolving relative references found within the scope of the xml:base attribute.

Any element defined by this specification MAY have an xml:lang attribute, whose content indicates the natural language for the element and its descendents. The language context is only significant for elements and attributes declared to be "Language-Sensitive" by this specification. Requirements regarding the content and interpretation of xml:lang are specified in Section 2.12 of XML

1.0 [W3C.REC-xml-20040204].

3. Terminology

For convenience, this protocol can be referred to as the "Atom Protocol" or "APP".

URI/IRI - A Uniform Resource Identifier and Internationalized Resource Identifier. These terms and the distinction between them are defined in [RFC3986] and [RFC3987]. IRIs are mapped to URIs before dereferencing takes place.

The phrase "the URI of a document" in this specification is shorthand for "a URI which, when dereferenced, is expected to produce that document as a representation".

Resource - A network-accessible data object or service identified by an IRI, as defined in [RFC2616]. See [W3C.REC-webarch-20041215] for further discussion on resources.

Representation - An entity included with a request or response as defined in [RFC2616].

Collection - A resource that contains a set of Member IRIs. See Section 9.

Member - A resource whose IRI is listed in a Collection by a link element with a relation of "edit" or "edit-media". See Section 9.1.

Workspace - A group of collections. See Section 8.

Service Document - A document that describes the location and capabilities of one or more Collections. See Section 8.

Category Document - A document that describes the categories allowed in a Collection. See Section 7.

4. Protocol Model

The Atom Publishing Protocol uses HTTP methods to edit and author Member Resources as follows:

- GET is used to retrieve a representation of a known resource.
- POST is used to create a new, dynamically-named, resource.
- PUT is used to update a known resource.
- DELETE is used to remove a known resource.

Along with operations on Member Resources the Atom Protocol defines Collection resources for managing and organizing Member Resources. Collections are represented by Atom Feed documents and contain the IRIs of, and metadata about, their Member Resources.

There are two kinds of Member Resources - Member Entry Resources and Media Resources. Member Entry Resources are represented as Atom Entries. Media Resources MAY have representations in any media type. A Media Link Entry is a Member Entry that contains metadata about a Media Resource. This diagram shows the classification of the resources:

```
  Member Resource
      -> Member Entry Resource
           -> Media Link Entry Resource
      -> Media Resource
```

Collections, represented by Atom feeds, contain entries. Those entries contain the Member Entry and Media Resources IRIs of the Collection. A Collection can contain any number of entries of either kind. In the diagram of a Collection below there are two entries. The first contains the IRI of a Member Entry Resource. The second contains the IRIs of both a Media Resource and a Media Link Entry Resource, which contains the metadata for that Media Resource:

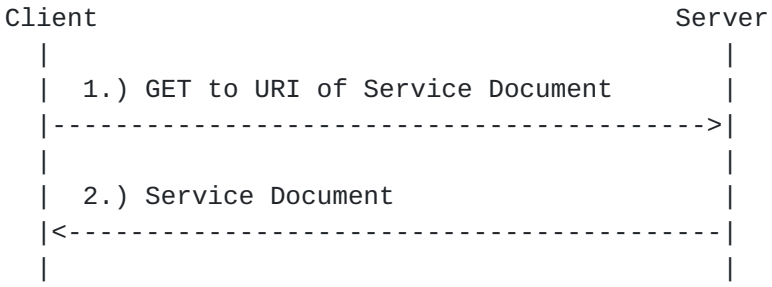
```
  Collection
     Entry
        Member Entry IRI    ->   Member Entry Resource

     Entry
        Member Entry IRI    ->   Media Link Entry Resource
        Media IRI           ->   Media Resource
```

Service Documents represent server-defined groups of Collections, and

are used to initialize the process of creating and editing resources.

5. Protocol Operations

5.1 Retrieving a Service Document

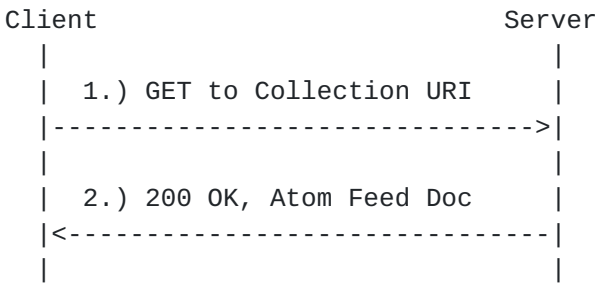


1. The client sends a GET request to the URI of the Service Document.

2. The server responds with the document enumerating the IRIs of a set of Collections and the capabilities of those Collections supported by the server. The content of this document can vary based on aspects of the client request, including, but not limited to, authentication credentials.

5.2 Listing Collection Members

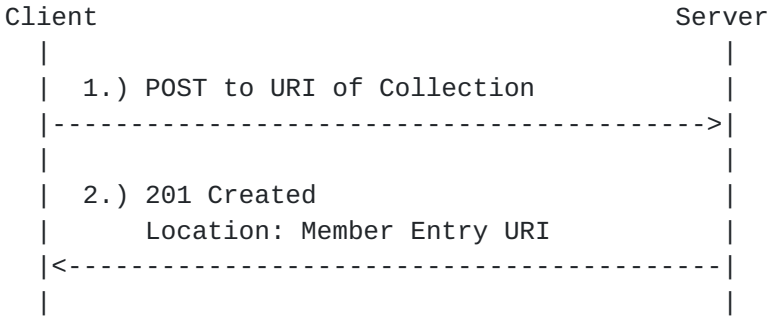
To list the members of a Collection the client sends a GET request to the URI of a Collection. An Atom Feed Document is returned containing one Atom Entry for each Member Entry Resource. See Section 10 and Section 11 for a description of the feed contents.



1. The client sends a GET request to the URI of the Collection.

2. The server responds with an Atom Feed Document containing the IRIs of the Collection members.

5.3 Creating a Resource



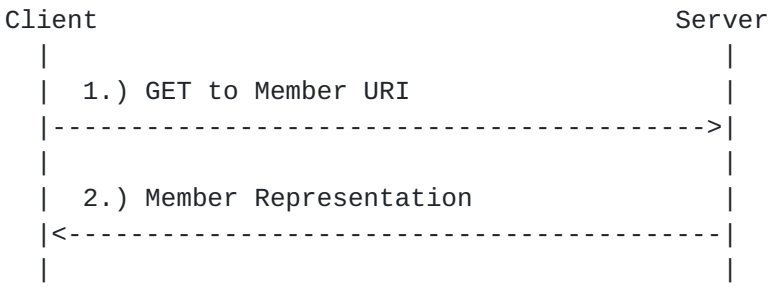
1. The client POSTs a representation of the Member to the URI of the Collection.

2. If the Member Resource was created successfully, the server responds with a status code of 201 and a Location: header that contains the IRI of the newly created Member Entry Resource. Media Resources may have also been created and their IRIs can be found through the Member Entry Resource. See Section 9.5 for more details.

5.4 Editing a Resource

Once a resource has been created and its Member URI is known, that URI can be used to retrieve, update, and delete the resource.

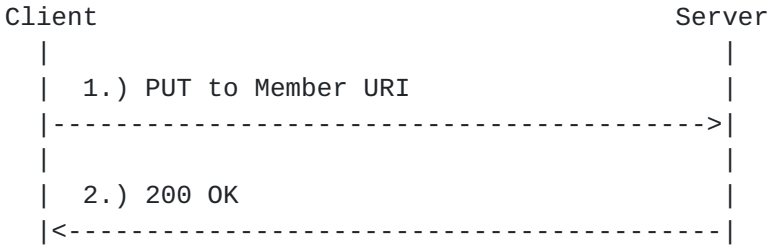
5.4.1 Retrieving a Resource



1. The client sends a GET request to the URI of a Member Resource to retrieve its representation.

2. The server responds with the representation of the resource.

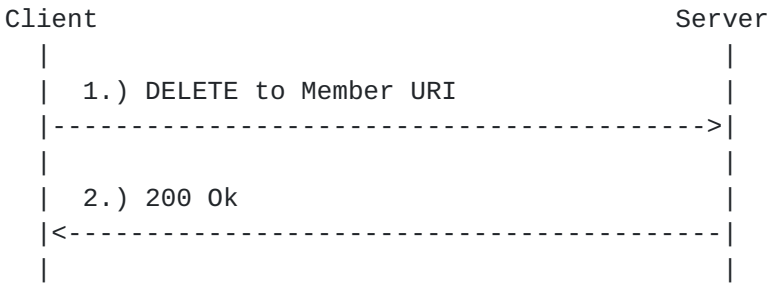
5.4.2 Updating a Resource



1. The client PUTs an updated representation to the URI of a Member Resource.

2. Upon a successful update of the resource the server responds with a status code of 200.

5.4.3 Deleting a Resource



1. The client sends a DELETE request to the URI of a Member Resource.

2. Upon the successful deletion of the resource the server responds with a status code of 200.

A different approach is taken for deleting Media Resources, see Section 9.5 for details.

5.5 Use of HTTP Response codes

The Atom Protocol uses the response status codes defined in HTTP to indicate the success or failure of an operation. Consult the HTTP specification [RFC2616] for detailed definitions of each status code. It is RECOMMENDED that entities contained within HTTP 4xx and 5xx responses include a human-readable explanation of the error.

6. Atom Publishing Protocol Documents

6.1 Document Types

This specification describes two kinds of Documents - Category Documents and Service Documents.

A Category Document (Section 7) contain lists of categories specified using the "atom:category" element from the Atom Syndication Format. A Service Document (Section 8) describes capabilities of workspaces, which are server-defined groupings of Collections.

The namespace name [W3C.REC-xml-names-19990114] for either kind of document is:

http://purl.org/atom/app#

This specification uses the prefix "app:" for the namespace name. The prefix "atom:" is used for "http://www.w3.org/2005/Atom", the namespace name of the Atom Syndication Format [RFC4287]. The namespace prefixes are not semantically significant.

Atom Publishing Protocol Documents MUST be well-formed XML. This specification does not define any DTDs for Atom Protocol formats, and hence does not require them to be "valid" in the sense used by XML.

6.2 Document Extensibility

The namespace name "http://purl.org/atom/app#" is reserved for future forward-compatible revisions of the document types. Future versions of this specification could add new elements and attributes. Software written to conform to this version of the specification will not be able to process such markup correctly and in fact will not be able to distinguish it from markup error.

Unrecognized markup in an Atom Publishing Protocol document is considered "foreign markup" as defined in [RFC4287].

Markup from other vocabularies ("foreign markup") can be used anywhere within a Category or Service Document unless it is explicitly forbidden. Processors that encounter foreign markup MUST NOT stop processing or signal an error, and SHOULD preserve foreign markup when transmitting such documents.

7. Category Documents

Category Documents contain lists of categories described using the "atom:category" element from the Atom Syndication Format [RFC4287]. Categories can also appear in Service Documents and describe the categories allowed in a Collection (see Section 8.2.5).

Category Documents are identified with the "application/atomcat+xml" media type (see Section 15).

7.1 Example

```
<?xml version="1.0" ?>
<app:categories
    xmlns:app="http://purl.org/atom/app#"
    xmlns="http://www.w3.org/2005/Atom"
    fixed="yes" scheme="http://example.com/cats/big3">
  <category term="animal" />
  <category term="vegetable" />
  <category term="mineral" />
</app:categories>
```

This Category Document contains three categories with the terms "animal", "vegetable", and "mineral". None of the categories has a label attribute (as defined in [RFC4287]). They all inherit the "http://example.com/cats/big3" category 'scheme' (in the [RFC4287] sense) declared on the app:categories element. Therefore if the "mineral" category were to appear in an Atom Entry or Feed Document, it would appear as:

```
<category scheme="http://example.com/cats/big3" term="mineral" />
```

7.2 Element Definitions

7.2.1 The "app:categories" element

The root of a Category Document is the "app:categories" element. An app:categories element MAY contain one or more "atom:category" elements from the Atom namespace ("http://www.w3.org/2005/Atom").

If an app:category child element has no "scheme" attribute it inherits the attribute from its app:categories parent. An app: category child element with an existing "scheme" attribute does not inherit the "scheme" value of its "app:categories" parent element.

7.2.1.1 Attributes of "app:categories"

The app:categories element MAY contain a "fixed" attribute, with a value of either "yes" or "no", indicating if the list of categories is a fixed or an open set. Collections that indicate the set is fixed MAY reject members whose categories are not listed in the Collection Document. Collections that indicate the set is open SHOULD NOT reject otherwise acceptable members whose categories are not listed in the Collection.

Alternatively, the app:categories element MAY contain an "href" attribute, whose value MUST be an IRI reference identifying a Category Document. If the "href" attribute is provided, the app: categories element MUST be empty and MUST NOT have the "fixed" or "scheme" attributes.

```
atomCategory =
    element atom:category {
       atomCommonAttributes,
       attribute term { text },
       attribute scheme { atomURI }?,
       attribute label { text }?,
       undefinedContent
    }

appInlineCategories =
    element app:categories {
        attribute fixed { "yes" | "no" }?,
        attribute scheme { atomURI }?,
        (atomCategory*)
    }

appOutOfLineCategories =
    element app:categories {
        attribute href { atomURI },
        (empty)
    }

appCategories = appInlineCategories | appOutOfLineCategories
```

8. Service Documents

For authoring to commence, a client needs to first discover the capabilities and locations of the available collections. Service Documents are designed to support this discovery process.

A Service Document describes workspaces, which are server-defined groupings of Collections. Service Documents are identified with the "application/atomserv+xml" media type (see Section 15).

There is no requirement that a server support multiple workspaces. In addition, a Collection MAY appear in more than one Workspace.

8.1 Example

```
<?xml version="1.0" encoding='utf-8'?>
<service xmlns="http://purl.org/atom/app#"
         xmlns:atom="http://www.w3.org/2005/Atom">
  <workspace>
    <atom:title>Main Site</atom:title>
    <collection
        href="http://example.org/reilly/main" >
      <atom:title>My Blog Entries</atom:title>
      <categories
         href="http://example.com/cats/forMain.cats" />
    </collection>
    <collection
        href="http://example.org/reilly/pic" >
      <atom:title>Pictures</atom:title>
      <accept>image/*</accept>
    </collection>
  </workspace>
  <workspace>
    <atom:title>Side Bar Blog</atom:title>
    <collection
        href="http://example.org/reilly/list" >
      <atom:title>Remaindered Links</atom:title>
      <accept>entry</accept>
      <categories fixed="yes">
        <atom:category
          scheme="http://example.org/extra-cats/"
          term="joke" />
        <atom:category
          scheme="http://example.org/extra-cats/"
          term="serious" />
      </categories>
    </collection>
  </workspace>
```

```
</service>
```

This Service Document describes two workspaces. The first Workspace is called "Main Site", has two collections called "My Blog Entries" and "Pictures" whose IRIs are "http://example.org/reilly/main" and "http://example.org/reilly/pic" respectively. The "Pictures" Workspace includes an "accept" element indicating that a client can post image files to the Collection to create new entries. Entries with associated media resources are discussed in Section 9.5.

The second Workspace is called "Side Bar Blog" and has a single Collection called "Remaindered Links" whose IRI is "http://example.org/reilly/list".

Within each of the two entry collections, the categories element provides a list of available categories for member entries. In the "My Blog Entries" Collection, the list of available categories is obtainable through the "href" attribute. The "Side Bar Blog" Collection provides a category list within the Service Document, but states the list is fixed, signaling a request from the server that entries be posted using only those two categories.

8.2 Element Definitions

8.2.1 The "app:service" Element

The root of a Service Document is the "app:service" element.

The "app:service" element is the container for service information associated with one or more workspaces. An app:service element MUST contain one or more app:workspace elements.

```
namespace app = "http://purl.org/atom/app#"
start = appService


appService =
   element app:service {
      appCommonAttributes,
      ( appWorkspace+
        & extensionElement* )
   }
```

8.2.2 The "app:workspace" Element

The "app:workspace" element contains information elements about the

collections of resources available for editing. The app:workspace element contains zero or more app:collection elements.

```
appWorkspace =
   element app:workspace {
      appCommonAttributes,
      ( appCollection*
        & extensionElement* )
   }

atomTitle = element atom:title { atomTextConstruct }
```

In an app:workspace element, the first app:collection element MUST refer to the preferred or primary Collection. In the following example, the "Entries" collection would be considered the preferred Collection:

```
    <service xmlns="http://purl.org/atom/app#"
     xmlns:atom="http://www.w3.org/2005/Atom">
      <workspace>
        <atom:title>My Blog</atom:title>
        <collection
             href="http://example.org/myblog/entries" >
          <atom:title>Entries</atom:title>
       </collection>
        <collection
             href="http://example.org/myblog/fotes">
          <atom:title>Photos</atom:title>
          <accept>image/*</accept>
        </collection>
      </workspace>
    </service>
```

8.2.2.1 The "atom:title" Element

The app:workspace element MUST contain one "atom:title" element, giving a human-readable title for the workspace.

8.2.3 The "app:collection" Element

The "app:collection" element describes a Collection. The app: collection element MAY contain one app:accept element and MAY contain any number of app:categories elements. The app:collection element MUST NOT contain more that one app:accept element.

```
appCollection =
   element app:collection {
      appCommonAttributes,
      attribute href { atomURI  },
      ( appAccept?

        & appCategories*
        & extensionElement* )
   }
```

8.2.3.1 Usage in Atom Feed Documents

The app:collection element MAY appear as a child of an atom:feed or atom:source element in an Atom Feed Document. Its value identifies a Collection by which new entries can be added to appear in the feed.

8.2.3.2 The "href" Attribute

The app:collection element MUST contain an "href" attribute, whose value gives the IRI of the Collection.

8.2.3.3 The "atom:title" Element

The app:collection Element MUST contain one "atom:title" element, giving a human-readable title for the Workspace.

8.2.4 The "app:accept" Element

The "app:accept" element value specifies a comma-separated list of media-ranges (see [RFC2616]) identifying the types of representations that can be POSTed to the URI of a Collection. Whitespace separation of the media-range values is considered insignificant and MUST be ignored.

The app:accept element is similar to the HTTP Accept request-header [RFC2616] with the exception that app:accept has no notion of preference. As a result, the value syntax of app:accept does not use "accept-params" or "q" arguments as specified in [RFC2616], section 14.1.

The order of media-ranges is not significant. The following lists are all equivalent:

```
<app:accept>image/png, image/*</app:accept>
<app:accept>image/*, image/png</app:accept>
<app:accept>image/*</app:accept>
```

A value of "entry" may appear in any list of media-ranges in an accept element and indicates that Atom Entry Documents can be posted to the Collection. If the accept element is omitted or empty, clients SHOULD assume that only Atom Entry documents will be accepted by the Collection.

```
appAccept =
   element app:accept {
         appCommonAttributes,
         ( appTypeValue? )
   }

appTypeValue = ( "entry" | media-type |entry-or-media-type  )
media-type = xsd:string { pattern = "entry,(.+/.+,?)*" }
entry-or-media-type = xsd:string { pattern = "(.+/.+,?)*" }
```

8.2.5 The "app:categories" Element

The "app:categories" element provides a listing of the categories that can be applied to the members of a Collection.

```
atomCategory =
    element atom:category {
       atomCommonAttributes,
       attribute term { text },
       attribute scheme { atomURI }?,
       attribute label { text }?,
       undefinedContent
    }

appInlineCategories =
    element app:categories {
        attribute fixed { "yes" | "no" }?,
        attribute scheme { atomURI }?,
        (atomCategory*)
    }

appOutOfLineCategories =
    element app:categories {
        attribute href { atomURI },
        (empty)
    }

appCategories = appInlineCategories | appOutOfLineCategories
```

The app:categories element MAY contain a "fixed" attribute, with a value of either "yes" or "no", indicating whether or not the listing of categories is considered to be a fixed, or closed set. The absence of the "fixed" attribute is equivalent to the presence of a "fixed" attribute with a value of "no". Collections that indicate a fixed set MAY reject members that include categories not specified in the provided listing. Collections that indicate an open set SHOULD NOT reject otherwise acceptable members whose categories are not present in the provided list.

The app:categories element MAY contain an "href" attribute, whose value MUST be an IRI reference identifying a Category Document. If the "href" attribute is provided, the app:categories element MUST be empty and the "fixed" and "scheme" attributes MUST NOT be present.

9. Creating and Editing Resources

9.1 Member URIs

The Member URI supports retrieving, updating and deleting the resource using HTTP GET, PUT and DELETE as described in this section. Retrieval and updating of Member Entry Resources are done via Atom Entry representations.

Member Entry URIs appear in two places. First, they are returned in a Location header after successful resource creation using POST, as described below. Second, in the entries of a Collection document, by an atom:link element with a link relation of "edit".

Each Member Entry SHOULD contain such an atom:link element providing its Member Entry URI.

9.2 Creating resources with POST

To add members to a Collection, clients send POST requests to the URI of a Collection. Collections MAY impose constraints on the media-types of request entities POSTed to the Collection and MAY generate a response with a status code of 415 ("Unsupported Media Type").

If a Member Resource was created in the Collection which received the POST, its Member Entry URI MUST be returned in an HTTP Location header.

When the server generates a response with a status code of 201 ("Created"), it SHOULD also return a response body, which if provided, MUST be an Atom Entry Document representing the newly-created resource, and SHOULD include its Member Entry URI in an atom:link element that has a relation of "edit".

Since the server is free to alter the posted entry, for example by changing the content of the "id" element, returning the Entry as described in the previous paragraph can be useful to the client, enabling it to correlate the client and server views of the new Entry.

When the POST request contains an Atom Entry Document, the response from the server SHOULD contain a Content-Location header that contains the same character-by-character value as the Location header.

The request body sent with the POST need not be an Atom Entry. For example, it might be a picture, or a movie. For a discussion of the issues in posting such content, see Section 9.5.

9.2.1 Example

Below, the client sends a POST request containing an Atom Entry representation to the URI of the Collection:

```
POST /myblog/entries HTTP/1.1
Host: example.org
User-Agent: Thingio/1.0
Authorization: Basic ZGFmZnk6c2VjZXJldA==
Content-Type: application/atom+xml
Content-Length: nnn
Slug: First Post

<?xml version="1.0" ?>
<entry xmlns="http://www.w3.org/2005/Atom"
    xmlns:app="http://purl.org/atom/app#">
  <title>Atom-Powered Robots Run Amok</title>
  <id>urn:uuid:1225c695-cfb8-4ebb-aaaa-80da344efa6a</id>
  <updated>2003-12-13T18:30:02Z</updated>
  <author><name>John Doe</name></author>
  <content>Some text.</content>
</entry>
```

The server signals a successful creation with a status code of 201. The response includes a "Location" header indicating the Member Entry URI of the Atom Entry and a representation of that Entry in the body of the response.

```
HTTP/1.1 201 Created
Date: Fri, 7 Oct 2005 17:17:11 GMT
Content-Length: nnn
Content-Type: application/atom+xml; charset="utf-8"
Content-Location: http://example.org/edit/first-post.atom
Location: http://example.org/edit/first-post.atom

<?xml version="1.0"?>
<entry xmlns="http://www.w3.org/2005/Atom"
    xmlns:app="http://purl.org/atom/app#">
  <title>Atom-Powered Robots Run Amok</title>
  <id>urn:uuid:1225c695-cfb8-4ebb-aaaa-80da344efa6a</id>
  <updated>2003-12-13T18:30:02Z</updated>
  <author><name>John Doe</name></author>
  <content>Some text.</content>
  <link rel="edit"
      href="http://example.org/edit/first-post.atom"/>
</entry>
```

The Entry created and returned by the server might not match the Entry POSTed by the client. A server MAY change the values of various elements in the Entry such as the atom:id, atom:updated and atom:author values and MAY choose to remove or add other elements and attributes, or change element and attribute values.

In particular, the publishing system in this example filled in some values not provided in the original POST. For example, it ascertained the name of the author, presumably via the authentication protocol used to establish the right to post.

9.3 Updating Resources with PUT

To update a resource, clients send PUT requests to its Member URI, as specified in [RFC2616].

To avoid unintentional loss of data when editing Member Entries or Media Link Entries, Atom Protocol clients SHOULD preserve all metadata that has not been intentionally modified, including unknown foreign markup as defined in Section 6 of [RFC4287].

9.4 Deleting Resources with DELETE

To delete a resource, clients send DELETE requests to its Member URI, as specified in [RFC2616]. For Media Resources, deletion of a Media Link Entry SHOULD result in the deletion of the associated Media Resource.

9.5 Media Resources and Media Link Entries

A client can POST a media type other than application/atom+xml to a Collection. Such a request creates two new resources - one that corresponds to the entity sent in the request, called the Media Resource, and an associated Member Entry, called the Media Link Entry. The server can signal the media types it will accept via the "accept" element in the Service Document (Section 8.2.4).

The Media Link Entry contains the IRI of the Media Resource and makes metadata about it separately available for retrieval and update. The Media Link Entry is used to store metadata about the (perhaps non-textual) Media Resource.

Successful responses to creation requests MUST include the URI of the Media Link Entry in the Location header. The Media Link Entry SHOULD contain an atom:link element with a link relation of "edit-media" that contains the Media Resource IRI. The Media Link Entry MUST have an "atom:content" element with a non-empty "src" attribute. The value of the "src" attribute is an IRI of the newly created Media

Resource. It is OPTIONAL that the IRI of the "src" attribute on the atom:content element be the same as the Media Resource IRI. That is, the "src" attribute value might instead be a link into a static cache or content distribution network and not be the Media Resource IRI.

Implementers are asked to note that according to the requirements of [RFC4287], entries, and thus Media Link Entries, MUST contain an atom:summary element. Upon successful creation of a Media Link Entry, a server MAY choose to populate the atom:summary element (as well as other required elements such as atom:id, atom:author and atom:title) with content derived from the POSTed entity or from any other source. A server might not allow a client to modify the server selected values for these elements.

For resource creation this specification only defines cases where the POST body has an Atom Entry entity declared as an Atom media type ("application/atom+xml"), or a non-Atom entity declared as a non-Atom media type. It does not specify any request semantics or server behavior in the case where the POSTed media-type is "application/atom+xml" but the body is something other than an Atom Entry. In particular, what happens on POSTing an Atom Feed Document to a Collection using the "application/atom+xml" media type is undefined.

9.6 The Slug: Header

Slug is a HTTP entity-header whose value is a "slug", i.e. a short name that can be used as part of URI for a Member Resource.

When posting an entity to a Collection to add a new Member, the server MAY use this information when creating the Member URI of the newly-created resource, for instance by using some or all of the words in the last URI segment. It MAY also use it when creating the atom:id or as the title of a Media Link Entry (see Section 9.5.).

Servers MAY ignore the Slug entity-header and MAY alter its value before using it. For example, the server MAY filter out some characters or replace accented letters with non-accented ones, spaces with underscores, etc.

9.6.1 Slug: Header syntax

The syntax of this header MUST conform to the augmented BNF grammar in section 2.1 of the HTTP/1.1 specification [RFC2616]. The TEXT rule is described in section 2.2 of the same document.

```
Slug = "Slug" ":" *TEXT
```

Clients MAY send non-ASCII characters in the Slug entity-header,

which they MUST encode using "encoded-words", as defined in [RFC2047]. Servers SHOULD treat the slug as [RFC2047] encoded if it matches the "encoded-words" production.

9.6.2 Examples

Below, the client sends a POST request containing a PNG image to the URI of the Collection:

```
POST /myblog/entries HTTP/1.1
Host: example.org
Content-Type: image/png
Slug: The Beach
Authorization: Basic ZGFmZnk6c2VjZXJldA==
Content-Length: nnn

...binary data...
```

The server signals a successful creation with a status code of 201. The response includes a Location header indicating the Member URI of the Media Link Entry and a representation of that entry in the body of the response. The Media Link Entry includes a content element with a src attribute, and a link using the link relation "edit-media" specifying the IRI to be used for modifying the Media Resource.

```
HTTP/1.1 201 Created
Date: Fri, 7 Oct 2005 17:17:11 GMT
Content-Length: nnn
Content-Type: application/atom+xml; charset="utf-8"
Content-Location: http://example.org/myblog/edit/the_beach
Location: http://example.org/myblog/edit/the_beach

<?xml version="1.0"?>
<entry xmlns="http://www.w3.org/2005/Atom">
  <title>The Beach</title>
  <id>urn:uuid:1225c695-cfb8-4ebb-aaaa-80da344efa6a</id>
  <updated>2005-10-07T17:17:08Z</updated>
  <author><name>Daffy</name></author>
  <summary type="text" />
  <content type="image/png"
     src="http://example.org/media/the_beach.png"/>
  <link rel="edit-media"
     href="http://example.org/media/edit/the_beach.png" />
  <link rel="edit"
     href="http://example.org/myblog/edit/the_beach />
</entry>
```

Here is an example of the Slug: header that uses the encoding rules of [RFC2047].

```
POST /myblog/entries HTTP/1.1
Host: example.org
Content-Type: image/png
Slug: =?iso-8859-1?q?The_Beach?=
Authorization: Basic ZGFmZnk6c2VjZXJldA==
Content-Length: nnn

...binary data...
```

See Section 9.2.1 for an example of the Slug: header applied to the creation of a Member Entry Resource.

10. Listing Collections

Collection resources MUST provide representations in the form of Atom Feed documents whose entries represent the Members in the Collection. Each entry in the Feed Document SHOULD have an atom:link element with a relation of "edit" (See Section 11.1).

The entries in the returned Atom Feed MUST be ordered by their "atom: updated" property, with the most recently updated entries coming first in the document order. Clients SHOULD be constructed in consideration of the fact that changes which do not alter the atom: updated value of an entry will not affect the position of the entry in a Collection.

Clients MUST NOT assume that an Atom Entry returned in the Feed is a full representation of a Member Entry Resource and SHOULD perform a GET on the URI of the Member Entry before editing.

10.1 Collection Paging

Collections can contain large numbers of resources. A naive client such as a web spider or web browser could be overwhelmed if the response to a GET contained every entry in the Collection, and the server would waste large amounts of bandwidth and processing time on clients unable to handle the response. For this reason, servers MAY return a partial listing of the most recently updated Member Resources. Such partial feed documents MUST have an atom:link with a "next" relation whose "href" value is the URI of the next partial listing of the Collection (the next most recently updated Member Resources) where it exists. This is called "Collection paging".

The returned Atom Feed MAY NOT contain entries for all the Members in a Collection. Instead, the Atom Feed document MAY contain link elements with "rel" attribute values of "next", "previous", "first" and "last" that can be used to navigate through the complete set of matching entries.

For instance, suppose a client is supplied the URI "http://example.org/entries/go" of a Collection of Member entries, where the server as a matter of policy avoids generating feed documents containing more than 10 entries. The Atom Feed document for the Collection will then represent the first 'page' in a set of 10 linked feed documents. The "first" relation will reference the initial feed document in the set and the "last" relation references the final Atom Feed Document in the set. Within each document, the "next" and "previous" link relations reference the preceding and subsequent documents.

```
  <feed xmlns="http://www.w3.org/2005/Atom">
    <link rel="first"
          href="http://example.org/entries/go" />
    <link rel="next"
          href="http://example.org/entries/2" />
    <link rel="last"
          href="http://example.org/entries/10" />
    ...
  </feed>
```

The "next" and "previous" link elements for the feed 'page' located at "http://example.org/entries/2" would look like this:

```
  <feed xmlns="http://www.w3.org/2005/Atom">
    <link rel="first"
          href="http://example.org/entries/go" />
    <link rel="previous"
          href="http://example.org/entries/go" />
    <link rel="next"
          href="http://example.org/entries/3" />
    <link rel="last"
          href="http://example.org/entries/10" />
    ...
  </feed>
```

11. Atom Format Link Relation Extensions

11.1 The "edit" Link Relation

This specification adds the value "edit" to the Atom Registry of Link Relations (see section 7.1 of [RFC4287]). The value of "edit" specifies that the value of the href attribute is the IRI of an editable Member Entry. When appearing within an atom:entry, the href IRI MAY be used to retrieve, update and delete the resource represented by that entry. An atom:entry MUST contain no more than one "edit" link relation.

11.2 The "edit-media" Link Relation

This specification adds the value "edit-media" to the Atom Registry of Link Relations (see section 7.1 of [RFC4287]). When appearing within an atom:entry, the value of the href attribute is an IRI that MAY be used to modify a Media Resource associated with that entry.

An atom:entry element MAY contain zero or more "edit-media" link relations. An atom:entry MUST NOT contain more than one atom:link element with a rel attribute value of "edit-media" that has the same type and hreflang attribute values. All "edit-media" link relations in the same entry reference the same resource. If a client encounters multiple "edit-media" link relations in an entry then it SHOULD choose a link based on the client preferences for type and hreflang. If a client encounters multiple "edit-media" link relations in an entry and has no preference based on the type and hreflang attributes then the client SHOULD pick the first "edit-media" link relation in document order.

12. Atom Publishing Controls

This specification defines an Atom Format Structured Extension, as defined in Section 6 of [RFC4287], for publishing control within the http://purl.org/atom/app# namespace.

12.1 The "app:control" Element

```
namespace app = "http://purl.org/atom/app#"

 pubControl =
    element app:control {
    atomCommonAttributes,
    pubDraft?
    & extensionElement
 }

 pubDraft =
   element app:draft { "yes" | "no" }
```

The "app:control" element MAY appear as a child of an atom:entry which is being created or updated via the Atom Publishing Protocol. The app:control element MUST appear only once in an Entry. The app:control element is considered foreign markup as defined in Section 6 of [RFC4287].

The app:control element and its child elements MAY be included in Atom Feed or Entry Documents.

The app:control element MAY contain exactly one "app:draft" element as defined below, and MAY contain zero or more extension elements as defined in Section 6 of [RFC4287].

12.1.1 The "app:draft" Element

The number of app:draft elements in app:control MUST be zero or one. Its value MUST be one of "yes" or "no". A value of "no" indicates a client request that the Member Resource be made publicly visible. If the app:draft element is missing then the value MUST be understood to be "no". The inclusion of the app:draft element represents a request by the client to control the visibility of a Member Resource and the app:draft element MAY be ignored by the server.

13. Securing the Atom Protocol

All instances of publishing Atom Format entries SHOULD be protected by authentication to prevent posting or editing by unknown sources. [[anchor23: note: this section is currently under discussion.]]

14. Security Considerations

The security of the Atom Protocol is based on [[anchor25: note: refers to incomplete section]].

[[anchor26: note: talk here about denial of service attacks using large XML files, or the billion laughs DTD attack.]]

15. IANA Considerations

15.1 Content-type registration for 'application/atomserv+xml'

An Atom Publishing Protocol Service Document, when serialized as XML 1.0, can be identified with the following media type:

MIME media type name: application

MIME subtype name: atomserv+xml

Mandatory parameters: None.

Optional parameters:

"charset": This parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in [RFC3023].

Encoding considerations: Identical to those of "application/xml" as described in [RFC3023], section 3.2.

Security considerations: As defined in this specification. [[anchor27: update upon publication]]

In addition, as this media type uses the "+xml" convention, it shares the same security considerations as described in [RFC3023], section 10.

Interoperability considerations: There are no known interoperability issues.

Published specification: This specification. [[anchor28: update upon publication]]

Applications that use this media type: No known applications currently use this media type.

Additional information:

Magic number(s): As specified for "application/xml" in [RFC3023], section 3.2.

File extension: .atomsrv

Fragment identifiers: As specified for "application/xml" in [RFC3023], section 5.

Base URI: As specified in [RFC3023], section 6.

Macintosh File Type code: TEXT

Person and email address to contact for further information: Joe Gregorio <joe@bitworking.org>

Intended usage: COMMON

Author/Change controller: This specification's author(s). [[anchor29: update upon publication]]

15.2 Content-type registration for 'application/atomcat+xml'

An Atom Publishing Protocol Category Document, when serialized as XML 1.0, can be identified with the following media type:

MIME media type name: application

MIME subtype name: atomcat+xml

Mandatory parameters: None.

Optional parameters:

"charset": This parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in [RFC3023].

Encoding considerations: Identical to those of "application/xml" as described in [RFC3023], section 3.2.

Security considerations: As defined in this specification. [[anchor30: update upon publication]]

In addition, as this media type uses the "+xml" convention, it shares the same security considerations as described in [RFC3023], section 10.

Interoperability considerations: There are no known interoperability issues.

Published specification: This specification. [[anchor31: update upon publication]]

Applications that use this media type: No known applications currently use this media type.

Additional information:

Magic number(s): As specified for "application/xml" in [RFC3023], section 3.2.

File extension: .atomcat

Fragment identifiers: As specified for "application/xml" in [RFC3023], section 5.

Base URI: As specified in [RFC3023], section 6.

Macintosh File Type code: TEXT

Person and email address to contact for further information: Joe Gregorio <joe@bitworking.org>

Intended usage: COMMON

Author/Change controller: This specification's author(s). [[anchor32: update upon publication]]

16. References

16.1 Normative References

[RFC2047] Moore, K., "MIME (Multipurpose Internet Mail Extensions) Part Three: Message Header Extensions for Non-ASCII Text", RFC 2047, November 1996.

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[W3C.REC-xmlbase-20010627] Marsh, J., "XML Base", W3C REC W3C.REC-xmlbase-20010627, June 2001.

16.2 Informative References

[RNC] Clark, J., "RELAX NG Compact Syntax", December 2001.

[W3C.REC-webarch-20041215]
Walsh, N. and I. Jacobs, "Architecture of the World Wide Web, Volume One", W3C REC REC-webarch-20041215, December 2004.

URIs

[1] <http://www.imc.org/atom-protocol/index.html>

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Appendix A. Contributors

The content and concepts within are a product of the Atom community and the Atompub Working Group.

Appendix B. RELAX NG Compact Schema

This appendix is informative.

The Relax NG schema explicitly excludes elements in the Atom Protocol namespace which are not defined in this revision of the specification. Requirements for Atom Protocol processors encountering such markup are given in Section 6.2 and Section 6.3 of [RFC4287].

The Schema for Service Documents:

```
# -*- rnc -*-
# RELAX NG Compact Syntax Grammar for the Atom Protocol

namespace app = "http://purl.org/atom/app#"
namespace atom = "http://www.w3.org/2005/Atom"
namespace xsd = "http://www.w3.org/2001/XMLSchema"
namespace xhtml = "http://www.w3.org/1999/xhtml"
namespace local = ""

start = appService

# common:attrs

atomURI = text

appCommonAttributes =
   attribute xml:base { atomURI }?,
   attribute xml:lang { atomLanguageTag }?,
   undefinedAttribute*


atomCommonAttributes = appCommonAttributes

undefinedAttribute =
  attribute * - (xml:base | xml:lang | local:*) { text }



atomLanguageTag = xsd:string {
   pattern = "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*"
}

atomDateConstruct =
    appCommonAttributes,
    xsd:dateTime
```

```
   # app:service

   appService =
      element app:service {
         appCommonAttributes,
         ( appWorkspace+
           & extensionElement* )
      }

   # app:workspace

   appWorkspace =
      element app:workspace {
         appCommonAttributes,
         ( appCollection*
           & extensionElement* )
      }

   atomTitle = element atom:title { atomTextConstruct }

   # app:collection

   appCollection =
      element app:collection {
         appCommonAttributes,
         attribute href { atomURI  },
         ( appAccept?

           & appCategories*
           & extensionElement* )
      }

   # app:categories

   atomCategory =
       element atom:category {
          atomCommonAttributes,
          attribute term { text },
          attribute scheme { atomURI }?,
          attribute label { text }?,
          undefinedContent
       }

   appInlineCategories =
       element app:categories {
           attribute fixed { "yes" | "no" }?,
           attribute scheme { atomURI }?,
           (atomCategory*)
```

```
      }

   appOutOfLineCategories =
       element app:categories {
           attribute href { atomURI },
           (empty)
       }

   appCategories = appInlineCategories | appOutOfLineCategories


   # app:accept

   appAccept =
      element app:accept {
            appCommonAttributes,
            ( appTypeValue? )
      }


   appTypeValue = ( "entry" | media-type |entry-or-media-type  )
   media-type = xsd:string { pattern = "entry,(.+/.+,?)*" }
   entry-or-media-type = xsd:string { pattern = "(.+/.+,?)*" }
   # above is an approximation, rnc doesn't support interleaved text


   # Simple Extension

   simpleExtensionElement =
      element * - app:* {
         text
      }

   # Structured Extension

   structuredExtensionElement =
      element * - app:* {
         (attribute * { text }+,
            (text|anyElement)*)
       | (attribute * { text }*,
           (text?, anyElement+, (text|anyElement)*))
      }

   # Other Extensibility

   extensionElement =
      simpleExtensionElement | structuredExtensionElement
```

```
   undefinedContent = (text|anyForeignElement)*

   # Extensions

   anyElement =
      element * {
         (attribute * { text }
          | text
          | anyElement)*
      }

   anyForeignElement =
       element * - atom:* {
          (attribute * { text }
           | text
           | anyElement)*
       }

   atomPlainTextConstruct =
       atomCommonAttributes,
       attribute type { "text" | "html" }?,
       text

   atomXHTMLTextConstruct =
       atomCommonAttributes,
       attribute type { "xhtml" },
       xhtmlDiv

   atomTextConstruct = atomPlainTextConstruct | atomXHTMLTextConstruct

   anyXHTML = element xhtml:* {
       (attribute * { text }
        | text
        | anyXHTML)*
   }

   xhtmlDiv = element xhtml:div {
     (attribute * { text }
      | text
      | anyXHTML)*
   }

   # EOF
```

The Schema for Category Documents:

```
   # -*- rnc -*-
   # RELAX NG Compact Syntax Grammar for the Atom Protocol
```

```
   namespace app = "http://purl.org/atom/app#"
   namespace atom = "http://www.w3.org/2005/Atom"
   namespace xsd = "http://www.w3.org/2001/XMLSchema"
   namespace local = ""

   start = appCategories

   # common:attrs

   atomCommonAttributes =
      attribute xml:base { atomUri }?,
      attribute xml:lang { atomLanguageTag }?,
      undefinedAttribute*

   undefinedAttribute =
     attribute * - (xml:base | xml:lang | local:*) { text }

   atomUri = text

   atomLanguageTag = xsd:string {
      pattern = "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*"
   }


   atomCategory =
       element atom:category {
          atomCommonAttributes,
          attribute term { text },
          attribute scheme { atomUri }?,
          attribute label { text }?,
          undefinedContent
       }

   appInlineCategories =
       element app:categories {
           attribute fixed { "yes" | "no" }?,
           attribute scheme { atomUri }?,
           (atomCategory*)
       }

   appOutOfLineCategories =
       element app:categories {
           attribute href { atomURI },
           (empty)
       }

   appCategories = appInlineCategories | appOutOfLineCategories
```

```
   # Extensibility

   undefinedContent = (text|anyForeignElement)*

   anyElement =
      element * {
         (attribute * { text }
          | text
          | anyElement)*
      }

   anyForeignElement =
       element * - atom:* {
          (attribute * { text }
           | text
           | anyElement)*
       }

   # EOF
```

Appendix C. Revision History

draft-ietf-atompub-protocol-10: PaceRemoveTitleHeader2, PaceSlugHeader4, PaceOnlyMemberURI,PaceOneAppNamespaceOnly, PaceAppCategories, PaceExtendIntrospection, UseElementsForAppCollectionTitles3, renamed Introspection to Service, lots of good editorials suggestions, updated media example with slug, moved xml conventions to convention sections, renamed XMl related Conventions to Atom Publishing Protocol Documents, added auth header to examples, consolidated definition of all resource types into the model section, added IANA reg info for application/atomcat+xml.

draft-ietf-atompub-protocol-09: PaceWorkspaceMayHaveCollections, PaceMediaEntries5, http://www.imc.org/atom-protocol/mail-archive/msg05322.html, and http://www.imc.org/atom-protocol/mail-archive/msg05272.html

draft-ietf-atompub-protocol-08: added infoset ref; added wording re IRI/URI; fixed URI/IRI ; next/previous fixed as per Atom LinkRelations Attribute (http://www.imc.org/atom-protocol/mail-archive/msg04095.html); incorporated: PaceEditLinkMustToMay; PaceMissingDraftHasNoMeaning, PaceRemoveMemberTypeMust, PaceRemoveMemberTypePostMust, PaceTitleHeaderOnlyInMediaCollections, PacePreserveForeignMarkup, PaceClarifyTitleHeader, PaceClarifyMediaResourceLinks, PaceTwoPrimaryCollections;

draft-ietf-atompub-protocol-07: updated Atom refs to RFC4287; incorporated PaceBetterHttpResponseCode; PaceClarifyCollectionAndDeleteMethodByWritingLessInsteadOfMore; PaceRemoveAcceptPostText; PaceRemoveListTemplate2; PaceRemoveRegistry; PaceRemoveWhoWritesWhat; PaceSimplifyClarifyBetterfyRemoveBogusValidityText; PaceCollectionOrderSignificance; PaceFixLostIntrospectionText; PaceListPaging; PaceCollectionControl; element typo in Listing collections para3 (was app:member-type, not app:list-template); changed post atom entry example to be valid. Dropped inline use of 'APP'. Removed nested diagram from section 4. Added ed notes in the security section.

draft-ietf-atompub-protocol-06 - Removed: Robert Sayre from the contributors section per his request. Added in PaceCollectionControl. Fixed all the {daterange} verbage and examples so they all use a dash. Added full rnc schema. Collapsed Introspection and Collection documents into a single document. Removed {dateRange} queries. Renamed search to list. Moved discussion of media and entry collection until later in the document and tied the discussion to the Introspection element app:member-type.

draft-ietf-atompub-protocol-05 - Added: Contributors section. Added: de hOra to editors. Fixed: typos. Added diagrams and description to model section. Incorporates PaceAppDocuments, PaceAppDocuments2, PaceSimplifyCollections2 (large-sized chunks of it anyhow: the notions of Entry and Generic resources, the section 4 language on the Protocol Model, 4.1 through 4.5.2, the notion of a Collection document, as in Section 5 through 5.3, Section 7 "Collection resources", Selection resources (modified from pace which talked about search); results in major mods to Collection Documents, Section 9.2 "Title: Header" and brokeout para to section 9.1 Editing Generic Resources). Added XML namespace and language section. Some cleanup of front matter. Added Language Sensitivity to some attributes. Removed resource descriptions from terminology. Some juggling of sections. See: http://www.imc.org/atom-protocol/mail-archive/msg01812.html.

draft-ietf-atompub-protocol-04 - Add ladder diagrams, reorganize, add SOAP interactions

draft-ietf-atompub-protocol-03 - Incorporates PaceSliceAndDice3 and PaceIntrospection.

draft-ietf-atompub-protocol-02 - Incorporates Pace409Response, PacePostLocationMust, and PaceSimpleResourcePosting.

draft-ietf-atompub-protocol-01 - Added in sections on Responses for the EditURI. Allow 2xx for response to EditURI PUTs. Elided all mentions of WSSE. Started adding in some normative references. Added the section "Securing the Atom Protocol". Clarified that it is possible that the PostURI and FeedURI could be the same URI. Cleaned up descriptions for Response codes 400 and 500.

Rev draft-ietf-atompub-protocol-00 - 5Jul2004 - Renamed the file and re-titled the document to conform to IETF submission guidelines. Changed MIME type to match the one selected for the Atom format. Numerous typographical fixes. We used to have two 'Introduction' sections. One of them was moved into the Abstract the other absorbed the Scope section. IPR and copyright notifications were added.

Rev 09 - 10Dec2003 - Added the section on SOAP enabled clients and servers.

Rev 08 - 01Dec2003 - Refactored the specification, merging the Introspection file into the feed format. Also dropped the distinction between the type of URI used to create new entries and the kind used to create comments. Dropped user preferences.

Rev 07 - 06Aug2003 - Removed the use of the RSD file for auto-

discovery. Changed copyright until a final standards body is chosen. Changed query parameters for the search facet to all begin with atom- to avoid name collisions. Updated all the Entries to follow the 0.2 version. Changed the format of the search results and template file to a pure element based syntax.

Rev 06 - 24Jul2003 - Moved to PUT for updating Entries. Changed all the mime-types to application/x.atom+xml. Added template editing. Changed 'edit-entry' to 'create-entry' in the Introspection file to more accurately reflect its purpose.

Rev 05 - 17Jul2003 - Renamed everything Echo into Atom. Added version numbers in the Revision history. Changed all the mime-types to application/atom+xml.

Rev 04 - 15Jul2003 - Updated the RSD version used from 0.7 to 1.0. Change the method of deleting an Entry from POSTing <delete/> to using the HTTP DELETE verb. Also changed the query interface to GET instead of POST. Moved Introspection Discovery to be up under Introspection. Introduced the term 'facet' for the services listed in the Introspection file.

Rev 03 - 10Jul2003 - Added a link to the Wiki near the front of the document. Added a section on finding an Entry. Retrieving an Entry now broken out into its own section. Changed the HTTP status code for a successful editing of an Entry to 205.

Rev 02 - 7Jul2003 - Entries are no longer returned from POSTs, instead they are retrieved via GET. Cleaned up figure titles, as they are rendered poorly in HTML. All content-types have been changed to application/atom+xml.

Rev 01 - 5Jul2003 - Renamed from EchoAPI.html to follow the more commonly used format: draft-gregorio-NN.html. Renamed all references to URL to URI. Broke out introspection into its own section. Added the Revision History section. Added more to the warning that the example URIs are not normative.

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Copyright Statement

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