ALTO Incremental Updates Using Server-Sent Events (SSE)

draft-ietf-alto-incr-update-sse-13

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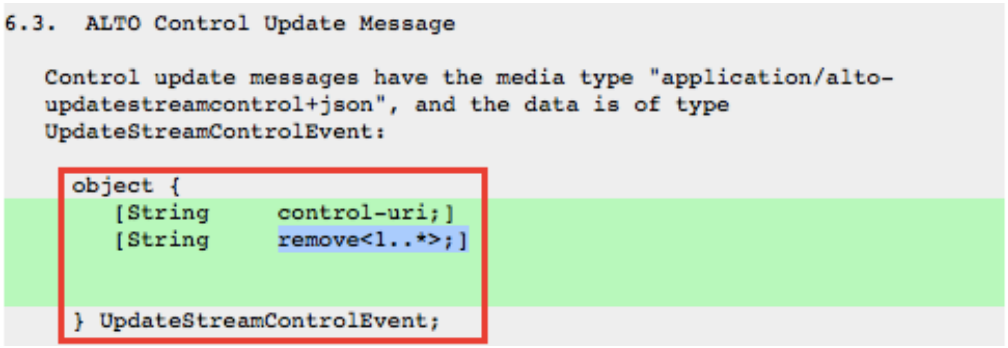
Updates Overview (v10-v13)

- Fix issues in reviews during WGLC (mainly typos and writing issues)
- Terms
  - New terms "update stream server" and "stream control server"
  - State the relationship between "update stream server", "stream control server" and "ALTO server" used in this document.
- Updates of Control Update Message Format
- A modular design of Update Stream Service and Stream Control Service
- Response of Update Stream Service/Stream Control Service
  - Procedure
  - Standard ALTO error response

Updates of Control Update Message Format

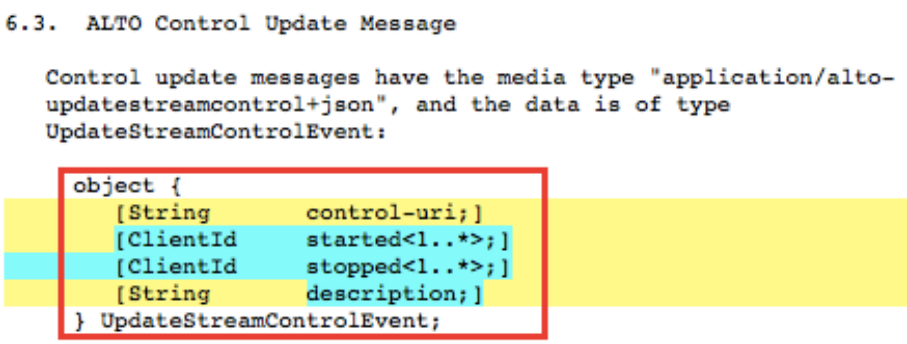


```
6.3.  ALTO Control Update Message

   Control update messages have the media type "application/alto-
   updatestreamcontrol+json", and the data is of type
   UpdateStreamControlEvent:

   object {
      [String      control-uri;]
      [String      remove<1..*>;]

   } UpdateStreamControlEvent;
```



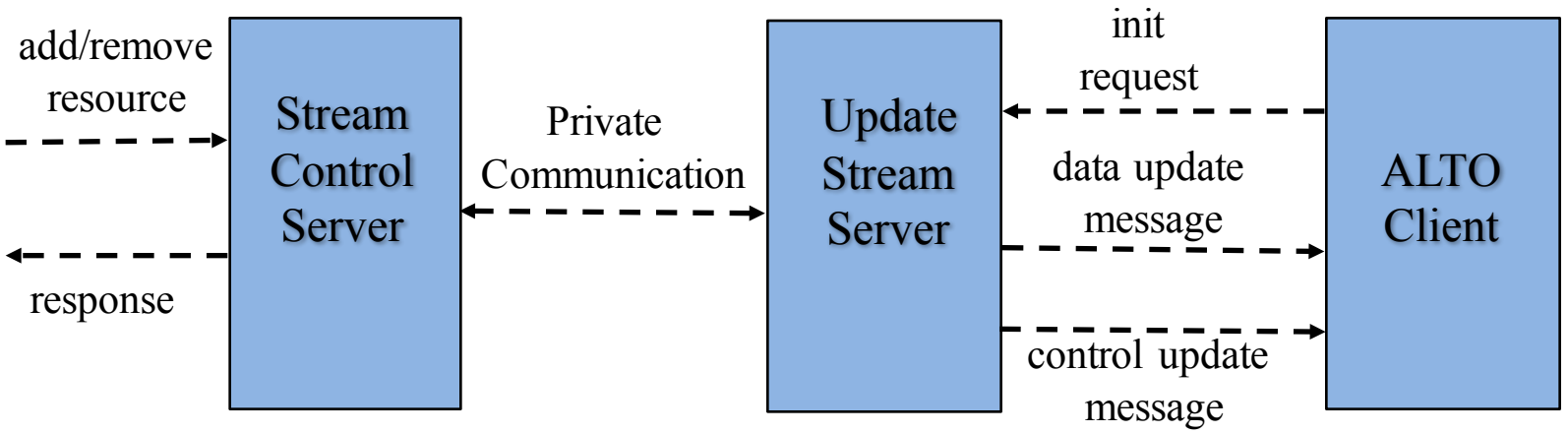
```
6.3.  ALTO Control Update Message

   Control update messages have the media type "application/alto-
   updatestreamcontrol+json", and the data is of type
   UpdateStreamControlEvent:

   object {
      [String       control-uri;]
      [ClientId     started<1..*>;]
      [ClientId     stopped<1..*>;]
      [String       description;]
   } UpdateStreamControlEvent;
```

- Started: a list of client-ids of resources that the server will start to send updates.
- Stopped: a list of client-ids of resources that the server will stop sending updates.
- Description: texts providing explanation for the event.

Modular Design: Decoupling the Update Stream Service and the Stream Control Service



Basic Model of Incremental Updates

Modular Design: Decoupling the Update Stream Service and the Stream Control Service

- Remove the tight relationship between the update stream service and control stream

```
7.  Update Stream Service

   An update stream service returns a stream of update messages, as
   defined in Section 6.  An ALTO server's IRD (Information Resource
   Directory) MAY define one or more update stream resources, which
   clients use to request new update stream instances.

   When a server creates a new update stream, it also creates a new
   update stream control service for that update stream.  A client uses
   the update stream control service to remove resources from the update
   stream instance, or to request updates for additional resources.  A
   client cannot obtain the update stream control service through the
   IRD.  Instead, the first event that the server sends to the client
   has the URI for the associated update stream control service (see
   Section 6.3.                                                Removd

   Section 8 describes the update stream control service.
```

```
7.  Update Stream Service

   An update stream service returns a stream of update messages, as
   defined in Section 6.  An ALTO server's IRD (Information Resource
   Directory) MAY define one or more update stream services, which ALTO
   clients use to request new update stream instances.
```

- Introduce a new field “support-stream-control” in the Capabilities of update stream service

```
7.4.  Capabilities

   The capabilities are defined by an object of type
   UpdateStreamCapabilities:

     object {
       IncrementalUpdateMediaTypes incremental-change-media-types;

     } UpdateStreamCapabilities;

     object-map {
        ResourceID -> String;
     } IncrementalUpdateMediaTypes;
```

```
7.4.  Capabilities

   The capabilities are defined as an object of type
   UpdateStreamCapabilities:

     object {
       IncrementalUpdateMediaTypes incremental-change-media-types;
       Boolean                     support-stream-control;
     } UpdateStreamCapabilities;

     object-map {
        ResourceID -> String;
     } IncrementalUpdateMediaTypes;
```

Response of Update Stream/Stream Control Service : Procedure

Update Stream Service

- Invalid request:
  - Standard ALTO error response
- Valid request:
  - Data Update message
  - Control update message

Stream Control Service

- Invalid request
  - Standard ALTO error response
- Valid request with invalid associated update stream
  - HTTP "404 Not Found" response
- Valid request successfully processed by the stream control server
  - HTTP "202 Accepted" response
  - HTTP "204 No Content" response (the update stream server has also successfully processed the request)

Response of Update Stream/Stream Control Service : Standard ALTO Error Response

```
7.6.  Response

   The response is a stream of update messages.  Section 6 defines the
   update messages, and [SSE] defines how they are encoded into a
   stream.

   An ALTO server SHOULD send updates only when the underlying values
   change.  However, it may be difficult for a server to guarantee that
   in all circumstances.  Therefore a client MUST NOT assume that an
   update message represents an actual change.

   There are additional requirements on the server's response, as
   described below.
```

```
7.6.  Response

   If the update stream request has any errors, the update stream server
   MUST return an HTTP "400 Bad Request" to the ALTO client.  The body
   part of the HTTP response is the JSON object defined in Section 8.5.2
   in [RFC7285].  Hence, an ALTO error response has the format:

      HTTP/1.1 400 Bad Request
      Content-Length: [TBD]
      Content-Type: application/alto-error+json
      Connection: close

      {
          "meta":{
              "code":  "***",
              "field": "***",
              "value": "***"
          }
      }
```

Example

Invalid request to remove client-id "properties"

```
POST /updates/streams/2718281828459
Host: alto.example.com
Accept: text/plain,application/alto-error+json
Content-Type: application/alto-updatestreamparams+json
Content-Length: ###

{
   "remove": [ "properties" ]
}
```

Standard ALTO error response

```
HTTP/1.1 400 Bad Request
Content-Length: [TBD]
Content-Type: application/alto-error+json

{
   "meta":{
       "code":"E_INVALID_FIELD_VALUE",
       "field": "remove",
       "value": "properties"
   }
}
```

Backup Slides

Response of Stream Control Service

- If the request has any errors, an ALTO error response has the format:

```
HTTP/1.1 400 Bad Request
Content-Length: [TBD]
Content-Type: application/alto-error+json
Connection: Closed

{
  "meta": {
    "code": "***",
    "field": "***",
    "value": "***"
  }
}
```

Note: According to [RFC7285], "field" and "value" are optional fields. If "field" exists, "value" MUST exists.

Take an example:

- If an update stream request does not have an "add" field:
  - Error code: "E_MISSING _FIELD"
  - Field: "add"
- If the "resource-id" field is invalid, or is not associated with the update stream:
  - Error code: "E_INVALID_FIELD_VALUE"
  - Field: "resource-id"
  - Value: the name of the invalid "resource-id"