WebSocket-based server-to-client notifications for the Application-Layer Traffic Optimization (ALTO) Protocol

draft-maroccor-alto-ws-01

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Background

Discussions on enhancements/extensions to the current ALTO protocol

• I2AEX BoF and ALTO WG session at IETF83
  – Check presentations and see also draft-marocco-alto-next

• Possible useful extensions
  – Incremental updates (see draft-schwan-alto-incr-updates)
  – Server-initiated Notifications ← focus of this draft/presentation
  – ALTO Information Extensions

• Use Cases that would benefit from such ALTO enhancements:
  – ALTO for CDNs and CDNI
  – ALTO for SDN
  – ALTO Server-to-server Communications
  – Virtualized Applications in Datacenters
Goals

Goals of draft-marocco-alto-ws-01

• Propose WebSockets (RFC 6455) as a possible solution for server-initiated ALTO information update notifications
• Highlight the benefits of this approach
• Provide high level example
• Start discussion of design tradeoffs in the ALTO WG
Why WebSockets?

- WebSockets are only one option for server-initiated ALTO update notifications
  - Other options include e.g. XMPP, BGP and SNMP
- Advantages of WebSockets
  - Explicitly intended to provide bi-directionality to HTTP, i.e. the transport the ALTO protocol is based on
  - Simple identification of related ALTO resources in a WebSocket URI
    - Easy advertisement of such WebSocket URIs in the Information Resource Directory (IRD)
  - Unambiguous definition of resources through MIME type
  - Reuse of HTTP authentication
Example

```
{
  "resources" : [
    ...
    ...
    {
      "uri" : "http://alto.example.com/networkmap",
      "media-types" : [ "application/alto-networkmap+json" ],
      "updates" : "ws://alto.example.com/networkmap"
    },
    {
      "uri" : "http://alto.example.com/costmap/num/routingcost",
      "media-types" : [ "application/alto-costmap+json" ],
      "capabilities" : {
        "cost-modes" : [ "numerical" ],
        "cost-types" : [ "routingcost" ]
      },
      "updates" : "ws://alto.example.com/costmap/num/routingcost"
    }
  ]
}
```

Information Resource Directory returned by an ALTO Server

- IRD contains the WebSocket URI of the update notification service associated to the specific resource
- ALTO Server provides both a network map and a cost map with corresponding update notification services
Conclusion and Discussion

• Design tradeoffs for server-initiated ALTO notifications
  – WebSockets implies keeping a connection alive to the server for updates
      • useful in cases where there are frequent notifications
      • However, there may be overhead in cases where an ALTO server only very rarely updates ALTO information
      • What is the main use case (with respect to frequency of updates) we are targeting with update notifications?
  – Possibility of having only one WS connection for all the update notifications of the resources the client is interested in
      • Pro: one connection only
      • Con: additional complexity due to the need of some kind of subscription protocol
BACKUP SLIDES
Need for Server-initiated ALTO notifications: Example of ALTO-Guidance within CDN Request Routing (DNS Example)