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HTTP-COAP Proxy Discovery using Link-format
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Abstract

This document discusses the problem of HTTP-COAP proxy discovery and proposes a method of using Link-format to do the job.

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Table of Contents

1. Introduction 3
1.1. Requirements Language 3
2. Scenario 3
3. Problem Formation 3
4. Link-format Proxy Discovery 4
5. Design Consideration 5
6. Acknowledgements 5
7. IANA Considerations 5
8. Security Considerations 6
9. References 6
9.1. Normative References 6
9.2. Informative References 6
Authors' Addresses 6

1. Introduction

CoAP [I-D.ietf-core-coap] is a RESTful protocol designed for constrained devices. The ultimate goal of CoAP is to enable the "Web of Things" concept, which connects the smart sensor network with the global internet. Although CoAP has been implemented on various platforms, the rest of web is still dominated by HTTP. As a result, it is desirable to interconnect the HTTP and CoAP via some intermediary proxy. For example, the CoAP sensor client in the constrained network can access and update resources on the HTTP server, and also the HTTP client on the web can access and/or update resources on the CoAP server.

There are already some works discussing how to map HTTP to CoAP and vice versa. The basic mapping between HTTP and CoAP is described in Section 8 of [I-D.ietf-core-coap] . Further details of implementing the proxy, internal procedures and design choices are described in[I-D.castellani-core-http-mapping] .

Static configuration of HTTP-CoAP proxies is a straightforward way for the client to access the server. However, in many situations, static configuration is not enough to meet the requirements. For example, if the HTTP client would like to access a certain type of resource (temperature or humidity in a certain location, etc.), it is required that the client would find an appropriate proxy to serve the content.

1.1. Requirements Language

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 RFC 2119 [RFC2119].

2. Scenario

One example scenario of proxy discovery comes from the requirements that integrates the smart network with the mobile network. The sensors want to find a mobile proxy that can proxy the information to the web. The sensors are static, running CoAP as a client, and wants to report information to the SNS website. The "mobile M2M devices" are nomadic and can serve as the CoAP-HTTP proxy. The sensor wants to discover who is nearby and can shepherd message to the Web.

3. Problem Formation

We divide the problem into two separated parts. The first is how a

CoAP client discovers a proxy to access the HTTP server. For example, the CoAP sensors want to report or get some information to a Web server. In this case, the CoAP sensor only acts as a client. In static configuration, the CoAP client is configured via DHCP or RSRA. But in dynamic environment, a mechanism for dynamic configuration is desired. This document mainly discusses this aspect.

The other case is how a HTTP client discovers a proxy to access the CoAP server. For example, the HTTP client wants to access a certain type of information in the constrained network, and would discover the proxy to the exact constrained sensor. In this case, the HTTP Client only accesss the sensor indirectly. In this case, the HTTP Client only needs to know the address or the domain name of the proxy node, and the proxy forwards the requests to the sensor node according to the sub-domain information or the path included in the URI within the request. But in this case, we believe that the DNS-SD infrastures are sufficient to handle this problem. For example, [I-D.vanderstok-core-bc] has described detailed considerations of a DNS-SD based proxy discovery method for Building Control use cases. So, in this document we will not talk about this direction.

4. Link-format Proxy Discovery

Before the CoAP sensor makes use of the CoAP-HTTP proxy, it must know the location of the proxy. There can be multiple ways to discover the proxy'ss location, including both static and dynamic methods. DHCP is one way to do that, and documented in another document. This document describes one way to discover the proxy by the CoRE link

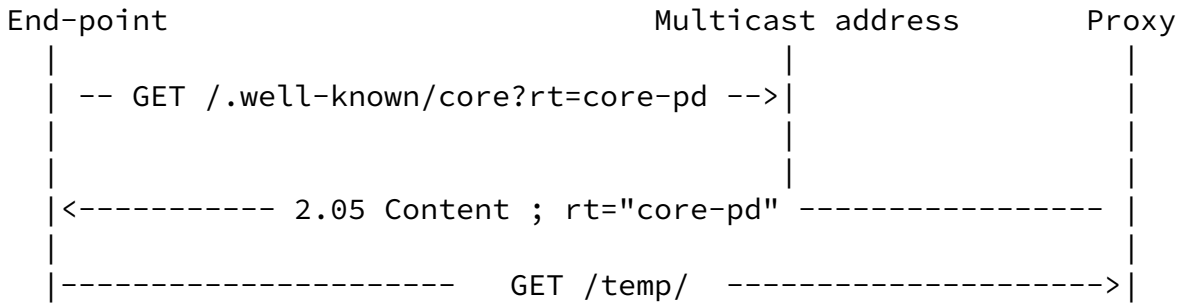
format [I-D.ietf-core-link-format].

Note: Think of the way the user is configured with the http proxy in the enterprise network.

Discovery is performed by sending a multicast GET request to /.well-known/core and including a Resource Type (rt) parameter [I-D.ietf-core-link-format] with the value "core-pd" in the query string. Upon success, the response will contain a payload with a link format entry for each proxy discovered. The multicast IP address used will depend on the scope required and the multicast capabilities of the network. (If determined, IANA actions are required to assign a multicast address for this purpose)

The following example shows an end-point discover a locally available CoAP-HTTP proxy. The CoAP end-point sends a multicast GET request to the multicast address in the domain carrying a resource type "core-pd" indicating its discovery of a local proxy. Then the serving proxy responds the request with the rt="core-pd" and the

address of the proxy is carried within the Content payload. Afterwards, the CoAP sensor initiates the data-plane communication with the proxy directly.



Req: GET coap://[ff02::1]/.well-known/core?rt=core-pd

Res: 2.05 Content
fe80::ff; rt="core-pd";

5. Design Consideration

There are some considerations with the above scheme. First, if all

the nodes on the link is obliged to listen to the multicast message, the energy consumption would be high and unneccessary. To avoid all the nodes on the link receiving the GET message, we can use a "ALL-COAP" multicast address for such kind of request. Regarding the multicast addresses, there would be IANA actions on it. Second, the resource type (rt) definition of the proxy discovery should be defined by IANA.

6. Acknowledgements

Some ideas in this document are according to the discussion between Zach Shelby on the problem. And authors also thank comments from Jari Arkko and Ralph Droms on IETF 82th meeting.

7. IANA Considerations

If the ideas in this document is determined by the working group, IANA actions are required to assign a multicast address for the purpose of HTTP-CoAP proxy discovery, as well as the link format for the proxy discovery.

8. Security Considerations

None.

9. References

9.1. Normative References

[I-D.castellani-core-http-mapping]
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[I-D.ietf-core-link-format]
Shelby, Z., "CoRE Link Format", draft-ietf-core-link-format-11 (work in progress), January 2012.

[I-D.vanderstok-core-bc]
Stok, P. and K. Lynn, "CoAP Utilization for Building Control", draft-vanderstok-core-bc-05 (work in progress), October 2011.

9.2. Informative References

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