A BEEP Binding for the HELD Protocol
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Abstract

A BEEP binding is described for HELD. This binding is more suitable than the basic HTTP binding in scenarios where multiple messages are sent between the same two parties.

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1. Introduction

The HTTP binding for HELD [I-D.ietf-geopriv-http-location-delivery] provides a basis for the protocol, which does not encumber implementations with a complex protocol stack. However, some applications require that a requester make multiple requests in parallel to a Location Information Server (LIS). [I-D.winterbottom-geopriv-lis2lis-req] and [I-D.winterbottom-geopriv-held-lis2lis-bcp] describe use cases and an application of HELD where HTTP is suboptimal.

The HTTP binding is not suitable in volume scenarios because HTTP suffers from head-of-queue blocking. This prevents multiple requests from being processed in parallel. In order to achieve higher throughput, the requester must establish multiple TCP connections in parallel. This causes HTTP to be unsuitable for applications where multiple parallel requests are expected by increasing the overheads.

BEEP [RFC3080] provides a framing scheme that allows for parallel requests. BEEP uses MIME [RFC2045] for its messages, which means that no significant modifications are required to carry HELD messages. This document describes a BEEP profile for HELD.

1.1. Terminology

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. The HELD BEEP Profile

The BEEP profile for HELD is identified as:

    urn:ietf:params:xml:ns:geopriv:held:beep

This identifier is used in the BEEP "profile" element during channel creation.

The HELD channel is a simple continuous channel that does not require any state information. Requests and their respective responses are always in the request-response form ("MSG"/"RPY").

2.1. Channel Initialization

The HELD profile is started with a single "profile" request. No additional parameters are required. When initiating a channel the "profile" element MUST be empty, as shown in the example below.

    <start number="1" serverName="lis.example.com">
    <profile uri="urn:ietf:params:xml:ns:geopriv:held:beep"/>
    </start>

The "serverName" attribute on the "start" message serves the same purpose as the HTTP [RFC2616] "Host" header in informing the server of the name it is known by.

Similarly, the response to channel initialization MUST be empty.

    <profile uri="urn:ietf:params:xml:ns:geopriv:held:beep"/>

2.2. Message Exchange Pattern

The BEEP binding for HELD requires only the "MSG"/"RPY" message exchange. Each "MSG" frame contains a request, which may be either a "locationRequest", "createContext" or "updateContext". Each "RPY" frame includes a response, either a PIDF-LO (i.e. "presence"), or a "contextResponse".


The following exchange demonstrates how a simple HELD location request and response are encapsulated. The "C:" and "S:" prefixes on lines are used following the convention in [RFC3080].

C: MSG 1 7 . 544 125
C: Content-Type: application/held+xml
C:
C: <?xml version="1.0"?>
C: <locationRequest xmlns="urn:ietf:params:xml:ns:geopriv:held"/>
C: END
S: RPY 1 7 . 1902 695
S: Content-Type: application/held+xml
S:
S: <?xml version="1.0"?>
S: <locationResponse xmlns="urn:ietf:params:xml:ns:geopriv:held">
S:     <!-- PIDF-LO contents not shown -->
S: </locationResponse>
S: END

2.3. Error Handling

The HELD BEEP binding does not use the BEEP "ERR" message to indicate errors at the HELD protocol level. Errors in handling HELD Requests are indicated to the requester in a "RPY" message.

Errors in the BEEP message that are unrelated to the HELD protocol, such as MIME formatting problems, are indicated using the BEEP "ERR" message.
3. The "held+beep:" URI

A new URI form is defined to describe a BEEP binding instance. The "held+beep:" URI includes server, port and an identifier that can be used to construct a location reference. The "held+beep:" URI is constructed as shown in Figure 4 using ABNF [RFC4234] and the definitions for URI components from [RFC3986].

3.1. Location By-Reference and the BEEP Binding

The "path" and "query" components of the "held+beep:" URI are used in a similar fashion to the analagous components in HTTP/1.1 [RFC2616]. These components can be conveyed for each request by including them in the MIME headers for each request.

The "Request-URI" header includes an absolute path and optional query components. The header is shown in Figure 5, using ABNF [RFC4234].

This header is modelled on the "Request-URI" field in HTTP/1.1 [RFC2616] and it follows the same rules. See Section 5.1.2 of [RFC2616] for details on how to use this header. A value of "*" implies that no location URI is being used, this value should be assumed when the header is omitted. A value of "*" is assumed if a "held+beep:" URI does not contain path or query elements.
4. LIS Discovery and Authentication for BEEP

This profile is most suited to situations where a client and LIS exchange a large number of requests over a prolonged period. It is anticipated that the client and LIS are known to each other.

Based on this assumption, it is reasonable for the LIS and its clients to have pre-existing configuration that makes discovery unnecessary. In addition, authentication details and methods can be pre-configured on both nodes. This section outlines how discovery can be performed for a LIS that supports the BEEP binding.

Regardless of the method used to determine the address of the LIS, a client MUST authenticate the LIS. This prevents any LIS spoofing attacks that could be used to acquire information about the client (and in turn, their clients).

For persistent connections, it is RECOMMENDED that the LIS also authenticate clients. Some authorization decision is likely to be necessary in order for a client to initiate a large volume of requests, which could represent significant load on a LIS.

This document does not mandate any specific authentication method; however, since TLS MUST be implemented, the mandatory methods in [RFC4346] are assumed to be present. Alternative authentication methods can be negotiated between the LIS and its clients.
5. Security Considerations

TLS [RFC4346] SHOULD be used for HELD over BEEP unless confidentiality, message integrity and authentication are assured through other means (e.g. dedicated media). It is RECOMMENDED that BEEP peers establish a TLS connection immediately, rather than relying on the TLS tuning profile in BEEP.
6. IANA Considerations

6.1. BEEP Profile Registration

This section outlines the HELD BEEP binding in the form described in [RFC3080].


Messages exchanged during Channel Creation: none

Messages starting one-to-one exchanges: HELD request messages from [I-D.ietf-geopriv-http-location-delivery] and extension documents.

Messages in positive replies: HELD request messages from [I-D.ietf-geopriv-http-location-delivery] and extension documents.

Messages in negative replies: The HELD "error" message

Messages in one-to-many exchanges: none

Message Syntax: c.f., HELD [I-D.ietf-geopriv-http-location-delivery]


Contact Information: c.f., the "Author’s Address" section of this document


This section registers a new XML namespace, "urn:ietf:params:xml:ns:geopriv:held:beep", as per the guidelines in [RFC3688].


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XML:
6.3. Registration of the "held+beep:" URI Scheme

This section registers the "held+beep:" URI scheme with the IANA, following the guidelines in [RFC4395].

URI scheme name: held+beep

Status: permanent

URI scheme syntax: See Figure 4 in Section 3.

URI scheme semantics: A held+beep URI defines a means of accessing a LIS, or it can be used to convey a location URI, see Section 3.

Encoding considerations: A held+beep URI is not designed to include internationalized text, it is created and consumed by automated processes only. Internationalized domain names [RFC3490] can be included in the authority part of the URI, but path components are not intended for user entry.

Applications/protocols that use this URI scheme name: The held+beep URI is used by Location Information Servers (LIS) as a means of describing a service, or as a location reference.

Interoperability considerations: No specific considerations.

Security considerations: No specific considerations.
6.4.  Registration of a LIS Application Protocol Tag for HELD over BEEP

This section registers a new S-NAPTR Application Protocol tag for the BEEP binding of the HELD [I-D.ietf-geopriv-http-location-delivery] protocol, as mandated by [RFC3958].

Application Service Tag:  HELD+BEEP

Intended Usage:  Identifies the HELD protocol over BEEP

Applicable Service Tag(s):  LIS

Terminal NAPTR Record Type(s):  S

Defining Publication:  RFCXXXX

Related Publications:  HELD [I-D.ietf-geopriv-http-location-delivery]

Contact Information:  The authors of this document

Author/Change Controller:  The IESG
7. References

7.1. Normative References


7.2. Informative References


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