Claroifications and Extensions to
the Generic Security Service Application Program Interface (GSS-API)
for the Use of Channel Bindings

Status of This Memo

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Abstract

This document clarifies and generalizes the Generic Security Service
Application Programming Interface (GSS-API) "channel bindings"
facility, and imposes requirements on future GSS-API mechanisms and
programming language bindings of the GSS-API.

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1. Introduction

The base GSS-API version 2, update 1 specification [RFC2743] provides a facility for channel binding (see also [RFC5056]), but its treatment is incomplete. The GSS-API C-bindings specification [RFC2744] expands somewhat on this facility in what should be a generic way, but is instead a C-specific way, thus leaving the treatment of this facility incomplete.

This document clarifies the GSS-API’s channel binding facility and generalizes the parts of it that are specified in the C-bindings document but that should have been generic from the start.

2. Conventions Used in This Document

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].

3. New Requirements for GSS-API Mechanisms

Given the publication of RFC 5056, we now assert that all new GSS-API mechanisms that support channel binding MUST conform to [RFC5056].

4. Generic Structure for GSS-API Channel Bindings

The base GSS-API version 2, update 1 specification [RFC2743] provides a facility for channel binding. It models channel bindings as an OCTET STRING and leaves it to the GSS-API version 2, update 1 C-bindings specification to specify the structure of the contents of the channel bindings OCTET STRINGs. The C-bindings specification [RFC2744] then defines, in terms of C, what should have been a generic structure for channel bindings. The Kerberos V GSS mechanism [RFC4121] also defines a method for encoding GSS channel bindings in a way that is independent of the C-bindings -- otherwise, the mechanism’s channel binding facility would not be useable with other language bindings.

In other words, the structure of GSS channel bindings given in [RFC2744] is actually generic in spite of being specified in terms of C concepts and syntax.

We generalize it as shown below, using the same pseudo-ASN.1 as is used in RFC 2743. Although the figure below is, indeed, a valid ASN.1 [CCITT.X680] type, we do not provide a full ASN.1 module as none is needed because no standard encoding of this structure is needed -- the definition below is part of an abstract API, not part
of a protocol defining bits on the wire. GSS-API mechanisms do need
to encode the contents of this structure, but that encoding will be
mechanism specific (see below).

GSS-CHANNEL-BINDINGS ::= SEQUENCE {
  initiator-address-type  INTEGER, -- See RFC2744
  initiator-address       OCTET STRING, -- See RFC2744
  acceptor-address-type   INTEGER, -- See RFC2744
  acceptor-address       OCTET STRING, -- See RFC2744
  application-data        OCTET STRING  -- See RFC5056
}

Abstract GSS-API Channel Bindings Structure

The values for the address fields are described in [RFC2744].

New language-specific bindings of the GSS-API SHOULD specify a
language-specific formulation of this structure.

Where a language binding of the GSS-API models channel bindings as
OCTET STRINGs (or the language’s equivalent), then the implementation
MUST assume that the given bindings correspond only to the
application-data field of GSS-CHANNEL-BINDINGS as shown above, rather
than some encoding of GSS-CHANNEL-BINDINGS.

As mentioned above, [RFC4121] describes an encoding of the above GSS-
CHANNEL-BINDINGS structure and then hashes that encoding. Other GSS-
API mechanisms are free to use that encoding.

5. Security Considerations

For general security considerations relating to channel bindings, see
[RFC5056].

Language bindings that use OCTET STRING (or equivalent) for channel
bindings will not support the use of network addresses as channel
bindings. This should not cause any security problems, as the use of
network addresses as channel bindings is not generally secure.
However, it is important that "end-point channel bindings" not be
modeled as network addresses; otherwise, such channel bindings may
not be useable with all language bindings of the GSS-API.
6. References

6.1. Normative References


6.2. Informative References


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