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N. Williams
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A PRF API extension for the GSS-API
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Abstract

This document defines a Pseudo-Random Function (PRF) extension to the Generic Security Service Application Programming Interface (GSS-API) for keying application protocols given an established GSS-API security context. The primary intended use of this function is to key secure session layers that don't or cannot use GSS-API per-message MIC (message integrity check) and wrap tokens for session protection.

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1. 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](#)].

[2.](#) Introduction

A need has arisen for users of the GSS-API to key applications' cryptographic protocols using established GSS-API security contexts. Such applications can use the GSS-API for authentication, but not for transport security (for whatever reasons), and since the GSS-API does not provide a method for obtaining keying material from established security contexts such applications cannot make effective use of the GSS-API.

To address this need we define a PRF extension to the GSS-API.

[3.](#) GSS_Pseudo_random()

Inputs:

- o context CONTEXT handle,
- o prf_in OCTET STRING,
- o desired_output_len INTEGER

Outputs:

- o major_status INTEGER,
- o minor_status INTEGER,
- o prf_out OCTET STRING

Return major_status codes:

- o GSS_S_COMPLETE indicates no error.
- o GSS_S_NO_CONTEXT indicates that a null context has been provided as input.
- o GSS_S_CONTEXT_EXPIRED indicates that an expired context has been provided as input.
- o GSS_S_UNAVAILABLE indicates that the mechanism lacks support for

- this functions.
- o GSS_S_FAILURE indicates failure or lack of support; the minor status code may provide additional information.

This function applies the established context's mechanism's keyed PRF function to the input data (prf_in), keyed with key material associated with the given security context and outputs the resulting octet string (prf_out) of desired_output_len length.

Mechanisms MAY limit the output of the PRF according, possibly in ways related to the types of cryptographic keys available for the PRF function, thus the prf_out output of GSS_Pseudo_random() MAY be smaller than requested.

This function, applied to the same inputs by an initiator and acceptor using the same established context, produces the *same results* for both, the initiator and acceptor.

Applications SHOULD NOT make more than one GSS PRF call per-established security context.

If an application makes multiple calls, per established security context, to the GSS PRF, then it is up to the application to ensure synchronization of order of function calls between initiator and acceptor; such applications SHOULD provide different input octet strings to each such GSS PRF call. The result of making multiple calls to the GSS PRF in different order on the initiator and acceptor

sides is undefined.

[3.1](#) C-Bindings

```
OM_uint32 gss_pseudo_random(
    OM_uint32          *minor_status,
    gss_ctx_id_t      context,
    const gss_buffer_t prf_in,
    ssize_t           desired_output_len,
    gss_buffer_t      prf_out
);
```

[4.](#) Security Considerations

Care should be taken in properly designing a mechanism's PRF function.

GSS mechanisms' PRF functions should use a key derived from contexts' session keys and should preserve the forward security properties of

the mechanisms' key exchanges.

5 Normative

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.

[RFC2743] Linn, J., "Generic Security Service Application Program Interface Version 2, Update 1", [RFC 2743](#), January 2000.

[RFC2744] Wray, J., "Generic Security Service API Version 2 : C-bindings", [RFC 2744](#), January 2000.

Author's Address

Nicolas Williams
Sun Microsystems
5300 Riata Trace Ct
Austin, TX 78727
US

EMail: Nicolas.Williams@sun.com

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