NetApp

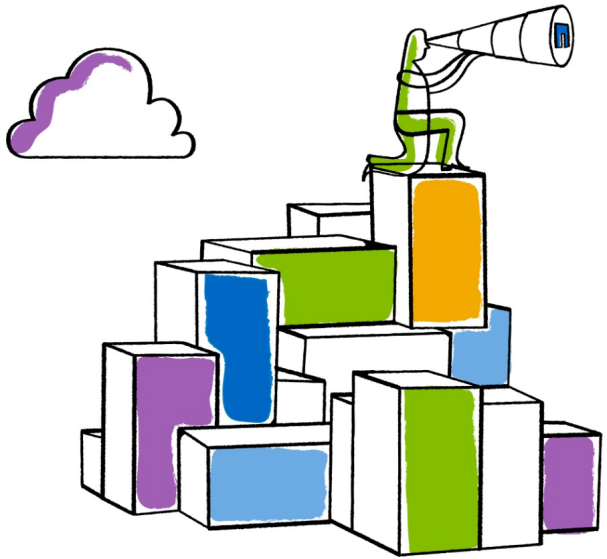
Go further, faster®

# Draft-ietf-nfsv4-rpcsec-gssv3-05

William A. (Andy) Adamson

andros@netapp.com

IETF 88 Vancouver



# Motivation

- Draft un-changed since Nov 07 2012
  - Refocus on NFSv4.2 use
- NFSv4.2 Secure Inter-server SSC
  - It's use in draft-ietf-nfsv4-minorversion2-19 not clear
- NFSv4.2 LNFS Full mode or server-guest mode
  - Made the obvious changes
  - I did not do a detailed review of LNFS needs

# Changes Between draft-04 and draft-05

- Simplify
  - Removed client identity assertions due to lack of interest
    - Can be added later, see extensibility section.
  - The rpc_gss_cred_vers_3_t handle_version field is not needed
  - Changed privilege assertions into structured privilege assertions
    - Draft-04 privilege assertions can be expressed as a structured PA
- Clarify
  - Restructured the draft including describing the encoding of each message type and it's use.

# Creating a GSSv3 Context

- Piggy back on existing GSS1 context , called the *'parent'* context handle
  - Creates a *'child'* GSS3 context handle bound to the payload
- Conceptually like v4.0 LOCK using confirmed OPEN sequence number stream for a new lockowner
- The RPC message header verifier field is *always* constructed using the parent context.
  - For all control and data messages

# RPCSEC_GSS3_CREATE control msg

- Looks a lot like a GSS1 DESTROY message except:
  - It has as a NULLPROC payload
  - It uses version 3 instead of version 1

```
struct rpc_gss_cred_vers_3_t {
        rpc_gss3_proc_t       gss_proc;        RPCSEC_GSS3_CREATE
        unsigned int          seq_num;         handle field context seq_num
        rpc_gss_service_t     service;         NOT rpc_gss_svc_none.
        opaque                handle<>;        GSS1 (parent) handle
    };
```

# Creating a GSS3 Context

- The server verifies the payload, then returns a GSS3 (child) handle + per payload response.
  - The GSS3 handle is used in all future GSS3 destroy and data messages that require the create payload binding
- Both the client and the server need to associate the GSS3 child handle with the parent GSS1(2) handle in their context caches.
  - Given GSS3 handle, lookup parent context for crypto..

# Creating a GSSv3 Context

- The RPCSEC_GSS3_CREATE control message NULLPROC payload is any combination of:
  - Channel binding
  - Compound authentication
  - Structured privilege (RPC application defined)
  - Security label assertion

# Compound Authentictaion

- In addition to the parent context handle, the compound authentication payload contains a context handle called the '*inner*' handle along with a
  - version (inner handle version)
  - Nonce
  - MIC of the nonce using the 'inner' GSS-API security context
- All uses of a child context handle that is bound to an inner context MUST be treated as speaking for the initiator principal of the inner context handle's GSS-API security context

# Structured Privilege Assertion

- An RPC application defined opaque structure. It's encoding, server verification, and any server policies are described by the RPC application definition.

```
struct rpc_gss3_privs {
        rpc_gss3_list_name      listname;
        opaque                  privilege<>;
};
```

- All successful privilege assertions are returned in the rpc_gss3_create_args assertions field

# Security Label Assertions

- The client performs a GSS3 LIST control message asking the server which security labels it supports
- A GSS3 CREATE control message is sent to bind a set of security labels to the resultant GSS3 handle

```
struct rpc_gss3_lfs {
        unsigned int lfs_id;
        unsigned int pi_id;
};
```

```
struct rpc_gss3_label {
        rpc_gss3_lfs    lfs;
        opaque          label<>;
};
```

# RPCSEC_GSS3_LIST control msg

- Used to list server supported security labels
- Client then chooses security label(s) from the list and creates a GSS3 handle bound to the chosen security labels.
- The LIST control message therefore uses the GSS1 parent handle and sequence number stream in the request, just like RPCSEC_GSS3_CREATE
  - Note: this is a change from the current -05 draft

# RPCSEC_GSS3_LIST control msg

- Used to list server supported security labels

```
struct rpc_gss_cred_vers_3_t {
        rpc_gss3_proc_t       gss_proc;       RPCSEC_GSS3_LIST
        unsigned int          seq_num;        handle field context seq_num
        rpc_gss_service_t     service;        any security service
        opaque                handle<>;       GSS1 (parent) handle
  };
```

- NULLPROC payload rpc_gss3_list_res

# RPCSEC_GSS3_DESTROY control msg

- Looks a lot like a GSS1 DESTROY message
  - With version 3 instead of 1

```
struct rpc_gss_cred_vers_3_t {
        rpc_gss3_proc_t       gss_proc;       RPCSEC_GSS3_DESTROY
        unsigned int          seq_num;        handle field context seq_num
        rpc_gss_service_t     service;        any security service
        opaque                handle<>;       GSS3 (child) handle
   };
```

# RPCSEC_GSS3_DATA

- The GSS3 data message auth header looks as expected:

```
struct rpc_gss_cred_vers_3_t {
        rpc_gss3_proc_t       gss_proc;       RPCSEC_GSS3_DATA
        unsigned int          seq_num;        handle field context seq_num
        rpc_gss_service_t     service;        any security service
        opaque                handle<>;       GSS3 (child) handle
    };
```

# Using a GSSv3 Context

- All NFS operations using the GSS3 handle assert all successful privileges and features associated with it's creation.
- Clients and servers therefore need to cache the specific privileges and features along with the GSS3 handles

# Issues

- Don’t destroy parent without first destroying child
  - GSS3 child handle depends on parent
- Review GSS3 LIST control message
  - Done prior to GSS3 create to find supported labels
  - Needs to use parent context handle
- Review NFSv4.2 and GSS3 security label handling
  - Ensure the two protocols handle the use cases
- Keep the void extensions arg and response?
- Error messages need to be completed

# Thank you