FedFS

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for
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Summary

The FedFS requirements have been approved for publication as an RFC.

The DNS SRV, NSDB, and Admin drafts are being prepared for WG Last Call in Nov/Dec 2009.
Drafts

Four drafts published as working group documents:

- **Requirements**
  draft-ietf-nfsv4-federated-fs-reqts

- **Namespace Root Discovery**
  draft-ietf-nfsv4-federated-fs-dns-srv-namespace

- **NSDB Protocol**
  draft-ietf-nfsv4-federated-fs-protocol

- **Admin Protocol**
  draft-ietf-nfsv4-federated-fs-admin
Summary: Requirements for a federated filesystem.

Category: Informational

Status: Draft is approved for publication as an RFC and in the RFC-Editor’s queue.

Namespace Root Discovery
draft-ietf-nfsv4-federated-fs-dns-srv-namespace-02

Summary: A DNS record format for publishing the location of a namespace’s root.

Proposed
Category: Standards Track

Status: Completed DNS Directorate Review per suggestion during IETF’75 WG meeting and received feedback on the NFSv4 WG mailing list.

Next Steps: Add pre-RFC5378 disclaimer and address other idnits.
Respond to any future mailing list feedback.
NSDB Protocol

draft-ietf-nfsv4-federated-fs-protocol-04

Summary: Defines the LDAP schema and operations on a Namespace Database (NSDB).

Proposed Category: Standards Track

Status: □ Received LDAP Expert Review.
□ Trond Myklebust demonstrated and released a Linux prototype of the NSDB protocol at the October Bake-a-thon.
□ Updated schema in -04 by splitting monolithic fls_info field into individual components. Improves searching for a single component.

Next Steps: □ Choose the format for an NFS path. The current proposal is to encode with XDR, but some would prefer a string encoding.
□ Decide if and how an NSDB is discoverable via DNS SRV.
□ LDAP Expert Review for new additions in -04 schema.
Summary: Describes an ONC RPC protocol to create/delete/query a junction on a fileserver.

Proposed Category: Standards Track

Status: Version -03 specifies the format of a path using the same data type as NFSv4 (changed from a string).

Next Steps: Choose and document the recommended mechanism for NSDB Trust Anchor management (admin protocol-specific procedure or TAMP [PKIX WG]).
Add a parameter to the query junction procedure to instruct a fileserver to resolve the given junction (useful for testing/diagnostics).
Meetings

Open meetings are held each week to resolve issues and review proposals.

- Thursdays, 1:30 – 2:30 PM Eastern  
  (10:30 - 11:30 AM Pacific)
- Conference Number: 1-888-765-3653
- Conference ID: 2354843
Many people have contributed! Including:

George Amvrosiadis (Univ. of Ioannina)  Pavan Mettu (Sun)
Andy Adamson (NetApp)                   Manoj Naik (IBM)
Dan Ellard (BBN Technologies)            Chris Stacey (EMC)
Craig Everhart (NetApp)                  Renu Tewari (IBM)
Sorin Faibish (EMC)                      Robert Thurlow (Sun)
Paul Lemahieu (EMC)                      Nicolas Williams (Sun)
James Lentini (NetApp)                   Mario Würzl (EMC)
Trond Myklebust (NetApp)

Special thanks to Michael Eisler for presenting these slides!
Background Information
FedFS is a set of open protocols that permit the construction of a scalable, cross-platform federated file system namespace accessible to unmodified NFSv4[.1] clients.

Key points:
- Unmodified clients
- Open: cross-platform, multi-vendor
- Federated: participants retain control of their systems
- Scalable: supports large namespaces with many clients and servers in different geographies
## FedFS Protocols

### Namespace Management
1. NSDB Management (LDAP)
2. Junction Management (ONC RPC)

### Namespace Navigation
3. Client root discovery (DNS)
4. Junction resolution (LDAP)

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The diagram illustrates the flow of NFSv4[.1] (unchanged) between NFSv4[.1] Clients, DNS Server, Administrative Host, and NSDB Server.
What are the benefits?

- Simplified management: eliminates complicated software such as the automounter.
- Separates logical and physical data location: allows data movement for cost/performance tiering, worker mobility, and application mobility.
- Enhances:
  - Data Replication: for load balancing or high availability
  - Data Migration: for moving data closer to compute or decommissioning systems
  - Cloud Storage: for the dynamic data center, enterprise clouds, or private internet clouds.
The illusion: The user and application software see a simple, hierarchical namespace.

Behind the scenes, simple management operations allow data mobility for high performance, high reliability, and high availability.
The user requests /home/alice:
1. The client attempts to access /home/alice on server foo.
2. Server foo discovers that home is a namespace junction and determines its location using the FedFS NSDB service.
3. Server foo returns an NFSv4 referral to the client directing it to server bar.
4. The client accesses home/alice on server bar.
NFSv4 clients supporting referrals are available on many platforms. For example:

- **AIX**: referrals and replication (including failover) supported since 5.3 (released August, 2004)
- **HPUX**: referrals supported in HP-UX 11iv3 with ONCplus B.11.31.03 (released May, 2008)
- **Linux**: referrals supported since 2.6.18 (released September, 2006)
  - Migration/replication support under development
 Prototype of NSDB protocols demonstrated at the summer WG meeting in Dublin (Summer, 2008)
 Four drafts published as NFSv4 WG documents (Fall, 2008).
 Federated namespace added to the NFSv4 WG charter (Spring, 2009)
 Requirements draft passed WG last call (May, 2009)
 Requirements approved for publication (October, 2009)