Federated Filesystem (FedFS)

James Lentini
jlentini@netapp.com

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Summary

Requirements published as RFC 5716 in January.

Three remaining drafts being prepared for WG last call:

• Namespace 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
Namespace Discovery: how a client locates a namespace’s root.

**NSDB:** (a) database management and (b) junction resolution.

**Admin:** junction management (create/delete/query).
Highlights since IETF’76

• NSDB and Admin drafts updated in January.
• Three week review period for all three drafts from January 21 to February 11.
  – All feedback was related to Admin protocol.
• Implementations of FedFS NSDB protocol were successfully tested at Connectathon in February.
Namespace Discovery

draft-ietf-nfsv4-federated-fs-dns-srv-namespace

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

Proposed Category: Standards Track

Status: Only cosmetic changes discussed since IETF’76 in November. idnits will be addressed in next update.

Next Steps: • Respond to any future mailing list feedback.
• WG Last Call (April or May?).
• Final DNS Directorate Review.
NSDB Protocol

draft-ietf-nfsv4-federated-fs-protocol

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

Proposed Category: Standards Track

Status: January -05 version included:
  • Recommendations for generating a referral from an FSL (2.4.3).
  • Expanded junction resolution example (3.2).
  • Clarified format of fedfsNetAddr [DNS name, IPv4, or IPv6 ] (4.2.1.2) and fedfsNsdbName [only DNS name] (4.2.1.4).

Next Steps: • WG Last Call (May or June?).
  • Final LDAP Expert Review (passed previous reviews ).
Admin Protocol

draft-ietf-nfsv4-federated-fs-admin

Summary: Describes an ONC RPC protocol to create/delete/query a junction on a fileserver.

Proposed Category: Standards Track

Status: January -04 version included:
  • Expanded junction query (see new error codes and functionality for FEDFS_LOOKUP_FSN).
  • NSDB Trust Anchor Management (see FEDFS_*_NSDB_PARAMS).

Next Steps: • Resolve questions about junction size, pathnames, and international strings (DNS names, paths, etc).
  • WG last call (June or July?).
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
Acknowledgements

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BACKGROUND INFORMATION
What is FedFS?

• 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. Namespace discovery (DNS)
4. Junction resolution (LDAP)

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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.

L.A.  New York  Boston

FY08  FY09  alice  bob  eve  FY09  home  /  data  bob  eve

The reality: 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’s /users.
4. The client accesses /users/alice on server bar.
Client Support for Referrals

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 since 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
- **OpenSolaris**: referrals supported since build 131 (released January, 2010).
Past Milestones

• 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
  – passed WG last call (May, 2009).
  – approved for publication (October, 2009).
  – published as RFC 5716 (January, 2010).