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

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Requirements
draft-ietf-nfsv4-federated-fs-reqts-06

Summary: Requirements for a federated filesystem.

Category: Informational

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

Next Steps:
- Publication of NFSv4.1. The FedFS requirements normatively reference (depend on) the NFSv4.1 specification.

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.

Admin Protocol
draft-ietf-nfsv4-federated-fs-admin-03

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

Acknowledgements

Many people have contributed! Including:

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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
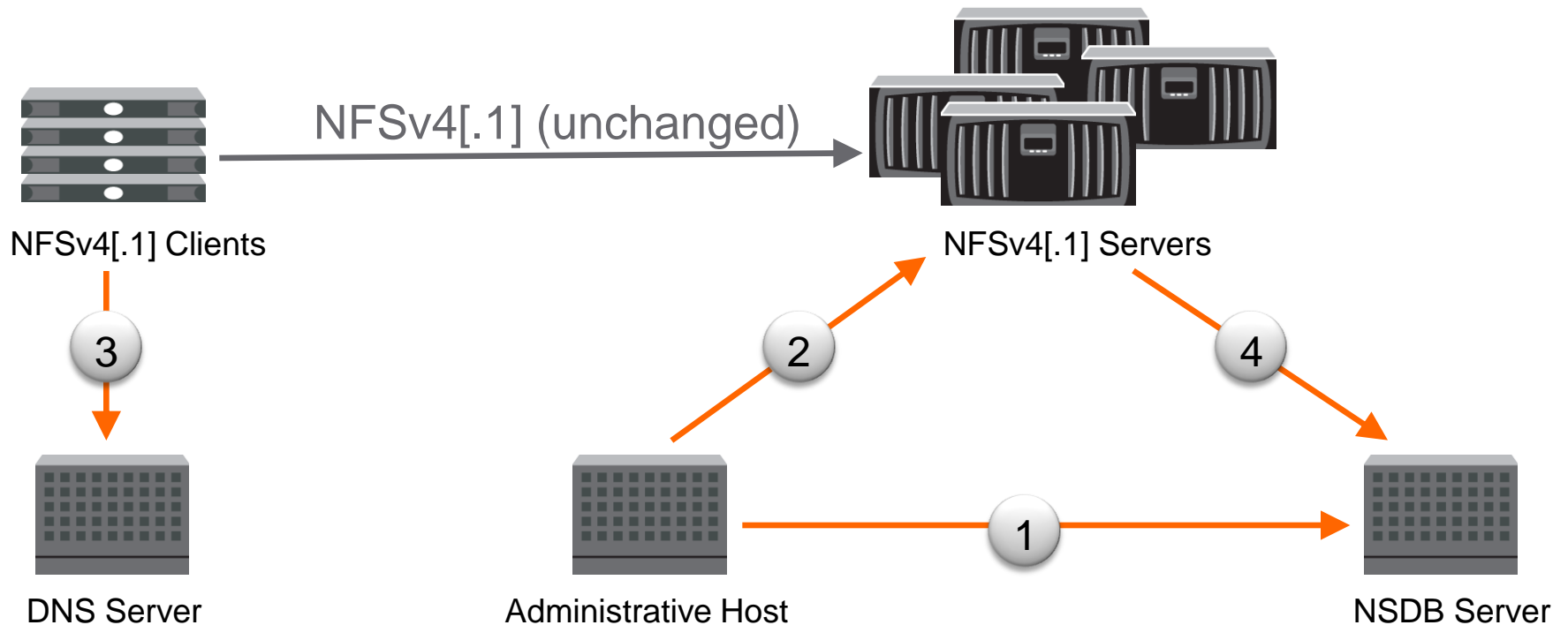
FedFS Protocols

Namespace Management	Namespace Navigation
1 NSDB Management (LDAP)	3 Client root discovery (DNS)
2 Junction Management (ONC RPC)	4 Junction resolution (LDAP)

NFSv4[.1] (unchanged)

NFSv4[.1] Clients

NFSv4[.1] Servers

3

2

4

1

DNS Server
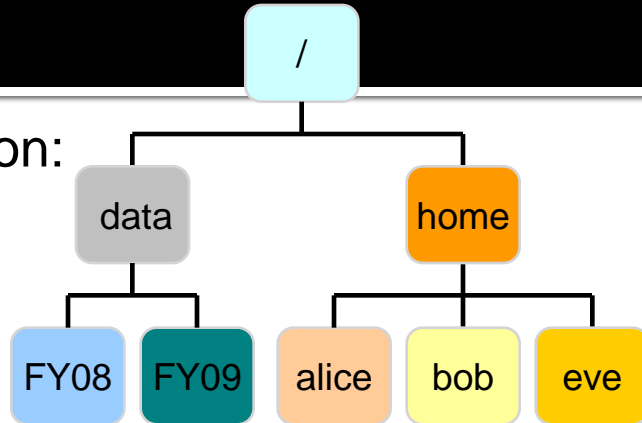
Administrative Host

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
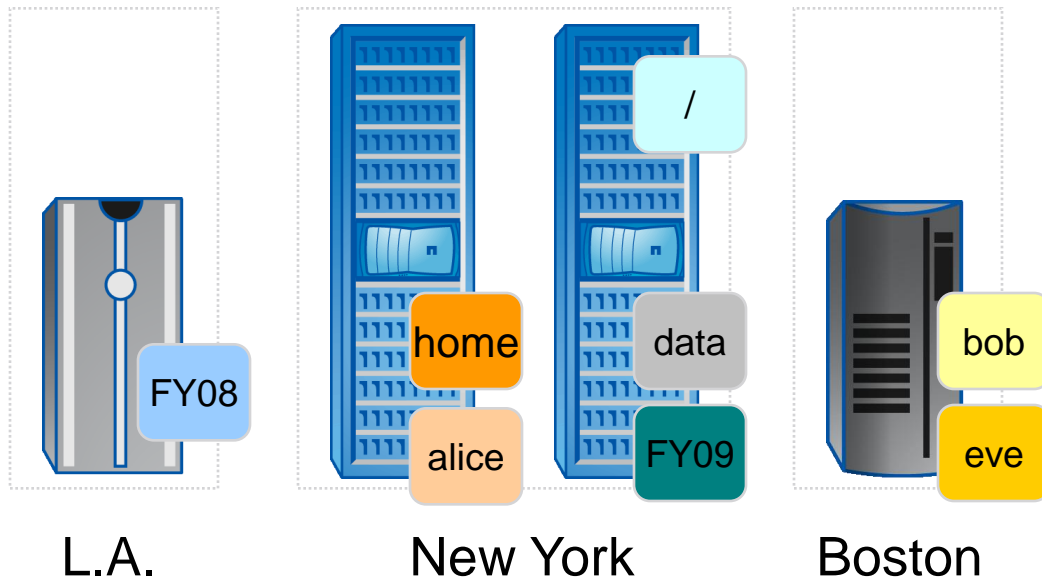 - Cloud Storage: for the dynamic data center, enterprise clouds, or private internet clouds.
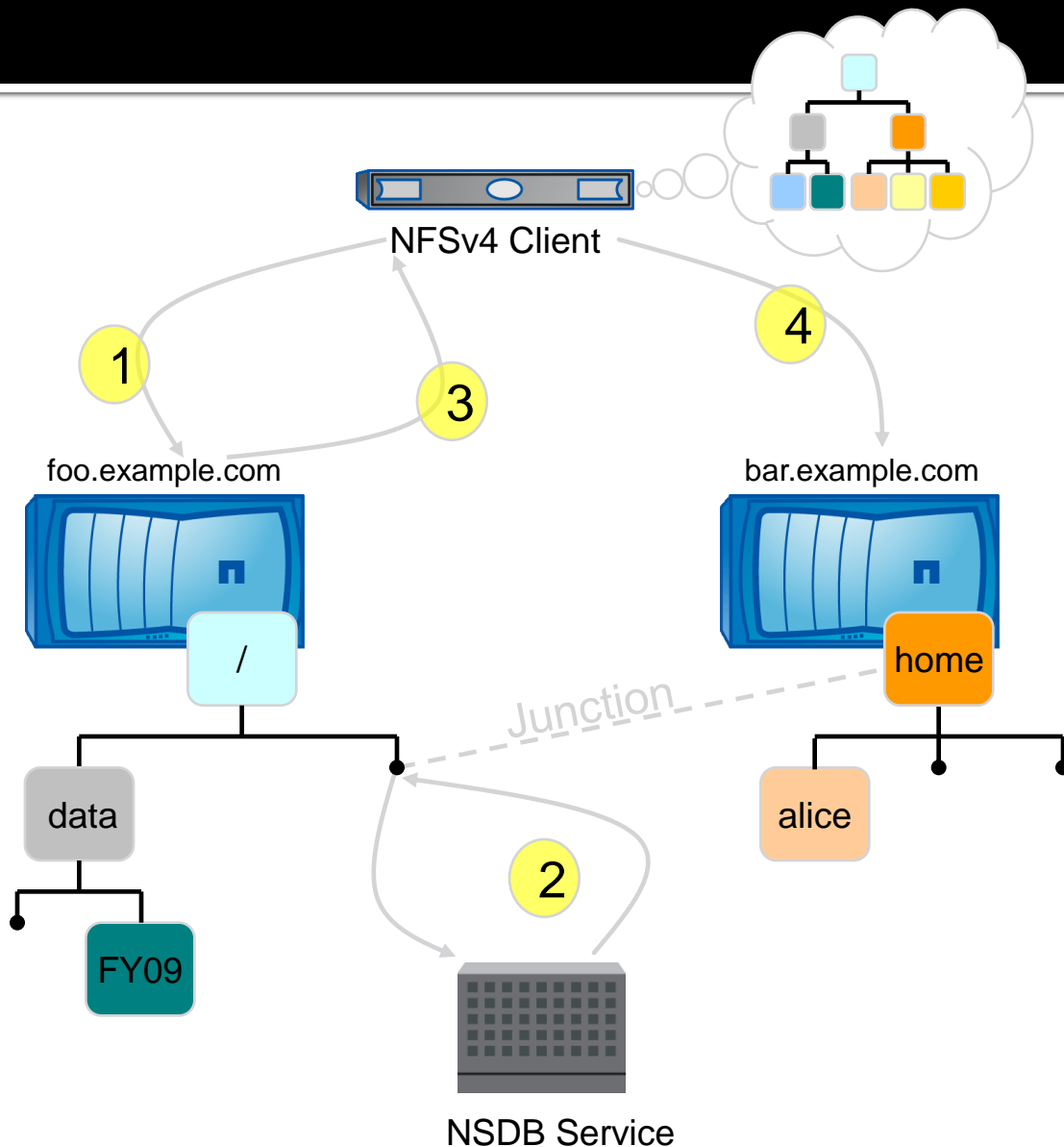
Federated Namespace Example

The illusion:

The reality:

L.A.   New York   Boston

- 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.

FedFS in Action

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.

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 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

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 draft passed WG last call (May, 2009)
- Requirements approved for publication (October, 2009)