Federated-filesystem protocol status

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Outline

- Background
- Terms
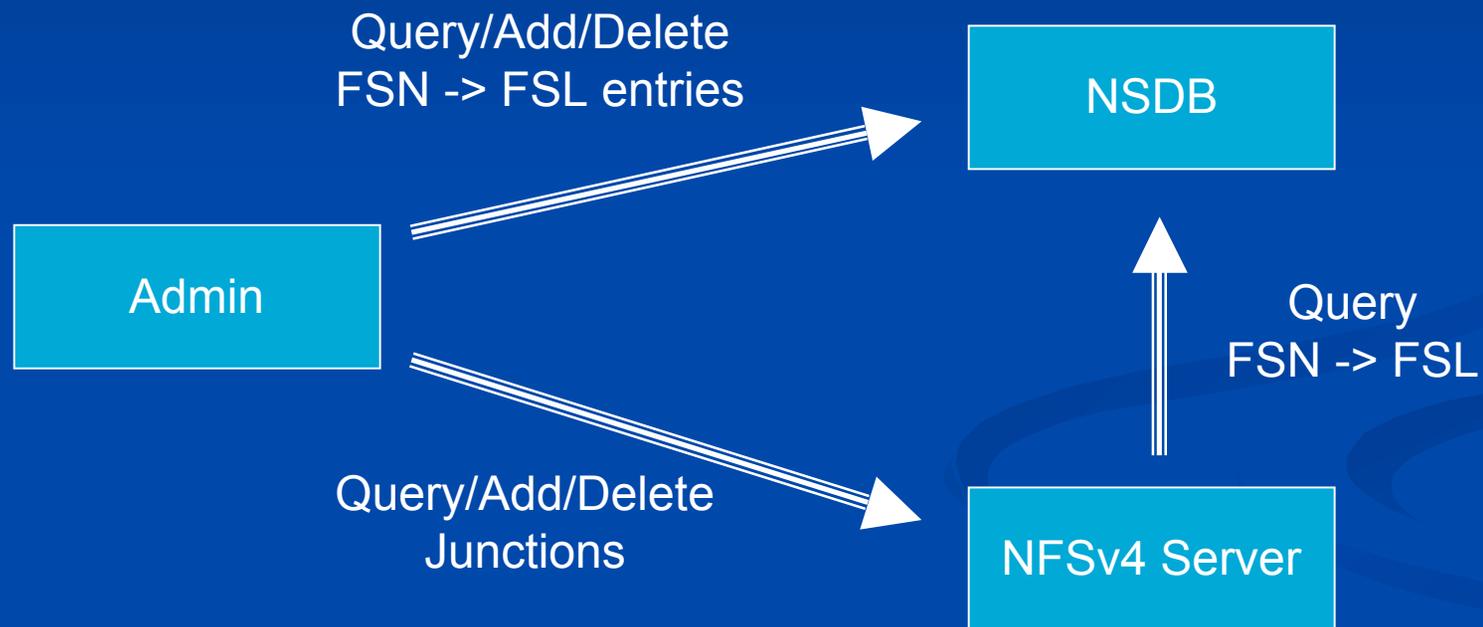- Protocols
- Status
- Issues

Background

- Idea: use NFSv4.x to build a cross-platform, federated file system with a shared, common namespace.
  - Cross-platform: based on an open, standard protocol
  - Federated: independent servers administered independently
- Use cases:
  - Single enterprise with multiple fileserver/cluster platforms
  - Federated enterprises sharing independently managed namespace(s)
- Open issues:
  - Discovery protocol for namespace roots not defined yet
  - The security model assumes an existing infrastructure for access, authorization, and ID mapping
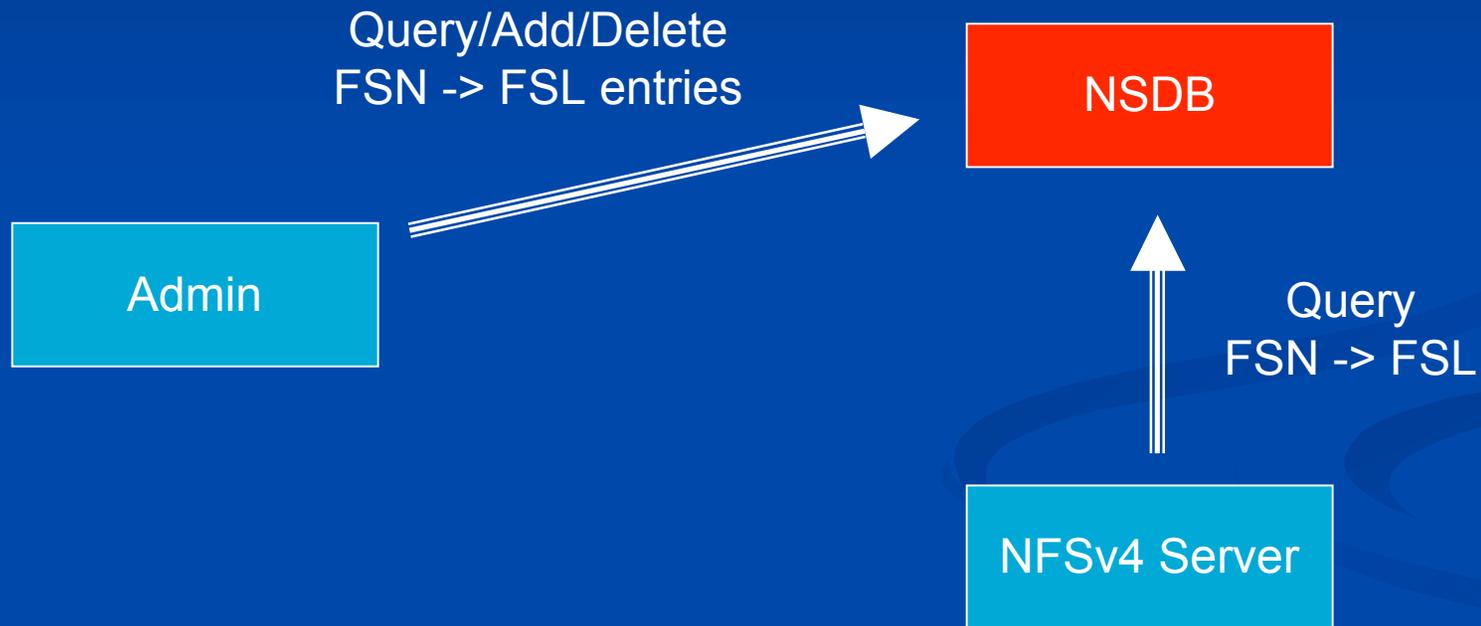
Terms and Definitions

- Fileset: the basic organizational unit for data
- NSDB: "namespace database"
  - Repository of info about filesets
  - Every fileset has a single authoritative NSDB
- FSN: "fileset name" - symbolic name of a fileset
  - UUID + Name of the NSDB responsible for the fileset
  - FSN is globally unique
- FSL: "Fileset Location - location of an implementation of a fileset
- Junction: binds a path within a fileset to a target FSN
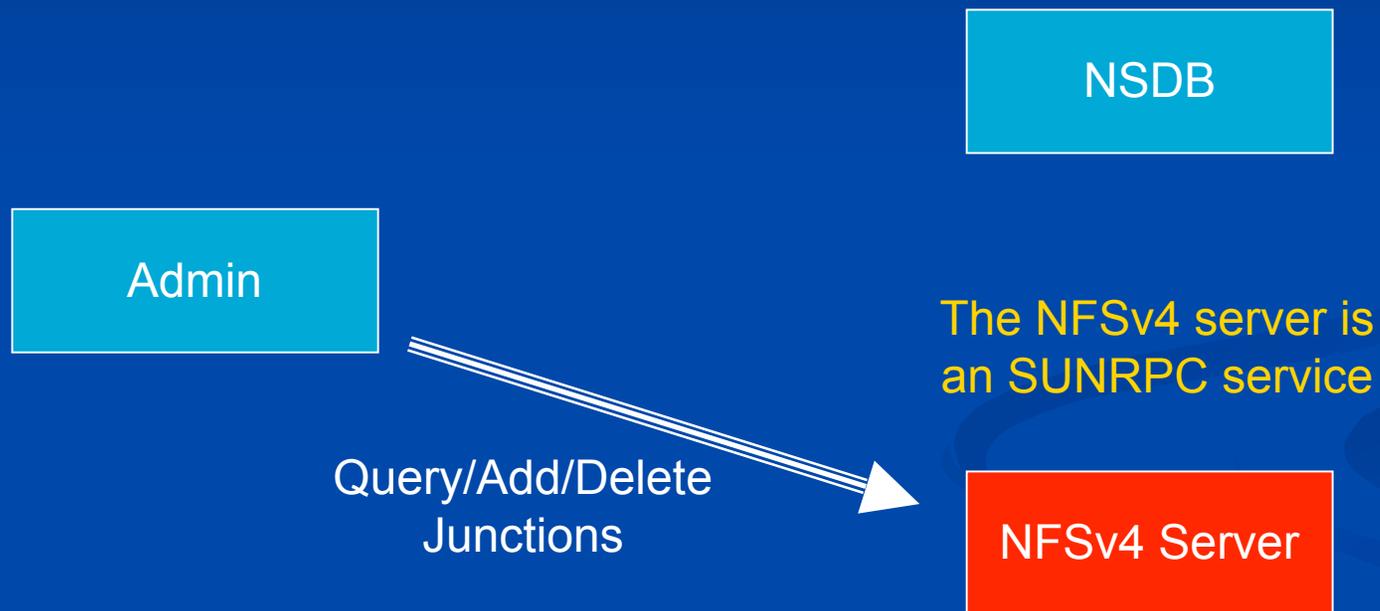 - Requires fileserver support

Three Roles and Subprotocols

NSDB Protocols

The NSDB is an
LDAP service

Query/Add/Delete
FSN -> FSL entries

NSDB

Admin

Query
FSN -> FSL

NFSv4 Server

NFSv4 Server Extensions

NSDB

Admin

The NFSv4 server is
an SUNRPC service

Query/Add/Delete
Junctions

NFSv4 Server

Discussion questions

- Common namespace
  - finding root fileservers not defined by protocol
- FSL consistency not defined
- Caching of namespace information across NSDBs
  - Default local NSDB not defined
- Security Issues
- Access/authorization, ID mapping issues

Draft Status

- We would like this work added to the NFS WG charter
- Rough consenus:
    - NSDB protocols well discussed, stable
    - Admin protocol is coming along
- (soon-to-be) running code:
    - NetApp is working on a proof-of-concept implementation

Open Issues

- NFSv4 client issues
    - Support for fs_locations with hostname and path
    - Support for pure referrals, migration, replica failover
    - Adding junctions to existing exported paths
- Replication and migration support
    - Should it be part of fed-fs protocol?

More Information at

- list federated-fs@sdsc.edu
- IETF Draft
  - draft-tewari-federated-fs-protocol-01.txt
  - draft-ellard-federated-fs-admin-00.txt
- Emails:
  - daniel dot ellard at netapp dot com
  - tewarir at us dot ibm dot com