

NICFNOSDNUFSETRREYN

NFS Version 4

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NFSv4 History

1998

NFSv4 Working Group Formed

1999

RFC 2625 – Design Considerations

2000

2001

RFC3010 - NFSv4

2002

RFC3010bis (NFSv4 redux)

2003

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Bakeoffs/Connectathons

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What is NFSv4?



N I C F N O S D N U F S E T R R E Y N C

NFSv4 (RFC3010bis)

KerberosV5 (RFC1510) Kerberos GSSAPI (RFC1964) SPKM-3/LIPKEY (RFC2847)

RPC (RFC1831) XDR (RFC1832) RPCSEC_GSS (RFC2203) GSSAPI (RFC2743)

TCP*



NFSv4 is...

Secure

- RPCSEC_GSS allows for per request authentication/integrity/privacy
- Private Key (KerberosV5)
- Public Key (LIPKEY/SPKM3)
- Negotiation within protocol



One Protocol

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PORTMAP
MOUNT
NFSv2/v3
LOCK/NLM
STATUS
ACL*

Port 111
Dynamic
Dynamic
Dynamic
Dynamic
Dynamic

NFSv4

Port 2049 TCP

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NFSv4 is...

- Internet Accessible
 - Use of TCP
 - Well defined port (2049) traverse firewalls
 - Delegation
 - COMPOUND procedure roundtrips reduced
 - Use of UTF-8
 - User/Group Names (not numbers)



Fewer Round Trips

N I C F N O S D N U F S E T R R E Y N

NFSv3

LOOKUP ACCESS READ

NFSv4

PUTFH
LOOKUP
GETFH
GETATTR
OPEN
READ

COMPOUND

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NFSv4 is...

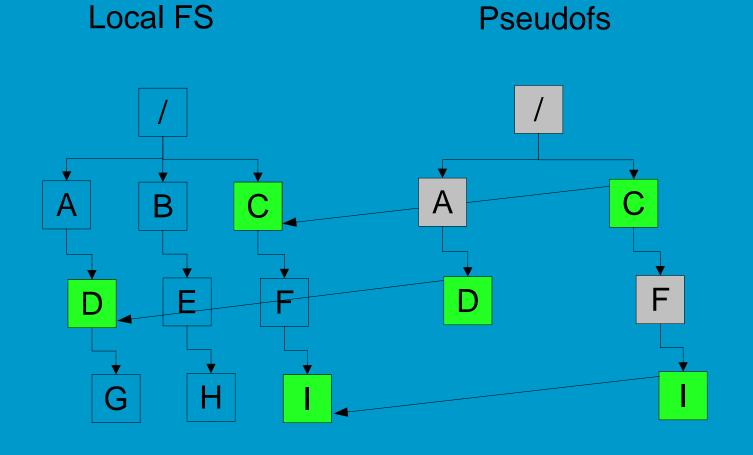
- Filesystem Flexibility
 - Non-Unix specific
 - File attribute model
 - Extensible numbered attributes
 - Named attributes
 - Single server namespace



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NFSv4 is...

Single Namespace



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Client SETCLIENTID

DELEGRETURN

NFSv4 is... Delegation Server

Callback Path? Delegate?←



OPEN

READ

LOCK

WRITE

LOCKU

CLOSE

OPEN

CLOSE

WRITE

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Replication/Migration

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Client



Old Server

Private protocol

New Server

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NFSv4 is...

- Extensible
 - Minor versions
 - Attribute addition
 - Operation addition



What is rfc3010bis?



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RFC3010bis

- NFSv4 again
- Reflects implementation work
- About 250 issues resolved
 - Typos -> Changes in state model
- IETF Last Call
 - draft-ietf-nfsv4-rfc3010bis-04.txt



RFC3010bis Updates

- State model changed to allow for Unix
- ACL interpretation clarifications
- Limits set for some opaque data types
- SETCLIENTID clarifications
- ...and many others



What next?



NFSv4 WG Next Steps

- Replication/Migration
 - In WG charter! Rob Thurlow to discuss
- Investigate Minor Version Items
 - Performance issues
 - Delegations of directories
 - Additional namespace mechanisms
 - Others



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