NFSv4 Open Source Project Update

Andy Adamson

CITI, University of Michigan

Ann Arbor

A little bit of history

- Sponsored by Sun Microsystems
- IETF reference implementation
- Linux and OpenBSD
- "Full featured" Linux 2.4.18 NFSv4 only client and server – not integrated with NFS v2/v3

NFSv4 in Linux 2.5

- ◆ Stateless client and server
  - – Fully integrated with v2 and v3
  - – Good performance
  - – Uses special stateids
- ◆ RPCSEC GSS framework
  - – Client up-call architecture
- ◆ Kerberos v5 GSS mechanism
  - – Mutual Authentication

Linux 2.4 Back Port

- Linux 2.4.18-18 kernel with RedHat 7.3 environment
- Matches Linux 2.5 NFSv4 functionality
- RPM install for kernel and daemons
- First release: Client only
- Effort led by Chuck Lever (NetApp)

Release Managemet

- ◆ New functionality released in Linux 2.5 kernel
  - Submit patches to Trond Myklebust and Neil Brown
  - They submit patches to Linus
- ◆ New functionality then added to back port
- ◆ Linux 2.4 back port: RPM release
- ◆ User daemons and configuration: RPM release

In the Pipeline

- ◆ Server
  - – Up-call mechanism
  - – Name to Id and Security context (GSS) cache
  - – Clientid state
- ◆ Client
  - – Name to id up-call and cache
  - – Share state

In the Pipeline

- FS_Locations (client)
- RPCSEC_GSS Data Integrity
  - Kerberos v5
- Server share state
- Client and Server ACLs
- Kernel SPKM3

Daemons

- ◆ Idmapd: name to id mapper
  - – Uses getpwxxx and /etc/nsswitch
  - – Secure AFS PTS nsswitch option
- ◆ GSSD: GSS context initialization
  - – Performs RPCSEC GSS Null proc to server
  - – Able to service multiple GSS mechanisms

Related Work

- MIT Kerberos RPCSEC GSS code
  - Based on existing MIT K5 rpc code
  - Kadmin and Kadmind interoperates with SEAM
  - submitted to MIT code base
- User level SPKM3
  - Diffie-Hellman key exchange with target X.509 keys
  - Data integrity
  - Uses OpenSSL libraries

OpenBSD

- Stateless operations complete
- Share state complete
- Byte-range locking being tested
- RPC Framework in use
  - Name to ID mapping
  - RPCSEC_GSS framework being coded
- Port to FreeBSD

Any questions?

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