IPv6 support for Linux NFS

Chuck Lever, Oracle Corporation
Use cases

• Today some applications can run natively on IPv6-only networks; NFS can’t
• IPv4 / IPv6 mixed environments
• IPv6-only environments
Project status

- Kernel timeline
- User space
- What’s missing
Kernel timeline

• Pre-2.6.23 kernels have:
  • Some RPC server support for IPv6
  • Client-side support for rpcbind versions 3 and 4
Kernel timeline

• 2.6.23 introduces:
  • String-based NFS mount option parsing
    • Subsumes legacy binary nfs_mount_data mount option structure
  • NFSv2/v3 mountd client in-kernel
  • Needed for many advanced NFS features including IPv6, NFS/RDMA, cache FS
Kernel timeline

- 2.6.24 adds:
  - IPv6 support in the in-kernel RPC client

- 2.6.25 will have:
  - IPv6 infrastructure in the NFS client (but not in NLM or NFSv4 callbacks)
Kernel timeline

- 2.6.26 may have:
  - IPv6 support in the in-kernel NLM and NSM
  - Remaining patches to support IPv6 in the in-kernel NFS server
User space progress

- Development components
  - libtirpc
    - Provides IPv6-enabled user-space RPC facilities
    - Collides with legacy RPC facilities already in glibc
User space progress

- Daemons
  - rpcbind replaces portmapper
  - rpc.statd
  - rpc.mountd
User space progress

- Client-side command line utilities
  - mount.nfs & friends
    - NFSv4 support is easy: umount is local-only, no need for getport
    - NFSv2/v3 require version and transport discovery for NFS and NLM
  - nfs(5) updates
User space progress

- Server-side command line utilities
- `exportfs` must support specifying IPv6 addresses in export rules
- `exportfs(8)` updates
What’s missing?

- RPC pipefs changes
- IPv6 support for NFSv4 callbacks and referrals
- Unknown requirements for advanced security flavors
- Significant test capabilities
Milestone

- Expect basic IPv6 support in all NFS components to become available for distributions to begin integrating during 2H08
Discussion topics

- What NFS on IPv6 use cases are a priority?
- Who can help finish the implementation?
- Who can test?