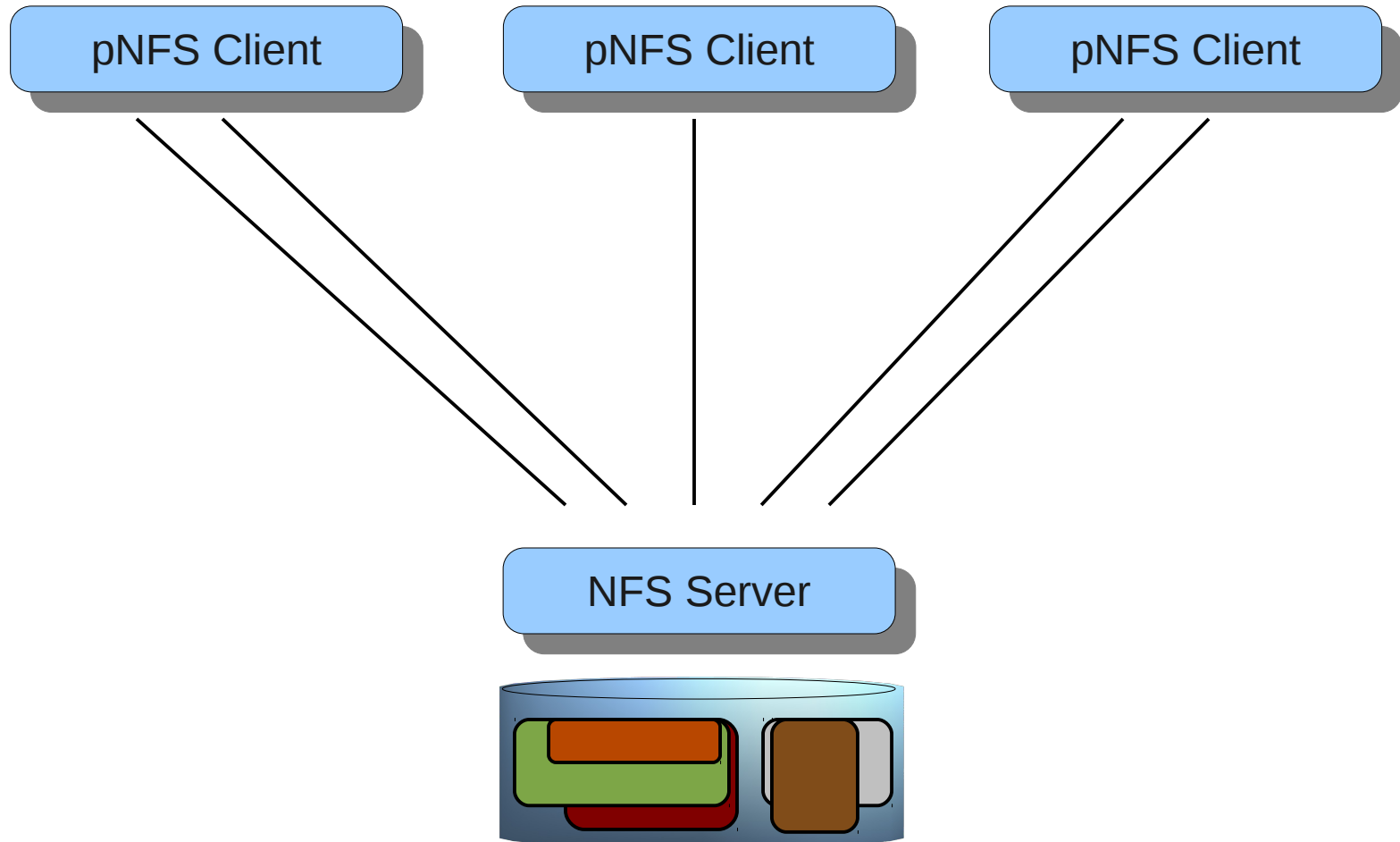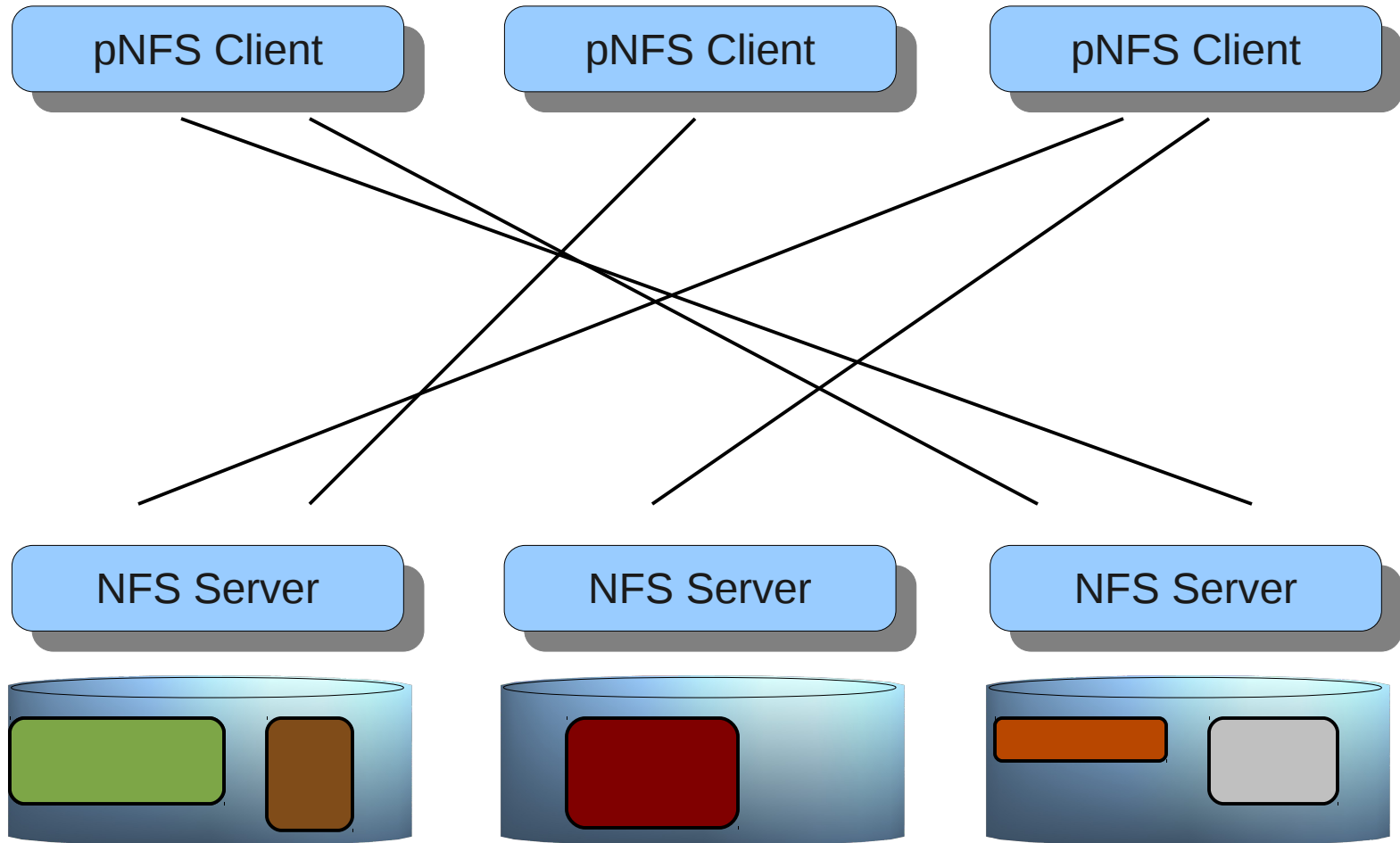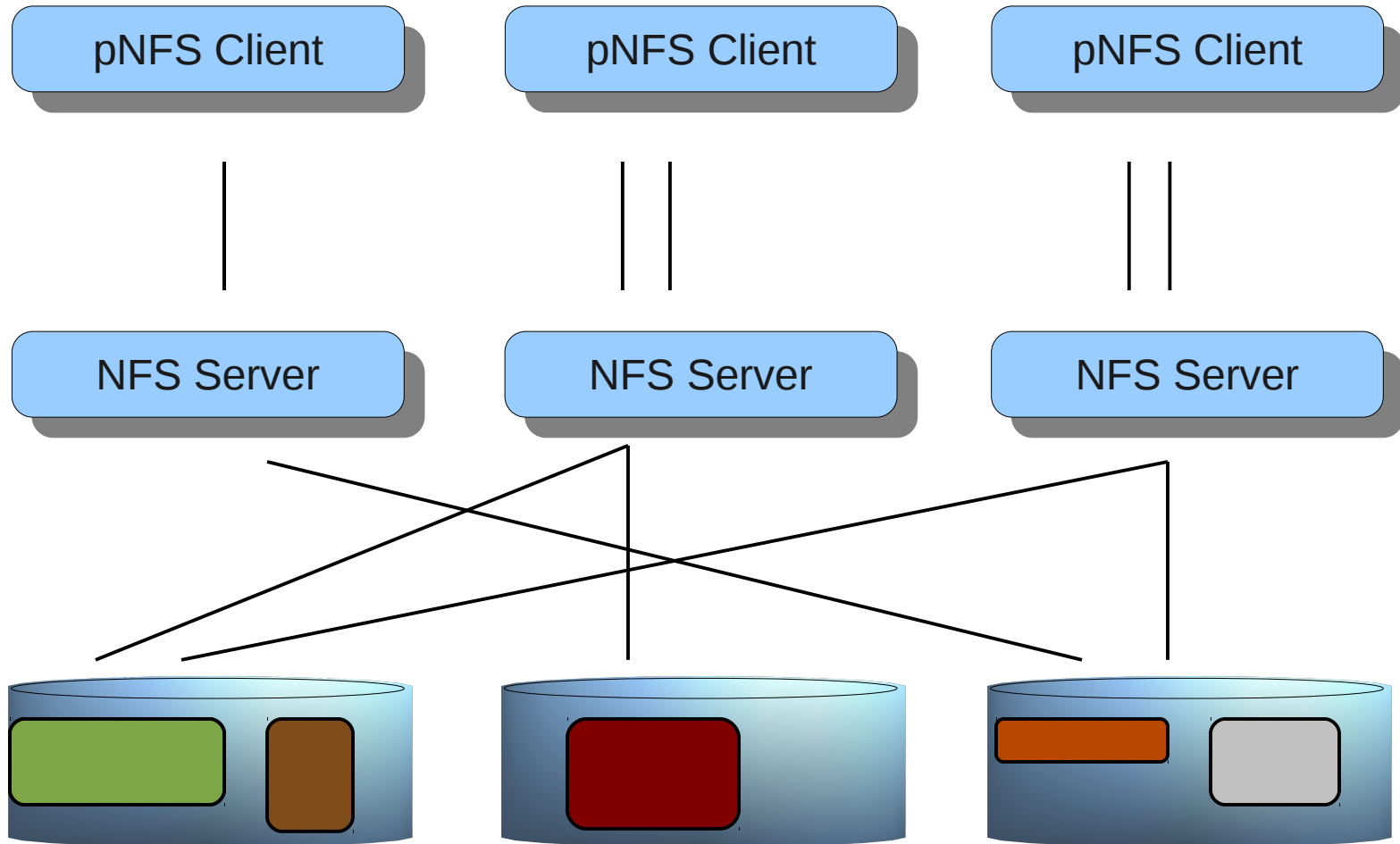# Legacy NFS provides sharing, but does not scale
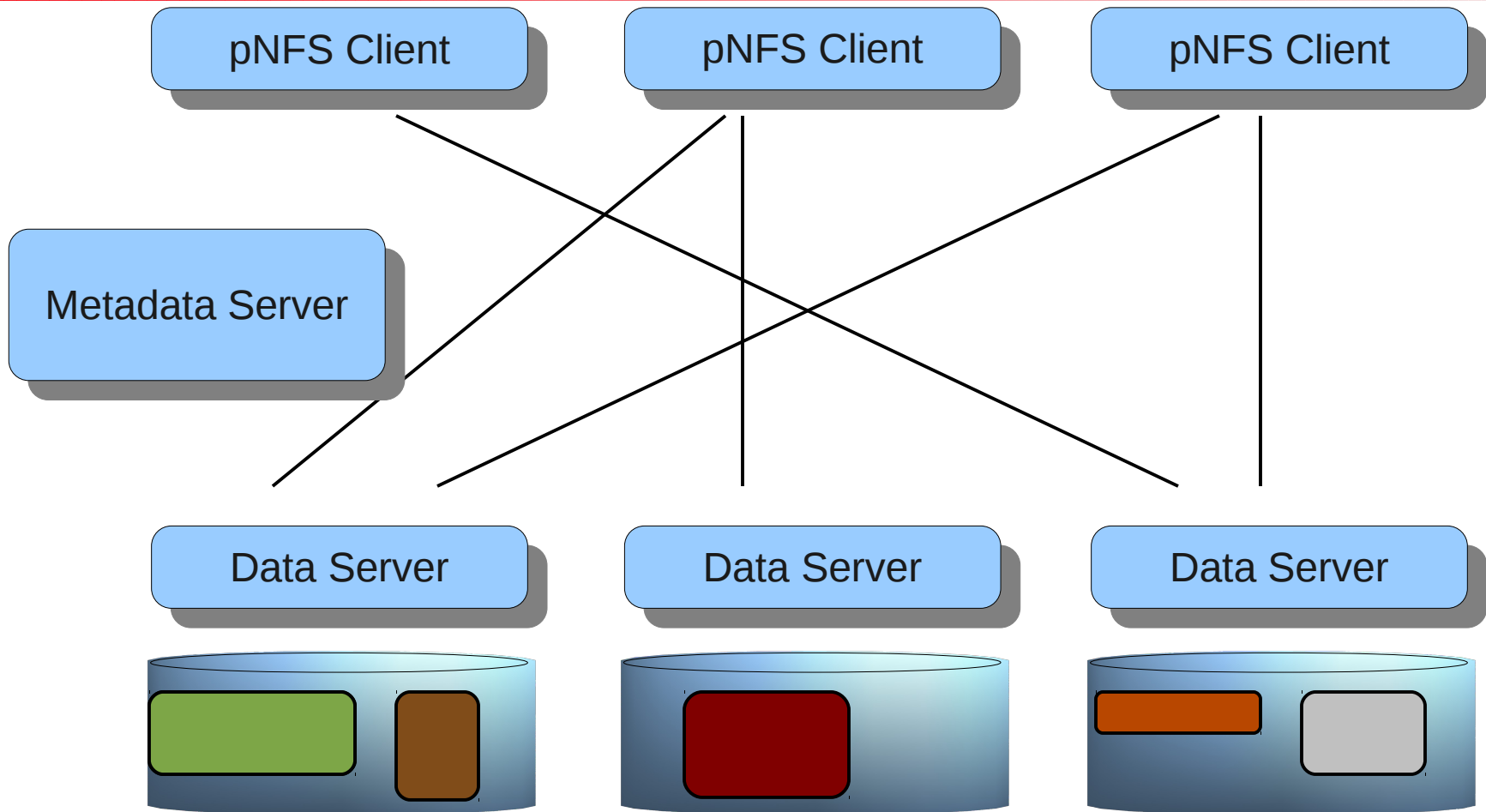
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Having many of these scale, but are hard to manage

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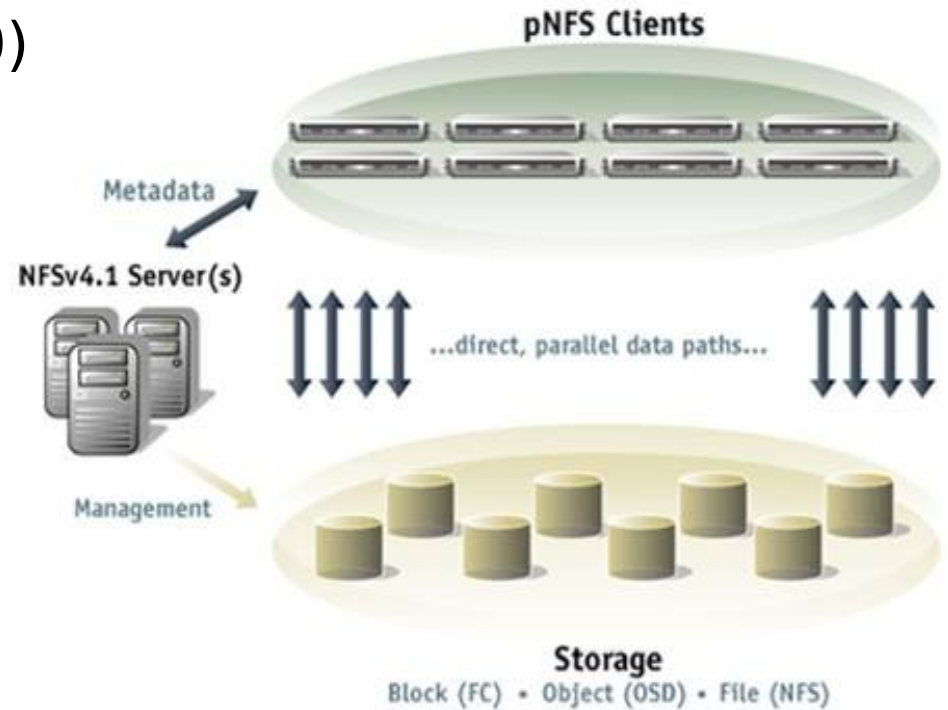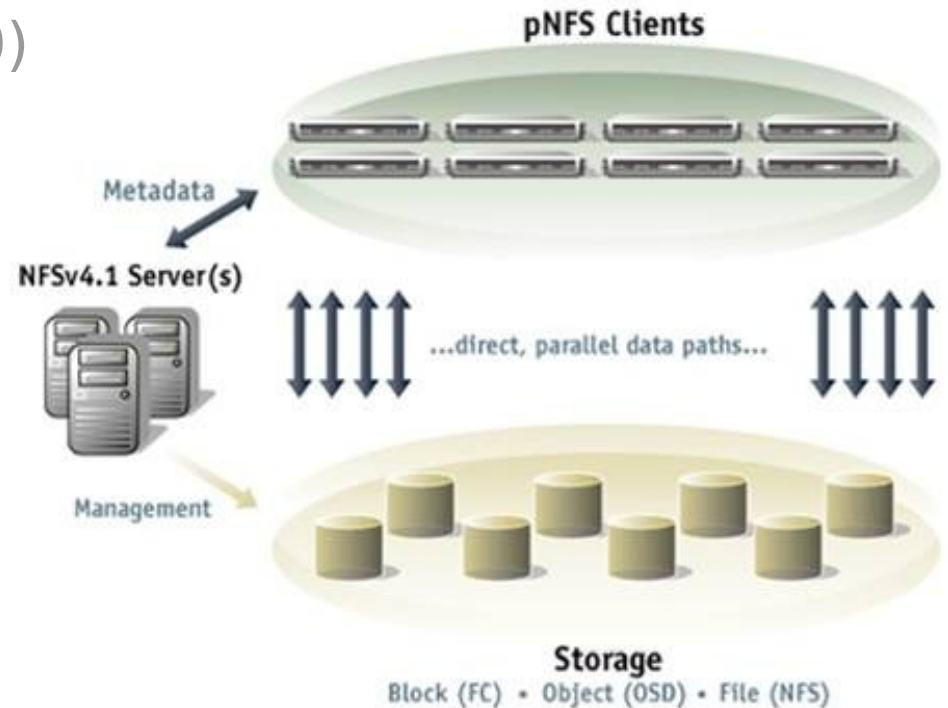# Clustered NAS scales, but at high cost

pNFS Scales AND easy to manage

Why pNFS?

- IETF Open standard (2010)

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pNFS Clients

Metadata

NFSv4.1 Server(s)

...direct, parallel data paths...

Management

Storage
Block (FC) • Object (OSD) • File (NFS)

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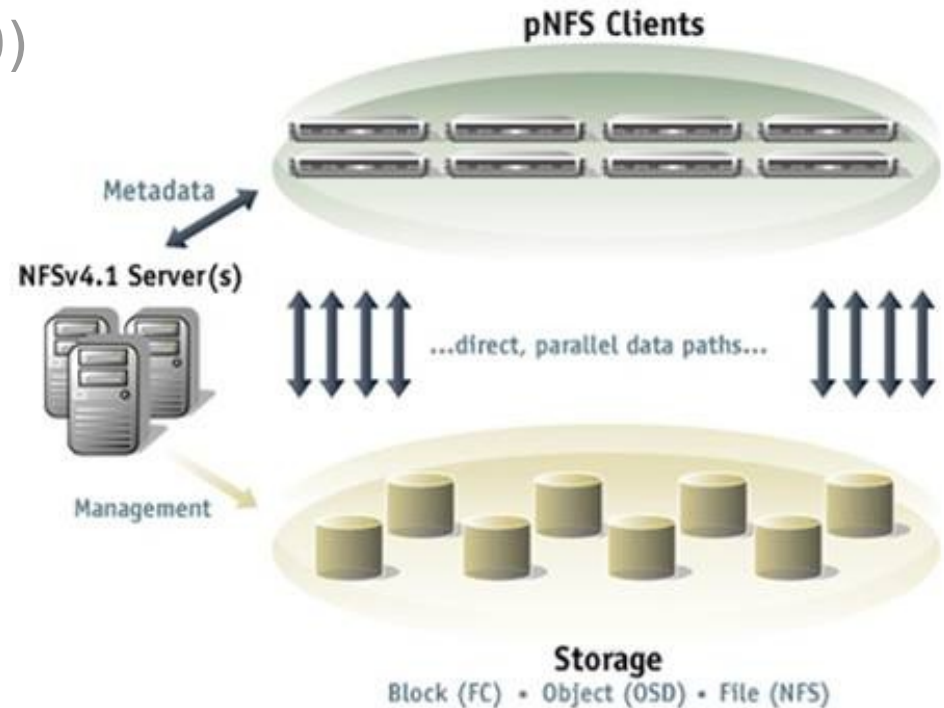
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pNFS Clients

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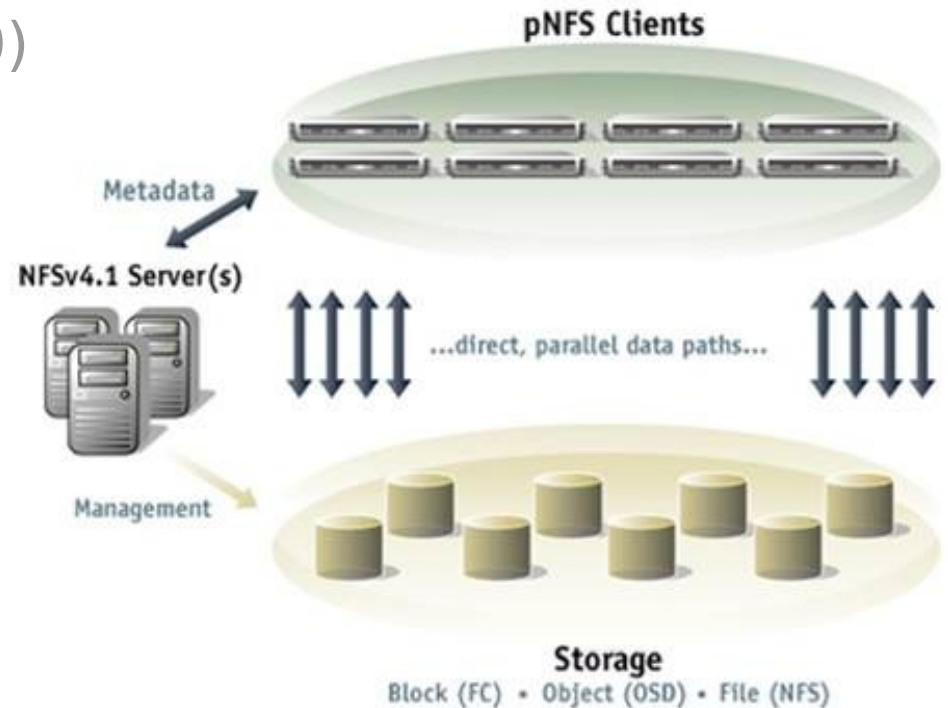
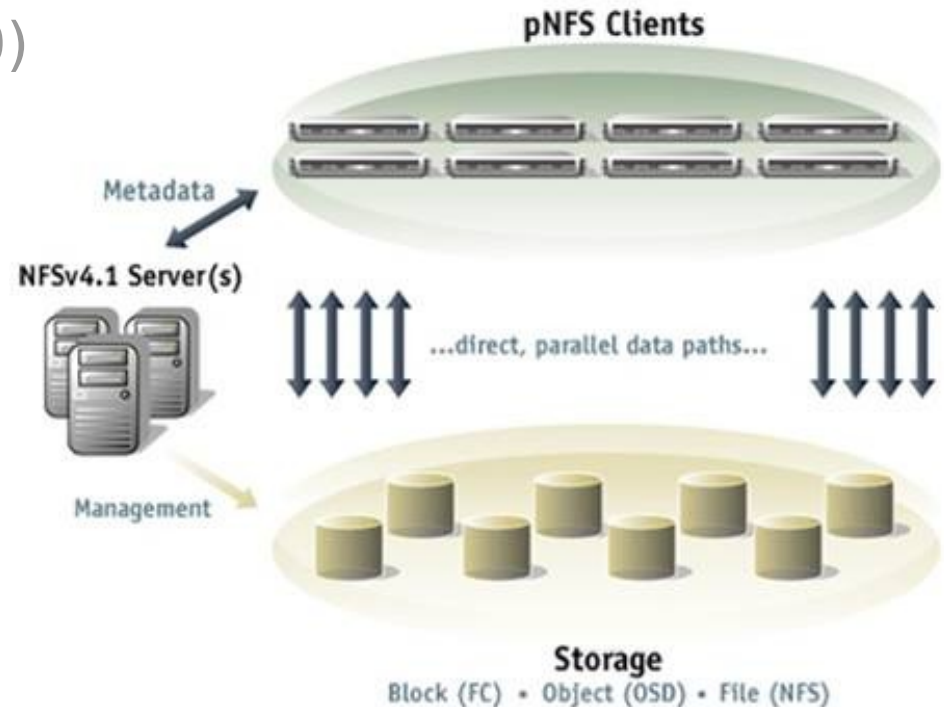Management

Storage
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pNFS Clients

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Management

Storage
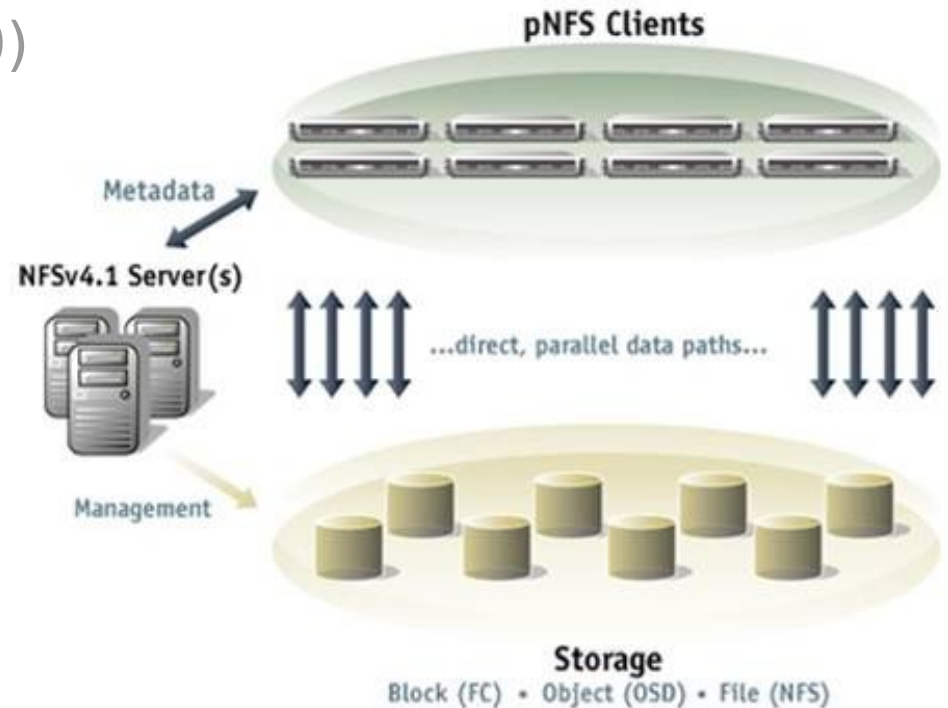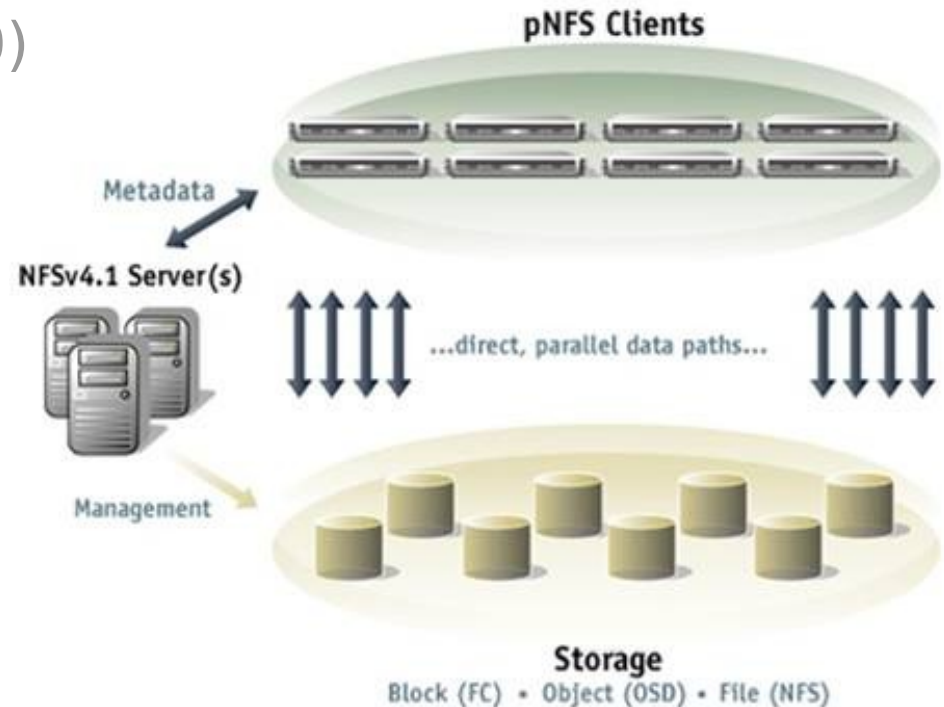Block (FC) • Object (OSD) • File (NFS)

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Built for Clusters

pNFS Clients

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Management

Storage
Block (FC) · Object (OSD) · File (NFS)

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The linux-pnfs project

- Linux-pnfs is a collaborative project for getting a reference implementation of NFSv4.1 & pNFS to linux
- Implemented all 3 layouts types: files, objects, and blocks
- Main contributors (in alphabetical order)
  - CITI (U. Mich)
  - EMC
  - DESY
  - IBM
  - Netapp
  - Panasas
  - Tonian

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Client Availability

- NFSv4.1 server submitted upstream Linux 2.6.30
- NFSv4.1 client submitted upstream Linux 2.6.31
- NFSv4 fully supported since 2.6.36

- pNFS client submitted upstream Linux 2.6.37 (v3.0 objects, v3.1 blocks)
- Included in Fedora 16
- Files layout in Tech Preview in RHEL 6.2
- Red Hat is collaborating with vendors on including the objects and blocks layouts

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Server Availability

- pNFS server actively maintained out of tree
    `git://linux-nfs.org/~bhalevy/linux-pnfs.git`

- Files layout over GFS2
    - and local-export testing back-end

- Object layout over exofs

- Reference server implementation available by Tonian

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