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June 11-14, 2013
Boston, MA

RED HAT
SUMMIT

Evolving & Improving Red Hat Enterprise Linux NFS

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Thursday, June 13

The Evolution of NFS

IETF-Draft

March 1989
RFC 1094

June 1995
RFC 1813

Dec 2000
RFC 3010

Jan 2010
RFC 5661



NFSv2



NFSv3



NFSv4.0



NFSv4.1



NFSv4.2

Great News!!



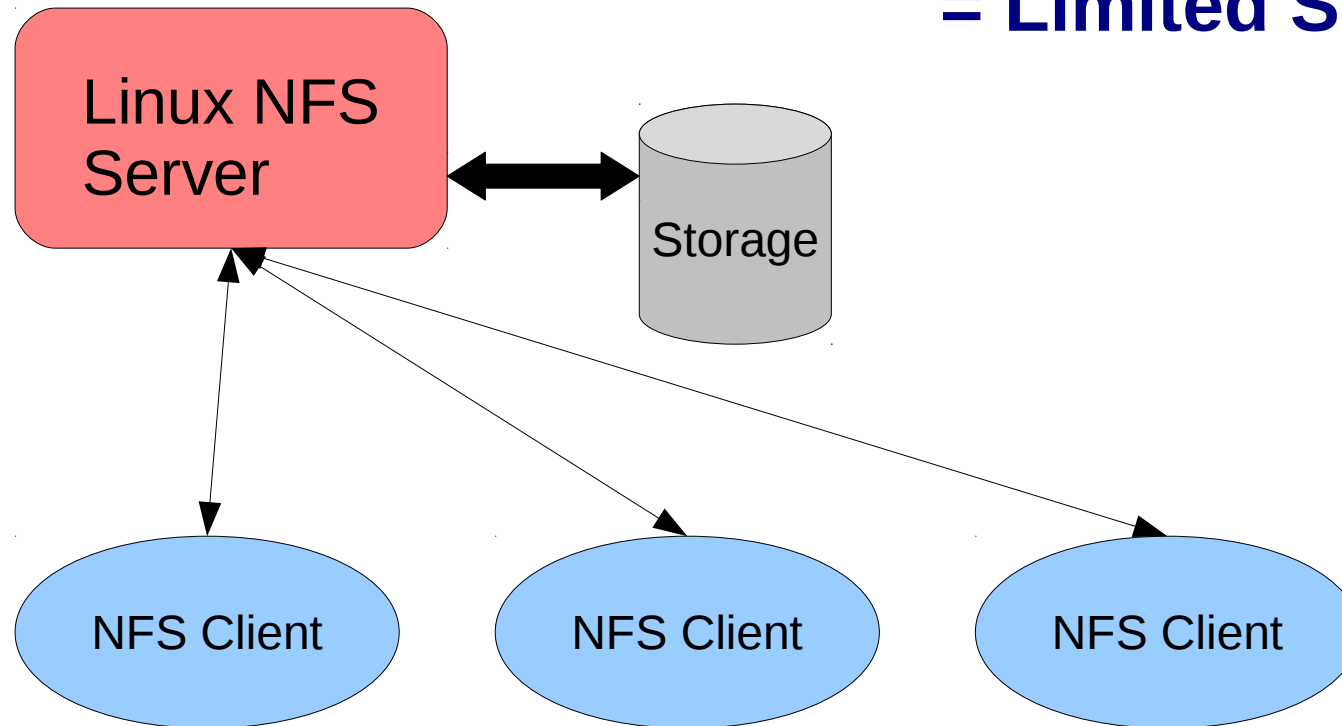
pNFS

WHAT is it??

NFS front end to a Cluster

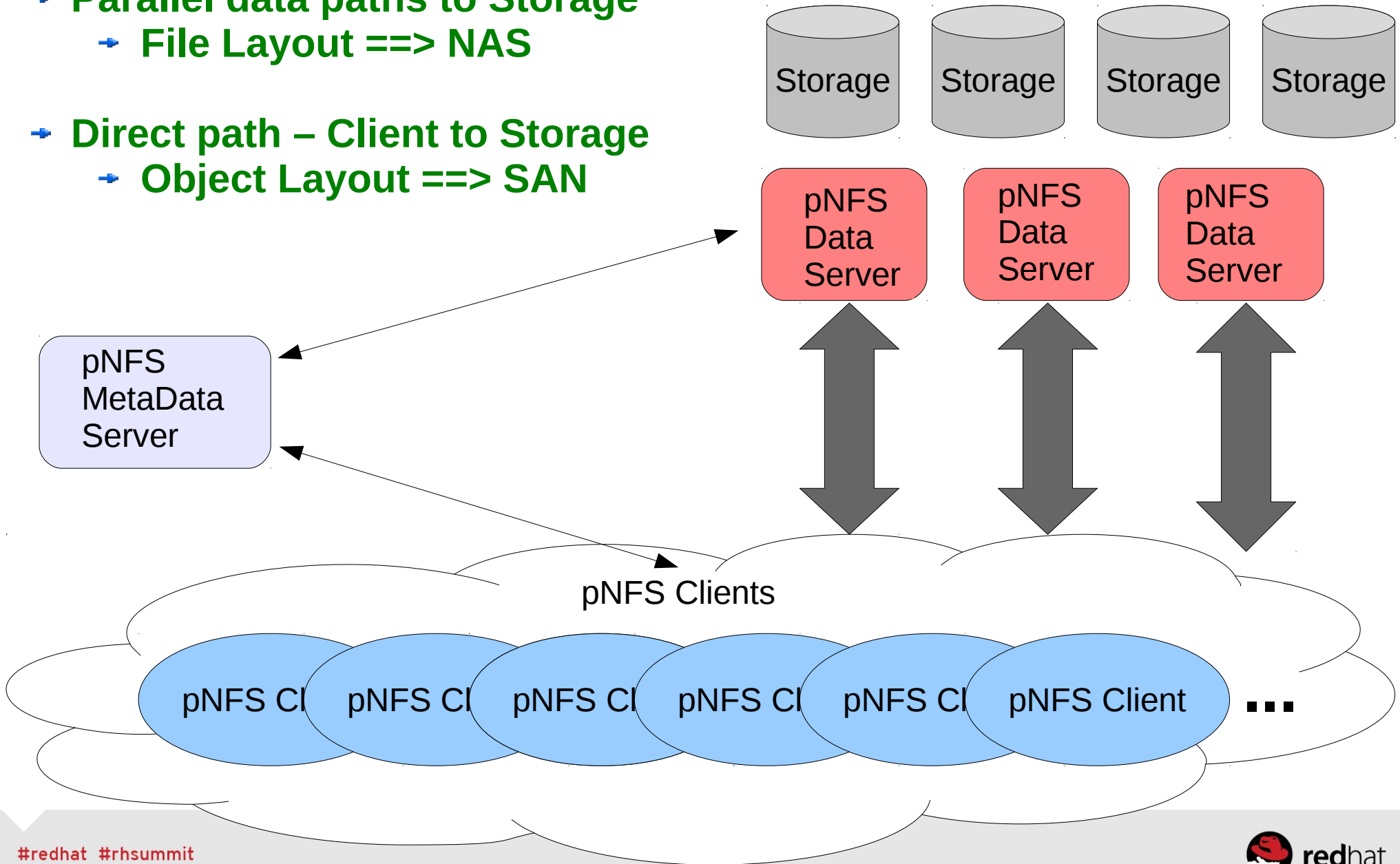
Traditional NFS

**One Server for Multiple Clients
= Limited Scalability**

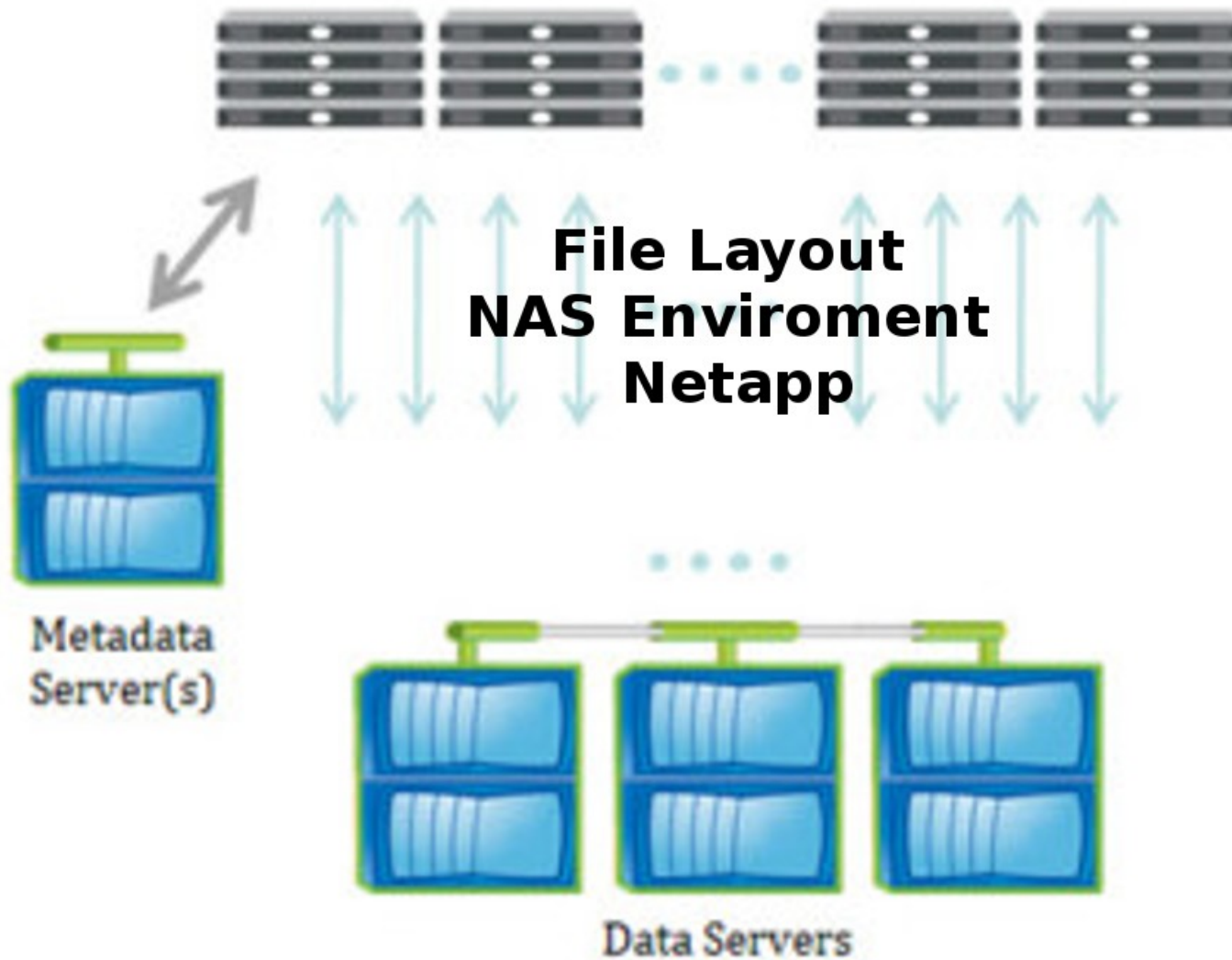


Parallel NFS = Scalability

- **Parallel data paths to Storage**
 - **File Layout ==> NAS**
- **Direct path – Client to Storage**
 - **Object Layout ==> SAN**



PNFS Layout Types



source: snleasfblog.org

PNFS Layout Types

Block Layout (SAN environment) - EMC

Object Layout (High Perf environment) – Panasas



Source: pNFS.com



redhat.

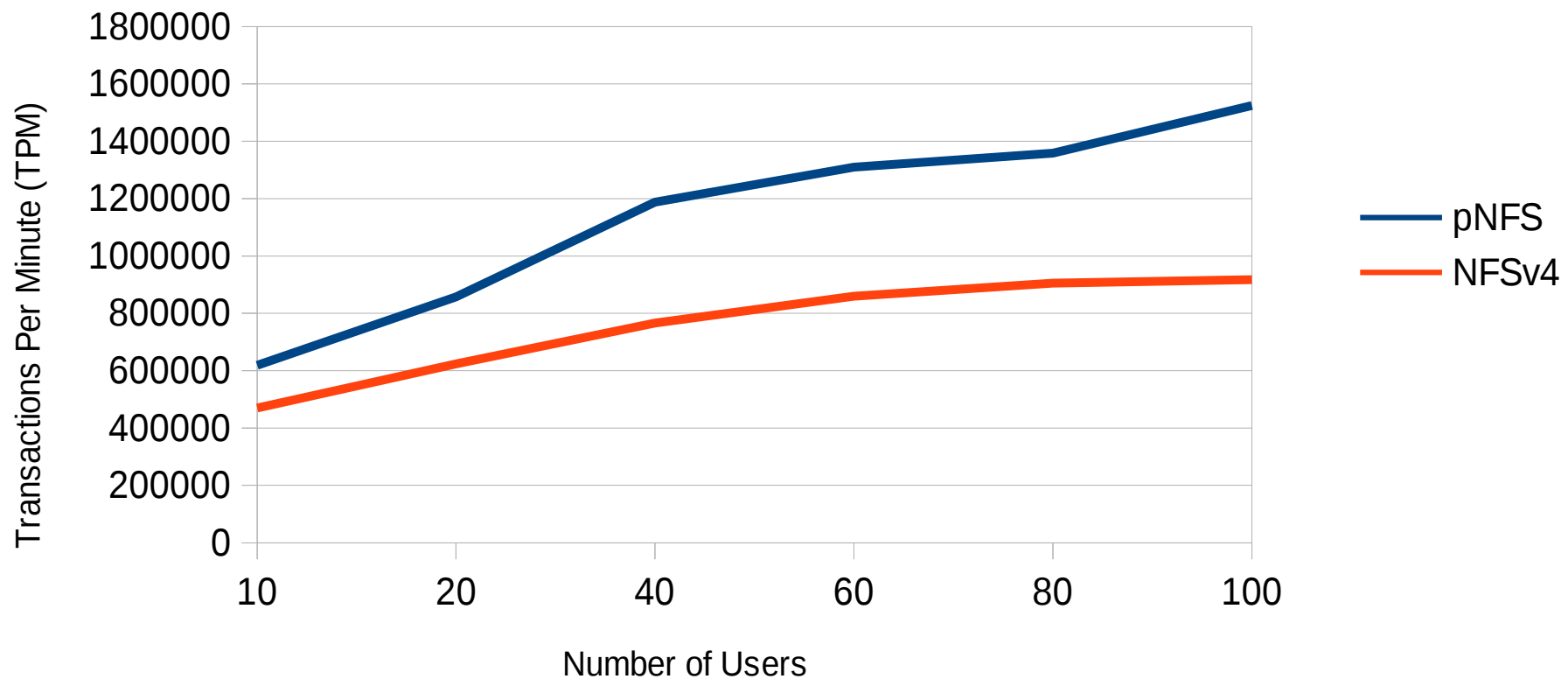
pNFS Supported in 6.4!!!!
(Client only - File Layouts)

Industry Leader

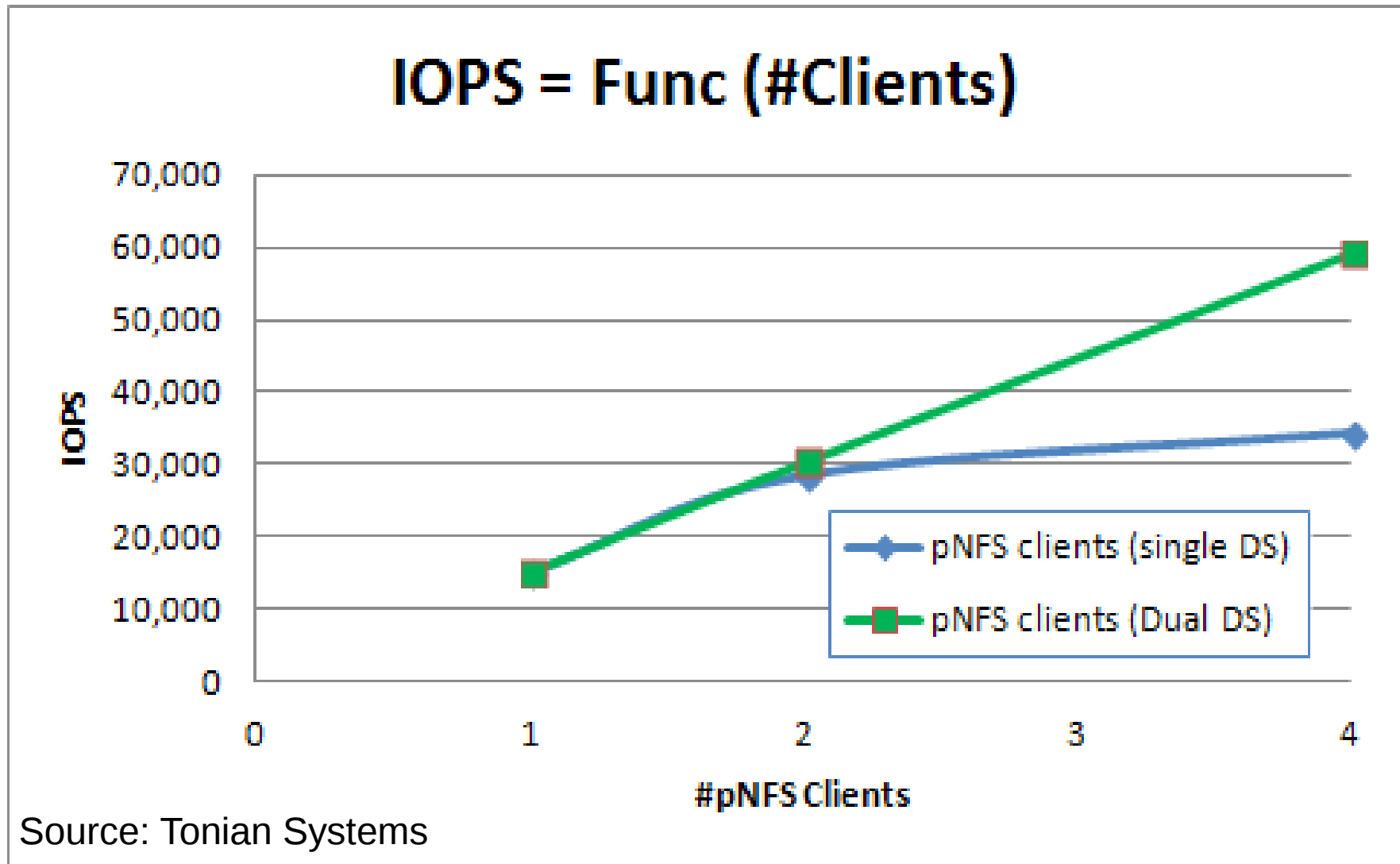
Bigger is Better!!!

RHEL 6.4 pNFS vs NFSv4

Oracle11gR2 OLTP Workload



Parallel NFS = High Performance and Scalability





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NFS 4.1 Server Support

NFS 4.2 Label NFS

FedFS

GSS-proxy



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NFS 4.1 Server Support

Reliable only-once semantics

Callbacks using 2049 port

No pNFS support... Yet!



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NFS 4.2 Labeled NFS

Selinux context supported

Usages:

Secure virtual machine on NFS servers
Limited access to Home dirs

Industry Leader



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FedFS

What is FedFS???

A way to manage NFS Namespace

What is a NFS Namespace???

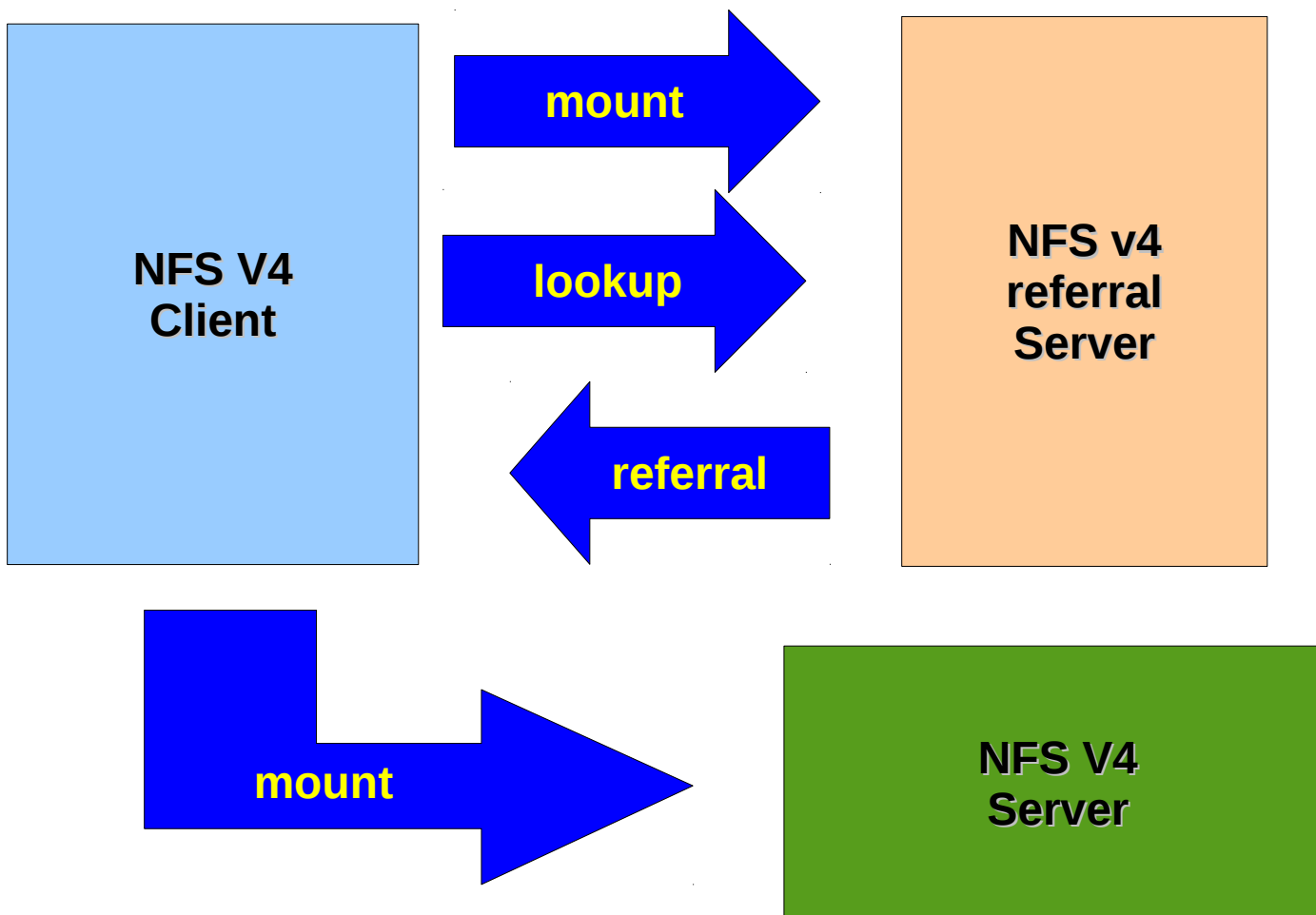
A group of NFS v4 referrals

What is an NFS v4 referral???



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NFS V4 Referrals





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FedFS Clients

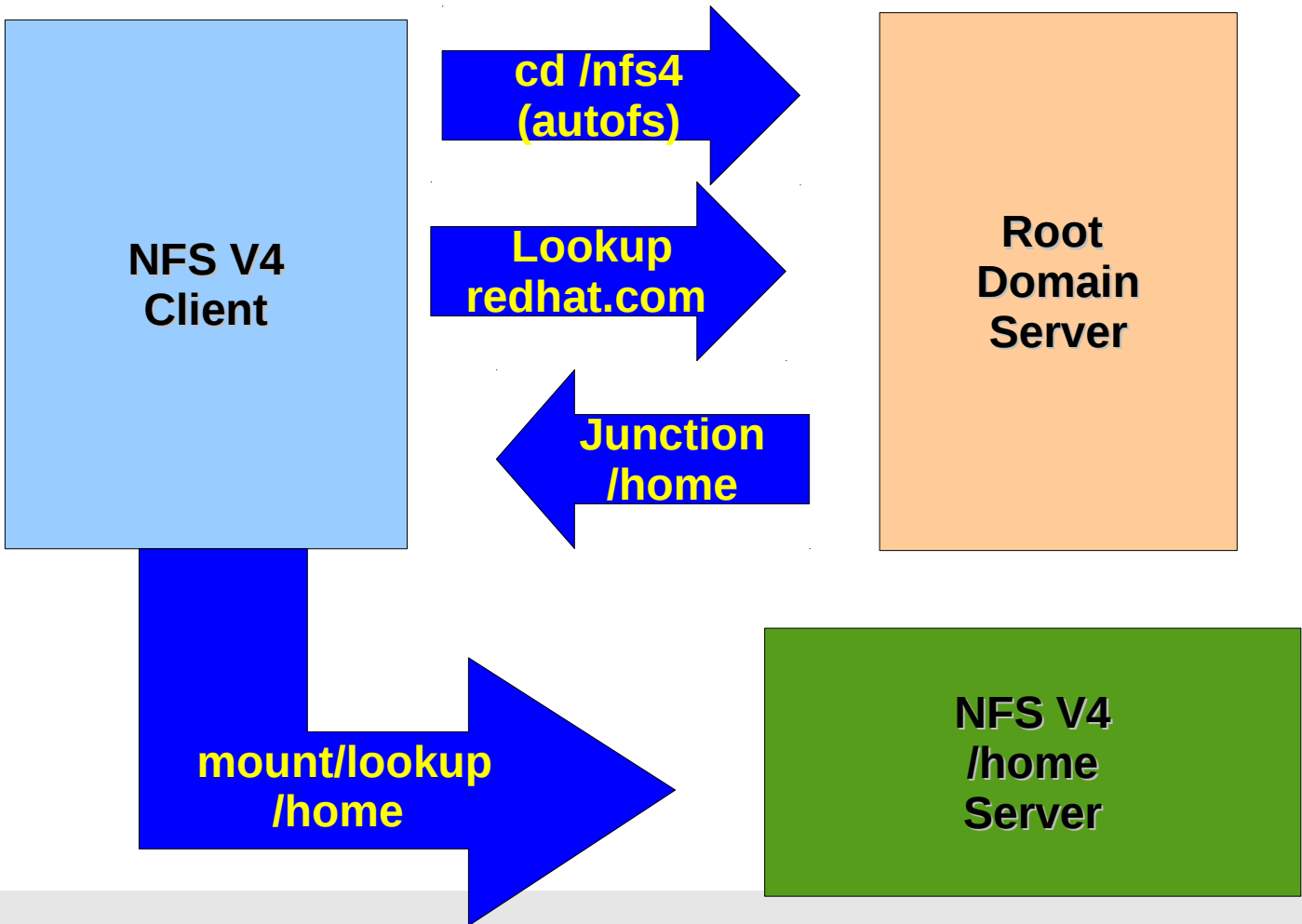
Autofs used to manage mounts

```
cd /nfs4/redhat.com/home
```



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`cd /nfs4/redhat.com/home`





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FedFS Domain Servers

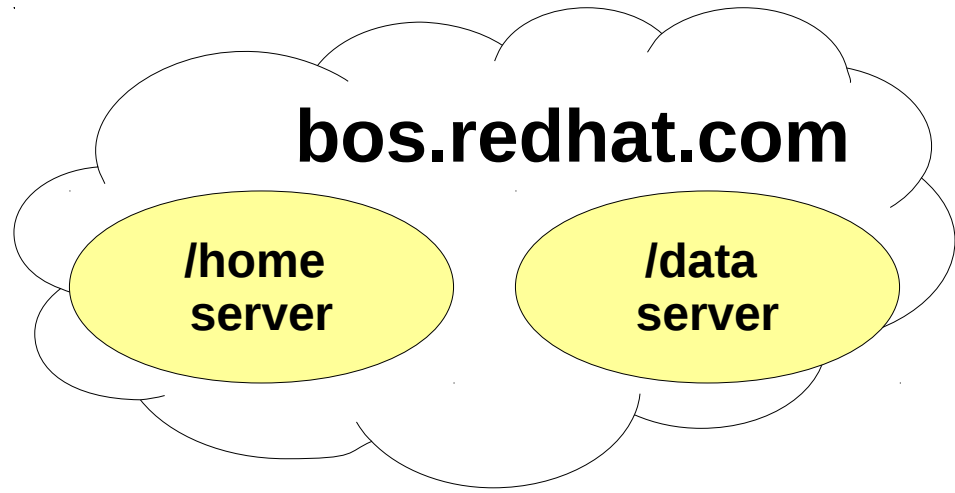
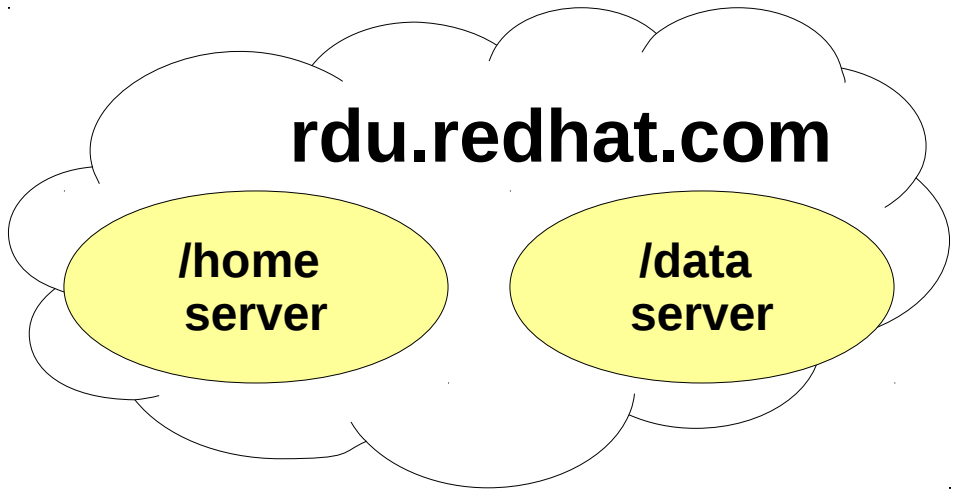
DNS or LDAP Is how server is found

Junctions determine where the mount goes



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FedFS Namespaces



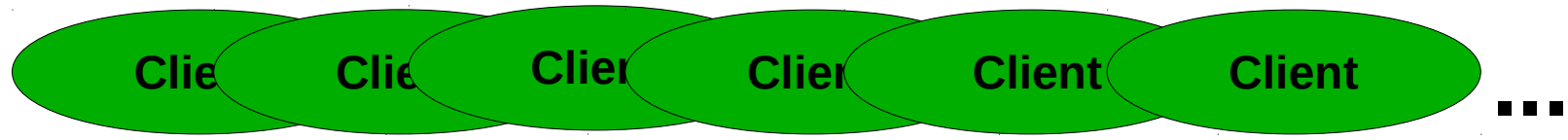
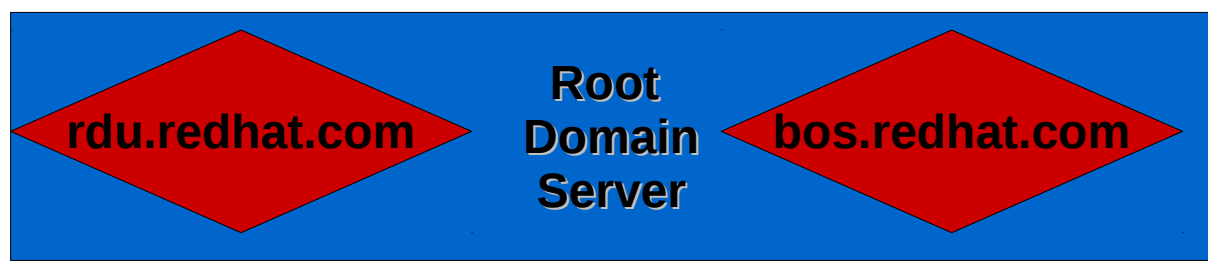
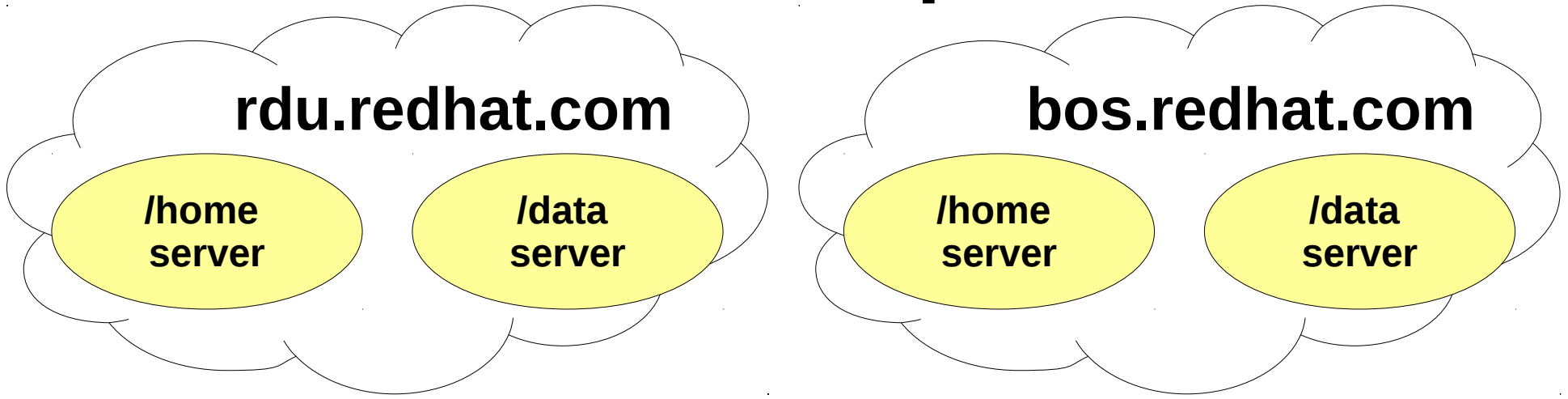
`cd /nfs4/rdu.redhat.com/home`

`cd /nfs4/bos.redhat.com/home`



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FedFS Namespaces





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Secure NFS Two Major Pains

Setup



FreeIPA

Ticket Renewal



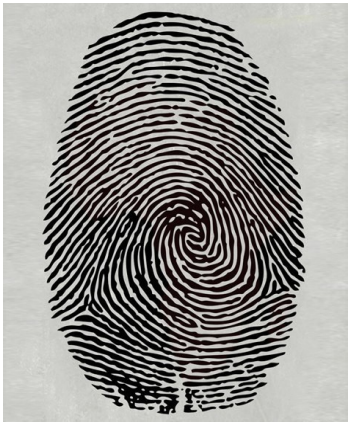
GSS-proxy



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FreeIPA

Identity + Policy + Audit = IPA





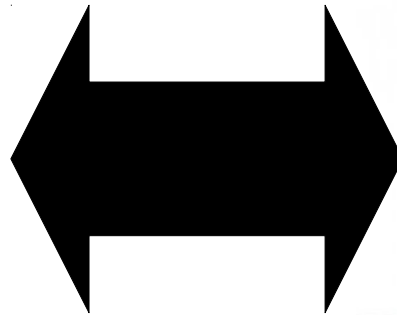
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FreeIPA Parts

Server



ipa-server-install



Client



ipa-client-install



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GSS-Proxy

Keytabs for everybody!!

Which Means:

kinit is no longer needed

Which Also Means:

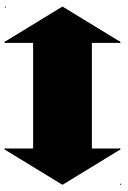
Long running jobs Solved!!



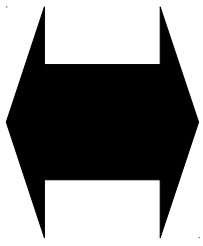
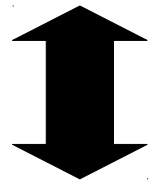
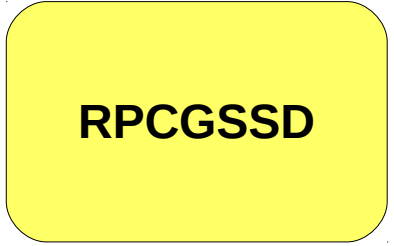
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cat /nfs/foobar



GSS-Proxy



Linux[™]
NFS Community



Home Page:

http://linux-nfs.org/wiki/index.php/Main_Page

Mailing List:

linux-nfs@vger.kernel.org

Upstream Bugs:

<https://bugzilla.kernel.org/>

Red Hat Bugs:

<https://bugzilla.redhat.com>

Question?

Email:

SteveD@RedHat.com

Slides/Handout

<http://people.redhat.com/steved/Summits/Summit13/>

Thank you!!!