Network File System (NFS)

Presented By:

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Introduction

- Developed by SUN Microsystems in 1984
- Allows users to access files and directories located on remote computers
- Builds on ONC RPC system
- Mechanism for storing files on a network

Platforms

- NFS most commonly used with UNIX systems
- Other software platforms-

  Mac OS, Microsoft Windows, Novell NetWare, etc.

Versions and Variations

Version 1

- Sun used only for in-house experimental purposes
- Did not release it to the public

Version 2

- Defined in RFC 1094, March 1989
- Originally operated entirely over UDP
- Designers meant to keep the protocol stateless

Version 3

- Defined in RFC 1813, June 1995
- Support for 64-bit file sizes
- Handle files larger than 4GB
- Did not release it to the public

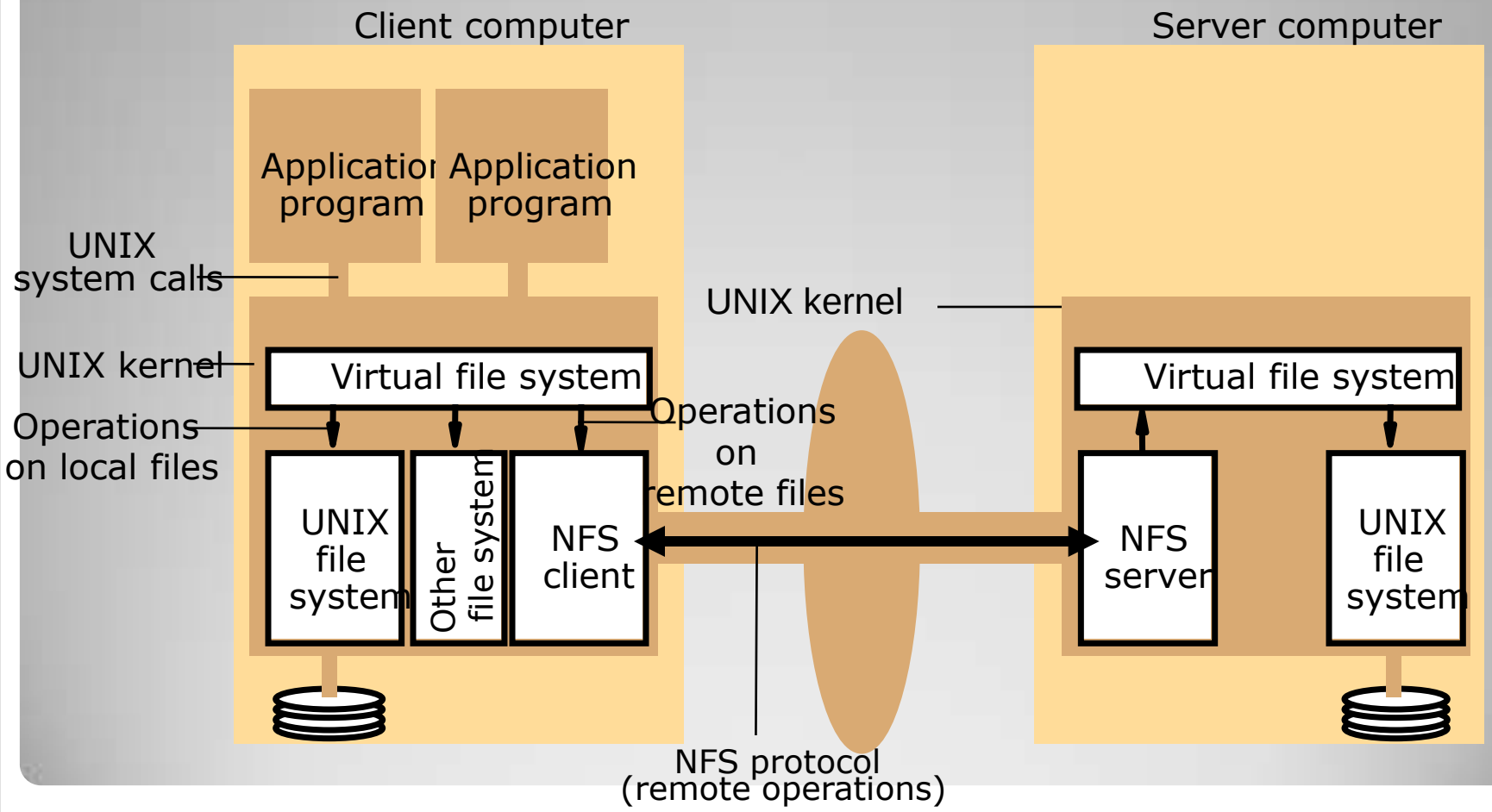
Version 4

- RFC 3010, December 2000, Revised in RFC 3530, April 2003
- Mandates strong security
- Introduces a stateful protocol

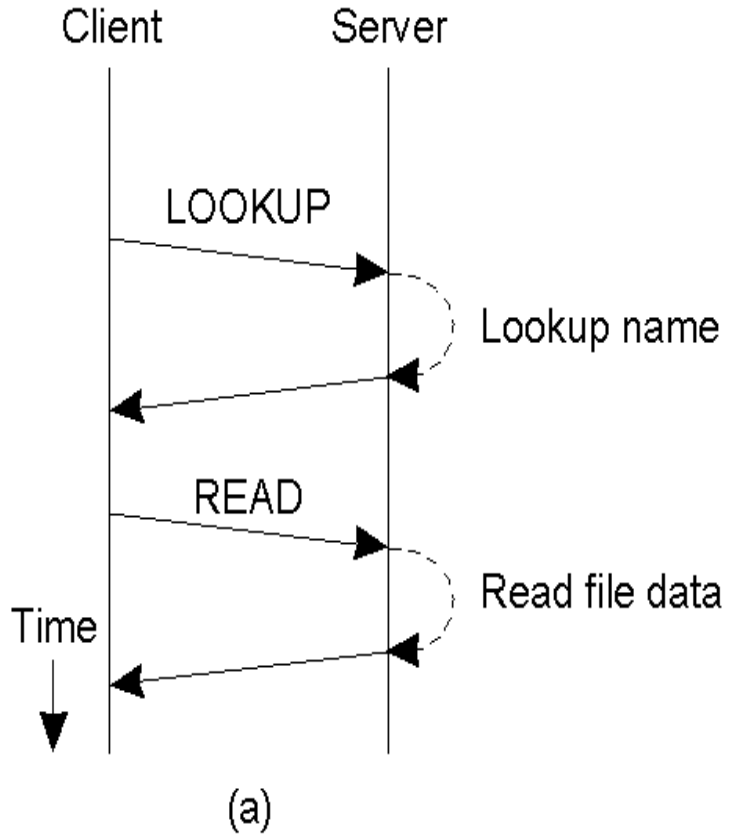
Main goal of NFS protocol

- NFS protocol designed without states. That's why it's very easy to recover server or client, because there are no states for them.
- NFS designed to support UNIX file system semantic, but protocol design can be adopted to support any file system semantic
- NFS protocol design doesn't depend on transport protocols. It's used with UDP by default, but still can be used with TCP protocol.

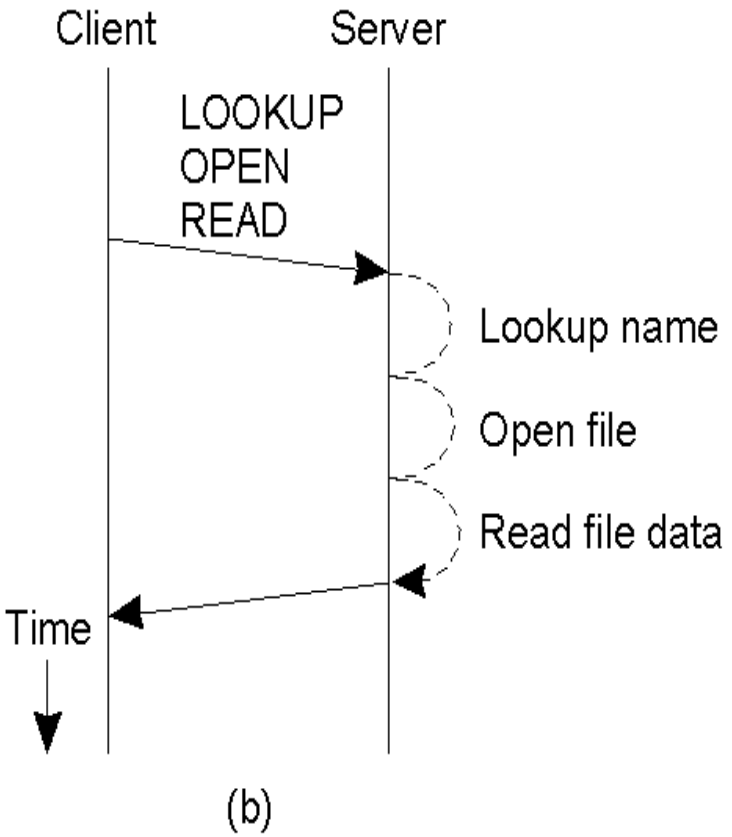
NFS Architecture



Communication



(a)



(b)

NFS Protocol

RPC request	Action
CREATE	Creates (or truncates) a file in the directory
LINK	Creates a hard link
LOOKUP	Looks up a file in the directory
MKDIR	Makes a directory
READADDR	Reads the contents of a directory
REMOVE	Removes a file in the directory
RENAME	Renames a file in the directory
RMDIR	Removes a directory
SYMLINK	Creates a symbolic link

RPC request	Action
GETATTR	Get file attribute
SETATTR	Set file attribute
LOOKUP	File name search
ACCESS	Check access
READ	Read file
WRITE	Write to the file
CREATE	Create file
REMOVE	Remove file
RENAME	Rename file

NFS Advantages

- Excellent e.g. of a simple, robust, high-performance distributed service
- Hardware and software operating system heterogeneity
- Security

Practical Uses of NFS

- Share a CD-ROM or other media with any number of clients
- Central NFS server on which all user home directories are stored
- Sharing the directory

THANK YOU