
07 infra TI

Introdução a NAS

Network Attached Storage



Universidade Presbiteriana Mackenzie

Entender o que é uma solução de NAS, seu componentes e benefícios; Diferentes de implementações de NAS; file-sharing protocols; Gerenciamento NAS;

File Sharing Environment

File system is a structured way of storing and organizing data files

File Sharing

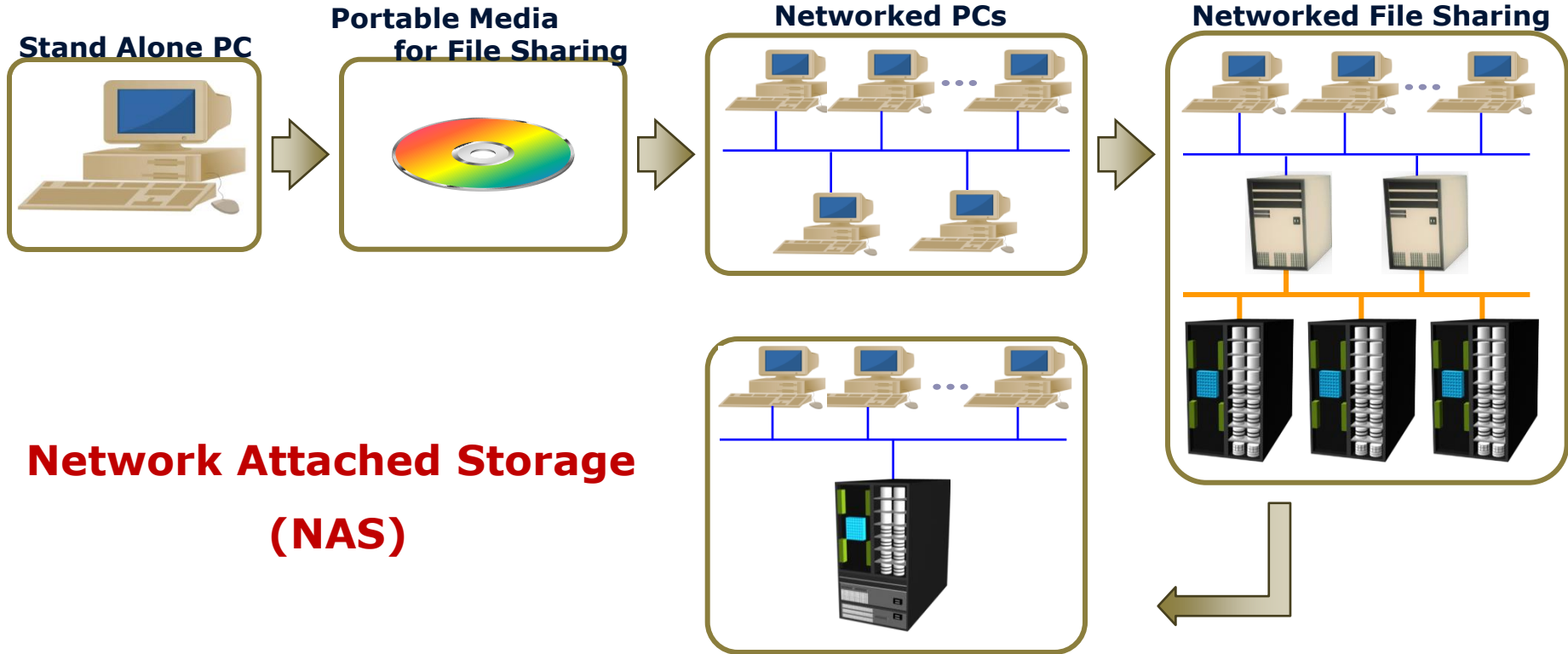
Storing and accessing data files over network

File system must be mounted in order to access files

Traditional *client/server model*, implemented with file-sharing protocols for remote file sharing

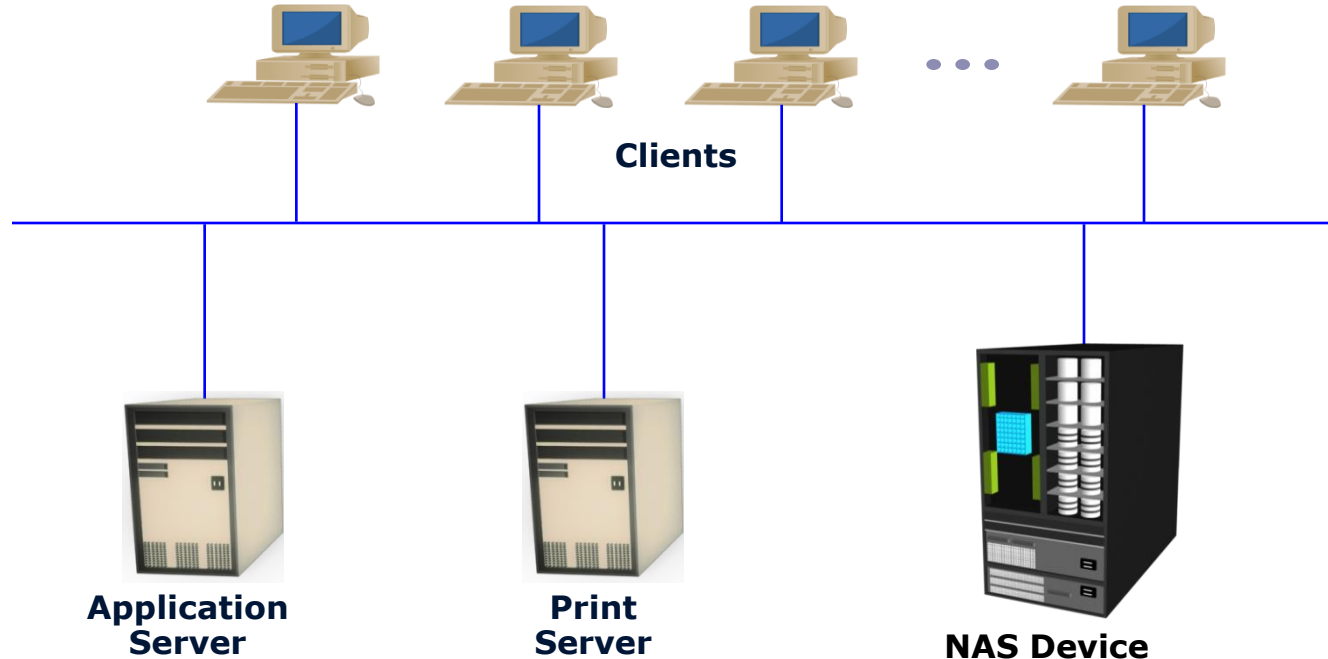
Example: FTP, CIFS (also known as SMB), NFS, DFS

File Sharing Technology Evolution

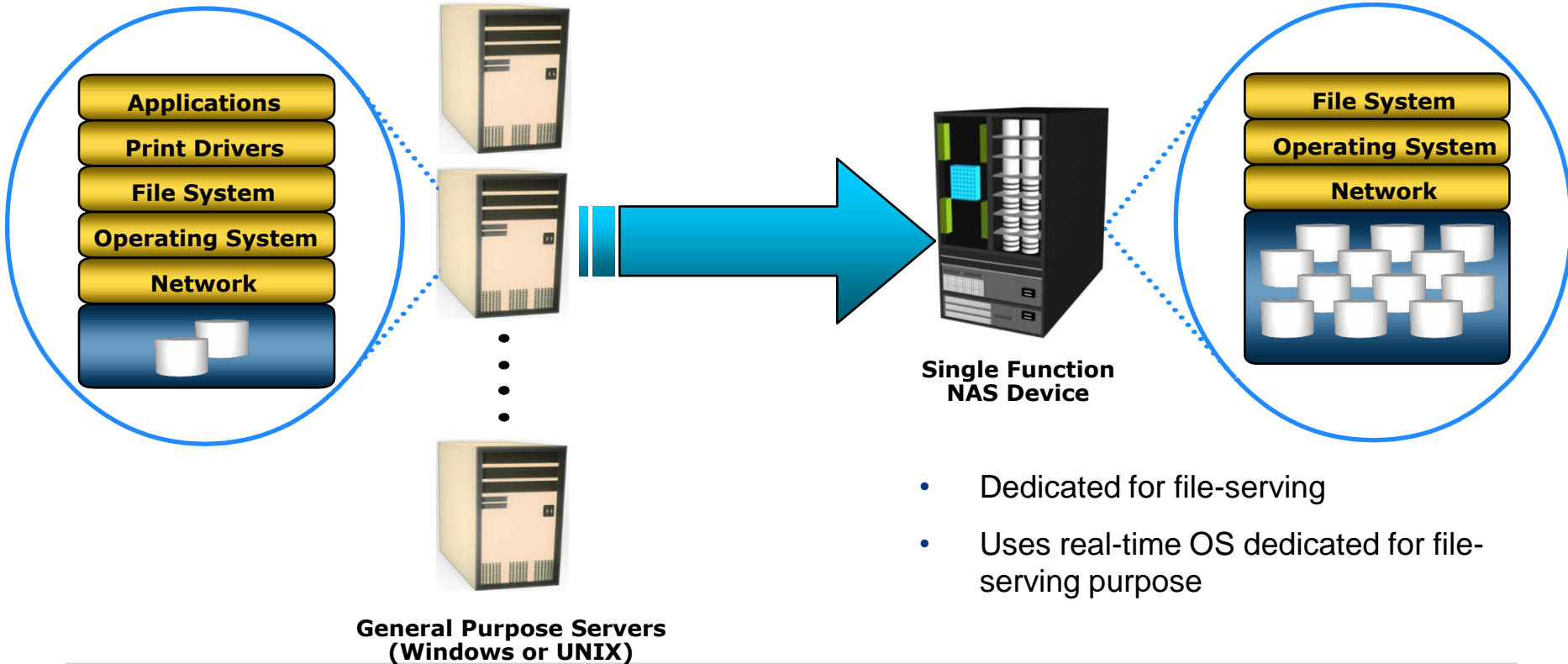


What is NAS ?

NAS is shared storage on a network infrastructure



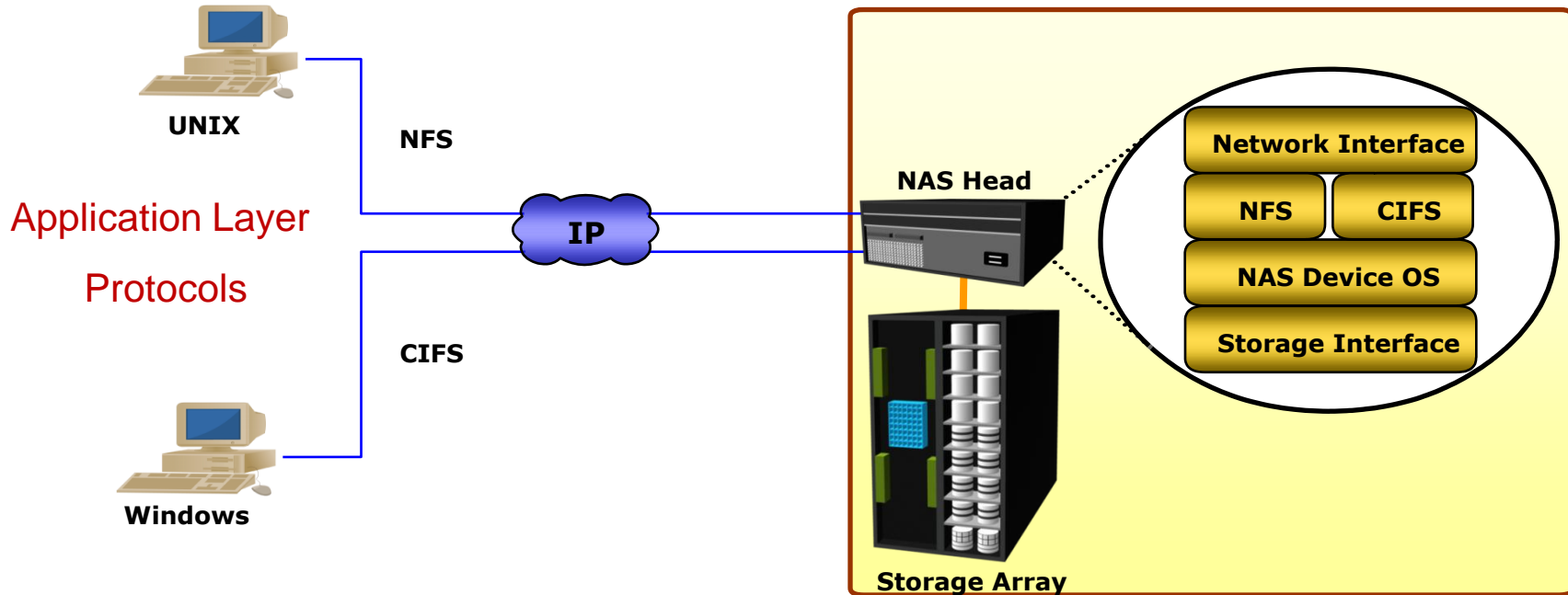
General Purpose Servers vs. NAS



Benefits of NAS

- Support comprehensive access to information
 - Improves efficiency – uses special purpose OS
 - Improved flexibility – platform independent
 - Centralizes storage
 - Simplifies management
 - Scalability
 - High availability – provide redundant components
 - Provides security integration to environment (user authentication and authorization)
-

Components of NAS



NAS File Sharing Protocols

Two common NAS file sharing protocols are:

NFS – Network File System protocol

Traditional UNIX environment file sharing protocol

CIFS – Common Internet File System protocol

Traditional Microsoft environment file sharing protocol, based upon the Server Message Block protocol

Network File System (NFS)

Client/server application

Uses **RPC** mechanisms over TCP protocol

Mount points grant access to remote hierarchical file structures for local file system structures

Access to the mount can be controlled by permissions

NAS File Sharing - CIFS

Common Internet File System

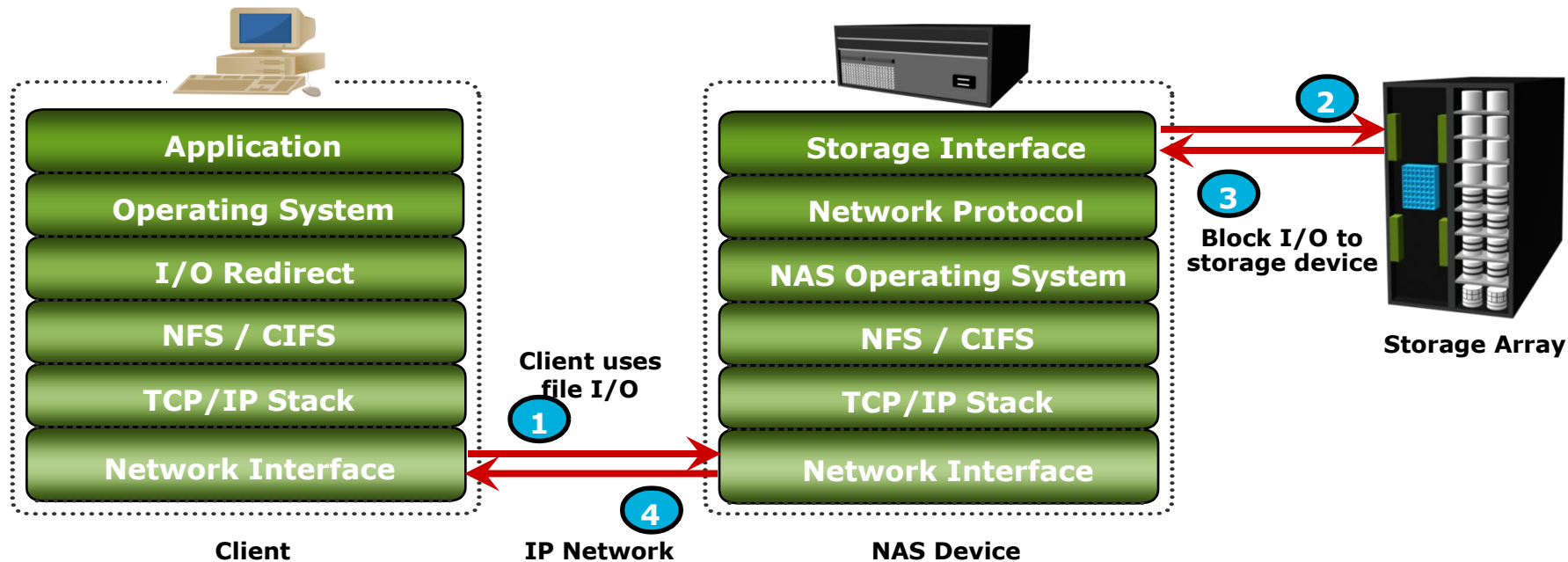
Developed by Microsoft in 1996, An enhanced version of the **Server Message Block (SMB)** protocol

Operates at the Application/Presentation layer of the OSI model

Most commonly used with Microsoft operating systems, but is platform-independent

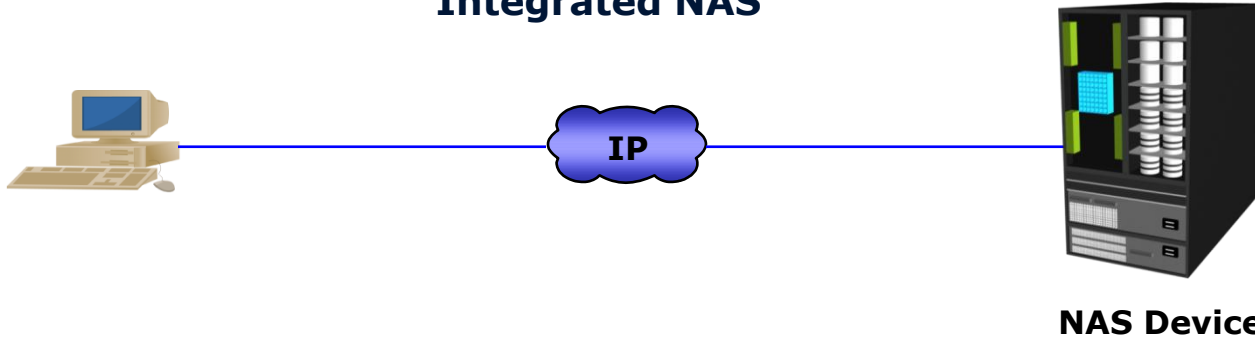
CIFS runs over TCP/IP and uses DNS (Domain Naming Service) for name resolution

NAS I/O



NAS Implementations

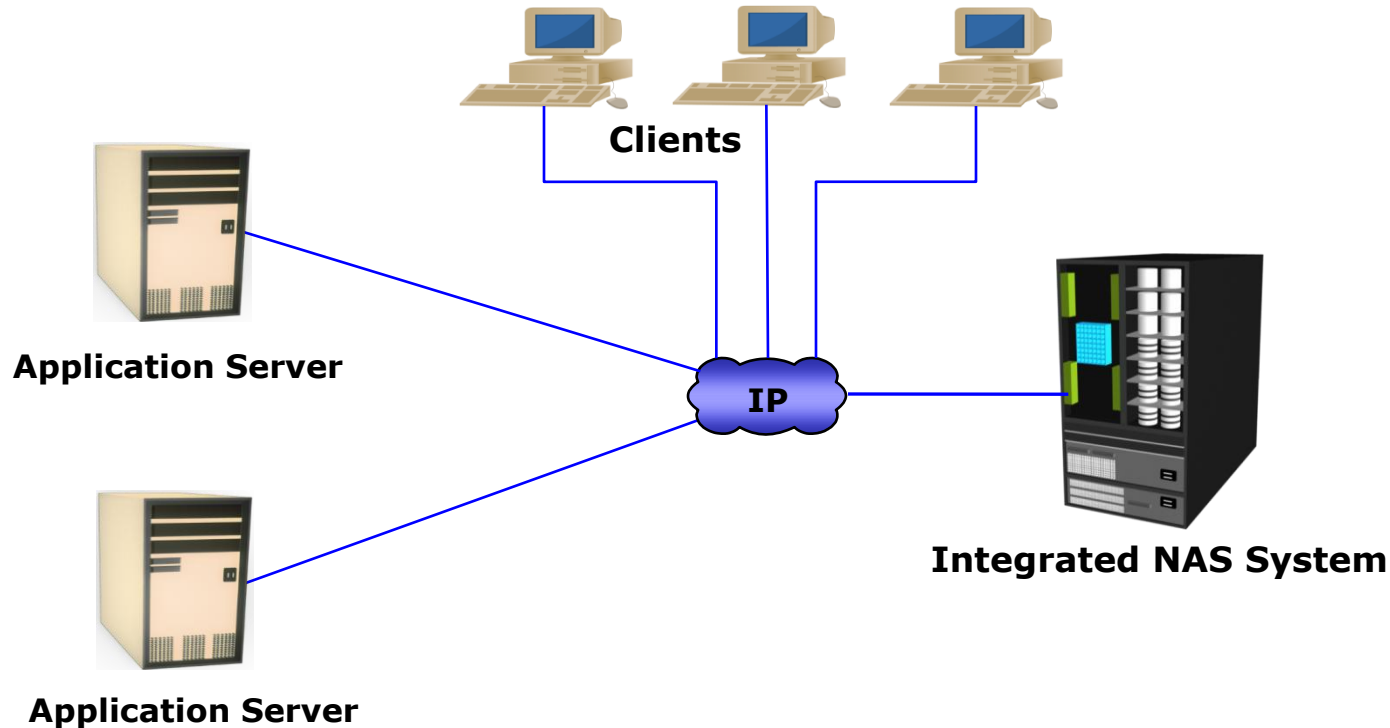
Integrated NAS



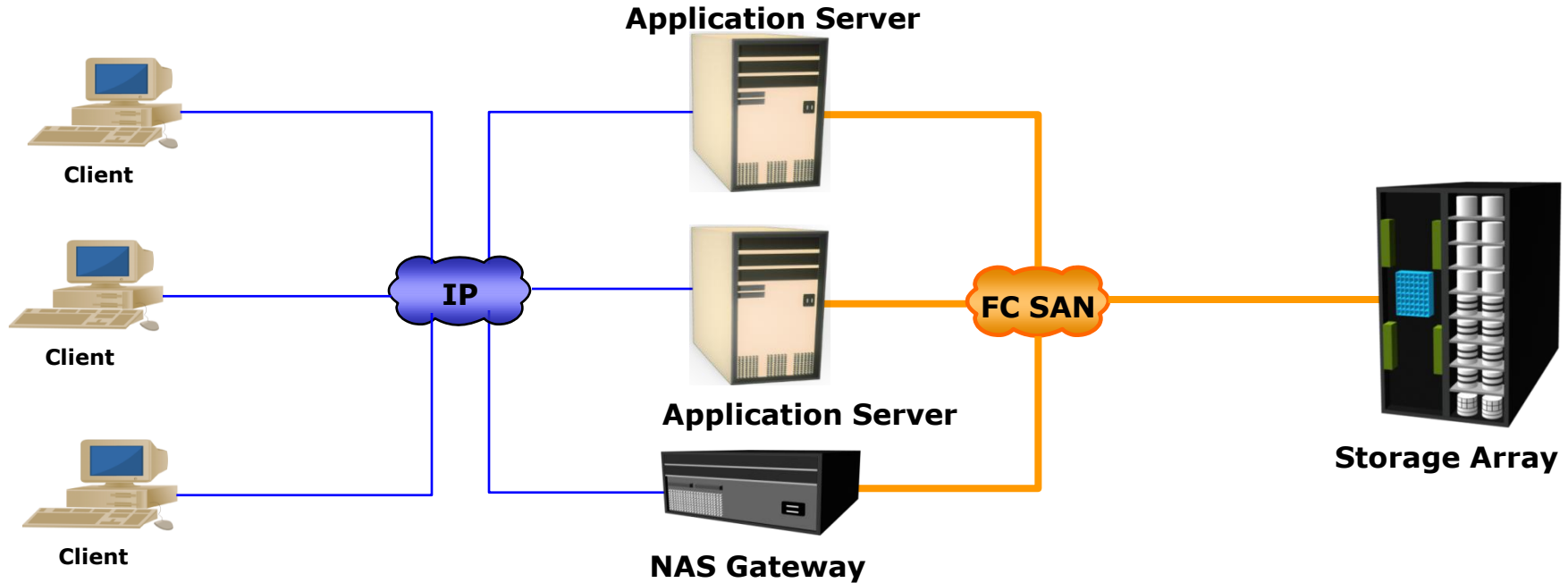
Gateway NAS



Integrated NAS Connectivity



Gateway NAS Connectivity



Hosting and Accessing Files

Steps to host a file system:

Create an array volume

Assign volume to NAS device

Create a file system on the volume

Mount the file system

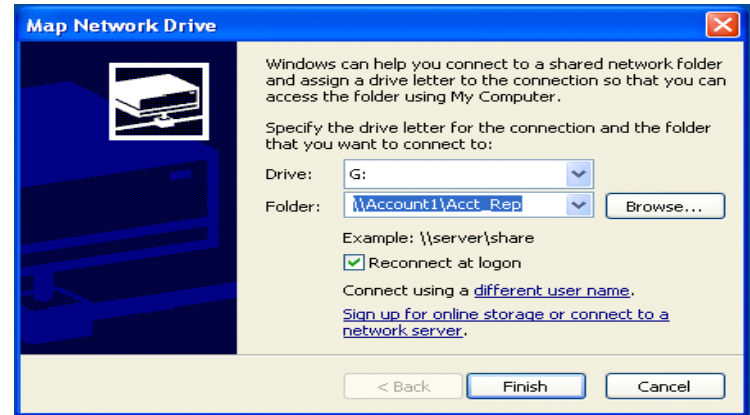
Access the file system

- Use NFS in UNIX environment

 - Execute mount/nfsmount command

- Use CIFS in windows environment

 - Map the network drive as: \\Account1\\Act_Rep



Managing NAS Environments

Managing an Integrated System

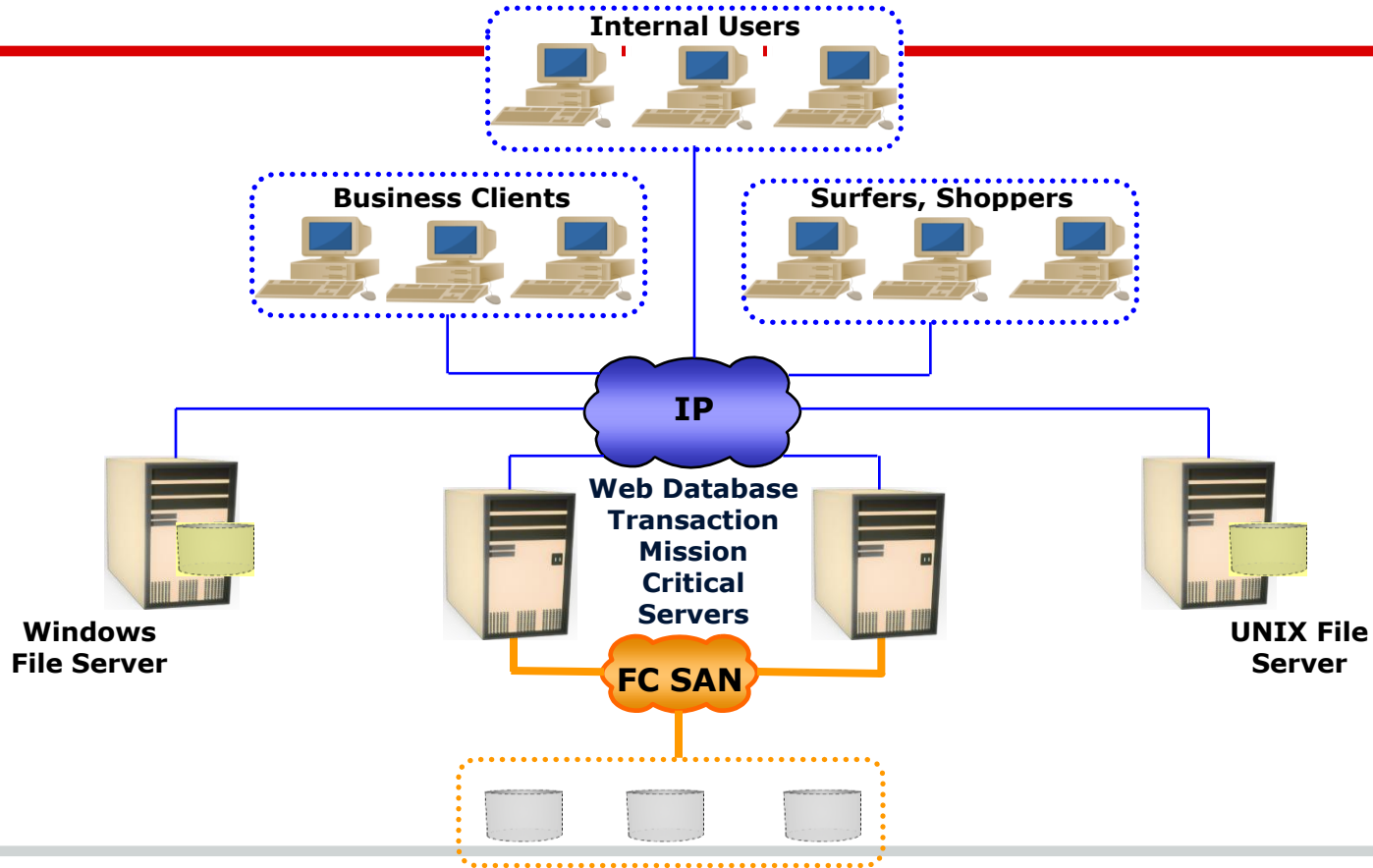
Both NAS component and the storage array are managed via NAS management software

Managing a Gateway System

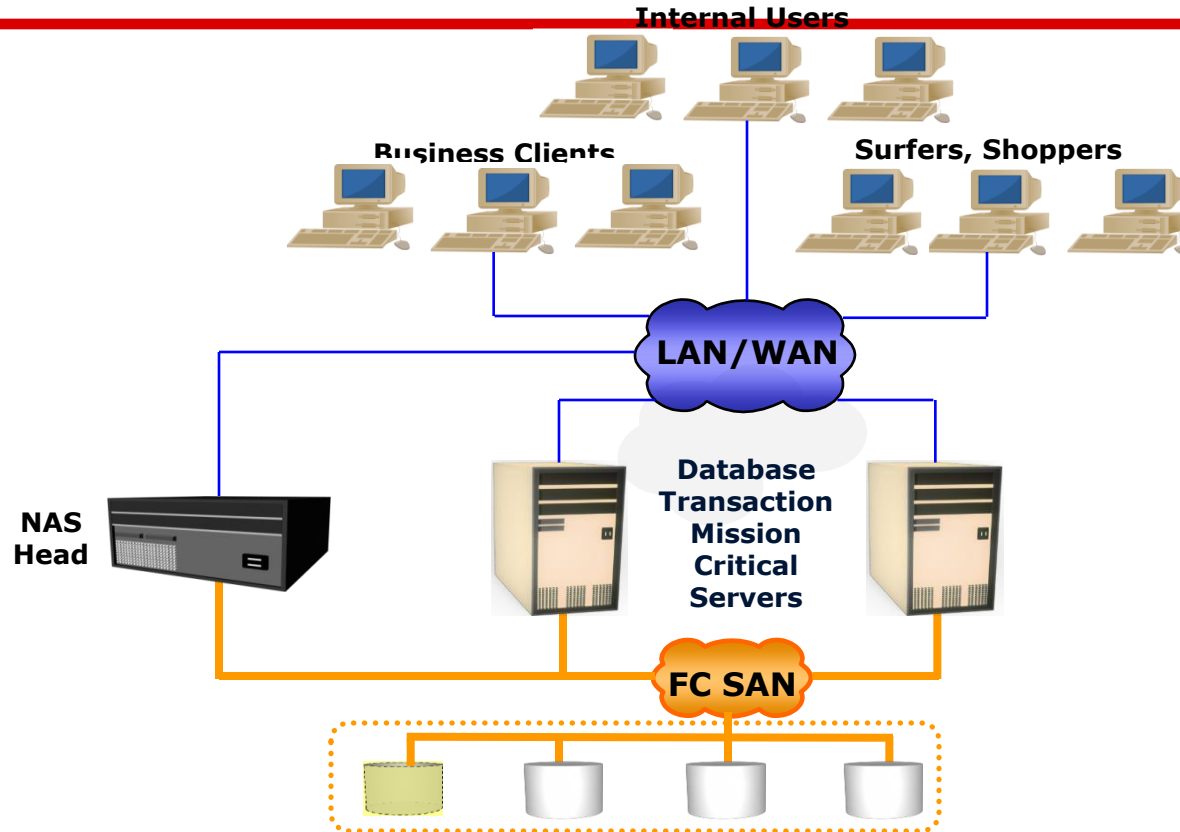
NAS component managed via NAS management software

Storage array managed via array management software

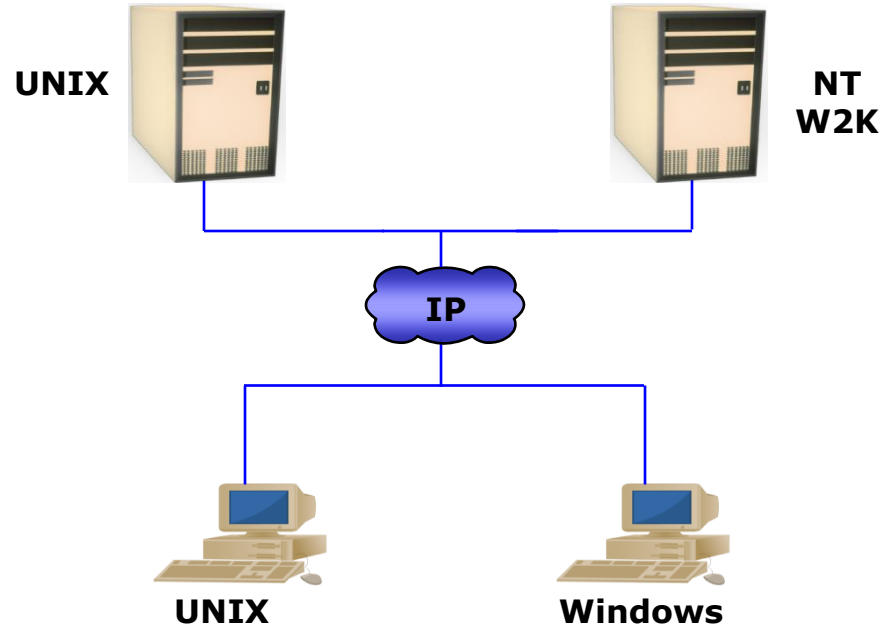
Traditional File Server Environment



Storage Consolidation with NAS

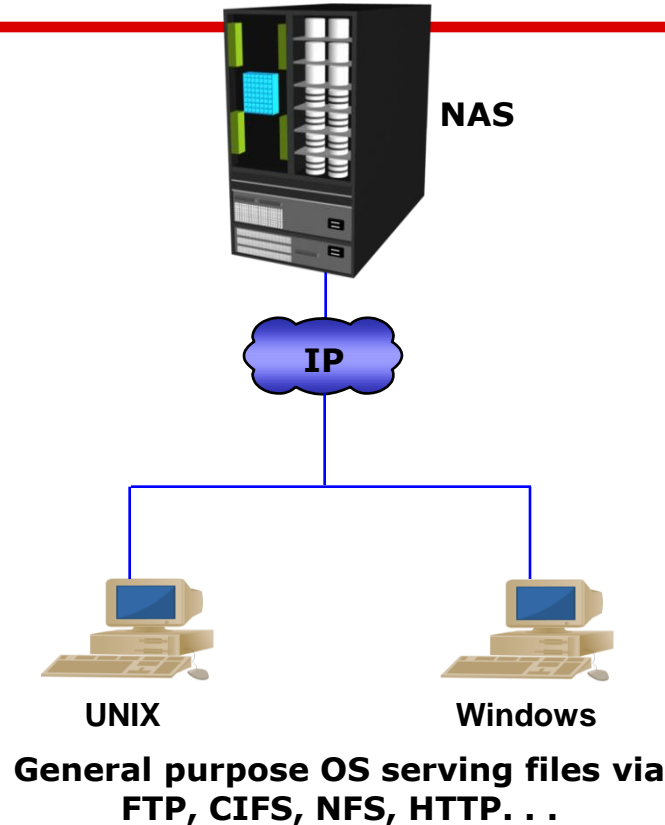


Traditional File Server Environment



**General purpose OS serving files via
FTP, CIFS, NFS, HTTP. . .**

Server Consolidation with NAS



Discussão e exercícios

Quais as diferenças entre uma solução de NAS e uma solução com gateway NAS ?

Qual parece ser uma solução mais flexível do ponto de vista do armazenamento em geral em um data center (e não somente para FS)?

Cite duas vantagens do uso de NAS sobre soluções tradicionais (com servidores) de File Server.

O NAS é um sistema de I/O por IP ? Explique.

Leitura recomendada

Capítulo 7

**Information Storage and Management Storing, Managing, and Protecting
Digital Information in Classic, Virtualized, and Cloud Environments**

2nd Edition Edited by Somasundaram Gnanasundaram, Alok Shrivastava

Apêndice

Capítulo 7

Information Storage and Management Storing, Managing, and Protecting Digital Information in Classic, Virtualized, and Cloud Environments

2nd Edition Edited by Somasundaram Gnanasundaram, Alok Shrivastava

of latency (Figure 7-7) in a NAS environment. Other factors that affect NAS performance at different levels are:

1. **Number of hops:** A large number of hops can increase latency because IP processing is required at each hop, adding to the delay caused at the router.
2. **Authentication with a directory service such as LDAP, Active Directory, or NIS:** The authentication service must be available on the network, with adequate bandwidth, and must have enough resources to accommodate the authentication load. Otherwise, a large number of authentication requests are presented to the servers, increasing latency. Authentication adds to latency only when authentication occurs.
3. **Retransmission:** Link errors, buffer overflows, and flow control mechanisms can result in retransmission. This causes packets that have not reached the specified destination to be resent. Care must be taken when configuring parameters for speed and duplex settings on the network devices and the NAS heads so that they match. Improper configuration may result in errors and retransmission, adding to latency.
4. **Overutilized routers and switches:** The amount of time that an overutilized device in a network takes to respond is always more than the response time of an optimally utilized or underutilized device. Network administrators can view vendor-specific statistics to determine the utilization of switches and routers in a network. Additional devices should be added if the current devices are overutilized.
5. **File/directory lookup and metadata requests:** NAS clients access files on NAS devices. The processing required before reaching the appropriate file or directory can cause delays. Sometimes a delay is caused by deep directory structures and can be resolved by flattening the directory structure. Poor file system layout and an overutilized disk system can also degrade performance.
6. **Overutilized NAS devices:** Clients accessing multiple files can cause high utilization levels on a NAS device which can be determined by viewing utilization statistics. High utilization levels can be caused by a poor file system structure or insufficient resources in a storage subsystem.
7. **Overutilized clients:** The client accessing CIFS or NFS data may also be overutilized. An overutilized client requires longer time to process the responses received from the server, increasing latency. Specific performance-monitoring tools are available for various operating systems to help determine the utilization of client resources.

