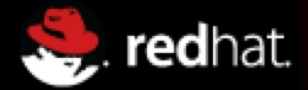


**RED HAT®  
TRAINING**



*Comprehensive, hands-on training that solves real-world problems*

# Red Hat System Administration III

DAY ONE	DAY TWO	DAY THREE	DAY FOUR
Introduction	DNS	File-based Storage (continued)	Bash Scripts
Services and Daemons	Email	MariaDB Databases	Bash Control Structures
IPv6 Networking	Block-based Storage	Apache HTTPD	Shell Environment
Link Aggregation and Bridging	File-based Storage		Containers
Network Port Security			Comprehensive Review

## DAY ONE

### Introduction

Services and  
Daemons

IPv6 Networking

Link Aggregation  
and Bridging

Network Port Security

## Introduction

- Welcome to Class
- Course Objectives and Structure
- Orientation to Classroom Network
- Internationalization

# Welcome to Class

# Course Objectives and Structure

DAY ONE	DAY TWO	DAY THREE	DAY FOUR
Introduction	DNS	File-based Storage (continued)	Bash Scripts
Services and Daemons	Email	MariaDB Databases	Bash Control Structures
IPv6 Networking	Block-based Storage	Apache HTTPD	Shell Environment
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Network Port Security			Comprehensive Review

# Orientation to Classroom Network

# Internationalization



## DAY ONE

Introduction

**Services and  
Daemons**

IPv6 Networking

Link Aggregation  
and Bridging

Network Port Security

# Chapter 1: Controlling Services and Daemons

- **Controlling Services with `systemctl`**
- **Controlling the Boot Process**

# Goal:

To review how to manage services and the boot-up process using `systemctl`.

# Objectives:

- Manage how systemd starts up system daemons and network services, using systemctl.
- Control and troubleshoot system boot using systemd targets.

# Controlling Services with `systemctl`

# **Practice: Using `systemctl` to Manage Services**

# Controlling the Boot Process

# **Practice: Selecting a Boot Target**

# **Lab:**

# **Controlling Services and Daemons**



## DAY ONE

Introduction

Services and  
Daemons

**IPv6 Networking**

Link Aggregation  
and Bridging

Network Port Security

## Chapter 2: Managing IPv6 Networking

- **Review of IPv4 Networking Configuration**
- **IPv6 Networking Concepts**
- **IPv6 Networking Configuration**

# Goal:

To configure and troubleshoot basic IPv6 networking on Red Hat Enterprise Linux systems.

# Objectives:

- Review how to configure IPv4 networking in RHEL 7
- Explain the basic concepts of IPv6 networking and read and write condensed IPv6 addresses
- Configure IPv6 networking using command-line tools and configuration files

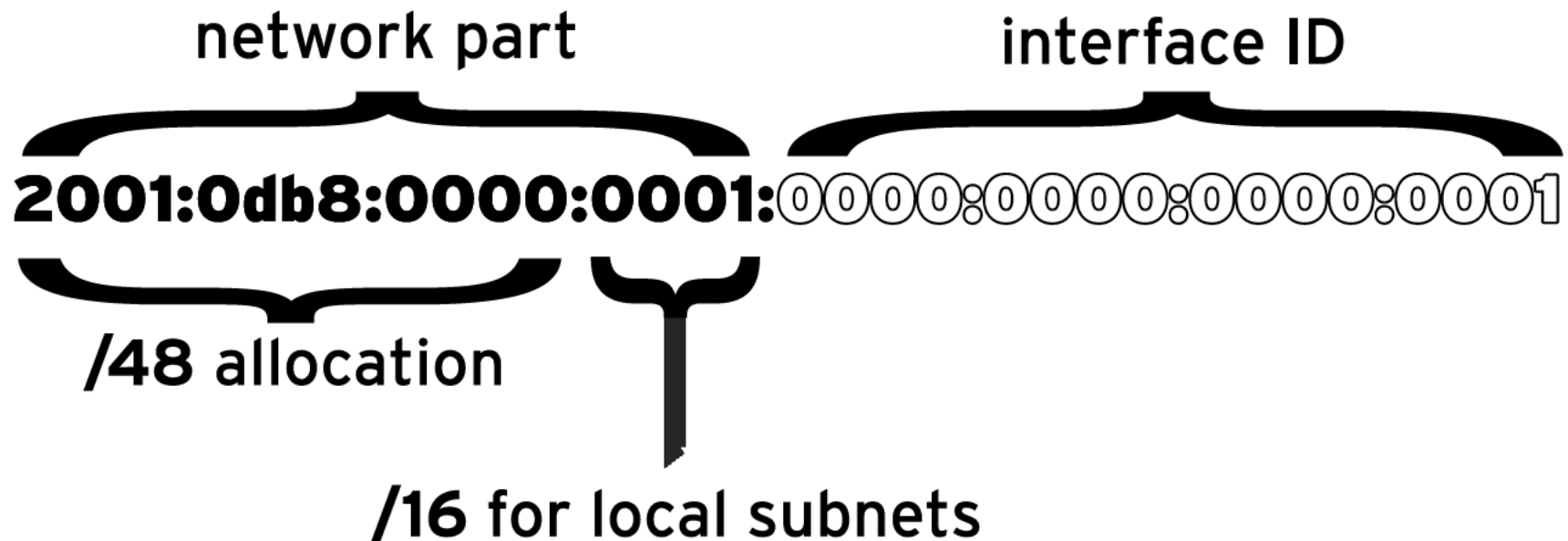
# **Review of IPv4 Networking Configuration**

# **Practice: Configuring IPv4 Networking**

# IPv6 Networking Concepts

IPv6 address is **2001:db8:0:1::1/64**

Allocation from provider is **2001:db8::/48**



# **Quiz: Interpreting IPv6 Addresses**



# IPv6 Networking Configuration

# **Practice: Configuring IPv6 Networking**

# **Lab:**

# **Managing IPv6 Networking**

## DAY ONE

Introduction

Services and  
Daemons

IPv6 Networking

**Link Aggregation  
and Bridging**

Network Port Security

## Chapter 3:

### Configuring Link Aggregation and Bridging

- Configuring Network Teaming
- Managing Network Teaming
- Configuring Software Bridges

# Goal:

To configure and troubleshoot advanced network interface functionality, including bonding, teaming, and local software bridges.

# Objectives:

- Use network teaming to provide link redundancy or higher throughput.
- Manage a network team interface.
- Manage local software bridges and associated interfaces.

# Configuring Network Teaming

# **Practice: Configuring Network Teaming**



# Managing Network Teaming

# **Practice: Managing Network Teaming**

# Configuring Software Bridges

# **Practice: Configuring Software Bridges**

# **Lab: Configuring Link Aggregation and Bridging**

## DAY ONE

Introduction

Services and  
Daemons

IPv6 Networking

Link Aggregation  
and Bridging

**Network Port Security**

## Chapter 4: Network Port Security

- Managing Firewalld
- Managing Rich Rules
- Masquerading and Port Forwarding
- Managing SELinux Port Labeling

# Goal:

To permit and reject access to network services using advanced SELinux and firewalld filtering techniques.

# Objectives:

- Review firewalld concepts and management commands covered in previous courses.
- Configure more complex firewall configurations using firewalld's support for "rich language rules."
- Describe and implement Network Address Translation (NAT).
- Ensure network ports have the correct SELinux type so that services are able to bind to them.



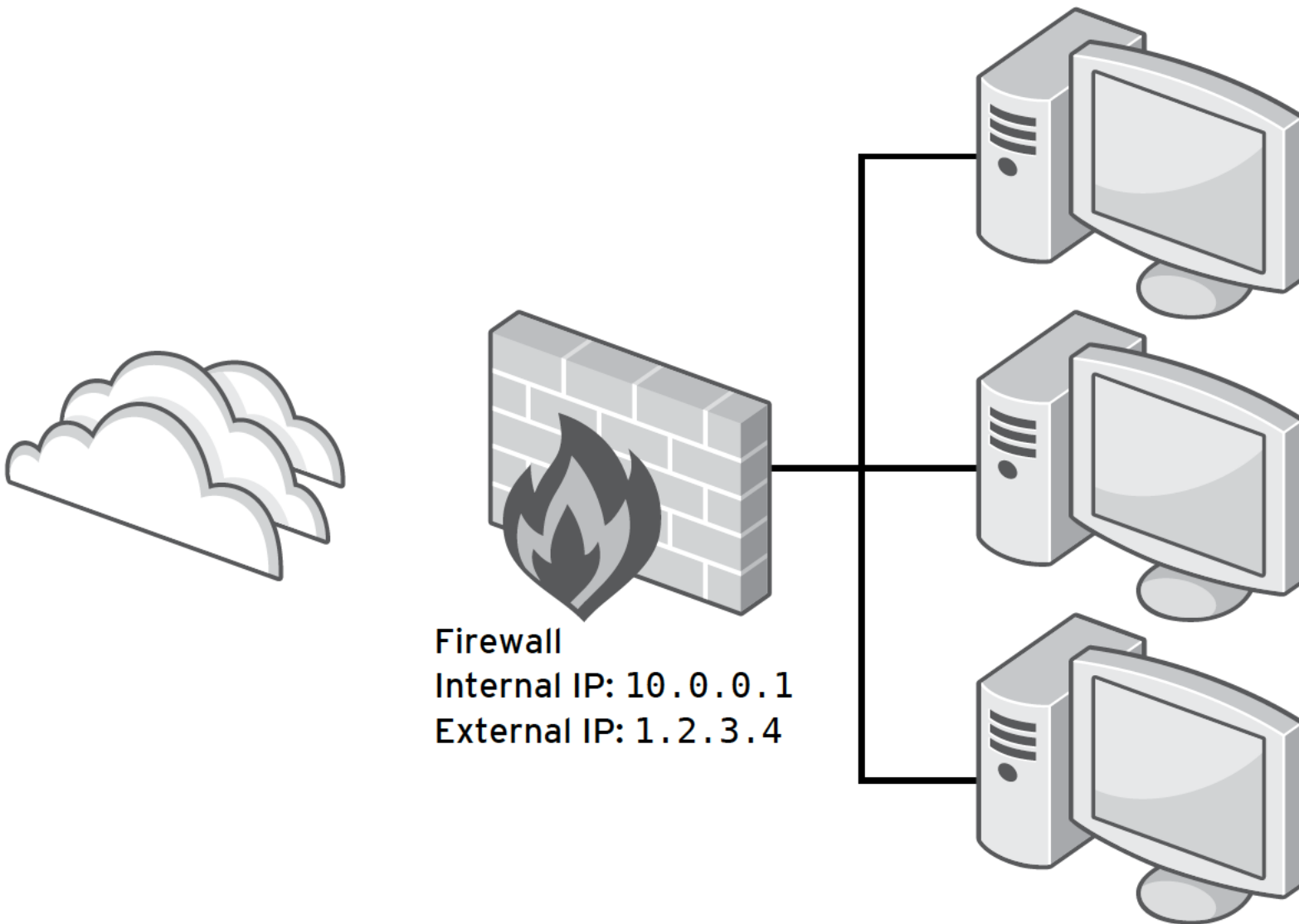
# Managing Firewall

# **Practice: Configuring a Firewall**

# Managing Rich Rules

# **Practice: Writing Custom Rules**

# Masquerading and Port Forwarding



# **Practice: Forwarding a Port**

# Managing SELinux Port Labeling



# **Practice: Managing SELinux Port Labeling**

# **Lab: Network Port Security**

## DAY TWO

DNS

Email

Block-based Storage

File-based Storage

## Chapter 5: Managing DNS for Servers

- DNS Concepts
- Configuring a Caching Nameserver
- DNS Troubleshooting

# Goal:

To set and verify correct DNS records for systems and configure secure caching DNS name service.

# Objectives:

- Explain how DNS is used to resolve names and addresses and the purpose of key DNS resource records.
- Configure unbound to act as a secure local caching nameserver.
- Describe common DNS configuration problems and how to identify and resolve them.

# DNS Concepts

# **Quiz:**

## **DNS Resource Record**

# Configuring a Caching Nameserver



# **Practice: Configuring unbound as a Caching Nameserver**

# DNS Troubleshooting

# **Practice: Troubleshooting DNS**

# **Lab:**

# **Managing DNS for Servers**

## DAY TWO

DNS

Email

Block-based Storage

File-based Storage

## Chapter 6: Configuring Email Transmission

- Configuring Send-only Email Service

# Goal:

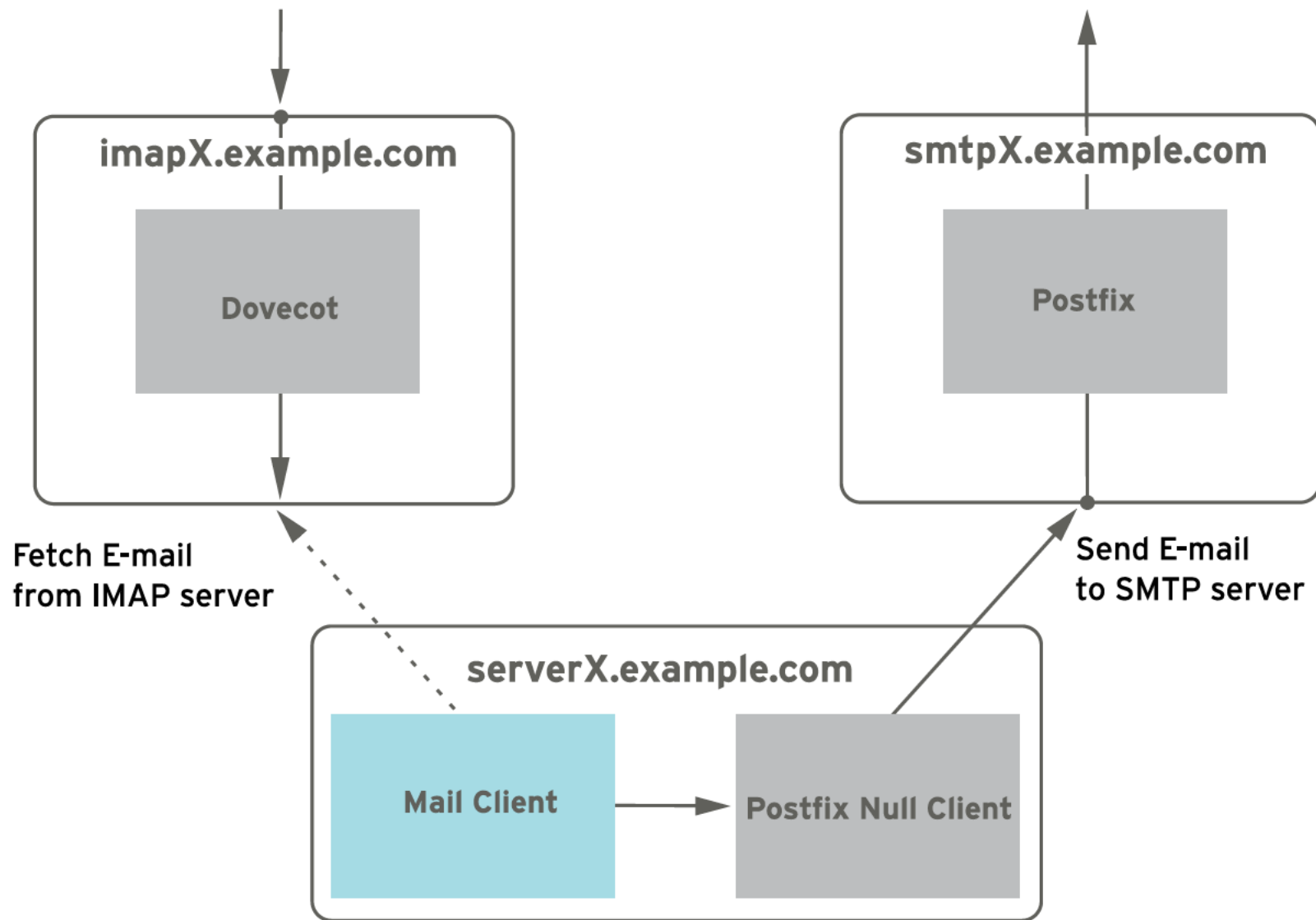
To relay all email sent by the system through an SMTP gateway.

# Objectives:

- Configure a Red Hat Enterprise Linux server to transmit all email through an unauthenticated SMTP gateway.

# Configuring Send-only Email Service





# **Practice: Configuring Send-only Email Service**

# **Lab:**

# **Configuring Email Transmission**

## DAY TWO

DNS

Email

**Block-based Storage**

File-based Storage

## Chapter 7: Providing Remote Block Storage

- iSCSI Concepts
- Providing iSCSI Targets
- Accessing iSCSI Storage

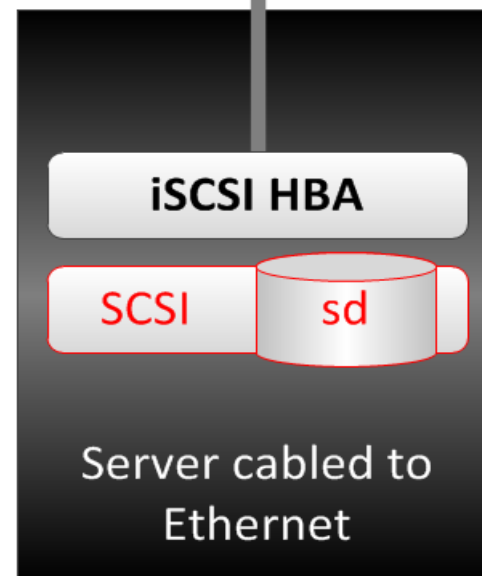
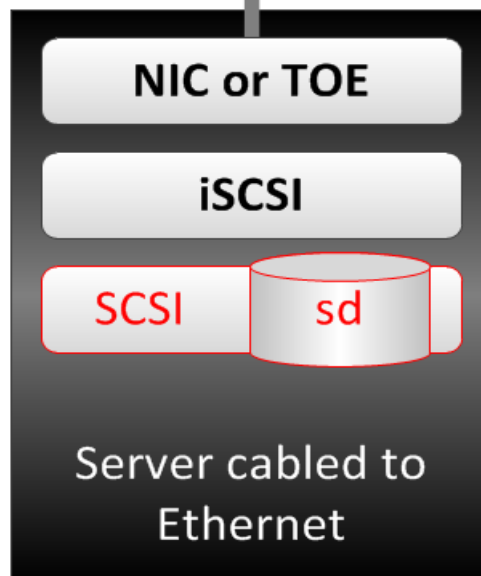
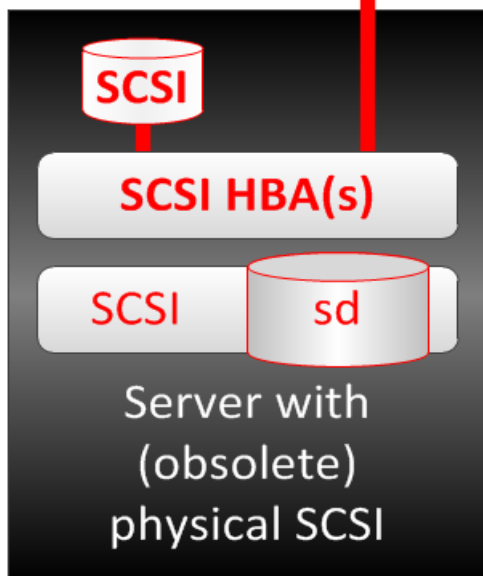
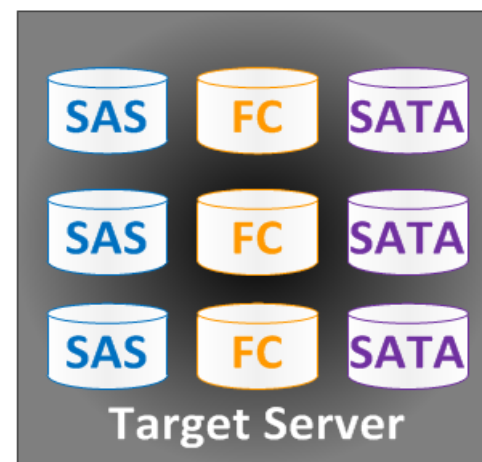
# Goal:

To provide and use networked iSCSI block devices as remote disks.

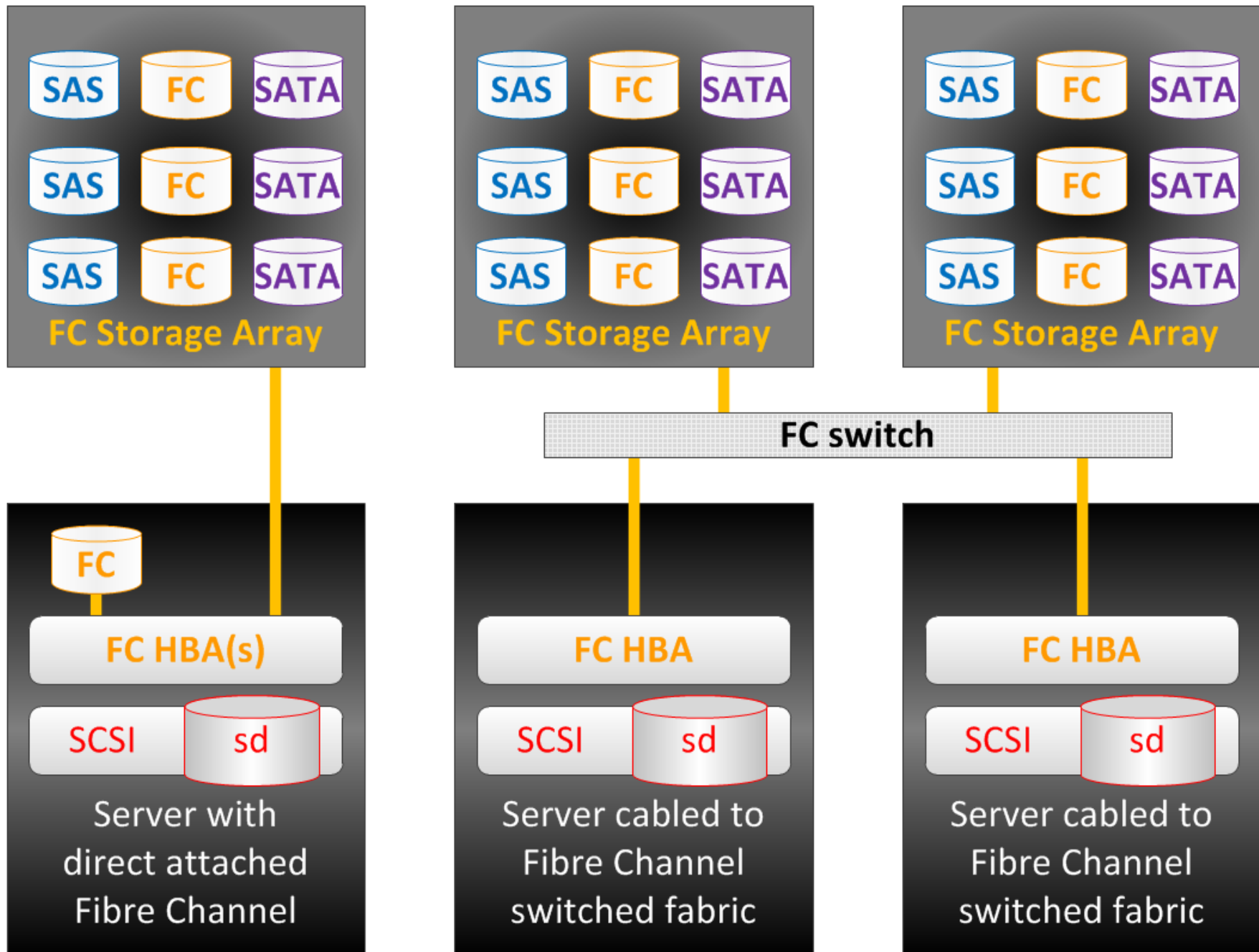
# Objectives:

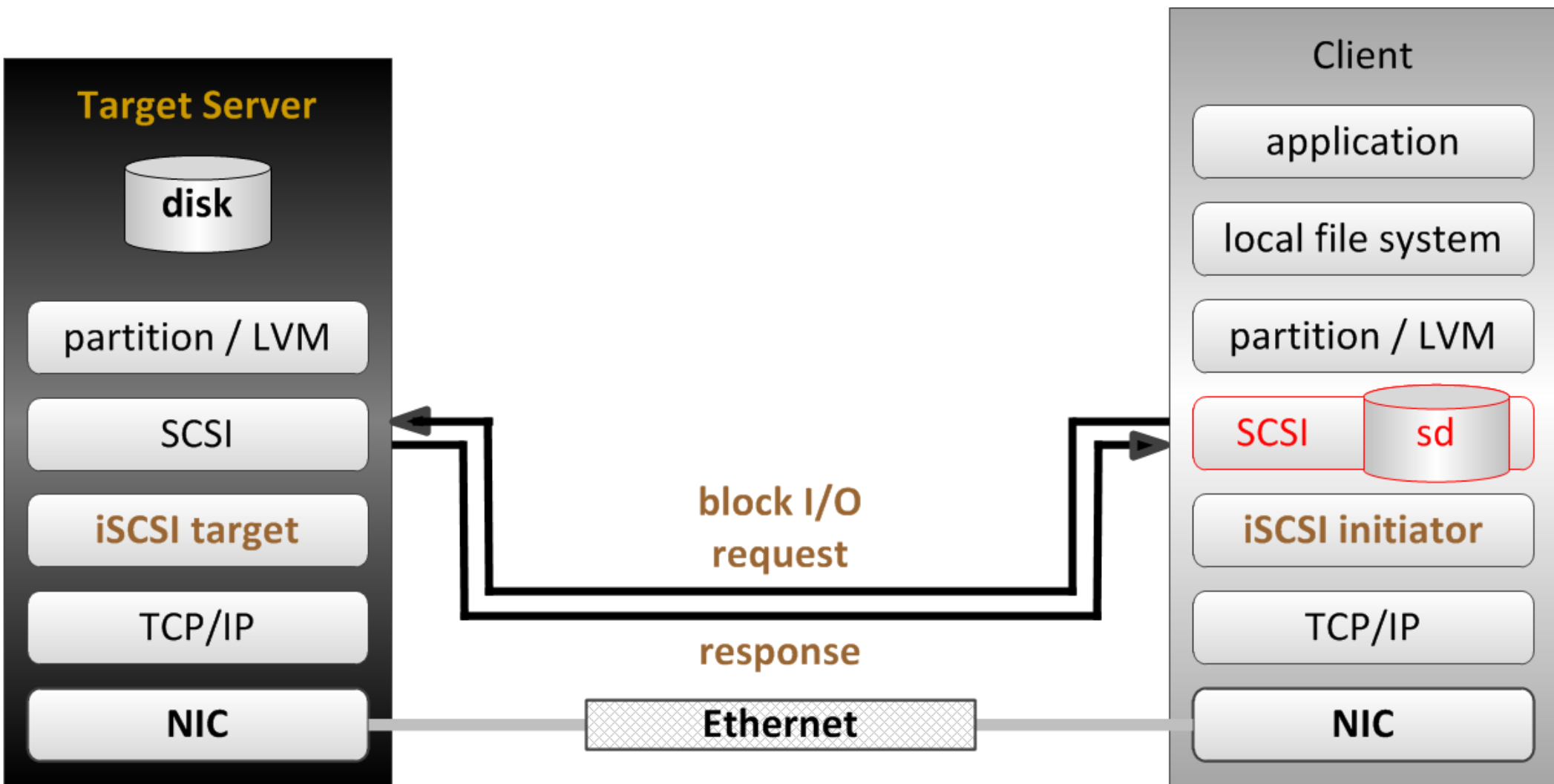
- Explain at a high level how iSCSI is used to provide remote access to block devices.
- Provide remote access using a local disk as a LUN of an iSCSI storage target.
- Access remote storage using an iSCSI initiator and prepare it for use.

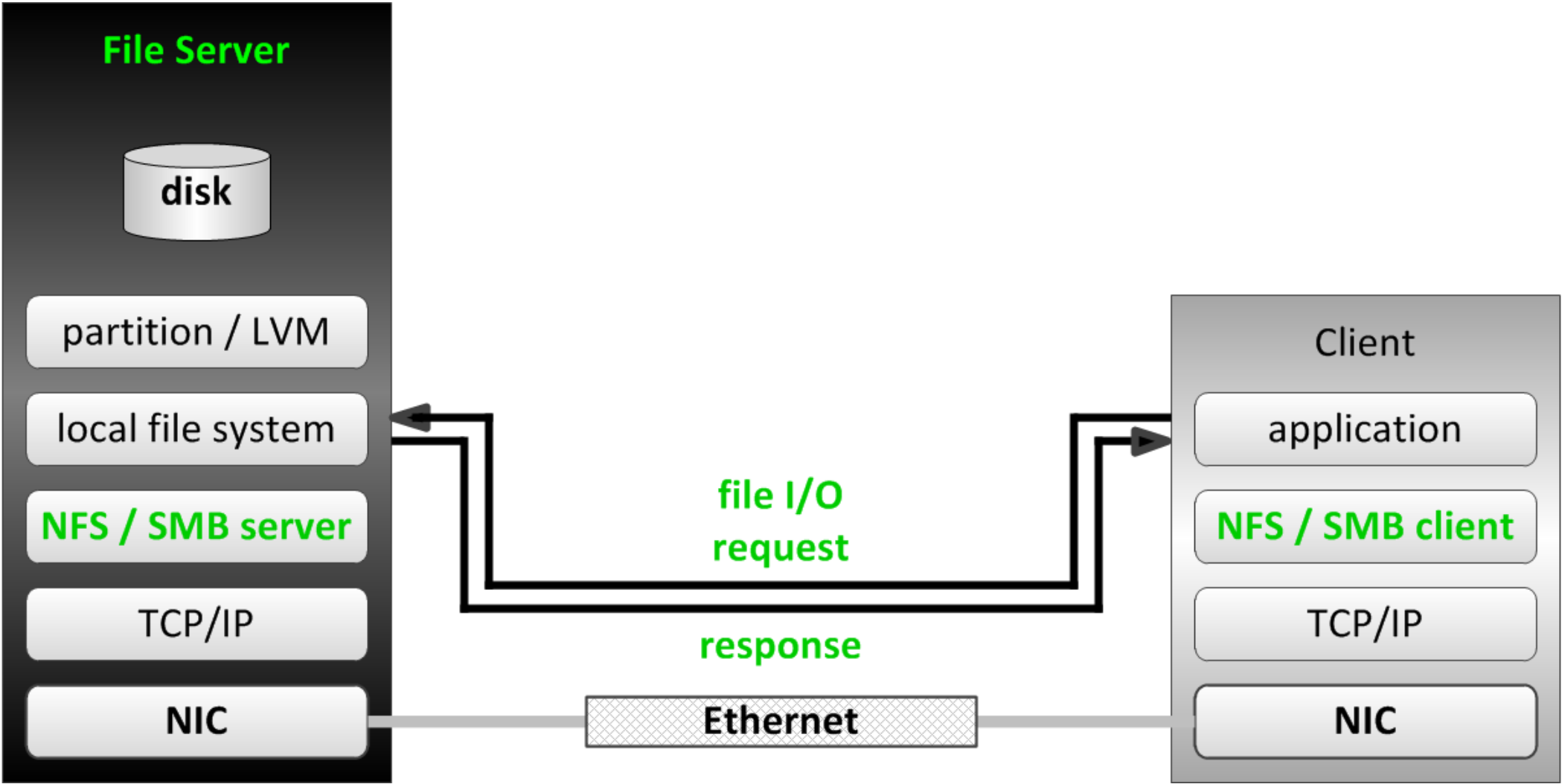
# iSCSI Concepts











# **Quiz: iSCSI Concepts**

# Providing iSCSI Targets

# **Practice: Providing iSCSI Targets**

# Accessing iSCSI Storage

# **Practice: Accessing iSCSI Storage**



# **Lab: Providing Block-based Storage**

## DAY TWO

DNS

Email

Block-based Storage

**File-based Storage**

## Chapter 8: Providing File-based Storage

- Exporting NFS File Systems
- Protecting NFS Exports
- Providing SMB File Shares
- Performing a Multiuser SMB Mount

# Goal:

To provide NFS exports and SMB file shares to specific systems and users.

# Objectives:

- Export file systems to client systems using NFS, controlling access by IP address.
- Export file systems to clients using NFS, controlling access with Kerberos and using labeled NFS.
- Share file systems with clients using SMB, controlling access by username and password.
- Mount an SMB share with the multiuser mount option, using password-based authentication and cifscreds to control access

# Exporting NFS File Systems

# **Practice: Exporting NFS File Systems**

# Protecting NFS Exports

# **Practice: Protecting NFS Exports**



## DAY THREE

### File-based Storage (continued)

MariaDB  
Databases

Apache HTTPD

## Chapter 8: Providing File-based Storage

- Exporting NFS File Systems
- Protecting NFS Exports
- Providing SMB File Shares
- Performing a Multiuser SMB Mount

# Providing SMB File Shares

# **Practice: Providing SMB File Shares**

# Performing a Multiuser SMB Mount

# **Practice: Performing a Multiuser SMB Mount**

# **Lab: Providing File-based Storage**

## DAY THREE

File-based Storage

**MariaDB  
Databases**

Apache HTTPD

## Chapter 9: Configuring MariaDB Databases

- Installing MariaDB
- Working with MariaDB Databases
- Managing Database Users and Access Rights
- Creating and Restoring MariaDB Backups

# Goal:

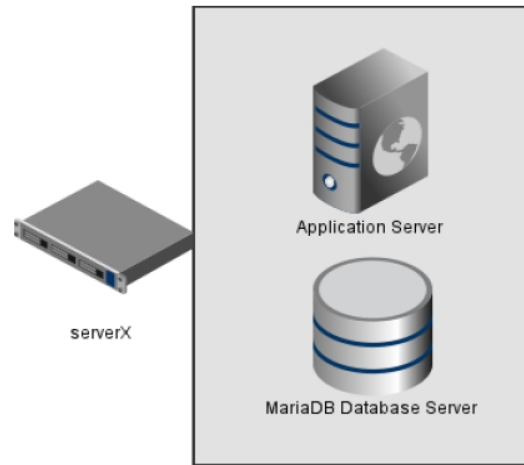
To provide a MariaDB SQL database for use by programs and database administrators.



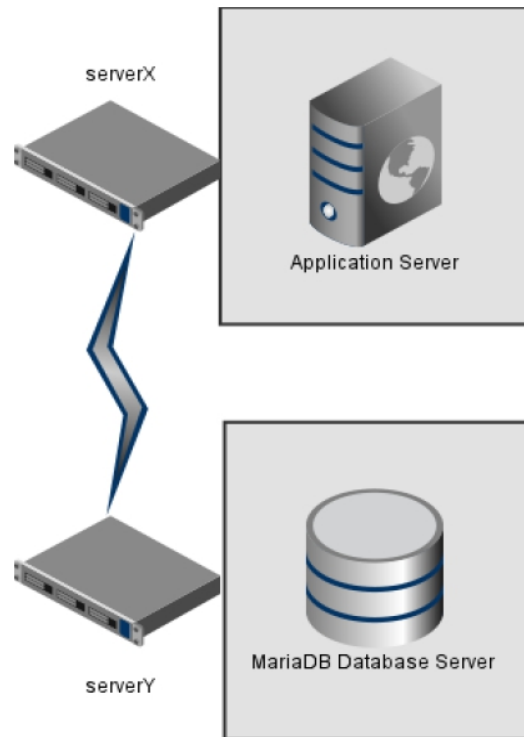
# Objectives:

- Install MariaDB.
- Configure and administer MariaDB.
- Configure user and access rights.
- Back up and restore MariaDB databases.

# Installing MariaDB



*Figure 9.1: Local access to MariaDB*



# **Practice: Installing MariaDB**

# Working with MariaDB Databases

# **Quiz:**

## **MariaDB Commands**

# Managing Database Users and Access Rights

# Practice: Managing Users



# Creating and Restoring MariaDB Backups

# **Practice: Restoring a MariaDB Database from Backup**

# **Lab:**

# **Configuring MariaDB Databases**

## DAY THREE

File-based Storage

MariaDB  
Databases

Apache HTTPD

## Chapter 10: Providing Apache HTTPD Web Service

- Configuring Apache HTTPD
- Configuring and Troubleshooting Virtual Hosts
- Configuring HTTPS
- Integrating Dynamic Web Content

# Goal:

To configure Apache HTTPD to provide TLS-enabled websites and virtual hosts.

# Objectives:

- Identify the key configuration files, log files, and content directories used by Apache httpd.
- Configure Apache httpd to provide IP-based and namebased virtual hosts.
- Configure Apache httpd to provide TLS-encrypted virtual hosts.
- Configure Apache httpd to serve dynamic databasedriven web content.

# Configuring Apache HTTPD

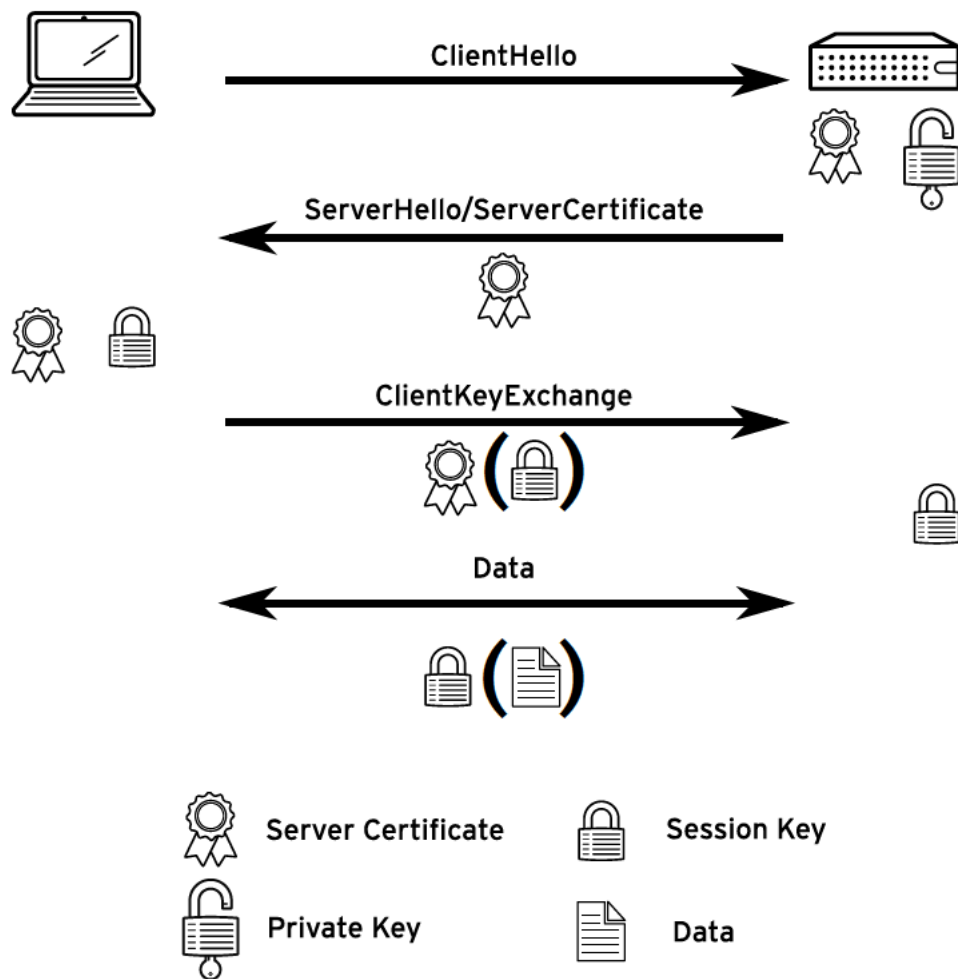
# **Practice: Configuring a Web Server**



# Configuring and Troubleshooting Virtual Hosts

# **Practice: Configuring a Virtual Host**

# Configuring HTTPS



# **Practice: Configuring a TLS-enabled Virtual Host**

# Integrating Dynamic Web Content

# **Practice: Configuring a Web Application**

# **Lab:**

## **Providing Apache HTTPD Web Service**



## DAY FOUR

### Bash Scripts

Bash Control  
Structures

Shell Environment

Containers

Comprehensive  
Review

## Chapter 11: Writing Bash Basics

- Bash Shell Scripting Basics

# Goal:

To write simple, well-structured shell scripts using Bash's shell expansion features and for-loop construct.

# Objectives:

- To write simple shell scripts using Bash.

# Bash Shell Scripting Basics

# **Practice: Writing Bash Scripts**

# **Lab: Writing Bash Scripts**

## DAY FOUR

Bash Scripts

**Bash Control  
Structures**

Shell Environment

Containers

Comprehensive  
Review

## Chapter 12: Bash Conditionals and Control Structures

- Bash Condition Evaluation and Control Structures

# Goal:

To use Bash conditionals and other control structures to write more sophisticated shell commands and scripts.



# Objectives:

- Incorporate the use of positional parameters, exit status, test conditions, and conditional structures to implement flow control in Bash shell scripts.

# **Enhancing Bash Shell Scripts with Conditionals and Control Structures**

# **Practice:**

## **Enhancing Bash Shell Scripts with Conditionals and Control Structures**

# **Lab:**

# **Bash Conditionals and Control Structures**

## DAY FOUR

Bash Scripts

Bash Control  
Structures

**Shell Environment**

Containers

Comprehensive  
Review

## Chapter 13: Configuring the Shell Environment

- Changing the Shell Environment

# Goal:

To customize Bash startup and use environment variables, Bash aliases, and Bash functions.

# Objectives:

- Use bash startup scripts to define environment variables, aliases, and functions

# Changing the Shell Environment



# **Practice: Working with Login and Non-Login Shells**

# **Lab: Configuring the Shell Environment**

## DAY FOUR

Bash Scripts

Bash Control  
Structures

Shell Environment

**Containers**

Comprehensive  
Review

## Chapter 14: Linux Containers and Docker

- Introduction to Linux Containers
- Using Docker

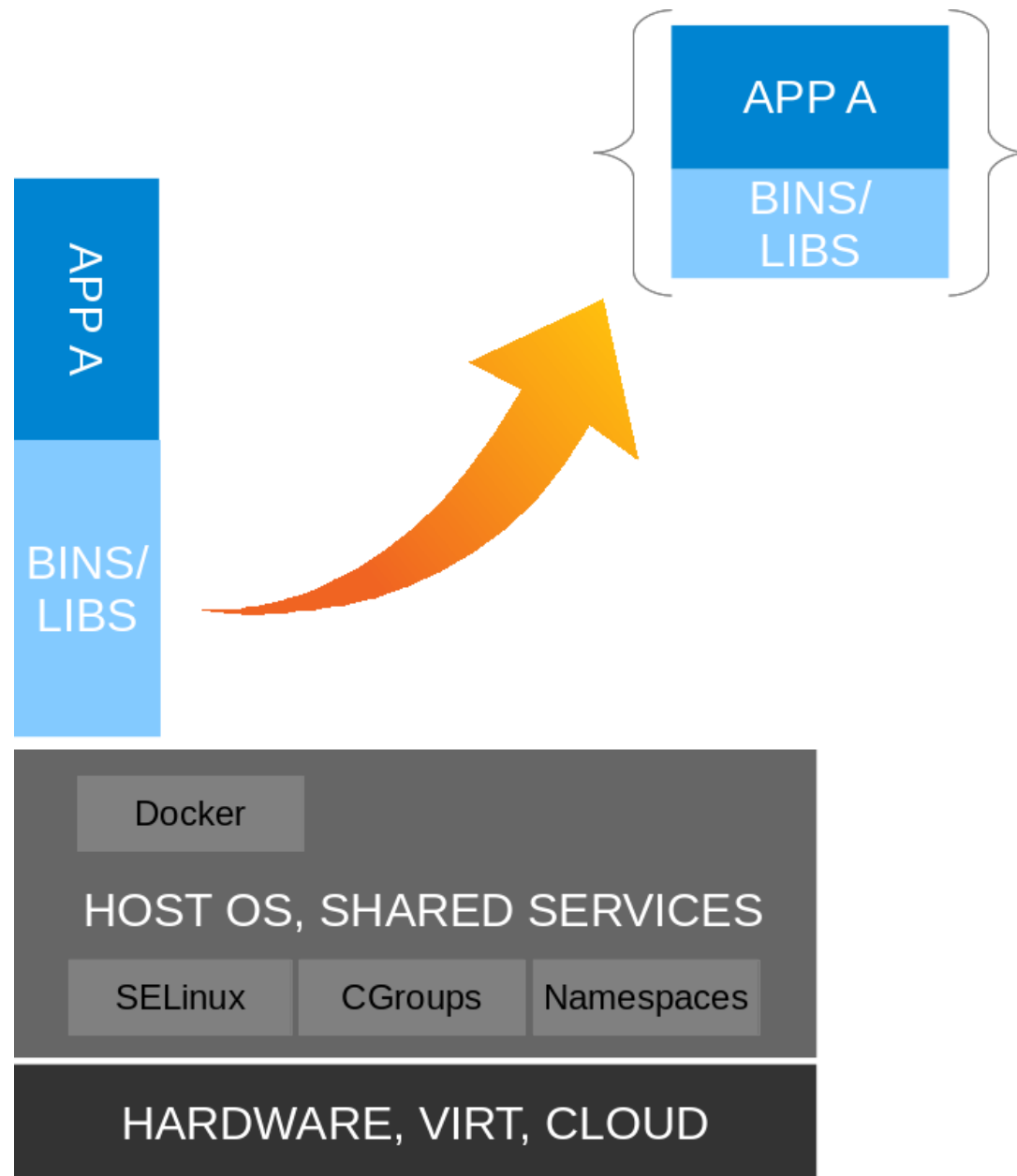
# Goal:

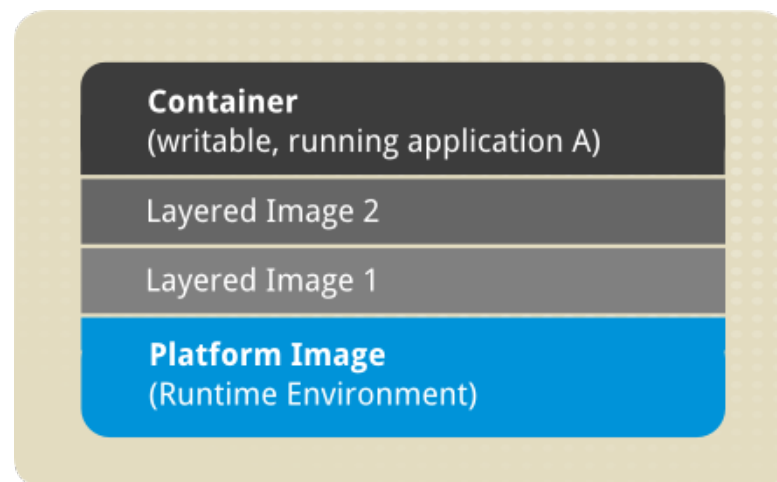
To manage Linux containers with Docker in Red Hat Enterprise Linux 7.

# Objectives:

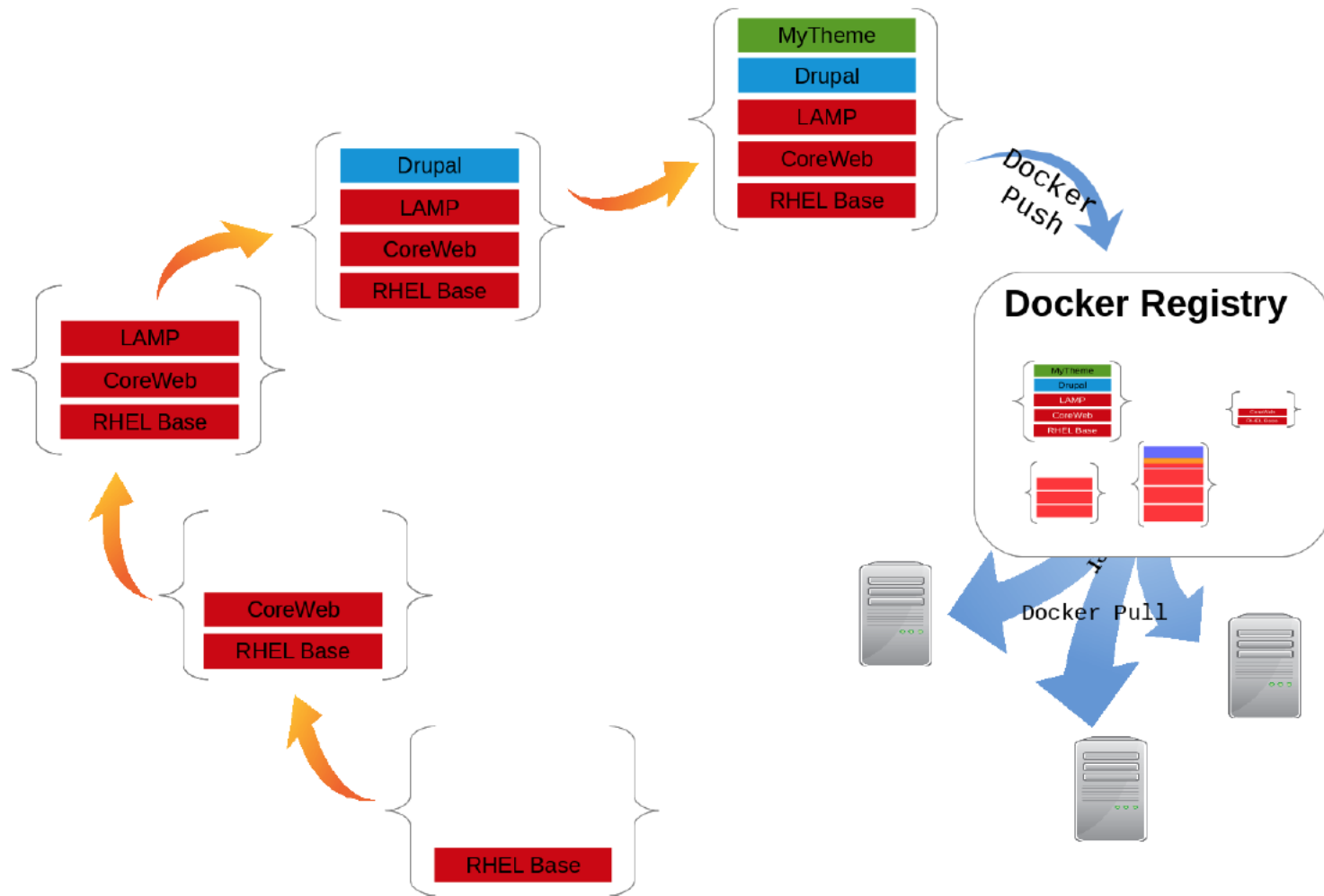
- Explain what Linux containers are and Docker's role in managing them
- Manage Linux containers using Docker

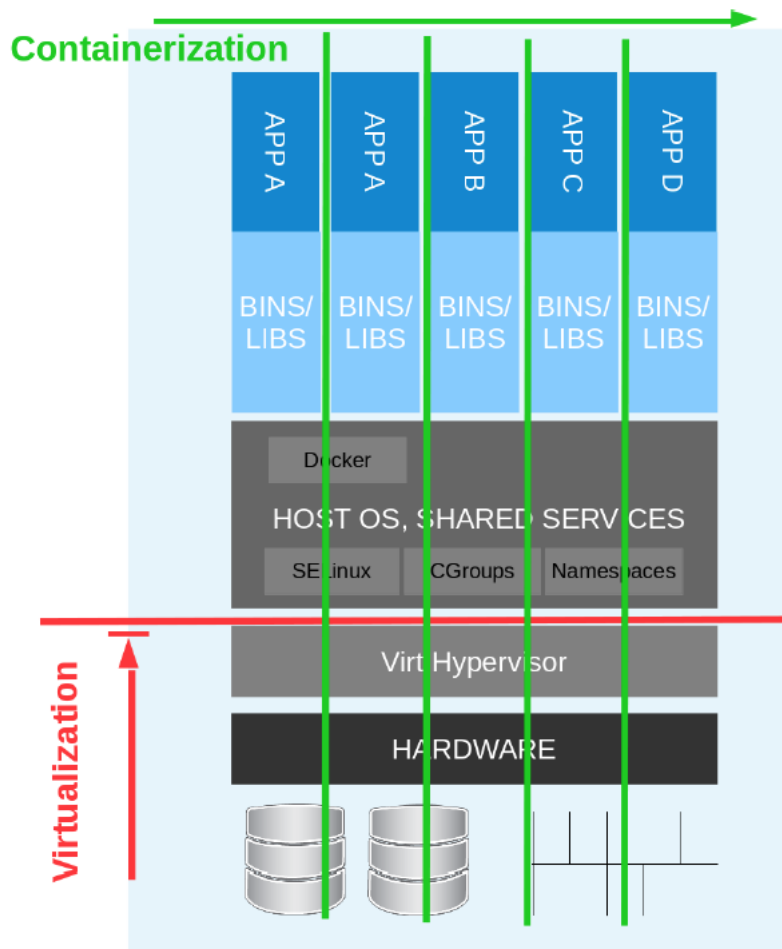
# Introduction to Linux Containers











# Using Docker

## DAY FOUR

Bash Scripts

Bash Control  
Structures

Shell Environment

Containers

Comprehensive  
Review

## Chapter 15: Comprehensive Review

- Red Hat System Administration  
III Comprehensive Review

# Goal:

To practice and demonstrate knowledge and skills learned in Red Hat System Administration III.

# Objectives:

- Review the course chapters to reinforce knowledge and skills.

# **Red Hat System Administration III**

## **Comprehensive Review**

# **Lab: Comprehensive Review of System Administration III**



