# Intercommunication Between Two Networks

## Introduction

This project, titled 'Intercommunication Between Two Networks,' focuses on the design and implementation of a network infrastructure for a company with two branches located in different states and a central server located in a third state. The objective is to establish effective communication between the branches and the server while implementing efficient network management practices using modern networking technologies.

## Objectives

The primary objectives of this project are to:  
1. Enable seamless intercommunication between two branches of the company.  
2. Establish connectivity with central servers for essential services such as DHCP, HTTP, and DNS.  
3. Ensure efficient IP address management using both static and dynamic methods.  
4. Implement VLANs and inter-VLAN routing for effective network segmentation.  
5. Utilize RIP (Routing Information Protocol) for routing between different networks.  
6. Provide wireless connectivity for specific departments using WLAN.  
7. Optimize network performance and security through subnetting and routing.

## Network Concepts Used

The following networking concepts and protocols were used in this project:  
1. Static and Dynamic IP Allocation: Dynamic IP allocation is handled by a DHCP server, while static IPs are used for specific departments requiring dedicated configurations.  
2. VLAN and Inter-VLAN Routing: VLANs are implemented to segregate network traffic for better management, and inter-VLAN routing ensures communication between VLANs.  
3. WLAN (Wireless Local Area Network): WLAN is deployed for departments requiring wireless connectivity.  
4. DHCP (Dynamic Host Configuration Protocol):Used for automatic IP address assignment to devices.  
5. HTTP and DNS Services: Provided by dedicated servers to handle web and domain name resolution services.  
6. RIP (Routing Information Protocol):Used for routing data between the two branches and the central server.  
7. Subnetting: Applied to optimize IP address utilization and network performance.

## Step-by-Step Implementation

### 1. Network Design and Topology

The network topology is designed with two branches and a central server. Each branch contains five departments that are either connected via VLAN, WLAN, or directly to the server using static or dynamic IP allocation.

### 2. Server Configuration

Two servers are configured:  
- DHCP and HTTP Server: Handles dynamic IP address allocation and HTTP services.  
- DNS Server: Resolves domain names and ensures seamless name-to-IP mapping.

### 3. VLAN Configuration

Virtual LANs are configured to segment the network into logical groups based on department. This ensures efficient traffic management and enhances network security.

### 4. Inter-VLAN Routing

Inter-VLAN routing is implemented to allow communication between devices in different VLANs. This is achieved using a Layer 3 switch or router.

### 5. Dynamic IP Allocation Using DHCP

A DHCP server is configured to dynamically assign IP addresses to devices in specific departments, reducing manual configuration efforts.

### 6. Wireless Connectivity (WLAN)

Wireless connectivity is provided to selected departments using WLAN. Access points are configured to ensure reliable and secure wireless communication.

### 7. RIP Protocol for Routing

RIP is used for dynamic routing between the two branches and the central server. This protocol ensures efficient routing table updates and network reachability.

### 8. Subnetting

Subnetting is applied to divide the network into smaller, manageable segments. This optimizes IP address usage and improves overall network performance.

## Conclusion

The project successfully demonstrates the implementation of a robust network infrastructure for a company with multiple branches. By leveraging technologies such as VLANs, WLAN, DHCP, RIP, and subnetting, the network ensures seamless communication, efficient IP address management, and optimized performance. This design can serve as a foundation for future scalability and advanced network features.