

Dynamic Routing Using Rip Version_2



Project Description



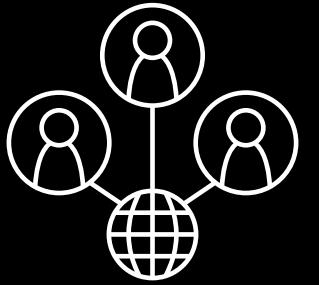
- This project demonstrates an inter-department agriculture network topology connecting several divisions through routers, switches, and servers.
- Each division has its own LAN connected to a central WAN via serial DTE connections. The entire network uses RIP Version 2 for dynamic routing.

Agriculture Department

Departments (LANs):

- **Soil Research Division (SRD)**- CSE
- **Crop Management Division (CMD)**- EEE
- **Irrigation & Water Resources Division (IWRD)**- PHARMACY
- **Fertilizer Distribution Division (FDD)**- CE
- **Agricultural Data & Analytics Division (ADAD)** - BBA
- **Central Server Zone**

Server **Details**



We have 8 server and 1 DNS

- **AgriData Server**
- **WeatherInfo Server**
- **SoilAnalysis Server**
- **CropMonitoring Server**
- **FarmerPortal Server**
- **FertilizerControl Server**
- **IrrigationControl Server**
- **YieldPrediction Server**
- **DNS Server**

Network, Server, Router IP

Device (server)	IP address	Mask	Gateway
AgriData Server	192.168.7.2	255.255.255.0	192.168.7.1
WeatherInfo Server	192.168.7.3	255.255.255.0	192.168.7.1
SoilAnalysis Server	192.168.7.4	255.255.255.0	192.168.7.1
CropMonitoring Server	192.168.7.5	255.255.255.0	192.168.7.1
FarmerPortal Server	192.168.7.6	255.255.255.0	192.168.7.1
FertilizerControl Server	192.168.7.7	255.255.255.0	192.168.7.1
IrrigationControl Server	192.168.7.8	255.255.255.0	192.168.7.1
YieldPrediction Server	192.168.7.9	255.255.255.0	192.168.7.1
DNS Server	192.168.7.254	255.255.255.0	192.168.7.1

Network IP

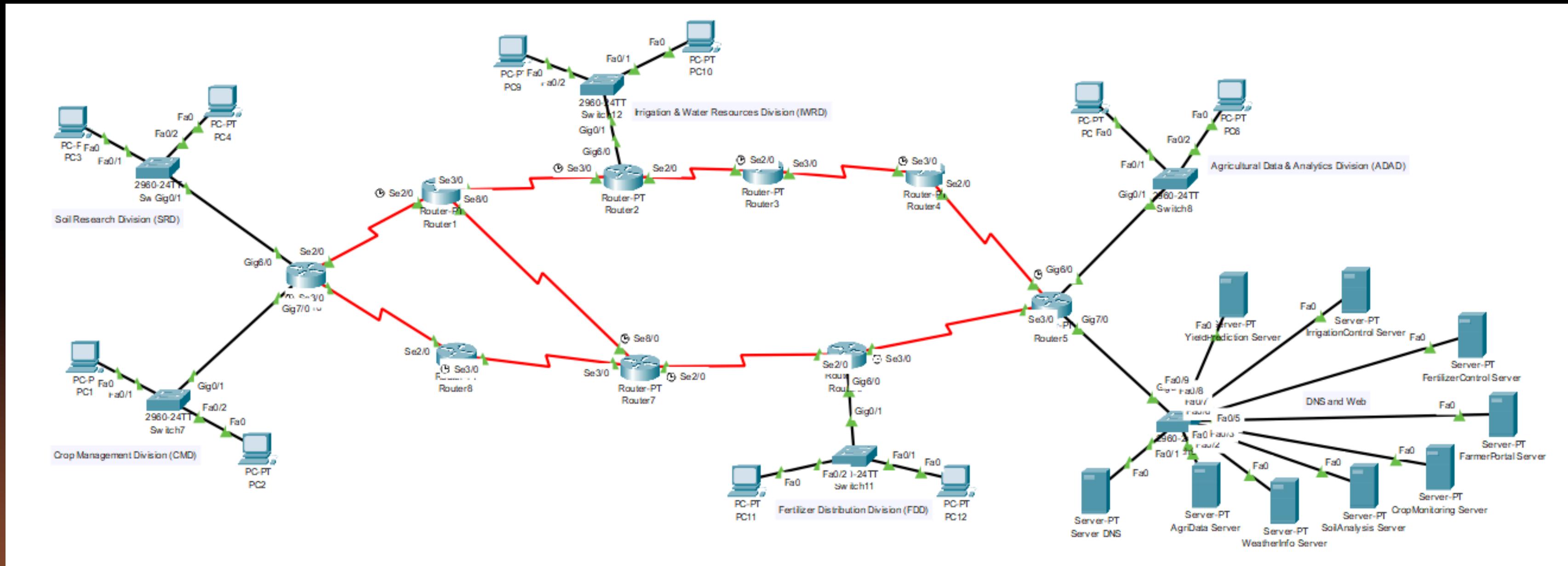
Name (Dept)	Network (CIDR)	Subnetmask	First usable	Last usable	Broadcast	Usable hosts
CSE(120)- Soil Research Division	192.168.1.0/25	255.255.255.128	192.168.1.1	192.168.1.126	192.168.1.127	126
EEE(100)- Crop Management Division	192.168.1.128/25	255.255.255.128	192.168.1.129	192.168.1.254	192.168.1.255	126
Pharmacy - (80) Fertilizer Distribution Division	192.168.2.0/25	255.255.255.128	192.168.2.1	192.168.2.126	192.168.2.127	126
CE(70)- Irrigation & Water Resources Division	192.168.2.128/25	255.255.255.128	192.168.2.129	192.168.2.126	192.168.2.127	126
BBA(50)- Agricultural Data & Analytics Division	192.168.3.0/25	255.255.255.192	192.168.3.1	192.168.3.62	192.168.3.63	62

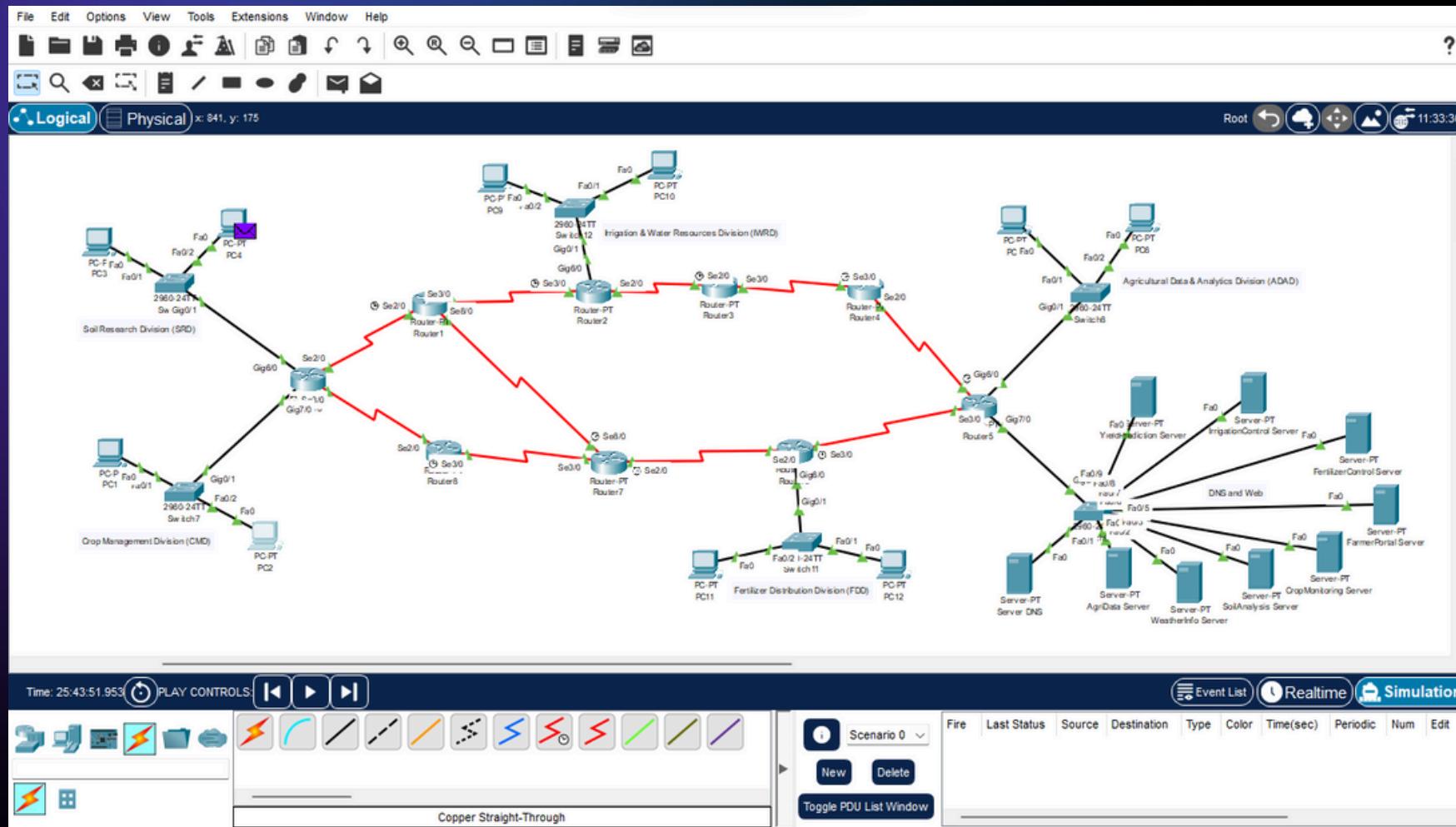
Server IP

Router IP

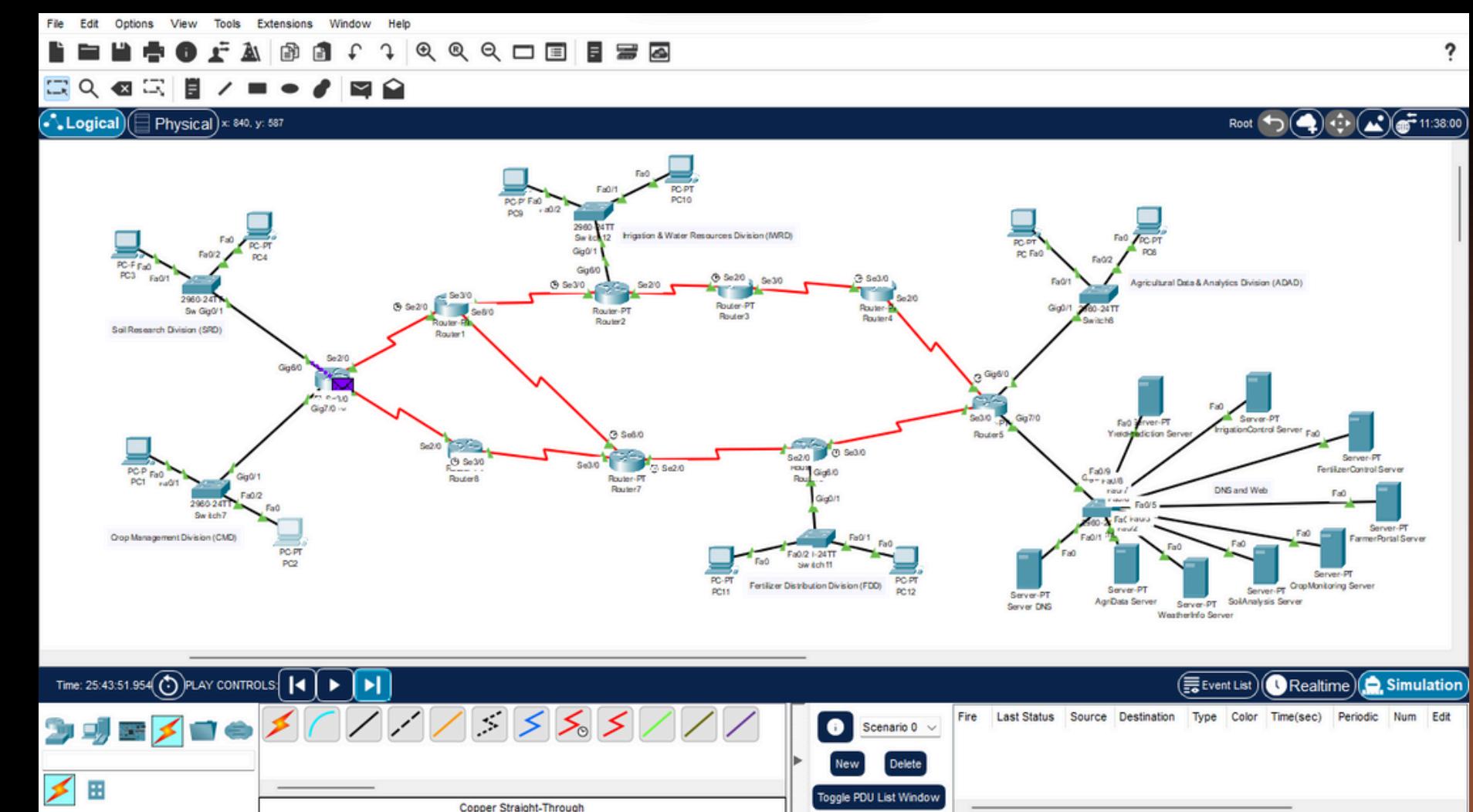
Name	Requirements	Network address	Subnet Mask	First Host	Last Host	Broadcast address
R0(se2)- R1(se2)	2	192.168.4.0	255.255.255.248	192.168.4.1	192.168.4.6	192.168.4.7
R1(se3)- R2(se3)	2	192.168.4.8	255.255.255.248	192.168.4.9	192.168.4.14	192.168.4.15
R2(se2)- R3(se2)	2	192.168.4.16	255.255.255.248	192.168.4.17	192.168.4.22	192.168.4.23
R3(se3)- R4(se3)	2	192.168.4.24	255.255.255.248	192.168.4.25	192.168.4.30	192.168.4.31
R4(se2)- R5(se2)	2	192.168.4.32	255.255.255.248	192.168.4.33	192.168.4.38	192.168.4.39
R5(se3)- R6(se3)	2	192.168.4.40	255.255.255.248	192.168.4.41	192.168.4.46	192.168.4.47
R6(se2)- R7(se2)	2	192.168.4.48	255.255.255.248	192.168.4.49	192.168.4.54	192.168.4.55
R7(se3)- R8(se3)	2	192.168.4.56	255.255.255.248	192.168.4.57	192.168.4.62	192.168.4.63
R8(se2)- R9(se3)	2	192.168.4.64	255.255.255.248	192.168.4.65	192.168.4.70	192.168.4.71
R1(se3)- R7(se8) **	2	192.168.4.72	255.255.255.248	192.168.4.73	192.168.4.78	192.168.4.79

Diagram (Cisco)



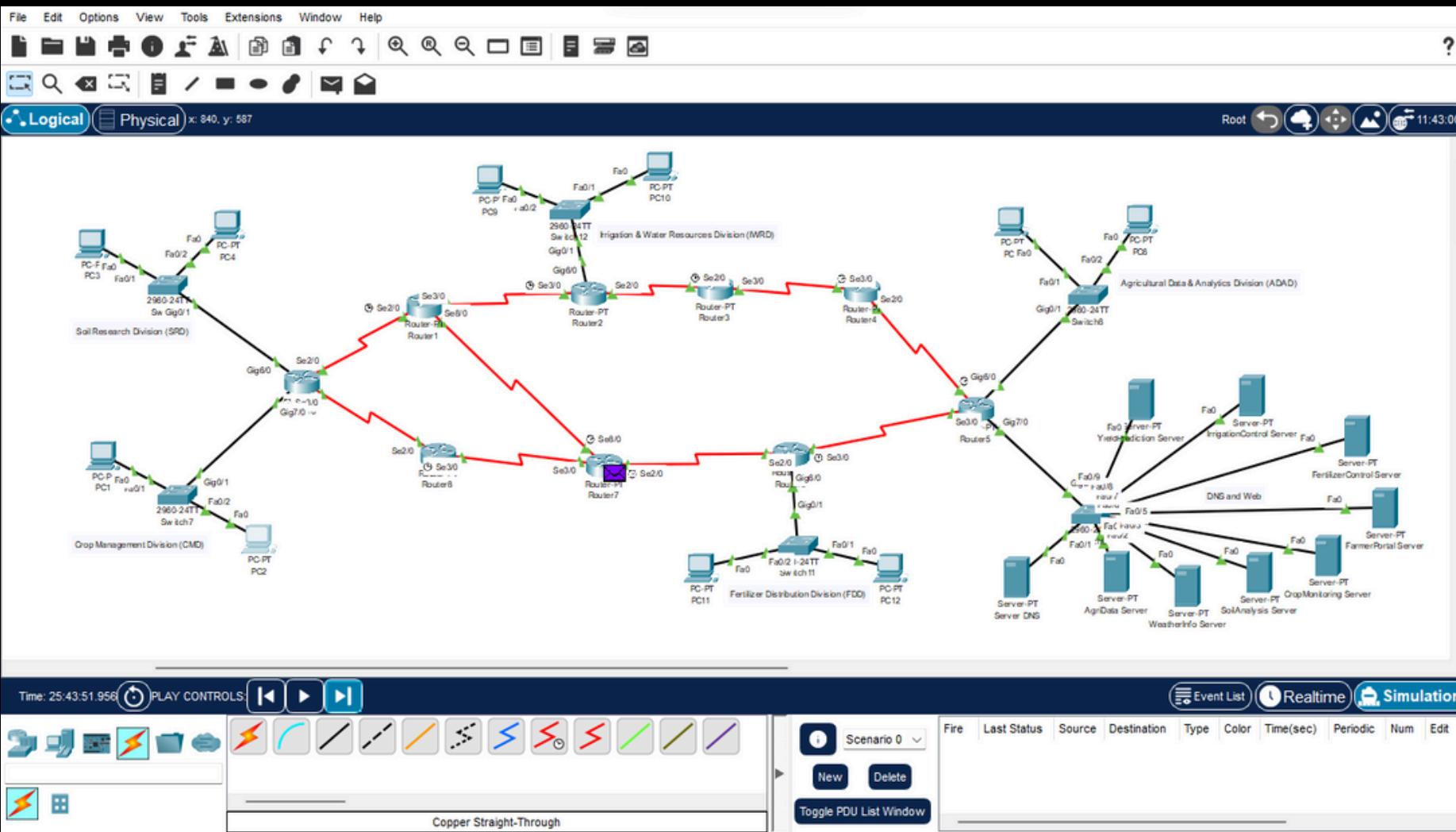


Step 1

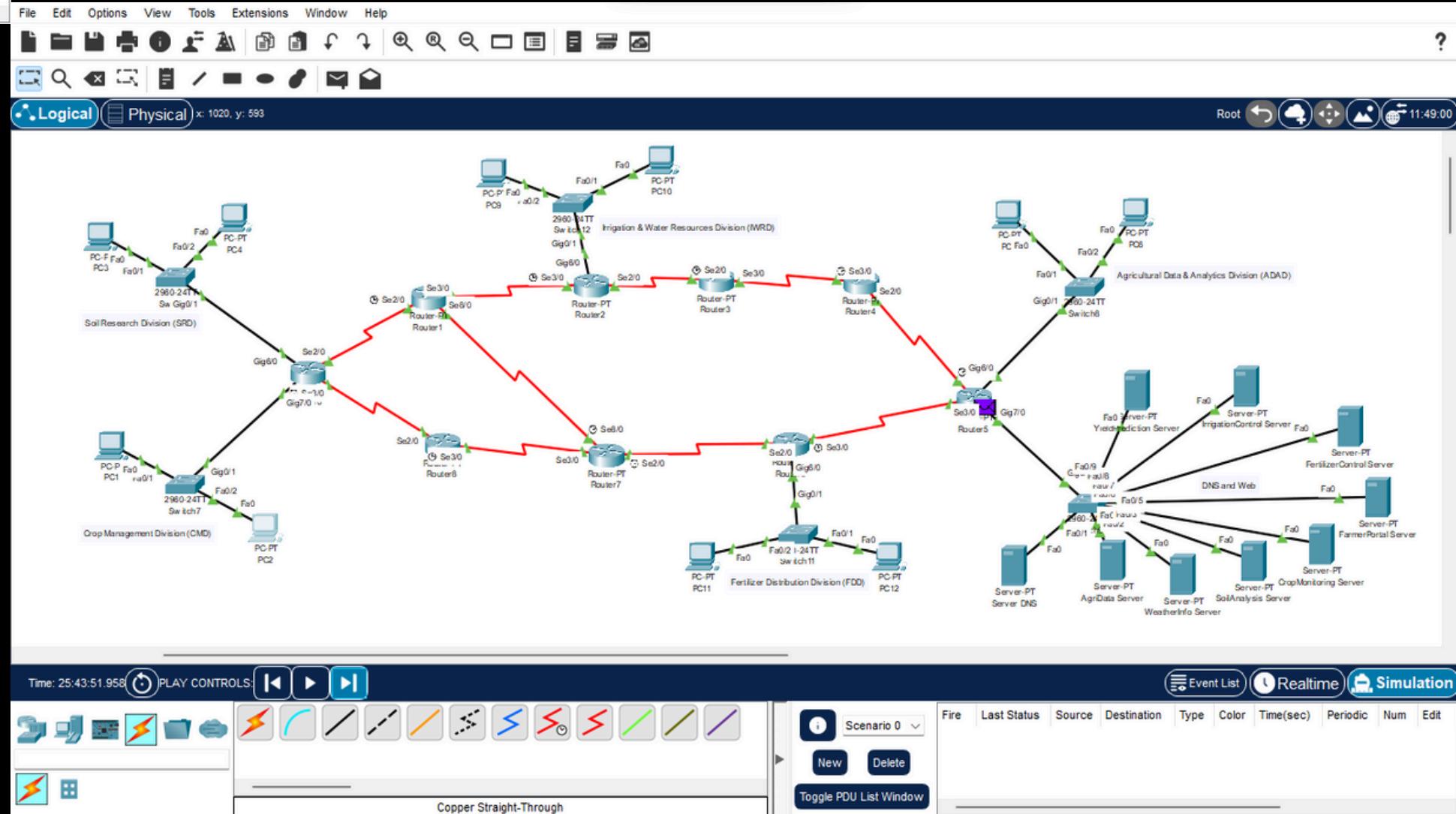


Step 2

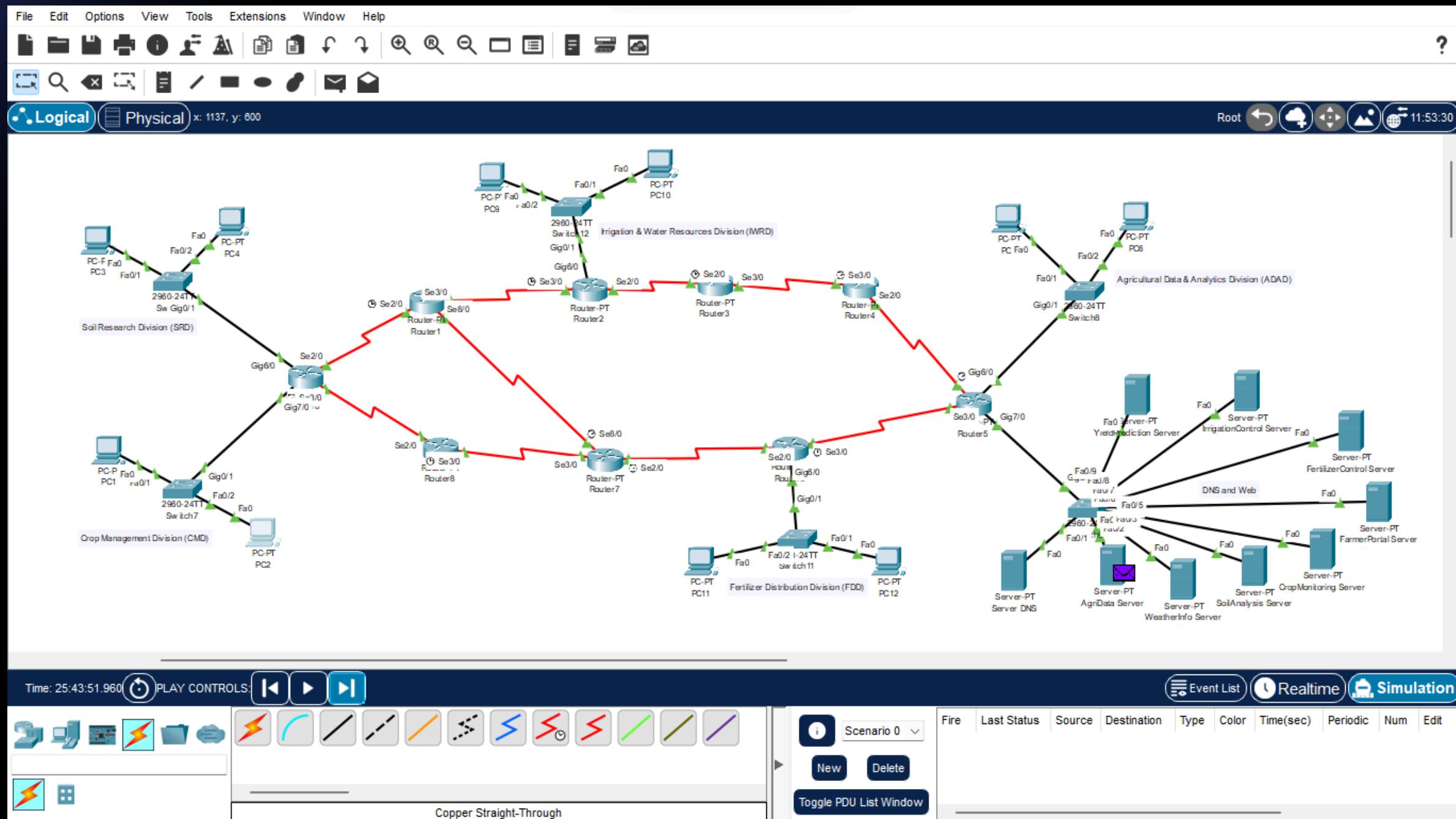
Step 3



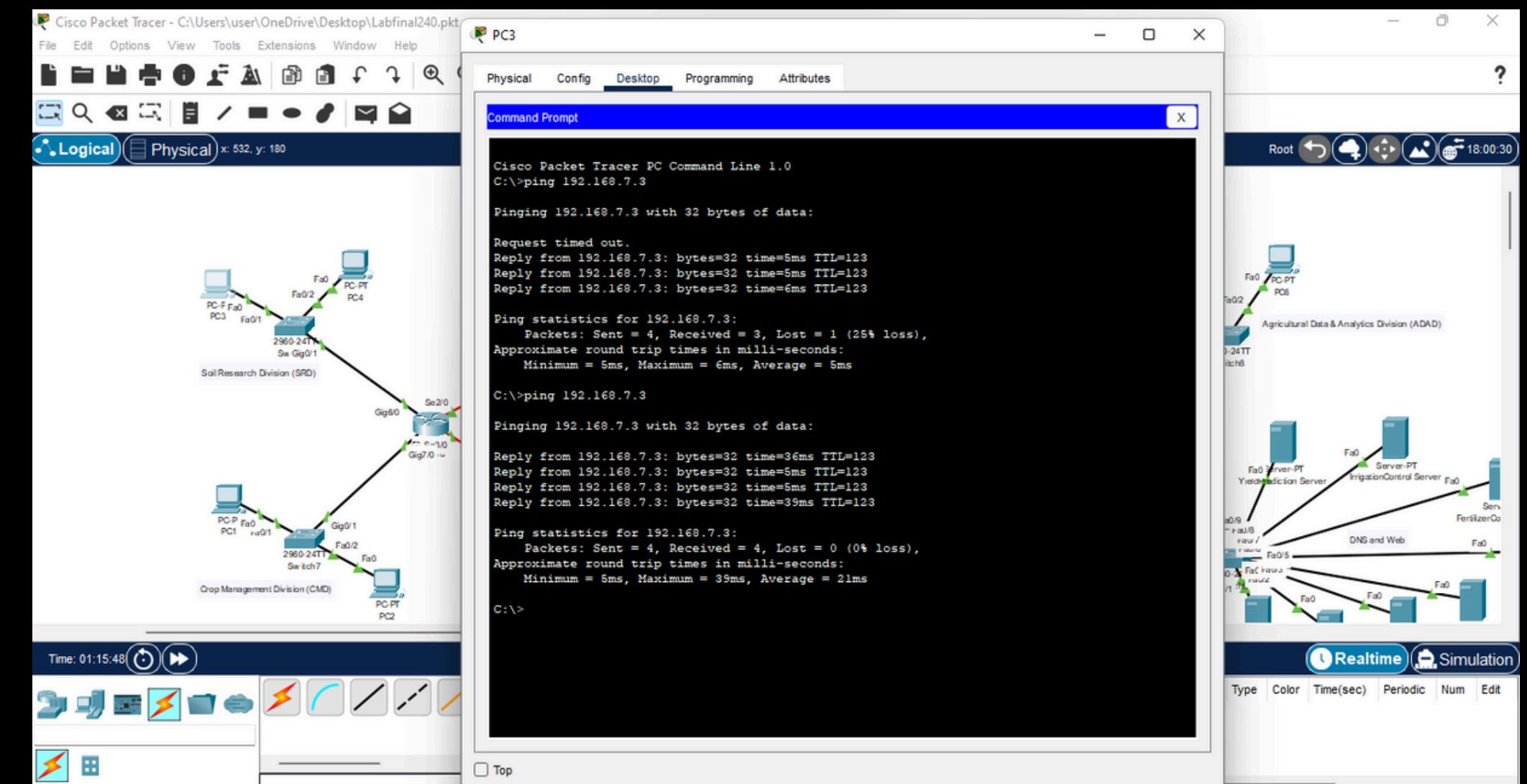
Step 4



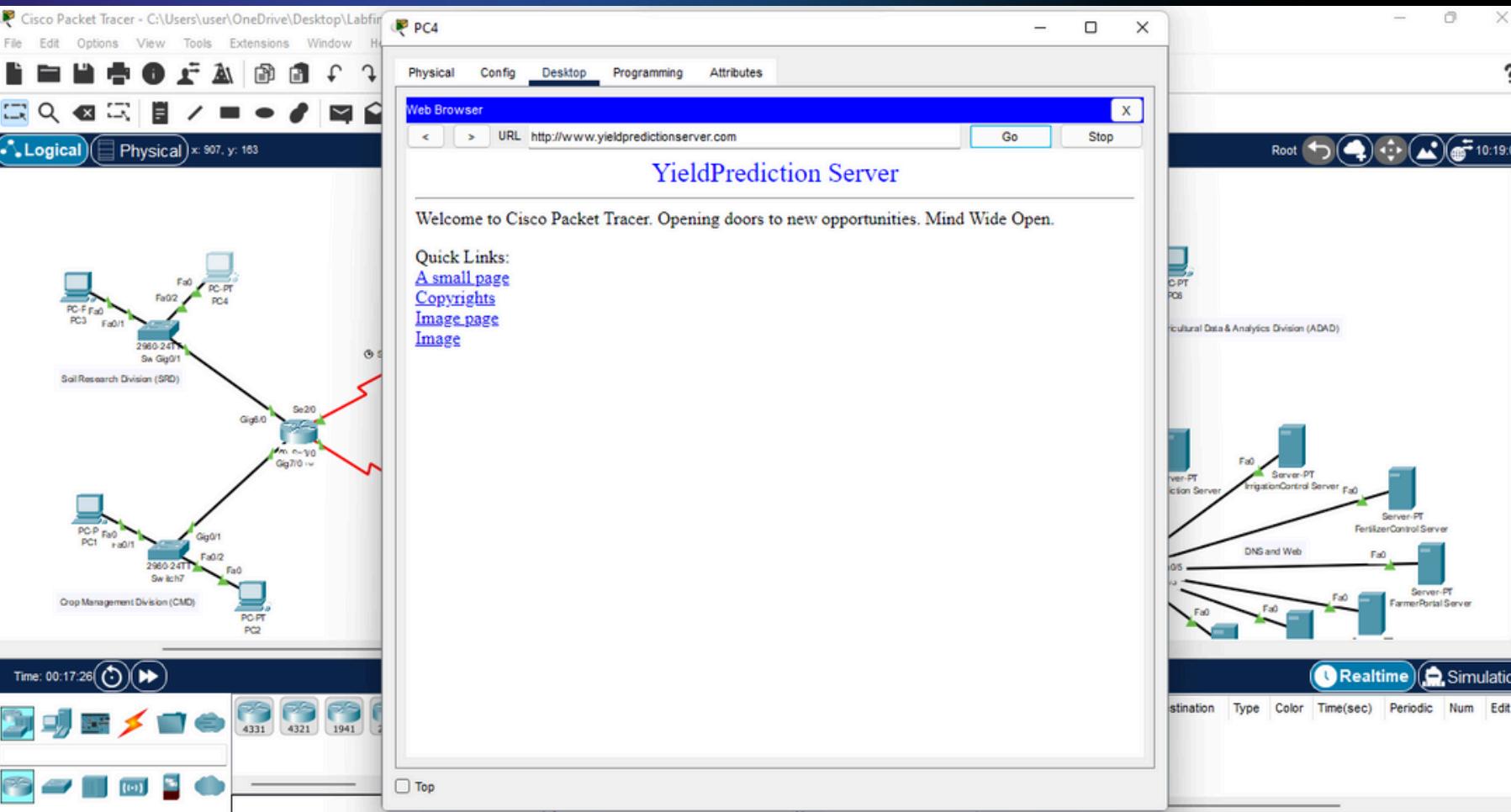
Reach the server



Command Prompt



Web Browser



Network Design Approach and Implementation

The network was designed using nine routers interconnected in a dynamic topology connecting five departmental LANs, each integrated with its own switch, servers, and PCs. Every router was configured with RIP Version 2 using the CLI (Command Line Interface) to enable efficient route propagation and automatic network updates.

All physical connections were established systematically:

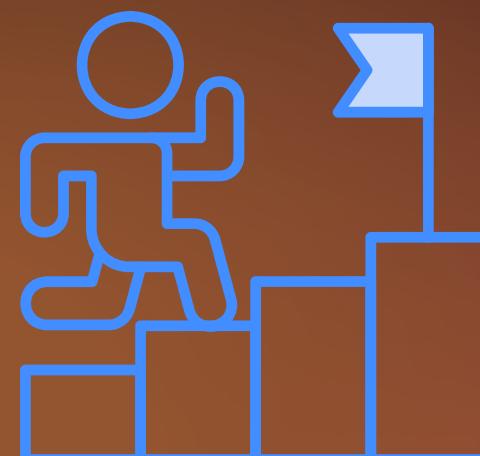
- Router-to-Router: via serial DTE/DCE connections using straight-through serial cables.
- Router-to-Switch: via Gigabit Ethernet interfaces for high-speed communication.
- Switch-to-Server/PC: via Fast Ethernet links ensuring stable LAN access.

VLSM subnetting was applied to calculate and assign IP addresses for each router interface, switch, and server to optimize address utilization. After completing the configuration, each connection was verified step by step using CLI commands such as show ip interface etc.

The setup was validated by performing PC-to-PC and PC-to-Server communication tests, using both the Command Prompt (ping command) and web browser access to confirm successful network operation and server connectivity.

Version 1 Challenges

- Router Connectivity: Establishing a proper DTE connection between Router 1 and Router 7.
- IP Calculation: Recalculating correct VLSM-based IP addresses.
- CLI Configuration: Setting up routing tables and verifying serial interfaces.
- Troubleshooting: Checking interfaces with 'show ip interface brief' and 'ping' commands



Why Version 2 Was Not Needed

- Version 2 was planned for improvements, but after resolving all issues in Version 1, the network became fully operational and optimized.
- Therefore, Version 2 was not required as Version 1 achieved complete connectivity and server access.

Conclusion

Through this project, we learned how to:

- Connect multiple departmental networks using routers and switches.
- Plan IP addressing and perform VLSM subnetting.
- Verify network connectivity using ping commands.
- Understand the role of DNS and implement dynamic routing (RIPv2).

Thank You