AICTE-CISCO VIRTUAL INTERNSHIP 2025: NETWORKING

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INTRODUCTION:

Modern networks are complex due to cloud, IoT, and hybrid setups.

- Manual configuration → slow, error-prone, lacks automation.
- Need for:
- Automatic topology generation
- Intelligent validation
- Scalable simulation

PROBLEM STATEMENT

Currently, there is no existing solution to automatically generate a network topology from the configuration files of individual routers. The generated topology does not need to be highly customer-specific but should align with the concepts taught in Level 8 of the course.

- Challenges include:
  - Bandwidth & traffic load analysis
  - Detecting missing or misconfigured devices
  - Providing load balancing solutions
  - Supporting fault injection & simulation
- Aim: Build a scalable & simulation-ready tool aligned with networking fundamentals.

FOCUS AREA

- Topology Generation & Validation
  - Create hierarchical topologies from router dumps
  - Detect duplicate IPs, VLAN mismatches, wrong gateways, loops
- Performance & Load Management
  - Recommend load balancing strategies
  - Analyze link bandwidth & traffic load
- Simulation & Fault Handling
  - Simulate Day-1 protocols (ARP, OSPF, Neighbor Discovery)
  - Inject faults (link failures, MTU mismatches)

WORKFLOW

Input: Router config files (e.g., R1, R2, R3)
Process:

- Parse configs → Build topology
- Validate setup → Run simulations
- Output:
- Topology diagram
- Bandwidth utilization report
- Error/warning logs
- Optimization recommendations

OUTCOMES & BENEFITS

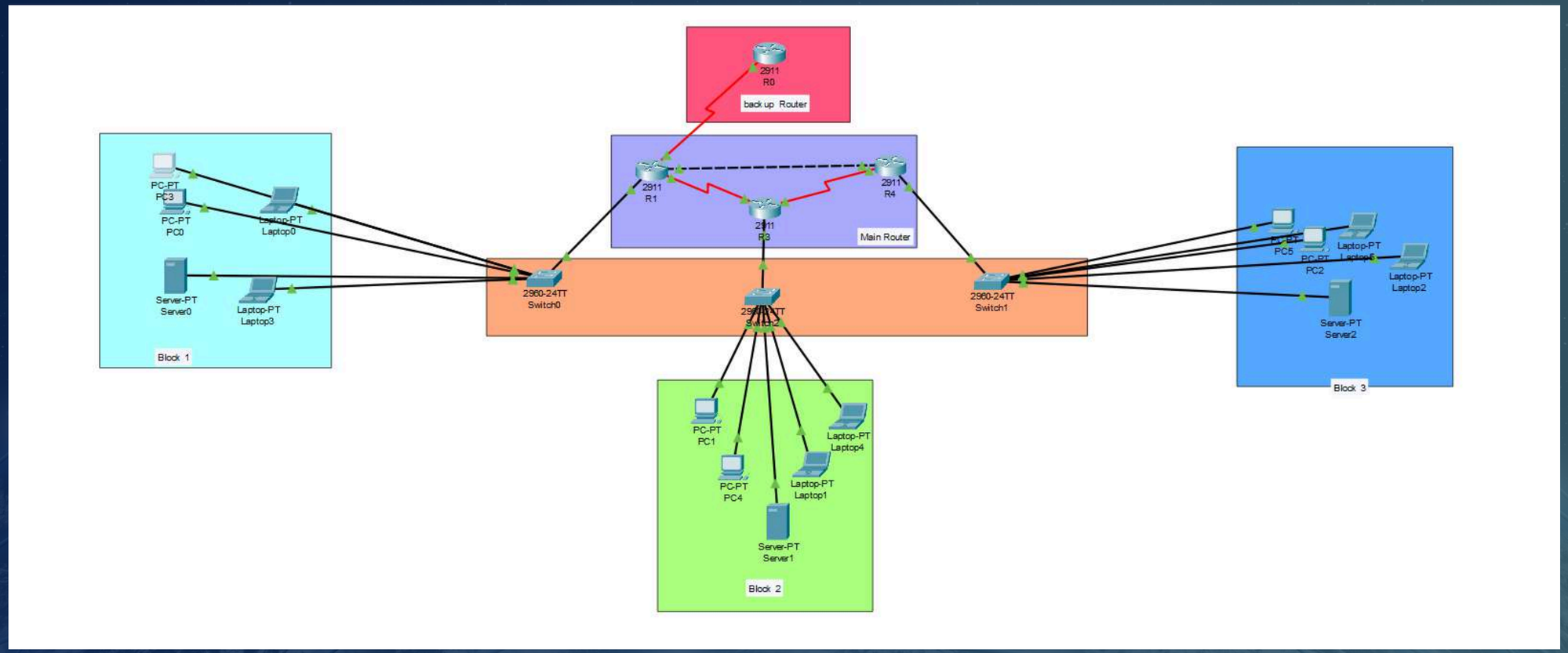
Outcomes:

- Automated topology generation
- Early detection of errors & missing devices
- Efficient load balancing strategies
- Scalable simulation tool for network testing

Benefits:

- Saves time & manual effort
- Improves accuracy & reliability
- Optimizes bandwidth utilization
- Enhances resilience against failures
- Works for small & large networks

PROJECT SCREENSHOT



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CONCLUSION

- The project addresses a critical gap in network automation.
- Enables:
  - Smart configuration validation
  - Reliable fault simulation
  - Intelligent optimization
- A step towards intelligent, self-healing networks of the future.


THANK YOU!