**Wide Area Network (WAN) Simulation Pack**

**1. Case Study: ABC Enterprises WAN Expansion**

ABC Enterprises is a growing company with headquarters in Melbourne and two branch offices in Sydney and Brisbane. The company currently operates with an outdated network infrastructure that lacks secure, reliable WAN connectivity between sites. The IT department has been tasked with designing, implementing, and securing a new WAN infrastructure that ensures:

* Secure VPN connectivity between all sites.
* Optimized bandwidth usage with reliable routing protocols.
* Proper IPv6 deployment for future scalability.
* Enhanced security mechanisms including firewall rules and access control lists (ACLs).
* Troubleshooting and monitoring tools to detect and rectify network issues efficiently.

As part of the project, you will act as a network engineer responsible for implementing the required WAN connectivity for ABC Enterprises.

**Required Software & Tools:**

Before beginning the project, ensure you have installed the necessary software on your device.

**Primary Network Simulation Tool:**

* **Cisco Packet Tracer** (Recommended for simulation, visualization, and troubleshooting) - Download from Cisco Networking Academy.

**Supporting Tools & Their Purpose:**

* **Wireshark** (Network packet analysis and traffic monitoring) - Download from <https://www.wireshark.org>.
* **Putty or Tera Term** (SSH/Telnet access to configure routers and switches).
* **VirtualBox/VMware** (For setting up virtualized network environments, if required).
* **Cloud-based labs (if available):**
  + Cisco Networking Academy **(NetAcad Labs) - Provides cloud-based networking practice**.
  + AWS or Google Cloud **(Optional for remote networking experiments)**.
  + GNS3 Cloud **(For remote access to routers/firewalls in advanced scenarios)**.

**Hardware Requirements:**

* **Laptop/Desktop with the following specifications:**
  + Minimum **8GB RAM** (16GB recommended for smooth virtualization)
  + At least **100GB free storage**
  + **Quad-core processor or higher** (Intel i5/i7 or AMD Ryzen recommended)
  + Stable **internet connection** (minimum 10 Mbps for online classes)

**Project Objectives:**

Students will complete the following tasks:

1. **Network Design Review & Planning:**
   * Review the provided network topology.
   * Identify legal and security protocol requirements.
   * Develop an installation and configuration plan.
   * Submit your plan for approval before proceeding.
2. **WAN Configuration:**
   * Implement the WAN connection method according to the provided design.
   * Configure and verify WAN protocols (PPP, HDLC, Frame Relay, or MPLS).
   * Configure a VPN (site-to-site IPsec or GRE tunnel).
   * Implement an ADSL connection.
   * Configure and implement a DHCP router.
   * Configure and verify IPv6 addressing.
   * Implement Network Address Translation (NAT) settings.
3. **Network Security Implementation:**
   * Apply Access Control Lists (ACLs) for network filtering.
   * Secure router access using SSH and strong authentication mechanisms.
4. **Troubleshooting & Testing:**
   * Conduct tests to verify WAN connectivity.
   * Use **Wireshark** to analyze network traffic.
   * Document troubleshooting steps and solutions for WAN issues.
5. **Presentation & Documentation:**
   * Prepare a 10–15 minute presentation on your network implementation.
   * Submit network configurations and project documentation.

**Submission Instructions** :

Students must submit the following:

* **A network design document** detailing IP addressing, topology, security protocols, and implementation steps.
* **WAN configuration in Cisco Packet Tracer**, including screenshots and saved files.
* **Troubleshooting logs** with documented solutions for identified issues.
* **A 10-15 minute recorded presentation** explaining the WAN setup and demonstrating configurations.
* **All configuration files and documentation** via the learning platform.

**5. Submission Guidelines:**

* Submit all required files via the online learning platform (Moodle/Google Classroom).
* Ensure that configurations are well-documented.
* If working in teams, ensure all members contribute equally.
* Presentations must be recorded (if conducted remotely) and uploaded for assessment.