**Project Delivery Document – Albion University Network**

**📌 Project Overview**

Albion University has two campuses located **20 miles apart**:

* **Main Campus** – hosts administrative departments, multiple faculties, IT department, and student labs.
* **Smaller Campus** – hosts the Faculty of Health and Sciences.

The project delivers a **scalable and secure network infrastructure** to connect both campuses and provide access to the **University Web Server** (on-premises) and **Cloud Email Server** (externally hosted).

**🎯 Objectives**

* Provide **end-to-end connectivity** between main and smaller campuses.
* Implement **VLAN segmentation** for each department/faculty.
* Enable **DHCP services** for dynamic IP allocation in Building A.
* Configure **RIPv2 routing** between routers, with **static routing** to the external cloud email server.
* Ensure **access to internal servers (Web & IT services)** and the **external email server**.
* Apply **basic switch security** (port mode, VLAN access).

**🖥️ Network Devices**

* **Routers**
  + Main Campus Router
  + Smaller Campus Router
  + Cloud Router (for external connectivity)
* **Switches**
  + Layer 3 Switch (per campus for VLAN routing & trunking)
  + Layer 2 Switches (per building for end devices)
* **Servers**
  + Web Server (Main Campus, Building C – IT Department)
  + Cloud Email Server (External, hosted in cloud)

**🌐 IP Addressing & VLANs**

Each department/faculty is placed on a **separate subnet and VLAN**:

| **VLAN ID** | **Department/Faculty** | **Location** | **Subnet** |
| --- | --- | --- | --- |
| 10 | Management (Admin) | Main – Building A | 192.168.1.0/24 |
| 20 | HR (Admin) | Main – Building A | 192.168.2.0/24 |
| 30 | Finance (Admin) | Main – Building A | 192.168.3.0/24 |
| 40 | Faculty of Business | Main – Building A | 192.168.4.0/24 |
| 50 | Faculty of Engineering/Computing | Main – Building B | 192.168.5.0/24 |
| 60 | Faculty of Art/Design | Main – Building B | 192.168.6.0/24 |
| 70 | Student Labs | Main – Building C | 192.168.7.0/24 |
| 80 | IT Department | Main – Building C | 192.168.8.0/24 |
| 90 | Faculty of Health/Sciences (Staff) | Smaller Campus | 192.168.9.0/24 |
| 100 | Faculty of Health/Sciences (Student Labs) | Smaller Campus | 192.168.10.0/24 |
| 200 | Server VLAN (Web & IT Services) | Main – Building C | 192.168.200.0/24 |

**⚙️ Configurations**

**🔹 Main Campus Router**

* Serial interfaces for WAN link to smaller campus and cloud.
* Sub-interfaces for VLANs 10–80 and 200 (Servers).
* DHCP pools for **Building A departments**.
* RIP v2 enabled for VLANs and WAN networks.

**🔹 Smaller Campus Router**

* Serial link to Main Campus.
* Sub-interfaces for VLANs 90 & 100.
* DHCP pools for Health & Sciences VLANs.
* RIP v2 enabled for internal and WAN routes.

**🔹 Cloud Router**

* Connected to Main Campus Router.
* Advertises cloud link via RIP.
* Provides **static route** for external email server.

**🔹 Switch Configurations**

* **Layer 2 Switches (per building):**
  + VLAN assignment for end devices.
  + Access ports assigned to respective VLANs.
  + Basic port security applied.
* **Layer 3 Switches (per campus):**
  + VLAN interfaces configured for routing.
  + Trunk ports enabled between switches and routers.

**🔹 DHCP Pools**

* **Building A (Main Campus)** → Admin, HR, Finance, Business (VLANs 10–40).
* **Smaller Campus** → Faculty of Health & Sciences Staff + Student Labs (VLANs 90–100).

**🔹 Servers**

* **Web Server** (Main Campus, IT Dept – VLAN 200)
  + IP: 192.168.200.10/24
  + Gateway: 192.168.200.1
* **Cloud Email Server** (External Cloud)
  + IP: 20.0.0.2/30
  + Gateway: 20.0.0.1

**🔹 Routing**

* **RIPv2** used for:
  + VLAN networks in both campuses.
  + WAN links between Main and Smaller Campus.
* **Static Routing** used for:
  + External cloud email server (20.0.0.2/30).

**🔍 Testing & Verification**

* VLAN check: show vlan brief
* Trunks: show interfaces trunk
* DHCP binding: show ip dhcp binding
* Routing: show ip route
* End-to-End test: Ping from campus PCs → Web Server → Cloud Email Server

**🚀 Future Enhancements**

* Replace RIP with **OSPF** for scalability.
* Introduce **redundant links** between campuses for high availability.
* Deploy **firewalls** for external connectivity security.
* Centralize DHCP using **dedicated DHCP Server**.
* Add **wireless infrastructure** with controllers.

**✅ Conclusion**

The Albion University network has been designed and implemented with **departmental VLAN segmentation**, **DHCP automation**, **RIP v2 routing**, and **cloud server integration**. This ensures **secure, scalable, and reliable communication** across both campuses and cloud resources.