

Wireless Networking Case Study: Wireless Network Services using WI-FI at the Mehran UET, Jamshoro. Pakistan

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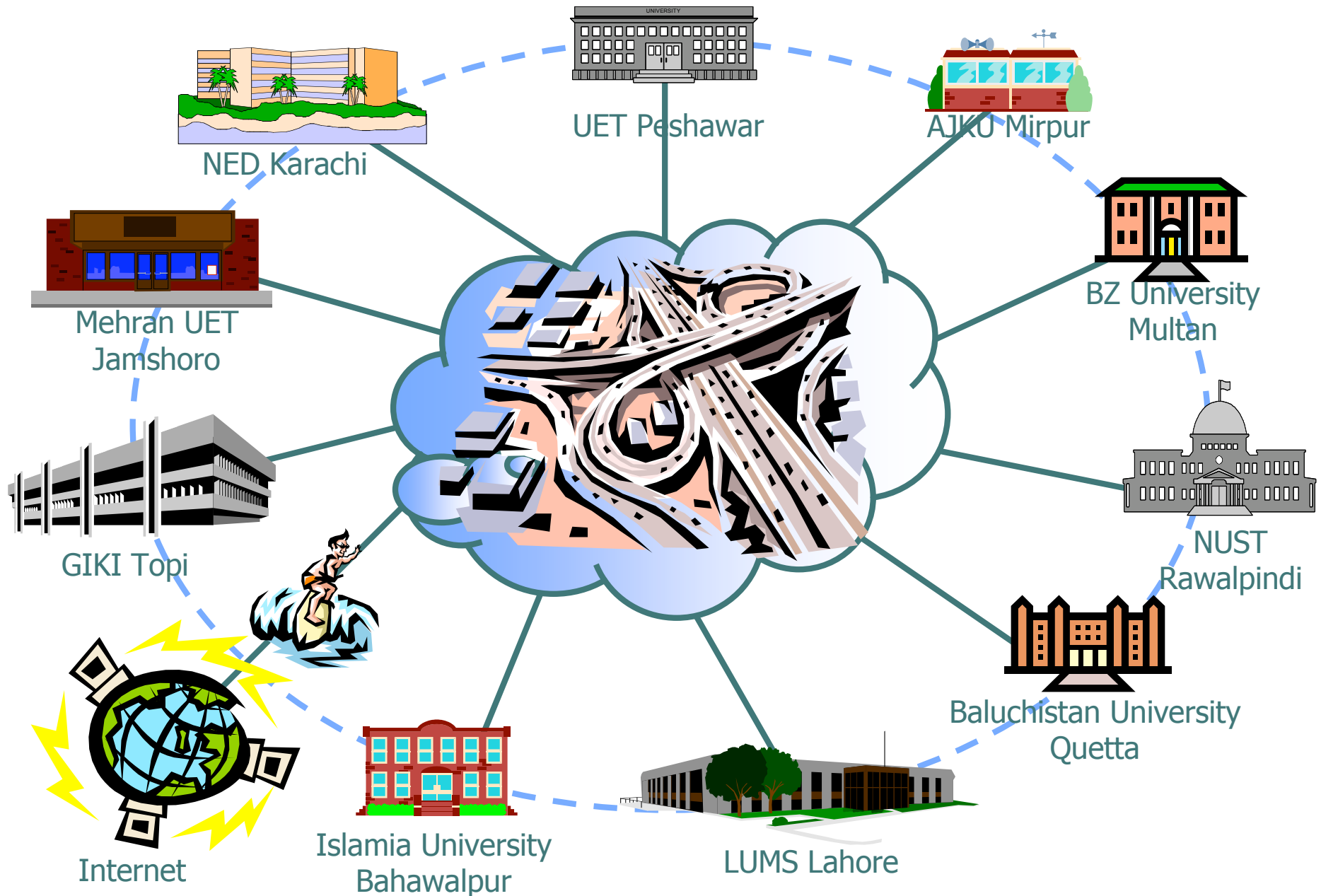
Mehran UET, Jamshoro Pakistan



ROADMAP

- Background
 - Pakistan Educational & Research Network
 - Core Network & Network Design
 - Project Introduction
 - Overall Objective of Projects
- Implementing Wi-Fi link in Mehran UET.
 - Geographical Location and Optical Fiber Link
 - Mehran ISP
 - Planning and Development
 - Questions

Pakistan Educational & Research Network



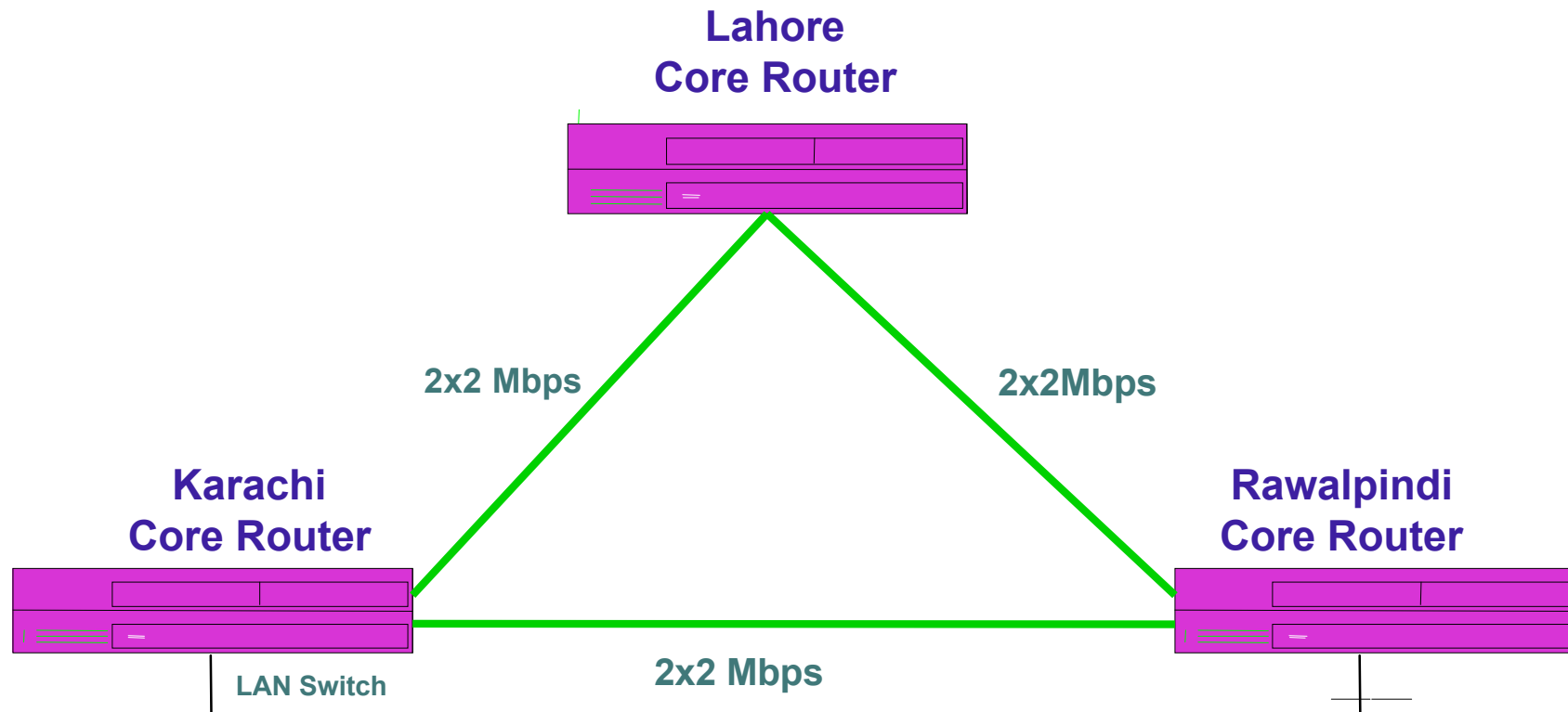


CORE NETWORK

- Three core locations including Islamabad, Lahore and Karachi
- These nodal points are interconnected at 2 Mbps using existing optical fiber network in the country
- Upgradeable to 155 Mb/s
- Initially 4 Mbps of international connectivity shall be provided at nodal locations for Internet facility



Network design



22 universities r connected including MUET







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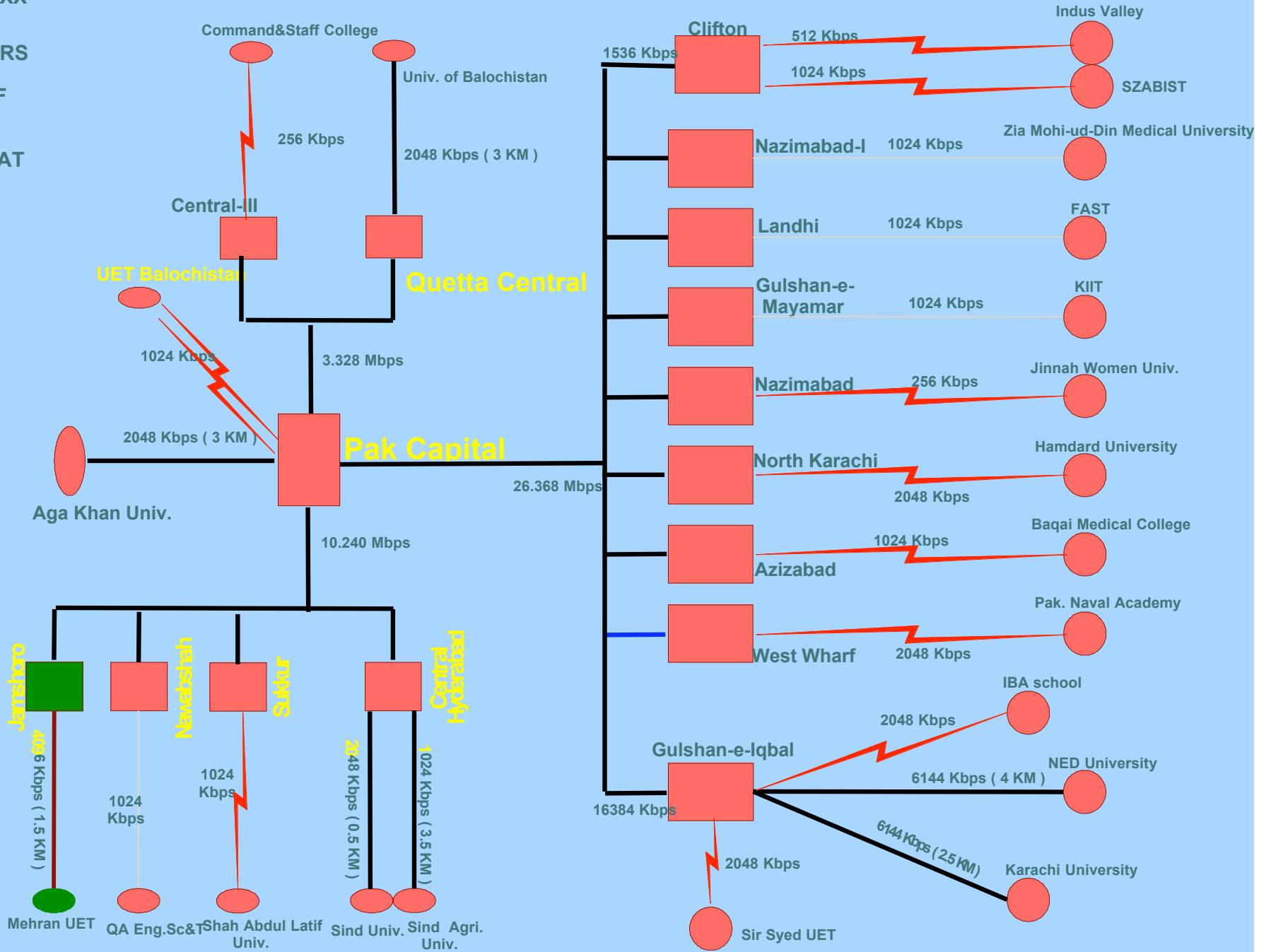
**SDH/PDH
(525/622 Mb/s)
backbone being
upgraded to
DWDM
10 Gb/s**

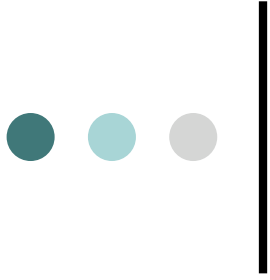
**INTERNET ACCESS TO 44 CITIES.
POPULATION COVERAGE 85%.**

Legend

-  DXX
-  DRS
-  OF
-  VSAT

Sind & Baluchistan





Project Objectives



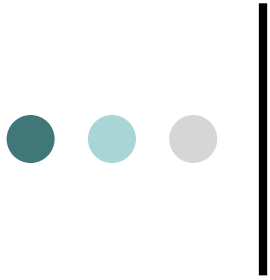
Project Introduction

- The [Mehran UET](#) wants to operate a wireless network service around its campus across the Jamshoro.
- Based on the [802.11g Wi Fi](#) standard, and will use VPN (Virtual Private Network).
- The service will be available to all [bona fide members of the University](#), and gives access to all standard network services.



Overall Objectives of the Project

- University can provide a Wireless service that will:
 - be deployed on two campuses
 - be integrated into our network infrastructure
 - have appropriate levels of resilience
 - have a support service, built around a self-service web site.



Implementation & Planning

Mehran UET Main Building



- Civil Dept
- Electrical
- Mechanical
- Basic Science
- Administration
- Teacher Room

Connected by OF



Architecture
CRP

??



Mehran UET Network Architecture

Faculty of IIT

Includes
Computer systems
Software engineering

Electronics

Telecommunication

Biomedical

Connected to OF for main building ISP

And form this second main link

Other departments r connected



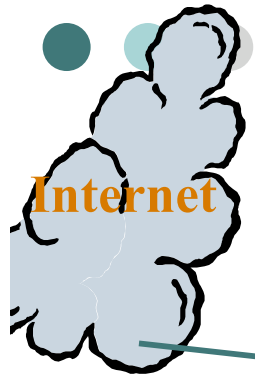
Super highway

??

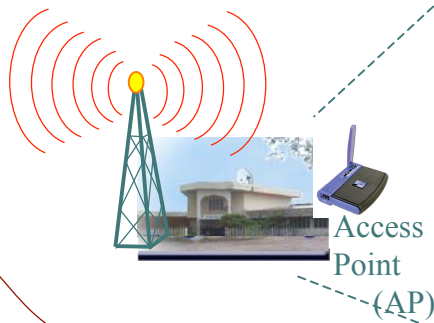
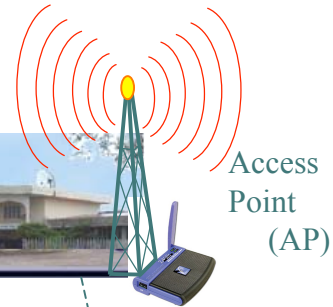


Target ????

Internet



OF

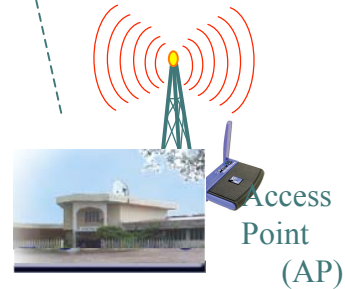


12km

15km

Super high way

13 km





Planning and Development

- A small project team comprising Applications and Network staff was established
- For Security we decided to keep the access points unsecured, but restrict the network to which they are all connected. This will be achieved using a combination of VLAN (Virtual Local Area Network) and VPN.
- All bona fide members of the University will have IT accounts within our Microsoft® Active Directory®. The VPN servers therefore use the Microsoft® IAS (Internet Authentication Service) to authenticate the VPN login against the Active Directory.



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- The sequence of events for a connection is as follows:
 1. Client will discover and connects to an access point.
 2. The client will be issued with an IP address by a DHCP (Dynamic Host Configuration Protocol) server.

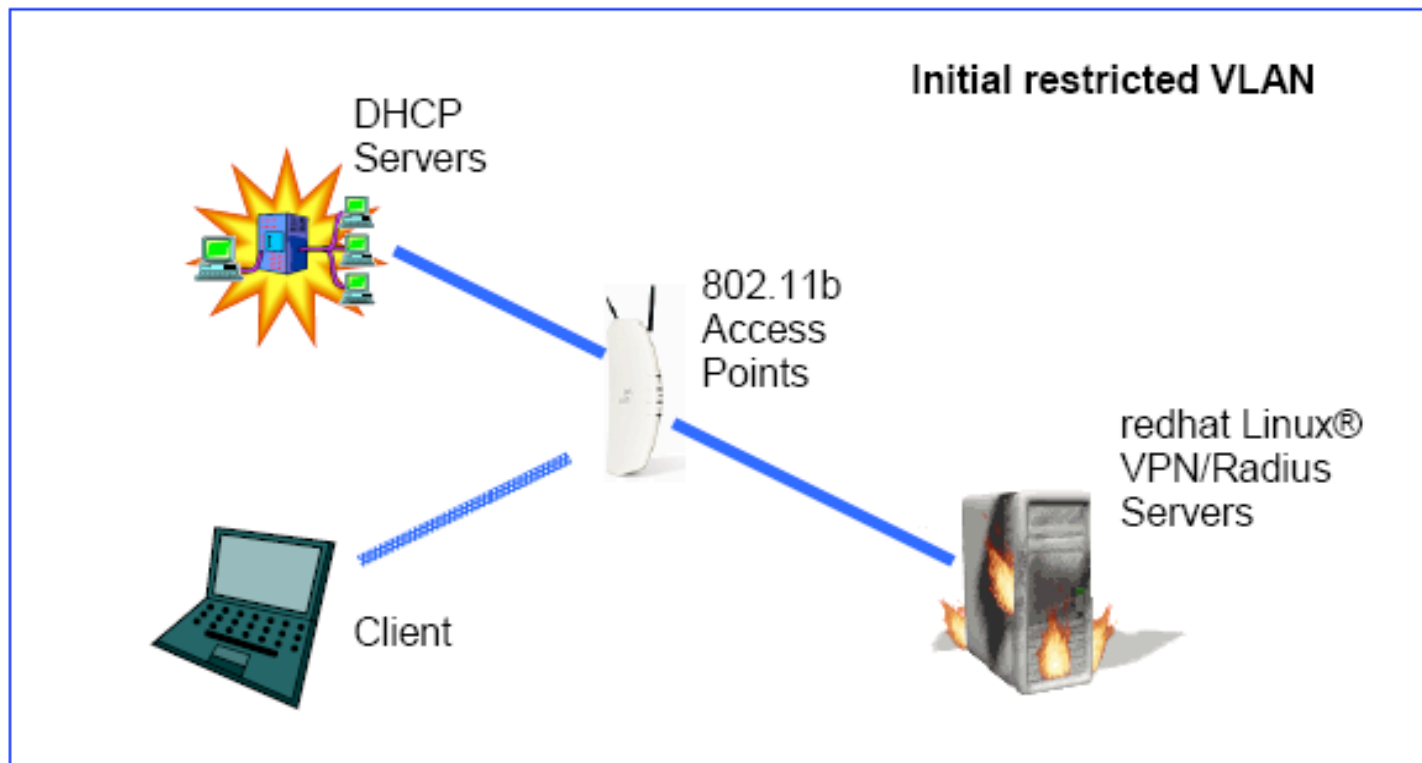


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3. Permissions within the restricted VLAN will only allow a client to connect to DHCP servers and the Linux/Windows 2000 professional ® VPN servers – see Figure 1
4. An encrypted connection will be established with the VPN servers.
5. The VPN server will authenticates username and password against the Active Directory via a Windows® server running the IAS, using CHAP (Challenge Handshake Authentication Protocol). The Radius server will be running on the Linux/Window 2000 Professional ® VPN will only use to hand-off/receive the authentication request to/from the IAS Service.



Figure 1 - Initial Client Connection



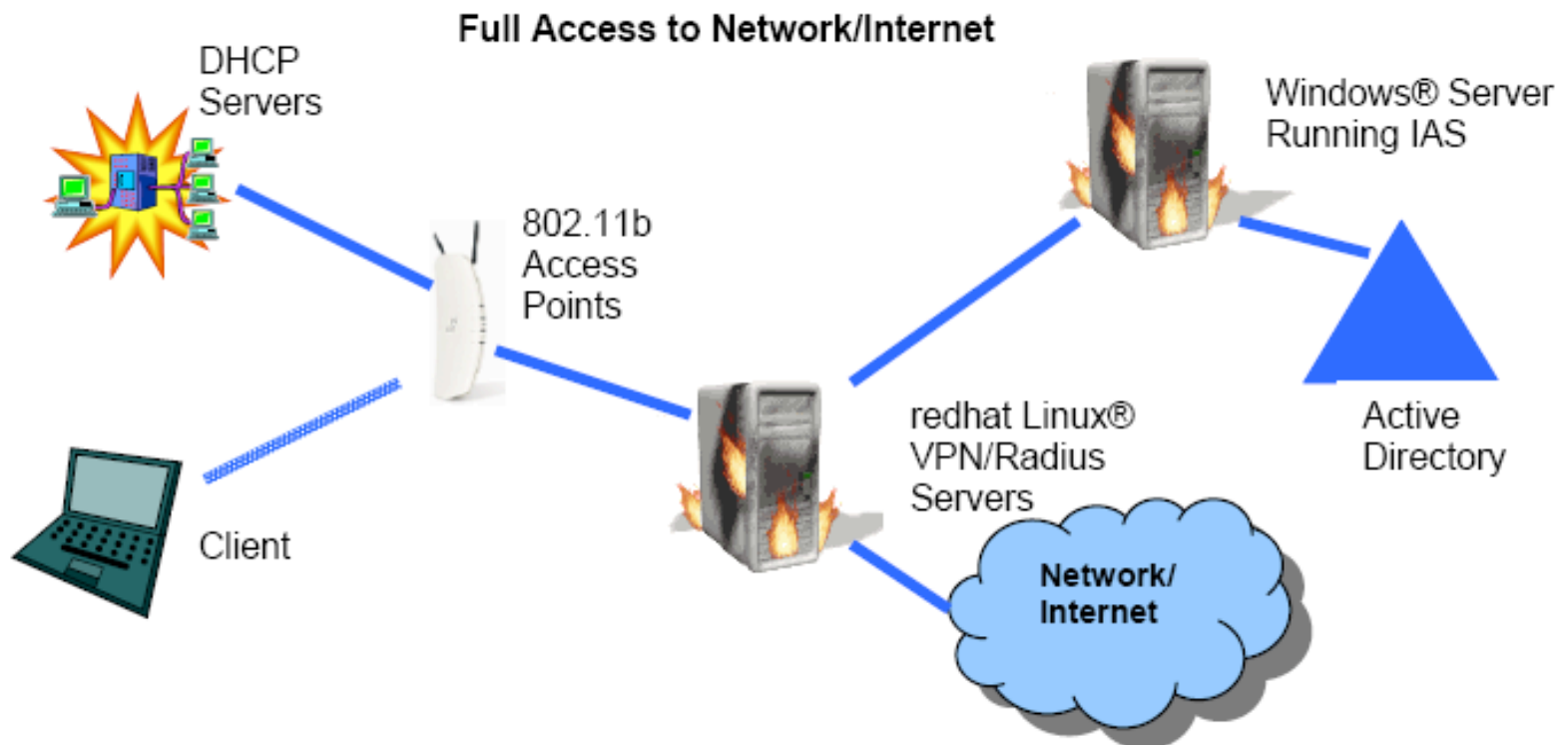


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6. The VPN server will issue a PPTP (Point-to-Point Tunneling Protocol) IP address. This is associated with a new VLAN whose permissions allow clients full standard network access – see Figure 2
7. For Internet access, this new VLAN's permissions require that the University's proxy servers are used with relevant client software applications.

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Figure 2 - Final Client Connection





User Access & Support

- All access points will be provided by central IT Services conforms to the above infrastructure.
- Any 'rogue' access points will routinely tracked down and will either disable, or will require conforming to the same infrastructure. In this way, all users can expect a standard service wherever they will locate on our campuses.
- If users will expect to set up VPN access on their client devices, configure their web browser etc. then it will absolutely **essential** that Comprehensive web-based self-help materials will available.



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- Consequently, a full range of step-by-step guides for Windows® 98, Windows® Me (Millennium Edition), Windows® 2000, Windows® XP, and Linux® operating systems will be created, together with troubleshooting and FAQ pages. The support site will be available to bona fide members of the Mehran UET.



Future Extension

- Up to 2006-7 we will connect with other affiliated universities/institutes
 - Dawood UET
 - AgaTaj Institute
 - Hiast

Questions & Comments

