

EXPERIMENT 3

Aim :

Build Infrastructure Mode in Wireless Networking.

Theory :

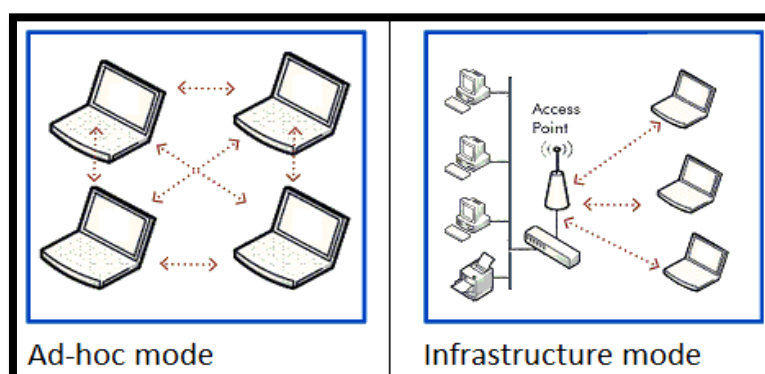
The IEEE 802.11 has two basic modes of operation: Infrastructure and Ad-Hoc mode. In ad-hoc mode, mobile units transmit directly peer-to-peer. In infrastructure mode, mobile units communicate through a wireless access point (WAP) that serves as a bridge to other networks (such as the Internet or a local area network).

Infrastructure Mode

Wireless networks running in infrastructure mode use one or more WAPs to connect the wireless network nodes centrally. This configuration is similar to the star topology of a wired network. Setting up an infrastructure mode network requires at least one wireless access point (AP) and that the AP and all the clients be configured to use the same network name (SSID). The access point is cabled to the wired network to allow wireless clients access to resources like the internet or printers. Additional APs can be joined to this network to increase the reach of the infrastructure and support more wireless clients.

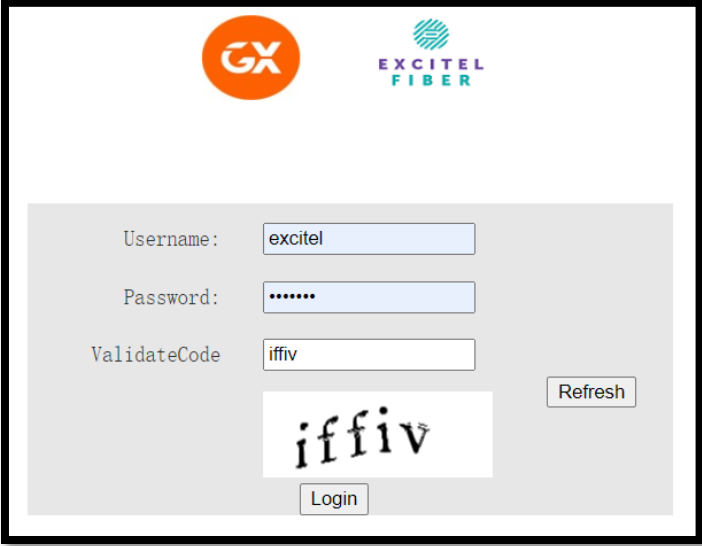
Ad-Hoc vs Infrastructure Mode

- Compared to ad-hoc, infrastructure mode offers the advantage of scale, centralized security management, and improved reach. Wireless devices can connect to resources on a wired LAN, which is common business settings.
- Disadvantage of infrastructure mode is simply the additional cost to purchase AP hardware. Ad-hoc networks connect to devices in a peer-to-peer manner, so all that's needed is the device themselves.
- Infrastructure mode is typical for long-lasting, more permanent implementations of a network. Homes, schools, and businesses do not usually spring for P2P connections used in ad-hoc mode because they're just far too decentralized to make sense in those situations.
- Ad-hoc networks are usually seen in short-lived moments where some devices need to share files but they're too far from a network to make it work. Or, maybe a small operating room in a hospital can configure an ad-hoc network for some of those wireless devices to communicate with each other.
- However, if you just need a few devices to communicate with one another, an ad-hoc network is fine. Don't add too many though, because one limitation of ad-hoc networks is that at some point the hardware just isn't fit for all of that traffic demand, which is when infrastructure mode is necessary.



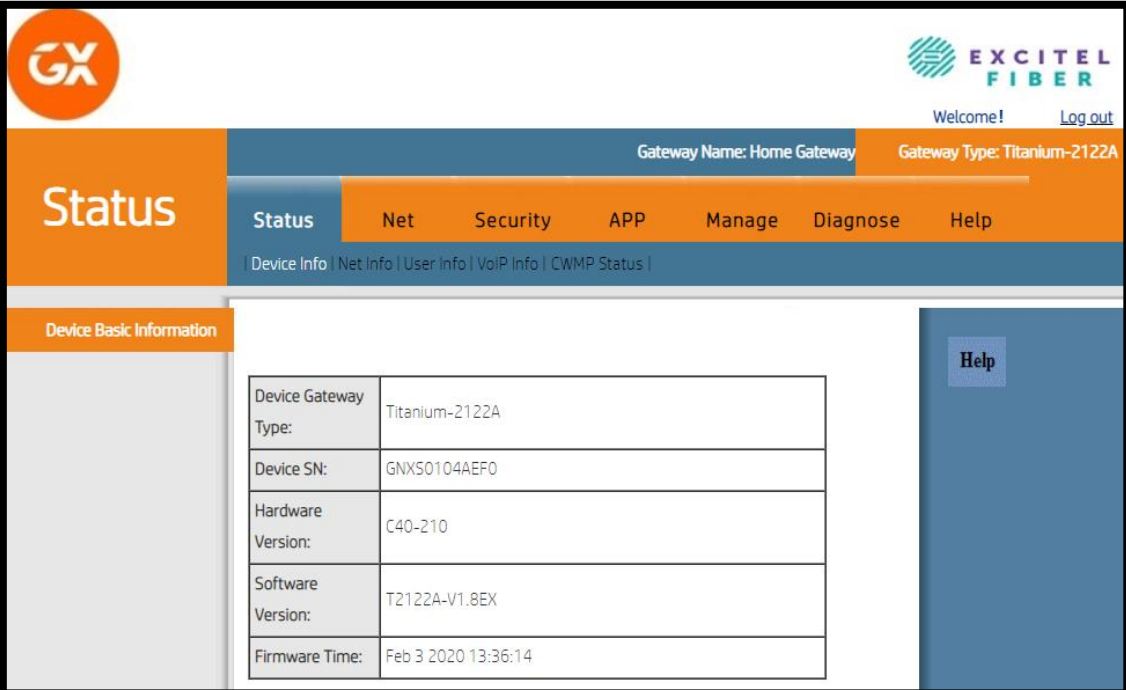
Configure Broadband Access Router :**1. Access Setup Page –**

- a) Type 192.168.0.1/192.168.1.1 in browser address bar and press enter.
- b) Enter username and password provided or check at the back of the router for login credentials. Click on login to access the setup page.



The login page for Excitel Fiber features the GX logo and Excitel Fiber branding at the top. It contains a login form with the following fields and controls:

- Username:** A text input field containing the value "excitel".
- Password:** A password input field with masked characters "*****".
- ValidateCode:** A text input field containing the value "iffiv".
- Refresh:** A button located to the right of the ValidateCode field.
- iffiv:** A large, stylized watermark or code displayed below the ValidateCode field.
- Login:** A button located at the bottom center of the form.

2. Click on Net/Manage or something like it depending on your router –

The Status page displays the router's configuration and status. It includes the GX logo, Excitel Fiber branding, and a navigation menu. The page shows the Gateway Name as "Home Gateway" and the Gateway Type as "Titanium-2122A". The Status menu is active, and the Device Basic Information section is expanded, showing the following details:

Device Gateway Type:	Titanium-2122A
Device SN:	GNXS0104AEF0
Hardware Version:	C40-210
Software Version:	T2122A-V1.8EX
Firmware Time:	Feb 3 2020 13:36:14

A Help button is visible on the right side of the page.

3. Select Internet Connection Type –

Net | Status | **Net** | Security | APP | Manage | Diagnose | Help

| WAN | Binding | LAN | WLAN | WLAN5G | CWMP | QoS | Time | Route |

InternetConnection

Transfer mode: PON

Connection Name: 2_VOICE_INTERNET_R_VID_-

Gateway Type: Route Enable: ☒

Bearer Service: VOICE_INTERNET

Binding Option: ☐ LAN1 ☐ SSID1 ☐ SSIDAC1 ☐ LAN2

DHCP ServerEnable: ☒

Link Mode: Connect via IP

Protocol Version: ☒ IPv4 ☐ IPv6 ☐ IPv4/IPv6

☒ DHCP Get an IP automatically from ISP.
☐ Static Get a static IP from ISP.

VLAN Gateway Type: TAG

VLAN ID[1-4094]:

802.1p[0-7]: 0

MulticastVLAN ID[1-4094]:

MTU[1-1500]: 1500

Enable NAT: ☒

Note: If change voice wan connection service, please register voip service again.

Help

Configuration Details for each of the Internet Connection Types is given below :

1. Configure D-Link Router for Cable Internet Connection –

To setup your router with cable internet, select the option Dynamic IP (DHCP).

DHCP ServerEnable: ☒

Link Mode: Connect via IP

Protocol Version: ☒ IPv4 ☐ IPv6 ☐ IPv4/IPv6

☒ DHCP Get an IP automatically from ISP.
☐ Static Get a static IP from ISP.

VLAN Gateway Type: TAG

VLAN ID[1-4094]:

802.1p[0-7]: 0

MulticastVLAN ID[1-4094]:

MTU[1-1500]: 1500

Enable NAT: ☒

OK Cancel

2. Configure D-Link Router with Static IP –

Enter the full IP Address details provided by your Internet Service Provider including Subnet Mask, Default Gateway, DNS Servers, etc.

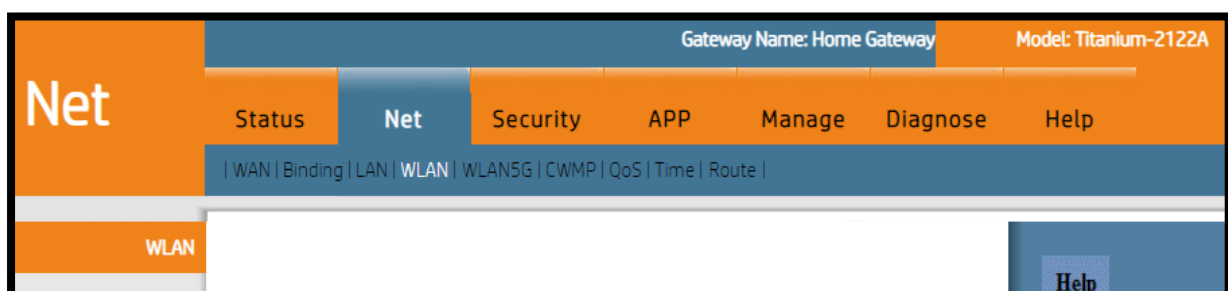
The screenshot shows a configuration window for a D-Link router. At the top, there are two radio buttons: 'DHCP' (unselected) and 'Static' (selected). To the right of these buttons are instructions: 'Get an IP automatically from ISP.' for DHCP and 'Get a static IP from ISP.' for Static. Below this, there are several input fields and a dropdown menu. The 'VLAN Gateway Type' is set to 'TAG' in a dropdown menu. Below it are input fields for 'VLAN ID[1-4094]:', '802.1p[0-7]:' (set to '0'), 'Multicast VLAN ID[1-4094]:', and 'MTU[1-1500]:' (set to '1500'). There is a checkbox for 'Enable NAT:' which is checked. At the bottom, there are input fields for 'IP Address:', 'Subnet Mask:', 'Default Gateway:', 'Primary DNS Server:', and 'Secondary DNS Server:'. At the very bottom right, there are 'OK' and 'Cancel' buttons.

Configure Wireless and Security :

Right after configuring internet access on router, you need to configure the wireless settings if you want to use it. Latest wireless routers support both 2.4GHz and 5GHz frequencies in order to extend its support to 802.11a, 802.11b, 802.11n and 802.11g wireless standards. 802.11n supports both 2.4GHz and 5GHz whereas 802.11a supports 5GHz only. 802.11b and 802.11g work in 2.4GHz. Here are the manual steps to configure wireless and security on router.

1. Login into your router setup page using your credentials.

2. Click on Wireless (WLAN) Settings tab –



3. WLAN for 2.4GHz Devices (802.11n, 11g and 11b) –

- a) Click on Enable Wireless and Select 802.11 mode (2.4GHz).

You can select one of the following 802.11 modes :

- 802.11b Only
 - 802.11g Only
 - 802.11a Only
 - Mixed 802.11g and 802.11b
 - Mixed 802.11n and 802.11g
 - Mixed 802.11n, 11g, 11b
- b) Check on Enable Auto Channel Scan.
- c) Now Wireless Router will automatically pick the channel with least interference.
- d) Wireless Network Name – Here you can write the name of your wireless network (SSID). SSID can be up to 32 characters and it is case sensitive.
- e) Select Channel Width – 20/40 MHz if you are using both 802.11n and non 802.11n devices. If you are not using 802.11n devices you can select 20MHz.
- f) Visibility of SSID – If you do not want to show your SSID, you can check the option Invisible.

WLAN

Help

Enable Wireless ☒

Select Mode: 802.11b/g/n Mix ▼

Select Channel: Auto ▼

Transmitted Power: 75% ▼

Beacon Interval: 100 (20~1000)

RTS/CTS Threshold: 2347 (1500~2347)

Fragment Threshold: 2346 (256~2346, only even number)

SSID Index: SSID1 ▼

SSID: Garg's_2.4g

Rate: Auto ▼

Bandwidth: 40 ▼ MHz

Protect Interval: Short ▼

Enable SSID: ☒

Connection Device Number: 32

Cancel Broadcast: ☐

WPS Enable: ☐

Security Settings: WPA-PSK/WPA2-PSK ▼

4. WLAN for 5GHz Devices (802.11n and 11a) –

Go to the WLAN5G tab and follow the same steps as mentioned above for 2.4GHz Devices.

The screenshot shows the 'WLAN5G' configuration page in a network management interface. The interface has a top navigation bar with tabs: Status, Net, Security, APP, Manage, Diagnose, and Help. Below this is a breadcrumb trail: | WAN | Binding | LAN | WLAN | WLAN5G | CWMP | QoS | Time | Route |. The 'WLAN5G' tab is selected, and a 'Help' button is visible on the right. The configuration settings are as follows:

Enable Wireless	<input checked="" type="radio"/> Open <input type="radio"/> Close
Select Channel:	INDIA <input type="button" value="v"/> AUTO <input type="button" value="v"/>
Current Channel:	52
TransmitPower Level:	100% <input type="button" value="v"/>
Beacon Interval:	100 (Range: 20~1000)
Fragment Threshold:	2346 (Range: 256~2346, only even)
DTIMInterval:	1 (Range: 1~255)
Select Mode:	11vht AC/AN/A <input type="button" value="v"/>
Station Num:	0 (Range: 0~31, 0 represents no restriction)
Channel bandwidth:	40 MHz <input type="button" value="v"/>
Extened Channel:	Down Extened Channel <input type="button" value="v"/>
Protected Interval:	AUTO <input type="button" value="v"/>
MCS:	AUTO <input type="button" value="v"/>
VHTBandwidth:	20/40/80 MHz <input type="button" value="v"/>
VHTProtected Interval:	AUTO <input type="button" value="v"/>
SSIDIndex:	1 <input type="button" value="v"/>
PerSSIDEnable:	<input checked="" type="radio"/> Open <input type="radio"/> Close
SSID:	Garg's_5g
Broadcast Enable:	<input checked="" type="radio"/> Open <input type="radio"/> Close
WPSEnable:	<input type="radio"/> Open <input checked="" type="radio"/> Close
Security Configuration:	WPA-PSK/WPA2-PSK <input type="button" value="v"/>