A Survey Paper on Different types Routers

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Abstract:-In networking data transmission is major one. To transfer the data from one network to another network router can play a vital role. In this paper we are presenting different types of router and their behavior of different usage areas.

Keywords:-Router, Network, Data, Medium, User.

I-INTRODUCTION:-Routers can play very important role in data transmissions. We have Different types of routers are available. According to their behavior Routers are classified into 1) Broad Band Router 2) Wireless Router 3) Specific Routers.

In specific router are again classified into a) Edge router b) Subscriber edge router c) Integrated service router d) Core Router e) Wired and wireless Router.

II-Routers and Types:- A Router is a device that can transfer the data from one network to anther network or within a network. Here we are representing the general Figure one represent the router image

Figure 1:-General Router Image

1) Broad Band Router – A Broad band router can provide the high speed internet access for desktops or computers. It contains a 3 or 4 Ethernet ports The Router can forwards the data from network to network. The Broad band router can support for high

speed data transfer from one host to another host. They include three or four Ethernet port for connecting desktop or laptop.
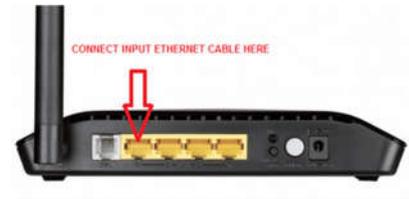

Figure 2:- Broad Band Router Image.

2) Wireless Router- The wireless Router can use the radio frequencies to transfer the data. The wireless routers can simply classified three types one is mobile, second is portable and third is desktop wifi routers. This is a device can provide the basic infrastructure for office or home. It can provide a way to connect small number of wired and any number of wireless devices to each other for accessing to the internet. One of the best example of wireless router is, our smart phone, it can work tethered, when you make your phone is hotspot. The portable wifi is another type of mobile hotspot. It can also provide high speed data transfer like 3G or 4G, depends on your plan in the operator. The portable wifi is a more reliable to access to the internet. In wireless desktop routers, a user can connect to the internet wirelessly using with a desktop wireless router.

Figure 3:- Wireless Router image

Figure4:- Subscriber Edge Router

3) Specific Router: - Specific Router means we can use the router in a specific environment. Here we are express the specific router, it is classified into

a) Edge Router: - the Edge router is a specialized router; it is located at edge of the network. An Edge Router can provide communication with different networks and autonomous systems. Edge Route can use the External border gateway protocol for communication. Below image it represents the edge of the router. Edge router is capable of transfer the up to 2 million packets per seconds.

Figure 4:- Edge Router

b) Subscriber Edge Router:-
Subscriber edge router is a specialized router, it can used by the organization or enterprise. It is located at the edge of the subscriber edge of the network. It can also call customer edge router. Below router is subscriber edge router.

c) Integrated service Router:-
Integrated router can be used for office branches for video-conferencing, virtualization services and high media over WAN. Here we can represent the integrated service router. Integrated service router designed to meet application demands .it can support up to 375 Mbps. It can provide the highly secure data, voice, video and application services to offices.

Figure: - Integrated service Router.

d) Core Router:- The core router is a router which can transfer the data/packets from host to host in within a network not across networks. A ore router is a router which can operate in internet backbone. or core .Core router can forwards the packets within a network.
Here we are representing the core router image.

Figure: - Core Router

e) Wired Router:- The wired router are connected using Ethernet cable to transfer the data form host to host.

In small network a wired router can connect to all hosts. Here we are representing the wired router.

Figure: - Wired Router

III-Routers and Usage: Router is a device which can transfer the data form one host to another host within a network or one network to another network.

Broad band Router is a router, which can be used to access the high speed internet. Wireless router are used by the internet service providers, they used to connect you using cable or dsl...

The Edge router is a special router; it can be placed at edge or boundary of the network. It can be used to connect to its network to external network.

Core router can forward the packets within a network. Integrated routers are used to connect different branch offices.

IV-Comparisons char of Different types of routers

1- Description about broad band router

LED indicator	Status	Description
POWER	Continuously lit	Indicates the router is on and has power.
SYS	Flashing	Indicates the router is operating correctly.
WAN	Continuously lit	Indicates the router's WAN port is connected to an Ethernet device.
WAN	Flashing	Indicates the port is transmitting and/or receiving data packets.
WLAN	Continuously lit	Indicates the wireless function is enabled.
WLAN	Flashing	Indicates it is wirelessly transmitting data
LAN(1/2/3/4)	Continuously lit	Indicates the router's LAN port is connected to an Ethernet device.
LAN(1/2/3/4)	Flashing	Indicates the port is transmitting and/or receiving data.
WPS	Flashing	Indicates the device is communicating with the client in WPS mode.

Port/Button	Description
WAN	Can be connected to Ethernet devices such as MODEM, Switch, Router, etc. Usually it is used to connect DSL MODEM or Cable MODEM, or ISP network cable for connecting to the Internet.
LAN (1/2/3/4)	Can be connected to an Ethernet switch, Ethernet router, or NIC card. Mostly they are used to connect to computers, Ethernet switches, etc.
RESET/ WPS	The system reset/ WPS button. Press and hold this button for 7 seconds and all of the settings will be deleted and router settings will be restored to factory default. Hold the button for 1 second and the WPS feature will be enabled. The WPS LED will flash when communicating in this mode.
POWER	The jack is for power adapter connection. Please use the included standard power adapter.
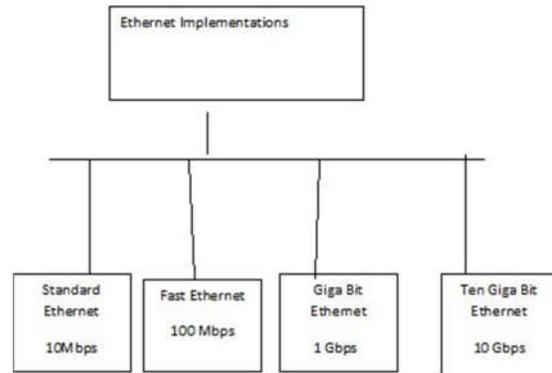
2- Wireless Lan Physical layer implementations
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IEEE	Technique	Band	Modulation	Rate (Mbps)
802.11	FHSS	2.4 GHz	FSK	1 and 2
	DSSS	2.4 GHz	PSK	1 and 2
		Infrared	PPM	1 and 2
802.11a	OFDM	5.725 GHz	PSK or QAM	6 to 54
802.11b	DSSS	2.4 GHz	PSK	5.5 and 11
802.11g	OFDM	2.4 GHz	Different	22 and 54

3- Edge router can be used in the edge of the network. It can transfer the data from one network to another network in very fast.
Below we are mentioned hardware specifications of edge router and Ede router software specifications.

Model: ERPro-8	
Dimensions	484 x 164 x 44 mm (19.06 x 6.46 x 1.73 in)
Weight	2.3 kg (5.07 lb)
Max. Power Consumption	40 W
Power	Internal AC/DC Power Adapter, 60 W (24V, 2.5A)
Power Input	110 - 240VAC
Button	Reset
LEDs Per Data Port	Speed/Link/Activity
Networking Interfaces Serial Console Port Data Ports	(1) RJ45 Serial Port (b) 10/100/1000 RJ45 Ports (2) 10/100/1000 RJ45/SFP Combination Ports
Layer 3 Forwarding Performance Packet Size: 64 Bytes Packet Size: 512 Bytes or Larger	2,400,000 pps 8 Gbps (Line Rate)
Processor	Dual-Core 1 GHz, MIPS64 with Hardware Acceleration for Packet Processing
System Memory	2 GB DDR3 RAM
On-Board Flash Storage	4 GB
Certifications	CE, FCC, IC
Rack-Mount	Yes
Operating Temperature	-10 to 45° C (14 to 113° F)
Operating Humidity	10 - 90% Noncondensing

Figure:- Edge Router Hardware Specifications

EdgeOS	
Interface/Encapsulation	Ethernet 802.1q VLAN PPPoE GRE IP in IP Bridging Bonding (802.3ad)
Addressing	Static IPv4/IPv6 Addressing DHCP/DHCPv6
Routing	Static Routes OSPF/OSPFv3 RIP/RIPng BGP (with IPv6 Support) IGMP Proxy
Security	ACL-Based Firewall Zone-Based Firewall NAT
VPN	IPSec Site-to-Site and Remote Access OpenVPN Site-to-Site and Remote Access PPTP Remote Access L2TP Remote Access PPTP Client
Services	DHCP/DHCPv6 Server DHCP/DHCPv6 Relay Dynamic DNS DNS Forwarding VRRP RADIUS Client Web Caching PPPoE Server
QoS	FIFO Stochastic Fairness Queueing Random Early Detection Token Bucket Filter Deficit Round Robin Hierarchical Token Bucket Ingress Policing
Management	Web UI CLI (Console, SSH, Telnet) SNMP NetFlow LLDP NTP UBNT Discovery Protocol Logging

Figure:- Edge Router Software Specifications.

4- Core Router-A core router can forwards the packets within a network to

Attribute	NE80E	
Switching capacity	2.56 Tbit/s	
Forwarding performance	1600 Mpps	
Slots	16 for LPUs, 2 for MPUs,4 for SFUs	
Dimensions (W*D*H)	442 mm × 669 mm × 1600 mm	
Max. Power Consumption	6000W	
Weight	294kg (fully configured)	
Interface type	OC-192c/STM-64c POS OC-12c/STM-4c POS OC-3c/STM-1c POS Channelized OC-3/STM-1 GE/FE E3/CT3 E1/T1	OC-48c/STM-16c POS OC-12c/STM-4c ATM OC-3c/STM-1c ATM 10GE-WAN/LAN 2.5GE/10GE RPR CE1/CT1
IPv4	Supports static routing, RIP, OSPF, IS-IS, and BGP-4. All interfaces support line-speed forwarding in complicated routing environments, for example, when the routing flapping occurs.	
IPv6	• Supports IPv4 & IPv6 dual stack. • Supports various technologies of transition from IPv4 to IPv6: manual configuration of tunnels, automatic configuration of tunnels, 6-to-4 tunnel, GRE tunnel, and ISATAP tunnel. • Supports 6PE and IPv4 over IPv6 tunnel. • Supports IPv6 static routes. • Supports dynamic routing protocols such as BGP-4/BGP4+, RIPng, OSPFv3, and IS-ISv6. • Supports IPv6 neighbor discovery and PMTU discovery. • Supports TCP6, ping IPv4, tracert IPv6, socket IPv6, static IPv4 DNS, specified IPv6 DNS servers, TFTP IPv6 client, and IPv6 policy-based routing. • Supports ICMPv6 MIB, UDP6 MIB, TCP6 MIB, and IPv6 MIB.	

Attribute	NE80E
MPLS/MPLS VPN	• Supports MPLS TE. • Supports MPLS/BGP VPN, which is compliant with RFC 2547bis. • Supports three inter-domain implementation modes. • Supports HoVPN and RRVPN. • Supports IPv6 VPN. • Supports the integration with the Internet services. • Supports MPLS L2VPN in Martini or Kompella mode. • Supports several Layer 2 VPN technologies such as VPLS and VLL. • Supports heterogeneity interworking. • Supports multicast VPN.
Layer 2 switching	• Supports IEEE 802.1q, IEEE 802.1ad, IEEE 802.1d, IEEE 802.1w, and IEEE 802.1s. • Supports VLAN aggregation (super VLAN). • Supports the filtering list based on MAC addresses and ports. • Complies with RFC 1483 Appendix B.
Reliability	• Provides IP/LDP/VPN/TE/VLL fast rerouting. • Supports the protection mechanisms such as IP/TE automatic rerouting, fast IGP/BGP/multicast route convergence, VRRP, self-healing RPR network (IPS), RRPP, IP-Trunk link backup, BFD, MPLS/Ethernet OAM, and routing protocol/port/VLAN Damping. • Supports PW redundancy, E-Trunk, E-APS, and E-STP. • Provides in-service patching and smooth upgrading of the software. • Adopts the passive backplane. • Provides redundancy backup for the key components such as the routing processing module, SFU, and power supply module to guard against single-point faults. • Supports the switching between hot backuped components. • Supports graceful restart (GR), NSF, multicast NSF, and BGP/IS-IS NSR. • Supports ISSU. • All components are hot swappable.
QoS	Provides a perfect QoS mechanism with the following functions: • Each LPU can provide advanced scheduling and congestion avoidance. • Provides accurate traffic policing and traffic shaping. • Provides the function of complex traffic classification and can identify the flows of fine granularity. • Supports MPLS HQoS to ensure the QoS for MPLS VPN, VLL, and PWE3 services. • Provides DS-TE based on DiffServ and MPLS TE. • Supports eight class types. • Supports the TE tunnel-oriented QoS.
Multicast	• Supports IGMPv1, IGMPv2, and IGMPv3. • Supports static multicast configuration. • Supports PIM-DM, PIM-SM, PIM-SSM, MSDP, and MBGP. • Supports multicast CAC. • Supports interoperability between multicast protocols. • Supports the multicast policy processing, including the policy processing for the multicast routing protocols and multicast

Attribute	NE80E
	forwarding. • Supports multicast QoS. • Supports two-level multicast replication on the SFU and LPU to achieve the optimal multicast effect.
Security	• Supports ACL-based packet filtering. • Supports URPF. • Supports GTSM. • Supports DHCP snooping. • Supports the defense against ARP attacks and DOS attacks. • Supports the MAC address constraint, and binding of MAC addresses and IP addresses. • Supports SSH and SSHv2. • Supports NetStream.
Clock	• Supports 1588v2. • Supports ACR. • Supports DCR. • Supports synchronization Ethernet clock.
Mobile backhaul	• Supports TDM PWE3. • Supports ATM PWE3. • Supports ATM IMA
Environmental requirements	Long-term ambient temperature: 0°C to 45°C Short-term ambient temperature: −5°C to +55°C Long-term relative humidity: 5% to 85% Short-term relative humidity: 0% to 100% Working altitude: ≤ 3000 m

5- Wireless Router Description:- It can provide a way to connect small number of wired and any number of wireless devices to each other for accessing to the internet

Conclusion: router are different kinds, one router can used in one purpose like data transmission and another one can be used in another purpose like video conferencing .

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