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A COMPARATIVE STUDY OF ROUTERS AND THEIR MECHANISM

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ABSTRACT

Routers have adopted various techniques to overcome the high performance mechanisms requirements of the network environment. Some of them use larger caches, while some of them have adopted the distributed architecture to get better performance. This paper explained about the various mechanisms of routers and examines the best suited router.

INTRODUCTION:

The use of the end-to-end congestion control mechanisms of router has been a critical factor in the robustness of the network. Network is no longer a small so user community, no longer possible to rely on all end-nodes to use end-to-end congestion control for best effort traffic. All developers to incorporate end-to-end congestion control in their network applications [7]. The network itself must now participate in controlling its own resource utilization. The router contains processing instructions for each step and blank spaces in which the production personnel can hand enter manufacturing data [12]. Frequently the router is used to inform production personnel of unusual processing required by this particular lot. Digital market a number of routers with their mechanism are available, so it is difficult to select one of them. This paper concentrated on their types and mechanism to find out suitable router.

Router and their Mechanisms

A router is a specialized computer that connects one network to another and directing data packets from source to the destination. Data from individual computers flow to a switch and directed to the router [3], which decides network to send that data. That decision is based off of routing protocols stored on the router in a 'routing' or 'configuration table.' This table records the best way to get to and communicate with other routers on other networks [1]. The routers are used in different commercial/private networks. There are several routing mechanisms that may be used as input sources to assist a router in building its route table. In router, directly connected interfaces are routes that are local to the router. The router has an interface directly connected to one or more networks or subnets. These networks are inherently known through the routers configured interface attached to that network [12]. Static routes are routes to destination hosts or networks that an administrator has manually entered into the router's route table. Static routes define the IP address of the next router and local interface to use forwarding traffic to a particular destination. End hosts, although capable, do not usually maintain their own local route tables; it relies on local routers to forward traffic to remote hosts [14]. For an end host to communicate with hosts beyond their local segment, an administrator at a minimum must configure it with an IP address of a router known as the Default Router. It can implement dynamic or static routes within the network to facilitate the learning of route information of local links. Default route to direct all traffic outside your network regardless of destination. This provides a good method because somewhere near 80,000 plus routes exist on the network. By implementing a default route the router simply directs all traffic to unknown destinations through the default path [8, 13].

Looking at the functionality of routers has used the different popular architectures. It then looks at router performance in light of various switching techniques. Finally three routers are available commercially and selected for further study, namely Juniper M16 Cisco 891-24X, LINKSUS-LRT214/LRT224 and examines their performance and mechanisms.

Comparative study of routers and their mechanism

For the study three types of router were selected. Selection is based on technology and management with different configuration. The different technical variables like as, required os, protocols, Data capacity, Data link protocol, Complaint standards, network protocols, size/weight, IPv4 and IPv6 supporting, Remote management protocols, WLAN Interfaces, LAN Interfaces, Integrated USB/2.0/AUX/CONSOLE, Modem and power supply. These technical variables were taken for the comparison.

Table 1: Three Different types of router with their parameters

S.NO	TECHNIAL VARIABLES	JUNIPER M19 SERIES	CISCO 891-24X-ROUTER	LINKSYS-LRT214/LRT224
1	REQUIRED O.S	Windows XP/ 7/10	Windows server 2007, Windows 7/8/10	Windows 7/8/10, Windows Server 2003
2	DATA CAPACITY (Max Speed in Mbps)	100/1000//10000Mbps	100/1000/10000 Mbps IPSec VPN tunnels : 50	10/100/1000 Mbps LAN/WAN Port,
3	DATA LINK PROTOCOL	Ethernet, Fast Ethernet	Ethernet, Fast Ethernet, Gigabit Ethernet	Ethernet
4	NETWORK PROTOCOL	RSPV, DHCP, DNS	L2TP, RSVP, ICMP, FTP, DHCP, DNS	L2TP, DHCP, DNS
5	COMPLAINT STANDARD	IEEE 802.3u 100 BASE-TX, IEEE 802.3ab 100 BASE-T, IEEE 802.3z 1000 BASE-X	IEEE802.1D, IEEE802.1Q, IEEE802.3af, IEEE802. 1x	IEEE 802.1Q VLAN
6	ROUTING PROTOCOL	OSPF, BGP, RIP	OSPF, RIP-1, RIP-2, BGP, PIM/DM,	Static and Dynamic Routing Protocols : RIP and RIPng
7	IPV4/IPV6 SUPORTING	IPv4/ IPv6	IPv4/ IPv6	IPv6 Only
8	REMOTEMGT. PROTOCOL	TELNET, SNMP, HTTP	TELNET, SNMP, HTTP, HTTPS	SNMP, SYSLOG
9	WLAN INTERFACES	NOT AVAILABBLE	1-port GE	NOT AVAILABBLE
10	LAN INTERFACES	8-port 10-/100-Mbps managed switch	24-port 10-/100-Mbps managed switch	8-port 10-/100-Mbps managed switch
11	INTEGRATED USB 2.0/AUX/CONSOLE	YES	YES	NOT AVAILABBLE
12	MODEM	NOT AVAILABBLE	V.92 analog modem	NOT AVAILABBLE

13	SIZE/WEIGHT	43.2 mm x 330.2 mm x 207 mm 3.7 KG	43.81 cm x 24.34 cm x 4.45 2.5 KG	191 x 130 x 40 mm
14	POWER SUPPLY	AC 100/240 V (50/60 Hz, 2.2 A)	AC 120/230 V (50/60 Hz, 2 A)	12 V, 1A

From the study of three Routers, it finds the suitable router "Cisco 891-24X", is most efficient for the Multicast Routing in LAN network.

To study in mechanism of routers variable this highly related with mechanism. In Juniper M19, Cisco 891-24x, Linksys LRT214/LRT224 were studies following variable like as Route caching, switching fabrics, Forwarding Engines, Distributed processing, Web security, Firewall protection, access control list, weighted random early detection(WRED), low latency queuing and NAT supports were taken in the considered on:

Table 2: Router Mechanism

S. NO	MECHANISM VARIABLES	JUNIPER M 19 SERIES	CISCO 891-24X-ROUTER	LINKSYS-LRT214/LRT224
1	Route Caching	Yes	Yes	Yes
2	Switching Fabrics	Yes	Yes	No
3	Forwarding Engines	No	Yes	Yes
4	Distributed Processing	No	Yes	Yes
5	Web Security	Yes	Yes	Yes
6	Firewall Protection	Yes	Yes	Yes
7	Access Control List(ACL)	Yes	Yes	Yes
8	Weighted Random Early Detection	No	Yes	No
9	Low-Latency Queuing (LLQ)	Yes	Yes	Yes
10	Nat Support	Yes	Yes	No

From the Table-2, it is clearly demonstrated that Cisco 891-24x router is suitable in term of mechanism between studied routers.

Result and Discussion

Cisco 891-24X router provides an amazing degree of flexibility in building large and arbitrary complex networks. This router designed use a switched backplane and contains many features and functions that is either rarely used or that can be performed in the background of high-speed data forwarding in the core of the small and in enterprise networks. It also classifies packets and performs control actions on the packets. Traditionally all the route lookup has been done centrally by the CPU, but this place a lot of load on the CPU and the CPU then becomes a performance bottleneck. So elaborated router has now moved towards providing interfaces with processing power [2, 6]. The switch fabric provides a large bandwidth for transmitting packets between interface cards, and increases throughput considerably in gigabit routers with switching fabric and interfaces. Distributed Processing architecture is a combination of all the techniques discussed above. It contains a switch fabric, which increases the number of packets that can be transmitted between interfaces [11]. Communication between interfaces and CPU can also be through the switch fabric, making CPU equivalent to an interface with additional functionality.

CONCLUSION

The expansion of the network has designed the appearance of routers with forwarding rates in the Gigabit and Terabit range. This report has briefly obtained the various approaches used for designing high-speed routers. High-speed routers must be robust and must have enough parallelism to support in multicast. To improve performance, critical functions are now performed; the buffer size should be suitably large to avoid packet losses, or to contain them within sensible limits. In case of crossbar switches, head of line blocking plays a major role in determining effective switching speed. Crossbar switches require the use of techniques like faster input/output channels, or allocation of LANs and satisfactory performance [2]. Industry has developed its own architectural design to improve performance Extensive research is being carried out in the industry to improve router performance to keep up with the exponential growth of the networks. This considers many unique and interesting challenges, on which the research community and industry have been working actively in high designs. Significant advances have been made in above router designs to address the most demanding customer issues regarding high speed packet forwarding, low per-port cost, flexibility and programmability, reliability, and ease of configuration. These advances have been made in the design of routers; some important open issues still remain to be resolved in coming years.

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