OSI Network Layer Note for Instructors These presentations are the result of a collaboration among the instructors at St. Clair College in Windsor, Ontario.Routing Protocols Routing Information Protocol (RIP) Enhanced Interior Gateway Protocol (EIGRP) Open Shortest Path First (OSPF)Address Types Two address types: MAC address: Physical address of the host Burned in to the NIC Layer 2 address Network Address: Logical address of the host Assigned by network administrator Layer 3 address Each Host Has Two Addresses Physical (MAC): The physical address uniquely identifies the host from all other hosts on all other networks at Layer 2.Characteristics: Connectionless "Best Effort" Delivery (Unreliable) Media Independent Connectionless "Best Effort" Delivery (Unreliable) Unreliable means simply that IP does not have the capability to manage and recover from undelivered or corrupt packets.Replacing the switch in the diagram with a router, creates two separate IP sub-networks and two broadcast domains.Information is learned in two ways: Manual configuration of the information (Static) Information received from another router (Dynamic) Static Routing Manually configured.An IP Address is like a telephone number: 519-972-2727 519 - Network Portion 972-2727 - Host Portion 519 - Windsor area 972-2727 - St. Clair College Dividing Networks from Networks An IP Version 4 address has two parts: Network number Host number The network portion of the address is the same for all hosts on the network.Routing Processes: How Routes Are Learned Routing requires that every hop, or router, along the path to a packet's destination have a route to forward the packet.Since protocols at other layers can manage reliability, IP is allowed to function very efficiently at the Network Layer.Fragmentation: At times, an intermediary device (router) will need to split up a packet when forwarding it from one media to a media with a smaller MTU.Dividing Networks from Networks The IP Version 4 Address contains elements that uniquely identify both the network and host.192.168.1.2 / 24 This method indicates Classless Routing or Classless Interdomain Routing (CIDR).192.168.1.2 / 24 This method indicates Classless Routing or Classless Interdomain Routing (CIDR).Destination Network - Routing Table Entries The hierarchical nature of Layer 3 addressing means that...The default route in a routing table performs much the same function as a default gateway in a PC. If a route for a packet cannot be found in the routing table, and a default route is present, that route will be used to forward the packet.If anyone finds any errors or omissions, please let me know at: tdame@stclaircollege.ca.Communication from Host to Host Network Layer Addresses packets with an IP Address.IPV4: Example Network Layer Protocol Internet Protocol Version 4 (IPV4) is the most widely used version of IP. Only Layer 3 protocol used on the Internet.Operates independent of the layers that handle the physical medium that carries the packet.Optical Fiber: ATM MTU = 17,966 bytes.IP Addressing - The Subnet Mask There are two methods of expressing a subnet mask.Physical (MAC): The physical address uniquely identifies the host from all other hosts on all other networks at Layer 2.Routers base their decisions on the NETWORK PORTION of the IP address when determining the best path for the packet.Dynamic Routing Routing information is exchanged among the routers using a routing protocol.Is concerned with the size of the packet or Maximum Transmission Unit (MTU).The MTU is established as part of the communication between the Data Link and Network Layers.Dividing Hosts ?into Groups Why Separate Hosts into Networks