**IP Questions**

1. IP does not make any significant assumptions about local networks and lower level links that are used to transmit datagrams. This is consistent with IP’s general goal to “run on anything” (heterogeneity). IP is also designed to be scalable and to give best effort performance (no guarantees on performance quality).
2. IP uses a best effort service model, which means that it makes no performance guarantees about the lower level networks it is running on. This is what allows IP to “run on anything”.
3. MAC addresses may be unique to each device, which works well as an identifier within a local network, but MAC addresses do not provide any information about where on the broader internet each device with a MAC address (MAC is a flat address space), hence the need for IP addresses.
4. 128.96.16/20 means 20 bits for the network and 12 (32 – 20) bits for the host. A 12 bit host part allows for up to 212 = 4096 individual hosts.

**RIP**

Initial Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F |
| A | 0 | 3 |  | 5 |  |  |
| B | 3 | 0 | 6 |  | 8 |  |
| C |  | 6 | 0 |  |  |  |
| D | 5 |  |  | 0 | 7 |  |
| E |  | 8 |  | 7 | 0 | 2 |
| F |  |  |  |  | 2 | 0 |

After 1st Exchange

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F |
| A | 0 | 3 | 9 | 5 | 11 |  |
| B | 3 | 0 | 6 | 8 | 8 | 10 |
| C | 9 | 6 | 0 |  | 14 |  |
| D | 5 | 8 |  | 0 | 7 | 9 |
| E | 11 | 8 | 14 | 7 | 0 | 2 |
| F |  | 10 |  | 9 | 2 | 0 |

After 2 Rounds of Exchanges

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F |
| A | 0 | 3 | 9 | 5 | 11 | 13 |
| B | 3 | 0 | 6 | 8 | 8 | 10 |
| C | 9 | 6 | 0 | 14 | 14 | 16 |
| D | 5 | 8 | 14 | 0 | 7 | 9 |
| E | 11 | 8 | 14 | 7 | 0 | 2 |
| F | 13 | 10 | 16 | 9 | 2 | 0 |

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**SDN**

All of the logic required to make routing decisions and dictate network policies is said to exist on the control plane while the simple act of receiving, processing, and forwarding packets through to the next hop on their journey is said to occur on the data plane. Separating the data and control planes allows us to run a network in which control plane operations can be centralized to one master node, leaving all other relatively “dumb and inexpensive” switches to carry out data plane operations at the master node’s instruction. This Software Defined Networking (SDN) results in better resource management, sharing, and provides top level abstractions of the system for users. It can also control the flow of data through its simple and inexpensive switches with minimal overhead.

**Dijkstra’s Algorithm**

See other attachement