Virtual Networks:
Start with something simple

IETF-79 Beijing, China
Virtual Network Research Group
Nov 12, 2010

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Let's consider a likely user?

- Cloud Provider
  - Needs to charge for physical resources
    - Queues, B/W, etc
  - Needs to charge for name space
    - MAC addresses??
    - VLAN tags??
    - IP addresses??
  - Can charge for network functionality
    - DHCP servers
    - Firewall
    - Routers
    - Load balancers
    - Other functionality...
Cloud environment?

- Cloud operator
  - A large/flat L2 network
  - Some L2 networks connected by a layer 3 device
  - Need to keep things simple
    - Tunnels, MAC-in-MAC, etc. gets too complex
- Cloud customer wants
  - Predictability of resources and performance
  - Flexibility in playing with IP addresses/subnets
  - Ability to partition their own traffic and resources
One simple solution?

- Allow the cloud operator to specify Virtual Networks and associated resources/policies and allocate these to VN “owner/users”:
  > Example identification/partitioned items:
    > Set of VLAN tags
    > Set of MAC addresses for Virtual Machines (or a MAC address prefix IP style)
    > Any L2 ACLs
  > Resource/Policies:
    > Consists of some physical resources like B/W, queue length, QoS, etc.
      - Be flexible in protocols to encourage device/hardware-specific enhancements from different vendors
- Virtual Network “owner/user” gets to assign his own IP address and any layer 3 or higher functionality
  > But administration isolated per VN, and packet-visibility and performance isolation remain as “acid test”
What needs to be done?

• OpenFlow has made some good progress in defining things at individual component/link level
• Some components exist... but
  > No unified way to create, describe and disseminate VN information among a set of network and server hardware
  > SNMP extensions