Rebuilding Net-44

Rethinking Amateur Radio Networking

Amateur IP Based Applications

- TCP/IP over AX.25 or D-STAR DD

- AX.25 over IP

- 802.x - HSMM, C3I, IP/Mesh Networking (Part 97)

- VOIP - IRLP, Echolink, AllStar, D-STAR DV, DATV, …

- Others

Amateur Radio TCP/IP Networking

- Current State
  - Low Speed
  - Islands of Operation
  - Bailing Wire and Duct Tape
  - Roll Your Own
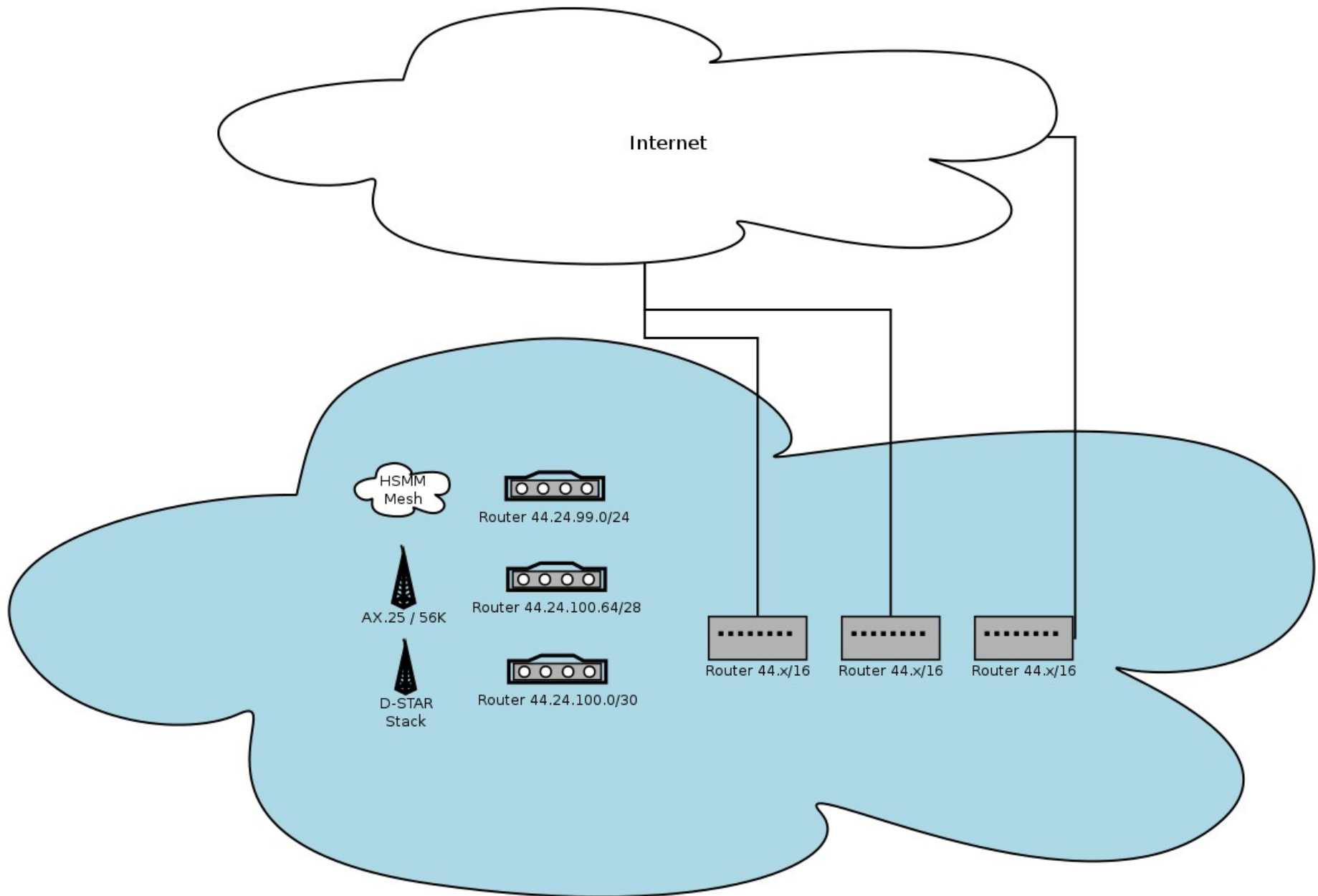 - Not for Average User

- Vision
  - Multi-Speed
  - Universal
  - Unified
  - Off-the-Shelf Blocks
  - Pre-configured infrastructure
  - Interoperable

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TCP/IP Networking Backbone

- Segment network and advertise to Internet.

- 255 1st tier subnets of 44.0-254/16
  (65K addresses per, allocated as needed for LANs)

- Fixed addresses for services / servers

- DHCP for mobile / intermittent stations with Dynamic DNS

- Tunnels (MPLS?) peer 1st Tier Subnets

- 1st Tier Subnets route non-44 traffic to Internet

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The Big Picture

Internet

HSMM Mesh

Router 44.24.99.0/24

AX.25 / 56K

Router 44.24.100.64/28

D-STAR Stack

Router 44.24.100.0/30

Router 44.x/16

Router 44.x/16

Router 44.x/16

TCP/IP Over AX.25 Use Case

- Delegate subnet to "local" router, Tunnel back to tier 1 subnet (44.24.x.x)

- Assign fixed IP addresses/DNS to Servers

- DHCP pool for Mobile/Intermittent Stations

- "Special" DHCP forwarder

  - Maps AX.25 callsign/SSID to hostname.

  - Dynamic DNS Updates
    (e.g. K7VE-1.ampr.org ↔ 44.24.73.221)

VOIP / DATV / Linking Use Case

- Delegate subnet to "service" gateway router

- Service gateway supports multiple point-to-point VPN tunnels.

  - One address or very small subnet.

- Repeater/Reflector/PBX opens VPN tunnel back to service gateway.

- DNS Records

  - (e.g. k7ve.irlp.ampr.org ↔ 44.200.22.44)

D-STAR Use Case

- Delegate subnet to "local" router, Tunnel back to tier 1 subnet (44.24.x.x)

- Assign fixed IP addresses/DNS to Servers

- DHCP pool for Mobile/Intermittent Stations

- "Special" DHCP forwarder

  – Maps "MyCall" and "Terminal ID" to hostname

  – Dynamic DNS Updates
    (e.g. K7VE-X.dstar-relay.net ↔ 44.24.32.103)

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HSMM/Mesh Use Case

- Delegate Subnet(s) to Mesh capable edge router.

- Assign fixed IP addresses to servers/fixed stations

- DHCP pool(s) for mobile/intermittent stations

  - "Standard" DHCP Server

  - Dynamic DNS Updates
    (e.g. hostname.gateway.ampr.org ↔ 44.24.88.144)

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Errata et Fini!

- Work toward Net-44 segmentation with agreements that allow ISP's to BGP.

- Service Definition (need to be for amateur use).

- Reference implementations for Plug-n-Play Infrastructure.

- Move from address registration to network management.

- Work on cool stuff! (OpenBTS, OpenISES/Tickets, …)