Multihoming with Locator/ID Separation Protocol: An Experimental Testbed

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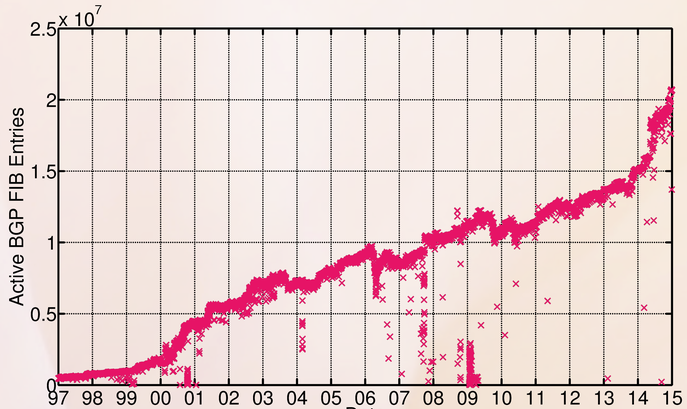
Scalability of the Internet Architecture

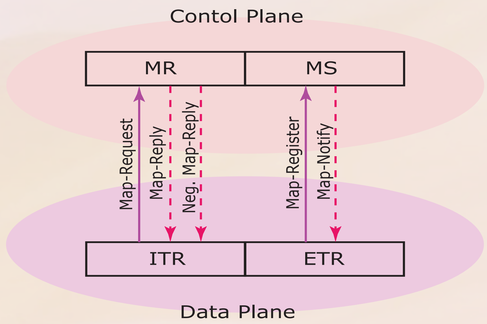
- The Internet Protocol (IP) namespace is overloaded with information about the location and the identity of network devices
- Locator/identifier overload is a recognized cause of the exponential growth of the routing tables in the Internet's Default-Free Zone (DFZ)
- Two main techniques to achieve the locator/ID split: address rewriting and map-and-encap



Growth of the BGP FIB table from 1997 to 2015

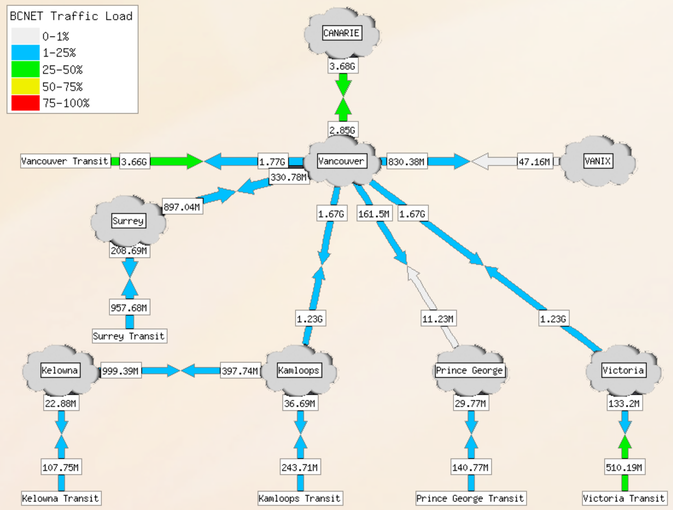
Locator/ID Separation Protocol (LISP)

- LISP employs the map-and-encap technique
- It operates in the data and control planes and introduces two new namespaces:
  - Endpoint Identifiers (EIDs) for connection endpoints
  - Routing Locators (RLOCs) for the connection point of a node to the network
- Ingress Tunnel Routers (ITRs): perform EID-to-RLOC mappings and are responsible for encapsulating the outgoing packets
- Egress Tunnel Routers (ETRs): accept LISP encapsulated packets, de-capsulate the packets, and forward them to end devices



LISP control and data planes and the exchanged messages

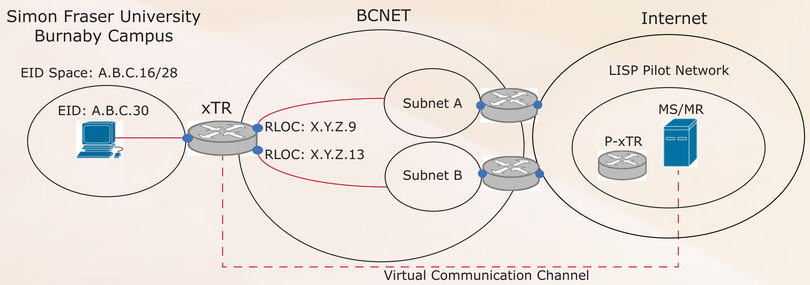
BCNET



BCNET traffic map: March 31 2015 18:03:04

- British Columbia's network extends over 1,400 km and connects Kamloops, Kelowna, Prince George, Vancouver, and Victoria
- Shown is the traffic bound for CANARIE (Canada's Advanced Research and Innovation Network), the commercial Internet (Transits), and the Vancouver Internet Exchange (VANIX)

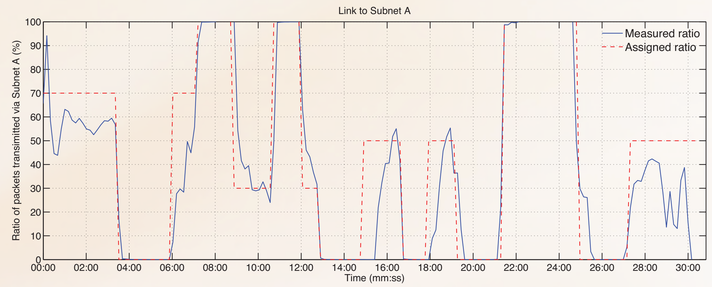
Multihomed LISP Testbed

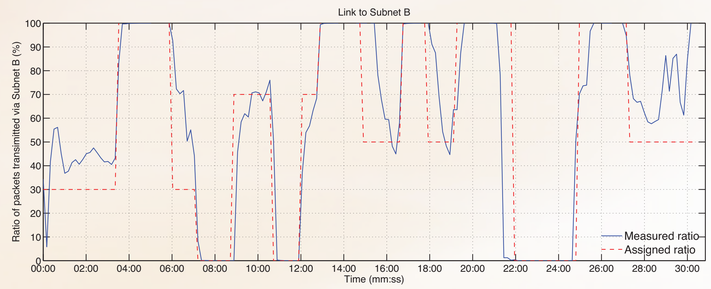


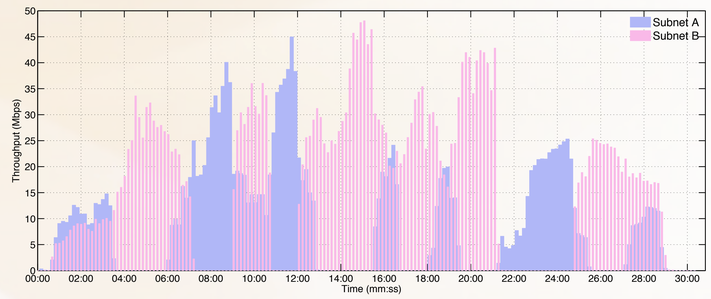
- Location: Communication Networks Laboratory at Simon Fraser University Burnaby campus in British Columbia, Canada
- Network architecture: a work-station connected via a dedicated fiber link to a LISP router (xTR) located at the BCNET transit exchange center in downtown Vancouver
- LISP router (xTR) is connected to two BCNET subnets
- LISP pilot network infrastructure is used for control plane operations
- EID address space A.B.C.16/28 is assigned by the LISP pilot network

Testbed Performance Evaluation

- Traffic: peer-to-peer BitTorrent file transfer of "The Zeitgeist: Moving Forward" motion picture
- Data transfer: 6.7 GB of data exchanged within 28 min and 15 s
- Distributions of traffic on the site connections was periodically changed
- Various link failures were tested by shutting down the network interfaces of the LISP router
- Traffic captured: inbound and outbound traffic to and from the multihomed site
- Traffic traces contain only the headers of the transmitted packets







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ManFI 2015
The Seventh IFIP/IEEE International Workshop on Management of the Future Internet
May 2015, Ottawa, ON, Canada

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