Helsinki University of Technology
Networking Laboratory

Future Internet – Pizza
RE2EE – First Prototype

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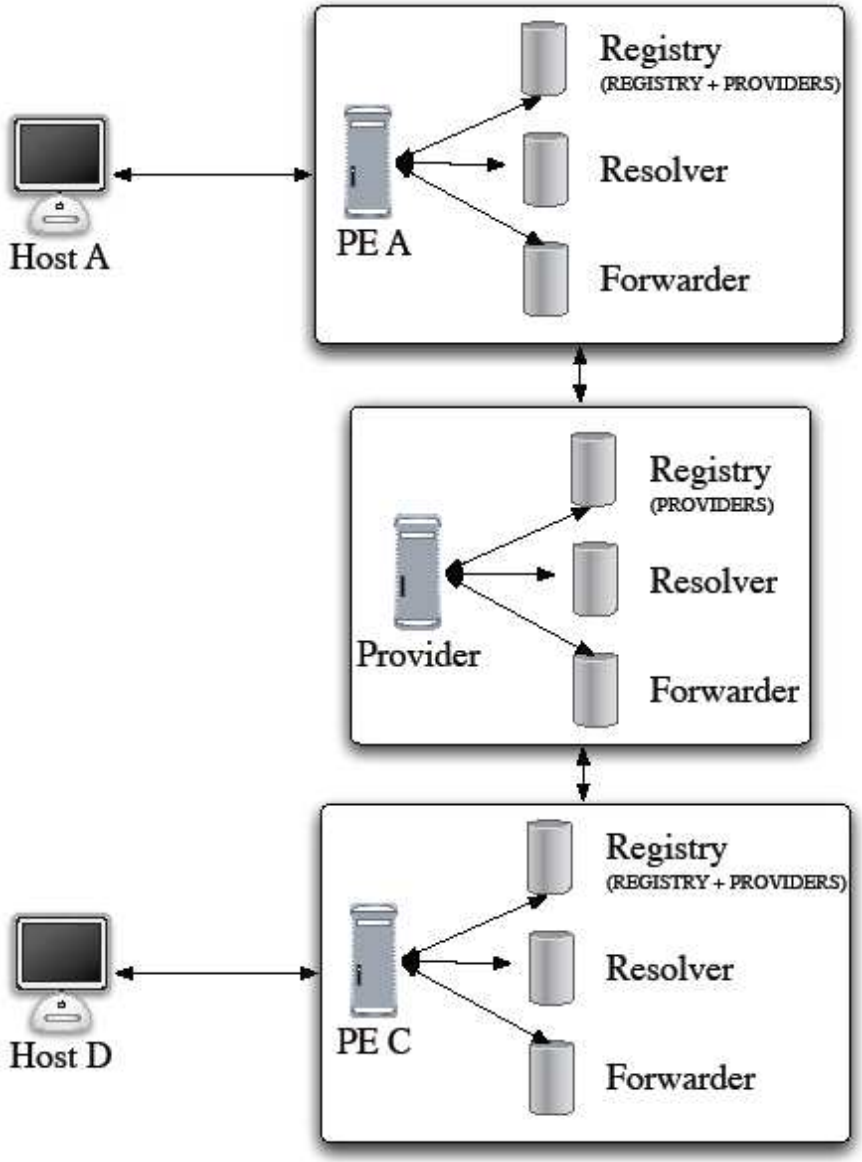
Future Internet at Comnet

- Projects:
  - ETNA – Ethernet Transport Network Architecture
    - EU project 2008-2009
    - NSN Israel, BT, Ethos Networks, BGU, Comnet
  - Fin-100-GET Celtic Project
    - Huge European project to develop 100GE
    - Finland: NSN, Tellabs, Nethawk, VTT, Comnet
  - ICT SHOK
    - Jukka Manner, Jörg Ott, RKa
  - Tieva II
    - DF funded
- RE2EE: Diploma thesis works: 2 will be finished 5/2008 based on ideas prior to ETNA

First Future Internet proto

SW Implementation



Uses Scapy, mySQL, virtual machines.
Runs on 2 real PCs.
Programmed in Python.
Implements
- Service discovery
- Registration
- Sending and Receiving
- Forwarding

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RE2EE Forwarding (1)

1.
send_packet("message","identity_of_host_B")
dst_MAC="PE_A_MAC"
src_MAC="host_A_MAC"

2.
forward("")
dst_MAC="host_B_MAC"
src_MAC="PE_A_MAC"
payload="identity_of_host_A"

By Jussi Ryynänen

RE2EE forwarding (2)

By Jussi Ryynänen

RE2EE Forwarding (3)

1.
send_packet("message","identity_of_host_D")
dst_MAC="PE_A_MAC"
src_MAC="host_A_MAC"

2.
dst_MAC="Provider_MAC"
src_MAC="PE_A_MAC"
encapsulate("")
  dst_MAC="host_D_MAC"
  src_MAC="PE_C_MAC"
  payload="identity_of_host_A"

3.
forward("")
dst_MAC="PE_C_MAC"
src_MAC="Provider_MAC"
  dst_MAC="host_D_MAC"
  src_MAC="PE_C_MAC"
  payload="identity_of_host_A"

4.
decapsulate and forward("")
dst_MAC="host_D_MAC"
src_MAC="PE_C_MAC"
payload="identity_of_host_A"

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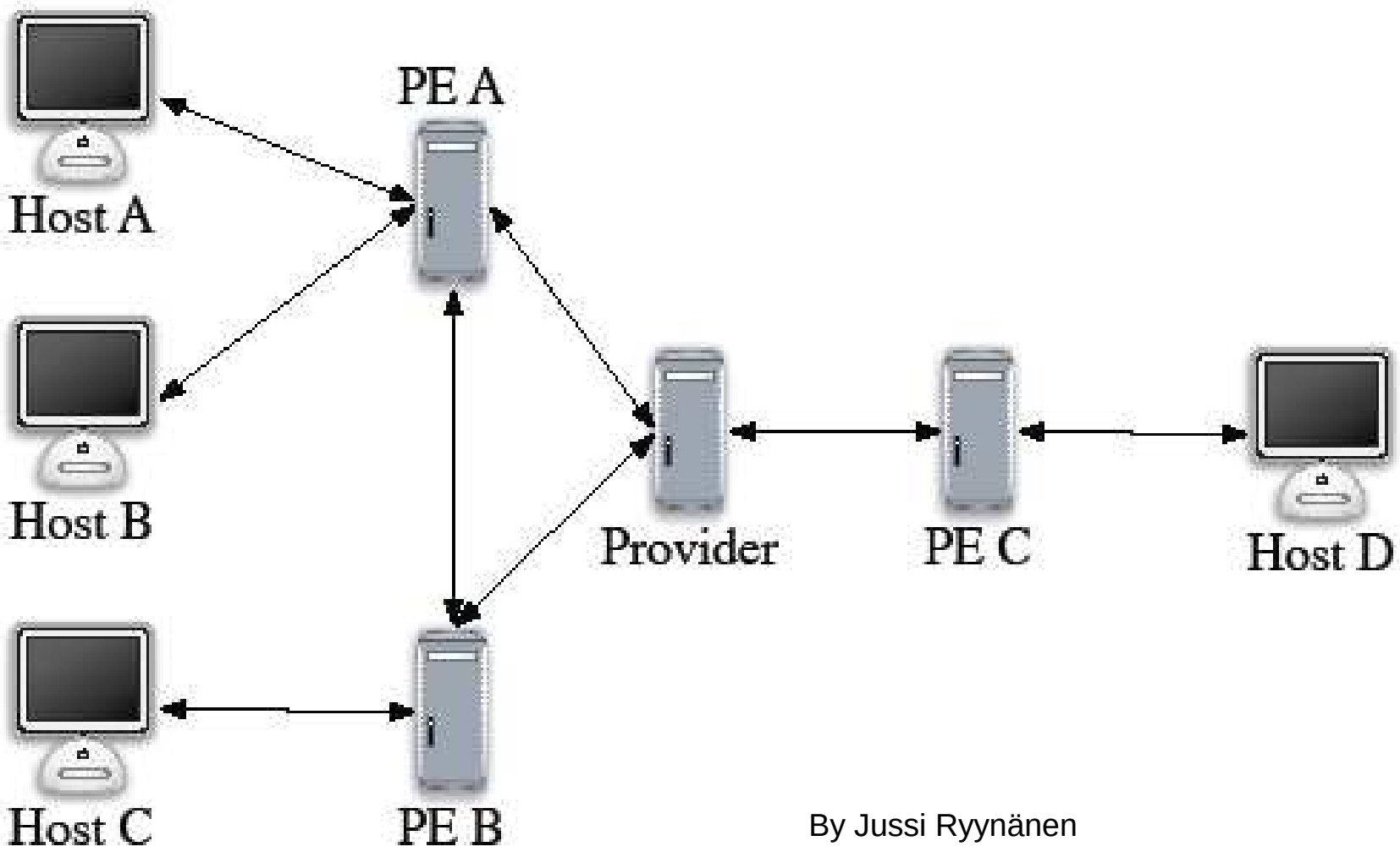
Demo set-up



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Next FI step

- IS-IS extension for Ethernet Transport Routing
  - MSc thesis: specification
  - Next: implementation

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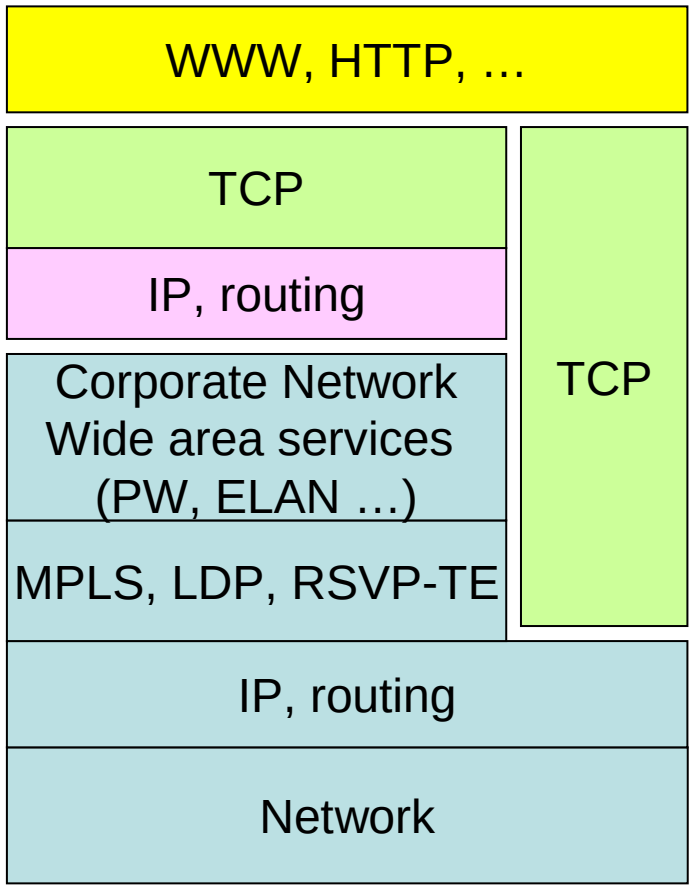
Current IP/RE comparison

Today

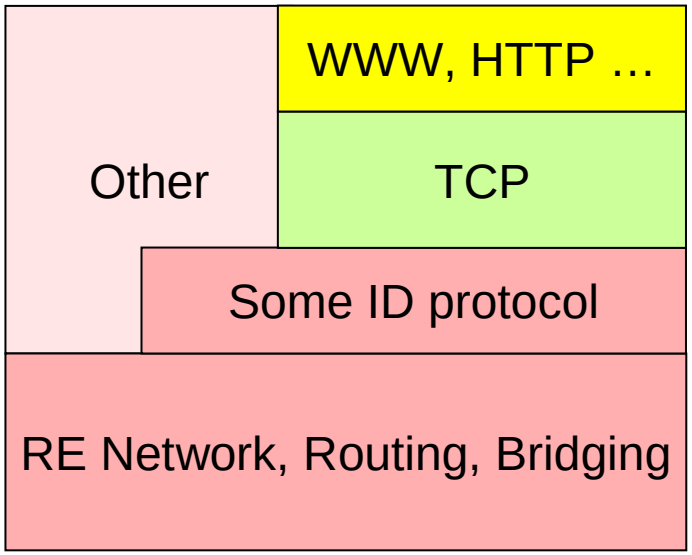
IP + MPLS + VPN



Future

RE2EE

Routed End-to-End Ethernet



What is needed?

- Mission Statement: Future Internet Research

  *Enhance the Internet technology and ecology as a platform for **innovation** while providing strong **governance over** the use of the network resources and information in such a way that especially **mobile use** of the network and its services will be natively supported.*

- My Solution:
  - IP over everything → encapsulation/ decapsulation on admin boundaries
  - Transparent network → network as a black box
  - Routing + DNS → Registration of devices + Routing + Caching + Several parallel Name to Address resolution services for different trust levels