Support for Multi-Homing and Robust Delivery Services Within MobilityFirst Future Internet Architecture

Chunhui Zhang*, Kai Su, Kiran Nagaraja, Guanling Chen*, Samuel Nelson, Ivan Seskar, Dipankar Raychaudhuri

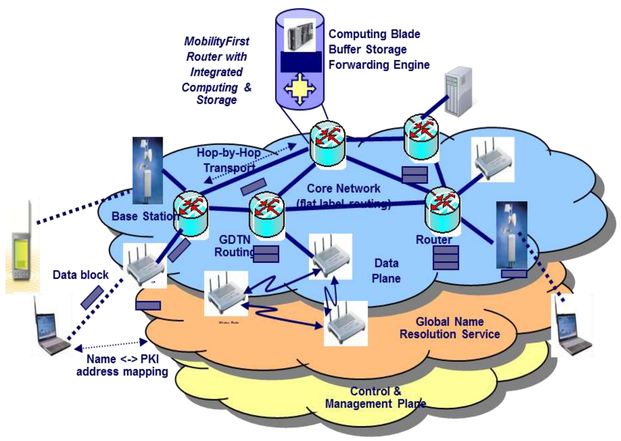
UMASS LOWELL * RUTGERS WINLAB | Wireless Information Network Laboratory

Introduction

Historic shift from PC's to mobile computing and embedded devices
•~4 B Cell phones vs. ~1 B PC's in 2010

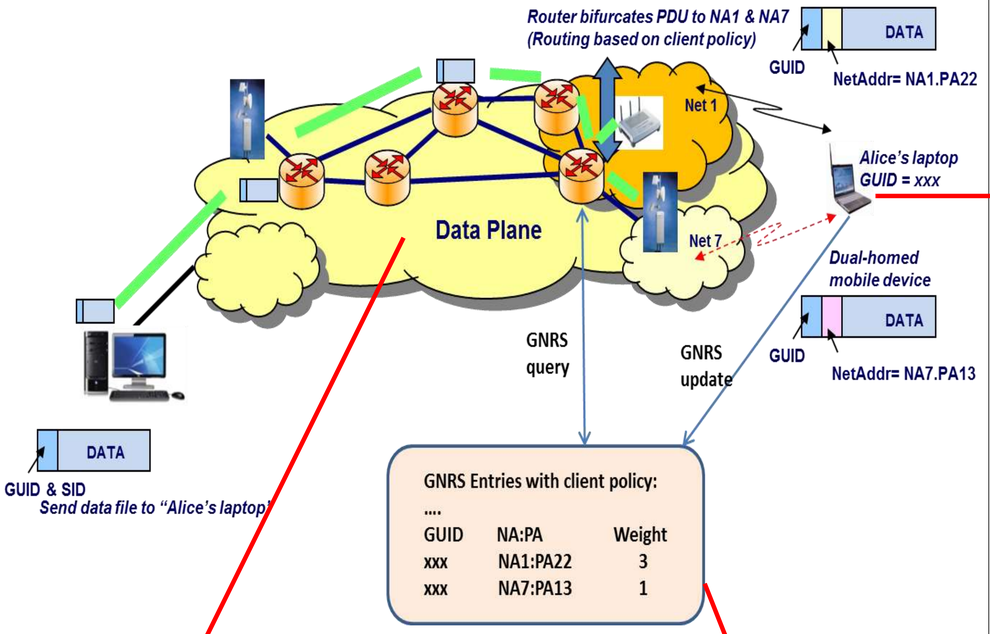
MobilityFirst Arch designed to meet emerging mobile/wireless service requirements at scale (Very distinct from today's TCP/IP)

- Separation of naming and addressing
- Storage-ware routing
- Hop-by-hop link level data transfer
- Client multi-homing support



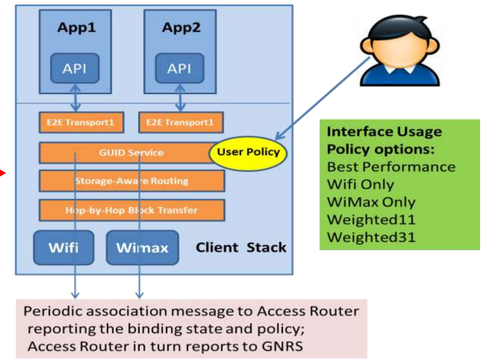
Demo Scenario

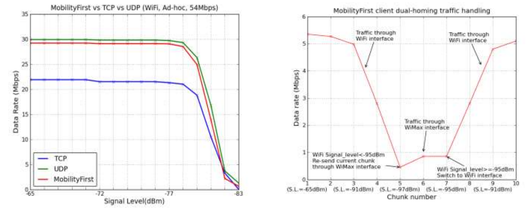
Reliable Delivery Services to Multi-Homed Host
- Storage aware routing - exploits in network storage and adapts across wired, wireless and DTN-type networks
- Multi-homing support – (receiver)weighted routing to multiple endpoints



Mobility-Oriented Host Stack

Android/Linux MF Protocol Stack
•Network API
•Hop Protocol
•Dual homing (Wifi/WiMAX)
•Interface Usage Policy

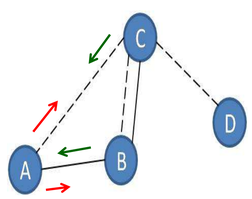




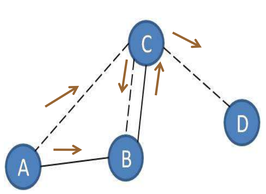
- One-hop performance comparison with TCP
- Best Performance policy with Wifi&WiMAX

Storage Aware Routing

- Up-to-date connection state of nodes in the partition
- Computed by exchanging the following messages:

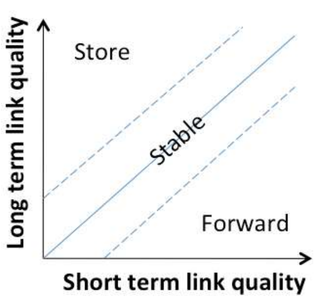


- - link probe(→)
- - ACK (⇢)
SETT=short term transmission time
LETT=long term transmission time = mean of SETTs



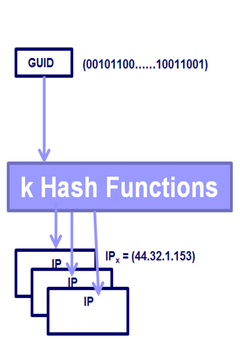
Node A floods link quality estimates of its neighbors

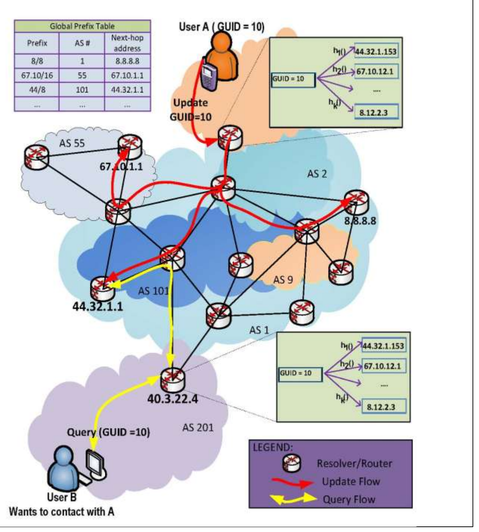
- For intra-partition graph,
  if (LETT of path > 1.1 * SETT of path)
    -Store the message
  else
    -Forward



Global Name Resolution Service

- GUID is mapped to address space using consistent hashing function following algorithm 1
- The <GUID-Address> mapping is then stored by the organization that announces chunk of address containing the hash result.
- Every mapping is replicated at K random locations
- Requesters select the closest mapping





SWINLAB@UML & WINLAB@Rutgers