New Applications via Opportunistic Peer-to-Peer Wireless Communications

Lixia Zhang
UCLA
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Smartphones play a big role in our digital life today

♢ Yet they largely remain as sensing/display tool that communicate with/largely rely on servers in the cloud

♢ Direct D2D communication will
  o (not limited to direct neighbors but multihop, ad hoc)
  o Reduce network load and reliance on cloud
    ▶ Good for energy saving, privacy preserving
  o Potentially much higher bandwidth/shorter delay
  o Enable smartphones to do a lot more
Why not much direct D2D comm. yet

♦ Physically phones can reach each other directly

♦ Logically it is difficult if not impossible
  o Specific technologies exist for one-hop D2D
    ▶ Not easy to use/available by default in general across products of different vendors
  o Most apps run over TCP/IP stack – can’t communicate w/o getting IP address or knowing other ends’ IP address
  o Do not utilize all available interfaces of multihomed hosts
  o Security is a BIG concern
Enabling D2D, multihop comm.

◊ NDN uses application data names to communicate → phones running the same apps can exchange data w/o IP address

◊ NDN secures data directly, enabling a receiver to authenticate all incoming data before accepting it
Remaining issues to be addressed

◊ Pervasive, usable security to enable everyone getting crypto protection without crypto training

◊ new energy efficient communication solutions

◊ efficient information discovery to enable one fetch desired data from the nearest available copy

◊ (your questions go here)
Initial results/ongoing work

◊ NDN running on Android

https://github.com/named-data-mobile/NFD-android

○ done a few demo apps

▷ Simple game
  – https://github.com/dchimeraan/ndn-hangman

▷ NDN Whiteboard
  – https://github.com/sumitgouthaman/NDNWhiteboard

▷ Photo sharing app
  – https://github.com/ohnonoho/photoSharing

◊ The work is at its beginning

◊ Making progressing on mobility solutions