New Applications via Opportunistic Peer-to-Peer Wireless Communications

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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
  o 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