

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
 - (not limited to direct neighbors but multihop, ad hoc)
 - Reduce network load and reliance on cloud
 - ▷ Good for energy saving, privacy preserving
 - Potentially much higher bandwidth/shorter delay
 - 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
 - Specific technologies exist for one-hop D2D
 - Not easy to use/available by default in general across products of different vendors
 - Most apps run over TCP/IP stack – can't communicate w/o getting IP address or knowing other ends' IP address
 - Do not utilize all available interfaces of multihomed hosts
 - 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