Fighting packet storms in mobile networks with information-centrism

Vaggelis G. Douros, Nikos Fotiou, George C. Polyzos
Mobile Multimedia Laboratory
Athens University of Economics and Business
The problem

• More than one third of the Internet users connect mostly through a smartphone
  – ... but smartphone applications are not mobile network-friendly

• Smartphones generate significant signaling traffic
  “Signaling traffic consists of the small background messages exchanged between a handset and a network to set up or end a data connection”

• Signaling load is increased up to 20 times when services are “down”
Is it serious?

• 2012: DoCoMo outage due to android, 2.5m subscribers affected

• Verizon Wireless suffered from similar problems
An example
Signaling

- Each polling period:
  - MN->BS
  - BS->Server
  - Server->BS
  - BS->MN
Signaling with ICN v1

• Initially:
  – \textbf{MN->BS}

• Every polling period
  – BS->Server
  – Server->BS

• If there is an update
  – \textbf{BS->MN}
  – \textbf{MN->BS}
  – BS->Server
  – Server->BS
  – \textbf{BS->MN}
Signaling with ICN v2

• Initially:
  – MN->BS

• Every polling period
  – BS->Server
  – Server->BS

• If there is an update
  – BS->MN
Some analytical results

- Let $N$ be the number of polling periods
- Let $M$ be the times there is an update
- Number of messages in the access network
  - Usual case: $2N$
  - ICN v1: $3M$
  - ICN v2: $M$
- If $M = 0.4N$
  - ICNv1 40% improvement
  - ICNv2 80% improvement
Future Steps

• Modifications of applications
• Mobile access network becomes aware of the application layer
• Security concerns
Thank you