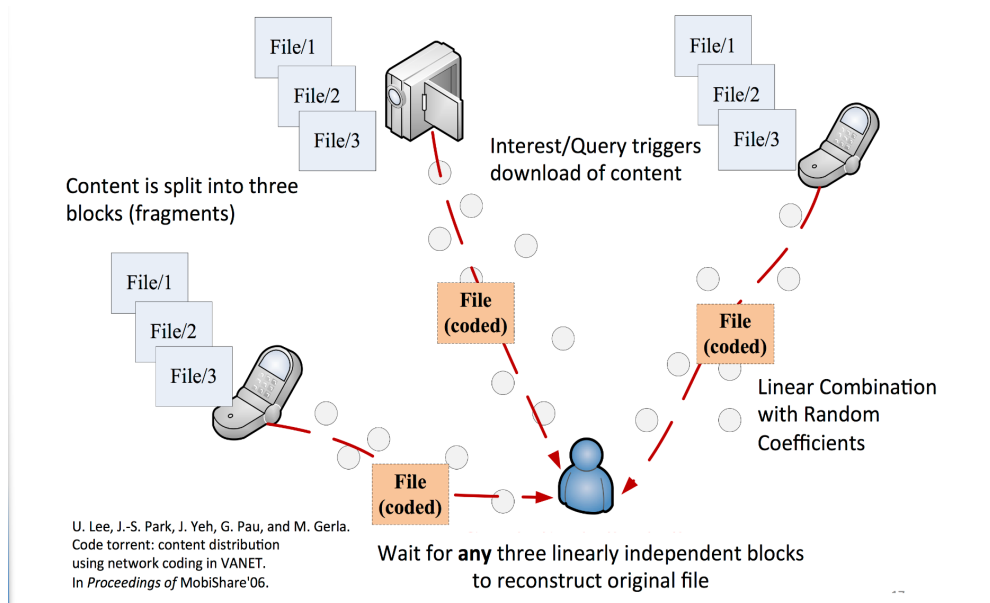


Content Network Coding on Androids: Energy Considerations

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Oliver Stehr SRI
(DARPA CBMEN project)

Content Based Network Coding in CBMEN (DARPA) Project

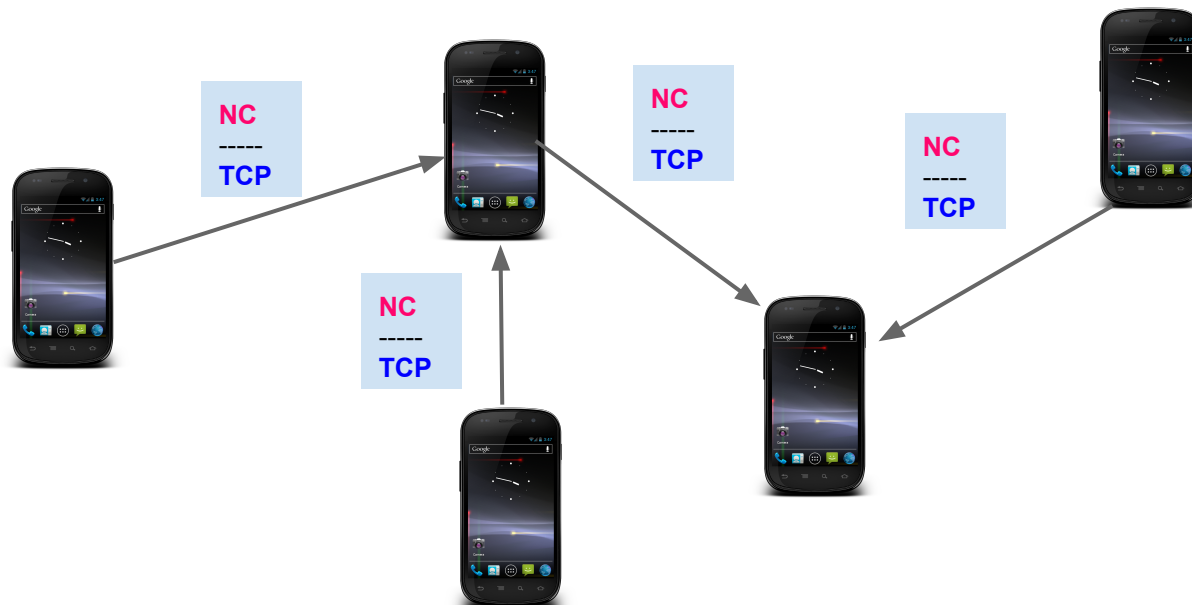
- Network coding helps content based MANETs (as in CBMEN)
 - Multiple cache downloads from mobiles



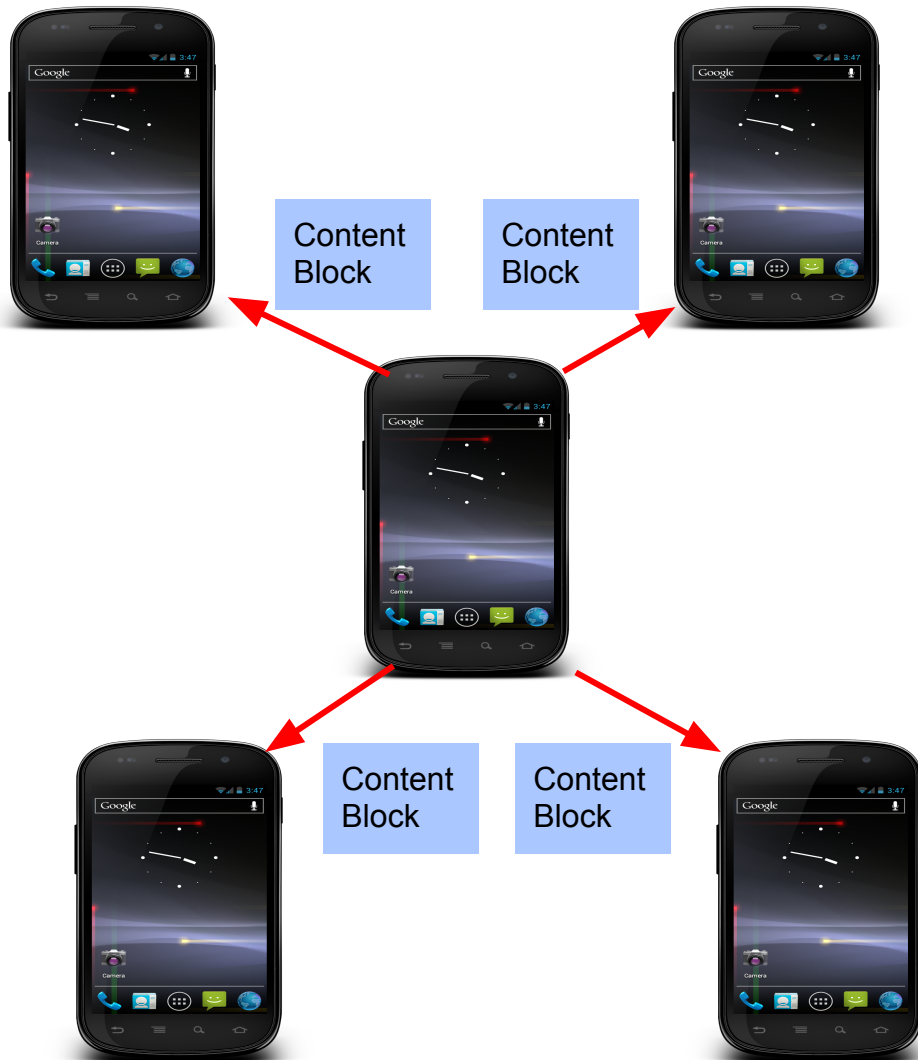
- However, coding exacts a stiff energy price (cpu, transmission) on mobile platforms

CBMEN Encounters Approach

- To reduce NC energy price, we increase coded block size
 - 32KB rather than packet size = 1024B
- We run TCP under NC to mitigate the effect of packet losses with the 32KB block



CBMEN Energy Experiment



Central publisher; four subscribers

- 5 Android Nexus S phones
- 1 Publisher, 4 Subscribers
- Display is always on
- Experiment stops when publisher runs out of POWER

Energy Results

- 1 Publisher, 4 Subscriber

Description	Lifetime	DataObjects Received
Baseline (idle - no network coding, no fragmentation, no dataobject transfer)	4 hours 20 minutes	n/a
No Coding (32768 bytes)	3 hours 18 minutes	1542
Network Coding (32771 bytes)	3 hours 5 minutes	1692

Network Coding slightly lower battery lifetime though **more DataObjects delivered**

Ratio No Coding to Coding Block Size	0.999
Ratio No Coding to Coding Battery Lifetime	0.934

3 bytes coding overhead. Thus, **majority energy loss due to cpu**, not transmission

In progress work

- Comparisons of TCP, UDP Unicast, UDP Broadcast (in progress, waiting for publication)
- Mobility results using CORE/EMANE
- Over the air mobility results using Android Nexus S phones
- Content and context aware (CANCO) network coding