The Socialization of Tiered Networks

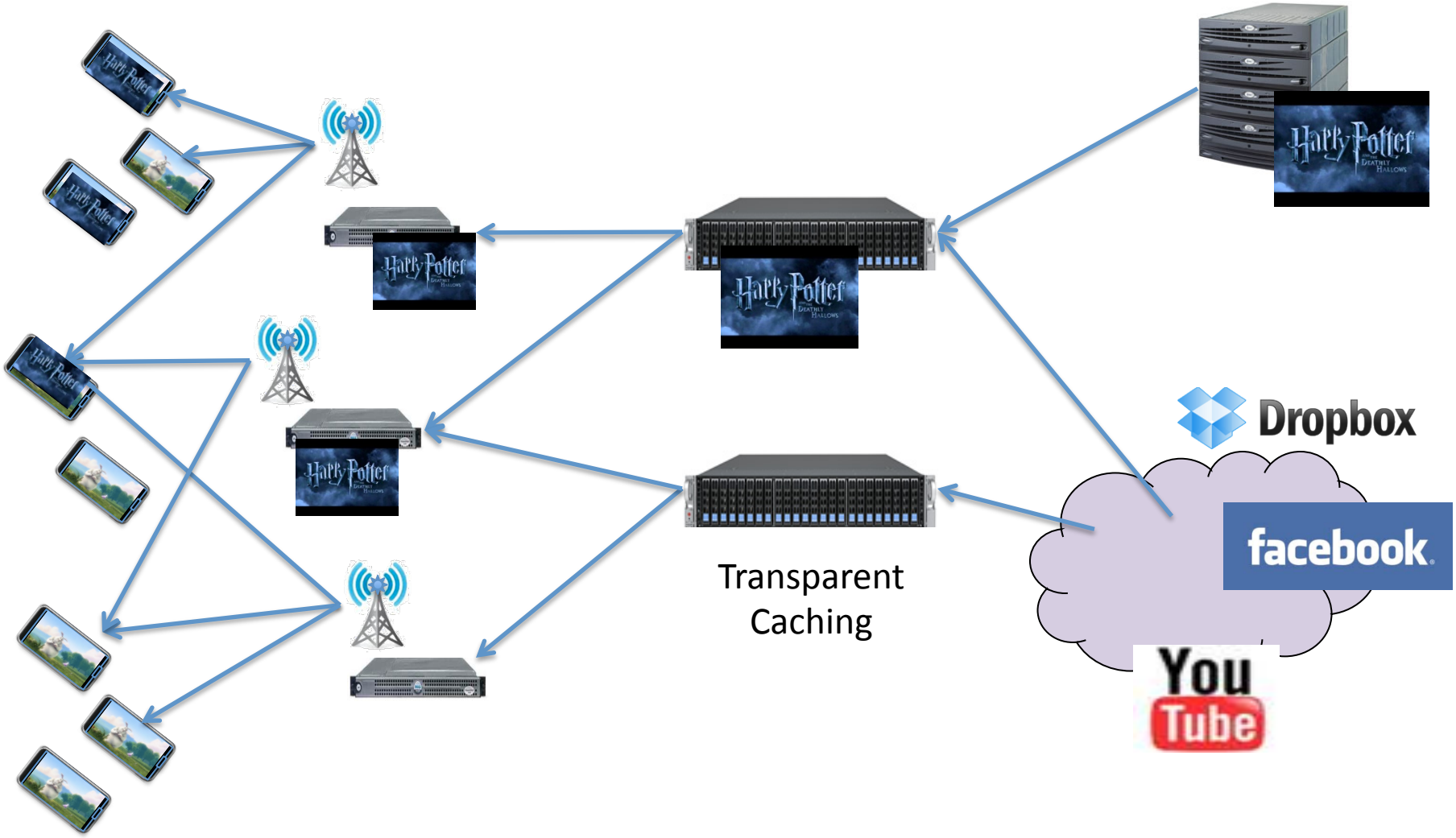
Michael Kilian

Visiting Scientist

mfkilian@mfkconsulting.com

Agenda

- Tiered Networks are de rigueur
- Network Coding to optimize transfer
  - Reduce power
  - Leverage Multi-source approaches
- Integrating Social Information
  - Location Information
  - Localized Information
  - Local “Friend” Information


Dropbox
facebook
You Tube
Transparent Caching

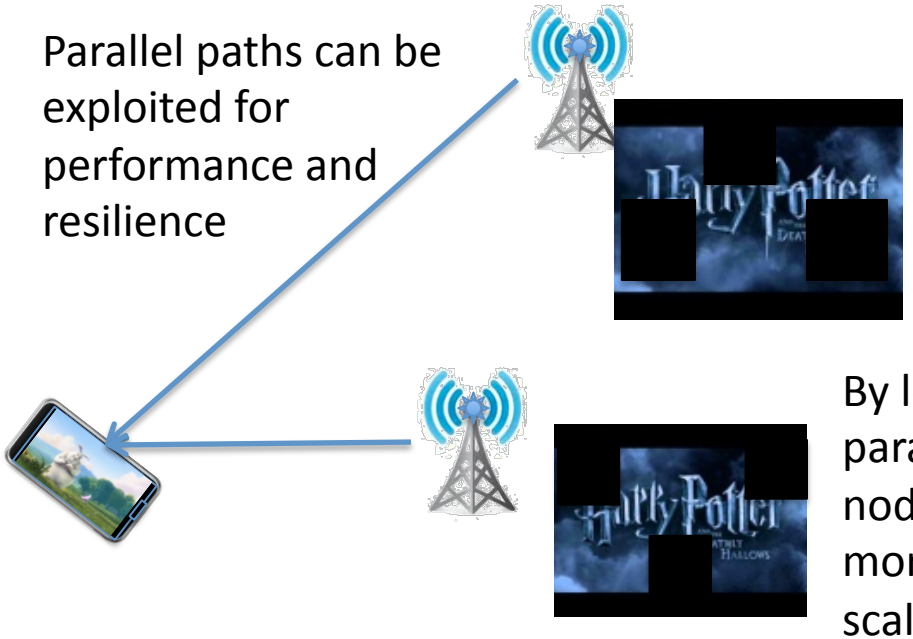
+/-

+ Reduce backhaul
+ Support multiple bandwidths
+ Better response (lower latency)

- Significant storage
- Significant cost to create bandwidth
- Unidirectional
- Lacking standards for multiplexing data

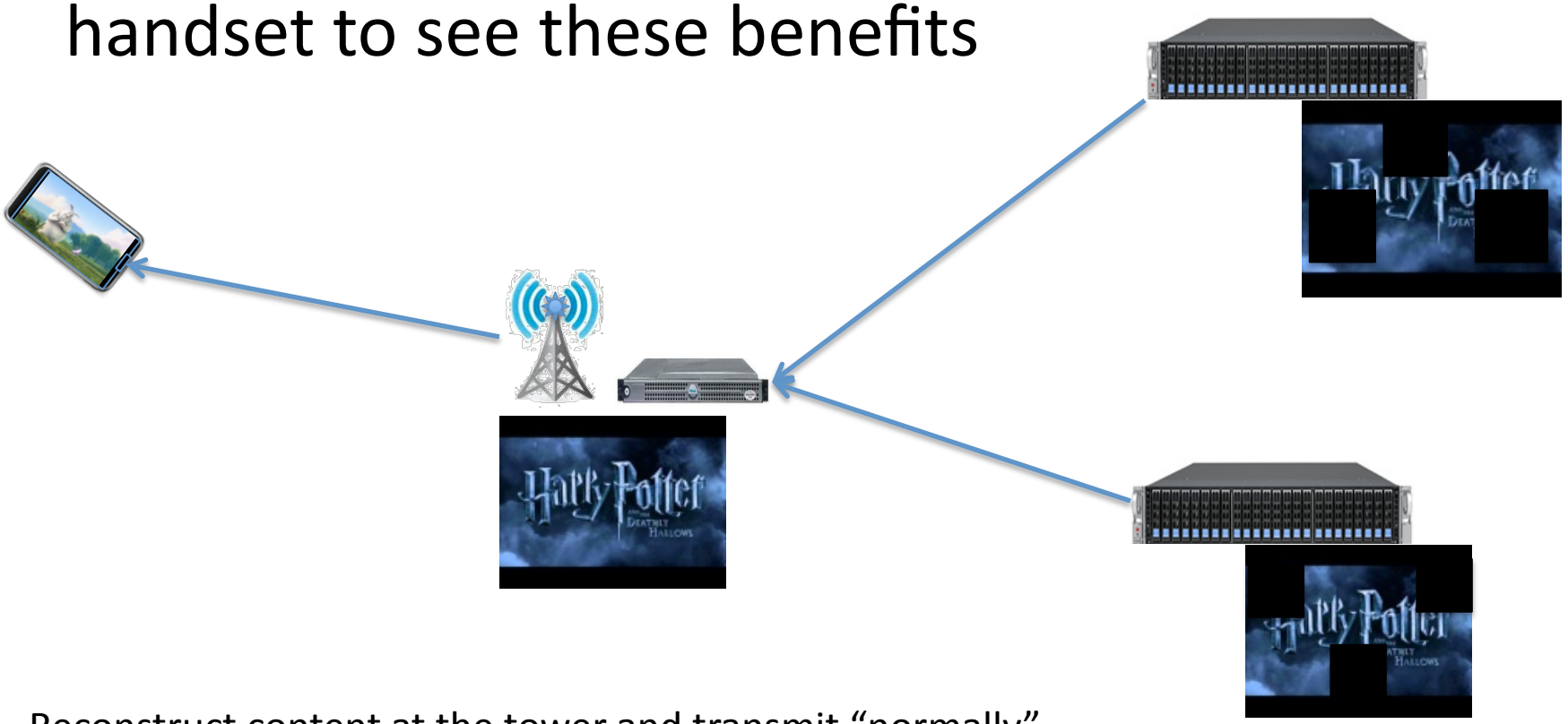
Network Coding

- Reduce the storage overhead
- Improve bandwidth
- Be more resilient to network failures



Network Coding

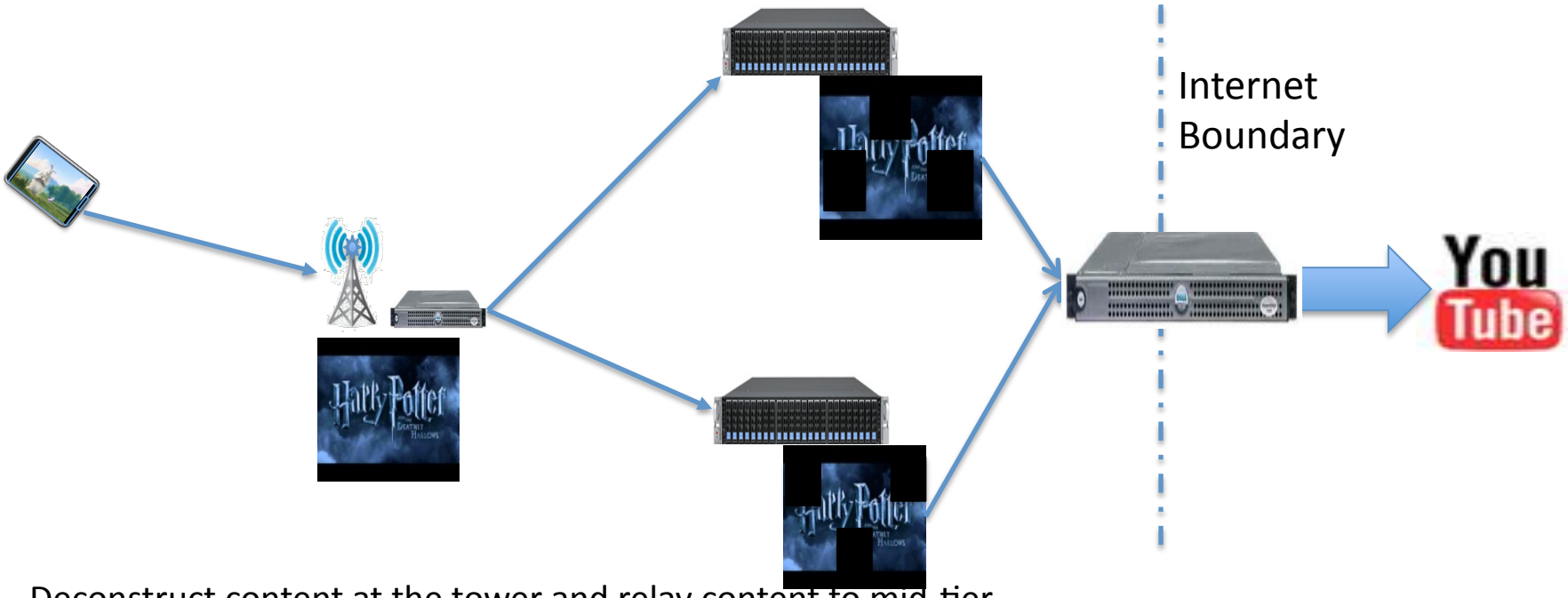
- It is not necessary to transfer in parallel to the handset to see these benefits



Reconstruct content at the tower and transmit “normally”
Improve backhaul distribution, reduce capacity at mid-tier.

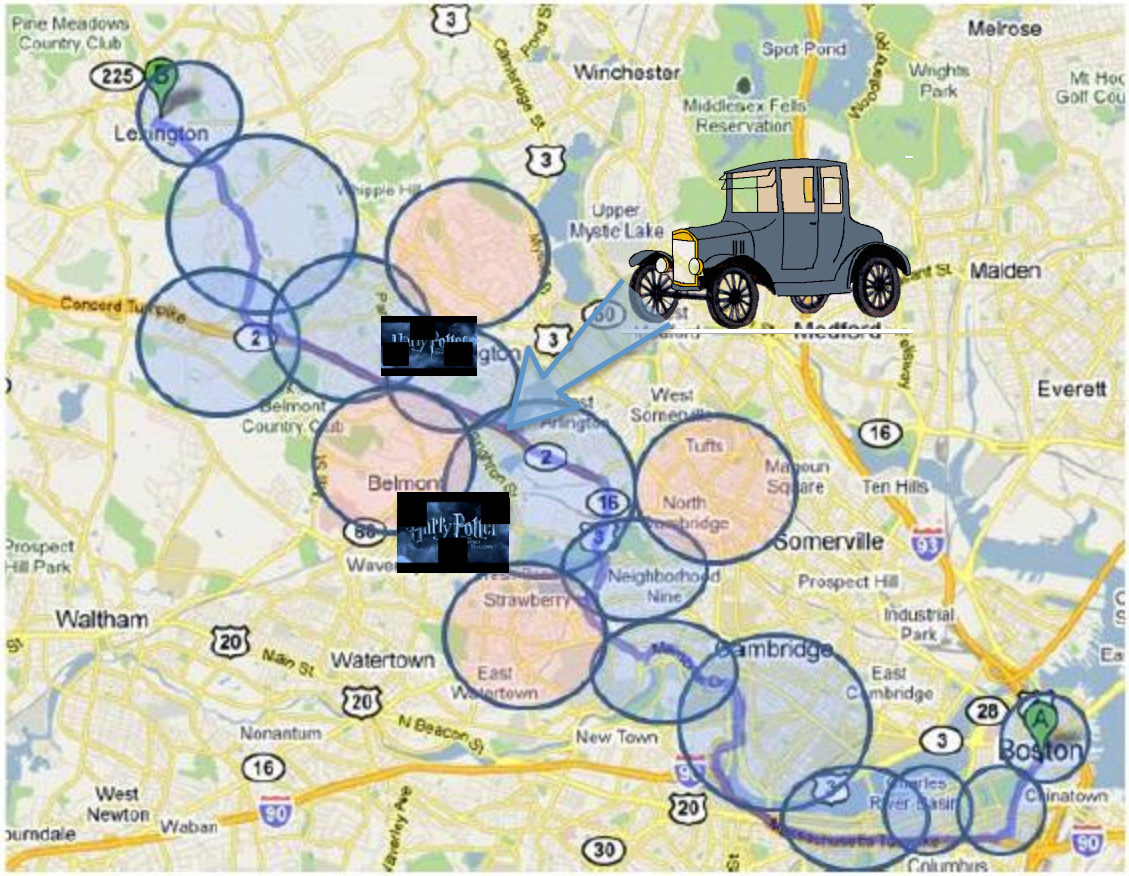
Network Coding

- Could this be bidirectional?



Deconstruct content at the tower and relay content to mid-tier,
Ultimately reconstructing at the origin

Leveraging Location Information



If I know where I am and where I am going then I should be able to anticipate where the content needs to be. It can be pre-staged at lower bandwidths.

Integration of GPS, location context, etc.

Leveraging Location Information

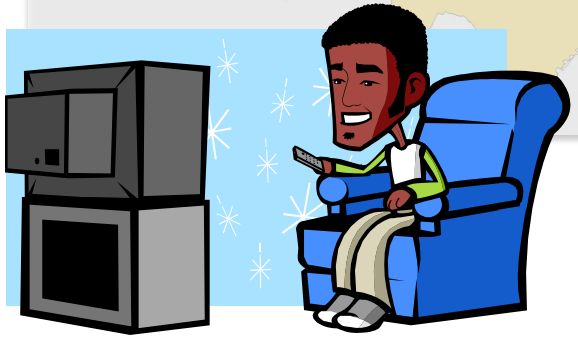
We know these sites are going to be congested. Can we change coding to enable more content to be delivered with less bandwidth? For example: Encode in more fragments to get better bandwidth distribution. Perhaps we should encode streaming content to lower bitrates at the caching point.

Service more users with the same amount of equipment

Putting Local Information Locally

Example: Insert an ad for the establishments around you…the ads can be geographically cached

Friends and Peering



Keep local information local while synchronizing it as necessary.

Example of such a Peering Network: Xbox Live for Call of Duty

Summary

- Tiered networks are becoming "Jacks or Better"
- Tiered networks can be made more efficient and intelligent
- Network coding, geographic sensitivity, bidirectional transit, application awareness
- Of these, perhaps bidirectional transit with coding is the most challenging