The Economics of Time Elasticity

A Case for a new mobile network service

Max Ott (Incoming Media & NICTA)
Yan Shvartzshnaider (University of Cambridge)

Mobile Internet - A Brief History

First there was 3G, underused, unlimited data plans, no worries ...

Then came the iPhone ...

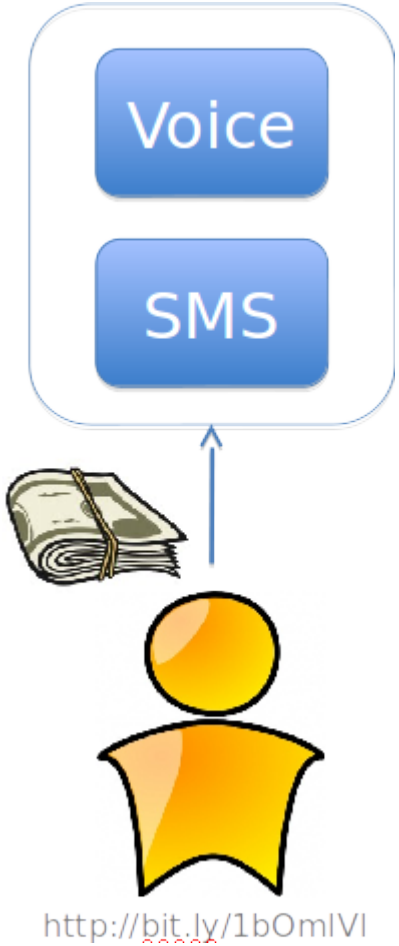
Panic!

Actors - Then

Carriers

- AT&T, Verizon

Users



Actors - Now

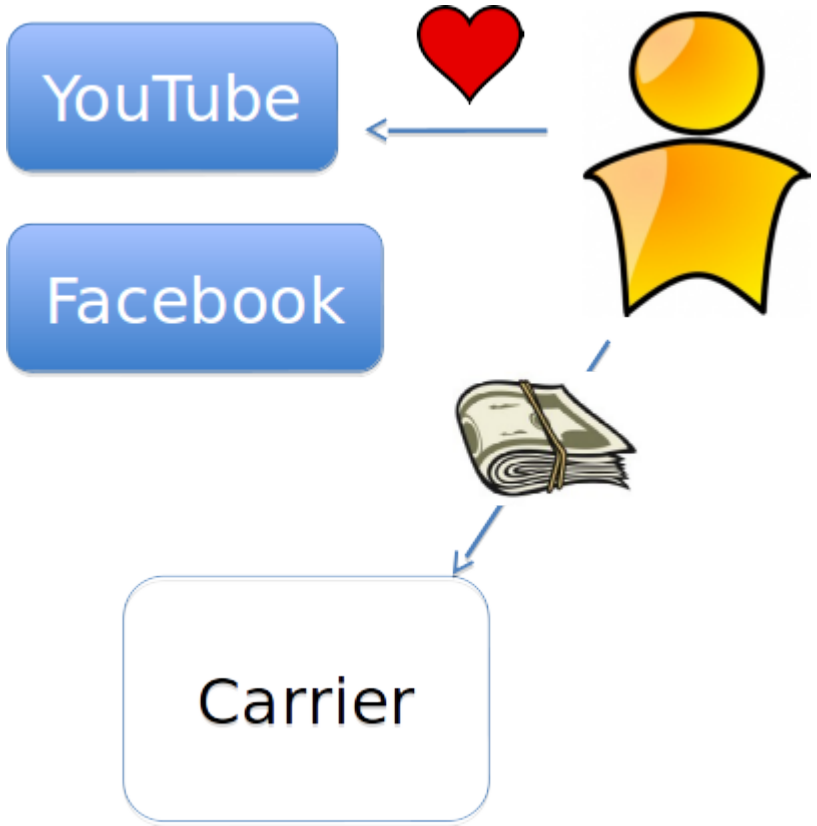
Carriers

AT&T, Verizon

Service providers

YouTube

Users



Should be Symbiotic Relationship

Great User Experience

⇨ increased Income

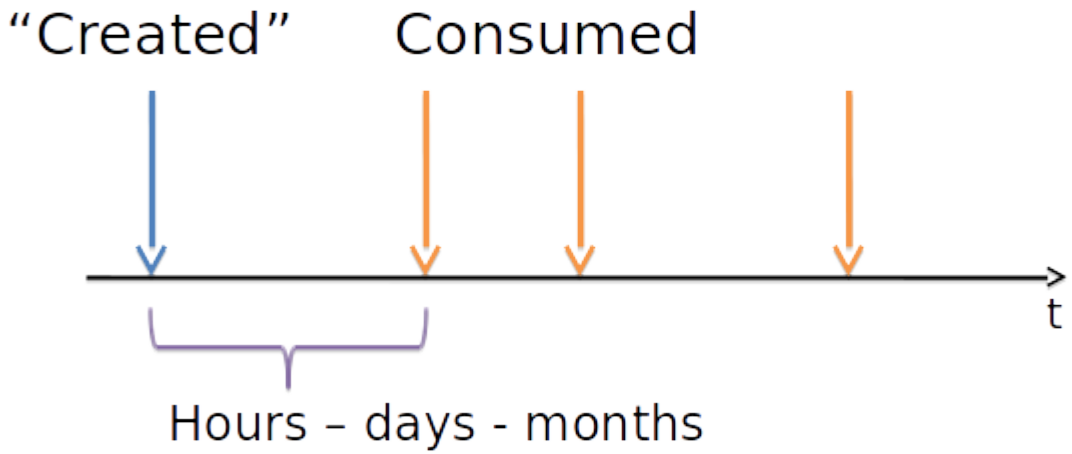
Great User Experience

⇨ requires great network

Service Providers need to incentivise carriers to help them maximise User Engagement

Mobile Data Usage

So what so special about video?

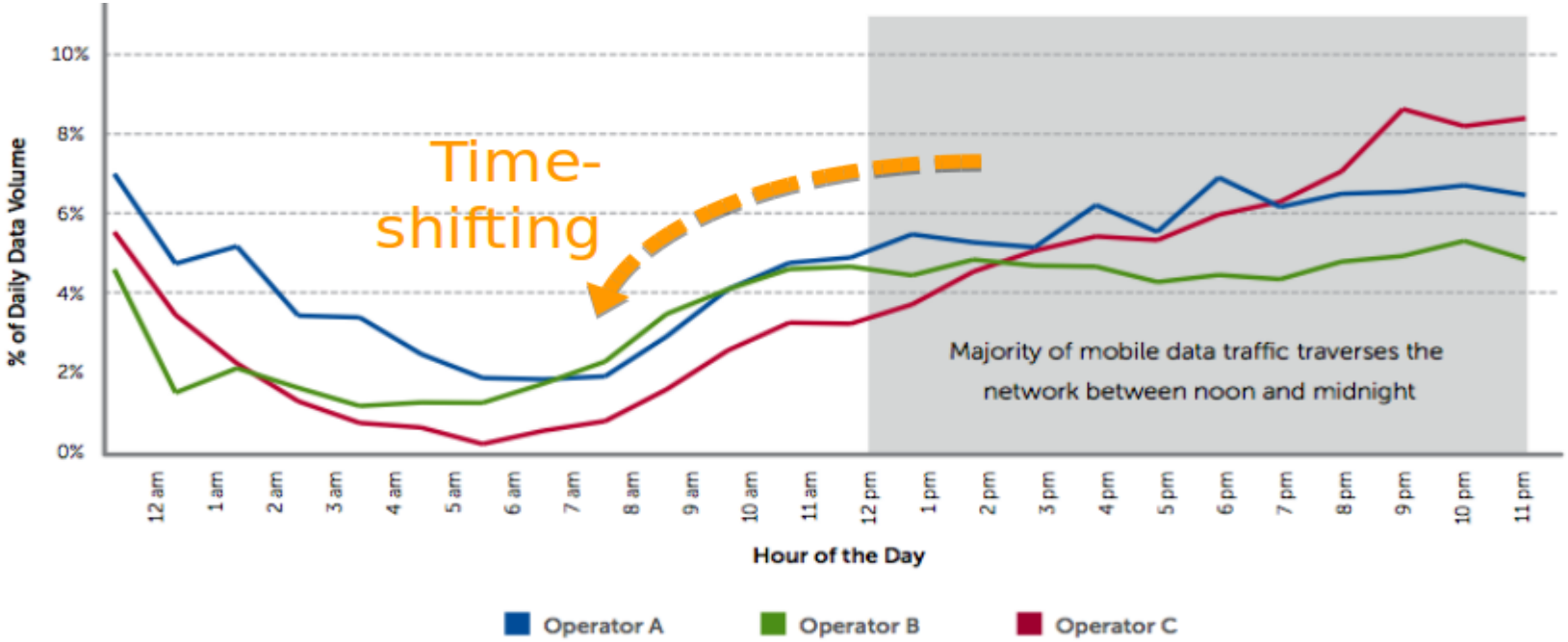


Cost of Delivering a Movie

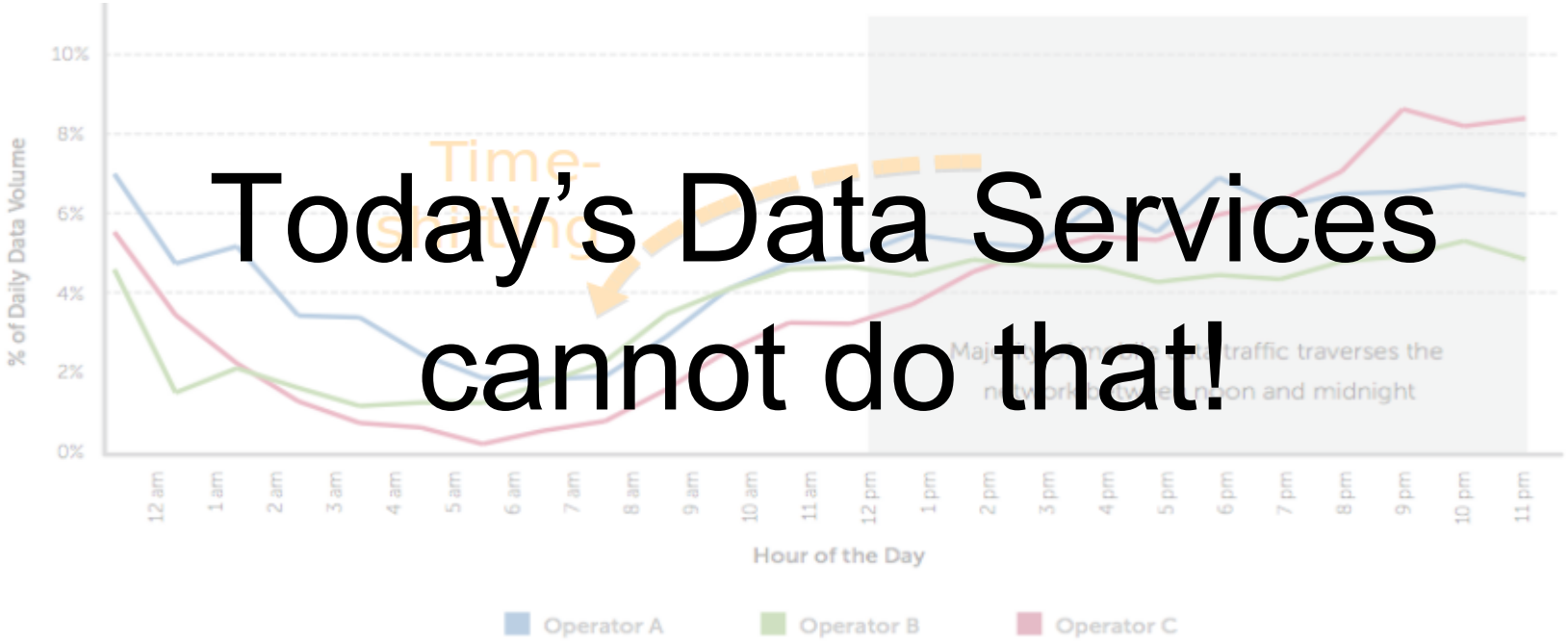
- Infrastructure (CapEx) & Operation (OpEx)
  - Dominated by Capex
  - Capex driven by PEAK demand
  - Leads to Congestion Pricing
- Cost varies greatly based on congestion – Orders of Magnitude!
  - Same for service providers (servers, connectivity)

Real delivery cost of a Bit
can vary by
Orders of Magnitude!

Reduce the Peaks - Fill the Valleys



Problem



Today's Data Services cannot do that!

Proposal: Content Logistic Service

- New content-centric network API
  - This is different to CCN proposals
- Smart distributed storage
  - This includes mobile device (terminals) - especially!!!
  - Opportunistic pre-positioning of content
- Less-than-best-effort traffic class
  - Only forward when there is nothing else to

Content-centric network API

- Declaration of intent
  - Probabilistic intent of future use
- Declaring meta-data
  - Prediction algorithms rely on discovering correlations
- Providing feedback
  - What was the final utility of retrieved content

Smart Distributed Storage

- Storage before bottleneck
  - backhaul network - basestation
  - access network - mobile
- Using meta-data and past behavior to predict:
  - what to store
  - when to move between storage
- Potentially building on IEEE 2200 (HQME)?

Smart Distributed Storage

Main Research Challenge!

backhaul network - basestation

access network - mobile

Using meta-data and past behavior to predict:

- what to store
- when to move between storage

Potentially building on IEEE 2200 (HQME)?

New Traffic Class

- Less-than-best-effort traffic class
  - Focus on keeping pipes full
- Using IP Header DiffServ Code Points (DSCP)?
  - Technology is there and deployed
  - May require new Traffic Management insights
  - Various large carriers are thinking about it
  - **Huge interest in exploiting LTE Broadcast**

Conclusion

- Operators need to embrace **Content Logistics** as a primary business objective
- It’s already happening
  - Telstra bought Ooyala
  - Commercial trials with top-tier operators
- Still plenty of open questions