Communications
Innovation
Institute

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What we want to do

- Infinite bandwidth for free
  - Low cost optical
  - Broadband wireless
  - Efficient, secure content
- What are the Technical, Policy, Economic barriers?
  - Fiber everywhere
  - Mesh wireless everywhere else
  - Eternity P2P storage everywhere and everywhere else

Fiber everywhere

- UK ought to be ideal
  - Have right demographics
  - Have duct infrastructure to most home/office
  - Have oldest EU deregulated telecom industry and gung ho free market loony government
  - Have world leading photonics research
- But it isnt just a technical or business case problem
  - Regulatory framework
    - currently, if incumbent deploys ftth for all, they have to allow access (as in ADSL) to all ISPs!
  - Maybe need to have govt. “own” fiber
    - And license spectrum on it? :-)
  - Not necessarily the solution, but just to give flavour

Mesh wireless everywhere else

- Information theory says mesh can have capacity increase as we add wireless users - panacea?
  - Not quite since there's a minimal tiling necessary, just to get connectivity
  - RF propagation is black magic.
  - There are quite a few multihop hybrid candidates just to start
  - Then there's the spectrum regulation
  - Then its cheap, but only when you ship 100s Millions of units
- 3 stage evolution
  - 1. Mixed access+spectrum license trading
  - 2. First 2/3 hop community nets for wider access
  - 3. Net coding and mesh starts to crystalize in some cities

Making Content owners Content with Content distribution and not contend with pirates

- P2p scales. It reduces cost of ownership
  - Can be used for storage and computation (c.f. Eternity and Xenoservers)
  - For commercial (netflix) and Domestic (backup) storage
  - For commercial (derivative) and domestic (halflife) computation
- Need secure auditable story on revenue stream!
  - Licenses havn't scaled
  - Trusted computing hasn't delivered
  - Subscription/radio/podcast play models (for CPU/OS/App?)

Picking just one interesting tech problem

- How to provision for p2p?
  - Need source model (e.g. download/upload arrival process statistics)
    - Can measure this by joining
  - Need traffic "matrix" (and over time)
    - Getting hard to measure with torrents, network codes and chaum mixes going on
- Some very large content outfits would like to use this
  - Warner for example
- Could also then design p2p solutions for other problems
  - DNS replacement for example

Some other mad stuff

- Opportunistic networking (a.k.a Haggle)
  - Sits somewhere between MANET and DTN
  - Use mobile objects to ferry packets (a.k.a. pocket switched networking)
- Experiments:
  - Have tried at Infocom (application was to distribute IP addresses via bluetooth and motes/phones to people when DHCP service was broken:-)
  - Have tried using envelopes
    - Imagine if all the letters in the post could carry packets too

Really interesting mad stuff…

- Mixed reality networks - one e.g.
- All cars have WiFi (mimo and steerable antennae)
- All cars have cameras (and other sensors)
- Can “fly through” a route to
  - Familiarise yourself with how it looks to drive
  - Check out live traffic situation
  - Rescue people can check out how to reach accident
  - History can be record of problem causes:-(
- Billing and speed control
  - Eg. Via tamper proof box & insurance discount (no privacy problem)

CII is Ideas shop

- Like innovation workbench, we have skills along the chain
  - From different departments
  - From industry, regulator, government
  - You can play too….
  - Please do!