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SPECTRUM MARKETS: POLICYMAKERS AND TECHNOLOGISTS

what will matter in spectrum markets?

- applications
- architecture
- interference
- control
- economics ...
- legal stuff ...

convergence



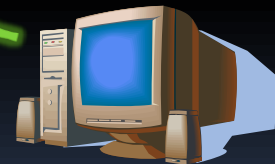
Telephone network



Cell phone networks



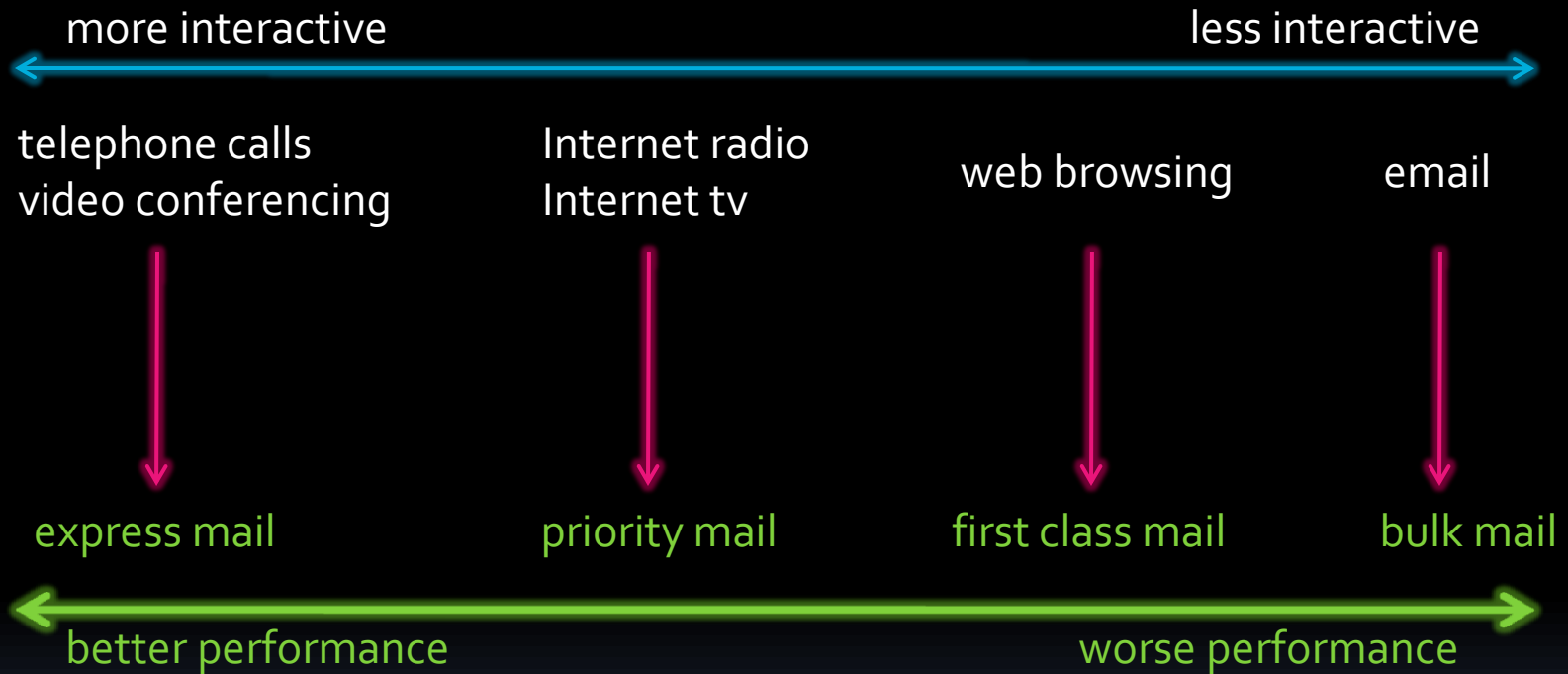
Cable tv networks



Internet



matching QoS to application



network architecture matters

- a variety of apps, thus packet switching
- capacity
 - architecture determines “capacity” or “achievable region” !
 - use doesn’t always sum linearly ! (“statistical multiplexing”)
 - sharing between service providers?
- QoS:
 - age-old tension between reserved resources vs. sharing
 - cost of QoS? (opportunity cost)
- architecture + econ + law

interference

- architecture approach: limit interference
 - impact of interference on other users? other apps?
 - how to describe the “limit”?
 - implemented through architecture?
- economics approach: charge for externality
 - impact of interference on other users? other apps?
 - determined by architecture?
 - determined by economics?
 - cost of interference?
- architecture + econ + law

control

Lots of work on this



- time scale

- power, bandwidth allocation, e.g. every 0.001 second
- rate allocation, e.g. every 0.1 second
- access, e.g. every 1 second
- secondary market, e.g. every ?? seconds

- user versus ISP control over device

- over apps?
- over app behavior?
- over QoS?

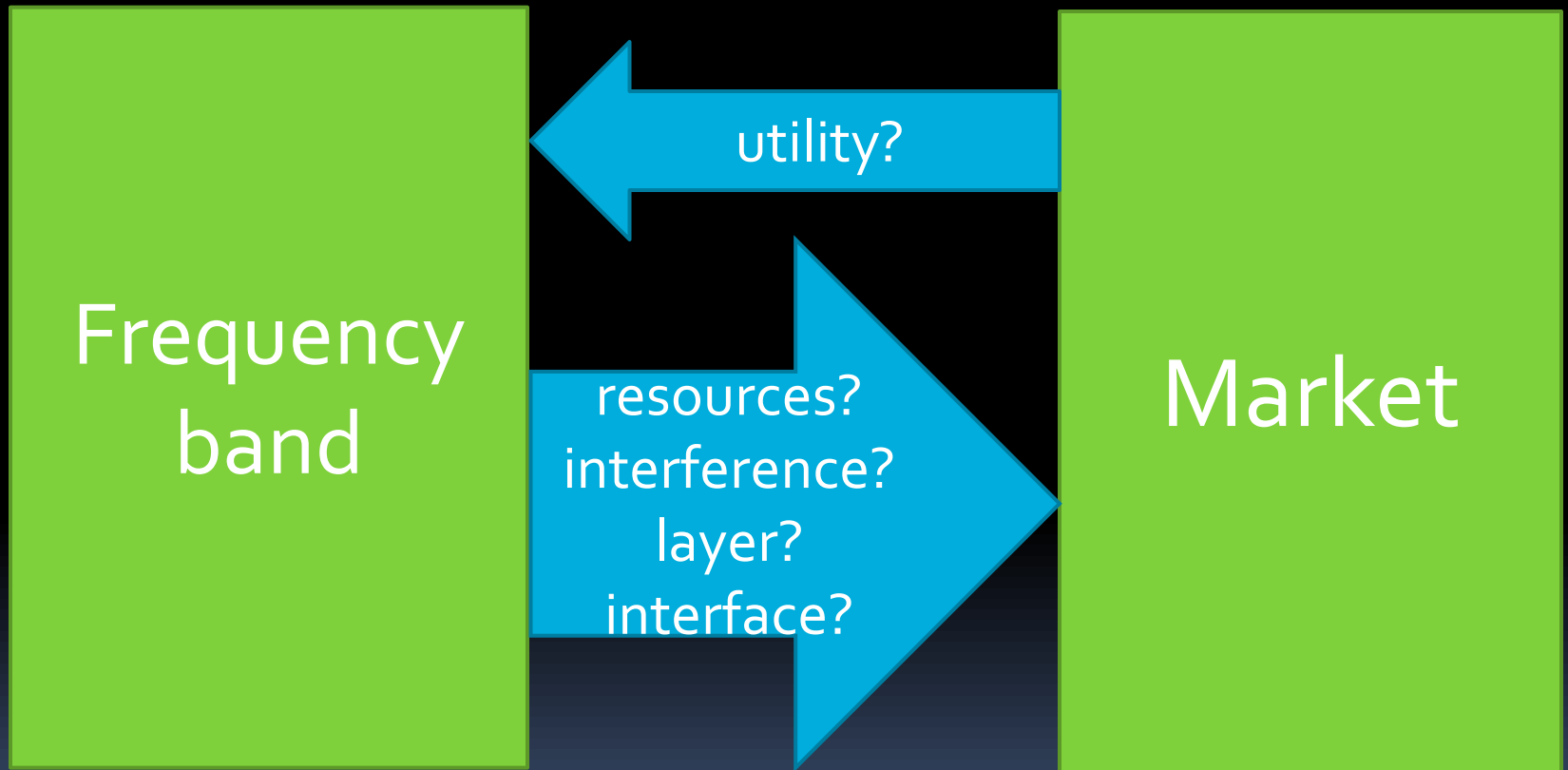
economics matters

- auctions
 - what to auction?
 - partly determined by architecture
 - interference
 - time scale?
 - usage?
- econ + architecture + law

legal stuff ...

- property rights, public interest
 - objective?
 - utility?
 - revenue?
 - innovation?
- legal terms
 - demarcation point?
 - harm?
 - interconnection?
- how to extend from past systems?
- law + econ + architecture

Frequency as a black box?



markets: sell what?

