Market Managed Multiservice Internet

M3I

Controlling Internet Quality with Price

Market Managed Multiservice Internet

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end-to-end principle

- ***change is the only constant***

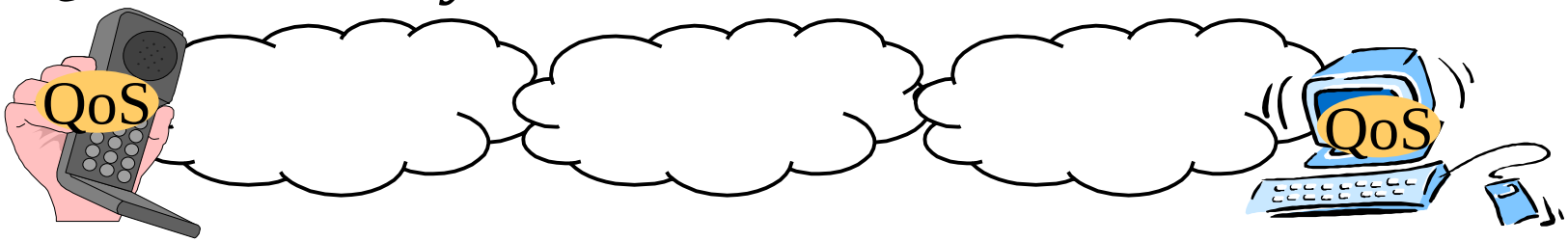
- ***for application flexibility in general purpose systems (e.g. Internet)***
  - lower layers: extremely ***general*** capabilities
  - move ***specific*** capabilities up and out

- ***define "specific" and "general"?***
  - 1973: ***connection*** too specific for network → synthesise at ends
  - 1993: Web: IP ✔ ATM ✘
  - 1999: pricing and charging: definitely too specific for IP
  - 2001: ***quality of the service (QoS)*** itself...?
  - 2005?, 2020?

not to be confused with...

- ***end-to-end QoS means...***

✔ ***QoS created by the ends***



✘ ***not just QoS everywhere along the path***

✘ integrated services (intserv),
✘ differentiated services (diffserv)
✔ ECN...

ECN?

- ***explicit congestion notification***
  - per packet QoS
- ***what?***
  - new single bit in IP packet header
  - IETF Proposed Standard (imminent)
- ***how?***
  - middle
    - congested routers randomly mark packets (rather than drop)
    - more congestion → more marks
  - ends
    - more marks → slower rate ***or...***

trust?

- ***end-to-end principle***
  - implies ***trust*** the ends to co-operate
- ***but if ends control their own QoS***
  - incentive required...
- ***...price per congestion mark***
  - more marks → slower rate ***or...***

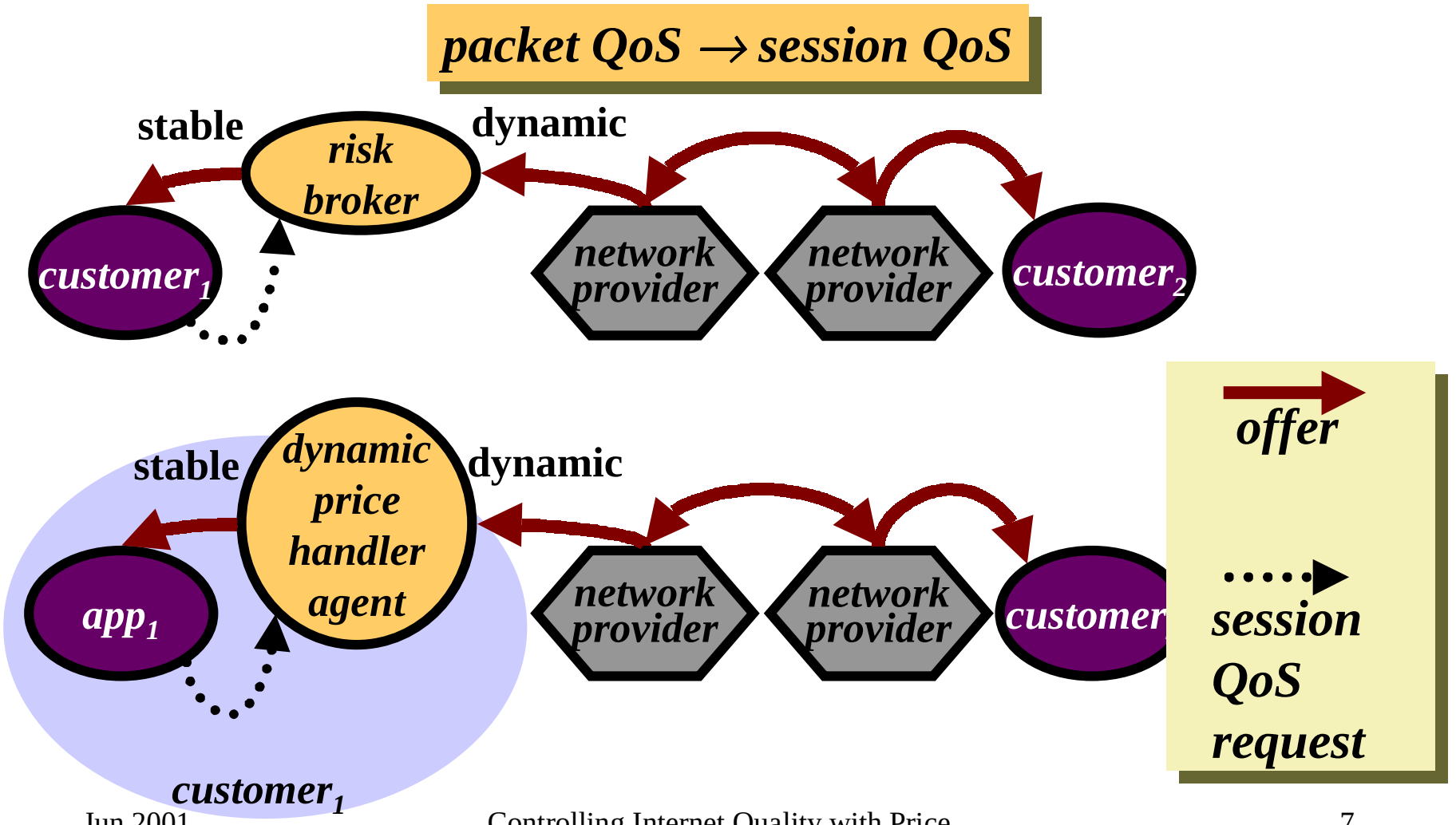
...same rate at higher cost

- choice → customer control

congestion avoidance pricing

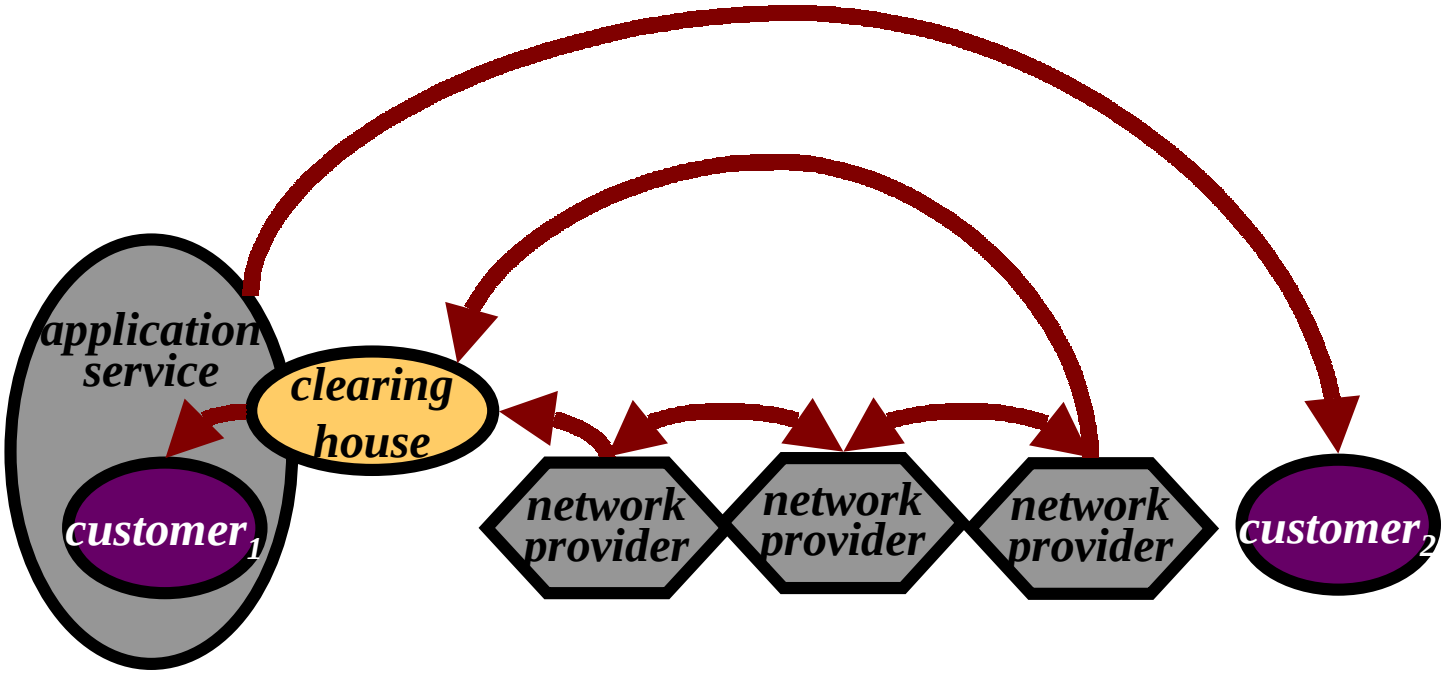
- ***economically optimal***
  - ends: correct incentives
  - middle: revenue naturally fills capacity shortages
- but…
  - …can we synthesise flexible commercial models?...
    …that fit all the desires of providers and customers?
  - …is it practical?
  - ...even if it is, will network operators offer it?
    - prediction: Yes, but only once Balkanisation of the Internet has failed (2006?)

minimise then synthesise



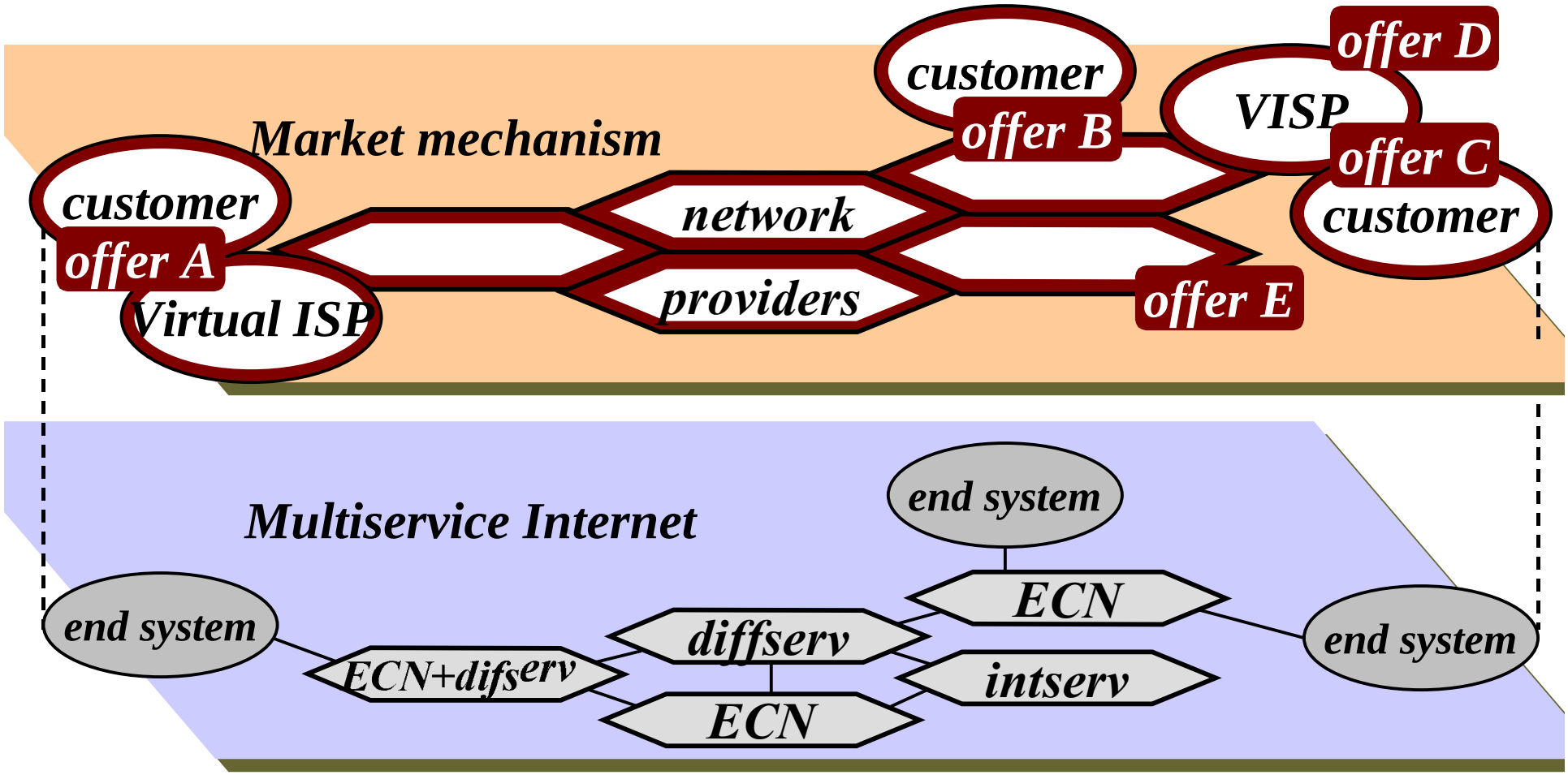
minimise then synthesise

half circuit QoS → end-to-end QoS



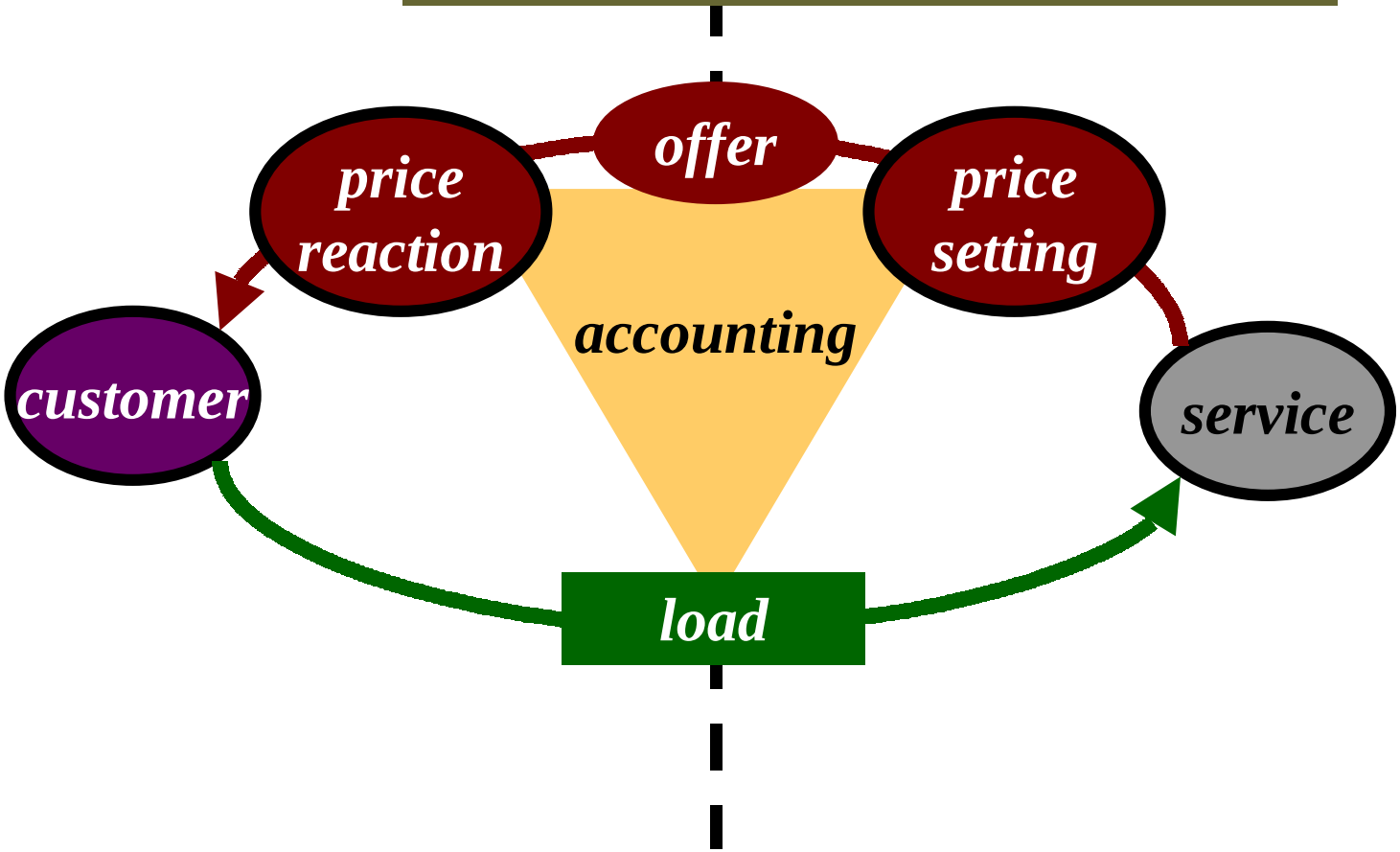
offer

what do I need?



market mechanism

at each customer/provider interface



implications

- ***network operators sell basic network service***
- ***customer creates quality!***

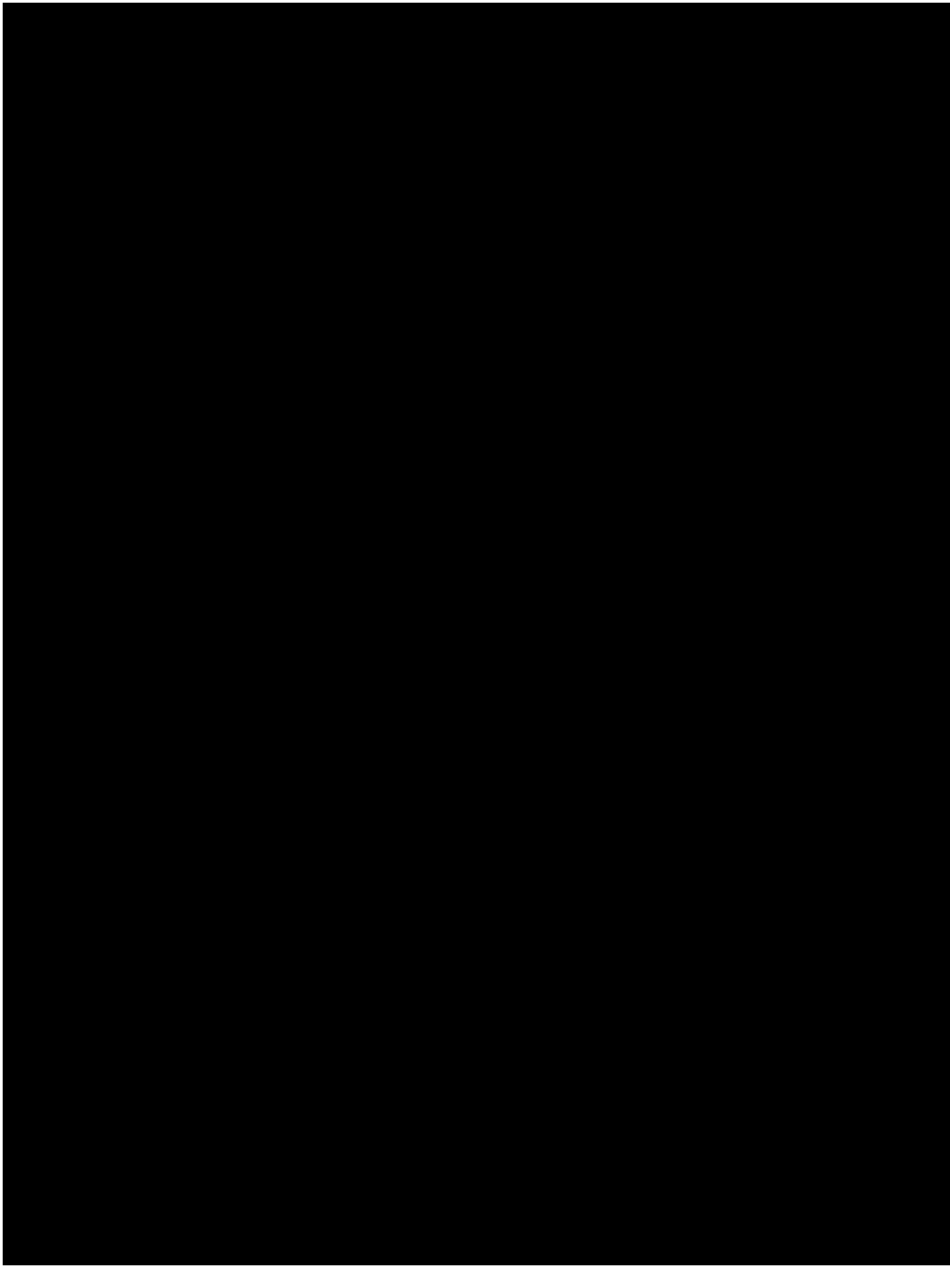
- ***limited market differentiation for networks...***
  - ...operators or suppliers
- ***network operators must differentiate with:***
  - end software add-ons
  - tariff flexibility

summary

- ***end-to-end principle***
  - the dumber the network the more valuable it is
  - quality of a service implemented by its customers!?
  - supply chain implications
- ***minimise then synthesise***
  - business models
  - engineering
- ***a Market Managed Multi-service Internet***
  - not just supporting the information economy...
  - ...but the economy within information

more info

- ***M3I project***
  - Jan 2000 - Dec 2001
  - contacts, background and first deliverables:
  - http://www.m3i.org/
- ***Bob Briscoe:***
  - http://www.labs.bt.com/people/briscorj/



spare slides

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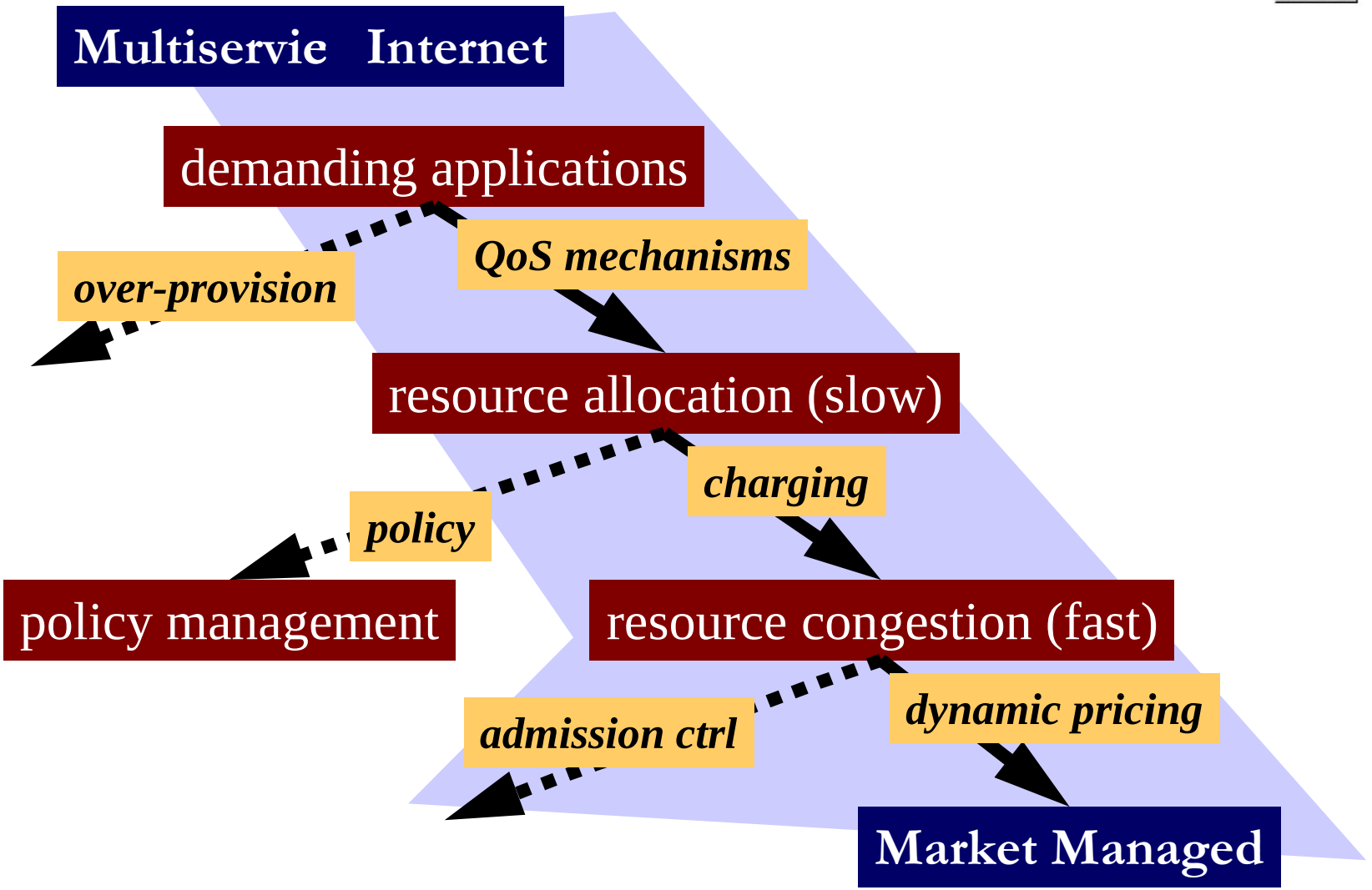
context


Multiservie Internet
demanding applications
QoS mechanisms
over-provision
resource allocation (slow)
charging
policy
policy management
resource congestion (fast)
dynamic pricing
admission ctrl
Market Managed

implications - commercial and social