



Traffic Exchange: Global Networks

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Introduction

- ◆ What role for policy?
- ◆ Economics
- ◆ Data

Relevant Markets

◆ General question of market definition

- demand and supply substitutability
- geographic aspects
- vertical aspects

◆ Indicative.....

- local access (infrastructure)
- local IP connectivity
- backbone connectivity

Local Access

◆ Supply side

- competing access technologies
- indirect access
 - minutes, loops, lines, bits, channels
 - importance of wholesale capacity for competitive flat-rate retail

◆ Demand side

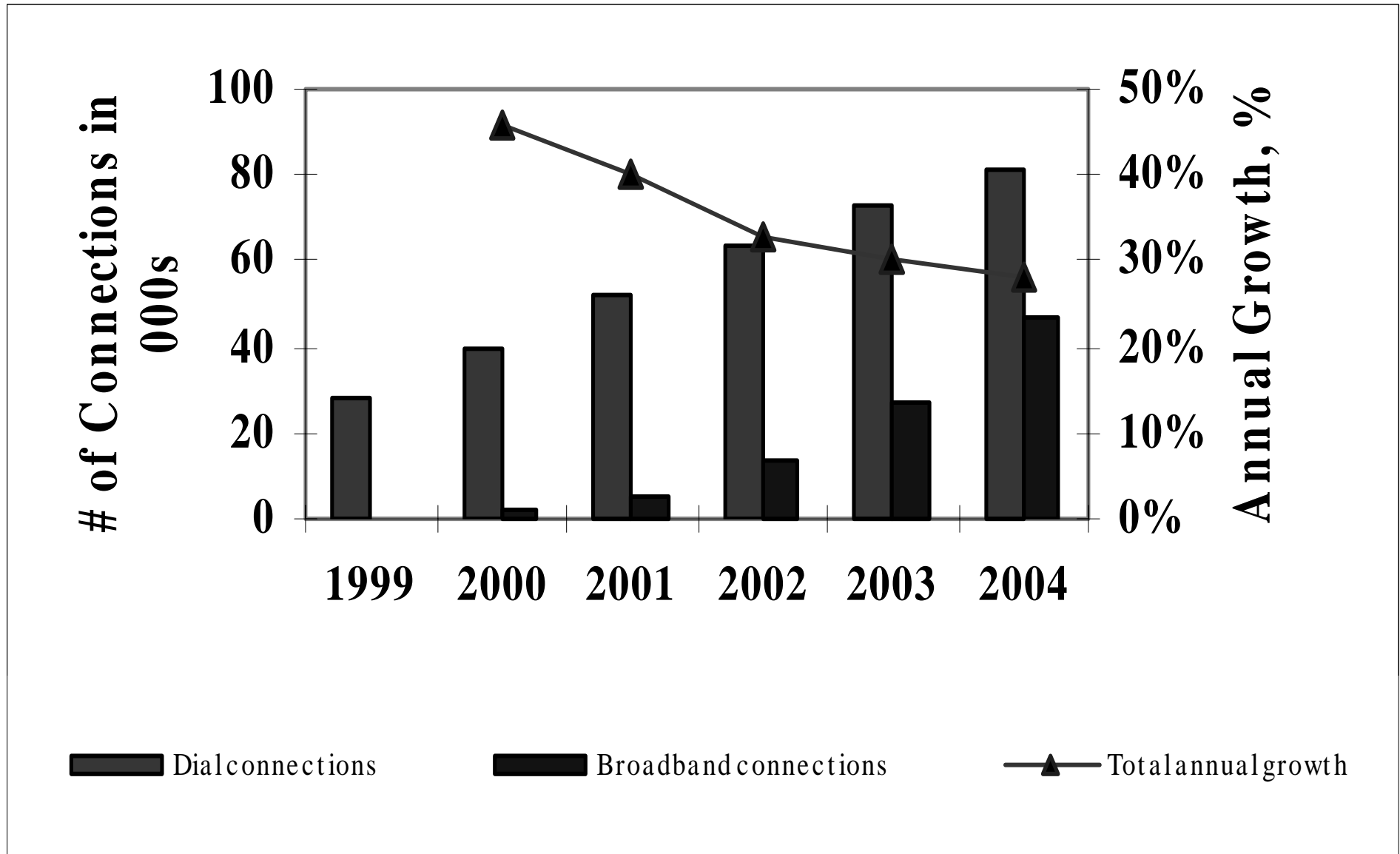
- willingness to pay
- ease of use

◆ Dynamics

- transition from minutes (variable or flat) to broadband (always on, bits)

Local Access

[source - IDC - connections (millions) W. Europe]



Backbone Infrastructure - Europe

Company	National backbone	Pan European
Cable and Wireless	D	D
Equant	L	D
Farland (BT)	D	L
Global Crossing	P	L
Global One	P	P
GTS/Hermes/Ebone	D	D
I-21	P	L
KPNQwest	P	D
Level3	P	L
MCIWorldcom	D	D
Metromedia Fiber	P	P
Viatel	P	L

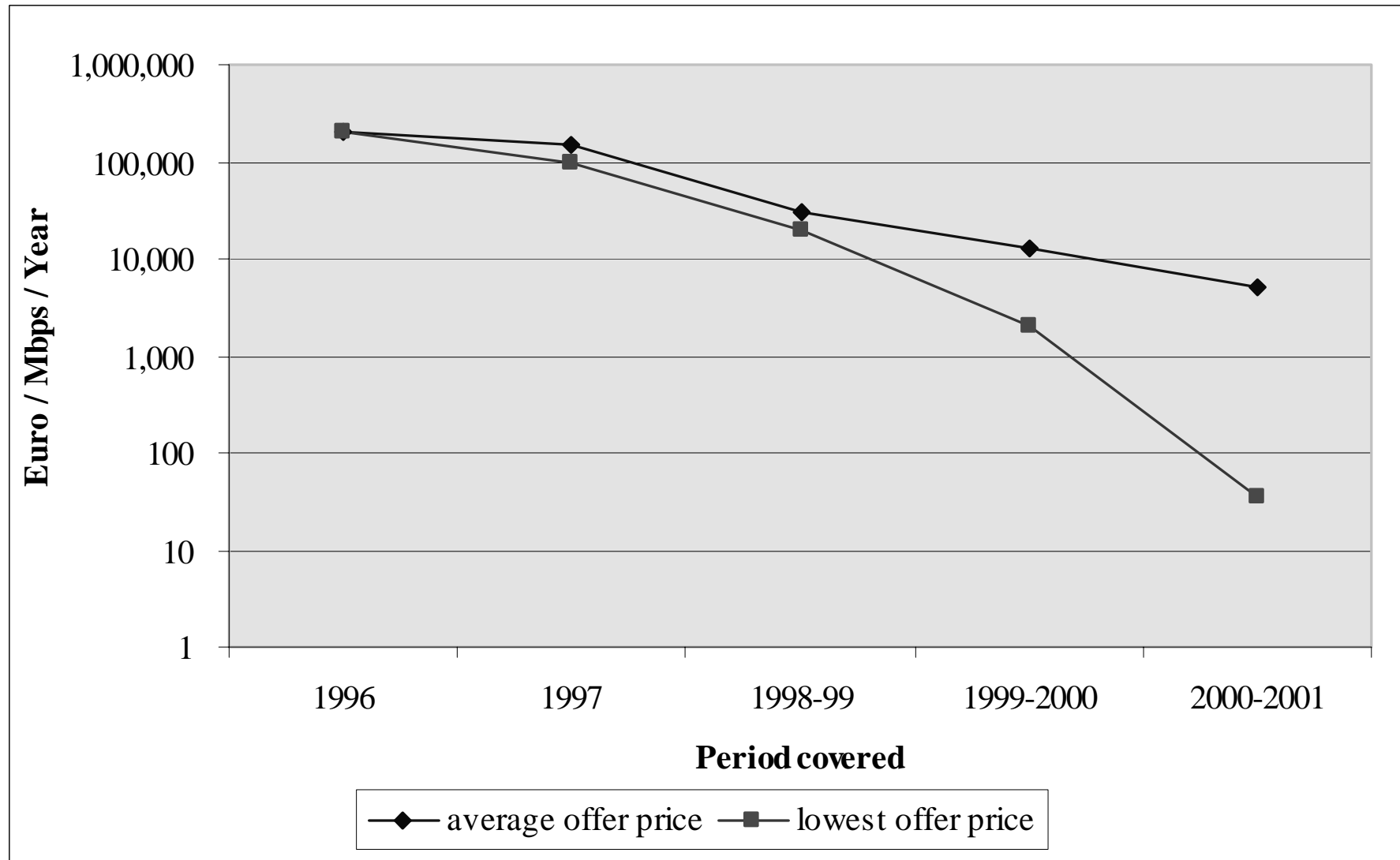
P= planned

L= limited

D= developed

Backbone Prices (euros per Mb/s per year)

[source DANTE - European network]



Economic Aspects

◆ Not a new question

- proposal for IP settlement in 1996
- note proponents and evolution [Telstra A\$80 m or \$20 per year per user]

◆ General issue

Are the traffic arrangements that emerge conducive to efficiency (allocative, dynamic, distributional) ? Do they facilitate or inhibit or distort Internet development ?

◆ Economic issue

- can we apply theory on one way and two way access to IP based traffic?
- content and transport, real-time and the rest

Economic Aspects

◆ Interconnection and Unbundling

Mandatory policy and pricing for **mandatory interconnection** at **any technically feasible point in the network** is the same as a policy for **compulsory unbundling of all network elements irrespective of whether they are essential facilities** or not.

[CONCLUSION - be very careful]

Mandate point (and terms) of Interconnection where there is a network bottleneck - last feasible point in network - local switch for PSTN..... the rest is for negotiation. This minimises functionality to be unbundled and maximises functionality that is competitively determined - gives freedom to negotiate efficient and mutually beneficial interconnection arrangements.

Economic Aspects

◆ Between Packet networks

In **circuit switched**, user expects his operator or service provider to make arrangements to terminate a call anywhere in the world and arrange for message from terminating user to be returned.

Not so for **packet network**. User expects his provider to make arrangements to deliver his packets. He expects to receive by virtue of other users making similar arrangements with their providers.

Does not appear to be a need for mandated interconnect, only feasible bottleneck is the last router. But the act of being an ISP and connecting to Internet and using **IP end to end** guarantees global interconnectivity (though quality may vary).

Any negotiated settlement or rate should have a strong relationship to the **average marginal cost of transit traffic** in both ISP networks for the settlement to be attractive to both parties.

Economic Aspects

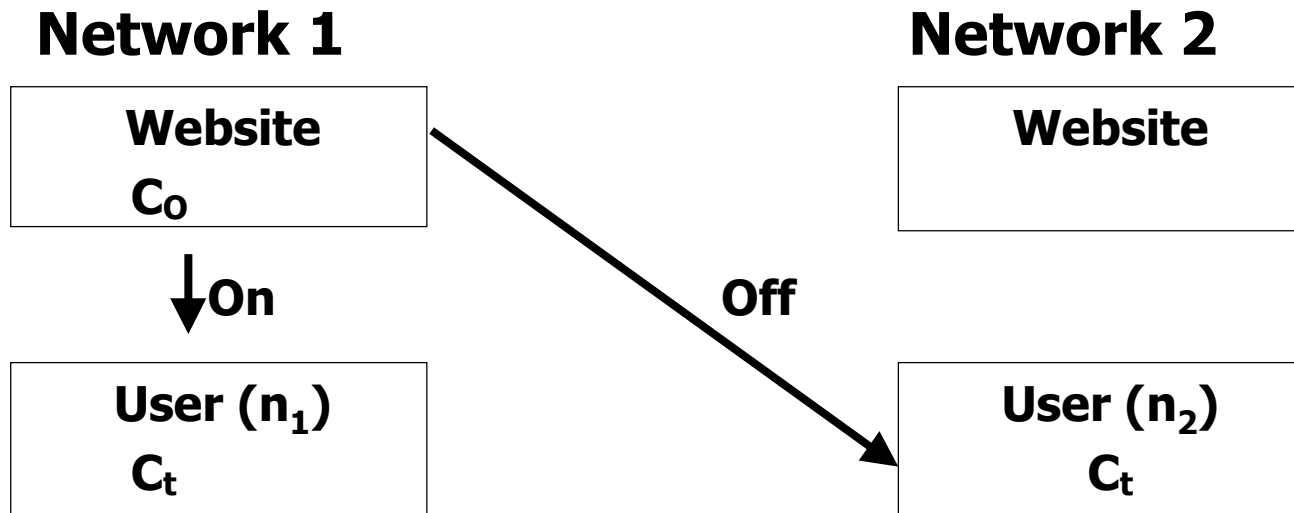
◆ Between Circuit-switched networks and Packet networks

When different protocol based networks inter-work (say the PSTN and a IP network), the interconnection rule should be an obligation on a terminating operator to accept traffic and deliver it.

Related obligation should be that the originating operator should deliver traffic to the terminating operator in a format in which it can be delivered (or bear the cost of conversion).

In fact, new entrants with packet networks are adopting circuit switched PSTN interconnection arrangements and are bearing the cost of any protocol conversions whether or not they are the originator or terminator of traffic.

Economic Aspects : off-net-cost pricing principle



On-net $C_o + C_t = C$

Off-net $C_o + a$

[price website]

$C_t - a$

[price user]

Network 1 attracts website from Network 2

$$n_1 [C - (C_t - a)] + n_2 [(C_o + a) - 0] = C_o + a$$

Contrast telecommunications where zero price for receiver

$$\text{Perceived extra cost outgoing traffic} = C + n_2 (a - C_t)$$

Economic Aspects - Conclusions

- ◆ Yes, can extend the theory
 - off-net-cost pricing principle
- ◆ Contrast with telecommunications
 - incentives for appropriate pricing
 - not so for telecoms (e.g. double marginalisation), although incentives to compete to attract users
- ◆ Questions
 - implications for IP/PSTN voice traffic
 - implications for 'quality' IP traffic

Policy and Regulatory Frameworks

◆The theory

- indicates the need (or not) to intervene
- risks of intervening
- optimal pricing rules and difficulties of enacting pricing rules
- also note technical constraints.....

◆The practice

- current situation in the European Union
- the future

Now

◆ Sector Specific Regulation

- Interconnection Directive
- the right to interconnect but not the terms for IP

◆ Competition Policy

- prevention of abuse of dominance or joint dominance
- anti-competitive agreements
- merger regulation
 - dominance, joint dominance test
 - cases have defined global IP connectivity markets

Future

- ◆ Proposed new EU rules and framework
 - prospective market failure (incl. the public interest)
 - new SMP, linked to dominance
 - competition rules
 - as above
 - possible move to **'significant lessening of competition'** for merger regulation test
- ◆ Sector specific intervention
 - market analysis and effective competition [new SMP] test
 - procedural framework for ex-ante identification of 'dominant' or 'jointly dominant' companies and selection from menu of remedies or rules to prevent abuse
 - not yet in place, still to be proven

Conclusions

◆ Lessons from recent years

- infrastructure competition changes everything
- still implies a regulatory framework
- first mover advantages
- competition rules, relevant market

◆ Economics

- lots of guidance on need or not to intervene
- IP different from telecoms (receiver also pays)

◆ Regulatory rules

- dominance on relevant markets
- menu of remedies (minimum regulation)