Pricing, billing and interconnection in an Next Generation Networks (NGN) environment

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Agenda: NGN Interconnection

- **Why NGN?**

  Networks

  - ➢ **What is a Next Generation Network?**
  - ➢ **Why should we migrate from today's networks to tomorrow's NGN?**

- **Basic Interconnection principles**

  Tools

  - ➢ **Traditional interconnection models**
  - ➢ **Traditional billing and revenue-sharing models**
  - ➢ **The trend towards bundling and flat-rate pricing**

- **Getting to there from here**

  Strategies

  - ➢ **Complexity versus simplicity**
  - ➢ **Mobile versus fixed termination**
  - ➢ **IP versus PSTN call termination**

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# What is an Next Generation Network?

Networks

Today's PSTN network	Next Generation Networks
• Circuit-switched.	• Packet-based, based on Internet Protocol (IP).
• Limited mobility of end-user services.	• Broad-based 'generalised mobility'.
• Vertical integration of application and call control layers, with dedicated networks.	• Horizontally-integrated control layers, with simultaneous delivery of applications. Service-related functions independent of transport-related technologies.
• Non-responsive network.	• NGN will be able to identify and adapt to user needs in real-time.

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Source: ITU Internet Reports 2005: The Internet of Things

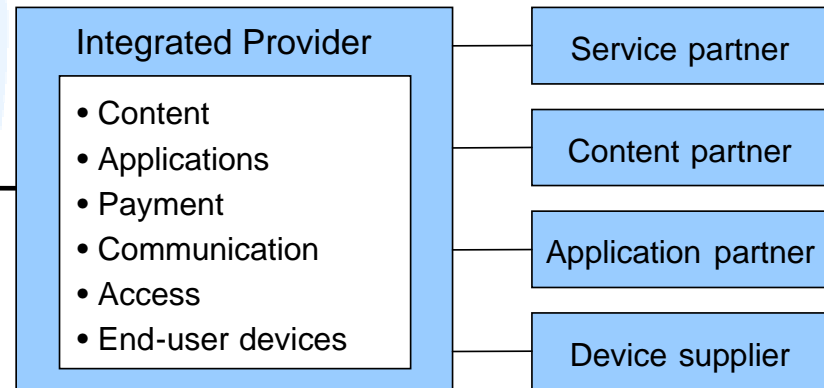# NGN migration implies integration and a "portable" user environment
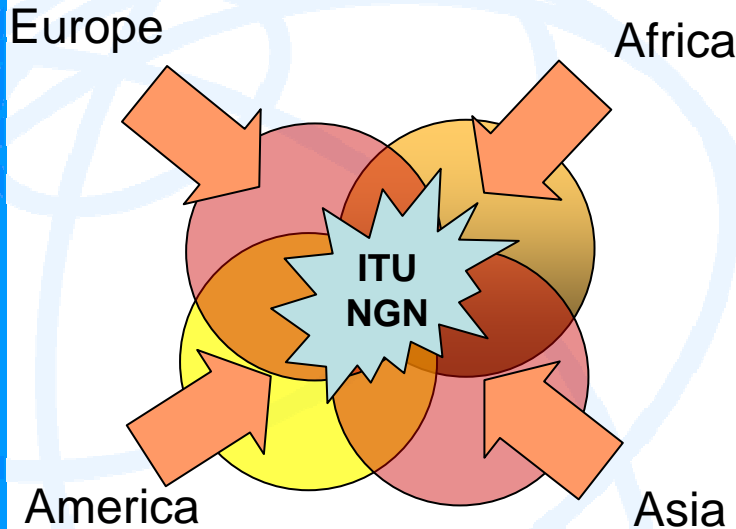
Today:

Fragmented B2C relationships
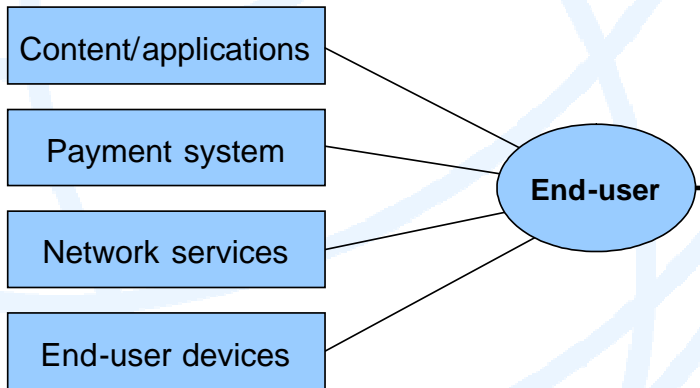
Tomorrow:

Bundling of all relevant B2C relationships and optimal supply of services, content and applications

Content/applications

Payment system

Network services

End-user devices

End-user

Integrated Provider

- Content
- Applications
- Payment
- Communication
- Access
- End-user devices

Service partner

Content partner

Application partner

Device supplier

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Source: ITU (2006): "Regulating new and emerging markets in the telecom sector", background paper prepared by Christian Wey et al.

Standardization efforts towards NGN

Europe

Africa

ITU NGN

America

Asia

Challenges

➢ **Multimedia**
➢ **Generalized mobility**
➢ **Convergence**
➢ **Integrity**
➢ **Multi-layer orientation**
➢ **Open character**

ITU-T SG 13: Rec. Y.2001

A NGN is a packet-based network **able to provide telecommunication services and able to make use of** multiple broadband, QoS-enabled **transport technologies and in which** service-related functions **are** independent **from underlying** transport-related technologies. **It enables** unfettered access **for users to networks and to competing service providers and/or services of their choice. It supports** generalized mobility **which will allow consistent and ubiquitous provision of services to users.**

NEXT GENERATION NETWORK

FG NGN

NGN-GSI

GLOBAL STANDARDS INITIATIVE
ITU-T

SG: 11, 13, 19, 2, 12, 16, 17
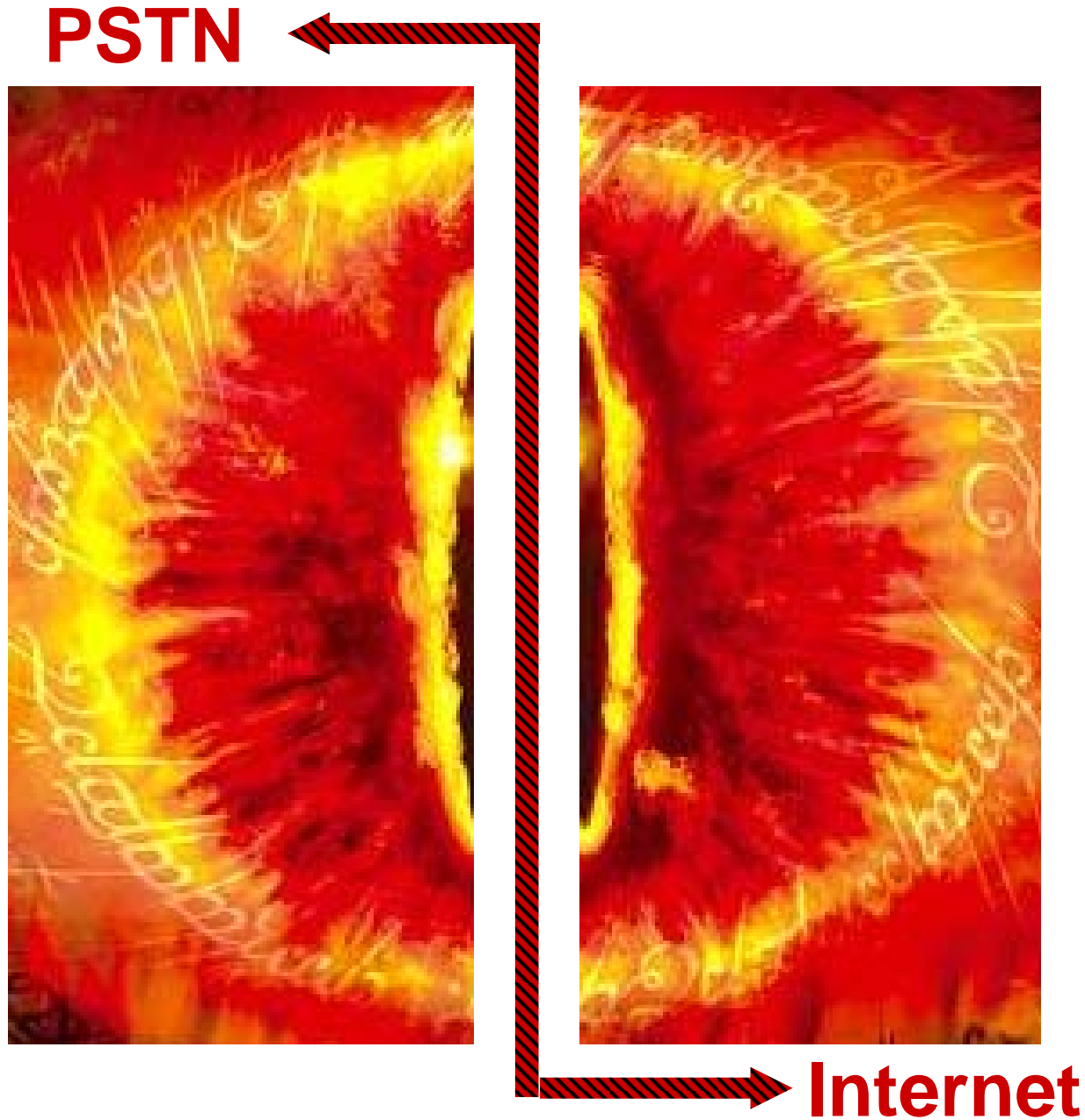
But, doubts persist over NGN

- **NGN represents the marriage of the Telco and IP worlds. But will it be a collision?**

- **Is the NGN just another a telco attempt to recreate an "Intelligent Network" with centralised intelligence?**

- **Is the NGN primarily an overlay or a new-build?**

- **Is it just a clever marketing name?**

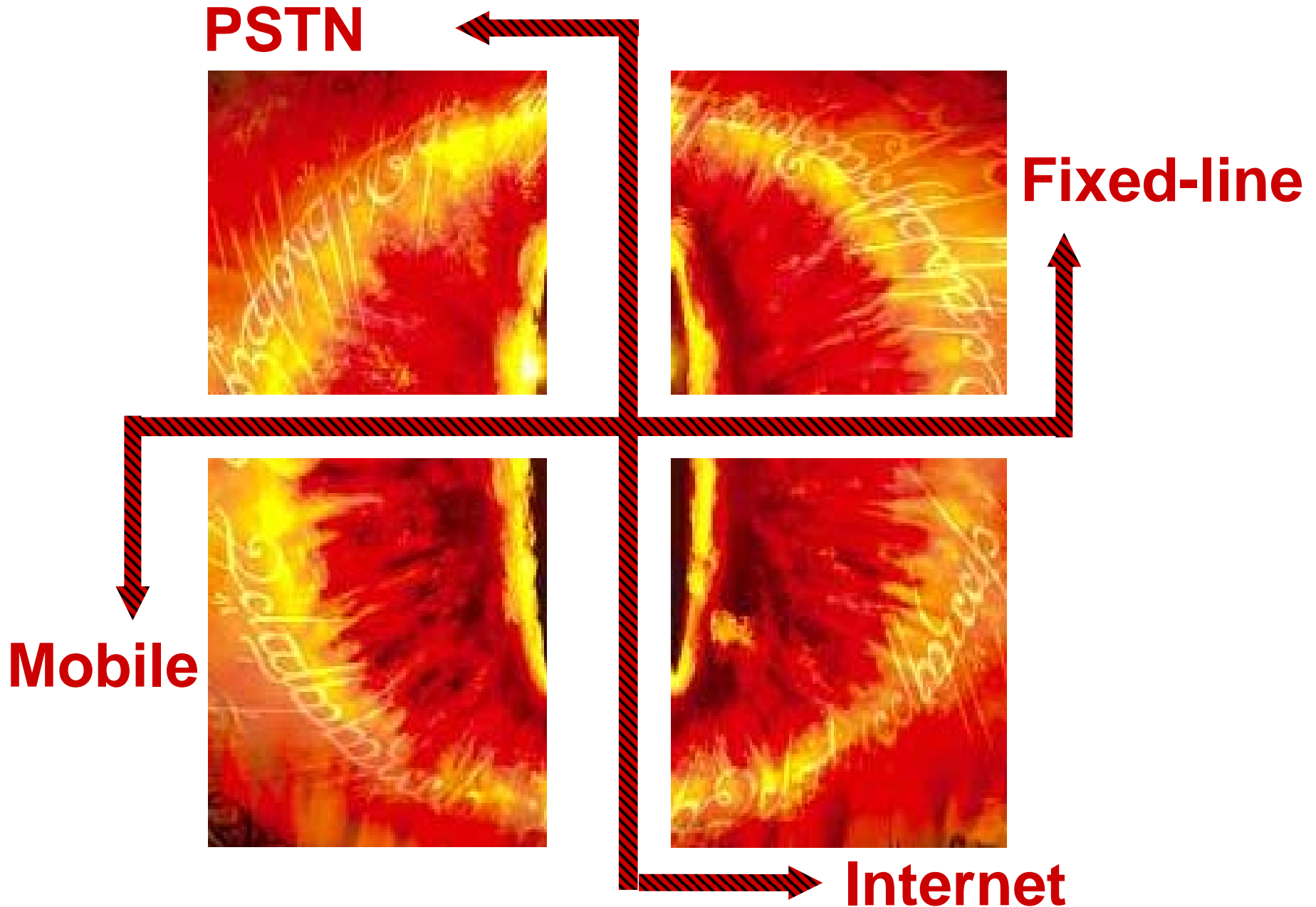- **Who pays for what, where, when and to whom in an NGN environment?**

The NGN vision?
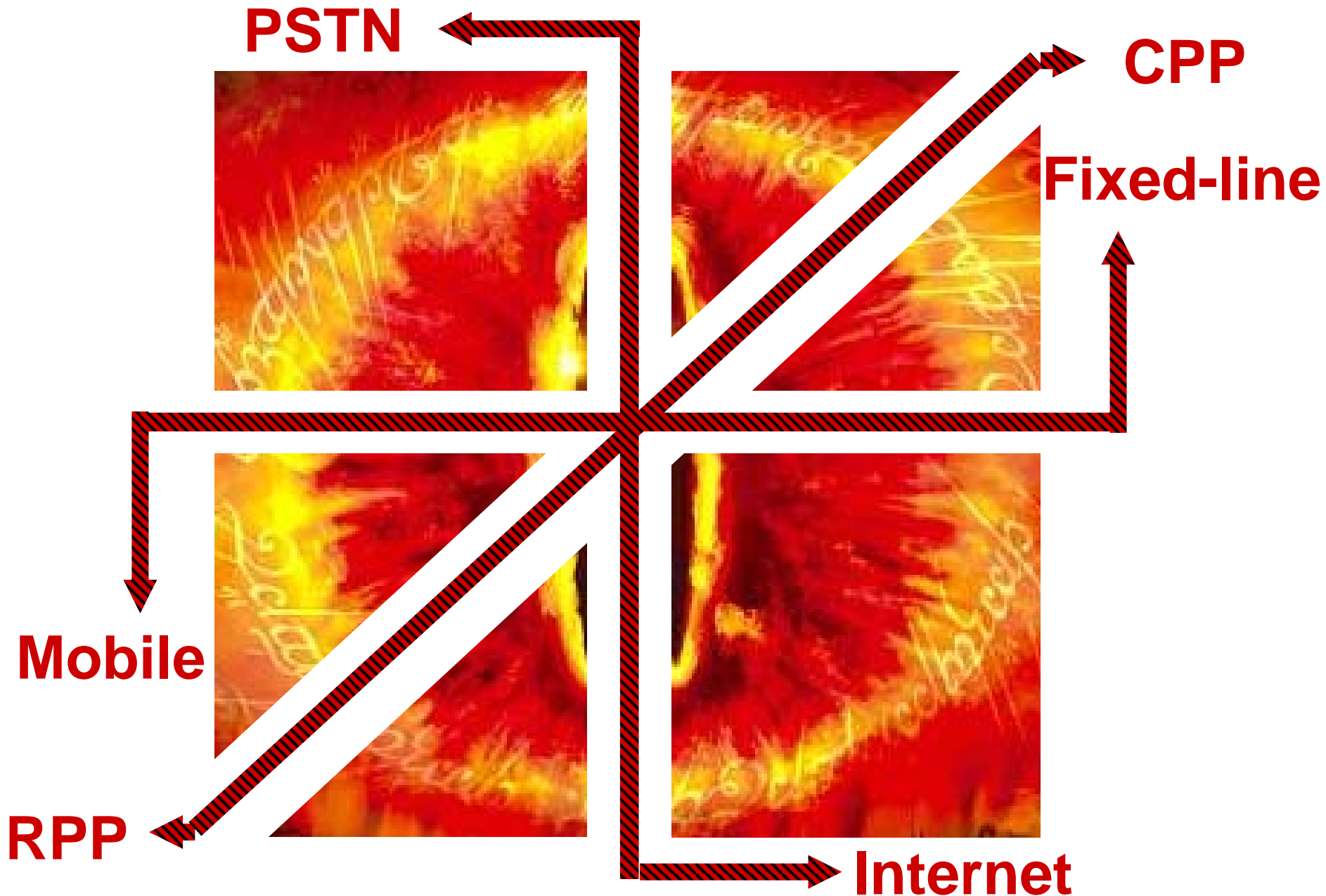

One ring to rule them all …

The NGN reality: a world divided …

PSTN

Internet

The NGN reality: a world divided …

PSTN

Fixed-line

Mobile

Internet

The NGN reality: a world divided …

PSTN

CPP

Fixed-line

Mobile

RPP

Internet

The NGN reality: a world divided …

PSTN

CPP

Fixed-line

Settle-ment

Mobile

RPP

Peering and transit
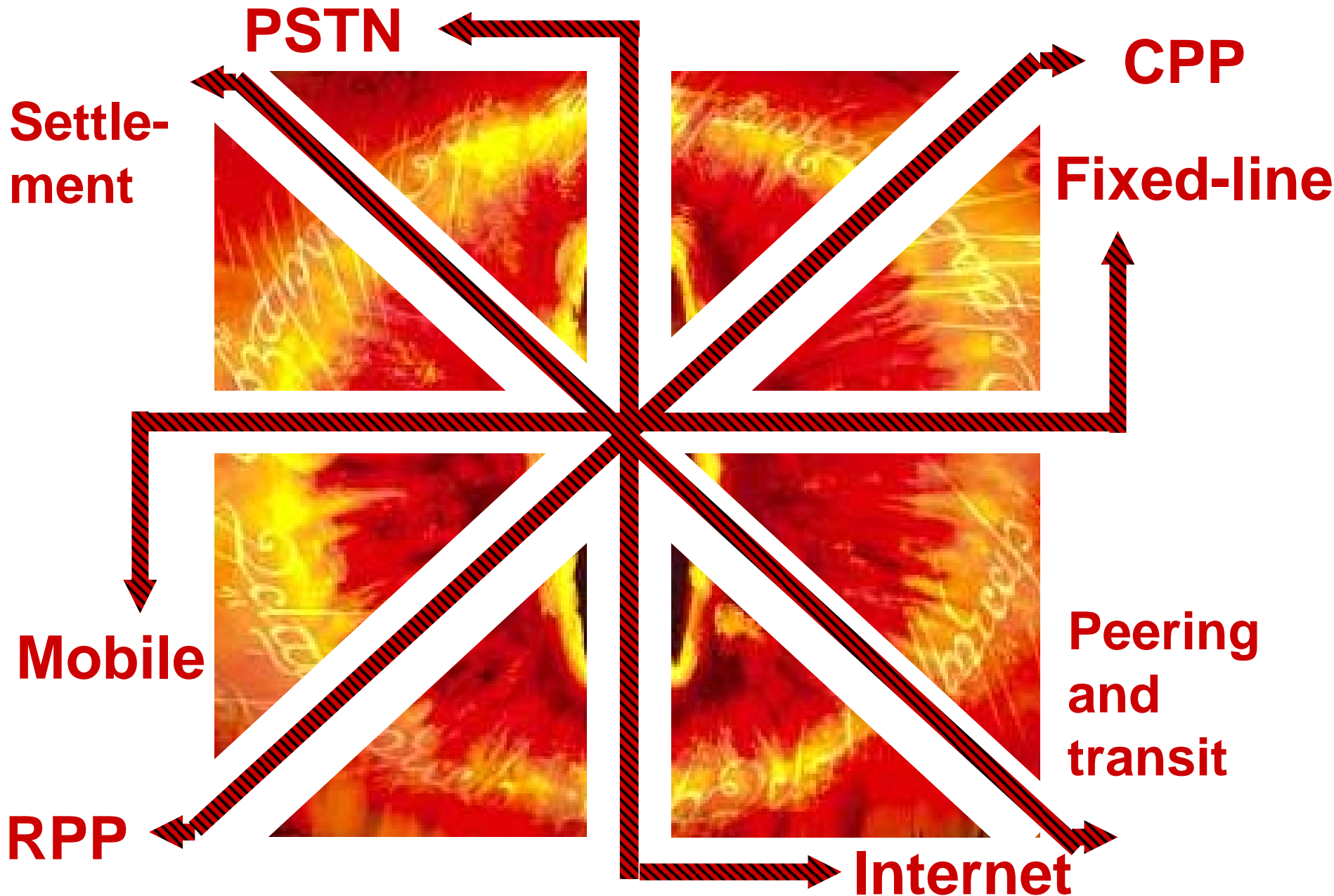
Internet

So, what might be the benefits of a Next Generation Network?

- **For the Operator:**
  - ➢ **Lower costs in having a single IP-based network to invest in and maintain**
  - ➢ **Single billing contact with the customer ("*internet with billing*")**
  - ➢ **Possibility to act as gateway for billing for content and applications from 3rd party providers**
  - ➢ **Reduced costs of legacy network maintenance**
- **For the customer:**
  - ➢ **Possibility to use the same customised environment between different platforms**
  - ➢ **Possibility of lower prices through bundled service offerings**
  - ➢ **Integration of own content (e.g., photos, music and video library, website) with that of service provider**

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What is driving NGN developments?

- **Financial performance**
  - ➢ **Revenue growth & margin protection**
  - ➢ **Reduced OPEX and CAPEX**
- **Operational issues**
  - ➢ **Obsolescence & modernization**
  - ➢ **Reliability, resilience & quality**
  - ➢ **Capacity & scalability**
  - ➢ **Simpler and faster provision of new service roll-out**
- **Convergence issues**
  - ➢ **Fixed/mobile convergence**
  - ➢ **Voice/data convergence**
  - ➢ **Telecoms/broadcasting convergence**
  - ➢ **Shifting from narrowband to broadband**


Network Transformation

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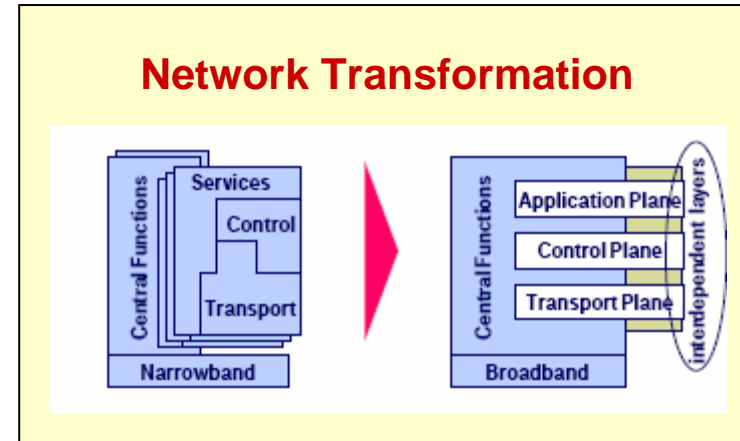
Tools

Interconnection possibilities

- **Traditional international accounting rates**
  - Symmetrical, negotiated bilateral arrangements for jointly-provided, switched telecommunication service
- **Interconnection**
  - Asymmetric rates for call termination/roaming
  - Fixed-to-fixed; fixed-to-mobile, mobile-to-fixed etc
- **Peering**
  - A bilateral arrangement to accept and terminate traffic (usually IP-based), generally without financial compensation
- **Transit**
  - An agreement to accept and terminate traffic on behalf of other carriers, for a price
- **Sender keeps all (Bill and Keep)**
  - Sending and receiving traffic without payment and (usually) without requirement for prior arrangements

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International interconnection: Then and now

Accounting rates	*International interconnection rates*
Normally symmetric (accounting rate split 50/50)	**Asymmetric (charges may vary between countries)**
Bilaterally negotiated	**Set unilaterally, but subject to trade discipline**
Discriminatory by country of origin of call, but not by fixed/mobile	**Discriminatory between fixed and mobile traffic, but not by country of origin of call**
Half-circuit regime (not normally unbundled)	**Full-circuit regime (can be unbundled)**

International voice traffic
(in billions of minutes)

Source: ITU.

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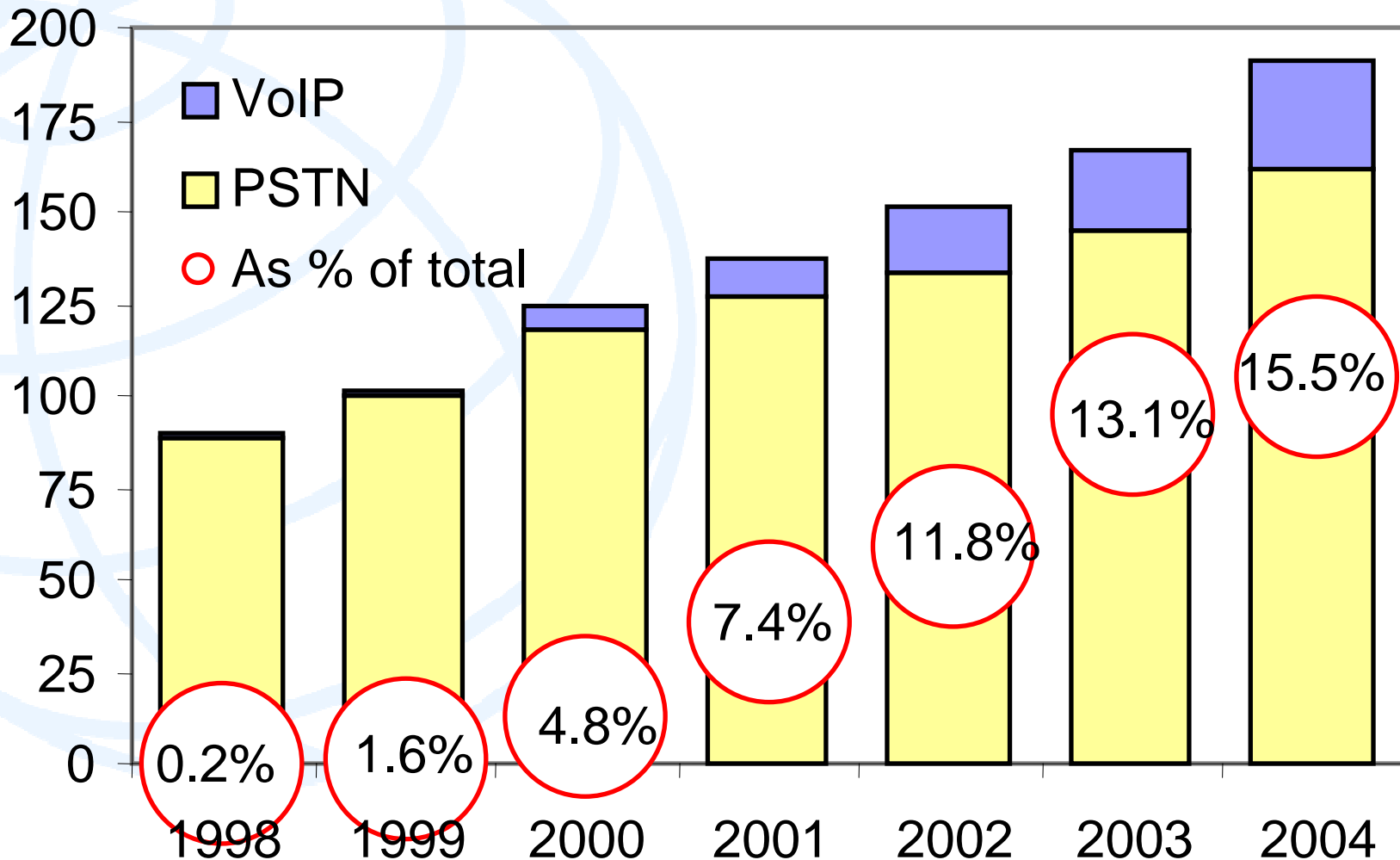
International voice traffic trends
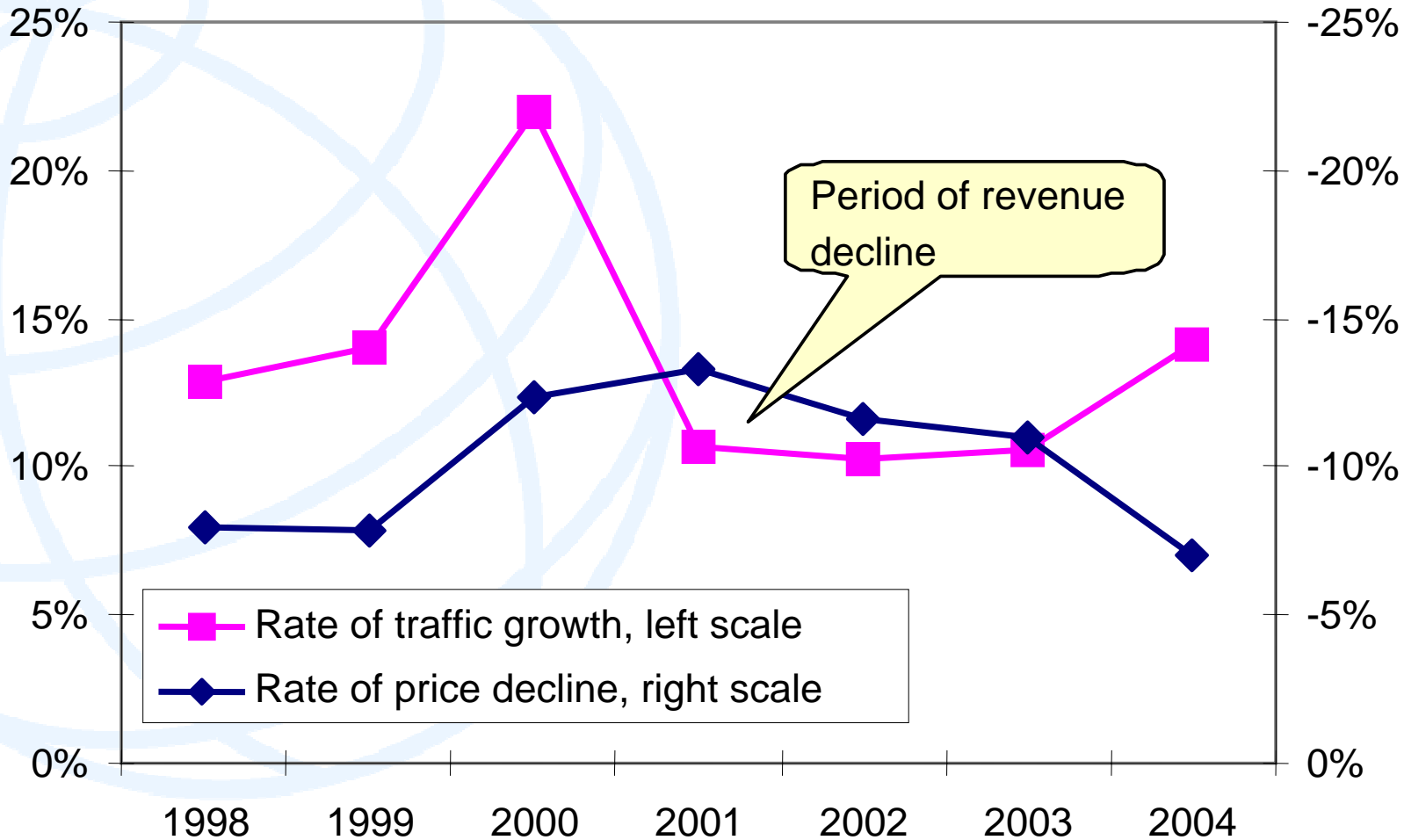## Revenue (US$bn) and price per min (cents)

Legend:
- Revenue (US$bn)
- Price per minute (US cents)

Price per minute (US cents) values: 63 (1998), 58 (1999), 51 (2000), 44 (2001), 39 (2002), 35 (2003), 32 (2004)
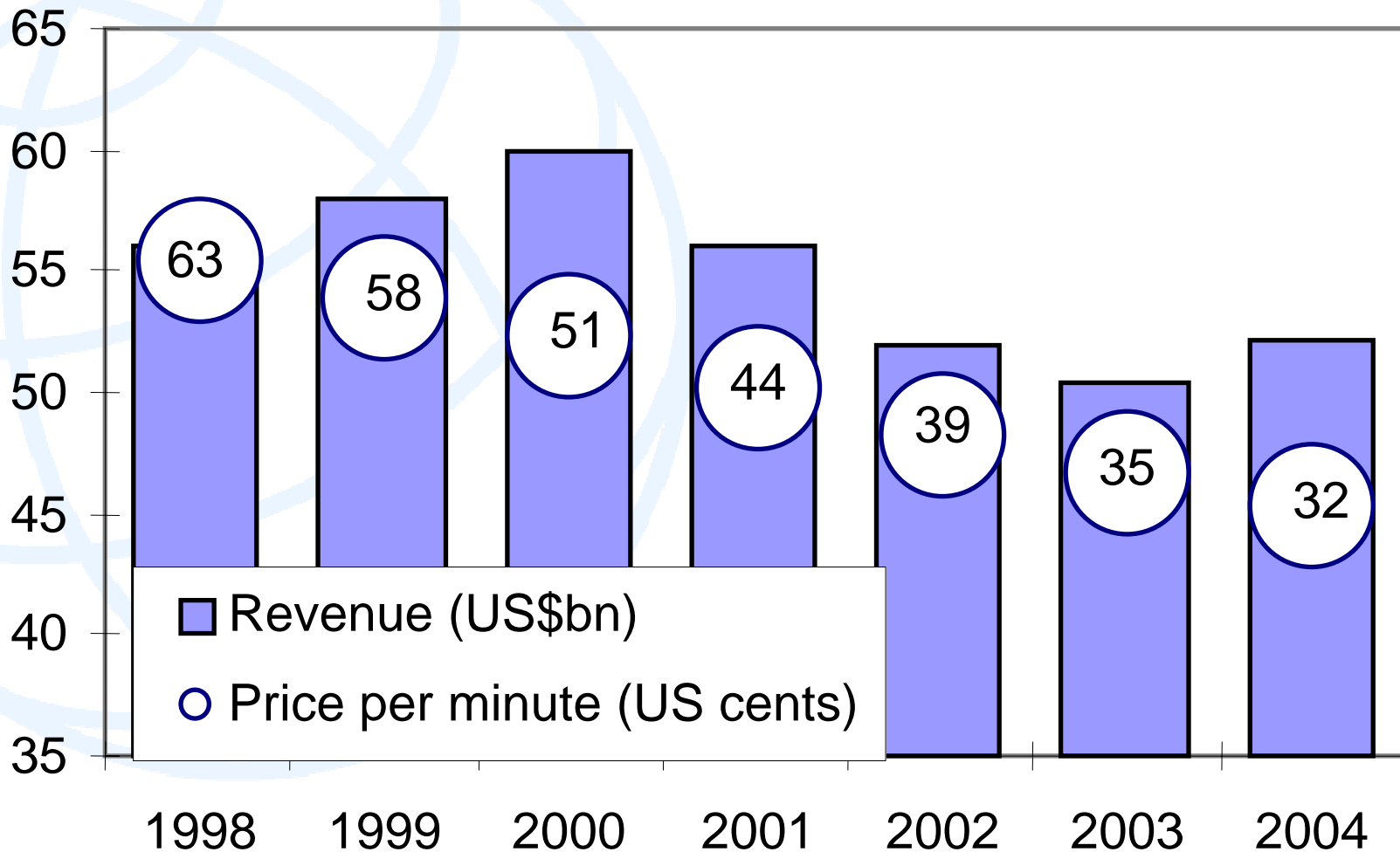
Is the crisis over now?
Int'l traffic growth and price decline, 1998-2004

Period of revenue decline

Rate of traffic growth, left scale
Rate of price decline, right scale

Source: ITU.

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Based on total traffic and average price, derived from revenue per minute. Note, inverted scale for price declines

Revenue sharing and billing

- **Settlement rates**
  - Agreement to split wholesale accounting rate between carriers, usually on a 50/50 basis
- **Interconnection**
  - Charges levied for call termination, usually on a per-minute basis
- **Transit**
  - Charges levied for carrying traffic, usually on a capacity basis
- **Calling Party Pays (CPP)**
  - Call originating party pays full retail cost of the call
- **Receiving Party Pays (RPP)**
  - Both call originating and call receiving parties pay a share of the retail cost of the call

The trend towards bundling

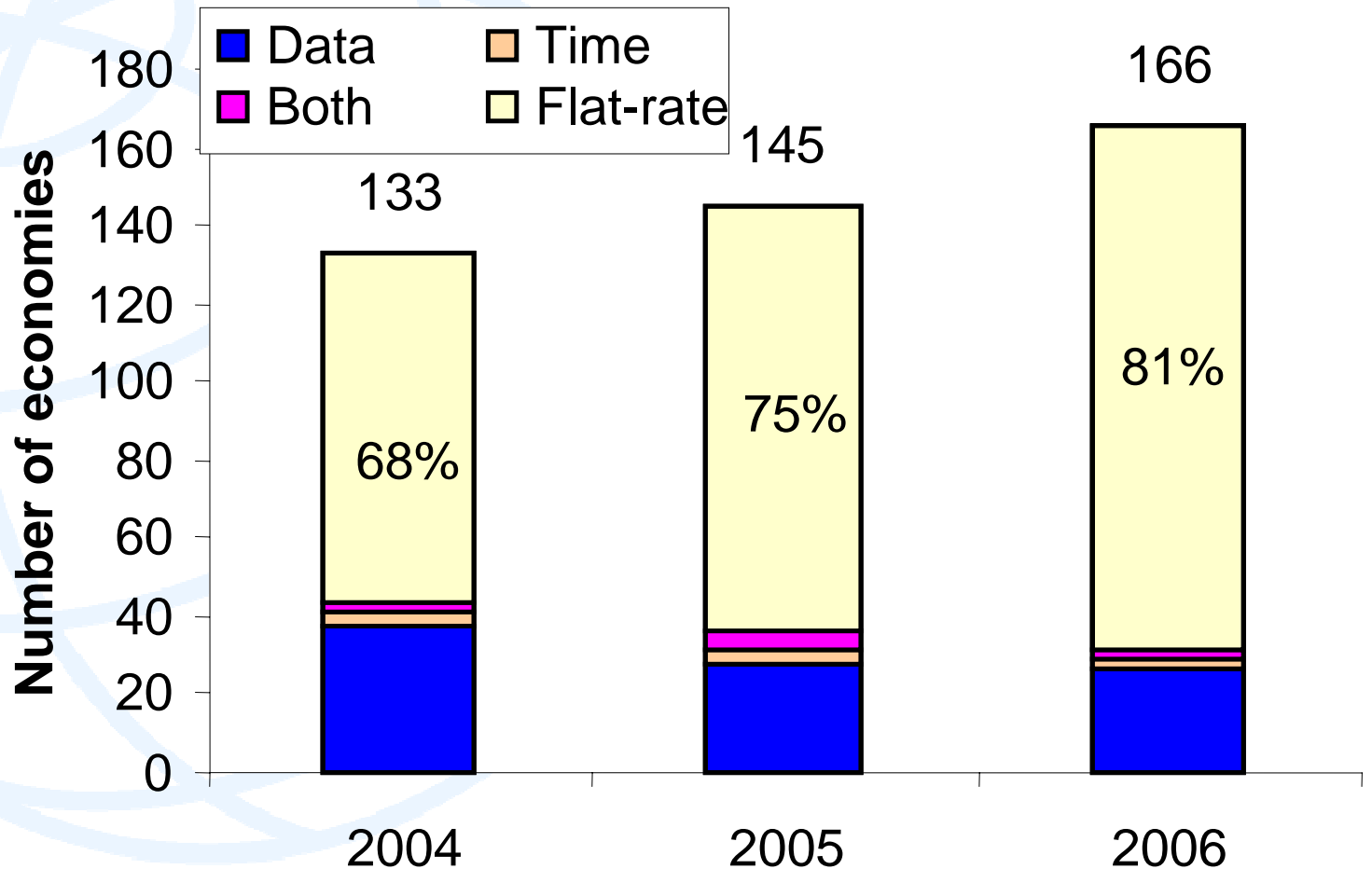## UK households taking bundled packages
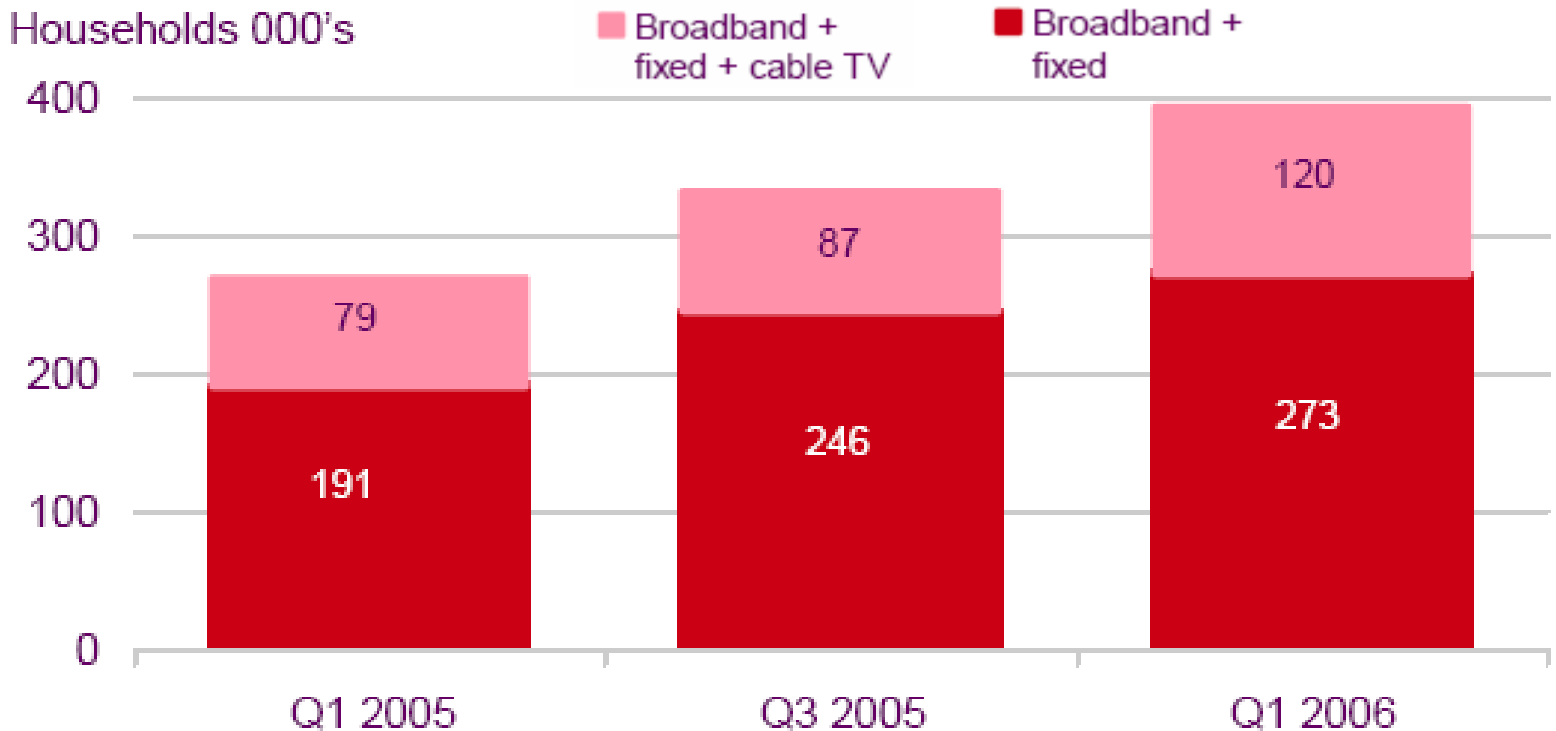
Source: OFCOM

The trend towards flat-rate pricing
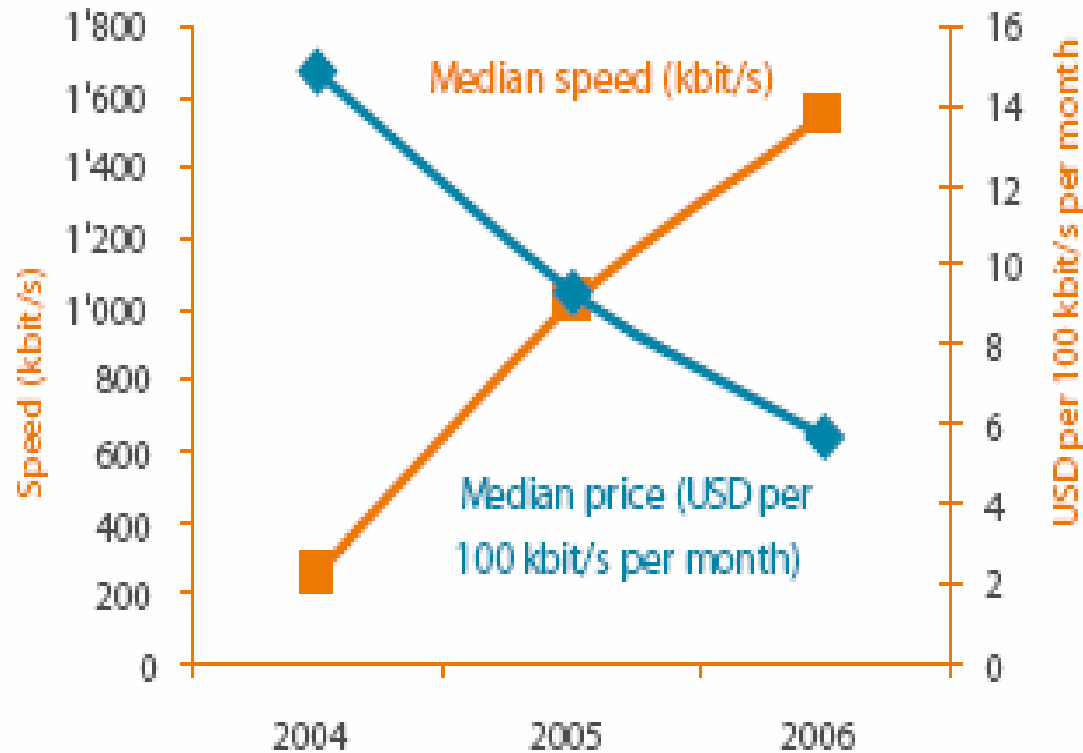
Global trends in broadband pricing schemes

Note: Data" refers to price packages with bit caps. "Time" refers to time-metering . "Both" refers to packages with both data and time caps. "Fl rate" implies unlimited monthly use.

Source: ITU World Information Society Report 2006 (www.itu.int/wisr).

Trends in broadband pricing, global

- **International survey of broadband prices**
  - ➤ **Based on 133 economies that had broadband as early as 2004**
- **Methodology**
  - ➤ **Based on price in US$ per 100 kbit/s**
- **Price trends**
  - ➤ **Median price has fallen by 41% p.a.**
  - ➤ **Median speed has risen by 66% p.a.**
  - ➤ **Faster than Moore's Law**

Broadband price and speeds
(for 133 economies)

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Source: ITU Internet Reports 2006: Digital.Life.

Growth in broadband speeds

Growth in max. broadband speeds

Legend: ☐ 2003 ☐ 2005 ☐ 2006

2006

2005

2003

Speed (kbps)

Source: ITU World Information Society Report 2006 (www.itu.int/wisr).
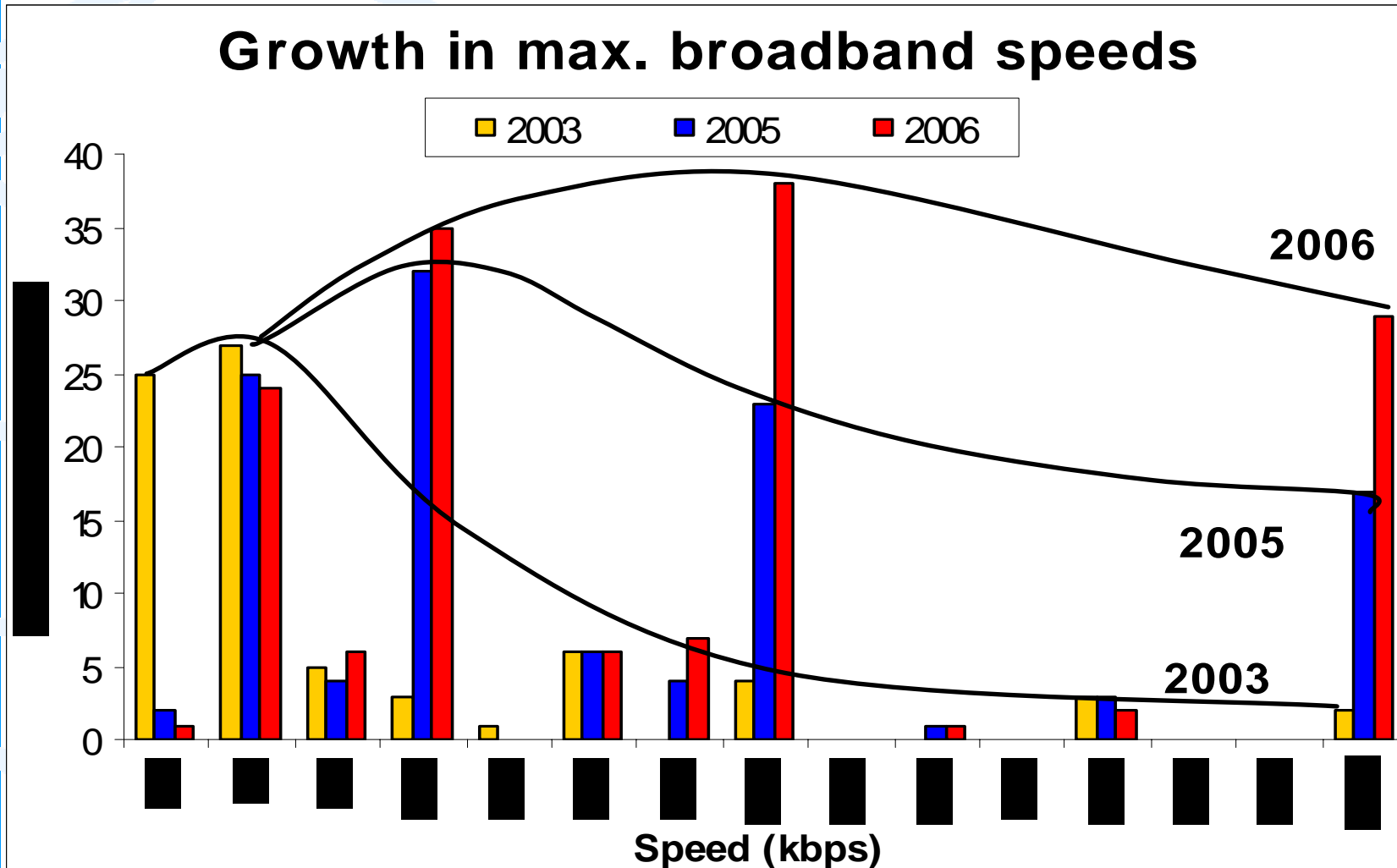
Prices in top 15 broadband economies

	Economy	Company	Speed Mbit/s	Price per month USD	Price per 100 kbit/s	Change 2005-06
1	Japan	Yahoo! BB	51.2	31.19	0.07	-12.5%
2	Rep. of Korea	Hanaro	51.2	40.59	0.08	...
3	Netherlands	internet Access	20.4	27.97	0.14	-81.3%
4	Taiwan, China	Chunghwa	12.3	22.67	0.18	...
5	Sweden		24.6	56.08	0.23	-6.5%
6	Singapore	Starhub	30.7	73.17	0.24	-85.0%
7	Italy	Libero	12.3	37.23	0.30	-73.8%
8	Finland	Elisa	24.6	85.64	0.36	-51.4%
9	France	Free	10.2	37.29	0.36	-90.1%
10	United States	Comcast	4.1	20.00	0.49	...
11	Germany	Freenet.de	6.0	30.95	0.52	...
12	United Kingdom	Pipex	8.1	50.89	0.63	-53.6%
13	Hong Kong, China	Netvigator	6.1	51.17	0.83	...
14	Portugal	Sapo	8.1	75.82	0.93	...
15	Canada	Bell	4.0	41.26	1.01	-3.9%
	Unweighted Average		18.3	44.33	0.42	-50.8%

Source: ITU Internet Reports 2006: Digital.Life.
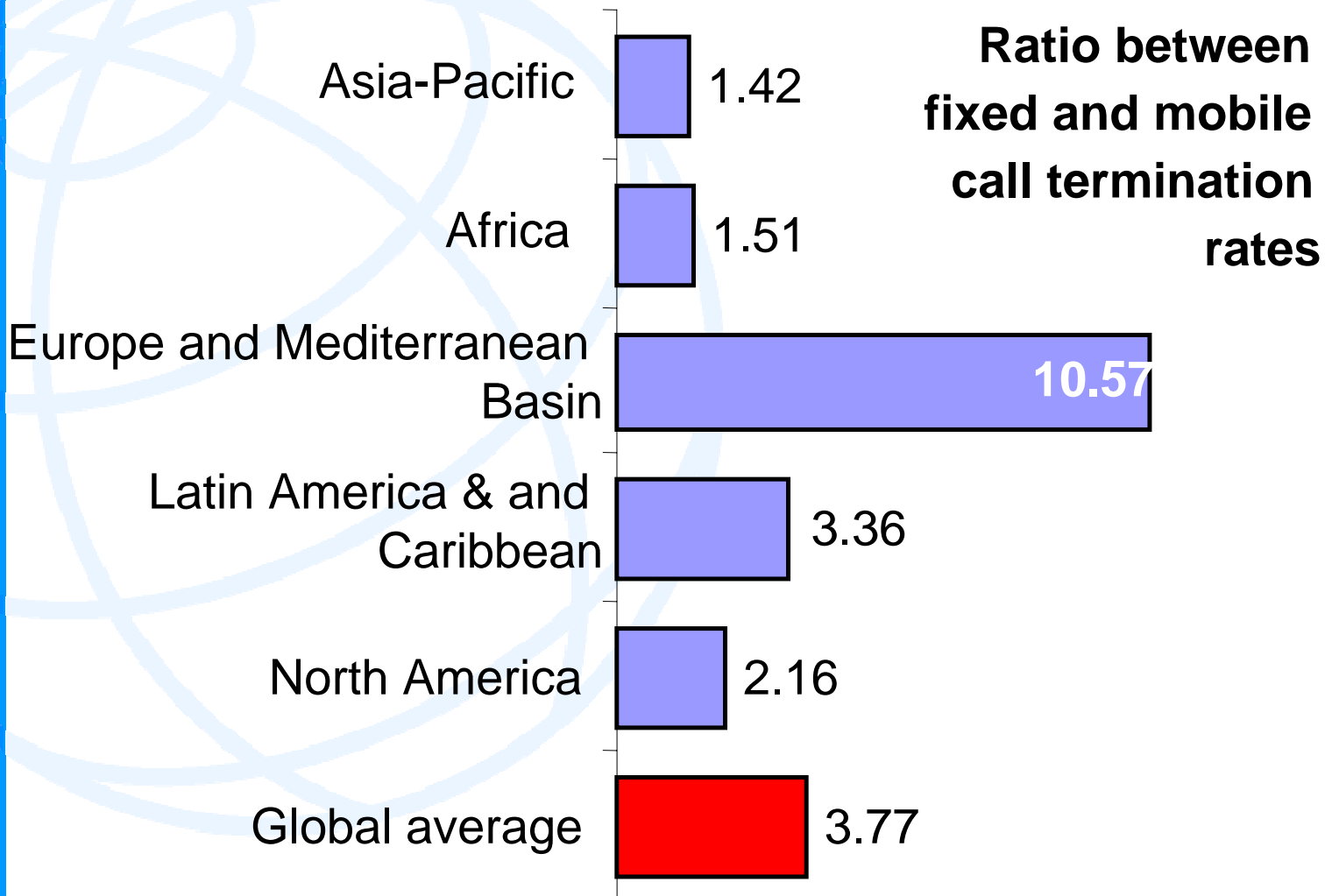
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Strategies

NGN interconnection options

- **Towards complexity**
  - **Differentiate between different traffic streams with different QoS**
  - **Differentiate between different user terminal devices (e.g., fixed, wireless, portable)**
  - **Provide interconnection options based on per-minute, per-volume, per-service type and per-content type**
- **Towards simplicity**
  - **Sender keeps all (bill and keep)**
  - **Arrangements based on interconnection capacity**

Termination rates worldwide

Termination rates in US cents per minute	Average fixed rate	Avererage mobile rate
Asia-Pacific	11.69	16.58
Africa	13.62	20.57
Europe and Mediterreanean	3.11	32.86
Latin America and Caribbean	4.88	16.43
North America	2.81	6.07
Global average	**5.77**	**21.76**

Source: ITU-T, based on survey of regional tariff groups.

Spot the odd one out ….

Ratio between fixed and mobile call termination rates

Region	Value
Asia-Pacific	1.42
Africa	1.51
Europe and Mediterranean Basin	10.57
Latin America & and Caribbean	3.36
North America	2.16
Global average	3.77

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Source: ITU-T, based on survey of regional tariff groups.

Conclusions

- **Inter-operator settlements remain important (but become more complex) in a converged or NGN environment**

- **Short-term: Per-minute settlement is preferred choice for carriers, but hard to sustain. Rates are dropping.**

- **Longer term: shift towards capacity-based pricing and/or towards "Sender Keeps All"**

- **Trends toward bundling and flat-rate pricing in retail market will be mirrored by capacity-based pricing in wholesale market**

- **But, migration to NGN will not make concerns over Significant Market Power (SMP) disappear**

Thank you.

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http://www.itu.int/spu