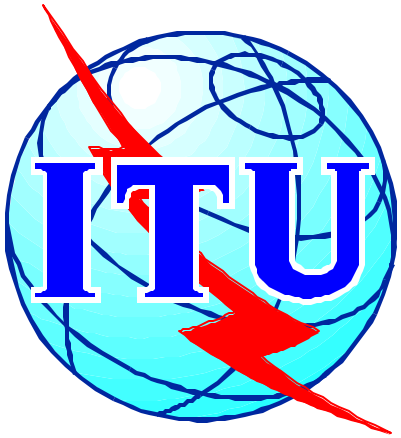
“The Internet changes everything”

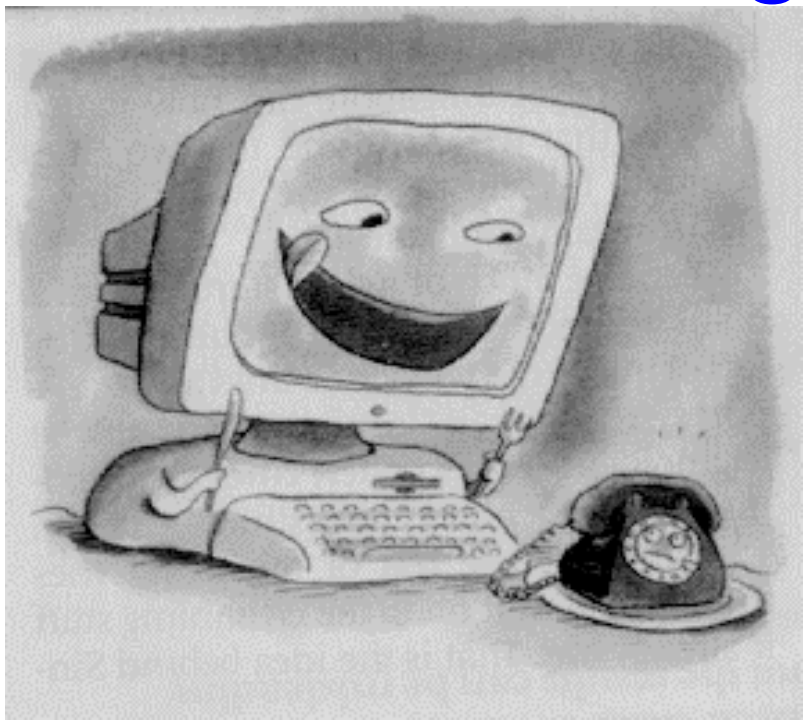
Dr Tim Kelly, ITU

Session 3: Course on Telecom Policy, Regulation and Management, University of Witwatersrand, 6-7 May, 1999



* The views expressed in this presentation are those of the author, and do not necessarily reflect the opinions of the ITU or its membership. Dr Kelly can be reached by e-mail at Tim.Kelly@itu.int

“We started out running the Net on top of the phone system, and we’ll end up with telephony running over the Net.”



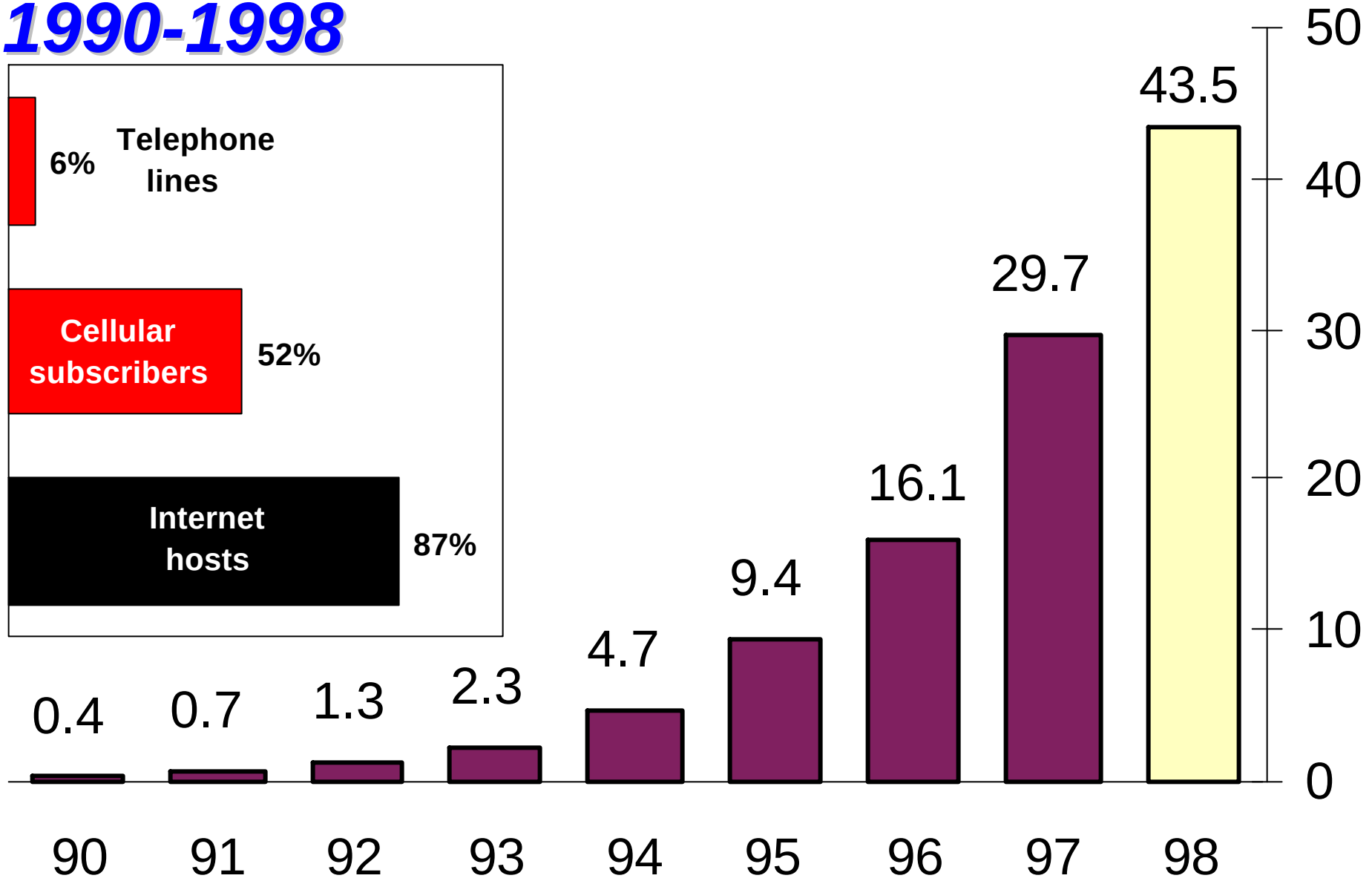
The Economist
May 2nd 1998

Eric Schmidt,
CEO, Novell,
Quoted in
Wired, August 1997

"The Internet changes everything"

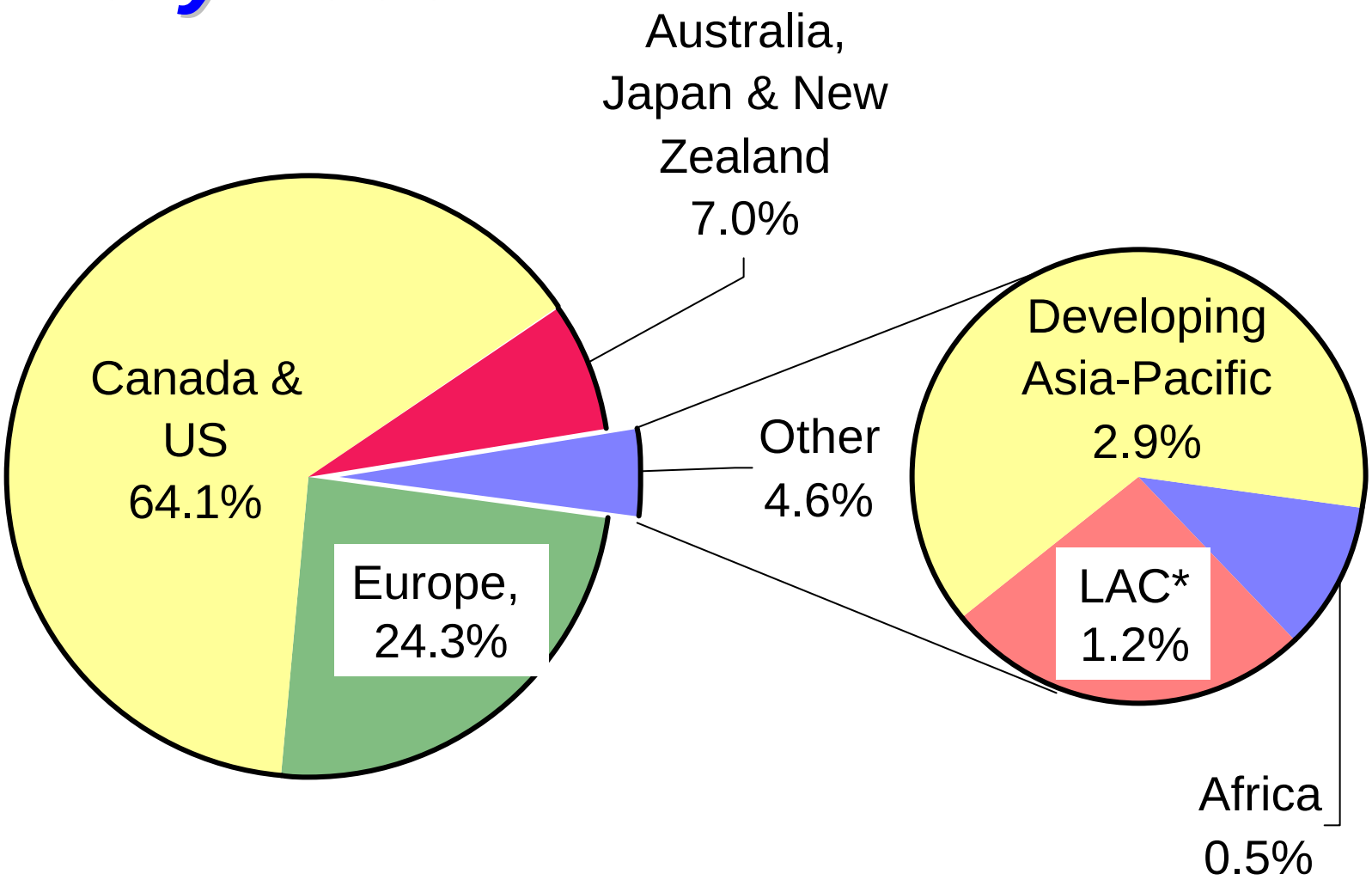
- **The Internet in Africa**
  - ⇨ **High growth, but small share of pie**
- **The Challenge**
  - ⇨ **Network architectures**
  - ⇨ **Retail pricing structures**
  - ⇨ **Wholesale pricing structures**
- **Threats and opportunities**
  - ⇨ **Who wins, who loses?**
- **Scenarios**
  - ⇨ **How will African Telcos fare?**

Internet hosts (million) and growth rates, 1990-1998



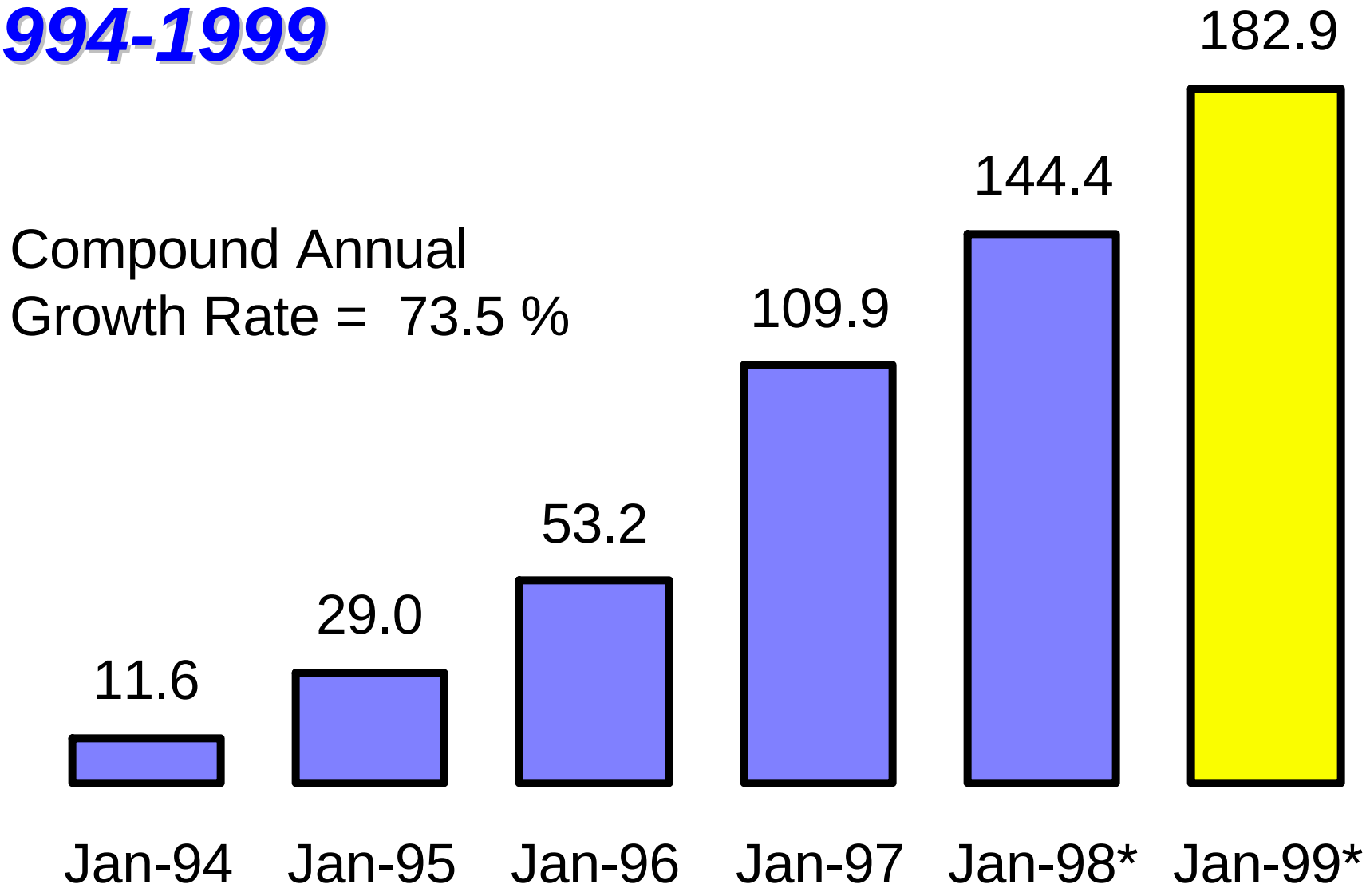
Source: ITU "World Telecommunication Development Report, 1998", Network Wizards.

Distribution of Internet hosts, January 1998



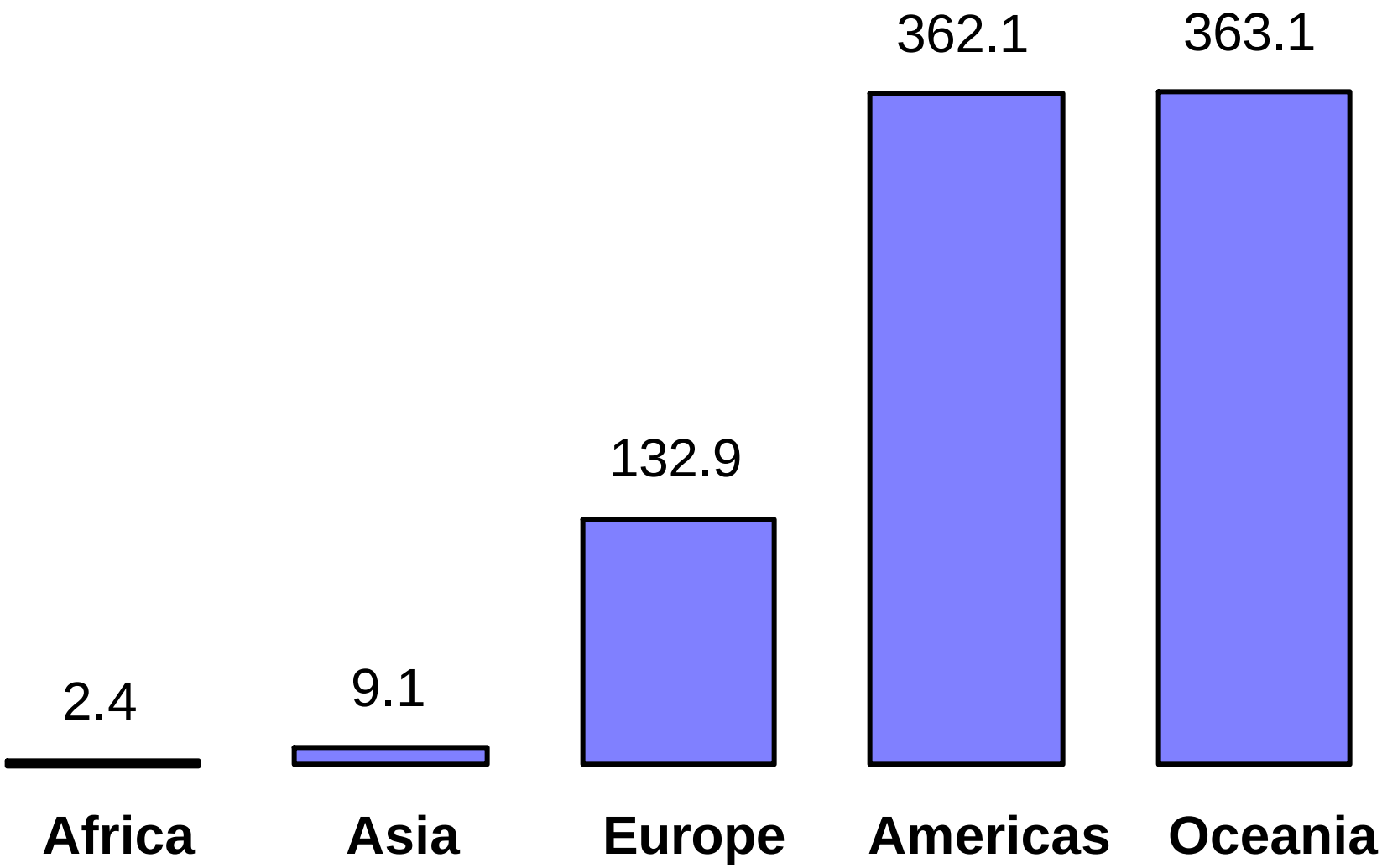
Source: *ITU "Challenges to the Network: Internet for development, 1999".*

Internet hosts (thousands) in Africa 1994-1999



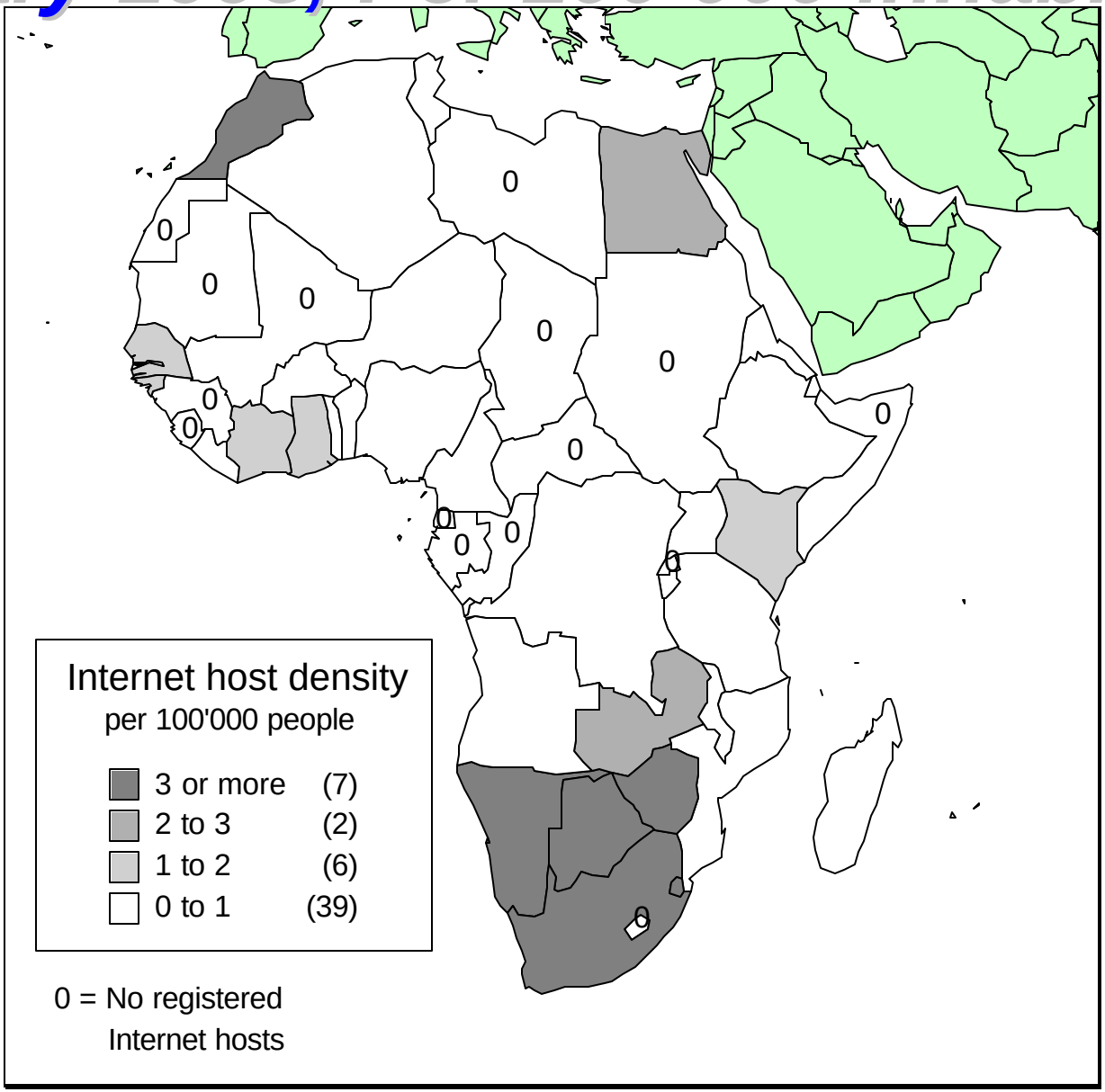
Source: ITU "Challenges to the Network: Internet for Development, 1999", Network Wizards.

Internet host density by region, January 1999, Per 10'000 inhabitants

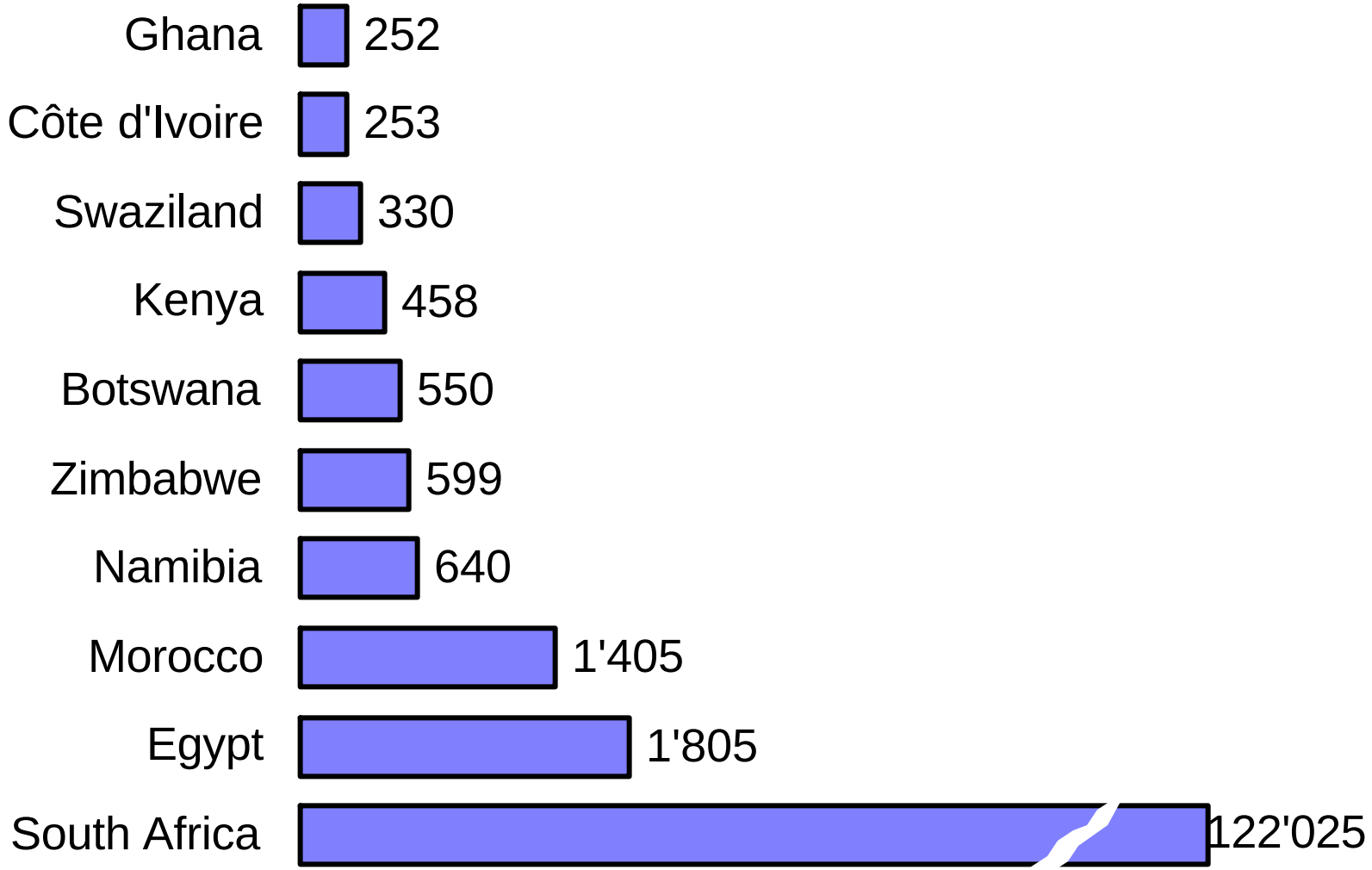


Source: ITU "Challenges to the Network: Internet for Development, 1999", Network Wizards.

Internet host density by country, January 1998, Per 100’000 inhabitants



Internet hosts, top 10 African countries, January 1998



Multimedia ranking of selected African countries, 1997/98

World Rank	Country	Teledensity (97)	TV density (97)	IP host per 10'000 (98)
91st	Mauritius	19.52	22.05	1.77
94th	South Africa	10.72	12.46	31.36
128th	Namibia	6.25	3.17	3.98
140th	Botswana	4.83	2.69	3.63
153rd	Zambia	0.94	7.98	0.21
155th	Zimbabwe	1.72	2.94	0.49
159th	Ghana	0.44	10.91	0.14
169th	Kenya	0.81	1.87	0.14
179th	Nigeria	0.36	6.09	0.00
185th	Tanzania	0.30	2.06	0.01
187th	Mozambique	0.36	0.39	0.04
197th	Ethiopia	0.26	0.51	0.01

Source: ITU "Challenges to the Network: Internet for Development, 1999", Network Wizards.

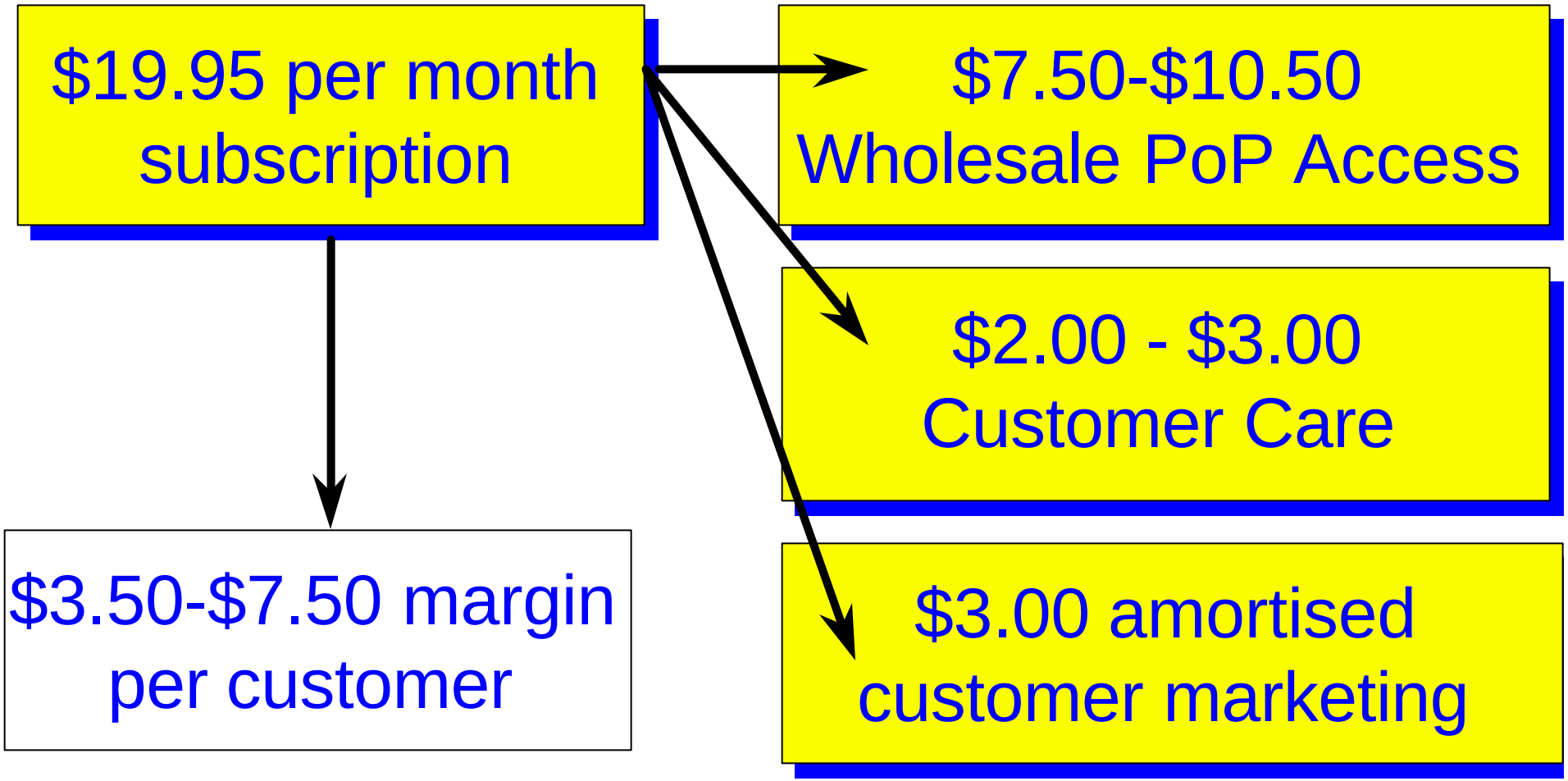
Internet Economics: Five factors that make the Internet different

1. **Packet-switched network architecture**
   - ⇨ **Connection-less not connection-oriented**
2. **Pricing independent of distance & duration**
   - ⇨ **Average message covers 15 or more "hops"**
3. **Peering arrangements, not settlements**
   - ⇨ **Based on a full-circuit regime, not on half-circuits**
4. **Traffic flows highly asymmetric**
   - ⇨ **Dominant flow is to terminal that initiates a session (though this is changing ….)**
5. **The United States sets the rules!**
   - ⇨ **There is no "Internet Telecommunication Union"**

Internet, price and service trends: Retail market

- **Until recently, flat-rate pricing dominant**
  - ⇨ **All you can eat for US$19.95**
- **Now, “Free Internet” becoming highly popular**
  - ⇨ **Price of Internet access cross-subsidised by cost of local calls plus revenue drawn from advertising**
- **Towards lower service quality**
  - ⇨ **“Best efforts” service delivery at lowest price**
- **Cross-promotion of Internet and other services**
  - ⇨ **“Free PC” with three year’s ISP subscription**
- **Tendency towards industry concentration**
  - ⇨ **AOL’s subscriber base > next ten ISPs added together**

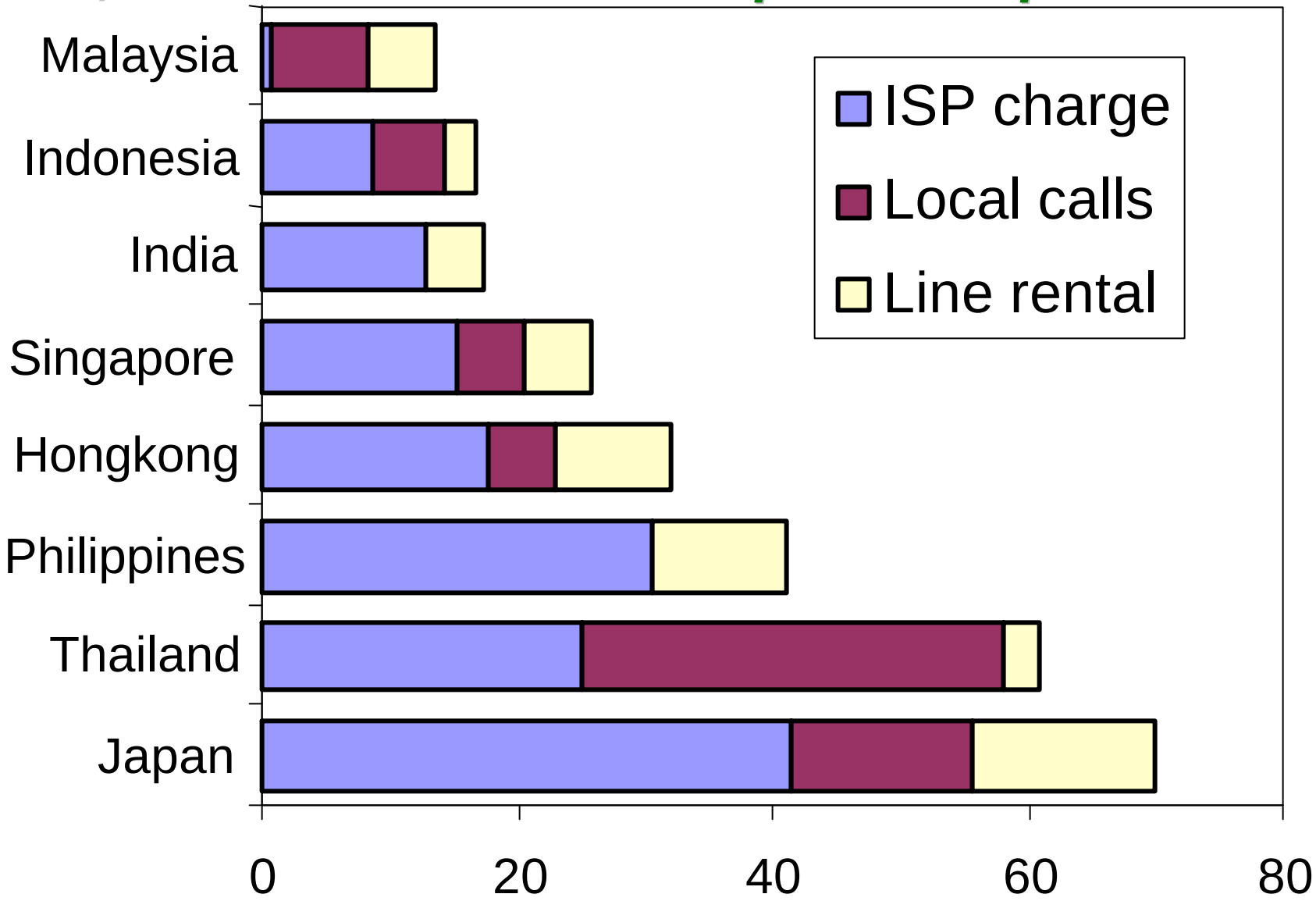
Where does the money go? Typical Internet Service Provider cash-flow



Source: Adapted from Paul Stapleton, ISP$ Market Report, Boardwatch Magazine.

Asia-Pacific, comparative prices,

In US$, based on 20 hours off-peak use per month



Source: ITU "Challenges to the Network: Internet for development, 1999".

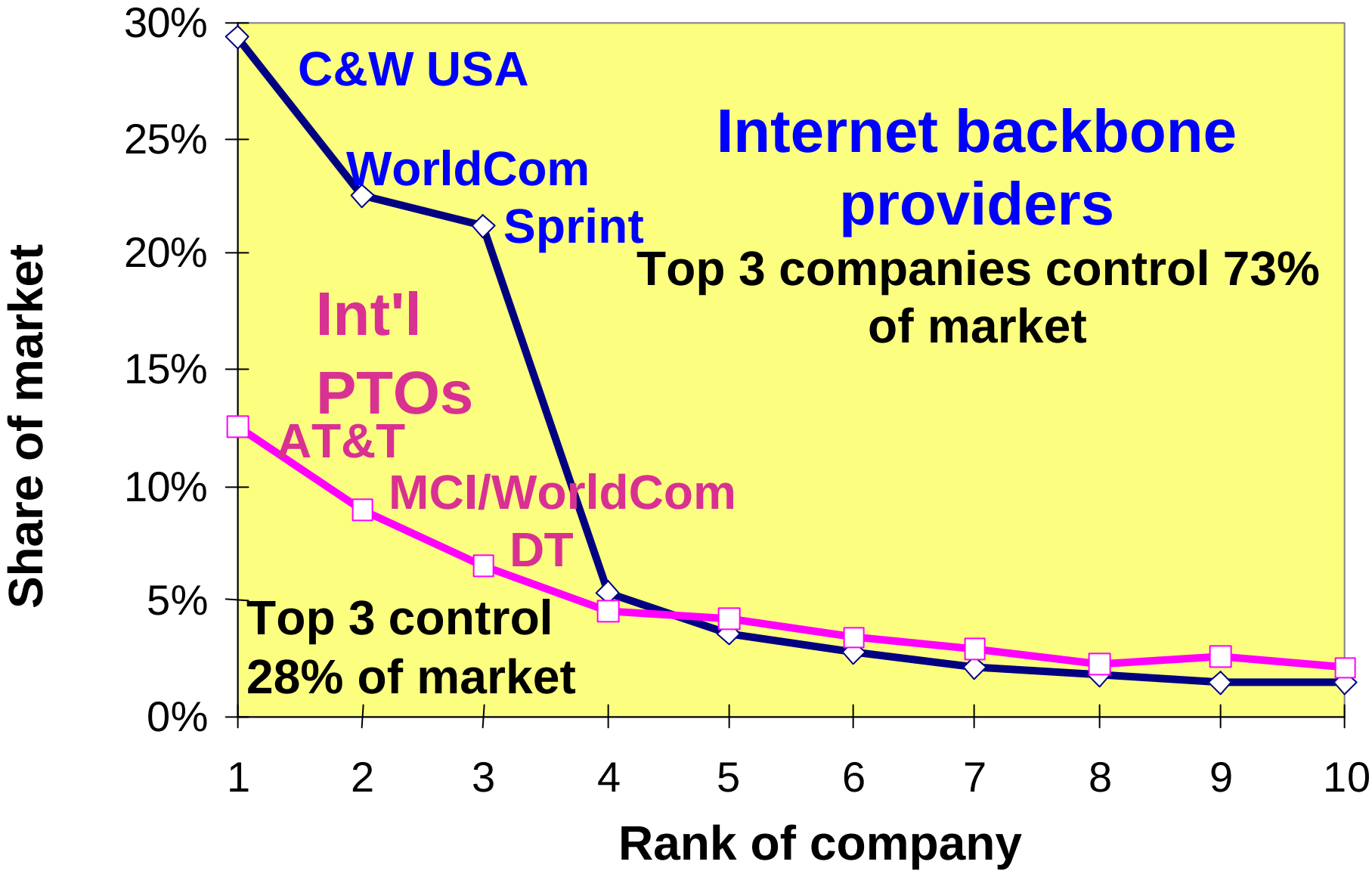
When is a local call not a local call?

- **Internet usage has grown fastest in countries which permit “free” or untimed local calls (e.g., USA, Canada, HK, Australia)**
- **But, PTOs claim that Internet users and ISPs are “free-riding” the network**
  - ⇨ **longer average sessions**
  - ⇨ **asymmetric traffic flows**
- **In countries where local calls are metered, users complain that Internet is too expensive**
  - ⇨ **“Strikes” of Internet users in Germany, France**
- **Rapid take-off of “Free Internet”**
  - ⇨ **Free monthly Internet access in return for loyalty to dial-up local loop service provider**

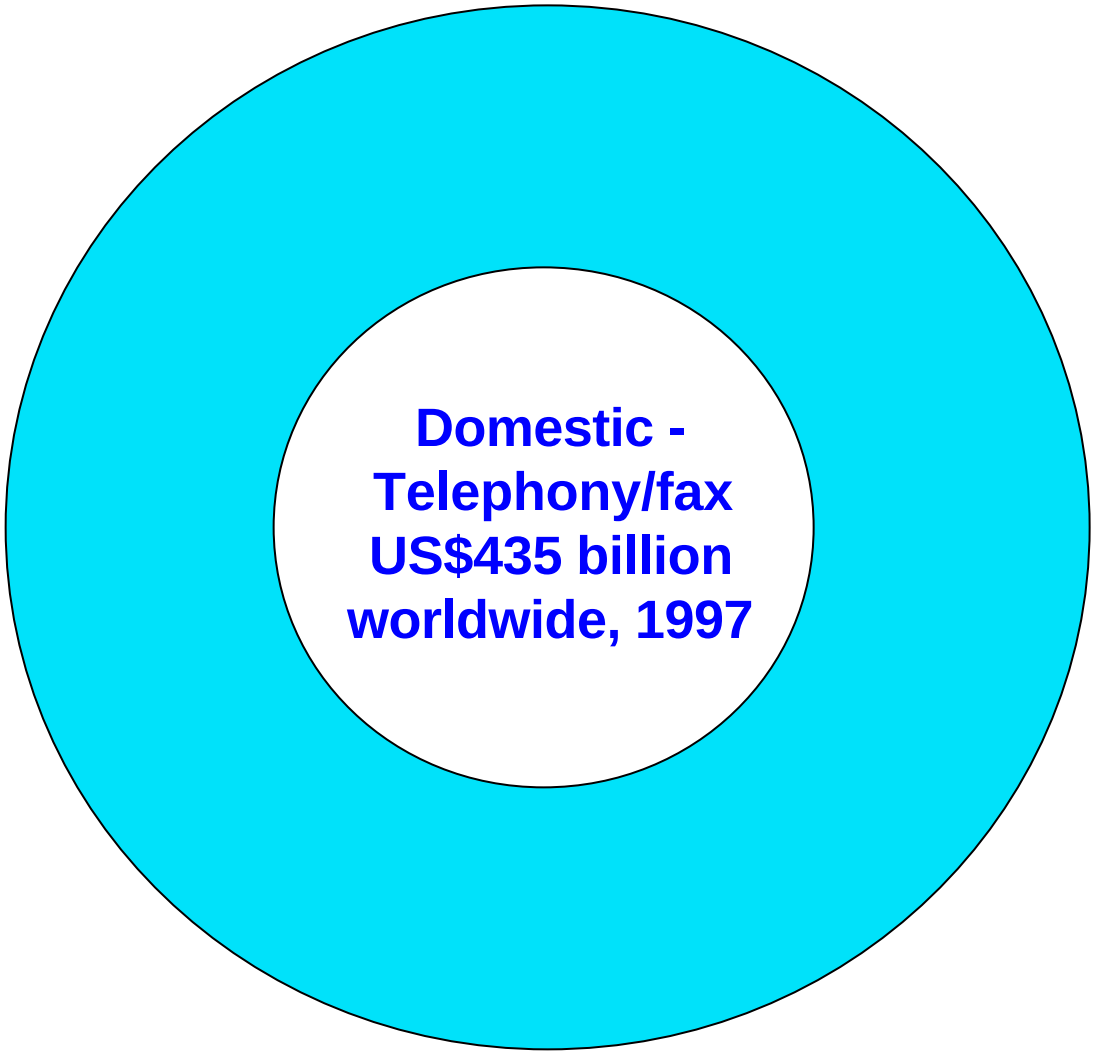
Internet, price and service trends: Wholesale market

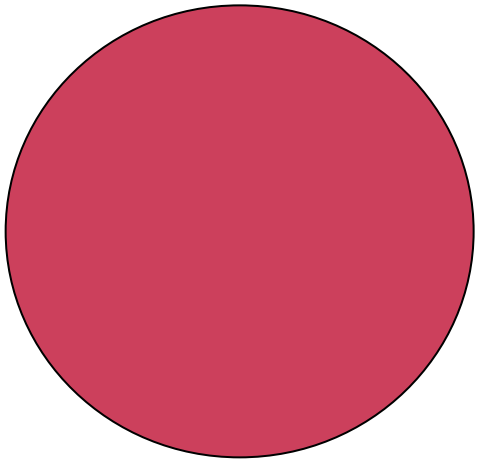
- **Tendency towards industry concentration**
  - ⇨ **Top 3 backbone service providers control > 70% of the market (measured by ISP connections)**
- **Economics of industry driven by hubbing**
  - ⇨ **> 90% of Internet traffic still passes through USA**
- **Peering arrangements being replaced with capacity-based transit payments**
  - ⇨ **Economies of scale forces smaller ISPs to concentrate traffic or surrender independence**
- **Leased line prices are critical to price variations**
  - ⇨ **Full-circuit regime replaces half-circuit telephony regime**

But, Internet backbone market is more concentrated than int'l telephone traffic



Sizing the market





**International -
Telephony/fax
US$65 billion worldwide,
1997**

**Internet Services
<US$2 billion worldwide,
1997**

Source: ITU World Telecommunication Indicators Database, and ITU estimates

Assessing the risk to the Telcos
Where are they most vulnerable?

Fax traffic

Data communications

Public Packet-switched Data Networks

Proprietary e-mail

Electronic news services

International voice

Mobile data services

Managed Data Services

Virtual Private Networks

Paging services

Freephone

National and local voice traffic

Leased circuits

Mobile voice services

Public Switched Network

Maintenance

Local loop

Who gets what …. ?

- **International telephone call @ $3 per 3 mins**
  - ⇨ **Telco which "owns" customer gets a fractional share of line rental (<US$0.01)**
  - ⇨ **Telco originating call gets int'l call charge (US$2.00)**
  - ⇨ **Telco terminating call gets net settlement (US$1.00)**
- **Internet telephony call (dial-up) @ $1 per call**
  - ⇨ **Telco which "owns" customer gets fractional share of line rental plus local call charge (<US$0.10)**
  - ⇨ **ISP which "owns" customer or Inet telephony provider gets fractional share of subscription charge (<US$0.10)**
  - ⇨ **Internet telephony provider gets profit (>US$0.70)**
  - ⇨ **Telco terminating call gets interconnect fee (<US$0.10)**

NB: Settlement payment = 10-100x interconnect fee

Gains and losses ...

	Gains / opportunities	*Losses / Threats*
Developed country Telcos	• Increased demand for leased lines • Additional subscriber lines • Higher value services / e-commerce	• Lower international fax and voice call charges • Markets for e-mail and content lost • Multiple new market entrants
Developing country Telcos	• As above, plus lower barriers to entry to developed country markets	• As above, plus significant reduction in net settlements • Requirement to pay full-circuit costs

Winners and losers ...

Factor	*Winners*	*Losers*
Erosion of settlements system	**Telcos with big deficits (e.g., AT&T, Sprint, MCI/WorldCom)**	**Telcos with big surpluses (e.g., Nitel, Telkom SA, KPTC)**
Increased demand for leased lines	**Infrastructure suppliers (e.g., Project Oxygen, INTELSAT)**	**Developing country Telcos locked into long-term supply agreements**
“All calls are local calls”	**Telcos with measured local service**	**Telcos with “free” local calls**
“Own” the customer	**Local loop providers**	**Long-distance service providers**

Possible scenarios

- **African Telcos win locally, but lose globally**
  - ⇨ **Small, start-up ISPs are acquired or put out of business by African Telcos. However, on the global scale, voice migrates to IP and no new arrangements are realised for more equitable IPL cost-sharing**
- **African Telcos win locally, and win globally**
  - ⇨ **As above, but more equitable arrangements are reached for carriage and termination of IP traffic, and voice stays on circuit-switched networks**
- **Africa Telcos lose locally, but win globally**
  - ⇨ **African Telcos lose local ISP market permanently but retain most international voice traffic**
- **African Telcos lose locally and globally**
  - ⇨ **Both local and international traffic is lost to ISPs**