# On the classification and value of communications
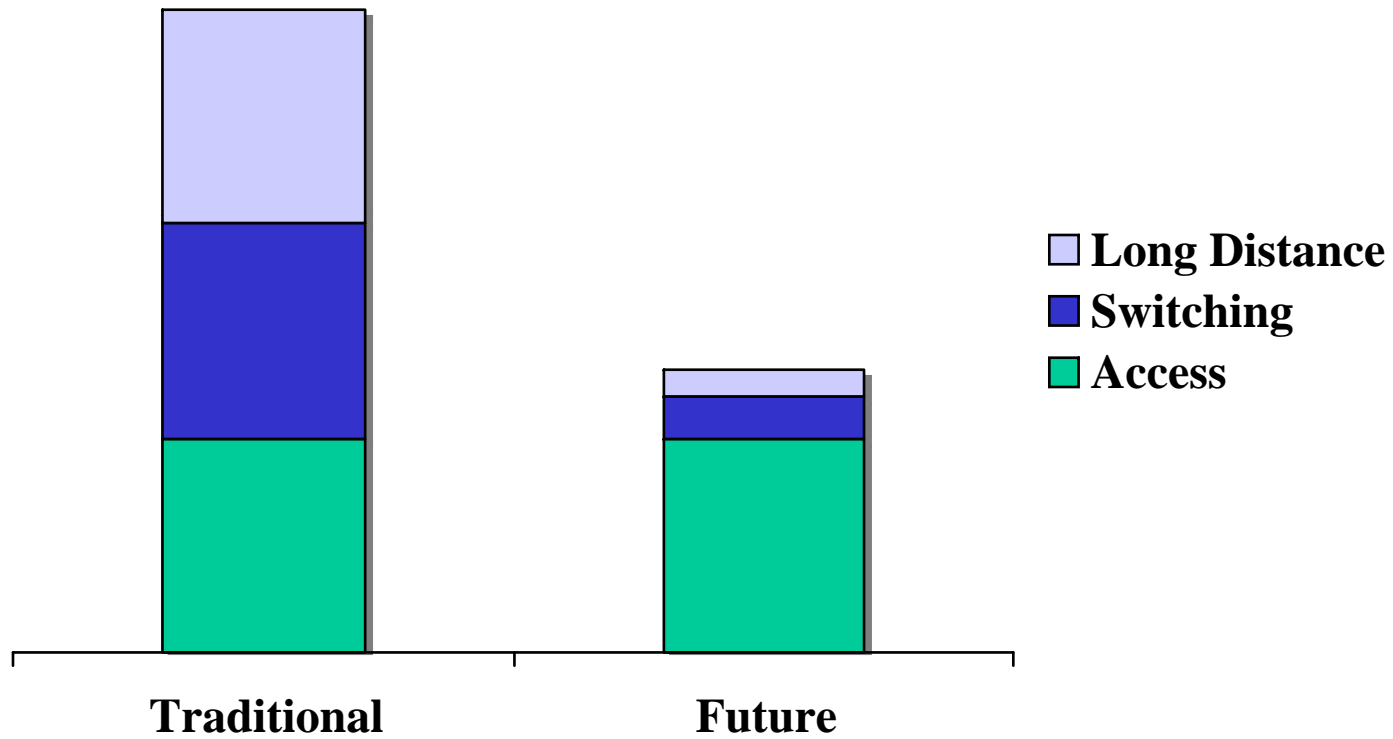
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# *Telecom Costs*



Legend:
- Long Distance
- Switching
- Access

Traditional    Future

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# *Size of telecom industry:*

- world GDP: approx. $70,000 B

- world telecom service revenues almost $2,000 B

- world advertising: approx. $500 B

- Google worldwide 2011 revenues: $38 B

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# *Where are the money and the traffic?*

- world revenues: more than half from wireless

- world revenues: mostly from voice, texting second

- traffic: about 40,000 PB/month at year-end 2012, around 5% from wireless, under 1% from voice

- Level 3 (incl Global Crossing and CDN arm): around 10% of world traffic, 2011 revenues of $6 B

- Akamai: 2011 revenues of $1.2 B

# *Revenue per MB (v. approximate)*:

- SMS:                                                    $1,000.00

- cellular calls:                                         1.00

- wireline voice:                                         0.10

- residential Internet:                                   0.01

- backbone Internet traffic:                              0.0001

## US wireless industry statistics

| year | revenues $B | capex $B | capex/revenues |
|------|-------------|----------|----------------|
| 2004 | 102.1 | 27.92 | 27.3% |
| 2005 | 113.5 | 25.24 | 22.2 |
| 2006 | 125.5 | 24.42 | 19.4 |
| 2007 | 138.9 | 21.14 | 15.2 |
| 2008 | 148.1 | 20.17 | 13.6 |
| 2009 | 152.6 | 20.36 | 13.3 |
| 2010 | 159.9 | 24.89 | 15.6 |
| 2011 | 169.8 | 25.32 | 14.9 |

# 4 dimensions of communications technology:

- volume: How much data can it transmit?

- transaction latency: How long does it take to do something?

- reach: Where can the service be provided?

- price: How much does it cost?


- reliability, …

# *Quantitative measures:*

◆ Sarnoff's Law: Value of content distribution network grows like n

◆ Metcalfe's Law: Value of connectivity network grows like $n^2$

◆ Briscoe, Odlyzko & Tilly: Metcalfe's Law wrong, value of general connectivity network grows like n*log(n)

n*log(n) grows faster than n, but difference is sufficiently slow to enable the "content is king" dogma to persist

n = number of participants

# *Other quantitative heuristics:*

◆ Value of bandwidth (or computing, or storage) as proportional to log of raw capacity: 10 bps, 1 Kbps, 1 Mbps, and 1 Gbps links have approximate values 1, 3, 6, and 9

◆ Locality: gravity models, with intensity of interaction between populations of sizes X and Y at distance d proportional to X*Y/d

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