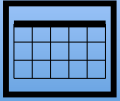


What a Ride! The Last
Decade of the Internet

What a Ride! The Last
Decade of the Internet
and a peep into the next

Geoff Huston
APNIC

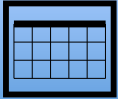


Remember 2002?



The EURO Currency is Launched





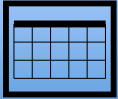
Remember 2002?



Switzerland joins the UN



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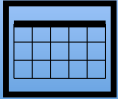
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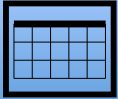
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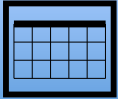
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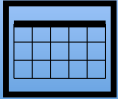
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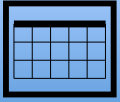
Brazil defeats Germany to win the FIFA World Cup



Remember 2002?

Still Struggling?
How about these?

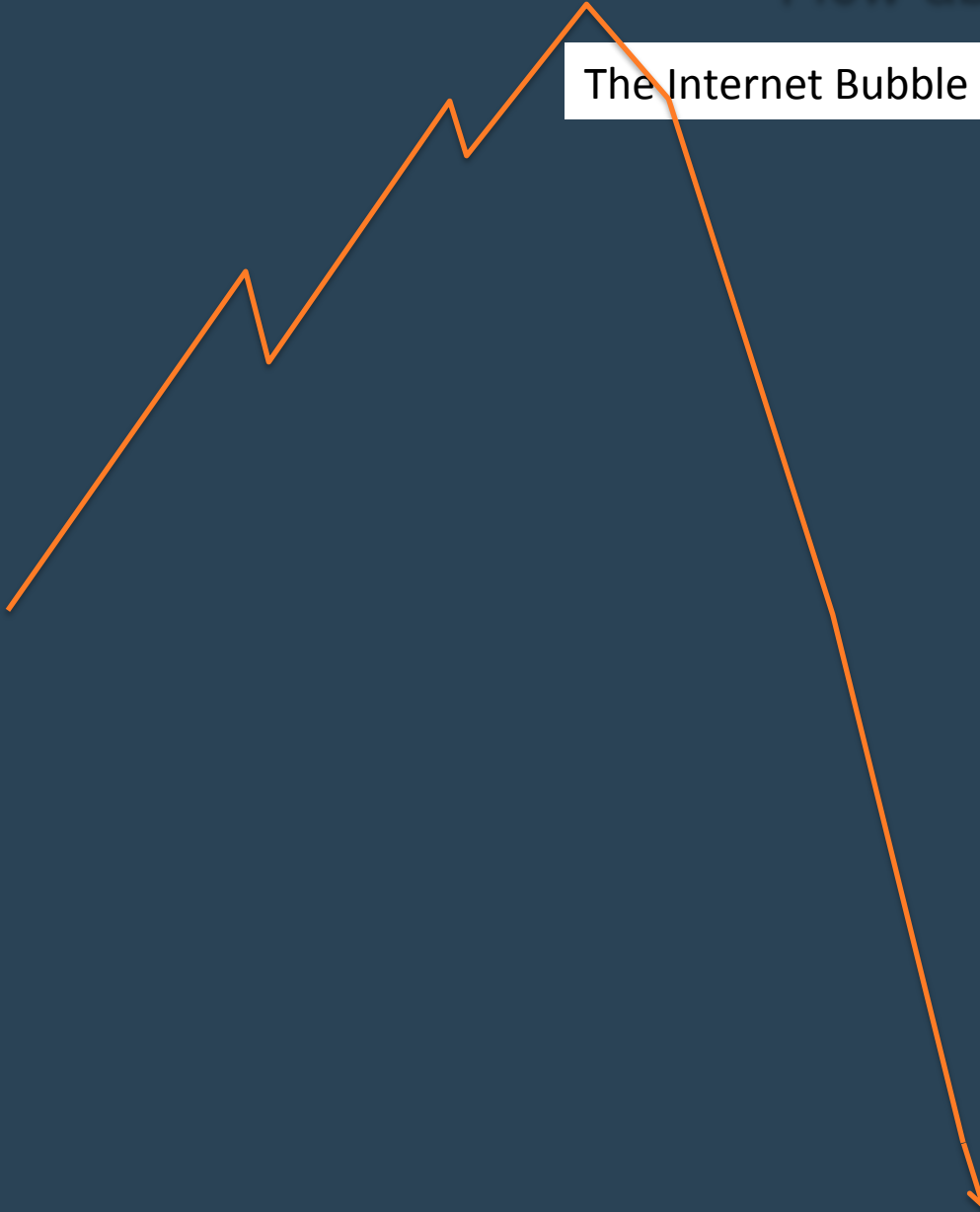


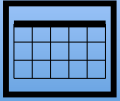


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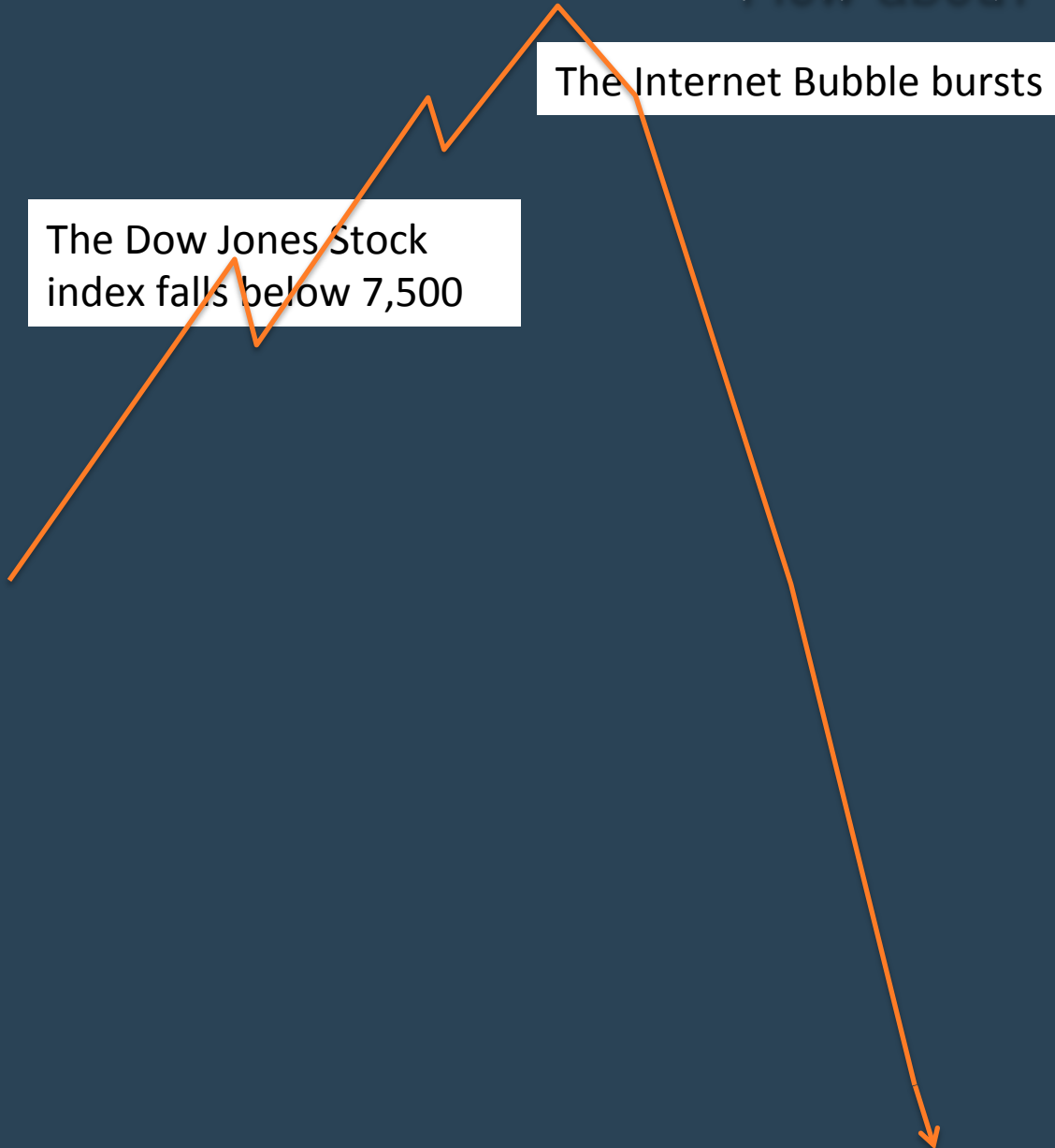
The Internet Bubble bursts

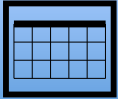




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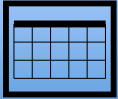
Still Struggling?
How about these?

The Dow Jones Stock
index falls below 7,500

The Internet Bubble bursts

Worldcom files for bankruptcy with assets
valued at \$103B (the largest to date in the US)

Sep 2008: Washington Mutual \$327B , Lehmann Bros \$ 691B



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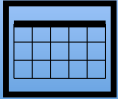
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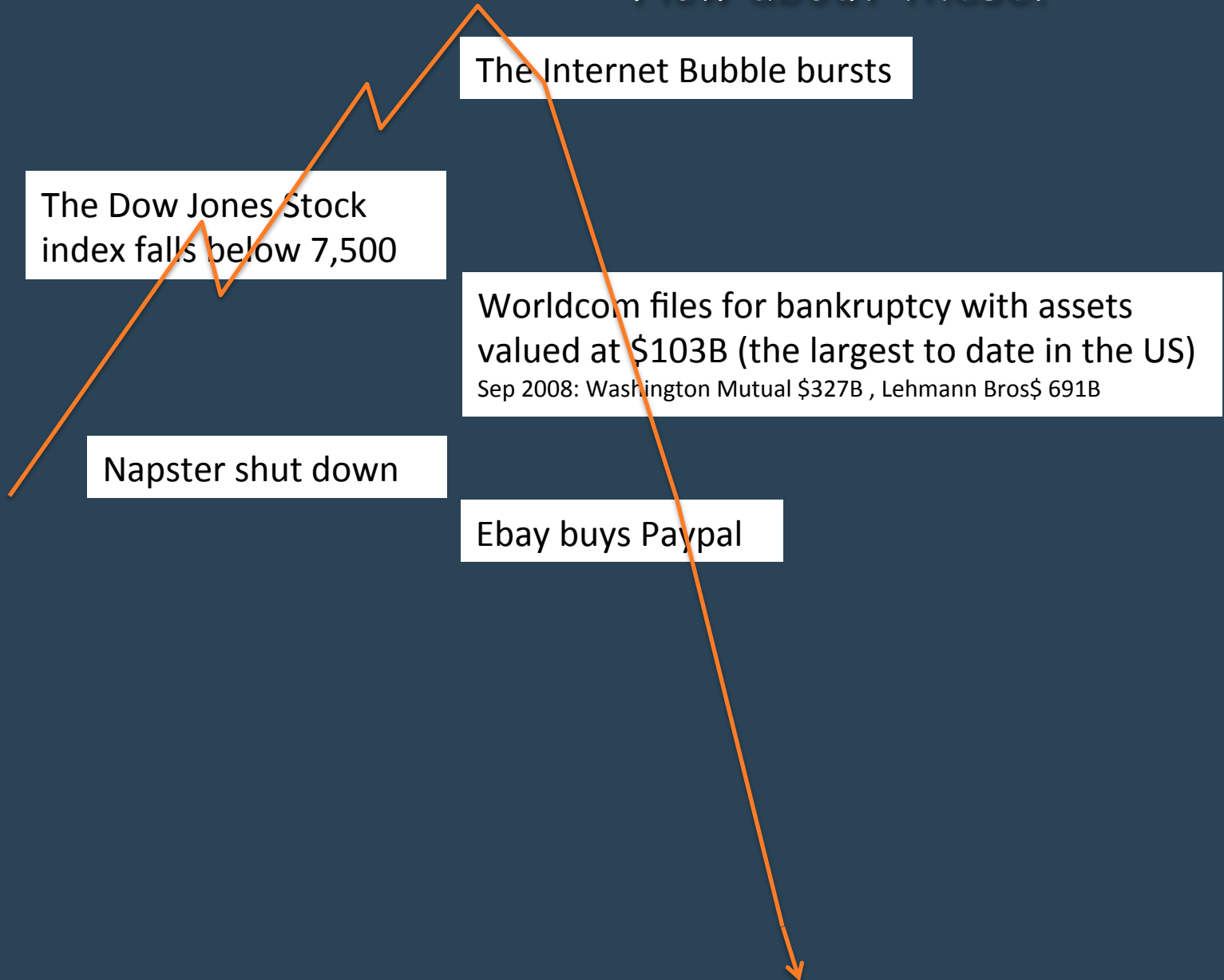
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Napster shut down



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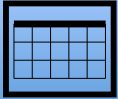
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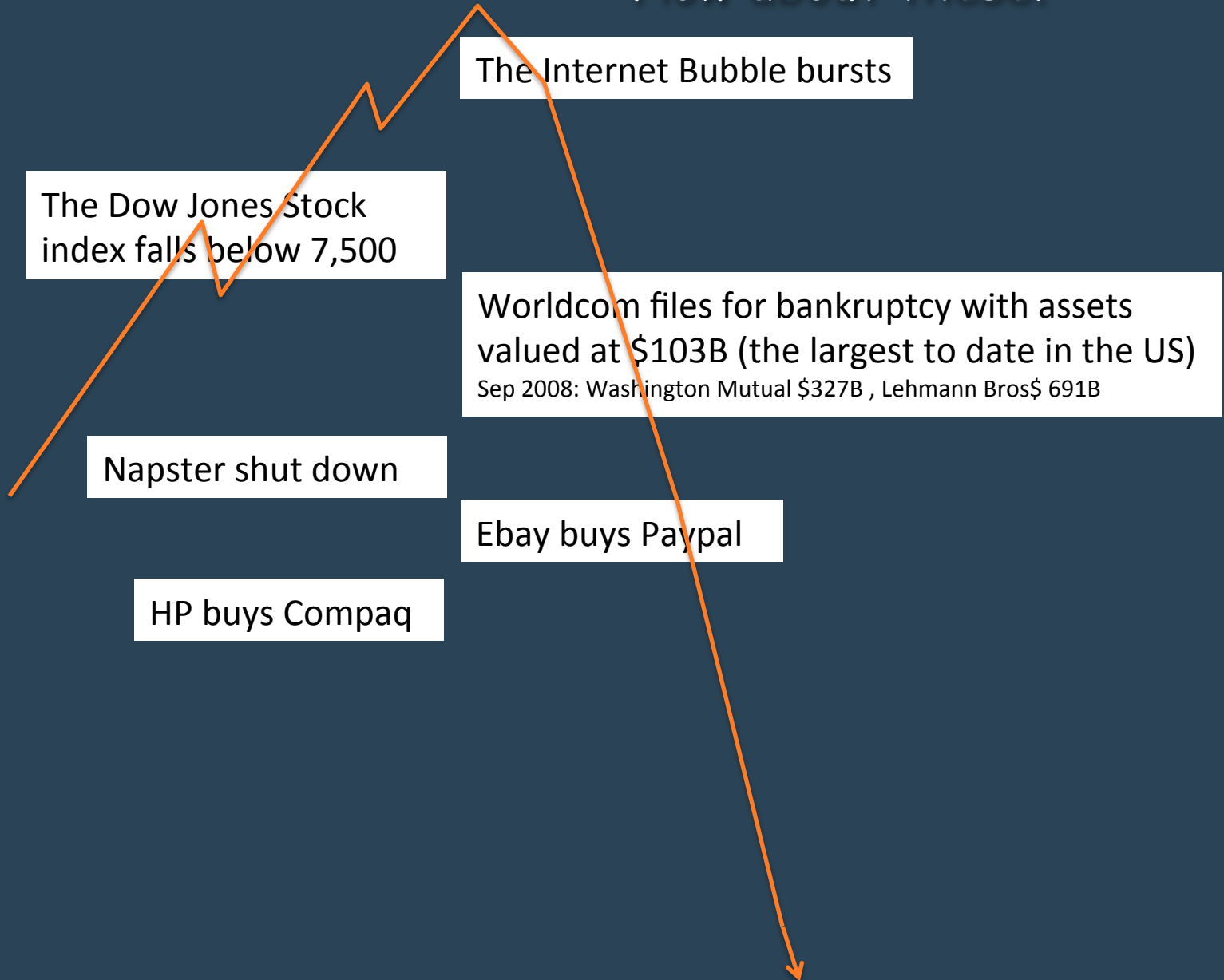
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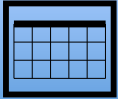
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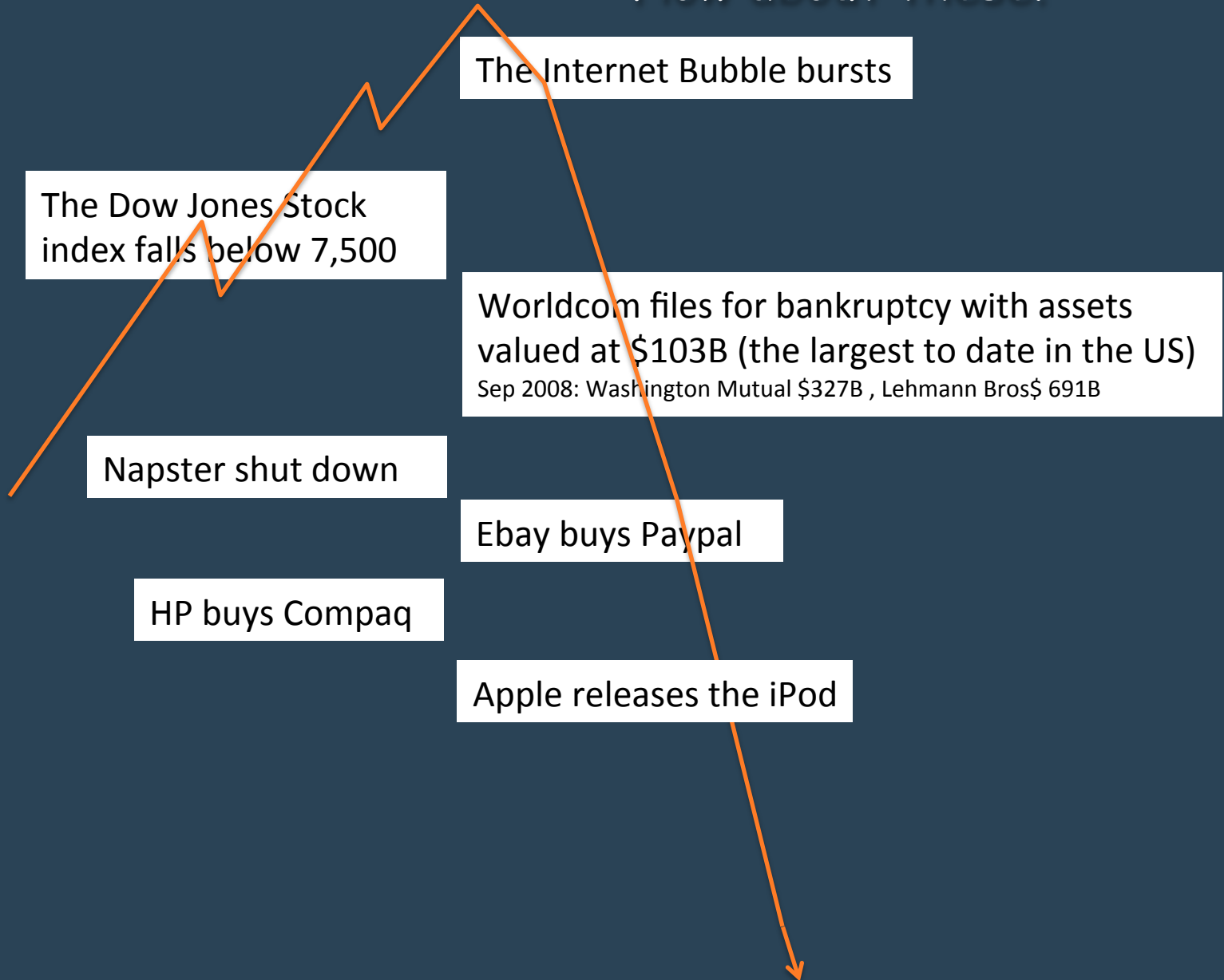
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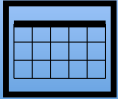
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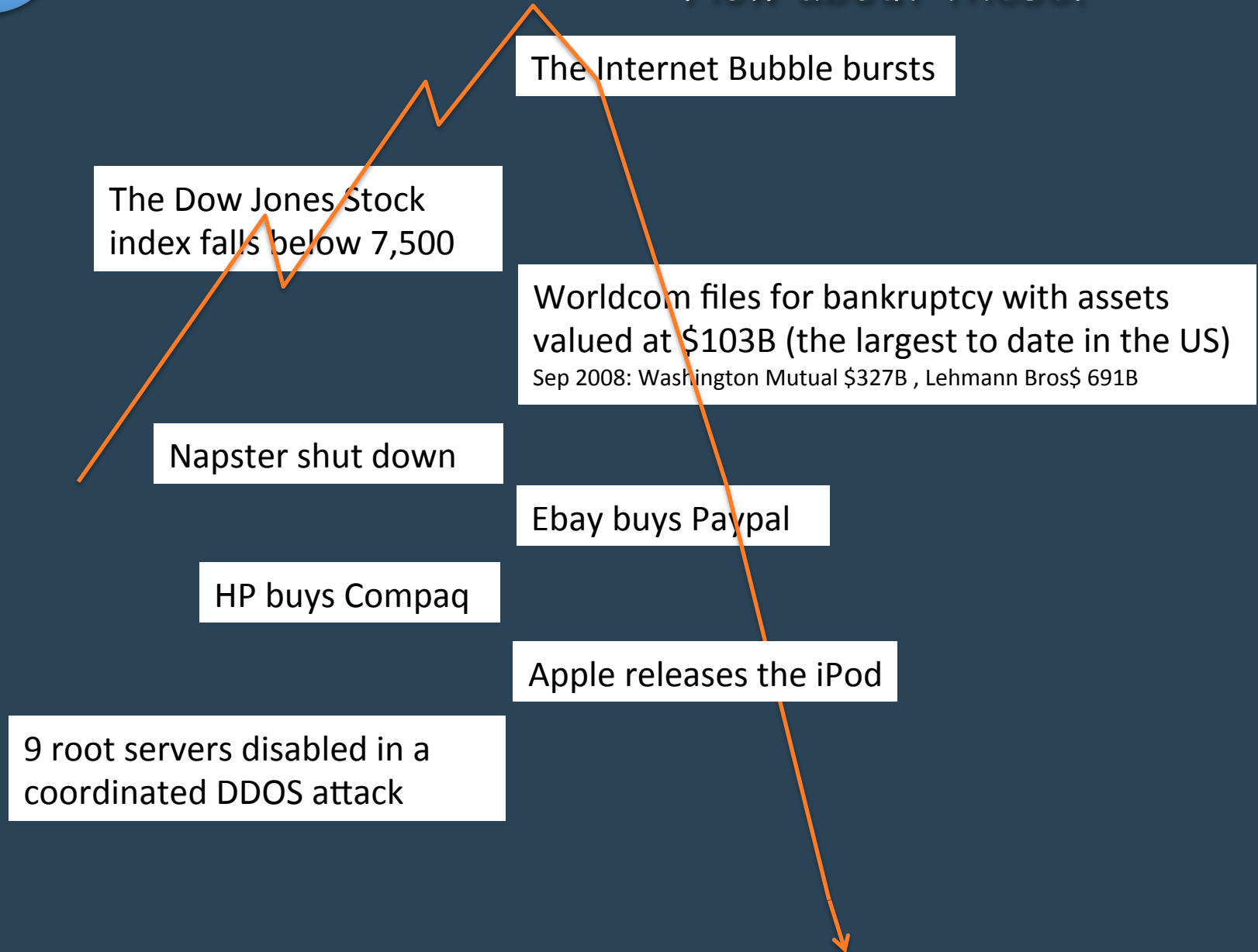
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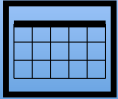
Apple releases the iPod



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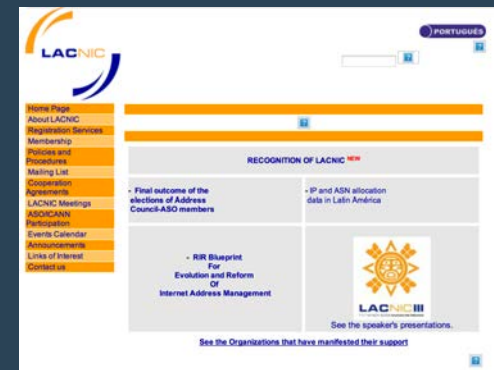
Ebay buys Paypal

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Apple releases the iPod

9 root servers disabled in a
coordinated DDOS attack

LACNIC was formed!



2002

The Internet in 2002

569 million online users

900 million GSM users



2002

The Internet in 2002

569 million online users

Web 2.0 Web Services were hot

900 million GSM users

Web Portals were not



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Laptops were cool

Large PCs were a tiny bit yesterday



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569 million online users

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Friendster had 3 million users

900 million GSM users

Web Portals were not

XML was not

Large PCs were a tiny bit yesterday

Look Smart was dead



2002 The Internet in 2002

569 million online users

Web 2.0 Web Services were hot

WAP was cool

Laptops were cool

Friendster had 3 million users

Windows XP was the OS of the day

900 million GSM users

Web Portals were not

XML was not

Large PCs were a tiny bit yesterday

Look Smart was dead

Mac OS was not



What's happened since
then?



THE INTERNET

A Decade Later

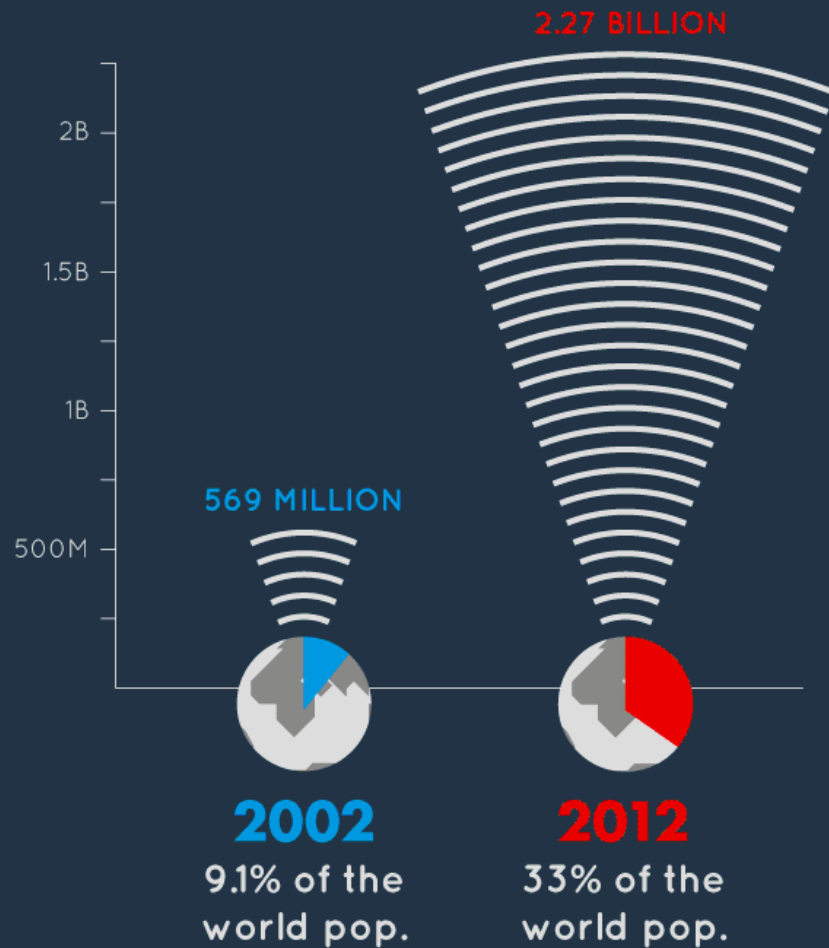


Who would've thought this possible?



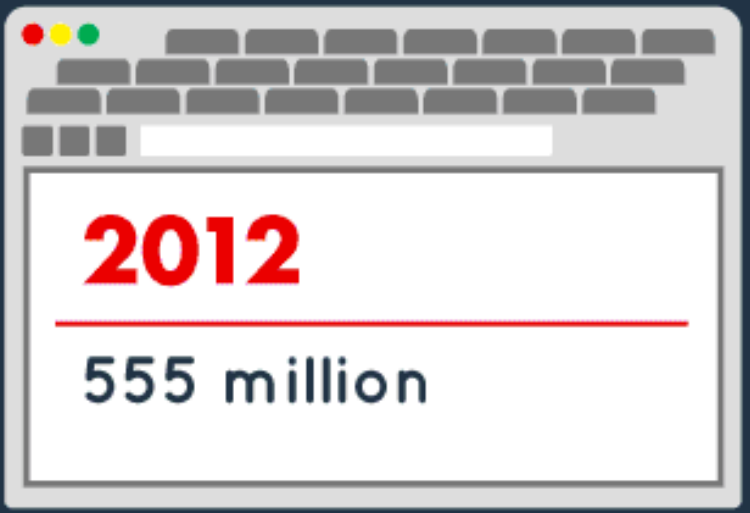
Internet Users

More users





Total Websites



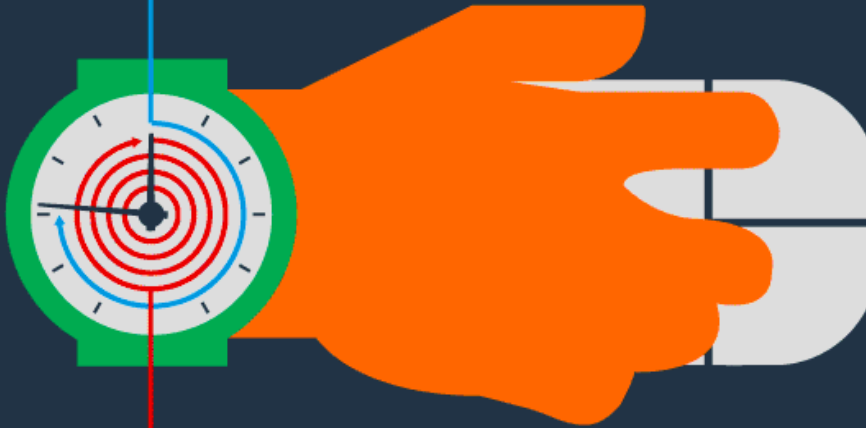
More to see

2002

46 minutes
a day



Internet Usage



2012

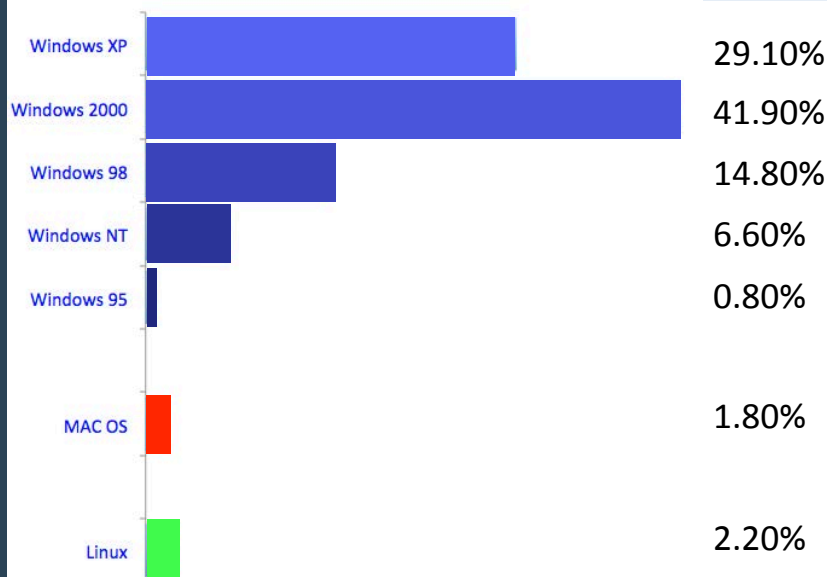
4 hours a day

More time looking



Operating Systems

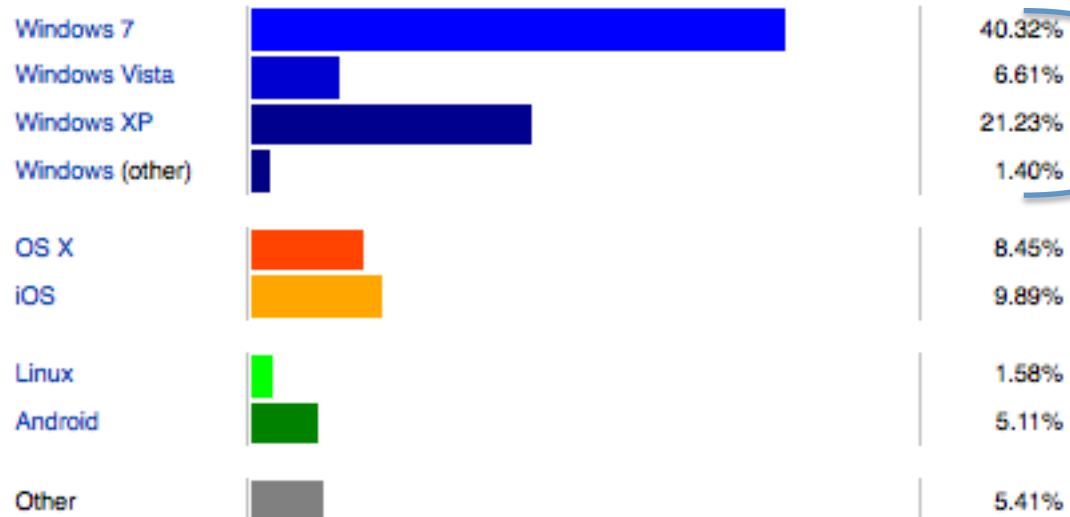
Operating system statistics for 2002



Windows: 96%



Operating system statistics for 2012



Windows: 70%

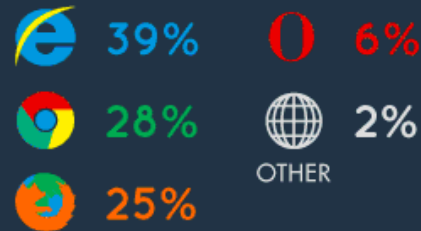
Usage shares of operating systems as of September 2012^[1]



2002



2012

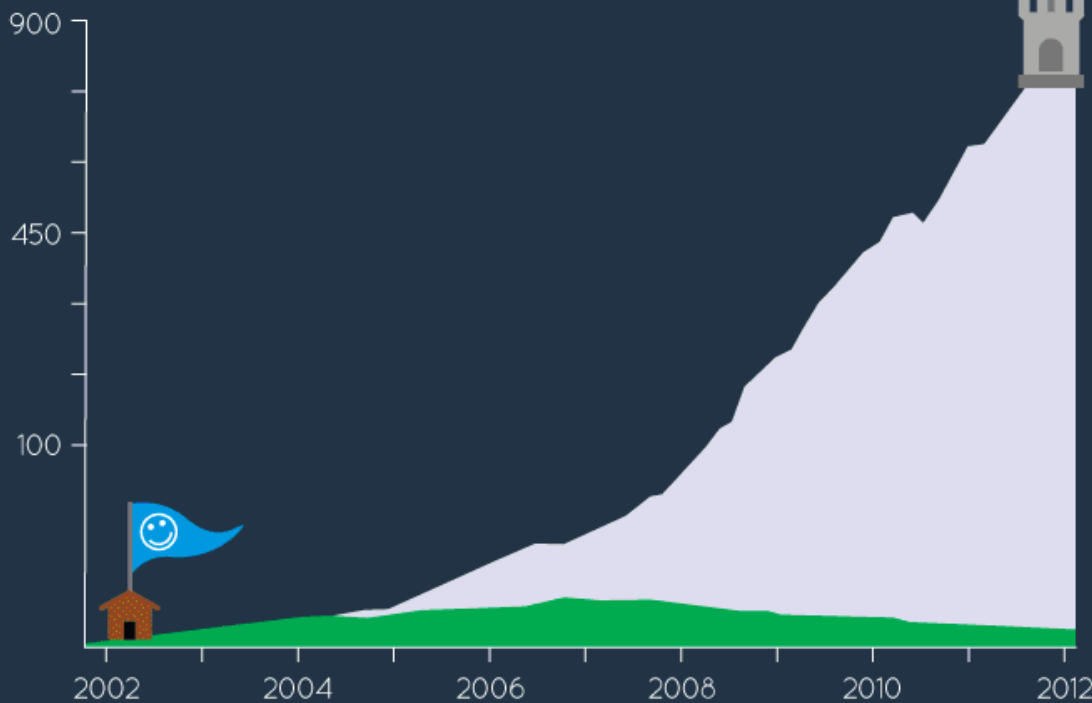


Web Browser

More browsers



Social Networking



WORLDWIDE UNIQUE VISITORS (IN MILLIONS)

2002

Friendster launched and had a whopping 3 million users.

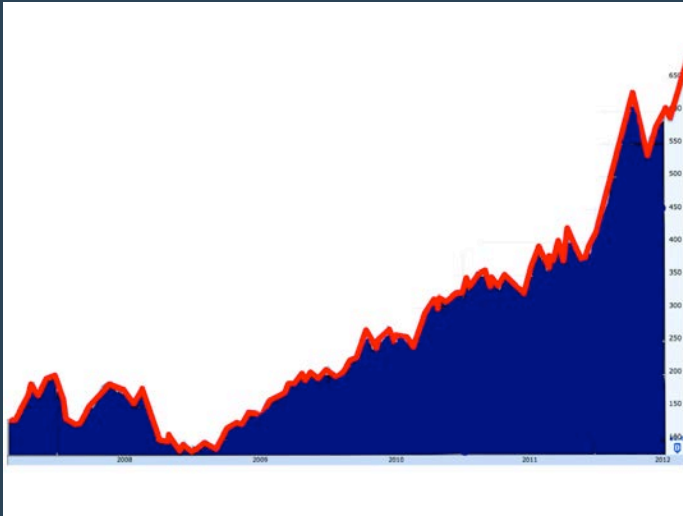
2012

The #1 social network site is Facebook with 900 million users.



The twitter-verse now runs at more than 340 million tweets per day.

Winners and Losers



Winners and Losers



Blockbuster – Video Rental

2002: Revenue \$5.5B

2010: Bankrupt

The Netflix logo, featuring the word "NETFLIX" in white, bold, sans-serif capital letters on a red rectangular background.

NETFLIX

Netflix – Online Video

2002: Revenue \$150M

2012: Revenue \$3.2B

Winners and Losers



Borders – Retail Books

2003: 1,249 stores worldwide,
\$3.2B sales

2011: Bankrupt



Amazon– Online Books and more

2002: \$2.8B sales

2012: \$18B sales

Winners vs Losers

**TOWER
RECORDS**

Tower Records – Retail Music

2002: 200 Stores, \$800M sales

2006: Bankrupt



iTunes– Online music

2003: Started

2012: 20 billion songs sold

\$6B sales

All these changes point to a massive shift in online channels to retail sales for entertainment services.



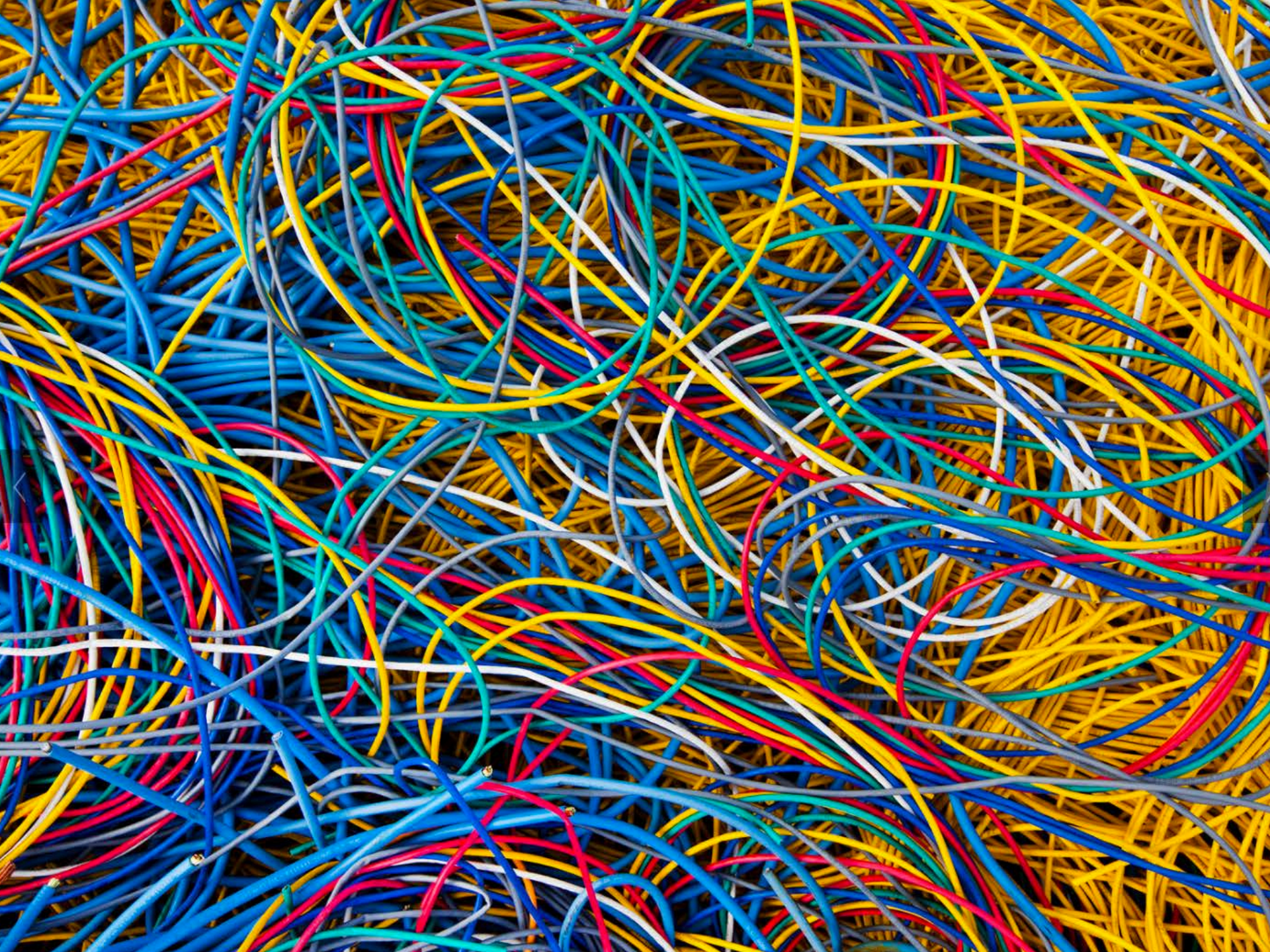
And its not just online books and music...

- Free-to-air advertisement revenues are falling, and many TV broadcasters are in trouble
- Print media advertisements are falling, and print newspapers are in trouble

And all this happened in just 10
years...

But the real driver for
change in the last decade
was not the shift in
advertising and retail
business models.

The real shift was away
from wires...



The real shift was
achieved in a wireless
device that just worked
brilliantly...



iPhone

And it has changed
everything...

PLACED UPON THE HORIZON (LASTING SHADOWS)

Grand View Design and the Institute without Boundaries

MASSIVE CHANGE

The Future of Global Design

WORLD PREMIERE
October 2, 2004 to January 3, 2005



With desktop devices the Internet was a dedicated activity



reliable power

lighting

privacy

large view screens

dedicated worktop

wired bandwidth

dedicated chair

The Internet is now anywhere and everywhere



hand sized

battery power

Thumb operated

radio connectivity

Its trivial, commonplace and blends into all our activities

"We are now living in a post-PC world"

"We are now living in a post-PC world"

Intel slides on PC slump

INTEL'S profit dropped 14 per cent in the third quarter, underscoring tough times for the personal computer sector amid competition from tablet-style devices and other headwinds.

The big chipmaker, whose microprocessors power most desktop PCs and laptops, said it was significantly scaling back production in the fourth quarter in response to weaker than expected demand. Intel said that move would cause it to take \$US500 million (\$485m) in charges for excess production capacity, triggering a big decline in its closely watched gross profit margin for the quarter.

emerging countries that have propelled the computer sector lately.

As it turned out, Intel's revenues in the third quarter came in a bit higher than the company predicted, and Intel said revenue should rise 1 per cent in the fourth quarter from the period ended in September. But analysts said they saw troubling signs in the current period, including the capacity charges and indications of pressures on chip prices.

The company reported net income for the period of \$US2.97 billion, or 58c a share, down from a profit in the year-earlier period

The Australian
18 October 2012

Where to from here?



5 Years Out



It's a mobile world!

2011: 270 million mobile units shipped

Factors:

- **Production volumes are bringing down component unit cost**
- **Android is bringing down software unit cost**
- **No need for new content - leverage off the the existing web universe of content**
- **Shift away from the desktop and the laptop by the production industry seeking new markets for their production capability**

In the next five years...



we have a choice...

In the next five years...



Everything gets
squashed into
HTTP, IPv4 and
CGNs

IPv6

And its not yet clear
which path the Internet
will take!

And its not yet clear
which path the ~~Internet~~
will take!

market forces

Can we look further out?

10 Years Out?



My personal view...by 2022

The Internet will be all IPv6 by 2022!

The market in IPv4 trading is a short term phase
CGNs also have near term limits under intense
scaling pressure

There is no extended afterlife in store for CGNs +
IPv4 if we make this transition to IPv6

(look at what happened to DECnet, SNA, Appletalk, X.25,...)

My personal view...by 2022

Radio spectrum will become even more of a scarce and highly valuable asset

well it is already, but the competition for spectrum in highly populous areas will continue

Fewer wide area services - more cellular / femtocell services backed by fibre backhaul to improve spectrum efficiency

My personal view...by 2022

Cloud / Data Centre services may well have peaked by 2022 and be on the decline again

Innovative competitive pressure at this time may well come from highly distributed systems that do not rely on intense concentrations of computation and information storage

20 Years Out?



My personal view...by 2032

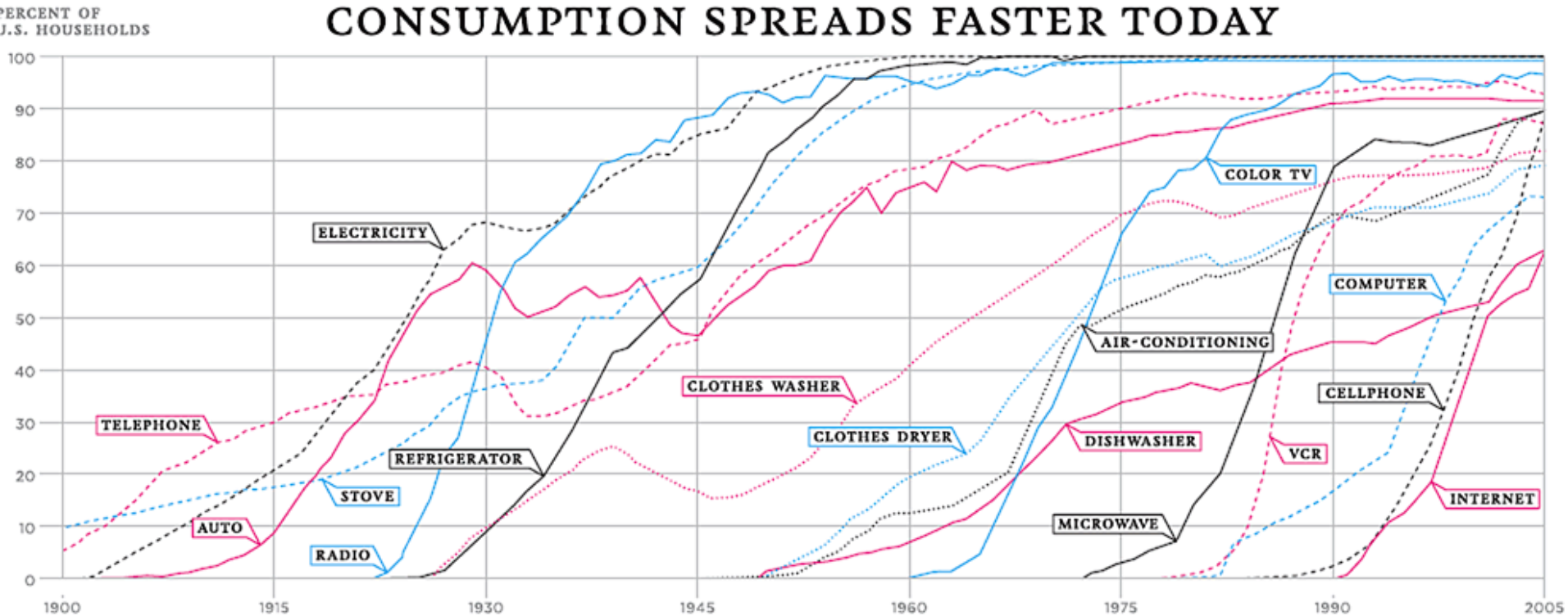
This is extremely tough!

very little from the world of 1992 is still with us today

very little of today's environment will be persistent for the next two decades

Why?

As the pace of technology adoption gets faster we cycle through successive generations of technologies at ever faster rates



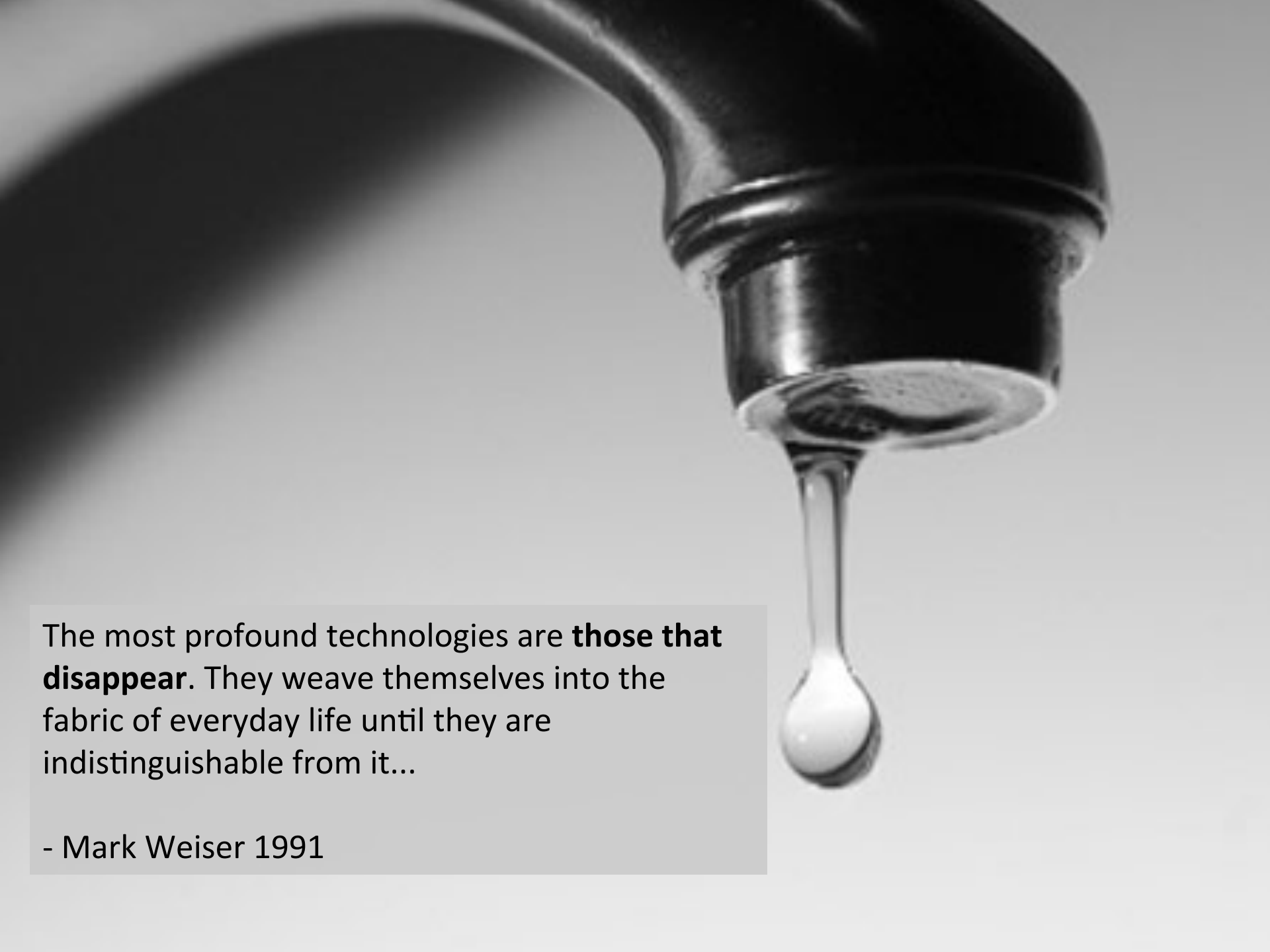
What's shaping our future?

You and i

What's shaping our future?

You and i

We need to think about a post-PC world where computation, storage and communications are abundant commodities. It's innovative mass-produced consumer devices and services that will shape much of the Internet's future. And the innovative force here is one of constant technology refinement and evolution!

A black and white photograph of a faucet with a single drop of water falling from it. The faucet is dark and metallic, and the water drop is clear and teardrop-shaped. The background is a light, neutral color.

The most profound technologies are **those that disappear**. They weave themselves into the fabric of everyday life until they are indistinguishable from it...

- Mark Weiser 1991

Thank You!