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# The Web in 2010

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# Technology

Moore's law (underlying technologies): performance/cost doubles every 18 months

- processing
- storage
- displays and imagers
- communications

Main impact is on reducing cost

Major recent gains in power-efficiency

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# The Web in 2010 - technology

- gigabit feeds to 100Mbit wireless access points
- more than a billion hosts
- several billion clients - fixed and mobile
- petabyte servers and petaflop supercomputers
- an immense amount of online information - over a zetabyte

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# Some useful units

- 1 terabyte = 1000 gigabytes
- 1 petabyte = 1000 terabytes
- 1 exabyte = 1000 petabytes
- 1 zetabyte = 1000 exabytes
  
- 1 LOC (Library of Congress) = 100 terabytes
  
- Everything written, composed, filmed, recorded = 1 exabyte

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# The Web in 2010 - content

- text, numbers
- audio, pictures, movies, animations
- themes, programs
- real-world overlays, experiences
- histories, geographies, memories, trails

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# The Web in 2010 - services

- computing
- asset management
- archiving
- content-based retrieval
- commerce
- transcoding
- high performance computing
- ...

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# The world is changing

I will be able to

- look up anything
- obtain and place contracts
- access vast computational resources
- work in a team
- buy and sell things
- buy and sell content (the 'weightless economy')
- ...

from

- my house, my office, the park, the beach ...

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# The web for nomads

Mobile access will increase rapidly over the next decade

Mobile clients will include

- laptops
- palmtops
- tablets
- phones
- gadgets
- wearables
- ...



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# Wearable computers

... are NOT PCs

... do NOT have keyboards

... do not have mice (mouses?)

... do not need head-mounted antennae

... do not need backpacks

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# Wearable computers

... are part of the clothes you put on every morning

... know where you are

... know what you like

... know who your friends are

... know you have a hangover

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# Interfaces and sensors

- microphones, headphones
- cameras, displays
- accelerometers
- gyroscopes and compasses
- bodysensors (heartrate ...)
- location (gps, sonar, pingers ...)

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# Multi-modal Interfaces

... complex transcoding to enable the communication of the same information in different ways (audio, image ...)

I don't want to get GPS information by looking at a map because I might drive into a tree

If I am talking to a friend, I want to look at a display

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# Intelligent assistant

Information delivery based on

- where you are
- what time it is
- what you are looking at
- what you are (probably) doing
- who you are with
- what's in the diary

... tourist jacket, shopping jacket ...

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# Servers and Services

...building up trails of information, integrating them and making them navigable

connecting personal interests with context (time, place, history ...)

- tourism, shopping, learning, sports, working, ...

shared multimedia information

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# Mobile communities

- messages in space and time
- context-based messaging
- find a new friend
- situated photography
- ...

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# Leisure and Learning

Shared augmented reality

Personalised augmented reality

Soundscapes (location and spatial audio)

- virtual reality - in the streets!
- adventure games
- audio sculpture
- heritage sites



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# Sports

- body monitoring
- training
- finding your way
- leaving/following a trail
- photographs

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# Training

- track your movements
- track your reactions
- see what the expert sees
- ... surgery, maintenance, sports

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# Creating the web

...composing using

- text
- sounds
- pictures
- animations
- real-world overlays
- programs

...choosing a good structure

...choosing a good medium - not just pages and pictures!

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# A word is worth a thousand pictures

If I know what I want to do, I just want to say it!

I don't want to have to search a screenful of symbols with a mouse.

ls, cp, rm, find, gcc, more ...

btdd, cuimd, eod, rofl, sohf, ...

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# Using the Web

To use the web

- I have to understand logic, without which I can't do efficient searches
- I have to think laterally, or else I will miss things
- I have to understand names or else I can not organise linked information

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“The name of the song is called ‘Haddocks’ Eyes.’ ”

“Oh, that’s the name of the song, is it?” Alice said, trying to feel interested.

“No, you don’t understand,” the Knight said, looking a little vexed. “That’s what the name is called. The name really is ‘The Aged Aged Man.’ ”

“Then I ought to have said ‘That’s what the song is called’?” Alice corrected herself.

“No, you oughtn’t: that’s quite another thing! The song is called ‘Ways And Means’: but that’s only what it’s called, you know!”

“Well, what is the song, then?” said Alice, who was by this time completely bewildered.

“I was coming to that,” the Knight said. “The song really is ‘A-sitting On A Gate’: and the tune’s my own invention.”

Lewis Carroll - Through The Looking Glass

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# Populating the web of 2010

...working with words, pictures, movies, sounds, programs

...linking and combining them in new ways

...augmenting the physical world

...creating situated information, experiences and services

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# Programs

Programs are our most powerful method of describing and communicating procedures, for things like

- manufacturing
- cooking
- administration
- mending a bicycle
- knitting
- ... and programming computers

They also save a lot of work ...



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Programs will have to be made up by mathematicians with computing experience and perhaps a certain puzzle-solving ability ...

There need be no real danger of it ever becoming a drudge, for any processes that are quite mechanical may be turned over to the machine itself.

Alan Turing, 1945

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# The Web in 2010

The costs of the the links, clients and servers is dropping.

The clients are appearing *everywhere*.

We will have the technology to compose, communicate and share information and experiences instantly, everywhere.

We will *all* have to learn how to do it!