LTI
Language, Technology and the Internet

The World Wide Web and HTML

Francis Bond
Division of Linguistics and Multilingual Studies
http://www3.ntu.edu.sg/home/fcbond/
bond@ieee.org

Lecture 6

Revision of Collaboration and Wikis

- Version Control Systems
- Wikipedia
- Licensing and Ownership

Version Control Systems

- Versioning file systems
  - every time a file is opened, a new copy is stored
- CVS, Subversion, Git
  - changes to a collection of files are tracked
  - simultaneous changes are merged
- Revision Tracking
  - Revisions are stored within a file
- Authorship in shared writing

Wikipedia

- The core aim of the Wikimedia Foundation, is to get a free encyclopedia to every single person on the planet. (Jimmy Wales)
- Wikipedia makes it easy to share your knowledge
  people like to do this
- Most edits are done by insiders!
- Most content is added by outsiders!
- Content comparable to Britannica

The five pillars of Wikipedia

1. Wikipedia is an online encyclopedia
2. Wikipedia has a neutral point of view.
3. Wikipedia is free content
4. Wikipedians should interact in a respectful and civil manner
5. Wikipedia does not have firm rules

Licenses and Ownership

- Copyright
- Copyleft
- Creative Commons

What is a good article?

1. Well-written
2. Factually accurate and verifiable
3. Broad in its coverage
4. Neutral
5. Stable
6. Illustrated, if possible, by images

The World Wide Web and HTML

Overview

- The Internet
- The structure of Markup
- The structure of the Web
- The future of the Web
- Linguistic features of the web

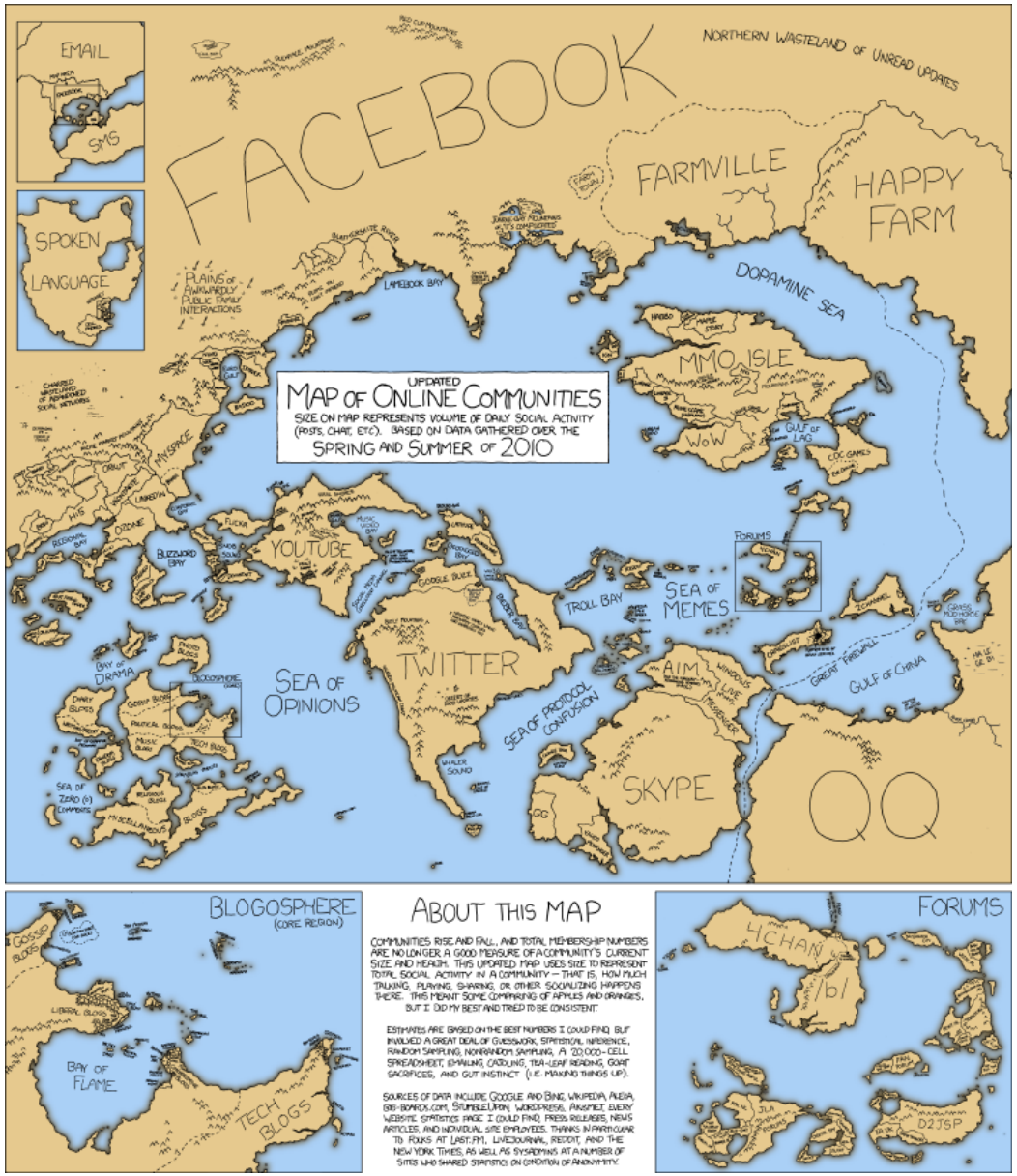
The Internet

- global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP)

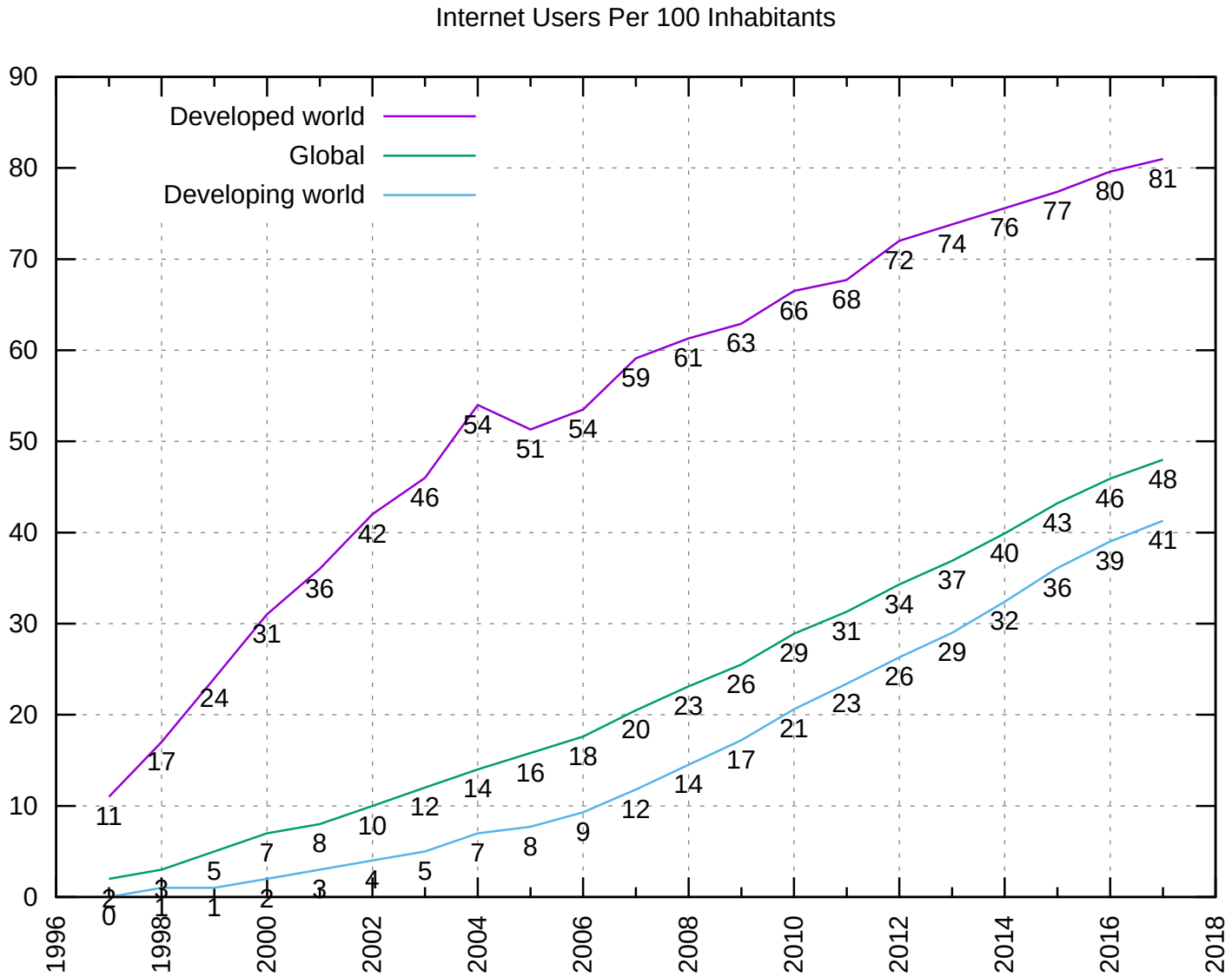
- Carries several services
  - HTTP (Hyper Text Transfer Protocol) — The Web
  - Email
  - VoIP (Voice over IP) — Telephony/Skype
  - FTP, ...(File Transfer)
  - Streaming Media — music, video
  - Instant Messaging

Map of online communities (2007)

Map of online communities (2010)



Growth of the Internet



Markup: formatting information

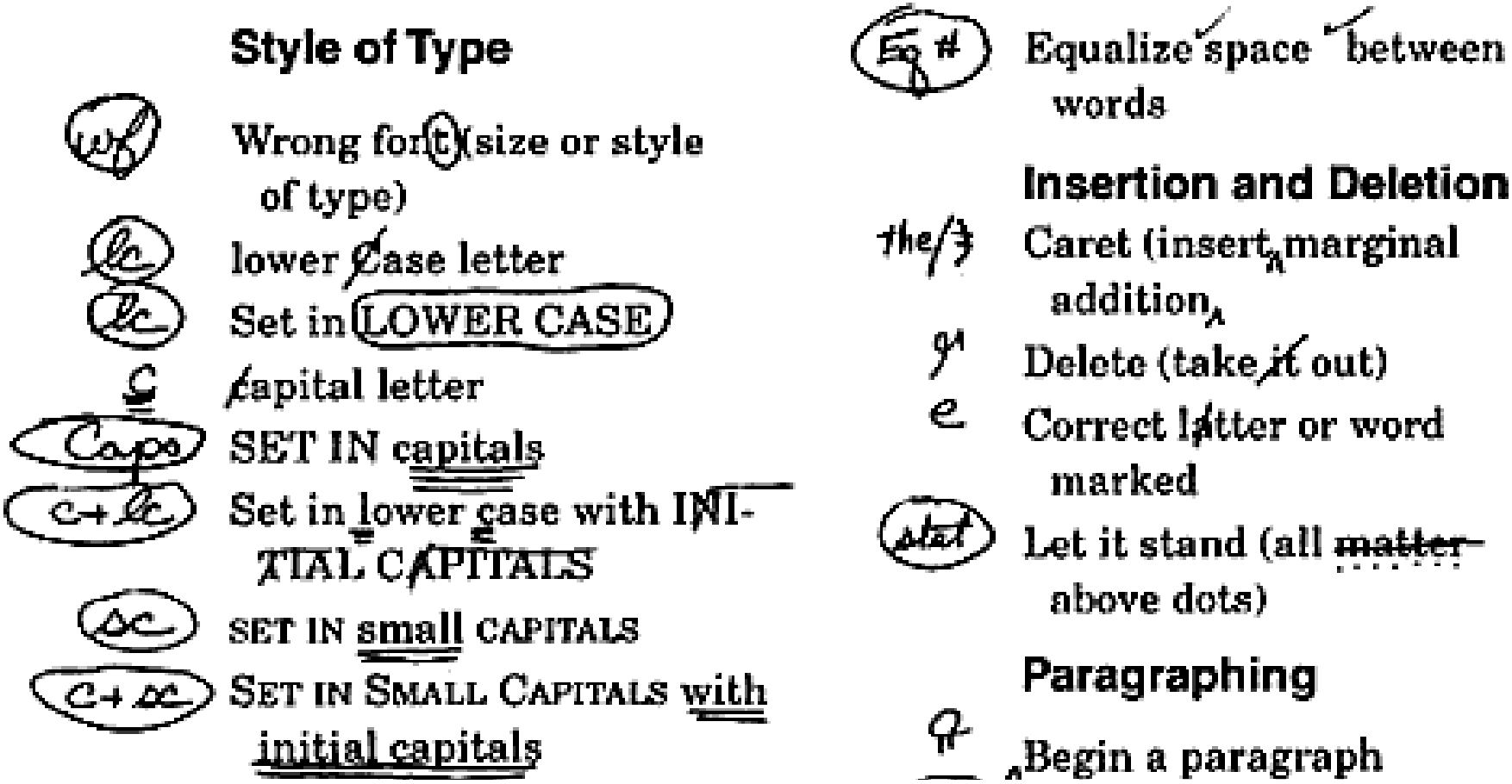
Why Markup?

- Reduce Ambiguity
  - Need to make meaning explicit
- Traditionally this is done by annotating text in some way

Markup Languages

- Annotation on how to print is called markup
  - underlining to indicate boldface
  - special symbols for passages to be omitted
  - special symbols for printed in a particular font
- This existed before computers
  - Editors would markup hand-written manuscripts
  - ...and pass them to type setters
  - ...who would prepare the manuscript for printing

Printers' Markup



Early Computer Markup (troff)

Headline
and some text

```
.ps 12                          % point size 12
.ft B                           % font type Bold
Headline
.ps 10                          % point size 10
.ft R                           % font type Roman
and some text.
```

- Marked up with `troff`
- Postscript and PDF (Portable Document Format) are similar

Visual Markup vs Logical Markup

- **Visual Markup** (Presentational)
  - What you see is what you get (WYSIWYG)
  - Equivalent of printers' markup
  - Shows what things look like
- **Logical Markup** (Structural)
  - Shows the structure and meaning
  - Can be mapped to visual markup
  - Less flexible than visual markup
  - More adaptable (and reusable)

Standard Generalize Markup Language: SGML

- ISO standard based on IBM's GML
- Attempt to make markup independent of processor
  - Important for archiving information
- Emphasis on logical markup
- Popularized the use of `<tag></tag>` notation
  - and entities `&lt;` `&gt;` when you need an <>
- Split the document into: Declaration, Prolog, Documentation

Hyper Text Markup Language: HTML

- Markup Language for web pages
- An extension of SGML
- Combines logical and visual markup
- Also allows hyperlinks (linking and anchoring)
- Created by Tim Berners-Lee at CERN (1989)
  - to make physics papers and documentation more accessible

HTML example

Headline
and some text

- Logical

```
<h1>Headline</h1>
<p>and some text
```

- Visual

```
<font size="3"><b>Headline</b></font>
<br>and some text
```

Logical allows various styles

Headline

and some text

```
<style>
H1 {
            font-size:24px;
            color:blue;
            margin-top:10px;
            margin-bottom:15px;
      }
</style>
```

- This can be done using CSS (Cascading Style Sheets)
- Separate Logical and Visual Structure

Benefits of Logical Tags

- Can transform things easily
  - No bold for Japanese and Chinese (just use size)
  - Can adapt to other modalities (speech)
- Logical form useful for other tasks
  - Summarization
    - Just show `<h1>` ... `<h3>`
  - Translation
    - Headers are noun phrases, not sentences
- Robustness: you can read the source directly

But still there is ambiguity!

- Tags on one site may not mean the same thing on another site
- Huge amount of information
  - Looking for Eric Miller may get the wrong one!
  - Looking for NTU gets
    - Nanyang Technological University
    - National Taxpayers Union
    - National Taiwan University
- What can we do?
  Semantic Web (week 10)

Hypertext

- HTML crucially adds hyperlinks
  - these extend text in a new way
  - references that you can immediately access

- `<href="http://somewhere.on.the.web">link me</a>`

- `<img src="http://somewhere.on.the.web/pic.jpg">`

- Immediately accessible references are qualitatively different

HTML example

```
<!doctype html>
<html>
  <head>
    <title>Hello HTML</title>
  </head>
  <body>
    <p>Hello World!</p>
   <p>Oh well, <span lang="fr">c'est la vie</span>,
      as they say in France.</p>
   <abbr id="anId" class="jargon" style="color:blue;"
         title="Hypertext Markup Language">HTML</abbr>
  </body>
</html>
```

How should you hyperlink?

- Pick a page
  - This course page
  - LMS research page
  - Wiki front page
  - Your choice
- Discuss whether you think there are enough links or too many or not enough? And are they linking to the best targets?
- You may wish to look at the *Wikipedia:Manual of Style/Linking* <https://en.wikipedia.org/wiki/Wikipedia:Manual_of_Style/Linking>

The Structure of the Web

- 550 billion documents on the Web (2001)
  mostly in the invisible Web, or deep Web
- 11.5 billion indexable web pages (2005)
- 25.21 billion indexable web pages (2009)
- 109.5 million websites (2009)
- 5.9 billion indexed pages (Sunday, 23 February, 2020).
  60 billion pages (googles index)
  https://www.worldwidewebsize.com/

The Deep Web

Dynamic content dynamic pages which are returned in response to a submitted query or accessed only through a form

Unlinked content pages which are not linked to by other pages (but clicking links them)

Private Web sites that require registration and login (Edventure, NTULearn)

Contextual Web pages with content varying for different access contexts (e.g., ranges of client IP addresses or previous navigation sequence).

Limited access content sites that limit access to their pages in a technical way (e.g., using the Robots Exclusion Standard)

Scripted content pages that are only accessible through links produced by JavaScript as well as content dynamically downloaded from Web servers via Flash or Ajax solutions.

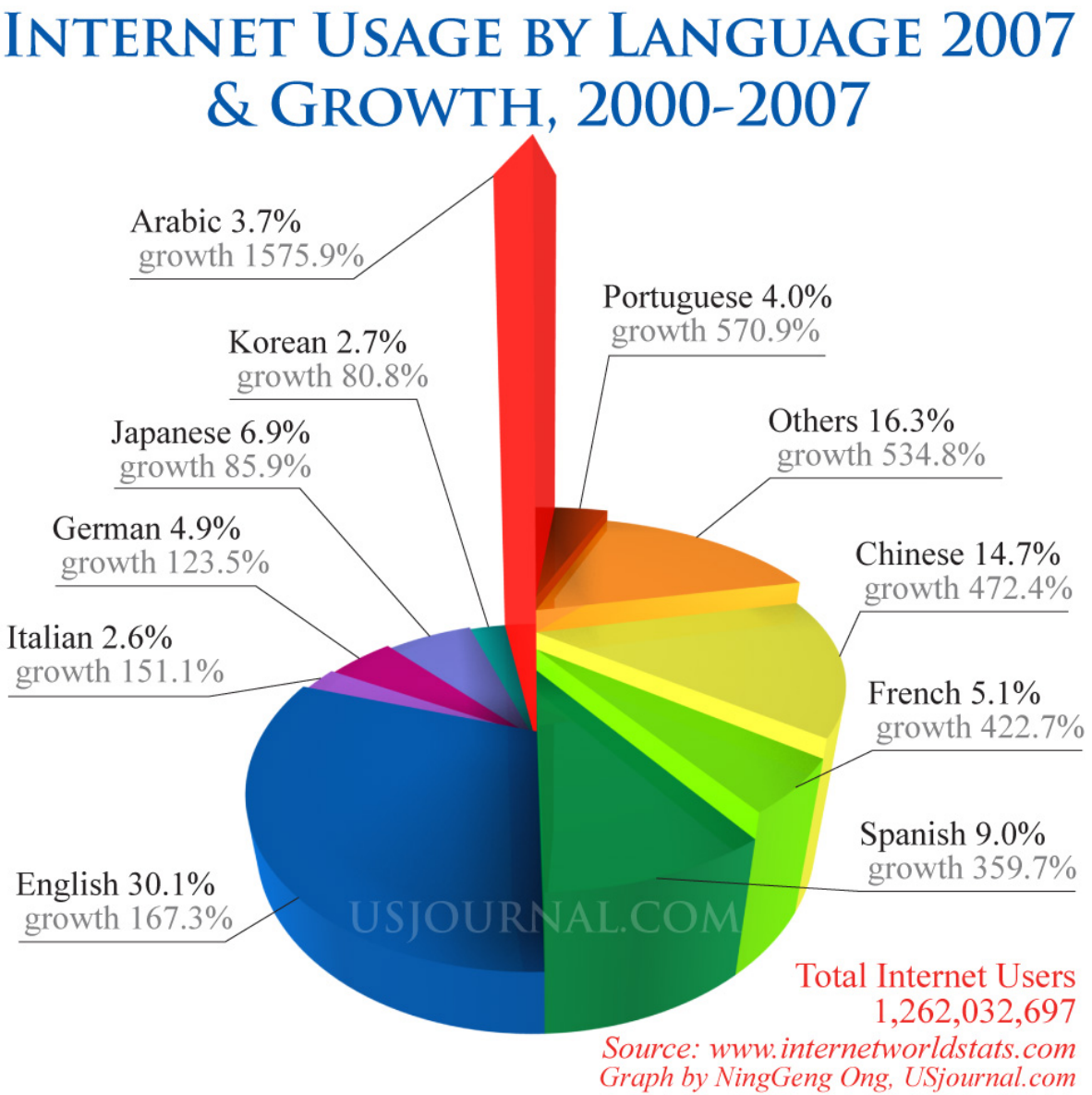
Non-HTML/text content textual content encoded in multimedia (image or video) files or specific file formats not handled by search engines.

These pages all include data that search engines cannot find!

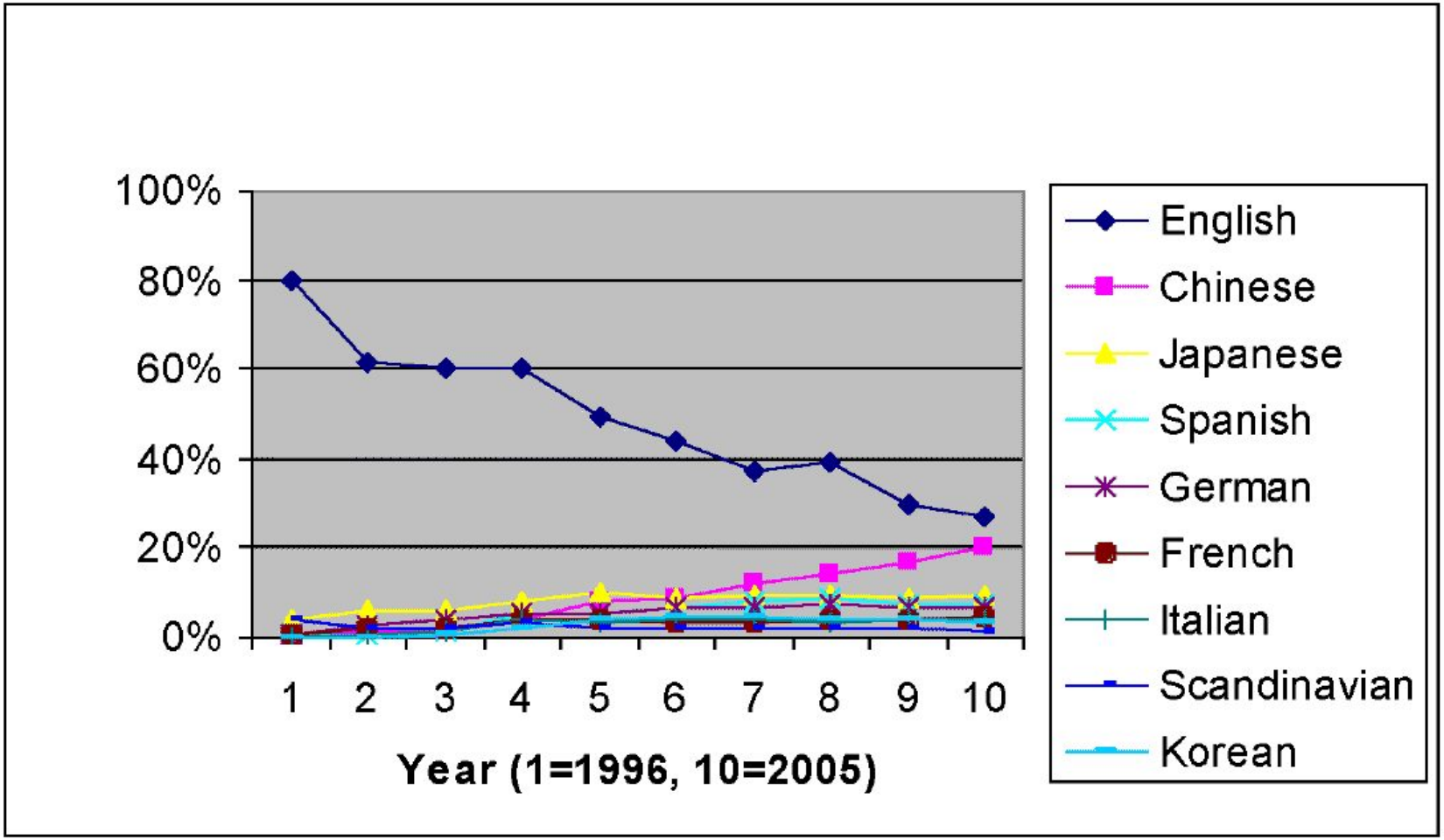
robots.txt

- A Robot (Web Crawler, or Spiders) is a program that automatically traverses the Web's hypertext structure by retrieving a document, and recursively retrieving all documents that are referenced. Robots are used for:
  - Indexing and *What's New* monitoring
  - HTML and Link validation
  - Mirroring and back up
- A website can explicitly tell robots where they can and cannot go
  - Compliance is voluntary, but followed by most robots
- You can Allow and Disallow whole directories, or individual pages
- You can Allow and Disallow individual user-agents (such as `Google`)

The Internet and Language Diversity

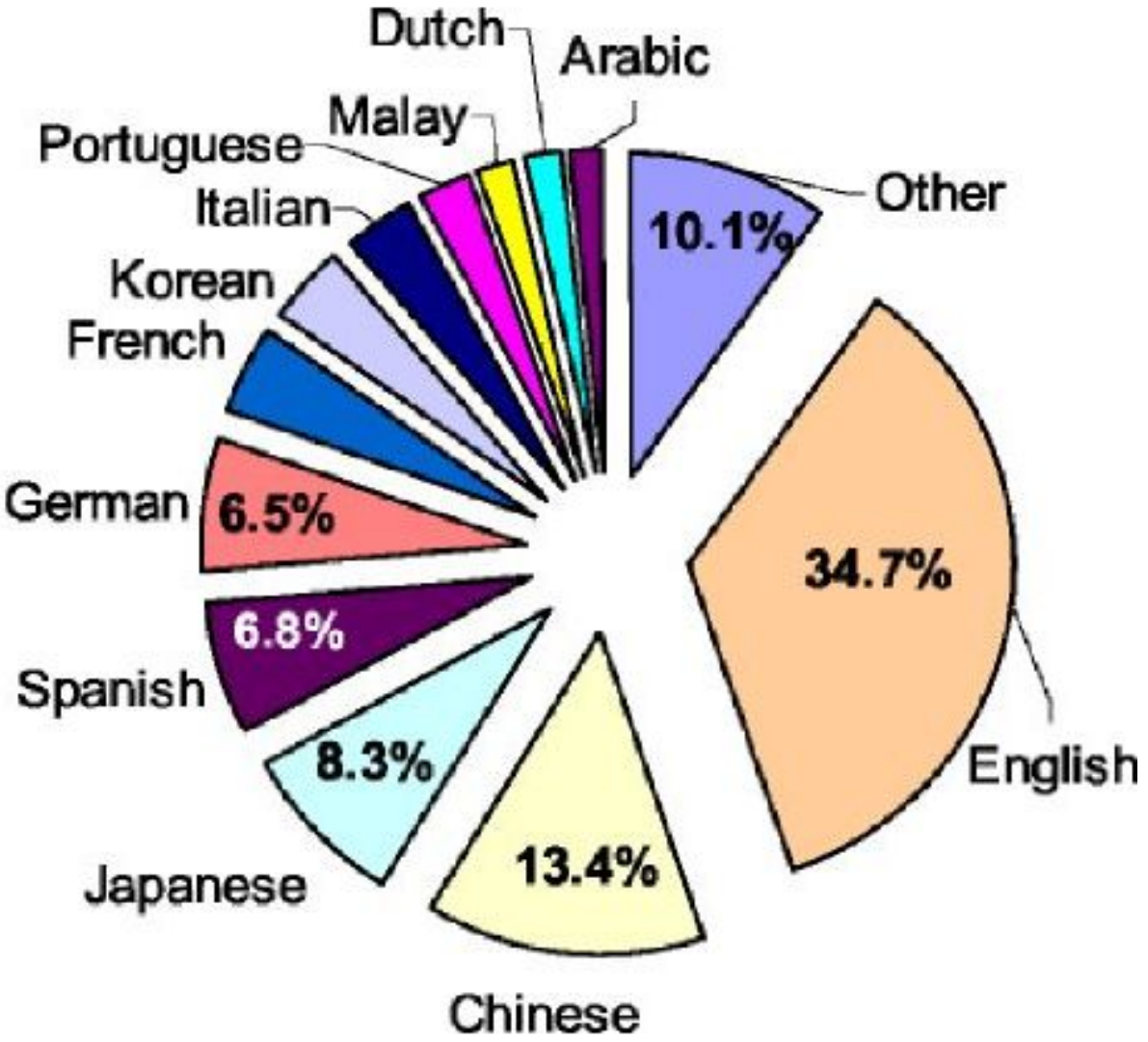


Distribution of languages among Internet users



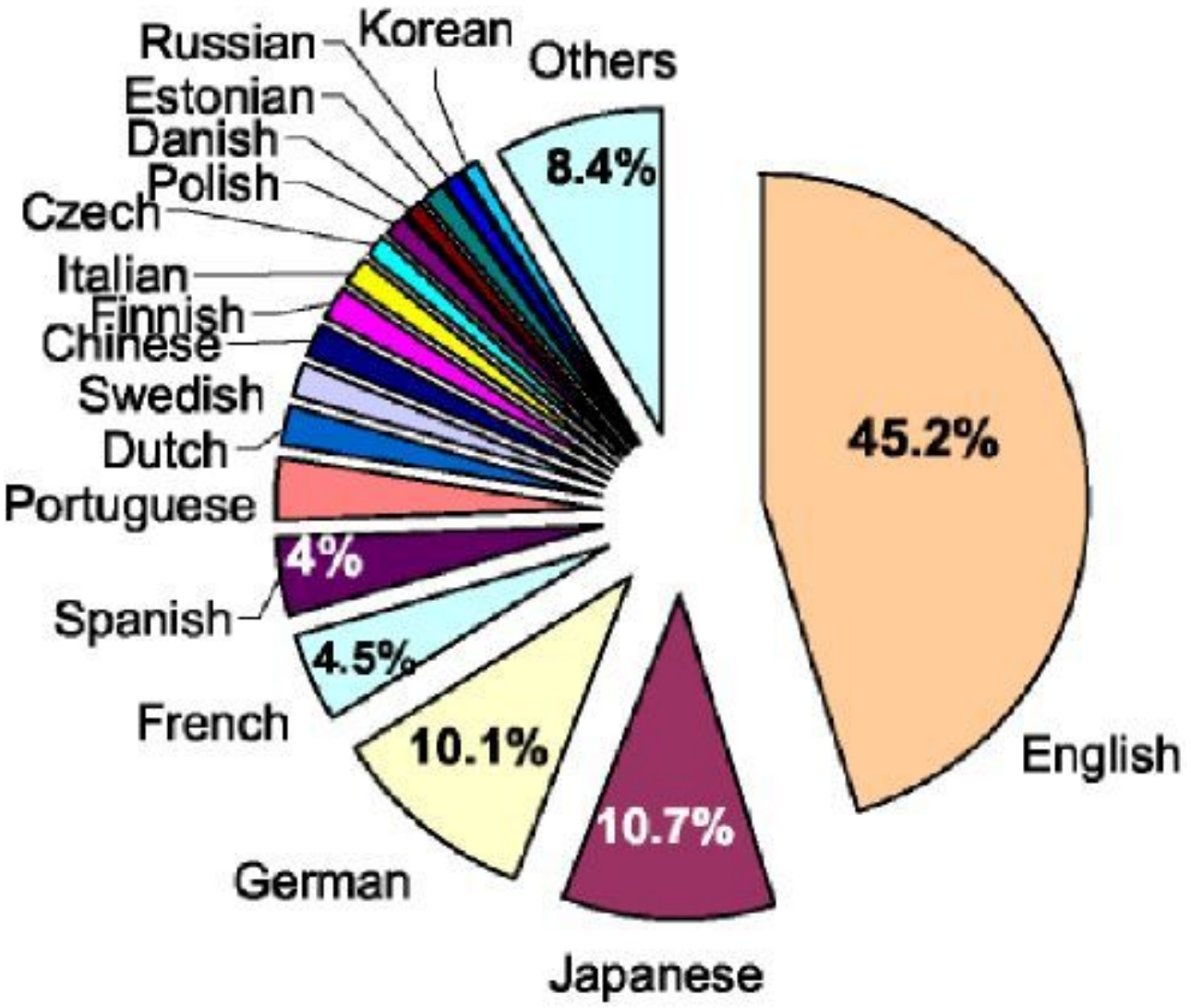
From Global Reach (2006) cited in Gerrand (2007)

Internet users by language, February 2005



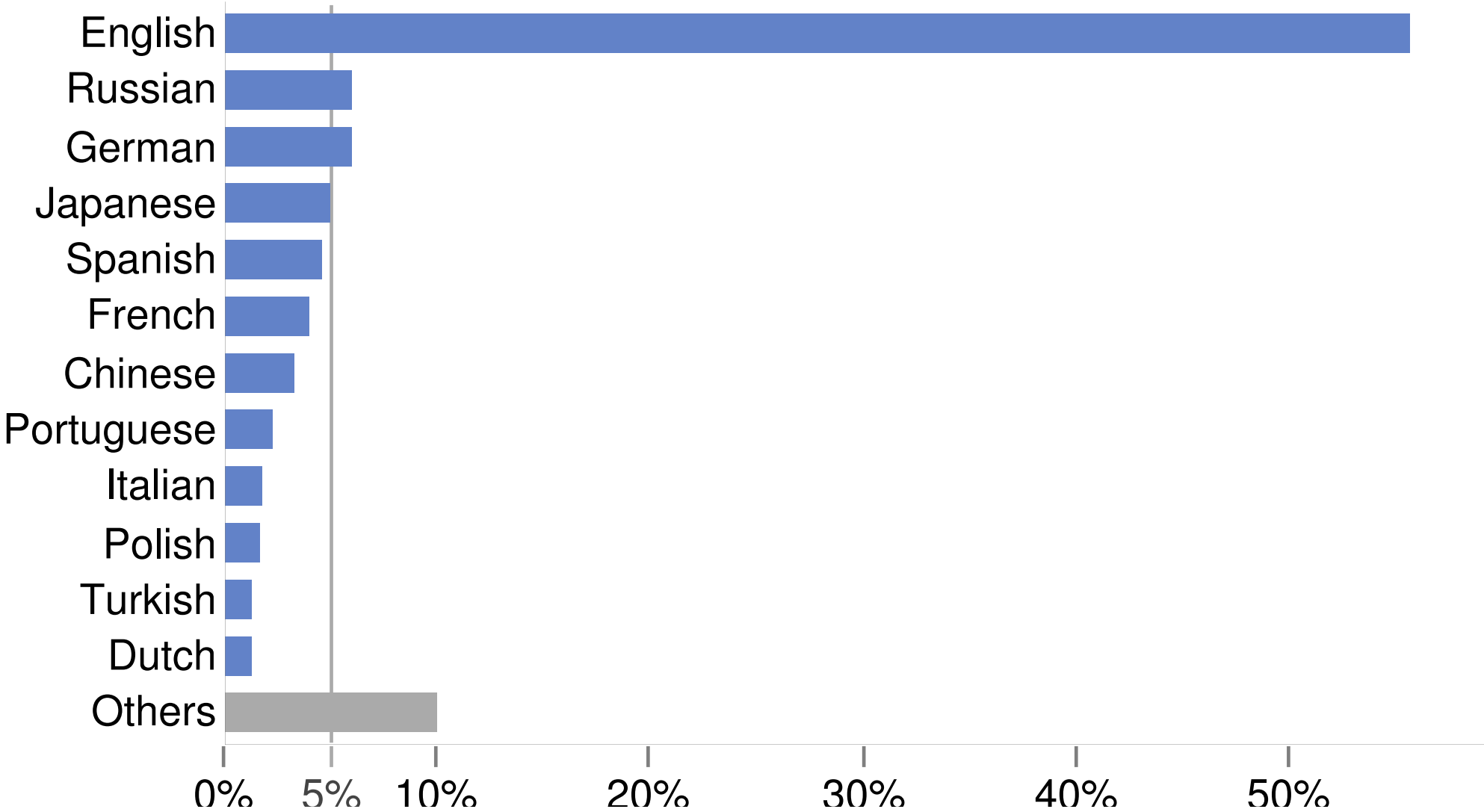
Source: OECD (2006) cited in Gerrand (2007)

Language of e-commerce, February 2005

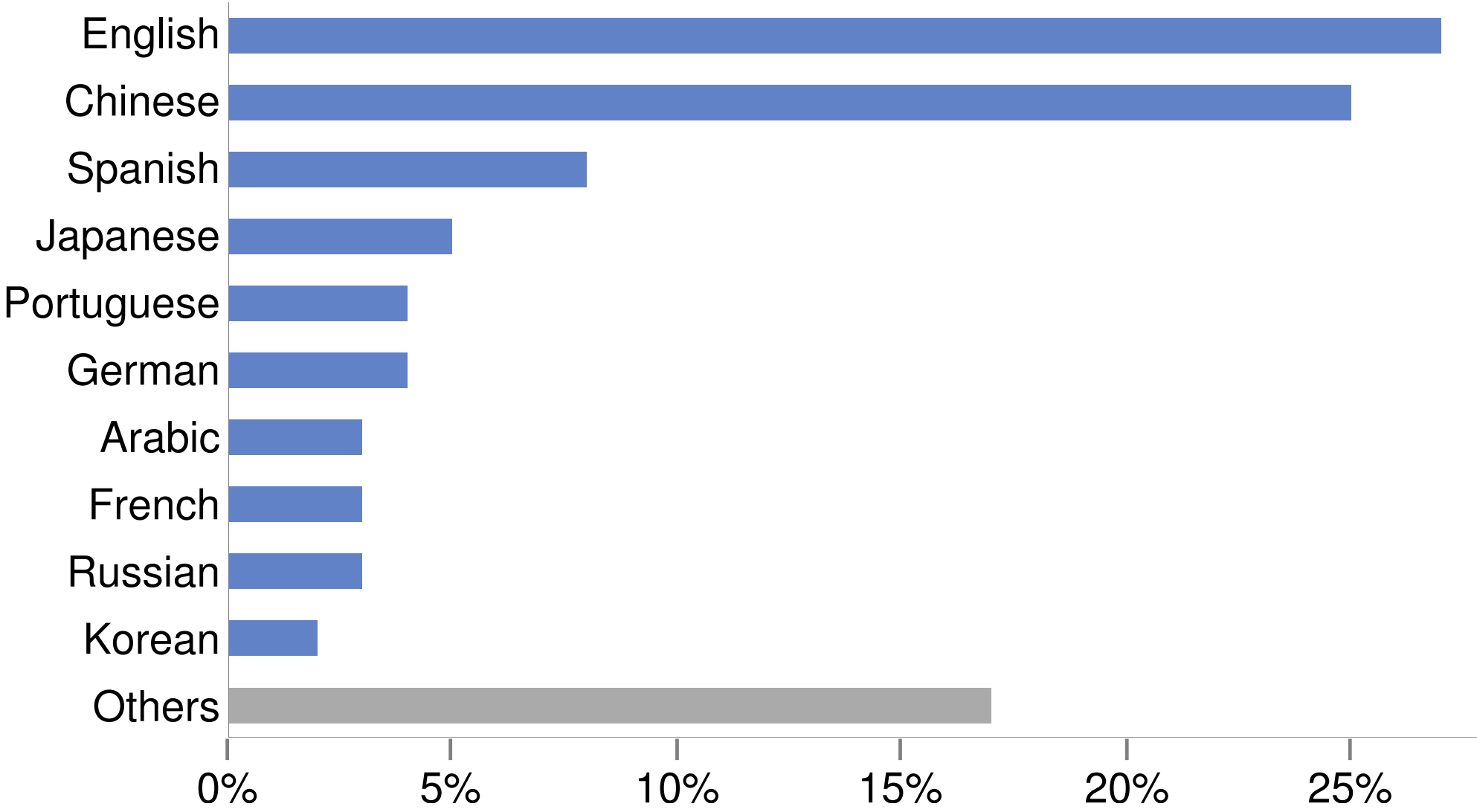


Source: OECD (2006) references to secure servers by language cited in Gerrand (2007)

Percentage of Web sites by language (2014)

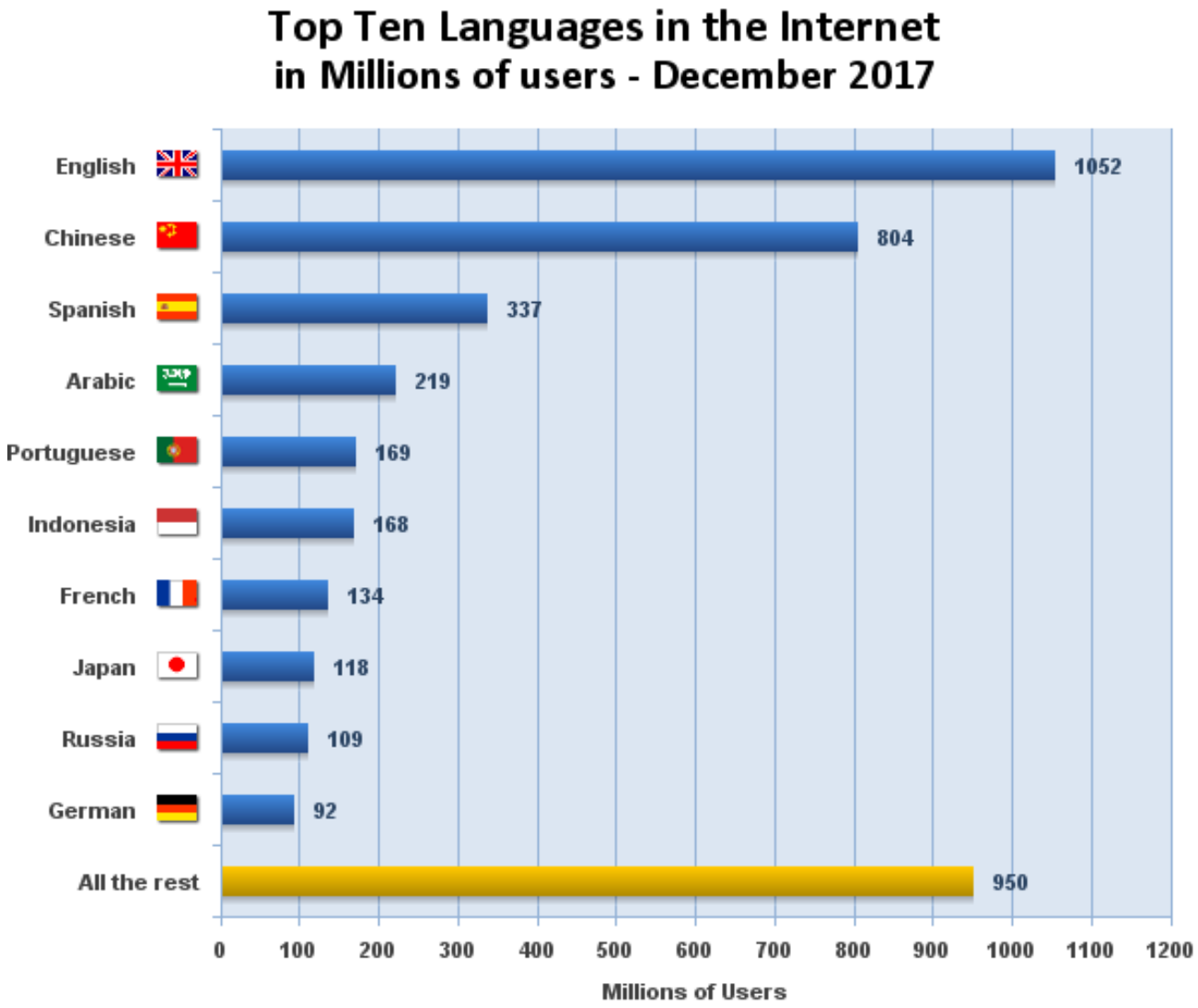


Percentage of Web users by language (2014)



https://en.wikipedia.org/wiki/Languages_used_on_the_Internet

Gradually Changing



Source: Internet World Stats - www.internetworldstats.com/stats7.htm
Estimated total Internet users are 4,156,932,140 in December 31, 2017

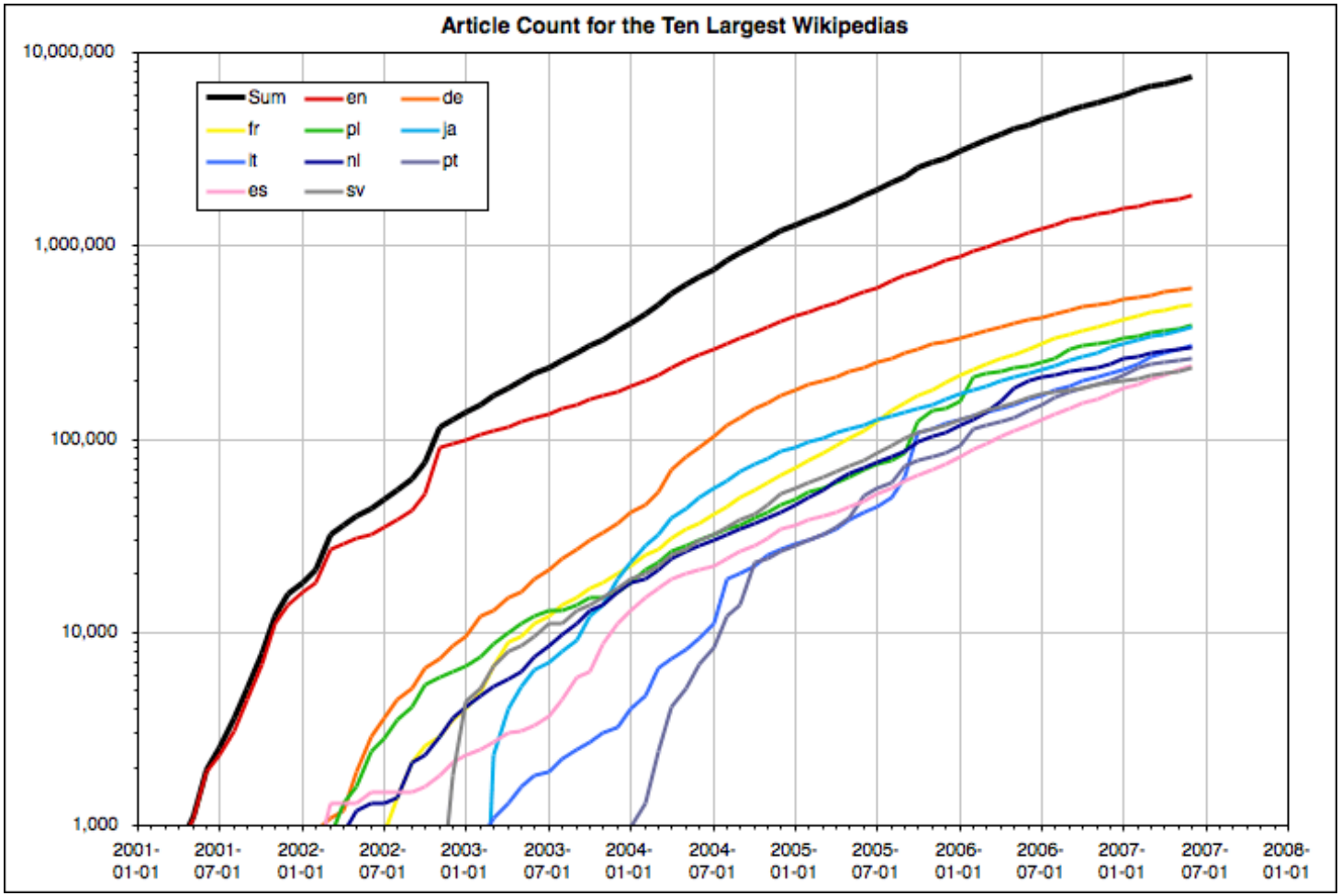
The Internet and Language Diversity

- Major languages will survive (not just English)
- **Sarnoff's Law:** the value of a broadcast network is proportional to the number of viewers (n)
- **Metcalfe's Law:** the value of a telecommunications network is proportional to the square of the number of connected users of the system (n^2)

  $\Rightarrow$ languages with more pages will become even more valuable

- Minor languages probably won't survive

Top ten Wikipedias



See also http://meta.wikimedia.org/wiki/List_of_Wikipedias
Wikipedias in 272 languages: only 96 with more than 10,000 pages

The next 5,000 days of the Web

- Kevin Kelly on the next 5,000 days of the web (20min)
- http://www.ted.com/talks/lang/eng/kevin_kelly_on_the_next_5_000_days_of_the_web.html (20min)
- The impossible has become possible
- The web is a single machine
  - Embodiment
  - Re-structuring
  - Co-dependence

Linguistic features of the web

- Much/most text is just the same
- Un-edited
- Accessible in great volume (and many languages)
- Editable — Wikis, comments, tweets
- Multi-media

Conclusion

- The web is changing what humanity can do with language
- It is not clear if it is changing what individual humans do
- Make sure you go through the wikipedia tutorial

References

- Crystal, D. (2011). *Internet Linguistics: a student guide*. Routledge

- Peter Gerrand (2007) Estimating linguistic diversity on the Internet: A taxonomy to avoid pitfalls and paradoxes. *Journal of Computer-Mediated Communication*, 12(4), article 8. http://jcmc.indiana.edu/vol12/issue4/gerrand.html

- Global Reach. (2006). Global Internet Statistics (by Language). Retrieved October 11, 2006 from http://www.global-reach.biz/globstats/index.php3