Web Engineering: Where to go?
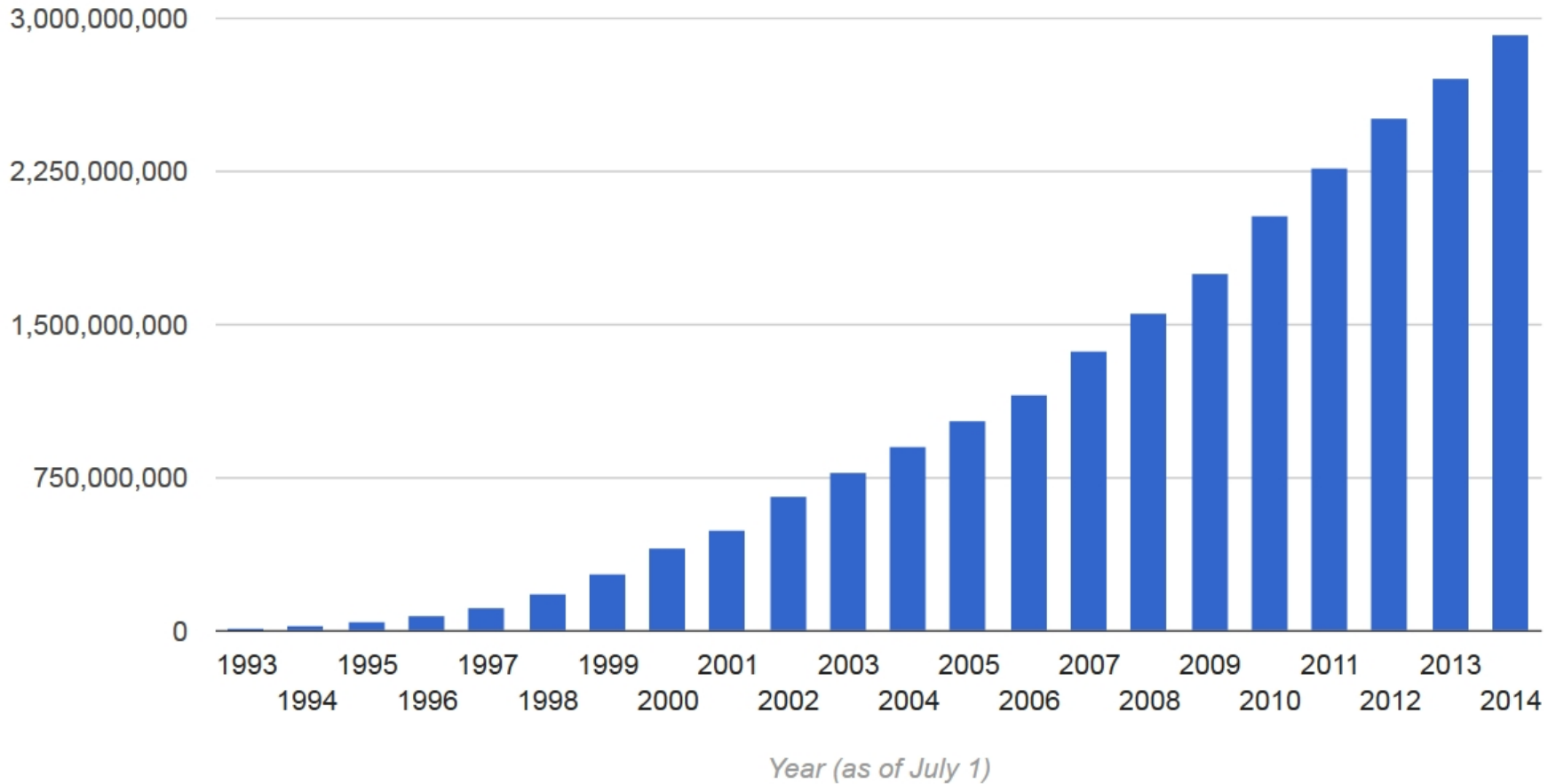
The University of Aizu
Quarter 2, AY 2018

Outline

- Introduction
- Our connection to WWW
- Trends on the Web
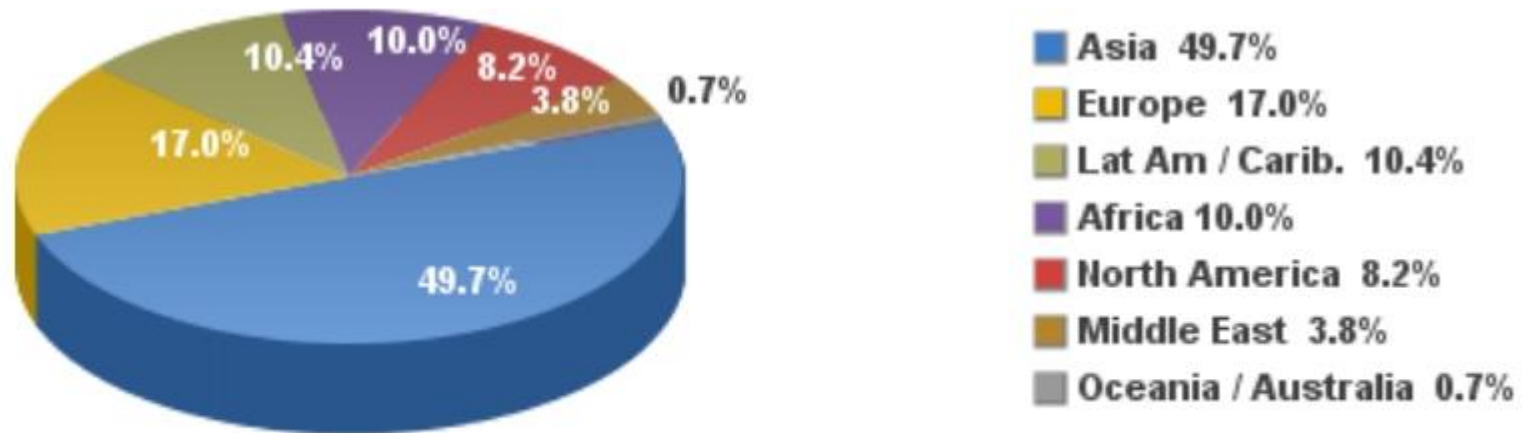- ITTY BITTY technology
- Conclusion

Internet Users in the World

Year (as of July 1)

Source: http://www.internetworldstats.com

Our connection to WWW

DATE	NUMBER OF USERS	% WORLD POPULATION
December, 1995	16 millions	0.4 %
December, 1996	36 millions	0.9 %
December, 1997	70 millions	1.7 %
December, 1998	147 millions	3.6 %
December, 1999	248 millions	4.1 %
March, 2000	304 millions	5.0 %
July, 2000	359 millions	5.9 %

June, 2015	3,270 millions	45.0 %
Dec, 2015	3,366 millions	46.4 %
Jun. 2016	3,631 millions	49.5 %
Dec. 2016	3,696 millions	49.5 %
Mar. 2017	**3,739 millions**	**49.6 %**
June 2017	**3,885 millions**	**51.7 %**

Source: http://www.internetworldstats.com

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Our connection to WWW as of June 30, 2017

Asia 49.7%
Europe 17.0%
Lat Am / Carib. 10.4%
Africa 10.0%
North America 8.2%
Middle East 3.8%
Oceania / Australia 0.7%

Source: Internet World Stats - www.internetworldstats.com/stats.htm
Basis: 3,885,567,619 Internet users in June 30, 2017
Copyright © 2017, Miniwatts Marketing Group

Source: http://www.internetworldstats.com

List of Countries by Internet Usage (2014)

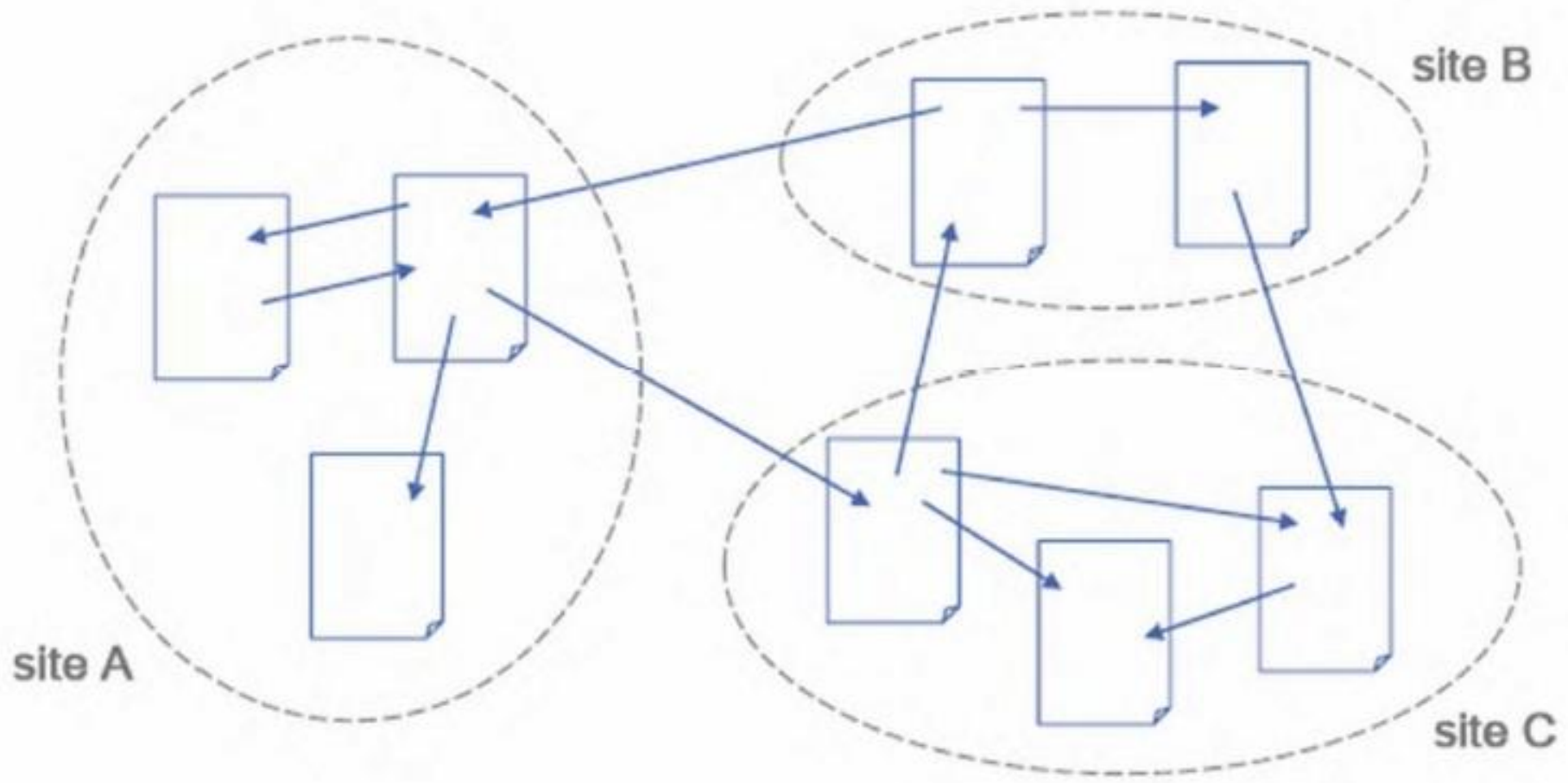| Rank▲	Country	Internet Users	1 Year Growth %	1 Year User Growth	Total Country Population	1 Yr Population Change (%)	Penetration (% of Pop. with Internet)	Country's share of World Population	Country's share of World Internet Users
1	China	641,601,070	4%	24,021,070	1,393,783,836	0.59%	46.03%	19.24%	21.97%
2	United States	279,834,232	7%	17,754,869	322,583,006	0.79%	86.75%	4.45%	9.58%
3	India	243,198,922	14%	29,859,598	1,267,401,849	1.22%	19.19%	17.50%	8.33%
4	Japan	109,252,912	8%	7,668,535	126,999,808	-0.11%	86.03%	1.75%	3.74%
5	Brazil	107,822,831	7%	6,884,333	202,033,670	0.83%	53.37%	2.79%	3.69%
6	Russia	84,437,793	10%	7,494,536	142,467,651	-0.26%	59.27%	1.97%	2.89%
7	Germany	71,727,551	2%	1,525,829	82,652,256	-0.09%	86.78%	1.14%	2.46%
8	Nigeria	67,101,452	16%	9,365,590	178,516,904	2.82%	37.59%	2.46%	2.30%
9	United Kingdom	57,075,826	3%	1,574,653	63,489,234	0.56%	89.90%	0.88%	1.95%
10	France	55,429,382	3%	1,521,369	64,641,279	0.54%	85.75%	0.89%	1.90%

Source: http://www.internetworldstats.com

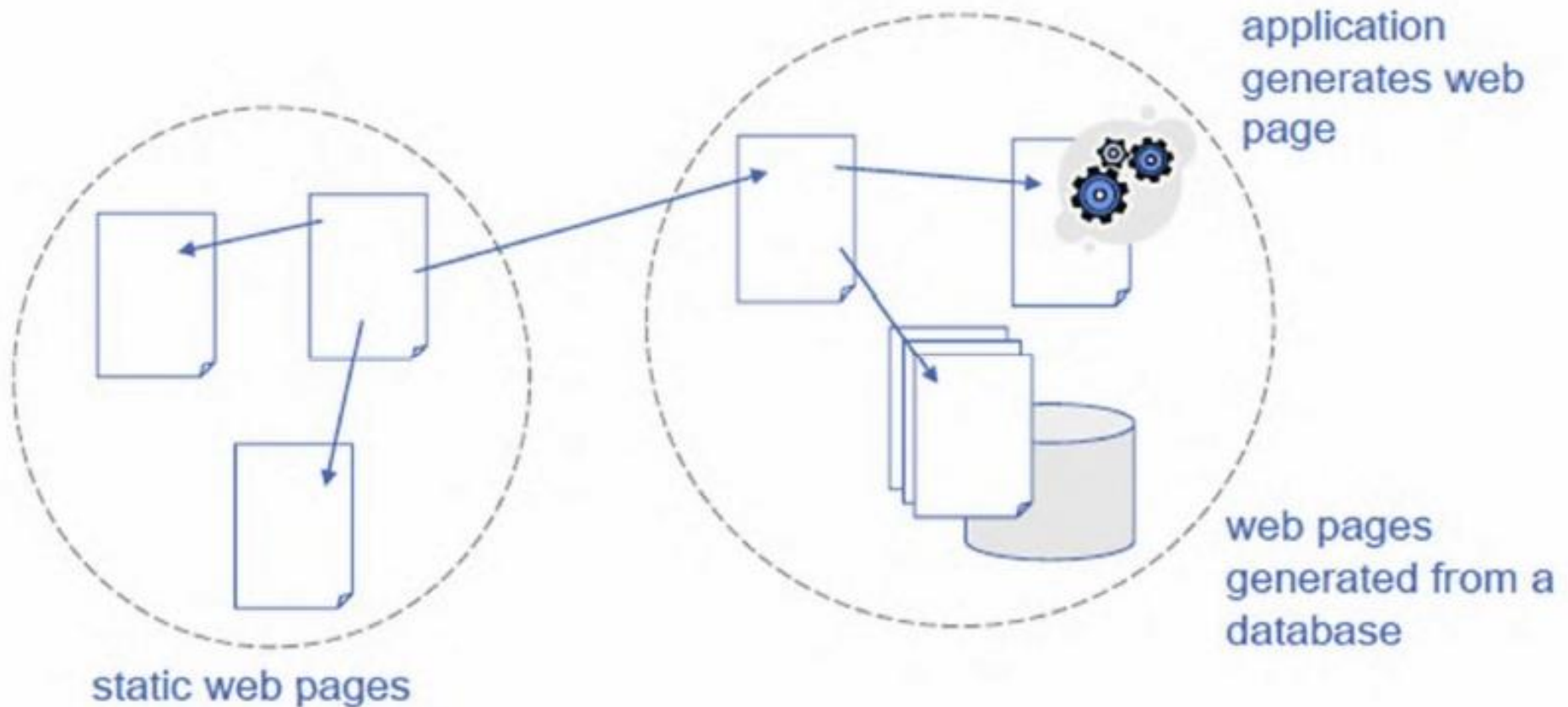# List of Countries by Internet Usage (2017)

#	Country or Region	Population, 2017 Est.	Internet Users 30 June 2017	Internet Penetration	Growth (*) 2000 - 2017	Facebook 30 June 2017
1	China	1,388,232,693	738,539,792	53.2 %	3,182.4 %	1,800,000
2	India	1,342,512,706	462,124,989	34.4 %	9,142.5 %	241,000,000
3	United States	326,474,013	286,942,362	87.9 %	200.9 %	240,000,000
4	Brazil	211,243,220	139,111,185	65.9 %	2,682.2 %	139,000,000
5	Indonesia	263,510,146	132,700,000	50.4 %	6,535.0 %	126,000,000
6	Japan	126,045,211	118,453,595	94.0 %	151.6 %	26,000,000
7	Russia	143,375,006	109,552,842	76.4 %	3,434.0 %	12,000,000
8	Nigeria	191,835,936	91,598,757	47.7 %	45,699.4 %	16,000,000
9	Mexico	130,222,815	85,000,000	65.3 %	3,033.8 %	85,000,000
10	Bangladesh	164,827,718	73,347,000	44.5 %	73,247.0 %	21,000,000

Source: http://www.internetworldstats.com

Web-based hypertext model

Web nowadays

application generates web page

web pages generated from a database

static web pages

# Challenges of Web engineering

- Users and usability
- Information sources
- Technologies
- Maintenance
- Legal, social, and ethical issues

Mobile phone + Computer = Smartphone: Revolution begins

□ 2007, Apple Inc. introduced the original iPhone, one of the first mobile phones to use a multi-touch interface.

- It was really successful commercial solution;
- iPhone became very much popular across the globe.
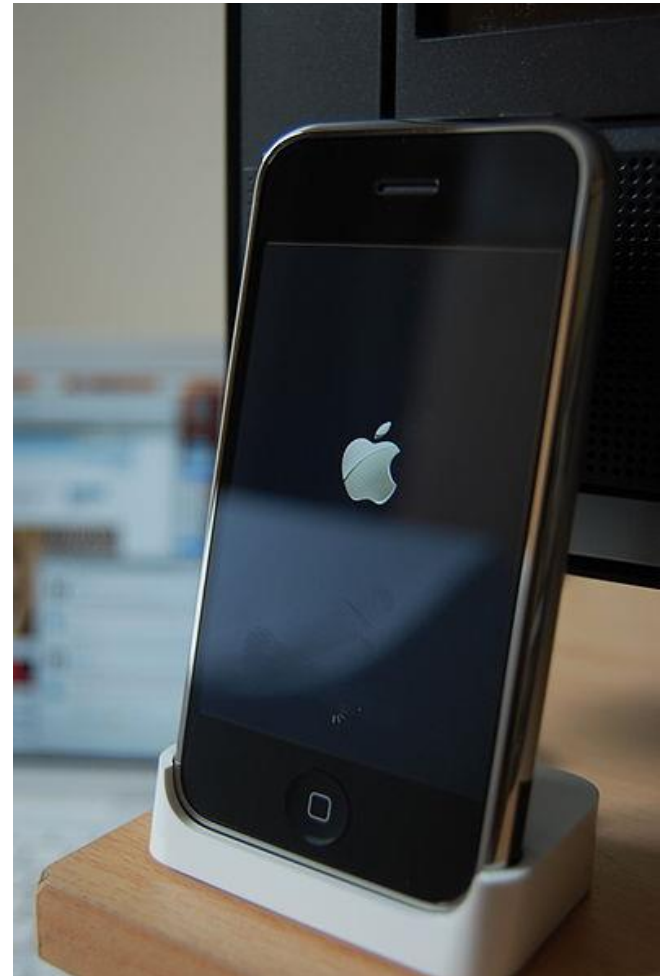
Tablet PC: Revolution continues

□ The first iPad was released in 2010:

- ○ touch screen display: 9.7 inches;
- ○ Memory: 256 MB;
- ○ Storage: 16 GB;
- ○ WI-FI;
- ○ Weight: 680 g;
- ○ Price 499 US$.

□ iPhone and iPad drastically changed the user's behaviors!

Users

□ Generally unknown
- ○ Expectations, behavior patterns not known at the development time;
- ○ More difficult to design interface;
- ○ No training;
- ○ Dealing with globalization:
  - Different cultures, languages, etc.

Information sources

- Dealing with a range of information sources and systems:
  - Data systems,
  - File systems,
  - Multimedia storage devices.
- Variety of types and formats of multimedia content:
  - Images, sounds, animations, etc.,
  - Text in different languages,
  - Clients may only be able to handle certain formats.

Technologies

- Web developers must work with a range of technologies and languages:
  - Document formats (HTML, XML, VoiceXML…)
  - Presentations (CSS, XSLT, …)
  - Programming (CGI, PHP, JavaScript, …)
  - Databases
  - Content management systems
  - Web servers
  - Application servers
- Rapid development of new technologies and standards

Maintenance

☐ Web sites evolve continuously without specific releases.

☐ Maintenance cycles may be days or even hours.

☐ Content, functionality, structure, and presentation may change significantly from one moment to the next.

☐ Necessary to provide some control over changes:

  ▫ Accuracy and quality of content.

Legal, Social, and Ethical Issues

- ☐ Copyright
- ☐ Privacy
- ☐ Criminal activities
- ☐ Internationalization of laws
- ☐ Access for the disabled and minorities

Trends on the Web

- More technologies
- Better usability
- Semantic Web
  - Knowledge management on the Web
  - Linking and integrating existing knowledge
 - Locating new knowledge

HCI and UI recognition

□ Importance of Human-Computer-Interactions (HCI) and User-Interface (UI) is understood by industry and government:
  ○ Plenty of jobs
  ○ Money for research

How many of us use mobile phones?

Rankings	Country or regions	Number of mobile phones	Population	Connections/100 citizens	Date of evaluation
	World	7,000,000,000+	7,324,782,000	96	2015[1][2]
1	China	1,321,930,000	1,371,220,000	96.40	December 2016[3][4]
2	India	1,183,040,925	1,311,050,530	91.56	September 2017[4][5]
3	United States	327,577,529	317,874,628	103.1	April 2014[6][7]
4	Brazil	284,200,000	201,032,714	141.3	May 2015[8][9]
5	Russia	256,116,000	142,905,200	155.5	July 2013[8][10]
6	Indonesia	236,800,000	237,556,363	99.68	September 2013[8]
7	Nigeria	167,371,945	177,155,754	94.5	February 2014[11]
8	Japan	146,649,600	127,300,000	115.2	2013[12]
9	Pakistan	133,283,043	180,854,781	77	November 2015[13][14][15][16]
10	Bangladesh	131,376,000	157,497,000	84.95	June 2016[17][18][19][20]

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

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Countries with the Largest Percent of Tech Jobs for Web Developers, October, 2014
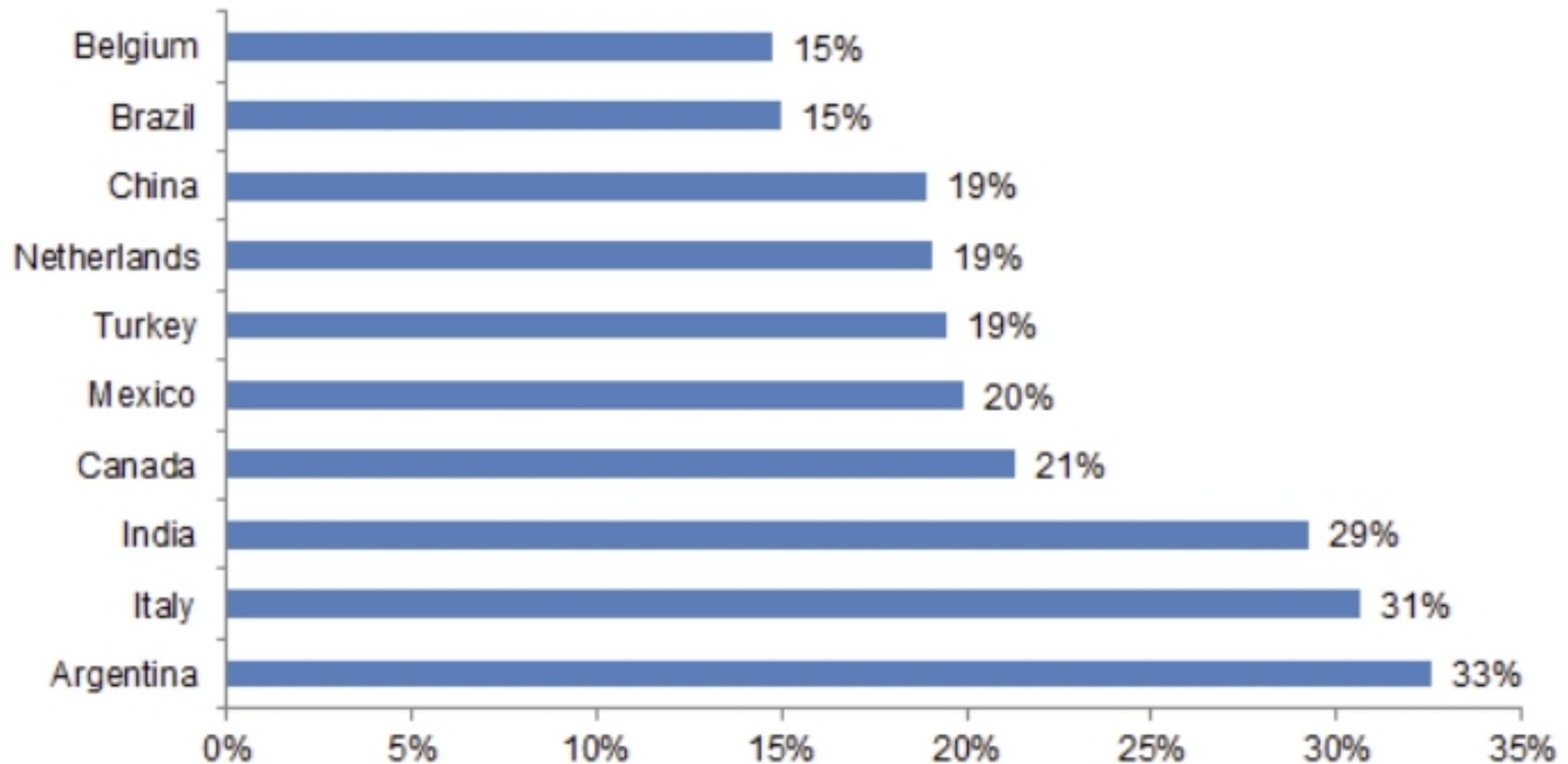
Source: WANTED Analytics

ITTY BITTY

- Web tool lets you create microsites that exist solely as URLs
- Author: Nicholas Jitkoff, the vice president of design at Dropbox
- Date of Introduction: July 05, 2018
  - https://www.theverge.com/2018/7/5/17538474/itty-bitty-site-self-contained-websites-urls-open-web
- You can create your own by following this URL: itty.bitty.site

https://itty.bitty.site

Itty bitty sites are contained *entirely* within their own link. (Including this one!) This means they're...

- 💼 **Portable** - you don't need a server to host them
- 👁 **Private** - nothing is sent to–or stored on–*this* server
- 🎁 **Easy to share** as a link or QR code

Itty bitty sites can hold about as much as a printed page, and there is a lot you can do with that:

- ✏️ Compose poetry
- 🛠 Create an app
- 🦜 Bypass a ~~140~~ 280 char limit
- 🎨 Express yourself in ascii

Learn more: How it works - Advanced editing - Security - GitHub

Create a new site

ITTY BITTY: Features

□ You can fill the equivalent of about one printed A4 page with any combination
  ○ plain text,
  ○ ASCII characters, or
  ○ emojis.

□ The site isn't actually hosted anywhere — the entirety of the webpage exists as a URL compressed using the Lempel–Ziv–Markov chain algorithm.

ITTY BITTY: Features

- The compressed content is converted from binary into a string of characters that can function as a standard web link.

- The actual data is stored in the end of the link, comprised of everything after the # symbol.

- You can also share itty bitty sites as QR codes as well, so long as the site can be compressed into about 2,610 bytes.

ITTY BITTY: How it works

□ Composing:
- You can edit directly on itty.bitty with simple formatting.

□ Compressing:
- To fit more in the URL, the content is compressed using the Lempel–Ziv–Markov chain algorithm. This significantly reduces the size of html

□ Link creation:
- This compressed data is base64 encoded, which converts it into to a set of letters and numbers that can be included in a URL.

ITTY BITTY: How it works

□ Fragments:

- ○ itty.bitty stores this text in a section of the URL called a fragment–everything after the first # symbol.

  http://itty.bitty.site/#Name/SITE_DATA

- ○ Fragments have a unique property: they are not sent to the server when requesting a website. Instead, the web browser traditionally uses them to scroll the page when it is loaded.

□ Sharing:

- ○ The links that are generated from this process are complete and substantial. They upto 2.610 bytes.

ITTY BITTY: How it works

□ Display:

  ○ Once the link is sent and opened, it loads itty.bitty.site to reverse the process, which is done completely on device.

  ○ The data is extracted, inflated, and then shown in the web browser.

□ Malicious use:

  ○ Scripting is enabled on these sites, which allows for greater flexibly, but can enable malicious use.

Conclusion

☐ We analyzed the current trend on the Web.

☐ We characterized a brand new experimental ITTY BITTY technology introduced in July 2018.