

# INTRODUCTION TO WEB ARCHITECTURES

Evolution of the Web

## THE WEB

- Who invented the Web?
- Why? What was the Web designed for? What problem was the Web created to solve?
- What requirements did Berners-Lee identify for the Web?
- How is the Web different than the Internet?

## THE WEB

- A huge distributed system for accessing linked files
- Built on top of fundamental Internet technologies and protocols

## DESIGN GOALS OF THE WEB

- Original goals:
  - "Pool of human knowledge"
  - Scalable
  - Distributed
  - Heterogeneous
  - "Uncoordinated"
  - Hyperlinked

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## ARCHITECTURE

- What is the underlying architecture of the web?
- What are the major components?
- How are files created?
- How are files identified?

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## ARCHITECTURE

- Client-server architecture
  - Browser (NCSA Mosaic)
- Create web files with HyperText Markup Language (HTML)
  - Web page
- Link pages using Universal Resource Locator (URL)
  - Page links are internal (hyperlinks)

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## WEB SITES

- Collection of related web pages
- Related by
  - Content
  - Aesthetics
  - Architecture

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## WEB APPLICATIONS

- Web sites are static
- Web applications (web apps) are dynamic
- Client-server application uses the browser as a client
- Benefits:
  - Architecture and OS neutral
  - Can update the application without re-installing on client machines
- Tailors information to the user
- Often involves a database

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## “WEB 2.0”

- circa 2004
- Folksonomy - allow users to collectively classify and find info (tagging)
- Richer User Experience - dynamic content, responsive to user input.
- User as contributor

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## WEB 2.0

- Long tail - services offered on demand basis
- Crowd Sourcing / User participation
- Basic Trust - contributions available to all
- Mass Participation

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## “AJAX”

- Asynchronous Javascript and XML
- Begone full-page refresh!
  - Only update parts of the page that need to change
- Browser can make server requests independent of a page load
- Web apps look and behave like desktop apps
- JQuery normalized the technique across browsers and popularized this approach.
- circa 2004/2005

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## RESPONSIVE WEB DESIGN (RWD)

- web designs that render well on a variety of device screens, and or window sizes.
- motivated by the high volume of web access occurring from smart phones / tablets.
- based on CSS3 media queries
- circa 2011

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## PROGRESSIVE WEB APPS

- Term coined by Google (circa 2016)
- progressive: cross browser, progressive enhancement as core tenant
- responsive
- connectivity independent (works offline or slow conns)

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## PROGRESSIVE WEB APPS

- App-like: app shell model separates app functionality from app content.
- Discoverable (identifiable as app, hence searchable)
- Re-engageable -push notifications
- Installable - can place icon on home screen
- Linkable - app has a shareable link.

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## PROGRESSIVE WEB APPS

- Google Lighthouse Tool - open source audit tool
- PWA Checklist:
  - served over HTTPS
  - responsive
  - app URLs load while offline

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## PROGRESSIVE WEB APPS

- PWA Checklist (continued)
  - Metadata provided for add to home screen
  - First load fast, even on 3G
  - Cross Browser
  - Snappy page transitions
  - Each page as an URL

## SPA MODEL

- Single Page Apps - circa 2002 / coinciding with web 2.0
- web app that works by dynamically rewriting the current page rather than fetching/loading new pages from a server
- JavaScript Frameworks: AngularJS, Ember, Meteor, React.

## READING ASSIGNMENT

- Read: [HTTP: The Protocol Every Web Developer Must Know](#).
- Watch PWA video: <https://developers.google.com/web/progressive-web-apps/>
- Read RWD article: <https://alistapart.com/article/responsive-web-design>