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IBM i

Go Mobile without Creating a Mobile App



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Your Presenter

- I eat new technology for breakfast
- 30+ years of IBM i and multi-platform development
- Founded and sold RJS Software Systems
- Created automated report distribution, document management, forms, workflow and app integration software
- MOBIGOGO multiplatform app development and consulting
- Process automation, web and mobile app development and integration consulting
- App modernization and open-source training
- iForGit Eliminate Awkward Git Integration on IBM i
- Open-source contributor
- Learn something new every day



Session Topics

Why do we need mobile apps ?

What types of mobile apps are there

How to create mobile apps without becoming a mobile expert

Sample app use cases

Demo

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Reasons for Mobile Enabled Apps

Field service

Order entry

Equipment inspections

Property inspections

Deliveries

Improve efficiency/lower costs





Mobilizing For IBM i Sites

- Need to modernize existing green screen apps
- Want to create browser-based apps
- May need mobile apps warehouse, field service, etc.
- Re-use existing database and RPG/CL/COBOL logic (Even S/36)
- Create new business logic in new languages Python, Node, PHP, etc.
- Get rid of paper-based processes and re-keying of data
- Provide better overall user experience





Types of Mobile Access

- Always Online
- Partially Online
- Always Offline





Always Online

- Standard web site programming
- HTML/CSS/JavaScript
- Use responsive framework such as (Bootstrap)
- Internet always available
- Mobile hotspot or wi-fi access





Partially Online

- Need to load information to device
- Store changes temporarily
- Sync changes when online
- Standard web site programming or device specific
- Internet NOT always available





Almost Always Offline

- Need to load information to device
- Store changes up to 24 hours or longer
- Sync changes when online
- Perform work fully offline
- Standard web site programming or device specific
- Internet NOT always available





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Which Device Platforms to Support ?



Desktops, Laptops, Chromebooks





Types of Mobile Apps

- Native Mobile Apps/Platform Specific
- Native Cross Platform Development
- Web Apps
- Single Page and Progressive Web Apps
- Hybrid Apps (Web and Mobile)



Native Mobile App Frameworks

- Objective C
- Swift
- Flutter
- React Native
- Ionic
- Xamarin/.Net Maui
- Mobile Angular
- Phonegap/Cordova

https://www.geeksforgeeks.org/top-mobile-app-development-frameworks/





HTML App Frameworks

- React
- Vue
- Angular
- Bootstrap
- .Net Blazor
- HTML/CSS/JS
- Others





Mobile App Categories

- Native Apps: A Native App is an application specifically designed for a particular platform or device.
- Web Apps: A Web App is an application designed to deliver web pages on different web platforms for any device.
- Hybrid Apps: A Hybrid App is a combination of both native & web applications. It can be developed for any platform from a single code base.





For Today's Discussion

- Web Apps: A Web App is an application that is designed to deliver web pages on different web platforms for any device.
- Hybrid Apps: A Hybrid App is a combination of both native & web applications. It can be developed for any platform from a single code base.
- Hybrid web apps are generally HTML sites wrapped to use WebView control on device

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Offline Friendly Web Apps

• Single Page Apps (SPA):

High performance, low maintenance, single web page, javascript, no full-page reloads needed.

- **Progressive Web App (PWA) :** Fast, cost-effective, offline access, auto-updates, easy installation.
- Very similar, but PWAs offer **offline capability**.
- We will focus on PWA apps for this discussion



ChatGPT on SPA vs PWA

SPA functionality:

 An SPA primarily focuses on updating content within a single web page using JavaScript, providing a smooth user experience without full page reloads.

PWA capabilities:

- A PWA builds on the SPA concept by adding features like service workers to enable offline access, manifest files for installability, and push notifications, giving it a more "app-like" experience.
- In essence, you can think of a PWA as an enhanced version of an SPA with additional features that make it behave more like a native app.





Progressive Web Apps (PWAs)

- Applications that you build by using **web technologies**.
- Can be installed and can run on all devices, from one codebase.
- Provide native-like experiences to your users on supported devices
- Adapt to the capabilities supported by each device
- Can also run in web browsers, like websites.



PWA Benefits

PWAs have access to advanced capabilities. For example:

- PWAs can continue working when the device is **offline**.
- PWAs support **push notifications**.
- PWAs can perform **periodic updates** even when the application is not running.
- PWAs can access hardware features.



Web Related Advantages

PWAs can run in web browsers, just like web sites. Advantages:

- PWAs can be **indexed** by search engines.
- PWAs can be shared and launched from a **standard web link**.
- PWAs are safe for users because they use secure HTTPS endpoints and other user safeguards.
- PWAs **adapt** to the user's screen size or orientation, and input method.
- PWAs can use advanced web APIs such as WebBluetooth, WebUSB, WebPayment, WebAuthn, or WebAssembly and your own services.



Lower Development Costs

- PWAs have a much lower cross-platform development cost than compiled apps
- Single codebase vs native apps.
- Native apps have codebase for **Android**, **iOS**, **desktop OS**, etc.
- With a PWA, you can use a **single codebase** that's shared between your website, mobile app, and desktop app (across operating systems).





Cross Device Compatability

- PWA apps Built using **HTML, CSS, and JavaScript**
- Hosted on web servers
- Run in **web browsers** like web site
- Can download and install on a device





Developing Mobile Web Apps

- Microsoft VS Code
- Microsoft Visual Studio 2022
- Web Storm https://www.jetbrains.com
- NSB/AppStudio https://www.appstudio.dev
- Notepad++





Compiling Hybrid Apps to Native

- Adobe Phonegap
- Apache Cordova
- CapacitorJS
- Volt.Builder
- Outputs native Android and iOS apps





Database/Local Storage/Offline

- SQLite/Wasm
- IndexedDB
- Local Storage
- Session Storage
- 10 mb max unless compiled native
- I believe native compiled HTML apps can use **unlimited storage**

Summary of Mobile App types





Mobile Web Apps

- Easy to create
- Use HTML, CSS and JS
- Assumption of always being on-line





Native Mobile Apps

- Have to use specific toolsets
- Objective C
- Flutter
- Android Studio
- Etc.....



Hybrid Mobile Apps

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- Easy to create
- Use HTML, CSS and JS
- Use Cordova or Capacitor to native compile
- Can use all native phone features
- iOS or Android





Hybrid Web Apps-PWA

- Progressive Web Apps
- Use HTML, CSS and JS
- Can be online or offline
- Data can be cached locally

Sample PWA Mobile App Use Cases





Mobile App Deployment Scenarios

- Live connect to talk directly to back-end system like IBM i
- Talk to cloud server and have IBM i pick up data from cloud site
- Perform all work in cloud and file transfer data to IBM i
- Some customers don't want to expose IBM i directly to web





Mobile Dishwasher Servicing

- Employee goes to customer site
- Reviews chemical usage
- Enters usage numbers
- Data saved temporarily to device during site visit.
- Or data immediately sent back to IBM i (if online)
- Used to be done with paperwork
- Keying validated and invoicing delays eliminated

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Mobile Dishwasher Servicing



Windows Laptops Can store current transaction offline temporarily



Mobile Route Servicing

- Employee loads route information to their device
- Goes to each site and does delivery and pickup
- Today they fill out paperwork
- Paperwork gets shipped back to corporate HQ
- Information currently keyed into IBM i billing system
- Creating an app to allow all route entry to happen offline
- Data can be synced. On demand.
- Paperwork and paperwork shipping costs will be eliminated





Mobile Route Servicing



Sample App Demo

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Single Page App



Desktop Browsers



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JSON Data Update to IBM i

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Sample App Summary

- Uses browser local storage to cache data
- Local storage caches login session info
- IBM i stores login info in session table
- Could be configured to be served fully offline by storing data in local storage







https://appstudio.dev

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AppStudio IDE

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DataTables Sample

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Garrett Winters	Accountant	Tokyo	8422	2011/07/25	\$170,750		
Ashton Cox	Junior Technical Author	San Francisco	1562	2009/01/12	\$86,000		
Cedric Kelly	Senior Javascript Developer	Edinburgh	6224	2012/03/29	\$433,060		
Airi Satou	Accountant	Tokyo	5407	2008/11/28	\$162,700		
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Showing 1 to 5 of 36 entries





App Studio

- Visually create apps for multiple platforms
- Target Android, iOS and Desktop
- Create Electron Native Apps
- Bootstrap framework
- Can bring your own custom javascript and components
- Low monthly subscription

Volt Builder



https://volt.build





- Search: pwa app development learning
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- MDN hs great new PWA guides (+ regular docs) <u>https://developer.mozilla.org/enUS/docs/Web/Progressive_web_apps</u>
- Service Worker Cookbook (copy/paste examples) <u>https://serviceworke.rs/#google_vignette</u>
- Microsoft PWA Presentations <u>https://microsoft.github.io/workshop-library/full/mood-journal-progressive-web-app/1-create-pwa.html</u>



Let's Connect on Social Media

- Github: <u>http://github.com/richardschoen</u>
- MobiGoGo Business site: <u>http://www.mobigogo.net</u>

(PWA web app training, Consulting or iForGit 5250 git client for managing classic RPG and CL source versioning)

- Personal site: <u>http://www.richardschoen.net</u>
- LinkedIn: <u>https://www.linkedin.com/in/richardschoen</u>
- Twitter/X: @richardschoen
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- Email: <u>richard@richardschoen.net</u> –or- <u>richard@mobigogo.net</u>





What You Learned

- Intro to Progressive web apps for offline and partially offline web apps
- Things to consider for PWA development
- Can use standard HTML/CSS/JS skillsets
- Reach out with questions or mobile consulting needs

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