

Comparison between Blazor WebAssembly (WASM) and Blazor Progressive Web App (PWA)

High-Level Concept

Concept	Meaning
Blazor WASM	A hosting model where the Blazor app runs entirely in the browser using WebAssembly
Blazor PWA	A feature set that adds installability, offline support, and caching to a Blazor WASM app

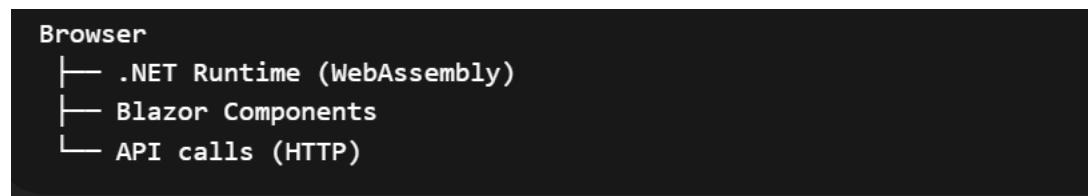
Key takeaway:

Blazor PWA = Blazor WASM + PWA capabilities

Blazor WebAssembly (WASM)

What it is

Blazor WASM allows you to run **.NET code directly in the browser** using WebAssembly, without requiring a server for UI rendering.



Key Characteristics

Aspect	Description
Execution	Runs fully in the browser
Server dependency	Only for APIs
Offline support	✗ Not by default
Installable	✗ No
Performance	Initial load can be slower

Aspect	Description
Hosting	Static hosting (Azure Static Web Apps, IIS, etc.)

Typical Use Cases

- SPA applications
- Client-heavy UI
- API-driven systems
- SaaS dashboards

Blazor Progressive Web App (PWA)

What it is

A **Blazor WASM app enhanced with PWA features**, enabling it to behave like a **native application**.

What PWA Adds

Feature	Provided By
Install on device	Web App Manifest
Offline support	Service Worker
Asset caching	Service Worker
App-like UI	Full-screen, icon, splash screen
Faster reload	Cached resources

Architecture

Code

```
Browser / Installed App
├── Blazor WASM
├── Service Worker
└── Cached Assets
└── API calls (optional offline)
```

Typical Use Cases

- Mobile-friendly apps
- Offline-first applications
- Field service apps
- E-commerce catalogs
- Internal enterprise tools

Side-by-Side Comparison

Feature	Blazor WASM	Blazor PWA
Hosting model	✓ Yes	✗ No (uses WASM)
Runs in browser	✓	✓
Installable like app	✗	✓
Offline support	✗	✓
Uses Service Worker	✗	✓
App icon & splash screen	✗	✓
Requires internet always	✓	✗
Mobile experience	Good	Excellent

Project Creation Difference

Blazor WASM (Standard)

```
dotnet new blazorwasm
```

Blazor WASM with PWA Enabled

```
dotnet new blazorwasm --pwa
```

What the --pwa flag adds:

- service-worker.js
- service-worker.published.js
- manifest.webmanifest
- Offline caching configuration

Real-World Analogy

Technology	Analogy
Blazor WASM	A website running in the browser
Blazor PWA	That same website installed as a mobile/desktop app