



Automatic

Progressive Web Apps

using Angular Service Worker

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Angular GDE

*“How to create an Angular
Progressive Web App?”*

Natively & naturally

Maxim Salnikov



- Full-Stack Engineer at **ForgeRock**
- **PWA**ngelist / tr ainer
- **LondonPWA** and **OsloPWA** meetups organizer
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After all, what is PWA?



Progressive web apps use **modern web APIs** along with traditional **progressive** enhancement strategy to create **cross-platform** web applications.

These apps work **everywhere** and provide several features that give them the same **user experience advantages** as native apps.

<https://developer.mozilla.org/en-US/Apps/Progressive>

Cross-platform?

Browser



Dev builds



Mobile




Desktop



App store?




During last two weeks


 Maxim «PWAngeList» Salnikov
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[Updated] That's official: after today's release of iOS 11.3, #Safari joins the "#PWA in production" browsers hall of fame! It still lacks some features like Web Push & Background Sync, but @Apple's decision to join the #YearOfPWA is clearly visible!



UPDATE
MARCH 29, 2018




iOS 11.3 is available today




 Simona Cotin
@simona_cotin

Following

 First PWAs have been published in the Windows 10 Store 

 Student Doctor Network
 Skyscanner
 Oyster

PWAs installed via the store will appear in "app" contexts like Start and Cortana search results. 

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Another day, another platform supported for your #PWA: now these apps are native for Chrome OS. Offline, own window, launch icon, etc. Today on Canary channel, very soon in release. #YearOfPWA



UX advantages?

Working offline

Smarter networking

Staying notified

Proper app experience



**Service Worker
API**

Web App Manifest

[bit.ly/go-pw a-slack](https://bit.ly/go-pw-a-slack)

- 1300+ developers
- Major browsers/ frameworks/libs reps



PWA



+

`<script />`

=

PWA



+



=

PWA

Angular Service Worker

NGSW

Generate a new Angular PWA

Yesterday

```
$ ng new myPWA --mobile
```

Angular Mobile Toolkit

- Angular CLI < 1.6
- Angular Service Worker β

Generate a new Angular PWA

Today

```
$ ng new myPWA --service-worker
```

- Angular CLI 1.6-1.7
- Angular Service Worker 5

Generate a new Angular PWA

Tomorrow

```
$ ng new myPWA
```

```
$ ng add @angular/pwa --project=myPWA
```

- Angular CLI 6
- Angular Service Worker 6
- Web App Manifest
- @Schematics

Building Angular PWA

```
$ ng build --prod
```

dist/

ngsw-worker.js

ngsw.json

Application

- Manifest
- Service Workers**
- Clear storage

Storage

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies

Cache

- Cache Storage
 - ngsw:db:control-
 - ngsw:9b13c7dfea
 - ngsw:db:ngsw:9k
 - ngsw:9b13c7dfea
 - ngsw:db:ngsw:9k
 - ngsw:8db369bb4
 - ngsw:db:ngsw:8c

Service Workers

Offline
 Update on reload
 Bypass for network
 Show all

http://127.0.0.1:8082/ [Update](#) [Push](#) [Sync](#) [Unregister](#)

Source [ngsw-worker.js](#)
Received 11/6/2017, 11:02:40 PM

Status ● #2720 activated and is running [stop](#)

Clients [http://127.0.0.1:8082/](#) [focus](#)

Elements Memory Console **Network** Audits Sources Performance >>

Group by frame
 Preserve log
 Disable cache
 Offline

Hide data URLs
 All | XHR JS CSS Img Media Font Doc WS Manifest

Name	Method	Status	Type	Size
127.0.0.1	GET	200	document	(from ServiceWorker)
styles.d41d8cd98f00b204e980.bun...	GET	200	stylesheet	(from ServiceWorker)
inline.bcfe357835369dbda7ce.bundl...	GET	200	script	(from ServiceWorker)
polyfills.ad37cd45a71cb38eee76.bu...	GET	200	script	(from ServiceWorker)
main.40a7c44944aa4a7e5a45.bundl...	GET	200	script	(from ServiceWorker)

Hint #1: Checking the status

<https://yourwebsite.com/ngsw/state>

```
NGSW Debug Info:
```

```
Driver state: NORMAL ((nominal))
```

```
Latest manifest hash: cd4716ff2d3e24f4292010c929ff429d9eeead73
```

```
Last update check: 9s215u
```

```
=== Version 34c3fd2361735b1330a23c32880640febd059305 ===
```

```
Clients: 7eb10c76-d9ed-493a-be12-93f305394a77
```

```
=== Version cd4716ff2d3e24f4292010c929ff429d9eeead73 ===
```

```
Clients: ee22d69e-37f1-439d-acd3-4f1f366ec8e1
```

```
=== Idle Task Queue ===
```

```
Last update tick: 4s602u
```

```
Last update run: 9s222u
```

```
Task queue:
```

Adding NGSW to the existing app

1. Install the package

```
$ npm install @angular/service-worker --save
```

2. Enable build support

```
$ ng set apps.0.serviceWorker=true
```

3. Register NGSW for your app

4. Create configuration file

Service worker build support in the CLI



Can be npm-scripted for legacy Angular CLIs!

Registering NGSW

app.module.ts

```
import { ServiceWorkerModule } from '@angular/service-worker';
import { environment } from '../environments/environment';

...
@NgModule({
  ...
  imports: [
    ...
    ServiceWorkerModule.register('/ngsw-worker.js',
      { enabled: environment.production }),
  ]
})
export class AppModule { }
```

NGSW configuration file

src/ngsw-config.json

```
{  
  "index": "/index.html",  
  "assetGroups": [...],  
  "dataGroups": [...]  
}
```

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App shell

assetGroups

```
{  
  "name": "app",  
  "installMode": "prefetch",  
  "resources": {...}  
}
```


App shell resources

assetGroups / "app" / resources

```
"resources": {
  "files": [
    "/favicon.ico",
    "/index.html"
  ],
  "versionedFiles": [
    "/*.bundle.css",
    "/*.bundle.js",
    "/*.chunk.js"
  ]
}
```

App shell / on-demand

assetGroups

```
{  
  "name": "assets",  
  "installMode": "lazy",  
  "updateMode": "prefetch",  
  "resources": {...}  
}
```

App shell / on-demand

assetGroups / "assets" / resources

```
"resources": {
  "files": [
    "/assets/**"
  ],
  "urls": [
    "https://fonts.googleapis.com/**",
    "https://fonts.gstatic.com/**"
  ]
}
```

Runtime caching

dataGroups

```
{
  "name": "api-freshness",
  "urls": [
    "/api/breakingnews/**"
  ],
  "cacheConfig": {
    "strategy": "freshness",
    "maxSize": 10,
    "maxAge": "12h",
    "timeout": "10s"
  }
}
```

Runtime caching

dataGroups

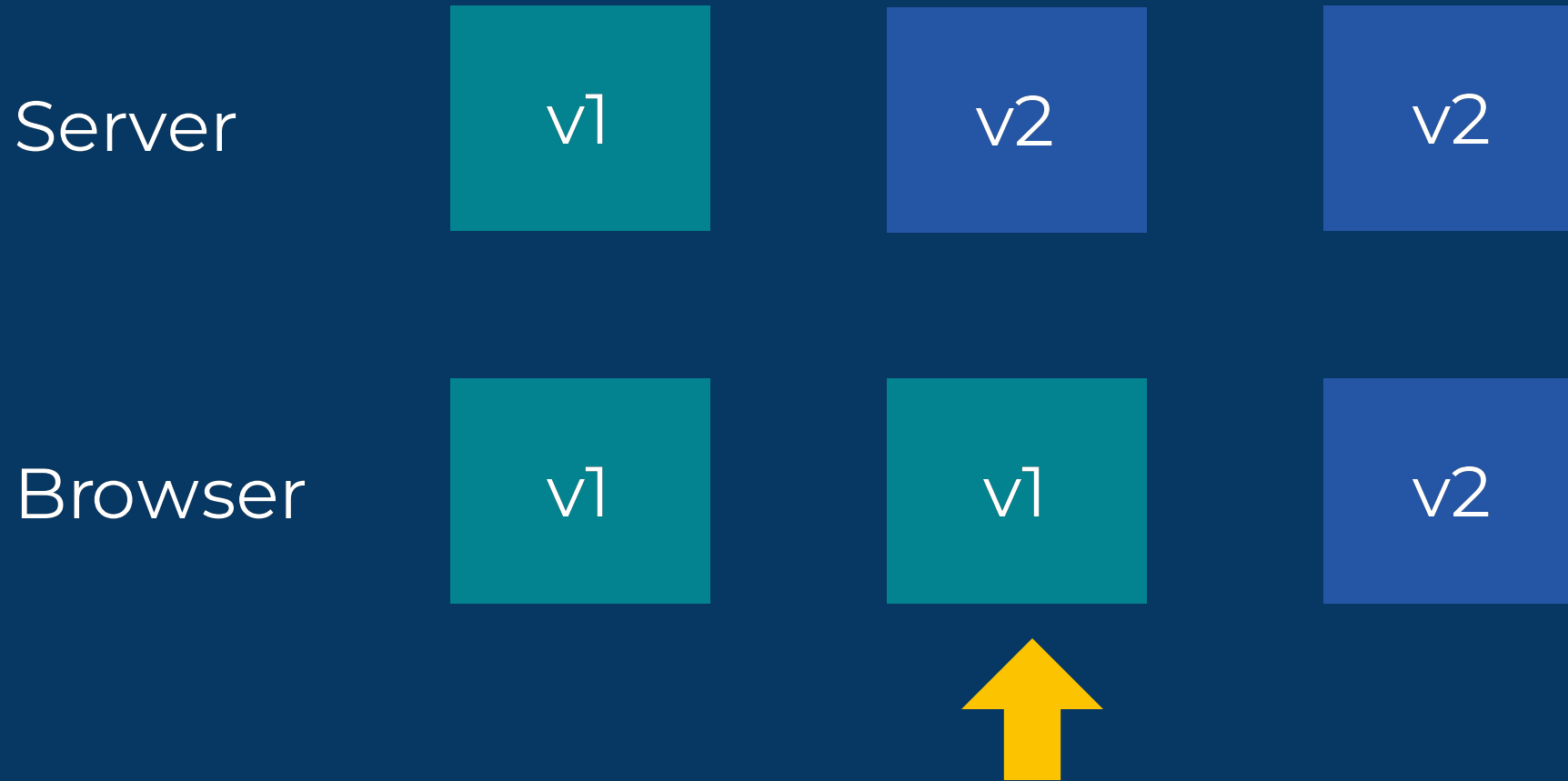
```
{
  "name": "api-performance",
  "urls": [
    "/api/archive/**"
  ],
  "cacheConfig": {
    "strategy": "performance",
    "maxSize": 100,
    "maxAge": "365d"
  }
}
```

Hint #2: Support API versioning

dataGroups

```
{  
  "version": 2,  
  "name": "api-performance",  
  "urls": [  
    "/api/**"  
  ],  
  ...  
}
```

App version updates



Hint #3: Notify about updates

updates.component.ts

```
import { SwUpdate } from '@angular/service-worker';
```

```
constructor(private swUpdate: SwUpdate) {}
```

```
this.swUpdate.available.subscribe(event => {  
  let snackBarRef = this.snackBar  
    .open('Newer version of the app is available', 'Refresh');  
  
  snackBarRef.onAction().subscribe(() => {  
    window.location.reload()  
  })  
})
```


☰ PWAtter v3

Caching Push Notifications Update flow

☰ Open log

★ Tweets
Choose between your timeline or favorites

☰ Load my timeline ❤️ Load my favorites

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Push notifications

push.component.ts

```
import { SwPush } from '@angular/service-worker';
```

```
constructor(private swPush: SwPush) {}
```

```
subscribeToPush() {  
  this.swPush.requestSubscription({  
    serverPublicKey: this.VAPID_PUBLIC_KEY  
  })  
  .then(pushSubscription => {  
    // Pass subscription object to backend  
  })  
}
```

Push notifications / send

server-side.js / sendNotification payload

```
{
  "notification": {
    "title": "Very important notification",
    "body": "Angular Service Worker is cool!",
    "icon": "https://angular.io/assets/logo.png",
    "actions": [
      {
        "action": "gocheck",
        "title": "Go and check"
      }
    ],
    ...
  }
}
```

Browser window showing PWAtter at 127.0.0.1:8080. The page content includes:

- Navigation tabs: Caching, **Push Notifications**, Update flow
- Text: "Push and notification use different, but complementary, APIs: push is invoked when a server supplies information to a service worker; a notification is the action of a service worker or web page script showing information to a user."
- Buttons: **Subscribe for push**, Unsubscribe, Subscribe for messages

The Chrome DevTools Network tab is active, showing a timeline with a 110ms scale. The console shows "Recording network activity..." and "Perform a request or hit ⌘ R to record the reload." A note mentions missing network activity from out-of-process iframes.

Hint #4: Kill switch

1. Long way

```
ng set apps.0.serviceWorker=false  
ng build --prod  
...deploy
```

2. Short way

```
rm dist/ngsw.json  
...deploy
```

Hint #4: Kill switch

3. Proper way

```
cp dist/safety-worker.js dist/ngsw-worker.js  
...deploy
```

safety-worker.js

```
self.addEventListener('install', e => { self.skipWaiting(); })  
  
self.addEventListener('activate', e => {  
  e.waitUntil(self.clients.claim());  
  self.registration.unregister().then(  
    () => { console.log('Unregistered old service worker');  
  });  
});
```

Main available features

App Shell

Runtime Caching

Push Notifications

Smart Updates

Angular Service Worker advantages

- Essential features are config-driven
- Decoupled updates model
- Integrity checks
- Doing things in Angular way

Thank you!

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Questions?