

 ManfredSteyer

Progressive Web Apps

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Inhalt

- Überblick zu PWA
- Service Worker als Herzstück von PWAs
- Daten im Browser speichern
- Installation am Home Screen
- Background Sync
- Push Notification
- Unterstützung in Angular
- Fazit

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Überblick zu PWA

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Web Apps

Keine
Installation

Cross-
Plattform

Einfaches
Deployment

Einfaches
Update

Durchsuchbar

Links/
Bookmarks

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Native Apps

Einfach zu
starten

Sofortiger
Nutzen

Offline

Langsame
Verbindungen

Push
Notifications

Gerätezugriff

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**Progressive Web Apps bieten
das Beste aus beiden Welten**

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Progressive Enhancements: Offline, Caching, Home Screen etc.

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App muss **auch** ohne
Erweiterungen Nutzen bieten!

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VS.

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Inhalt/ Use Cases

Layout

Progressive Enh.

[<http://alistapart.com/article/understandingprogressiveenhancement>]

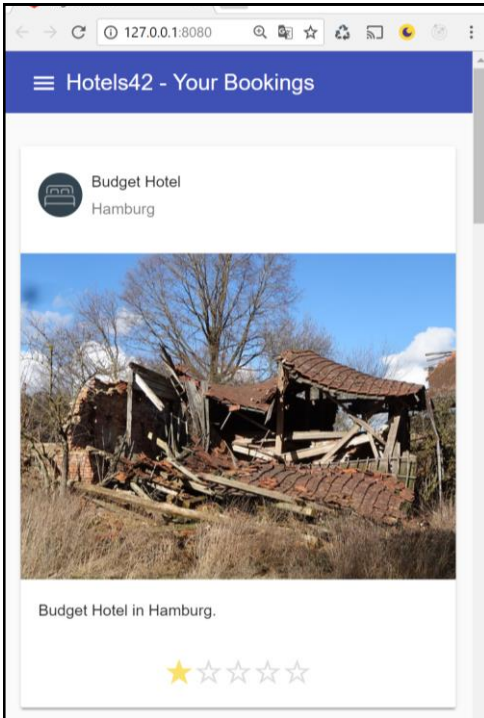
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Wie implementiert man **Progressive Enhancements** und **PWA**?

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Case Study

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Service Worker

Herzstück von PWAs

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Service Worker

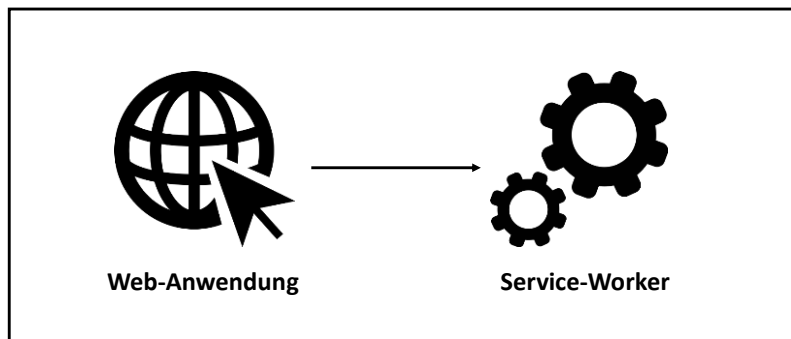


Browser

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Service Worker

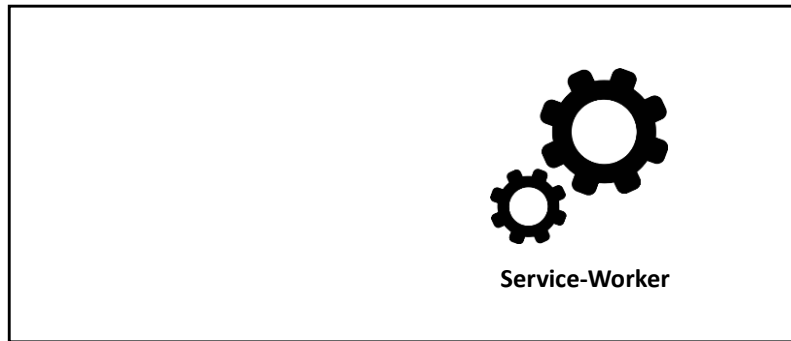


Browser

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Service Worker

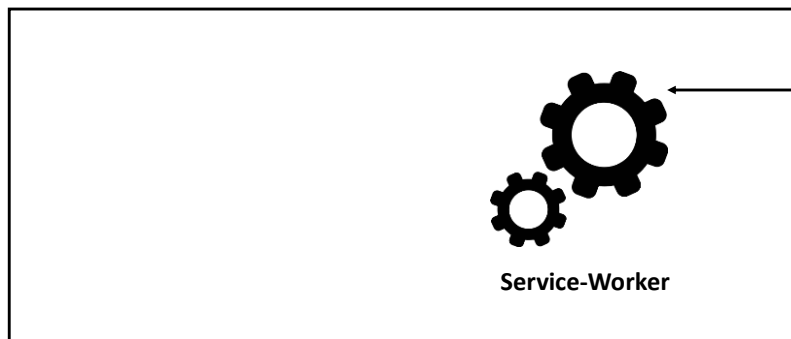


Browser

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Service Worker

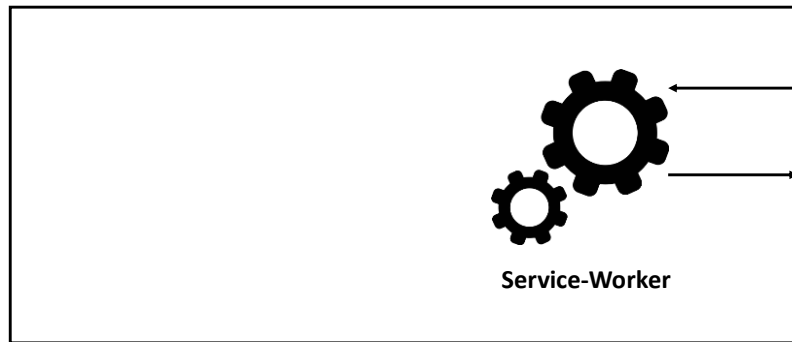


Browser

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Service Worker

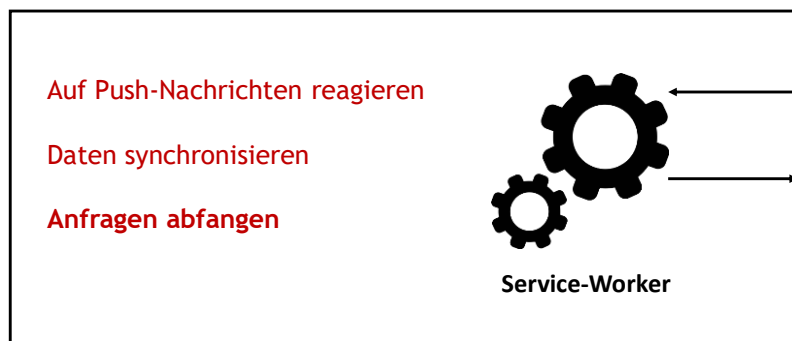


Browser

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Service Worker

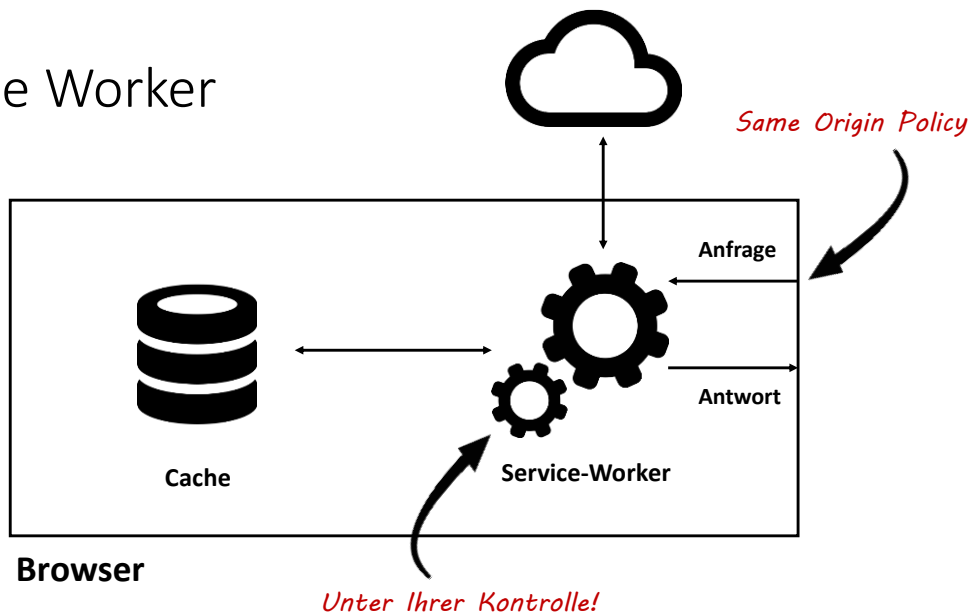


Browser

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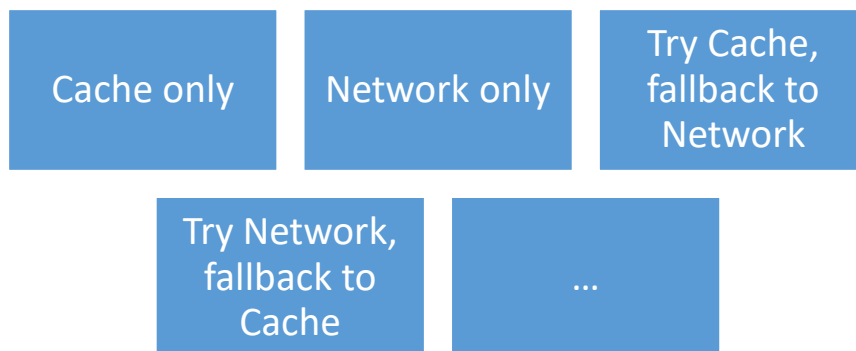
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Service Worker



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Cache Strategien



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Service Worker registrieren

```
if('serviceWorker' in navigator) {
  navigator
    .serviceWorker
    .register('/sw.js', { scope: '/' })
    .then((r) => { console.debug('service worker started!'); });
}
```

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Service Worker Script

```
var context: any = self;

context.addEventListener('install', function(e:any) {
  e.waitUntil(fillCache().then(() => context.skipWaiting()));
});

context.addEventListener('activate', function(e) {
  e.waitUntil(clearOldCaches().then(() => context.clients.claim()));
});

context.addEventListener('fetch', function(event: any) {
  event.respondWith(cacheFirst(event.request));
});
```

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FillCache and CacheFirst

```
function fillCache() {  
  return caches.open(CACHE_NAME)  
    .then(cache => cache.addAll(CACHE_FILES));  
}
```

```
function cacheFirst(request) {  
  return caches.match(request)  
    .then(response => response || fetch(request));  
}
```

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Caching Strategies

<http://tinyurl.com/pwa-caching>

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IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *
		2-32						
		1 33-43						
		44						
		3 45						
		46-51						
		3 52						
	12-14	53-59	4-39		10-26			
	2 15-16	3 60	40-44	3.1-11	27-31	3.2-11.2		
6-10	17	61-62	45-69	11.1	32-55	11.4		2.1-4.4.4
11	18	63	70	12	56	12	all	67
		64-65	71-73	TP				

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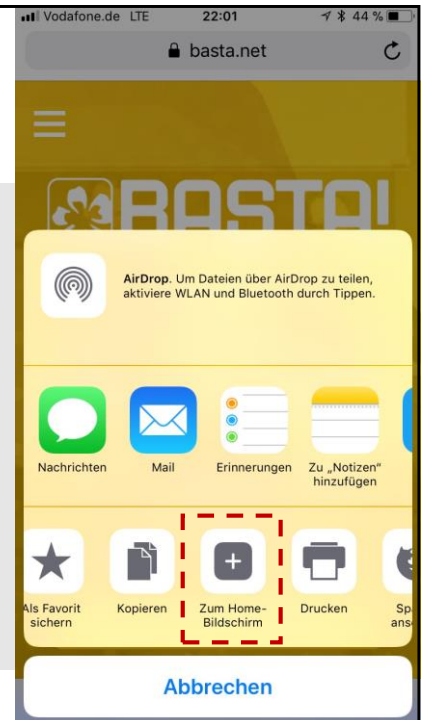


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Web App Manifest

```
{
  "name": "Hotel PWA-Demo",
  "short_name": "Hotel",
  "icons": [{
    "src": "images/touch/icon-128x128.png",
    "sizes": "128x128",
    "type": "image/png"
  }, [...] ],
  "start_url": "/index.html?homescreen=1",
  "display": "standalone",
  [...]
}
```

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Manifest referenzieren

```
<!-- Web Application Manifest -->
<link rel="manifest" href="manifest.json">
```

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@angular/service-worker

Zwei mögliche Abstraktionen für Service Worker

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@angular/service-worker

Kommt von Angular / CLI

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

+ **Config-Datei mit Cache-Strategien etc.**
+ **ng build -prod**

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@angular/pwa

- Installiert @angular/service-worker
 - npm install
 - Generiert Konfiguration
 - Importiert Angular-Modul
- Generiert App Manifest
- Generiert ngsw-config.json
- ng add @angular/pwa

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NgUpdate Service

- checkForUpdate()
- available (Observable)
- activateUpdate()
 - Danach Reload nötig

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DEMO

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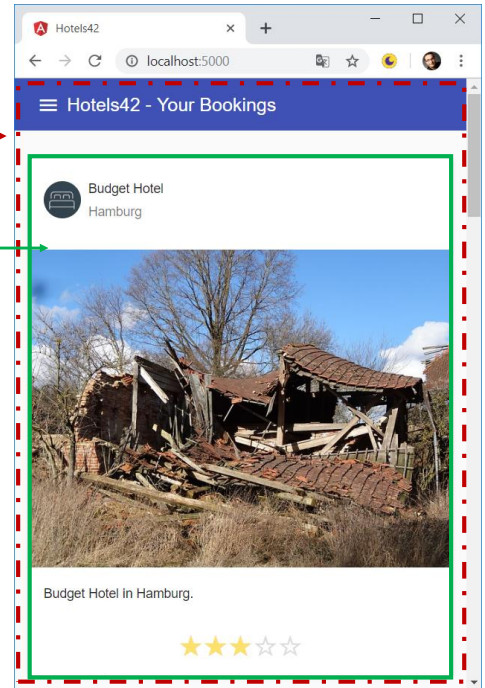
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App Shell

- App Shell: Vorrendern
 - Wie bei SSR, nur statisch!
- Content: Cachen
- Grund: Sofortiger nutzen

App Shell →

Content →



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App Shell generieren

ng generate app-shell

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DEMO

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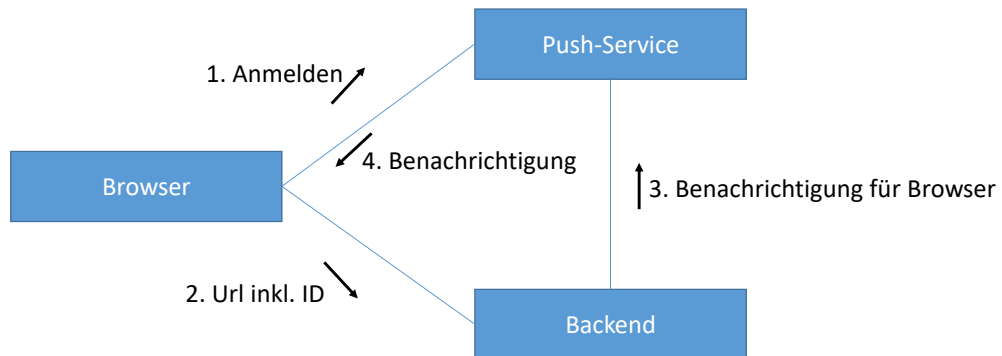
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Push Notifications



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Für Push registrieren

```

let nav:any = navigator;

if ('serviceWorker' in navigator) {
  nav.serviceWorker.ready.then(function(reg) {
    reg.pushManager.subscribe({
      userVisibleOnly: true
    }).then(function(sub) {
      console.log('endpoint:', sub.endpoint);
      // Send endpoint with id over to web api
    });
  }).catch(function(error) { [...] });
}
  
```

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Auf Push in Service Worker reagieren

```
context.addEventListener('push', function(event: any) {  
  
    event.waitUntil(_ =>  
        context.registration.showNotification("Delay", {  
            body: 'Your flight is delayed',  
            icon: '/images/touch/icon-128x128.png',  
            tag: 'my-tag'  
        }));  
});
```

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SwPush

- requestSubscription(...)
 - Rückgabewert hat Daten für zum Server
- messages (Observable)
- notificationClicks (Observable)

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DEMO

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Daten lokal speichern

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Daten offline speichern

- LocalStorage (kein Zugriff über Service Worker)
- WebDb (deprecated aber hier)
- IndexedDb

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Quotas als Herausforderung

Browser	Limit
Chrome	<6% of free space
Firefox	<10% of free space
Safari	<50MB
IE10	<250MB
Edge	Dependent on volume size

[<https://developers.google.com/web/fundamentals/instant-and-offline/web-storage/offline-for-pwa>]

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Fokus

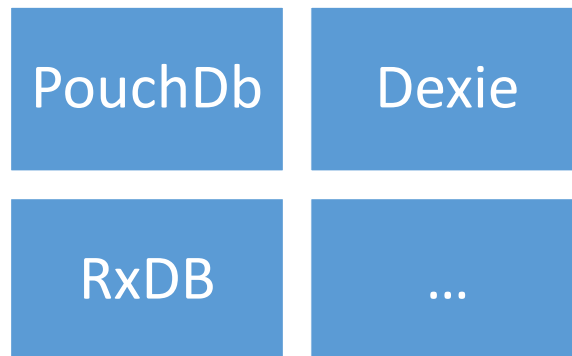
- Kein langfristiger Offlinebetrieb
- Überbrücken langsamer oder fehlender Datenverbindungen

Postausgang

! 🔔 📄 📧	AN	BETREFF
▲ Datum: Heute		
📧	'mama@hotel-mama.com'	Frische Wäsche
📧	'bruce.wayne@wayne-enterprises.com'	AW: Neuer Anzug
📧	'office@starfleet.com'	Bewerbung als Captain
📧	'Mirko Schrempp (mschrempp@sandsme...'	Keynote BASTA!

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Abstraktionen für Browser-Datenbanken



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Background Sync

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A blue speech bubble with a tail pointing downwards, containing the text 'Background Sync'. The background of the slide features a series of concentric, curved lines in a light blue-grey color.

Background Sync

- App fordert **Background Sync** an
- Service Worker führt **Sync Event** aus, wenn es passend erscheint (Netzwerk, Akku, ...)
- Pläne für periodische Background Sync

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Background Sync anfordern

```
let nav: any = navigator;

if ('serviceWorker' in nav && 'SyncManager' in window) {
  nav.serviceWorker.ready
    .then(reg => {
      return reg.sync.register('upload');
    })
    .catch(_ => {
      return this.buchungService.upload();
    });
} else {
  this.buchungService.upload();
}
```

Tag

Fallback: Directly sync in Browser Thread

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Sync Event in Service Worker

```
context.addEventListener('sync', function(event) {
  console.debug("Service Worker: sync, tag=" + event.tag);
  if (event.tag == 'upload') {
    event.waitUntil(bs.upload().then(_ =>
      console.debug('background-upload finished')));
  }
});
```

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PWAs im weiteren Sinn

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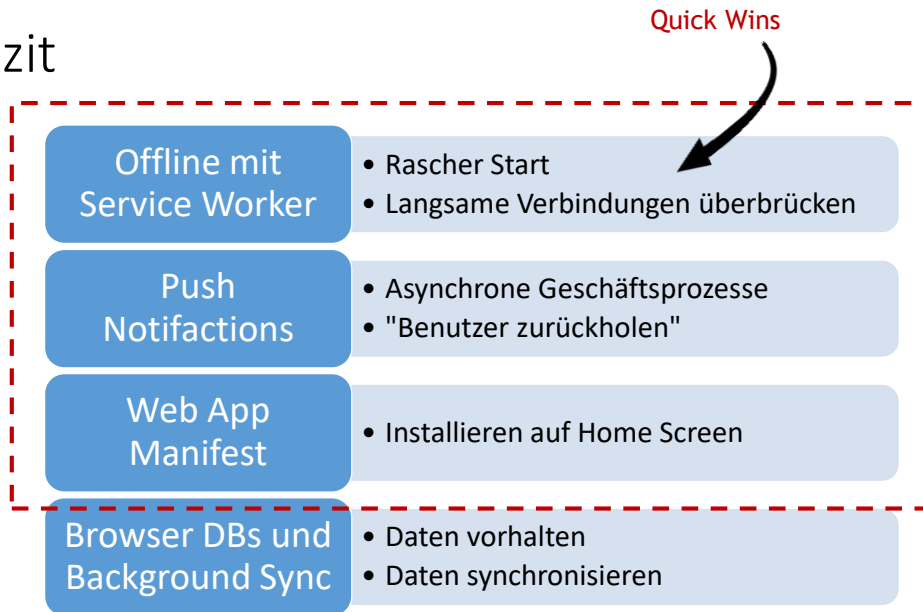
PWAs im weiteren Sinn

- Moderne Browser APIs
 - <https://whatwebcando.today/>
- Welcher Browser unterstützt was?
 - <https://caniuse.com/>

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Fazit



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Fazit

Jede Web-App sollte eine PWA sein

Sehr verlockend (nicht nur) für Business Apps

M&Ms können Ihnen den Tag retten

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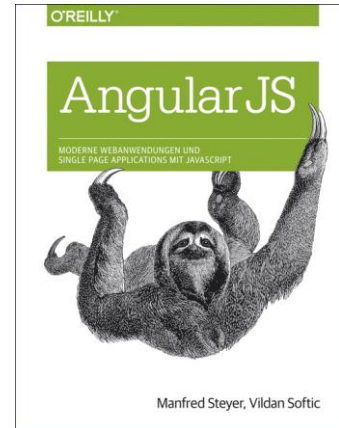
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