



# 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

# Web Apps

Keine  
Installation

Cross-  
Plattform

Einfaches  
Deployment

Einfaches  
Update

Durchsuchbar

Links/  
Bookmarks

# 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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# Service Worker

Herzstück von PWAs



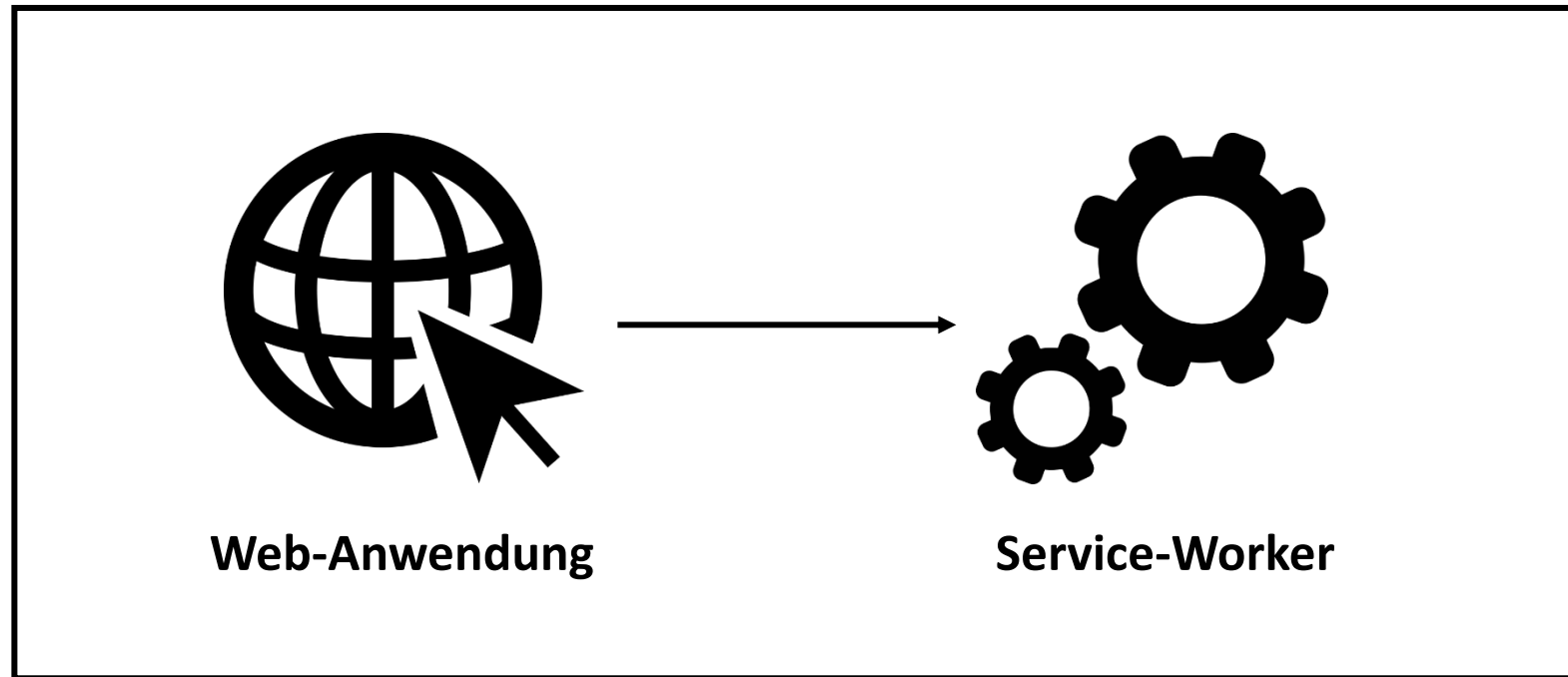
# Service Worker



Web-Anwendung

**Browser**

# Service Worker



**Browser**

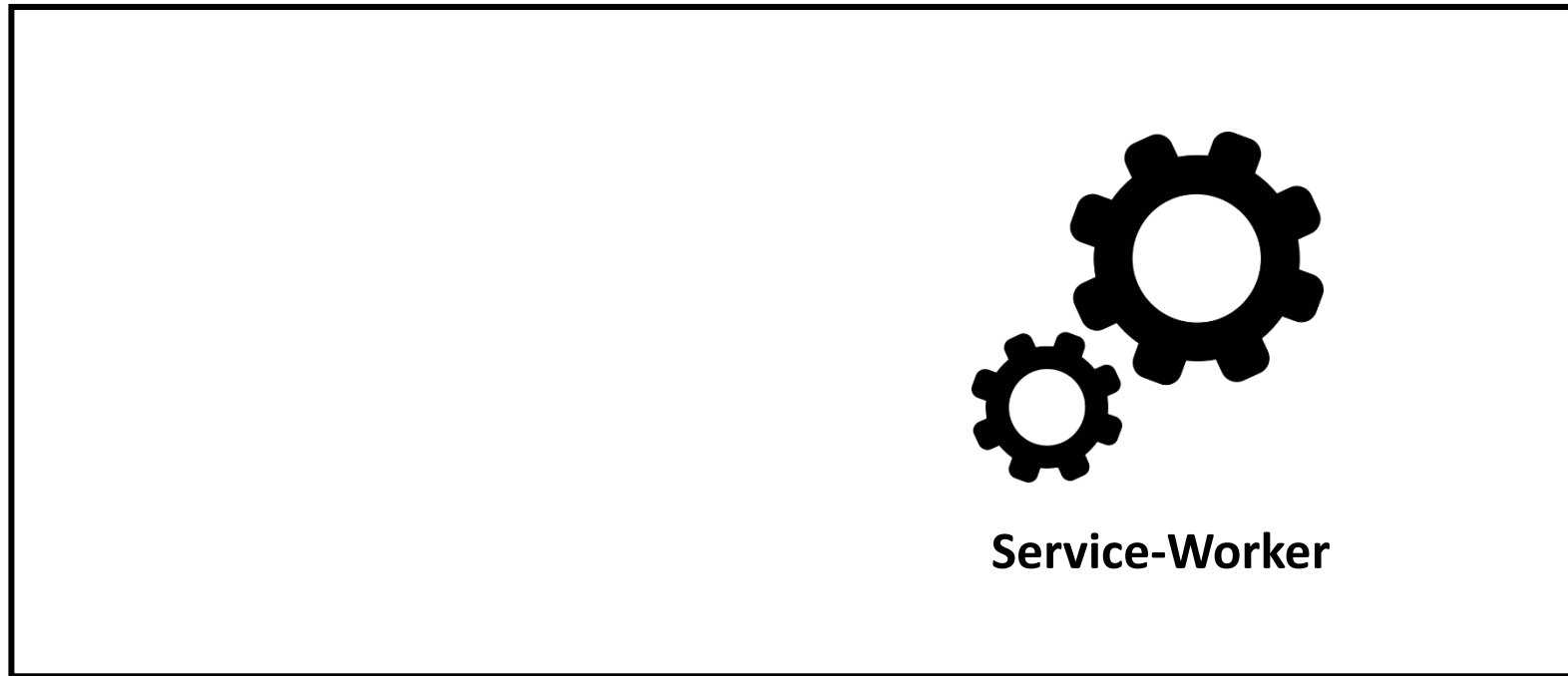


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# Service Worker



**Browser**

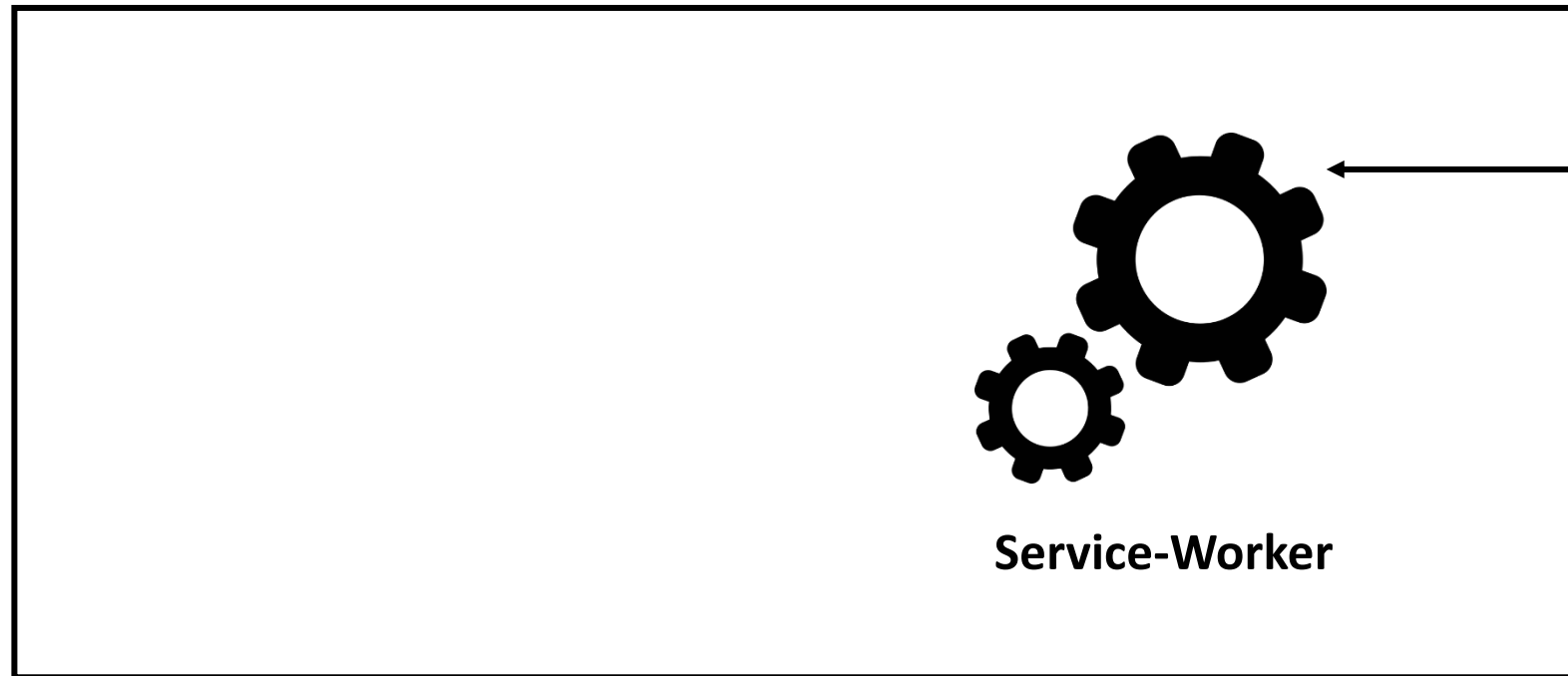


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# Service Worker



**Browser**

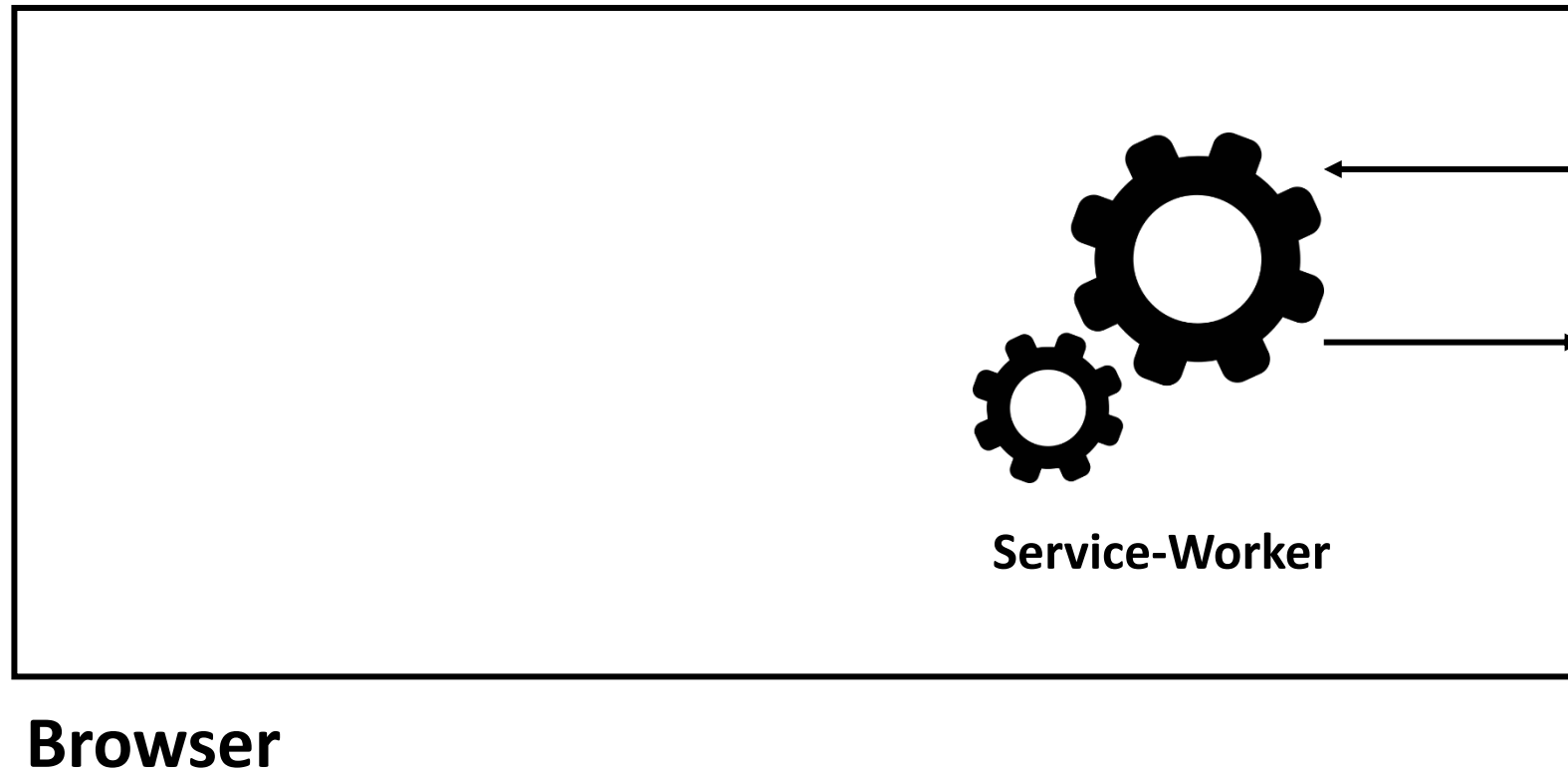


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# Service Worker



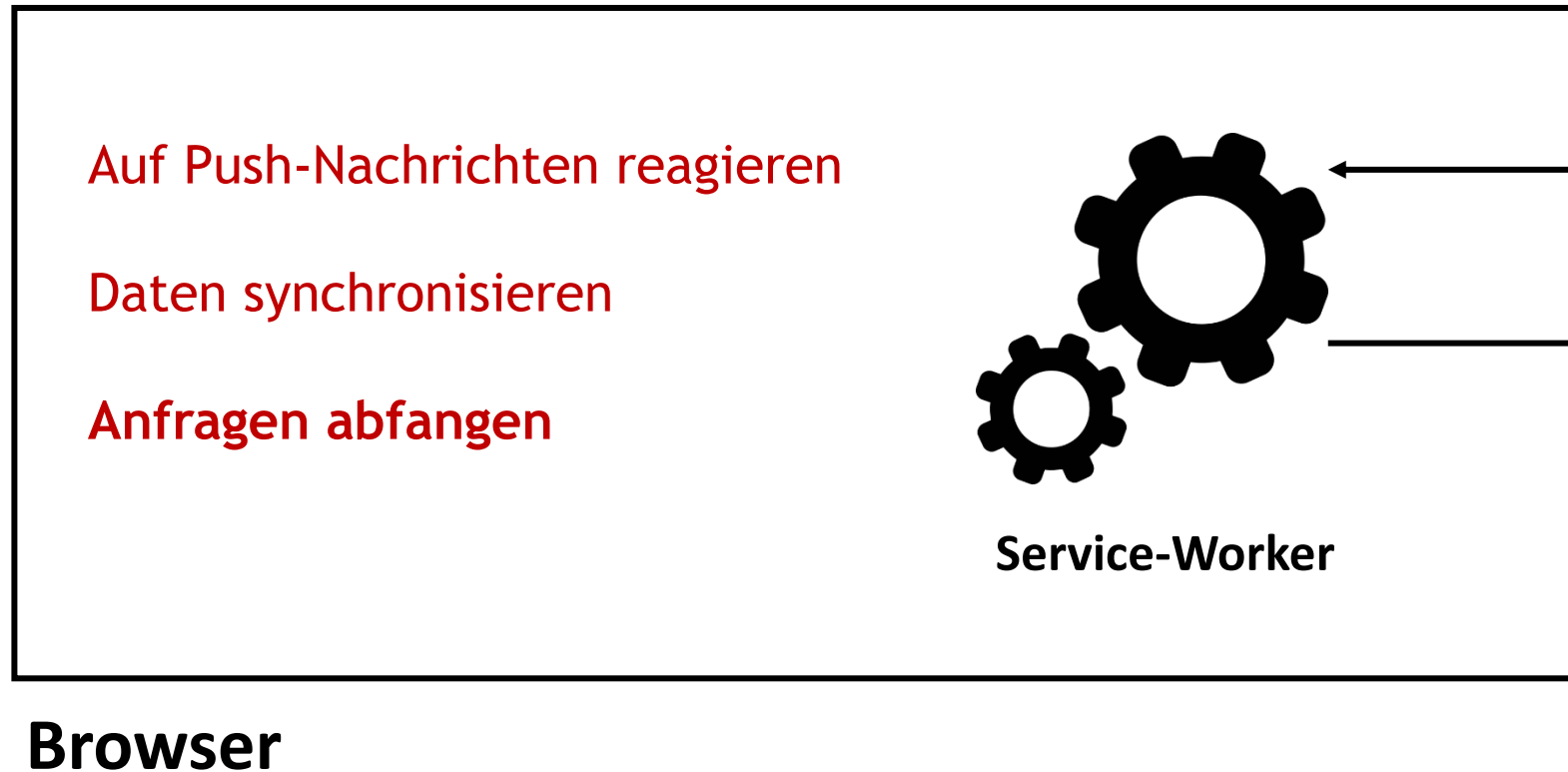
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# Service Worker

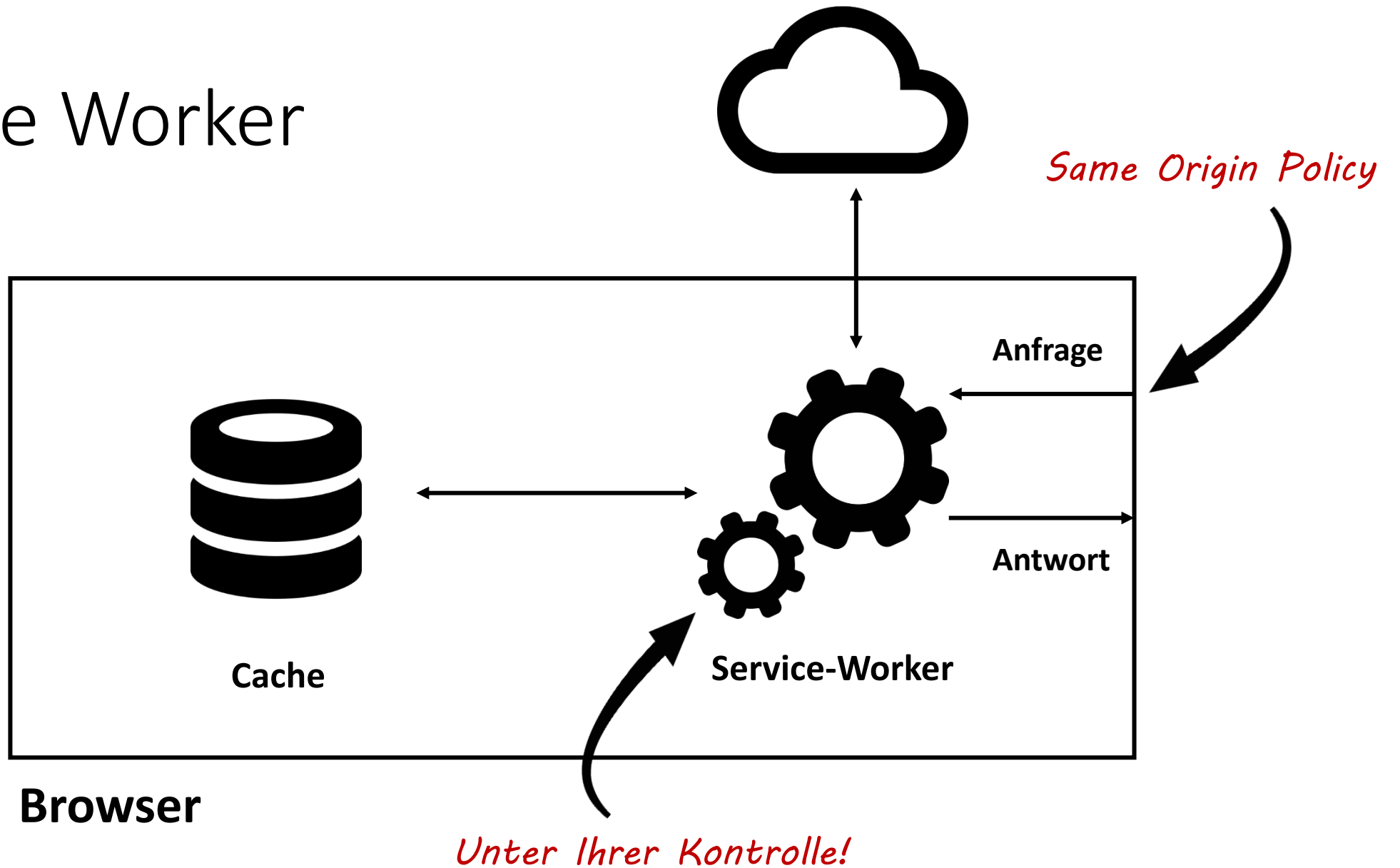


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# Service Worker



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# Cache Strategien

Cache only

Network only

Try Cache,  
fallback to  
Network

Try Network,  
fallback to  
Cache

...



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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));
});
```





# 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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Installation am  
Home Screen

# 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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Abbrechen



# Manifest referenzieren

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

# Lab



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@angular/service-worker

Zwei mögliche Abstraktionen für  
Service Worker

# @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
  - Importiert Angular-Modul
  - Generiert ngsw-config.json
  - Generiert Web App Manifest
- ng add @angular/pwa

# SwUpdate Service

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



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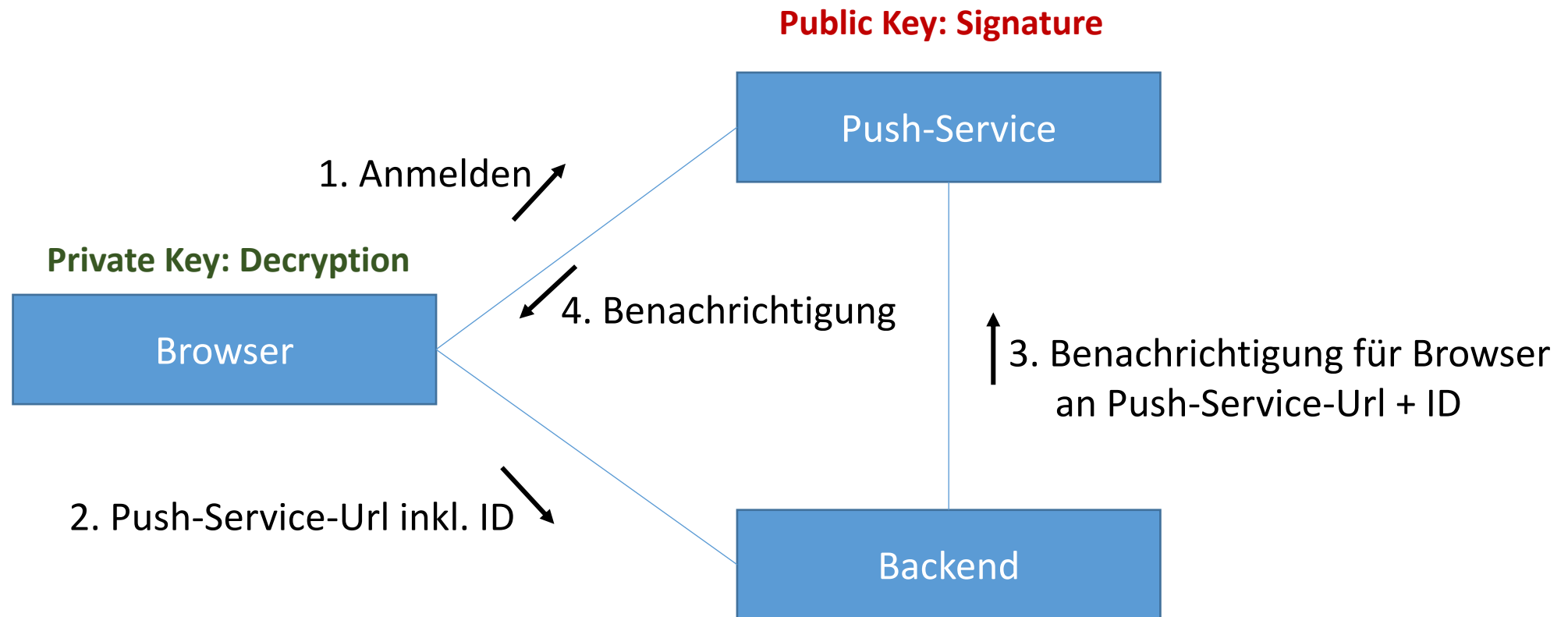
# Push Notifications

---





# Push Notifications



# SwPush

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



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Daten lokal speichern

# 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!	





# Abstraktionen für Browser-Datenbanken

PouchDb

Dexie

RxDB

...



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# Background Sync



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## Background Sync

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

# 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/>



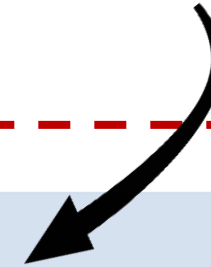
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# Fazit

Quick Wins



## Offline mit Service Worker

- Rascher Start
- Langsame Verbindungen überbrücken

## Push Notifications

- Asynchrone Geschäftsprozesse
- "Benutzer zurückholen"

## Web App Manifest

- Installieren auf Home Screen

## Browser DBs und Background Sync

- Daten vorhalten
- Daten synchronisieren



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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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