



# PROGRESSIVE WEB APP

DEV SUMMIT 2016

# **PROGRESSIVE?**

- new software development methodology
- progressive enhancement ("fortlaufende Verbesserung")

- **Progressive** - Work for every user, regardless of browser choice because they're built with progressive enhancement as a core tenet.
- **Responsive** - Fit any form factor: desktop, mobile, tablet, or whatever is next.
- **Connectivity independent** - Enhanced with service workers to work offline or on low quality networks.
- **App-like** - Feel like an app to the user with app-style interactions and navigation because they're built on the app shell model.
- **Fresh** - Always up-to-date thanks to the service worker update process.
- **Safe** - Served via HTTPS to prevent snooping and ensure content hasn't been tampered with.
- **Discoverable** - Are identifiable as "applications" thanks to W3C manifests and service worker registration scope allowing search engines to find them.
- **Re-engageable** - Make re-engagement easy through features like push notifications.

- **Installable** - Allow users to “keep” apps they find most useful on their home screen without the hassle of an app store.
- **Linkable** - Easily share via URL and not require complex installation.

# HTTPS

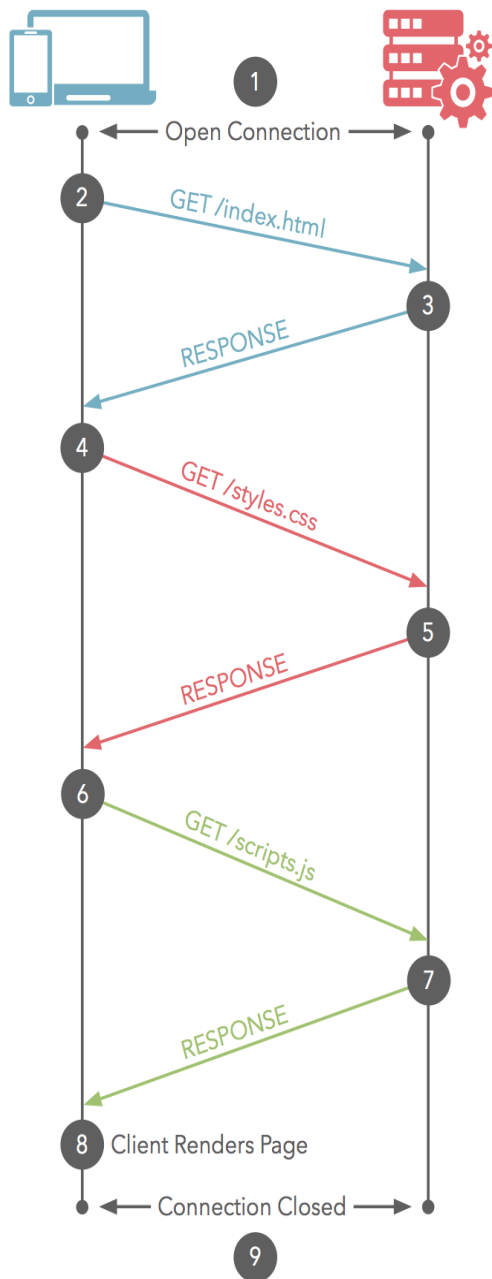
- secure
- free (**lets encrypted**)
- Google Services need HTTPS (GeoAPI)
- HTTP/2

# HTTP/2

- SPDY
- multiplexing
- over 9000
- binary
- compressed headers
- push

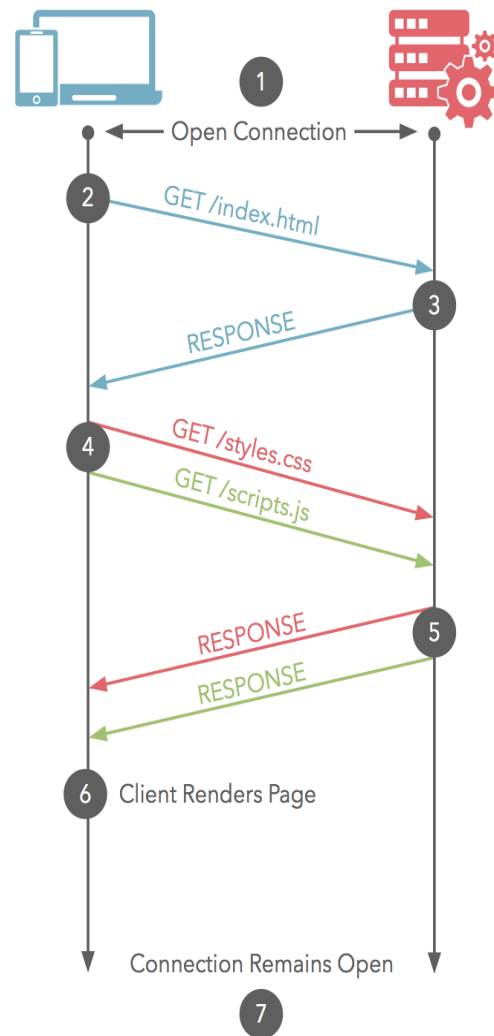
**DEMO**

## HTTP/1.1 Baseline



Time

## HTTP/2 Multiplexing





# HTTP/2

- OpenSSL 1.0.2
- Nginx 1.10

# nginx.conf

---

```
listen 443 ssl
```

---

# nginx.conf

---

```
listen 443 ssl http2;
```

---



**DEMO**

## **APP-LIKE**

- Homescreen Icon
- Splash Screen
- Full-Screen (no URL bar)
- Control of the screen orientation
- Works offline

# MANIFEST.JSON

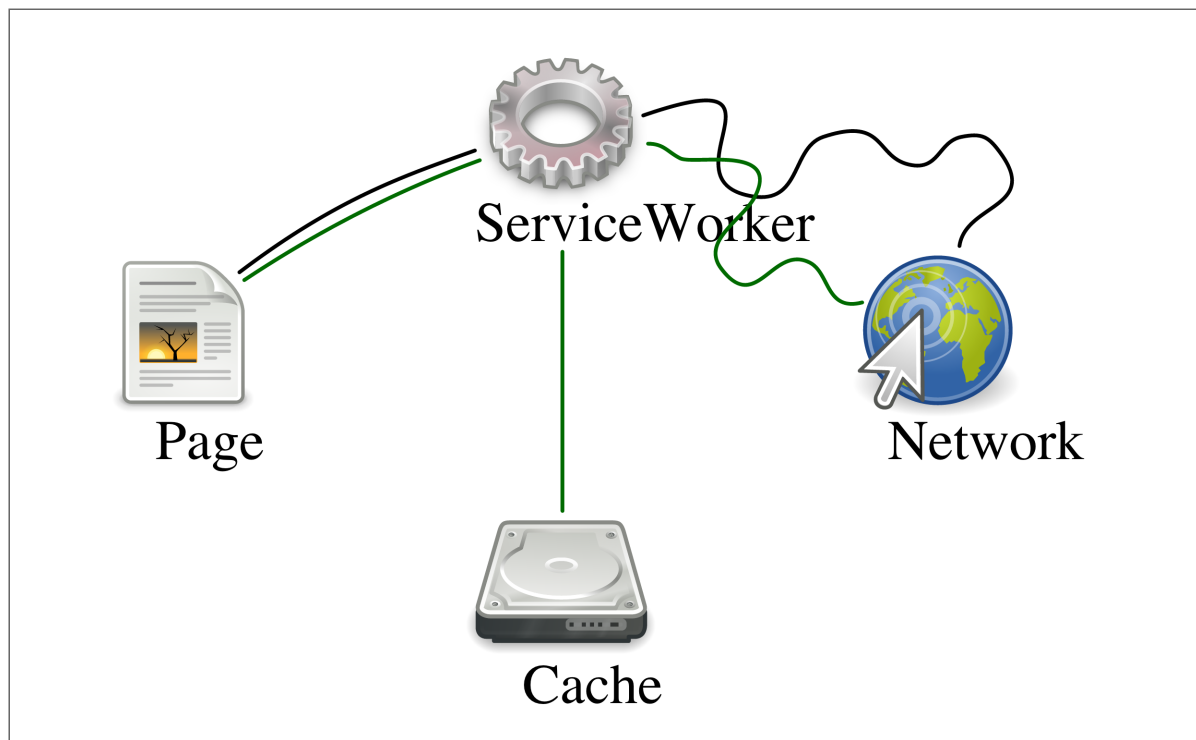
```
{
  "name": "Weather",
  "short_name": "Weather",
  "icons": [{
    "src": "images/icons/icon-128x128.png",
    "sizes": "128x128",
    "type": "image/png"
  }, {
    "src": "images/icons/icon-144x144.png",
    "sizes": "144x144",
    "type": "image/png"
  }...],
  "start_url": "/index.html",
  "display": "standalone",
  "orientation": "portrait-primary",
  "background_color": "#3E4EB8",
  "theme_color": "#2F3BA2"
}
```





# **SERVICE WORKERS**

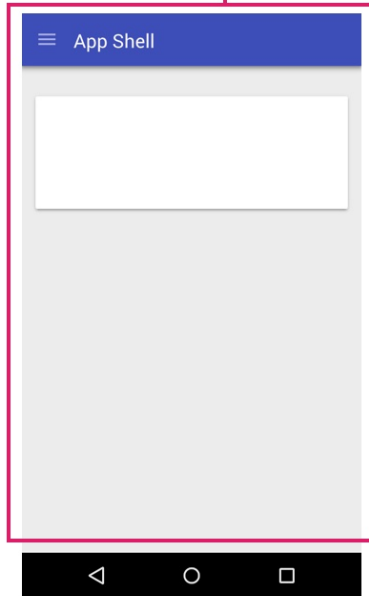
- script that is run by your browser in the background
- Ability to intercept and handle network requests
- Offline capabilities
- Push notifications



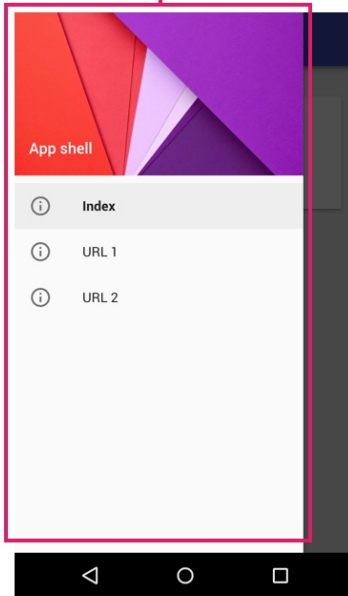
# **APPLICATION SHELL MODEL**

- minimal HTML, CSS, and JavaScript powering a user interface

# application shell



Cached shell loads **instantly** on repeat visits.



# content



Dynamic content then populates the view

# **OFFLINE FIRST**

**Instant-loading Offline First with Jake Archibald**

# OVERWATCH APP

# INDEX.HTML

```
<script>
  if('serviceWorker' in navigator) {
    navigator.serviceWorker
      .register('/sw.js')
      .then(function() { console.log("SW Registered");
    }
  }
</script>
```

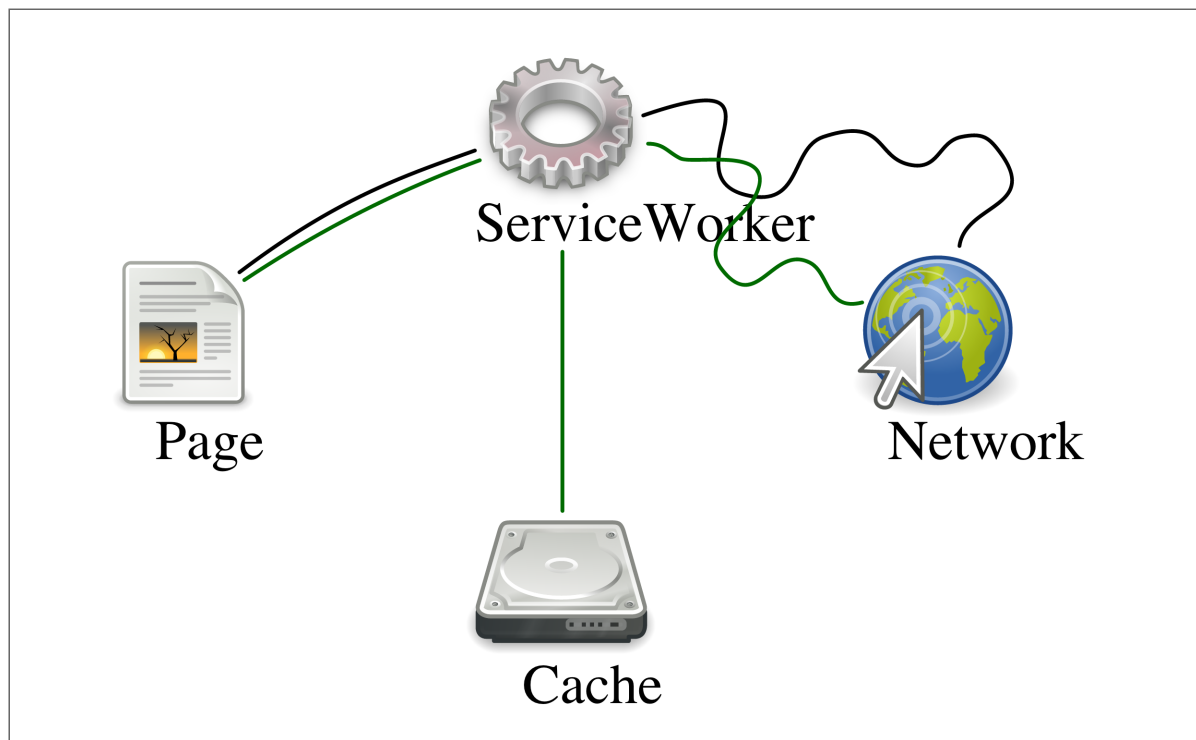
# INSTALL

```
self.addEventListener('install', function(e) {
  e.waitUntil(
    caches.open('overheroes').then(function(cache) {
      return cache.addAll([
        '/',
        '/index.html',
        '/heroes',
        '/css/overheroes.css',
        '/js/overheroes.js'
      ]);
    })
  );
});
```



# CACHE FIRST

```
//sw.js
self.addEventListener('fetch', function(event) {
  event.respondWith(
    caches.open('overheroes').then(function(cache) {
      return cache.match(event.request).then(function(
        return response || fetch(event.request).then
        cache.put(event.request, response.clone(
        return response;
      });
    });
  );
});
```



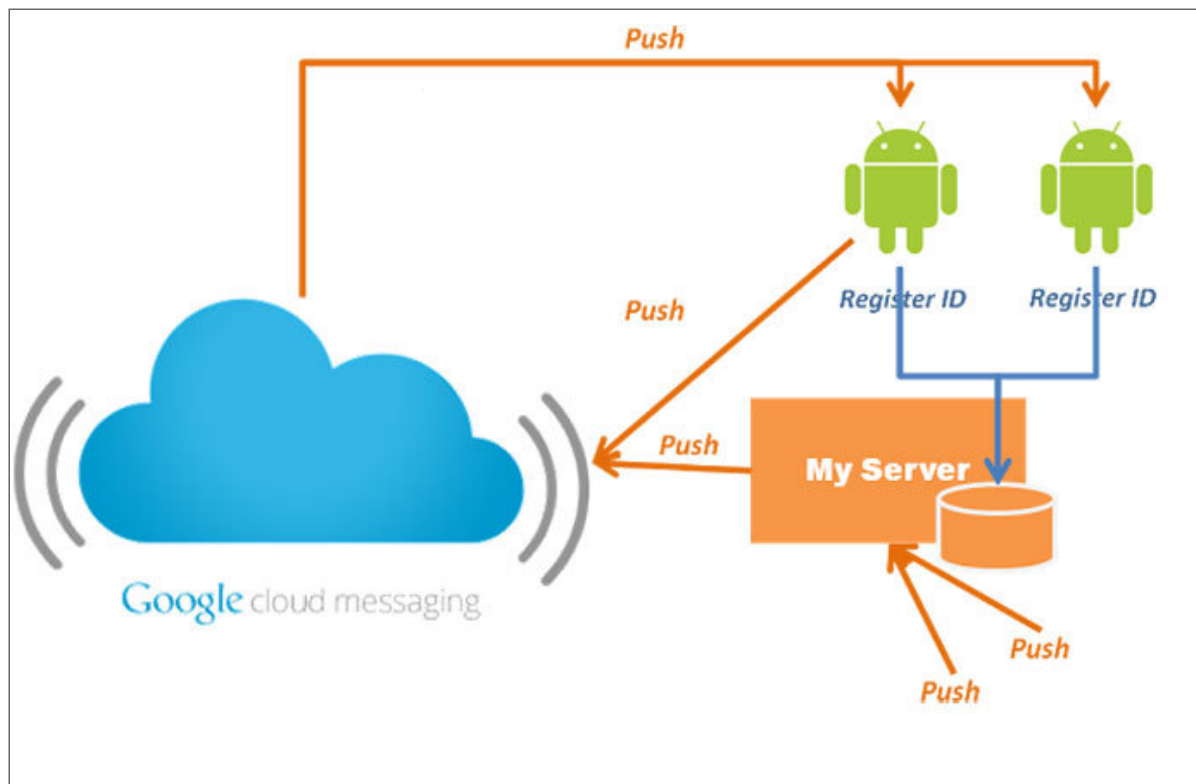
# **Overheroes Demo**

# SW-TOOLBOX.JS

- `toolbox.networkFirst`
- `toolbox.cacheFirst`
- `toolbox.fastest`
- `toolbox.cacheOnly`
- `toolbox.networkOnly`
- `toolbox.router.get(urlPattern, handler, options)`
- other methods

**PUSH**

# Google Cloud Messaging



# manifest.json

```
{  
  "name": "My PWA",  
  "gcm_sender_id": "593836075156"  
}
```



# Subscribe

```
if ('serviceWorker' in navigator) {  
  console.log('Service Worker is supported');  
  navigator.serviceWorker.register('sw.js').then(function(  
    reg.pushManager.subscribe({  
      userVisibleOnly: true  
    }  
  ));  
}.catch(function(error) {  
  console.log(':^(', error);  
});  
}
```

Device Endpoint

<https://android.googleapis.com/gcm/send/APA9>

# Message

```
self.addEventListener('push', function(event) {  
  var title = 'Push message';  
  event.waitUntil(  
    self.registration.showNotification(title, {  
      body: 'The Message',  
      icon: 'images/icon.png'  
    })  
  ));  
});
```

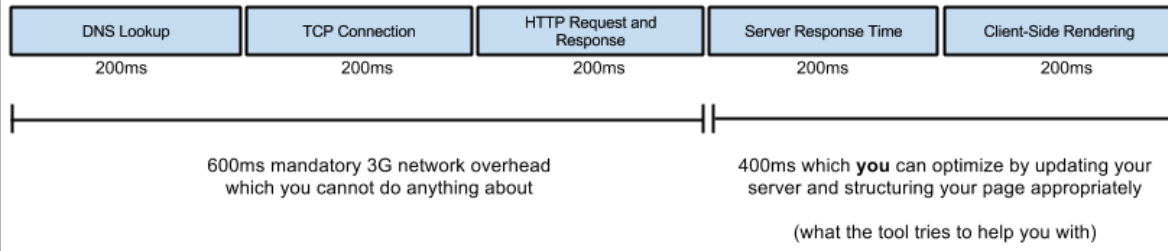
**DEMO**

**SPEEDS VARY**

**ROUND TRIP TIMES INCREASE AS  
BANDWIDTH DECREASES**

- +50 ms WiFi
- +500 ms 3G
- +2500 ms 2g

## Rendering a mobile page in 1 second



# EXAMPLES

- **booking.com**
- **airhorner.com**
- **pwa.rocks**



- <https://developer.chrome.com/extensions/manifest>
- <https://developers.google.com/web/fundamentals/started/push-notifications/>