

## **Experiment - 08**

**Aim:** To code and register a service worker, and complete the install and activation process for a new service worker for the E-commerce PWA.

### **Theory:**

#### **Service Worker**

Service Worker is a script that works on browser background without user interaction independently. Also, It resembles a proxy that works on the user side. With this script, you can track network traffic of the page, manage push notifications and develop “offline first” web applications with Cache API.

Things to note about Service Worker:

- A service worker is a programmable network proxy that lets you control how network requests from your page are handled.
- Service workers only run over HTTPS. Because service workers can intercept network requests and modify responses, "man-in-the-middle" attacks could be very bad.
- The service worker becomes idle when not in use and restarts when it's next needed. You cannot rely on a global state persisting between events. If there is information that you need to persist and reuse across restarts, you can use IndexedDB databases.

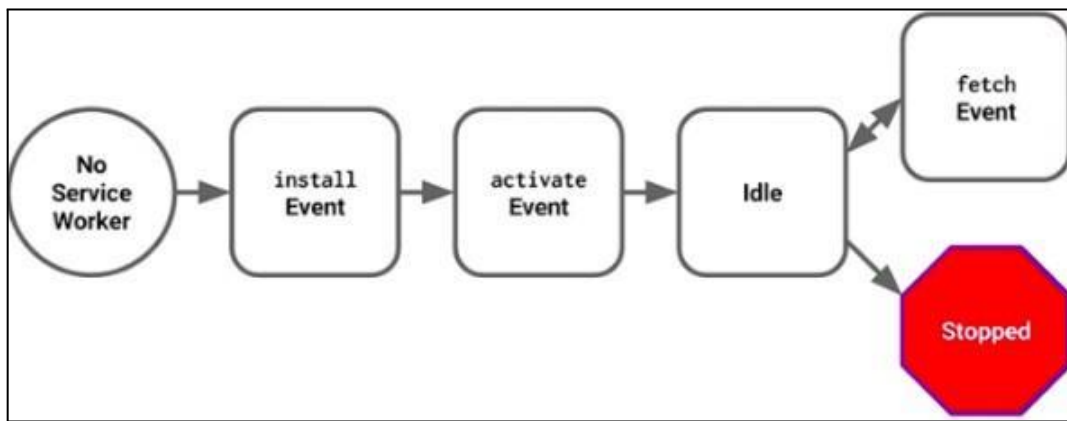
#### **What can we do with Service Workers?**

- You can dominate **Network Traffic**  
You can manage all network traffic of the page and do any manipulations. For example, when the page requests a CSS file, you can send plain text as a response or when the page requests an HTML file, you can send a png file as a response. You can also send a true response too.
- You can **Cache**  
You can cache any request/response pair with Service Worker and Cache API and you can access these offline content anytime.
- You can manage **Push Notifications**  
You can manage push notifications with Service Worker and show any information message to the user.
- You can **Continue**  
Although Internet connection is broken, you can start any process with Background Sync of Service Worker.

## What can't we do with Service Workers?

- You can't access the **Window**  
You can't access the window, therefore, You can't manipulate DOM elements. But, you can communicate to the window through post Message and manage processes that you want.
- You can't work it on **80 Port**  
Service Worker just can work on HTTPS protocol. But you can work on localhost during development.

## Service Worker Cycle



A service worker goes through three steps in its life cycle:

- Registration
- Installation
- Activation

## Registration

To install a service worker, you need to register it in your main JavaScript code. Registration tells the browser where your service worker is located, and to start installing it in the background. Let's look at an example:

This code starts by checking for browser support by examining **navigator.serviceWorker**. The service worker is then registered with `navigator.serviceWorker.register`, which returns a promise that resolves when the service worker has been successfully registered. The scope of the service worker is then logged with `registration.scope`. If the service worker is already installed, `navigator.serviceWorker.register` returns the registration object of the currently active service worker.

The scope of the service worker determines which files the service worker controls, in other words, from which path the service worker will intercept requests. The default scope is the location of the service worker file, and extends to all directories below. So if `service-worker.js` is located in the root directory, the service worker will control requests from all files at this domain.

You can also set an arbitrary scope by passing in an additional parameter when registering. For example:

`main.js`

```
navigator.serviceWorker.register('/service-worker.js', {  
  scope: '/app/'  
});
```

In this case we are setting the scope of the service worker to `/app/`, which means the service worker will control requests from pages like `/app/`, `/app/lower/` and `/app/lower/lower`, but not from pages like `/app` or `/`, which are higher.

If you want the service worker to control higher pages e.g. `/app` (without the trailing slash) you can indeed change the scope option, but you'll also need to set the Service-Worker-Allowed HTTP Header in your server config for the request serving the service worker script.

## Installation

Once the browser registers a service worker, installation can be attempted. This occurs if the service worker is considered to be new by the browser, either because the site currently doesn't have a registered service worker, or because there is a byte difference between the new service worker and the previously installed one.

A service worker installation triggers an `install` event in the installing service worker. We can include an `install` event listener in the service worker to perform some task when the service worker installs. For instance, during the `install`, service workers can precache parts of a web app so that it loads instantly the next time a user opens it (see caching the application shell).

## Activation

Once a service worker has successfully installed, it transitions into the activation stage. If there are any open pages controlled by the previous service worker, the new service worker enters a waiting state. The new service worker only activates when there are no longer any pages loaded that are still using the old service worker. This ensures that only one version of the service worker is running at any given time.

When the new service worker activates, an `activate` event is triggered in the activating service worker. This event listener is a good place to clean up outdated caches (see the Offline Cookbook for an example).

Once activated, the service worker controls all pages that load within its scope, and starts listening for events from those pages. However, pages in your app that were loaded before the service worker activation will not be under service worker control. The new service worker will only take over when you close and reopen your app, or if the service worker calls **clients.claim()**. Until then, requests from this page will not be intercepted by the new service worker. This is intentional as a way to ensure consistency in your site.

## Code

### script.js

```
<script>
// Register the Service Worker
// Check if browser supports Service Worker
if ('serviceWorker' in navigator) {
  window.addEventListener('load', () => {
    navigator.serviceWorker.register('/serviceworker.js')
      .then(registration => {
        console.log('Service Worker registered with scope:', registration.scope);
      })
      .catch(error => {
        console.error('Service Worker registration failed:', error);
      });
  });
}
</script>
```

### service-worker.js

```
const cacheName = "pwa-e8";
const assetsToCache = [
  "/",
  "/index.html",
  "/cart.html",
  "/cafe.png",
  "/js/script.js",
  "/nature.png"
];

self.addEventListener("install", (event) => {
  event.waitUntil(
    caches.open(cacheName).then((cache) => {
      return cache.addAll(assetsToCache);
    })
  );
});

self.addEventListener("activate", (event) => {
  event.waitUntil(
    caches.keys().then((cacheNames) => {
      return Promise.all(
        cacheNames
```

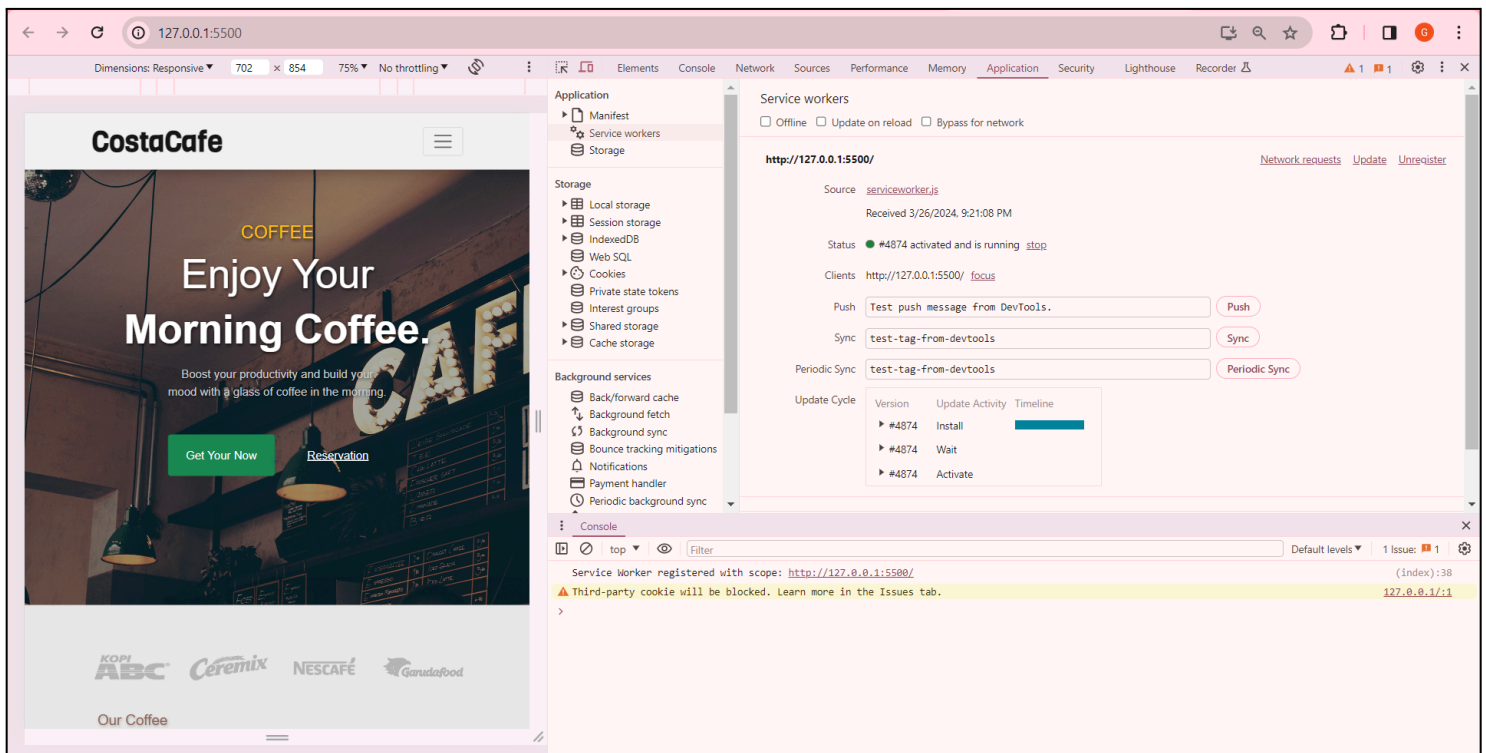
```

.filter((name) => {
  return name !== cacheName;
})
.map((name) => {
  return caches.delete(name);
})
);
});

```

**OUTPUT :**

**In developer tools -> Application -> service -workers**



IndexedDB

Web SQL

Cookies

Private state tokens

Interest groups

Shared storage

Cache storage

pwa-e8 - http://127.0.0.1:5500/

Background services

Back/forward cache

Background fetch

Background sync

Bounce tracking mitigations

Notifications

Payment handler

Periodic background sync

Speculative loads

Push messaging

Reporting API

Frames

top

Filter by Path

http://127.0.0.1:5500

Origin http://127.0.0.1:5500

Bucket name default

Is persistent No

Durability relaxed

Quota 0 B

#	Name	Response-Type	Content-Type	Content-Len...	Time Cached	Vary Header
0	/	basic	text/html	18,550	3/26/2024, 9:...	Origin
1	/cafe.png	basic	image/png	830,809	3/26/2024, 9:...	Origin
2	/cart.html	basic	text/html	7,878	3/26/2024, 9:...	Origin
3	/index.html	basic	text/html	18,550	3/26/2024, 9:...	Origin
4	/js/script.js	basic	application/ja...	2,321	3/26/2024, 9:...	Origin

Total entries: 5

Console

top

Filter

Default levels

1 Issue: 1

Service Worker registered with scope: http://127.0.0.1:5500/

(index):38

**CONCLUSION :** Thus we have registered a service worker, and completed the installation and activation process for a new service worker for the E-commerce PWA.