Securing Servers Using OIDC and Keycloak

- Overview of OpenID Connect
- Introduction to Keycloak
- Securing a demo application

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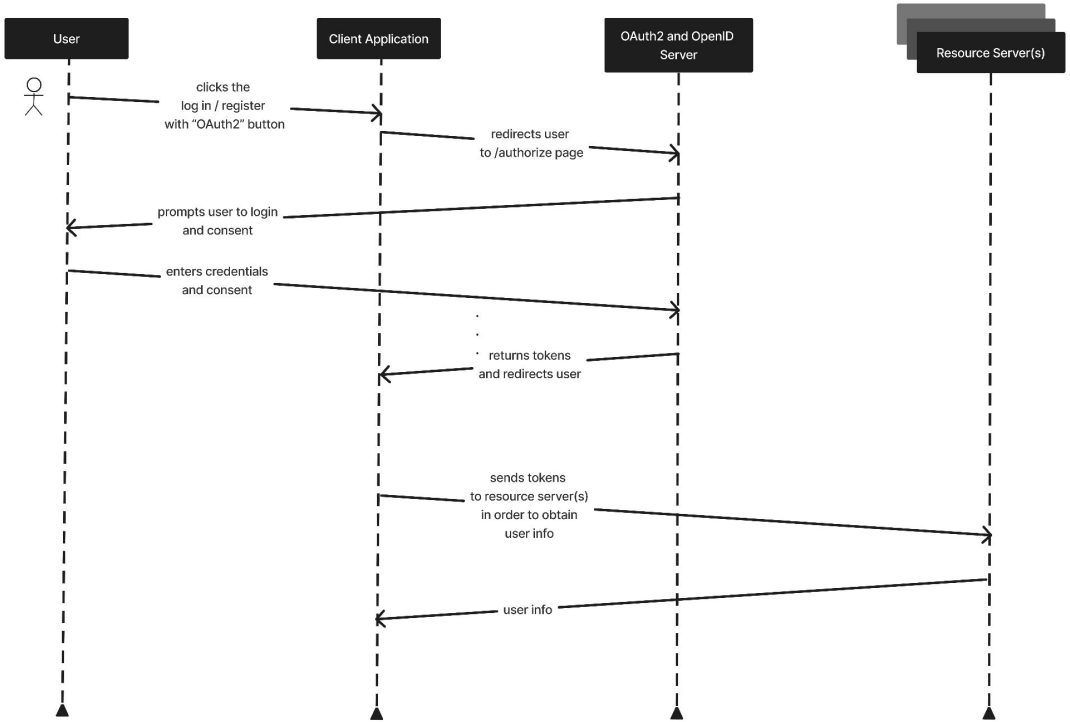
What is OAuth 2.0 ?

- An authorization framework that enables applications to access **user resources** from **resource servers** over HTTP.
- Actors:
  - Resource owner: **Users** (real people)
  - **OAuth2 clients** (The application that wants to use oauth2 to authenticate its users)
  - **Resource Servers** (A server holding sensitive user information)
  - **Authorization Server** (A server capable of providing access tokens that can be consumed by resource servers)

OAuth Flow (over-simplified)



1. OAuth 2.0 and OpenID Connect Introduction

What is OpenID Connect ?

- An **extension of the OAuth2 framework** used in order **authenticate a user**, and **receive information about the user's identity** and session.
- Essentially, **it is a token that contains user data** that the client can immediately use (**no need to access a resource server**). Such data can be **used** by the client in order **to apply custom client logic** (e.g display the username on a site, create and link session information between provider and application).

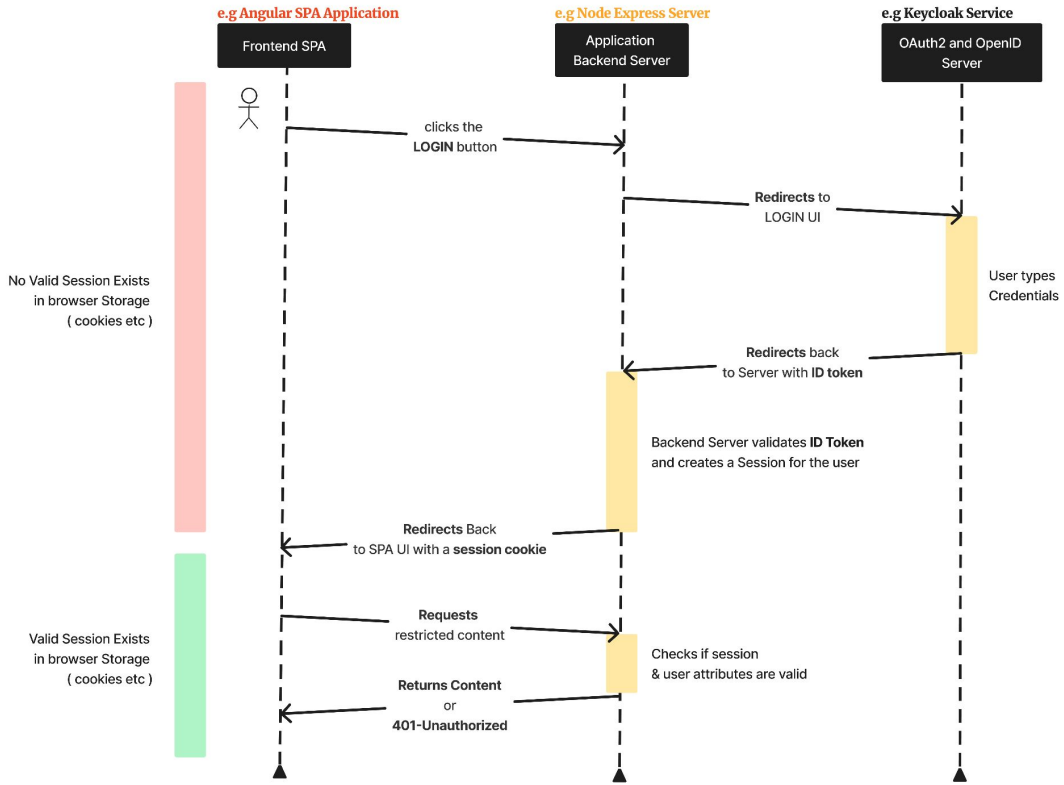
What is Keycloak ?

- An open-source **standalone authentication service** that provides **Single Sign-On**, **Identity** and Access **Management**.
- Supports **OAuth2**, **OpenID Connect** and SAML protocols.
- Can easily be managed and configured using the **admin dashboard**.
- In our discussion, **keycloak provides ID tokens** to requesting **client applications**. Those applications can be numerous and may have the same user base.

Securing SPA Applications with OIDC and Keycloak

- There is **NO SECURE** way of **DIRECTLY** **acquiring and storing ID Tokens in SPA applications**.
- That's why **we store** the **ID tokens** in our **backend server(s)** and **create secure sessions between our backend(s) and SPA application(s)**.
- **We require valid sessions in order to access backend resources**. (e.g letting a client create a post)

Acquiring ID Tokens from an OpenID Server and creating a Secure Session



Demo time

- We will deploy keycloak locally. Using the admin dashboard, we will create a client application and then link it with our backend server. Then, using our SPA client, we will initiate Login actions in order to create secure sessions.
- You can follow along by cloning https://github.com/stzagkarak/angular-express-keycloak-demo.git

Understanding Keycloak Realms & Clients

- In keycloak, **a realm manages a set of users**, credentials, roles, and groups. **A user belongs to and logs into a realm**. **Realms are isolated** from one another and can only manage and authenticate the users that they control.
- **Inside realms we can create client applications**. Each client has access to the users that are inside that realm.

In Production

- You **MUST** change the keycloak configuration for production environments. This repo contains a production-ready configuration that you can easily tweak and deploy in a web server.
    - *Note that the repo is not fully documented yet.*
- The instructions inside `deploying_in_production.md` and the appropriate deployment file may give you an example of how to deploy such staff in production.

Further Reading

Please study the provided code and read through the provided presentation.
Additionally, I highly encourage you to check the below resources (random order):

1. https://medium.com/@prashantramnyc/node-js-with-passport-authentication-simplified-76ca65ee91e5
2. https://medium.com/keycloak/keycloak-express-openid-client-fabea857f11f
3. https://dev.to/zachgoll/the-ultimate-guide-to-passport-js-k2l
4. https://dev.to/cristain/how-to-set-up-typescript-with-nodejs-and-express-2023-gf
5. https://medium.com/@ramanamuttana/custom-attribute-in-keycloak-access-token-831b4be7384a