

Keycloak - Complete Notes (Installation, Run & Usage)

Style: JWT / OAuth jaise simple, handwritten-style notes

Purpose: Easy understanding + quick revision + interview ready

What is Keycloak?

Keycloak ek **open-source Identity & Access Management (IAM) tool** hai.

Keycloak use hota hai: - **Authorization Server** banane ke liye - OAuth 2.0 & OpenID Connect implement karne ke liye - Login, Roles, Tokens manage karne ke liye

👉 Simple line:

Keycloak = Ready-made Authorization + Authentication Server

Why Keycloak?

Problems without Keycloak

- Login system khud banana padta hai
- Password security handle karni padti hai
- OAuth / OIDC complex hota hai

Keycloak Solution

- Ready-made login pages
 - OAuth 2.0 + OpenID Connect support
 - Role-based access control
 - Token management
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Keycloak Architecture (Basic)

- **User** → Actual user
 - **Client** → Your application (Spring Boot)
 - **Realm** → Isolated security domain
 - **Keycloak Server** → Authorization Server
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Keycloak Installation (Step-by-Step)

Method 1: Using ZIP (Most Common)

 Download Keycloak from official site  Extract ZIP file  Go inside folder

Folder structure example:

```
keycloak-xx.x.x.x/  
├── bin/  
├── conf/  
└── data/
```

How to Run Keycloak (First Time)

Step 1: Open Terminal / CMD

Go to Keycloak `bin` folder

```
cd keycloak/bin
```

Step 2: Create Admin User

```
kc.bat bootstrap-admin
```

(Windows)

```
./kc.sh bootstrap-admin
```

(Linux / Mac)

 Username & Password set karo

Step 3: Start Keycloak Server

```
kc.bat start-dev
```

(Windows)

```
./kc.sh start-dev
```

(Linux / Mac)

⌚ Step 4: Access Admin Console

Browser me open karo:

```
http://localhost:8080
```

Admin Console login karo

⌚ Important Keycloak Concepts



⌚ Realm

- Security boundary
- Har project ka alag realm

Example:

```
my-realm
```

⌚ Client

- Application jo Keycloak use karti hai

Example: - Spring Boot app - React app

⌚ User

- End user
- Username, password, roles

Roles

- Permissions define karte hain

Types: - Realm Roles - Client Roles

Creating Realm (Basic Steps)

😊 Admin Console → Create Realm 😊 Realm name set karo 😊 Save

Creating Client (Spring Boot App)

😊 Realm → Clients → Create 😊 Client ID set karo 😊 Client type: Public / Confidential 😊 Save

Creating User

😊 Realm → Users → Add User 😊 Username set karo 😊 Password set karo 😊 Enable user

Assigning Roles to User

😊 Users → Role Mappings 😊 Select role 😊 Assign

Tokens in Keycloak

- **Access Token** → API access
- **ID Token** → User identity (OIDC)
- **Refresh Token** → New access token

All tokens are **JWT format**

Keycloak + OAuth / OIDC Flow (Simple)

😊 User app open karta hai 😊 App Keycloak login page par redirect karta hai 😊 User login karta hai 😊 Keycloak token deta hai 😊 App token use karta hai 😊 API access milta hai



Keycloak Ports & URLs

- Server URL: `http://localhost:8080`
- Admin Console: `/admin`
- Realm endpoint:

```
/realms/{realm-name}
```



Common Problems & Solutions



Server not starting

- Port 8080 free nahi



Login page not loading

- Realm active nahi



Interview One-Liners



- Keycloak is an open-source IAM tool
- Keycloak acts as Authorization Server
- Supports OAuth 2.0 and OpenID Connect
- Tokens issued by Keycloak are JWT



Quick Revision Summary

- Keycloak = Authorization Server
- Ready-made OAuth + OIDC
- Realm → Client → User → Role
- Tokens = JWT



These are SIMPLE, NOTEBOOK-READY Keycloak NOTES Installation, run, and usage clearly covered