Crowdcast starts soon!

Application Security with Keycloak and Quarkus

Dr. Marco Bungart

Software Engineer

2020-12-02

IBM & Consol present: Openshift + Quarkus = 💛

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Dr. Marco Bungart

- 2008 – 2013: Studied Bioinformatics/Computer Science in Jena
- 2013 – 2018: Ph.D. student in Kassel
- Since 2018: Software Engineer at ConSol
- Twitter, github, bitbucket, stackoverflow, … : turing85
- Interests: Keycloak, GraalVM, Quarkus

OAuth2 & Keycloak

The “good old days”

- Monolithic applications: server-side Authentication/Authorization
  - Authentication/Authorization managed through session-state
  - Scaling was done vertically, not horizontally
- Moving to the cloud & multiple services: How to sync session states?
  - There are ways, but they introduce complexity
- What about social logins (Google, Facebook, …)?

→ Solution: Do not hold the session state on the server-side!

What is OAuth2?

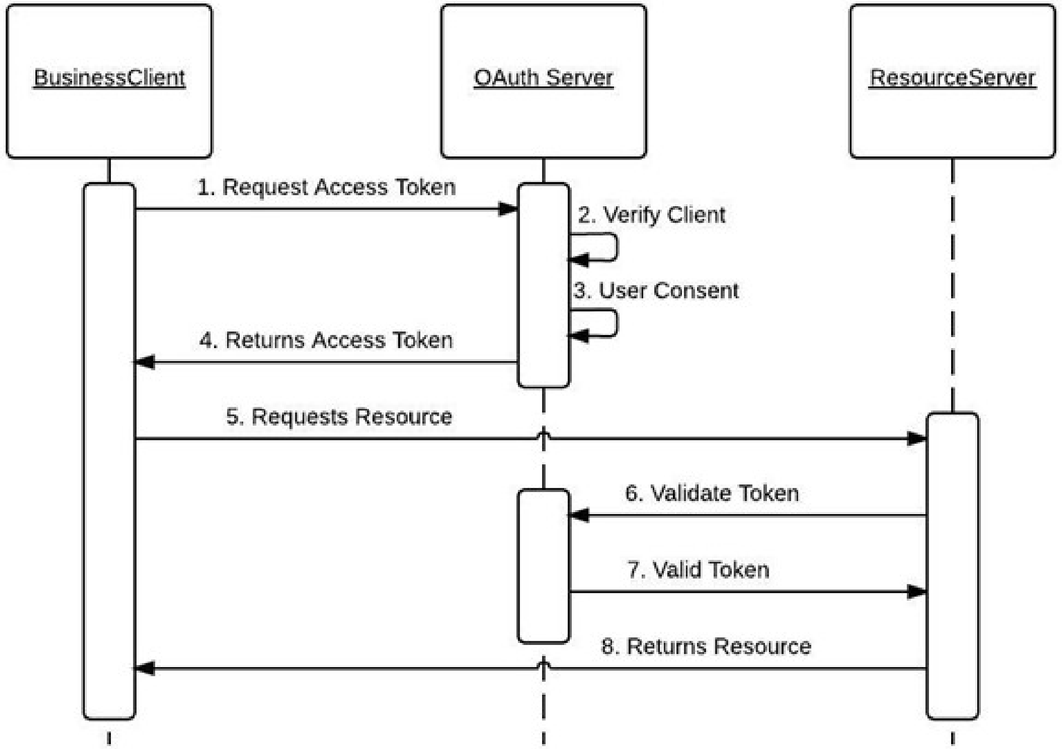
- Protocol for authentication/authorization
- Standard – RFC 6794
- Base for OpenID Connect (OIDC, “social login”) – RFC 8414
- Allows “Single Sign-On” for ecosystem

→ Good User Experience

Why OAuth2?

- Battle-hardened
- Different “flows” for different use cases
- Authentication/Authorization without server-state
- OAuth server grants token on successful authentication
- Authentication is stored in, e.g., the Frontend
- Backend system(s) evaluate token to grant Authorization (not part of this talk)
- Separation of concerns: OAuth server authenticates (“who?”), backend service authorizes (“what?”)
- Good client library support

How does OAuth2 work (schema)?



Source: https://docs.oracle.com/cd/E82085_01/160027/JOS%20Implementation%20Guide/Output/oauth.htm

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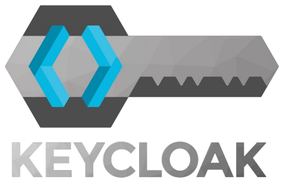
Plenty of Fish, why Keycloak?

- Many OAuth products available, e.g. Auth0, Okta, Keycloak
- Keycloak is one of the few verified, open-source, free-to-use OAuth2 & OIDC servers (See here for an exhaustive list)
  - Developed by RedHat JBoss since 2014
  - On-Prem hosting & Configuration Flexibility
    - Cloud- & Cluster-compatible
  - User Federation (ldap, kerberos, …, plugable!)
  - In active development
  - Enterprise support available through Red Hat SSO



A little bit of Nomenclature

- **Resource Owner**: owns a resource, i.e. the User
- **Authorization Server**: Keycloak
  - Provides Authentication through tokens
- **Tokens** are signed & stored in, e.g., the frontend
- **Resource Server**: a (backend-)Server, providing resources
  - Makes Authorization decision based on token
  - May invoke the Authentication Server
- **Client**: makes request against Authorization server to, e.g., create or validate tokens, can be a Resource Server

A word of advice

If you use OAuth as Authentication/Authorization to your cluster, do **not** deploy the OAuth provider within the cluster.

If something in your cluster goes haywire, the OAuth provider service within the cluster may be affected, and you may have locked yourself out.

Alternatively, deploy to dedicated nodes (e.g. infrastructure nodes).

Live Demo

Live Demo

Source: https://makeameme.org/meme/lets-pray-to-9000c9f697

Resources

Resources

- Official OAuth2 Website
- Official OpenID Website
- Jwt.io - Website to decode JWT Tokens
- Keycloak Getting Started Guide
- Keycloak Docker Image
- https://github.com/ConSol/ibm-quarkus/tree/keycloak

I want more

- We (Consol) offer quarkus workshops. If you are interested, please visit:
  - https://www.consol.de/software-engineering/quarkus/

Recap

Recap

- OAuth as Authentication/Authorization without server-state
  - Standard
  - Battle-hardened
- Keycloak as open-source, free-to-use & verified provider
  - Configurable
  - User Federation
  - Enterprise Support
- Keycloak configuration
  - Clients, Users, Roles
  - Mappers

Thank you!

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