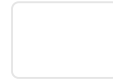**Akitect.io**

Lessons

Lesson 1 - Overview of Keycloak

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ⓘ 01/07/2024 - 📖 6 phút

#keycloak   #oauth2   #openid-connect

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Why Use Keycloak?

Benefits of Using Keycloak

Simplified Identity Management

Keycloak significantly simplifies **identity and access management**. Instead of building and maintaining separate user management systems for each application, Keycloak allows you to **centralize this management**. This not only reduces workload for developers but also ensures **consistency and higher security** across the system. With Keycloak, you can easily manage users, groups, roles, and permissions from **a single interface**.

Easy Integration

One of the major advantages of Keycloak is its **ease of integration** with existing applications and services. Keycloak supports multiple standard protocols such as **OAuth2, OpenID Connect, and SAML**, allowing you to connect with most popular services and applications. This helps you **save time and effort** in setting up and maintaining authentication and authorization mechanisms, while ensuring **flexibility and scalability** for your system.

Strong Security

Security is crucial in any identity management system, and Keycloak delivers on this front. It provides advanced **security features** such as two-factor authentication (2FA), session management, and role-based access control (RBAC). This helps **protect your data** from potential threats and ensures that only authorized users can access critical resources. Integration with **external identity providers** also enhances security and convenience for users.

Open Source

Keycloak is an **open-source solution**, offering numerous benefits for your business. You can **customize and extend Keycloak** according to

your specific needs without facing restrictions from vendors. Open source also means you **don't have to worry about licensing costs**, reducing financial burden for your enterprise. Moreover, Keycloak benefits from a large and active open-source community that provides support and contributions, helping you **resolve issues quickly and effectively**.

Illustrative Examples

- **Simplified Identity Management:** A large e-commerce company with millions of users can use Keycloak to **centralize identity and access management**, reducing IT workload and enhancing management efficiency.
- **Easy Integration:** A non-profit organization can quickly integrate Keycloak with existing systems such as **Google Workspace and Microsoft Office 365** to synchronize identity and access rights.
- **Strong Security:** A bank can utilize Keycloak to implement **two-factor authentication** for all internal applications and online services, ensuring security for sensitive financial data.
- **Open Source:** A tech startup can **customize Keycloak** to fit their specific needs without incurring licensing costs, saving expenses and enhancing competitiveness.

Keycloak vs Other SSO Solutions Comparison

Feature	Keycloak	Auth0	Okta	IdentityServer
Type	Open Source	Commercial Service	Commercial Service	Open Source
Cost	Free	High cost as user base scales	High cost	Free
User Interface	Powerful and user-friendly	User-friendly	User-friendly	Requires additional configuration
Integration with IdPs	Supports Google, Facebook, GitHub, LDAP, Active Directory	Supports multiple IdPs	Supports multiple IdPs	Integrates with some IdPs, needs config

| Feature	Keycloak	Auth0	Okta	IdentityServer
Supported Protocols	OAuth2, OpenID Connect, SAML	OAuth2, OpenID Connect, SAML	OAuth2, OpenID Connect, SAML	OAuth2, OpenID Connect, SAML
Two-Factor Authentication (2FA)	Available	Available	Available	Needs additional configuration
Session Management	Managed from user interface	Managed from user interface	Managed from user interface	Basic session management, needs config
Role-Based Access Control (RBAC)	Available	Available	Available	Available
Scalability and Customization	High, due to open-source nature	Available, limited by costs	Available, limited by costs	High, due to open-source nature
Social Login (Social Authentication)	Available	Available	Available	Available, needs additional configuration
Community and Support	Large open-source community, support from Red Hat	Vendor support, smaller community	Vendor support, smaller community	Open-source community support
Installation and Deployment	Easy installation and deployment on various platforms	Easy to use online service	Easy to use online service	Requires configuration and deployment

Conclusion

- **Keycloak** is a great choice for businesses needing a **powerful, open-source, cost-effective, and highly customizable** identity management solution.
- **Auth0** and **Okta** provide **easy-to-use and powerful solutions** but come with higher costs, suitable for businesses preferring not to manage their own systems.
- **IdentityServer** offers similar features to Keycloak but requires **more configuration** and lacks the **strong user interface** Keycloak provides.

Key Features of Keycloak

Authentication

Keycloak supports various authentication methods such as **passwords, two-factor authentication (2FA),** and **certificate-based authentication**. Users can securely log into applications and services.
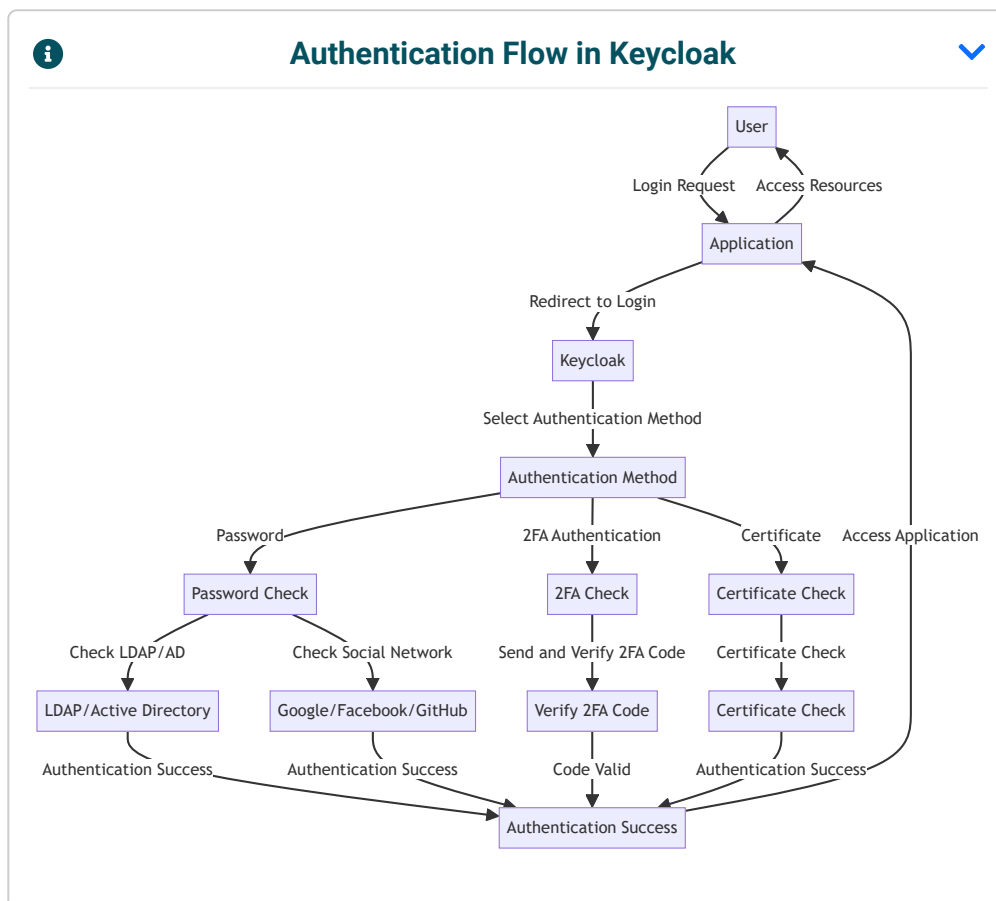

Authorization

Keycloak provides tools to **manage user access rights** based on roles (**Role-Based Access Control - RBAC**) and authorization policies (**Policy-Based Access Control - PBAC**). This helps tightly control access to resources and services.

Authorization Flow in Keycloak
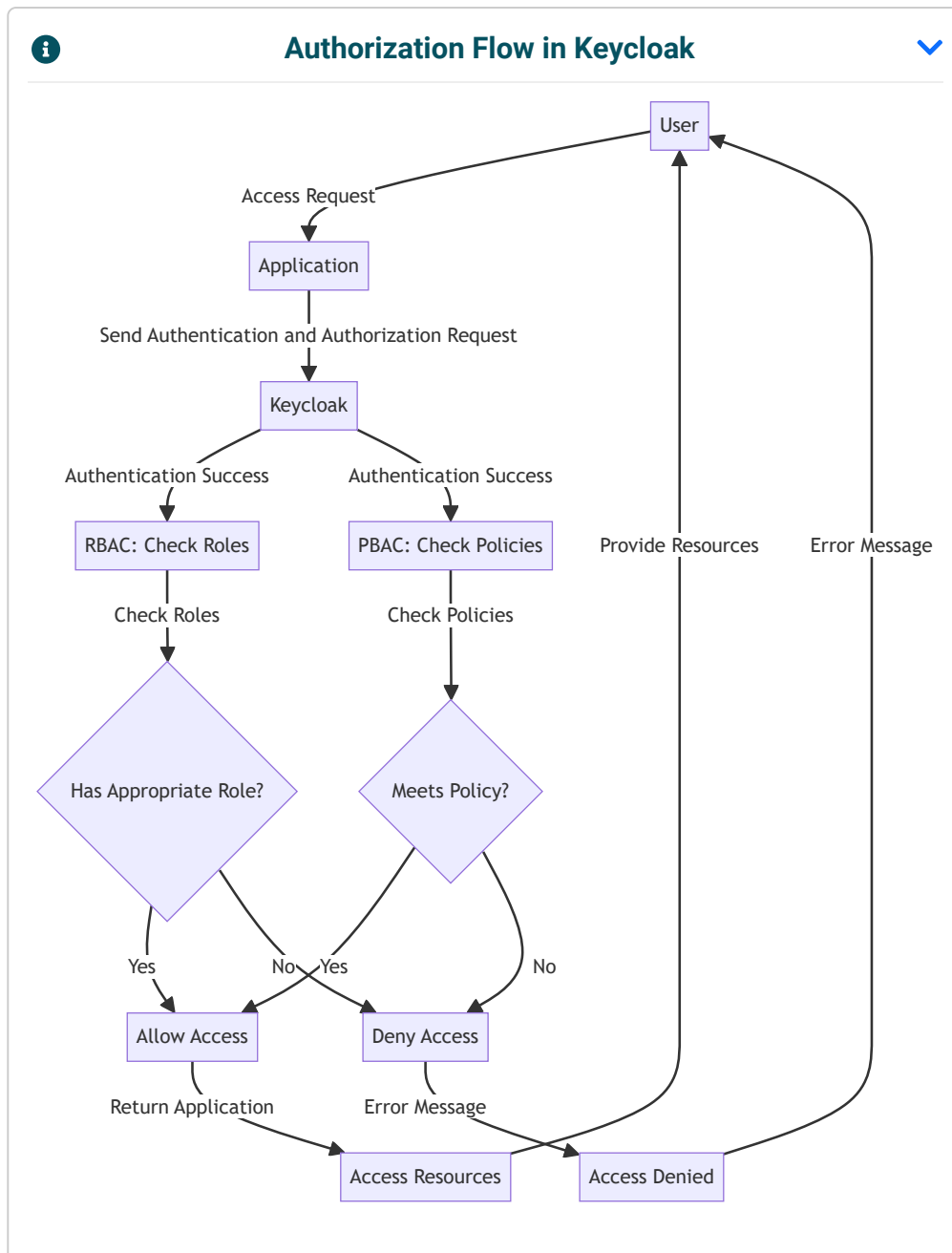
Identity Brokering and Social Login

Keycloak supports **integration with external identity providers** (**IdPs**) such as **Google, Facebook,** and **GitHub**. This allows users to log into the system using their social media accounts.
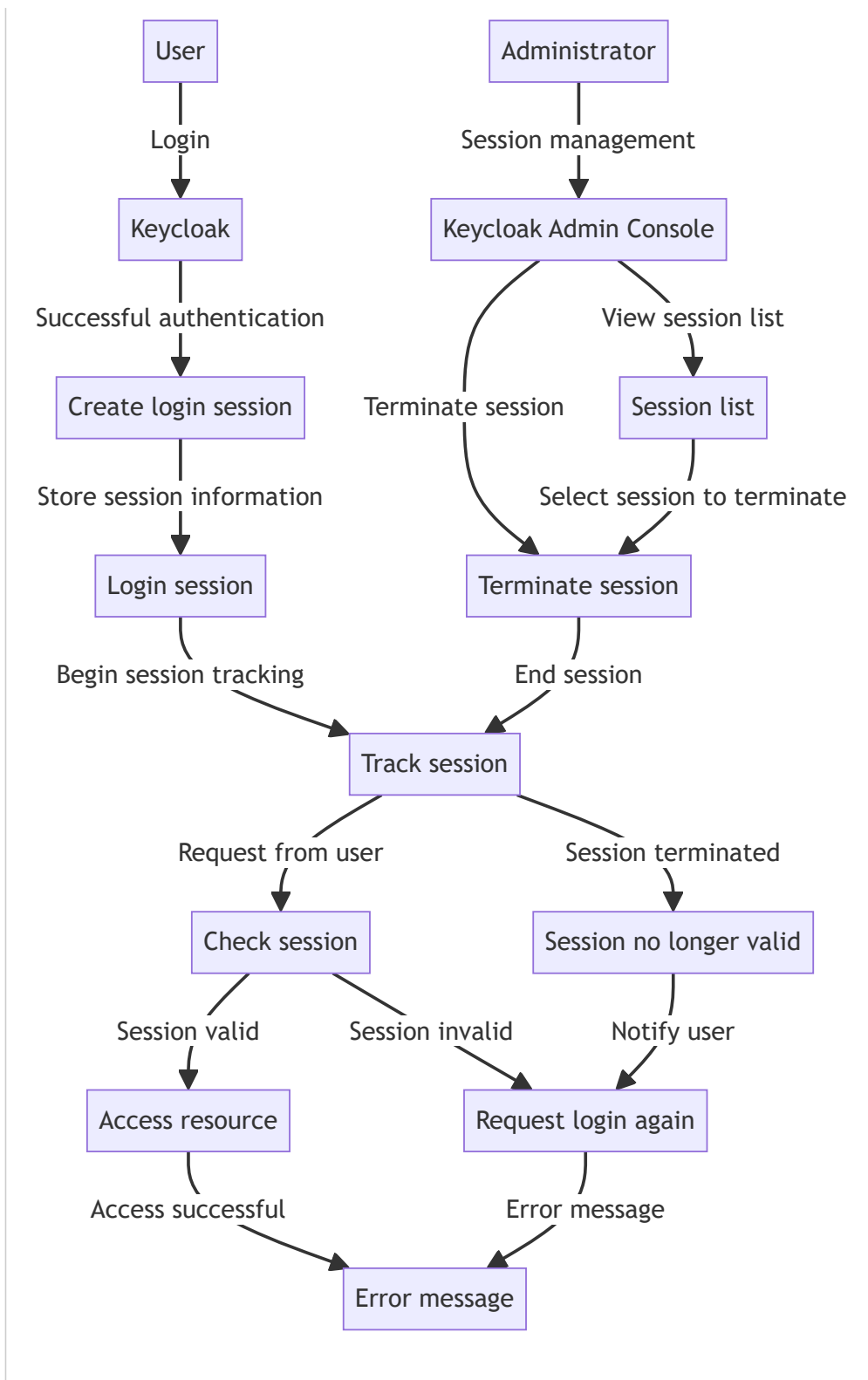
Identity Brokering Flow in Keycloak
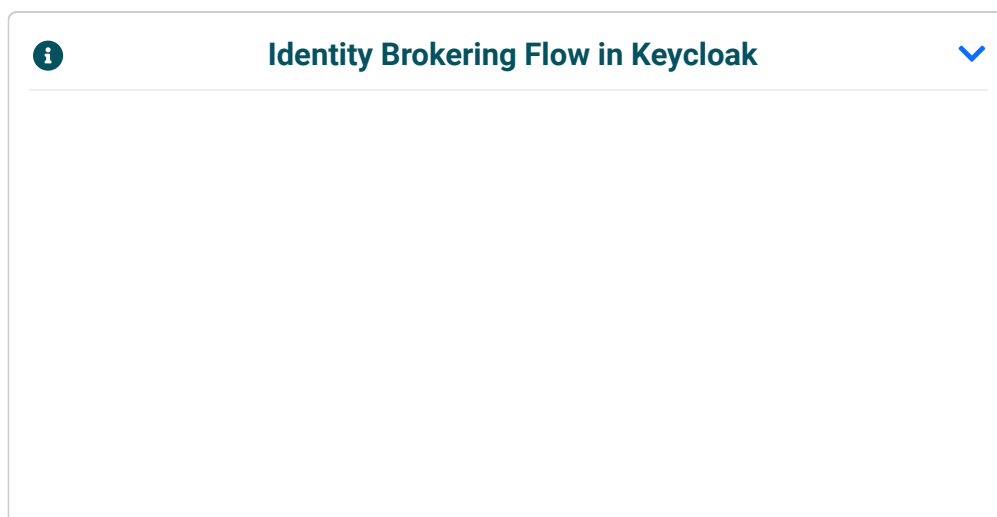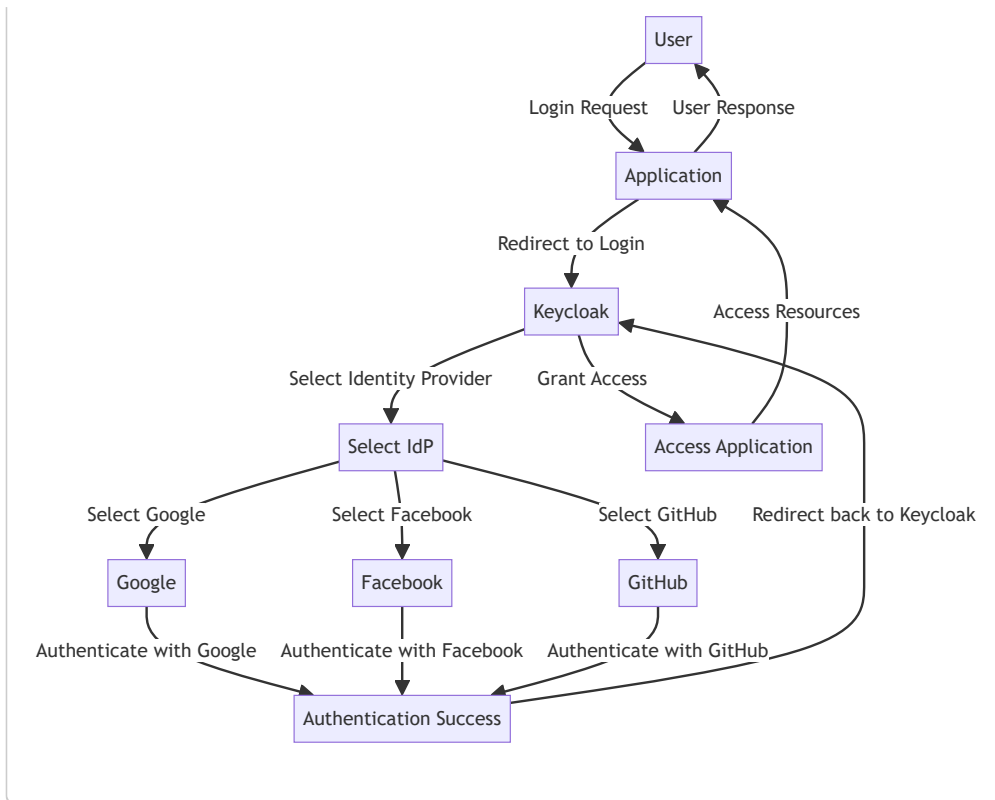
Session Management

Keycloak manages user login sessions, allowing you to track and control login sessions. Administrators can **view and terminate login sessions** from the admin interface.


ℹ️   **Session Management Flow in Keycloak**   ⌄

```mermaid
User --Login--> Keycloak
Keycloak --Successful authentication--> Create login session
Create login session --Store session information--> Login session
Login session --Begin session tracking--> Track session

Administrator --Session management--> Keycloak Admin Console
Keycloak Admin Console --View session list--> Session list
Keycloak Admin Console --Terminate session--> Terminate session
Session list --Select session to terminate--> Terminate session
Terminate session --End session--> Track session

Track session --Request from user--> Check session
Track session --Session terminated--> Session no longer valid

Check session --Session valid--> Access resource
Check session --Session invalid--> Request login again
Session no longer valid --Notify user--> Request login again

Access resource --Access successful--> Error message
Request login again --Error message--> Error message
```

User Federation

Keycloak supports **user federation**, allowing you to **integrate with existing LDAP or Active Directory** services. This enables centralized management of users across different systems.

> ⓘ **User Federation Flow in Keycloak**   ⌄
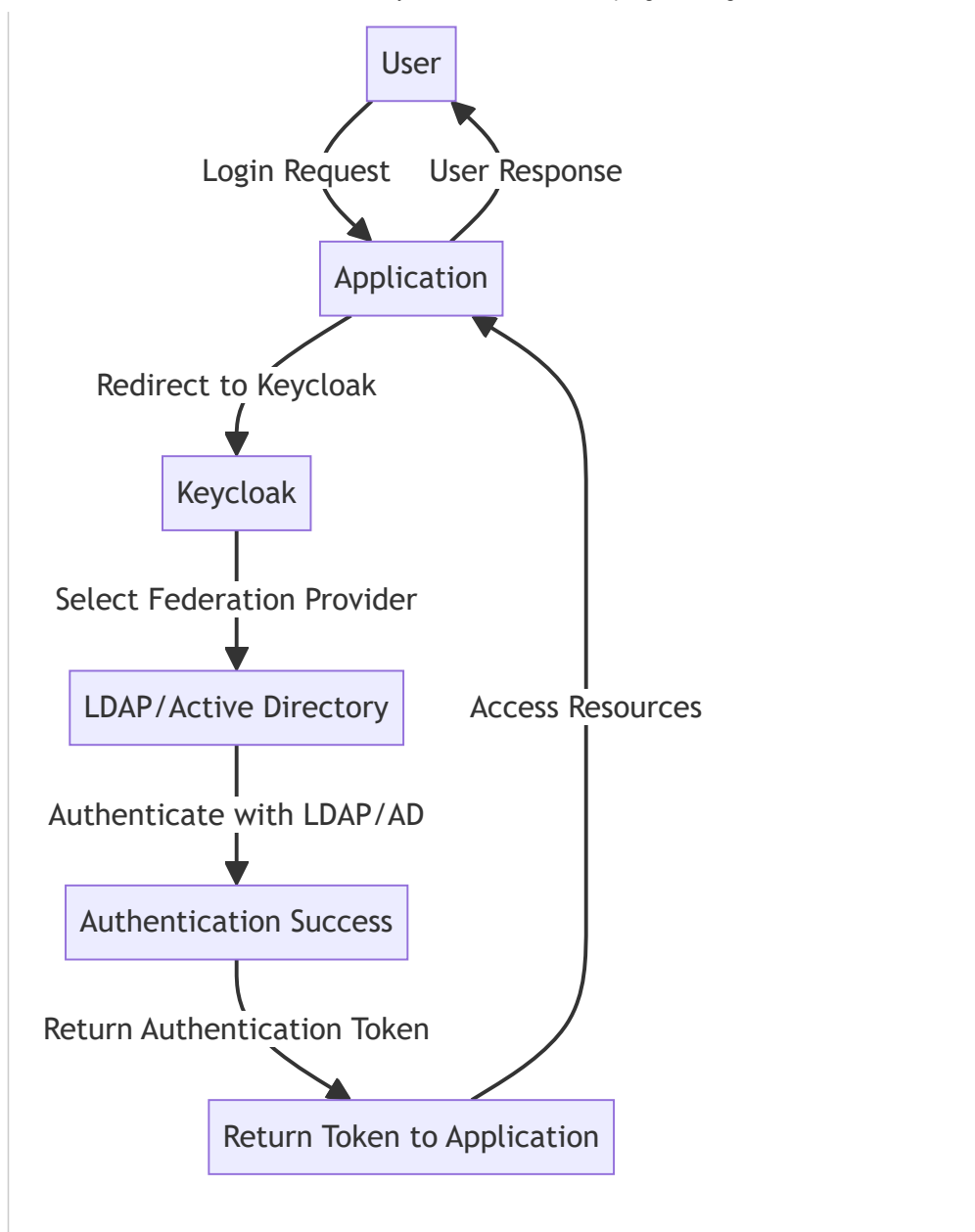
Conclusion

Keycloak provides a **comprehensive identity and access management solution** suitable for various business needs. Whether you need robust authentication, flexible authorization, seamless social login integration, or efficient session management, Keycloak offers a powerful platform to secure your applications and services. Its open-source nature and strong community support make it a compelling choice for organizations looking to enhance security while maintaining flexibility and control over their identity management systems.

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