GridGain

User Authentication in Distributed Applications

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Agenda

- Authentication models
- Single Sign On
- Example
  - GridGain and Control Center
- Demo
  - Integration of OpenID Connect with Control Center
  - SSO with secured cluster
  - Implementation of a custom Authenticator

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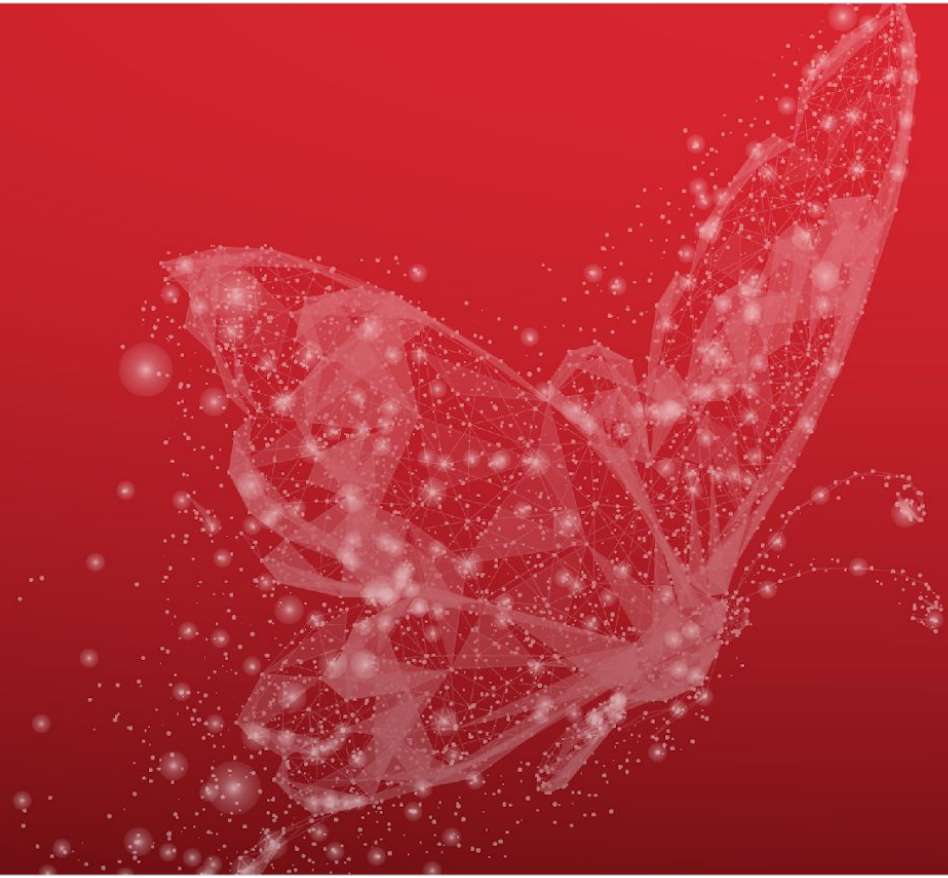
Authentication models



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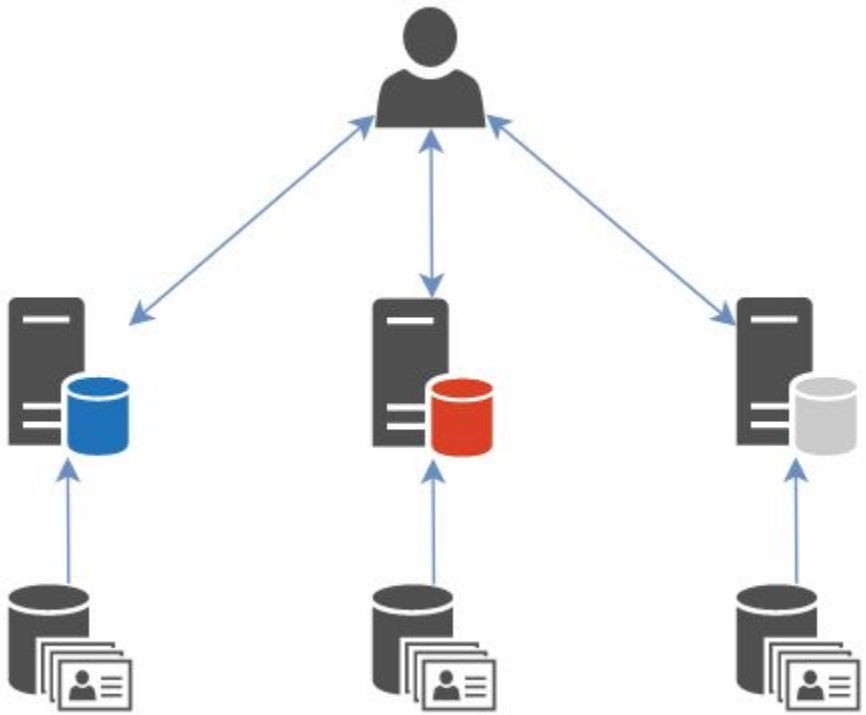
Model #1:
Database of users inside application

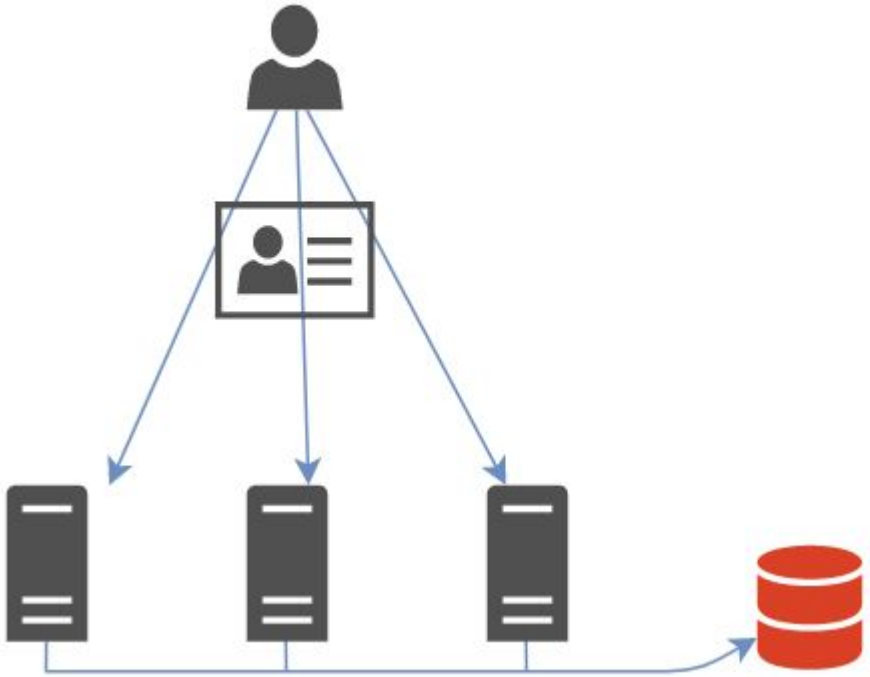
- No need for special interaction protocols
- An existing database can be used

Model #1:
Database of users inside application



- ! Syncronization issues between several applications
- ! Global user sessions are not supported

Model #2:
Shared database of users



- No need for synchronization
- Global sessions can be stored

! Duplication of logic

! Problematic to make schema changes

! Only trusted applications can access the database

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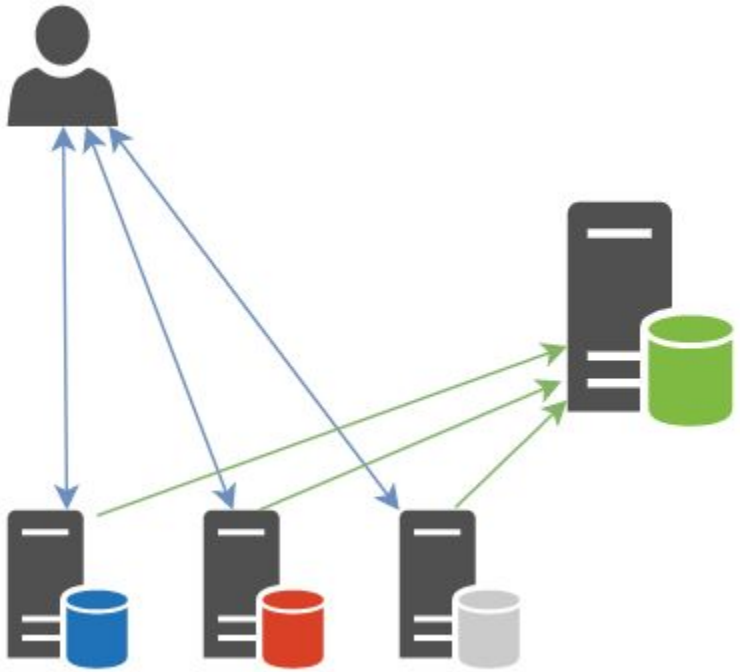
Model #3:
Separate authentication service

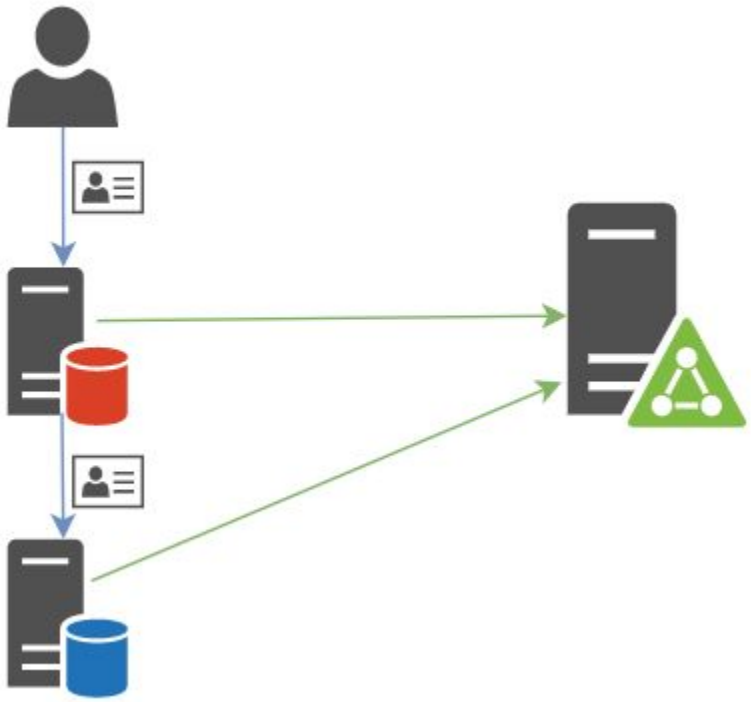


- Centralized database of users

! Need a special authentication protocol

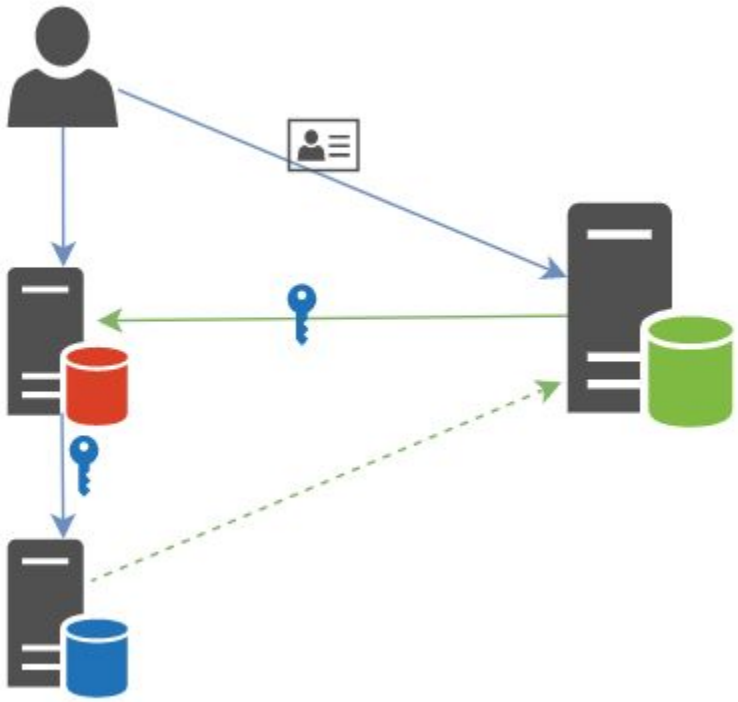
! Overhead on an additional external request

Model #3:
Separate authentication service



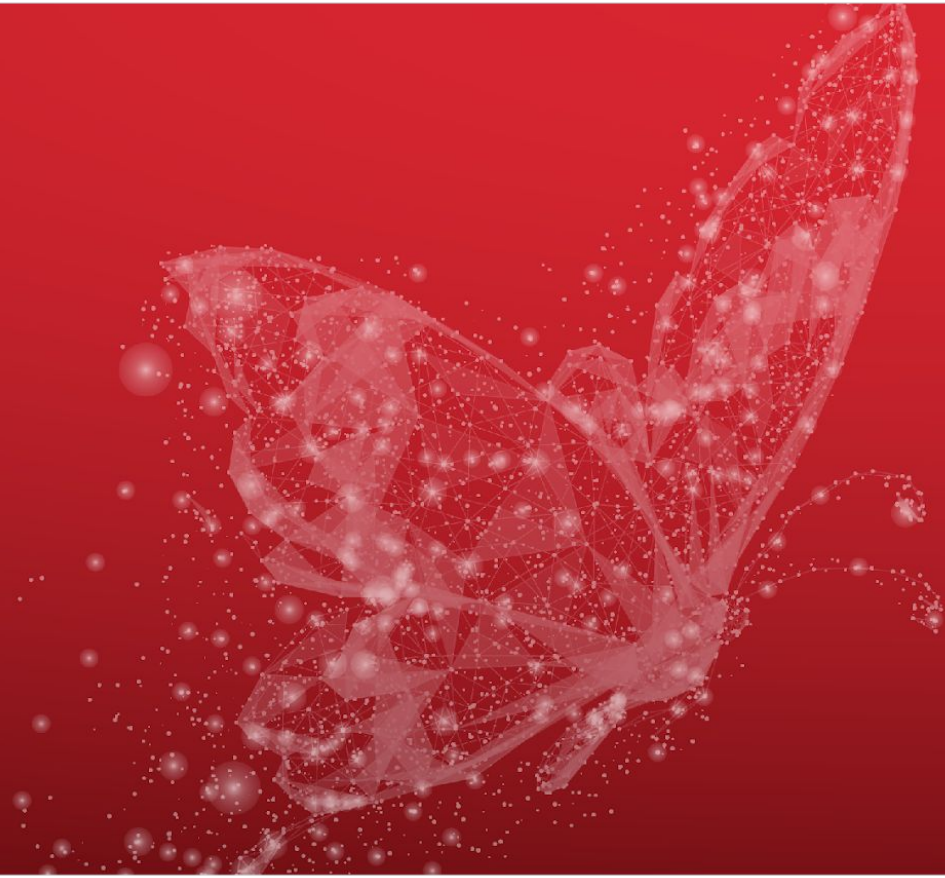
- Request to a new system – new authentication
- Propagation of users credentials between subsystems

Model #4: Single sign on



- Centralized database of users
- Single session for multiple applications
- Temporary token instead of a password

Single Sign On



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OAuth 2.0

OAuth 2.0 flows

- Authorization code
- Implicit
- Client credentials
- Resource owner password
- Authorization code with proof key for code exchange

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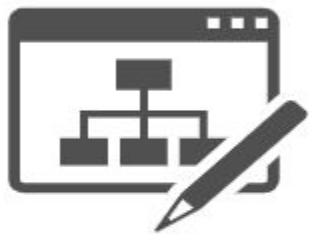
OAuth 2.0. Authorization code

PhotoEditor Frontend



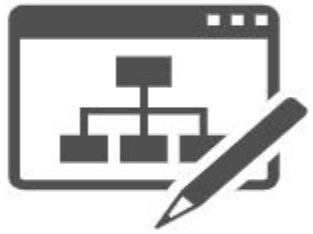
PhotoEditor Backend

Facebook

GridGain

OAuth 2.0. Authorization code

PhotoEditor Frontend



PhotoEditor Backend

Facebook

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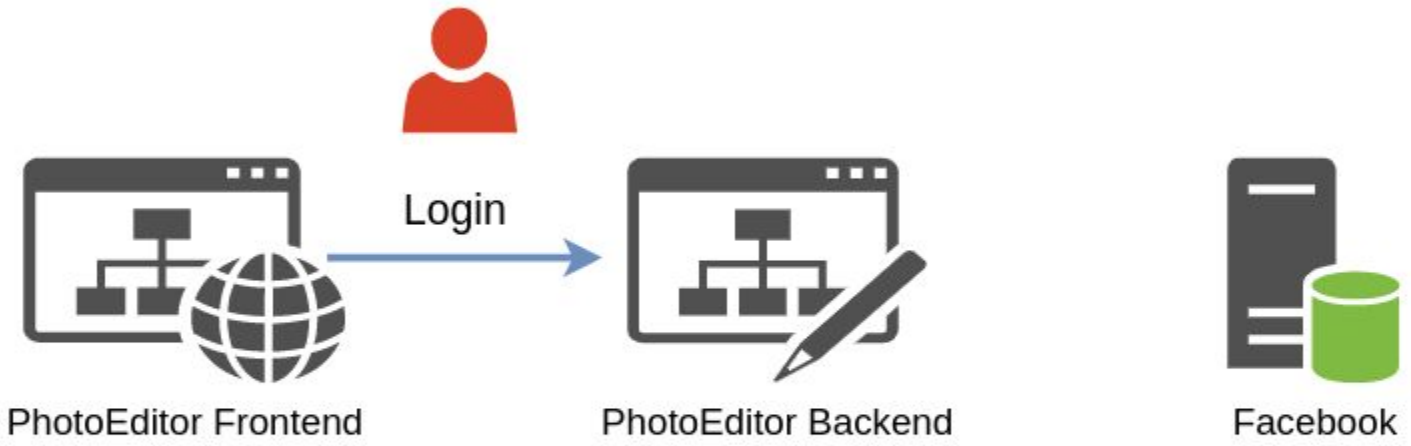
OAuth 2.0. Authorization code



OAuth 2.0. Authorization code

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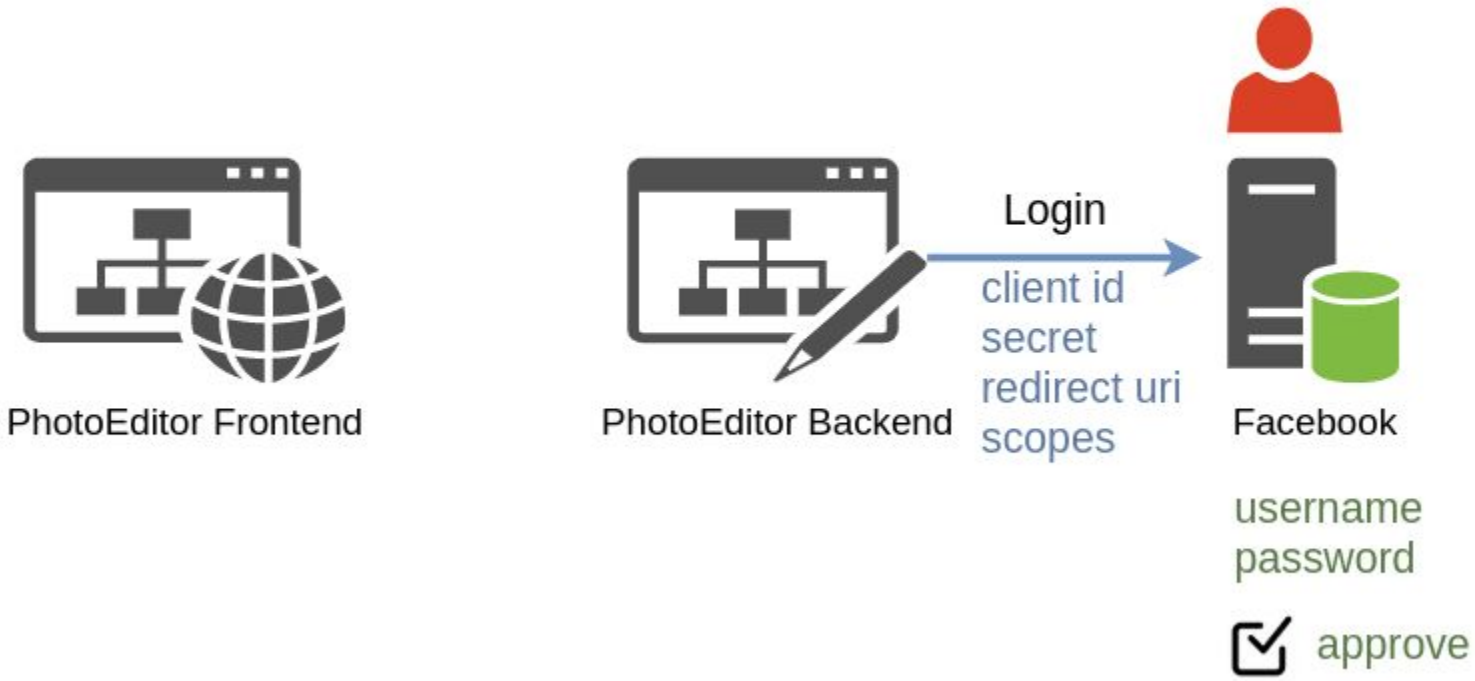

OAuth 2.0. Authorization code

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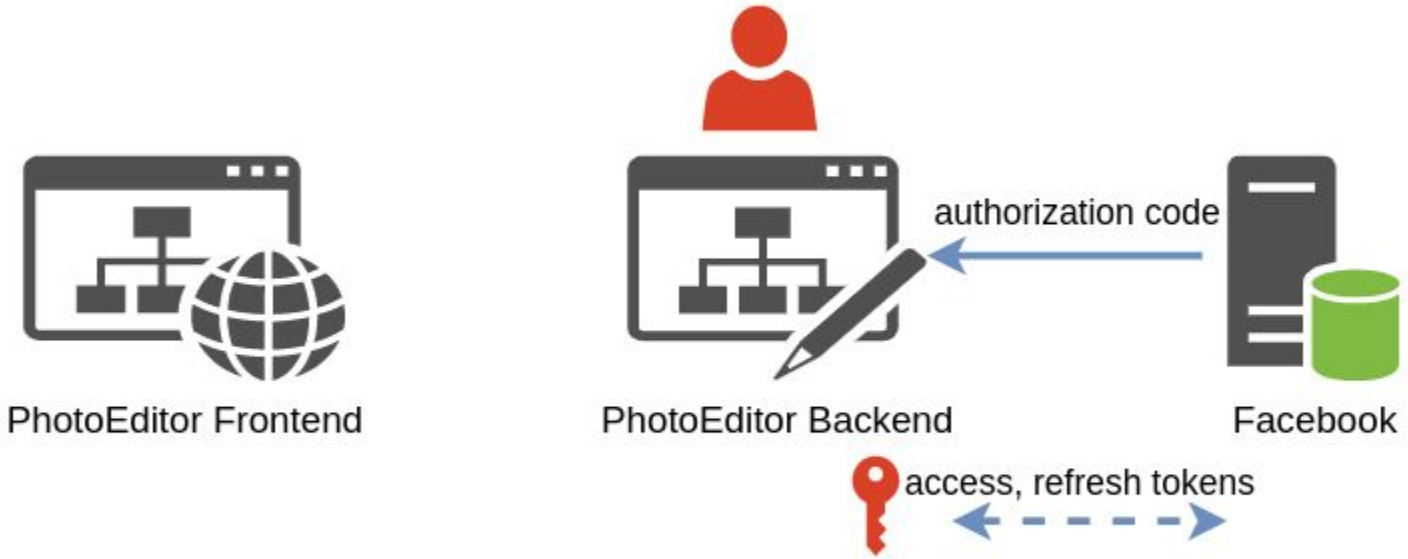
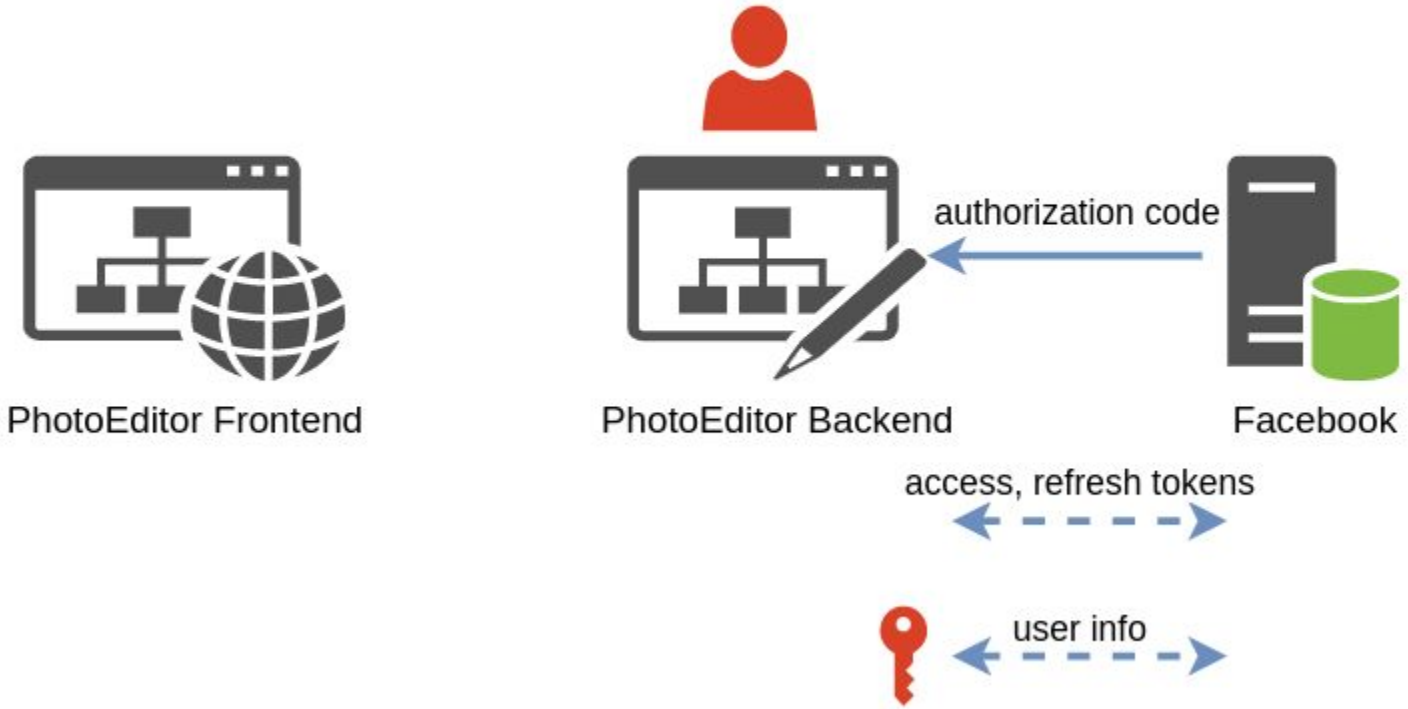
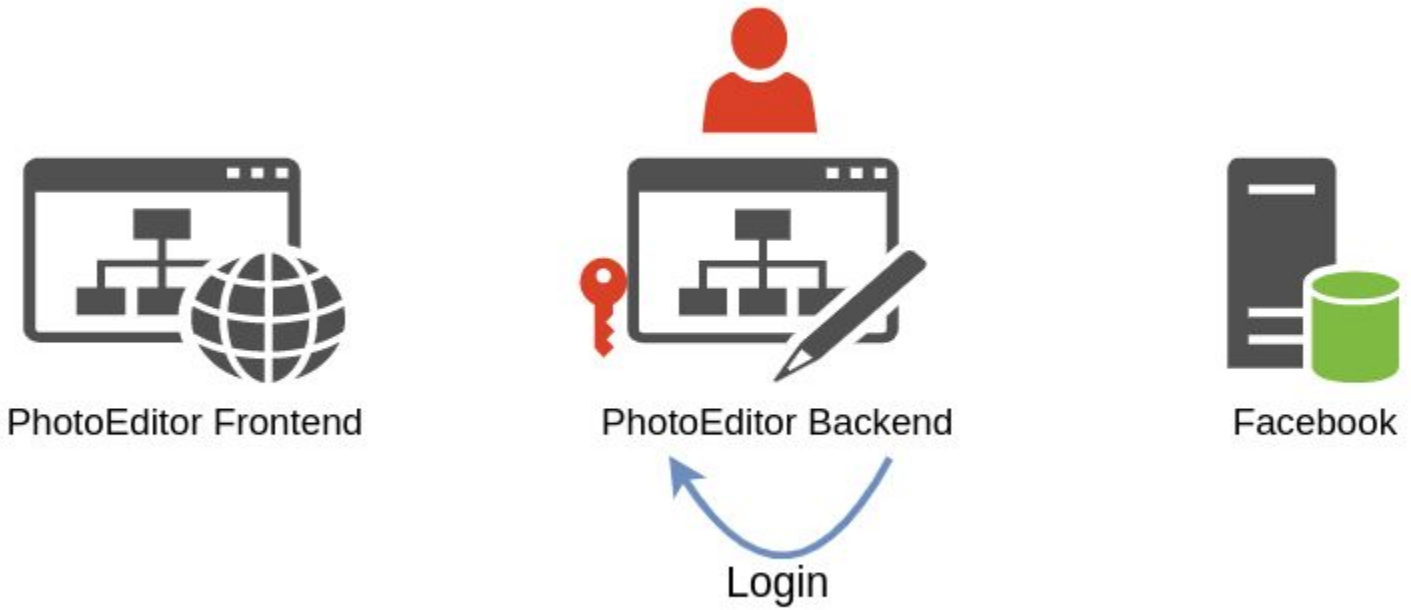


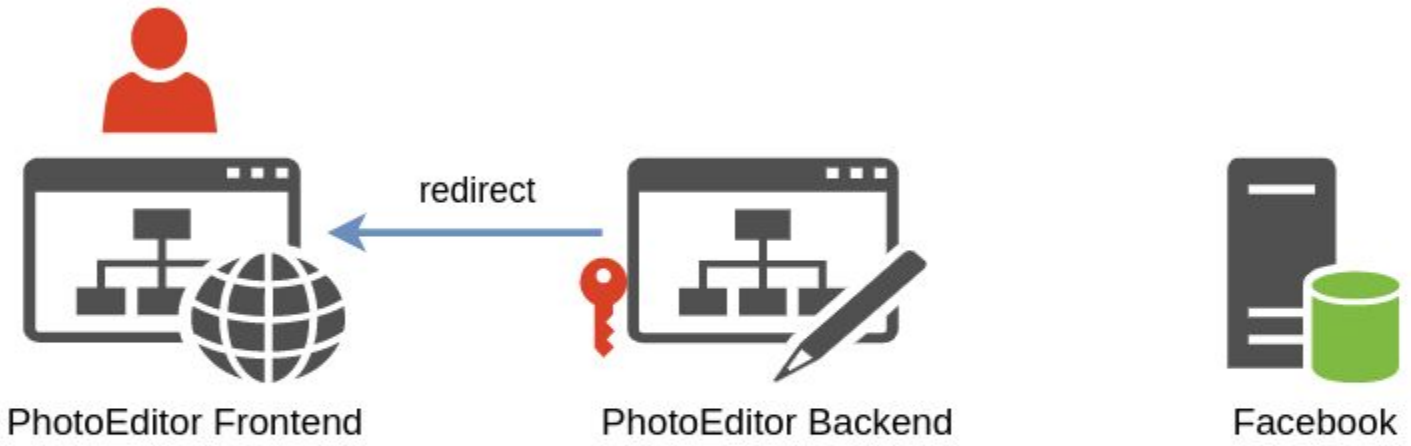
OAuth 2.0. Authorization code



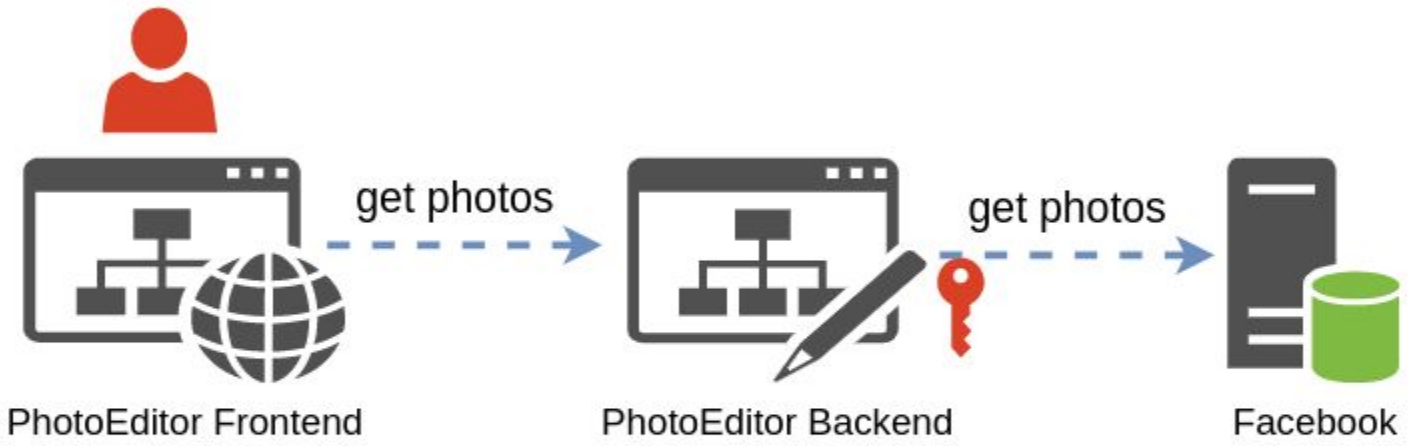
OAuth 2.0. Authorization code



OAuth 2.0. Authorization code



OAuth 2.0. Authorization code



OpenID Connect

OpenID Connect

- Extension of OAuth2.0

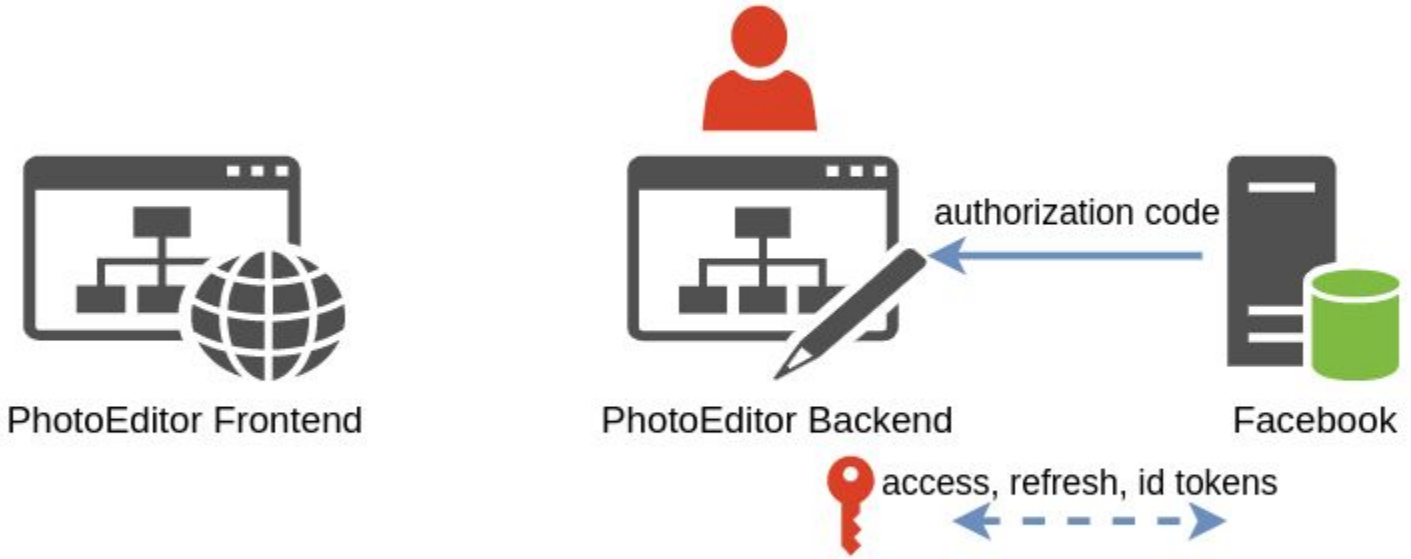
OpenID Connect

- Extension of OAuth2.0
- Authentication and authorization

OpenID Connect

- Extension of OAuth2.0
- Authentication and authorization
- The specification is more strict

OpenID Connect



OpenID Connect ID token

```
HTTP/1.1 200 OK
 Content-Type: application/json
 Cache-Control: no-store
 Pragma: no-cache

 {
  "access_token": "SlAV32hkKG",
  "token_type": "Bearer",
  "refresh_token": "8xLOxBtZp8",
  "expires_in": 3600,
  "id_token": "eyJhbGciOiJSUzI1NiIsImtpZCI6IjFlOWdkazcifQ.ewogImlzc
    yI6ICJodHRwOi8vc2VydmVyLmV4YW1wbGUuY29tIiwKICJzdWIiOiAiMjQ4Mjg5
    NzYxMDAxIiwKICJhdWQiOiAiczZCaGRSa3F0MyIsCiAibm9uY2UiOiAibi0wUzZ
    fV3pBMk1qIiwKICJleHAiOiAxMzExMjgxOTcwLAogImlhdCI6IDEzMTEyODA5Nz
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    QyHE5lcMiKPXfEIQILVq0pc_E2DzL7emopWoaoZTF_m0_N0YzFC6g6EJbOEoRoS
    K5hoDalrcvRYLSrQAZZKflyuVCyixEoV9GfNQC3_osjzw2PAithfubEEBLuVVk4
    XUVrWOLrLl0nx7RkKU8NXNHq-rvKMzqg"
 }
```


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OpenID Connect ID token

```
HTTP/1.1 200 OK
 Content-Type: application/json
 Cache-Control: no-store
 Pragma: no-cache

 {
  "access_token": "SlAV32hkKG",
  "token_type": "Bearer",
  "refresh_token": "8xLOxBtZp8",
  "expires_in": 3600,
  "id_token": "eyJhbGciOiJSUzI1NiIsImtpZCI6IjFlOWdkazcifQ.ewogImlzc
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    NqeGpe-gccMg4vfKjkM8FcGvnzZUN4_KSP0aAp1tOJ1zZwgjxqGByKHiOtX7Tpd
    QyHE5lcMiKPXfEIQILVq0pc_E2DzL7emopWoaoZTF_m0_N0YzFC6g6EJbOEoRoS
    K5hoDalrcvRYLSrQAZZKflyuVCyixEoV9GfNQC3_osjzw2PAithfubEEBLuVVk4
    XUVrWOLrLl0nx7RkKU8NXNHq-rvKMzqg"
 }
```
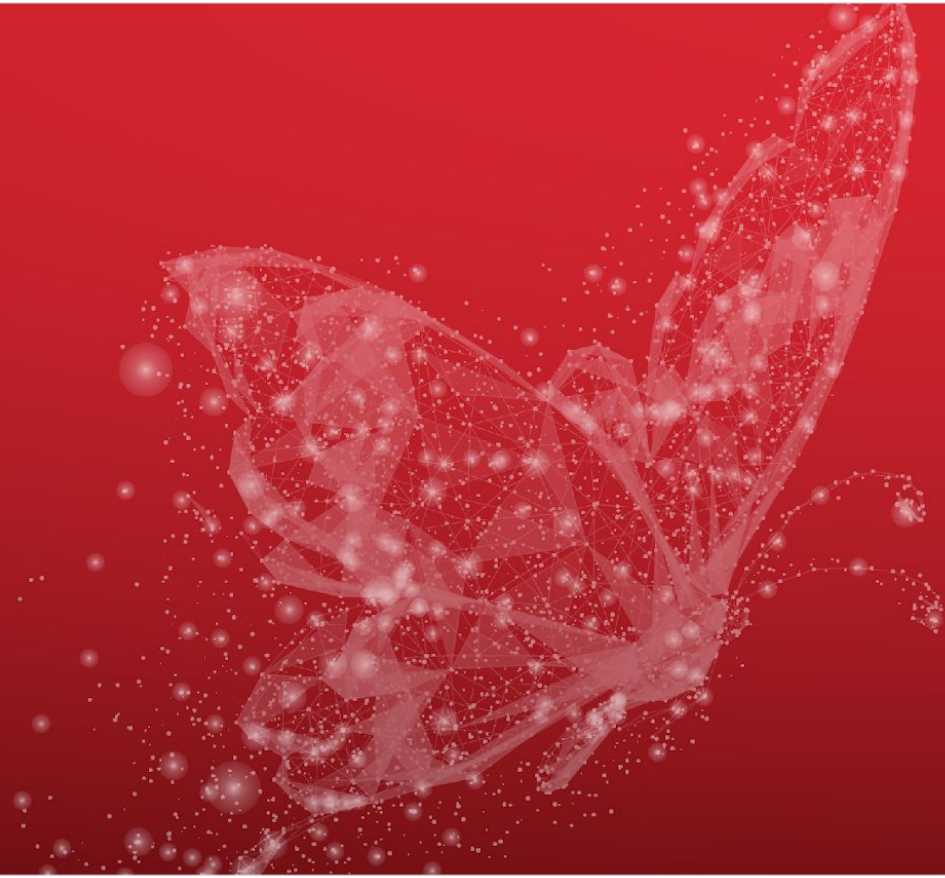

```
{
 "iss": "http://server.example.com",
 "sub": "248289761001",
 "aud": "s6BhdRkqt3",
 "nonce": "n-0S6_WzA2Mj",
 "exp": 1311281970,
 "iat": 1311280970,
 "name": "Jane Doe",
 "given_name": "Jane",
 "family_name": "Doe",
 "gender": "female",
 "birthdate": "0000-10-31",
 "email": "janedoe@example.com",
 "picture": "http://example.com/me.jpg"
}
```

Control Center



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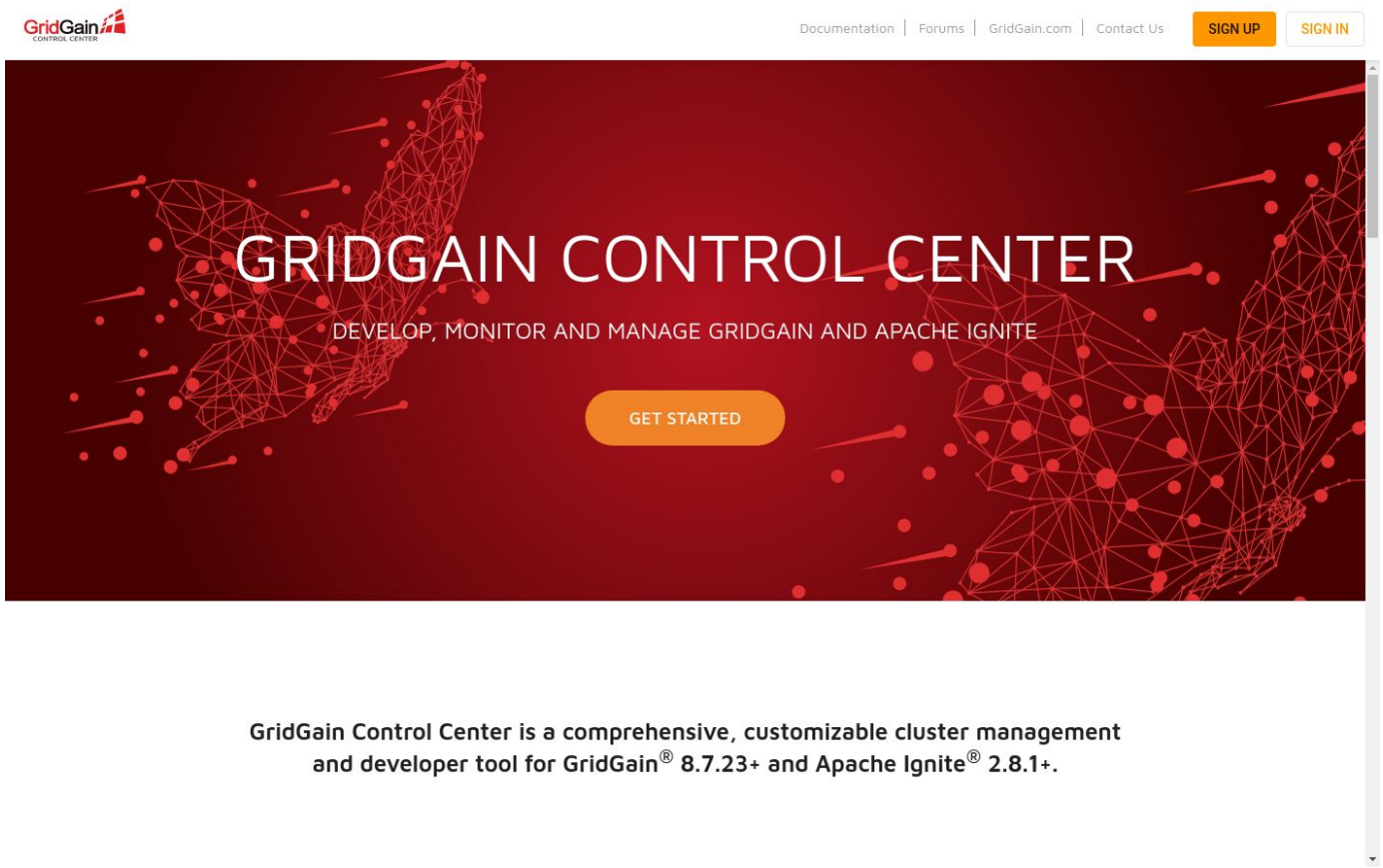
Control Center overview



https://control.gridgain.com

Control Center overview

- Monitoring and management

https://control.gridgain.com

Control Center overview

- Monitoring and management
- Hosted, on-premise

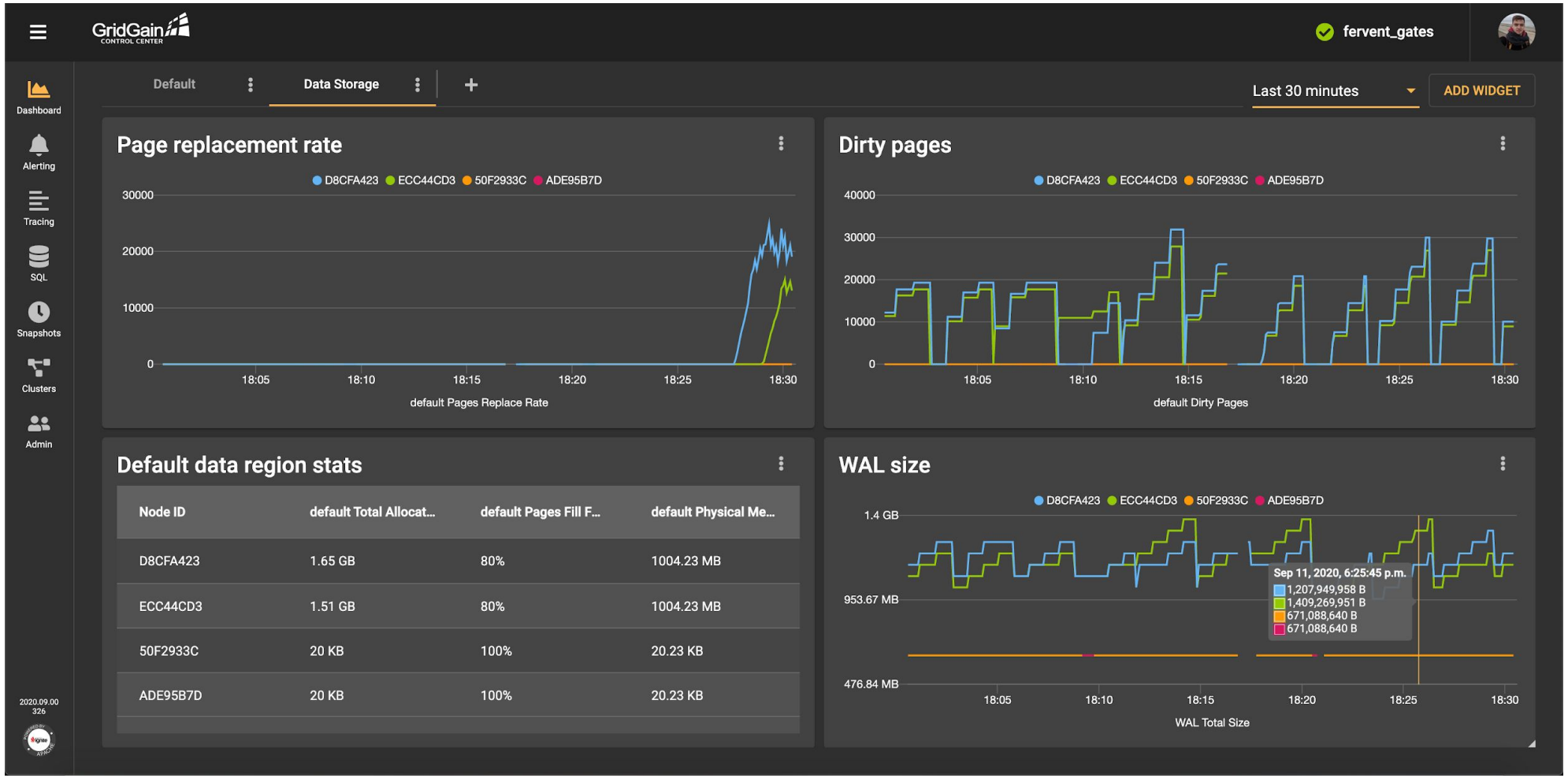
https://control.gridgain.com

Control Center overview

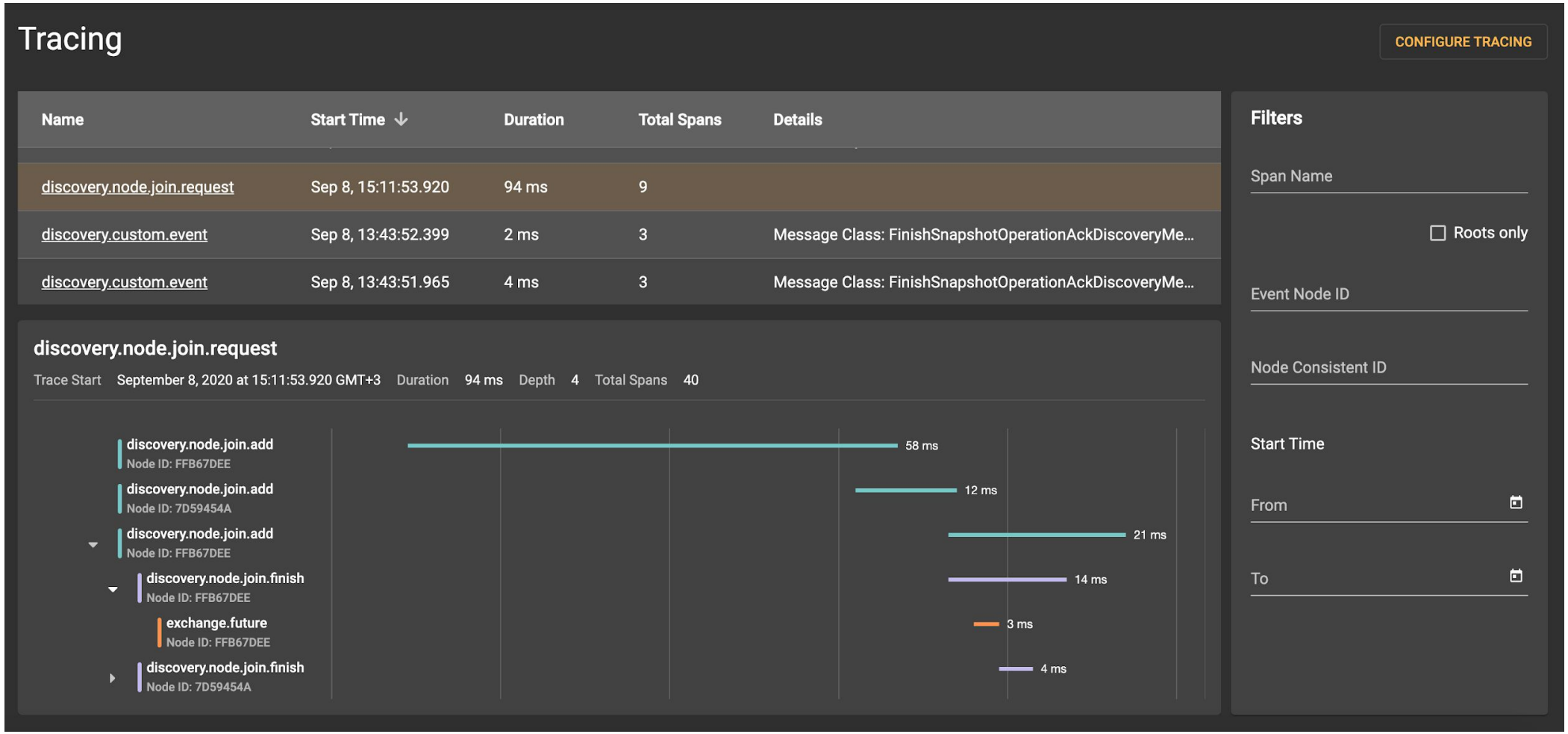
- Monitoring and management
- Hosted, on-premise
- Successor of Web Console

https://control.gridgain.com

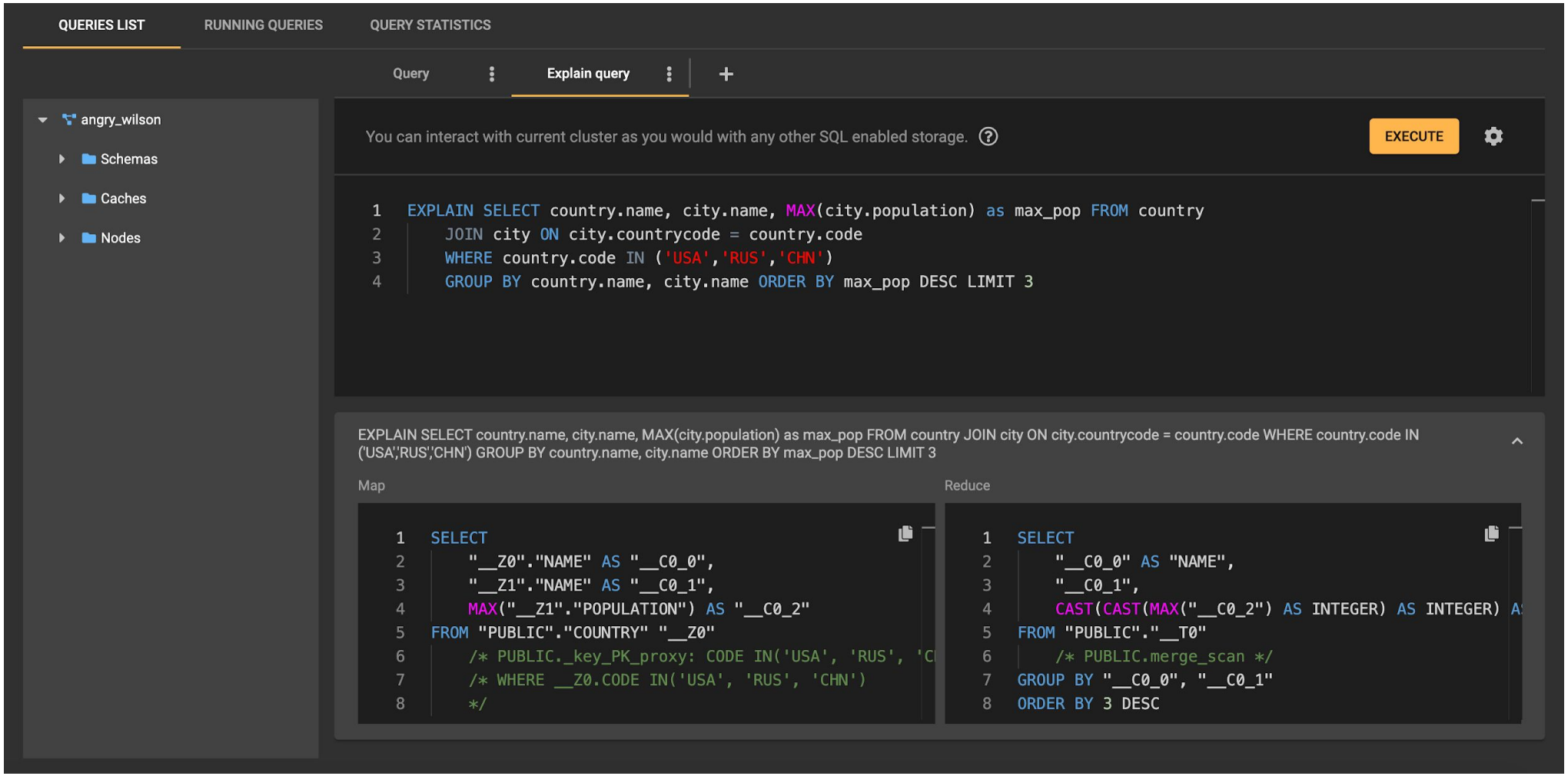
Control Center overview



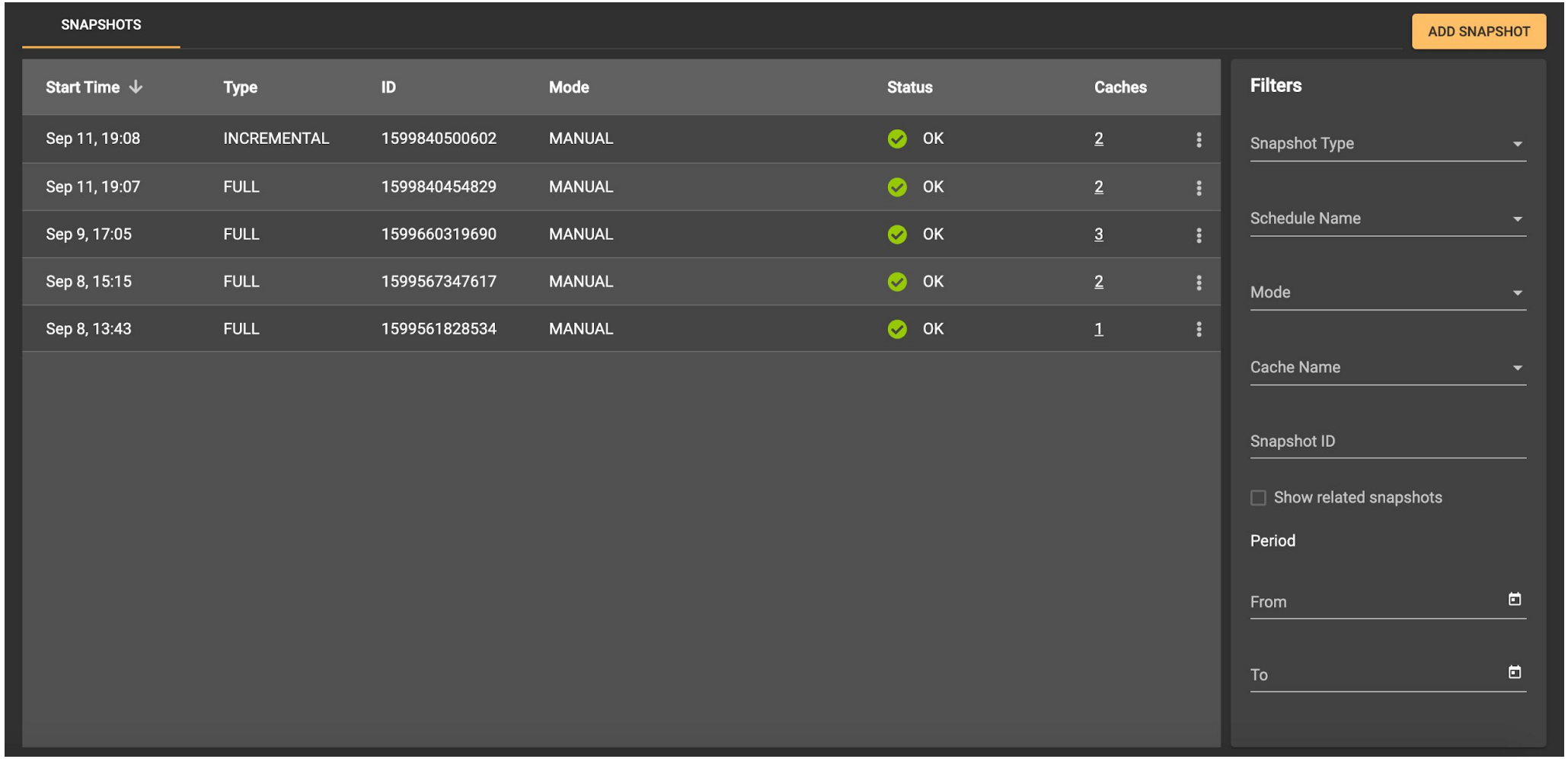
Control Center overview



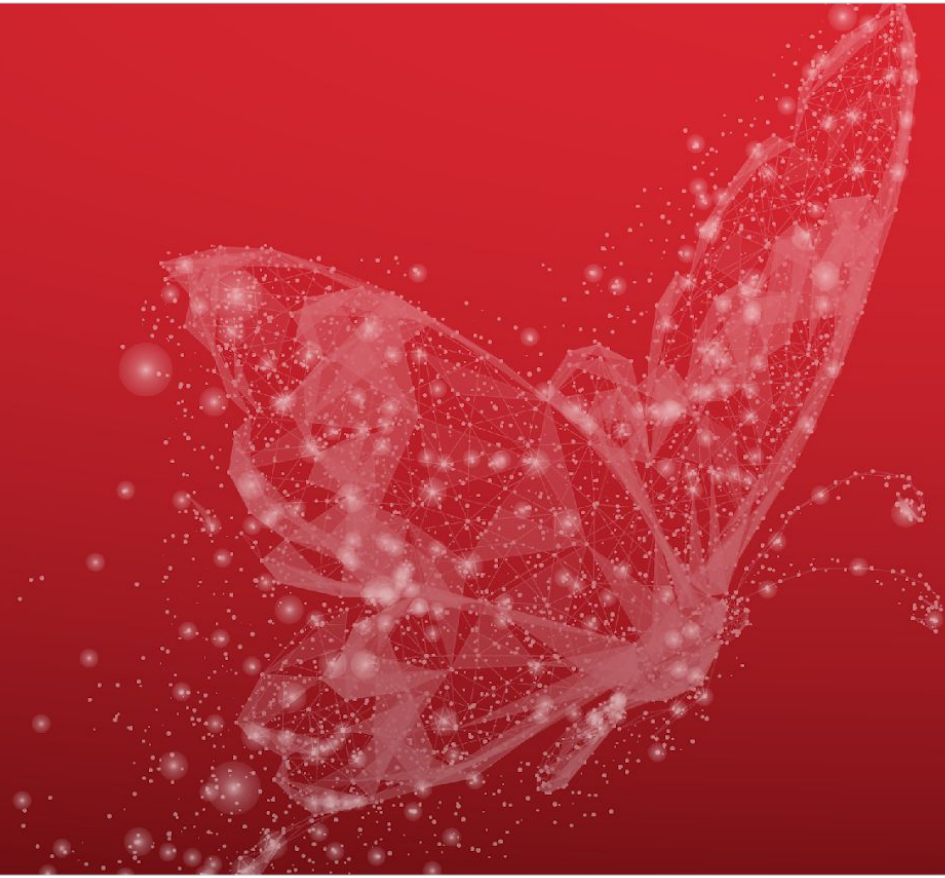
Control Center overview



Control Center overview



Demo. Control Center



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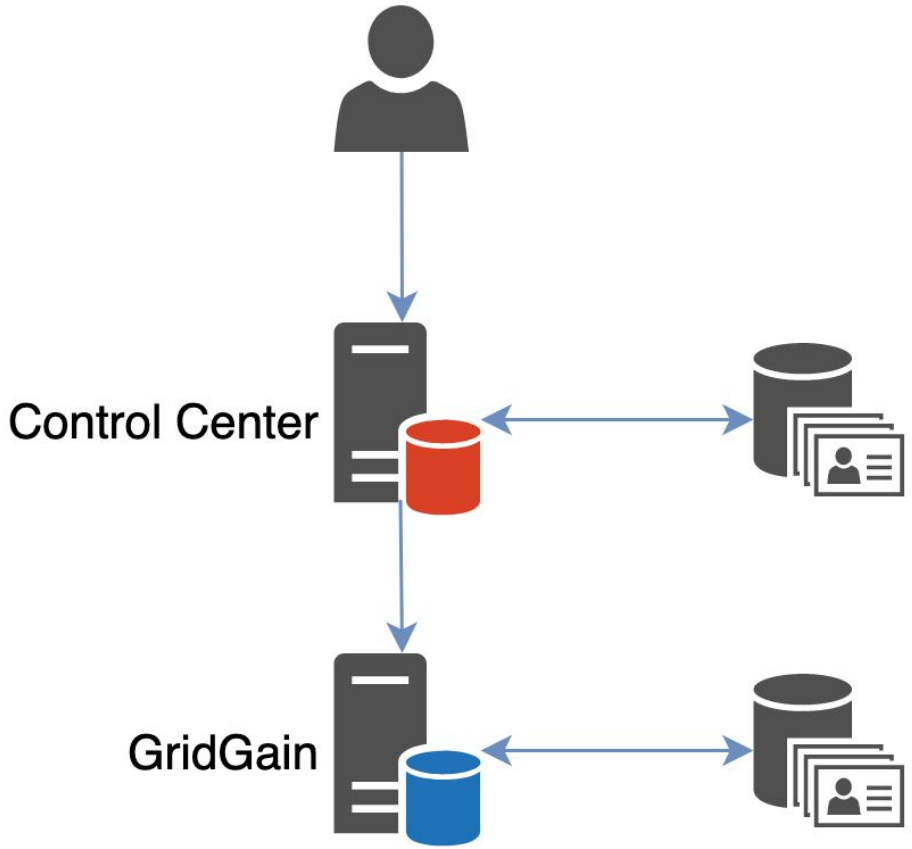
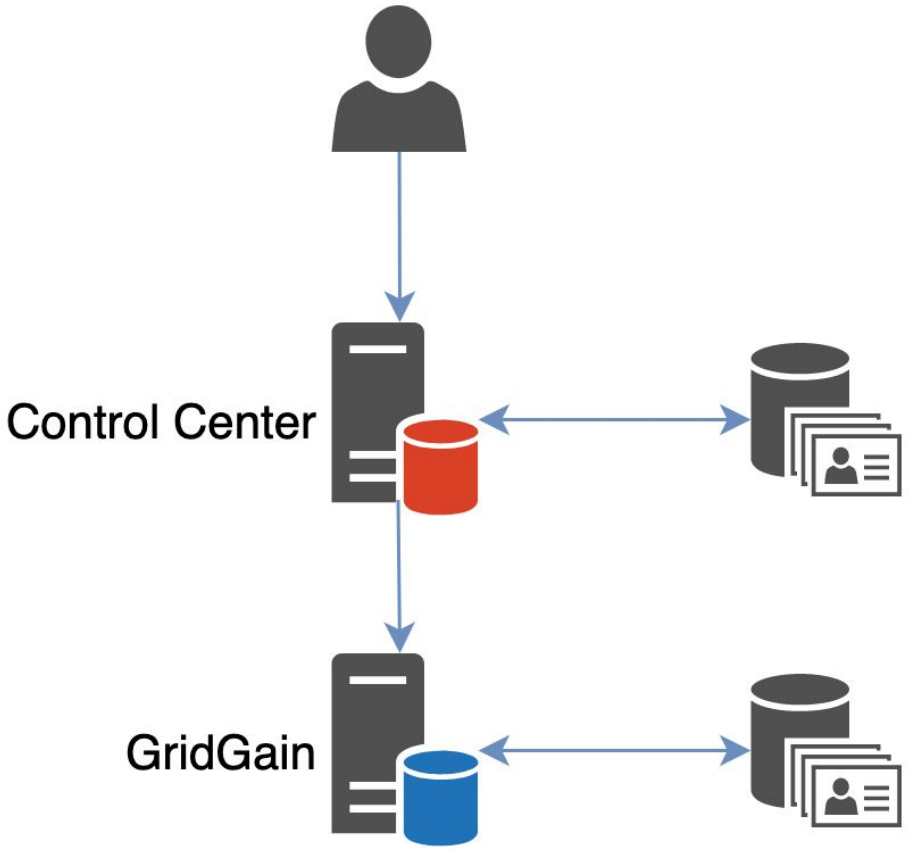
Demo #1:
Separate users storage

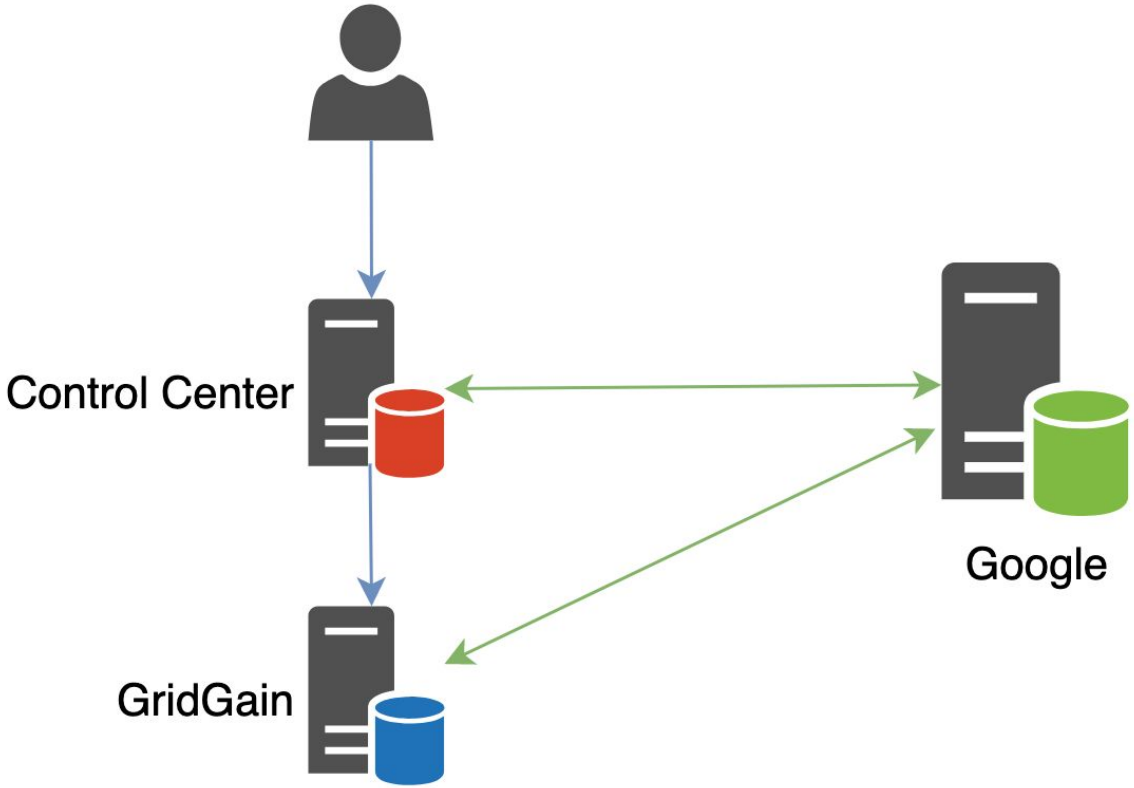


Demo #1:
Separate users storage

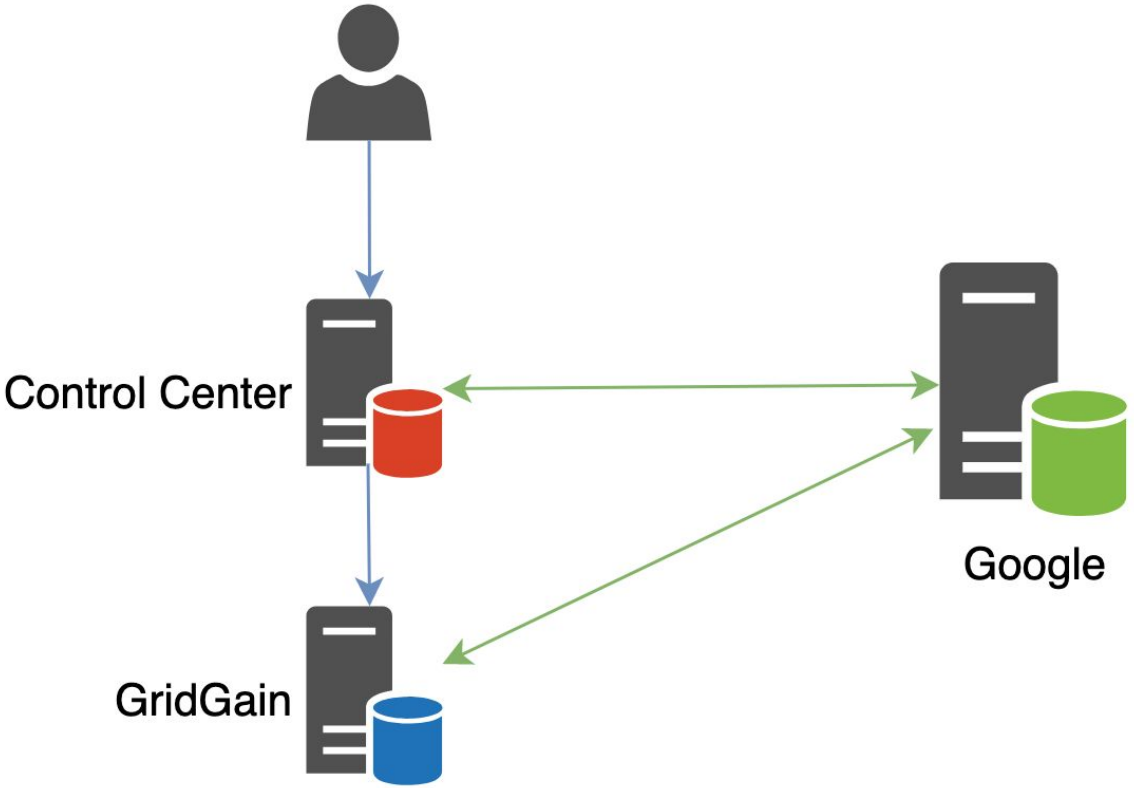


- ! Control Center and GridGain have different sets of users
- ! Repetitive password requests

Demo #2:
Centralized users storage

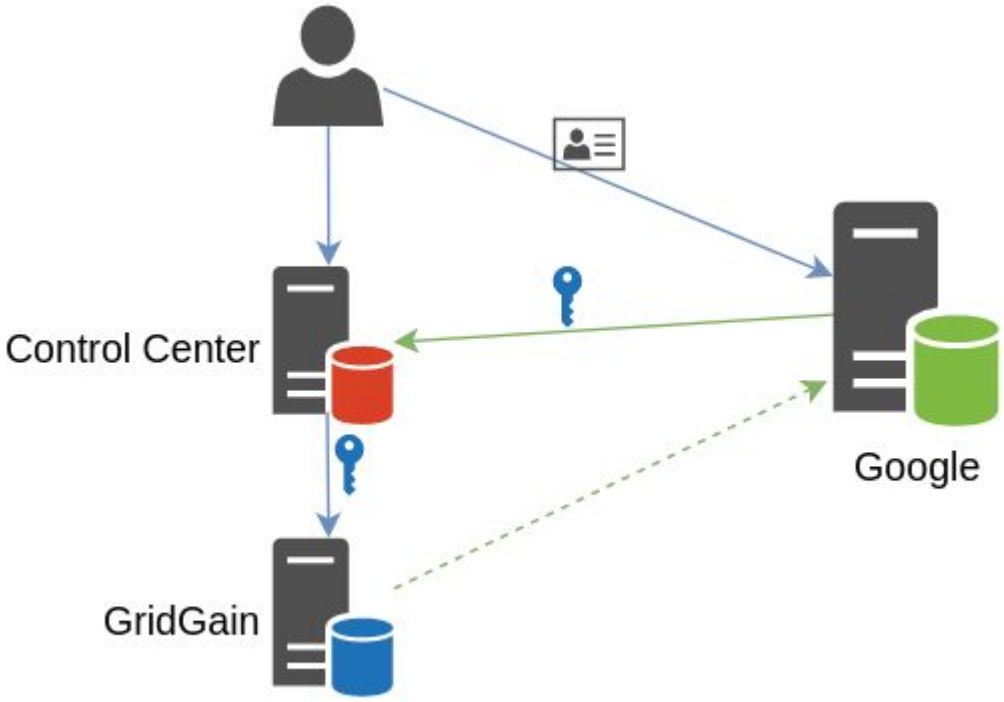


Demo #2:
Centralized users storage

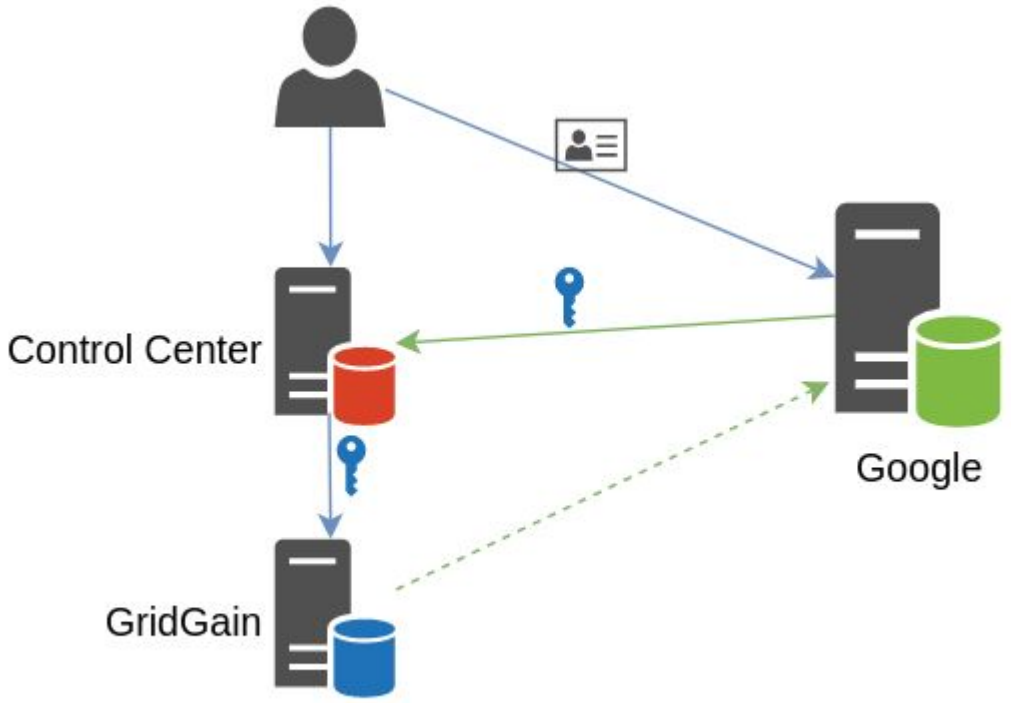


- The same set of users in both systems
- ! Repetitive password requests

Demo #3:
Single sign on

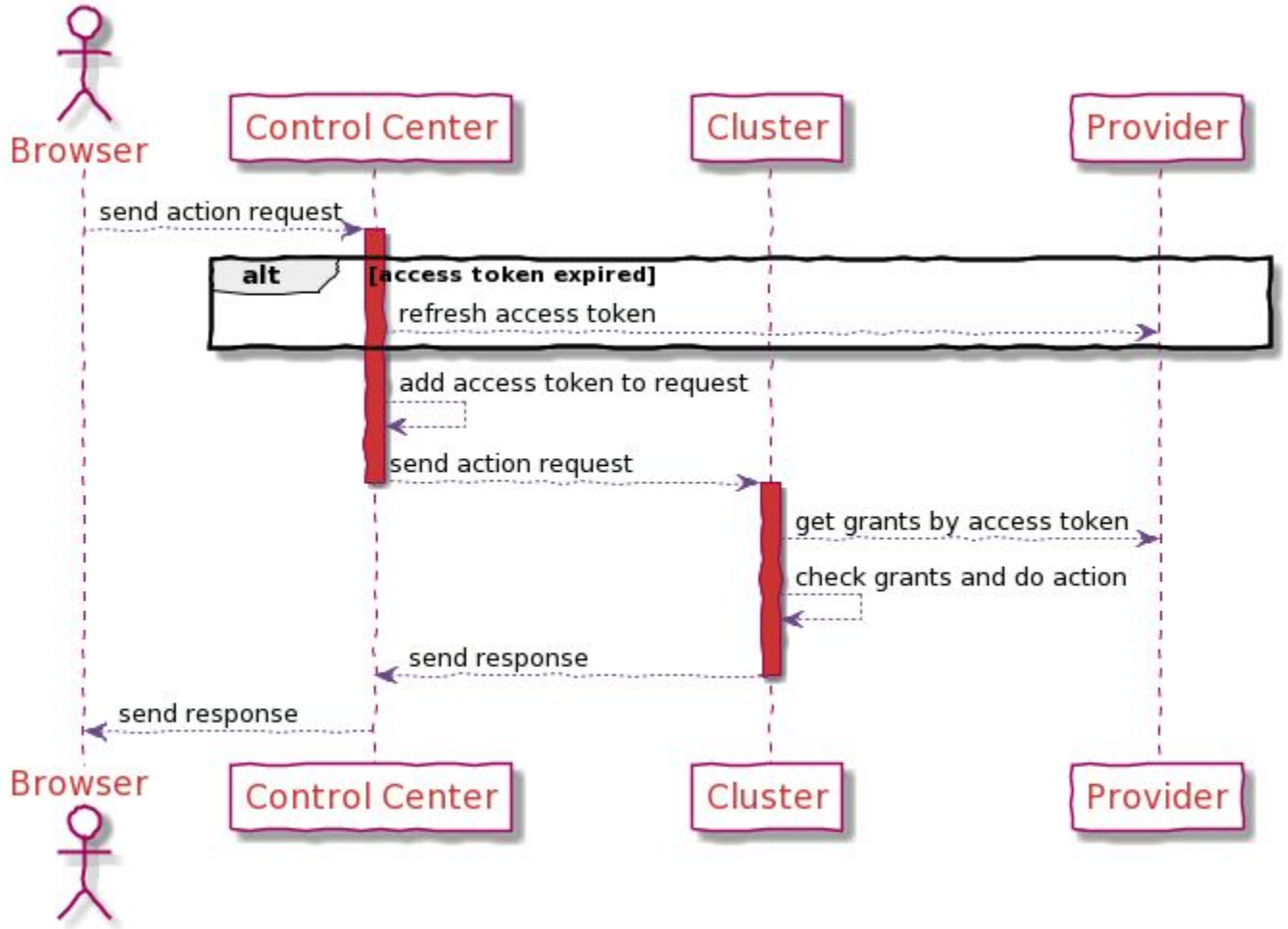


Demo #3:
Single sign on

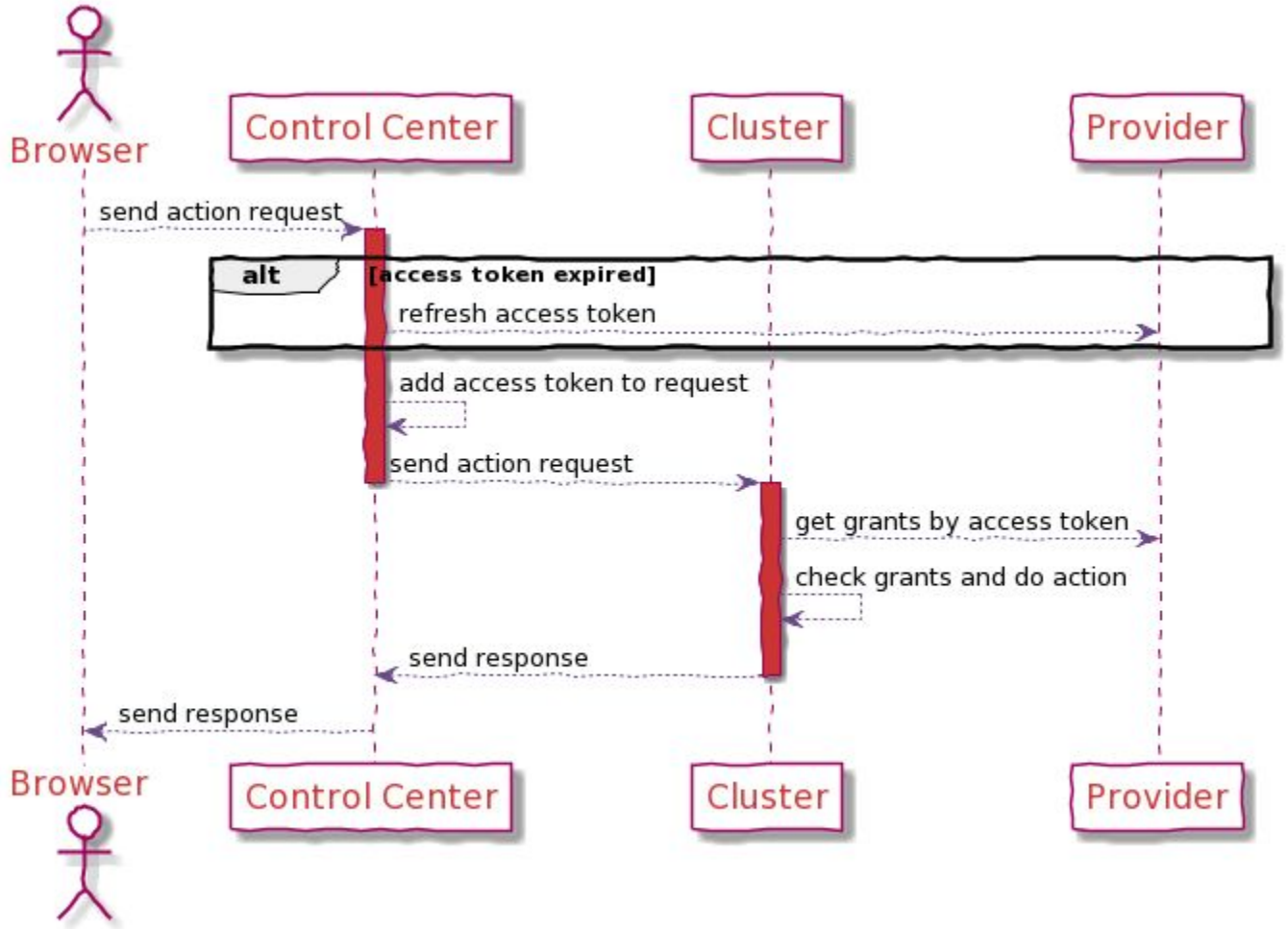


- The same set of users in both systems
- No need to type sign in multiple times

Single sign on flow

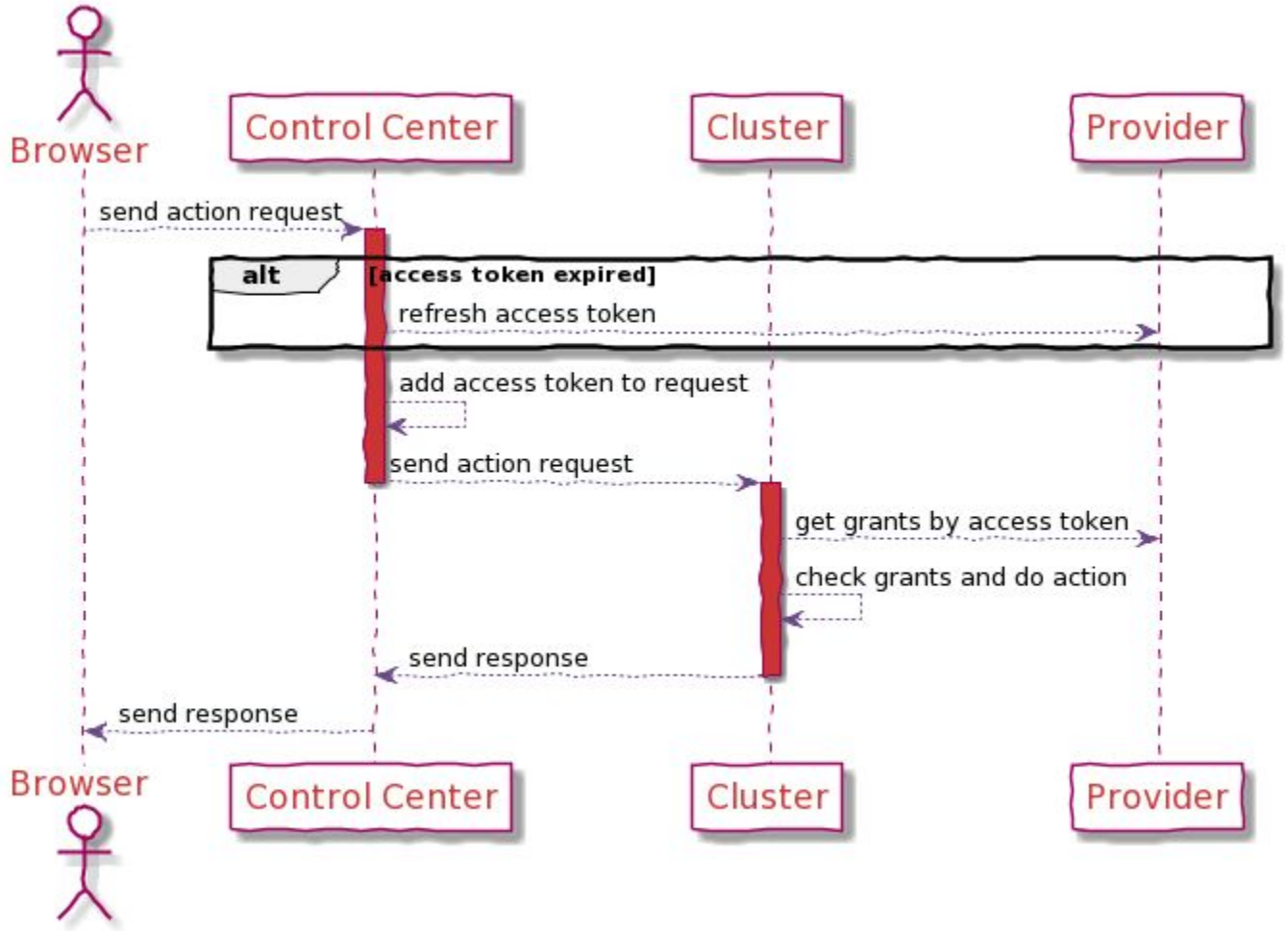


Single sign on flow




```
{
 "login": "firstuser",
 "password": "m5faSDf3",
 "userObject": null
}
```

Single sign on flow




```
{
 "login": null,
 "password": null,
 "userObject": {
   "tokenType": "Bearer",
   "accessToken":"SlAV32hkKG"
 }
}
```

GridGain Authenticator

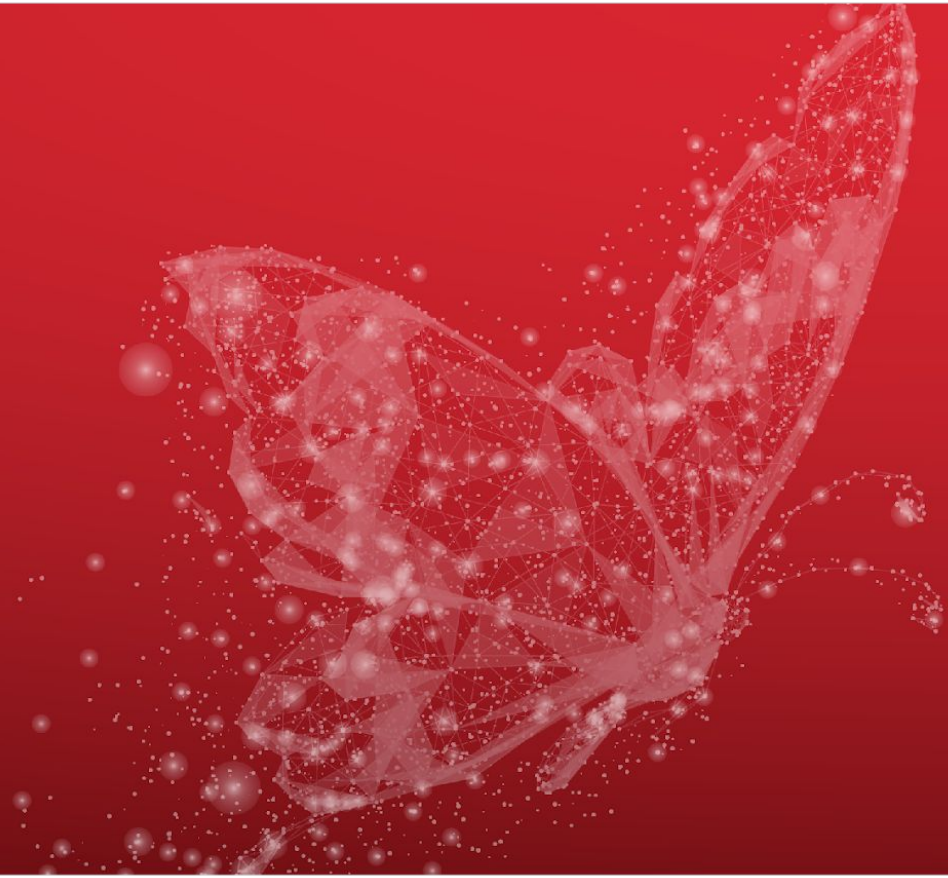
- Responsible for users authentication in the cluster
- Possible to extend to support authorization
- Available in GridGain Enterprise+

https://github.com/GridGain-Demos/gridgain-oauth2-authenticator-example/

OpenID Connect. Required steps.

- Register your application at the provider
  - Specify the redirect URL
- Specify the properties:
  - Client id
  - Client secret
  - Authorization URI
  - Token URI
  - JWK set URI

Demo
Adding another provider



Single sign on

! The setup is trickier

- Users management is more convenient
- The same credentials for the cluster and Control Center
- No repetitive identity checks
- Sessions are stored on the provider’s side

Control Center plans

- OAuth2 Authenticator
- More providers
- LDAP

Thank you!

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