

Hướng dẫn lấy accessToken và truy vấn API Epic FHIR

Bước 1: Chuẩn bị thông tin

- **client_id**: Được cấp bởi Epic (ví dụ: `3a81e8e1-81f7-4cd8-ac61-058c5d34c5de`)
- **private key**: File PEM (PKCS#8) dùng để ký JWT assertion
- **token endpoint**: <https://fhir.epic.com/interconnect-fhir-oauth/oauth2/token>

Bước 2: Sinh JWT assertion

1. Tạo một project console app C# (hoặc file `.cs` bất kỳ):

```
dotnet new console -n EpicJwtAssertionGenerator
```

2. Copy file sau vào program.cs

```
using System;
using System.IdentityModel.Tokens.Jwt;
using System.Security.Cryptography;
using Microsoft.IdentityModel.Tokens;
using System.Text.RegularExpressions;

class Program
{
    static void Main()
    {
        // Gắn private key PEM vào đây (PKCS#8, không có header/footer)
        // Phía dưới là key mẫu
        string privateKeyPem = @"-----BEGIN PRIVATE KEY-----
MIIEvgIBADANBgkqhkiG9w0BAQEFAASCBAKgwggSkAgEAAoIBAQDiChn
DADXTYAHZ
n3ak4kGpg9pPpYiUt7RyyvuLPld38uXwvLSm8z6RBLDe4hJsLwXUHpd
KWfVPwmsm
fZkEz1QABUZAfFaASNmUdIFEcRFuVKB/zf8xhGd4mY7FFKo0dkCB0GX
ess/v+HkO
-----END PRIVATE KEY-----";

        // Tạo JWT assertion
        var tokenHandler = new JwtSecurityTokenHandler();
        var key = new RsaSecurityKey(RsaCreateFromPem(privateKeyPem));
        var token = tokenHandler.CreateToken(new[] { new JwtRegisteredClaimNames.Sub, "EpicFHIR" }, new JwtRegisteredClaimNames.Iss, "EpicFHIR", new[] { new JwtRegisteredClaimNames.Exp, DateTime.UtcNow.AddHours(1) }, new[] { new JwtRegisteredClaimNames.Aud, "EpicFHIR" }, key, null);
        var accessToken = tokenHandler.WriteToken(token);
    }
}
```

ThYAbDkCfsXuczH4o9uWb4+/WwhDY8KMVCPiNvx/LWJX41cMq9jNb1
rrOpDCn2m+
RdM5RKD2BU0m/w5RbwC4P0/Gyzt2TrJF1MASrt1eBLPQt353ZtEC4kY
CqdUXL3hE
aOdU+balyzR+1mY2AS0opPsR5F+8pwbof1GCP7SqKkMEE+1qINjTcJQ1l
PkjYLB+
q1LbVa7RAgMBAAECggEAAK7bcH+BTExst5XIHC2RXNepMxIVghbKo0
xuNJkpF+U
9kBkJRdziJaxqkbe4zgNIKf4r1fprE3btGYfVatOKDofnivl9Sj416NG+oQe+
wwN
hYwrTOXo27FH+quU6UqgzbtSPOG8rJqqBy9g541v4JIOMPGgoVmS4
VOphd2DqEv
qzz11MsuU3dLWTstfdTyGCRJwbBik+HbK/fBw+8HGh974f7h1VhDeBQy
vTeqGot0
NSf9o9DIEHjiy8yH7B0eSWlPnwSTao6ruVG0iXmuFFz0vdrVxR+vJb3MI
6zsRgq/
8xQSK4HkVnVNZsE1E/SITNvG5CDhX8Se/vRILIYbQQKBgQD5bjacAOdl
RhnpBAZp
d7odhLfwmTTjmx9ZMpsO6057tYNqoXsOO0jqtzSezODt6HU6DrF0QLiX
YM+iqPU2
GnKXQO3izvmdHTrsLS5fxjV1CuGLt0y1RtsMCeLBL0+kGRTgcn5U+YzO
+cXJ1sk7
pwz7b/s5bnmQyjMx0FKIVYNI8QKBgQDn/ixE37BUo9zFeM3DxpW5FH
UgE88Ygrrc
Fimfy9uBDoN+RP6xtYJOoTurJQWTeoSJ6fxBmv3BzotvVvTglJArw49hd
RNgcgoV
WO8JPVtykmD0gPL9DnX5Gt+j8mWAZrLePrIk4HIVMIBVZvEp8eMHx4
+lZpzCQUo
60f0M5x24QKBgQCF55wbjgSrgsGyODf1ANiCpIBVMvqlwitHKHrDvKFK
mnxtjzIP
v5X6o9X09oo+TIA4ldDAV0qBwfBWI5xYqkQgXTQYUgMBTMLoLa06r17
dcbT527Kr
ktlfkiMQKQSRVQG3KOAXYE0uhDqhi9RGWP0IMurMvzk1+McZE/xqwn
WjEQKBgQDW
+DedOonyZETW1zlUD5f9gG9n4fMtCzaLah337Lbhx8kg4F4B3ed5ZP4
dgJjCJ+1Y
vnD5ed1aEUIzUahn0kIly3i5HftuKt9dGKOnNCXbALjG2BZRV20J/1TsXlif
uopU

```

VIRMx43vBJpmiJVAANwXAVyiL4tiIY0HKA3sw0ZhAQKBgFuVMYoC3Kn
i81d9DB7e
wYVrjccSeBbCaLTvSiRi1TmSVQufHI3IK+MnGr2JG4c/DjCqnInfP5G+SB
d9hyYp
LzeMFBzqdabdEwfNyX/WI7WxfAA0n/bJVPqQtJoIO0dDE9vWkvMRd/
WLMKx798C6
+2RZ/3+TTwvGbVUCx0H1RoTS
-----END PRIVATE KEY-----";

```

```

// Phía dưới là clientId mẫu
string clientId = "3a81e8e1-81f7-4cd8-ac61-058c5d34c5de";
string tokenUrl = "https://fhir.epic.com/interconnect-fhir-oauth/oa
uth2/token";

```

```

// Parse PEM để lấy RSA key
var rsa = RSA.Create();
rsa.ImportPkcs8PrivateKey(
    source: Convert.FromBase64String(
        Regex.Replace(privateKeyPem, @"-----.*?-----|\s+", string.E
mpty, RegexOptions.Singleline)
    ),
    bytesRead: out _
);

```

```

var credentials = new SigningCredentials(new RsaSecurityKey(rs
a), SecurityAlgorithms.RsaSha384);

```

```

var now = DateTimeOffset.UtcNow.ToUnixTimeSeconds();
var exp = now + 300;
var jti = Guid.NewGuid().ToString();

```

```

var payload = new JwtPayload
{
    { "iss", clientId },
    { "sub", clientId },
    { "aud", tokenUrl },
    { "jti", jti },
    { "exp", exp },

```

```

        { "nbf", now },
        { "iat", now }
    };

    var header = new JwtHeader(credentials);
    var jwt = new JwtSecurityToken(header, payload);

    var handler = new JwtSecurityTokenHandler();
    var assertion = handler.WriteToken(jwt);

    Console.WriteLine(assertion);
}
}

```

3. Thêm package cần thiết

```

dotnet add package System.IdentityModel.Tokens.Jwt
dotnet add package Microsoft.IdentityModel.Tokens

```

4. Chạy chương trình:

```

dotnet run --project EpicJwtAssertionGenerator

```

5. Copy kết quả JWT assertion.

```

eyJhbGciOiJSUzZM4NCIsInR5cCI6IkpXVCJ9.eyJpc3MiOiJzYTgxZThlMS04M
WY3LTRjZDgtYWM2MS0wNThjNWQzNGM1ZGUlLCJzdWliOiJzYTgxZThlMS
04MWY3LTRjZDgtYWM2MS0wNThjNWQzNGM1ZGUlLCJhdWQiOiJodHRw
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dGgyL3Rva2VuliwianRpljoiMDVIMTI4NzktMjdjNy00NDlkLTlkNjltYmJhZjFhZ
DM0OGIwliwiZXhwIjoxNzU3OTA1NzktMjU3OTU0OTU0OTU0OTU0OTU0OTU0OTU0
dCI6MTc1NzkwNTQ5N30.MvMJ8LDVqMovKlekMsPdIlgJar5WPZOjgLQFac
WND5aViyMdsrwNV0Se5pRrfAtBlp5s2Bi065OxNU_Pc6NaU1IPZoRZdVZ7M
5hhsWx4HMk4Blzs663c85-n02vSPx290hyjFY_cnLI-5M-ijvxAHZzZgow0n2
HUfrp9c7V2xCXzF9uGHT-F69XpHdEgGIYbdy2qWK3Fclcq_c79CnsqRyEJY
EQ2K-G-sw6oGUDzdzX0gsbesMfe1pH5s6B3HPnzHCu6aPq1C5bLQIAecQa

```


WFjNjEtMDU4YzVkMzRjNWRlliwiZXBpYy5lY2kiOiJ1cm46ZXBpYzpPcGVuL
kVwaWMtY3VycmVudCIsImVwaWMubWV0YWRhdGEiOiJlWkgxaXdCWHZ
YVUdrbHctVzhsLTRQTmg0SGRyeVo4N2NQaklpZXNhX0I2bkdkYUNCcDdV
dVZnOHpmVjVtRmFPdEFZZmk2TkU1SzNhRDZmY09pU2pQVXJ4M2xLVlgw
WGJjTGczUTYteUp3SHNGdU1PcFNsWmJMaTVmb1o1ckFzVSIsImVwaWMu
dG9rZW50eXBlljoiYWNjZXNzliwiZXhwIjoxNzU3OTA5MTkyLCJpYXQiOjE3N
Tc5MDU1OTIsImIzcyI6InVybipvaWQ6MS4yLjg0MC4xMTQzNTAuMS4xMy4
wLjEuNy4zLjY4ODg4NC4xMDAiLCJqdGkiOiJlYTBMmJY1Ni02MTYyLTRmO
TktOTHiMy1hNjgyZWEwNjMyOWEiLCJuYmYiOjE3NTc5MDU1OTIsInN1Yil6I
mV2TnAtS2hZd09PcUFabjFwWjJlbnVBMjYJ9.gL9nAYsLkm3GW7IPRaoWt8
UaWQSTmxMfT2z30jTxTMoVZlwxwbXkfVBml-WaUZgtA8qk1TGdJfN2gyVj
Ud9XUXIlyzcLgG3CCTwNQqrZs6mnFzQOIGwASX9s5B-6T7fYmAxBN5EfJ6
X5rcYVRxCO_lplhhWYARvQOWzeyg0LcYqB9d678Aiq-aAn_VDBjenG-0SBG
bjdNNO9x_iFEOyJKIKTqXGBIglfJAV2RYhnhbDxnJK7K_V2SMGj0yryVC3PuK
8ZpBV0braEmqwhXvgCvg4hLNYqDETwMJjfFNUgZyt0QGRL1EH5TtTTARp
CHU_dOocH3zai4LplhkmhcAgLEUA"

Response: (example)

```
<Patient xmlns="http://hl7.org/fhir"><id value="erXuFYUfucBZaryVksYEcMg3" /><extension url="http://open.epic.com/FHIR/StructureDefinition/extension/legal-sex"><valueCodeableConcept><coding><system value="urn:oid:1.2.840.114350.1.13.0.1.7.10.698084.130.657370.19999000" /><code value="female" /><display value="female" /></coding><text value="Female" /></valueCodeableConcept></extension><extension url="http://open.epic.com/FHIR/StructureDefinition/extension/sex-for-clinical-use"><valueCodeableConcept><coding><system value="urn:oid:1.2.840.114350.1.13.0.1.7.10.698084.130.657370.19999000" /><code value="female" /><display value="female" /></coding></valueCodeableConcept></extension><extension url="http://hl7.org/fhir/us/core/StructureDefinition/us-core-race"><extension url="ombCategory"><valueCoding><system value="urn:oid:2.16.840.1.13883.6.238" /><code value="2131-1" /><display value="Other Race" /></valueCoding></extension><extension url="text"><valueString value="Other" /></extension></extension><extension url="http://hl7.org/fhir/us/core/StructureDefinition/us-core-ethnicity"><extension url="text"><valueString value="Unknown" /></extension></extension><extension url="http://hl7.org/fhir/us/core/StructureDefinition/us-core-sex"><valueCode value="248152002" /></extension><extension url="http://open.epic.com/FHIR/Structure
```



```

Definition/extension/calculated-pronouns-to-use-for-text"><valueCodeableConcept><coding><system value="http://loinc.org" /><code value="LA29519-8" /><display value="she/her/her/hers/herself" /></coding></valueCodeableConcept></extension><identifier><use value="usual" /><type><text value="CEID" /></type><system value="urn:oid:1.2.840.114350.1.13.0.1.7.3.688884.100" /><value value="FHRWXTR3N5LZS57" /></identifier><identifier><use value="usual" /><type><text value="EPIC" /></type><system value="urn:oid:1.2.840.114350.1.13.0.1.7.5.737384.0" /><value value="E4007" /></identifier><identifier><use value="usual" /><type><text value="EXTERNAL" /></type><system value="urn:oid:1.2.840.114350.1.13.0.1.7.2.698084" /><value value="Z6129" /></identifier><identifier><use value="usual" /><type><text value="FHIR" /></type><system value="http://open.epic.com/FHIR/StructureDefinition/patient-dstu2-fhir-id" /><value value="TnOZ.elPXC6zcBNFMcFA7A5KZbYxo2.4T-LyIRk4GoW4B" /></identifier><identifier><use value="usual" /><type><text value="FHIR STU3" /></type><system value="http://open.epic.com/FHIR/StructureDefinition/patient-fhir-id" /><value value="erXuFYUfucBZaryVksYEcMg3" /></identifier><identifier><use value="usual" /><type><text value="INTERNAL" /></type><system value="urn:oid:1.2.840.114350.1.13.0.1.7.2.698084" /><value value="Z6129" /></identifier><identifier><use value="usual" /><type><text value="EPI" /></type><system value="urn:oid:1.2.840.114350.1.13.0.1.7.5.737384.14" /><value value="203713" /></identifier><identifier><use value="usual" /><type><text value="MYCHARTLOGIN" /></type><system value="urn:oid:1.2.840.114350.1.13.0.1.7.3.878082.110" /><value value="FHIRCAMILA" /></identifier><identifier><use value="usual" /><type><text value="WPRINTERNAL" /></type><system value="urn:oid:1.2.840.114350.1.13.0.1.7.2.878082" /><value value="736" /></identifier><active value="true" /><name><use value="official" /><text value="Camila Maria Lopez" /><family value="Lopez" /><given value="Camila" /><given value="Maria" /></name><name><use value="usual" /><text value="Camila Maria Lopez" /><family value="Lopez" /><given value="Camila" /><given value="Maria" /></name><telecom><system value="phone" /><value value="+1 469-888-8888" /><use value="work" /><rank value="2" /></telecom><telecom><system value="phone" /><value value="+1 469-469-4321" /><use value="mobile" /><rank value="3" /></telecom><telecom><system value="email" /><value value="knixontestemail@epic.com" /><rank value="1" /></telecom><gender value="female" /><birthDate value="1987-09-12" /><deceasedBoolean value="false" /><address><use value="home" /><text value="3268 West Johnson

```



```

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t 117" /><city value="GARLAND" /><district value="DALLAS" /><state valu
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ctureDefinition/patient-preferenceType"><valueCoding><system value="h
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D" /></generalPractitioner><managingOrganization><reference value="Or
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tal System" /></managingOrganization></Patient>

```