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### Question

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## How to Interoperate with CareEvolution

I've been trying to interoperate with careevoltion using their backend-services.

Spec: <http://docs.smarthealthit.org/authorization/backend-services/>

This involves creating a JWT (JSON Web Token) that I have been unable to do using  
%OAuth2.JWT:ObjectToJWT.

I downloaded [jwt.pfx](#) and then ran the following openssl commands to create some pem files.

```
openssl pkcs12 -in jwt.pfx -out file.nokey.pem -nokeys  
openssl pkcs12 -in jwt.pfx -out file.withkey.pem
```

```
openssl rsa -in file.withkey.pem -out file.key
```

```
cat file.nokey.pem file.key > file.combo.pem3
```

I then ran some node code to create the private portions of the RSA key:

```
var fs = require('fs');  
var rsaPemToJwk = require('rsa-pem-to-jwk');  
var pem = fs.readFileSync('file.key');  
console.log(pem);  
var jwk = rsaPemToJwk(pem, {use: 'sig'}, 'private');  
console.log(JSON.stringify(jwk));
```

```
C:\Users\Paul\Desktop\jwt>node rsa-pem-to-jwk.txt > c:\tmp\priv.txt
```

I then changed the node code so that it created the public portions of the RSA key.

```
var jwk = rsaPemToJwk(pem, {use: 'sig'}, 'public');  
C:\Users\Paul\Desktop\jwt>node rsa-pem-to-jwk.txt > c:\tmp\public.txt
```

I then ran the following COS code:

```
KILL JOSE
```

```
S JOSE("keyalg")="RSA"  
S JOSE("sigalg")="RS256"  
  
S A=+$H-47117  
S B=A*86400  
S C=$P($HOROLOG, " ", 2)  
S EPOCH=B+C  
// add 4 minutes  
S D=60*4
```

```
S EPOCH=EPOCH+D
```

```
set body=##class(%DynamicObject).%New()
do body.%Set("iss", "JWTClientCredentials", "string")
do body.%Set("aud", "https://fhir.careevolution.com/Master.Adapter1.WebClient/identity
server/connect/token", "string")
do body.%Set("exp", EPOCH, "string") // 1516032893
do body.%Set("nbf", EPOCH, "string") // 1516032893
do body.%Set("jti", "db5ba9b3-602c-4b5f-beb9-4e8d76028c01", "string")
do body.%Set("sub", "07e5a735-a4f7-e711-8136-0a69c1b3225b", "string")
do body.%Set("user_name", "psimon", "string")
do body.%Set("clientid", "JWTClientCredentials", "string")

// copied from /tmp/priv.txt (node output)
```

```
s localpriv="{ ""kty"": ""RSA"" , ""n"": ""s0hguxNL5Xb6_Fk3u_fnZrUXuRnjj1wIEGXlsnqb4r
ptiDYeX9dEQm29eDe5fhXWjrPtU33WA_zz0Y9R5z7EaX4ZlZG7PlFlm5vu3bEu-qeuMp8Xb3hPMyND-87JGrb
B1t5i-BgMpjQoe1hYT8iqzElfEtUGYyNn2dhsSwIVwqIaRt4ly65oyW9Ea7VL92kmCEgUmIn-lrEfvygfbEL2H
-9dW42dAMvEwLCQGM7iX1zuHRAH9Ec9kwnaBb2kfHzoSJXZm5WcuPYJIWZrvu1RbHcZBFFF0GwCDTH1bfECmr
6c-6BPeeUMw6resnbM4v3dTrbKD64HQbC33x4_Xs3pTQ"" , ""e"": ""AQAB"" , ""d"": ""FVOizh45hQ5
mROaIDSAsqrkQHWDLBR65htnYPScAp4qayqOVnL5d38z8Cru5SDoGiE83CBuL_eV1S5R09cEttC7f9D7lu0A
Lijs-avjm0dxoiHUMYKI7KaYkTCwJGDhtTpYdx810k8DYn9UqqjDMevjb1_GOC4wAvNmbZUTWODTDFVXm7D42v
cUnh0e7nTYu7qGBRcfRrduzjBZMSddZoz8suWbJlQowUt6-bYOUPixec1ML8oOKrtuQ_Y6fI-SNkaM5MrrJku
-s1KXIot5ZGXkpqE-PUQsw1DAzs6MfS6CcufdYad1Bd6sn6bOLNjn3DffDJQGHQUIUefTJ2I_YMQ"" , ""p""
: ""7CSQiUHeP_C2QBgQEsC_yF0Q1AFHmNEn9ua01J20LJSu7zzYCde6E5X-j-9w37nzdzOclceEI2-20AvV_
Ukh3R78q9_-Mtc9AUk2BunwzfaAdjH10YT0IpJEI-IluMpOX9RETTK3KXpjOFBefHOeHS0DyWLRXDaAt2k_9c
1Q1Lc"" , ""q"": ""wlvJ3Ap_i1vxt5q6zRT6JBxstvXLi0hQgHZnchvNluOfhzBTfYTSiK0n60d-yj1c90i
Zt97B4XKWfps29xwd6wqS6X-QtG59AvlU0IOH4FSoyvyVy4yqpMSzAjgmhwZri-API7XWd1KSmkTB8t-Xfdxj
dnC6kM62MqtsdC-Vhs"" , ""dp"": ""WFFomV1AQUvG7fvR7yGV2Nst0wzTeU0o1Eg-26KL42yMbL-10S4me
XLM7YpQ_evvKfLi8R_YxOQgE6AhnYR_nNLdD29MBDnKADQgd7-BJ5b8_hwfBxihs1hgEcef8hf_7glWrks8ik
_S0hoE7KjVRvYyB1zlDob35yD_IfBzPcs"" , ""dq"": ""h5_NiIK65eBPGDQczicpNjGvmyyB0LuxkTM01I
3aNMS5-Xg7ioc48q8B_oAr9axERzqeKbSDznJLmiVtgZpZNj62rcGalI3VJ1IeYTKn18I8aoYTWXnXf5bNY2
STV32NqfIkHmMxOSqhqoz4Wia0a9tyfJ_FUG8urMT6dUkPKk"" , ""qi"": ""WsLO8yNdoSMF3sYAISKhx_N
J5ua6PIsaezUpYk6WgENHfUnwXXiDpDgx8AKae2vRpPaGoHhJkiih5JHTtVWNNGUXB0-DItnX0jodM78NT31Xe
fKuE4Pg6nLtrpPlQpRql6Gjlen2FcVtQ5Tb1oFO9dkBoBB-gGWK9dy0WPR5D9w"" }"
```

```
// copied from /tmp/public.txt (node output)
```

```
s localpub=
{ ""kty"": ""RSA"" , ""use"": ""sig"" , ""n"": ""ALaMFdNTmzUu1wnMGNmsIkBMJUS4EdMAe2HXpQ-k4aDk
94znJuCi9OJnJQU41m4nqgEWdzMVVQmlqZ3ih1Xx5vpFzmb4m4EkAcmK0ULVCLL9QRqvuwbojeXW8pJ1cH-EA
QKnkMzF6GbtmmDubK46bx2GaQh8rLYAfLvoIwXfyrxIday2VdRNz_3yGzLoxr5QxcFml46479mY3xXwmTSMvV
NHEN4F1xPnsLQoNPH3guA104dm8S-f2z_vcZBdSrgijibesdOP3ugY1xJvDDT3WSf3WW7cjan8M3vZmCNTPW
e6JEewsc6cDBiFWn9UUomulFUV_uucTsV_NXMd8nQ_Hs"" , ""e"": ""AQAB"" }"
```

```
SET ST=##class(%OAuth2.JWT).ObjectToJWT(.JOSE,.body,localpriv,localpub,.JWT)
```

If you run the above code in a terminal session - it does \*not\* work:

```
USER>d $system.OBJ.DisplayError(ST)
```

```
ERROR #5002: Cache error: <INVALID OREF>zGetJWK+2^%OAuth2.JWT.1
```

Killing JOSE and re-running the code works ... however, the JWT is invalid since I cannot get the POST that contains the JWT to successfully return an accesstoken?

```
USER>K JOSE
```

```
USER>SET ST=##class(%OAuth2.JWT).ObjectToJWT(.JOSE,.body,localpriv,localpub,.JWT)
```

```
?USER>ZW JWT
```

```
JWT="eyJ0eXAiOiJKV1QiLCJhbGciOiJub25lIn0.eyJpc3MiOiJodHRwczovL2ZoaXIuY2FyZWF2b2x1dGlvbi5jb20vTWFzdGVyLkFkYXB0ZXIxLldlYkNsawVudC8iLCJhdWQioiJodHRwczovL2ZoaXIuY2FyZWF2b2x1dGlvbi5jb20vTWFzdGVyLkFkYXB0ZXIxLldlYkNsawVudC8iLCJleHAiOiIxNTE2MTIxNjA5IiwibmJmIjoiMTUxNjEyMTYwOSIsImp0aSI6ImRiNWJhOWIzLTYwMmMtNGI1Zi1zWI5LTRLOGQ3NjAyOGMwMSIsInN1YiI6Ija3ZTVhNzM1LWE0ZjctZTcxMS04MTM2LTBhNj1jMWIzMjI1YiIsInVzZXJfbmFtZSI6InBzaW1vbiIsImNsawVu dGlkIjoiT0F1dGhUZXN0In0. "
```

So, can anyone please tell me what I'm doing wrong here?

To summarise what I'm trying to do is use the pfx cert to sign the JWT and then use that JWT to get hold of an accesstoken.

The attached C# code will apparently create a JWT that will work with careevolutions back-end services - but so far I've been unable to compile the code in VS-2017.

Finally, can Cache can be configured to support back-end services (similar to the above).

Spec: <http://docs.smarthealthit.org/authorization/backend-services/>

Thanks,

-- Paul.

[#FHIR](#) [#JSON](#) [#Caché](#)

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Source URL:<https://community.intersystems.com/post/how-interoperate-careevolution>