Hands-on with Oracle WebLogic Server

Deep dive into various configurations with Oracle Weblogic Server

August 18, 2015

Steps to create a self-signed certificate using OpenSSL

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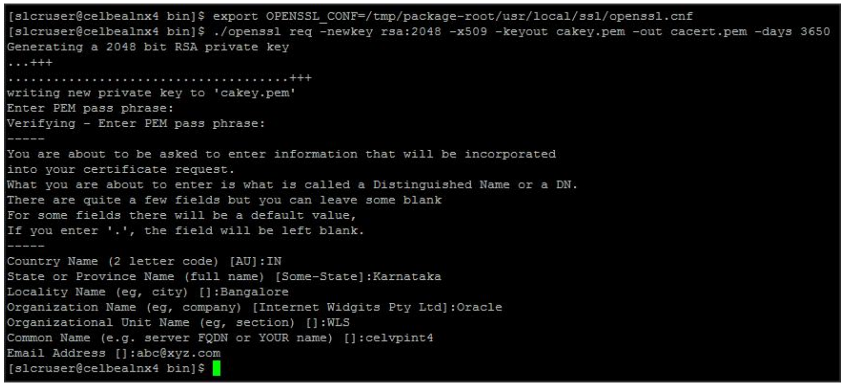
Below are the steps to create a self-signed certificate using OpenSSL :

STEP 1 :

Create a private key and public certificate using the following command :

Command : openssl req -newkey rsa:2048 -x509 -keyout cakey.pem -out cacert.pem -days 3650



```
[slcruser@celbealnx4 bin]$ export OPENSSL_CONF=/tmp/package-root/usr/local/ssl/openssl.cnf
[slcruser@celbealnx4 bin]$ ./openssl req -newkey rsa:2048 -x509 -keyout cakey.pem -out cacert.pem -days 3650
Generating a 2048 bit RSA private key
...+++
....................................+++
writing new private key to 'cakey.pem'
Enter PEM pass phrase:
Verifying - Enter PEM pass phrase:
-----
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:IN
State or Province Name (full name) [Some-State]:Karnataka
Locality Name (eg, city) []:Bangalore
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Oracle
Organizational Unit Name (eg, section) []:WLS
Common Name (e.g. server FQDN or YOUR name) []:celvpint4
Email Address []:abc@xyz.com
[slcruser@celbealnx4 bin]$
```

In the above command :

- If you add "-nodes" then your private key will not be encrypted.

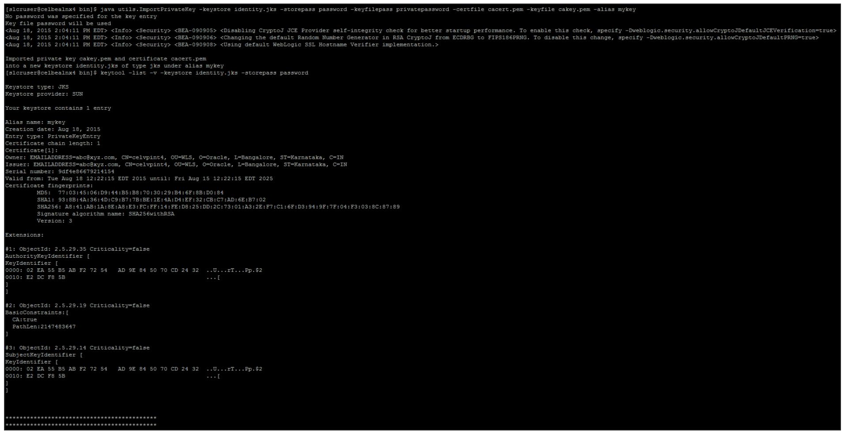
- cakey.pem is the private key

- cacert.pem is the public certificate

STEP 2 :

Use the following java utility to create a JKS keystore :

Command : java utils.ImportPrivateKey -keystore identity.jks -storepass password -keyfilepass privatepassword -certfile cacert.pem -keyfile cakey.pem -alias mykey



```
[slcruser@celbealnx4 bin]$ java utils.ImportPrivateKey -keystore identity.jks -storepass password -keyfilepass privatepassword -certfile cacert.pem -keyfile cakey.pem -alias mykey
No password was specified for the key entry
Key file password will be used
<Aug 18, 2015 2:04:11 PM EDT> <Info> <Security> <BEA-090905> <Disabling CryptoJ JCE Provider self-integrity check for better startup performance. To enable this check, specify -Dweblogic.security.allowCryptoJDefaultJCEVerification=true>
<Aug 18, 2015 2:04:11 PM EDT> <Info> <Security> <BEA-090906> <Changing the default Random Number Generator in RSA CryptoJ from ECDRBG to FIPS186PRNG. To disable this change, specify -Dweblogic.security.allowCryptoJDefaultPRNG=true>
<Aug 18, 2015 2:04:11 PM EDT> <Info> <Security> <BEA-090908> <Using default WebLogic SSL Hostname Verifier implementation.>

Imported private key cakey.pem and certificate cacert.pem
into a new keystore identity.jks of type jks under alias mykey
[slcruser@celbealnx4 bin]$ keytool -list -v -keystore identity.jks -storepass password

Keystore type: JKS
Keystore provider: SUN

Your keystore contains 1 entry

Alias name: mykey
Creation date: Aug 18, 2015
Entry type: PrivateKeyEntry
Certificate chain length: 1
Certificate[1]:
Owner: EMAILADDRESS=abc@xyz.com, CN=celvpint4, OU=WLS, O=Oracle, L=Bangalore, ST=Karnataka, C=IN
Issuer: EMAILADDRESS=abc@xyz.com, CN=celvpint4, OU=WLS, O=Oracle, L=Bangalore, ST=Karnataka, C=IN
Serial number: 9df4e86679214154
Valid from: Tue Aug 18 12:22:15 EDT 2015 until: Fri Aug 15 12:22:15 EDT 2025
Certificate fingerprints:
         MD5:  77:03:45:06:D9:44:B5:B8:70:30:29:B4:6F:8B:D0:84
         SHA1: 93:8B:4A:36:4D:C9:B7:7B:BE:1E:4A:D4:EF:32:CB:C7:AD:6E:B7:02
         SHA256: A8:41:AB:1A:8E:A8:E3:FC:FF:14:FE:D8:25:DD:2C:73:01:A3:2E:F7:C1:6F:D3:94:9F:7F:04:F3:03:8C:87:89
         Signature algorithm name: SHA256withRSA
         Version: 3

Extensions:

#1: ObjectId: 2.5.29.35 Criticality=false
AuthorityKeyIdentifier [
KeyIdentifier [
0000: 02 EA 55 B5 AB F2 72 54   AD 9E 84 50 70 CD 24 32  ..U...rT...Pp.$2
0010: E2 DC F8 5B                                        ...[
]
]

#2: ObjectId: 2.5.29.19 Criticality=false
BasicConstraints:[
  CA:true
  PathLen:2147483647
]

#3: ObjectId: 2.5.29.14 Criticality=false
SubjectKeyIdentifier [
KeyIdentifier [
0000: 02 EA 55 B5 AB F2 72 54   AD 9E 84 50 70 CD 24 32  ..U...rT...Pp.$2
0010: E2 DC F8 5B                                        ...[
]
]



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```
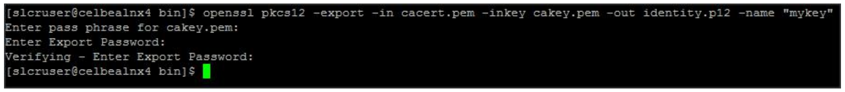

Alternatively, you can use the following commands to create a PKCS12 / JKS file :

STEP 2a :

Create a PKCS12 keystore :

Command : openssl pkcs12 -export -in cacert.pem -inkey cakey.pem -out identity.p12 -name "mykey"



```
[slcruser@celbealnx4 bin]$ openssl pkcs12 -export -in cacert.pem -inkey cakey.pem -out identity.p12 -name "mykey"
Enter pass phrase for cakey.pem:
Enter Export Password:
Verifying - Enter Export Password:
[slcruser@celbealnx4 bin]$
```

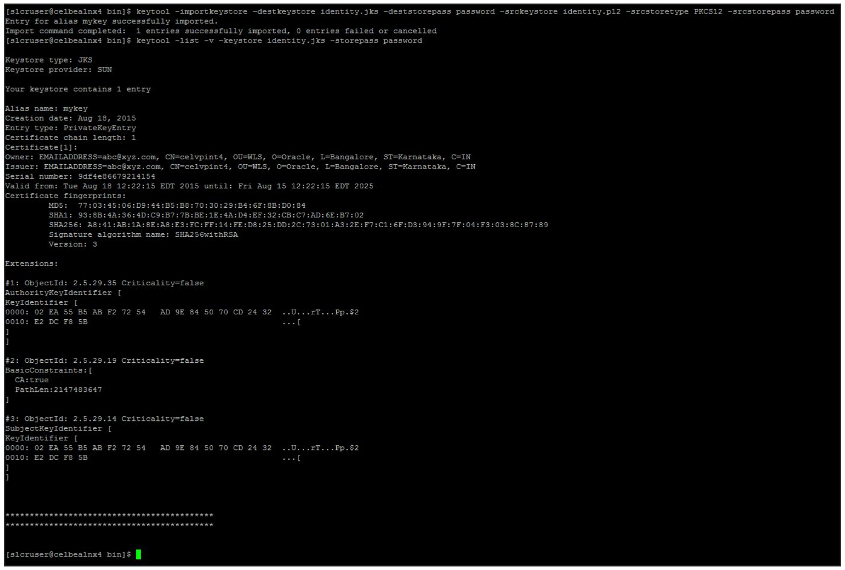
In the above command :

- "-name" is the alias of the private key entry in keystore.

STEP 2b :

Now convert the PKCS12 keystore to JKS keytstore using keytool command :

Command : keytool -importkeystore -destkeystore identity.jks -deststorepass password -srckeystore identity.p12 -srcstoretype PKCS12 -srcstorepass password



```
[slcruser@celbealnx4 bin]$ keytool -importkeystore -destkeystore identity.jks -deststorepass password -srckeystore identity.p12 -srcstoretype PKCS12 -srcstorepass password
Entry for alias mykey successfully imported.
Import command completed:  1 entries successfully imported, 0 entries failed or cancelled
[slcruser@celbealnx4 bin]$ keytool -list -v -keystore identity.jks -storepass password

Keystore type: JKS
Keystore provider: SUN

Your keystore contains 1 entry

Alias name: mykey
Creation date: Aug 18, 2015
Entry type: PrivateKeyEntry
Certificate chain length: 1
Certificate[1]:
Owner: EMAILADDRESS=abc@xyz.com, CN=celvpint4, OU=WLS, O=Oracle, L=Bangalore, ST=Karnataka, C=IN
Issuer: EMAILADDRESS=abc@xyz.com, CN=celvpint4, OU=WLS, O=Oracle, L=Bangalore, ST=Karnataka, C=IN
Serial number: 9df4e86679214154
Valid from: Tue Aug 18 12:22:15 EDT 2015 until: Fri Aug 15 12:22:15 EDT 2025
Certificate fingerprints:
         MD5:  77:03:45:06:D9:44:B5:B8:70:30:29:B4:6F:8B:D0:84
         SHA1: 93:8B:4A:36:4D:C9:B7:7B:BE:1E:4A:D4:EF:32:CB:C7:AD:6E:B7:02
         SHA256: A8:41:AB:1A:8E:A8:E3:FC:FF:14:FE:D8:25:DD:2C:73:01:A3:2E:F7:C1:6F:D3:94:9F:7F:04:F3:03:8C:87:89
         Signature algorithm name: SHA256withRSA
         Version: 3

Extensions:

#1: ObjectId: 2.5.29.35 Criticality=false
AuthorityKeyIdentifier [
KeyIdentifier [
0000: 02 EA 55 B5 AB F2 72 54   AD 9E 84 50 70 CD 24 32  ..U...rT...Pp.$2
0010: E2 DC F8 5B                                        ...[
]
]

#2: ObjectId: 2.5.29.19 Criticality=false
BasicConstraints:[
  CA:true
  PathLen:2147483647
]

#3: ObjectId: 2.5.29.14 Criticality=false
SubjectKeyIdentifier [
KeyIdentifier [
0000: 02 EA 55 B5 AB F2 72 54   AD 9E 84 50 70 CD 24 32  ..U...rT...Pp.$2
0010: E2 DC F8 5B                                        ...[
]
]



*******************************************
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[slcruser@celbealnx4 bin]$
```
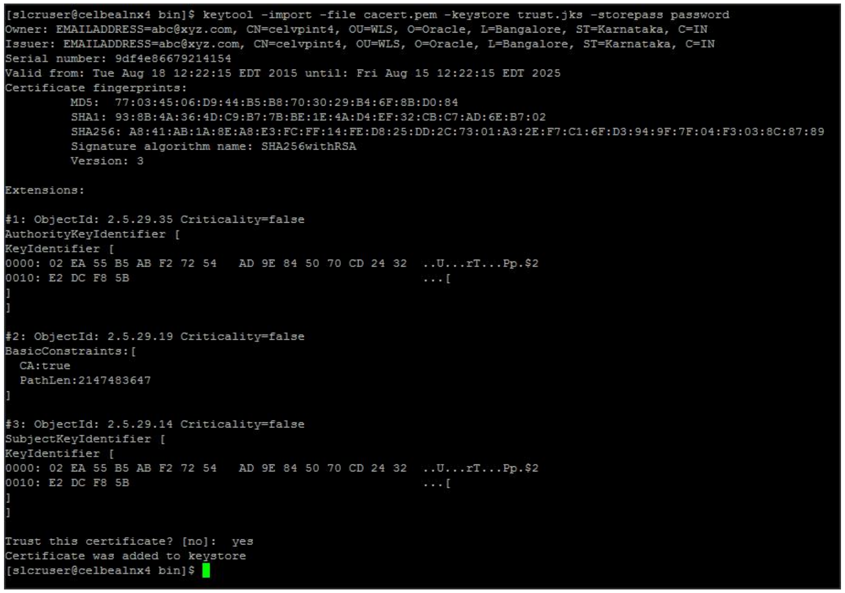

STEP 3 :

Create a trust keystore using the following command :

Command : keytool -import -file cacert.pem -keystore trust.jks -storepass password



```
[slcruser@celbealnx4 bin]$ keytool -import -file cacert.pem -keystore trust.jks -storepass password
Owner: EMAILADDRESS=abc@xyz.com, CN=celvpint4, OU=WLS, O=Oracle, L=Bangalore, ST=Karnataka, C=IN
Issuer: EMAILADDRESS=abc@xyz.com, CN=celvpint4, OU=WLS, O=Oracle, L=Bangalore, ST=Karnataka, C=IN
Serial number: 9df4e86679214154
Valid from: Tue Aug 18 12:22:15 EDT 2015 until: Fri Aug 15 12:22:15 EDT 2025
Certificate fingerprints:
         MD5:  77:03:45:06:D9:44:B5:B8:70:30:29:B4:6F:8B:D0:84
         SHA1: 93:8B:4A:36:4D:C9:B7:7B:BE:1E:4A:D4:EF:32:CB:C7:AD:6E:B7:02
         SHA256: A8:41:AB:1A:8E:A8:E3:FC:FF:14:FE:D8:25:DD:2C:73:01:A3:2E:F7:C1:6F:D3:94:9F:7F:04:F3:03:8C:87:89
         Signature algorithm name: SHA256withRSA
         Version: 3

Extensions:

#1: ObjectId: 2.5.29.35 Criticality=false
AuthorityKeyIdentifier [
KeyIdentifier [
0000: 02 EA 55 B5 AB F2 72 54   AD 9E 84 50 70 CD 24 32  ..U...rT...Pp.$2
0010: E2 DC F8 5B                                        ...[
]
]

#2: ObjectId: 2.5.29.19 Criticality=false
BasicConstraints:[
  CA:true
  PathLen:2147483647
]

#3: ObjectId: 2.5.29.14 Criticality=false
SubjectKeyIdentifier [
KeyIdentifier [
0000: 02 EA 55 B5 AB F2 72 54   AD 9E 84 50 70 CD 24 32  ..U...rT...Pp.$2
0010: E2 DC F8 5B                                        ...[
]
]

Trust this certificate? [no]:  yes
Certificate was added to keystore
[slcruser@celbealnx4 bin]$
```

<Additional Info>

- To view the public certificate :

```
openssl x509 -in cacert.pem -noout -text
```

- To concatenate the private key and public certificate into a pem file (which is required for many web-servers) :

```
cat cakey.pem cacert.pem > server.pem
```

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