

Create CA

Generate CA Private Key

```
openssl genrsa -out ca.key 4096
```

Self Sign CA (5 years)

```
openssl req -new -x509 -sha256 -days 1826 -key ca.key -out ca.crt
```

Create Certificate Request

Create a Private Key

```
openssl genrsa -out user.key 4096
```

Create a certificate request

```
openssl req -new -key user.key -out user.csr
```

Signing Requests

Process the request and get it signed by the CA

```
openssl x509 -req -days 730 -sha256 -in user.csr -CA ca.crt -CAkey  
ca.key -set_serial 01 -out user.crt
```

Sign using v3 extension file

```
openssl x509 -req -days 730 -sha256 -in user.csr -extfile v3.txt -CA ca.crt  
-CAkey ca.key -set_serial 01 -out user.crt
```

Create Extension File

```
basicConstraints = CA:FALSE  
authorityKeyIdentifier=keyid,issuer  
keyUsage = digitalSignature, nonRepudiation, keyEncipherment,  
dataEncipherment  
subjectAltName = @alt_names  
[alt_names]  
DNS.1 = server1.example.com  
DNS.2 = mail.example.com  
DNS.3 = www.example.com  
DNS.4 = www.sub.example.com  
DNS.5 = mx.example.com  
DNS.6 = support.example.com  
IP.1 = 192.168.0.100  
URI.1 = https://www.myexample.com
```

Put the code in a file, modify it to reflect your site needs and save it as:
v3.txt

Checking Certificates

Dump the Certificate

```
openssl x509 -in user.crt -text -noout
```

Check Purpose

```
openssl x509 -purpose -in user.crt -inform PEM
```

Inspect Certificate Request

```
openssl req -text -noout -verify -in user.csr
```

Export Certificate

Export as PKCS12 (PFX)

```
openssl pkcs12 -export -out user.pfx -inkey user.key -in user.crt
```

Export as PKCS12 with including CA public key

```
openssl pkcs12 -export -out user.pfx -inkey user.key -in user.crt -certfile  
ca.crt
```

Export as PKCS7 (P7B)

```
openssl crl2pkcs7 -nocrl -certfile user.crt -out certificate.p7b
```

Convert PFX to PEM

```
openssl pkcs12 -in user.pfx -out user.crt -nodes
```

While converting PFX to PEM format, openssl will put all the Certificates and Private Key into a single file.

You will need to open the file in Text editor and copy each Certificate & Private key (including the BEGIN/END statements) to its own individual text file and save them as certificate.cer, CAcert.cer, privateKey.key respectively.

