前期准备和一些废话：

1.环境：windows10，把 openssl 配置好；linux 直接参考 OpenSSL PKI Tutorial，

2.获取 Simple PKI 示例文件

方式 1：通过 git 直接获取，关于 git 的相关操作略

```
git clone https://bitbucket.org/stefanholek/pki-example-1
```

方式 2：直接打开上面网址获得，具体操作略

3.新建一个文件夹用于存放文件，将刚才的获得的 etc 文件夹放入，我直接用 git 下来的文件夹 pki-example-1 就没有这一步

4.下文中的命令行所涉及的路径和文件名请自行根据需求更改，命令行这东西踩的坑多了就会用了

5. 下文中 1.1、1.2、2.1、2.2 必须在使用 openssl ca 命令之前完成，其他创建文件夹步骤根据个人习惯进行自行调整

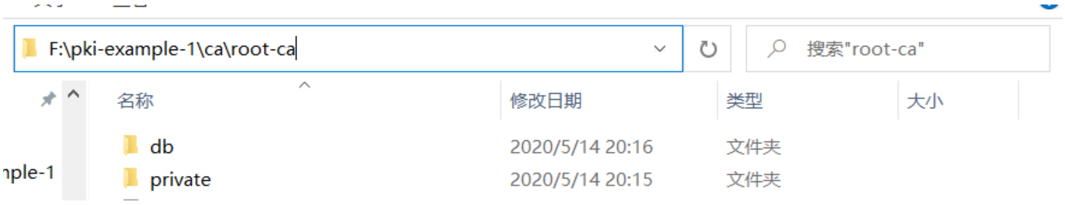
6. 本着前人踩坑后人白嫖的原则写这篇教程，也是培养一下自己写博客的习惯，由于是做完后回忆着写，一些不是重点的步骤难免有些混乱

对照实验指导手册步骤和 OpenSSL PKI Tutorial 开始操作：

0.cmd 进入刚才创建的存放文件目录，输入 openssl 进入 openssl，或者下面的命令前加上 openssl

1.创建 rootCA

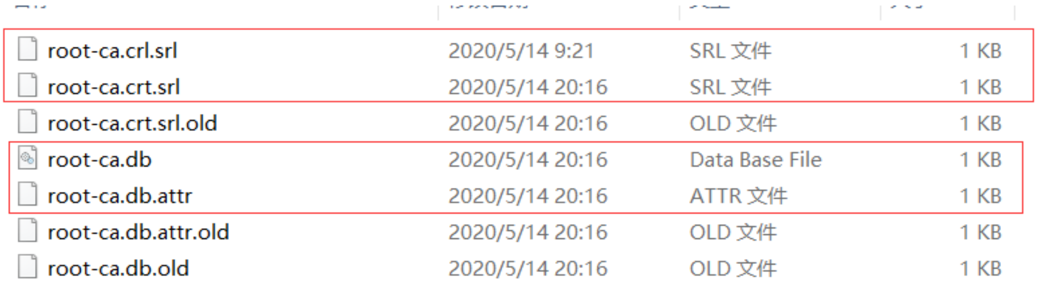
1.1 进入刚才的存放文件目录，开始手动创建目录，最后所需要的文件夹路径如：



F:\pki-example-1\ca\root-ca

名称	修改日期	类型	大小
db	2020/5/14 20:16	文件夹	
private	2020/5/14 20:15	文件夹	

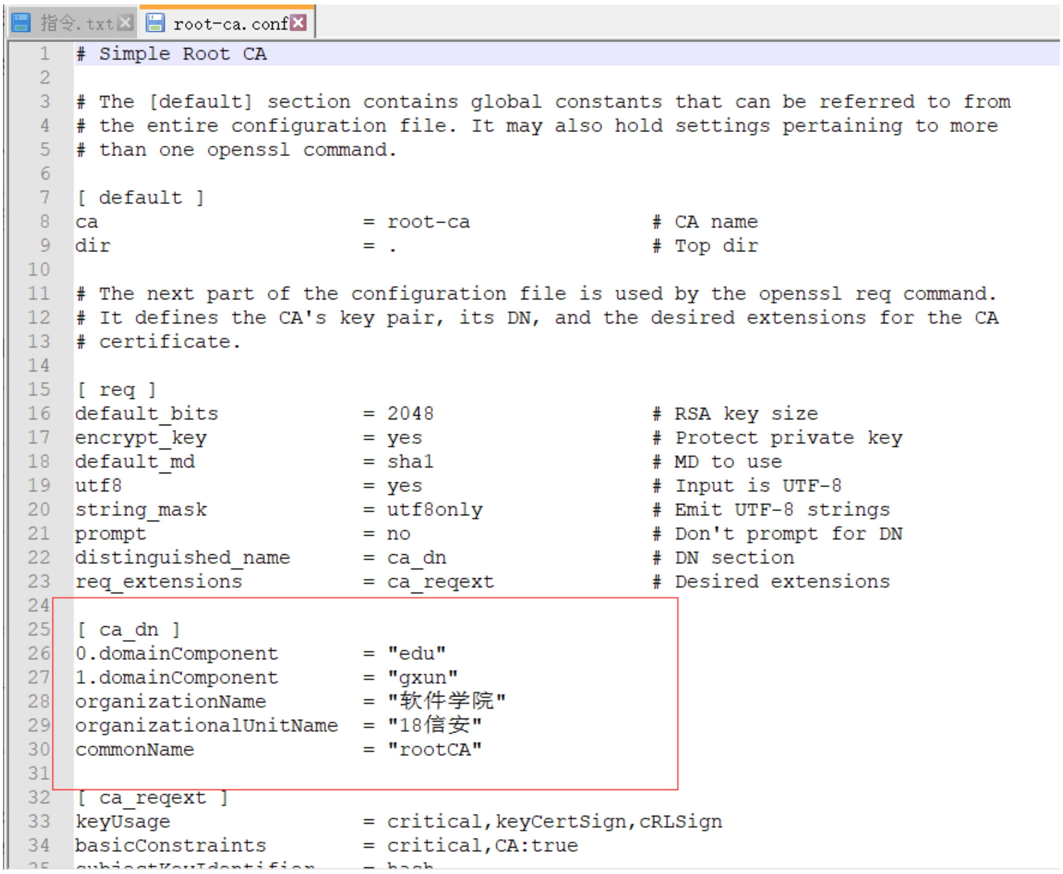
1.2 db 文件夹中创建图中红框文件



root-ca.crl.srl	2020/5/14 9:21	SRL 文件	1 KB
root-ca.crt.srl	2020/5/14 20:16	SRL 文件	1 KB
root-ca.crt.srl.old	2020/5/14 20:16	OLD 文件	1 KB
root-ca.db	2020/5/14 20:16	Data Base File	1 KB
root-ca.db.attr	2020/5/14 20:16	ATTR 文件	1 KB
root-ca.db.attr.old	2020/5/14 20:16	OLD 文件	1 KB
root-ca.db.old	2020/5/14 20:16	OLD 文件	1 KB

root-ca.crt.srl、root-ca.crl.srl 用记事本或者 notepad++打开输入 01，用于表示证书序列号,CRL 号码从 01 开始

1.3 按实验要求更改配置文件 root-ca.conf



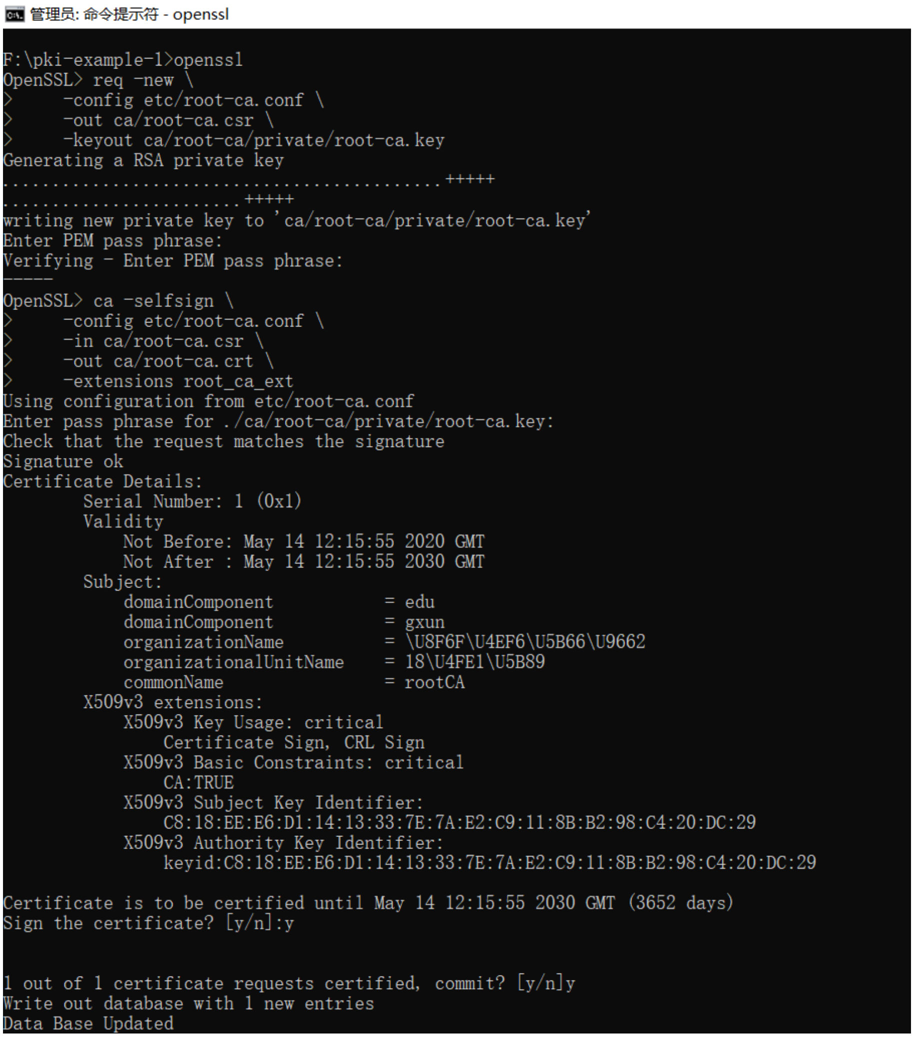
```
# Simple Root CA

# The [default] section contains global constants that can be referred to from
# the entire configuration file. It may also hold settings pertaining to more
# than one openssl command.

[ default ]
ca                      = root-ca               # CA name
dir                     = .                     # Top dir

# The next part of the configuration file is used by the openssl req command.
# It defines the CA's key pair, its DN, and the desired extensions for the CA
# certificate.

[ req ]
default_bits            = 2048                  # RSA key size
encrypt_key             = yes                   # Protect private key
default_md              = sha1                  # MD to use
utf8                    = yes                   # Input is UTF-8
string_mask             = utf8only              # Emit UTF-8 strings
prompt                  = no                    # Don't prompt for DN
distinguished_name      = ca_dn                 # DN section
req_extensions          = ca_reqext             # Desired extensions

[ ca_dn ]
0.domainComponent       = "edu"
1.domainComponent       = "gxun"
organizationName        = "软件学院"
organizationalUnitName  = "18信安"
commonName              = "rootCA"

[ ca_reqext ]
keyUsage                = critical,keyCertSign,cRLSign
basicConstraints        = critical,CA:true
subjectKeyIdentifier    = hash
```

1.4 创建 rootCA 请求，cmd 输入

```
req -new \
    -config etc/root-ca.conf \
    -out ca/root-ca.csr \
    -keyout ca/root-ca/private/root-ca.key
```

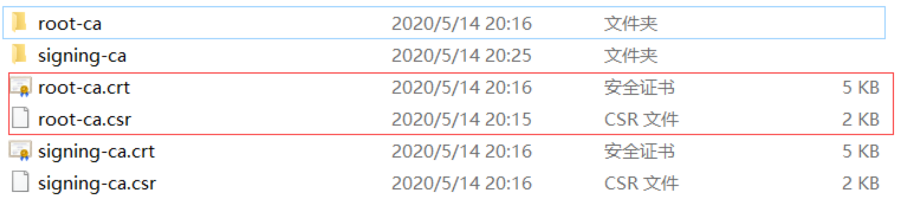
1.4 生成 rootCA 证书，cmd 输入

```
ca -selfsign \
    -config etc/root-ca.conf \
    -in ca/root-ca.csr \
    -out ca/root-ca.crt \
    -extensions root_ca_ext
```



```
F:\pki-example-1>openssl
OpenSSL> req -new \
>     -config etc/root-ca.conf \
>     -out ca/root-ca.csr \
>     -keyout ca/root-ca/private/root-ca.key
Generating a RSA private key
............................................+++++
........................+++++
writing new private key to 'ca/root-ca/private/root-ca.key'
Enter PEM pass phrase:
Verifying - Enter PEM pass phrase:
-----
OpenSSL> ca -selfsign \
>     -config etc/root-ca.conf \
>     -in ca/root-ca.csr \
>     -out ca/root-ca.crt \
>     -extensions root_ca_ext
Using configuration from etc/root-ca.conf
Enter pass phrase for ./ca/root-ca/private/root-ca.key:
Check that the request matches the signature
Signature ok
Certificate Details:
        Serial Number: 1 (0x1)
        Validity
            Not Before: May 14 12:15:55 2020 GMT
            Not After : May 14 12:15:55 2030 GMT
        Subject:
            domainComponent           = edu
            domainComponent           = gxun
            organizationName          = \U8F6F\U4EF6\U5B66\U9662
            organizationalUnitName    = 18\U4FE1\U5B89
            commonName                = rootCA
        X509v3 extensions:
            X509v3 Key Usage: critical
                Certificate Sign, CRL Sign
            X509v3 Basic Constraints: critical
                CA:TRUE
            X509v3 Subject Key Identifier:
                C8:18:EE:E6:D1:14:13:33:7E:7A:E2:C9:11:8B:B2:98:C4:20:DC:29
            X509v3 Authority Key Identifier:
                keyid:C8:18:EE:E6:D1:14:13:33:7E:7A:E2:C9:11:8B:B2:98:C4:20:DC:29

Certificate is to be certified until May 14 12:15:55 2030 GMT (3652 days)
Sign the certificate? [y/n]:y


1 out of 1 certificate requests certified, commit? [y/n]y
Write out database with 1 new entries
Data Base Updated
```

结果如下图，rootCA 的 root-ca.key 存放在 ca/root-ca/private 中不展示出来：



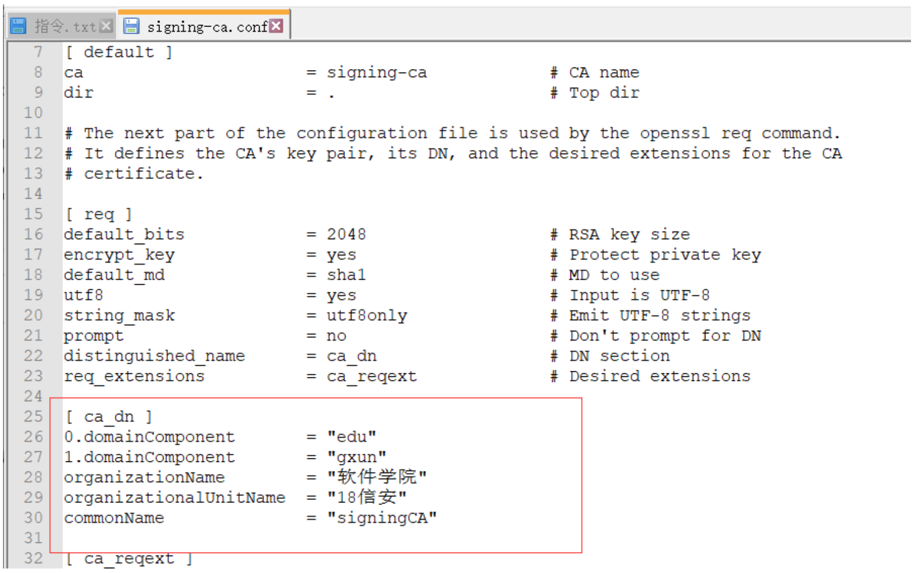
root-ca	2020/5/14 20:16	文件夹	
signing-ca	2020/5/14 20:25	文件夹	
root-ca.crt	2020/5/14 20:16	安全证书	5 KB
root-ca.csr	2020/5/14 20:15	CSR 文件	2 KB
signing-ca.crt	2020/5/14 20:16	安全证书	5 KB
signing-ca.csr	2020/5/14 20:16	CSR 文件	2 KB

2.创建 signingCA

2.1 创建目录，类似 1.1 操作，不赘述

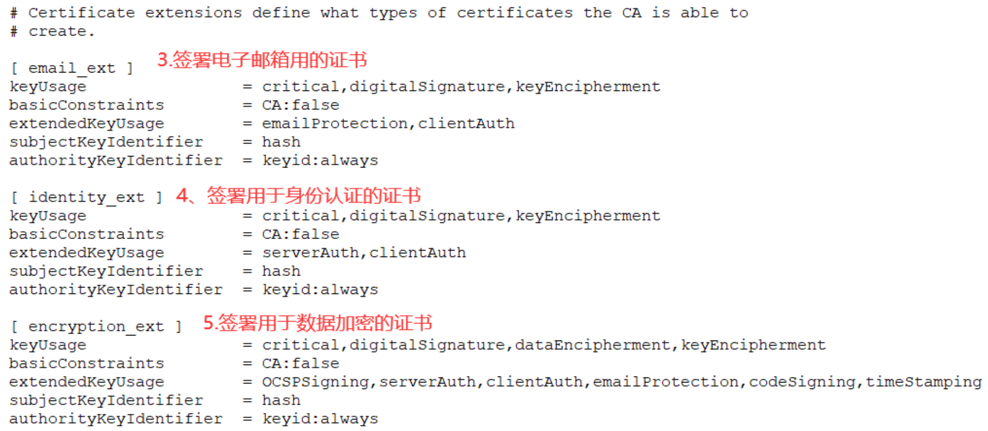
2.2 创建数据库，类似 1.2 操作，不赘述

2.3 修改配置文件 signing-ca.conf，修改部分如图：



```
[ default ]
ca                      = signing-ca            # CA name
dir                     = .                     # Top dir

# The next part of the configuration file is used by the openssl req command.
# It defines the CA's key pair, its DN, and the desired extensions for the CA
# certificate.

[ req ]
default_bits            = 2048                  # RSA key size
encrypt_key             = yes                   # Protect private key
default_md              = sha1                  # MD to use
utf8                    = yes                   # Input is UTF-8
string_mask             = utf8only              # Emit UTF-8 strings
prompt                  = no                    # Don't prompt for DN
distinguished_name      = ca_dn                 # DN section
req_extensions          = ca_reqext             # Desired extensions

[ ca_dn ]
0.domainComponent       = "edu"
1.domainComponent       = "gxun"
organizationName        = "软件学院"
organizationalUnitName  = "18信安"
commonName              = "signingCA"

[ ca_reqext ]
```

注意修改和添加下面部分，涉及到实验手册 4、5、6 步骤（图序号有错不想改）:



```
# Certificate extensions define what types of certificates the CA is able to
# create.

[ email_ext ]  3.签署电子邮箱用的证书
keyUsage                = critical,digitalSignature,keyEncipherment
basicConstraints        = CA:false
extendedKeyUsage        = emailProtection,clientAuth
subjectKeyIdentifier    = hash
authorityKeyIdentifier  = keyid:always

[ identity_ext ]  4、签署用于身份认证的证书
keyUsage                = critical,digitalSignature,keyEncipherment
basicConstraints        = CA:false
extendedKeyUsage        = serverAuth,clientAuth
subjectKeyIdentifier    = hash
authorityKeyIdentifier  = keyid:always

[ encryption_ext ]  5.签署用于数据加密的证书
keyUsage                = critical,digitalSignature,dataEncipherment,keyEncipherment
basicConstraints        = CA:false
extendedKeyUsage        = OCSPSigning,serverAuth,clientAuth,emailProtection,codeSigning,timeStamping
subjectKeyIdentifier    = hash
authorityKeyIdentifier  = keyid:always
```

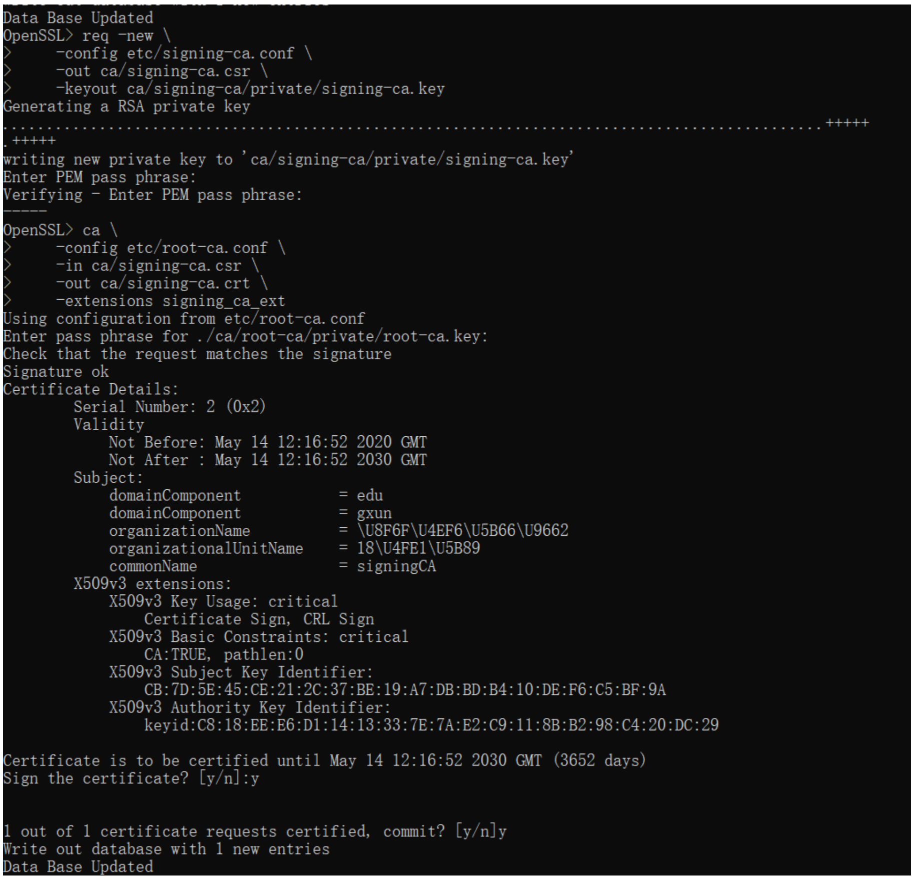
如果没有这部分可以省略-extensions 命令，删掉后要把[signing-ca]中 x509_extensions 也删了； extendKeyUsage 部分根据要求的用途进行修改，对应的证书配置文件部分一起修改

2.4 创建 signingCA 请求

```
req -new \
    -config etc/signing-ca.conf \
    -out ca/signing-ca.csr \
    -keyout ca/signing-ca/private/signing-ca.key
```

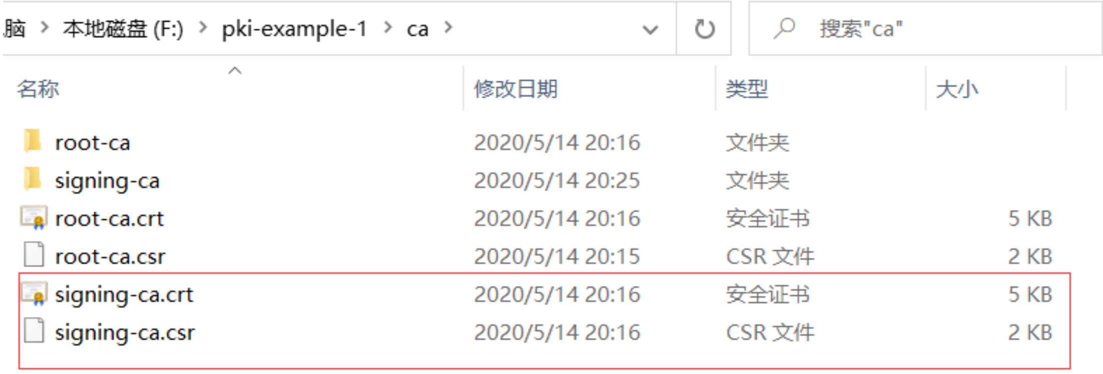
2.5 生成 signingCA 证书

```
ca \
    -config etc/root-ca.conf \
    -in ca/signing-ca.csr \
    -out ca/signing-ca.crt \
    -extensions signing_ca_ext
```



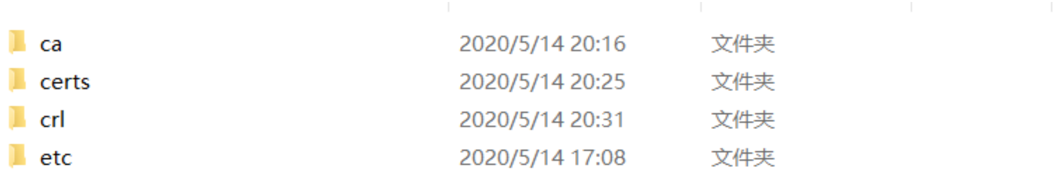
```
Data Base Updated
OpenSSL> req -new \
>     -config etc/signing-ca.conf \
>     -out ca/signing-ca.csr \
>     -keyout ca/signing-ca/private/signing-ca.key
Generating a RSA private key
..............................................................................................+++++
.+++++
writing new private key to 'ca/signing-ca/private/signing-ca.key'
Enter PEM pass phrase:
Verifying - Enter PEM pass phrase:
-----
OpenSSL> ca \
>     -config etc/root-ca.conf \
>     -in ca/signing-ca.csr \
>     -out ca/signing-ca.crt \
>     -extensions signing_ca_ext
Using configuration from etc/root-ca.conf
Enter pass phrase for ./ca/root-ca/private/root-ca.key:
Check that the request matches the signature
Signature ok
Certificate Details:
        Serial Number: 2 (0x2)
        Validity
            Not Before: May 14 12:16:52 2020 GMT
            Not After : May 14 12:16:52 2030 GMT
        Subject:
            domainComponent           = edu
            domainComponent           = gxun
            organizationName          = \U8F6F\U4EF6\U5B66\U9662
            organizationalUnitName    = 18\U4FE1\U5B89
            commonName                = signingCA
        X509v3 extensions:
            X509v3 Key Usage: critical
                Certificate Sign, CRL Sign
            X509v3 Basic Constraints: critical
                CA:TRUE, pathlen:0
            X509v3 Subject Key Identifier:
                CB:7D:5E:45:CE:21:2C:37:BE:19:A7:DB:BD:B4:10:DE:F6:C5:BF:9A
            X509v3 Authority Key Identifier:
                keyid:C8:18:EE:E6:D1:14:13:33:7E:7A:E2:C9:11:8B:B2:98:C4:20:DC:29

Certificate is to be certified until May 14 12:16:52 2030 GMT (3652 days)
Sign the certificate? [y/n]:y


1 out of 1 certificate requests certified, commit? [y/n]y
Write out database with 1 new entries
Data Base Updated
```

结果类似 rootCA:



名称	修改日期	类型	大小
root-ca	2020/5/14 20:16	文件夹	
signing-ca	2020/5/14 20:25	文件夹	
root-ca.crt	2020/5/14 20:16	安全证书	5 KB
root-ca.csr	2020/5/14 20:15	CSR 文件	2 KB
signing-ca.crt	2020/5/14 20:16	安全证书	5 KB
signing-ca.csr	2020/5/14 20:16	CSR 文件	2 KB

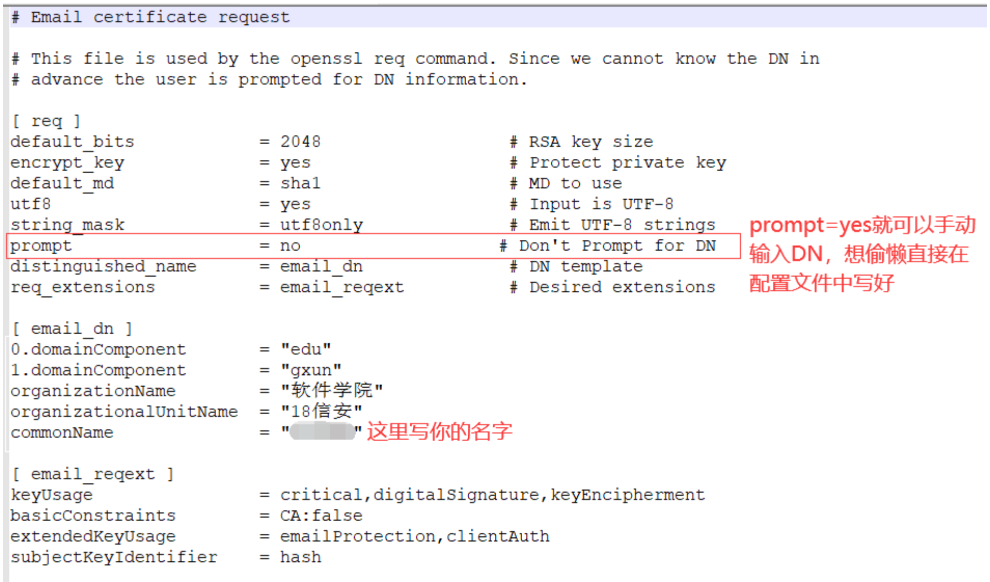
3.创建 certs 文件夹存放下面用创建好的 CA 证书来签发的证书，crl 存放吊销证书列表



ca	2020/5/14 20:16	文件夹
certs	2020/5/14 20:25	文件夹
crl	2020/5/14 20:31	文件夹
etc	2020/5/14 17:08	文件夹

4. 签署电子邮箱用的证书

4.1 修改配置文件 email.conf



```
# Email certificate request

# This file is used by the openssl req command. Since we cannot know the DN in
# advance the user is prompted for DN information.

[ req ]
default_bits            = 2048                  # RSA key size
encrypt_key             = yes                   # Protect private key
default_md              = sha1                  # MD to use
utf8                    = yes                   # Input is UTF-8
string_mask             = utf8only              # Emit UTF-8 strings
prompt                  = no                   # Don't Prompt for DN
distinguished_name      = email_dn              # DN template
req_extensions          = email_reqext          # Desired extensions

[ email_dn ]
0.domainComponent       = "edu"
1.domainComponent       = "gxun"
organizationName        = "软件学院"
organizationalUnitName  = "18信安"
commonName              = "[redacted]"

[ email_reqext ]
keyUsage                = critical,digitalSignature,keyEncipherment
basicConstraints        = CA:false
extendedKeyUsage        = emailProtection,clientAuth
subjectKeyIdentifier    = hash
```

prompt=yes就可以手动输入DN，想偷懒直接在配置文件中写好

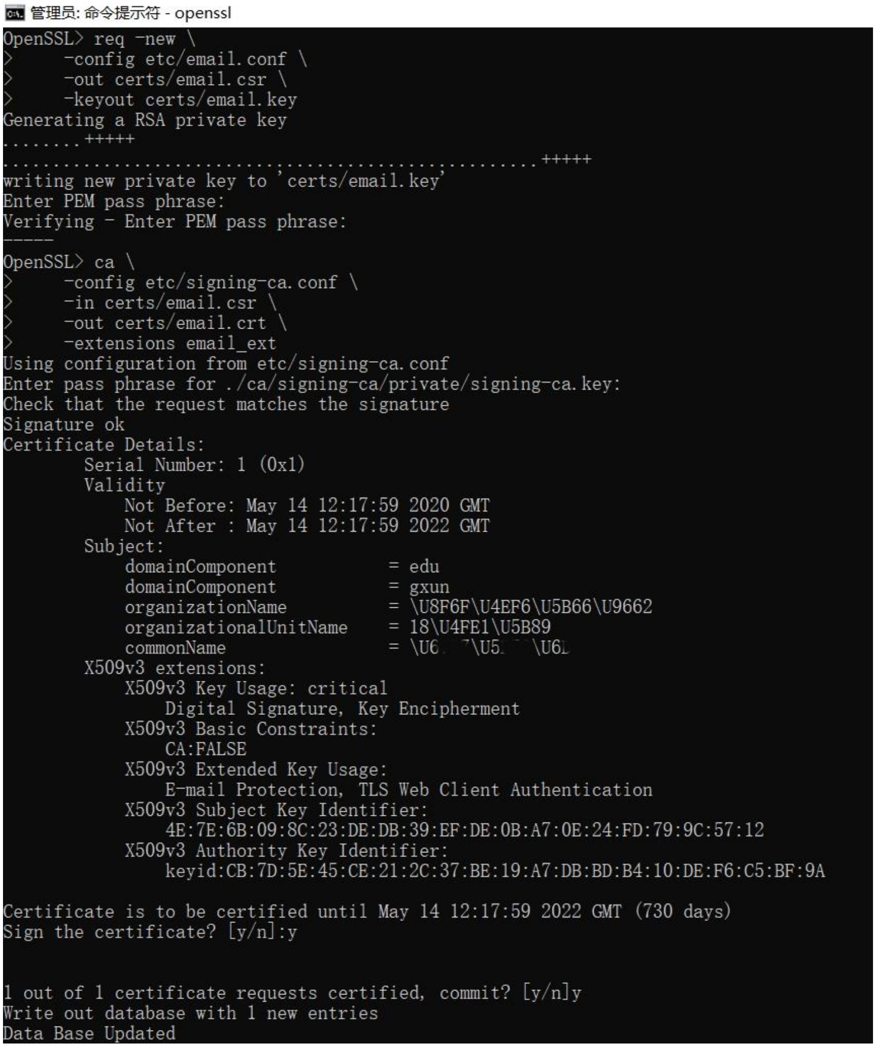
这里写你的名字

4.2 创建签署电子邮箱的证书请求

```
req -new \
        -config etc/email.conf \
        -out certs/email.csr \
        -keyout certs/email.key
```

4.3 生成签署电子邮箱的证书，使用 signingCA 颁发

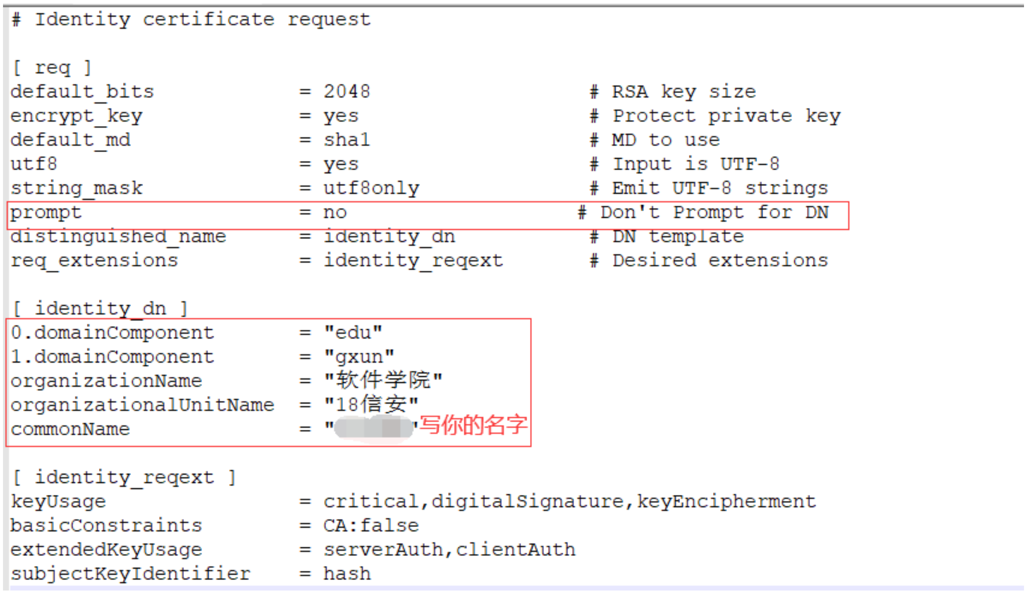
```
ca \
        -config etc/signing-ca.conf \
        -in certs/email.csr \
        -out certs/email.crt \
        -extensions email_ext
```



```
OpenSSL> req -new \
>     -config etc/email.conf \
>     -out certs/email.csr \
>     -keyout certs/email.key
Generating a RSA private key
.......+++++
.....................................................+++++
writing new private key to 'certs/email.key'
Enter PEM pass phrase:
Verifying - Enter PEM pass phrase:
-----
OpenSSL> ca \
>     -config etc/signing-ca.conf \
>     -in certs/email.csr \
>     -out certs/email.crt \
>     -extensions email_ext
Using configuration from etc/signing-ca.conf
Enter pass phrase for ./ca/signing-ca/private/signing-ca.key:
Check that the request matches the signature
Signature ok
Certificate Details:
        Serial Number: 1 (0x1)
        Validity
            Not Before: May 14 12:17:59 2020 GMT
            Not After : May 14 12:17:59 2022 GMT
        Subject:
            domainComponent           = edu
            domainComponent           = gxun
            organizationName          = \U8F6F\U4EF6\U5B66\U9662
            organizationalUnitName    = 18\U4FE1\U5B89
            commonName                = [redacted]
        X509v3 extensions:
            X509v3 Key Usage: critical
                Digital Signature, Key Encipherment
            X509v3 Basic Constraints:
                CA:FALSE
            X509v3 Extended Key Usage:
                E-mail Protection, TLS Web Client Authentication
            X509v3 Subject Key Identifier:
                4E:7E:6B:09:8C:23:DE:DB:39:EF:DE:0B:A7:0E:24:FD:79:9C:57:12
            X509v3 Authority Key Identifier:
                keyid:CB:7D:5E:45:CE:21:2C:37:BE:19:A7:DB:BD:B4:10:DE:F6:C5:BF:9A

Certificate is to be certified until May 14 12:17:59 2022 GMT (730 days)
Sign the certificate? [y/n]:y


1 out of 1 certificate requests certified, commit? [y/n]y
Write out database with 1 new entries
Data Base Updated
```

5. 签署用于身份认证的证书

5.1 从 https://bitbucket.org/stefanholek/pki-example-3/src/master/etc/identity.conf 获取配置文件 identity.conf 并进行如下修改:



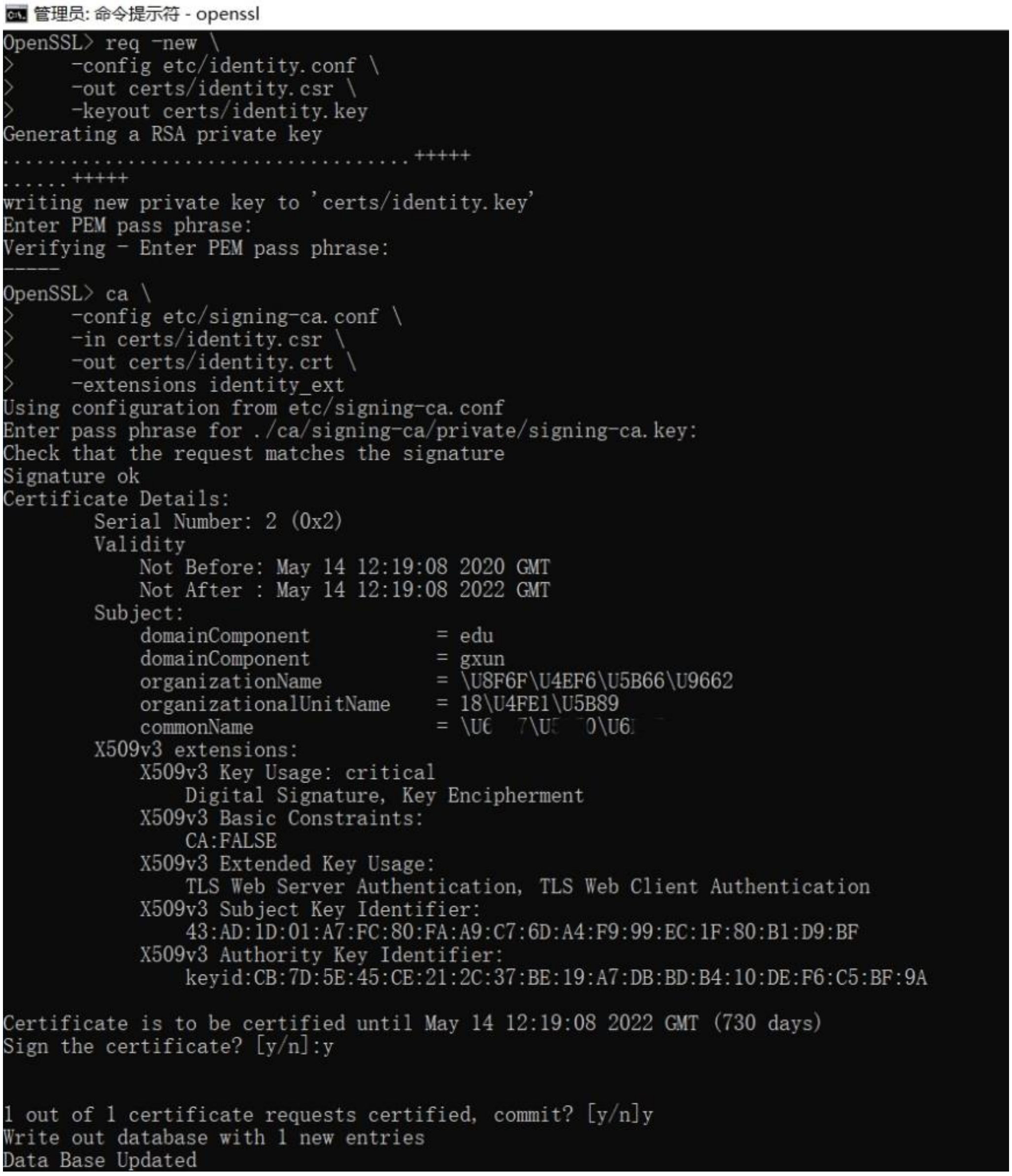
```
# Identity certificate request

[ req ]
default_bits            = 2048                  # RSA key size
encrypt_key             = yes                   # Protect private key
default_md              = sha1                  # MD to use
utf8                    = yes                   # Input is UTF-8
string_mask             = utf8only              # Emit UTF-8 strings
prompt                  = no                    # Don't Prompt for DN
distinguished_name      = identity_dn           # DN template
req_extensions          = identity_reqext       # Desired extensions

[ identity_dn ]
0.domainComponent       = "edu"
1.domainComponent       = "gxun"
organizationName        = "软件学院"
organizationalUnitName  = "18信安"
commonName              = "[redacted]"写你的名字

[ identity_reqext ]
keyUsage                = critical,digitalSignature,keyEncipherment
basicConstraints        = CA:false
extendedKeyUsage        = serverAuth,clientAuth
subjectKeyIdentifier    = hash
```

5.2 创建用于身份认证的证书请求

```
req -new \
        -config etc/identity.conf \
        -out certs/identity.csr \
        -keyout certs/identity.key
```

5.3 生成用于身份认证的证书

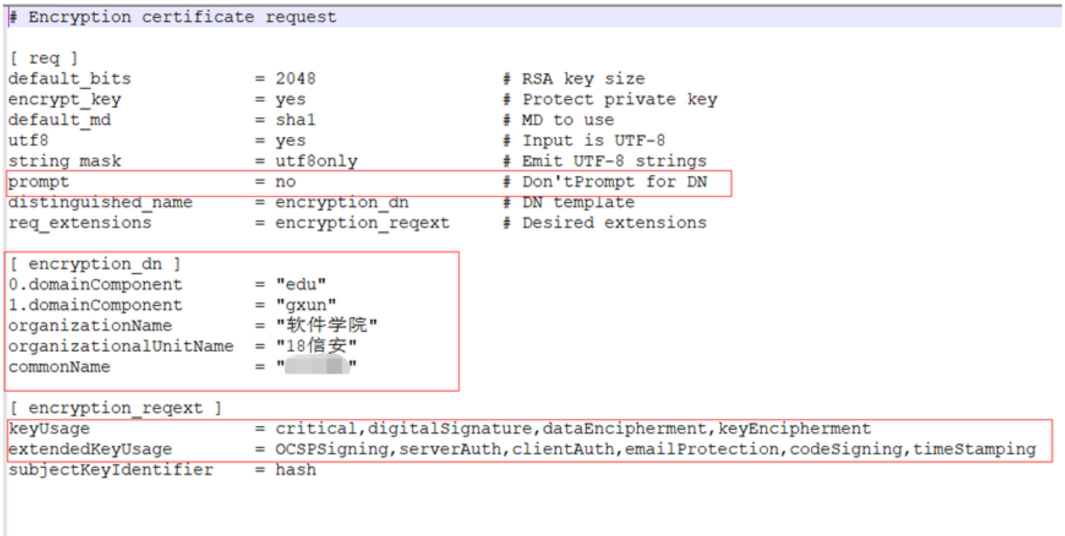
```
ca \
        -config etc/signing-ca.conf \
        -in certs/identity.csr \
        -out certs/identity.crt \
        -extensions identity_ext
```



```
OpenSSL> req -new \
>     -config etc/identity.conf \
>     -out certs/identity.csr \
>     -keyout certs/identity.key
Generating a RSA private key
...................................+++++
.....+++++
writing new private key to 'certs/identity.key'
Enter PEM pass phrase:
Verifying - Enter PEM pass phrase:
-----
OpenSSL> ca \
>     -config etc/signing-ca.conf \
>     -in certs/identity.csr \
>     -out certs/identity.crt \
>     -extensions identity_ext
Using configuration from etc/signing-ca.conf
Enter pass phrase for ./ca/signing-ca/private/signing-ca.key:
Check that the request matches the signature
Signature ok
Certificate Details:
        Serial Number: 2 (0x2)
        Validity
            Not Before: May 14 12:19:08 2020 GMT
            Not After : May 14 12:19:08 2022 GMT
        Subject:
            domainComponent           = edu
            domainComponent           = gxun
            organizationName          = \U8F6F\U4EF6\U5B66\U9662
            organizationalUnitName    = 18\U4FE1\U5B89
            commonName                = \U6[redacted]7\U5[redacted]0\U6[redacted]
        X509v3 extensions:
            X509v3 Key Usage: critical
                Digital Signature, Key Encipherment
            X509v3 Basic Constraints:
                CA:FALSE
            X509v3 Extended Key Usage:
                TLS Web Server Authentication, TLS Web Client Authentication
            X509v3 Subject Key Identifier:
                43:AD:1D:01:A7:FC:80:FA:A9:C7:6D:A4:F9:99:EC:1F:80:B1:D9:BF
            X509v3 Authority Key Identifier:
                keyid:CB:7D:5E:45:CE:21:2C:37:BE:19:A7:DB:BD:B4:10:DE:F6:C5:BF:9A

Certificate is to be certified until May 14 12:19:08 2022 GMT (730 days)
Sign the certificate? [y/n]:y


1 out of 1 certificate requests certified, commit? [y/n]y
Write out database with 1 new entries
Data Base Updated
```

6. 签署用于数据加密的证书

6.1 从 https://bitbucket.org/stefanholek/pki-example-3/src/master/etc/encryption.conf 获取配置文件 encryption.conf 并进行如下修改：



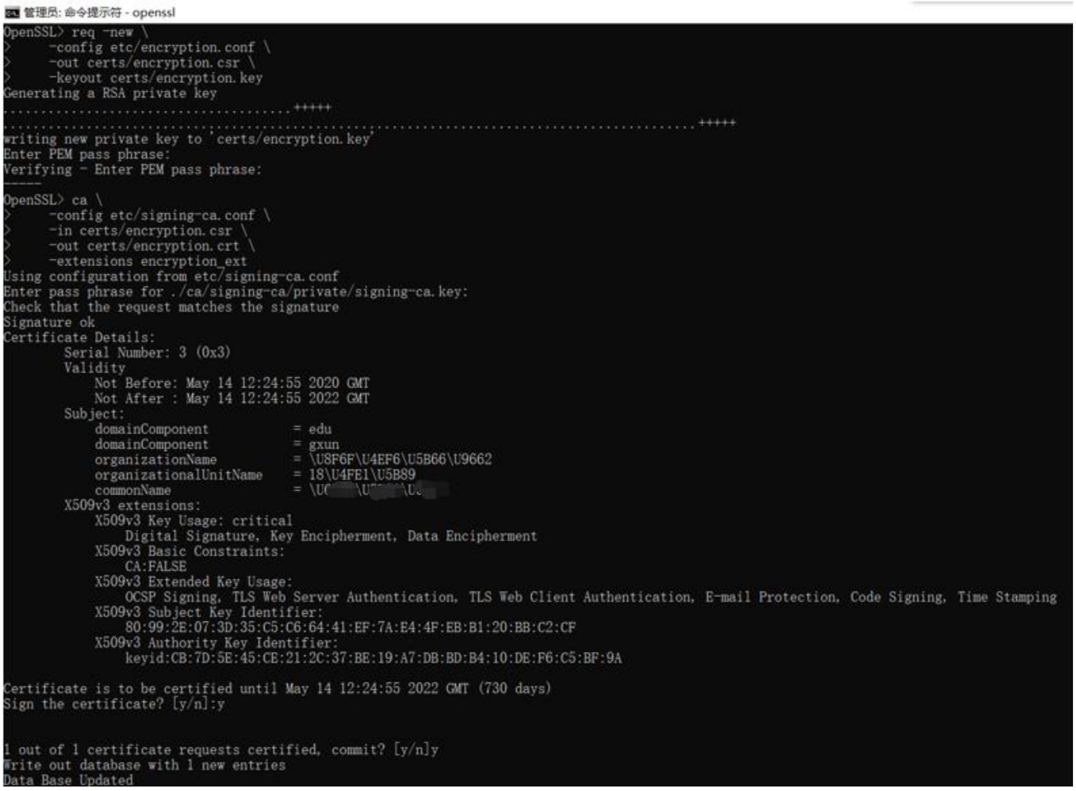
```
# Encryption certificate request

[ req ]
default_bits            = 2048                  # RSA key size
encrypt_key             = yes                   # Protect private key
default_md              = sha1                  # MD to use
utf8                    = yes                   # Input is UTF-8
string_mask             = utf8only              # Emit UTF-8 strings
prompt                  = no                    # Don'tPrompt for DN
distinguished_name      = encryption_dn         # DN template
req_extensions          = encryption_reqext     # Desired extensions

[ encryption_dn ]
0.domainComponent       = "edu"
1.domainComponent       = "gxun"
organizationName        = "软件学院"
organizationalUnitName  = "18信安"
commonName              = "[redacted]"

[ encryption_reqext ]
keyUsage                = critical,digitalSignature,dataEncipherment,keyEncipherment
extendedKeyUsage        = OCSPSigning,serverAuth,clientAuth,emailProtection,codeSigning,timeStamping
subjectKeyIdentifier    = hash
```

6.2 创建用于数据加密的证书请求

```
req -new \
    -config etc/encryption.conf \
    -out certs/encryption.csr \
    -keyout certs/encryption.key
```

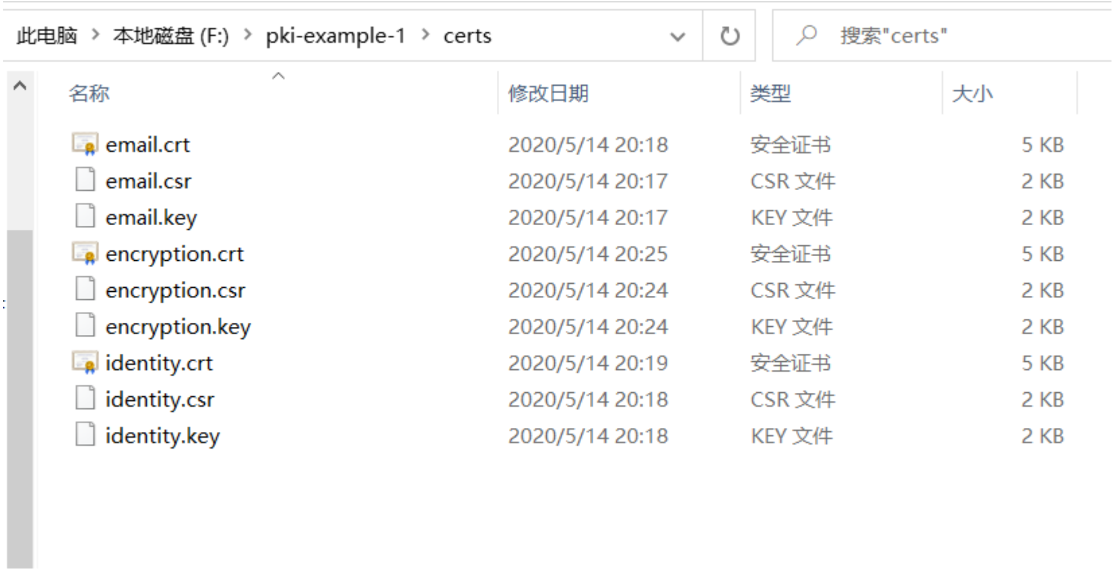
6.3 生成用于数据加密的证书

```
ca \
    -config etc/signing-ca.conf \
    -in certs/encryption.csr \
    -out certs/encryption.crt \
    -extensions encryption_ext
```



```
OpenSSL> req -new \
>      -config etc/encryption.conf \
>      -out certs/encryption.csr \
>      -keyout certs/encryption.key
Generating a RSA private key
.....................................+++++
.................................................................................................+++++
writing new private key to 'certs/encryption.key'
Enter PEM pass phrase:
Verifying - Enter PEM pass phrase:
-----
OpenSSL> ca \
>      -config etc/signing-ca.conf \
>      -in certs/encryption.csr \
>      -out certs/encryption.crt \
>      -extensions encryption_ext
Using configuration from etc/signing-ca.conf
Enter pass phrase for ./ca/signing-ca/private/signing-ca.key:
Check that the request matches the signature
Signature ok
Certificate Details:
        Serial Number: 3 (0x3)
        Validity
            Not Before: May 14 12:24:55 2020 GMT
            Not After : May 14 12:24:55 2022 GMT
        Subject:
            domainComponent           = edu
            domainComponent           = gxun
            organizationName          = \U8F6F\U4EF6\U5B66\U9662
            organizationalUnitName    = 18\U4FE1\U5B89
            commonName                = [redacted]
        X509v3 extensions:
            X509v3 Key Usage: critical
                Digital Signature, Key Encipherment, Data Encipherment
            X509v3 Basic Constraints:
                CA:FALSE
            X509v3 Extended Key Usage:
                OCSP Signing, TLS Web Server Authentication, TLS Web Client Authentication, E-mail Protection, Code Signing, Time Stamping
            X509v3 Subject Key Identifier:
                80:99:2E:07:3D:35:C5:C6:64:41:EF:7A:E4:4F:EB:B1:20:BB:C2:CF
            X509v3 Authority Key Identifier:
                keyid:CB:7D:5E:45:CE:21:2C:37:BE:19:A7:DB:BD:B4:10:DE:F6:C5:BF:9A

Certificate is to be certified until May 14 12:24:55 2022 GMT (730 days)
Sign the certificate? [y/n]:y


1 out of 1 certificate requests certified, commit? [y/n]y
Write out database with 1 new entries
Data Base Updated
```

4、5、6 部分结果如图：

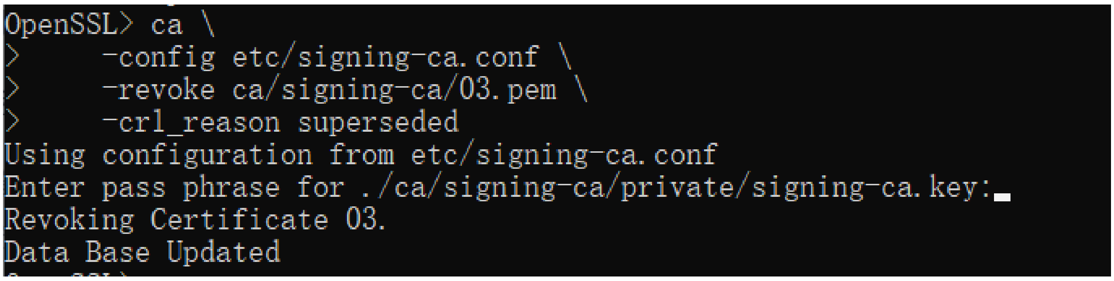


名称	修改日期	类型	大小
email.crt	2020/5/14 20:18	安全证书	5 KB
email.csr	2020/5/14 20:17	CSR 文件	2 KB
email.key	2020/5/14 20:17	KEY 文件	2 KB
encryption.crt	2020/5/14 20:25	安全证书	5 KB
encryption.csr	2020/5/14 20:24	CSR 文件	2 KB
encryption.key	2020/5/14 20:24	KEY 文件	2 KB
identity.crt	2020/5/14 20:19	安全证书	5 KB
identity.csr	2020/5/14 20:18	CSR 文件	2 KB
identity.key	2020/5/14 20:18	KEY 文件	2 KB

7. 废除第 6 步用于加密的证书并将其加入到 CRL 中

7.1 吊销用于加密的证书（查看证书序列号为 03）

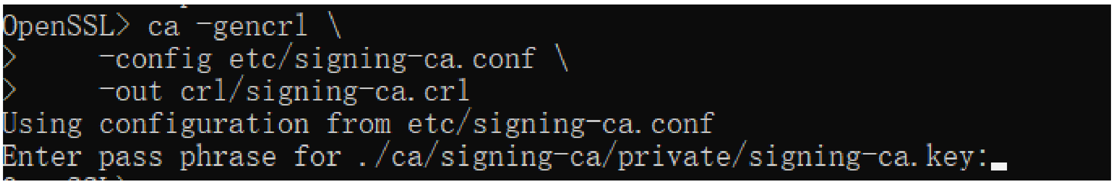
```
ca \
        -config etc/signing-ca.conf \
        -revoke ca/signing-ca/03.pem \
        -crl_reason superseded
```



```
OpenSSL> ca \
>     -config etc/signing-ca.conf \
>     -revoke ca/signing-ca/03.pem \
>     -crl_reason superseded
Using configuration from etc/signing-ca.conf
Enter pass phrase for ./ca/signing-ca/private/signing-ca.key:
Revoking Certificate 03.
Data Base Updated
```

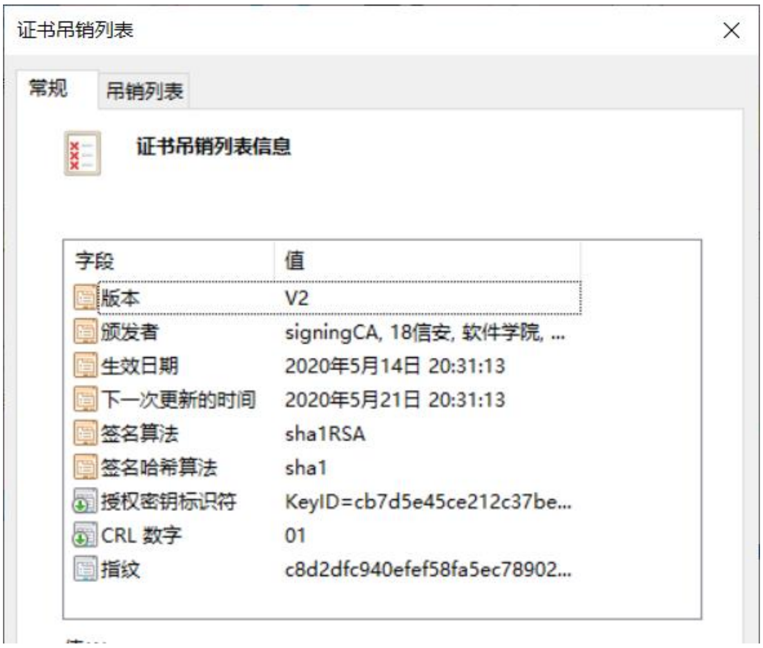
7.2 创建证书撤销列表

```
ca -gencrl \
        -config etc/signing-ca.conf \
        -out crl/signing-ca.crl
```



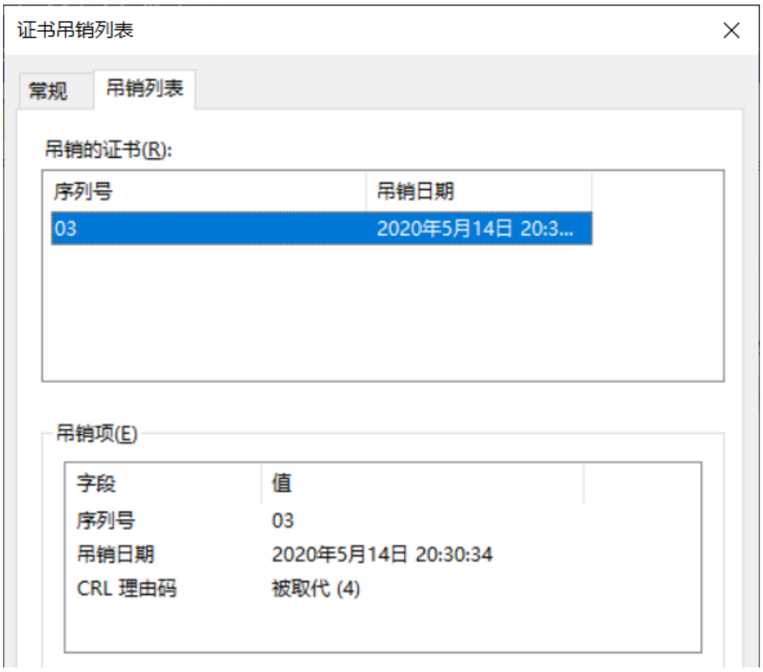
```
OpenSSL> ca -gencrl \
>     -config etc/signing-ca.conf \
>     -out crl/signing-ca.crl
Using configuration from etc/signing-ca.conf
Enter pass phrase for ./ca/signing-ca/private/signing-ca.key:
```

crl 中新增文件 signing-ca.crl，吊销成功：



证书吊销列表信息

字段	值
版本	V2
颁发者	signingCA, 18信安, 软件学院, ...
生效日期	2020年5月14日 20:31:13
下一次更新的时间	2020年5月21日 20:31:13
签名算法	sha1RSA
签名哈希算法	sha1
授权密钥标识符	KeyID=cb7d5e45ce212c37be...
CRL 数字	01
指纹	c8d2dfc940efef58fa5ec78902...



吊销的证书(R):

序列号	吊销日期
03	2020年5月14日 20:3...

吊销项(E)

字段	值
序列号	03
吊销日期	2020年5月14日 20:30:34
CRL 理由码	被取代 (4)