项目编号： 22

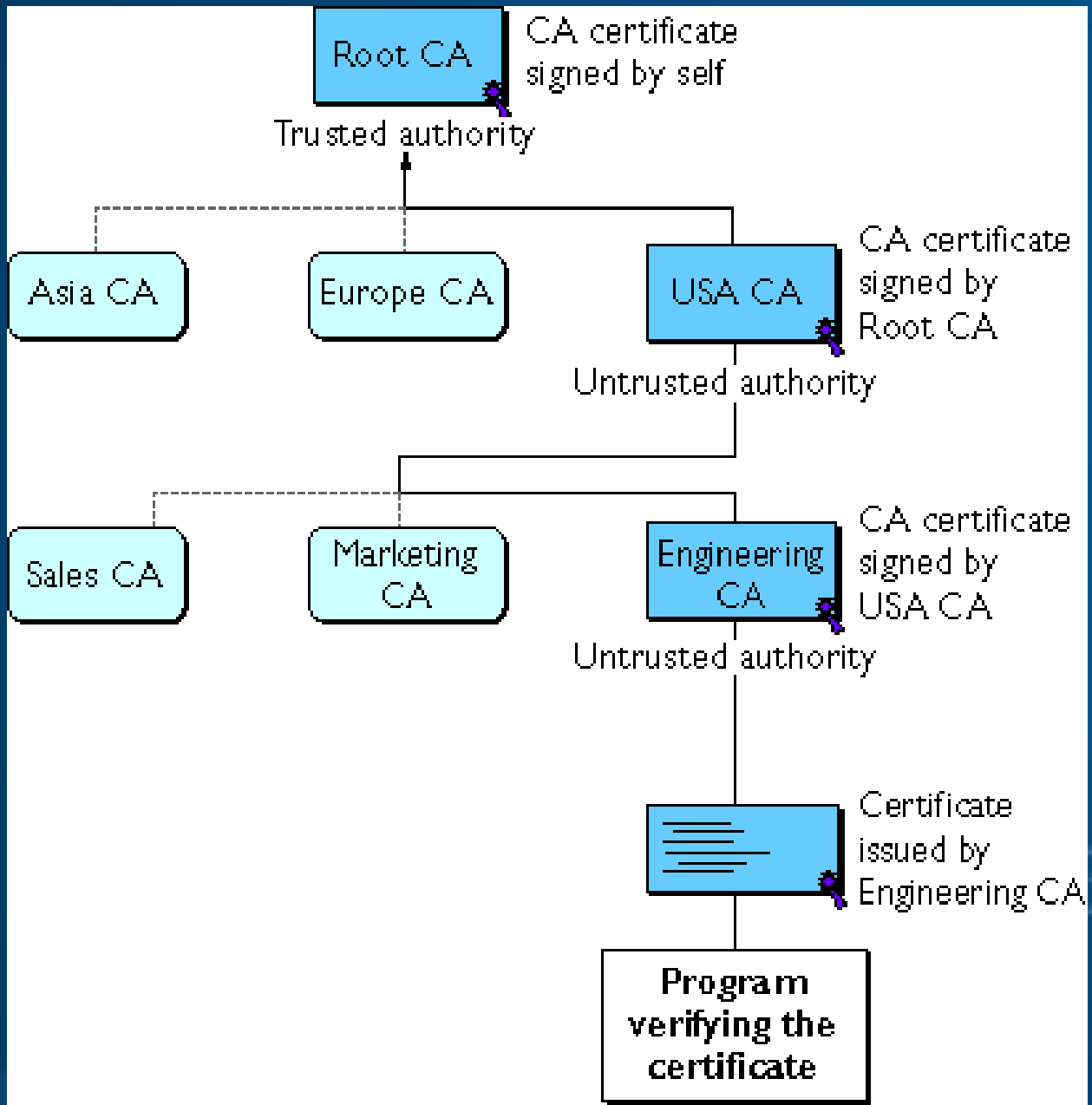
利用OpenSSL实现证书的创建和验证

组长：吴道远

组员：邵泽慧　徐林　邵依　陈浩

一、创建证书

证书的层次结构



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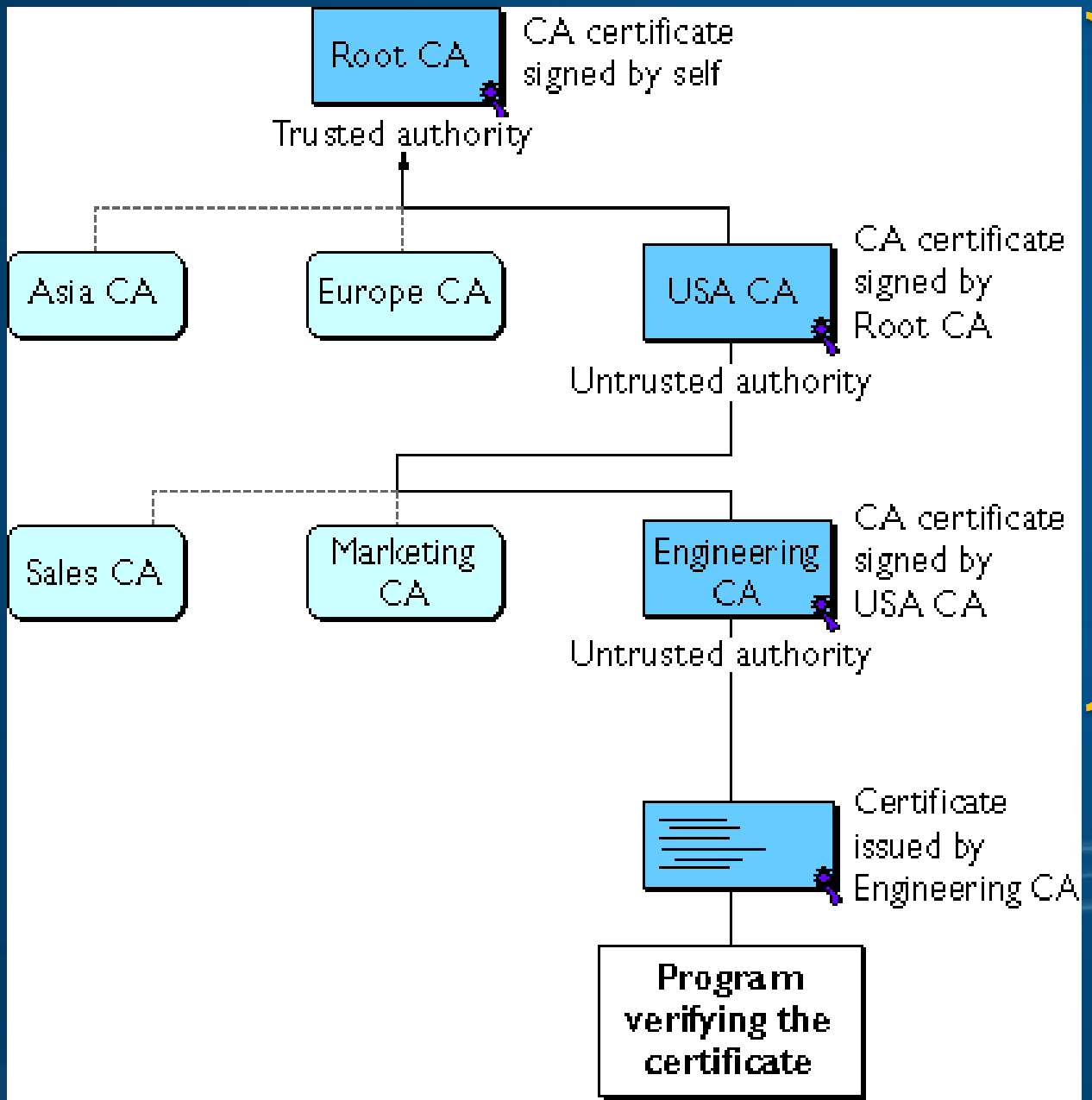

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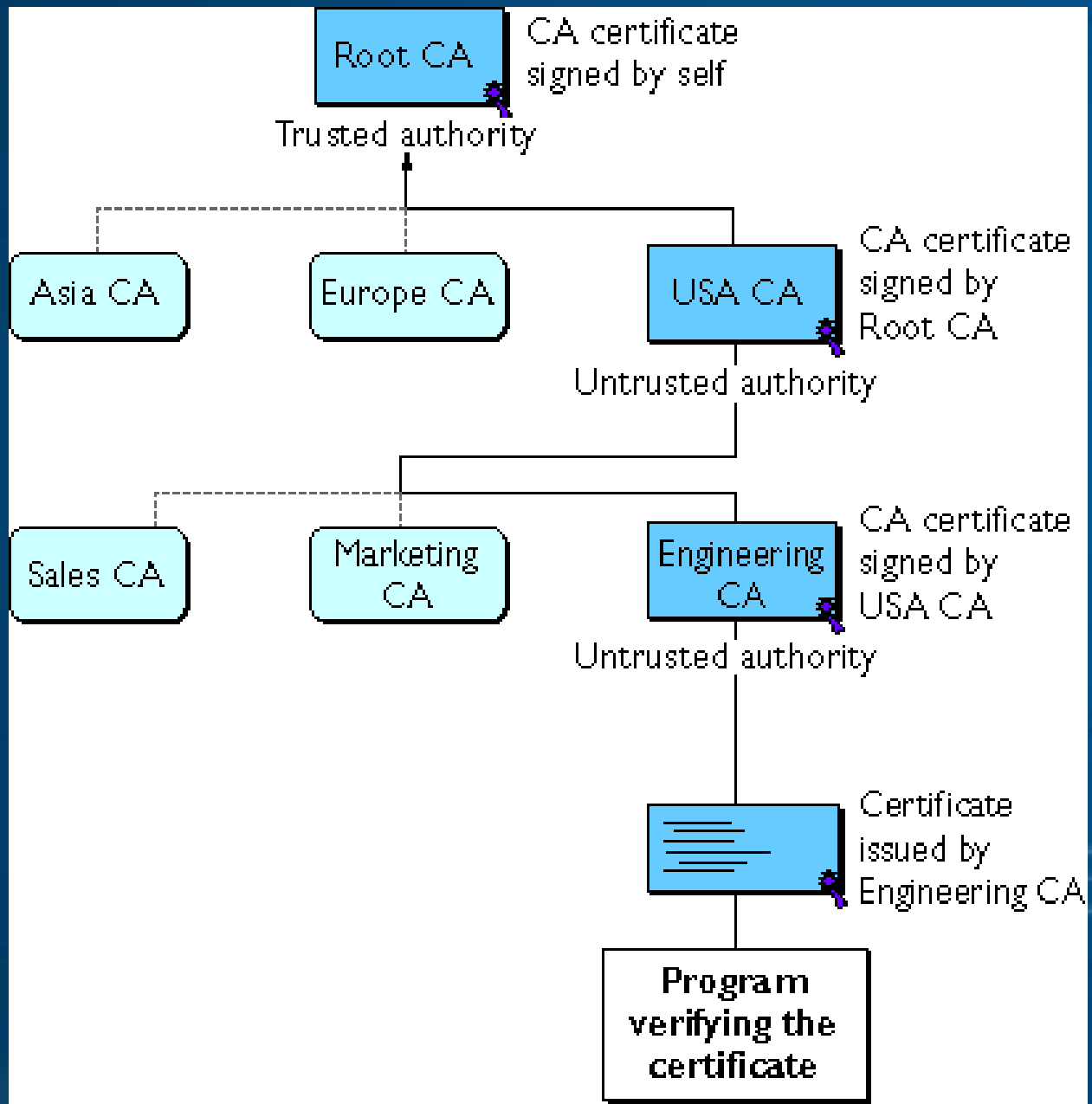

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创建根证书(Root CA，最高层认证中心)

1. 创建CA的私钥：

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2. 创建CA的证书请求：(clzqwdy@gmail.com)

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3. 对刚刚生成的证书请求进行自签名：

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4. 将证书导出成浏览器支持的.p12格式：(PKCS标准)

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1. X.509 标准

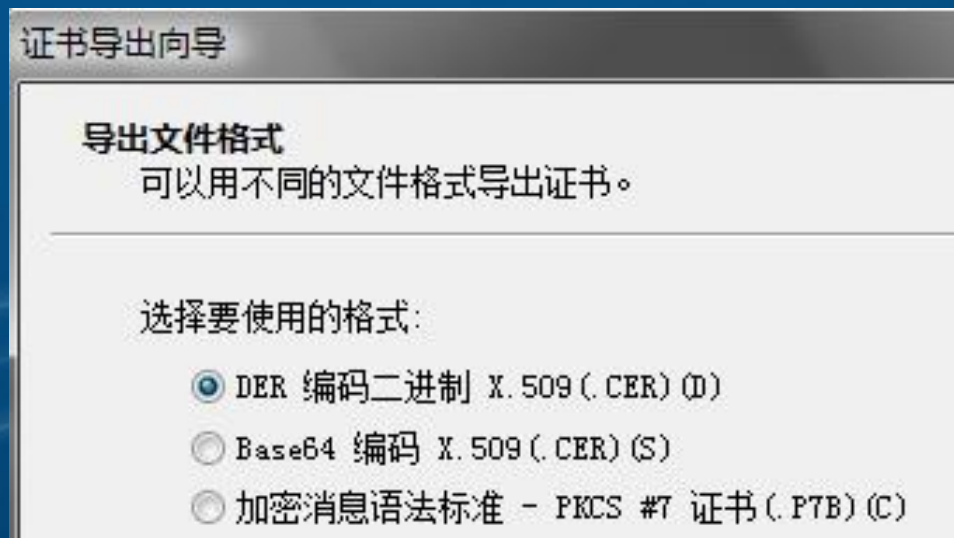
a) 类比于POSIX，反正就是个接口标准
b) 大多数证书格式遵循的. Also: X.500 PKCS
c) 结构!!! 见server-cert.pem

2. .pem后缀的证书

a) PEM格式(-inform PEM)，Base64编码
b) -----BEGIN CERTIFICATE----- 与 -----END CERTIFICATE-----

3. .cer .crt .der后缀的证书

a) Usually: DER form，binary
b) Sometimes: Base64 (or PEM form)



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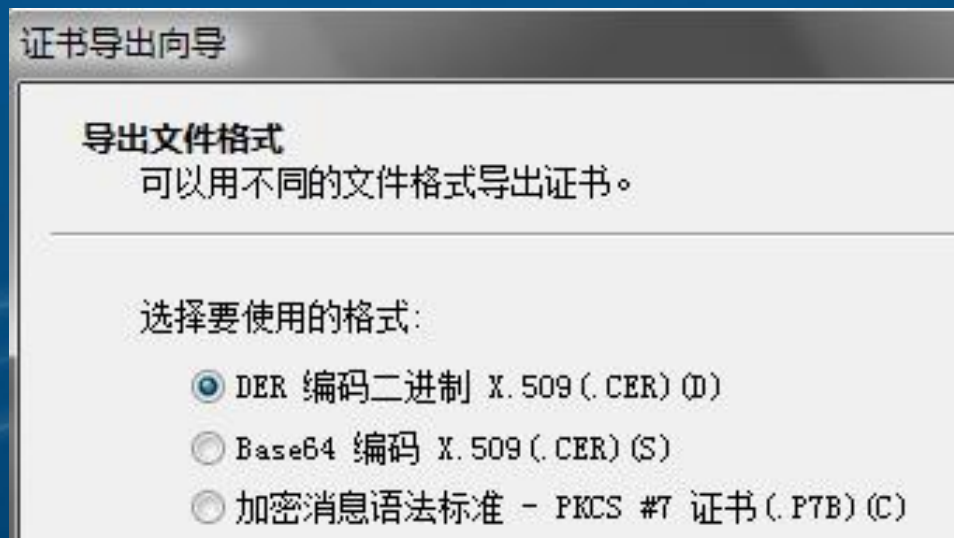

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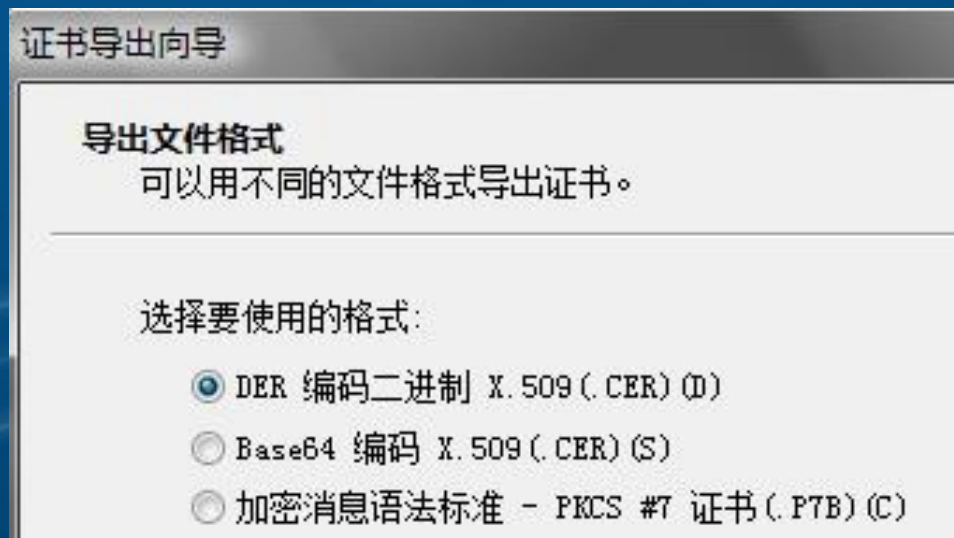

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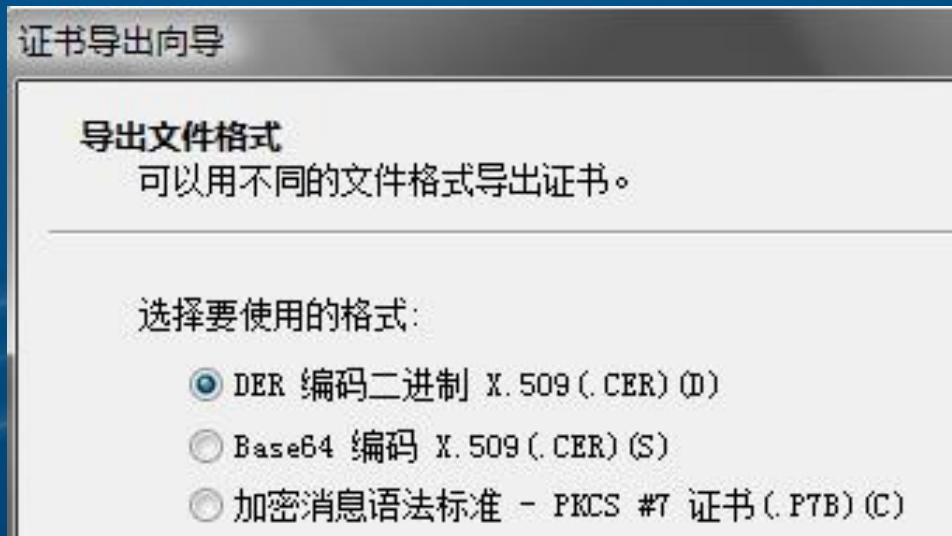
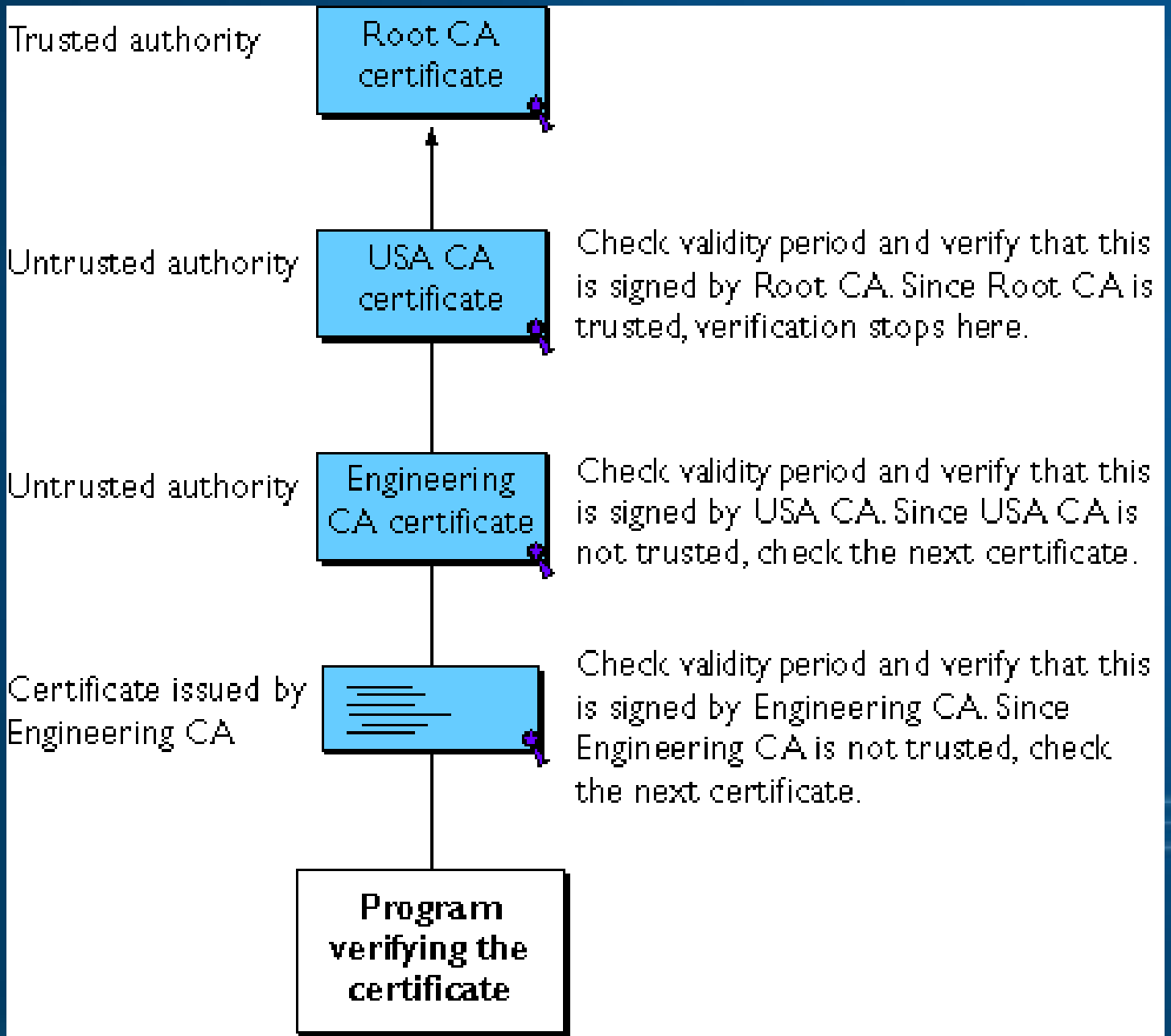


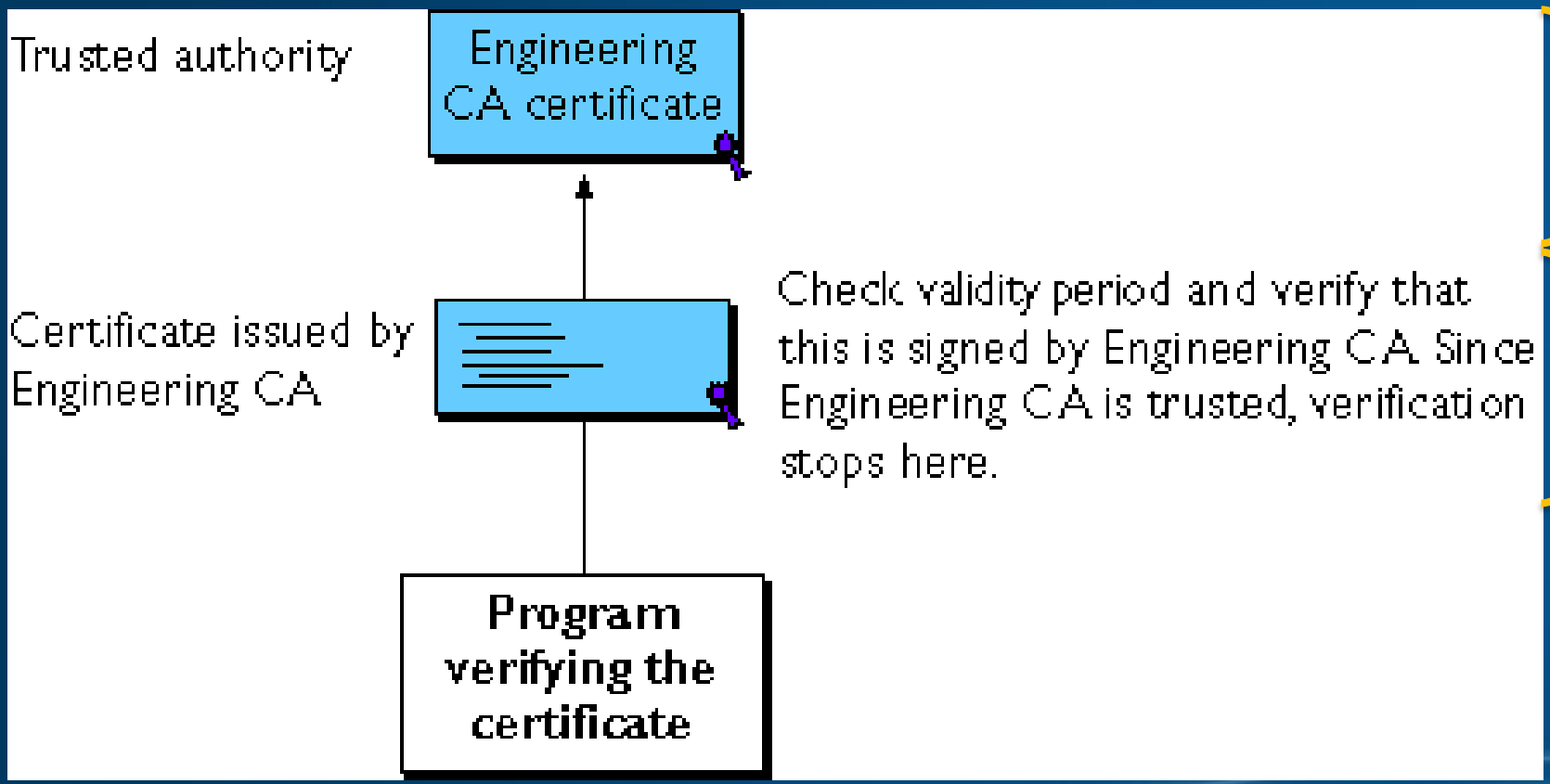
三、验证证书

Verifying a certificate chain all the way to the root CA



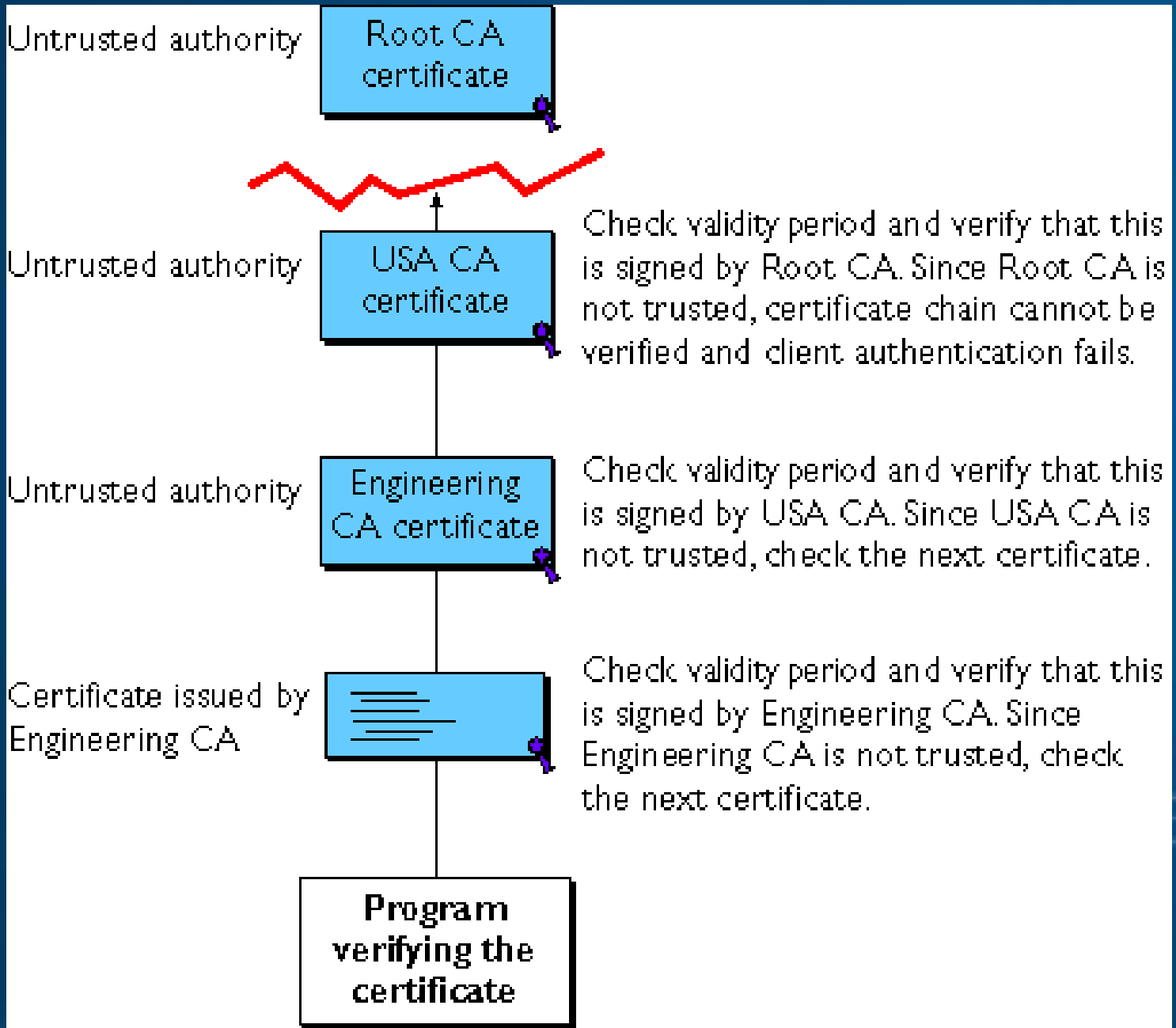
三、验证证书

Verifying a certificate chain to an intermediate CA



三、验证证书

A certificate chain that can't be verified



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demo原理 + 命令行方式验证 + 编程方式验证

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a) root-cert.pem AND server-cert.pem
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3. 验证一个已经过期的证书：(and编程验证)

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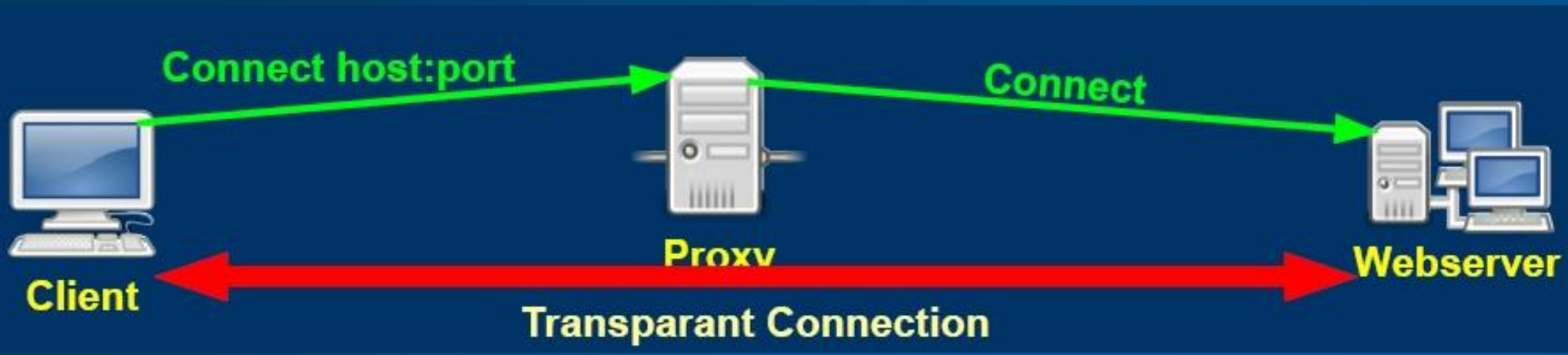
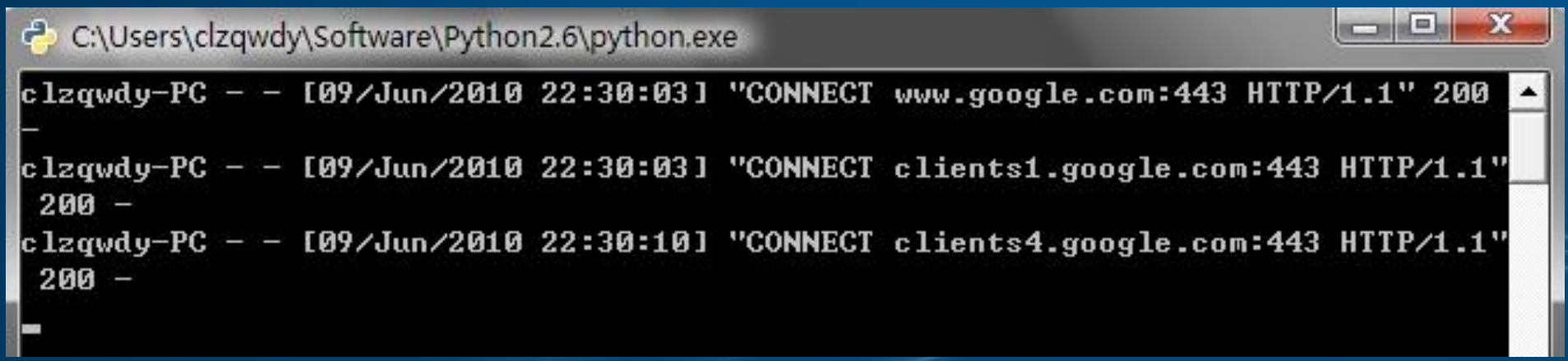
四、Http代理

一个正常的Http Proxy处理CONNECT()时的情况





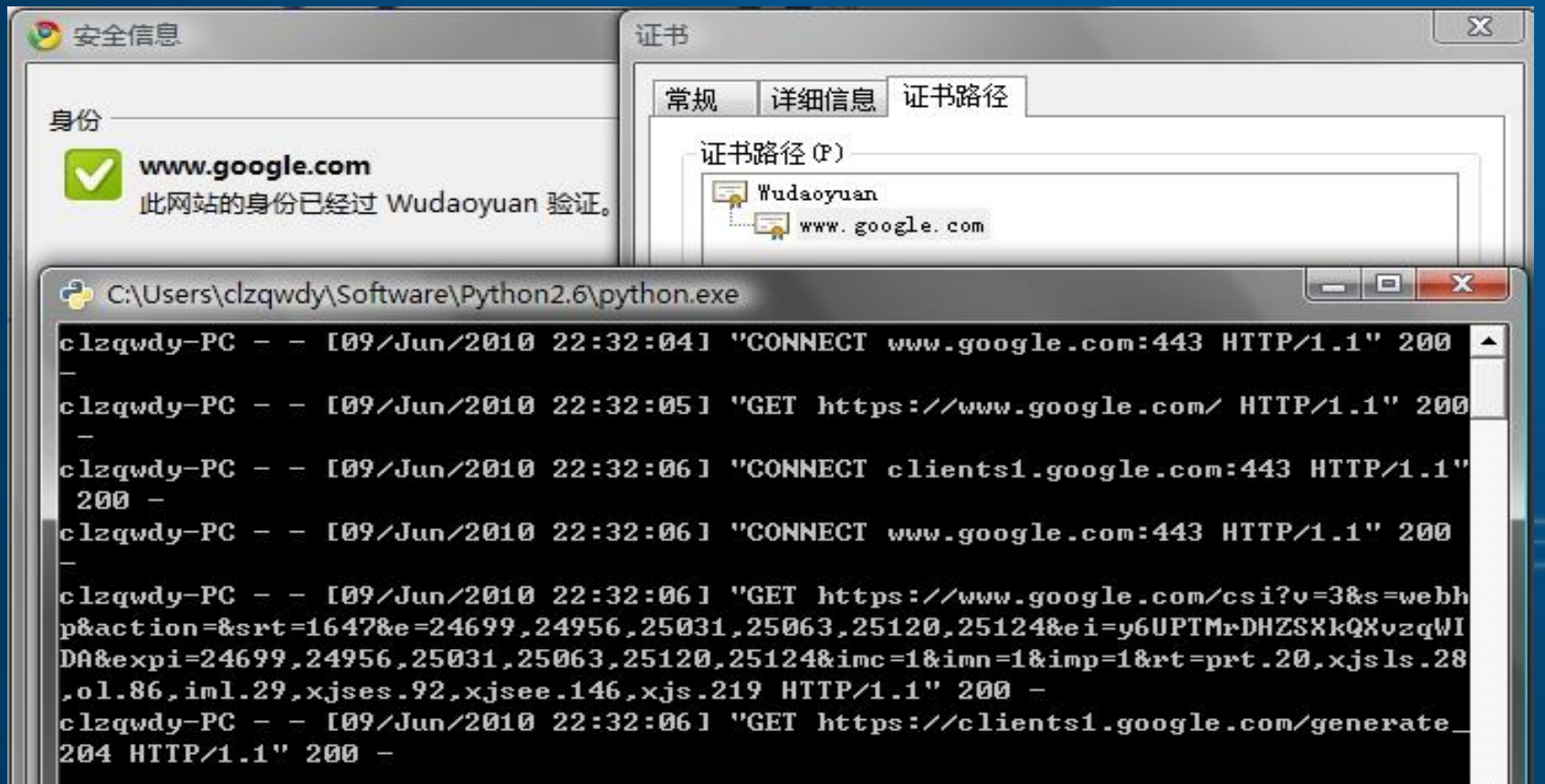
四、Http代理

Man In the Middle

Client

Proxy

Web Server



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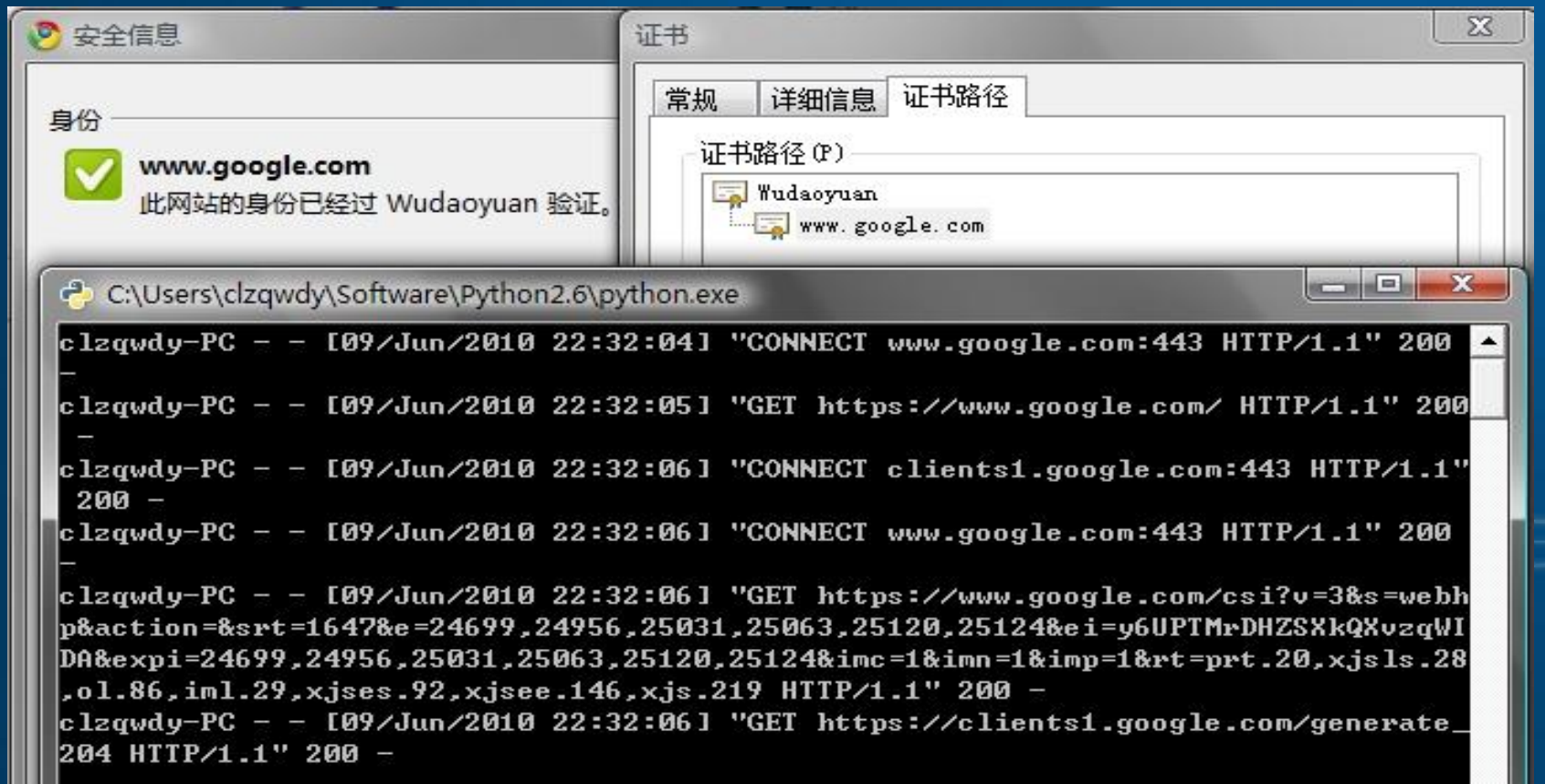
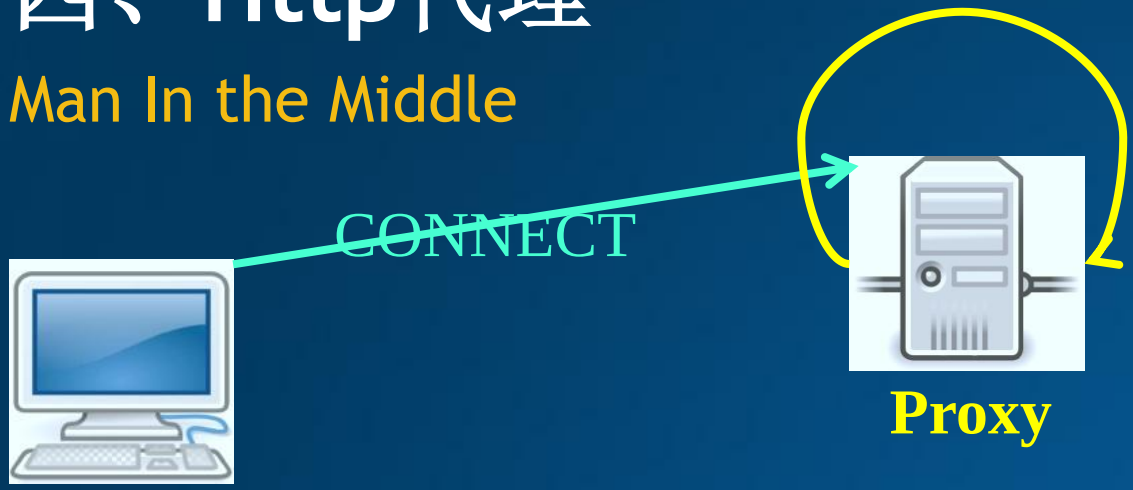
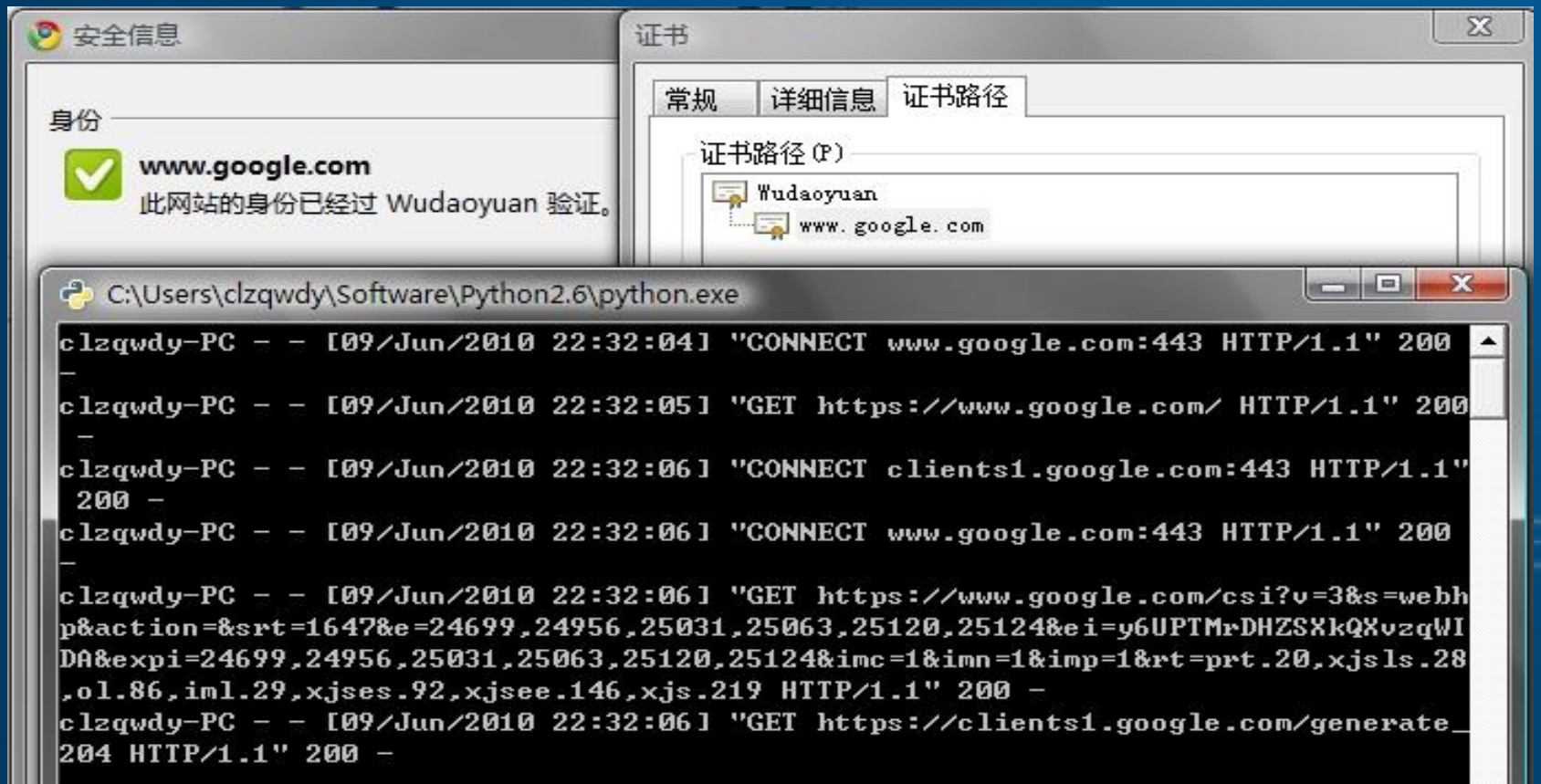


四、Http代理

CA sign a server cert to Host

Man In the Middle





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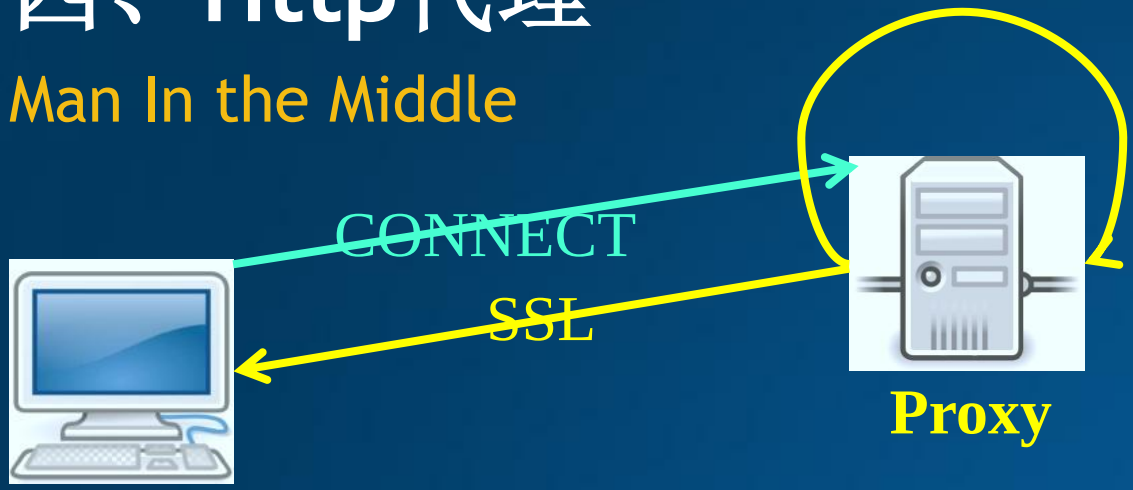
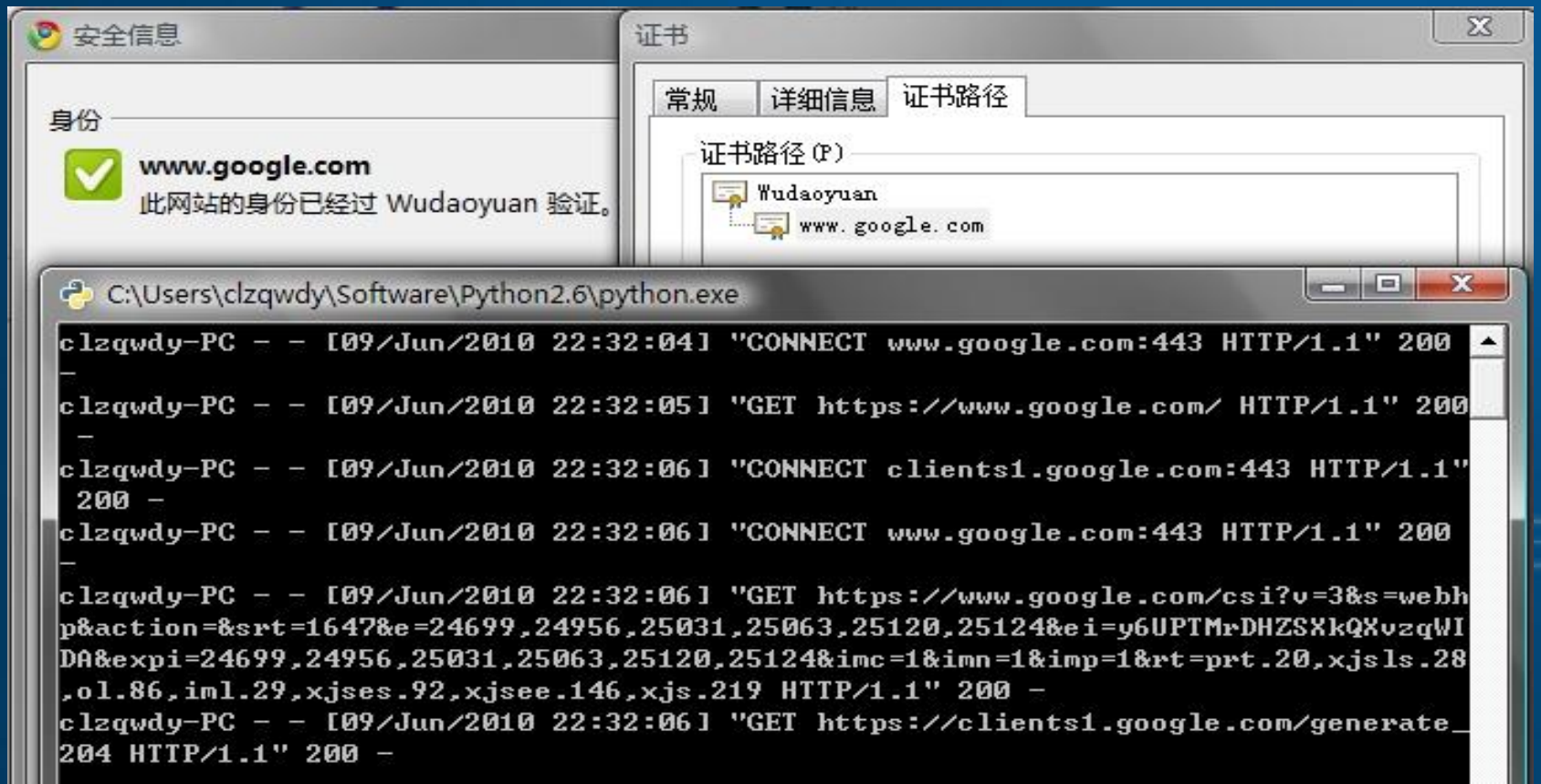
Man In the Middle





四、Http代理

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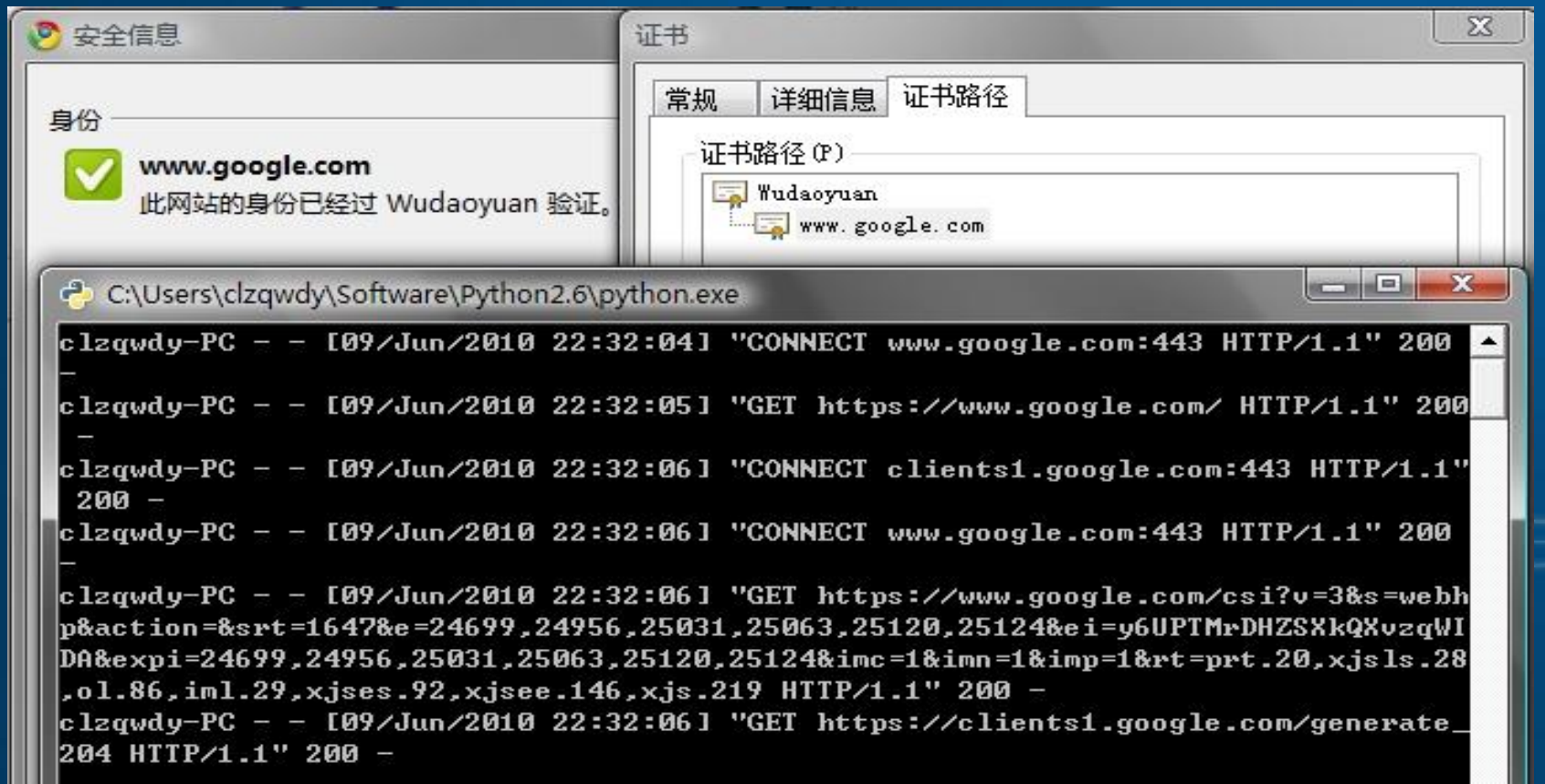

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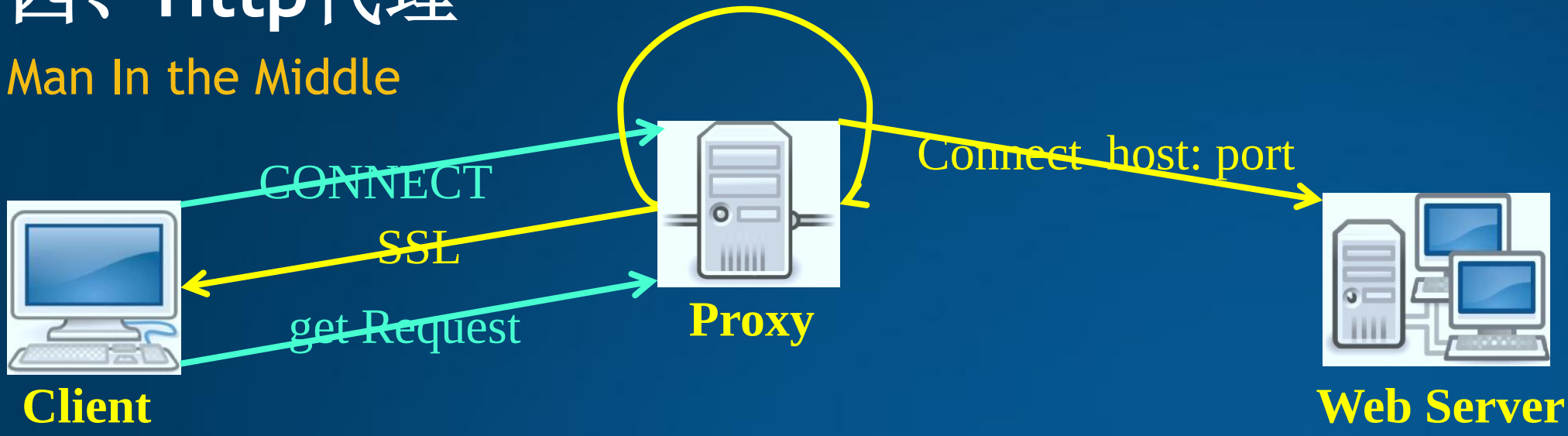

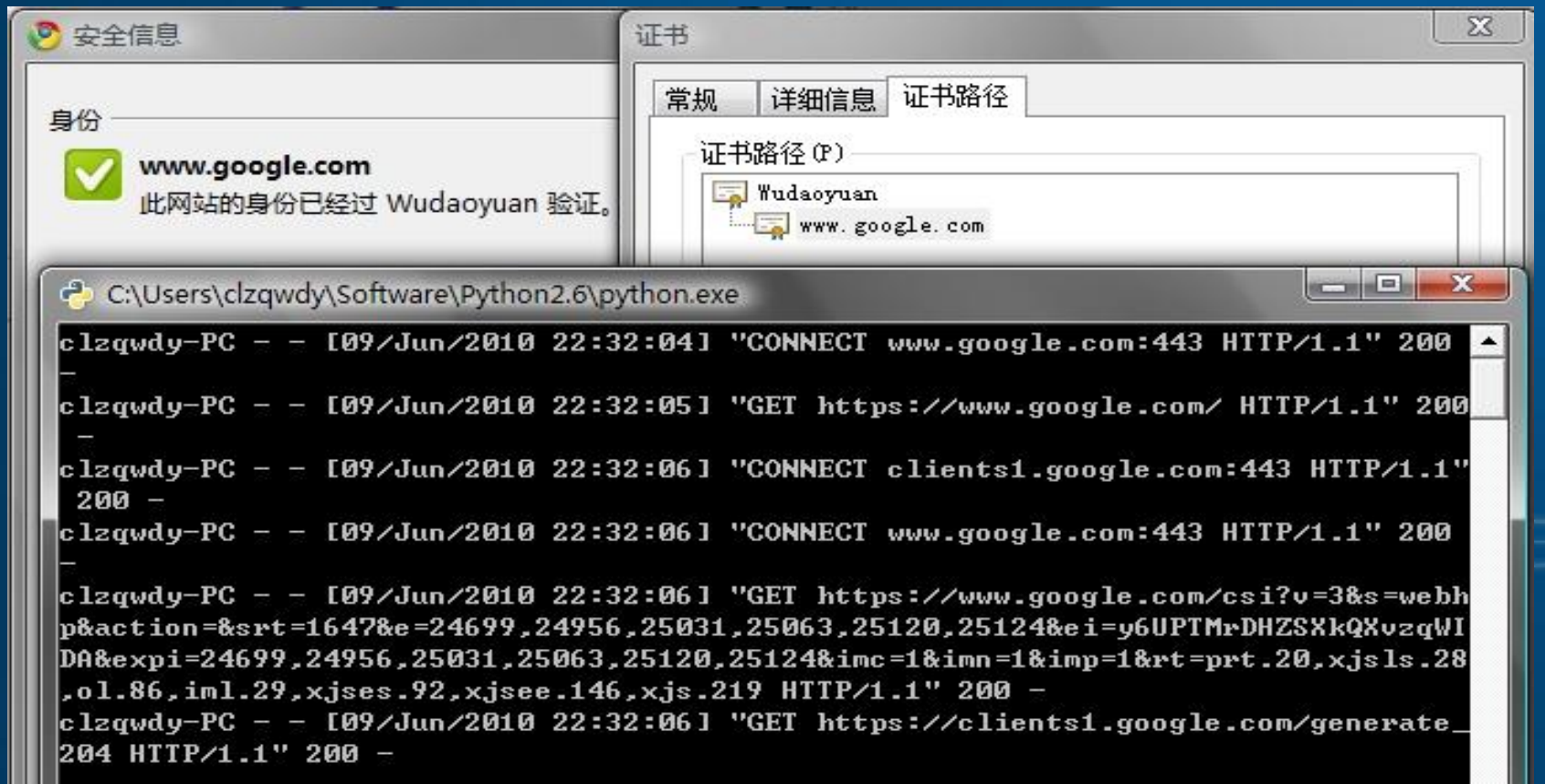

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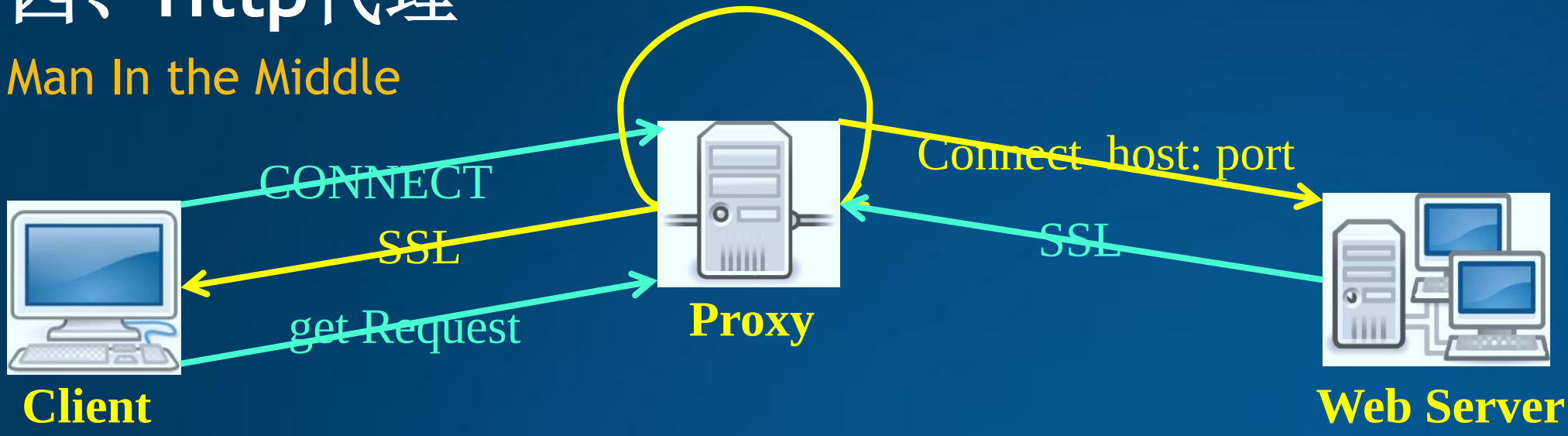

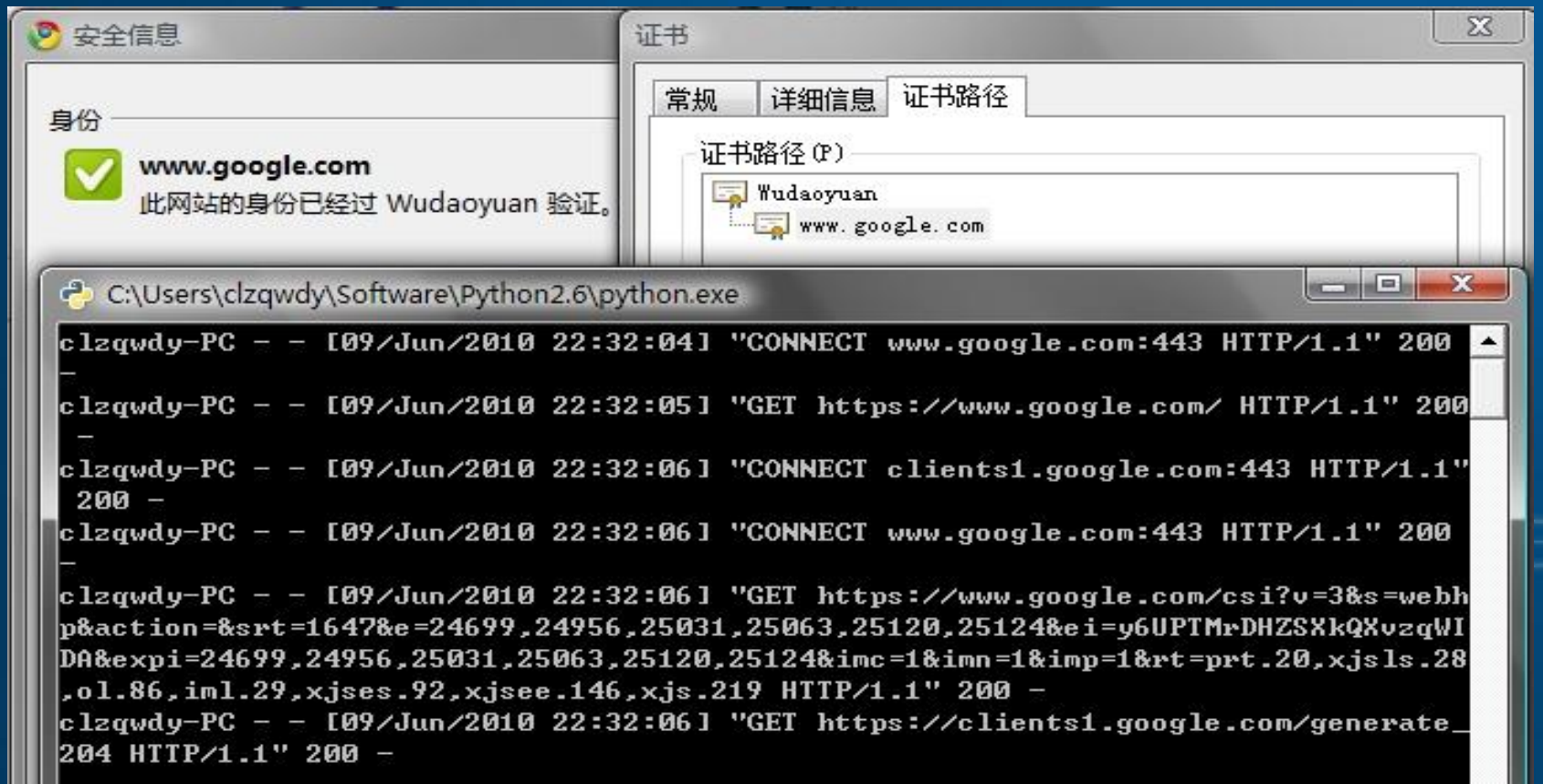

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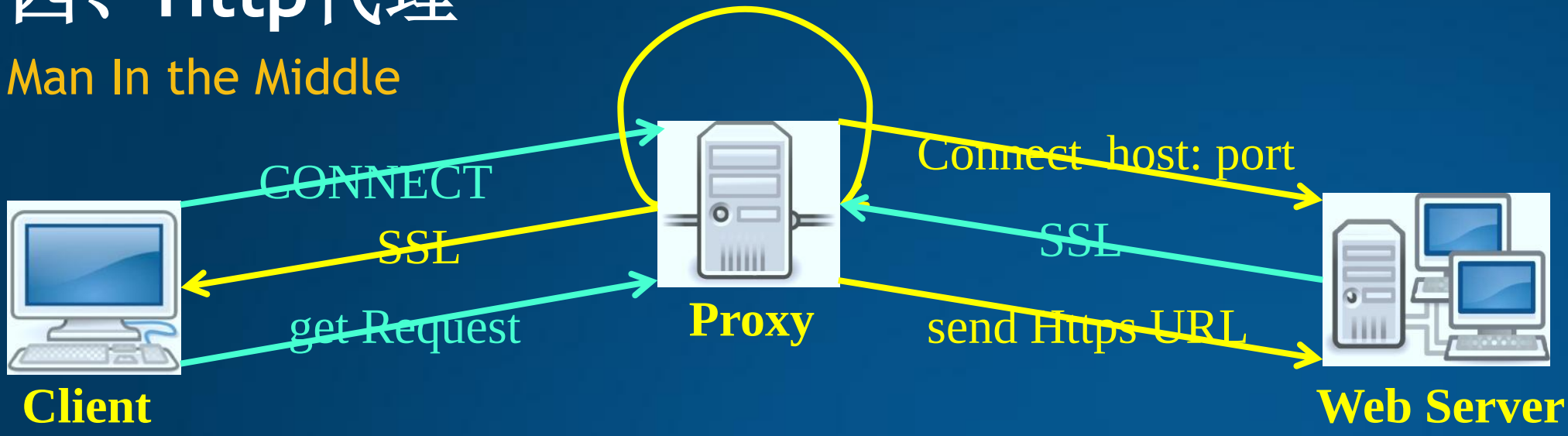

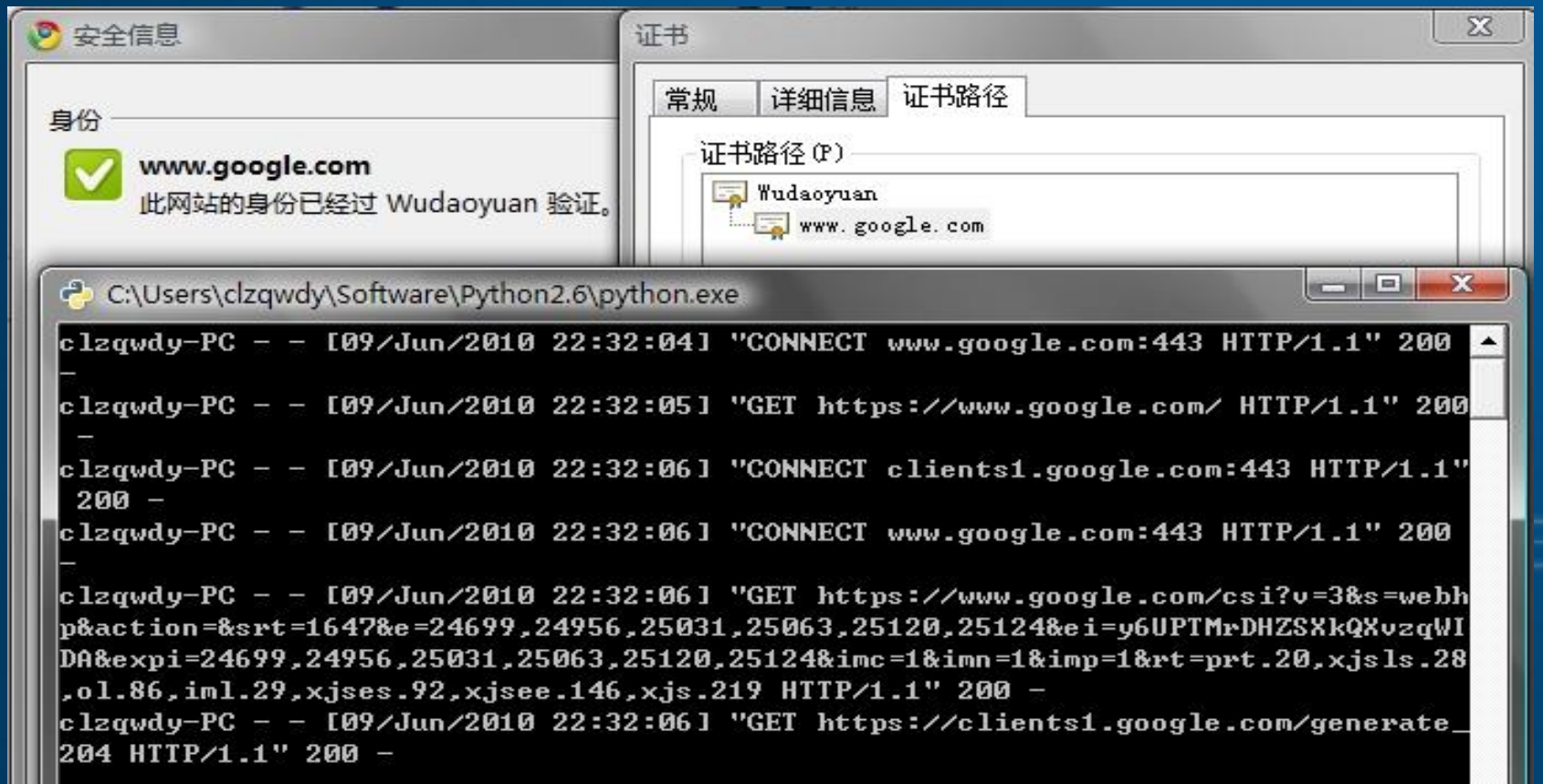

Thank You Very Much!