IBM HTTP Server (IHS) with the OS/390 Digital Certificate in Release 10

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Agenda

IBM HTTP Server (IHS) 5.3 Support for RACF Keyrings

- Use of System SSL - Change in Key Management

RACF SPE - Digital Certificate Enhancements

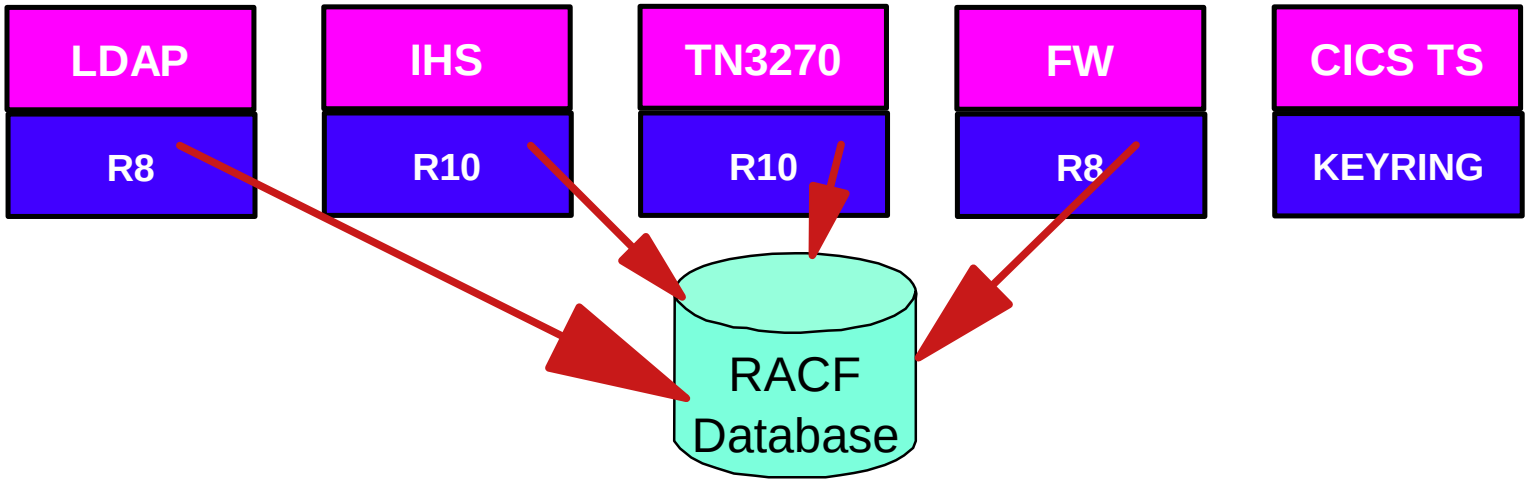
- Replacement of CA Servlet (GO CA)

RACF Keyring support

Every product had/has his own keyring !

Managed by MKKF, IKEYMAN or GSKKYMAN !

Release 8 added keyring support to RACF



RACF Keyring Support in V2R8

RACDCERT GENCERT

- create public/private key pair and digital certificates

RACDCERT ADDRING or CONNECT

- create keyring and add certificates

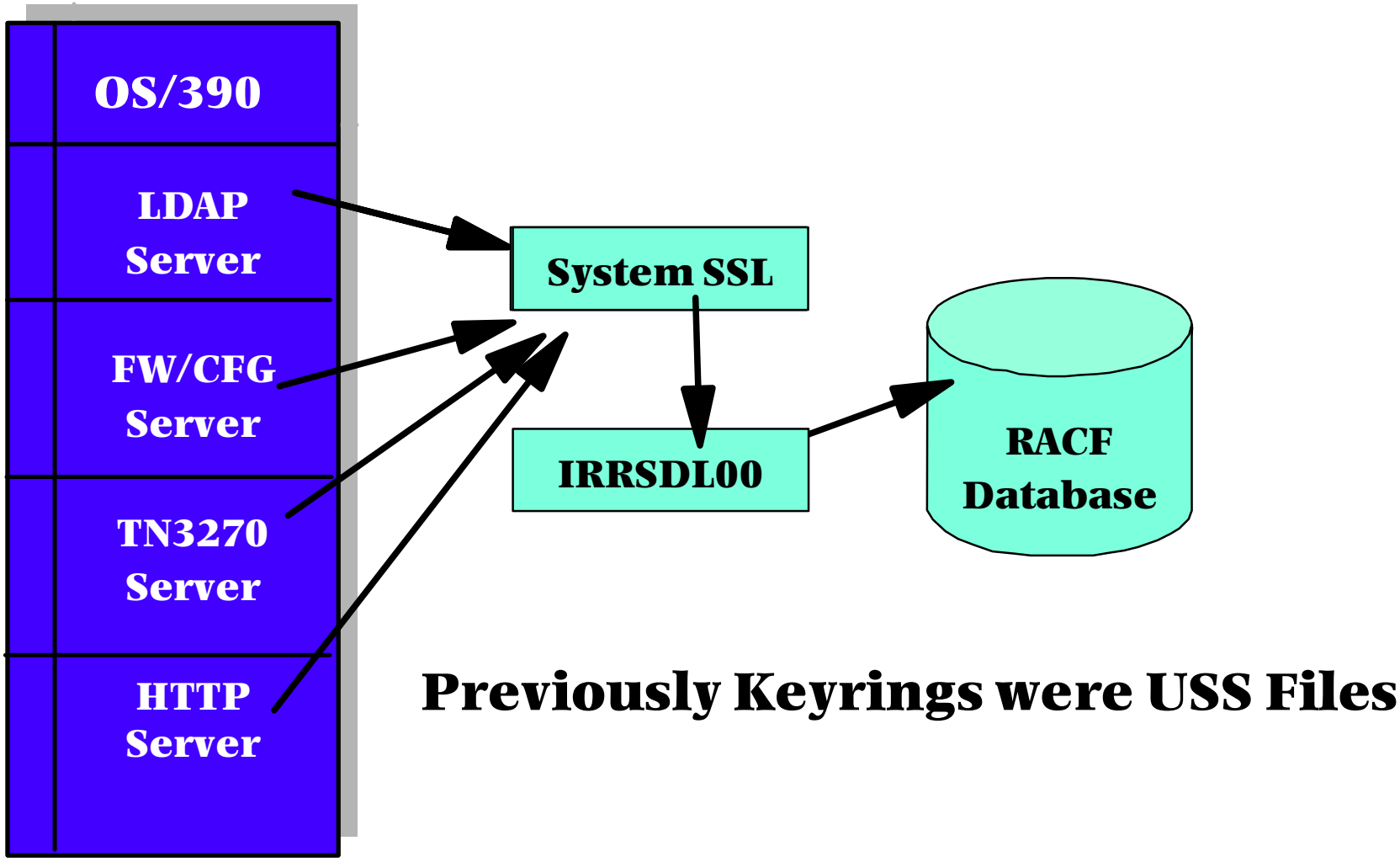
IBM HTTP Server (IHS) 5.3

Exploits System SSL

- Changes in key Management
  - uses GSKKYMAN instead of IKEYMAN to manage your digital certificate and keyring (USS File)
  - support for RACF keyrings - generated using RACDCERT ADDRING
  - server certificate generated using RACDCERT GENCERT or imported using RADCERT ADD

    Note: The ICSF is not (yet) supported for digital certificates in RACF Keyrings

RACF Key Rings



Previously Keyrings were USS Files

RACF Keyring Set-up

Generate digital certificate for the Server

- `RACDCERT GENCERT ID(WEBSRV) SUBJECTSDN(CN('WTSC57.ITSO.IBM.COM) OU('ITSO')O('IBM') L('POUGHKEEPSIE') SP('NEW YORK') C('US')) SIZE(1024) WITHLABEL('SC57W') SIGNWITH(CERTAUTH LABEL('ITSO CA')) KEYUSAGE(HANDSHAKE)`

Create RACF Keyring

- `RACDCERT ID(WEBSRV) ADDRING(SC57WEB)`

Associate the digital certificate of server and any CA's with the RACF keyring

- `RACDCERT ID(WEBSRV) CONNECT(ID(WEBSRV)LABEL('SC57W') RING(SC57WEB) DEFAULT USAGE(PERSONAL))`

RACF Key Ring Example


```
racdcert id(websrv) listring(sc57web)

Digital ring information for user WEBSRV:

Ring:
     >sc57web<
Certificate Label Name                 Cert Owner     USAGE      DEFAULT
-------------------------------------  ------------   --------   -------
sc57w                                  ID(WEBSRV)     PERSONAL     YES

racdcert id(tcpipu) listring(*)

Digital ring information for user TCPIPU:

Ring:
     >telnetserver<
Certificate Label Name                 Cert Owner     USAGE      DEFAULT
-------------------------------------  ------------   --------   -------
ITSO CA                                CERTAUTH       CERTAUTH     NO
telnetserver                           ID(TCPIPU)     PERSONAL     YES
peggys test cert                       ID(TCPIPU)     PERSONAL     NO
```

RACF Certificate Example

RACDCERT ID(WEBSRV) LIST(LABEL(SC57W)
Label: sc57w
Certificate ID: 2QbmxcLi2eWig/X3pkBA
Status: TRUST
Start Date: 2000/10/02 23:00:00 End Date: 2001/10/03 22:59:59
Serial Number:
>00<
Issuer's Name:
>CN=wtsc57.itso.ibm.com.OU=ITSO.O=IBM.C=US<
Subject's Name:
>CN=wtsc57.itso.ibm.com.OU=ITSO.O=IBM.C=US<
Key Usage: HANDSHAKE
Private Key Type: Non-ICSF
Private Key Size: 1024
Ring Associations:
Ring Owner: WEBSRV
Ring: >sc57web<

HTTPD.CONF changes

The **KEYFILE** directive now points to the **LABEL** of the RACF keyring;

The owner of the keyring and the (default) digital certificate has to be the User ID associated with the HTTP Server's Started Task (websrv in our case !)

The changes to the **KEYFILE** directive is as follows:

- **keyfile label SAF**

The Started Task User ID needs READ access to :

- IRR.DIGTCERT.LIST in the FACILITY class
- IRR.DIGTCERT.LISTRING in the FACILITY class

PKISERV - Release 10
Digital Certificate Enhancement

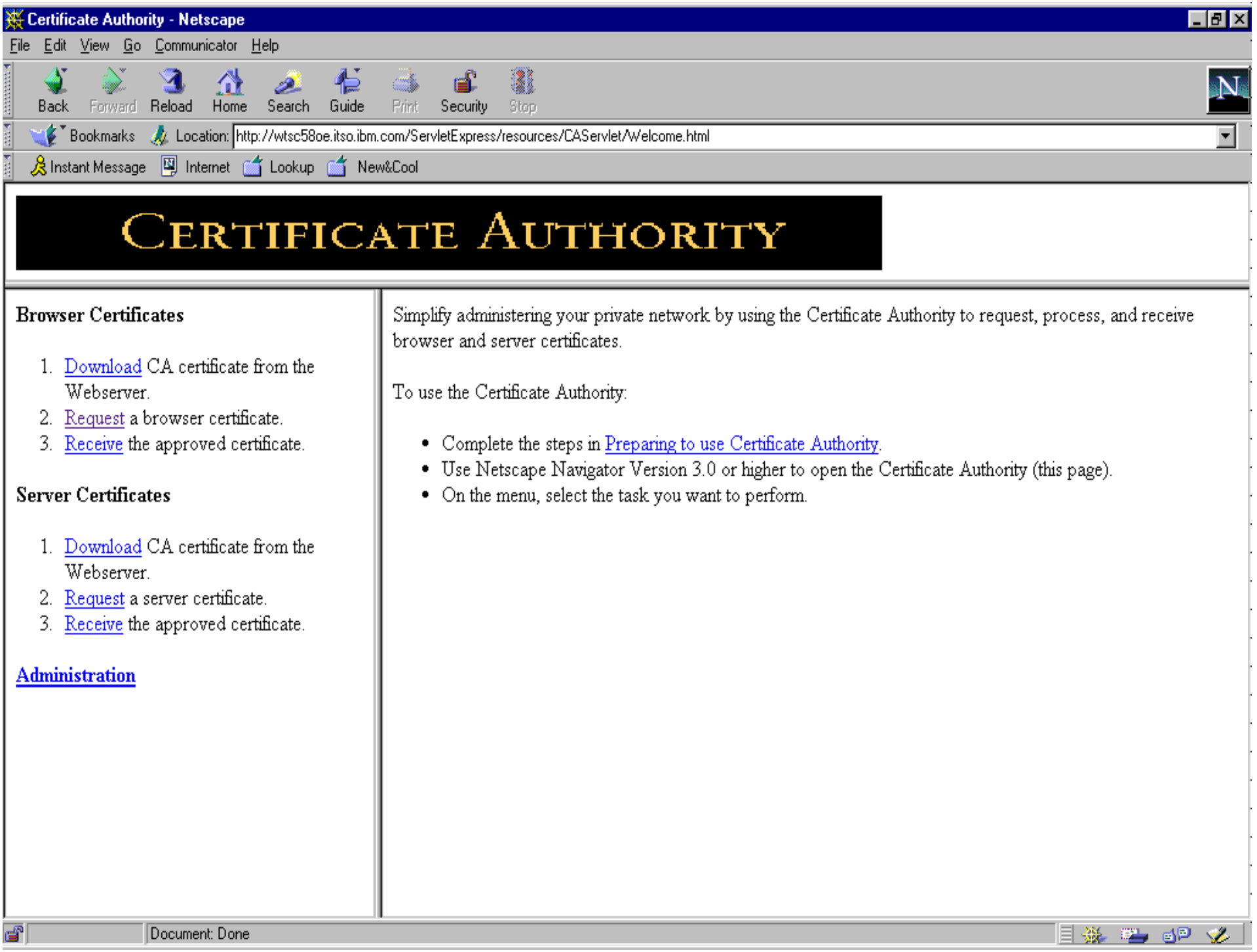
A little History First

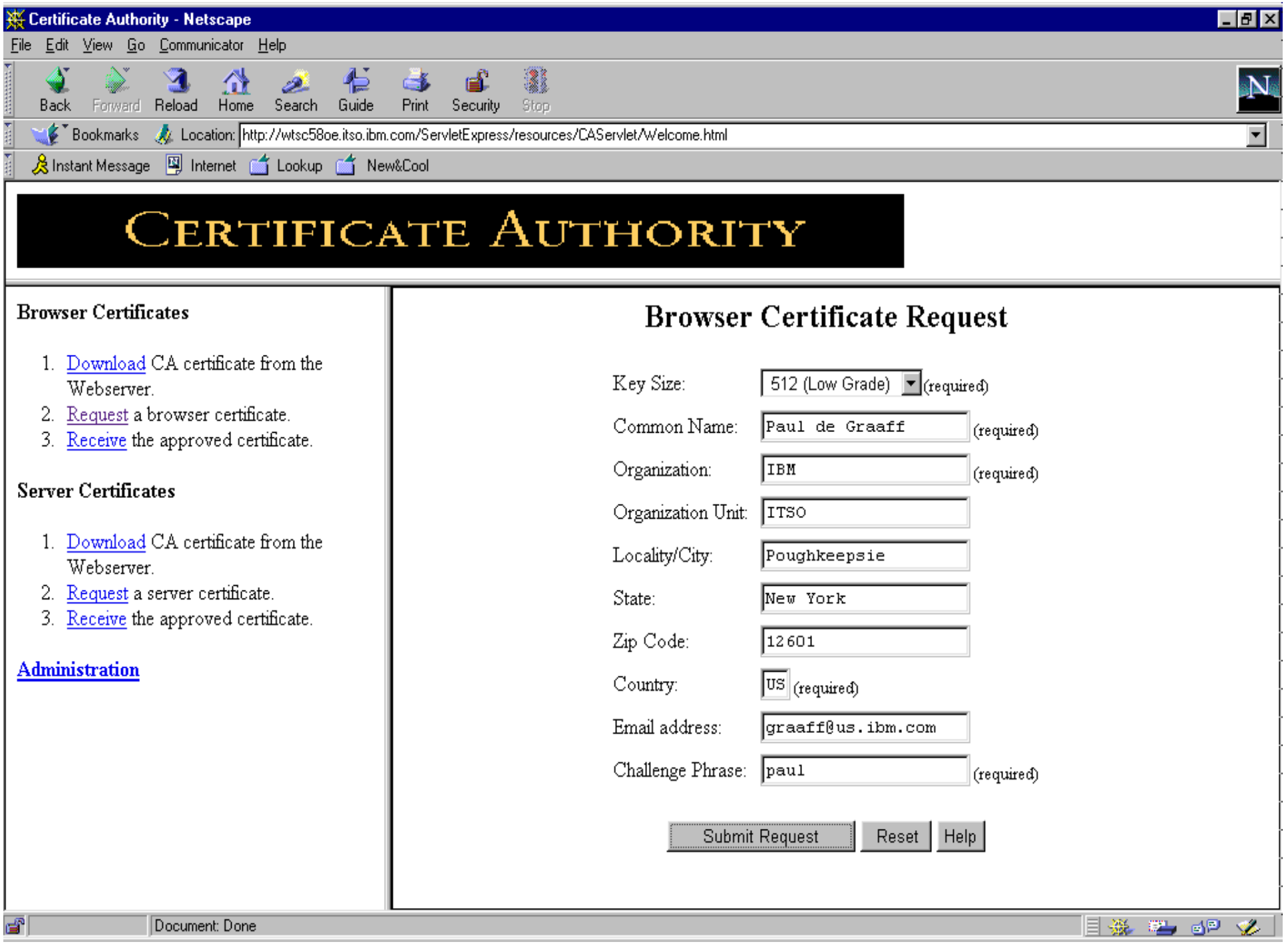
The GO CA function was introduced in DGW 5.0 and was later renamed to the CA Servlet in the IBM HTTP Server rename timeframe.

It provided PKI capabilities to the OS/390 platform

It was able to generate digital certificates for :

- Personal Digital Certificates (Browser)
- Server Digital Certificates


Certificate Authority - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Guide Print Security Stop
Bookmarks Location: http://wtsc58oe.itso.ibm.com/ServletExpress/resources/CAServlet/Welcome.html
Instant Message Internet Lookup New&Cool
CERTIFICATE AUTHORITY
Browser Certificates
1. Download CA certificate from the Webserver.
2. Request a browser certificate.
3. Receive the approved certificate.
Server Certificates
1. Download CA certificate from the Webserver.
2. Request a server certificate.
3. Receive the approved certificate.
Administration
Simplify administering your private network by using the Certificate Authority to request, process, and receive browser and server certificates.
To use the Certificate Authority:
• Complete the steps in Preparing to use Certificate Authority.
• Use Netscape Navigator Version 3.0 or higher to open the Certificate Authority (this page).
• On the menu, select the task you want to perform.
Document: Done


Certificate Authority - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Guide Print Security Stop
Bookmarks Location: http://wtsc58oe.itso.ibm.com/ServletExpress/resources/CAServlet/Welcome.html
Instant Message Internet Lookup New&Cool
CERTIFICATE AUTHORITY
Browser Certificates
1. Download CA certificate from the Webserver.
2. Request a browser certificate.
3. Receive the approved certificate.
Server Certificates
1. Download CA certificate from the Webserver.
2. Request a server certificate.
3. Receive the approved certificate.
Administration
Browser Certificate Request
Key Size: 512 (Low Grade) (required)
Common Name: Paul de Graaff (required)
Organization: IBM (required)
Organization Unit: ITSO
Locality/City: Poughkeepsie
State: New York
Zip Code: 12601
Country: US (required)
Email address: graaff@us.ibm.com
Challenge Phrase: paul (required)
Submit Request Reset Help
Document: Done

PKISERV Introduction

Release 10 Introduces a Web based application to generate:

- Personal (Browser) Digital Certificates
- Sign Digital Certificates for non-390 based Server

The following APARs are required:

- RACF APAR OW45211
- SAF APAR OW45212

It is a replacement for the CA Servlet shipped previously with IBM HTTP Server for OS/390 Release 5.2 and prior.

PKISERV Introduction ...

Documentation is available from the RACF Homepage

Soon redbook SG24-5675 will have the documentation as well, plus examples.

PKISERV Introduction ...

PKISERV is basically a web based interface to some of the RADCERT capabilities available in Release 10:

Release 8 supported generation of digital certificates

- no export function of the certificate in PKCS#12
- was targeted at OS/390 Servers

Release 10 will no longer support the CA Servlet function

- RACF will now allow export of certificates in PKCS#12 format

PKISERV Introduction ...

You can also generate Digital Certificates using

- RACDCERT GENCERT

To export the certificate you will need to take the following steps:

- RACDCERT EXPORT
- Download to your PC
- Import it to your Browser (IE, Netscape)

The Web based interface eliminates these cumbersome steps !!

RACDCERT GENCERT Syntax


```
RACDCERT
   [  ID(userid) | CERTAUTH | SITE ]
   GENCERT[('request-data-set-name')]
      [SUBJECTSDN([C('country')]
                        [SP('state-or-province')]
                        [L('locality')]
                        [O('organization-name')]
                        [OU('organization-unit-name1'
                           [,'organization-unit-name2',...]
                           )]
                        [T('title')]
                        [CN('common-name')]  )]
```

RACDCERT GENCERT Syntax ...

[SIZE(key-size)]

[NOTBEFORE([DATE(yyyy-mm-dd)]
[TIME(hh:mm:ss)])]

[NOTAFTER([DATE(yyyy-mm-dd)]
[TIME(hh:mm:ss)])]

[WITHLABEL('label-name')]

[SIGNWITH([CERTAUTH|SITE]
LABEL('label-name'))]

[ICSF]

RACDCERT GENCERT Syntax ...

[KEYUSAGE(HANDSHAKE DATAENCRYPT DOCSIGN CERTSIGN)]

[ALTNAME(

IP(numeric-ip-address)
DOMAIN('internet-domain-name')
EMAIL('email-address')
URI('universal-resource-identifier'))]

]

RACDCERT EXPORT Syntax


```
RACDCERT
   [
     | EXPORT ( LABEL('Label Name') )
                    DSN('Output Dataset Name')
                    [ FORMAT(CERTDER | CERTB64 |
                                          PKCS12DER | PKCS12B64) ]
                       [ PASSWORD('PKCS12 Password') ]
```

PKISERV - Configuration

Configuration File (**PKI.CONF**) allows for flexible configuration

Differences with the CA Servlet:

- Provides no administration approval process (auto-approved)

- Digital Certificate requests are based on RACF permissions to FACILITY class profiles !

PKISERV - Configuration ...

The structure of the configuration File (**PKI.CONF**) is:

- Templates define the type of certificates you want to generate and/or approve
  - SAF Browser Certificate 1 Year (provided)
  - SAF Server Certificate 1 Year (provided)
- CONTENT Section - What HTML to display
- APPL Section - identifies certificate fields the application should provide (User ID)
- CONSTANT Section - certificate fields that have a hardcoded value

PKISERV - Configuration ...

The structure of the configuration File (**PKI.CONF**) is:

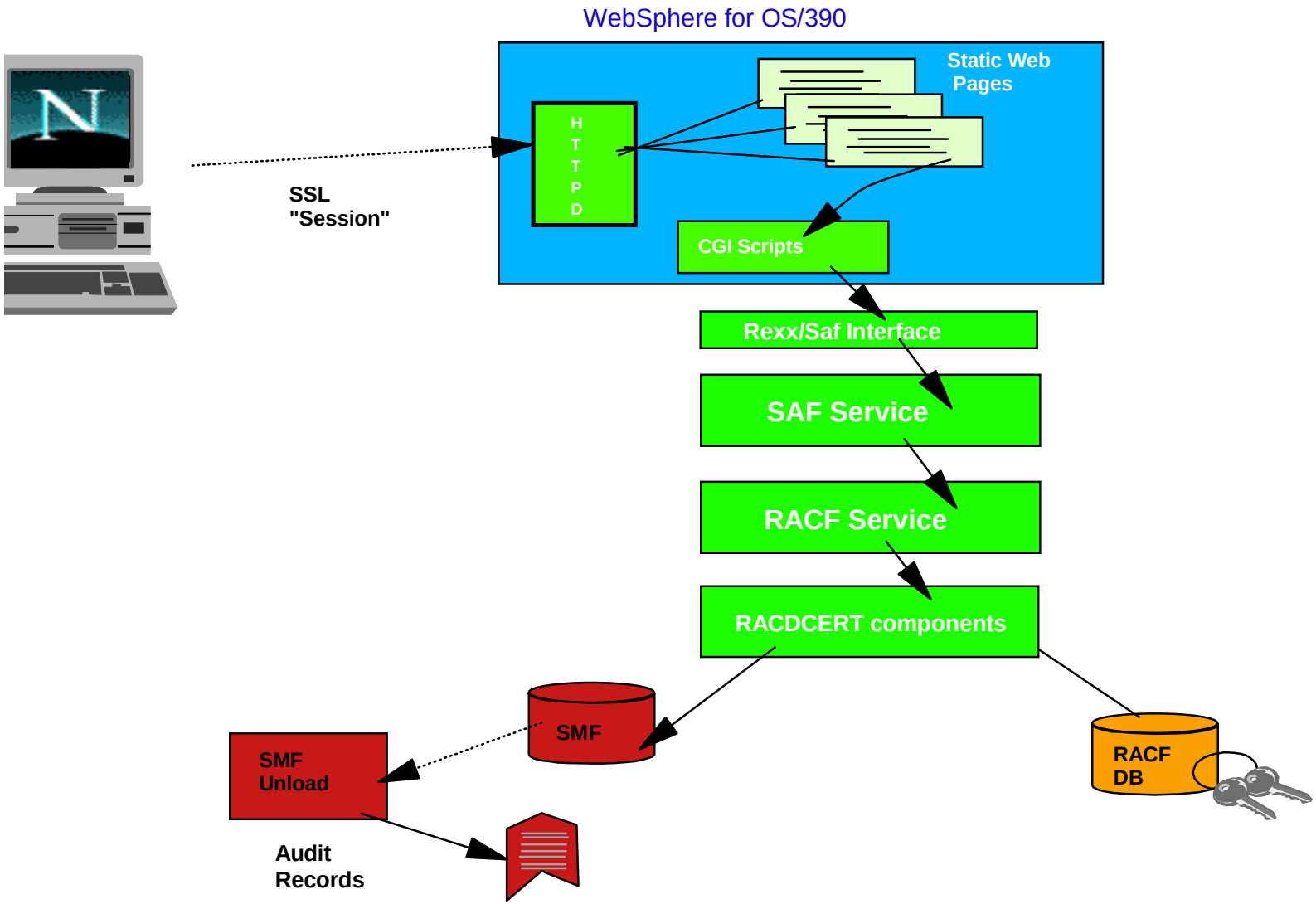
- SUCCESSCONTENT Section - display HTML when cert request is successful
- FAILURECONTENT Section - display HTML when cert request fails
- RETRIEVECONTENT Section - display HTML to enable cert retrieval
- RETURNCERT Section - display HTML when cert retrieval successfull

PKISERV - Configuration ...

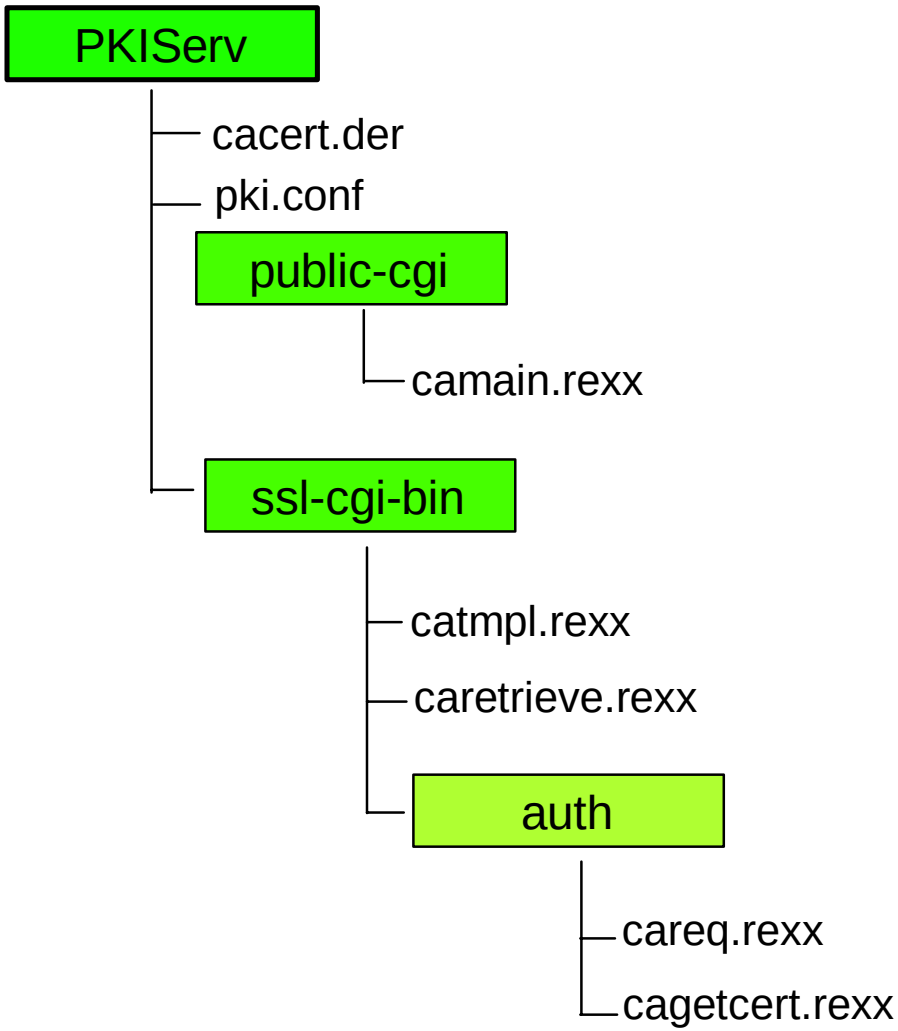
The configuration File (**PKI.CONF**) requires at least changes to the CONTENT section, for example

```
<APPL>
 %%UserId%%                                  ==> User ID of the User requesting cert
</APPL>
<CONSTANT>
 %%Org=IBM%%                                 ==> Hardcoded Value for Organization
 %%OrgUnit=ITSO%%                            ==> Hardcoded Value for Organizational Unit
 %%KeyUsage=handshake%%                      ==> Hardcoded Value = Indicates SSL Usage
 %%NotAfter=365%%                            ==> Hardcoded Value = Validity Period 365 Days
 %%Country=US%%                              ==> Hardcoded Value for Country
 %%SignWith=SAF:CERTAUTH/ITSO CA%%           ==> Hardcoded Value for signing CA cert
</CONSTANT>
 %%CommonName=%%                             ==> CommonName provided by End User
```

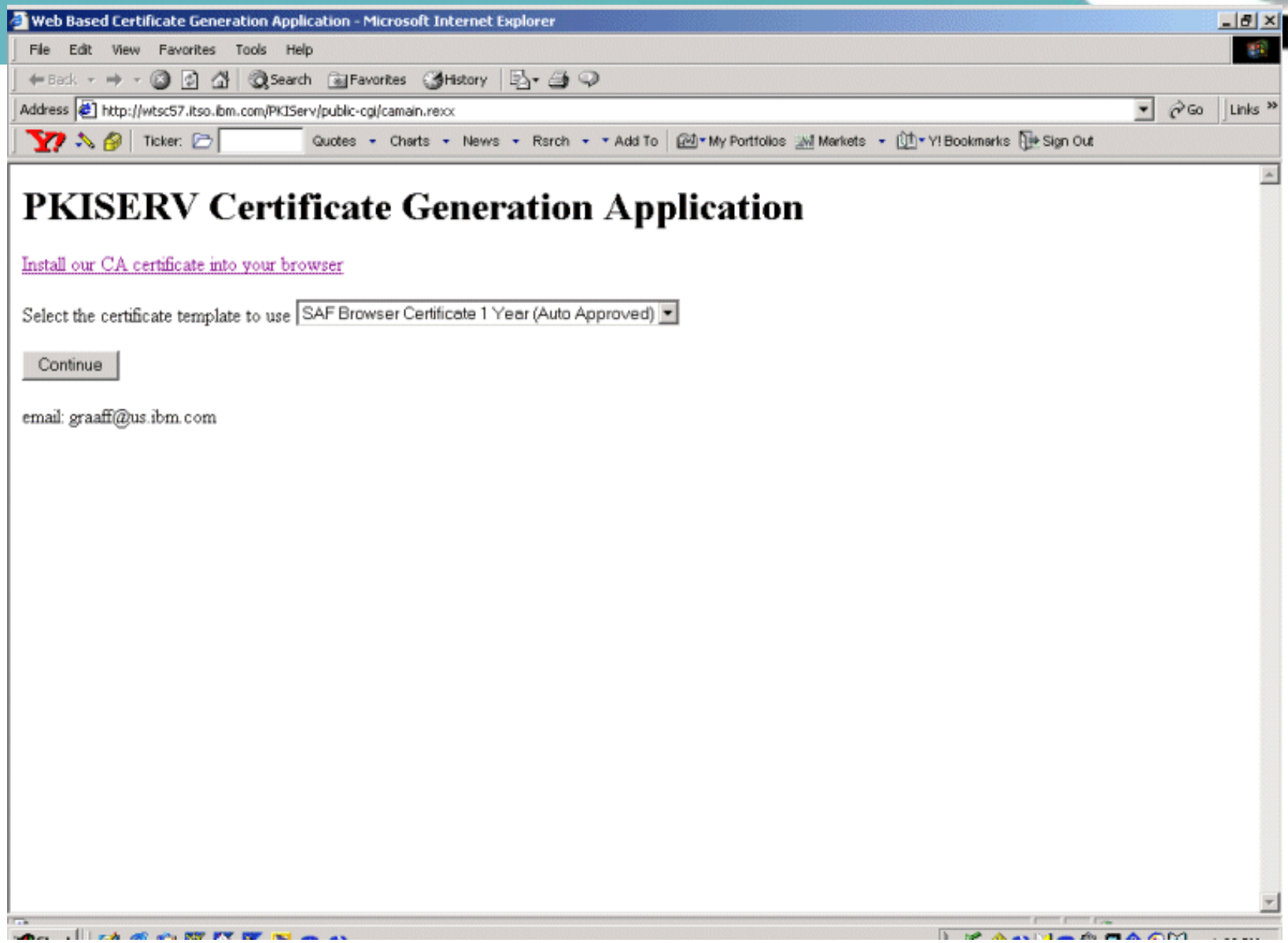
RACF SPE - Flow Chart



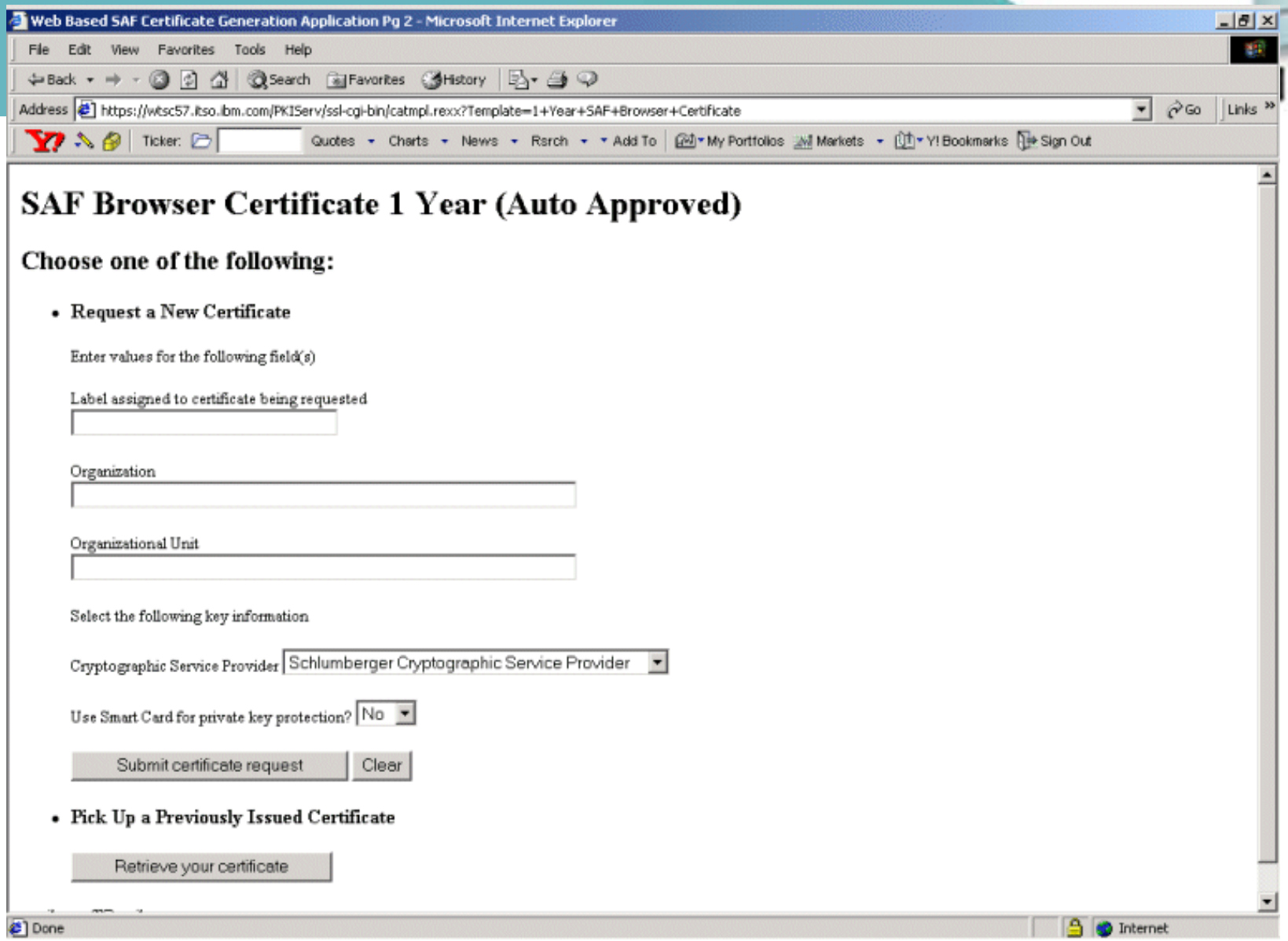
RACF SPE - Directory Structure provided



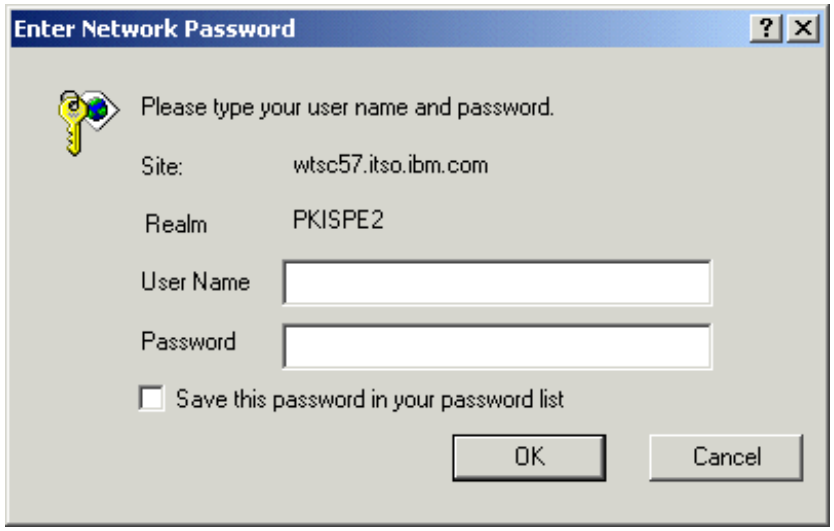
RACF SPE - Web based Interface



RACF SPE - Web based Interface

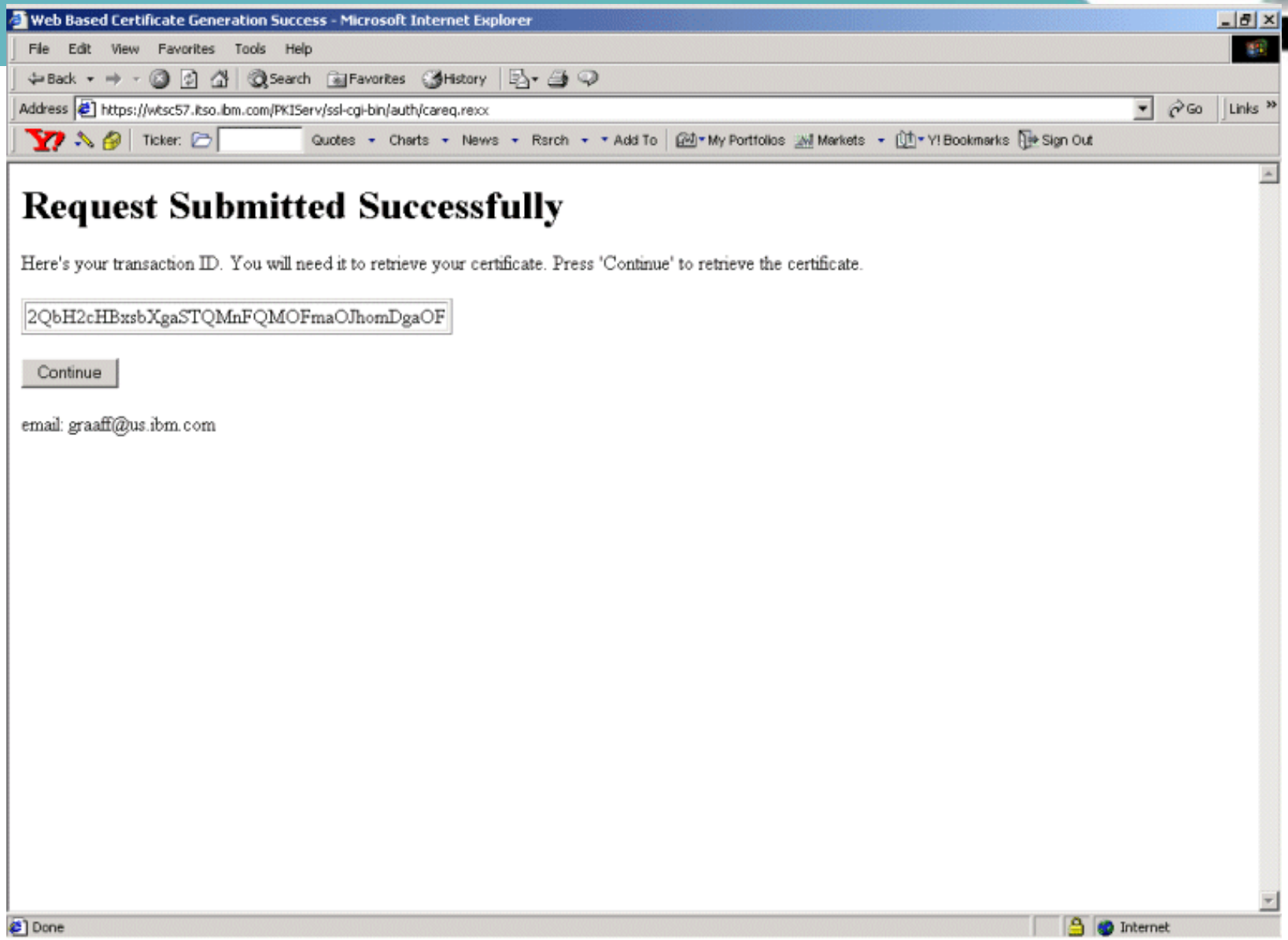


RACF SPE - Web based Interface



You need to be authorized to generate a digital certificate !

RACF SPE - Web based Interface



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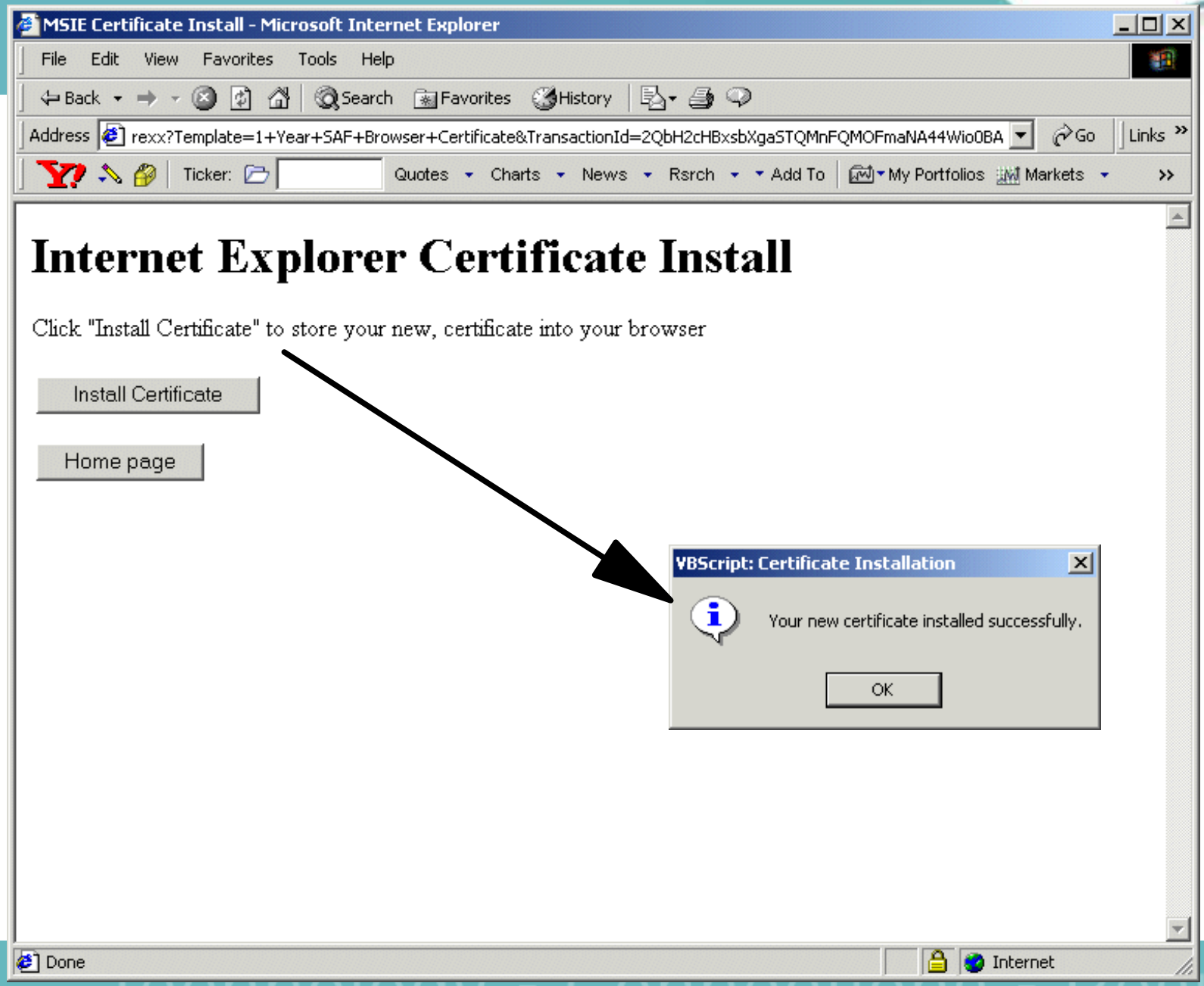
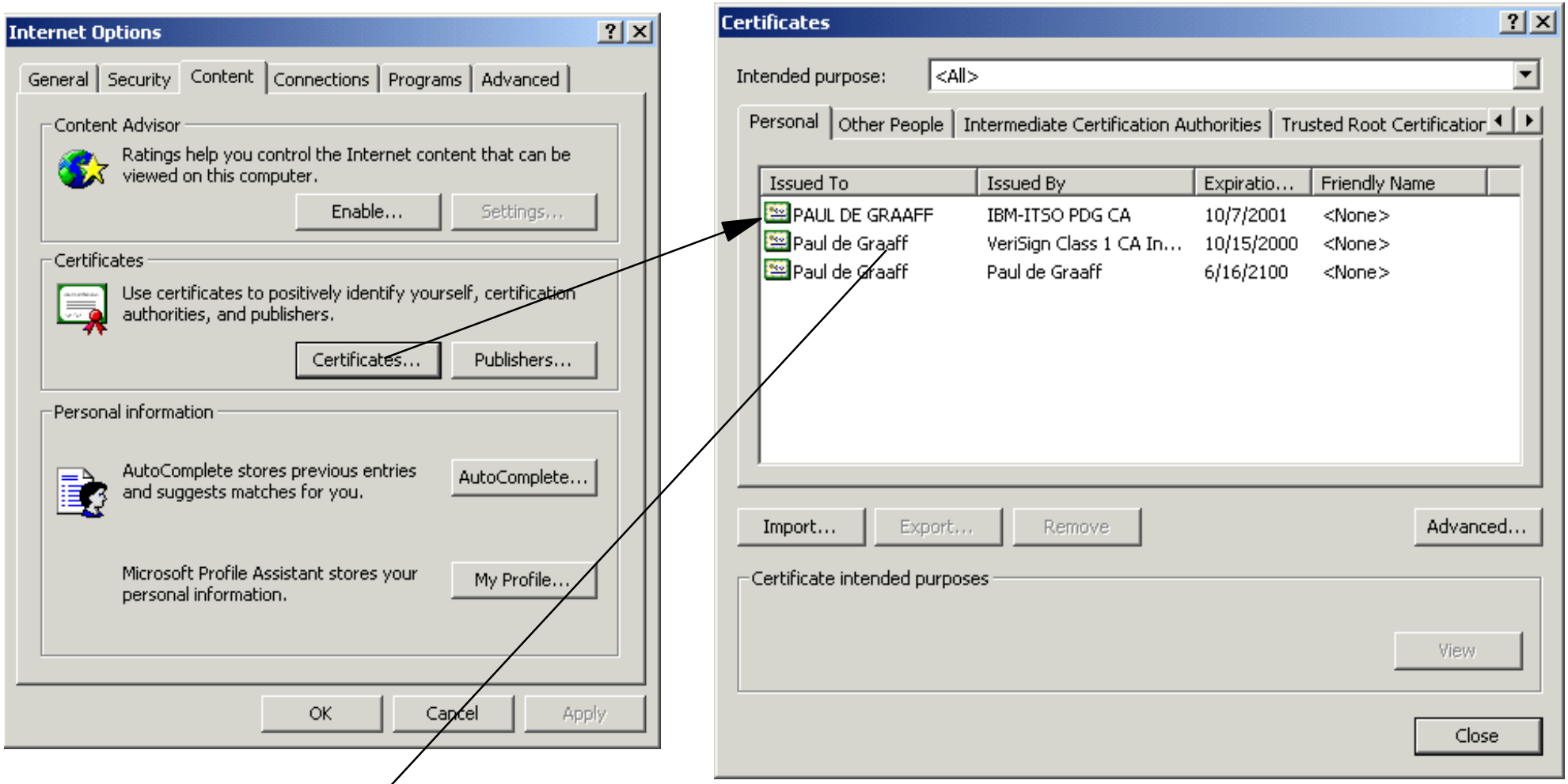


RACF SPE - Web based Interface



Common Name retrieved from RACF Name Field

RACF - RACDCERT LIST Output

Label: **Paul IE Certificate**
Certificate ID: 2QbH2cHBxsbXgaSTQMnFQMOFmaOJhomDgaOF
Status: TRUST
Start Date: 2000/10/07 00:00:00
End Date: 2001/10/07 23:59:59
Serial Number:
>10<
Issuer's Name:
>CN=IBM-ITSO PDG CA.OU=ITSO.O=IBM.C=US<
Subject's Name:
>**CN=PAUL DE GRAAFF**.OU=ITSO.O=IBM.C=US<
Key Usage: HANDSHAKE
Private Key Type: None
Ring Associations:
*** No rings associated ***

PKISERV - R_PKIServ Authorizations

To be able to generate a digital certificate, a User ID will need to be RACF SPECIAL or have access to:

IRR.RPKISERV.<function> in the **FACILITY** class

READ	-	access to subsequent RACDCERT functions is based on the client's User ID
UPDATE	-	access to subsequent RACDCERT functions is based on the daemon User ID (not used by Websphere)
CONTROL	-	no subsequent checks are being made to RACDCERT functions

Functions are GENCERT and EXPORT !

Questions ???