IBM HTTP Server 8.5.5
SSL Certificate

```
********************************************************************
*****                  Table of Content                      *****
********************************************************************
```

```
********************************************************************
```

1 Information

This document will help with the installation of the IBM HTTP Server and configuration to a SSL certificate. If a SSL certificate is not provided then a self-signed certificated can be created using the IBM Key Management.

This document covers Linux and Windows operating system. You can use the document as a template for other Operating systems.

Useful links:

- IBM HTTP Server V8.5.5 - Knowledge Center
  https://www.ibm.com/support/knowledgecenter/en/SSEQTJ_8.5.5/as_ditamaps/was855_welcome_ihs.html

- Creating a Self-Signed Certificate - Knowledge Center
  https://www.ibm.com/support/knowledgecenter/en/SSEQTJ_8.5.5/com.ibm.websphere.ihs.doc/ihs/tihs_certselfsigned.html

- Working with key database - Knowledge Center
  https://www.ibm.com/support/knowledgecenter/en/SSEQTJ_8.5.5/com.ibm.websphere.ihs.doc/ihs/tihs_createkeydb.html

This document is not written or supported by IBM

Name	Date	Version	Description
Loc Dang	7/18/2017	V1	Install IBM HTTP Server and configure to a SSL certificate

2 IBM Installation Manager

To install IBM HTTP Server it requires the IBM Installation Manager. If IBM Installation Manager has been installed, this section can be skipped.

2.1 Media

1. Open a browser and set the URL to the **Installation Manager and Packaging Utility download documents** page

   http://www-01.ibm.com/support/docview.wss?uid=swg27025142

2. Navigate through the site to download IBM Installation Manager for the correct Operating System and bit version.

   Example: Media for IBM Installation Manager 1.8.6.1

Operating System	File Name
Linux 64bit	agent.installer.linux.gtk.x86_64_1.8.6001.20170428_1156.zip
Linux	agent.installer.linux.gtk.x86_1.8.6001.20170428_1156.zip
Windows 64bit	agent.installer.win32.win32.x86_64_1.8.6001.20170428_1156.zip
Windows	agent.installer.win32.win32.x86_1.8.6001.20170428_1156.zip

3. Create a directory for the extracted IBM Installation Manager media *<IIM_MEDIA>*

   Example:
```
WIN     F:/Media/IIM
LINUX   /opt/tmp/Media/IIM
```

4. Extract the media file to the newly created directory

2.2 Install

If a supported version of IBM Installation Manager is already installed, this section can be skipped. Verify the version of IBM Installation Manager is supported by the IBM HTTP Server before moving on to the next section. IBM Installation Manager can be installed through GUI, console mode and silent install. In this section, the installation will be done using the silent install.

https://www.ibm.com/support/knowledgecenter/SSDV2W_1.8.0/com.ibm.silentinstall12.doc/topics/r_install_cmd.html

Follow one of the following sections to install the IBM Installation Manager

- `Root/Administrator`
- `Non-Root/Non-Administrator`

NOTE: IBM Installation Manager can be installed for a group. This document does not cover the installation of IBM Installation Manager for a group.

2.2.1 Root/Administrator

This section only needs to be followed when installing the IBM Installation Manager as root or an administrator.

1. Login to the IBM HTTP Server file system
2. Open a command prompt
3. Change to the IBM Installation Manager media directory *<IIM_MEDIA>*

    Example:
```
WIN             cd F:/Media/IIM/
LINUX           cd /opt/tmp/Media/IIM/
```

4. Run the following command on one line to install IBM Installation Manager
```
installc(.exe) -installationDirectory <IIM_HOME>/eclipse -log <LOGFILE>
-acceptLicense
```

    Example: WINDOWS
```
installc.exe -installationDirectory E:\IBM\InstallationManager\eclipse
-log F:\IIM_Install.log -acceptLicense
```

    Example: LINUX
```
./installc -installationDirectory /opt/IBM/InstallationManager/eclipse
-log /opt/tmp/IIM_Install.log -acceptLicense
```

5. Verify the install results
```
Installed com.ibm.cic.agent_<IIM_VERSION> to the <IIM_HOME>/eclipse
directory
```

    Example: WINDOWS
```
Installed com.ibm.cic.agent_1.8.6001.20170428_1156 to the
E:\IBM\InstallationManager\eclipse directory.
```

    Example: LINUX
```
Installed com.ibm.cic.agent_1.8.6001.20170428_1156 to the
/opt/IBM/InstallationManager/eclipse directory.
```

2.2.2 Non-Root

This section only needs to be followed when installing the IBM Installation Manager as a non-root or non-administrator user.

1. Login to the IBM HTTP Server
2. Open a command prompt.
3. Change to the IBM Installation Manager media directory *<IIM_MEDIA>*

    Example:
```
WIN     cd F:/Media/IIM/
LINUX   cd /opt/tmp/Media/IIM/
```

4. Run the following command on one line to install IBM Installation Manager

```
userinstc(.exe) –installationDirectory <IIM_HOMER>/eclipse –log
<LOGFILE> –acceptLicense
```

    Example: WINDOWS
```
userinstc.exe -installationDirectory E:\IBM\InstallationManager\eclipse
–log F:\temp\IIM_Install.log -acceptLicense
```

    Example: LINUX
```
./userinstc -installationDirectory /opt/IBM/InstallationManager/eclipse
-log /opt/tmp/IIM_Install.log -acceptLicense
```

5. Verify the install results
```
Installed com.ibm.cic.agent_<IIM_VERSION> to the <IIM_HOME>/eclipse
directory
```

    Example: WINDOWS
```
Installed com.ibm.cic.agent_1.8.6001.20170428_1156 to the
E:\IBM\InstallationManager\eclipse directory.
```

    Example: LINUX
```
Installed com.ibm.cic.agent_1.8.6001.20170428_1156 to the
/opt/IBM/InstallationManager/eclipse directory.
```

3   IBM HTTP Server

3.1 *Media*

3.1.1 WebSphere Application Server Supplements 8.5.5

The WebSphere Application Server Supplements contains the IBM HTTP Server, WebSphere Plugins and WebSphere Customization tool installation media files.

1. Download the following WebSphere Application Server Supplement media files from Passport advantage. Save the files to a temporary media location *<MEDIA>*

   MEDIA = _____

   Example:
   ```
   WIN     F:\Media
   LINUX   /opt/tmp/Media
   ```

Media	File Name	Description
CIK1VML	WAS_V8.5.5_SUPP_1_OF_3.zip	IBM WebSphere Application Server V8.5.5 Supplements (1 of 3) for Multiplatform Multilingual
CIK1WML	WAS_V8.5.5_SUPP_2_OF_3.zip	IBM WebSphere Application Server V8.5.5 Supplements (2 of 3) for Multiplatform Multilingual
CIK1XML	WAS_V8.5.5_SUPP_3_OF_3.zip	IBM WebSphere Application Server V8.5.5 Supplements (3 of 3) for Multiplatform Multilingual

2. Create a directory where the extracted files of the WebSphere Application Server Supplements media will be extracted to *<MWASSUP>*

   MWASSUP = _____

   Example:
   ```
   WIN     F:\Media\WASSUPP
   LINUX   /opt/tmp/Media/WASSUPP
   ```

3. Extract all files to the same directory *<MWASSUPP>*

   Example:
   ```
   <MWASSUPP>/disk1/…
   <MWASSUPP>/disk2/…
   <MWASSUPP>/disk3/…
   <MWASSUPP>/lafiles/…
   <MWASSUPP>/readme_appclient/…
   ```

```
        <MWASSUPP>/readme_ihs/…
        <MWASSUPP>/readme_plugclient/…
        <MWASSUPP>/readme_plugins/…
        <MWASSUPP>/readme_wct/…
        <MWASSUPP>/Remote_Installation_Tool_for_IBM_i/…
        <MWASSUPP>/responsefiles/…
        <MWASSUPP>/Copyright.txt
        <MWASSUPP>/repository.config
```

3.1.2 WebSphere Application Server Supplements Fixpack

1. Open a browser and set the following link below

   Recommended updates for WebSphere Application Server
   http://www-01.ibm.com/support/docview.wss?uid=swg27004980#ver85_0

2. Navigate to the latest fixpack and download the WebSphere Application Server
   Supplement fixpack media. Save the files to a temporary media location
   <MEDIA>

   MEDIA = _____

   Example:
```
WIN    F:\Media
LINUX  /opt/tmp/Media
```

Supplements local repository ZIP files containing Application Client, Web server plug-ins, Pluggable Application Client, IBM HTTP Server

Example: Fixpack 11

File Name	Description
8.5.5-WS-WASSupplements-FP011-part1.zip	8.5.5-WS-WASSupplements-FP011-part1 for distributed platforms
8.5.5-WS-WASSupplements-FP011-part2.zip	8.5.5-WS-WASSupplements-FP011-part2 for distributed platforms
8.5.5-WS-WASSupplements-FP011-part13.zip	8.5.5-WS-WASSupplements-FP011-part3 for distributed platforms

3. Create a directory where the extracted files of the WebSphere Application Server
   Supplements fixpack media will be extracted to. *<MWASSUP>*

   MWASSUP = _____

   Example:
```
WIN    F:\Media\WASSUPP
LINUX  /opt/tmp/Media/WASSUPP
```

4. Extract all files to the same directory *<MWASSUPP>*

Example:

```
<MWASSUPP>/disk1/…
<MWASSUPP>/disk2/…
<MWASSUPP>/disk3/…
<MWASSUPP>/lafiles/…
<MWASSUPP>/readme_appclient/…
<MWASSUPP>/readme_ihs/…
<MWASSUPP>/readme_plugclient/…
<MWASSUPP>/readme_plugins/…
<MWASSUPP>/readme_wct/…
<MWASSUPP>/Remote_Installation_Tool_for_IBM_i/…
<MWASSUPP>/responsefiles/…
<MWASSUPP>/Copyright.txt
<MWASSUPP>/repository.config
```

3.2 Install

3.2.1 Root/Administrator

1. Login to the IBM HTTP Server file system

2. Run the following command to install IBM HTTP Server. When installing as a non-root user, the port used during installation must be 1024 or higher.

```
<IIM_HOME>/eclipse/tools/imcl(.exe) install com.ibm.websphere.IHS.v85 -
silent -acceptLicense -installationDirectory <IHS_HOME> -repositories
<MWASSUPP> -properties user.ihs.httpPort=<PORT_NUMBER> -
sharedResourcesDirectory <IMSHARED> -log <LOGFILE>
```

Example: WINDOWS
```
E:\IBM\InstallationManager\eclipse\tools\imcl.exe install
com.ibm.websphere.IHS.v85 -silent -acceptLicense -installationDirectory
E:\IBM\HTTPServer -repositories F:\Media\WASSUPP -properties
user.ihs.httpPort=80 -sharedResourcesDirectory E:\IBM\IMShared -log
F:\IHS_Install.log
```

Example: LINUX
```
/opt/IBM/InstallationManager/eclipse/tools/imcl install
com.ibm.websphere.IHS.v85 -silent -acceptLicense -installationDirectory
/opt/IBM/HTTPServer -repositories /opt/tmp/Media/WASSUPP -properties
user.ihs.httpPort=80 -sharedResourcesDirectory /opt/IBM/IMShared -log
/opt/tmp/IHS_Install.log
```

3. Verify the installed message
```
Installed com.ibm.websphere.IHS.v85_8.5.5000.20130514_1044 to the
<IHS_HOME> directory.
```

Example: WINDOWS
```
Installed com.ibm.websphere.IHS.v85_8.5.5000.20130514_1044 to the
E:\IBM\HTTPServer directory.
```

Example: LINUX
```
Installed com.ibm.websphere.IHS.v85_8.5.5000.20130514_1044 to the
/opt/IBM/HTTPServer directory.
```

3.2.2 Non-Root/Non-Administrator

1. Login to the IBM HTTP Server file system

2. Run the following command to install IBM HTTP Server. When installing as a non-root user, the port used during installation must be 1024 or higher.

```
<IIM_HOME>/eclipse/tools/imcl(.exe) install com.ibm.websphere.IHS.v85 -
silent -acceptLicense -installationDirectory <IHS_HOME> -repositories
<MWASSUPP> -properties
user.ihs.httpPort=<PORT_NUMBER>,user.ihs.allowNonRootSilentInstall=true
-sharedResourcesDirectory <IMSHARED> -log <LOGFILE>
```

Example: WINDOWS
```
E:\IBM\InstallationManager\eclipse\tools\imcl.exe install
com.ibm.websphere.IHS.v85 -silent -acceptLicense -installationDirectory
E:\IBM\HTTPServer -repositories F:\Media\WASSUPP -properties
user.ihs.httpPort=8080,user.ihs.allowNonRootSilentInstall=true  -
sharedResourcesDirectory E:\IBM\IMShared -log F:\Logs\IHS_Install.log
```

Example: LINUX
```
/opt/IBM/InstallationManager/eclipse/tools/imcl install
com.ibm.websphere.IHS.v85 -silent -acceptLicense -installationDirectory
/opt/IBM/HTTPServer -repositories /opt/tmp/Media/WASSUPP -properties
user.ihs.httpPort=8080,user.ihs.allowNonRootSilentInstall=true -
sharedResourcesDirectory /opt/IBM/IMShared -log
/opt/tmp/IHS_Install.log
```

3. Verify the installed message
```
Installed com.ibm.websphere.IHS.v85_8.5.5000.20130514_1044 to the
<IHS_HOME> directory.
```

Example: WINDOWS
```
Installed com.ibm.websphere.IHS.v85_8.5.5000.20130514_1044 to the
E:\IBM\HTTPServer directory.
```

Example: LINUX
```
Installed com.ibm.websphere.IHS.v85_8.5.5000.20130514_1044 to the
/opt/IBM/HTTPServer directory.
```

3.3 Update Fixpack

1. Login to the IBM HTTP Server file system
2. Run the following command to update IBM HTTP Server

```
<IIM_HOME>/eclipse/tools/imcl(.exe) install com.ibm.websphere.IHS.v85 -
silent -acceptLicense -installationDirectory <IHS_HOME> -repositories
<MWASSUPP>/repository.config -log <LOGFILE>
```

Example: WINDOWS
```
E:\IBM\InstallationManager\eclipse\tools\imcl.exe install
com.ibm.websphere.IHS.v85 -silent -acceptLicense -installationDirectory
E:\IBM\HTTPServer -repositories F:\Media\SUPPFP -log
F:\Logs\IHS_Update.log
```

Example: LINUX
```
/opt/IBM/InstallationManager/eclipse/tools/imcl install
com.ibm.websphere.IHS.v85 -silent -acceptLicense -installationDirectory
/opt/IBM/HTTPServer -repositories /opt/tmp/Media/SUPPFP -log
/opt/tmp/IHS_Update.log
```

3. Verify the installed message
```
Updated to com.ibm.websphere.IHS.v85_<VERSION> in the <IHS_HOME>
directory.
```

NOTE: Depending on the version of the fixpack, the following message will appear. Since this is an IBM HTTP Server fixpack update, no further steps are required.

```
WARNING: Your default Java SDK is Java SE 6. After April 2018, service
for JavaSE 6 can no longer be provided, which could expose your
environment to security risks.

To stay current and reduce the risk of security exposures, update to
Java SE 8 using one of the following options:
- Install WebSphere Application Server 8.5.5.11 or later with Java SE
8.
- Migrate to WebSphere Application Server traditional Version 9.
```

Example: WINDOWS
```
Installed com.ibm.websphere.IHS.v85_8.5.5011.20161206_1434 to the
E:\IBM\HTTPServer directory.
```

Example: LINUX
```
Installed com.ibm.websphere.IHS.v85_8.5.5011.20161206_1434 to the
/opt/IBM/HTTPServer directory.
```

3.4 Post Step for Windows

When installing IBM HTTP Server on windows a windows service must be used to start and stop the HTTP process. Use this section to create a windows service.

1. Login to the IBM HTTP Server file system
2. Change to the bin directory of the IBM HTTP Server home directory

```
<IHS_HOME>\bin
```

Example: `E:\IBM\HTTPServer\bin`

3. Run the following command to create a Windows service for IBM HTTP Server. For a non-administrator on windows, run the command in a command prompt set to "Run as Administrator"

```
httpd.exe -k install
```

Note: There are other options to customize the Windows service for IBM HTTP Server

```
-n <WINDOWS SERVICE NAME>
-f <HTTPD.CONF LOCATION>
```

Example:

```
httpd.exe -k install -n "IBM HTTP Server V8.5 service" -f
E:\IBM\HTTPServer\conf\httpd.conf
```
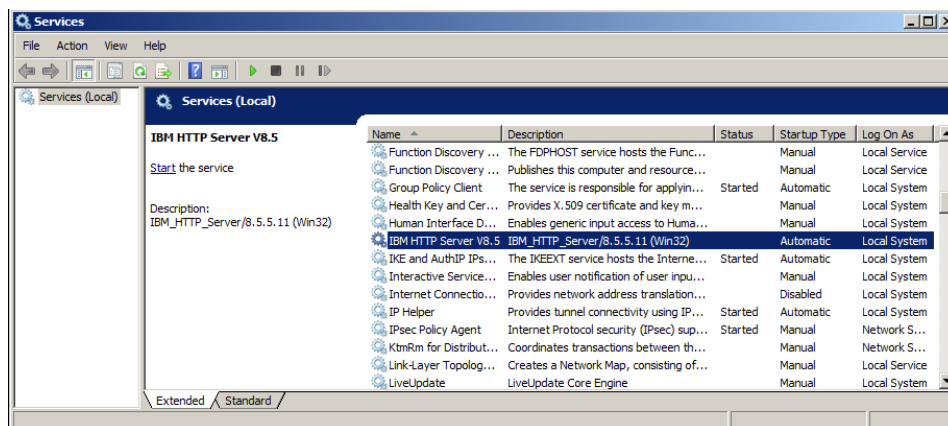
4. Verify the results

```
Installing the IBM HTTP Server V8.5 service
The IBM HTTP Server V8.5 service is successfully installed.
Testing httpd.conf....
Errors reported here must be corrected before the service can be
started.
```

5. Open the windows service and verify the new service exist.

3.5 Validate

1. Login to the IBM HTTP Server file system
2. Open a command prompt

3. Run the following command to start the IBM HTTP Server. For a non-administrator on windows, run the command in a command prompt set to "Run as Administrator"

```
WIN     <IHS_HOME>\bin\apache.exe -k start
LINUX   <IHS_HOME>/bin/apachectl -k start
```
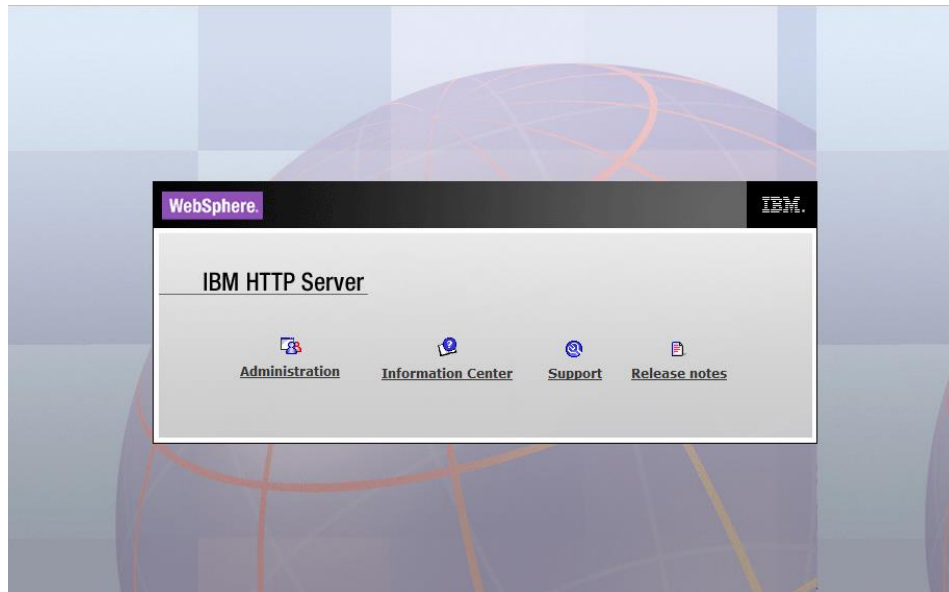
Example:
```
WIN     E:\IBM\HTTPServer\bin\apache.exe -k start
LINUX   /opt/IBM/HTTPServer/bin/apachectl -k start
```

4. Open a browser and set the URL to the IBM HTTP Server
```
http://<HOSTNAME>:<PORT>
```

Example: http://myihs.loc.com:80

5. Run the following command to stop the IBM HTTP Server. For a non-administrator on windows, run the command in a command prompt set to "Run as Administrator"

```
WIN     <IHS_HOME>\bin\apache.exe -k stop
LINUX   <IHS_HOME>/bin/apachectl -k stop
```

Example:
```
WIN     E:\IBM\HTTPServer\bin\apache.exe -k stop
LINUX   /opt/IBM/HTTPServer/bin/apachectl -k stop
```

4 SSL Certificate

4.1 Create Self-Signed Certificate

If SSL on the webserver is required either create a self-signed certificate or request a signed certificated. This section will help with creating a self-signed certificate using IBM Key Management.

1. Login to the IBM HTTP Server file system
2. Create a directory where the self-signed certificated will be located

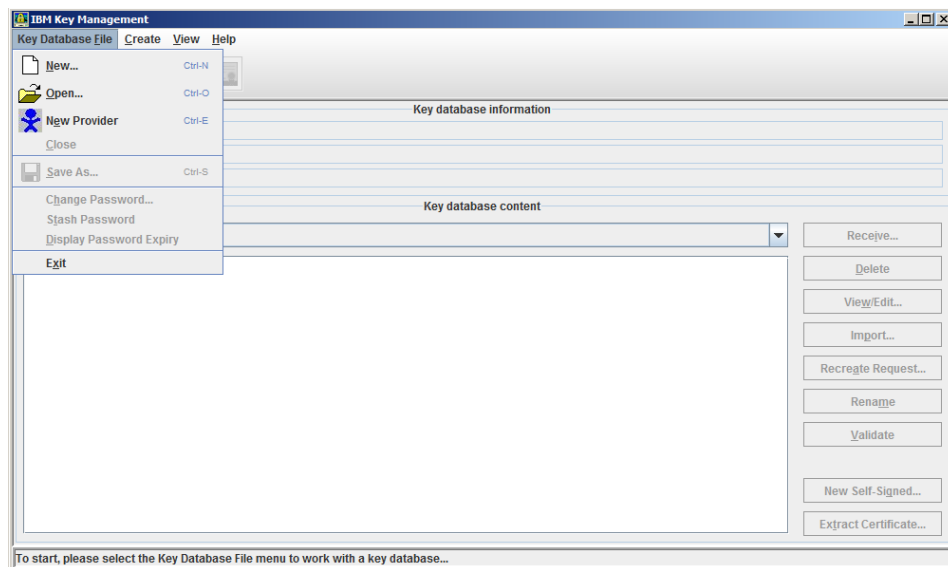   SSL_HOME = _____

   Example: `<IHS_HOME>/ssl`

   ```
   WIN     E:\IBM\HTTPServer\ssl
   LINUX   /opt/IBM/HTTPServer/ssl
   ```

3. Run the following command to start the IBM Key Management
   ```
        <IHS_HOME>/bin/ikeyman(.bat)
   ```

   Example:
   ```
   WIN     E:\IBM\HTTPServer\bin\ikeyman.bat
   LINUX   /opt/IBM/HTTPServer/bin/ikeman
   ```


4. Click Key Database File > New…

5. Fill in the following information

Key database type	CMS
File Name	
Location	

Example: Windows

Key database type	CMS
File Name	key.kdb
Location	E:\IBM\HTTPServer\ssl

Example: Linux

Key database type	CMS
File Name	key.kdb
Location	/opt/IBM/HTTPServer/ssl

6. Click OK

7. Enter a password in the Password and Confirm Password field.

Password = _____

8. Check **Stash password to a file**
9. Click OK
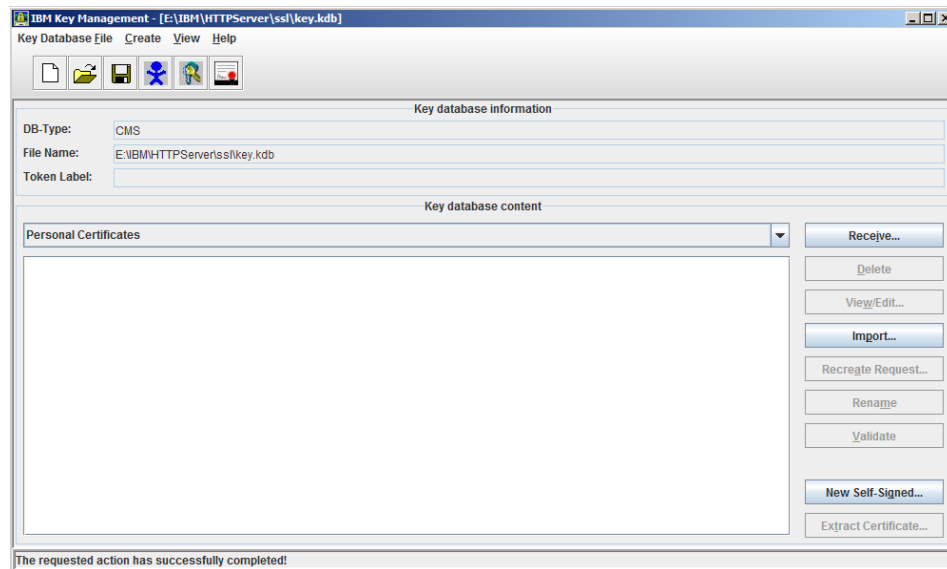
10. Click **New Self-Signed…** button

11. Fill in the following information

Key Label	Required	
Version	Required	
Key Size	Required	
Signature Algorithm	Required	
Common Name	Optional	
Organization	Optional	
Organization Unit	Optional	
Locality	Optional	
State/Providence	Optional	
Zipcode	Optional	
Country or region	Optional	
Validity Period	Required	
Email Address	Optional	
IP Address	Optional	
DNS Name	Optional	

Example:

Key Label	Required	myihs
Version	Required	X509 V3
Key Size	Required	1024
Signature Algorithm	Required	SHA1WithRSA
Common Name	Optional	myihs.loc.com
Organization	Optional	
Organization Unit	Optional	
Locality	Optional	
State/Providence	Optional	NC
Zipcode	Optional	27709
Country or region	Optional	
Validity Period	Required	365
Email Address	Optional	
IP Address	Optional	
DNS Name	Optional	

NOTE: The Common Name can contain a wild card to accept multiple hostnames

12. Click OK
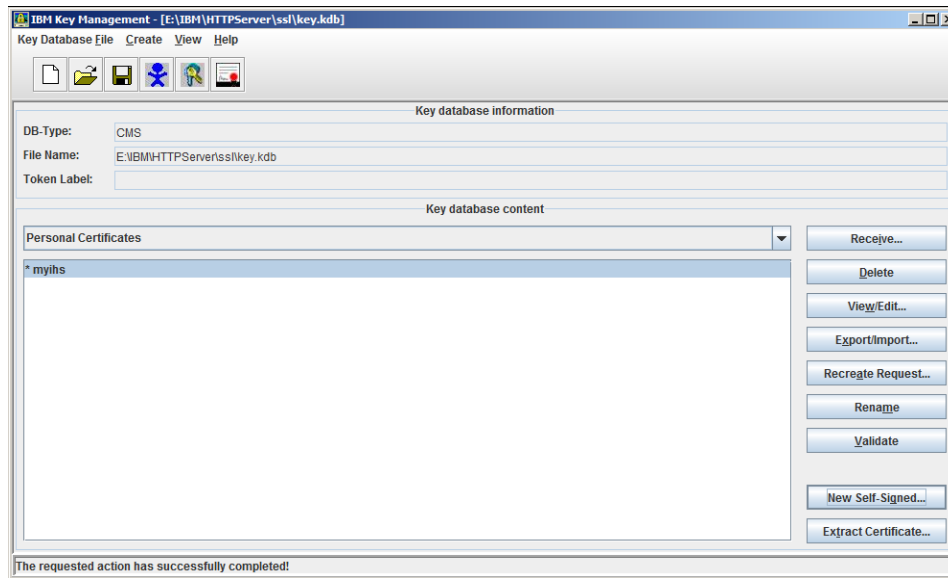
13. Close IBM Key Management
14. Using a command prompt or file explorer, verify the ssl file has been created

```
<SSL_HOME>/<KEYDB_FILENAME>
```

Example:

```
WIN     E:\IBM\HTTPServer\ssl\key.kdb
LINUX   /opt/IBM/HTTPServer/ssl/key.kdb
```

4.2 Configure SSL Certificate to IBM HTTP Server

4.2.1 Windows

1. Login to the IBM HTTP Server file system
2. Open the httpd.conf file of the IBM HTTP Server with an editor

```
<IHS_HOME>\conf\httpd.conf
```

Example: `E:\IBM\HTTPServer\conf\httpd.conf`

3. Uncomment the SSL configuration

Before: Windows
```
# Example SSL configuration which supports SSLv3 and TLSv1
# To enable this support:
#   1) Create a key database with ikeyman
#   2) Update the KeyFile directive below to point to that key database
#   3) Uncomment the directives up through the end of the example
#      Note: The IPv6 Listen directive must only be uncommented if
#      IPv6 networking is enabled.
#
#LoadModule ibm_ssl_module modules/mod_ibm_ssl.so
#Listen 0.0.0.0:443
## IPv6 support:
#Listen [::]:443
#<VirtualHost *:443>
#SSLEnable
#SSLProtocolDisable SSLv2
#</VirtualHost>
#KeyFile E:/IBM/HTTPServer/ihsserverkey.kdb
#SSLDisable
# End of example SSL configuration
```

After: Example
```
# Example SSL configuration which supports SSLv3 and TLSv1
# To enable this support:
#   1) Create a key database with ikeyman
#   2) Update the KeyFile directive below to point to that key database
#   3) Uncomment the directives up through the end of the example
#      Note: The IPv6 Listen directive must only be uncommented if
#      IPv6 networking is enabled.
#
LoadModule ibm_ssl_module modules/mod_ibm_ssl.so
Listen 0.0.0.0:443
## IPv6 support:
Listen [::]:443
<VirtualHost *:443>
SSLEnable
SSLProtocolDisable SSLv2
```

```
</VirtualHost>
KeyFile E:/IBM/HTTPServer/ihsserverkey.kdb
SSLDisable
# End of example SSL configuration
```

4. Update the KeyFile with the correct location of the ssl certificate

Before:
```
    KeyFile E:/IBM/HTTPServer/ihsserverkey.kdb
```

After:
```
    KeyFile E:/IBM/HTTPServer/ssl/key.kdb
```

5. Save httpd.conf
6. Start/Restart the IBM HTTP Server

4.2.2 Linux

1. Login to the IBM HTTP Server file system
2. Open the httpd.conf file of the IBM HTTP Server with an editor

```
    <IHS_HOME>/conf/httpd.conf
```

Example: `/opt/IBM/HTTPServer/conf/httd.conf`

3. Uncomment the SSL configuration

Before:
```
# Example SSL configuration which supports SSLv3 and TLSv1
# To enable this support:
#   1) Create a key database with ikeyman
#   2) Update the KeyFile directive below to point to that key database
#   3) Uncomment the directives up through the end of the example
#
#LoadModule ibm_ssl_module modules/mod_ibm_ssl.so
#Listen 443
#<VirtualHost *:443>
#SSLEnable
#</VirtualHost>
#KeyFile /opt/IBM/HTTPServer/ihsserverkey.kdb
#SSLDisable
# End of example SSL configuration
```

After: Example
```
# Example SSL configuration which supports SSLv3 and TLSv1
# To enable this support:
#   1) Create a key database with ikeyman
#   2) Update the KeyFile directive below to point to that key database
#   3) Uncomment the directives up through the end of the example
```

```
#
LoadModule ibm_ssl_module modules/mod_ibm_ssl.so
Listen 443
<VirtualHost *:443>
SSLEnable
</VirtualHost>
KeyFile /opt/IBM/HTTPServer/ihsserverkey.kdb
SSLDisable
# End of example SSL configuration
```

4. Update the Listen port to the SSL port desired. By default, it is 443. If running as a non-root user, the port must be 1024 or higher

    Example:
```
ROOT          Listen 443
NON-ROOT      Listen 9443
```

5. Update the virtual host with the port matching the listening port

    Example:
```
ROOT          <VirtualHost *: 443>
NON_ROOT      <VirtualHost *: 9443>
```

6. Update the KeyFile with the correct location of the ssl certificate

Before: Example
```
        KeyFile /opt/IBM/HTTPServer/ihsserverkey.kdb
```

After: Example
```
        KeyFile /opt/IBM/HTTPServer/ssl/key.kdb
```

7. Save httpd.conf
8. Start/Restart the IBM HTTP Server

4.3 Validate

1. Login to the IBM HTTP Server file system
2. Open a command prompt
3. Run the following command to start the IBM HTTP Server. For a non-administrator on windows, run the command in a command prompt set to "Run as Administrator"

```
WIN     <IHS_HOME>\bin\apache.exe -k start
LINUX   <IHS_HOME>/bin/apachectl -k start
```
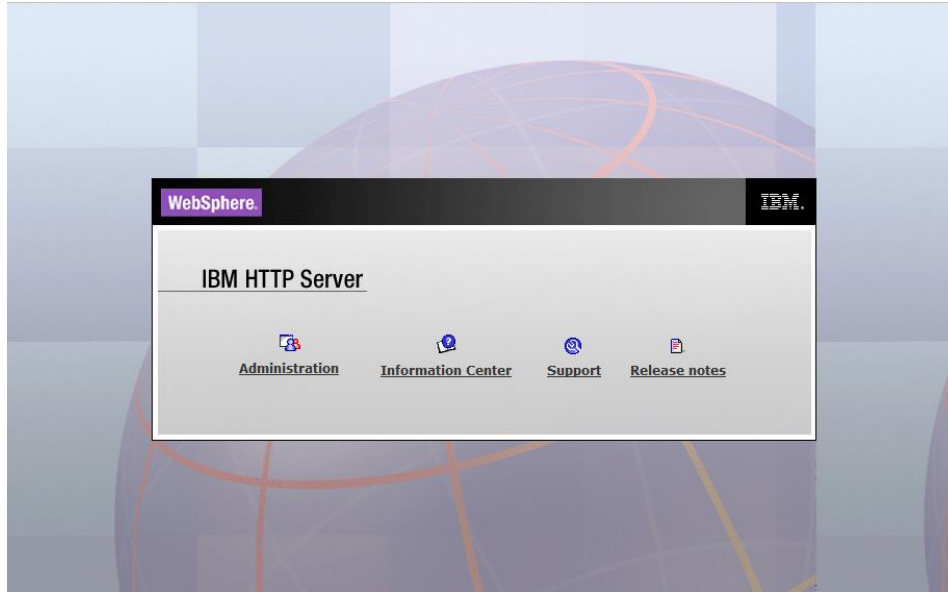
    Example:
```
WIN     E:\IBM\HTTPServer\bin\apache.exe -k start
LINUX   /opt/IBM/HTTPServer/bin/apachectl -k start
```

4. Open a browser and set the URL to the IBM HTTP Server

   `https://<HOSTNAME>:<PORT>`

   Example:
```
ROOT/Administrator     https://myihs.loc.com:443
NON-ROOT/Administrator https://myihs.loc.com:9443
```


5. Run the following command to stop the IBM HTTP Server. For a non-administrator on windows, run the command in a command prompt set to "Run as Administrator"

```
WIN     <IHS_HOME>\bin\apache.exe -k stop
LINUX   <IHS_HOME>/bin/apachectl -k stop
```

   Example:
```
WIN     E:\IBM\HTTPServer\bin\apache.exe -k stop
LINUX   /opt/IBM/HTTPServer/bin/apachectl -k stop
```

5 Troubleshoot

5.1 Required components supplied by other packages

Error:
```
ERROR: The installation package IBM HTTP Server for WebSphere
Application Server 8.5.5.0 requires components supplied by other
packages.
To fix the issue, either install the required components or deselect
the installation package.
The required components may be supplied by the following installation
packages:
Package: Microsoft Visual C++ 2008 Redistributable Package
```

Solution:
Install Package Microsoft Visual C++ 2008 Redistributable Package and restart the
Operating System

5.2 Permission denied: make_sock: could not bind to address

Error:
apache.exe -k start
```
(OS 10048)Only one usage of each socket address (protocol/network
address/port)
is normally permitted.  : make_sock: could not bind to address
0.0.0.0:80
no listening sockets available, shutting down
```

./apachectl -k start
```
(13)Permission denied: make_sock: could not bind to address [::]:443
(13)Permission denied: make_sock: could not bind to address 0.0.0.0:443
no listening sockets available, shutting down
Unable to open logs
```

Solution:
Review the httpd.conf and verify the ssl port. Verify the ssl port is above 1024

5.3 Locking is not possible in the directory

Error:
userinstc.exe -installationDirectory E:\IBM\InstallationManager\eclipse -log
F:\IIM_Install.log -acceptLicense
```
Invalid Configuration Location:
```

```
Locking is not possible in the directory
"F:\Media\IIM\configuration\org.eclipse.osgi". A common reason is that
the file system or Runtime Environment does not support file locking
for that location. Please choose a different location, or disable file
locking passing "-Dosgi.locking=none" as a VM argument.
F:\Media\IIM\configuration\org.eclipse.osgi\.manager\.fileTableLock
(Access is denied)
```

Solution:
Check the permission of the media files
Check the permission of the location where the log file is being saved

5.4 Your user ID or group has insufficient permission

Error:
userinstc.exe -installationDirectory E:\IBM\InstallationManager\eclipse -log
F:\IIM_Install.log -acceptLicense
```
ERROR: Your user ID or group has insufficient permissions granted for
the installation directory path: E:\IBM\InstallationManager\eclipse.
Ensure that your user ID or group has at least write permission to the
installation directory and execute permission to each directory
preceding the installation directory.
```

Solution:
Check the permission of the location of where the product is being installed to.

5.5 (OS 5) Access is denied. : Failed to open the WinNT service manager

Error:
httpd.exe -k install
```
Installing the IBM HTTP Server V8.5 service
(OS 5)Access is denied.  : Failed to open the WinNT service manager
```

Solution:
Open a command prompt as "Run as Administrator"