



ADSS Web RA Installation Guide

ASCERTIA LTD

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1 Introduction

Registration Authority (RA) is another important component of PKI along with Certificate Authority (CA). CA is primarily responsible to create and revoke certificates, but complex business scenarios demand more than just the creation of certificates. Their responsibilities now include but not limited to managing users, certificate creation requests and revocation of certificates.

Businesses in the modern world require strong control over these processes along with the complete audit trail, to maintain the irrefutable evidence of these activities for future. Such additional controls and management are covered by an RA. An RA is therefore responsible to verify a user and their certificate request, and then inform the CA to issue the requested certificate.

An RA receives a request for digital certificate and verifies the user requesting the certificate. The user verification can be done manually through face to face interaction or electronically by using other mediums like phone, video conferencing, mail or courier that is acceptable to the RA as a secured medium. Once RA approves the user, it informs the CA to issue the certificate for the user. The RA then obtains the user certificate from the CA, and sends it to the user using a secure medium.

1.1 Scope

This manual describes how to install ADSS Web RA.

ADSS Web RA comprises four components and the installation procedure for all are covered herein:

- **Web** interface that provides user services on desktop browsers.
- **Admin** console that provides system administration and configuration.
- **API** that utilises the ASP.NET Web API framework to provide a REST architecture.
- **Device** is used to manage device enrolment for certificate creation.

1.2 Intended Readership

This manual is intended for administrators responsible for installation and initial configuration. It is assumed that the reader has a good understanding of web applications running on IIS, digital signatures, digital certificates and IT security.

1.3 Technical Support

If technical support is required, Ascertia has a dedicated support team providing debugging and integration assistance as well as general customer support. Ascertia Support can be accessed through [Ascertia Ticketing System](#) or email address: support@ascertia.com

Ascertia provides formal support agreements with all product sales. Contact sales@ascertia.com for further details.

A Product Support Questionnaire should be completed in order to provide Ascertia Support having information about your system environment, along with details of any issues encountered. When requesting help, it is always important to confirm these details:

- System Platform.
- ADSS Web RA Version Number.
- Details of the specific issue and relevant steps taken to reproduce it if possible.
- Database vendor, version and patch level.
- Product log files.

1.4 Glossary

ADSS Web RA	A short form of Unified Web Registration Authority
Cert	A short form of Digital Certificate
DBMS	Database Management System
HSM	Hardware Security Module
HTTP	Hyper Text Transfer Protocol
HTTP/S	HTTP over SSL/TLS connection
SSL	Secure Sockets Layer

2 System Requirements

System Requirements includes hardware and software requirements both.

2.1 Hardware Prerequisites

Components	Requirements
Hard Disk Space	<ul style="list-style-type: none"> • 200 GB (Minimum)
Memory	<ul style="list-style-type: none"> • 16 GB (Minimum) • 24 GB (If the number of concurrent users is higher) • 32 GB (If the database is also deployed on the same system as the ADSS Web RA)
Processor	<ul style="list-style-type: none"> • A modern multi-core CPU such as Xeon E3-XXXX or E5-XXXX series is recommended
Processor Type	<ul style="list-style-type: none"> • x64
HSM (Optional)	<ul style="list-style-type: none"> • SafeNet Luna SA, Luna PCI, Luna G5 • SafeNet Protect Server (PCI or External) • Thales nShield Solo or Connect HSMs • Utimaco HSMs • Azure Keyvault • Amazon AWS Cloud HSM

2.2 Software Prerequisites

Component	Requirements
Operating Systems	<ul style="list-style-type: none"> Windows Server 2019 Windows Server 2016
Microsoft IIS	<ul style="list-style-type: none"> IIS 10 Application Development feature in IIS
IIS Rewrite Module	<ul style="list-style-type: none"> v2.1
.Net Framework	<ul style="list-style-type: none"> .Net Framework 4.7.2 or above
.Net Core Runtime & Hosting Bundle	<ul style="list-style-type: none"> ASP.NET Core Runtime 6.0.8 or above
Database Server	<ul style="list-style-type: none"> Microsoft SQL Server 2019 Microsoft SQL Server 2017 Microsoft SQL Server 2016 Microsoft SQL Server 2014
Database Management Studio	<ul style="list-style-type: none"> Microsoft SQL Server Management Studio 2019 Microsoft SQL Server Management Studio 2017 Microsoft SQL Server Management Studio 2016 Microsoft SQL Server Management Studio 2014
Web Brower (for end-users and administrators)	<p>The following browsers are supported:</p> <ul style="list-style-type: none"> Google Chrome 40+ Mozilla Firefox 35+ Microsoft Edge 14+ IE 11 (Not supported by Microsoft anymore) Apple Safari 8+ Opera 26+
ADSS Server	<p>ADSS Web RA uses ADSS Server under the hood to create and manage certificates for the end user as a CA. ADSS Server can be installed on a separate machine or on the same machine for testing and proof of concept. It is recommended to keep the ADSS installation on a separate machine for a production environment. For further requirements related to the installation of ADSS Server, please refer to the installation guide of ADSS Server.</p> <ul style="list-style-type: none"> ADSS Server 6.6 or above

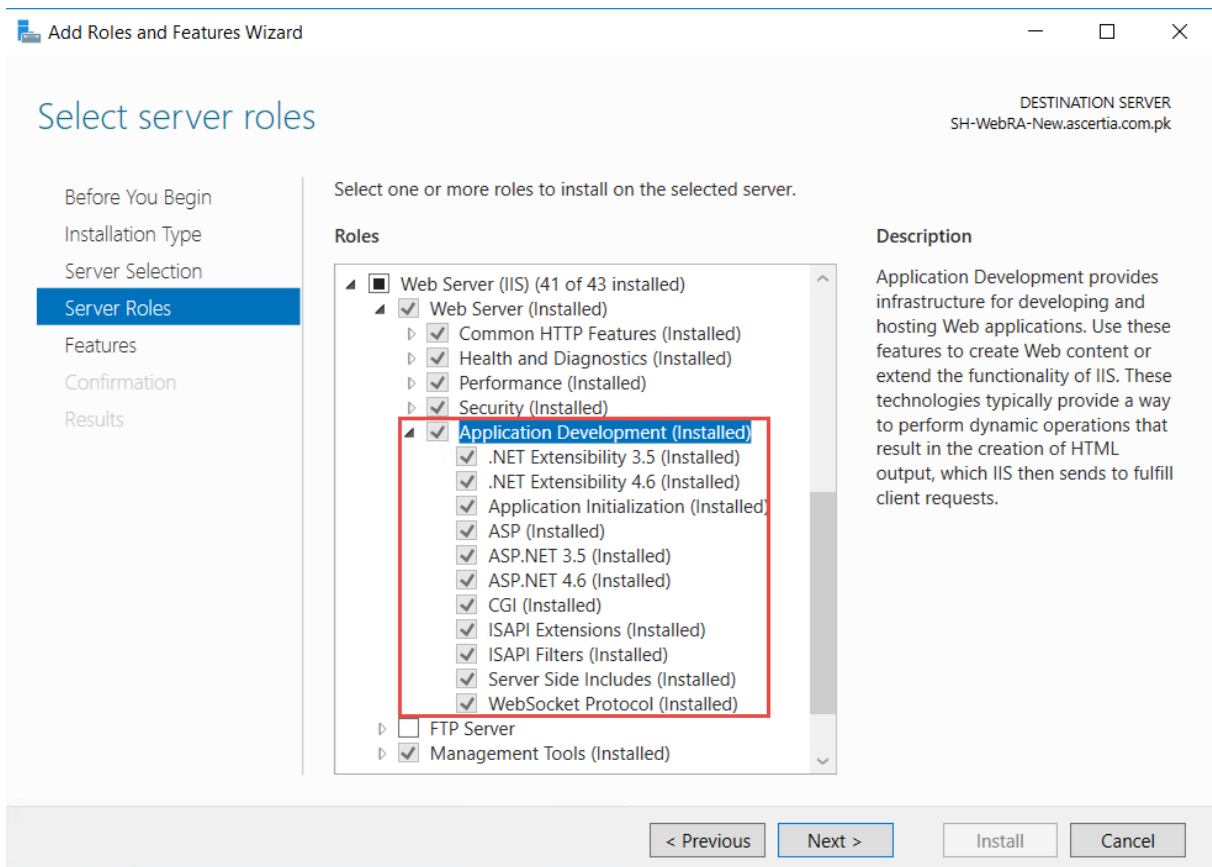
DMZ Proxy Systems	<p>A DMZ proxy server is recommended to provide enhanced security for ADSS Web RA. Supported web servers are:</p> <ul style="list-style-type: none">• Windows Server + IIS, Apache or IBM HTTP Server• Linux + Apache or IBM HTTP Server <p>It is recommended to use a reasonable CPU, 4 GB RAM (Minimum), 2000 MB Disk Space for the web server machine. ADSS Web RA and ADSS Server support network proxies to allow authenticated access to external services. Certificate generation with local smartcards or USB tokens requires ADSS Server Go>Sign Service.</p>
--------------------------	--

For testing and proof of concepts, ADSS Server and ADSS Web RA can be installed on the same machine along with the database server. However, for optimal performance in a production environment, it is always recommended to install them on separately dedicated machines.

The details given above are the minimum set of requirements; for higher concurrent use of the application the system requirements may vary based on the load and performance expectations.

2.3 Application Development feature in IIS

Enable the following feature in IIS of the deployment machine:



The screenshot shows the 'Add Roles and Features Wizard' window. The title bar reads 'Add Roles and Features Wizard'. The main heading is 'Select server roles'. On the right, it says 'DESTINATION SERVER SH-WebRA-New.ascertia.com.pk'. A navigation pane on the left lists steps: 'Before You Begin', 'Installation Type', 'Server Selection', 'Server Roles' (highlighted), 'Features', 'Confirmation', and 'Results'. The main area is titled 'Select one or more roles to install on the selected server.' and contains a tree view of roles. The 'Web Server (IIS) (41 of 43 installed)' role is expanded, showing sub-roles like 'Web Server (Installed)', 'Common HTTP Features (Installed)', 'Health and Diagnostics (Installed)', 'Performance (Installed)', 'Security (Installed)', 'Application Development (Installed)', '.NET Extensibility 3.5 (Installed)', '.NET Extensibility 4.6 (Installed)', 'Application Initialization (Installed)', 'ASP (Installed)', 'ASP.NET 3.5 (Installed)', 'ASP.NET 4.6 (Installed)', 'CGI (Installed)', 'ISAPI Extensions (Installed)', 'ISAPI Filters (Installed)', 'Server Side Includes (Installed)', and 'WebSocket Protocol (Installed)'. The 'Application Development (Installed)' role is highlighted with a red box. To the right, a 'Description' box explains that Application Development provides infrastructure for developing and hosting Web applications. At the bottom, there are buttons for '< Previous', 'Next >', 'Install', and 'Cancel'.

2.4 Microsoft .Net Core 6.0.8 Runtime & Hosting Bundle

Download the Microsoft .Net Core 6.0.8 runtime and hosting bundle from the following link:

- [Microsoft .Net Core 6.0.8 Runtime & Hosting Bundle](#)

Scroll down to 6.0.8 version and download the highlighted hosting bundle installer

6.0.8 Security patch

[Release notes](#) Latest release date August 9, 2022

Build apps - SDK

SDK 6.0.400

OS	Installers	Binaries
Linux	Package manager instructions	Arm32 Arm32 Alpine Arm64 Arm64 Alpine x64 x64 Alpine
macOS	Arm64 x64	Arm64 x64
Windows	Arm64 x64 x86 winget instructions	Arm64 x64 x86
All	dotnet-install scripts	

Visual Studio support
 Visual Studio 2022 (v17.2)
 Visual Studio 2022 for Mac (v17.3)

Included in
 Visual Studio 17.3.0

Included runtimes
 .NET Runtime 6.0.8
 ASP.NET Core Runtime 6.0.8
 .NET Desktop Runtime 6.0.8

Language support
 C# 10.0
 F# 6.0

Run apps - Runtime

ASP.NET Core Runtime 6.0.8

The ASP.NET Core Runtime enables you to run existing web/server applications. **On Windows, we recommend installing the Hosting Bundle, which includes the .NET Runtime and IIS support.**

IIS runtime support (ASP.NET Core Module v2)
 16.0.22195.8

OS	Installers	Binaries
Linux	Package manager instructions	Arm32 Arm32 Alpine Arm64 Arm64 Alpine x64 x64 Alpine
macOS		Arm64 x64
Windows	Hosting Bundle x64 x86 winget instructions	Arm64 x64 x86

.NET Desktop Runtime 6.0.8

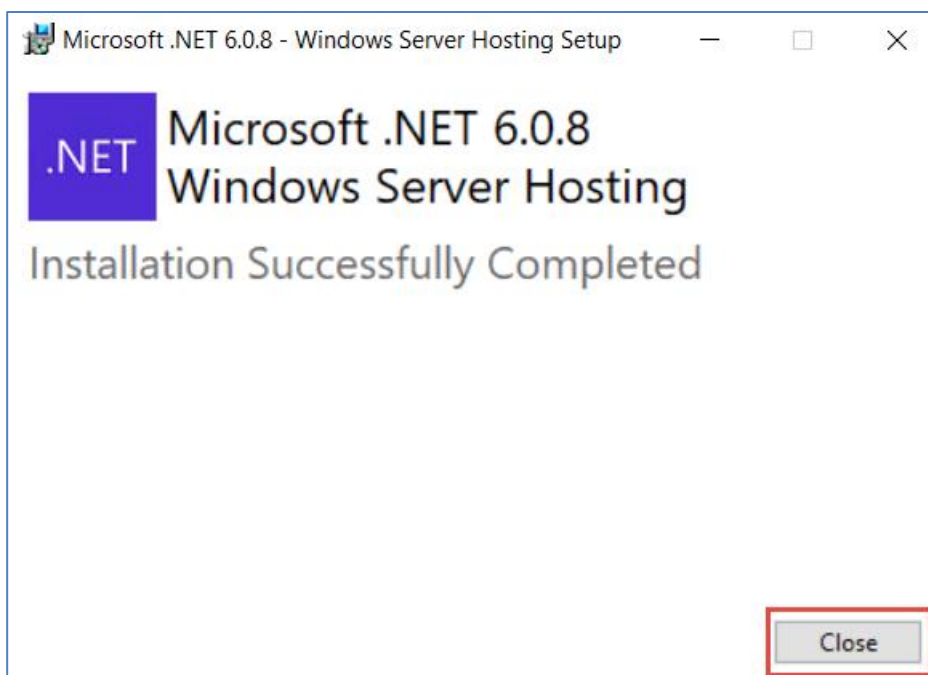
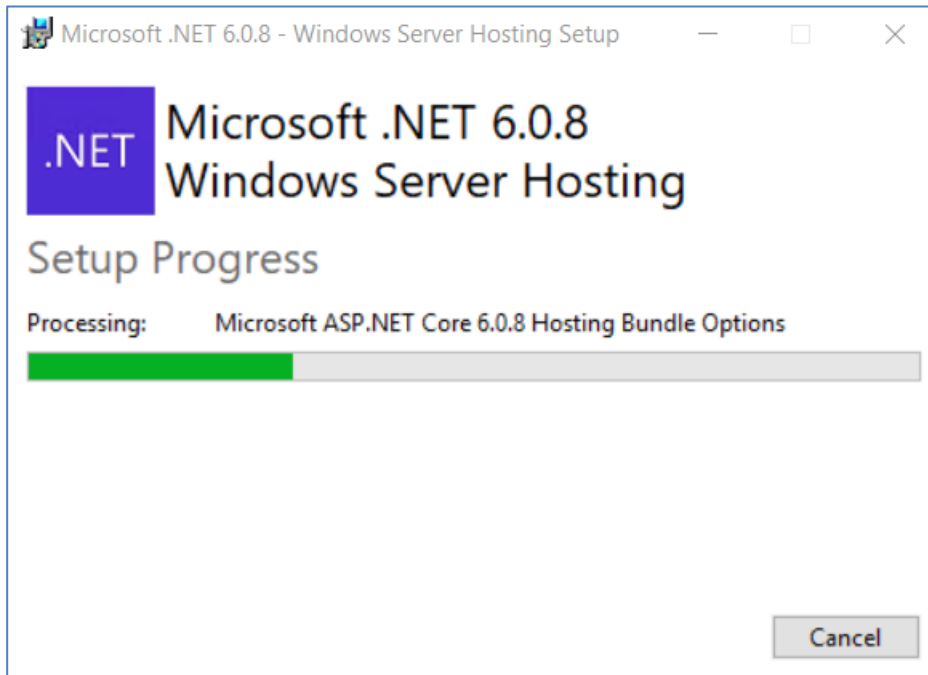
The .NET Desktop Runtime enables you to run existing Windows desktop applications. **This release includes the .NET Runtime; you don't need to install it separately.**

OS	Installers	Binaries
Windows	Arm64 x64 x86 winget instructions	

Once downloaded execute the installer by executing **dotnet-hosting-6.0.8-win.exe**



Agree to the license terms and conditions and press Install, it will take a few minutes to complete.



And after successful completion of the installation press **Close**.

To test if the installation was correct and components are reachable, run command line and type

```
Command Prompt
Microsoft Windows [Version 10.0.18362.239]
(c) 2019 Microsoft Corporation. All rights reserved.

:\Users\ >dotnet

Usage: dotnet [options]
Usage: dotnet [path-to-application]

Options:
  -h|--help           Display help.
  --info              Display .NET Core information.
  --list-sdks         Display the installed SDKs.
  --list-runtimes     Display the installed runtimes.

path-to-application:
  The path to an application .dll file to execute.
```

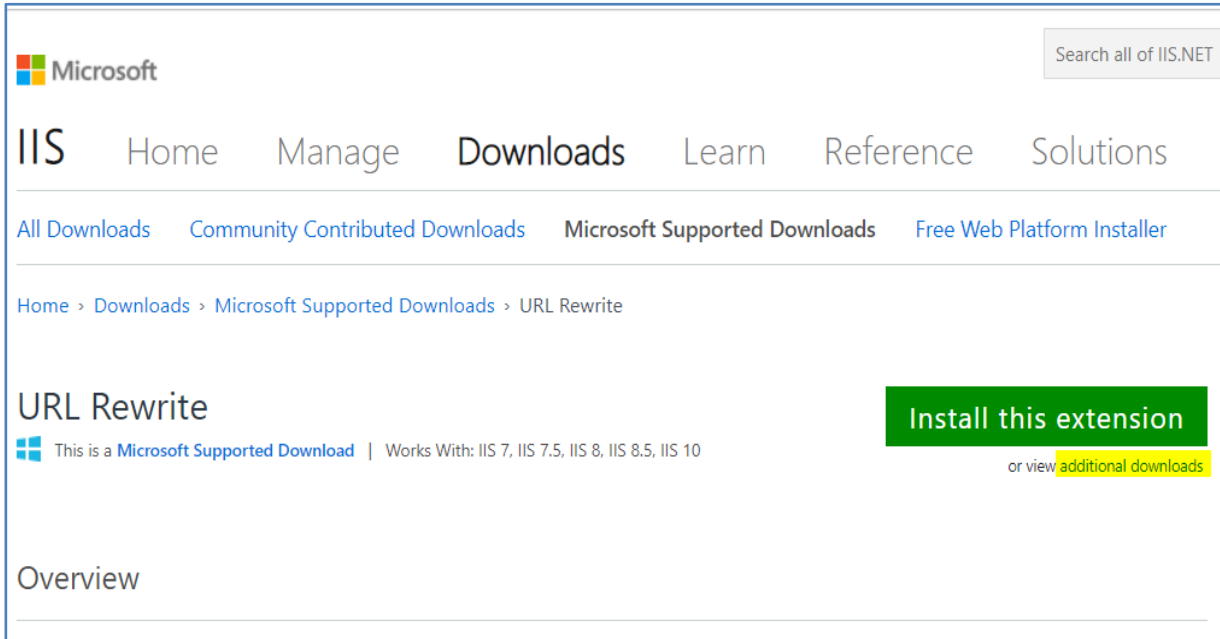
At this point, system is required to **restart** to apply these changes effectively.

2.5 Microsoft IIS URL Rewrite Module 2.1

Download Microsoft IIS URL rewrite module 2.1 from the following link:

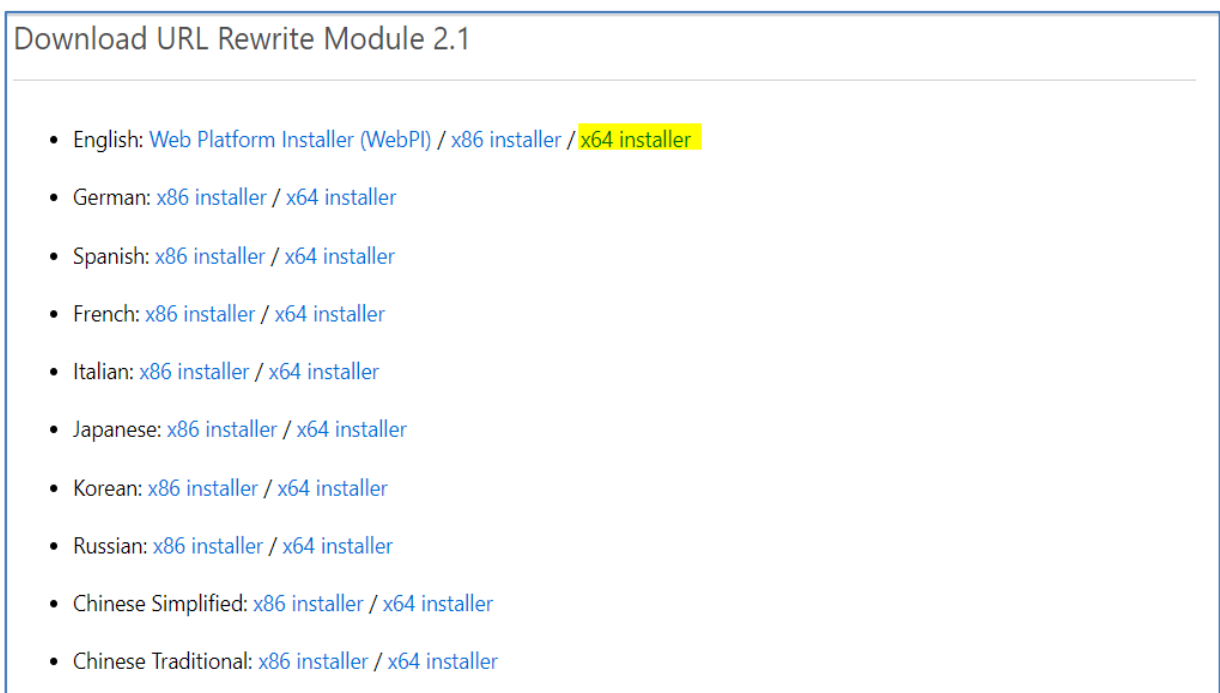
- [Microsoft IIS URL Rewrite Module 2.1](#)

Navigating to this URL will present with the following screen:



The screenshot shows the Microsoft IIS URL Rewrite Module 2.1 download page. At the top, there is a search bar labeled "Search all of IIS.NET". Below it, the navigation menu includes "IIS", "Home", "Manage", "Downloads", "Learn", "Reference", and "Solutions". Under "Downloads", there are links for "All Downloads", "Community Contributed Downloads", "Microsoft Supported Downloads", and "Free Web Platform Installer". The breadcrumb trail is "Home > Downloads > Microsoft Supported Downloads > URL Rewrite". The main heading is "URL Rewrite", followed by a sub-heading "This is a Microsoft Supported Download" and "Works With: IIS 7, IIS 7.5, IIS 8, IIS 8.5, IIS 10". A prominent green button says "Install this extension", with a link "or view additional downloads" below it. The "Overview" section is partially visible at the bottom.

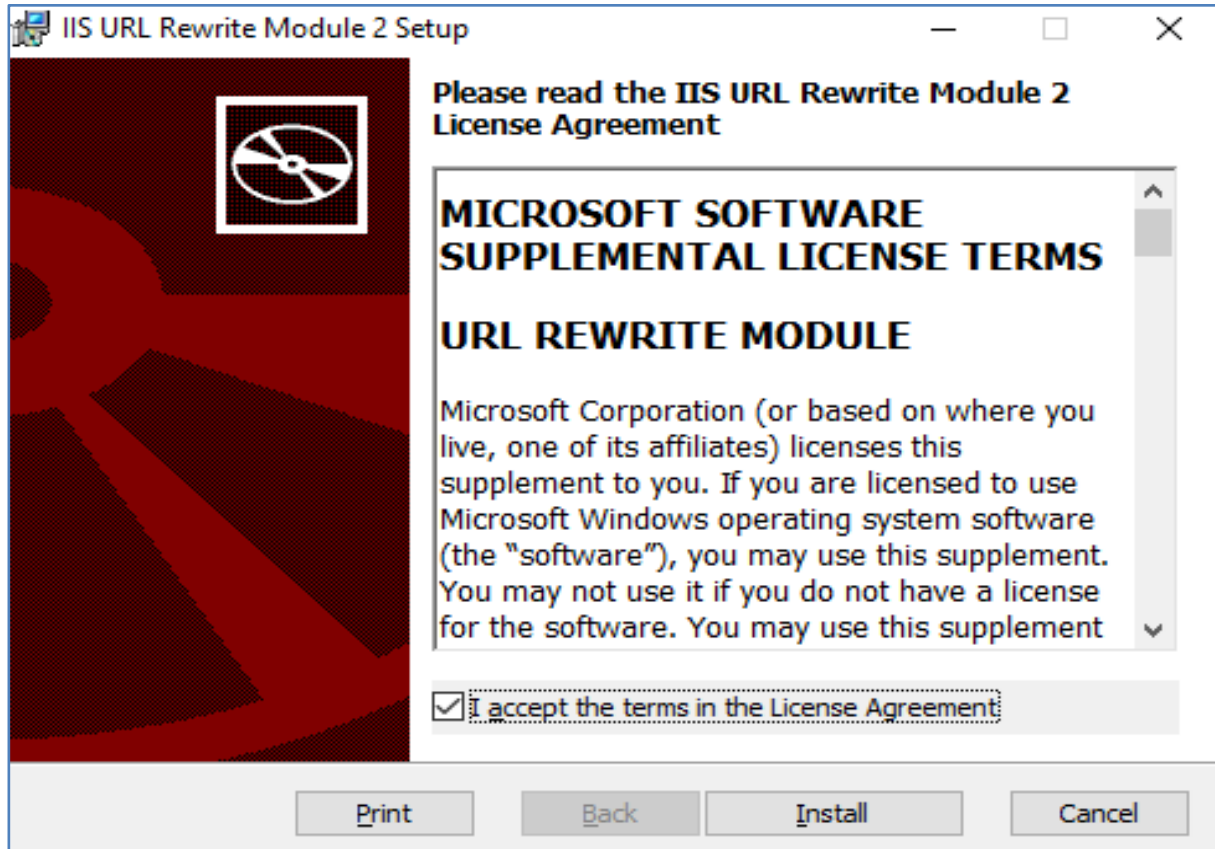
Clicking on the green **Install this extension** will install the extension on the current machine. For offline installers click **Additional Downloads** which will bring you down to the list of the installers



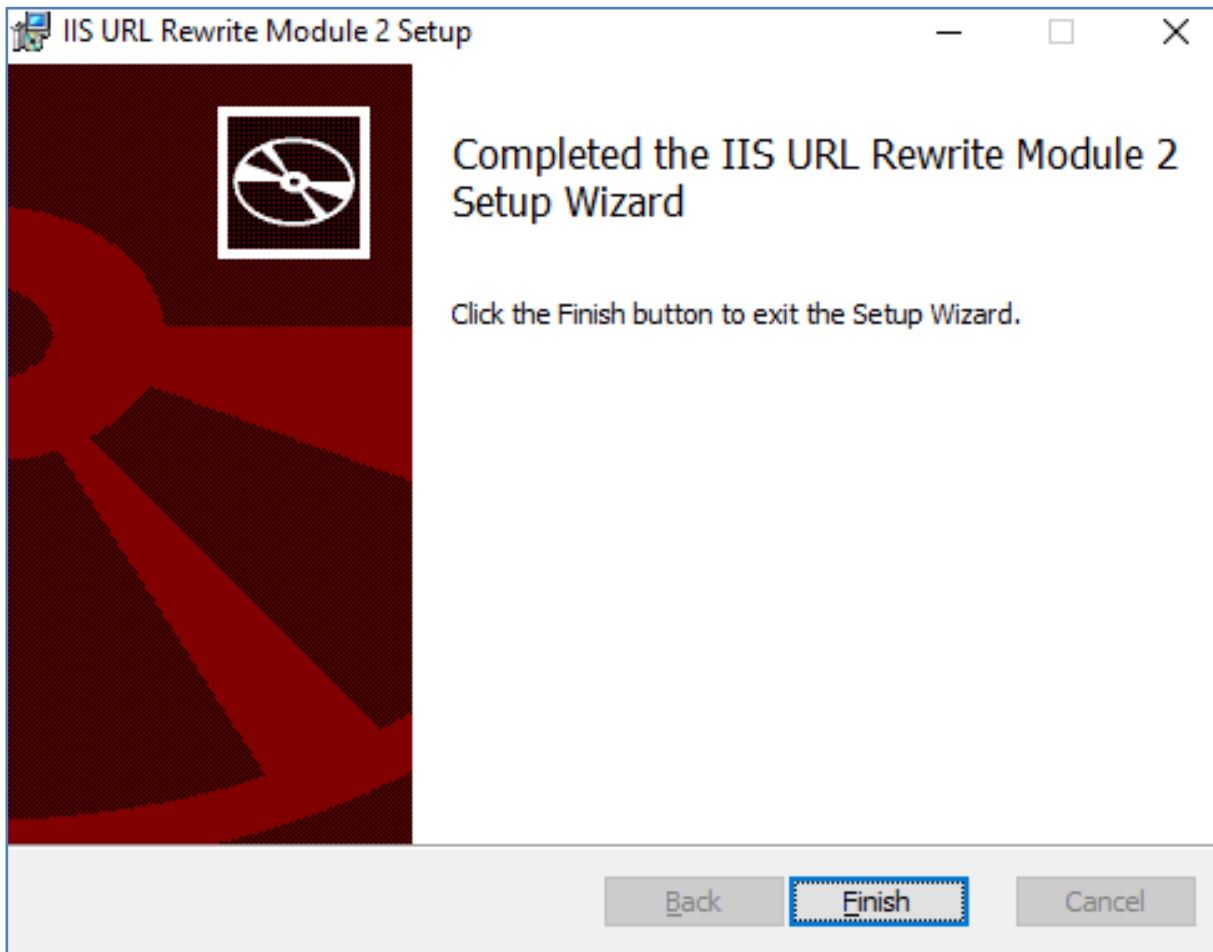
The screenshot shows the "Download URL Rewrite Module 2.1" page. It lists various language and architecture installers:

- English: [Web Platform Installer \(WebPI\)](#) / [x86 installer](#) / [x64 installer](#)
- German: [x86 installer](#) / [x64 installer](#)
- Spanish: [x86 installer](#) / [x64 installer](#)
- French: [x86 installer](#) / [x64 installer](#)
- Italian: [x86 installer](#) / [x64 installer](#)
- Japanese: [x86 installer](#) / [x64 installer](#)
- Korean: [x86 installer](#) / [x64 installer](#)
- Russian: [x86 installer](#) / [x64 installer](#)
- Chinese Simplified: [x86 installer](#) / [x64 installer](#)
- Chinese Traditional: [x86 installer](#) / [x64 installer](#)

Download "x64 installer" with your preferred language. For this documentation it's English. Start the installation by executing the downloaded file in administrator mode.



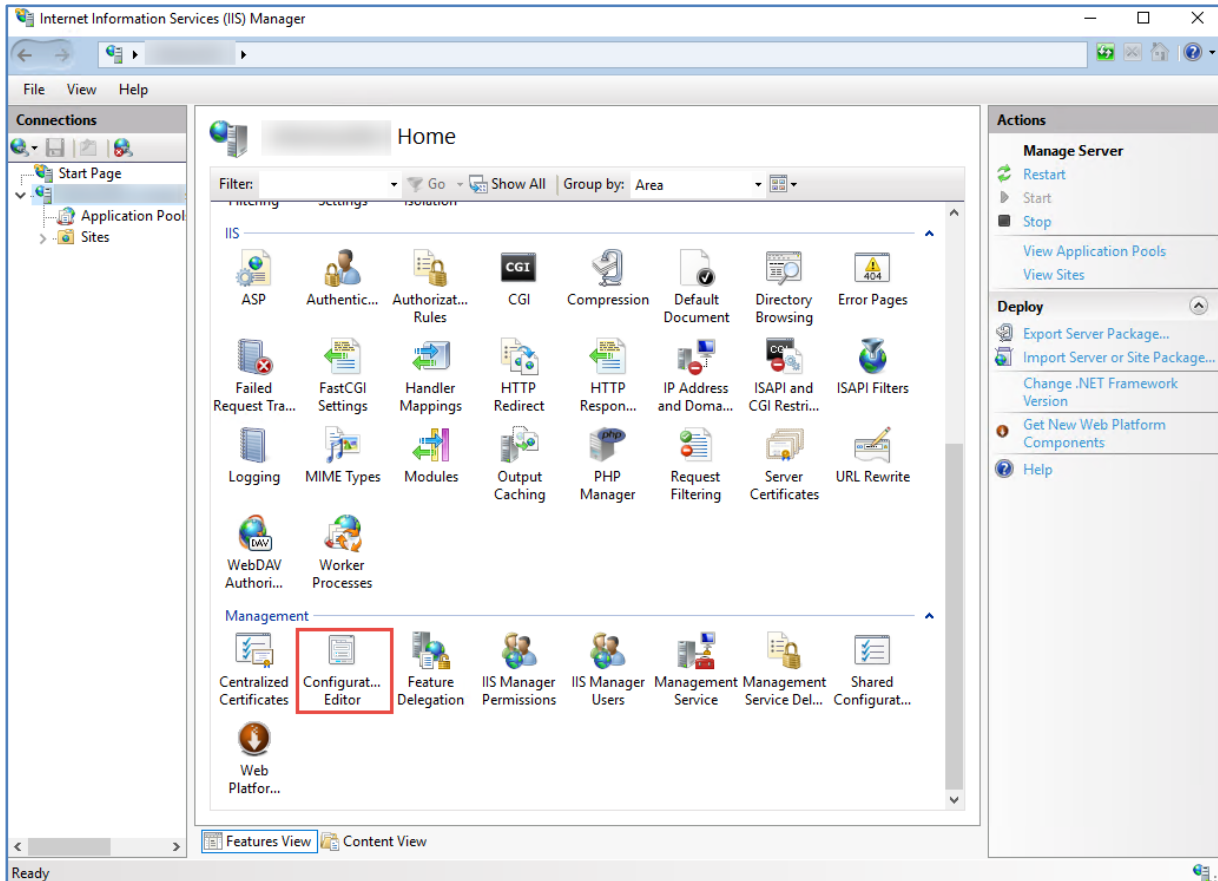
Accept the terms in the license agreement and click **Install** to proceed, the installation will take few minutes:



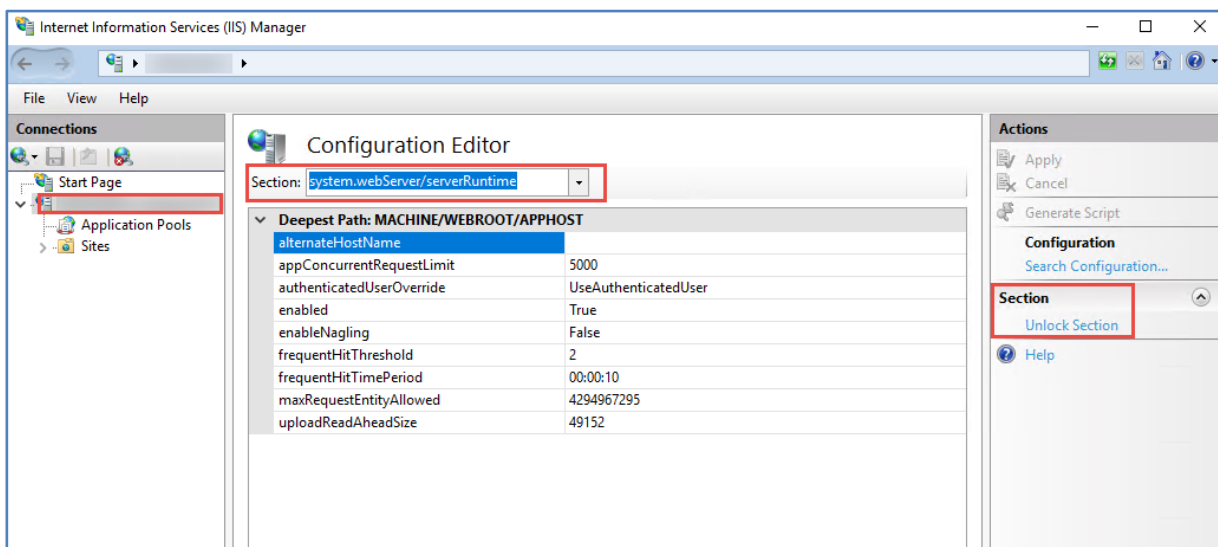
Click **Finish** once the installation is complete

2.6 Unlock system.webServer/serverRuntime section in IIS

1. Open IIS
2. Select Server from left panel
3. Open Configuration editor from right pane under Management section



4. Unlock system.webServer/serverRuntime section in configuration editor of IIS.



The installation process for prerequisites is complete.

SMTP Server

ADSS Web RA uses email as the primary notification medium. User registration, and all notifications are sent via SMTP. Hence it is a critical part of the architecture and deployment. Details required are:

- Hostname/IP address of SMTP server
- Listening Port of SMTP server
- TLS/SSL authentication to communicate with SMTP server (if required)
- Username and password to authenticate to SMTP server (if required)
- Email from Address for notifications sent from ADSS Web RA
- Email to Address for alerts and warnings sent by ADSS Web RA
- Email Subject for alerts and warnings sent by ADSS Web RA



If there is no alternative it is possible to still use ADSS Web RA. However, this involves copying the notification emails directly from the database and manually running the links therein. This usage is strongly discouraged in favour of a standard deployment though.

2.7 Database

Both ADSS Web RA and ADSS Server require their own respective databases. It is not needed to create the schema or configure any other feature prior to the installation.

Permissions are required to allow the creation of database tables, and entry, modification, and removal of data within those tables.

3 Installation Modules

ADSS Web RA consists of the following modules. Note the API is the only non-mandatory ones for a working solution:

- **ADSS Web RA Admin**
Administration application that allows to manage the system wide configurations, service plans, user accounts and access controls etc.
- **ADSS Web RA Desktop Web**
ADSS Web RA Web is used to manage certificates for creation, renewal and revocation.
- **ADSS Web RA API (Restful Web Services)**
REST architecture API support that is used to integrate ADSS Web RA functionality within your own portal. The API uses JWT to implement authentication and authorization. There is a separate API Guide that provides full details of the REST architecture implementation, see details.
- **ADSS Web RA Device**
ADSS Web RA Device is used to manage device enrolment for certificate creation, renewal and revocation.
- **ADSS Web RA SSL Device**
ADSS Web RA SSL Device is used to manage device enrolment over SSL for certificate creation, renewal and revocation e.g. EST Protocol

4 ADSS Web RA Installation

4.1 Fresh Installation of ADSS Web RA

Before starting the ADSS Web RA installation process, make sure the following:

Prerequisites must be installed on the ADSS Web RA machine. If these are not installed, ADSS Web RA will not open and even cannot display any page when accessed.

An empty database is created on the DMBS (SQL Server) with privileges for ADSS Web RA.

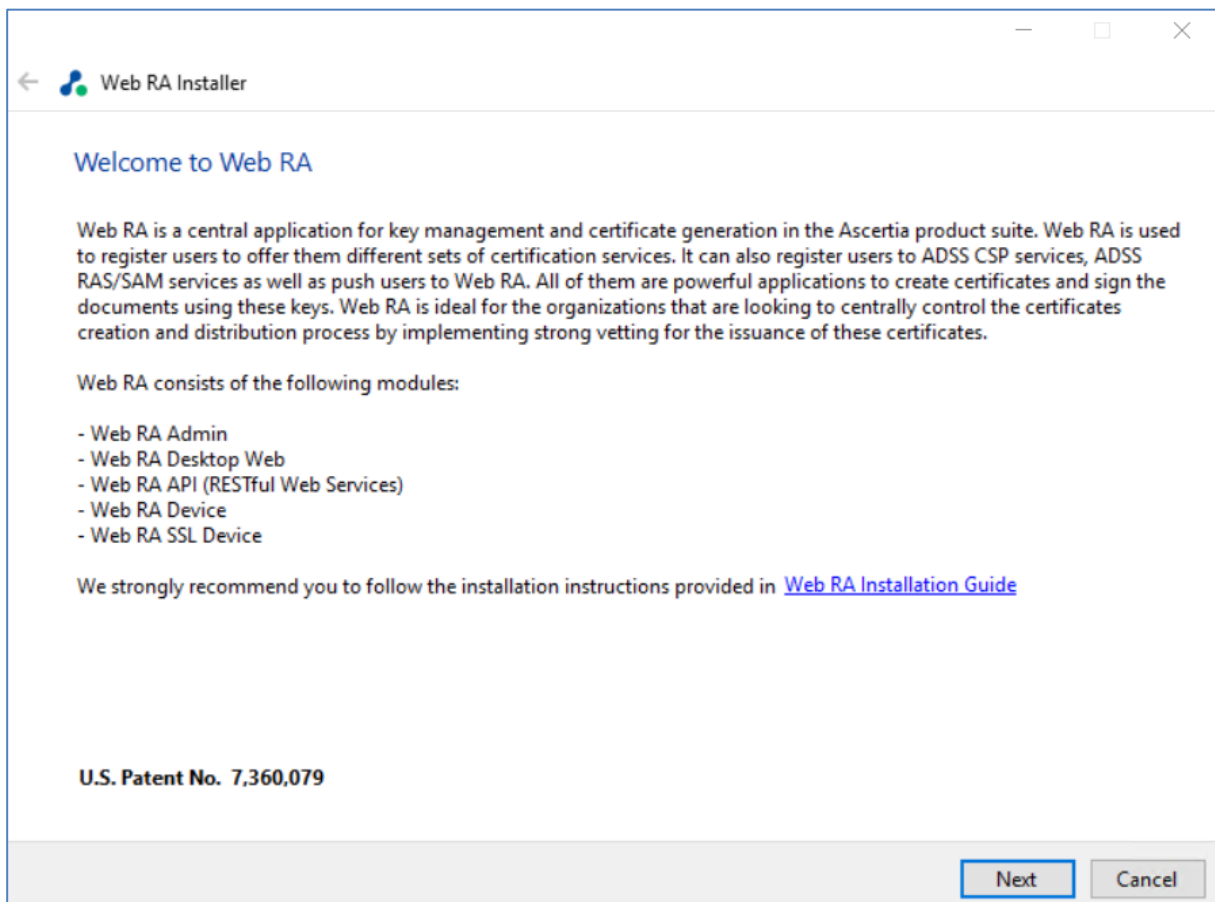
The ADSS Web RA package **MUST** be unzipped on to a disk that has sufficient space – a minimum of **100GB** is recommended. This is because the product is installed and runs from where the installation package is extracted to. Hence, choose a suitable location and naming structure. If you extract the installer on Desktop, it will not work so choose a proper drive to extract it.

Note: Do not include spaces in the installation folder name and path - use hyphen or underscore characters instead if required. Spaces will cause functional problems with ADSS Web RA installation. The installer must be run from a user account with the Windows Administrator privileges.

ADSS Web RA installer generates all the required database tables and populates the default data required to run the system. Therefore, there is no requirement for separate SQL scripts or equivalent for non-SQL databases.

Once the above conditions are satisfied, launch the installer by right-clicking the file **[WEBRA-Installation-Dir]/setup/install.bat** and selecting **Run as administrator** from the menu will present the welcome screen.

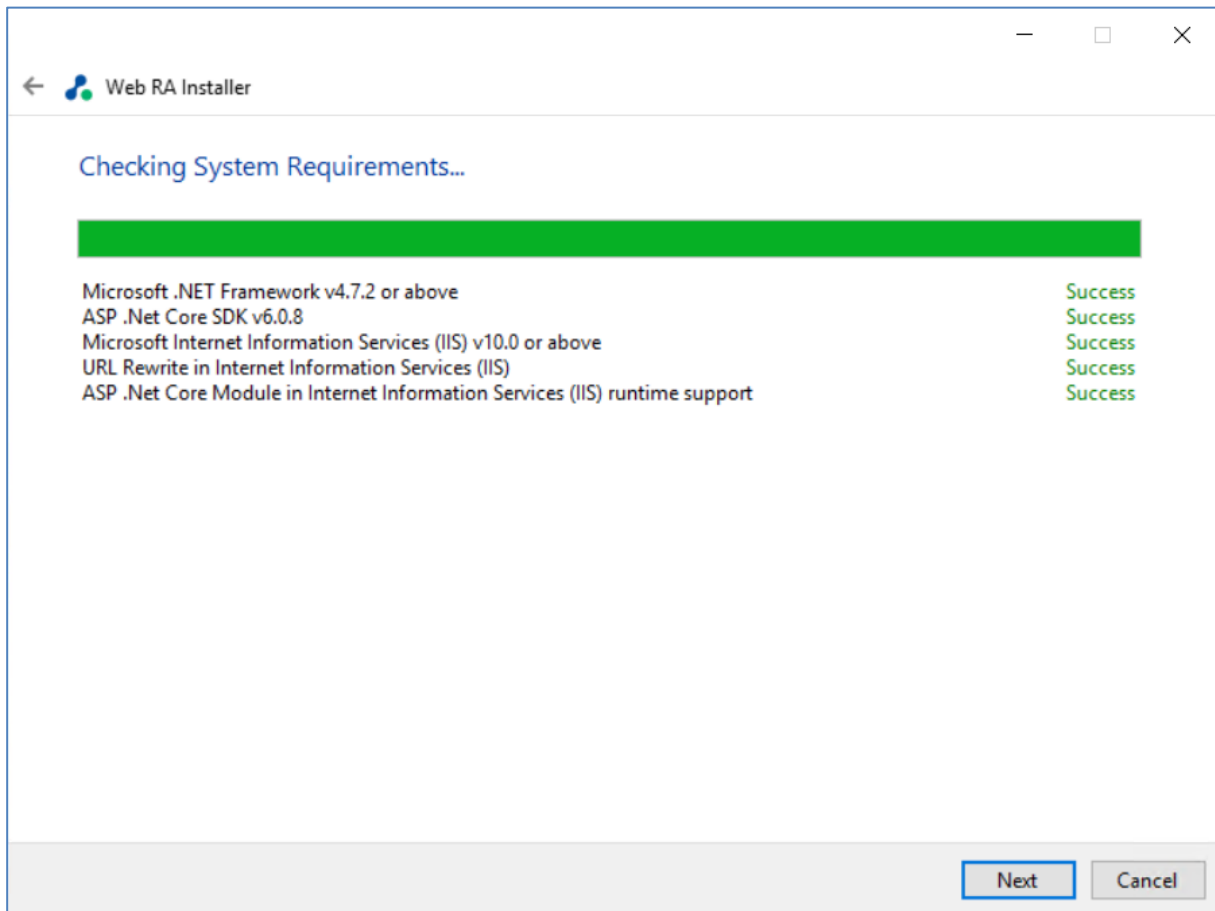
The following welcome screen is shown:



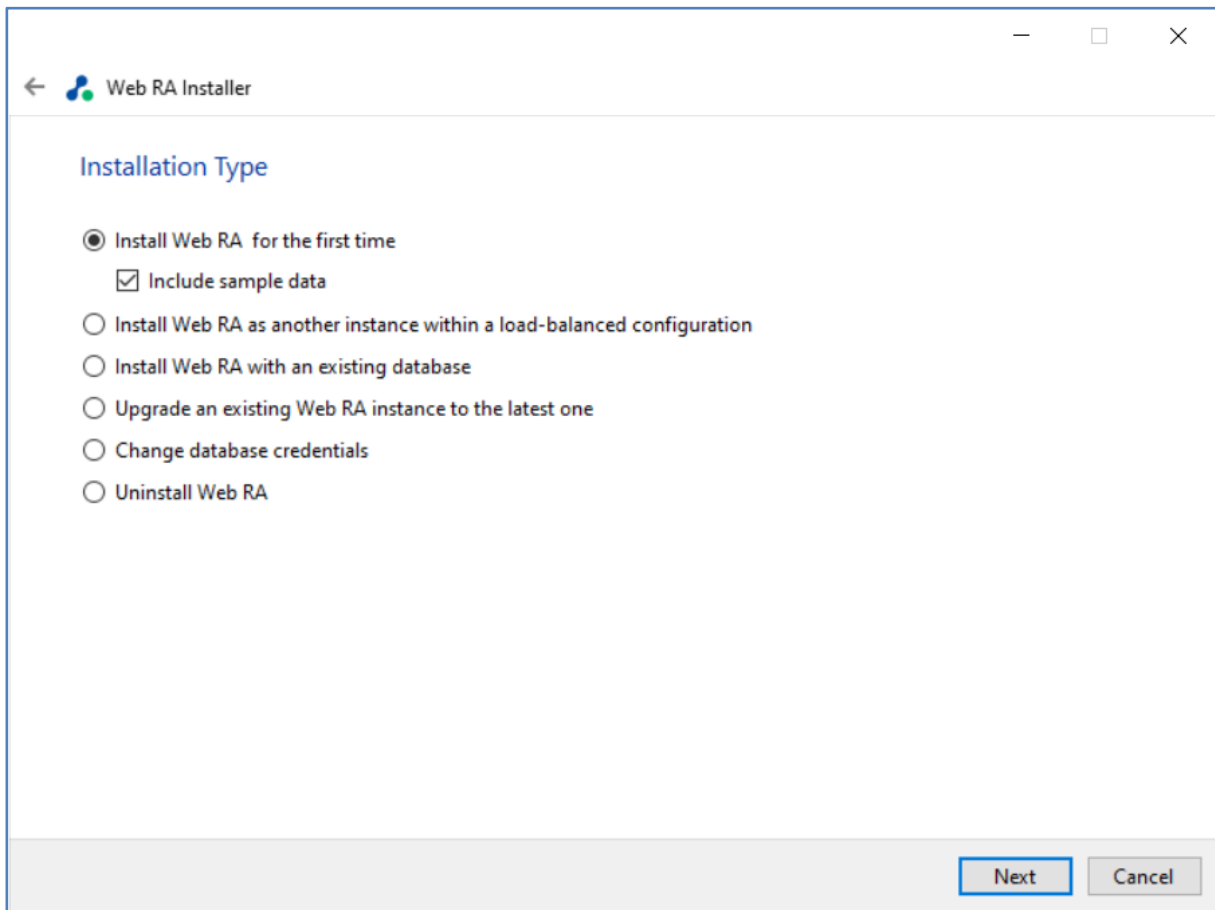
Click the 'Next' button to continue.

A check of various operating system requirements is performed to check if the required prerequisites are installed or not. If any of the ADSS Web RA system dependencies is not found, or not functioning, then this will be reported on the screen.

Note you can only proceed with the installation once all issues related to system dependencies are resolved as shown here:



Click the '**Next**' button to select an installation type.



If you are installing ADSS Web RA for the first time or you wish to deploy a fresh installation with a new database, then select **“Install Web RA for the first time”**. The **“Install Web RA as another instance within a load-balanced configuration”** option will install the ADSS Web RA instance in a load-balanced mode. If you wish to upgrade an older system to the latest version, then select **“Upgrade” an existing ADSS Web RA instance to the latest one**. Installer supports the upgrade when the base (current) installation is v2.1.1 or higher.

The **Install Web RA with an existing database** option will install ADSS Web RA against an existing ADSS Web RA database. For example, this option can be used to recover a system from a database back-up. The **Change database credentials** option is used if the database password, user, database name and/or server is changed, and it needs to be updated in ADSS Web RA installation. Select the last option **Uninstall Web RA** if you wish to uninstall ADSS Web RA from the system.

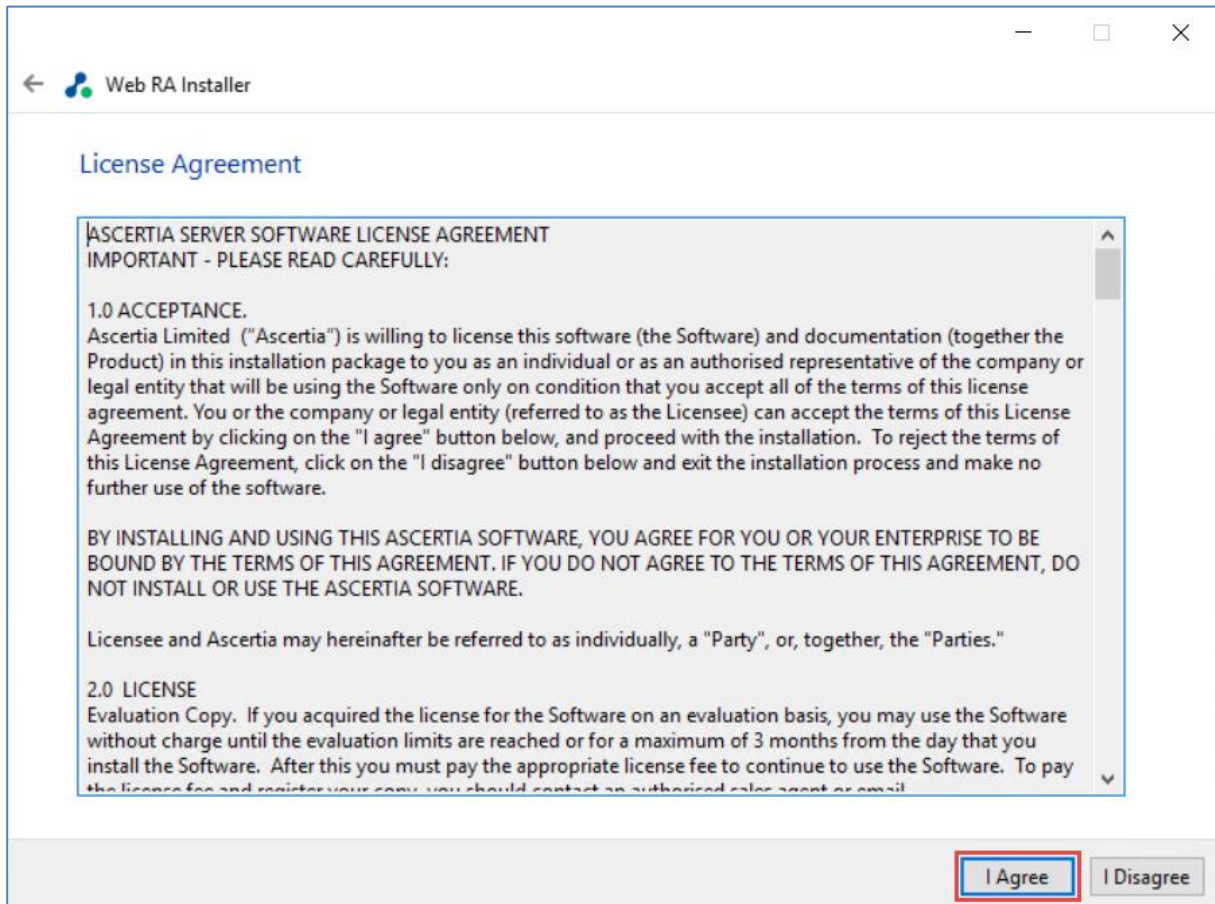
Select the option **Install Web RA for the first time**.

You can include sample data in application during fresh installation. Sample data includes following data:

- Default ADSS Connector
- Default SMTP Connector
- Default ADSS Service Profile
- Default Subscriber Agreement
- Default Vetting Form
- Default Service Plan
- Default Authentication Profile

If "Include Sample Data" is not selected then above data will not be added when application installed.

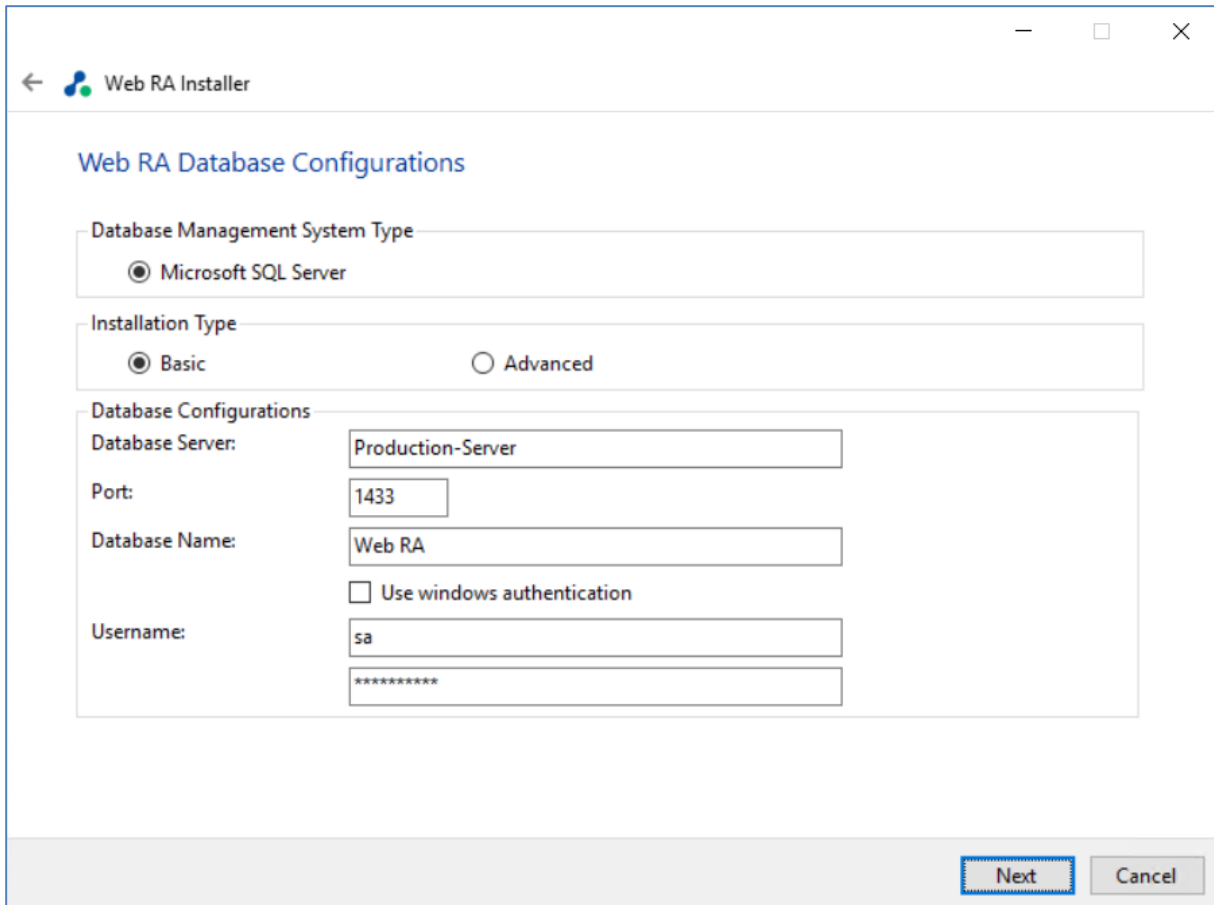
Click the **Next** button to show the License Agreement:



Click the **I Agree** button to proceed.

Readme screen will be displayed with new features list. Click **Next** button to proceed.

The following screen for database details will be displayed:



Web RA Database Configurations

Database Management System Type

Microsoft SQL Server

Installation Type

Basic Advanced

Database Configurations

Database Server: Production-Server

Port: 1433

Database Name: Web RA

Use windows authentication

Username: sa

Next Cancel

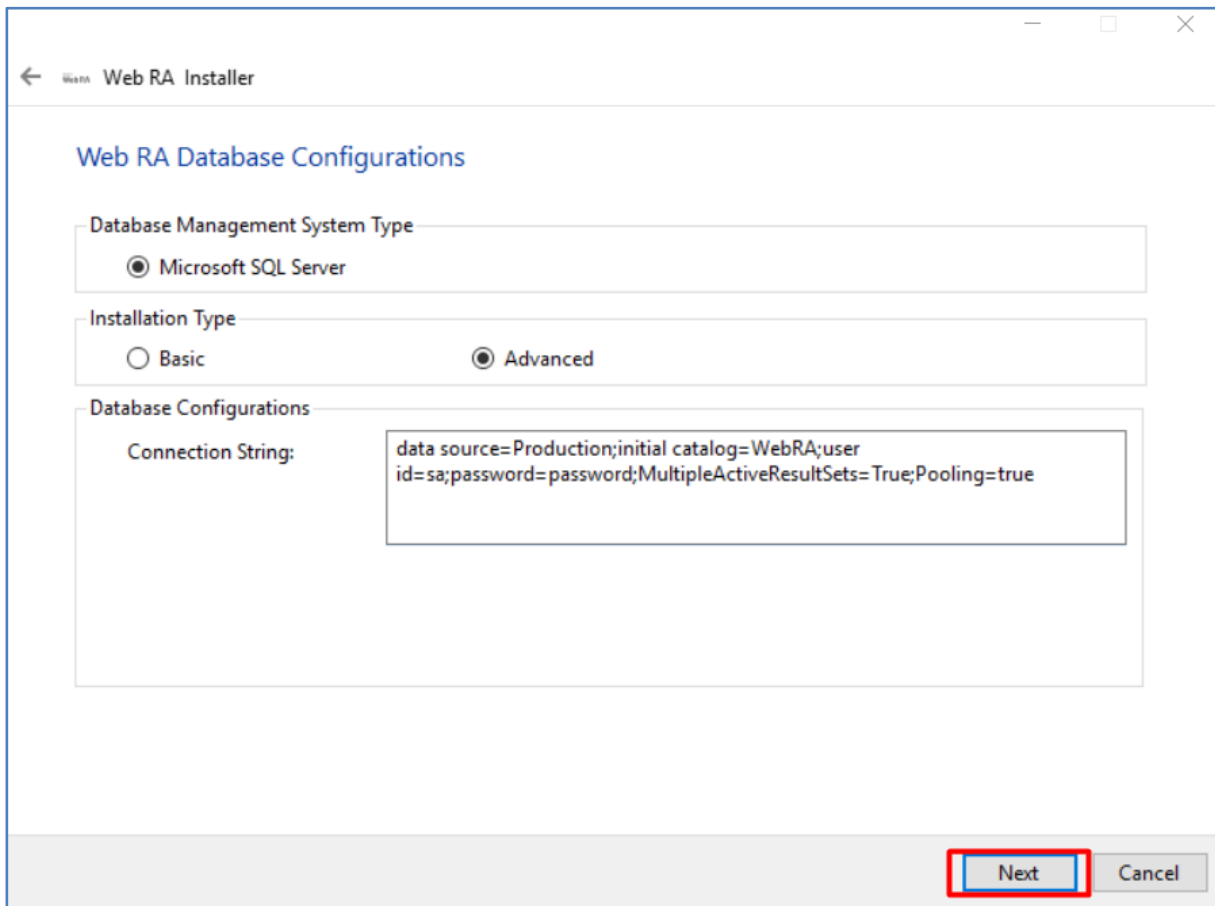
Furthermore, you can either choose to do a basic installation or use an advanced one. If this is a basic installation, then use the first option **Basic** and provide the appropriate ADSS Web RA database credentials. The information displayed above is an example and you should configure the relevant settings for your own environment.

Note that once you enter the database credentials and select **Next**, the installer uses the information to test the connectivity to the database. If the installer can establish the connection with the database, then it will proceed with the installation.

The following table details the configuration options:

Item	Description
Database Server / Host Name	Database server IP or DNS name.
Port	Database listening port. For SQL Server the default port is 1433 .
Database Name	Name of the database instance. Note this must exist prior to the installation.
Use Windows Authentication	<p>If enabled, installer will use the Windows logged in user to communicate with database. You are required to enter password because it will be used in Application Pool to set the Identity against this user for all websites.</p> <p>By default, the current logged in user will be configured in the Application Pool Identity. If you wish to run ADSS Web RA under a different windows user, then you need to change it manually.</p> <p>If your requirement is to use SQL Server authentication, then type SQL Server Username and Password in the underneath fields without enabling this option.</p>
Username	Name of the database user. Note this must exist prior to the installation. It is not required in the case of Windows Authentication.
Password	Password credential of the database user. Note this must exist prior to the installation. In case of Windows Authentication, type the password of domain user shown in the Username field to configure the Application Pool Identity in IIS Server for successful communication with SQL Server.

If this is not a basic installation and you choose the second option to “**Advanced**” then the following screen is shown:



The information displayed above is an example and you should configure the relevant settings for your own environment.

Once you complete the options and select **Next**, the installer uses the information provided to test the connectivity to the database. If the installer can establish the connection with the database, then it will proceed with the installation.

The following table details the configuration options:

Item	Description
ADSS Web RA Connection String	The following are sample connection strings for SQL Server: <ul style="list-style-type: none"> • Simple One - “data source= [Database Server Address];initial catalog= [Database Name];user id=[Database User Name];password=[Database User Password];MultipleActiveResultSets=True;Pooling=true” • For Named instance - “data source= [Database Server Address][SQL Server Instance Name];initial catalog=[Database Name];user id=[Database User Name];password[Database User Password];MultipleActiveResultSets=True;Pooling=true” • For Windows Authentication - “data source= [Database Server Address];initial catalog=[Database Name];integrated security=SSPI;MultipleActiveResultSets=True;Pooling=true”

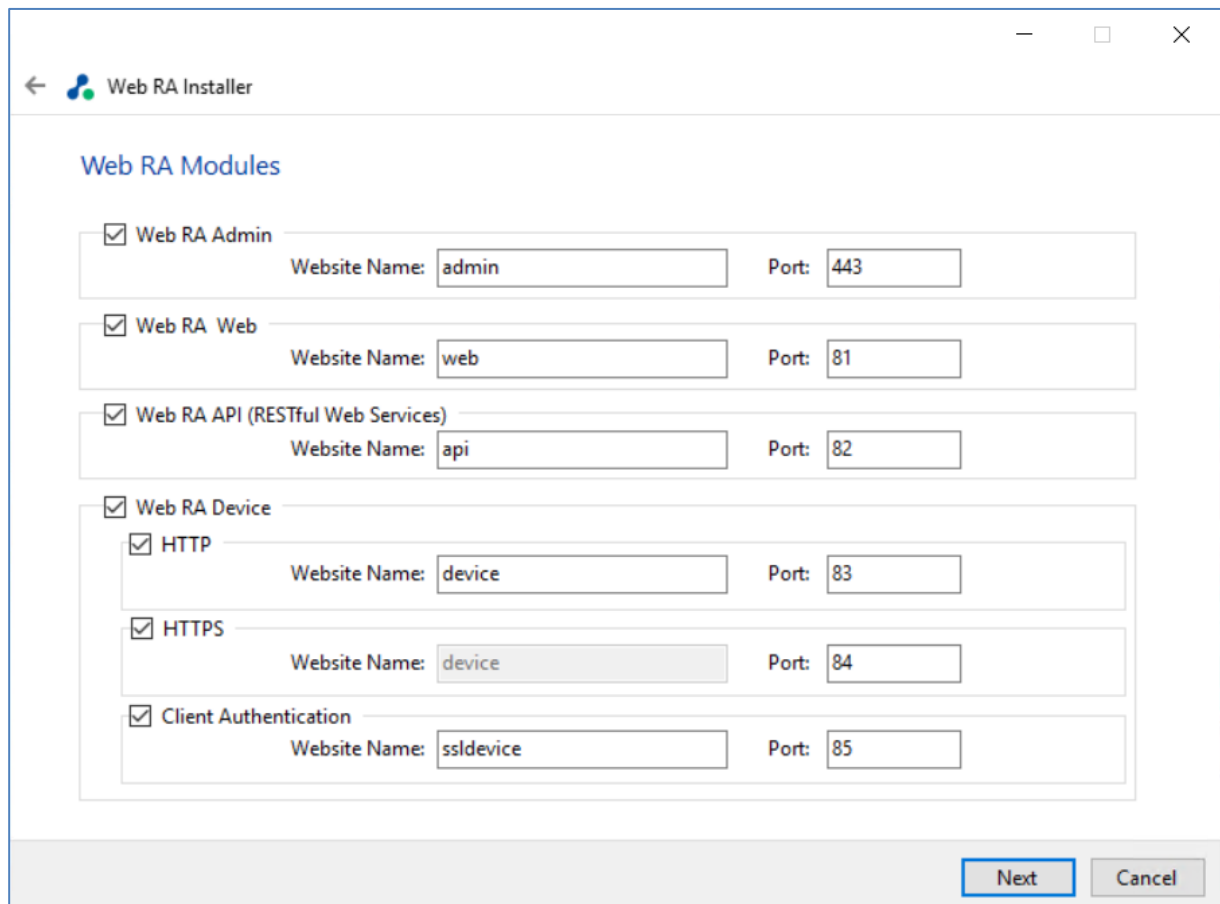
Username	Field will only be shown in case of Windows Authentication while for SQL Server Authentication, username will be provided in the connection string.
Password	In case of Windows Authentication, type the password of domain user shown in the Username field to configure the Application Pool Identity in IIS Server for successful communication with SQL Server. In case of SQL Server authentication, password will be provided in the connection string.



*If windows authentication is enabled in connection string, installer will use the Windows logged in user to communicate with database upon clicking the **Next** button. You are required to enter password because it will be used in Application Pool to set the Identity against this user for all websites.*

By default, the current logged in user will be configured in the Application Pool Identity. If you wish to run ADSS Web RA under a different Windows user, then you need to change it manually. As shown in the following Screen:

Click the **Next** button to select specific modules:



The screenshot shows the 'Web RA Modules' configuration window. It contains several sections, each with a checked checkbox and input fields for 'Website Name' and 'Port':

- Web RA Admin: Website Name: admin, Port: 443
- Web RA Web: Website Name: web, Port: 81
- Web RA API (RESTful Web Services): Website Name: api, Port: 82
- Web RA Device:
 - HTTP: Website Name: device, Port: 83
 - HTTPS: Website Name: device, Port: 84
 - Client Authentication: Website Name: ssldevice, Port: 85

At the bottom right, there are 'Next' and 'Cancel' buttons. The 'Next' button is highlighted with a blue border.

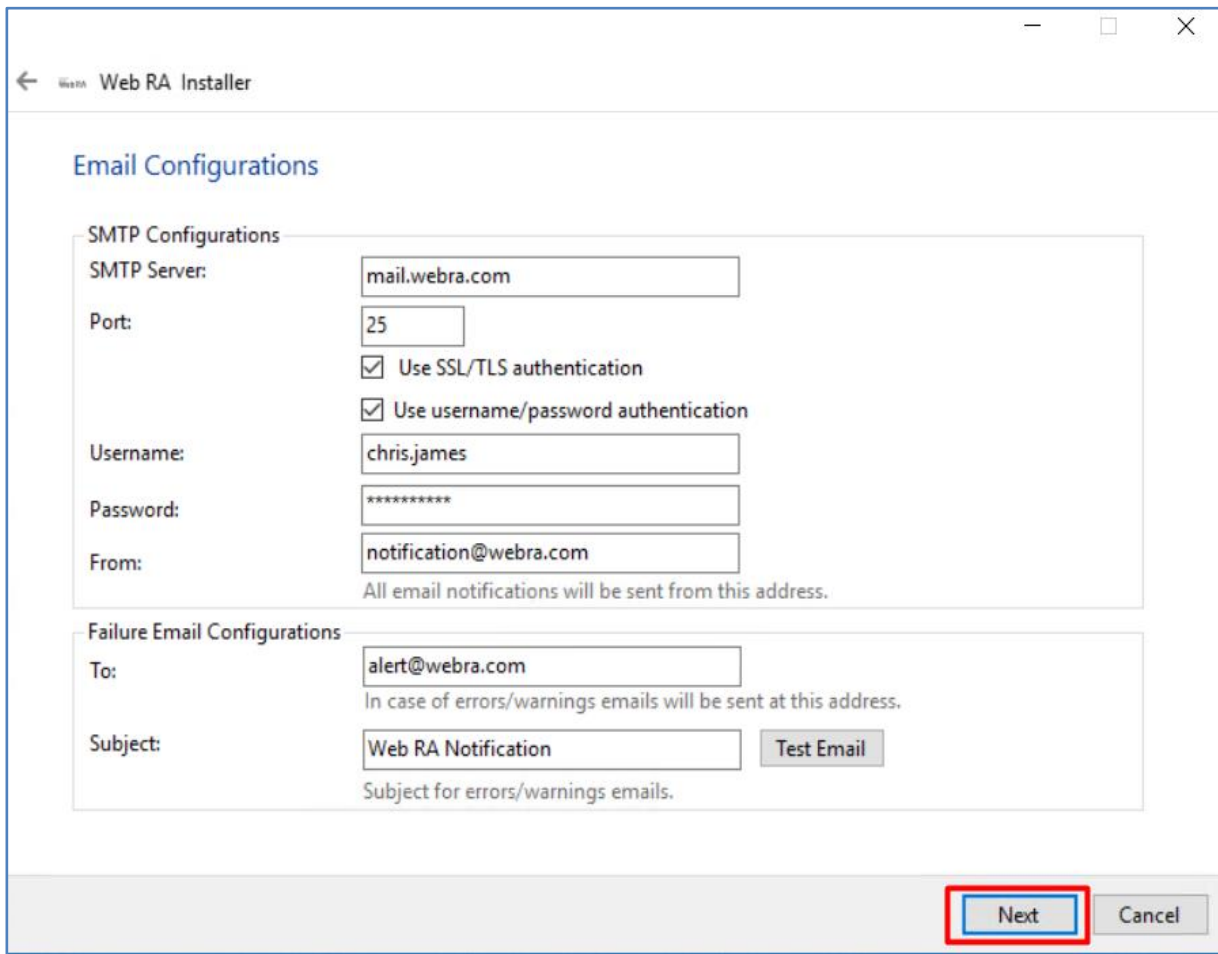
Select the appropriate modules to install the required features. For each selected application, provide the web application name and port. A typical in-house installation of ADSS Web RA should only include Admin, Desktop Web, and the API and lastly, the device will be added.

The information displayed above is an example, which you may change to suit your environment and organisation preferences. However, the example shown is sufficient. The names will appear as websites under IIS.

The following table details the modules options:

Item	Description
ADSS Web RA Admin	ADSS Web RA Admin is used by the administrators to manage the system wide configurations, service plans, user accounts and access control etc.
ADSS Web RA Web	ADSS Web RA Web is used to manage certificates for creation, renewal and revocation.
ADSS Web RA API	REST API is used to integrate ADSS Web RA functionality within your own portal.
ADSS Web RA Device	ADSS Web RA device is used to manage device enrolment for certificate creation, renewal and revocation. This site will be deployed with http and https bindings.
ADSS Web RA SSL Device	ADSS Web RA SSL device is used to manage device enrolment over SSL for certificate creation, renewal and revocation e.g. EST Protocol. This site will be deployed with https SSL.

Click the **Next** button to configure the SMTP server and email settings:



Configure the SMTP Server and email settings for your environment. ADSS Web RA must have access to a suitable SMTP server. Without which users will not be able to receive registration emails that are required to complete the sign-up process. In addition, administration notification and alert emails will also not be sent. Although the latter will not prevent functionality, but it is not a recommended approach. The information displayed above is an example and you should configure the relevant settings for your own environment.

The configuration items are explained in the following table:

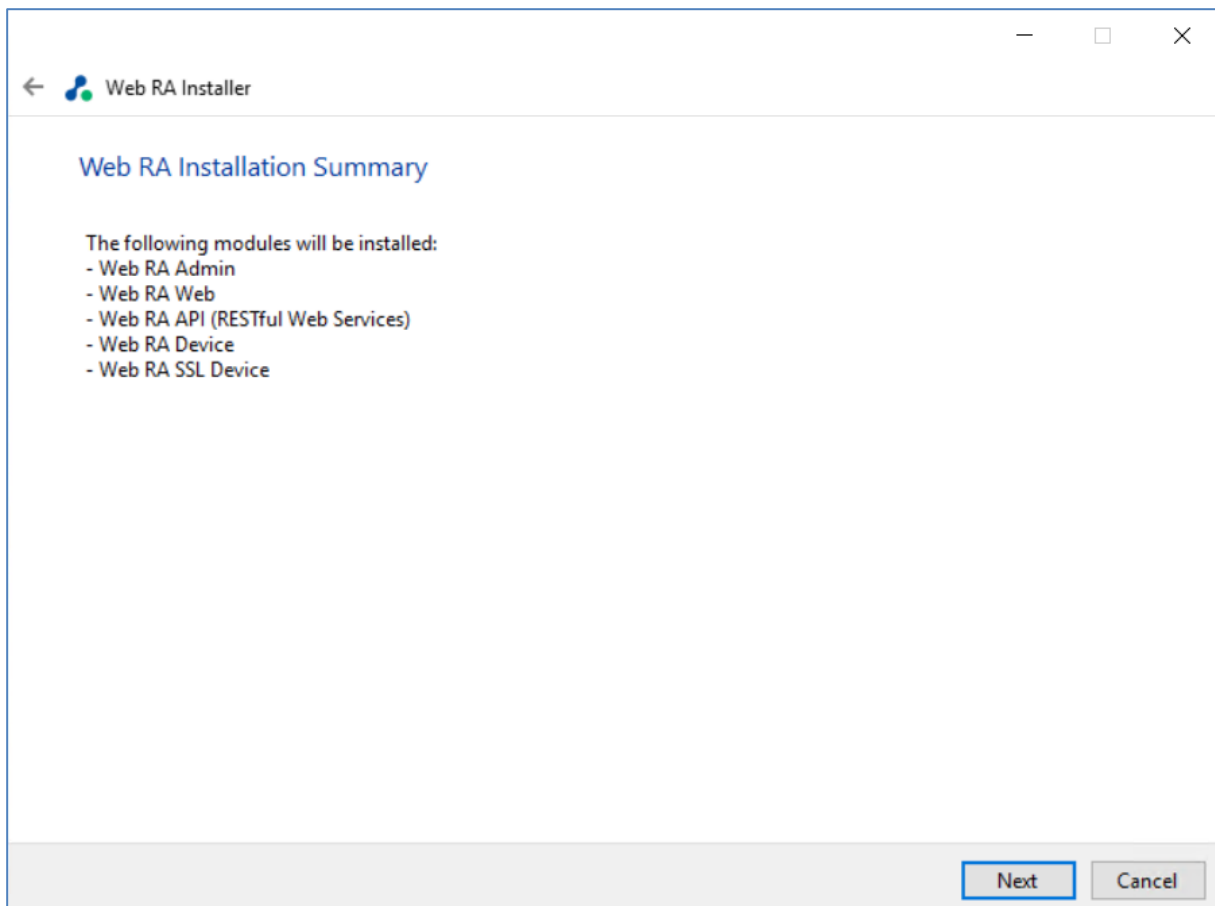
Item	Description
SMTP Server	Defines the email server address. This email server is used to send email notifications to users as required, such as for account registration, data sharing etc. It is also used for sending notification emails to ADSS Web RA administrators.
Port	Define the service port for the SMTP mail server.
Use SSL/ TLS authentication	Select this option if the SMTP mail server requires SSL/TLS.
Username	Configure the SMTP mail server username that is used to send ADSS Web RA generated emails.
Password	Define the password to authenticate the SMTP server.
From	Configure the From email address that should be used to send notification emails to users and administrators.

To	Configure the email address where error notifications should be sent. This is usually the IT support team address.
Email Subject	Define a subject line for the notification emails that are sent to the administrator, e.g. ADSS Web RA Alert.

After configuring these SMTP settings, click the **Test Email** button to verify that SMTP configurations are valid.

Note: If “Include Sample Data” is not selected then SMTP configuration screen will not be shown.

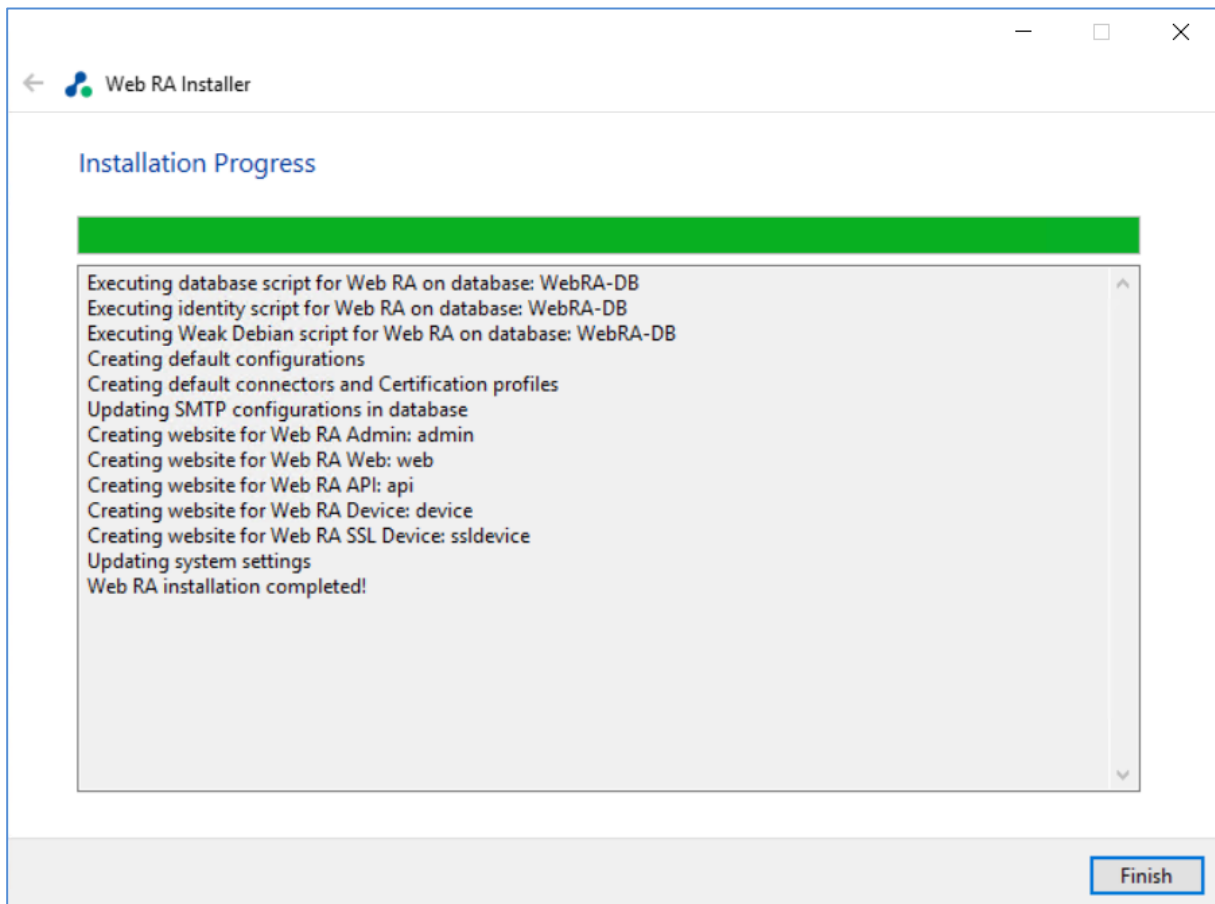
Click the **Next** button to see the summary and complete the installation:



This screen shows the installation summary by listing the different product modules that will be installed.

If you think any listed item is incorrect then use the Back button (arrow towards the top-left of the dialogue box) to correct your choices before proceeding ahead.

Otherwise, click the **Next** button to continue with the installation.



Click **Finish** to complete the installation process.

4.1.1 ADSS Web RA URLs

See these URLs to access the ADSS Web RA web sites:

Service	URL Format	Example
ADSS Web RA Admin	<a href="https://<machine-name>:PORT">https://<machine-name>:PORT	https://localhost:443
ADSS Web RA Desktop Web	<a href="https://<machine-name>:PORT">https://<machine-name>:PORT	https://localhost:81
ADSS Web RA API	<a href="https://<machine-name>:PORT">https://<machine-name>:PORT	https://localhost:82
ADSS Web RA Device	<a href="https://<machine-name>:PORT">https://<machine-name>:PORT	http://localhost:83 https://localhost:84
ADSS Web RA SSL Device	<a href="https://<machine-name>:PORT">https://<machine-name>:PORT	https://localhost:85

Where necessary (i.e. browsing Admin website) your web browser will prompt you to select the appropriate certificate for authentication purposes. Note the installation process places the necessary

certificates into the Windows Security Store, Internet Explorer, Edge, Chrome and related browsers that rely on the security store, can use them as such.

If you wish to use Firefox and similar web browsers that utilize their own respective security stores you will need to import **adss-default-admin.pfx** and **WebRA-default-admin.cer** from **[WebRAInstallationDirectory]/setup/certs** directory.

There are two options to set secure binding against each ADSS Web RA site:

1. Using standard IIS web server HTTP redirects. This means the basic installation is done with various ADSS Web RA sites, where each site has their respective default port/binding but no host name. You can then add new sites for each web site and bind this to the desired external public facing host name and secure port, likely to be 443. Each site can be configured in such a fashion. Each default ADSS Web RA site can then be configured to permanently redirect to the secure version.
2. Once the deployment of ADSS Web RA is completed, the bindings of each site can be changed to use a secure (443) port. The new binding will include the appropriate public facing host name.

Once the bindings of IIS web sites have been put in place, access the ADSS Web RA administration console and make changes to the general configuration settings. This means changing the public and private URLs for the Desktop Web and API sites accordingly. Once done save the changes and publish them.



Option 2 is recommended.

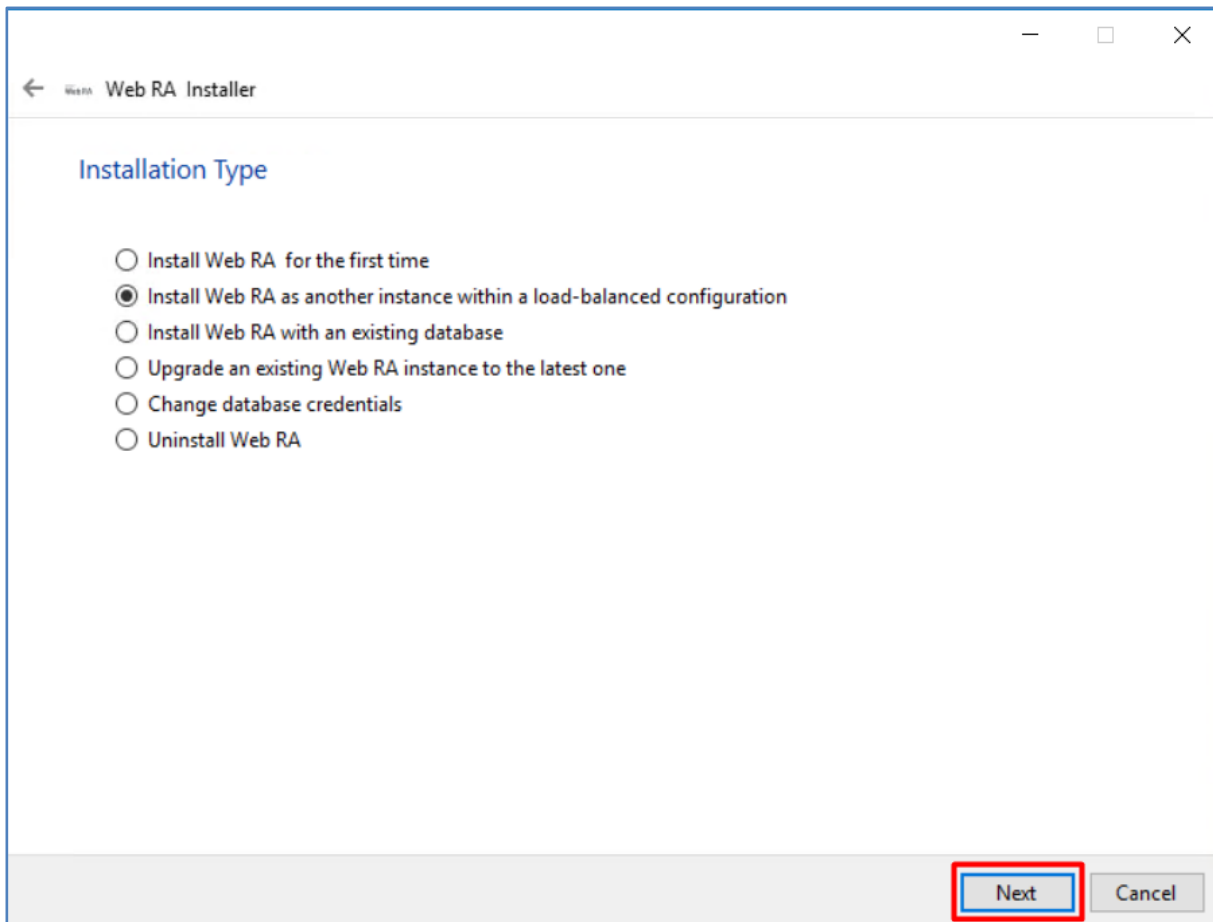
4.2 Installing ADSS Web RA with A Load-Balanced Configuration

Follow these instructions to install ADSS Web RA with a load-balanced configuration.

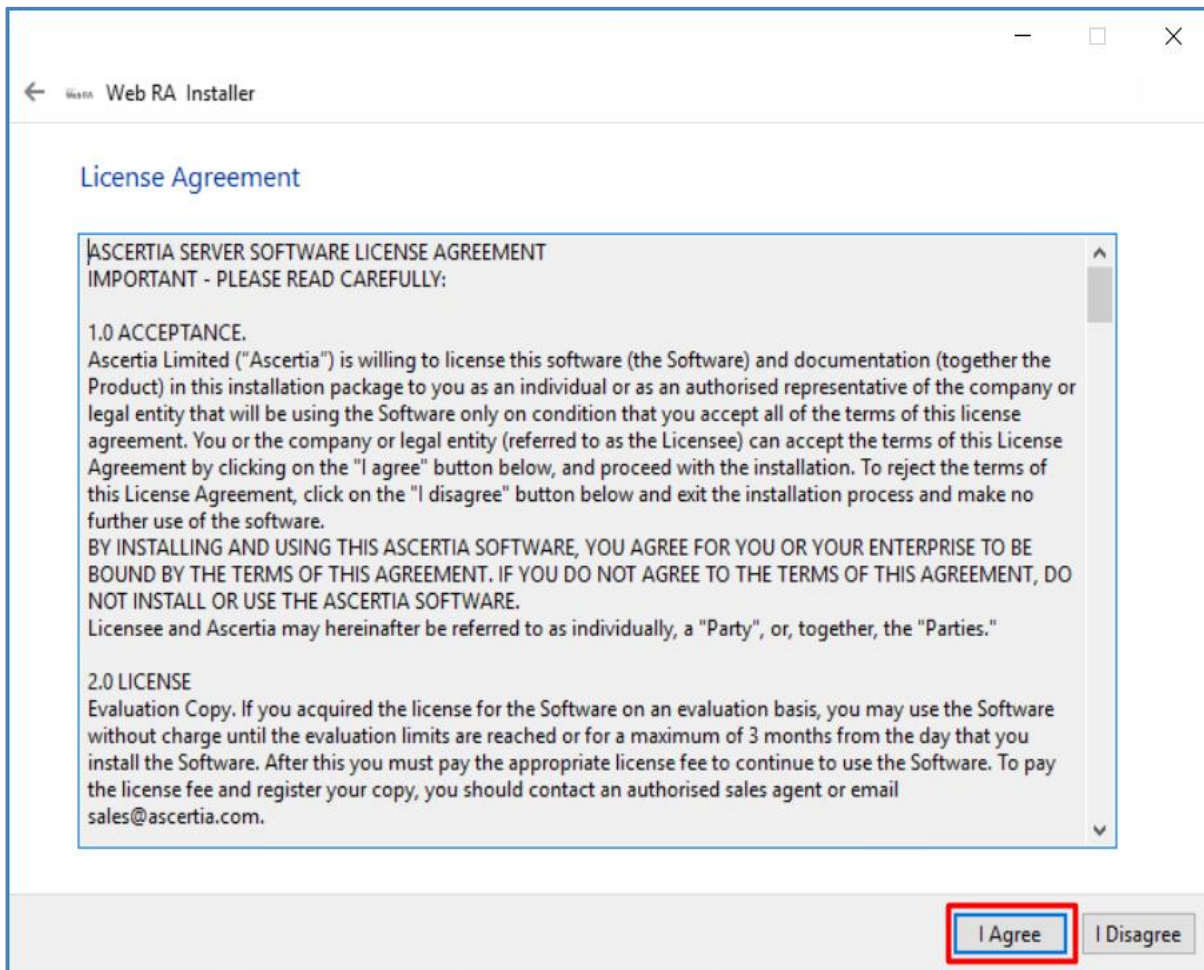
Launch the installer by right-clicking the file name **[Web RA Installation Directory]/setup/install.bat** and select **Run as administrator**.

Follow the installation wizard as described previously until the **Installation Type** screen is shown:

Select the option **Install ADSS Web RA as another instance within a load-balanced configuration**



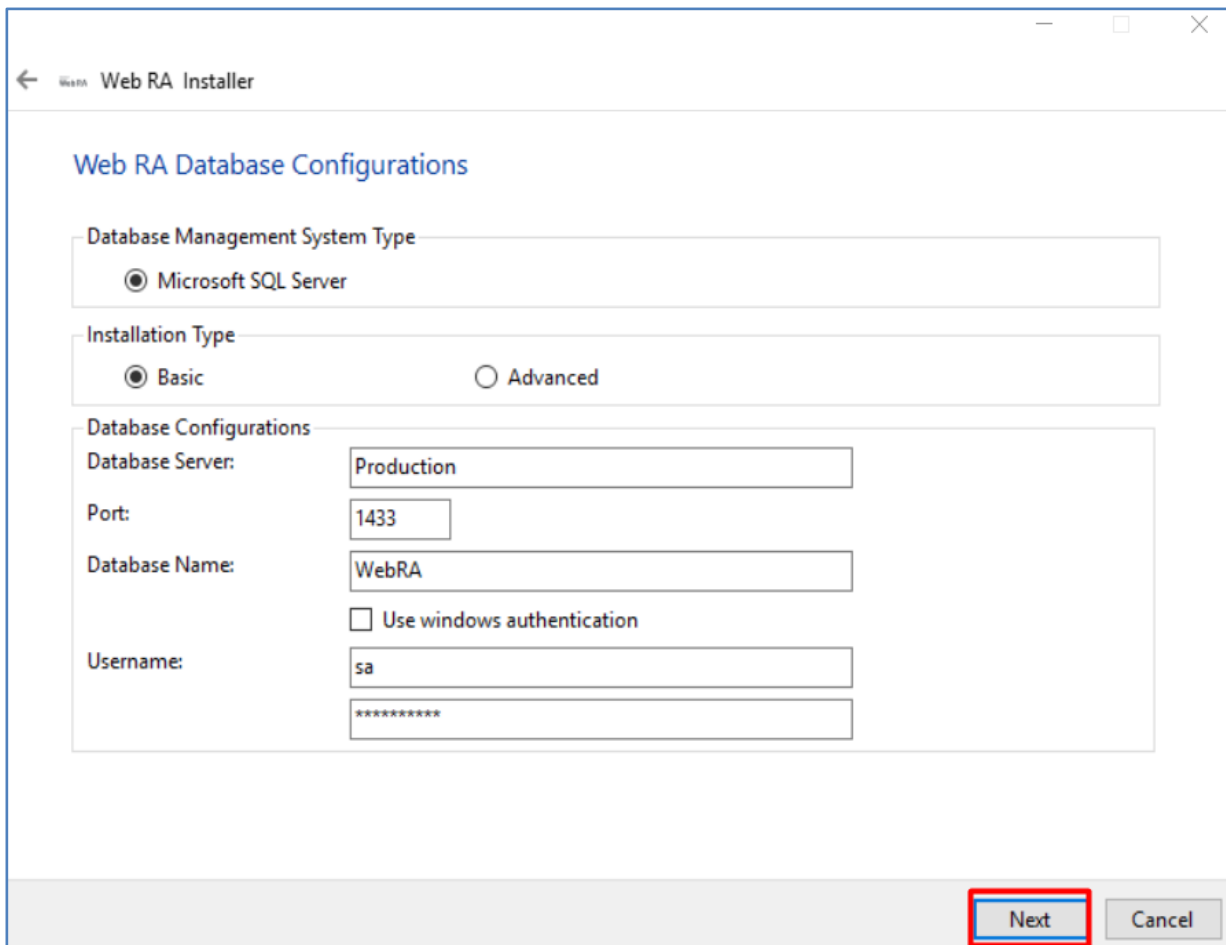
Click the **Next** button to show the License Agreement:



Click the **I Agree** button to continue.

Readme screen will be displayed with new features list. Click **Next** to proceed.

The following screen for database details will be displayed:



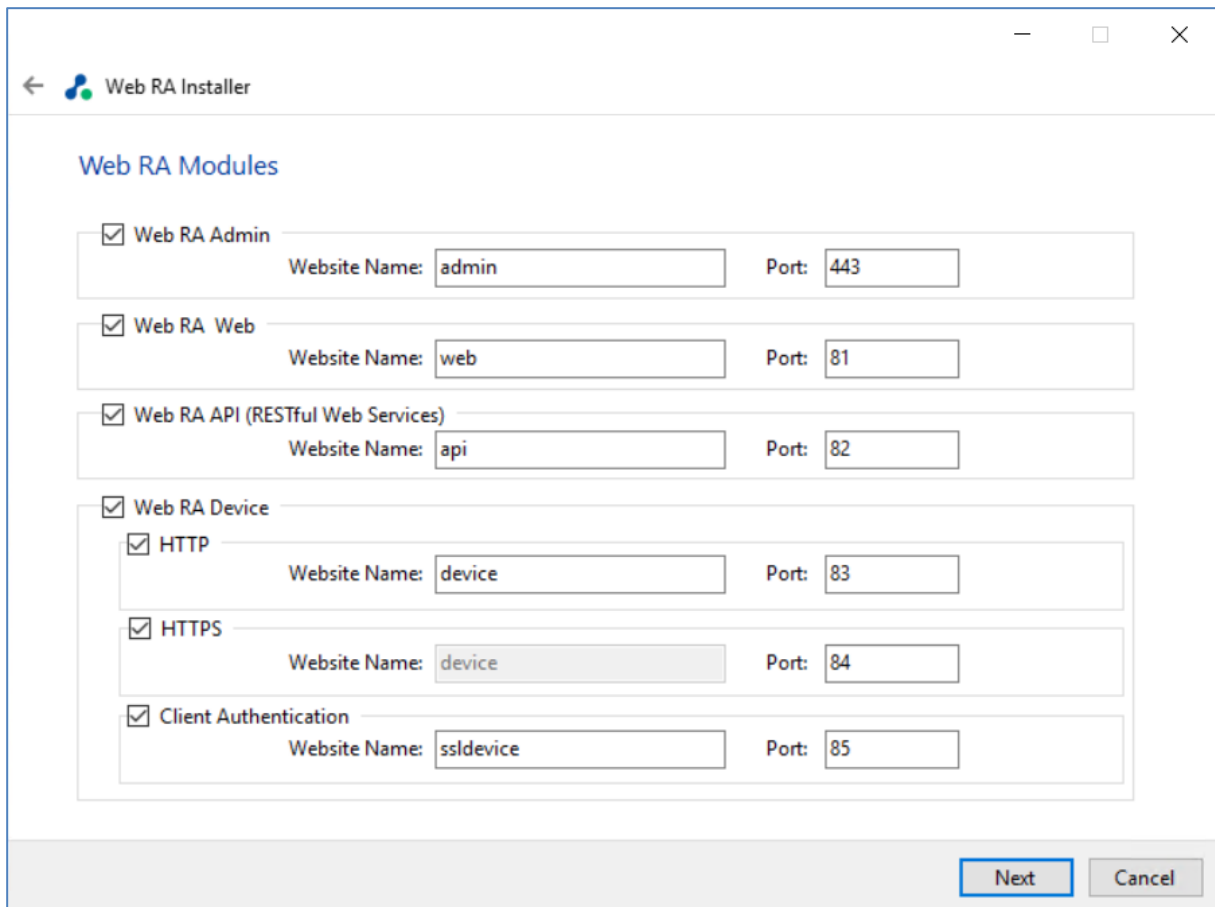
The information displayed above is an example and you should configure the relevant settings for your own environment.



The ADSS Web RA database schema and the version required by the installer must be the same.

*If the current ADSS Web RA database schema is older than the version required by the installer, and you click **Next**, the installer will prompt you that ADSS Web RA database schema will be upgraded to the latest version. Click **OK** to authorise the schema update.*

Click the **Next** button to select specific modules.



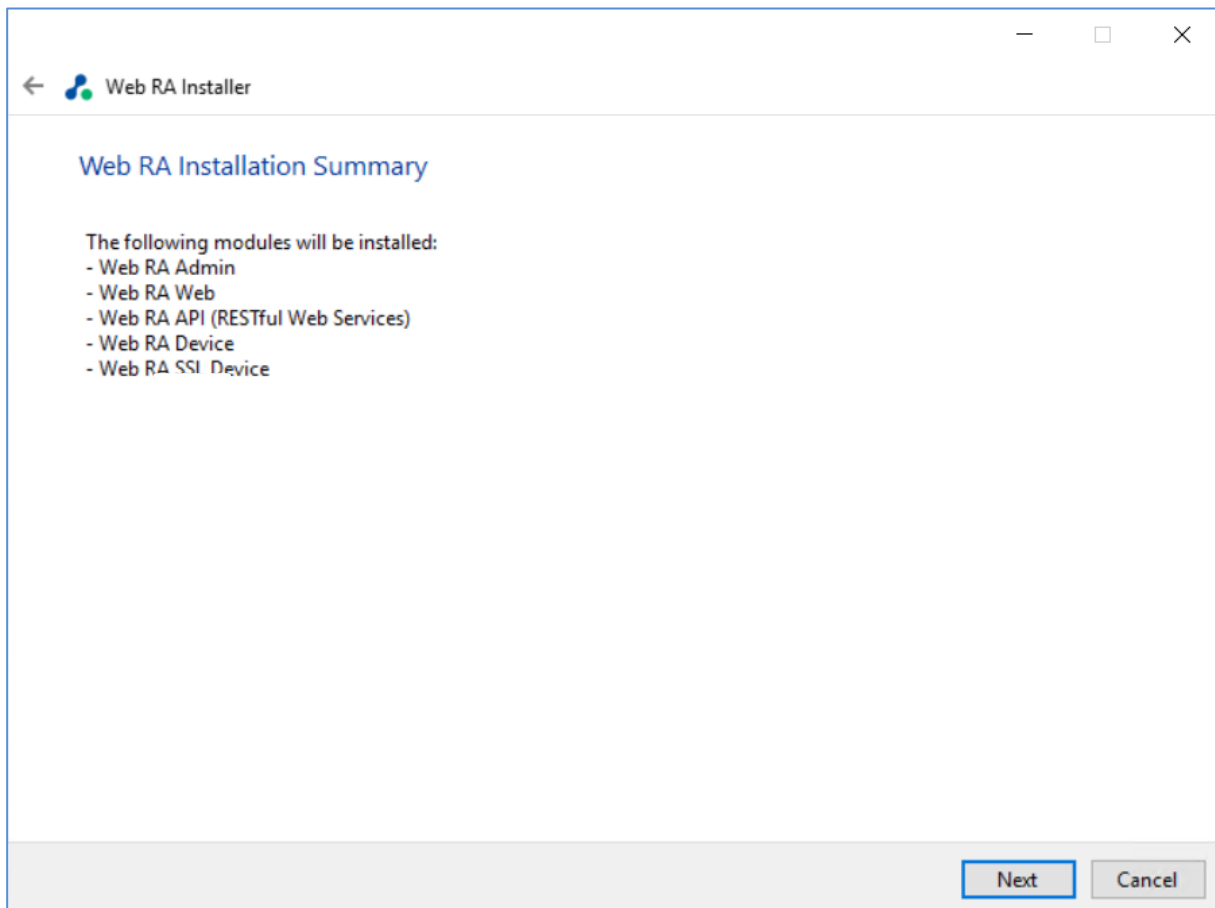
The image shows a screenshot of the 'Web RA Installer' application window. The window title is 'Web RA Installer' and it has standard window controls (minimize, maximize, close). The main content area is titled 'Web RA Modules' and contains several sections, each with a checked checkbox and a sub-section with its own checkbox. Each sub-section has a 'Website Name' and a 'Port' field.

Module	Sub-Module	Website Name	Port
<input checked="" type="checkbox"/> Web RA Admin	<input checked="" type="checkbox"/>	admin	443
<input checked="" type="checkbox"/> Web RA Web	<input checked="" type="checkbox"/>	web	81
<input checked="" type="checkbox"/> Web RA API (RESTful Web Services)	<input checked="" type="checkbox"/>	api	82
<input checked="" type="checkbox"/> Web RA Device	<input checked="" type="checkbox"/> HTTP	device	83
	<input checked="" type="checkbox"/> HTTPS	device	84
	<input checked="" type="checkbox"/> Client Authentication	ssldevice	85

At the bottom right of the window, there are two buttons: 'Next' (highlighted with a blue border) and 'Cancel'.

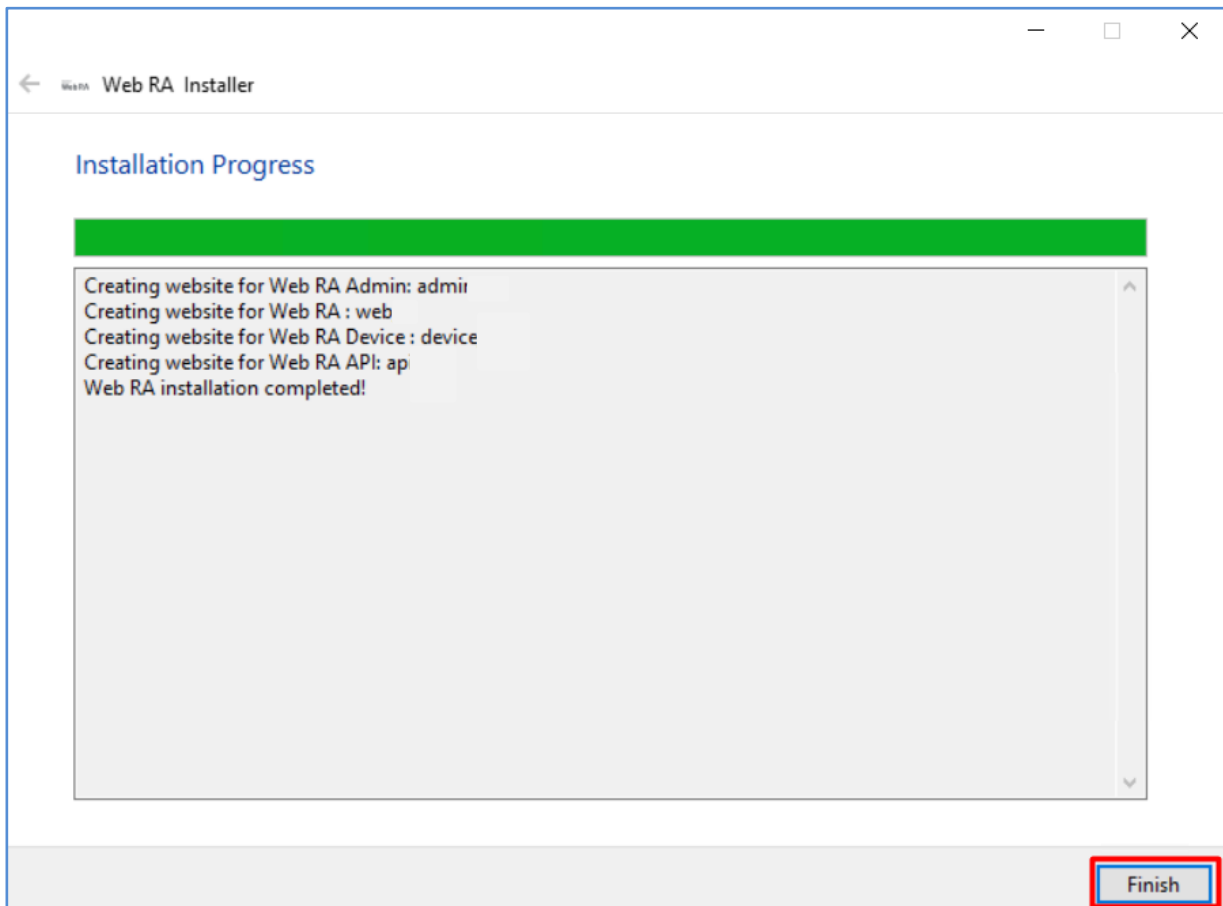
Select the appropriate modules to install the required features.

Click the **Next** button to show the summary and complete the installation:



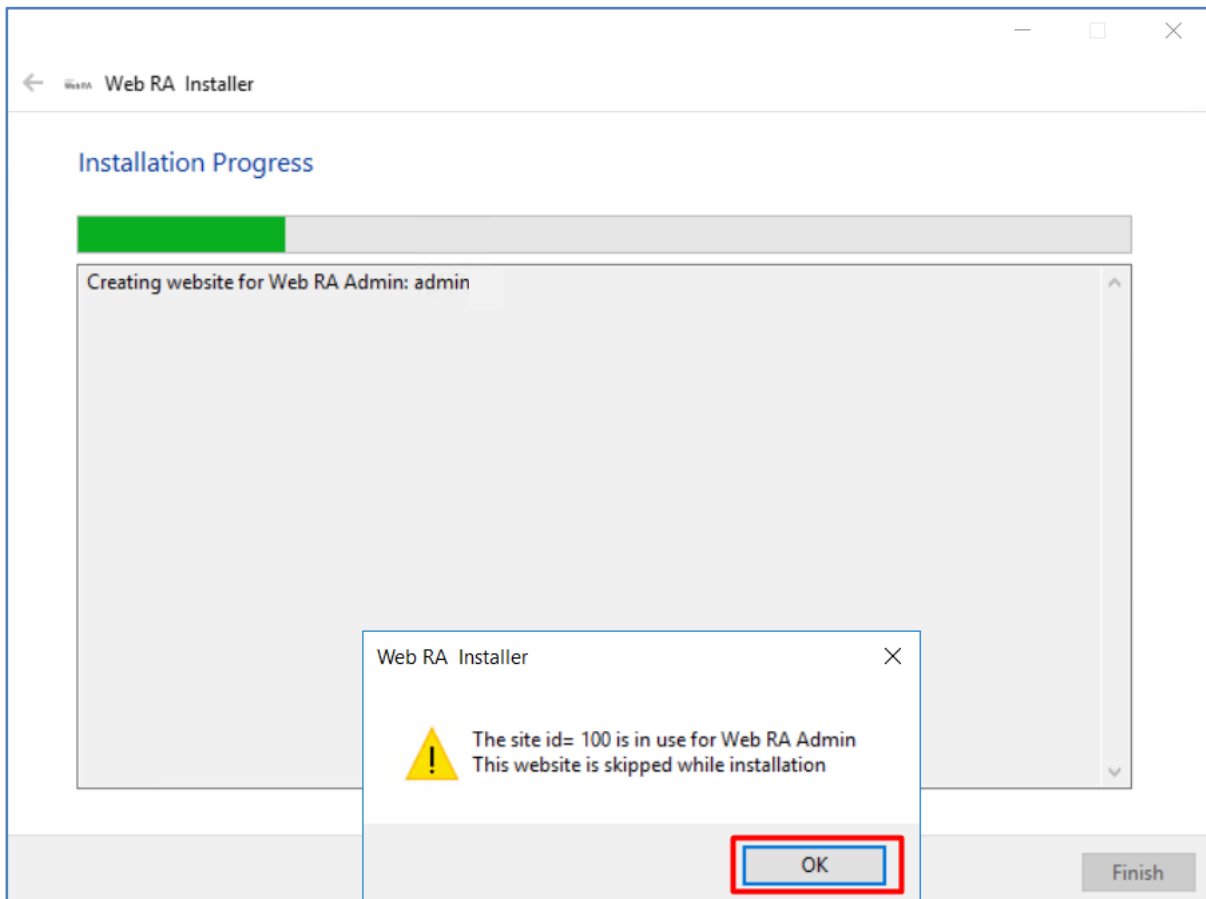
This screen shows the installation summary by listing the different product modules that will be installed.

If you think any listed item is incorrect then use the **Back** button (arrow towards the top-left of the dialogue box) to correct your choices before proceeding ahead.



Click the **Next** button to continue with the installation.

In case of an error message, as shown below, click **OK** to continue.



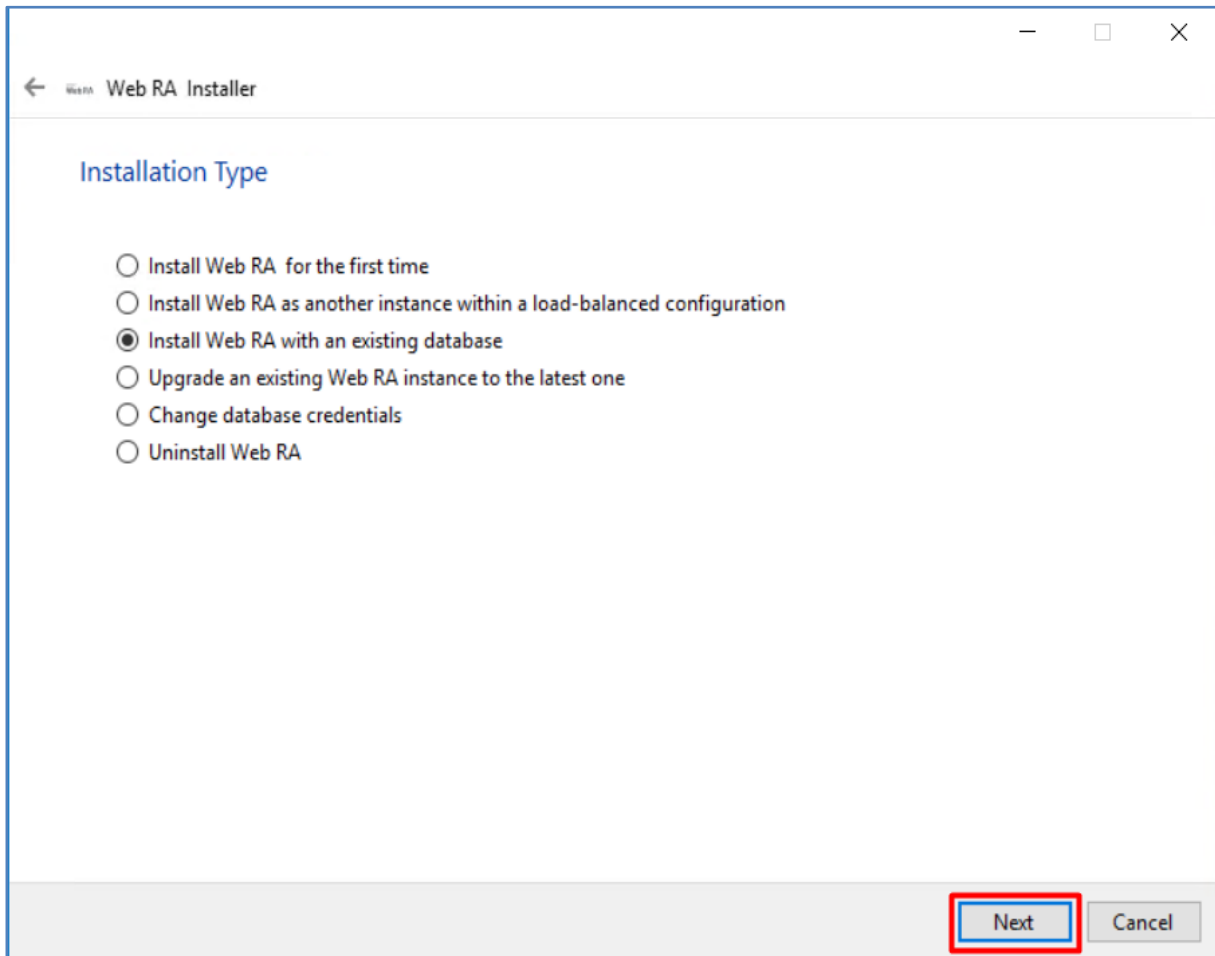
Click the **Finish** button to complete the installation process.

4.3 Installing ADSS Web RA with an Existing Database

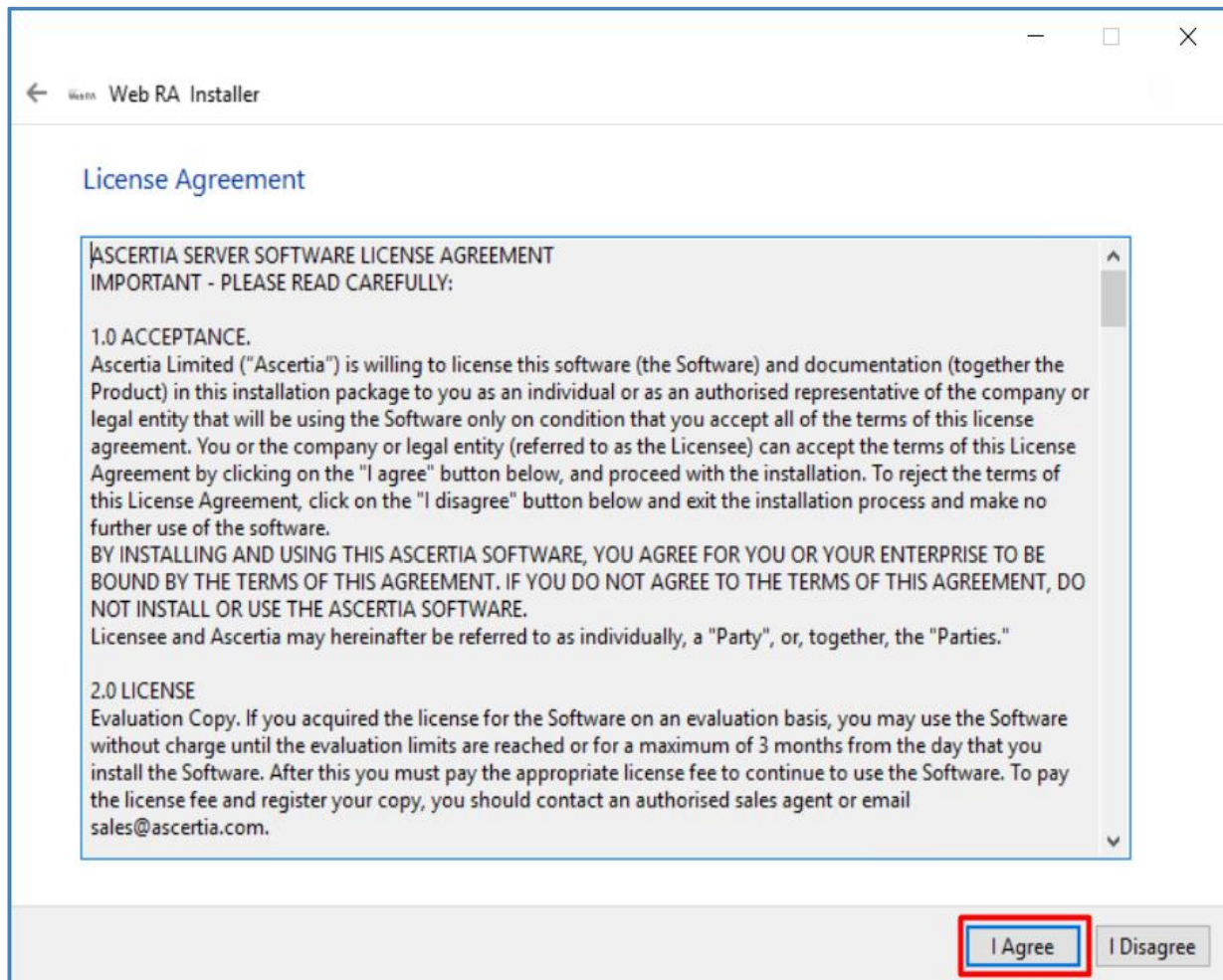
In order to install the ADSS Web RA with an existing database, follow the below mentioned installation instructions:

Launch the installer by right-clicking the file name **[ADSS Web RA Installation Directory]/setup/install.bat** and select **Run** as administrator. Follow the installation wizard as described previously until the Installation Type screen is shown:

Select the option **Install ADSS Web RA within existing database**



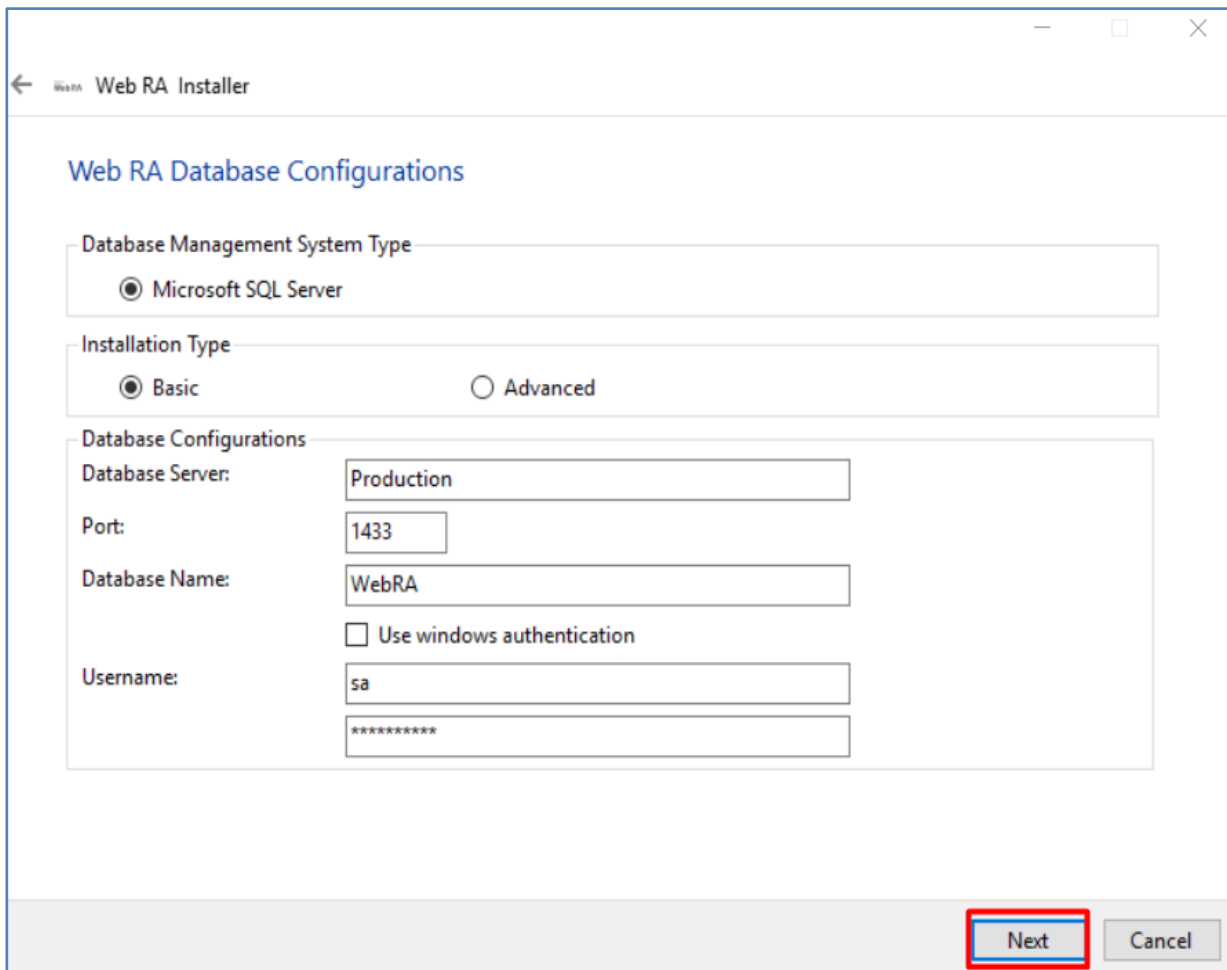
Click the **Next** button to show the License Agreement:



Click the **I Agree** button to continue.

Readme screen will be displayed with new features list. Click **Next** to proceed.

The following screen for database details will be displayed:



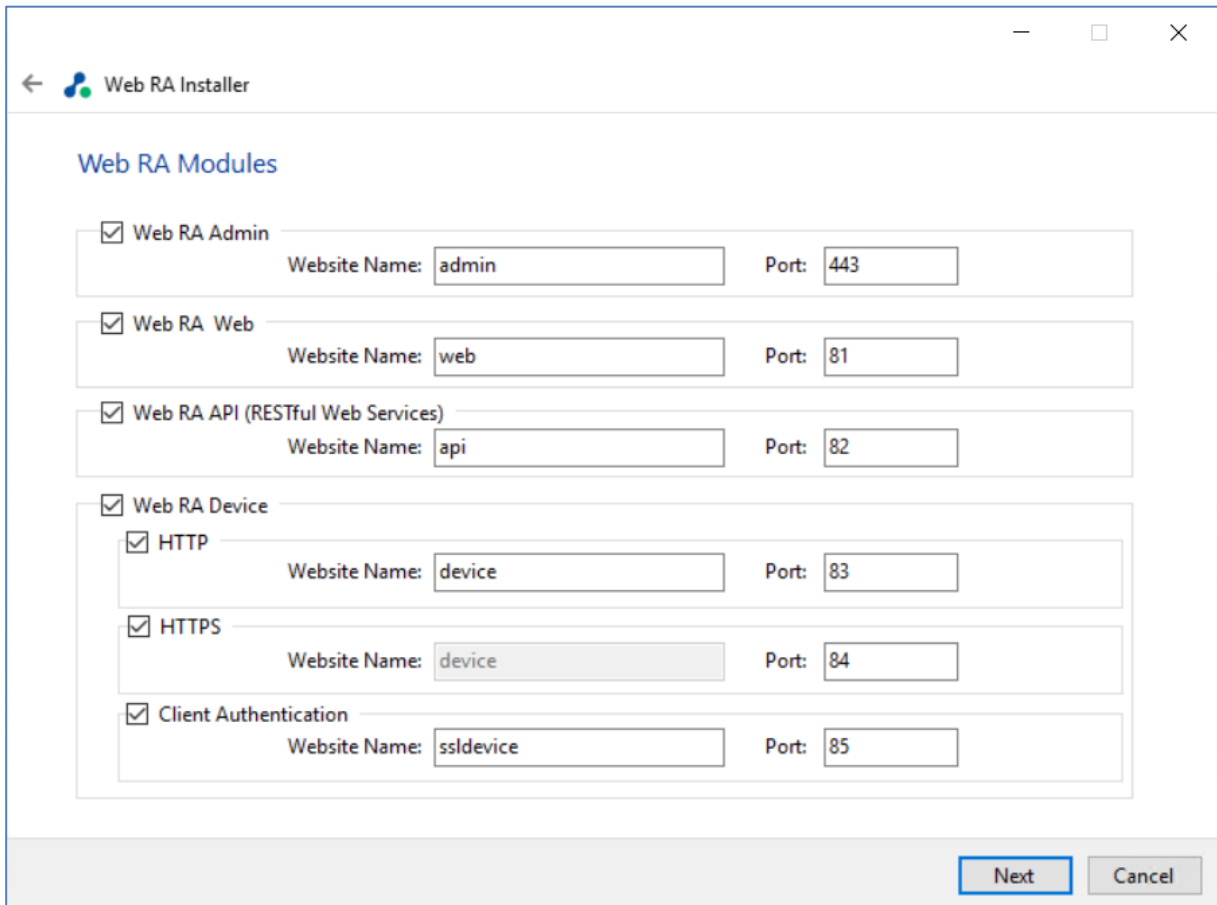
The information displayed above is an example and you should configure the relevant settings for your own environment.



The ADSS Web RA database schema and the version required by the installer must be the same.

*If the current ADSS Web RA database schema is older than the version required by the installer, and you click **Next**, the installer will prompt you that ADSS Web RA database schema will be upgraded to the latest version. Click **OK** to authorise the schema update.*

Click the **Next** button to select specific modules.



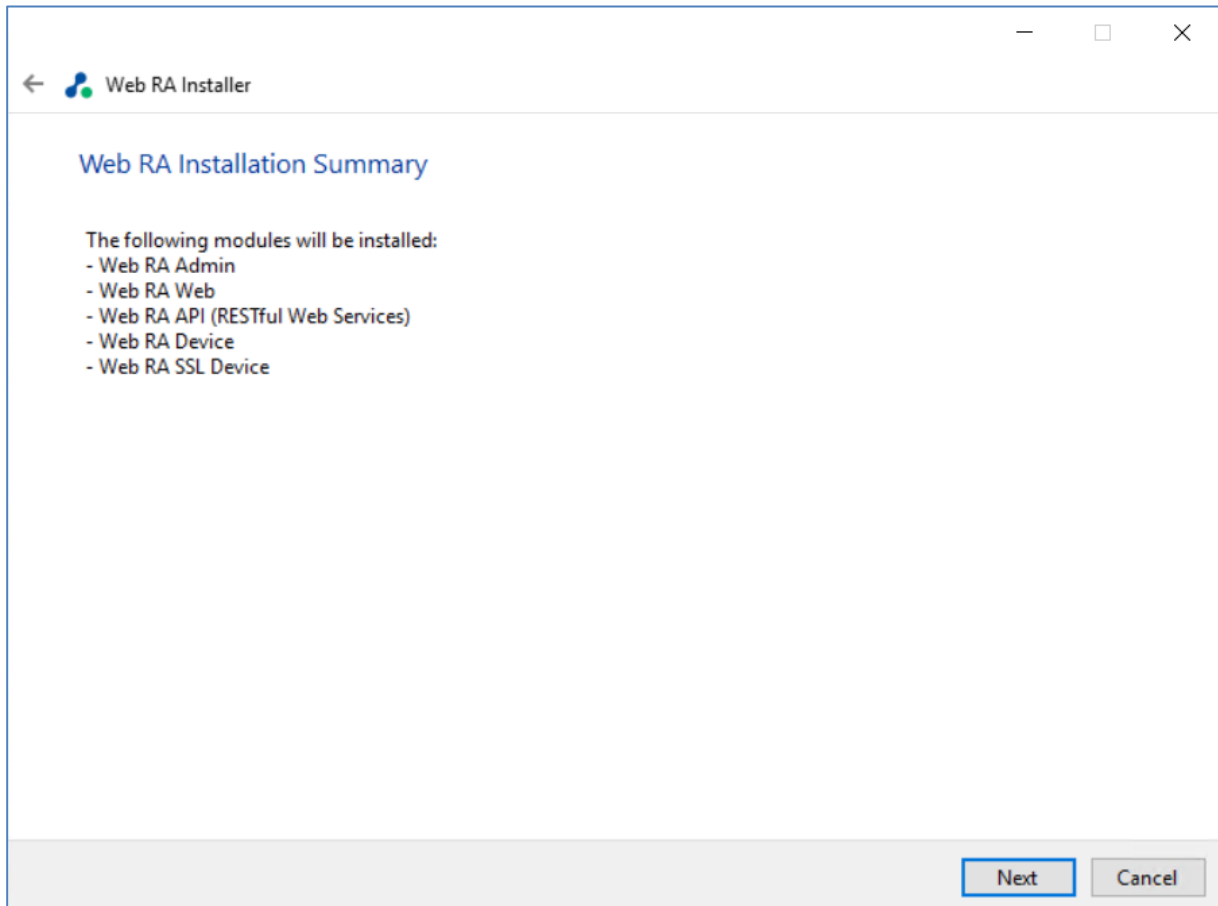
The image shows a screenshot of the 'Web RA Installer' application window. The window title is 'Web RA Installer'. The main content area is titled 'Web RA Modules' and contains a list of modules, each with a checked checkbox, a 'Website Name' field, and a 'Port' field. The modules are:

- Web RA Admin: Website Name: admin, Port: 443
- Web RA Web: Website Name: web, Port: 81
- Web RA API (RESTful Web Services): Website Name: api, Port: 82
- Web RA Device
 - HTTP: Website Name: device, Port: 83
 - HTTPS: Website Name: device, Port: 84
 - Client Authentication: Website Name: ssldevice, Port: 85

At the bottom right of the window, there are two buttons: 'Next' (highlighted with a blue border) and 'Cancel'.

Select the appropriate modules to install the required features.

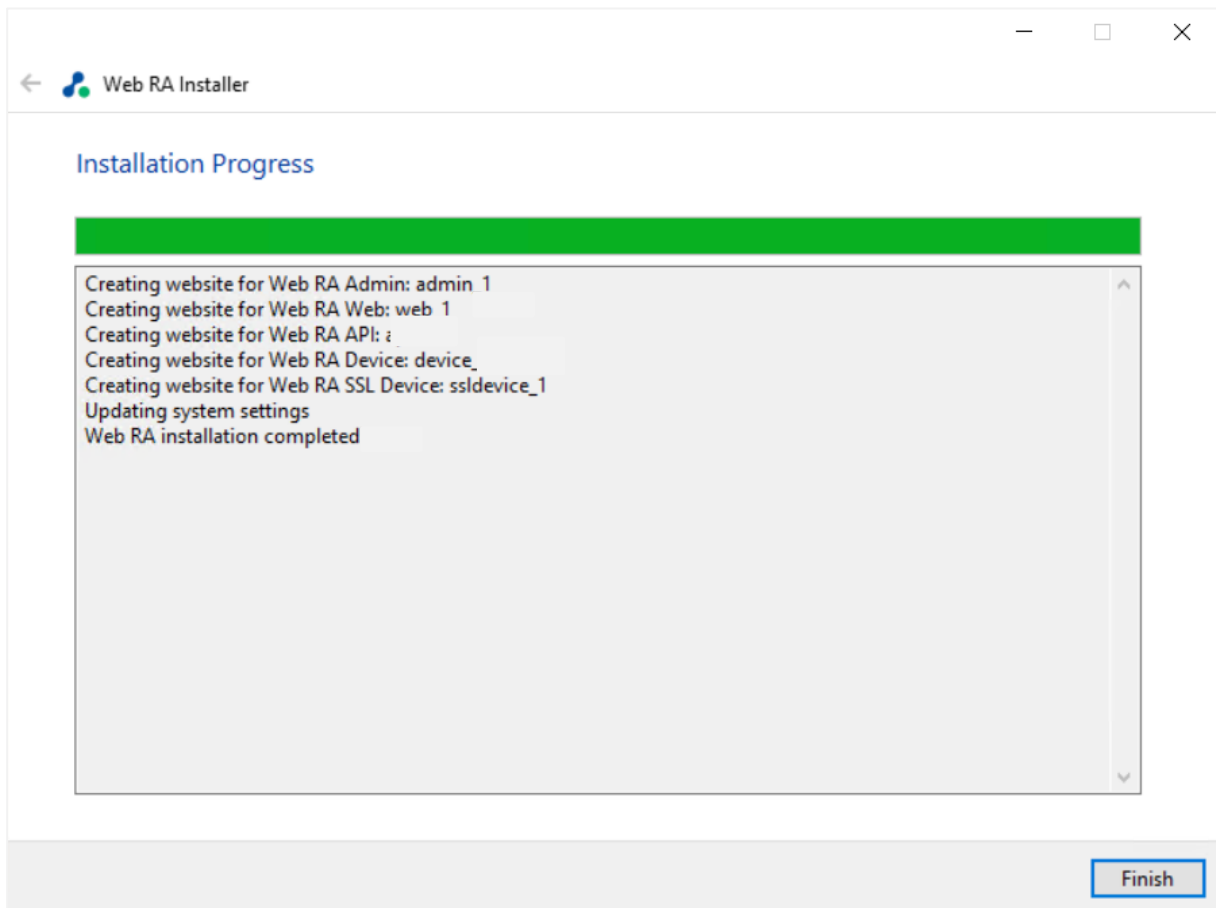
Click the **Next** button to show the summary and complete the installation:



This screen shows the installation summary by listing the different product modules that will be installed.

If you think any listed item is incorrect then use the **Back** button (arrow towards the top-left of the dialogue box) to correct your choices before proceeding ahead.

Click the **Next** button to continue with the installation.



Click the **Finish** button to complete the installation process.

4.4 Upgrading ADSS Web RA

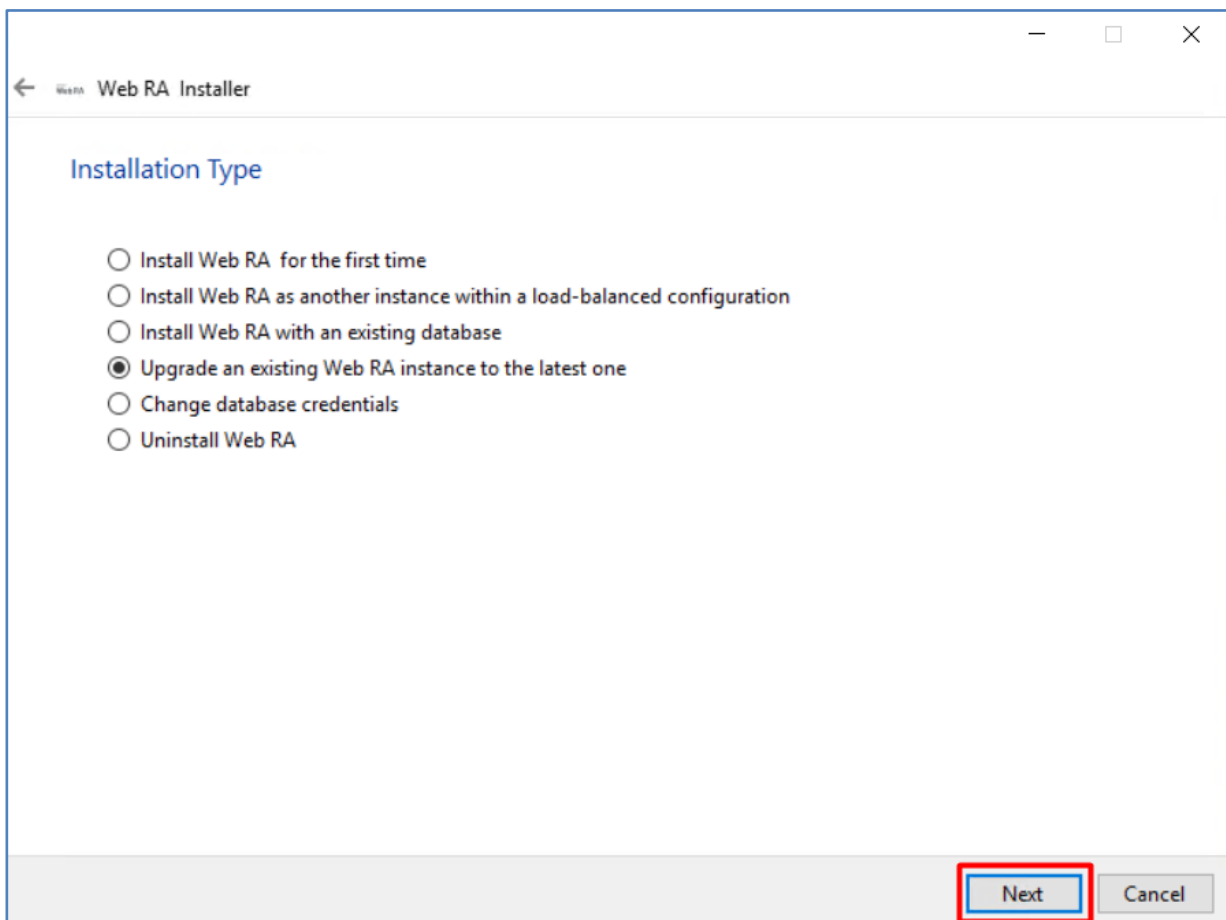
The upgrade process for ADSS Web RA is quick and easy. The existing data files, database schema and database entries are automatically upgraded during the process.

4.4.1 Upgrade Procedure

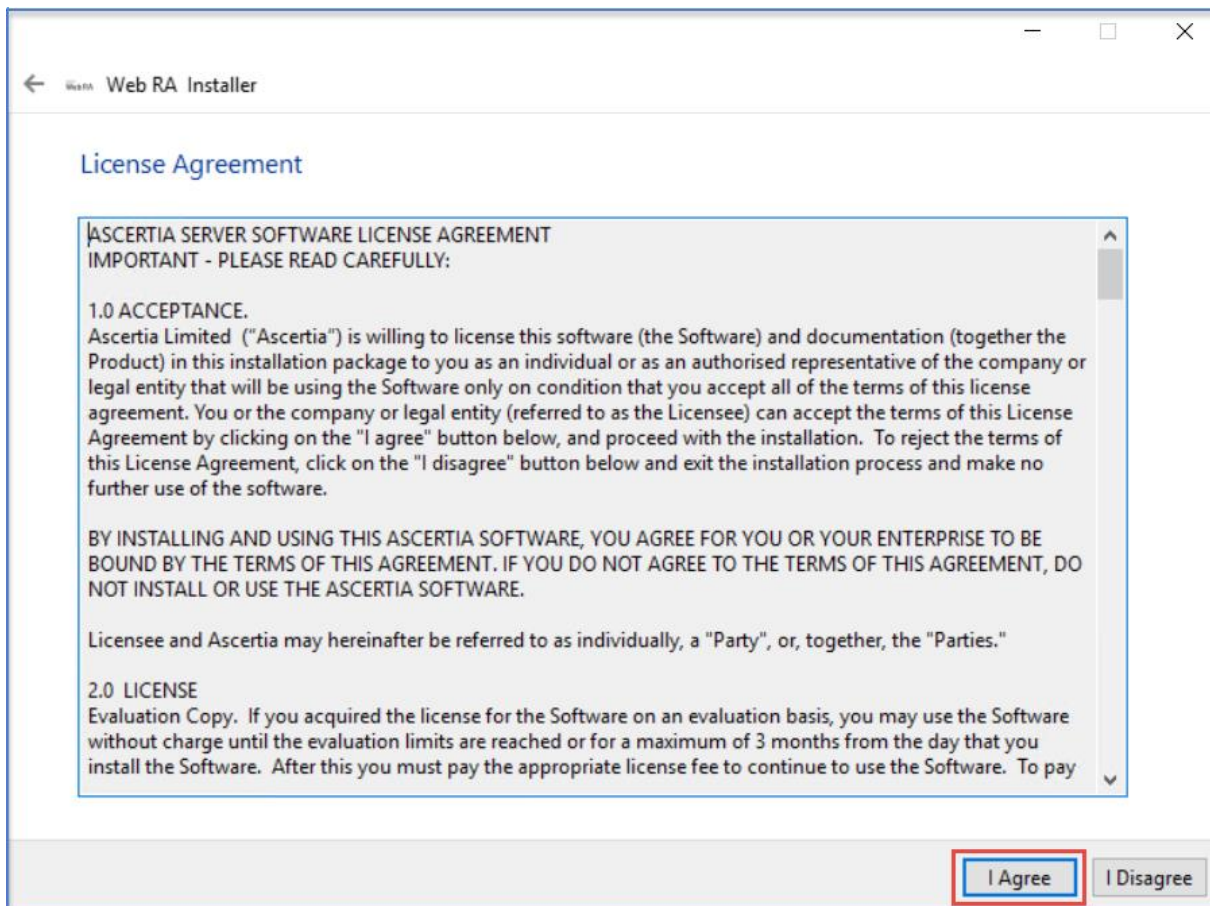
Follow these instructions to upgrade an older version of ADSS Web RA to the latest version. Launch the installer by right-clicking the file name **[ADSS Web RA Installation Directory]/setup/install.bat** and select **Run as administrator**.

Follow the installation wizard as described previously until the **Installation Type** screen is shown:

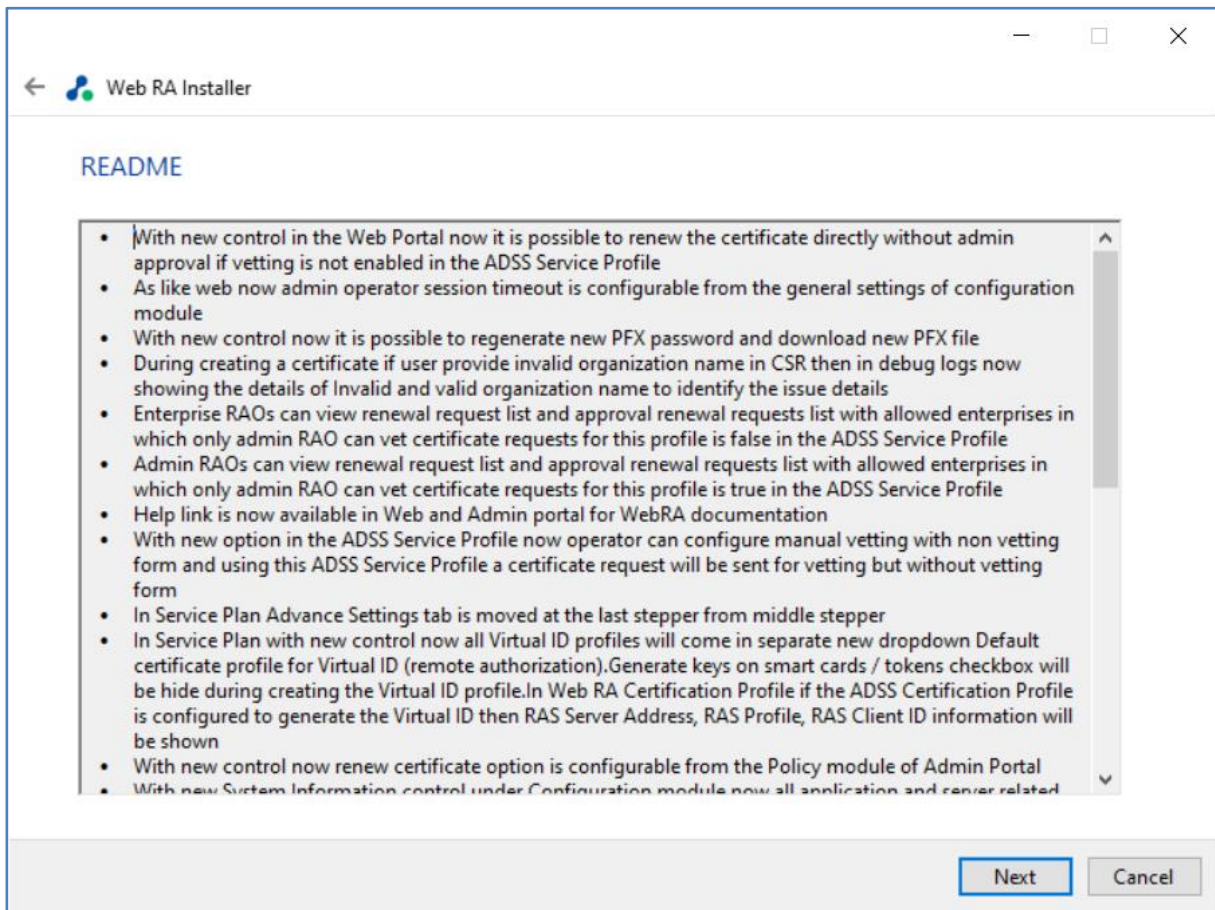
Select the option **Upgrade an existing ADSS Web RA instance to latest one**



Click the **Next** button to view and accept the license agreement:

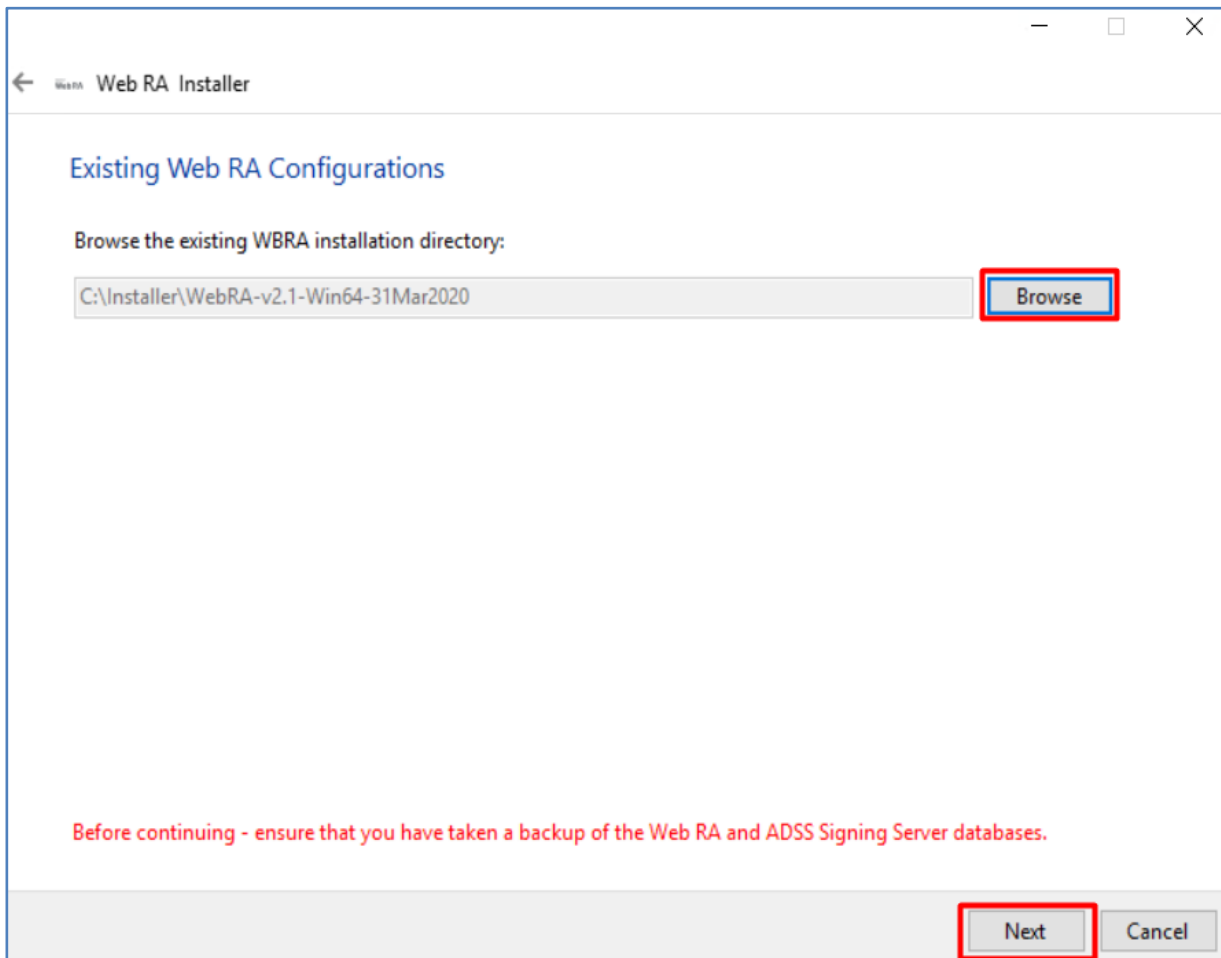


Click the **I Agree** button to proceed



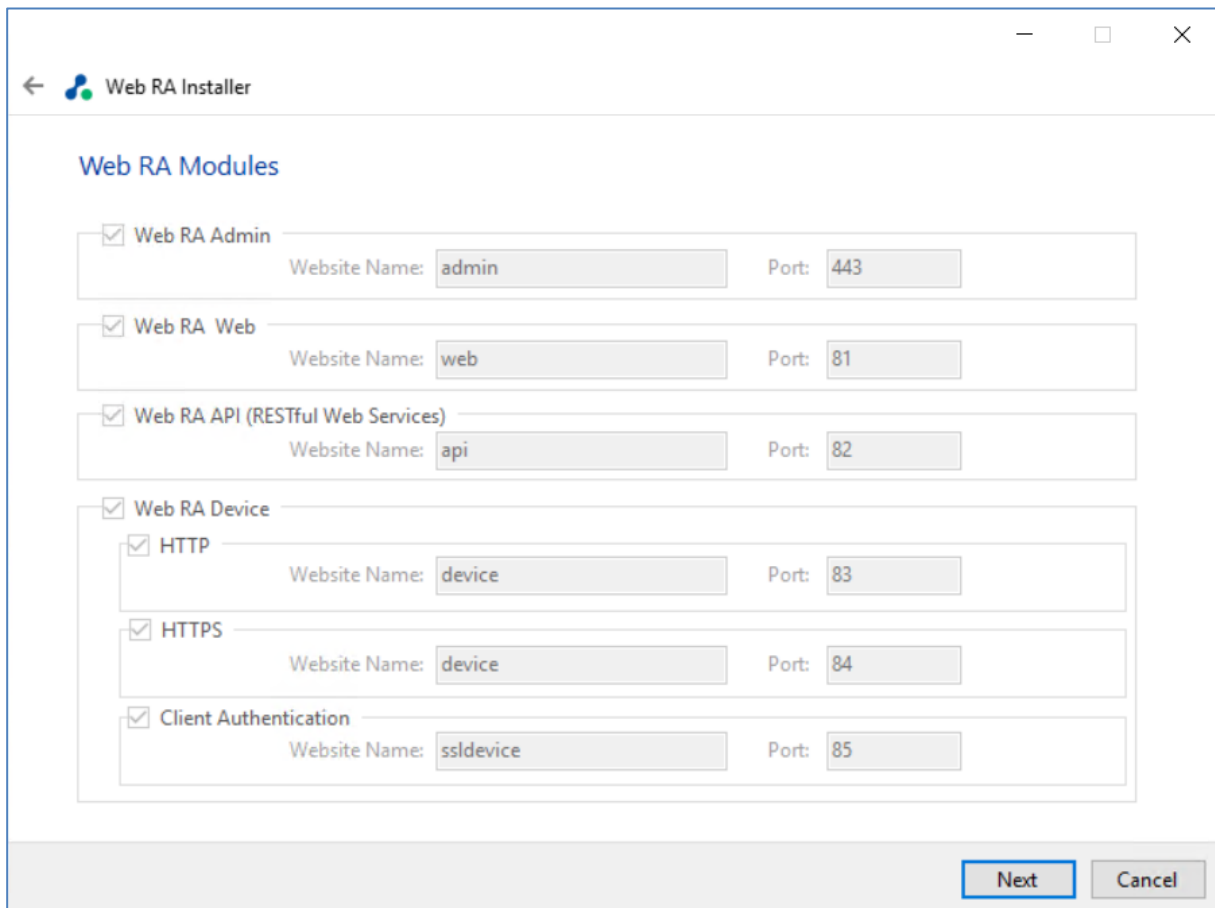
Readme file screen will be open. This includes all features of current version.

Click Next to proceed



Click **Browse** and define the path to the existing ADSS Web RA installation directory.

Click the **Next** button to select specific modules:

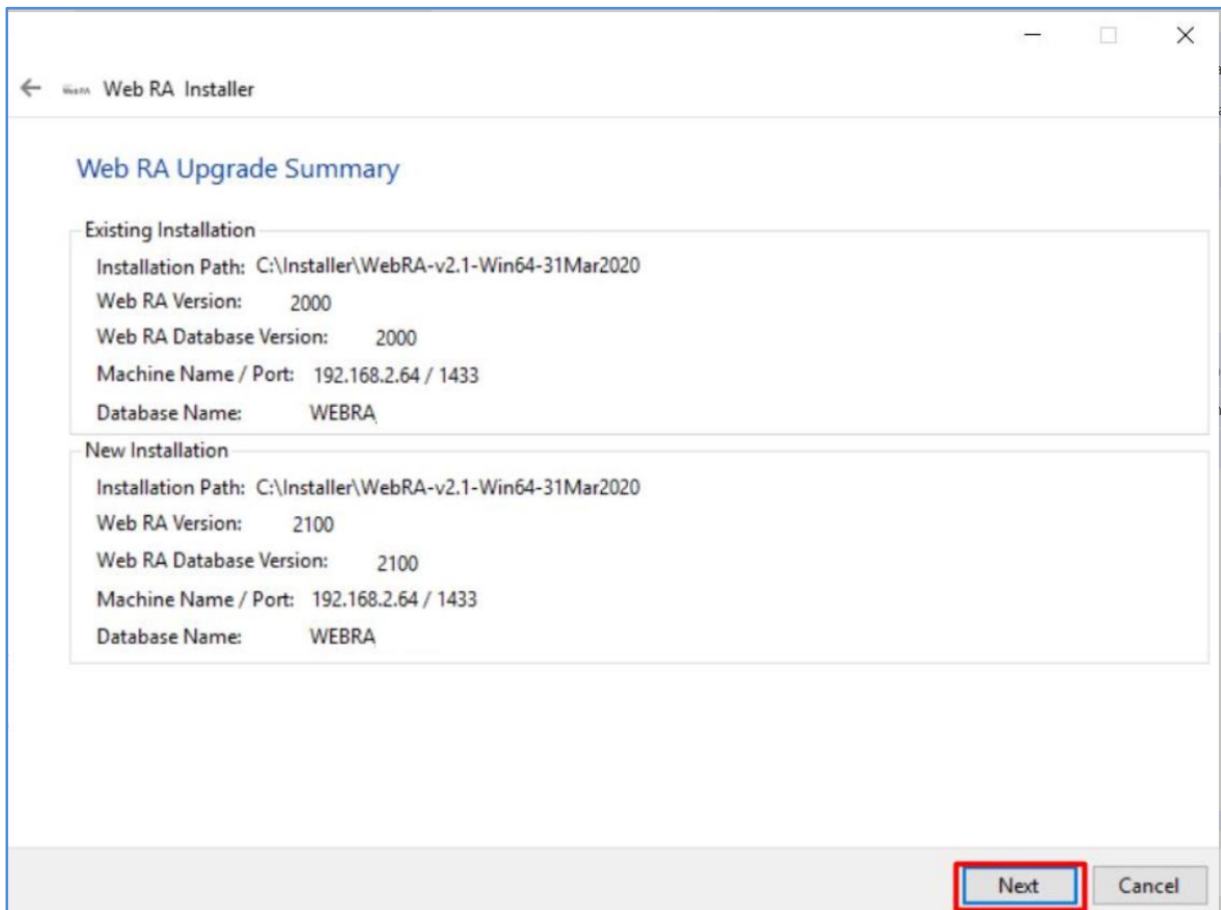


The image shows a screenshot of the 'Web RA Installer' application window. The window title is 'Web RA Installer'. The main heading is 'Web RA Modules'. Below this, there are several configuration sections, each with a checked checkbox and a 'Website Name' and 'Port' field. The 'Web RA Admin' section has 'admin' and '443'. The 'Web RA Web' section has 'web' and '81'. The 'Web RA API (RESTful Web Services)' section has 'api' and '82'. The 'Web RA Device' section is expanded and contains three sub-sections: 'HTTP' with 'device' and '83', 'HTTPS' with 'device' and '84', and 'Client Authentication' with 'ssldevice' and '85'. At the bottom right, there are 'Next' and 'Cancel' buttons. The 'Next' button is highlighted with a blue border.

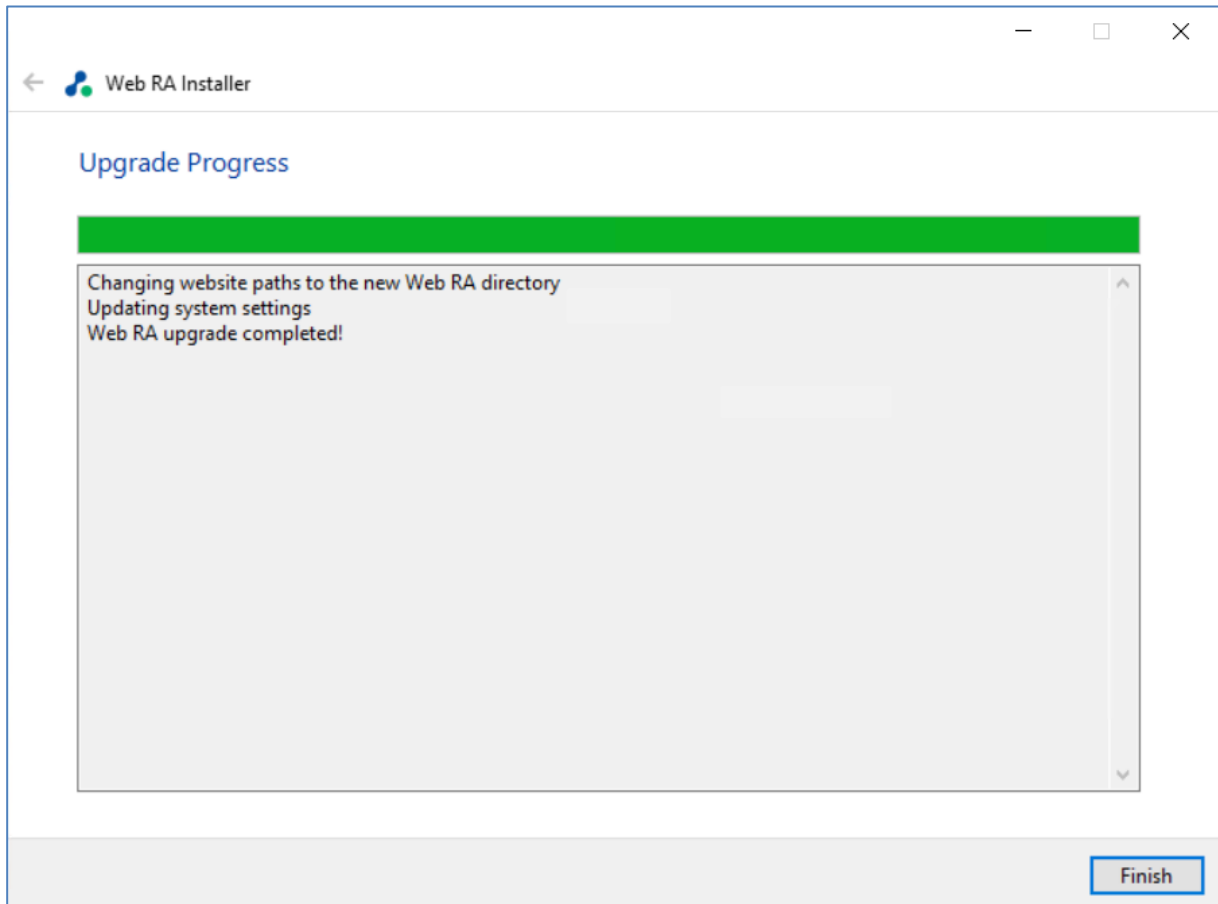
Module	Website Name	Port
Web RA Admin	admin	443
Web RA Web	web	81
Web RA API (RESTful Web Services)	api	82
Web RA Device		
HTTP	device	83
HTTPS	device	84
Client Authentication	ssldevice	85

This screen shows a list of all ADSS Web RA modules. Components that are already installed are displayed but **greyed** out, while any ADSS Web RA module(s) that have not been installed previously can be selected for installation during the upgrade.

Click the **Next** button to see the upgrade summary:



Click the **Next** button to start the upgrade progress.



Click the **Finish** button to complete the ADSS Web RA upgrade process.

Note: It is recommended to restart IIS after upgrade installation of ADSS Web RA.

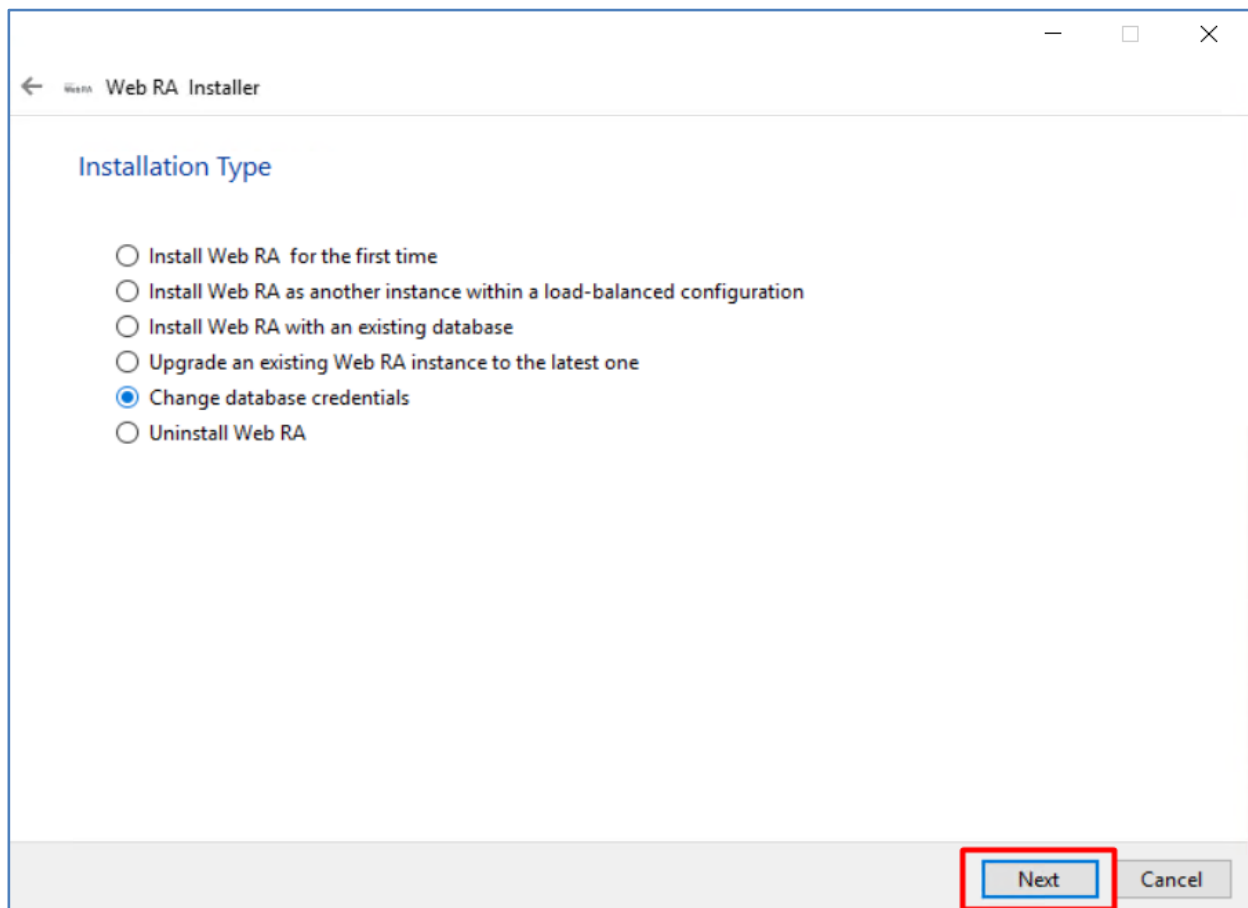
4.5 Changing Database Credentials for an Existing Installation

Database credentials stored by ADSS Web RA are encrypted for security purpose. If you need to make changes in your database server configurations, then these changes must be reflected in the ADSS Web RA installation for the signing operations to continue.

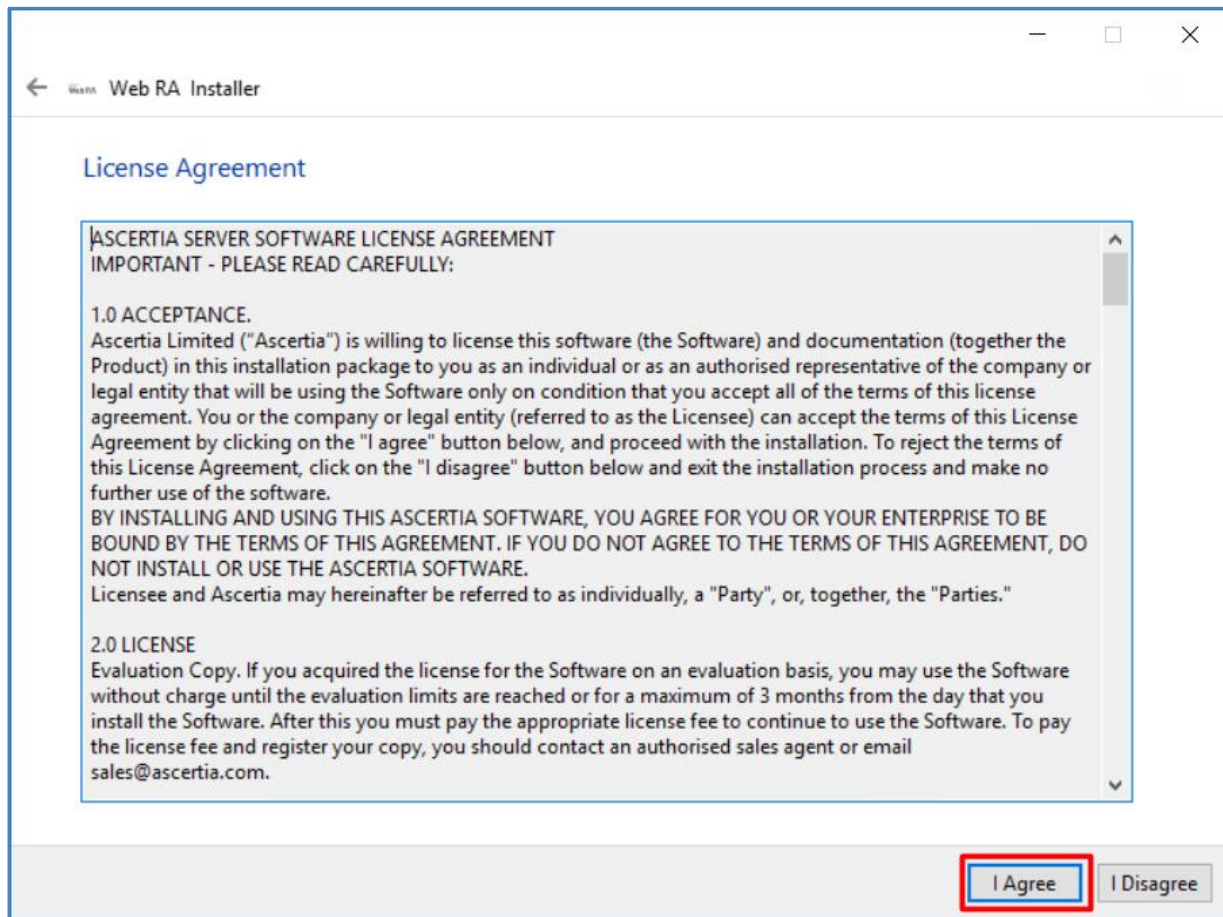
ADSS Web RA provides an option through the installer to update the following types of database related information:

1. **Database username** and **password**.
2. **Database name** and/or **server** (in case if database is restored from production database otherwise you need to install with existing database option).
3. **Authentication types** (from SQL Server to Windows authentication and vice versa)

Follow the installation wizard, and select the “**Change database credentials**” option, when the **Installation Type** screen is shown:

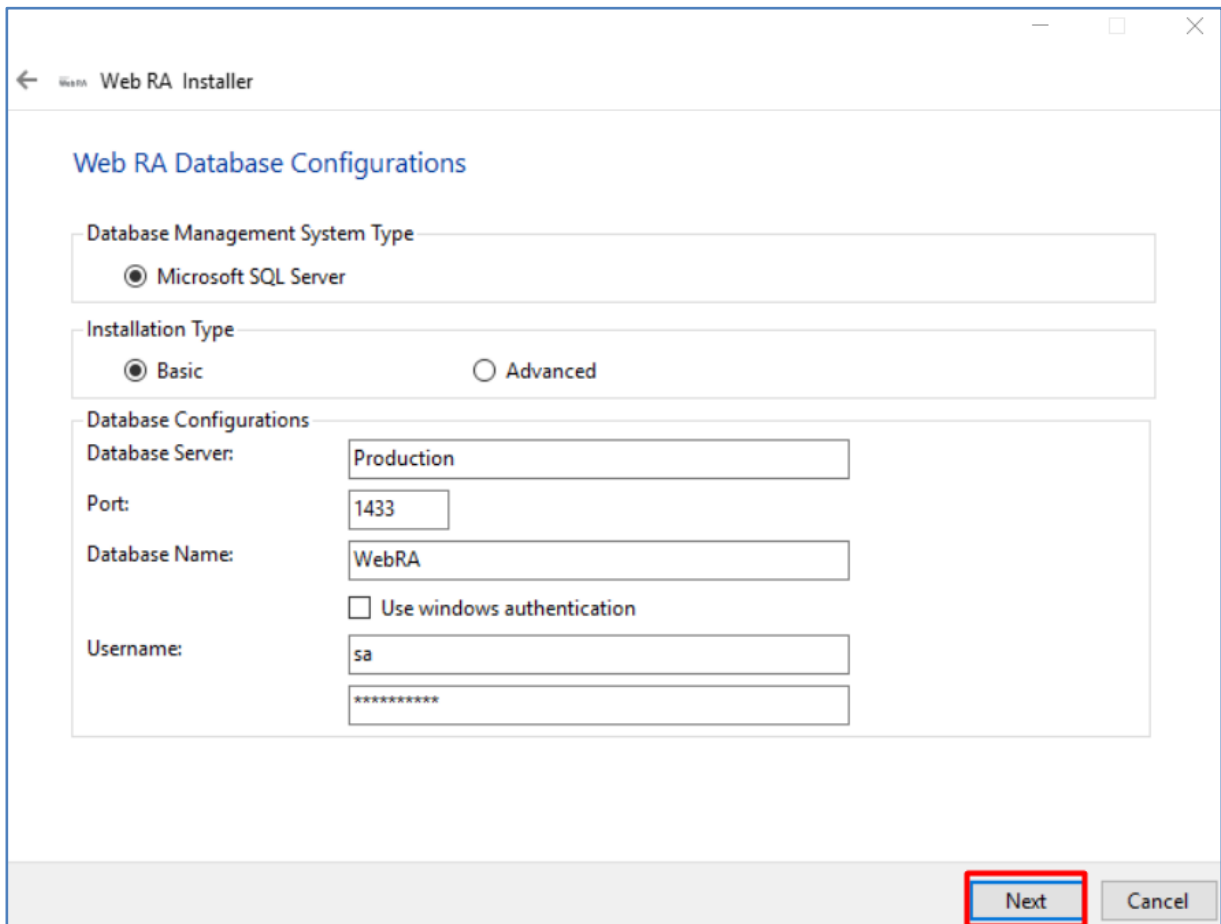


Click the **Next** button to show the License Agreement:



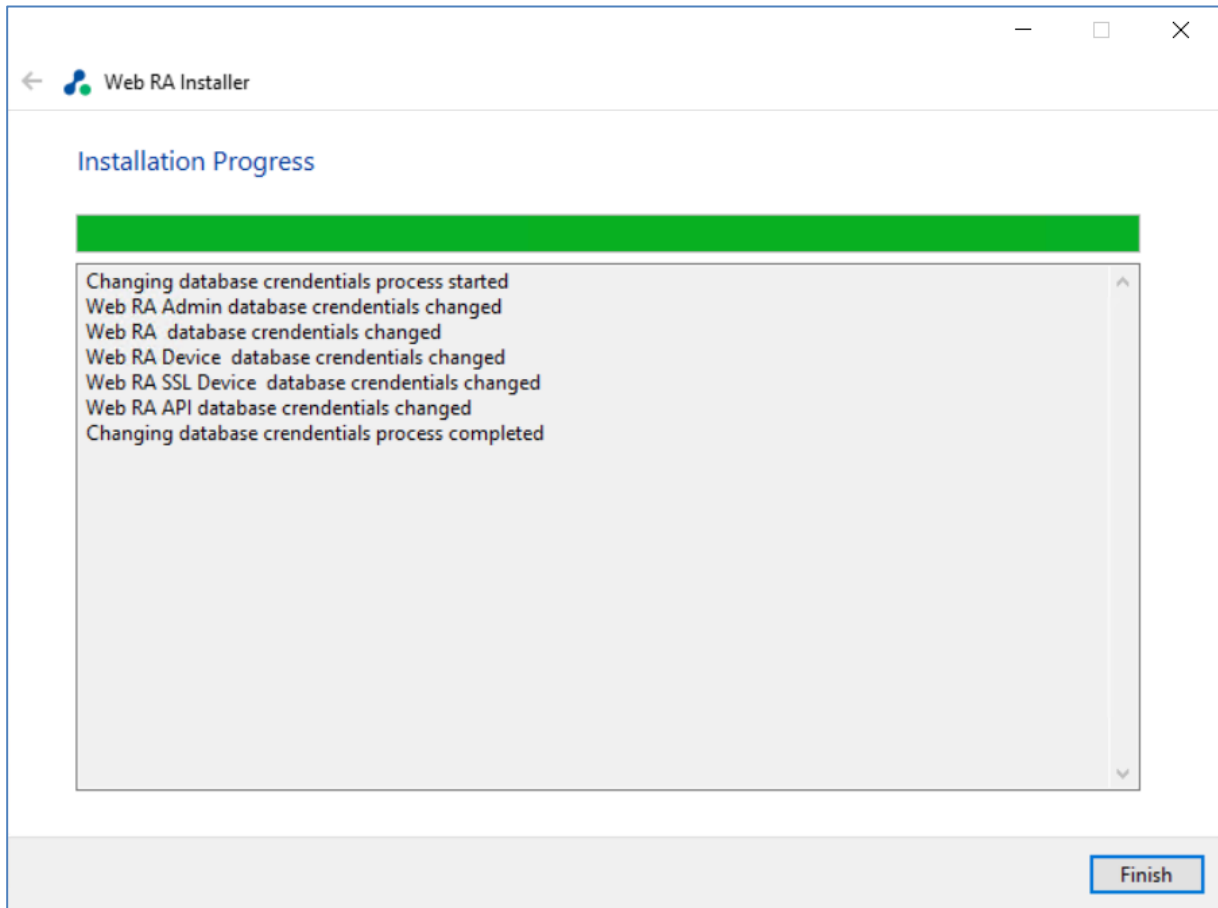
Click the **I Agree** button to proceed.

The following screen to prompt for database details will be displayed:



The image shows a screenshot of the 'Web RA Database Configurations' window in the 'Web RA Installer'. The window title is 'Web RA Web RA Installer'. The main heading is 'Web RA Database Configurations'. There are three main sections: 'Database Management System Type' with a radio button selected for 'Microsoft SQL Server'; 'Installation Type' with radio buttons for 'Basic' (selected) and 'Advanced'; and 'Database Configurations' which includes fields for 'Database Server' (Production), 'Port' (1433), 'Database Name' (WebRA), a checkbox for 'Use windows authentication' (unchecked), 'Username' (sa), and a password field (masked with asterisks). At the bottom right, there are 'Next' and 'Cancel' buttons, with the 'Next' button highlighted by a red rectangle.

Click the **Next** button to update the database configurations.



Click the **Finish** button to update the database configurations.

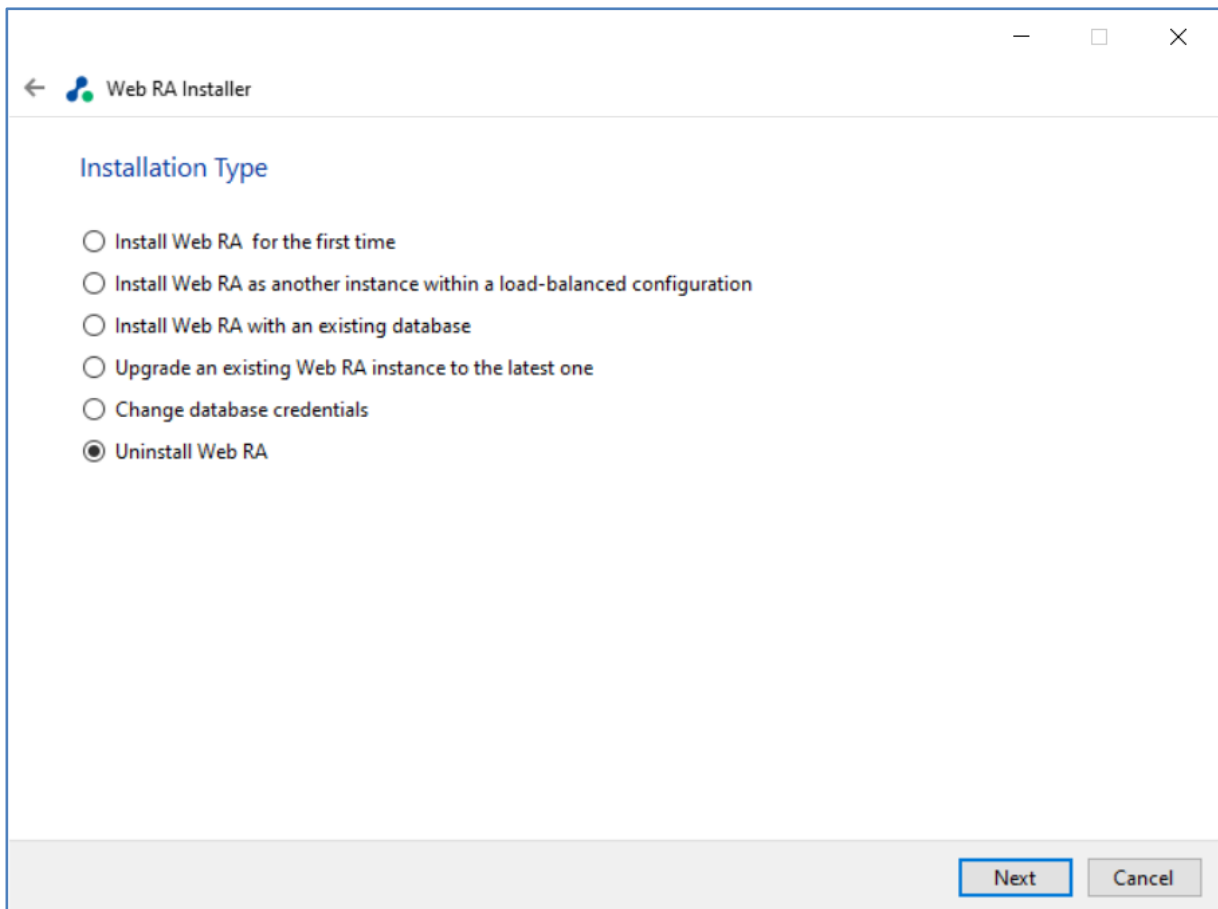
5 ADSS Web RA Uninstallation

Though we will not be pleased to let you go, but sometimes we have to say goodbye. You may uninstall ADSS Web RA Installer anytime.

For this:

Right click the **[ADSS Web RA Directory]/setup/install.bat** file and choose **Run as administrator**.

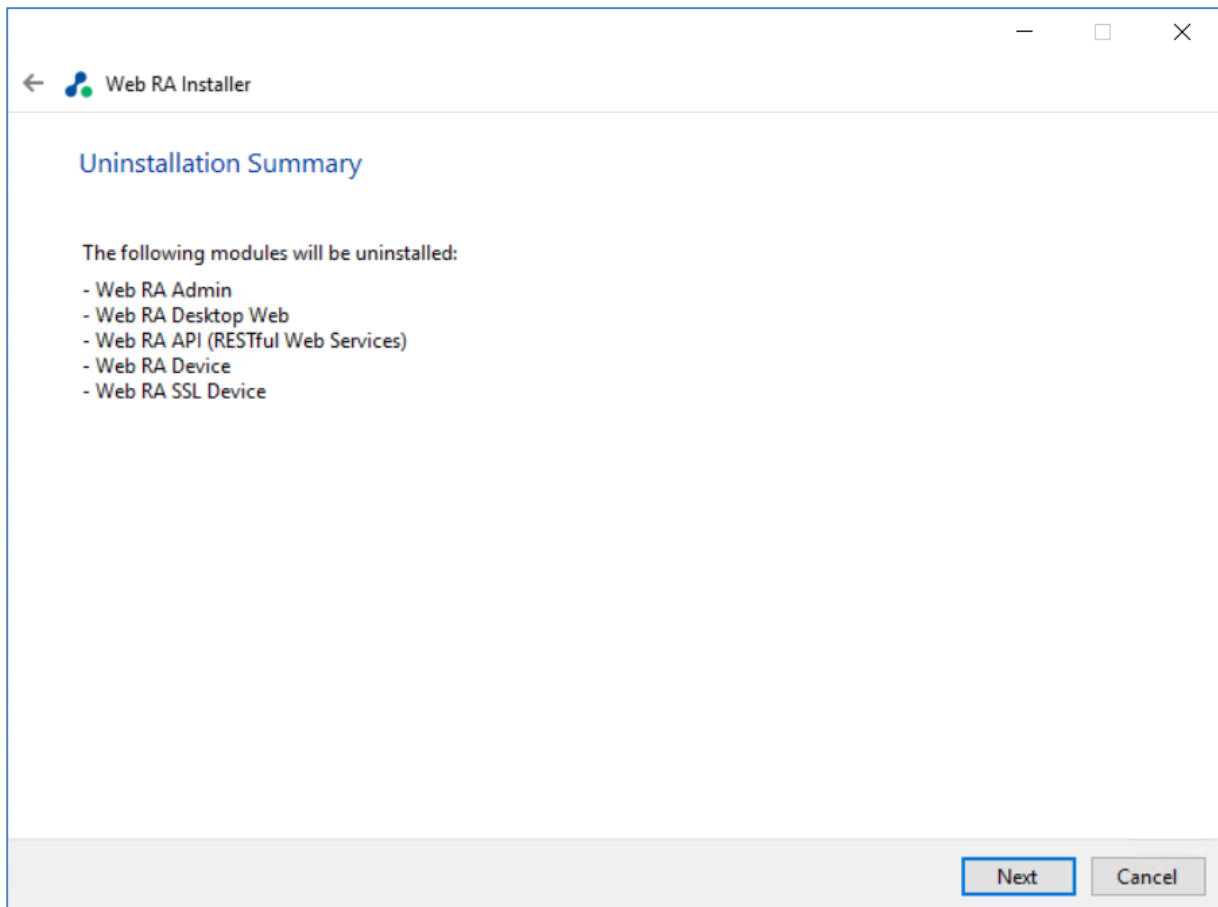
Follow the installation wizard until the **Installation Type** screen is shown:



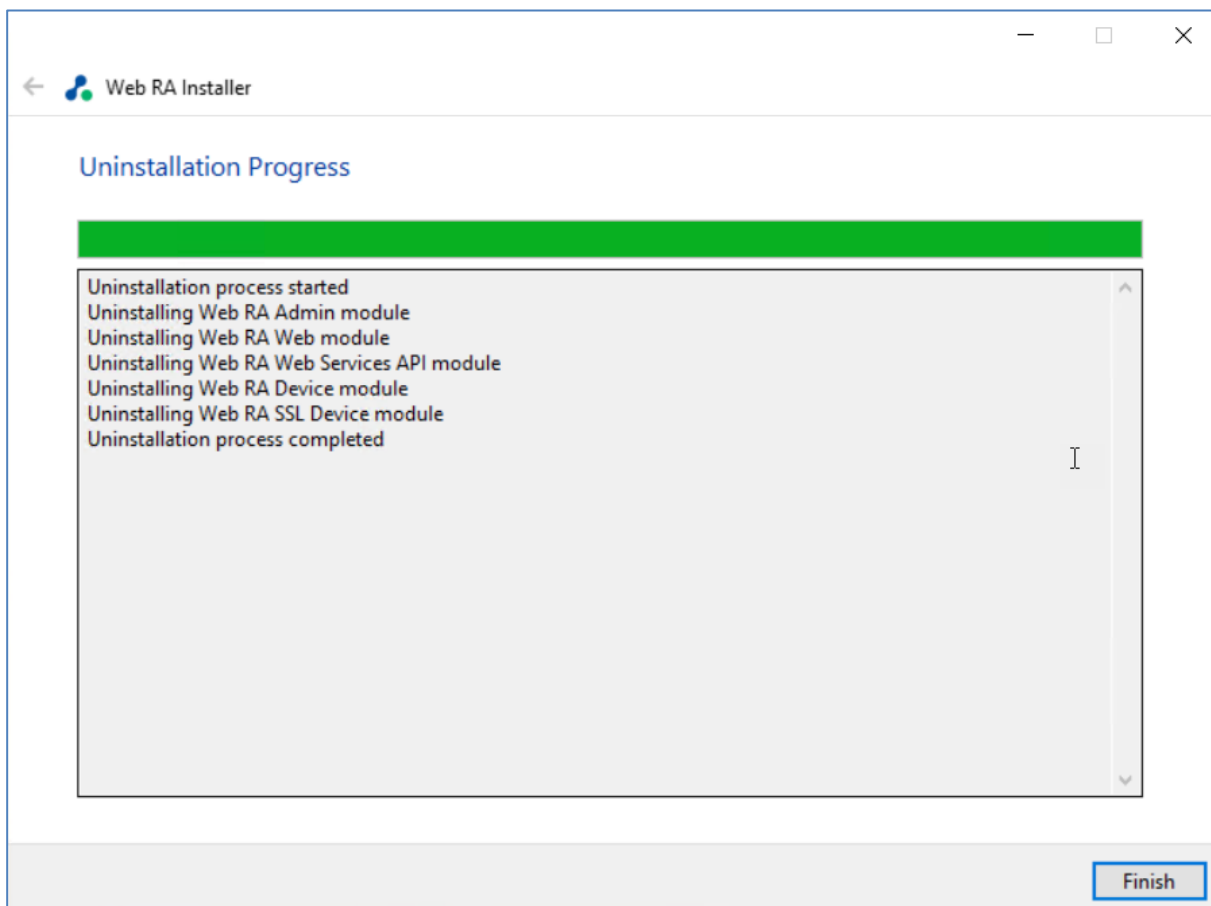
Select **“Uninstall ADSS Web RA”** to remove all websites from IIS mapped and this directory.

Click the **Next** button to proceed further.

The following screen is shown:



Click the **Next** button to proceed with the uninstall process.



Click the **Finish** button to complete the process.

Note: This procedure does not remove the system database and its respective contents. You need to remove database manually.

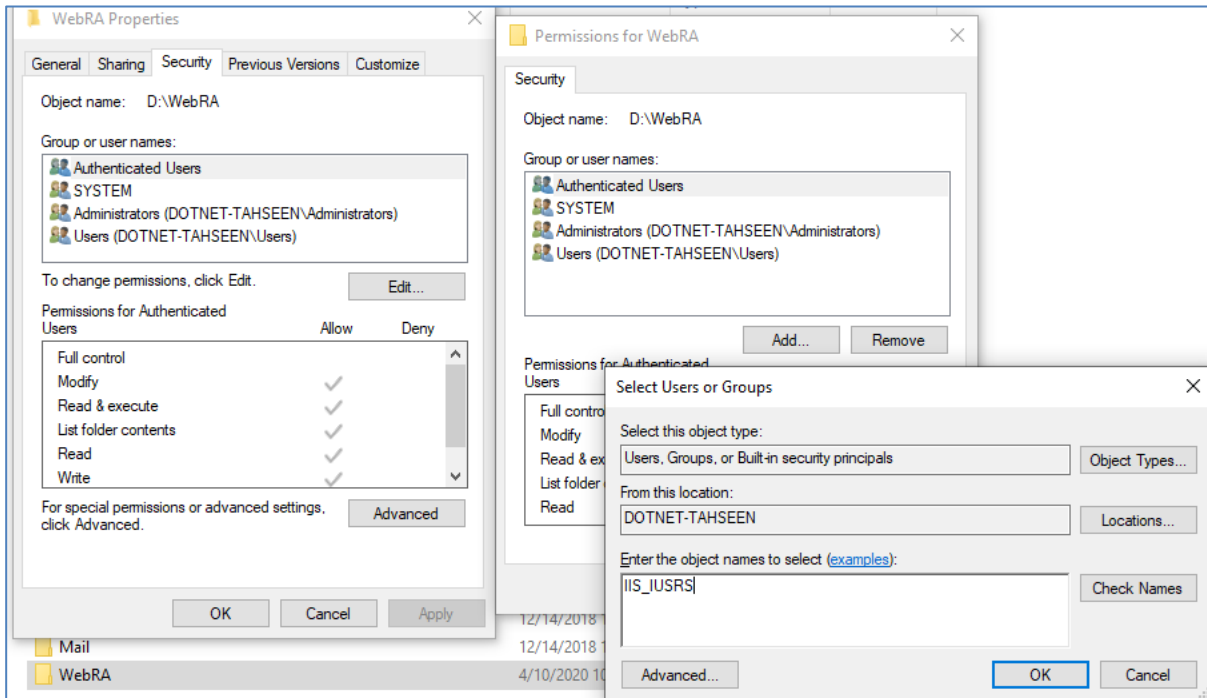
6 Appendix

6.1 Troubleshooting

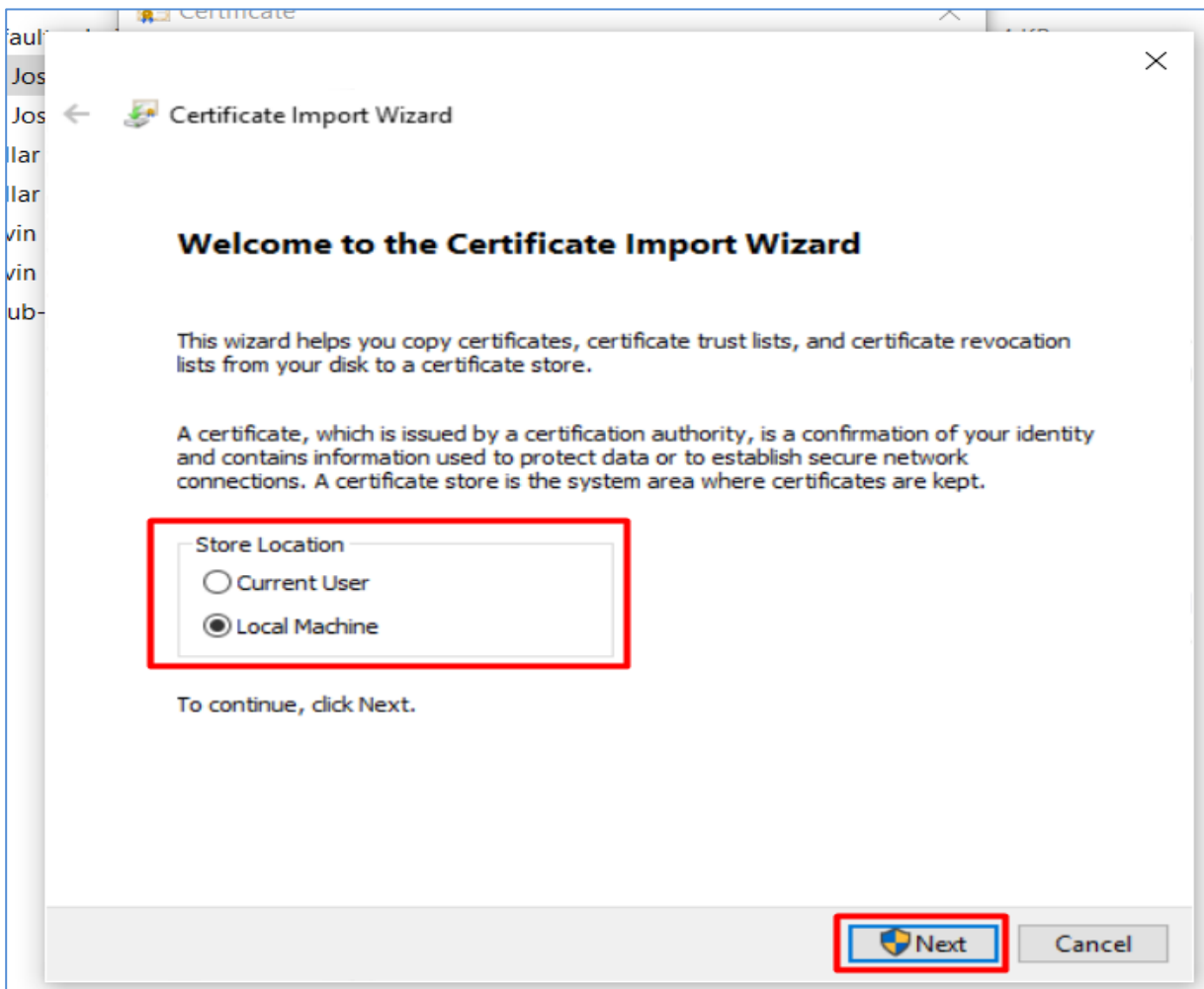
1. If ADSS Web RA Admin module is installed on Windows 2012 R2, then the HTTP 403.16 error code may occur when you access the ADSS Web RA Admin console from web browser.

Follow these instructions to solve this issue:

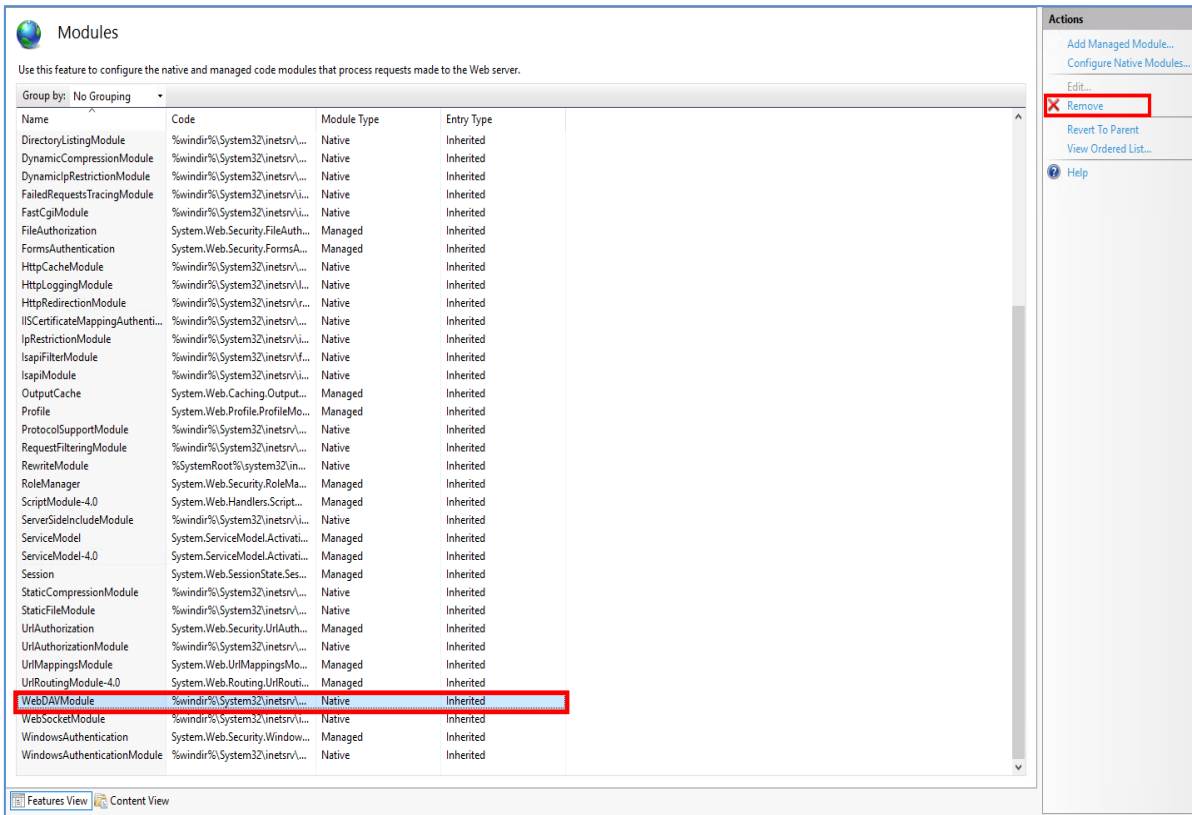
- a. Open registry and add the key:
KEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\SecurityProviders\SCHANNEL
 - b. Create a new key with **Value Type: REG_DWORD (32-bit)**
 - c. Set **Value Name: ClientAuthTrustMode**
 - d. Edit the field and set **Value Data: 2**
 - If you are interested to know more details about it, browse the Microsoft KB link: <https://support.microsoft.com/en-us/kb/2464556>.
2. If you receive the HTTP error code 500.19 whilst accessing Admin, Web or API then:
 - a. Open **IIS Management Console**
 - b. Go to **Application Pools**
 - c. Select a site and click **Advanced Setting**
 - d. In **General**, make sure that **Enable 32-Bit Applications** is set to **False**.
 3. If you cannot start ADSS Server from Windows Services panel on Azure, then make sure that you are not starting those services under Windows user that you have created while creating the Azure instance. You must create another Windows user with Administrative rights and start the services under that user.
 - Upon deploying to the server, you must keep in mind that the firewall and ports are open so that user can access the application from outside.
 - In Firewall -> outbound rules. Open the ports if you want to 80-90, 440-450.
 - Make sure the Directory has IIS permissions where code files are published



- Add / Install the SSL Server certificate in Microsoft management console which will be import to IIS so, connection between server and application could establish successfully.



- For API to work against all Verbs (GET,POST,DELETE,PUT etc) without **405** error, make sure WebDav Module remove against the API site.To do this click on “API” site in IIS ,select “Modules”, find the “WebDAVModule” and remove it.



- Configurations used for Simple Certificate Enrollment Protocol (SCEP)
 - Make sure that following tag is added in “web.config” of web module:

```

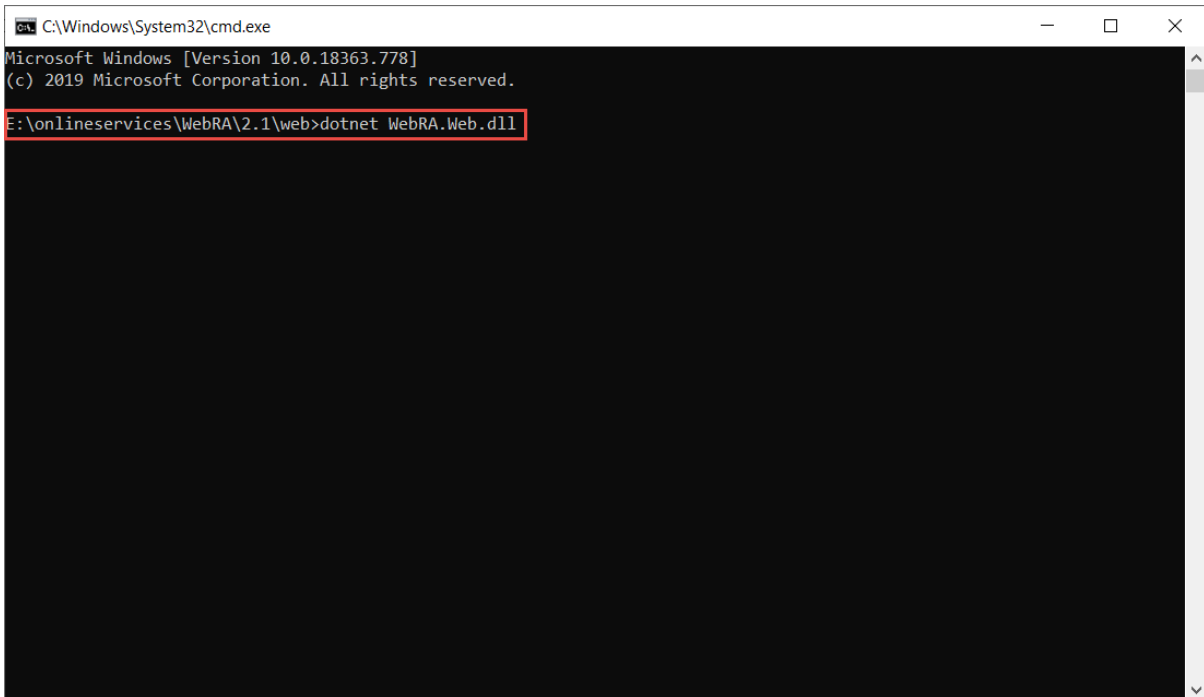
<security>
  <requestFiltering>
    <requestLimits maxQueryString="8192" />
  </requestFiltering>
</security>
    
```

```

<configuration>
  <location path="." inheritInChildApplications="false">
    <system.webServer>
      <handlers>
        <add name="aspNetCore" path="*" verb="*" modules="AspNetCoreModuleV2" resourceType="Unspecified" />
      </handlers>
      <aspNetCore processPath="dotnet" arguments=".\WebRA.Protocol.dll" stdoutLogEnabled="true" stdoutLogFile=".\logs\stdout">
      </aspNetCore>
      <security>
        <requestFiltering>
          <requestLimits maxQueryString="8192" />
        </requestFiltering>
      </security>
    </system.webServer>
  </location>
</configuration>
<!--ProjectGuid: 31d1b205-525a-481e-bd32-4378e4f6559d-->
    
```

- SCEP server URL that will be used for router will be:
 "[Server URL]/scep" e.g. "<https://beta.web.ra.signinghub.com/scep>"
- Update URL value in Expect-CT header in "**web.config**" for web and admin modules according to your deployment URL.
 e.g.
 <add name="Expect-CT" value="max-age=0, report-uri='https://adminra.signinghub.com'" />

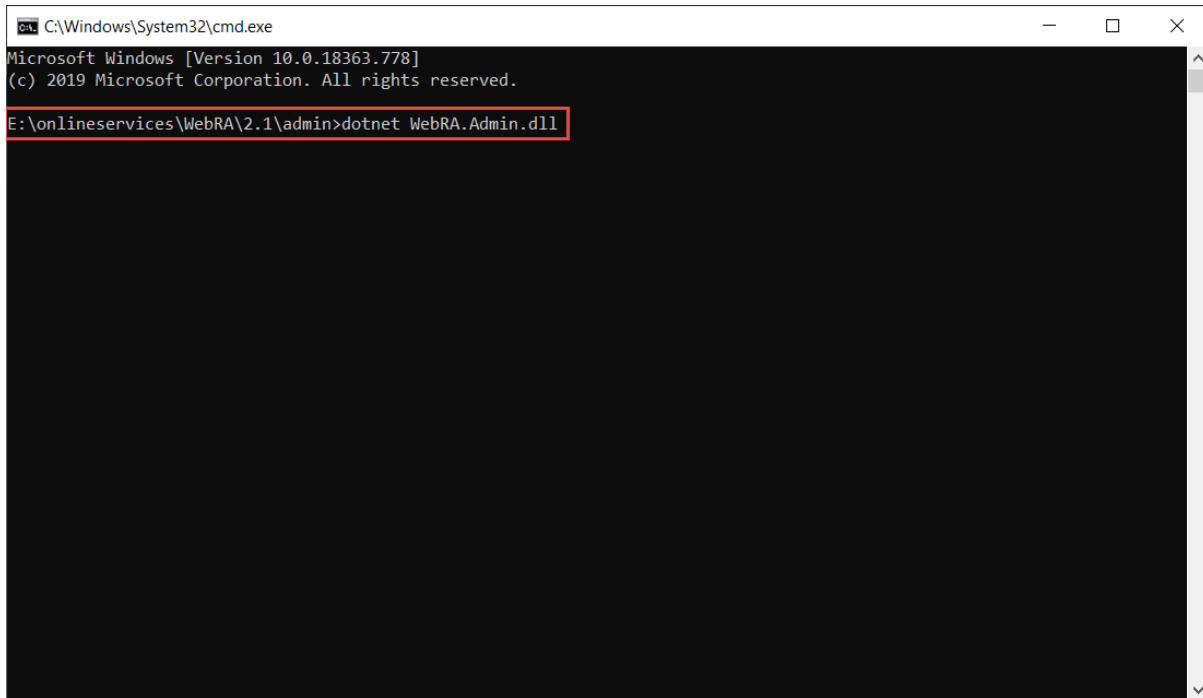
To test if the code is working properly for web, run command line in [installation-dir]/web and type following command:



```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.778]
(c) 2019 Microsoft Corporation. All rights reserved.

E:\onlineservices\WebRA\2.1\web>dotnet WebRA.Web.dll
```

To test if the code is working properly for admin, run command line in [installation-dir]/admin and type following command:



```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.778]
(c) 2019 Microsoft Corporation. All rights reserved.

E:\onlineservices\WebRA\2.1\admin>dotnet WebRA.Admin.dll
```

6.2 SSL Certificates

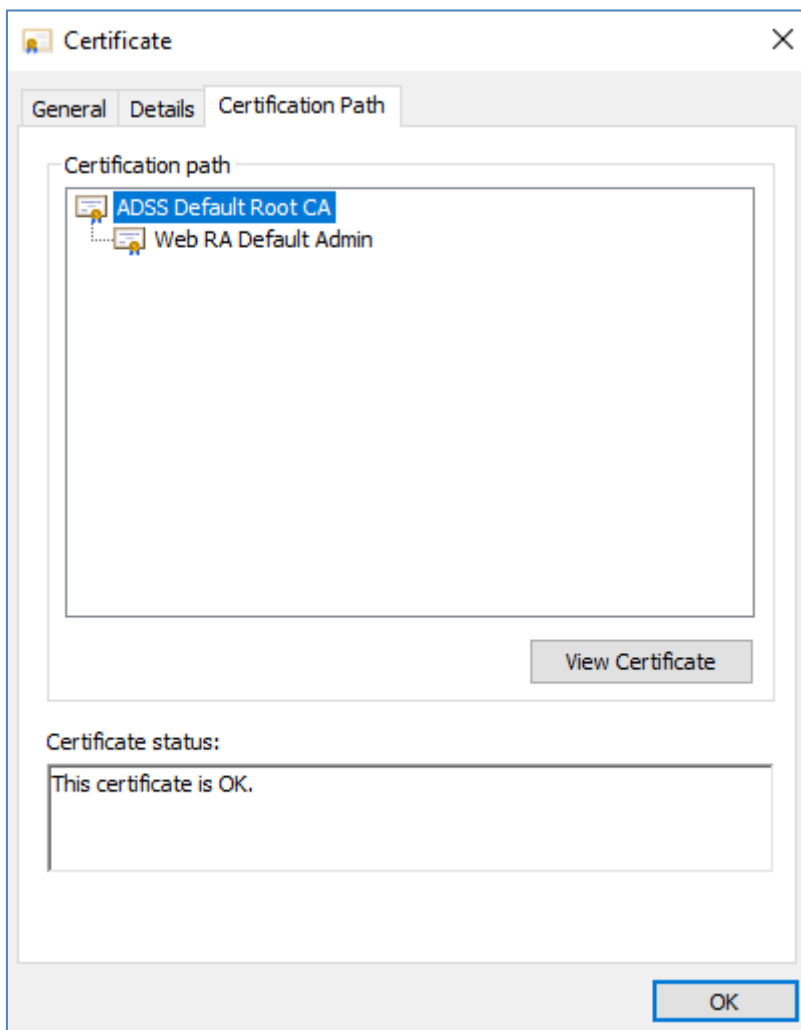
ADSS Web RA is a web application that is hosted in IIS. It is recommended to secure the communication between the server and browsers by using SSL over HTTPS. It is also recommended to use an SSL certificate issued by a well-known certificate authority (CA) e.g., Comodo, Symantec, Digicert etc.

The Administrators portal can be accessed only via TLS client authentication. A default TLS client certificate is already packaged into ADSS Web RA.

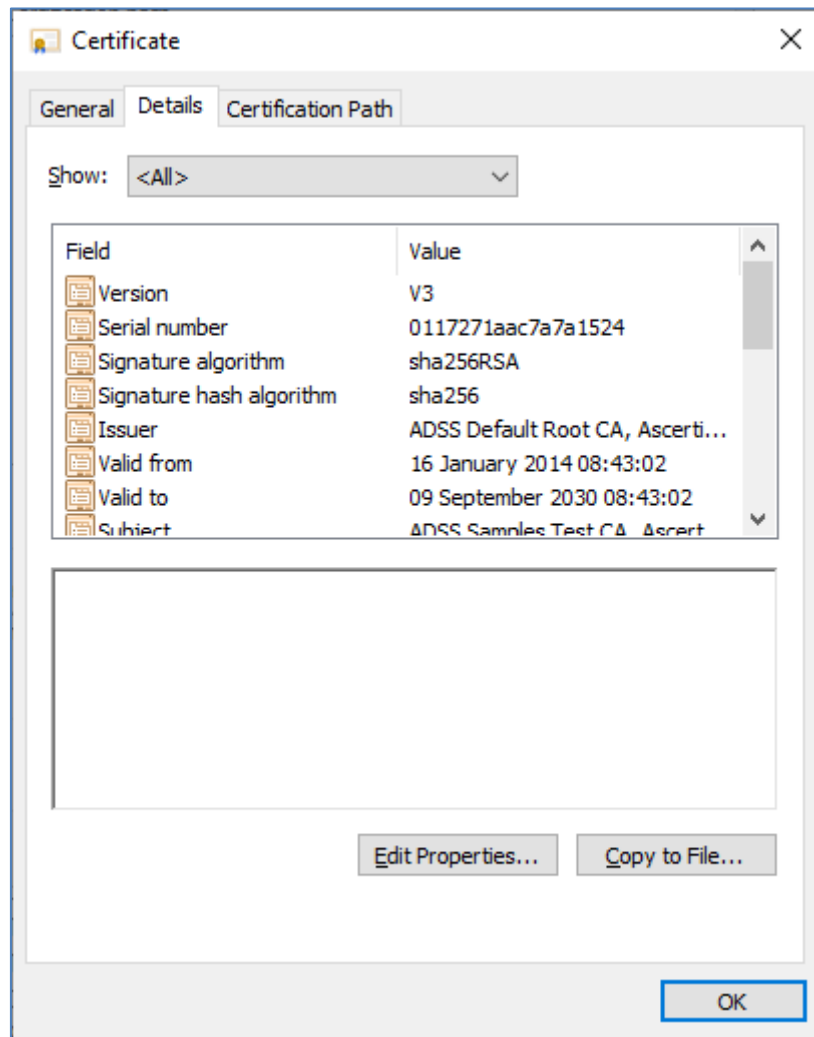
6.2.1 Exporting Root and Intermediate Certificates

In the [installation_dir]/setup/certs directory there are two files with the name **web-ra-default-admin.cer** and **web-ra-default-admin.pfx**. TLS certificate is installed, but root certificates are not validated by the machine. To validate it, root certificate needs to be imported in the certificate store.

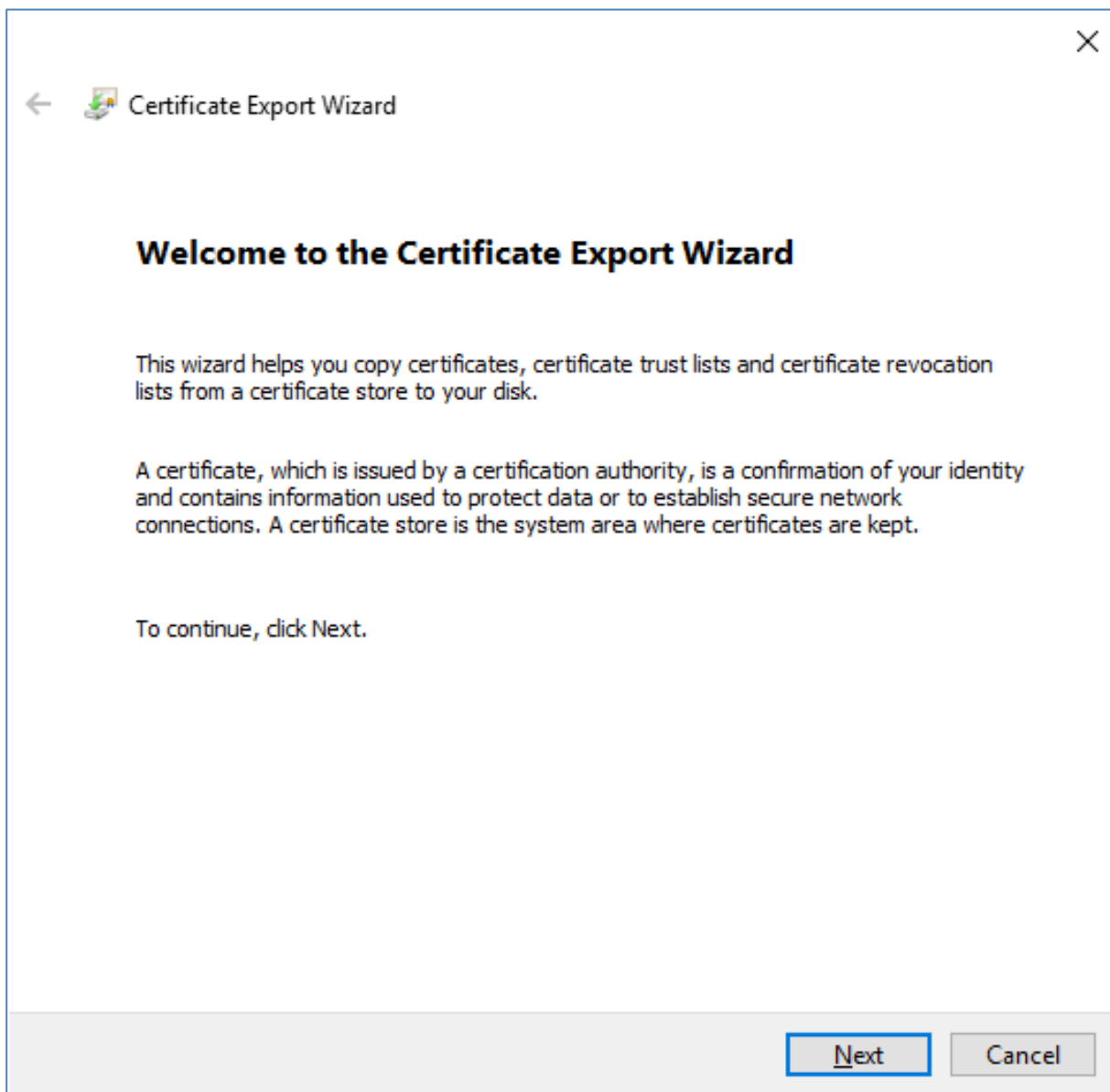
Double click the **web-ra-default-admin.cer** file



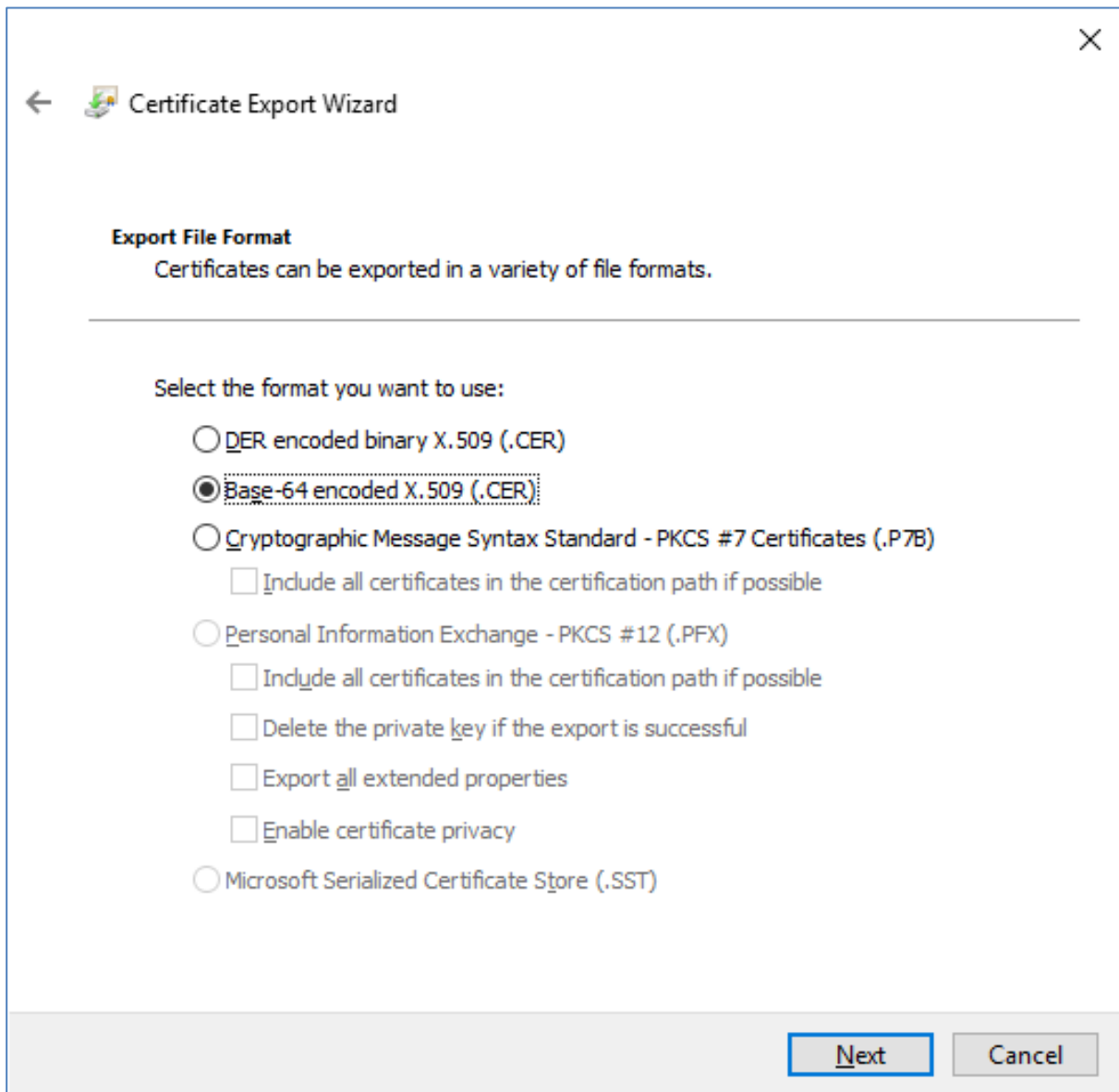
Select the **Certification Path** tab from the top. Default ADSS Web RA TLS certificate has one root certificate. Select the root certificate and click the **View Certificate** button. A new window will appear showing the general details of the intermediate certificate.



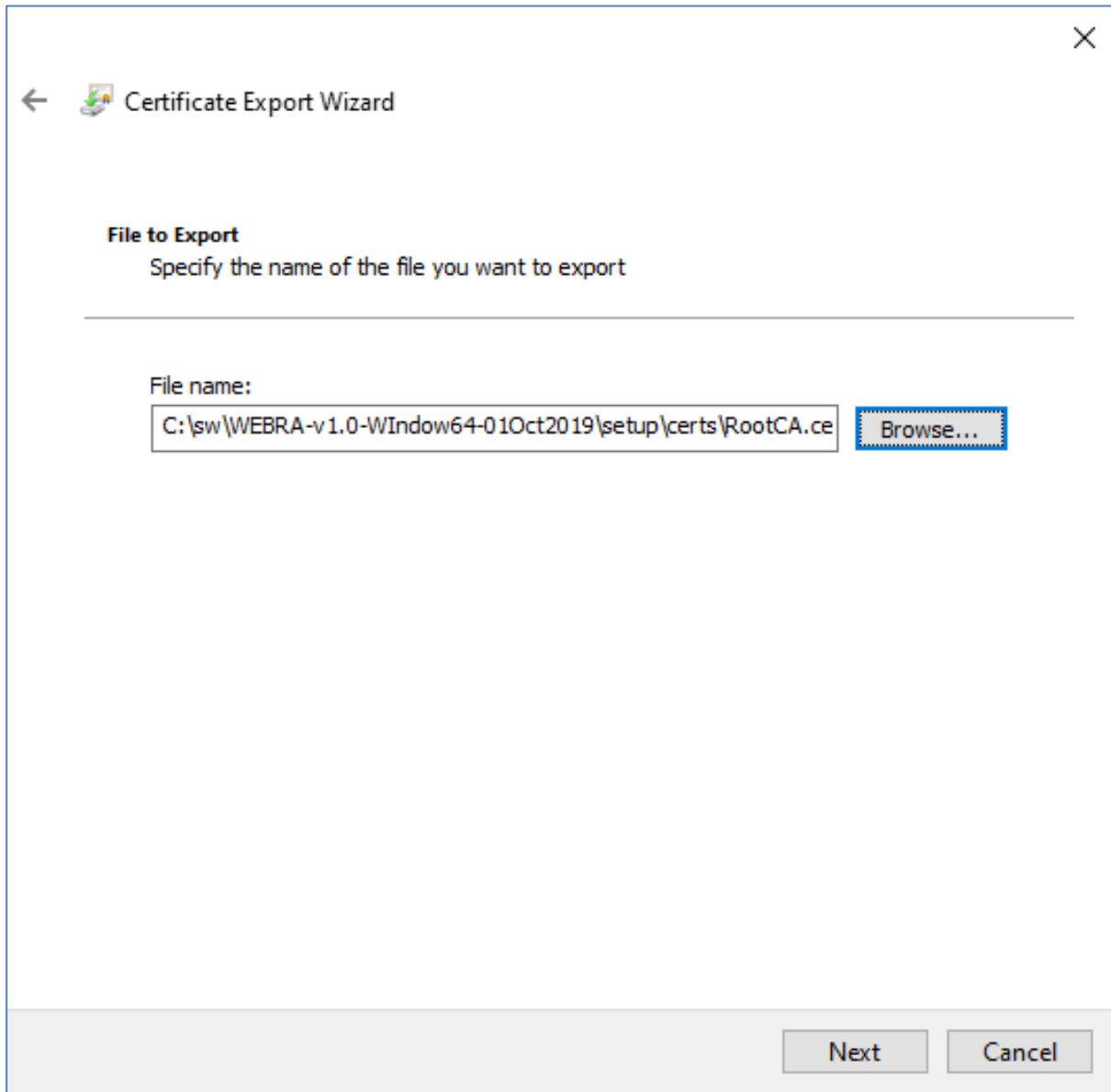
Select the **Details** tab from the top and click **Copy to File**. This will initiate the certificate export wizard.



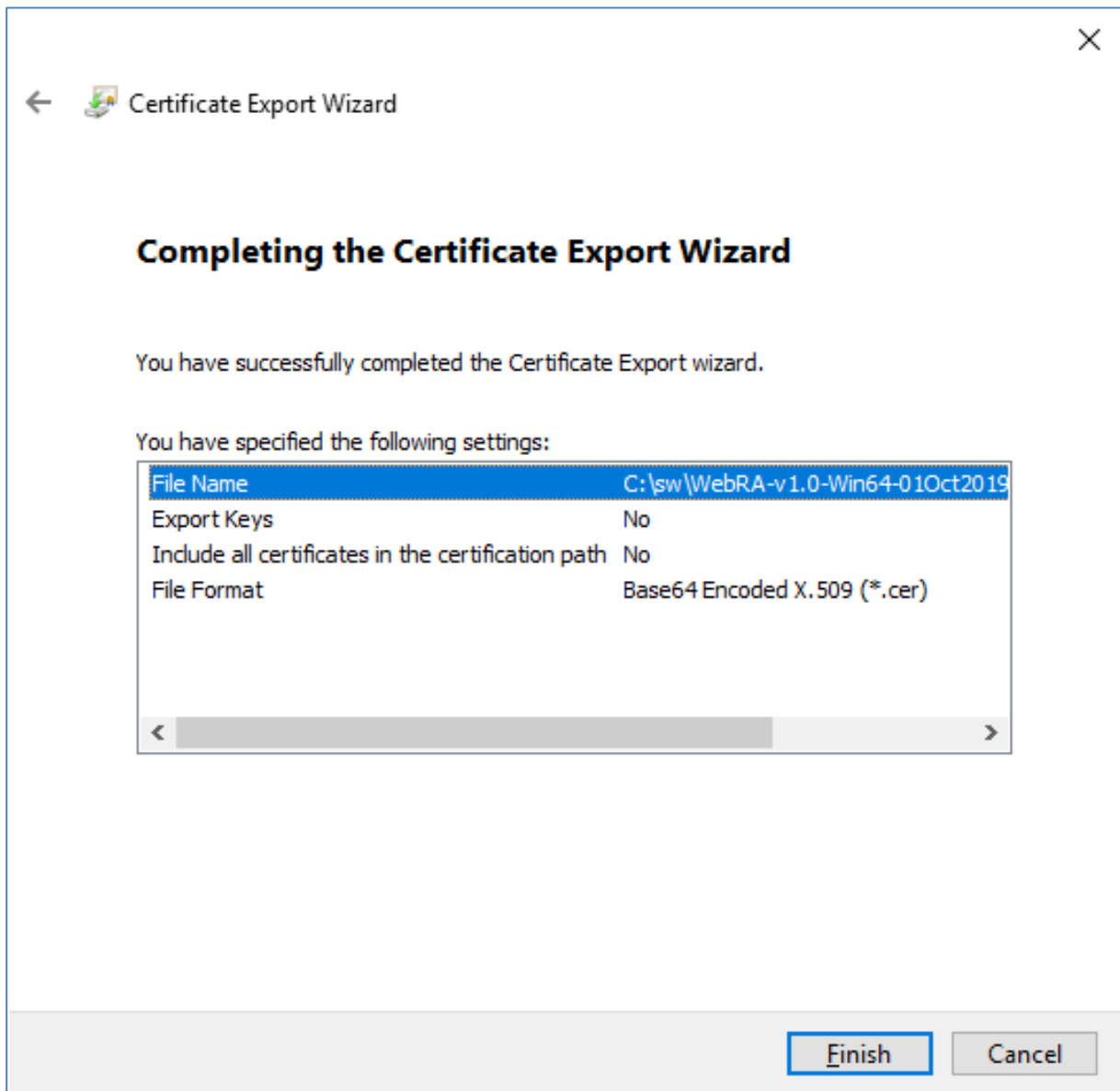
Click **Next**



Select the **Base-64 encoded X.509 (.CER)** option and click **Next**



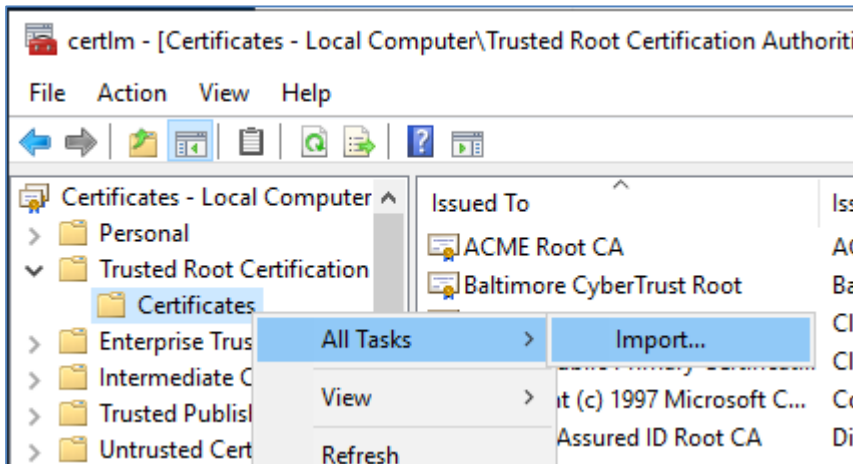
Choose a path where you want to save the certificate file for the intermediate certificate, and click **Next**.



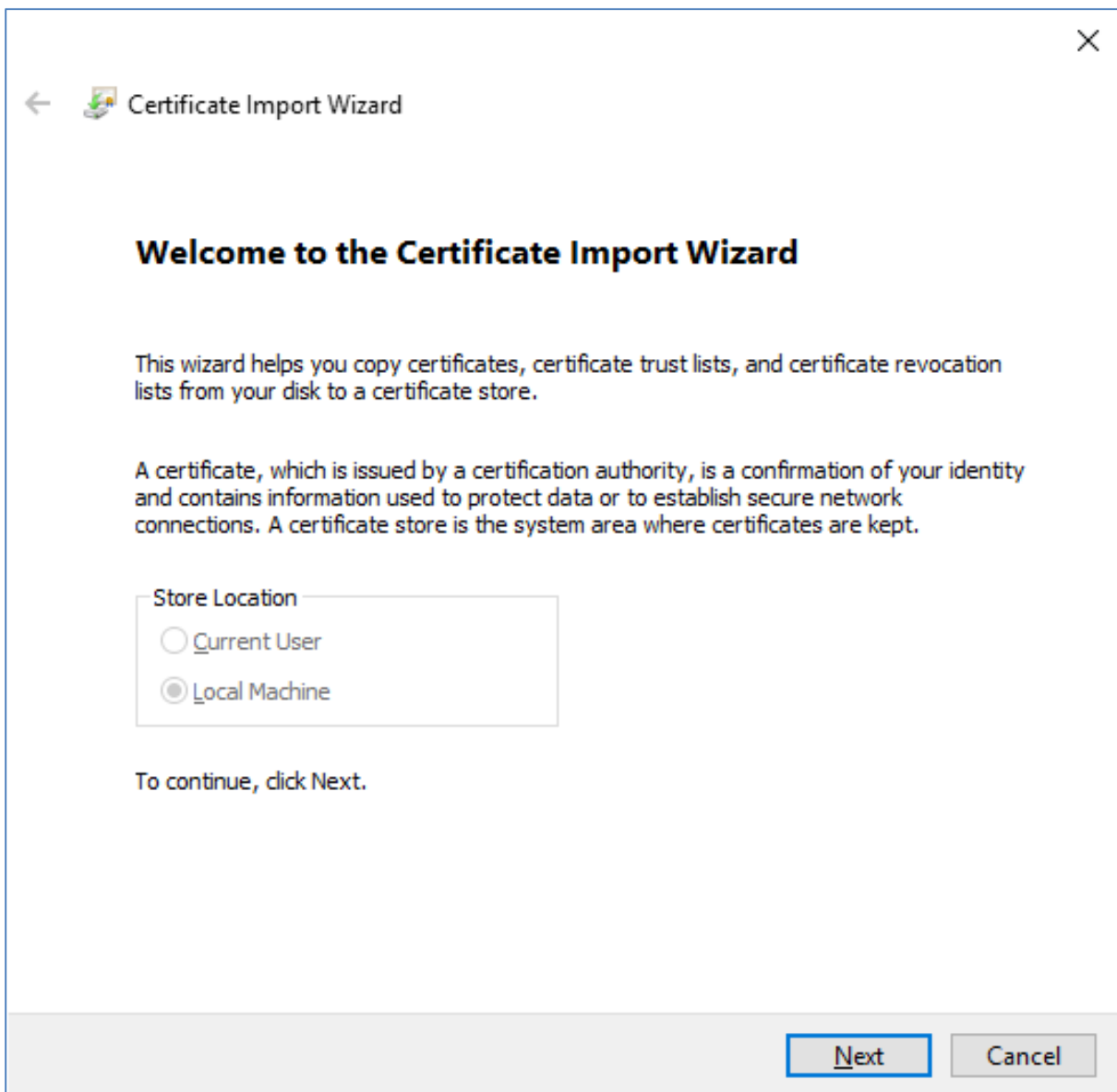
Click **Finish** to complete the export process for the root certificate.

6.3 Importing Root and Intermediate Certificates

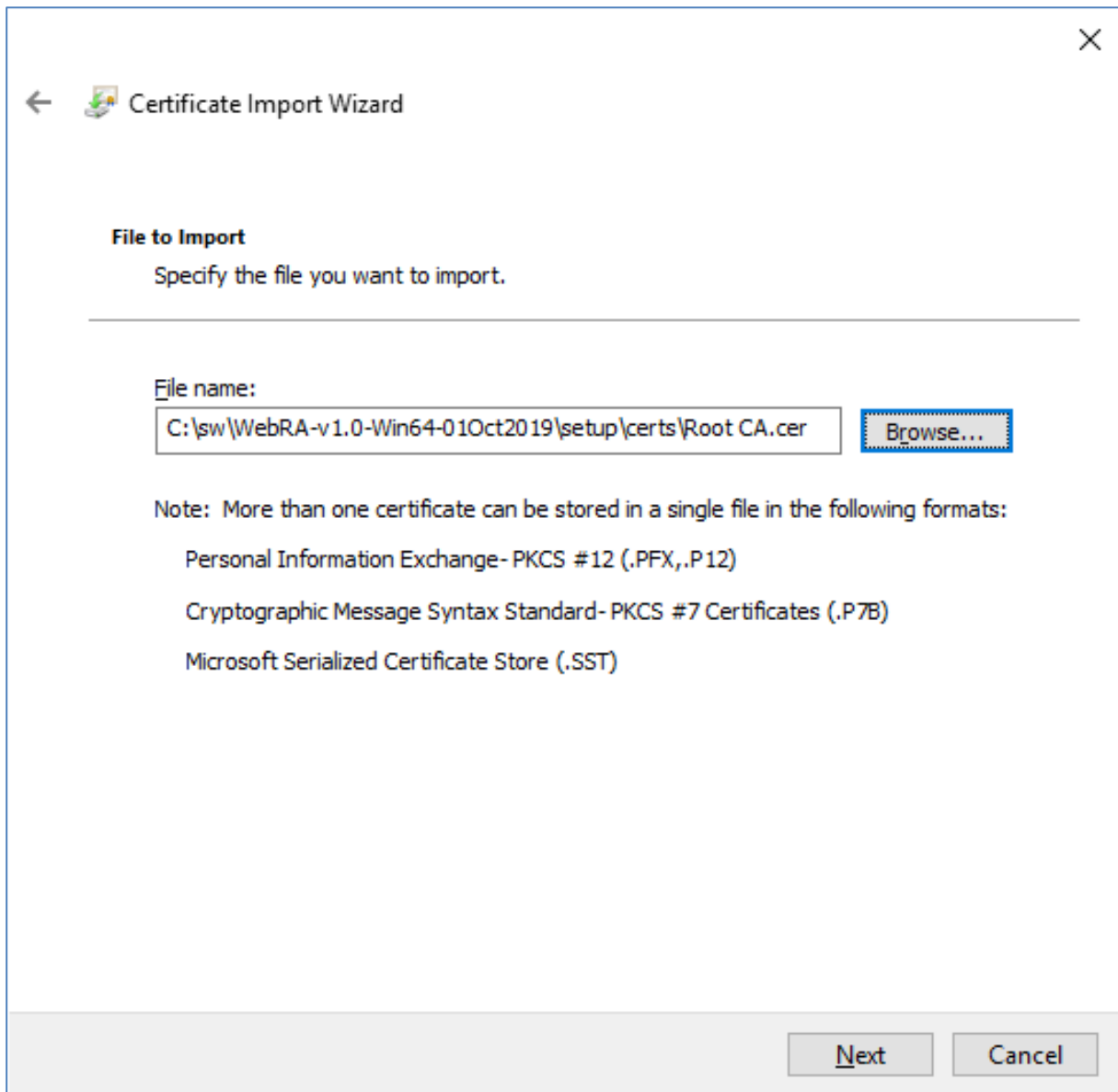
Now that we have the intermediate and root certificates exported and saved in a local file, we can import it to the certificate store. Launch **certlm.msc** from the command prompt.



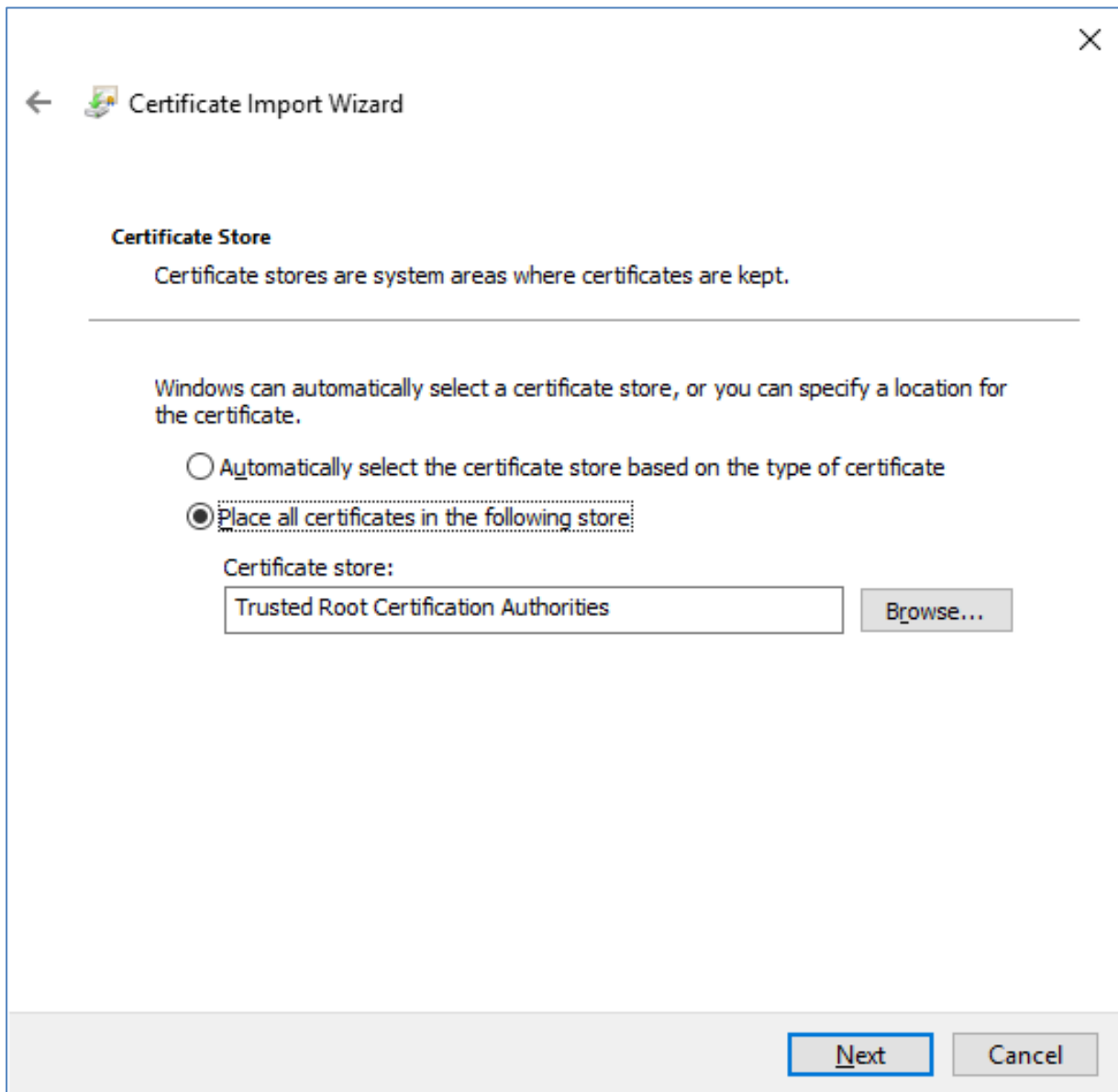
Expand the **Trusted Root Certification Authorities** folder from the left panel and right click on **Certificates**. Now select **All Tasks** and then **Import...**



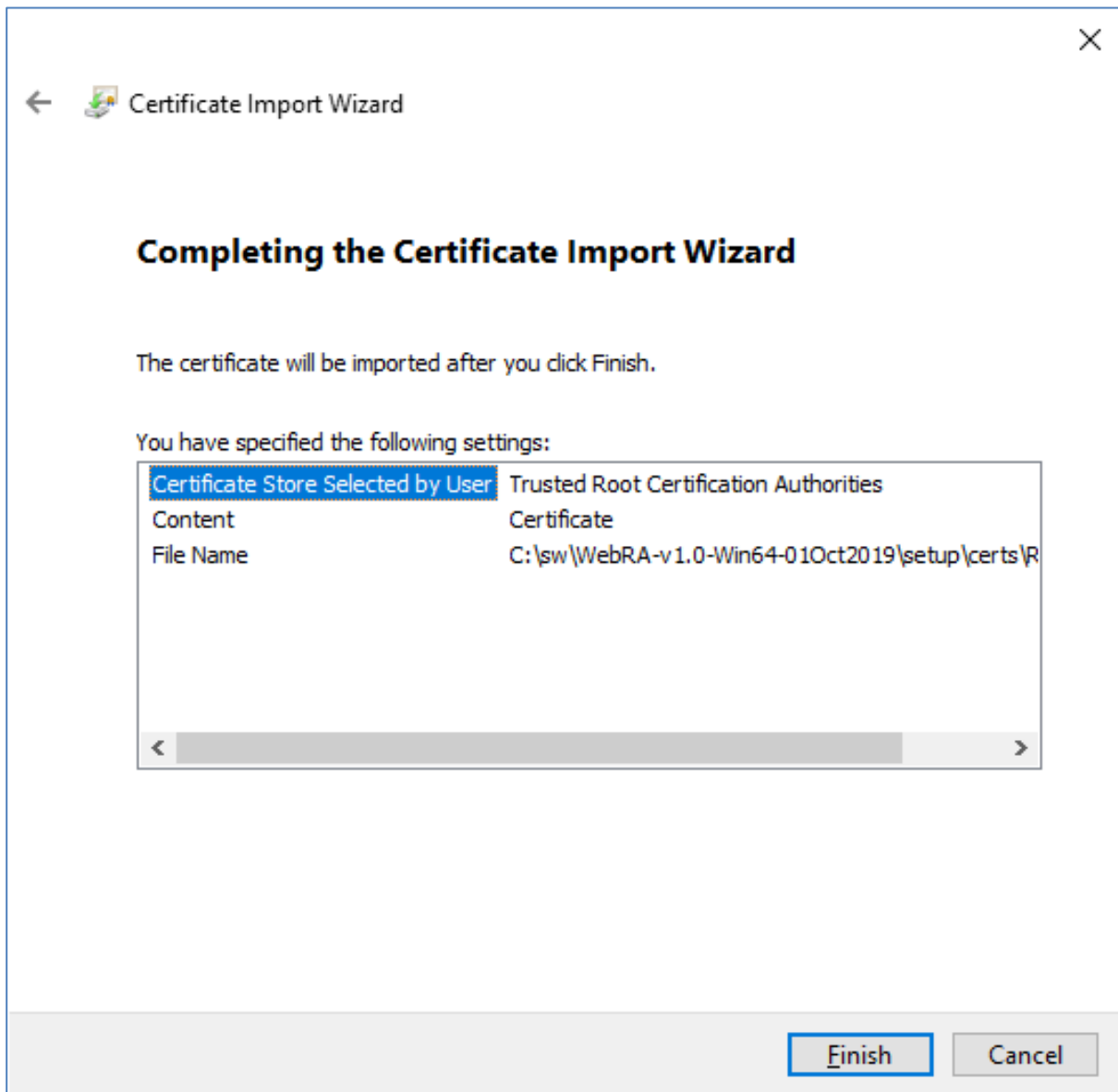
A certificate import wizard appears, Click **Next** to proceed.



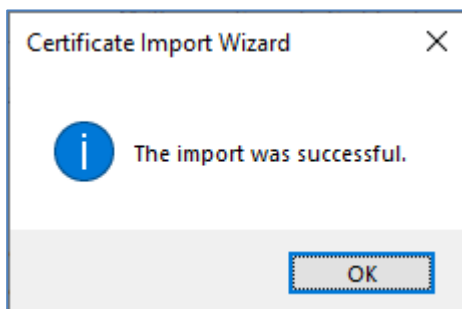
Browse the root certificate that we recently exported and click **Next** to proceed.



Click **Next** to proceed.



The root certificate is imported to the certificate store, click **Finish**

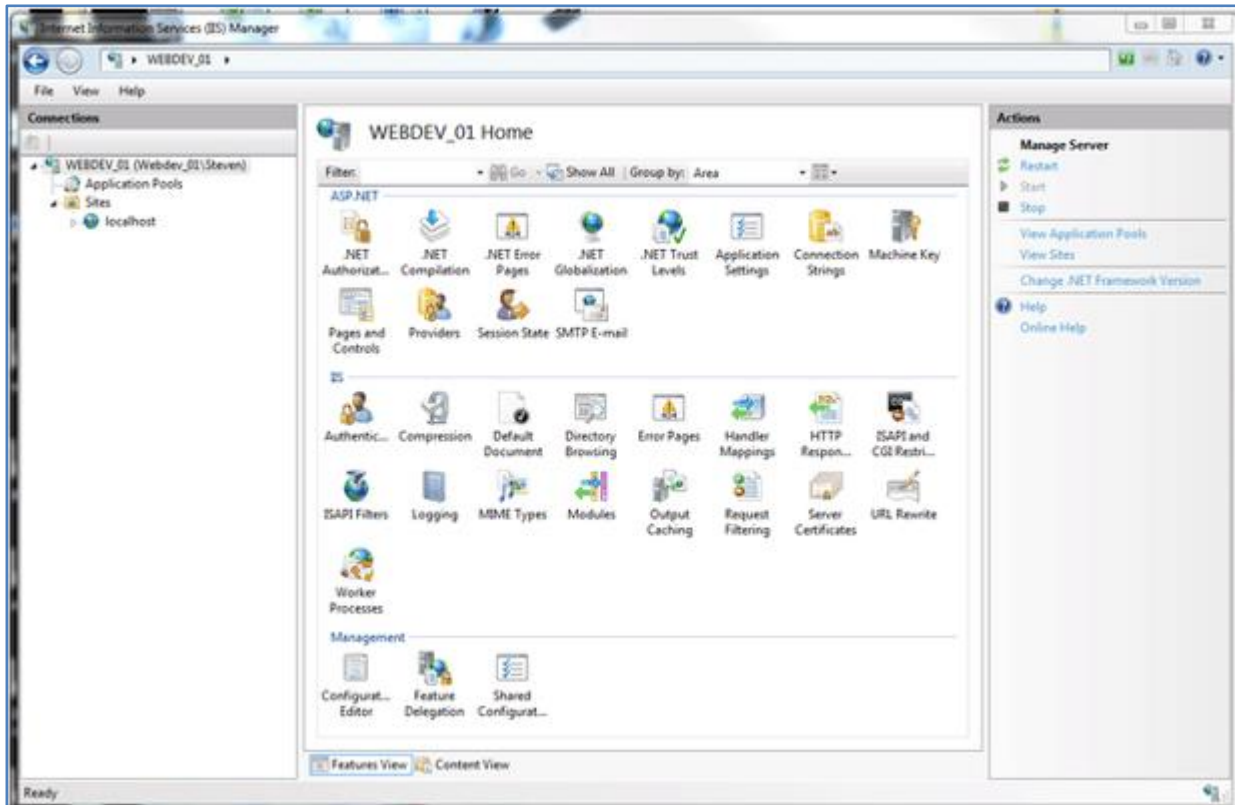


A prompt will appear informing about the successful import of the certificate.

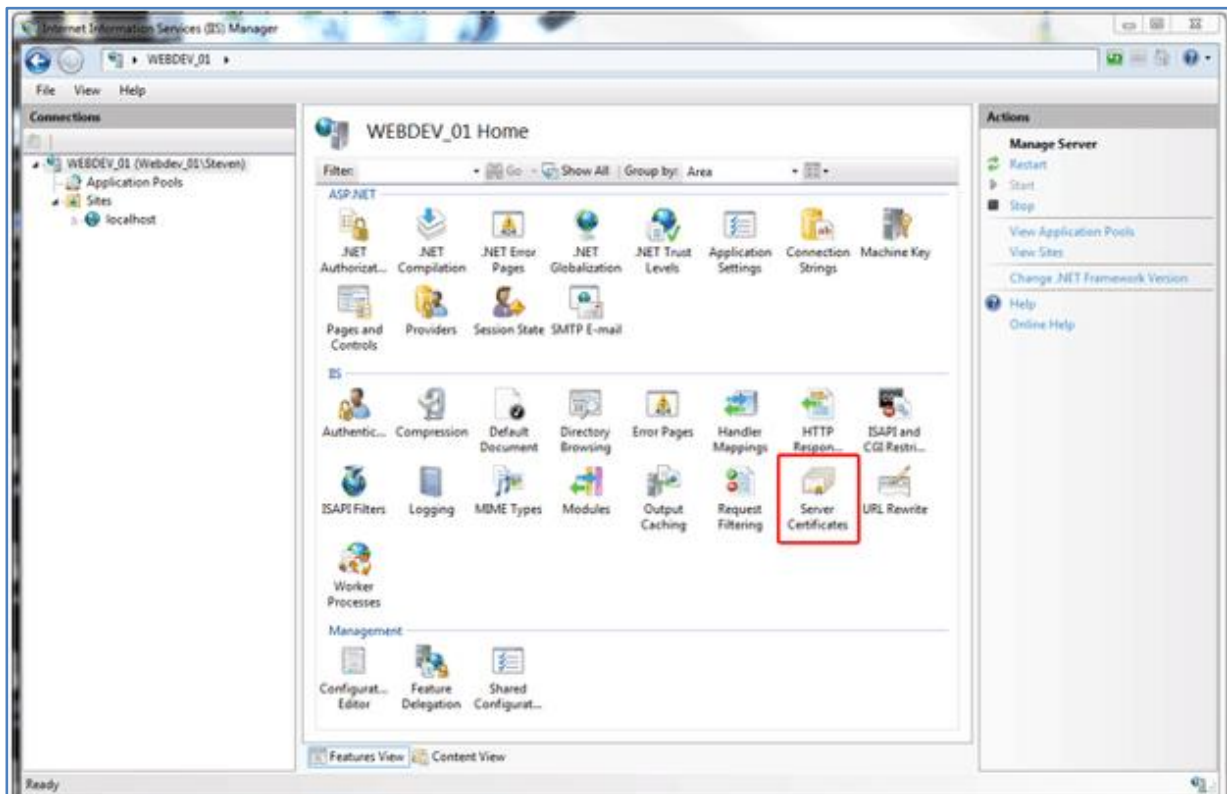
If you want to deploy the application for testing purpose you may want to use a self-signed certificate for proof of concept.

6.4 Generate a Self -Signed Certificate

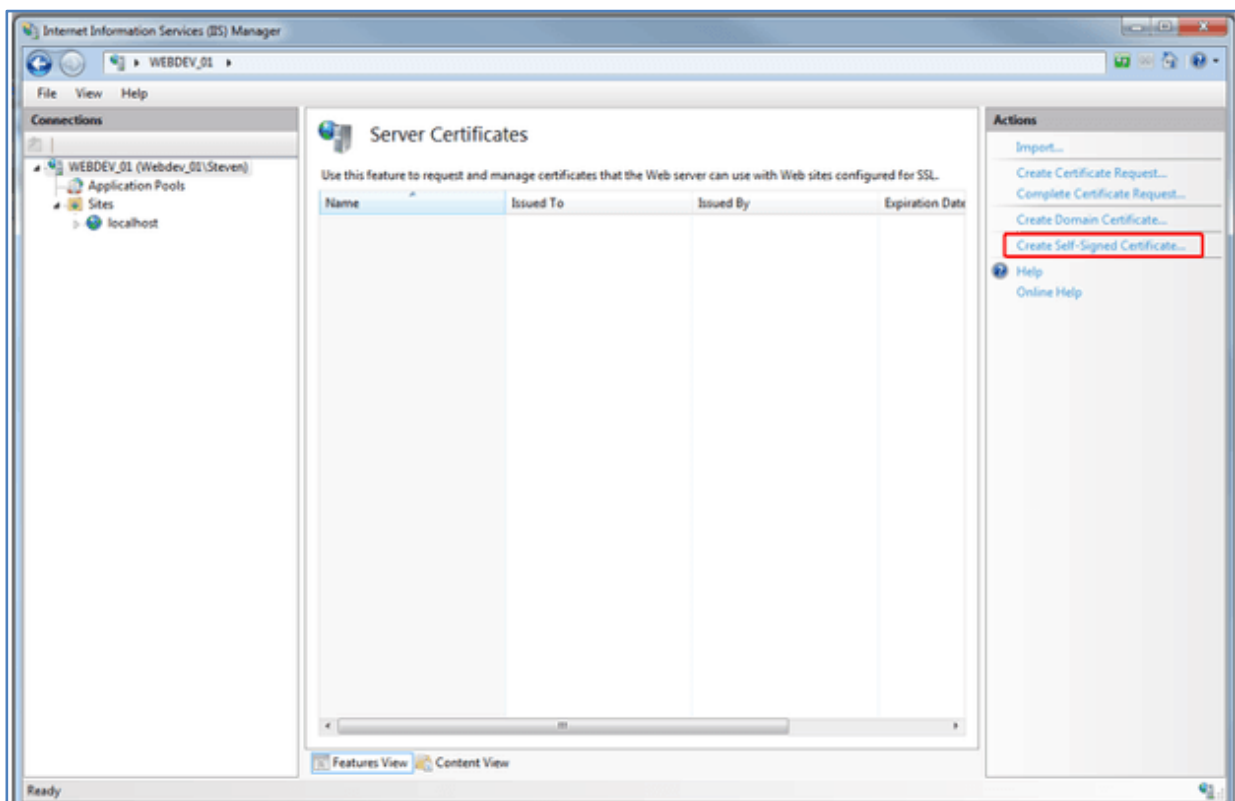
For testing purpose or a proof of concepts, mostly a self-signed certificate will be needed. It is easy to create a self-signed certificate with IIS. Launch the IIS



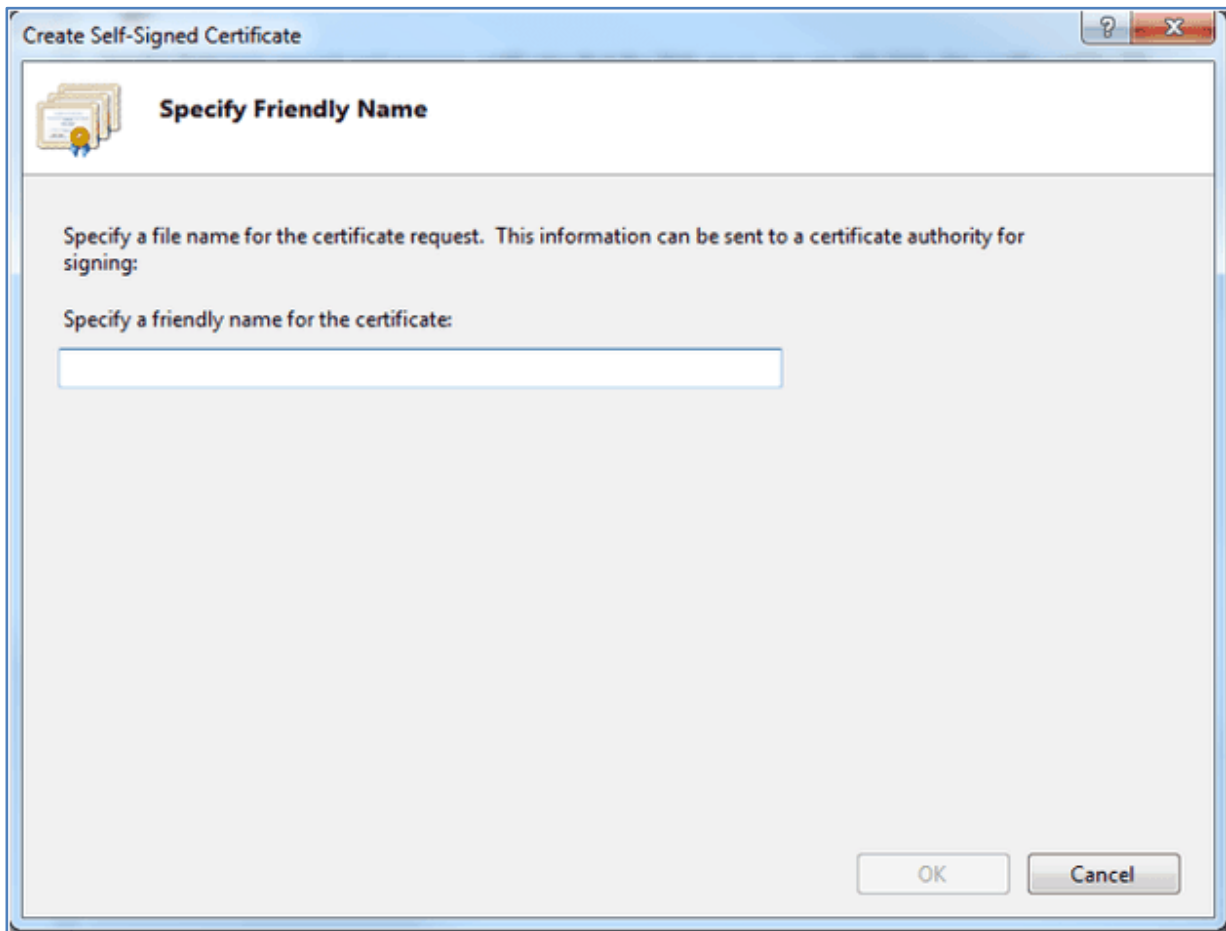
Click the **server name** from the left menu of **connections**



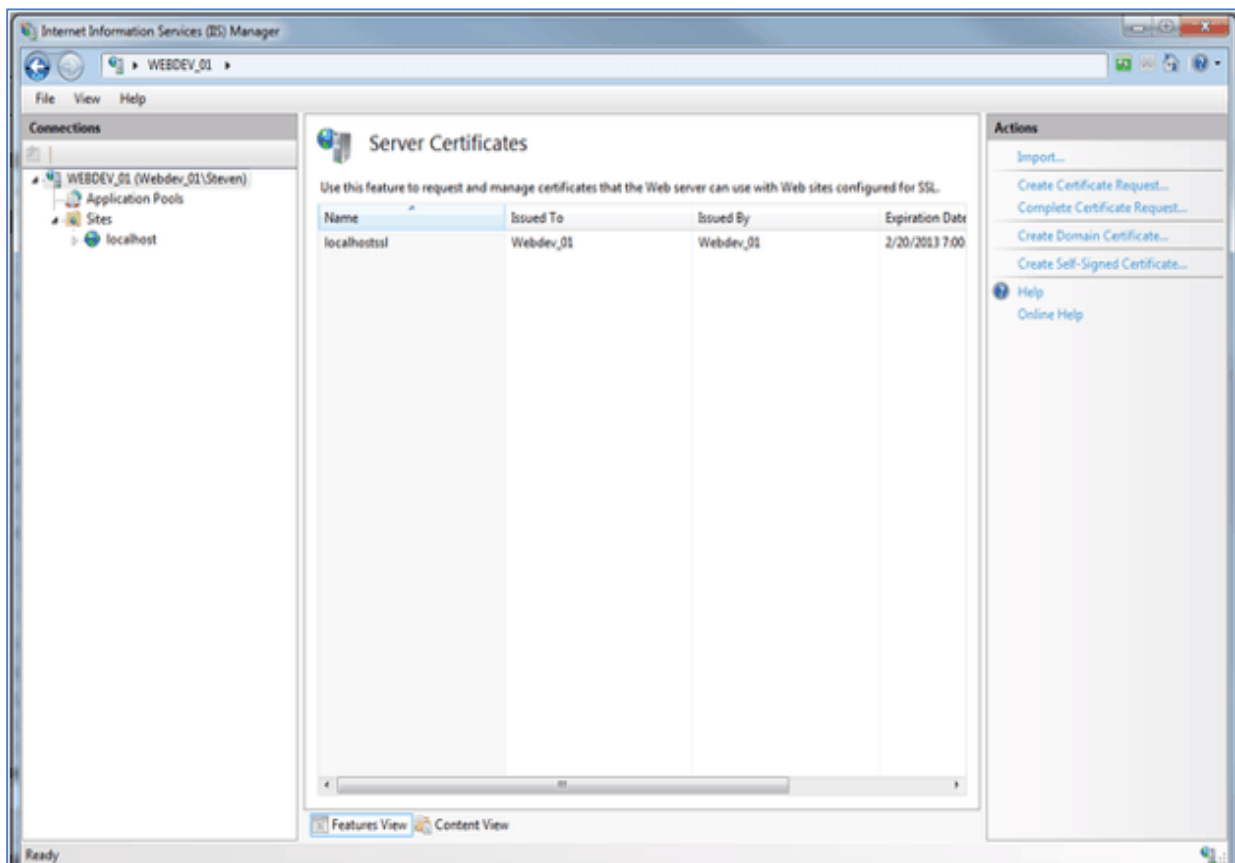
Double click **Server Certificates** from the IIS section in the middle panel.



Click **Create Self-Signed Certificate...** under the right **Actions** column



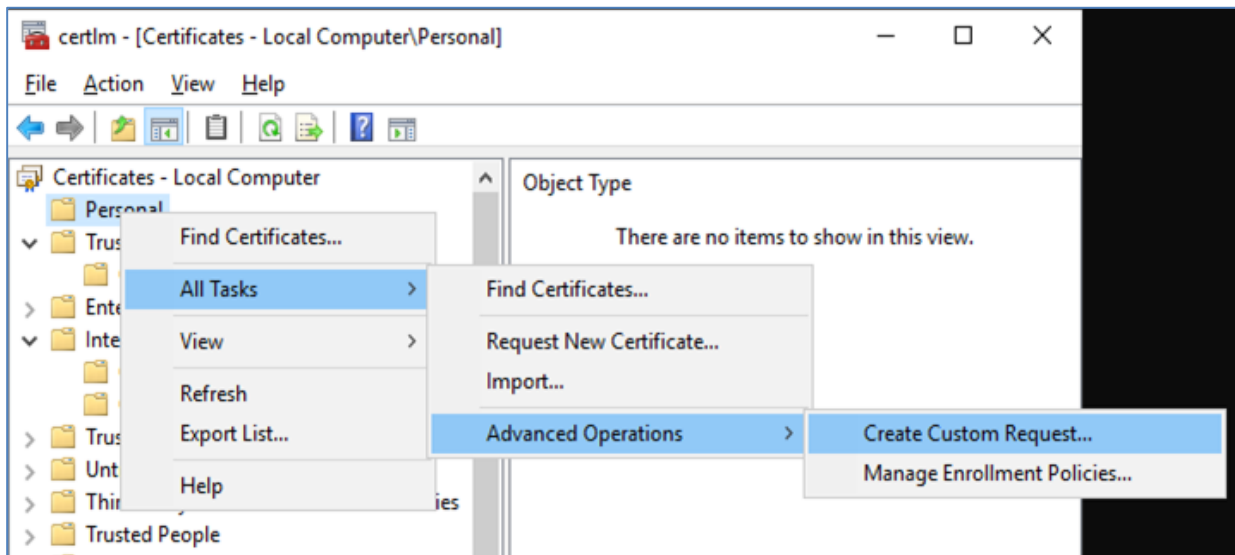
Provide a meaningful name and press **OK**



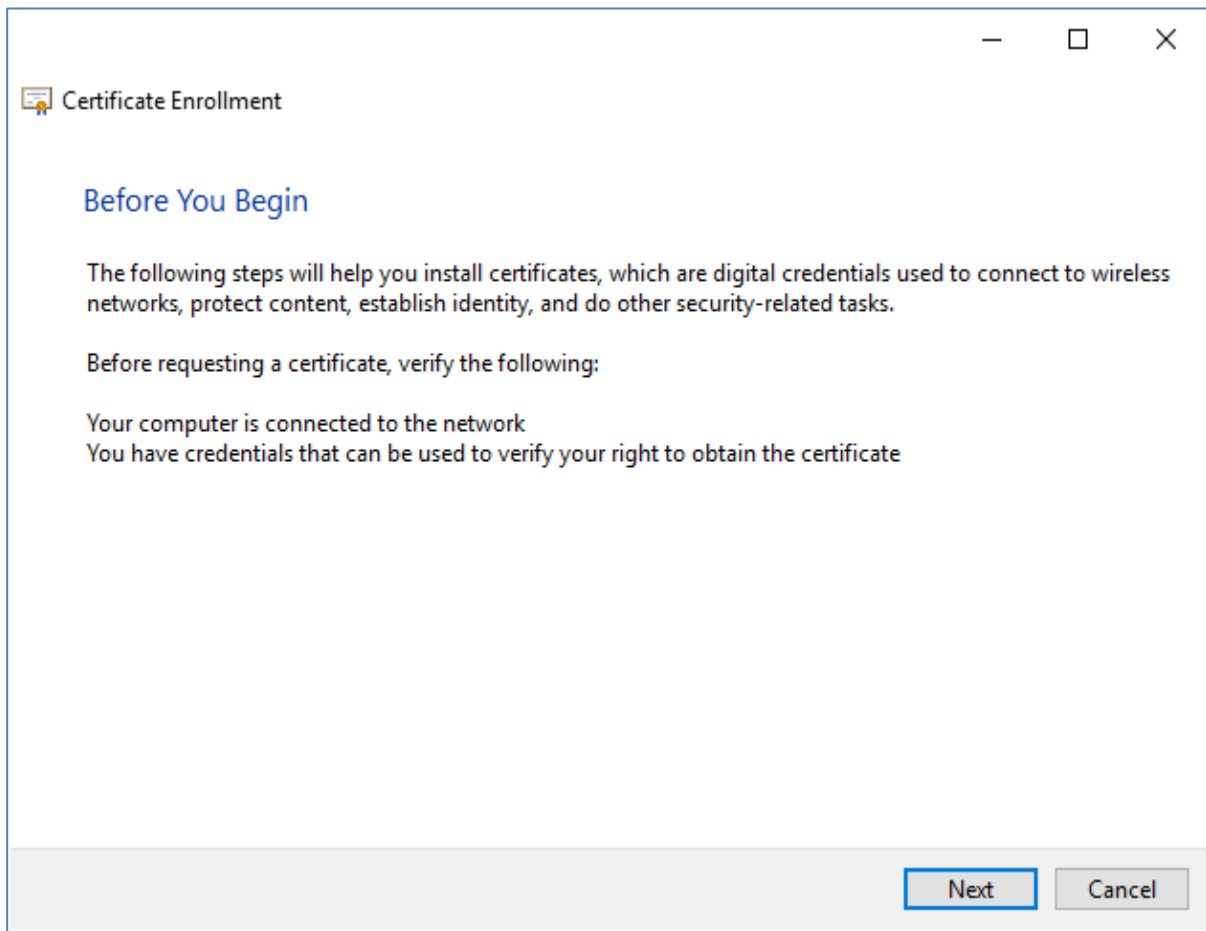
Now you have an SSL certificate that is self-signed and has a validity of 1 year. You can select this certificate for creation of HTTPS binding for test and proof of concepts purposes.

6.5 Generate a CSR for an SSL Certificate

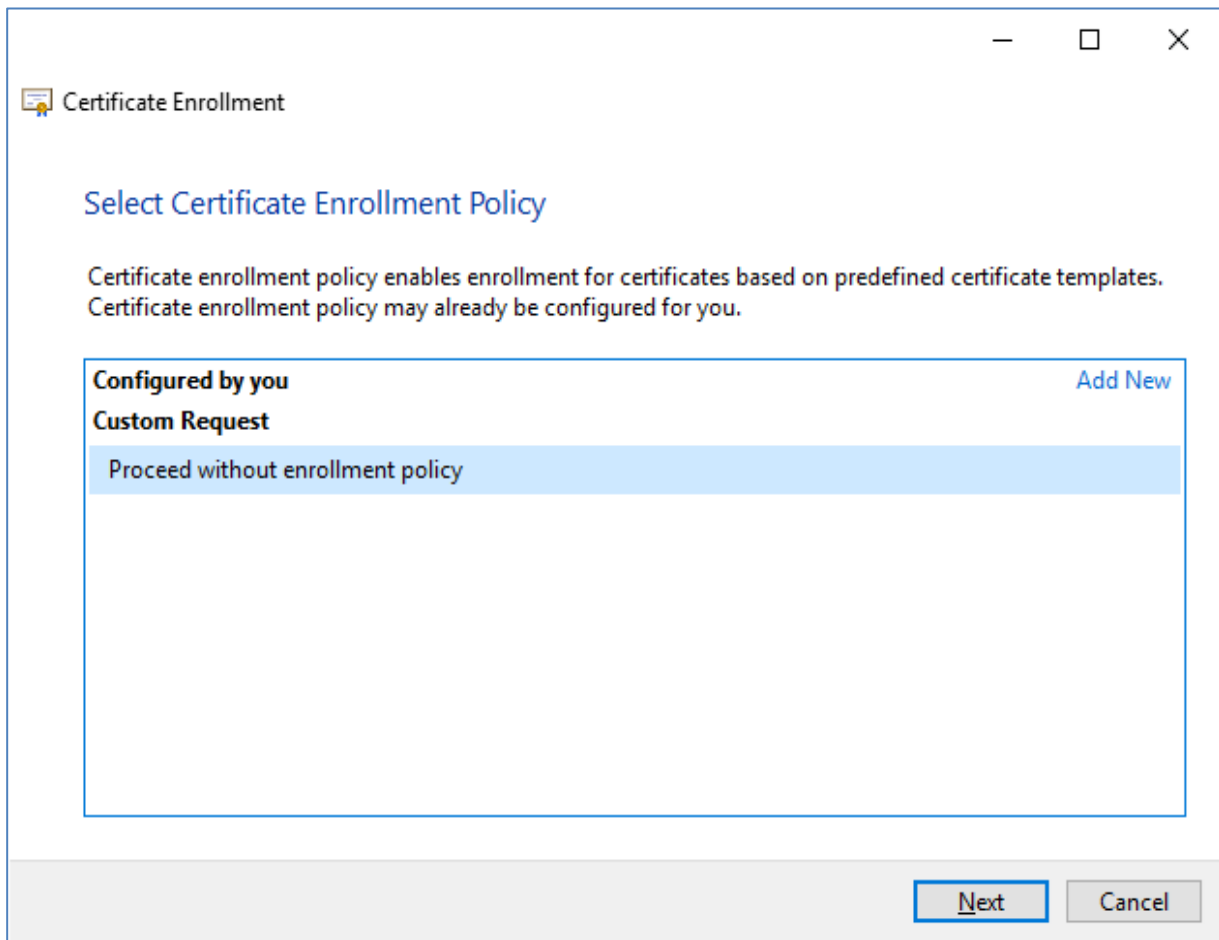
To generate a self-signed SSL certificate from IIS, launch **certlm.msc** from the command prompt.



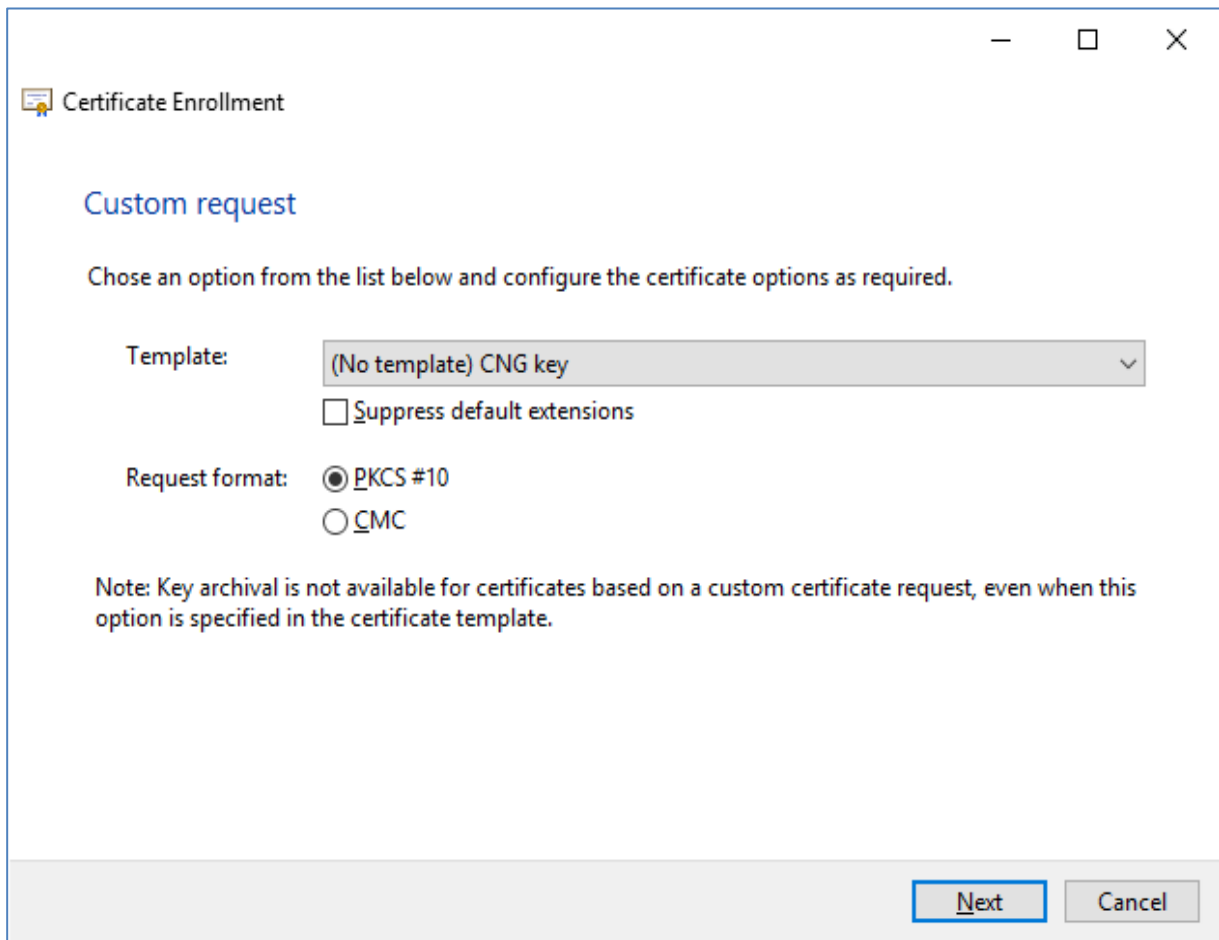
From the left menu, select and right click the **Personal** folder. From the context menu, select **All Tasks** then **Advanced Operations** and then **Create Custom request**. A new dialog will appear for certificate enrollment.



Press **Next** to proceed.



Select **Proceed without enrollment policy** and press **Next**.



Certificate Enrollment

Custom request

Chose an option from the list below and configure the certificate options as required.

Template: (No template) CNG key

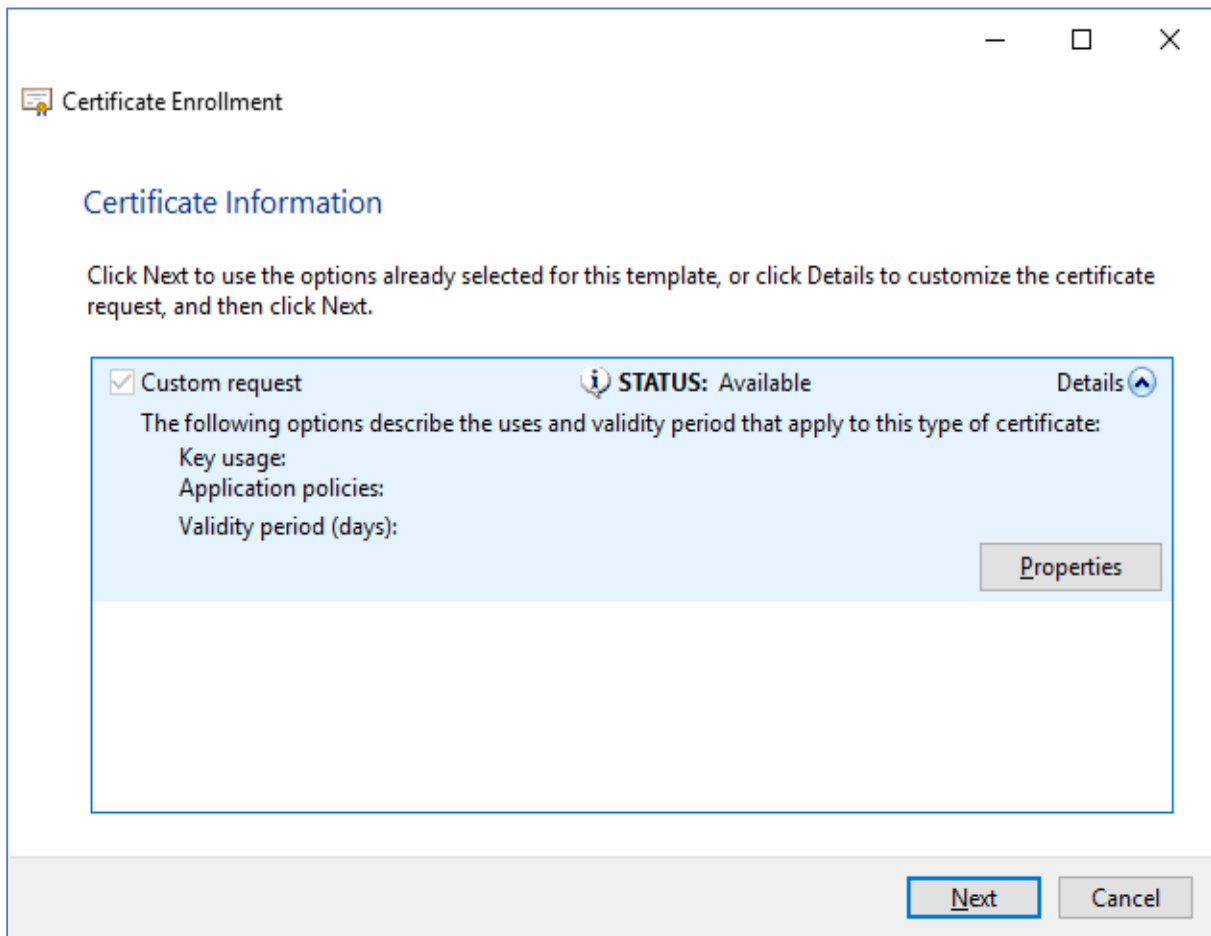
Suppress default extensions

Request format: PKCS #10
 CMC

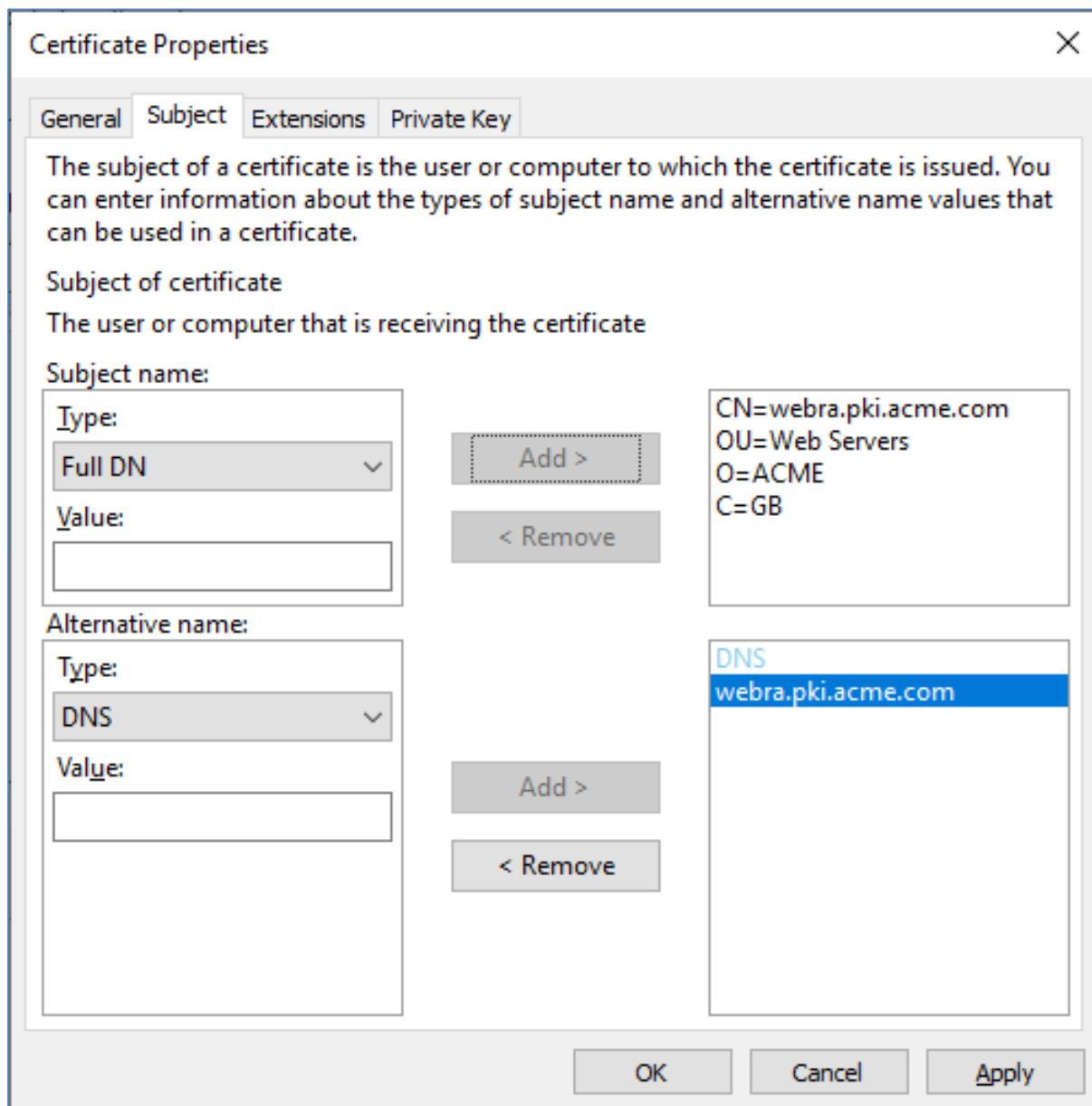
Note: Key archival is not available for certificates based on a custom certificate request, even when this option is specified in the certificate template.

Next Cancel

Accept the default values and press **Next** without changing anything



Click **Details** and the **Properties** button will appear. Click **Properties**



The subject of a certificate is the user or computer to which the certificate is issued. You can enter information about the types of subject name and alternative name values that can be used in a certificate.

Subject of certificate
The user or computer that is receiving the certificate

Subject name:

Type:
Full DN

Add >

< Remove

Value:
CN=webra.pki.acme.com
OU=Web Servers
O=ACME
C=GB

Alternative name:

Type:
DNS

Add >

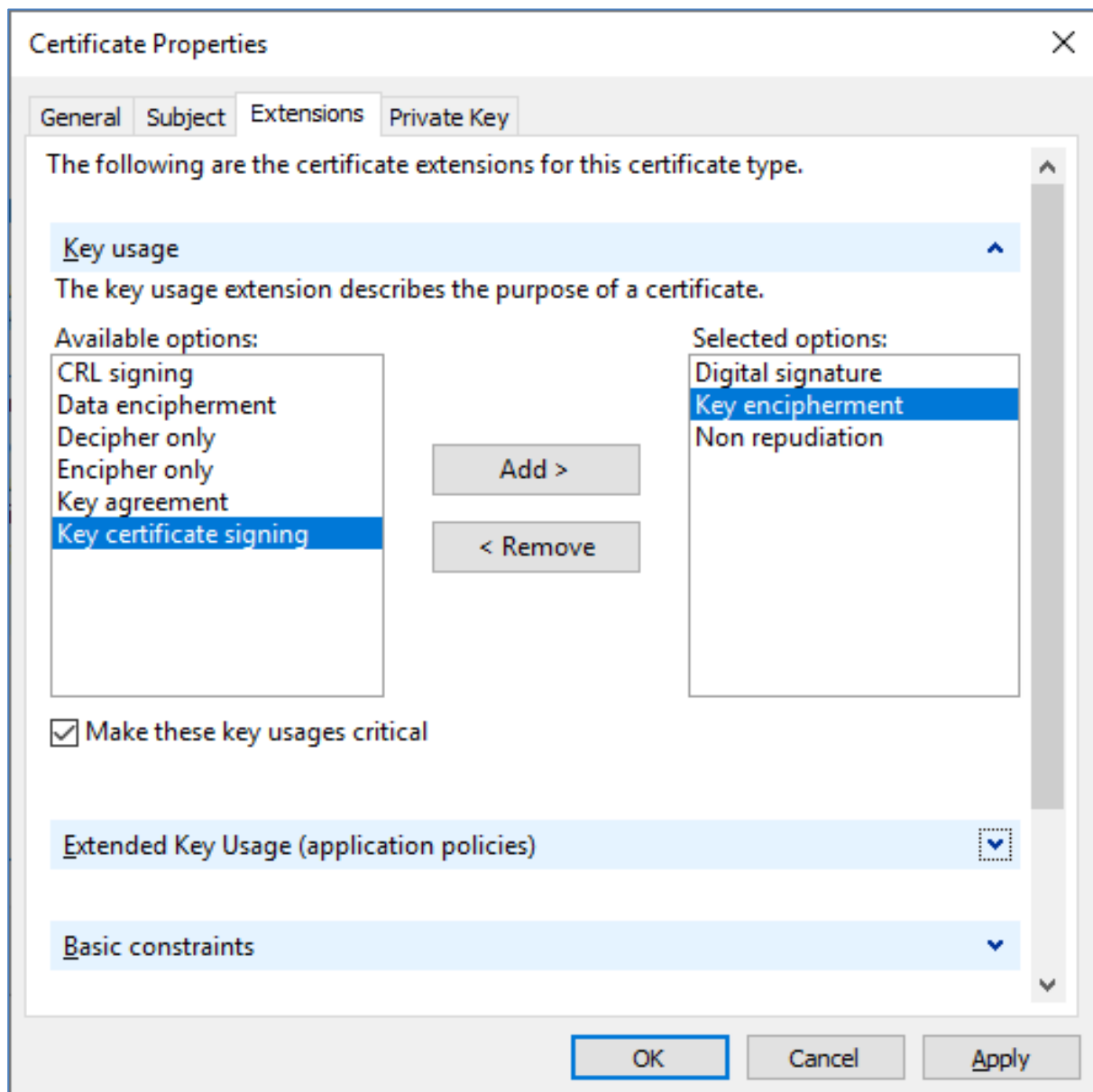
< Remove

Value:
DNS
webra.pki.acme.com

OK Cancel Apply

Select the **Subject** tab from the top. For subject name enter **CN=webra.pki.acme.com, OU=Web Servers, O=ACME, C=GB** in the value and press **Add >**. For Alternate name enter DNS value as **webra.pki.acme.com**.

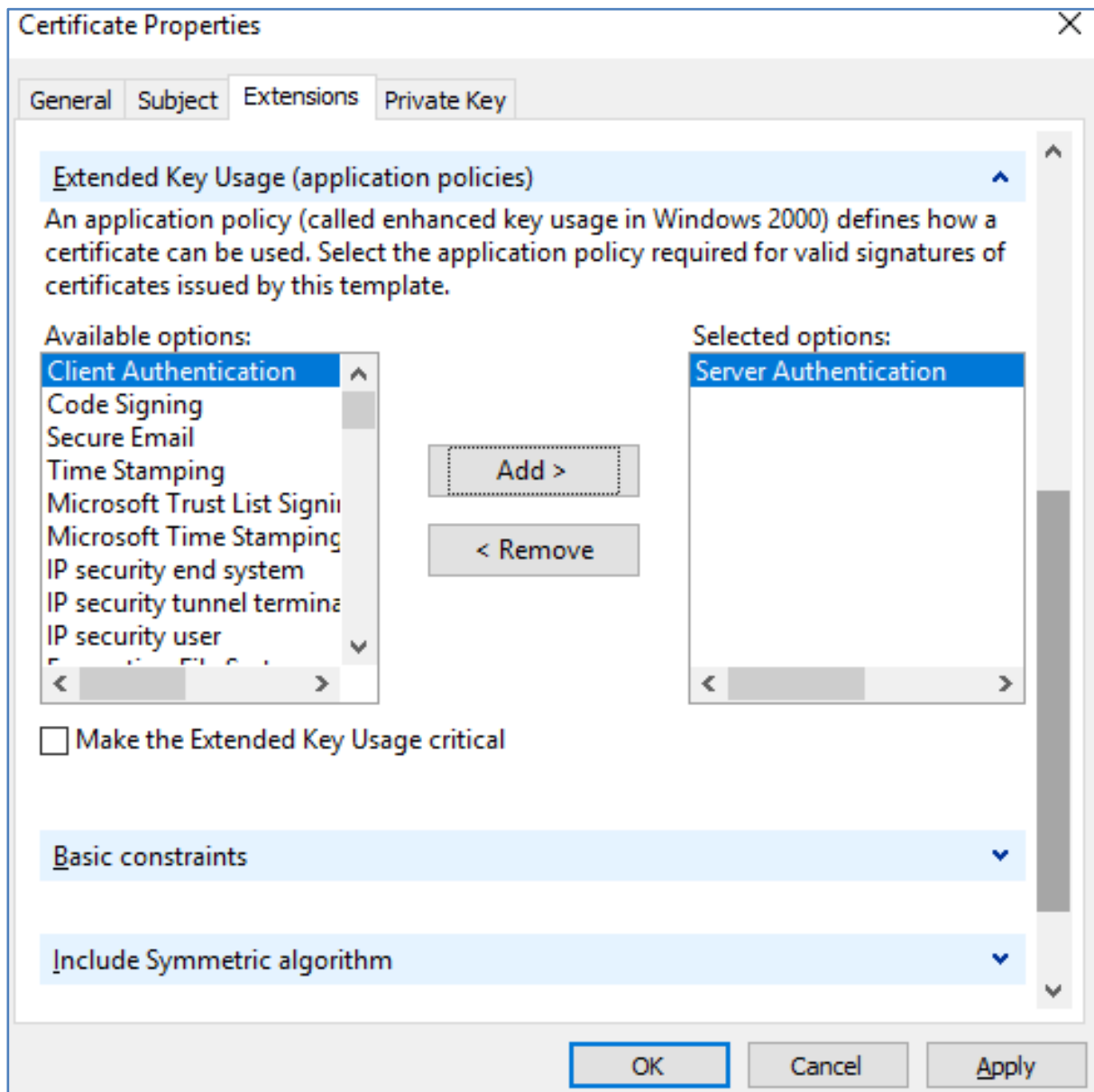
Note, these values are the sample values for the certificate and can be replaced with the realistic data.



Select the **Extensions** tab from the top. Select the **Key usage** option from the drop down extensions. Now from the **Available options**, choose the following:

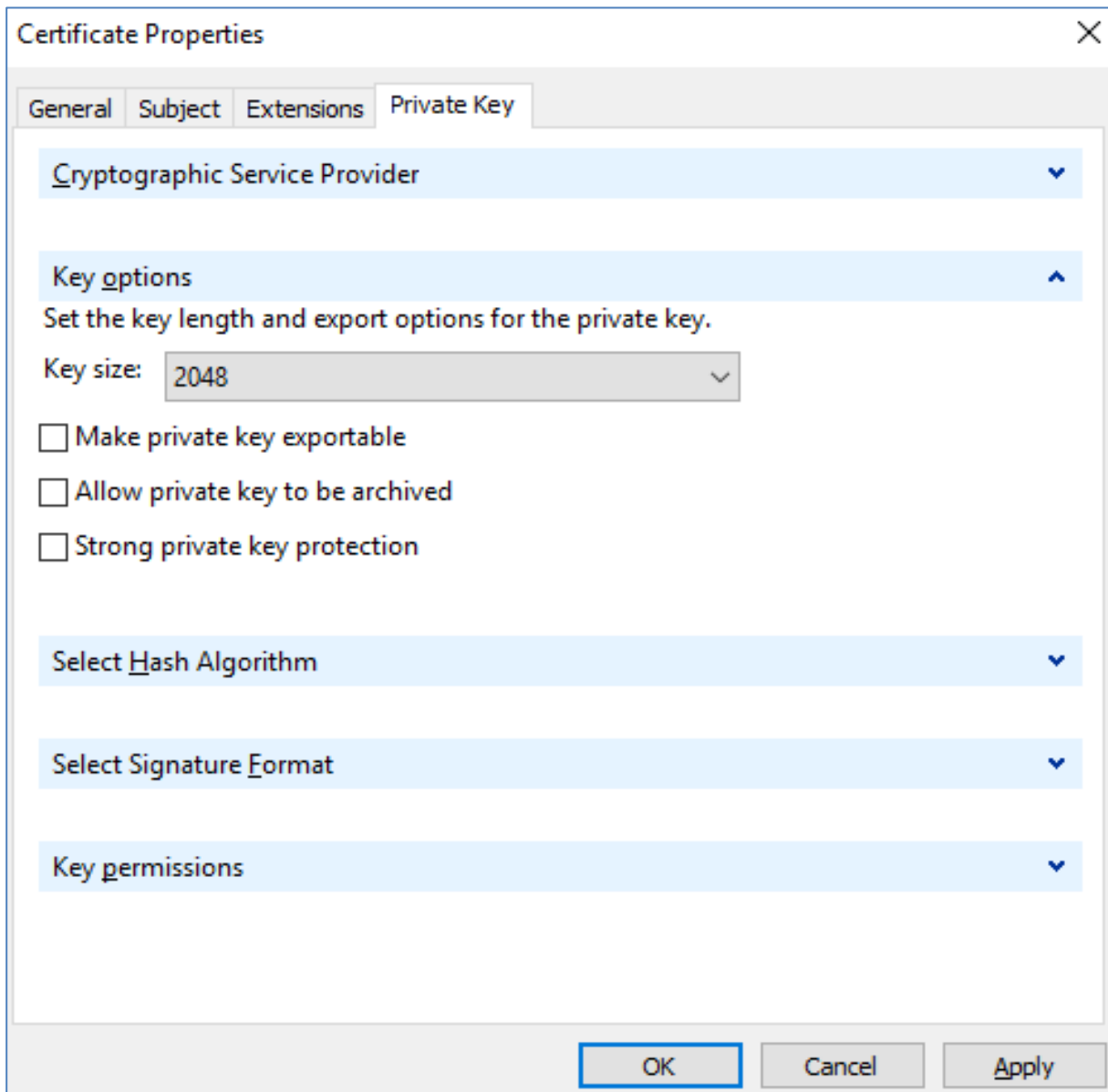
- Digital signature
- Key encipherment
- Non repudiation

Make sure the check box against **Make these key usages critical** is checked.



Now select the **Extended Key Usage (application policies)** from the drop down, and select the following from the available options:

- Server Authentication

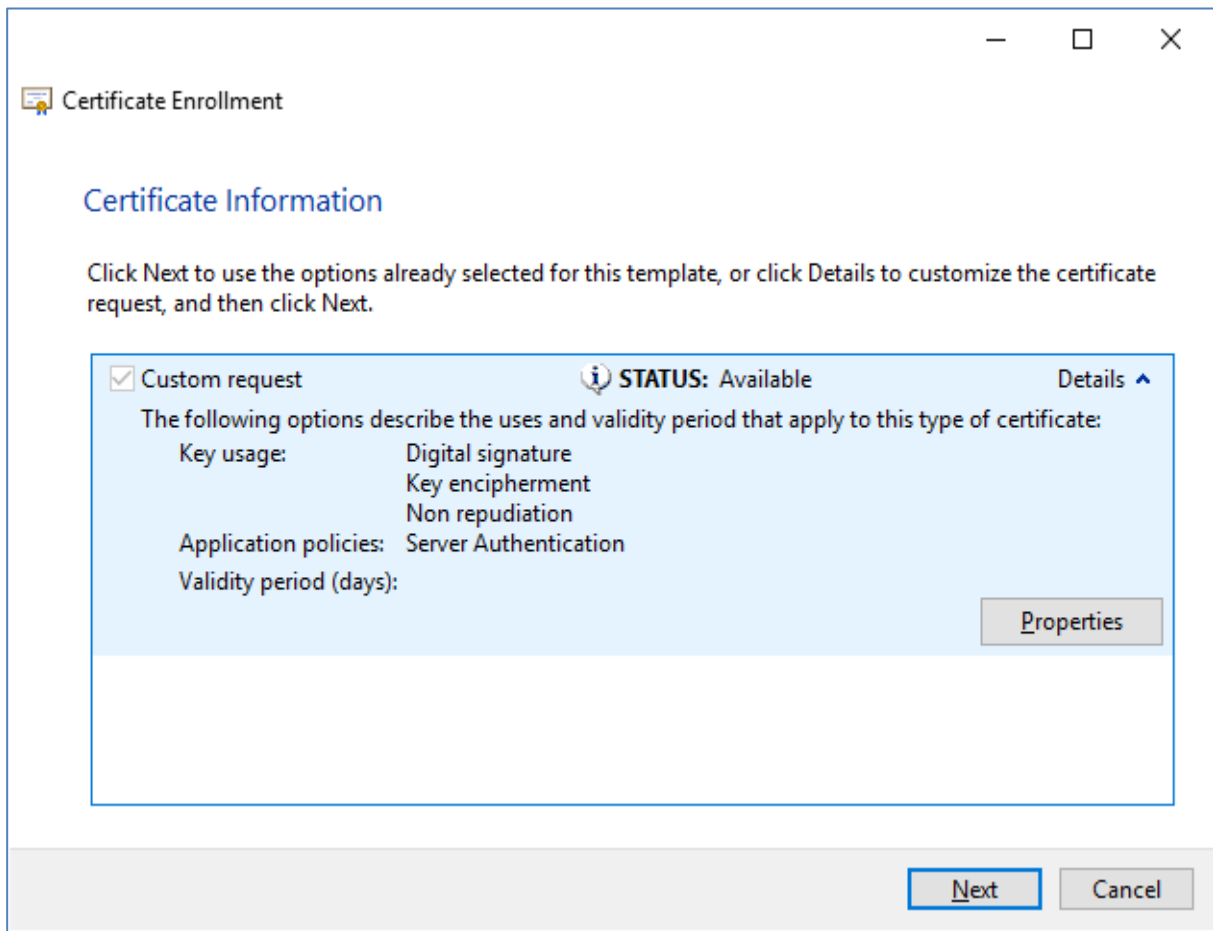


The image shows a 'Certificate Properties' dialog box with the 'Private Key' tab selected. The dialog has a title bar with a close button (X) and a tabbed interface with 'General', 'Subject', 'Extensions', and 'Private Key' tabs. The 'Private Key' tab contains several settings:

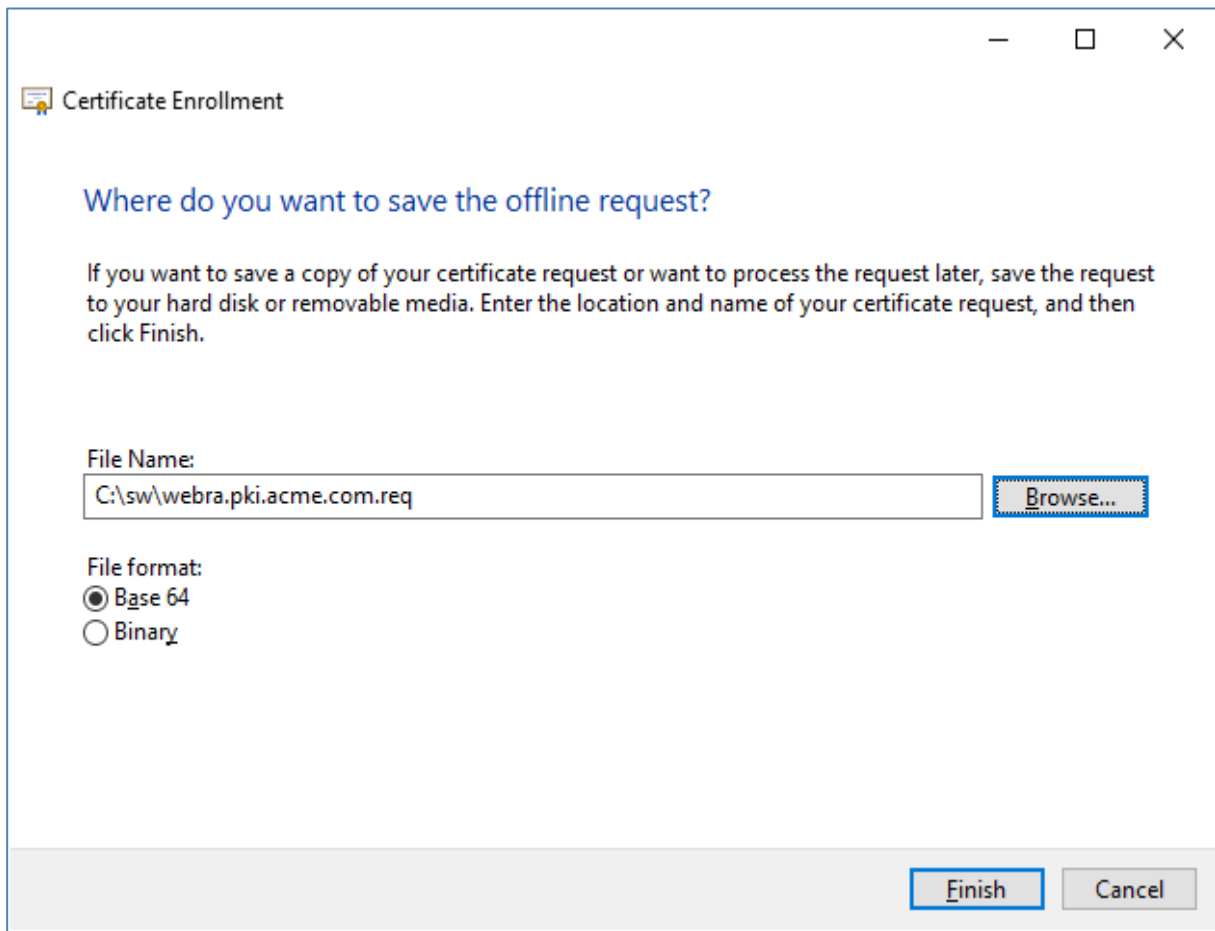
- A dropdown menu for 'Cryptographic Service Provider'.
- A dropdown menu for 'Key options' with a sub-label 'Set the key length and export options for the private key.' Below it is a 'Key size' dropdown menu set to '2048'.
- Three unchecked checkboxes: 'Make private key exportable', 'Allow private key to be archived', and 'Strong private key protection'.
- A dropdown menu for 'Select Hash Algorithm'.
- A dropdown menu for 'Select Signature Format'.
- A dropdown menu for 'Key permissions'.

At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Apply'.

Select the **Private Key** tab from the top. Select the **Cryptographic Service Provider** option from the first drop down and **Key options** from the second drop down. Change the Key size to **2048** and click **OK**. You will be back to the certificate enrollment screen



Press **Next** to proceed.



Browse the location to save the request file and select the **Base 64** file format. Press **Finish**.

This request file can be submitted to any CA to create a certificate against this request. Every CA processes the request and generates a certificate as per their own policy. Once the certificate is received from a CA it can be imported into the certificates.

For further details contact us on sales@ascertia.com or visit www.ascertia.com

*** End of Document ***