

Configuring Modern Authentication for EWS in Crestron Fusion® Software

Integration Guide Crestron Electronics, Inc.

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Configuring Modern Authentication for EWS in Crestron Fusion® Software

Introduction

This document provides the procedures required to configure Modern Authentication (OAuth 2) support for Crestron Fusion® software in the Microsoft® EWS (Exchange Web Services) service.

The Modern Authentication authorization model is provided by the Azure® Active Directory® service to integrate managed API applications with the same authentication model used by the Office 365® software REST APIs. Once Modern Authentication is configured in EWS, Crestron Fusion uses this access method to provide heightened user authentication.

NOTE: This authentication method is compatible only with Office 365 at this time. On-premises support may be available at a future date.

Create a New Application Registration

To configure Modern Authentication in EWS, a Crestron Fusion application registration must be configured in Azure Active Directory using the Azure portal. This procedure only must be done once per Office 365 tenant.

Register the Application with Azure

To create a new Crestron Fusion application registration in Azure Active Directory:

- 1. Sign into the Azure portal with a user ID that has Global Administrator rights.
- 2. Select Azure Active Directory from the left navigation menu.
- 3. Select App registrations from the Azure widget menu.
- 4. Click + New application registration.

App registrations - New application registration



A Create dialog box is displayed.

Create Dialog Box

Home > crestron electronics, inc A	pp registrations ゝ (
Create	□ ×
* Name 🚯	
FusionEwsApp4	~
	· · · · ·
Application type 0	•
Application type () Web app / API	~
Application type Web app / API Sign-on URL	~

- 5. Enter the following information:
 - **Name:** Enter a name for the application. The name must be unique to the Azure Active Directory profile.
 - Application type: Select Web app / API from the drop-down menu.
 - **Sign-on URL**: Enter a sign-on URL for the application. The application name entered in the **Name** text field should be repeated as the URL.
- 6. Click **Create**. The application is created and displayed in the widget.

Add Office 365 API Access

To add Office 365 API access to the Crestron Fusion application:

- 1. Select **App registrations** from the Azure widget menu.
- 2. Select the application created for Crestron Fusion. An application dialog box is displayed.
- 3. Click 💭 Settings. A Settings dialog box is displayed.

Crestron Fusion App Window



- 4. Select **Required permissions** under the **API ACCESS** menu.
- 5. Click + Add. An Add API access dialog box is displayed.

Settings Dialog Box - Required Permissions

Settings	×	Required permissions
		- Add Grant permissions
GENERAL		АРІ
Properties	>	Windows Azure Active Directory
🗮 Reply URLs	>	
Owners	>	
API ACCESS		
Required permissions	>	

6. Select Office 365 Exchange Online (Microsoft.Exchange) from the Select an API menu.

Add API access Dialog Box - Select an API

Add API access	×	Select an API
Select an API Office 365 Exchange Online (M		Search for other applications with Service Principal name
2 Select permissions	_	Windows Azure Active Directory Office 365 Exchange Online (Microsoft Exchange)
		Microsoft Graph Office 365 SharePoint Online (Microsoft:SharePoint)
		Skype for Business Online (Microsoft-Lync)
		Office 365 Yammer
		Power BI Service (Power BI)

- 7. Click Select.
- 8. Click the associated check boxes to display a check mark next to **Use Exchange Web Services with full access to all mailboxes** and the **Read and write calendars in all mailboxes** in the **Enable Access** menu.

Add API access	Enable Access	
1 Select an API Office 365 Exchange Online	APPLICATION PERMISSIONS	N 14
Select nermissions	Read all users' full profiles Ves	
2 roles, 0 scope	Read all user mailbox settings 📀 Yes	
	✓ Use Exchange Web Services with full access to all mailboxes	
	Send mail as any user 📀 Yes	
	Read calendars in all mailboxes 📀 Yes	
	Read contacts in all mailboxes 📀 Yes	
	Read mail in all mailboxes 📀 Yes	
	Read and write mail in all mailboxes O Yes	
	Read and write contacts in all mailboxes 📀 Yes	
	Read and write all user mailbox settings 📀 Yes	
	Read user tasks in all mailboxes 📀 Yes	
	Read and write tasks in all mailboxes 📀 Yes	
	Read and write calendars in all mailboxes	

Add API access Dialog Box - Enable Access

- 9. Click **Select** and then **Done**.
- 10. Select **Required permissions** under the **API ACCESS** menu.
- 11. Click **Grant permissions** to grant the Office 365 API permissions to the Crestron Fusion application. A confirmation window is displayed.
- 12. Click **Yes** to confirm granting the API permissions.

Required Permissions Menu

TED PERMIS

Generate a Self-Signed Certificate

EWS Modern Authentication requires a self-signed certificate to travel with the application, which provides additional application security.

The self-signed certificate may be generated using various tools (such as PowerShell® software or openssl). The procedure below explains how to generate the certificate from the Windows® operating system SDK (software development kit).

To generate a self-signed certificate from the Windows SDK:

- 1. Open the command prompt in the Windows system.
- 2. Issue the following command, replacing [ApplicationName] with the application name created in EWS:

```
cd C:\Program Files\Microsoft SDKs\Windows\v6.0A\Bin\x64
makecert -r -pe -n "CN=[ApplicationName]" -b 09/05/2018 -e
09/05/2025 -ss my -len 2048
```

If the certificate is generated, a "Succeeded" message is displayed.

NOTE: The command above may not be compatible with some versions of the Windows SDK. The command has been confirmed to work with Windows SDK version 6.0a.

- The -b and -e parameters set the validity time range. The date entered for -e should be at least five years ahead of the date entered for -b.
- The -r parameter indicates that the certificate is self-signed.
- The -pe parameter indicates that the private key is exportable.
- The -ss my parameter sets the certificate in the **Personal** folder of the cert store.

To export the self-signed certificate for use with the application:

- 1. Issue the mmc command in the command prompt to run Certificate Manager.
- 2. Navigate to File > Add/Remove Snap-In.
- 3. Move the **Certificates** snap-in from the **Available snap-ins** menu to the **Selected snap-ins** menu.
- 4. Select the **My user account** radio button in the dialog box that displays, and then click **Finish.**
- 5. Navigate to Console Root > Certificates Current User > Personal > Certificates in the menu tree.

Console 1 - Personal Cert Store

1	ᡖ Console1 - [Console Root\Certificates - Current User\Personal\Certificates]						
10:	File Action View Favorites Window Help						
(🔿 🚈 📅 🤞 🗈	a 🗙 🗐 🗟	? 🗊				
(Console Root		Issued To	Issued By	Expiration Date	Intended P	
~ 6	Gertificates - Current User Gertificates Certificates Trusted Past Certification Author		🔄 Entrust Root Certification Auth	Entrust Root Certification Authority	11/27/2026	<all></all>	
			🙀 CrestronFusionEwsApp4	CrestronFusionEwsApp4	9/5/2025	<all></all>	
			Entrust Certification Authority	Entrust Root Certification Authori	10/23/2024	<all></all>	
	Enterprise Trust	runcation Autor	Entrust Root Certification Auth	Entrust Root Certification Authority	9/22/2024	<all></all>	

- 6. Right-click the application cert.
- 7. Select All tasks > Export. A certificate export wizard opens.
 - a. When prompted, select the **No**, do not export the private key radio button.
 - b. When prompted, select the Base-64 encoded X.509 (.CER) radio button.
 - c. When prompted, name the certificate "[ApplicationName].cer". where [ApplicationName] is the application name created in EWS.
 - d. Click **OK** to exit the wizard once the export has completed.
- 8. Right-click the application cert.
- 9. Select All tasks > Export. A certificate export wizard opens.
 - a. When prompted, select the Yes, export the private key radio button.
 - b. Retain the default file export settings.
 - c. When prompted, enter and confirm a password for the private key.
 - d. When prompted, name the certificate "[ApplicationName].pfx". where [ApplicationName] is the application name created in EWS.
 - e. Click **OK** to exit the wizard once the export has completed.
- 10. Run the following PowerShell script, pointing to the saved .cer file as highlighted below.

```
# This will print out the values needed to put into the AD App manifest.
#
$Cert = New-Object
System.Security.Cryptography.X509Certificates.X509Certificate2
$Cert.Import("c:\Temp\[ApplicationName].cer")
$BinaryData = $Cert.GetRawCertData()
$Base64Value = [System.Convert]::ToBase64String($BinaryData)
$BinaryData = $Cert.GetCertHash()
$Base64Thumbprint = [System.Convert]::ToBase64String($BinaryData)
$Keyid = [System.Guid]::NewGuid().ToString()
write-Host "Base-64 Thumbprint:"
$Base64Thumbprint
write-Host "Keyid:"
$Keyid
write-Host "Base-64 Value:"
$Base64Value
```

The PowerShell output appears as follows:



Ensure that this output is available for the remaining procedures.

Add the Certificate to the Application

Once a self-signed certificate has been generated for the application, it may be added to the application in the Azure portal.

To add the self-signed certificate to the application via the Azure Active Directory:

- 1. Select **App registrations** from the Azure widget menu.
- 2. Select the application created for Crestron Fusion. An application dialog box is displayed.
- 3. Click 🗣 Settings. A Settings dialog box is displayed.

Crestron Fusion App Window

Home > crestron electronics, inc App registrations	> FusionEwsApp4
FusionEwsApp4 Registered app	* 🗆 ×
🌣 Settings 💉 Manifest 🛚 🗴 Delete	
Display name FusionEwsApp4	Application ID bb7ce38e-cf92-442a-8363-1d220489f8a3
Application type Web app / API	Object ID b830d464-5603-44a2-96c4-38db9636e7f1
Home page http://FusionEwsApp4	Managed application in local directory FusionEwsApp4
	*

- 4. Select Keys under the API ACCESS menu.
- 5. Click Upload Public Key.

Keys Menu - Upload Public Key

Settings >	Keys	
	Save X Discard T Upload Public Key	
GENERAL	Passwords	
Properties >	DESCRIPTION EXPIRES VALUE	
∏ Reply URLs	No resulte	
🔮 Owners >	Vav description	e will be
API ACCESS		: will DC
🔏 Required permissions 🔰 🗧	Public Keys	
Keys >	THUMBPRINT	START DA

- 6. Select the [ApplicationName].cer file created for the application. The .cer file is uploaded to the application.
- 7. Once the upload completes, click **Save.** The thumbprint from the PowerShell script used to create the self-signed certificate is added to the **Public Keys** menu.
- 8. Select App registrations from the Azure widget menu.
- 9. Select the Crestron Fusion application. An application dialog box is displayed.
- 10. Click **Manifest**. The JSON manifest for the application is displayed in an **Edit** screen.

Crestron Fusion App Window

Home > crestron electronics, inc App registrations	> FusionEwsApp4
FusionEwsApp4 Registered app	* = ×
🏟 Settings 📝 Manifest 🛛 🛅 Delete	
Display name FusionEwsApp4	Application ID bb7ce38e-cf92-442a-8363-1d220489f8a3
Application type Web app / API	Object ID b830d464-5603-44a2-96c4-38db9636e7f1
Home page http://FusionEwsApp4	Managed application in local directory FusionEwsApp4
	*

11. In the keyCredentials section, replace the existing code with the code below, where [Base64Thumbprint from PS script], [Keyid from PS script], and [Base64Value from PS script], are replaced with the appropriate values from the PowerShell script used to create the self-signed certificate.

```
"keyCredentials": [
    {
        "customKeyIdentifier": "[Base64Thumbprint from PS script]",
        "keyId": "[Keyid from PS script]",
        "type": "AsymmetricX509Cert",
        "usage": "Verify",
        "value": "[Base64Value from PS script]"
     }
],
```

NOTES:

- Copying the PowerShell output directly into the JSON manifest may add extraneous line ends, which will cause the manifest to fail when saved. To avoid this scenario, copy the PowerShell output into a text editing program, and then remove the extraneous line ends before pasting the content into the manifest.
- Any keyCredentials values in the existing JSON manifest that are not in the pasted code will return after the manifest is saved.

The following code uses the sample PowerShell output shown on page 8 as an example.

```
"keyCredentials": [
    {
       "customKeyIdentifier": "ehg0qxkvD12mFqjT8u88MzSZW1Y=",
       "keyId": "ff144009-ce5c-46e1-8cd2-1c0733e92195",
       "type": "AsymmetricX509Cert",
       "usage": "Verify",
       "value":
"MIIDHzCCAqeqAwIBAqIQ/AQnORqvc5hAdvZUXIuSLTANBqkqhkiG9w0BAQQFADAqMR4w
HAYDVQQDExVDcmVzdHJvbkZ1c21vbkV3c0FwcDQwHhcNMTgwOTA1MDQwMDAwWhcNMjUwO
TA1MDQwMDAwWjAgMR4wHAYDVQQDExVDcmVzdHJvbkZ1c21vbkV3c0FwcDQwggEiMA0GCS
qGSIb3DQEBAQUAA4IBDwAwqqEKAoIBAQDE+y6Hy08r8r+kj0BlG1ffRMf7RiwMAF0hWG1
NxSUYEVPQTjTzkARme8oClrlTyxk0ftv56LleR0xqBrIxufqjru0qyx1lY1sqTMNNPqua
GehlvIny75tClz+tAtOuw6wOlJQ28P3RjrlOnqQ4tYqi98C2GcaNHSPsExZY36B8cMZCb
IirQqPENSqwKq/SudNoNjX/LMFLJBcJoD5r7xdq/5JGsymhuRKhxfo58th1Pdu1nOeQfG
zlcxjXW8YSGMelqK97eTOQCPqCAWEwI9wiY8hfjVUDNxq9WBM76Pq5y17QV7rK+IS1xON
1FusYxiof+SMYnclnHZLRAopQJoU/AqMBAAGjVTBTMFEGA1UdAQRKMEiAEA4PF6eu27qC
KKeFugtFfGihIjAgMR4wHAYDVQQDExVDcmVzdHJvbkZ1c21vbkV3c0FwcDSCEPwEJzkYL
30YQHb2VFyLki0wDQYJKoZIhvcNAQEEBQADggEBAGLXnaeVqSvOefiV/sit5cS+8eyEAr
rPZAKMmfPnUm5gVsMZtI/ivqgVp8TpvSp3DQhrQkkW1qHHlJOf2PyhwEpv3ZEbEPwkk+x
W1udhjwVVrTIbMmvqQQMIiAxxL3ymQ0A9Xd+FfRuhYQvozZVyDYWDaqVG8CBYH8Yj55FJ
hhjR2LkEdgyEVq8o5UK91MbN2LWRRu5c2NHmGuNAakp7+RFCEdT4u9s5ADFVqp1211pNU
I2nwVasyn2p6zWW5jVQD9VPfpT1tWaZwsVqEJIRfpeQ8ZFPsTWFAR0P1ArJi1PhtEg267
a3pzlPe3E+fnrt2EXC6+4H0xI/AEE"
     }
  ],
```

12. Click **Save** on the **Edit** screen.

Exit the **Edit** screen, and then click **Manifest** to display the **Edit** screen again. The keyCredentials section should now appear as follows:

keyCredentials Section

18	"keyCredentials": [
19	{
20	<pre>"customKeyIdentifier": "ehg0qxkvD12mFqjT8u88MzSZW1Y=",</pre>
21	"endDate": "2025-09-05T04:00:00Z",
22	"keyId": "ff144009-ce5c-46e1-8cd2-1c0733e92195",
23	"startDate": "2018-09-05T04:00:00Z",
24	<pre>"type": "AsymmetricX509Cert",</pre>
25	"usage": "Verify",
26	"value": null
27	}
28],

Confirm that the startDate and endDate values match the start and end dates specified when creating the certificate. If so, the application has read the uploaded certificate successfully.

NOTE: It is normal that null is shown for value.

Configure Crestron Fusion Settings

Modern Authentication for EWS configuration parameters must be set in Crestron Fusion. The **Microsoft Exchange** page in the Crestron Fusion Configuration web client has been extended so that Modern Authentication may be configured outside of the **All Config** page.

Microsoft Exchange Page

	Set	ttings: Microsoft Exchange			
Configuration settings were successfully updated.					
- General		Maximum Checkpoint Age:	48 (hours)		
Log		Notification Port:	65206		
Scheduling		Notification Interval	2 (minutos)		
		Notification Interval.			
		Notification Resubscribe Delay:	30 (seconds)		
		Enable Asynchronous Exchange Request:			
LDAP		Notifications To Hostname:			
- 🗅 Micros		Use OAuth for EWS authentication:	\checkmark		
🗋 Microsoft Exchange		OAuth settings			
BinDoint		0365 tenant ID:	07dfb591-bce8-461e-beea-9182630ce52e	[
Forwarding		Client ID (Application ID):	e46219ec-478b-430f-b156-2fa559096a8b		
Web		Currently Londod Costificator	Eurise Eurober ECC effe		
SMTP		Currently Loaded Certificate:	FusionewsAppFSG.pix		
Media		OAuth certificate (PFX):	Browse No file selected.		
API		Certificate Password:	•••••		
Advanced		EWS convertibly	https://outlook.office265.com/		
Alert Service		EWS SEIVELURL:	https://outlook.onice565.com/	l.	

If the **Use OAuth for EWS authentication** option is selected, additional **OAuth settings** are provided at the bottom of the **Microsoft Exchange** page.

The following sections identify the configuration variable name and the associated **OAuth settings** setting in the Microsoft Exchange page (if present).

NOTE: Sample values are used in the following sections for reference. These values must be replaced with values from the application created using the previous sections.

EwsOAuthTenantId (O365 tenant ID)

The EwsOAuthTenantId variable sets the tenant ID of the Office 365 account. This variable may also be set using the **O365 tenant ID** field in the **Microsoft Exchange** page.

To locate the Office 365 tenant ID:

- 1. Sign into the Azure portal with a user ID that has Global Administrator rights.
- 2. Select Azure Active Directory from the left navigation menu.
- 3. Select **Properties** from the Azure widget menu.

The tenant ID is listed in the **Directory ID** field.

Azure Active Directory Properties - Directory ID

1	SQL databases	戸 Custom domain names	Yes No
2	Azure Cosmos DB	Ø Mobility (MDM and MAM)	Directory ID 8d753e8b-3fdc-4332-84f1-aaf34d63865f
N	Virtual machines	📍 Password reset	Technical contact
		Company branding	pneary@crestron.com
Y	Load Dalancers	Ö User settings	Global privacy contact
	Storage accounts	•• ••••	
		Properties	
$\langle \cdots \rangle$	Virtual networks		Privacy statement URL
		Notifications settings	
•	Azure Active Directory		

EwsOAuthClientId (Client ID (Application ID))

The EwsOAuthClientId variable sets the application ID. This variable may also be set using the **Client ID (Application ID)** field in the **Microsoft Exchange** page.

To locate the application ID:

- 1. Sign into the Azure portal with a user ID that has Global Administrator rights.
- 2. Select Azure Active Directory from the left navigation menu.
- 3. Select **App registrations** from the Azure widget menu.
- 4. Select the application created for Crestron Fusion. An application dialog box is displayed.

The application ID is listed in the **Application ID** field.

Crestron Fusion App Window

Home > crestron electronics, inc App registrations > FusionEwsApp4			
FusionEwsApp4 Registered app	* 🗖 ×		
🏟 Settings 💉 Manifest 📋 Delete			
Display name FusionEwsApp4	Application ID bb7ce38e-cf92-442a-8363-1d220489f8a3		
Application type Web app / API	Object ID b830d464-5603-44a2-96c4-38db9636e7f1		
Home page http://FusionEwsApp4	Managed application in local directory FusionEwsApp4		
	*		

EwsOAuthCertificatePassword (Certificate Password)

The EwsOAuthCertificatePassword variable sets the certificate private key password. This variable may also be set using the **Certificate Password** field in the **Microsoft Exchange** page.

For this variable, enter the private key password created while exporting the self-signed certificate.

EwsOAuthCertificate (OAuth Certificate (PFX))

The EwsOAuthCertificate variable sets the contents of the .pfx file created when the certificate with the private key was exported. This variable may also be set using the **OAuth Certificate (PFX)** field in the **Microsoft Exchange** page.

For this variable, enter the path of the .pfx file on the network, or use the **Browse** button on the **Microsoft Exchange** page to locate the file on the network.

NOTE: The read-only **Currently Loaded Certificate** text field shows the .pfx file that is loaded to the application. The file path of the .pfx file is not included.

EwsOAuthServerName (EWS Server URL)

The EwsOAuthServerName variable sets the URL of the EWS server. This variable may also be set using the **EWS ServerURL** field in the **Microsoft Exchange** page.

For this variable, enter "https://outlook.office365.com/".

Configure Office 365 Tenant for OAuth

The Office 365 tenant must be configured to enable OAuth if it is not already configured by setting the OAuth2ClientProfileEnabled variable to \$True.

The following PowerShell script queries the OAuth settings for the Office 365 tenant:

```
$UserCredential = Get-Credential # Enter your 0365 admin credentials in the pop-up
$Session = New-PSSession -ConfigurationName Microsoft.Exchange -ConnectionUri
https://outlook.office365.com/powershell-liveid/ -Credential $UserCredential -
Authentication Basic -AllowRedirection
Import-PSSession $Session -DisableNameChecking
Get-OrganizationConfig | Format-Table -Auto Name,OAuth*
#Set-OrganizationConfig -OAuth2ClientProfileEnabled $true
```

The command to enable OAuth is commented at the bottom of the script.

Test the Configuration

A new TEST OAUTH command has been added to the Crestron Fusion Services controller to help validate the configuration for OAuth settings.

** RoomView Service Controller				
Room/View Service C Loader C Signal C Schedule C Log C Media C Data C Groupware				
Hostname/IP Address	Port Connect			
Command: Argument #1 TEST I OAUTH	Other args:			
<pre>RwsOAuthEnabled: True RwsOAuthBatholity: https://login.wi RwsOAuthCertificate: 2533 bytes RwsOAuthCertificate: 2533 bytes RwsOAuthCertificatePassword: ****** RwsOAuthPfFileName: FusionEwsAppFS EwsOAuthClientId: e46219ec-478b-430 EwsOAuthClientId: 07dfb591-bce8-461 We got Microsoft.Exchange.WebServic</pre>	ndows.net/07dfb591-bce8-461e-be office365.com/ **** C.pfx f-b156-2fa559096a8b e-beea-9182630ce52e es.Data.0AuthCredentials	ea-9182630ce52e/oauth2/v2.0/authorize		
🗖 Word wrap	Execute Close			
Execute OK				

Crestron Fusion Services Controller - TEST OAUTH

The readout shown in the image above indicates a successful test run.

NOTE: The CONFIG RELOAD command must be run if any changes have been made to the OAuth configuration prior to issuing a new TEST OAUTH command. If changes are made to the configuration, the Groupware service may take up to 10 minutes to receive the new values; otherwise, the service app pool may be cycled again to receive the new values immediately.

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