

Configure MinRole Search and Cloud Hybrid Features in SharePoint Server 2016 and Office 365

By

Priyaranjan KS

About the Author

Priyaranjan KS is a Senior SharePoint Consultant, who is engaged in architecting, designing and developing solutions in SharePoint and Office 365. He has been working with SharePoint over the past 7 years and has worked on SharePoint 2007 through SharePoint 2016. He is a Certified Scrum Master, as well as a Microsoft Certified Solutions Developer (SharePoint Apps).

He is a C# Corner MVP and frequently collaborates with them in the field of SharePoint. In case, you need any SharePoint help, you can either find him [here](#) or drop a [mail](#) to him.

He has published two other Free SharePoint 2016 e-books, which can be found at [C# Corner](#).

Target Audience

The users reading the book neednot have an in-depth working knowledge in SharePoint but a basic working knowledge of Azure, Office 365 and SharePoint is considered ideal.



PRIYARANJAN K S
(C# Corner MVP)

Acknowledgement

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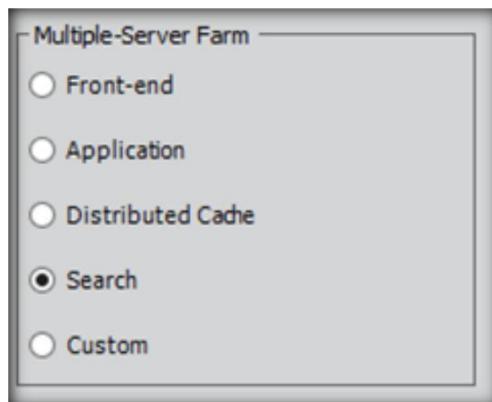
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I. Introduction

SharePoint 2016 General Availability was announced in the [Future Of SharePoint](#) conference in May 2016. It is the latest iteration of SharePoint and is said to be the most scalable and stable product in SharePoint line up. Several improvements have been made over its predecessor, SharePoint 2013. The notable improvements have happened in the Search Department. With the introduction of Search MinRole Feature and improved Cloud Hybrid Search Services, SharePoint 2016 brings in a highly scalable and mature Content Management Ecosystem.

Search as a MinRole

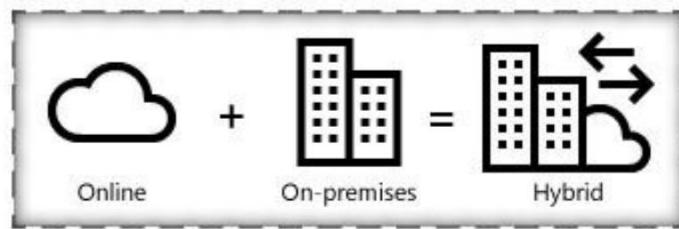
MinRole is a feature, which is newly introduced in SharePoint 2016, which offloads SharePoint load by hosting the features like search as a separate Server. The image given below shows the available MinRole options, which we can configure.



Thus, we can configure the Search Service in a Server, which is optimized for handling search and crawl operations.

SharePoint Cloud Hybrid Features

SharePoint Hybrid is considered as the first step towards embracing Cloud infrastructure. Hybrid helps the organization to maintain the best of SharePoint On- Premise and Online functionalities. With SharePoint Hybrid features, you can integrate the two environments together in a variety of ways to provide a more productive user experience.



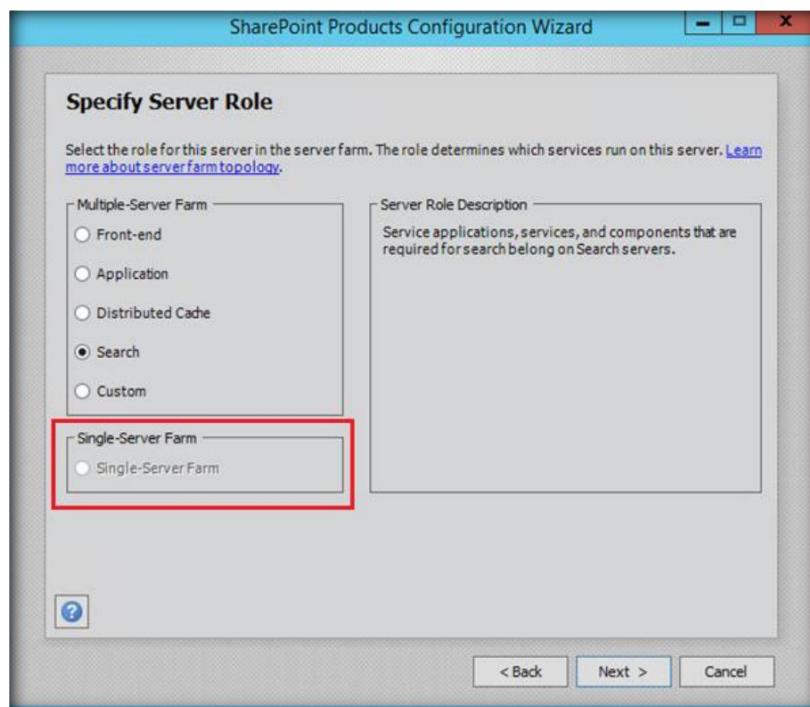
Cloud Hybrid features in SharePoint comprises of

- Cloud Hybrid Search- It provides SharePoint On-Premise search results in SharePoint Online.
- Cloud One Drive Redirection- It redirects the users to Office 365 OneDrive for business, upon clicking On-Premise OneDrive button.
- Cloud Hybrid Site Features- It provides an extensible app launcher in SharePoint 2016, which integrates tile in Office 365 to On-Premise app launcher. It also redirects the users to Office 365 Team Sites on clicking SharePoint On-Premise Sites button in the suite bar.

II. SharePoint Farm Architecture

SharePoint 2016 farm has been created as a Multi-Server installation in Azure by making use of Virtual Machines for each Server. The setting up of the farm is not covered in this book. However, a very detailed step by step guide for creating the SharePoint 2016 farm in Azure has been published [here](#). You can download and use the free e-book to set up a SharePoint 2016 farm. The farm configuration used throughout the book is discussed below.

SharePoint 2016 installation in Development environment can easily be done in a single Server environment for which during the installation, we have the option to select “Single Server Farm” option. However, if we select that option, we will never be able to extend SharePoint Farm to the multiple Servers for load balancing. In Dev and UAT environments, single Server installation is justified but in production, it is a strict no.



In this guide, we will be working with a SharePoint 2016 multi-Server farm, which is set up in Azure. The architecture of the installation in Azure involves the creation 4 VM's which will serve different MinRoles.

- VM1 – Active Directory Domain Controller VM.
- VM2 – SQL Server 2016 VM.
- VM3 – SharePoint Server 2016 VM.
- VM4 – Search MinRole VM.

A. Active Directory Domain Controller VM

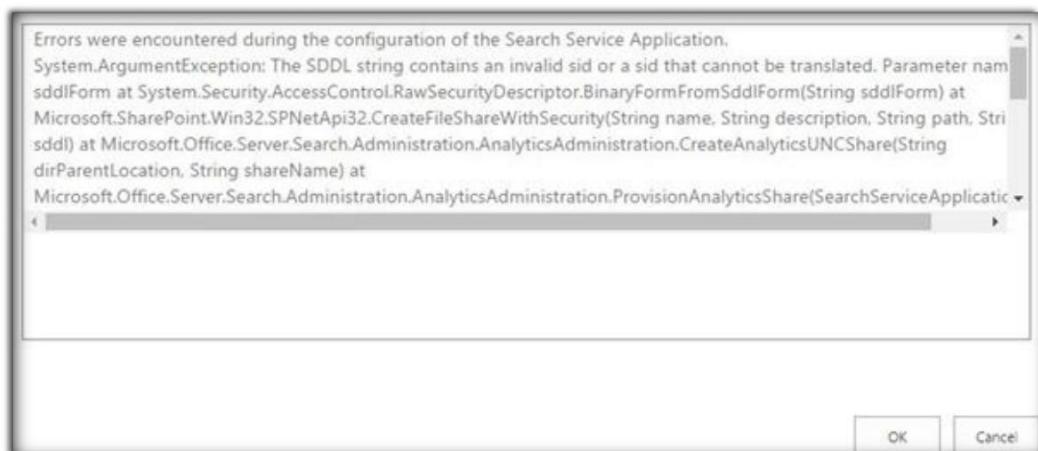
When we try to set up SharePoint 2016 farm, the obvious question that gets asked is do we really need an AD set up in the farm. Well, the answer to that is simple. If you want to reap all the benefits of SharePoint, you need an AD to be configured, else you will stumble upon some of the road blocks, mentioned below.

- If you are not using an AD user, you will be stuck with the [Local User Account issue](#), when you run the Configuration Wizard.

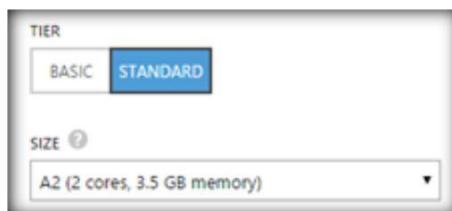


The workaround for this issue is to either,

- a. Configure the Active Directory prior to the installation of SharePoint and run SharePoint Configuration Wizard later or
- b. Create Configuration database, using PowerShell prior to running SharePoint Configuration Wizard (continue without AD creation).
- Another issue is that you will run into it is that you won't even be able to configure SharePoint Search, as we will be stuck with the error given below.

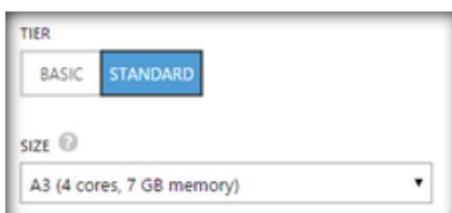


Having gone through these issues and as per the recommendation from SharePoint team at Microsoft, it is better to have an Active Directory Domain Controller up and running in the farm, prior to starting SharePoint 2016 installation. Now, we have confirmed the requirement for AD, next question is where to configure it? Though we can easily set up Active Directory Domain Controller in the same VM as the Application Server, where we install SharePoint 2016, it is a flat no, when it comes to Production environments. Microsoft has put up [acknowledge base article](#), which states the details of this scenario. Thus, it boils down to the fact, which we have to set up to Active Directory in another separate VM within the domain. I have made the use of Azure A2 Resource package, which offers a dual core processor and 3.5 GB RAM for this and have named it as VM: VM01-AzureAD. The admin user account created during the provisioning of the VM is “AzureADAdmin”.



B. SQL Server 2016 VM

This VM serves as the back end for the SharePoint 2016 installation. I have made use of a VM with a pre-installed SQL 2016 Express image to add to the SharePoint Farm as DB Server. In order to provide ample resources, so as to ensure a smooth run, Azure A3 resource package, which has Quad Core processor and 7 GB RAM is used. It is named as VM: VM02-SQL2016. The admin user account created during the provisioning of the VM is “SQLAdmin”.



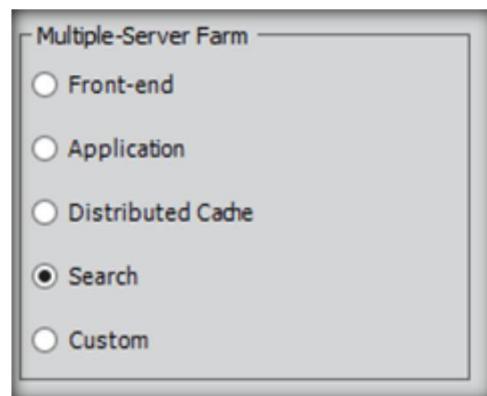
C. SharePoint Server 2016 VM

This is our primary VM, which will act as the Application Server. SharePoint Server 2016 is installed in this VM. As per SharePoint 2016 hardware requirements, I went with Azure D3 resource package, which offers Quad Core Processor and 14 GB RAM. It is named as VM: VM03-SP2016. The admin user account is created during the provisioning of the VM is “SPAdmin”.



D. Search MinRole VM

One of the enhancements that came along with SharePoint 2016 is the introduction of MinRoles. MinRoles helps to offload SharePoint Server from the functionalities like search. SharePoint installation allows the creation of 5 different types of MinRoles during the set up. The available MinRoles are shown below.



If we do not intent to make use of MinRoles, we can select „Single Server Farm“ available, which is given below MinRoles.



In this guide, we will make use of MinRoles and create a separate VM for search. We will name the VM: VM04-MiniRole. The admin user account is created during the provisioning of the VM will be “MiniRoleAdmin”.

The detailed steps to setup the farm in Azure has been documented as a free e-book, which you can be downloaded [here](#).

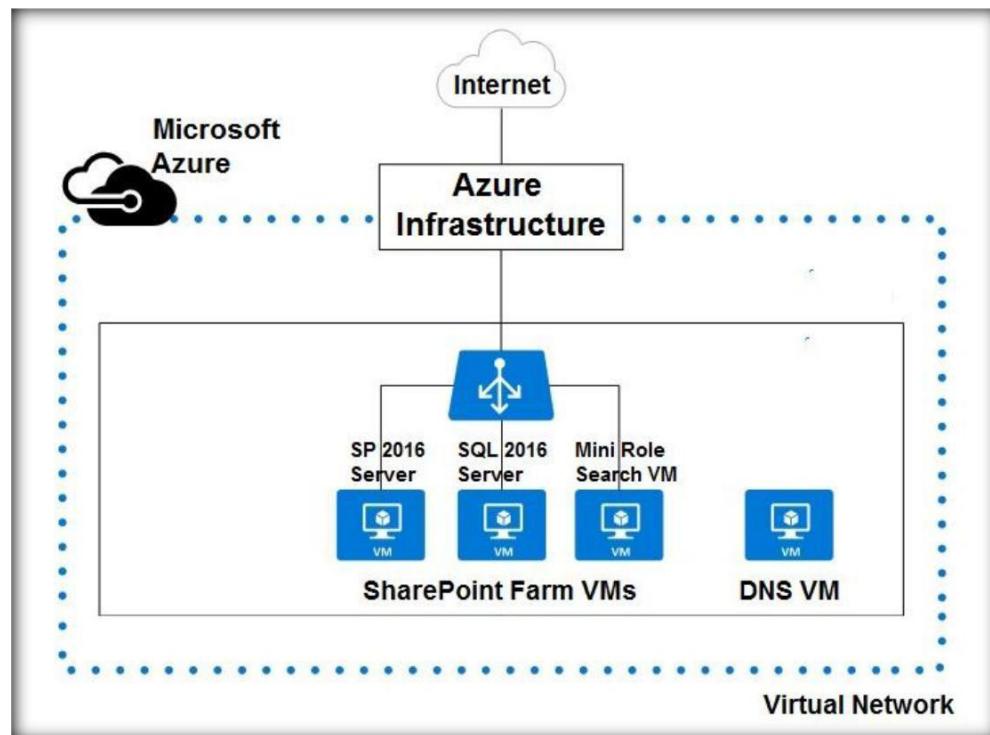
SharePoint User Accounts Used

VM and the domain users created can be summarized as

VM Name	Local administrator	DomainService Accounts
VM01- AzureAD	AzureADAdmin: Acts as the Domain Administrator for the farm.	SPSetupAccount: Setup account is used to install SharePoint 2016.
VM02-SQL2016	SQLAdmin: Takes additional responsibility of SQL Service Account.	SPFarmAccount: Farm account is used to configure SharePoint 2016.
VM03-SP2016	SPAdmin: Local SharePoint Server Administrator.	
VM04-MiniRole	MiniRoleAdmin : Local SharePoint Mini Role Administrator	

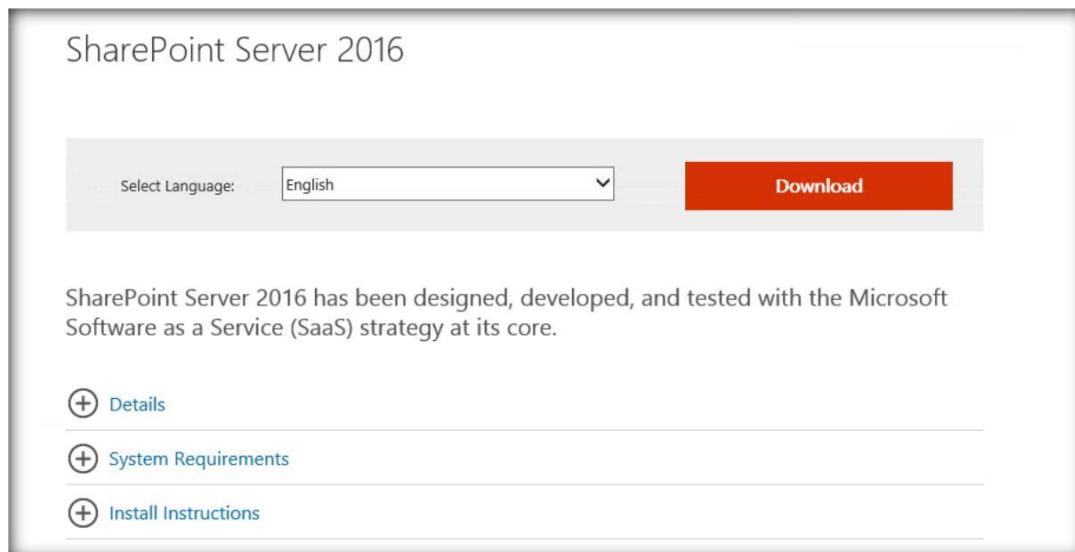
III. SharePoint Server 2016 Farm Architectural Diagram

MinRole Server has been used to configure Search Service in MinRoles, as well as to set up Cloud Hybrid Search. The farm architecture is shown below.



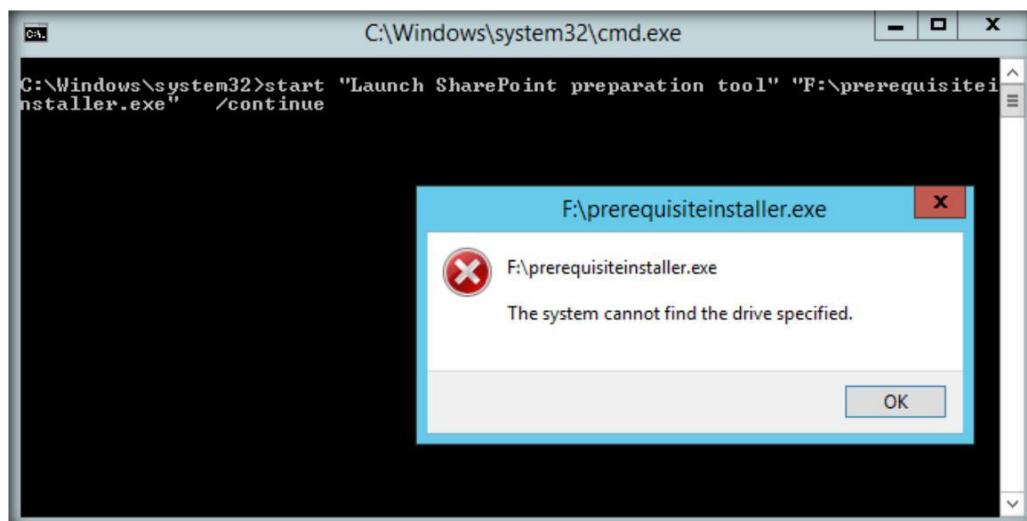
IV. SharePoint Search MinRole Server Installation

In order to set up SharePoint Server MinRole dedicated for search, we have to set up SharePoint Server 2016 in the Server. You can get SharePoint 2016 executable from [here](#). Download the EXE to VM.

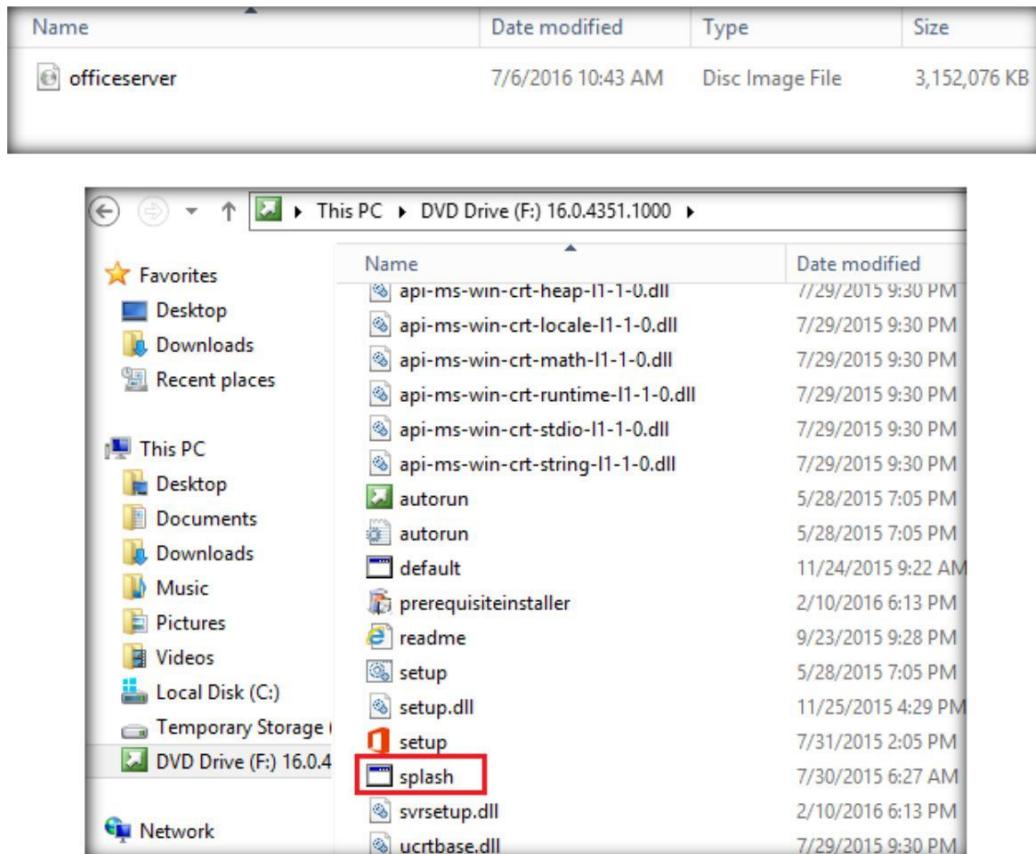


A. Install SharePoint Server 2016

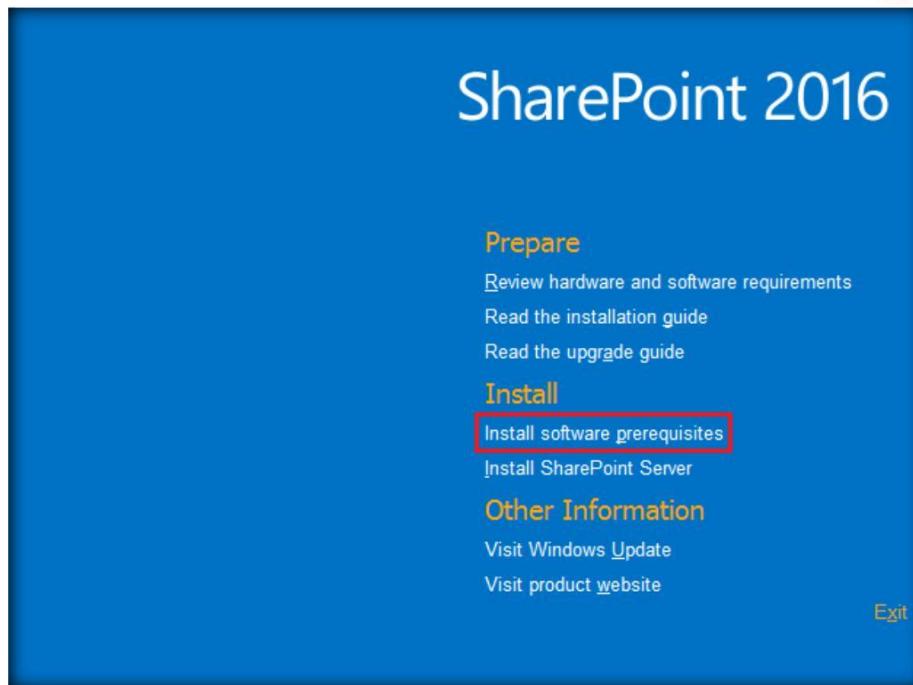
Once downloaded, go to the location and double click on the image file, so as to mount it as a disk. You can use any image mounting software or out of the box Windows default mounting capability. There will be an intermediate restart during the installation and if you use the default Windows mounting, the mounted disk will be automatically dismounted at the restart and you may face the error after the restart.



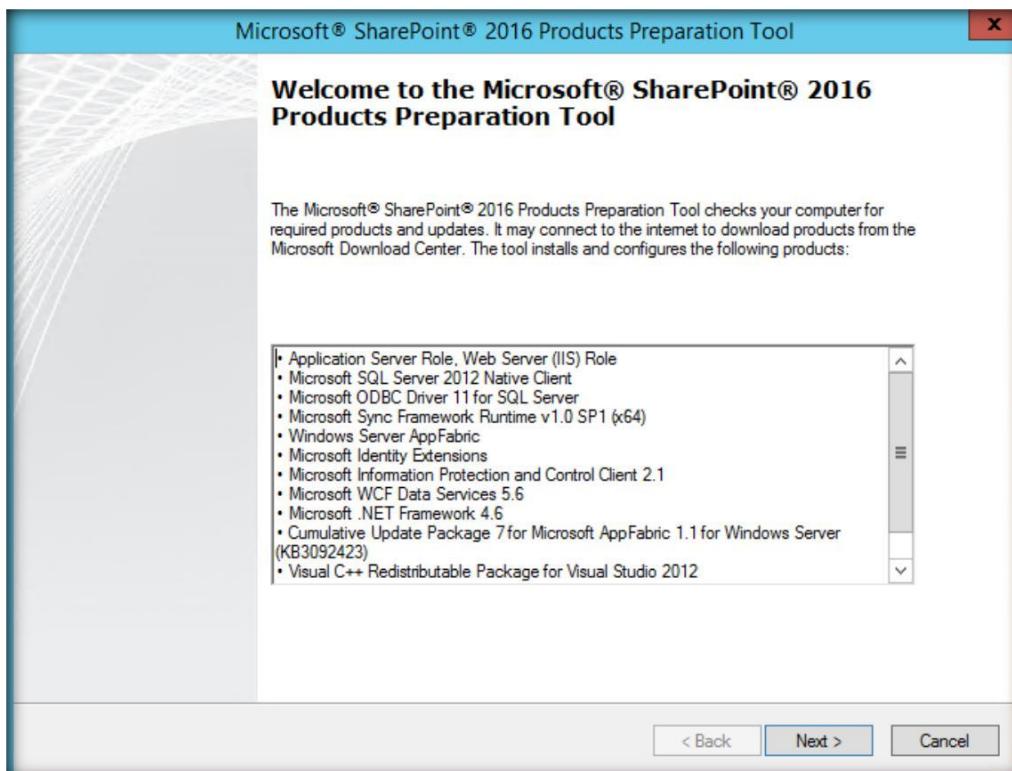
However, this is not a problem. After the system restarts, you can mount the disk again and run the prerequisites installer. If you really don't want to go through the hassle, you can use some third party mounting software.



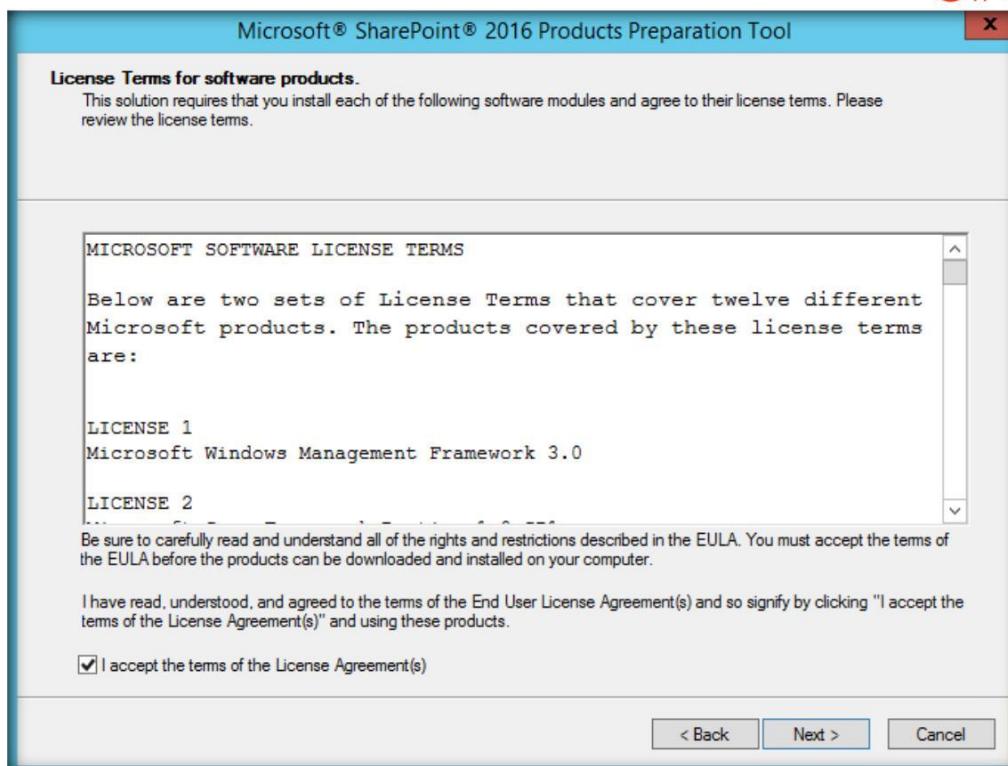
Click on Splash HTML Application.



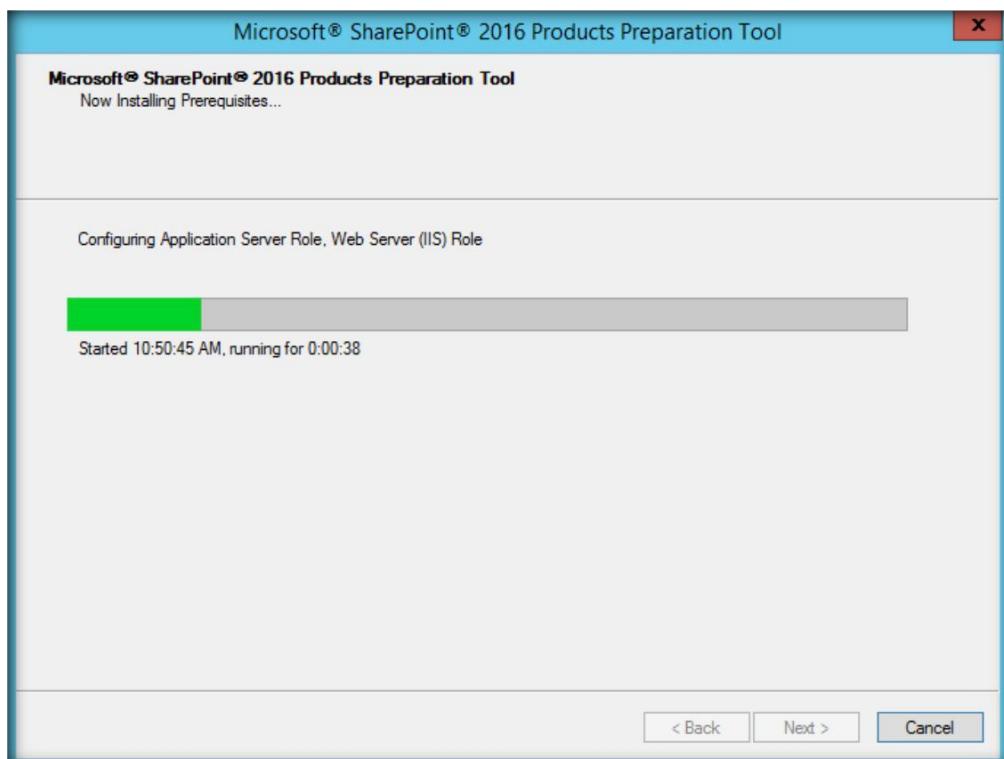
Before installing SharePoint Server 2016, we have to install a set of prerequisites. Click „Install software prerequisites“.



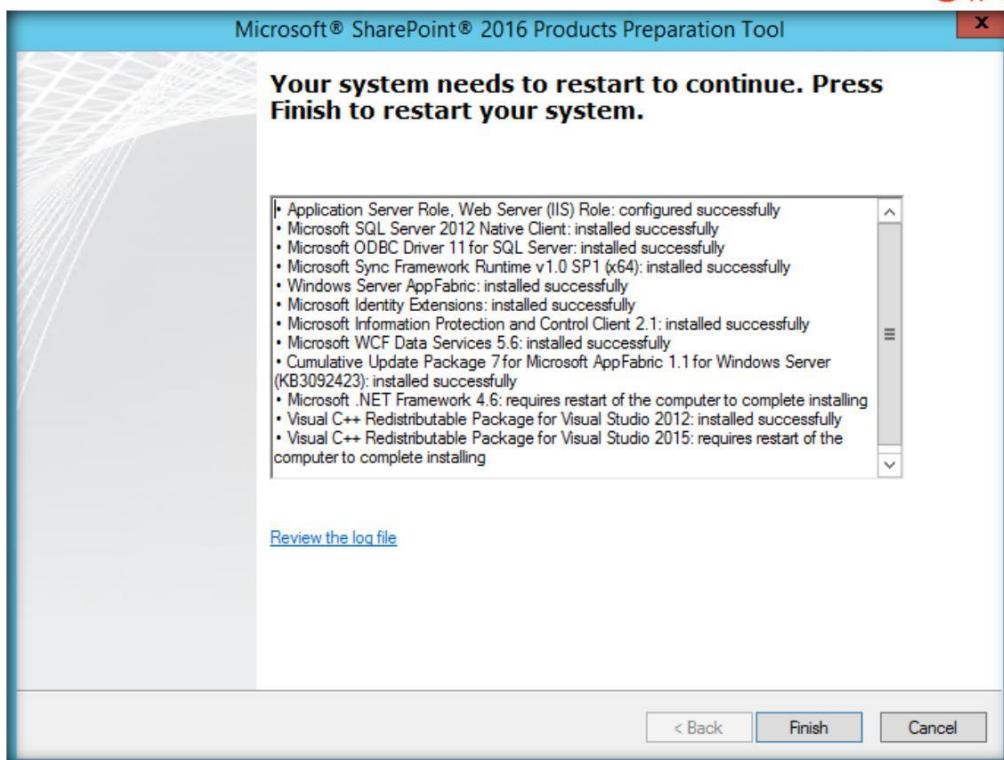
This will open up the product preparation tool, which will install a list of prerequisites.



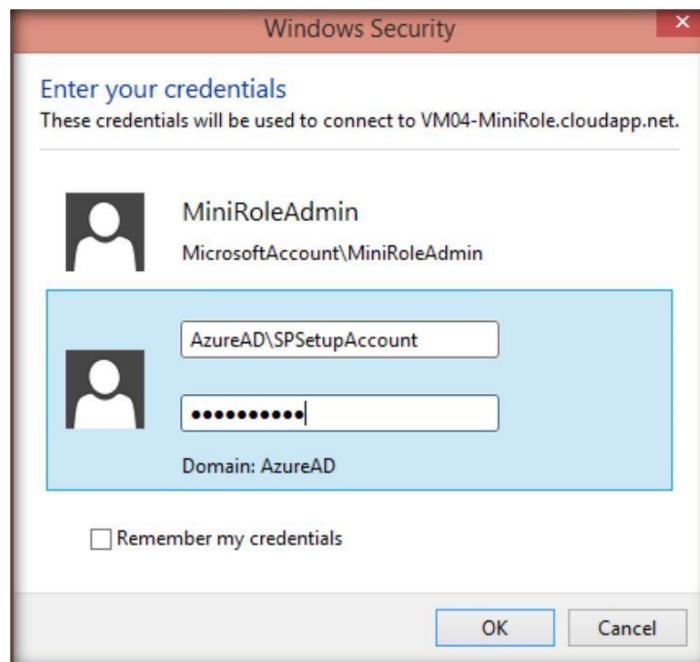
Accept the agreement and click „Next“.



The products preparation tool will run for some time.



After some time, we will get the message, which asks for a system restart. The product preparation tool has not completed, but it requires an intermediate restart for some of the changes to take effect. Click „Finish“. This will restart the VM. After some time, log in to the VM again, using the same „SPSetupAccount“ credentials.

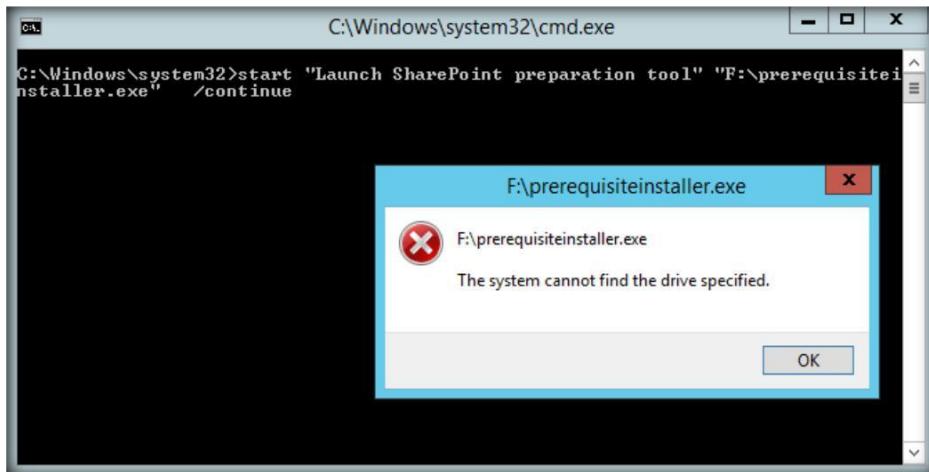


At this time, you may get the error given below. This is because the Prerequisites installer tried to start as soon as the VM was restarted and the mounted disk was dismounted during

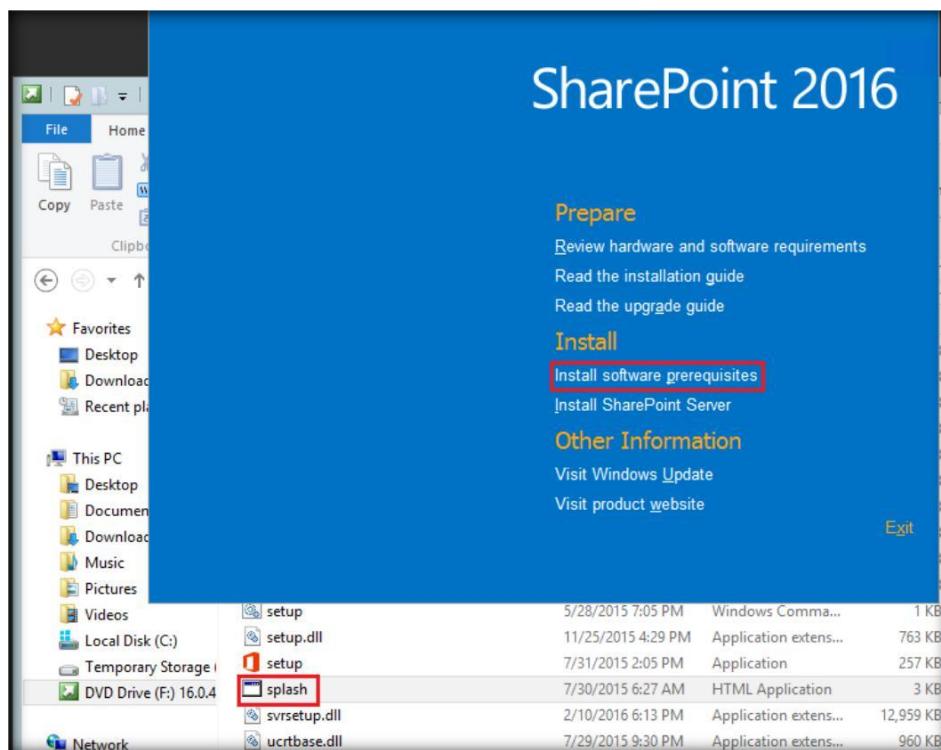
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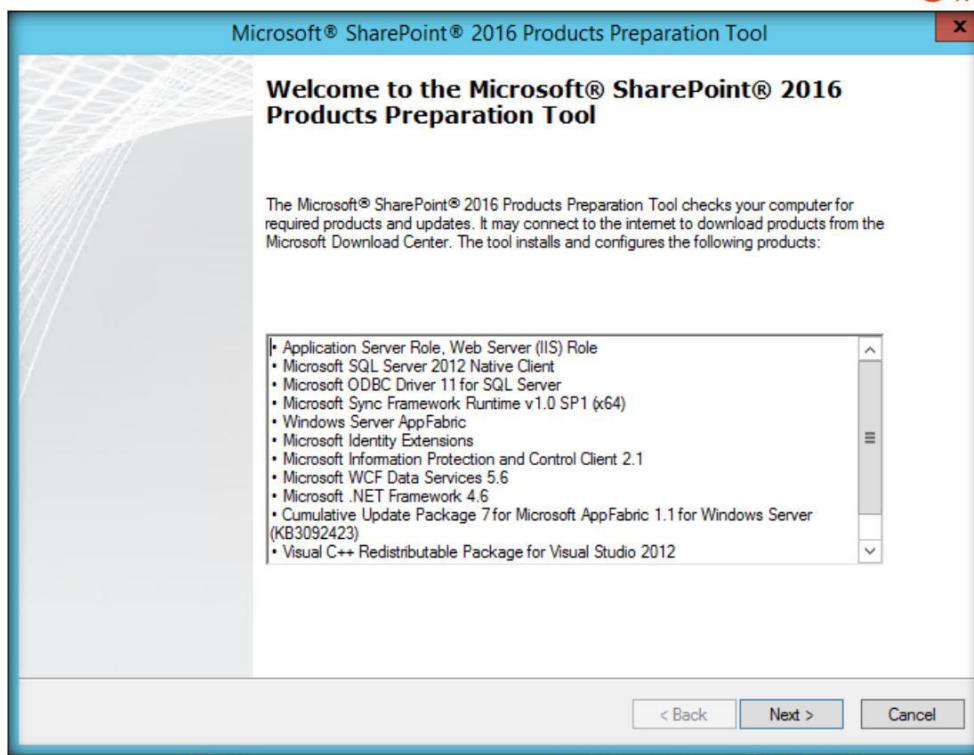
the restart. Thus, we will have to mount the disk once again and start the „splash“ HTMLApplication.



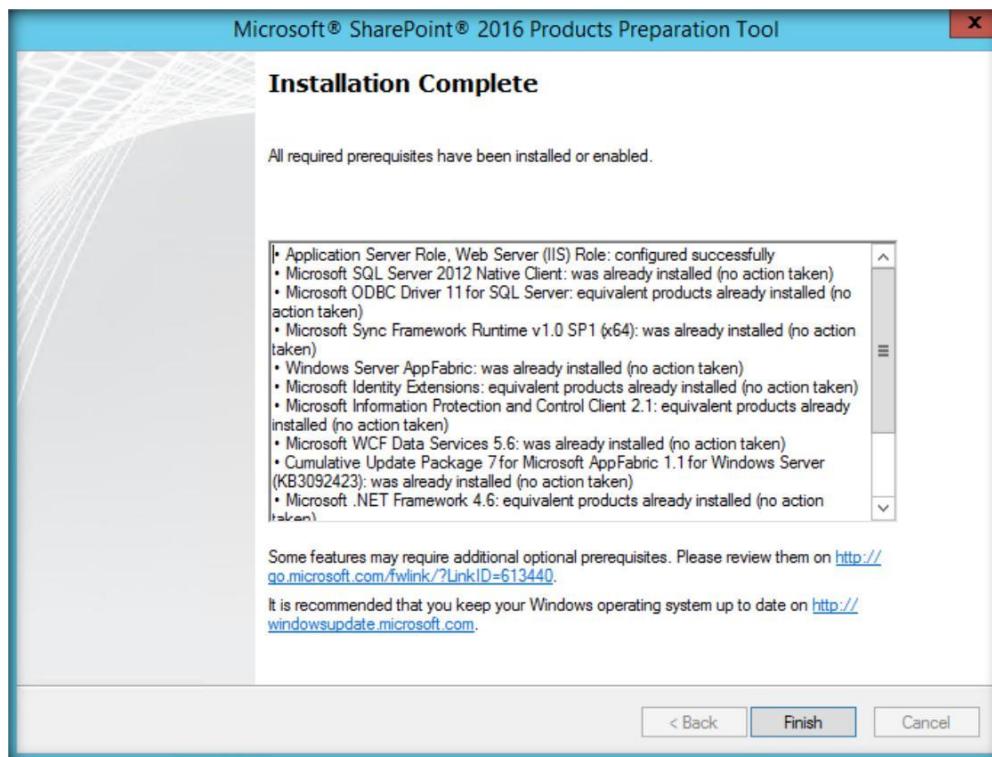
After clicking „splash“ Application, select „Install Software prerequisites“ to start the product preparation tool once again.



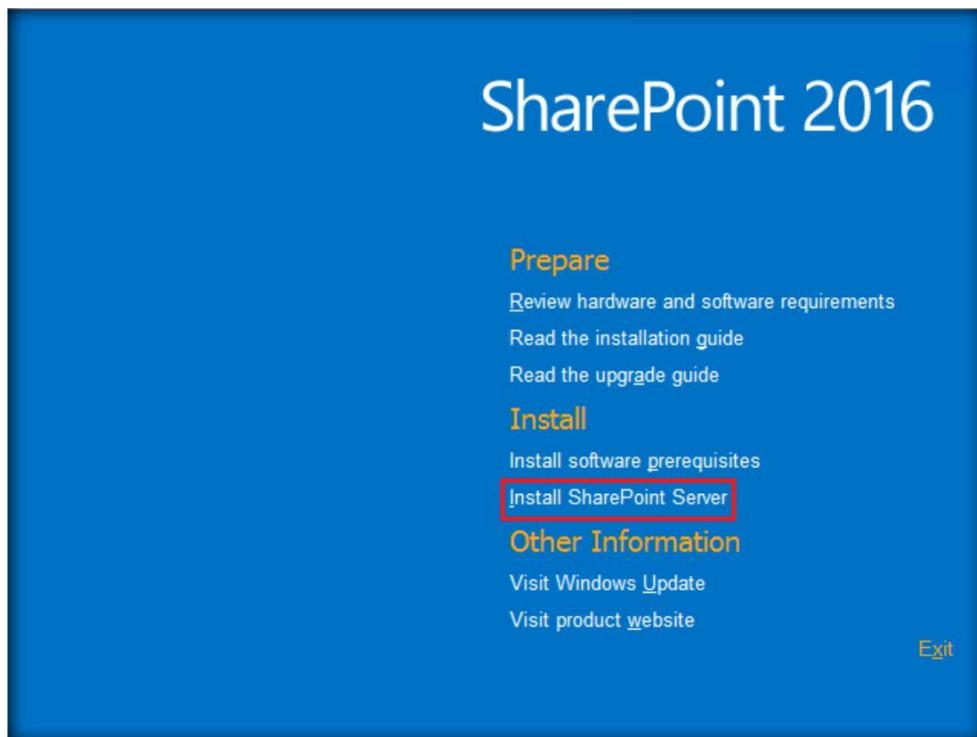
This will invoke the products preparation tool.



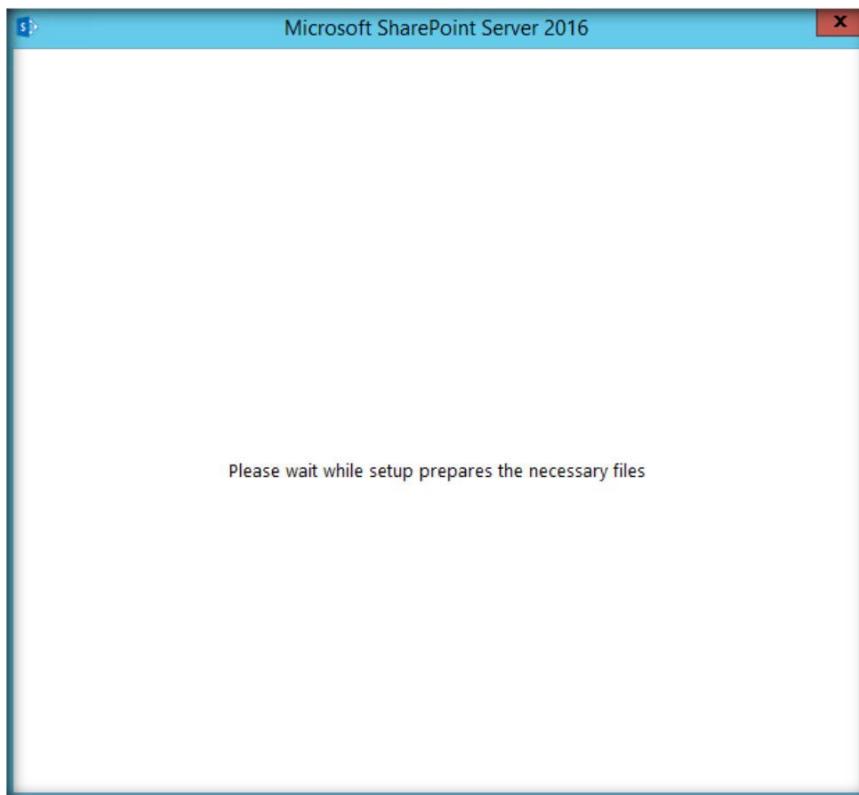
It will run for barely a minute ideally, as it has already installed most of the components.



Thus, prerequisites are installed. Click „Finish“. Now, we can start installing SharePoint Server. Thus, let's head back the „splash“ HTML Application and click „Install SharePoint Server“.



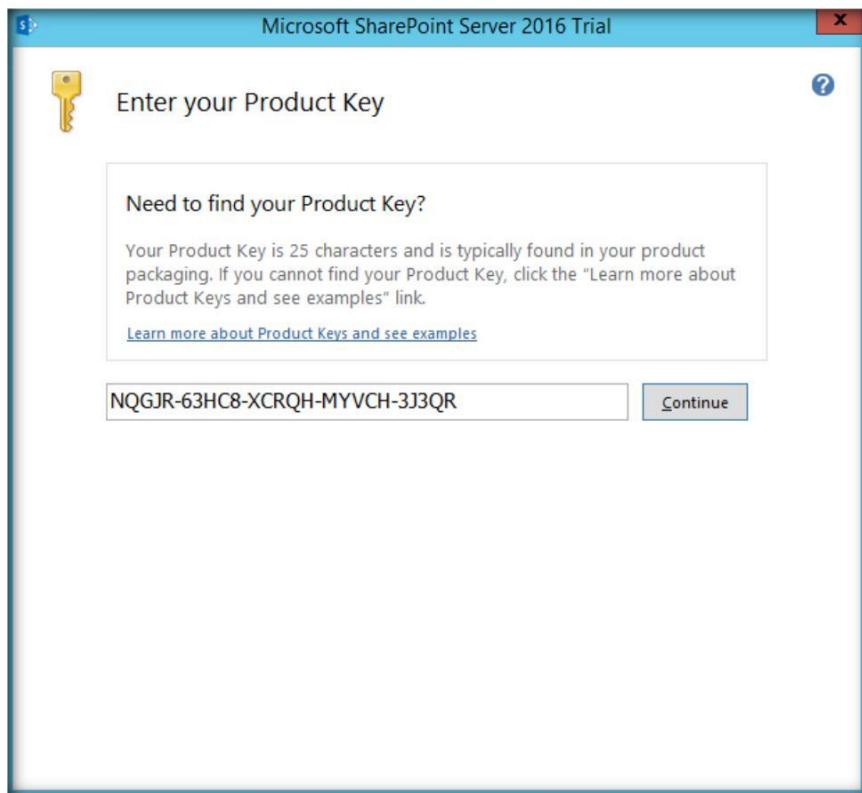
This will start the installation engine for SharePoint Server 2016.



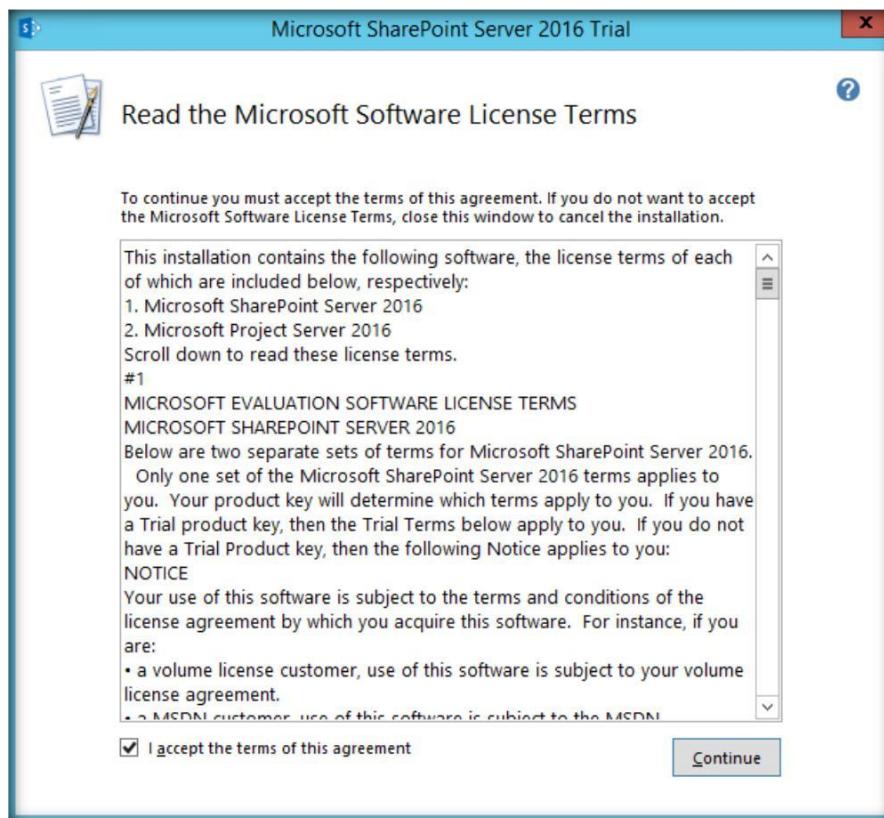
When prompted, provide a product key. Use any one of the following trial product keys. The trial period is for 6 months from the date of installation. You can convert to a licensed installation at any time during the trial or after the trial has expired by entering the appropriate product key in Central Administration.

- Enterprise trial product key: NQGJR-63HC8-XCRQH-MYVCH-3J3QR
- Standard trial product key: RTNGH-MQRV6-M3BWQ-DB748-VH7DM

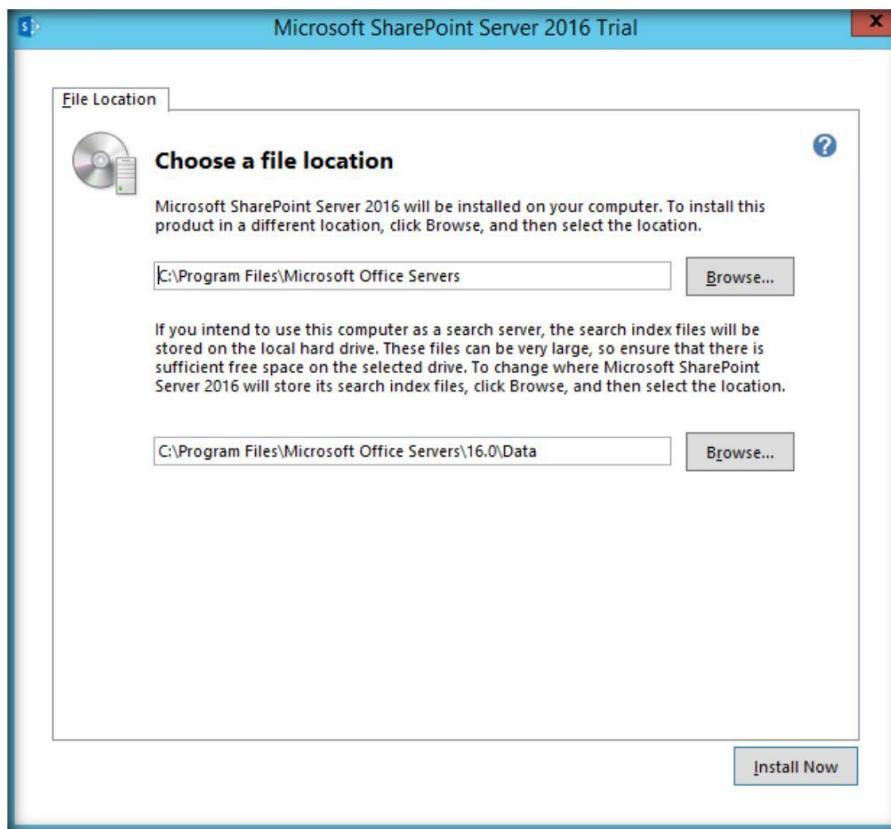
Note: Use an Enterprise product key for SharePoint to enable Project Server 2016.



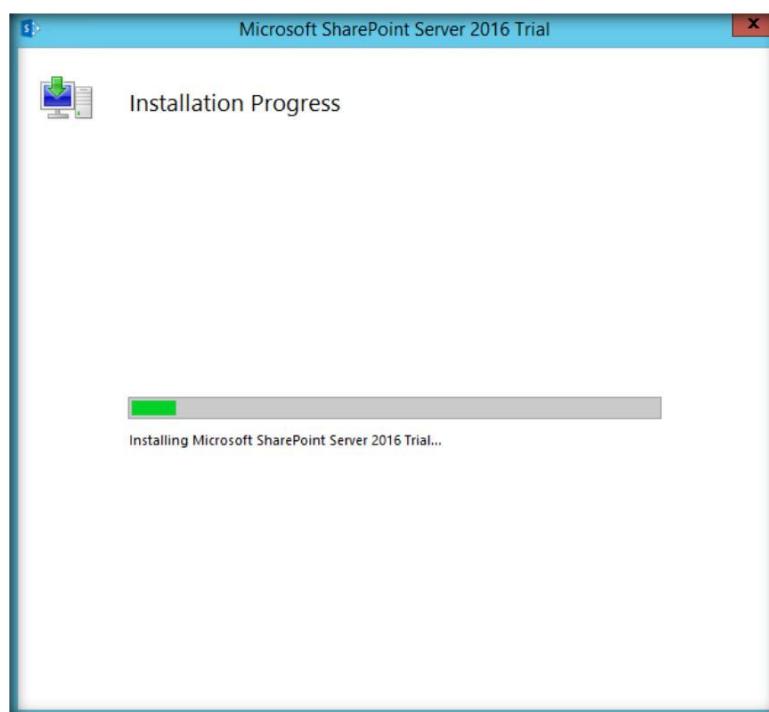
Accept the agreement and click Continue.



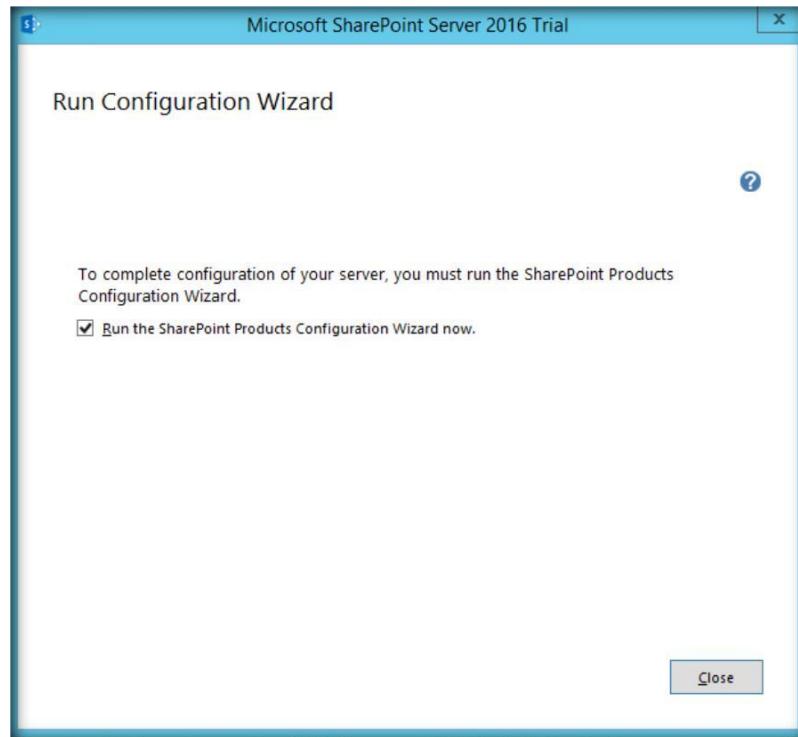
Enter the installation location for SharePoint 2016. You may change the default location or keep it as it is and click Install Now.



This will start the installation of SharePoint Server 2016 in VM.

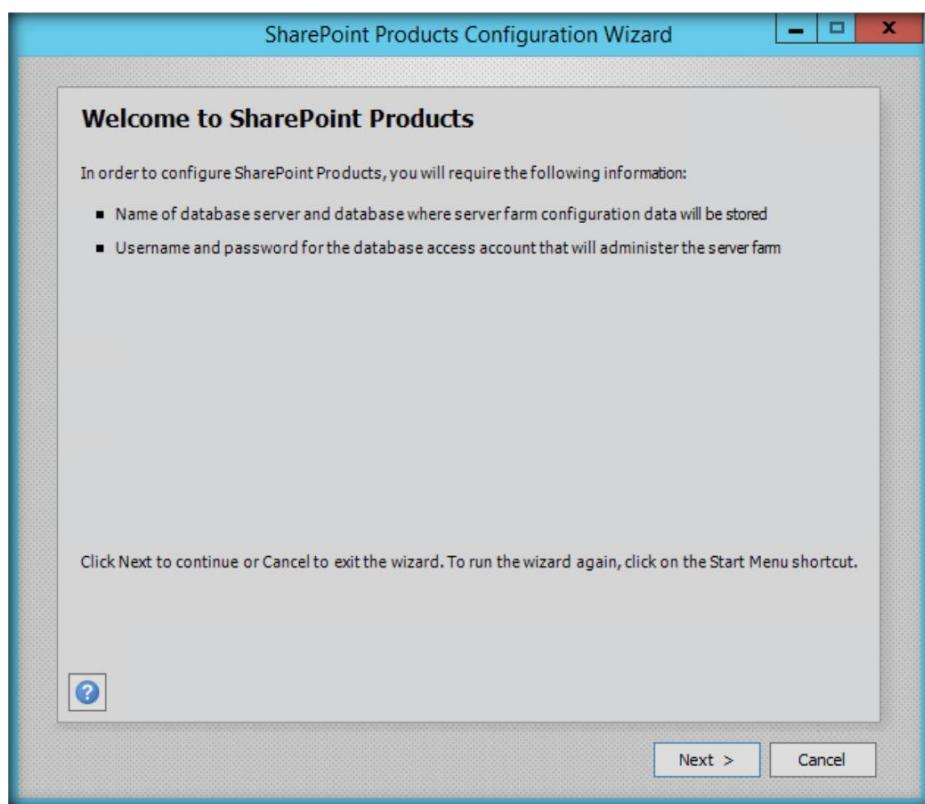


Installation will take some time. Once the installation completes, you will get the message to run the Configuration Wizard. Select the checkbox „Run the SharePoint Products Configuration Wizard now“ and click Close.

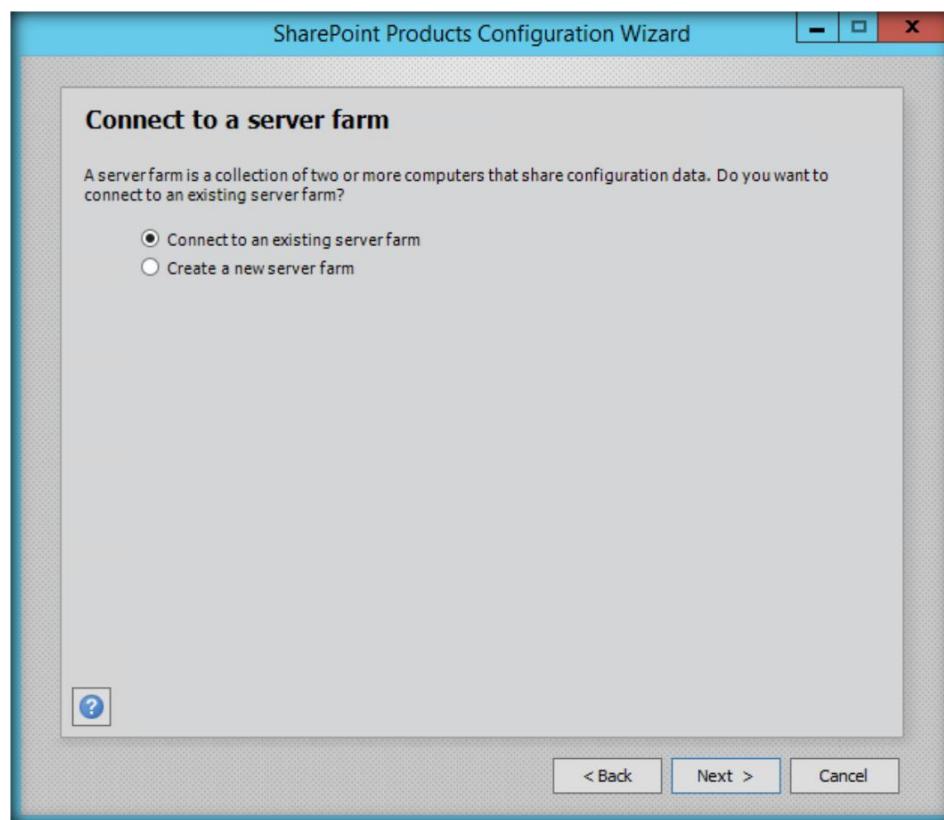


B. Configure SharePoint as Search MinRole

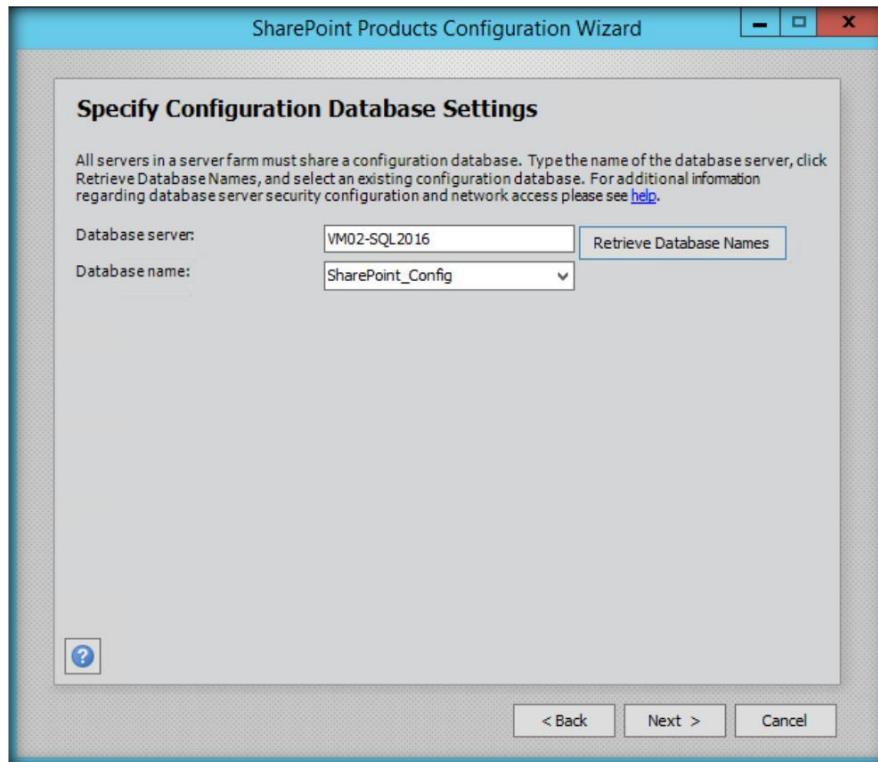
SharePoint Products Configuration Wizard when ran for the first time will create the Configuration DB and create a new SharePoint farm. However, we have already done this in the VM03-SP2016 VM(Refer installation [E-Book](#) for more info). This time, we will be using the same Config DB and will connect to the Server Farm. We will be selecting the MinRole: „Search“ to configure the current Server. Since we have the back-end database in a separate VM, make sure that it is up and running. You also have to make sure that AD VM is in a running state, as we are using the domain accounts throughout the installation. Click „Next“.



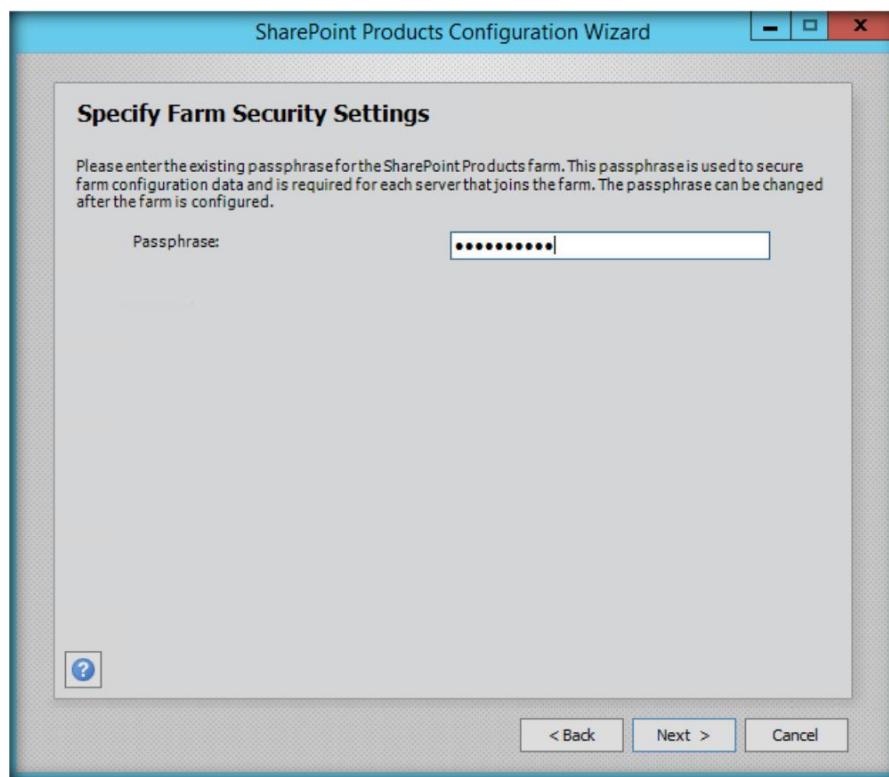
Select the radio button „Connect to an existing server farm“.



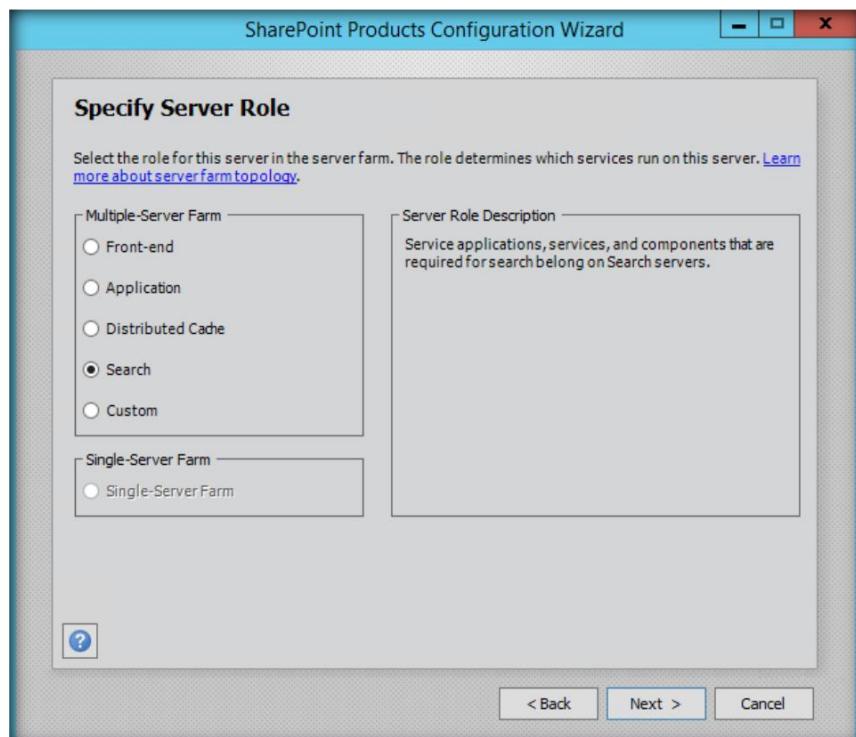
Specify the database Server name: VM02-SQL2016 and click on Retrieve database names button. This will populate the „SharePoint_Config“ database name in the field „Database Name“. Click Next.



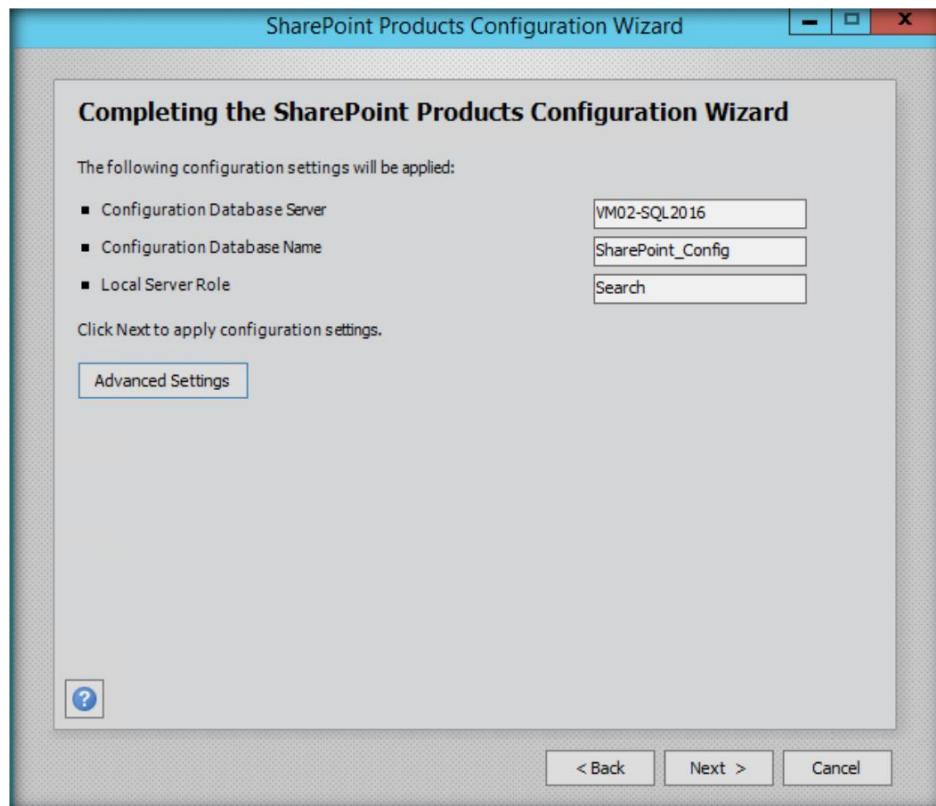
Enter the passphrase, which we had configured during the creation of SharePoint VM. This is essential to add MinRole VM to the SharePoint Farm. Click Next.



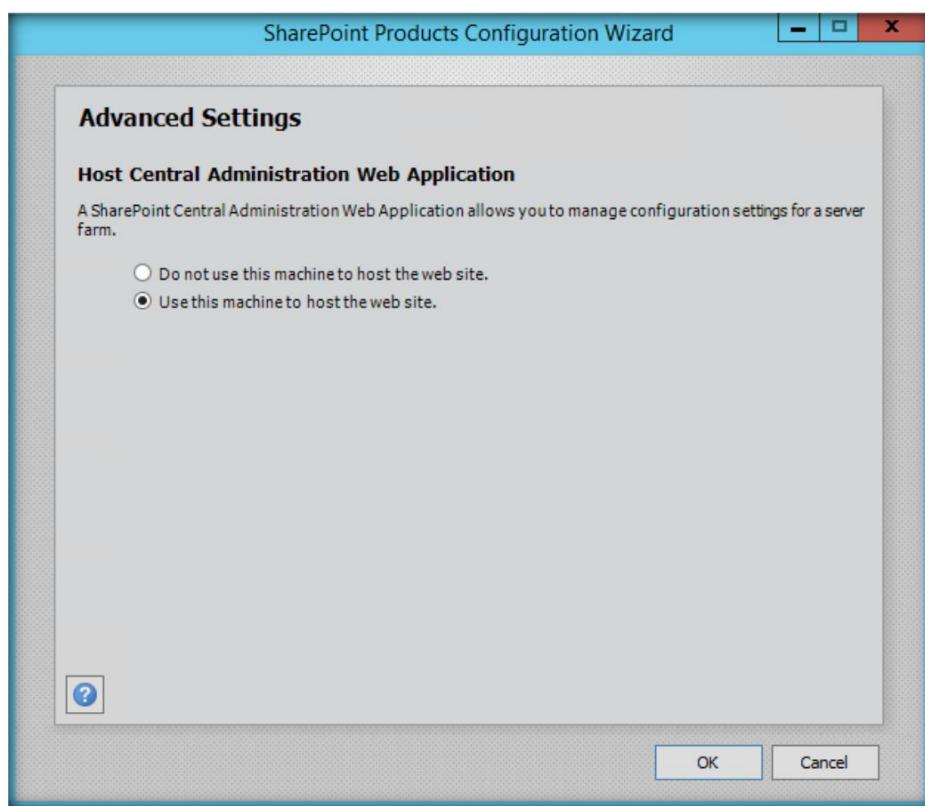
Now, we have to specify the MinRole that will be served by this VM. Since we are configuring this VM to take the role of Search Server, we will select the 'Search' MinRole. Click Next.



This page will show the configurations that will be applied to SharePoint installation in VM. You can see that the Local Server Role is shown as „Search“. You can click on „Advanced Settings“ to configure the Central Administration settings.



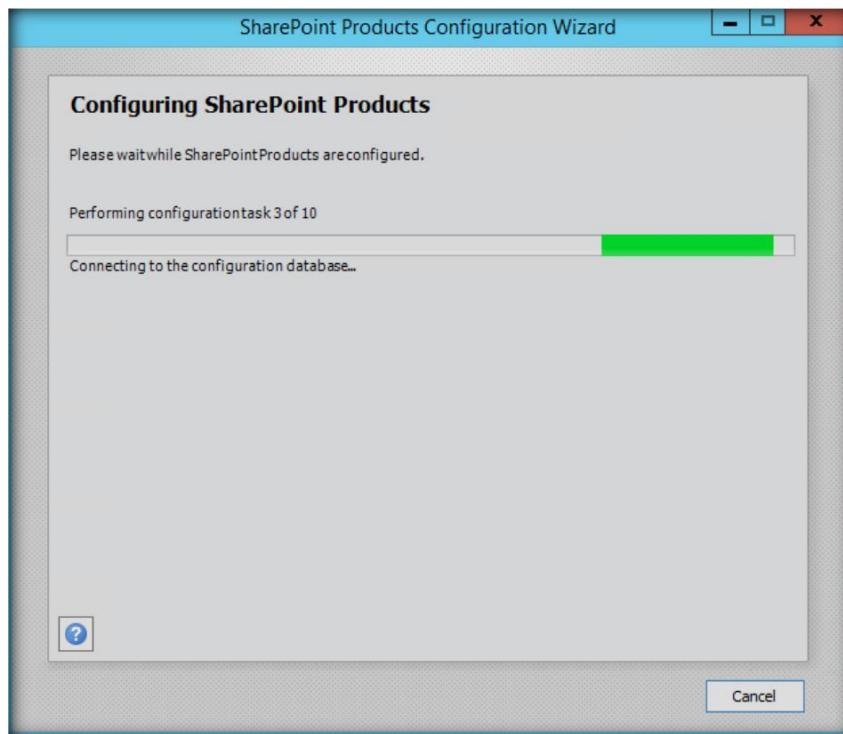
By default, it won't be setting up Central Administration in this VM but you can select the radio button „Use this machine to host Central Administration“, if you want to host CA in one more Server in the farm.



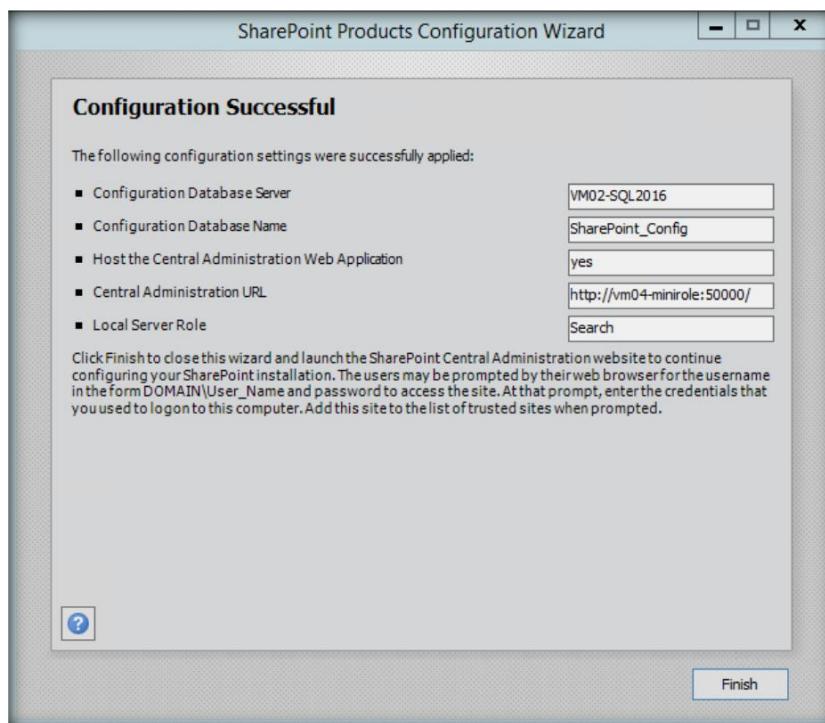
Click OK and it will update the Configuration page about the Central Administration hosting setting. Click Next.



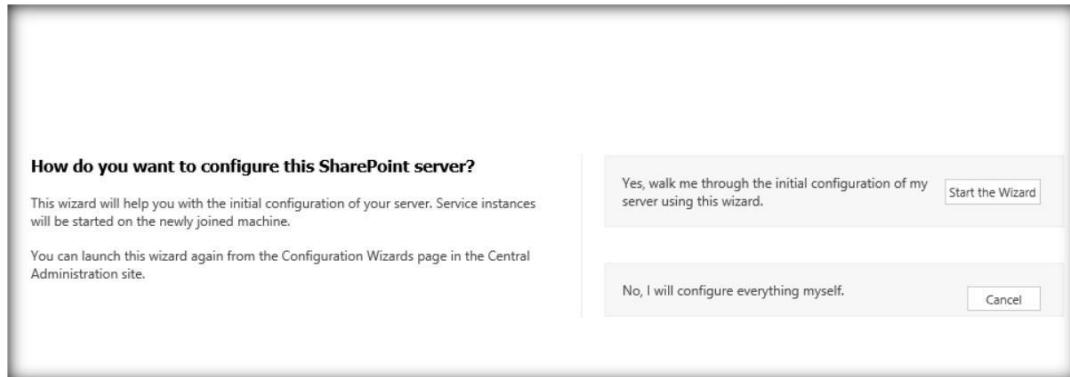
Now, the Configuration Wizard has started to configure the MinRole in the Server.



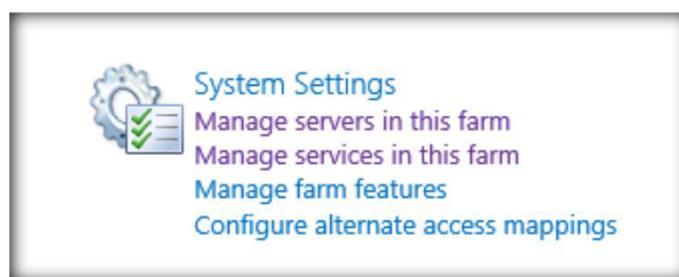
After some time, the configuration is completed and shows a successful configuration message.



Click Finish and it will open up the Central Administration site page, where the Configuration Wizard for setting up the Service Applications will open up. However, since most of the Service Applications were created in SharePoint VM03, we really don't have to use this wizard. We can configure it directly from the Service Applications" page. Click Cancel.



If we go to „Manage Servers in this farm“, we can see the Servers, which are in the farm.

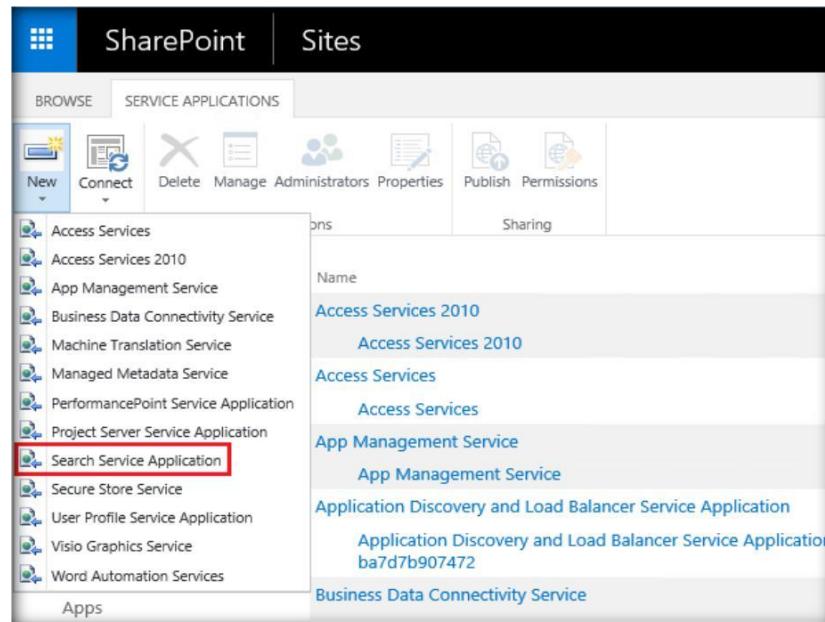


Each Server and the roles associated with it are displayed, as shown below.

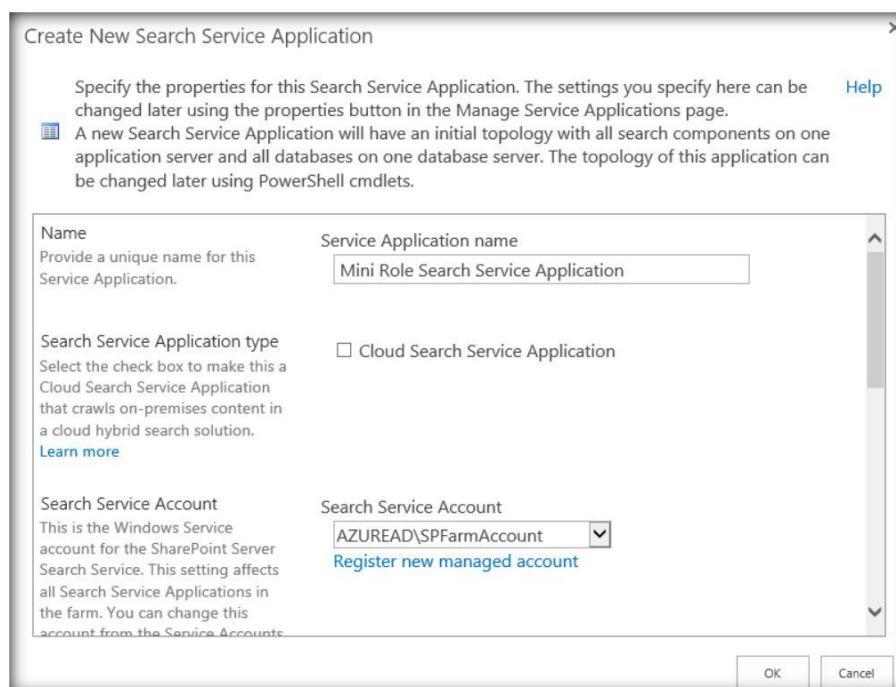
Servers in Farm					
Farm Information					
Configuration database version: 16.0.4327.1000					
Configuration database server: VM02-SQL2016					
Configuration database name: SharePoint_Config					
Server	SharePoint Products Installed	Role	Compliant	Services Running	
VM02-SQL2016		External		Microsoft SharePoint Foundation Database	
VM03-SP2016	Microsoft SharePoint Server 2016	Application	<input checked="" type="checkbox"/> Yes	App Management Service Business Data Connectivity Service Central Administration Claims to Windows Token Service Machine Translation Service Managed Metadata Web Service Microsoft SharePoint Foundation Incoming E-Mail Microsoft SharePoint Foundation Web Application Microsoft SharePoint Foundation Workflow Timer Service PowerPoint Conversion Service Project Server Application Service Secure Store Service User Profile Service Word Automation Services	
VM04-MINIROLE	Microsoft SharePoint Server 2016	Search	<input checked="" type="checkbox"/> Yes	Central Administration Claims to Windows Token Service Search Host Controller Service Search Query and Site Settings Service SharePoint Server Search	

C. Configure Search in MinRole VM

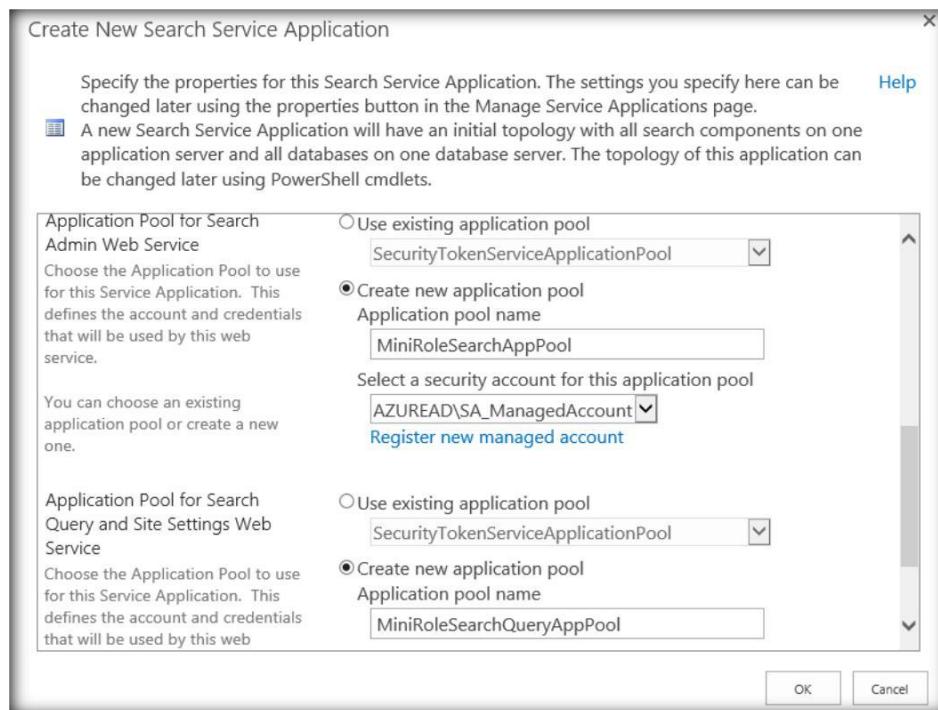
Now, let's go to the Service Application page and create a new Search Service Application, which will configure search in the entire farm. Click „Search Service Application“.



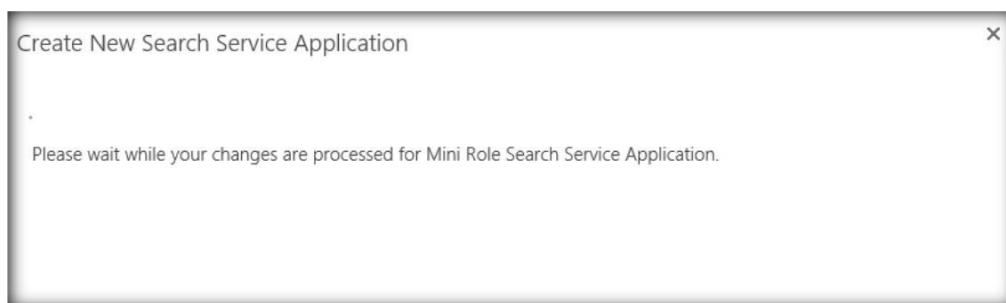
Specify the name for the Search Service Application and the Search Service Account. As a best practice, you can create a new domain account in the AD VM and click Register New Managed account to add the new Domain Account as the Search Service Account. For the time being, I am using the Farm Account as the Search Service Account. It is always advisable to have a separate Managed Account configured as the Search Service Account.



Specify the Search Admin Web Service Application Pool name and the name for the Search Query Application pool. Click OK.



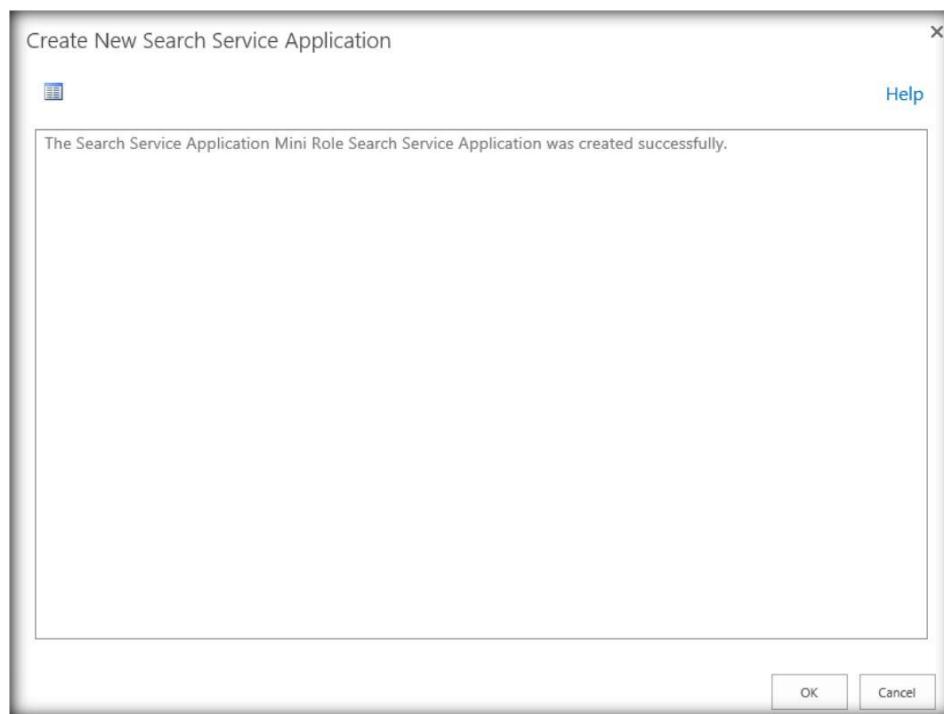
This will provision the new Search Service Application.



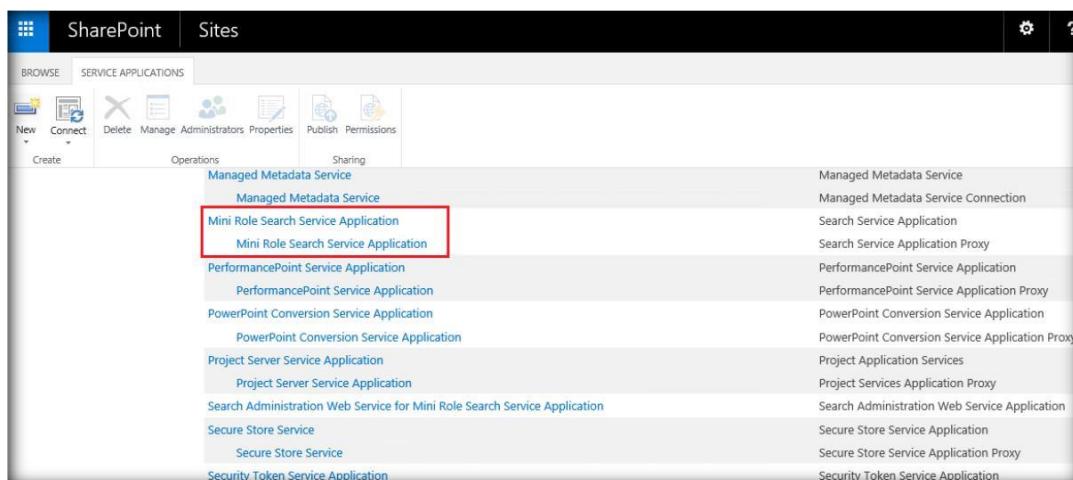
It will take some time to complete the creation of the Service Application.



Finally, the new Search Service Application has been created.



If we go to the Service Applications page, we can see the Search Service Application, which is listed out.



Managed Metadata Service	Managed Metadata Service
Managed Metadata Service Connection	
Search Service Application	
Search Service Application Proxy	
PerformancePoint Service Application	PerformancePoint Service Application
PerformancePoint Service Application Proxy	
PowerPoint Conversion Service Application	PowerPoint Conversion Service Application
PowerPoint Conversion Service Application Proxy	
Project Server Service Application	Project Application Services
Project Server Service Application Proxy	
Search Administration Web Service for Mini Role Search Service Application	Search Administration Web Service Application
Secure Store Service	Secure Store Service Application
Secure Store Service Application	Secure Store Service Application Proxy
Security Token Service Application	Security Token Service Application

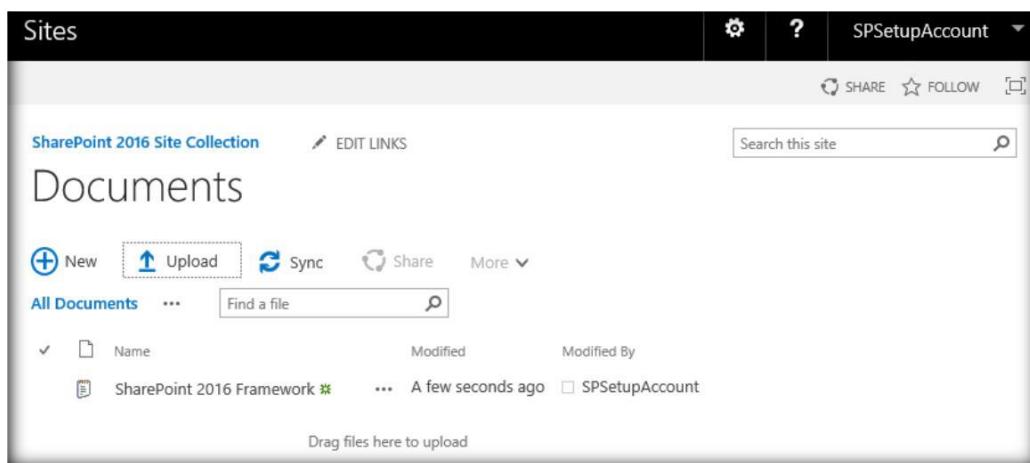
Click MinRole Search Service Application.

Central Administration		
Farm Search Administration		
Search Administration		
Diagnostics		
Crawl Log	Administrative status	Running
Crawl Health Reports	Crawler background activity	None
Query Health Reports	Recent crawl rate	0.00 items per second
Usage Reports	Searchable items	0
Crawling	Recent query rate	0.00 queries per minute
Content Sources	Default content access account	AZUREAD\SPFarmAccount
Crawl Rules	Contact e-mail address for crawls	someone@example.com
Server Name Mappings	Proxy server for crawling and federation	None
File Types	Search alerts status	On Disable
Index Reset	Query logging	On Disable
Pause/Resume	Global Search Center URL	Set a Search Center URL
Crawler Impact Rules		

It will list out the Search Settings page. Currently, there are no items in the index as crawl has not been run yet. The Search Application topology will list out the databases associated with the Search Service in the back-end database.

Search Application Topology						
Server Name	Admin	Crawler	Content Processing	Analytics Processing	Query Processing	Index Partition
VM04-MINIROLE	✓	✓	✓	✓	✓	✓
Database Server Name Database Type Database Name						
VM02-SQL2016	Administration Database	Mini_Role_Search_Service_Application_DB_ce14e99f8e36444282655d211ecde2ee				
VM02-SQL2016	Analytics Reporting Database	Mini_Role_Search_Service_Application_AnalyticsReportingStoreDB_b2427b9f897c40b087022504a1395d58				
VM02-SQL2016	Crawl Database	Mini_Role_Search_Service_Application_CrawlStoreDB_edafe7d981ea4229809f10c1e0b2fb0e				
VM02-SQL2016	Link Database	Mini_Role_Search_Service_Application_LinksStoreDB_c8aa4e60be8745f5892b122d2882deb6				

Before running the search crawl, let's head over to the Application Server and try running a sample search for the document given below.



Name	Modified	Modified By
SharePoint 2016 Framework	A few seconds ago	SPSetupAccount

The search result page does not show up any search results.

SharePoint 2016 Site Collection  EDIT LINKS

Search

🔍

Preference for results in English ▾

Nothing here matches your search

Suggestions

- Make sure all words are spelled correctly
- Try different search terms
- Try more general search terms
- Try fewer search terms
- Try these [tips for searching](#)

Let's configure search. Click Content Sources.

① "Where should users' searches go?" Provide the location of the global Search Center

Central Administration Farm Search Administration Search Administration Diagnostics Crawl Log Crawl Health Reports Query Health Reports Usage Reports <div style="border: 2px solid red; padding: 2px; display: inline-block;">Crawling</div> Content Sources Crawl Rules Server Name Mappings File Types Index Reset Pause/Resume Crawler Impact Rules	System Status Administrative status Running Crawler background activity None Recent crawl rate 0.00 items per second Searchable items 0 Recent query rate 0.00 queries per minute Default content access account AZUREAD\SPFarmAccount Contact e-mail address for crawls someone@example.com Proxy server for crawling and federation None Search alerts status On Disable Query logging On Disable Global Search Center URL Set a Search Center URL
--	---

It will list out the available content sources in the Service Application. Click „Local SharePoint Sites“.

Mini Role Search Service Application: Manage Content Sources

Use this page to add, edit, or delete content sources, and to manage crawls.

 [New Content Source](#) |  [Refresh](#) |  [Start all crawls](#)

Type	Name	Status	Current crawl duration	Last crawl duration	Last crawl completed	Next Full Crawl	Next Incremental Crawl
	Local SharePoint sites	Idle			None	None	None

It will show the sites, which will be crawled under this content source.

Mini Role Search Service Application: Edit Content Source

Use this page to edit a content source.

* Indicates a required field

Name	Name: *
Type a name to describe this content source.	
Content Source Details	
This shows the current status of the Content Source.	
Content Source Type:	SharePoint Sites
Current Status:	Idle
Continuous Crawl Status:	
Last crawl type:	N/A
Last crawl began:	N/A
Last crawl duration:	N/A
Last crawl completed:	N/A
View Crawl History	
Start Addresses	
Type the URLs from which the search system should start crawling.	Type start addresses below (one per line): *
http://vm03-sp2016 http://vm03-sp2016:51000 sps3://vm03-sp2016	

„http://vm03-sp2016:51000“ is the site collection, where we have the content. It is by default present in the Local sites. Click Start Full Crawl, as we are running it for the first time.

Mini Role Search Service Application: Manage Content Sources

Use this page to add, edit, or delete content sources, and to manage crawls.

[New Content Source](#) | [Refresh](#) | [Start all crawls](#)

Type	Name	Status	Current crawl duration	Last crawl duration	Last crawl completed	Next Full Crawl	Next Incremental Crawl
Local SharePoint sites	Local SharePoint sites	Idle				None	None
Edit View Crawl Log Start Full Crawl (highlighted) Start Incremental Crawl Resume Crawl Pause Crawl Stop Crawl Delete							

It will show the status as „Crawling Full“. Wait for some time. Since the content is very less, it should ideally finish soon. Depending on the content, search crawl can easily span 24+ hours.

Mini Role Search Service Application: Manage Content Sources

Use this page to add, edit, or delete content sources, and to manage crawls.

[New Content Source](#) | [Refresh](#) | [Stop all crawls](#) | [Pause all crawls](#)

Type	Name	Status	Current crawl duration	Last crawl duration	Last crawl completed	Next Full Crawl	Next Incremental Crawl	Priority
Local SharePoint sites	Local SharePoint sites	Crawling Full	00:00:52			None	None	Normal

Click Refresh. The status has changed to „idle“, which indicates that the crawl has finished.

Mini Role Search Service Application: Manage Content Sources

Use this page to add, edit, or delete content sources, and to manage crawls.

[New Content Source](#) | [Refresh](#) | [Start all crawls](#)

Type	Name	Status	Current crawl duration	Last crawl duration	Last crawl completed	Next Full Crawl	Next Incremental Crawl	Priority
	Local SharePoint sites	Idle		00:03:10	7/9/2016 9:19:18 AM	None	None	Normal

Now, let's head back to SharePoint Application Server, VM03 and try to search the document once again.

SharePoint 2016 Site Collection [!\[\]\(11ab000f779fafc3336e0575b554e1de_img.jpg\) EDIT LINKS](#)

Search



Preference for results in English ▾

SharePoint 2016 Site Collection
SharePoint 2016 Framework ...
[vm03-sp2016:51000](#)

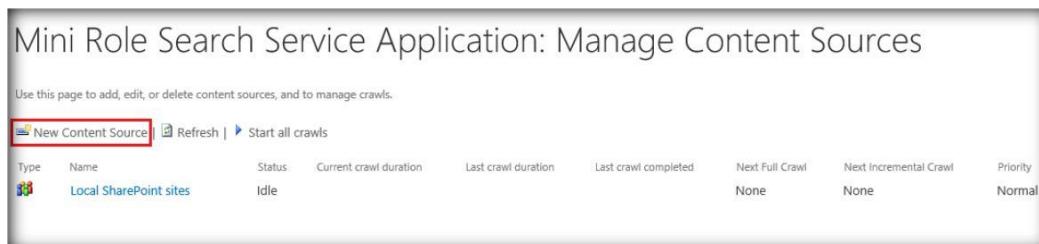
SharePoint 2016 Framework
SharePoint Framework was announced at the Future of SharePoint Conference ... It will be dispatched to **SharePoint** Online first followed by On Premise environments
[vm03-sp2016:51000/Shared Documents/SharePoint 2016 Framework.txt](#)

This time, the search has returned back the results. Thus, we have configured an Active Directory in one VM, an Application Server in a separate VM, back-end database in another VM and the Search MinRole in yet another different VM resulting in a scalable SharePoint 2016 Farm.

D. New Content source

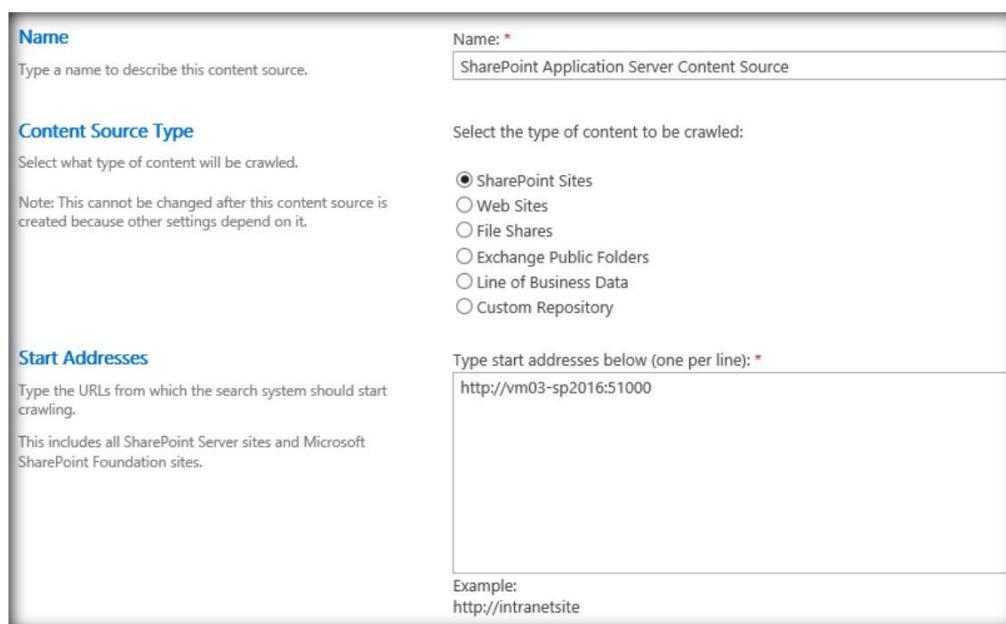
Earlier, we had been using the default out of the box Content Source “Local SharePoint Sites”. Now, let’s create a new content source and add the site to crawl, which is under Content Source. Creating a new content source facilitates the crawling of a single site, if required. Adding all the sites under a particular Content Source can result in a huge crawl time, which can span days. In order to avoid this, it is advisable to have multiple content sources.

To create a new content source, click New Content Source.



The screenshot shows the 'Manage Content Sources' page. At the top, there is a header: 'Mini Role Search Service Application: Manage Content Sources'. Below the header, a message says: 'Use this page to add, edit, or delete content sources, and to manage crawls.' There is a red box around the 'New Content Source' button. To the right of the button are links for 'Refresh' and 'Start all crawls'. The main table has columns: Type, Name, Status, Current crawl duration, Last crawl duration, Last crawl completed, Next Full Crawl, Next Incremental Crawl, and Priority. One row is visible: 'Local SharePoint sites' (Type: SharePoint sites, Status: Idle, Last crawl completed: None, Priority: Normal).

Specify the content source name, start address and the crawl settings.



The screenshot shows the 'New Content Source' configuration page. It has several sections:

- Name:** The 'Name:' field is filled with 'SharePoint Application Server Content Source'.
- Content Source Type:** A note says 'Select what type of content will be crawled.' Below it, a list of options includes 'SharePoint Sites' (selected), 'Web Sites', 'File Shares', 'Exchange Public Folders', 'Line of Business Data', and 'Custom Repository'.
- Start Addresses:** A note says 'Type the URLs from which the search system should start crawling.' Below it, a note says 'This includes all SharePoint Server sites and Microsoft SharePoint Foundation sites.' The 'Type start addresses below (one per line):' field contains 'http://vm03-sp2016:51000'.
- Example:** Below the start address field, it shows 'Example: http://intranetsite'.

Crawl Settings

Specify the behavior for crawling this type of content.

Selecting to crawl everything under the hostname will also crawl all the SharePoint Sites in the server.

Caution: After you select crawl settings for a SharePoint content source, you cannot change crawling behavior unless you re-create the content source. Verify that you select the option that best suits your needs.

Select crawling behavior for all start addresses in this content source:

Crawl everything under the hostname for each start address
 Only crawl the Site Collection of each start address

Crawl Schedules

Select the crawl schedules for this content source.

Continuous Crawl is a special type of crawl that eliminates the need to create incremental crawl schedules and will seamlessly work with the content source to provide maximum freshness. Please Note: Once enabled, you will not be able to pause or stop continuous crawl. You will only have the option of disabling continuous crawl.

Enable Continuous Crawls
 Enable Incremental Crawls

Incremental Crawl

Full Crawl

Select the priority for this content source:

Click OK. Make sure, it is not present in any other content sources, else we will get the warning given below.

Start Addresses

Type the URLs from which the search system should start crawling.

This includes all SharePoint Server sites and Microsoft SharePoint Foundation sites.

Type start addresses below (one per line): *

Example:

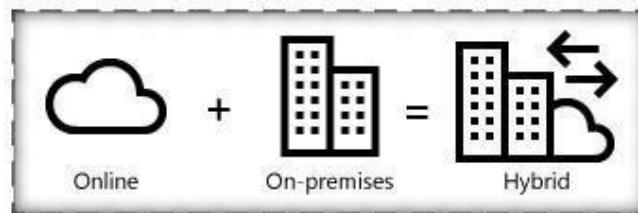
✖ The start address "http://vm03-sp2016:51000/" already exists in this or another content source.

Thus, the content source has been created and can be used to crawl the specified sites. When we ran for the first time, it will run a full crawl to index all the data within the site.

We have seen how we can configure MinRole Search in SharePoint 2016. Now, let's head over to setting up SharePoint Hybrid features.

V. SharePoint Hybrid Features

SharePoint Hybrid is considered as the first step towards embracing Cloud infrastructure. Hybrid helps the organization to maintain the best of SharePoint On-Premise and Online functionalities. With SharePoint Hybrid features, you can integrate the two environments together in a variety of ways to provide a more productive user experience.



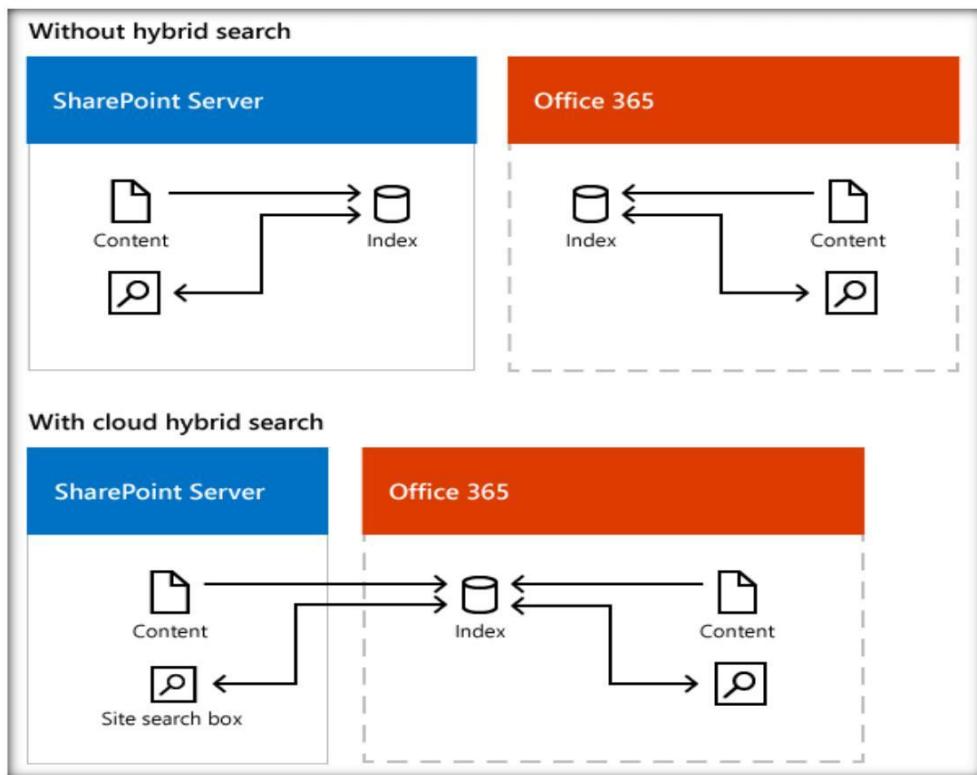
Cloud Hybrid features in SharePoint comprises of

- Cloud Hybrid Search- It provides SharePoint On-Premise search results in SharePoint Online.
- Cloud One Drive Redirection- It redirects the users to Office 365 OneDrive for business, upon clicking On-Premise OneDrive button.
- Cloud Hybrid Site Features- It provides an extensible app launcher in SharePoint 2016, which integrates tile in Office 365 to On-Premise app launcher. It also redirects the users to Office 365 Team Sites on clicking SharePoint On-Premise Sites button in the suite bar.

We will see more about each of the Cloud Hybrid implementation in the coming sections.

A. Cloud Hybrid Search

Cloud Hybrid search facilitates the users to search for the content, which exists in SharePoint 2016 On-Premise Server along with the content search in Office 365. This is done by crawling the content in SharePoint 2016 Server and indexing it along with the search index in Office365.



Before setting up Cloud Hybrid search, we need to configure some prerequisites in SharePoint 2016 and Office 365 environment. Ensure the steps, mentioned below are done.

- An Active Azure Subscription is available.
- Office 365 AD is manageable from Azure.
- A public domain has been registered with Office 365.
- A UPN prefix that matches the public domain has been added to the Local AD.
- Synchronize Local Active Directory with Office 365.

1. Get an Azure Subscription

Azure provides multiple purchase options. You can either skip the free trial or get a paid subscription directly [here](#), else you can make use of the Visual Studio Dev essentials program, where you can make use of fixed credits per month.

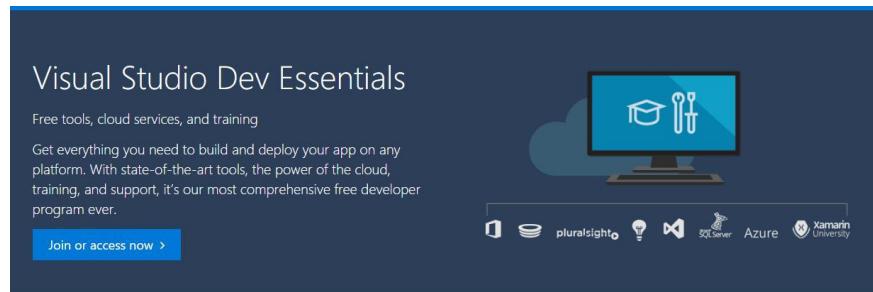
Visual Studio Dev essentials provide a lot of freebies for the developers. This includes a 6 months PluralSight subscription, as well as a \$25/month Azure subscription. These are real value adds to any developer, who wants to get his hands dirty with some serious learning. In this e-book, we will see how to register for the free \$25/month Azure subscription.

Microsoft calls this freebie subscription as Developer Benefit Program. In order to reap these

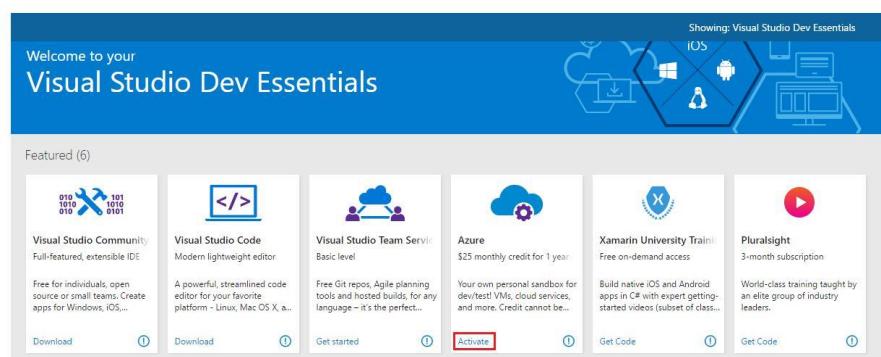
benefits, you need to have a Hotmail or an Outlook account. Now, let's see how to get the free Azure credits, using the developer benefit program.

Steps to activate Free Azure Subscription

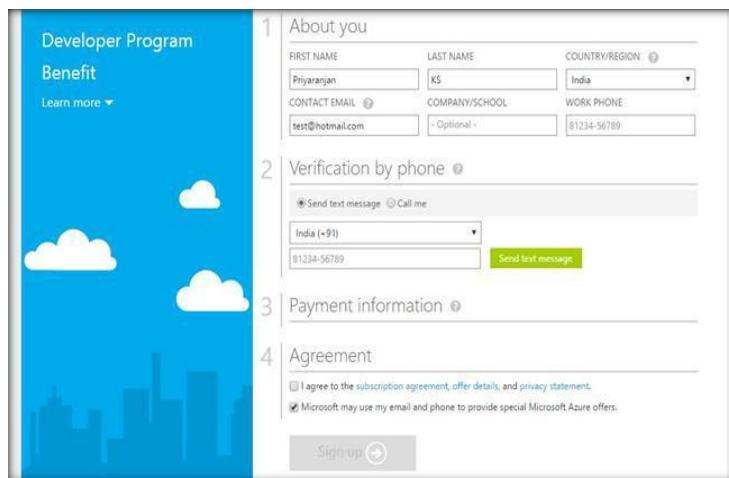
- After creating Hotmail/Outlook account, go to Visual Studio Essential Dev [site](#).
- Click Join or Access now.



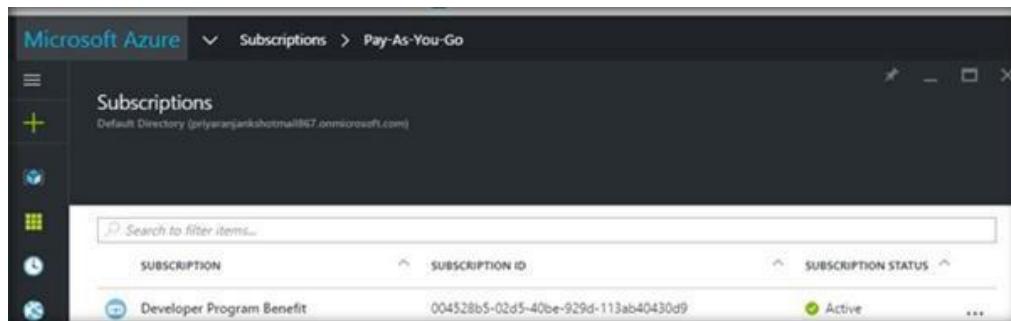
- There are multiple free resources, which can be utilized for learning and R&D purposes. We will go with Azure \$25 monthly Azure credit. Click Activate.



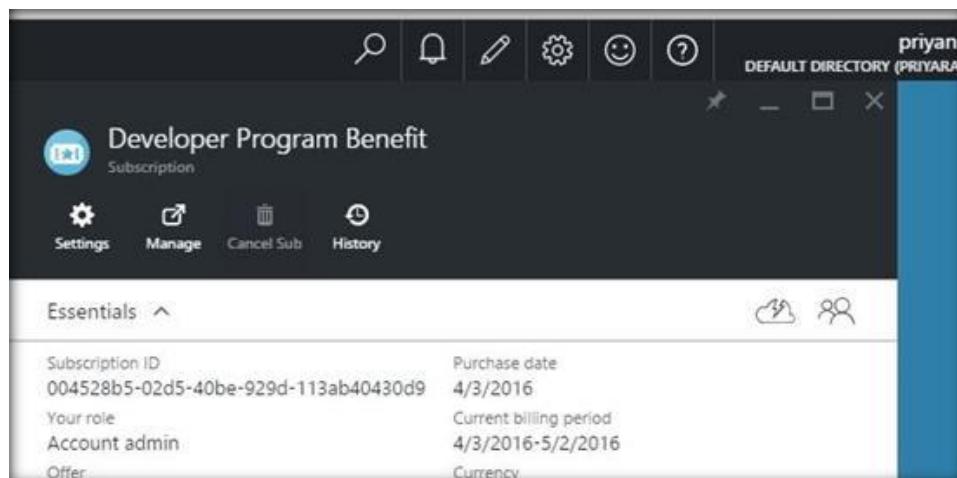
- This will take us to the Purchase page.



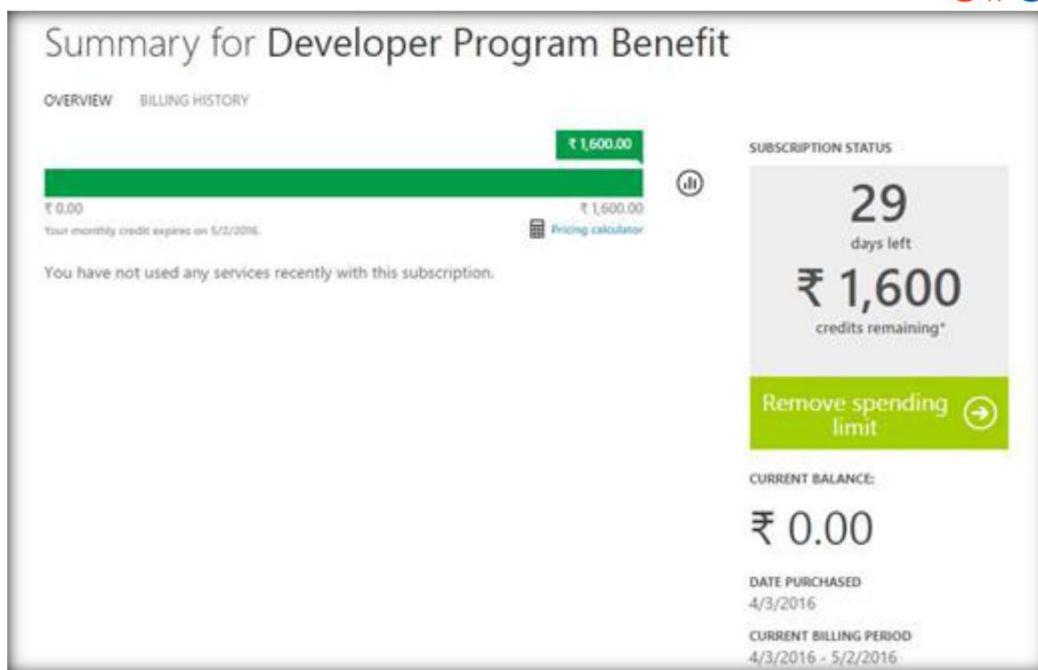
- Here, you will have to enter the personal details and verify yourself via Text Message/Phone Call. In addition to it, you have to enter the credit card details. You won't be charged anything. Once the subscription is set up successfully there is an option called "Remove Spending Limit", which when enabled allows you to use the resources when 25\$ limit is reached. When spending limit has been removed, the creditcard would be charged as per the usage. Click Signup.



The subscription has been created for you. You can add VMs and other resources to this subscription and get some serious work done.



Make sure to check the usage once in a while from the Manage section of the Subscription.



This will show the remaining credits available. Make sure to stop the VM after the usage, if required, else the credit will be used up for every live minute.

Once the credit is used up for a particular month, the VM or any other resources subscribed under the Developer Benefit Program won't be accessible anymore. You will have to wait for the next month so that \$25 credit will be added to your account. This will restore access to the environments. However if you don't want to wait till next month you can click on Remove Spending Limit button in the above screen shot and you will be charged on a usage basis until free credits are loaded to your account in the subsequent month.

2. Sign up for Office 365 account

You can sign up for Office 365 account [here](#). Make sure to subscribe to an Enterpriseplan (Office 365 Enterprise E1/E3/E5), which houses SharePoint Online.

3. Register a new Domain with Office 365

When we sign up for Office 365, initially we get a default domain XXXX.onmicrosoft.com. In my case, it was CTSPlayground.onmicrosoft.com.Microsoft, which suggests in getting a new public domain of the form contoso.com to set up hybrid search. Thus, I bought a new domain and registered it with Office 365. Adding of a new domain has been explained in this section.

When we sign up for Office 365, initially we get a default domain XXXX.onmicrosoft.com. In order to spin up a trial version and do some testing of the environment, this domain is perfectly fine. However, if we want to deploy Office 365 Service in an organization, we will have to get a custom domain, so that the customers and users can identify the organization by the URL.

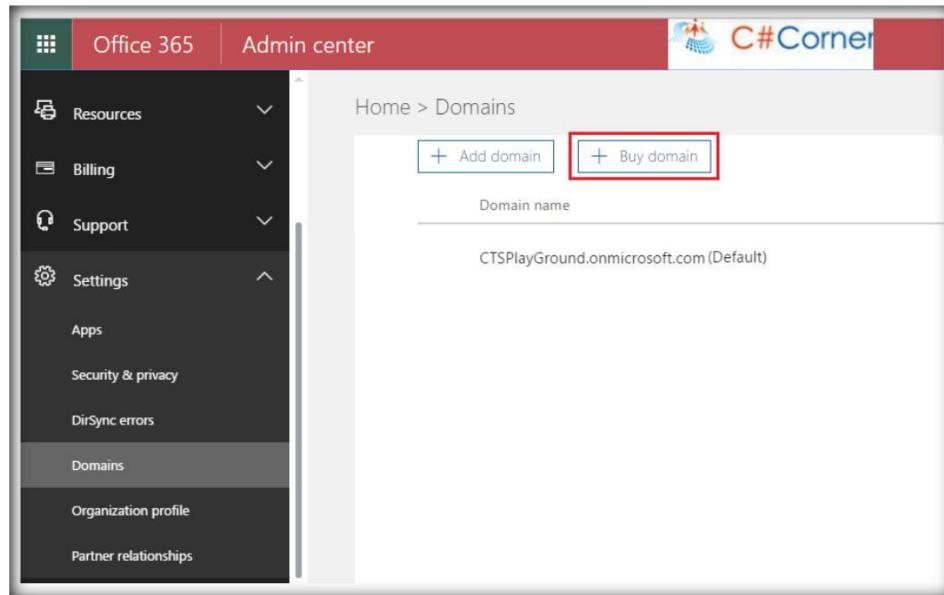
We have two options, when it comes to adding a new domain to Office 365.

- Buy a new domain from Office 365 Admin Centre.
- Use an existing owned domain and add it to Office 365.

Let's see, how we can achieve both.

Buy a new domain from Admin Center

Office 365 Admin Center provides the global administrator to buy a new domain from Settings -> Domains section. Here, click Buy domain to navigate to the page, where we can buy a new domain.



It will take us to the [page](#), where we can search for a suitable and available domain name. Once we have found a suitable match, click Buy, which will take us to the GoDaddy site to complete the purchase.

Buy a domain and we'll set it up for you [What's a domain?](#)



Type the domain name you'd like to buy

[Check availability](#)

You will complete your purchase at GoDaddy.com.

 SharePointAdventures.com is available. [Buy](#)

Or these domains are also available

sharepointadventures.us	Buy
sharepointadventures.net	Buy
sharepointadventures.org	Buy
sharepointadventures.info	Buy
sharepointadventure.com	Buy

Click go to GoDaddy.com.

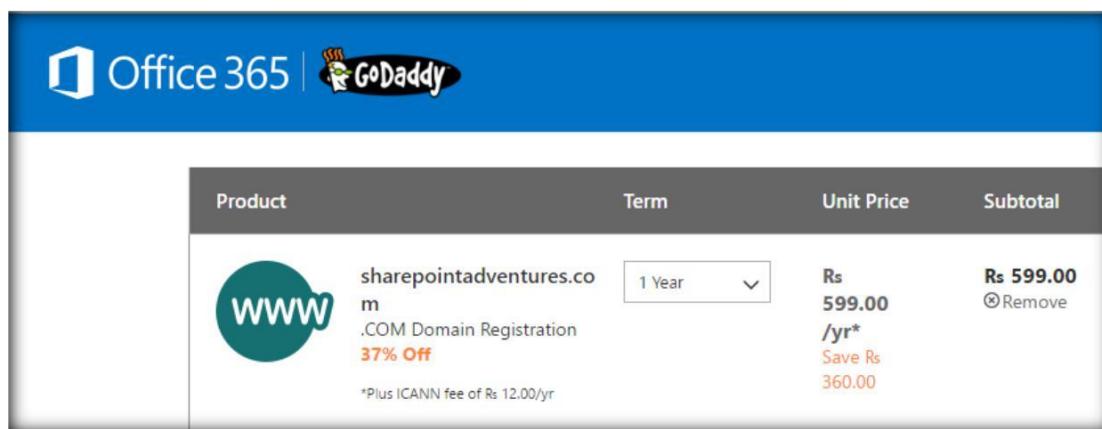
Complete your purchase at GoDaddy.com



Then we'll bring you back here to finish setting up.

[Go to GoDaddy.com](#) [Cancel](#)

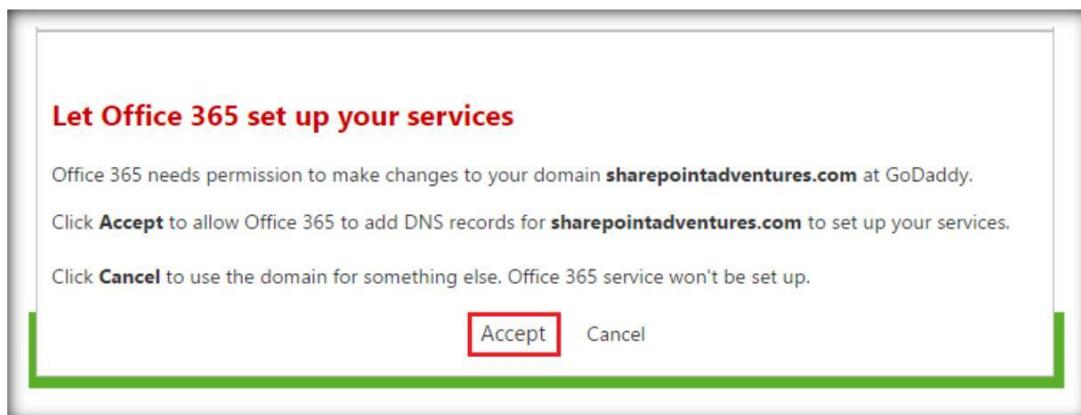
The total amount and the duration of ownership can be specified in the GoDaddy site.



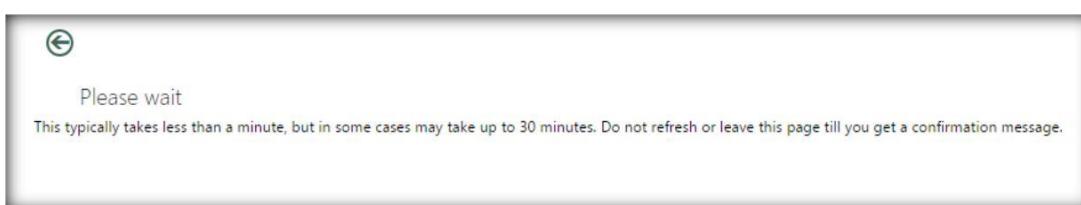
Product	Term	Unit Price	Subtotal
sharepointadventures.co m .COM Domain Registration 37% Off	1 Year	Rs 599.00 /yr* Save Rs 360.00	Rs 599.00

*Plus ICANN fee of Rs 12.00/yr

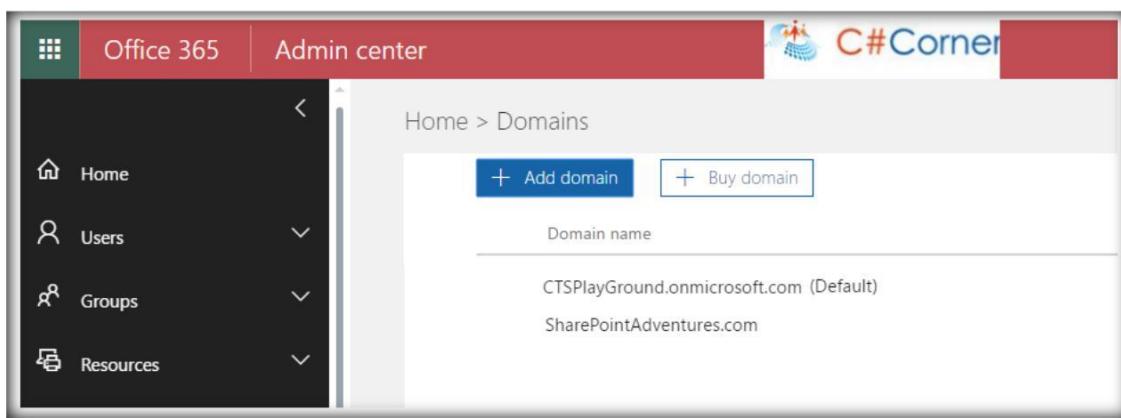
Once the payment is completed, a dialog box will appear, which requests for the permissions, so that Office 365 can make the domain entries in the GoDaddy domain center. Click *Accept*.



This will take some time.

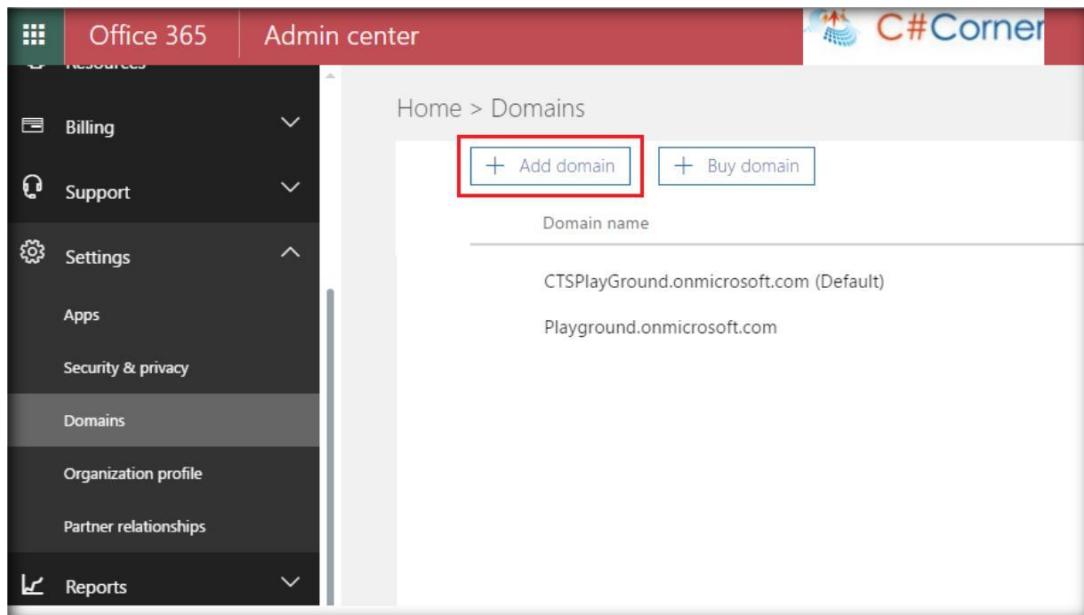


Once it is completed, head over to the Office 365 domain's page and we can see the new domain is listed out.

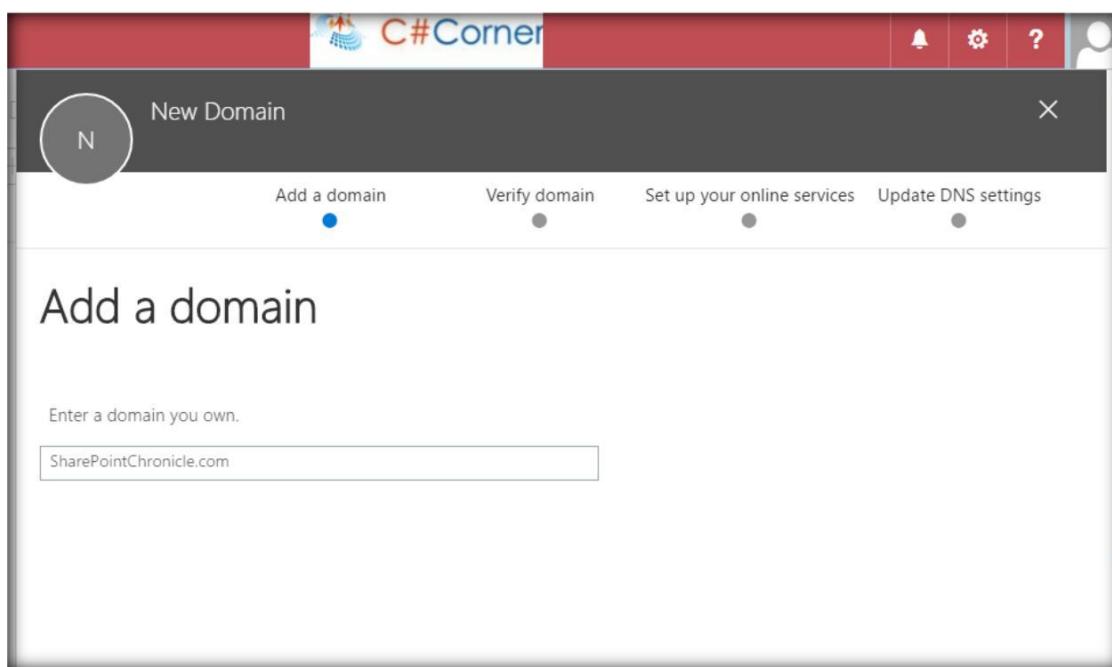


Add an existing domain to Office 365

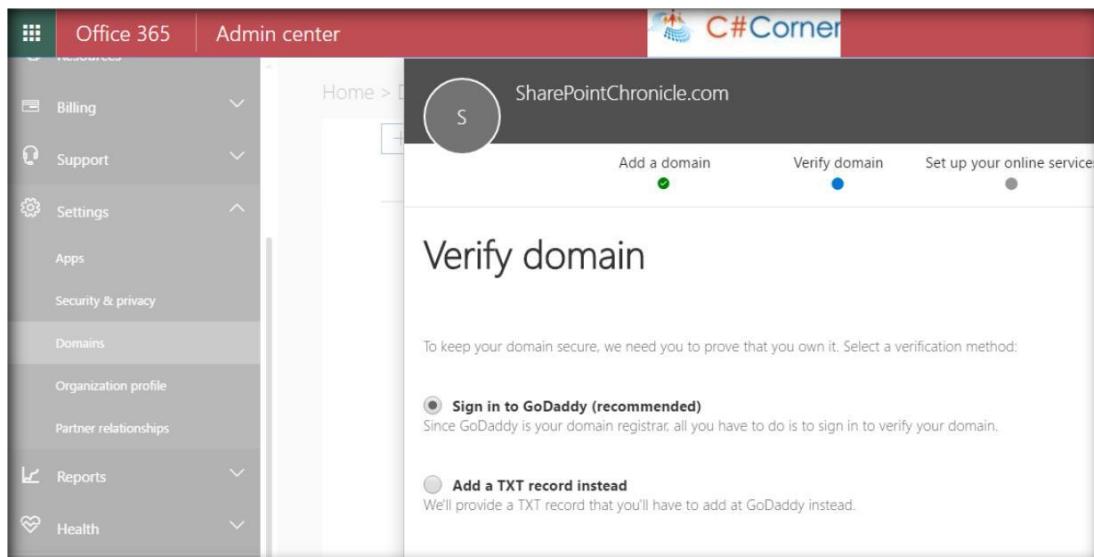
However, there can be the instances, where we already own a domain and we have to use it with Office 365. In such a scenario, go to the domain's page and click Add domain.



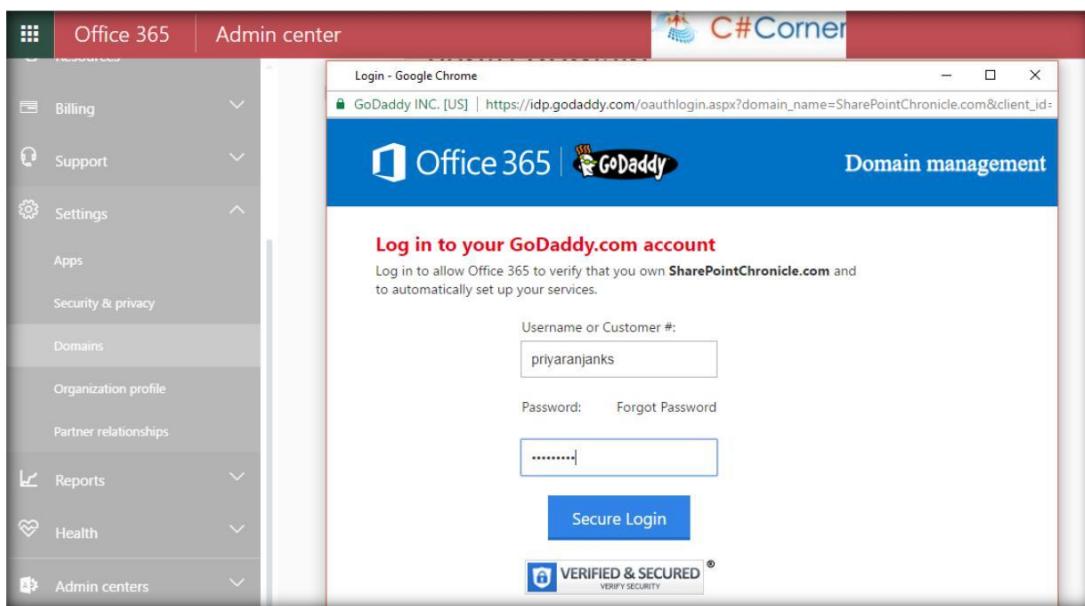
Specify the name of the domain, which you own in the text box, as shown below.



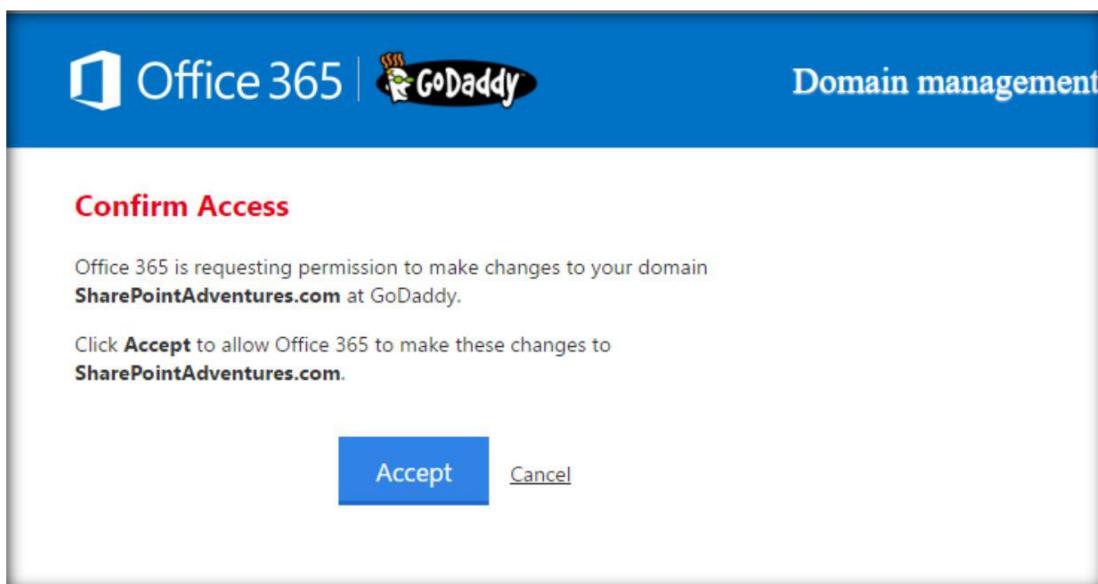
Office 365 will now want to verify that you really own such a domain. You can either choose „Sign in to GoDaddy“, so that it automatically contacts the domain registrar and do the verification.



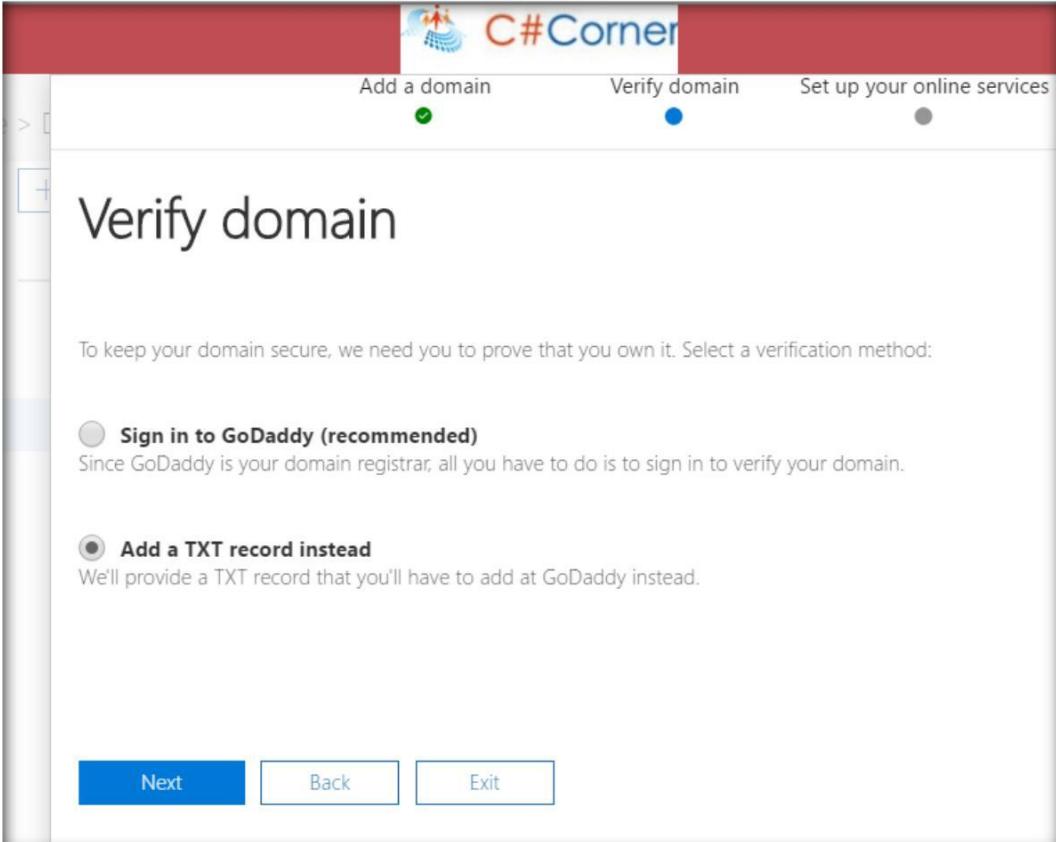
In order to automatically do the verification, a Go Daddy login screen will come up, where you have to authenticate to GoDaddy by entering the username and the password.



Allow Office 365 to make the changes to the domain at GoDaddy by clicking Accept and this will automatically verify the domain.



However, there may be cases, where we have to do it manually, if OAuth login to GoDaddy fails. In such a case, we will have to add the TXT record provided by Office 365 to GoDaddy(or your domain registrar).



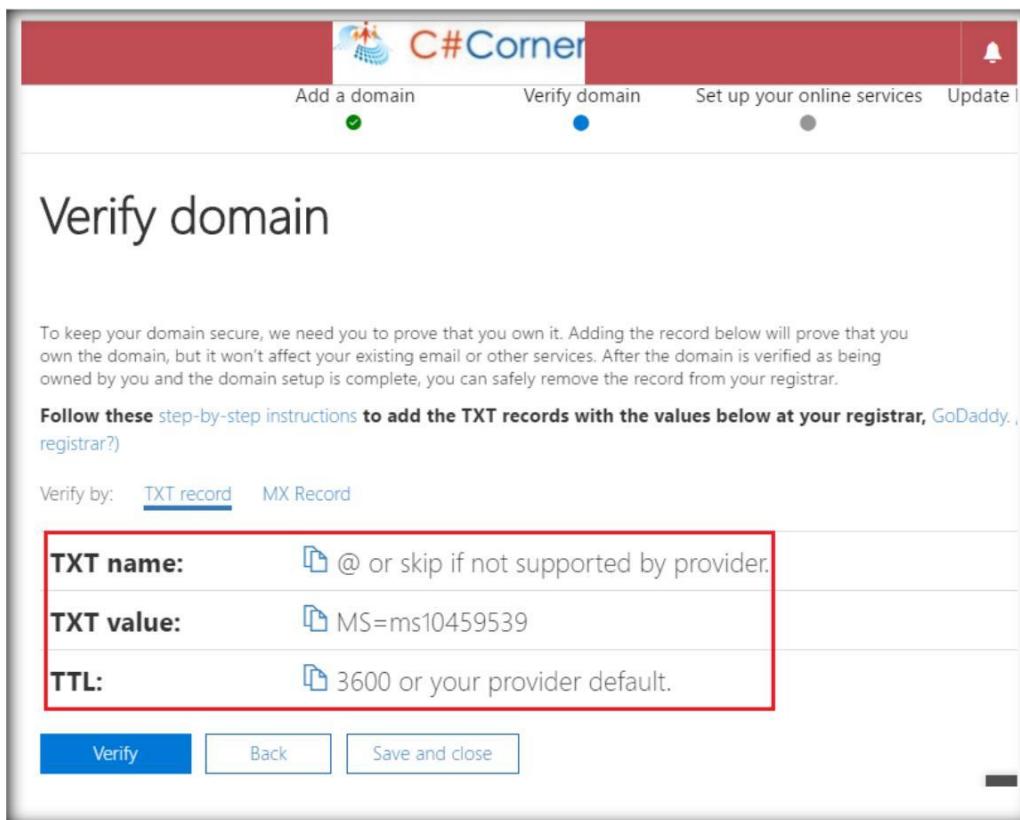
To keep your domain secure, we need you to prove that you own it. Select a verification method:

Sign in to GoDaddy (recommended)
Since GoDaddy is your domain registrar, all you have to do is to sign in to verify your domain.

Add a TXT record instead
We'll provide a TXT record that you'll have to add at GoDaddy instead.

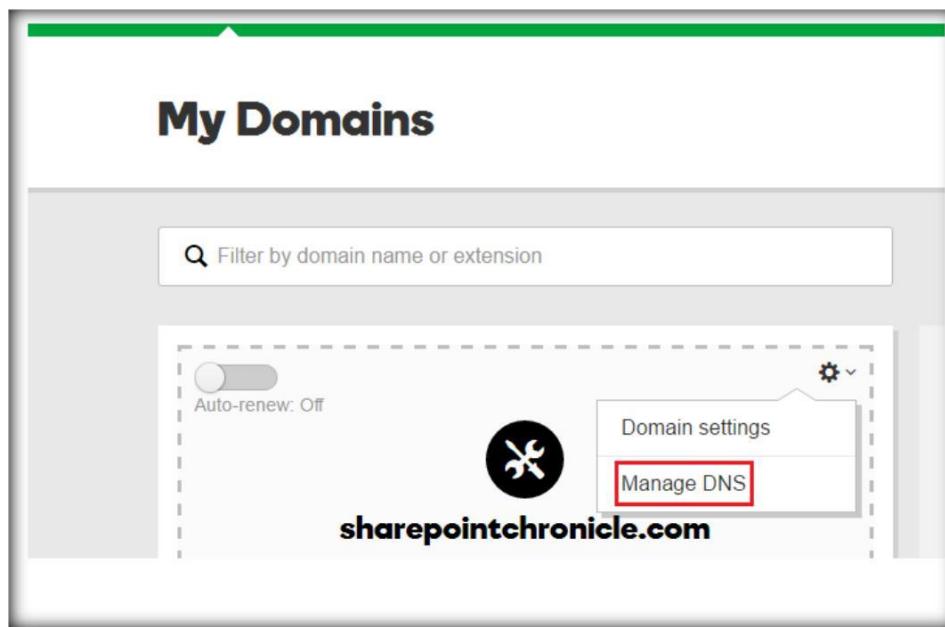
Next **Back** **Exit**

On clicking next, we will be provided with TXT record values, which we will have to add at GoDaddy site.



The screenshot shows the 'Verify domain' page on the C#Corner website. At the top, there are navigation links: 'Add a domain' (green dot), 'Verify domain' (blue dot, currently selected), 'Set up your online services' (grey dot), and 'Update I'. Below the navigation is a heading 'Verify domain'. A note below the heading states: 'To keep your domain secure, we need you to prove that you own it. Adding the record below will prove that you own the domain, but it won't affect your existing email or other services. After the domain is verified as being owned by you and the domain setup is complete, you can safely remove the record from your registrar.' A bold instruction follows: 'Follow these step-by-step instructions to add the TXT records with the values below at your registrar, GoDaddy., registrar?'. Below this, there are three input fields: 'TXT name' with a note '@ or skip if not supported by provider.', 'TXT value' with a note 'MS=ms10459539', and 'TTL' with a note '3600 or your provider default.'. At the bottom are buttons for 'Verify', 'Back', and 'Save and close'.

Log in to your Domain Registrar site and in my case, it is GoDaddy. Select Manage DNS.



The screenshot shows the 'My Domains' page on the GoDaddy website. The main title is 'My Domains'. There is a search bar labeled 'Filter by domain name or extension'. Below the search bar, there is a section for 'Auto-renew: Off' with a toggle switch. To the right of this is a 'Domain settings' button, which has a dropdown menu open with the 'Manage DNS' option highlighted with a red box. The domain 'sharepointchronicle.com' is listed below the settings. The entire screenshot is framed by a green border.

It will by default have some domain records, which are required for the functioning of the domain. Click Add to create a new TXT record for the domain verification.

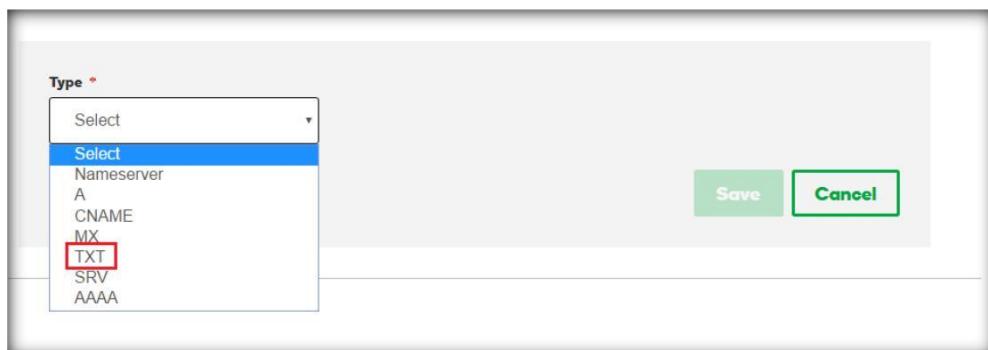
Records

Last updated 17-10-2016 22:58 PM

Type	Name	Value	TTL	
A	@	50.63.202.52	600 seconds	
CNAME	email	email.secureserver.net	1 Hour	
CNAME	ftp	@	1 Hour	
CNAME	www	@	1 Hour	
CNAME	_domainconnect	_domainconnect.gd.domaincontrol.com	1 Hour	
MX	@	mailstore1.secureserver.net (Priority: 10)	1 Hour	
MX	@	smtp.secureserver.net (Priority: 0)	1 Hour	
NS	@	ns57.domaincontrol.com	1 Hour	
NS	@	ns58.domaincontrol.com	1 Hour	



From the dropdown, select „TXT“.



Add the values provided by Office 365 in the text boxes given below. The host corresponds to the TXT name, which is provided by Office 365.

TXT		
Host *	TXT Value *	TTL *
<input type="text" value="@"/>	<input type="text" value="MS=ms10459539"/>	<input type="text" value="Custom"/>
Seconds *		
<input type="text" value="3600"/>		
<input type="button" value="Save"/> <input type="button" value="Cancel"/>		

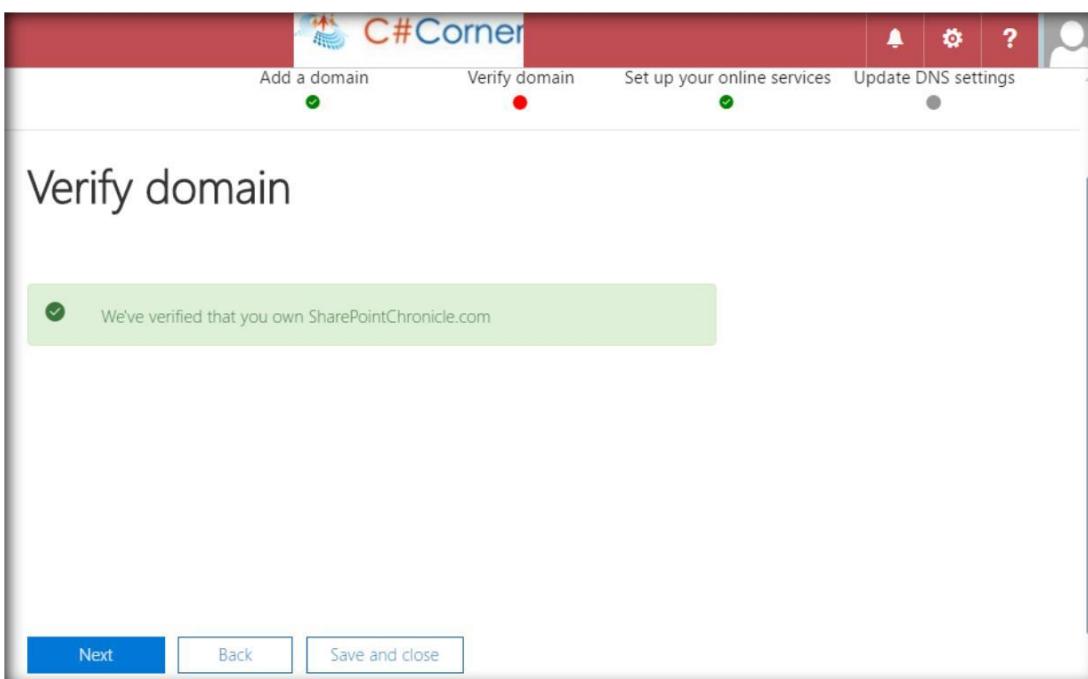
Once you have added it, it comes in the records.



NS	@	ns57.domaincontrol.com	1 Hour
NS	@	ns58.domaincontrol.com	1 Hour
TXT	@	MS=ms55885800	1 Hour

ADD

Head back to Office 365 and click Verify button in the page. If the entry added in the domain registrar page is correct, we will get the success message given below.

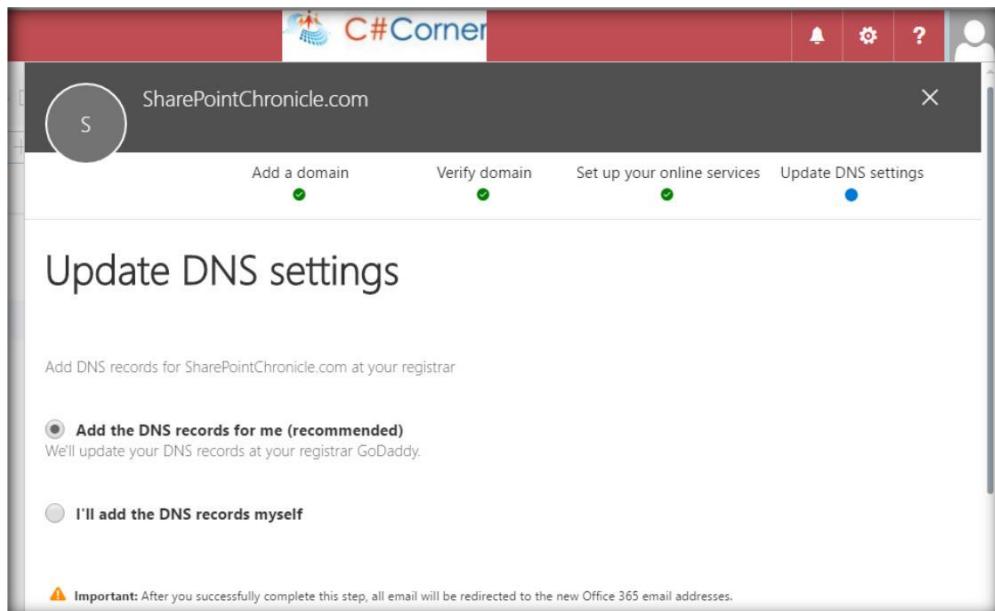


We've verified that you own SharePointChronicle.com

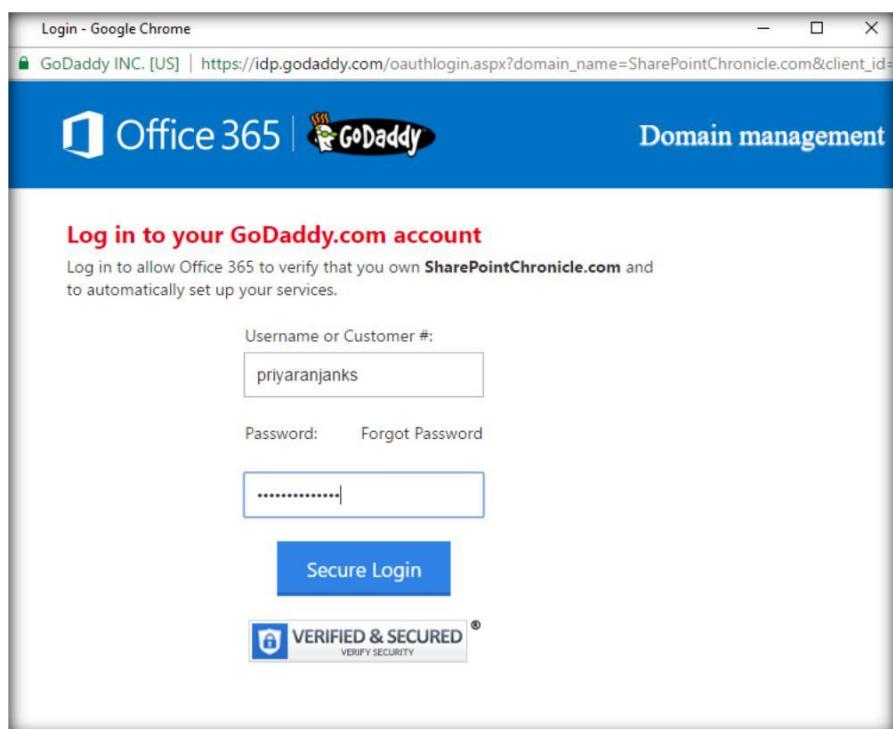
Next **Back** **Save and close**

Update DNS Settings

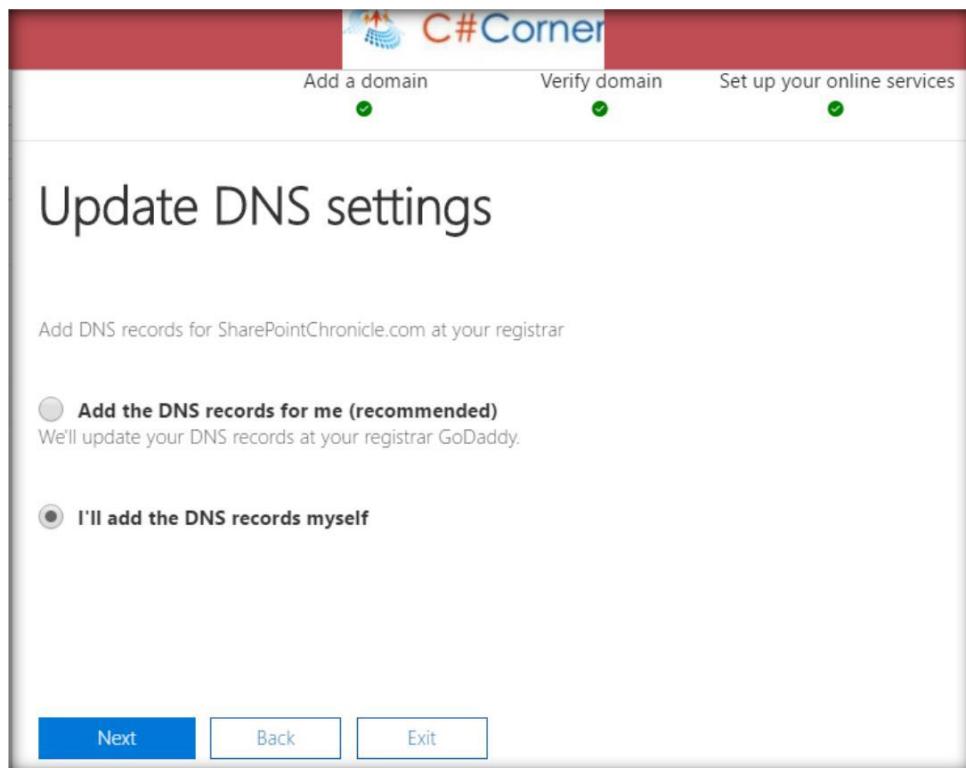
Once we have verified the domain, we have to update DNS Settings. Similar to the above step, we can automate this step by selecting the first option 'Add the DNS records for me'.



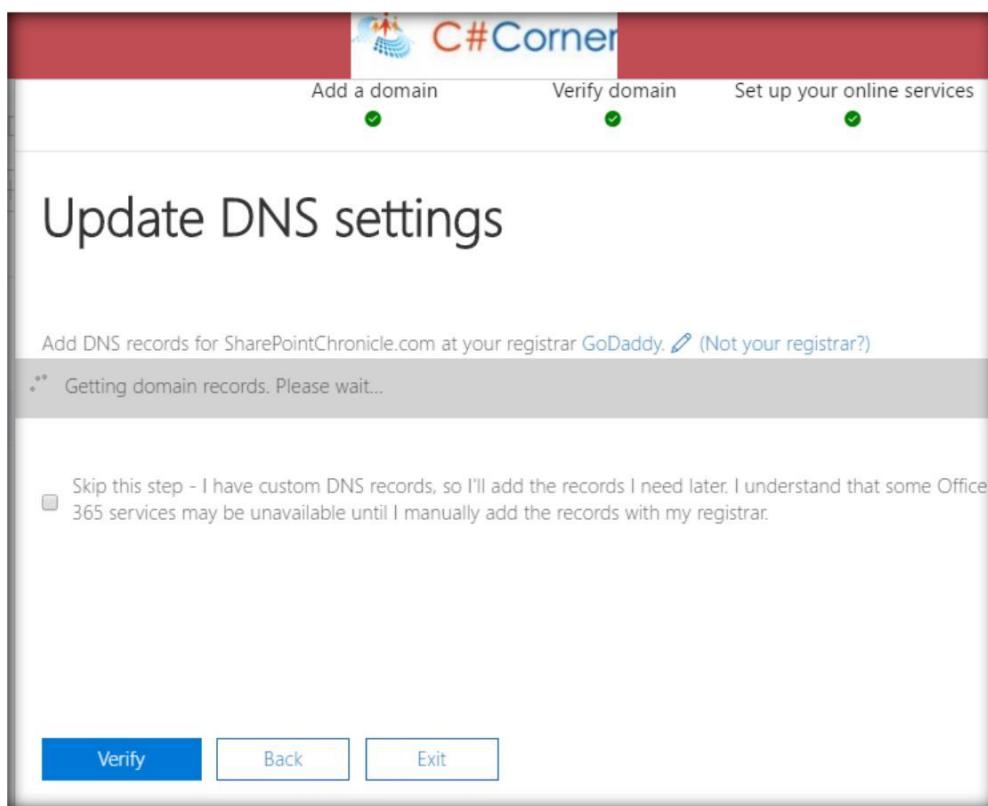
Authenticate to your Domain registrar by adding the user name and password and the domain setting will be automatically updated to the domain registrar by Office 365.



In case of any authentication failure, select I'll add the DNS records by myself and click Next.

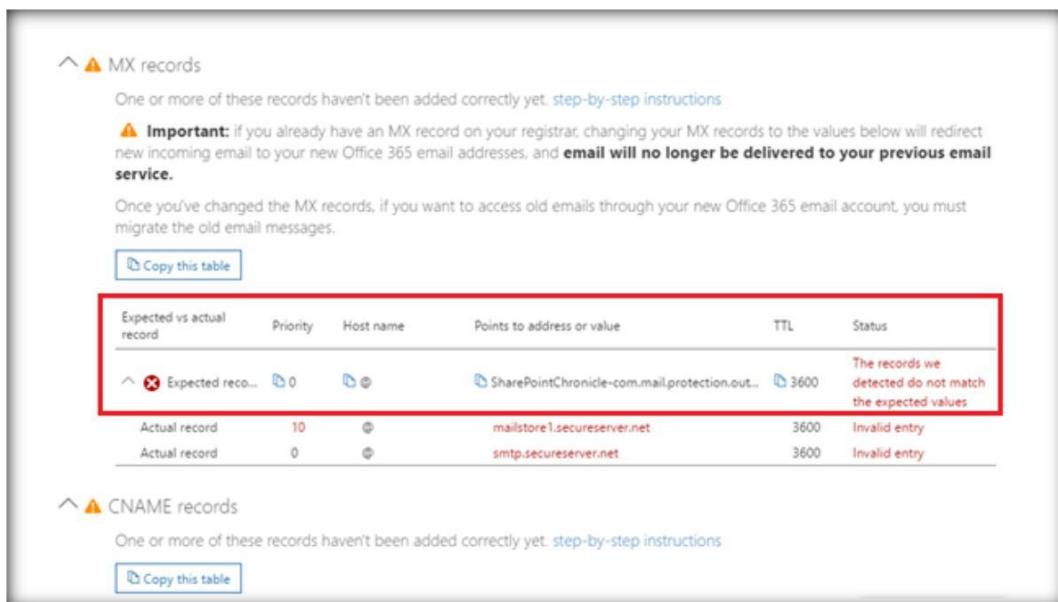


This will fetch a set of DNS records that we will have to update manually at the domain registrar's site.



The set of records that we will have to update are given below.

- MX Records
- CNAME Records
- TXT Record
- SRV Records

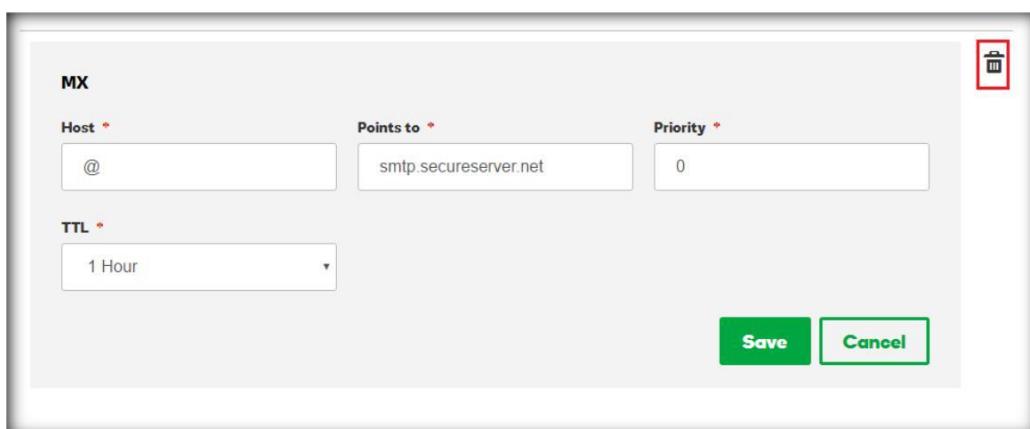


Expected vs actual record	Priority	Host name	Points to address or value	TTL	Status
Expected record	0	SharePointChronicle.com.mail.protection.out...	3600		The records we detected do not match the expected values
Actual record	10	mailstore1.secureserver.net	3600	Invalid entry	
Actual record	0	smtp.secureserver.net	3600	Invalid entry	

First, let's add MX record, which will redirect the mails. We will have to add 1 MX record, which is provided by Office 365 at the domain registrar site. Office 365 also has listed out 2 records, which are already present in the domain registrar site (mailstore.secureserver.net and smtp.secureserver.net), which we will have to remove from the domain registrar.

CNAME	_domainconnect	_domainconnect.gd.domaincontrol.com	1 Hour	
MX	@	mailstore1.secureserver.net (Priority: 10)	1 Hour	
MX	@	smtp.secureserver.net (Priority: 0)	1 Hour	

Select the edit icon and click on the trash bin icon against both the pre-existing MX records.



MX

Host * @ **Points to *** smtp.secureserver.net **Priority *** 0

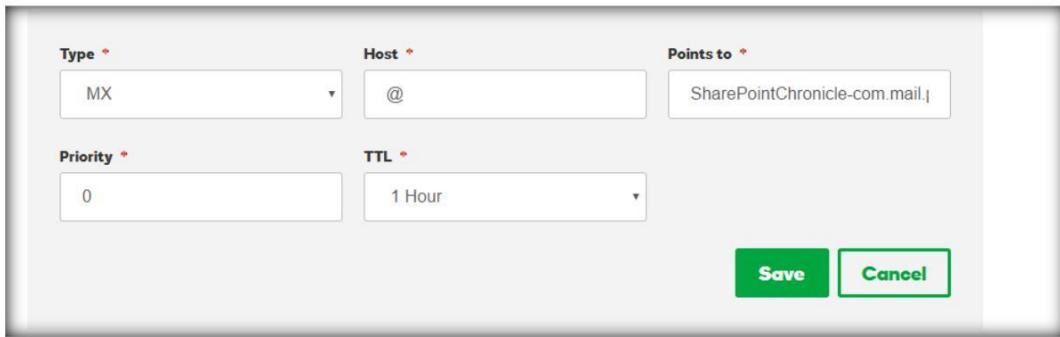
TTL * 1 Hour

Save **Cancel**

Now, click add button and select MX from the dropdown.

TXT	@	MS=ms10459539	1 Hour	
NS	@	ns57.domaincontrol.com	1 Hour	
NS	@	ns58.domaincontrol.com	1 Hour	
Type *	Select	Save	Cancel	
	Select Nameserver A CNAME MX TXT SRV AAAA			

Specify the values provided by Office 365 and click Save.



The screenshot shows the 'Add a record' dialog for creating an MX record. The fields are filled as follows:

- Type: MX
- Host: @
- Points to: SharePointChronicle-com.mail.outlook.com
- Priority: 0
- TTL: 1 Hour

At the bottom are 'Save' and 'Cancel' buttons.

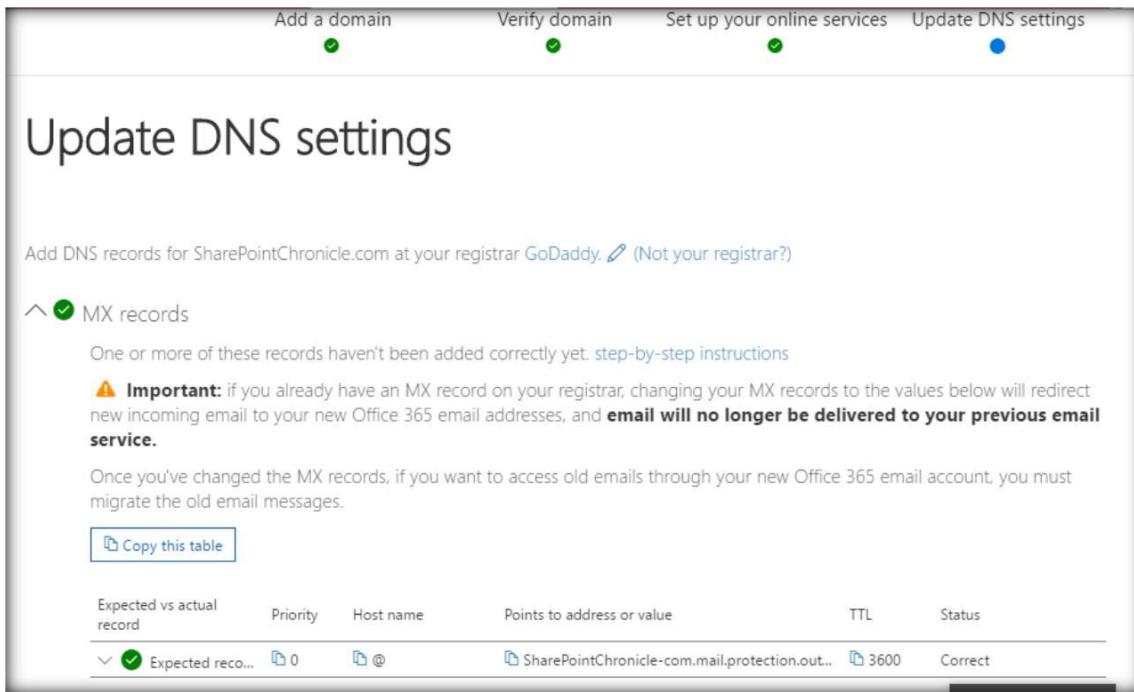
This will add the new MX record, which is provided by Office 365.



The screenshot shows the list of DNS records. A new MX record has been added, highlighted with a red border:

Type	Host	Points to	TTL
NS	@	ns57.domaincontrol.com	1 Hour
NS	@	ns58.domaincontrol.com	1 Hour
MX	@	SharePointChronicle-com.mail.protection.outlook.com	1 Hour

Clicking on Verify button in the Office 365 page will check for the validity of the newly added MX record, as shown below.



The screenshot shows the 'Update DNS settings' page. At the top, there are four status indicators: 'Add a domain' (green), 'Verify domain' (green), 'Set up your online services' (green), and 'Update DNS settings' (blue). Below this, the title 'Update DNS settings' is displayed.

Instructions for adding DNS records for SharePointChronicle.com at GoDaddy are provided. A note states: 'One or more of these records haven't been added correctly yet. [step-by-step instructions](#)'.

A warning message says: '⚠ Important: if you already have an MX record on your registrar, changing your MX records to the values below will redirect new incoming email to your new Office 365 email addresses, and **email will no longer be delivered to your previous email service.**'

Below this, a note says: 'Once you've changed the MX records, if you want to access old emails through your new Office 365 email account, you must migrate the old email messages.'

A 'Copy this table' button is available. The table below lists the current DNS records:

Expected vs actual record	Priority	Host name	Points to address or value	TTL	Status
✓ Expected record...	0	@	SharePointChronicle-com.mail.protection.out...	3600	Correct

Now, let's add the CNAME records. We have 6 missing entries, which will have to be created at the domain registrar.

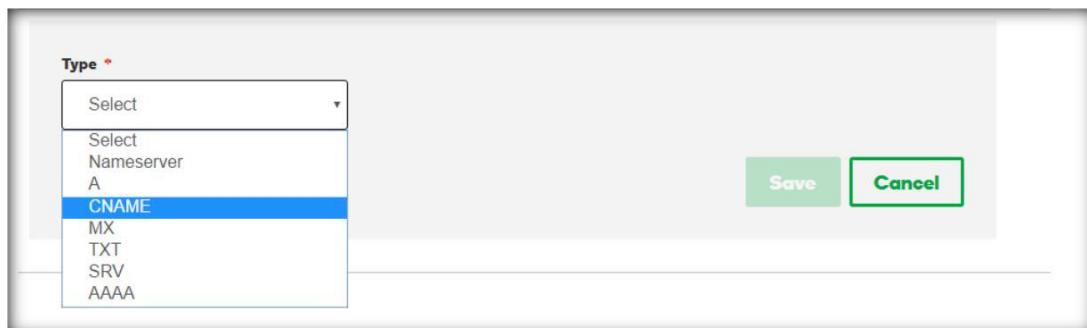
^ ▲ CNAME records

One or more of these records haven't been added correctly yet. step-by-step instructions

[Copy this table](#)

Expected vs actual record	Host name	Points to address or value	TTL	Status
^ ❌ Expected record	autodiscover	autodiscover.outlook.com	3600	No records found
Actual record				Missing record
^ ❌ Expected record	sip	sipdir.online.lync.com	3600	No records found
Actual record				Missing record
^ ❌ Expected record	lyncdiscover	webdir.online.lync.com	3600	No records found
Actual record				Missing record
^ ❌ Expected record	msoid	clientconfig.microsoftonline-p.net	3600	No records found
Actual record				Missing record
^ ❌ Expected record	enterpriseregist...	enterpriseregistration.windows.net	3600	No records found
Actual record				Missing record
^ ❌ Expected record	enterpriseenroll...	enterpriseenrollment.manage.microsoft.com	3600	No records found
Actual record				Missing record

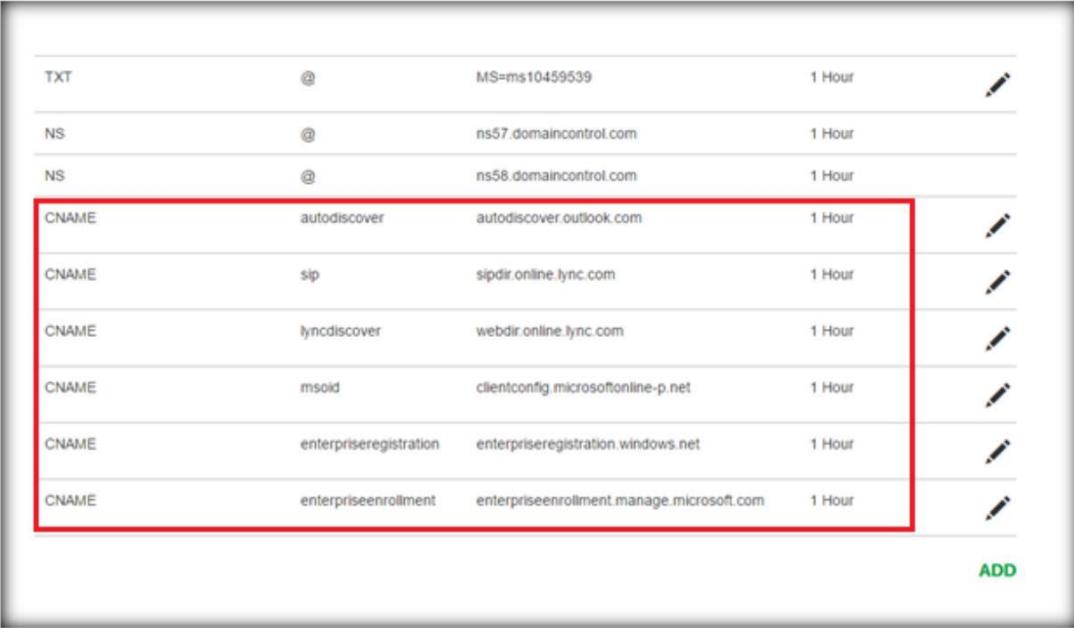
Click Add and select CNAME from the dropdown.



Specify the values provided by Office 365 and click Save.

Type *	Host *	Points to *
CNAME	autodiscover	autodiscover.outlook.com
TTL *	1 Hour	

Do this for all the 6 record entries, which are provided by Office 365.

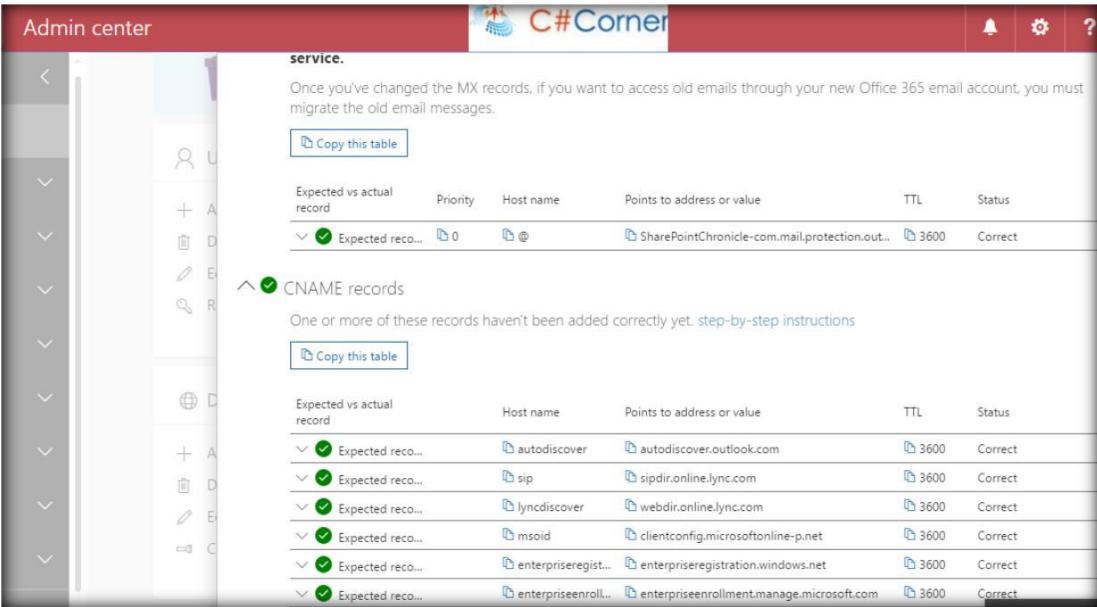


The screenshot shows a list of DNS records in the Office 365 Admin Center. A red box highlights the CNAME records section, which includes the following entries:

Type	Priority	Host name	Points to address or value	TTL	Status
TXT	@	MS=ms10459539		1 Hour	
NS	@	ns57.domaincontrol.com		1 Hour	
NS	@	ns58.domaincontrol.com		1 Hour	
CNAME	autodiscover	autodiscover.outlook.com		1 Hour	
CNAME	sip	sipdir.online.lync.com		1 Hour	
CNAME	lyncdiscover	webdir.online.lync.com		1 Hour	
CNAME	msoid	clientconfig.microsoftonline-p.net		1 Hour	
CNAME	enterpriserегистration	enterpriserегистration.windows.net		1 Hour	
CNAME	enterpriseenrollment	enterpriseenrollment.manage.microsoft.com		1 Hour	

ADD

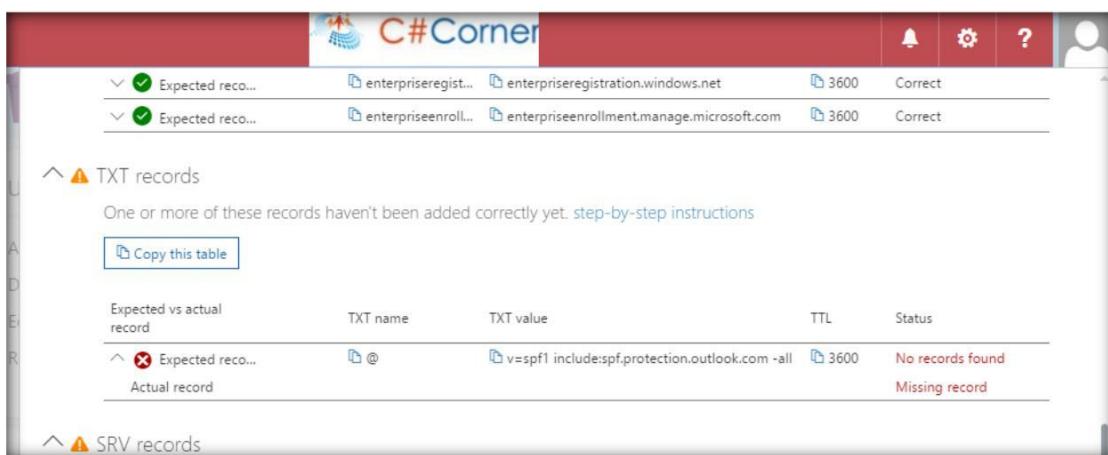
Head back to Office 365 Admin Center and click Verify. It will display a tick mark against the missing CNAME records, which indicates successful updation.



The screenshot shows the results of the verification process. The CNAME records section now shows green checkmarks next to each record, indicating successful update. The table data is as follows:

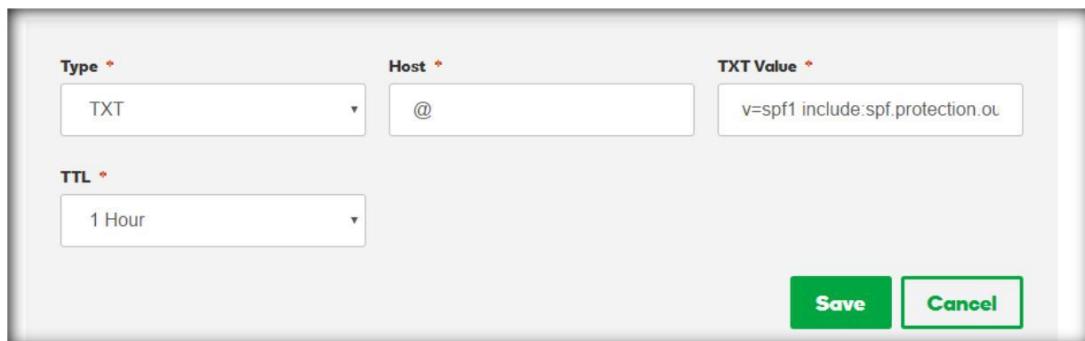
Expected vs actual record	Host name	Points to address or value	TTL	Status
✓ Expected reco...	autodiscover	autodiscover.outlook.com	3600	Correct
✓ Expected reco...	sip	sipdir.online.lync.com	3600	Correct
✓ Expected reco...	lyncdiscover	webdir.online.lync.com	3600	Correct
✓ Expected reco...	msoid	clientconfig.microsoftonline-p.net	3600	Correct
✓ Expected reco...	enterpriserегист...	enterpriserегистration.windows.net	3600	Correct
✓ Expected reco...	enterpriseenroll...	enterpriseenrollment.manage.microsoft.com	3600	Correct

Now, we have to add the TXT record.



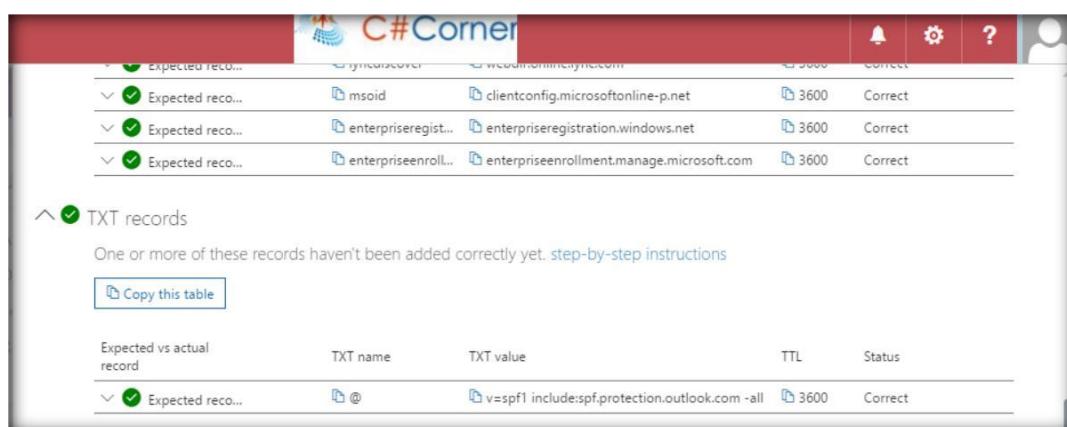
The screenshot shows the C# Corner tool interface. At the top, there are two sections: 'Expected record' and 'Actual record'. Below these are tables for 'TXT records' and 'SRV records'. The 'TXT records' table has columns: 'Expected vs actual record', 'TXT name', 'TXT value', 'TTL', and 'Status'. One entry is shown: 'Expected record' (v=spf1 include:spf.protection.outlook.com -all) and 'Actual record' (v=spf1 include:spf.protection.outlook.com -all). The status is 'No records found'.

Head over to the domain registrar and add the TXT record with the values, which are provided by Office 365.



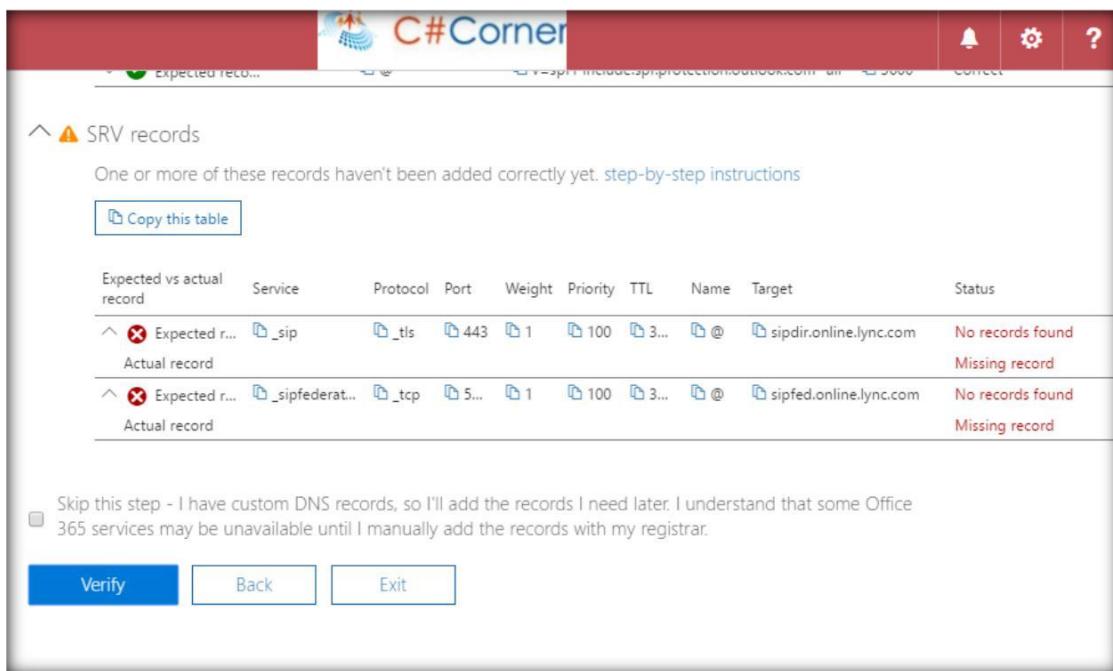
The screenshot shows the 'Add Record' dialog in the Office 365 Admin Center. It has fields for 'Type' (set to 'TXT'), 'Host' (set to '@'), 'TXT Value' (set to 'v=spf1 include:spf.protection.outlook.com'), and 'TTL' (set to '1 Hour'). At the bottom are 'Save' and 'Cancel' buttons.

Verify the newly added TXT record in the Office 365 Admin Center.



The screenshot shows the C# Corner tool interface after adding the TXT record. The 'Actual record' section now includes the entry 'v=spf1 include:spf.protection.outlook.com -all' under the 'Expected record' row. The status is 'Correct'.

Finally, add the SRV record. As shown below, we have to add 2 SRV records.

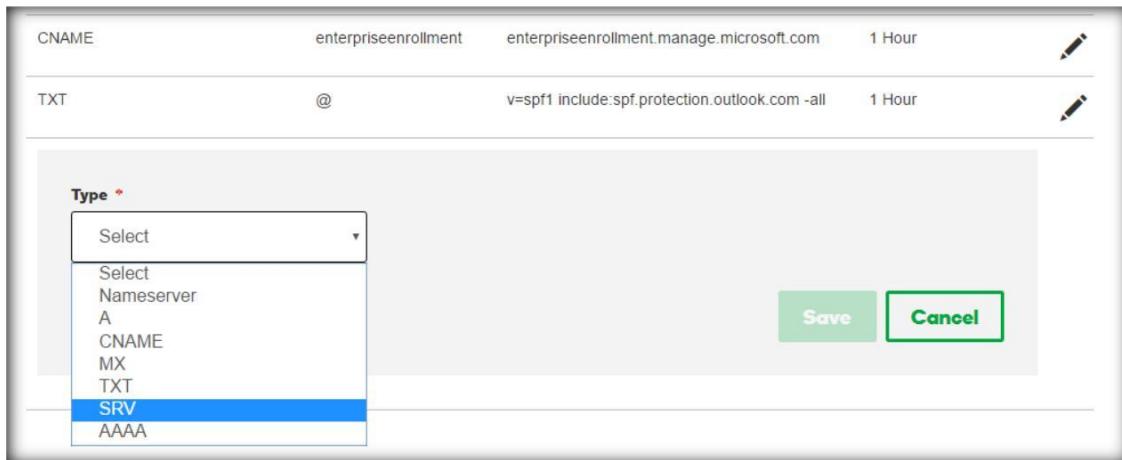


The screenshot shows a web-based DNS checker for the domain `v=spf1 include:spf.protection.outlook.com`. At the top, it says "Expected records found: 0" and "Actual records found: 0". Below this, under "SRV records", it states: "One or more of these records haven't been added correctly yet. step-by-step instructions". A table lists two expected records:

Expected vs actual record	Service	Protocol	Port	Weight	Priority	TTL	Name	Target	Status
Expected record	_sip	_tls	443	1	100	3...	@	sipdir.online.lync.com	No records found
Actual record									Missing record
Expected record	_sipfederat...	_tcp	5...	1	100	3...	@	sipfed.online.lync.com	No records found
Actual record									Missing record

At the bottom, there is a note: "Skip this step - I have custom DNS records, so I'll add the records I need later. I understand that some Office 365 services may be unavailable until I manually add the records with my registrar." Below the note are three buttons: "Verify" (blue), "Back" (white), and "Exit" (white).

Select SRV from the dropdown in the domain records management page of the domain registrar.



The screenshot shows a "Domain Records" management page. It lists two existing records: a CNAME record pointing to `enterpriseenrollment.manage.microsoft.com` with a TTL of 1 Hour, and a TXT record for `@` with the value `v=spf1 include:spf.protection.outlook.com -all` and a TTL of 1 Hour. Below this, a modal dialog is open for adding a new record. The "Type" dropdown menu is open, showing options: Select, Nameserver, A, CNAME, MX, TXT, SRV, and AAAA. The "SRV" option is highlighted with a blue selection bar. At the bottom of the dialog are "Save" and "Cancel" buttons.

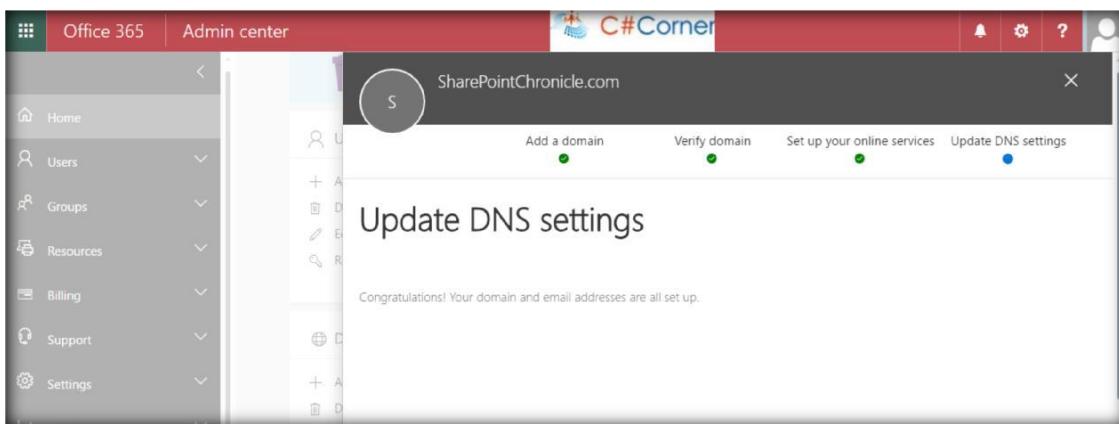
Add the values, as provided by Office 365 and click Save.

Type *	Service *	Protocol *
SRV	_sip	_tls
Name *	Target *	Priority *
@	sipdir.online.lync.com	100
Weight *	Port *	TTL *
1	443	Custom
		Seconds *
		3600
		Save
		Cancel

This will list out all the added domain records in the domain registrar's page.

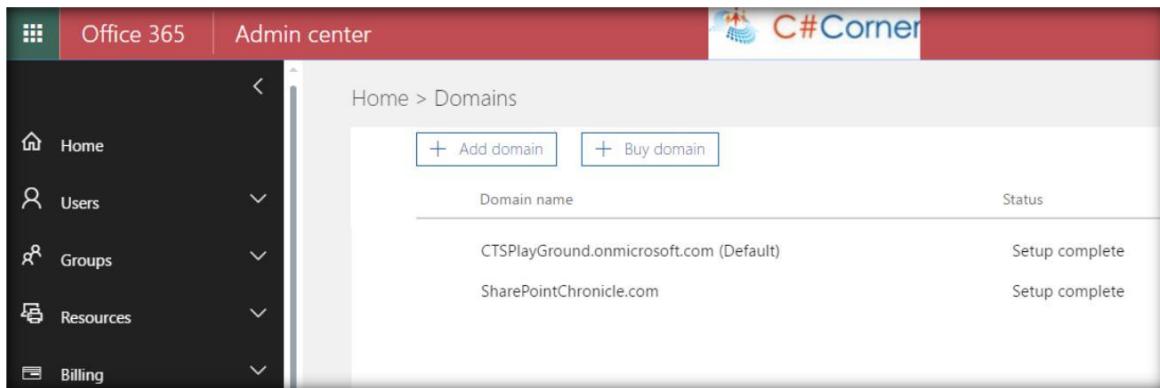
CNAME	autodiscover	autodiscover.outlook.com	1 Hour	
CNAME	sip	sipdir.online.lync.com	1 Hour	
CNAME	lyncdiscover	webdir.online.lync.com	1 Hour	
CNAME	msoid	clientconfig.microsoftonline-p.net	1 Hour	
CNAME	enterpriseregistration	enterpriseregistration.windows.net	1 Hour	
CNAME	enterpriseenrollment	enterpriseenrollment.manage.microsoft.com	1 Hour	
TXT	@	v=spf1 include:spf.protection.outlook.com -all	1 Hour	
SRV	_sip._tls.@	100 1 443 sipdir.online.lync.com	1 Hour	
SRV	_sipfederationtls._tcp...	100 1 5061 sipfed.online.lync.com	1 Hour	
ADD				

Do a final verification by clicking on Verify button and we should get the success message given below, which states that the domain and the E-mail addresses are set up.



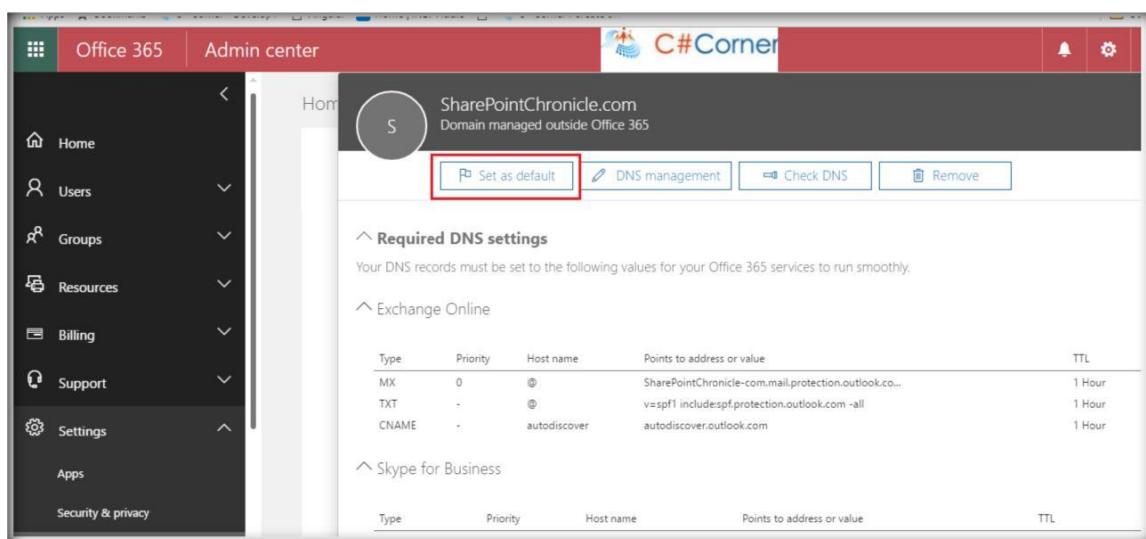
Set Primary Domain

Heading over to the domain's page, we can see that the new domain has been added and is successfully set up.



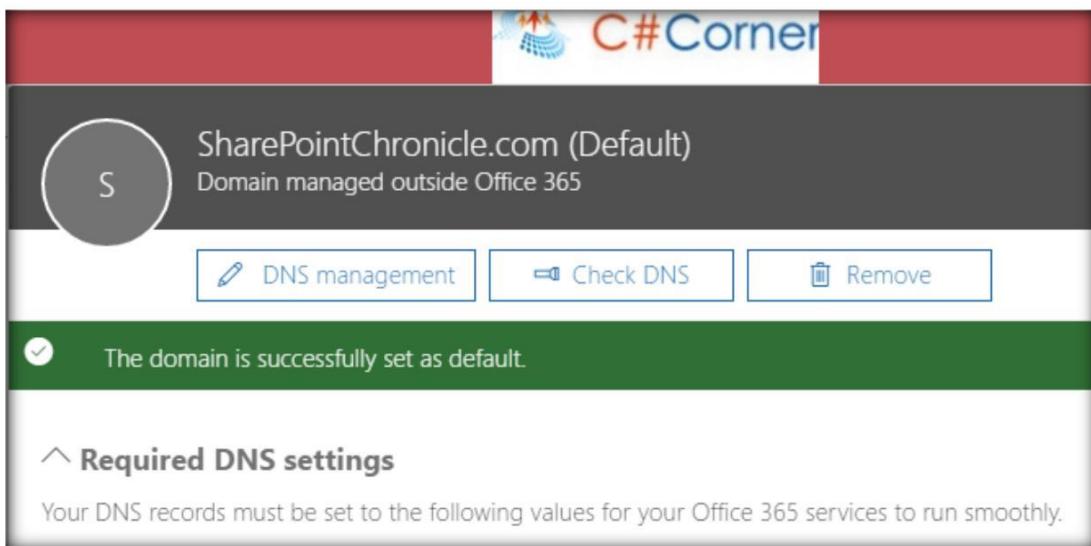
The screenshot shows the 'Domains' page in the Admin center. It lists two domains: 'CTSPlayGround.onmicrosoft.com (Default)' and 'SharePointChronicle.com', both in 'Setup complete' status. There are buttons for '+ Add domain' and '+ Buy domain' at the top.

Click the new domain and set it as default, if we want to start using it.



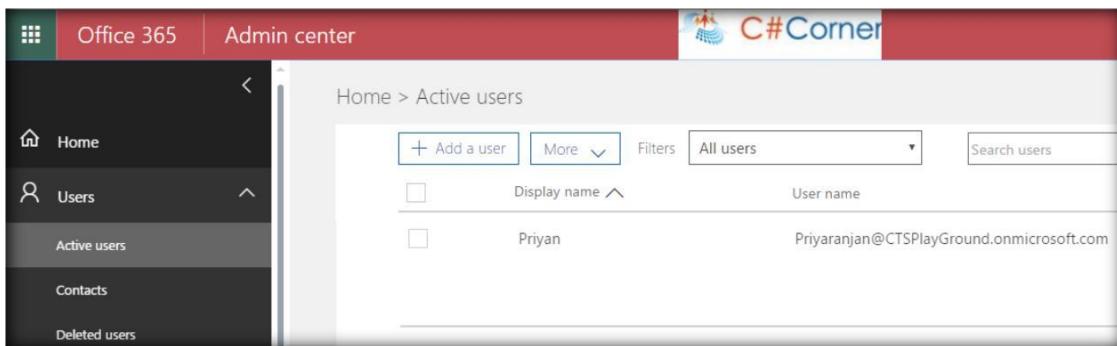
The screenshot shows the 'Domains' page again, but now the 'SharePointChronicle.com' row is selected. A red box highlights the 'Set as default' button, which is now active. Other buttons visible include 'DNS management', 'Check DNS', and 'Remove'.

Thus, the newly added domain has been set as the default domain in Office 365.



The screenshot shows the SharePoint Chronicle domain setup page. At the top, it displays "SharePointChronicle.com (Default)" and "Domain managed outside Office 365". Below this are three buttons: "DNS management", "Check DNS", and "Remove". A green success message states "The domain is successfully set as default." Under the heading "Required DNS settings", it says "Your DNS records must be set to the following values for your Office 365 services to run smoothly."

As a final step, we have to go to the list of the users and edit their E-mails to start using the new domain.



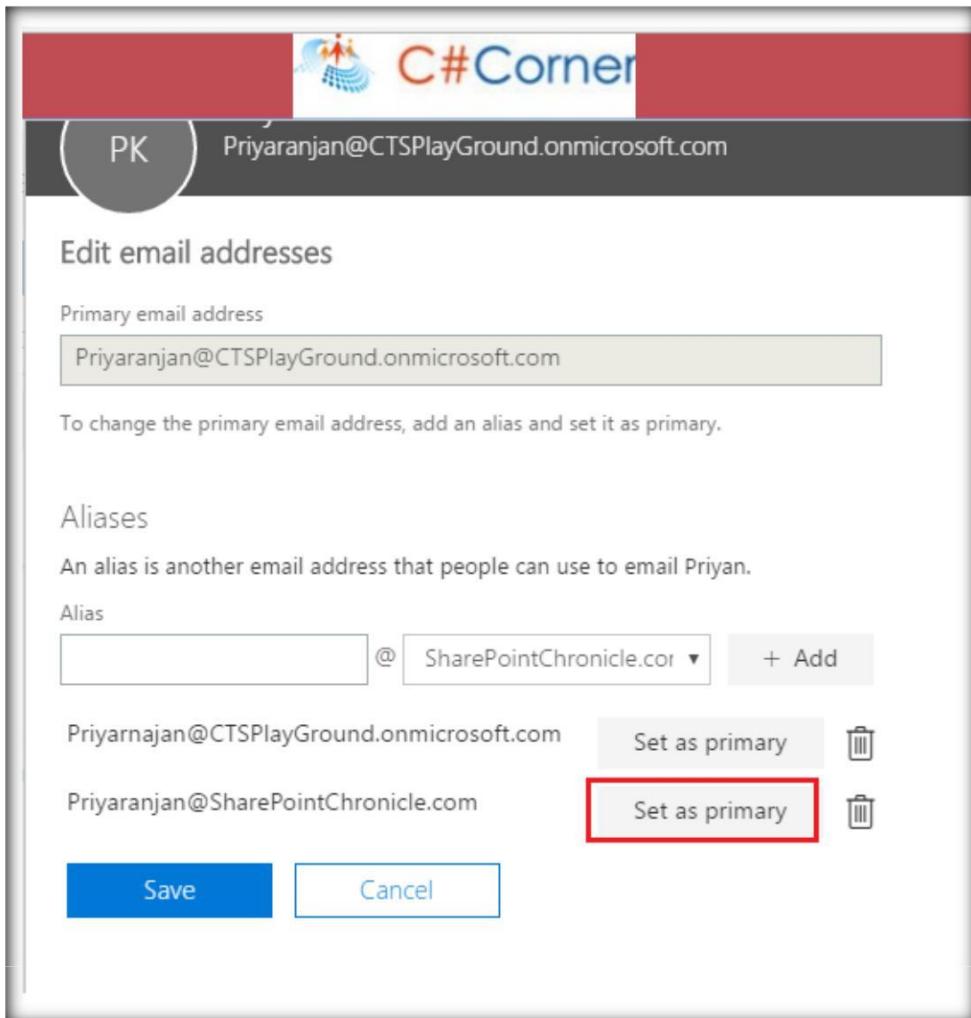
The screenshot shows the Microsoft Admin center interface under the "Office 365" tab. The left sidebar shows "Home", "Users" (selected), "Active users" (highlighted), "Contacts", and "Deleted users". The main area shows the "Home > Active users" page with a search bar and filters. It lists one user, Priyan, with the email address "Priyaranjan@CTSPlayGround.onmicrosoft.com".

Click Edit option against the user name.



The screenshot shows the user profile edit page for "Priyan". The top bar shows the user's name and email. Below are buttons for "Reset password" and "Delete user". The user information section includes "User name / Email" (Priyaranjan@CTSPlayGround.onmicrosoft.com) and "Aliases" (Priyarnajan@CTSPlayGround.onmicrosoft.com). A red box highlights the "Edit" button in the top right corner of the user information table.

Add the new domain E-mail address and click Save.



PK Priyanjan@CTSPayGround.onmicrosoft.com

Edit email addresses

Primary email address

Priyanjan@CTSPayGround.onmicrosoft.com

To change the primary email address, add an alias and set it as primary.

Aliases

An alias is another email address that people can use to email Priyan.

Alias

Priyarnajan@CTSPayGround.onmicrosoft.com Set as primary Delete

Priyanjan@SharePointChronicle.com Set as primary Delete

Save Cancel

We will thus get an onscreen message about the change in an E-mail address.

 **C#Corner**

Priyan
Priyanjan@SharePointChronicle.com

 The user name or email information has been updated.

The following changes were made to the user's user name, make sure you notify them of that change so that they aren't blocked from signing in.

From: Priyanjan@CTSPlayGround.onmicrosoft.com
To: Priyanjan@SharePointChronicle.com

The primary email address was successfully changed.

From: Priyanjan@CTSPlayGround.onmicrosoft.com
To: Priyanjan@SharePointChronicle.com

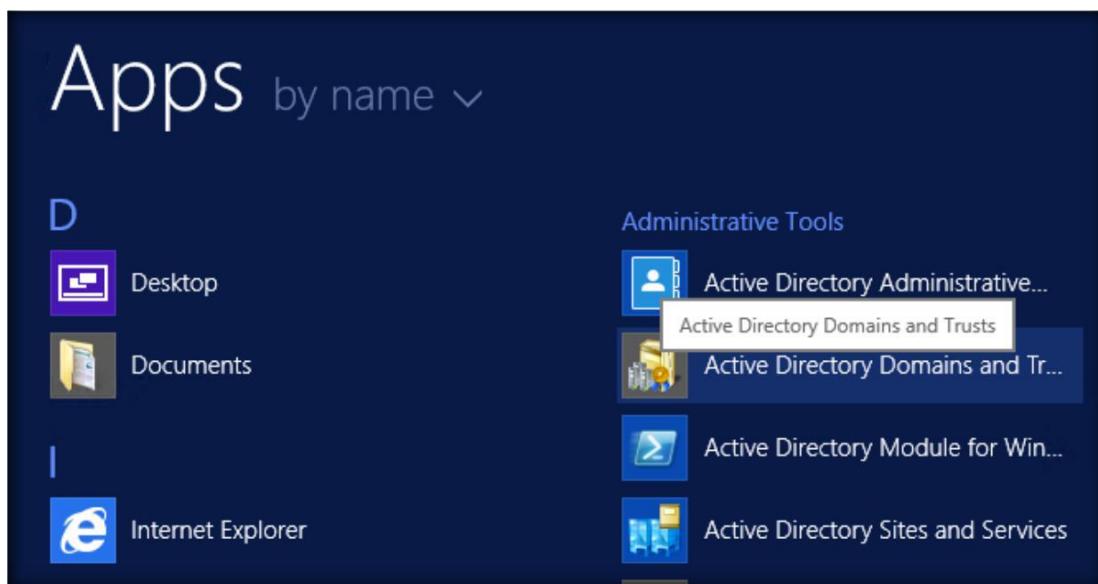
The following alias was added:
Priyanjan@CTSPlayGround.onmicrosoft.com

The following alias was deleted:
Priyanjan@SharePointChronicle.com

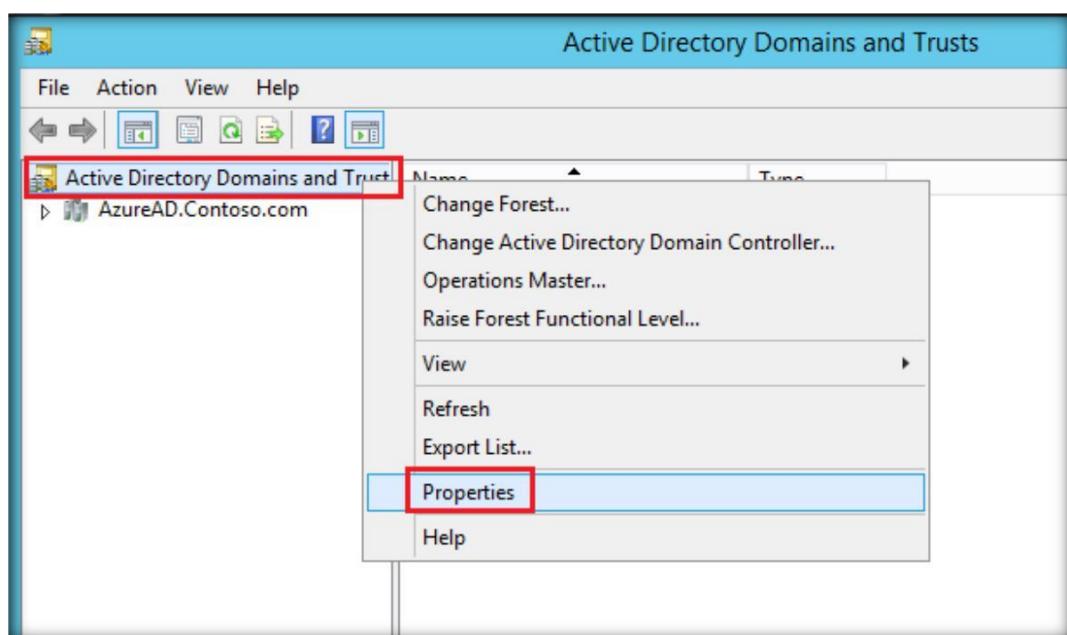
4. Assign a UPN domain suffix

UPN stands for User Profile Name. Now, we have to create a UPN domain suffix in the Active Directory domain, where Active Directory Services are configured in such a way that it matches the public domain that was created and registered with Office 365 in the previous step. The active directory can be in an On-Premise Server or it can be in a virtual machine hosted in Azure.

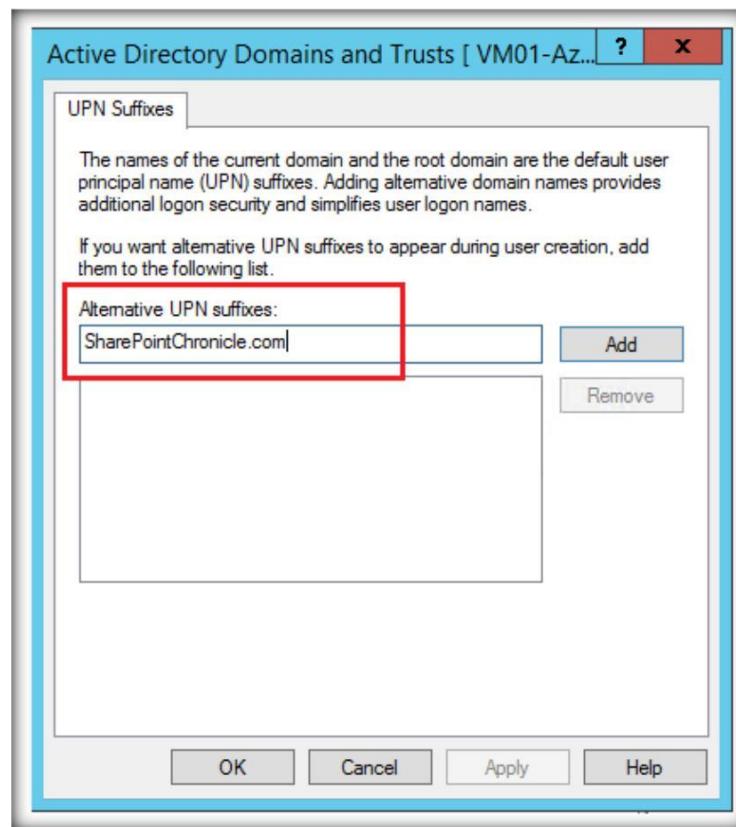
In my existing configuration, I have hosted SharePoint Services in Azure and I have set up Azure Directory Services in a virtual machine. In my case, it is hosted in the Server *VM01-AzureAD*. Select Active directory domain and trusts from the Server hosting active directory.



Right click the root and select *Properties*.



This will open up the Window, where we can specify the UPN Suffix. Specify the Public domain, which we had registered earlier with Office 365. Click *Add*.

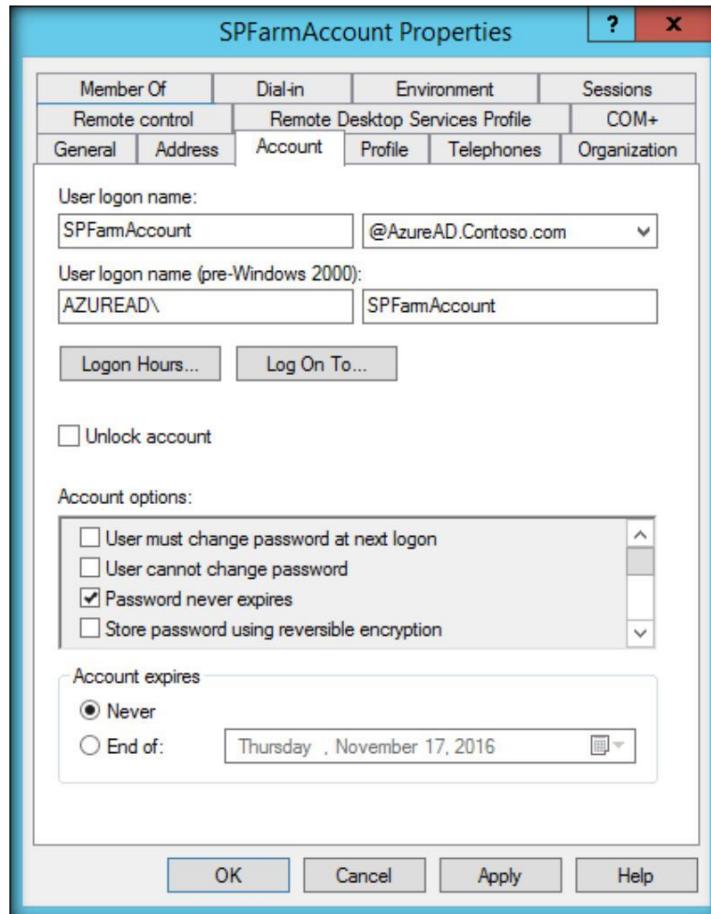


Now, head over to the Active Directory users and Computers.

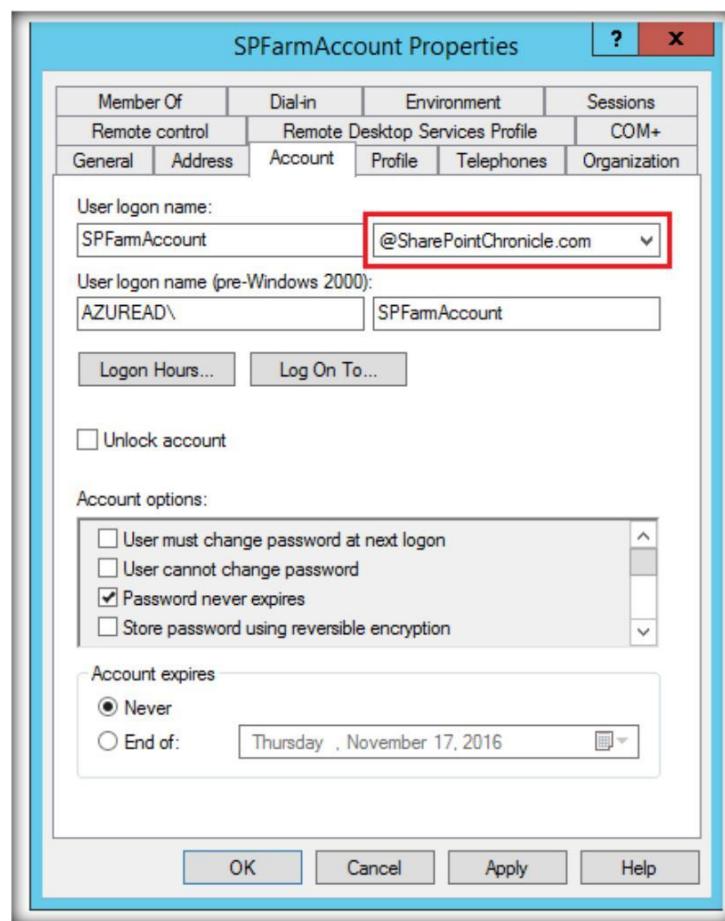


Update UPN for Single User

Select the user names, which you would like to federate with Cloud search. If the number of accounts are small, we can do it manually by editing the user login name and updating the new UPN. By default, as it opens up, it will show the existing local domain ,which is *AzureAD.Contoso.com*here.



We have to change it to *SharePointChronicle.com*. Click *Apply*.

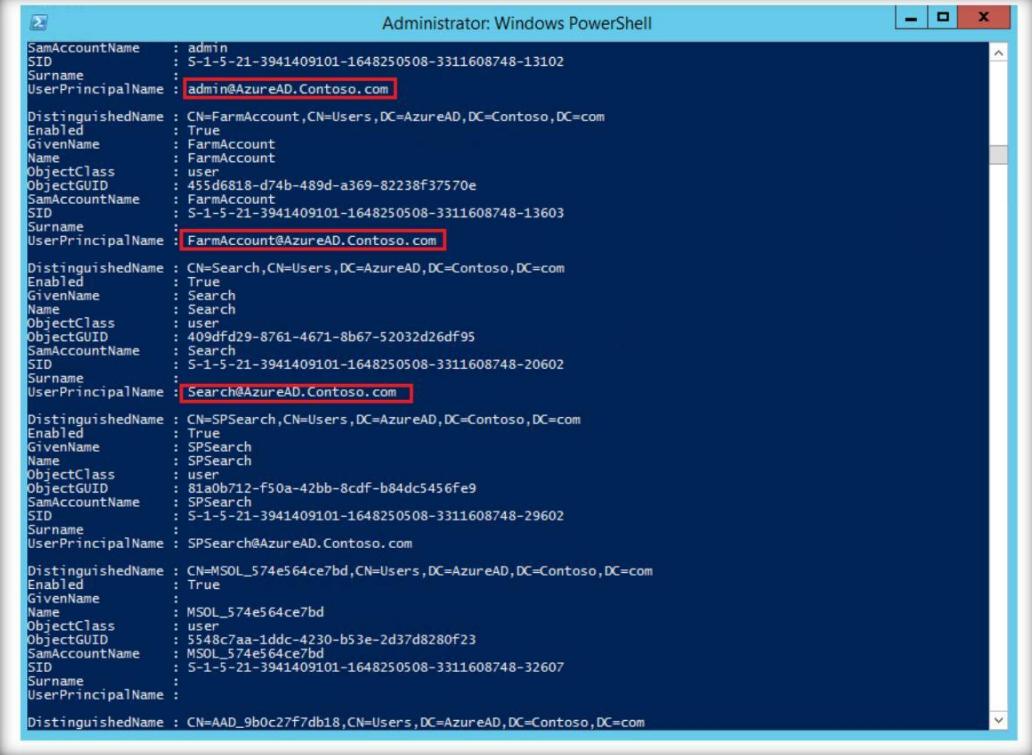


Update UPN for Multiple users

However, if there are multiple users, doing it manually for each user is cumbersome. In such a case, we can use PowerShell. Spin up PowerShell as an administrator and run the command given below, which will give us the users in the domain and their details

```
Get-ADUser -SearchBase $DN -filter *
```

As you can see, UPN of the AD Users are currently *AzureAD.Contoso.com*.



```
Administrator: Windows PowerShell
SamAccountName : admin
SID             : S-1-5-21-3941409101-1648250508-3311608748-13102
Surname         :
UserPrincipalName : admin@AzureAD.Contoso.com

DistinguishedName : CN=FarmAccount,CN=Users,DC=AzureAD,DC=Contoso,DC=com
Enabled          : True
GivenName        : FarmAccount
Name              : FarmAccount
ObjectClass      : user
ObjectGUID       : 455d6818-d74b-489d-a369-82238f37570e
SamAccountName   : FarmAccount
SID              : S-1-5-21-3941409101-1648250508-3311608748-13603
Surname          :
UserPrincipalName : FarmAccount@AzureAD.Contoso.com

DistinguishedName : CN=Search,CN=Users,DC=AzureAD,DC=Contoso,DC=com
Enabled          : True
GivenName        : Search
Name              : Search
ObjectClass      : user
ObjectGUID       : 409df29-8761-4671-8b67-52032d26df95
SamAccountName   : Search
SID              : S-1-5-21-3941409101-1648250508-3311608748-20602
Surname          :
UserPrincipalName : Search@AzureAD.Contoso.com

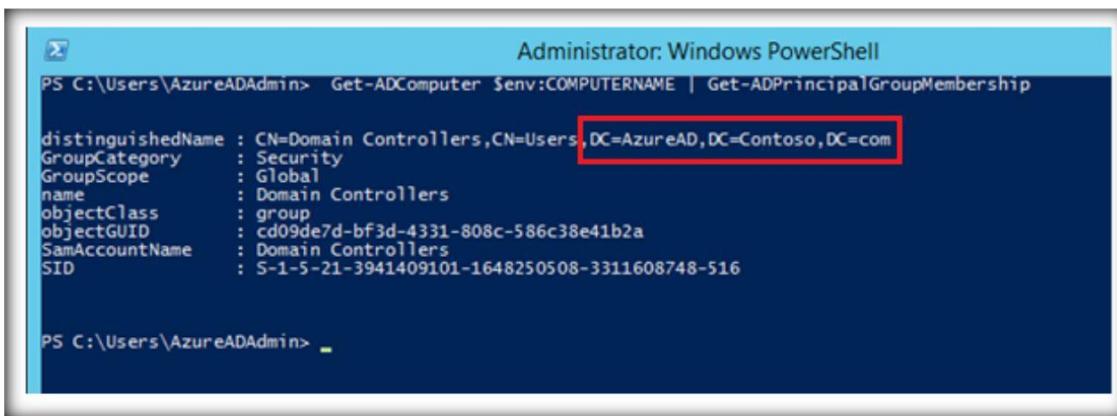
DistinguishedName : CN=SPSearch,CN=Users,DC=AzureAD,DC=Contoso,DC=com
Enabled          : True
GivenName        : SPSearch
Name              : SPSearch
ObjectClass      : user
ObjectGUID       : 81a0b712-f50a-42bb-8cdf-b84dc5456fe9
SamAccountName   : SPSearch
SID              : S-1-5-21-3941409101-1648250508-3311608748-29602
Surname          :
UserPrincipalName : SPSearch@AzureAD.Contoso.com

DistinguishedName : CN=MSOL_574e564ce7bd,CN=Users,DC=AzureAD,DC=Contoso,DC=com
Enabled          : True
GivenName        : MSOL_574e564ce7bd
Name              : MSOL_574e564ce7bd
ObjectClass      : user
ObjectGUID       : 5548c7aa-1ddc-4230-b53e-2d37d8280f23
SamAccountName   : MSOL_574e564ce7bd
SID              : S-1-5-21-3941409101-1648250508-3311608748-32607
Surname          :
UserPrincipalName : MSOL_574e564ce7bd@AzureAD.Contoso.com

DistinguishedName : CN=AAD_9b0c27f7db18,CN=Users,DC=AzureAD,DC=Contoso,DC=com
```

Run the script given below to get the distinguished name of the domain controller, which we will need to use in PowerShell script.

```
Get-ADComputer $env:COMPUTERNAME | Get-ADPrincipalGroupMembership
```



```
Administrator: Windows PowerShell
PS C:\Users\AzureADAdmin> Get-ADComputer $env:COMPUTERNAME | Get-ADPrincipalGroupMembership

distinguishedName : CN=Domain Controllers,CN=Users,DC=AzureAD,DC=Contoso,DC=com
GroupCategory     : Security
GroupScope        : Global
name              : Domain Controllers
objectClass       : group
objectGUID        : cd09de7d-bf3d-4331-808c-586c38e41b2a
SamAccountName   : Domain Controllers
SID               : S-1-5-21-3941409101-1648250508-3311608748-516

PS C:\Users\AzureADAdmin>
```

Run the script given below to change the existing UPN (AzureAD.Contoso.com) to the new UPN (SharePointChronicle.com). The script given below will fetch each user from the current domain and replace the UPN with a new value, using the *Set-ADUser* command.

Import-Module ActiveDirectory

```
$existingUPNSuffix = "AzureAD.Contoso.com"

$newUPNSuffix = "SharePointChronicle.com"

$DN = "DC=AzureAD,DC=Contoso,DC=com"

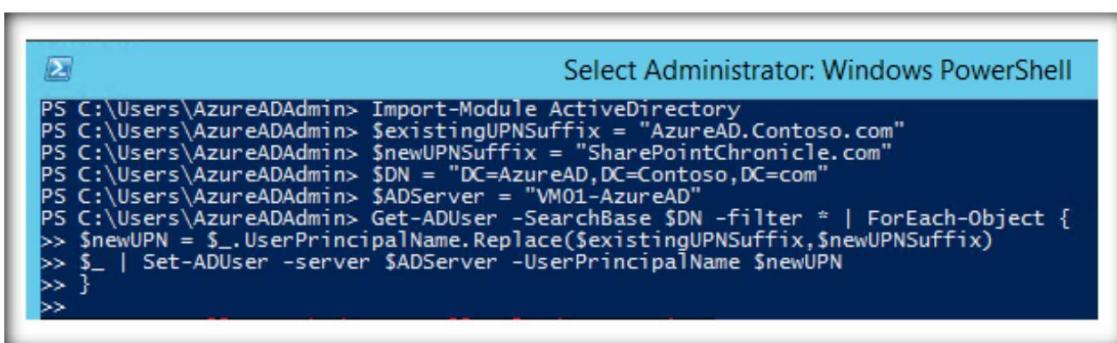
$ADServer = "VM01-AzureAD"

Get-ADUser -SearchBase $DN -filter * | ForEach-Object {

    $newUPN = $_.UserPrincipalName.Replace($existingUPNSuffix,$newUPNSuffix)

    $_ | Set-ADUser -server $ADServer -UserPrincipalName $newUPN

}
```

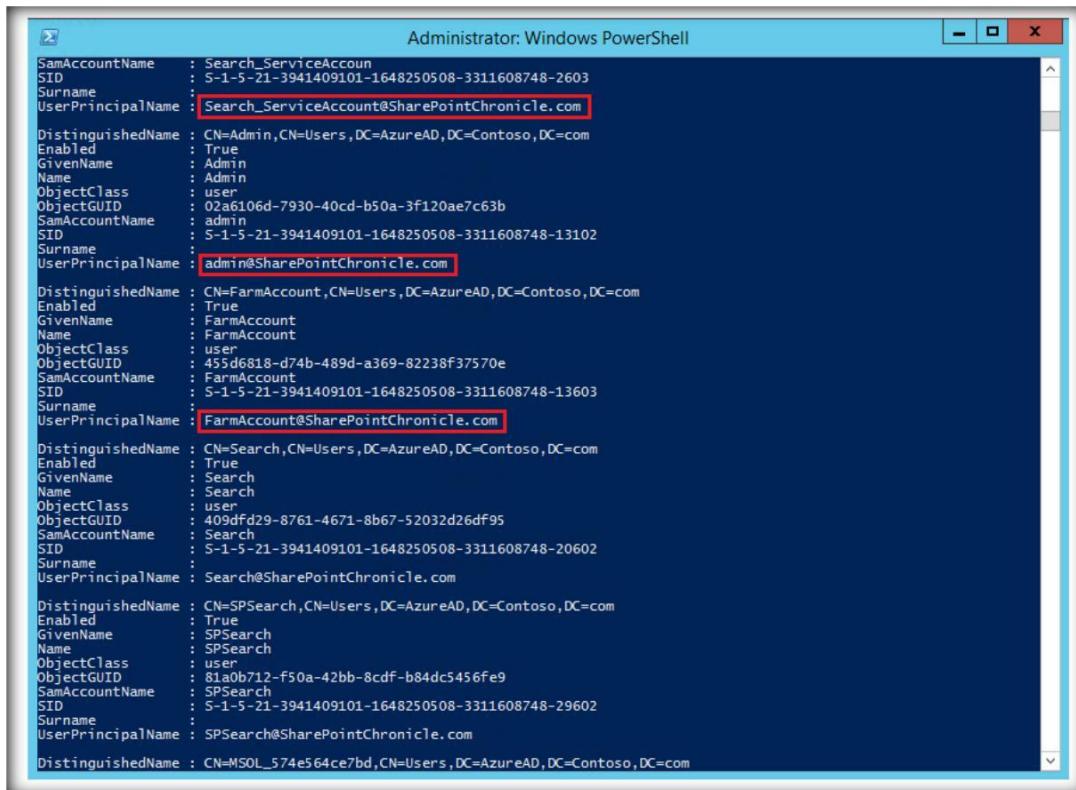


```
Select Administrator: Windows PowerShell
PS C:\Users\AzureADAdmin> Import-Module ActiveDirectory
PS C:\Users\AzureADAdmin> $existingUPNSuffix = "AzureAD.Contoso.com"
PS C:\Users\AzureADAdmin> $newUPNSuffix = "SharePointChronicle.com"
PS C:\Users\AzureADAdmin> $DN = "DC=AzureAD,DC=Contoso,DC=com"
PS C:\Users\AzureADAdmin> $ADServer = "VM01-AzureAD"
PS C:\Users\AzureADAdmin> Get-ADUser -SearchBase $DN -filter * | ForEach-Object {
>>     $newUPN = $_.UserPrincipalName.Replace($existingUPNSuffix,$newUPNSuffix)
>>     $_ | Set-ADUser -server $ADServer -UserPrincipalName $newUPN
>> }
```

Post running of the script shown above, let's see, if the UPN has changed. Run the *Get-ADUser* command to retrieve the users in the domain.

```
Get-ADComputer $env:COMPUTERNAME | Get-ADPrincipalGroupMembership
```

After running the script, the UPN has changed from *AzureAD.Contoso.com* to *SharePointChronicle.com*.



```
Administrator: Windows PowerShell
SamAccountName : Search_ServiceAccount
SID             : S-1-5-21-3941409101-1648250508-3311608748-2603
Surname         : 
UserPrincipalName : Search_ServiceAccount@SharePointChronicle.com

DistinguishedName : CN=Admin,CN=Users,DC=AzureAD,DC=Contoso,DC=com
Enabled          : True
GivenName        : Admin
Name             : Admin
ObjectClass      : user
ObjectGUID       : 02a6106d-7930-40cd-b50a-3f120ae7c63b
SamAccountName   : admin
SID              : S-1-5-21-3941409101-1648250508-3311608748-13102
Surname         : 
UserPrincipalName : admin@SharePointChronicle.com

DistinguishedName : CN=FarmAccount,CN=Users,DC=AzureAD,DC=Contoso,DC=com
Enabled          : True
GivenName        : FarmAccount
Name             : FarmAccount
ObjectClass      : user
ObjectGUID       : 455d6818-d74b-489d-a369-82238f37570e
SamAccountName   : FarmAccount
SID              : S-1-5-21-3941409101-1648250508-3311608748-13603
Surname         : 
UserPrincipalName : FarmAccount@SharePointChronicle.com

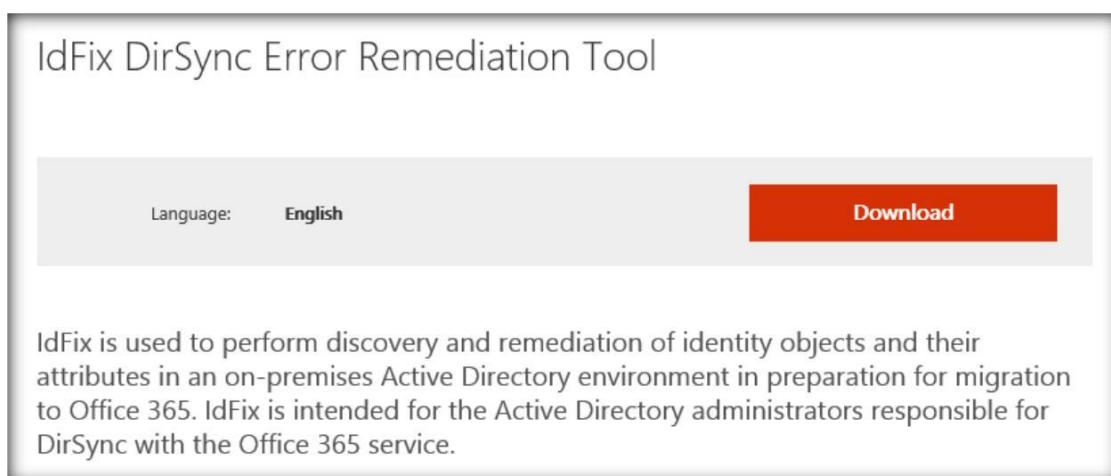
DistinguishedName : CN=Search,CN=Users,DC=AzureAD,DC=Contoso,DC=com
Enabled          : True
GivenName        : Search
Name             : Search
ObjectClass      : user
ObjectGUID       : 409df429-8761-4671-8b67-52032d26df95
SamAccountName   : Search
SID              : S-1-5-21-3941409101-1648250508-3311608748-20602
Surname         : 
UserPrincipalName : Search@SharePointChronicle.com

DistinguishedName : CN=SPSearch,CN=Users,DC=AzureAD,DC=Contoso,DC=com
Enabled          : True
GivenName        : SPSearch
Name             : SPSearch
ObjectClass      : user
ObjectGUID       : 81a0b712-f50a-42bb-8cdf-b84dc5456fe9
SamAccountName   : SPSearch
SID              : S-1-5-21-3941409101-1648250508-3311608748-29602
Surname         : 
UserPrincipalName : SPSearch@SharePointChronicle.com

DistinguishedName : CN=MSOL_574e564ce7bd,CN=Users,DC=AzureAD,DC=Contoso,DC=com
```

Fix Active Directory issues.

Before synchronizing the active directory, we have to make sure that the active directory is devoid of errors like duplicates and formatting issues. IdFix is a tool, which identifies issues with the active directory identity objects and provides remediation measures to overcome it. It can be downloaded from Microsoft [site](#).



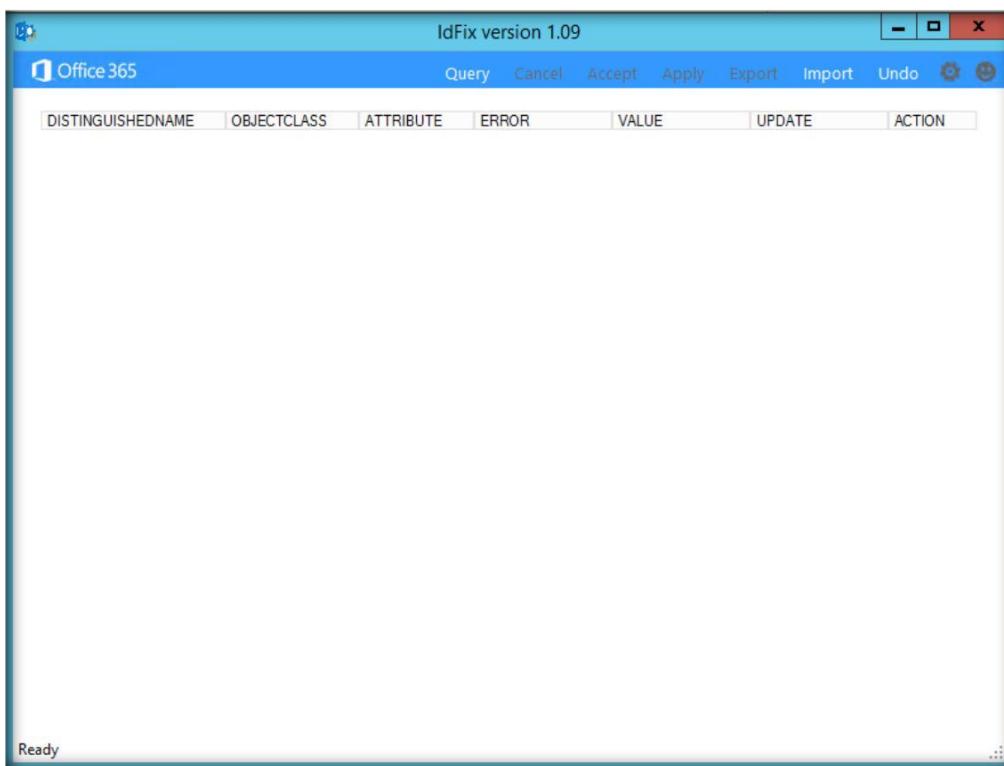
IdFix DirSync Error Remediation Tool

Language: **English**

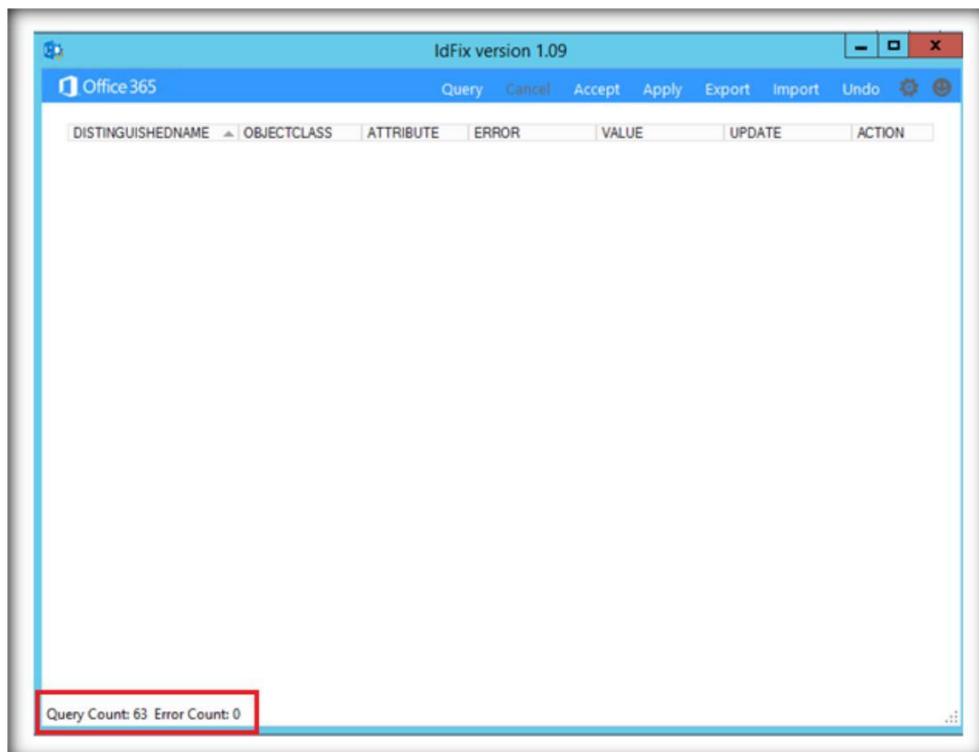
Download

IdFix is used to perform discovery and remediation of identity objects and their attributes in an on-premises Active Directory environment in preparation for migration to Office 365. IdFix is intended for the Active Directory administrators responsible for DirSync with the Office 365 service.

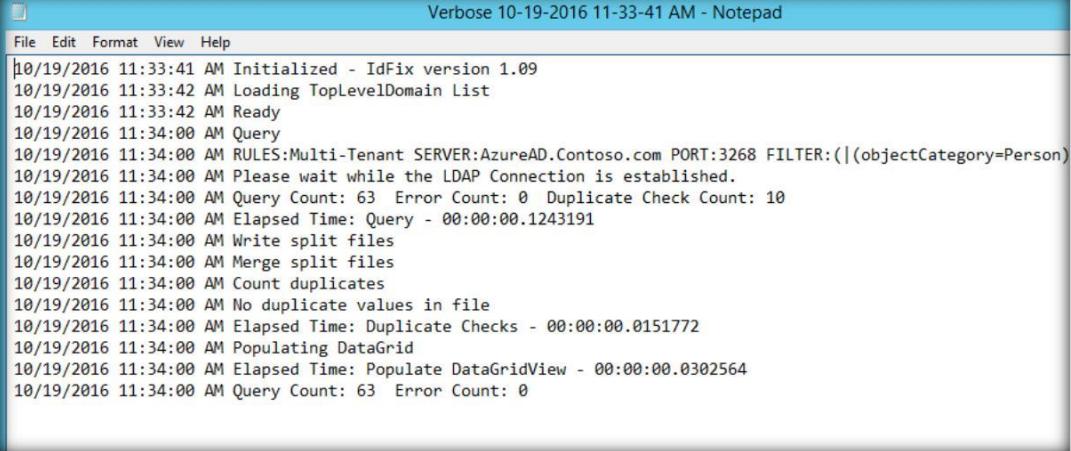
Once it is downloaded, unzip the file and run IdFix tool.



Click Query option to start scanning of the Active Directory identity objects. You can see the number of objects scanned and errors returned in the bottom section of the tool.



In case of any errors, it will list out the errors and the remediation measures, which are required to be done. We can also get a verbose log file of the scan done by the IdFix tool in the location, where IdFix is placed. The log file will give a detailed scan report.

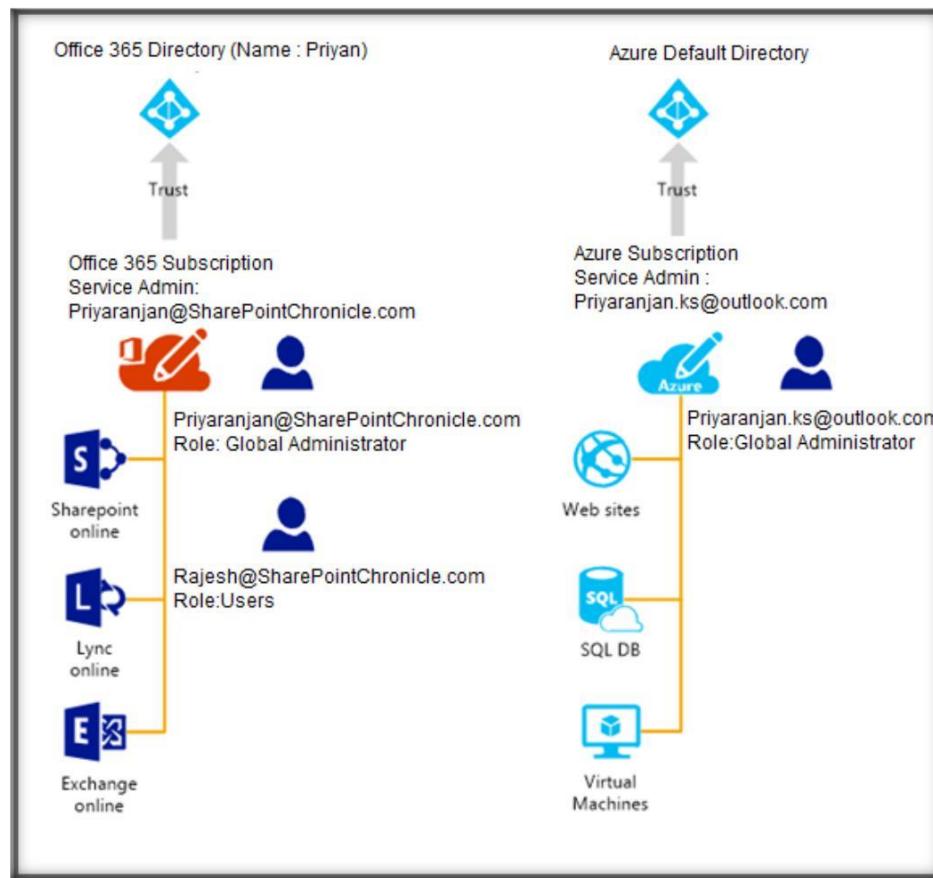


The screenshot shows a Notepad window titled "Verbose 10-19-2016 11-33-41 AM - Notepad". The window contains a log of events from the IdFix tool:

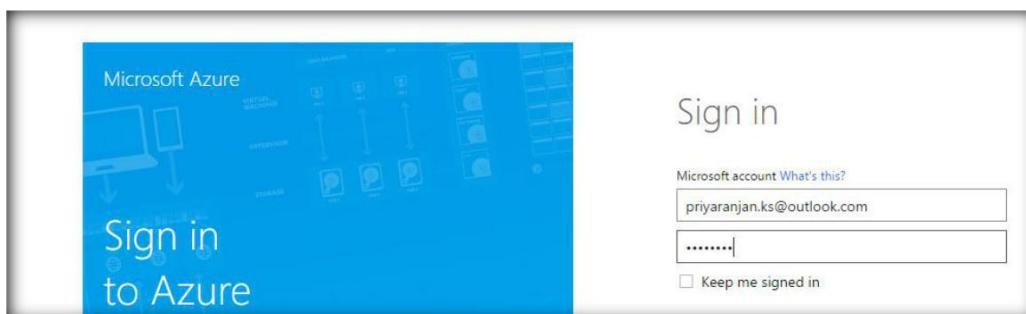
```
File Edit Format View Help
10/19/2016 11:33:41 AM Initialized - IdFix version 1.09
10/19/2016 11:33:42 AM Loading TopLevelDomain List
10/19/2016 11:33:42 AM Ready
10/19/2016 11:34:00 AM Query
10/19/2016 11:34:00 AM RULES:Multi-Tenant SERVER:AzureAD.Contoso.com PORT:3268 FILTER:(|(objectCategory=Person)
10/19/2016 11:34:00 AM Please wait while the LDAP Connection is established.
10/19/2016 11:34:00 AM Query Count: 63 Error Count: 0 Duplicate Check Count: 10
10/19/2016 11:34:00 AM Elapsed Time: Query - 00:00:00.1243191
10/19/2016 11:34:00 AM Write split files
10/19/2016 11:34:00 AM Merge split files
10/19/2016 11:34:00 AM Count duplicates
10/19/2016 11:34:00 AM No duplicate values in file
10/19/2016 11:34:00 AM Elapsed Time: Duplicate Checks - 00:00:00.0151772
10/19/2016 11:34:00 AM Populating DataGridView
10/19/2016 11:34:00 AM Elapsed Time: Populate DataGridView - 00:00:00.0302564
10/19/2016 11:34:00 AM Query Count: 63 Error Count: 0
```

5. Manage Office 365 Subscription Directory from Azure

Before starting to synchronize On-Premise Active Directory with Office 365, we have to enable the management of Office 365 directory from Azure. By Default, when we create an Azure Subscription, the Service admin will have an access to the default directory, which gets created along with Azure subscription. In addition to it, we will create a mirror copy of the Office 365 Directory in Azure, so that we can manage and synchronize On-Premise directory with Office 365 Directory in Azure AD.



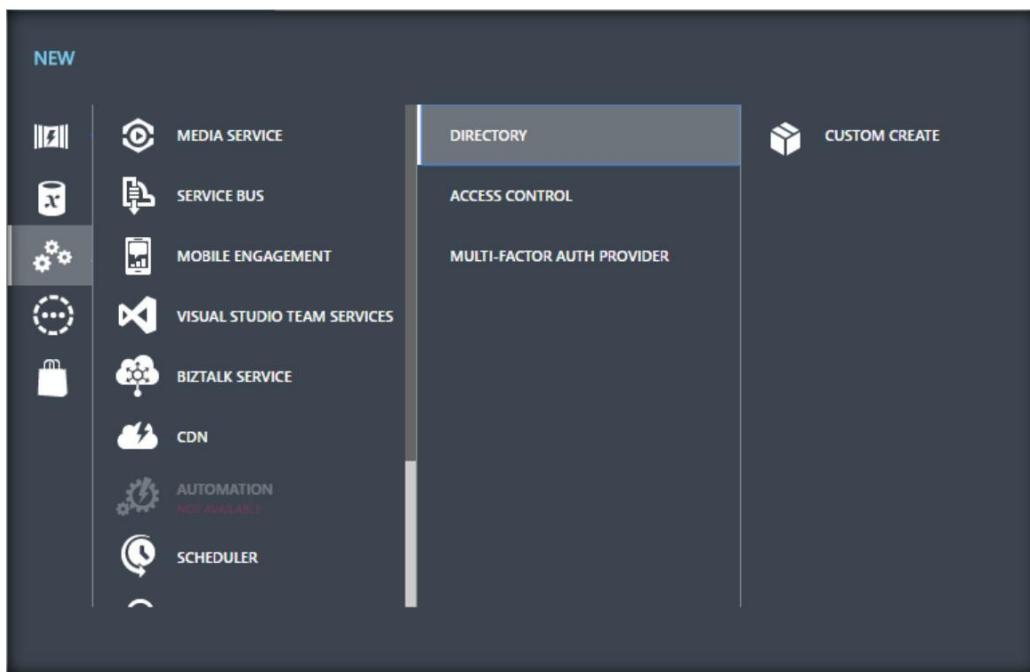
In order to do this, sign in to Azure subscription, using your Azure credentials. In my case, it is priyarnajan.ks@outlook.com.



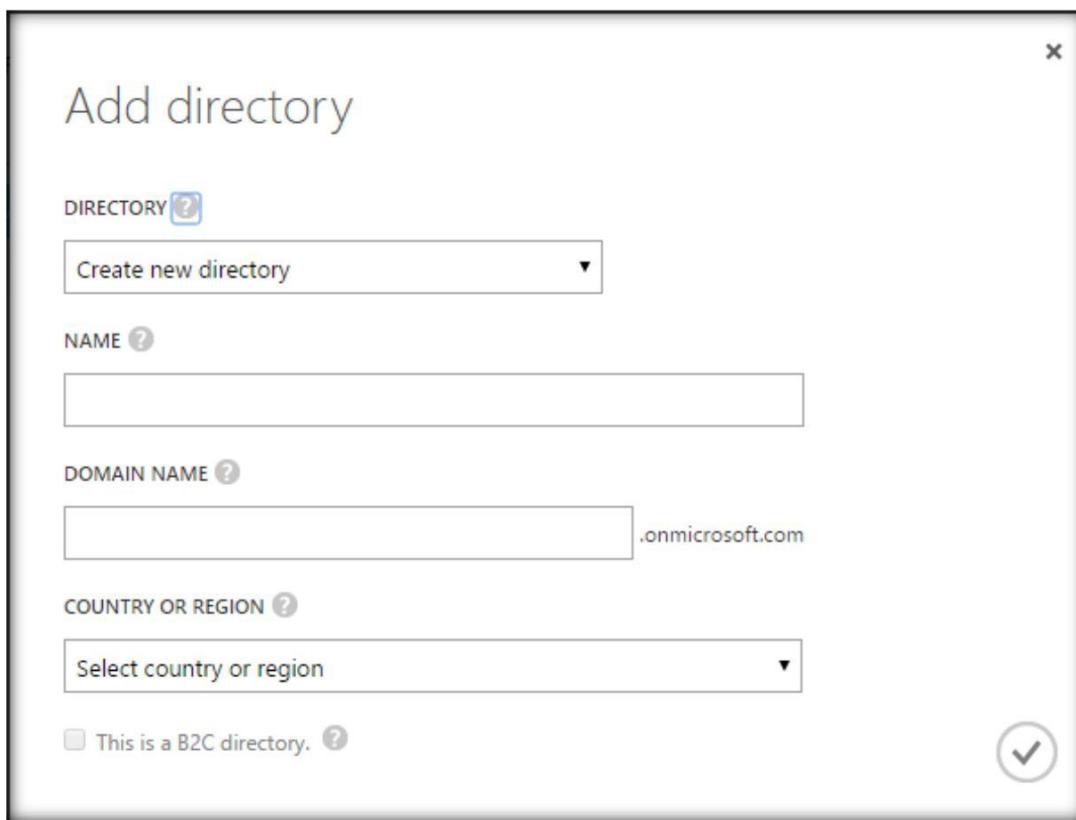
From the active directory tab, click *New*.



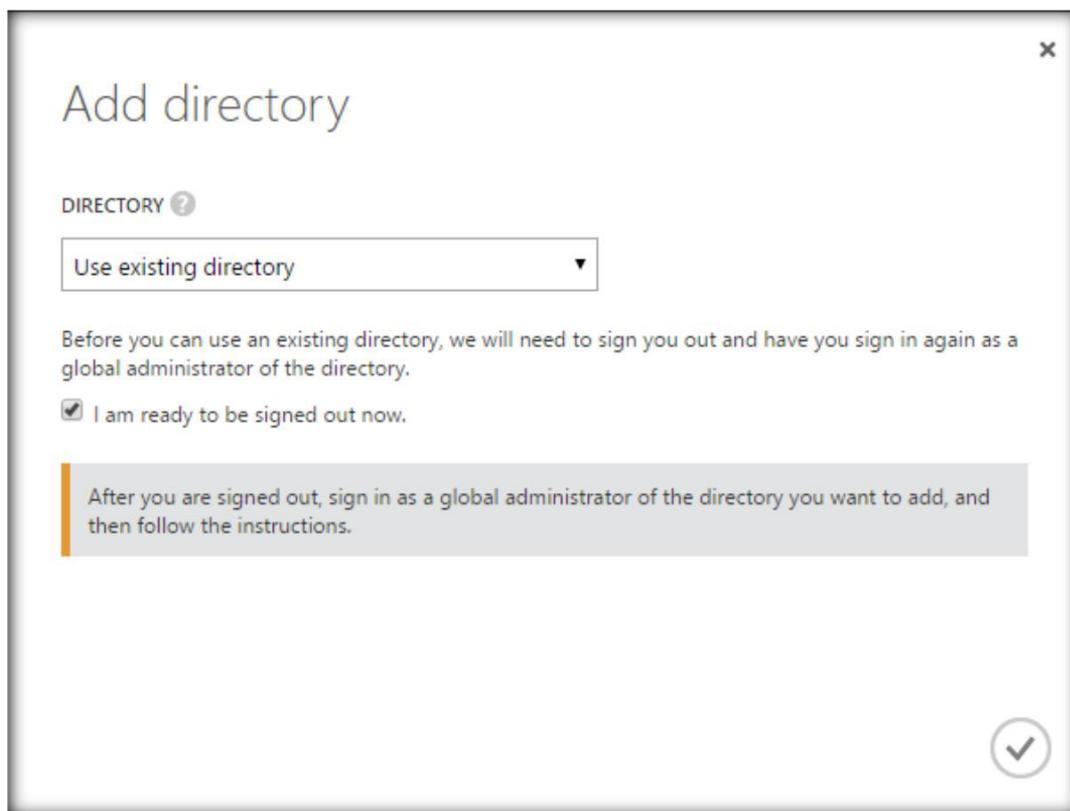
Select *Directory* and click *Custom Create*.



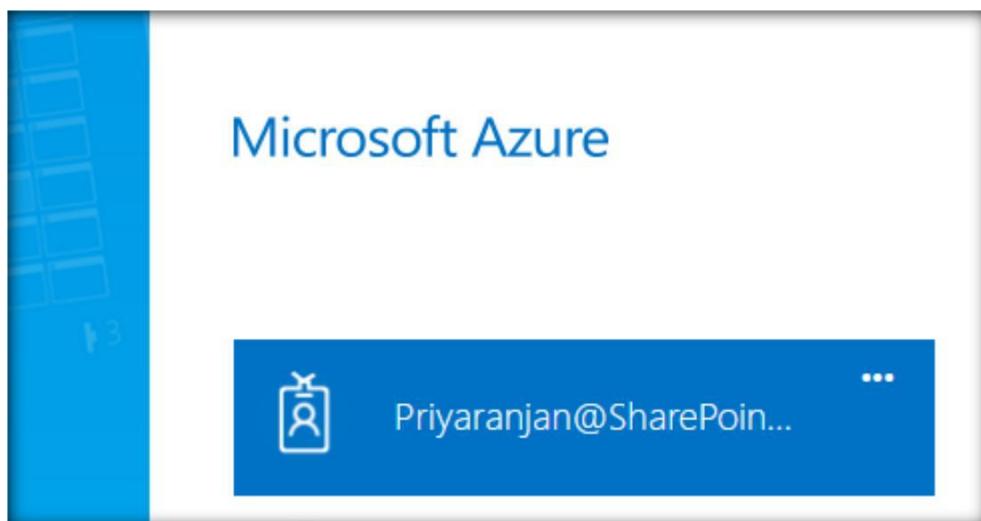
This will open up the Window, where we can create a new Azure Active Directory with the default option of *creating new directory*.



Change the option value to *Use existing directory*. Also, make sure that you select the check box, “Iam ready to be signed out now”. Click on the tick mark to proceed with the sign out process. What this will do is sign you out of Azure subscription and you will have to log in with the credentials of Office 365 Directory global administrator.

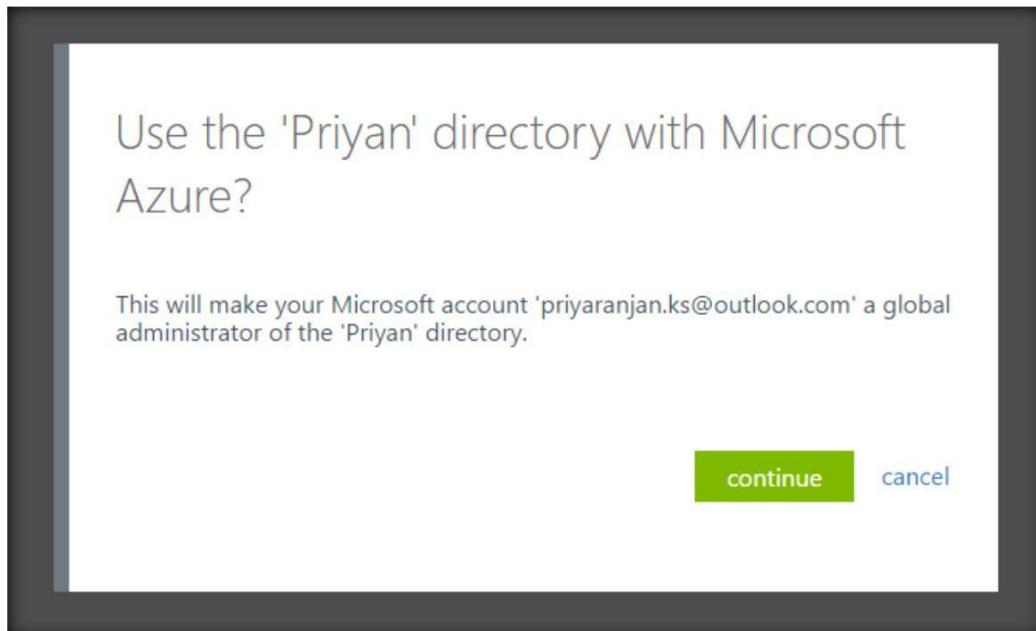


Now, log in again with Office 365 Global administrator credentials.

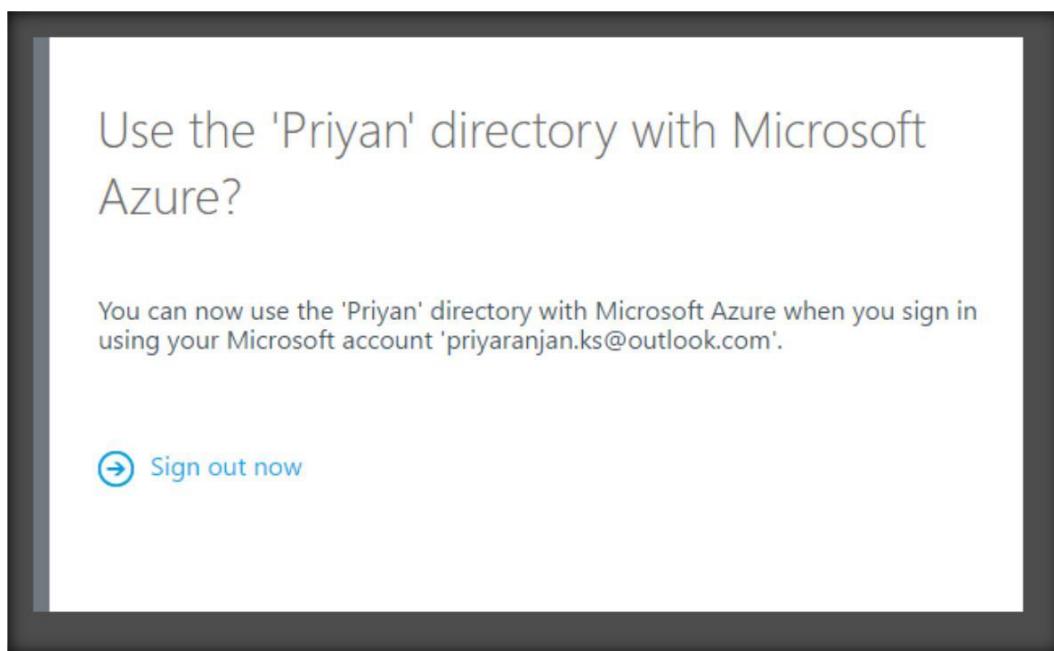


This time, you will be asked if Office 365 Directory (in my case *Priyan*) can be used with Azure. If we click continue, Azure administrator will be made; the global administrator for both Azure AD as well as Office 365 Directory. In this way, we can manage both the directories in one place. In our case, we are really not concerned about any other Azure directories, but in order to synchronize On-Premise directory with Office 365 and Office 365 directory has to be manageable from Azure. This was the primary reason, why we are

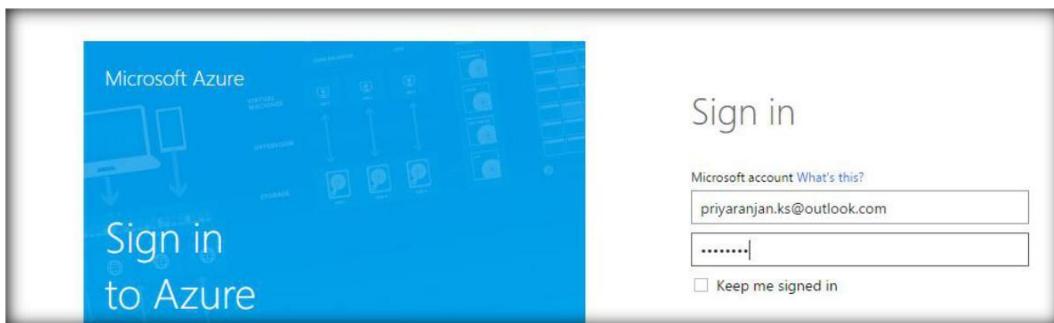
bringing over Office 365 directory to Azure subscription. In this way, we can use Azure AD Connect software to synchronize On-Premise AD with Azure AD.



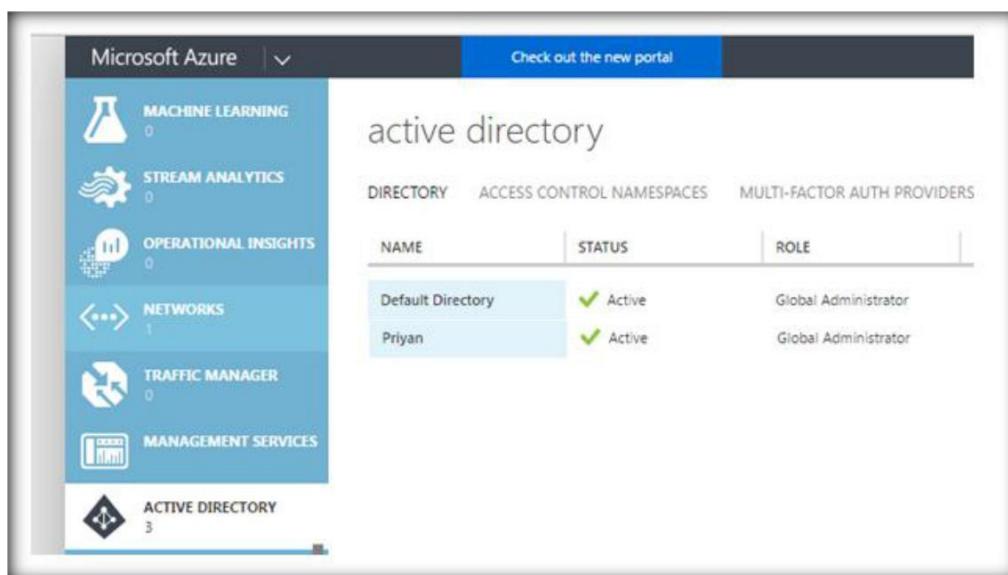
Click Sign out now.



Now, log in back to Azure subscription, using your Azure credentials.



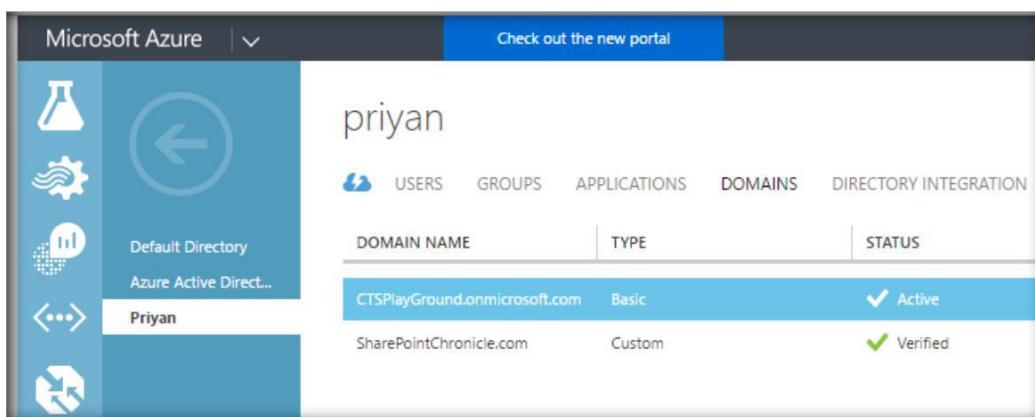
Heading over to Active Directory tab, we can see Office 365 Directory is present in the listing along with the default directory.



The screenshot shows the Microsoft Azure Active Directory management portal. On the left sidebar, under the "ACTIVE DIRECTORY" section, there are two entries: "Default Directory" and "Priyan". The main area displays a table with columns: NAME, STATUS, and ROLE. The table contains two rows:

NAME	STATUS	ROLE
Default Directory	Active	Global Administrator
Priyan	Active	Global Administrator

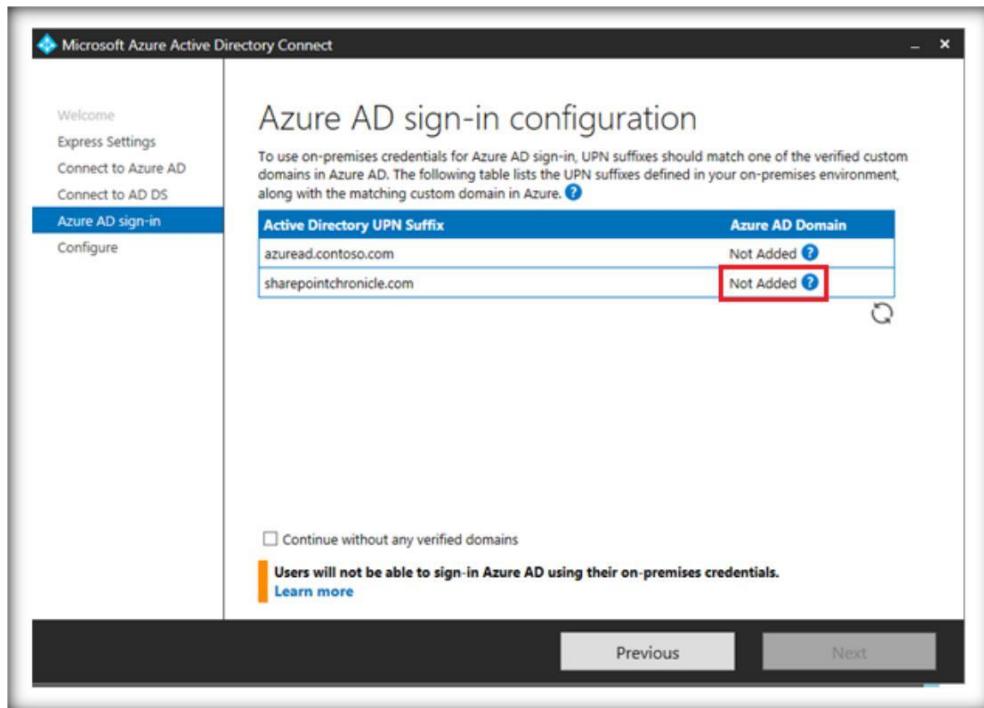
Click on it and going to the Domains tab, we can see the domains in the Office 365 Active Directory. Here, we can see the newly added public domain *SharePointChronicle.com* as well.



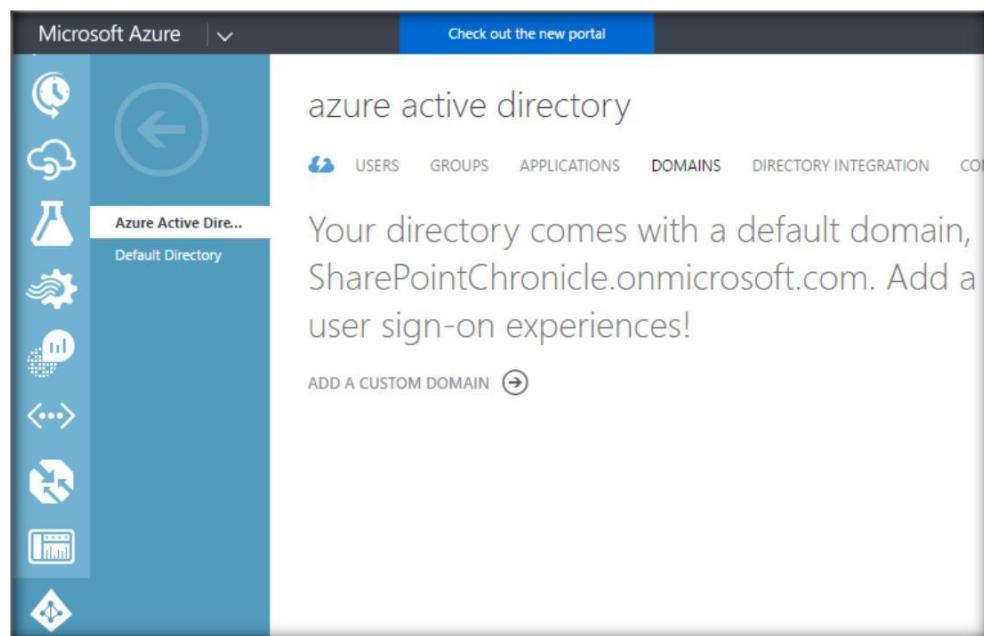
The screenshot shows the Microsoft Azure Active Directory Domains management portal. On the left sidebar, under the "ACTIVE DIRECTORY" section, there are three entries: "Default Directory", "Azure Active Direct...", and "Priyan". The "Priyan" entry is selected. The main area displays a table with columns: DOMAIN NAME, TYPE, and STATUS. The table contains two rows:

DOMAIN NAME	TYPE	STATUS
CTSPlayGround.onmicrosoft.com	Basic	Active
SharePointChronicle.com	Custom	Verified

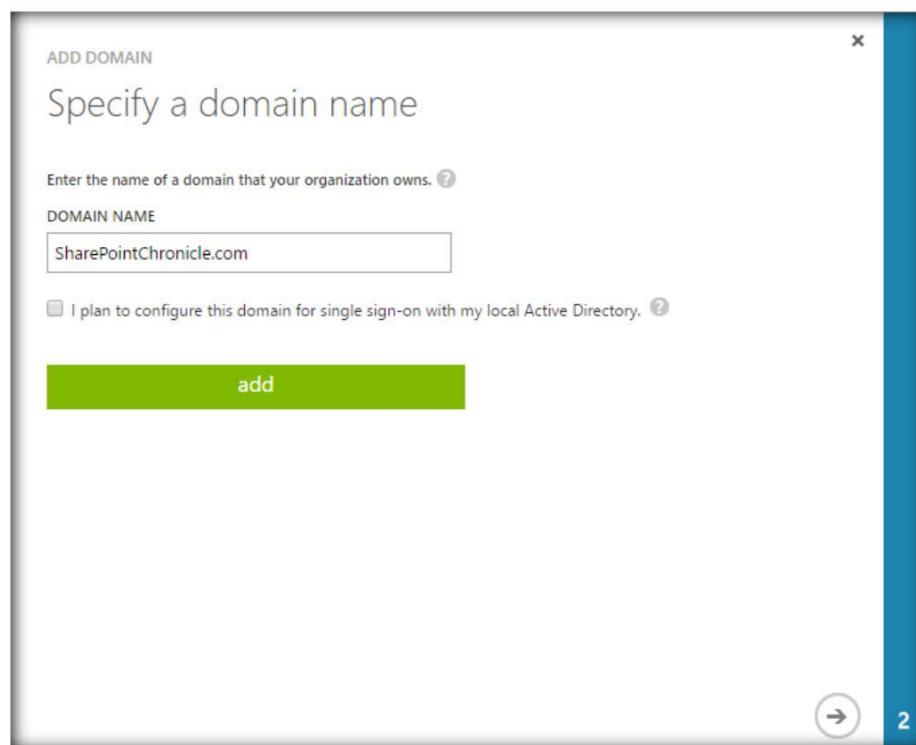
The adding and verification of the domain is an important step, else we will not be able to sign in to Azure AD, using On-Premise credentials. The screenshot shown below would come across while synchronizing On-Premise AD with Azure AD.



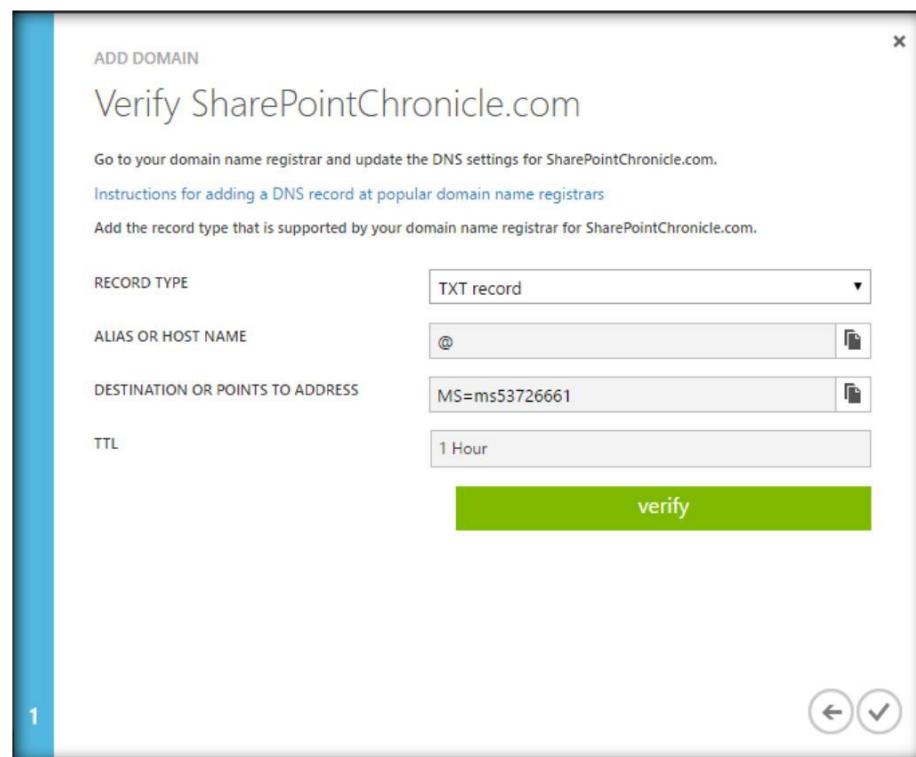
In case, your public domain status is not verified or the domain name does not show up in the Domain page, then proceed with the steps, given below.



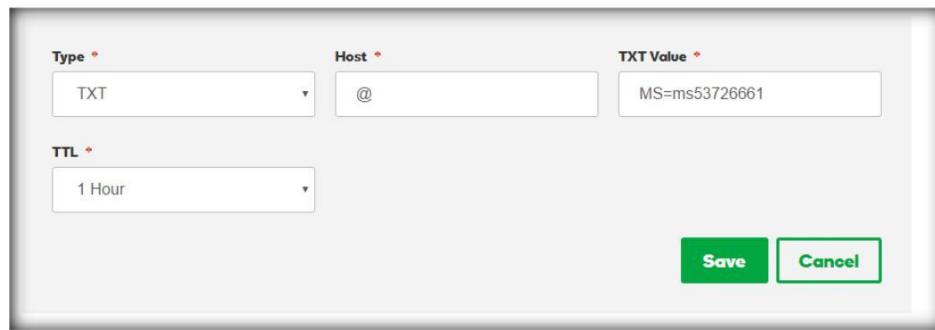
Specify the public domain name registered with Office 365 and click add.



Now, in order to do the verification of the domain, as we will be provided with a set of record values, which we will have to add in the domain management page of the domain registrar.



Add the values specified above to the domain record in the domain registrar's site. In my case, it is *GoDaddy*.



The screenshot shows a form for creating or modifying a DNS record. The fields are as follows:

- Type: TXT
- Host: @
- TXT Value: MS=ms53726661
- TTL: 1 Hour

At the bottom right are two buttons: "Save" and "Cancel".

Click *Save* and go back to the Azure domain's page and click *verify* to complete the domain verification.

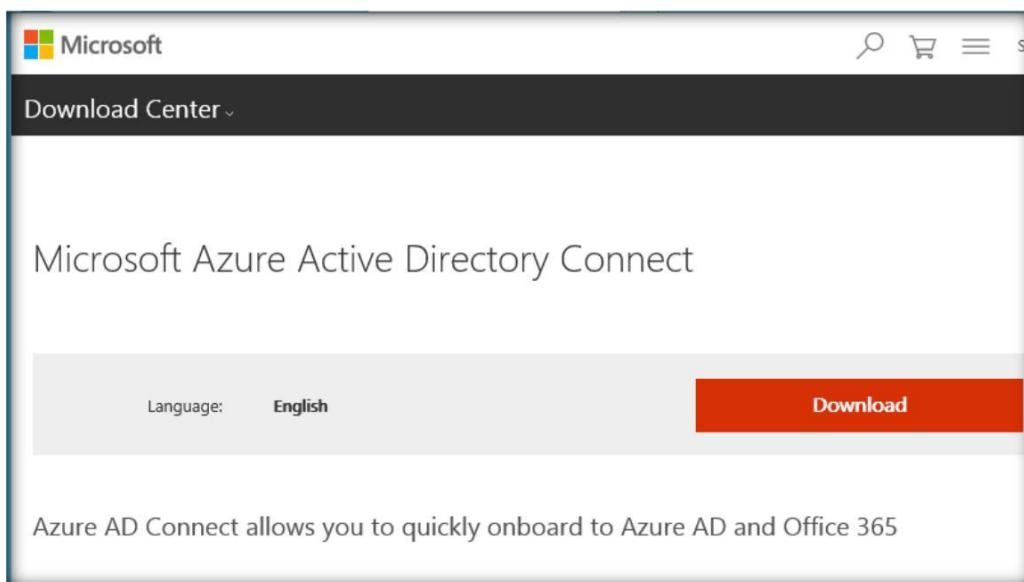
6. Sync Azure AD

Once the Active Directory is in a healthy state and assured to be devoid of an identity object issue, we can plan to synchronize On-Premise active directory with Office 365. Now, we really don't have to manually recreate On-Premise user accounts in Office 365 as it is not only double the work but also adds up the risk of duplicating the user accounts. Directory Synchronization comes into play, as it mirrors On-Premise directory in Office 365.

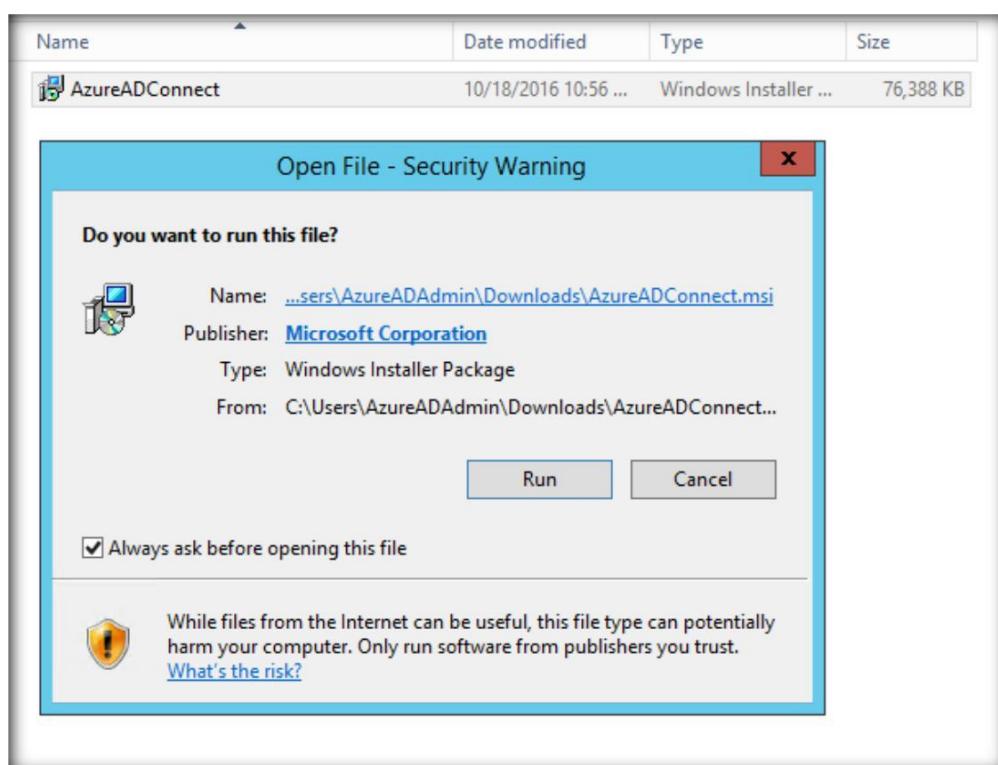
We have two types of Active Directory Sync.

- Directory Synchronization along with password synchronization- In this synchronization technique, the user accounts (Directory) are migrated to Office 365 along with their passwords. This means the user will have the same password for On-Premise environment as well as for Office 365. However, the user will have to authenticate separately when logging into On-Premise and Office 365 by providing the same credentials.
- Directory Synchronization with Single Sign On (SSO)- In this synchronization mechanism, the user logs in to the On-Premise environment and when they go to Office 365, they are automatically logged in.

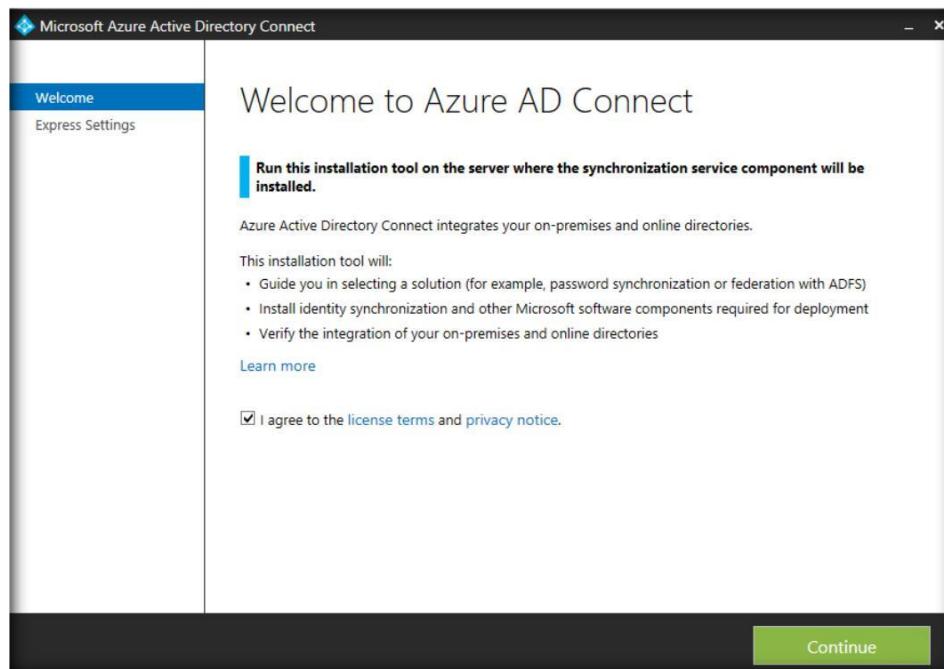
Directory Synchronization with Password Sync is the most common Active Directory synchronization used. We can use Azure Active Directory Connect to implement On-Premise and Office 365 directory synchronization. We can download Azure AD Connect from [Microsoftsite](#).



Once it is downloaded, run the installer file.



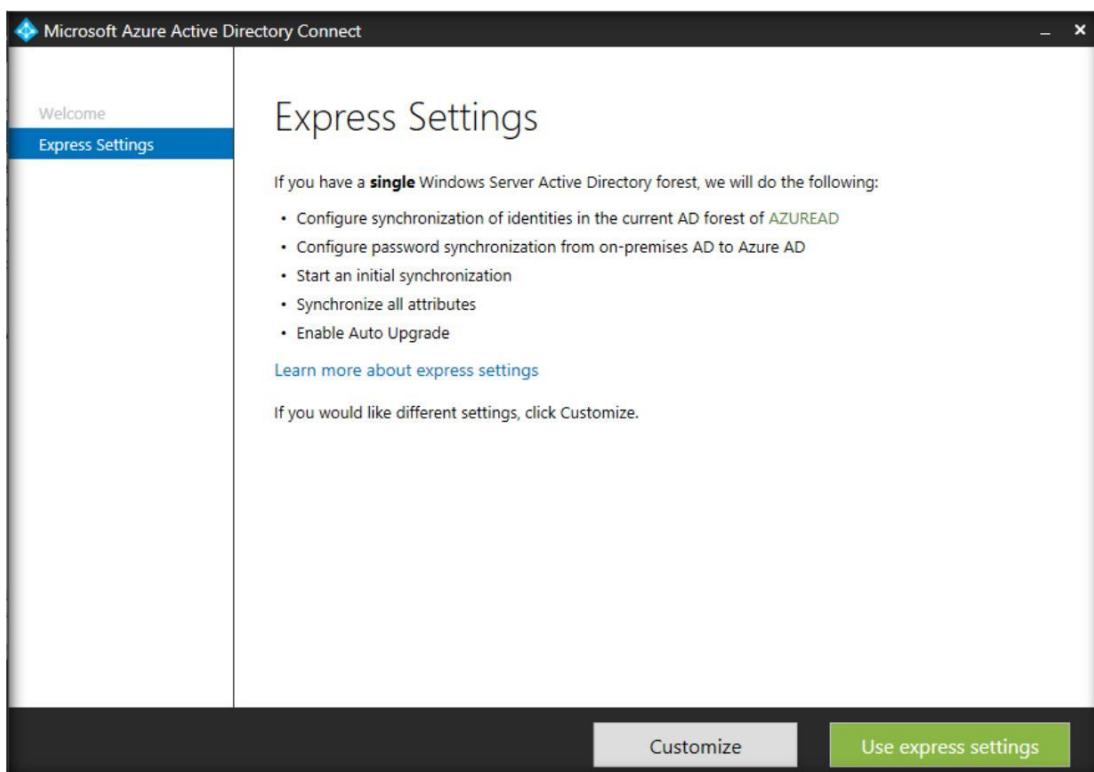
This will spin up Azure Active Directory Connect wizard. Accept the agreement and proceed.



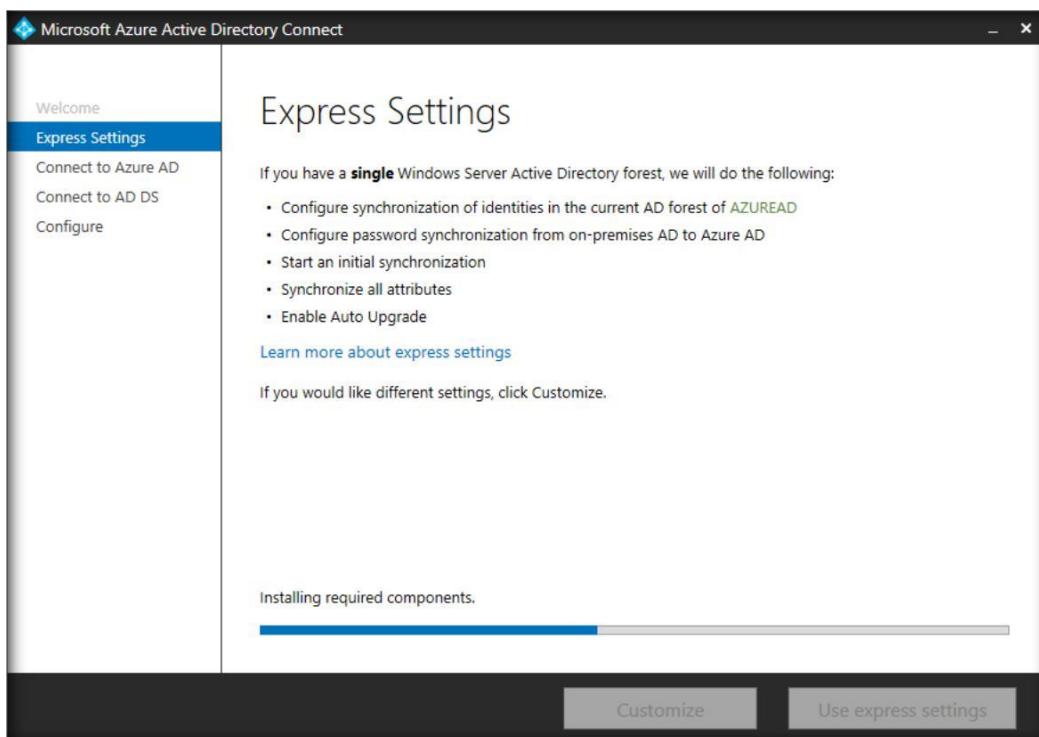
Here, we have two options given below.

- We can continue with Express settings, if we want to user Azure AD Connect to synchronize the directories (On-Premise with Office 365 along with Password Synchronization).
- Click Customize to set up Directory Synchronization with Single Sign On.

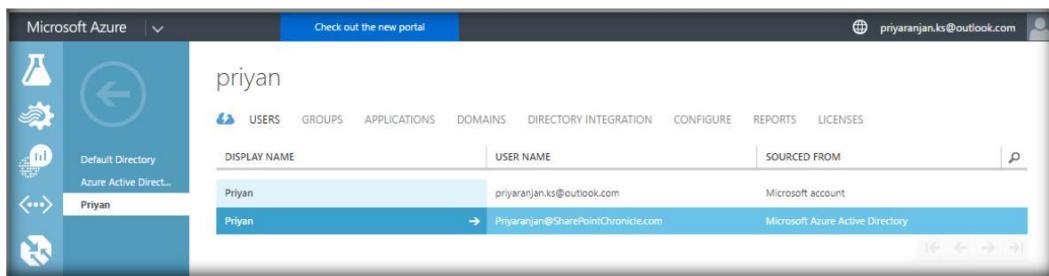
In this walkthrough, we will continue with Express settings.



This will start installing the required components in the local machine.



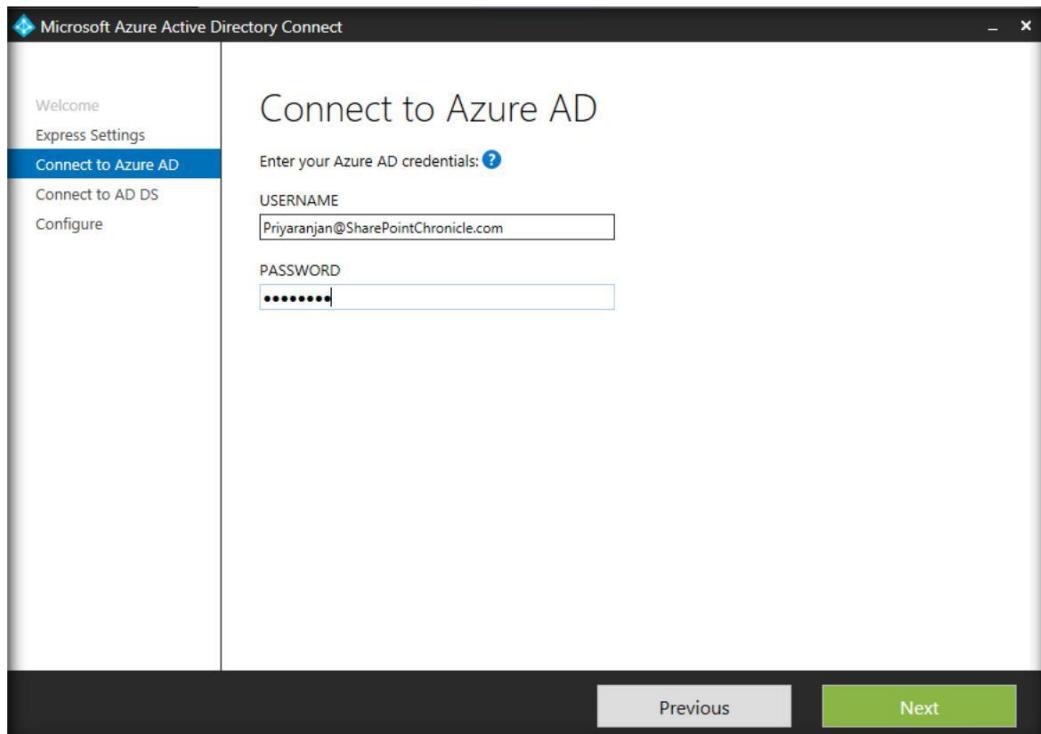
Now, in Azure Active Directory listing, we can see the users, who are the global administrators of Office 365 directory added to Azure.



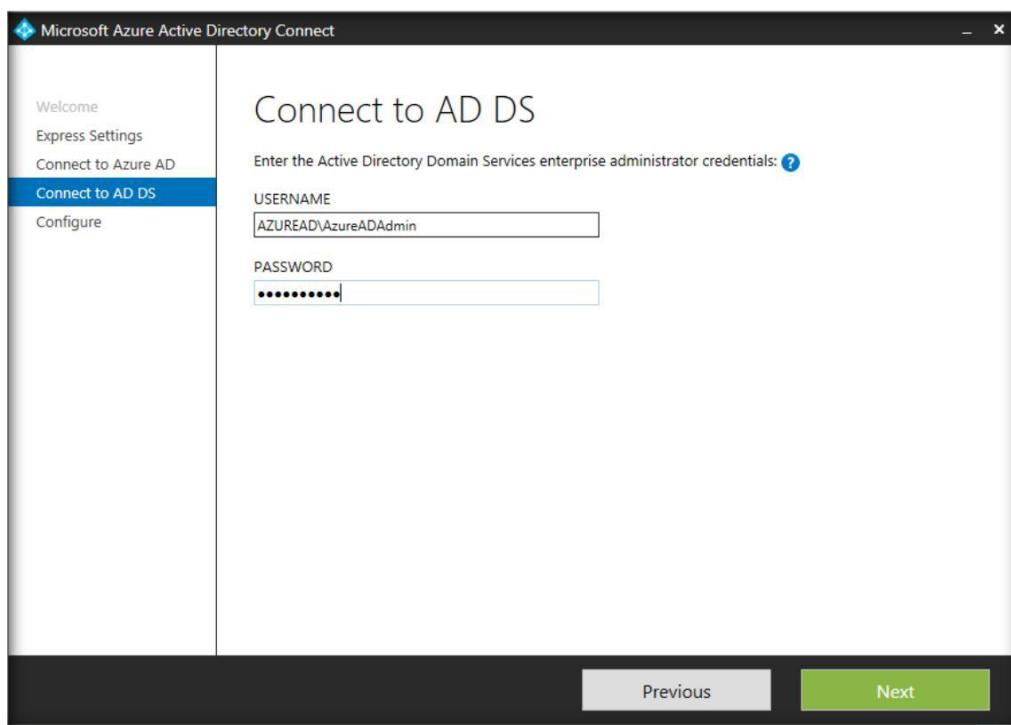
The screenshot shows the Microsoft Azure Active Directory portal. The left sidebar has icons for Default Directory, Azure Active Directory, and Priyan. The main area is titled 'priyan' and shows a table with two rows:

DISPLAY NAME	USER NAME	SOURCED FROM
Priyan	priyaranjan.ks@outlook.com	Microsoft account
Priyan	Priyaranjan@SharePointChronicle.com	Microsoft Azure Active Directory

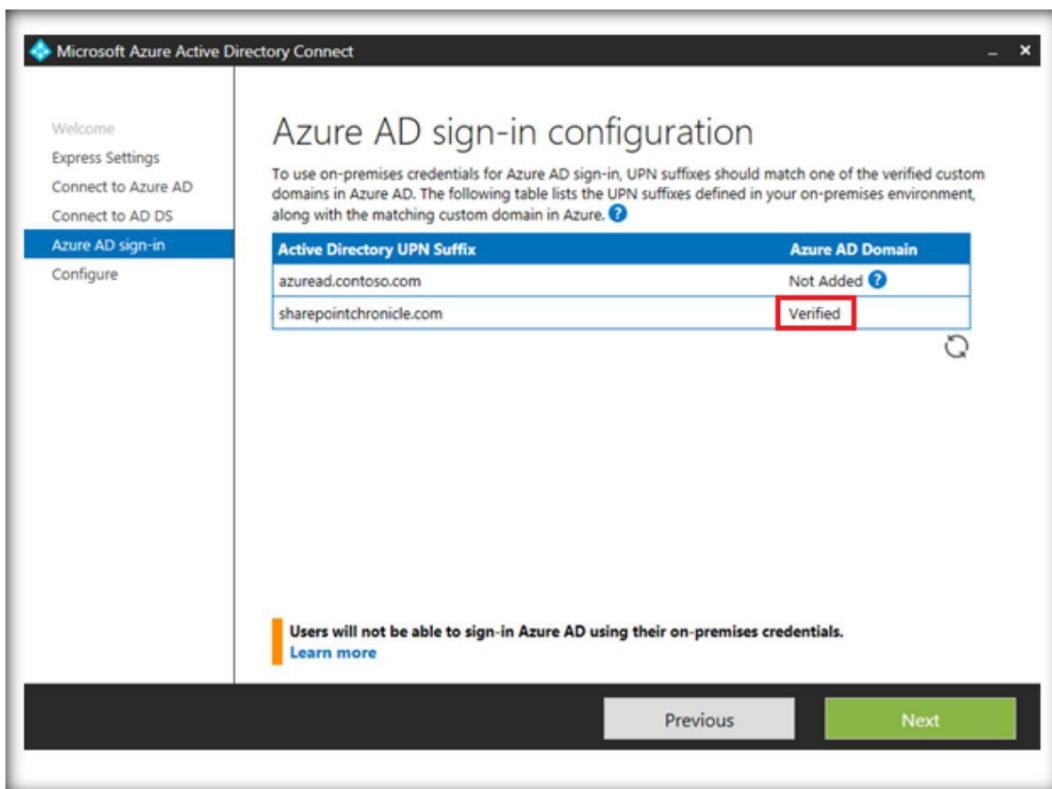
Enter the username and credential of the global administrator. Click Next.



The screenshot shows the 'Microsoft Azure Active Directory Connect' application window. The left sidebar has options: Welcome, Express Settings, Connect to Azure AD (which is selected), Connect to AD DS, and Configure. The main area is titled 'Connect to Azure AD' and says 'Enter your Azure AD credentials: ?'. It has two input fields: 'USERNAME' containing 'Priyaranjan@SharePointChronicle.com' and 'PASSWORD' containing '*****'. At the bottom are 'Previous' and 'Next' buttons, with 'Next' being green.



Here, you can see that in order to perform an Azure ad sign in the UPN prefixes, which we had added to On-Premise, Active directory should match with the verified public domain in Azure (SharePointChronicle.com).



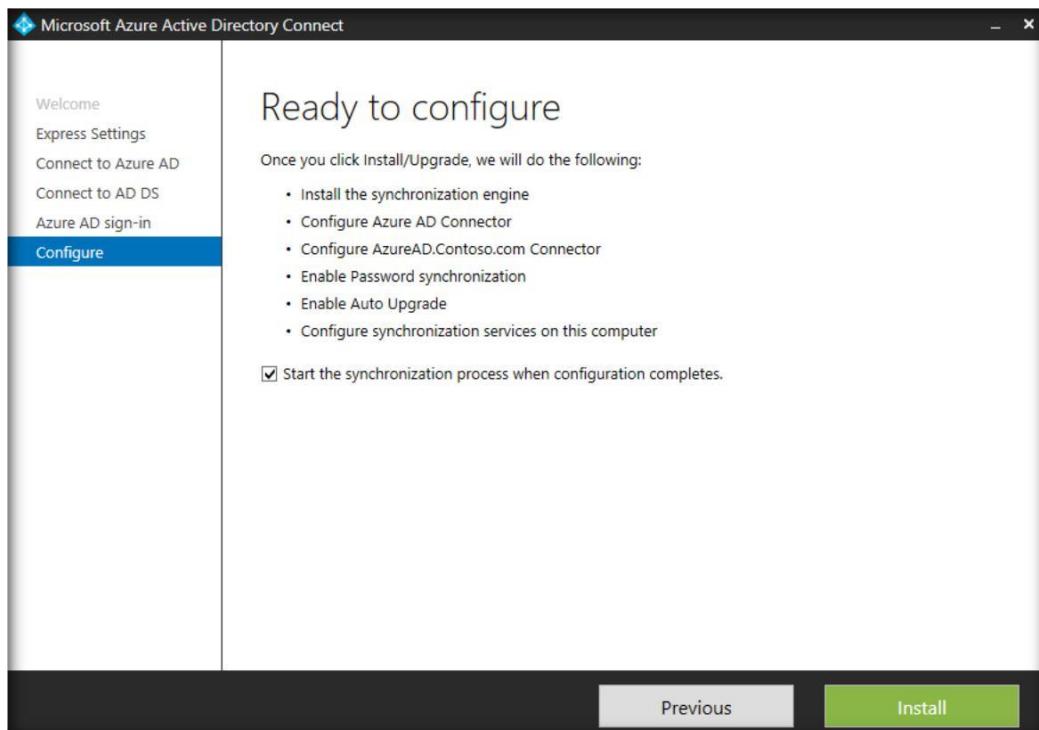
Thus, we have to ensure two things, which are

©2016 C# CORNER.

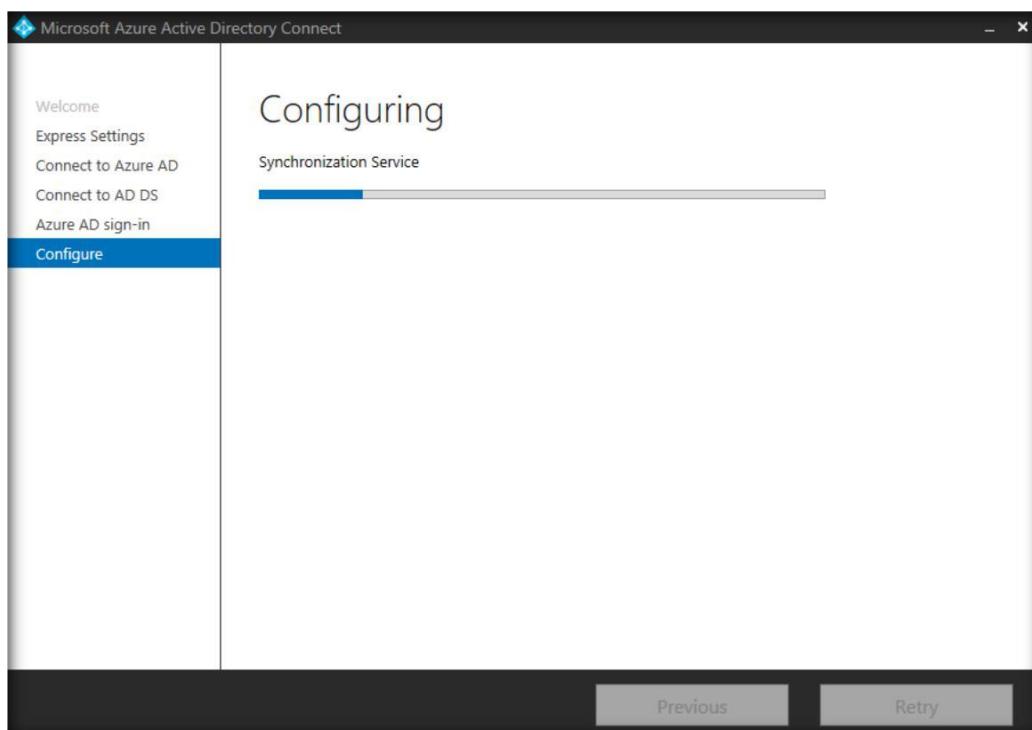
SHARE THIS DOCUMENT AS IT IS. PLEASE DO NOT REPRODUCE, REPUBLISH, CHANGE OR COPY.

- ✓ The public domain is added as UPN in the local On-Premise directory.
- ✓ The public domain is added and verified in Azure.

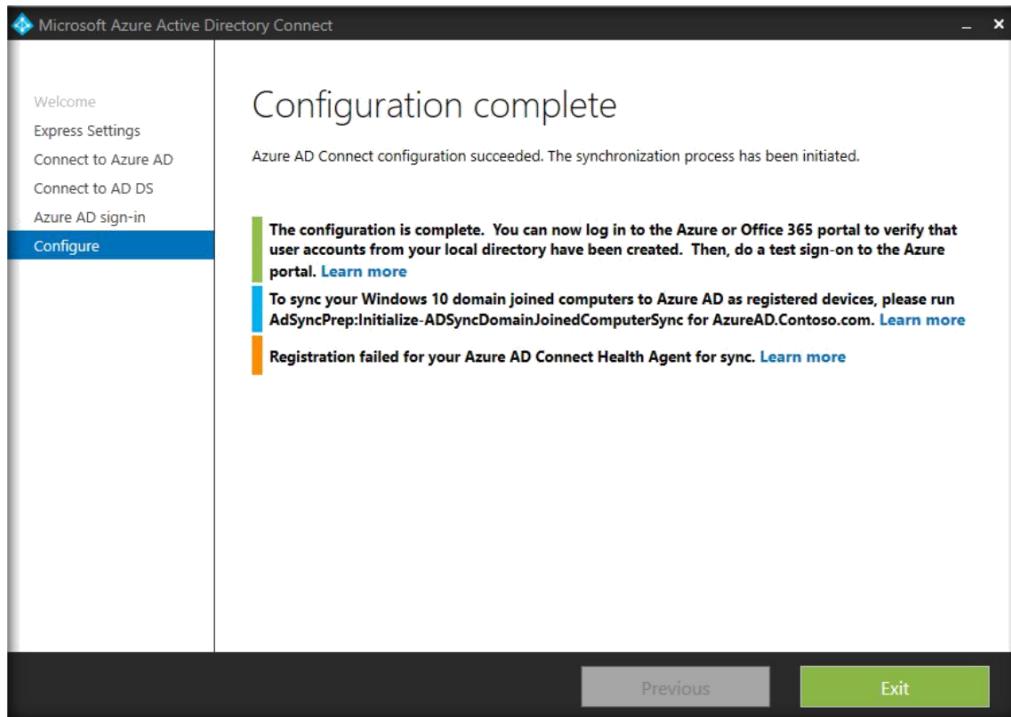
Once we have a verified the listed domain, click Next.



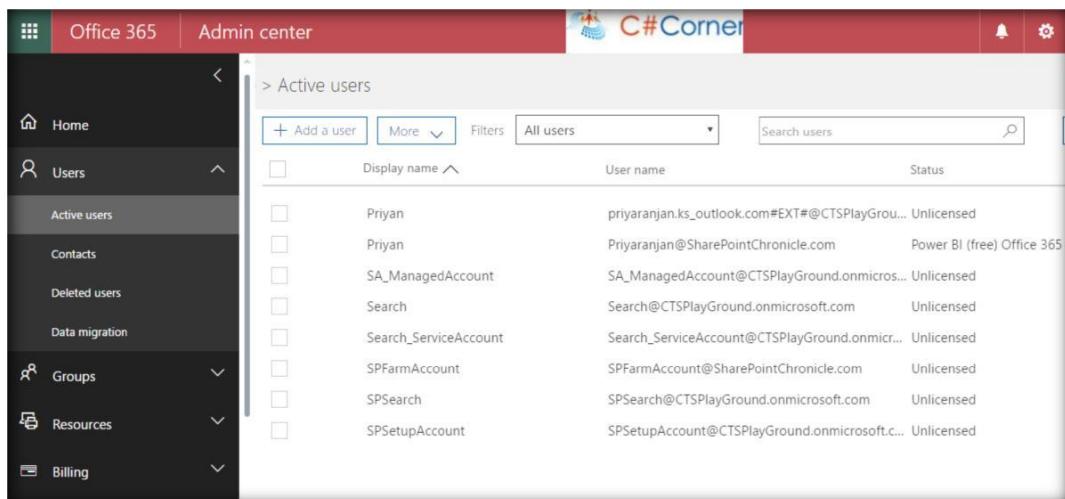
Click Install to start the synchronization process, once Azure AD Connect installation completes.



Finally, the configuration has completed.

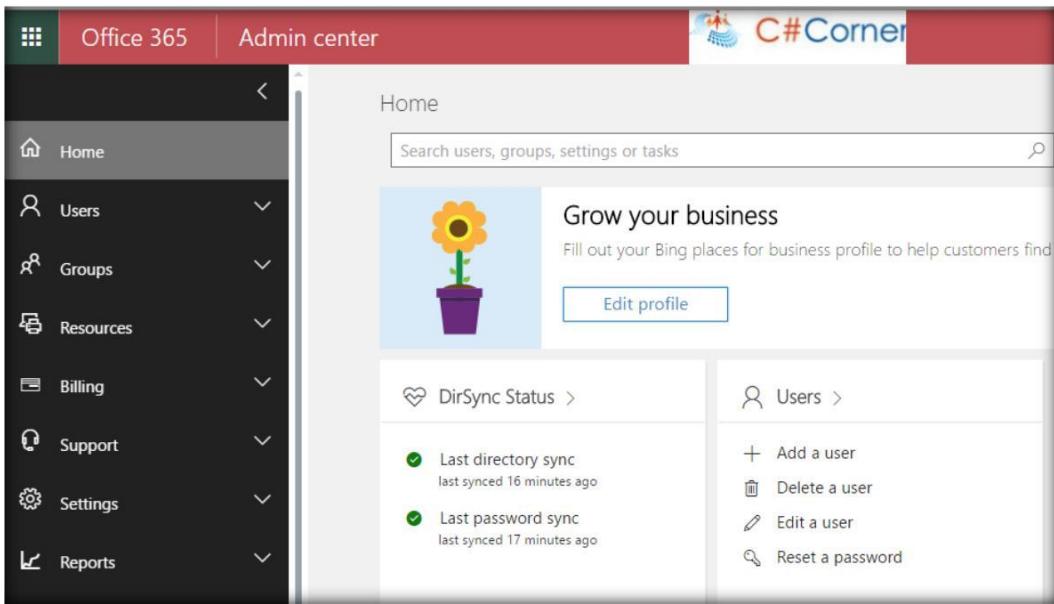


Head over to Office 365 to check the synchronization status. All On-Premise users have been added to Office 365 as a part of the synchronization process.



The screenshot shows the Microsoft 365 Admin center interface. The left navigation menu includes Home, Users (Active users selected), Contacts, Deleted users, Data migration, Groups, Resources, and Billing. The main content area is titled 'Active users' and lists the following users:

	Display name	User name	Status
<input type="checkbox"/>	Priyan	priyaranjan.ks_outlook.com#EXT#@CTSPlayGrou...	Unlicensed
<input type="checkbox"/>	Priyan	Priyaranjan@SharePointChronicle.com	Power BI (free) Office 365 E...
<input type="checkbox"/>	SA_ManagedAccount	SA_ManagedAccount@CTSPlayGround.onmicrosoft...	Unlicensed
<input type="checkbox"/>	Search	Search@CTSPayGround.onmicrosoft.com	Unlicensed
<input type="checkbox"/>	Search_ServiceAccount	Search_ServiceAccount@CTSPayGround.onmicrosoft...	Unlicensed
<input type="checkbox"/>	SPFarmAccount	SPFarmAccount@SharePointChronicle.com	Unlicensed
<input type="checkbox"/>	SPSearch	SPSearch@CTSPayGround.onmicrosoft.com	Unlicensed
<input type="checkbox"/>	SPSetupAccount	SPSetupAccount@CTSPayGround.onmicrosoft.c...	Unlicensed



The screenshot shows the Microsoft Office 365 Admin center Home page. The left sidebar includes links for Home, Users, Groups, Resources, Billing, Support, Settings, and Reports. The main content area features a search bar at the top. Below it is a 'Grow your business' section with a sunflower icon and an 'Edit profile' button. Further down are sections for 'DirSync Status' (showing last sync details) and 'Users' (with options to Add a user, Delete a user, Edit a user, or Reset a password).

7. Configure Cloud Hybrid Search

As a part of configuring the search Service Application, we have to perform two steps, which are

- ✓ Create a Cloud Hybrid Search Service Application.
- ✓ Set up Cloud Hybrid Onboarding.

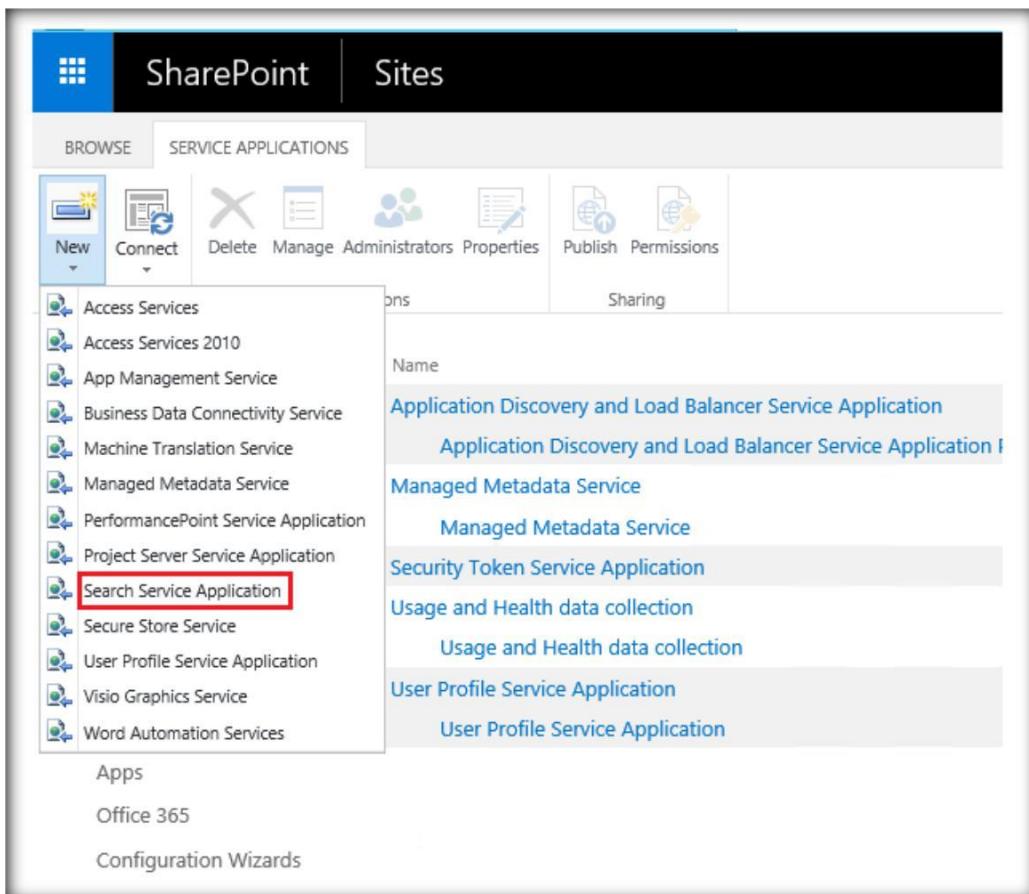
Microsoft has provided two scripts that automate both these steps. You can get the script [here](#). The two scripts will be downloaded, as shown below.

Name	Date modified	Type	Size
CreateCloudSSA.ps1	3/10/2016 9:00 PM	Windows PowerS...	7 KB
Onboard-CloudHybridSearch.ps1	4/4/2016 12:53 PM	Windows PowerS...	19 KB

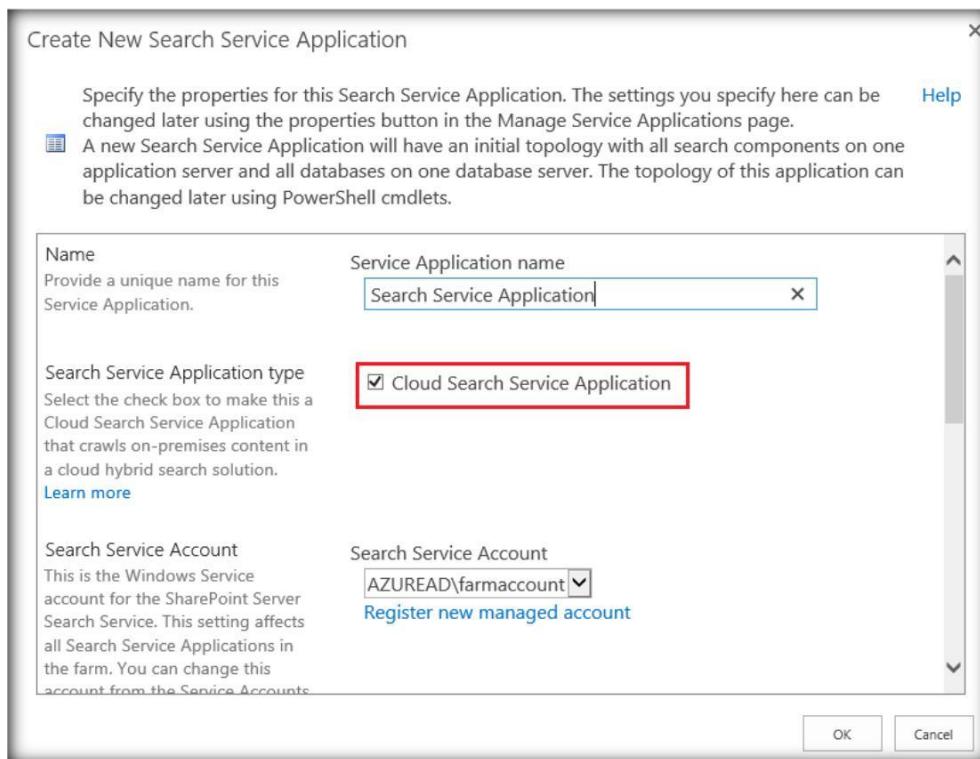
Let's head over to the Server, where we will be configuring the search. My farm configuration is such that I have created a Server (VM04-MINIROLE) as Search MinRole to specifically set up Search Service.

Create Search Service Application from UI

From managing the Service Applications page, we can create Cloud search Service Application through UI.



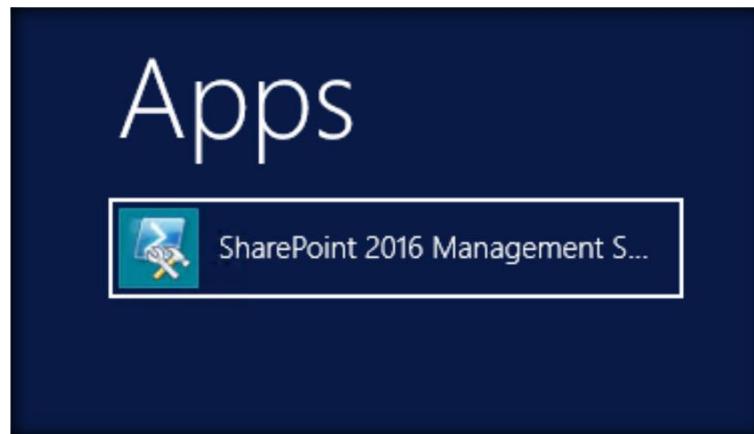
It is quite similar to the process of creating a normal search Service Application, except that we have to select an extra checkbox „Cloud Search Service Application“ to make the Service Application cater to Cloud Hybrid solution approach.



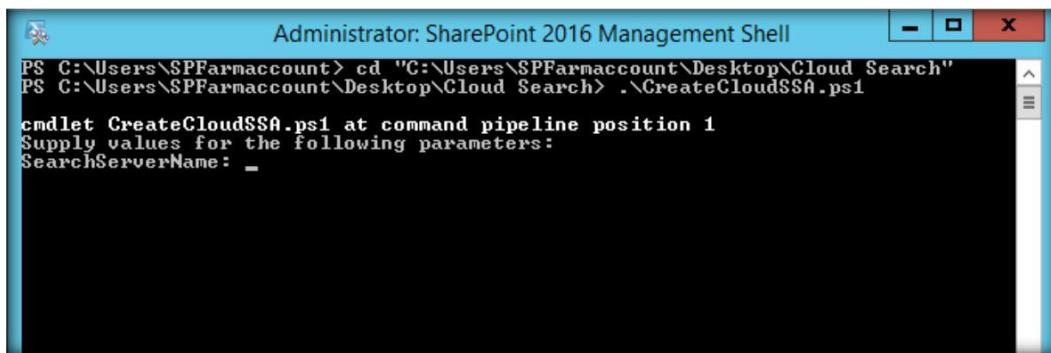
Though we can create the Service Application through UI, search Service creation and management is more stable when done through PowerShell. This is mainly due to the fact that, as per my personal experience, configuring search through UI sometimes takes longer and may even get stuck, which never ends.

Create Cloud Search Service Application through PowerShell

In order to create the Cloud search Service Application, ensure that you have downloaded the script `CreateCloudSSA.ps1` [here](#). Once you have the script downloaded to the Server, spin up SharePoint 2016 Management Shell as an administrator.



Navigate to the location, where you have stored the `CreateCloudSSA.ps1` script and run it.



```
Administrator: SharePoint 2016 Management Shell
PS C:\Users\SPFarmaccount> cd "C:\Users\SPFarmaccount\Desktop\Cloud Search"
PS C:\Users\SPFarmaccount\Desktop\Cloud Search> .\CreateCloudSSA.ps1
cmdlet CreateCloudSSA.ps1 at command pipeline position 1
Supply values for the following parameters:
SearchServerName: _
```

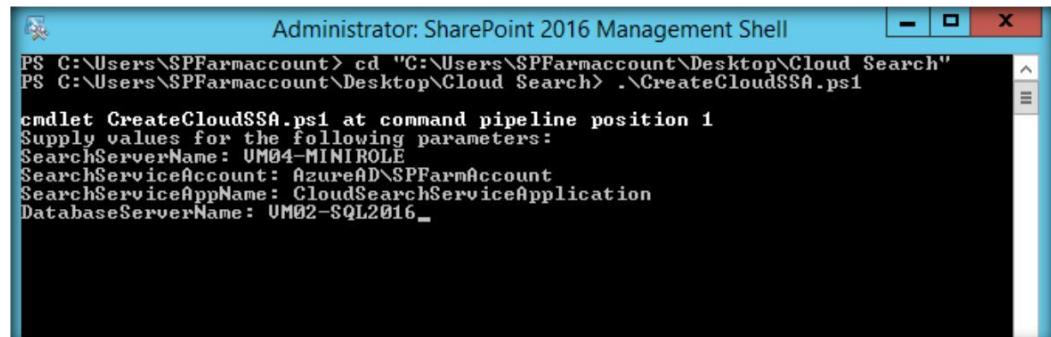
It will ask for the few parameters, which are required to be supplied for the script to continue execution.

SearchServerName- Specify SharePoint 2016 Server, where you are configuring the Search Service (VM04-MINIROLE in my case)

SearchServiceAccount- The search Service account in the format Domain\UserName that will be used to configure search Service(I have created a search Service account by the name SPFarmAccount).

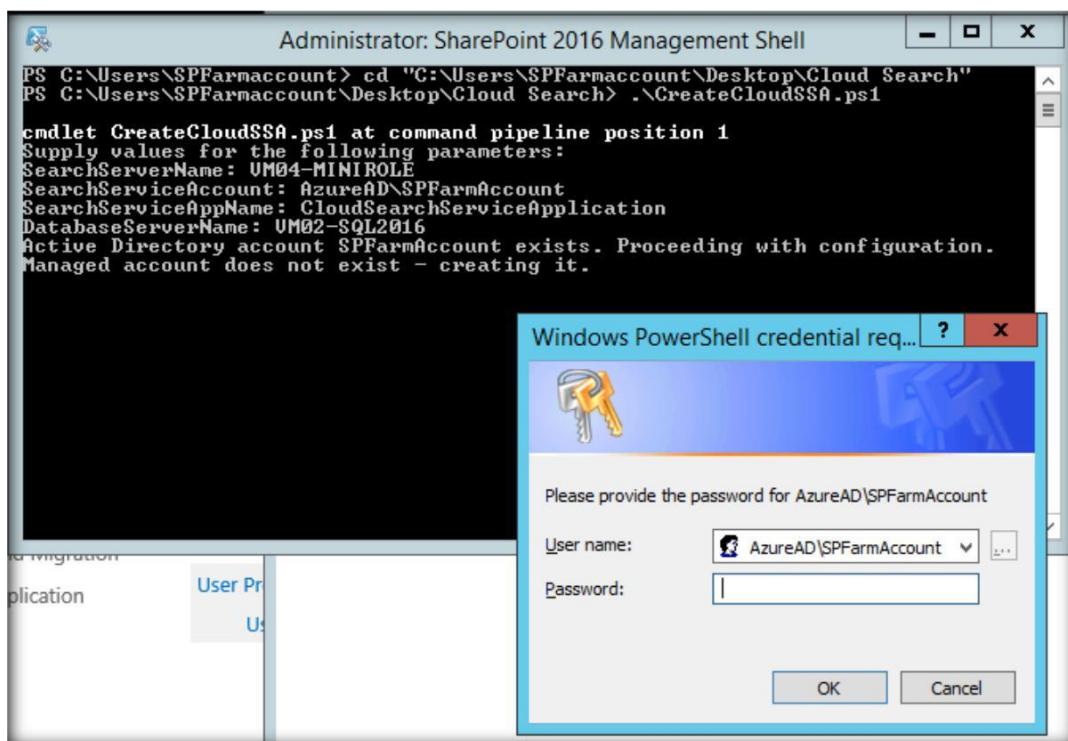
SearchServiceAppName- The name of the Cloud search Service Application.

DatabaseServerName- The name of the database Server in SharePoint 2016 farm.

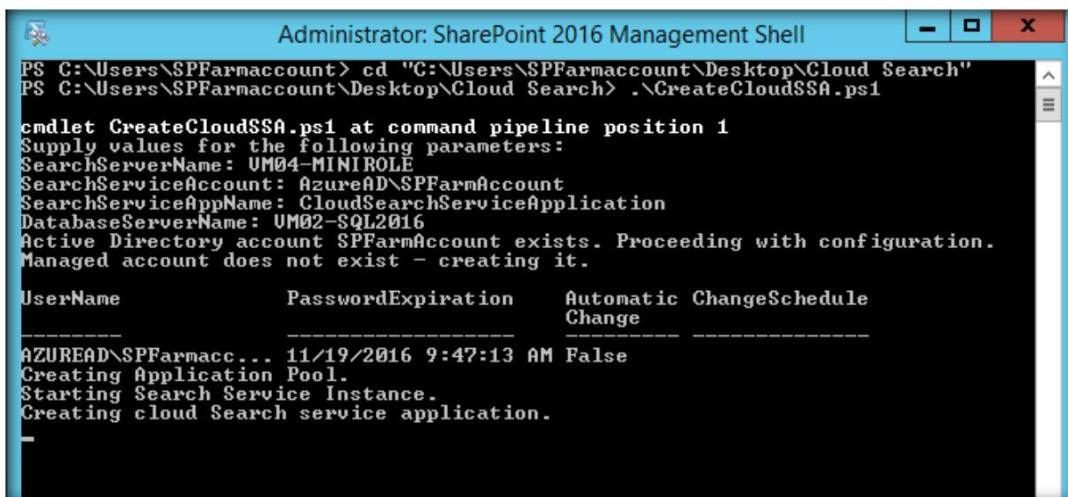


```
Administrator: SharePoint 2016 Management Shell
PS C:\Users\SPFarmaccount> cd "C:\Users\SPFarmaccount\Desktop\Cloud Search"
PS C:\Users\SPFarmaccount\Desktop\Cloud Search> .\CreateCloudSSA.ps1
cmdlet CreateCloudSSA.ps1 at command pipeline position 1
Supply values for the following parameters:
SearchServerName: VM04-MINIROLE
SearchServiceAccount: AzureAD\SPFarmAccount
SearchServiceAppName: CloudSearchServiceApplication
DatabaseServerName: VM02-SQL2016_
```

If the search Service Account is not added as a managed account, it will be automatically added as a managed account by the script. If prompted, add the credentials of the search Service Account.



Cloud Search Service Application creation has started and this will take few minutes to complete.



Once the Cloud search Service Application is created, the next major step is to activate the topology, which is a time consuming step.

Administrator: SharePoint 2016 Management Shell

```

SearchServerName: VM04-MINIROLE
SearchServiceAccount: AzureADSPFarmAccount
SearchServiceAppName: CloudSearchServiceApplication
DatabaseServerName: VM02-SQL2016
Active Directory account SPFarmAccount exists. Proceeding with configuration.
Managed account does not exist - creating it.

UserName          PasswordExpiration      Automatic ChangeSchedule
                  Change

AZUREAD\SPFarmacc... 11/19/2016 9:47:13 AM False

Creating Application Pool.
Starting Search Service Instance.
Creating cloud Search service application.
Configuring search administration component.
Waiting for the search administration component to be initialized.

Inspecting cloud Search service application.
Search Service Properties
  Cloud SSA Name    : CloudSearchServiceApplication
  Cloud SSA Status  : Online
  Cloud Index Enabled : True
Configuring search topology.
Activating topology.

```

Finally, we will get the success message, which indicates that the Cloud search Service Application has been created.

SharePoint | Sites

Administrator: SharePoint 2016 Management Shell

```

Managed account does not exist - creating it.

UserName          PasswordExpiration      Automatic ChangeSchedule
                  Change

AZUREAD\SPFarmacc... 11/19/2016 9:47:13 AM False

Creating Application Pool.
Starting Search Service Instance.
Creating cloud Search service application.
Configuring search administration component.
Waiting for the search administration component to be initialized.

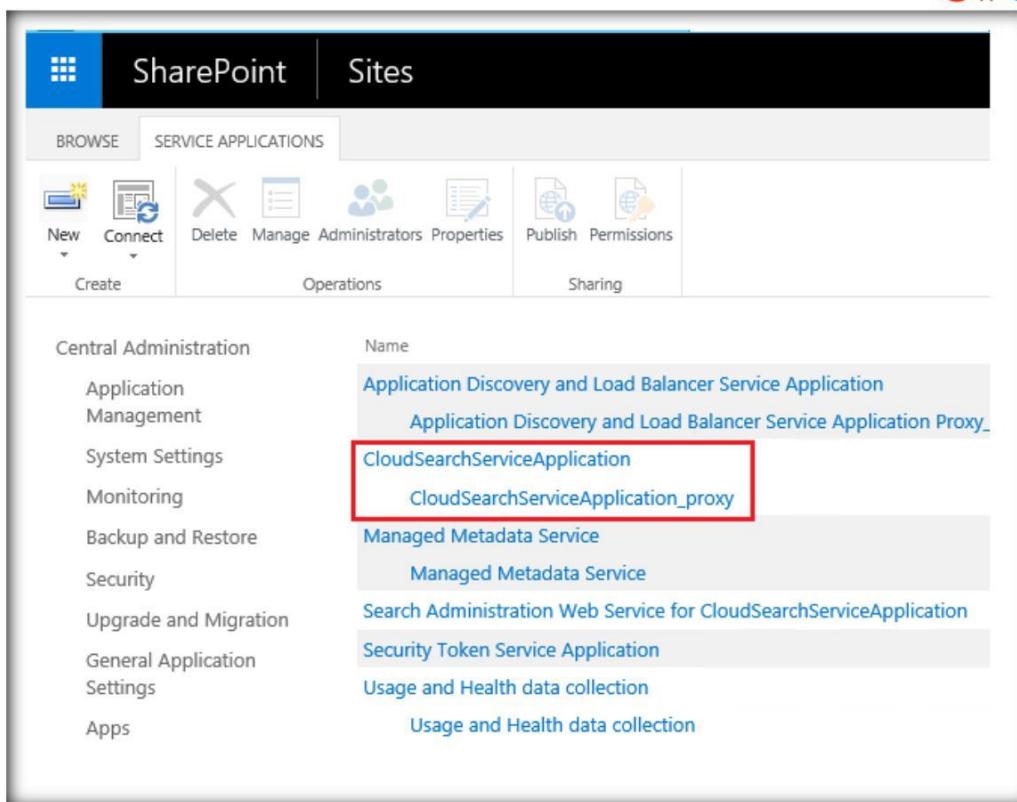
Inspecting cloud Search service application.
Search Service Properties
  Cloud SSA Name    : CloudSearchServiceApplication
  Cloud SSA Status  : Online
  Cloud Index Enabled : True
Configuring search topology.
Activating topology.

Creating proxy.
Cloud search service application provisioning completed successfully.

PS C:\Users\SPFarmaccount\Desktop\Cloud Search> _

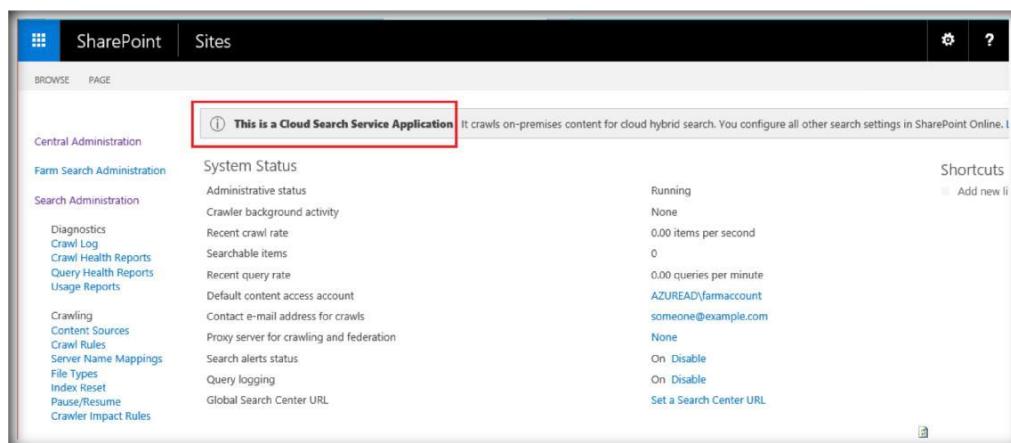
```

Now, if we go to the list of Service Application page, we can see the newly created Cloud search Service Application.



The screenshot shows the SharePoint Central Administration interface under the 'Service Applications' tab. On the left, there's a navigation menu with links like Central Administration, Application Management, System Settings, Monitoring, Backup and Restore, Security, Upgrade and Migration, General Application Settings, and Apps. The 'CloudSearchServiceApplication' service application is listed under the 'Managed Metadata Service' section. A red box highlights the 'CloudSearchServiceApplication' link.

Clicking on it will take you to the Cloud search administration page, where we can create content sources and configure other search related settings.



The screenshot shows the 'Cloud Search Service Application' administration page. It displays system status information such as administrative status (Running), crawler background activity, recent crawl rate (0.00 items per second), searchable items (0), recent query rate (0.00 queries per minute), and default content access account (AZUREAD\farmaccount). A callout box highlights the message 'This is a Cloud Search Service Application'.

The Cloud search topology will be listed down in the same page. VM04-MINIROLE is the Server, where search has been configured and the various search service components are activated. It will also add four databases in the SharePoint Database Server(VM02-SQL2016) as a part of the search Service Application creation.

Search Application Topology						
Server Name	Admin	Crawler	Content Processing	Analytics Processing	Query Processing	Index Partition 0
VM04-MINIROLE	✓	✓	✓	✓	✓	✓
Database Server Name	Database Type	Database Name				
VM02-SQL2016	Administration Database	CloudSearchServiceApplication				
VM02-SQL2016	Analytics Reporting Database	CloudSearchServiceApplication_AnalyticsReportingStore				
VM02-SQL2016	Crawl Database	CloudSearchServiceApplication_CrawlStore				
VM02-SQL2016	Link Database	CloudSearchServiceApplication_LinksStore				

Search Service Components.

As shown above in Search Configuration setup, SharePoint Search architecture is made up of the below components.

- ✓ Crawl and content processing
- ✓ Index
- ✓ Query processing
- ✓ Search administration
- ✓ Analytics

A successfully configured search Service will have all the components listed above are working in unison. Each of the components will have a created database in SQL Server. On a high level, the crawl component is responsible for crawling SharePoint content and collects the crawl properties, which will in turn be sent to the content processing component. The content processing component receives the crawled properties, processes it and sends it to Indexcomponent.

Index component receives the processed items from the content processing component and writes it to the search index. At the same time, it is responsible for returning the results for a search query from the search index.

When the user inputs a search query and presses enter, the query is processed by Querycomponent and is submitted to Index component for data the retrieval from search index.

Search administration component performs the overall administration of search like instantiating search Service instance and the related components.

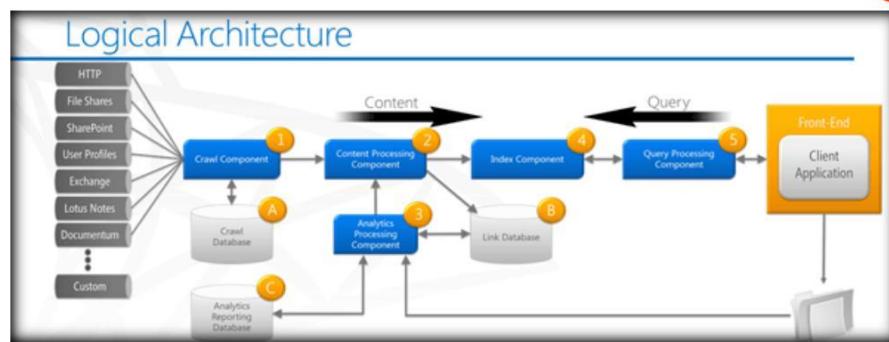


Image Source: Microsoft MSDN

Connect your Cloud Search Service Application to your Office 365 tenant

In order to complete Cloud Hybrid search set up, we have to connect the recently created Cloud Search Service Application to Office 365 tenant. Microsoft has provided the script to automate the onboarding of the Cloud search Service Application and Office 365 to Cloud Hybrid Search. You can get the script named Onboard-CloudHybridSearch.ps1 [here](#).

Name	Date modified	Type	Size
CreateCloudSSA.ps1	3/10/2016 9:00 PM	Windows PowerS...	7 KB
Onboard-CloudHybridSearch.ps1	4/4/2016 12:53 PM	Windows PowerS...	19 KB

However, in order to run the script, we have some prerequisites, which needs to be completed. Download and install the modules given below.

- [!\[\]\(b2639cf99c0fa60ddf3f27db0609f717_img.jpg\) Microsoft Online Services Sign-In Assistant for IT Professionals RTW](#)
- [!\[\]\(f3239612ea0ee8d68627b57fe2150d79_img.jpg\) Azure Active Directory Module for Windows PowerShell \(64-bit version\)](#)

Install Microsoft Online Services Sign-In Assistant

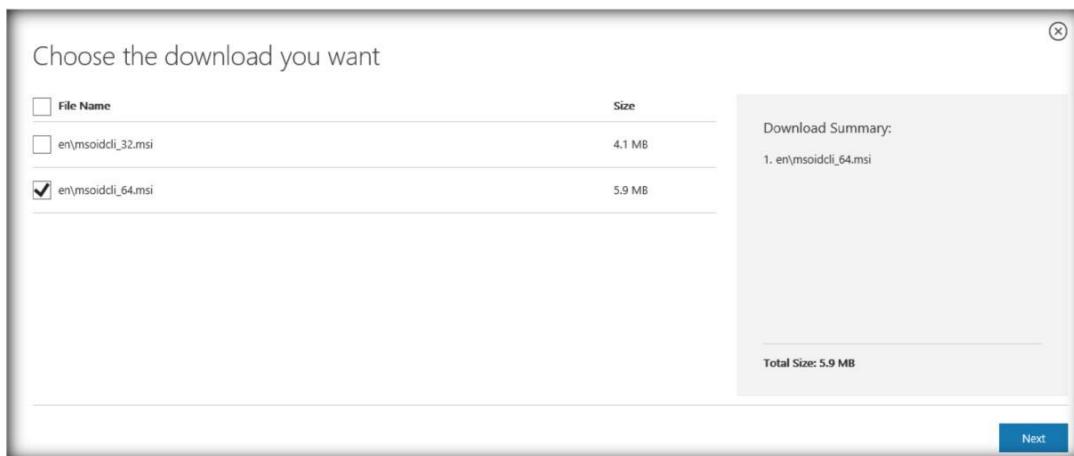
First, download Microsoft Online Services Sign-In Assistant.

Microsoft Online Services Sign-In Assistant for IT Professionals RTW

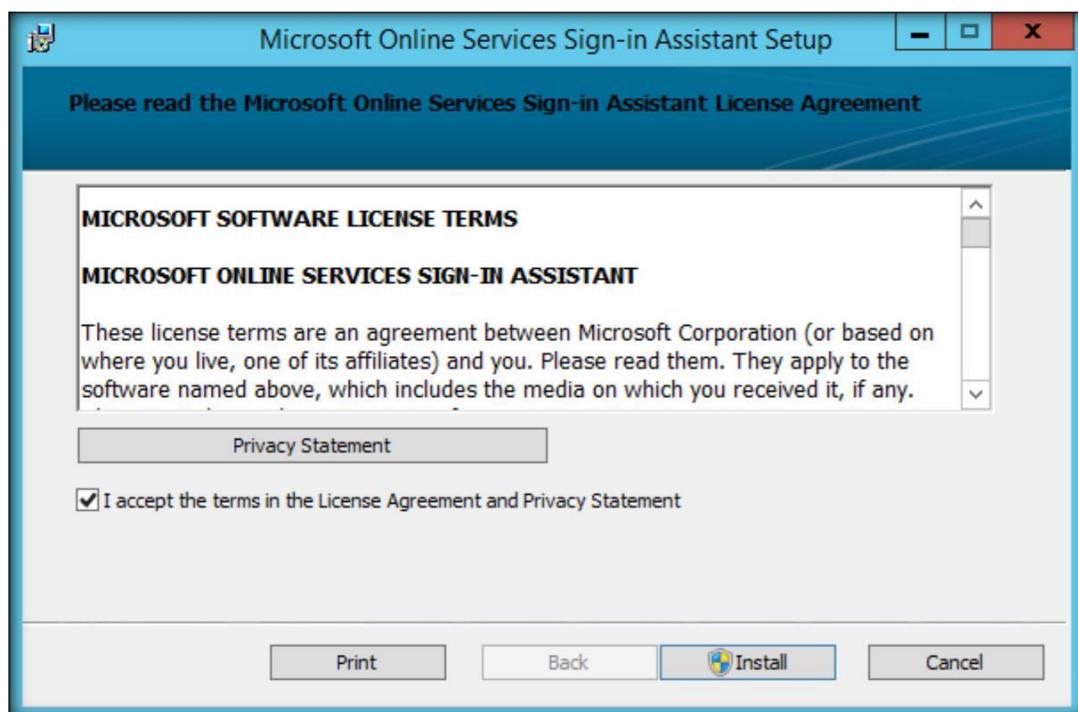
Select Language: English

The Microsoft Online Services Sign-In Assistant provides end user sign-in capabilities to Microsoft Online Services, such as Office 365.

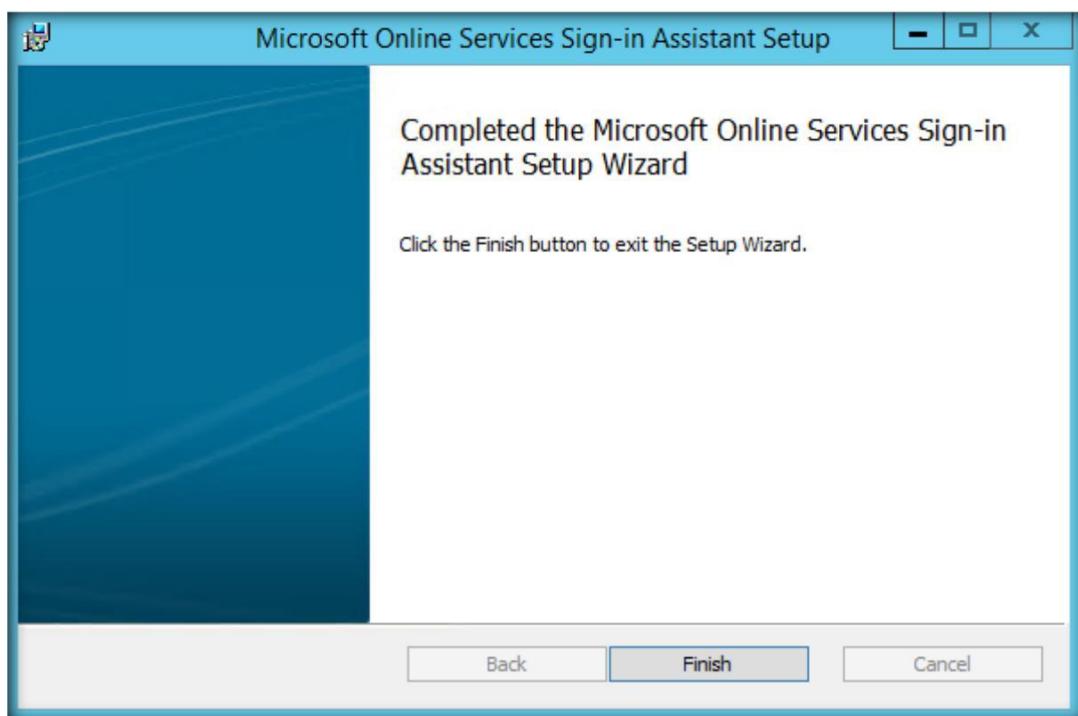
Select the 64 bit version.



Accept the agreement and click Install.



This would complete the setup of Microsoft Online Services Sign-in Assistant.

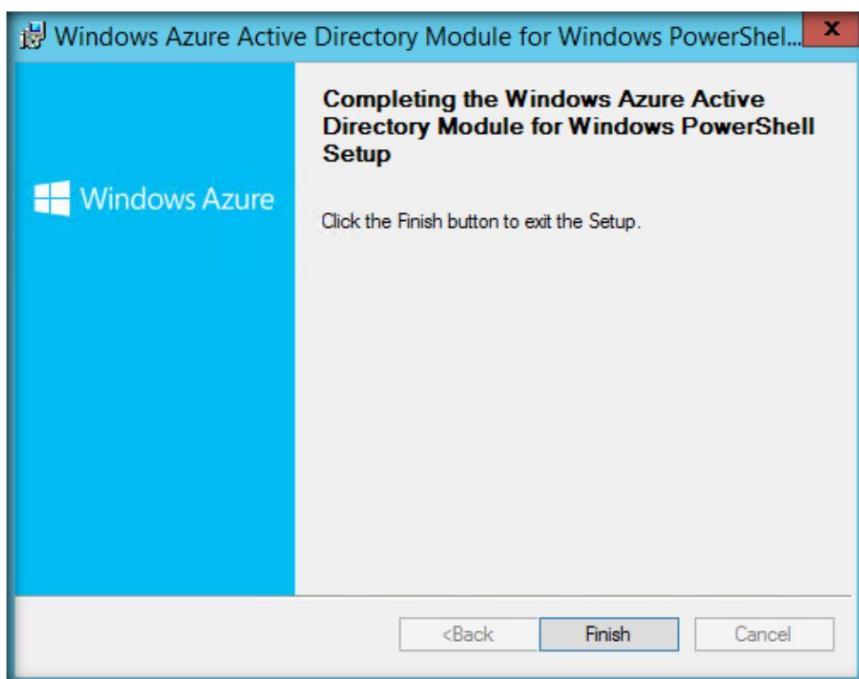


Install Azure Active Directory Module

Azure active directory module provides cmdlets for Azure AD administrative tasks like the user and domain management. You can download the executable file [here](#). Run the downloaded Azure active directory module installation file.

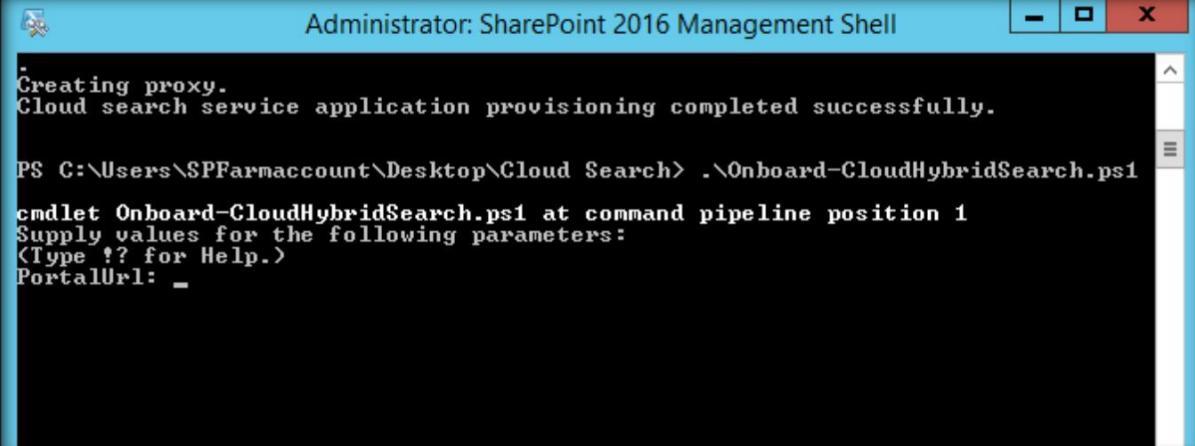


Click Finish to complete the setup of Azure active directory.



Run the Onboarding Script

In order to complete the onboarding of Cloud Search Service Application and Office 365 on to Cloud Hybrid Search, let's go ahead and run the Onboard-CloudHybridSearch.ps1 script.



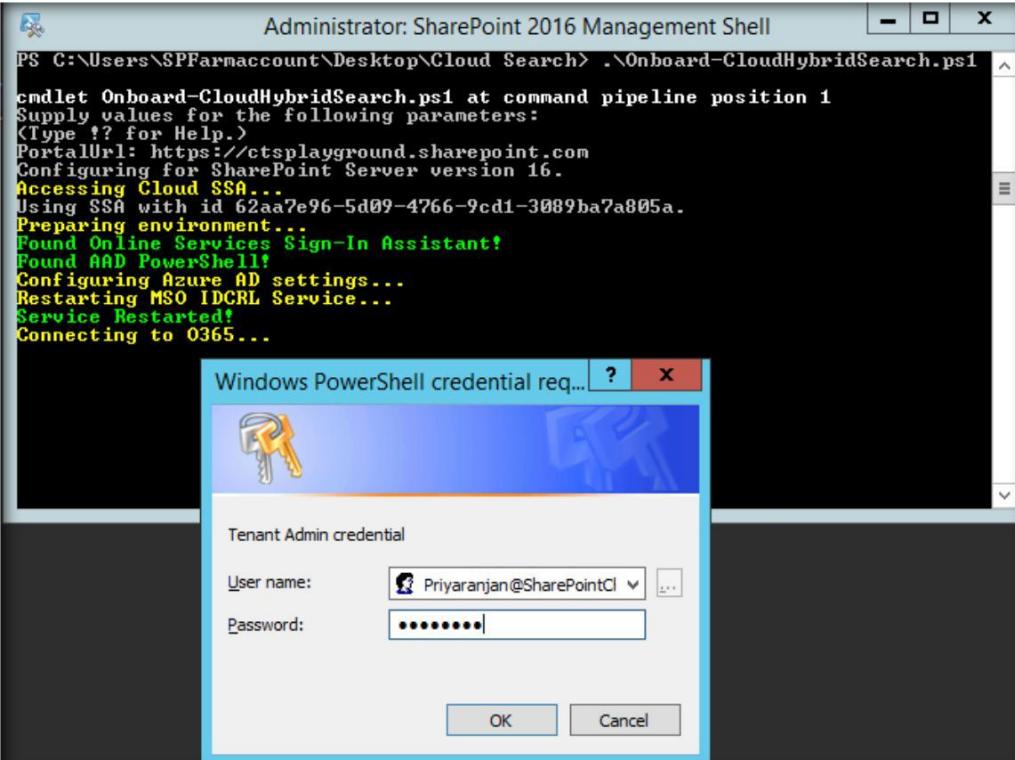
```
Administrator: SharePoint 2016 Management Shell
PS C:\Users\SPFarmaccount\Desktop\Cloud Search> .\Onboard-CloudHybridSearch.ps1
cmdlet Onboard-CloudHybridSearch.ps1 at command pipeline position 1
Supply values for the following parameters:
<Type !? for Help.>
PortalUrl: -
```

It will ask for few parameters that we will have to input.

Portal URL- Specify SharePoint Online URL of the organization.

Administrator Credentials- It will also ask for Office 365 global administrator credentials.

If asked, enter the Cloud Search Service Application name.



```
Administrator: SharePoint 2016 Management Shell
PS C:\Users\SPFarmaccount\Desktop\Cloud Search> .\Onboard-CloudHybridSearch.ps1
cmdlet Onboard-CloudHybridSearch.ps1 at command pipeline position 1
Supply values for the following parameters:
<Type !? for Help.>
PortalUrl: https://ctsplayground.sharepoint.com
Configuring for SharePoint Server version 16.
Accessing Cloud SSA...
Using SSA with id 62aa7e96-5d09-4766-9cd1-3089ba7a805a.
Preparing environment...
Found Online Services Sign-In Assistant!
Found AAD PowerShell!
Configuring Azure AD settings...
Restarting MSO IDCRL Service...
Service Restarted!
Connecting to O365...
```

Windows PowerShell credential request

Tenant Admin credential

User name: Priyaranjan@SharePointCI

Password: [REDACTED]

OK Cancel

This will complete the Onboarding process and will register Cloud Hybrid search.

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Administrator: SharePoint 2016 Management Shell

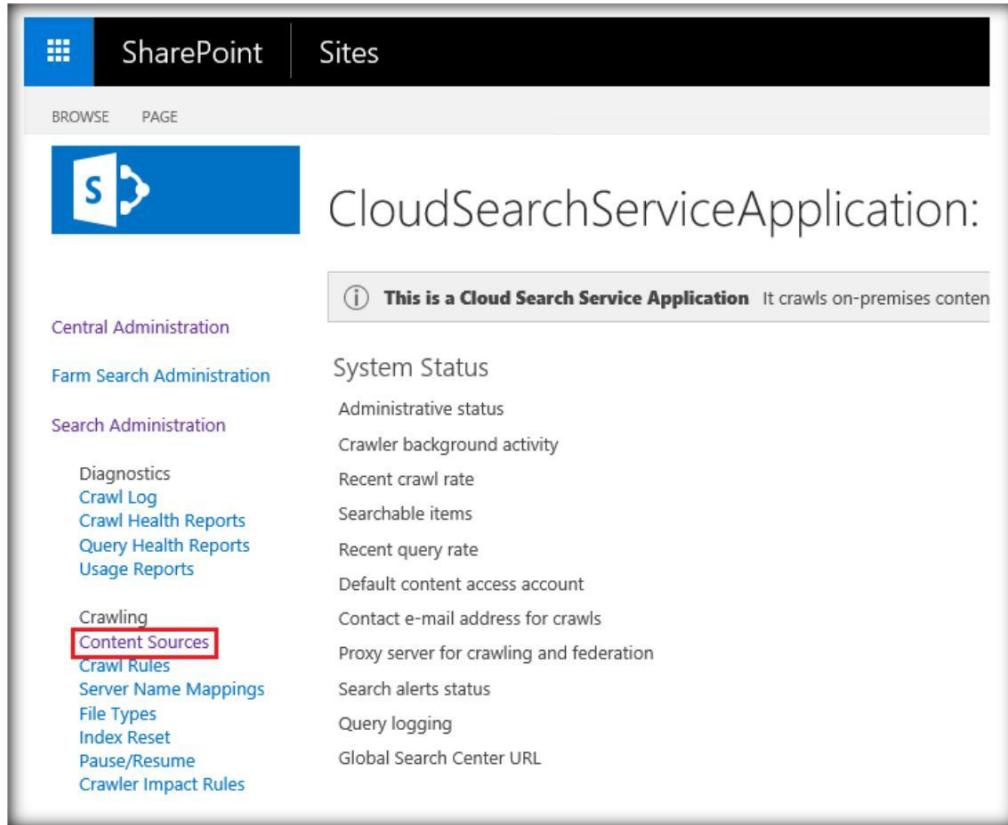
```
8f0dc9ad-0d19-4fec-a421-6d027900014/*.search.production.emea.trafficmanager.net
8f0dc9ad-0d19-4fec-a421-6d027900014/*.search.production.apac.trafficmanager.net
The following symmetric key was created as one was not supplied HkcMya4zhszjW6wQ
FskXyb7H605Ana0xWKhvtRvkE2U=
Connecting to content farm in SPO...
Preparing tenant for cloud hybrid search (this can take a couple of minutes)...
PreparePushTenant was successfully invoked!
Getting service info...
Registered cloud hybrid search configuration:

TenantId          : 3ac95963-3f36-457b-b9c9-4363e0adac44
AuthenticationRealm : 3ac95963-3f36-457b-b9c9-4363e0adac44
EndpointAddress    : https://indfrontendexternal.search.production.apac.trafficmanager.net:443

Configuring Cloud SSA...
Restarting SharePoint Timer Service...
Restarting SharePoint Server Search...
All done!
PS C:\Users\SPFarmaccount\Desktop\Cloud Search> _
```

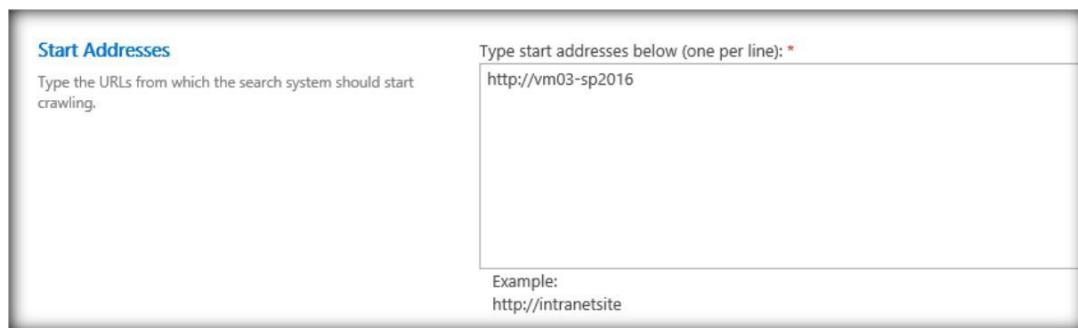
8. Create a content source to crawl for cloud hybrid search

As a final step in configuring the Cloud Hybrid search, we have to create a content source and run a full crawl in SharePoint On-Premise Server. Clicking on the Cloud Search Service Application will open up the Search Administration page. Select Content Source in the left pane of the Search Administration page.



The screenshot shows the SharePoint Search Administration page. The left navigation menu includes links such as Central Administration, Farm Search Administration, Search Administration, Diagnostics (with sub-links Crawl Log, Crawl Health Reports, Query Health Reports, Usage Reports), Crawling (with sub-links Content Sources, Crawl Rules, Server Name Mappings, File Types, Index Reset, Pause/Resume, Crawler Impact Rules). The 'Content Sources' link is highlighted with a red box. The main content area displays information about the Cloud Search Service Application, including its administrative status, crawler background activity, and various crawl metrics. A note indicates that it crawls on-premises content.

Click Create New Content Source. This will open up the page, where we can add the start address of the content source, which has to be crawled.



The screenshot shows the 'Create New Content Source' page. The 'Start Addresses' section contains a text input field with the URL 'http://vm03-sp2016'. Below the input field, there is an example URL 'http://intranetsite'.

We can also specify the crawl schedules. We can set the schedules when the incremental and full crawls will take place in the Server.

SharePoint | Sites

CloudSearchServiceApplication: Add Content Source

Central Administration

Use this page to add a content source.

Farm Search Administration

* Indicates a required field

Search Administration

Diagnostics
Crawl Log
Crawl Health Reports
Query Health Reports
Usage Reports

Crawling
Content Sources
Crawl Rules
Server Name Mappings
File Types
Index Reset
Pause/Resume
Crawler Impact Rules

Queries and Results
Authoritative Pages
Result Sources

Name

Type a name to describe this content source.

Content Source Type

Select what type of content will be crawled.

Note: This cannot be changed after this content source is created because other settings depend on it.

Start Addresses

Type the URLs from which the search system should start crawling.

This includes all SharePoint Server sites and Microsoft SharePoint Foundation sites.

Name: *
Cloud Search Service Content Source

Select the type of content to be crawled:

SharePoint Sites
 Web Sites
 File Shares
 Exchange Public Folders
 Line of Business Data
 Custom Repository

Type start addresses below (one per line): *

http://vm03-sp2016

Crawl Schedules

Select the crawl schedules for this content source.

Continuous Crawl is a special type of crawl that eliminates the need to create incremental crawl schedules and will seamlessly work with the content source to provide maximum freshness. Please Note: Once enabled, you will not be able to pause or stop continuous crawl. You will only have the option of disabling continuous crawl.

Enable Continuous Crawls
 Enable Incremental Crawls

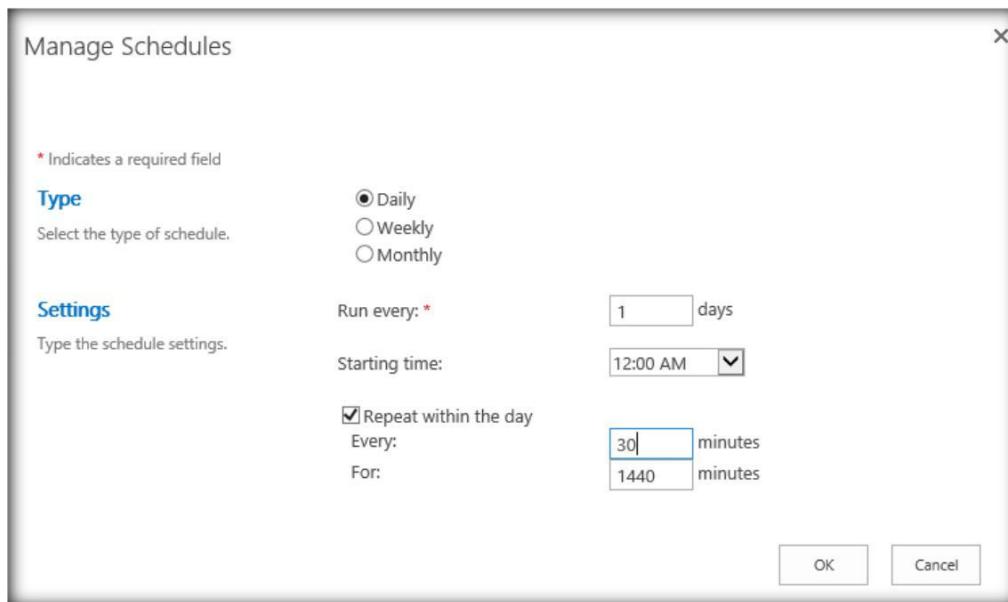
Incremental Crawl

None Create schedule

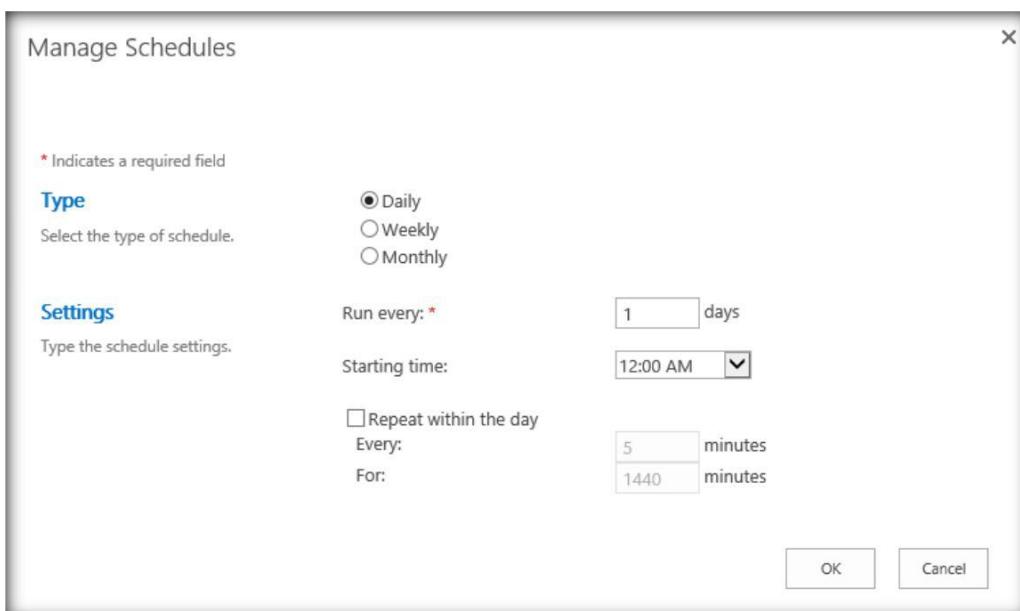
Full Crawl

None Create schedule

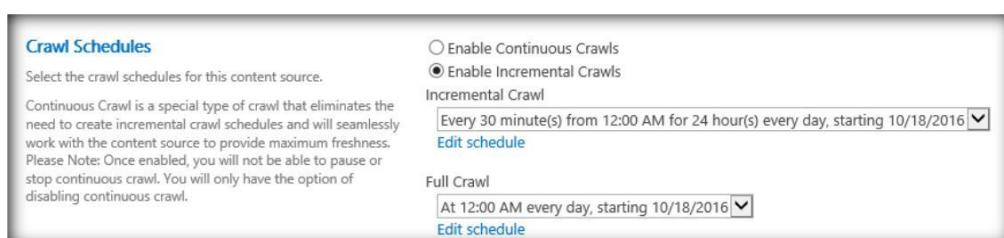
The incremental crawl is scheduled to run after every 30 minutes.



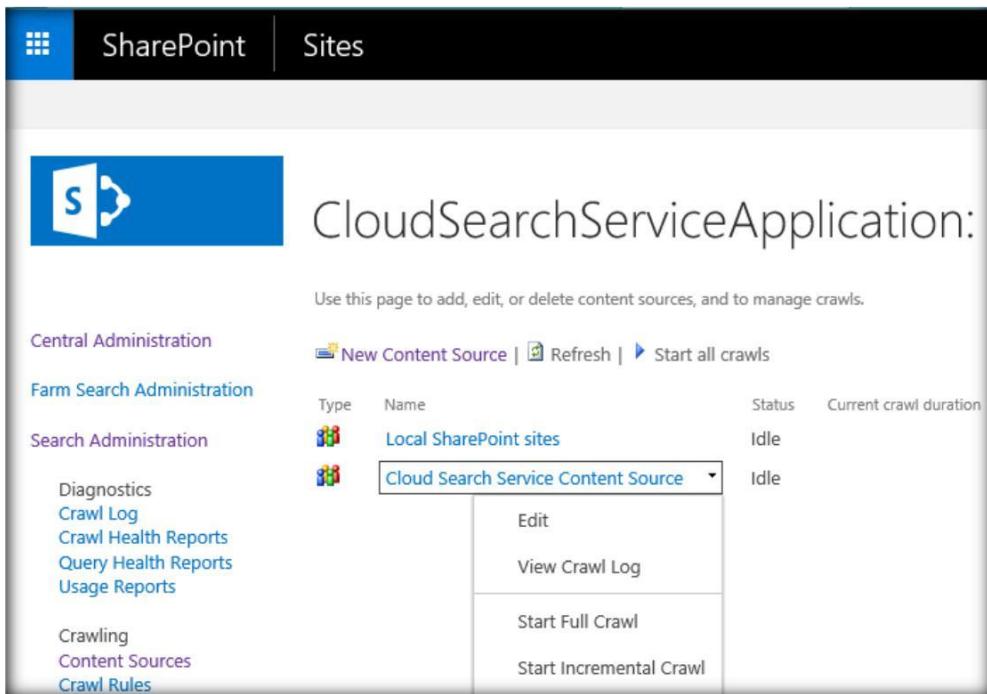
The full crawl on the other hand runs every day at 12 AM.



The crawl schedules after configuration will look, as shown below.



Now, let's go ahead and run a full crawl.

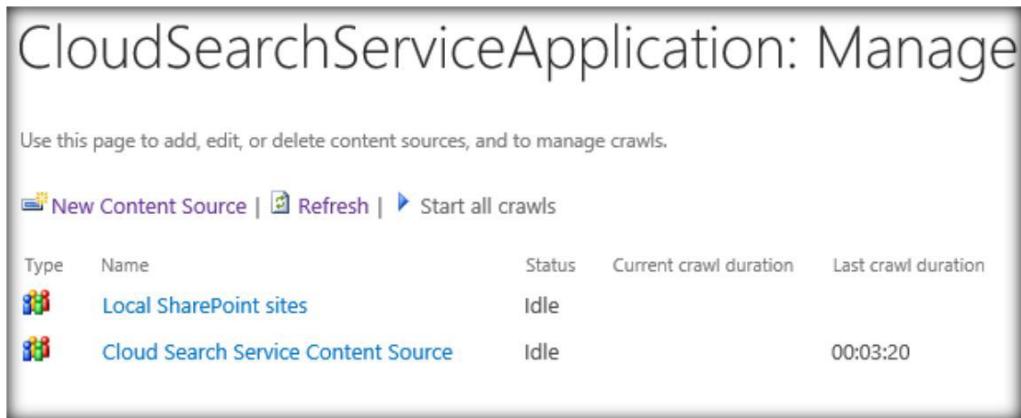


The screenshot shows the SharePoint Central Administration interface under Farm Search Administration. On the left, there's a navigation menu with links like Central Administration, Farm Search Administration, and Search Administration. Under Search Administration, there are sections for Diagnostics (Crawl Log, Crawl Health Reports, Query Health Reports, Usage Reports) and Crawling (Content Sources, Crawl Rules). The main content area is titled "CloudSearchServiceApplication:" and contains a message: "Use this page to add, edit, or delete content sources, and to manage crawls." It features a table with two rows:

Type	Name	Status	Current crawl duration
	Local SharePoint sites	Idle	
	Cloud Search Service Content Source	Idle	

A context menu is open over the second row, listing options: Edit, View Crawl Log, Start Full Crawl, and Start Incremental Crawl.

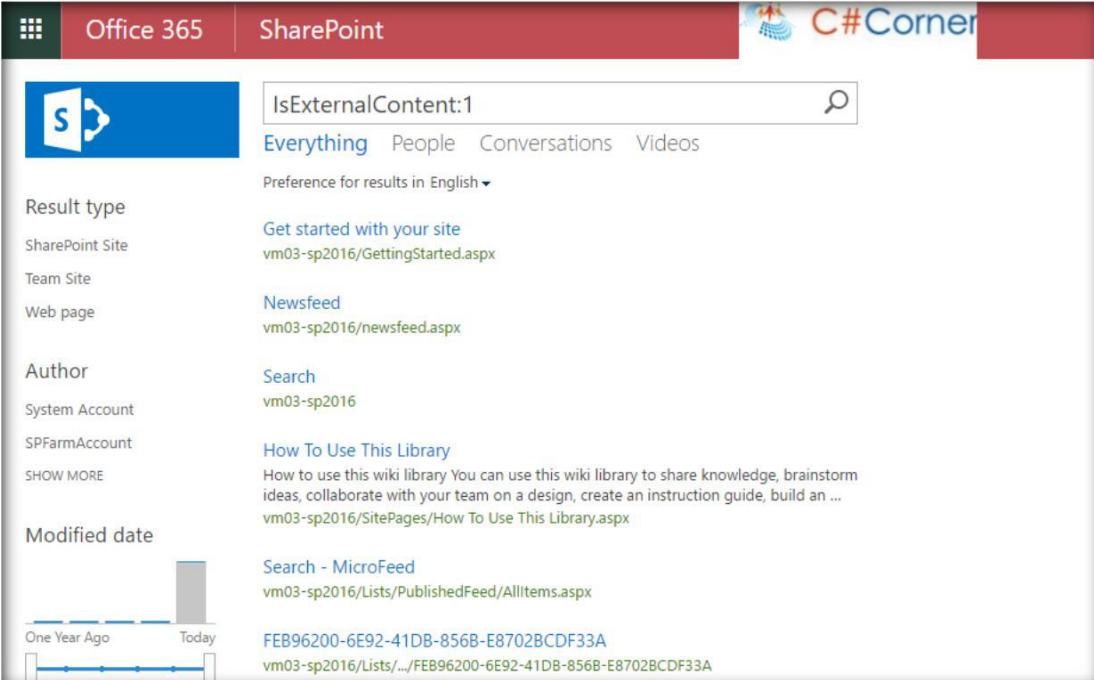
Since this is the first time, we are running the crawl. Even if we click on incremental crawl, a full crawl will take place and the time taken will depend upon the amount of the content within the content source.



The screenshot shows the "CloudSearchServiceApplication: Manage" page. It has a message: "Use this page to add, edit, or delete content sources, and to manage crawls." Below it is a table:

Type	Name	Status	Current crawl duration	Last crawl duration
	Local SharePoint sites	Idle		
	Cloud Search Service Content Source	Idle		00:03:20

Once the crawl has completed lets test the hybrid search scenario by going to SharePoint Online and search for *IsExternalContent:1*. This has listed the search results from SharePoint On-Premise Server, which indicates a successful Hybrid Search Configuration.

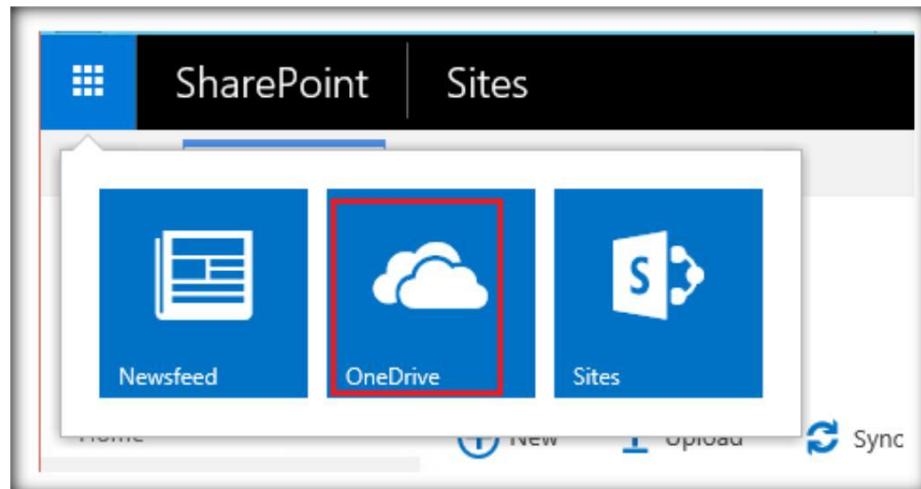


The screenshot shows a SharePoint search results page. At the top, there are navigation links for "Office 365" and "SharePoint". On the right, the "C#Corner" logo is visible. The search bar contains the query "IsExternalContent:1". Below the search bar, there are links for "Everything", "People", "Conversations", and "Videos". A dropdown menu for "Preference for results in English" is open. The search results are categorized by "Result type": "SharePoint Site" (link to "Get started with your site"), "Team Site" (link to "Newsfeed"), and "Web page" (link to "Search"). There is also a section for "Author" (System Account, SPFarmAccount, SHOW MORE) and "Modified date" (a slider from "One Year Ago" to "Today" with a result for "FEB96200-6E92-41DB-856B-E8702BCDF33A").

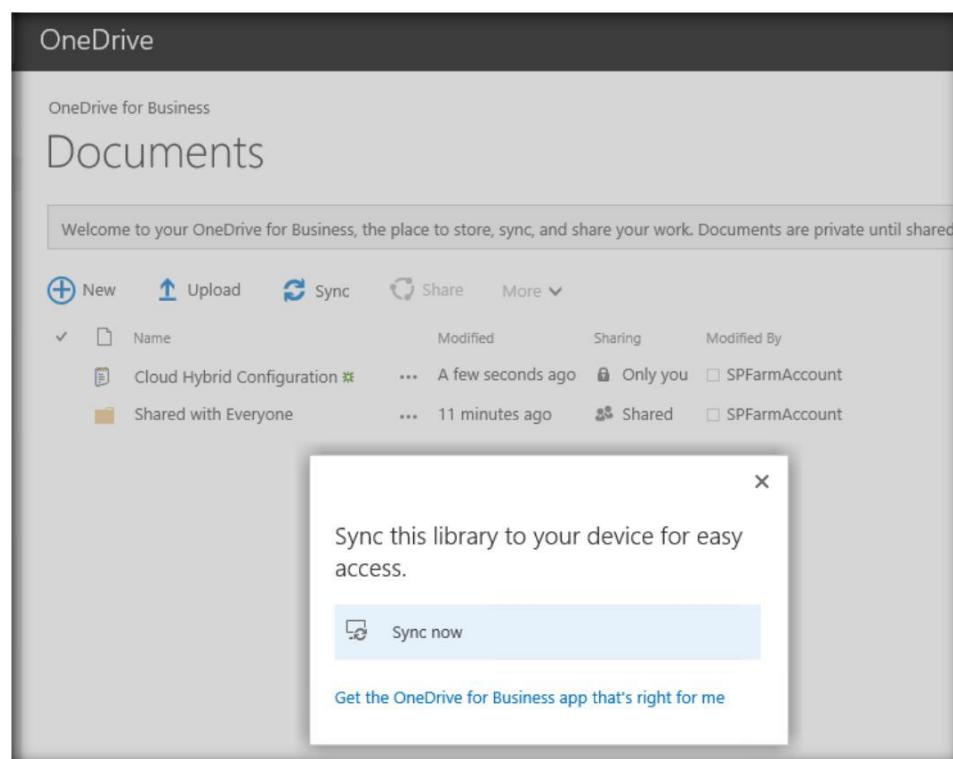
Reference:[https://technet.microsoft.com/en-us/library/dn720906\(v=office.16\).aspx](https://technet.microsoft.com/en-us/library/dn720906(v=office.16).aspx)

B. Configure Hybrid One Drive for Business in SharePoint Server 2016

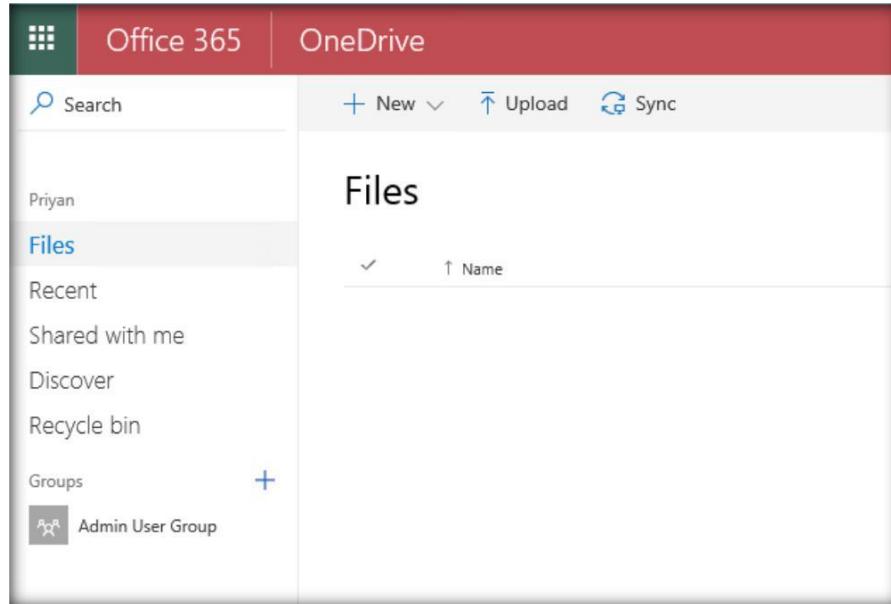
OneDrive for Business is the document library, which is available within the My Sites in SharePoint Server 2016. Thus, to centrally store the documents for sharing and collaboration, this document library can be used. Thus, OneDrive provides a central repository for the document collaboration.



If we click OneDrive option in the Navigation bar, it will take us to the OneDrive Location within My Sites.

A screenshot of the OneDrive for Business interface. The title bar says 'OneDrive'. Below it, 'OneDrive for Business' and 'Documents' are displayed. A message box at the top states: 'Welcome to your OneDrive for Business, the place to store, sync, and share your work. Documents are private until shared.' Below this, there's a table showing two items: 'Cloud Hybrid Configuration' (modified 'A few seconds ago') and 'Shared with Everyone' (modified '11 minutes ago'). A modal dialog box is overlaid on the page, prompting the user to 'Sync this library to your device for easy access.' It contains a 'Sync now' button and a link to 'Get the OneDrive for Business app that's right for me'.

However, as a part of the Hybrid Features in SharePoint Server 2016, we can redirect the users to OneDrive for Business in Office 365 when they click OneDrive on SharePoint 2016 Navigation bar.



In this section, we will see how to set up Hybrid OneDrive for Business in Office 365 and SharePoint 2016.

Before setting up Hybrid OneDrive for SharePoint Server 2016, we have to ensure that

- ✓ Office 365 environment is configured for Hybrid setup.
- ✓ Ensure that the required Services are up and running in SharePoint Server.

1. Office 365 Prerequisite Configurations

The Configurations that has to be done in Office 365 side is already covered in the previous section (Cloud Hybrid search),as shown below.

- A public domain has been registered with Office 365 (Refer [here](#) for the implementation).
- A UPN prefix that matches the public domain has been added to the Local AD (Refer [here](#) for the implementation).
- An Active Azure Subscription is available (Refer [here](#) to see how to get \$25 free Azure credits every month).
- Office 365 AD is manageable from Azure (Refer [here](#) for the implementation).
- Synchronize Local Active Directory with Office 365 Directory (Refer [here](#) for the implementation).

2. SharePoint Server 2016 Prerequisite Configurations

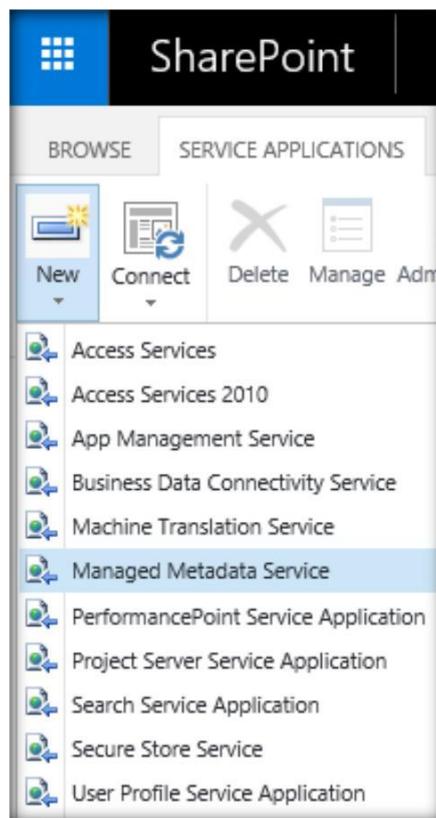
As a part of setting up the prerequisites in SharePoint Server 2016 we will have to ensure the successful provisioning of:

- Managed Metadata Service Application
- User Profile Service Application
- My Sites
- App Management Service Application
- Subscription Setting Service
- Setup Synchronization connection with Active Directory Services

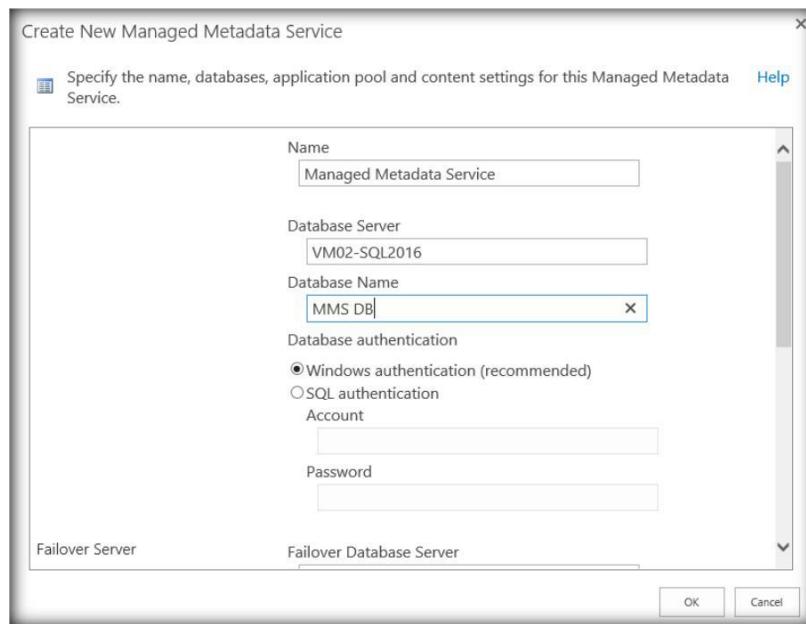
We will cover the SharePoint Side Configurations in this section.

3. Provision Managed Metadata Service Application

As the first step to configure SharePoint Server 2016 environment, we have to create the managed metadata Service Application from the Manage Service Application's page.



Enter the Service Application name, Database Server, Database name etc., which will be used with the Service Application.

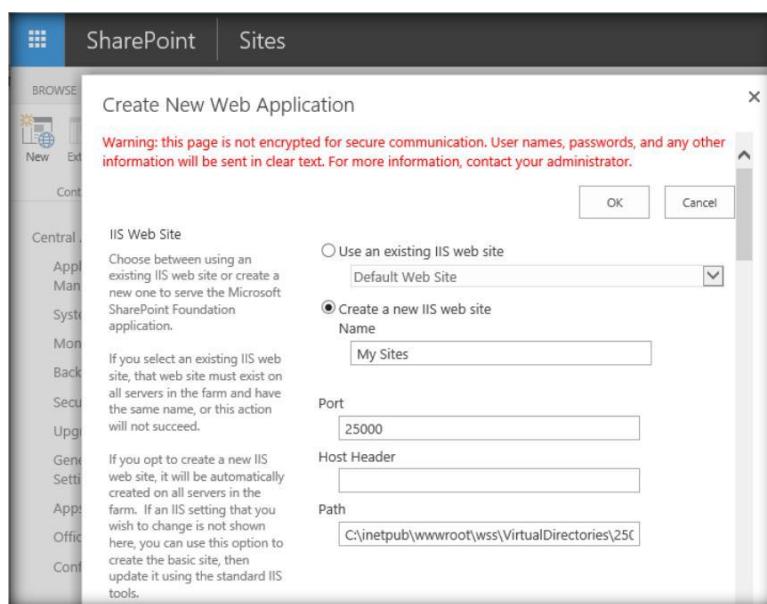


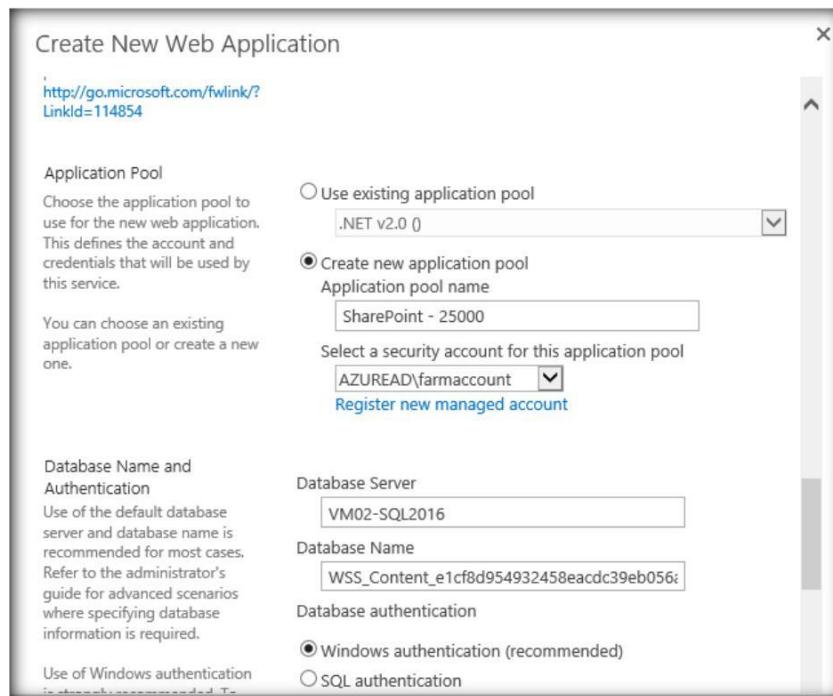
Clicking OK will start provisioning the Managed Metadata Service Application.



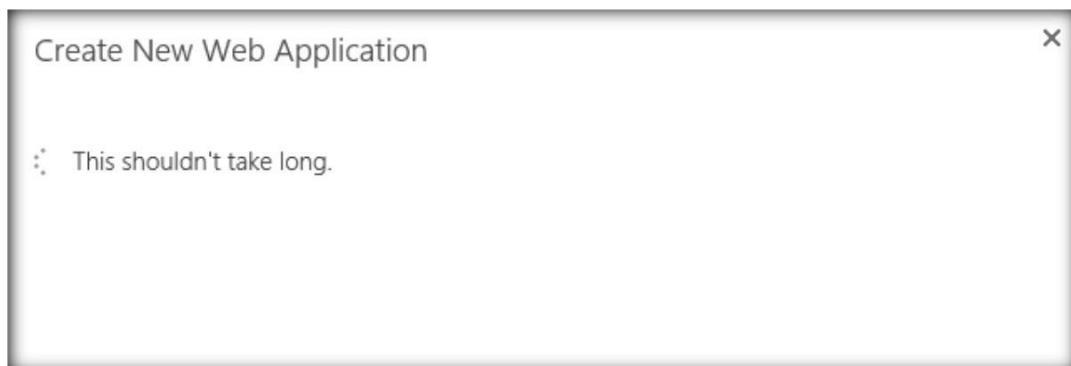
4. Setting up My Sites

In order to set up My Sites, we can create a new Web Application that will host the sites. It can either use a separate Application pool or use a stand-alone one. There are no extra settings, which are required to be done during the Web Application creation. The default settings are good enough. From the Web Application creation page, create a new Web Application. Provide the IIS Site name, Port number, Application Pool, Database Server and Database name.

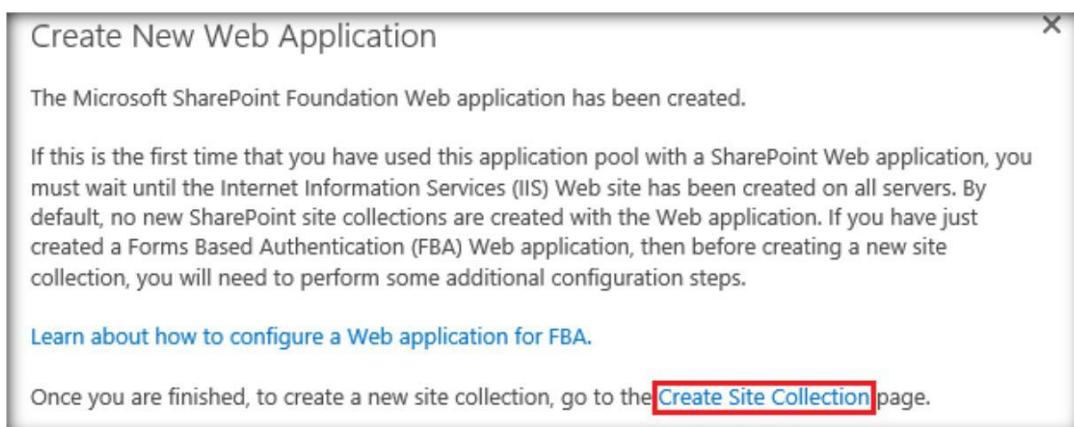




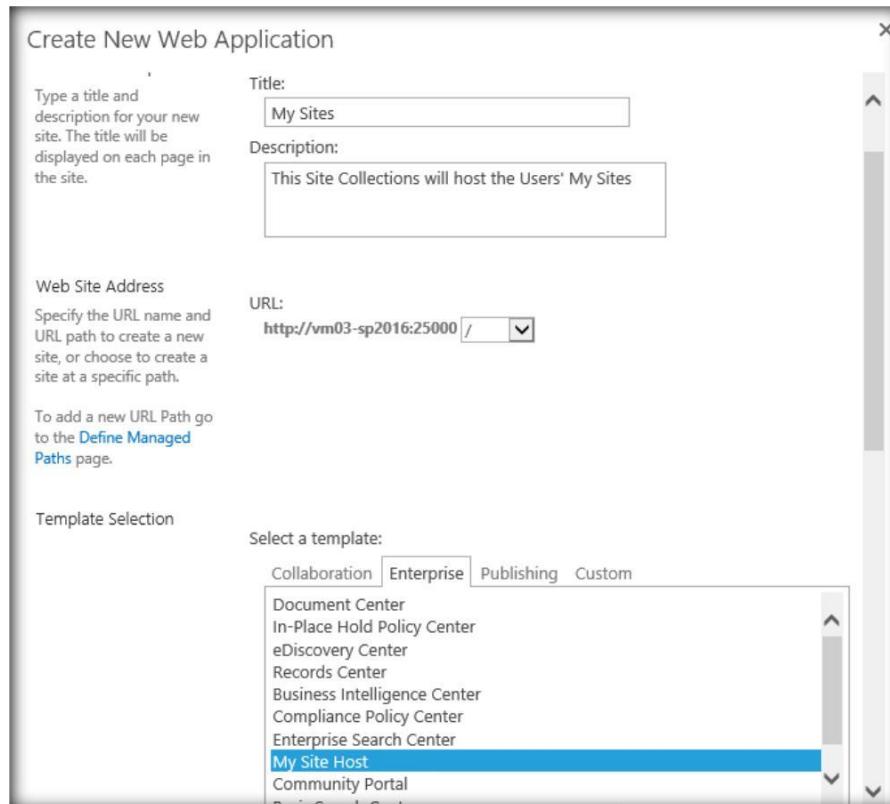
Click OK. This will start provisioning the Web Application.



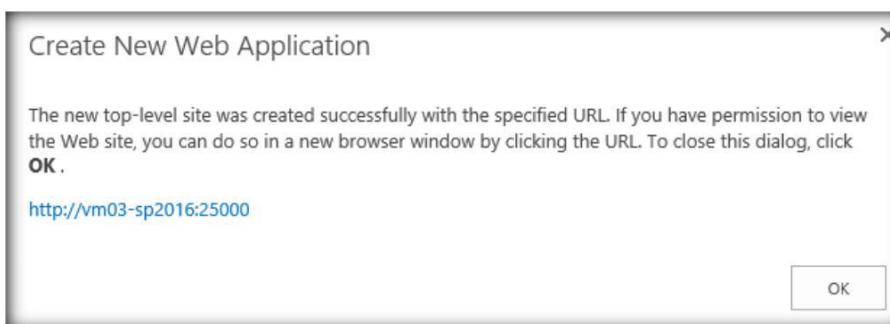
Once the Web Application is created, click Create Site Collection option.



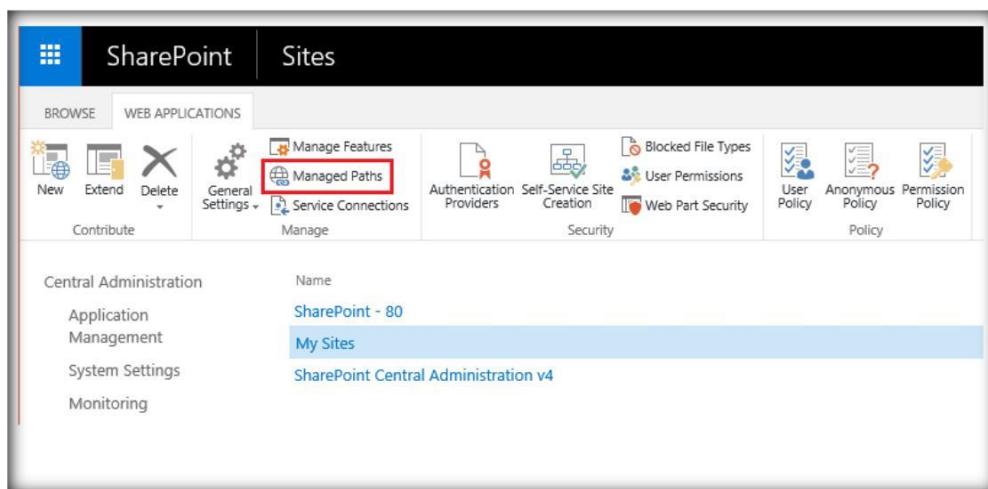
This will provide the option to create the site collection that will hold My Sites. Specify the site collection name and select the template My Site Host from Enterprise tab.



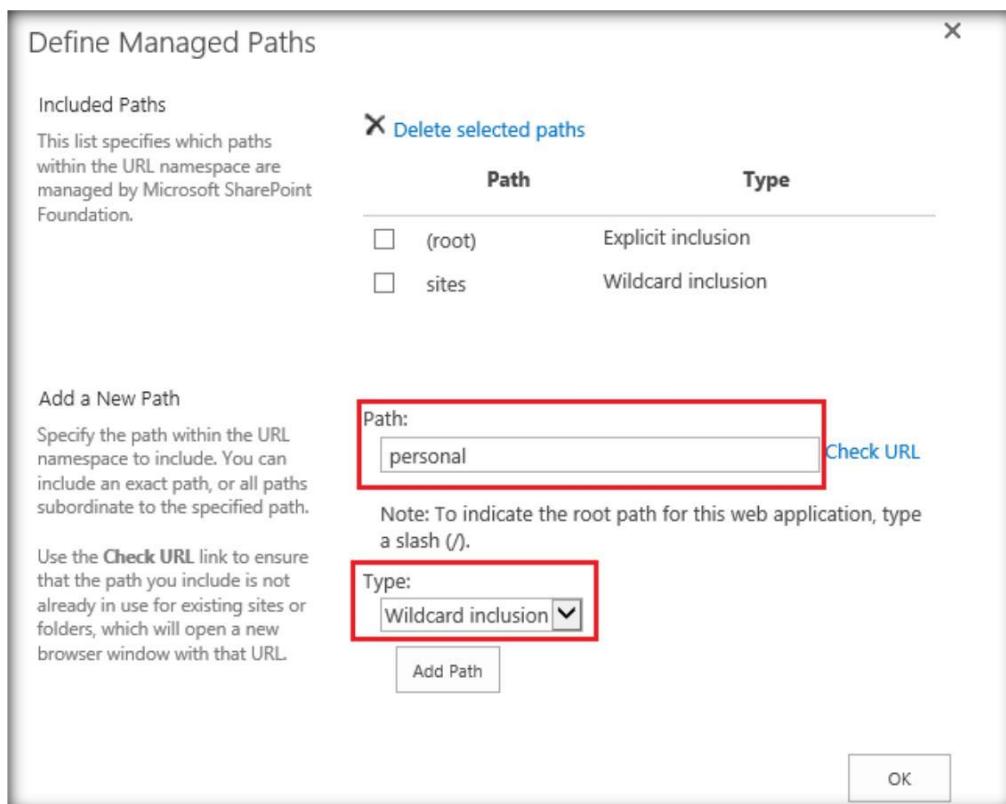
This will complete the creation of the My Site, Site collection at <http://vm03-sp2016:25000/>



Once you have the My Site Web Application and Site collection in place, ensure that you create a managed path for the sites. In order to do this, head over to the Web Application, which was created recently and select Managed Paths.

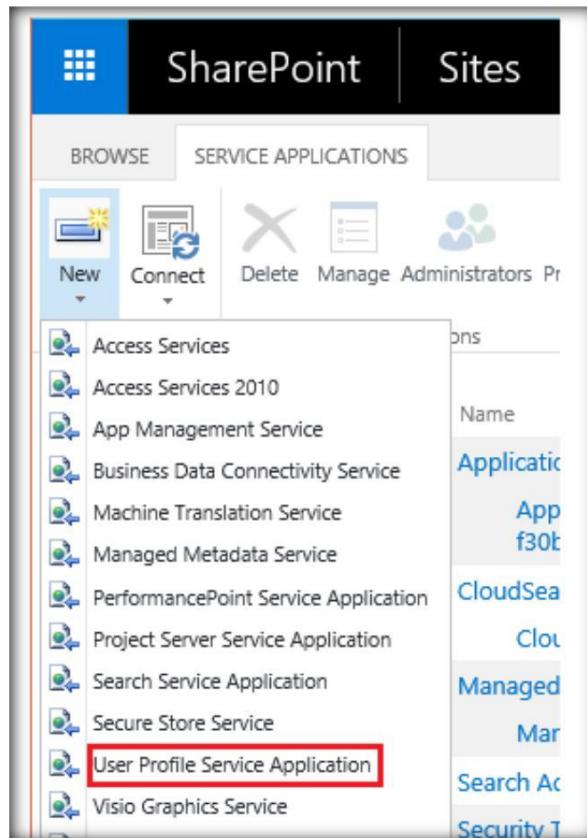


Add the managed path personal in the text box and select Wild card inclusion from the type drop down. Click OK. This will create a managed path in the Web Application under which all My Sites will be created in the future.

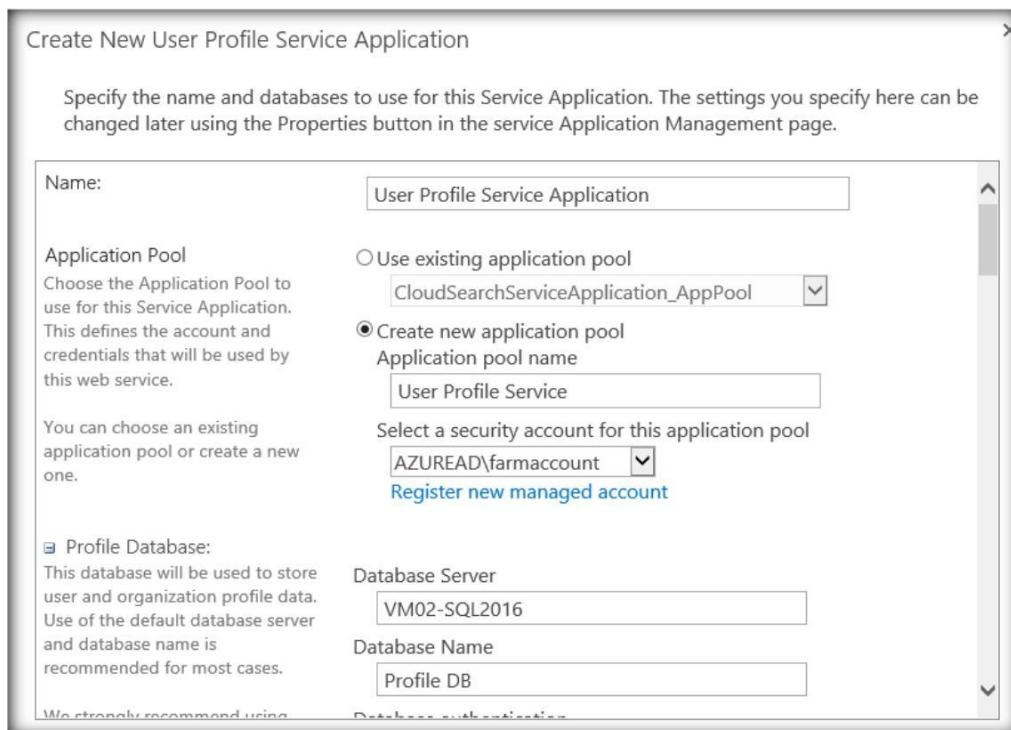


5. Setting up User Profile Service Application

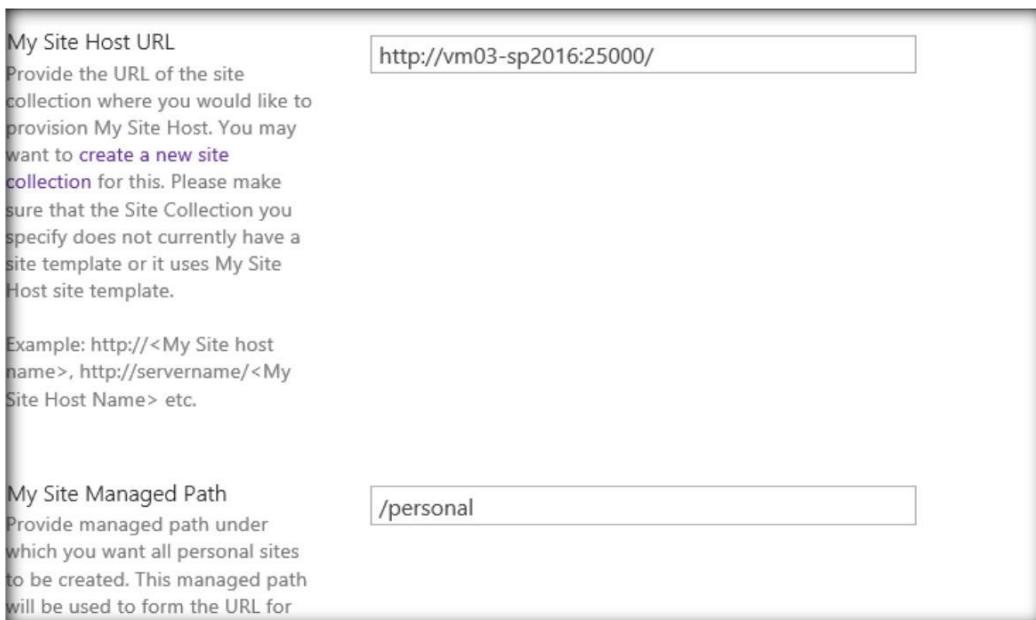
We can provision the user profile Service Application from the Manage Service Application's page.



Once the User Profile Service Application is selected, it will provide the page, where we can specify the Service Application Name, Application Pool, Application Pool Account, Database Server and Database name.



Specify My Site Host URL, which was created earlier and leave My Site Managed Path as /Personal. This is the managed path, which we had created in the earlier step.

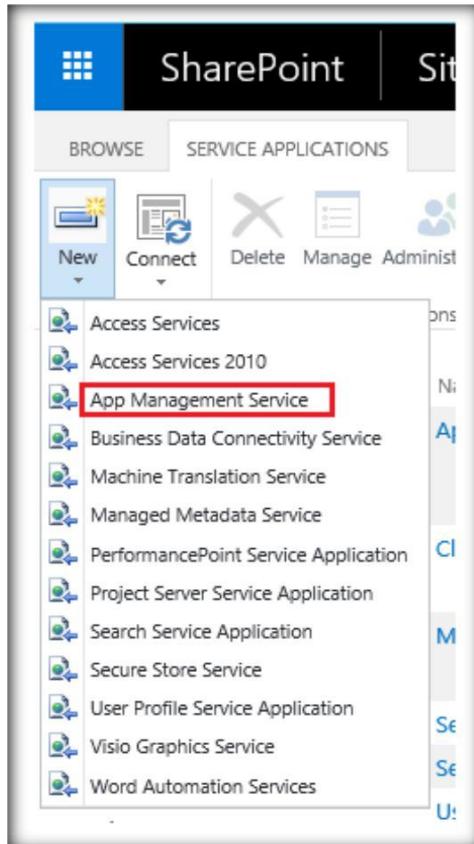


Click OK. This will complete the provisioning of the user Profile Service Application.



6. Provision App Management Service Application

The next Service Application that has to be set up is the app management Service Application. Head over to the Manage Service Application's page and from the *New* dropdown, select app management Service.



This will open up the page, where we can specify the app management Service Application Name, Database Server, Database Name, Application Pool and the Application Pool account.

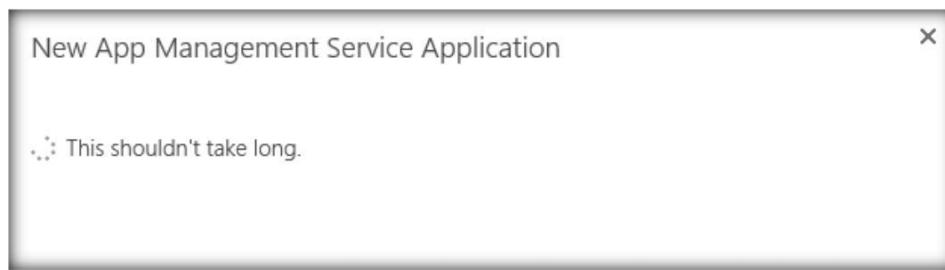
New App Management Service Application

<p>Name Enter the name of the app management service application. The name entered here will be used in the list of Service Applications displayed in the Manage Service Applications page.</p> <p>Database Use of the default database server and database name is recommended for most cases. Refer to the administrator's guide for advanced scenarios where specifying database information is required.</p> <p>Use of Windows authentication is strongly recommended. To use SQL authentication, specify the credentials which will be used to connect to the database.</p>	<p>Service Application Name <input type="text" value="App Management Service Application"/></p> <p>Database Server <input type="text" value="VM02-SQL2016"/></p> <p>Database Name <input type="text" value="App_Management_Service"/> X</p> <p>Database authentication</p> <p><input checked="" type="radio"/> Windows authentication (recommended)</p> <p><input type="radio"/> SQL authentication</p> <p>Account <input type="text"/></p> <p>Password <input type="password"/></p>
--	--

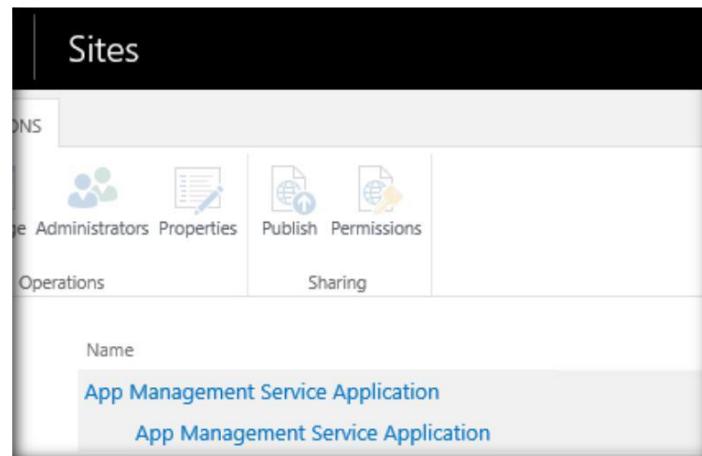
<p>You can choose to associate a database with a specific failover server that is used in conjunction with SQL Server database mirroring.</p> <p>Application Pool Choose the Application Pool to use for this Service Application. This defines the account and credentials that will be used by this web service.</p> <p>You can choose an existing application pool or create a new one.</p> <p>Create App Management Service Application Proxy Specify if you want to create App Management Service Application Proxy and add the proxy to the default proxy group on this farm.</p>	<p>Failover Database Server <input type="text"/></p> <p><input type="radio"/> Use existing application pool <input type="text" value="CloudSearchServiceApplication_AppPool"/> ▼</p> <p><input checked="" type="radio"/> Create new application pool Application pool name <input type="text" value="App Management Service"/></p> <p>Select a security account for this application pool <input type="text" value="AZUREAD\farmaccount"/> ▼</p> <p>Register new managed account</p> <p><input checked="" type="checkbox"/> Create App Management Service Application Proxy and add it to the default proxy group</p>
---	---

OK Cancel

Click OK to start the provisioning of the Service Application.

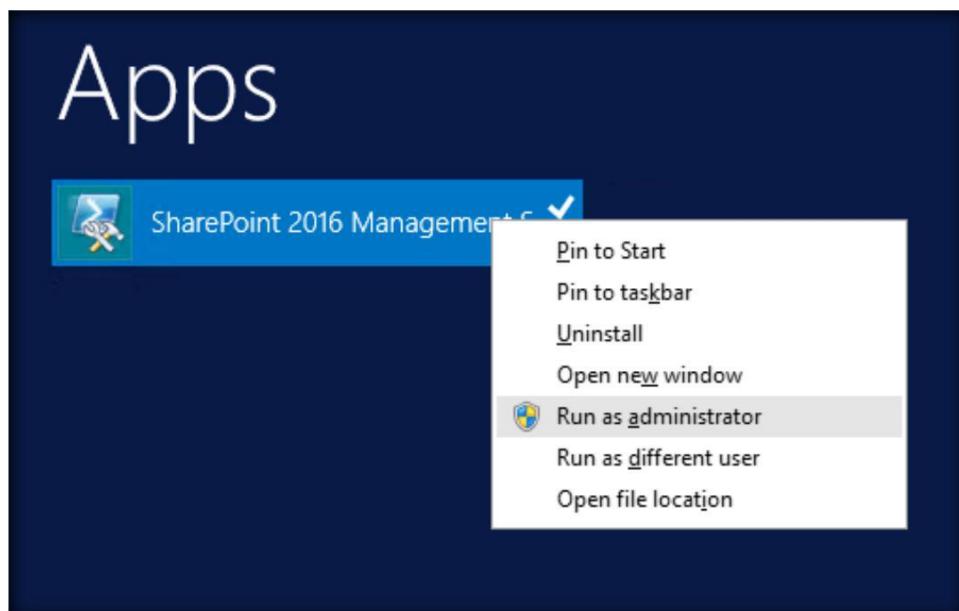


This will create the app management Service Application.



7. Provision Subscription Settings Service Application

The last Service Application that has to be created is the Subscription Settings Service Application. This cannot be created directly from the Central Administration and has to be provisioned, using PowerShell. To do this, spin up SharePoint 2016 Management Shell as an administrator.



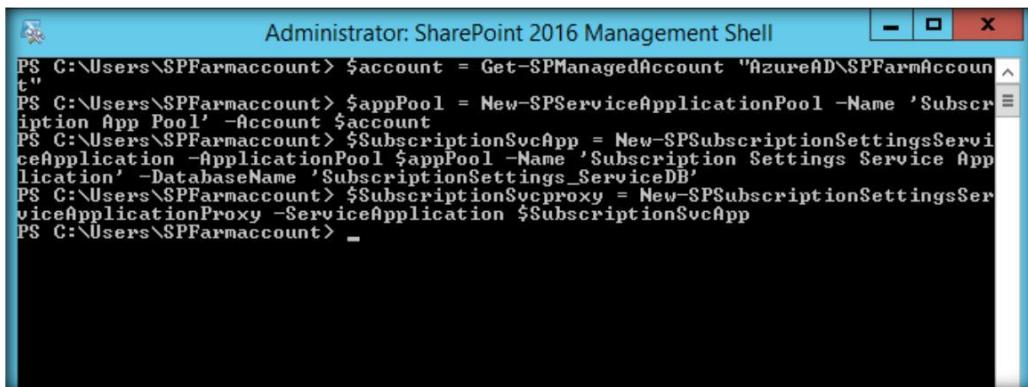
Ensure that you have a managed account in place. Run the commands given below to provision the Subscription settings Service Application.

```
$account = Get-SPManagedAccount "AzureAD\SPFarmAccount"

$appPool = New-SPServiceApplicationPool -Name 'Subscription App Pool' -Account
$account

$SubscriptionSvcApp = New-SPSubscriptionSettingsServiceApplication -ApplicationPool
$appPool -Name 'Subscription Settings Service Application' -DatabaseName
'SubscriptionSettings_ServiceDB'

$SubscriptionSvcproxy = New-SPSubscriptionSettingsServiceApplicationProxy
- ServiceApplication $SubscriptionSvcApp
```



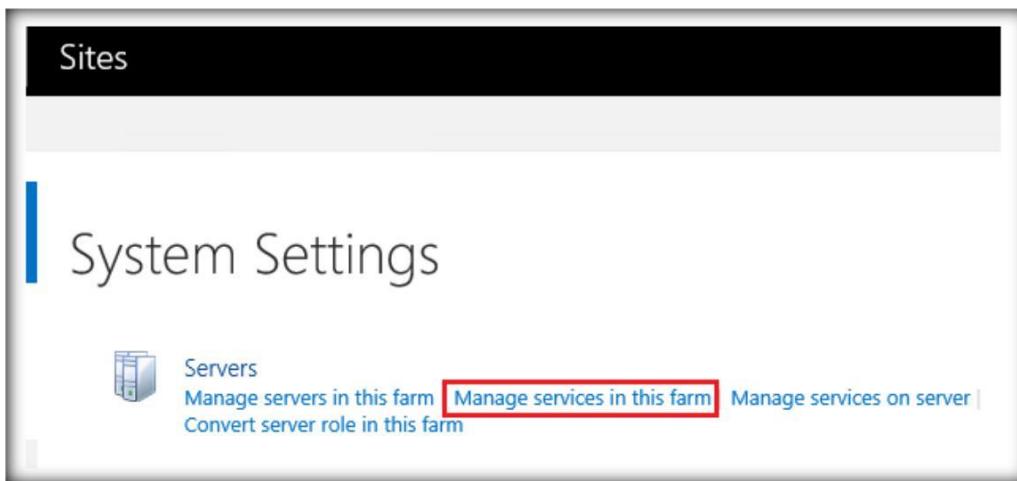
The screenshot shows the SharePoint 2016 Management Shell window titled 'Administrator: SharePoint 2016 Management Shell'. It contains the following PowerShell script:

```
PS C:\Users\SPFarmaccount> $account = Get-SPManagedAccount "AzureAD\SPFarmAccount"
PS C:\Users\SPFarmaccount> $appPool = New-SPServiceApplicationPool -Name 'Subscription App Pool' -Account $account
PS C:\Users\SPFarmaccount> $SubscriptionSvcApp = New-SPSubscriptionSettingsServiceApplication -ApplicationPool $appPool -Name 'Subscription Settings Service Application' -DatabaseName 'SubscriptionSettings_ServiceDB'
PS C:\Users\SPFarmaccount> $SubscriptionSvcproxy = New-SPSubscriptionSettingsServiceApplicationProxy -ServiceApplication $SubscriptionSvcApp
PS C:\Users\SPFarmaccount>
```

This will provision the Subscription Settings Service Application.

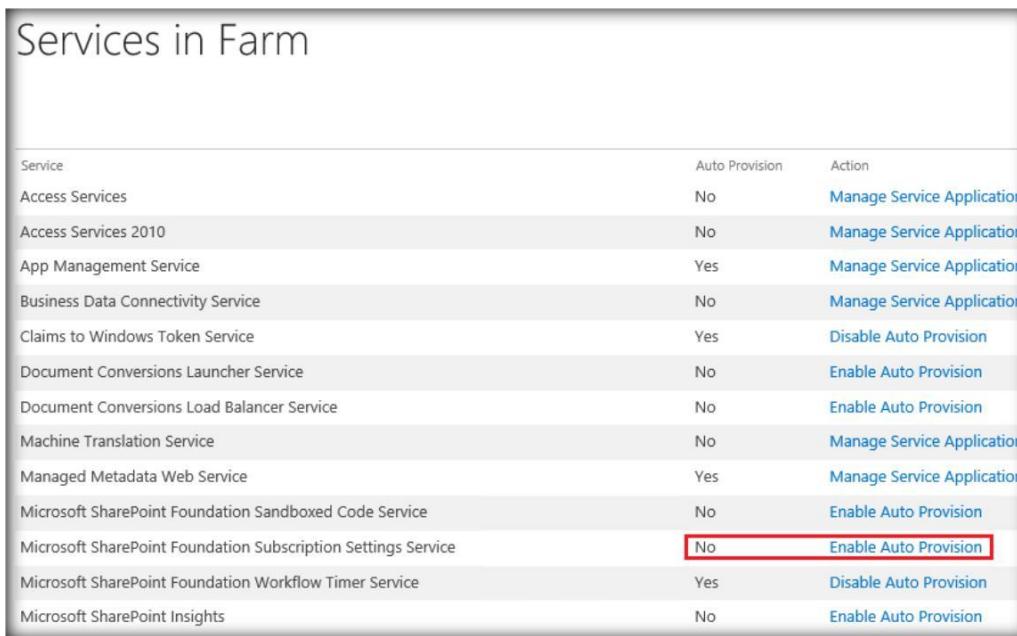


Now, we have to enable the Subscription Settings Service. From System Settings, select Manage Services in this farm.



The screenshot shows the SharePoint 'System Settings' page under the 'Sites' navigation bar. In the top navigation, there is a 'Servers' icon followed by four links: 'Manage servers in this farm', 'Manage services in this farm' (which is highlighted with a red box), 'Manage services on server', and 'Convert server role in this farm'.

This will list all the Services available within the farm. By default, Microsoft SharePoint Foundation Subscription Settings Service is disabled in the farm. Change it to Yes to provision the Service.

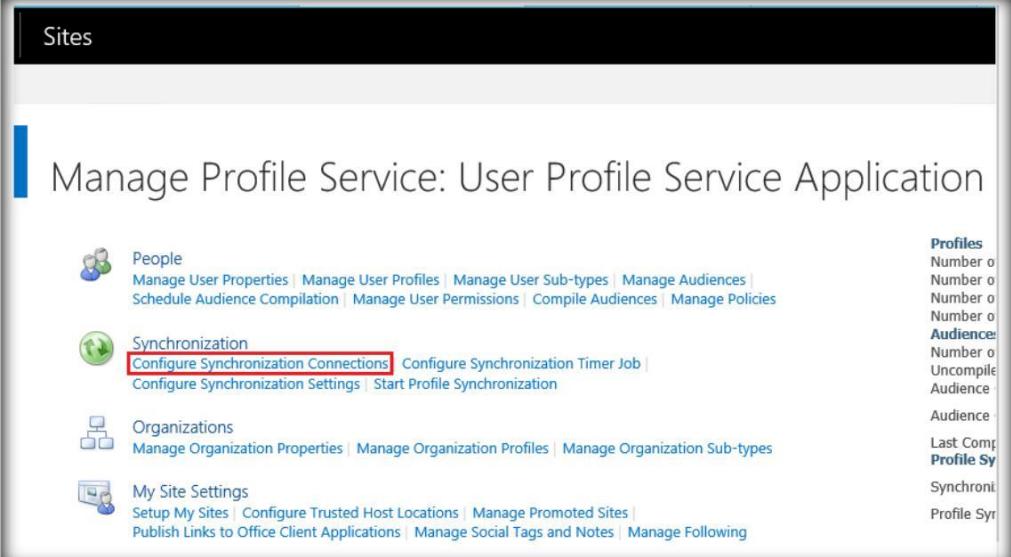


The screenshot shows the 'Services in Farm' list. The table has three columns: Service, Auto Provision, and Action. The 'Microsoft SharePoint Foundation Subscription Settings Service' row is highlighted with a red box around its 'Auto Provision' and 'Action' cells, which both contain the value 'Enable Auto Provision'.

Service	Auto Provision	Action
Access Services	No	Manage Service Application
Access Services 2010	No	Manage Service Application
App Management Service	Yes	Manage Service Application
Business Data Connectivity Service	No	Manage Service Application
Claims to Windows Token Service	Yes	Disable Auto Provision
Document Conversions Launcher Service	No	Enable Auto Provision
Document Conversions Load Balancer Service	No	Enable Auto Provision
Machine Translation Service	No	Manage Service Application
Managed Metadata Web Service	Yes	Manage Service Application
Microsoft SharePoint Foundation Sandboxed Code Service	No	Enable Auto Provision
Microsoft SharePoint Foundation Subscription Settings Service	No	Enable Auto Provision
Microsoft SharePoint Foundation Workflow Timer Service	Yes	Disable Auto Provision
Microsoft SharePoint Insights	No	Enable Auto Provision

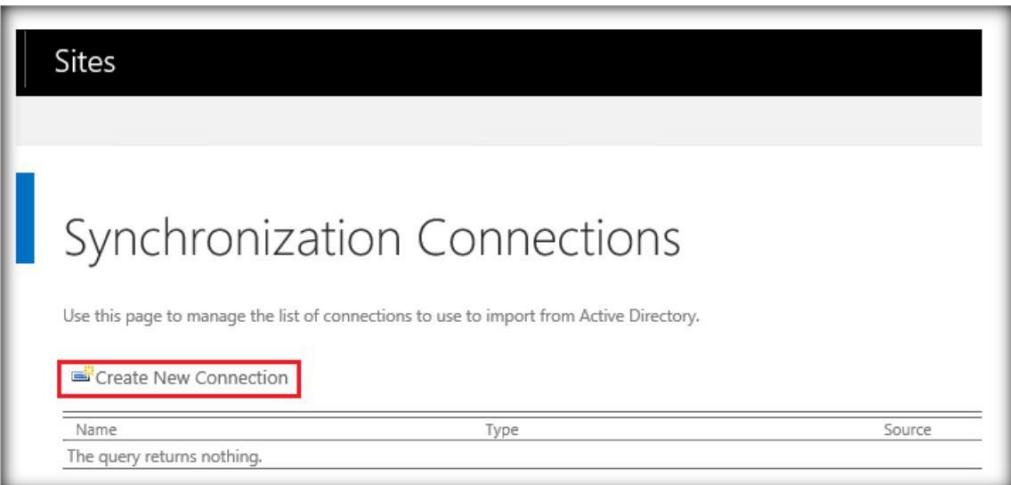
8. Configure Synchronization Connection

In order to set up Hybrid OneDrive, we have to create a synchronization connection with Active Directory Domain Services for the User Profile Service Application. In order to do this, head over to the Manage User Profile Service Application and select Configure Synchronization Connections option.



The screenshot shows the 'Manage Profile Service: User Profile Service Application' interface. The 'Synchronization' section is visible, containing links for 'Configure Synchronization Connections', 'Configure Synchronization Timer Job', 'Configure Synchronization Settings', and 'Start Profile Synchronization'. The 'Configure Synchronization Connections' link is highlighted with a red box.

Click Create New Connection to set up a new synchronization connection.



The screenshot shows the 'Synchronization Connections' page. It includes a note: 'Use this page to manage the list of connections to use to import from Active Directory.' Below this is a 'Create New Connection' button, which is highlighted with a red box. A table below shows a single entry: 'Name' (The query returns nothing), 'Type' (Active Directory Import), and 'Source' (Active Directory).

Specify the connection name and select the type as Active Directory Import. Mention the connection string, which will be the Full Qualified Domain Name. Leave the authentication provider type as Windows Authentication. Account Name and Password has to be the credentials of the domain administrator.

Sites

Add new synchronization connection

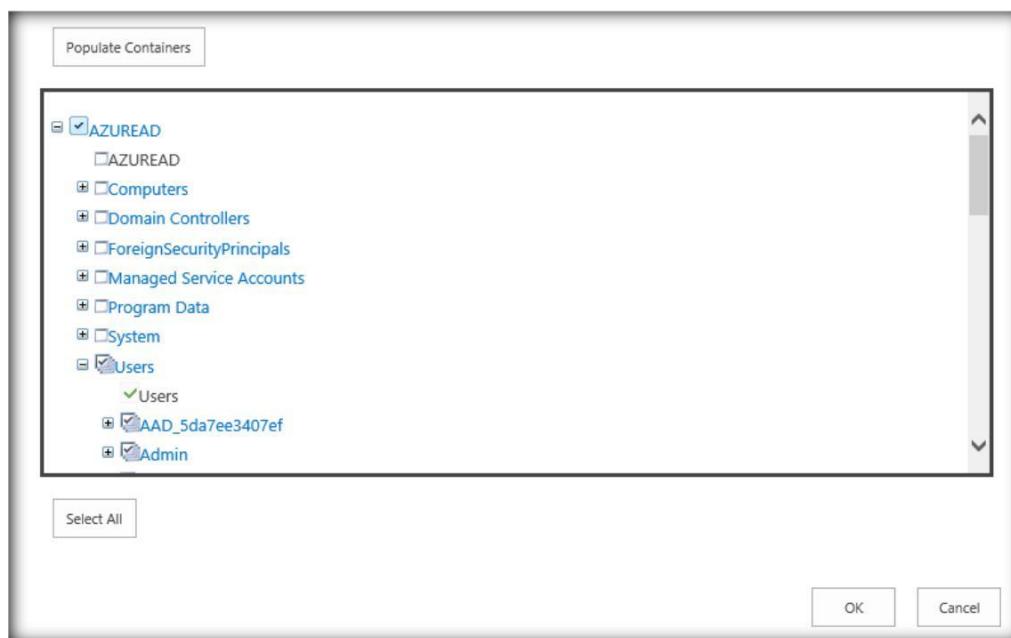
Use this page to configure a connection to a directory service server to synchronize users.

* Indicates a required field

Connection Name	Hybrid Synchronization
Type	Active Directory Import
Connection Settings	
Fully Qualified Domain Name (e.g. contoso.com):	AzureAD.Contoso.Com
For Active Directory connections to work, this account must have directory sync rights.	
Authentication Provider Type:	Windows Authentication
Authentication Provider Instance:	<input type="button" value="▼"/>
Account name: *	AzureAD\AzureADAdmin
Example: DOMAIN\user_name	
Password: *	*****
Confirm password: *	*****

Port:	389
<input type="checkbox"/> Use SSL-secured connection	
<input type="checkbox"/> Filter out disabled users	
Filter in LDAP syntax for Active Directory Import.	
Containers	
Choose which containers you want to be synchronized.	<input type="button" value="Populate Containers"/>

Click Populate Containers. This will populate the Domain Objects. Select the users node and click OK.



This will complete the setting up of the synchronization connection.

9. Verify the User Properties before running Synchronization

Now, let's head over to the Manage user Properties option from the People tab. We have to verify the user profile properties before running the synchronization connection.

Synchronization Connections

Use this page to manage the list of connections to use to import from Active Directory.

[Create New Connection](#)

Name	Type	Source
Hybrid Synchronization	Active Directory Import	AzureAD.Contoso.Com

Manage Profile Service: User Profile Service Application

- People**
 - [Manage User Properties](#) (highlighted)
 - [Manage User Profiles](#)
 - [Manage User Sub-types](#)
 - [Manage Audiences](#)
 - [Schedule Audience Compilation](#)
 - [Manage User Permissions](#)
 - [Compile Audiences](#)
 - [Manage Policies](#)
- Synchronization**
 - [Configure Synchronization Connections](#)
 - [Configure Synchronization Timer Job](#)
 - [Configure Synchronization Settings](#)
 - [Start Profile Synchronization](#)
- Organizations**
 - [Manage Organization Properties](#)
 - [Manage Organization Profiles](#)
 - [Manage Organization Sub-types](#)
- My Site Settings**
 - [Setup My Sites](#)
 - [Configure Trusted Host Locations](#)
 - [Manage Promoted Sites](#)
 - [Publish Links to Office Client Applications](#)
 - [Manage Social Tags and Notes](#)
 - [Manage Following](#)

Profiles
Number o
Number o
Number o
Number o
Audience
Number o
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Audience
Audience
Last Comp
Profile Sy
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Profile Syr

We will check for the user principal name and work E-mail. The user profile name should be mapped to userPrincipalName and Work E-mail should be mapped to the mail. However, the mapping property is blank, as shown below.

Sites		
Proxy addresses	▲▼	string (Multi Value)
Hire date	▲▼	date
Display Order	▲▼	integer
Claim User Identifier	▲▼	string (Single Value) samAccountName
Claim Provider Identifier	▲▼	string (Single Value)
Last Colleague Added	▲▼	date
Outlook Web Access URL	▲▼	URL
Resource Forest SID	▲▼	binary
User Principal Name	▲▼	string (Single Value)
First Run Experience	▲▼	integer
Personal Site Instantiation State	▲▼	integer
Distinguished Name	▲▼	string (Single Value)

Thus, let's add the mapping for the user's principal name. Select Edit.

Outlook Web Access URL	▲▼
Resource Forest SID	▲▼
User Principal Name	▲▼
First Run Experience	 Edit  Delete
Personal Site Instantiation State	▲▼

In the attribute text box, specify the mapping "userPrincipalName" and click Add.

Add New Mapping

Specify the field to map to this property when synchronizing user profile data.

When synchronizing with a Business Data Connectivity source you can only import (not export) data from associated entity fields by selecting the association. Mapping a multivalued field to a single value property is allowed, importing will attempt to get only the first value. Mapped properties cannot be modified by users.

Security Note: If you are using a high privilege account for profile synchronization, you will be able to read, import and export directory attributes that are not normally viewable by all users, make sure the appropriate default privacy setting is selected.

Note: The selection of directory service properties may be disabled if the User Profile Service Application is in an untrusted domain or if profile synchronization is not configured.

Multivalue property is tagged with "(M)".

Source Data Connection:
 Hybrid Synchronization

Attribute

 Attribute: userPrincipalName

Direction
 Import

The new mapping has come up in the page.

Outlook Web Access URL	▲▼	URL
Resource Forest SID	▲▼	binary
User Principal Name	▲▼	string (Single Value) userPrincipalName
First Run Experience	▲▼	integer
Personal Site Instantiation State	▲▼	integer
Distinguished Name	▲▼	string (Single Value)

Similarly, the Work E-mail mapping is missing. Thus, edit the property as well.

Feed service provider defined identifier	▲▼	string (Single Value)
> Contact Information	▲▼	Section
Work email	▲▼	E-mail
Mobile phone	▲▼	string (Single Value)
Fax	▲▼	string (Single Value)
Home phone	▲▼	string (Single Value)

Add the mapping mail in the attribute text box and click Add.

Add New Mapping

Specify the field to map to this property when synchronizing user profile data.

When synchronizing with a Business Data Connectivity source you can only import (not export) data from associated entity fields by selecting the association. Mapping a multivalued field to a single value property is allowed, importing will attempt to get only the first value. Mapped properties cannot be modified by users.

Security Note: If you are using a high privilege account for profile synchronization, you will be able to read, import and export directory attributes that are not normally viewable by all users, make sure the appropriate default privacy setting is selected.

Note: The selection of directory service properties may be disabled if the User Profile Service Application is in an untrusted domain or if profile synchronization is not configured.

Multivalue property is tagged with "(M)".

Source Data Connection: Hybrid Synchronization

Attribute mail

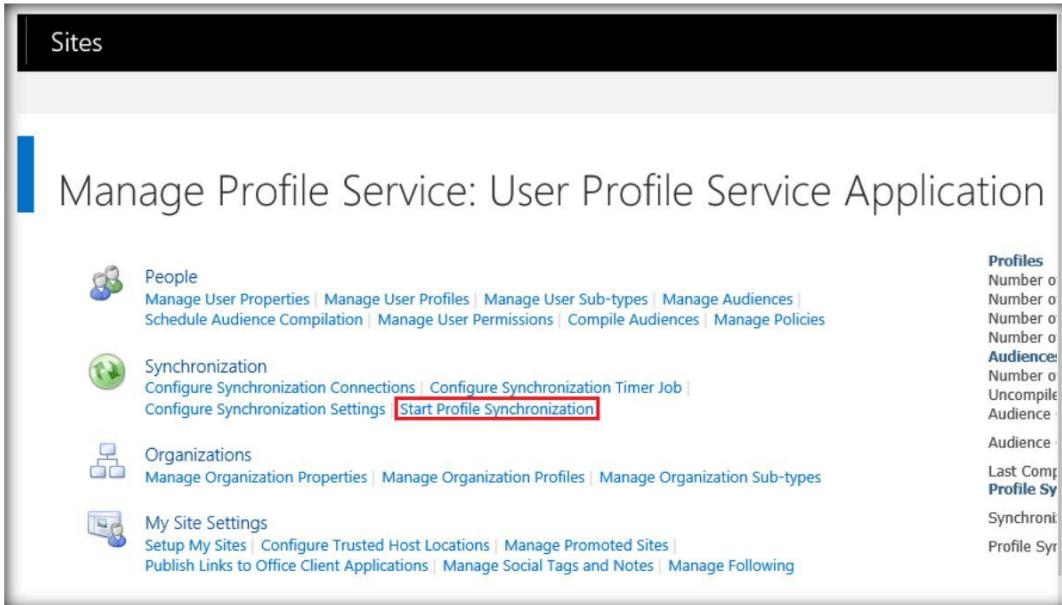
Direction Import

Thus, we can see both the properties have been mapped.

User Principal Name	<input type="checkbox"/>	string (Single Value)	<input checked="" type="checkbox"/> userPrincipalName
Personal Site Instantiation State	<input type="checkbox"/>	integer	
Distinguished Name	<input type="checkbox"/>	string (Single Value)	
Source Object Distinguished Name	<input type="checkbox"/>	string (Multi Value)	
Last Keyword Added	<input type="checkbox"/>	date	
Claim Provider Type	<input type="checkbox"/>	string (Single Value)	
Saved Account Name	<input type="checkbox"/>	string (Single Value)	
Saved SID	<input type="checkbox"/>	binary	
Object Exists	<input type="checkbox"/>	string (Single Value)	
Personal Site Capabilities	<input type="checkbox"/>	integer	
SPS-PersonalSiteFirstCreationTime	<input type="checkbox"/>	date time	
SPS-PersonalSiteLastCreationTime	<input type="checkbox"/>	date time	
SPS-PersonalSiteNumberOfRetries	<input type="checkbox"/>	integer	
SPS-PersonalSiteFirstCreationError	<input type="checkbox"/>	string (Single Value)	
Feed service provider defined identifier	<input type="checkbox"/>	string (Single Value)	
> Contact Information	<input type="checkbox"/>	Section	
Work email	<input type="checkbox"/>	E-mail	<input checked="" type="checkbox"/> mail

10. Start Profile Synchronization

The user profile property mappings have been verified. Now, we have to synchronize the UPN domain suffix and E-mail address, which we configured in Active Directory Domain Services. In order to do this, select the Start Profile Synchronization option from the Synchronization tab.



Sites

Manage Profile Service: User Profile Service Application

- People**
Manage User Properties | Manage User Profiles | Manage User Sub-types | Manage Audiences | Schedule Audience Compilation | Manage User Permissions | Compile Audiences | Manage Policies
- Synchronization**
Configure Synchronization Connections | Configure Synchronization Timer Job | Configure Synchronization Settings **Start Profile Synchronization**
- Organizations**
Manage Organization Properties | Manage Organization Profiles | Manage Organization Sub-types
- My Site Settings**
Setup My Sites | Configure Trusted Host Locations | Manage Promoted Sites | Publish Links to Office Client Applications | Manage Social Tags and Notes | Manage Following

Profiles
Number o
Number o
Number o
Number o
Audience:
Number o
Uncompile
Audience
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Last Comp
Profile Sy
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Profile Sy

Select “Start Incremental Synchronization” and click OK.

Sites

Start Profile Synchronization

Use this page to start a full or incremental Synchronization.

Start Profile Synchronization

Select Incremental Synchronization to start an incremental synchronization now. Only data that has changed in connected sources and User Profile will be synchronized.

Not recommended: In most case, Incremental sync should be sufficient. Selecting Full Synchronization is time and compute intensive and is not recommended unless absolutely required to reset data store in User Profile.

Start Incremental Synchronization
 Start Full Synchronization

To the right of the Manage Profile Service page, you can see the Synchronization Settings summary.

Profiles	
Number of User Profiles	36
Number of User Properties	109
Number of Organization Profiles	1
Number of Organization Properties	15
Audiences	
Number of Audiences	1
Uncompiled Audiences	0
Audience Compilation Status	Idle
Audience Compilation Schedule	Every Saturday at 01:00 AM
Last Compilation Time	Not compiled
Profile Synchronization Settings	
Synchronization Schedule (Incremental)	every 5 minutes between 0 and 0
Profile Synchronization Status	Idle

11. Setup User Permissions to access One Drive for Business

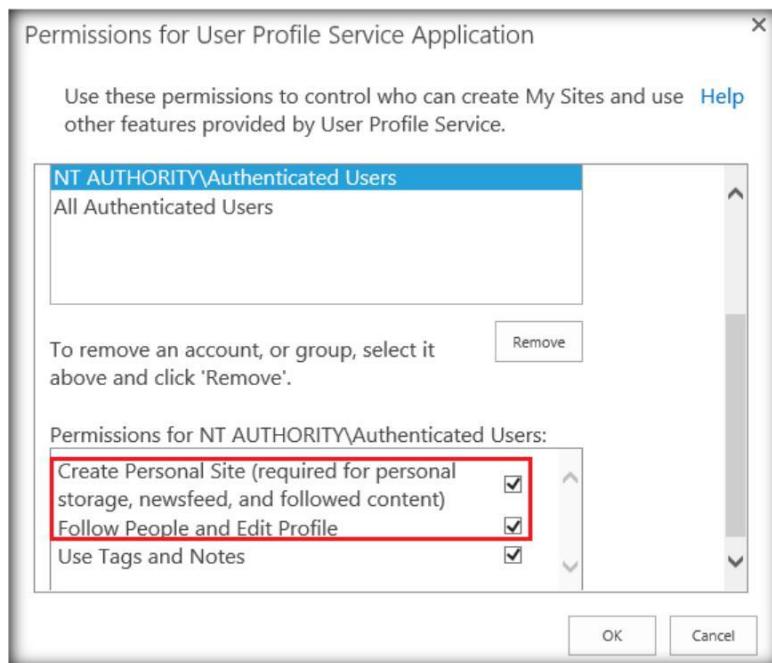
In order to use OneDrive for Business in Office 365, the users of the SharePoint Site must be having the “Create Personal Site” and “Follow People and Edit Profile” permissions. Both are controlled by the user permissions in the User Profile Service Application. Thus, let’s head over to Manage User Permissions section in the People tab and grant the required access.

Sites

Manage Profile Service: User Profile Service Application

 People	Profiles Number o Number o Number o Number o Audience Number o Uncompil Audience
Manage User Properties Manage User Profiles Manage User Sub-types Manage Audiences Schedule Audience Compilation Manage User Permissions Compile Audiences Manage Policies	Audience Last Com Profile Sy Synchroni Profile Sy
 Synchronization	
Configure Synchronization Connections Configure Synchronization Timer Job Configure Synchronization Settings Start Profile Synchronization	
 Organizations	
Manage Organization Properties Manage Organization Profiles Manage Organization Sub-types	
 My Site Settings	
Setup My Sites Configure Trusted Host Locations Manage Promoted Sites Publish Links to Office Client Applications Manage Social Tags and Notes Manage Following	

Select the permissions given below for the authenticated users and click OK.

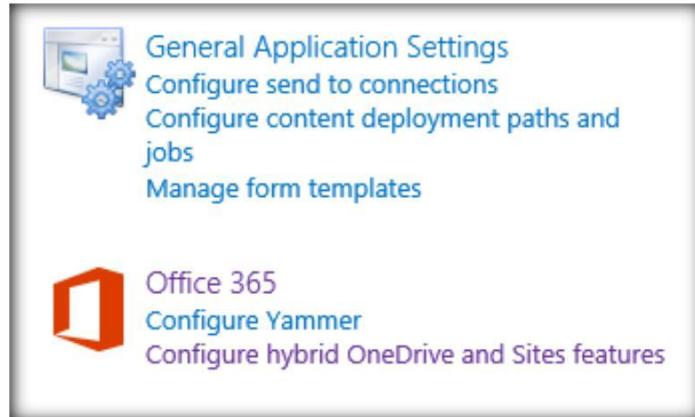


12. Get Office 365 My Site

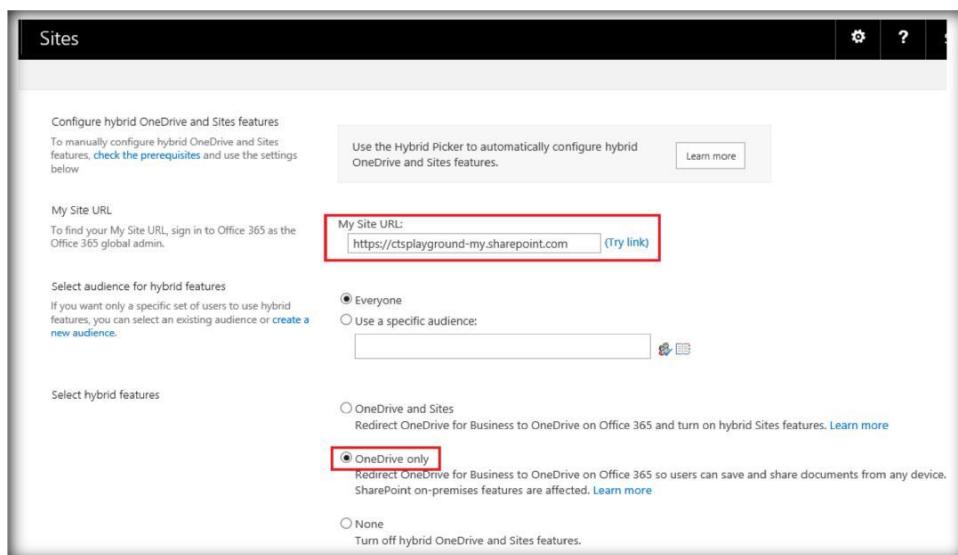
Before configuring OneDrive for business link, we have to get the URL for My Sites site collection in SharePoint Online. So as to find the My Sites URL in Office 365, click SharePoint from the admin menu. In the site collections list, get the site collection URL, which contains <domain>-my.sharepoint.com.

URL
https://ctoplayground.sharepoint.com
https://ctoplayground.sharepoint.com/portals/hub
https://ctoplayground.sharepoint.com/search
https://ctoplayground.sharepoint.com/sites/AppCatalog
https://ctoplayground.sharepoint.com/sites/CompliancePolicyCenter
https://ctoplayground.sharepoint.com/sites/eDiscoverySite
https://ctoplayground.sharepoint.com/sites/Playground
https://ctoplayground.sharepoint.com/sites/SearchCenter
https://ctoplayground-my.sharepoint.com

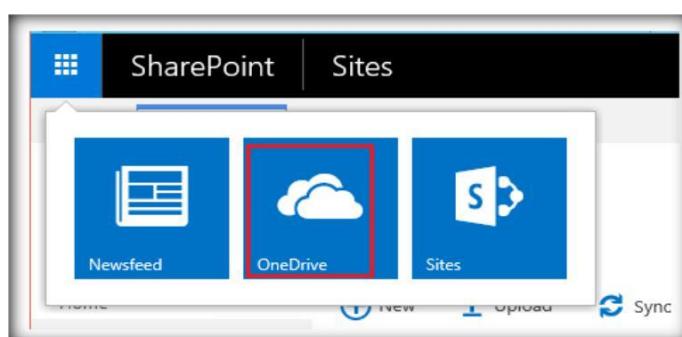
In my case, it is <https://ctsplayground-my.sharepoint.com>. As the final step, let's head over to Office 365 tab in Central Administration and select "Configure hybrid OneDrive and Site features".



Enter SharePoint Online My Site URL in the My Site URL section. Select Radio button "One Drive Only" in Hybrid features section.



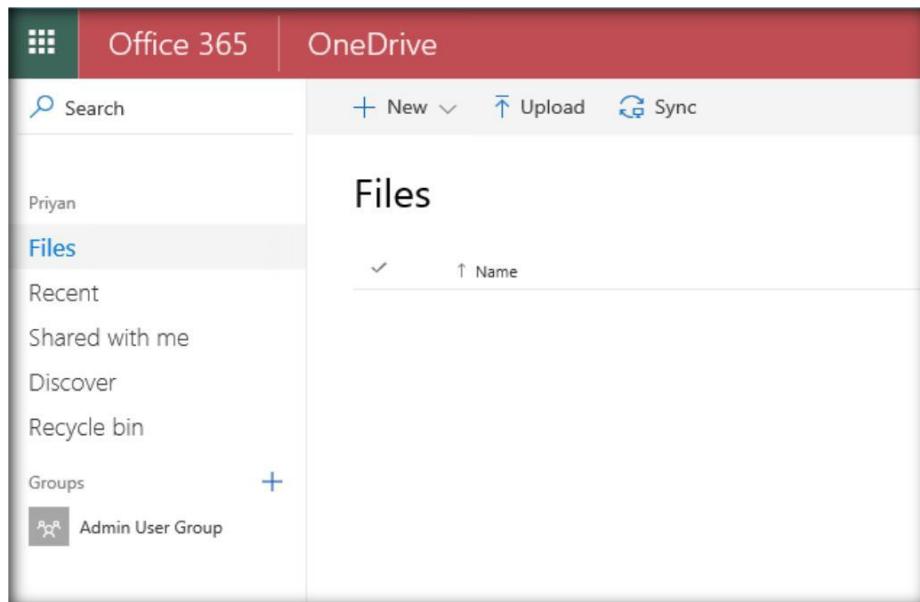
Let's test the OneDrive for the business, which is redirected by clicking on the OneDrive link.



This will take us to Office 365 login page.



Once authenticated, we can work on Office 365 OneDrive.


 A screenshot of the Microsoft OneDrive interface. The top navigation bar has tabs for "Office 365" and "OneDrive". The "OneDrive" tab is active. The left sidebar shows a file tree with "Priyan" at the root, followed by "Files", "Recent", "Shared with me", "Discover", and "Recycle bin". Below this is a "Groups" section with a "+ Add group" button and a "Admin User Group" entry. The main content area is titled "Files" and shows a list of files with sorting options "✓" and "↑ Name". At the top of the main area, there are buttons for "New", "Upload", and "Sync".

References:[https://technet.microsoft.com/en-us/library/mt147425\(v=office.16\).aspx](https://technet.microsoft.com/en-us/library/mt147425(v=office.16).aspx)

Thus, we have successfully configured Hybrid OneDrive. Now, let's see how we can set up Hybrid team sites. The initial SharePoint and Office 365 configurations are same for both Hybrid OneDrive and Hybrid team sites. Hybrid team sites has an extra setting up of Hybrid Picker from Office 365.

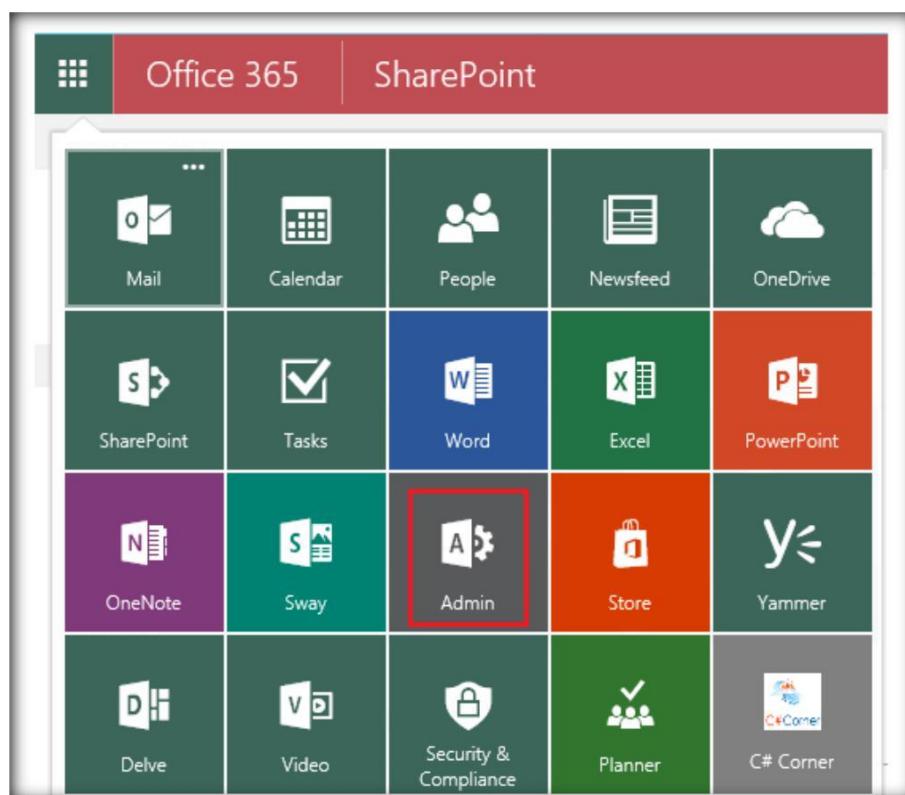
C. Configure SharePoint Hybrid Team Sites

SharePoint Hybrid team sites provides an extensible app launcher in SharePoint 2016, which integrates the tile in Office 365 to On-Premise app launcher. It also redirects the users to Office 365 team sites on clicking SharePoint On-Premise sites button in the suite bar.

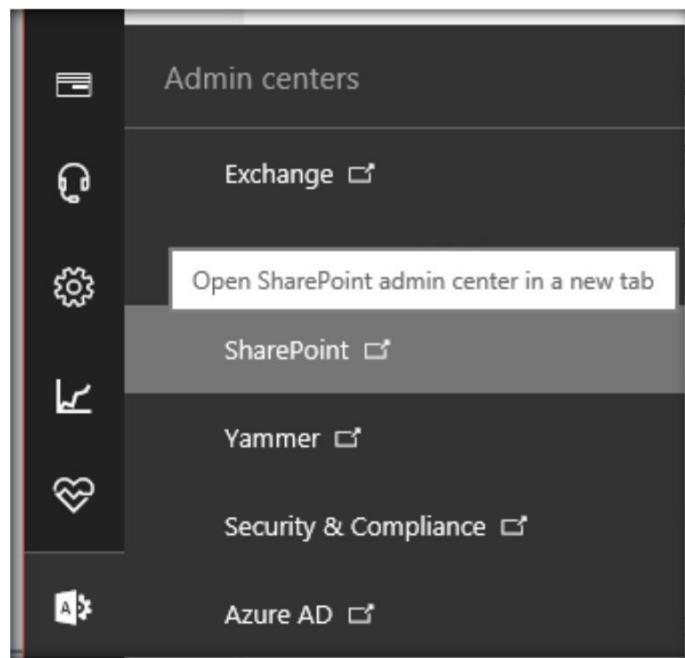
We will see how to configure Hybrid Team Sites in SharePoint Server 2016 in this section. Prior to setting up Hybrid Team sites, we have some configurations that has to be done in Office 365 as well as SharePoint, which was discussed in the previous sections. You can find them here, as shown below.

- [Office 365 Configurations](#)
- [SharePoint On Premise Configurations](#)

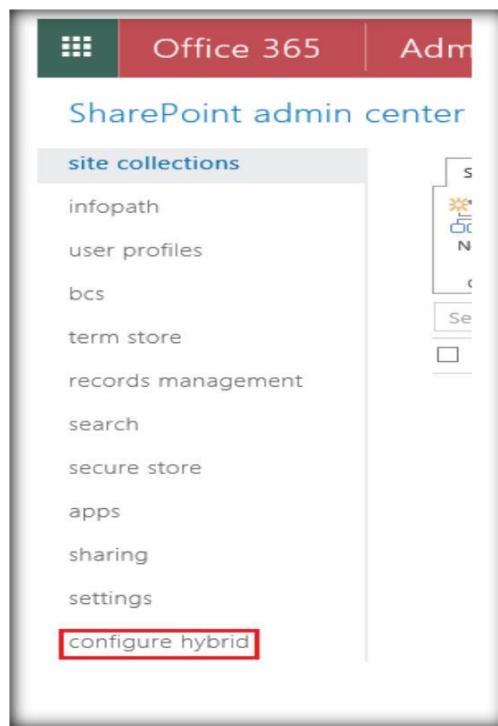
Once the configurations listed above are completed, let's head over to Office 365. Go to the admin center by clicking on the Admin tile in the app launcher.



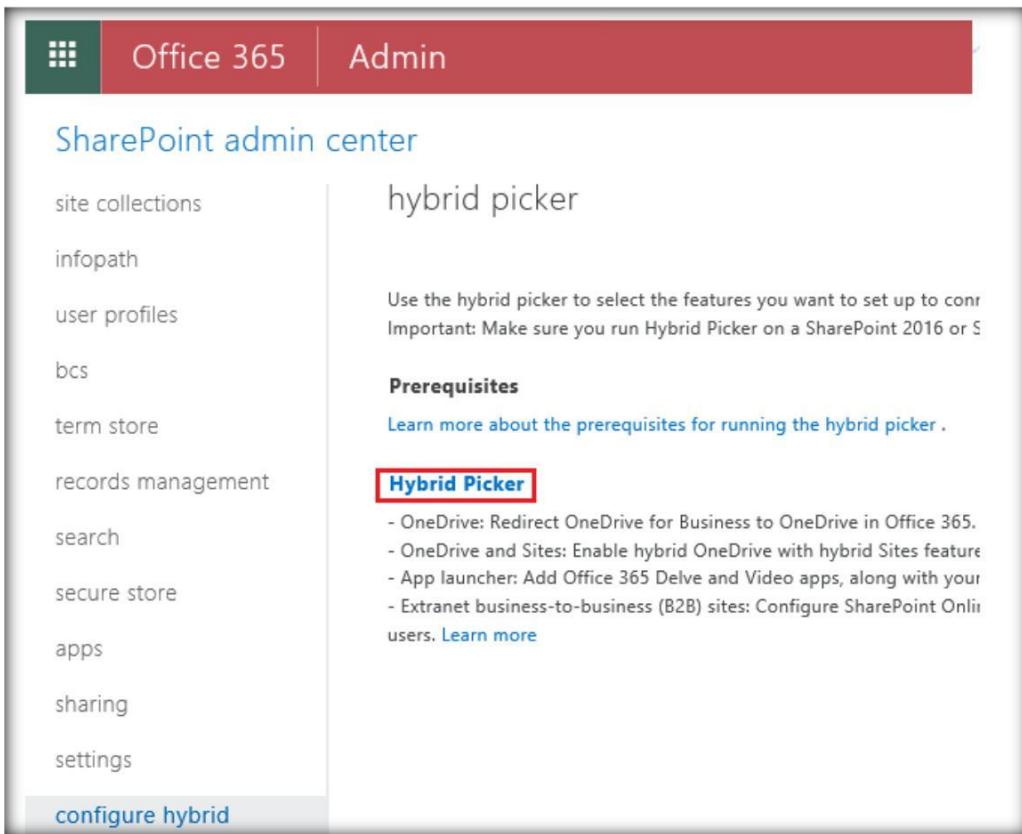
Click on SharePoint Admin center.



Select Configure Hybrid options from the left menu.



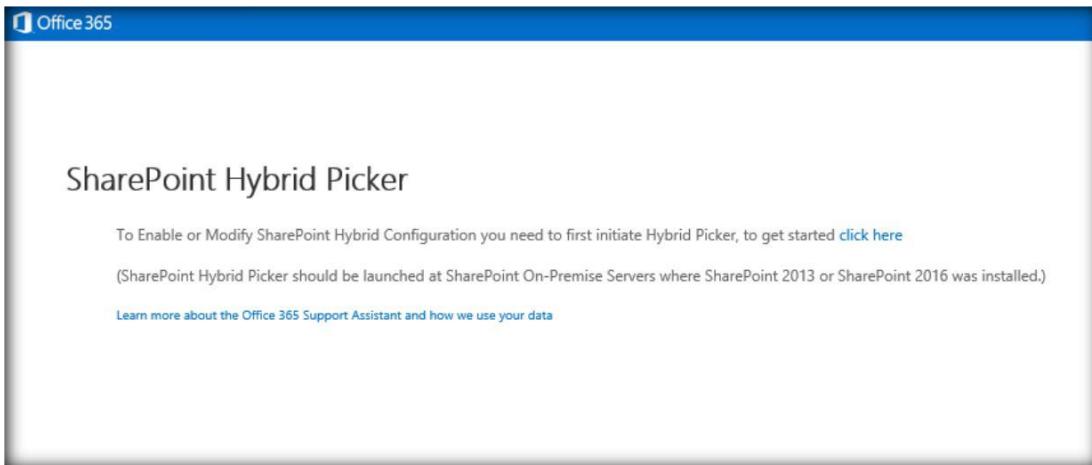
This will open up the page, where we can start configuring the Hybrid Picker. Click on *Hybrid Picker*.



The screenshot shows the SharePoint Admin Center interface. At the top, there's a navigation bar with a grid icon, the text "Office 365" and "Admin". Below this, the main title is "SharePoint admin center". On the left, a sidebar lists various administrative options: site collections, infopath, user profiles, bcs, term store, records management, search, secure store, apps, sharing, and settings. At the bottom of this sidebar is a button labeled "configure hybrid". The main content area is titled "hybrid picker". It contains a brief description: "Use the hybrid picker to select the features you want to set up to connect Office 365 and SharePoint 2016 or later. Important: Make sure you run Hybrid Picker on a SharePoint 2016 or later server." Below this is a section titled "Prerequisites" with a link: "Learn more about the prerequisites for running the hybrid picker". A red-bordered box highlights the "Hybrid Picker" section, which lists several requirements: - OneDrive: Redirect OneDrive for Business to OneDrive in Office 365. - OneDrive and Sites: Enable hybrid OneDrive with hybrid Sites feature. - App launcher: Add Office 365 Delve and Video apps, along with your organization's apps. - Extranet business-to-business (B2B) sites: Configure SharePoint Online to connect to external users. There's also a "Learn more" link.

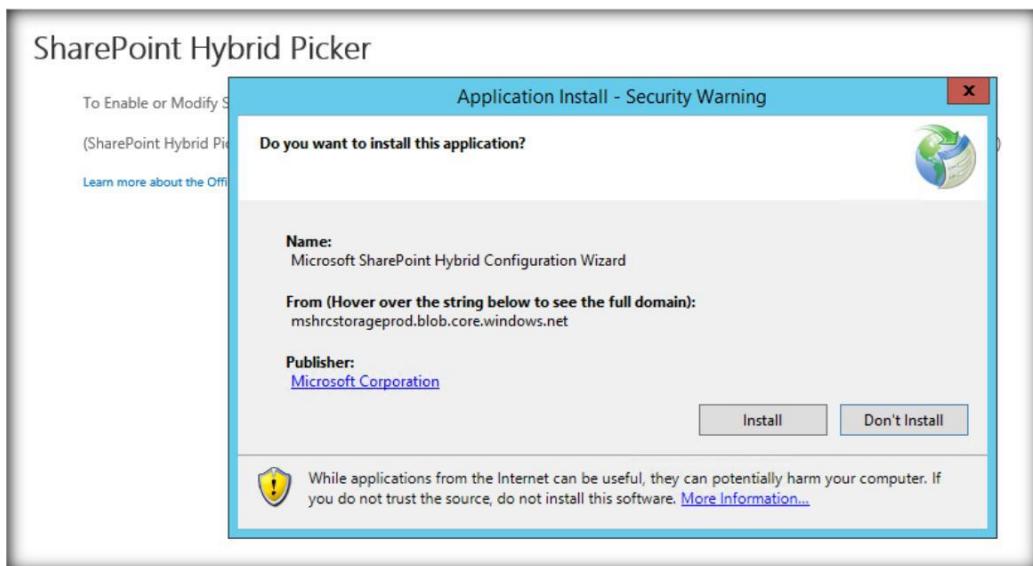
1. Configure SharePoint Hybrid Picker

From SharePoint Hybrid Picker Configuration page, select click here.

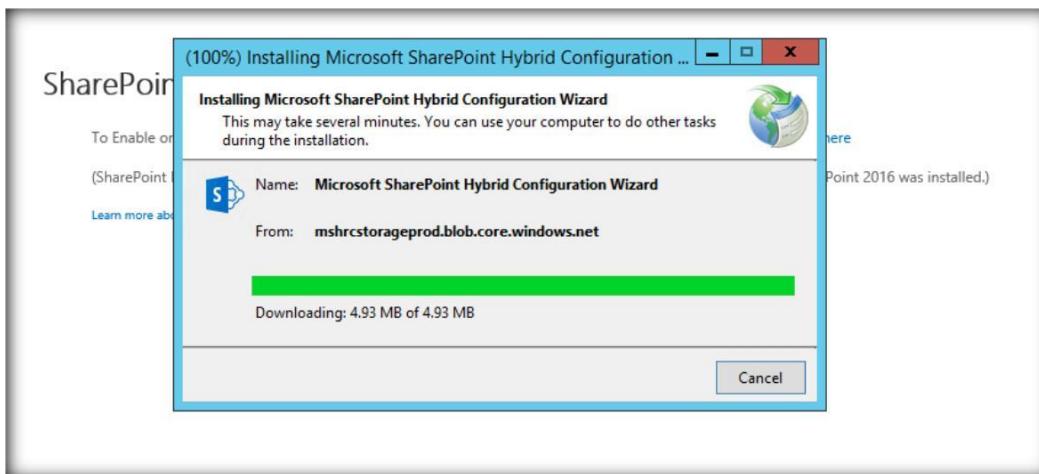


The screenshot shows the "SharePoint Hybrid Picker" configuration page. At the top, it says "Office 365". The main title is "SharePoint Hybrid Picker". Below it, there's a note: "To Enable or Modify SharePoint Hybrid Configuration you need to first initiate Hybrid Picker, to get started [click here](#)". Below that, it says: "(SharePoint Hybrid Picker should be launched at SharePoint On-Premise Servers where SharePoint 2013 or SharePoint 2016 was installed.)". At the bottom, there's a link: "Learn more about the Office 365 Support Assistant and how we use your data".

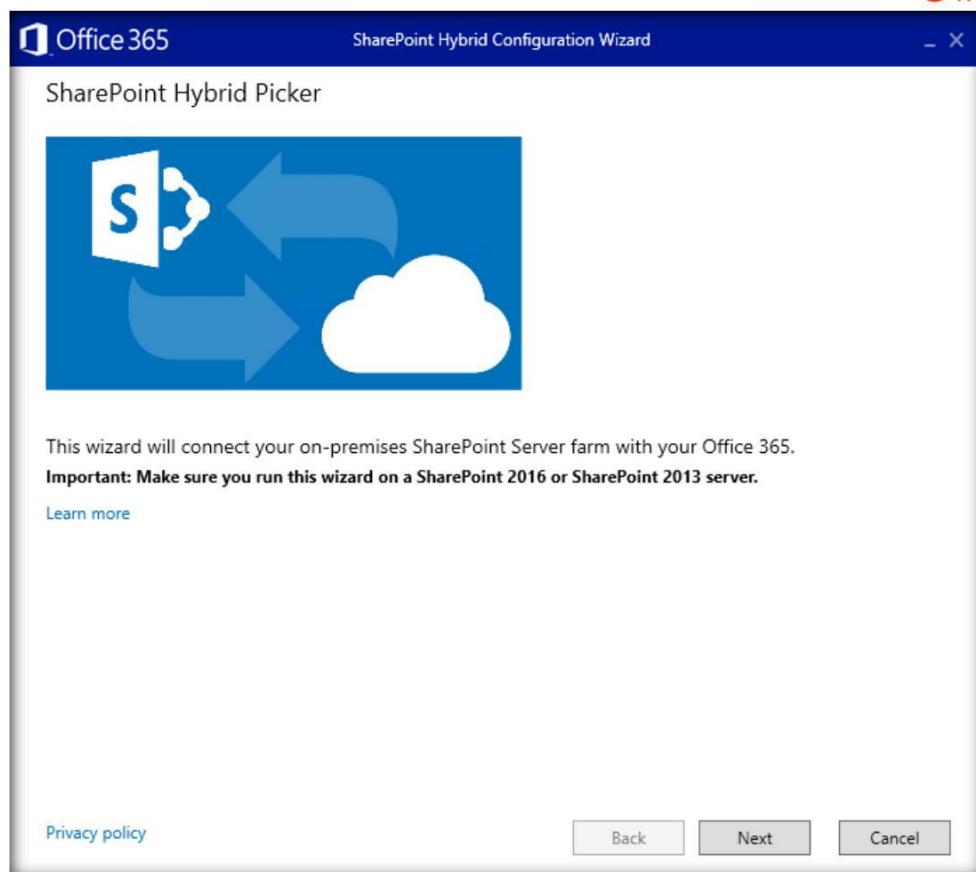
This will start opening up page from where we can download and install Microsoft SharePoint Hybrid Configuration wizard. Click *Install*.



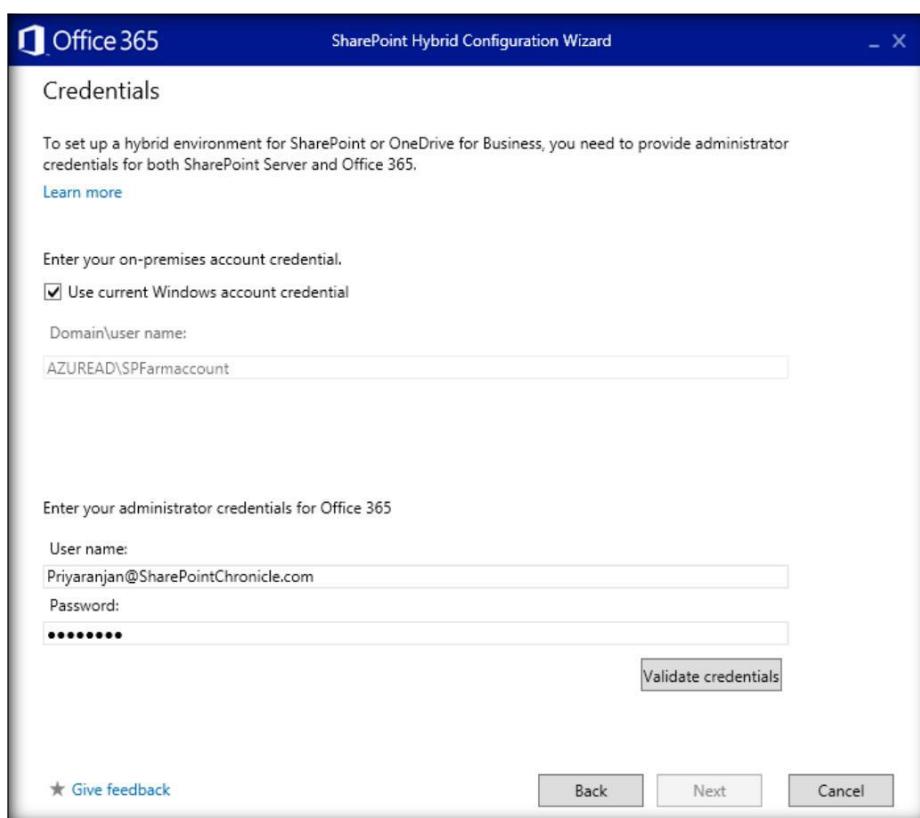
This will download the wizard to the local machine.



Once the wizard installation completes, it opens up Hybrid Configuration Wizard, which will connect SharePoint Server to Office 365.



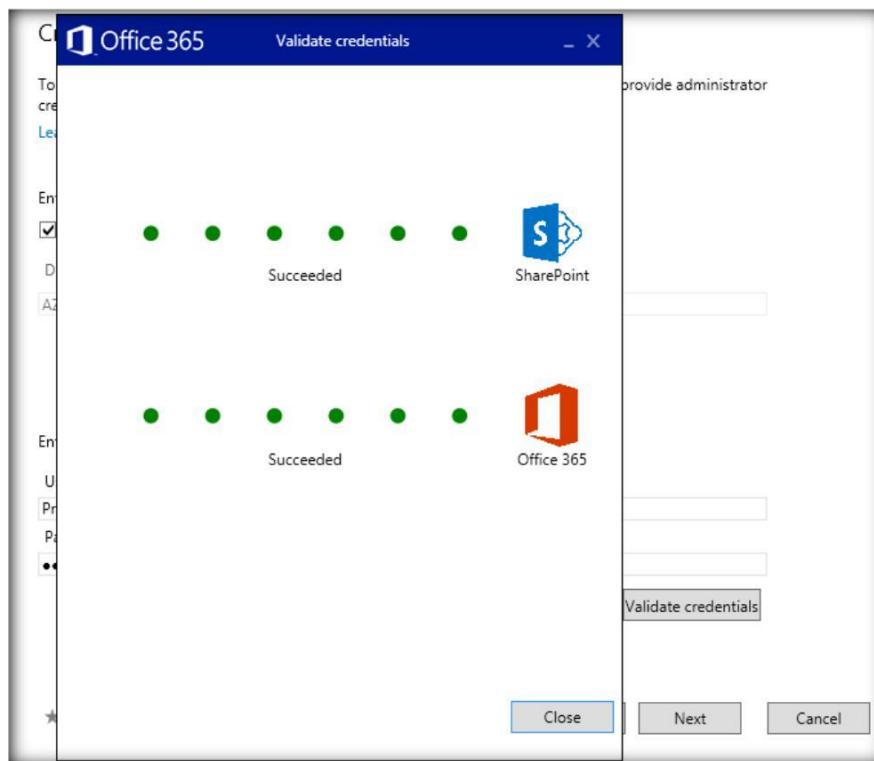
Specify Office 365 tenant administrator credentials in the credentials page.



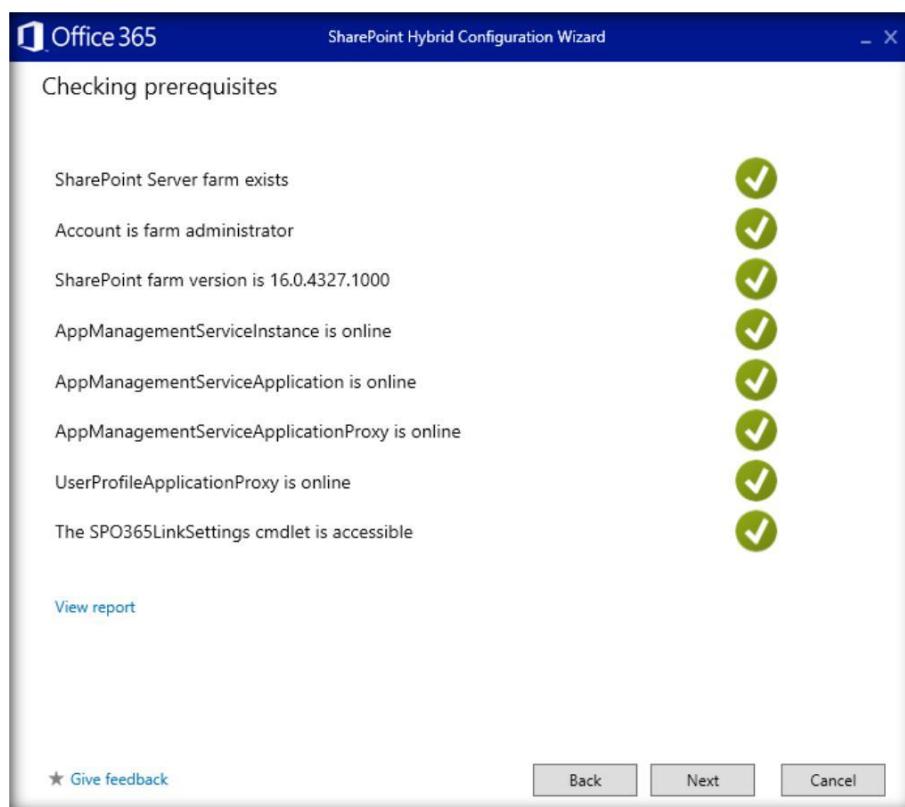
You can click on Validate credentials to check for its correctness.



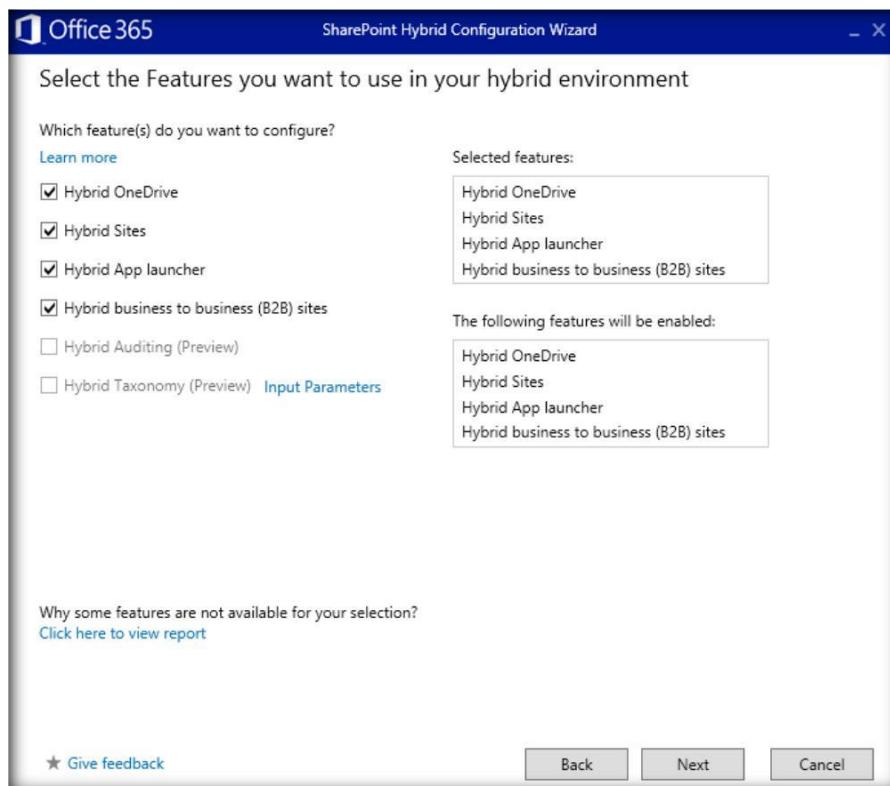
Make sure to disable Multi Factor Authentication, when doing this, else we would get a wrong tenant credential error, as shown above.



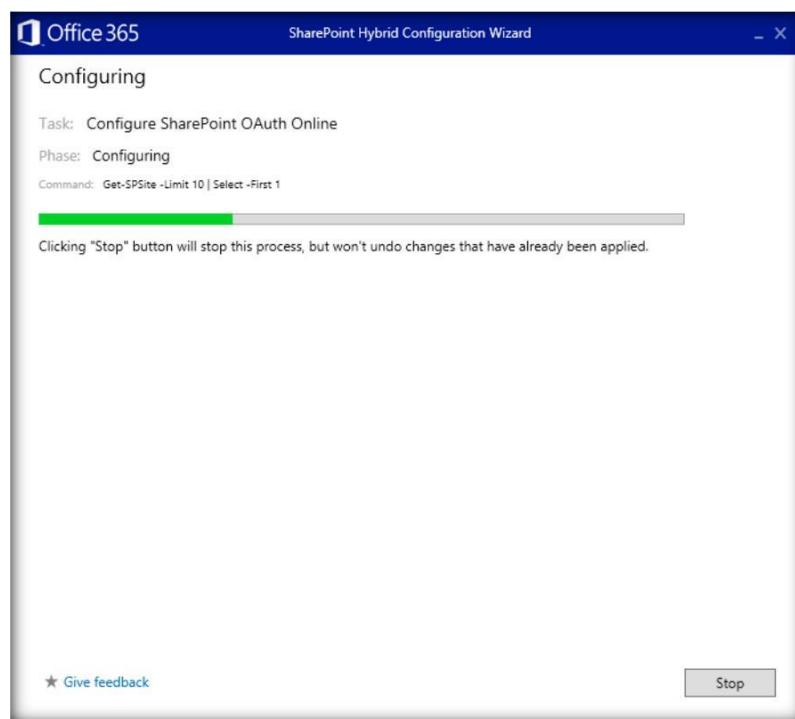
Once you get „a succeeded message“, close the validation Window and click Next. It takes you to a prerequisite checker page. Click Next.



Select the features, which you would like to configure as a part of the Hybrid set up. Click Next.



This will start configuring the Hybrid features.



Finally, you will get a summary page, which states the Hybrid features that were configured.

Office 365 SharePoint Hybrid Configuration Wizard

Configuration summary

Your SharePoint Server environment is now connected to Office 365.
Restart Internet Information Services (IIS) at the next convenient time.

- Hybrid OneDrive** Configuration succeeded. All your SharePoint users have been redirected to OneDrive in Office 365. If you want only some users to be redirected, go to the Configure Hybrid Features page in SharePoint Central Administration and select "Use a specific audience". To go to the page, click [here](#)
- Hybrid Sites** Configuration succeeded. All your SharePoint users can use hybrid SharePoint Sites features. If you want only some users to use the features, go to the Configure Hybrid Features page in SharePoint Central Administration and select "Use a specific audience". To go to the page, click [here](#)
- Hybrid App launcher** Configuration succeeded. All your SharePoint Server users now have the hybrid app launcher. If you want only some users to have it, go to the Configure Hybrid Features page in SharePoint Central Administration and select "Use a specific audience". To go to the page, click [here](#)
- Hybrid business to business (B2B) sites**

[Give feedback](#) [Next](#)

Office 365 SharePoint Hybrid Configuration Wizard

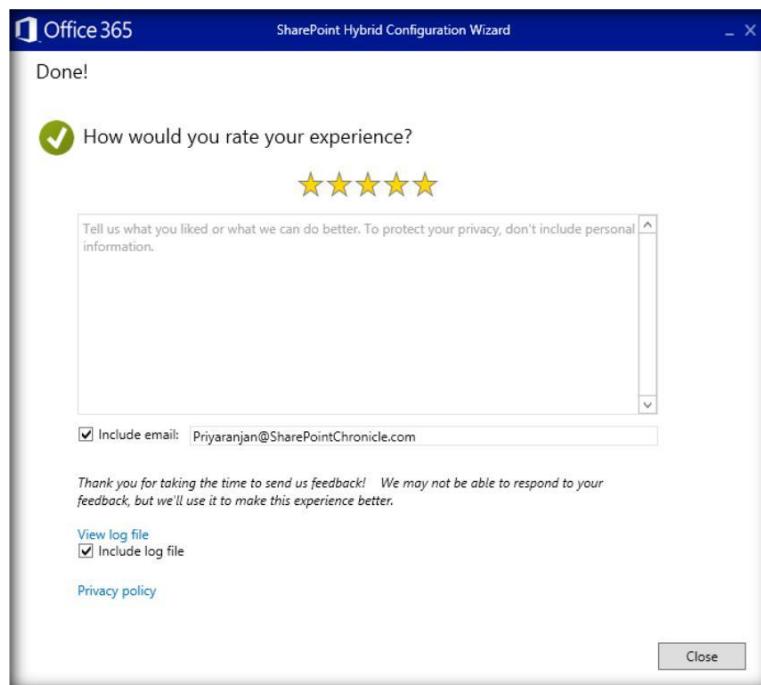
Configuration summary

Your SharePoint Server environment is now connected to Office 365.
Restart Internet Information Services (IIS) at the next convenient time.

- Hybrid Sites** Configuration succeeded. All your SharePoint users can use hybrid SharePoint Sites features. If you want only some users to use the features, go to the Configure Hybrid Features page in SharePoint Central Administration and select "Use a specific audience". To go to the page, click [here](#)
- Hybrid App launcher** Configuration succeeded. All your SharePoint Server users now have the hybrid app launcher. If you want only some users to have it, go to the Configure Hybrid Features page in SharePoint Central Administration and select "Use a specific audience". To go to the page, click [here](#)
- Hybrid business to business (B2B) sites** Configuration of OAuth hybrid connection and hybrid Follow Sites features is completed. You can now navigate across Intranet sites in on-premises and Extranet sites in SharePoint Online by simply using the Follow gesture in the sites page. To create new hybrid B2B extranet sites, go to the SharePoint Online admin center, and click "New" on the site collections page. [Learn more](#) about creating extranet sites in SharePoint Online.

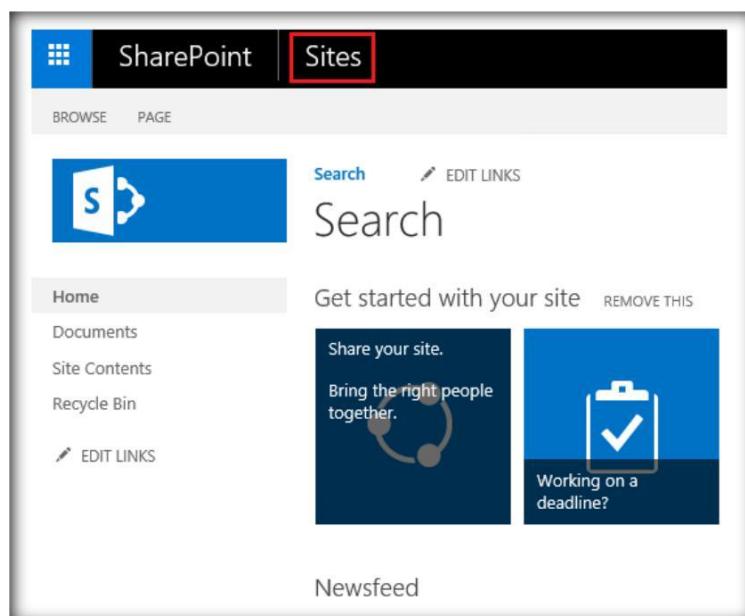
[Give feedback](#) [Next](#)

You chose to rate the Hybrid configuration experience and click Close, which will exit the Hybrid Configuration Wizard.

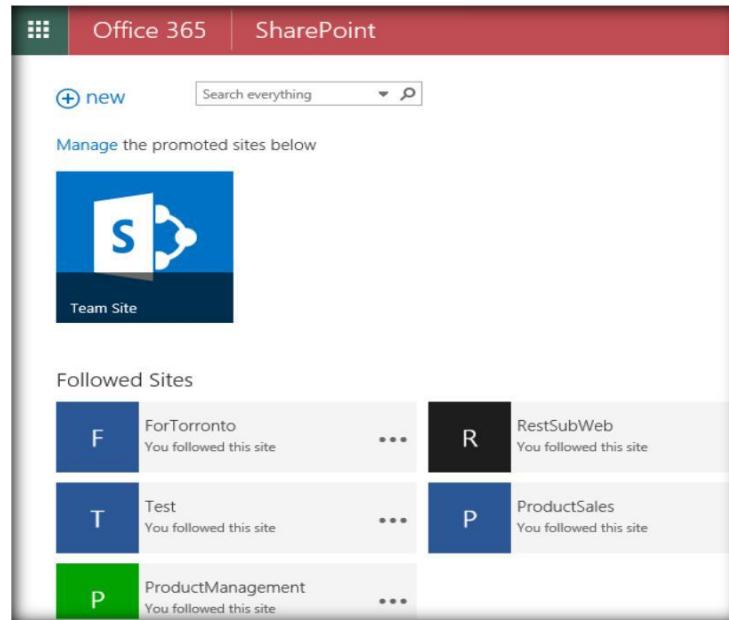


2. Test Hybrid Site Features

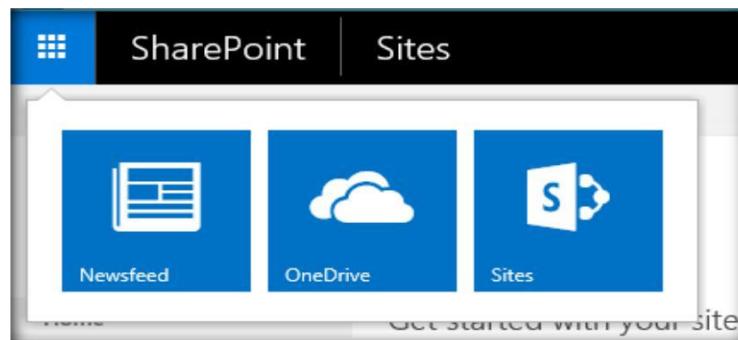
Now, let's head over to SharePoint Server site and test out the Hybrid features. Click on sites to test the Hybrid site functionality.



This will take you to Office 365 Team sites page, which ensures successful configuration.



In addition to this, if you check the suite bar, if there is some customization like logo that is added to Office 365, it will also be synchronized with SharePoint Server. By default, only Newsfeed, OneDrive and Sites tiles are present in SharePoint Server app launcher.



After Hybrid configuration, we will get an extensible app launcher with Delve and Video Integration.



Reference:[https://technet.microsoft.com/en-us/library/mt346110\(v=office.16\).aspx](https://technet.microsoft.com/en-us/library/mt346110(v=office.16).aspx).

VI. Summary

Thus, we had a walkthrough over the newly introduced/enhanced features of SharePoint Server 2016. You can find more SharePoint resources [here](#).