

User Guide

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CHAPTER 1. Introduction

This document provides a detailed guide for using and configuring the RealTime Service.

The RealTime Manager is designed to configure and manage the RealTime Service – a solution aimed at collecting data from an Exchange server and storing it in specific destinations.

The RealTime Service User Guide is intended for IT administrators and describes how to configure the RealTime Service with the help of the RealTime Manager's features. This document also includes the description of RealTime Service post-installation operations that must be performed in the RealTime Manager interface.

Definitions, Acronyms and Abbreviations

Term	Definition
AD (Active Directory)	Service that provides the means to manage identities and relationships that make up network environments.
Group or distribution list	List of e-mail addresses given one collective name. By referring to the list name internet, users can refer to all addresses on the list simultaneously.
Microsoft .NET Framework	A set of Microsoft software technologies for connecting information, people, systems, and devices. It enables a high level of software integration using Web services: small, discrete, building-block applications that connect to each other as well as to other, larger applications over the Internet.
Microsoft Exchange Server	The messaging platform that provides e-mail, scheduling, online forms, and the tools for custom collaboration and messaging-service applications.
RealTime Manager (RTM)	Windows application designed to configure and manage the RealTime Service
RealTime Service (RTS)	Window Service is designed to collect data from the Exchange Server and store it in a specific destination.
UTC (Coordinated Universal Time)	Equivalent to mean solar time at the prime meridian, formerly expressed in GMT.

RealTime Service Overview

The main purpose of the RealTime Service is to track the creation, deletion, modification of items from the Exchange Server and update.

The basic RTS components are:

- The RealTime Manager it is an administrative program for managing the Configuration Information.
- The RealTime Service it is a Windows service used for real-time synchronization of Exchange items to one of the destinations set up in the RealTime Manager application. This service also manages the license.

The RealTime Service collects data from the Exchange Server and stores it in specified destinations. In fact, synchronization happens when the service receives notifications from the Exchange Server in real time or whenever it is requested. The RealTime Service can perform full synchronization: all data is replicated from the Exchange server and from Active Directory.



The RealTime Manager provides options for saving the configuration of the connecting information, destination store, filtering output data and logging.

Also, the RTS tracks changes in distribution lists (groups) and user changes in these groups from Active Directory. The program must have access to Active Directory to perform these operations.

RealTime Manager Overview

The RealTime Manager (RTM) is primarily used to configure the RealTime Service. With the help of this application a user can set options for tracking user groups on the Active Directory which must be tracked and perform manual synchronization.

The RealTime Manager provides the ability to configure synchronization settings for a particular destination. Likewise, it can be used for specifying common settings applied to the RealTime Service.

The RealTime Manager includes options for selecting and managing user groups and specifying which user group is to be used in synchronization.

These mentioned above configurations are all stored in the RTS Database.



CHAPTER 2. Using RealTime Manager

Connect to the service.

The first time you run the RTM, you will see its window which will look like in the picture below.

RealTime Manager	-	- (×
View Help			
Open all Close all views Automatically hide connections list			
Connections Options			
	Add-On Products RealTime Service		

Figure 1. RealTime Manager initial screen

The first action, you should do, is to create the connection to the RealTime Server. For that, press the icon marked with flag 1 on the picture above. The following window will appear:

tion properties X
STServer
192.168.0.54
5000 ‡
OK Cancel

Figure 2. Connection properties



Name the server, as you need, and enter its IP address in the correspondent fields. Right after you click [**OK**], you will see the message, like on the picture below. Read it carefully and select the required option.



Figure 3. Confirm connection

If you press [Yes], the main window will look like below.

Actions Disconne	ect View Help	Enable Full synchronize	Edit settings Test	configuration	Status			
R S	RTSforTUAN ×	Synchronization		General				
al Time Services	RealTime Servic Service started Next full synchr	e version: 6.6.15.64 at: 5/11/2021 2:17: onization is scheduled at: <	04 PM (not scheduled>				Exchange Central: WebTeam Central: Resource Central:	0 / 10000 0 / 10000 0 / 10000
A	ctivity name			Status	Start time	End time	Last message	
		Start synchroniz	Activites represent ation with domain co	Currently th t some service introller or Exc	ere are no activities processes, which yu change server and c	ou can monitor here. orresponding activity will ap	opear here.	

Figure 4. RealTime Manager main window



When you run the RTM next time, services will be disconnected by default. To connect to the needed service, you just have to select it in the list and right click. Then choose the correspondent option in the appeared context menu (see the picture).



Figure 5. Select needed service

User Interface

Flexibility

The first thing you must know is that the interface of the application is very flexible. You can press the header of a certain area and drag it to any place in the application window. The process of interface "reconstruction" looks like on the picture below.

Actions Actions Disconnect	View Help Start Restart Stop	e View status Test configuration Save	Refresh	
Connecti	Service Synchronization	General		
	RTSforTUAN			<
lime Se	RealTime Service <	RealTime Service > General set	lings	
nvices	General settings Domain controllers Exchange servers Database Synchronization schedule License Logging	Service management port: Real Time Calendar port: Push notifications receiver port: Keep last activity messages: No-end-date appointments recurrence lin Daily: Weekly: Monthly: Yearly:	5000 ↓ 5001 10002 ↓ 10000 ↓ nits: 730 ↓ 312 ↓ 72 ↓ 6 ↓	
	RealTime Service Exchange Central WebTeam Central Resource Central	Recovering from errors on reading data Number of attempts: Interval between attempts (sec):	from Exchange:	

Figure 6. RTM interface

Thus, you can organize the application's interface as it is most comfortable for you.

Notice that in this document the default interface is described and used for making screenshots.



Toolbar

As you can see, the interface of the RTM may be visually divided into three parts:

- Toolbar
- Service list
- Views area

The Service list contains the list of connections; the Views area contains views of connections correspondingly.

The toolbar has three tabs:

- Actions
- View
- Help

Actions

The "*Actions*" tab of the RealTime Manager toolbar contains buttons to do the main functions of the application. See these buttons and their descriptions in the table below.

Button	Description
المجامع المحالي المحالي Disconnect	Press this button to disconnect from the current connection.
Start	Click the Start button to start the RealTime Service. This button is only visible when RealTime Service is stopped.
🐼 Restart	The Restart button appears when the RealTime Service is running. Its function is to restart the service.
E Stop	Click the Stop Service button to stop the RealTime Service. This button is only enabled when the service is running.
Enable	This button starts regular activities.
Full synchronize	Click this button to immediately call appointment synchronization from the Exchange server to the Destination store.
View status	Shows status of processes running in the service like status of synchronization with the Exchange Server, status of databases.
Test configuration	With the help of this button, you can check if all your settings are correctly changed or configured.
Status	Open dialog with statuses of all users.



Filter	Click this button to enable filtering users.
Save	Click this button to save changes on the current tab or window.
Refresh	Use this button to refresh the displayed view.
Test	This button is used to check the connection to the database.
Create	Click this button to create a database if there is no existing database for data synchronization or re-creates a new one instead of the old DB.
Clear	Click this button to clear appointments in the database.
Load from file	Click this button to browse to and load the license file (see more details in the "License" section).
Edit license	This button is intended for manual license editing.
Edit settings	This button opens the section of settings and allows editing them.

View

This tab contains only two secondary icons with the help of which you can open all connection views or close all of them as well.

See description of both icons in the table below.

Button	Description
Open all views	This icon, if pressed, opens views of all connections.
Close all views	This icon, if pressed, closes views of all connections.

Help

This tab contains also just two icons described in the table below.



Button	Description
About	This button shows information about the application and its producer.
User guide	This icon, if pressed, leads to the User Guide file.

When you press the "About" button, you will see the informational window like on the picture below:



Figure 7. RealTime Manager - About

Settings

When you press the *"Edit settings"* icon for a connection (highlighted in the picture below), you will navigate to the correspondent application section.



Figure 8. RealTime Manager interface



Settings are also divided into groups according to their functions:

- RealTime Service
- Exchange Central
- WebTeam Central
- Resource Central

See all these groups in the lower part of the picture below.

RealTime Service * <	RealTime Servic	e > License
General settings *	Licensed to:	default
Domain controllers	License code:	RTS6-350F9DD0C1-D4D20A8CD6-BD97A01216-D63B978E22-B1D6BF977B-688DA9252
Exchange servers *	Activation key:	206F-45AB-917C
Database	Expires:	6/20/2024 (30 day(s) left)
Synchronization schedule		
License	Total calendars per-p	roduct:
Logging	Exchange Central	10
	Resource Central	10
RealTime Service *		
Exchange Central		
WebTeam Central		
Resource Central		

Figure 9. Setting groups

By selecting one of these groups, you can configure its settings.

RealTime Service settings

Here you can configure RTS settings obviously.

General Settings

In this settings section you can set up ports shown in the picture below. Default values of "Service management port" and "Real Time Calendar port" are 5000 and 5001, respectively.

Also, here you should set the number of last activity messages (flag 1 below) – records of the process log which will be kept in the server's memory. It is useful, for example, for the status of DBs – you can see in activity messages what data is written to the database and what is moved to the queue.

For No-end-date recurrence appointments, the RTS will synchronize only a certain number of records to the database. By default, these numbers of records are:

- For appointment recurrence daily: 730 records.
- For appointment recurrence weekly: 312 records.
- For appointment recurrence monthly: 72 records.
- For appointment recurrence yearly: 6 records.

Under flag 2 on the picture below, you can find the group of settings responsible for the number of attempts to send requests to the Exchange server. It touches almost all operations.



These settings work in the next way: if an attempt of sending request to the Exchange server is unsuccessful because of some reason (interrupted connection or overloaded server) then requests are repeated with the period indicated in the "Interval between attempts" field until the request passes through or the number of attempts reaches the limit set in the "Number of attempts" field.

Also, an important condition – attempts to send requests are repeated, only when the error which happened during the first attempt is recoverable i.e., can be fixed in some time (like mentioned network interruption or server overloading). In other cases, attempts to send requests are not repeated.

To sum it up - in case of recoverable request error, the warning is written into the log and attempts of request are repeated; if unrecoverable error happened, the error is written into the log and requests are not repeated.

RealTime Service <	RealTime Service > General settings
General settings	Service management port: 5000 🗘
Domain controllers	Real Time Calendar port: 5001
Exchange servers	Push notifications receiver port: 10002 ‡
Database	Keep last activity messages: 10000 🛟 🚽 1
Synchronization schedule	No-end-date appointments recurrence limits:
License	Daily: 730 🗘
Logging	Weekly: 312 ‡
	Monthly: 72 🗘
	Yearly: 6 ‡
	2
	Recovering from errors on reading data from Exchange:
RealTime Service	Number of attempts: 5 💲
	Interval between attempts (sec):
Exchange Central	
🔣 WebTeam Central	Fix missing CleanGlobalObjectID and GlobalObjectID appointment fields
Resource Central	Disable sending emails

Figure 10. General Settings

Under flag 3 on the picture above you can find the "*Fix missing CleanGlobalObjectID and GlobalObjectID appointment fields*" checkbox. As it turns on writing to the Exchange server, it is unchecked by default and a user should switch it manually to use the correspondent option. Its function is the following: for some reason, appointments may not contain "CleanGlobalObjectID" and "GlobalObjectID" fields; the mentioned option finds the lack of these fields (or one of them) and creates a missing field (or both) in an appointment. This works for real-time appointments processing as well as for the full synchronization.

NOTE: For Resource Central application, appointments are not processed without "CleanGlobalObjectID" and "GlobalObjectID" fields, as these fields are the main for the Resource Central database. So, to correct work with Resource Central, the correspondent checkbox must be marked.

If you check on the option "**Disable sending emails**" then the function SendEmail is stopped, and no emails are sent.

To provide security connection between client application and Public RTS API across domain, RTS provides CLIENT ID and KEY, which must be used in client to help client authenticate connection with RTS service.

For security connection, there are 2 options:



1. Use default RTS certificate (option "specify certificate" is unchecked)

RealTime Service * <	RealTime Service > General settings
General settings *	Number of attempts: 5 ‡
Domain controllers	Interval between attempts (sec):
Exchange servers *	
Database	Fix missing CleanGlobalObjectID and GlobalObjectID appointment fields
Synchronization schedule	Disable sending emails
License	
Logging	✓ Additional APIs
	Real Time Calendar port Https: 5003
	Real Time Calendar port REST: 5004
RealTime Service *	CLIENT ID
Exchange Central	KEY D
	Generate
WebTeam Central	Certificate thumborint
Resource Central	Check

Figure 11. RTS Manager – General settings

Check on 'Additional APIs', then click [Generate]. After that, you can have the ID and the key as highlighted in the above figure.

Save this information and pass it into the client application. Client application must use CLIENT ID and KEY as UserName and Password connection parameters to RTS service.

2. Use concrete/user specific certificate from Windows certificate storage.

In this case you must specify the certificate thumbprint in the text "Certification thumbprint".

Check on **Specify certificate** when you want to specify a valid certificate on server based on the thumbprint. Copy the thumbprint of certificate and paste it into the text field. Click [**Check**] to verify this certificate.

Domain controllers

In this settings section you should define domain controllers. Right after you enter the section you will see links like in the picture below.

RealTime Service * «	RealTime Service > Domain controllers
General settings	Add domain controller
Domain controllers	Add Office 365 domain controller Add Office 365 domain controller (OAuth2)
Exchange servers *	

Figure 12. Domain Controllers



Depending on the domain controller type you are adding you will see different controls for editing entry properties.

You can add several domains in this way. To delete a domain, use the correspondent icon.

Do not forget to save changes.

On-premises domains

You should enter the name of the domain you want to add, at the top. For that, click twice on the text marked with flag 1 below.

After that, enter the domain user credentials into correspondent fields.

RealTime Service * <	RealTime Se	rvice > Domain contro	llers		
General settings	▼ add-on-co	mpany X < 1			
Domain controllers *	Username:	AdminRC180		LDAP options	
Exchange servers	Password:	•••••		LDAP	
Database					
Synchronization schedule	✓ Enable periodic AD synchronization and disable AD push notifications				

Figure 13. Domain Controller – On-premises domains

You can optionally check on "*Enable periodic AD synchronization and disable AD push notifications*" and input time for the cycle of regular full sync.

In addition, you can select either LDAP options:

€ RC180 * ×			
RealTime Service * <	RealTime Service > Domain controllers		
General settings	▼ add-on-company X		
Domain controllers *	Username: AdminRC180 LDAP options		
Exchange servers	Password: •••••		
Database			
Synchronization schedule	✓ Enable periodic AD synchronization and disable AD push notifications		
License	Synchronize each 720 🗘 minutes		
Logging	▼ Domain controller address/name 🗱		
	Username: LDAP options		
	Password: DAP		
	CLDAPS		
RealTime Service *	Enable periodic AD synchronization and disable AD push notifications		
Exchange Central	Add domain controller		
WebTeam Central	Add Office 365 domain controller Add Office 365 domain controller (OAuth2)		

- LDAPS: It can only be used with On-premises domains. This option will make RTS work with LDAPS to communicate with domain controllers.
- LDAP: It is similar to LDAPS. This option can be used when LDAPS is not applicable.

NOTE: You need to import certificate on the device that installed RTS in order to use LDAP options.

Office 365 domains

You should enter your cloud tenant's name (e.g. yourdomain.onmicrosoft.com). For that, click twice on the text marked with flag 1 below.

After that you should specify the application for your service principal and its password in corresponding fields if you already have one.

You may use "Create / Update" button to create new or update existing service principal in your cloud organization. This is a recommended approach. You will be prompted for your cloud organization credentials and RTS will try to create service principal and assign it necessary rights.

NOTE: Service principals created in Windows Azure AD may not be available right away.

Polling interval is the interval in seconds used to poll Office 365 Active Directory for changes.

RealTime Service * «	RealTime Service > Domain controllers	
General settings	▶ 192.168.1.126 💥	
Domain controllers *	Tenant name (e.g. domain.onmicrosoft.com) *	
Exchange servers *	App principal ID: 42545847DDD2-4DE1-D2C5-D5F6-D1125647G Create / Upda	te
Database	Password:	
Synchronization schedule	Polling interval (sec): 30 🛟	
License	Add domain controller	

Figure 14. Domain Controller – Office 365 domains

NOTE: If you want to know more about the Global admin role requirement to ensure that the credentials has sufficient access rights, please refer to this KB: <u>Register service principal in Azure AD when used with Office</u> <u>365</u>.

Office 365 domains (OAuth2)

You should enter your cloud tenant's name (e.g., yourdomain.onmicrosoft.com). For that, click twice on the text marked with flag 1 below.

ClientId (App name	1	$\left(\begin{array}{c}1\end{array}\right)$
Client Secret		
Exposed Api Uri		
Update token ever	/ 30 🗘 mins	Get Access Token
https://outlook.o	fice365.com/EWS.AccessAsUs	er.All
Service account	(none)	
Token expiration	(none)	
https://graph.wir	dows.net/Directory.Read.All	
Service account	(none)	
Token expiration	(none)	

Figure 15. Domain Controller - O365 domains (OAuth2)

Details including **ClientId (App name)**, **Client Secret**, **Exposed Api Uri** must be achieved in the process of creating an app in Azure portal. Please refer to this <u>Knowledge Base Article</u> for more details.

After filling in necessary details, clicking [Get Access Token] will populate data to 2 panels underneath.

Polling interval is the interval in seconds used to poll Office 365 Active Directory for changes.

Exchange servers

The "*Exchange Servers*" tab is used to configure the Exchange server that the program will work with and credentials to log on to the server with.

Add Exchange Server



Right after you enter the correspondent settings section, you will see the link "Add Exchange server", like on the picture below.



Figure 16. Exchange servers

After you click that link, you will see the dialog which allows adding Exchange servers (it is shown below).

Enter the name of your Exchange server at the top by clicking twice the text next to **X** icon. Right after you enter it, the next field "*EWS URL*" will be filled automatically, if it was empty before. There will be the link to the Exchange Web Services.

0365 💥			
EWS URL:			Resource Central - Permissions and Resource data s
Username:	psadmin		Use Remote PowerShell
Domain:	psaod.onmicrosoft.com		
Password:	•••••		Autodetect autodiscover URL
Set number o	of available connections:	8 🜲	O Custom autodiscover URL:
Use threads	for full synchronization:	4 🜲	· · · · · · · · · · · · · · · · · · ·
Use threads	for processing notifications:	8 🜲	
Subscription	expiration timeout (minutes):	2 🗘	
Custom h	ost for push notifications	0	
	113.190.242.155		
☑ Custom port for push notifications 10002 🗘		10002 🛟	
This is Of	fice 365 server		
Use custo	om timeout (seconds)	1 📩	
Appointments read per request in full sync: 100 🗘			
\Box Full sync.—skip appoint. older than (days) 1 $\hat{\downarrow}$			
Push not		1 *	

Figure 17. Settings for Exchange servers

When the RealTime Service is located behind the NAT, it may not be possible for the Exchange Server to contact it directly over the network. Here you can specify a custom host and a port through which the Exchange Server will send push notifications. Usually, the host here is the address or hostname of the NAT box and the port is a port number which you map in the NAT box firewall for the RealTime Service.



Then specify the username, the user's domain and the password of the administrator or the credentials of another account, which has permission to read/write each person's mailbox and calendar folder.

The "Set number of available connections" determines the max connections to Exchange server. This number should not exceed 26.

The *"Use threads..."* fields contain numbers of threads used for full synchronization and for processing notifications from the Exchange server.

The **"Subscription expiration timeout"** field contains the number of minutes in which a subscription for Exchange server notifications expires and is recreated.

Setting of connections and threads

Setting the number of threads and connections correctly is important for the system performance of the push notifications and full sync processing. Connections and threads should be a fitted according to the CPU core count of the server and <u>not</u> higher.

Example:

CPU core count of

- 8 Logical = 8 connections
- Or
- 8 Physical (single core) = 8 connections

Setting threads for processing notifications and full synchronization should follow the overall rule of thumb:

- X connection = X push threads and X/2 full sync
- 8 connection = 8 push threads and 4 full sync

Setting processing notifications and full synchronization like above will compete for the available connections. If you schedule full sync. during low peak, it should not affect push notifications or prolong the full sync process. If you want the full sync to be able to run together with many push notifications coming in, then you can set threads for processing notifications 1-2 counts lower than available connections, in this way there will always be free threads for full sync. However, this can also be a downside, as you would not take full advantage of all connections for push notifications when full sync. process is not running.

Please be aware that the description above is based on RTS running as the only application using the CPU. If you have multiple applications competing for the connections, the correct configuration and best performance of RTS will be affected by these.

NOTE:

Connections can also be set a bit higher as some of the connections might be waiting for a thread processing and therefore not affecting the server's CPU.

If your server is suffering from slow network responses, increasing thread count above the max available connections could help as well as CPU is not utilized will waiting for response.

However, in both cases stated above it is hard to give any rule of thumb in such case.

Furthermore, setting to high values of e.g. threads can have a negative effect on the CPU usage and affect performance of server. Having too many waiting threads and CPU will have to switch between threads and that is performance heavy. Also, it can increase the number of threads waiting for available connections which will consume a lot of memory of the machine.

To add Office 365 Exchange server, consider the following approach.



Option "This is Office 365 server" must be checked, this will disable EWS URL field, which is not used in this case.

"Domain" field must contain the name of your Office 365 domain (e.g. myoffice365domain.onmicrosoft.com). "User" and "Password" should contain credentials of account within your cloud organization.

Also, when you check on *"This is Office 365 server"* option, it is possible to set a custom autodiscover URL with (autodiscover-s.outlook.com), (autodiscover-s.outlook.de) or (autodiscover-s.partner.outlook.cn).

NOTE: You must open the corresponding TCP port to allow connections from external networks. Also, if you are installing RTS not on Internet facing server you must map port on your NAT box to RTS incoming notifications port on its server and enter correct data in *"Custom host for push notifications"* and *"Custom port for push notifications"* fields.

Checking on **"Use custom timeout"** allows you to configure timeout (in seconds) of exchange operations. This field can be put in use sometimes for situations in which the default timeout is not enough and the program might encounter errors.

You can also configure the number of appointments loaded in one batch by selecting from dropdown list or entering a number to "*Appointments read per request in full sync*" field. The default value is 100 (appointments).

By selecting "*Full sync.-skip appointments older than (days)*" and "*Push not.-skip appointments older than (days)*" options and selecting the number of day(s) from the dropdown list, you can limit the number of appointments read per request in full sync. This option is subsidiary to "*Appointments read per request in full sync*" field. Do not forget to save changes.

When your organization is in the stage of migration from Active Directory on premise to Windows Azure, it is required that option "*In migration*" is checked.

On the right side of the panel, there is a section for Permissions and Resource Data synch:



If you uncheck the option '**Use Remote PowerShell**', 2 features Group synch and Resource Data synch will be disabled.

Add Office 365 Exchange Server (OAuth2)

Under the link *"Add Exchange server"*, you can see the link Add Office 365 Exchange Server (OAuth2). Click that link, you will see the dialog which allows adding Office 365 Exchange servers.



Set number of available connections:	8 ‡	✓ Use Remote PowerShell
Use threads for full synchronization:	4 🔹	Resource Central - Permissions and Resource data
Use threads for processing notifications:	8 ‡	Get Access Token
Subscription expiration timeout (minutes):	2 🗘	
Custom host for push notifications		
connectortest01.southeastasia.	cloudapp.azur	
✓ Custom port for push notifications	10002 🌲	https://outlook.office365.com/.default
Use custom timeout (seconds)	1 ‡	Service account (none)
Appointments read per request in full sync:	100 🗘	
Full sync.—skip appoint. older than (days)	1 ‡	(IOIC)
Push not.—skip appoint. older than (days)	1 📜	Autodetect autodiscover URI
In migration		
Exchange Permission Method		
Impersonation		
Mailbox/Calendar Access		

Figure 18. Settings for Add Office 365 Exchange Server (OAuth2)

Some fields on the left panel are already described in the previous section.

Exchange Permission Method

Impersonation

In order for the program to be able to run and to get proper access to calendars information on the Exchange Server, Exchange Impersonation can be used. You can read how to configure it following the next link:

• Exchange Online | Exchange Server 2013, 2016, 2019 | Office 365 http://msdn.microsoft.com/en-us/library/office/dn722376(v=exchg.150).aspx

You can test the correctness of the specified access parameters by clicking the "**Test configuration**" button. If the setting is incorrect, the RealTime Manager will show you some messages containing recommendations to check what value is wrong.

NOTE: The Exchange Impersonation is <u>no longer</u> supported for <u>new service accounts</u> signed in RTM as Microsoft begins blocking the assignment of the Impersonation role in Exchange Online to accounts starting in May 2024, and in the near future, this role and its feature set will be completely removed from Exchange Online. Note that Impersonation is still active for service accounts that were granted it prior to this period.

Mailbox/Calendar Access

With the termination of Impersonation, the Service Account must be granted the following permissions in order for the program to be able to run and to get proper access to mailbox/calendar information of the resources on the Exchange Server:

- Full Access + Send As permissions on the resources added in RTS.
 -OR-
- Calendar Editor permission on the organizer who books meetings on Booking Manager.

Read the following links for how to configure necessary permission(s):



- Configure Full Access and Send As permissions on Exchange Management Shell: <u>Manage permissions for recipients | Microsoft Learn</u> (Exchange Online | Exchange Server 2010, 2013, 2016, 2019 | Office 365)
- Configure Full Access and Send As permissions on Exchange Online: Refer to <u>Appendix C</u> for more information.
- Configure Calendar Editor permission on Exchange Management Shell: <u>Add Mailbox Folder</u> <u>Permission</u> (Exchange Online | Exchange Server 2010, 2013, 2016, 2019 | Office 365)

On the right panel, if you uncheck the option '**Use Remote PowerShell**', 2 features Group synch and Resource Data synch will be disabled. If you check on '**Use Remote PowerShell**', the dialog under it will be available.

✓ Use Remote Power	rShell
Resource Centra	I - Permissions and Resource data 🛿
	Get Access Token
https://outlook.of	fice365.com/.default
Service account	(none)
Token expiration	(none)

Figure 19. Use Remote PowerShell enabled

Click [Get Access Token For Remote Session], and a pop-up window will appear to require you to input the credentials of the service account.



Figure 20. Sign in to get access token

Click [Sign in] and the information on RootRemoteExchangeAPI will be populated:



✓ Use Remote Powe	rShell
Resource Central - Permissions and Resource data s	
	Get Access Token
https://outlook.of	fice365.com/.default
Service account	pnb@aodop.onmicrosoft.com
Token expiration	5/23/2024 8:31 AM

Figure 21. Get Access token successfully

NOTE:

- The Exchange Servers and Domain Controllers tabs must use the same service account to get access token.
- In case you update a different service account to get access token in *either of the 2 mentioned tabs*, you only need to click on *the remaining tab* to automatically apply that new service account credentials to that tab. Following that, the new access token for that tab will be produced automatically.

Database

Here you can create a RealTime Service database connection. Right after you enter this section, you will see the dialog like on the figure below.

In the "SQL Server" field, enter the name of an SQL server available in your LAN or choose one in the dropdown list.

RealTime Service * <	RealTime Service > Database
General settings	SQL server:
Domain controllers *	192.168.1.61 • Refresh
Exchange servers	Use SSL (imported certificate required on RTS side)
Database *	 Windows authentication
Synchronization schedule	
License	SQL server authentication
Logging	Username: sa
	Password:
	Database:
	newRTS1 - Refresh

Figure 22. Database



Enter the information to log on to the database: choose between the "Windows Authentication" option (domain credentials will be used to log on to the SQL server) and the "SQL server authentication" - enter a specific username and password in this case.

If there is no RealTime Service database on the specified SQL server, the RealTime Service would create one. Otherwise, you can choose to use the existing database or delete its content to have a new blank one. Use buttons of database management on the RTM toolbar for that.

Use the "Refresh" buttons in the dialog to renew values of correspondent dropdown lists.

In addition, you can check on "Use SSL (imported certificate required on RTS side)" option to use SSL to connect with SQL (make sure that you have imported certificate on the device that installed RTS).

Do not forget to save performed changes.

By doing the above steps, a configuration file (Settings.xml) will be created and stored in the RealTime Service folder (default folder is \ProgramData\Add-On Products\RealTime Service 6\). The file contains the specified connection string to the configuration database.

Synchronization schedule

Here you can set intervals of constant synchronization.

Right after you enter this settings section, you will see the dialog as follows.

First, mark the "Enable periodic full synchronization" to make its settings active.

RealTime Service * <	RealTime Service > Synchronization schedule
General settings *	Enable periodic full synchronization
Domain controllers	Time: 12:00:00 AM 🗘
Exchange servers *	
Database *	Daily Every 1 day(s)
Synchronization schedule *	O Weekly O Every weekday
License	O Monthly Every weekend day
Logging	Stop:
	When completed
	In 1 1 hour(s) Reset sync. state

Figure 23. Synchronization schedule

In the "*Time*" field set the time when the synchronization will be performed. After that, select the period of synchronization itself.

There are three kinds of periods, as you can see on the picture above:

- Daily
- Weekly
- Monthly

The "*Daily*" settings are shown on the previous figure. On the figure below you can see "*Weekly*" settings.



🔵 Daily	Every	1 🗘 week(s)	on:	
Weekly	Monday	✓ Tuesday	Vednesday	Thursday
OMonthly	Friday	Saturday	Sunday	

Figure 24. Synchronization circle settings

And on the following picture you can see "Monthly" options.

Oaily	Every 1 🗘 month(s) on:
O Weekly	● Day 1 ⁺
Monthly	O First - Monday -

Figure 25. Synchronization circle settings

You can set the time when the synchronization is automatically stops by selecting either:

- When completed
- In ... hour(s)

Stop:		
When	completed	
In	1 🗘 hour(s)	Reset sync. state

Figure 26. Stop schedule

Press [**Reset sync. state**] to clear the synchronization state in previous time. All these settings are rather simple and intuitive.

License

From the moment of the first installation of the RealTime Service, RTS works in the demo mode. The demo license is valid for one day only and works with 10 calendars for each product maximum. The message, like below, will be shown every time you connect to the RealTime Service which is working in the demo mode.





If you have a valid license, you can enter it any time.



Enter license

Go to the "License" settings section, as it is recommended in the message above. There you can use options "Edit license" (flag 1) and "Load from file" (flag 2) to set the license – find the correspondent buttons on the toolbar (see flags on the picture below).

Actions	View Help							
الله المعالم المحالم المحالم المحالم المحالم	Start Start	Enable Full synchronize	View status	Test configuration	Save Defr	esh Edit license	Load from file	2
Connecti	Service	Synchronization		General	·	Lice	nse	



If you press the "Edit license" icon, you will see the following picture:

- The "Edit license" button turned to the "Cancel edit license" button (flag 1 below).
- The fields under flag 2, 3 and 4 on the picture below became active there you can manually insert the license name and the license key correspondently.
- The information about an expiration date and the number of licensed calendars for each product can also be found there.

Ac	tions	View Help										
Dis	onnect	Start Start Restart	Enable Full Synchro	synchronize nization	View status	Test configuratio General	n Save	Refresh	Edit license	Cancel edit license	Load from file	1
Re	🐻 aod	Test01 * ×							2		1	
al Time Services	RealT Gen Dom Excl Data Syn	ime Service * eral settings * nain controllers hange servers * abase * chronization sch nse	<	RealTime Service > License 3 Licensed to: default License code: RTS6-350F9DD0C1-D4D20A8CD6-BD97A01216-D638978E22-B1D6BF977B-688DA925: Activation key: 206F-45AB-917C Expires: 6/20/2024 (30 day(s) left) 4 Total calendars per-product:				3				
	Logi	ging		Exchange Central 10 WebTeam Central 10 Resource Central 10								

Figure 29. License section

If you use the "Load from file" option to install the license, you should browse for the valid license file and open it. In this case all data will be entered automatically, and you will see the message, like below.



Figure 30. License notice



Do not forget to save changes in this settings section.

License expired

If the license is expired, you will get the message about that, when you connect to the server – see the figure below.

RT53726		×
8	License has expired. If you have a valid license, you can enter it on the RealTime Service > License settings page.	
	ОК	



Even, when your license is expired, the RealTime Manager, as well as the RealTime Service, will still work. But in the RTM the settings for the product with expired license will not be available and the RTS will not write correspondent data connected to such product into the database.

If some product is not licensed, it will not be listed in the list "**Total calendars per-product**" of the "**License**" section; its settings, as it was mentioned, will be blocked (see flag 1 below) in the RTM and, when you try to open them, you will get the message like on the following picture.

RealTime Service <	RealTime Service > Exchange servers	
General settings	Exchange server name 1 X	
Domain controllers	EWS URL:	Resource Central - Permissions and Resource data sync
Exchange se hoald1		×
Database Vour licen	na daar pat induda Evchanga Cantral	
Synchroniza Please or	der a license which includes Exchange Central if you want to use Rea	Time Service as data provider for this application.
License	OK	
Logging	Use threads for full synchronization: 4 -	
	Use threads for processing notifications: 8 ‡	
	Subscription expiration timeout (minutes):	
	✓ Custom host for push notifications)
(T)	13.76.170.88]
RealTime Service	port for push notifications]
Exchange Central	✓ Inis is Office 365 server	
	Use custom timeout (seconds)]
A WebTeam Central	Appointments read per request in full sync: 100 🌻]
Resource Central	Full sync.—skip appoint. older than (days)]
		1

Figure 32. Message from the system

If the limit of licensed calendars is exceeded for some product, it will be indicated on the "*Status*" page and the work will be continued only with the licensed number of calendars – the over-limit ones will be ignored.



See on the picture below the "Status" page and under flag 1 there are numbers of calendars: red – over-limit calendars, black – licensed limits.

Actions V J Disconnect	ew Help Start Restart Stop	Disable	Full synchronize	Edit settings	est configuration	2 Status			
Connection	Service	S	ynchronization		General				
RealTime Service	es	4	🐻 local 🗙						
er 🖉 🕷	Image: Service version: 6.4.12.0 Exchange Central: 32 / 2 Image: Service version: 6.4.12.0 Exchange Central: 32 / 2 Service started at: 16-02-2016 04:37:32 WebTeam Central: 106 / 2 Next full synchronization is scheduled at: <not scheduled=""> Resource Central: 106 / 2</not>								
			Activity name		Status	s Start	t time	End time	Last message
			Exchange server rts	02		27.0	4.2012 15:36:41		Got request to subscri
			Notifications			27.0	4.2012 15:36:41		Successfully subscribe
			Full synchronizat	ion		27.0	4.2012 15:37:42	27.04.2012 15:37:42	Finished synchronizati
			Domain controller rts	:02 - small 1rts.loca	al 🖻	27.0	4.2012 15:36:40		FQDN: rts02.small 1rts
			Notifications			27.0	4.2012 15:36:41		Changed object: rtsus
			Full synchronizat	ion		27.0	4.2012 15:37:42	27.04.2012 15:37:43	Done

Figure 33. Status page

Logging

Errors and (or) events of the RealTime Manager and the RealTime Service can be logged for using in case of troubles by problem possible cause detection. The *"Logging"* settings section is intended for managing logging options.

General settings	Level for file logging	Debug	View file las
Domain controllers			view file log
Exchange servers	None	All	Open logs folder
Database	Level for logging to Windows Event Log	Debug	
Synchronization schedule			
License	None	All	
Logging	Cleanup log files older than 20 - dave		

Figure 34. Logging

There are 2 scrolls in the **Logging** section:

- Level for file logging
- Level for logging to Windows Event Log

These levels indicate the depth of logging.

Levels of file logging can be the following:

- None
- Errors
- Warning





- Info
- Debug

Levels of logging to Windows Event Log are the same as file logging.

Select the "None" level to disable logging.

Also, there are two buttons in the *"Logging"* settings section. They are *"View file log"* and *"Open logs folder"*. With their help you can perform correspondent actions.

Log files are named as it is described in the table below:

	RealTime Service
For current date	RTS.log
For other date	RTS.log- <date> For example: RTS.log-2021-08-01</date>

The log file of the current date will always be RTS.log. When a day passes, the log file of the day will be changed to the second format which is RTS.log-<date>. When a log size reaches 30 Mb it changes the name according to the format RTS.log-<date>.<counter>. There can be a few such files per day.

Errors and events will be stored in the Windows Event Log. Logging data can be viewed in the standard Windows feature – the Event Viewer. To launch the Event Viewer, click Start, Settings, Control Panel, Administrative Tools, Event Viewer.

Also, "*Cleanup log files older than*" is a feature that allows you to delete log files older than a number of days. The number of days that can be selected from the dropdown list include **3**, **7**, **14**, **30** days.

NOTE: The "*Cleanup log files older than*" function can only be applied to file logging, not event logging.

Exchange Central, WebTeam Central and Resource Central Settings

The work with settings of the Exchange Central, the WebTeam Central and the Resource Central is similar, so the explanations are gathered in one chapter.

The Exchange Central is a Windows based application used for groups scheduling.

The WebTeam Central is a browser-based group/team calendar that makes it possible to view and manage as many calendars as needed in one view.

The Resource Central is the complete meeting and conference planning tool for internal and external events.

General

First you have to go to the "General" section and mark the 'Enable output for this product' checkbox to make the data transferring to this application's database possible.

Right after that, the dropdown list below will become active, and there you will have the possibility to select the time zone which will be used for storing dates in the application's database.



WebTeam Central *	WebTeam Central > General
General *	Enable output for this product
Database	Use the following time zone for storing dates:
Filtering	Use server local time zone 👻
Groups and users	
	Synchronize calendar permissions (Legacy)

Figure 35. Settings for WebTeam Central – General

In the lower part of the figure above, you can find the '**Synchronize calendar permissions**' checkbox. It turns on/off access rights synchronization for a certain database. If the option is turned off, the access rights are not read from Exchange and, as a result, are not written into the database.

This option is available only for the WebTeam Central and the Resource Central and turned on by default. It may be useful in the following situation: for example, the use of calendar access permissions may be not enabled in Resource Central, so there is no need to read the rights from the Exchange and synchronize them - as a result, the mentioned option can be turned off for time economy.

One more synchronization option is available for the Resource Central only and is shown in the following section.

Deletion events processing delay

In the Resource Central general settings, there is one additional option called 'Deletion events processing delay'.

Resource Central <	Resource Central > General
General	Enable output for this product
Database	All dates will be stored using the following time zone:
Filtering	(UTC) Coordinated Universal Time
Resource data synch	
Rooms and facility equipment	Deletion events processing delay (sec): 40 🗘
	Synchronize calendar permissions (Legacy)
	Synchronize meeting responses Replace appointment OriginalSubject by OrganizerName
	Synchronize body information of reservation
RealTime Service	
Exchange Central	
WebTeam Central *	
Resource Central	

Figure 36. Settings for Resource Central - General



To describe the function, first, it is necessary to describe the situation in which this function is used.

The RTS receives push-notifications from the Exchange server about different changes in appointments. If a meeting (appointment assigned to a few users) is changed, the Exchange server re-creates the whole appointment (deletes an old one and creates new with changes). As a result, the RTS receives 2 push-notifications: one about event deletion, and one about creation. These push-notifications can be sent by the Exchange in different messages, or in the one.

If the mentioned push-notifications are received in one message, they can be filtered because it's obvious, that, in fact, a change happened to the same appointment. If those push-notifications are received in different messages, it cannot be differed, the real deletion happened or the appointment deletion with re-creation.

So, the **"Deletion events processing delay"** option lets to set the timeout between receiving deletion message and its processing with the correspondent database record. This means that, if you set the timeout in 30 sec, the RTS will wait 30 seconds after receiving such message before it will be processed and this fact - written to the database. If during the timeout, the message about appointment re-creation is received, the deletion message will be ignored, and the correspondent change will be written to the database.

Notice that messages about real deletions made by users will also be delayed during the set timeout.

The optimal timeout should be chosen for each system individually depending on the system's parameters. The default value here is 40 seconds.

There is one more checkbox comparing with the WebTeam general settings - "Synchronize meeting responses". For some rooms which automatically accept/reject meeting it was impossible to read response - accept or reject - because the appointment was deleted and moved from calendar folder to deleted folder. As a result, usp_NotifyMeetingResponse was not called.

In order to solve this issue, this checkbox was added.

When it's checked, the application treats deleted appointments (which are in deleted folder) as valid responses and uses ResponseType property from it as a parameter in usp_NotifyMeetingResponse. The only thing in database which you can see is that - usp_NotifyMeetingResponse has been called for automatically accepted/rejected meeting as it is required.

NOTE: The option "Synchronize meeting responses" is available only for the Resource Central.

Replace appointment's OriginalSubject with OrganizerName

In the Resource Central general settings, there is another option called '*Replace appointment* OriginalSubject with OrganizerName'.



aodTest01 *		ο×
Resource Central <	Resource Central > General	
General	Enable output for this product	
Database	All dates will be stored using the following time zone:	
Filtering	(UTC) Coordinated Universal Time	
Resource data synch		
Rooms and facility equipment	Deletion events processing delay (sec): 40 ‡	
	Synchronize calendar permissions (Legacy) Synchronize relationships of groups Synchronize meeting responses Replace appointment OriginalSubject by OrganizerName Synchronize body information of reservation	
RealTime Service		
Exchange Central		
WebTeam Central *		
Resource Central		

Figure 37. Replace appointment OriginalSubject by OrganizerName

In some cases, you may not want meeting subjects to be seen by other people and you would set up Exchange to replace the subject with the Organizer's name. However, the Orginal subject, initially created in Exchange before reservation is sent to the resource Calendar and replaced, remains. This option can provide this privacy by replacing the Original Subject of reservation with the organizer's name before sending the information to Resource Central Database.

NOTE: When you enable this option, it will only apply to new reservations. Old reservations (which are already booked before) will still show their original subject.

Active Directory group relationship sync

If you check on option '**Sync relationships of groups**', the feature of synchronizing all Active Directory relationships of group is enabled, and relationship data of distribution lists (which are added to resources' policy and their child groups) will be passed to RC. If not checked, Resource Central will only be able to use user email addresses assigned to Exchange policies and permissions.

NOTE: In order to get Groups and hidden Groups it is a requirement that the service account must be given the following Exchange role *View-Only Recipients* (refer to <u>Appendix D</u> for more details)

Enabling this feature will require a full synchronization and depending on your number of resources, groups, and the complexity of the structure of the groups this can be time consuming and increase the load on the application when processing the data for the first time or when doing a full sync. So, it is recommended to set up the feature during off-hours or low peak periods.



Synchronizing body information of reservation

aodTest01 *		c	1)
Resource Central * <	Resource Central > General		
General *	✓ Enable output for this product		
Database	All dates will be stored using the following time zone:		
Filtering	(UTC) Coordinated Universal Time	Ψ.	
Resource data synch			
Rooms and facility equipment	Deletion events processing delay (sec): 40	D ‡	
	Synchronize calendar permissions (Legacy)	Synchronize relationships of groups	
	Synchronize meeting responses	Replace appointment OriginalSubject by OrganizerName	
		Synchronize body information of reservation	
C D			
A RealTime Service			
Exchange Central			
WebTeam Central *			
Resource Central *			

Figure 38. Sync body information of reservation

Enabling this feature will allow Resource Central to get information of the external organizers, including:

- Name
- Email
- Phone number

NOTE: RC 4.3 RTM or higher is required to run this function.

Database

Here you can create an application's database connection. Right after you enter this section, you will see the dialog like on the figure below.

In the "SQL Server" field, enter the name of an SQL server available in your LAN or choose one in the dropdown list.

WebTeam Central <	WebTeam Central > Database
General	SQL server:
Database	- Refresh
Filtering	Use SSL (imported certificate required on RTS side)
Groups and users	Windows authentication
	○ SQL server authentication
	Username:
	Password:
	Database:
RealTime Service *	
Exchange Central	Please enter connection information for an existing database.
WebTeam Central	
Resource Central	

Figure 39. WebTeam Central Settings - Database

Enter the information to log on to the database: choose between the "Windows Authentication" option (domain credentials will be used to log on to the SQL server) and the "Use SQL server authentication" - enter a specific username and password in this case.

You can choose to use the existing database or delete its content to have a new blank one. Use buttons of database management on the RTM toolbar for that.

Use the *"Refresh"* buttons in the dialog to renew values of correspondent dropdown lists. Do not forget to save performed changes.

Also similar to RTS's Database, you can check on "Use SSL (imported certificate required on RTS side)" option (make sure that you have imported certificate on the device that installed RTS).

Filtering

RealTime Manager features a filtering function for synchronizing only the necessary data. The *"Filtering"* section is featured in each application section.

First, mark the "*Enable filtering*" checkbox to activate the option of filtering for the database.

The "Filtering" section features the following aspects:

• Older than (days). The default value is 31.



• Newer than (days). The default value is 1825.

Adjust these two elements above to define the date range. Only the items within the specified date range will be processed.

You can also select to apply the filtering only for full synchronization.

See this in the picture below.

kip appointments Older than (days): Newer than (days):	31	+	
Category filter action:	Include	-	Suppress data in the following fields:
1 2		3	 Body Categories Location Optional Attendees Required Attendees Resources Subject Organizer
⊨ ×			2

Figure 40. Filtering in WebTeam Central

Only appointment start date (including start time) is considered during processing. To add a new category to the list, do the following:

- 1. Click the "*Add*" button (flag 1 on the figure above). The "**New Category**" line will become available for editing.
- 2. Type in the category name you need.
- 3. To remove a category, select the category you want to delete and click the "*Remove*" button (flag 2).

The "Suppress data in the following fields" area contains the list of appointment fields which, if marked, will not be synchronized (i.e., will be marked as empty in the database). You can mark or unmark them all using icons under flag 3 on the figure above.

The "Include private appointment" checkbox (flag 4), if marked, allows the RTS synchronize private appointments.

For these appointments, RTS collects only time and date information, leaving all text fields empty. The *"Replace subject with"* field under this checkbox would be enabled to enter a subject value, which will be used to replace the subject line of private appointments prior to storing them to the database.



Filtering mechanism

The filtering mechanism in RTS includes Exchange filter (established in <u>Exchange servers'</u> section) and product filter (in each application: WebTeam Central, Exchange Central or Resource Central). The first filter involves Exchange filter. After that, product filter is involved.

- 1. Exchange filter
 - First, the server loads **IDs** and **Start dates** of appointments. It ignores normal appointments if their start date is older than the days specified by Exchange filter.
 - Together with normal appointments, master recurring appointments are also loaded.
 - After that, the server loads all occurrences for these recurring masters and does not filter them.
- 2. Product filter
 - All appointments are passed to the database.
 - Now the product filter is involved. It also filters occurrences of recurring appointments.

So, the filtering mechanism can be illustrated by the following example:

- If the exchange days filter is **3** and product is **10**, then appointments older than **3** days will not be loaded.
- If Exchange days filter is **15** and product is **10** then appointments older than **10** days will not be loaded.

Resource data synch

This function is only available for Resource Central. The configuration made in this section will decide which fields can be selected for each category (*Active Directory Properties, Mailbox properties, Mailbox Calendar Configuration* or *Mailbox Regional Configuration*) in Resource Central backend for the purpose of synchronizing resource data from Exchange and Active Directory.

NOTES:

- This function only works if the parameter RC.ResourceDataSynch.Enable is turned on in Resource Central. Please refer to the *Resource Central Parameter Guide* for more details about this parameter.
- Real-time update (push) only works for Active Directory properties and Mailbox Regional properties.

Clicking on Resource data synch, the following panel will be displayed:

Resource Central <	Resource Central > Resource data synch
General	Active Directory Properties
Database	Mailbox properties (Remote PowerShell access required)
Filtering	Mailbox Calendar Configuration (Remote PowerShell access required)
Resource data synch	Mailboy Dagional Configuration (Demote DowerShall access required)
RealTime Service *	
Exchange Central	
WebTeam Central *	
Resource Central	

Figure 41. Resource data synch



In this panel, you have 4 sections of data properties. Click one or more of these to make necessary configuration using the arrows (> and <):

Start typing to filter messages			Start typing to filter messages
description (On-Premise only)	*		department
displayNamePrintable (On-Premise only)			displayName
distinguishedName (On-Premise only)			extensionAttribute11 (On-Premise only)
division (On-Premise only)	U		extensionAttribute14 (On-Premise only)
extensionAttribute1 (On-Premise only)		>	streetAddress
extensionAttribute10 (On-Premise only)			
extensionAttribute12 (On-Premise only)			
extensionAttribute13 (On-Premise only)		<	
extensionAttribute15 (On-Premise only)			
extensionAttribute2 (On-Premise only)			
extensionAttribute3 (On-Premise only)			
extensionAttribute4 (On-Premise only)			
extensionAttribute5 (On-Premise only)			
autoraine Attaikute (On Deseries anlu)	*		
1ailbox properties (Remote PowerShell a	occess req	uired)	

Figure 42. Select properties

What you select for the right column will be inserted into Resource Data Synch section in Resource Central backend. These properties are categorized accordingly, so that the selection can be conveniently made. The properties with no "On-Premise only" text in their names can be used for both Online and On-Premise environment.

NOTES:

- For Exchange Online:
 - If the service account has *Impersonation* right and *View-Only Recipients* role, RTS gets all data of all groups.
 - If the service account has *Full Access* right and *View-Only Recipients* role, RTS gets all data of all groups.
- For Exchange On-Premise:
 - If service account has *Impersonation* right and *View-Only Recipients* role, RTS gets all data of all groups.

(Refer to Appendix D for more details on how to assign View-Only Recipients role to service account)

Groups and users

The RealTime Manager provides an interface to manage user groups and users which will be synchronized in the "*Groups and users*" settings section.

NOTE: For the Resource Central the "Groups and users" section is called "Rooms and facility equipment".

On the picture below you can see how it looks. Groups and correspondent users are on the right side of the panel.





Figure 43. Rooms and facility equipment for Resource Central

On the Toolbar, click the "Add" button to add a user group or users.

NOTE: For Resource Central you can also add groups and users for synchronization, but the server will take only Room/Equipment mailboxes, user mailboxes will be ignored.

The following dialog box will appear when you add groups or users:



Active Directory sear	ch		\times
Search in domains:	Search following objects: 🗸 Groups 🛛 Any	*	
aoprc.mail.onmicros	oft.c V Rooms and equipment		
X	1 Name BeginsWith → Description 3	2	
Vame	E-mail Description	Container	
AOP_Christina5	AOPChristina5@aoprc.onmicr	aoprc.mail.onmicrosoft.com	[
🚺 AOP_Christina6	AOPChristina6@aoprc.onmicr	aoprc.mail.onmicrosoft.com	[
🚺 AOP_Christina7	AOPChristina7@aoprc.onmicr	aoprc.mail.onmicrosoft.com	
🚺 AOP_Christina8	AOPChristina8@aoprc.onmicr	aoprc.mail.onmicrosoft.com	
🚺 AOP_Christina9	AOPChristina9@aoprc.onmicr	aoprc.mail.onmicrosoft.com	
🚺 AOP_Delegate 1	AOP_Delegate1@aoprc.onmi	aoprc.mail.onmicrosoft.com	
🚺 aop_devroom01	aop_devroom01@aoprc.onmi	aoprc.mail.onmicrosoft.com	
🚺 aop_devroom02	aop_devroom02@aoprc.onmi	aoprc.mail.onmicrosoft.com	
🚺 aop_devroom03	aop_devroom03@aoprc.onmi	aoprc.mail.onmicrosoft.com	
🚺 aop_devroom04	aop_devroom04@aoprc.onmi	aoprc.mail.onmicrosoft.com	
🚺 aop_devroom05	aop_devroom05@aoprc.onmi	aoprc.mail.onmicrosoft.com	
╏ aop_devroom06	aop_devroom06@aoprc.onmi	aoprc.mail.onmicrosoft.com	
🚺 aop_devroom07	aop_devroom07@aoprc.onmi	aoprc.mail.onmicrosoft.com	
💈 aop_devroom08	aop_devroom08@aoprc.onmi	aoprc.mail.onmicrosoft.com	[
Find		OK Cance	el

Figure 44. Search group and users

In this dialog box, choose the domain (flag 1) on which you want to select groups or users. Then specify the search objects – use checkboxes and a field under flag 2 for that.

NOTE: for the Resource Central the **"Users"** checkbox is renamed to **"Rooms and equipment"** and during searching process only Room/Equipment mailboxes are found.

Also, you can filter search results by adding conditions to names and descriptions of groups and users – see flag 3 on the picture above.

Speaking about conditions which you can add – see them in the picture below.



Figure 45. Conditions

After you find needed groups or users, select them and click "OK". They will be added after that.

NOTE: the number of calendars for your license is recalculated when settings for user calendar are changed. When the limit is exceeded, extra calendars will be marked as selected still, but not synchronized.

You can also remove groups and users using the correspondent button on the toolbar. Do not forget to save performed changes.



Status

The "Status" table illustrates information on synchronization details.

To view the status, click the "Status" button on the toolbar.

The window, listing currently processed activities, will be displayed in the connection view, like it is shown on the picture below.

The number of used licenses for products and correspondent limits are also shown in this window (see flag 1).

onnect	Start Stop Service	Disable Full synchronize	Edit settings Te	st configuratio General	N Status		1
🐻 RTS	ionPrivate03	×					
1	RealTime Servic Service started Next full synchr	e version: 6.6.15.64 at: 5/11/2021 8:46: onization is scheduled at: <	25 AM (not scheduled>				Resource Central: 60 / 10
Activit	ty name			Status	Start time	End time	Last message
Excha	nge server Exch	ange server name 1			5/11/2021 8:47:07		Using external hostname for PUSH notif
No	otifications			🔊 🦪	5/11/2021 8:47:16		Will retry to create subscription for Qtes
Fu	II synchronizatio	'n					
Domai	in controller aop	rc.onmicrosoft.com - aoprc.	mail.onmicrosoft	. ⊳	5/11/2021 8:47:07		Found domain aoprc.mail.onmicrosoft.co
No	otifications				5/11/2021 8:47:13		AccessToken is going to expire in 2 minu
Fu	Il synchronizatio	'n					
Datab	ases						
Re	ealTime Service						Saved domain aoprc.mail.onmicrosoft.co
Re	esource Central						Saved domain aoprc.mail.onmicrosoft.co
Calend	dar Service						SendMail() user admin@aoprc.onmicros
Em	nails_std						SendMail() user admin@aoprc.onmicros
Ap	pointments_std						UpdateCalendarAppointment() user quy
Em	nails_ext						
Ap	pointments_ext	:					
Group	is synchronizatio				5/11/2021 11:28:56	5/11/2021 11:29:14	Done, Memory free within : 0, 1secs

Figure 46. Status section

The table displays activities running currently.

There are five columns in the table providing general user data:

- "Activity name" shows the name of an activity and the server or the domain to which this activity is connected.
- "Status" indicates whether an activity is running or is disabled, also the percentage of completion may be shown.
- "Start time" and "End time" columns are intuitive.
- "Last message" shows the last synchronized record.

You can run or stop any running activity separately using the right click menu – see its options on the picture below.





Figure 47. Options for activities

If you want to view messages, select the correspondent option in the context menu, then you will see the picture as follows. You can filter messages using the search field (flag 1 in the picture below).

Activity name				Status	Start time	End time	Last message	2		
Exchange server Excha	ange server name 1				5/11/2021 8:47:07	·	Using externa	al hostnam	e for P	USH notific
Notifications					5/11/2021 8:47:16		Successfully s	subscribed	for no	tifications
Full synchronization	1									-
Domain controller aopr	Messages : Notific	ations							\times	osoft.co
Notifications			Start ty	ping to filter	messages					n 2 minut
Full synchronization	Time	Level	Messa	age						1
Databases	5/11/2021 8:47:13	🗩 Info	Subso	cribing for cha	anges in domain objects		~			1
RealTime Service	5/11/2021 8:47:14	🗩 Info	Succe	essfully subsc	ribed for changes in dom	ain objects	\sim	1		osoft.com
Resource Central	5/11/2021 9:45:24	🗩 Info	Acces	ssToken is go	ing to expire in 2 minutes	, geting new AccessTok	en 🕒	<u> </u>		rosoft.com
Calendar Service	5/11/2021 10:43:35	🗩 Info	Acces	ssToken is go	ing to expire in 2 minutes	, geting new AccessTok	en			nmicrosof.
Emails_std	5/11/2021 11:41:45	🗩 Info	Acces	ssToken is go	ing to expire in 2 minutes	, geting new AccessTok	en			nmicrosof.
Appointments_std	5/11/2021 12:39:58	🗩 Info	Acces	ssToken is go	ing to expire in 2 minutes	s, geting new AccessTok	en			user quyn.
Emails_ext	5/11/2021 1:38:08 PM	🗩 Info	Acces	ssToken is go	ing to expire in 2 minutes	s, geting new AccessTok	en			
Appointments_ext	5/11/2021 2:36:20 PM	🗩 Info	Acces	ssToken is go	ing to expire in 2 minutes	, geting new AccessTok	en			
Groups synchronization	5/11/2021 3:34:30 PM	🗩 Info	Acces	ssToken is go	ing to expire in 2 minutes	, geting new AccessTok	en			secs
									_	

Figure 48. Message: Notifications

To disable all running activities, press the correspondent button on the toolbar.

If you perform full synchronization, its status is also shown in the "Status" table, and it can also be stopped with the correspondent button on the toolbar.

NOTE: For calendar service logging, based on what is displayed in this section we can distinguish among types of licenses:

• If only "private" license is available, only "Emails" and "Appointments" are displayed.

Databases	
RealTime Service	
Resource Central	
Calendar Service	
Emails	
Appointments	

• If "private and public" are both available, they are distinguished with the suffix:



Resource Central
Calendar Service
Emails_std
Appointments_std
Emails_ext
Appointments_ext

For private: Emails_std Appointments_std

For public: Emails_ext Appointments_ext

User statuses

If you click an icon in the General section on the toolbar (picture below), the dialog with statuses of all users will appear.



Figure 49. User status

You can select a few users there and perform some actions on them. See what actions exactly, in the picture below.

The "Synchronize" action means full synchronization; the "Stop synchronization" stops it correspondently.

The *"Clear Watermark"* action clears all watermarks sent by the Exchange server and initiates immediate recreation of all subscriptions. This function may be very useful if the server works incorrectly for some time.

Just as a note, the watermark - is a special type of mark used for tracking changes in calendars. A watermark is sent by the Exchange server every time when some changes happen in a calendar. On the table below you can see what user info is represented and how it looks.



Synchronize Stop synch	ronization Clear watermark	Ch	oose column to filter Domain		Ŧ	Filte	r			
Actions for sele	ected users		Filter							
omain	Name	۸	Email	EC	WTC	RC	Status	Last synchronized	Last heart beat	Exchange CAS
odop.onmicrosoft.com	TestRTS_Room5		TestRTS_Room5@aodop.onmicr			0	Subscribed, SubscriptionE	2024-04-29 08:10:07	2024-05-23 03:52:28 😣	aodop.onmicr
 ✓ - Active ✓ - Inactive, beyond t 	he license limit		EC - Exchange Central WTC - WebTeam Centra	1						
 Active - Inactive, beyond t - Inactive, output to 	he license limit database is not enable	:d	EC - Exchange Central WTC - WebTeam Central RC - Resource Central	1						
 Active Inactive, beyond t Inactive, output to Active, but heart b 	he license limit database is not enable eats received not very	ed ofter	EC - Exchange Central WTC - WebTeam Centra RC - Resource Central n	1						
 Active Inactive, beyond t Inactive, output to Active, but heart b Inactive, there are 	he license limit database is not enable reats received not very e no heart beats long pe	d ofter	EC - Exchange Central WTC - WebTeam Centra RC - Resource Central n of time	I						

Figure 50. Status of users

Here is the list of possible user statuses:

- NoCAS
- NoMailboxServer
- QueuedForSubscription
- Subscribing
- Subscribed
- SubscriptionError
- QueuedForSynchronization
- Synchronizing
- SynchronizationError

Search/filter function

With this function, you can look for the resource calendar(s) as you wish. There are 2 ways to utilize this feature after clicking the [**Filter**] button:

Enter the search criteria into the corresponding column

Synchronize Stop synchr Actions for sele	ronization Clear watermark	Cho	oose column to filter	Domain A Domain A Name Fmail	-	Filter		
Domain T	Name	-	Email	EC		RC	Status	Last synchronized
aodop.onmicrosoft.com	TestRTS_Room5		TestRTS_Room5@a	WTC	-[\bigcirc	Subscribed, SubscriptionE	2024-04-29 08:10:07
				RC				
				Status 💌	•			
· ·								

Figure 51. Search by entering criteria to the corresponding column



You can choose a column to filter or click directly on the filter icon on the right side of the column, a filter table will appear. By inputting the search criteria into the corresponding column names, you can filter the results as your wish.

Use Filter Editor

You can also click [Edit Filter] button to open "Filter Editor" dialog:

Filter Editor	l	1 - 1		×	Exchange CAS
And 🕀					
		ОК	Cancel	Apply	Edit Filter
				🔺 Sho	ow/hide legend;

Figure 52. Open Filter Editor dialog box

In the "Filter Editor" dialog you can enter criteria by clicking on plus symbol and select the appropriate conditions for your search:

nd	d 🖸	
l	Domain Equals <enter a="" p="" val<=""></enter>	ue> 😢
	Domain	
	Email	
	Exchange CAS	
	Last heart beat	
	Last synchronized	
	Name	
	RC	
	Status	



Figure 53. Search conditions

After that, click [OK] to apply the input conditions and the result shows up.

Handling of newly assigned resource

When a new resource is added in RTS yet not in Resource Central, its Status will be shown as "New":

Actions for sel	ected users	Filte	r							
Domain	Name	▲ E	mail	EC	WTC	RC	Status	Last synchronized T	Last heart beat	Exchange CAS
365rc.onmicrosoft.com	benres_00	b	enres_00@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:06	2021-12-07 09:36:30 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_01_05	b	enres_01@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:05	2021-12-07 09:35:30 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_02	b	enres_02@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:08	2021-12-07 09:36:14 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_03	b	enres_03@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:12	2021-12-07 09:36:36 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_04	b	enres_04@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:10	2021-12-07 09:36:36 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_05	b	enres_05@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:12	2021-12-07 09:36:39 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_06	b	enres_06@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:05	2021-12-07 09:36:07 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_07	b	enres_07@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:05	2021-12-07 09:36:09 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_08	b	enres_08@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:09	2021-12-07 09:36:15 🥝	365rc.onmicro
365rc.onmicrosoft.com	benres_09	b	enres_09@365rc.onmicrosoft			0	Subscribed	2021-11-29 09:30:11	2021-12-07 09:36:18 🥝	365rc.onmicro
365rc.onmicrosoft.com	newyork_01	n	ewyork_01@365rc.onmicrosof			0	New			

Resource with "New" status will not be able to synchronize data until its Status changed to Subscribed. You can still perform full synchronize, group synchronize, and resource data synchronize when there is resource(s) with "New" status. However, only resources with "Subscribed" will synchronize data.

To change a resource's Status from "New" to "Subscribed", make sure that you have added it to Resource Central. Then you can either:

• Wait for RTS to automatically check Status every 60 minutes. If the new resource is added to Resource Central, RTS will automatically change that resource's status to "Subscribed" and synchronize the new resource.

-OR-



• Go to RTM interface and look for the final line "Newly assigned resource checker". Then right-click on it and select [Start].

RealTime Service version: 6.6.18.4 Service started at: 12/8/2021 1:53:17 AM Next full synchronization is scheduled at: <not scheduled=""></not>				Exchange Central: WebTeam Central: Resource Central:	0 / 1000 0 / 1000 1 / 1000
Activity name	Status	Start time	End time	Last message	
Notifications		12/8/2021 1:58:12		Successfully subscribed for notifica	ations 🔺
Full synchronization					_
Domain controller 365rc.onmicrosoft.com - 365rc.onmicrosoft.com		12/8/2021 1:58:07		Found domain 365rc.onmicrosoft.	com
Notifications		12/8/2021 1:58:14		Successfully subscribed for change	es in
Full synchronization					
Databases					
RealTime Service	83			Saved domain 365rc.onmicrosoft.	com
Resource Central				Saved domain 365rc.onmicrosoft.	com
Calendar Service					
Emails_std					
Appointments_std					
Emails_ext					
Appointments_ext					
Groups synchronization					
Resource data synch				Remote PowerShell configured, fe	ature
Newly assigned resource checker				Next check: 02:53:23	
🗩 View messages					

In case a resource is removed from RTS yet still exists in Resource Central, that resource will not be able to synchronize data to the database. But if the resource is added back to RTS, its Status will become "Subscribed" and it will start synchronizing data again.

NOTE: Handling of newly added resource is only applicable for Resource Central, not Exchange Central and WebTeam Central.

Saving Configuration

To apply the changes made to parameters in RealTime Service, you have to save them by clicking the "Save" button on the toolbar.

Before saving, RealTime Manager will check if settings are correct. If settings are incorrect (for example: the Exchange Server's name is wrong), the RealTime Service cannot connect to the Exchange server and then there will be a message informing a user about that and the setting itself will not be saved.

NOTE: The **"Save"** button is only enabled, if there are changes in the settings.



CHAPTER 3. Appendixes

Appendix A – Access Control List synchronization

In this chapter the Access Control List synchronization is described.

Access Control List (ACL) is a list of security protections that applies to an object (file, process, event, or anything else having a security description).

The RealTime Service collects the permission settings (ACL) during synchronization on each calendar folder in order to avoid possible problems with synchronized user or group folder permissions. Without this function, it may happen so that a certain user or group folder restricted for updating will be still updated by the WebTeam Central.

The Calendar folder is set permission as depicted in the picture below:

General	Home	Page	AutoArchive
Administration	Forms	Permissions	Synchronization
Name	Permission Lev	el	
Default	Custom		
Add		emove	operties
Permissions			
Permission Level:	Custom		•
Read		Write	
None		Create iter	ns
Free/Busy tin	ne	Create sub	ofolders
Free/Busy tin location	ne, subject,	Edit own	
Full Details		Edit all	
Other Free/Bu	sy		
Delete items		Other	
None		Folder own	her
Own		Folder con	tact
Own		Folder visit	ble
 All 			
 All]		

Figure 54. Calendar Properties



The tables below illustrate how the Permissions for calendar folder in Outlook would be synchronized to the database.

Read permission:

Outlook permission		Permission Synchronized to Database			
Read	Other	Read			
None	null	0			
Free/Busy time	null	0			
Free/Busy time, Subject, location	null	0			
Full Details	Folder Visible = true	1			

Create and Edit permissions:

Outlook permission		Permission Synchronized to Database
Write	Create	Edit
null	0	0
Create Items = true	1	0
Create Subfolders = true	1	0
Edit Own = true	0	1
Edit Own = true Edit All = true	0	2

Delete permission:

Outlook permission	Permission Synchronized to Database
Delete Item	Delete
None	0
Own	1
All	2

Special case: if both the *"Folder Visible"* and the *"Folder Owner"* checkboxes are selected, then the permission synchronized to the database would be as below regardless of other outlook permissions' values.

Outlook permission Permission Synchronized to Database					
Other	Read	Create	Edit	Delete	
Folder Owner = true	1	1	2	2	





Appendix B – Notifications do not work

The troubleshooting of the problem of non-working notifications is described in this appendix.

How this problem can be defined:

- RTS does not reflect changes in calendars.
- Constant warnings about recreated subscriptions for all users (see an example in the picture below).

Messages : Emai	ls_std	I		×
		Start typing to filter messages		_
Time	Level	Message		
30.11.2012 0:59:41	🗩 Info	Will retry to create subscription for rtsuser60 - rtsuser60@small1rts.local in 120 second(s)		
30.11.2012 0:59:41	🛕 Warning	Removing timed out subscription for user eq1 - eq1@small1rts.local (no status update from server for more than second(s))	120	
30.11.2012 0:59:41	🗩 Info	Will retry to create subscription for eq1 - eq1@small1rts.local in 120 second(s)		
30.11.2012 0:59:41	\land Warning	Removing timed out subscription for user rtsuser1 - rtsuser1@small1rts.local (no status update from server for n 120 second(s))	nore tha	٦
30.11.2012 0:59:41	🗩 Info	Will retry to create subscription for rtsuser1 - rtsuser1@small1rts.local in 120 second(s)		
30.11.2012 0:59:41	\land Warning	Removing timed out subscription for user rtsuser57 - rtsuser57@small1rts.local (no status update from server fo than 120 second(s))	r more	
30.11.2012 0:59:41	🗩 Info	Will retry to create subscription for rtsuser57 - rtsuser57@small1rts.local in 120 second(s)		
30.11.2012 0:59:42	🛕 Warning	Removing timed out subscription for user rtsuser37 - rtsuser37@small1rts.local (no status update from server fo than 120 second(s))	r more	
30.11.2012 0:59:42	魺 Info	Will retry to create subscription for rtsuser37 - rtsuser37@small1rts.local in 120 second(s)		
30.11.2012 0:59:42	🛕 Warning	Removing timed out subscription for user rtsuser24 - rtsuser24@small1rts.local (no status update from server fo than 120 second(s))	r more	
30.11.2012 0:59:42	魺 Info	Will retry to create subscription for rtsuser24 - rtsuser24@small1rts.local in 120 second(s)		
30.11.2012 0:59:42	🛕 Warning	Removing timed out subscription for user rtsuser102 - rtsuser102@small1rts.local (no status update from server than 120 second(s))	for more	э

Figure 55. RTS logs

When you meet the mentioned symptoms, it means that the Exchange CAS can't connect to the Push notifications receiver port set in the General settings and, in fact, real-time synchronization doesn't work.

There are several reasons why the mentioned problem can happen. Read about them below.

The firewall on the server, where the RTS is installed, blocks incoming connections; to fix this – either turn off the firewall or allow TCP connection to the Push notifications receiver port.

By default, the RTS sends the host name to the Exchange server (if the Custom host for push notifications option isn't set for the Exchange server) and it can be that this host name cannot be resolved to IP address from the system that Exchange CAS is running on. To resolve this, just turn on the Custom host for push notifications option and input the IP address of the RTS server manually.

The RTS is beyond the NAT. In this case you should turn on the Custom host for push notifications and the Custom port for push notifications options and set the NAT server address (name or IP) and the port on the NAT server that is mapped to address/port of RTS into correspondent fields.

Other problems also may happen, but they should be diagnosed in a certain environment and as a result do not have any common solution.

Here is one more tip – to ensure that the RTS port is accessible from the CAS server, you should run the following command on the system which the CAS is running on:

telnet RTS_SERVER_NAME_OR_IP RTS_PUSH_PORT

If the connection is successful, this command will clear the console and will be waiting for input. If an attempt to connect is unsuccessful, an error will appear.





Appendix C – Mailbox and calendar right assignment to Service Account

With Full Access right, the service account will have proper access to get calendars information and mailbox of a resource on Exchange.

Open the browser and navigate to the address where <u>Exchange admin center</u> is hosted. On the side bar, clicking on "Resources" under **Recipients** tree will open a list of resources. Select a resource and turn to tab 'Delegation' on its details window. There are three permissions listed here, but only **Send as** and **Read and Manage (Full Access)** are necessary for the service account.



Figure 56. Exchange admin center \rightarrow Resource \rightarrow Delegation

In the "Read and message (Full Access)" area, click [Edit], and the "Manage delegates" box opens as follows:



Continue to click [Add members], and the next screen will display. Search for and add the service account to which you wish to grant *Read and Manage (Full Access)* permission to access this resource. This account would be the one utilized to obtain Access Token.





Figure 57. Add members with full access to the mailbox

To complete, click [Save] then [Confirm].

←	×
Add read and manage permissions	
Are you sure you want to add delegate permission?	
Confirm	

Figure 58. Add permission confirmation

If the permission is added successfully, you will meet the below notification:



Figure 59. Add permission successfully

Repeat the same procedure to add Send as permission.



After adding above permissions to a service account, that account now has proper access to get calendars information and mailbox of the selected resource on the Exchange Server.

Appendix D – View-Only Recipients role assignment to Service Account

The *View-Only Recipients* role enables administrator (Service Account) to view the configuration of recipients, such as mailboxes, mail users, mail contacts, distribution groups, and dynamic distribution groups. This appendix specifies procedures on how to assign *View-Only Recipients* role to service account on both Exchange Online and Exchange On-premises:

On Exchange Online

Open the browser and navigate to the address where <u>Exchange admin center</u> is hosted. On the side bar, clicking on "Admin roles" under **Roles** tree will open a list of role groups:

≡		Home	> Admin roles	
۵	Home			
8	Recipients ^	Adn	nın roles	
	Mailboxes	Admin r Exchanc	ole groups give users permissions to view d an admin center. Give users only the access t	ata, complete tasks, and use Powershell cmdlets in the least-permissive role. Le
	Groups	about n	nanaging role groups	
	Resources			
	Contacts	ት የ	ld role group	
	Mail flow			
ዲ	Roles ^		Role group ↑	Description
	Admin roles		Communication Compliance	Viewer of communication compliance that can access the
	User roles		Communication Compliance	Investigators of insider risk management that can triage a
	Outlook web app policies		Administrators	as well as explore content.
ß	Migration		Compliance Administrator	Perform searches and place holds on mailboxes, SharePoi Business locations.
-ů	Mobile V		Compliance Management	This role group will allow a specified user, responsible for

Figure 60. Add role group

Click [Add role group] and follow these steps to set up role group:

Step 1: Set up the basics

In this step, name the new role group and select 'Default' in Write scope field:





Admin Roles > Add role gro	oup
Basics	Set up the basics
Permission	
O Admins	To get started, fill out some basic information about the role group that you're creating.
	Name *
Review and finish	View-Only Recipients role for Service Account
	Description
	Enter a description to let other admins know the purpose of this role group.
	Write scope ()
	Default
	Next Cancel

Figure 61. Set up the basics

Step 2: Add permissions

Search and select role View-Only Recipients. Click [Next] to proceed.

Admin Roles $>$ Add role group					
✓ Basics	Add permissions				
Permission					
Admins Select the roles to add to the View-Only Recipients role for Service Account role group. Roles Admins define the scope of the tasks that the members assigned to this role group have permission to manage.					
C Review and finish			1 selected X	ew-Only R	× ≣
	~	Role ↑	Description	Default recipient scope	Default
	V	View-Only Recipients	This role enables administrators to view the configuration of recipients, such as mailboxes, mail uers, mail contacts, distribution groups, and dynamic distribution groups. This role can be combined with roles associated with the ViewOnlyConfiguration role type to create a role group that can view every object in the organization.	None	None
	Back	Next		Cance	1

Figure 62. Add role

Step 3: Assign admins

This step allows you to search and select the service account to which permissions to manage the *View-Only Recipients* role are assigned. You can search the service account by its name or email address:







Click [Next] to switch to the final step.

Step 4: Review role group and finish

In this screen, you can review the information imported previously. If you want to edit, click [Back] to go to the previous steps.

Admin Roles $>$ Add role group	
Basics	Review role group and finish
Permission	
Admins	We recommend letting the members of the role group know how these changes will impact them.
Review and finish	Basics Name: View-Only Recipients role for Service Account Description: Write Scope: Default Edit basics
	Permissions View-Only Recipients Edit permissions
	Admins Service Account Edit admins
	Back Add role group Cancel

Figure 64. Review role group and finish





When complete, click [Add role group]. When the role group is created successfully as the below figure, click [Done] to finish.

Admin Roles > Add role	group
Basics	Status
Permission	View-Only Recipients role for Service Account role group has been added.
 Admins 	Related features View this role group Add another role group
Review and finish	
	Done

On Exchange On-premises

Open the browser and navigate to the address where Exchange On-premises is hosted. To begin configuring the *View-Only Recipients* role for the service account, you need to create a new role group by clicking on "admin roles" and then 'permissions' in the sidebar.

Enterprise Office 365						
Exchange admin center						
recipients	admin roles user roles Outlook Web App policies					
permissions						
compliance management	+ / 前 暗 2 3					
organization	NAME					
	Compliance Management					
protection	Delegated Setup					
mail flow	Discovery Management					
mail now	Help Desk					
mobile	Hygiene Management					
	Organization Management					
public folders	Public Folder Management					
	Recipient Management					
servers	Records Management					
	RTS					
hybrid	Security Administrator					
	Security Reader					
	Server Management					
	UM Management					

Figure 65. Add new role group





new role grou	ıp				
*Name:			1	(1)	
Description:					
Write scope:		_		$\langle \mathbf{a} \rangle$	
Default		•		(2)	
Organizational	unit:				
Roles:					
+ -				(3)	
NAME		*]	(•)	
Members:					
+ -				(4)	
NAME	DISPLAY NAME	*		. ,	
			Save	С	ancel

Figure 66. New role group panel

Follow the steps to add *View-Only Recipients* role to your service account:

Step 1: Name the new role.

Step 2: For 'Write scope' section, select [Default].

Step 3: In the 'Roles' section, click + to pick the role you wish to assign to the service account.



DISPLAY NAME	*		
UM Mailboxes UM Prompts Unified Messaging UnScoped Role Management User Options UserApplication View-Only Audit Logs View-Only Configuration		View-Only Recipients This role enables administrators to view the configuration of recipients, such as mailboxes, mail users, mail contacts, distribution groups, and dynamic distribution groups. This role can be combined with roles associated with the ViewOnlyConfiguration role type to create a role group that can view every object in the organization. Default recipient scope	
View-Only Recipients			
WorkloadManagement	•	None	
1 selected of 75 total			
add ->		OK Cancel	

Figure 67. Add role

Step 4: In the 'Members' section, click + to select the service account to whom *View-Only Recipients* role is assigned.

NAME	DISPLAY NAME	FOLDER	
Account 1	Account 1	ps.com/Users	
Account 2	Account 2	ps.com/Users	
Account 3	Account 3	ps.com/Users	
Account 4	Account 4	ps.com/Users	
Account 5	Account 5	ps.com/Users	
		1 selected of 80 total	
add ->	Account 1 [remove];		

Figure 68. Add service account





You can look for that service account by entering its name in the Search box. Select it and press [add] button to insert that service account. Click [OK] to return to the main panel to review your selections. To re-select the service account, click — and then pick a different service account.

*Name:			
View-Only Recipients for	or service account		
Description:			
Dofoult			
	•		
Organizational un	it:		
0			
Roles:			
+ -			
NAME		*	
Man Oak Dedalate			
View-Only Recipients			
Members:			
Members:			
Members: + NAME	DISPLAY NAME		
Members: NAME	DISPLAY NAME		
Members: + - NAME Account 1	DISPLAY NAME		

Click [Save] to finish. Your new role group is now listed on the admin roles list:

Exchange admin ce	enter
recipients	admin roles user roles Outlook Web App policies
permissions	
compliance management	+ 🖋 亩 昏 🔎 😂
organization	NAME
	Compliance Management
protection	Delegated Setup
	Discovery Management
mail llow	Help Desk
mohile	Hygiene Management
mobile	Organization Management
public folders	Public Folder Management
	Recipient Management
servers	Records Management
	RTS
hybrid	View-Only Recipients for service account