

Google Workspace

GWMME

Admin Guide

Google Workspace Migration for Microsoft Exchange

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This project contains code from sendmail, NetBSD, RSA Data Security MD5 Message-Digest Algorithm, Cyrus IMAP.



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Chapter 1: About this guide

GWMME used to be known as G Suite Migration for Microsoft Exchange (GSMME).

This guide helps administrators understand and implement Google Workspace Migration for Microsoft Exchange (GWMME). GWMME is a product that you can use to migrate your users' email, calendar, and contact data to Google Workspace from:

- Microsoft Exchange
- Any 3501-compliant IMAP server, such as Novell GroupWise, Cyrus, Courier, or Dovecot
- Personal Storage Table (PST) files
- Another Google Workspace account

What's in this guide

This guide contains the following information:

- An overview of GWMME features and functionality
- An explanation of the architecture and how information migrates
- Instructions for running the product
- Troubleshooting tips

Who should use this guide

This guide is intended for administrators who are responsible for setting up and running GWMME. Administrators should be familiar with the server data they need to migrate (Exchange or IMAP server) and with Google Workspace.

Where to find the latest information about GWMME

You can find information about the latest version of the product, including new features, fixed issues, and a link to the latest documentation in [What's new in GWMME](#).

Need technical support?

If you have any questions or need technical support, go to [Contact Google Workspace support](#).



Disclaimer for third-party product configurations

Parts of this guide describe how Google products work with Microsoft Exchange and other third-party products. It details the configurations that Google recommends. These instructions work with the most common scenarios. Any changes to third-party configurations should be made at the discretion of your system administrator.

Google does not provide technical support for configuring mail servers or other third-party products. In the event of a third-party issue, you should consult your system administrator. Google accepts no responsibility for third-party products. Consult the product's website for the latest configuration and support information. You can also contact Google Solutions Providers for consulting services and options.

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Chapter 2: Overview

What is GWMME?

GWMME is a server-side product that migrates your organization's email, calendar, and contact data from Exchange, an IMAP server, or PST files to Google Workspace. With the product, migrations are:

- **Scalable**—You can set up a small migration in 4 steps. You can also set up larger migrations with expanded controls.
- **Server-level**—You can migrate hundreds of users at the same time.
- **Noninvasive**—Your users can continue to use their mail, calendar, and contacts during the migration period without interruption.

You can migrate data from:

- **Microsoft Exchange 2000, 2003, 2007, 2010, 2013, or 2016, including Exchange Online (Office 365)**—Migrate mail, calendar events and resources, contacts, and public folders.
- **IMAP mail servers**—Migrate email from IMAP mail servers, Novell GroupWise, Cyrus, Courier, Dovecot, SunMail, Zimbra, or other RFC 3501-compliant IMAP servers.
- **PST files**—Migrate Personal Storage Table (PST) files on behalf of users after they aggregate the files into one location.
- **Hosted Exchange accounts**—Migrate data from hosted Exchange by running the migration tool on local servers, without requiring the Exchange hosting partner to run any special software on their end.
- **Other Google Workspace accounts**—You can also use IMAP server support to migrate data from one Google Workspace account to another.

Features

Some of the important features of GWMME are:

- Migrate mail, contact, and calendar (including calendar resources) data from Exchange.
- Migrate mail from IMAP servers.
- An administrator controls setup and migration. Users are not involved.
- Retain control of migrated users and calendar resources by using comma-separated values (CSV) files.
- Use parallel migration for multiple users to speed up the migration process.



- When using Exchange, you can choose to migrate using your administrator username and password or profile (which can be useful when migrating from hosted Exchange accounts).
- Migrate public folders using the desktop interface or the command line.
- Optionally, migrate email messages to Google Vault.
- Using the estimation tool, you can estimate the amount of email messages, calendar events, and contacts to migrate before you begin.
- Use premigration diagnostics that check for configuration errors in connectivity and authentication, as well as errors in your user list.
- Review detailed migration reports, which show an overview of a migration, any message errors during a migration, why errors occurred, and the affected users.
- See logging and reporting of migration results, with an adjustable level of detail for quick updates or detailed debugging.
- Get real-time status updates on the progress of a migration.
- Migrate email messages sent or received during a specific time frame.

Comparison with other tools

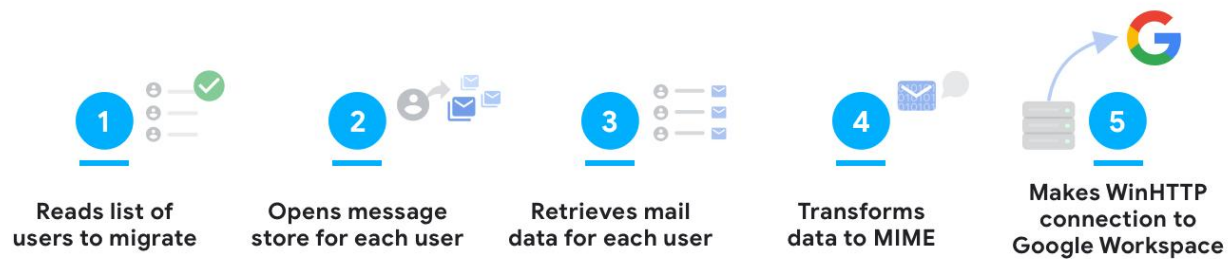
GWMME offers a single solution for migrating your data from Exchange, IMAP mail servers, and PST files. To see an overview of the similarities and differences between GWMME and other Google migration products, go to [Google Workspace migration product matrix](#).

Architecture

You run GWMME on one or more client machines in your network, with a single instance of the product on each client. If you run multiple instances, they run in parallel. Each instance of GWMME migrates a specific list of users. It's multithreaded, with a thread opened for each migrated user. You can specify the number of users GWMME migrates simultaneously on each instance.

The following diagram illustrates how GWMME retrieves user data and migrates it to Google Workspace.

Migration steps



1. GWMME reads the list of users you want to migrate. You can specify how many threads it processes simultaneously. For example, it creates 25 threads if you have 25 users and you set up GWMME to process all of them. GWMME creates 10 threads if you only have 10 users to process. When a thread finishes processing a user, it moves to the next on the list.
2. Using the information you provide during setup, GWMME opens the message store or PST file for each user identified in the list.
3. GWMME retrieves mail data for each user. (It can also retrieve calendar and contact data if you're migrating from Exchange.)
4. GWMME transforms email data to MIME. If you're migrating from Exchange Server or PST files, this step uses Microsoft Outlook components.
5. GWMME makes a WinHTTP connection to Google Workspace. Using OAuth 2 domain-wide delegation, GWMME signs in to the users' Google Workspace accounts and writes the transformed message-store data to each user's account.

What is migrated?

During the migration, GWMME processes contacts first, followed by calendar data, then email. For details, go to [What data GWMME migrates](#).

Parallel processing

Each client machine simultaneously processes the number of users based on the user restriction you specify. The default is 25. The amount of processed data depends on the number of users you configure for each client machine and the number of machines you're using.

GWMME is usually capable of processing one message per user, every 2 seconds. Factors that reduce processing speed are hardware constraints or network latency factors, including:

- Physical resources on the client machine, such as the CPU, memory, disk speed, and network connection speed
- Physical resources on the Exchange or IMAP server, such as the CPU, memory, disk or network connection speed, and server performance
- The overall speed of your network and connection to external networks
- The density of traffic outside your network

You can increase the amount of data you process by increasing the number of users you process simultaneously on each client machine and the number of client machines you use.

Chapter 3: Prepare to migrate

Complete the following steps before you migrate your data using GWMME. Some steps are optional, depending on your setup and what data you plan to migrate.

Step 1: System requirements

Before you run GWMME, you need to meet Google Workspace edition and configuration requirements, account requirements for your Exchange server, and Microsoft Windows system requirements for your client machines. For details, go to [GWMME system requirements](#).

Step 2: Provision users in Google Workspace

Before you migrate your users, you need to provision Google Workspace accounts, create any aliases or groups, and add any domain aliases for them.

It's important to provision all users when you migrate calendar data, even if you only want to perform a partial migration. For details on how to avoid calendar issues with user accounts, go to [Troubleshoot calendar issues with user accounts](#).

Step 3: Authorize GWMME for your account

Before you install GWMME, you must authorize it for your account. For details, go to [Authorize GWMME for your account](#).

Step 4: Create CSV files for users & calendar resources

There are 2 types of CSV files used in a GWMME migration:

1. A control CSV file, which is used to map users and, if required, calendar resources (such as meeting rooms). For details, go to [Create a control CSV file for user accounts](#).
2. A mapping CSV file, which is used if you're migrating calendar events. For details, go to [Create a mapping CSV file](#).

Important: Keep your mapping CSV file separate from your control CSV file. The mapping CSV needs all users and calendar resources in your organization. The control CSV should only contain the users and resources that you're migrating in the current phase.



Step 5: (Optional) Maintain calendar resource free/busy status

Because calendar events might not migrate from Exchange in a specific order, turn on **Automatically add all invitations to this calendar** for all of your calendar resources. Doing so preserves their correct free/busy status.

To do this:

1. Follow the instructions in [Share room and resource calendars](#).
2. Under **Auto accept invitations**, choose **Automatically add all invitations to this calendar**.
3. When the migration is complete, change the setting to the **Auto-accept invitations that do not conflict** to preserve the free/busy status of the resources you migrate.

Step 6: (Optional) Prepare PST folder structure

Important: GWMME can't migrate password-protected PST files. Disable password protection before you attempt to migrate.

If you want to migrate PST files, first set up a folder structure to accommodate those files:

1. Set up one top-level folder.
2. Within that top-level folder, create an individual folder for each user whose PST files you want to migrate.
3. Place the PST files within these individual folders.

Example:

- PST
 - user1@example.com (user folder)
 - archive.pst (PST file to migrate)
 - MyPst.pst (PST file to migrate)
 -
 - user2@example.com (user folder)
 - archive.pst (PST file to migrate)
 - MyPst.pst (PST file to migrate)
- 4. Name the individual folders based on the primary email address configured in the source mail system. For example, if your file of usernames takes the form user1@example.com, user2@example.com, then name your individual folders **user1@example.com** and **user2@example.com**.

5. Allow read and write permissions on each individual PST file, so that GWMME can write migration-related metadata to those files.

Note: If you're using an exported or archived PST file, it's not possible to identify the primary root folder for calendar and contacts. All calendars are migrated as additional calendars into Google Calendar, instead of any default calendar. You can avoid this by using PST migration for mail only. Use Exchange for migrating calendars.

Step 7: Set up access to your Exchange or IMAP server

For details on the versions of Exchange or IMAP servers supported by GWMME, check the [GWMME system requirements](#).

Note: This step is not required if you are migrating from PST files.

Access an on-premises Exchange Server

If you're using an on-premises version of Exchange Server 2007 or later, you need to set the following GWMME administrator permissions to migrate your users' mailboxes:

1. Create a normal Microsoft Active Directory user, such as CORP\GWMME_ADMIN.
2. Enable mail on the user account in your Exchange Management Shell.

```
Enable-Mailbox -Identity 'corp.example.com/Users/GWMME ADMIN'  
-Alias 'GWMME_ADMIN'
```

3. Grant GWMME_ADMIN permission to specific mailboxes or databases with Exchange Management Shell.

- To grant access to individual mailbox: `Add-MailboxPermission -Identity "Corp\Joe.User" -User Corp\GWMME_ADMIN -AccessRights FullAccess -InheritanceType All`
- To grant permission to all mailboxes in a specific mailbox database:
`Add-ADPermission -Identity "Mailbox Database 0212328573" -User "Corp\GWMME_ADMIN" -ExtendedRights Receive-As`

For details about granting Exchange permissions, refer to your Microsoft documentation.

Access Exchange Online (Office 365)

For hosted versions of Exchange Server (Exchange Online or Office 365), grant full access to the account migrating your users' mailboxes:



1. Open the Exchange Online admin portal.
2. Using the admin user, create a Migrator user.
3. From a Windows client, connect as an administrator to an Exchange Online PowerShell console:

```
Import-PSSession $(New-PSSession -ConfigurationName Microsoft.Exchange  
-ConnectionUri https://outlook.office365.com/powershell-liveid/  
-Credential $(Get-Credential) -Authentication Basic -AllowRedirection)
```

4. Grant FullAccess permissions to each of the user mailboxes that you intend to migrate (replace <Migrator>@<domain> with the ID of the Exchange user account you set up in step 2):

```
Get-Mailbox -ResultSize unlimited -Filter "(RecipientTypeDetails -eq  
'UserMailbox') -and (Alias -ne 'Admin')" | Add-MailboxPermission -User  
<Migrator>@<domain> -AccessRights FullAccess -InheritanceType All
```

Consult your Microsoft documentation to verify the commands for your setup.

Access IMAP servers

There are no special permissions required to migrate from an IMAP server. Connections to the IMAP server are made based on the username and password information you provide in the list of users you're migrating.

For Google Workspace, Cyrus, Mirapoint, or Exchange IMAP servers, if you want to migrate using an admin username and password, see [Migrating from Google Workspace, Cyrus, Mirapoint, or Exchange IMAP servers](#).

Step 8: Prepare your Windows client machines

Each client machine that runs GWMME needs:

- Memory: 512 MB RAM
- CPU: 2 GHz or more
- Minimum disk space: 8 GB

For details on Windows versions supported by GWMME, check the [GWMME system requirements](#).

The migration process is multithreaded and can consume a lot of resources. GWMME loads the data for each user into memory. Use dedicated machines with robust CPU and memory and increase the resources with the number of users you plan to process simultaneously on each machine.

Note: To avoid authentication issues with Exchange, sign in to Windows on the client machines as an Exchange administrator.

Step 9: (Optional) Migrate your shared contacts to Google

Before you migrate your users, migrate your shared contacts to Google Workspace. That way, your users can immediately access your full address list.

For information about migrating contacts, go to [Sync user data with Active Directory or an LDAP server](#).

Step 10: Download & run the GWMME installer

To download the installer:

1. Go to the [GWMME download page](#) and click **Download GWMME**.
2. Copy the installer to a folder on your client machine or machines.
3. Double-click **GoogleWorkspaceMigration.msi** > **Run**.

Your system installs GWMME in one of these places:

- C:\Program Files\Google\Google Workspace Migration\ExchangeMigration.exe
- C:\Program Files (x86)\Google Workspace Migration\ExchangeMigration.exe

Step 11: (Optional) Specify custom log folder path

GWMME creates log files that you can use to troubleshoot issues or provide to Google support (for details, go to [Interpreting log files](#)). By default, GWMME saves these log files at the following location on each client machine:

C:\Users\user-name\AppData\Local\Google\Google Apps Migration\Tracing\ExchangeMigration

Note: In the path, *user-name* identifies the signed-in administrator who is running the migration.

You can specify a custom folder path for the log files:

1. Edit the **HKEY_CURRENT_USER\Software\Google\Google Apps Migration** registry key.
2. Create key (string value):
 - name = "LogFolder"
 - value = "C:\custom-folder-path" (replace *custom-folder-path* with the path for the log files).

Chapter 4: Deploy

Deployment scenarios

The deployment scenarios in this chapter are suitable for large organizations migrating many user accounts with GWMME. Some small and medium-sized organizations don't require a special server topology and might choose to not run a pilot migration. Familiarize yourself with the content in this chapter. Then decide whether all the phases are relevant for your organization. If not, you can skip to [Chapter 6: Migrate data](#).

There are 5 major phases to a GWMME deployment:

1. Plan
2. Test
3. Migrate
4. Delta migration (optional)
5. Go Live

Phase 1: Plan

In the planning phase, consider:

- [Topology options](#)
- [Prepare your users](#)
- [Organize your data](#)

Topology options

A single instance of GWMME runs on an intermediary client machine between your source server and Google Workspace. You can migrate the data from one or more servers and deploy one or more clients for each server. You must use at least one client per server, and each client migrates a unique list of users.

Listed below are the main topology options.

Important:

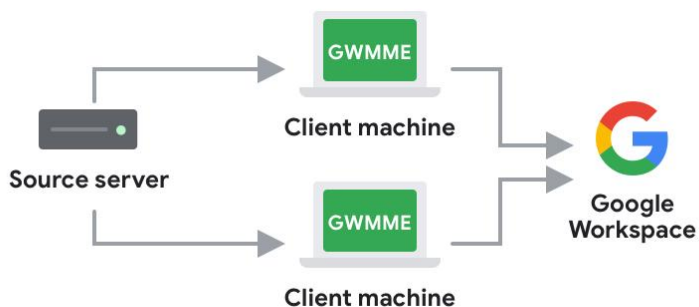
- Because there's a single location for the configuration file, you can only run one instance of GWMME on each client machine. If you try to run multiple instances on a single client, those instances overwrite one another's configuration files.
- Each instance must reference a unique list of users to avoid corrupting the status information for each user's data.

Single server, single client



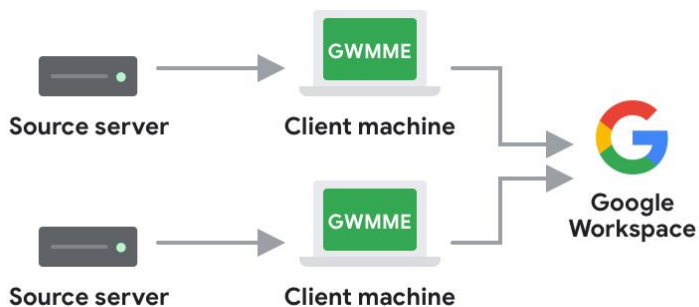
This is the most basic configuration. Use it when all your data is on one server and a single migration client meets your needs. Depending on your network latency and client capacity, a client can migrate 500–1,000 users.

Single server, multiple clients



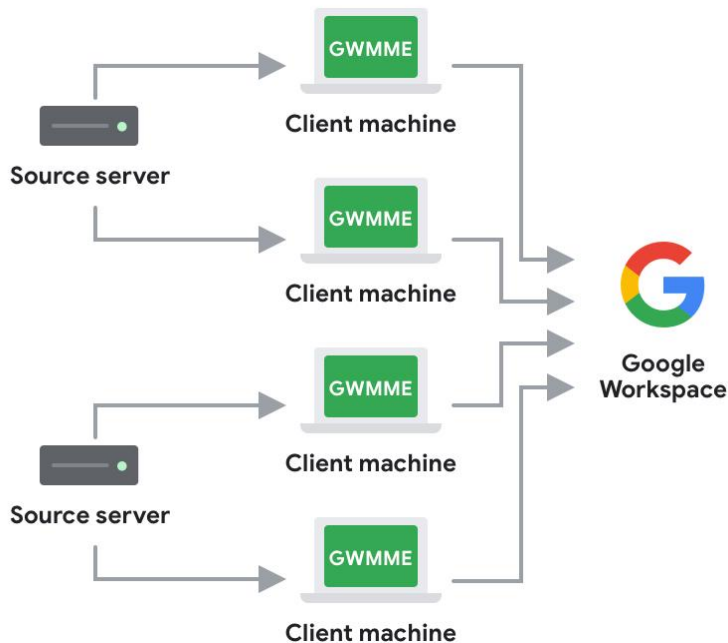
Use this topology if you need to migrate more data than a single client can handle. GWMME sources data from a single-source server. Multiple GWMME client machines migrate data. To avoid data corruption, ensure that no users appear on multiple clients' user lists.

Multiple servers, each with single client



Use this topology if you have multiple data servers, but a single client is enough capacity for each server. If you have user data on multiple servers, each server should have its own client machine running a migration. Be sure that user data is separate for these servers.

Multiple servers, each with multiple clients



This is the most complex topology. In this configuration, there are multiple source servers. Each has more data than a single client can handle.

Prepare your users

Before you begin the transition to Google Workspace, give your users:

- **Details about the upcoming transition to Google Workspace**—Early communication is important to prepare them for the change in their routines.
- **Options for Google Workspace training**—Make training available to your users as early as possible and eliminate the anxiety that accompanies change. To find training and communications resources, visit the [Google Workspace Learning Center](#).

Organize your data

To organize your data, you should:

- **Clean up inboxes**—To reduce the amount of data migrated, you can choose to not migrate deleted email messages. Prior to the migration, have your users clean up their accounts by deleting unwanted messages and moving messages they want to keep into their inbox.

- **Create exclusion folders**—When you configure your migration, you can exclude specific, top-level folders, which is any folder at the same level as the inbox. To effectively use exclusion folders:
 - Have your users prepare the folders prior to migration. Users should locate the folders at the same level as the inbox (top-level) folders, then move all relevant messages to those folders.
 - To keep it simple, enforce a naming convention, such as **Excluded Mail**. Then, when you identify the folders you want to exclude from a migration, you have a reliable way to specify the correct folders for every user. You specify excluded folders by entering a CSV list in [Step 3: Select the data to migrate](#).

Phase 2: Test

Before you migrate all of your users to Google Workspace, test the migration on a small group of users to gather data on the process. For example, consider:

- How many users can a single client machine process at one time and stay within the capacity of its physical resources?
- How many client machines can you run at capacity without overwhelming your network?
- How long will it take to migrate all your data with your migration resources running at an optimal rate?

You can consult the migration reports on each client to get an idea of migration performance. For information about reports, go to [Chapter 7: Migration reports](#).

Your test migration also allows you to go through the process on a smaller scale and identify any problems that might arise, as well as possible solutions. When you're ready to migrate your users, migrate a pilot group first to estimate how long it takes to migrate all your users.

For example, migrate 25 users, review the migration report, and estimate the migration time for all users. Here's how:

1. In the report, find the average message migration rate (migration rate) and number of migrated messages for those users (total mail messages migrated).
2. Calculate the average migration time for a user (= total messages migrated / total users migrated) / migration rate).
3. Calculate the total migration time (= average migration time for one user * total number of users) / number of migration threads.

For more information on threading (the number of users migrated simultaneously), go to [Parallel processing](#).

Run a Google Workspace pilot deployment

A test migration and a pilot deployment allows you to check the process of migrating data and subsequently working with mail, calendars, and contacts in Google Workspace. Any issues you encounter with a small pilot deployment are more easily corrected, so you can provide a smoother transition for the rest of your users.

You can also use the data from your pilot deployment to plan the resources you need to migrate the rest of your users.

What to expect after a pilot deployment

If you implement dual delivery for your Google Workspace pilot deployment users, Google Workspace removes duplicate messages through:

- Your Exchange server
- An edge appliance or service
- Google Workspace

Note: You can configure GWMME to only migrate messages from before your implementation of dual delivery.

If you implemented direct delivery to Google Workspace for your pilot users, there are no duplicate messages for the period of the pilot deployment.

Phase 3: Migrate

Before you migrate user data, decide:

- When the migration will begin
- How much time you need to migrate data
- What access your users get to the existing email server infrastructure before, during, and after the migration

Example time frame

Time frame	Activity
Thursday to Friday	Provision users.
Friday end of business	<ul style="list-style-type: none">• Start receiving mail in Google Workspace.• Stop receiving mail on your Exchange or IMAP server.• Establish read-only access to your Exchange or IMAP server.

Friday night to after migration	Migrate data.
Monday start of business	Users switch to Gmail and Google Calendar.

If your network can accommodate the migration traffic along with normal business, let the migration finish. If not, start the migration again each night. If you restart, the migration picks up from where it left off.

Newest data migrates first. So, on Monday morning, your users have access to their most recent mail and calendar events. Your users can work with their Google Workspace accounts while older data migrates.

You can also consider allowing read-only access to your mail server for a period of time. Doing so allows your users to view data that hasn't migrated, but transition to using Google Workspace for new email messages, contacts, and Calendar data.

Phase 4: Delta migration (optional)

Perform a delta migration after the bulk migration, but before the go-live period. The purpose of this stage is to migrate email received in your users' legacy inbox during the bulk migration period.

To perform a delta migration, specify the date range in [Step 3: Select the data to migrate](#). The date range for the delta migration is usually the start date of the bulk migration to the current day.

If you're able to migrate all data over a quiet period, such as a weekend, you might not need to run a delta migration. Use a delta migration when the amount of data to migrate is significant and the migration time causes a gap in the user's migrated email data. GWMME doesn't migrate email messages that the legacy user receives during the primary migration.

Delta migrations only migrate content that hasn't been migrated. It doesn't reflect changes to content that's already migrated (such as the read status of an email).

It's important to run the delta migration as close as possible to your go live date to ensure your users' email is up to date. Inform your users that they shouldn't access their mailboxes during the delta migration period. If you're running a delta migration, consider migrating your contact and calendar data as close as possible to the go-live date to ensure that all data is as up to date as possible.

Phase 5: Go live

In the go-live phase, all users become active and begin using Google Workspace accounts for daily activities. During this phase, consider whether you need to:



- Run any necessary remigrations.
- Start the migration of additional data (for example, PST files or data older than the original migration scope).
- Provide your users with additional training and support.

Chapter 5:

Watchpoints & best practices

Consider the following watchpoints and best practices before you start a migration or migrate content with GWMME.

First migration

Email

- When a domain is configured for dual delivery at the email gateway, mail between users within the same organization avoids external gateways and is dual-delivered. If you're running this configuration, you might want to migrate email to Google Workspace for the period of time you have dual delivery enabled.
- After migration, Google Workspace provides an estimate of the number of email messages in a user's inbox. It doesn't provide an absolute count. The number of messages in your Gmail inbox might therefore be different from the number in your legacy inbox.
- If you set a retention policy in your Admin console or Google Vault for your mail, migrated mail is retained based on its original date, not its migration date.
- Don't migrate message stubs (from an archival system, for example). Migrating message stubs prevents content from being remigrated.

Email attachments

- Outlook or Exchange stores attachments as unencoded binary data. Gmail uses MIME encoding. The MIME format takes up more storage space, so data sizes might differ between the legacy account and Gmail. Gmail accepts attachments up to 25 MB.

User calendar migration

- Make sure you provision all users in Google Workspace before migrating calendars, even if you only want to perform a partial migration. Ensure that all domain aliases are added for each user. For details, see [Troubleshoot calendar issues with user accounts](#).
- You can't migrate calendar attachments. Manually download attachments from calendar events, upload those events to Google Drive, and then reattach them to the event in Google Calendar.



- Consider carefully when it's best to migrate calendar data. If a user changes an existing event, the changes aren't reflected in Google Workspace.
- Declined legacy events are shown as not accepted (not declined) in Google Workspace.
- To enable fan-out for a Calendar migration, you must use the command line and enable the `--enable_calendar_fanout` argument. You must use the command to turn on Calendar migration fan-out. For details, go to [Run GWMME from the command line](#).

Calendar resource migration

- You can change event attendees' Exchange email addresses to Google email addresses using the calendar resource CSV file. Go to [Create a mapping CSV file](#).
- Until you change the calendar resource setting to **Auto-accept invitations that do not conflict**, the resource appears as a **guest** instead of a resource under **Rooms** in the calendar invitation interface.
- Migrate resources as early as possible in the migration timeline. Use a single thread for each administrator performing a migration, because resources take longer to migrate.
- Migrate resources using only a single thread per GWMME system. This approach prevents GWMME from making too many concurrent Calendar API requests to Google.
- Use a different Google administrator account for each GWMME system to maximize the number of concurrent Calendar API requests to Google. Doing so helps avoid 403 errors.
- Separate resource migrations into as many different GWMME systems as possible and attempt to distribute resources evenly. This action ensures that the resource migration's load is reasonably well balanced across all GWMME systems.
- Only migrate resources for up to one year. Don't migrate each resource's history.
- If you migrate more than one year's worth of data, it's important to run a simulated migration to a test domain early in the Google Workspace deployment project.
- Add the calendar resources to the user and calendar resource CSV files. For details, go to [Create CSV files for users and calendar resources](#).

Groups and distribution lists

- Ensure groups and lists are provisioned in Google Workspace, because GWMME doesn't migrate distribution lists or groups to Google Workspace. Doing so ensures proper email flow when users reply to messages sent to any groups or distribution lists.

Multiple domains and email aliases

- If your organization has multiple domains or multiple email aliases for user accounts, provision the email addresses on the user account in Google Workspace before migrating calendar data. If the

aliases aren't defined in Google Workspace, calendar event data might not be properly migrated to Google Workspace.

Migrate public folders from Exchange

- You can migrate public folders from Exchange to Google Groups using the GWMME desktop interface or from the command line. Do so after you migrate your users' mail, calendars, and contacts. For instructions, go to [Migrate public folders with GWMME](#).

Subsequent migrations

If you need to migrate content again, take the following considerations into account:

Email

- If there are errors or problems with a user migration, you might remigrate all data for that user. Doing so doesn't duplicate existing email content already in the mailbox. However, it takes longer, because GWMME remigrates each message, regardless of whether it exists in the target.
- Remigrating email data might alter the state of messages (from unread to read), particularly when you are remigrating email messages to Vault.
- Remigrated email data reflects any newly applied labels. GWMME doesn't migrate updated content, read status, or any previously applied labels.

User calendar migration

- If you remigrate calendar events, GWMME picks up new meeting requests that have been created since your last migration, as it does with contacts and email data.
- If, after a migration, you change an existing calendar event on your legacy server, such as updating the meeting room or date of a meeting, the updates don't appear in Google Workspace afterward. Even if you configure GWMME to **Migrate all data** (including previously migrated data), GWMME doesn't update these events.

Contacts

- Avoid remigrating contact data. If you remigrate contacts and choose **Migrate all data** (including previously migrated data), contacts are duplicated in Google Workspace. If you need to remigrate contact data, first delete the data you migrated originally, and then run a new migration.
- If you remigrate contacts and create duplicate contacts, you can use the option in Google Contacts to [Merge duplicate contacts](#).
- The contact migration tool migrates contacts created since your last migration. Modified contacts aren't migrated.

Chapter 6: Migrate data

Migration overview

To start your migration with GWMME, sign in to the client machine and run the product. When you run GWMME, the migration wizard opens and prompts you for connection, authentication, and configuration information. You enter the required information in 4 basic steps:

- [Step 1: Choose a server type](#)
- [Step 2: User and domain information](#)
- [Step 3: Select the data to migrate](#)
- [Step 4: Migration settings](#)

In step 4, if you click **Cancel** before clicking **Save** or **Migrate**, you lose the information you entered. Clicking **Save** or **Migrate** saves your information to a configuration file. You can use those settings when you run another migration. The configuration file contains the settings from only your most recent save or migrate operation.

If you cancel the migration or it stops due to a hardware failure or a power outage, the process restarts where it stopped on the previous run. GWMME processes contacts and calendar data first, followed by email data. You can see updates as the migration progresses.

After a migration, close and restart GWMME before starting a new migration.

Multiple instances

It's possible to have multiple instances migrating simultaneously, but this can cause serious problems if it's not set up correctly. If you run multiple instances, be aware of the following restrictions to avoid data corruption:

- Because there's a single location for the configuration file, you can only run one instance of GWMME on each client machine. If you try to run multiple instances on a single client, those instances overwrite each other's configuration files.
- Each instance must reference a unique list of users. If you use multiple instances for the same user, you might see corrupted status information for a user's data.

Run a migration from the command line

You can use the command line to run a migration. For details, go to [Run GWMME from the command line](#).

Before you begin

- Complete the steps in [Chapter 3: Prepare to migrate](#).
- Also, consider the information in [Chapter 5: Watchpoints & best practices](#).

Step 1: Choose a source server type

Start by providing the following information:

- **Use my most recent migration settings**—Select this option to use the settings from your most recent configuration file. If this is your first migration and you haven't saved any previous settings, this option has no effect.
- **Server Type**—Choose from:
 - **Exchange**—For Exchange or PST files
 - **IMAP**—For IMAP
 - **Gmail**—For another Google Workspace account or @gmail.com users

Note: You can select the **IMAP** option for a Gmail migration. However, selecting the **Gmail** option provides configuration presets to make a migration simpler.

Details on these options are below.

Exchange options

- **Specify Exchange server details**—Complete the following fields:
 - **Host name/IP address**—Enter the fully qualified domain name or the IP address of the email server from which you want to migrate data. For example: smtp.example.com or 198.0.2.1.
 - **Admin username**—Enter the username for the Exchange administrator account you want to use to open your users' mail stores. The account must have at least the Receive As permission on the Exchange server. Make this username the same one you use to sign in to the computer where you're running GWMME. You're prompted for it and the password in step 4.
- **Specify a profile to use for migration**—Select this option to sign in to an Exchange server using a premade Outlook profile and migrate the data for each user. Use this option if you encounter any permissions or connection errors. Make sure you verify the correct settings when creating a profile. For details, go to [Verify your settings](#).
- **Outlook Admin Profile**—Select the Outlook profile of the Exchange administrator you want to use to sign in to your Exchange server.
- **Specify a folder with PST files**—Next to **Folder with PST files**, browse to the folder that contains the PST files you want to migrate. For details on how to set up the folders, go to [Prepare PST folder structure](#).

IMAP options

- **IMAP Server type**–Select the type of IMAP server that contains the user data you’re migrating. If you specify an incorrect server type, you could see performance issues.
- **Hostname/IP address**–Enter the fully qualified domain name or the IP address of the IMAP server from where you want to migrate data. For example: mail.example.com or 198.0.2.1.
- **IMAP Security**–Choose the type of IMAP encryption you want to use for your migration:
 - **None**–No encryption
 - **SSL**–SSL/TLS encryption
 - **STARTTLS**–TLS encryption using the STARTTLS command
- **IMAP Port**–Enter the connection port on the IMAP server.
- **IMAP Path Prefix**–Enter the IMAP folders' path prefix that is common to all folders. This usually is the IMAP namespace for the folder names. Typical values of path prefix are:
 - Groupwise IMAP, Gmail, Dovecot–none (leave the field blank)
 - Cyrus, Courier–INBOX

Consult your IMAP server documentation for more information.

Exchange 2010 IMAP migration considerations

If you’re using IMAP migrations with Exchange 2010, you can increase the maximum allowed service sessions per user for large numbers of threaded migrations. For more information, consult your Microsoft documentation.

Special instructions for Cyrus IMAP

If you select **Cyrus IMAP** in step 1, you get 2 additional options–**IMAP Admin User** and **IMAP Admin Password**. You can:

- **Enter your IMAP admin username and password**–Runs the migration in admin mode.
Set the IMAP path prefix to `user.%s` or `user/%s` (depending on what the folder separator character is on your Cyrus IMAP server). In admin mode, you don’t need to include your users’ passwords in the CSV file. You can just format the file with their username in Cyrus, followed by their username in Google Workspace. Example: jane, janesmith or jane, janesmith@example.com

Note: Some versions of Cyrus prior to 2.3.10 don’t provide the read or unread state of mail if you migrate using an administrator’s password. All mail is migrated as unread. If you want to migrate email with the correct state in admin mode, make sure that your Cyrus servers support **sharedseen** annotation, and that it’s turned on. If your server doesn’t support **sharedseen** annotation, use normal mode and list each user’s password.

- **Leave the username and password fields blank**—Runs the migration in normal mode. The migration proceeds just like other IMAP migrations. Provide individual user passwords in the migration CSV file to sign in and fetch emails during migration. The CSV file must be in the following format: user1#user1password, Google-Workspace-user. Example: janesmith#Q8BW2svB, janesmith@example.com

Special instructions for Other IMAP Server

When you select **Other IMAP Server**, an extra option appears for **IMAP Server Capabilities**. Using this option, you can enable or disable IMAP server search capabilities, such as message size, deleted flags, date range, and message ID range.

If you're unsure of your IMAP server's capabilities, uncheck each box and click **OK**. Most IMAP servers support all of these capabilities. In rare cases where an IMAP server doesn't support a setting, the IMAP search failure shows up in the logs. Either way, you can run the migration again after enabling the supported flags.

Gmail options

Simply click **Next** to continue.

Step 2: User & domain information

This step is the same for Exchange and IMAP migrations. Provide the following information:

- **Google Workspace domain name**—Enter the name of the Google Workspace domain to which you are migrating email (for example, solarmora.com).
- **Service Account credentials file**—Enter the path to your service account JSON file. For more information, go to [Authorize GWMME for your account](#).
- **Google Workspace Admin user**—Enter your administrator details.

Step 3: Select the data to migrate

The options in this step are different for Exchange or IMAP as your server type. Provide the following information:

- **File of accounts to migrate**—If you're migrating email, calendar, or contact data, click **Browse** to locate the CSV file with the names of the users you want to migrate. For more information about this file, go to [Create a control CSV file for user accounts](#).
- **File of folders to migrate**—If you're migrating the content in public folders, click **Browse**. Then, locate the file that provides a mapping between the hierarchical folder name in Exchange and the Google Groups email address. For details, go to [Migrate public folders](#).

- **Advanced options:**
 - **Migrate x users at a time**—Enter the number of users you want to migrate at one time on the client. A separate thread opens for each user. If you don't specify a value, GWMME defaults to 25 users. It processes one message every 3 seconds, for each user. An optimal setting is 25–50 users, depending on the machine's configuration. For more information, go to [Parallel processing](#).
 - **Do not migrate mail from these top-level folders**—Excludes specific top-level folders from the migration. Any folder at the same level as the inbox is a top-level folder. Enter a CSV list of top-level folder names. Folder names can include spaces and don't require quotation marks. GWMME ignores any subfolder names you enter. For information about preparing exclusion folders, go to [Organize your data](#).
 - **Migrate to Google Vault**—If your Google Workspace account has the Google Vault service, you can select this option to add all migrated email messages to Vault. Remember, though, that users' migrated messages are not visible in their Gmail inboxes and folder information is removed from messages before they're migrated. You can migrate email to Vault from any type of supported mail server (including Exchange, IMAP, and Gmail) as well as from PST files. To learn more about Vault, go to the [Google Vault Help](#).

Exchange options

- **Select the data you wish to migrate**—You have the option to import email, calendars, and contact data, and public folders. Check the box for each type of data you want to migrate.
 - Migrate all of your email messages and calendar events or select a date range. If you select **Calendar**, you can upload your calendar resources, such as meeting rooms. For more information, go to [Migrate a subset of users](#).
 - If you select **Public Folders**, you can't migrate users at the same time. Migrate your users' mail, calendar events, and contacts first. For details, go to [Migrate public folders with GWMME](#).
- **I am migrating a subset of users**—Available only if you select **Calendar** under **Select the data you wish to migrate**. Upload CSV files with a complete list of every user and calendar resource in your organization (even if you aren't migrating them in this round of migrations), such as meeting rooms. For more information, go to [Create CSV files for users and calendar resources](#).
- **Advanced options:**
 - **Migrate deleted emails**—Select this option to migrate messages in the Deleted Items folder to Gmail's Trash. Gmail deletes the messages 30 days following a migration.
 - **Migrate junk emails**—Select this option to migrate messages in the Junk Email folder.

- **Do not migrate mail from these top-level folders**—If you select Microsoft Exchange IMAP, you must add calendar and contacts folders to the exclusion list.

IMAP options

- **Select the data you wish to migrate**—If you don't want to migrate all your email messages, you can select a date range.
- **Do not migrate mail from these top-level folders**—In the case of Gmail IMAP, use label names to exclude specific folders. Gmail IMAP uses the following system labels:
 - Inbox
 - Starred
 - Sent
 - AllMail
 - Drafts
 - Spam
 - Trash


You can also specify custom labels to exclude folders.

Excluding folders for Gmail IMAP works slightly differently. Each message in Gmail can have multiple labels. If a message has an excluded label or folder, GWMME also excludes the message, even if it has other labels or folders attached.


Gmail IMAP options (only for Gmail migrations)

If you selected the **IMAP > Gmail** or the Gmail server type in step 1, migrating users need to individually disable folder size limits and make the All Mail, Spam, and Trash labels available to IMAP.

To disable folder size limits:

1. Open Gmail and, on the right, click Settings  > **See all settings**.
2. On the **Forwarding and POP/IMAP** tab under **Folder Size Limits**, check the **Do not limit the number of messages in an IMAP folder (default)** box.
3. Click **Save Changes**.

To show the All Mail, Spam, and Trash labels in IMAP:

1. Open Gmail and, on the right, click Settings  > **See all settings**.
2. On the **Labels** tab, check the **Show in IMAP** box for the **All Mail**, **Spam**, and **Trash** labels.

Map calendar users

GWMME allows you to map the addresses of users and calendar resources to their Google Workspace addresses, if they're different. Doing so migrates calendar event attendees and organizers. You need 2 CSV files:

1. One with the subset of users and resources that you're migrating in the current phase.
2. Another that has a full list of all users and resources.

If your users' addresses are changing from Exchange to Google Workspace, the mapping file should cover all users and resources. Include all users, because some users might be attendees for calendar events that you're currently migrating.

For more information on formatting CSV files, go to [Create CSV files for users and calendar resources](#).

Migrate a subset of users

To migrate a subset of users, in GWMME:

1. At step 3, under **Select the data you wish to migrate**, check the **Calendar** box.
2. Check the **I am migrating a subset of users** box.
3. Upload the CSV files and click **OK**.

Step 4: Migration settings

GWMME displays different information depending on whether you choose Exchange, IMAP, or Gmail in step 1. The same procedures apply to all. All selections are optional.

1. Review your migration settings. If you want to change a value, click **Edit**:
 - **Migrate all data**—If you select this option with a subsequent migration, GWMME:
 - Doesn't duplicate email messages, but could revert their status (for example, read mail could become unread and old labels could be assigned to messages).
 - Overwrites (doesn't duplicate) calendar events.
 - Duplicates contacts. After the migration, you can remove duplicates by merging contacts. For details, go to [Merge duplicate contacts](#).
 - **Save settings**—Saves your settings in a configuration file. The next time you run GWMME, you can reuse the settings.
 - **Run Diagnostics**—GWMME validates your configuration and user list before running the migration. For more information about running diagnostics, go to [Run diagnostic tests](#).
 - **Estimate**—GWMME performs an estimate of the amount of data you want to migrate. If you select this option with **Migrate**, GWMME provides an estimate and runs a migration.
 - **Migrate**—GWMME migrates data.

2. When you're satisfied with your settings, click **Next**.

If you're migrating from an Exchange server, you see a dialog box. This dialog box doesn't appear if you signed in to the client computer using your Exchange administrator username and password or previously selected **Remember my password** in this box.

3. Complete these steps:

- Enter the username and password for the Exchange administrator account you're using to open your users' mail stores. This is the same username you entered in step 1. (Use the same username with which you signed in to the client computer where you're running GWMME.)
- Check the **Remember my password** box to bypass this step in future migrations.
- Click **OK**.

If you checked the **Run Diagnostics** box, the **Validation Settings** screen appears. See below for details on diagnostic tests.

If you didn't select **Run Diagnostics**, the migration starts.

Run diagnostic tests

If you select **Run Diagnostics**, GWMME validates your configuration and users list before you run the migration. The validation helps to prevent migration errors or a failed migration.

What's validated?

The diagnostic tests validate the following information:

- Connection to the Exchange or IMAP server
- Administrator privileges
- Format of the user CSV file
- Whether GWMME can access the users and their mailboxes specified in the users list on the Exchange or IMAP server using the administrator username and password
- Whether the users in the user CSV file also exist in Google Workspace
- Connection to the Google server
- The OAuth service account key JSON file you provided

Diagnostic test results

The Validation Settings screen shows the progress of the diagnostic test. If GWMME encounters an error, it displays **Failed** next to the validation error. For more information about a failed validation, click **Help**.

Additional information appears in the **Error Details** box.

Validate entire user list

GWMME initially only checks the first 10 users in your CSV file. To validate the entire user list, check the **Include exhaustive user validations** box. If you select this option, the test might take much longer.

During a migration

With Exchange, contacts are migrated first, followed by calendar data, and then email. Your users can use their Google Workspace accounts.

The migration moves to the next item if:

- A user in the list doesn't exist in Google Workspace.
- It encounters a mail store it can't open.
- It encounters an error with a particular item, such as a message.

GWMME records errors in the log files. You can find the migration log files as well as status and output files here: C:\Users*user-name*\AppData\Local\Google\Google Apps Migration\Tracing

Note: In the path, *user-name* identifies the signed-in administrator who is running the migration.

Monitor a migration

When your migration starts, you can monitor the progress in the following screens.

Estimate screen:

1. In step 4, check the **Estimate** box.
GWMME performs an estimate before it begins the migration.
2. Afterward, click **Migrate** to start the migration.
3. Click **Detailed estimation report** for more detailed information.

Migrate screen:

1. On the Review or the Estimation screen, check **Migrate**.
2. Find the progress of your migration on the **Output** screen.

As the migration progresses, GWMME updates the **Output** screen with user and data information..

Chapter 7: Migration reports

Migration reports overview

GWMME provides detailed reports about the migrations. You can view an aggregate report that includes information from all your migrations or a separate report for each one. Use these reports to see what errors occurred during a migration and why.

In addition to migration reports, GWMME provides the following related information:

- **Log files**—In most cases, migration reports provide all the information you need to troubleshoot. However, you might need to examine detailed logs to troubleshoot a specific issue or send logs to Google support for analysis. For details, go to [Interpreting log files](#).
- **Diagnostics**—Migration reports only show message errors that occur during a migration. To determine whether there are errors with your configuration, run the premigration diagnostics. For details, go to [Run diagnostic tests](#).

Report IDs

Whenever you run a migration, GWMME creates a report with a unique name, or ID. GWMME names the reports by the date and time at which the migration run completed and includes the process ID. For example, a report with the name 2020-10-12-11-14-20-p5172.log was created on October 12, 2020 at 11:14:20 AM, with process ID 5172.

Migration report views

There are 2 types of migration report views. You can choose to view the report of a specific migration or an aggregate of all migration runs:

- **User view**—Shows a list of migrated users and indicates whether failures occurred during the migration of email messages, calendar events, or contacts. If errors occurred, you can click the links on the report to see more detail.
- **Error view**—Shows a list of errors and the number of users or messages for which an error occurred. You can click the links on the report to see details about specific errors.

Open migration reports

When you open a report, it appears in a new window in your web browser. Don't open a report while you're running a migration because the migration might fail.

To open a report:

1. On the GWMME machine, click **Start > All Programs > Google > Google Workspace Migration > Show Report**.

The command console window opens, which starts the reports server.

2. Don't close this window.

After the reports server starts, the aggregate report opens in a browser window.

3. To open a report for a specific migration, select the report from the **Select Migration Run ID** list on the browser.

For more information, go to [Report IDs](#).

Report pages

After you open an aggregate report or a specific migration report, you can navigate to additional pages to determine which users were affected by errors, which errors occurred, as well as any details about the errors.

Summary page

This page is the top-level page of an aggregate or specific migration report. It summarizes the following statistics for all migration runs (for the aggregate report) or a single migration run (for a specific migration report):

- Total users migrated
- Failed users
- Number of email messages, calendar events, and contacts migrated
- Number of failed email messages, calendar events, and contacts
- Email migration rate

Total users migrated

- Shows the list of users migrated. You can click the name of a user to view more detail.
- To get to this page, click **Summary page > Total Users Migrated**.

Failed users

- Shows the list of users with migration errors and the type of error. For more details about specific user errors, click the name of a user.
- To get to this page, click **Summary page > Failed Users**.

User migration summary

- Shows the type of migrated folder (email, calendar, and contacts) and the number of errors that occurred. Click the name of a folder to view details.
- To get to this page, click **Summary page** and choose a path:
 - **Total Migrated Users > *username***
 - **Failed Users > *username***
 - **Total Errors > Users Affected > *username***

Folder details

- Shows details about each error for a specific folder. Click the link under **Subject** to view the message summary page. Click the error code to view users failed by error.
- To get to this page, click **Summary page** and choose a path:
 - **Total Migrated Users > *username* > *folder name***
 - **Failed Users > *username* > *folder name***

Message details

- Shows details about failed messages, including the error message and error description. You can also see HTTP request and response information if a Google API error occurred when the message was being uploaded to Google Workspace.
- To get to this page, click **Summary page** and choose a path:
 - **Total Migrated Users > *username* > *folder name* > *message***
 - **Total Errors > Users Affected > *folder name* > *message***

Error list

- Shows each type of error that occurred during a migration and the number of users who got that error. Click the number under **Users Affected** to view the **Users failed with Error** page.
- To get to this page, click **Summary page > Total Errors**.

Users failed with error

- Shows the users that encountered an error during a migration and details about each user's migrated messages. Click the name of a user to view the details.
- To get to this page, click **Summary page > Total Errors > Affected Users**.

Chapter 8: Troubleshoot

You can find the latest troubleshooting information for GWMME in [Troubleshoot a GWMME migration](#).

What to provide to support

When you [contact Google Workspace support](#):

- Provide a ZIP file that includes the files found at:
C:\Users\username\AppData\Local\Google\Google Apps Migration\Tracing\ExchangeMigration.
- Have the CSV file or files you used for the migration.

Common issues

How do I cleanly remigrate a user's calendar?

You might need to remigrate a user's calendar if there are changes to it after an initial migration. To completely remigrate a user's calendar, follow these steps:

1. Delete the user's calendar.
2. Configure GWMME to migrate the user's calendar and select the **Migrate all data** option.

How many calendar resources can I migrate per admin account?

You can achieve a stable migration when running one administrator per GWMME instance and one calendar resource (single concurrent thread). For more information about calendar migration best practices, go to [Chapter 5: Watchpoints & best practices](#).

Troubleshoot calendar issues with user accounts

To ensure that migrated calendar data is associated with the correct Google Workspace accounts, make sure you provision all your users in Google Workspace before you migrate any accounts—even if you only want to perform a partial migration. Add all domain aliases for each user. Otherwise, the following issues might occur:

- **Conflicting accounts**—A conflicting account can occur if an unprovisioned user previously signed up for a personal Google Account (such as Google Drive, Google Photos, Blogger, or any other Google services that aren't Gmail) and used the same email address that they use in your organization. Calendar invitations to and from that user on migrated users' calendars are associated with a conflicting account for the unprovisioned user. The user might not get calendar event updates from the organizer. For more information, go to [About conflicting accounts](#).

Resolution: Provision the user and then delete and recreate all events where the user is the organizer or a guest.

- **Unrecognized domain alias**—If the organizer of the calendar event used an alias or non-routable, internal-only SMTP address when creating the event, and you add the event before adding the alias to the organizer's user account in Google Workspace, the following issues might occur:
 - The migrated calendar events of attendees don't synchronize and disconnect from the event on the organizer's calendar. If the organizer makes a change to the event, it doesn't fan out to the attendees' calendars, even though the events have the same event ID.
 - Calendar notifications and updates don't propagate to the attendees' calendars.

Resolution:

- Add a domain alias in the Admin console to create aliases for all users in the domain.
- Add a secondary domain and create an alias for each user, organizer, or attendee of the migrated event. (Migrated calendar events where the organizer or attendees are listed with the legacy domain update with the primary domain and synchronize after the aliases are added.)

How can I tell if my OAuth settings are entered correctly?

Make sure you've followed the steps in [Authorize GWMME for your account](#).

Resolving X.500 to SMTP for a PST file migration

When migrating a PST file with GWMME, the file might not contain the SMTP address for a user. It might instead have the Exchange X.500 address. You can configure GWMME to resolve the X.500 address to an SMTP address using your Exchange address book.

To configure GWMME to use the Exchange address book for recipient resolution, create a (non-cache mode) MAPI mail profile. Ensure that the profile is based on the Windows user or service account and is on the server that performs the GWMME PST mail migration. The MAPI mail profile needs to connect to the original Exchange infrastructure so that GWMME can properly resolve recipients.

Note: It's important to configure the mail profile with the signed-in user or service account so that authentication to the Exchange address book is automatic and doesn't fail due to an authentication error.

When GWMME finds an X.500 address on a message, it looks to see if any MAPI mail profiles registered on the migration server match the X.500 Exchange organization name. If a MAPI mail profile is registered with the same X.500 Exchange organization name, GWMME tries to resolve the X.500 address using the address book registration in the MAPI mail profile.

If GWMME fails to find a valid mail profile or recipient in the Exchange address book, it reverts to a best-effort method of converting the X.500 address to an SMTP address. GWMME looks at the last CN value of the X.500 address and uses that as the email address name.

Important: Test and confirm that you properly configured the migration server, because this feature isn't enabled by a command line. If you migrate data and later realize this feature wasn't working, you must delete the mail content from Google and then remigrate it.

Reaching the MAPI sessions limit (Exchange Server 2003, 2007, 2010)

Exchange Server supports a limit of 32 MAPI sessions for the GWMME administrator migration account. If you receive error 0x8004011d when running a migration, first determine whether the Exchange Server went over the 32 MAPI session limit. If the Exchange Server has passed the limit, you can resolve the issue by configuring GWMME or your Exchange Server.

If the MAPI session limit caused error 0x8004011d, the GWMME trace logs show:

```
2020-03-25T07:33:21.110-04:00 e2c E:TaskSystem
ExchangeMigration!TaskRunnerThread::ExecuteSingleTask @ 41 ()> Failed with
0x8004011d, last successful line = 34.
2020-03-25T07:33:21.110-04:00 e2c A:Migration
ExchangeMigration!MigrationUserStatus::SetMigrationStart @ 117
(user@example.com)> In progress: Now migrating user=user@example.com
Error=Microsoft Exchange is not available. Either there are network
problems or the Exchange server is down for maintenance.
Component=Microsoft
Exchange Information Store
LowLevelError=-2147221227
Context=1318
```

For more information about trace logs, go to [Interpreting log files](#).

Also, check the event logs on the Exchange Server machine. The following example log for Exchange 2007 shows that the server exceeds the MAPI session limit:

```
Log Name: Application Source: MSExchangeIS Date: 1/1/2020 11:00:00 PM
Event ID: 9646
Task Category: General Level: Error
Keywords: Classic User: N/A
```

Computer: server.example.com

Description: Mapi session "a1234567-abcd-1234-a5c5-fcb5b810b949" exceeded the maximum of 32 objects of type "session".

To avoid exceeding the MAPI session limit, take one of these steps:

- If GWMME uses more than 32 threads for a single migration, configure it to use fewer threads.
- If you have multiple GWMME migration servers, create a single administrator account for each server. Ensure that each server uses fewer than 32 threads.
- Configure the Exchange Server Information Store service to allow more than 32 MAPI connections.

Exchange 2010 client request throttling causing performance issues

Exchange 2010 supports client request throttling, which can limit the performance of GWMME migrations when migrating a large number of users. You can configure a specific policy in the GWMME administrator account that exempts it from throttling.

To create and apply a custom throttling policy:

1. On the Microsoft Exchange Server, click **Start > Microsoft Exchange Server 2010 > Exchange Management Shell**.
2. Enter **New-ThrottlingPolicy GWMME -RCAMaxConcurrency \$null -RCAPercentTimeInAD \$null -RCAPercentTimeInCAS \$null -RCAPercentTimeInMailboxRPC \$null Type Set-Mailbox "GWMME_Admin" -ThrottlingPolicy GWMME**

For details on Exchange 2010 client throttling policies and settings, refer to your Microsoft documentation.

Verifying your configuration and user list

If you're unable to start a migration or you find that some users aren't migrated, there might be an issue with your configuration or user list. To identify and resolve the issue, you can run premigration diagnostic tests.

These tests can identify errors in connectivity, authentication, and your user list, including:

- Users in your list who aren't on your Exchange or IMAP server
- Suspended, deleted, or unprovisioned users in your list
- Incorrect sign-in details or other information about your Exchange or IMAP server
- An incorrect email address or Exchange alias for a user
- Failed OAuth requests caused by an incorrect OAuth JSON private key or Windows clock setting

For information on running diagnostic tests on your configuration and user list, go to [Run diagnostic tests](#).

Viewing migration reports

If message errors occur during a migration, you can check the migration reports for details about errors and affected users. For more information, go to [Chapter 7: Migration reports](#).

Interpreting log files

In most cases, migration reports provide the information you need to troubleshoot message errors that occur during a migration. However, you might need to examine log files for more information about migration errors or provide logs to Google support.

The log files provide an ongoing account of how each segment of the migration progressed. In general, this information is most valuable to Google support. For example, if a log file indicates a particular Exchange Migration module or method as the cause of an error, then Google engineers can address the issue. However, the log files can also help you identify problems like timeouts or network errors to resolve in your own environment.

Log analyzer

Google provides a log analyzer for GWMME. The analyzer can scan your trace log files and identify many types of migration issues. To use the analyzer, upload your files to the [Google Admin Toolbox Log Analyzer](#).

The Log Analyzer can identify most issues within a few moments of submission.

Types of log files

GWMME produces 2 types of log files that have the following information:

- **Status**—A summary of the overall status of a completed migration run
- **Trace**—Details about the migration as it progresses through the data for each user

Find the log files on each client machine in the following location:

C:\Users*user-name*\AppData\Local\Google\Google Apps Migration\Tracing\ExchangeMigration.

Notes:

- In the path, *user-name* identifies the signed-in administrator who is running the migration.
- You can customize the folder path for the log files. For details, see [Optional: Specify custom log folder path](#).

If you encounter a problem during migration, use the log files to identify where in the process the error occurred. The following sections explain how to interpret the information in each log file type.

Status log file

GWMME creates and names the status log file for a migration according to the date and time that the migration ends and includes the process ID. For example, a file with the name Status-2020-11-12-11-14-20-p5172.log was created on November 12, 2020 at 11:14:20 AM with process ID 5172.

The file contains summary information for each user processed during the migration and information about each type of data you choose to migrate (contacts, calendars, and email data). The information for a user includes:

- The username and the overall status of data migration:

```
<Exchange User:hyduser1:  
Status:Success:
```
- Information about the success or failure of migrating contact data:

```
<Contact Migration:Not Started Total Contacts:0  
Success Count:0 Fail Count:0
```
- Information about the success or failure of migrating calendar data:

```
<Calendar Migration:Success Total Calendar Events:0 Success Count:0  
Fail Count:0
```
- Information about the success or failure of migrating email data (per folder):

```
<Email Migration:Success  
<Folder Name:blr/apmt/spf-old Folder Migration Status:Success Folder  
Total:248  
Migrated Count:248 Success Count:248 Fail Count:0>
```

Trace log file

GWMME creates and names the trace log file for a migration according to the date and time that the migration run started and includes the process ID. For example, a file with the name Trace-2020-07-19-16-53-58-p8108.log was created on July 19, 2020, at 4:53:58 PM with process ID 8108. The file updates as the migration progresses.

The trace file begins with entries similar to:

```
Configuration: Exe name: C:\Program Files (x86)\Google\Google Workspace  
Migration\ExchangeMigration.exe  
Exe version: 8.6.7.5309  
GSync version: 8.6.7.5309  
OS Version: 5.1.2600 OS Service Pack: 3.0 OS Suite/Product: 256/1
```

Processor arch: 0/6/3846

Process Id: 8108

The opening entries provide information about the location and version of the Exchange migration executable file, the Exchange migration product version, operating-system information about the computer where the GWMME is running, and the process ID for the particular migration run.

Subsequent entries in the trace log file begin with the same general information as the following example:

```
2020-07-19T16:53:58.264+05:30 3ac A:Migration
ExchangeMigration!ServerMigrationSource::ProcessUser @ 88 () >
source_user:drafts google_user:drafts
2020-07-19T16:54:00.139+05:30 3ac A:Migration
ExchangeMigration!ServerMigrationConfig::LogConfig @ 343 () > Migration
Configuration:
ExchangeProfileName: (null)
SourceServer: 172.26.201.222
SourceAdmin:
GoogleDomain: example.com
ForceRestart: 1
IsMigrateEmail: 1
IsMigrateContacts: 0
IsMigrateCalendar: 0
EmailMigrationStartDate: 2020-08-01
EmailMigrationEndDate:
ExcludeTopLevelFolders:
```

Log fields

Trace log entry	Explanation
2020-07-19T16:53:58.264+05:30 / 2020-07-19T16:54:00.139+05:30	Date and time entry for the log
3ac	Thread ID
A	The logging level (A: All, I: Information, E: Error, F: Fatal, W: Warning, V: Verbose).

	GWMME hard codes the All, Error, Fatal, and Warning logging levels. You can enable Information and Verbose logging levels by editing the Windows registry. For more information, go to Enable trace logging .
Migration	Module name (for example, Migration, Generic, Sync, Calendar)
ServerMigrationSource / ServerMigrationConfig	Class name
ProcessUser / LogConfig	Method name
@88/@ 343	Line number
sourceuser:drafts	Username on the source server
googleuser:drafts	Username in Google Workspace
Migration Configuration	Beginning of the list of configuration details
ExchangeProfileName	Name of the Exchange profile used for the migration
SourceServer	IP address or fully qualified domain name of the source server
SourceAdmin	Administrator account on the source server
GoogleDomain	Google Workspace target domain
ForceRestart	A full or restarted migration (0=run migration from last stopping point, 1=migrate all data)
IsMigrateMail	Mail migration (0=no, 1=yes)
IsMigrateContacts	Contact migration (0=no, 1=yes)
IsMigrateCalendar	Calendar events migration (0=no, 1=yes)
EmailMigrationStartDate	Beginning date for the migration
EmailMigrationEndData	End date for the migration
ExcludeTopLevelFolders	List of top-level folders to exclude

Enable trace logging

To enable Information, Verbose, or Performance logging levels in the trace log file, edit the tracing registry key and its accompanying Level DWORD Value:

- Registry key: HKEY_CURRENT_USER\Software\Google\Google Apps Migration\Tracing
- DWORD Value: Level
- Value data: Change the default value of 7 to:
 - f (Information)
 - ff (Verbose)
 - 4F (Performance)

For more information on editing the registry on Microsoft Windows, consult your Microsoft documentation.