ArcGIS Enterprise: Configuring a Geodatabase

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Document Release: Version 0.1

April 10, 2024

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Revision History

The table that follows summarizes the revision history of this document.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Release | Summary of Revisions | Date | Author(s) | Approver |
| Draft 0.1 | Draft content created | 12/10/2024 | Noe Diaz | N/A |
| Draft 0.2 | Technical edit and formatting |  |  | N/A |
| Draft 0.3 | Updated draft |  |  | N/A |
| Draft 0.4 | Technical edits from peer review |  |  | N/A |
| Draft 0.5 | Content edits |  |  | N/A |
| Draft 0.6 | Content corrections |  |  | N/A |
| Draft 0.7 | Quality assurance review |  |  | N/A |
| Final 1.0 | Accepted edits and baselined the document |  |  | N/A |

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# Introduction

## Purpose

This installation guide provides the information necessary to install and configure Enterprise Geodatabase on ArcGIS Enterprise.

## Scope

This document covers all required steps for understanding Enterprise Geodatabase.

## Document Conventions

Table 1‑1 describes the conventions used in this documentation.

Table 1‑1: Document Conventions

| Convention | Meaning |
| --- | --- |
| **🛈** | Indicates a note that supplements the information in the current section or about the procedure. |
| ! | Indicates an important note related to the current section or procedure. |
|  | Indicates that a section or procedure needs to be repeated. |
| Text > Text > Text | The arrow symbol (>) is used for navigation paths (e.g., **Start** > **Programs** > **Adlib** > **Express** > **Express Server**). All navigation paths in this document assume that Windows is set to display Classic View. |

# About This Guide

The content in this installation guide contains references to the software manufacturer’s online help documentation specific to ArcGIS Enterprise Creating an Enterprise Database. These help topics are noted, where applicable, and the links to the specific topics are in alphabetical order in Appendix A.

# about Enterprise Geodatabase

This section describes ArcGIS Enterprise geodatabase and what constitutes an enterprise geodatabase.

At the heart of any good enterprise GIS system lives a clean, tidy, and performance enterprise geodatabase. The geodatabase is the core of a strong GIS system; without data, you have nothing. Likewise, a poorly installed, configured, or maintained geodatabase leads to disappointing applications for end users. Proper installation, configuration, tuning, maintenance, and administration of the geodata are crucial to the health and usability of a GIS.

Before we can cover enterprise geodatabase administration, we first need to discuss what makes an enterprise geodatabase; how we install, create, or enable one; how we connect to it; and how we load data into it. Also, keep in mind that in no way can we cover all aspects of Enterprise geodatabase administration in one chapter; an entire book could be dedicated just to this topic. Instead, this chapter will highlight several aspects of installing, configuring, and maintaining an SQL Server enterprise geodatabase. Keep in mind that many of the principles covered can be applied to other RDBMSs as well.

After the completion of this knowledge base article (KBA), you will know how to install, utilize, manage, and maintain an ArcGIS Enterprise geodatabase. The KBA will cover:

* What exactly is an enterprise geodatabase?
* Installation and configuration of the RDBMS
* Creating or enabling an enterprise geodatabase
* Database connections
* Loading data
* Users, roles, and privileges
* Database maintenance

## What cONSTITUES an enterprise geodatabase?

This section explains the geodatabase in the context of ArcGIS Enterprise, refers to a geodatabase that is designed to be used in an enterprise-level GIS environment. A geodatabase is a spatially enabled database. Within the ArcGIS Enterprise framework, there are different types of geodatabases.

### File Geodatabase

This uses the file system folder to store the GIS datasets and is a default database in your ArcPro project. Each dataset can be 1 TB in size. If not using enterprise geodatabase, this is the recommended file-based storage type.

### Enterprise Geodatabase

This uses a relational database management system (RDBMS) for data storage, supports multiple simultaneous user connections, and is limited in size by the RDBMS.

|  |  |
| --- | --- |
| **🛈** | **Note:** File geodatabases are intended for single users and small workgroups with one writer and multiple readers, where concurrent user connections eventually degrade performance with more and more readers. File geodatabases can have only one editor per feature dataset, stand-alone feature class, or table. For medium to large organizations needing multiple writers and larger numbers of concurrent readers, an enterprise geodatabase is the optimal choice. |

## Enterprise Geodatabase

This section describes an Enterprise Geodatabase, which is a multiuser geodatabase that leverages a relational database management system (RDBMS) to store and manage spatial and non-spatial data. Here are some key components and characteristics of an Enterprise Geodatabase in ArcGIS:

### Relational Database Management System (RDBMS)

An Enterprise Geodatabase is based on a supported RDBMS such as Microsoft SQL Server, Oracle, PostgreSQL, or IBM Db2. The choice of the RDBMS depends on your organization's preferences, requirements, and infrastructure.

### ArcGIS Server Integration

An Enterprise Geodatabase is typically integrated with ArcGIS Server, allowing users to publish and share geospatial services. This integration enables web services, including feature services and map services, to access and interact with the spatial data stored in the geodatabase.

### Multiuser Editing

One of the key features of an Enterprise Geodatabase is its ability to support concurrent multiuser editing. Multiple users can access and edit the geodatabase simultaneously, with the system managing locks and conflicts to ensure data integrity.

### Versioning

Versioning is a mechanism that allows multiple users to work on different versions of the geodatabase simultaneously. Each user can create a version to make edits, and these edits can be reconciled and merged with the main version (also known as the default version) to maintain a consistent and accurate representation of the data.

In an enterprise geodatabase with multiple editors, versions allow you to work with the same data at the same time without applying locks or duplicating data. Versions give each editor their own unique, isolated view of the data. Versioning facilitates long transactions by allowing editors to work isolated within their own version of the geodatabase and across multiple edit sessions. Once an editor finishes a collection of edits, they can merge their changes back to the parent version from which their version was created. The original parent of all versions in a geodatabase is called the default version.

### Geodatabase Administration

An Enterprise Geodatabase requires administrative tasks to manage user permissions, ensure data integrity, and optimize performance. This includes user management, backup and restore operations, and performance tuning.

### Integration with ArcPro

Users can connect to an Enterprise Geodatabase using ArcGIS Desktop software, such as ArcGIS Pro, for data creation, editing, and analysis.

### Security and Authentication

The Enterprise Geodatabase supports security measures and authentication mechanisms to control access to the geodatabase and ensure that only authorized users can perform specific actions.

## Summary

In summary, an Enterprise Geodatabase is a robust and scalable solution for managing spatial data in an enterprise GIS environment. It leverages RDBMS technology, integrates with ArcGIS Server, supports multiuser editing and versioning, and requires ongoing administration to ensure data integrity and optimal performance.

# Relational Database Management System Configuration

## RDBMS Installation

The installation and configuration of a Relational Database Management System (RDBMS) for use with ArcGIS Enterprise involve several steps. The exact steps can vary depending on the specific RDBMS you are using (e.g., Microsoft SQL Server, Oracle, PostgreSQL).

### Microsoft SQL Server

The first step in setting up an enterprise geodatabase is to install your RDBMS. In many organizations, this is handled by someone in the IT department, such as a DBA, Engineers, or Systems Administrator. If so, try to work with them as much as possible for the setup of your RDBMS; not only will you build a stronger working relationship with them, but you will further understand how your RDBMS was installed and configured.

### Preparation

Preparation: Ensure that your system meets the hardware and software requirements of Microsoft and Esri. Install the SQL Server Database Engine (ODBC Driver 17.3, 2017 SQL Server version). Additionally, you will need SSMS (Version 18.11) to create new tables and views.

1. Download SQL Server Installer: Obtain the SQL Server installation media or download the installer from the Microsoft website. Choose the appropriate edition and version of SQL Server based on your organization's needs and licensing agreements.
2. Run the SQL Server Setup Wizard: Launch the SQL Server Setup Wizard by running the SQL Server installation executable. The wizard will guide you through the installation process.
3. Select Installation Type: During the installation, you'll be prompted to choose the installation type. Common options include a new SQL Server stand-alone installation or adding features to an existing installation. Choose the appropriate option based on your requirements.
4. Accept License Terms: Review and accept the license terms and conditions to proceed with the installation.
5. Choose the SQL Server Edition: Select the edition of SQL Server that aligns with your organization's needs. The available editions may include Standard, Enterprise, or others, depending on your licensing agreement.
6. Select Features: Choose the SQL Server features you want to install. For a geodatabase, you typically need the "Database Engine Services" feature. Depending on your requirements, you may also select additional features such as Full-Text and Semantic Extractions for Search.
7. Instance Configuration: Specify the instance configuration. You can choose a default instance or a named instance. Ensure that you make a note of the instance name, as you'll need it later during the geodatabase configuration.
8. Server Configuration: Configure the SQL Server services, including the SQL Server Database Engine and SQL Server Agent. Specify service accounts and set authentication modes. Choose between Windows Authentication Mode or Mixed Mode (Windows Authentication and SQL Server Authentication).
9. Database Engine Configuration: Configure the database engine settings, including server collation. Ensure that the collation setting is compatible with your organization's language requirements.
10. Data Directories Configuration: Specify the data directories for the system databases, user databases, and backup directories. Plan the storage locations carefully to optimize performance.
11. TempDB Configuration (Optional): Consider configuring the TempDB settings, such as the number of data files and their size. Proper TempDB configuration can contribute to improved performance.
12. Install and Wait: Start the installation process. The installer will copy files, configure services, and install the selected features. The installation time may vary based on your selections and server resources.
13. Complete the Installation: Once the installation is complete, review the summary information and check for any warnings or errors. Address any issues as needed.
14. Post-installation Tasks: After the SQL Server installation, you may need to perform post-installation tasks, such as configuring firewall settings, enabling protocols, and verifying the installation through SQL Server Management Studio (SSMS).

### Database Configuration

During the SQL Server installation, configure the database server with the required settings, such as collation and authentication mode. Create a new database for your geodatabase.

1. SQL Server Installation: Download the appropriate version of Microsoft SQL Server based on the requirements specified by Esri for your version of ArcGIS Enterprise.
2. Run the SQL Server setup wizard and follow the prompts to install the SQL Server Database Engine. Make sure to choose the appropriate options for your organization's needs, such as selecting features like Database Engine Services.
3. Instance Configuration: During the installation, you'll need to configure the SQL Server instance. Specify the instance name, and authentication mode (Windows Authentication Mode or Mixed Mode), and set the SQL Server administrator accounts.
4. Database Engine Configuration: Configure the SQL Server Database Engine settings, including server collation and authentication mode. Ensure that the chosen collation is compatible with your organization's language requirements.
5. Server Authentication: If you choose Mixed Mode authentication, set up SQL Server authentication by providing passwords for the system administrator (sa) account.
6. Database Creation: Create a new database for your ArcGIS Enterprise geodatabase. You can do this during the SQL Server installation or afterward using SQL Server Management Studio (SSMS).
7. Database Collation: Ensure that the collation of the database is set correctly. The collation should match the collation of the SQL Server instance.
8. Database File Configuration: Configure the location and size of the data and log files for the new database. Consider best practices for file placement and sizing based on your organization's needs.
9. TempDB Configuration (Optional): Consider configuring TempDB settings for optimal performance. This includes setting the number of data files and configuring their size.
10. Security and Permissions: After creating the database, configure security settings. This may involve creating SQL Server logins and user accounts, as well as assigning the necessary permissions to these accounts.
11. Firewall Configuration: Ensure that the SQL Server instance is accessible from other machines in your network by configuring the Windows Firewall or any other firewall software running on the server.
12. Verify Installation: Verify that the SQL Server installation and database creation were successful. Connect to the SQL Server instance using SSMS and confirm that you can see the newly created database.

### SQL Server Client Configuration

Install SQL Server Native Client on the machines where ArcGIS Server and ArcGIS Desktop will be installed. Install Portal for ArcGIS Software.

1. Install SQL Server Native Client: SQL Server Native Client is a component that provides an interface for connecting to SQL Server from client applications. It includes ODBC (Open Database Connectivity) and OLE DB (Object Linking and Embedding, Database) drivers for SQL Server. You can download the SQL Server Native Client from the Microsoft Download Center or use the installation media that came with your SQL Server installation.
2. Select Components for Installation: During the installation of SQL Server Native Client, you may be prompted to select specific components to install. Ensure that the components necessary for your environment are selected. For ArcGIS, the ODBC and OLE DB components are typically important.
3. Complete the Installation: Follow the prompts to complete the installation of SQL Server Native Client. This process may include accepting license terms, specifying installation locations, and configuring additional options.
4. Verify the Installation: After the installation is complete, it's a good practice to verify that SQL Server Native Client is installed correctly. You can do this by checking for the presence of ODBC drivers and OLE DB providers in the system.
5. Update Connection Properties (Optional): Depending on your organization's security policies and network configuration, you might need to update the connection properties for SQL Server Native Client. This could include specifying the server’s name, port number, and authentication method.
6. Install on ArcGIS Server and ArcGIS Desktop Machines: Repeat the SQL Server Native Client installation on all machines where ArcGIS Server and ArcGIS Desktop will be installed. This ensures that these machines have the necessary client components to connect to the SQL Server database.
7. Configure Data Sources (Optional): After installing SQL Server Native Client, you may need to configure ODBC data sources on the machines. This step is often required if you're using ODBC connections in your ArcGIS configuration. You can use the Windows ODBC Data Source Administrator to set up data sources.
8. ArcGIS Server Configuration: During the ArcGIS Server Post Installation process, you will be prompted to provide the connection information for the SQL Server database. Ensure that you specify the correct server’s name, authentication type, and credentials.

### Database Authorization

Set up SQL Server authentication or Windows authentication for the geodatabase. Create a SQL Server login for the ArcGIS Server account. We need our Service Account that runs GIS Server to have the right permissions in SQL in order to register the connection. Additionally, we need to Create Database Connection to get your SDE file for registering as a Data Store for Server Manager. Just a heads up, you’re going to need your service account to be given permissions in SSMS before registration. If you need some sort of justification, see below.

Typically your Enteprise requires using SQL Server to ensure robust, scalable, and high-performance data management, supporting complex spatial queries and seamless integration with ArcGIS Enterprise. Its advanced security features and reliable backup and recovery options also enhance data integrity and availability.

**Now back to OS authentication:**

If you access data through OS authentication, add the ArcGIS Server account to the database and grant it permissions to the resources that it needs to access. When the service runs, it will log in to the database management system as the ArcGIS Server account.

The way that you add the ArcGIS Server account and grant it permissions can vary. You may find it helpful to consult your DBMS documentation to learn how to grant access to an operating system account. Once you add the ArcGIS Server account, you need to grant it SELECT permissions to the data that you are going to publish. Write permissions on the data are required if you plan to allow edits to the data.

Here is more to reference for the justification:

**ArcGIS Server Service Account to have SQL Permissions to Register as Datastore**

Register data with ArcGIS Server using Server Manager: Registering your data directories does not grant the ArcGIS Server account permissions to access your data. You must give the ArcGIS Server account at least read permissions to any folder that you register. When you register a database, the type of permissions you need to grant depends on what type of database you use, what type of authentication you use, and what type of access the connecting user needs. See Make your data accessible to ArcGIS Server to learn more about the scenarios where you need to apply permissions.

https://enterprise.arcgis.com/en/server/latest/manage-data/windows/registering-your-data-with-arcgis-server-using-manager.htm

**Grant permissions to the data**

When you publish services that reference registered data, the ArcGIS Server account needs at least read permissions to any data in folders that you use in your services and at least SELECT permission on any data in databases or enterprise geodatabases that you access using operating system authentication. If you publish editable feature services or geodata services (geodatabases only), the ArcGIS Server account also needs editing permissions.

If you register a folder with the ArcGIS Server site, you must explicitly give the ArcGIS Server account permissions to read from that folder.

If you register the containing database, the type of permissions you need to grant depends on what type of database you are using and what type of authentication you are using to connect.

Services published from cloud data warehouses are read-only; therefore, the credentials used to connect only require privileges to select data. The process of granting permissions to your file-based or database data is described in the remaining sections of this topic. If the data is stored in a folder, or if the data is in a database that you access using operating system authentication or Microsoft Azure Active Directory authentication, you must grant the ArcGIS Server account permission to the folder or the data in the database. The ArcGIS Server account is the domain account you specified when you installed ArcGIS Server, not the primary site administrator specified when the ArcGIS Server site was created.

https://enterprise.arcgis.com/en/server/latest/manage-data/windows/making-your-data-accessible-to-arcgis-server.htm#GUID-58A12575-36EC-4FD1-A5D8-A34FBE957736

1. SQL Server Authentication Modes: Microsoft SQL Server supports two authentication modes: Windows Authentication Mode and Mixed Mode (Windows Authentication and SQL Server Authentication). Choose the authentication mode that aligns with your organization's security policies.
2. Creating SQL Server Logins: Logins are credentials that allow users or processes to connect to the SQL Server instance. You will need to create a SQL Server login for the ArcGIS Server account. If using Windows Authentication, you may only need to create a login for the Windows account used by the ArcGIS Server service. If using Mixed Mode, create a SQL Server login for the ArcGIS Server service account and specify a strong password.
3. Assigning Server Roles: SQL Server provides server roles that grant server-level permissions. Assign server roles to the logins as needed. The "sysadmin" role, for example, provides full administrative rights.
4. Creating a Database User: Once the login is created, create a user in the database for the ArcGIS Server account. This step links the SQL Server login to a specific database and allows you to grant permissions at the database level. Use the `CREATE USER` statement in Transact-SQL to create a user.
5. Assigning Database Roles: SQL Server geodatabases typically use roles to manage permissions within the database. Assign the user to roles such as db\_owner or other roles with the necessary privileges. For example, the `sp\_addrolemember` stored procedure can be used to add a user to a role.
6. Granting Permissions: Grant specific permissions to the user based on the needs of the ArcGIS Server account. Common permissions include SELECT, INSERT, UPDATE, DELETE, and EXECUTE. Use the `GRANT` statement in Transact-SQL to assign permissions. This service account will need the following settings:

* create table
* create procedure
* create function
* create view
* control on its own schema
* select
* insert
* update
* delete
* execute
* view database state

1. Testing Connection: After setting up logins, users, and permissions, test the connection from the machine running the ArcGIS Server to the SQL Server database to ensure that the ArcGIS Server account can connect successfully.

### Enable SQL Server Authentication

If using SQL Server authentication, enable SQL Server authentication mode and create user logins for the geodatabase.

1. Mixed Mode Authentication: During the SQL Server installation, you choose between Windows Authentication Mode and Mixed Mode (Windows Authentication and SQL Server Authentication). Mixed Mode allows both Windows accounts and SQL Server logins to connect to the SQL Server instance.
2. Configure Server Authentication Mode: If you chose Mixed Mode, you need to configure the SQL Server instance to use both Windows Authentication and SQL Server Authentication.
   * Open SQL Server Management Studio (SSMS).
   * Connect to the SQL Server instance.
   * Right-click on the server name, select "Properties," and go to the "Security" tab.
   * Choose "SQL Server and Windows Authentication mode" and click "OK."
3. Restart SQL Server Service: After changing the authentication mode, you may need to restart the SQL Server service to apply the changes. In SSMS, right-click on the SQL Server instance, choose "Restart," and confirm the restart.
4. Create SQL Server Logins: With SQL Server Authentication enabled, you can create SQL Server logins for users who need to connect using a username and password. In SSMS, navigate to "Security" -> "Logins" and right-click to create a new login. Specify the login name, choose SQL Server Authentication, and set a strong password.
5. Assign Server Roles and Permissions: After creating SQL Server logins, assign them to appropriate server roles and grant the necessary permissions. Common server roles include "sysadmin" for full administrative rights. Use the `sp\_addsrvrolemember` stored procedure to add a login to a server role.
6. Database User Creation (if needed): If the SQL Server login needs to access a specific database, you may need to create a corresponding database user. Use the `CREATE USER` statement in Transact-SQL to create a user in the desired database.
7. Assign Database Roles and Permissions (if needed): Assign the database user to appropriate roles and grant the necessary permissions within the specific database. Use the `sp\_addrolemember` stored procedure to add a user to a database role.
8. Testing Authentication: Test the SQL Server Authentication by connecting to the SQL Server instance using the SQL Server login credentials to ensure successful authentication.

## Authorize Database access to sQL Database

### Authentication and Authorization

Authentication is the process of proving the user is who they claim to be. A user connects to a database using a user account. When a user attempts to connect to a database, they provide a user account and authentication information. The user is authenticated using one of the following two authentication methods:

SQL authentication: With this authentication method, the user submits a user account name and associated password to establish a connection. This password is stored in the master database for user accounts linked to a login or stored in the database containing the user accounts not linked to a login.

Logins and users: A user account in a database can be associated with a login that is stored in the master database or can be a user name that is stored in an individual database.

A login is an individual account in the master database, to which a user account in one or more databases can be linked. With a login, the credential information for the user account is stored with the login.

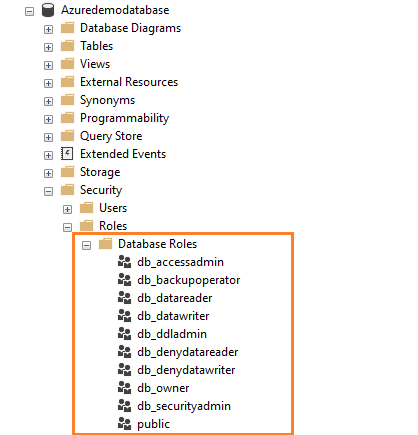
A user account is an individual account in any database that may be, but does not have to be, linked to a login. With a user account that is not linked to a login, the credential information is stored with the user account.

Authorization to access data and perform various actions are managed using database roles and explicit permissions. Authorization refers to the permissions assigned to a user, and determines what that user is allowed to do. Authorization is controlled by your user account's database role memberships and object-level permissions. As a best practice, you should grant users the least privileges necessary.

### Create accounts for database level roles

**Fixed Database Roles**

Expand the Azure SQL DB and navigate to security -> Roles -> Database Roles to get a list of available fixed database roles, expand the Azure SQL DB and navigate to Security -> Roles -> Database Roles. You get the following fixed-database roles.



The following table lists the database roles and their description.

**db\_owner**

The users in the db\_owner fixed database roles provide the highest permissions in a database. Users have the privilege to create, drop, alter, write, or drop the database. To add a user in the db\_owner role, we can use T-SQL stored procedure sp\_addrolemember. The following statements provide db\_owner permissions to the demologin1.

**db\_accessadmin**

The fixed database role db\_accessadmin provides rights to add or remove, create, and manage database users. The following script provides db\_accessadmin role permissions to the groupname user.

**db\_datareader**

The db\_datareader role grants rights required to read data from all tables and views in the database. For example, suppose you want developers to read data from the production database. In this case, you can provide him db\_datareader role in the respective database. The following script provides db\_ datareader role permissions to the groupname user.

**db\_datawriter**

The db\_datareader role grants rights required to write(insert, update) data from all tables and views in the database. For example, you can add your application account to this role to perform data inserts, updates. The following script provides db\_datawriter role permissions to the groupname user.

**db\_ddladmin**

The db\_ddladmin fixed database role grants permissions to create and manage database objects. For example, you can add users in this role to create, alter or drop the objects in the database. The following script provides db\_ddladmin role permissions to the groupname user.

**db\_denydatareader**

The db\_denydatareader role denies access for a user to read data from any table or view in the database using the db\_denydatareader role. The following script provides db\_denydatareader role permissions to the groupname user.

**db\_denydatawriter**

The db\_denydatawrite database role denies a user to write data into the table or view of the database. The following script provides db\_denydatawriter role permissions to the groupname user.

**db\_backupoperator**

The db\_backupoperator provides permissions to back up the SQL database. If you execute the T-SQL statement to provide db\_backupoperator role in Azure DB, it executes successfully.

**Public**

Once you create a new database user and do not provide server or database level permissions, it belongs to the public database role. You cannot remove a user from the public role. If you try to access an object using the public role, the user inherits permissions granted to the public role.

### Groups and Roles

In short, typically you have PowerUsers, ReadOnlyUsers, Users. The GDB admin will need its own login to create data in ArcGIS Pro.

To verify Database role membership: Go to Database in SSMS, Security, Users, Right click your user account, Select Properties, Membership, Verify db\_datareader, db\_datawriter, db\_ddladmin are checked and click okay.

# Creating or Enabling an Enterprise Geodatabase

## the SQL Server Admin Creates the DB, and The GDB Admin Creates the GDB

If the person creating the geodatabase does not have access to the database administrator's password, the database administrator can create the database and the geodatabase administrator's login, user, and schema. If the geodatabase is to be stored in the sde schema, the database administrator creates a sde login, user, and schema. If the geodatabase is to be stored in the dbo schema, the database administrator creates a login and user and assigns the user to be the owner of the database.

**Summary and Prerequisites**

You are going to see these same steps in the documentation, as this is a quick reference summary. If you want more information and details, skip these steps and read the documentation below (5.1.1).

Notes: We need to update the license for gdb and keycodes when we update Server licenses. Additionally, users in the database need to have to own login account to have their own schema mapped.

#### **5.1.1 Quick Guide**

This is a streamlined guide for connecting an existing database to ArcGIS Pro and configuring it for use with ArcGIS Enterprise.

#### **Database Configuration Steps**

1. **Open Database Properties**
   * In the catalog tree, right-click the database and select **Properties**.
   * Under **Options > Miscellaneous**, set both **Allow Snapshot Isolation** and **Is Read Committed Snapshot** to True.
2. **Create a Schema in SQL Server Management Studio (SSMS)**
   * Log in to SSMS.
   * Navigate to the database > **Security > Schemas**.
   * Right-click **Schemas** and select **New Schema**.
   * Assign your user account as the schema owner.
     + If your account is not listed, ensure it is added as a login or ask an administrator to add your account.
3. **Verify User Schema**
   * Confirm your account is listed under **Security > Users** and is mapped to the new schema.
   * Right-click your user account, select **Properties**, and set the default schema to the one you created.
4. **Check Permissions**
   * Ensure your user group has the required permissions (db\_ddladmin) for geodatabase configuration.
   * Verify that the ArcGIS Server service account has db\_datareader and db\_datawriter permissions on the database.
5. **Connect in ArcGIS Pro**
   * Use the .sde file (typically stored in your Documents folder) to establish a database connection in ArcGIS Pro.
6. **Register the Database**
   * Open the **ArcGIS Server Manager** in a browser (e.g., https://<server>/manager).
   * Go to **Site > Data Stores > Register Database** and register the database using the .sde file. Ensure the connection uses operating system authentication and not a system admin account.
7. **Enable Enterprise Geodatabase**
   * In ArcGIS Pro, right-click the database connection and select **Enable Enterprise Geodatabase**. The account used for this process must have dbo privileges.

#### **Important Notes on Database Isolation Settings**

* **Allow Snapshot Isolation**
  + **Why Enable It?** Improves data consistency in multi-user environments and minimizes transaction conflicts.
  + **Benefits:** Prevents blocking during data editing, ensuring stable database performance.
* **Is Read Committed Snapshot**
  + **Why Enable It?** Uses row versioning for faster reads without locking rows.
  + **Benefits:** Reduces blocking and ensures smooth operations during data edits in ArcGIS Pro.

#### **5.1.2 Updating ArcGIS Enterprise Licenses and Re-enabling the Geodatabase**

#### **Updating ArcGIS Server Licenses**

1. **Obtain New License File**
   * Request the updated license file from your Esri account.
2. **Run the Authorization Tool**
   * Open the ArcGIS Server Authorization tool.
   * Follow the prompts to authorize the server with the new license file.

#### **Re-enabling the Geodatabase**

1. **Enable the Geodatabase in ArcGIS Pro**
   * Right-click the database connection (\*.sde) in the **Catalog** pane.
   * Select **Geodatabase Administration > Enable Geodatabase** and provide the required license file and connection details.
2. **Re-register the Geodatabase in ArcGIS Server Manager**
   * Go to **Site > Data Stores > Register Database**.
   * Provide the .sde file and validate the connection.
3. **Test the Connection**
   * Verify the database connection in **ArcGIS Server Manager** under **Site > Data Stores**. Ensure the status is "Valid."

### Run the Enable Enterprise Geodatabase Tool

You can run the Enable Enterprise Geodatabase tool from ArcPro to create a geodatabase in an existing SQL Server database.

In our previous geodatabase creation scenario, the geodatabase administrator is also the database administrator, allowing for the ease of use of the Create Enterprise geodatabase tool. However, what if you are the geodatabase administrator but not the database administrator? In other words, you have the credentials to create the geodatabase, but not the initial database in the RDBMS. When this is the case, your dataset administrator will first have to create the database and geodatabase administrator’s login, user, and schema.

After your database administrator has created your database for you, you can proceed with enabling the geodatabase functionality within it with the Enable Enterprise Geodatabase tool. Now that your database administrator has done all of the heavy lifting with the creation of the database, geodatabase administrator login, user, and schema (things that in our previous scenario were done with the Create Enterprise Geodatabase tool), you can enable the database by following these steps:

SQL connection string: s

Database Name:

1. Start ArcPro.
2. [Connect to the SQL Server database](https://desktop.arcgis.com/en/arcmap/latest/manage-data/gdbs-in-sql-server/connect-sqlserver.htm) from the Catalog tree as the geodatabase administrator.
3. Be sure to save the user's password on the Database Connection dialog box, or make sure you are authorized in SSMS to connect via MFA Azure AD.
4. Right-click the database connection and click Enable Geodatabase.
5. The Enable Enterprise Geodatabase tool opens, and the Input Database Connection field is populated with the connection file name and location.
6. Browse to the ArcGIS Server authorization file that was created when you authorized ArcGIS Server and add it to the Authorization File text box.
7. When you use the wizard to authorize ArcGIS Server, a keycodes file is written to the server where the software is installed. The keycodes file is created in Program Files\ESRI\License<release>\sysgen on Windows servers. Copy the file to a location the Enable Enterprise Geodatabase tool can access. If you have not already done so, authorize ArcGIS Server to create this file.
8. Click OK to run the tool.

A geodatabase is created in the database.

Messages related to geodatabase creation are written to the sde\_setup.log file, which is created in the directory specified for your %TEMP% variable on the computer where the tool is run. If you have any problems creating a geodatabase, check this file to troubleshoot the problem.

## Connecting to the Geodatabase

Now that we have a shiny new enterprise geodatabase, we need to connect to it. A connection allows us to use, manage, and administer the geodatabase. Before we can connect, there are a few items to configure.

### Configure the instance to allow connections

By default, SQL server instances are not configured to allow connections from other computers. If you have a new installation of SQL Server, ensure the SQL Server service is running and listening on the correct ports. We must ensure that remote connections to the database server are allowed. To do this, first open SQL Server Management Studio on your database server and log in with the sysadmin credential. In the Object Explorer pane, right-click on the database server and go to properties. In the Properties window, select the Connections page. Under remote server connections, ensure that allow remote connections to the server are checked. Click on OK.

Next, open SQL Server Configuration Manager, and under SQL Server Network Connection, select Protocols. Ensure that TCP/IP is enabled. Right-click on TCP/IP and go to Properties. Select the IP address tab and scroll down to the IPALL section. Note the TCP port listed here; 1433 is the default port for SQL Server. If your instance of SQL Server is running on a non-standard port, you will need the port number later when we connect to the geodatabase.

For your PC to connect to the remote SQL Server instance, you will need a piece of software known as a client. The client contains drivers that allow your PC to connect to the enterprise database server. On a 64-bit operating system, you must install the 64-bit operating system, you must install the 64-bit SQL Server native client.

**You will need to go to SSMS to update the database settings. Go to the Database Properties and go to Options. You will make Allow Snapshot Isolation and Is Read Committed Snapshot On Changed from False to True**.

Graphical user interface, application

Description automatically generated

Additionally, this may not be necessary if the service account already has the right permissions. Go to security - create new user - created svc account as user - make sure to click default db - we assigned it data reader inside db.

Open you have your database open to connections and have your client drivers installed, you can add a database connection in ArcPro. In the catalog tree, expand Database Connections and double-click on Add Database Connection. When creating a connection to DB via ArcPro, you want to create the initial connection using the SA (not OS). After connection, right click the database and enable with key codes. Right click, privileges, add user group in ArcPro.

**Additionally, you can use the Create Database Connection Tool in ArcPro to create the sde file connection**. To connect to an SQL Server geodatabase instance, do the following:

1. Open the Catalog Pane in ArcGIS Pro.
2. Right-click Databases and click New Database Connection.
3. From the Database Platform dropdown, select SQL server.
4. **Instance is the name of your database instance**. If you were connecting to a local SQL Server instance on the same machine, you could simply use a local host. If your instance is a named instance other than the default SQL Server instance, connect to it as <server name>\<instance name>, such as gisprod\gis. If your database is listening on a port other than the default 1433 SQL port, include that in the instance name as well, separated from your instance name by a comma, for example, gisprod\gis,1500 for example. If the Microsoft Azure SQL Database or Azure SQL Managed Instance name is cloudy4u.database.windows.net, type cloudy4u.database.windows.net in the Instance text box.
5. **Choose the type of authentication** to use when connecting to the database:

Operating system authentication—You do not need to type a username and password; the connection is made using the login name and password used to sign into the operating system. If the login used for the operating system is not a valid database login, the connection fails.

Database authentication—You must provide a valid database username and password in the Username and Password text boxes, respectively. Usernames can be a maximum of 30 characters.

1. **Enter the proper credentials you intend to connect with**. Note that if you chose OS authentication, this option is created out and the credentials of the currently logged-in Windows user are utilized to connect to the database. Here, you can also choose to save credentials with the connection you are creating. This is fine to do with viewer and editor accounts, but it's highly recommended not to save credentials for sde or sysadmin-level connections. Not only it is to protect your database from unintended elevated access by others, but it is also a measure to keep you from accidentally connecting as an elevated user and possibly carrying out unintended actions.
2. **Once you have provided all the preceding parameters**, a connection to the database instance is attempted. If the connection is successful, the database dropdown will get populated with a list of databases available to the credentials provided. Choose the database you wish to connect to.
3. Click OK to create the connection file.

A database connection appears under Databases in the Catalog pane, and a connection file (.sde) is create in the ArcGIS Pro project directory.

You can rename the file by typing a new name in the Catalog pane and pressing enter.

## Register the database with Arcgis server

To allow the ArcGIS Server site to access the data, use the database connection file you create to add a registered data store in ArcGIS Pro or add a data store item in the portal.

If you want web layers to reference—and potentially edit—data in an enterprise geodatabase or supported database, you need to register the database with a server that is federated with your portal.

1. On the ribbon, click the Share tab. In the Manage group, click Data Stores.
2. The Manage Registered Data Stores pane appears. (You can also open the pane from the Share as Web Layer pane, on the General tab, under Location.)
3. At the top of the pane, confirm that the drop-down list is set to Portal Items. Click the Add button and click Database.
4. On the Add data store dialog box, provide a title and, optionally, enter tags.
5. A title is required metadata for the data store portal item. Tags are required when sharing to an ArcGIS Enterprise 10.9 or earlier portal.
6. Optionally, specify a folder to contain the data store item in your portal.
7. By default, the item is stored at the root level of your content. You can choose an existing folder or create a folder using the drop-down menu. You can also browse to a folder.
8. Add a publisher database connection in one of the two following ways:
9. Click Add. On the Database Connection dialog box, fill in the connection properties and click OK. See Database connections in ArcGIS Pro for details.
10. Click Import. In the Select Existing Geodatabase file browser, browse to an existing database connection file (.sde) and click OK.
11. The publisher database is the database that contains the data you want to register with the server.
12. On the Add data store dialog box, if the publisher and server work with different databases uncheck the Same as publisher database connection check box. Click Add or Import to specify a database connection the server can access.
13. When registering a data store for a cloud data warehouse, the server database connection must be the same as the publisher database connection. The option to specify a different server database connection is disabled.
14. Click the check box for the server to which you want to add the data store. You can select more than one server.
15. If your database connection is to a cloud data warehouse, select the hosting server. You can only publish data from cloud data warehouses to the hosting server.
16. Optionally, click Validate to confirm that the server can access the server database.
17. If the database is accessible, a confirmation appears in the Status column next to the server name. If not, an error appears. The connection is also validated automatically when you create the data store.
18. Under Share with, specify how the data store will be shared.
19. Everyone—This option makes your data store public. Anyone can access and see it.
20. My Organization—This option allows your data store to be shared with all authenticated users in the organization.
21. Groups—You can share your data store with groups to which you belong and their members.
22. Leave all options unchecked to set the sharing level to the owner of the item.
23. Click Create.

The data store is created and appears in the Manage Registered Data Stores pane.

In SQL Server, the database admin owns everything in the entire SQL Server instance. The geodatabase admin, on the other hand, owns only the objects within a geodatabase. So, in short, your SQL server admin creates the database, and the geodatabase admin creates the geodatabase.

# Summary

A GIS is only as good as the data that powers it. Geodatabase administration is crucial in keeping a well-maintained, performance geodatabase that users will be able to utilize efficiently. In this guide, we discussed how to create a geodatabase, connect to it, creates accounts for users to access it, load data into it, manage user privileges, manage user connections, and perform routine maintenance.

# FAQs

**Is the DBA going to be the geodatabase administrator?**  [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/setup-geodatabase-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fsetup-geodatabase-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299853901425%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3D1lUJdBVghnOkHH2QuFjT4Vkd03NXjAtjD7PreBqLmJk%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

See Topics:

* You are the SQL Server and geodatabase administrator
* The SQL Server administrator created the database; the geodatabase administrator creates the geodatabase

**Geodatabase schema – dbo or sde?**  [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/comparison-geodatabase-owners-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fcomparison-geodatabase-owners-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299853901425%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3DxfEeGMT9vE600m6W935pOZCfSnBZYR0uP4ny0vcKbng%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)  See Topic, Comparison Table

**Geodatabases in Microsoft SQL Server?**  [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/overview-geodatabases-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Foverview-geodatabases-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299853901425%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3DgkbbGFDSSBQA80eU32vC%252FxogEnczGthSOR0RbILIyO4%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Privileges for geodatabase in SQL Server** [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/privileges-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fprivileges-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3DNVw0g9BCt4hxY1aTyozRnVdRCGWRbzkYYwoui11tnPw%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Add logins and users to SQL Server** [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/add-users-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fadd-users-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3DzxCTjNu694bVgi%252BTKlac4KUZw4v55QAMSVZoIpMoohY%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Enterprise geodatabase maintenance tasks**  [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/enterprise-geodatabase-maintenance.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fenterprise-geodatabase-maintenance.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3Df9ODyRZqjlMRZxOjZ%252B8g6PmfTOuMp4oKw5UhfPAPTYs%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Connecting to MS SQL Server from ArcGIS** [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/connect-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fconnect-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3Ddi3zYS7HaFLFIA%252BKGfDaiU0roWwXgEypH%252BxOl6cSxco%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Advanced Topics** [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/connections-highly-available-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fconnections-highly-available-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3D98XEQ%252BQA%252FCuhvo9%252FKR5bsKF%252BAYvyVoKnOhmg0JEMZFQ%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Enterprise Geodatabase System Tables** [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/enterprise-geodatabase-internal-tables.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fenterprise-geodatabase-internal-tables.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3D%252B5gi75xcocLr08W2Wn6QF1Mzb9ftei6Pu%252FeRADHAcy4%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760) (implications for auditing)

**Geodatabsae system tables in SQL Server** [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/geodatabase-system-tables-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fgeodatabase-system-tables-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3DQbwTYDiY%252FqUHotaTwulNEwjhxWyT4DUFDzKyroyHw3U%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760) (implications for auditing)

**Auditing tools**  [https://community.esri.com/t5/data-management-questions/auditing-tools-for-sde-users-and-privileges/td-p/1229544](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fcommunity.esri.com%252Ft5%252Fdata-management-questions%252Fauditing-tools-for-sde-users-and-privileges%252Ftd-p%252F1229544%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3D6%252F5znA9Zy5htpQDSusgS2C%252B4EHqfuWdUYjh03YrEY7c%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Traditional versioning** [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/overview/recommended-version-administration-workflow.htm#:~:text=A%20recommended%20workflow%20for%20enterprise,or%20by%20building%20a%20model](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Foverview%252Frecommended-version-administration-workflow.htm%2523%253A~%253Atext%253DA%252520recommended%252520workflow%252520for%252520enterprise%252Cor%252520by%252520building%252520a%252520model%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3DS%252Bqn1i0GLPCVjs0%252BLwTQq%252FwaD6np9yqQauF%252Fqg%252FVcCA%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760).

**Data management strategies** [https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/overview/data-management-strategies.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Foverview%252Fdata-management-strategies.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3DTd0ySkVf4oZNxGr6iERd6Vt50ZRTaNa5zPRFTrhX4uM%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Slightly dated but relevant** – list of EGDB resources [https://community.esri.com/t5/esri-training-documents/deploying-and-maintaining-a-multiuser-geodatabase/ta-p/1042929](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fcommunity.esri.com%252Ft5%252Fesri-training-documents%252Fdeploying-and-maintaining-a-multiuser-geodatabase%252Fta-p%252F1042929%26data%3D05%257C02%257CDiazND%2540state.gov%257Ca9ed30bbd9f0477236be08dc11540a34%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638404299854057786%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C3000%257C%257C%257C%26sdata%3DQXi3m6ZC%252BA0gYyaxGKIqY%252B1Bw2zYpioEZnItGpg8Ca0%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=a266c0c17f76fcdcd94fc2bcd0dab4d0b27b6fe3880d817ac6e3065711702760)

**Firewall Configuration:** Ensure that the necessary ports are open in the firewall to allow communication between the ArcGIS Server and the RDBMS.

**Geodatabase Versioning and Other Configurations:** Depending on your organization's requirements, you may need to configure geodatabase versioning, set up additional database options, and define spatial reference information. (Look at Esri versioning control for Enterprise GDB)

**Documentation:** Always refer to the official Esri documentation for the specific version of ArcGIS Enterprise you are using, as well as the documentation provided by the RDBMS vendor.

**Auditing SQL Server:** Every SQL Server database has a transaction log that records all transactions and the database modifications made by each transaction. The transaction log is a critical component of the database. If there's a system failure, you'll need that log to bring your database back to a consistent state. <https://learn.microsoft.com/en-us/sql/relational-databases/logs/the-transaction-log-sql-server?view=sql-server-ver16>

###### References

**GIS Bibliography**

A comprehensive index of journal articles, conference proceedings, books, and reports related to GIS, including references and full-text materials. gis.library.esri.com

**ArGIS Documentation and Tutorials**

In-depth information, tutorials, and documentation for ArcGIS Products.

ArcGIS Online: arcgis.com

ArcGIS Desktop: desktop.arcgis.com

ArcGIS Enterprise: enterprise.arcgis.com

**Esri Community**

Join the online community of GIS users and experts: community.esri.com

**Esri Events**

Esri conferences and user group meetings offer a great way to network and learn how to achieve results with ArcGIS. esri.com/events

**Esri Videos**

View an extensive collection of videos by Esri leaders, event keynote speakers, and product experts. youtube.com/user/esritv

**GIS Dictionary**

This browser defines and describes thousands of GIS terms. support.esri.com/other-resources/gis-dictionary

**Enterprise Geodatabase Resources:**

Database requirements SQL Server

[https://enterprise.arcgis.com/en/system-requirements/latest/windows/database-requirements-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fenterprise.arcgis.com%252Fen%252Fsystem-requirements%252Flatest%252Fwindows%252Fdatabase-requirements-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175812134%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DfX5SePY%252FVmYr%252BxNqIfU%252Bhi%252B%252FxBxa5vJrurtXsq72hwU%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Overview Geodatabases in SQL Server

[https://pro.arcgis.com/en/pro-app/3.1/help/data/geodatabases/manage-sql-server/overview-geodatabases-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252F3.1%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Foverview-geodatabases-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175824927%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DO6SfhPLSSNk3maJGBxwRJG3P9%252BV2D6PL3Xw3SEPVH6o%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Comparison of geodatabase owners in SQL Server

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/comparison-geodatabase-owners-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fcomparison-geodatabase-owners-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175832455%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DMCJykt%252FEyOvoyZcWq5%252FVSDfouK%252B3vfR9mrXIVPh5GYk%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Geodatabase administrator in SQL Server

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/geodatabase-administrator-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fgeodatabase-administrator-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175840919%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DGcCiRFRwxZfzzwQAu3bZQKHuAZuktDcfYCpKSpxY27o%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

User accounts and groups

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/user-accounts-groups.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fuser-accounts-groups.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175848187%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DURG7mQfO9PIn8F70AR0NutG09yGHQP5uvu%252FXUOG7JUg%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Add logins and users to SQL Server

[https://pro.arcgis.com/en/pro-app/3.1/help/data/geodatabases/manage-sql-server/add-users-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252F3.1%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fadd-users-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175854698%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DzdICU2nLxVSPxO3JxmkLVUfmfNhwVocb6w9pyY0ZcGw%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Privileges for geodatabase in SQL Server

[https://pro.arcgis.com/en/pro-app/3.1/help/data/geodatabases/manage-sql-server/privileges-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252F3.1%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fprivileges-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175861032%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3D4IhLG0kAE34XCsB%252FCJB9yr3IBHSi9PShhzojK87b6yo%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Grant and revoke dataset privileges in databases and enterprise geodatabases

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/overview/grant-dataset-privileges.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Foverview%252Fgrant-dataset-privileges.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175867336%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DHBz78HMZbQA3l%252FOR6Z0SUL6Ym5qfvhvJgDx8irLFzqQ%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Manage connections to enterprise geodatabases in SQL Server

[https://pro.arcgis.com/en/pro-app/3.1/help/data/geodatabases/manage-sql-server/manage-connections-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252F3.1%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fmanage-connections-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175873551%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DYwQDtqcbqHWgnwnY3cSZWVWtOI0LP59QrzVYsmT0f0s%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Connect to SQL Server from ArcGIS

[https://enterprise.arcgis.com/en/server/latest/manage-data/windows/connect-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fenterprise.arcgis.com%252Fen%252Fserver%252Flatest%252Fmanage-data%252Fwindows%252Fconnect-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175879887%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3D5Wm4P9JMiAhq1LEevGWReQFgdkD5LThQaBCo4oakXug%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Create a geodatabase in SQL Server

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/setup-geodatabase-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fsetup-geodatabase-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175886109%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3D1CShs%252BTZrE0T6oJYmaqooBps4tTiehjdYyX1y5zZnQI%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Geodatabase system tables in SQL Server

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/geodatabase-system-tables-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fgeodatabase-system-tables-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175892486%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3De3Fd8B8jlTwdFaPl6AA374FeOsBk30W6hsXkb7dMKSs%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Advanced Topics: Connect to HA

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/connections-highly-available-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fconnections-highly-available-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175898843%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DaKGjUCfUR5QYZb%252B1a0Fm%252FWKOdrBQlwbGGWf8VKBZx9Q%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Advanced Topics:  Encrypted connections

[https://pro.arcgis.com/en/pro-app/3.1/help/data/geodatabases/manage-sql-server/connections-encrypted.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252F3.1%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fconnections-encrypted.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175905185%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DW0EBBYJzATT6ntXEOzFr698j1do6MTd4jNnRxVPcicc%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

SQL Server configuration parameters

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/configuration-parameters-sqlserver.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Fmanage-sql-server%252Fconfiguration-parameters-sqlserver.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175911453%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DOfOwWtDtoqWAI8Tt2Y%252FZFfChBTYJrNJy7cQ8cYQYVpw%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Versioning Types

[https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/overview/versioning-types.htm](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fpro.arcgis.com%252Fen%252Fpro-app%252Flatest%252Fhelp%252Fdata%252Fgeodatabases%252Foverview%252Fversioning-types.htm%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175917757%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3D91xL5l3TQBkyt%252FQb0Com7P0mTHlQPmT1dAVH5o%252BIKKg%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Enterprise Geodatabase: An Introduction

[https://mediaspace.esri.com/media/t/1\_svt4nf35](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fmediaspace.esri.com%252Fmedia%252Ft%252F1_svt4nf35%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175923988%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3D%252Fp8E1UEJFPCGus0xCLyaJAU6nNgwjCIfqiChV7lFbvo%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Enterprise Geodatabase: Topics in MS SQL Server Administration

[https://www.esri.com/content/dam/esrisites/en-us/about/events/media/UC-2019/technical-workshops/tw-6208-479.pdf](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fwww.esri.com%252Fcontent%252Fdam%252Fesrisites%252Fen-us%252Fabout%252Fevents%252Fmedia%252FUC-2019%252Ftechnical-workshops%252Ftw-6208-479.pdf%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175929760%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DWW2MLf4idKAF0Mo9oPTZWwTfST4su6sWgaIrkBx9KLA%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Enterprise Geodatabase:  Intro to Multi-User GDB

[https://www.esri.com/content/dam/esrisites/en-us/about/events/media/UC-2019/technical-workshops/tw-6207-477.pdf](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fwww.esri.com%252Fcontent%252Fdam%252Fesrisites%252Fen-us%252Fabout%252Fevents%252Fmedia%252FUC-2019%252Ftechnical-workshops%252Ftw-6207-477.pdf%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175935918%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DpTmYlSj4e48wwyWW%252Be%252BCLfBxtnJeGjGLY9YnScE9fMc%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

Migrate an on-premises enterprise geodatabase in SQL Server to Azure SQL Database

[https://support.esri.com/en-us/knowledge-base/migrate-an-on-premises-enterprise-geodatabase-in-sql-se-000023991](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fgcc02.safelinks.protection.outlook.com.mcas.ms%2F%3Furl%3Dhttps%253A%252F%252Fsupport.esri.com%252Fen-us%252Fknowledge-base%252Fmigrate-an-on-premises-enterprise-geodatabase-in-sql-se-000023991%26data%3D05%257C02%257CDiazND%2540state.gov%257C13e8b872e6cf48b9f37a08dc48253d21%257C66cf50745afe48d1a691a12b2121f44b%257C0%257C0%257C638464572175941912%257CUnknown%257CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%253D%257C0%257C%257C%257C%26sdata%3DdAyWOo04Wc%252FnEKm8TFnpZPhHTHEhMYx%252BUTDTO%252BOC8ZI%253D%26reserved%3D0%26McasTsid%3D20893&McasCSRF=2607f9533d28776ca713f24cd018638d8ec440e9a4a0ef65a978a52b40b14cb5)

SQL Server Privileges and ArcGIS Pro

<https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/privileges-sqlserver.htm>