**SQL Tasks / Roadmap**

**Prerequisites**

1. **Accounts and Permissions:**
   * Obtain GIS SQL service account login to make a connection to the database. Reference: [Adding registered databases](https://enterprise.arcgis.com/en/server/10.8/cloud/azure/add-registered-databases.htm#ESRI_SECTION1_D8CC3BD596B84360B1EA0D22BA06298A).
   * Obtain an ArcGIS Server keycodes file and place it in a location accessible from the ArcGIS client used to create the geodatabase.
   * A service account with db\_owner permissions in SQL Server for setting up the EGDB.
2. **Networking and Security:**
   * Proper network configurations to ensure communication between the VMs, SQL Server, and ArcGIS Server.
   * Firewall rules and security settings allowing necessary ports (e.g., TCP port 1433 for SQL Server) to be open.

**Checklist Outline**

1. **Installing Microsoft SQL Server and SQL Server Management Studio (SSMS):**
   * Downloading and installing SQL Server and SSMS
   * Installing necessary ODBC drivers compatible with ArcGIS Enterprise 10.8.1
2. **Creating Service Accounts and Assigning Permissions:**
   * Creating service accounts in Active Directory or as local SQL Server accounts
   * Granting appropriate permissions, including addressing the challenges of assigning db\_owner permissions in a decentralized GIS business model
3. **Setting up the Enterprise Geodatabase (EGDB):**
   * Using ArcGIS Pro to create and configure the geodatabase
   * Verifying the setup through system tables and schema checks
4. **Registering the Database with ArcGIS Server:**
   * Registering the SQL Server database as a datastore in ArcGIS Server
   * Validating the connection to ensure accessibility
5. **Initializing and Connecting to the SQL Database:**
   * Establishing a connection to the SQL database using ArcGIS Pro
   * Initializing the database for use with ArcGIS and verifying the setup
6. **Creating Features and Loading Data:**
   * Creating new feature classes or importing existing data using ArcGIS Pro
   * Loading data into the geodatabase and ensuring it is accessible

**Checklist Details**

**Step 1: Install Microsoft SQL Server and SSMS**

1. **Task:** Install Microsoft SQL Server and SQL Server Management Studio (SSMS) 18.11.
   * **Checklist:**
     + Download and install Microsoft SQL Server.
     + Install SQL Server Management Studio (SSMS) 18.11.
     + Install the ODBC driver compatible with ArcGIS Enterprise 10.8.1.
     + Verify the installation by connecting to the SQL Server instance using SSMS.

**Step 2: Create a Service Account and Assign Permissions**

1. **Task:** Create a service account and assign appropriate permissions in SQL Server.
   * **Checklist:**
     + Create a service account in Active Directory or as a local SQL Server account.
     + Grant the service account db\_owner permissions on the relevant databases.
     + Identify users who will be creating features and determine their required permissions.
     + Grant appropriate permissions (read/write) to users who will create features in the database.
     + Obtain GIS SQL service account login to make a connection to the database using Windows login (service account that runs the GIS Server service). Reference: [Adding registered databases](https://enterprise.arcgis.com/en/server/10.8/cloud/azure/add-registered-databases.htm#ESRI_SECTION1_D8CC3BD596B84360B1EA0D22BA06298A).
     + Obtain an ArcGIS Server keycodes file and place it in a location accessible from the ArcGIS client used to create the geodatabase.
     + **Note:** Discuss permissions with ISSO and Diplomatic Security to ensure data security:
       - Schedule a meeting with ISSO and Diplomatic Security.
       - Discuss the necessity of db\_owner permissions for creating new constructs in the database.
       - Explore possible solutions or compromises to ensure Diplomatic Security can use the database.

**Step 3: Setup Enterprise Geodatabase (EGDB)**

1. **Task:** Create an Enterprise Geodatabase (EGDB) in SQL Server.
   * **Checklist:**
     + Open ArcGIS Pro and create a new database connection using the service account credentials.
     + Use the Create Enterprise Geodatabase tool to set up the geodatabase.
       - Reference: [Create an enterprise geodatabase in SQL Server](https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/setup-geodatabase-sqlserver.htm)
     + Verify the creation of the geodatabase by checking the system tables and schema.

**Step 4: Register the Database with ArcGIS Server**

1. **Task:** Register the SQL Server database as a datastore in ArcGIS Server.
   * **Checklist:**
     + Open ArcGIS Server Manager and navigate to the Data Stores section.
     + Add the database connection file (.sde) created in ArcGIS Pro as a registered database.
       - Reference: Registering a database with ArcGIS Server
     + Validate the connection to ensure the ArcGIS Server can access the database.

**Step 5: Initialize and Connect to the SQL Database**

1. **Task:** Initialize the SQL database to be used as an EGDB in ArcGIS Pro.
   * **Checklist:**
     + Open ArcGIS Pro and connect to the SQL database using the connection file.
     + Initialize the database for use with ArcGIS by creating necessary tables and configuring settings.
     + Verify the initialization by checking the ability to create and load features.

**Step 6: Create Features and Load Data**

1. **Task:** Create features and load data into the SQL database using ArcGIS Pro.
   * **Checklist:**
     + Use ArcGIS Pro to create new feature classes or import existing data.
     + Load data into the geodatabase using tools such as Simple Data Loader or copy-paste methods.
     + Ensure the data is correctly loaded and accessible through ArcGIS Pro.
       - Reference: Loading data into the geodatabase
2. **Testing and Verification:**
   * **Task:** Test the functionality of the geodatabase after creation and data loading.
     + **Checklist:**
       - Create and edit features in the geodatabase.
       - Perform spatial queries and analyses.
       - Verify that all operations are functioning correctly and efficiently.
3. **Security and Maintenance:**
   * **Task:** Implement and review best practices for database security and maintenance.
     + **Checklist:**
       - Use strong passwords for all accounts.
       - Grant least privilege permissions to users.
       - Regularly review and update security configurations.
       - Perform routine maintenance and backups.
4. **Versioning (Optional):**
   * **Task:** Implement versioning for managing edits and tracking changes in the geodatabase.
     + **Checklist:**
       - Understand the versioning workflows supported by ArcGIS Enterprise.
       - Register datasets as versioned in the geodatabase.
       - Create and manage versions for different editing scenarios.
       - Reconcile and post changes as needed.
       - Reference: [Versioning Types](https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/overview/versioning-types.htm)

**Esri Documentation References**

* **Database Requirements for SQL Server**: [Database requirements SQL Server](https://enterprise.arcgis.com/en/system-requirements/latest/windows/database-requirements-sqlserver.htm)
* **Overview Geodatabases in SQL Server**: [Overview Geodatabases in SQL Server](https://pro.arcgis.com/en/pro-app/3.1/help/data/geodatabases/manage-sql-server/overview-geodatabases-sqlserver.htm)
* **Comparison of Geodatabase Owners in SQL Server**: [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)
* **Connect to SQL Server from ArcGIS**: [Connect to SQL Server from ArcGIS](https://enterprise.arcgis.com/en/server/latest/manage-data/windows/connect-sqlserver.htm)
* **Create a Geodatabase in SQL Server**: [Create a geodatabase in SQL Server](https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/manage-sql-server/setup-geodatabase-sqlserver.htm)
* **Loading data into the geodatabase**: Loading data into the geodatabase
* **Versioning Types**: [Versioning Types](https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/overview/versioning-types.htm)