

Bridge Manager Server

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Bridge Manager Client

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# Bridge Manager Server

## Prerequisites

Note that the agent and console applications are fully supported for installation on the same system as the client. If this is your preferred method of deployment, combine the system requirements by selecting the highest requirements and prerequisites from each, and set the server IP address in the client to 127.0.0.1

The Bridge Manager agent and console applications have the following prerequisites:

### Minimum System Requirements

- Windows Server 2012 R2
- Intel Xeon Processor X5660
- 8GB RAM
- 40GB Disk Space

### **.NET 6.0 Runtime** *x86 or x64 depending on your system*

Required by the main Bridge Manager agent and console applications.

### **C++ 2015 Redistributable** *x86 or x64 depending on your system*

Required by the main Bridge Manager agent and console applications. If your operating system surpasses Windows 10 version 1809 (October 2018 Update) or Windows Server 2019, this should not need to be installed.

### Microsoft SQL Server

There are many different versions and flavours of SQL Server, and most should work without issue for Bridge manager. The 2017 and 2022 versions of SQL Server Express have been tested and operate without issue. The most important factor in determining which you should use is compatibility with your operating system, but also consider storage capacities if opting for an Express edition. SQL Server 2008 Express and later comes with a 10GB database size limit, which should be sufficient for most use cases.

### Microsoft SQL Server Setup

Detailed instructions on how to use SQL Server fall outside the scope of this document as the specific menu layout will be slightly different from version to version. To ensure that SQL Server is set up to facilitate Bridge Manager's various operations, ensure that the following requirements are met:

- The relevant SQL Server instance is set to use both Windows Authentication and SQL Server Authentication.
- TCP/IP and Shared Memory protocols must both be enabled in the SQL Server Configuration Manager for the relevant SQL Server instance.

- The relevant SQL Server service must be set to use the local built-in account in the SQL Server Configuration Manager.
- A reader login needs to be created for the agent to run user-defined SQL statements safely.
  - The server role for the login should be set to public.
  - The login must be mapped to BridgeManager (not possible until after the application has been set up).
  - The login should have only the public and db\_datareader roles enabled for the BridgeManager database (not possible until after the application has been set up).

Once these requirements are in place, Bridge Manager should be able to carry out all of its functions relating to SQL Server.

## Installation

After all prerequisites have been installed, simply copy the Bridge Manager Server folder to any desired location and create a shortcut to BridgeManagerConsole.exe to place on your desktop or in your start menu. This executable is the entry point to the server-side part of the application, and you will generally launch and interact with the agent from here.

If you wish to have the agent start automatically with Windows, you will want to add BridgeManagerAgent.exe to your startup applications. This executable is stored in the same folder as BridgeManagerConsole.exe. There is no direct user interface for this executable beyond the console application, but it will continuously attempt to connect to SQL Server until the connection can be made.

## Future Updates

- 1 Stop the agent through the console (see the **database** section for a list of commands). Close the console.
- 2 Stop the SQL Server service. This can be done through the SQL Server Configuration Manager for whichever version of SQL Server you have installed.
- 3 Replace the Bridge Manager Server directory with the updated version folder.
- 4 Restart the SQL Server service.
- 5 Restart the agent from the console.

## First Run

Run BridgeManagerConsole.exe.

On launch, the console will automatically create a Bridge Manager folder in the current Windows user's Documents folder, which it will use to store files. Everything besides the application is stored here, including the database itself, making it exceptionally simple to back up and restore the deployment in its entirety if needed. See **Creating and Restoring From Backups** for further information on this subject.

## SQL Server Connection

If your SQL Server instance was named something other than "SQLEXPRESS", then the console will fail to find it on launch. During launch, the application will have created a file named sql-server-name.txt in "Documents/Bridge Manager/Config Files". Open it, input the correct name, save the file, and relaunch the console application. If everything was configured correctly, you should be presented with a message stating that the server name has been read and that a connection to SQL Server has been established.

If you are still unable to connect to the database, take another look at the **SQL Server Configuration** section above, and confirm that everything is in place. The problem is most likely to be that the Shared Memory protocol is disabled for the relevant SQL Server instance, or that the name is wrong in sql-server-name.txt

## Console Menu Navigation

Before moving on, it would be best to familiarise yourself with the console's menu navigation system. When the console application has fully loaded, you will be presented with a 'home>' prompt. Type 'help' and press enter. You will be presented with a list of commands in white, with explanations in grey. If all or part of a command is displayed in square brackets, this represents a variable part of the command. In this case, to navigate between the home, database, data, agent and network menus, you need to replace '[menu name]' with the one you wish to navigate to.

Type 'agent' and press enter to navigate to the agent menu, and then type 'help' to pull up a list of possible commands. Below the list of global commands, you will now also see a list of agent menu commands. The 'status' command tells us we can use it to see if the agent is running. Run the command. Once the database has been configured and the agent is running, this will also present us with a list of logged in users and their IP addresses.

Navigate to the 'data' menu, and then run the help command again. You will note that some of these commands call for either a string or an int to be inserted at the end. A string represents text, and an int represents a whole number. If you read the explanation for 'import organisations [string]', you will see that it describes what is required as the string for that command.

Better explanations for all available commands are provided later in this guide.

## Quick Setup

Database creation is designed to be fully automated on Bridge Manager. Unless you are importing pre-defined database settings (see database in the **Bridge Manager Console** section) you should be able to simply follow the process immediately below and move straight on to setting up the client once the SQL Server reader account has been configured (see **Reader SQL Login Configuration**). If you need to customise the network ports, also look at the **Network Settings** section.

- Open the console.
- Once you are presented with a 'home>' prompt, the application has loaded. Type 'database' and press return to enter the database menu.
- Type 'create database' and press return.
- Type 'agent' and press return.
- Type 'start' and press return.

Once these steps are completed, you should be met with a message stating 'Process started'. At this point, you may need to use your Windows admin permissions to grant the agent access to the network. Once this is done, assuming there are no errors, the agent is now running using the default network port configuration and can be connected to by the client on those ports. Be sure to check the **Reader SQL Login Configuration** section below before moving on to the client.

If the agent fails to run or the database could not be created, take another look at the **SQL Server Configuration** steps to make certain that everything is set up correctly. You can also take a look at agent-error-log.txt in "Documents/Bridge Manager" to see if there are any error messages that describe where the failure is occurring.

# Reader SQL Login Configuration

When the agent is first launched, if not present, it will create the sql-reader.txt file in “Documents/Bridge Manager/Config Files”. This file contains two lines, the first representing the username for the SQL reader account mentioned in the **Microsoft SQL Server Setup** section, the second representing the password. Make sure that this file is set correctly in order for users to run custom select statements from the client’s Select Query Builder.

Note that this feature raises a clear security issue for any system connected to the internet that is intended to hold sensitive data. It is a consequence of the application’s intended deployment on an air-gapped network. If this poses a risk for your specific deployment, the source code will need to be modified to mitigate this. Regardless, it is important to make sure that this login is only configured to be allowed to read from the database, and not to write to it.

## Customise Network Port Settings

This section is only relevant to administrators wishing to use specific network ports.

To create a network config file, in the console, navigate to the agent menu and type ‘create network config’. network-config.txt will be placed in “Documents/Bridge Manager/Config Files”.

When you open this text file, you will see inbound and outbound port fields. Set these as desired and ensure that the Bridge Manager client applications that connect to it are configured with the reverse, i.e. the client’s outbound port should be equal to the agent’s inbound port. Make sure to leave the textual format of the file untouched including the white space, altering only the port numbers.

In the console, type ‘parse network config’ to confirm that you have set the ports correctly. Assuming this is successful, the agent will pick up the new ports on the next start.

When configuring the ports for use in your firewall settings, note that the Bridge Manager client and agent communicate with each other only over TCP, never UDP.

## Creating and Restoring From Backups

Since all of Bridge Manager’s working files are stored in “Documents/Bridge Manager”, including the database itself, the task of either creating or restoring from backups is exceptionally simple.

### Creating a Backup

To create a backup, simply copy the Bridge Manager folder to another drive or directory.

This will back up all aspects of the server-side application. This includes various configuration files, the database itself, report presets, the agent error log, and any other files responsible for storing client settings server-side.

## Restoring From a Backup

To restore from a backup, stop the agent through the console (see the ‘start’ and ‘stop’ **agent** commands in the **Bridge Manager Console** section below).

Once the agent has been stopped, simply remove the current Bridge Manager folder from Documents, then copy the previously backed up Bridge Manager folder into the same location (the folder must still be named “Bridge Manager” in order for the console and agent to locate it). If another program is currently accessing the database, SQL Server Management Studio for example, you may need to close this in order to remove the original folder.

Once the backup has been copied back to Documents, restart the agent from the console.

Note that if the ‘delete database’ command was run, SQL Server will have had its record of the database erased, and copying the file back in will not be enough. In this case, simply follow the same process regarding copying the backup into the correct location, then relaunch the console. As part of the console’s startup routine, it will automatically locate the files and recreate the database on SQL Server’s end. You will need to manually reconfigure the reader account with its BridgeManager permissions (see **Reader SQL Login Configuration** earlier in this section).

## Console Commands List

Although the bulk of administration is carried out through the Bridge Manager client, there are some functions that rely on the console, such as database creation, data importing and interacting with the agent. This section serves as a comprehensive list of commands with more detailed explanations than those provided when running the ‘help’ command.

### home

#### exit

Quit the console application. The agent, if started, will remain running in the background and will be picked back up by the console on its next launch.

#### [menu name]

State the name of the menu you wish to navigate to. Type ‘help’ for a list of available menus.

### database

The database menu is used for database creation, modification to the template prior to creation, and deletion. For data importing, see the ‘data’ menu immediately after this section. All the commands available in this menu are only relevant at the point of database creation.

Most commands in this menu were intended to streamline the software development process, and as such are not particularly user friendly, but may prove useful in some cases. All except ‘create database’ can be ignored in any scenario where the database creation is not intended to be repeated, as might be the case in a test or demonstration environment. If the database is only ever intended to be created once on one system, you are better off using the client to customise the database layout after installation. The only exception to this rule is if you want to reduce the Organisation or Asset ID column types from INT to SMALLINT or TINYINT, but be aware that you will not be able to increase these later through the console or client should they prove insufficient, and doing so manually through something like SQL Server Management Studio will prove difficult and may corrupt the integrity of the database if not done correctly.

The **type override** commands offer a way to customise the data type and VARCHAR lengths before creating the database.

The **column addition** commands offer a way to predefine a list of columns to add to the organisation, asset, contact, conference, task, visit and document tables.

The **friendly name** commands allow you to predefine more user-friendly names for columns or names more specific to your use case, for example changing 'Dial\_No' to 'IP\_Address'. They will then display themselves with this chosen name across the client application, but their actual column names in the database tables will remain unchanged.

Any loaded overrides, additions or friendly names are held in memory and applied during database creation.

#### **create type overrides**

This command will generate a type-overrides.txt file in the Config Files folder. See the explanation for 'load type overrides' below for instruction on its use.

#### **load type overrides**

After running the previous command to create type-overrides.txt, open it in a text editor. Instructions are provided at the top of the file – make sure to read these fully. Note that all lines beginning with “# ” will be ignored when loading overrides from the file. Once you are happy and the file has been saved, run the command.

Any errors will be reported, along with the quantity of types that differed from their currently held values after any previous overrides as opposed to their default values. If you need to know the quantity of types that differ from default types, run 'reset type overrides' beforehand. If you do receive errors, refer again to the instructions in the file to make sure everything is formatted correctly.

All loaded overrides will be applied to the database structure upon database creation.

#### **reset type overrides**

This command clears the type overrides held in memory, but it will not affect the type-overrides.txt file itself. To reset the file to defaults, simply run 'create type overrides' again to overwrite it.

#### **view current types**

This command will generate a list of all columns and their types with any overrides applied. This will display updated types where overrides are in place but will not display any loaded column additions or friendly names.

#### **create column additions**

This command will generate a column-additions.txt file in the Config Files folder. See the explanation for 'load column additions' below for instruction on its use.

#### **load column additions**

After running the previous command to create column-additions.txt, open it in a text editor. Instructions are provided at the top of the file – make sure to read these fully. Note that all lines beginning with “# ” will be ignored when loading additions from the file. Once you are happy and the file has been saved, run the command.

Any errors will be reported along with a summary of the columns that were found and added. These columns will be included in the database structure upon database creation. Note that, unlike type overrides which accumulate across loads, column additions are automatically wiped prior to each load.

#### **wipe column additions**

This command clears all previously loaded column additions from memory. It does not affect column-additions.txt.

#### **create friendly names**

This command will generate a friendly-names.txt file in the Config Files folder. See the explanation for 'load friendly names' below for instruction on its use.

## load friendly names

After running the previous command to create friendly-names.txt, open it in a text editor. Instructions are provided at the top of the file – make sure to read these fully. Note that all lines beginning with “# ” will be ignored when loading friendly names from the file. Once you are happy, run the command. Any successfully read names will be summarised here and will be applied automatically after database creation (all friendly names are held in a dedicated table rather than being applied to the actual database structure in any way).

Note that this command automatically clears any friendly names already held in memory before running.

## wipe friendly names

This command clears all previously loaded friendly names from memory. It does not affect friendly-names.txt.

## create database

This command will automatically create the database, placing both the BridgeManager\_Data.mdf database file and the BridgeManager\_Log.ldf log file into “Documents/Bridge Manager”, applying any loaded type overrides, column additions or friendly names as it does so.

Any errors displayed here could indicate an issue with either the SQL Server setup or your Windows account credentials. Ensure that your Windows account has administrator rights, and that SQL Server is configured as per the requirements listed in the **Microsoft SQL Server Setup** section earlier in the document. Errors displayed in the console simply echo SQL Server’s own error messages, so you may use these to seek guidance from the wider SQL Server community.

## delete database

If you wish to delete the database in its entirety, run this command. As this command is highly destructive, you must enter a sequence of strings to confirm deletion. The strings in order are:

```
11A 11A2B 1B2B3 000DESTRUCT0
```

Database deletion is completely irreversible unless a backup was made beforehand.

# data

The commands in the data menu are used to either populate the database with test data for demonstrative, trial or debugging purposes, or to migrate data from another system. Data importing is only possible for the organisation and asset tables, and the database must already have been created.

To get a feel for how it works, first generate random test data using the ‘generate test data’ command. Examine the generated file in a spreadsheet viewer. If you wish to import data of your own, replicate this format exactly, adding or removing columns as needed. Note that at the time of writing this document for Bridge Manager v 1.0, only TEXT, NUMBER, and DATETIME types are fully supported for data import.

**In case of import errors**, the console application will produce a file in the same folder as the data import CSV file with a ‘-import-errors’ suffix, stating SQL Server’s error message for each failure. This is the best place to start when troubleshooting.

## import

This command automatically runs the four commands given below in sequence, assuming file names of ‘Organisations.csv’ and ‘Assets.csv’ located in “Documents/Bridge Manager/Data Import”.



`import organisations [string]`

State the file name you wish to import and run the command. No full file path is necessary, and the .csv file must be located inside the “Documents/Bridge Manager/Data Import” folder. You will be presented with a series of colons, with red colons indicating failures and green colons indicating successful imports.

After running, any organisation parents will need to be imported using the command below.

`import organisation parents [string]`

Organisations contain a column representing the parent organisation that they belong to. This can't be set in the initial data import as the complete list of organisations isn't yet present in the table, meaning they can't yet be stated as parents. For this reason, parents must be set after the initial import.

State the same import .csv file you used when running the ‘import organisations’ command, and you will see a similar output indicating failures and successes.

`import assets [string]`

Identical in nature to the ‘import organisations’ command above, relating instead to assets.

`import asset parents [string]`

Identical in nature to the ‘import organisation parents’ command above, this time relating to assets. Note that the asset parent column points to organisations rather than other assets.

Importing asset parents has been kept separate from the initial asset import due to the need to avoid import failures in cases where referenced organisations are not present. For this reason, if you wish to avoid importing assets where their parent organisations are not present, you will need to handle this beforehand when preparing your data for migration or handle it afterwards through the Bridge Manager client application.

`generate test data [int]`

Generate an Organisations.csv file and an Assets.csv file in “Documents/Bridge Manager/Data Import”, each containing randomly generated test data. The int value represents the number of organisations to generate, but bear in mind that for each organisation, up to ten assets will also be generated.

## agent

This menu contains a small set of functions for controlling the agent application.

Note that when the console first loads, it will display a message stating whether the agent is already running.

`start`

Start the BridgeManagerAgent.exe program. Note that this executable must be in the same directory as the console application. The command will fail if the executable could not be found, or if the process is already running in the background.

A difference when the launching the agent from the console as opposed to running BridgeManagerAgent.exe directly from the Windows file explorer is that it will not display an empty console window. You will still be able to find the application in the Windows task manager.

`stop`

Stop the BridgeManagerAgent.exe program. This command will work even if the agent wasn't started this session or from within the console.

## status

Check whether the agent is already running. If it is, you will also be presented with a list of currently open sessions, with usernames and IP addresses against each.

In case of errors or unexpected behaviour, have a look in “Documents/Bridge Manager” for agent-error-log.txt. This will provide further context for troubleshooting.

## logout [string]

Log out a user with an open session. State the username.

## close [string]

Close the Bridge Manager client application on a user’s system by stating the username associated with an open session.

## reset admin password

Reset the default admin account’s password to ‘admin’.

# network

This menu provides a couple of commands necessary for assigning custom network ports for the agent application to use to communicate with the client. For more detailed instructions, see the **Customise Network Port Settings** section earlier in the document.

The agent will need to be restarted using the ‘stop’ and ‘start’ commands in the agent menu for any changes to take effect.

## parse network config

Test the validity of network-config.txt located in “Documents/Bridge Manager/Config Files”. Assuming the file is present and formatted correctly, you will be presented with the configured ports.

## create network config

Create a fresh network-config.txt file in “Documents/Bridge Manager/Config Files”.

# Bridge Manager Client

## Prerequisites

The Bridge Manager client application requires the following runtime libraries to run:

### Minimum System Requirements

- Windows 10
- Intel Core i5-6500 Processor @ 3.60 GHz
- 4GB RAM
- 50MB Disk Space
- 1080p Display Resolution

### **.NET 6.0 Runtime** *x86 or x64 depending on your system*

Required by the main Bridge Manager client application.

## Installation

Simply copy the Bridge Manager Client folder to any desired location and create a shortcut to "Bridge Manager.exe" to place on your desktop or in your start menu.

After being run for the first time, the program will automatically create a Bridge Manager directory in your Documents folder in which to store the network settings. Currently there are no other files held here, but any future updates will make use of this directory whenever the program needs to utilise the system's storage.

## Future Updates

Due to the rudimentary nature of the installation, updates follow a similar process. Simply overwrite the current installation with a folder holding the latest version of the Bridge Manager client.

Bridge Manager must be closed before attempting the update. Note that if the application is hosted on a shared drive, all users will need to close Bridge Manager on their systems. The **Close Client** instructions in the **Additional Account Controls** section could assist with this if users have not left the application running while logged out.

# First Run

When launching the application, you will be presented with the login window.

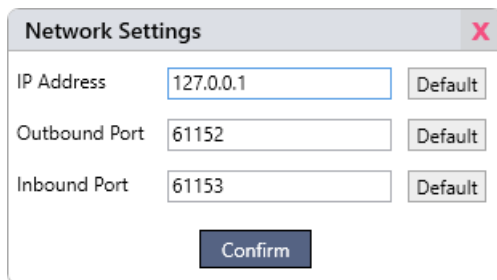
## Network Settings

To connect to the agent, you will need to set the server IP address and the desired ports.

Open Network Settings. To do so, click the Login button while holding down Ctrl-Alt-Shift. While holding the keys down, the button will change from Login to Network Settings.

### IP Address

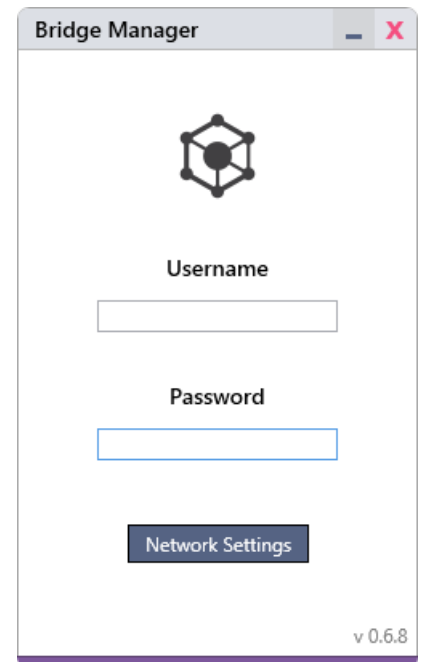
Set this to the IP address of the server that hosts the Bridge Manager agent.

A dialog box titled "Network Settings" with a close button (X) in the top right corner. It contains three input fields: "IP Address" with the value "127.0.0.1", "Outbound Port" with the value "61152", and "Inbound Port" with the value "61153". Each input field has a "Default" button to its right. At the bottom center is a "Confirm" button.

### Outbound & Inbound Ports

*Unless you have a reason to, it is recommended to leave these ports on their default settings.*

They must be set to the reverse of their definitions in the agent's network-config.txt file. Unless this file has been altered, the default settings will be correct.

A window titled "Bridge Manager" with a close button (X) in the top right corner. It features a hexagonal logo with a central node. Below the logo are two input fields: "Username" and "Password". At the bottom center is a "Network Settings" button. The version "v 0.6.8" is displayed in the bottom right corner.

## Log In

Once the network settings have been set, log in with the built-in administrator account. The default username and password will be 'admin' and 'admin'. It is recommended to change this password as early as possible.

## Troubleshooting

### Unable to login

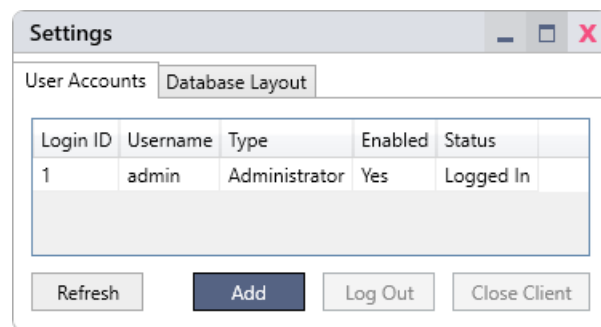
If you are unable to log in using the default admin credentials, use the console application on the server to reset the admin password.

### Unable to connect to agent

If you are unable to connect to the agent, then the IP address or ports may be set incorrectly. Check the client's network settings and the agent's network-config.txt file and remember that the inbound and outbound ports should be reversed on each. If you are still unable to connect, it could indicate an issue with your network or firewall. Confirm network connectivity, and that the necessary ports are open for TCP connections on the client and server machines for the Client and Agent applications respectively.

# User Account Management

To manage user accounts, go to the User Accounts tab in File > Settings.



Login ID	Username	Type	Enabled	Status
1	admin	Administrator	Yes	Logged In

Refresh Add Log Out Close Client

## Adding a New Account

- Click Add.
- Input the desired username and password. Note that there are no restrictions on password complexity.
- Set the user's permissions, referencing the information below if required.
- Enable or disable the account as needed.
- Click Save.

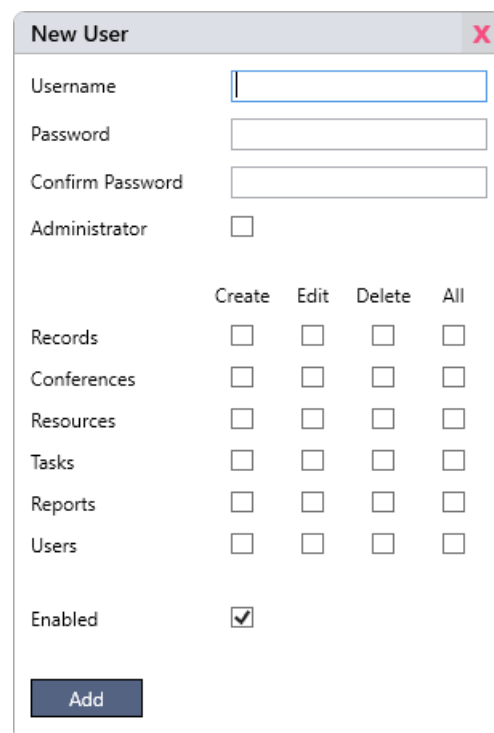
## Permission Categories

### Administrator

Checking this box will hide all other permission categories, since full administrators hold all rights implicitly. As well as all permissions listed below, they have the following capabilities:

- Correct change reasons in the change logs of organisations and assets.
- Forcefully log out users and close clients remotely.
- Alter the database layout.

<b>Records</b>	Relates to organisations, assets and contacts.
<b>Conferences</b>	Relates to conferences, connections and recurrences.
<b>Resources</b>	Relates to resources.
<b>Tasks</b>	Relates to tasks, visits and documents.
<b>Reports</b>	Relates to Select Query Builder and Select Statement presets.
<b>Users</b>	Relates to user accounts.



Username

Password

Confirm Password

Administrator ☐

	Create	Edit	Delete	All
Records	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conferences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Enabled ☒

Add

## Create, Edit, and Delete

Each category (i.e. records, conferences, resources, etc.) is split out into 'create', 'edit' and 'delete' permissions. In most cases these functions are self-explanatory, but some examples require more explanation and a partial understanding of the database layout.

Essentially, any action that causes a change to any entity, such as a login, record or conference, requires the relevant 'edit' permissions. This can mean that some things that seem like they should be creations or deletions are in fact treated as edits. This can result in some unexpected behaviours, such as when removing an asset from an organisation. This is not a deletion, because no entities are being deleted. Here, the asset is being automatically edited to set its Parent Reference field to null, making this a record edit.

Some actions require more than one of the three permission types to carry out. One example would be when creating a new recurrence by right clicking on a conference in the schedule view. This is both a creation and an edit, as the recurrence must be created, and the conference must be automatically edited to reference the new recurrence.

Although it may seem confusing in some instances, this approach allows for complete consistency in how each permission type is treated in every instance across the application.

## Enabled

This setting is used to disable and re-enable accounts if required.

## Editing an Account

- Double click on any account listed to bring up the User Settings window. Note that some settings cannot be changed on the built-in admin account.
- Make any desired changes and click Save (not necessary after a resetting a password).
- If the user is currently logged in, changes will not take effect until they log out. It is strongly recommended to log a user out remotely if they are logged in when changes are made.

## Deleting an Account

- Double click on any account listed to bring up the User Settings window. Note that the built-in admin account cannot be deleted.
- Click Delete.

Note that deleting a user account will cause associated record changes and conferences to list the user as [user deleted].

## Resetting a Password

- Double click on any account listed to bring up the User Settings window.
- Click on Reset Password
- After a password has been chosen and repeated in the Confirm field, click Set Password.
- Close the User Settings window. There is no need to click Save unless other changes have been made.

## Additional Account Controls

### Log Out

Remotely log a user out. This is especially important if you have just made changes to a user's permissions.

### Close Client

While a user is still logged in, you have the option to close their client application remotely. This can be useful if the Bridge Manager client is hosted on a shared drive, and you need all users to close their applications before you can update the software.

# Database Layout

To manage the database layout, go to the Database Layout tab in File > Settings.

Note that these settings should only be changed by an administrator with a good understanding of Bridge Manager's database layout, and also of SQL databases in general.

Click Refresh at any point to reflect any changes made. Changes you make should be reflected immediately, but the column list may be out of date if another administrator is currently working on the database layout.

Settings

User AccountsDatabase Layout

Table	Column	Friendly Name	Type	Max	Core	SDC	Unique	Allowed
Organisation	Organisation_ID		INT	2147483647	✓		✓	
Organisation	Organisation_Reference		VARCHAR	40	✓		✓	
Organisation	Parent_Reference		VARCHAR	40	✓			
Organisation	Organisation_Name		VARCHAR	200	✓			
Organisation	Dial_No		VARCHAR	20	✓		✓	
Organisation	Notes		VARCHAR(MAX)	2147483647	✓			
Asset	Asset_ID		INT	2147483647	✓		✓	
Asset	Asset_Reference		VARCHAR	20	✓		✓	
Asset	Organisation_Reference		VARCHAR	40	✓			
Asset	Notes		VARCHAR(MAX)	2147483647	✓			
Contact	Contact_ID		SMALLINT	32767	✓		✓	
Contact	Notes		VARCHAR(MAX)	2147483647	✓			
Conference	Title		VARCHAR	50	✓			

Refresh

Add

Remove

Reorder

## Database Layout Table Summary

The Database Layout tab contains a summary of every column in the database that relates to the Organisation, Asset, Contact, Conference, Task, Visit, Document, Login or Recurring tables.

### Table

The table the column belongs to.

### Column

The name of the column.

### Friendly Name

Non-editable columns that are integral to the software's core functions may use friendly names to change how they appear across the application. See the **Adding a New Column** section for more details and **Editing a Column** for changing the name of non-core columns.

### Type

The SQL data type of the column.

### Max

Either the maximum length of a text field, or the maximum value of a numerical field.

### Core

If a column is marked core, then it is integral to the running of the application and will have some settings unavailable for edit.

### SDC

User-added columns may have ‘soft duplicate checks’ enabled to reduce the risk of data duplication. See the **Adding a New Column** section for more details.

### Unique

User-added columns may have a unique SQL constraint placed on them to eliminate the possibility of data duplication.

### Allowed

This list of values, if present, represents what will appear in the associated dropdown list wherever this column appears in the application. This will only ever appear on columns of VARCHAR type.

## Adding a New Column

- Click Add in the Database Layout tab.
- Select the database table to which you would like to add the column.
- Input an SQL-compliant column name.
- Select type, along with the maximum length/value and allowed list if necessary.
- Select Soft Duplicate Check or Unique if required.
- Click Add.

### Table

Select the table to which you would like to add the column.

### Column Name

The column name must be SQL-compliant. Any spaces will be automatically replaced with underscores for compliancy, and throughout the application the column name will have its underscores replaced with spaces for better presentation.

### Friendly Name

For the non-editable columns that are integral to the software’s core functions, you may set a friendly name. In most instances, these will be displayed wherever they appear across the application’s various windows. For example, if you set the friendly name for the organisation table’s Dial\_No column to ‘IP Address’, it will appear as ‘IP Address’ in the Organisation window, the search bar of the data pane and the select query builder.

Note that friendly names, like column names, are stored in the database with spaces replaced with underscores. When displayed in the application, the underscores are replaced with spaces for better presentation.

The 'New Column' dialog box is shown with the following details:

- Title:** New Column
- Table:** Organisation (selected from dropdown)
- Column Name:** Country
- Friendly Name:** (empty)
- Type:** VARCHAR (selected from dropdown)
- Max:** (empty)
- Allowed:** England, Scotland, Wales, Ireland (list box)
- Soft Duplicate Check:** ☒
- Unique:** ☐
- Button:** Add



## Type

A selection of SQL data types is available for use in Bridge Manager. Reference the following list of types to select one that meets your needs.

### VARCHAR

Variable-length text type (**VAR**iable **CHAR**acter). This option should be used whenever you wish to place a maximum length on a text field using the Max field, or whenever you wish the field to be displayed as a dropdown list. Note the Max value must equal or exceed the length of the longest option in the allowed list.

### VARCHAR(MAX)

Unlimited-length text type. This option should be used whenever you wish to store text data of unknown length. Note that this option is no less efficient in terms of storage space than the previous VARCHAR option when storing shorter strings. It simply allows for up to  $2^{31}-1$  characters' worth of text in the field.

VARCHAR(MAX) columns may not have an associated allowed list.

### TINYINT, SMALLINT & INT

Whole-number types. Each has a different maximum value, displayed in the **Max** field.

### DATE, DATETIME & TIME

Types for storing the date only, the date and time, or the time, respectively. Note that the TIME type cannot exceed 23:59. This is an unfortunate limitation of Microsoft SQL Server, and there is no TIMESpan type available in SQL.

### BOOLEAN

True/false data type, representing SQL Server's BIT type. It is displayed in most parts of the application as a dropdown list with the options of NULL (blank), 'Yes' or 'No'.

## Max

This field is only editable for the VARCHAR type. If you are intending to use the allowed list, the max setting must equal or exceed the length of its longest string. For other types, this field represents the maximum length or value of the respective type.

## Allowed

This field can only be used with the VARCHAR type, and if it is used, it represents the options that will display in the dropdown menu wherever this column appears in the application. If the allowed list is left empty, then the column will display as a simple text input field.

The list of options should be separated by line breaks. Make sure not to leave a trailing line break at the end, as this would add an empty option to the end of the dropdown list. An empty option is already present by default, always appearing at the top of the list, and is stored as NULL if selected.

## Soft Duplicate Check

Placing a soft duplicate check on a column is a great way to reduce the risk of accidental data duplication, without enforcing uniqueness with a unique constraint (see below). If this setting is enabled, then whenever a user attempts to create or make a change to a record or conference, they will be alerted if an identical value already exists in that column. They can then either bypass this warning or go back to take a closer look.

## Unique

This setting is disabled when creating a column and must be set after creation (see **Editing a Column**).

Placing this constraint on a column will force all of its values to be unique. It cannot be bypassed, is enforced by SQL Server, and cannot be placed on a column that already contains duplicate values until this has been resolved.

Note that the constraint only affects duplicate non-NULL values. Multiple NULL values are still allowed in the column.

## Editing a Column

Note that only user-added columns are completely customisable. All other columns are core to the software, and only customisable fields are enabled.

- Double click the column you wish to adjust.
- Adjust as needed.
- Click Edit to save any changes.

## Editing Core Columns

While making changes to core columns is allowed, it is only recommended in most circumstances to set a friendly name if desired. While the column type or max length is often partly editable (numerical columns are locked to the various INT types; textual columns are locked to either of the VARCHAR types), these changes should only be made if the need arises. It is, for example, possible that you could run out of ID values in a column of TINYINT or SMALLINT type. If this occurs, the type should be changed to raise the max value. Likewise, the VARCHAR length should be increased if you start working with organisation or asset references that exceed the current max character length.

Some columns are primary keys that must be kept synchronous with any foreign keys that reference them. Bridge Manager has been designed to automate this process, so that, for example, if *Organisation.Organisation\_Reference* has its max length updated, then *Asset.Organisation\_Reference* and *Organisation.Parent\_Reference* will be automatically updated to reflect this.

Making changes to columns that would result in any of their held values being invalid is strictly disallowed by SQL Server.

Even with these safeguards in place, it is advised to leave core column types alone unless absolutely necessary, and to always back up the database before making any changes.

If you need to change the INT type of a primary key column, note that all unique constraints must be lifted from the relevant table beforehand due to a quirk in the way SQL Server implements non-clustered indexes. Incidentally, this makes changes to the organisation and asset ID types impossible as there are built-in unique constraints on these tables.

## Type Conversions

How SQL types are converted, and which SQL type conversions are possible, falls outside the scope of this document. It is enough to note here that the application allows for changes to the column type within the bounds of SQL Server's implementation, such as between BOOLEAN and TINYINT, but you should be extremely careful when doing this and should always create a backup beforehand to prevent data loss.

## Removing a Column

Only user-added columns can be removed from the database. Always back up the database before carrying out a removal to prevent accidental data loss.

- Click on the column you wish to be removed.
- You may be presented with a warning if the column contains any data.
- Click Remove.

## Reordering Columns

To rearrange the order in which user-added columns are displayed across the application, click Reorder in the Database Layout tab in File > Settings.

### Moving a Column

- Select a table.
- Select any user-added column (core columns are greyed out). You may select more than one by holding the shift key.
- Click the ▲ or ▼ buttons to move the column(s) up or down.
- Add headers and separators as desired (see below).
- Click Apply.

### Headers & Separators

**Headers** are handy for making the data input areas more readily discernible and intuitive. They will appear in the organisation, asset, contact and conference windows.

- Click + to add a new header. You will see a new header appear in the column list. Headers are identified in bold with a grey background.
- Double click it to name it.
- Click the ▲ or ▼ buttons to move the header up or down.
- Click - to remove the header if desired.

The screenshot shows the 'Reorder Columns' dialog box. The 'Table' dropdown is set to 'Organisation'. The 'Columns' list contains the following items: Organisation ID, Organisation Reference, Parent Reference, Organisation Name, Dial No, Available for Conferencing, Notes, Location (bold header), Address 1, Address 2, City, Country, Service Information (bold header), Postcode, Service Type, Service Live, and System Type. At the bottom, there are up/down arrow buttons, a '+ -' button labeled 'Add/Remove Headers', and an 'Apply' button.

To convert a header to a **separator**, simply double click on it, delete the header name, and click Confirm. You will notice that it becomes an empty narrow row in the column list. Control or remove it in the same way as a header.

### Note on Order Storage

Headers and separators are stored in “Documents/Bridge Manager/Config Files/section-headers” on the server. The column orders are stored in the OrganisationOrder, AssetOrder, ContactOrder, ConferenceOrder, TaskOrder, VisitOrder and DocumentOrder tables in the database.

# Correcting Change Reasons

Bridge Manager accounts with full admin rights have the capability to correct change reasons. This capability is restricted to administrators in order to maintain the integrity and reliability of the change logs associated with organisations and assets.

## A Brief Explanation of the Change Tables

Only the organisation and asset tables have change logs associated with them. They are intended to track past versions of their associated records. These past versions are fully searchable and can be viewed as snapshots in time from within the client application.

On a data level, the organisation and asset tables each have a separate change table associated with them. Each row of these tables stores the changes that were made in any given edit, with every column that wasn't changed holding a NULL value. Each column has a BIT column alongside it to determine if the value was or wasn't changed. This makes the system rather efficient regarding storage, since the entire organisation or asset is not recreated fully in each snapshot.

When a user wishes to view a past version of a record, the agent takes the row that corresponds to the desired date and time and works backwards to build up a picture of what the record looked like at that point. If updates are made to either the organisation or asset table via the client or console, the associated change table is updated to reflect this.

Due to the way reconstruction takes place, a change can and must never be deleted or have its time adjusted, as this could result in operational errors within the software when viewing previous versions of the organisation or asset. Only the change reason can be corrected. Also, since Bridge Manager maintains the change tables according to its own implementation, the Organisation and Asset tables should never be altered using SQL and should only be edited from inside the application to ensure the change tables are kept in check.

Note that the organisation and asset tables still hold complete records – only the change tables contain fragments of records. If you were to view the most recent change snapshot for a record, you would find it to be identical to the complete record stored in the organisation or asset table.

## Correcting a Change Reason

- Open any existing organisation or asset.
- Click on the Change Log tab.
- Select a change from the list.
- Click Correct Reason.
- Correct the old reason, or type in a new one.
- Click Submit.

Click **Refresh** to reflect any changes made to the record since you first opened the window.

Organisation - SSA3

Organisation

Assets & Contacts

Change Log

Refresh

Correct Reason

Time	Username	Reason
23/12/2024 14:50	admin	Set parent to imported value, 'Mars Colony'.
23/12/2024 14:50	admin	Imported organisation.

# BridgeManager Database Diagram

Note that the diagram below is not exhaustive, as it omits the OrganisationOrder, AssetOrder, ContactOrder, ConferenceOrder, TaskOrder, VisitOrder, DocumentOrder and FriendlyNames tables. Those tables are purely operational to the application and are not intended to be queried by the user or administrator.

