3

3. Installation: Windows

Release Notes

Mascot 3.1 is compiled for Intel/AMD 64-bit Windows. Refer to the release notes for last-minute additions to documentation and the Matrix Science web site support page for patches and known issues:
https://www.matrixscience.com/mascot_support.html

Cluster Mode

If you have a licence to run Mascot on multiple processors, and plan to do so on a networked cluster of machines, then please familiarise yourself with the material in Chapter 11, Cluster Mode, before proceeding with the installation.

System Requirements

Disk Space

The Mascot Server program files require 5.5 GB of Disk space, SwissProt requires 3.9 GB and PRIDE Contaminants 0.3 GB.

File system

The hard disk must be formatted for NTFS. It is advisable that NTFS file compression is *not* used for the compressed database files. There are reports that NTFS compression is not fully compatible with memory mapping. NTFS file compression can be used on the FASTA and reference files if you wish.

Memory

To get the best performance from Mascot, the database files need to be memory mapped. It is recommended that you have at least 16 GB of RAM.

Perl

Mascot includes a 'private' copy of Perl. If a different version of Perl is already installed or is installed later, this will not affect Mascot and the Mascot copy of Perl will not be visible to other applications.

Hyper-threading

Hyper-threading (Intel) and Symmetric multi-processing (AMD) is a hardware technique to improve the performance of multi-threaded programs. Hyper-threading does not double performance because pairs of cores share other resources, such as the on-chip cache. On some systems, a BIOS setting can be used to enable and disable hyper-threading.

Hyper-threading is detected automatically. Each CPU in the Mascot licence enables up to 4 cores to be used for searches. Hyper-threading is ignored when counting cores, so that you may see a 1 CPU licence using 8 threads on a system with a quad core processor with hyper-threading enabled.

Intel hybrid architectures

Intel desktop and workstation processors from the 12th generation onward may use a hybrid architecture. These processors have both 'P' (performance) and 'E' (efficiency) cores. Mascot can be run on both 'P' and 'E' cores, but the performance of the 'E' cores is poor. It is best to pin Mascot to only use 'P' cores. If your processor has 'E' cores, then after installation, search for ProcessorSet in Chapter 6, Configuration & Log Files.

Web Server

Mascot for Windows is tested with IIS and Apache.

The Mascot installation has been fully automated for Microsoft Internet Information Server 8.0 and later. A good starting point for IIS support information is http://www.iis.net/

IMPORTANT: You **must** configure IIS as illustrated below **before** proceeding with the installation. Otherwise, the Mascot installation is likely to fail.

If IIS is configured as a secure server (SSL/TLS), you must change it temporarily to non-secure mode (http: on port 80). Once the installation is complete, you can change back to secure mode.

If you wish to use Apache as your web server, you will need to perform some manual configuration, as described in Appendix D, Web Server Configuration.

Preparation: Check system requirements

The following steps need to be performed.

1. Verify that the computer has sufficient memory and disk space.
2. Verify that the computer has a suitable version of Microsoft Windows installed. Mascot Server requires 64-bit Windows 8.1/Server 2012 R2 or later on Intel or AMD.

3. Virus scanning software should not be running during the installation.
4. If you have a multi-CPU licence and intend to use Mascot cluster mode, refer to Chapter 11, Cluster Mode for further details before proceeding.

Preparation: Install web server

If this is a **clean installation**: You must install a web server before installing Mascot. The instructions in this section show how to install Microsoft IIS. If you would like to use Apache web server instead, refer to the instructions in Appendix D, Web Server Configuration.

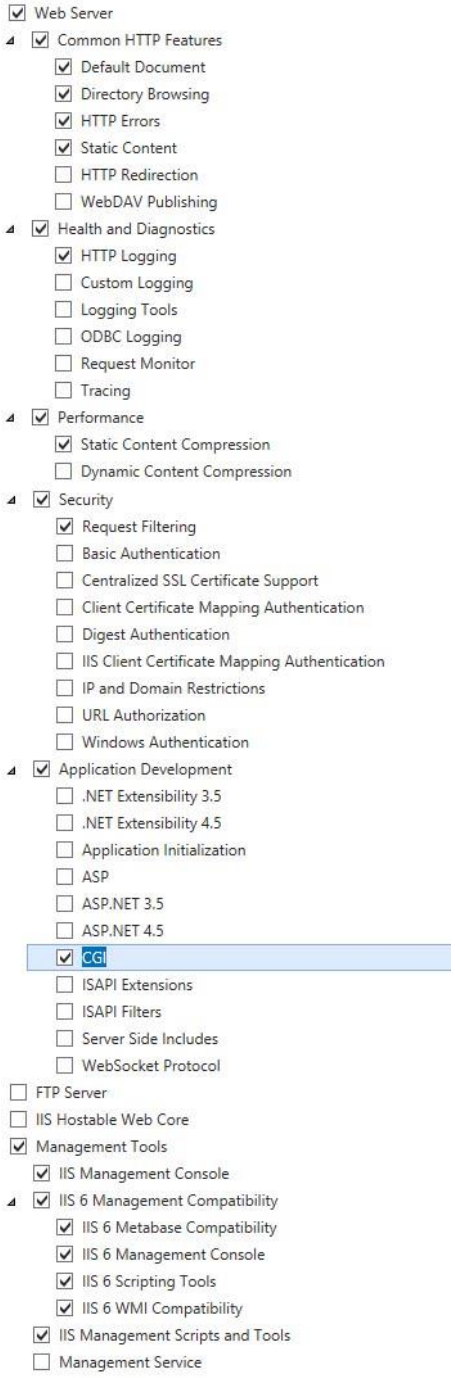
If this is a **version update**: A web server is already installed. Please double check that the correct components are enabled.

Server 2012 R2

Mascot will run under all Server 2012 R2 editions as long as they include the GUI. A 'Core' installation is not supported.

It is advisable to ensure that the latest updates have been installed.

The Microsoft web server is IIS 8.5 for Server 2012 R2. From the Control Panel, choose *Turn Windows features on or off* to launch Server Manager. Select *Add Roles and Features*. In the *Server Roles* page of the wizard, check *Web Server (IIS)*. In the *Role Services* page, ensure that all the checkboxes shown below are checked, in addition to any default selections. Then, choose OK.



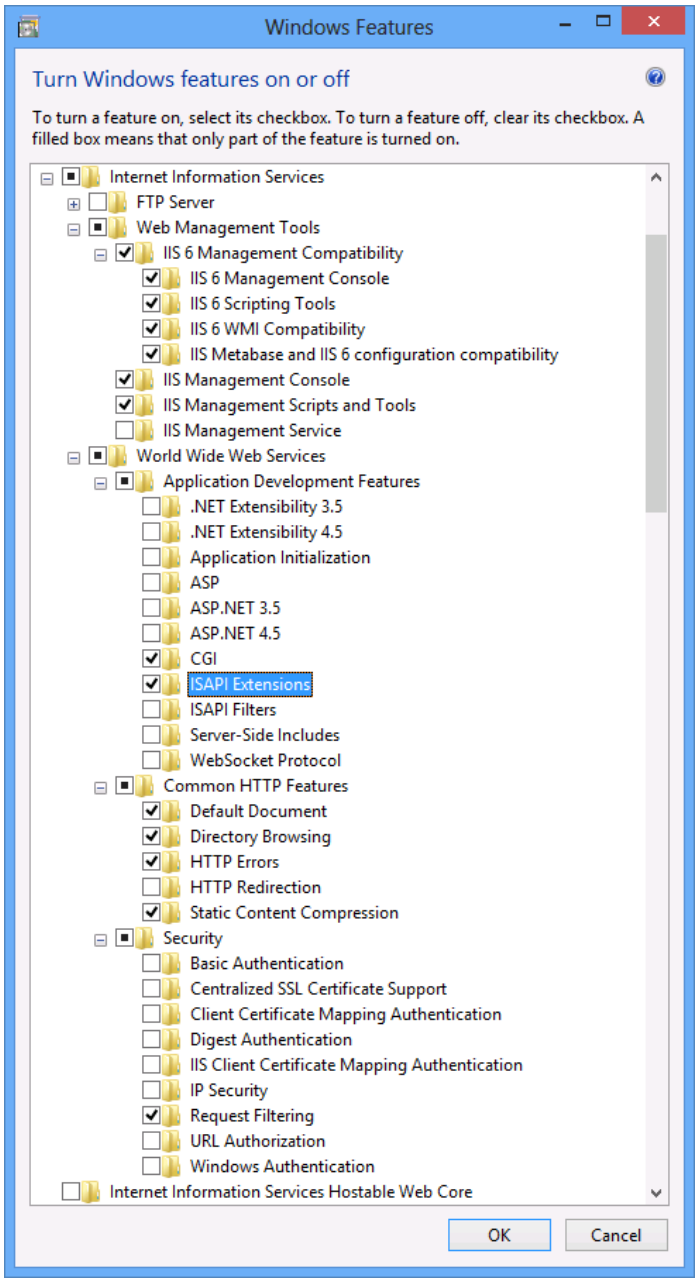
Windows 8.1

Mascot will run under all Windows 8.1 editions except RT, but note that only Professional and Enterprise support remote desktop hosting.

It is advisable to ensure that the latest updates have been installed.

The Microsoft web server is IIS 8.5 for Windows 8.1. By default, this is not installed. To install IIS, from the Control Panel, choose *Programs and Features*, *Turn Windows features on or off*. Expand the node for Internet Information

Services, and ensure that all the checkboxes shown below are checked, in addition to any default selections. Then, choose OK.



Server 2016

Mascot will run under all Server 2016 editions as long as they include the GUI or 'Desktop Experience'. A non-GUI or 'Core' installation is not supported.

It is advisable to ensure that the latest updates have been installed.

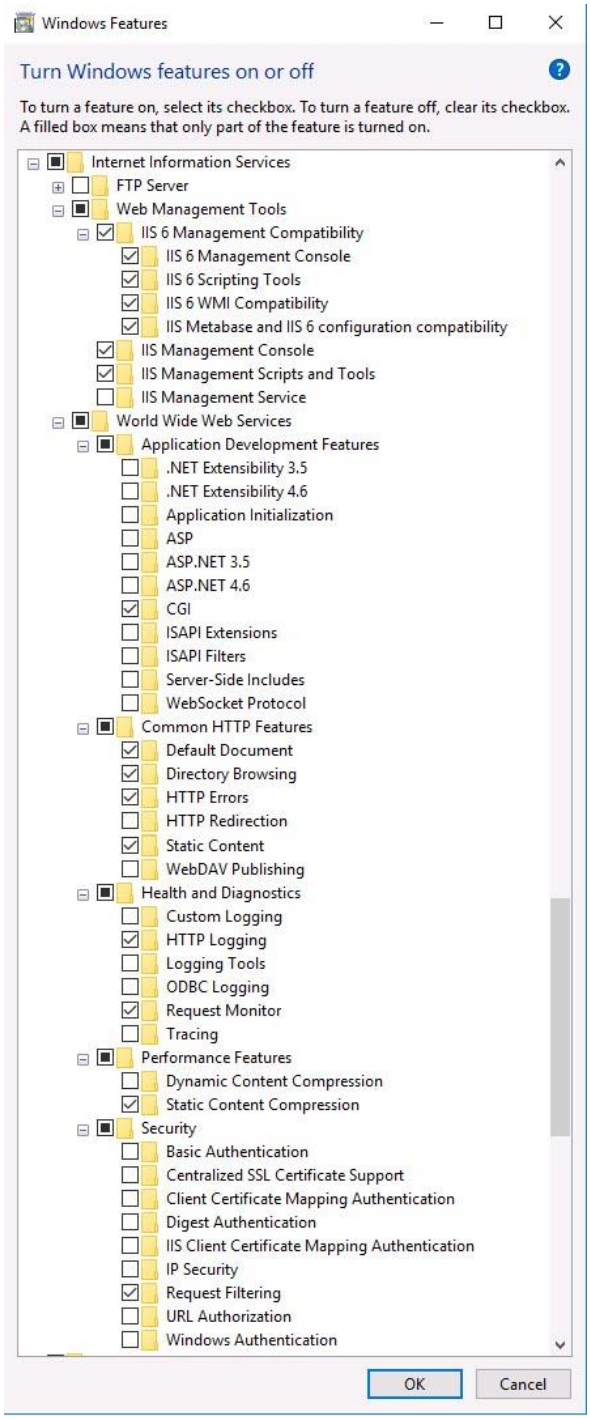
The Microsoft web server is IIS 10. From the Control Panel, choose *Turn Windows features on or off* to launch Server Manager. Select *Add Roles and Features*. In the *Server Roles* page of the wizard, check *Web Server (IIS)*. In the *Role Services* page, configure as for Windows Server 2012.

Windows 10

Mascot will run under all Windows 10 editions, but note that the Home edition does not support remote desktop hosting.

It is advisable to ensure that the latest updates have been installed.

The Microsoft web server is IIS 10. By default, this is not installed. From the Control Panel, choose *Apps and Features* then *Programs and Features*, *Turn Windows features on or off*. Ensure that all the checkboxes shown below are checked, in addition to any default selections. Then, choose OK.



Server 2019

Mascot will run under all Server 2019 editions as long as they include the GUI or 'Desktop Experience'. A non-GUI or 'Core' installation is not supported.

It is advisable to ensure that the latest updates have been installed.

The Microsoft web server is IIS 10. From the Control Panel, choose *Turn Windows features on or off* to launch Server Manager. Select *Add Roles and Features*. In the *Server Roles* page of the wizard, check *Web Server (IIS)*. In the *Role Services* page, configure as for Windows Server 2012.

Windows 11

Mascot will run under all Windows 11 editions, but note that the Home edition does not support remote desktop hosting.

It is advisable to ensure that the latest updates have been installed.

The Microsoft web server is IIS 10. By default, this is not installed. To install IIS, from the Control Panel, choose *Apps and Features* then *Programs and Features*, *Turn Windows features on or off*. Expand the node for Internet Information Services, and configure as for Windows 10.

Server 2022

Mascot will run under all Server 2022 editions as long as they include the GUI or 'Desktop Experience'. A non-GUI or 'Core' installation is not supported.

It is advisable to ensure that the latest updates have been installed.

The Microsoft web server is IIS 10. From the Control Panel, choose *Turn Windows features on or off* to launch Server Manager. Select *Add Roles and Features*. In the *Server Roles* page of the wizard, check *Web Server (IIS)*. In the *Role Services* page, configure as for Windows Server 2012.

Installation

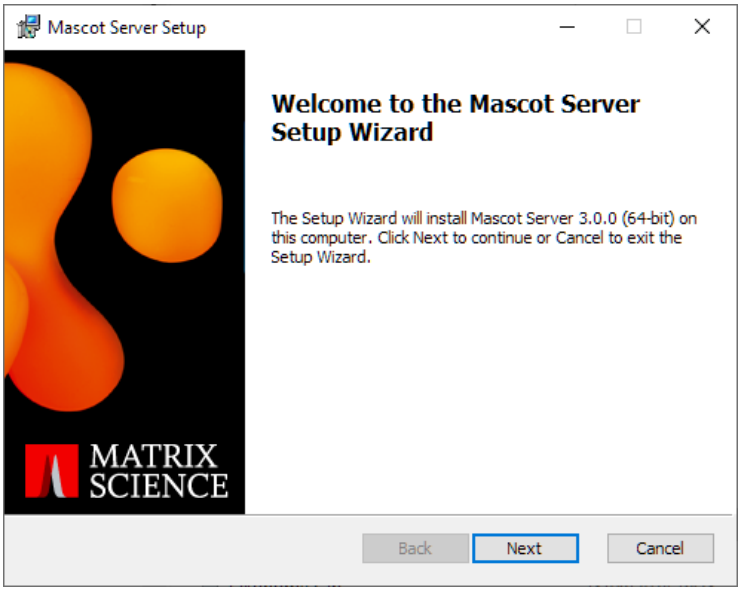
1. If you are installing from a Mascot Server ISO image or DVD: Mount the Mascot ISO image, or insert the Mascot program DVD.

   If you have downloaded the installer as a self-extracting executable, copy the file to a temporary location and double click to unpack. This will create a folder containing exactly the same files as on the Mascot Server ISO image.

2. Double click on `setup64.exe`.

3. Before the installation of Mascot begins, required Microsoft Visual C++ libraries will be installed.

4. Next, the following window will be displayed:



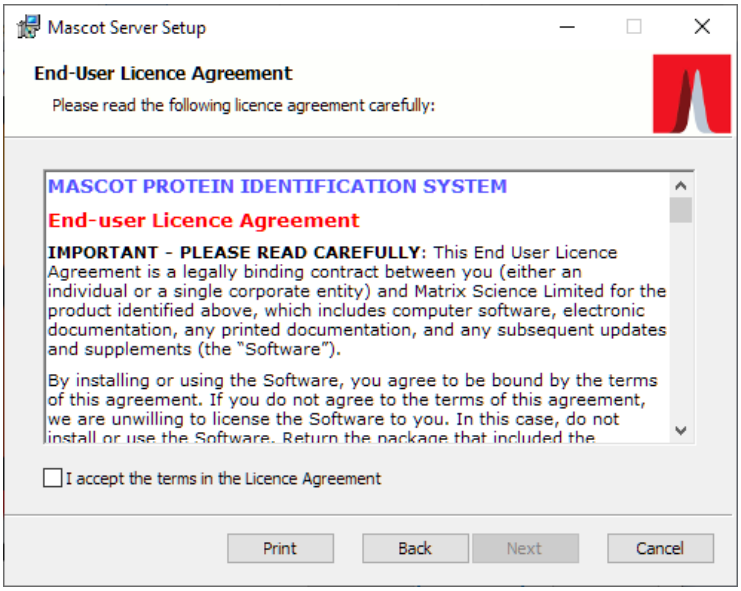
If the installation cannot proceed, a message box will be displayed. Typical problems include:

You do not have Administrator privileges: Log out and log in as a user with local Administrator rights.

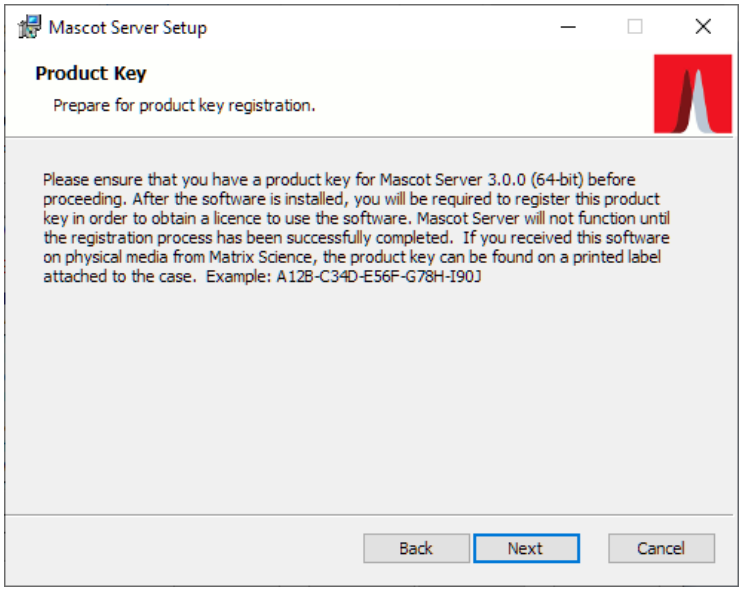
Unsupported Windows platform: Refer to the system requirements at the beginning of this Chapter.

Any problem(s) must be fixed before the installer will proceed.

5. Pressing Next displays the Mascot End-User Licence Agreement:

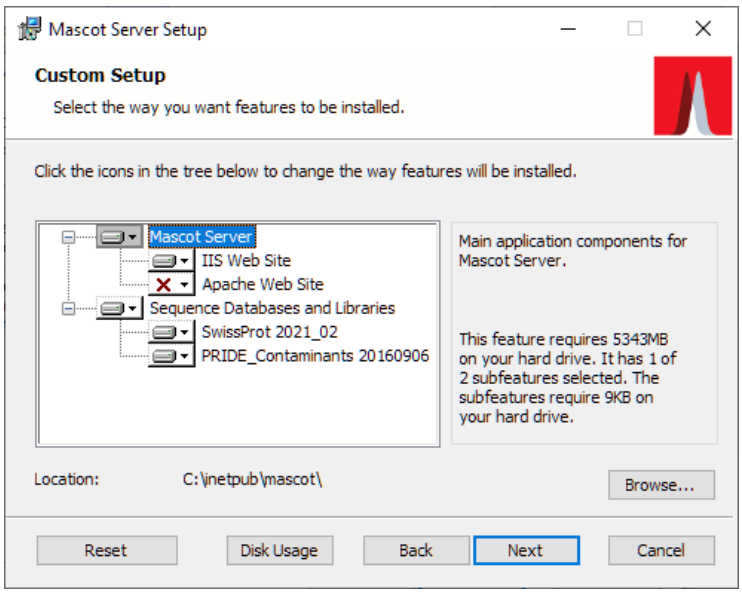


If you do not consent, you cannot proceed with the installation.



6. This is a reminder that you will need to register a product key to create a licence file. This product key may be printed on a sticker on the CD case or it may have been sent by email. If you cannot locate your product key, contact support@matrixscience.com for assistance.

7. The next screen allows you to choose which components will be installed:



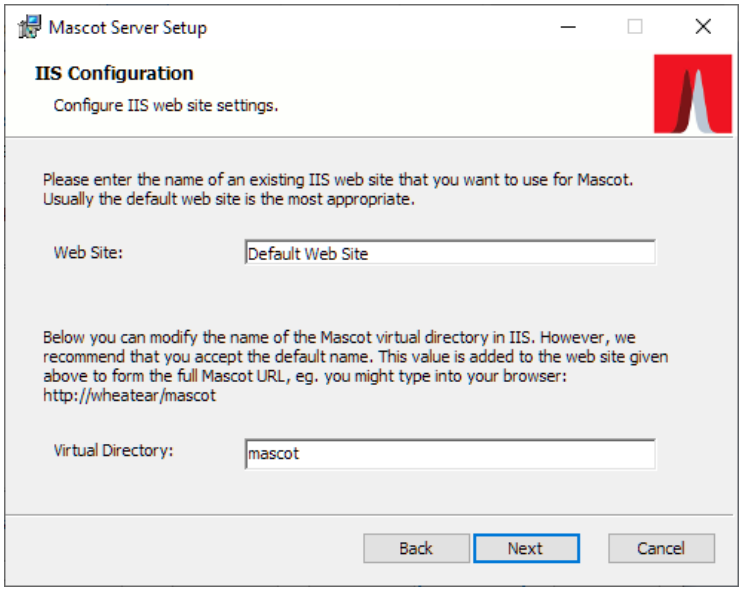
If IIS is installed and functional, the default selections will be as shown above, with IIS being configured automatically. If you don't have IIS installed, the Apache option will be selected instead. A test for whether Apache or some other web server is actually installed comes later.

You can de-select the Swiss-Prot Fasta database and PRIDE Contaminants spectral library, but if this is a clean install, you are advised not to do so. It is better to proceed with a full installation, so that the installation can be verified. If you don't want SwissProt to be available, you can easily remove it later.

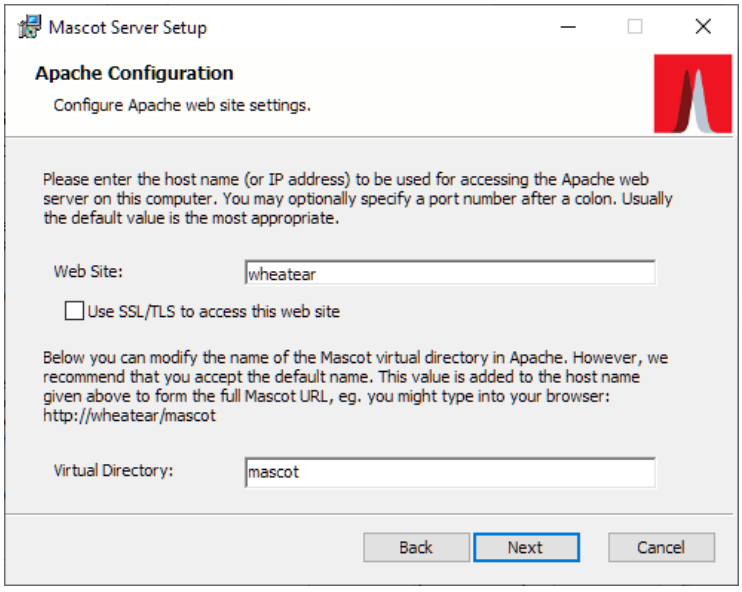
The default location for the installation is *\inetpub\mascot* on the drive with most free space with the sequence databases in *\inetpub\mascot\sequence*. You can change one or both of these by selecting the component then choosing Browse. If there is insufficient disk space on the selected drive(s), the installation will not be able to continue.

8. The next step depends on whether IIS or Apache was selected as the web server.

   For **IIS**, in most cases, you should leave the web site field set to 'Default Web Site'. If you have multiple web sites defined and want to use a non-default site for Mascot, enter the name as displayed in IIS Manager.



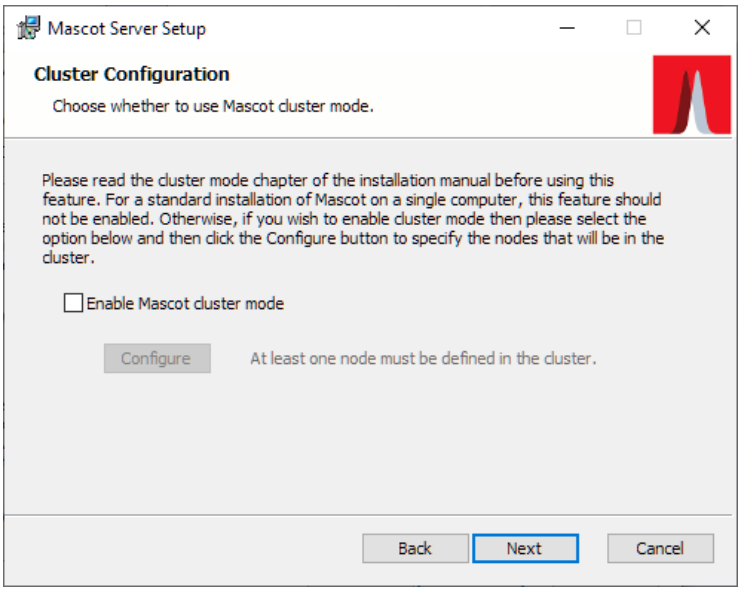
   For **Apache**, or any other web server, you need to confirm the local web server hostname and port. Do not enter localhost in the web site field if you wish to access your Mascot server from other computers on your LAN. If there are DNS problems, so that a hostname is not recognised across the LAN, then enter an IP address.



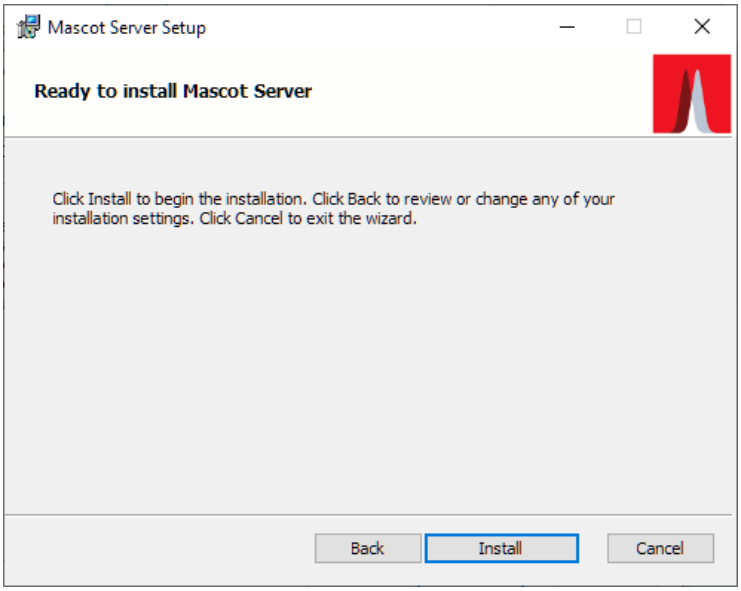
The default ports are 80 for http and 443 for https. The installer will test that the web server responds using the specified hostname and port number. If you have configured your Apache web server as a secure server (https), check the box for 'Use SSL/TLS to access this web site'.

The virtual directory name can be changed, but remember that users are more likely to guess the correct URL if you stick with 'mascot'. Also, some third party software may incorrectly assume the directory name is always 'mascot'.

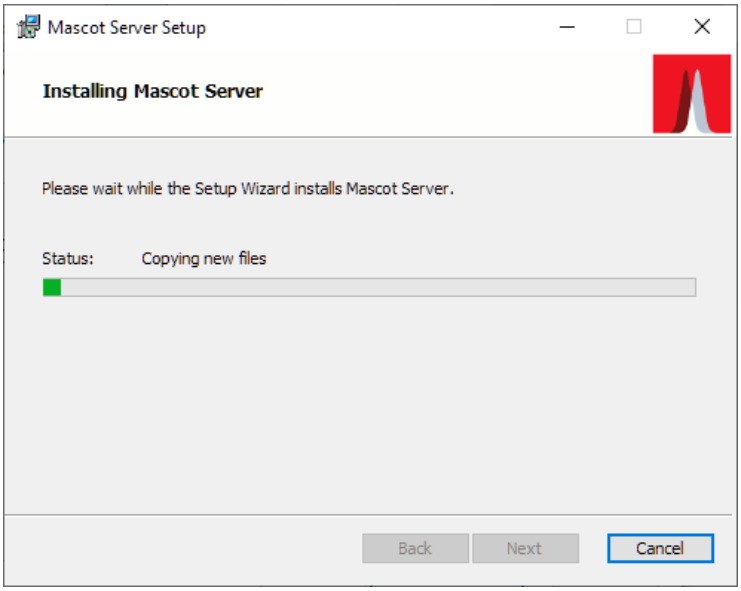
9. If you have a multi-CPU licence, you can configure Mascot for execution on a networked cluster. If you intend to do this, refer to Chapter 11, Cluster Mode for further details before proceeding. If you are installing Mascot on a single server, leave the Enable cluster mode checkbox clear.



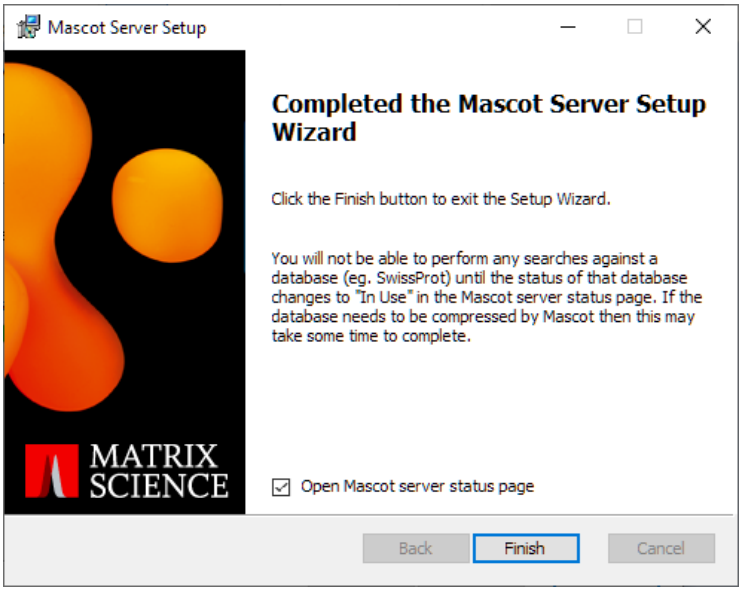
10. The next step is your last opportunity to cancel the installation!



Copying the program files takes a few minutes.



Unpacking the SwissProt files takes some time, and a command window will be displayed at this point. Please be patient and don't try to close the command Window.



11. If you are using Apache, model entries for the Apache configuration file can be found in *apache.conf* in the Mascot *config* directory. Further information on web server configuration can be found in Appendix D, Web Server Configuration.

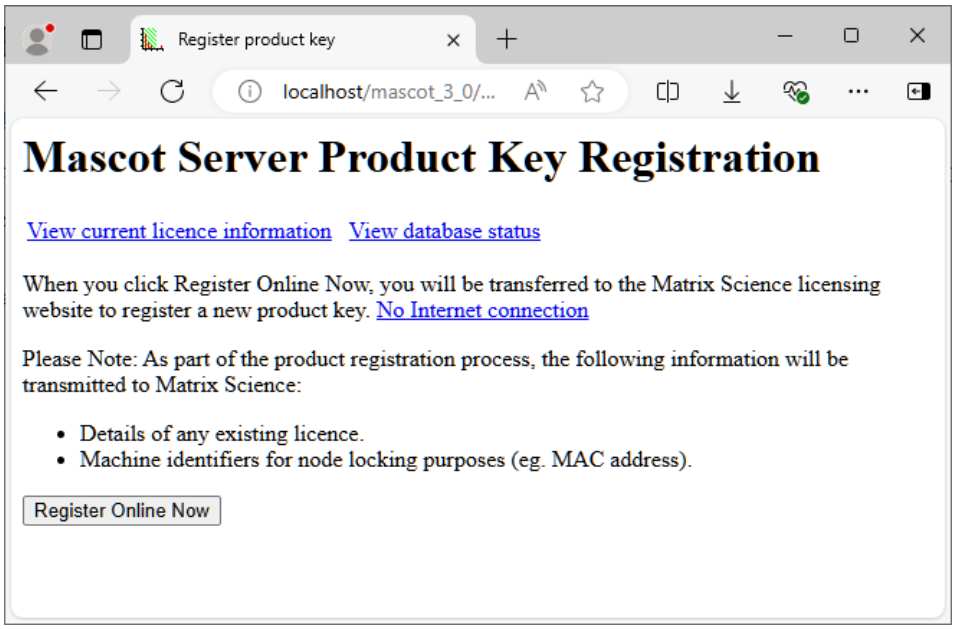
12. Installation of Mascot program files is finished. The directory structure created in the installation directory is illustrated in figure 1.1.

13. Open the Mascot server status page.

Licence Registration

14. The following screen will be displayed in your default web browser.

(If you cleared the checkbox at the end of the installation wizard, from the Windows Start menu, choose Programs; Mascot; Admin; Database Status. Then choose Register new product key.)



If the Mascot server is connected to the Internet: Click Register Online Now to start the registration process.

If the Mascot server is isolated from the Internet: Follow the link for 'No Internet connection'. A file containing registration information (registration.xml) can then be saved and copied to a system with Internet access for submission to the Matrix Science registration web site.

After registration, the licence file can be saved directly to the Mascot Server. A copy of the licence file will also be sent by email.

The registration form allows a second email address to be specified, in case the person installing Mascot is not the end-user. Ensure that the end-user email address is entered into the upper part of the form and the email address to which the licence file should be sent is entered into the CC email field in the lower part of the form.

To be recognised, the licence file must be saved to the *config\licdb* directory as a file with the extension *.lic*.

Mascot Security

15. If this is a **clean installation:** Mascot security is disabled on installation. To enable Mascot security, refer to Chapter 12, Mascot Security.

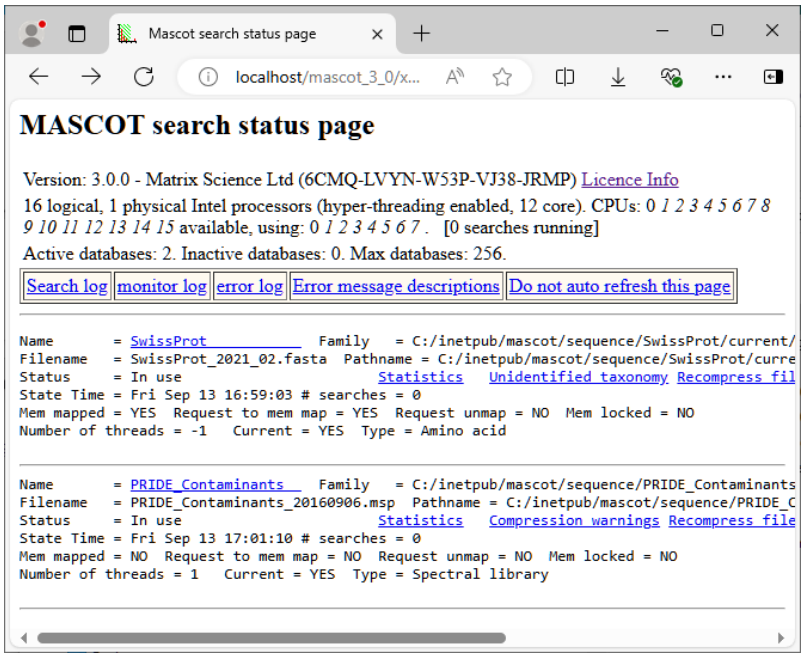
    If this is a **version update**: the update procedure does not affect the status of Mascot Security.

Verify System Operation

A copy of the SwissProt database is included with the installation files. It is recommended that the operation of Mascot is verified and tested using this database before adding further databases or making configuration changes.

Mascot Monitor (*ms-monitor.exe*) is used to manage the swapping and memory mapping of the sequence databases used by Mascot. For Mascot to operate, *ms-monitor.exe* must be running at all times.

Once the new licence file is in place, follow the hyperlink to Database Status. You should see a display similar to the following:



If an error occurs, use the links to the monitor log and the error log to investigate the cause. If all is well, you will see the following messages displayed on the status line for SwissProt:

```
Creating compressed files
  Running 1st test
  First test just run OK
  Trying to memory map files
  Just enabled memory mapping
  In Use
```

You can begin exploring and using Mascot. However, do not try to run searches or view results reports until the relevant sequence database is 'In Use'.

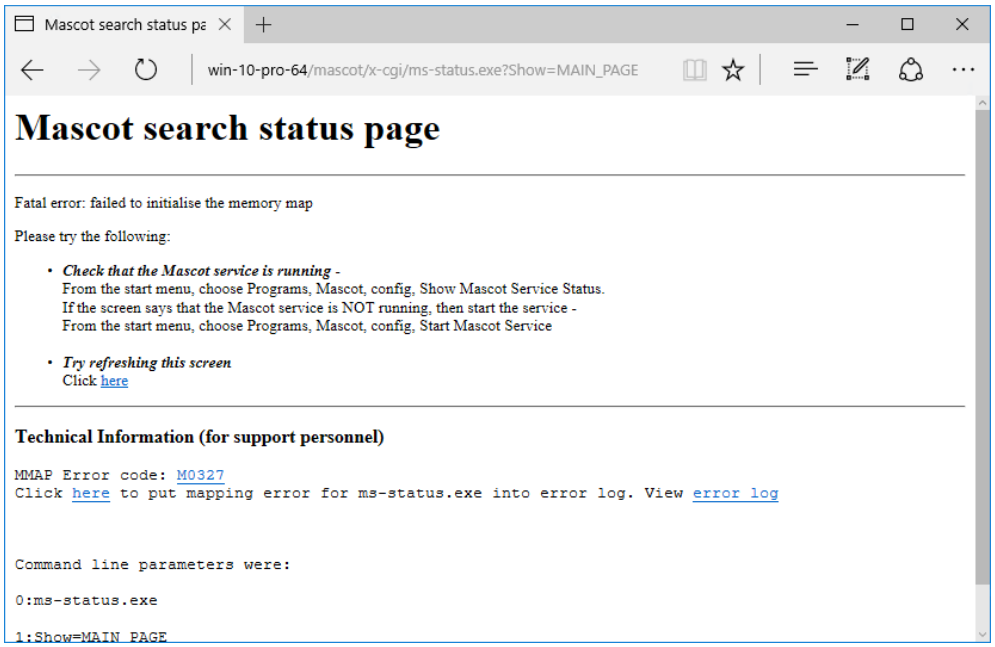
Troubleshooting

Check the Mascot Server Support Page

There may be a fix listed on the Matrix Science Web Site. From the menu, choose Support; Mascot Server and scan down to see if your problem is described.

The status screen shows an error

If the Mascot Monitor service fails to start, then the following text or something similar will be displayed in the status screen:



There are several possible causes:

Service not started

Since one of the first things that the Monitor service does is to create the memory mapped file, this could indicate that the service has not started. You can tell whether the service has started by choosing *Start; Programs; mascot; config; Show Mascot ms-monitor service status*.

If the service is not running, check the `monitor.log` and `errorlog.txt` file in the `logs` directory. If there is nothing in those files, then it may be necessary to try and run `ms-monitor.exe` as a command line executable. *You should only do this if the Mascot service is not running.* To do this, open a command prompt window, and change directory to the mascot `bin` directory. If your installation path was the default, you will need to type:

```
cd \Inetpub\mascot\bin
```

next start the monitor program:

```
ms-monitor DEBUG
```

Any error messages should be displayed on the screen. If possible, correct the faults, and then start the Mascot Service from the start menu. Note that the mascot service should never be running at the same time as `ms-monitor.exe` is being run from the command line.

International Versions of Windows

If Mascot is installed on a version of Windows that is not in the English language, then when the ms-status screen is displayed, it may have the error 'Failed to initialise memory map"

To correct this fault, the following procedure is required:

1. You will need to find the names of the 'groups' that your version of Windows uses for Administrators and Users. In German, for example, these names are "Administratoren" and "Benutzer" respectively. To see a list of User names, from the start menu, select Control panel, Administrative Tools, Computer Management. Expand Local Users and Groups.

2. From the start menu, select
   Programs | Mascot | Config | Stop Mascot Service

3. From the start menu, select
   Programs | Mascot | Config | Mascot Configuration File

4. Scroll down to near the bottom of the file and find the line:
   NTIUserGroup Users
   and change this to (for example, for German)
   NTIUserGroup Benutzer

5. Find the line
   NTMonitorGroup Administrators
   and change this to (for example, for German)
   NTMonitorGroup Administratoren

6. Save the mascot.dat file

7. From the start menu, select
   Programs | Mascot | Config | Start Mascot Service

8. Re-load the status page:
   Programs | Mascot | Search Status
   (You may need to refresh / reload the page)

9. For each active database, choose Recompress file

Wait until the files have been compressed and a test search has been done. Mascot is now ready for use.

The site search facility does not work

The local Mascot web pages are indexed using a product called ht://Dig. A log file is made as the indexes are built during the installation. The log file *mascot\htdig\build.log* may contain an error message indicating the nature of the problem.

If the web server was not operational during Mascot installation, it will not have been possible to build the keyword index. To build or rebuild it, open an administrator command window and enter the following commands. If Mascot was installed into a different path, you may have to modify the first two lines

```
C:
cd \inetpub\mascot\htdig
```

```
bin\htdig.exe -v
bin\htmerge.exe -v
```

Once the commands have completed, keyword search using the control at the top right of the web pages should be operational.

Search status shows a failure to create compressed files

On the search screen, find out what caused the error by clicking on the *Error log* link, fix the fault, (possibly out of disk space), and then click on *retry*.