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Introduction

This document describes the steps to install the most recent version of BlueFuse Multi and BlueFuse Server and upgrade from an earlier release.

BlueFuse Multi v3.0, or later, can be deployed to operate in one or both of the following modes:

- ▶ **Classic Mode**—Multiple installations of BlueFuse Multi can access a database, but are limited to read-only activity.
- ▶ **Server Mode**—Multiple users have read-write access to a database. Experiment reports can be viewed in a web browser. If you intend to install BlueFuse Multi in Server Mode, consult your IT department.

This document provides installation details for several different scenarios. First, read the following sections:

- ▶ *Supported Operating Systems on page 3*
- ▶ *Hardware Requirements on page 4*
- ▶ *Deployment Modes on page 5*
- ▶ *Choose a Deployment Mode on page 6*

After you have chosen a deployment mode, read the following sections:

- ▶ New Installations:
 - ▶ **Classic Mode**—*First Time Installation on page 7*
 - ▶ **Server Mode**—*Server Mode Installation on page 8*
- ▶ Upgrades for v3.0 and later:
 - ▶ **Classic Mode**—*Classic Mode Upgrade on page 9*
 - ▶ **Classic to Server Mode**—*Classic Mode to Server Mode Upgrade on page 10*
 - ▶ **Server Mode**—*Server Mode Upgrade on page 11*

Illumina supports upgrading for BlueFuse Multi v3.0 and later. For earlier versions of BlueFuse Multi, first upgrade to v3.0, and then to the most recent version. Contact Illumina Technical Support for detailed instructions.

Supported Operating Systems

BlueFuse Multi

The following desktop operating systems are supported for BlueFuse Multi. Non-English language versions of Windows are not supported.

- ▶ **Windows 10**—x86 and x64
- ▶ **Windows 8.1**—x86 and x64
- ▶ **Windows 7**—x86 and x64



NOTE

BeadChip arrays require an x64 operating system.

BlueFuse Server

Install BlueFuse Server on a Microsoft server instead of a desktop operating system. Server operating systems are designed to support large numbers of networked clients. If you install BlueFuse Server on a desktop operating system, the system registry is automatically changed to support the larger number of network connections required in Server mode.

The following server operating systems are supported for BlueFuse Server:

- ▶ **Windows Server 2008**—x86 and x64, excluding Server Core installations
- ▶ **Windows Server 2008 R2**—Excluding Server Core installations
- ▶ **Windows Server 2012 and R2**—Excluding Server Core installations
- ▶ **Windows Server 2016**—Excluding Server Core installations



NOTE

BeadChip arrays require an x64 operating system.

Hardware Requirements

BlueFuse Multi

Minimum Hardware Requirements

- ▶ **Memory (RAM)**—2 GB
- ▶ **Processor**—2 GHz
- ▶ **Screen Resolution**—800 x 600



NOTE

These requirements are not sufficient for BeadChip Arrays.

Minimum Hardware Requirements for BeadChip Arrays

- ▶ **Memory (RAM)**—4 GB
- ▶ **Processor**—2 GHz
- ▶ **Screen Resolution**—1024 x 768 or higher
- ▶ **Network Speed**—1 Gb



NOTE

These requirements are sufficient for karyomapping.

Recommended Hardware Requirements

- ▶ **Memory (RAM)**—4 GB or higher
- ▶ **Processor**—2 GHz or higher multicore processor
- ▶ **Screen Resolution**—1024 x 768 or higher
- ▶ **Network speed**—1 Gb

BlueFuse Server

Minimum Hardware Requirements

- ▶ **Memory (RAM)**—4 GB
- ▶ **Processor**—2 GHz or higher multicore processor
- ▶ **Network Speed**—1 Gb

Recommended Hardware Requirements

- ▶ **Memory (RAM)**—8 GB or higher
- ▶ **Processor**—2 GHz or higher multicore processor

- ▶ Network speed—1 Gb

Deployment Modes

Classic Mode

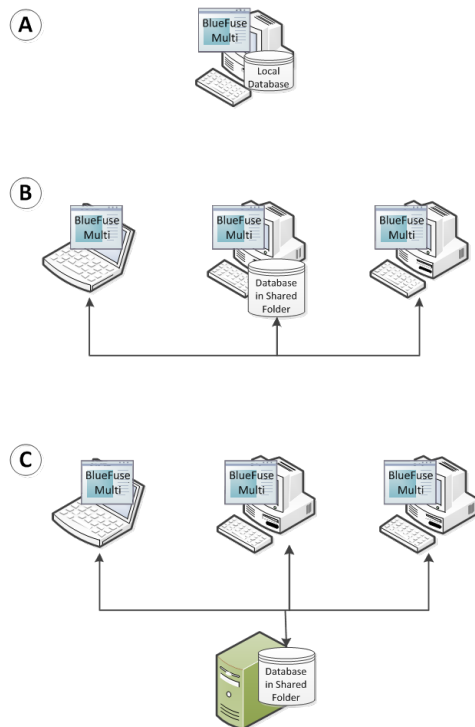
This architecture requires a single installation of BlueFuse Multi on each desktop computer. Classic mode does not support simultaneous read-write access for multiple users using the same database.

Customers deploy BlueFuse Multi in classic mode for the following reasons:

- ▶ There is little contention over database access and multi-user read-write functionality is not necessary.
- ▶ To take advantage of new features in the most recent version of BlueFuse Multi using existing infrastructure.
- ▶ To upgrade to the multi-user read-write functionality in stages.

The following figure illustrates the three main deployment options for a classic mode installation of BlueFuse Multi v3.0, or later.

Figure 1 Classic Mode Deployment Scenarios for BlueFuse Multi



- A Single installation of BlueFuse Multi on a desktop computer.
- B Installation of BlueFuse Multi on multiple desktop computers with the database directory shared.
- C Installation of BlueFuse Multi on multiple desktop computers with the database stored on the disk of a networked Server computer.

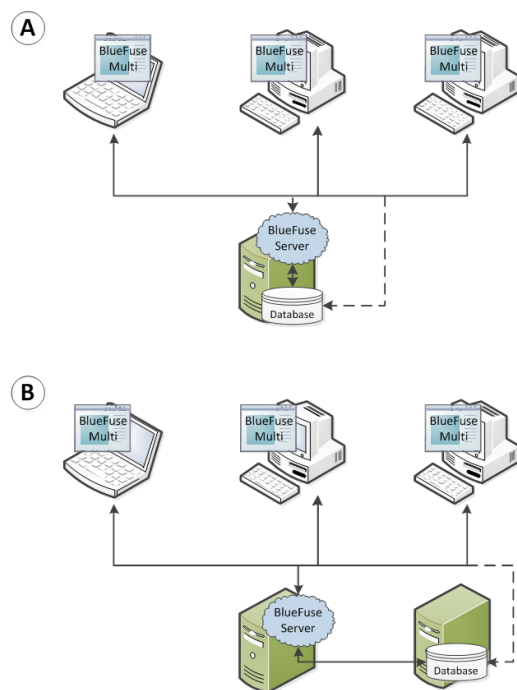
Server Mode

Server mode requires BlueFuse Multi installation on each desktop computer and BlueFuse Server installation on the designated centralized server computer.

The BlueFuse Server software accepts incoming requests for access to the database and manages contention and locking. Deploy BlueFuse Multi in Server mode when there is contention for access to the database for multiple users.

The following figure illustrates the two main deployment options for the server mode installation of BlueFuse Server.

Figure 2 Server Mode Deployment Scenarios for BlueFuse Multi and BlueFuse Server.



- A BlueFuse Multi installed on all desktop computers and BlueFuse Server installed on the computer hosting the database files. Illumina recommends deploying server mode using this option.
- B BlueFuse Multi installed on all desktop computers, BlueFuse Server installed on a separate computer, and the directory containing the database hosted on another computer or network attached storage (NAS) device. If this option is chosen, do not use Vista or Windows 7 on the computer hosting the database directory.

Choose a Deployment Mode

Consult the following tables to choose a deployment mode of BlueFuse Multi. If you are still unsure of the best deployment mode for your lab, contact Illumina Technical Support.

Upgrade Existing BlueFuse Multi Installation

If you are upgrading an existing BlueFuse Multi installation, choose a deployment mode that matches your lab description.

Deployment Mode	Lab Description
Classic Mode	<ul style="list-style-type: none"> • Little contention over database access and multiuser read-write access. • No significant increase in the number of BlueFuse Multi soon.
Server Mode	<ul style="list-style-type: none"> • Significant contention for multiuser read-write access, or anticipate significant contention soon. • Planning to significantly increase the number of BlueFuse Multi soon. • Has a suitable computer available to host the BlueFuse Server.

New BlueFuse Multi Installation

If you are performing a new installation of BlueFuse Multi, choose a deployment mode that matches the needs of your lab.

Deployment Mode	Lab Description
Classic Mode	<ul style="list-style-type: none"> • Likely to require ≤ 3 installations of BlueFuse Multi.
Server Mode	<ul style="list-style-type: none"> • Likely to have significant contention for multiuser read-write access, or anticipate significant contention soon. • Has a suitable computer available to host the BlueFuse Server. If you do not have a suitable computer but anticipate a significant number of BlueFuse Multi users, purchase a computer to host BlueFuse Server.

Installation

This section provides procedures for installing BlueFuse Multi in classic or server mode during a first-time installation or an upgrade. For more information, see the [BlueFuse Multi Installation video](#) and the [BlueFuse Server Installation video](#).

First Time Installation

Classic Mode Installation

To install BlueFuse Multi in classic mode, perform the following steps for each computer. To download the annotation database and installer, go to the [BlueFuse Multi Software support page](#) and select **Downloads**.

- 1 Before starting installation, make sure that your lab meets the following requirements:
 - ▶ You have administrator privileges on each computer.
 - ▶ There is a local or shared directory with at least 100 GB of space for the BlueFuse Multi databases.
 - ▶ Each computer has read-write access to the database directory.
 - ▶ Each computer meets the minimum hardware requirements.
- 2 Download the latest annotation database.
- 3 Unzip the annotation database.
- 4 Download the latest version of BlueFuse Multi.
- 5 Run the installation file.
- 6 Launch BlueFuse Multi.
By default, BlueFuse Multi is accessible from the BlueGnome programs folder in the Start menu.
- 7 To create a database, perform the following steps.
 - a Select **Tools**, and then **Change Database Path**.
 - b Locate the database using the UNC path or mapped network drive.

- c Make sure that **Connect to Database Server** is not selected.
 - d Select **OK**.
- 8 To load the annotation database, select **Tools**, and then **Import New Annotation**. Browse to the annotation database, and then select **OK**.
- 9 If BlueFuse Multi is installed on multiple computers and the database folder is shared, make sure that all installations have read-write access to the database. To change read-write access, select **Users**, and then **Set Read-Only** or **Set Read-Write**.
- 10 Create users and valid login information.

Server Mode Installation

To install BlueFuse Multi in server mode, first install the server software on a server computer with an appropriate specification. Then install BlueFuse Multi on each desktop computer. To download the annotation database and installers, go to the [BlueFuse Multi Software support page](#) and select **Downloads**.

BlueFuse Server Installation

- 1 Before starting installation, make sure that the BlueFuse Server computer meets the following requirements:
 - ▶ You have administrator privileges on the designated BlueFuse Server computer.
 - ▶ There is a local or shared directory with at least 100 GB of space for the BlueFuse Multi databases.
- 2 Perform the following preinstallation steps:
 - ▶ Have your IT department create or allocate a specific domain or workgroup user to run the BlueFuse Server service. Make sure that the user has full access to the database folder and that the login information has no expiration date.
 - ▶ Designate a folder location on the server computer for the BlueFuse Multi database. Make sure that access permissions for the database directory allows read-write access for the user designated to run the service and for all BlueFuse Multi clients.
 - ▶ Consult your IT department about the port address. Make sure that a firewall is not blocking the designated port and that it is not used by another application.
- 3 Download the latest version of BlueFuse Server.
- 4 Make sure that all other applications on the computer are closed.
- 5 Run the installation file.
- 6 Browse to the user created in step **u** and enter the login information. If you are entering the user name directly into the field, use the format `<domain>\<username>` or `<workgroup>\<username>`.
- 7 If your IT department suggests a port number different to the default, perform the following steps.
 - a Open the BlueFuse Server configuration file (bluegnome_server.cfg) in the BlueFuse Server installation folder (\Program Files (x86)\BlueGnome\BlueFuse Server).
 - b Change `'Port = 12345'` to new address.
 - c To restart the BlueFuse Server service, reboot the computer or select **Control Panel, Admin Tools**, and then **Services**.
- 8 Make sure that the BlueFuse Server service is running in the Windows services list.
- 9 Make sure that both the Windows Security and Sharing permissions on the database folder allow remote BlueFuse Multi clients to read and write to the directory.

BlueFuse Multi Installation

- 1 Before starting installation, make sure that each computer meets the following requirements:
 - ▶ Able to access the BlueFuse Server over the network.
 - ▶ Able to access the BlueFuse Server status web page. To access the status web page, open your web browser and browse to the URL *yourserver:<port_number>* (eg, *http://mainserver:12345*).
 - ▶ Part of the same domain or workgroup as the BlueFuse Server.
 - ▶ Has read-write access to the database directory.
- 2 Download the latest annotation database.
- 3 Unzip the annotation database.
- 4 Download the latest version of BlueFuse Multi.
- 5 Run the installation file.
- 6 Launch BlueFuse Multi.
By default, BlueFuse Multi is accessible from the BlueGnome programs folder in the Start menu.
- 7 To create a database, perform the following steps.
 - a Select **Tools**, and then **Change Database Path**.
 - b Select **Connect to Database Server**.
 - c In the **Host** field, enter the name of the server computer.
 - d Enter the port address.
 - e Locate the database using the UNC path or mapped network drive.
 - f Select **OK**.
- 8 To load the annotation database, select **Tools**, and then **Import New Annotation**.
Browse to the annotation database, and then select **OK**.
- 9 Create users and valid login information.

Upgrade an Existing Installation

Classic Mode Upgrade

To upgrade BlueFuse Multi v3.0, or later, perform the following steps.

- 1 Before starting installation, perform the following preupgrade steps:
 - ▶ Make sure that each computer has administrator privileges.
 - ▶ Make sure that all users are logged out of the database.
 - ▶ Note current database locations. These locations are lost during upgrade.
- 2 To back up existing databases, copy the entire directory structure to another drive.
- 3 To download the latest version of BlueFuse Multi, go to the [BlueFuse Multi Software support page](#) and select **Downloads**.
- 4 Run the installation file on one computer.
- 5 When prompted, browse to the current database. Make sure that **Connect to Database Server** is not selected.
- 6 Select **OK**.
- 7 Upgrade the current database.



NOTE

This step can take some time. If using a shared database, do not upgrade other computers until the first upgrade is complete.

- 8 Run the installation file and upgrade the databases on the remaining computers.
When the upgrade is complete, make sure that each copy of BlueFuse Multi can access the upgraded database.

Classic Mode to Server Mode Upgrade

This procedure is divided into the following sections:

- ▶ Upgrade BlueFuse Multi and the database on one computer.
- ▶ Install the BlueFuse Server software on a server computer.
- ▶ Upgrade the remaining computers.

Upgrade BlueFuse Multi

- 1 Perform the following preupgrade steps:
 - ▶ Make sure that each computer has administrator privileges.
 - ▶ Disconnect all BlueFuse Multi installations from the database.
- 2 Upgrade BlueFuse Multi on one computer. For more information, see *Classic Mode Upgrade on page 9*.

Install BlueFuse Server

- 3 Install BlueFuse Server on a server computer. For more information, see *BlueFuse Server Installation on page 8*.

Install BlueFuse Server

- 1 Install BlueFuse Server on a server computer. For more information, see *BlueFuse Server Installation on page 8*.
This step is recommended to prevent local connection.

Upgrade Remaining Computers

- 1 Copy the upgraded database folder to the server disk.
- 2 To download the latest version of BlueFuse Multi, go to the [BlueFuse Multi Software support page](#) and select **Downloads**.
- 3 Run the installation file on all computers with BlueFuse Multi.
- 4 To point all BlueFuse Multi to the server, perform the following steps.
 - a Select **Tools**, and then **Change Database Path**.
 - b Select **Connect to Database Server**.
 - c In the **Host** field, enter the name of the server computer.
 - d Enter the port address.
 - e Locate the database using the UNC path or mapped network drive.
 - f Select **OK**.
- 5 **[Optional]** Remove the original database folder.
This step is recommended to prevent local connection.

Server Mode Upgrade

This procedure is divided into the following sections:

- ▶ Upgrade BlueFuse Multi and the database on one computer.
- ▶ Upgrade BlueFuse Server.
- ▶ Upgrade the remaining computers.

Upgrade BlueFuse Multi

- 1 Perform the following preupgrade steps:
 - ▶ Make sure that each computer has administrator privileges.
 - ▶ Disconnect all BlueFuse Multi installations from the database.
- 2 Upgrade BlueFuse Multi on one computer. For more information, see *Classic Mode Upgrade on page 9*.

Upgrade BlueFuse Server

- 1 Make sure that you have administrator privileges on the server computer.
- 2 To download the latest version of BlueFuse Multi, go to the [BlueFuse Multi Software support page](#) and select **Downloads**.
- 3 Run the installation file.
- 4 Make sure that the BlueFuse Server service is running in the Windows services list.

Upgrade Remaining Computers

- 1 Copy the BlueFuse Multi installer to each computer.
- 2 Run the installation file on each computer.

Activating Web Access through Server Mode

If you are on the same network as your server, you can access experiment reports using a web browser. You do not need BlueFuse Multi installed on your computer to view web reports.

The web reporting functionality is disabled by default. Enable web reporting using the server configuration file. Before enabling web reporting, consider data privacy and security issues with your IT department. If web reporting is enabled, valid login credentials are required to access the reports.

- 1 On the server computer, open the configuration file using a text editor.
- 2 In the [WebReports] section of the configuration file, change the Enabled setting to 1.
- 3 In the same section, add a database path and alias entry in the format `Database = [UNC database path]|[database alias]`. The path is a full network UNC path to the database. The alias is shown as the database name on the web reporting login page. You can add multiple database entries.
- 4 Save the changes and then close the file.
- 5 In the **Control Panel**, select **Admin Tools** and then **Services** to restart BlueFuse Multi or reboot the server computer.

To view the web reports, open your web browser to the URL `yourserver:<port_number>/reports`. For example, if your BlueFuse Server computer name is `mainserver` and you are using the default port, then the URL is `http://mainserver:12345/reports`.

The web reports are static. To update the web report with changes from the database, refresh the page.

Troubleshooting

Problem	Solution
The server status web page is not accessible.	Check your firewall settings on the server computer.
When creating a new database in a shared folder, access is denied.	Make sure that all BlueFuse Multi users have read-write access to the shared folder.
When creating a database in a server mode deployment, server is not detected on the host name.	<ul style="list-style-type: none"> On the server computer, open the Control Panel, and then open Services. Make sure that the BlueFuse Server service. Make sure that the firewall settings allow BlueFuse Multi to connect to the server port. Make sure that the server name entered is correct.
The installation of the server fails and the following error message is shown: Error 1722. There is a problem with this Windows Explorer package. A program run as part of the setup did not finish as expected. Contact your support personnel or package vendor.	The user credentials assigned to the server service do not have rights to log on as a service. The administrator installing the server also does not have sufficient privileges to assign these rights to the user.
When attempting to run BlueFuse Multi, the software fails to read the login file.	The service running the server does not have read-write permissions for the database directory.

Revision History

Document	Date	Description of Change
Document # 15053614 v04	December 2018	Added Windows Server 2016 to BlueFuse Server supported operating systems. Updated links to support page for software download information.
Document # 15053614 v03	December 2018	Added Windows 10 - x86 and x64 to supported operating systems. Removed references to registering BlueFuse Multi as this is no longer required. Updated document for BlueFuse Multi v4.5
Document # 15053614 v02	January 2017	Updated document for BlueFuse Multi v4.4 Removed Windows Vista from Desktop Operating Systems
Document # 15053614 v01	November 2015	Updated document for BlueFuse Multi v4.3 and v1.7 Reformatted installation procedures. Removed Windows Server 2003 and R2 from BlueFuse Server Operating Systems. Updated links to accounts.illumina.com
Document # 15053614 Rev. B	November 2014	Updated document for BlueFuse Multi v4.2 and BlueFuse Server v1.6. Removed Upgrades for v2.x section.
Document # 15053614 Rev. A	July 2014	Initial release.

Technical Assistance

For technical assistance, contact Illumina Technical Support.

Website: www.illumina.com
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North America	+1.800.809.4566	
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Belgium	+32 80077160	+32 34002973
China	400.066.5835	
Denmark	+45 80820183	+45 89871156
Finland	+358 800918363	+358 974790110
France	+33 805102193	+33 170770446
Germany	+49 8001014940	+49 8938035677
Hong Kong	800960230	
Ireland	+353 1800936608	+353 016950506
Italy	+39 800985513	+39 236003759
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New Zealand	0800.451.650	
Norway	+47 800 16836	+47 21939693
Singapore	+1.800.579.2745	
Spain	+34 911899417	+34 800300143
Sweden	+46 850619671	+46 200883979
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Safety data sheets (SDSs)—Available on the Illumina website at support.illumina.com/sds.html.

Product documentation—Available for download in PDF from the Illumina website. Go to support.illumina.com, select a product, then select **Documentation & Literature**.



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