BLUECIELO MERIDIAN ENTERPRISE 2016

System Requirements

Reference

BlueCielo ECM Solutions
bluecieloecm.com
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CONTENTS

Legal Notice ..... **i**

Contents ..... **ii**

1 Introducing BlueCielo Meridian Enterprise **1**

2 About Meridian deployment strategies **2**

2.1 Understanding the single-server strategy 2

2.2 Understanding the multiple-server strategy 3

2.3 About the deployment models 3

2.3.1 Understanding the workgroup model 3

2.3.2 Understanding the department model 5

2.3.3 Understanding the enterprise model 6

3 Understanding system requirements for the Meridian server **9**

3.1 Recommended server specifications 9

3.2 Server role requirements 11

3.3 Understanding document storage space requirements 12

3.4 About HyperCache 13

4 Understanding system requirements for Meridian clients **16**

5 Understanding network requirements **18**

6 Understanding system requirements for optional modules **19**

1 INTRODUCING BLUECIELO MERIDIAN ENTERPRISE

BlueCielo Meridian Enterprise is the departmental to enterprise-wide engineering content management system from BlueCielo ECM Solutions. It can be installed with the following database engines: BlueCielo Hypertrieve, Microsoft® SQL Server®, or Oracle® (see the *Supported Software* document for this release of Meridian available from your BlueCielo ECM Solutions Solutions Partner or the BlueCielo ECM Solutions extranet). The number of vaults, documents, and concurrent users is limited only by available hardware resources on the host server computer.

2 ABOUT MERIDIAN DEPLOYMENT STRATEGIES

The architecture of Meridian Enterprise is flexible so that it can be deployed in various configurations to meet a wide range of organization sizes and requirements from small workgroups to large enterprises. Each configuration has inherent advantages and disadvantages in terms of:

- Load: From a small departmental productivity tool to a mission-critical enterprise system with many users and documents.
- Reliability: Whether all components are hosted on a single server or some components are hosted by dedicated, fail-safe systems.
- Systems management: Distributing components to other servers correspondingly distributes administrative responsibilities.
- Geography: Whether data resides in a single vault or many vaults distributed globally.
- Functionality: From out-of-the-box basic tools to custom data structures and unique functionality.

The following topics discuss basic strategies for designing a deployment configuration and give several models from which similar configurations can be based.

2.1 Understanding the single-server strategy

The single-server strategy is best suited to smaller Meridian configurations for use in workgroups or small departments. This strategy is based on deploying all Meridian components on a single server, which has the following notable advantages and disadvantages.

Single-server strategy overview

Advantage	Disadvantage
Lower hardware cost	
Less complicated configuration	
Single point of administration	Not well suited to centralized IT management
Performs well with modest loads	Maximum performance is limited by hardware

Under this strategy, Meridian is installed on a single server that can be upgraded with additional processors and memory to serve the growing needs of more users and documents. An organization may deploy their initial configuration based on this strategy and then transition to a multi-server strategy later.

In particular, a single processor server can be upgraded with an additional processor in those cases where the Meridian application uses a third-party DBMS hosted on the same server. Then, each application can use its own processor assigned by Windows.

More important is the available free memory of the server. Meridian can take advantage of all of the physical memory installed on a server that is accessible by the Windows operating system. Vault documents and metadata are both stored directly on the server in this strategy.

When a Meridian application server has been scaled up under this strategy as much as possible, if the organization's needs continue to grow, the replacement strategy is to scale the configuration out to multiple servers as described in the following section.

2.2 Understanding the multiple-server strategy

To accommodate the users, workloads, and document quantities of large departments and the enterprise, the best results can be obtained by scaling Meridian out to additional servers for more processing and storage capacity, which has the following notable advantages and disadvantages.

Multiple-server strategy overview

Advantage	Disadvantage
	Higher hardware cost
	More complicated configuration
Better suited to centralized IT management	Multiple points of administration require coordination
Required to obtain maximum performance for heavy loads	More complicated security administration

Each of the major components of a Meridian-based system can be hosted on its own server, thereby making the maximum processor power and physical memory available to the primary process, the EDM Server service. For example, the Meridian database server, web server, and content index server can each be deployed on separate server computers with their own inherent benefits.

Under this strategy, vault data can be distributed between metadata residing on a database server and documents stored on the Meridian application server, on a file server, or even stored on network attached storage (NAS) or storage area network (SAN) devices.

For configuration recommendations for specific system sizes under this strategy, see “About the deployment models” on page 3.

2.3 About the deployment models

The following topics describe deployment models for BlueCielo Meridian Enterprise to provide adequate performance and stability for several typical organization sizes. These models and the corresponding system requirements contained in this document pertain to Meridian Enterprise only. Meridian can be one system within a larger computing environment that also includes Meridian Explorer, which can serve many times more users than Meridian Enterprise. For information about Meridian Explorer system requirements and deployment, see the *BlueCielo Meridian Explorer Administrator's Guide*.

Note The configurations that follow are general in nature and intended as a starting point for your own performance and stability tuning. The actual performance that can be expected for any particular number of concurrent users and documents is dependent on many factors. These configurations do not guarantee a particular level of performance or stability, and additional optimization may be necessary. Consultation is available from BlueCielo ECM Solutions Services or one of our Partners.

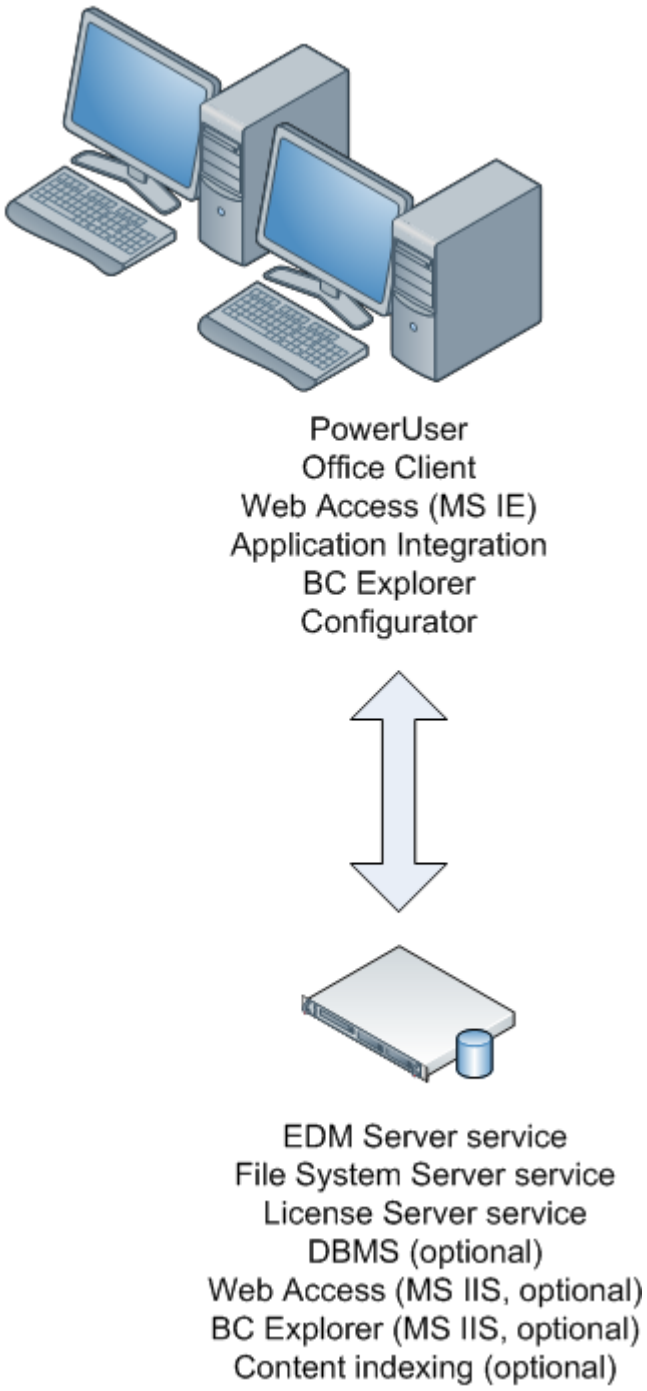
2.3.1 Understanding the workgroup model

In the workgroup model, Meridian is configured to meet the following needs:

- Less than 50 Meridian vault users, excluding Meridian Explorer repository users, which can be many more.
- Single site.

- Add-on modules such as the Meridian Asset Management Module, Publisher, and Global Collaboration Framework are not used.
- Minor or no customization is implemented.

A typical configuration to meet the needs of a workgroup would look similar to the following figure.



Since all components are installed on a single server, that server should be dedicated to Meridian and host no other significant applications or services. The DBMS in this configuration can be either the embedded Hypertrieve database engine (preferred), or SQL Server or Oracle if standards conformance is required and a separate database server is not available (see “Understanding the department model” on page 5).

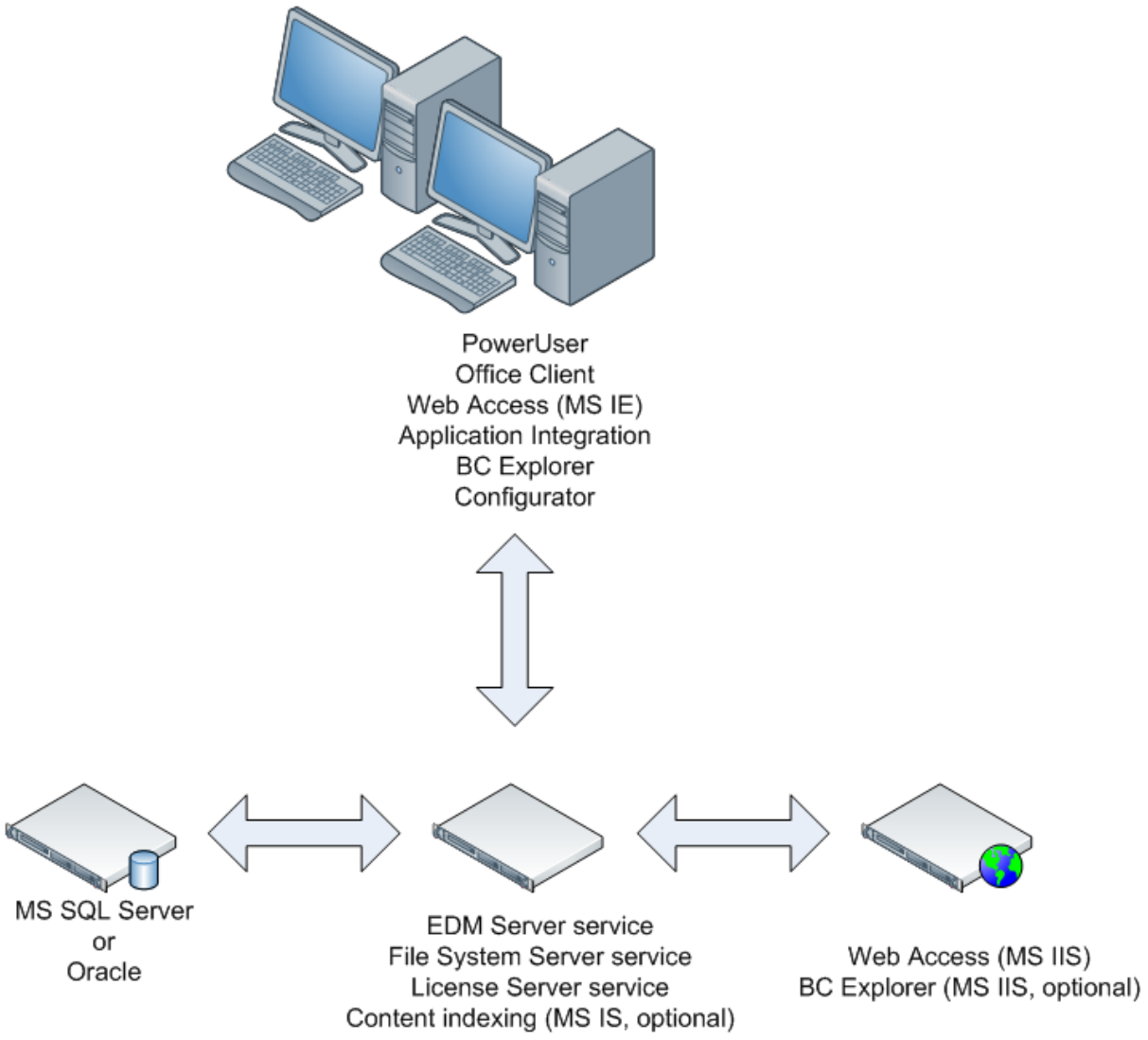
The maximum cache size of each vault should be 1 GB or less. The combined sizes of all vault database caches plus user session memory must not exceed the amount of application virtual memory provided by the operating system.

2.3.2 Understanding the department model

The department model represents an organization with the following needs:

- Between 50 and 75 Meridian vault users, excluding Meridian Explorer repository users, which can be many more.
- A single site.
- Add-on modules such as the Meridian Asset Management Module, Publisher, and Global Collaboration Framework may be required.
- Minor to moderate customization is implemented.
- Oracle or SQL Server is the organization's standard DBMS.
- An existing suitable web server is available

A typical configuration to meet the needs of a department would look similar to the following figure.



In this configuration, Meridian uses existing DBMS and web servers, and all remaining components are installed on a single dedicated application server.

Configuration of the Meridian application server should include the following items.

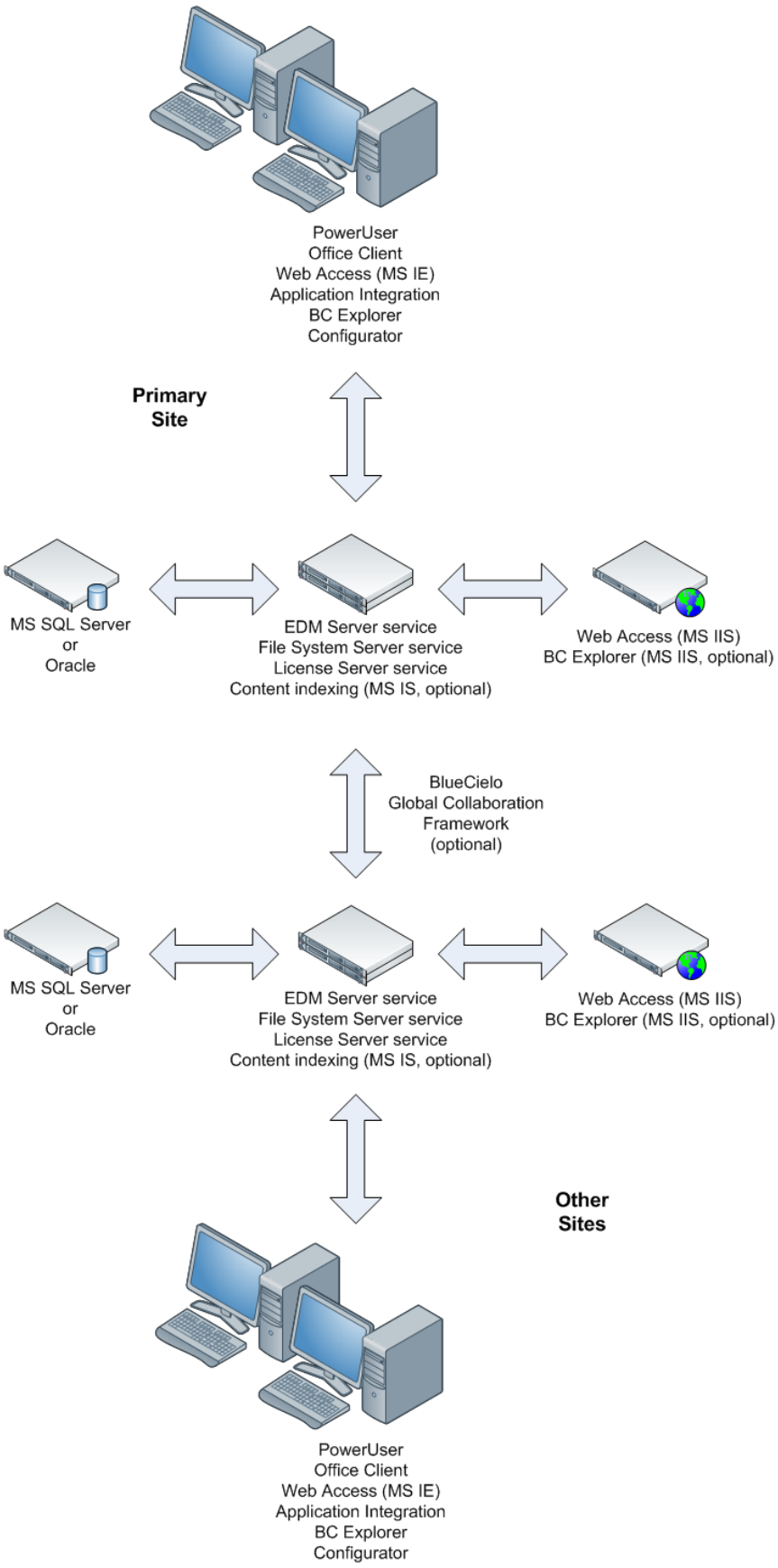
- The maximum cache size of each vault should be 1 GB or less. The combined sizes of all vault database caches plus user session memory must not exceed the amount of application virtual memory provided by the operating system.
- Windows Server /3GB and /userva switches enabled if more than 75 users.
- If multiple vaults are accessed frequently, the CopyDLL option enabled for each vault.
- A separate database server should be used only if there is a minimum 1 Gbps (fiber optic preferred) and very reliable connection to the Meridian application server. Otherwise, the application and database should be hosted on the same computer and 64-bit editions of Windows and Meridian installed.

2.3.3 Understanding the enterprise model

The enterprise model represents an organization with the following needs:

- Over 75 Meridian vault users, excluding Meridian Explorer repository users, which can be many more.
- One or more sites.
- Add-on modules such as the Meridian Asset Management Module, Publisher, and Global Collaboration Framework may be required.
- Moderate to heavy customization is implemented.
- Oracle or SQL Server is the organization's standard DBMS.
- An existing suitable web server is available.

A typical configuration to meet the needs of an enterprise would look similar to the following figure.


PowerUser
Office Client
Web Access (MS IE)
Application Integration
BC Explorer
Configurator
Primary Site
MS SQL Server
or
Oracle
EDM Server service
File System Server service
License Server service
Content indexing (MS IS, optional)
Web Access (MS IIS)
BC Explorer (MS IIS, optional)
BlueCielo
Global Collaboration
Framework
(optional)
MS SQL Server
or
Oracle
EDM Server service
File System Server service
License Server service
Content indexing (MS IS, optional)
Web Access (MS IIS)
BC Explorer (MS IIS, optional)
Other Sites
PowerUser
Office Client
Web Access (MS IE)
Application Integration
BC Explorer
Configurator

In this configuration, Meridian uses existing DBMS and web servers, and all remaining components are installed on one or more dedicated application servers at each of the organization's sites. Each site hosts its own vaults from which users may work not only on documents relative to that site, but also with documents residing at any number of other sites through the services provided by the Meridian Global Collaboration Framework.

Configuration of the Meridian application servers should include the following items.

- The maximum cache size of each vault should be 1 GB or less. The combined sizes of all vault database caches plus user session memory must not exceed the amount of application virtual memory provided by the operating system.
- Windows Server /3GB and /userva switches enabled if more than 75 users.
- If multiple vaults are accessed frequently, the CopyDLL option enabled for each vault.
- A separate database server should be used only if there is a minimum 1 Gbps (fiber optic preferred) and very reliable connection to the Meridian application server. Otherwise, the application and database should be hosted on the same computer.
- If more than 75 concurrent users per server, a dedicated 64-bit server:
  - Windows Server 64-bit edition (especially if Meridian and the database management system are hosted on the same computer).
  - Meridian 64-bit components installed

3 UNDERSTANDING SYSTEM REQUIREMENTS FOR THE MERIDIAN SERVER

There are numerous hardware configurations possible for the Meridian server, depending on how it will be used, and the database engine that is used. A server on which Meridian is running should be a dedicated server that is not used for any other purposes, such as a print server or running other applications.

The following Meridian application server components must be installed on the same server:

- AutoManager EDM Server service
- Optional BlueCielo File System (AMFS) service

The following components can also be run on the Meridian application server or on one or more separate servers, if required to improve scalability or performance.

- Optional SQL Server or Oracle database management systems. See the *Supported Software* document for this release of Meridian available from your BlueCielo ECM Solutions Solutions Partner or the BlueCielo ECM Solutions extranet.
- Optional Windows Indexing Service (for full-text searching)
- Optional Web Access (Internet Information Services)
- The BlueCielo License Server service

The optional SQL Server or Oracle database server can be either an existing server or new installations on the Meridian server (with adequate hardware resources). If a separate Oracle database server will be used, the Oracle client software must be installed on the Meridian application server. Both SQL Server and Oracle installations use the same cache used by the Hypertrieve database engine to improve performance, so the performance of each will be similar to Hypertrieve.

Servers with multiple processors can manage multiple vaults more efficiently, to reduce overall CPU loading.

3.1 Recommended server specifications

We recommend that you install Meridian on a server with the following specifications.

These specifications are recommended for the following environments:

- Minimum – Up to 50,000 documents and 15 users, or for demonstration computers.
- Recommended – Up to 100,000 documents and 30 users, or for demonstration computers.
- Best – More than 100,000 documents and more than 30 users.

Hardware specifications

Requirement	Minimum	Recommended	Best
CPU	Intel® Xeon® E3 or E5	Intel® Xeon® E3, E5, or E7	Intel® Xeon® E7
Memory	2 GB or higher depending on the total of all database sizes	4 GB or higher depending on the total of all database sizes	8 GB or higher depending on the total of all database sizes

Hardware specifications (continued)

Requirement	Minimum	Recommended	Best
Storage	1 GB + document storage space on high performance drives. Non-system partition volumes recommended. To calculate the document storage space, see “Understanding document storage space requirements” on page 12.		

Note Lesser specifications might be insufficient to configure HyperCache. For more information, see “About HyperCache” on page 13.

- Dedicated server that is not used for anything other than Meridian and its database engine, SQL Server or Oracle. Two or more processors (as fast as possible) are recommended when Oracle or SQL Server are used on the same computer or with multiple active vaults.
- CD-ROM drive (optional for installation only).
- One of the Windows Server operating systems (with latest Service Pack) listed in the *Supported Software* document for this release of Meridian. We recommend the 64-bit editions of Windows and Meridian, particularly if SQL Server or Oracle are installed on the same computer with Meridian (not recommended). The operating system should be installed with the roles and services described in “Server role requirements” on page 11.
- If the vaults will not be hosted on the Meridian application server with the Hypertrieve database engine, a connection to one of the database management systems listed in the *Supported Software* document for this release of Meridian.
  - If any vaults will use the **Oracle 5** database engine (not **Oracle 3**) to connect to either a local or remote Oracle server, the 64-bit Oracle Data Access Components (ODAC) must be installed on the Meridian server. For more information about database engine selection during vault creation, see Creating a new vault.
- The vault audit trail feature of the Meridian FDA Module and the subscriptions feature of Meridian Enterprise require a connection to one of the database management systems listed in the *Supported Software* document for this release of Meridian.
- SQL Server Compact Edition 3.5 (64-bit only) installed in advance. The Meridian Enterprise setup program will check for its existence and show a warning if it is not found. This is the default storage for external lookup tables, the user account database, and Local Workspace. This is not installed by the Meridian setup programs. An installation package is provided for manual installation.

  Note The lookup tables (but not the user account database or Local Workspace databases) can also be stored in a server edition of SQL Server. The supported versions of SQL Server are listed in the *Supported Software* document for this release of Meridian. Storage in a server edition has the following limitations:

  - Lookup table entries will not be included in the vault configuration export (`.met`) file. Therefore, they cannot be imported for use in another vault unless that vault is also connected to the same database server.
  - Lookup tables will not be included in the vault backup snapshots and must be backed up separately.

- Retrieving lookup table entries and using them in custom property pages requires VBScript programming. The database connection strings will be encoded in the scripting, which may pose a security risk for your organization and will require updating if the database server name is changed.

The data can be stored in Microsoft Access tables instead if the following requirements are met:

- An OLE DB driver is installed. Microsoft Office includes a 64-bit OLEDB driver named the Office System Driver that can be used to connect to Access, Excel, and text files. The provider name is Microsoft.ACE.OLEDB.<*VersionNumber*>. If Office is not installed, the driver is available as a separate download from the Microsoft Download Center by the name of Microsoft Access Database Engine Redistributable. For additional information, see Jet for Access, Excel and Txt on 64-bit systems at ConnectionStrings.com.
- The **ConnectionString** registry setting is configured
- The **TablesDb** registry setting is configured
- The **WorkspaceDB** registry setting is configured

Note Depending on how much additional data is stored in Microsoft Access (for example: document subscriptions, audit log, GCF transfer logs), the database can grow to where performance is degraded considerably. For that reason, we do not recommend using Microsoft Access for more than external lookup tables, the user account database, and Local Workspace. Store all additional data in SQL Server instead.

- One of the Internet Information Services version listed in the *Supported Software* document for this release of Meridian (for optional Web Access). The minimum IIS components that must be installed for proper operation of Web Access are described in “Server role requirements” on page 11.

  Note If the **Request Filtering** feature option **Allow unlisted file name extensions** is disabled in IIS Manager, the following file extensions must be added to the **File Name Extensions** list and allowed: `.dll,.gif,.png,.js,.css`.

- One of the Internet Explorer versions listed in the *Supported Software* document for this release of Meridian (some components are used by Meridian).
- Microsoft .NET Framework 4.0 Full Profile (the Client Profile is insufficient)
- Any additional requirements for specific operating systems or Meridian releases that are documented in the *BlueCielo Meridian Enterprise 2016 Release Notes*.

These specifications pertain to Meridian Enterprise only. Meridian can be one system within a larger computing environment that also includes Meridian Explorer, which can serve many times more users than Meridian Enterprise. For information about Meridian Explorer system requirements and deployment, see the *BlueCielo Meridian Explorer Administrator's Guide*. For the best possible performance, see “About HyperCache” on page 13. This specification is recommended for SQL Server or Oracle installations on the same computer with Meridian.

3.2 Server role requirements

Windows Server 2003 and higher allow you to select the operating system components that are installed on the server to match the functions that you expect the server to perform. This reduces system administration and the amount of disk space used. Certain components of Meridian Enterprise require that some operating system components be installed in order to function correctly.

The following table lists the minimum server roles and role services that are required for particular Meridian Enterprise components. These roles and services must be installed on the computer that will host the Meridian component, whether on the same server with other roles and services or on a different server. Additional roles and services may be installed but are not required.

Server role requirements

Meridian Component	Server Components
EDM Server service	**Application Server** role services: ■ **Windows Process Activation Service Support** ■ **HTTP Activation** **File Server** role services: ■ **Indexing Service** (optional)
BlueCielo File System Server (AMFS) service	**File Services** role services: ■ **File Server**
Web Access	**Web Server (IIS)** role services: ■ **Static Content** ■ **IIS Management Console** ■ **ISAPI Extensions** ■ **ISAPI Filters** ■ **Basic Authentication** or **Windows Authentication** per your organization's security requirements If AutoVue Client/Server will be deployed, the **Windows Communication Foundation HTTP Activation** feature must also be enabled.
Data Library web server	**Web Server (IIS)** role services: ■ **Static Content** ■ **ASP.NET 4.5** ■ **IIS Management Console** ■ **Basic Authentication** or **Windows Authentication** per your organization's security requirements

3.3 Understanding document storage space requirements

When estimating the disk space needed for a Meridian application server or file server, there are many variables involved:

- The number of vaults that will reside on the server
- The number of documents that will reside in each vault
- The size of the documents that will be stored in each vault

- The number of revisions of each document
- The type of database engine used (Hypertrieve, SQL Server, or Oracle)
- The number of properties that will be used in each vault
- The amount of data stored in each property

With all of these variables, an accurate disk space calculation is nearly impossible. But you can make a rough estimate with these formulas:

- Stream storage space for each vault = Number of documents × average document size × number of document revisions + 20 percent future growth.
- Database storage space = 0.6 to 1.0 GB per 100,000 documents. Triple the storage space if Hypertrieve is used, to allow for backup snapshot files. Double the storage space if SQL Server or Oracle is used (allow additional space for database replicas, if required).

These are rough estimates only, but should give you a good start on estimating server disk space requirements.

We strongly recommend that vaults be located on a different drive on the same server from the Meridian program files. The streams can be stored on any local or network storage device accessible by Windows via a UNC address and the account under which the EDM Server service is run. Vaults cannot be located on mapped drives, which require an interactive logon session. However, local disk storage typically provides the best performance and reliability. Database files should be located on the fastest possible drives.

Note Windows normally uses extended memory to cache data before writing it to virtual memory on disk. However, Windows does not do this if a Hypertrieve database is stored on a network device accessed by a UNC location. In that case, Windows assumes that the data could be modified by other users since it does not reside on the local computer.

3.4 About HyperCache

Note The following applies to Meridian 64-bit editions when run on a Windows 64-bit operating system only.

Because the 64-bit platform provides a vastly larger memory address space and server computers with large amounts (16 GB or more) of physical memory are readily available and affordable, Meridian performance and scalability can be improved with an optimal configuration called HyperCache. HyperCache is the default configuration for the Meridian Enterprise 64-bit platform.

In the HyperCache configuration, vaults are loaded entirely into memory. This maximizes the performance of these vaults, which typically serve larger numbers of users and higher document quantities. The contents of the HyperCache are saved in Hypertrieve databases between service shutdowns and startups for the fastest possible loading. The vault contents are replicated to repositories hosted by SQL Server or Oracle where they can be accessed with the Meridian Explorer client or standard reporting tools such as SQL Reporting Server and Crystal Reports.

Performance tests in simulated customer environments have shown HyperCache can improve performance significantly. Stress tests have shown that Meridian Enterprise 64-bit with HyperCache can manage 1.5 million documents (not counting revisions) and over 200 concurrent users while still providing good performance.

Earlier versions of Meridian Enterprise have been used mostly with up to 0.5 million documents (not counting revisions) and up to 100 concurrent users.

Note While these tests have been executed on hardware and software configurations that resemble typical customer environments, they cannot be taken to be representative of any particular customer environment. Therefore, in cases of more than 0.5 million documents (not counting revisions) and/or more than 100 concurrent users, we strongly recommend having the hardware and software configuration reviewed by BlueCielo ECM Solutions or your BlueCielo Partner.

We recommend HyperCache configuration for all customers, but particularly for those with the following scenarios:

- Existing systems with performance or scalability problems.
- Customers planning to significantly expand their number of users or documents in the near future.

Implementing HyperCache requires:

- 64-bit CPU server computer
- Adequate physical memory (greater than the sum of the sizes of all vaults stored in Hypertrieve)
- Microsoft Windows Server 2003 or 2008 or higher
- Additional requirements as listed in “Recommended server specifications” on page 9
- BlueCielo Meridian Enterprise 2012 or higher
- No new system administration tasks

To calculate the amount of physical memory required for existing Hypertrieve vaults, add the size of all vault database files together and round up to the next largest memory configuration available for the server computer. To calculate this amount for existing SQL Server or Oracle vaults, add half the size of all vault database files and round up.

Hypertrieve example

Memory Pool	Size (MB)
Windows Server operating system	2000
Meridian services	200
Meridian user sessions (25 MB/user * 50 users)	1250
Work In Progress vault	266
As-Built vault	789
Archive vault	1584
Min. Server Memory	**6089**

Assuming the closest available memory configurations for the server are 6 GB and 8 GB, select the 8 GB configuration at a minimum.

SQL Server or Oracle example

Memory Pool	Size (MB)
Windows Server operating system	2000

SQL Server or Oracle example (continued)

Memory Pool	Size (MB)
Meridian services	200
Meridian user sessions (25 MB/user * 100 users)	2500
Work In Progress vault	1902/2=951
As-Built vault	3048/2=1524
Archive vault	6692/2=3346
Min. Server Memory	**10521**

Assuming the closest available memory configurations for the server are 8 GB and 12 GB, select the 12 GB configuration at a minimum.

Configuring HyperCache is described in the following topic.

4 UNDERSTANDING SYSTEM REQUIREMENTS FOR MERIDIAN CLIENTS

For successful installation and acceptable performance on a client computer, the Meridian client applications require the following minimum specifications.

Hardware specifications

Requirement	Minimum
CPU	Intel® Pentium® 4 3 GHz with SSE2
Memory	2 GB (4 GB recommended and for 64-bit) or higher depending on the other applications used with Meridian
Storage	Up to 750 MB depending on the options chosen.
Display	1024 x 768 resolution with true color

The software requirements include:

- One of the Windows desktop operating systems (with latest Service Pack) listed in the *Supported Software* document for this release of Meridian. We recommend the 64-bit editions of Windows and Meridian.
- Microsoft SQL Server Compact Edition 3.5 (64-bit computers only, optional for 32-bit)
- Microsoft .NET Framework 4.0 Full Profile (the Client Profile is insufficient)
- Some of the optional Meridian modules require the .NET Framework 4.0 and other software to be installed. See the system requirements in the module's *Administrator's Guide*.
- TCP/IP networking protocol
- For document viewing, a version of the Java Runtime Environment that is specified in the *Oracle AutoVue Client-Server Deployment Installation and Configuration Guide* for the version of AutoVue that is installed with Meridian.
- Sufficient access rights for installation of Meridian (that is, a member of the **Administrators** group of the computer).
- Any additional requirements for specific operating systems or Meridian releases that are documented in the Release Notes.

Client computer specifications should be determined by the most demanding application that is installed on them. This is particularly true for heavy duty 3D CAD applications such as Autodesk AutoCAD, Autodesk Inventor, or SolidWorks. In such cases, you should always use a computer that meets at least the software manufacturer's recommended specification, not the minimum.

To use Meridian Web Access over the Internet or an intranet, a client computer must have a web browser capable of downloading, installing, and running ActiveX and JavaScript components. The supported web browsers are listed in the *Supported Software* document for this release of Meridian.

Notes

- To enable the correct functioning of the ActiveX controls used by Meridian Web Access, configure one of the following items on the **Security** tab of **Internet Options** in **Control Panel** for each Web Access user.

- For either the **Internet** or **Local intranet** zone (as applicable for your system), set all options under **ActiveX controls and plug-ins** to either **Enable** (preferred) or **Prompt** (and ensure the user always clicks **Yes** when prompted to use a control related to Meridian).

  OR

- Add the Meridian Web Access site to the **Trusted sites** zone.

- On Windows 64-bit operating systems, Internet Explorer 10 and 11 open web pages in 32-bit processes only. This is for backward compatibility with ActiveX components. Therefore, Meridian Enterprise installs and runs 32-bit components when necessary, particularly for viewing documents.

5 UNDERSTANDING NETWORK REQUIREMENTS

Because Meridian data is stored on a server, Meridian relies heavily on network performance. Therefore, the network bandwidth between all Meridian client and server computers must be 100 Mbps or higher to ensure adequate performance. The bandwidth between Meridian servers (application servers, database servers, web servers, and other servers used by Meridian) should be 1 Gbps or higher (preferably optical links and very reliable). There should be no switches, routers, hubs, or network cards slower than 100 Mbps at any point between Meridian computers. Just as important as speed is the latency (delay) of the network, which should be under 5 milliseconds between all LAN client computers and the Meridian application server. Real-time bandwidth, latency, and Meridian application server responsiveness can be measured with the **Diagnostics** command in PowerUser as described in the *BlueCielo Meridian Enterprise User's Guide*.

Note Although the Meridian application server is based on Microsoft Windows servers, it is possible to integrate Meridian into a Novell Netware network as long as user authentication can be performed with a Windows server. Both Microsoft and Novell offer tools to integrate each other's directory services into their own network.

Meridian relies heavily on the DCOM protocol. By default, DCOM communicates over a very wide port range (1024 to 6500). The Meridian desktop clients always start a DCOM session with a request on the TCP port 135 of the Meridian application server. If a response is received, DCOM handles further communications and determines which port will be used. It's essential to ensure that DCOM is running with TCP/IP only. If possible, delete all other protocols except TCP/IP if you are not using them. If you only have a restricted number of ports to use, refer to the Microsoft MSDN site for the current recommendation for the minimum number of ports to allocate.

If you use more than one Windows server or more than a few Windows workstations, we recommend implementing a Windows domain structure. We highly recommend installing Meridian only on a member server, not a domain controller. You might also need to configure security delegation as described in Understanding security delegation.

6 UNDERSTANDING SYSTEM REQUIREMENTS FOR OPTIONAL MODULES

The hardware and software specifications listed elsewhere in this document support the basic engineering content management functionality provided by BlueCielo Meridian Enterprise, the centerpiece of the BlueCielo Meridian Enterprise product suite. The entire suite includes optional modules that integrate with BlueCielo Meridian Enterprise to extend its functionality to other enterprise departments and information systems. Some of the optional modules impose additional requirements that should also be considered. A brief overview of the modules and their requirements are listed below.

Optional module resource requirements

Module	Function	Resource Requirements
Advanced Project Workflow Module	Provides advanced change management and project workflow features.	No additional resources.
Asset Management Module	Integrates Meridian with plant maintenance management systems (MMS).	Additional vault database storage space, high-speed ODBC connectivity to the MMS server, web server, synchronization processing time, additional client component installation may be necessary.
FDA Module	U.S. Food and Drug Administration 21 CFR Part 11 compliant functionality.	Meridian server configured to “Recommended server specifications” on page 9 specifications, additional vault database storage space, rendering storage space, SMTP server, audit log database server, rendering server, database client installed on Meridian server and clients (Oracle only).
Global Collaboration Framework	Wide area network collaboration on documents stored in remote vaults.	Additional vault database storage space, transfer file storage space, synchronization processing time, high-speed HTTP/FTP connectivity between Meridian servers.
BlueCielo Explorer	Easy to use, Web browser-based, read-only views of Meridian vaults for information consumers on a large scale.	Repository database server, web server, additional Windows components.
Publisher Module	Automated rendering of vault documents to alternative formats and publishing to other vaults or information systems.	Rendering storage space, rendering server, additional Windows components.
Transmittal Management Module	Provides features for the creation, tracking, and management of submittals and transmittals.	No additional resources.

Several of the modules listed above perform tasks under the control of the Windows Scheduler. If the tasks take too long to complete when run on the Meridian server, or if they need to be executed on a more frequent basis, an additional application server may be necessary.

For more information on specific requirements for each module, refer to the module's *Administrator's Guide*.