



Informatica® B2B Data Exchange
10.2.3

Performance Tuning Guide

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Publication Date: 2020-05-21

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Preface

Use the *B2B Data Exchange Performance Tuning Guide* to learn how to adjust the hardware and software configuration for B2B Data Exchange. Browse recommendations to improve throughput and scalability of the hardware and software through benchmark tests that you use to run B2B Data Exchange.

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CHAPTER 1

Performance Tuning

This chapter includes the following topics:

- [Performance Tuning Overview, 6](#)
- [Hardware Configuration, 6](#)
- [Software Configuration, 8](#)

Performance Tuning Overview

The goal of performance tuning is to optimize throughput, which is the number of events that B2B Data Exchange processes every second.

Performance tuning involves adjustments to the hardware and software configuration in your environment, which assist you to accommodate the different throughput requirements in the organization. The hardware and software adjustments also help to improve the production environment scalability, which is the ability to manage the environment resources in a way that maintains the desired performance when the data volume increases.

This chapter contains recommendations for adjustments to your hardware and software configurations. The recommendations are based on benchmark tests that measure the performance and scalability of B2B Data Exchange and PowerCenter workflows on different databases, operating systems, and software configurations.

Hardware Configuration

You can tune performance and optimize throughput by setting up and configuring your hardware to maximize throughput. Throughput is the number of events that B2B Data Exchange and PowerCenter process every second.

You can modify various hardware aspects to accommodate the required throughput. For example, you can install additional CPU cores, replace slower hard disks with faster and more reliable hard disks, or cluster multiple computers to handle the different product installations instead of a single computer.

CPU Cores

To improve the performance of the machines on which B2B Data Exchange runs, you can incorporate additional CPU cores based on the required throughput. You determine how many CPU cores to use based on the throughput requirements in your organization.

The recommendations in this section address throughput for B2B Data Exchange. For more information about the CPU core recommendations for PowerCenter and Data Transformation, see the *PowerCenter Performance Tuning Guide* and the *Data Transformation Performance Benchmark Guide*.

You can add CPU cores to a single machine, or you can use multiple machines in a cluster configuration. If you add CPU cores to a single machine, each CPU core adds full processing power to the machine overall processing power.

The following table describes the recommended minimum CPU cores that B2B Data Exchange requires for different throughput:

Events per Second	Minimum CPU Cores
100	8
200	16
300	24
400	32
Adding CPU cores to the machine may not accommodate processing of more than 400 events per second.	

Physical Storage and Memory

To improve the performance of the machines on which B2B Data Exchange and PowerCenter run, consider the following recommendations:

- Store the Data Exchange document store on a high-performance storage system, such as Network-Attached Storage (NAS), to increase the processing reliability and performance when PowerCenter processes large documents that B2B Data Exchange passes by reference. If you require higher throughput, do not use a Network File System (NFS).
- Store the database repository on a high-performance file system, such as Storage Area Network (SAN), to improve the data transfer speed and reliability.
- Store the B2B Data Exchange transaction log and the database repository on a high-performance hard drive, such as Solid-State Drive (SSD), to accommodate increased amounts of log entries.
- Run B2B Data Exchange on a machine with at least 8GB of RAM.

Cluster Environment

To improve the performance of the machines on which B2B Data Exchange and PowerCenter run, consider the following recommendations:

- Install the B2B Data Exchange server on a computer cluster instead of on a single machine.
- Store the database repository on a separate machine instead of on the same machine on which B2B Data Exchange and PowerCenter run.

Software Configuration

You can configure settings in B2B Data Exchange, PowerCenter, and the database repository software to tune performance and optimize throughput.

For example, you can pass documents from B2B Data Exchange to PowerCenter by reference, set up batch event creation requests that PowerCenter sends to B2B Data Exchange, or increase the maximum size of the redo log in the database repository.

The following sections describe the software modifications you can make to tune performance and increase throughput. The recommendations are based on performance benchmark tests in B2B Data Exchange and PowerCenter.

B2B Data Exchange Settings and Utilities

To improve the performance of B2B Data Exchange, consider the following recommendations:

- Set the log to INFO mode instead of DEBUG mode. By default, the B2B Data Exchange log generates less log entries in INFO mode. You can set the log to DEBUG mode troubleshoot issues and set it back to INFO mode to improve performance.
- In the dxruntime.sh utility for the Linux, AIX, or Solaris operating system, or the dxruntime.bat utility for the Windows operating system, increase the Java heap size for the B2B Data Exchange server. For more information about the utility, see the *B2B Data Exchange Installation and Configuration Guide*.
- In the server and console copies of the dx-configuration.properties file, you can tune several properties to improve throughput. For more information about the configuration file, see the *B2B Data Exchange Installation and Configuration Guide*.
 - Increase the number of maximum statements in the dx.jdbc.maxPoolSize property to 200.
 - To improve file send performance set the dx.mft.pool.maxSessionsPerEndpoint default setting to allow five files to be sent concurrently.
 - Tune the outbound threads control with the dx.queue.pool.outbound.threads.core property and the dx.queue.pool.outbound.threads.max property default setting to allow up to 20 messages to be processed concurrently.
 - Tune the inbound threads control with the dx.queue.pool.internal.threads.core property and the dx.queue.pool.internal.threads.max property default setting to allow up to 20 messages to be processed concurrently.
- When you define File Receive or Managed File Transfer endpoints for documents larger than 4KB, choose to pass documents by reference instead of by value.

Data Exchange Transformations in PowerCenter Workflows

You can configure certain Data Exchange transformations to optimize PowerCenter workflow performance. For example, you can reduce the amount of events that you add to documents, increase the number of partitions, or reduce the number of correlations.

For detailed information about specific impact of Data Exchange transformations on throughput, see the *B2B Data Exchange Advanced Performance Tuning Guide*.

Database Repository

To improve the database repository performance, consider the following recommendations:

- Increase the number of concurrent sessions that the database repository can run.
Note: Only the database administrator can perform this action. For more information, consult your database administrator.
- For Oracle servers, increase the size and the number of instances of the redo log. Each time the log file reaches the maximum size, the database creates a new log file. Increase the log file size to reduce the number of log files that the database creates during run time. Increasing the number of instances of the log file enables load balancing and increases the availability of the log files. The benchmark tests that are described in this document used three instances of the redo log with a file size of 2 GB for each instance .
- When the number of events in the event table exceeds three million, archive the events by using Data Archive. Otherwise, the B2B Data Exchange console can run slower or the database queries might fail. For more information about how to archive the events, see the *B2B Data Exchange Administrator Guide*.

B2B Data Exchange JMS Broker

To improve the performance of the B2B Data Exchange JMS broker, consider the following recommendations:

- If you split messages with one PowerCenter workflow process the messages with another PowerCenter, send the messages between the PowerCenter workflows in batches of at least 20 messages instead of sending each message separately.
- Disable persistency when you send messages between PowerCenter workflows.
- In the activemq.xml file, increase the memory limit and the storage size to match the JVM size. To do this, enter a higher value in the **memoryUsage limit** and the **storeUsage limit** parameters. For example, if the average message size is 10 KB, and your organization requires the queue to hold up to 1,000 messages, set the memory limit to at least 10 MB.
- Tune the values for the failover URL in the JNDI connection. For example, to change the timeout, maximum attempts, and initial reconnect relay, you might use the following settings:

```
jms.closeTimeout=30000&timeout=30000&maxReconnectAttempts=5&initialReconnectDelay=1000
```
- If you expect to create hundreds of AMQ connections either from B2B Data Exchange or from PowerCenter, set the AMQ broker to use the NIO configuration. Locate the following parameter settings:

```
<transportConnector name="openwire" uri="tcp://0.0.0.0:18616"...
```

Change to the following parameter settings:

```
<transportConnector name="openwire1" uri="nio://0.0.0.0:18616?
useQueueForAccept=false"/>
```

Configuration for Thousands of Endpoints

To improve the performance of the B2B Data Exchange endpoints when working with thousands of endpoints, configure the following settings:

- Improve the file input processing speed.
 - Use a fast file system. Ensure that the file input folders reside on computers with a fast file system.
 - Configure endpoints to multiple folders to avoid any individual folders that contain thousands of files.

- Adjust the file endpoint settings.
 - Tune the value for time interval to scan a folder for new files. Change the `dx.endpoint.file.scan.interval` system setting from the default value of **5** to the maximum number of seconds that the customer accepts, for example **120**.
 - Tune the value for the number of files expected each time that B2B Data Exchange scans a folder for new files. If more files are sent during peak periods than this value, the files wait for subsequent scans, which improves performance. Set the `dx.endpoint.file.scan.max` parameter to the expected number, for example **25**, instead of the default value of **250**.
 - Tune the value for the file backlog to a lower number. The backlog is the set of files that DX buffers during processing. Set the `dx.endpoint.file.backlog.max` parameter to a lower value, for example **250**, instead of the default value of **5000**. To change the expiration time for the backlog, set the `dx.endpoint.file.backlog.timeout` parameter, whose default value is **10**.
- Schedule the MFT endpoints that act as inbound client to collect files at an appropriate frequency to your communication needs. A schedule that is too short creates many requests to the remote server that fetch few, small files. A schedule that is too long might create large processing peaks.

Informatica Managed File Transfer Configuration Tuning

To improve performance, the following table describes the B2B Data Exchange property settings to be tuned:

Properties	Settings
<code>dx.infamft.httpclient.maxConnPerRoute</code>	Define the maximum number of HTTP requests to Informatica Managed File Transfer for the same project. For example, if Informatica Managed File Transfer is concurrently running five jobs from B2B Data Exchange for the same project, then the setting should be greater than five.
<code>dx.infamft.httpclient.maxconnectionTotal</code>	Define the maximum number of total HTTP requests to Informatica Managed File Transfer. The value should equal or exceed the total number of concurrent jobs launched from B2B Data Exchange that will run in Informatica Managed File Transfer.
<code>dx.queue.pool.outbound.threads.max</code>	The setting should have a higher value than the value for the property <code>dx.infamft.httpclient.maxConnTotal</code> .
<code>dx.queue.pool.inbound.threads.max</code>	Maximum number of Receive Jobs to trigger at a time.

The following connection and project timeout tuning is suggested:

- Increase project timeout in B2B Data Exchange system properties.
- Increase number of retry attempts for Informatica Managed File Transfer resource.
- Zlib compression is preferred for the SFTP resource, if the remote server supports this compression option.
- Increase the number of retry attempts for Informatica Managed File Transfer resources.
- Increase the client timeouts for remote servers and server timeouts for Informatica Managed File Transfer resources.

The Admin Server configuration in Tomcat for Informatica Managed File Transfer should be tuned to increase the maximum number of threads and the connection timeout for Informatica Managed File Transfer.

For Informatica Managed File Transfer, the following database tuning is suggested:

- Increase the maximum database connection to at least 200.
- Increase the maximum idle connection to the maximum to at least 30 seconds.
- Increase the maximum wait time to at least 10,000 msec.

CHAPTER 2

Performance Benchmark Tests

This chapter includes the following topics:

- [Benchmark Tests Overview, 12](#)
- [Transformation Performance Benchmark Test, 12](#)
- [Informatica Managed File Transfer Benchmark Test, 14](#)

Benchmark Tests Overview

This chapter describes a number of performance benchmark tests.

The Transformation benchmark test tested a single PowerCenter workflow that uses Data Transformation parsers and Data Exchange transformations under different CPU core combinations on single and multiple machines. The Transformation benchmark test measures the performance and scalability of B2B Data Exchange and PowerCenter workflows that use Data Exchange transformations.

The test results help determine which hardware and software configuration adjustments you can make to tune the performance and optimize throughput in B2B Data Exchange and PowerCenter.

The Informatica Managed File Transfer benchmark test examines how to optimize throughput, which is the number of files and events that Informatica Managed File Transfer processes every second. The benchmark test measured the performance and scalability of Managed File Transfer and B2B Data Exchange when using MFT tasks to get and put files. The test results help determine which hardware and software configuration adjustments you can make to tune the performance and optimize throughput in B2B Data Exchange and Informatica Managed File Transfer.

Transformation Performance Benchmark Test

The Transformation performance benchmark test determined the optimal hardware configuration and PowerCenter partitions to use when you want B2B Data Exchange to process a specific throughput of events per second with PowerCenter and Data Transformation.

The test was performed on a single machine with an 8 CPU core processing power, and in a cluster configuration with a combined 16 CPU core processing power. B2B Data Exchange sent documents with different file sizes to PowerCenter, which processed the documents by value with the X12 Parser transformation.

For the single machine, PowerCenter was configured to use 32 partitions. For the machine cluster, each PowerCenter installation was configured to use 16 partitions, with a total of 32 partitions.

The following table describes the performance benchmark test results:

File Size	Number of Machines	Events per Second	PowerCenter Partitions
2KB	1	385	32 partitions
2KB	2	500	2 x 16 partitions
6.5KB	1	189	32 partitions
6.5KB	2	367	2 x 16 partitions
16KB	1	98	32 partitions
16KB	2	187	2 x 16 partitions

The table illustrates that the machines reached maximum throughput when both machines in a cluster use 32 PowerCenter partitions to process a 2K file size document with no processing errors.

Transformation Benchmark Test Machine Specifications

The transformation benchmark tests were performed on single machines and on all machines in a cluster configuration. The test configuration contained one Oracle database machine and three identical application machines with B2B Data Exchange, PowerCenter, and Data Transformation.

The following table lists the test machine specifications for all test machines:

Category	Specification
Server Model	HP ProLiant BL460c G7 ServerOracle database
CPU Cores	2 X 8 Cores Westmere-EX 9350 1.73GHz
RAM	48GB
Local Disk	2 X 300GB 10,000RPM SAS hard disk
Shared Storage	HP P2000 disk array with 49 X 146GB 15,000RPM SAS hard disks
Operating System	Red Hat Linux 5.6 64-bit

PowerCenter Workflow Components

The PowerCenter workflow that the performance benchmark test used includes multiple Data Exchange transformations and Data Transformation parsers. The workflow is provided with this document.

The following table lists the order of the workflow components:

Order	Component
1	JMS Input
2	DX_Event_Details
3	DT_Streamers
4	DX_Create_Event Note: PowerCenter divided the file between the PowerCenter partitions and created an event for each partition.
5	DX_Add_Document_To_Event
6	DT_X12_Parser
7	DX_Add_Document_To_Event
8	DX_Set_Event_Attribute
9	DX_Event_Details
10	File Output

Informatica Managed File Transfer Benchmark Test

The Informatica Managed File Transfer benchmark test measured the performance and scalability of Managed File Transfer and B2B Data Exchange when using MFT tasks to get and put files. The test results help determine which hardware and software configuration adjustments you can make to tune the performance and optimize throughput in B2B Data Exchange and Informatica Managed File Transfer.

Informatica Managed File Transfer Benchmark Test Machine and Configuration Specifications

The following table lists the test machine specifications for the Informatica Managed File Transfer and B2B Data Exchange test server:

Category	Specification
Operating System, Virtual Machine	Windows Server 2012 R2 Standard
RAM	32 GB
CPU Cores	8 Core 2.40 GHz Processor
Kernel Version	9.3.9600.18821

The following table lists the test machine specifications for the remote test server:

Category	Specification
Operating System, Virtual Machine	Windows Server 2008 R2 Standard
RAM	16 GB
CPU Cores	8 Core 2.40 GHz Processor
Kernel Version	9.1.7601.23915

The following table describes the B2B Data Exchange configuration:

Category	Description
Number of partners	20 partners with one account
PowerCenter batch workflow	One workflow
Profiles	20 profiles

The following table describes the Informatica Managed File Transfer configuration:

Category	Description
Number of web users	Four web users
Resources	<p>Eight resources were tested with the following details:</p> <ul style="list-style-type: none"> - One FTP resource - One FTPS resource using password - One FTPS resource using certificate - Three SFTP resources using passwords - Three SFTP resources using certificates - Two SFTP resources using public/private key
Endpoints	<p>Twenty Informatica MFT Receive and Send endpoints were tested with the following details:</p> <ul style="list-style-type: none"> - Two FTP Remote Receive and Send endpoints - Two FTPS Remote Receive and Send endpoints using password - Two FTPS Remote Receive and Send endpoints using certificate - Six SFTP Remote Receive and Send endpoints using passwords - Four SFTP Remote Receive and Send endpoints public/private key - Four Hosted Receive and Send endpoints <p>All the endpoints use the same workflow.</p>

Informatica Managed File Transfer Sizing Benchmark

The Informatica Managed File Transfer sizing benchmark test helps to assess the optimal setup when you use Informatica Managed File Transfer with B2B Data Exchange.

The following table shows the configurations for the sizing tests:

Configuration									
Servers	1	1	2	2	2	4	4	8	16
CPU cores	4	8	8	16	16	8	16	16	16
Memory (GB)	8	16	16	32	64	16	64	64	32

The following table shows the throughput rate in MBs for the sizing tests for both inbound and outbound files:

	Average MBs / file									
Files/hour	0.01	0.1	1	5	10	25	50	100	500	1,000
10	0.1	1	10	50	100	250	500	1,000	5,000	10,000
100	1	10	100	500	1,000	2,500	5,000	10,000	50,000	100,000
500	5	50	500	2,500	5,000	12,500	25,000	50,000	250,000	500,000
1,000	10	100	1,000	5,000	10,000	25,000	50,000	100,000	500,000	
2,500	25	250	2,500	12,500	25,000	62,500	125,000	250,000	1,250,000	
5,000	50	500	5,000	25,000	50,000	125,000	250,000	500,000		
10,000	100	1,000	10,000	50,000	100,000	250,000	500,000			
25,000	250	2,500	25,000	125,000	250,000	625,000				
50,000	500	5,000	50,000	250,000	500,000	1,250,000				
100,000	1,000	10,000	100,000	500,000	1,000,000					

For example, for the test where an average of 10 files/hour were transferred, with an average file size of 0.01 MB, the equivalent of approximately 0.1 MB of files transferred per hour.

For the test where an average of 25,000 files/hour were transferred, with an average file size of 500 MB, the equivalent of approximately 1.25 TB of files transferred per hour.

Informatica Managed File Transfer Recieve and Send Benchmark

The Informatica Managed File Transfer Send and Receive benchmark test helps to determine the throughput of files for Informatica Managed File Transfer Receive with B2B Data Exchange.

The following table describes the File Receive action benchmark test results for Informatica Managed File Transfer:

Type	50 KB File (Receive)	250 KB File (Receive, Decrypt)	1 MB File (Receive)
Number of Peak Hours	7	7	7
Number of Normal Hours	3	3	3
Total Nmber of Files	249600	321789	99996
Files/Normal Hours	19200	24753	7692
Files/Peak Hour	38400	49506	15384
Missed Files	0	0	0
% CPU (Normal Hour)	60	78	75
% CPU (Peak Hour)	60	78	80
Network - Normal Hour	1 MB	6 MB	6 MB
Network - Peak Hour	1.25 MB	6 MB	6 MB
Disk I/O (Normal Hour)	1.25 MB	6 MB	6 MB
Disk I/O (Peak Hour)	-	40 MB	32 MB

The following table describes the File Send action benchmark test results for Informatica Managed File Transfer:

Type	50 KB File (Send)	1 MB File (Send)	1 MB File (Send)	1 MB File (Send)	1 MB File (Send, Encrypt)
NuMber of Peak Hours	7	7	7	7	7
NuMber of Normal Hours	3	3	3	3	3
Total NuMber of Files	59995	59995	249600	399997	299990
Files/Normal Hours	4615	4615	19200	30769	23000
Files/Peak Hour	9230	9230	38400	61538	46000
Missed Files	0	0	0	0	0
% CPU (Normal Hour)	30	30	60	70	80
% CPU (Peak Hour)	40	40	90	95	100

Type	50 KB File (Send)	1 MB File (Send)	1 MB File (Send)	1 MB File (Send)	1 MB File (Send, Encrypt)
Network - Normal Hour	200 KB	1 MB	2 MB	2 MB	2.5 MB
Network - Peak Hour	300 KB	1 MB	4 MB	8 MB	4 MB
Disk I/O (Normal Hour)	6 MB	50 MB	40 MB	52 MB	200 MB
Disk I/O Peak Hour)	12 MB	60 MB	80 MB	70 MB	300 MB

Informatica Managed File Transfer Longevity Benchmark

The Informatica Managed File Transfer benchmark test helps to assess action longevity when you use Informatica Managed File Transfer with B2B Data Exchange.

The following table describes the longevity benchmark test conditions:

Description	Amount
Total Duration in Hours	8
Number of Normal Hours	6
Number of Peak Hours	2

The following tables describes the longevity benchmark test hardware configuration for Informatica Managed File Transfer and B2B Data Exchange servers:

Informatica Managed File Transfer and B2B Data Exchange Servers	Specifications
OS	Windows Server 2012 R2 Standard
RAM	32 GB
CPU	8 Core 2.40GHz Processor
Machine Type	Virtual Machine
Kernal Version	9.3.9600.18821

The following tables describes the longevity benchmark test hardware configuration for the remote:

Remote Server	Specification
OS	Windows Server 2008 R2 Standard
RAM	16 GB
CPU	2.10GHz (4 Core)

Remote Server	Specification
Machine Type	Virtual Machine
Kernal Version	9.1.7601.23915

The following table describes the longevity benchmark test results for Informatica Managed File Transfer. The test included 414 GB of files, with a test duration of 8 hours, repeated over 4 day.

File Size	Receiving Files During Normal Hours	Receiving Files During Peak Hours	Sending Files During Normal Hours	Sending Files During Peak Hours
50 KB	1000	2000	1000	2000
1 MB	500	1000	500	1000
10 MB	500	1000	500	1000
100 MB	50	100	50	100
500 MB	10	20	10	20
1 GB	4	7	4	7
5 GB	3	6	3	6

The following table describes the longevity benchmark test total results:

Description	Normal Hours	Peak Hours
Total Files/Hour	2067	4133
Total Size Inbound/Hour	35 GB	51 GB
Total Size outbound/Hour	35 GB	51 GB
Total Processed Files	12402	8266
Total Size (GB)	210	102

The following table describes the timeline of completed events:

File Size	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	Subtotal
50 KB	1000	1000	2000	2000	1000	1000	1000	1000	10000
1 MB	500	500	1000	1000	500	500	500	500	5000
10 MB	500	500	1000	1000	500	500	500	500	5000
100 MB	50	50	100	100	50	50	50	50	500

File Size	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	Subtotal
500 MB	10	10	20	20	10	10	10	10	100
1 GB	4	4	7	7	4	4	4	4	38
5 GB	3	3	6	6	3	3	3	3	30
Total	2067	2067	4133	4133	2067	2067	2067	2067	20668

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