

04 March 2014

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Escalation Group

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**Recipient(s):**

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**Subject:****B2Bi troubleshooting & environment health-check**

## Summary

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1.	Introduction	3
2.	I/O Usage	4
3.	System / external application limits	9
4.	Network issues	12
5.	Trading engine restarts unexpectedly / slow restarts / errors at starting...	15
6.	Miscellaneous	17
7.	Appendix 2 : how to use Filerutil and filer_list programs	17

## 1. Introduction

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This document provides clues & best practices to troubleshoot stability issues on B2Bi (unexpected Trading Engine restarts, B2Bi task crashes, Intermittent or permanent low performance...) and to ensure that B2Bi has an appropriate setup.

## 2. I/O Usage

### 1- I/O speed

If I/O is not fast enough on the system, it may cause performances issues, and also unexpected B2Bi restarts : regular internal checks are performed to make sure that the response time to the shared disk is fast enough. If not, a forced stop is triggered and B2Bi performs a restart.

And as B2Bi is very I/O consuming, the I/O monitoring is very important.

That is why it is recommended to implement system alerts in case of slow I/O (to be done under the system administrator control)

- How to measure I/O speed (to be performed during a peak activity)

1. On UNIX / Linux, use the *sar* command to monitor the response time

➤ `sar -d 5 10 > /home/axway/sar_output.txt` runs the command 10 times, with 5 second between each execution and redirect the result in `sar_output.txt`

Focus on the *await (ms)* column. Getting high values (several hundreds) in case of high load indicates a possible problem.

08:12:22	DEV	tps	rd_sec/s	wr_sec/s	avgrq-sz	avgqu-sz	await	svctm	%util
08:12:27	dev8-0	33.40	0.00	568.00	17.01	8.50	254.57	4.04	13.50
08:12:27	dev8-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08:12:27	dev8-2	0.60	0.00	11.20	18.67	0.00	0.67	0.67	0.04
08:12:27	dev8-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08:12:27	dev8-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08:12:27	dev8-5	32.80	0.00	556.80	16.98	8.50	259.21	4.10	13.46

2. On Windows, use the *performance monitor* to detect possible IO bottlenecks

PhysicalDisk: % Disk Time more than 50% indicates a possible bottleneck

3. Use the program `$CORE_SOLUTIONS/4edi/pgm/b2bi_diskaccesstime.x4` to monitor the response times in B2Bi

The program returns 2 values: synchronized and unsynchronized.

Synchronized and unsynchronized refers to how integrator writes to the disk:

- Unsynchronized writes might go to system caches and then the operating system decides when to send them to the disk
- Synchronized writes are forced to go to the disk (to ensure that the data is not in memory and lost in case of a system crash)

Integrator Queue, Logger, Timer, Table, and Filer tasks use synchronized writes.

DML map or JMCs processing use unsynchronized writes.

Note that disk access usually increases when B2Bi processes messages.

Run the command when there is no or very low traffic.

Run the command several times to get an average time.

➤ *r4edi b2bi\_diskaccesstime.x4*

	<i>Synchronized</i>	<i>Unsynchronized</i>
<i>B2BI_SHARE_DATA</i>	<i>1.220 ms</i>	<i>0.085 ms</i>
<i>CORE_ROOT</i>	<i>1.395 ms</i>	<i>0.085 ms</i>
<i>CORE_DATA</i>	<i>1.385 ms</i>	<i>0.050 ms</i>

Getting less than 5 ms for the synchronized time is an acceptable value

Getting always less than 1 ms for the unsynchronized time is an acceptable value

#### Note

- disk access tool is also available in the Performance monitor on the Kernel Server Task (shared disk access time).
- the access time increases when the system is loaded. It may reach several seconds in case of high load

#### - Possible solutions to reduce the access time

##### 1. Disk

Make sure the disk itself guarantees sufficient performance. Fibre channel disks is recommended.

##### 2. Memory

Make sure that the system is not swapping : it would slow down the I/O significantly

##### 3. Service Packs level

Number of I/O calls have been decreased latest Service Pack.  
Installing the latest Service may improve the I/O speed.

#### 4. Message limit

When the size of the processed message is

- < message limit : the message is cached in memory

- > message limit : the message is written in a physical file in Integrator filer directory

Default value for the message limit is 4ko. Depending on the load (number and size of the messages), the complexity of the integration flow, the memory available on the operating system and the I/O speed, it can be interesting to modify such limit.

Example : we need to process high load (more than 5 messages /sec), most of the messages are around 10k, there is several Go memory available on the system, and we noticed that the I/O speed is very low. In such scenario, it makes sense to increase the limit in order to use more memory and to limit the number of I/O calls.

To modify the limit, use the Configure functionality / B2Bi Core and change the parameter "Message size for caching message content in memory".

#### 5. B2BI\_MESSAGE\_LOG

In case of high load of messages (for instance more than 5 messages/sec) and when each entries creates a large number of entries in the Copilot Message Log (depends of the integration flow complexity, for instance 15 entries for 1 unique message), it might be interesting to modify B2BI\_MESSAGE\_LOG setting.

Setting B2BI\_MESSAGE\_LOG to 0 will limit the number of log entries.

B2BI\_MESSAGE\_LOG should be modified in *\$CORE\_LOCAL/config/environment.dat*.

Refer to <https://support.axway.com:443/WSD/kb/152821> for further information

## 6. CORE\_NO\_SYNCPOINT\_DATA

Synchronous points enable to resend failed messages using the Copilot Message Log. Setting `CORE_NO_SYNCPOINT_DATA=yes` limits the number of synchronous points created during the execution of the flow.

By default, `CORE_NO_SYNCPOINT_DATA` is not set.

If project requirement affords it (it depends on the strategy used for the messages reprocessing) , it can be interesting to set `CORE_NO_SYNCPOINT_DATA`.

`CORE_NO_SYNCPOINT_DATA` should be modified in `$CORE_LOCAL/config/environment.dat.in` `$CORE_LOCAL/config/environment.dat`

## 7. Logger

An overloaded Logger can be very I/O consuming.

Be careful: logger searches returning a large number of entries consumes CPU, memory and disk space and may impact the message processing. Please refer to <https://support.axway.com/en/admin/kbadmin/article-details/id/164932> for further details

- Make sure that integrator archiving is working properly
  - Check in Copilot Message Log if there is entries older than X days where X = the "archive inactive logs older than" + "archive every" you can Open to the Configure tool to retrieve the values
  - Check if there is fxxx files older than X days, located in `$B2BI_SHARED/data/filer`

Note that :

- `$CORE_LOCAL/tool/pgm/filer_list.x4` and `$CORE_LOCAL/tool/pgm/filerutil.x4` can be used to list and remove filer files (refer to Appendix 2)
- Archiver task can also be ran manually. That could be interesting to troubleshoot archiver issues. Refer to <https://support.axway.com/en/admin/kbadmin/article-details/id/156825>
- Check how many f\*\*\* files are located in the filer directory
  - `cd $B2BI_SHARED_DATA/filer/singleton`
  - `find . -name "f*" -print | grep -c ".*"`
- Check if there is no "old" active entries. "Old" means older than the max processing time. It may happen for different reason (unexpected stop, processing errors...)

and can slow down the logger and slow down the start-up significantly. If it is the case, analyze the entries to figure out why the processing has not been complete, and reprocess or inactivate such active entries accordingly.

Inactivation of the active entries can be done in 2 different ways :

- using `LOGGER_OPTIONS` (refer to <https://support.axway.com:443/WSD/kb/68801>)
  - manually inactivating the entries in Copilot Message Log
- It is recommended to set the option `-D` and `-R` :
    - `-D` : In case the Logger instance has to regenerate indexes because of an earlier crash, this option tells the instance to initially just regenerate the main index. This makes it possible for a system using the Logger instance to be up and running in a shorter time
    - `-R` : This Logger instance automatically inactivates active log entries that have become older than the specified *time* option argument

## 2- I/O coherence (applies to cluster environments only)

- Various errors and warnings such as *"failed to stat filer directory"*, *"Filer insert reply: Returned filer file xxx is not empty"*, *"UTIL\_FILESTATUS: failed to fetch status for file xxx Stale NFS file handle"*, *"Filer insert reply xxx doesn't exist"* may be caused by coherence problem between the different nodes
  - o on Unix use such syntax to find such messages in Integrator traces :
    - `cd $CORE_DATA/trace`
    - `find . -name '*' |xargs grep -l "failed to stat filer directory "`
    - same command for the other messages
  - o on Windows, use Windows search
- Possible solutions
  - 1- IO coherence can be tested using [http://wiki.samba.org/index.php/Ping\\_pong](http://wiki.samba.org/index.php/Ping_pong) (note that the IO coherence testing part relies on working file system locks)
  - 2- If nfs file system is used : *"noac"* mounting option might be used. The noac option prevents clients from caching file attributes so that applications can more quickly detect file changes on the server. But be careful, the noac option decreases the performance significantly. Performance tests should be performed after using this option. Similar option exists for other file systems.
  - 3- Deactivate NFS cache : refer to <https://support.axway.com/en/admin/kbadmin/article-details/id/155881>



### 3. System / external application limits

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All the checks and modifications described in this chapter should be done under the system administrator control.

#### 1- Memory

Minimum memory required for B2Bi is 4GB.

But depending on the complexity of the flows and on the size of the messages processed, this number will differ, a usage of 16 – 32 GB might be recommended

Minimum CPU is 2 Dual Core, but depending on configuration and load, a usage of 2 Quad / Eight Core might be recommended

Running out of memory on the system leads to errors like *"no memory left"*, *"java heap space"* (depending on the impacted module).

It may occur in case of load peak or when processing messages larger than usual.

If it occurs, check the memory available when performing a load test, and make sure that the system has enough memory available to handle the load

- On AIX : use *svmon* command
- On Linux : use *free -m* command
- On Windows : use the Windows Task Manager

It is highly recommended to implement system alerts in case the memory left goes under a certain limit (to be done under admin system's control). Monitoring the most consuming processes is recommended as well, to detect possible memory leaks.

Check that *Xmx* values are appropriate

- Integrator : set *Xmx* value in *\$CORE\_LOCAL/config/jvm.cfg*
  - On UNIX: *UNIX:Replace '-Xmx128M'*
  - On Windows: *WINDOWS:Replace '-Xmx128M'*
- Interchange : update *Xmx* value for the related module (cn, te, tx) in *Interchange/conf/jvmArguments.xml*

#### 2- Sockets / no open files

Socket errors related can be (*"socket is already registered"*, *"Socket write timeout"*, *"SOCKET\_GET: recv() system call failed: No buffer space available"* *"too many open files"...*)

- on Windows, you can monitor the no files using the free tool "*process explorer*" (*process properties* -> *handle* column). There are different possible solutions :
  - increase *BSOCKET\_SOCKET\_COUNT* (default is 64. For instance, set it to 1024) in *\$CORE\_LOCAL/config/environment.dat*
  - modify Windows registry keys :
    - decrease *TCPTimeWait* (for instance from 240 to 60)
    - increase *MaxUserPort* (for instance, set it to 20000)
- Unix / Linux
 

There are actually 2 different limits : the overall limit on the system and the limit per process

  - Max number of open files on the system
 

On Linux, The file */proc/sys/fs/file-nr* provides the number of files allocated / available / max Ex : 20055 (allocated) 0 (available) 6553600 (max).

On Unix, use the command *lsof | wc -l* to check the no files opened in the system

It is a global value for all the processes.

If necessary, extend the max number of opened files by modifying the value in *proc/sys/fs/file-max*
  - Max number of open files per process
 

Use the command *ulimit -n* to retrieve the number of open files per process

Use the command *ls /proc/<pid>/fd|wc -l* where the <pid> refers to the B2Bi processes. Check in priority the processing engine (pids can be found in *Copilot* -> *Task Monitor*)

If necessary, increase the max number of open files per process, using *ulimit -n <new value>*

### 3- Oracle process

Reaching the max number of process connected to Oracle leads to the following error: "*tns no appropriate service handle found*"

Monitor the number of processes connected to B2Bi and Interchange instance, and change number of Process in Oracle accordingly (refer to the B2Bi administration guide for details)

### 4- Maximum number of connections on Interchange connection pool

Such error occurs when reaching the limit :

(JDBC.warn: 106) - The maximum number of connections (100) for the connection pool have been exhausted.

Refer to <https://support.axway.com/en/admin/kbadmin/article-details/id/160788> to increase the limit in Interchange

## 5- External application

Make sure that no external application is using too much system resources (I/O, memory...), especially during high load activity, and even during a short period of time.

Examples :

- Backup / snapshot of the windows machine (very I/O consuming)
- Virus scan (can make the system swap or lock the access to files)
- Porter scans (may cause port conflicts)

List the application / tasks which are scheduled through crontab, windows tasks schedulers etc... and provide the date and time and the job description

## 6- Ports

Use monitoring tools like *process explorer* (Windows) or *netstat / lsof* commands (Unix) to make sure that ports defined for B2Bi are not used by external applications. In case of suspicion, a script can be executed in background. Note that Integrator ports are prefixed by *\$CORE\_PORT\_PREFIX*.

UNIX commands samples :

- *netstat -Aan | grep [Port No]* - This shows if the specified port is being used. The hex number in the first column is the address of protocol control block (PCB)  
You can script this to check for all ports assigned to B2Bi.
- *rmsock [Port No] tcpcb* - This shows the process who is holding the socket. Note: This command must be run as root.

AIX example :

```
Netstat          -Aan          /          grep          30542
f10000f303321b58  tcp4          0          0          *.30542          *. *          LISTEN
```

The netstat command above shows that the port 30542 is being used for listening. To figure out which process is using the port, run rmsock as root ::

```
rmsock f10000f303321b58 tcpcb
```

The socket 0x3321800 is being held by proccess 692476 (db2sysc)

## 7- File system kernel threads

When A/A node start-up is slow (~ more than 10 minutes) on an nfs file system, increase the number of kernel threads (processes) that the nfsd daemon can use on the NFS share machine ("the server" in this context).

Default is 8 (*RPCNFSDCOUNT=8*) and can be increased to 30 threads (*RPCNFSDCOUNT=30*)

## 8- File system

It seems obvious but it is highly recommended to monitor the file system to avoid file system full and send alert when the disk available is lower than X Go.

In particular, monitor the space available on the shared directory.

Running out of space on B2Bi disks may cause uncontrolled behaviour.

If a file system full occurs, and if you are getting unexpected errors, first try to perform a *Configure* on B2Bi Core and Integrator component. I will restore system default configuration and may fix the problem.

# 4. Network issues

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All the checks and modifications described in this chapter should be done under the system administrator control.

## 1- Latency

High Latency (ping) will affect more small sized operations (filer ops).

Use the *ping* command to measure the latency :

- o to the shared disk
- o to B2Bi and Interchange databases

Response time must be at minimum < 100 ms

If the response time is > 100ms, contact the system administrator

## 2- Bandwidth

Bandwidth issues will affect logger and queue access performance.

Measure the bandwidth between Integrator server and the shared disk

- o on UNIX / Linux, execute the command `dd if=/dev/zero of=$B2BI_SHARED_DATA/file bs=4096 count=409600`

Be careful : such command will create a 1.5Go file on the shared disk  
Processing time < 30s is an acceptable result.

### 3- Database access

We need to make sure that the setup always guarantees a response time to the remote database < 5 seconds

If at any point the database response will fall under five seconds, the failover functionality will shut down the node that are experiencing a response time greater than five seconds and such error will occur :

*B2Bi Supervisor:282:Database is not available, request timed out. Request issued 6 seconds ago.  
B2Bi Supervisor:587:Set Forced Stop*

Kernel server uses 5 seconds before negotiating new system node when normal stop. In case of forced stop, the time is 60 seconds. To confirm that the network is the cause of B2Bi stability issues, it can be useful to increase the environment variable `B2BI_ISALIVE_TIMER` (default value = 5 seconds) in `$CORE_LOCAL/config/environment.dat` : if it fixes the issue, it means that the cause of the problem is probably network related.

Once the problem is identified and fixed, don't forget to reset the default value.

### 4- Recommendations

- Make sure that the network interface is at least 1Gb. But 10Gb is recommended.
- We recommend a dedicated shared files system for B2Bi, as opposed to the typical implementation scenario for centralized storage solutions like NetApp, being a big storage cloud for a whole company / multiple users and applications. Only a dedicated shared file system will guarantee the necessary read / write performance
- Make sure that no external applications are creating heavy load on the machine where the database resides, even during a short period of time
- Maximum Transfer Unit (MTU) optimisation : refer to <https://support.axway.com/kb/163707/language/en>
- When a network issue occurs and causes the nodes to restart, it may happen that both are trying to restart as primary node. As there can be only one primary node this obviously doesn't work and lead to major issues. You would get such error :

*Line 10540: 2012-09-10 14:55:02,959 - INFO [Cluster Thread 4]  
(ClusterMaintenanceManager.start:55) - This node is now responsible for  
cluster maintenance tasks*

The issue is due to installer not removing older version of a jar:  
com.axway.cluster.node-\*.jar.

Issue is caused by old versions of jar files that were not removed by the installer :

***D:/Axway/Synchrony/Interchange/corelib/com.axway.cluster.api-1.3.4.1.jar***

*D:/Axway/Synchrony/Interchange/corelib/com.axway.cluster.api-1.3.4.5.jar*

*D:/Axway/Synchrony/Interchange/corelib/com.axway.cluster.executive-1.3.4.5.jar*

***D:/Axway/Synchrony/Interchange/corelib/com.axway.cluster.node-1.3.4.1.jar***

*D:/Axway/Synchrony/Interchange/corelib/com.axway.cluster.node-1.3.4.5.jar*

Remove the 1.3.4.1 versions to get rid of this problem.

## 5. Trading engine restarts unexpectedly / slow restarts / errors at starting...

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Unexpected or erroneous TE restarts may have many different causes.

Root causes can be :

- OS related (see below : memory, IO, network...)
- configuration related (user tasks)
- product related

First step is to collect TE logs, CN logs and Integrator traces and to “merge” it to check which module threw the first error.

It's also very important to record every action (patch installation, OS upgrade, products restarts, external application start-up...) done on the system and correlate any action done with the logs (date and time).

If TE, CN and Integrator logs does not provide enough info to find out the root cause, adding the debug on the affected modules may provide useful information

- debug on B2Bi connector (Integrator side)  
<https://support.axway.com:443/WSD/kb/72403>
- debug on the B2Bi connector (Interchange side)  
<https://support.axway.com:443/WSD/kb/72404>
- debug on the Kernel Server task  
<https://support.axway.com:443/WSD/kb/73322>
- debug on the PM server task  
<https://support.axway.com:443/WSD/kb/70058>
- debug for the Data I/O within the HME task (Integrator)  
<https://support.axway.com:443/WSD/kb/153353>
- debug on the Queue task (Integrator)  
<https://support.axway.com:443/WSD/kb/153352>
- debug on the Filer task (Integrator)

<https://support.axway.com:443/WSD/kb/153350>

- debug on the Logger tasks (Integrator)  
set `LOGGER_OPTIONS=-d` in `environment.dat`
  
- Set the debug on B2BXServer
  - o Go to the *System Management* page. Click on the Integration Engine link.  
At "Add custom settings for this Integrator instance"
  - o Add following property:  
Name=`b2bxserver.debug`  
Value=`true`  
Traces will be written in `<hostname>_cn_console.log`
  
- Set the debug on a specific Integrator module (available in B2Bi 1.5.0\_SP6 and later)
  - o `r4edi $CORE_LOCAL/tool/pgm/task_setdebug.x4 -A password [-m host] [-c config server port] [-t name] [-d level]`
    - o `-d` should be 2 for debug
    - o `-t` should be the name of the task and can be found in B2Bi UI -> System Management -> Integrator Tasks (ex : "B2BX HME 4 Task")
  
- Generate and analyze dump files :
  - o Kill the Control node and check the console file  
`ps -ef | grep cn`  
`kill -3 <pid>`  
output file is : `Interchange/logs/cn_console.log`
  
  - o Kill the Trading engine node and check the console file  
`ps -ef | grep te`  
`kill -3 <pid>`  
output file is : `Interchange/logs/te_console.log`
  
- Set debug on the starter server (when B2Bi core cannot start) :
  - o after Interchange is started run the command :  
`r4edi st_debug.x4 -a local/config/passwd -s $CORE_STARTER_PORT -d y`
  
  - o check Integrator trace and look for debug entries coming from `starter.x4`



## 6. Miscellaneous

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- 1- Transaction Director is activated by default in B2Bi 1.5.0. if the customer do not need it, it is strongly recommended to inactivate it. Indeed, it overloads socket usage and may cause also HTTP errors :

*ERROR :20120821:13.03.25.64:procengine(procengine(hierchmsgenv)):the MBC 'B2Bi Express Get Transfer Report' threw an exception 'HTTPERR', error 701 in statement 'HTTPLIB.CLIENTDIALOG\_SOCKETEVENTREAD'*

*ERROR :20120821:19.03.02.88:procengine(procengine(hierchmsgenv)):the MBC 'B2Bi Express Dynamic Control' threw an exception 'HTTPERR', error 2901 in statement 'HTTPLIB.CLIENTDIALOG\_SOCKETEVENTREAD'*

*ERROR :20120821:12.37.17.31:procengine(procengine(hierchmsgenv)):the MBC 'B2Bi Express Dynamic Control' threw an exception 'HTTPERR', error 3001 in statement 'HTTPLIB.CLIENTDIALOG\_SOCKETEVENTREAD'*

*WARNING:20120821:18.07.41.74:procengine(procengine(procmbc\_be\_dynamiccontrol)):[<5203>]HTTP is completed by connection closure, possible data truncation*  
*ERROR :20120821:18.07.41.74:procengine(procengine(procmbc\_be\_dynamiccontrol)):Error NORESPONSE from TxD when trying to post an event*

## 7. Appendix 2 : how to use Filerutil and filer\_list programs

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- *filer\_list.x4*

Run Integrator profile

Run *r4edi* *~/filer\_list.x4* *\$B2BI\_SHARED\_DATA/filer/singleton* *>*  
*\$CORE\_ROOT/filer\_data*

Check the results in *filer\_data*

- *filerutil.x4*

First list the files older than *<no\_of\_days>* :

*r4edi* *filerutil.x4* *-a* *\$CORE\_LOCAL/config/passwd* *-r*  
*\$B2BI\_SHARED\_DATA/data/filer/singleton/ -t <no\_of\_days>*

To delete the files, run :

*r4edi* *filerutil.x4* *-a* *\$CORE\_LOCAL/config/passwd* *-r*  
*\$B2BI\_SHARED\_DATA/data/filer/singleton/ -t <no\_of\_days> -D*