# **WebSphere**<sub>®</sub>

Tuning AlphaBlox for WebSphere Business Monitor versions 6.1 and later



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### Chapter 1. Tuning Alphablox for WebSphere Business Monitor

WebSphere<sup>®</sup> Business Monitor uses Alphablox for dimensional analysis. To better use resources and avoid performance issues between WebSphere Business Monitor and Alphablox, additional tuning should be performed on the system. To fully maximize the performance, you should author monitor models with performance in mind and configure specific values for the production environment.

To schedule Alphablox cube caching and cube summary table refresh, see "Managing Monitor scheduled Services" in the WebSphere Business Monitor information center.

### Overview of WebSphere Business Monitor and Alphablox integration

Using Alphablox, WebSphere Business Monitor can provide multidimensional analysis on your monitored data using the Dimensions and Reports widgets and portlets.

#### How it works

During monitor model development, a cube is created automatically with each monitoring context. An optional cube is automatically created for each monitoring context level, however, it can be deleted from the model if not needed. Dimensions are defined for the cubes to enable dimensional analysis on the data of the monitoring context. When the monitor model is deployed to WebSphere Business Monitor, two additional date dimensions are added, CreationTime and TerminationTime, that track the instance creation and termination time (as mentioned in the following paragraph). Like all date dimensions, CreationTime and TerminationTime have a year/month/day hierarchy for drilling.

The CreationTime and TerminationTime dimensions represent the creation time and termination time for an instance. These dimensions are mapped to the database date-dimension table, DIM TIME, which contains the range of dates that will be used for dimensional analysis. Each time Alphablox starts, the dimension members for each cube are loaded into the Alphablox member cache, causing each date dimension to load the range of dates in DIM\_TIME into server memory. By default, the member cache is static, which causes the dimension member data to reside in server memory. The process can consume memory and CPU cycles in such a way that impacts system performance .

The information in "Tuning Alphablox for WebSphere Business Monitor" provides some tuning recommendations that you can implement to minimize the impact on system performance.

#### Monitor model considerations

During monitor model development, you should consider the performance impacts of your development decisions. Because each monitoring context requires an IBM® Alphablox cube to enable multidimensional analysis on the data of the monitoring context, you should design your monitor model to minimize the number of cubes that are created.

A cube exists for each monitoring context and, generally, a cube is not needed at each level. Starting with WebSphere Business Monitor 6.1.1 on DB2 and 6.1.2.3 on Oracle, a one-to-one relationship between monitoring contexts and cubes is no longer required. The entire dimensional model can be deleted from a monitor model, or various cubes relating to monitoring contexts can be deleted from the monitor model's dimensional model.

The basic way to reduce the number of cubes during development is to eliminate any child monitoring contexts that are not needed. Child monitoring contexts with their own metrics are only needed when there are multiple child monitoring context instances possible, such as in a BPEL subprocess loop.

**Note:** During monitor model generation, you can choose to monitor BPEL activities as "event groups" instead of "monitoring contexts". Monitoring BPEL activities as event groups reduces the number of monitoring contexts and subsequently the number of cubes.

If only one child monitoring context instance can exist and you still choose to model child monitoring contexts, then you can pull the metrics up into the parent monitoring context to create a centralized parent monitoring context. A centralized parent monitoring context would contain all metrics that are required for multidimensional analysis, which would allow you to delete the cubes associated with the children monitoring contexts. Doing this will create an additional column in the database for each child metric.

#### Centralized parent monitoring contexts

To create a centralized parent monitoring context, you must complete the following high-level tasks for a monitor model with a parent-child relationship between monitoring contexts:

- 1. Identify the metrics required for multidimensional analysis on the child metric, and create triggers to capture changes on the values in the metrics.
- 2. Create replica metrics for the child metrics on the parent metric, and set the trigger values to the same value as the child metric trigger. Likewise, the expression should be the same as the child expression.
- 3. Use the replica metrics on the parent metric for multidimensional analysis.
- 4. Delete the cubes for the child cubes that have replica metrics using the **Dimensional View** tab.

### **Tuning checklist**

If you are experiencing memory or performance problems when using Alphablox with WebSphere Business Monitor, consult the following general and advanced checklists for tuning assistance.

This following recommended tasks apply to WebSphere Business Monitor versions 6.2 and later. For WebSphere Business Monitor version 6.1.x, see "Tuning for 6.1".

#### General checklist

The following table contains the general tuning recommendations checklist for WebSphere Business Monitor 6.2. and later.

Table 1. General tuning recommendations

Recommended task	Related information
Schedule longer cube refresh intervals	For instructions, see "Managing Alphablox cube caching".
Remove dimension members for the years that are not needed	Delete all rows in the database date-dimension table, DIM TIME, and then add back only the years that you need. For instructions, see "Adding or removing date dimension values".
Disable or remove unneeded cubes	A cube exists for each monitoring context and, generally, a cube is not needed at each level. If the cubes were not removed from the model as discussed in the "Monitor model considerations" section, you can disable or remove them at run time. Using the WebSphere Application Server administrative console, you can remove all cubes for a version of a monitor model. Using the Alphablox administration console, you can disable specific cubes one-at-a-time. For more information, see "Disabling or removing cubes".

#### **Advanced checklist**

Use the advanced tuning recommendations checklist if you have completed the general tuning recommendations checklist in Table 1 and achieved insufficient results. The advanced tuning recommendations are for environments with deep histories or extensive numbers of cubes and dimensions.

Table 2. Advanced tuning recommendations

Recommended task	Related information
Use either the cross-version cube or the version-specific cube, not both	You can delete cubes for the monitoring contexts that have both cross-version and version-specific cubes.
Exploit the Alphablox dynamic member cache and data cache	For information about this topic, see "Alphablox caches" or consult the Alphablox information center.
Move to a 64-bit Java virtual machine (JVM)	A 64-bit JVM will have additional address space and can support much more memory usage than a 32-bit JVM.
For an extensive amount of instances, precompute aggregates and store them in database summary tables (MQTs).	When you have deep histories, such as 1 million or more instances, adding cube summary tables, also known as Materialized Query Tables (MQTs), can improve performance. See "Managing the cube summary table refresh" for detailed information.

### **Tuning for 6.1**

This checklist provides tuning recommendations for when you are experiencing memory or performance problems when using Alphablox with WebSphere Business Monitor 6.1.*x*.

**Note:** In WebSphere Business Monitor 6.1.1 and later, a cube is created automatically with each monitoring context, however, the pairing of a monitoring context to a cube is no longer required. In previous versions, the pairing of a monitoring context to a cube was required.

#### General checklist

The following table contains the general tuning recommendations checklist for WebSphere Business Monitor 6.1.*x*.

Table 3. General tuning recommendations

Recommended task	Related information
Schedule longer cube refresh intervals	For instructions, see in the 6.1 information center.
Remove dimension members for the years that are not needed	Delete all rows in the database date-dimension table, DIM TIME, and then add back only the years that you need. For instructions, see in the 6.1 information center.
Disable or remove unneeded cubes	A cube exists for each monitoring context and, generally, a cube is not needed at each level. If the cubes were not removed from the model as discussed in the "Modeling Considerations" section, you can disable or remove them at run time. Instructions are provided below for disabling cubes in WebSphere Business Monitor versions 6.0.x and 6.1.

#### Disabling cubes using the Alphablox administration console

- 1. From the **Administration** tab, click the **Cubes** link.
- 2. From the list displayed, select a cube to disable and then click **Edit**. (Note: Ensure that your browser is configured to allow pop-ups.)
- Next to the IBM Alphablox cube name field, clear the Enabled check box and then click OK.
- 4. Restart the Alphablox server.

## Disabling cubes using the configuration files on the system where Alphablox is installed

- 1. Locate the configuration files for a cube in the *Alphablox\_root/repository/* cubes/cube\_name directory, where:
  - *Alphablox\_root* represents the installation directory for Alphablox. *cube\_name* represents the name of the cube you are configuring.
- 2. Using a text editor, open a cube configuration file and set the value for **cubeenabled** to false.
- 3. Save the file and then restart the Alphablox server.

#### Advanced checklist

Use the advanced tuning recommendations checklist if you have completed the general tuning recommendations checklist in Table 1 and achieved insufficient results.

Table 4. Advanced tuning recommendations

Recommended task	Related information
Use either the cross-version cube or the version-specific cube, not both	You can delete cubes for the monitoring contexts that have both cross-version and version-specific cubes.
Exploit the Alphablox dynamic member cache and data cache	For information, see "Alphablox caches" or consult the Alphablox information center.
Move to a 64-bit Java virtual machine (JVM)	A 64-bit JVM will have additional address space and can support much more memory usage than a 32-bit JVM.

### Adding or removing date dimension values

The WebSphere Business Monitor database includes a date dimension table containing dates in the range January 1, 2008 through December 31, 2012. You can manually add or remove dates in this table using database scripts provided by WebSphere Business Monitor.

For the purpose of dimensional analysis with DB2<sup>®</sup> Alphablox, date-based metrics are automatically joined with the WebSphere Business Monitor database date-dimension table, DIM TIME. This ensures that there will be no gaps in the dates as you "drill down" on a date dimension and examine details at the year, month, and day levels. To accomplish this, the database date-dimension table, DIM TIME, is populated at the time of WebSphere Business Monitor product installation with dates from January 1, 2008 through December 31, 2012.

When an instance has a metric value not represented in the database date-dimension table (for example, a value before 2008 or after 2012), then, consequently, this instance will not be included in any dimension or report query. To include instances with dates outside of the existing date values in dimensional analysis, those dates must be added to the database date-dimension table. The dimension date values are cached in server memory, so you might want to remove unneeded past or future dates from the database date-dimension table DIM\_TIME to decrease server memory use and improve dimensional analysis performance.

In the case of database migration from WebSphere Business Monitor version 6.0.2, determine before migration which, if any, dates fall outside of the range January 1, 2008 through December 31, 2012. Additional dates before 2000 and after 2014 should be added to the WebSphere Business Monitor database script.

Note: The population is handled differently for each database vendor.

Database scripts have been included in the WebSphere Business Monitor installation to easily change the date range in the DIM\_TIME table. These scripts, by default, remove all existing entries and create fifteen years of entries from 2000 through 2014. Alter the scripts to include the date ranges required by the existing or projected set of instance data.

To add new dates to the database date-dimension table, DIM\_TIME, use the dim\_time\_entries scripts located in the dbscripts/Monitor/platform directory (for

example, for DB2: Monitor\_install\_dir/dbscripts/Monitor/DB2/dim\_time\_entries\_db2.ddl). Complete the following steps:

1. In a text editor, open the SQL script.

**Note:** Each database-specific script contains instructions for altering the date range to be created in the DIM\_TIME table.

- 2. Update the appropriate entries with the new dates.
- 3. Run the database-specific dim\_time\_entries ddl.

The following scripts are included:

- DB2 dim\_time\_entries\_db2.sql
- DB2 for zOS dim\_time\_entries\_db2\_zos.sql
- Oracle dim\_time\_entries\_oracle.sql
- Derby dim\_time\_entries\_derby.sql

**Note:** The Derby script loads DIM\_TIME entries from the dim\_time\_data\_2000\_2015.del data file. Date entries should be added to or removed from this file to change the date range to be loaded.

### Disabling or removing cubes

IBM Alphablox cubes are used for multidimensional analysis. Because each monitoring context is paired with a cube, unnecessary cubes might be created. Using the Alphablox administrative console, you can disable specific cubes for monitoring contexts that do not require multidimensional analysis. Using the WebSphere Application Server administrative console, you can remove all cubes for monitoring contexts that do not require multidimensional analysis for a version of a monitor model.

### **Disabling Alphablox cubes**

Use this procedure to disable specific cubes, one at a time, for monitoring contexts that do not require multidimensional analysis.

Using the Alphablox administration console, complete the following steps to disable unnecessary cubes:

- 1. Click **Cubes** to select the tab.
- 2. Click **Edit** for each cube you want to disable.
- 3. Clear the Enabled check box.
- 4. Click **OK**, and restart the Alphablox server.

### Removing Alphablox cubes

Use this procedure to remove all Alphablox cubes for a version of a monitor model.

Before you begin this task, you must log on to the WebSphere Application Server administrative console.

To remove Alphablox Cubes, complete the following steps:

- In the WebSphere Application Server administrative console, click Applications
   → Monitor Models.
- 2. Click the version of the model whose Alphablox Cubes you want to remove.
- 3. Click Manage Alphablox Cubes

- 4. For the Location field, select one of these two options:
  - Local if Alphablox is installed on a standalone monitor server or in a cluster known by the network deployment environment.
  - **Remote** if the Alphablox is installed on a server or a cluster in a different cell. If you select this option, complete the following:
    - a. In the **Host name** field, type the host name of the server on which Alphablox is installed.
    - b. The host name can be **localhost** if Alphablox is installed on the same physical machine as the monitor server. If you installed Alphablox into a cluster, Alphablox might reside on multiple servers in a cell. If it resides on multiple servers, you can choose any one of the Alphablox servers in the cluster and enter the host name for that server. Then, the cube is deployed to all servers in the cluster.
    - c. In the **RMI port** field, type the RMI port number of the server on which Alphablox is installed.
    - d. In the Security field, select either Disabled or Enabled. If you select Enabled, complete the log-on security credential (user ID and password) for this server.

#### Note:

- If you enable security, administrative security must also be enabled on the Monitor server. Otherwise, the creation of the Alphablox cubes fails
- The Alphablox cubes can only be deployed to a single Alphablox server. If you are using dashboards both on the WebSphere Business Monitor server and on WebSphere Portal, you can only deploy to one of these Alphablox servers. To deploy to both, you need to setup Alphablox clustering across the monitor server and WebSphere Portal Alphablox servers. In this case, you deploy the cubes to one of the servers and the cubes are automatically replicated on the other server.
- 5. Click Remove.

### Alphablox caches

Alphablox has two available caches that can be modified to potentially improve the performance of a cube, data cache and member cache.

The data cache stores cube cells fetched from the relational database and gets populated as measures are queried by users. The data cache is set to "unlimited" by default, but you can add a maximum size to improve memory utilization.

The member cache stores dimension metadata (members) and gets populated upon cube startup or refresh. Member cache can be tuned to either completely or partially cache members. Static member caching is the default method for all cubes, however, it requires large amounts of memory because the data is stored in memory. To improve memory utilization, change the caching method to be dynamic member caching.

#### Cache refresh

WebSphere Business Monitor controls the refresh frequency for the Alphablox caches. For best results, configure the refresh settings using only the Monitor scheduled services (not the Alphablox administrative pages). See "Managing Alphablox cube caching" for more information.

### Configuring dynamic member caching

Alphablox has two types of member caching available, static member caching and dynamic member caching. Static caching is a mechanism where all dimensional data is loaded into memory when Alphablox is started. Static caching is the default caching method for all cubes, however, it requires large amounts of memory because the data is stored in memory. Dynamic member caching is a mechanism for caching dimensional data where Alphablox loads the dimensional data into memory, indexes the data, stores the data in the Alphablox repository, and then removes the server memory. To improve memory utilization, you should use dynamic member caching.

Before configuring dynamic member caching, you should consider the number of input and output operations that are performed and the CPU utilization these activities require. Using dynamic member caching will also cause delays in MDX queries and increased time for Alphablox startup.

Complete the steps to configure dynamic member caching using the Alphablox administration console:

- 1. Click **Cubes** to select the tab.
- 2. Click Edit for each cube.
- 3. Click **Tuning** in the navigation panel.
- 4. Select **Dynamic** for the **Member Cache**.
- 5. Set the maximum value to be greater than 11000 for the **Dynamic Member Cache Settings**.
- 6. Click **OK**, and restart the Alphablox server.

### Configuring the data cache

To improve memory utilization (but potentially decrease performance), you can change the data cache from "unlimited" to a maximum size.

To configure the data cache using the Alphablox administration console, complete the following steps:

- 1. From the **Administration** tab, click the **Cubes** link.
- 2. Select an Alphablox cube from the list and then click **Edit**.
- 3. In the navigation panel, click **Tuning**.
- 4. Under Data Cache, clear the **Unlimited** check box and then enter a value (number of rows) in the **Max size** field.
- 5. Click **OK** to save changes and then restart the Alphablox server.

### Managing Alphablox cube caching

Use the Alphablox cube caching service to increase response time on the Dimensional and Reports widgets by caching cube measure values. You can view and schedule the cube caching service using the Alphablox administrative console.

By default, Alphablox cube caching service is suspended after a model is deployed to provide access to the most recent monitor data from the Dimensional and Reports widgets. Although access to the most recent data is valuable during model development and in small production environments, it might cause performance degradation in larger production environments. In these cases, the Alphablox cube caching service can be resumed and scheduled for the frequency and timing that you want. After the cube cache refreshes at the scheduled interval, the first

dashboard user to request a specific dimensional result has to wait for the query to execute. Subsequent requests and subsequent users receive an instant response to the same query because the result is cached.

Note: If dimensional queries are still taking too long after resuming the cube caching service, you can enable the cube summary table refresh service. This service pre-aggregates the dimensional values in the background, thus improving the dashboard response time for even the first dashboard request after the cube cache refresh. If the cube summary table refresh service is enabled, configure both services to run on the same interval and timing to ensure that the cached values are the most recent values.

#### Accessing Alphablox cube caching settings

To manage scheduled Alphablox cube caching services using the WebSphere Application Server administrative console, click **Applications** → **Monitor Services** → Monitor Scheduled Services → model\_name → Scheduled Services → Alphablox Cube Caching.

### Chapter 2. Troubleshooting tips and references

You can find troubleshooting information for WebSphere Business Monitor on the on the IBM Support Portal (http://www.ibm.com/support/entry/portal/Downloads/Software/WebSphere/WebSphere\_Business\_Monitor). Some of the existing troubleshooting topics for version 6.2 are listed here for your reference.

#### Additional dimension members may not initially display

Additional dimension members may not initially display in View mode in Dimensions and Reports after they are configured or edited.

If you configure Dimensions or Reports to display a set of cube dimension members, due to a Alphablox limitation, only the members that exist at the time of configuration (or edit) will be displayed in View mode. If the cube is updated to contain additional dimension members after the views are configured (or edited) and you want to display these values in View mode, the view should be re-configured (or reedited) so that the new values are displayed. For a temporary fix: you can perform a drill up, then a drill down, on the dimension and the updated members will appear. However, the next time you log into WebSphere Portal, those members still will not be shown.

#### Troubleshooting topics reference

Table 5. Alphablox-related troubleshooting topics in WebSphere Business Monitor 6.2 information center

Topic title	URL	
AlphaBlox administrator password errors	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/dash_abx_pwd_error.html	
AlphaBlox unable to start on AIX	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/admin_abx_nostart.html	
Unable to automatically create Alphablox cubes during Monitor model installation or from Manage Alphablox Cubes link	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/admin_abx_connect.html	
Unable to create AlphaBlox cubes on a remote WebSphere Business Monitor server	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/admin_abx_remote_server.html	
Enabling WebSphere Portal security causes AlphaBlox to end unexpectedly	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/dash_abx_ends.html	
Microsoft Excel file not valid when exported using AlphaBlox	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/dash_abx_xls.html	

Table 5. Alphablox-related troubleshooting topics in WebSphere Business Monitor 6.2 information center (continued)

Topic title	URL
ZipException during server startup	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/admin_zipexception_startup.html
Dimensions and Reports messages	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/message_dashboard.html
0551–0600 Lifecycle Alphablox Handler messages	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/message_lifecycle_abx_handler.html
6201–6250 Lifecycle Alphablox messages	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/trouble/message_lifecycle_abx.html

# Chapter 3. Reference page

This page contains a list of references related to using Alphablox and WebSphere Business Monitor.

Table 6. Published documentation

Information center name	URL
developerWorks	http://www.ibm.com/developerworks
IBM's resource for developers and IT professionals	
IBM Alphablox Version 9.5 information center	http://publib.boulder.ibm.com/infocenter/ablxhelp/ v9r5m0/topic/com.ibm.db2.abx.ic.doc/ welcome_alphablox.htm
IBM WebSphere Business Monitor 7.0 information center	http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r0mx/topic/com.ibm.btools.help.monitor.doc/home.html
IBM WebSphere Business Monitor 6.2 information center	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.doc/home.html
IBM WebSphere Business Monitor 6.1 information center	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r1mx/topic/com.ibm.btools.help.monitor.doc/home_top.html

Table 7. Alphablox-related topics in WebSphere Business Monitor 6.2 information center

Topic name	URL	
Tuning AlphaBlox for WebSphere Business Monitor	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.install.doc/config/abx_tune.html	
Installing AlphaBlox into your monitoring environment	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.install.doc/install/abx_inst.html	
Configuring AlphaBlox	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.install.doc/install/abx_cfg.html	
Managing Alphablox Cubes	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/admin/ablox_manage.html	
Select Monitor model AlphaBlox options	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.admin.doc/admin/install_ablox_options.html	
Adding or removing date dimension values for AlphaBlox dashboards	http://publib.boulder.ibm.com/infocenter/ dmndhelp/v6r2mx/topic/ com.ibm.btools.help.monitor.install.doc/admin/ ablox_dim_table.html	

Table 7. Alphablox-related topics in WebSphere Business Monitor 6.2 information center (continued)

Topic name	URL
Migrating the AlphaBlox repository	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/topic/com.ibm.btools.help.monitor.install.doc/migration/mig_abx_db.html

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