Core Services Plug-In for IIB Statistics

Version 11

Installation and User's Guide

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Chapter 1: Introduction

Welcome to the meshIQ Platform Core Services IBM Integration Bus (IIB) Statistics Expert Plug-in Guide. This guide describes installation and use of the IIB statistics expert. This plug-in is designed to work with Core Services, platform components, and other plug-ins, and run simultaneously without interference or performance degradation.

1.1 How This Guide is Organized

Chapter 1*:* Identifies the users and history of the document. System requirements for this plug-in are outlined. All other system and platform information is listed in the Core Services Installation and User's Guides.

Chapter 2: Contains a brief description of the IIB Statistics Expert along with the statistics that are collected for message flows.

Chapter 3: Provides instruction for new installations of the IIB Statistics Expert Plug-in.

Chapter 4*:* Provides instruction for using the IIB Statistics Expert Plug-in.

Chapter 5: Provides a listing of IIB Statistics Expert metrics.

Appendix A*:* Provides a detailed list of all reference information required for the installation of Core Services.

Appendix B: Contains conventions used in Core Services and documents typographical conventions.

1.2 History of This Document

Table 1-1. Document History

Release Date:	Document Number	AutoPilot/Core Services Version	Summary
May 2022	**AP/IIBE 611.003.1**	**N/A**	Updated name of document to *Autopilot M6 Plug-in for IBM Integration Bus (IIB) Statistics Installation and User's Guide*
August 2024	**CSIIB 11.000**	**11.x.x**	Updated document to reflect meshIQ Platform.

1.2.1 User Feedback

meshIQ encourages all Users and Administrators of the meshIQ Platform to submit comments, suggestions, corrections and recommendations for improvement for all platform documentation. Please send your comments via email. Send messages to: *support@meshiq.com*. You will receive a written response, along with the status of any proposed change, update, or correction.

1.3 Related Documents

The complete listing of related and referenced documents is listed in *Appendix A* of this guide.

1.4 Intended Audience

The IIB Statistics Plug-in Guide is intended for use by installers and administrators of meshIQ Core Services and IIB Expert. There are three user groups defined for the purpose of installation and use.

- **Installer:** The installer should be familiar with Java Run Time Environment 11 (JRE 11) or higher. Procedures for installing software on the target platform such as Windows and/or UNIX. Basic understanding of TCP/IP and IBM MQ.
- **Administrator:** The administrator should have a working knowledge of middleware, TCP/IP, and system management. The Administrator should also have an understanding of Java Runtime Environment (JRE) and TCP/IP and installation procedures for the platform where Core Services are installed (for example, Windows or Linux).
- **User:** Requires only local operating system operations knowledge and basic knowledge of Core Services.

1.5 System Requirements

This section defines system and platform prerequisite support requirements for Core Services/IIB.

1.5.1 Platforms

The IIB Statistics expert is compatible with the following platforms:

- Windows 10 or later
- Unix (AIX, Linux)

1.5.2 Other Requirements

The IIB Expert requires the following conditions:

- Core Services 11.x.x or later
- JDK 11.x.x or higher
- IBM Integration Bus (IIB) or later
- Target operating system environment
- Installer may need administrative privileges for the target platform.
- Since communication between IIB and Core Services is done via IBM MQ, it is necessary to have a proper installed IBM MQ client on the CEP server that is hosting the expert.

1.6 Technical Support

If you need additional technical support, you can contact meshIQ by telephone or by email. To contact technical support by telephone, call **(800) 963-9822 ext. 1**, if you are calling from outside the United States, dial **001-516-801-2100**. To contact mySupport by email, send a message to *mysupport@meshiq.com*. To access the meshIQ automated mySupport system (user id and password required), go to: *http://mysupport.meshiq.com/*. Contact your local meshIQ Platform Administrator for further information.

1.7 Conventions

Refer to *Appendix B* for conventions used in this guide.

Chapter 2: About the IIB Statistics Expert

2.1 Introduction

The IIB Statistics Expert is designed to monitor and manage your IIB environment (also known as message broker). IIB generates internal message flow accounting and statistics information which are processed by the IIB Statistics Expert and integrated into the meshIQ Platform infrastructure. Communication from the IIB Statistics Expert to Core Services is through an IBM MQ queue via an IBM MQ server connection.

The IIB plugin is compatible with Version 10 and upward (using the integration API).

- The expert connects to MQ using properties on the IBM MQ tab to collect statistics information. It connects to IIB using http using properties from the IIB Options tab to collect status information (when the publish status option is selected).
- Existing WBI plugin instances are not upgraded when applying the expert. If you are migrating from V9, you will need to manually add and configure new experts for V10 instances.
- If you run in a mixed V8/V9 and V10 environment and want to collect status information from BOTH V8/V9 and V10, you will need to run the WBI expert and the IIB expert on different CEP instances that have unique lib folders due to incompatible IBM jar files. The easiest way to do this is to run them on separate servers.
- You are no longer required to use an IBM JRE to collect status information for IIB V10 and above.

2.1.1 Definitions

Broker – Routing and Transformation Engine supporting various protocols such as http, MQ, and files.

Message Flow – A specific logical flow through the message broker which may include logic, transformation, and routing.

Threads – processing threads allocated to an Execution Group which execute the message flows

Execution Group – A grouping of related message flows that provides isolation, performance allocation, and control.

Topic – A hierarchy that describes the context of a specific message.

Subscription – A request to receive posts to all or part of a topic hierarchy.

Queue Manager – An IBM MQ service that provides the underlying technology for Message Broker. Required even if the broker does not use IBM MQ Message Flows.

2.1.2 IIB Message Flow Summary

The expert can collect three distinct types of data from the broker. (See details below.)

Statistics Data

- Message Flow Statistics
- Thread Statistics
- Node Statistics
- Terminal Statistics

Resource Usage

- Execution Group Usage
- Component Usage
  - JVM, Parsers, etc.

Status Data

- Broker Status
- Execution Groups
- Message Flows

Please refer to the IBM manual for additional information regarding message flow accounting and statistics data:

http://www-01.ibm.com/support/knowledgecenter/SSKM8N_8.0.0/mapfiles/help_home_msgbroker.html.

Chapter 3: Installation & Configuration

3.1 Installation Preparation

This section contains general information related to preparing for and installing the IIB Statistics Expert software.

3.1.1 Installation Materials

Installation can be performed from installation media or by downloading files from the meshIQ Resource Center.

3.1.1.1 Technical Documents

Prior to installation, review all text files and installation procedures provided on the meshIQ Resource Center. We recommend that you print all installation related materials to allow the installer to review them prior to installation and better follow the detailed instructions within.

3.1.2 Licensing Information

A copy of the standard Licensing Agreement is imbedded in the installation software. The formal licensing agreement has been furnished in the purchase agreement package.

3.2 Installation

This section provides instructions for installing IIB Statistics Expert on compatible platforms. Review all installation related materials prior to commencing installation procedures. Reviewing materials will allow installers to determine installation options and familiarize themselves with associated requirements.

3.2.1 Before Installing the IIB Statistics Expert

This procedure outlines the typical procedures for installing the IIB Statistics Expert for all supported platforms.

1. IBM Integration Bus (IIB) 9.0 or later.
2. Ensure that Performance Message Flow accounting and statistics are enabled and that the detail level is configured according to your needs. (This will be done in *section 3.2.3*.)
3. The system that the CEP server is running on can access the IBM MQ Queue manager.
4. If the optional IIB status data is required, an IBM JRE must be available to the CEP server.
5. If the com.ibm.mq.allclient library version is earlier than version 9.3.3, set up the following system property in node.properties on the CEP:
   `property com.ibm.mq.cfg.useIBMCipherMappings=false`
6. Using the IBM MQ iKeyman tool, create a client JKS key store that includes the queue manager certificate.
   - The IBM MQ server certificate must have alias “ibmwebspheremq“ + queue manager name (in lowercase).

- The client certificate must have alias “ibmwebspheremq“ + user name (in lowercase) that will be used to connect to the channel.

3.2.2 Installing the IIB Expert from the meshIQ Resource Center

1. Download the IIB Statistics Expert Plug-in from the meshIQ Resource Center.
2. Save your work and log off Core Services.


NOTE

There are no specific logoff procedures required to exit the User Console.

3. Stop the Nodes and/or Domain Servers that will be updated as specified in the *Core Services User's Guide*.
4. Copy `AP_IIB-`*`version`*`.pkg` into the `[`*`AUTOPILOT_HOME`*`]\updates` directory.


NOTE

Core Services can be installed on a Windows or a Unix machine. For Unix, substitute forward slash '/' in all directory paths.

5. At the command prompt, run:
`[`*`AUTOPILOT_HOME`*`]\bin\pkgman ..\updates\AP_IIB-`*`version`*`.pkg`


NOTE

Make sure there are no errors posted at the bottom of the screen.

6. Verify plug-in installation: `[`*`AUTOPILOT_HOME`*`]\bin\pkgman -info`. You should see **IIB-Plugin** in the installed library list.

3.2.3 Configuring Message Flow Accounting and Statistics Data in IIB

The message flow accounting and statistics data is generated by IIB. This functionality is turned off by default and has to be configured by the IIB administration. Please refer to the IBM IIB manual for detailed information about activation of the message flow accounting and statistics data.

3.2.3.1 Activating Statistics Collection

There are two types of data collection:

- archive
- snapshot.

Archive data is for use in longer term sampling of data (that is, data you want to collect continuously for general monitoring of message flows). The user defines the data collection interval. The default is 60 minutes. To change this interval, use the **`mqsichangebroker`** command with the **`-v`** parameter.

Snapshot data is the type you want to collect for a short period of time when you are troubleshooting a problem in one or more message flows. The snapshot data is collected every 20 seconds, and you cannot change this interval.

The output format must be xml when used with the expert.

To activate message flow statistics (that is, "publish" the data), use the following command:

`mqsichangeflowstats`

The options set using this command remain active until modified by a subsequent **`mqsichangeflowstats`** command. The format of the command will be different on distributed and z/OS systems, but the data collected is the same. The command **`mqsireportflowstats`** can be used to display the current settings.

- For archive data, use the **-a** option and for snapshot data, use the **-s** option. You can activate both archive and snapshot data collection.
- For all execution group and message flows, use the **-g** and **-j** options. You can also specify specific execution groups with **-e** and flows with **-f**.
- Thread **(-t)** and Node **(-n)** statistics are optional and should match expert DetailLevel settings.
- Output format must be xml **(-o xml).**

Sample commands for Windows/Unix/Linux:

`mqsichangeflowstats` ***`Broker`*** **`-s -g -j –t basic –n basic –o xml -c active`**

Activate (c active) archive data (-a) snapshot data collection (-s) for all execution groups (-g), all message flows (-j), basic thread statistics (-t basic), basic flow processing node statistics (-n basic), output statistics message format is XML capturing basic data.

`mqsichangeflowstats` ***`Broker`*** **`-a -g -j –n advanced -c active`**

Activate archive data collection (-a) for all execution groups and message flows including advanced node level statistics.

`mqsichangeflowstats *Broker* -a -e EGRP -f MyFlow1 -c active -t basic`

Activate archive data collection for execution group EGRP and only message flow MyFlow1 include basic thread statistics.

Sample commands for z/OS:

`mqsichangeflowstats integration_node_name -a -e "EGRP2" -f MyFlow1 -c inactive`

Turn off archiving of accounting data collection for message flow MyFlow1 in integration server (another term for execution group) EGRP2 in a given integration node (another term for a broker).

`mqsichangeflowstats *integration_node_name* -s -g -j -b none`

Turn on snapshot statistics (-s) for all message flows (-j) in all execution groups (-g) and specify that the statistics are not to be partitioned according to accounting origin data (-b none).

Sample command using SDSF on z/OS:

`F CS71BRK,CS A=YES,G=YES,J=YES,C=ACTIVE,O=XML,T=BASIC,N=ADVANCED`

where:

`A=YES` means collect archive data; use **`S=YES`** to collect snapshot data

`G=YES` means include all execution groups

`J=YES` means include all message flows

`C=ACTIVE` means turn on statistics collection; use **`C=INACTIVE`** to stop statistics collection

`O=XML` means collect statistics into an XML formatted message

`T=BASIC` means include message flow process thread related statistics

`N=ADVANCED` means include message flow node related statistics and terminal related statistics

To see the status of z/OS message flows in an execution group:

`F CS71BRK,LIST  E='EG0001'`

3.2.3.2 Collection Data

To activate data collection (that is, "subscribe" to the data), create a subscription based on the following topic structure:

`$SYS/Broker/brokerName/StatisticsAccounting/recordType/executionGroupLabel/messageFlowLabel`

Example Subscriptions:

`$SYS/Broker/Broker1/StatisticsAccounting/#`

Subscribes to all data collected for Broker1.

`$SYS/Broker/+/StatisticsAccounting/SnapShot/#`

Subscribes to all SnapShot data for any broker.

`$SYS/Broker/Broker2/StatisticsAccounting/+/EGRP/#`

Subscription to data for Execution Group EGRP only for Broker2.

The resultant data is then placed on a queue for processing by an application. This queue will be referenced in the broker configuration below.


NOTE

The topics may be configured to be persistent and to overflow to the dead letter queue by default. This can be changed by creating a topic definition that specifies these options.

3.2.4 Configuring Resource Statistics Data in IIB

Resource statistics are resources used by execution groups. The following are examples of resource statistics usage:

- JVM
  - Identify memory resource issues
  - Frequent Garage Collection
- Parsers
  - Identify Resource cost of a parser
  - Identify inefficient parser architecture
- Sockets
  - Traffic patterns

3.2.4.1 Activating Resource Statistics Collection

You must activate resource statistics collection; by default, collection is not active. To activate resource statistic collection (that is, "publish" the data), use the following command:

`mqsichangeresourcestats`

Once executed, resource statistic collection is set until reset. The collection interval is fixed at 20 seconds. Data is collected for all or a specific execution group. Commands are similar for distributed and z/OS.

Sample commands:

`mqsichangeresourcestats Broker -c active`

Activate resource statistics data collection for all execution groups of this broker.

mqsichangeresourcestats *Broker* -e EGRP -c active

Activate resource statistics data collection for execution group EGRP of this broker.

mqsichangeresourcestats *Broker* -c inactive

Deactivate resource statistics for all message flows in all execution groups for this broker.

z/OS command in Unix file system to activate resource statistics data collection for all execution groups, all message flows:

/usr/lpp/wmqi/V8R0M0/bin/mqsichangeresourcestats *BrokerName* -c active

3.2.4.2 Resource Statistics Collection

The topic for each message has the following structure:

$SYS/Broker/*broker_name*/ResourceStatistics/*execution_group_name*

You can set up subscriptions for a specific execution group on a specific broker, for example:

$SYS/Broker/MB7BROKER/ResourceStatistics/default

You can also use wildcards in the subscriptions to broaden the scope of what is returned. For example, to subscribe to reports for all execution groups on all brokers, use the following values:

$SYS/Broker/+/ResourceStatistics/#

The resultant data is then placed on a queue for processing by an application. This queue will be referenced in the broker configuration below. The same queue should be used for both message flow and resource statistics data.

3.2.5 Configuring Status Data in IIB

These steps are only necessary when collecting status information which uses the broker CMP (Configuration Manager Proxy) API, renamed to IBM Integration API.

1. Copy the CMP API jar from broker to the Core Services library, [*AUTOPILOT_HOME*]/lib.

For example:

```
C:\Program Files\IBM\MQSI\8.0.0.1\classes\ConfigManagerProxy.jar
```

2. Update atpnode.lax to use an IBM JRE or JDK.

For example:

```
lax.nl.current.vm=C:\\...\\ibm_sdk70\\jre\\bin\\java.exe
```

Chapter 4: Core Services Integration

The following is required to enable Core Services to receive facts generated by the message flow accounting and statistics data of IIB.

1. Open the User Console.
2. Click Deployment Tool to display Directory Viewer (if not already displayed).

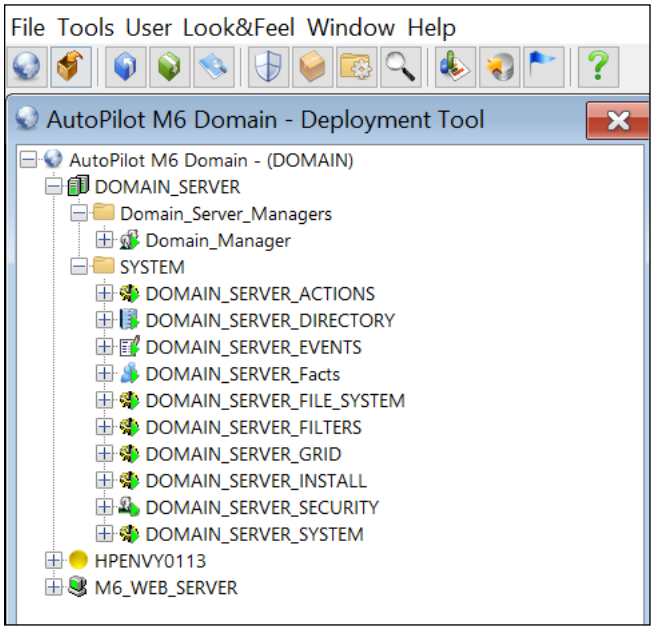

Figure 4-1. Deployment Tool and Networked Nodes

3. Right-click the CEP server, (for example, *HPENVY013* in Figure 4-2), to monitor message flow.
4. Click **Deploy Expert > IIB Monitor > IIB Monitor** to open the *Create IIB Monitor* configuration screens.

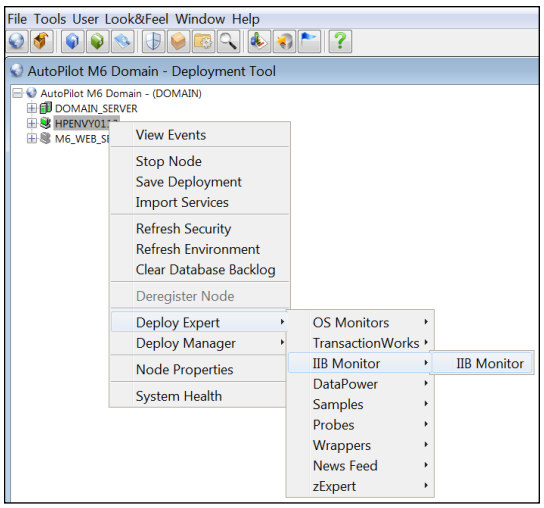

Figure 4-2. Deploy IIB Statistics Expert

NOTE

As of version 11.0.1, the IIB Management tab is no longer available in the Core Services Plug-In for IIB Statistics.

5. On the **IBM MQ** tab, complete the input fields as described below. This is required to set up connection to the IBM MQ queue manager.

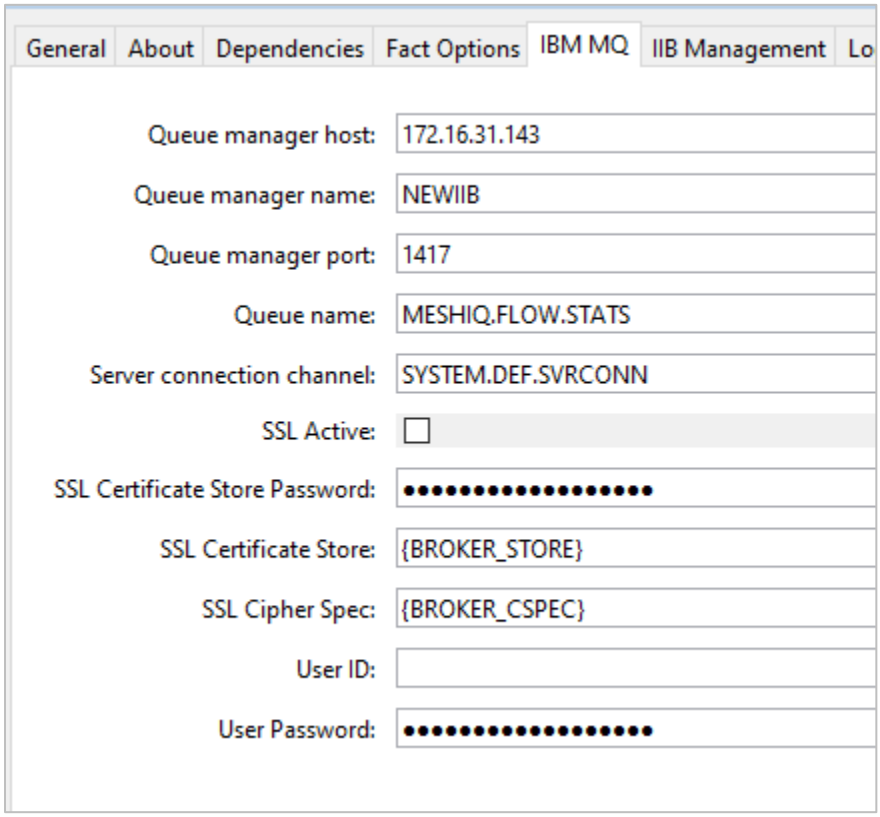

Figure 4-3. Create IIB Monitor – IBM MQ Tab

Table 4-1. IIB Monitor – IIB MQ Properties

Property	Description
Queue manager host	Queue manager host
Queue manager name	Name of the queue manager to read IIB statistics messages from (IBM MQ server connection).
Queue manager port	Queue manager port.
Queue name	Name of the queue to read IIB statistics messages from.
Server connection channel	Name of server connection channel.
SSL Active	Select this checkbox to enable the SSL Internet security protocol.
SSL Certificate Store Password	Password for access to the certificate store database file.
SSL Certificate Store	Full path to the certificate store database file. Example: `C:/ProgramData/IBM/MQ/qmgrs/QM_SMA_SSL/ssl/client/client.jks`

Table 4-1. IIB Monitor – IIB MQ Properties	
Property	**Description**
SSL Cipher Spec	The cipher to use for the SSL connection. (Example: TLS_RSA_WITH_AES_128_CBC_SHA256)
User ID	User ID passed to queue manager for user authentication, if required, for statistics and resource data collection. **Note:** The broker status request is issued with the user ID of the CEP server and uses the IBM Integration API, also known as the Configuration Manager Proxy, or CMP, and sometimes referred to as the IBM Integration Bus Java API.
User Password	User password passed to the queue manager on connect.

6. On the General screen, change the **Name** and **Brief description** to reflect the IIB Monitor Expert functionality.

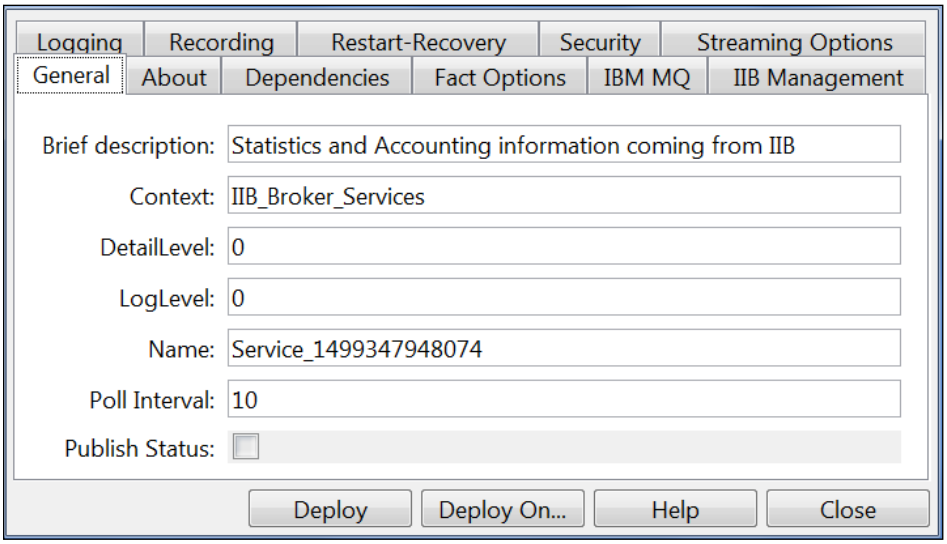

Figure 4-4. Create IIB Monitor – General Tab

7. The following properties are available for the IIB Monitor expert. Review (if updating existing Expert) or configure data elements as follows:

NOTE Dependencies are reserved. Leave blank unless required. Dependencies are comma delimited lists of services within a Managed Node. The lists must be available to the specified service prior to loading. The sequence of service loading is determined by the list.

Table 4-2. IIB Monitor – General Properties	
Property	**Description**
Brief description	Short description of the service.
Context	User defined category that will be registered in the Domain Server. Context is displayed as folder icon under each Managed Node.

Table 4-2. IIB Monitor – General Properties	
Property	**Description**
DetailLevel	Detail level for message flow statistics collection: 0 only message flow statistics 1 message flow statistics + thread statistics 2 message flow statistics + thread statistics + node statistics 3 message flow statistics + thread statistics + node statistics + terminal statistics
LogLevel	Specifies the logging level - 0 in production - 1 in debug situation
Name	Name that uniquely identifies the service in the Domain Server. Enter or modify the Service Name as required, or in accordance with local guidelines. Variations of names are used when deploying services on multiple Nodes. No spaces or blanks are recommended in Service Name formats. Example: IIB_Monitor.
Poll Interval	Interval in seconds to poll the message queue.
Publish Status	Include status data in published metrics (requires integration API).

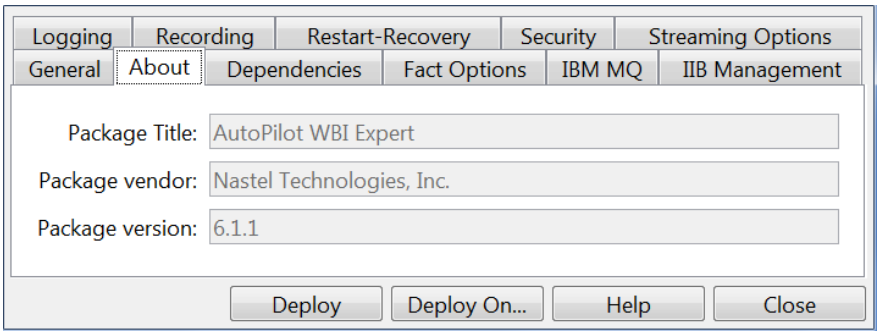

Figure 4-5. Create IIB Monitor – About Tab

Table 4-3. IIB Monitor – About Properties	
Property	**Description**
Package Title	Implementation title of source package.
Package vendor	Name of implementation vendor.
Package version	Package version as assigned by the vendor.

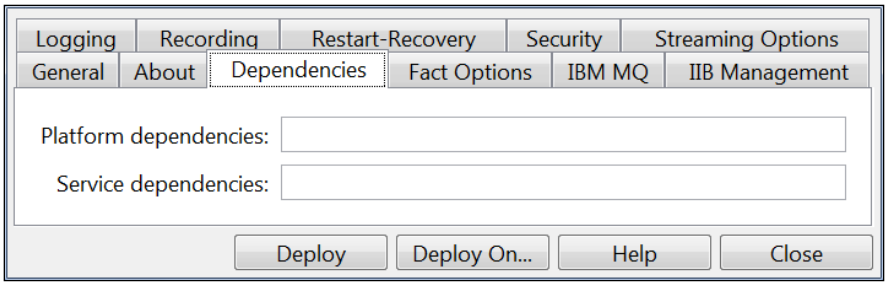

Figure 4-6. Create IIB Monitor – Dependencies Tab

Table 4-4. IIB Monitor – Dependencies Properties	
Property	**Description**
Platform dependencies	Comma separated list of operating system platforms this expert is dependent on.
Service Dependencies	Comma separated list of services this expert is dependent on.

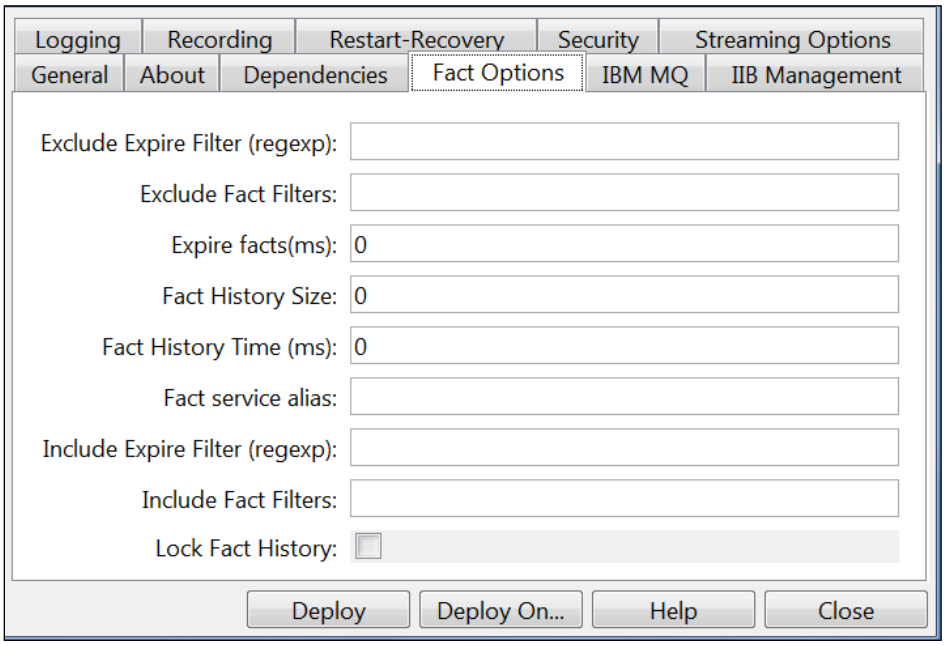

Figure 4-7. Create IIB Monitor – Fact Options Tab

Table 4-5. IIB Monitor – Fact Options Properties	
Property	**Description**
Exclude Expire Filter (regexp)	Facts that match the specified regular expression are not expired.
Exclude Fact Filters	Comma separated list of fact paths to exclude during publishing. For example: *SYSTEM*, *FactName*
Expire facts(ms)	User-defined time in which facts that have not been updated within a specific time automatically expire (in milliseconds). The default is 0, which means never expire. However, in most applications, 0 should not be used. In cases where certain data is no longer published, if 0 is used, these facts will never expire. It is recommended that this value be 50% larger than the sample rate.
Fact History Size	Automatically maintains the specified number of samples for each published fact in memory.
Fact History Time	Automatically maintain fact history not exceeding specified time in milliseconds.

Table 4-5. IIB Monitor – Fact Options Properties	
Property	**Description**
Include Fact Filters	Comma separated list of fact paths to include during publishing. For example: *SYSTEM*, *FactName*
Fact service alias	If supported by the expert, specifies the alternative service name that the expert will publish its facts under.
Include Expire Filter (regexp)	Facts that match the specified regular expression are expired.
Lock Fact History	Enables/disables history collection after accumulating the first history batch up to **Fact History Time** or **Fact History Size** which ever limit is reached first. If disabled newer history samples replace older on a rolling basis.

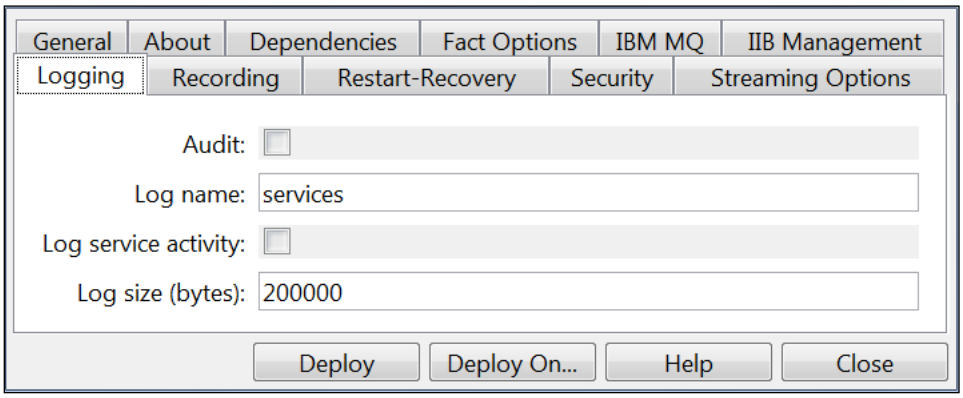

Figure 4-8. Create IIB Monitor –Logging Tab

Table 4-6. IIB Monitor – Logging Properties	
Property	**Description**
Audit	Enable/Disable service audit trace. Default is disabled.
Log Name	Log name associated with the service. The default name is Services, but may be changed as required. (Example: `Task_Progress_Process_Log`)
Log service activity	Enable/Disable service activity trace. Default is disabled.
Log size (bytes)	Log size in bytes. Real log size is the maximum value of the server.log.size and logsize.

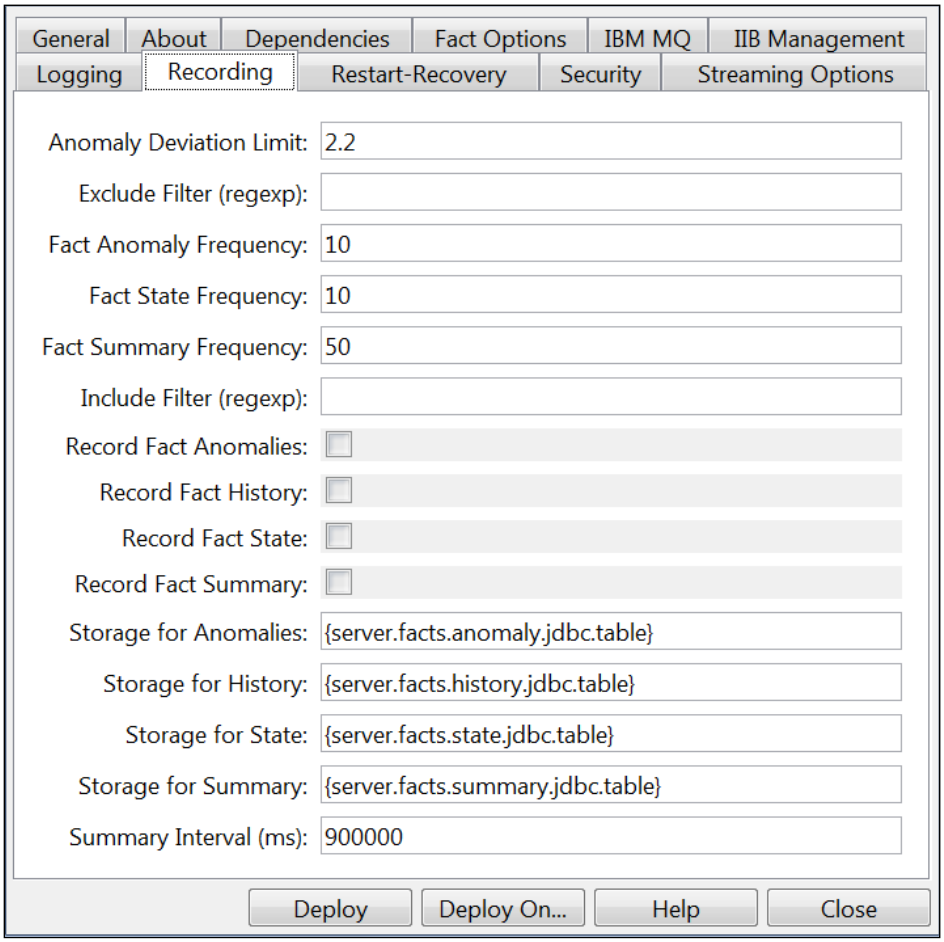

Figure 4-9. Create IIB Monitor – Recording Tab

Table 4-7. IIB Monitor – Recording Properties

Property	Description
Anomaly Deviation Limit	The number of standard deviations from the mean at which the value is considered an anomaly. For example, a value of 2.2 is 2.2 standard deviations. Requires fact recording to be configured (although not actually recording).
Exclude Filter (regexp)	A regular expression filter to exclude certain facts from being written to the database. Facts have the format `expert\class\instance\leaf=value` such as in the example `Servers\Linux\Serv7\processes=40`.
Fact Anomaly Frequency	The frequency of fact updates at which anomaly calculation is done. A value of 10 indicates every 10th sample. A value of 1 would analyze every fact update to determine if it was an anomaly.
Fact State Frequency	If **Record Fact State** is enabled, the value entered here specifies how often the Fact State is updated.
Fact Summary Frequency	If **Record Fact Summary** is enabled, used to write an intermediate summary record every Xth update to the fact during the Summary Interval. In this example, every 50th update to the fact an intermediate summary record is recorded. This is done to avoid waiting 15 minutes for a summary record to appear in the summary table.

Table 4-7. IIB Monitor – Recording Properties	
Property	**Description**
Include Filter (regexp)	A regular expression filter to include certain facts being written to the database. Same format as described for the exclude filter.
Record Fact Anomalies	If enabled, records every fact anomaly into the Anomaly database. The exclude/include filters are respected. Requires fact recording to be configured (although not actually recording).
Record Fact History	If enabled, records every fact change into the History database. The exclude/include filters are respected. To define database tables and set Core Services options, refer to the *Core Services Administrator's Guide*, section 4.5.4.1.
Record Fact State	If enabled, records the last value published (current state) into the state database and restores that value when the CEP Server is stopped and restarted. The exclude/include filters are respected. To define database tables and set Core Services options, refer to *Core Services Administrator's Guide*, section 4.5.4.1.
Record Fact Summary	If enabled, records summary record at the interval designated in the **Summary Interval (ms)** field into the Summary database. The exclude/include filters are respected. To define database tables and set Core Services options, refer to *Core Services Administrator's Guide,* section 4.5.4.1.
Storage for Anomalies	Database table where the Fact Anomalies data is stored.
Storage for History	Database table where the Fact History data is stored.
Storage for State	Database table where the Fact State data is stored.
Storage for Summary	Database table where the Fact Summary data is stored.
Summary Interval (ms)	If **Record Fact Summary** is enabled, designates the interval of time in ms for which baseline numbers for each numeric fact are computed. Summary Interval is only in effect when CEP instance is running in record mode (ATPNODE –record). Default 900000 is 15 minutes, which means maintain a baseline of statistics for each numeric fact for a period of 15 minutes and write a record to the database. At the end of interval fact statistics is reset and the baseline collection starts again.

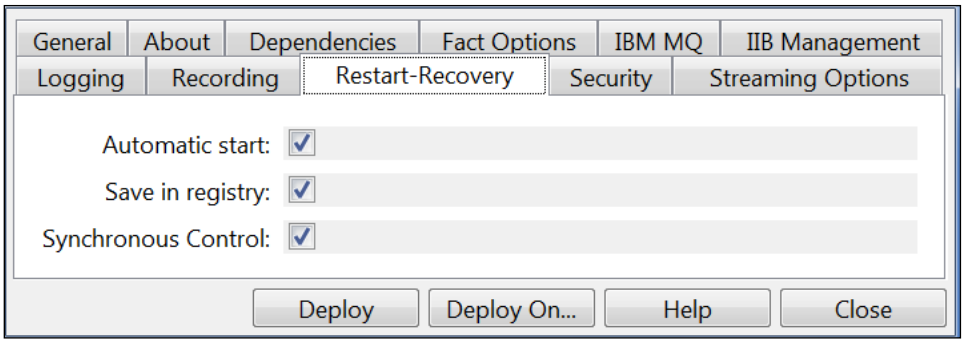

Figure 4-10. Create IIB Monitor – Restart-Recovery Tab

Table 4-8. IIB Monitor – Restart-Recovery Properties	
Property	**Description**
Automatic Start	Enable/disable automatic start.
Save in Registry	Persistent services are saved in `Registry.xml` file. Default is enabled.
Synchronous Control	Enable/Disable synchronous service initiation.

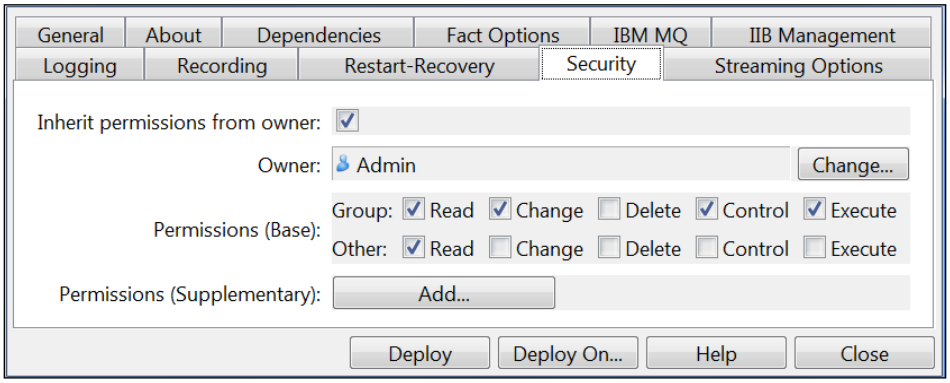

Figure 4-11. Create IIB Monitor – Security Tab

Table 4-9. IIB Monitor – Security Properties		
Property	**Description**	
Inherit Permission from Owner	Enable/disable inherit permission from owner's permission masks. Default is enabled.	
Owner	User that owns the object.	
Permissions (Base)	Permissions for users in the same group and users in other groups. Enable/disable as required.	
	Group:	**Others:**
Read	Group members may read/view attributes of an object.	Other users may read/view attributes of an object.
Change	Group members may change the attributes of an object.	Other users may change the attributes of an object.
Delete	Group members may delete the object.	Other users may delete the object.
Control	Group members may execute control actions such as start, stop, and disable.	Other users may execute control actions such as start, stop, and disable.
Execute	Group members may execute operational commands on the object.	Other users may execute operational commands on the object.

Table 4-9. IIB Monitor – Security Properties	
Property	**Description**
Permissions (Supplementary)	Adds additional users and groups.

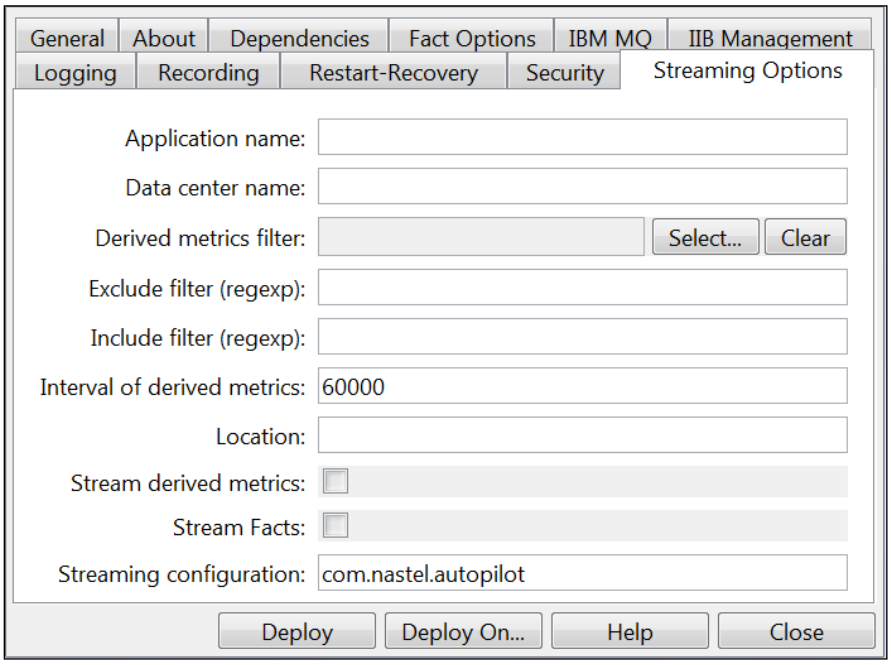

Figure 4-12. Create IIB Monitor – Streaming Options Tab

Table 4-10. IIB Monitor – Streaming Options Properties	
Property	**Description**
Application name	Application name
Data center name	Data center name
Derived metrics filter	Click **Select** to select an existing filter or create a new one.
Exclude filter (regexp)	Ignore facts that match specified regular expression; that is, do not stream facts that match the regexp.
Include filter (regexp)	Only stream the facts that match specified regular expression.
Interval of derived metrics	Time interval, in milliseconds, to send fact derived metrics.
Location	Sets server location if different from the default.
Stream derived metrics	Enable/disable derived metrics streaming.
Stream Facts	Enable/disable fact streaming.
Streaming configuration	Indicates where the data streams. The default is **com.nastel.autopilot**.

Chapter 5: IIB Statistics Expert Metrics

This section describes the IIB Statistics Expert metrics collected by the expert coming from the IIB statistics messages. They are published as facts and are available under each expert. Once published, these facts can be included in one or more Core Services Business views for validation, automation, notifications, logging and alerts. The specific facts may vary slightly by version of broker and options selected during configuration.

5.1 Message Flow Statistics Facts

Each message flow produces a set of statistics, which are published by Core Services as the following facts:

Table 5-1. Message Flow Statistics Facts

Property	Description
AccountingOrigin	Accounting origin
BrokerLabel	Broker name
BrokerUUID	Broker universal unique identifier
CPUTimeWaitingForInputMessage	Total CPU time spent waiting for input messages in microseconds
ElapsedTimeWaitingForInputMessage	Total elapsed time spent waiting for input messages in microseconds
EndDate	Interval end date
EndTime	Interval end time
ExecutionGroupName	Execution group name
ExecutionGroupUUID	Execution group universal unique identifier
MaximumCPUTime	Maximum CPU time spent processing an input message in microseconds
MaximumElapsedTime	Maximum elapsed time spent processing an input message in microseconds
MaximumSizeOfInputMessages	Maximum input message size in bytes
MessageFlowName	Message flow name
MinimumCPUTime	Minimum CPU time spent processing an input message in microseconds
MinimumElapsedTime	Minimum elapsed time spent processing an input message in microseconds
MinimumSizeOfInputMessages	Minimum message input size in bytes
NumberOfThreadsInPool	Number of threads in pool
StartDate	Interval start date
StartTime	Interval start time

Table 5-1. Message Flow Statistics Facts	
Property	**Description**
TimesMaximumNumberofThreadsReached	Number of times the maximum number of threads is reached
TotalCPUTime	Total CPU time spent processing input messages in microseconds
TotalElapsedTime	Total elapsed time spent processing input messages in microseconds
TotalInputMessages	Total number of messages processed
TotalNumberOfBackouts	Number of transaction backouts
TotalNumberOfCommits	Number of transaction commits
TotalNumberOfErrorsProcessingMessages	Number of errors processing a message
TotalNumberOfMessagesWithErrors	Number of messages that contain errors
TotalNumberOfMQErrors	Number of MQGET errors (MQInput node)
TotalNumberOfTimeOutsWaitingForRepliesToAggregateMessages	Number of timeouts processing a message (AggregateReply node only)
TotalSizeOfInputMessages	Total size of input messages in bytes

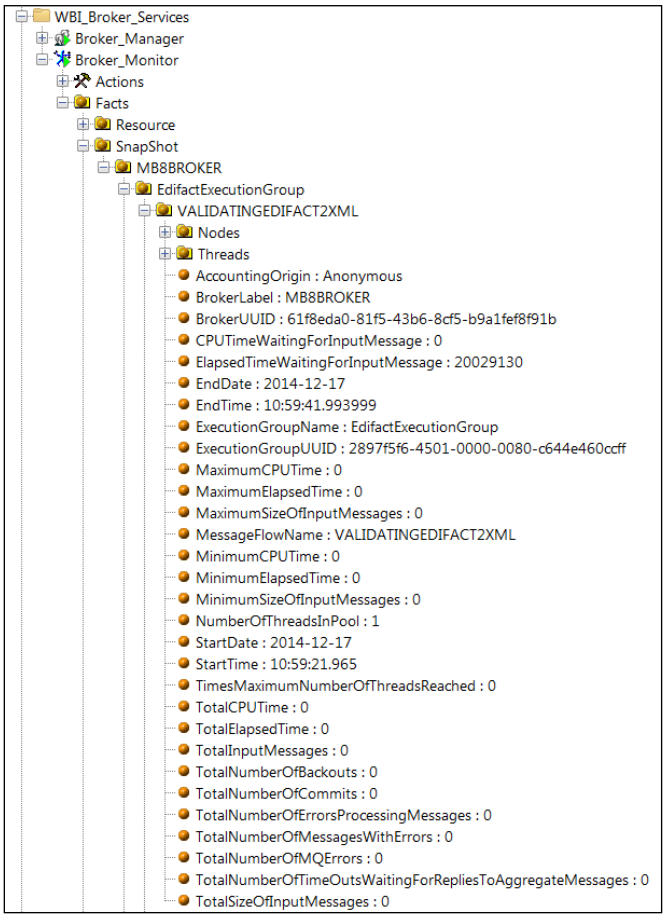

Figure 5-1. Message Flow Statistics Facts

5.2 Thread Statistics Facts

The thread statistics are disabled by default in the IIB Statistics Expert. To include the thread statistics, the Parameter DetailLevel in the General tab has to be set to the integer value "2" (without quotation marks). Each set of thread statistics for a message flow result in publishing the following facts:

Table 5-2. Thread Statistics Published Facts	
Property	**Description**
CPUTimeWaitingForInputMessage	Total CPU time spent waiting for input messages in microseconds.
ElapsedTimeWaitingForInputMessage	Total elapsed time spent waiting for input messages in microseconds.
MaximumSizeOfInputMessages	Maximum size of input messages in bytes.
MinimumSizeOfInputMessages	Minimum size of input messages in bytes.
Number	Relative thread number in pool.
TotalCPUTime	Total CPU time spent processing input messages in microseconds.
TotalElapsedTime	Total elapsed time spent processing input messages in microseconds.
TotalSizeOfOutputMessages	Total size of output messages in bytes.
TotalNumberOfInputMessages	Total number of messages processed by thread.

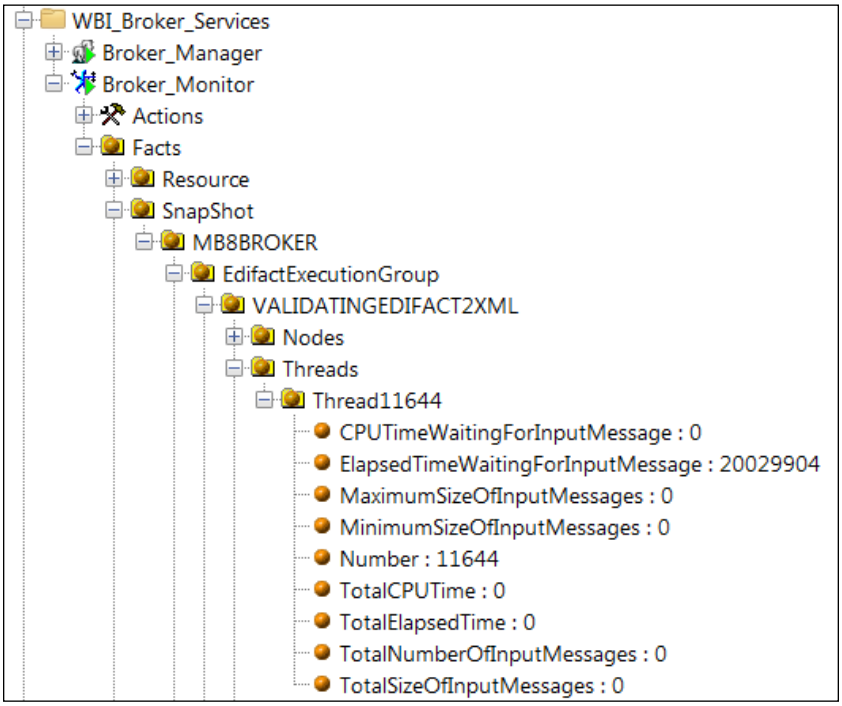

Figure 5-2. Thread Statistics Facts

5.3 Node Statistics Facts

An IIB message flow node is a processing step in a message flow. It can be a built-in node, a user-defined node, or a subflow node. A message flow node receives a message, performs a set of actions against the message, and optionally passes the original message, and one or more other messages, to the next node in the message flow. There are many message flow node types, including IBM MQ (e.g., MQInput, MQOutput, MQReply, MQGet), Web Services (e.g., SOAPInput, SOAPInput), Transformation (e.g., Compute, Mapping), Routing, Database, and Java, File.

The node statistics are disabled by default in the IIB Statistics Expert. To include the node statistics, the parameter DetailLevel in the General tab has to be set to the integer value "1" (without quotation marks). Each set of node statistics for a message flow result in the publishing of the following facts:

Table 5-3. Node Statistics Published Facts

Property	Description
CountOfInvocations	Total number of messages processed by this node
Label	Name of node (Label)
MaximumCPUTime	Maximum CPU time spent processing input messages in microseconds
MaximumElapsedTime	Maximum elapsed time spent processing input messages in microseconds
MinimumCPUTime	Minimum CPU time spent processing input messages in microseconds
MinimumElapsedTime	Minimum elapsed time spent processing input messages in microseconds
NumberOfInputTerminals	Number of input terminals
NumberOfOutputTerminals	Number of output terminals
TotalCPUTime	Total CPU time spent processing input messages in microseconds
TotalElapsedTime	Total elapsed time spent processing input messages in microseconds
Type	Type of node

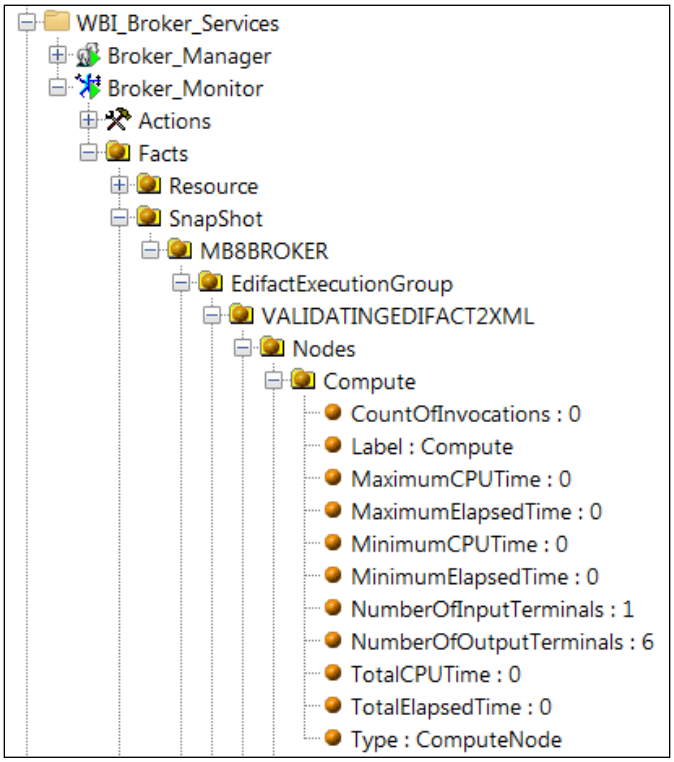

Figure 5-3. Node Statistics Facts

5.4 Terminal Statistics Facts

The terminal statistics are disabled by default in the IIB Statistics Expert. To include the terminal statistics, the parameter DetailLevel in the General tab has to be set to the integer value "3" (without quotation marks). Terminals refer to the input and output terminals or connector points on the input and output side of a message flow processing box, like wiring connection points for chips on a printed circuit board. Each terminal on a message flow node, results in a set of statistics being published as the following facts:

Table 5-4. Terminal Statistics Published Facts

Property	Description
CountOfInvocations	Number of times that a message is propagated through this terminal
Label	Terminal name (e.g., failure, in, out, out1)
Type	Terminal type (input or output)

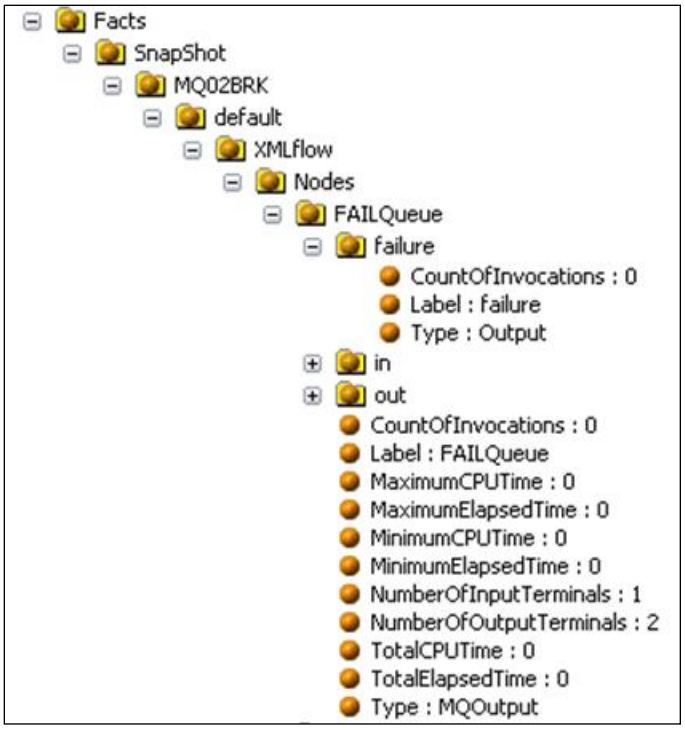

Figure 5-4. Terminal Statistics Facts

5.5 Status Published Facts

Each status statistic publishes the following facts. Drill down to view additional status facts for items in the tree.

NOTE

The status collection is dependent on the broker Integration API version and the broker version. Broker version 10 and higher uses an HTTP protocol for the API transport layer and is not dependent on the presence of MQ. Because of that, the Integration API version 10 and later transparently converts client application MQ API calls to HTTP calls. Lower version brokers, such as 8 and 9, are MQ dependent and the associated Integration API does not change MQ API calls. If the CEP node has Integration API v10 installed and you are using a V8 or V9 broker which does not use HTTP, then the broker status requests from the broker status requests from the IIB Expert on the CEP node will fail. (Refer to section 2.1.)

Table 5-5. Status Published Facts

Property	Description
broker_name	Name of the broker.
broker_status	State of the broker.
build	The internal build identifier for the broker.
desc	The description assigned to the broker at creation.
mode	The execution options in effect for the broker.
osarch	Type of OS architecture.
osname	Name of operating system.
version	Version of the broker.

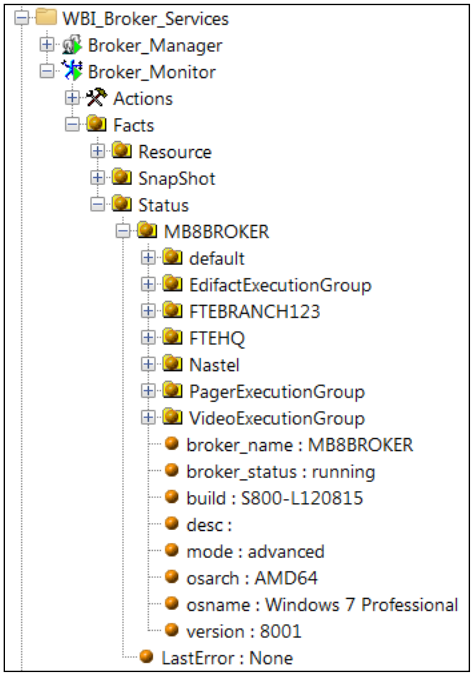

Figure 5-5. Status Published Facts

5.6 Resource Published Facts

Each resource statistic publishes the following facts. Drill down to view additional resource info for items in the tree (CICS, etc.).

Table 5-6. Resource Published Facts

Property	Description
brokerLabel	The broker name.
brokerUUID	The broker unique identifier.
collectionStartDate	The start date of the collection interval.
collectionStartTime	The start time of the collection interval.
endDate	The end date of the collection interval.
endTime	The end time of the collection interval.
executionGroupName	The execution group name.
executionGroupUUID	The execution group unique identifier.
StartDate	The date the execution group was last started.
StartTime	The time the execution group was last started
timezone	The time zone of the collection interval.

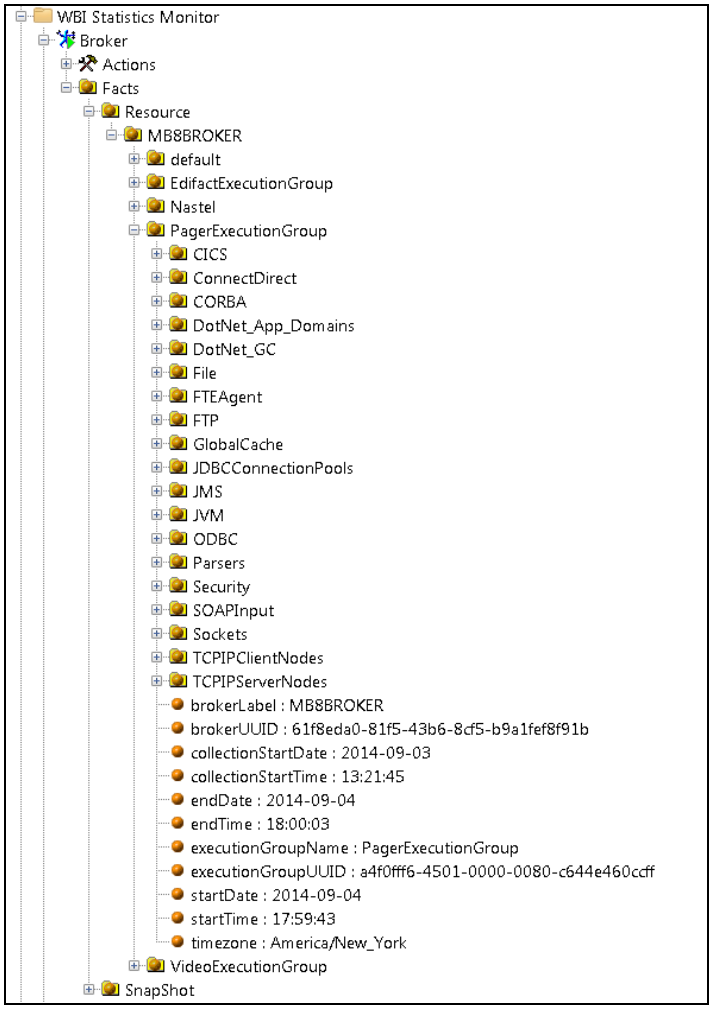

Figure 5-6. Resource Published Facts

Appendix A: References

A.1 meshIQ Documentation

Table A-1. meshIQ Documentation	
Document Number (or higher)	**Title**
CS-INS11.000	*meshIQ Platform Core Services Installation Guide*
CS-USR11.000	*meshIQ Platform Core Services User's Guide*
M6/MQ 10.002.1	*AutoPilot M6 Plug-in for IBM MQ Installation and User's Guide*
M6/OSM 600.002	*AutoPilot M6 Operating System Monitors Installation and User's Guide*
AP/TEMS 110.003	*AutoPilot Plug-in for TIBCO EMS*
AP/OR 100.005	*AutoPilot/Oracle Plug-in Guide*
AP/IT JMX 430.001	*AutoPilot/JMX Plug-in Guide*

A.2 IBM Documentation

Error! Hyperlink reference not valid.Error! Hyperlink reference not valid.*https://www.ibm.com/docs/en/integration-bus/10.1?topic=product-overview*

http://www.eclipse.org

Error! Hyperlink reference not valid.A.3 Java™

http://www.oracle.com/technetwork/java/javase/tech/javamanagement-140525.html

Error! Hyperlink reference not valid.*http://www.oracle.com/technetwork/java/index.html*

Appendix B: Conventions

B.1 Typographical Conventions

Table B-1. Typographical Conventions	
Convention	**Description**
Blue/Underlined	Used to identify links to referenced material or websites. **Example:** *meshIQ Resource Center*
Bold Print	Used to identify topical headings, and to identify toggles or buttons used in procedural steps. **Example:** Click **EXIT**.
Italic Print	Used to place emphasis on a title, menu, screen name, or other categories.
Monospaced Bold	Used to identify keystrokes/data entries, file names, directory name etc.
Monospaced italic	Used to identify variables in an address location. **Example:** [*C:\AutoPilot_Home*]\documents. Where the portion of the address in the brackets [ ] is variable.
Monospaced Text	Used to identify addresses, commands, scripts etc.
Normal Text	Typically used for general text throughout the document.
Table Text	Table text is generally a smaller size to conserve space. 10-, 9-, and 8-point type is used in tables throughout the meshIQ Platform product family of documents