RTI Monitor

User's Manual

Version 4.5



rti

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Chapter 1 Welcome

 $RTI^{\textcircled{8}}$ Monitor is a graphical tool that displays monitoring data from RTI ConnextTM (formerly *RTI Data Distribution Service*) applications.

Monitor will help you:

- □ Understand your system with an easy-to-use graphical view into your entire *Connext* application.
- ❑ **Verify your design** by making sure your *Connext* entities are communicating as expected.
- □ **Tune performance** by providing deep statistics on every aspect of the middleware's operation.



RTI Monitor

- **Optimize integration** with detailed information on every *Connext* entity in your system.
- □ **Monitor real-time operation** with a dashboard of tools to see traffic patterns, errors, lost samples, and more.

You can run *Monitor* on the same host as the *Connext* application or on a different host.

To enable a *Connext* application to provide monitoring data to *Monitor*, the application needs to use the *Monitoring Library* plug-in.

Connext notifies *Monitoring Library* every time an entity is created/deleted or a QoS is changed. *Monitoring Library* also periodically queries the status of all *Connext* entities. *Monitoring Library* sends all the data to *Monitor* once it gets the data from the *Connext* application.

Monitoring is enabled in the application by setting values in the DomainParticipant's PropertyQosPolicy (programmatically or through an XML QoS profile).

Refer to the *Monitoring Library Getting Started Guide*, included with the *Monitoring Library* bundle, for details. *Monitoring Library* is available from the RTI Support Portal (accessible from https://support.rti.com/).

Chapter 2 Starting Monitor

On Linux systems:

Start Monitor using the provided rtimonitor script.

For example, if you installed *Monitor* in /opt/rti, start it by entering:

> /opt/rti/RTI_Monitor_<version>/scripts/rtimonitor

On Windows systems:

Start *Monitor* by double-clicking *<installation directory>*\scripts\rtimonitor.bat.

You can also start it from the command-line if you need to use any of the options described in Section 2.1.

2.1 Command-line Options

Monitor accepts the command-line options in Table 2.1.

Table 2.1 Command-line Options

Option	Description
-aggregationPeriodSeconds <seconds></seconds>	<i>Monitor</i> periodically goes through all the monitored entities in the system (this information is saved in its own database) to calculate aggregated statistics and states. This value controls that minimum period (specified in seconds). Default: 5 seconds
-help	Displays all command-line options.

Table 2.1	Command-line	Options
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Option	Description
-historyDepth <value></value>	<i>Monitor</i> saves some statistics' history, so it can be displayed in the charts. This option controls how much historical data (number of samples) is saved per monitoring topic. Default: 12 samples
-ignoreTypeConflicts	Instructs <i>Monitor</i> to ignore any type conflicts. In <i>Monitor</i> , type conflicts are based on type-code equality rather than type compatibility. This command-line option can be useful if you have types that have different type-codes but are compatible. Default: Not specified (do not ignore type conflicts)
	Specifies which domains <i>Monitor</i> will join when it starts up.
	<pre><domain_id_list> is a list of domain IDs, each separated by a comma.</domain_id_list></pre>
-initialDomainIds <domain_id_list></domain_id_list>	To specify multiple domain IDs on a Windows system, enclose the comma-separated IDs in quotation marks. For example: -initialDomainIds "31, 32".
	Default: If not specified, you will be prompted to enter a domain ID when <i>Monitor</i> starts.
-matchRefreshPeriodSeconds <seconds></seconds>	Specifies the period at which to refresh the system overview panel's matches.
	Default: 5 seconds
notification History Donth Avalues	Specifies the number of notifications to keep per entity.
	Default: 12 notifications
-pruneDeadObjectsPeriodSeconds <seconds></seconds>	Sets the period at which <i>Monitor</i> should clean up user-interface objects (such as the Host, and Process nodes in the tree views) that are no longer current (have no more children nodes in the tree view). This value should be increased when dealing with very large systems where the time to complete discovery is lon- ger than the default value of 3 seconds. Default: 3 seconds

Option	Description
-spawnReadThreads	Instructs <i>Monitor</i> to use multiple threads (according to the number of cores on the host) to retrieve data from its <i>Connext</i> DataReaders (which contain monitoring data). This is typically only needed for very large systems.
	Default: Not specified (use a single read thread to retrieve data at a period of 1 second)
	Sets the verbosity for <i>Monitor</i> and <i>Connext</i> .
	0: silent (both <i>Connext</i> and <i>Monitor</i>)
	1: errors (both <i>Connext</i> and <i>Monitor</i>)
	2: warnings (Monitor only)
-verbosity <value></value>	3: warnings (both <i>Connext</i> and <i>Monitor</i>)
	4: information (Monitor only)
	5: tracing (<i>Monitor</i> only)
	6: tracing (both Connext and Monitor)
	Default: 1

Table 2.1 Command-line Options

3. Using Monitor

Chapter 3 Using Monitor

Monitor consists primarily of tree views and panels. There is also a toolbar for easy access to the most commonly used commands. This chapter provides more details on *Monitor's* components.





3.1 Tree Views

There are two tree views on the left:

- □ The **Physical View** displays all entities, arranged by their physical containment.
- □ The **DDS Logical View** displays all the entities, arranged by domains and topics.

When you select an entity in one of the panels, it becomes selected in the tree.

Similarly, when you select an entity in a tree, any entity-specific panels are updated to display information for the newly selected entity. One exception to this is if you use the **pin** button in the upper-left corner of the panel. When a panel is pinned to an entity, it will periodically receive updated data for the pinned entity—even when another entity is selected in the tree.

Figure 3.2 Physical and DDS Logical Views



Note: "Topics" and "DomainParticipants" appear strictly to help organize the tree; they are not entities. If you select either of these while viewing an unpinned entity-specific panel, Monitor behaves as if you selected the domain or DomainParticipant above it in the tree.

3.2 Working with Monitor's Panels

Monitor has several panels that display monitoring data in graphical and tabular form. Some panels show data for a specific selected entity, while others show system-wide information:

□ Entity-Specific Panels

- Status Panel (Section 3.3.1)
- Chart Panel (Section 3.3.2)
- Description Panel (Section 3.3.3)
- Notifications Panel (Section 3.3.4)
- Distributed Logger Panel (Section 3.3.5)

□ System-wide Panels and Tables

- System Overview Panel (Section 3.4.1)
- All Notifications Table (Section 3.4.2)
- System Types Table (Section 3.4.3)
- Processes Table (Section 3.4.4)

You can create these panels by:

- Using the **Window**, **Create Panel** option from the menu
- □ Right-clicking an entity and selecting from the popup menu (entity-specific panels only)
- Clicking a button on the toolbar (see Figure 3.1)

You may have multiple panels of each type open at the same time.

Panels can be arranged by various options in the **Window** menu. There is also a **Tile** button in the toolbar.



3.3 Entity-Specific Panels

The contents for entity-specific panels change to show whatever entity is currently selected in the tree view. You can, however, 'pin' a panel to an entity to prevent it from switching contents; to do so, use the **pin** button in the upper-left corner of the panel. When a panel is pinned to an entity (you will see the pin button changed to ...), it will periodically receive updated data for the same pinned entity—even when another entity is selected in the tree. The entity for the entity-specific panel (pinned or unpinned) is indicated by the entity hierarchy list at the top of the panel.

The **backward** \triangleleft and **forward** $\stackrel{\frown}{\Rightarrow}$ buttons in the toolbar can be used navigate through the entity-selection history.

3.3.1 Status Panel 📑

The Status panel displays real-time statistics for the selected entity.

gure 3.3 Status Panel			Parent li electeo	st for the d entity	
<u>System</u> > <u>Host</u> :	siesta.tti.com > Process : 4	Status Panel <u>152</u> > <u>DP : 0</u> > <u>Publisher</u> > <u>DV</u>	V { Square }		
ilter by match: All Mat Display Mode: O Basi	ches c	•			
	Co	mmon Information			
Last Update:	Mon Dec 20 22:56:56 EST	2010 GUID:	c0a80203.1038.2.800020	002	
Update Period:	5.0 sec	conds			
	D;	ataWriter Statistics			
⊢ Sample Statistics −		- Heartbeat Statistics			- Delta value
Pushed Count:	8 567 (\ 80)	Heartbeat Count:	270 ()	2)	shows the
Pushed Dutas:	6,007 (200)	Heartbeat Bytes:	8,640 (Δ 6 ²	4)	update per
Pushed Bytes.	051,092 (200,080)	Gap Count:	1 (Δ0	o) 🖌	
Pulled Count:	0 (Δ0)	Gap Bytes:	32 (Δ0	0)	
Pulled Bytes:	0 (Δ0)	Ack Count:	269 (Δ3	3)	
Filtered Count:	0 (Δ0)	ACK Bytes: Nack Count:	7,532 (Δ84 1 (Δ	4)	
Filtered Bytes:	0 (Δ0)	Nack Bytes:	28 (Δ(5)	
Rejected Count:	0 (Δ0)	Send Window Size:	25	56	
T institutes T and		Sequence Numbers			
Livenness Lost		First Available Sample: 💌	-429496729	97	
		Last Available Sample:	-429496729	97	
		· · · · · · · · · · · · · · · · · · ·		and the second se	

 Reliable DataWriters when "Filter by match" is set to All Matches

-DataReaders when "Filter by match" is set to a specific endpoint (not All Matches)

It displays statuses of the selected entity, or an aggregation of all the statuses of all the entities that belong to that selected item. For example, if you select a DataWriter, the statuses are just for that entity. If you select a Publisher, the statuses are an aggregation of those for all DataWriters that belong to that Publisher. Aggregation calculation period can be controlled by the command-line parameter **-aggregationPeriodSeconds** (see Table 2.1 for details).

Basic and **Advanced** options are provided. **Basic** data only includes Sample Statistics and Heartbeat Statistics (for reliable readers or writers only). The **Advanced** option

shows all the available statuses for the entity (some of the data is only available for reliable readers or writers).

Warnings and Error Statuses

Warnings and errors are checked for some of the statuses; warnings are highlighted in yellow, errors are in red. See Section 3.3.4 for details on which statuses are checked for warnings or errors. To clear the warnings and errors status of ALL entities in the system, select the *solution* from the toolbar or **Actions**, **Clear All Notifications** from the menu.

The **Common Information** section shows you general information about the entity the GUID for the entity for this panel, when the data was last updated, and the current update period.

Filter by match only appears for DataWriters and DataReaders. If anything other than **All matches** is selected, the data shown in the Status panel will only include data that belongs to the matching kind that you have selected—a subset of the data for the entire entity.

Filter by match:

Display Mode:

All Matches

All Matches

- Locators --

Filter options for DataWriters

- □ All matches
- A selected locator
- □ A selected matching endpoint (DataReader)

Filter options for DataReaders:

- □ All matches
- □ A selected matching endpoint (DataWriter)

Above: Example filter options for a DataWriter. The locators are for the transports. The matching endpoint is a DataReader.

Host : siesta.rti.com > Process : 7472

UDPv4://10.50.2.30:7411

UDPv4://192.168.2.2:7411 -- Matching Endpoints --

SHMEM://0.2.1.0.0.2.0.0.0.0.0.0.0.0.0.0.7411

Below: Example filter options for a DataReader. The matching endpoint is a DataWriter.



3.3.2 Chart Panel

The Chart panel graphs the selected statistics (on the Y axis) over time (the X axis) for the selected entity.

You can control the time range with the slider at the bottom of the main window, and other chart properties by right-clicking within the chart area.

Filter by match only appears for DataWriters and DataReaders— Section 3.3.1 describes the choices.

The Chart Data options depend on the type of the selected entity.

The number of samples that can be displayed in the chart is controlled by the **-historyD-epth** command-line option (see Table 2.1 for details).

To plot multiple chart data for the same entity at the same time, create multiple Chart Panels.



Figure 3.4 Chart Panel

Slider controls the time range for all charts

3.3.3 Description Panel

The Description panel's contents depend on what is selected in the tree view. There are three tabs which may appear:

QoS (appears for all *Connext* entities)—Shows the QoS settings for the selected entity.

Figure 3.5 Description Panel's QoS Tab



- □ **Builtin Topic Data** (appears for DomainParticipants, DataWriters, and DataReaders)—Shows the propagated QoS in the builtin topic for the selected entity.
- Figure 3.6 Description Panel's Builtin Topic Data Tab



❑ **Data Type** (appears for DataWriters and DataReaders)—Shows the type code, serialized size, and IDL representation of the associated data type:

Figure 3.7 Description Panel's Data Type Tab

Description Panel				
System > Host : siesta.tti.com > Process : Subscriber > DR { Square }	<u>7472</u> > <u>DP:0</u> >			
QoS Builtin Topic Data DataType				
Type Name:	ShapeType 🔺			
Typecode Serialized Size:	130			
Minimum Serialized Size:	24			
Maximum Serialized Size:	152			
Maximum Key Serialized Size:	137			
IDL Representation				
struct ShapeType { string<128> color; //@key				
long v:				
long shapesize;				
3.	T			

The Description panel is not applicable when a system, host, or process is selected, since they are not *Connext* entities.

3.3.4 Notifications Panel 📑

The Notifications panel displays the selected entity's current status (normal, warning or error) and a historical list of all related alarm statuses. Warnings are highlighted in yellow, errors are in red.

Figure 3.8 Notifications Panel

2	Notifications Panel
-⊋= <u>System</u> > <u>Ho</u>	st : siesta.rti.com > Process : 7472 > DP : 0 > Subscriber > DR { Square }
Builtin Topic Key:	c0a80202.1d30.1.80000107
Last Update:	Tue Jul 27 21:03:06 EDT 2010
State:	WARNING
Reasons —	
Field:	requested_deadline_missed_status.status.total_count_change: 20 > 0
Historical Problems Last Update: State: Reasons	Tue Jul 27 21:03:01 EDT 2010 WARNING
Field:	requested_deadline_missed_status.status.total_count_change: 19 > 0
Last Update:	Tue Jul 27 21:02:46 EDT 2010
State:	WARNING
Reasons	
Field:	<pre>requested_deadline_missed_status.status.total_count_change : 20 > 0</pre>

Clearing Notifications

To clear the warnings and error status of ALL entities in the system, select the **w** button from the toolbar or **Actions**, **Clear All Notifications** from the menu.

Historical statuses will never be cleared. The number of saved historical statuses is controlled by the **-notificationHistoryDepth** command-line option (see Table 2.1 for details).

Table 3.1 lists the conditions that are considered warnings or errors.

Type conflicts might be ignored if the **-ignoreTypeConflicts** command-line option is used (see Table 2.1 for details).

Entity	Conditions	Warning or Error
	Type conflicts (equality comparison)	Error
	Incompatible QoS	Error
DataPaadar	Samples rejected	Error
DataKeauer	Deadlines missed	Warning
	Liveliness lost	Warning
	Samples lost	Warning
	Using push_on_write = false with best-effort reliabil- ity or an asynchronous publisher	Error
	Type conflicts (equality comparison)	Error
DataWriter	Incompatible QoS	Error
	Inactivated DataReaders	Error
	Liveliness lost	Warning
	Deadlines missed	Warning
DomainParticipant	On same host as another DomainParticipant that does not agree on using shared memory	Error
Topic	Inconsistent topic status	Error

Table 3.1 Warning and Error Conditions

3.3.4.1 Additional Information from RTI Distributed Logger

RTI Distributed Logger is a library that enables applications to publish log messages to *Connext*. If you are interested in purchasing *Distributed Logger*, please contact your RTI Sales representative.

If a *Connext* application uses *Distributed Logger*, the log messages it sends to *Monitor* are used as an integral part of the entity state kept for the associated Process. You can see this in Figure 3.9, where log messages have changed the Process' state to **Error** because there are error-level log messages. This is a simple but powerful way to monitor the health of a distributed system with minimal integration work. If the application already tracks its state, it can write updates to the state for Warning and Error to the log. Those will be picked up by *Monitor* and reflected in the display.

See also: Distributed Logger Panel (Section 3.3.5).

Note: *Monitor* cannot downgrade entity state from Error to Warning to Normal. You can make this change explicitly with the **Clear All Notifications** button on the toolbar.

1 N	lotifications Panel
\$ System > Host : 192.168.0.3 > Process : 3276	
Builtin Topic Key:	c0a80003.ccc.0.0
ast Update:	Mon May 02 17:42:31 EDT 2011
itate:	ERROR
Reasons	
Field	: coincito warming state due to level : 100 05065602640675
Field	: oning to warming state due to revert 199,50000000000000000
Field	coinc to warning state due to level : 199 95065603664966
Field	going to warning state due to level : 199 9506560364888
Field	: going to warming state due to level : 200.0
Field	coing to warning state due to level : 199,95065603665756
Field	going to warning state due to level : 199.9506560364809
Field:	: going to error state due to level : 200.0
Field:	: going to warning state due to level : 199.95065603666552
Field:	: going to warning state due to level : 199.95065603647296
Field:	: going to error state due to level : 200.0
Field.	: going to warning state due to level : 199.95065603667342
Field:	type_code : type conflicts count : 1
Field:	type_code : type conflicts count : 1
Historical Problems	
State: Reasons	Mon May 02 17:42:27 EDT 2011 ERROR
Cast Optione. State: Reasons Field:	Mon May 02 17:42 27 EDT 2011
Lass Opole. State: Reasons Field:	Mon May 02 17:42 27 EDT 2011 ERROR going to warning state due to level : 199 95065603650465 going to error state due to level : 200 0
Las opole. State: Reasons Field: Field:	Mon May 02 17:42 27 EDT 2011 ERROR
Eastopolie State: Reasons Field: Field: Field:	Mon May 02 17:42:27 EDT 2011 ERROR : going to warning state due to level : 199 95065603650455 : going to error state due to level : 200.0 : going to warning state due to level : 199 95065603664173 : going to warning state due to level : 199 95065650364975
East oppole. State: Field: Field: Field: Field: Field:	Mon May 02 17:42 27 EDT 2011 ERROR going to warning state due to level : 199 95065603650465 going to warning state due to level : 199 9506560364075 going to warning state due to level : 199 9506560364975 going to warning state due to level : 200.0 going to warning state due to level : 209 5006560364975 going to warning state due to level : 200.0 going to warning state d
Las Opole. State: Reasons Field: Field: Field: Field: Field:	Mon May 02 17:42:27 EDT 2011 ERROR i going to warning state due to level : 199.95065603650465 going to warning state due to level : 199.95065603664173 going to warning state due to level : 199.95065603649675 going to warning state due to level : 199.95065603649676 going to warning state due to level : 199.9506560364966
Lass opeane. State: Reasons Field: Field: Field: Field: Field: Field:	Mon May 02 17:42:27 EDT 2011 ERROR : going to warning state due to level : 199 95065603660465 : going to error state due to level : 209 95065603664173 : going to warning state due to level : 199 9506560364075 : going to warning state due to level : 199 9506560364075 : going to warning state due to level : 199 9506560364076 : going to warning state due to level : 199 9506560364086 : going to warning state due to level : 199 9506560364086
East opeale. Reasons Field:	Mon May 02 17:42:27 EDT 2011 ERROR going to warning state due to level : 199.95065603650465 going to warning state due to level : 199.9506560364173 going to warning state due to level : 199.9506560364173 going to warning state due to level : 199.9506560364975 going to warning state due to level : 199.95065603664968 going to warning state due to level : 199.95065603664988 going to warning state due to level : 199.95065603664888 going to warning state due to level : 199.95065603664888 going to warning state due to level : 199.95065603664888 going to warning state due to level : 199.95065603664888 going to warning state due to level : 199.9506560364888
Lass Optale. State: Reasons Field: Field: Field: Field: Field: Field: Field: Field:	Mon May 02 17:42:27 EDT 2011 ERROR
Las Opole: State: Reasons Field: Field: Field: Field: Field: Field: Field: Field: Field: Field:	Mon May 02 17:42:27 EDT 2011 ERROR i going to warning state due to level : 199 95065603650465 going to warning state due to level : 199 9506560364873 going to warning state due to level : 199 9506560364873 going to warning state due to level : 199 9506560364865 going to warning state due to level : 199 9506560364868 going to warning state due to level : 199 9506560364868 going to warning state due to level : 199 9506560364868 going to warning state due to level : 199 9506560364868 going to warning state due to level : 199 95065603664888 going to warning state due to level : 199 95065603664888 going to warning state due to level : 199 95065603664888 going to warning state due to level : 199 95065603664888 going to warning state due to level : 199 95065603648888 going to warning state due to level : 199
State: Reasons Field: Field	Mon May 02 17:42:27 EDT 2011 ERROR going to warning state due to level : 199.95065603650465 going to warning state due to level : 199.9506560364075 going to warning state due to level : 199.9506560364473 going to warning state due to level : 199.95065603644975 going to warning state due to level : 199.9506560364496 going to warning state due to level : 199.9506560364496 going to warning state due to level : 199.9506560366496 going to warning state due to level : 199.9506560366496 going to warning state due to level : 199.9506560366496 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560366756 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.9506560364809 going to warning state due to level : 199.950656
Las Opole: State: Rearons Field Field Field Field Field Field Field Field Field Field Field Field Field Field Field Field	Mon May 02 17:42:27 EDT 2011 ERROR : going to warning state due to level : 199 95065603650465 : going to warning state due to level : 199 95065603664073 : going to warning state due to level : 199 95065603664073 : going to warning state due to level : 199 95065603664076 : going to warning state due to level : 199 95065603664066 : going to warning state due to level : 199 95065603664086 : going to warning state due to level : 199 95065603664868 : going to warning state due to level : 199 95065603668756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 9506560366809 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 950656036685756 : going to warning state due to level : 199 95065603668575

Figure 3.9 Notifications Panel: Integrating Log Message Level with Entity State

3.3.5 Distributed Logger Panel

Monitor's Distributed Logger panel allows you to see messages from *Distributed Logger*, a separate library that can be integrated with *Connext* applications. You can also use this panel to control *Distributed Logger*.

Distributed Logger is integrated into *Monitor's* entity state (normal, warning, and error) tracking feature. Therefore error and warning messages logged to an application's logging system and sent to *Monitor* through *Distributed Logger* will change a process' status to Error and Warning, respectively.

The Distributed Logger panel is associated with Process entities. Therefore it only displays information when a Process is selected from the Physical View and that Process is running an instance of *Distributed Logger*.

	File Domain Actions Window	v <u>H</u> elp									
	(💠 👌 🗂 🖉 💰		🗎 🛤 🛛 🌒	۵ 🔔 🕷	6						
Soloctod	Physical View DDS Logical View	7						Di	stributed Logger		
Process	• •			3	System	<u>n > Host : 1</u>	<u>192.168.0.3</u> >	Process : 3276			
1100033	Entity	Description	Туре	Mes	sages	State and C	Controls File I	_ogger			
	V 🚣 System			Find	Row	Count	50 🌲 VI	ew Filter: Trace	•		
	 Ig2.168.0.3 Process 	ID = 3064		Sen	# A Ti	ime		Level	Category	Message	R
7	V Process	ID = 3276		004.7	1 0	5/02/2011 04	5-38-48 899 PM	Debug	ann SamnleCoun	strategy: RAMP : baseline : 1 : new value : 0	
L L	DomainParticipant : 0	Launch S			2 0	5/02/2011 0	5:38:58 898 PM	Debug	ann SampleCoun	strategy: RAMP: baseline: 1: new value: 1	
	V Topics				3 0	5/02/2011 0	5:38:50 630 PM	Warning	ann LaunchSyste	going to warning state due to level : 100 950656	
	Commands	Comman	system::c		4 04	5/02/2011 04	5:38:59 639 PM	Fron	ann LaunchSyste	going to warning state due to level : 200.0	
	P Flow	Flow	system:		5 0	5/02/2011 0	5:38:59 639 PM	Warning	app LaunchSyste	going to warning state due to level : 199 950656	
	R Level	Level	system:		6 0	5/02/2011 0	5:38:59 889 PM	Info	ann LaunchSyste	going to normal state due to level : 199,8026728	4
	Riscommunicat	Miscomm	DDS::String		7 0	5/02/2011 0	5:30:08 898 PM	Debug	ann SamnleCoun	stratery : RAMP : haseline : 1 : new value : 0	
	Pressure	Pressure	system:		8 04	5/02/2011 04	5:30:00 306 PM	Warning	ann LaunchSyste	going to warning state due to level : 100 050656	0
	ReproblematicType	Problema	Problema		9 04	5/02/2011 0	5:30:00 307 PM	Error	ann LaunchSyste	going to error state due to level : 200.0	
	Temperature	Temperat	system:		10 01	5/02/2011 03	5.55.65 557 F M	Mamina	appleamencyste	going to endi state due to terer. 200.0	
	🤊 rti/log	rti/log	com::rti::I		11 0	5/02/2011 04	5-39-09 398 PM	Info	ann LaunchSyste	going to normal state due to level : 199 8026728	4
	rti/log/administra	rti/log/ad	com::rti::I		12 04	5/02/2011 04	5:39:13 651 PM	Warning	ann LaunchSyste	going to warning state due to level : 199 950656	0
	🤊 rti/log/administra	rti/log/ad	com::rti::I		13 04	5/02/2011 04	5:30:13 651 PM	Fror	ann LaunchSyste	going to warning state due to level : 200.0	
	🗩 rti/log/administra	rti/log/ad	com::rti::I		14 0	5/02/2011 0	5:30:13 652 PM	Warning	app.LaunchSyste	going to warning state due to level : 109 050656	0
	🛛 🗐 Subscriber				14 0.	5/02/2011 0	5-30-13 652 PM	Info	app.LaunchSyste	going to warming state due to level : 199,900000	<u></u>
	DataReader	Flow	system:		16 0	5/02/2011 0	5:30:16 402 PM	Warning	app.LaunchSyste	going to warning state due to level : 199.0020720	0
	DataReader	Level	system		17 0	5/02/2011 0	5:39:16 403 PM	Error	app.LaunchSyste	going to warning state due to level : 199.90000	0
	DataReader	Pressure	system:		19 08	5/02/2011 0	5:39:16 404 PM	Warning	app.LaunchSyste	going to warning state due to level : 200.0	_
	DataReader	Problema	Problema		10 0	5/02/2011 0	5-30-16 406 PM	Info	app.LaunchSyste	going to warming state due to level : 199,900000	4
	DataReader	Temperat	system.		20 0	5/02/2011 0	5-30-10 400 PM	Warping	app.Launch3yste	going to morning state due to level : 199.0020720	4
	DataReader	rti/log/ad	com:rti::1		20 0	5/02/2011 03	5:39.18 050 PM	Fron	app.LaunchSyste	going to warning state due to level : 199.900000	
	V A Publisher	rano grada			21 0	5/02/2011 0:	5:39.10 007 FM	Margina	app.LaunchSyste	going to entri state due to level - 200.0	_
	DataWriter	Comman	systemic		22 03	5/02/2011 0:	5.39.10 057 FM	warning	app.LauricriSyste	going to warming state due to rever. 199.950656	0
	DataWriter	Miscomm	DDS: String		23 03	5/02/2011 0:	5.39.16 000 PM	Dahua	app.LauricriSyste	going to normal state due to rever. 199.8026726	.4
	T N Publisher		DDOOunig		24 03	5/02/2011 03	5.39.18 898 PM	Debug	app.sampleCoun	strategy. RAMP. baseline. 1. new value. 1	
	DataWriter	rti/log	com::rti::l	-	• •						
	DataWriter	rti/log/ad	com:rti::1	Mess	sage Det	ails					
	DataWriter	rti/log/ad	com:rti::1	Publ	lication	Sequenc	e Number: 1	0			
	Datawriter	ninograu	com.na	Time	• 05/02	/2011 05:3	39:09 398 PM				
				Leve	el: Warr	ning					
				Cate	and and a	ann Launch	SvetemContr	oller			
				Moc	soone.	ipp.counci	loystemoonti	blici			
				wies	saye.			400 05005500057	000		
				going	g to war	ning state	due to level .	199.99069603697	326		
							0				
				Chart Tin	ne Range	e (minutes):	1	2 4	8	16 32 64	128
	System Metrics Domains: 1 Hosts:	1 Processe	s: 2 Participar	ts: 2 Topi	ics: 11 F	Publishers: 4	4 DataWriters:	13 Subscribers: 2	DataReaders: 9		

As seen in Figure 3.10, the Distributed Logger panel has three tabs:

- □ Messages Tab (Section 3.3.5.1)
- □ State and Controls Tab (Section 3.3.5.2)
- □ File Logger Tab (Section 3.3.5.3)

When a Process containing an instance of *Distributed Logger* is selected, the cached log messages populate the table in the **Messages** tab, and the **State and Controls** and **File Logger** tabs are updated to reflect the state of the *Distributed Logger* instance.

3.3.5.1 Messages Tab

Process

selected

message

The Messages Tab, shown in Figure 3.10 and Figure 3.11, displays a table containing the log messages from the currently selected Process. The messages can include those logged using the application's logging library, RTI Logger, as well as the standard out and standard error of the application, depending on how the application configured Distributed Logger.

By default, the messages are presented sorted based on the order in which they were written. By clicking on the column headers, you can re-sort the table to meet your needs. The panel also has a "Find" button to do simple string searches, a control to limit the number of rows which are displayed, and a view filter which shows filters messages that are less severe than the selected level. At the bottom of the panel is a detailed display for the selected messages from the table. This is primarily useful when the log message contains multiple lines (only a single line is displayed in the table).

Figure 3.11 Distributed Logger Panel's "Messages" Tab



3.3.5.2 State and Controls Tab

The State and Controls tab, shown in Figure 3.12, provides the ability to control the verbosity of the Distributed Logger instance directly from *Monitor*. It also provides control over the RTI Logger verbosity and shows the most recent (if any) response to commands it has processed.



0	Distributed Logger 🧧	
§ System > Host : 192.168.0.3 > Process : 3276		
Messages State and Controls File Logger		
Distributed Logger State: Last Update: Application Kind: Level:	Operati 05/02/2011 05:40:56 267 Trace Trace	Distributed Logger Verbosity Control
RTI Logger		
Print Format	Default Default	
Platform Verbosity:	Error Error	Verbosity
Communication Verbosity:	Error Error	Control
Database Verbosity:	Error Error	
Entities Verbosity:	Error Error	
API Verbosity:	Error	
Command Response		
Result	OK Message:	iviost recent
Invocation: Host ID: cl	0 Last Update: 05/02/2011 05:40:56 267 1a80003 App ID: 1	a command

3.3.5.3 File Logger Tab

The File Logger tab, shown in Figure 3.13, provides a way to save log messages for a single Process to a file. This is especially useful when issues are noticed for a Process and you want to capture the output to share with others for analysis. Another more general-purpose way to save log messages to a file is provided as an example with *Distributed Logger* and is detailed in the *Distributed Logger Getting Started Guide*.

The File Logger tab provides inputs for the file path and the queue size. There are displays that show how many messages have been written as well as dropped (due to queue size). The current and maximum queue sizes are also displayed.

Note: The **File Size** may not update as quickly as the **Messages Written** count. In fact, the **File Size** is usually zero until several messages have been written. This is because buffering is used to increase the throughput performance while writing to the file.

5		Distributed Logger	88
§ System > Host :	192.168.0	1.3 > Process : 3276	
Messages State and	Controls	File Logger	
Stop Queue Size:	512	A. Y	
Log File Path:	Browse	c:templapplication_log.bt	
Running:			true
File Path:			c:templapplication_log.tx
File Size:			1,089,536 (Δ 139,264
llessage Written:			7,089 (∆900
lessages Dropped Coun	t		(
ast Exception:			
Max Queue Size:			294
Desaula Ciza:			34 of 512 : 6%

Figure 3.13 Distributed Logger Panel's "File Logger" Tab

3.4 System-Wide Panels and Tables

System-wide panels and tables show a summary of the states of the whole system.

3.4.1 System Overview Panel

The System Overview panel displays a map of the entities in the system.

You can change the criteria for how items in the map are highlighted by selecting the **Notifications**, **Matches**, or **Measurement** option. A **Key** is provided to indicate the meaning of the different highlights in the map.

If the **Notifications** option is selected, the map will show all the entities in the system and their colors will show if they are in normal, warning or error mode.

If the **Matches** option is selected, the map will show all the entities that are currently matched and all the entities that are currently unmatched due to potential errors.

For an 'ideal match,' opposing endpoints (DataWriters and DataReaders) must have the same domain ID, same topic name, and belong to compatible partitions (if any are specified). This list of ideal matches is compared to the list of actual matches received from *Monitoring Library* to determine which entities are marked as matches or mismatches in

Figure 3.14 System Overview Panel (Notifications Option)

8	System Overview Panel								
Highligh	nt Mode	s () Measurement M	easurement. Samp	les Received Count	Scale:	No Scaling			
Key:	Selected	Normal	Warning	Error					
Display	Name Controls								
	Host	Terse	Topic:	Terse 🔻	DataReader:	Terse			
	Process:	Terse	Subscriber:	Terse	DataWriter:	Terse			
	DomainParticipant:	Terse	Publisher:	Terse	All:	Terse			
• •									
TTT DWDW DW Pub DP P: 6032 P: 7024 siesta.rti.com									
	A visual map The outer-ma	o of the system ost box represe	n. ents the host.	T = TopiDR = DateDW = DateSub = SubsPub = PubDP = DonP:# = proc	c aReader aWriter scriber lisher nainParticipant cess ID				

the map. There are various reasons for a mismatch, such as incompatible QoS or data types, misconfigured discovery peers, or use of the *Connext* **ignore_*()** APIs, among other reasons.

The matches are shown at the peer-level only. That is, if you select a Publisher, you will not see matches for the DataWriters that belong to it. Table 3.2 provides more information on what matches are shown for selected entities.

Table 3.2 Peer-Level Objects

If you select this type of object	You will see matching information for
Host	Hosts
DomainParticipant	DomainParticipants
Publisher	Subscribers

Table 3.2 Peer-Level Objects

If you select this type of object	You will see matching information for
Subscriber	Publishers
DataWriter	DataReaders
DataReader	DataWriters
Topic	Topics

If an entity is highlighted as 'Partially Matched,' *some* (not all) of its child entities are not matched (such as a Publisher that has one matched DataWriter and one or more unmatched DataWriters.)

The **-matchRefreshPeriodSeconds** command-line option controls how often the matching information is refreshed (see Table 2.1 for details).

Figure 3.15 System Overview Panel (Matches Option)

٥		System Overvie	w Panel		
Highlight Mode	s 🔘 Measurement	Measurement: Samp	oles Received Count	Scale:	No Scaling V
Key: Selected	Match	ied Partia	ally Matched	Mismatched	
Display Name Controls					
Host	Terse) Topic:	Terse	DataReader:	Terse
Process:	Terse	Subscriber:	Terse	DataWriter:	Terse
DomainParticipant:	Terse	Publisher:	Terse	AII:	Terse
		DW DW DW DW Pub DP P: 7856 siesta.rti.ct	TTT DR Sub DP P: 6896	R	

If the **Measurement** option is selected, the **Measurement** and **Scale** drop-down menus are enabled. **Measurement** allows you to select which data value to display in the map. **Scale** allows you to control the scaling factor of the data value.

Figure 3.16 System Overview Panel (Measurement Option)

٥						
Highlight Mode	s 💿 Measurement	Measurement: Sam	ples Received C	Count	Scale:	No Scaling
Key: Selected 0	1 10	100 1T	10T 100T	1M	10M	
Display Name Controls						
Host:	Terse	Topic	Terse	•	DataReader:	Terse
Process:	Terse	Subscriber	Terse	•	DataWriter:	Terse
DomainParticipant:	Terse	Publisher	Terse	•	All:	Terse
A v						
	TTT	DR DR Sub				
		P: 7856	P: 6890	6		
	-	siesta.rti.c	com			

Move the mouse over an entity in the map will show you the details of that entity for the selected highlight mode.

The **Display Name Controls** simply control how the items in the map are labeled (or whether they are hidden). Each entity types can be hidden from the map, labeled tersely (with just an abbreviation for the entity type, such as T for a Topic), or include more information, such as T {Topic Name}.

3.4.2 All Notifications Table 🛕

The All Notifications Table shows you all the current errors and warnings for the entire system (not just the currently selected entity).

Figure 3.17 All Notifications Table

ſ	🛆 All Notific	ations Tal	ole 📃 🗖 🛛
	Select in Views Find Show Problem Types:	Warning	C Error
l	Entity	State	Status 🖳
l	System > Host : siesta.rti.com > Process : 6280 > DP : 0 > S	ERROR	requested_incompatible_qos_status.status.tot
l	System > Host : siesta.rti.com > Process : 7052 > DP : 0 > P	ERROR	offered_incompatible_gos_status.status.total
l	System > Host : siesta.rti.com > Process : 7052 > DP : 0 > P	WARN	offered_deadline_missed_status.status.total_c

This panel has filters to include or exclude warnings/errors. Errors are shown in red. Warnings are shown in yellow.

If a row is selected in the table, the **Select in Views** button selects the entity in tree views on the left.

The **Find** button is useful for searching through a large table. (This is a simple string search, so you must use the exact same form as displayed in the table.)

Clicking on a column heading will sort the table by the values in that column. Clicking it again will sort in the opposite order.

The 🖪 button just above the vertical scrollbar allows you to choose which columns appear in the table. It also has options to pack (resizes) columns and enable a horizontal scrollbar. (Note: to enable the 'Pack Selected Column' option, select a cell in the top row.)



You can change the order of the columns by simply dragging them to a new place in the table.

Clearing Notifications

To clear the notifications, select the <u>k</u> button from the toolbar or Actions, Clear All Notifications from the menu.

3.4.3 System Types Table 🔝

The System Types table displays all the known data types in the selected domain.

System Types Table							
1	Find				Domain: 0		•
I	Type Name	Keyed	Min Serialized	Max Serialized	Max Key Serialized	Type Code Serialized	5
	ShapeType	Yes	24	152	137	130	
l							

The **Domain** drop-down menu includes a list of all the joined domain IDs for you to select.

Like the All Notifications Table (Section 3.4.2), this table also has a button (above the vertical scrollbar) to control the columns that appear in the table. You can also sort the table based on any of the columns by clicking the column heading.

The **Find** button is useful for searching through a large table. (This is a simple string search, so you must use the exact same form as displayed in the table.)

3.4.4 Processes Table 🗔

The Processes table displays memory and CPU information for all the processes in the system.

Processes Table									
Select in Physical View		Find]						
Host	ID	Total CPU	User CPU	Kernel CPU	Physical Memory (MB)	Total Memory (MB)	5		
siesta.rti.com	4,112	5.928	0.936	4.992	27.66	107.492			
siesta.rti.com	6,280	0	0	0	26.328	107.055			
siesta.rti.com	7,052	0.936	0.312	0.624	23.832	110.738			

These values are valid only if the host is a Linux or Windows system.

For multi-core machines, CPU usage can be greater than 1.

Like the All Notifications Table (Section 3.4.2), this table also has a button (above the vertical scrollbar) to control the columns that appear in the table. You can also sort the table based on any of the columns by clicking the column heading.

For example, you can quickly sort by Total CPU to see which process is using the most. When the process row is selected in the table, you can use the **Select in Physical View** button to see where this process is within the physical tree.

The **Find** button is useful for searching through a large table. (This is a simple string search, so you must use the exact same form as displayed in the table.)

3.5 Joining and Leaving Domains 📥 👄

You must specify the domain(s) in which you want *Monitor* to monitor.

When *Monitor* starts, you will be prompted to enter a domain ID (unless you start it with the **-initialDomainIds** command-line option).

	Join DDS Domain 🛛 🛛 🔀
?	Please enter the ID of the DDS domain you'd like to join.
	OK Cancel

Actions

Show Current Domains.

📥 Join Domain.

Leave Domain.

Window

Help

Domain

File

 $\langle \bullet \rangle$

Phy

You can also join and leave domains by using the and sin the **Domain** menu:

To see the currently joined domains, select **Domain**, **Show Current Domains...** from the menu.

3.6 Saving and Loading Data 📑 📑

Monitor can work with live data or data that's been saved to a file. To save monitoring data, use the **I** button on the toolbar or select **File**, **Save Data...** from the menu. The file will be saved in a Serialized Java Objects format (.ser).

To load a data file, use the 📑 button on the toolbar or select **File, Load Data...** from the menu.

When *Monitor* is working with saved data, you will see **(Histor-ical data mode)** in the title bar, followed by the filename. For example:

<u>F</u> ile	<u>D</u> omain	Actio	ns
	Save Data Load Data Exit	э Э	Logi

rti RTI Monitor (Historical data mode) C:\RTI\MyMonitorTutorialData.ser					
<u>F</u> ile <u>D</u> omain <u>A</u> ctions <u>W</u> indow <u>H</u> elp					
🔷 🔶 📥 🖌 🖩 🚼	i III 🗎 💐 📃 🗶 🏔 🗔				

Monitor will save notifications, descriptions, and statistics (for DomainParticipants, DataReaders, and DataWriters), up to the history depth or notification history depth for every object being monitored.

Notes:

- □ While viewing saved data, you will not see built-in topic data or the IDL representation of the data type in the Description panel. This information is not saved in the data file.
- □ You cannot save data while using a loaded data file.
- □ After viewing saved data, to return to live data you must reconnect to the domain(s) that you want to monitor by joining the domain (see Section 3.3.5).

3.7 Connecting and Disconnecting the Display 🥖 🔓

To stop *Monitor* from updating the display (while still receiving data), select the *still* button on the toolbar or **Actions**, **Disconnect Display** from the menu.

To resume display updates, select the **s** button on the toolbar or **Actions**, **Connect Display** from the menu.

Note: Data samples may be lost at the *Connext* level while *Monitor's* display is disconnected because the History QoS is configured to only keep the last few samples.

3.8 Changing Transport Settings in the Configuration File

The QoS used by *Monitor* are in *<installation directory>/config/* rtimonitor_qos_profiles.xml. You can edit this file to adjust the QoS to fit your system's needs. The typical use case is to adjust the transport settings so that they align with the other applications in the system, as these are critical for communication. However changing any other settings in this file may result in unpredictable behavior and is not supported.

Generally, the configuration file is editable on the system. There are certain circumstances where it cannot be updated, such as on Windows 7 when *Monitor* is installed in the "Program Files" directory. If this is the case, open your text editor with 'administrative' permissions before opening the QoS file.