Tech Note 1008
Storing Application Server 2014 Alarms and Events Using Historian

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Topic#: 002840
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Introduction

Application Server 2014 enables you to Historize alarms and events using Historian. The new storage procedure for Historical alarms and events starts at the **Area** level as opposed to the Galaxy level in the previous versions. Alarms and events are captured from the Notification Distributor of each Area. Then they are sent to Event Historization Service (EHZ) and then to the Historian.

This *Tech Note* demonstrates the new functionality.

The following topics are covered in this *Tech Note*:

- **Storage Process**
- **Selecting Alarm/Event Categories to Historize**
- **Configuring the Engine and Application Object**
- **Configuring the Alarm Client and Demonstrating Runtime Behavior**
- **Failing Over from the Primary to the Secondary Historian**

Assumptions

This *Tech Note* assumes that you have already configured a redundant Historian. For information on configuring redundant Historian, refer to **Tech Note 987 Configuring AppServer to Store Data in Primary and Partner Historians**.

Application Versions:

- Wonderware Application Server 2014 (version 4.0) or later
- Wonderware InTouch 2014 (version 11.0) or later
- Wonderware Historian Server 2014 (version 11.5) or later

Storage Process

1. The Alarms and Events are stored in the new A2ALMDB database located in the Historian with the same schema as existing

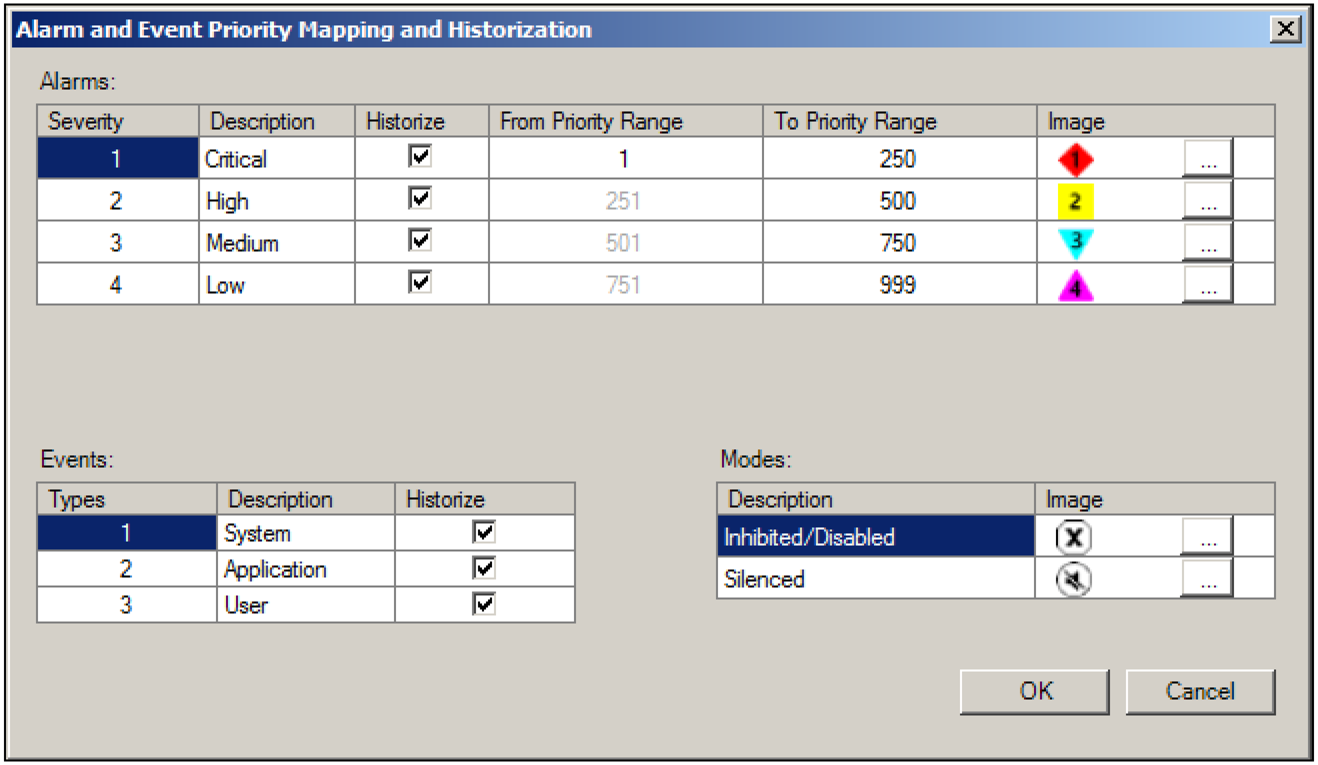
WWALMDB.

2. Events and process data follow the same route through HCAL (Historian Client Access Layer) to Historian.
3. Existing Alarm and Event message flow is not altered. They can still be sent to Alarm Manager and historized to WWALMDB.
4. Alarms, Events and Process Data share the same historian configuration such as historian node; store/forward path etc. "Enable storage to historian" must be enabled to historize process data and events.
5. Similar to process data, Alarm and Events historization also support store/forward, application engine fail-over and dual Historians.

Selecting Alarm/Event Categories to Historize

Choose the alarm and event categories that you would like to historize by using the Alarm Priority Mapping applet.

- To open Alarm Priority Mapping, go to **Galaxy\Configure\Alarm Priority Mapping**. Figure 1 (below) shows the default settings of Alarm Priority Mapping in a new Galaxy.



Alarm and Event Priority Mapping and Historization

Alarms:

Severity	Description	Historize	From Priority Range	To Priority Range	Image
1	Critical	☑	1	250	◆ 1 ...
2	High	☑	251	500	■ 2 ...
3	Medium	☑	501	750	▼ 3 ...
4	Low	☑	751	999	▲ 4 ...

Events:

Types	Description	Historize
1	System	☑
2	Application	☑
3	User	☑

Modes:

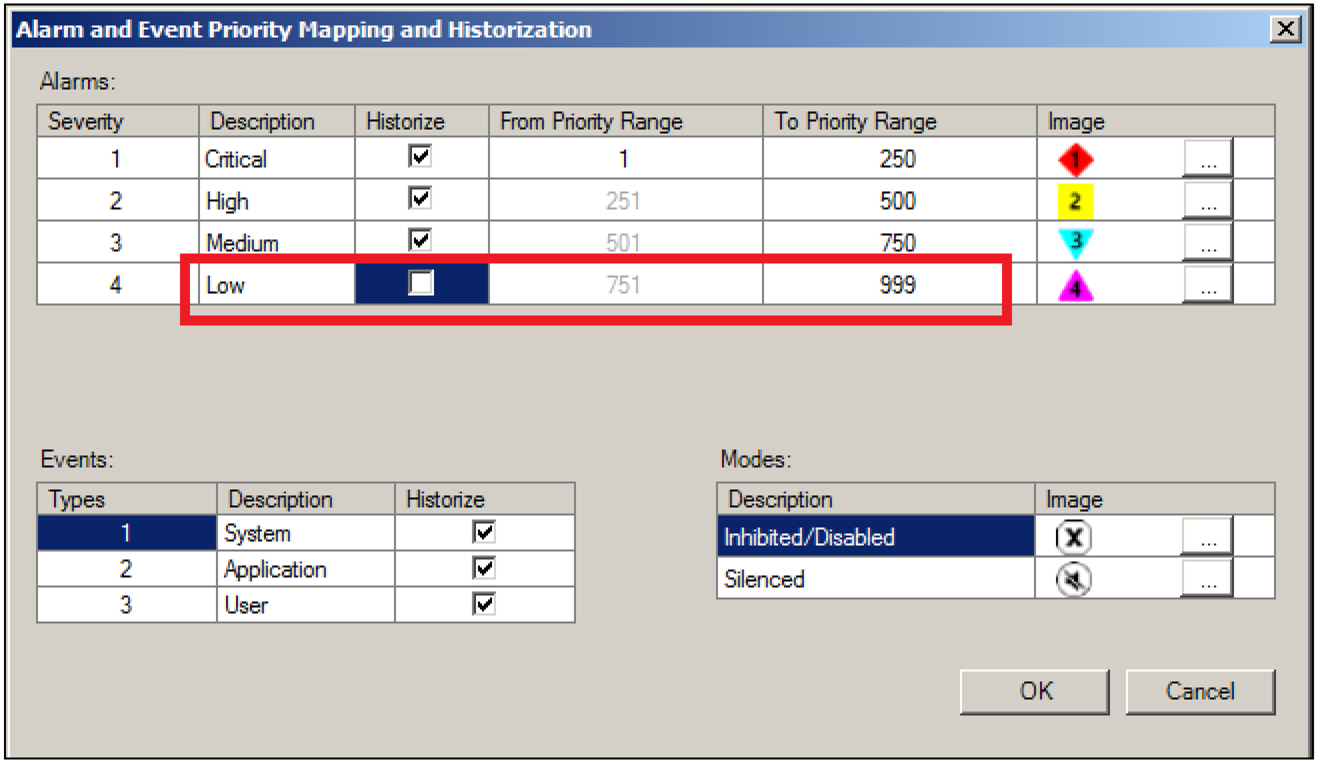
Description	Image
Inhibited/Disabled	⊗ ...
Silenced	🔇 ...

Figure 1: Alarm and Event Priority Mapping Applet

Note: In a migrated Galaxy, the **Historize** option is not enabled by default.

Checking/unchecking the **Historize** checkbox against each category determines whether or not you would like to historize them. Modifying the **Historize** option does not require you to deploy changes.

For this example, the **Low** Alarm Severity level (default from priority **751** to priority **999**) is unchecked (Figure 2 below). For more details about Alarm Priority Mapping, please refer to Application Server User's Guide.



Alarm and Event Priority Mapping and Historization

Alarms:

Severity	Description	Historize	From Priority Range	To Priority Range	Image
1	Critical	☑	1	250	1
2	High	☑	251	500	2
3	Medium	☑	501	750	3
4	Low	□	751	999	4

Events:

Types	Description	Historize
1	System	☑
2	Application	☑
3	User	☑

Modes:

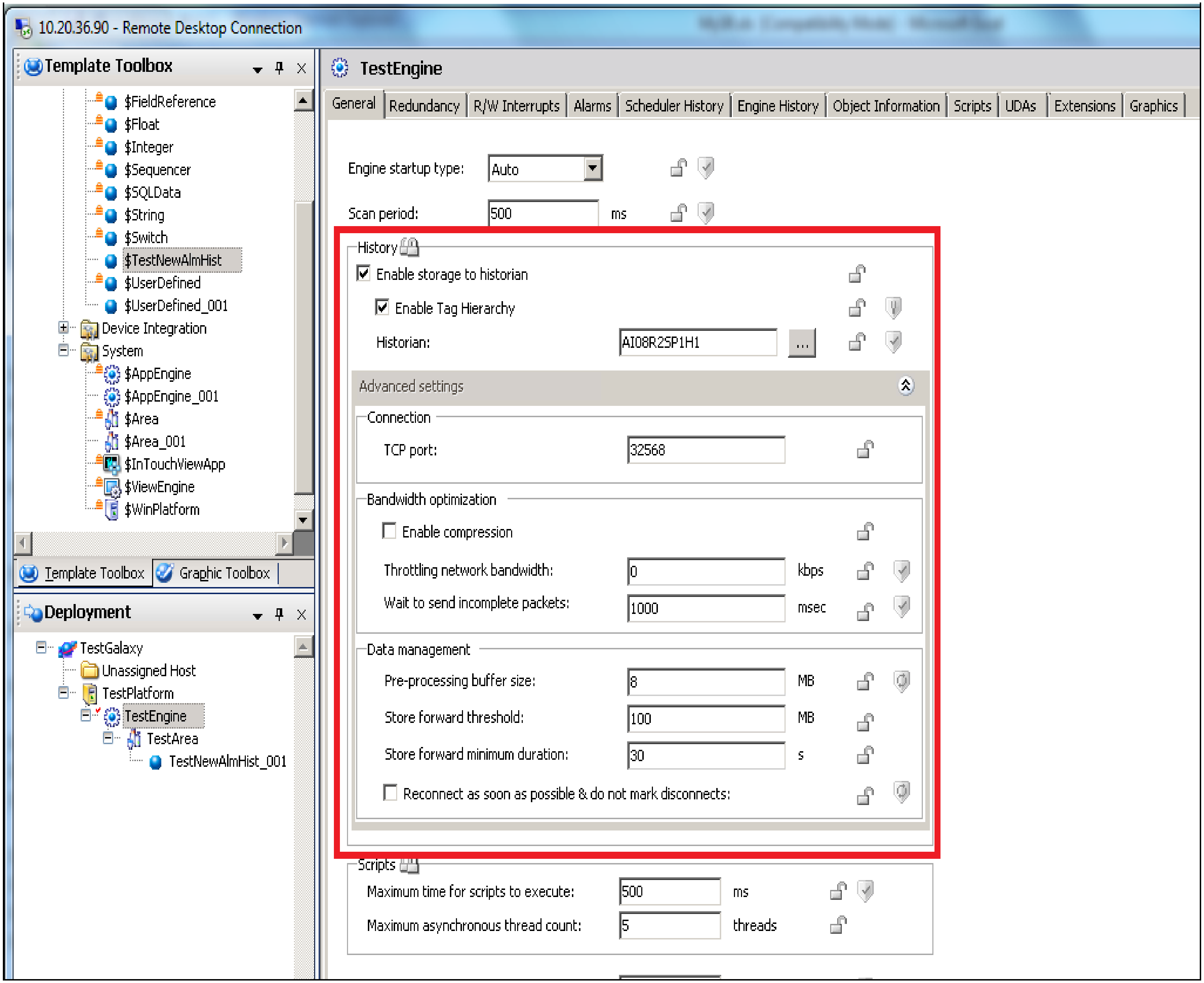
Description	Image
Inhibited/Disabled	☒
Silenced	

FIGURE 2: LOW ALARM SEVERITY LEVEL IS UNCHECKED

Configuring the Engine and Application Object

Setting up the Engine

At the Engine level, select the **Enable storage to historian** and **Enable Tag Hierarchy**. Then select the Primary Historian node for the Historian source.



Engine startup type: Auto

Scan period: 500 ms

History

☑ Enable storage to historian

☑ Enable Tag Hierarchy

Historian: AI08R2SP1H1

Advanced settings

Connection

TCP port: 32568

Bandwidth optimization

☐ Enable compression

Throttling network bandwidth: 0 kbps

Wait to send incomplete packets: 1000 msec

Data management

Pre-processing buffer size: 8 MB

Store forward threshold: 100 MB

Store forward minimum duration: 30 s

☐ Reconnect as soon as possible & do not mark disconnects:

Scripts

Maximum time for scripts to execute: 500 ms

Maximum asynchronous thread count: 5 threads

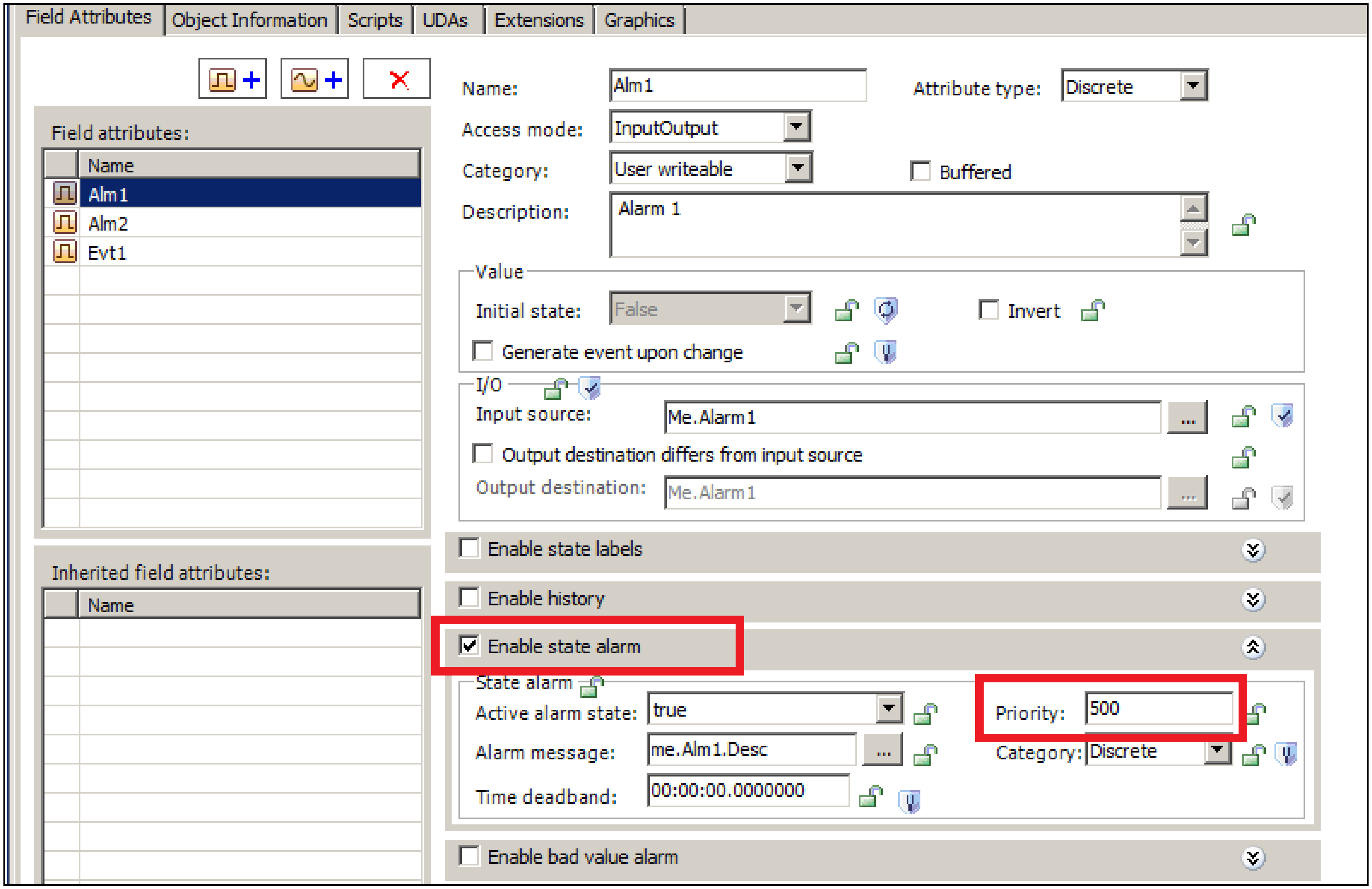
Figure 3: Enable Storage to Historian

Note: The Historian above (AI08R2SP1H1) has a partner Historian (AI08R2SP1H2).

Object Setup

For this example, create a simple Application Object Template and configure it with with the following:

- A Discrete field attribute (**Alm1**) with a State alarm of **500** priority.



Field attributes: Alm1, Alm2, Evt1

Name: Alm1

Attribute type: Discrete

Access mode: InputOutput

Category: User writeable

□ Buffered

Description: Alarm 1

Initial state: False

□ Invert

□ Generate event upon change

Input source: Me.Alarm1

□ Output destination differs from input source

Output destination: Me.Alarm1

□ Enable state labels

□ Enable history

☑ Enable state alarm

Active alarm state: true

Priority: 500

Alarm message: me.Alm1.Desc

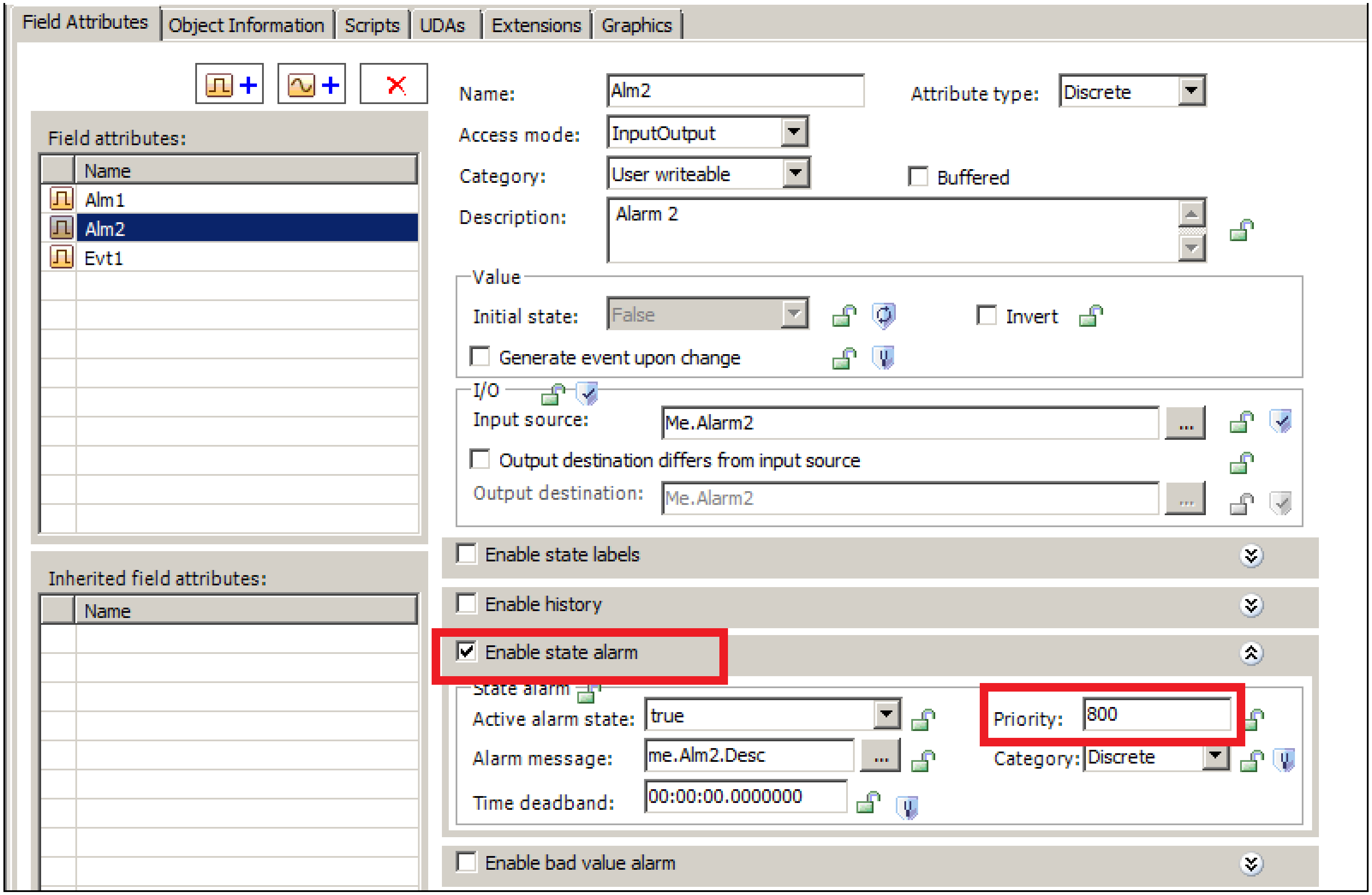
Category: Discrete

Time deadband: 00:00:00.0000000

□ Enable bad value alarm

Figure 4: Discrete Alarm With Priority 500

- A Discrete field attribute (**Alm2**) with a State alarm of **800** priority.



Field attributes:

Name
Alm1
Alm2
Evt1

Inherited field attributes:

Name

Name: Alm2

Attribute type: Discrete

Access mode: InputOutput

Category: User writeable

□ Buffered

Description: Alarm 2

Value

Initial state: False

□ Invert

□ Generate event upon change

I/O

Input source: Me.Alarm2

□ Output destination differs from input source

Output destination: Me.Alarm2

□ Enable state labels

□ Enable history

☑ Enable state alarm

State alarm

Active alarm state: true

Priority: 800

Alarm message: me.Alm2.Desc

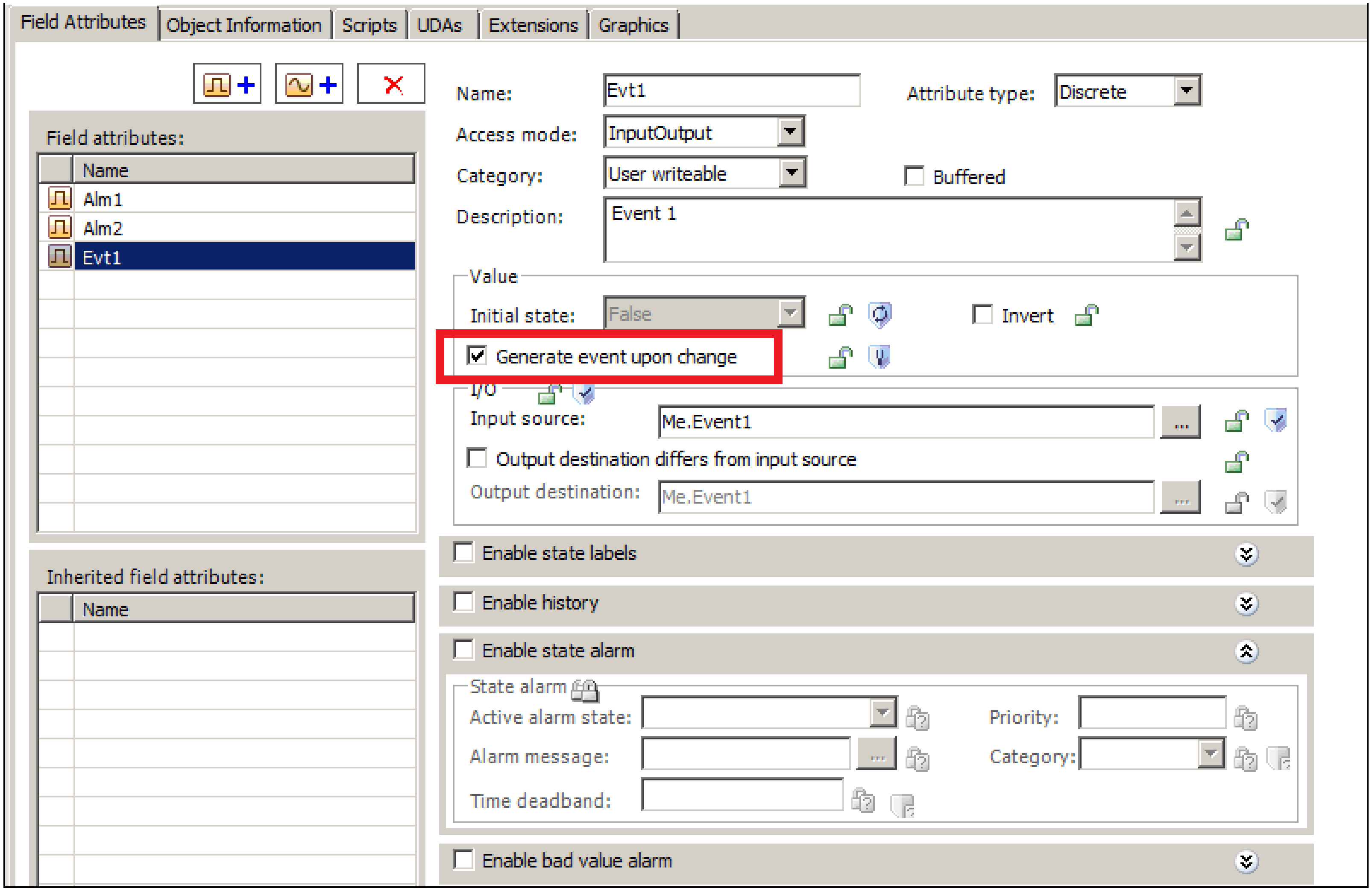
Category: Discrete

Time deadband: 00:00:00.0000000

□ Enable bad value alarm

Figure 5: Discrete Alarm With Priority 800

- A Discrete field attribute (**Evt1**) with **Generate event upon change** checked.



Field attributes:

Name
Alm1
Alm2
Evt1

Inherited field attributes:

Name

Name: Evt1
Attribute type: Discrete
Access mode: InputOutput
Category: User writeable
☐ Buffered
Description: Event 1

Value
Initial state: False
☐ Invert
☑ Generate event upon change

I/O
Input source: Me.Event1
☐ Output destination differs from input source
Output destination: Me.Event1

☐ Enable state labels

☐ Enable history

☐ Enable state alarm

State alarm
Active alarm state:
Priority:
Alarm message:
Category:
Time deadband:

☐ Enable bad value alarm

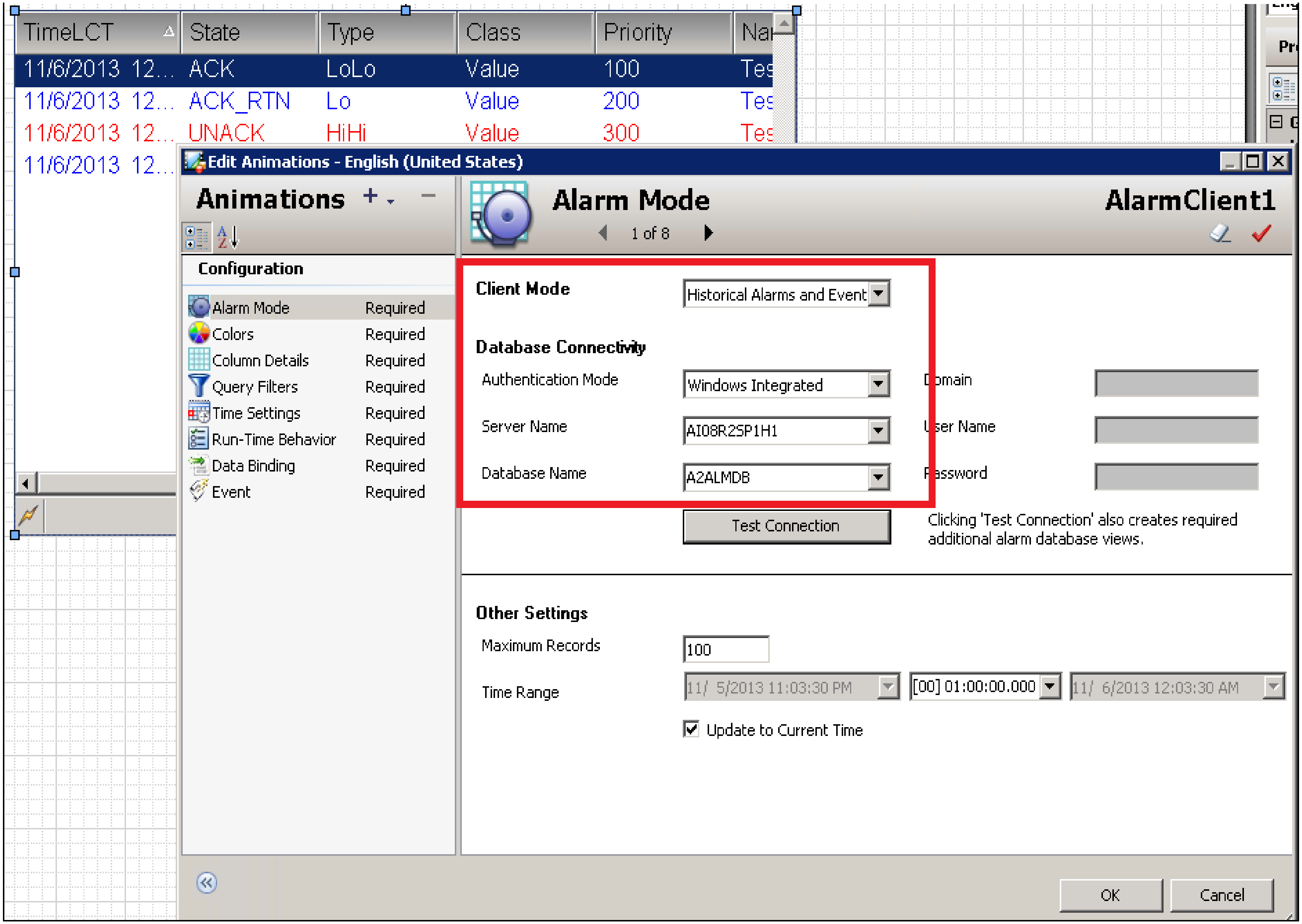
Figure 6: Discrete Event

Deploy an instance of this template and change the Alarm states of its three attributes to **True**.

Configuring the Alarm Client and Demonstrating Runtime Behavior

1. Create a new Archestra Graphic and insert an Alarm Client Control.

2. Select the following for the properties:
   a. **Historical Alarms and Events**
   b. Authentication Mode: **Windows Integrated**
   c. Server Name: Primary Historian Server Name (**AI08R2SP1H1**)
   d. Database Name: **A2ALMDB**



TimeLCT	State	Type	Class	Priority	Na
11/6/2013 12...	ACK	LoLo	Value	100	Tes
11/6/2013 12...	ACK_RTN	Lo	Value	200	Tes
11/6/2013 12...	UNACK	HiHi	Value	300	Tes
11/6/2013 12...					

Edit Animations - English (United States)

Animations

Configuration

Alarm Mode	Required
Colors	Required
Column Details	Required
Query Filters	Required
Time Settings	Required
Run-Time Behavior	Required
Data Binding	Required
Event	Required

Alarm Mode — 1 of 8 — AlarmClient1

Client Mode: Historical Alarms and Event

Database Connectivity

Authentication Mode: Windows Integrated

Server Name: AI08R2SP1H1

Database Name: A2ALMDB

Domain:

User Name:

Password:

Test Connection

Clicking 'Test Connection' also creates required additional alarm database views.

Other Settings

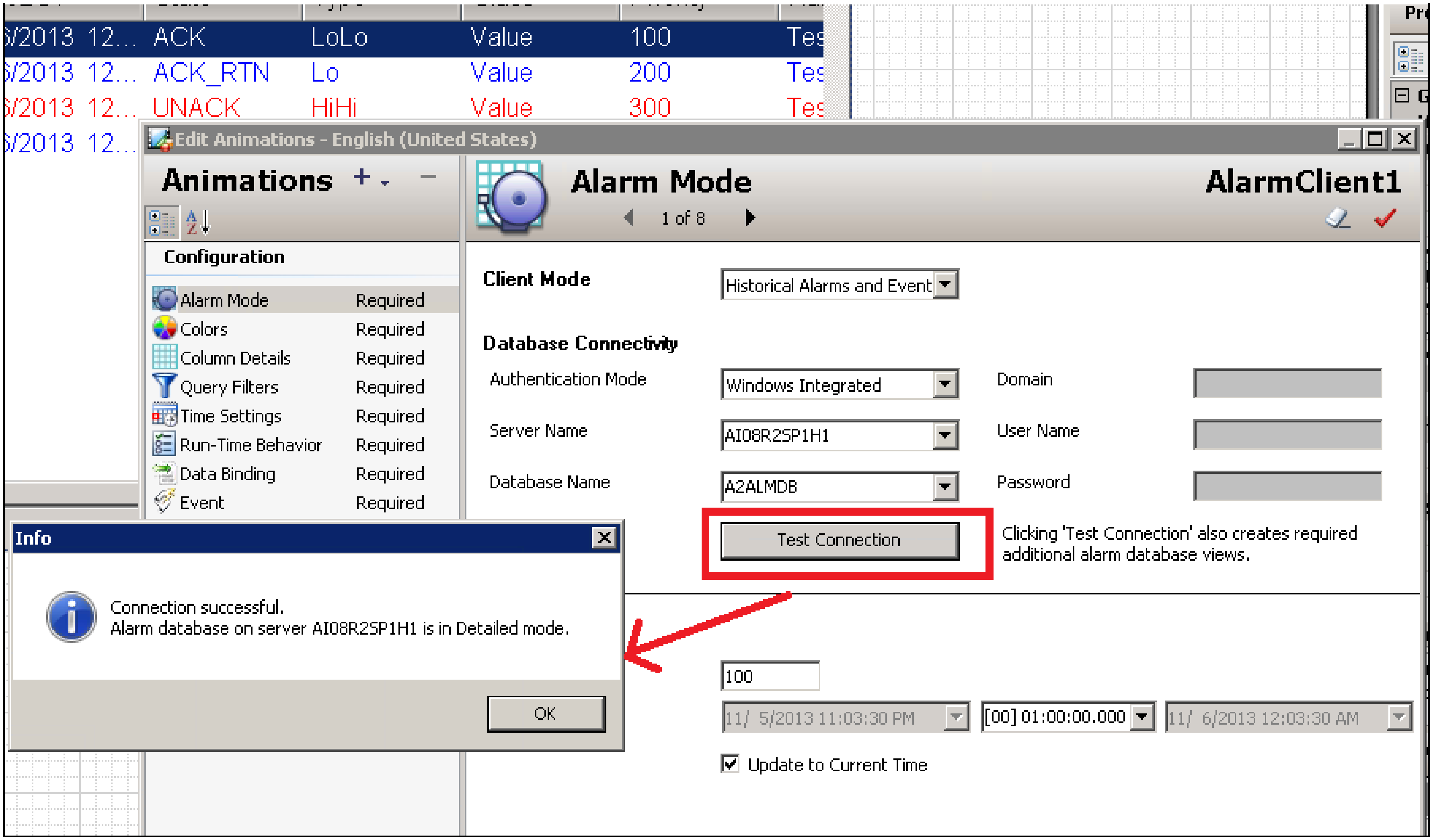
Maximum Records: 100

Time Range: 11/ 5/2013 11:03:30 PM — [00] 01:00:00.000 — 11/ 6/2013 12:03:30 AM

☑ Update to Current Time

Figure 7: ArchestrA Graphic

3. Test the Connection.



/2013 12...	ACK	LoLo	Value	100	Tes
/2013 12...	ACK_RTN	Lo	Value	200	Tes
/2013 12...	UNACK	HiHi	Value	300	Tes
/2013 12...					

Edit Animations - English (United States)

Animations

Configuration

Alarm Mode	Required
Colors	Required
Column Details	Required
Query Filters	Required
Time Settings	Required
Run-Time Behavior	Required
Data Binding	Required
Event	Required

Alarm Mode 1 of 8 AlarmClient1

Client Mode: Historical Alarms and Event

Database Connectivity

Authentication Mode: Windows Integrated

Domain:

Server Name: AI08R2SP1H1

User Name:

Database Name: A2ALMDB

Password:

Test Connection

Clicking 'Test Connection' also creates required additional alarm database views.

100

11/ 5/2013 11:03:30 PM [00] 01:00:00.000 11/ 6/2013 12:03:30 AM

☑ Update to Current Time

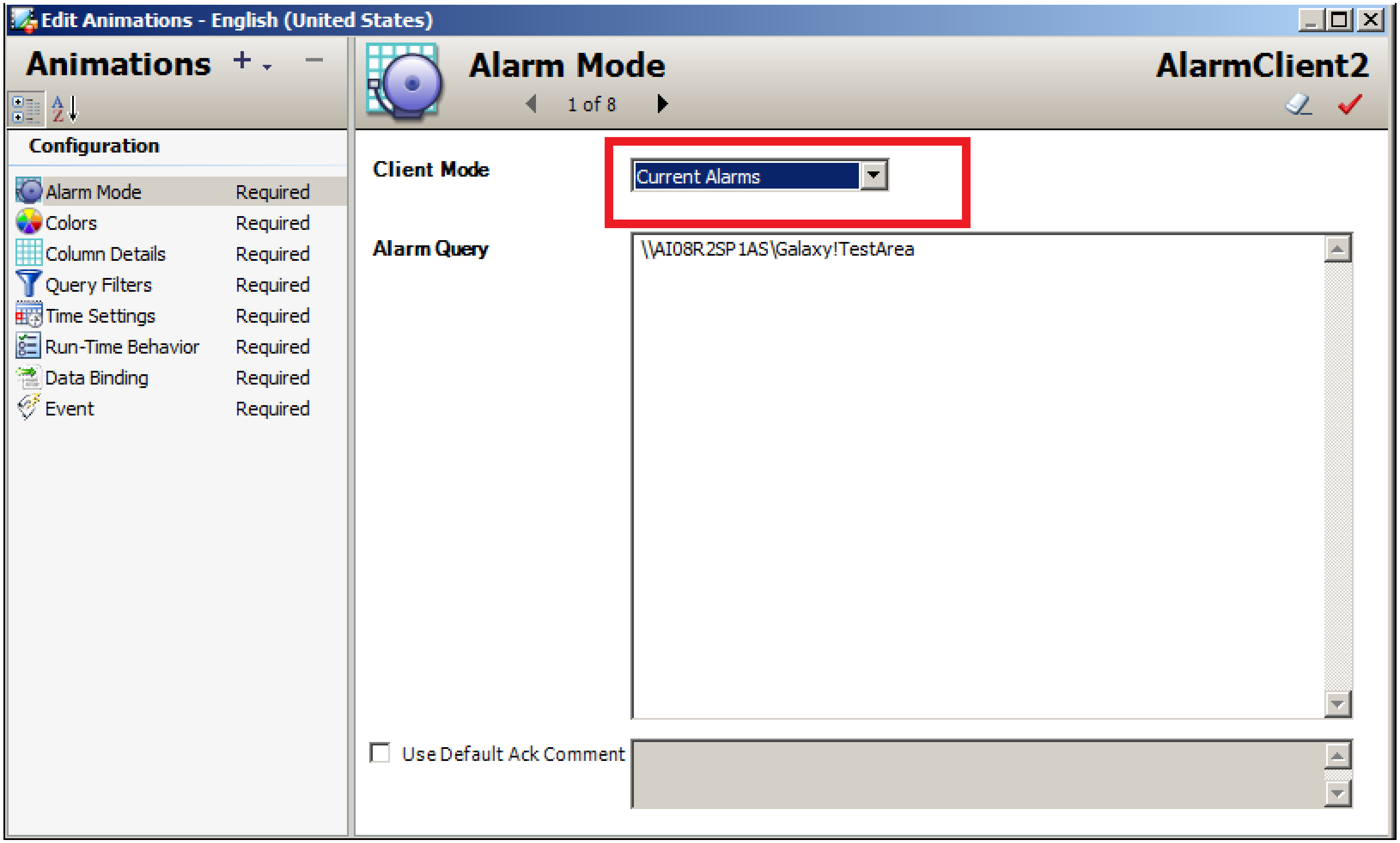
Info

Connection successful.
Alarm database on server AI08R2SP1H1 is in Detailed mode.

OK

Figure 8: Test the DB Connection

4. For illustration purposes ONLY, create another ArchestrA graphic with an Alarm Client to show the **Current Alarms**.



Client Mode: Current Alarms

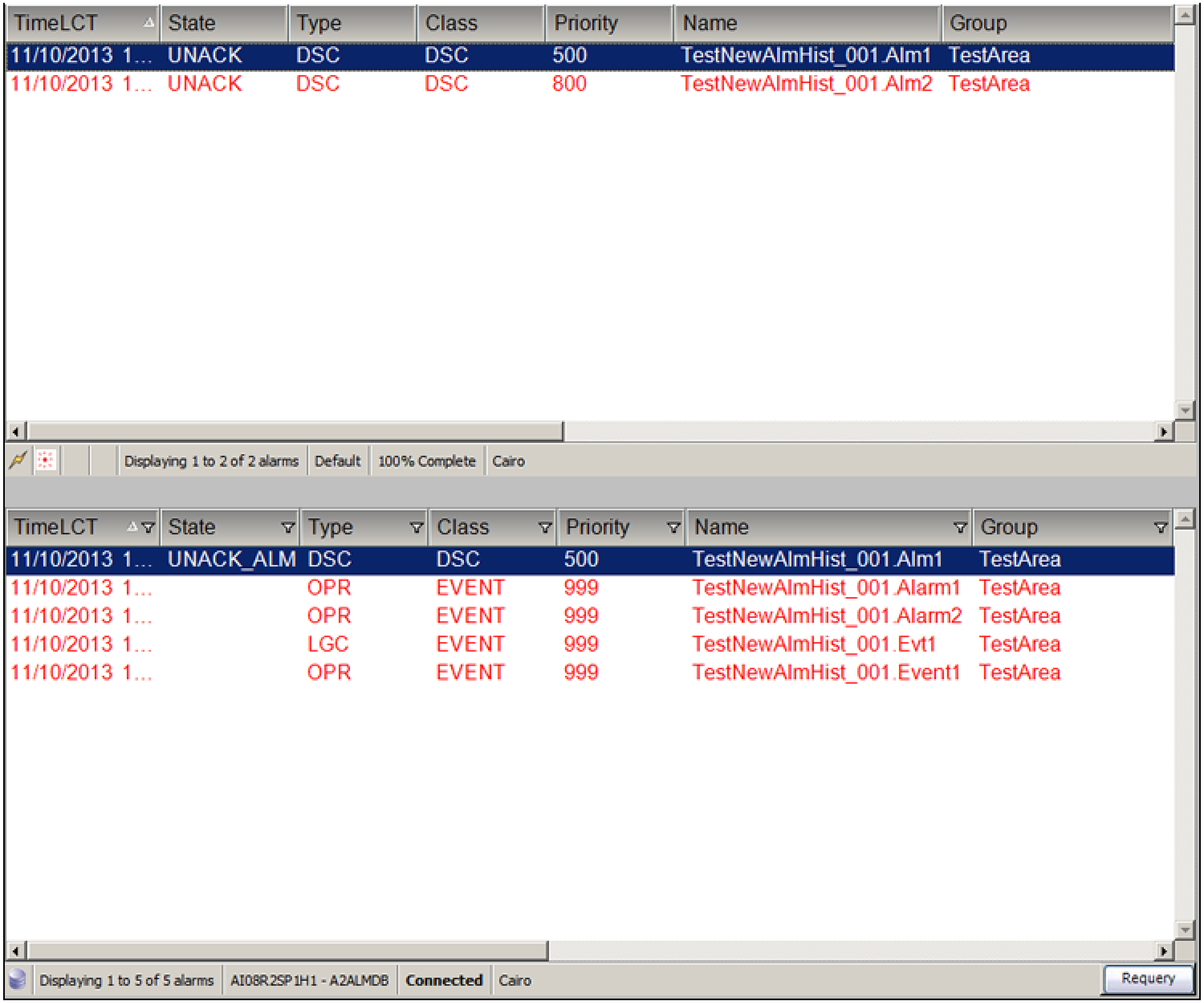
Alarm Query: \\AI08R2SP1AS\Galaxy!TestArea

□ Use Default Ack Comment

Figure 9: Current Alarms

5. Embed the two ArchestrA graphics demonstrated above into a managed InTouch application.

6. Go to Runtime.



TimeLCT	State	Type	Class	Priority	Name	Group
11/10/2013 1...	UNACK	DSC	DSC	500	TestNewAlmHist_001.Alm1	TestArea
11/10/2013 1...	UNACK	DSC	DSC	800	TestNewAlmHist_001.Alm2	TestArea

Displaying 1 to 2 of 2 alarms | Default | 100% Complete | Cairo

TimeLCT	State	Type	Class	Priority	Name	Group
11/10/2013 1...	UNACK_ALM	DSC	DSC	500	TestNewAlmHist_001.Alm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea
11/10/2013 1...		LGC	EVENT	999	TestNewAlmHist_001.Evt1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Event1	TestArea

Displaying 1 to 5 of 5 alarms | AI08R2SP1H1 - A2ALMDB | **Connected** | Cairo

Figure 10: Runtime Alarm States

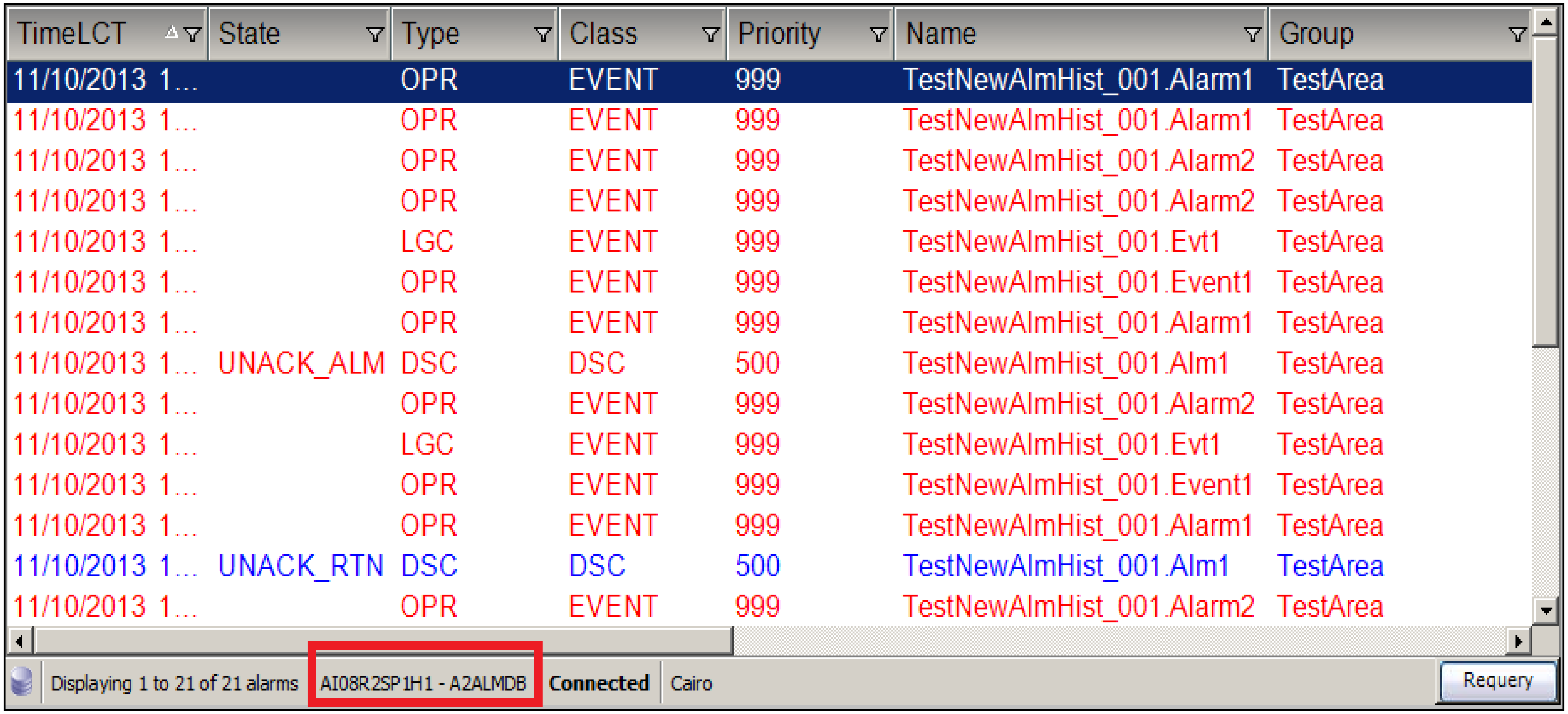
While the State alarms for Alm1 and Alm2 are in the Current Alarms client (the top viewer), only the alarm for Alm1 is in the Historical client (the bottom viewer). This is because the Alarm category containing Alm2 wasn't selected for historization as mentioned above.

Failing Over from the Primary to the Secondary Historian

One advantage of using Historian to store the alarms and events of Application Server is that you can make use of the redundant Historian feature. In other words, when the primary Historian becomes unavailable, the Alarm Client fails over to the secondary Historian automatically.

The following graphics demonstrate this:

The Primary Historian (**AI08R2SP1H1**) is available as shown in the Status Bar (Figure 10 below).

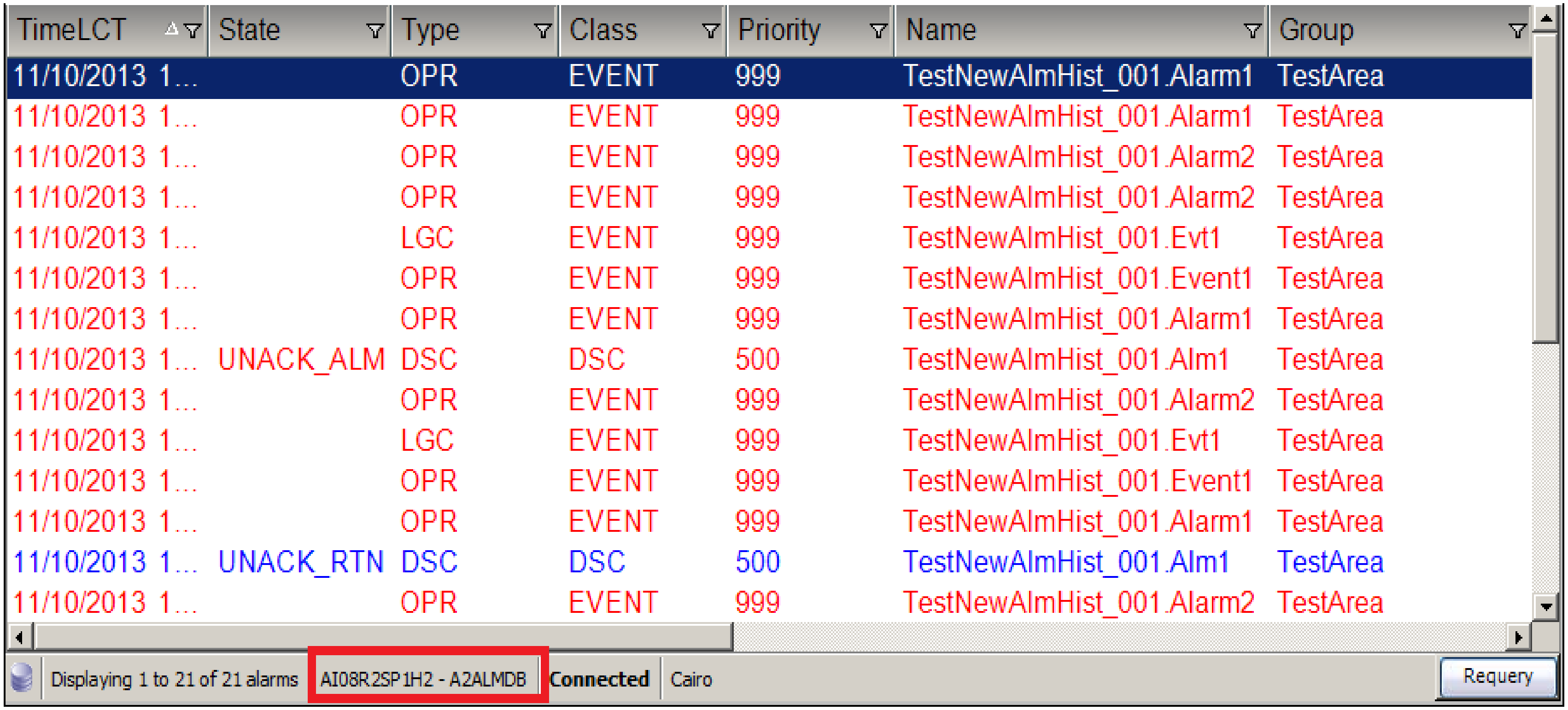


TimeLCT	State	Type	Class	Priority	Name	Group
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea
11/10/2013 1...		LGC	EVENT	999	TestNewAlmHist_001.Evt1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Event1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...	UNACK_ALM	DSC	DSC	500	TestNewAlmHist_001.Alm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea
11/10/2013 1...		LGC	EVENT	999	TestNewAlmHist_001.Evt1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Event1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...	UNACK_RTN	DSC	DSC	500	TestNewAlmHist_001.Alm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea

Displaying 1 to 21 of 21 alarms | AI08R2SP1H1 - A2ALMDB | Connected | Cairo

Figure 11: Primary Historian In Status Bar

When the Primary becomes unavailable, the Alarm client fails over automatically to the Secondary Historian (**AI08R2SP1H2**) as shown in the Status bar (Figure 12 below).



TimeLCT	State	Type	Class	Priority	Name	Group
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea
11/10/2013 1...		LGC	EVENT	999	TestNewAlmHist_001.Evt1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Event1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...	UNACK_ALM	DSC	DSC	500	TestNewAlmHist_001.Alm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea
11/10/2013 1...		LGC	EVENT	999	TestNewAlmHist_001.Evt1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Event1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm1	TestArea
11/10/2013 1...	UNACK_RTN	DSC	DSC	500	TestNewAlmHist_001.Alm1	TestArea
11/10/2013 1...		OPR	EVENT	999	TestNewAlmHist_001.Alarm2	TestArea

Displaying 1 to 21 of 21 alarms | AI08R2SP1H2 - A2ALMDB | Connected | Cairo

FIGURE 12: SECONDARY HISTORIAN IN STATUS BAR

Note: After failover, the Alarm Client stays connected to the Secondary Historian even if the Primary becomes available. The Alarm Client connects back to the Primary Historian only when the Secondary fails.

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