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Introduction

This Tech Tip describes how to calculate statistics on tags in Wonderware InTouch, assuming those tags are being historized in InSQL Historian 9.0. The statistic functions provided in this application are Min, Max, Avg and StDev. For the Min, Max and Avg calculations, the queries take advantage of the advanced retrieval modes provided by Historian 9.0, allowing for very fast calculations of these statistics. Since Standard Deviation (StDev) is not one of the advanced retrieval modes in Historian, we use the standard SQL "StDev" function – calculation time is dependent on the duration over which you calculate this statistic. Since this application uses InTouch SQLAccess functionality, the SQLAccess features needs to be added to the InTouch installation, if that option was not checked during the original installation.

Once this functionality has been added to your InTouch application all that is required to calculate a statistic is a call to a Quick Function from within any script:

CalculateStat(StatTagname as Message, Start as Message, End as Message, StatType as Message)

where

StatTagname	The name of the tag in InSQL Historian to calculate
Start	Start Date/Time of the calculation period
End	End Date/Time of the calculation period
StatType	Statistic type – min, max, avg or stdev (not case sensitive)

Procedure

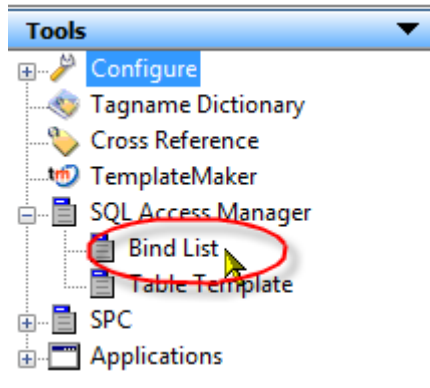
The following procedure details the steps to develop this functionality in InTouch:

1. Create the following tags in WindowMaker :

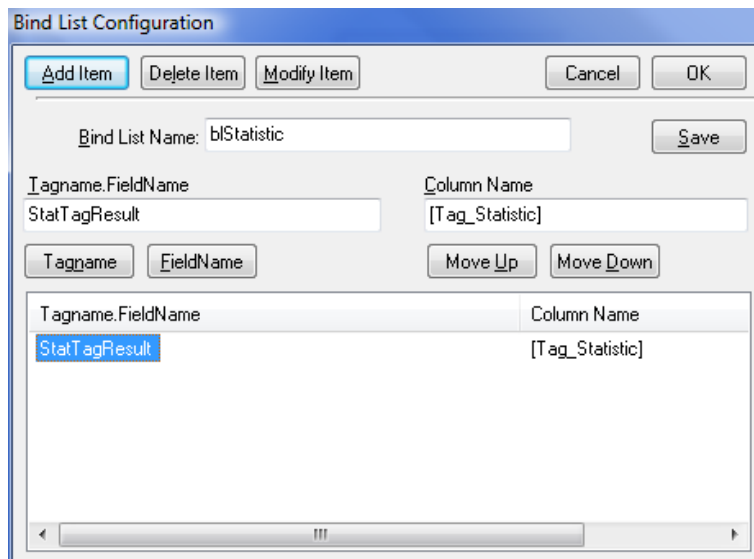
Tagname	Tag Type	Description
ConnectionID	Memory Int	SQL connection Identifier
ResultCode	Memory Int	SQL result code
CalculatedStatisticTag	Memory Real	"Holding" tag for the returned statistic calculation
StatTagResult	Memory Real	Calculated value returned from the SQL BindList
InputTagname	Memory Msg	Tagname to calculate statistic on (in InSQL)
StatEndTime	Memory Msg	End date/time of calculation time range
StatisticType	Memory Msg	Statistic type: MIN, MAX, AVG or STDEV
StatStartTime	Memory Msg	Start date/time of calculation time range

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2. Create a new SQLAccess BindList in InTouch:



3. Name the new BindList **blStatistic**



4. In the Tagname.FieldName field, enter **StatTagResult**; in the ColumnName field, enter **[Tag_Statistic]**, and click OK
5. Create a new QuickFunction, and name it **CalculateStats**
6. In the QuickFunction editor, define the following four Arguments:
 - **StatTagname** Message
 - **Start** Message
 - **End** Message
 - **StatType** Message

7. Create the script as follows:

```
{Depending on what StatType was passed in - Min, Max, Avg, StDev - create the
appropriate SQL query}
IF StringUpper(StatType) == "MIN" THEN
    ResultCode = SQLSetStatement( ConnectionID, "Select Value [Tag_Statistic]
From History Where wwRetrievalMode = 'minimum' AND wwCycleCount = 1 ");
    ResultCode = SQLAppendStatement( ConnectionID, "AND Tagname = '" +
InputTagName + "' And DateTime > '" + Start + "' And DateTime <= '" + End +
"' " );

ELSE IF StringUpper(StatType) == "MAX" THEN
    ResultCode = SQLSetStatement( ConnectionID, "Select Value [Tag_Statistic]
From History Where wwRetrievalMode = 'maximum' AND wwCycleCount = 1 ");
    ResultCode = SQLAppendStatement( ConnectionID, "AND Tagname = '" +
InputTagName + "' And DateTime > '" + Start + "' And DateTime <= '" + End +
"' " );

ELSE IF StringUpper(StatType) == "AVG" THEN
    ResultCode = SQLSetStatement( ConnectionID, "Select Value [Tag_Statistic]
From History Where wwRetrievalMode = 'average' AND wwCycleCount = 1 ");
    ResultCode = SQLAppendStatement( ConnectionID, "AND Tagname = '" +
InputTagName + "' And DateTime > '" + Start + "' And DateTime <= '" + End +
"' " );

ELSE IF StringUpper(StatType) == "STDEV" THEN
    ResultCode = SQLSetStatement( ConnectionID, "Select StDEV(Value)
[Tag_Statistic] from History Where wwResolution = 1000 AND Tagname = '" +
InputTagName + "' ");
    ResultCode = SQLAppendStatement( ConnectionID, "AND wwRetrievalMode =
'cyclic' AND DateTime > '" + Start + "' And DateTime <= '" + End + "' " );
ENDIF;
ENDIF;
ENDIF;
ENDIF;

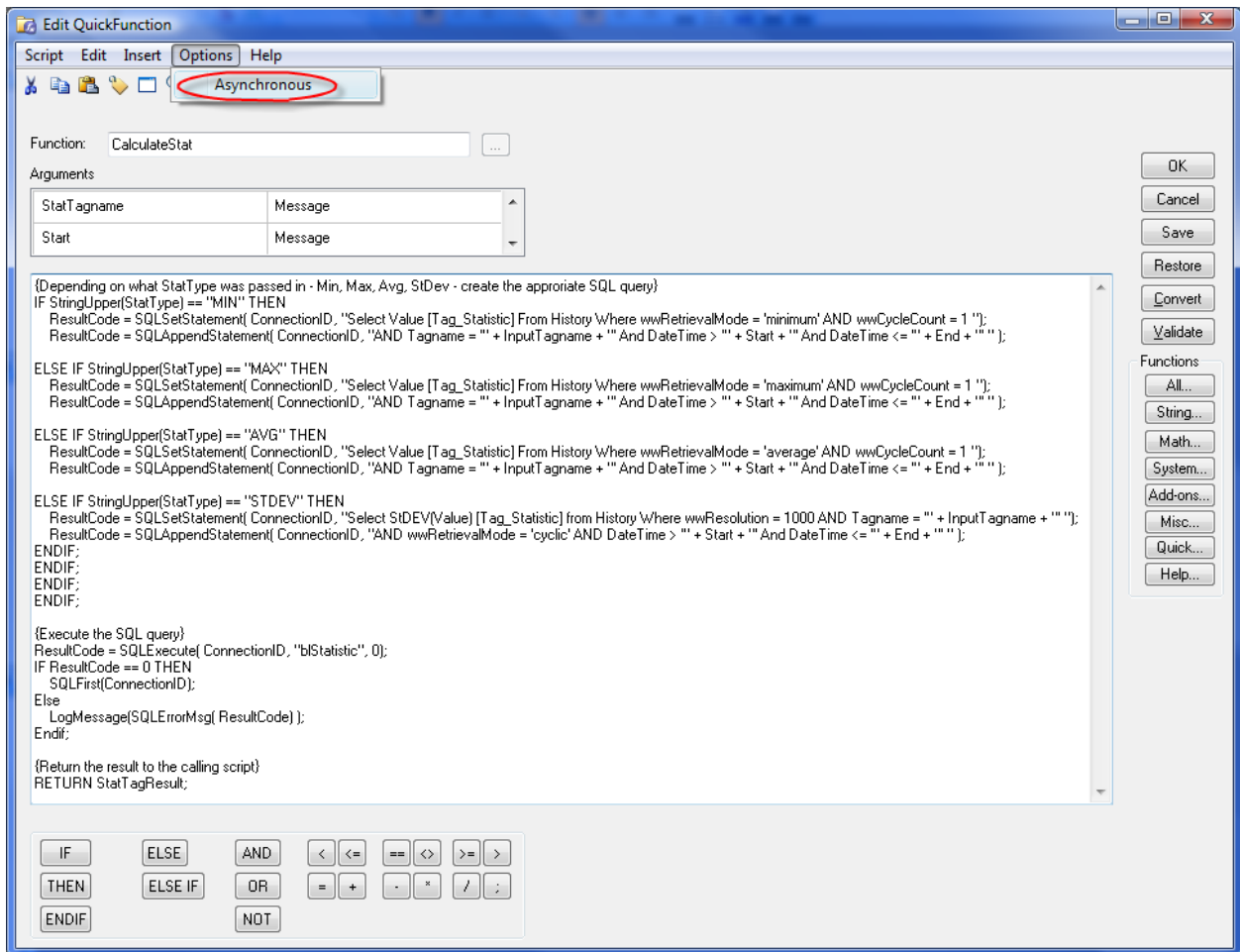
{Execute the SQL query}
ResultCode = SQLExecute( ConnectionID, "blStatistic", 0);
IF ResultCode == 0 THEN
    SQLFirst(ConnectionID);

Else
    LogMessage(SQLErrorMsg( ResultCode) );
ENDIF;

{Return the result to the calling script}
RETURN StatTagResult;
```

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8. The QuickFunction editor should look as follows:



9. Finally, click the *Options* menu choice, and select **Asynchronous** (as shown above), and Save.

10. Next create a new QuickFunction named **ConnectDB** - no Arguments are required

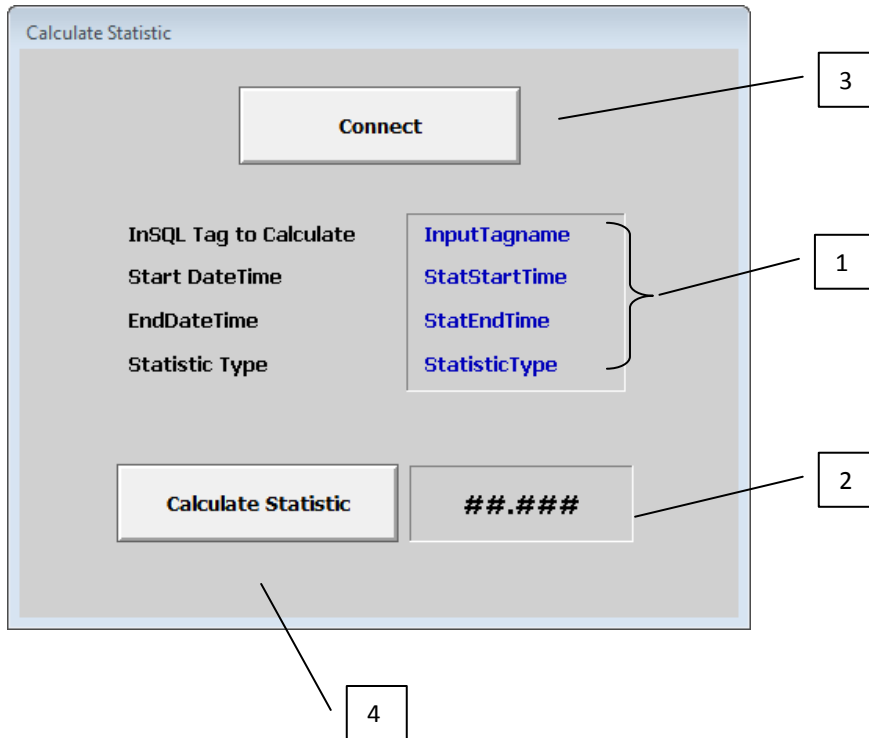
11. The script for this QuickFunction is as follows:

```
ResultCode = SQLConnect(ConnectionID,
"Provider=SQLOLEDB.1;Password=wwUser;Persist Security Info=True;User
ID=wwUser;Initial Catalog=RUNTIME;Data Source=MYHISTORIAN");
```

Where **MYHISTORIAN** is the name of your Wonderware Historian

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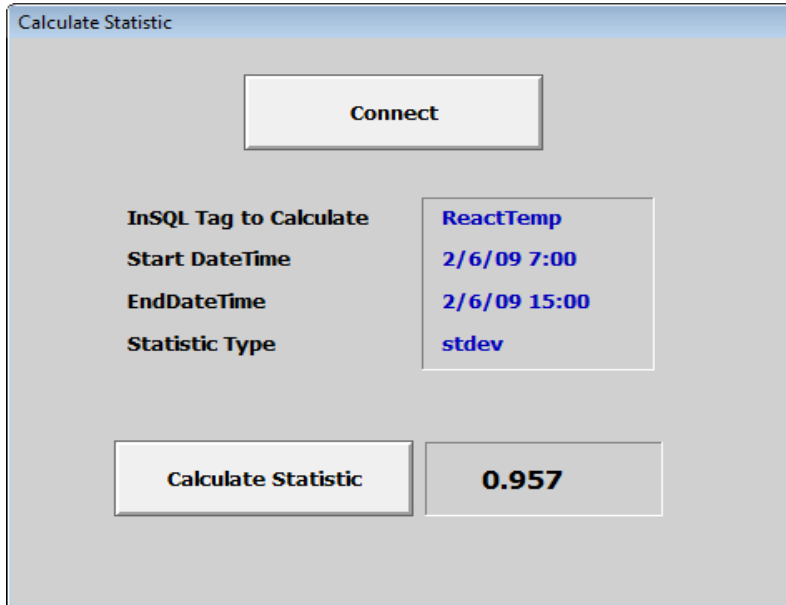
12. Create a test window named **Calculate Statistic**. Place the tagnames as User Inputs on the window [1]. Place a Value Display [2] for the calculated statistic value tag (**CalculatedStatisticTag**). Place two buttons with Action Scripts – **Connect** [3] and **Calculate Statistic** [4]:



13. Under the Connect button, create an Action Script as follows:
`CALL ConnectDB();`
14. Under the Calculate Statistic button, create an Action Script as follows:
`CalculatedStatisticTag = CALL CalculateStat(
 InputTagname, StatStartTime, StatEndTime, StatisticType);`

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15. To test the application in Runtime, open the window in WindowViewer, and enter the four required values (see example below):



16. Click the **Connect** button to connect to the Historian server, and then click the **Calculate Statistic** button – the resulting statistic value will be displayed. Try replacing the Statistic Type to min, max or avg.

Notes:

- To use this functionality in an InTouch application, make use of “automated” scripts such as Application, Condition or Data Scripts. For example:
 - Call the ConnectDB() QuickFunction in the Application – On Startup script
 - Call the CalculateStat() QuickFunction in an Data Change script on the \$Hour tag, to calculate Hourly statistics. You could dynamically assign the StatStartTime and StatEndTime tag values based on the time of the day
 - Call the CalculateStat() QuickFunction from a Condition script that indicates a batch status. At the start of the batch (BatchStatus == 1) capture the StatStartTime as (\$DateString + “ ” + \$TimeString). At the end of the batch (BatchStatus == 0) capture the StatEndTime as (\$DateString + “ ” + \$TimeString). Then call the CalculateStat() QuickFunction for any batch-related statistics you wish to calculate and display for the duration of the batch.
- It is only necessary to use the ConnectDB() QuickFunction once in an application. Do not call it every time you need to calculate a statistic
- Understand the impact of using long DateTime durations for the statistic calculations – the more data included in the calculation will likely result in longer times to calculate the statistics
- For a copy of this completed InTouch 10.0 application, please email your request to support@wonderwarene.com