Opendiem Training

Exercise 9
Engine Services

Opendiem-TRN-0009

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Update	RAC	12/12/2012	Update Standard Function Driver Section

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Exercise 9 – Introduction to Opendiem Service Engine

Introduction

The remaining exercises in this training class are related to Opendiem Engine and the Opendiem Engine Services.

OPENDIEM ENGINE

The Service Engine's primary role is to handle the flow of information around the Server. All the transactions between the Services are passed to the Service Engine, which then routes the information to the appropriate receiving Service(s).

OPENDIEM SERVICES

Opendiem Services are elements that are used to add features and functionality to the Opendiem system and are 'plugged in' as required to build a complete system. Multiple numbers of each Service and Services of the same type can be added to the Server as required to build the system. Each service runs as a separate task to provide enhanced system reliability and to ensure that each service obtains sufficient processing time.

Opendiem Services available fall into one of three categories as listed below: -

- *Communication Services (Drivers)*
  Provide an interface between the Opendiem system and the outside world. They communicate between the Opendiem system and any external system that may be connected, such as a LonWorks system.
- *Data Service*
  Provides custom processing functions for data that is entering or leaving the system.
- *Client Service*
  Provides additional tools to extend the functionality of the Opendiem system.

Objective

In this exercise you will use the Opendiem Service Engine to start & stop the server, examine properties of the currently loaded project, set the default project & start screen and find out how

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to load and unload various services. Later in the exercise you will use the Standard Data Functions Service to perform averaging of several values in the Web Browser.

Starting Opendiem Service Engine

Exercise Instructions

Ensure that Opendiem Engine is running on your Server by checking that the Opendiem Engine Icon is visible in the system tray:

If not already running, start the Opendiem Engine. From the Windows Start menu select the **Opendiem** folder and select the **Opendiem Engine** icon.

To bring up Opendiem Engine, right click on the Opendiem Icon in the system tray and select **Show Opendiem Engine**. The screen below will show. (click **Main** on the Opendiem menu bar if any other screen shows.)

Opendiem Engine has four screens: Main, Security, Services and Support.

Main

The Main window contains general settings and the ability to stop and start the server. The Project Properties has a checkbox for automatically loading the current project each time Opendiem Engine starts - if this checkbox is not selected then no project is loaded on startup or reset. In normal operation Opendiem Engine is placed in the Windows Startup group. This screen also sets the default Opendiem screen to load when a client connects to the Opendiem Server. A drop down list reveals all screens in the currently loaded project.

Security

The security window contains Opendiem's security settings. This screen allows groups and users to be set up and different levels of access are assigned as required. A later exercise will explore the Opendiem's security features.

Services

The Services window contains the Server Services and is where Services are added and removed from the project. Individual services are run from the Services window.

Support

The Support window contains support information such as Contact Details, Version Number and access to the logging function. The log will be reviewed in a later exercise.

Obtaining information on the currently loaded project.

From the Opendiem Engine menu select **File | System Properties**. A screen similar to the following will appear.
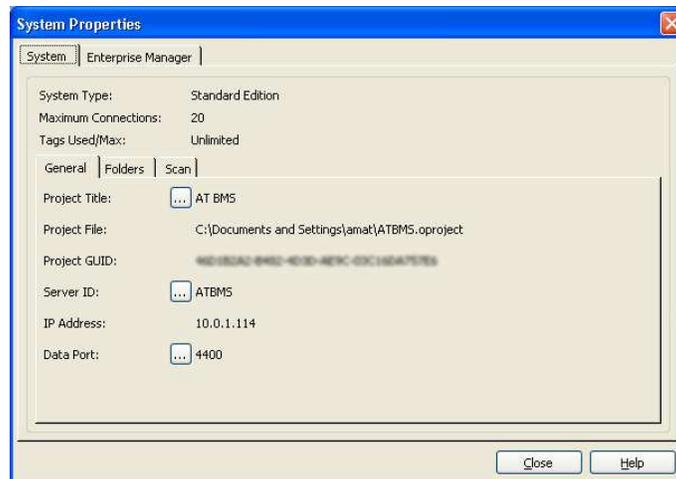
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This screen details the system type, maximum number of simultaneous client connections, the currently loaded project file and path, the GUID which is used to ensure version synchronization between the various services and Opendiem Engine, the system id – used in multiple Server projects and the TCP/IP port for the Opendiem Server.

Opendiem Services

The Opendiem Server architecture is based upon Services, which perform specific functions and run as separate tasks, for example Scheduling and Data Logging, ensuring that the performance of one service does not affect that of the others. This modular architecture improves reliability and maintainability.

You will recall that Services are elements that are used to add features and functionality to the Opendiem system and are 'plugged in' as required to build a complete system. Multiple numbers of each Service and Services of the same type can be added to the Server as required to build up the entire system.

Switch to the Services screen and a window similar to the one below will show.

Adding and removing Services.

Double click on the **Add Service** entry and a screen will appear with the three service categories, Client Services, Data Services and Drivers. To add a service, expand the service category and

select the service to be added by double clicking on it. Try adding a Scheduler Client service - you will be prompted for a key name for the service. Each key name must be unique and you will receive an error if the key name is already in use. You can add multiple instances of a service to expand the system capabilities; for example, adding a second instance of the Scheduler service will create an additional 16 schedules for the project.

To remove a service, right click on the service and a context menu appears, select **Terminate…** a prompt will ask whether to delete all stored settings for the service. Selecting **Yes** deletes all data for the service out of the project database. For example if the Scheduler service had been set up with dates, times, actions etc then selecting **Yes** would delete the data, selecting **No** terminates the service and next time the service is loaded it would automatically load the settings from the database.

When a service is added to the project it is automatically started when the Service Engine next starts.

We will now take a look at some of Opendiem's core services that exist as part of most projects; these are the Opendiem Server, Web Server and Standard Functions Services.

Opendiem Server

The Opendiem 'User and Server Connections' service allows remote users to connect to Opendiem from a web browser. The service is automatically installed and is the only service that cannot be removed from the Server. This service contains information about the server and the clients.

Double click on the Opendiem User and Server Connections service or right click and select **Open**. The screen below will appear.

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The Servers tab contains the following information:

- IP Address
This displays the TCP/IP address of the Server as supplied by Windows and cannot be changed by the server.

- Server ID
- Project Title
- Version
- Last Read/Write, etc.
- Access to much more info and management tools covered in a later section.

Select the Users tab and the following information appears.

- Number
The user number assigned by the server to the client at the time of logon.

- User
The user name of the client if available. This will be 'Anon' if User Authentication is not being used.

- IP
The IP address of the client computer.

- Start
The time and date that the user logged-on.

To view a history of activity for an individual user, right click on the required user and select **Log…** from the context menu or select the **User Log…** button. The User Log displays all Server activity for the selected user, including the Client operating system, Opendiem Java client version, screens displayed and any changes the user makes on a screen. A sample user log screen is shown below.
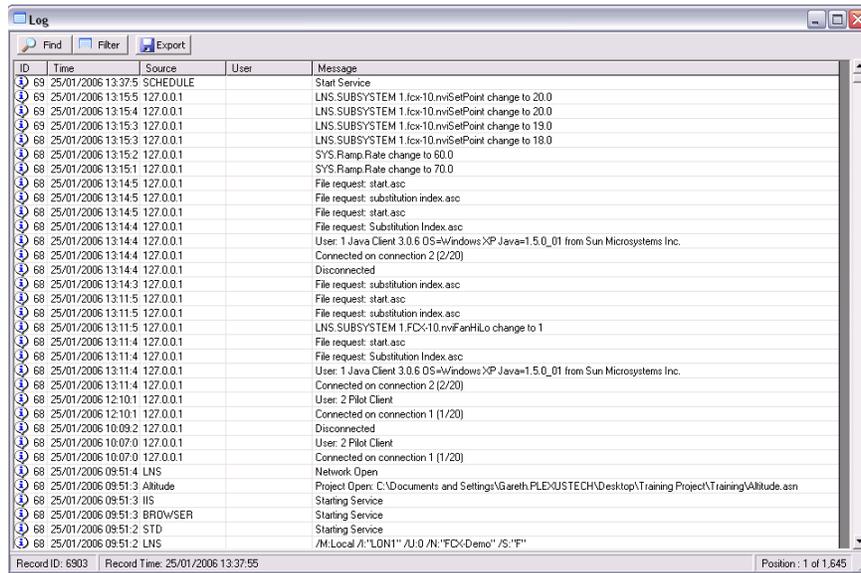
The User tab also has a facility for disconnecting a user from the Server. Experiment with disconnecting a Client connection.

The Log tab displays a log of the communications between the clients and the server. The log displays 100 entries and can be used for diagnostics.

Further details on an item in the log can be obtained by selecting the required item and then right clicking and selecting Details from the context menu.
To clear the log entries, right click and select Clear from the context menu. This clears all the entries in the log and the log will start again from the next new entry.

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Standard Functions Driver

The Standard Functions service provides a mechanism for applying standard functions such as temperature conversions, averaging and scaling.

Syntax for this driver's function is: [datatag]%STD.[function].([factor*])

      *for multiple factors ie ScaleOffset and OffsetScale separate them with a "space"

The Standard data service functions can be viewed in the Project Browser and can be dragged onto the Function Qualifier box within Designer dialogs.

The Temperature functions are:

CtoF   Converts Centigrade to Fahrenheit

FtoC   Converts Fahrenheit to Centigrade

CtoK   Converts Centigrade to Kelvin

KtoC   Converts Kelvin to Centigrade

FtoK   Converts Fahrenheit to Kelvin

KtoF   Converts Kelvin to Fahrenheit

The Time functions are:

GMT   Returns the current GMT date and time

TZ   Allows you to offset a date and time to a given time zone.

The Scale functions are:

Offset   Adds an offset to a value

Scale   Scales a value by a multiplication factor

ScaleOffset   Scales, then offset a value

OffsetScale   Offset, then scale a value

The Number functions are:

Bit   Returns the value of a single bit.

Hex   Returns the Hexadecimal representation of a number.

Digit   Returns a single digit from a number

Max   Returns the maximum of the value and the parameter.

Min   Returns the minimum of the value and the parameter.

The Range functions are:

MaxRange   Returns the maximum of a range of values.

MinRange   Returns the minimum of a range of values.

AvgRange   Returns the Average of a range of values.

SumRange   Returns the Sum of a range of values.

We have already seen how temperature conversions and number conversions work in a previous exercise. We will now use an averaging function, which could be used for example to show the average temperature of a zone.

If necessary start Opendiem Designer and create a new Design Screen. (Remember to place some navigation buttons from the start screen or change the default start screen).

From the Project Explorer drag SYS.Text.1, SYS.Text.2 and SYS.Text.3 onto the Design Screen. Select all three objects and from the Object Properties make them all editable between 0 and 500, set the **Change** value to 10.

Now select each item in turn and from the Project Explorer drag the variable STD, Range, AvgRange onto the Function Qualifier box as shown below. The parameter is set as the default STD.AvgRange(key), change **key** to 'GP' as shown. The parameter now set to 'GP' is the group name and will be used by Opendiem to determine which members of a group are to be included in the calculation, in this case the average. Note that any group name can be used.

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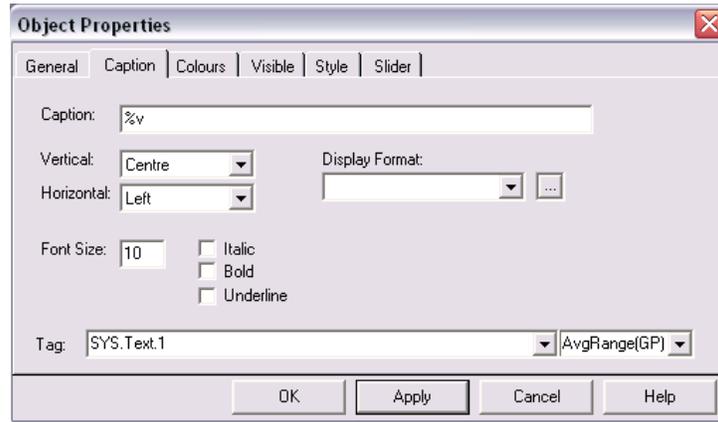
Next, add some text onto the screen and change the caption to 'Average = %v'. In the Tag box type 'STD.GP,' where GP is the name of the group that is to be averaged.

The SYS.Text registers are variant types, which means that they can adopt any variable type. In order for our spin button to work we must force the type to numeric. Right click on the Design Screen background and in the Object Properties select **OnLoad** and in the **Advanced** tab enter the following:

```
set sys.text.1=0
set sys.text.2=0
set sys.text.3=0
```

This will set each of the 'sys.text' registers to 0 when the screen loads.
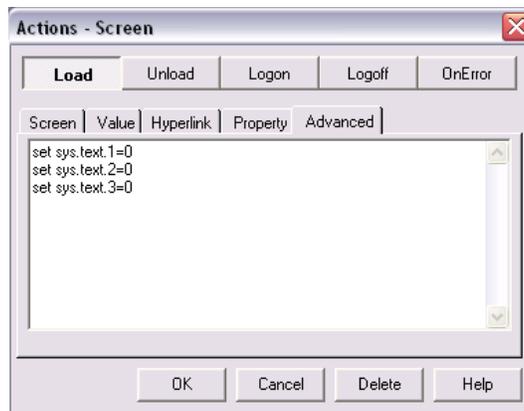
Save your work and test the results in the browser. Adjust each of the values using the spin buttons and watch the average calculation being performed as shown below.
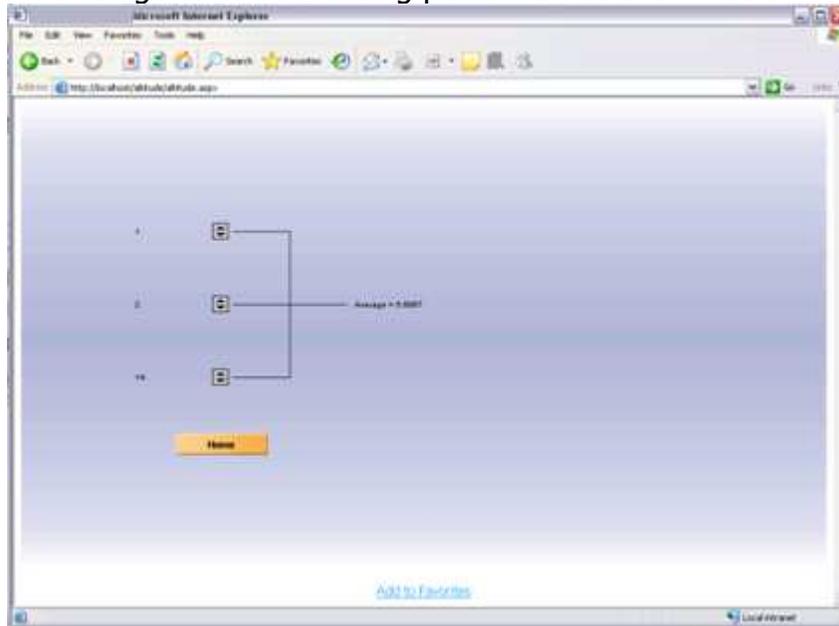
Open the Standard Functions service & select the **Log** tab. This log is a history of all calculations carried out by the Standard service, the <> symbols indicate if the data is from the service to Opendiem Engine > or into the service from Opendiem Engine <. Any calculation errors are also reported here.
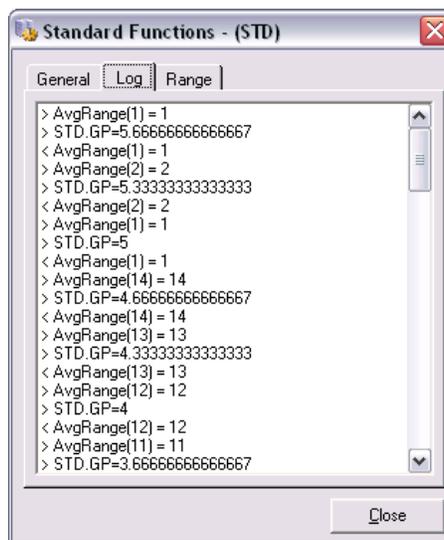
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End of Exercise 9

In this exercise we have reviewed the Opendiem Service Engine and three of the services which are essential components of any project that you create. You also created a screen which averaged three values within a web browser using the Standard Functions service.

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