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# Datalogging in LabVIEW with SQL Server

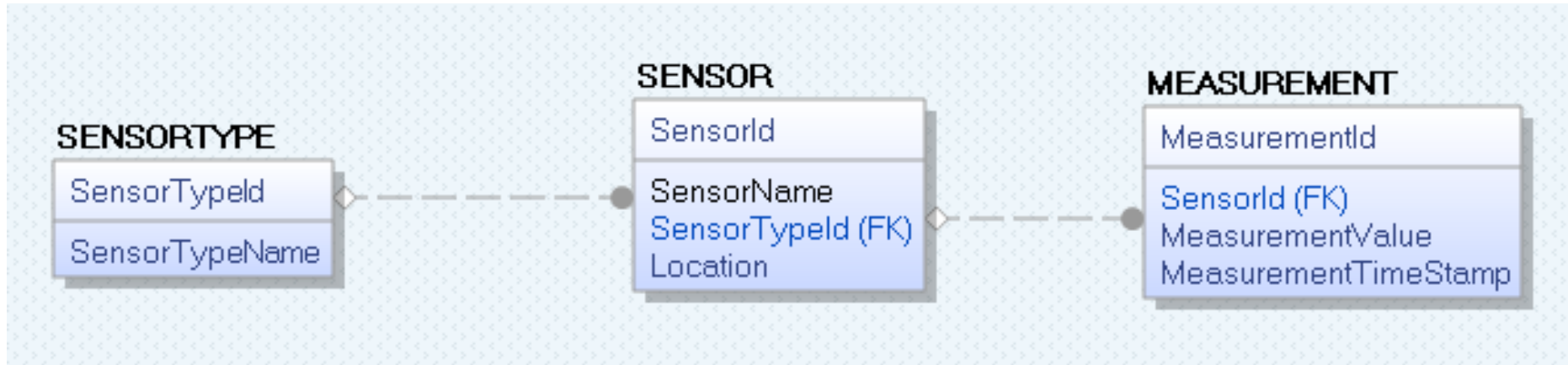
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# Contents

- A Datalogging Application created in LabVIEW will be presented
- The Database Design is created with Erwin Data Modeler
- The Database is implemented in SQL Server

# Database Design

The following Database Design has been created with Erwin Data Modeler:



Note! This is just a basic example, typically you may need more Tables

# Tables

```
CREATE TABLE [SENSORTYPE]  
(  
    [SensorTypeId]          int IDENTITY ( 1,1 ) NOT NULL ,  
    [SensorTypeName]       varchar(100) NOT NULL ,  
    PRIMARY KEY CLUSTERED ([SensorTypeId] ASC)  
)  
go  
  
CREATE TABLE [SENSOR]  
(  
    [SensorId]              int IDENTITY ( 1,1 ) NOT NULL ,  
    [SensorName]            varchar(100) NOT NULL ,  
    [SensorTypeId]         int NULL ,  
    [Location]              varchar(100) NULL ,  
    PRIMARY KEY CLUSTERED ([SensorId] ASC),  
    UNIQUE ([SensorName] ASC),  
    FOREIGN KEY ([SensorTypeId]) REFERENCES [SENSORTYPE]([SensorTypeId])  
)  
go  
  
CREATE TABLE [MEASUREMENT]  
(  
    [MeasurementId]        int IDENTITY ( 1,1 ) NOT NULL ,  
    [SensorId]              int NOT NULL ,  
    [MeasurementValue]     float NULL ,  
    [MeasurementTimeStamp] datetime NULL ,  
    PRIMARY KEY CLUSTERED ([MeasurementId] ASC),  
    FOREIGN KEY ([SensorId]) REFERENCES [SENSOR]([SensorId])  
)  
go
```

# Stored Procedure

```
CREATE PROCEDURE SaveMeasurement
@SensorName varchar(100),
@MeasurementValue float
AS

DECLARE
@SensorId int,
@SensorTypeId int

if not exists (select * from SENSOR where SensorName = @SensorName)
begin
    select top 1 @SensorTypeId = SensorTypeId from SENSORTYPE order by SensorTypeId
    insert into SENSOR (SensorName, SensorTypeId, Location) values (@SensorName, 1, 'Unknown')
end
else
    select @SensorId = SensorId from SENSOR where SensorName = @SensorName

insert into MEASUREMENT (SensorId, MeasurementValue, MeasurementTimeStamp)
values (@SensorId, @MeasurementValue, getdate())

GO
```

# View

```
CREATE VIEW SensorInformation
AS
SELECT
SENSOR.SensorId,
SENSOR.SensorName,
SENSOR.SensorTypeId,
SENSORTYPE.SensorTypeName,
SENSOR.Location
FROM
SENSOR
INNER JOIN SENSORTYPE ON SENSOR.SensorTypeId = SENSORTYPE.SensorTypeId
GO
```

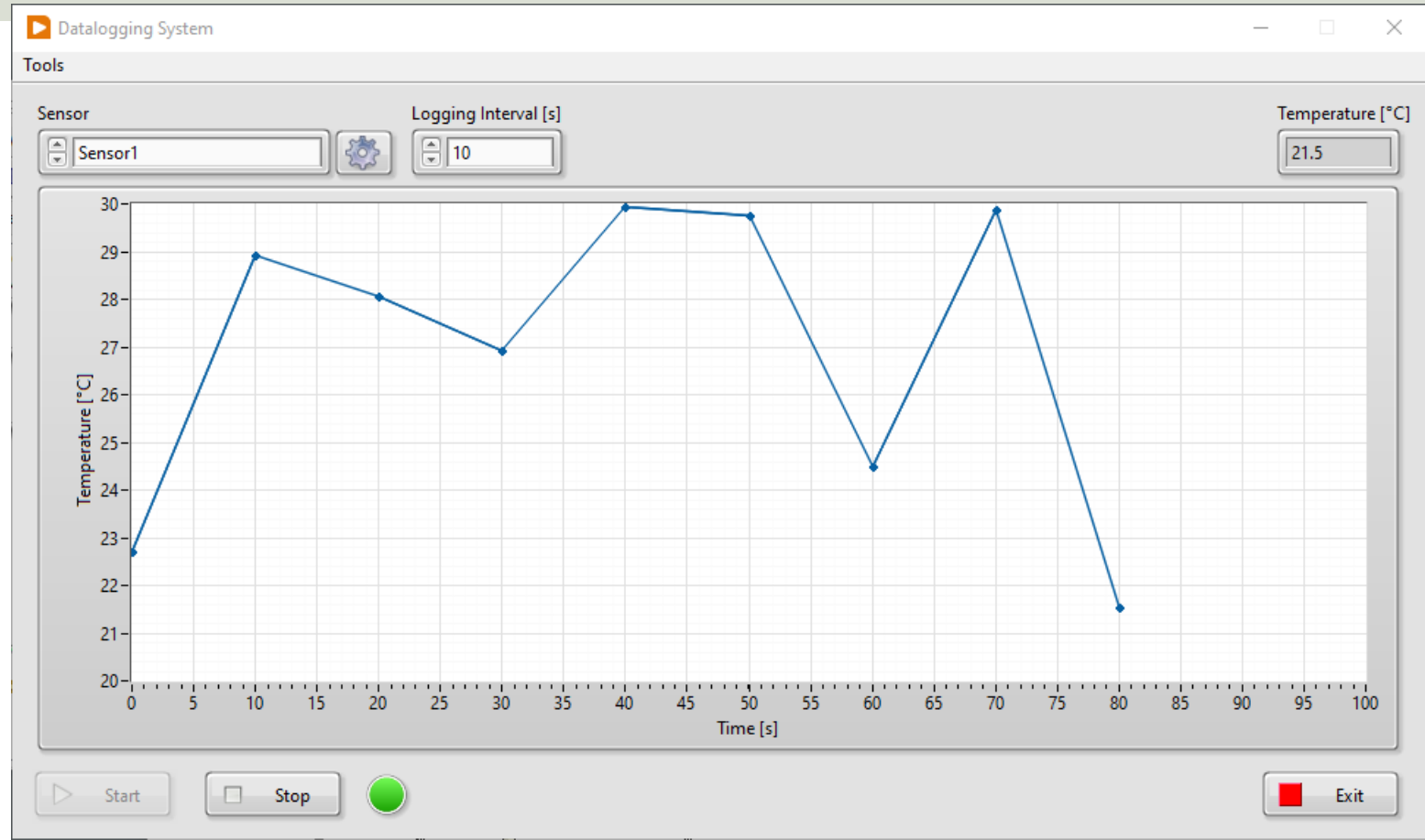
# Sensor Types

The System supports the following Sensor Types:

```
INSERT INTO SENSORTYPE (SensorTypeName) VALUES ('PT-100')
GO
INSERT INTO SENSORTYPE (SensorTypeName) VALUES ('Thermocouple')
GO
INSERT INTO SENSORTYPE (SensorTypeName) VALUES ('TMP36')
GO
INSERT INTO SENSORTYPE (SensorTypeName) VALUES ('TC-01')
GO
```

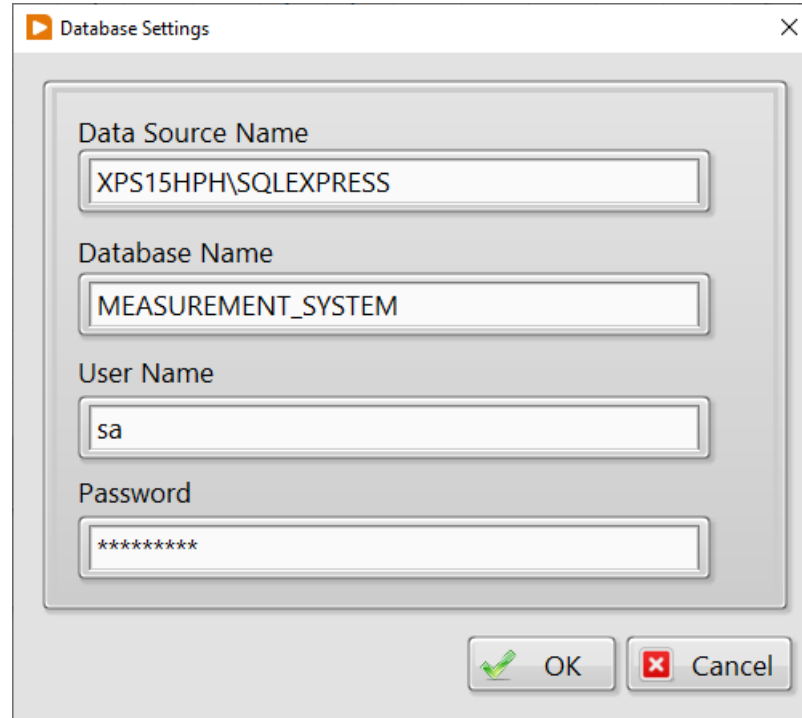
Typically, you need to update the Application in order to support new Sensor Types

# LabVIEW





# Database Settings



The image shows a 'Database Settings' dialog box with the following fields and values:

- Data Source Name:** XPS15HPH\SQLEXPRESS
- Database Name:** MEASUREMENT\_SYSTEM
- User Name:** sa
- Password:** \*\*\*\*\*

At the bottom right, there are two buttons: 'OK' (with a green checkmark icon) and 'Cancel' (with a red X icon).

# Sensor Configuration

The screenshot displays a software interface for sensor configuration. The main window, titled "Sensor Configuration", contains a table with the following data:

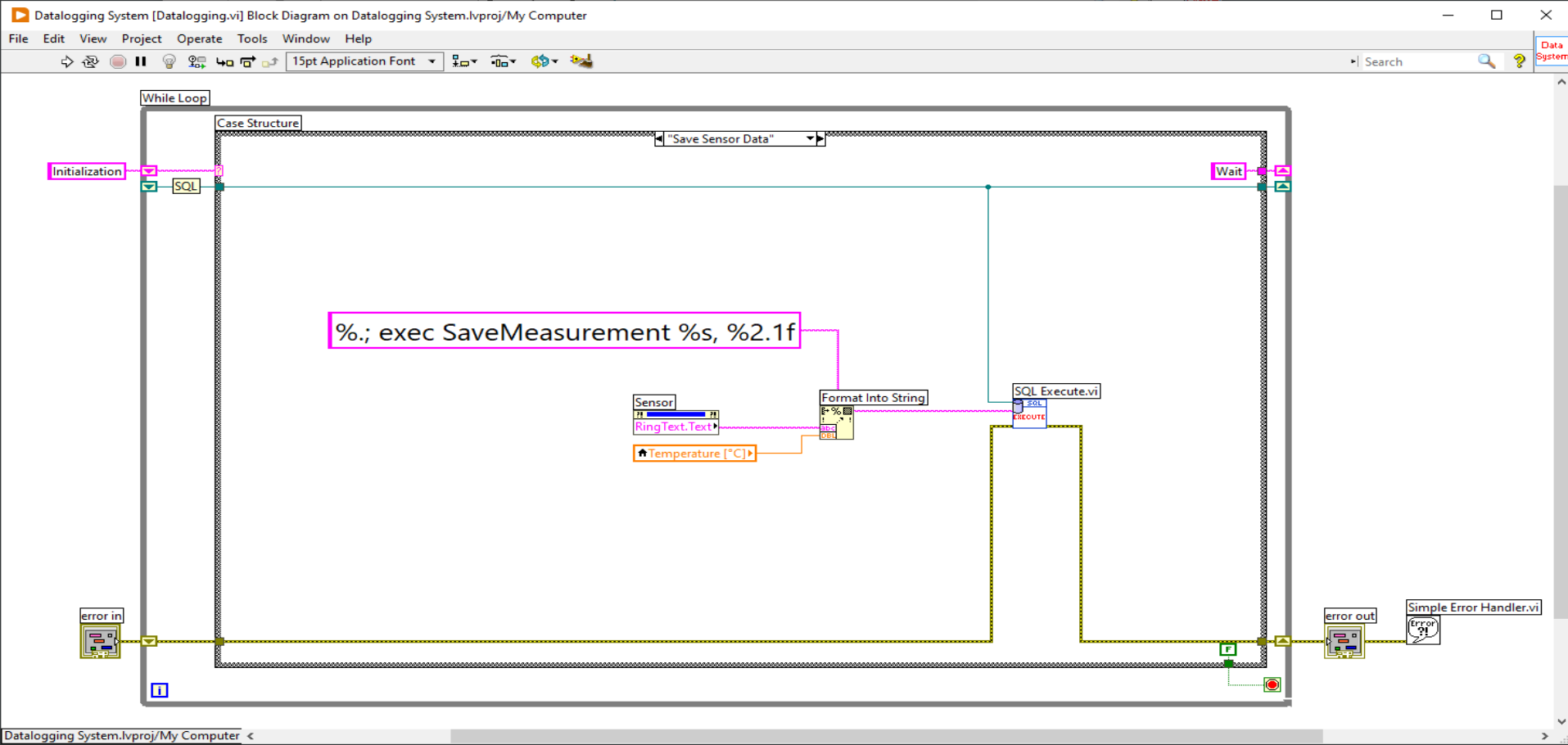
SensorId	SensorName	Type	Location
1	Sensor1	PT-100	Porsgrunn
2	Sensor2	Thermocouple	Skien
3	Sensor3	Thermocouple	Bergen
5	Sensor4	Thermocouple	Bamble

To the right of the table are three buttons: "New" (with a plus icon), "Update" (with a gear icon), and "Delete" (with a minus icon). At the bottom right is an "Exit" button (with a red square icon).

Two dialog boxes are overlaid on the main window:

- New Sensor:** A dialog box with three input fields: "SensorName" (empty), "SensorType" (set to "<0>"), and "Location" (empty). It has "OK" and "Cancel" buttons at the bottom.
- Update Sensor:** A dialog box with three input fields: "SensorName" (set to "Sensor1"), "SensorType" (set to "PT-100"), and "Location" (set to "Porsgrunn"). It has "OK" and "Cancel" buttons at the bottom.

# Code



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