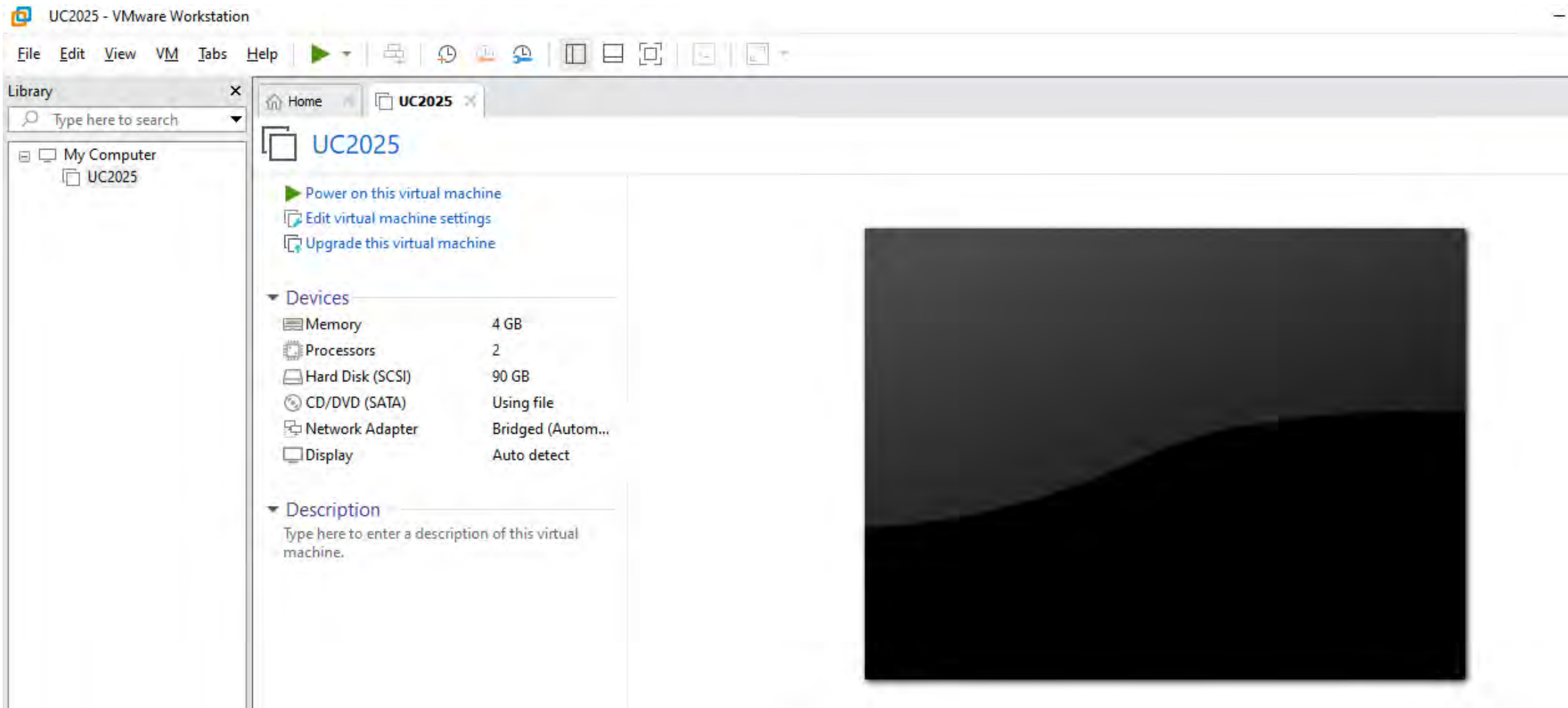


SCADA best practices and  
tips

# SCADA Reports









# Generate Values



# Table of Contents

- Historical Report
- Operation Log
- Event Report
- Generic Report
- Tag Report
- Reports in SmartVU
- Report Scheduler
- Scada Add-in



Survalent.

## SurvalentONE

DB-405

SCADA REPORT DATABASE

**EDITING GUIDE**

Version 1.14

Confidential & Proprietary

# SCADA Reports

- System supports a wide range of reporting types catering to your requirements.
- Historical reports are popular to produce

## Types of Reports

- Historical (Datasets)
- Generic (Custom reports)
- Operation Log (Operator Summary tab)
- Events
- Log settings

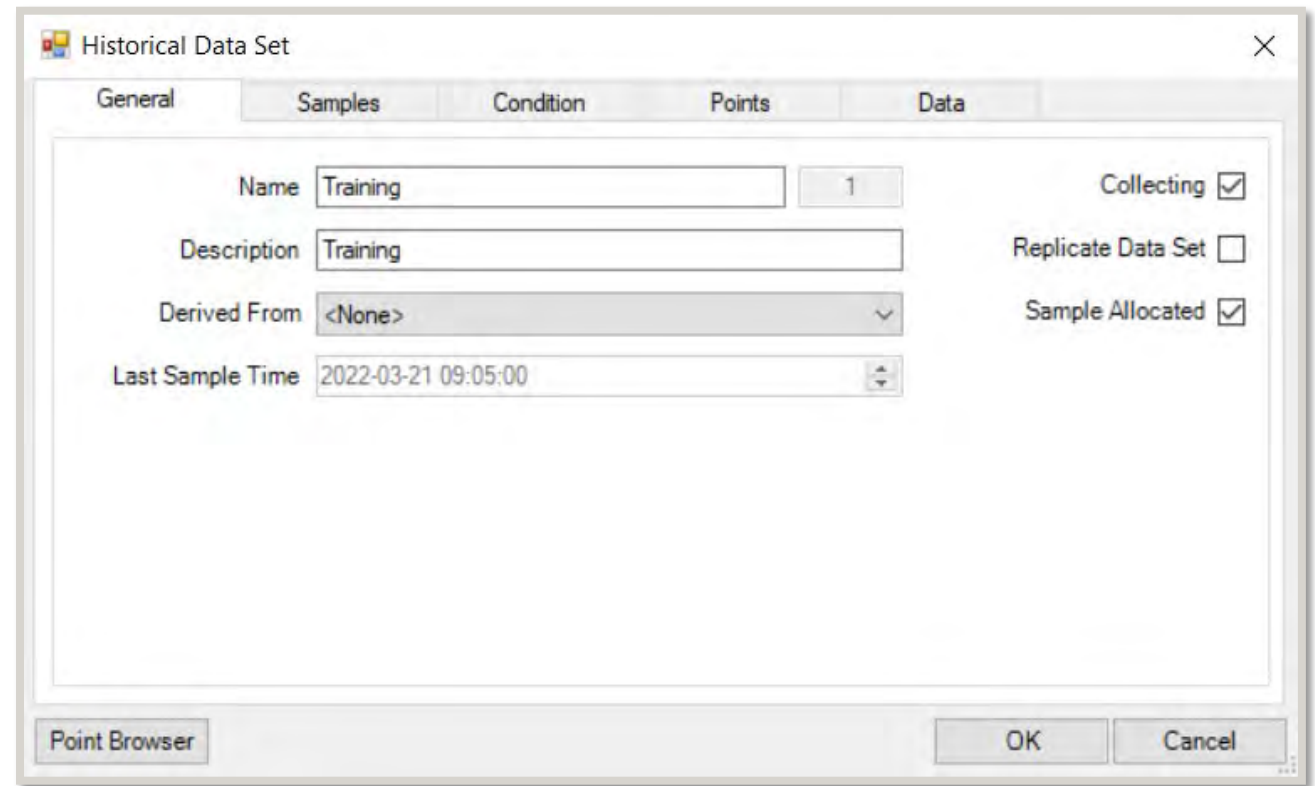
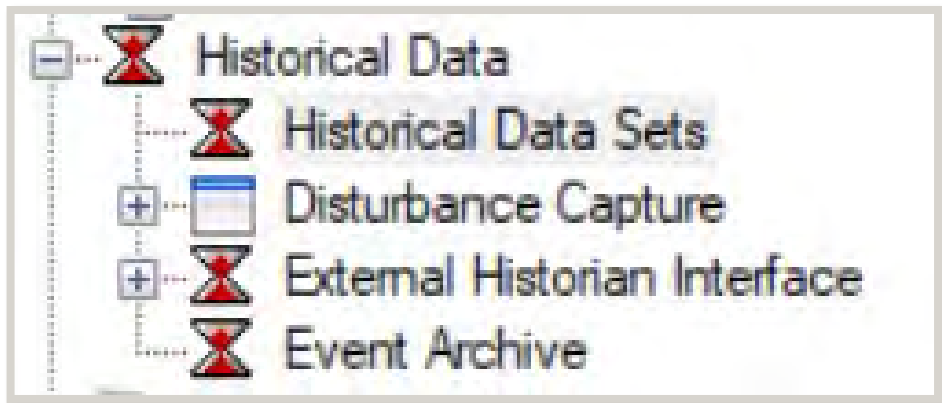


# SCADA Historical Datasets/Reports

- Historical Datasets and Historical Reports
- Historical databases are organized in datasets
- Datasets are groups of points that are sampled at a common frequency/storage duration
- Must Specify
  - Which points do you want to be sampled?
  - How often do you want them sampled?
  - How long do you want to samples held?
  - What stats (e.g. min, max, average) do you want to be collected?
- Producing a report
  - - We can produce reports from the datasets above

# Historical Dataset

- Requires Historical dataset to be created in database
- Datasets are group of points that are sampled at common frequency



A screenshot of the 'Historical Data Set' configuration window. The window has tabs for 'General', 'Samples', 'Condition', 'Points', and 'Data'. The 'General' tab is active. It contains the following fields and controls:

- Name:** Training
- Description:** Training
- Derived From:** <None>
- Last Sample Time:** 2022-03-21 09:05:00
- Collecting:** ☒
- Replicate Data Set:** ☐
- Sample Allocated:** ☒

At the bottom, there is a 'Point Browser' button and 'OK' and 'Cancel' buttons.



# Historical Dataset

Historical Data Set

General Samples Condition Points Data

Sample Duration 30 Days 0 Hours 0 Minutes 0 Seconds

Sample Interval Set ...

0 Days 0 Hours 1 Minutes 0 Seconds

Observation Interval 0 Days 0 Hours 0 Minutes 15 Seconds

Alignment 2021-11-04 00:00:00 Lead Timestamp ☐

## Sample Interval:

**Monthly** – Sample interval of 1 month; samples taken at the end of the last day of each month

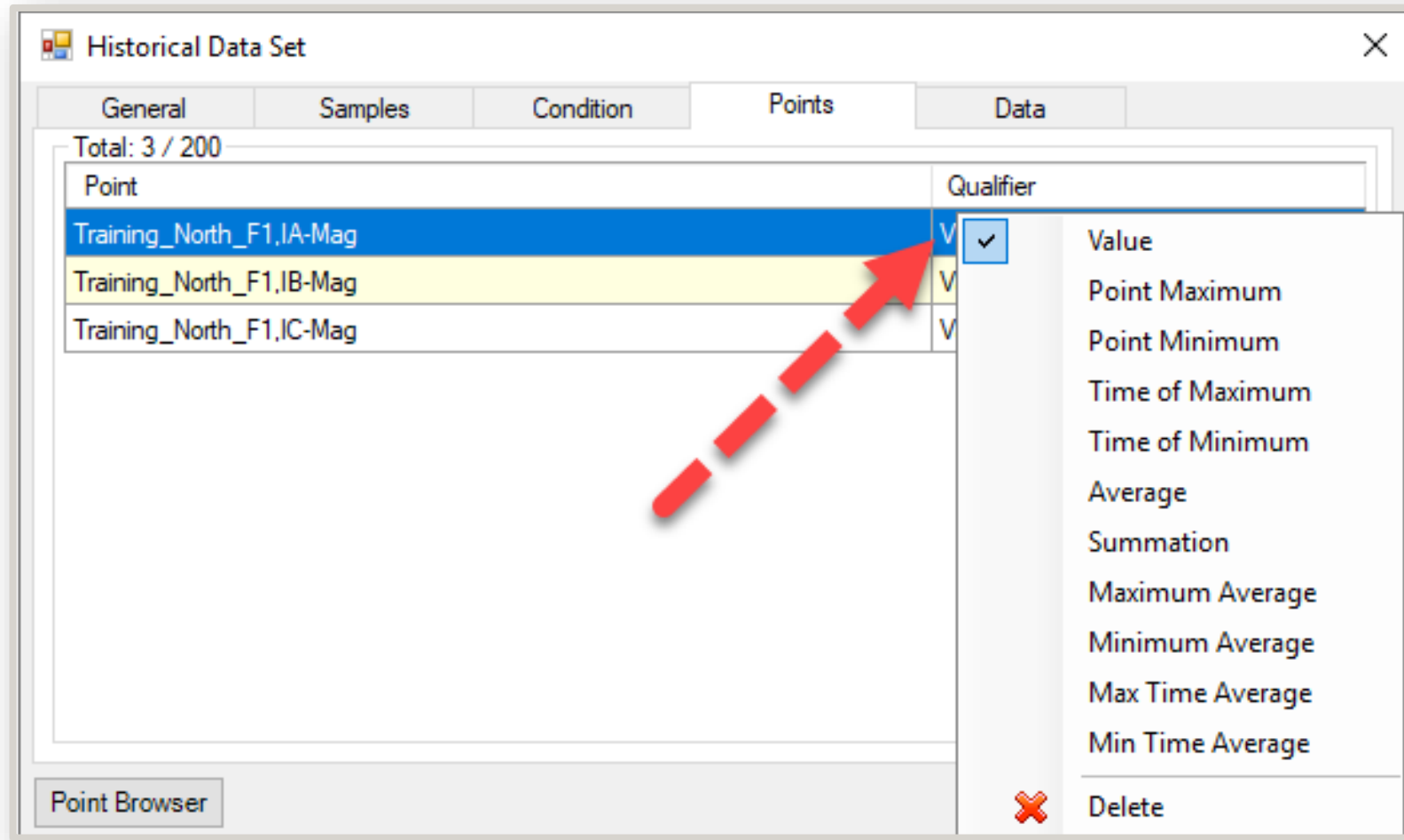
**Yearly** – Sample interval of 1 year; samples taken at the end of the last day of each year

**Lead Timestamp** - Samples to be stamped with the time of the beginning of the interval

**Lag Timestamp** - Samples are marked with the time of the end of the sample interval

**Observation Interval** - This specifies how often to take observations of the points' values for purposes of calculating statistics such as minimums, maximums and averages.

# Historical Reports – Point Qualifiers



# Historical Reports – Point Qualifiers

Item	Description
Value	Store the actual value of the point, instead of doing any average, max or min calculations. Value is the only one that really makes sense if the observation interval is the same as the sample interval.
Point Maximum	Store the maximum value of all the observations taken during the sample interval.
Point Minimum	Store the minimum value of all the observations taken during the sample interval.
Time of Maximum	Store the time of the maximum value during the sample interval.
Time of Minimum	Store the time of the minimum value during the sample interval.
Average	Store the average of all the observations taken during the sample interval.
Summation	Store the sum of all the observations taken during the sample interval.
Maximum Average	Used in a derived (secondary) dataset, to store the maximum value observed of an average stored in the primary dataset.
Minimum Average	Store the minimum value observed of an average stored in the primary dataset.
Max Time Average	Store the time of the above maximum value of the average.
Min Time Average	Store the time of the above minimum value of the average.
Delete	Deletes the point in the list.

- This computes and records certain derived values for the point, such as the maximum or the average value.
- Points that use these qualifiers are checked at each observation interval, and a running value of the statistic is maintained. At the end of the sample interval, the last observation is made, and the resulting values are stored in the sample record in the historical data file.



## Command Sequence

### General

Sequence #

Name

Autostart ☐

There is Error ☐

At Line

Description

Restart ☐

State

State Point



Message

☒ COMPILED CODE IS UP TO DATE

Schedule

### Source. Line 3

```
do while (1)
```

```
  delay 1s
```

```
  "SUB1_F1_FORM6,IIPhaseA"=random(1,90)
```

```
  "SUB1_F1_FORM6,IIPhaseB"=random(1,90)
```

```
  "SUB1_F1_FORM6,IIPhaseC"=random(1,90)
```

```
endwhile
```

### Log

# Exercise

Create a Historical  
Dataset and  
produce a report



- Using STC Explorer, first create a historical Dataset for these analog points:
  - SUB1\_F1\_FORM6,IIPhaseA
  - SUB1\_F1\_FORM6,IIPhaseB
  - SUB1\_F1\_FORM6,IIPhaseC

# Historical Dataset – File Size

- Be mindful of the number of points and sampling frequencies
- System will allocate disk space for each Dataset

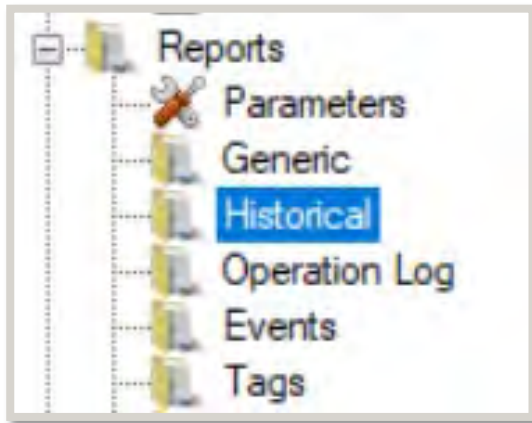
ID	Name	Description
1	Training	Training
2	North Feeder 1 Analog values	Analog values IA,IB, IC

File Explorer path: This PC > Local Disk (C:) > Program Files (x86) > Survalent > ScadaServer > Database

Name	Date modified	Type	Size
HistorianTypes.DBF	2023-08-29 10:04 AM	DBF File	1 KB
HistSamples1.DBF	2023-09-19 2:18 PM	DBF File	2,026 KB
HistSamples2.DBF	2023-09-19 2:18 PM	DBF File	2,026 KB

# Historical Reports



[Analog Values For F1] Historical Data Report

**General**

Name: Analog Values For F1  
Description: Analog Values For F1  
DataSet: ANALOG VALUES

Sample Time Format: MMM dd, yyyy hh:mm:ss 2 Columns  
Order: Descending  
Show Condition Codes: ☐  
Show Qualifiers: ☐  
Add Statistic Summary: ☒ every 10 Line(s)

**Time Range**

☐ From  To   
☒ Interval: 1 Days End: 0 Days ago

**All Points**

Point	Qualifier
-------	-----------

**Selected Points**

Point	Qualifier	Caption	Format
North_F1,IA-Mag	Value	Friendly ...	2-6
North_F1,IB-Mag	Value		2-6
North_F1,IC-Mag	Value		2-6

Export Preview Point Browser OK Cancel

# Exercise

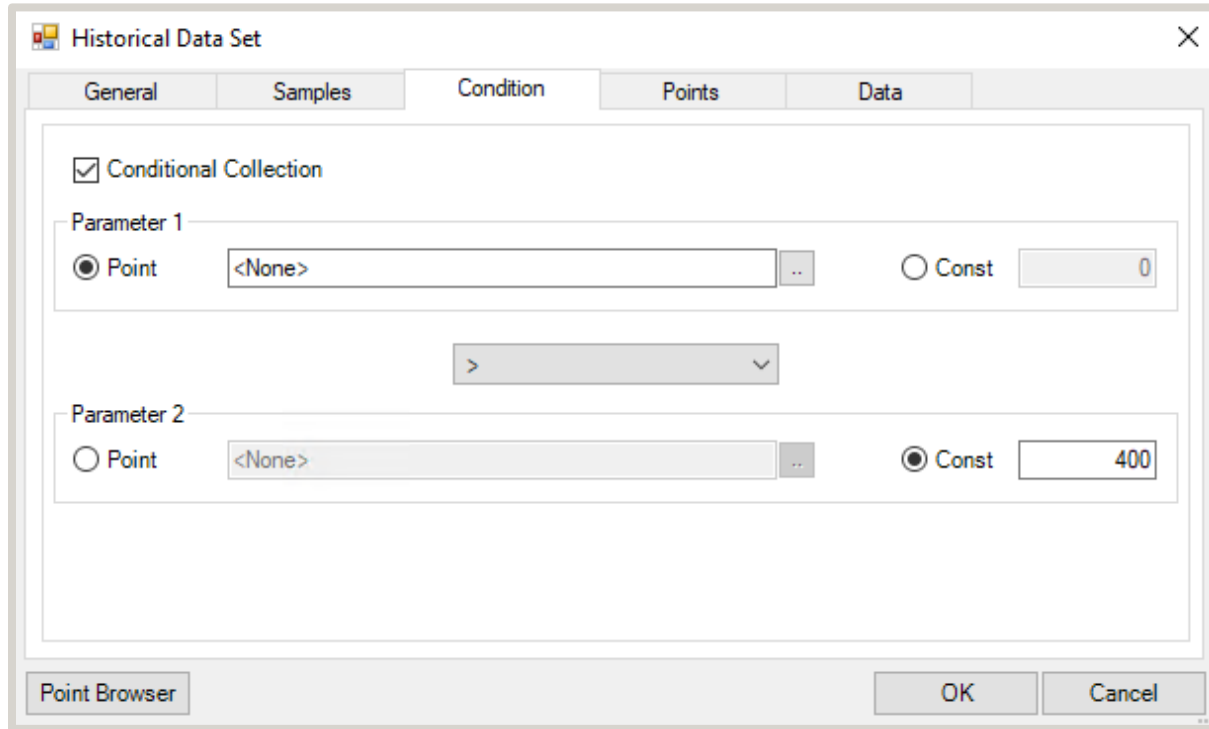
Create a  
Historical report



- Produce a Historical Report for Analog points



# Historical Reports - Conditional



The 'Historical Data Set' dialog box is shown with the 'Condition' tab selected. It features a 'Conditional Collection' checkbox which is checked. Below this, there are two parameter sections. 'Parameter 1' has a radio button for 'Point' selected, with a dropdown menu showing '<None>' and a 'Const' option with a value of '0'. 'Parameter 2' has a radio button for 'Const' selected, with a dropdown menu showing '<None>' and a value of '400'. A 'Point Browser' button is located at the bottom left, and 'OK' and 'Cancel' buttons are at the bottom right.

Historical Data Set

General Samples Condition Points Data

☒ Conditional Collection

Parameter 1

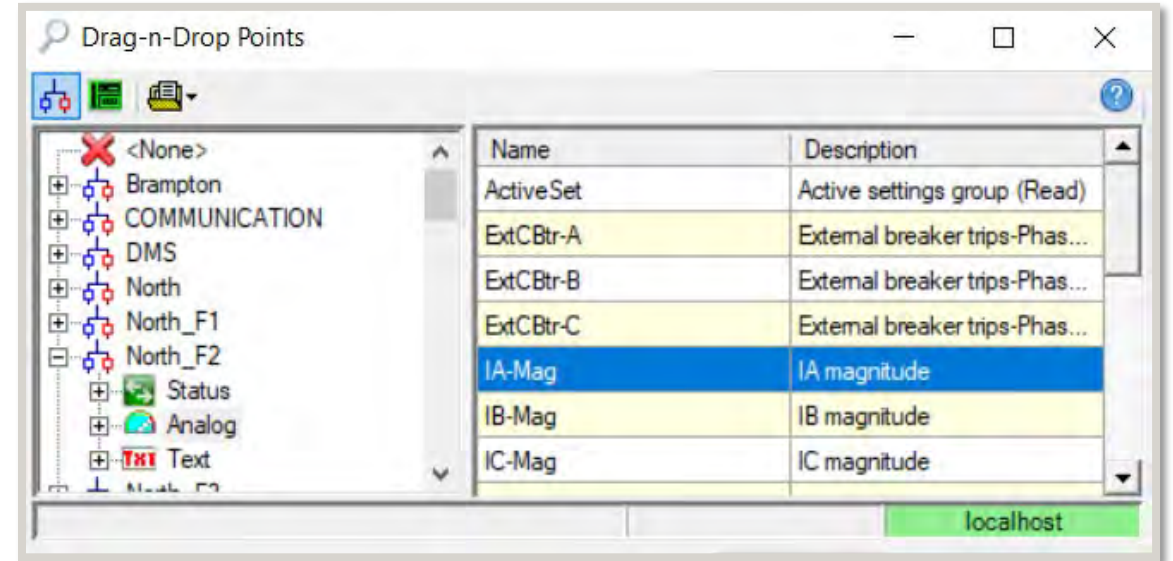
☒ Point  .. ☐ Const

>

Parameter 2

☐ Point  .. ☒ Const

Point Browser OK Cancel



The 'Drag-n-Drop Points' dialog box shows a tree view on the left with a red 'X' over the root '<None>'. The tree includes 'Brampton', 'COMMUNICATION', 'DMS', 'North', 'North\_F1', 'North\_F2', 'Status', 'Analog', and 'Text'. On the right, a table lists points with their names and descriptions. The 'IA-Mag' point is highlighted in blue. The 'localhost' button is at the bottom right.

Drag-n-Drop Points

Name	Description
ActiveSet	Active settings group (Read)
ExtCBtr-A	External breaker trips-Phas...
ExtCBtr-B	External breaker trips-Phas...
ExtCBtr-C	External breaker trips-Phas...
IA-Mag	IA magnitude
IB-Mag	IB magnitude
IC-Mag	IC magnitude

localhost

If conditional sampling is enabled, observations or samples are recorded only when the specified condition is true.

# Exercise

Create a Historical Dataset for Analog values of Feeder 1 showing only values Greater than 400



- Using STC Explorer, first create a historical Dataset for these analog points:
  - Training\_North\_F1,IA-Mag
  - Training\_North\_F1,IB-Mag
  - Training\_North\_F1,IC-Mag
  - Qualifier = Value
  - Add a condition for values greater than 400

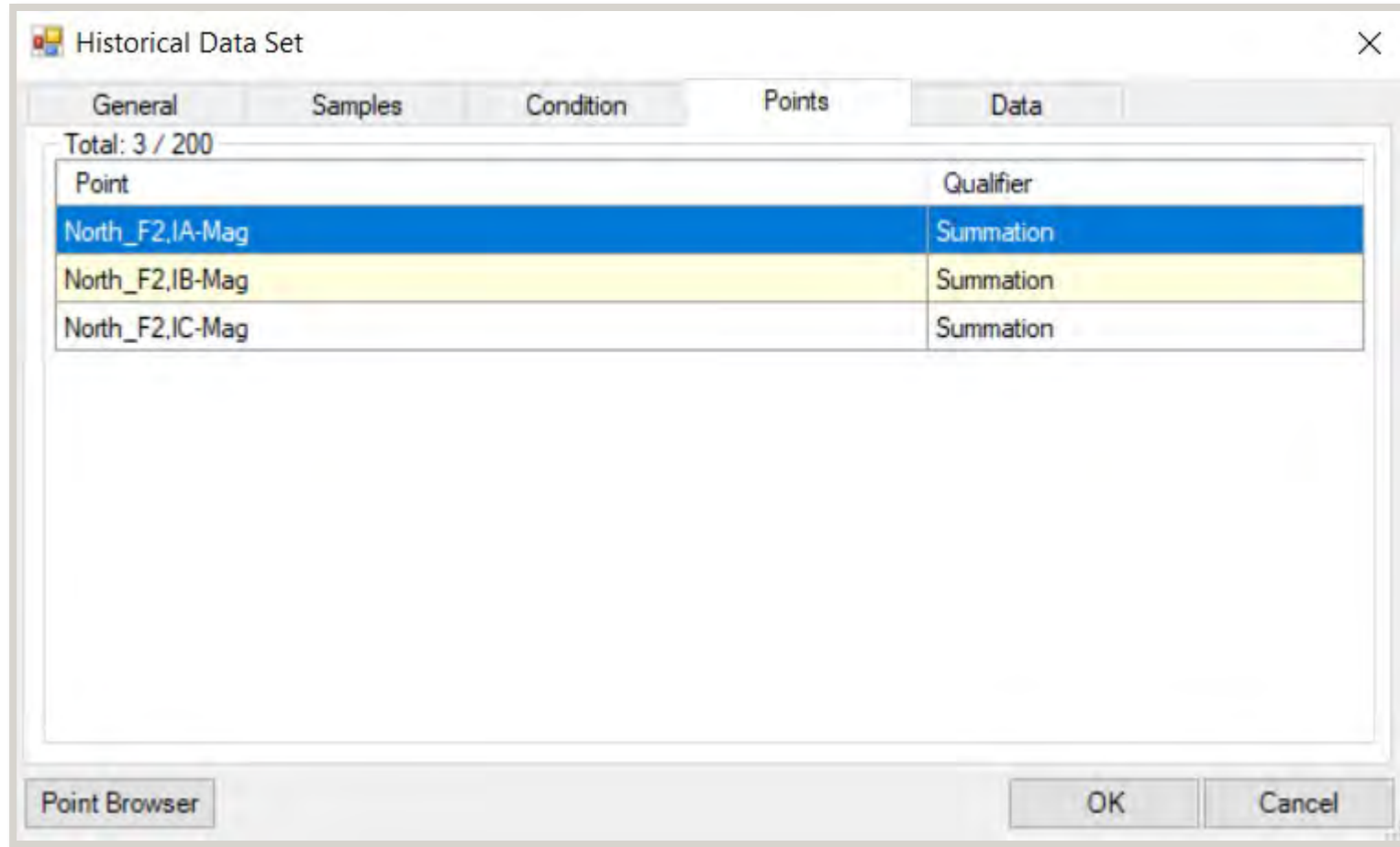
# Exercise

Create a  
Historical report



- Produce a Historical Report based on the previous example

# Historical Reports - Summation



The screenshot shows a software window titled "Historical Data Set" with a close button (X) in the top right corner. The window has five tabs: "General", "Samples", "Condition", "Points", and "Data". The "Points" tab is currently selected. Below the tabs, it says "Total: 3 / 200". A table is displayed with two columns: "Point" and "Qualifier". The table contains three rows of data. The first row is highlighted in blue, the second in yellow, and the third is white. At the bottom of the window, there is a "Point Browser" button on the left and "OK" and "Cancel" buttons on the right.

Point	Qualifier
North_F2,IA-Mag	Summation
North_F2,IB-Mag	Summation
North_F2,IC-Mag	Summation

# Exercise

Create a Historical  
Dataset for  
Summations  
Analog values of  
Feeder 1



- Using STC Explorer, first create a historical Dataset for these analog points:
  - Training\_North\_F1,IA-Mag
  - Training\_North\_F1,IB-Mag
  - Training\_North\_F1,IC-Mag
  - Qualifier = Summation

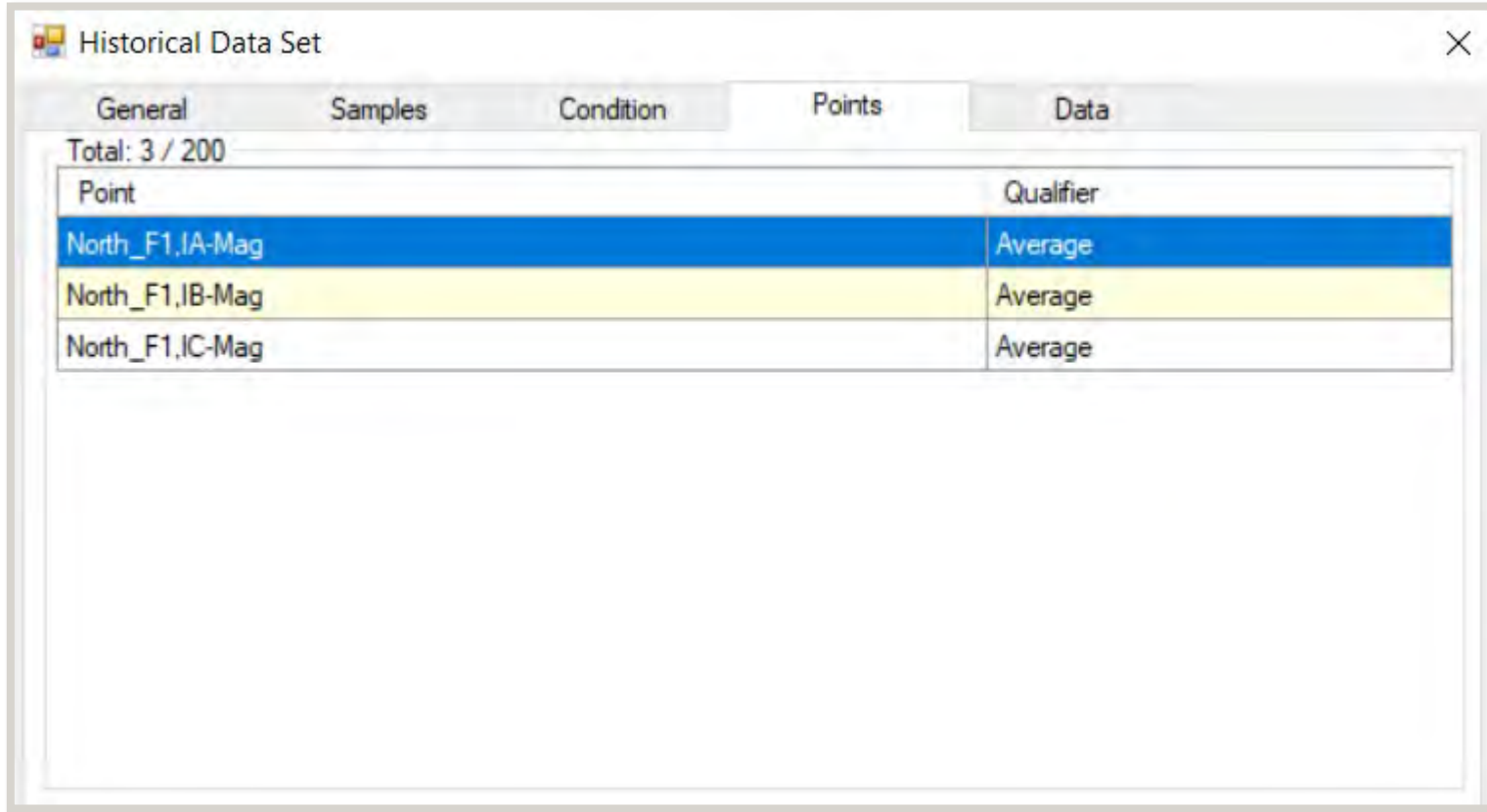
# Exercise

Create a  
Historical report



- Produce a Historical Report based on the previous example

# Historical Reports – Average



The screenshot shows a software window titled "Historical Data Set" with a close button (X) in the top right corner. The window contains a tabbed interface with five tabs: "General", "Samples", "Condition", "Points", and "Data". The "Data" tab is currently selected. Below the tabs, it says "Total: 3 / 200". A table is displayed with two columns: "Point" and "Qualifier". The table contains three rows of data, each with a blue header row and a yellow data row.

Point	Qualifier
North_F1,IA-Mag	Average
North_F1,IB-Mag	Average
North_F1,IC-Mag	Average

# Exercise

Create a Historical Dataset for Averages - Analog values of Feeder 1



- Using STC Explorer, first create a historical Dataset for these analog points:
  - Training\_North\_F1,IA-Mag
  - Training\_North\_F1,IB-Mag
  - Training\_North\_F1,IC-Mag
  - Qualifier = Average



# Exercise

Create a  
Historical report



- Produce a Historical Report based on the previous example

# Operation Log Reports

- Provides a way to see Operator summary in reports

The screenshot shows the 'Operation Log Report' dialog box with the following settings:

- General:**
  - Name: Operation Log
  - Description: Operation Log
  - Orientation: Portrait
  - Order: Descending
  - Print with Annotations: ☐
  - Print Only Selected Records: ☐
  - Print Header: ☒
- Time Range:**
  - From: 2021-03-23 22:26 (or First Record ☒)
  - To: 2021-03-23 22:26 (or Last Record ☒)
  - Start: 1 Days ago at 00:00
  - For Interval Of: 0 Until Now
- Drop Units:**
  - ☒ All Points
  - ☐ Include Childs
- User Types:**
  - ☒ Switch
  - ☐ Circuit Breaker
  - ☐ Recloser
  - ☐ GIS
  - ☐ AMPS
  - ☐ Type06
  - ☐ Type07
  - ☐ Type08
  - ☒ All
- Zones:**
  - ☒ Zone1
  - ☐ Zone2
  - ☐ Zone3
  - ☐ Zone4
  - ☐ Zone5
  - ☐ Zone6
  - ☐ Zone7
  - ☐ Zone8
  - ☒ All

Buttons at the bottom: Export, Preview, Point Browser, OK, Cancel.

# Event Reports

An Event report allows you to extract data from the Event Data Recording table.

The screenshot shows the 'Status Point' configuration window for 'Mechanism3ph'. The 'General' tab is active. The 'Name' field is 'Mechanism3ph' and the 'ID' is '400013'. The 'Description' is 'Mechanism 3-phase'. Under 'User Type', 'IEDdata' is selected. Under 'Device Class', 'Sustained' is selected. Under 'Zone Group', 'AllZones' is selected. Under 'Command-State', 'OpenClose' is selected. A red arrow points to the 'Event Data Recording' checkbox, which is checked. Other checkboxes include 'Privilege Mode', 'Disturbance', 'SOE Event', 'Outage', 'No Redundant Controls', 'SCS Enabled', and 'Control Password Required'.

The screenshot shows the 'Events Report' configuration window. The 'General' tab is active. The 'Name' field is 'Event Example'. The 'Orientation' is 'Portrait'. The 'Print Point Name' checkbox is checked. The 'Description' field is empty. The 'Order' is 'Descending'. The 'Print Point Description' checkbox is checked. The 'Debouncing' is '<None>'. The 'Print Header' checkbox is checked. The 'Time Range' section shows 'From' and 'To' dates as '2021-03-23 21:44'. The 'Start' is '1 Days ago at 00:00'. The 'For Interval Of' is '0 Until Now'. The 'Drop Units' section is empty. The 'User Types' list includes 'Type36', 'IEDdata' (checked), 'Station', 'CommLine', 'RTU', 'Master', and 'DMS'. The 'Event Types' list includes 'Status Change' (checked), 'Analog Change', 'Control', 'Set Point', 'SOE Data Lost', 'SOE Status Change', 'SOE Analog Change', and 'SOE Code'. The 'All' checkbox is checked. The 'Export', 'Preview', and 'Point Browser' buttons are at the bottom left. The 'OK' and 'Cancel' buttons are at the bottom right.

# Exercise

Create an  
Operation Log  
Report



- Produce an Operation Log Report
- Print with Annotations
- Print Only Selected Records

# Exercise

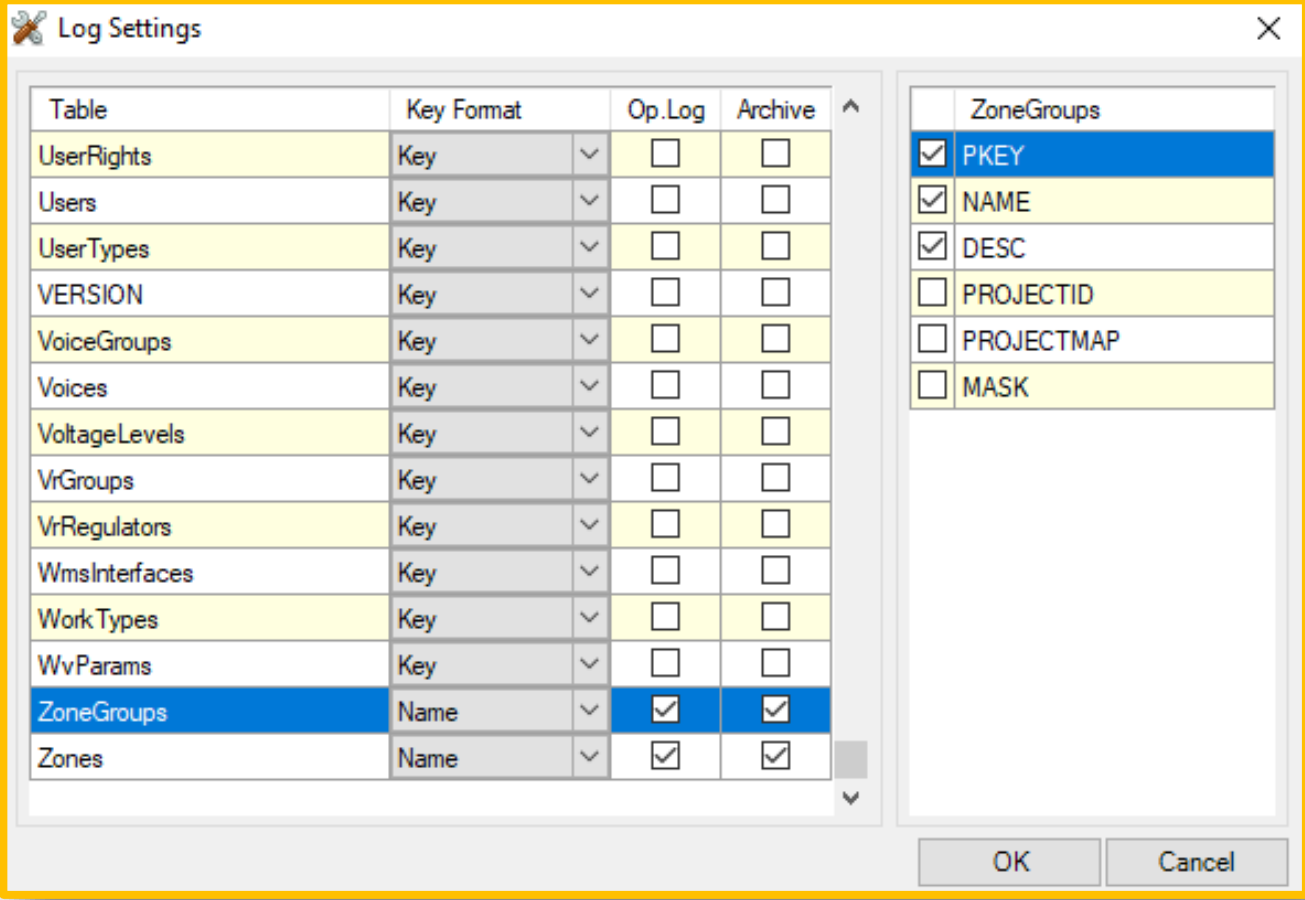
## Create an Events Report



- Produce an Events Report and practice changing the options

# System > Logs > Log Settings

Turn on Audits for certain database tables.



The Log Settings dialog box is shown, allowing configuration of auditing for various database tables. The 'ZoneGroups' table is selected in the list, and its audit settings are visible on the right.

Table	Key Format	Op.Log	Archive
UserRights	Key	<input type="checkbox"/>	<input type="checkbox"/>
Users	Key	<input type="checkbox"/>	<input type="checkbox"/>
UserTypes	Key	<input type="checkbox"/>	<input type="checkbox"/>
VERSION	Key	<input type="checkbox"/>	<input type="checkbox"/>
VoiceGroups	Key	<input type="checkbox"/>	<input type="checkbox"/>
Voices	Key	<input type="checkbox"/>	<input type="checkbox"/>
VoltageLevels	Key	<input type="checkbox"/>	<input type="checkbox"/>
VrGroups	Key	<input type="checkbox"/>	<input type="checkbox"/>
VrRegulators	Key	<input type="checkbox"/>	<input type="checkbox"/>
WmsInterfaces	Key	<input type="checkbox"/>	<input type="checkbox"/>
Work Types	Key	<input type="checkbox"/>	<input type="checkbox"/>
WvParams	Key	<input type="checkbox"/>	<input type="checkbox"/>
ZoneGroups	Name	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Zones	Name	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

ZoneGroups
<input checked="" type="checkbox"/> PKEY
<input checked="" type="checkbox"/> NAME
<input checked="" type="checkbox"/> DESC
<input type="checkbox"/> PROJECTID
<input type="checkbox"/> PROJECTMAP
<input type="checkbox"/> MASK

OK Cancel

# Exercise

Create an audit  
on Zones/Zone  
Groups



- Turn on audits for Zone and Zone Groups
- Modify Zones
- Modify Zone Groups
- Produce an audit report

# Generic Reports

- Provides a way to access SCADA database tables as reports
- There are certain database tables and fields that consist of additional information that can be pulled out for your reports.

Table Name	Field Name	Description
AnalogPoints		All of the analog points in the system
	Zoneld	Zone group number
	UserTypeld	User type number
	StationPid	ID number of station point belongs to
	EngUnits	Engineering Units (text)
	EmgHi	Alarm limit, emergency, upper
	EmgLo	Alarm limit, emergency, lower
	PrEmgHi	Alarm limit, pre-emergency, upper
	PrEmgLo	Alarm limit, pre-emergency, lower
	UnrsHi	Alarm limit, unreasonable, upper
	UnrsLo	Alarm limit, unreasonable, lower
	Rtuld	ID number of RTU
	AddrA	Telemetry address A
	AddrB	Telemetry address B
	AddrC	Telemetry address C
	AddrD	Telemetry address D
	UnackdAlrm	Unacknowledged alarm flag
	Value	Value in engineering units
	ScaleFact	Scale factor
	Offset	Offset

StatusPoints		All of the status points in the system
	Zoneld	Zone group number
	UserTypeld	User type number
	Rtuld	ID number of RTU
	InputA	Telemetry address A
	InputB	Telemetry address B
	InputC	Telemetry address C
	InputD	Telemetry address D
	AlarmSkIID	ID number of alarm message format
	StationPid	ID number of station point belongs to
	TransCount	Transition count
	UnackdAlrm	Unacknowledged alarm flag
	Value	Current value (state): 0, 1, 2, 3
	NormState	Normal value (state): 0,1
	PrefSuffID	ID number of Command/State string
	FormatID	Format Code



# Generic Reports

Run a report that shows all of the analog points in the system that is using :

1. Emergency High/Low – Alarm limit values
2. Emergency High/Low – Alarm priority values
3. Indicate ones that are currently in use
4. Must show the name of the stations

The screenshot shows a software window titled "[SUB1\_F1\_FORM6,IIPhaseA] Analog Point" with three tabs: "General", "Telemetry", and "Alarms". The "Alarms" tab is active, displaying three sections for different alarm types: "PreEmerg", "Emergency", and "Unreason". Each section has a "Low" and "High" checkbox, a "Limit" input field, a "Priority" dropdown menu, and a "Remote Alarm" dropdown menu. The "Deadband" is set to 3 for all sections. At the bottom, there is a "Remote Annunciation Delay, sec" spinner set to 0 and an "Annunciate even if Acknowledged" checkbox.

Alarm Type	Low	High	Limit	Priority	Remote Alarm	Deadband
PreEmerg	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	100	1-	<None>	3
Emergency	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	50	0-	<None>	3
Unreason	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	25	3-	<None>	3

Remote Annunciation Delay, sec: 0

Annunciate even if Acknowledged: ☐

# Exercise

Create a report to show a list of Analog Limits



- Run a report that shows all of the analog points in the
- system that is using :
  1. Emergency High/Low – Alarm limit values
  2. Emergency High/Low – Alarm priority values
  3. **Optional:** Indicate ones that are currently in use
  4. Must show the name of the stations

# Exercise

Create a report  
to show a list  
devices/users  
with Privileged  
mode



- Run reports to show:
  - 1) Users with Privileged mode
  - 2) Status Points with Privileged mode
  - 3) Update the report to only show the ones enabled

# Tag Reports

When a tag is applied, the system records the type of tag, tag description and its timestamp.

**Tags Report**

**General**

Name: Tag Report    Orientation: Portrait    Group By: <None>

Description:    Order: Descending    Include Temporary Devices: ☐

Print Header: ☒

**Time Range**

☐ From: 2022-10-09 13:41    or First Record: ☒    To: 2022-10-09 13:41    or Last Record: ☒

☒ Start: 1 Weeks ago    at 00:00    For Interval Of: 0    Until Now

**Drop Units**

☒ All Points    ☐ Include Childs

**User Types**

- ☒ Switch
- ☐ Circuit Breaker
- ☐ Recloser
- ☐ GIS
- ☐ Type05
- ☐ Type06
- ☐ Type07

☒ All

**Tag Types**

- ☒ FU
- ☐ HC
- ☐ HO
- ☐ IN

☒ All

Export    Preview    Point Browser    OK    Cancel

# Exercise

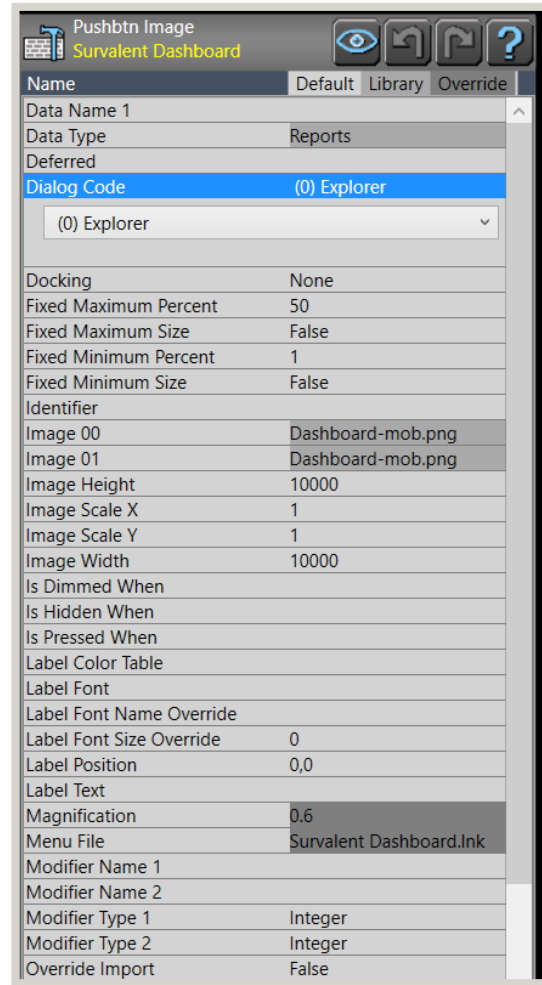
Create a report  
to show a list of  
Tagged devices



- Create a Tag Report to see the currently tagged device.

# PMacro for Reports

- Reports that are created in the database can be opened from SmartVU using Pushbutton PMacro



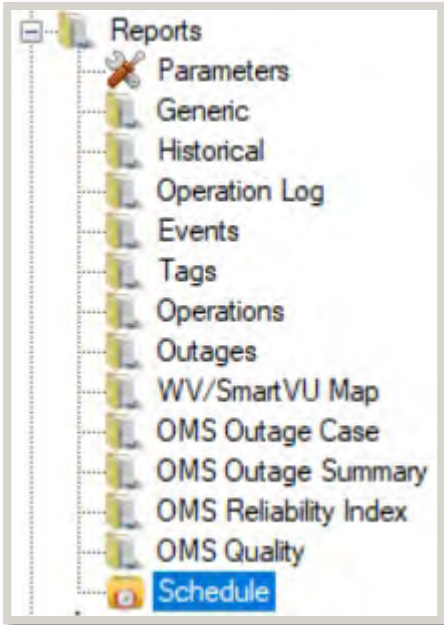
# Exercise

Practice creating  
a Pushbutton  
Pmacro for  
reports



- Go to SmartVU, and open up the Training Map
- Go to a substation, and create a Pushbutton PMacro
- Configure it to open up one of your reports

# Report Scheduler



[Daily Reports - Analog Value F1] Report Scheduler

General Schedule File Destination

Enabled ☒

Name: Daily Reports - Analog Value F1

Description: Daily Reports - Analog Value F1

Report Name: Analog Values For F1 Report Type: HISTORICAL

Destination: File

Last Print: Last Error: Done OK Last Print: 2022-03-17 17:40

[Daily Reports - Analog Value F1] Report Scheduler

General Schedule File Destination

Time of Day

From: 12:05 To: 23:59 ☐ Midnight ☒ Midnight

Once in Interval: ☐ Every, hr:min: ☒ 00:05

Day of Week

☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☒ Thursday ☐ Friday ☐ Saturday

Day of Month

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

[Daily Reports - Analog Value F1] Report Scheduler

General Schedule File Destination

File Path: C:\USERS\DHOANG\DESKTOP\REPORTS

File Name: ANALOG REPORTS F1 -

File Extension: PDF

Add Timestamp to File Name ☒



# Exercise

Practice creating  
a schedule to  
produce reports



- Go to STC Explorer
- Practice creating a schedule to produce and file your reports

# SCADA Add-in

- Allows users to import both current and historical SCADA data directly into MS Excel
- Minimum requirements:
  - Windows NT, 2000, 2003, XP or Vista
  - MS Office 2000+



# Exercise

## Practice SCADA Add-in



- If you have MS Excel on your machines:
- Follow or watch the instructor instructions:
  - Create some historical reports
  - Understanding worksheets

Survallent.



Global User Conference

■ Questions?

# Questions?





## CONTACT:

To create a support case, please send an email to  
[support@survalent.com](mailto:support@survalent.com)

Please contact us for any inquiries about training or to sign up for  
Survalent trainings  
[training@survalent.com](mailto:training@survalent.com)



# Thank you