

OCTOBER 25, 2023

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# Leveraging AVEVA™ PI System™ to Integrate D-SCADA with OMS

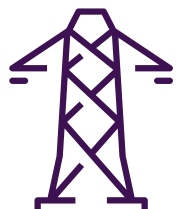
Selameselassie Retta, Sr SCADA Engineer, ConEdison

Gaurav Agrawal, Sr System Analyst, ConEdison

AVEVA

# Consolidated Edison Company of New York (ConEdison)

Enterprise Agreement signed in year 2020



- Electric Operations
  - Distribution
  - Transmission



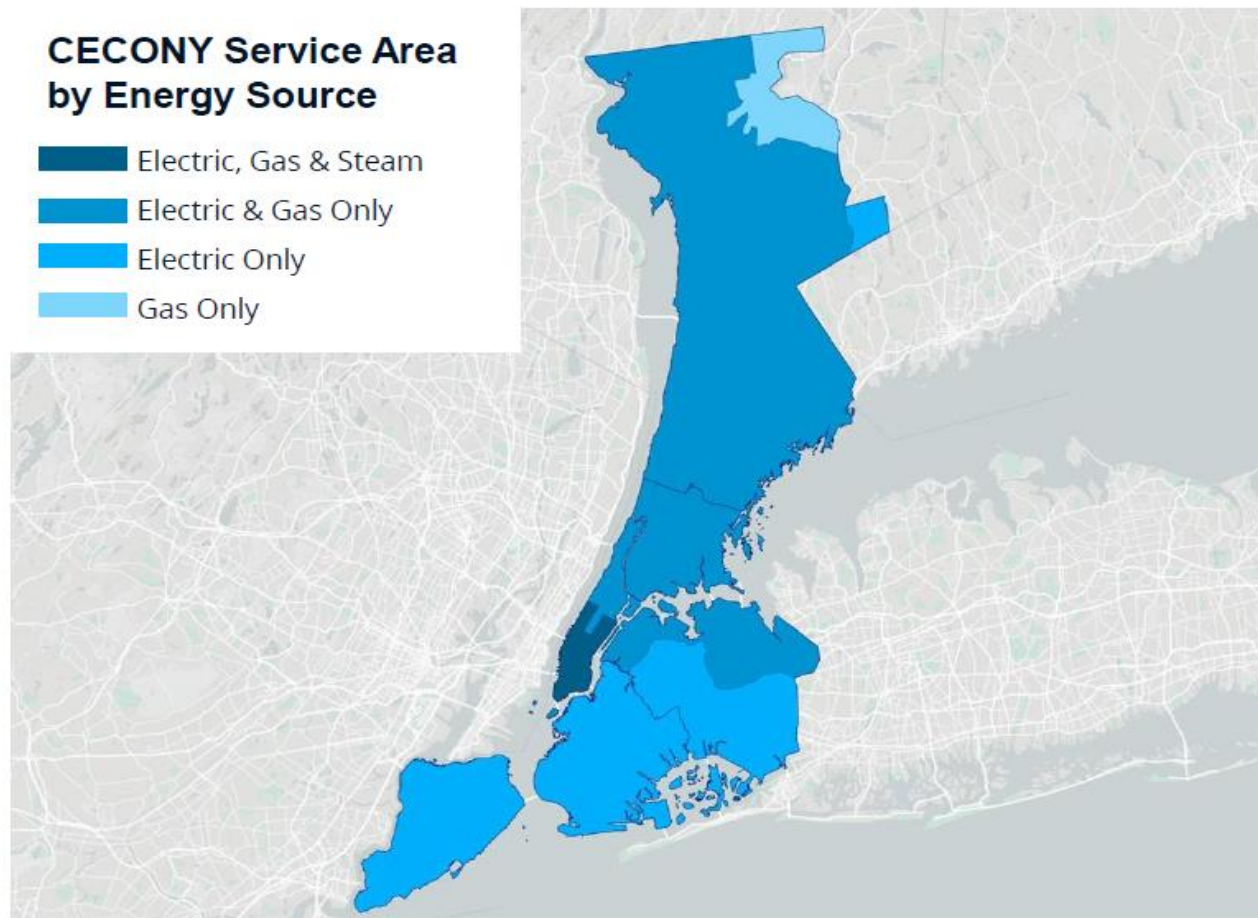
- Gas Operations



- Steam Operations

**CECONY Service Area by Energy Source**

- Electric, Gas & Steam
- Electric & Gas Only
- Electric Only
- Gas Only



# Consolidated Edison Company of New York (ConEdison)

## Energy for New York City and Westchester

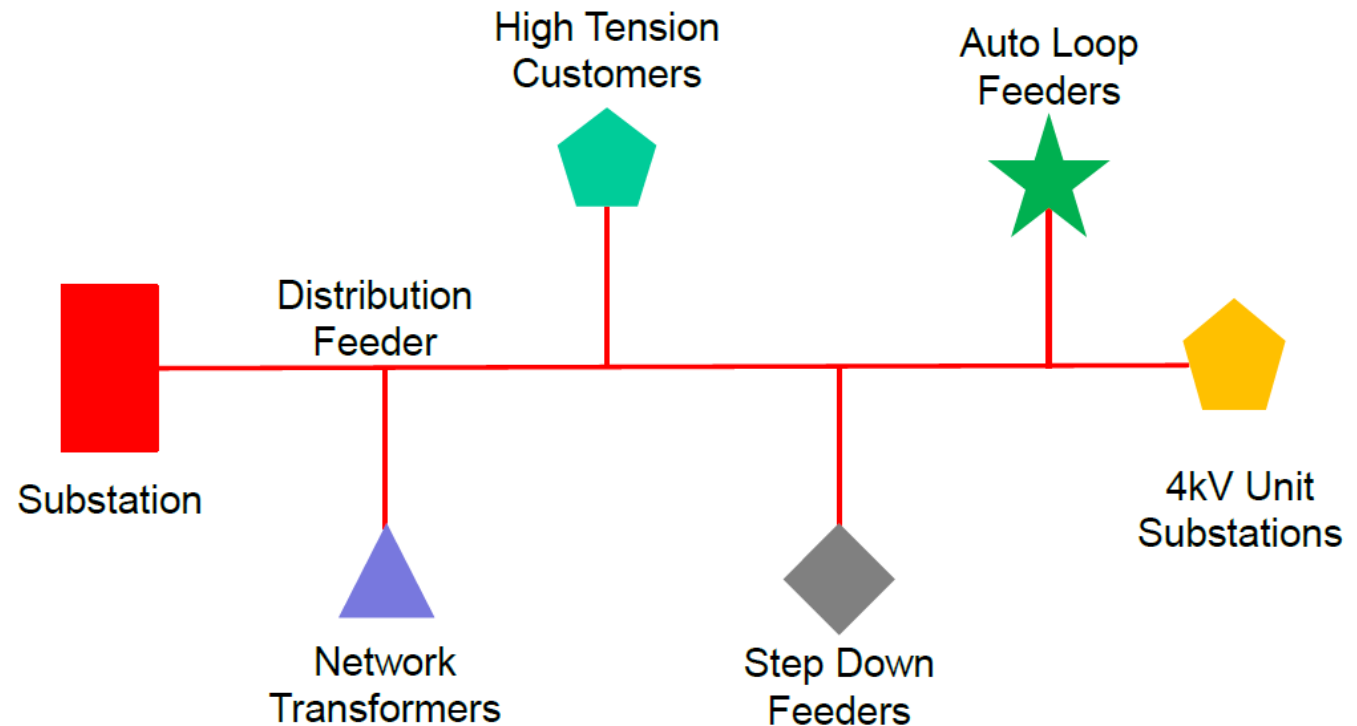
- Longest-listed company on the New York Stock Exchange
- 200 years of legacy
- 3.62 Million Electric Customers
  - 2.5 Million Network
  - 1 Million Non-Network
- 36,000 Miles of Overhead Transmission & distribution lines
- 94,000 Miles of Underground Transmission & distribution lines
- Record System Peak Load: 13,321 MW
- 1.1 Million Gas Customers
- 4,300 miles of gas mains
- 1,700 Steam Customers
- 105 miles of Steam mains and lines



# Expansive distribution system

Distribution Electric Control Center (Manhattan, Brooklyn & Queens, Bronx & Westchester, Staten Island)

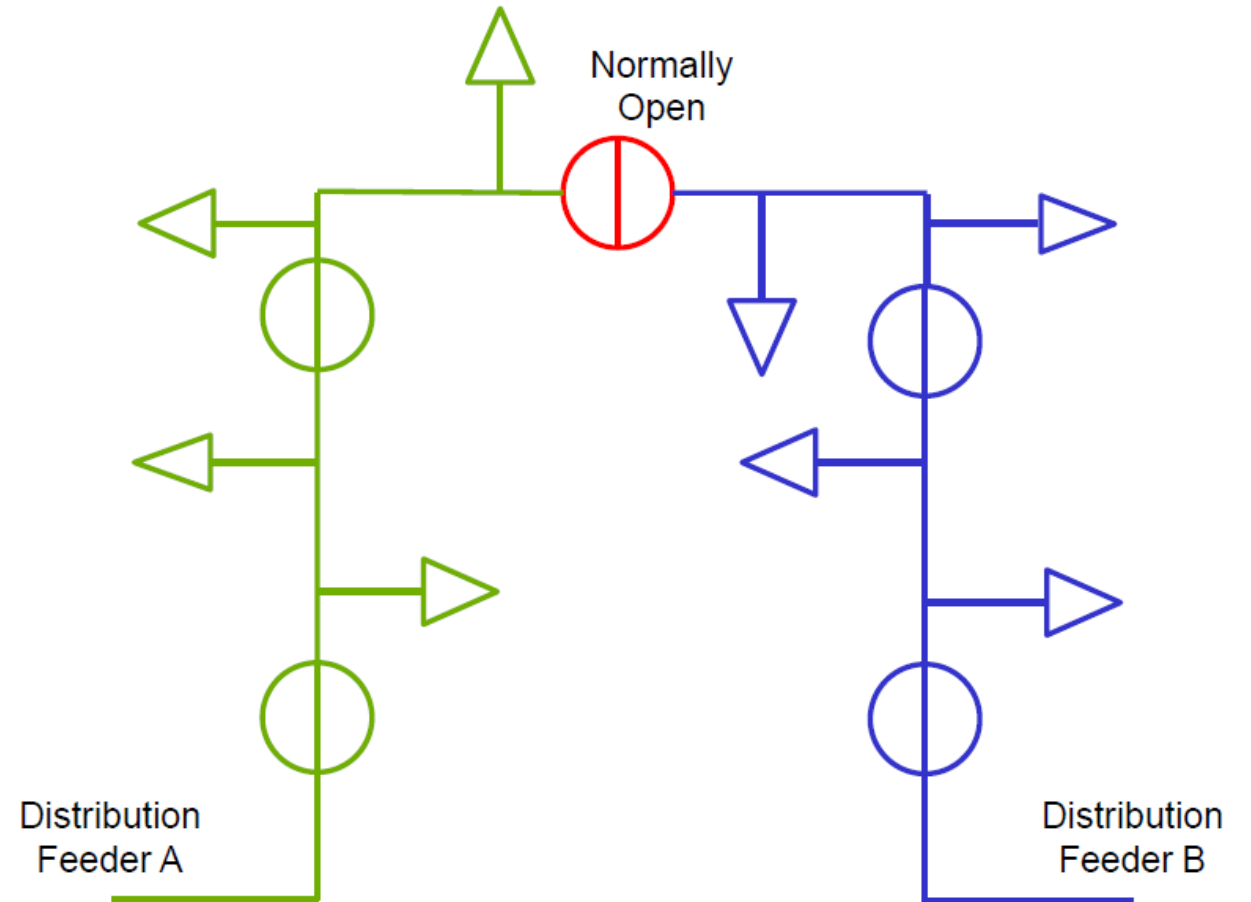
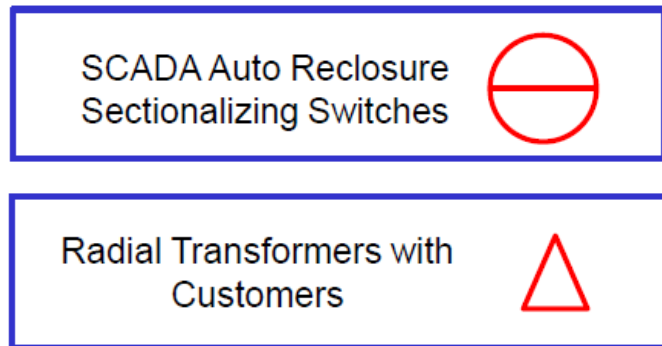
- 65 Second Contingency Networks
  - Ability to operate on the loss of 2 sources
- 19 First Contingency Networks
  - Ability to operate on the loss of 2 sources
- 62 Substations
  - 2210 Distribution Feeders
  - 43,000 Network Transformers
  - 185 Autoloops
  - 217 4kV Unit Substations
  - 110 Step Down Feeders
- 266,573 manholes and service boxes



# Distribution system overview

## AutoLoop Systems @ ConEdison

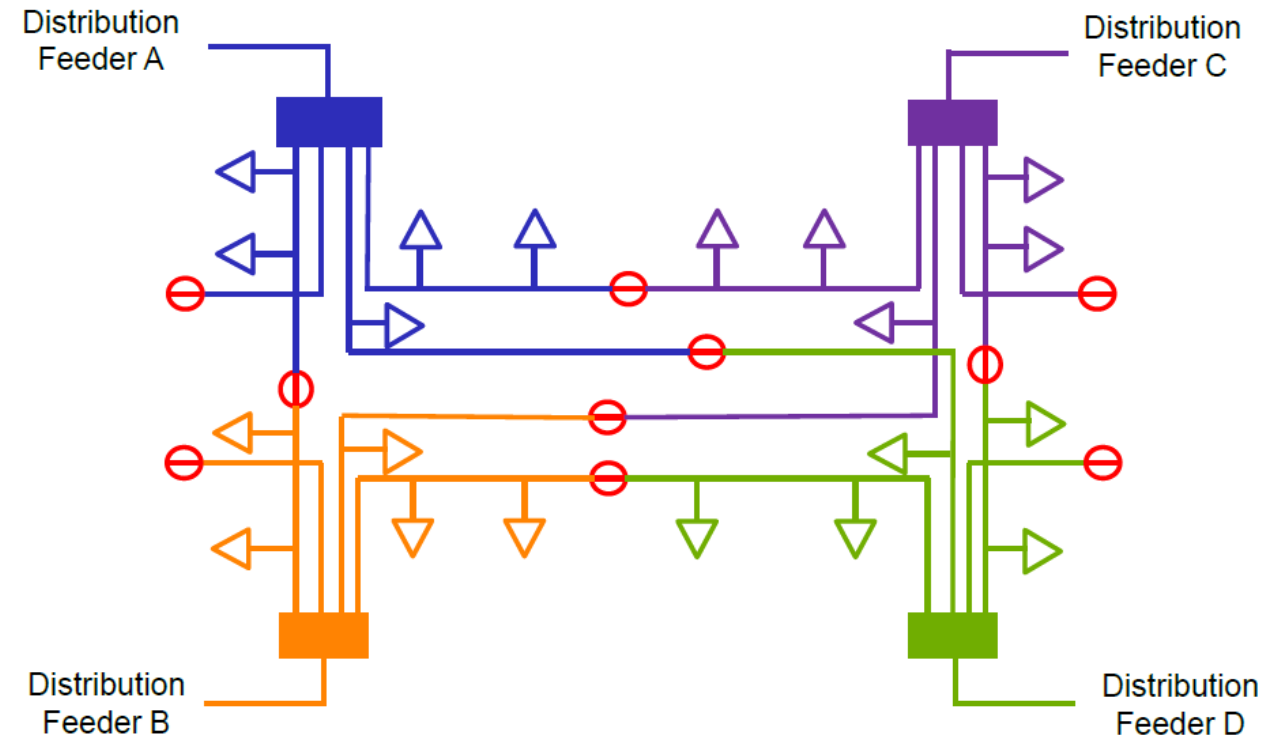
- 2 Feeders connected by a normally open switch
- Multiple Automatically operated and SCADA operated sectionalizing switches



# Distribution system overview

## 4KV Grid System @ ConEdison

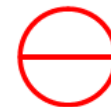
- Multiple interconnected Unit Substations
- Each substation supplied by a different Distribution Feeder
- Connected through distribution feeders with normally closed automatically and SCADA operated switched in between
- Supports overhead areas with over 676 feeders



4kV Stepdown Substation



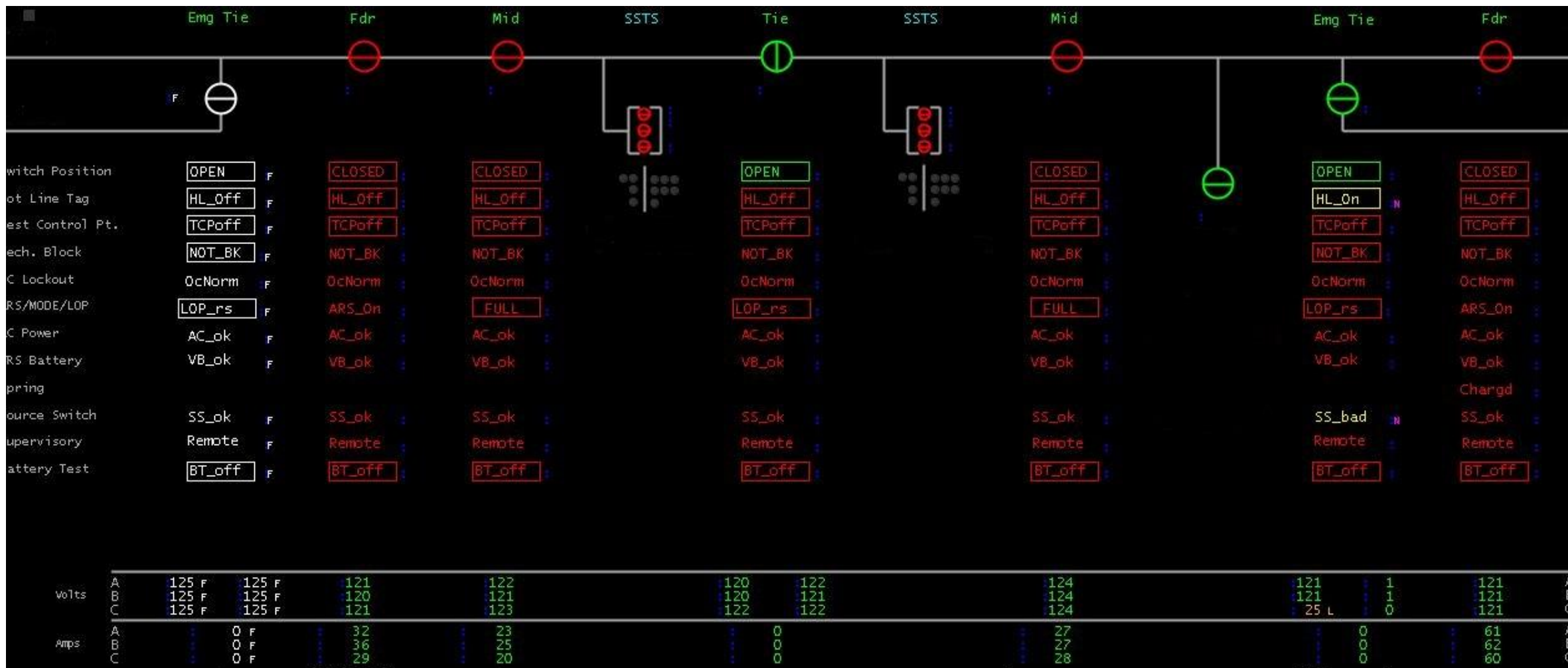
SCADA Auto Reclosure  
Sectionalizing Switches



Radial Transformers with  
Customers



# SCADA System - screenshot



# D-SCADA to OMS Integration Project



## ConEd Success Story



### Challenge

- Manually Open/Close SCADA device in OMS Viewer
- Manually adjust restore time
- Rely on OMS prediction rules for outage calls



### Solution

- Leverage PI to create device Change of Status (COS) Analytics using Eventframes
- PI Notification web service function to call Webservice
- Leverage PI AF to create Device mapping between D-SCADA and OMS
- Leverage PI4BA for reporting



### Benefits

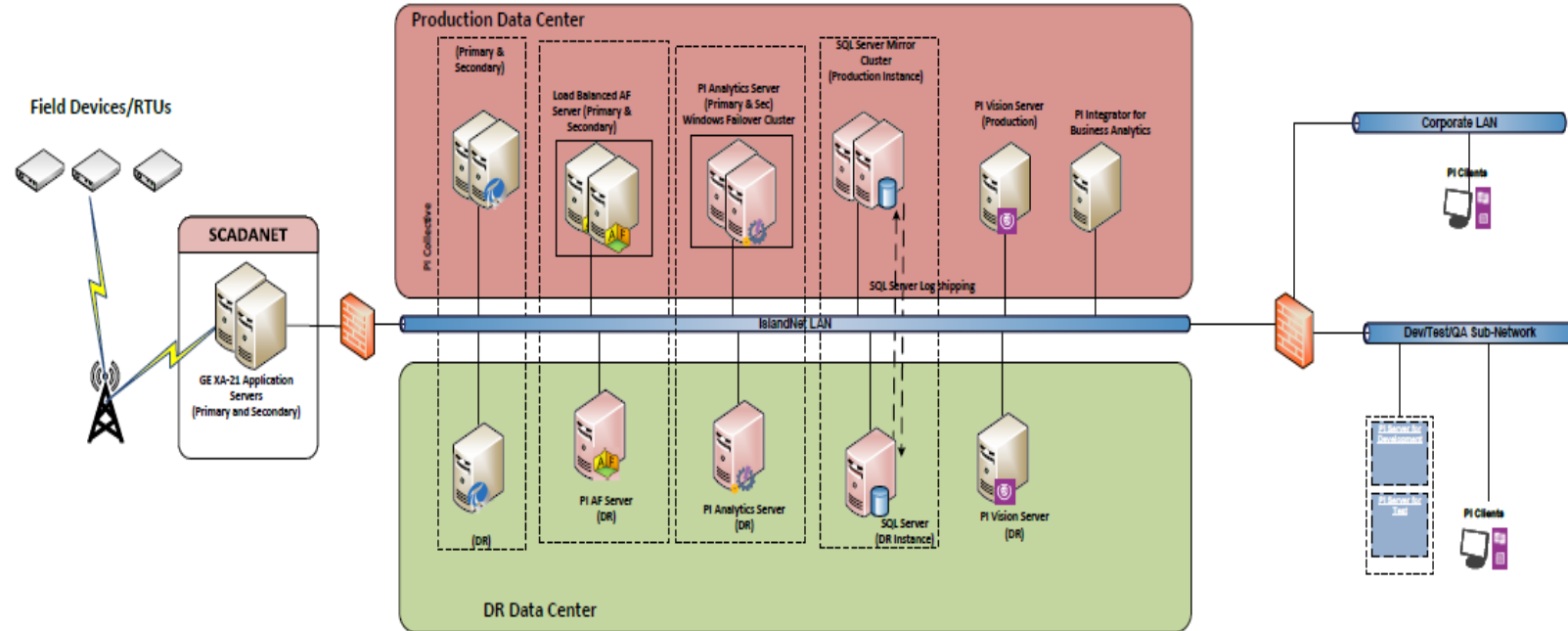
- Automatically Open/Close SCADA device in OMS Viewer
- Automatically group customer calls and AMI last gasps
- Automatically capture accurate restoration time based on SCADA
- Automatically suppress AMI last gasps caused by SCADA operations



# Distribution Electric AVEVA PI System

## Quick Facts

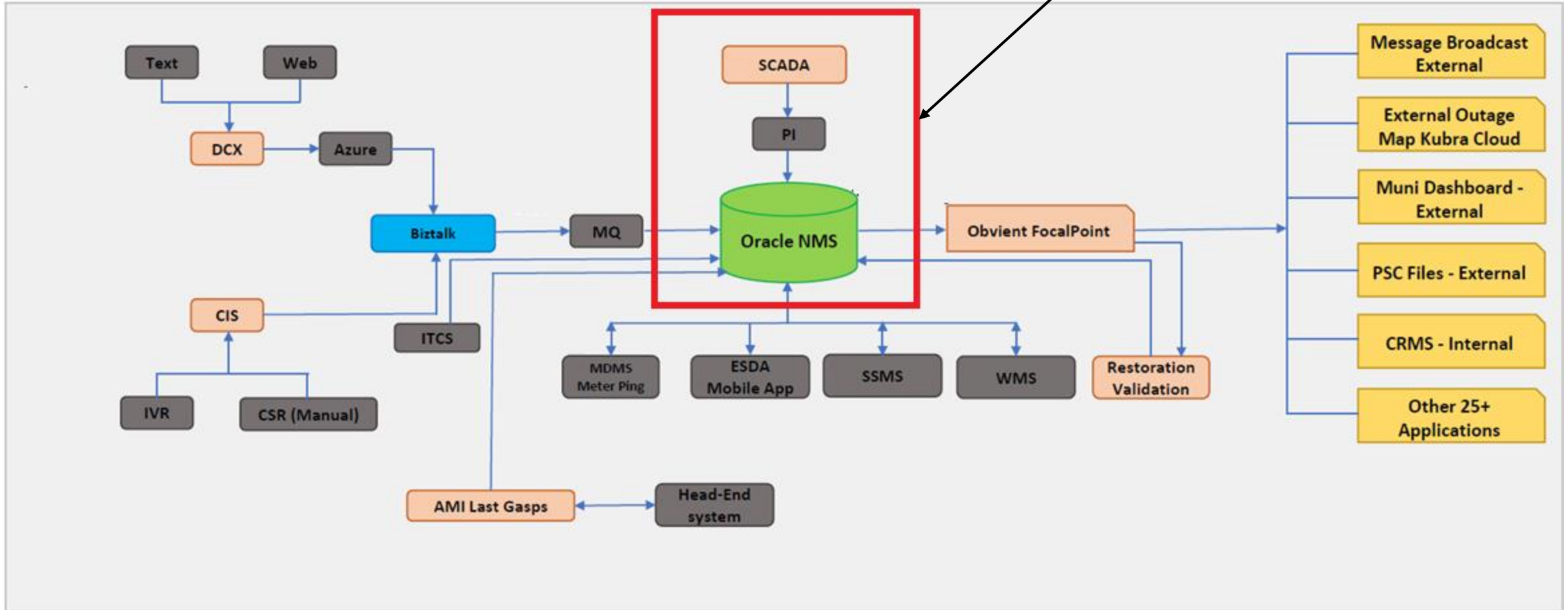
- 1.5 Million PI tags
- Data from SCADA Master System
- 10 years of Data worth 6 TB (4 GB/Day)
- Highly available PI System with DR site
- PI AF High Availability via Load Balancer
- Analysis and Notification High Availability via Microsoft Windows Clustering
- PI Integrator for Business Analytics (100K Data Stream)



# Outage Management System @ ConEd

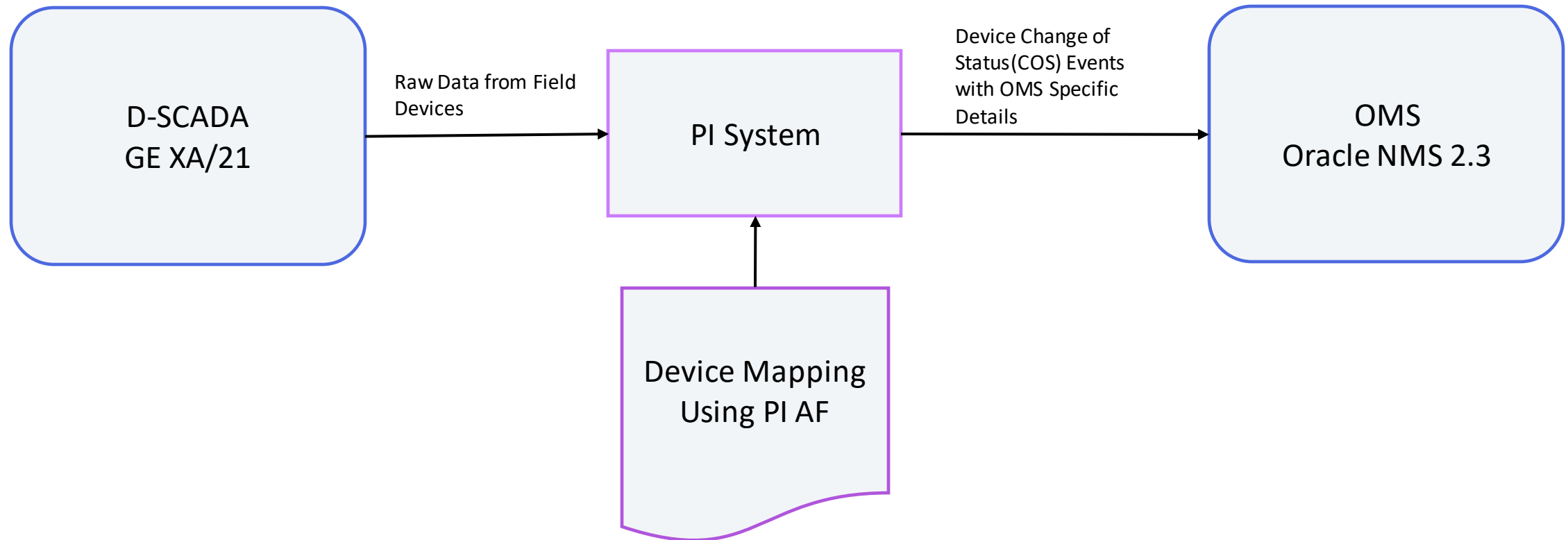
## Oracle Network Management System 2.3

D-SCADA TO OMS Integration



# D-SCADA to OMS integration

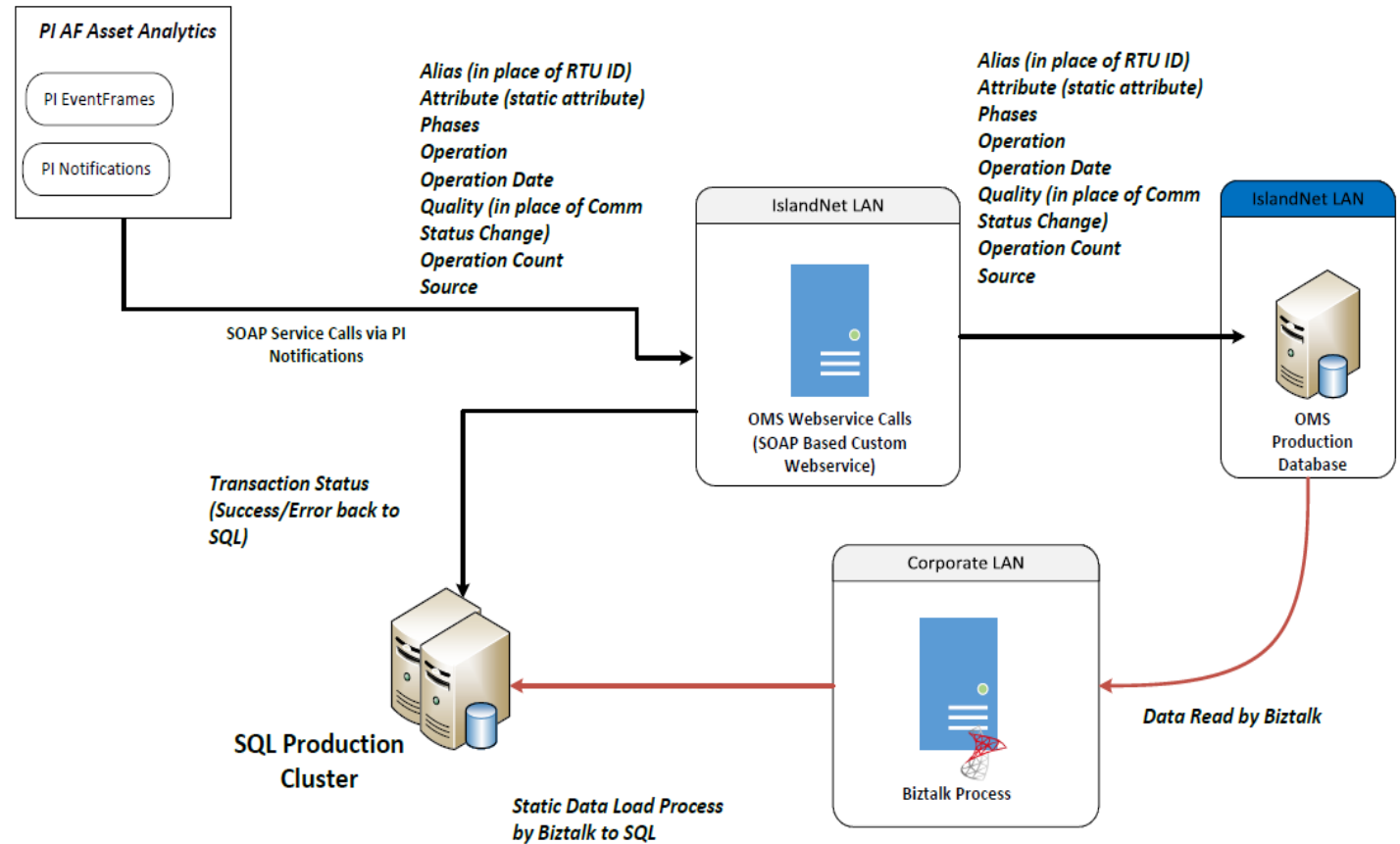
## High Level Overview



# D-SCADA to OMS integration

## Project Specific Details

- ~ 5000 Overhead Reclosers
- ~ 900 Feeder Breakers
- 30 Element Templates
- 15 Eventframe Templates
- 17K individual Analyses (Expression and Eventframes)
- 10K Notification Rules
- Tableau Dashboard for Reporting (using PI integrator for Business Analytics)



# Asset structure – drill down

Elements	
Search	
	Name
+	Bronx
+	Brooklyn
+	HTM DAS
+	Manhattan
+	Queens
+	Staten Island
+	SYSTEM
+	Westchester



Elements	
+	Elements
+	Bronx
+	Brooklyn
+	Brooklyn 4kV Grids
+	DER Sites
+	Loops
+	Networks
+	Overhead Switches
+	1001
+	1001S
+	1002S
+	1004
+	1004S
+	Coney Island
+	Cropsey
+	Dyker
+	Fort Hamilton
+	Gerritsen
+	Gravesend



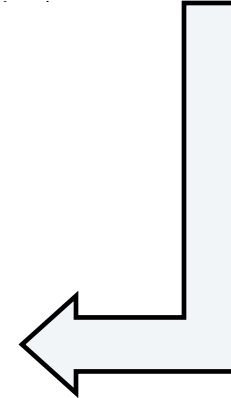
Overhead Switches	
+	100 1
+	2613
+	2614
+	2615
+	2616
+	2617
+	2618
+	2619
+	2620
+	2621
+	2622
+	2623
+	2624
+	2625
+	2626
+	2627
+	2628
+	2629
+	2630
+	2631
+	2632
+	2633
+	2634
+	2635
+	2636
+	2637
+	2638
+	2639
+	2640
+	2642
+	2643
+	2646



SCADA Device – OMS ALIAS from Mapping Table – RTU #2613  
3011:22AB:P48355:GTTS:900000173

Device Phase Switch Position – Data feed from SCADA System

Elements			
Filter			
Name	Value	Time Stamp	
Hot Line Tag	HL_OFF	3/25/2023 4:17:18.175 PM	
Inhibit - STAR	N	1/1/1970 12:00:00 AM	
Loop - STAR	CLOSED	1/1/1970 12:00:00 AM	
Nominal Status - STAR	CLOSED	1/1/1970 12:00:00 AM	
Operation Count - STAR	1	1/1/1970 12:00:00 AM	
Quality - STAR	0	1/1/1970 12:00:00 AM	
Source System - STAR	BT	1/1/1970 12:00:00 AM	
STAR ALIAS	3011:22AB:P48355:GTTS:900000173	1/1/1970 12:00:00 AM	
Static Data Load Time - STAR	9/15/2023 7:36:45 PM	1/1/1970 12:00:00 AM	
Switch Position A	CLOSED	5/5/2023 12:40:56.936 PM	
Switch Position B	CLOSED	5/5/2023 12:40:56.936 PM	
Switch Position C	CLOSED	5/5/2023 12:40:56.936 PM	
Switch Type - STAR	GTTS	1/1/1970 12:00:00 AM	
The Switch - STAR	0	1/1/1970 12:00:00 AM	
TransactionType - STAR	Payload	1/1/1970 12:00:00 AM	
Category: Static Data			
Communication	VZ MODEM	1/1/1970 12:00:00 AM	
Device Name	2613 Grid Tie	1/1/1970 12:00:00 AM	
Device Type	Grid Tie	1/1/1970 12:00:00 AM	
Location	E 85 ST IS CHURCH LA	1/1/1970 12:00:00 AM	
Loop		1/1/1970 12:00:00 AM	
PI Template	GTSTS-M_ALL	1/1/1970 12:00:00 AM	
Pole Number	P48355	1/1/1970 12:00:00 AM	
RTU#	2613	1/1/1970 12:00:00 AM	



# Element attribute – table lookup

The screenshot illustrates the configuration of a table lookup attribute for an element in the AVEVA software. The process involves selecting a data source table and defining a query to retrieve attribute values based on the element's RTU ID.

**SQL\_SCADA\_POINTS Table Data:**

LOAD_DATETIME	Rtu_ID	Alias	BORO	Switch_Type	Feeder 1
10/13/2023 3:34:46 PM	2606	L11:28AB:P33324:NATS:700191504	queens	NATS	L18
10/13/2023 3:34:46 PM	2607	L10:25AE:P63644:NATS:700225533	queens	NATS	L10
10/13/2023 3:34:46 PM	2608	L13:25AE:P61236:NATS:700134660	queens	NATS	L13
10/13/2023 3:34:46 PM	2609	L13:25AE:P50425:NATS:700224578	queens	NASTS	L9
10/13/2023 3:34:46 PM	2610	L13:28AD:P63776:GRTS:700225788	queens	GRTS	L13
10/13/2023 3:34:46 PM	2611	L17:26AC:P72309:NATS:700224792	queens	NATS	L6
10/13/2023 3:34:46 PM	2612	L18:28AC:P72311:GRTS:700226771	queens	GRTS	L18
10/13/2023 3:34:46 PM	2613	3011:22AB:P48355:GTTS:900000173	queens	GTTS	3011
10/13/2023 3:34:46 PM	2614	3013:23AC:P57503:GTTS:700216259	queens	GTTS	3013
10/13/2023 3:34:46 PM	2615	3015:13AA:P63197:GTTS:900000100	queens	GTTS	3015
10/13/2023 3:34:46 PM	2616	3018:19AC:P60335:GTTS:700216261	queens	GTTS	3018

**Element Attribute Configuration (2613):**

Name	Value	Time Stamp
Hot Line Tag	HL_Off	3/25/2023 4:17:18.175 PM
Inhibit - STAR	N	1/1/1970 12:00:00 AM
Loop - STAR		1/1/1970 12:00:00 AM
Nominal Status - STAR	CLOSED	1/1/1970 12:00:00 AM
Operation Count - STAR	1	1/1/1970 12:00:00 AM
Quality - STAR	0	1/1/1970 12:00:00 AM
Source System - STAR	PI	1/1/1970 12:00:00 AM
STAR ALIAS	3011:22AB:P48355:GTTS:900000173	1/1/1970 12:00:00 AM
Static Data Load Time - STAR	10/13/2023 3:34:46 PM	1/1/1970 12:00:00 AM
Switch Position A	CLOSED	5/5/2023 12:40:56.936 PM
Switch Position B	CLOSED	5/5/2023 12:40:56.936 PM
Switch Position C	CLOSED	5/5/2023 12:40:56.936 PM
Switch Type - STAR	GTTS	1/1/1970 12:00:00 AM
Tie Switch - STAR	0	1/1/1970 12:00:00 AM
TransactionType - STAR	Payload	1/1/1970 12:00:00 AM

**Table Lookup Configuration:**

Name: STAR ALIAS  
Description: <None>  
Properties: <None>  
Categories: SCADA-TO-STAR  
Default UOM: <None>  
Value Type: String  
Value: 3011:22AB:P48355:GTTS:900000173  
Display Digits: -5  
Data Reference: Table Lookup  
Settings...  
SELECT ALIAS FROM [SQL\_SCADA\_POINTS] WHERE [RTU\_ID] = %Element%

# Asset Analytics

## Eventframe & Notifications

2613

General Child Elements Attributes Ports Analyses Notification Ru...

Name
Point Name Extension
RTU Communication
SCADA to STAR - Hot Line Status
SCADA to STAR - Millisecond Timestamp
<b>SCADA to STAR - Switch A Status</b>
SCADA to STAR - Switch B Status
SCADA to STAR - Switch C Status
Time Offline Calculator
TRIP A Phase
TRIP B Phase
TRIP C Phase



Generation Mode: Explicit Trigger Event Frame Template: STS-OHSW 3 PH - Switch Position A

Name	Expression	True for	Severity
Variables			
badValue	BadVal(TagVal('Switch Position A', '*'))		
Start triggers			
StartTrigger1	PrevVal('Switch Position A', '*') <> TagVal('Switch Position A', '*') AND Not(badVa	Not Set	None
End trigger			
EndTrigger	PrevVal('Switch Position A', '*') <> TagVal('Switch Position A', '*') AND Not(badVa		

Scheduling:  Event-Triggered  Periodic

Trigger on: Any Input

Advanced Event Frame Settings...

2613

General Child Elements Attributes Ports Analyses Notification Rules Version

Name	Criteria
SCADA to STAR - Hot Line Tag Notificati...	Analysis = SCADA to STAR - Hot Line Status
<b>SCADA to STAR - Switch A Status</b>	Analysis = SCADA to STAR - Switch A Status
SCADA to STAR - Switch B Status	Analysis = SCADA to STAR - Switch B Status
SCADA to STAR - Switch C Status	Analysis = SCADA to STAR - Switch C Status



SCADA to STAR - Switch A Status - Subscriptions

Name	Configuration	Notify Option
STAR Webservice Delivery Channel	Configured	Event start

# Attribute Mapping

## PI Notification Web Service Configuration

- 18 Attribute Mapping between PI and OMS including Notification Send Time
- Transaction Success/Error Message back from Webservice into SQL Table thus closing out feedback loop
- Heartbeat Function –
  - Calculated SCADA Point toggling b/w 0 & 1 every minute
  - 3 heartbeat point for 3 regions (BQ, XW and SI)
  - Heartbeat Monitoring on OMS end – Alerts generated if heartbeat not received within 10 minutes

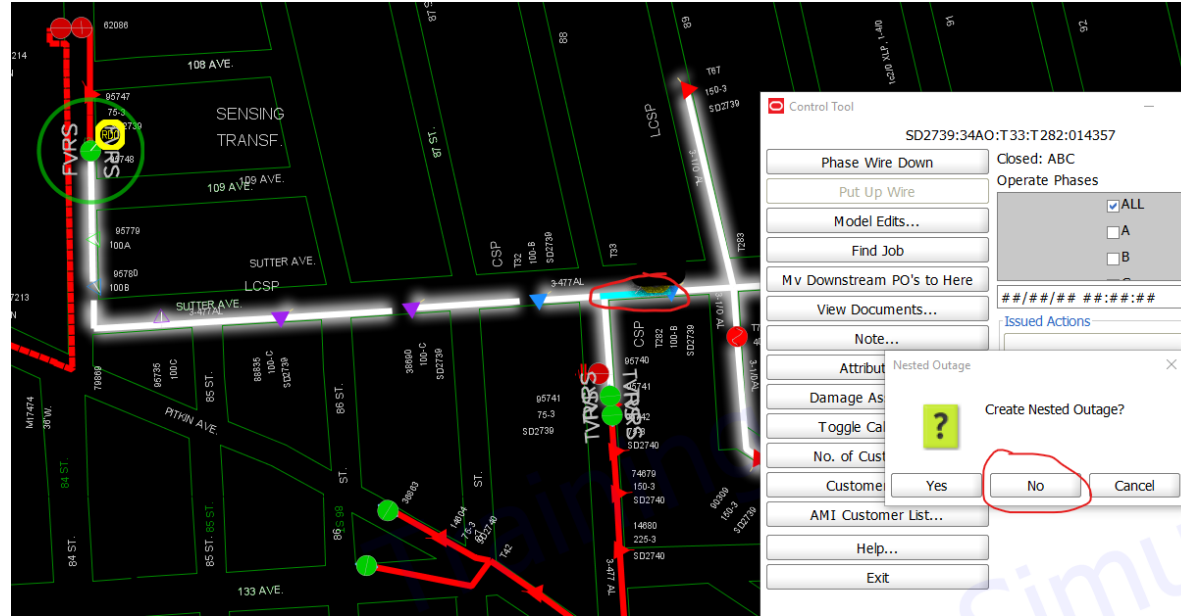
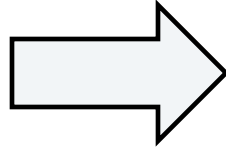
Name	Value Type	Value
Attribute	String	Switch Position A Attribute - STAR:Value At Start Time
CLS	String	H_CLS:Value At Start Time
DataSource	String	DataSource - STAR:Value At Start Time
EventID	String	Event Frame:Unique ID
IDX	String	H_IDX:Value At Start Time
Loop	String	Loop - STAR:Value At Start Time
OperationCount	String	Operation Count - STAR:Value At Start Time
Phase	String	Switch Position A Phase - STAR:Value At Start Time
Quality	String	Quality - STAR:Value At Start Time
RTU_ID	String	RTU#:Value At Start Time
Send_DateTime	String	Notification Rule:Send Time
SourceSystem	String	Source System - STAR:Value At Start Time
STARAlias	String	STAR ALIAS:Value At Start Time
Status	String	Switch Position A Switch Position A - STAR:Value At Start Time
Status_Chg_Date	String	Switch Position A Switch Position A - STAR:Time Stamp At Start Time
Status_Chg_Time	String	Switch Position A Millisecond - Switch Position A:Value At Start Time
SwitchType	String	Device Type:Value At Start Time
TransactionType	String	TransactionType - STAR:Value At Start Time

SourceSystem	Status	Description	Timestamp	LastModified	RTU_ID	H_CLS	H_IDX	Alias	OperationStatus	Operation_Date	SendTime
PI	SUCCESS		2023-09-15 17:38:10.940	2023-09-15 17:38:10.940		333	1	HEARTBEAT:0:0:northern-1852	1	9/15/2023 5:38:00 PM	9/15/2023 5:38:10 PM
PI	SUCCESS		2023-09-15 17:38:10.880	2023-09-15 17:38:10.880		333	3	HEARTBEAT:0:0:staten-1852	0	9/15/2023 5:38:00 PM	9/15/2023 5:38:10 PM
PI	SUCCESS		2023-09-15 17:37:11.037	2023-09-15 17:37:11.037		333	1	HEARTBEAT:0:0:northern-1852	0	9/15/2023 5:37:00 PM	9/15/2023 5:37:10 PM
PI	SUCCESS		2023-09-15 17:37:10.983	2023-09-15 17:37:10.983		333	3	HEARTBEAT:0:0:staten-1852	1	9/15/2023 5:37:00 PM	9/15/2023 5:37:10 PM
PI	SUCCESS		2023-09-15 17:37:10.920	2023-09-15 17:37:10.920		333	2	HEARTBEAT:0:0:queens-1852	0	9/15/2023 5:37:00 PM	9/15/2023 5:37:10 PM
PI	SUCCESS		2023-09-15 17:36:11.207	2023-09-15 17:36:11.207		333	1	HEARTBEAT:0:0:northern-1852	1	9/15/2023 5:36:00 PM	9/15/2023 5:36:11 PM
PI	SUCCESS		2023-09-15 17:36:11.130	2023-09-15 17:36:11.130		333	3	HEARTBEAT:0:0:staten-1852	0	9/15/2023 5:36:00 PM	9/15/2023 5:36:11 PM
PI	SUCCESS		2023-09-15 17:36:11.050	2023-09-15 17:36:11.050		333	2	HEARTBEAT:0:0:queens-1852	1	9/15/2023 5:36:00 PM	9/15/2023 5:36:10 PM
PI	SUCCESS		2023-09-15 17:35:52.527	2023-09-15 17:35:52.527	1301	168	21501	5X66:29W:T85:MFVRS:5053	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.477	2023-09-15 17:35:52.477	1301	168	21501	5X66:29W:T85:MFVRS:5053-50	0	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.430	2023-09-15 17:35:52.430	1041	168	27800	7X96:18AB:16306:MFVRS:5609	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.380	2023-09-15 17:35:52.380	1041	168	27800	7X96:18AB:16306:MFVRS:560...	0	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.327	2023-09-15 17:35:52.327	1918	168	27504	16W02:139BH:28:MFSTS:8103	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.260	2023-09-15 17:35:52.260	1040	168	16201	7X96:19AB:T7432:FVRS:7914-50	0	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.200	2023-09-15 17:35:52.200	1425	168	27801	7X96:18AB:T4918:MTSTS:791...	0	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.160	2023-09-15 17:35:52.160	1040	168	16201	7X96:19AB:T7432:FVRS:7914	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.103	2023-09-15 17:35:52.103	1425	168	27801	7X96:18AB:T4918:MTSTS:7915	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:52 PM
PI	SUCCESS		2023-09-15 17:35:52.050	2023-09-15 17:35:52.050	1039	168	16100	7X94:14AC:18053:FVRS:7926-50	0	9/15/2023 5:35:39 PM	9/15/2023 5:35:51 PM
PI	SUCCESS		2023-09-15 17:35:51.993	2023-09-15 17:35:51.993	1918	168	27504	16W02:139BH:28:MFSTS:8103	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:51 PM
PI	SUCCESS		2023-09-15 17:35:51.933	2023-09-15 17:35:51.933	1424	168	27802	7X94:15AB:4154:MSTS:7916-50	0	9/15/2023 5:35:39 PM	9/15/2023 5:35:51 PM
PI	SUCCESS		2023-09-15 17:35:51.877	2023-09-15 17:35:51.877	1918	168	27504	16W02:139BH:28:MFSTS:8103	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:51 PM
PI	SUCCESS		2023-09-15 17:35:51.807	2023-09-15 17:35:51.807	1039	168	16100	7X94:14AC:18053:FVRS:7926	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:51 PM
PI	SUCCESS		2023-09-15 17:35:51.747	2023-09-15 17:35:51.747	1425	168	27801	7X96:18AB:T4918:MTSTS:7915	2	9/15/2023 5:35:39 PM	9/15/2023 5:35:51 PM
PI	SUCCESS		2023-09-15 17:35:51.633	2023-09-15 17:35:51.633	1025	169	11600	7X96:16AC:7400:TVRS:5981-50	0	9/15/2023 5:35:39 PM	9/15/2023 5:35:51 PM
PI	SUCCESS		2023-09-15 17:35:51.583	2023-09-15 17:35:51.583	1025	169	11600	7X96:16AC:7400:TVRS:5981	1	9/15/2023 5:35:39 PM	9/15/2023 5:35:51 PM

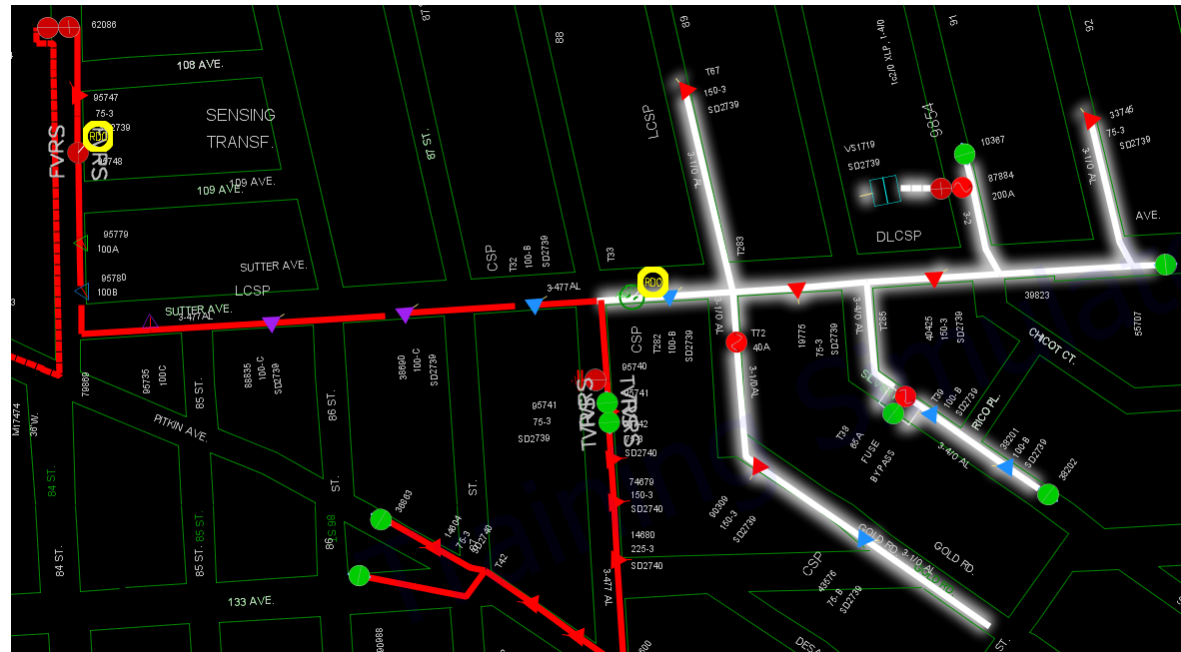
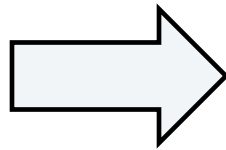


# Example

- Step 1 – SCADA sends FVRS Device OPEN operation on the Loop resulting into Loop de-energized



- Step 2 – SCADA sends TVRS Device CLOSE operation on the Loop resulting into Loop re-energized



# Tableau Report using PI Integrator for BA

OHSW Status Feeder Breakers

## SCADA OHSW Status Report

Region	RTU ID	Loop on	Communication Feeder	Supply Feeder	STAR ALIAS	Location	H CIs	H Idx	Switch Position	Switch Position A	Switch Position B	Switch Position C	Alignment - STAR Vs PI	Nominal Stat
	2900	FORTHA..	VZ MODEM	2892	2892-23G:P67760:SFSTS:..	BAY RIDGE AVE. S.S 1P W/O 10 AVE.	172	9000					Aligned	Nominal Stat
	2901	FORTHA..	VZ MODEM	2892	2892-24G:P67771:SFSTS:..	67 ST. N.S. 1P W/O 10TH AVE	172	9003		CLOSED	CLOSED	CLOSED	Aligned	Nominal Stat
	2902	FORTHA..	VZ MODEM	8883	8883-25H:P67718:ETVRS:..	63 ST. E. S. 1P N/O 9 AVE.	170	4700	OPEN				Aligned	Nominal Stat
	2903	FORTHA..	VZ MODEM	8890	8890-20E:P67713:ETVRS:..	86TH ST. E. S. 1 N/O 10TH AVE.	170	4900	OPEN				Aligned	Nominal Stat
	2907	FORTHA..	VZ MODEM	2892	2892-24G:P67774:MVRS:..	10 AV WS 875 67 ST	168	32801	CLOSED				Aligned	Nominal Stat
	2915	FORTHA..	VZ MODEM	2893	2893-21F:P67903:MVRS:..	10 AV W.S. 170' N/O 81 ST	168	32800	CLOSED				Aligned	Nominal Stat
	2919	GEL	VZ MODEM	7803	7803-10P:P69235:SSTS:9..	AVE.V S.S. 1 E/O CONEY ISLAND AVE.	174	20500		CLOSED	CLOSED	CLOSED	Aligned	Nominal Stat
	2920	GEL	VZ MODEM	7803	7803-80:P50910:SSTS:90..	AVE. Y S.S. 4 E/O E. 7 ST.	174	20501		CLOSED	CLOSED	CLOSED	Aligned	Nominal Stat
	2921	Null	VZ MODEM	3008	3008-20AB:P69690:GMST:..	E 80 ST E.S 1 N/O PAERDEGAT 9 ST.	175	13600		CLOSED	CLOSED	CLOSED	Aligned	Nominal Stat
	2945	MADISO..	VZ MODEM	7802	7802-19T:P68766:MVRS:..	AVE. L N.S. 1P E/O E. 34 ST.	168	33801	CLOSED				Aligned	Nominal Stat
	2946	MADISO..	VZ MODEM	7802	7802-18U:P39068:CSVRS:..	E. 36 ST E.S. 2P S/O AVE. M	173	19600	CLOSED				Aligned	Nominal Stat
	2947	MADISO..	VZ MODEM	7802	7801-16U:P38182:TVRS:9..	E 37 ST. W.S. 4P S/O AVE P	169	17901	OPEN				Aligned	Nominal Stat
	2948	MADISO..	VZ MODEM	7801	7801-15U:P48099:CSVRS:..	E. 37 ST. W.S. 1P S/O QUENTIN RD.	173	19601	CLOSED				Aligned	Nominal Stat
	2949	MADISO..	VZ MODEM	7801	7801-15V:P48763:MVRS:..	AVE R N.S. 1WE E 37 ST.	168	33800	CLOSED				Aligned	Nominal Stat
	2950	MADISO..	VZ MODEM	7801	7801-14T:P43026:FVRS:9..	BURNETT ST. E. S. 1P N/O AVE. R	168	31401	CLOSED				Aligned	Nominal Stat
	2951	MADISO..	VZ MODEM	7801	7801-14V:P45435:ETVRS:..	E 37 ST 370S FILLMORE AV	170	6300	OPEN				Aligned	Nominal Stat
	2952	MARINE	VZ MODEM	7801	7801-11U:P17595:TVRS:9..	AVE. U.S.S. 2P E/O BURNETT ST.	169	18000	OPEN				Aligned	Nominal Stat
	2953	MARINE	VZ MODEM	7802	7802-14V:P51721:MVRS:..	E. 37 ST W.S. 2P S/O AVE. S	168	33901	CLOSED				Aligned	Nominal Stat
	2954	MARINE	VZ MODEM	7802	7802-14U:P49186:FVRS:9..	E 34 W.S. 4P S/O AVE. R	168	31501	CLOSED				Aligned	Nominal Stat
	2955	MARINE	VZ MODEM	4819	4819-14U:P44769:ETVRS:..	FILLMORE AVE. S.S. 2P E/O E. 33 ST.	170	3200	OPEN				Aligned	Nominal Stat
	2956	Null	VZ MODEM	SD3108	SD3108-8U:T3076:FVRS:9..	AVE X 1P/E BRAGG ST	168	37900	CLOSED				Aligned	Nominal Stat
	2957	Null	VZ MODEM	SD3109	SD3109-10U:P58123:FVR:..	COYLE ST E.S 3 N/O AVE N	168	38000	CLOSED				Aligned	Nominal Stat
	2958	Null	VZ MODEM	SD3108	SD3108-10U:P61299:TVR:..	E/S KNAPP ST 2P/S AVE V	169	19300	OPEN				Unaligned	Nominal Stat
	2959	Null	VZ MODEM	SD3109	SD3109-8V:P53296:GSSST:..	GERRITSEN AVE. W.S. 3 S/O DEVON AVE.	173	19900		CLOSED	CLOSED	CLOSED	Aligned	Nominal Stat
	2960	REDHO..	VZ MODEM	1853	1853-39I:P7801:ETVRS:9..	COLUMBIA ST. E.S 1S BAY ST	170	2900	OPEN				Aligned	Nominal Stat
	2961	CIL	VZ MODEM	7805	7805-5J:P69358:ETVRS:9..	CROPSEY AVE E.S. 1 N/O NEPTUNE AVE	170	1101	OPEN				Aligned	Nominal Stat
	2962	CIL	VZ MODEM	7804	7804-4K:P10124:ETVRS:7..	MERMAID AVE S.S. 1 E/O W 15 ST	170	1100	OPEN				Aligned	Nominal Stat
	2963	MARINE	VZ MODEM	7801	7801-8V:P54052:CSVRS:9..	DEVON AVE. N.S. 1 E/O EBONY CT.	173	19700		CLOSED	CLOSED	CLOSED	Aligned	Nominal Stat
	2964	MARINE	VZ MODEM	7801	7801-11U:P29757:SFSTS:..	GERRITSEN AVE W.S. 1 S/O AVE U	172	9401		CLOSED	CLOSED	CLOSED	Aligned	Nominal Stat
	2965	MARINE	VZ MODEM	7801	7801-11U:P68953:SFSTS:..	STUART ST. W.S. 1S/O AVE U	172	9400		CLOSED	CLOSED	CLOSED	Aligned	Nominal Stat

PI Data Update Time

Max. Static Data Load Time - S.

### Filters

- Region
- (All)
  - 33kV Feeders
  - 1050 - Fox Hills
  - 1051 - Fresh Kills
  - Bronx
  - Brooklyn
  - Loops New
  - Queens
  - Staten Island

- Alignment - STAR Vs PI
- (All)
  - Aligned
  - Unaligned

- Nominal State - PI
- (All)
  - Nominal State
  - Not Nominal State

Filter by Borough

Nominal Vs Not Nominal Device filter

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# D-SCADA to OMS integration project

## Project Challenges & Lessons Learned

- Challenge -
  - Aging equipment, contacts losing connectivity – Resulted into Chattering of devices
    - More than 100 Operations in a week
    - Feeder breakers also had chattering issues
- Mitigation -
  - Implemented 2 Level of Chatter Filter using Expression Analytics
    - Overhead Reclosers – Max 6 events in an hour, max 12 events in 24 hours
    - Feeder Breakers – Analyze phase currents on every feeder trip/close, if Phase currents reduces/increases than true operations else ignore event
- Results -
  - Only valid Operations being sent to OMS
  - Increased accuracy & Better resiliency of overall system

# Chatter filters

**Kyle**

General Attribute Templates Ports Analysis Templates Notification Rule Templates

Name: SCADA to STAR - Switch A Status  
 Description:  
 Categories: SCADA-TO-STAR  
 Analysis Type:  Expression  Rollup  
 Enable analyses when created from template  
[Create a new notification rule template for SCADA](#)

Example Element: [Queens\Overhead Switches\1009\2768](#)

Generation Mode: Explicit Trigger Event Frame Template: STS-OHSW 3 PH - Switch Position A

Name	Expression	True for	Severity
Variables			
badValue	BadVal(TagVal('Switch Position A', '*'))		
Start triggers			
StartTrigger1	PrevVal('Switch Position A', '*') <> TagVal('Switch Position A', '*') AND Not Set (optional) None		
	PrevVal('Switch Position A', '*') <> TagVal('Switch Position A', '*') AND Not(badValue) and NumOfChanges('Switch Position A', '*-60s', '*') < 6 AND NumOfChanges('Switch Position A', '*-24h', '*') < 12		
End trigger			
EndTrigger	PrevVal('Switch Position A', '*') <> TagVal('Switch Position A', '*') AND Not		

Chatter Filter using NumofChanges Function for Overhead Reclosers

**Feeder Breaker - USA**

General Attribute Templates Ports Analysis Templates Notification Rule Templates

Name: Calculated Feeder Breaker Trip  
 Description: Calculates feeder break trip based  
 Categories: Bank Breaker Notification  
 Analysis Type:  Expression  Rollup  
 Enable analyses when created from template

Example Element: [Queens\Queens 4kV Grids\1012 - Jamaica\145 Rd\145 Rd\\_9125](#)

Name	Expression	Output Attribute
AB	Avg(PrevVal('PH A AMPS', '*'), PrevVal('PH B AMPS', '*'))	Map
BC	Avg(PrevVal('PH B AMPS', '*'), PrevVal('PH C AMPS', '*'))	Map
CA	Avg(PrevVal('PH A AMPS', '*'), PrevVal('PH C AMPS', '*'))	Map
Variable2	//If PrevVal('FDR_BREAKER_152', '*') <> TagVal('FDR_BREAKER_152', '*') AND TagVal('FDR_BREAKER_152', '*') < 5 then 1 else 0	Map
Variable3	If TagVal('Feeder Breaker Delayed Status', '*') = 1 AND (AB < 5 or BC < 5 or CA < 5) then 1 else 0 If TagVal('Feeder Breaker Delayed Status', '*') = 2 AND (AB > 5 or BC > 5 or CA > 5) then 2 else 0	Feeder Breaker C

Chatter Filter comparing Phase Currents for Feeder Breakers



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# Questions?

Please wait for the microphone.  
State your name and company.



# Please remember to...

Navigate to this session in the mobile app to complete the survey.



# Thank you!

“Arise, Awake and Stop not until the goal is reached”

Swami Vivekananda

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