

Brightlayer Utilities suite

Pittsburgh User Group

Feeder Automation

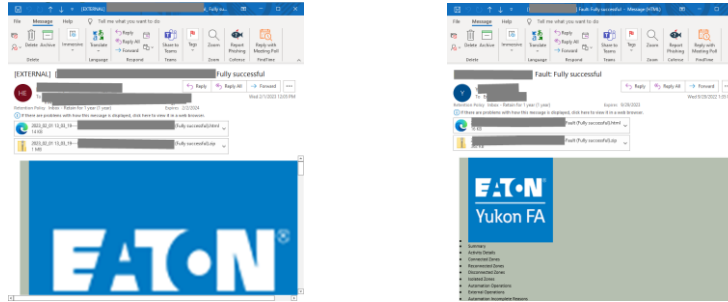
Charlene Ericson – Product Owner
Jasmin Giroux-Maltais – Product Manager

User Group Agenda

- Upcoming 3.3R1
- Buy-a-Feature Game Review
- Roadmap
- Customer use case – Carroll EMC
- Data analytics technologies
- Open Mic

3.3R1 – Coming in May 2023

- Improve Eaton logo embedded in event emails



- New Analog Measurement Shape



- Generic Single-Phase Device

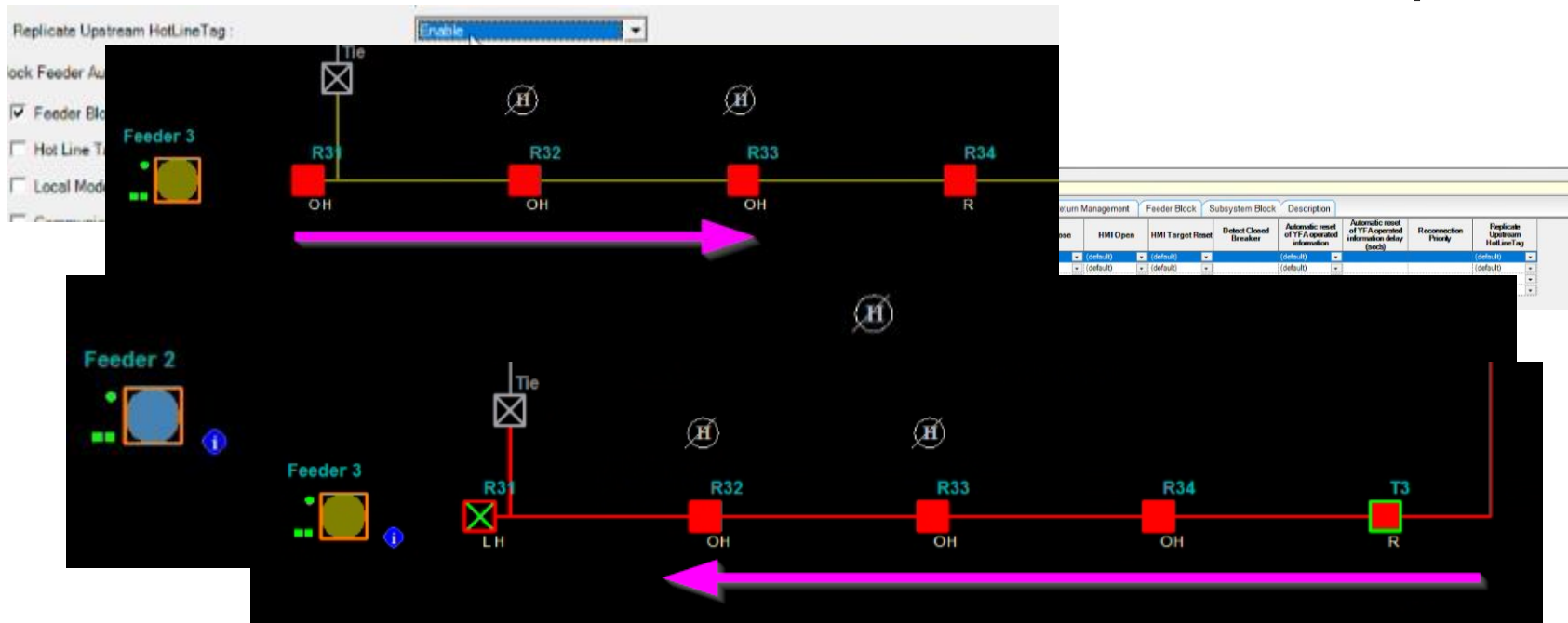
Automation Configuration \ Device Types \ Switching Device

Define all used device types in this table. Device types should be defined before devices.

ID	Control (IED) Type	Fault Capability	Connected Phase	Break Load	Make Load
Form6	Cooper Form 6	Trip and Reclose	All phases	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
▶ PhaseB Device	Generic	Trip and Reclose	Phase B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>

3.3R1 – Coming in May 2023

- Extend HLT isolation to devices without HLT point



3.3R1 – Coming in May 2023

- Global VTD Site

The screenshot displays the YFA Manager software interface. At the top, a banner reads "COOPER POWER SERIES Yukon™ Feeder". The main window has a menu bar with "Server", "Regions", "Events", "Health Reports", and "Options". Below the menu is a toolbar with icons for "Restart", "Stop", "Explorer", "Traces", "Health", and "System Start". A notification window is open in the center, titled "S43 position changed", showing a profile picture of a man named Kaven, an email address ending in "@eaton.com", and a retention policy of "Inbox - Retain for 1 year (1 year)" that expires on "2024-02-04". The notification also states: "Trigger: Feeder Automation Demo.S43_Position - Unable to retrieve historical events. SIM: Device position (open/close)".

In the background, a table of data is visible. The table has columns for "Current" and "13210...". The data rows include:

	Current	13210...		
127	Training Demo.DMS_S41_IC	21.0	SM: Phase C inst. current	2023-02-03 10:35:48.689*
127	Training Demo.DMS_S41_IC_Demand	21.0	SM: Phase C device demand current	2023-02-03 10:35:48.689*
42	Training Demo.DMS_S41_IC_Demand_FA	23.9	YFA: Phase C demand current computed b	2023-02-03 10:35:46.946*
0	Training Demo.DMS_S41_ICFaultMag	0.0	SM: Phase C fault magnitude	2023-02-03 10:23:55.888*
0	Training Demo.DMS_S41_IGFaultMag	0.0	SM: Ground fault magnitude	2023-02-03 10:23:55.888*
37	Training Demo.DMS_S41_Info1	23.4	YFA: Information value 1	2023-02-03 10:35:46.946*

3.3R1 – Coming in May 2023

- Real-Time Monitor Web Solution

Source	Type	Name	Floating Point Value	Integer Value
ComServer	BI	S22_Reclose_Blocked	0	
ComServer	BI	S22_Position	1	
ComServer	BI	S22_Hot_Line_Tag	0	
ComServer	BI	S22_Fault_Ind	0	
ComServer	BI	S22_VoltLoss_Ind	0	
ComServer	BI	S22_SystemFault_Ind	0	
ComServer	BI	S22_Locked_Out	0	
ComServer	BI	S42___CommFail	0	



Buy-a-Feature Game Review

Least purchased features (Nice to haves)

Integrate VTD Log

Closed Loops **\$200**

Auto Update Redundant

Region Log Levels **\$200**

Commissioning Dashboard **\$1000**

Cap Bank Control **\$500**

GIS Import **\$1000**

Mail Authentication **\$200**

Enhanced 1Ph Support

Wide Area Volt and VAR Analysis and Capacitor Bank Control

Tool to assist in commissioning new devices/feeders/subsystems

Import system topology and diagram from GIS system

id

Mo
Ma
Sen

Add an

in to

ones, upon a
with a KW value,
to utility trackouts over a time period


with a KW value, control individual phases, ??

Powering Business Worldwide

Buy-a-Feature Game Review

Most purchased long term feature

Predictive Analysis **\$1800**



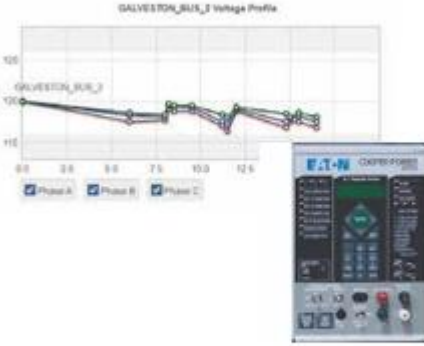
Run "what-if" scenarios periodically to predict success and identify areas for improvement

The screenshot displays a dashboard with a sidebar on the left containing navigation options like 'Home', 'Reports', 'Dashboards', 'Alerts', 'Settings', and 'Help'. The main content area features several data visualization components: a top row of four summary cards with values like '1.5M', '100%', '\$1.2M', and '10'; a central section with a bar chart titled 'Performance by Product Line', a pie chart, and a line chart; and a bottom right corner with a prominent purple card showing the value '1,940'.

Buy-a-Feature Game Review

Most purchased “short term” features

Voltage Control **\$900**



The image shows a screenshot of a software interface displaying a voltage profile graph. The graph is titled "GALVESTON_BUS_2 Voltage Profile" and plots voltage (V) on the y-axis (ranging from 115 to 125) against time on the x-axis (ranging from 0.0 to 12.5). Three data series are shown: "Phase A", "Phase B", and "Phase C". The voltage starts at approximately 120V and fluctuates slightly over time. Below the graph is a photograph of an Eaton controller device with a screen and various buttons.

Wide Area Voltage Analysis and LTC and Regulators Coordinated Control


Full Shared Tie **\$700**



A hand-drawn illustration of a bow tie with a red and white polka-dot pattern.

Allow for an automated tie between subsystems or regions

Simulator Replay **\$300**



A red circular icon containing a white play button symbol and a white circular arrow, representing a replay or refresh function.

Rerun events in the simulator allowing user to make changes and see different results.

Roadmap

- 4.0R1 Q4 2023
 - New product name: Feeder automation manager
 - Licensing with Revenera – You manage your license
 - Prepare for **FUTURE** structure
 - 3 modules
 - Communication bridge (YGS)
 - Reliability (YFA)
 - Power quality (IVVC)



Why those modifications ?

- Shared technology between two software
- Shared R&D resources
- More than just FLISR now
- Prepare for future integration of Volt/Var management
- Eaton standard licensing platform
- Mechanism to convert actual licenses



Roadmap



- 4.0R1 Q4 2023
 - Enterprise Gateway update
 - Additional Master Protocols: IEC 101/104, Modbus, OPC UA
 - Additional Slave Protocols: IEC 104, OPC UA
 - DNP secure authentication V5

Roadmap

- 4.1R1 Q2 2024 – **TBC – Preliminary list**
 - Tie device between subsystems/regions (11699)
 - **Advantage:** You can have smaller subsystem or region
 - **Disadvantage:** The engine will not be able to process two events in parallel anymore if a Tie is shared between two subsystems or regions. On the affected subsystems.
 - Enhanced single phase support (11973)
 - Support of single-phase interconnection when load is unbalanced



AVVC Phase 1&2 – Volt\Var by heuristic (~2025)

- 1st Integration of Voltage Regulators
 - Support of CVR (limited to VR & LTC only)
 - Support of Voltage Management (limited to VR + LTC only)
- 2nd Integration of Capacitor Bank controller
- Supported Functionalities (same as IVVC)
 - CVR, Voltage Management, Peak reduction, Energy reduction, etc.
- Reactive to post event switching operations



Roadmap

- Q4 2024
 - Phase 1
 - Voltage management & CVR using VR and LTCs



Future

- Volt/Var management with Cap Banks
- Enhanced Triple Single support (part1) (12489)
- Allow operations to be executed in parallel on regions (11429)
- Dynamic bus monitoring (998)





New PowerShell Scripts


- Sync Redundant server configuration**
- Populate the Customer Count per zone*
- Find all Bypassed and Out of Service devices**
- Export or Import multiple regions based on a text file**

**Available on demand

*Available in 3.3R1

Single phase device integration

- Select the phase under Device Types

ID	Control (IED) Type	Fault Capability	Connected Phase	B
Form6	Cooper Form 6	Trip and Reclose	All phases	
AutomatedSwitch	S&C 5801	Detect	All phases	
Manual	Manual Switch	None	All phases	
 Spear	Eaton SPEAR	None	All phases	
			Phase A	
			Phase B	
			Phase C	

- Power flow 3Ph to 1Ph
- Limitation on Tie – YFA need same phase on both side (for now)



Data Analytics Technologies

Report Aggregator

- Used by our QA to analyze customer configurations
- Extract the system report file
- Create an excel spreadsheet

	A	B	C	D	E	F	BP	BQ	BR	BS
1	Customer	Server	Region	Parent Subsystem	Source Feeder	ID	Device Automated Reset (sec's)	Zone Load Expiry Timeout (sec's)	Out Of Service	Bypassed
2	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F1	C2_SF1	3600	900	Disabled	Disabled
3	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F1	C1_S11	3600	900	Disabled	Disabled
4	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F1	C1_S12	3600	900	Disabled	Disabled
5	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F1	C1_T12	3600	900	Disabled	Disabled
6	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F2	S22	3600	900	Disabled	Disabled
7	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F2	S21	3600	900	Disabled	Disabled
8	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F2	SF2	3600	900	Disabled	Disabled
9	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F4	SF4	3600	900	Disabled	Disabled
10	Customer1	CASROWHP6097924	Feeder Automation Demo	Sub	F4	MS4	3600	900	Disabled	Disabled

Pro-Tip video available eaton.com/yfa

Power-BI

- Easily extract information from the xml file from the Health report
- A little bit more work is necessary to extract data from the Event folder

Power-BI

Health report Step 1: Get files from Folder

The screenshot shows the Power BI Desktop interface with the 'Get Data' menu open. The menu lists various data sources, and the 'More...' option at the bottom is highlighted with a blue box and a blue arrow pointing to it. A tooltip below the 'More...' option reads 'Connect to data from multiple sources.' The background shows a dashboard with several cards and a donut chart.

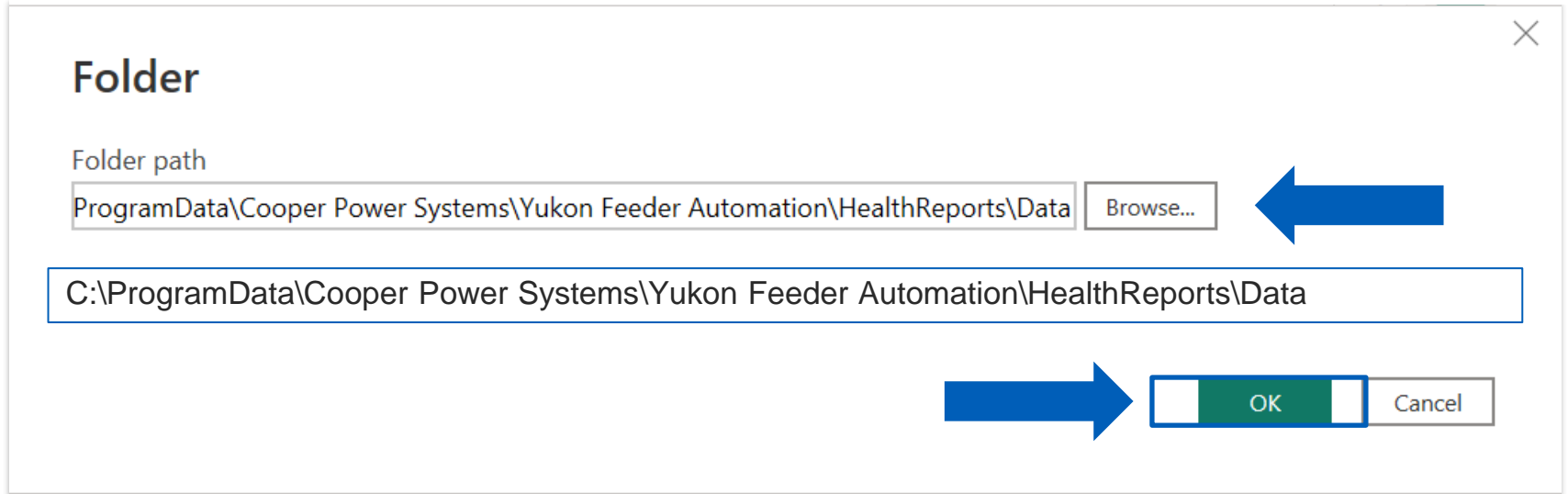
- Common data sources
 - Excel workbook
 - Power BI datasets
 - Dataflows
 - Datawarehouse
 - SQL Server
 - Analysis Services
 - Text/CSV
 - Web
 - OData feed
 - Blank query
 - Power BI Template Apps
 - More... (Connect to data from multiple sources.)

The screenshot shows the 'Get Data' dialog box. The 'Folder' option is selected and highlighted with a blue box and a blue arrow. A tooltip below the 'Folder' option reads 'Import metadata and links about files in a folder.' The dialog box lists various data sources under the 'All' category.

- Get Data
 - Search
 - All
 - Excel Workbook
 - Text/CSV
 - XML
 - JSON
 - Folder (Import metadata and links about files in a folder.)
 - PDF
 - Parquet
 - SharePoint folder
 - File
 - Database
 - Power Platform
 - Azure
 - Online Services
 - Other

Power-BI

Health report Step 1: Get files from Folder



Power-BI

Health report Step 2: Transform data

C:\ProgramData\Cooper Power Systems\Yukon Feeder Automation\HealthReports\Data

Content	Name	Extension	Date accessed	Date modified	Date created
Binary	2023-02-06--145550--Feeder Automation Demo.xml	.xml	2023-05-04 8:32:06 AM	2023-02-06 2:55:51 PM	2023-03-27 8:58:27 AM
Binary	2023-02-06--145611--Feeder Automation Demo.xml	.xml	2023-05-04 8:32:06 AM	2023-02-06 2:56:11 PM	2023-03-27 8:58:27 AM
Binary	2023-04-04--093001--Feeder Automation Demo.xml	.xml	2023-05-04 8:32:06 AM	2023-04-04 9:30:02 AM	2023-04-04 9:30:02 AM
Binary	2023-04-05--093000--PG3_YFAConfig_RevC_20220408....	.xml	2023-05-04 8:32:06 AM	2023-04-05 9:30:00 AM	2023-04-05 9:30:00 AM
Binary	2023-04-14--093000--PG3_YFAConfig_RevC_20220408....	.xml	2023-05-04 8:32:06 AM	2023-04-14 9:30:01 AM	2023-04-14 9:30:01 AM
Binary	2023-04-19--093000--AEP PSO - Henryetta 20231804 R...	.xml	2023-05-04 8:32:06 AM	2023-04-19 9:30:02 AM	2023-04-19 9:30:02 AM
Binary	2023-05-02--093000--Training Demo.xml	.xml	2023-05-04 8:32:06 AM	2023-05-02 9:30:00 AM	2023-05-02 9:30:00 AM
Binary	2023-05-03--111150--Duke DEC - Instance 3.xml	.xml	2023-05-04 8:32:06 AM	2023-05-03 11:11:51 AM	2023-05-03 11:11:51 AM

Power BI Desktop interface showing a table of XML files. A blue arrow points to the 'Transform Data' button in the bottom right corner of the window.

Power-BI

Health report Step 3: Transform to XML

The screenshot shows the Power Query Editor interface. The ribbon includes 'File', 'Home', 'Transform', 'Add Column', 'View', 'Tools', and 'Help'. The 'Transform' tab is active, showing options like 'Choose Columns', 'Remove Columns', 'Keep Rows', and 'Remove Rows'. The main area displays a table with 8 rows and 2 columns: 'Content' and 'Extension'. The 'Content' column contains binary data. A context menu is open over the 'Content' column, with the 'Transform' option selected, and the 'XML' option highlighted. A blue box highlights the 'XML' option. A blue arrow points from the left towards the 'Content' column, and another blue arrow points from the right towards the 'XML' option.

Right-Click on **Content** column

Power-BI – Event report

- Steps 1 and 2 are the same as Health report
- Step 3 needs some more work

Power-BI

Event report Step 3: Decompress the Zip file

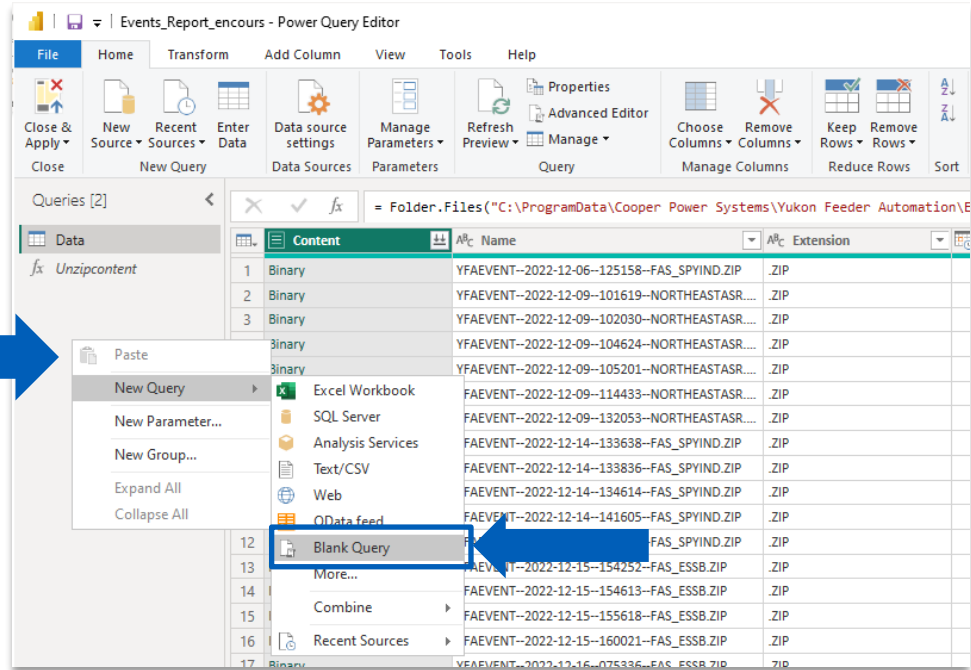
- Steps 1 and 2 are the same as Health report
- Step 3 needs some more work

Power-BI

Event report Step 3: Decompress the Zip file

- First create a new Blank Query

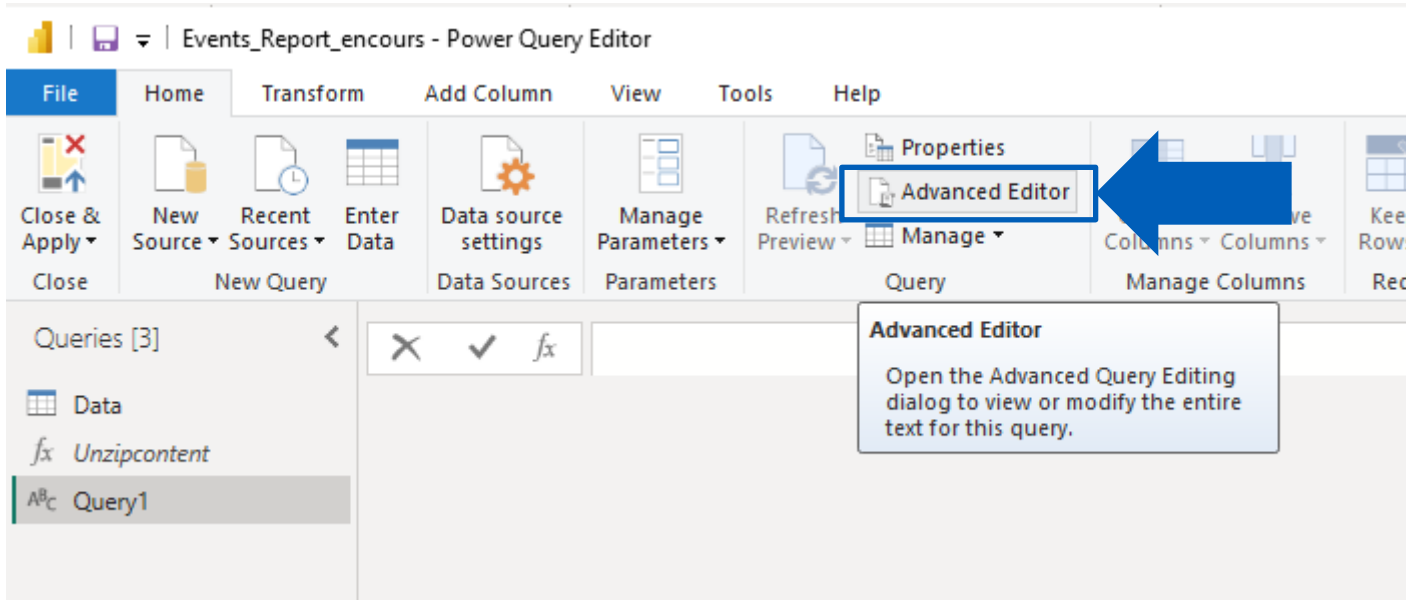
Right-Click



Power-BI

Event report Step 3: Decompress the Zip file

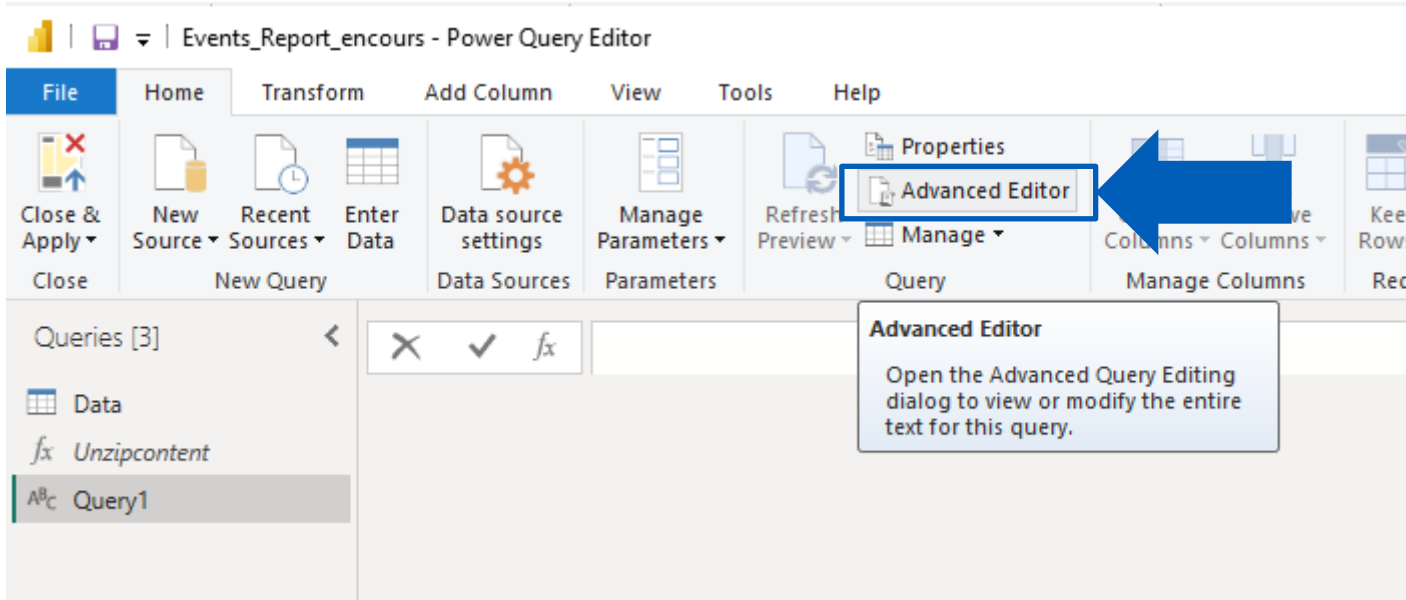
- Second use Advanced Editor



Power-BI

Event report Step 3: Decompress the Zip file

- Second use Advanced Editor



Power-BI

Event report Step 3: Decompress the Zip file

- Replace the white space content with the unzip function from this web site:
<https://github.com/Michael19842/PowerBiFunctions/blob/main/ZipFile/Unzip.m>

Power-BI

Event report Step 3: Decompress the Zip file

Advanced Editor

Query1 Display Options ?

```
// Function build for decompressing a Zip file even if the filelength is missing in the localheader
// More info on zip files here: https://en.wikipedia.org/wiki/ZIP_(file_format)
// Known limitation: If there is a comment appended to the central header then this function will fail. You can use a hex editor to find these comments at the end of the file wicht will be just readable text
(ZipFile as binary) =>
let
    //Load the file into a buffer
    ZipFileBuffer = Binary.Buffer(ZipFile),
    ZipFileSize = Binary.Length(ZipFileBuffer),
    //Constant values used in the query
    CentralHeaderSignature = 0x02014b50,
    CentralHeaderSize = 42,
    LocalHeaderSize = 30,
    // Predefined byteformats that are used many times over
    Unsigned16BitLittleEndian =
        BinaryFormat.ByteOrder(
            BinaryFormat.UnsignedInteger16,
            ByteOrder.LittleEndian
        ),
    Unsigned32BitLittleEndian =
        BinaryFormat.ByteOrder(
            BinaryFormat.UnsignedInteger32,
            ByteOrder.LittleEndian
        ),
    // Definition of central directory header
    CentralDirectoryHeader =
        BinaryFormat.Record(
```

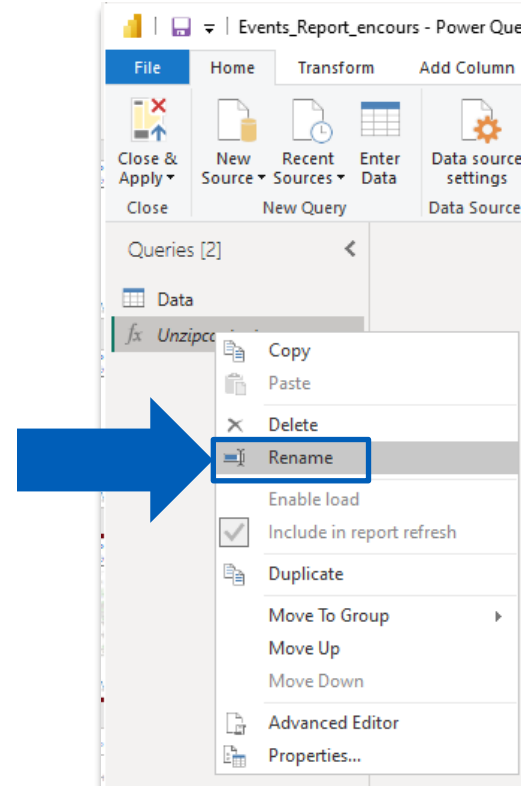
✓ No syntax errors have been detected.

 Done Cancel

Power-BI

Event report Step 3: Decompress the Zip file

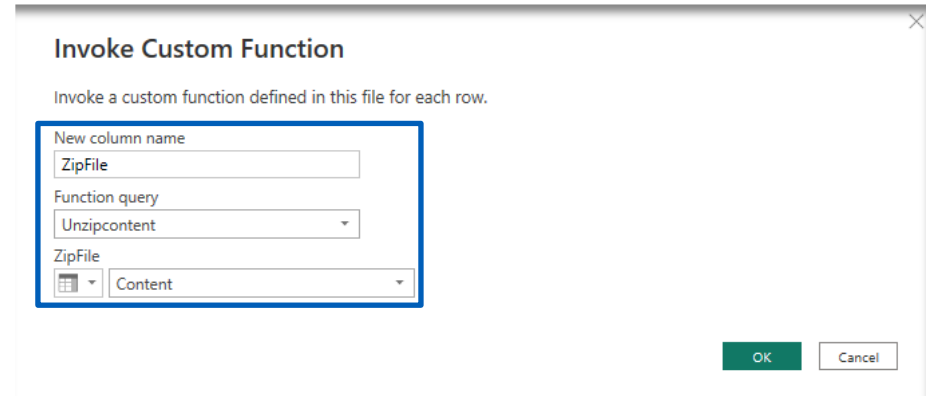
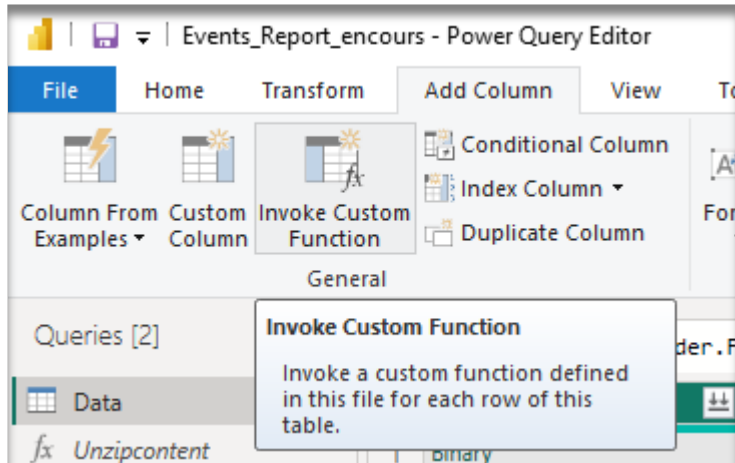
- Use the Rename to name this Query:
Unzipcontent



Power-BI

Event report Step 3: Decompress the Zip file

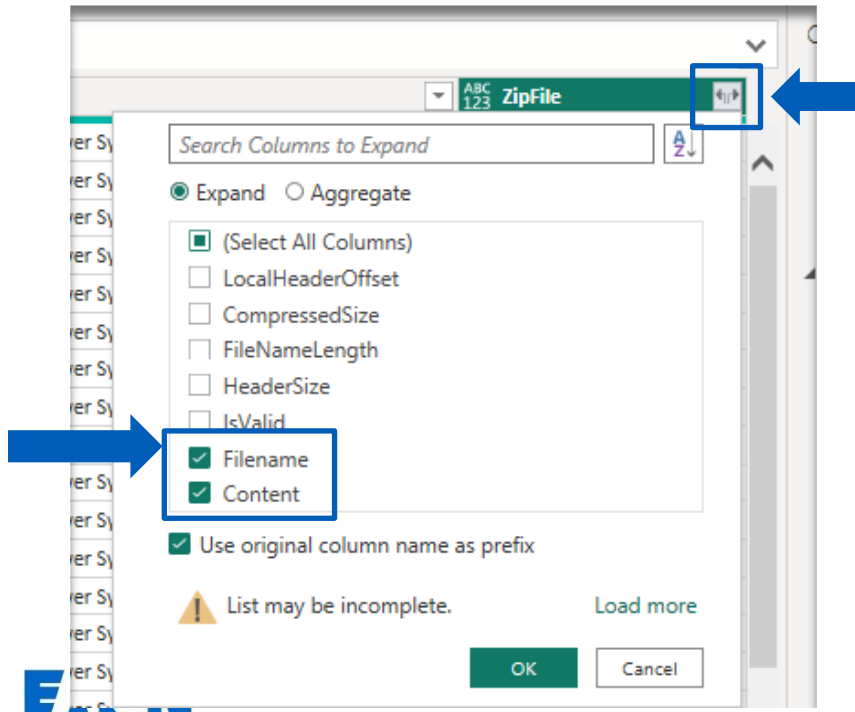
- Invoke the Custom Function



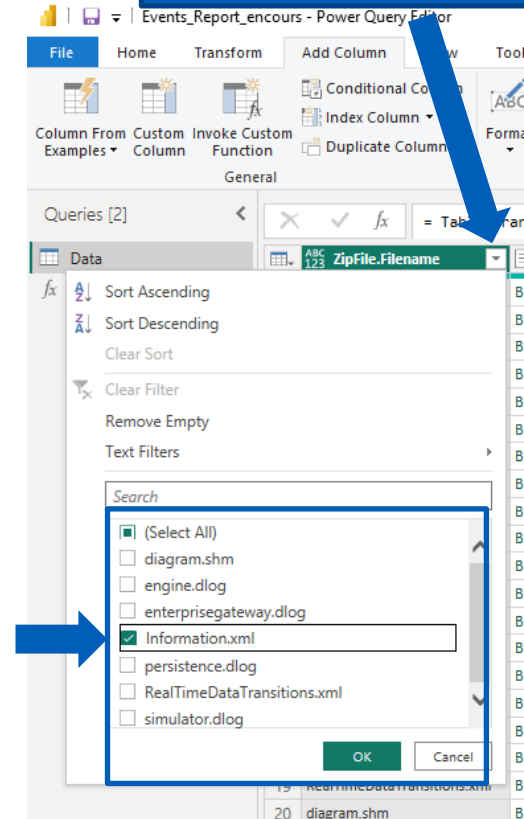
Power-BI

Event report Step 4: Data is **almost** available

- Expand the column



Click on Arrow



Power-BI

Event report Step 5: Data is **now** available

- Transform the XML to a table

```
= Table.SelectColumns("#Expanded ZipFile",{ZipFile.FileName", "ZipFile.Content"})
```

Right-Click on column name

JSON
XML
Text
Text Transforms

Power-BI

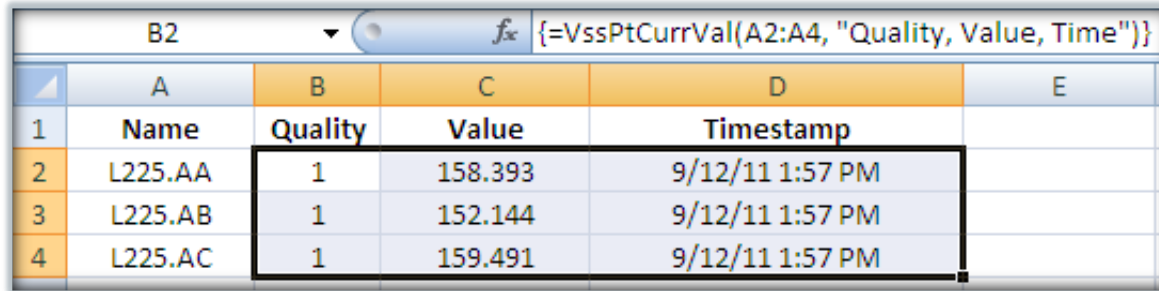
Event report Step 5: Data is now available

fx = Table.ExpandTableColumn("#Parsed XML", "ZipFile.Content", {"Activities", "AutomationIncompleteReasons", "AutomationIncompleteReasonsString", "DurationString",

	ZipFile.FileName	ZipFile.Content.Activities	ZipFile.Content.AutomationIncompleteReasons	ZipFile.Content.AutomationIncompleteReasonsString	ZipFile.Content.DurationString	ZipFile
1	Information.xml	Table	Table	Table	3 minutes and 49 seconds	Return
2	Information.xml	Table	Table	Automation disabled, Other	282 milliseconds	Voltag
3	Information.xml	Table	Table	Automation disabled, Other	101 milliseconds	Voltag
4	Information.xml	Table	Table	Major health problem	76 seconds and 419 milliseconds	Fault, I
5	Information.xml	Table	Table	Major health problem	60 seconds and 466 milliseconds	Fault,)
6	Information.xml	Table	Table	Table	2 minutes and 1 second	Fault,)
7	Information.xml	Table	Table	Table	4 minutes and 39 seconds	Fault
8	Information.xml	Table	Table	External control	10 seconds and 460 milliseconds	Voltag
9	Information.xml	Table	Table	Table	3 minutes and 44 seconds	Return
10	Information.xml	Table	Table	Table	4 minutes and 36 seconds	Return
11	Information.xml	Table	Table	Load limit	79 seconds and 736 milliseconds	Voltag
12	Information.xml	Table	Table	Table	66 seconds and 767 milliseconds	Return
13	Information.xml	Table	Table	Table	108 seconds and 715 milliseconds	Voltag
14	Information.xml	Table	Table	Table	2 minutes and 4 seconds	Voltag
15	Information.xml	Table	Table	Table	64 seconds and 996 milliseconds	Return
16	Information.xml	Table	Table	Table	76 seconds and 868 milliseconds	Return
17	Information.xml	Table	Table	Table	76 seconds and 825 milliseconds	Return
18	Information.xml	Table	Table	Table	81 seconds and 213 milliseconds	Voltag
19	Information.xml	Table	Table	Table	77 seconds and 382 milliseconds	Return
20	Information.xml	Table	Table	Load limit	78 seconds and 984 milliseconds	Voltag
21	Information.xml	Table	Table	Table	75 seconds and 959 milliseconds	Return
22	Information.xml	Table	Table	Load limit	80 seconds and 344 milliseconds	Voltag
23	Information.xml	Table	Table	Table	77 seconds and 260 milliseconds	Return
24	Information.xml	Table	Table	Load limit	18 seconds and 787 milliseconds	Voltag
25	Information.xml	Table	Table	Table	19 seconds and 170 milliseconds	Voltag
26	Information.xml	Table	Table	Table	18 seconds and 439 milliseconds	Return
27	Information.xml	Table	Table	Table	19 seconds and 106 milliseconds	Voltag
28						

Excel Add-In (3.3R1)

- Brings any data points to an Excel spreadsheet
- Real-time data only
 - Historical data: Export to Power-BI feature in Explorer
- See “Visual TD Excel Add-In User Guide”



The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E
1	Name	Quality	Value	Timestamp	
2	L225.AA	1	158.393	9/12/11 1:57 PM	
3	L225.AB	1	152.144	9/12/11 1:57 PM	
4	L225.AC	1	159.491	9/12/11 1:57 PM	

The formula bar at the top shows the function: `=VssPtCurrVal(A2:A4, "Quality, Value, Time")`

Your turn



Topic 1 – Discussion on ADMS integration



Reasons to use YFA with an ADMS ?



What is the best way to integrate YFA to an ADMS ?



What would make it easier ?

Topic 2 – Discussion on an event outcome



How do you use the event outcome ?



Is it true to say you use this as a start to see if there is anything that needs to be investigated ?



What if we add a section in the report to include any issues that occurred during the event ? Would that be useful ?

Questions



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