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Bulletproof Your Dataflows:

Error Handling and Data Quality in Fabric

Cristian Angyal

About me

- **Electrical Engineering background**
- **Former Project Manager** *(PMP®, PMI-ACP®)*
- **Microsoft Certified Professional**

  (DP-600, DP-700, PL-300, MCT, MCSA, MCSE, MOS Master)
- **Romania PBI and Modern Excel UG Founder**

  https://www.meetup.com/*romaniapug*
- **Microsoft MVP (*Excel & Power BI*)**
- **Husband** *(25y+)* and **proud father**
- Love to ski, travel and learn

Cristian Angyal

in/cristian-angyal
https://linktr.ee/cristiangyal

Session Plan

1. Dataflows Gen2 - Short Overview
2. Error Types in Power Query M
3. Handling Errors: try/otherwise, try/catch, structured patterns
4. Cell-Level Errors - Detect, Isolate, Route
5. DEMO - Lakehouse Error Handling in Fabric
6. Centralized Error Log Table
7. Best Practices & Wrap-up

What are Dataflows Gen2?

Data Transformation & preparation engine in Microsoft Fabric

Extract

Connect to 150+ data sources:
Lakehouse, Warehouse, SQL, APIs, Files, SharePoint, and more

Transform

Power Query M: full ETL capabilities
UI-driven or advanced M code editing

Load

Write directly to Fabric Lakehouse,
Data Warehouse, or other destinations

Refresh

Scheduled, on-demand, or triggered
via Fabric Pipeline orchestration

Key differences vs. Power BI Dataflows (Gen1)

- ✅ Native Lakehouse & Warehouse output destinations
- ✅ Staging layer automatic or configurable
- ✅ Fabric Pipeline integration for orchestration and error monitoring

How Power Query M Works

Every M expression must produce exactly one of two outcomes:

✅ A Value

- Scalar: text, number, date, logical
- Structured: list, record, table
- Binary, function, type

❌ An Error

- Expression could NOT produce a value
- Always has 3 components: Reason, Message, Detail
- Can propagate or be caught and handled

🎯 **Today's focus: understanding, catching, routing, and logging errors**

Anatomy of a Power Query Error

Every error in M is a record with 3 fields:

Reason

The error category. Defaults to "Expression.Error" if not specified.
Examples: DataFormat.Error, Expression.Error, DataSource.Error

Message

Human-readable explanation of what went wrong.
Can be a plain string or structured with Message.Format + parameters.

Detail

Additional context. Can be any M value — a record, a list, a table.
This is where you put your custom diagnostic data.

```
// Raising a custom error
error [
    Reason = "DataFormat.Error",
    Message = "Invalid date format in source file",
    Detail = [SourceFile = "sales_2024.csv", ColumnName = "OrderDate", Value = "31/02/2024"]
]
```

Two Types of Errors in Power Query

⛔ STEP-LEVEL Errors

- **Prevents the entire query from loading**
- Data Source Errors - file/DB not found
- Step Formula Errors - syntax, type mismatch
- Precedent Query Errors - upstream failure
- Formula Firewall Errors - privacy level conflicts

In Fabric: these block the Dataflow run and surface as Pipeline activity failures

⚠️ CELL-LEVEL Errors (Value Errors)

- **Does NOT stop the query from loading**
- Data Type Conversion Errors - most common
- Operation Errors - e.g. divide by zero, null ops
- Custom validation errors you raise explicitly

PQ silently replaces errors with null
→ silent data quality issues!
***This is the focus of today's demo**.*

Dealing with Errors in M

Five strategies — choose based on your data quality requirements:

⚠ **Ignore**	*Let PQ silently replace errors with null.* *⚠ Only acceptable if null is a valid value.*
🗑 **Remove**	*Use Table.RemoveRowsWithErrors to delete rows with errors.* *Good when error rows have no salvageable data.*
🔄 **Replace**	*Use Table.ReplaceErrorValues with a default/fallback value.* *Good for non-critical fields with known defaults.*
🎯 **Keep**	*Use Table.SelectRowsWithErrors to isolate error rows.* *Great for building a dedicated error inspection table.*
🛡 **Leverage**	*Use try/otherwise or try/catch to handle errors per-cell and extract structured error data. Most powerful pattern.*

`try … otherwise` - Basic Error Catching

Evaluates an expression; returns the fallback value if it raises an error:

```
// Basic try/otherwise
let
    Result = try Number.FromText("abc") otherwise -1,
    // Returns -1 because "abc" cannot be converted to a number

// In a custom column (very common use case)
    SafeAmount = try Number.FromText([RawAmount]) otherwise null,

// With a meaningful fallback
    SafeDate = try Date.FromText([RawDate]) otherwise #date(1900,1,1)
in
    Result
```

✅ When to use try/otherwise

- You want a fallback value on error
- Errors are expected and acceptable
- Quick, simple, readable code

⚠️ Limitations

- Error information is lost — you only get the fallback
- Cannot log what went wrong or where
- Not suitable for audit/monitoring patterns

`try … catch` - Full Error Record Access

try/catch gives you access to the full structured error record:

```
// try/catch – access the error record
let  SafeConvert = (val as text) =>
        try Number.FromText(val)
        catch (e) => [
                HasError = true,  ErrorReason = e[Reason],
                ErrorMsg = e[Message],  ErrorDetail = e[Detail]?,
                OriginalVal = val ]
in  SafeConvert("abc")
// Returns: [HasError=true, ErrorReason="Expression.Error", OriginalVal="abc"]
```

e[Reason]	e[Message]	e[Detail]?
Error category/type. E.g. "DataFormat.Error"	Human-readable description. Use in error log table.	Structured context data. ? avoids error if null.

`try` - The Error Record Pattern

try alone returns a record with HasError + Value or Error:

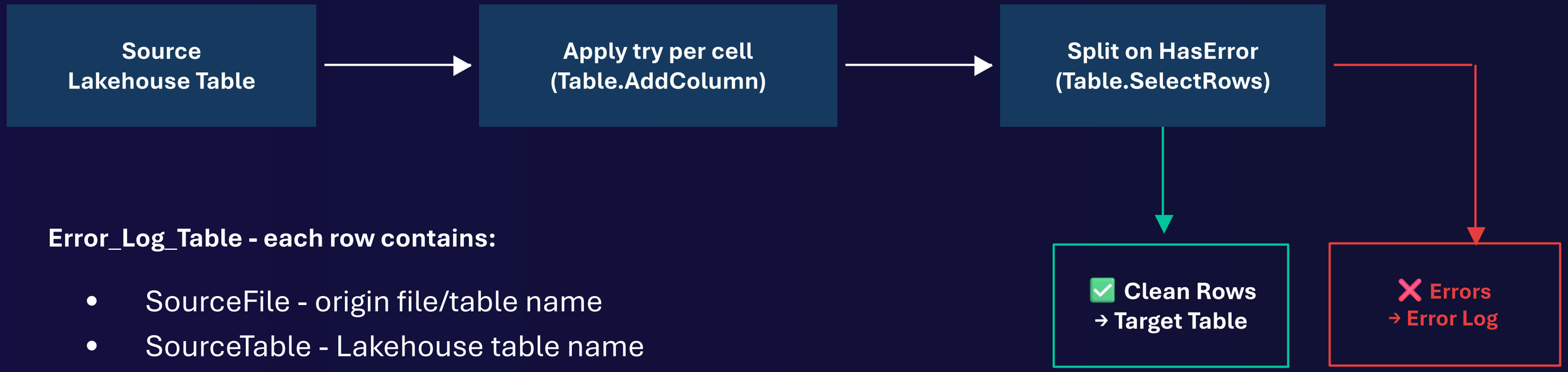
```
// try alone — returns a typed record
let
    Result1 = try Number.FromText("42")
    // Result: [HasError = false, Value = 42, Error = null]

    Result2 = try Number.FromText("abc")
    // Result: [HasError = true, Value = null, Error = [Reason="...", Message="...", Detail=...]]

// Accessing the error fields
    ErrReason  = Result2[Error][Reason],
    ErrMessage = Result2[Error][Message],
    ErrDetail  = Result2[Error][Detail]?
in
    ErrReason
```

💡 **Practical pattern: apply to each cell in a column using Table.AddColumn**

```
// Apply per cell in a column
Table.AddColumn(SourceTable, "TryQty", each try [Quantity])
// Creates a new column with [HasError, Value, Error] record for each row
```

Partial Failure Pattern

Load clean rows to target table AND route errors to audit log — in one Dataflow:



Error_Log_Table - each row contains:

- SourceFile - origin file/table name
- SourceTable - Lakehouse table name
- ColumnName - which column had the error
- ErrorReason - the M error reason
- ErrorMessage - the M error message
- OriginalValue - the raw value that caused the error

Demo

Live Demo

Fabric Dataflows Gen2 — Error Handling & Error Log

⚙️ **Setup**	Fabric Workspace with Lakehouse containing multiple tables with cell-level errors
🔍 **Inspect**	Examine the raw tables - identify which columns have errors and why
🛠️ **Handle**	Build **Dataflow Gen2** with try/catch per-column error catching
✅ **Route**	Split clean rows to target table, errors to Error Log table
📊 **Monitor**	Browse the Error Log table in the Lakehouse with full error context

Monitoring in Fabric: Pipeline + Error Log

Two layers of monitoring for Dataflows Gen2 in production:

Layer 1: Pipeline Activity Status

- Dataflow succeeds or fails at the run level
- Cell-level errors do NOT cause a run failure
- Step-level errors cause run failure → Pipeline can branch on failure
- Use On Failure activity path in Pipeline to trigger alerts or fallback logic

Layer 2: Error_Log_Table (our build)

- Captures cell-level quality errors the Pipeline cannot see
- Queryable from Lakehouse SQL endpoint or Power BI
- Enables Power BI Data Quality dashboard: error trends by source, table, column
- Can trigger alerts via Fabric Activator when error count exceeds threshold

Best Practices for Dataflows Gen2

...learned from the community and production experience

🎯 **PLAN for errors,** don't wait for them to happen	Design error handling into your query architecture from day one. Retrofitting is much harder.
🔒 **Disable Auto-Detect Data Types**	Turn off automatic type detection in Dataflow settings. Apply types explicitly as the LAST step before loading.
🛡 **Use try/catch over try/otherwise** for any monitored column	try/otherwise discards the error. try/catch preserves it for your audit log.
📈 **Set Error Log destination to Append mode**	Never overwrite the error history. Accumulate runs to enable trend analysis.
⏱ **Add LoadTimestamp** to both clean and error tables	Enables partitioning, incremental queries, and time-based analysis in Power BI.
⚙ **Use parameters** for source paths and table names	Parameterize source connections to avoid hard-coded paths that break on environment changes.
⚠ **Don't rename or remove columns** early in the query	Reordering/renaming early causes query fragility. Keep source structure until you need to transform.

Additional Resources

- **Microsoft Docs — M Error Handling** *https://learn.microsoft.com/en-us/power-query/dealing-with-errors*
- **Microsoft Docs — Power Query Error Record** *https://learn.microsoft.com/en-us/powerquery-m/error-record*
- **Fabric Dataflows Gen2 documentation** *https://learn.microsoft.com/en-us/fabric/data-factory/dataflows-gen2-overview*
- **Chris Webb — Power Query error handling deep dive** *https://blog.crossjoin.co.uk/*
- **Ben Gribaudo — M Primer Part 15: Error Handling** *https://bengribaudo.com/blog/2020/01/15/4883*
- **DataChant — Power Query tips** *https://datachant.com/*

Session Summary

1	**Dataflows Gen2 Overview**	ETL engine in Fabric: connect, transform, load to Lakehouse/Warehouse
2	**Error Types**	Step-Level (blocks run) vs Cell-Level (silent data quality risk)
3	**`try/otherwise` vs `try/catch`**	try/catch preserves the full error record - essential for audit logging
4	**Partial Failure Pattern**	Clean rows → destination table Error rows → Error Log table
5	**Error Log Table**	Centralized, append-mode audit table with full context per error
6	**Monitoring**	Pipeline status (step errors) + Error Log (cell errors) = complete coverage

Questions?

I'm happy to dive deeper on any of the patterns we covered

- Can I use this pattern with non-Lakehouse sources (SQL Server, SharePoint)?
- How do I handle errors in nested JSON or complex types in M?
- What happens to error rows when I use incremental refresh?
- Can I build a reusable error-handling function across multiple queries?

Thank You!

Bulletproof Your Dataflows: Error Handling and Data Quality in Fabric

"The goal is not zero errors.

The goal is knowing about every error."

Cristian Angyal

Microsoft MVP

Romania Power BI & Modern Excel UG Founder

meetup.com/romaniapug

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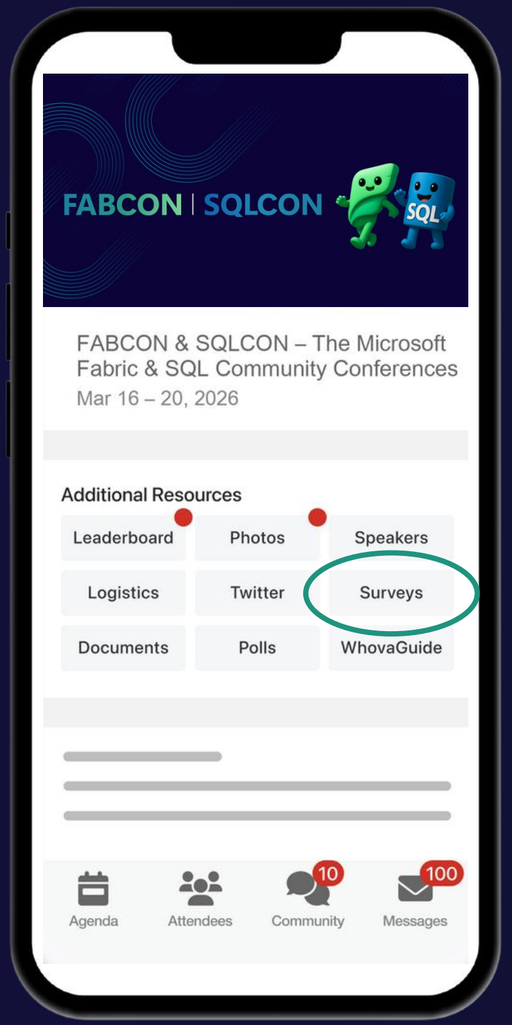

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