Lab 2: Creating a Tumbling Window Trigger in Azure Data Factory

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🎯Learning Objective

By the end of this lab, the learner will understand:

- What a Tumbling Window Trigger is.
- How tumbling windows work in time blocks.
- Why tumbling windows are used for time-series or batch-based data processing.
- How to create and configure a Tumbling Window Trigger step-by-step.
- How to attach it to a pipeline.

🛼Learning Outcome

After completing this lab, the learner will be able to:

- Build automated time-window-based pipelines.
- Configure window size, start time, recurrence, and retry policies.
- Monitor each window execution in ADF.
- Understand how missed windows can be re-run automatically.

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1. Concept: What is a Tumbling Window Trigger?

A **Tumbling Window Trigger** is a trigger type that runs a pipeline based on **fixed, non-overlapping time windows**.

Each window represents an exact block of time:

- 1 PM to 2 PM → Window 1
- 2 PM to 3 PM → Window 2
- 3 PM to 4 PM → Window 3

A key feature is that **each window runs exactly once**, and if any window fails or is missed, Azure Data Factory can **automatically re-run that specific window**.

This makes tumbling windows perfect for:

- Time-series data
- Hourly log processing
- Daily partitions
- Any scenario that needs reliable, window-based data movement

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2. Hands-On Lab: Creating a Tumbling Window Trigger

This lab is kept very simple and clean, specially designed for beginners.

Step 1: Open Azure Data Factory Studio

1. Go to Azure Portal.
2. Open your Azure Data Factory resource.
3. Click **Open Azure Data Factory Studio** (or **Author & Monitor**).

Step 2: Create or Select a Pipeline

If you already have a pipeline, you can use it.

If not, create a simple test pipeline:

1. Click **Author**.
2. Click **+ Add** → **Pipeline**.
3. Name it: `PL_TumblingWindowDemo`.
4. Add a basic **Wait** activity.
5. Click **Publish All**.

Step 3: Create a Tumbling Window Trigger

1. Click **Manage** (gear icon).
2. Select **Triggers**.
3. Click **+ New**.
4. Choose **Tumbling Window** → Continue.

Now the configuration screen will open.

Step 4: Configure the Tumbling Window Trigger

Fill in the details:

- **Name:** `TR_TumblingWindow_Hourly`
- **Description:** "Runs the demo pipeline every hour in fixed time windows"
- **Type:** Tumbling Window

Window Start Time

Choose:

- Today's date
- Set time to the next full hour (Example: If it's 1:23 PM, choose 2:00 PM).

Window Size

- **1 Hour** (this means each window = 1 hour block)

Recurrence

- Set to 1 (per window size)

Retry Policy (Optional)

You may enable automatic retries for failed windows:

- Retry count: 3
- Retry interval: 30 seconds

Click **Next**.

Step 5: Attach Trigger to the Pipeline

1. Select pipeline: `PL_TumblingWindowDemo`
2. Click **OK**.
3. Click **Publish All**.

Your tumbling window trigger is now active.

Step 6: Test the Trigger (Optional)

Tumbling window triggers cannot be manually triggered like schedule triggers because they follow strict time windows.

But you can test it by:

1. Waiting for the next window time.
2. Or temporarily changing the start time to the current time + 1 minute.

Step 7: Monitor Window Runs

1. Go to **Monitor**.
2. Select **Trigger Runs**.
3. Choose your tumbling window trigger.
4. You will see each window instance separately.

Each window will show:

- Start time
- End time
- Status

If a window fails, ADF can automatically retry or allow you to re-run that specific window.

🎉Congratulations!

You have successfully created and configured a **Tumbling Window Trigger** in Azure Data Factory.

This type of trigger is essential when you work with:

- Time-partitioned data
- Batch processing
- IoT time-series flows
- Log and telemetry patterns