ISLANDS OF DATA: CONNECTING STUDENT RETENTION TO THE NATIONAL STUDENT CLEARINGHOUSE

TEXAS A&M UNIVERSITY – CORPUS CHRISTI

Agenda

- Intuitional Background
- Institutional Data Need and Planning
- Data Collection, Database Creation and Validation
- Next Steps

TEXAS A&M UNIVERSITY – CORPUS CHRISTI

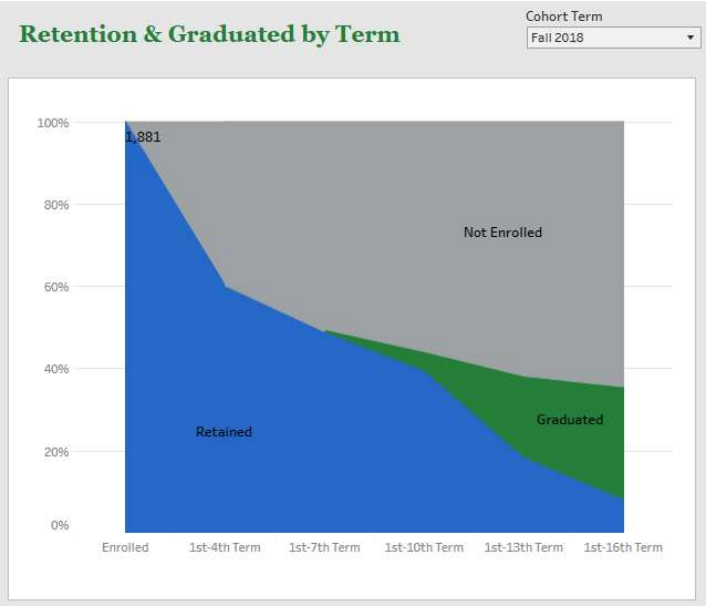
- "The Island University"
- Established in 1947
- Research II Institution
- Hispanic Serving Institution (HSI)
- 6 colleges and 1 school
- Fall 2024 Enrollment: 11,266
- Offer bachelor's, master's, and doctoral degrees

PAIRS –TAMUCC
(Planning, Analytics, Institutional Research, & Strategic Initiatives)

Three Areas

- Planning and Institutional Research
- Analytics
- Strategic Initiatives

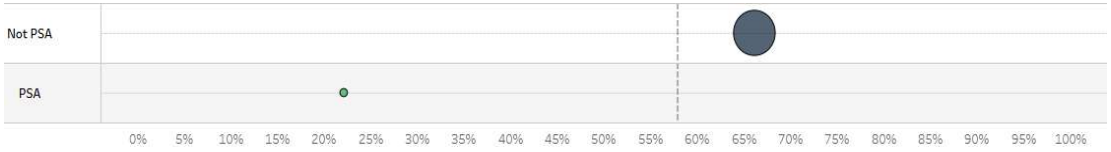
Institutional Need



Where do these students go?

- TAMU-CC participates in the Program for System Admission (PSA) within the TAMU system
  - High Transfer-out rate (41% vs. 6-year Grad Rate = 40%)

University Retention Rate	PSA Student Retention Rate	Non-PSA Student Retention Rate
60.2%	22.9%	67.3%



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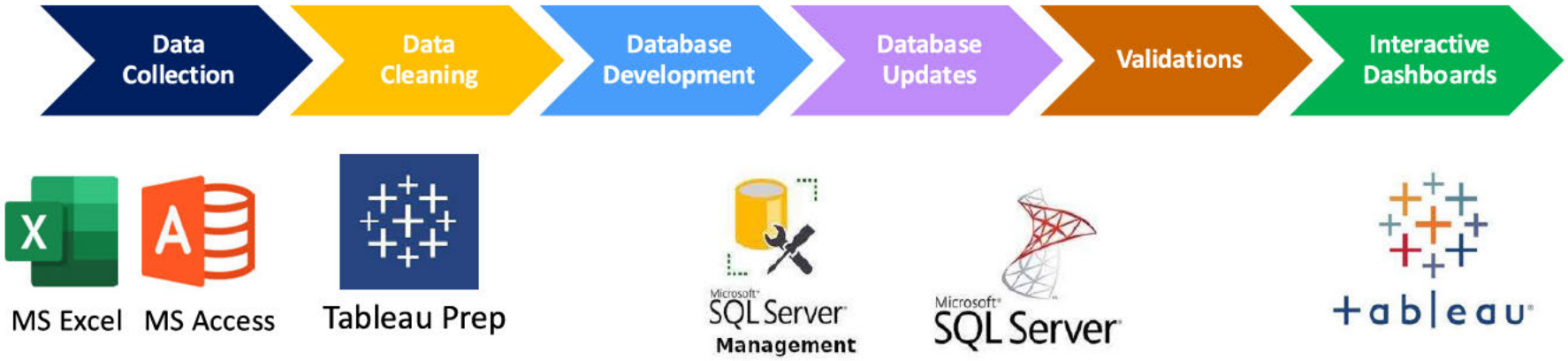
PLANNING PROCESS

Process Overview

- Data sources:
  - TAMU-CC Retention Database
  - National Student Clearinghouse
- Tools for collection, clean-up, development, validation, and analysis



PLANNING & DECISION-MAKING

- Subsequent Enrollment NSCH submissions using our existing Retention Database
  - Use the detailed file – multiple lines per student
  - Determine the dates for each subsequent enrollment term
- Establish rules to determine which student record to use

Record	Search	College Code	College Name	College	2-year /	Public /	Enrollment Beg	Enrollment E
Y	20180915	011161-00	TEXAS A&M UNIVERSITY - CORPUS CHRISTI	TX	4	Public	20180827	20181205
Y	20180915	011161-00	TEXAS A&M UNIVERSITY - CORPUS CHRISTI	TX	4	Public	20190114	20190418
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20190826	20191215
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20200121	20200517
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20200601	20200809
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20200824	20201213
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20210119	20210516
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20210601	20210808
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20210823	20211212
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20220118	20220515
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20220531	20220808
Y	20180915	012015-00	AUSTIN COMMUNITY COLLEGE DISTRICT	TX	2	Public	20230821	20231210

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DATA COLLECTION

Data Collection

NSCH - Data Collection Process

Step 1: Pull Data from NSCH (Excel)

National Student Clearinghouse®

Step 2: Retention Database (historical_cbm0c1 & historical_cbms)

- Tracks undergraduate through doctorate cohorts
- Cohort Types
- 24 semesters/8 years
- Retention/Graduation by:
  - College
  - Department
  - Major

Step 3: Data Cleaning

Step 4: Store Data in NSCH Database

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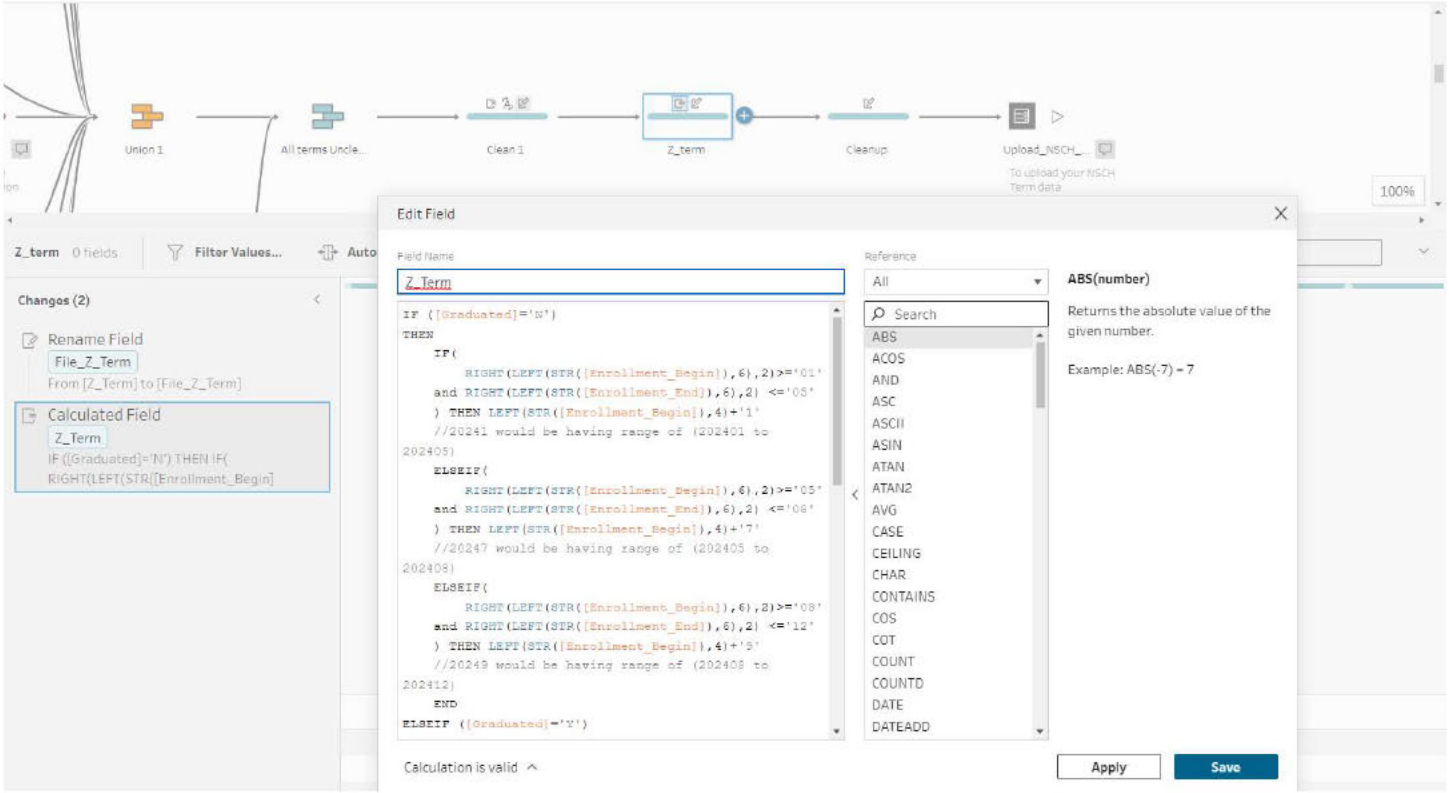
DATA CLEANING

Data Cleaning

NSCH - Data Cleaning Process

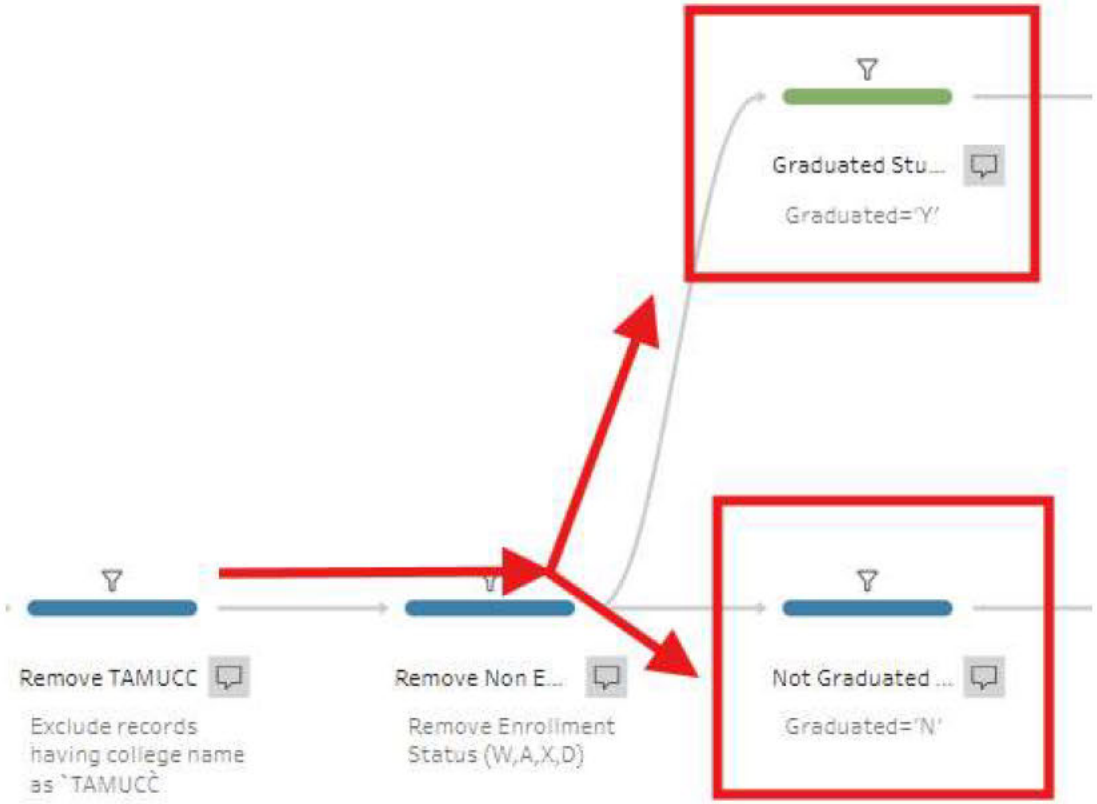
Step 1: Collect data from different terms and combine them (UNION in Tableau Prep).
Step 2: Initial data cleaning: Rename columns.
Step 3: Create calculated fields for 'Z_Term' (based on enrollment/graduation dates).
Step 4: Push into DB as *'NSCH return uncleaned all terms.'*



PREPARATION AND CLEANUP FOR NSCH DATA

- **Prep-Initial Cleanup:**
- Remove TAMU-CC records.
- Exclude non-enrolled statuses (W, A, X, D).

- Filter for Not Graduated (Graduated = N).
- **Prep for Not Graduated Records:**
- Create calculated fields for Start_Date and End_Date (based on Z_Term).
- Filter invalid enrollments using Enrollment Checker.



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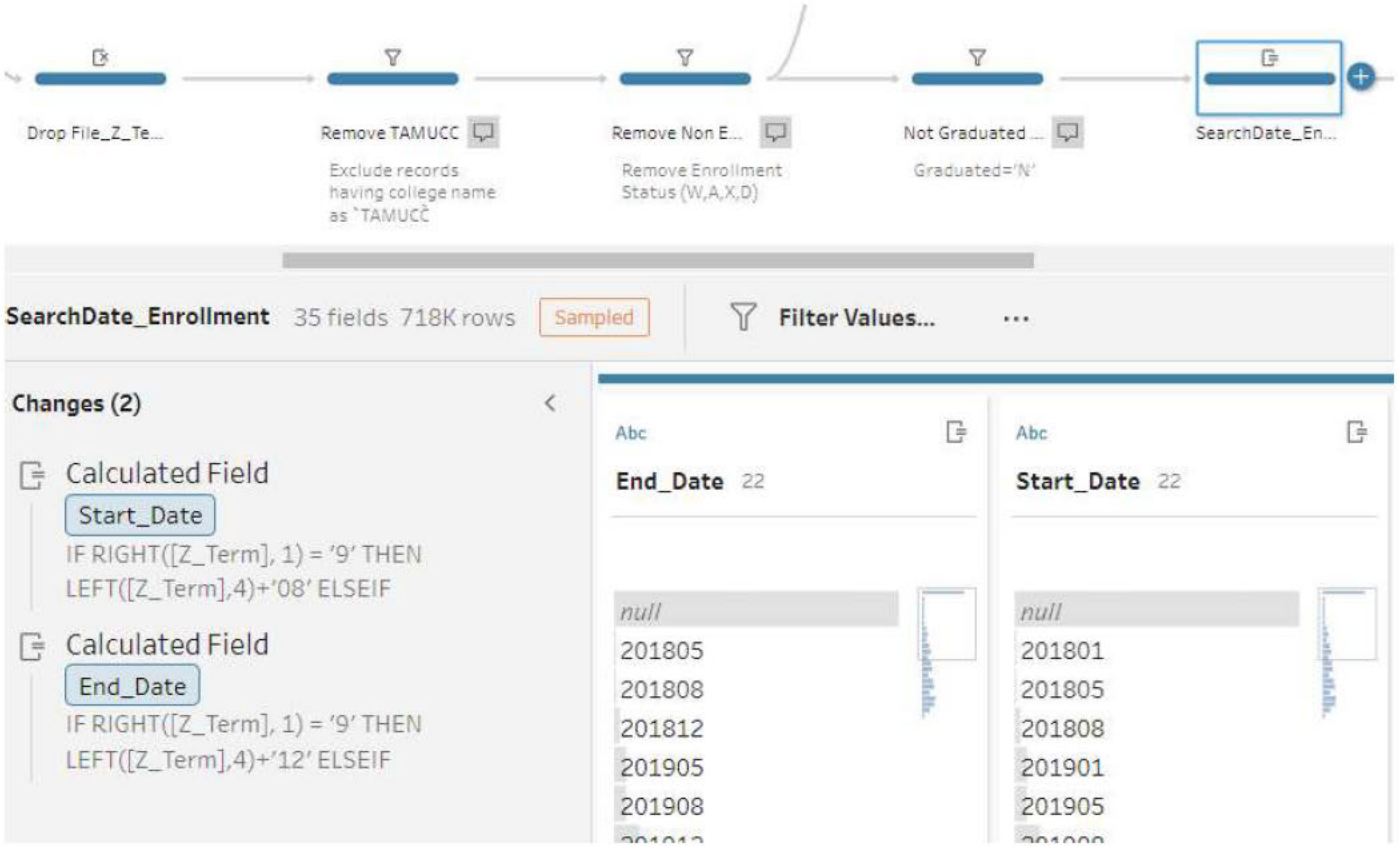

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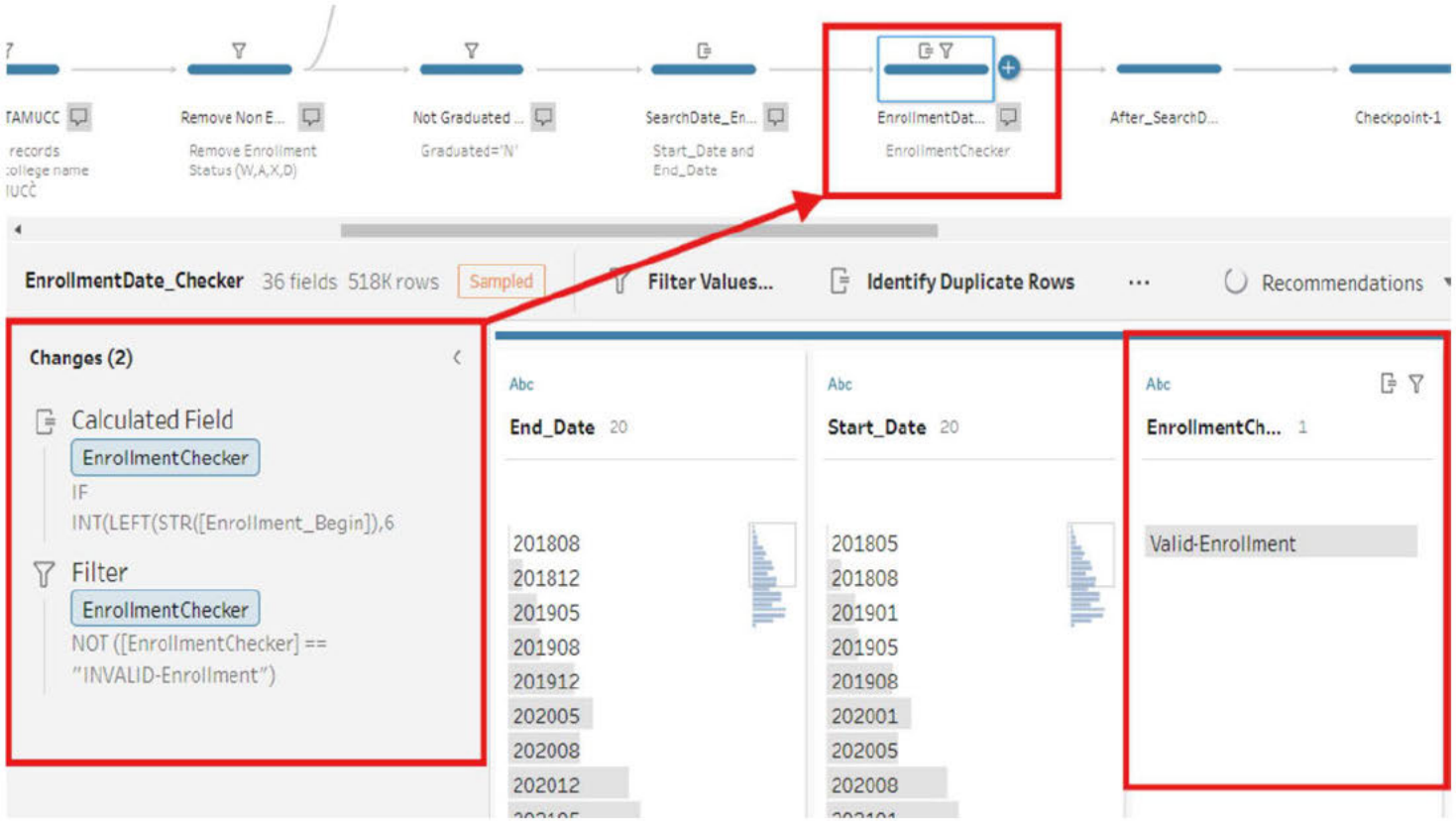
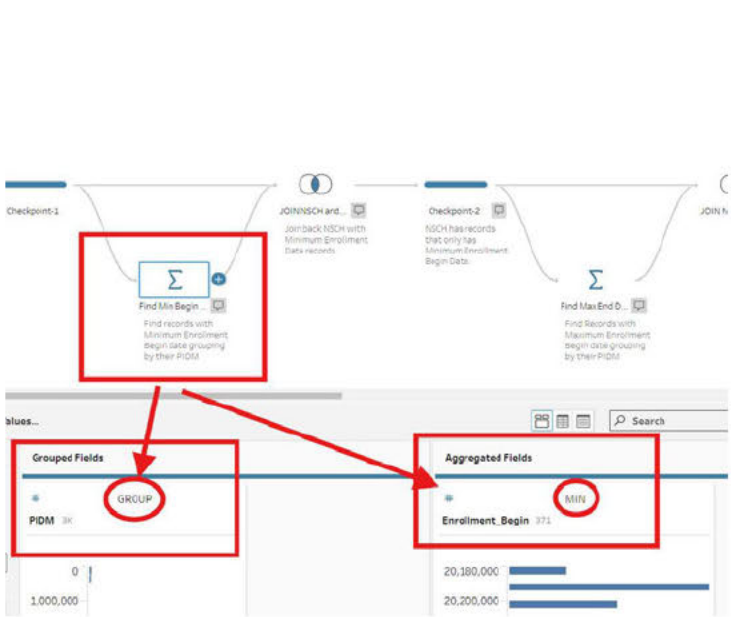
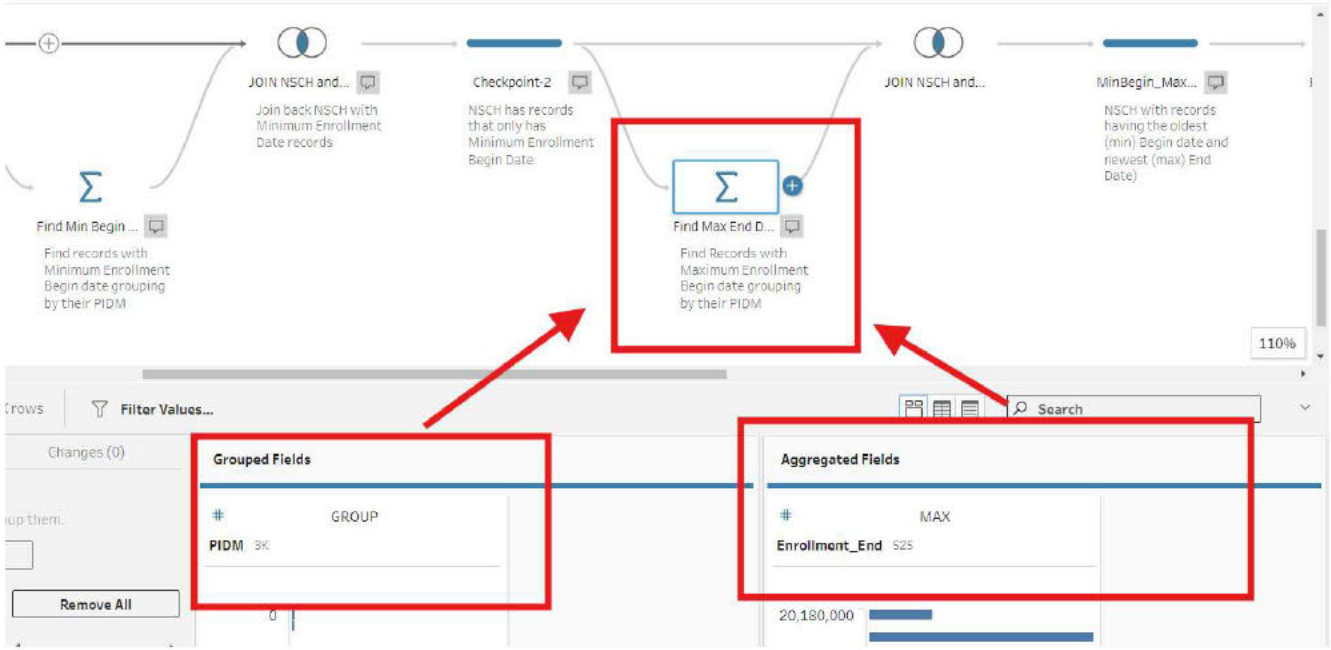


PREPARATION AND CLEANUP FOR NSCH DATA

AGGREGATION AND JOINING – Not Graduated Records

- Aggregate Records:
  - Minimum Enrollment Begin Dates (grouped by Z_Term & PIDM).
  - Maximum Enrollment End Dates (grouped by Z_Term & PIDM).
- Inner Joins:
  - Minimum/Maximum Enrollment Dates with NSCH data.
- Remove Duplicate Records





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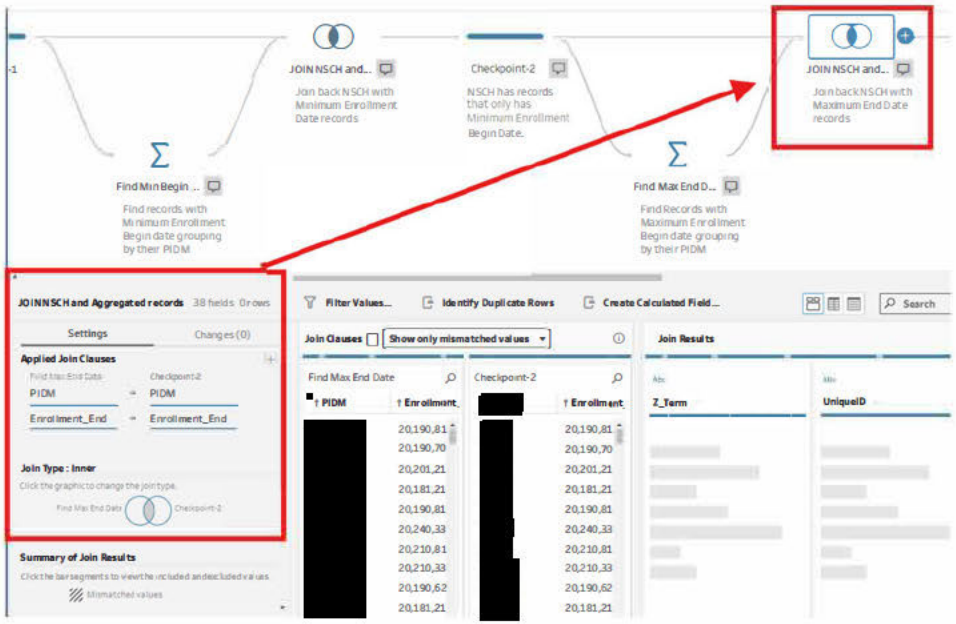
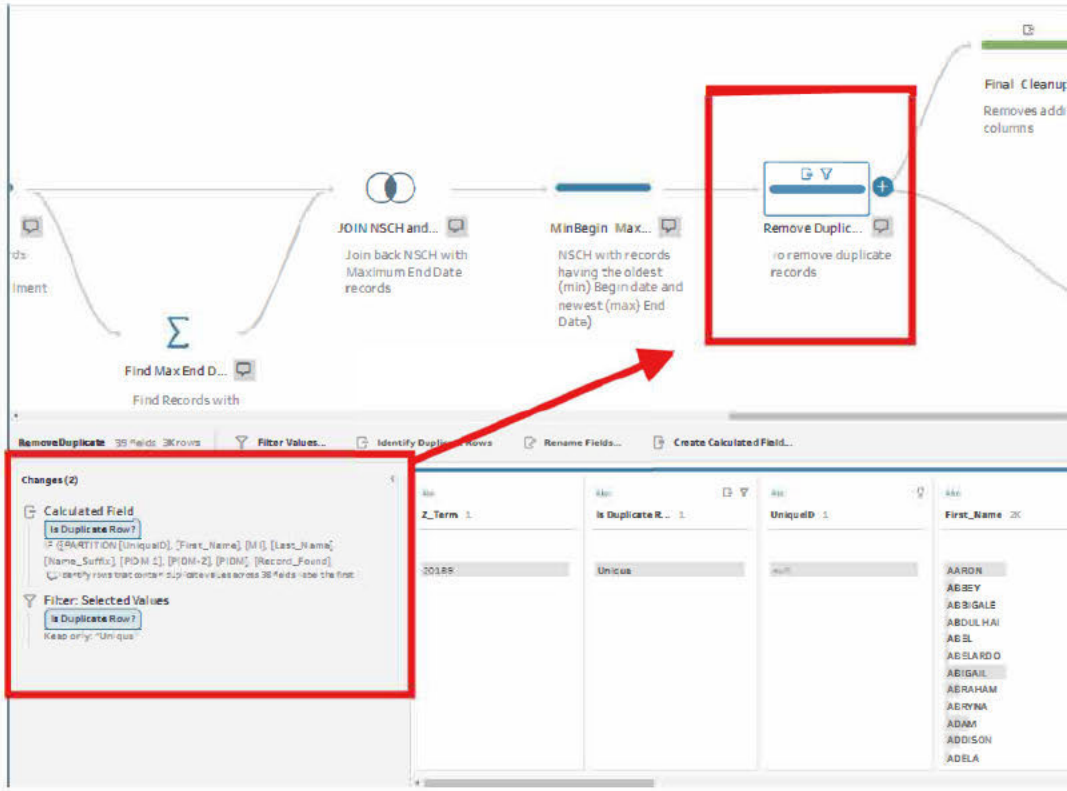
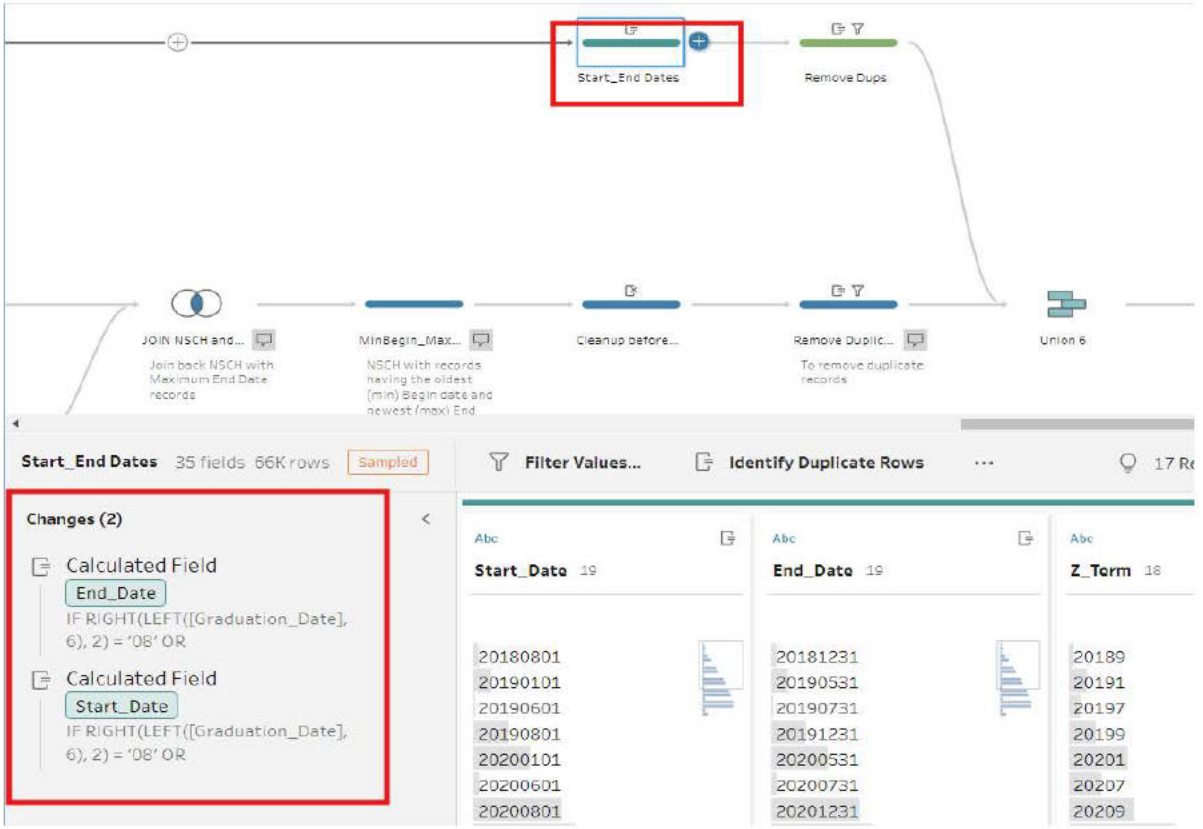




PREPARATION AND CLEANUP FOR NSCH DATA

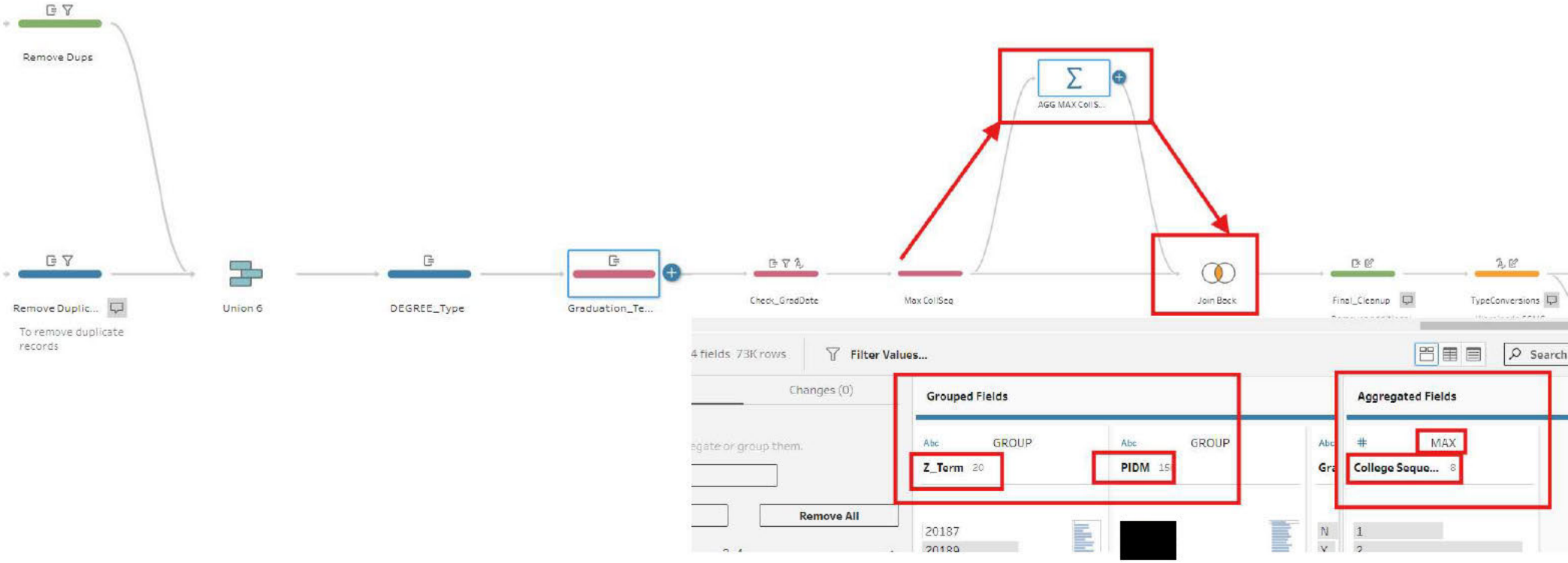
Prep for Graduated Records:

- Filter for Graduated Records (Graduated = Y).
- Create calculated fields for **Start_Date** and **End_Date** (based on **Graduation_Date**).
- Remove Duplicate Records.



COMBINING AND CLEANUP FOR NSCH DATA

- **Union Steps:** Combine NSCH Graduated and Not Graduated Records.
- **Create Calculated Fields:**
- Degree_Type (from Degree_Title).
- Graduation_Term (from Graduation_Date).
- Check_GraduationDate (validations: Graduated=N, Y, etc.).
- Aggregate maximum College Sequence by Z_Term & PIDM.



SQL SERVER STEPS

- Append new term data to **'NSCH_all_terms_cleaned'**. (From Tableau Prep to the Database)
- Sort NSCH Term data by key attributes (State, 2/4 yr., Public/Private, Graduated) into a '**NSCH_all_terms_ordered**'.
- Insert data into **Retention_NSCH**.
- Run updates for new term data.
- Validation and investigation queries.

DATABASE OBJECTS OF THE PROJECT

Validate record counts across key tables:

- Retention_final.
- NSCH_return_uncleaned_all_terms.
- NSCH_all_terms_cleaned.
- NSCH_all_terms_ordered.
- Retention_NSCH.
- Investigate issues using dedicated queries.

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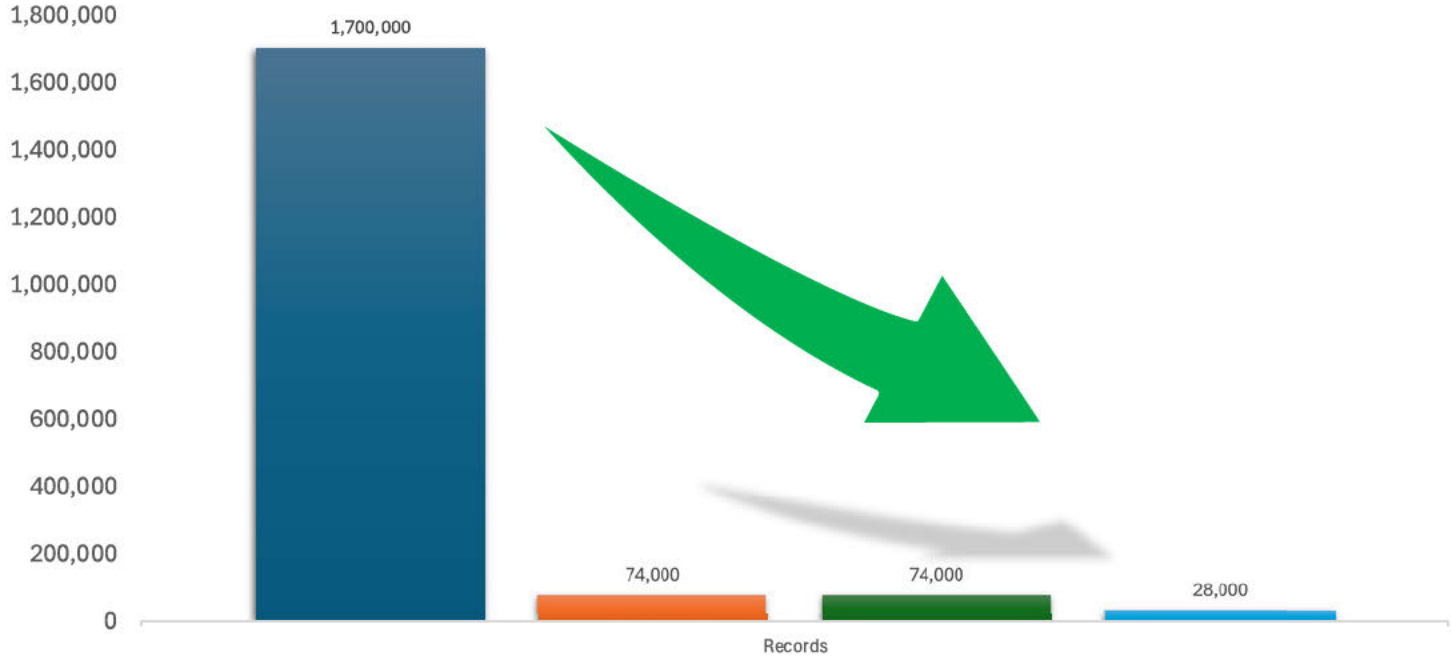
DATABASE DEVELOPMENT & UPDATES

Database Development

NSCH – Database Development



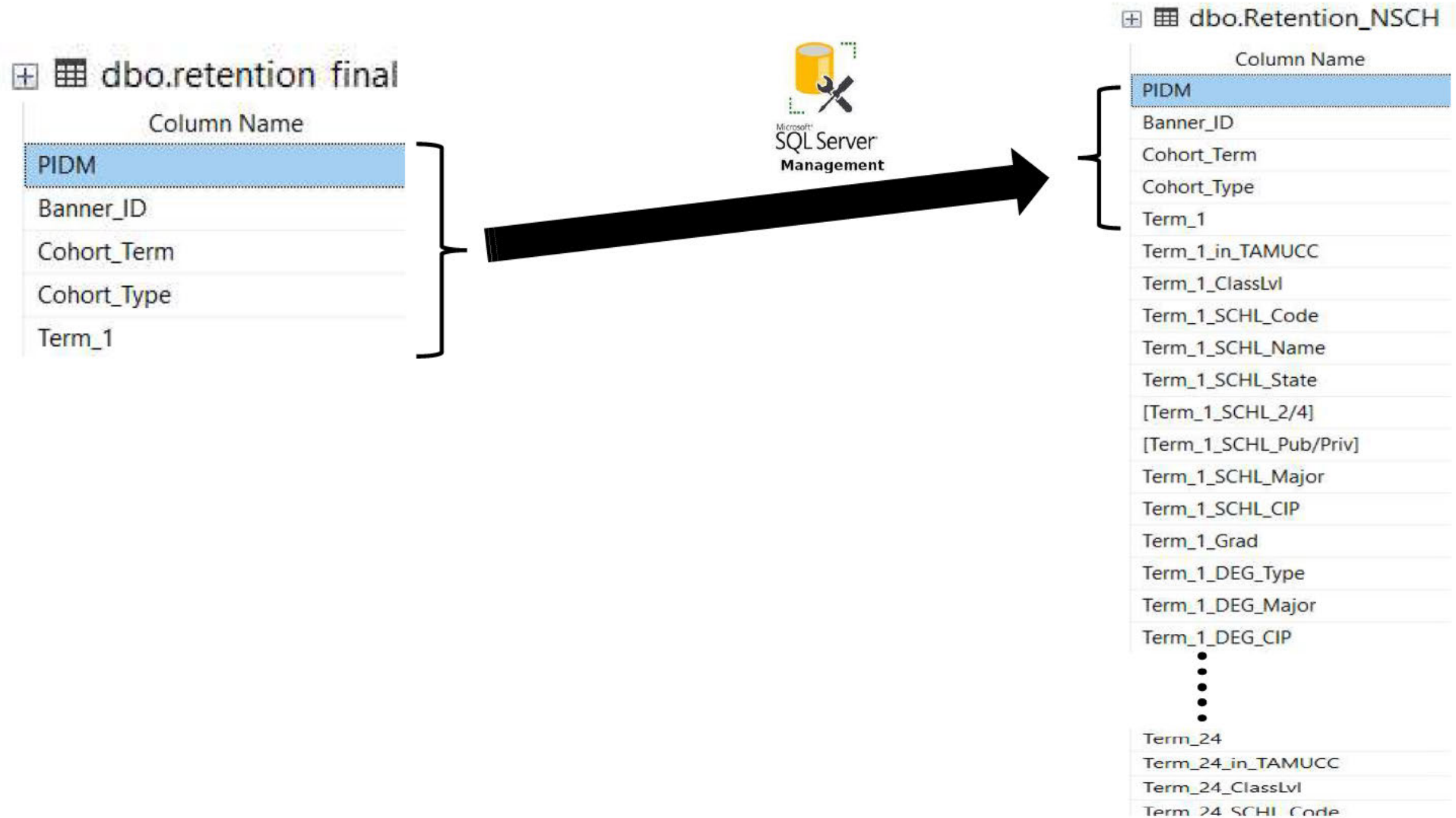
Key Database objects:

Retention_final	
NSCH_return_uncleaned_all_terms	1,700,000
NSCH_all_terms_cleaned	74,000
NSCH_all_terms_ordered	74,000
Retention_NSCH	28,000

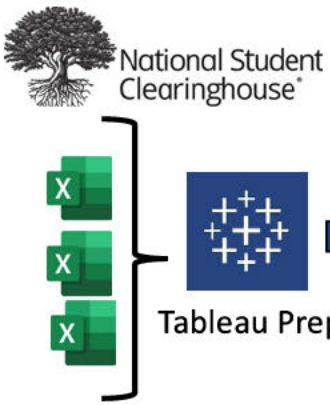
Microsoft SQL Server Management

Microsoft SQL Server

NSCH – DB Object Schema



NSCH – DB Overview



dbo.NSCH_return_uncleaned_all_terms

Column Name
Z_Term
File_Z_Term
[Your Unique Identifier]
First_Name
Middle_Initial
Last_Name
NameSuffix
PIDM
[Record Found Y/N]
Search_Date
College_Code_Branch
College_Name
College_State
[2_4_year]
Public_Private
Enrollment_Begin
Enrollment_End
Enrollment_Status
[Class Level]
[Enrollment Major 1]
[Enrollment CIP 1]
[Enrollment Major 2]
[Enrollment CIP 2]
Graduated
Graduation_Date
[Degree Title]
[Degree Major 1]
[Degree CIP 1]
[Degree Major 2]
[Degree CIP 2]
[Degree Major 3]
[Degree CIP 3]
[Degree Major 4]
[Degree CIP 4]
[College Sequence]

Tableau Prep

dbo.NSCH_all_terms_cleaned
dbo.NSCH_all_terms_ordered

Column Name
Z_Term
[Your Unique Identifier]
First_Name
Middle_Initial
Last_Name
NameSuffix
PIDM
[Record Found Y/N]
Search_Date
College_Code_Branch
College_Name
College_State
[2_4_year]
Public_Private
Enrollment_Status
Class_Level
[Enrollment Major 1]
[Enrollment CIP 1]
[Enrollment Major 2]
[Enrollment CIP 2]
Graduated
Graduation_Date
[Degree Title]
[Degree Major 1]
[Degree CIP 1]
[Degree Major 2]
[Degree CIP 2]
[Degree Major 3]
[Degree CIP 3]
[Degree Major 4]
[Degree CIP 4]
College_Sequence
Enrollment_Begin
Enrollment_End

SQL Server Management

SQL Server Management

dbo.Retention_NSCH

Column Name
PIDM
Banner_ID
Cohort_Term
Cohort_Type
Term_1
Term_1_in_TAMUCC
Term_1_ClassLvl
Term_1_SCHL_Code
Term_1_SCHL_Name
Term_1_SCHL_State
[Term_1_SCHL_2/4]
[Term_1_SCHL_Pub/Priv]
Term_1_SCHL_Major
Term_1_SCHL_CIP
Term_1_Grad
Term_1_DEG_Type
Term_1_DEG_Major
Term_1_DEG_CIP
⋮
Term_24
Term_24_in_TAMUCC
Term_24_ClassLvl
Term_24_SCHL_Code

NSCH – Database Updates

Sorting NSCH_all_terms_cleaned to NSCH_all_terms_ordered, to populate Retention_NSCH with appropriate records!

⊞ dbo.NSCH_all_terms_cleaned


```
ORDER BY
Z_term,
   CASE
        WHEN nsch_all.College_State = 'TX' THEN
            CASE
                WHEN nsch_all.[2_4_year]='4' AND nsch_all.[Public_Private]='Public'  THEN 1
                WHEN nsch_all.[2_4_year]='4' AND nsch_all.[Public_Private]='Private' THEN 2
                WHEN nsch_all.[2_4_year]='2' AND nsch_all.[Public_Private]='Public'  THEN 3
                WHEN nsch_all.[2_4_year]='2' AND nsch_all.[Public_Private]='Private' THEN 4
            END
        WHEN nsch_all.[2_4_year]='4' AND nsch_all.[Public_Private]='Public' THEN
            CASE
                WHEN nsch_all.College_State = 'LA'   THEN 5
                WHEN nsch_all.College_State = 'AR'   THEN 6
                WHEN nsch_all.College_State = 'OK'   THEN 7
                WHEN nsch_all.College_State = 'NM'   THEN 8
                ELSE  9
            END
        WHEN nsch_all.[2_4_year]='4' AND nsch_all.[Public_Private]='Private' THEN
            CASE
                WHEN nsch_all.College_State = 'LA'   THEN 10
                WHEN nsch_all.College_State = 'AR'   THEN 11
                WHEN nsch_all.College_State = 'OK'   THEN 12
                WHEN nsch_all.College_State = 'NM'   THEN 13
                ELSE  14
            END
        WHEN nsch_all.[2_4_year]='2' AND nsch_all.[Public_Private]='Public' THEN
            CASE
                WHEN nsch_all.College_State = 'LA'   THEN 15
                WHEN nsch_all.College_State = 'AR'   THEN 16
                WHEN nsch_all.College_State = 'OK'   THEN 17
                WHEN nsch_all.College_State = 'NM'   THEN 18
                ELSE  19
            END
        WHEN nsch_all.[2_4_year]='2' AND nsch_all.[Public_Private]='Private' THEN
            CASE
                WHEN nsch_all.College_State = 'LA'   THEN 20
                WHEN nsch_all.College_State = 'AR'   THEN 21
                WHEN nsch_all.College_State = 'OK'   THEN 22
                WHEN nsch_all.College_State = 'NM'   THEN 23
                ELSE  24
            END
    END,
    College_State;
```

⊞ dbo.NSCH_all_terms_ordered

Dynamic SQL – for Data Loading and Updates in Retention_NSCH

How Dynamic SQL Streamlines Updates:

- Dynamically generates queries for each term (Term_1 to Term_24).
- Reduces manual effort and saves time.
- Ensures consistency & accuracy across all terms.

Conditional Logic:

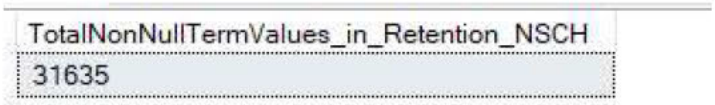
- Uses CASE statements for relevant updates.
- Updates fields based on enrollment status (Graduated/Not Graduated).
- Ensures only necessary data is updated.

```
DECLARE @termNum INT = 1;
DECLARE @sql NVARCHAR(MAX);

WHILE @termNum <= 24
BEGIN
    SET @sql = '
    UPDATE nsch
    SET
    -- Update the corresponding term columns (Term_1, Term_2, etc.)
    Term_' + CAST(@termNum AS NVARCHAR(2)) + '_ClassLvl = nsch_all_ordered.[Class Level],
    Term_' + CAST(@termNum AS NVARCHAR(2)) + '_SCHL_Code = nsch_all_ordered.College_Code_Branch,
    -- Additional fields for each term, using Dynamic SQL to address different terms
    Term_' + CAST(@termNum AS NVARCHAR(2)) + '_Grad = CASE
        WHEN nsch_all_ordered.Graduated = ''Y''
            AND nsch_all_ordered.Graduation_Term = nsch_all_ordered.Z_Term
        THEN nsch_all_ordered.Graduated
        ELSE NULL
    END
    -- Repeat similar logic for other fields like DEG_Type, DEG_Major, etc.
    FROM Retention.dbo.Retention_NSCH_new nsch
    JOIN Retention.dbo.newer_NSCH_all_terms_ordered nsch_all_ordered
        ON nsch.PIDM = nsch_all_ordered.PIDM
        AND nsch_all_ordered.Z_Term = nsch.Z_Term
    WHERE nsch_all_ordered.Z_Term = ' + CAST(@termNum AS NVARCHAR(2)) + ';'

    EXEC sp_executesql @sql;

    SET @termNum = @termNum + 1;
END;
```

Validation across NSCH database objects

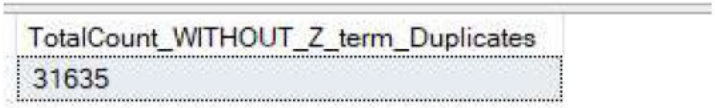
TotalNonNullTermValues_in_Retention_NSCH (31,635):

- Represents non-null term values across all terms in Retention_NSCH.
- Ideally matches TotalCount_WITHOUT_Z_term_Duplicates.



TotalCount_WITHOUT_Z_term_Duplicates (31,635):

- Counts distinct records, excluding duplicates based on Z_term.
- Should match the TotalNonNullTermValues_in_Retention_NSCH count.



TotalCount_with_Z_term_Duplicates (34,295):

- Includes duplicates where some PIDMs have multiple records for the same Z_term.
- Duplicates are handled via a priority sorting process before loading into Retention_NSCH.

Data Loading Based on Sorting:

- The sorting ensures only the most relevant record per PIDM is loaded, preserving data integrity.

NEXT STEPS

Ongoing validation

- Continue to validate data integrity after each update cycle.
- Ensure consistency across all terms and detect any anomalies.

Automation

- Further automate the data update and validation processes using Dynamic SQL & Stored Procedures.
- Explore additional tools for enhanced automation efficiency.

Refinement of the process

- Continuously improve the data cleanup and transformation steps to ensure the highest data quality.

6

DATA VALIDATION

Data Validation

Power BI

NSCH – Data Validation

- Verify Cohort Loaded
- Create 6 Categories by Year
  - Graduated TAMUCC
  - Retain TAMUCC
  - Graduated Elsewhere
  - Retained Elsewhere
  - Stop-Out
  - Hasn't Occurred

*4_Status	*7_Status	*10_Status	*13_Status	*16_Status	*19_Status	*21_Status	*24_Status
Stop-Out	Stop-Out	Stop-Out	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain TAMUCC	Retain TAMUCC	Retain TAMUCC	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC
Retain TAMUCC	Stop-Out	Stop-Out	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain TAMUCC	Retain TAMUCC	Retain TAMUCC	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain TAMUCC	Retain Elsewhere	Stop-Out	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain TAMUCC	Retain TAMUCC	Retain TAMUCC	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain Elsewhere	Retain Elsewhere	Stop-Out	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain Elsewhere	Retain Elsewhere	Stop-Out	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain TAMUCC	Retain TAMUCC	Retain TAMUCC	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain TAMUCC	Retain TAMUCC	Retain TAMUCC	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred	Hasn't Occurred
Retain TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC	Grad TAMUCC

Data Validation

NSCH – Data Validation

Retention and Graduation Rates

Cohort Term	Student Class Level	Cohort Type	Entering College
Fall 2021	All	All	All

PSA Status	Race/Ethnicity	First-Generation	Full-Time/Part-Time
All	All	All	All

1st Year Status	#	%
Grad Elsewhere	3	0.09%
Grad TAMUCC	38	1.16%
Retain Elsewhere	461	14.09%
Retain TAMUCC	2,097	64.11%
Stop-Out	672	20.54%
Total	**3,271**	**100.00%**

2nd Year Status	#	%
Grad Elsewhere	19	0.58%
Grad TAMUCC	473	14.46%
Hasn't Occurred	2	0.06%
Retain Elsewhere	571	17.46%
Retain TAMUCC	1,383	42.28%
Total	**3,271**	**100.00%**

3rd Year Status	#	%
Grad Elsewhere	104	3.18%
Grad TAMUCC	764	23.36%
Retain TAMUCC	885	27.06%
Stop-Out	1,518	46.41%
Total	**3,271**	**100.00%**

4th Year Status	#	%
Grad Elsewhere	108	3.30%
Grad TAMUCC	772	23.60%
Hasn't Occurred	2,391	73.10%
Total	**3,271**	**100.00%**

5th Year Status	#	%
Grad Elsewhere	101	3.09%
Grad TAMUCC	915	27.97%
Hasn't Occurred	2,255	68.94%
Total	**3,271**	**100.00%**

6th Year Status	#	%
Grad Elsewhere	101	3.09%
Grad TAMUCC	915	27.97%
Hasn't Occurred	2,255	68.94%
Total	**3,271**	**100.00%**

7th Year Status	#	%
Grad Elsewhere	101	3.09%
Grad TAMUCC	915	27.97%
Hasn't Occurred	2,255	68.94%
Total	**3,271**	**100.00%**

8th Year Status	#	%
Grad Elsewhere	101	3.09%
Grad TAMUCC	915	27.97%
Hasn't Occu		
Total		

[redacted]	PIDM_CNT
	1
	1
Total	**3,271**

Power BI

Data Validation

Power BI

NSCH – Data Validation

Retain 1st Year Other University	# Students
⊞ TEXAS A&M UNIVERSITY	154
⊞ DEL MAR COLLEGE	49
⊞ TEXAS STATE UNIVERSITY - SAN MARCOS	20
⊞ BLINN COLLEGE- BRYAN CAMPUS	17
⊞ AUSTIN COMMUNITY COLLEGE DISTRICT	15
⊟ UNIVERSITY OF TEXAS - SAN ANTONIO	14
COMMUNICATION	2
KINESIOLOGY	2
PSYCHOLOGY	2
ARCH CONSTRUCTION STUDIES	1
BIOLOGY	1
BUSINESS ANALYTICS	1
CYBER SECURITY	1
ENVIRONMENTAL SCIENCE	1
EQUITY AND EDUCATION	1
MARKETING	1
MEDICAL HUMANITIES	1
⊞ UNIVERSITY OF HOUSTON	11
⊞ UNIVERSITY OF TEXAS RIO GRANDE VALLEY	8
⊞ LONE STAR COLLEGE SYSTEM DISTRICT	7
⊞ SAM HOUSTON STATE UNIVERSITY	7
⊞ SAN ANTONIO COLLEGE	7
⊞ TEXAS TECH UNIVERSITY LUBBOCK	7
⊞ COASTAL BEND COLLEGE	6
⊞ TARRANT COUNTY COLLEGE	6
⊞ TEXAS A&M UNIVERSITY - KINGSVILLE	6
⊞ NORTHWEST VISTA COLLEGE	5
⊞ PALO ALTO COLLEGE	5
⊞ TEXAS A&M UNIVERSITY- SAN ANTONIO	5
⊞ TEMPLE COLLEGE	4
⊞ UNIVERSITY OF NORTH TEXAS	4
⊞ COLLIN COUNTY COMMUNITY COLLEGE	3
⊞ TEXAS STATE TECHNICAL COLLEGE- HARLINGEN	3
Total	461

2nd Year Retain Other University	# Students
⊞ TEXAS A&M UNIVERSITY	167
⊞ DEL MAR COLLEGE	68
⊞ TEXAS STATE UNIVERSITY - SAN MARCOS	24
⊟ UNIVERSITY OF TEXAS - SAN ANTONIO	24
KINESIOLOGY	3
PSYCHOLOGY	3
COMMUNICATION	2
MEDICAL HUMANITIES	2
	1
ACCOUNTING	1
ARCH CONSTRUCTION STUDIES	1
BUSINESS ANALYTICS	1
CHEMICAL ENGINEERING	1
CHEMISTRY	1
CYBER SECURITY	1
ENGLISH	1
ENVIRONMENTAL SCIENCE	1
FINANCE	1
INFORMATION SYSTEMS	1
MARKETING	1
MECHANICAL ENGINEERING	1
MULTIDISCIPLINARY SCIENCE	1
⊞ AUSTIN COMMUNITY COLLEGE DISTRICT	17
⊞ TEXAS A&M UNIVERSITY - KINGSVILLE	16
⊞ SAN ANTONIO COLLEGE	11
⊞ UNIVERSITY OF HOUSTON	11
⊞ TEXAS TECH UNIVERSITY LUBBOCK	10
⊞ UNIVERSITY OF NORTH TEXAS	10
⊞ UNIVERSITY OF TEXAS RIO GRANDE VALLEY	10
⊞ LONE STAR COLLEGE SYSTEM DISTRICT	8
⊞ SAM HOUSTON STATE UNIVERSITY	8
⊞ BLINN COLLEGE- BRYAN CAMPUS	7
⊞ COASTAL BEND COLLEGE	6
Total	571

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REFLECTION & NEXT STEPS

Reflection

Challenges Faced

- Getting familiar with NSCH data.
- Amount of data starting with. N = 1.7M
- Creating crosswalks for various NSCH variables such as Degree Type, CIP code, etc.
- Deciding on the logic to determine which records to choose

Reflection

Benefits

- A comprehensive database of subsequent enrollment & degree completion
- Clean, organized, and structured "census" data for ongoing data analysis
- Helping interpret student enrollment and transfer-out patterns
- Understanding the students' academic journey.

NEXT STEPS

- Establish process and timing of updating the database
- Create data visualizations to help analyze and share data findings
- In-depth research analysis on our transfer-out students


Q&A

THANK YOU!

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