EAST TEXAS A&M

Beyond the Visual: Building Secure, Public-Facing Dashboards from Certified Data

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Introduction

- **One of the A&M system schools**
- **Rural Status**
- **First-gernation**
- **Minority enrollment (54%)**
- **R2 status: higher research spending and doctorate production**
- **Student access and earning classification:Higher Access, medium income**
- **Six academic colleges, CID (100% online)**
- **Name change**

Why Public Facing Dashboards

- **Transparency and Public Trust**
- **Simplied Complexity**
- **Database Security**
- **Visibility, Accessibility and Affordability**

Our institutional conundrum

→ **Internal dashboards**

- Contained sensitive or FERPA-protected data
- Use both real-time and certified data
- Required campus firewall/VPN access
- Designed for analytical depth and internal decision-making
- Include operational matrices, can be complicated to navigate and digest the information
- Not compatible public communication tools

vs.

→ **Create a public-facing, interactive dashboard using certified data:**

- Easy to find
- Easy to understand
- Easy to reuse
- For public communication
- Updates yearly based on the reporting cycle

Power BI Dashboard Data Preparation

Transform SSN to Different ID System

Data Preparation

Transform SSN to different ID system (Why?)

Sequential IDs	Salted Hash
➜ **Approach 1: Assign 1, 2, 3... based on record order**	➜ **Approach 2: SHA-256 (SSN + secret SALT)**
➜ **Advantages:**	➜ **Advantages:**
• Simple to implement • Human-readable	• Deterministic (same SSN = same ID, regardless of extract method)
➜ **Critical limitations:**	• Order-independent (reproducible)
• Order-dependent (breaks reproducibility) • Work well with only full refresh.	• Supports both full refresh and incremental updates

Illustrative Code Snippet

```python
if pd.isna(ssn) or ssn == "":
    return None


combined_text = f"{ssn}_{salt}"

hash_result = hashlib.sha256(combined_text.encode())
hex_hash = hash_result.hexdigest()
hash_int = int(hex_hash[:16], 16)
id = (hash_int % 9000000000) + 1000000000
return id
```

**Null-safe handling:** skip records without valid identifiers

SSN + SALT → prevents reverse identification

HASH Algorithm → non-reversible SHA-256 hash to convert identifiers

ID format → convert the first 16 characters of the hash into an integer and map it into a fixed 10-digit range.

Example function demonstrating how the new IDs are generated using SSN + SALT, not for production; Dashboard retention rates reconcile exactly with THECB accountability reports

ETL Workflow
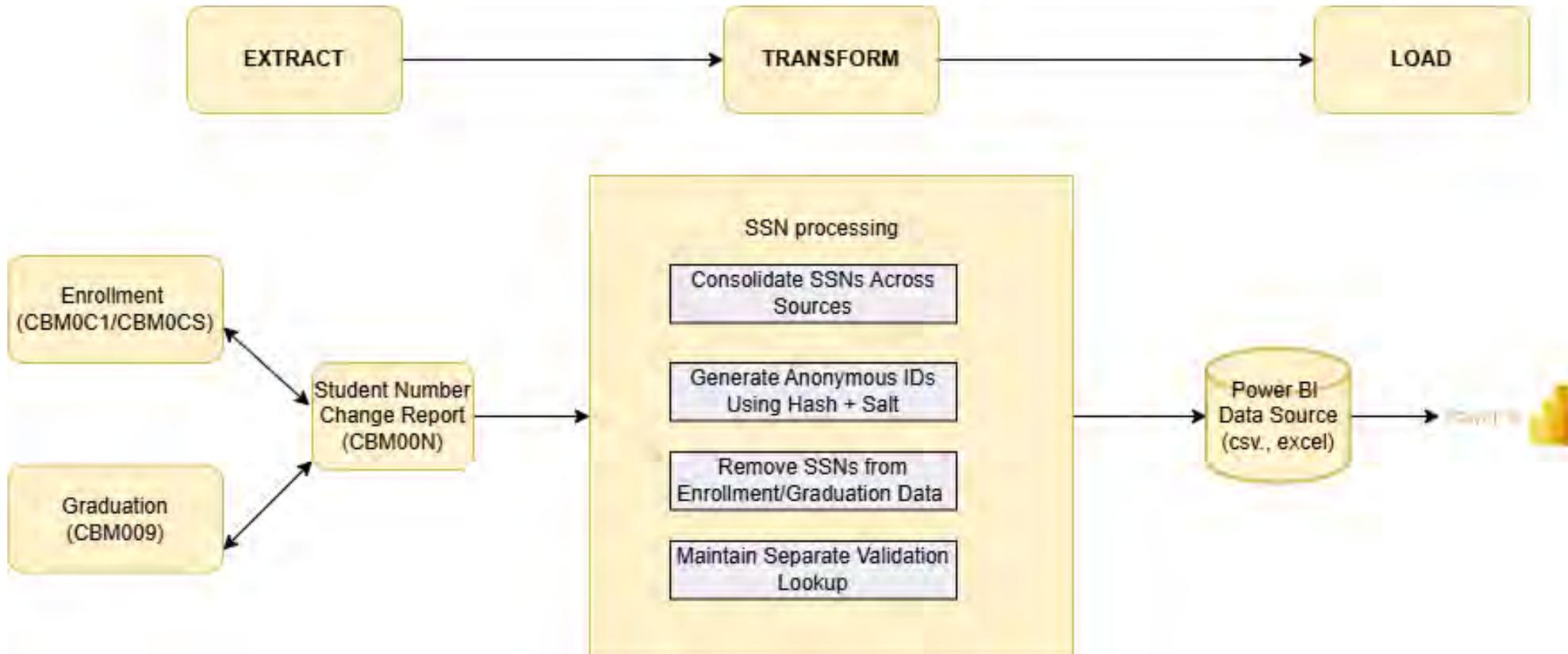
What We Learned Building This System

→ **Deterministic salted hashing**

- Preserved privacy while maintaining longitudinal linkage
- Produced stable IDs across repeated extracts
- Enabled direct reconciliation with certified state reports

→ **Designed for real-world data volatility**

- 4.4% of students experienced SSN corrections
- ID continuity was preserved without manual crosswalks
- Eliminated downstream reconciliation effort

Data Visualization

Using DAX controlled KPI cards for effective decision making

ETAUM Dashboard Roadmap

➜ **Enrollment Trends (five-year comparison)**

➜ **Demographic information built in as parameters**

➜ **Academic Units (College, CIP)**

➜ **Academic status (level, classfication)**

➜ **Persistent Rate (e.g.Top feeder counties)**

➜ **Persisten Rate by college, programs**

Using KPI Cards to Improve At-a-Glance Understanding

➜ **In corporate dashboards, KPI cards are commonly used to:**

- surface key metrics
- provide quick, glanceable context
- show direction relative to prior periods or targets

➜ **We adopted the KPI pattern:**

- Integrated prior-year comparison into the primary metric
- Highlighted year-over-year change without manual calculation

Our Dashboard Evolution: Adding historical data into KPI

Version 1.0 (Current Live)
Static totals, no trend context

Total Students Enrolled

12,998

Version 2.0 (In Development)
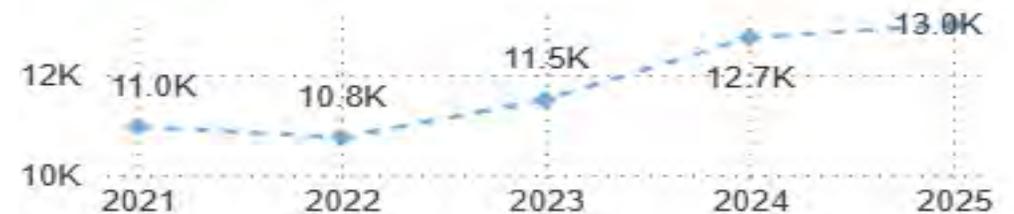KPI cards with YoY context, improved navigation

Total Enrollment

12,998

vs Fall 2024 ▲ 2.0%

13.0K

12K 11.0K 10.8K 11.5K 12.7K

10K 2021 2022 2023 2024 2025

What We Learned From Version 1.0

- It required users to search for temporal context
- Follow-up questions were predictable: "How does this compare to last year?"

Retention KPI Card: Another Example

One-Year Persistence Rate Overview

Persistence Rate

58.5%

▼3.7% vs Fall 2023

1223
Initial Cohort

715
Retained Next Fall

- **Summarizes one-year persistence matrix**

- **Shows YoY changes in persistence rate**

- **Uses the same KPI design pattern as enrollment to provide consistent, at-a-glance context without implying evaluation or causality**

Extending KPI Logic Beyond the Headline Metric: Examples

Example 1: Enrollment Breakdown

Example 2: Persistence Rate

By College, Level, and Classification

College	Current Fall	Previous Fall	% of Changes from Previous Fall
⊞ Ag Sciences & Nat Resources	707	712	▼ 0.7%
⊞ Business	1999	2332	▼ 14.3%
⊞ Education & Human Services	3002	3020	▼ 0.6%
⊞ Humanities, Social Sci & Arts	1547	1597	▼ 3.1%
⊞ Innovation and Design	4543	3756	▲ 21.0%
⊞ Science & Engineering	1200	1324	▼ 9.4%
Total	12998	12741	▲ 2.0%

One-Year Persistence Rate in Top Feeder Counties

Top Feeder Counties	Initial Cohort	Retained Next Fall	Persistence Rate ▼	vs. Previous Fall Cohort
Hopkins	34	28	82.4%	▼ 3.3%
Hunt	143	101	70.6%	▼ 2.7%
Tarrant	47	32	68.1%	▲ 13.4%
Rockwall	56	38	67.9%	▼ 3.2%
Denton	32	21	65.6%	▲ 4.7%
Fannin	23	15	65.2%	▼ 6.2%
Collin	80	52	65.0%	▼ 11.6%
Ellis	22	12	54.5%	▼ 2.6%
Kaufman	64	34	53.1%	▼ 9.7%
Dallas	489	244	49.9%	▼ 5.7%

Takeaways

- Delibarte desgin of the content of the dashboard
- Understand data consumers' common needs and barriers
- Display historical data vs current year data only
- Clearly labeling helps data consumer interprete data trends
- Coordinated early with MarCom and IT to support secure public embedding

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Example Scenarios

Leadership Quick Brief

Quick Fact Check

Enrollment Scenarios:
- "How's enrollment looking?"
- "Where are we seeing changes?"

Retention Scenarios:
- "How are we retaining students?"
- "Which programs need attention"

Conclusion

What can we take away from this project?

What You Can Take Away

➔ **If You're Building a Public Dashboard:**

- Use salted hash (not sequential IDs) for longitudinal tracking
- Plan for SSN corrections from the start (affects ~4% of students)
- Consider high-level aggregation for public access and suppress cells < 10 to protect privacy

➔ **If You're Improving Dashboard Design:**

- Embed YoY context directly in KPIs
- Reduce navigation needed to understand trends
- Test with realistic user questions
- Balance certification requirements with usability

→ Technical Resources We Used:

- Python for ETL and anonymization (hashlib library)
- Power BI for visualization and DAX calculations
- Certified CBM data as authoritative source

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