# Data Flow Diagram

Task 1.5 Deliverable -- Software Architecture Diagrams

This document traces how data moves through the Cook County Tax Extension system, from initial external inputs (IMS database records, VSAM files, control cards) through intermediate processing files to final outputs (tax rates, agency valuations, reports). The focus is on the data itself -- what it represents, how it transforms, and where it ends up.

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1. End-to-End Data Flow Overview

The system transforms raw property assessment and exemption data into equalized assessed valuations and frozen agency files used for tax rate computation. The high-level flow is:

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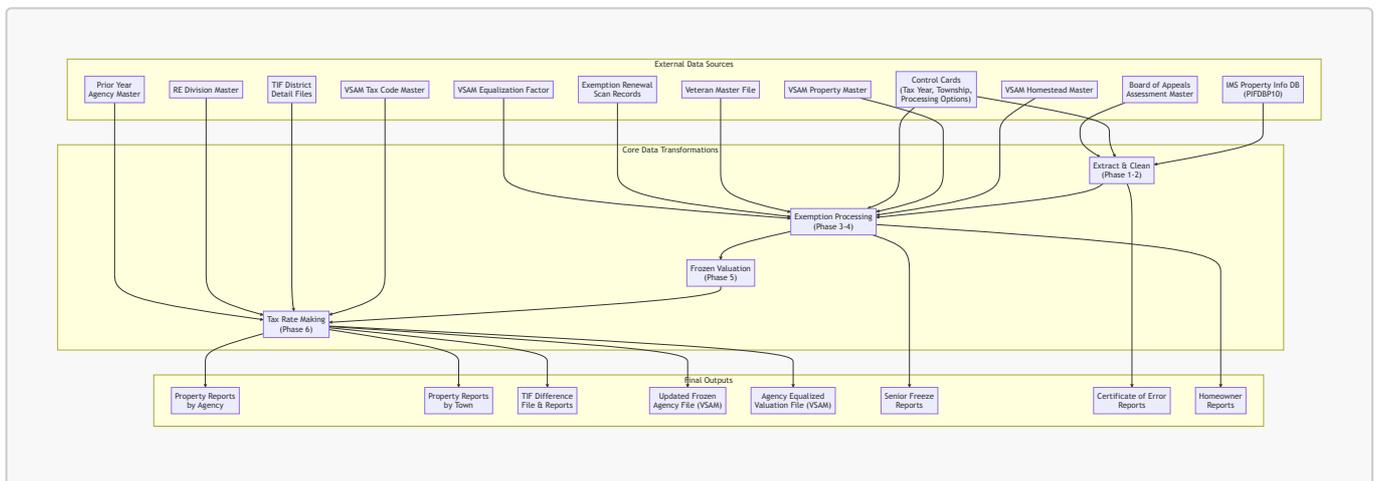
2. The Assessment Master Pipeline (Chain A)

The Assessment Master is the central data structure. It is a sequential file containing one record per property parcel with assessment values, property class, tax code, and exemption indicators. It flows through the system as a chain of generations: each program reads one generation and writes the next.
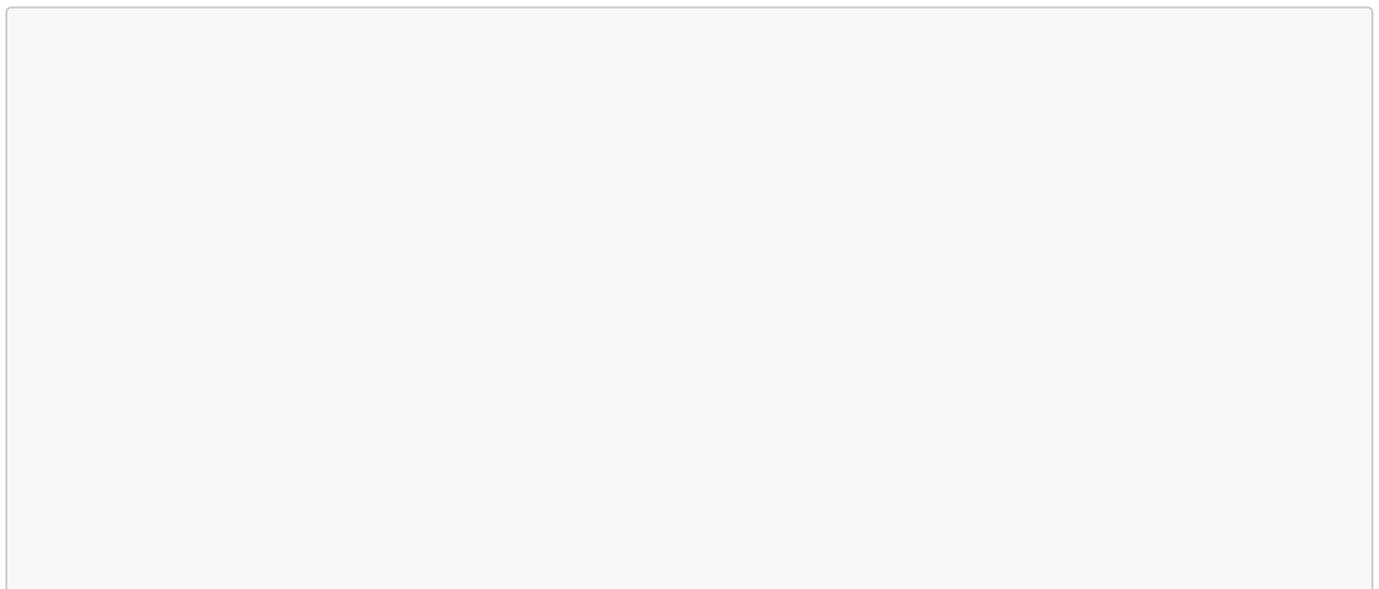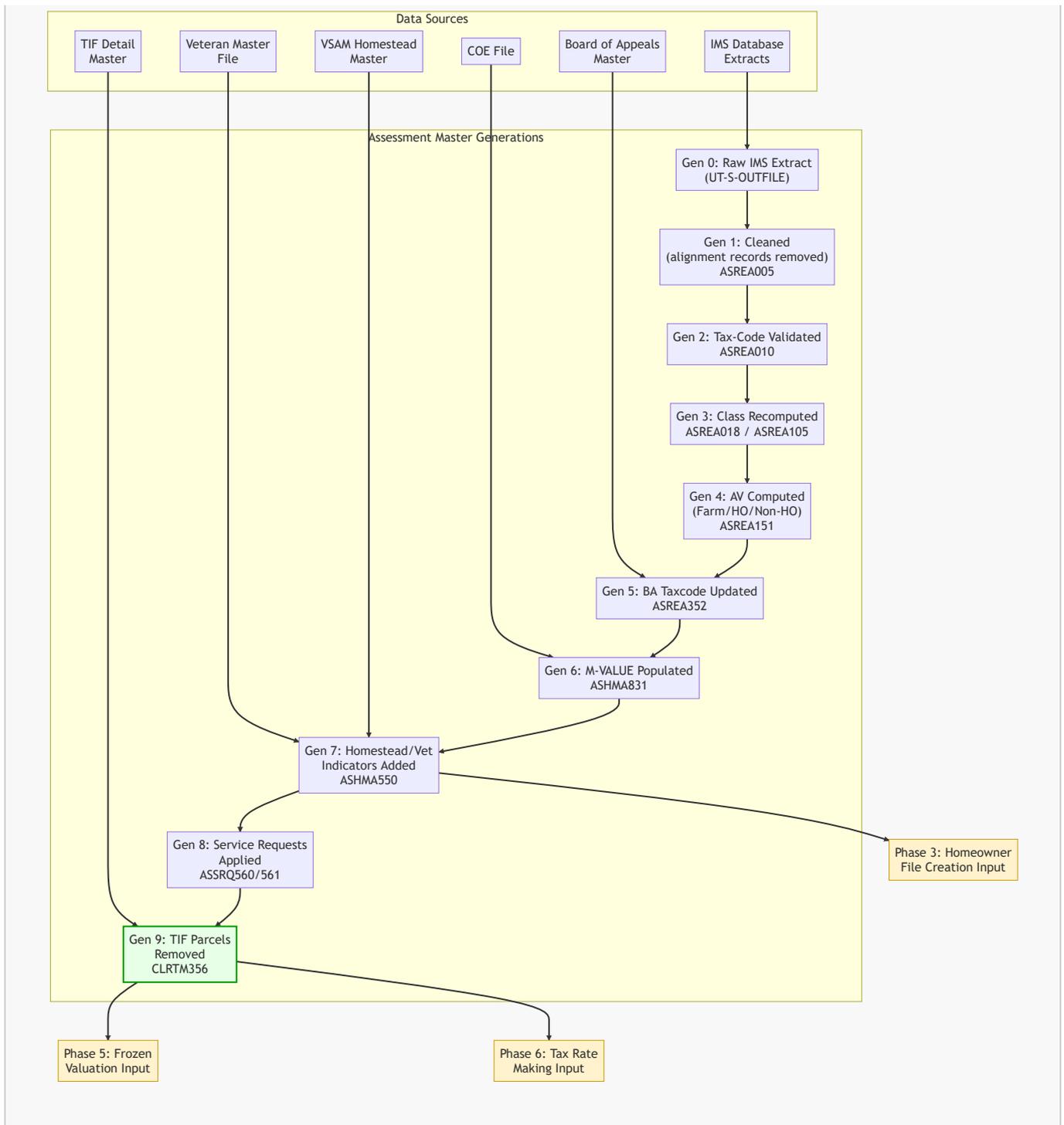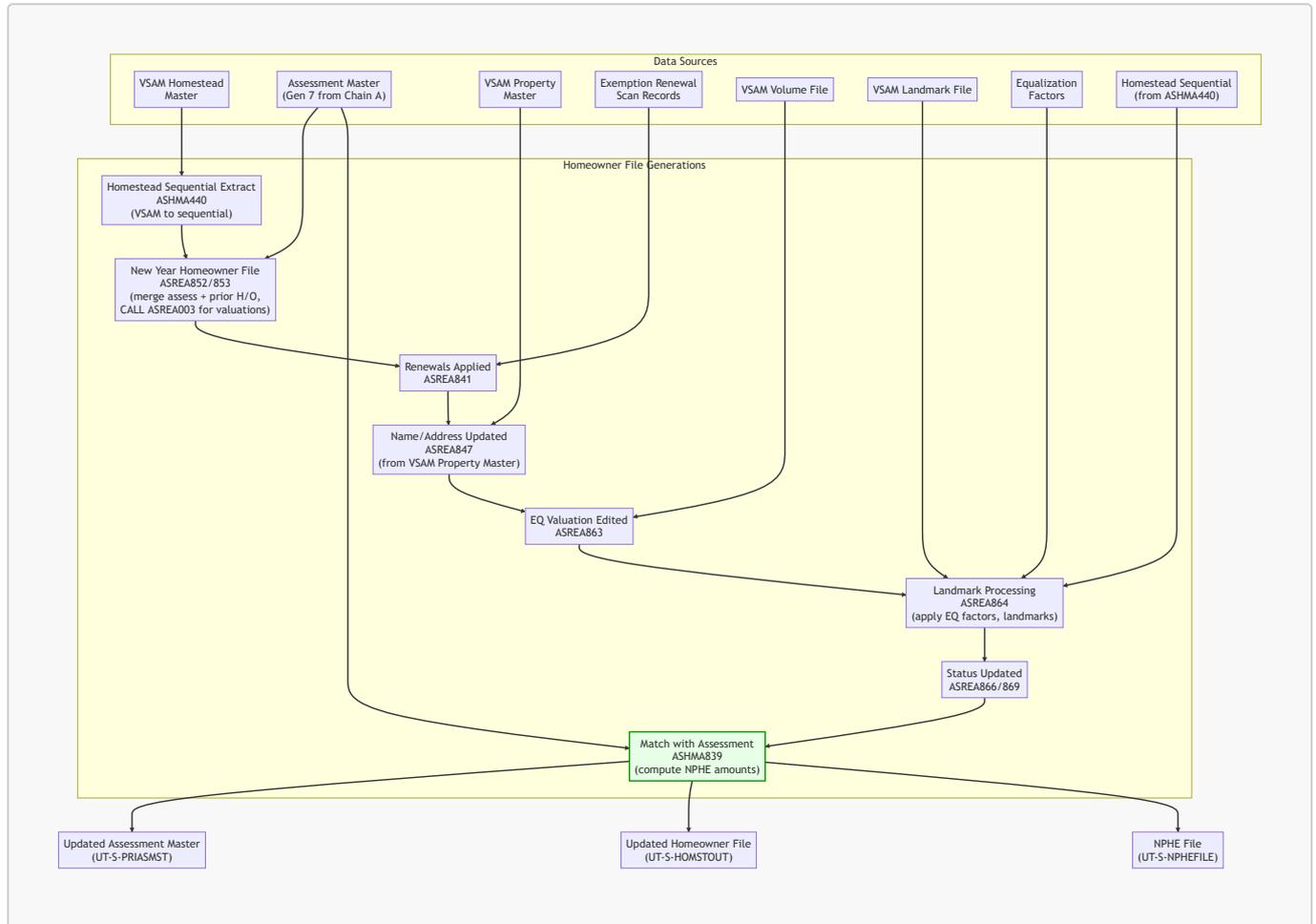
Key data transformations at each generation:

- **Gen 0-1**: Raw IMS extract cleaned of non-data records (print alignment)
- **Gen 2**: Tax codes validated against VSAM Tax Code Master
- **Gen 3-4**: Property class recomputed; Farm, Homeowner, and Non-Homeowner Assessed Valuations calculated
- **Gen 5**: Board of Appeals corrections merged in
- **Gen 6**: Current total equalized value (M-VALUE(9)) populated, COE adjustments applied
- **Gen 7**: Homestead and veteran exemption indicators merged from VSAM
- **Gen 8**: Chicago Circulator mixed-class tax types assigned
- **Gen 9**: TIF district parcels removed (separated for TIF-specific processing)

3. The Homeowner Exemption Pipeline (Chain B)

This pipeline creates and enriches the Homeowner Exemption file, which tracks which properties qualify for homeowner, senior, disability, and other exemptions along with their equalized valuations.


Key data at each generation:

- **HO Gen 0**: Homestead Master converted from VSAM indexed to sequential for batch processing
- **HO Gen 1**: Assessment Master matched with prior homeowner file; ASREA003 computes property valuations for types 1-5
- **HO Gen 2-3**: Renewal applications and name/address corrections applied
- **HO Gen 4-5**: Equalized valuations edited, landmark property special handling applied
- **HO Gen 6**: Homeowner statuses updated post-processing
- **HO Gen 7**: Final match/merge of homeowner file with current assessment master; NPHE (Non-Primary Homeowner Exemption) amounts computed. Three outputs feed downstream processing.

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4. The Senior Freeze Pipeline (Chain C)

The Senior Citizens Assessment Freeze Homestead Exemption pipeline freezes assessed values for qualifying senior citizens and computes the tax difference.
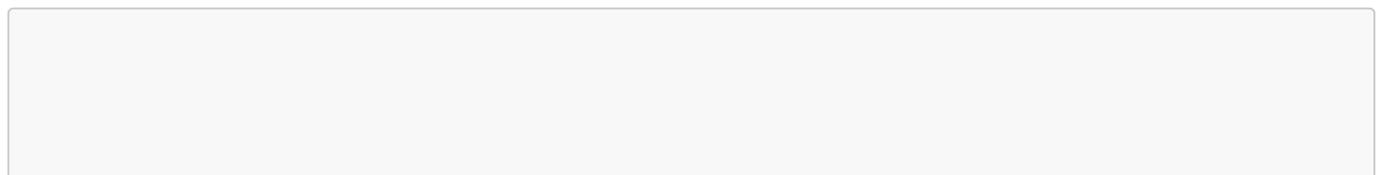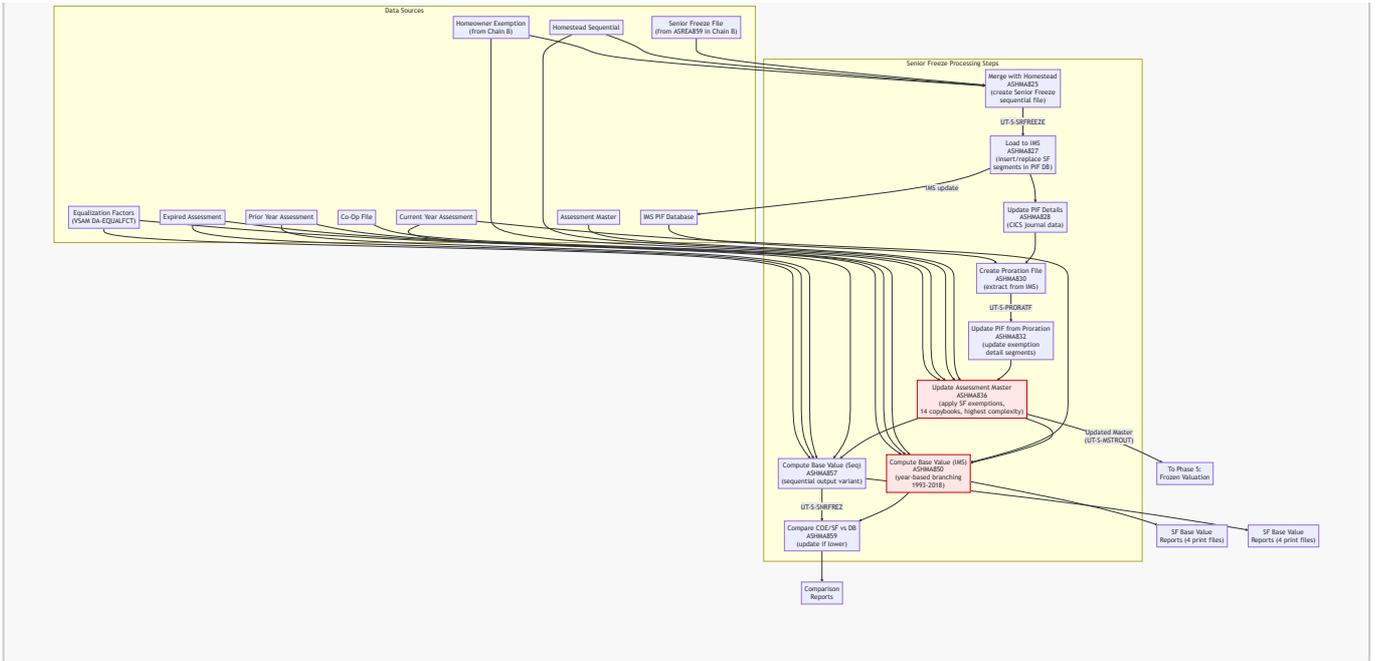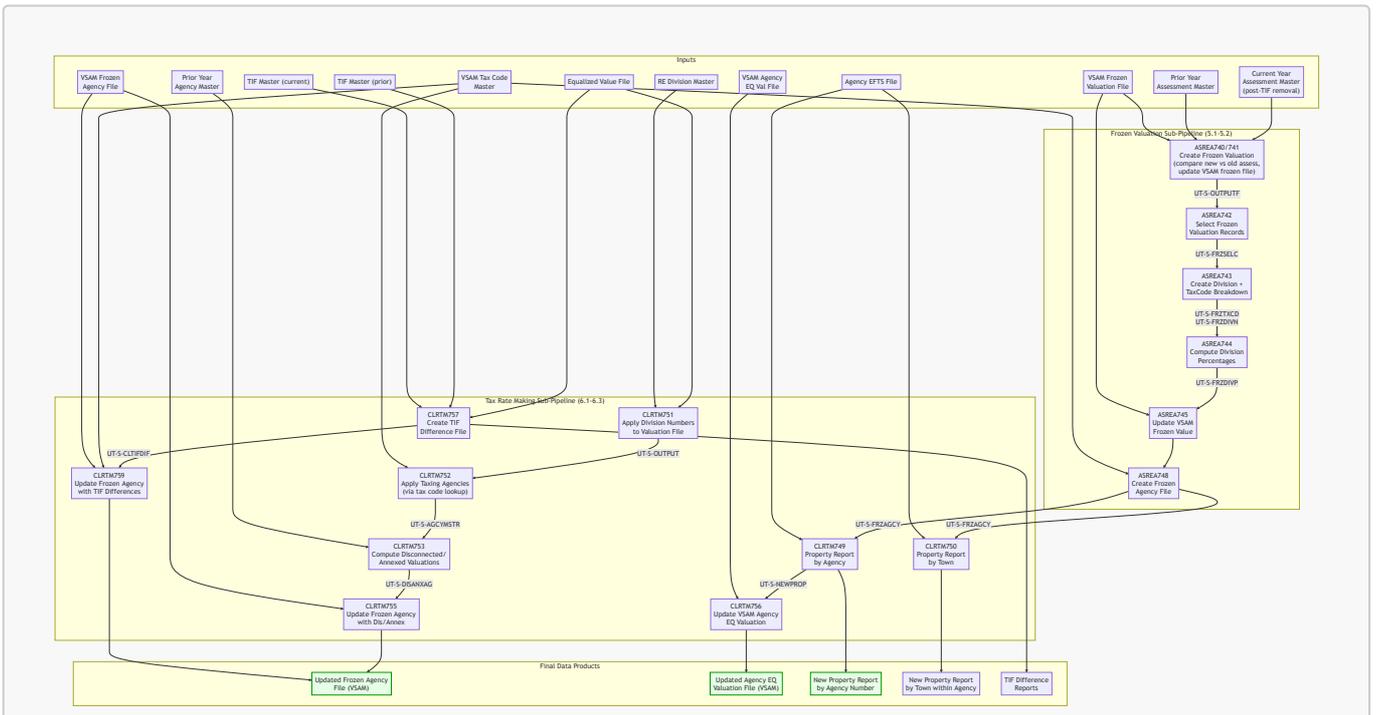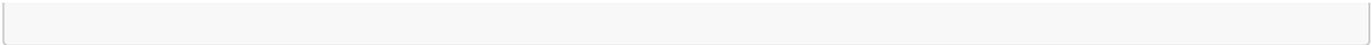
Data highlights:

- **ASHMA836** is the most complex program in the system (14 copybooks, IMS + 6 sequential files). It reads the Assessment Master, Homestead file, Homeowner Exemption file, and Co-Op file, then writes an updated Assessment Master with Senior Freeze exemptions applied.
- **ASHMA850** contains year-based branching logic spanning 1993 through 2018, computing the Senior Freeze base value tax difference. It reads three assessment files (current, prior, expired) plus equalization factors.
- ASHMA850 updates IMS directly; ASHMA857 is a variant that writes a sequential file instead.

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5. The Frozen Valuation and Tax Rate Making Pipeline (Chain D)

This is the final processing stage, computing frozen valuations for PTELL (Property Tax Extension Limitation Law) compliance and producing the agency-level files used for final tax rate computation.

Data highlights:

- **Frozen Valuation** compares current vs. prior year assessment masters against the VSAM Frozen Valuation file to determine frozen base values used for PTELL compliance.
- **Division Percentages** (ASREA744 output) break down frozen valuations by division and tax code, creating the proportional allocation used for agency-level computations.
- **CLRTM752** is the critical linking step: it reads the Assessment Master and the VSAM Tax Code file to determine which taxing agencies (school districts, municipalities, parks, etc.) apply to each property.
- **TIF processing** (CLRTM757/759) computes the increment between current EQ values and frozen base values; this increment is the revenue directed to TIF districts rather than general taxing agencies.

6. Shared / Cross-Pipeline Data

Several data files are consumed by programs in multiple pipelines:

Data File	Produced By	Consumed By Pipelines
Assessment Master	Chain A (Phase 2)	Chain B (H/O creation), Chain C (SF update), Chain D (Frozen Val + Tax Rate)
Homestead Sequential	ASHMA440	Chain A (ASHMA550), Chain B (H/O creation), Chain C (ASHMA825, ASHMA836)
Homeowner Exemption File	Chain B (Phase 3)	Chain C (ASHMA836 Senior Freeze update)
Equalization Factors	CLREB020, VSAM DA-EQUALFCT	Chain B (ASREA864), Chain C (ASHMA850/855/857)
Co-Op File	ASHMA660	Chain C (ASHMA836)
Tax Code Master (VSAM)	External	Chain A (ASREA010), Chain D (ASREA748, CLRTM752, CLRTM759)
Frozen Valuation (VSAM)	Chain D (ASREA745)	Chain D (ASREA740/741), Chain B (ASREA909)

7. Data Volume and Flow Direction Summary
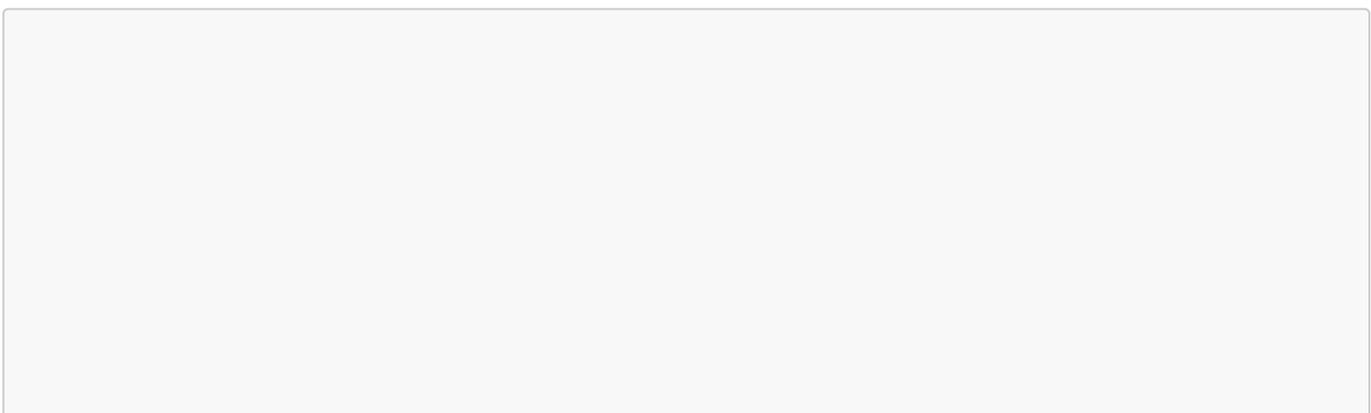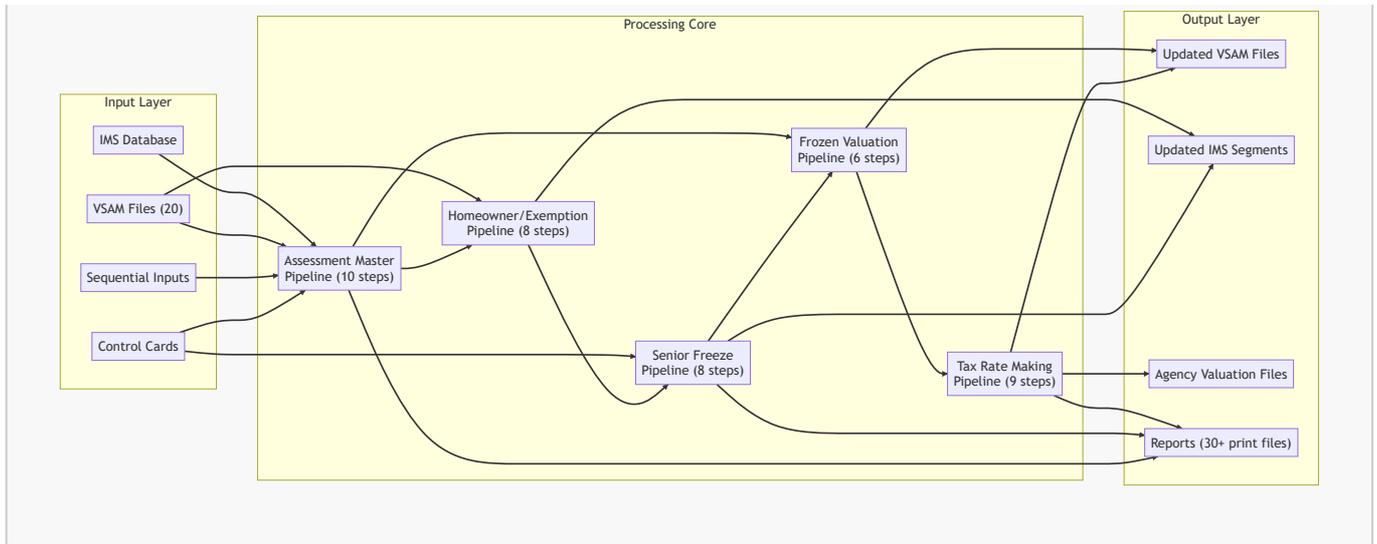
Summary statistics:

- **Input files**: ~20 VSAM indexed files + IMS database + 40+ sequential input DD names
- **Intermediate files**: ~80+ sequential DD names used for inter-program communication
- **Output products**: ~30+ print/report files + 5 updated VSAM files + IMS database updates
- **Total DD names cataloged**: ~236 SELECT/ASSIGN statements across 63 programs with file I/O