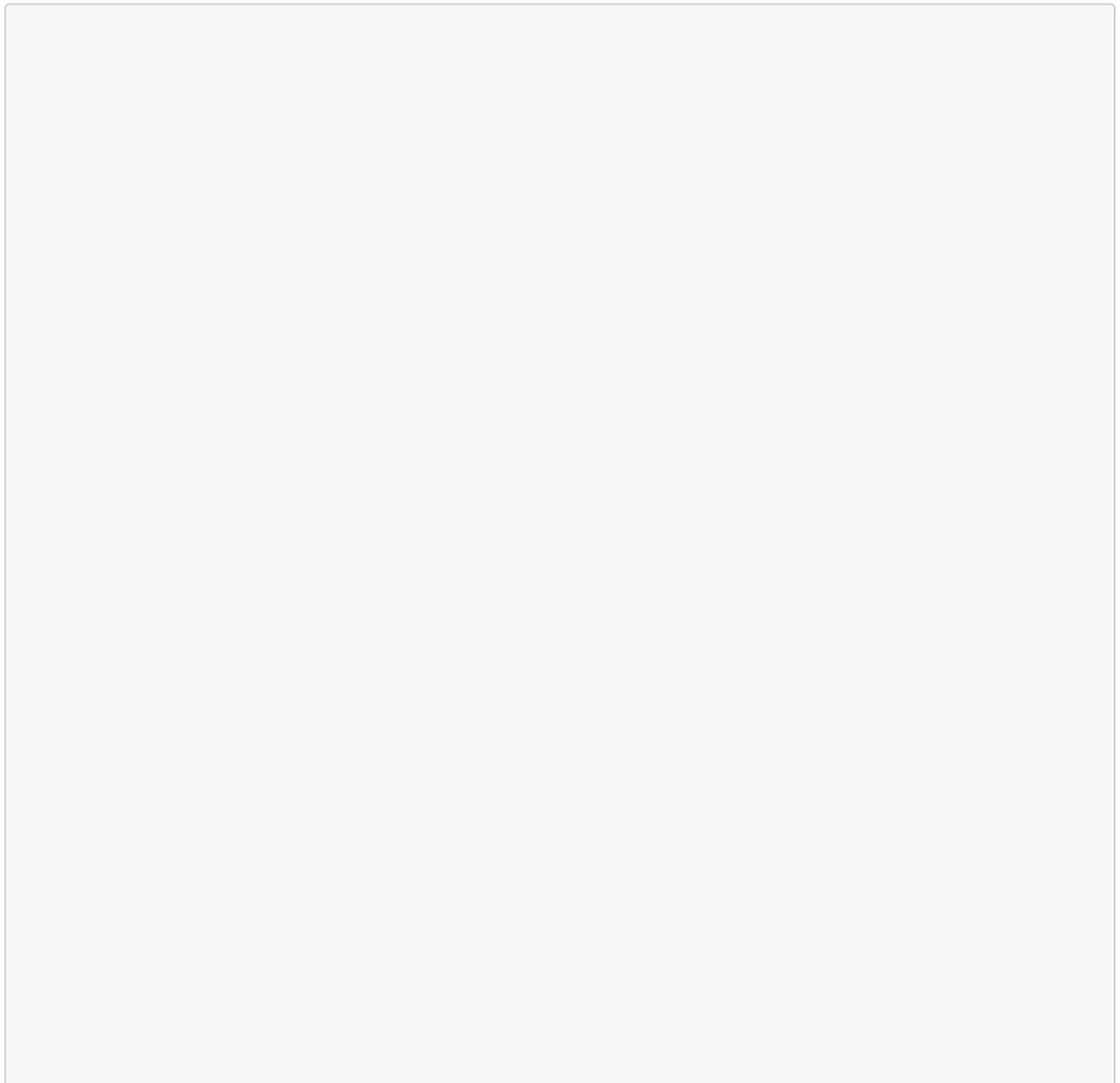# Copybook Relationship Diagram
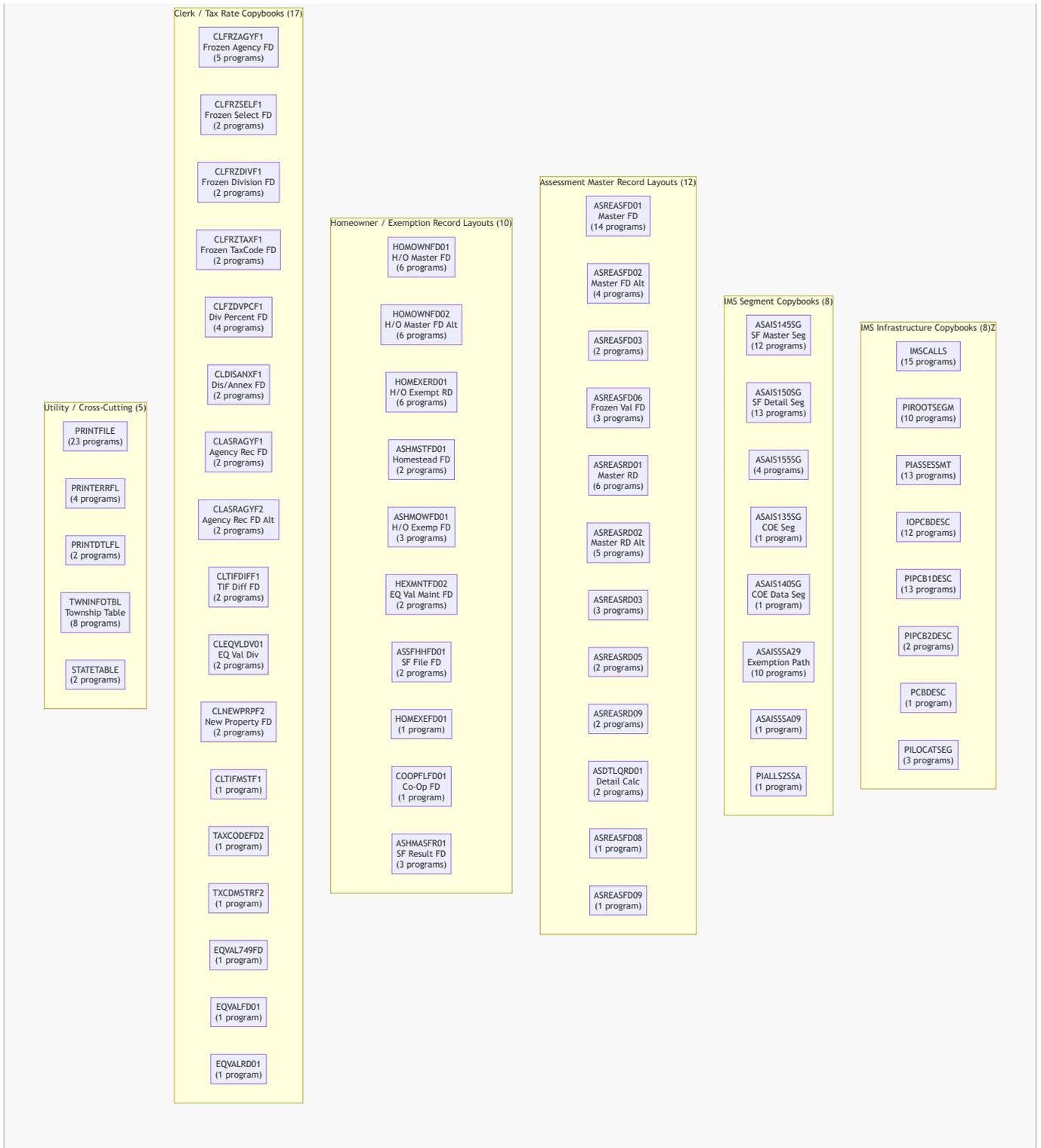
Task 1.5 Deliverable -- Software Architecture Diagrams

This document visualizes shared data structures (copybooks) and the program groups that use them. In COBOL, copybooks are the primary mechanism for sharing record layouts and data definitions across programs -- they function as the equivalent of shared type definitions, header files, or schema declarations in modern languages. Understanding which copybooks are shared by which programs reveals the true structural coupling in the system.
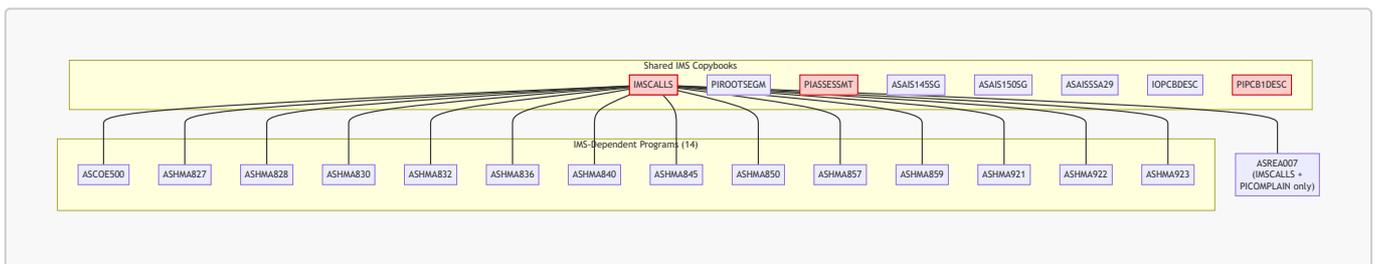
1. Copybook Categories Overview

The 82 distinct copybooks fall into five functional categories. The diagram below shows these categories and their relative usage across the 59 programs that include at least one copybook.

Clerk / Tax Rate Copybooks (17)

- CLFRZAGYF1 — Frozen Agency FD (5 programs)
- CLFRZSELF1 — Frozen Select FD (2 programs)
- CLFRZDIVF1 — Frozen Division FD (2 programs)
- CLFRZTAXF1 — Frozen TaxCode FD (2 programs)
- CLFZDVPCF1 — Div Percent FD (4 programs)
- CLDISANXF1 — Dis/Annex FD (2 programs)
- CLASRAGYF1 — Agency Rec FD (2 programs)
- CLASRAGYF2 — Agency Rec FD Alt (2 programs)
- CLTIFDIFF1 — TIF Diff FD (2 programs)
- CLEQVLDV01 — EQ Val Div (2 programs)
- CLNEWPRPF2 — New Property FD (2 programs)
- CLTIFMSTF1 — (1 program)
- TAXCODEFD2 — (1 program)
- TXCDMSTRF2 — (1 program)
- EQVAL749FD — (1 program)
- EQVALFD01 — (1 program)
- EQVALRD01 — (1 program)

Utility / Cross-Cutting (5)

- PRINTFILE (23 programs)
- PRINTERRFL (4 programs)
- PRINTDTLFL (2 programs)
- TWNINFOTBL — Township Table (8 programs)
- STATETABLE (2 programs)

Homeowner / Exemption Record Layouts (10)

- HOMOWNFD01 — H/O Master FD (6 programs)
- HOMOWNFD02 — H/O Master FD Alt (6 programs)
- HOMEXERD01 — H/O Exempt RD (6 programs)
- ASHMSTFD01 — Homestead FD (2 programs)
- ASHMOWFD01 — H/O Exemp FD (3 programs)
- HEXMNTFD02 — EQ Val Maint FD (2 programs)
- ASSFHHFD01 — SF File FD (2 programs)
- HOMEXEFD01 — (1 program)
- COOPFLFD01 — Co-Op FD (1 program)
- ASHMASFR01 — SF Result FD (3 programs)

Assessment Master Record Layouts (12)

- ASREASFD01 — Master FD (14 programs)
- ASREASFD02 — Master FD Alt (4 programs)
- ASREASFD03 — (2 programs)
- ASREASFD06 — Frozen Val FD (3 programs)
- ASREASRD01 — Master RD (6 programs)
- ASREASRD02 — Master RD Alt (5 programs)
- ASREASRD03 — (3 programs)
- ASREASRD05 — (2 programs)
- ASREASRD09 — (2 programs)
- ASDTLQRD01 — Detail Calc (2 programs)
- ASREASFD08 — (1 program)
- ASREASFD09 — (1 program)

IMS Segment Copybooks (8)

- ASAIS145SG — SF Master Seg (12 programs)
- ASAIS150SG — SF Detail Seg (13 programs)
- ASAIS155SG — (4 programs)
- ASAIS135SG — COE Seg (1 program)
- ASAIS140SG — COE Data Seg (1 program)
- ASAISSSA29 — Exemption Path (10 programs)
- ASAISSSA09 — (1 program)
- PIALLS2SSA — (1 program)

IMS Infrastructure Copybooks (8)Z

- IMSCALLS (15 programs)
- PIROOTSEGM (10 programs)
- PIASSESSMT (13 programs)
- IOPCBDESC (12 programs)
- PIPCB1DESC (13 programs)
- PIPCB2DESC (2 programs)
- PCBDESC (1 program)
- PILOCATSEG (3 programs)

2. IMS Dependency Cluster

The most significant structural coupling in the codebase is the IMS dependency cluster. Fourteen programs share a common set of 8 IMS copybooks and must all be migrated together during modernization.


Shared IMS Copybooks: IMSCALLS, PIROOTSEGM, PIASSESSMT, ASAIS145SG, ASAIS150SG, ASAISSSA29, IOPCBDESC, PIPCB1DESC

IMS-Dependent Programs (14): ASCOE500, ASHMA827, ASHMA828, ASHMA830, ASHMA832, ASHMA836, ASHMA840, ASHMA845, ASHMA850, ASHMA857, ASHMA859, ASHMA921, ASHMA922, ASHMA923

ASREA007 (IMSCALLS + PICOMPLAIN only)

Modernization implication: Replacing IMS requires changing all 15 programs that use IMSCALLS, plus updating the 8 shared IMS copybooks. These programs cannot be migrated individually -- they form an atomic migration unit.

Additionally, programs ASHMA832 and ASHMA859 use **PIPCB2DESC** (a second PCB descriptor), indicating they access multiple IMS databases or segments with separate PCBs.

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3. Assessment Master Record Layout Sharing

The Assessment Master record layout (**ASREASFD01** and its variants) is the most widely shared business-domain copybook, connecting programs across all six domain prefixes.
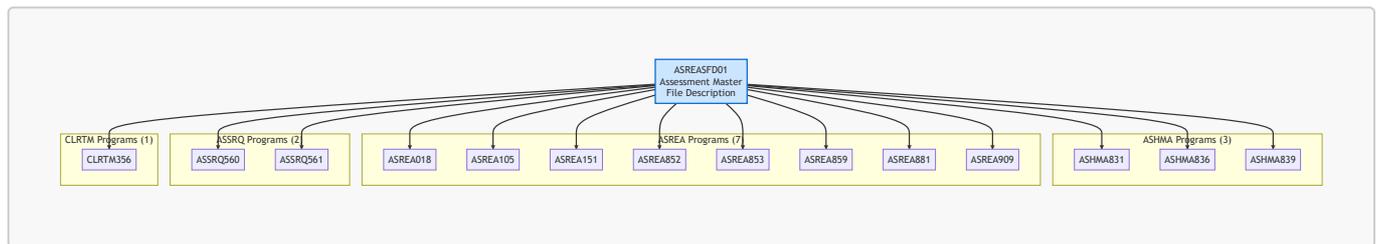
The ASREASFD01 copybook defines the file description (FD) for the Assessment Master sequential file. Any change to this record layout affects 14 programs across 4 domain prefixes. The related read-description (RD) variants are:

Copybook	Purpose	Programs
ASREASRD01	Assessment Master RD (read)	ASHMA550, ASREA010, ASREA110, ASREA178, ASREA352, ASREA880 (6)
ASREASRD02	Assessment Master RD (alternate)	ASHMA550, ASHMA850, ASHMA857, ASREA178, ASREA352 (5)
ASREASRD03	Assessment Master RD (third variant)	ASHMA831, ASHMA850, ASHMA857 (3)
ASREASFD02	Assessment Master FD (alternate)	ASREA018, ASREA105, ASREA151, CLRTM356 (4)
ASREASFD06	Frozen Valuation FD	ASREA740, ASREA741, ASREA742 (3)

Total programs affected by Assessment Master record layout changes: 27 (counting all FD and RD variants, with deduplication).

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4. Homeowner / Exemption Copybook Cluster

The homeowner and exemption record layouts form the second major structural cluster, linking the ASHMA and ASREA domain programs.
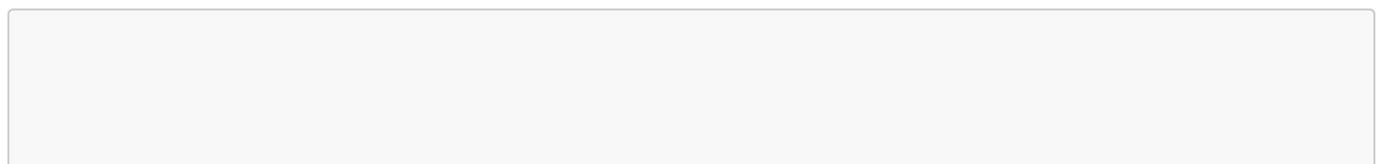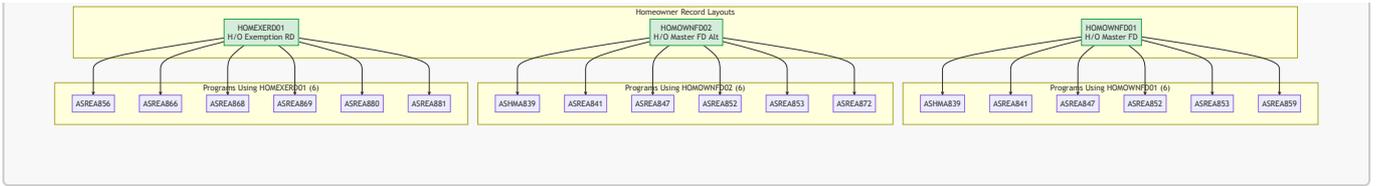
HOMOWNFD01 and HOMOWNFD02 are almost always used together (5 of 6 programs use both), suggesting they define two views of the same homeowner record (e.g., input and output variants). HOMEXERD01 is used by a different set of 6 programs that process the homeowner exemption data in later pipeline stages.

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5. Clerk / Frozen Valuation Copybook Cluster

The Clerk domain copybooks bridge the ASREA frozen valuation programs and the CLRTM tax rate making programs, showing how assessment data flows into tax computation.
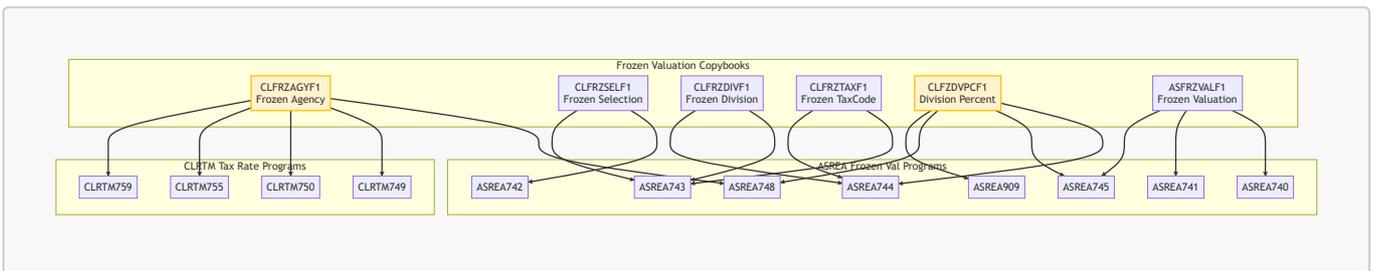
Key observation: CLFRZAGYF1 (Frozen Agency record layout) is the primary structural link between the ASREA frozen valuation pipeline and the CLRTM tax rate pipeline. It is used by 5 programs across both domains. **CLFZDVPCF1** (Division Percent record) is used by 4 programs and represents the intermediate data format that flows through the frozen valuation computation chain.

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6. Cross-Cutting Utility Copybooks

Two copybooks are used across nearly all domain boundaries:

PRINTFILE (23 programs)
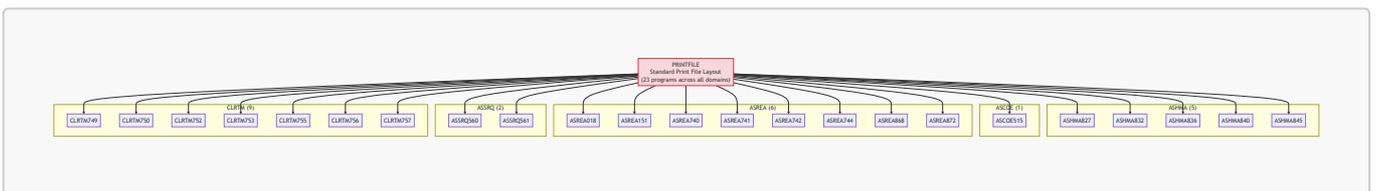
TWNINFOTBL (8 programs)

The Township Information Table provides township names and codes used for reporting and geographic grouping:

Program	Domain
ASHMA440	Homestead extraction
ASHMA550	Assessment master merge

Program	Domain
ASREA151	AV computation
ASREA178	Type 5-to-3 conversion
ASREA856	Township homeowner files
ASREA864	Landmark processing
ASREA872	Town response report
CLRTM750	Report by town within agency

7. Copybooks Used by Exactly One Program (Inlining Candidates)

During modernization, 27 copybooks that are used by exactly one program could potentially be inlined (absorbed directly into the program's code) to reduce file count and simplify the codebase:
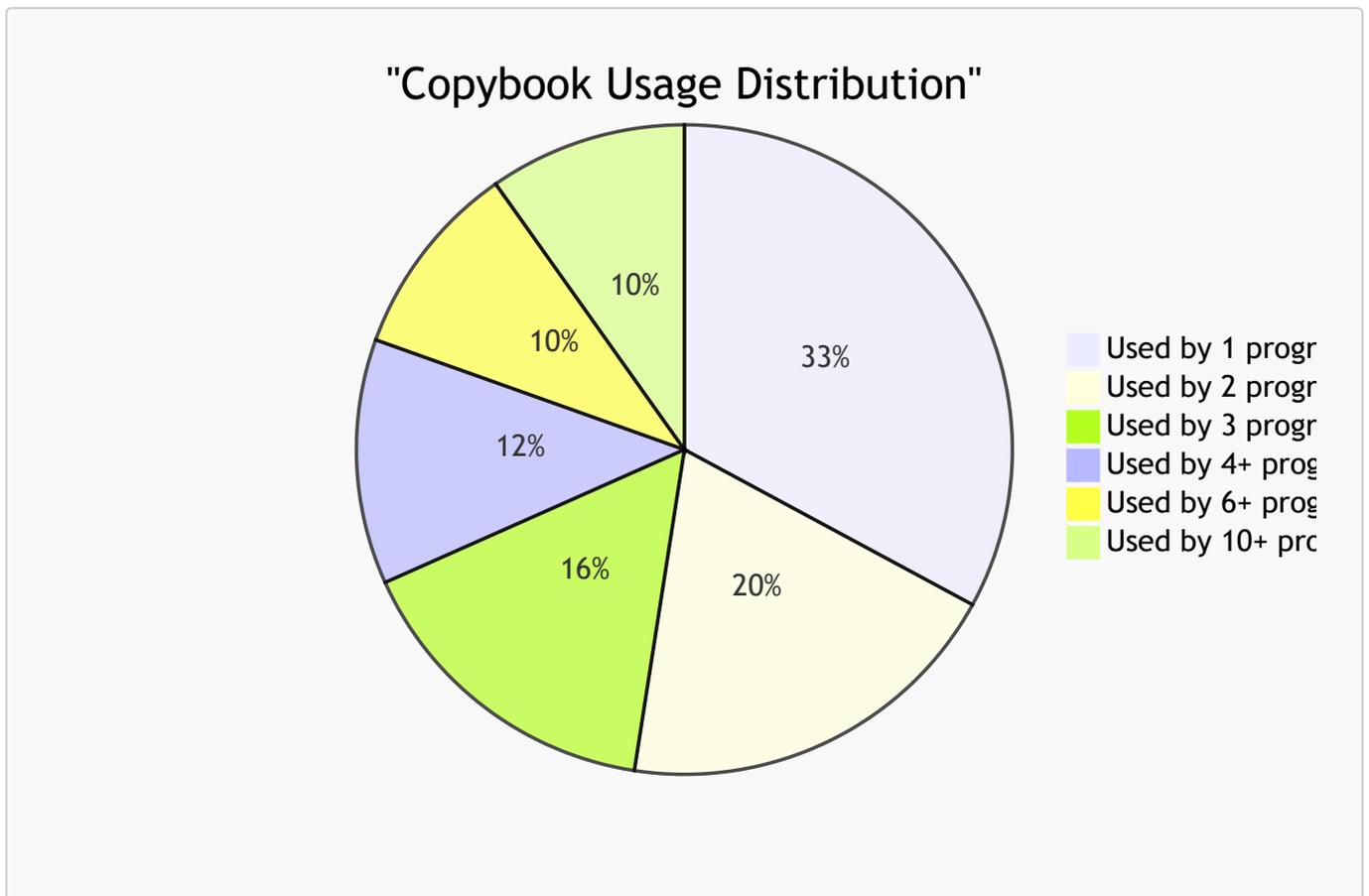
The 27 single-use copybooks include specialized IMS segment descriptors (ASAIS135SG, ASAIS140SG for COE segments used only by ASCOE500), domain-specific record layouts (COOPFLFD01 used only by ASHMA836), and validation routines (VALIDDATE2, VALIDCYMD2 used only by ASHMA828).

8. Modernization Coupling Matrix

The following table summarizes the "blast radius" of changes to key copybooks -- how many programs and domains would be affected:

Copybook	Programs	Domains	Modernization Risk
PRINTFILE	23	5 (all except CLREB)	Low -- standardized output format; easily replaced with modern logging/reporting
IMSCALLS	15	3 (ASCOE, ASHMA, ASREA)	High -- IMS call interface; requires database migration strategy
ASREASFD01	14	4 (ASHMA, ASREA, ASSRQ, CLRTM)	High -- core data structure; any schema change affects 14 programs
PIASSESSMT	13	2 (ASCOE, ASHMA)	High -- IMS segment layout; coupled to database schema
PIPCB1DESC	13	2 (ASCOE, ASHMA)	High -- IMS PCB; coupled to database configuration
ASAIS145SG	12	1 (ASHMA) + ASCOE	Medium -- Senior Freeze segment; domain-specific
ASAIS150SG	13	1 (ASHMA) + ASCOE	Medium -- Senior Freeze detail; domain-specific
TWNINFOTBL	8	4 (ASHMA, ASREA, CLRTM)	Low -- reference table; replace with config/database lookup
HOMOWNFD01	6	2 (ASHMA, ASREA)	Medium -- homeowner record layout
HOMEXERD01	6	1 (ASREA)	Medium -- exemption record layout; single-domain
CLFRZAGYF1	5	2 (ASREA, CLRTM)	Medium -- cross-domain bridge copybook