Getting your VSAM Data into DB2

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The Reality Today

- Many IBM Mainframe sites still have large portfolios of mission-critical VSAM applications.
- VSAM:
  - is not designed for open data access (reporting, analysis, data mining...)
  - data does not integrate well with data in relational database systems
  - is not easily accessible from other platforms
  - is not designed to support highly available, mixed online and batch workloads
  - maintenance and reorganization tools lack the richness of DBMS tools

Why convert from VSAM to DB2?

- Expose field-level data hidden inside 'opaque' VSAM records:
  - SQL, ODBC, JDBC
  - modern, end-user query tools
  - data mining
  - ...
- Make mainframe data accessible from 'any' platform type:
  - distributed applications
  - web applications
  - ...
- Continuous ('24 x 7') availability:
  - concurrent update, with integrity
    - multiple CICS region
    - batch and CICS
    - multiple batch streams
    - production work and housekeeping

  } - eliminate MRO overhead
  - else Transactional VSAM, and a Coupling Facility
- Exploit relational integrity, and other DB2 capabilities...

Gaining Open Access to VSAM Data – The Alternatives

'Gateway' Technology

- Performance overhead
- Restricted flexibility
- Doesn't address the operational issues
  - Concurrent online & batch, multiple DBA skill sets, etc.
- Additional license cost

Gaining Open Access to VSAM Data – The Alternatives

Duplicate Data in VSAM and DB2

- Day old syndrome
- Disruption to on-line service
- Multiple versions of the truth
- Synchronization issues
- Doesn't address the operational issues
  - Concurrent online & batch, multiple DBA skill sets, etc.

Gaining Open Access to VSAM Data – The Alternatives

Move to a new package/platform

- No investment protection
- Requires changes in working practices
- High project costs
  - Application customization
  - Data migration
  - End user training

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Gaining Open Access to VSAM Data – The Alternatives

VSAM to DB2 migration tools

- There are a number on the market to migrate data from VSAM to DB2
- Still leaves you to undertake the most expensive and risky part of the migration:
  - rewriting application programs to access the data in its new form

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CICS VSAM Transparency for z/OS

- program # 5697-I76

The CICS VT approach: low risk, with accelerated delivery

- No changes to existing application programs
- One-time data migration from VSAM to DB2
- Migrate one VSAM file at a time
- Supports extensive data re-engineering during the migration process
- Testing is simplified
- Working data exists in one place
- Value is delivered quickly

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CICS Tools

Application Reuse

CICS Business Event Publisher for MQSeries®
outbound event management using MQ

CICS Interdependency Analyzer
understanding active application inventory

Performance Management

CICS Performance Monitor
real-time performance management, monitoring and troubleshooting

CICS Performance Analyzer
comprehensive off-line performance reporting and analysis

Resource Recovery

CICS VSAM Recovery
recovery with integrity of mission critical VSAM data sets updated by CICS or batch applications

Operational Efficiency

Session Manager
multiple session management from single 3270 screen

CICS Online Transmission Time Optimizer
optimizes 3270 data streams to improve system performance and end-user productivity

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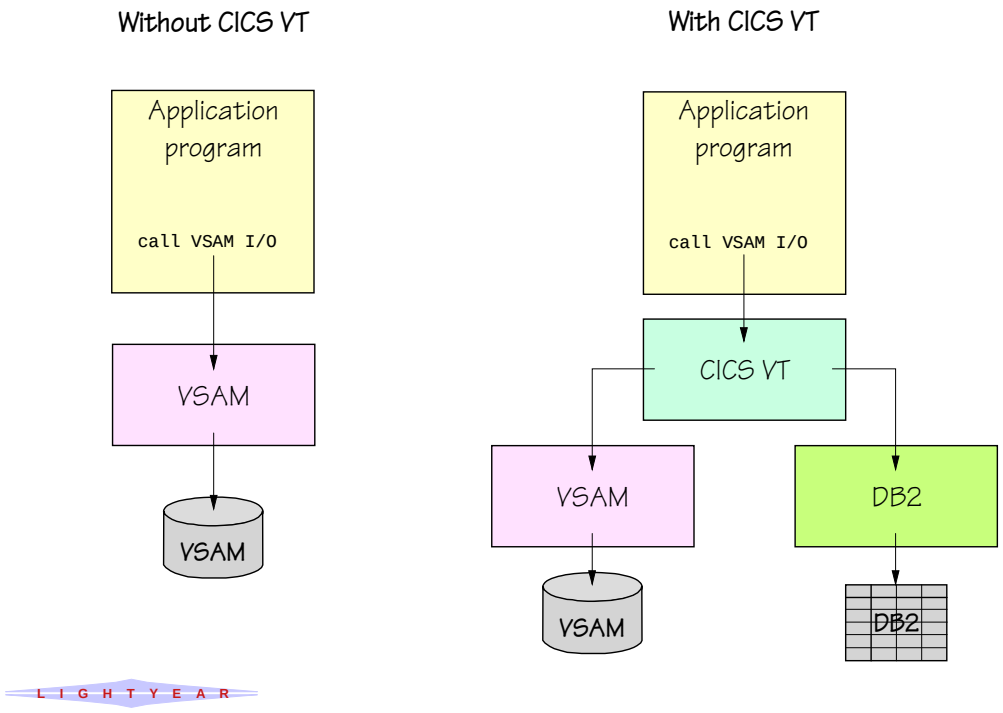
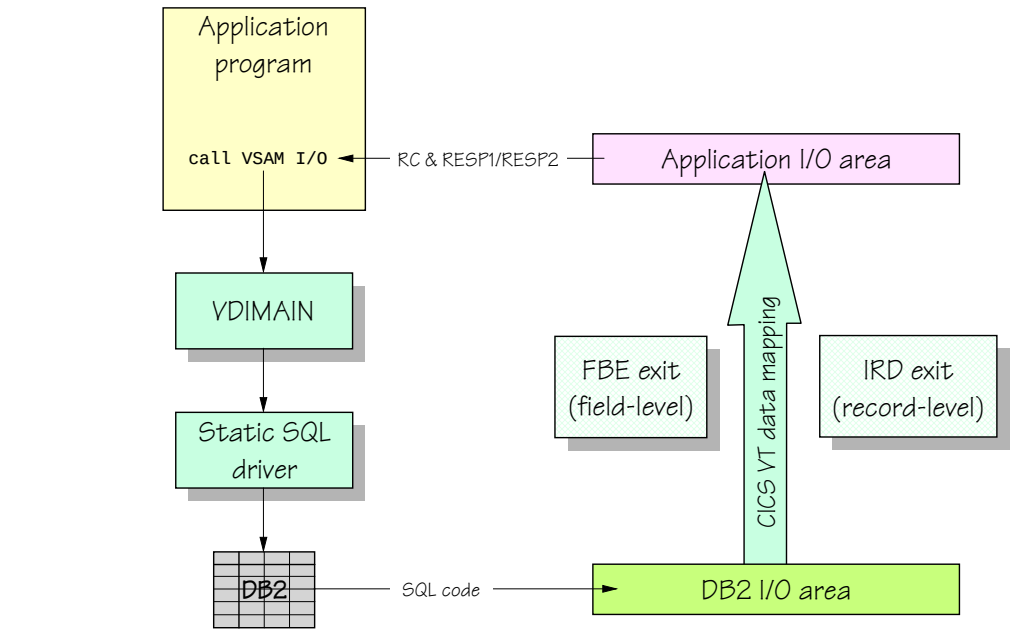
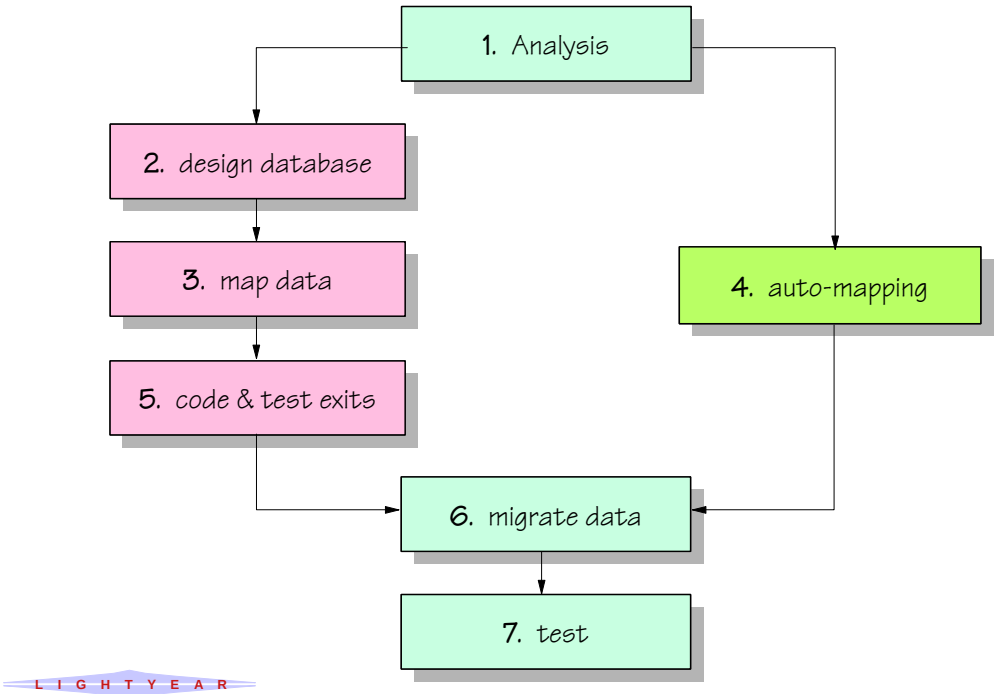
Execution Process Flow



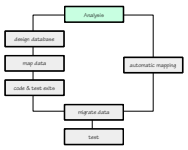
CICS VT Architecture



Migration Process Overview

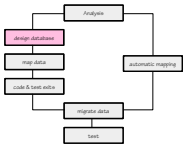


Analysis



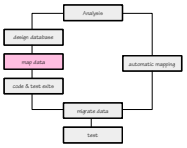
- Identify the files to be migrated
  - Enables you to define migration phasing
- Identify alternate index paths
- Identify all of the application programs that access the file.
  - Enables you to develop a test plan
  - Identify batch JCL procedures that need to be modified
- Locate record-layout COBOL copybooks for the files
  - Identify files that have multiple copybooks
- Decide how to deal with obsolete fields or record subtypes
- Identify future requirements for the file - e.g., additional columns?
- Identify maximum number of concurrent START BROWSE processes needed

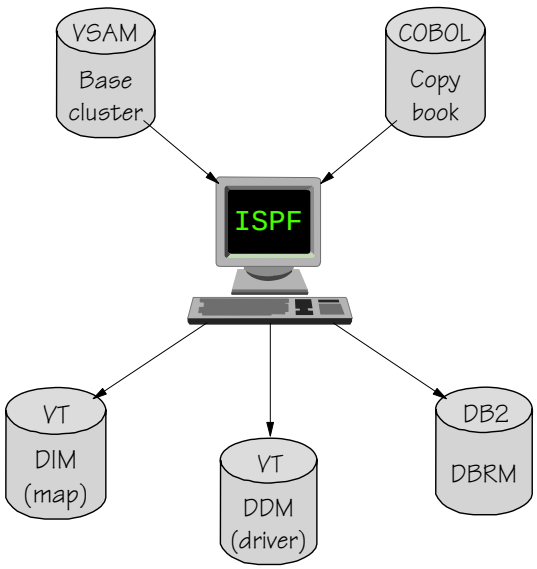
Database Design



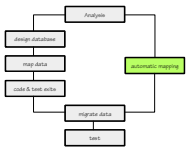
- One DB2 table for every VSAM data set
- VSAM base cluster key or RRN become DB2 primary key
- Copybook field becomes DB2 column (typically)
- Record subtypes handled through user exits and multiple DB2 tables
- Obsolete/filler fields do not need to be migrated
- Full support for PATH processing
- Not supported:
  - Access to an alternate index cluster as a regular data set.
  - ESDS and Linear data set types.
  - Processing using RBA access.

Mapping

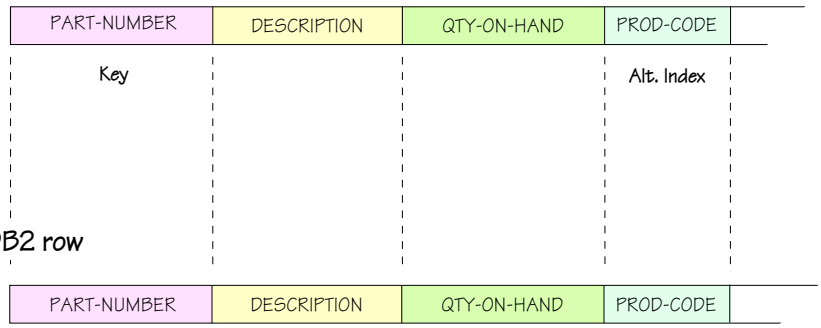




Mapping



VSAM record



VSAM Field to DB2 Column relationship using COBOL copybook

Mapping performed automatically or using interactive ISPF dialogues

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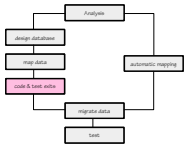
Exits



- Field-level:
  - Field Build Exit (FBE)
    - invoked automatically for retrieval from DB2, and on insert and update to DB2
    - typically, used for special data format conversions, verification routines, etc..
    - can include SQL calls
- Record-level:
  - Insert, Replace, Delete (IRD) exit
    - can be invoked automatically before and/or after DB2 update call
    - typically, used to handle DB2 columns that don't map to VSAM fields, and when VSAM records map to multiple DB2 tables.
- assembler language only!

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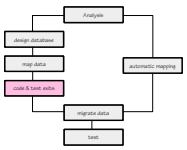
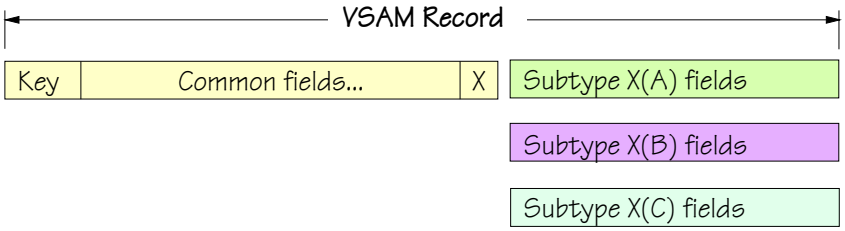
Redefined record structure





Equivalent DB2 Tables

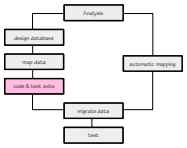
DB2TAB_COMMON	key + common columns
DB2TAB_SUBTYPE_A	key + subtype X(A) columns
DB2TAB_SUBTYPE_B	key + subtype X(B) columns
DB2TAB_SUBTYPE_C	key + subtype X(C) columns

CICS VT exit routines

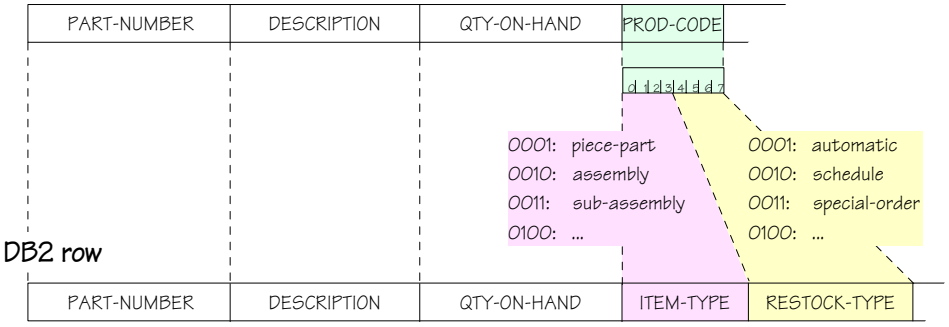
FBE: to read the appropriate _SUBTYPE table based on the value of 'X'

IRD: required for update processing based on the value of 'X'

Data Re-engineering example



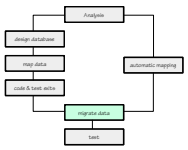
VSAM record



Exploit Field Build Exit (FBE) to enhance usability of DB2 version of data:

- separate components of complex codes
- translate codes to meaningful values
- and so on...

Data Migration



- CICS VT utilities:
  - VIDUNLOD:
    - unload VSAM file
  - VIDLOAD:
    - convert VIDUNLOD output to DB2 load format
    - scan for potential 'bad' data that may prevent DB2 load
- DB2 utilities:
  - generate the DB2 load control cards - DSNTIAUL sample program (or equivalent)
  - use the standard DB2 LOAD utility to load the tables

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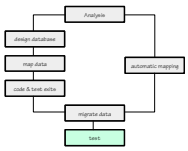
Testing



- Verify data mapping
  - run the VIDUNLOD program against the migrated dataset and compare with the output created during the migration activity
- Verify that the correct access paths have been selected by DB2
  - DB2 EXPLAIN output
- Test application programs
  - Usually, not necessary to test every program that accesses a migrated file
  - Data re-engineering main factor in determining rigor required during testing
- CICS VT trace facility for CICS and batch environments

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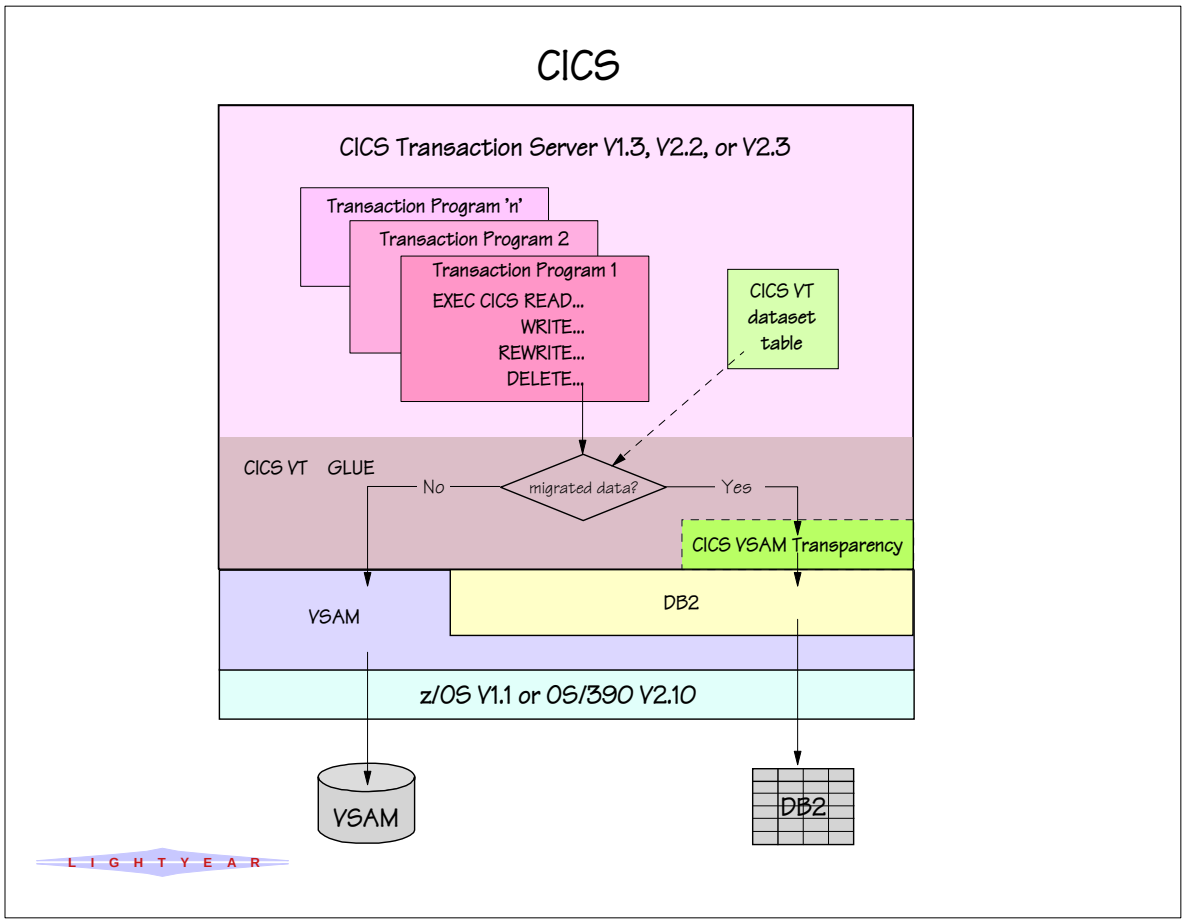
CICS
CICS Transaction Server V1.3, V2.2, or V2.3
Transaction Program 'n'
Transaction Program 2
Transaction Program 1
EXEC CICS READ...
WRITE...
REWRITE...
DELETE...
CICS VT dataset table
CICS VT GLUE
No
migrated data?
Yes
CICS VSAM Transparency
VSAM
DB2
z/OS V1.1 or OS/390 V2.10
VSAM
DB2
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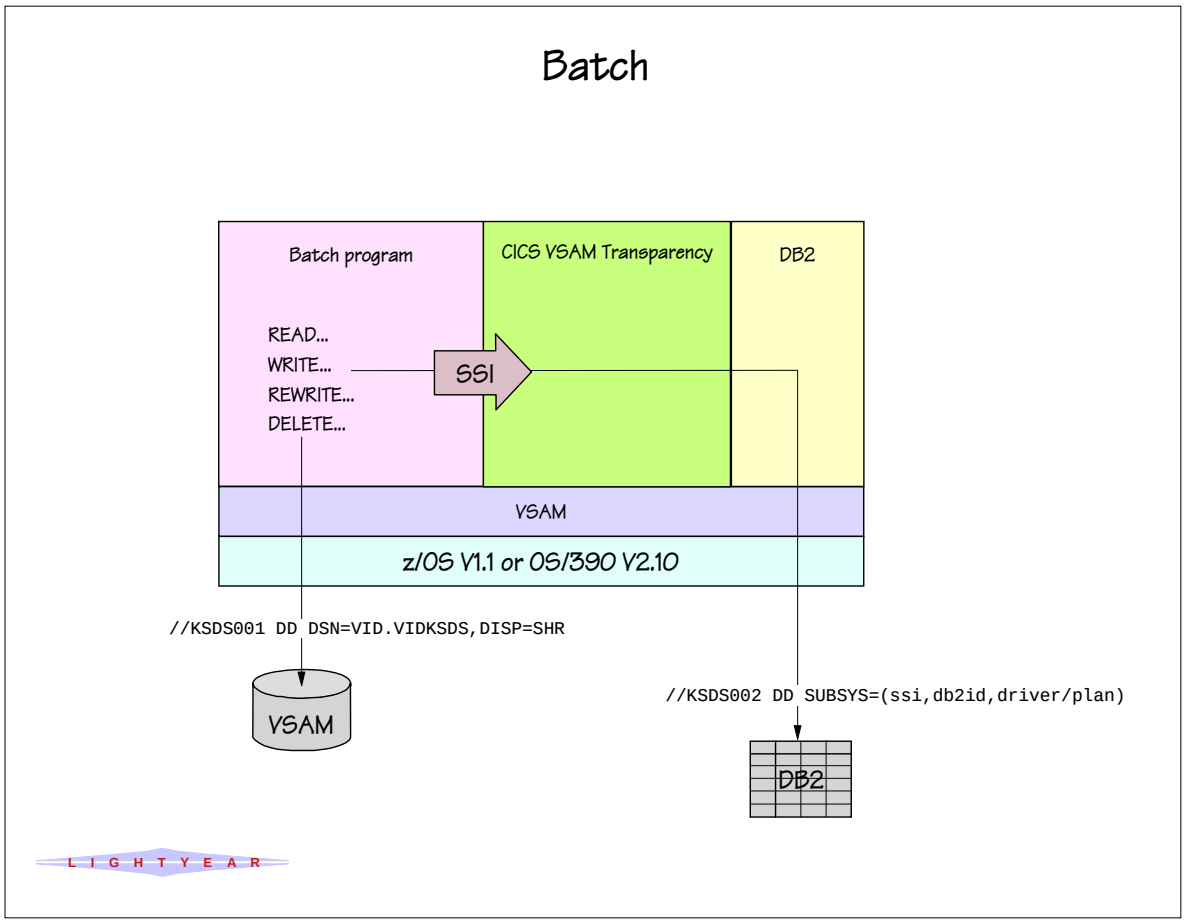
Batch
Batch program
CICS VSAM Transparency
DB2
READ...
WRITE...
REWRITE...
DELETE...
SSI
VSAM
z/OS V1.1 or OS/390 V2.10
//KSDS001 DD DSN=VID.VIDKSDS,DISP=SHR
//KSDS002 DD SUBSYS=(ssi,db2id,driver/plan)
VSAM
DB2
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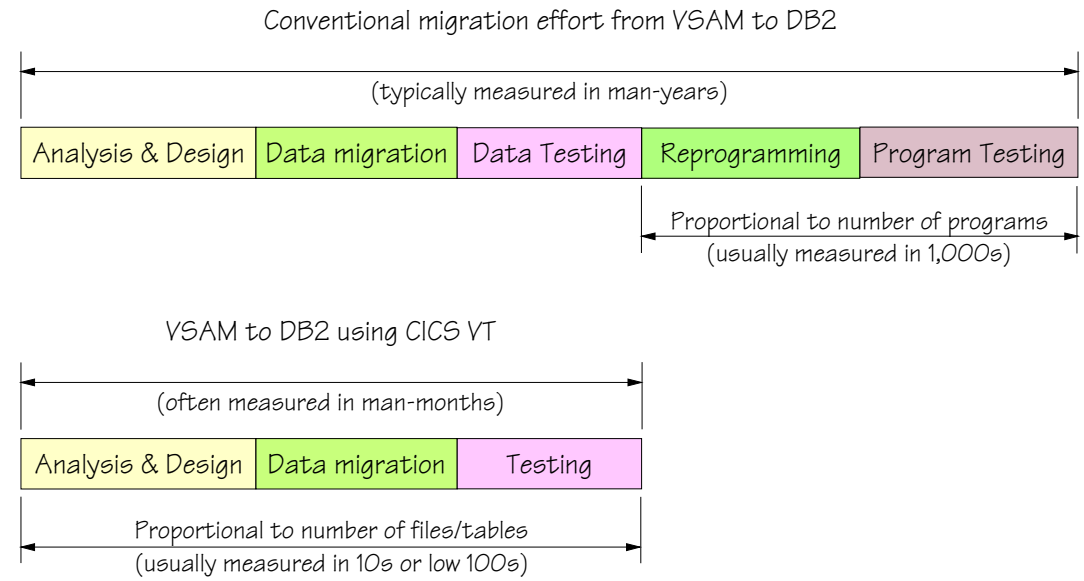
CICS VT vs. Conventional Method



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Why CICS VT?

- Faster implementation, and significantly lower risk than other solutions; proven technique based on 7 years of DL/2 (IMS-DB2) experience
- Take full advantage of DB2 capabilities
- Data opened up for flexible reporting and cross-platform access
- Single source of production data, available to all with consistent Quality of Service
- Single DBA skill set; relational skills (DBA & programming) readily available
- Preserves the investment in legacy application programs
- New applications can be 100% DB2 based

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The origins of CICS VT

- DL/2
  - First released in 1997 by **Circle Computer Group**
  - IMS to DB2 migration and transparency solution
  - 40+ customers worldwide
  - Protecting investment in over 10,000 application programs in one site alone

> *"Without DL/2 and its low risk approach,*
> *it is unlikely that we could have done this project at all."*
>
> Ferda Bek, Garranti Bank

- VS/2
  - Based on the same engine as DL/2, with a new, VSAM-specific front-end
- CICS VT
  - Non-exclusive licensed version of VS/2 marketed by

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Circle Computer Group

- Trusted and proven supplier
  to the IBM mainframe marketplace for 25 years
- Global software products and solutions
- Headquarters in Guildford, UK
- IBM BEST Team Partner

CICS VT or VS/2?

	CICS VT V1.1	VS/2 V1
Function	=	=
Support	m	
Services	m	

Services available from: Lightyear Consulting Ltd.

Palo Alto - Austin - Calgary - Laguna Beach - Scottsdale
www.lightyr.com

- Database migration to *DB2*
- *VS/2* and *DL/2* software sales and related services *(sole North American distributor)*
- *CICS*, *DB2*, *IMS*, & *z/OS* software and tools, sales and upgrades
- Customized on-site technical seminars & education classes
- *WebSphere MQ* and application integration services
- *CICS* & *IMS* Web enabling design and implementation
- Database and online system performance analysis and tuning