DL/2
The IMS to DB2 Transparency Migration Solution for Your Business Sustaining Applications

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Agenda

- **Introductions**
  - Circle Computer Group
  - Lightyear Consulting

- **Overview of DL/2**

- **New Features and Functionality**

- **Q&A**
The DL/2 Solution

- Migrate your business sustaining data from IMS to DB2 without changing any of your business sustaining application programs’ source code
- Retain the investment in your business sustaining applications
- Improve the availability and accessibility of your business sustaining data
Why Make the Move?

- IMS Skills are at a premium
- Support of multiple DB environments is drain on resources and man time
- The cost of IMS Licensing and 3rd Party tools are expensive but could be mitigated
- Access to IMS for data mining and reporting is limited and could be impacting your business
- The move from IMS to DB2 could provide significant business, and financial gains to your organization
Circle Computer Group  www.circle-group.com

- IBM mainframe software and services provider
- Global software products and solutions
- Specialists in Transparency Migration of Business Sustaining Applications
- DL/2 IMS to DB2 and VS/2 VSAM to DB2
- CICS VSAM Transparency for z/OS
  - IBM Program Product
  - Announced on Feb 19, 2004
  - www.ibm.com/cics/vt
About Lightyear

Lightyear Consulting

- Circle’s North American Distributor
- IBM Business Partner
- CICS, DB2, IMS, WebSphere MQ & z/OS education, software, tools
- Websphere MQ application integration
- Application development services
- Database Migration to DB2
- eServer Hardware

Palo Alto – Dallas – Boston – St Louis – Chicago – Scottsdale – Calgary
The DL/2 Approach

• Low Risk/Accelerated Delivery
  – Applications remain unchanged during the data migration
    • Legacy IMS calls are converted to highly optimized DB2 calls
  – Migrate one database at a time
    • Mapping and transformation tools help automate the process
  – Testing is simplified
    • Only checking for data transformation errors, not application logic errors
  – Value is delivered quickly
    • Fastest route to DB2
  – Application modification can then:
    • Proceed if required
    • Occur one application at a time
The DL/2 Approach

Without DL/2

Appl Prog

IMS Interface

DL/1

With DL/2

App Prog

IMS Interface with DL/2

Has data been migrated to DB2?

NO

DL/1

YES

DB2

Static SQL

Call Intercepted
Take full advantage of DB2 Capabilities

- 24*7 mixed workload support
- Easy integration with other applications
- Supports web enablement
- Data opened up for ad hoc access
- SQL is easier to maintain
- Single DBA skill set
- One operational database environment to support

While protecting your investment in your business sustaining applications
DL/2 Technical Overview

• Objective of DL/2

• DL/2 Architecture Overview

• Typical DL/2 Database Migration Process

• Database Design and Data Re-engineering

• Maintaining Applications Post-Migration
Objective of DL/2

“To allow you to migrate your IMS data to DB2 without having to change Application Programs”

- Program calls continue to be EXEC DLI / CALL xxxTDLI
- Program logic still driven by IMS Status Codes
- DB2 isolated into new programs
- SQL code checking handled externally
Run-time decision to process in IMS or DB2

APPL PROG IMS Stub

MIGRATED DATABASE?

NO YES

IMS DB2

APPLICATION I/O AREA

Data Exchange

DB2 I/O Area
Typical DL/2 Database Migration

- One-time activity per database DBD
- Requires:
  - Application Knowledge
  - IMS and DB2 DBA skills

DATA Quality dependency
Typical DL/2 Database Migration

Automation to generate DDL, database mapping, and some application testing
DB2 Database Design Options

- Each IMS Segment Type becomes a DB2 table
- IMS Concatenated Key become DB2 Primary Key
- Hierarchy maintained using Referential Integrity
- TIMESTAMP column for non-keyed segments
- DB2 Partitioning using Primary Key (if required)
How will the data be used after migration to DB2?

- If no SQL access is required, DB2 design should be based on DBD fields.
- If query or program access is required, DB2 design should be based on Copybook fields.
- Numeric and date data inconsistencies are almost inevitable with Copybook method.
Data Re-engineering

- **DL/2 Provides automated Re-engineering**
  - Any numeric date field can become DB2 DATE column
  - Zoned Decimal can become DEC, INT, SMALLINT
  - Filler fields do not need to be migrated

- **User APIs for more complex Re-engineering**
  - Field Level data verification
  - Repeating groups
  - REDEFINEd structures
Data Re-engineering

REDEFINED IMS SEGMENTS

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DB2 DESIGN

- **DB2TAB_COMMON**  KCOL_A, KCOL_B + Common area columns
- **DB2TAB_LAYOUT_A** KCOL_A, KCOL_B + Layout=A columns
- **DB2TAB_LAYOUT_B** KCOL_A, KCOL_B + Layout=B columns
- **DB2TAB_LAYOUT_C** KCOL_A, KCOL_B + Layout=C columns

- Field Build Exit (FBE) for data retrieval
- Insert Replace Delete Exit (IRD) for update
Data Re-engineering

Enhances business value of data in DB2

Flag resolved by application program code

Expanded country name maintained by DL/2 exits
Run-time decision to process in IMS or DB2

- APPL PROG IMS Stub
- MI GRATED DATABASE
- IMS
- DB2
- DL/2
- PCB Mask
- SQL Code
- APPLICATION I/O AREA
- DL/2 Data Re-engineering
- DB2 I/O Area
Call Interception at Application Program Runtime
Gets IMS call parms and PCBLIST
Executes DL/2 Driver Programs
  - Data Structures from DL/2 DBD Driver module
  - SQL Access by DL/2 SQL Driver module
Data and IMS PCB Feedback area returned to Application Program


- **DBD Driver Module**
  - Shows the Mapping of IMS record to DB2 Record
  - Includes any DL/2 data re-engineering
  - One per IMS database DBD

- **SQL Driver Module**
  - Contains SQL to access DB2
  - 100% Static SQL
  - Indexed Access Paths always used
  - One per IMS PSB
Typical DL/2 Database Cut Over

• After Testing Completed
  - Create DB2 Objects in Production DB2
  - Promote DL/2 DBD and SQL Drivers to Production
  - Define DL/2 objects to CICS
  - JCL changes to IMS MPRs, CICS, and Batch jobs
  - Migrate Production Database(s)
  - Register Migrated Databases
  - New DB2 Utility jobs required
Maintaining Applications Post DL/2 Migration

• Application Programs can be maintained as either IMS or DB2 programs
• New database calls can be coded in SQL
• New columns can be added to DB2 tables
  – Existing Copybook not necessarily affected
  – Existing Programs not necessarily affected
• Existing IMS calls can be converted to DB2 calls
Maintaining Applications Post DL/2 Migration

- If no changes to database calls are required, DL/2 is completely transparent to programmer
- No restriction on types of database calls
  - Existing IMS and DB2 programs supported
- DL/2 Library must be part of regular Program Management process
  - DL/2 Stub will resolve static IMS calls
Features Not Supported in DL/2 V2.3

- FASTPATH DBs using Calls not supported by ‘full function’ IMS
- Non-DL/1 calls to DL/1 DBs
- Independent ‘AND’ in SSAs
- Q’n’ COMMAND CODE
- IRD calls to Secondary IXs as Standalone DBs
- Applications not using IMS Services to access DBs
• **Projected Availability 3Q05**

• **Many enhancements:**
  - Functionality
  - Operability
  - Performance
  - Serviceability
Functionality Enhancements:

- Support CKPT, XRST, ROLS, & SETS
- Register GSAM database
- Compare Tool in CICS
Operability Enhancements:
- Drivers are re-entrant
- In CICS, Drivers can be RELOAD=NO
- Removed IMS segment size limit
- Mapper generates more objects
Performance Enhancements:

- Drivers are re-entrant
- Drivers are smaller in size
- DBOS support of variable length records
Serviceability Enhancements:
- Compare tool enabled at step level
- DL/2 trace facility enhanced
- Improved diagnostics
Questions ...