

**DATABASE AND APPLICATION
DEVELOPMENT IN THE '90s:**

THE CONFERENCE

Chicago, October 1-4, 1991

NDN
Norm De Nardi Enterprises
Presents

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DEVELOPMENT
IN THE '90S:
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**Application Migration
and Portability
David McGoveran
Alternative Technologies**

SHARING DATA

METHODS

- BROADCAST UPDATE
- READ OLD WRITE BOTH
- READ NEW WRITE BOTH
- 2PC
- BATCH SYNCHRONIZATION (TO OLD? TO NEW?)
- GATEWAYS (EXTERNAL, OPEN SERVERS)

MIGRATION: TECHNIQUES

- **COMMERCIAL CONVERSION UTILITIES & SERVICES**
 - **SmartStar**
 - **Trifox**
 - **IBM Conversion Guides**
 - **SQL SOLUTIONS**
 - **UNIFACE**

- **DESIGN MIGRATION: E.G. BACHMAN**

- **OPEN SERVERS, GATEWAYS**

MIGRATION: TECHNIQUES

- **IMPORT/EXPORT UTILITIES**

- **SOFTWARE LAYERS (COMPATIBILITY)**

- **DATABASE APPLICATION INTERFACE STANDARDS**
 - **ANSI EMBEDDED SQL**
 - **ANSI MODULE LANGUAGE**
 - **DAL (APPLE)**
 - **SQL ACCESS**
 - **SQL SERVICES (DEC)**
 - **RDA (IBM)**
 - **PROPRIETARY (OCI, DBLIBRARY)**

MIGRATION: KEY ISSUES

- RECORD VERSUS SET ACCESS
- PROCEDURAL VERSUS NONPROCEDURAL
- PHYSICAL VERSUS LOGICAL
- TRANSACTION MANAGEMENT
- SYSTEM CATALOG/DATA DICTIONARY
- PEOPLE ISSUES
 - TRAINING - EDUCATION AND INTERNALIZATION
 - EXPERIENCE
 - ACCESS TO EXPERTS

MIGRATION: COMMERCIAL UTILITIES & SERVICES

SMARTSTAR MIGRATION SERVICES

- **DATA MIGRATION**

- **SCHEMA REVERSE ENGINEERING & REDEFINITION**
 - **AUTOMATIC DATA TYPE CONVERSION**
 - ☞ EXAMPLE: Conversion from ORACLE system catalog to CDO usage.

- **FORMS CONVERSION**
 - **SQL*Forms, FMS, TDMS, DECforms, and SmartStar Forms**
 - ☞ EXAMPLE: Automatic conversion of SQL*Forms INP files to IFDL (Independent Forms Definition Language).

MIGRATION: COMMERCIAL UTILITIES & SERVICES

SMARTSTAR MIGRATION SERVICES

■ APPLICATION CONVERSION

- ☛ **EXAMPLE:** Conversion from SQL*Forms, SQL*Plus, SQL*Menus, and OCI to SmartStar. Triggers and other certain other proprietary constructs are not supported
- ☛ **BUT...** after conversion applications support Oracle, Rdb, RMS, Sybase, and others.

■ QUERY LANGUAGE CONVERSION

- ☛ **EXAMPLE:** Conversion from SQL*Plus to ANSI SQL.

MIGRATION: COMMERCIAL UTILITIES & SERVICES

TRIFOX TRIM/TOOLS

- **FORMS APPLICATION CONVERSION TO TRIM/APP**
- **REPORT APPLICATION CONVERSION TO TRIM/REPORT**
- **CONVERTED APPLICATIONS ARE DBMS-INDEPENDENT**
 - (Rdb, Oracle, Sybase, etc.)
- **DATA CONVERSION**
 - **LOAD UTILITY TO MIGRATE DATA**
- **CONVERSION IS NOT FULLY AUTOMATIC**
 - ☞ **EXAMPLE: SQL*Forms conversion does not support user-named triggers, global variables, SQL extensions, or version 3.0.**

MIGRATION: COMMERCIAL UTILITIES & SERVICES

- **IBM CONVERSION GUIDES**
 - **DATACOM/DB, ADABAS, IDMS TO SQL/DS AND DB2**

- **SQL SOLUTIONS**
 - **EASY SQL, SQR, SQL ADMINISTRATOR, SQL DEBUG, ETC.**

- **COGNOS POWERHOUSE**

- **IBI FOCUS**

- **UNIFACE**

MIGRATION: COMMERCIAL UTILITIES & SERVICES

BACHMAN/RE-ENGINEERING PRODUCT SET: I

- **/WORKSTATION MANAGER**
 - **GRAPHICAL USER INTERFACE**
 - **EXPERT ADVISOR,**
 - **DECISION LOGGER**
 - **A REQUIRED 386 PC-DOS PS/2**
 - **SESSION MANAGER**

MIGRATION: COMMERCIAL UTILITIES & SERVICES

BACHMAN/RE-ENGINEERING PRODUCT SET: II

- **/DATABASE ADMINISTRATOR (DB2) (IDMS)**
 - LOGICAL/PHYSICAL DATABASE DESIGN AND DOCUMENTATION
 - LOGICAL/PHYSICAL ER DIAGRAM REPRESENTATION OF DDL
 - CREATES KEYS AND INDEXES
 - DETERMINATION OF FREE SPACE REQUIREMENTS, SPACE ALLOCATION, ETC.,
 - TRACKS RELATIONSHIP TO DATA SOURCE
 - GENERATES DDL
 - EXPERT ADVISOR

- **/DBA Catalog Extract (DB2)**
 - CREATES A DDL FILE

MIGRATION: COMMERCIAL UTILITIES & SERVICES

BACHMAN/RE-ENGINEERING PRODUCT SET: III

■ /DATA ANALYST

☛ FOR DEVELOPING, CONSOLIDATING, EDITING, VALIDATING, AND RE-ENGINEERING INFORMATION MODELS.

- BUILD AND DOCUMENT NORMALIZED INFORMATION MODELS
- MIGRATION FROM IDMS, IMS, AND VSAM
- IMPORT/EXPORT FOR LINKING TO OTHER CASE AND DB2 TOOLS
- GRAPHICAL TOOLS
- EXPERT ASSISTANCE

■ /DA CAPTURE (IMS) (FILES) (IDMS)

MIGRATION: EVALUATION AND PLANNING

■ IMPORTANT CONCEPTS:

- VALIDATE APPLICATIONS AFTER CONVERSION (TEST DATA)
- ROW COUNTS SHOULD BE KNOWN
- UPDATES DURING CONVERSION SHOULD BE MINIMIZED
- AVOID RUNNING IN PARALLEL
- PERFORM IRREVERSIBLE CONVERSIONS LAST

■ IDENTIFY SOURCES AND TARGETS

- HARDWARE, O/S, LANGUAGES, DATABASES AND FILES
- MULTIPLE SOURCES OR TARGETS

■ MAJOR TASK

- CONVERSION TO A NORMALIZED RELATIONAL SCHEMA

MIGRATION: EVALUATION AND PLANNING

■ KEY COST FACTORS

- NUMBER OF PHYSICAL RECORD TYPES;
COMPLEXITY OF RECORD TYPES AND DIVERGENCE
FROM RELATIONAL
- REQUIRES EXTENSIVE APPLICATION KNOWLEDGE
- DATABASE SIZE
- NUMBER OF ACCESS METHODS (INDEXED, DIRECT,
RELATIVE)
- SET ORDERING; USE OF DUPLICATES
- NUMBER OF FIELDS OR COLUMNS
- NUMBER OF GROUPS, REPEATING GROUPS,
MULTILEVEL GROUPS, OR SETS
- REDUNDANT ELEMENTS
- UNDOCUMENTED DATA STRUCTURES
- COBOL REDEFINES OR C UNIONS

OPEN SYSTEMS

SAA (SYSTEMS APPLICATION ARCHITECTURE) I

- SPECIFICATION 3Q87

- PLATFORMS
 - SYSTEM /370 (TSO/E UNDER MVS/XA and CMS UNDER VM) WITH DB2 AND SQL/DS
 - AS/400 (OS/400 WITH SQL/400)
 - PS/2 (OS/2 EE DATABASE MANAGER)

OPEN SYSTEMS

SAA (SYSTEMS APPLICATION ARCHITECTURE) II

■ FOUR MAJOR COMPONENTS

- COMMON USER ACCESS (INTERACTIVE USE OF SCREENS)
- COMMON APPLICATIONS (APPLICATION PACKAGES)
- COMMON COMMUNICATIONS SUPPORT
(COMMUNICATIONS PROTOCOLS AND SERVICES)
 - ☛ 3270 DATA STREAM, 5250 DATA STREAM, DIA/DCA, IPDS, SDLC, TOKEN
 - ☛ Various protocol categories including OPEN - X.25, PROPRIETARY - RING, SNADS, SNA NET MANAGER, LU 6.2

OPEN SYSTEMS

SAA (SYSTEMS APPLICATION ARCHITECTURE) III

- **COMMON PROGRAMMING INTERFACE
(PROGRAMMING LANGUAGES AND SERVICES)**
 - ☛ Languages include C, COBOL, FORTRAN, PL/I and RPG. Other languages and services include a procedure language based on REXX (VM), application generation statements based on CSP; services include database interface (SQL), dialog interface based on the IBM PC EZ-VU product, presentation interface similar to that in the IBM graphical data display manager product (GDDM), query interface based on (extensions to) QMF.

OPEN SYSTEMS

NAS (DEC NETWORK APPLICATION SERVICES) I

- ☛ "A SET OF SOFTWARE THAT ENABLES APPLICATIONS INTEGRATION ACROSS A DISTRIBUTED, MULTIVENDOR ENVIRONMENT CONSISTING OF STANDARDS-BASED PROGRAMMING INTERFACES, TOOLKITS, AND PRODUCTS THAT HELP DEVELOPERS BUILD APPLICATIONS WHICH ARE WELL-INTEGRATED AND MORE EASILY PORTABLE ACROSS SYSTEMS."

OPEN SYSTEMS

NAS (DEC NETWORK APPLICATION SERVICES) II

- NAS REPLACES SERVICES
 - FILE, UI, GKS, CDA, ETC.
 - FORMS, TERMINAL, GRAPHICS, WINDOWING,
 - APPLICATION CONTROL SERVICES, ETC.

- NAS SUPPORTS VAX/VMS AND RISC/ULTRIX DIRECTLY

- INTEROPERABILITY WITH OSI, DOS, OS/2, MAC,
 - TERMINALS (VTS, 3270S, DECWINDOWS)
 - IBM (SNA AND VIDA)

OPEN SYSTEMS

NAS (DEC NETWORK APPLICATION SERVICES) III

- **FOUR MAJOR COMPONENTS**

- **APPLICATIONS ACCESS SERVICES:**
 - ☛ LIKE CUI, INCLUDES WINDOWING SERVICES (DECWINDOWS, DECFORMS) VT EMULATORS, GRAPHICS SERVICES (DEC GKS, DEC PHICS) APPLICATION CONTROL SERVICES (LIVELINK, BUIDER WITH DECDECISION)

- **COMMUNICATIONS AND CONTROL SERVICES**
 - ☛ MESSAGING SERVICES (MAILBUS WITH ALL-IN-1, EDI SERVICES WITH DEC/EDI, RPC SERVICES WITH DECRPC)

OPEN SYSTEMS

NAS (DEC NETWORK APPLICATION SERVICES) IV

■ INFORMATION/RESOURCE SHARING SERVICES

- ☛ MAKE INFORMATION AND RESOURCES AVAILABLE TO USERS AND APPLICATIONS ANYWHERE ON A NETWORK. INCLUDES COMPOUND DOCUMENT SERVICES WITH CDA TOOLKIT, CDA VIEWERS, CDA CONVERTER LIBRARY, DECIMAGE APPLICATIONS SERVICES; DATA ACCESS SERVICES WITH SQL/SERVICES AND ULTRIX/SQL; REPOSITORY SERVICES WITH CDD/PLUS; FILE SHARING WITH PCSA, ALL-IN-1, NETWORK FILE SYSTEMS; PRINTING SERVICES WITH DECPRINT, PRINTSERVER20 AND 40, SCRIPTPRINTER, DECPRINT UTILITY FOR POSTSCRIPT TO SIXEL, PCSA.

OPEN SYSTEMS

NAS (DEC NETWORK APPLICATION SERVICES) V

- SYSTEM ACCESS SERVICES:
 - ☞ ENABLES THE APPLICATION TO CALL FOR FUNCTIONS IN THE OPERATING SYSTEM: POSIX THE X/OPEN, OPEN SOFTWARE FOUNDATION, AND NIST PORTABLE OPERATING SYSTEM INTERFACE.

- VMS CALLING STANDARD:
 - ☞ A FACILITY LIKE CPI THAT IS RELATED TO NAS BUT IS ALWAYS A PART OF DEC VMS ENVIRONMENTS.

OPEN SYSTEMS

NAS (DEC NETWORK APPLICATION SERVICES) VI

■ DEC NAS PRODUCTS INCLUDE

- DECWRITE, DECDECISION, ALL-IN-1, VAX/VTX, DECDESIGN, EDCS, DECIMAGE SCAN, DATATRIEVE, VAX NOTES, VAX SET

■ THIRD PARTY NAS PRODUCTS

- OVER 1,100 VENDORS BUILDING APPLICATIONS USING NAS INCLUDING COGNOS, INFORMATION BUILDERS, SMARTSTAR, COMPUTER ASSOCIATES, AND LOTUS.

PORTABLE APPLICATIONS

■ DBMS INCOMPATIBILITIES

- SQL DML
- RI
- CATALOG
- DDL & PHYSICAL DESIGN
- BACKUP AND RECOVERY PROCEDURES AND REPORTS
- TRANSACTION MANAGEMENT
- PERFORMANCE AND OPTIMIZATION

■ LANGUAGE PORTABILITY

PORTABLE APPLICATIONS

- SOFTWARE ARCHITECTURES
- DANGERS OF EMBEDDED SQL VERSUS APIs
- INDEPENDENCE
 - MACHINE
 - O/S
 - LANGUAGE
 - DBMS
 - NETWORK
- LOGICAL VS. PHYSICAL INDEPENDENCE