

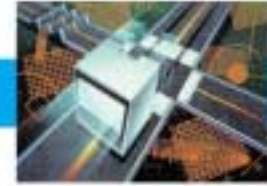
Planning and Performing Database Migrations

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HP Platinum Partner

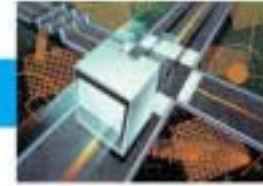




Agenda

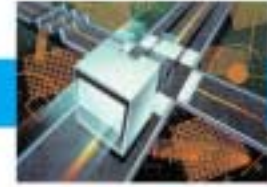
- Database Architectures
- Migration Planning
- Migration Implementation
- Database Migration Tools Review
- Questions & Answers





Database Architectures

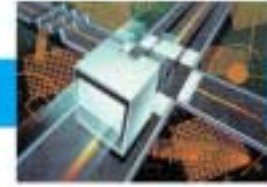




Overview

- Most popular databases used on HP e3000 do not exist on HP-UX or Windows
- Migration really means conversion
- Years of experience to learn from

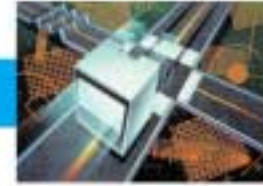




HP e3000 Databases

- TurbolImage
 - Omnidex, Superdex, TPI, others
- Allbase
- KSAM
- MPE Flat Files
 - circular, msg, RIO, temp, etc.

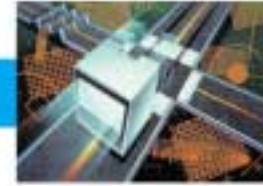




TurboImage

- Network topology
- Unique features
 - Datasets and Items
 - Master/Detail
 - Keys
 - Chain read
 - Sort items
 - Security paradigm
 - Migrating secondaries, etc.
- 3rd party Indexing
- DBSCHEMA & DBUTIL

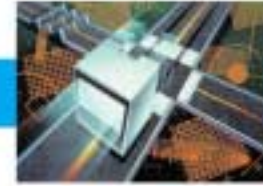




Eloquence

- 95% of Image functionality
 - Supports Image Calls
 - Missing some of the newer features
- Ideal for up to 500 concurrent users
- Interesting to mainly small to mid-sized customers and ISVs
- Many vendors are or will soon be supporting Eloquence
- Upcoming support for Omnidex
- 2000-5000 customers worldwide
 - Only ~200 using Image intrinsic interface
- \$7,000 per server

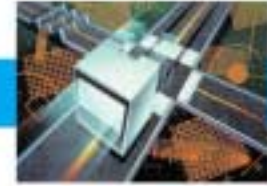




RDBMS

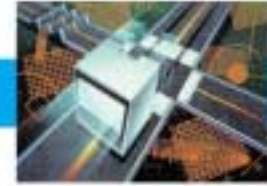
- Particularities
 - Tables not Datasets
 - Columns not Items, Rows not records
 - Indexes
 - Views and table joins
 - Column Item types
 - No arrays
 - Nulls
 - Triggers
 - Rollbacks
 - Data page and log file caching
 - Administration tools
- Unique features, SQL extensions
- Need a Database Administrator





Migration Planning

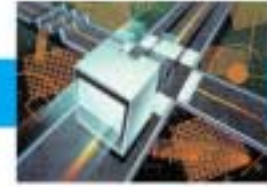




RDBMS selection

- What DB can support my existing db access needs
- Factors to consider
 - Price
 - Market share and popularity
 - Manufacturer credibility
 - Support track record
 - User license cost
 - Support and upgrade cost

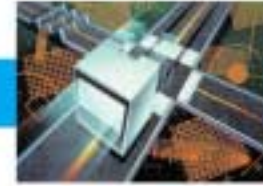




Technical considerations

- Efficiency / Performance
- Maintenance ability
- Supporting tools
- Stability
- Scalability
- Administration
- DBA Tools

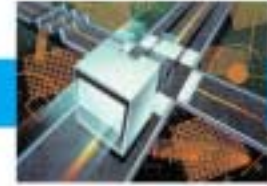




Choices

- Oracle (Unix/PC)
- SQL Server (PC)
- DB2 (Unix/PC)
- Eloquence (Unix/PC)
- Sybase (Unix)
- Informix (Unix/PC)
- PostgreSQL/MySQL (Unix/PC)
- C-ISAM/D-ISAM (Unix/PC)
- Access and others (PC)
- Flat (Unix/PC)
- Others...

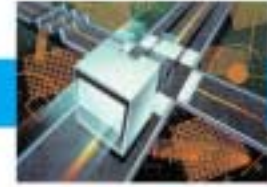




Migration planning

- Assess current environment
- Understand current HP support constraints
- Timeframe, effort, milestones
 - When can you start?
 - Test machine
 - Completion expectance
 - Prior to end of 2006 or beyond?

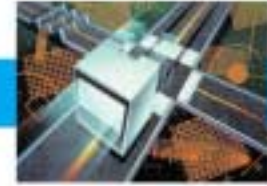




Analyze current system

- CPUs, users, connections, databases, disk space
- Applications (critical, non-critical, purchased)
- 3rd party vendors for all apps and tools
- Types of languages
- User interface
- Data entry screen tools
- Development tools
- Operational tools
- Critical state preservation

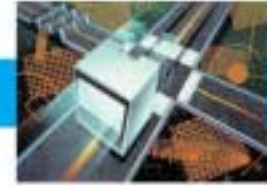




Analyze current DB

- Datasets Relationships
- Security
- Item storage types
- Date items
- Buffer items and redefinitions
- Dirty data
- Arrays
- Data transaction volume and performance (throughput)

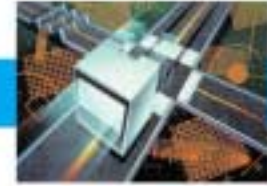




Migration planning

- New database structure
 - Identical copy (Phase 1)
 - Quicker method
 - May have performance issues
 - Not taking advantage of SQL
 - Note: Even a DB replication may require some code adaptation
 - Optimization / Improvements (Phase 2)
 - More effort
 - More efficient
 - SQL features, extensions, etc.

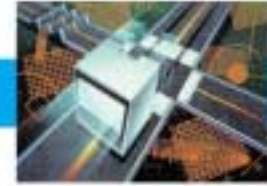




Migration planning

- Automatic masters disappear
- Manual masters become tables
- Detail datasets of Manual masters become table with a foreign key constraint
- Item -> column type conversion
- Data conversion
- Image SORT items become clustered Indexes
- IMSAM/Omnidex: Indexed keys become Indexes and queried with LIKE operator, unless using Omni-Access

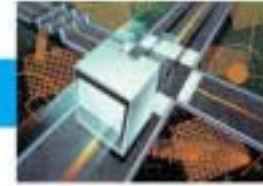




Migration planning

- What about Omnidex and Superdex?
 - Relational Databases have strong data querying capabilities
 - However, most of the commonly-used Omnidex functionality doesn't exist. (keyword retrieval)
 - Omnidex has a migration path to Omni-Access
 - API compatibility libraries exist, reducing need to re-write queries.
 - Superdex – best option is migration to Omni-Access.
- Omni-Access is not as simple a product to implement as Omnidex

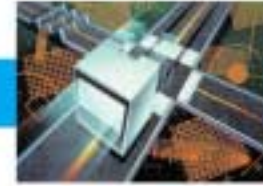




Migration planning

- Nulls
 - Used with SQL extensions
 - Define columns as NOT NULL
 - Least impact on code
 - Cannot take advantage of NULLs
 - Define some columns as NULL
 - May impact the code
 - Can take advantage of NULLs

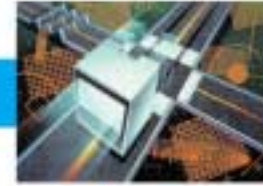




Migration planning

- Arrays
 - Method 1: One big column
 - Some code changes may be required
 - Not recommended for Integer or Pack
 - Method 2: 1 column per occurrence
 - Some code changes required
 - Recommended for Integer or Pack
 - Method 3: New table, one row per occurrence
 - Significant code changes required
 - More flexible

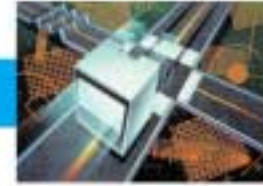




Migration planning

- Dates
 - CHAR 8
 - Keep as is
 - Does not impact code
 - Change to Datetime/Timestamp
 - Consider if time logging is needed
 - Consider to take advantage of Datetime features
 - Some code changes may be required
 - CHAR 6
 - Similar to CHAR 8
 - Potential problems with new external tools if using HPDATE
 - Julian
 - Keep or Change concept
- *Over 250 ways in which dates have been stored in HP e3000 applications*

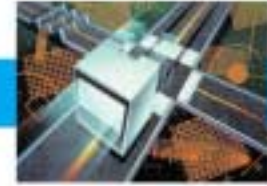




Migration planning

- Integers
 - RISC / Itanium: Keep same format
 - CISC: Little/Big endien issue

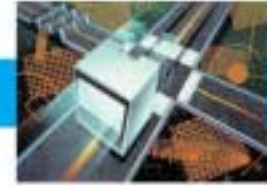




Application DB Access

- Can you keep the code as is?
 - Tools can translate DB access intrinsics to native or general access functions
 - Keep the intrinsics and use a mapper API, which will make the appropriate native translation
- Define access method
 - Native
 - API mappers
 - ODBC/ADO/JDBC/etc.

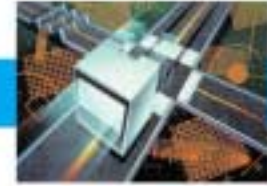




Methods of Moving Data

- Export/Import
- DB migration tools
- Write your own transfer programs

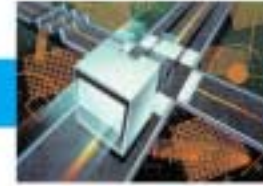




Tests and refinement

- Migration tests
 - Data integrity tests
 - Data transformation tests
 - Application data access tests
 - Performance Benchmarking

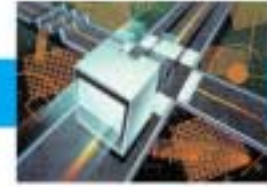




Migration methods

- Data Migration Options
 - Big Bang / Magic Weekend
 - Not usually practical
 - Running systems in parallel
 - Incremental loading
 - Parallel processing

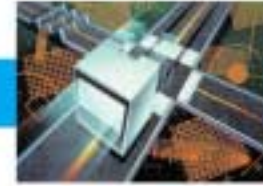




Migration planning

- Features = changes
- Don't over do it
- Ensure that new db type and structure will be compatible with the existing apps

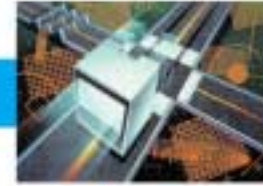




Migration planning

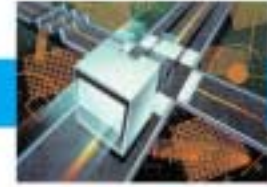
- Second phase improvements
 - Normalization
 - Views and table joins
 - Code optimization for direct SQL access
 - DateTime
 - Null items
 - Triggers





Migration Implementation

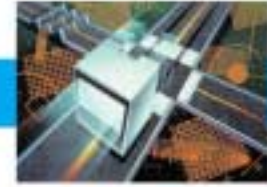




Setup new RDBMS

- The DBA issue
 - Training, hiring
 - Remote access
- Install new db on new platform
- Make minimum access and configuration adjustments
- Create test database
- Link machines on network

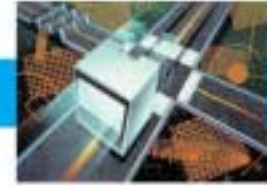




Migration implementation

- Make copy of source database
- Create new db structure
 - Native RDBMS tools
 - Native Schema scripts
 - Automated tools
- Consolidate and Replicate the data
- Test the applications
- Data mirroring (pre and post production)

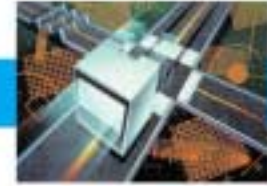




Migration implementation

- Option 1: Manual Data Export/Import
 - Export data to flat files
 - Endian issue
 - Build import scripts
 - Column type conversions
 - Nulls
 - Dates
 - Arrays
 - Security
 - Import data from flat files through scripts

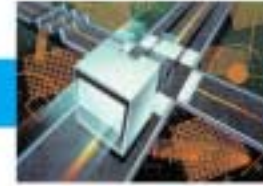




Migration implementation

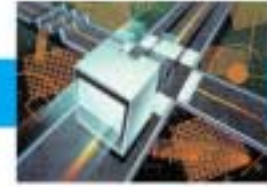
- Option 2: Database migration tools
 - GUI
 - Global changes
 - Column types conversions
 - Endien issue
 - Arrays
 - Nulls
 - Dates
 - Security
 - In-flight transformation
 - Mirroring features





Database Migration Tools Review

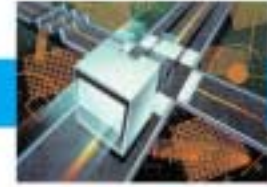




Database Migration Tools

- Focused products for TurboImage
 - Quest/Taurus – Bridgewater
 - Speedware – DBmotion
 - MB Foster – UDACentral
 - OmniSolutions – SqlLink 3000
 - And other bridges (XenoBridge, Robelle, DISC, WRQ, iMaxSoft, VitalSoft, etc.)
- App migration tools that offer some level of DB migration
 - Neartek, Denkart, Transoft, Sungard BI-Tech





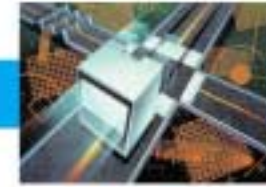
BridgeWare

co-product of Quest Software and Taurus Software

- Customer Migrations
- Staged migration = no user downtime
- Fast map and load data with GUI
- No database expertise required
- Highlights “dirty data”
- Complex transformations
- Real-Time MPE data capture
- Bi-directional, high speed data movement

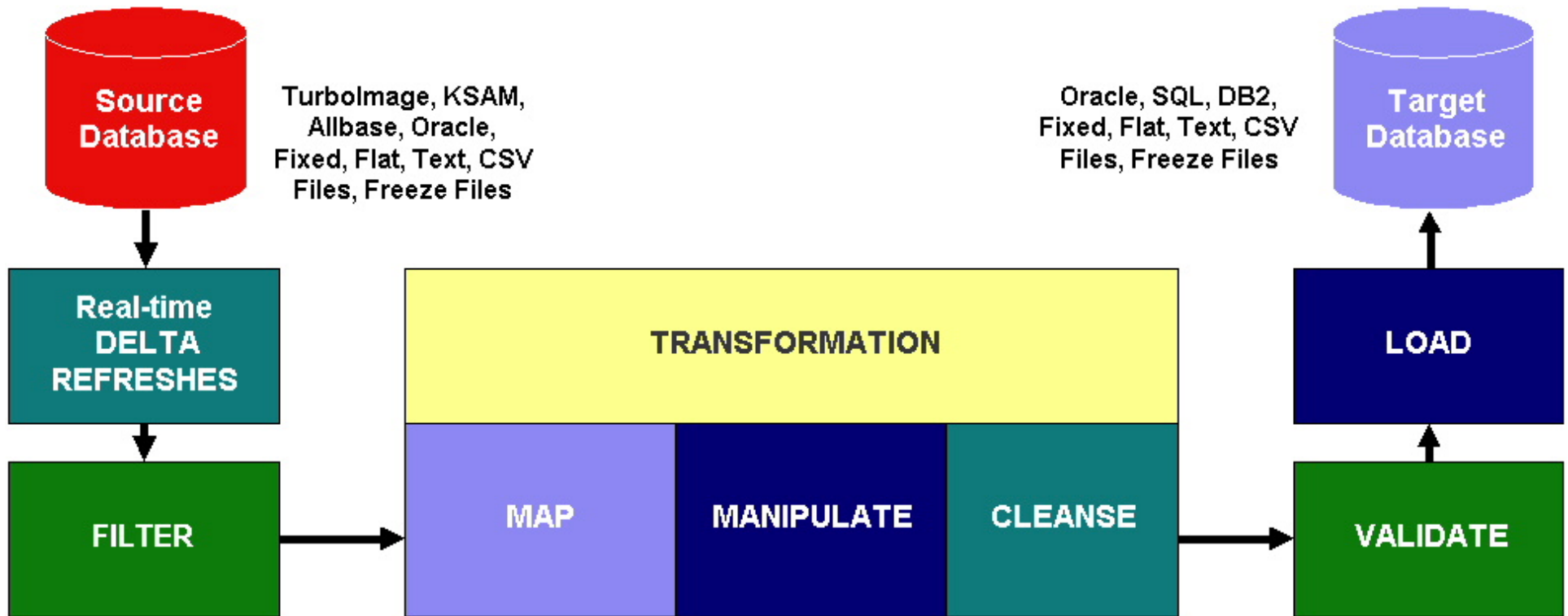
powered by
BridgeWare
co-product of Quest Software &
Taurus Software





BridgeWare Process

BridgeWare HP e3000 Migration to Open Systems



powered by **BridgeWare**



co-product of Quest Software & Taurus Software

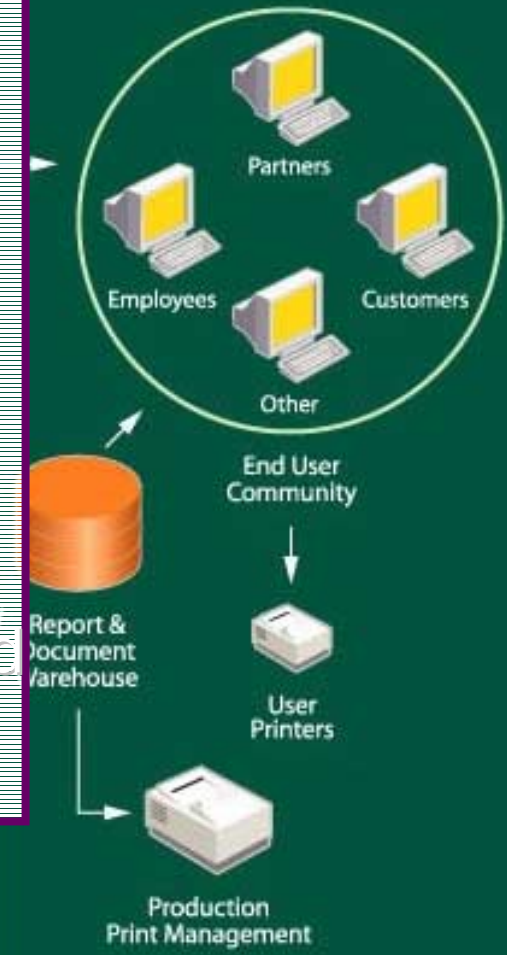


The New Application Infrastructure

Development

End Users

- Tools for designing, testing and benchmarking the new environment
- Tools for monitoring and diagnosing root cause issues in production
- Tools for high availability & reporting
- Tools for Print archival and printing



The Application Infrastructure

Development & Test

Production

End Users



Development & Deployment

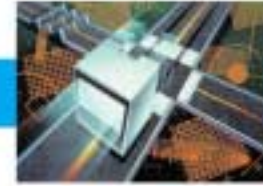
- QDesigner –Design & Develop
- Benchmark Factory –Load Testing, Scalability prior to “GO LIVE”
- SQL Impact - Analyze impact of schema changes and code effected
- Spotlight – Detect, diagnose, resolve root cause
- Schema Manager -Create, track and deploy schema changes throughout the application lifecycle

DBAs

High Availability
& Reporting
Databases

Business
Intelligence
Databases

Production
Print Management



DBmotion

from **SPEEDWARE**

Years of migration experience
in one powerful tool

- Benefits
 - Saves you significant time by automating much of the process
 - Designed for e3000 databases
 - Easily fits into your migration budget with it's affordable price
- Features
 - Supports Image/Ksam/Flat to Oracle (any server) and SQL Server. Also automates Omnidex -> OmniAccess.
 - Easy to use GUI interface filled with wizards
 - Automates database structure replication
 - Creates target database
 - Offers complete control of global naming and datatype adjustments
 - Provides default structure and datatype mapping
 - Automates all data transfer and conversion
 - Estimates time to copy rows of tables and whole databases
 - Supports multiple simultaneous database migrations with detachable client
 - Handles arrays, nulls, dates and Omnidex!
 - Merge Databases and files into one target Database
 - Provides reporting features to better understand database files and items



DBMotion - [Database Definition]

File Edit View Tools Window Help

Source Database: Target Database:

Source - Columns - EducTe

Property	Value
Name	CRS-CODE
Physical	
Data Type	X4
Key Options	
Key Type	STANDARD
Primary	YES
Unique	YES
Sort Item	
Master	

Target - Columns - EducTest.CRSMAS

Property	Value
Name	CRS-CODE
Physical	
Null Support	NO
Data Type Op	
Data Type	CHAR(4)
Type	CHAR(p)
Precision	4
Scale	0
Key Options	
Key Type	STANDARD
Primary	YES
Unique	YES
Foreign File	
Foreign Item	

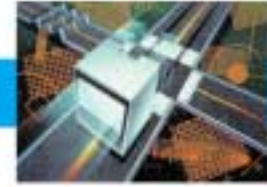
Find and Replace Wizard - Adjustment Confirmation

Confirm the objects you want to change:

	Source Name	Source Datatype	Target Name	Target Datatype	New Target Name	New Target Datatype
<input checked="" type="checkbox"/>	CRS-CODE	X4	CRS-CODE	CHAR(4)	CRS_CODE	VARCHAR(30)
<input checked="" type="checkbox"/>	CREDITS	I	CREDITS	SMALLINT	CREDITS	INT
<input checked="" type="checkbox"/>	CURRENT-PRI	I2	CURRENT-	INT	CURRENT_	INT
<input checked="" type="checkbox"/>	INST-QUAL-NO	I2	INST-QUA	INT	INST_QUAL	INT
<input checked="" type="checkbox"/>	MAX-STUDENT	I	MAX-STUD	SMALLINT	MAX_STUD	INT
<input checked="" type="checkbox"/>	NAME	X30	NAME	CHAR(30)	NAME	VARCHAR(30)
<input checked="" type="checkbox"/>	PASSING-GRA	I	PASSING-	TEXT	PASSING_	INT
<input checked="" type="checkbox"/>	PREREQ-CRS-C	X4	PREREQ-C	CHAR(4)	PREREQ_C	VARCHAR(30)
<input checked="" type="checkbox"/>	STATUS	X2	STATUS	CHAR(2)	STATUS	VARCHAR(30)
<input checked="" type="checkbox"/>	TOTAL-HRS	I	TOTAL-HR	SMALLINT	TOTAL_HR	INT

Log Window Find Name or Datatype 1 Find Name or Datatype 2

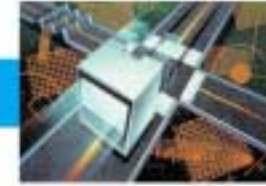
Help < Back Finish Cancel



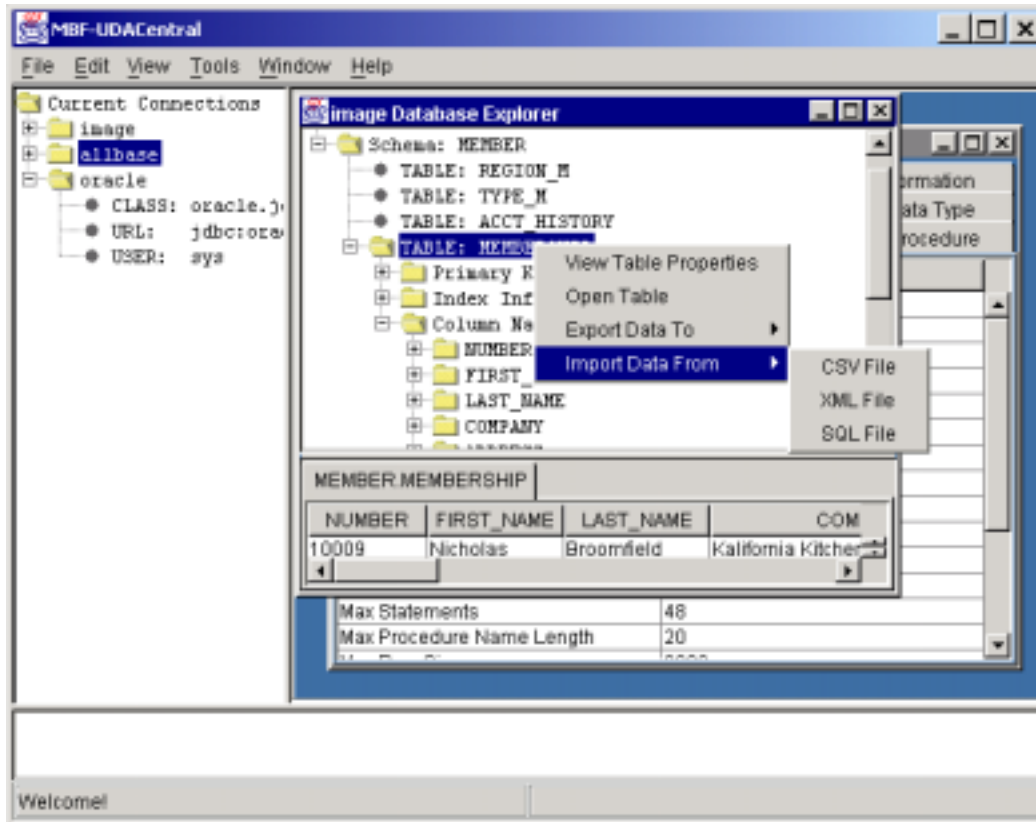
MB Foster UDACentral

- MB Foster's UDACentral provides migration capabilities that include :
 - Database Explorer
 - JDBC Explorer
 - Database Converter
 - Data Import/Export with conversion
 - Data Editor
 - Dynamic SQL Supporter
 - Distributed Query Execution





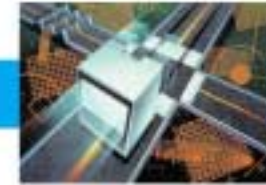
MB Foster UDACentral



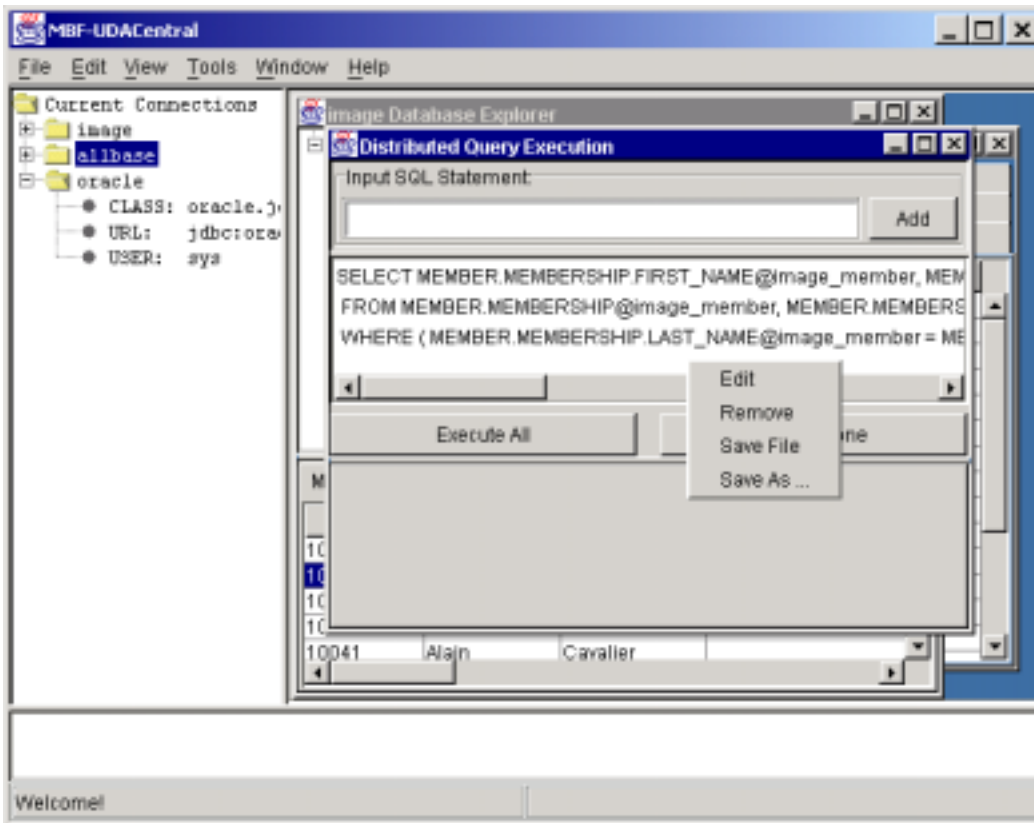
Import/Export Capabilities :

You can import/export data in a number of formats, including XML, CSV, HTML, eMail and SQL.



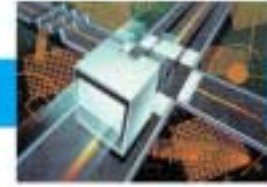


MB Foster UDACentral



Distributed Query Execution allows you to create, edit, execute and save distributed SQL queries. You can also re-use queries from the Distributed Query Wizard. Results can be exported in a number of formats.





SqlLink3000

- SqlLink3000 allows you to access any ODBC compliant SQL database from your HPe3000.
- SqlLink3000 uses Microsoft ADO and TCP/IP to access your Sql data.
- SqlQuery, an interactive 'query- like' tool is included, so you can access your data without programming.
- Data server is multi-threaded, giving the highest level of performance.

[OmniSolutions, Inc.](#)

GLI
INNOVATIONS



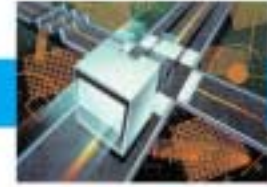
LUND
SOFTWARE SOLUTIONS



mbs
MANAGED BUSINESS SOLUTIONS

SPEEDWARE





SqlLink3000

- SqlLink3000 features:
- Read/Write access to your database
- Supports Insert/Update/Delete/Exec statements
- Supports Views
- Supports stored procedures
- All the above available from SqlQuery
- Migrate your data to SQL using GUI3000, and
- then access it from your HPe3000.

[OmniSolutions, Inc.](#)

GUI
INNOVATIONS



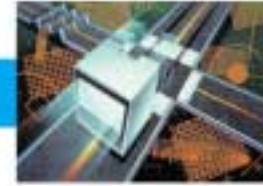
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Demonstrations

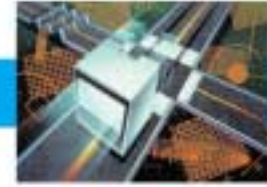
[DBmotion Short Demo \(1:37\)](#)

[DBmotion Longer Demo \(6:49\)](#)

[UDA-Central Longer Demo \(8:23\)](#)

[Bridgewater Longer Demo \(6:00\)](#)

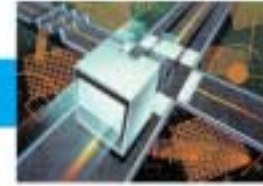




In Conclusion

- Careful planning will be vital to ensuring success
- Numerous options exist for implementation
- Take advantage of the experts...





Thank You

Questions & Answers

