MIGRATING EXPRESS DATA TO ORACLE 9I

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PREFACE

At the time of this writing (January, 2002), Oracle 9i release 2 is still in development. This release adds significant additional capabilities over Oracle 9i release 1 and changes the options for migrating data. Limited access to information has prevented a thorough review of Oracle 9i OLAP release 2. The IOUG Live! presentation will include more information on Oracle 9i OLAP release 2 and migration possibilities.

INTRODUCTION

In Oracle 9i OLAP, you can now enjoy the benefits of multidimensional access to your data and still store it in the Oracle RDBMS. Companies that have Express databases need to evaluate whether they should keep their data in Express, use analytic workspaces, or migrate the data to the Oracle RDBMS. Of course, if your data is truly stored in an RDBMS and you access the data in Express via the Relational Access Manager (RAM), you don't really need to migrate the data, as it already is in the RDBMS. In this case, you simply need to re-map the relational structures to 9i OLAP structures using the Cube Builder component of Oracle Enterprise Manager.

IS MIGRATION REALLY NECESSARY?

Oracle has consistently stated that Express will continue. Many applications work fine in their current environment. For many existing Express applications, Express provides the services needed by the application. Each application will have to be evaluated to determine whether the benefits of the new environment based on Oracle 9i justify the changes necessary to migrate to Oracle 9i OLAP.

MIGRATING TO AN ANALYTIC WORKSPACE

Details on migrating data in Oracle 9i OLAP release 2 are still sketchy. However, migrating data to analytic workspaces in release 1 of Oracle 9i OLAP is very simple. In release 1, analytic workspaces are simply a marketing term for what is in fact an Express database. To access an analytic workspace, all you do is add the directory that contains the Express .db file to the ServerDBPath key and execute the OLAP DML command "database attach <database name>". If you want to use the Java OLAP API with the database, you must ensure that the metadata added by Express Administrator is attached to each object in the database. Unfortunately, Oracle doesn't really supply a tool to do this, but if the database was created using Express Administrator, the database likely has the metadata it needs to function as an analytic workspace. The step-by-step process for turning an Express database into an analytic workspace is documented in the Oracle9i OLAP Services Concepts and Administration Guide, part number A88755-01. It is available on technet.oracle.com.

MIGRATING TO RDBMS TABLES

Migrating to RDBMS tables is trickier because new objects must be created. As of this writing, there are no automated tools for creating a RDBMS schema from Express databases. Relational objects must be created for each Express object using a tool such as Oracle Warehouse Builder. Once these objects are created, the data can be migrated.

MIGRATING DATA VIA OLAP DML

A straight-forward way for migrating Express data is by executing OLAP DML commands. In order to do this, you simply execute a series of SQL INSERT statements, one for each cell of data. Use the SQL PREPARE and SQL EXECUTE statements to make this more efficient. It can be as simple as the following program:

```
DEFINE INSERTPRICE PROGRAM
PROGRAM

limit TIME to all
limit PROD to all
sql prepare s1 from insert into pricetbl values (:time, :prod, :price)

for TIME PROD
  if price ne na
    then do
      sql execute s1
      if sqlcode ne 0
        then continue
    doend
END
```

MIGRATING DATA VIA FLAT FILES

Of course, a final method for migrating Express data is the tried and true method of writing data out to flat files and using the SQL Loader to read it back into the RDBMS. As arcane and old-fashioned as this may sound, often this method can be the most productive and efficient since: a) it naturally provides a way to assure quality since the intermediary file can be viewed, b) the SQL Loader is very efficient at loading large amounts of data and can be run in parallel (as can the Express sessions that write the data), and c) tools to accomplish this are readily available. In order to do this, you simply open a file using the OUTFILE OLAP DML command, and write out data using the REPORT or ROW commands. If using the REPORT command, be sure to use the NOHEAD option to remove headings that might produce unwanted header records. A simple program to report out a two-dimensional PRICE variable would be the following:

```
DEFINE WRITEPRICE PROGRAM
PROGRAM

outfile tempfile.txt
limit TIME to all
limit PROD to all
report nohead width 20 down PROD across TIME: PRICE
outfile eof
END
```

Be sure to take advantage of any conjoint dimensions that may exist to compress out any NA's in the data and consider even changing composites into conjoints (using the CHGDFN command) and using the key function to identify the key dimensions of the conjoint. If SALES is dimensioned as <TIME <PRODGEOG PROD GEOG>>, you can write it out with the sample program:

```
DEFINE WRITESALES PROGRAM
PROGRAM

outfile tempfile.txt
limit TIME to all
limit PROD to all
limit GEOG to all
chgdfn PRODGEOG dimension
report nohead width 20 down key(PRODGEOG PROD) –
            width 20 key(PRODGEOG GEOG) –
            across TIME: SALES
outfile eof
END
```

CONCLUSION

So which method is best? Unfortunately, little data exists at this writing to provide a real answer. Also unclear is whether Oracle or other parties will provide more seamless solutions. The easiest is simply to leave the data in Express or to move the data to an analytic workspace. With SQL extensions in Oracle 9i OLAP release 2, the data in analytic workspaces is accessible via SQL, so perhaps the data can stay in an analytic workspace. Until better performance data is available, it is difficult to provide an answer on whether to move data to the RDBMS in a star schema or whether to keep data stored multi-dimensionally.

Migrating Express Data to Oracle 9i
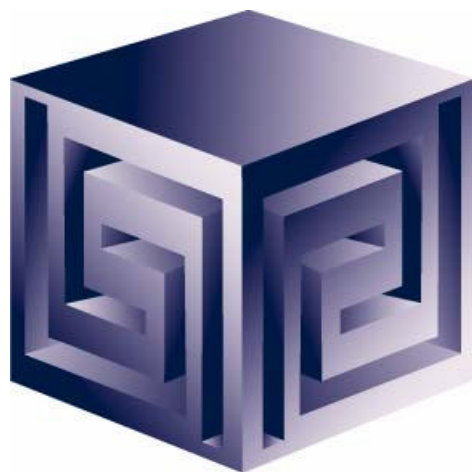
presented at

IOUG Live! 2002

paper number 400

Presented by:

Dan Vlamis (dvlamis@vlamis.com)

**Vlamis Software Solutions, Inc.
(816) 781-2880**

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Vlamis Software Solutions, Inc.

- **Founded in 1992 in Kansas City, Missouri**

- **A Member of Oracle Partner Program since 1995 along with various Oracle Beta Programs**

- **Designs and implements databases/data marts/data warehouses using RDBMS and Multidimensional tools**

- **Specializes in Data Transformation, Data Warehousing, Business Intelligence, Applications Development**

- **Founder Dan Vlamis is former developer of Sales Analyzer Application**

- **Oracle Certified Solutions Provider**

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Disclaimer

Oracle 9i is being changed in release 2 and all statements, illustrations and features shown during this presentation are subject to change.

Topics

- **General Overview and Review of 9i OLAP**

- **Evaluating Need to Migrate**

- **Advantages of Oracle 9i OLAP over Express**

- **Methods of Migrating Data (from Express and RDBMS tables via RAA/RAM)**

  - **Storing in RDBMS tables**

  - **Storing in Analytic Workspace**

- **What is lost in migration**

- **Migrating Applications**

Oracle 9i OLAP

Business Intelligence Beans

OLAP Services

Java OLAP API

CWM Metadata Provider	SQL Generator	Query Processor	Multidimensional Engine	M-D Metadata Provider

Metadata	Data	◄••••► Future	Data	Metadata

Oracle Relational Database   **Analytic Workspace**

Data Warehouse - Query and Reporting

Forecasts • Models • Allocations Consolidations • Scenarios • Custom Functions

Vlamis Software Solutions, Inc.

New Data Storage Possibilities
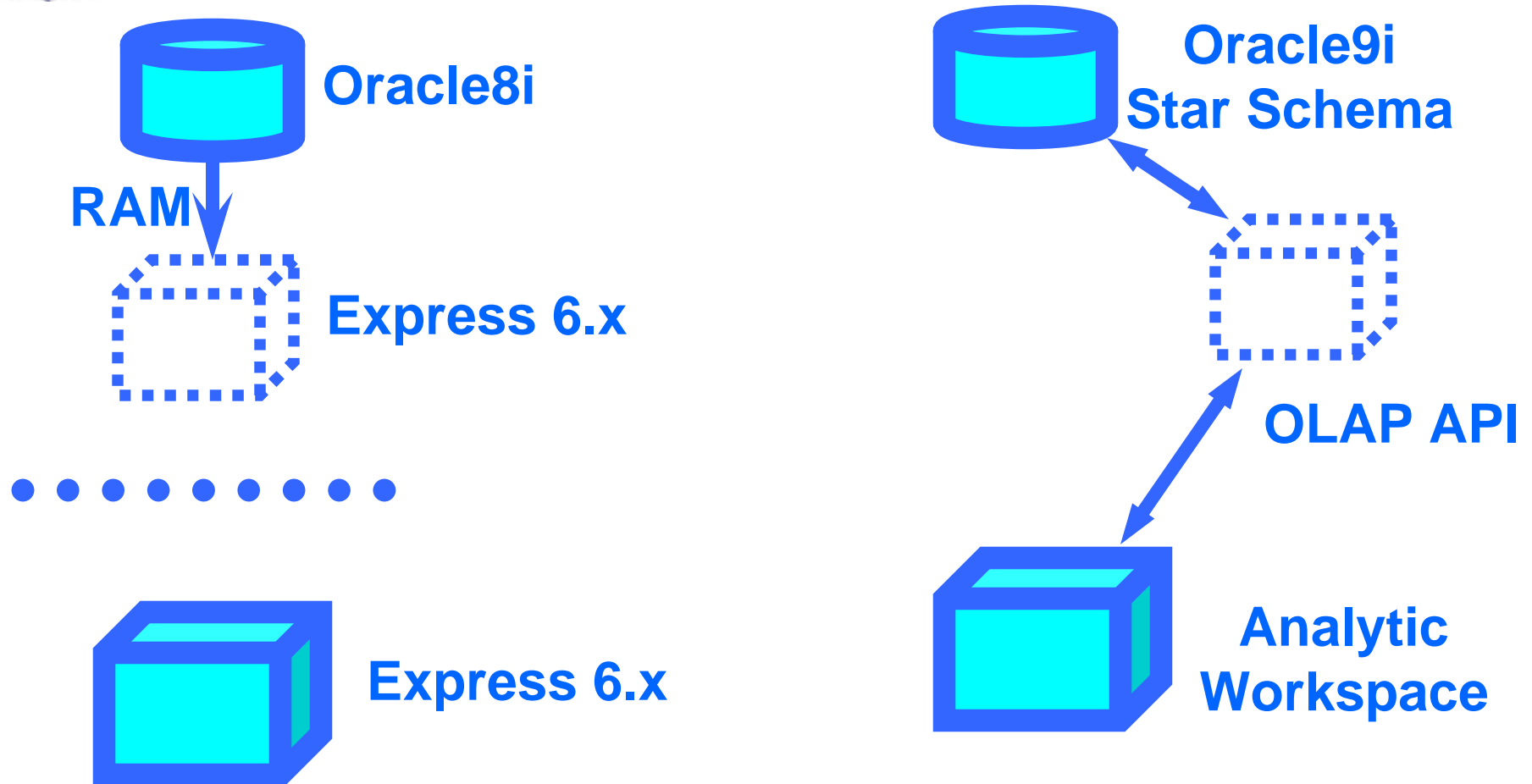
Oracle8i

RAM

Express 6.x

Express 6.x

Oracle9i
Star Schema

OLAP API

Analytic
Workspace

Oracle Enterprise Manager Sample Screen (replaces RAA)

Express Has Not Gone Away...
It has just been absorbed

- **Analytic Workspaces are Express DB files**

- **Oracle marketing will downplay Express**

- **Design considerations for Analytic Workspaces same as for Express DBs**

- **Express engine still there**

- **Express SPL still there (but only operates on storage in analytic workspaces)**

- **Analytic Workspaces better at complex calculations (for now)**

- **Use OLAP Worksheet for OLAP DML commands**

Migration Issues

- **Is migration really necessary?**

- **Express not going away**

- **New capabilities may alter much of design**

- **Reasons for migrating:**

  - **Increase db size**

  - **Performance**

  - **New features (BI Beans)**

  - **Moving data painful (load times, disk space)**

- **Consider leaving data in Analytic Workspace**

Advantages of Oracle 9i OLAP over Express

- **Java OLAP API**

- **BI Beans Access**

- **Centralized Storage and Integration with RDBMS**

- **(9.2) SQL Access to MDBMS data**

- **Scaleable**

- **Parallel Aggregate and Allocation**

- **Bulk data transfers between AW and tables**

Express Features and Limitations

- **Multidimensional data store provides quick access**

- **All data in single proprietary file**

- **Express SPL powerful for calcing and extending apps**

- **GUI environment uses Visual Basic language**

- **RAM moves data from RDBMS into Express**

- **Designed for multiple read/only users**

- **Difficult for IT to adopt, Max database size**

- **Difficult to integrate and schedule back ups**

- **Long learning curve for new developers**

- **Not consistent with Oracle direction**

- **Star and snowflake only, performance concerns**

- **No mult-writer support**

New Data Storage Possibilities

Oracle8i

RAM

Express 6.x

Express 6.x

Oracle9i Star Schema

OLAP API

Analytic Workspace
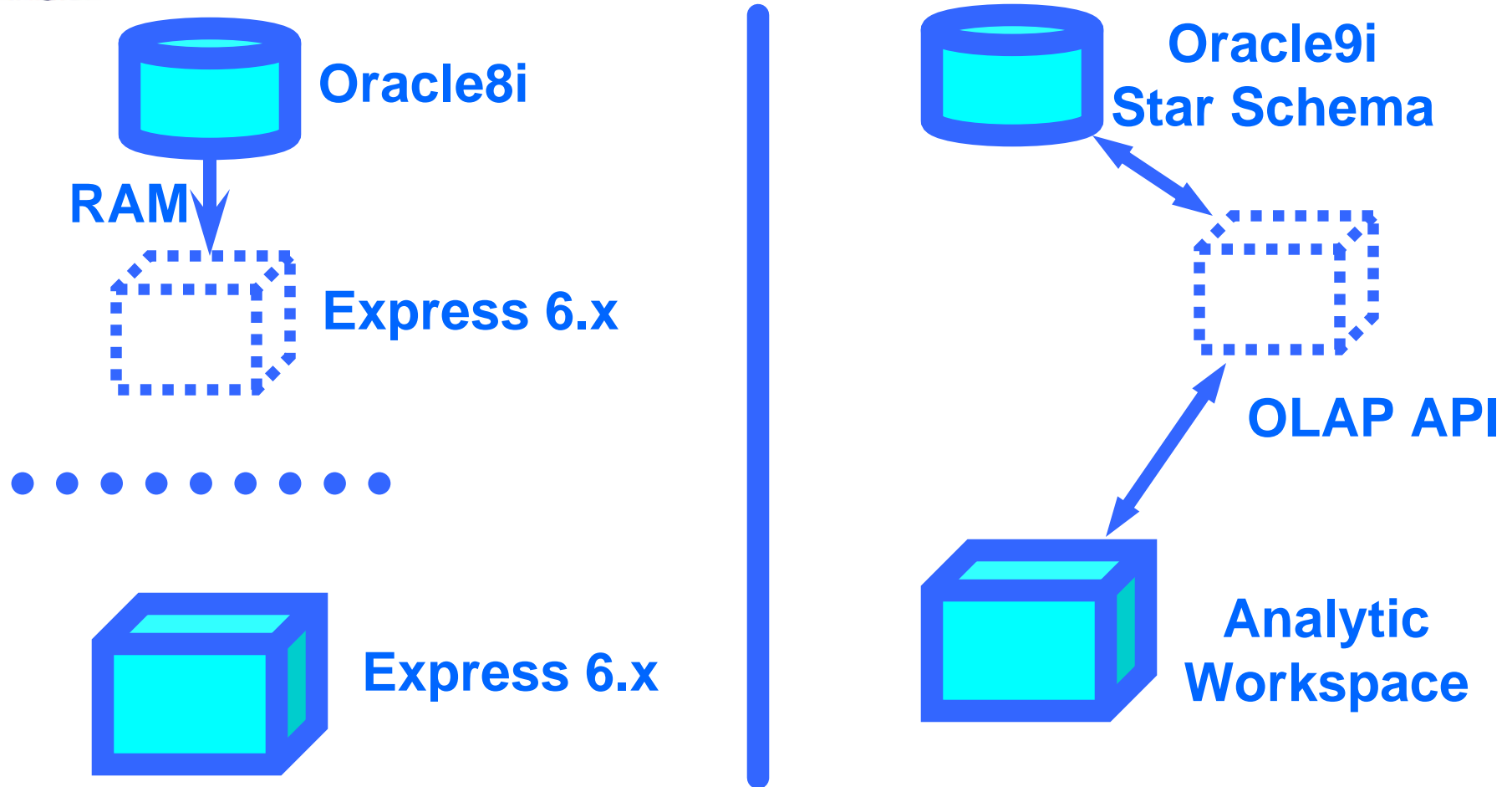
Advantages of RDBMS Storage

Oracle9i
Star Schema
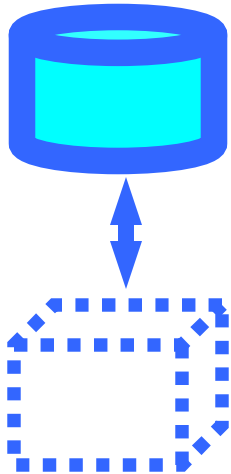
- **Store data in familiar RDBMS**

- **Easy access to data using SQL**

- **Can use materialized views**

- **Best for read-only applications**

- **Model with OWB**

- **Data may already be in schema**

Advantages of AW Storage

- **Faster multidimensional access**
- **Personal user workspaces**
- **Best for read/write applications**
- **Best for heavier analysis**
- **OLAP DML language**
- **Ordered dimension values**
- **Transparent joins**
- **Referential integrity**
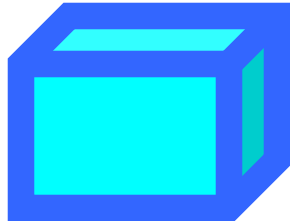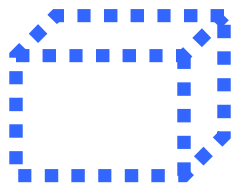
Analytic Workspace

What Are AW Cubes?

- **Data stored as arrays**

- **Dimension values are internally integers**

- **Offset calculated using simple multiplication**

- **Offset tells exactly where to look for data**

- **Pages and segmentation complicate design**

- **Conjoints and composites handle sparsity**

Calculating the cell offset is simple multiplication and addition

Formula for calculating cell offset:

month + product * (# of months) + city*(# of months * # of products)

2 + **1** * (3) + **1** *(3 * 3) = 14
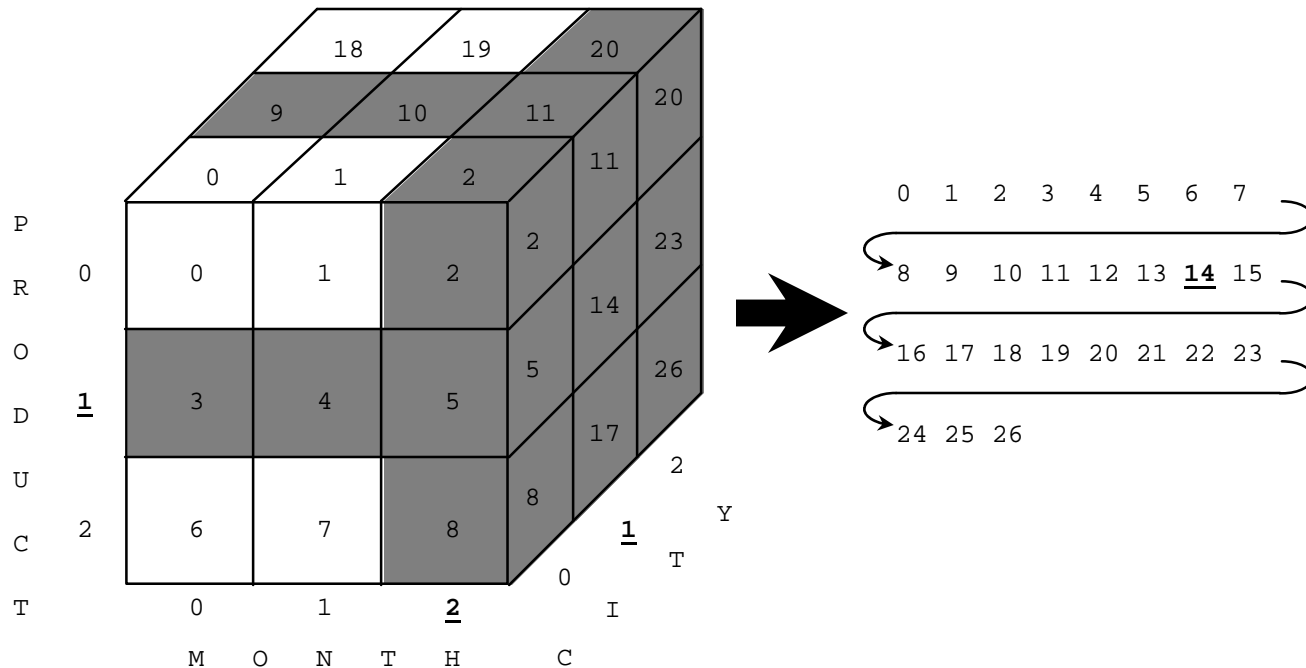
Migration Issues

- **Need for "old environment"?**
  - Need to migrate multiple times?

- **Migrating metadata**
  - Multidimensional definitions

- **Migrating data**
  - Moving data efficiently

- **Migrating application logic**
  - Express SPL
  - Loaders
  - Models

Migration Choices

No Data Moves

Oracle9i
Star Schema

RDBMS to AW

Express to
RDBMS

OLAP API

Export EIF file

Analytic
Workspace
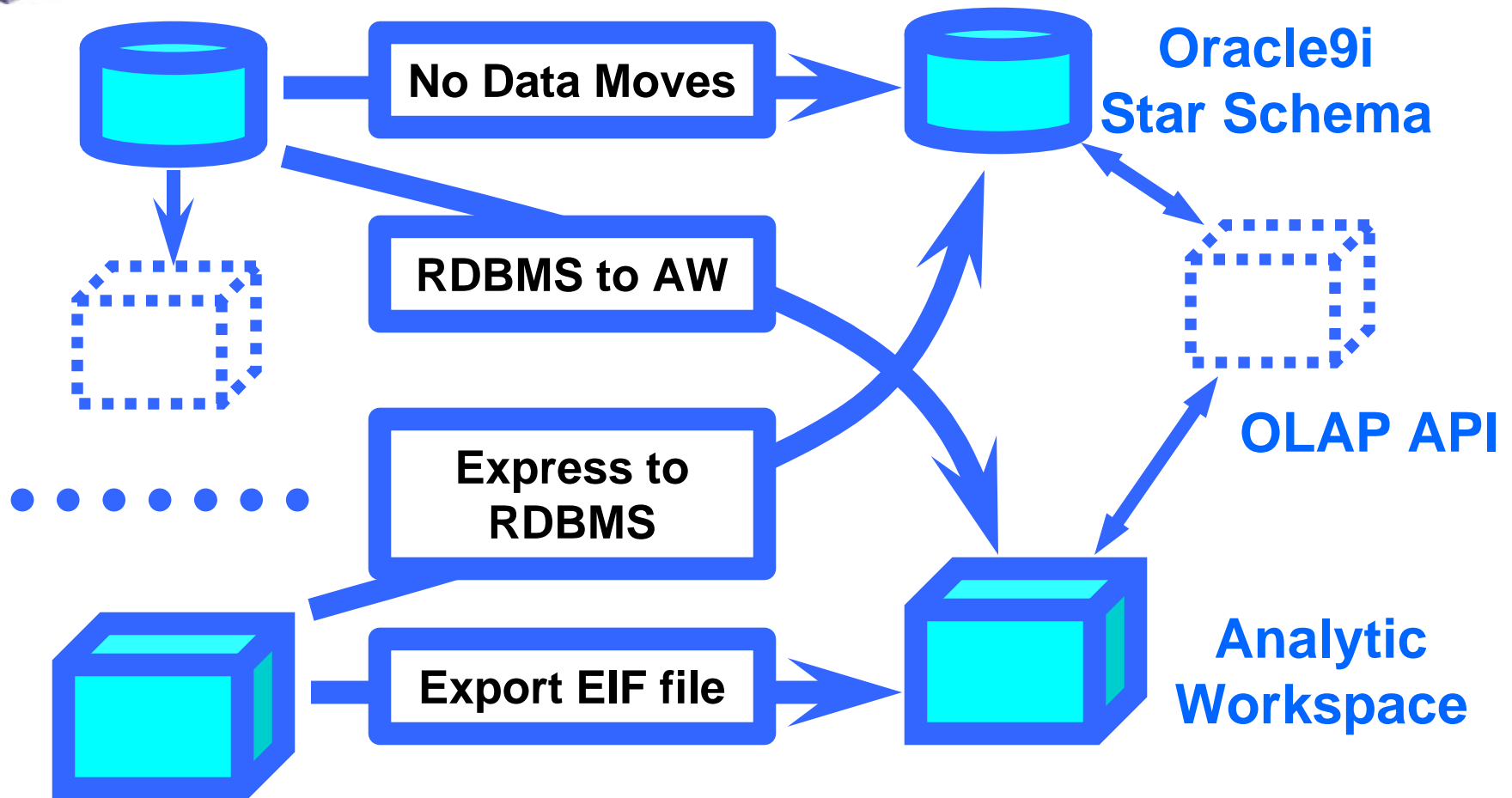
Choices for Moving Data From Express to AW

?
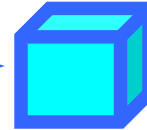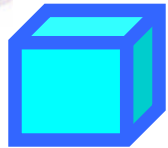
Analytic Workspace

- **Export to EIF file**

- **Write flat file and read in**

Using Export / Import to Move Data From Express to AW
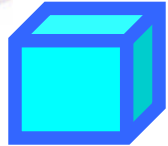
Export EIF file → **Analytic Workspace**
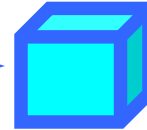
- **Connect to DB in Express 6.3**
- **Create EIF file**

```
allstat
limit name to all
export all to eif file 'data.eif' rewrite
```

- **Set up file access rights**
- **Connect to Oracle 9i using OLAP Worksheet**
- **Create AW, import file and update AW**

```
aw create newdata
import all from eif file '/files/data.eif' data dfns
update
commit
```

Writing/Reading Files to Move Data From Express to AW
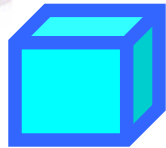
Read flat file → **Analytic Workspace**
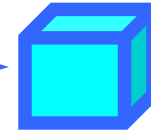
- **Connect to DB in Express 6.3 and write file**

```
outfile data.txt
report nohead down geog across time: sales
outfile eof
```

- **Set up file access rights**
- **Connect to Oracle 9i using OLAP Worksheet**
- **Create AW, read file and update AW**

```
aw create newdata
_filehandle = fileopen('/files/data.txt' r)
fileread _filehandle w 10 geog across time: sales
update
commit
```

Moving Data
From Oracle 8i to Oracle 9i

No Data Moves → **Oracle9i Star Schema**
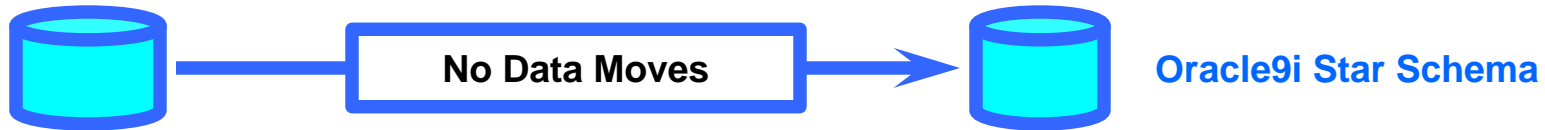
- **No data to move—upgrade handles it**

- **May have "extra" Express logic to replicate**

- **RAM mappings must be reentered in cube wizard in Oracle Enterprise Manager**

- **OWB may be able to help here**

- **Overall very simple**
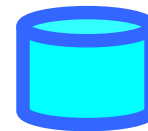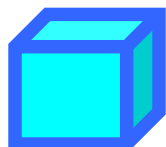
Oracle Enterprise Manager Sample Screen (replaces RAA)

Choices for Moving
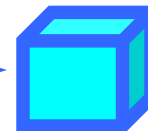# Data From Express to Star Schema
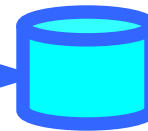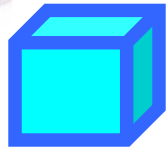
? → **Oracle9i Star Schema**

- **Write out file and SQL Load it in**

- **Oracle Warehouse Builder?**

- **Alternative: Move to analytic workspace and count on migrating AW to RDBMS (futures)**
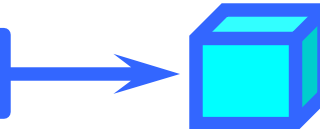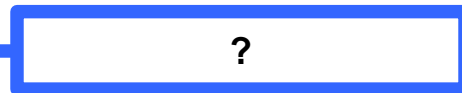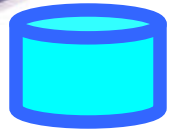
Oracle9i Star Schema

?

Export EIF File → **Analytic Workspace**

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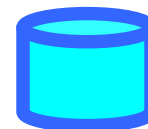
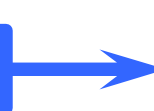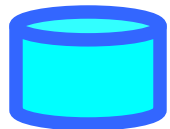# How to Move AW Data to Star Schema

- **Write OLAP DML code that SQL inserts rows**

- **Can be sped up with SQL Prepare command**

- **(9iR2) OLAP Table Function allows AW data to be access from SQL, so…**
  - **SQL insert into SALESFACT as**

    select * from OLAPTF('XADEMO', 'SALES')

- **Third-party tools**

- **Oracle will need this anyway, so perhaps they will provide efficient mechanism**

Choices for Moving Data From RAM to AW

? → **Analytic Workspace**

- **Write out file and fileread in using OLAP DML**
- **Oracle Warehouse Builder**
- **Alternative: Move to 9i and count on migrating to AW (futures)**

No Data Moves → **Oracle9i Star Schema**
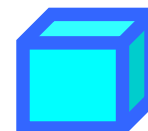
? → **Analytic Workspace**

How to Move RAM Data to AW

- **First of all, why moving data to AW?**

- **For OWB, see paper 422 –** *Using Oracle9i Warehouse Builder and Oracle 9i to create OLAP ready Warehouses*

- **Oracle will need to move star schema to AW anyway, so perhaps they will provide efficient mechanism**

But What About Non-Data Data?

- **Major data is only 90% of a database**

- **"Extra" data is small but requires more effort**

- **Express examples:**
  - models
  - valuesets
  - two-dimensional attributes
  - relations

- **Try to model as database object**

Migrating non-Schema data to Relational

- **Models often part of application logic**

- **Valuesets can be modeled as "boolean attributes"**

- **Many to many attributes used by OFA**
  - **model as two-dimensional boolean measure**

- **Relations are just constrained fact tables**

Metadata Required

RDBMS data

- Stored in "Olap catalog"
- Edited with OEM
- Based on CWM
- Once set up, can use OLAP API against data

Analytic Workspace data

- Stored in Express Common Metadata (ECM) format
- Similar to OEO/Adminstrator metadata
- Once set up, can use OLAP API against database
- ECM stored in series of catalogs in AW so 9i OLAP and BI Beans can access

Migrating Applications

- **See Paper 404 -** Converting Express Applications to Oracle9i and BI Beans Applications

- **Java OLAP API**

- **BI Beans**

- **Oracle Applications (later)**

- **3rd party applications (e.g. VSS Business Analyzer)**

Migration Paths

Legacy Express Applications

- **OEO apps**

  Metadata perhaps translate, otherwise recode

- **Express Web Agent apps**

  Same as above

- **Custom Express apps**

  Depends

- **OSA and OFA**

  Non-custom data and reports should migrate

Other Presentations

404: Converting Express Applications to Oracle9i and BI Beans
Chris Claterbos, Vlamis Software Solutions, Inc.

Tuesday, April 16, 2002   Time:10:00 AM - 11:30 AM

409: Oracle9i OLAP -- How does it Really Work?
Dan Vlamis, Vlamis Software Solution, Inc.

Tuesday, April 16, 2002   Time:4:15 PM – 5:15 PM

412: Oracle9i OLAP - The Platform for Web-Enabled Applications
Bud Endress, Oracle Corporation

Wednesday, April 17, 2002   Time:1:30 PM – 2:30 PM

422: Using Oracle Warehouse Builder 3i and Oracle9i to Create OLAP-Ready Warehouses
Chris Claterbos, Vlamis Software Solutions, Inc.

Thursday, April 18, 2002   Time:9:45 AM – 10:45 AM

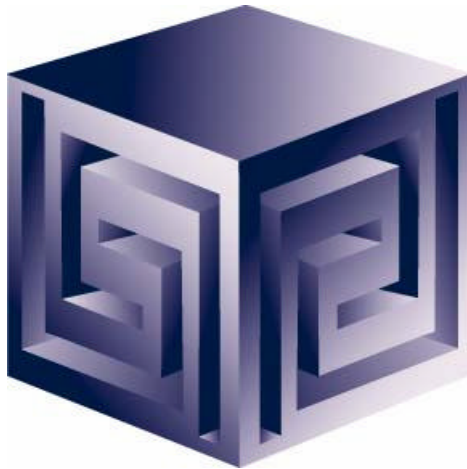**427: Oracle9i Integrated Business Intelligence**
John Entenmann, Oracle Corporation

Thursday, April 18, 2002   Time:11:00 AM – 12:00 PM

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