Oracle Multimedia

Managing Medical

and Other Specialty Data

presentation for:

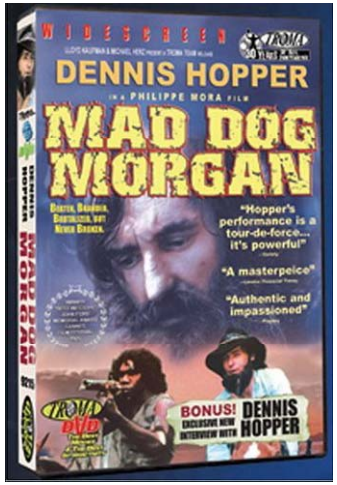
Oracle OpenWorld

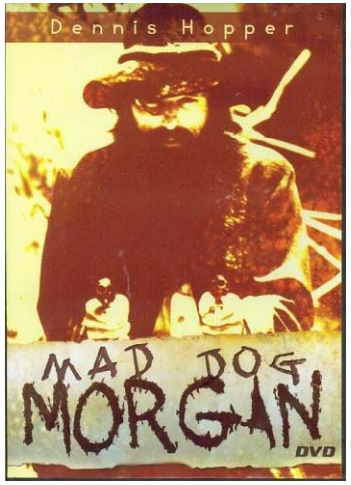
September 21 – 25, 2008

Who Oracle thinks I am?

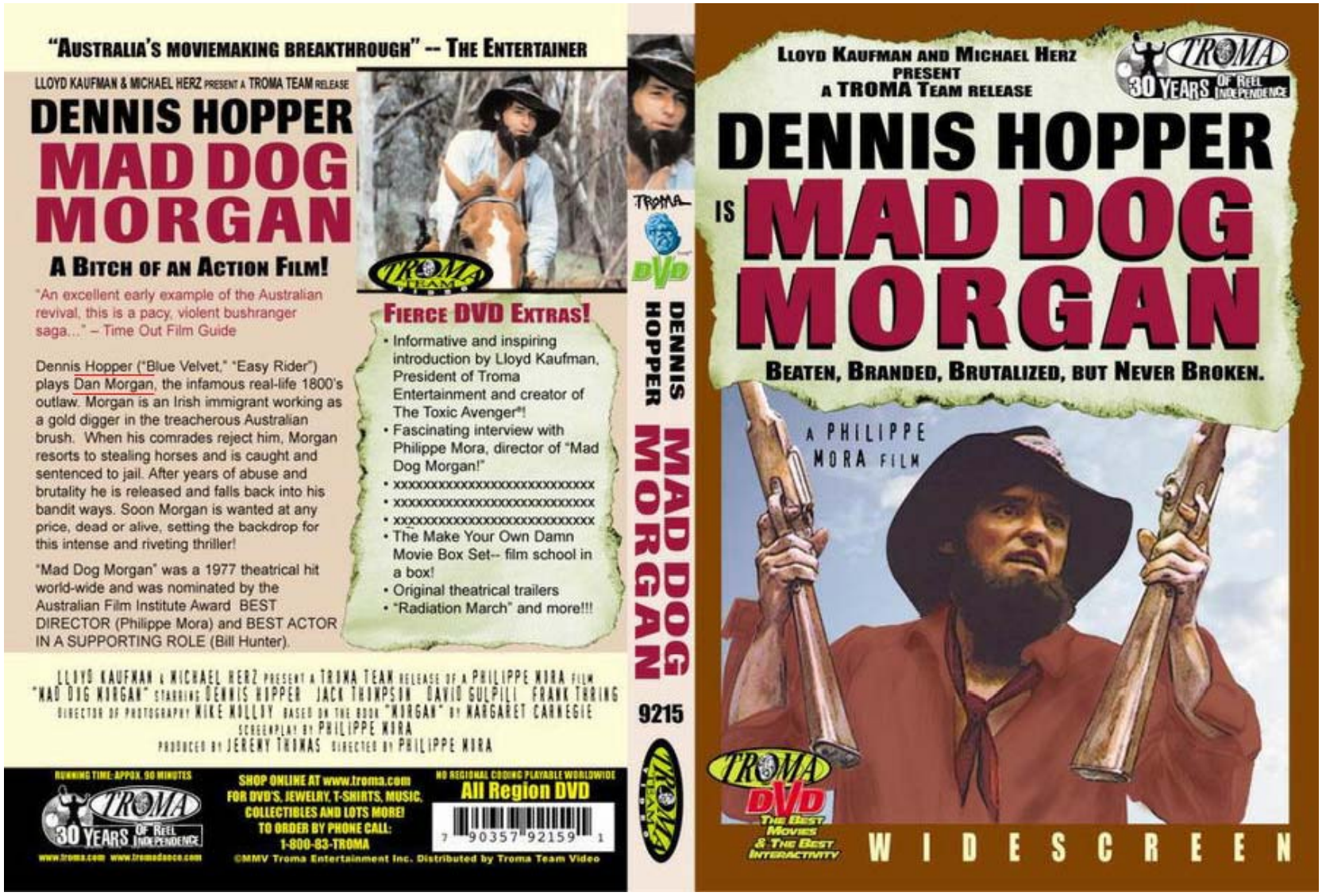
- Daniel Morgan – damorgan@u.washington.edu
- Oracle Ace Director
- University of Washington
  - Wrote UW Oracle curricula
  - Primary program instructor - 8 years
- The Morgan behind Morgan's Library on the web
  - www.psoug.org/library.html
- Education Chair: PSOUG
- Member: UKOUG
- Frequent speaker – OOW and user group events
- Beta tester: 10g, 11g, and TimesTen
- Oracle since version 6

Who I really am

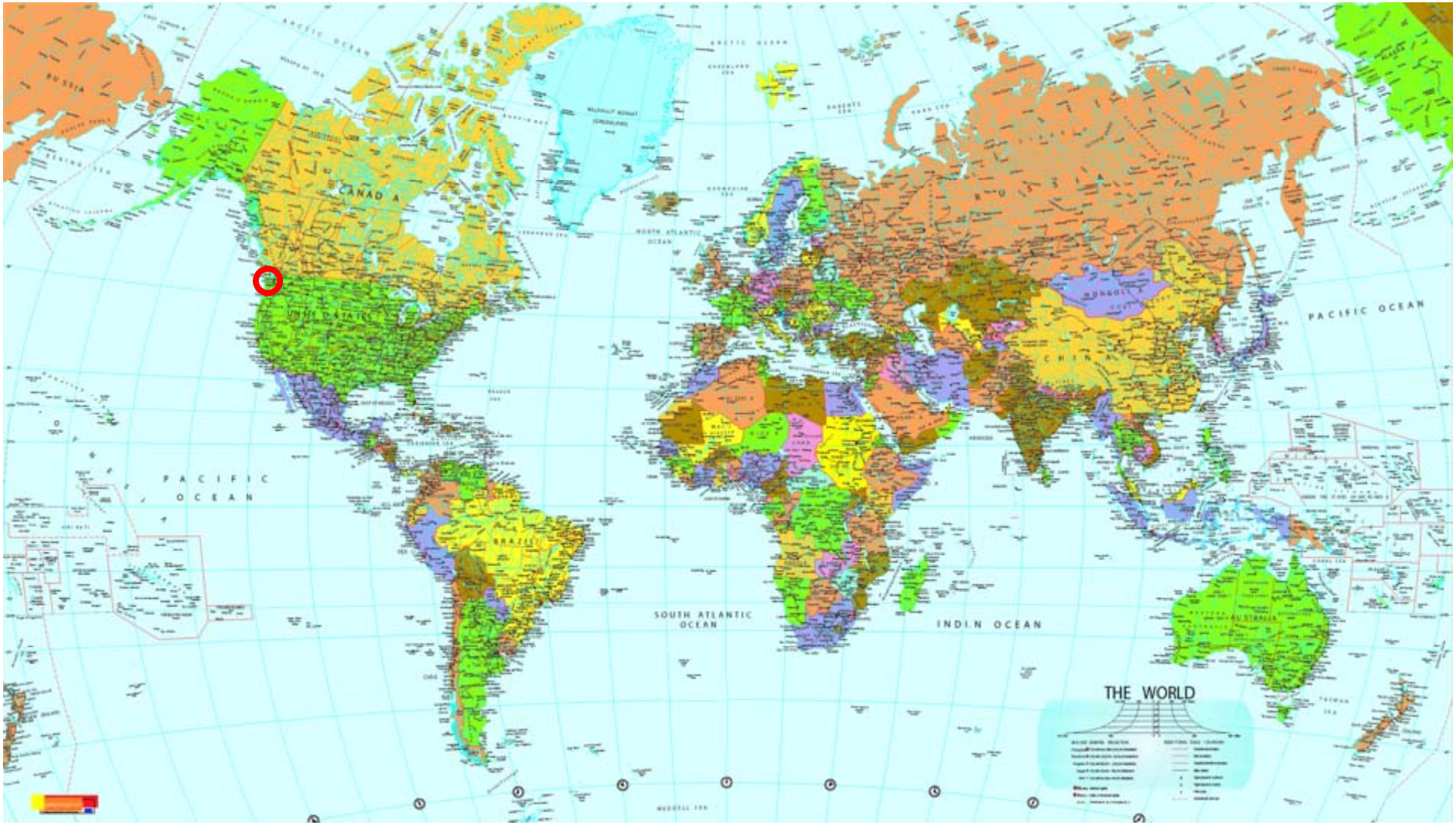




Who I really am



What is a Puget Sound



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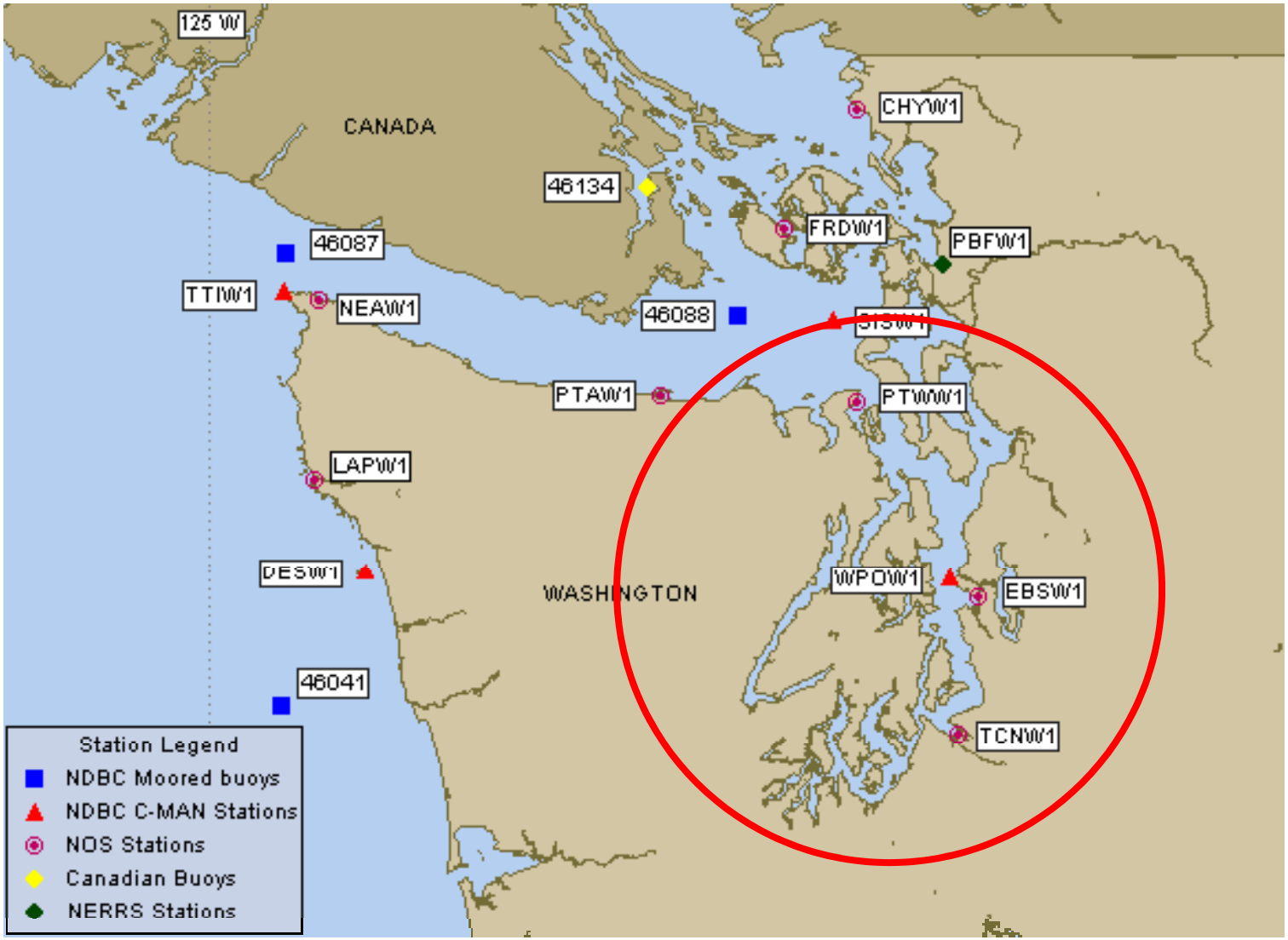

This "IS" the Puget Sound

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What is new with PSOUG

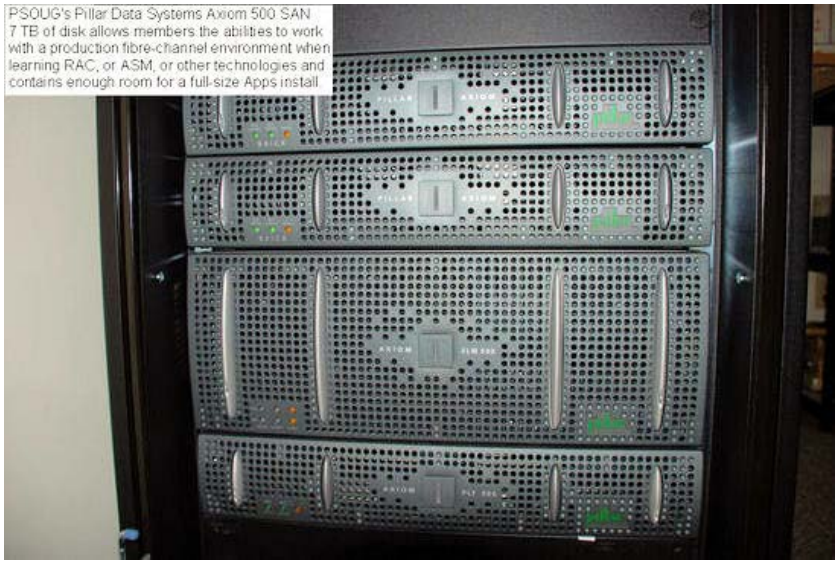
- New location
  - Bellevue, WA
- New classes including
  - 11g Data Guard
  - 11g RAC and ASM
  - e-Business Suite 11.5.10 -> Release 12
  - Developer Bootcamp
  - DBA Bootcamp
  - Audit Vault
  - Diaster Recovery & RMAN

PSOUG Lab

PSOUG Lab

NetApp 270C

Pillar Data Systems Axiom 500



Website Stats

Countries				
Countries		Pages	Hits	Bandwidth
United States	us	396312	684852	18.59 GB
India	in	96897	168706	4.65 GB
Great Britain	gb	53627	88558	2.49 GB
Germany	de	39012	70659	2.09 GB
Canada	ca	32183	58344	1.46 GB
France	fr	30993	53290	1.53 GB
Italy	it	25045	45052	1.25 GB
Spain	es	24944	42091	1.20 GB
Brazil	br	23580	47045	1.31 GB
Australia	au	21577	36875	998.21 MB
Poland	pl	18950	33032	1016.91 MB
Netherlands	nl	13620	25534	689.26 MB
Switzerland	ch	13145	24019	675.81 MB
China	cn	13112	22787	768.60 MB
Mexico	mx	10026	18581	519.59 MB
Russian Federation	ru	8962	17278	513.61 MB
Czech Republic	cz	8928	17428	466.28 MB
Portugal	pt	8517	12919	349.08 MB
Singapore	sg	8223	13007	360.88 MB
Hungary	hu	7647	13249	405.34 MB
Belgium	be	7615	13030	364.80 MB
Hong Kong	hk	7203	13375	357.07 MB
Turkey	tr	6882	14039	365.12 MB
Sweden	se	6763	12091	322.99 MB
Indonesia	id	5640	9418	343.12 MB
Argentina	ar	5612	10436	298.55 MB
Austria	at	5415	10493	266.72 MB
Malaysia	my	5034	9183	266.03 MB
Finland	fi	4770	8159	205.20 MB

November: Mogens Nørgaard

Training

Dinner

Beer Tasting

November: Mogens Nørgaard

Training

Dinner

Beer Tasting

What a surprise!

msnbc

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  - Space News
  - Science
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  - Games
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- Blogs Etc.
- Local News

Microsoft Excel fails math test

Employee blogger wrote that some multiplication results incorrect

AP Associated Press

Updated: 10:29 a.m. PT Sept 28, 2007

SEATTLE – Microsoft Corp.'s Excel 2007 spreadsheet program is going to have to relearn part of its multiplication table.

In a blog post, Microsoft employee David Gainer said that when computer users tried to get Excel 2007 to multiply some pairs of numbers and the result was 65,535, Excel would incorrectly display 100,000 as the answer.

Gainer said Excel makes mistakes multiplying 77.1 by 850, 10.2 by 6,425 and 20.4 by 3,212.5, but the program appears to be able to handle 16,383.75 times 4.

Story continues below ↓

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What is Oracle Multimedia?

- New name
  - Used to be Intermedia
- Enables the Oracle Database to store, manage, manipulate, and retrieve:
  - audio
  - documents
  - images
  - video
- Based on object-relational data types
  - OrdAudio
  - OrdDoc
  - OrdImage
  - OrdVideo

Oracle Multimedia Metadata?

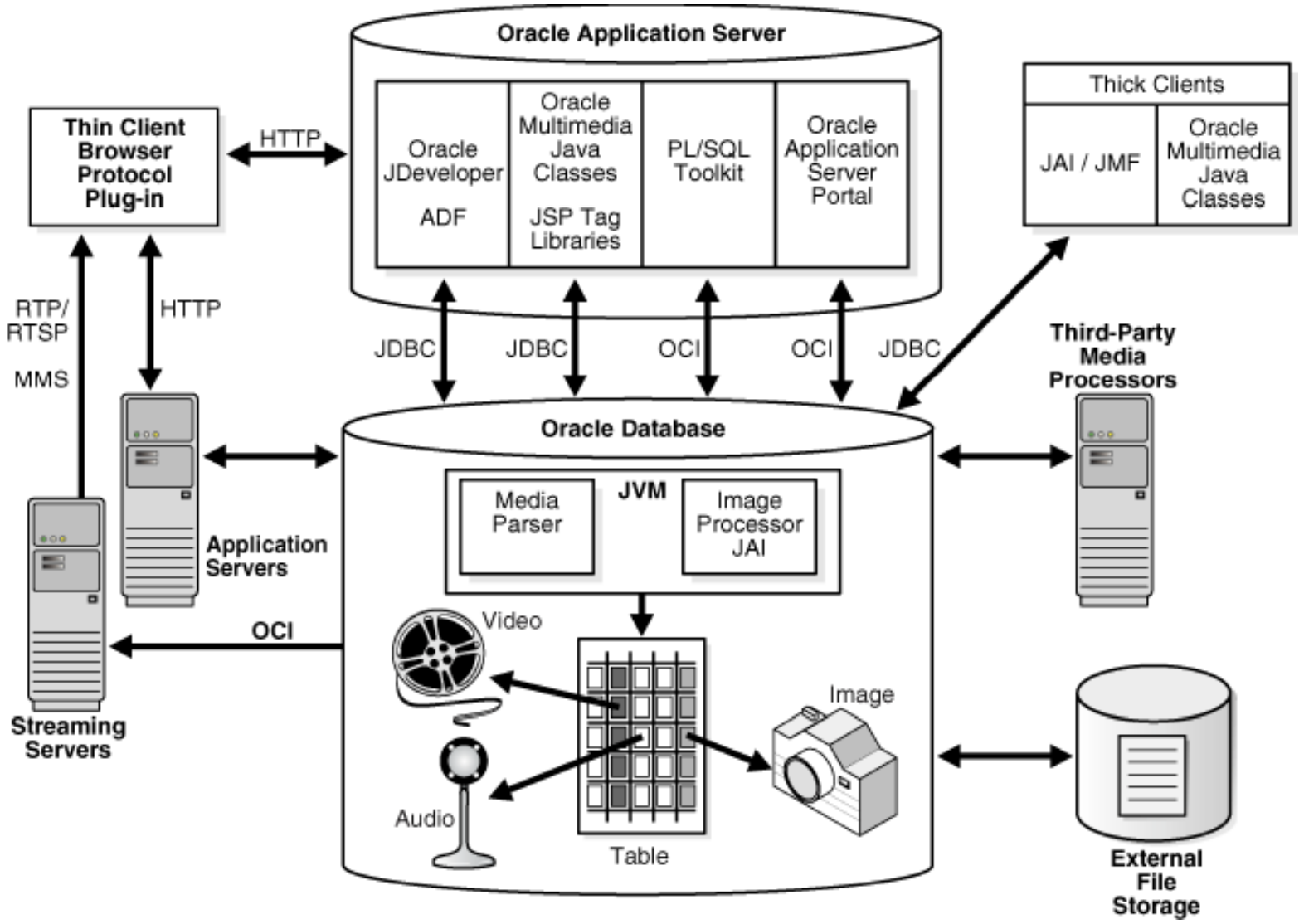
- Media metadata is stored in the database under Oracle Multimedia control. Oracle Multimedia manages metadata for all the media types and may automatically extract it for audio, image, and video. This metadata includes:

- source type
- source location
- source name
- update timestamp
- description
- MIME type
- encoding type
- number of channels
- frame width & height
- frame resolution
- frame rate
- number of colors
- sampling rate
- sample size
- compression type
- play time
- height & width
- image content length
- image content format
- compression format
- compression type
- play time
- number of frames
- bit rate
- extracted XML such as director or producer of a movie

Integrated with

- SQL
- PL/SQL
- OCI
- Streaming Content
  - RealNetworks Streaming Servers
  - Microsoft Windows Media Services
- Web Technology Support
  - Oracle Multimedia Servlets and JSP Java API
  - Oracle Application Server Portal
  - Oracle Application Development Framework (ADF)
- SQL*Loader

Oracle Multimedia Architecture



Multimedia Storage

- Internally, in the database, as BLOBs
  - Up to 8GB - 128TB depending on block size
- Externally, outside the database
  - Using a BFILE pointer

OrdAudio

- OrdAudio integrates the storage, retrieval, and management of digitized audio data

- Audio may be produced by an audio recorder, an audio source such as a microphone, digitized audio, other specialized audio recording devices, or even by program algorithms. Audio recording devices take an analog or continuous signal, such as the sound picked up by a microphone or sound recorded on magnetic media, and convert it into digital values with specific audio characteristics such as format, encoding type, number of channels, sampling rate, sample size, compression type, and audio duration.

Audio File Formats

- Supported Formats
  - .MPG
  - .MPEG
  - .MP3
  - .MP4
  - RealNetworks
  - .WAV
  - and many more

OrdAudio Datatype

```
SQL> desc ordaudio

 Name                          Type
 ----------------------------- ----------------
 DESCRIPTION                   VARCHAR2(4000)
 SOURCE                        ORDSYS.ORDSOURCE
 FORMAT                        VARCHAR2(31)
 MIMETYPE                      VARCHAR2(4000)
 COMMENTS                      CLOB
 ENCODING                      VARCHAR2(256)
 NUMBEROFCHANNELS              NUMBER(38)
 SAMPLINGRATE                  NUMBER(38)
 SAMPLESIZE                    NUMBER(38)
 COMPRESSIONTYPE               VARCHAR2(4000)
 AUDIODURATION                 NUMBER(38)
```

OrdDoc

- OrdDoc integrates the storage, retrieval, and management of heterogeneous media data

- The OrdDoc type can store any heterogeneous media data including audio, image, and video data in a database column. Instead of having separate columns for audio, image, text, and video objects, you can use one column of OrdDoc objects to represent all types of multimedia.

OrdDoc Datatype

```
SQL> desc sys.orddoc
 Name                 Type
 -------------------- ----------------
 SOURCE               ORDSYS.ORDSOURCE
 FORMAT               VARCHAR2(80)
 MIMETYPE             VARCHAR2(80)
 CONTENTLENGTH        NUMBER(38)
 COMMENTS             CLOB
```

OrdImage

- OrdImage integrates the storage, retrieval, and management of digitized images

- OrdImage supports two-dimensional, static, digitized raster images stored as binary representations of real-world objects or scenes. Images may be produced by a document or photograph scanner, a video source such as a digital camera or VCR connected to a video digitizer or frame grabber, other specialized image capture devices, or even by program algorithms. Capture devices take an analog or continuous signal such as the light that falls onto the film in a camera, and convert it into digital values on a two-dimensional grid of data points known as pixels. Devices involved in the capture and display of images are under application control.

Image File Formats

- Supported Image Formats
  - .BMP (bitmap)
  - .DCM (DICOM)
  - .GIF
  - .JPG & .JPEG
  - .PCT (pict)
  - .TIFF
  - and many more

OrdImage Datatype

```
SQL> desc ordimage
 Name                      Type
 ------------------------- ----------------
 SOURCE                    ORDSYS.ORDSOURCE
 HEIGHT                    NUMBER(38)
 WIDTH                     NUMBER(38)
 CONTENTLENGTH             NUMBER(38)
 FILEFORMAT                VARCHAR2(4000)
 CONTENTFORMAT             VARCHAR2(4000)
 COMPRESSIONFORMAT         VARCHAR2(4000)
 MIMETYPE                  VARCHAR2(4000)
```

OrdVideo

- OrdVideo integrates the storage, retrieval, and management of digitized video data

- Video may be produced by a video recorder or camera, digitized animation video, other specialized video recording devices, or even by program algorithms. Some video recording devices take an analog or continuous signal, such as the video picked up by a video camera or video recorded on magnetic media, and convert it into digital values with specific video characteristics such as format, encoding type, frame rate, frame size (width and height), frame resolution, video length, compression type, number of colors, and bit rate.

Video File Formats

- Supported Video Formats
  - .MOV (Apple QuickTime)
  - .AVI (Microsoft Video)
  - .RM (RealNetworks)
  - .MPG
  - .MP4
  - and many more

OrdVideo Datatype

```
SQL> desc ordvideo
 Name                  Type
 --------------------- ----------------
 DESCRIPTION           VARCHAR2(4000)
 SOURCE                ORDSYS.ORDSOURCE
 FORMAT                VARCHAR2(31)
 MIMETYPE              VARCHAR2(4000)
 COMMENTS              CLOB
 WIDTH                 NUMBER(38)
 HEIGHT                NUMBER(38)
 FRAMERESOLUTION       NUMBER(38)
 FRAMERATE             NUMBER(38)
 VIDEODURATION         NUMBER(38)
 NUMBEROFFRAMES        NUMBER(38)
 COMPRESSIONTYPE       VARCHAR2(4000)
 NUMBEROFCOLORS        NUMBER(38)
 BITRATE               NUMBER(38)
```

ORDSYS Schema

```
SQL> conn ordsys/ordsys
SQL> SELECT object_type, COUNT(*)
  2  FROM user_objects
  3  GROUP BY object_type;

OBJECT_TYPE             COUNT(*)
------------------- ----------
SEQUENCE                    11
PROCEDURE                    7
OPERATOR                     2
LIBRARY                      2
LOB                          9
PACKAGE                     27
PACKAGE BODY                19
TYPE BODY                   17
JAVA RESOURCE               66
TABLE                       68
INDEX                       91
FUNCTION                    34
VIEW                        26
INDEXTYPE                    1
JAVA CLASS                1521
TYPE                       448
```

DICOM Data Types

```
SQL> select object_name from user_objects
  2  where object_type = 'TYPE'
  3  and object_name like '%DICOM%';

OBJECT_NAME
------------------------------
DICOM_IMAGE179_T
DICOM_PRIVATE_ATTRIBUTE608_T
DICOM_RUNTIME_PREFERENC605_T
DICOM_STANDARD_ATTRIBUT611_T
DICOM_UID_DEFINITIONS619_T
ORDDICOM
ORD_DICOM_HEADER180_T

7 rows selected.

SQL>
```

ORDDICOM Data Type

```
SQL> desc orddicom
 orddicom is NOT FINAL

 Name                          Null?    Type
 ----------------------------- -------------
 SOP_INSTANCE_UID              VARCHAR2(128)
 SOP_CLASS_UID                 VARCHAR2(64)
 STUDY_INSTANCE_UID            VARCHAR2(64)
 SERIES_INSTANCE_UID           VARCHAR2(64)
 SOURCE                        ORDDATASOURCE
 METADATA                      SYS.XMLTYPE
 CONTENTLENGTH                 NUMBER(38)
 FLAG                          NUMBER(38)
 EXTENSION                     BLOB
```

Health Warning

Due to complaints made to the Surgeon General's office ...

The balance of this presentations will be:

Live in SQL*Plus

The source code for all demos can found in Morgan's Library at www.psoug.org under DICOM

You are now entering ...

… a …