

Oracle Tools

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Agenda

- RDBMS Tools
- Programmatic Tools
- Developer Suite

Introduction

- Oracle offers many tools
- Sometimes is difficult to choose what is the right tool for the task
- Our purpose is to offer a general overview of the most important tools provided by Oracle

Agenda

- **RDBMS Tools**
- Programmer Tools
- Developer Suite

RDBMS Tools

- **SQL*Plus**
 - Interactive SQL line-mode client with reporting facilities
- **Export**
 - Will create a logical dump of your data
- **Import**
 - Will read an export file and put it back into the database
- **Data Pump**
 - Enhanced export/import tools provided with Oracle10g
- **SQL*Loader**
 - Reads an ASCII file and loads it into the database

SQL*Plus

- Traditional line-mode tool to execute SQL
 - There is a Web version but it is not installed, not tested, at least not at CERN ;-)
- Scripting and formatting facilities
 - Big flexibility in formatting the output
 - Can generate quite good reports
- Very severe and sometimes annoying but always very useful tool

Oracle SQL*Plus

File Edit Search Options Help

SQL*Plus: Release 9.2.0.1.0 - Production on Fri Jan 21 15:44:37 2005

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Connected to:

Oracle9i Enterprise Edition Release 9.2.0.6.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.6.0 - Production

SQL> set line 100

SQL> select * from emp where deptno > 10;

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	SMITH	CLERK	7902	17-DEC-80	800		20
7499	ALLEN	SALESMAN	7698	20-FEB-81	1600	300	30
7521	WARD	SALESMAN	7698	22-FEB-81	1250	500	30
7566	JONES	MANAGER	7839	02-APR-81	2975		20
7654	MARTIN	SALESMAN	7698	28-SEP-81	1250	1400	30
7698	BLAKE	MANAGER	7839	01-MAY-81	2850		30
7788	SCOTT	ANALYST	7566	09-DEC-82	3000		20
7844	TURNER	SALESMAN	7698	08-SEP-81	1500	0	30
7876	ADAMS	CLERK	7788	12-JAN-83	1100		20
7900	JAMES	CLERK	7698	03-DEC-81	950		30
7902	FORD	ANALYST	7566	03-DEC-81	3000		20

11 rows selected.

SQL> |

Export

- Dumps into a pseudo-ascii file
 - SQL stmts to reconstruct your tables, indexes, views, pl/sql code, grants, constraints etc
 - table rows
 - index data is not dumped (indexes created during import)
- Users can export all their data or set of tables
- DBA can perform a full export of the database
 - For backup or migration to a new release
 - For recovery from human errors

Export

- Be careful if you are modifying your data at the same time...
 - Consistent only at table level NOT at export level by default
 - Using option *consistent=Y* will assure your data is consistent as of the beginning of the export process, but in case off big schemas/databases and small rollback segments you can get „Snapshot too old“ error.
- To see short description of all available export tool options one can execute:
`exp help=y`

Export - most important options

- USERID - username/password
- FILE - output files (EXPDAT.DMP)
- PARFILE - parameter filename
- CONSTRAINTS - export constraints (Y)
- GRANTS - export grants (Y)
- INDEXES - export indexes (Y)
- TRIGGERS - export triggers (Y)
- STATISTICS - analyze objects (ESTIMATE)
- DIRECT - direct path (N)
- ROWS - export data rows (Y)
- CONSISTENT - cross-table consistency(N)
- FULL - export entire file (N)
- OWNER - list of owner usernames
- TABLES - list of table names
- QUERY - select clause used to export a subset of a table

Import

- Reads a file produced by EXPort and writes it back into the database
- Recovery purposes: can recover everything or individual tables
 - No options to recover just a synonym or a view or a piece of pl/sql code
 - But you are a good programmer and you have the .sql scripts that generate them, right ?

Import

- Import is writing into the database...
So it may run out of Rollback space!!!!
- Use the options `commit=y` and `buffer=N` to avoid this problem
 - N is the buffer size that will be filled before import issues a commit
- To see short description of all available export tool options one can execute:
`imp help=y`

Import - most important options

- USERID - username/password
- SHOW - just list file contents (N)
- BUFFER - size of data buffer
- COMMIT - commit array insert (N)
- FILE - input files (EXPDAT.DMP)
- PARFILE - parameter filename
- IGNORE - ignore create errors (N)
- GRANTS - import grants (Y)
- INDEXES - import indexes (Y)
- CONSTRAINTS - import constraints (Y)
- FULL - import entire file (N)
- FROMUSER - list of owner usernames
- TOUSER - list of usernames
- TABLES - list of table names
- ROWS - import data rows (Y)

Data Pump

- New export/import tools in Oracle10g
 - expdp - export
 - impdp - import
- Many enhancements on functionality/performance area
 - Execution parallelism
 - Possibility to suspend/restart/monitor jobs
 - More ways to change metadata
 - Possibility to direct migration of data from one database to another with use of database links
 - Up to 20 times better performance in comparison to old exp/imp tools
- One important limitation in comparison to old export/import tools
 - Dump files can be stored on the server side only

SQL*Loader

- A tool that reads text files and loads their content into the database
- It requires a Control file that describes the structure of the text file
- Provides great flexibility
- Can perform some conversion before loading the data

Read → Process → Insert

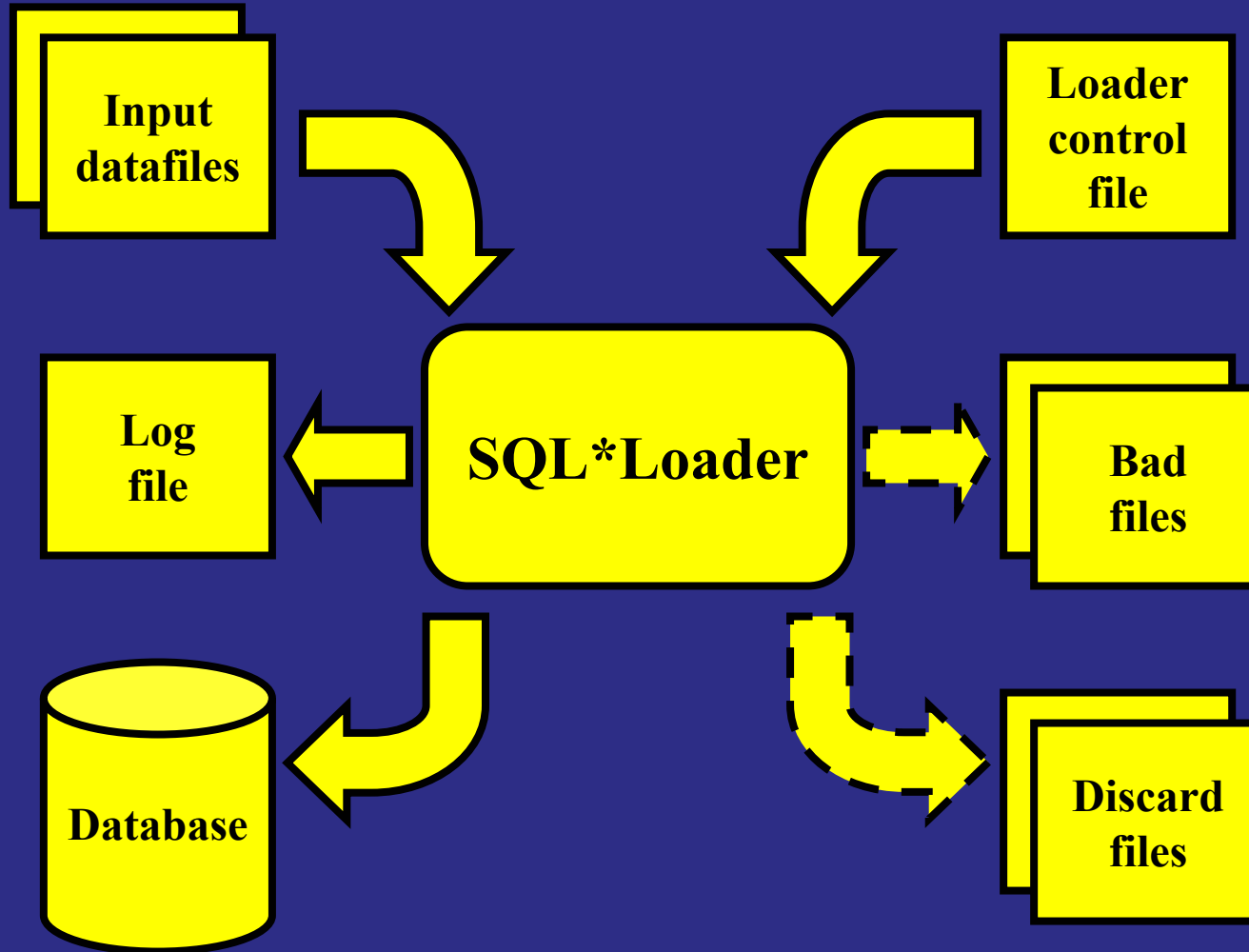
SQL*Loader

- The Control file describes the structure of the document
 - The format (data is TAB separated, comma separate ?)
 - How are the numbers described ? How many digits ?
 - Where to put the data ?
- How the data is handled (any pre-processing)

SQL*Loader

- The tool will generate a file with the bad records
 - Those records that could not be loaded due to errors (wrong format according to Control file?)
- It is a fast tool... with the option Direct=Y it will "go" directly to the Oracle datafiles..
 - Skipping the internal SQL layer.
- If run SQL*Loader without any option you can see usage information

SQL*Loader



SQL*Loader - most important options

- userid - ORACLE username/password
- control - Control file name
- log - Log file name
- bad - Bad file name
- data - Data file name
- discard - Discard file name
- discardmax - Number of discards to allow (Default all)
- skip - Number of logical records to skip (Default 0)
- load - Number of logical records to load (Default all)
- errors - Number of errors to allow (Default 50)
- rows - Number of rows in conventional path bind array or between direct path data saves
- silent - Suppress messages during run
- direct - use direct path
- parfile - parameter file

Agenda

- RDBMS Tools
- **Programmatic Tools**
- Developer Suite

Programmatic Tools

- Bindings to 3GL languages (Fortran, C, C++, Java)
 - No longer available Pascal, PL/I...
- Two flavors
 - Precompiler
 - Call Interface

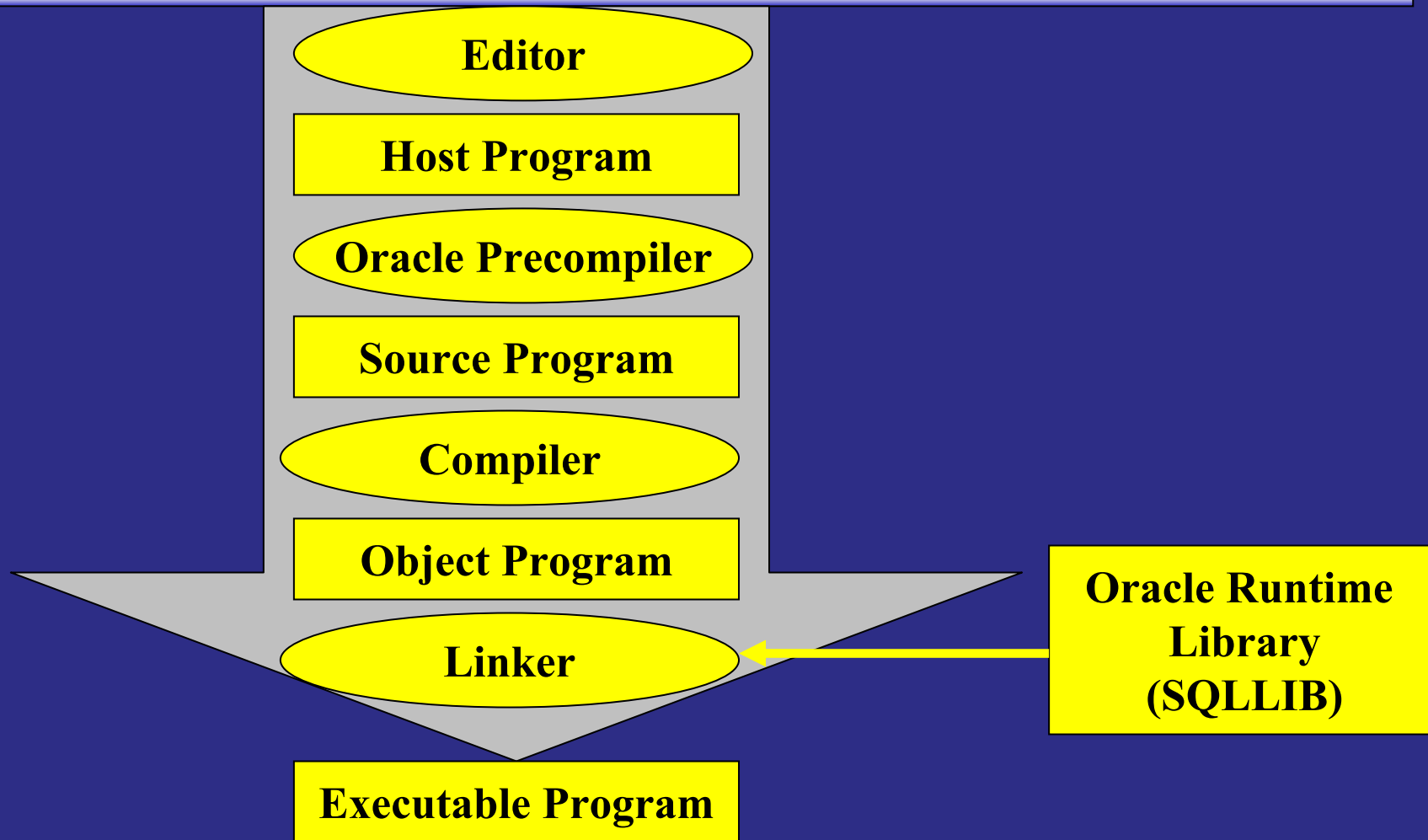
Precompiler

- An Oracle Precompiler is a programming tool that allows you to embed SQL statements in a high-level host program

```
EXEC SQL SELECT ename, sal, comm  
INTO :emprec INDICATOR :emprec_ind  
FROM emp  
WHERE empno = :emp_number;
```

Precompiler converts these tags into calls to an internal Oracle library

Precompiler



Precompiler

- The precompiler will also parse your includes file looking for macro definitions etc...
- Oracle supplies **Makefiles** to control the process of moving from a Precompiler program to the real executable
- At CERN we have Proc*C (suffix is .pc)
 - The only Precompilers that are still evolving are Proc*C and Pro*Cobol!!!

Precompiler

- The Makefile and demos are located in `$ORACLE_HOME/precomp/demo/proc/demo_proc.mk`
- You can run/test/modify the samples by doing `make -f demo_proc.mk samples`
- You also need to know what a Makefile is, and how to handle it...
 - You may even need to modify it for your own *dark* purposes...
- The Makefiles are now pretty good.. In the past they were quite horrendous...☹

Oracle Call Interface

" The Oracle Call Interface (OCI) is an application programming interface (API) that allows you to create applications that use the native procedures or function calls of a third-generation language to access an Oracle database server and control all phases of SQL statement execution. OCI supports the datatypes, calling conventions, syntax, and semantics of a number of third-generation languages including C, C++, COBOL and FORTRAN."

Oracle Call Interface

- Bunch of C function calls supplied by Oracle
 - They look like normal calls to C functions.
 - No embedded SQL stmt, no Precompiler step
 - Thread safety
- C++ has a similar binding OCCI...
- For Java Oracle provides JDBC drivers and API working in similar fashion.

Oracle Call Interface

- To compile OCI we have a Makefile supplied by Oracle

```
$ORACLE_HOME/rdbms/demo/demo_rdbms.mk
```

OCI or Precompiler

- Precompiler is friendlier
 - It does a lot of work for you in the background
- With OCI you see many low level details...
 - But OCI is *easier* to debug...integrates better with the debuggers
- The choice for Pro or OCI depends on the end-user
 - If you are a good C programmer then OCI may be for you
- Have a look at both, and then decide..

Agenda

- RDBMS Tools
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- **Developer Suite**

Developer Suite

- **Oracle Forms/Reports/Graphics**
 - RAD tools to create forms/reports/graphics applications
- **Oracle Designer**
 - Case tool to generate database applications
- **Jdeveloper**
 - Java IDE

Forms/Reports/Graphics

- There are three main sub-component per tool
 - Builder
 - Compiler (or generator)
 - Runtime
- The pseudo-binaries are not compatible between different platforms
- Integration: can create a Forms application with Report and Graphics components...
- Can include Java code (apart from normal SQL and/or pl/sql)

Forms/Reports/Graphics

- Last release, 10g (9.0.4), allows only Web deployment
 - Client-server still available for development
- Current version installed at CERN, 6i, allows for normal client-server and web deployment
 - Client/server supported until 2006
- Requires the installation and configuration of certain Oracle Internet Application Server component
 - Forms/Reports Services
- It is likely that this line of Oracle products will disappear in coming years

Oracle Designer

- Complete toolset to model, generate and capture the requirements and design of applications
- Helps to focus on the application requirements not the technology that will implement it
 - Entity Relationship diagrammer
 - Process modeller
 - Function diagrammer
- Reengineering facilities
 - Can read forms, database schemas and generate the E/R diagram, functions etc corresponding to the application

Oracle Designer

- Transformers transforming requirements into proposal/template of the application
 - Database design transformer
 - Application design transformer
- Generator modules for
 - Forms/Reports
 - SQL
 - Web PL/SQL Cartridge
 - Integration with JDeveloper
 - BC4J from the Designer repository

Oracle Designer 6i | **Repository Object Navigator - ccdb@casedb - GLOBAL SHARED WORKAREA: Navigator**

File View Tools Help | File Edit View Navigator Version Utilities Tools Options Window Help

Model System Requirements | Transform Preliminary | Repository Tools

Process Modeler | Dataflow Diagrammer | Database Design Transformer | Function Hierarchy Diagrammer | Entity Relationship Diagrammer | Dependency Manager | Matrix Diagrammer | Repository Administration

GLOBAL SHARED WORKAREA: Navigator

- GLOBAL SHARED WORKAREA
 - CCDB2
 - CCDBNEW (1)
 - CCDB_test
 - Diagrams
 - Entities
 - Modules
 - Oracle Databases
 - PL/SQL Definitions
 - Preferences
 - Sequence Definitions
 - Storage Definitions
 - Table Definitions
 - View Definitions
 - Usages
 - Inclusions
 - DBD_TUT
 - SYSTEM FOLDER

CCDBNEW (1): Application System Properties

Name	CCDBNEW (1)
Version	
Title	
Authority	
Owner	CCDB
Data Warehouse ?	No
Documentation	
Priorities	
Constraints	
Comment	
Summary	
Objectives	
Description	

Entity Relationship Diagrammer GLOBAL SHARED WORKAREA - CCDB_ERD_1.PTMP (CCDB2)

File Edit View Layout Version Utilities Options Tools Window Help

CCDB2

Edit Entity - CCDB2/ACCOUNT

Definition	Synonyms	UIDs	Attributes	Att D
Short Name	<input type="text" value="ACC"/>			
Plural	<input type="text" value="ACCOUNTS"/>			
Volume				
Initial	<input type="text"/>			
Maximum	<input type="text"/>			

For Help, press F1

Start | 4. The Mo... | INBOX - P... | Tools.ppt | Oracle De... | Repositor... | Entity Rel... | 6:23 PM

Oracle Designer

- You require a special account in the database service `casedb`
 - the Designer repository is only installed there..
- And runs only on Microsoft Windows
 - In the past it used to run on Unix..

JDeveloper

- Complete and integrated Java, XML and Web Services development environment
 - Build/debug/tune/deploy
 - Full J2EE 1.3 support (as of 9.0.3)
 - Full J2EE 1.4 support (as of 10.1.3 - currently only the preview version available)
- Based initially on Borland's Jbuilder code
 - Initial versions not very useful 1.x 2.x
 - V3.x became interesting...
 - Entirely re-written using Java
 - Solaris, HPUX, Linux, Windows

Jdeveloper

- Wizards to create your Servlets, JSP, EJB, WEB Services, XML...
- UML Class diagrammer
- Support (as of 9.0.3) for Open Source projects like Junit, Apache Ant or Struts
- Plug-ins for 3rd party tools (Visual Café, Web Gain, Rational Rose etc..)
- Support for Clear Case, CVS
- Good integration with Oracle Database Server and Application Server
- Through SDK you can extend and customize the development environment
 - available in <http://otn.oracle.com>
 - Extensions available (ex .Java source code beautifier and reformatter)



Applications - Navigator

- tmp1
 - client_common
 - common
 - dealerInvoice_client
 - Application Sources
 - mypackage7
 - Frame1.java
 - tmp1.pl21.client.invoice
 - DealerInvoiceClient.java
 - DealerInvoiceClientProxyServlet.java
 - DealerInvoiceClientThread.java
 - DealerInvoiceException.java
 - Web Content
 - dealerInvoice_ws
 - orderStatus_ws
 - temporary
 - ws_common
 - Application Sources

WebServiceBase.java | **Frame1.java** | DealerInvoiceClient.java

jTextArea1

jButton1 jButton2

Component Palette

Swing

- Custom...
- JButton
- JCheckBox
- Components
- Data Controls

this (JFrame) - Property Inspector

background	236, 233, 216
bounds	10, 10, 400, 300
contentPane	<default>
defaultClose...	2
enabled	True
font	"Tahoma", 0, 11
foreground	Color.black
classPane	<default>

Constraints

No Constraints

Frame1.java - Structure

- UI
 - this
 - <null>
 - jButton2
 - jButton1
 - jTextArea1
 - Menu
 - Other

Source | Class | **Design**

UI - Log

- UI
 - D:\Work\TMPL\Programy\dealerInvoice_client\dealerInvoice_client.jpr
 - D:\Work\TMPL\Programy\dealerInvoice_client\src\mypackage7\Dialog1.java
 - Class/Interface: Unexpected token
 - Class/Interface: Unexpected token
 - Class/Interface: Unexpected token
 - Class/Interface: Unexpected token
 - Class/Interface: Unexpected token
 - Class/Interface: Unexpected token

Documentation

- Documentation on the tools
 - <http://oradoc/ora9ir2/nav/docindex.htm>
 - Utilities -> Oracle 9iR2 Utilities
 - Pro* ... Precompiler Programmer's Guide -> Precompilers
 - Oracle Call Interface Programmer's Guide -> OCI
 - <http://oradoc/dev6i> - Oracle Developer 6i
 - <http://oradoc/ids902> - Oracle Internet Developer Suite 9i

The End

- And this is the end of the presentation
 - Questions
 - Answers hopefully 😊