

Is XE for Me?

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Abstract

Have you ever wanted to utilize Oracle's Database Management System in your curriculum but found the cost too prohibitive? Were you turned off by the fact that the academic license does not allow you to deploy it unless the user has an Oracle license, making it difficult to develop real projects for smaller clients? Oracle has developed an entry level database, Oracle Database 10g Express Edition (XE) which was released within the last year. The database is free to develop, deploy, distribute and download from Oracle. Beginning in the fall of 2006, we made the database available to students in several classes. I will discuss how we utilize Oracle XE in our classes and compare Oracle 10g XE to 10g Enterprise Edition for students, faculty, and support staff.

Introduction

For the past ten years the Computer and Information Technology Department (C&IT) program in Columbus has used Oracle RDBMS in most of our classes utilizing database software. In the C&IT Bachelor of Science program we have seven courses that focus on database design, development, programming and administration. We use Microsoft Access in our introductory class and in five of the classes we utilize Oracle's RDBMS. In C&IT we try to give our students an edge by incorporating tools they will use in their jobs, not just in the database curriculum but for all of our courses. By all accounts Oracle continues to be the overall leader in the worldwide relational and object-relational database management systems software market. By using Oracle in our classes we feel like we are helping our students to "hit the road running". Many of the larger companies in the Columbus area use Oracle and they have generally commented they feel it is a plus to utilize the software in our classes.

Currently, C&IT at Columbus is a member of the Oracle Academy, formerly known as Oracle Academic Initiative. Oracle Academy helps provide select Oracle development, database and application server products for classroom use. This enables institutions to offer cutting-edge technology coursework for degree programs like computer science, engineering, or information systems. Following are a few of the benefits of becoming a member of Oracle Academy:

- Access to Oracle's 24/7 technical support
- Free Oracle software
- 50% discount for Oracle Academy faculty and technical support staff through Oracle University
- 40% discount on Oracle certification exams
- 50% discount on Self Test Software

- Ability to purchase subscriptions to curriculum developed by and for Oracle University

The cost for a department to join the Oracle Academy is \$500 annually. The C&IT department at Columbus has been a member for the past ten years. We have found the program to be very beneficial for our program, faculty and students. In the past we have utilized the discounts for faculty training and purchase of Oracle curriculum. Our students join Oracle Academy and are eligible for discounts Oracle offers. We are a commuter campus and many students drive from outside the Columbus area to take classes. Many of our students use the Oracle Academy agreement to download the Oracle database to their home computers. Others download a client-side version in order to access the Oracle server on campus. This allows our students to finish labs at home and not make additional trips to campus. There have been a few downsides to using the Oracle Enterprise Edition for students at home. The biggest downside for newer students is installing and administering. This has been troublesome typically for the more inexperienced of our students typically freshman and sophomores. If students have dial-up at home the actual download is virtually a day long event. Finally, the Enterprise and Standard Edition of Oracle 10g tends to be a resource hog and for students with older machines this can be problematic (I will go into this topic later). Installing the client-side version of Oracle has been well received by students with only minor complaints. Again for students with dial-up, access can be tedious. Also, in the past we have had some problems with hackers into our Oracle server and availability was intermittent at that time. This problem was virtually eliminated when we upgraded from Oracle 9i to Oracle 10g Release 2 last summer.

Overall, we have been very pleased with our participation in the Oracle Academy. We feel like it has been beneficial to students, faculty and staff and plan to continue our participation in the program.

Introduction to ORACLE XE

In February 2006, Oracle made an entry-level database named Oracle Database 10g Express Edition, otherwise known as Oracle XE, available on its website. The free download is a mere 157 MB versus Oracle Enterprise Edition coming in at 697MB in zipped files. Oracle states that Oracle XE “is an entry-level, small-footprint database based on the Oracle Database 10g Release 2 code base that's free to develop, deploy, and distribute; fast to download; and simple to administer” (Oracle, 2006). Oracle XE can be used by developers working on a variety of platforms including SQL, PL/SQL, Java, C, PHP, .NET, HTML DB, C++, ODBC, OLE DB (Foot, 2006). The Oracle XE site also claims support for XML and even some open source applications (Oracle, 2007). Oracle also claims it could be beneficial to educational institutions and students if their curriculum calls for a database.

Oracle XE retains some characteristics of the commercial database; however, it does have several differences and limitations. Oracle XE can be installed on computers with any number of processors; however, it will only use one processor per machine. Similarly, no matter how much memory and hard drive the system has Oracle XE will only use up to one gigabyte of system memory and up to four gigabytes of disk space (Oracle, 2006). Listed in Table 1 is a comparison of Oracle XE features versus Oracle Standard and Enterprise Edition.

Oracle Summary of Features

Key Feature Summary	Express Edition	Standard Edition	Enterprise Edition
Maximum CPUs	1	4	No Limit
RAM	1GB	OS Max	OS Max
Database Size	4GB	No Limit	No Limit
Windows	Yes	Yes	Yes
Linux	Yes	Yes	Yes
Unix	No	Yes	Yes
64 Bit Support	No	Yes	Yes
Server Managed Backup and Recovery (RMAN)	No	Yes	Yes
Real Application Clusters	No	Yes	Option
Stored procedures deployed in database in Java and PL/SQL	PL/SQL Only	Yes	Yes
Application Express	Yes	Yes	Yes
XML Support	Yes	Yes	Yes
Enterprise Manager	No	Yes	Yes
Partitioning	No	No	Yes
Oracle Warehouse builder	No	Core ETL features included	Enterprise ETL, data Quality and Connectors Options available

Table 1

The CPU, RAM and database size limitations are nearly identical to Microsoft’s SQL Server 2005 Express Edition. Like Oracle XE it also has the limitations of using only one processor, one gigabyte of system memory, and one gigabyte of hard drive space (Oracle, 2007). Though Oracle XE does not support 64-bit like SQL Server Express, it can be installed on the Linux distributions of Debian, Mandriva, Novell, Red Hat, and Ubuntu (Wall, 2006). Following in Table 2 are the minimum requirements for Oracle XE.

Oracle XE System Requirements

Requirement	Value
System architecture	Intel (x86)
Operating System	One of the following 32-bit Windows operating systems <ul style="list-style-type: none"> • Windows 2000 Service Pack 4 or later • Windows Server 2003 • Windows XP Professional Service Pack 1 or later
Network protocol	TCP/IP

Disk space	Server component: 1.6 GB Client component: 75MB
RAM	256 MB minimum, 512 MB recommended

Table 2

The installation of Oracle XE also differs from previous version of Oracle. Oracle XE does not use the typical universal installer, rather questions are asked by the installer and the Windows services are installed automatically. With these and other changes, Oracle XE can be installed and up and running in a few minutes, even if the user has no previous experience with Oracle. In my C&IT 272 Database Fundamentals class I demonstrated for the class the Oracle XE install. To install and add a new user took approximately 20 minutes. This was much more straight forward than the typical Oracle 10g Enterprise Edition install through the Oracle Installer.

Another feature of Oracle XE is the built-in web graphical user interface (GUI). The main buttons are: administration, the object browser, SQL, and utilities as displayed in Figure 1. Administration allows users with sufficient privileges to manage and monitor the database users, memory, and storage. The object browser lets users create and view tables, views, indexes, and sequences among other things. The SQL button permits a user to enter SQL commands, create, view, and upload SQL scripts, and to use the query builder.

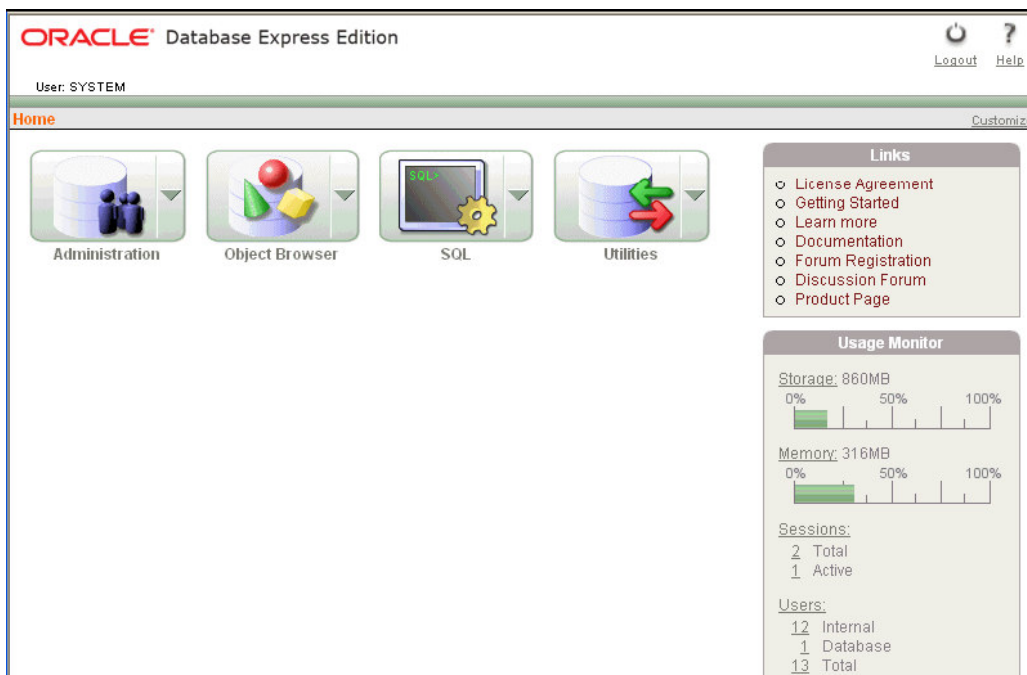


Figure 1

The query builder is similar to the one found in Microsoft Access. The GUI lets the user join tables and select fields with the click of the mouse. Then conditions can be entered for the selected fields. Oracle XE builds the SQL for the query and like Access, users have the option of viewing and modifying the SQL. The results of the SQL are instantly viewable. When finished, users can save the query or perhaps copy and paste the code into whatever application is being written as displayed in Figure 2.

Home > SQL > SQL Commands

Autocommit Display 10 Save Run

```
-- the following uses the wildcard * to retrieve all the columns of data in
-- all rows of the employees table
SELECT * FROM employees;

-- the following uses the wildcard * to retrieve all the columns of data in
-- all rows of the departments table
SELECT * FROM departments;
```

Results Explain Describe Saved SQL History

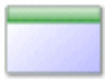
DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
10	Administration	200	1700
20	Marketing	201	1800
30	Purchasing	114	1700
40	Human Resources	203	2400
50	Shipping	121	1500
60	IT	103	1400

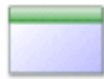
Figure 2


The application developer could be described as a combination of the form and report wizard in Microsoft Access. It also takes user defined conditions that link and control the flow through the application. Using this tool, it is possible to create web-based applications with little to no written code. Displayed in Figure 3 is the Application Builder home page.

Home > Application Builder

Application View Icons Display 15 Go Import > Create >

 Sample Application v2.0

 Web Services

 Web Services Demonstration Application

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Figure 3

Reaction to Using ORACLE XE

At the time of writing this paper students are still using Oracle XE in my C&IT 272 Database Fundamentals class. At the end of the semester I intend to survey the students on their impressions of Oracle XE. Informally, I have requested comments from students based on approximately ½ semester using the product. I also have a student doing an independent study using Oracle XE as part of his class assignment.

First, I will give my own initial reactions and then add some comments from students. Having used Oracle since Oracle release 5 as a developer, DBA and instructor I have seen several things that I've been impressed with. The installation was very easy and relatively short. Typically, an Oracle installation uses Oracle Installer, however that was not required with the Oracle XE install. I found the install quick and easy even for relatively novice users. In fact because of time constraints I usually don't demonstrate and install in my introductory database class C&IT 272. This semester I did a install at the start of class and finished the install and had added a new Oracle user in about twenty to twenty-five minutes which is pretty impressive for Oracle. Another thing that I was pleased with was the documentation. Oracle provided a nice tutorial and documentation for DBAs and developers. Most was very easy to access and use. I have not had a chance to use the Application Builder development tool so I cannot offer an opinion on that functionality. Running Oracle XE on my home desktop I found it not to be a typical drain on resources that Oracle can be. Also, it can be easily started and stopped.

The user interface is easier for the inexperienced user as the typical interface we use in the C&IT 272 is the command line SQL*Plus interface displayed in Figure 4 as opposed to the SQL Command interface displayed in Figure 2. Students typically found it easier to navigate the user-friendly Oracle XE SQL interface.

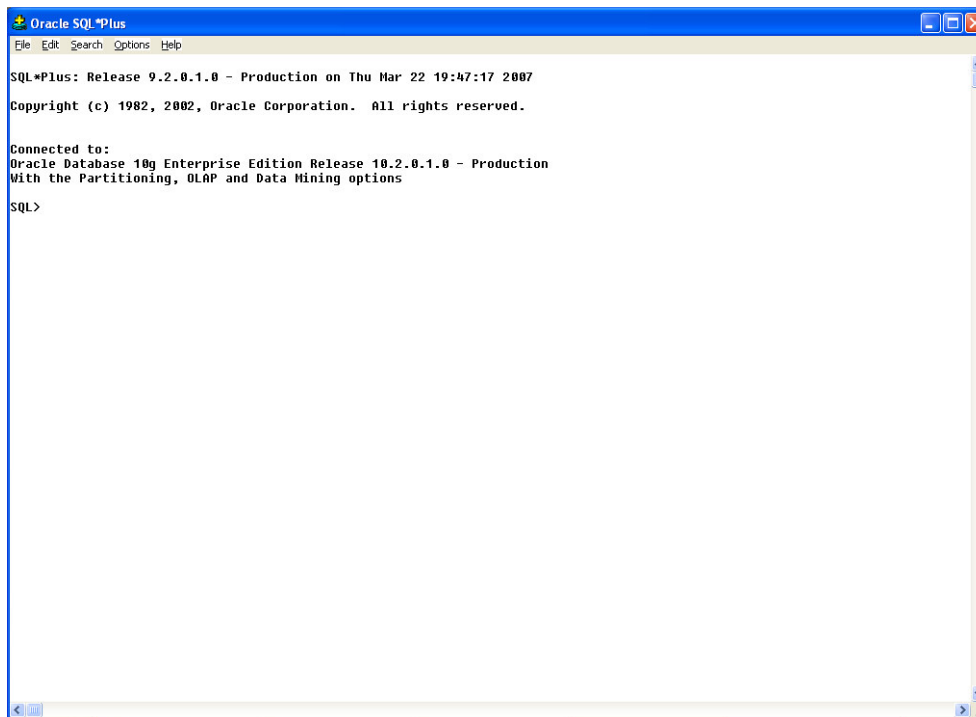


Figure 4

A downside I found with Oracle XE was a limitation on the size of a script file to run. The size limitation is 4K on the script files. Students typically load three databases for the class. Two files worked fine but the third file was too large for it to run. Also, SQL*Plus commands embedded in the script file produced error messages. The error messages were not a problem because the script would still execute with the errors. For the script file that was too big the two options used were: to break the file into parts (typically the create statements and populate state-

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ments), or even easier was to run the script from the command line interface. Probably the biggest downside of using Oracle XE in class was not anything to do with Oracle XE but rather the fact that students in some cases ran Oracle XE at home and on campus we used Oracle 10g Release 2 with the standard SQL*Plus interface. On top of that some students also installed the Oracle 10g Client side and a few installed the Oracle 10g Enterprise Edition at home. This led to some student's confusion. Because of their inexperience they were not sure what version they were running, if it was connecting to school, etc. Most students have not had experience with a database other than Microsoft Access. That was probably the biggest complaint from the students and most comprehended the differences but there was a few who struggled for a couple weeks. A plus that we are going to attempt to explore is the fact that Oracle XE can be used in development and no purchase is necessary. This will make it much easier to use small live projects in class. In the past it was virtually impossible because we could only deploy an application for a user that had a valid Oracle license. Because of Oracle's pricing most small businesses and non-profits don't have Oracle installed. Now our students can develop and deploy using Oracle XE because it is free to develop and deploy. This semester the student doing an independent study is developing an application for our Student Services area using Oracle XE and the Application Builder tool provided.

The reaction from our lab support staff was very favorable. According to our lab manager the Oracle XE was easy to install, much simpler than the Enterprise Edition of Oracle. Also, it was not a drain on disk or RAM on the server. Finally, Oracle XE was also easy to set up to be accessed on the network.

Based on the features of Oracle XE it will not satisfy the needs of all classes in our database curriculum. For instance, in our C&IT 392 Enterprise Data Management we have content that deals with data partitioning which Oracle XE does not support. In our C&IT 487 Database Administration we utilize Enterprise Manager to manage multiple instances and use Installer to install add on products. Both of these products are not used by Oracle XE. However, in our C&IT 272 Database Fundamentals it handles most of the tasks required and I believe in our C&IT 372 Database Programming where students create packages, procedures and functions using PL/SQL it should also be fine.

One assignment for my independent study student was to load Oracle XE on his laptop and try it out on a few assignments. On the laptop he noticed a few performance considerations. By default, Oracle XE starts up with Windows. While for the most part it runs quietly in the background, there are times when Oracle XE would use over 300 megabytes of system memory. The upside is Oracle XE can be quickly and easily stopped by running the stop database command from the start menu. At the present time the student is working with the Application Builder on the Student Services project and I hope to have an update by the time of the ASCUE conference.

Summary

Oracle calls Oracle XE an entry-level database fast and easy to download and administer with the added benefit that it is free to develop, deploy, and distribute. Having utilized Oracle XE for the past semester I would have to agree. Even with some of its limitations it provides students experience with a database based on Oracle 10g Enterprise Edition. For students it provides a good experience with a GUI interface superior to the SQL*Plus we typically use. We will not

drop our Oracle Academy subscription because it offers many valuable features: access to Oracle Enterprise Edition which is needed in some upper level classes, discounts on Oracle training for faculty and staff, ability to purchase Oracle course material, access to Oracle support for an annual fee of \$500. I think Oracle XE is a nice complement to have. For our students it has two plusses. It is easy for students to install and use at home, and we can have students utilize it on real projects for small businesses and non-profits which as mentioned earlier in the paper was not possible because of the license issue for the small companies. The second is a big advantage because we like to have “live” projects in classes if possible. Is Oracle XE right for your institution? It will support a multi-user environment and is easy to install and to administer which is always a plus since most smaller institutions don’t have support staff trained to support and administer Oracle. Using Oracle gives students experience with the market leader in relational database area which is useful to students seeking jobs. And finally, the price is right for institutions with a limited budget, it’s FREE! If your institution offers one or two classes in database curriculum Oracle XE may be all you need. At any rate it can be a complement to your current setup.

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