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# Expert Oracle Application Express



**John Edward Scott  
Dietmar Aust  
Martin Giffy D'Souza  
Doug Gault  
Dimitri Gielis  
Roel Hartman  
Michael Hichwa**

**Sharon Kennedy  
Denes Kubicek  
Raj Mattamal  
Dan McGhan  
Francis Mignault  
Anton Nielsen**

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## **Expert Oracle Application Express**

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*This book is dedicated to Carl Backstrom and Scott Spadafore.*

*All author royalties are donated equally to the charity trust funds of their respective families.*

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# Foreword

When I wrote my first book, *Pro Oracle Application Express*, back in 2008 (with Scott Spendolini contributing a chapter on Themes and Templates), I found it an extremely rewarding experience. However, like a lot of first-time authors, I found it very tough to fit writing in around my regular day job and other commitments. *Pro Oracle Application Express* ended up taking a lot longer than originally anticipated and ran to almost twice as many pages as originally planned, mainly due to my passion for the subject matter—I kept wanting to give more and more information.

I was extremely happy to see that when *Pro Oracle Application Express* was released, it was a very big success, at times ranking in the Top 1000 of all books sold on Amazon, which is quite an achievement for a technical book, let alone for a relatively niche area like Oracle Application Express. It was also the top selling book at Oracle Openworld that year.

So I'd done it, I'd written my first book, something I always wanted to do and it was (by relative standards) a great success. However, the questions soon started: "Hey, John, when are you writing another book?" Well, my reply was "never again!"

Are you surprised by that answer? Well, let me qualify it. I have such respect for people like Tom Kyte (who was kind enough to write the Foreword to *Pro Oracle Application Express*) and my good friend, Steven Feuerstein, who write book after book, but I simply don't know how they manage to find the time to fit it into their schedules. Writing one book, while extremely rewarding once it was published, was at times one of the toughest things I've ever done. Sitting in front of a blank page at 4 a.m., trying to meet a publishing deadline, does not quite fit the glamorous image I had of being an author.

However, two events changed my opinion on writing another book. Those events were the deaths of my two good friends, Carl Backstrom and Scott Spadafore. Both Carl and Scott were longtime members of the Oracle Application Express development team and I have lost count of the number of times both Carl and Scott have helped me in my time as a developer with Oracle Application Express. I also had the pleasure of meeting Carl and Scott many times during the various Oracle conferences we all attended over the years. One of my most vivid, happy memories during an Oracle conference was the day that Carl took Dimitri Gielis and myself for a tour around San Francisco during Oracle OpenWorld. One of my other vivid memories involves a deep discussion about the internals of APEX security with Scott Spadafore, sitting in a bar late in the evening, before Scott then turned the conversation to telling jokes.

With the sad and very unexpected passing of both Carl and Scott I wanted to do something to help both families. Carl often spoke of his daughter and I know that Scott was extremely proud of his family too. Following the success of my previous book, I felt that the best way I could do something to help would be to write another book where ALL of the author royalties were split between the charities of the two families.

Now since I already knew how much work is involved in writing a book, I came up with the idea of asking other people if they would be interested in writing a chapter. At the ODTUG Kaleidoscope event last year (2010), I approached my good friends, the authors whose names you see in this book, and asked each of them if they would be interested in writing a chapter. I asked every one of these people because they all knew Carl and Scott personally. I have the honour of saying that not one person hesitated to step up to the challenge of donating their time, experience, and knowledge to make this book happen. For that I am deeply grateful to all of the authors (in alphabetical order): Anton, Dan, Denes, Dietmar,

Dimitri, Doug, Francis, Martin, Mike, Raj, Roel, and Sharon. There were many times when it looked like this book might never make it to print; it was certainly a struggle to coordinate the book deadlines with the challenges of everyone's day jobs.

So, then, this book is dedicated to two people who were always so amazingly generous with their time and help, two people who were always held in the highest regard by the Oracle APEX community and, most importantly, two people I had the honour calling friend.

**John Edward Scott**

<http://jes.blogs.shellprompt.net>  
<http://www.apex-evangelists.com>

I was fortunate enough to meet both Carl and Scott at the ODTUG Kaleidoscope conferences in 2008 and 2009, respectively. Carl was kind enough to spend some of his personal time answering all my questions and going through some of his examples with me. After writing about enhancing a security feature in APEX, Scott called me up right away to discuss it on a weekend. He was always very helpful, especially on the forums. Both Scott and Carl were great individuals who truly loved what they did, and enjoyed passing along their wealth of knowledge to others. I'm honoured to be able to contribute to this book in the same spirit that Scott and Carl engaged themselves with in the Oracle community.

**Martin Giffy D'Souza**

<http://www.talkapex.com>  
<http://www.clarifit.com>

I had the distinct privilege of getting to know both Scott and Carl at many of the seminars and user groups they attended. Scott was scary smart with a dry and unforgiving sense of humor. His knowledge of the internal workings of APEX Security was unmatched and he shared the knowledge generously both in person and on the forums. Carl was quiet until you got to know him but a great guy and awesome JavaScript coder. In the early days he personally helped me solve a few problems on how to integrate JavaScript into APEX, and his passion for APEX and JavaScript was apparent. When John Scott approached me with the idea of the book, I didn't hesitate, and am honored to be able to be a part of this tribute to two truly great men.

**Doug Gault**

I first got in touch with Carl and Scott "virtually" on the Internet, through the APEX Forum and the blogs. They were both extremely helpful to me and everybody in the APEX community.

I believe it was in 2007, at Oracle Open World, that I met both Carl and Scott personally for the first time. I guess my blog post (<http://dgielis.blogspot.com/2007/11/oow07-day-1-sessions-apex-meetup.html>) from that time says it all: "At the APEX demo grounds I met Scott Spadafore for the first time. 'He's the man!' some say, and I must confirm. Such a nice person, a great guy!"

I liked Scott very much, not only for his knowledge (especially in security), but even more for the person he was. And then Carl . . . I was truly shocked when I read about his car accident. Although we only met in person at the Oracle conferences, Carl became a real friend. I remember the many chats we had (in MSN). He was just a message away . . . I called him "Mister AJAX" as he was so strong in all the fancy web stuff. During conferences, we always met up.

When you were with Carl there was always something happening. He had so many great stories. He liked to go out and have fun. I will never forget one Friday in San Francisco, just after OOW: Carl spent that day with John and me, and showed us the coolest places in the city. He also took us to one of the best Chinese places in Chinatown and told us some great stories about his life. I remember Carl as an exceptional person—a great friend who was always willing to help others.

Scott, Carl, I feel honored to have known you both personally and I am happy I could contribute to this book in your honor.

Dimitri Gielis

The first time I met Carl in real life, it was during ODTUG's Kaleidoscope in New Orleans. I got the chance to show him a plan board with a drag-and-drop feature—all built in APEX, of course. He was truly impressed by what I'd done, saying "did you truly build that in APEX?" He even convinced me to show it to the other APEX Development Team members.

One of the most striking things about Carl, apart from the fact he always did his utmost best to help everybody, was his fear of presenting. Although everybody recognized Carl as the leading expert, knowing way more than everyone else, he always was so nervous. But I guess that was one of his charms as well! I also remember, during that same event, Carl, John, and myself sitting at the bar, drinking some whiskey. And every glass poured contained a fly! So we talked about the never-ending fly whiskey a long time (after a thorough inspection, the bottle itself appeared to contain a lot of flies).

Before I met Scott for real, we had some contact on the OTN Forum. All about security, of course, because that was Scott's main focus—but he also knew an awful lot of all other Oracle stuff! The thing I remember most is a night in Monterey during which the usual suspects of APEX people got together for some food and drinks. Scott was sitting next to Raj Mattamal, who is without any doubt the fastest speaker in the Oracle world. And with that they formed two opposites: Raj rambling on about whatever, and Scott just sitting there, most of the time silently. But every time Scott did say something it was either incredibly funny or so spot on, you couldn't imagine.

We owe a lot to these two great guys. APEX wouldn't be the great product it is today without them. They are missed a lot.

Roel Hartman

I first met Scott in person when we were tasked to help the Chicago Police Department. It was my first day on site and Scott had picked up an extra sandwich for me because he knew that there were no stores nearby and the neighborhood was too dangerous to wander around in. He even let me choose which I preferred. That was Scott—always helping someone out—me, our team, and everyone on the APEX forum.

Carl and I used to chat mostly at night. He could write amazing code, but not the greatest documentation. He would help me with my JavaScript and I would help to document his example scripts. He helped me pick out a computer for my eldest daughter's 15th birthday, and helped my youngest with her computer homework. I feel honored to have had the opportunity to work with both of them and jumped at the chance to contribute to a book in their honor.

Sharon Kennedy

As this book is an APEX one and nobody can deny Scott and Carl's unbelievable contributions to the community, I wanted to take this dedication moment to express that these guys were first and foremost amazing people. I had the pleasure of calling these guys my friends since the early APEX days (and before), and it's their unique personalities that I'll never forget. Not a week goes by that I'm not reminded of a joke from Scott (even the bad ones) or a story from Carl—and I'm forever grateful for that. That the community could come together to put such a book as this together in tribute to them is surely a testament to their impact, but it's critically important to me that people know what great guys they were as regular people.

**Raj Mattamal**

<http://nianticsystems.com>

Unfortunately, I never had the opportunity to meet Scott, but a quick look at the APEX forum's "Top Users in Forum" list speaks volumes about the kind of guy he was—and his name will deservedly remain there for a long time to come. The number of people that Scott was able to help, myself included, is truly impressive and inspirational.

When it came to being helpful and inspirational, Carl was very much the same kind of guy that Scott was and I'm very grateful to have met him. He was incredibly influential in my development career, having helped me along while I learned the basics of client-side development. He even introduced me to jQuery!

I find it especially rewarding to have been asked to write a chapter on plug-ins in APEX—a topic that often involves lots JavaScript. To me it's proof positive that people like Carl and Scott live on in those they helped and mentored. I will always strive to have the same impact on others as they had on me.

**Dan McGhan**

The first time I met Scott was at my first Open World in 2007. In fact, he was the first member of the APEX development team that I've had the pleasure to meet. I remember that he introduced himself, and that he recognized me from the forum. He seemed happy to see me and I immediately felt part of the community. During the same conference, I also had the chance to meet Carl and the rest of the team. They both were always available to answer questions and propose solutions. They took notes of our suggestions, and the next thing we knew they were included in the next APEX release. I have been using Oracle products for over 20 years, and have never seen a product team as close to their users. And that is in large part because of Scott and Carl. I am honored to contribute to this project in memory of two great colleagues and friends, and I would like to thank John for giving me the opportunity to pay tribute to them.

**Francis Mignault**

<http://insum-apex.blogspot.com>  
<http://www.insum.ca>

Dynamic  
CarlBack blogs now fixed  
Early Night

A Haiku for Carl, by Anton Nielsen

<http://c2anton.blogspot.com/2008/11/haiku.html>

spring leaps forth  
though warmth, shining sun  
brilliance lost

A Haiku in memory of Scott, by Anton Nielsen

<http://c2anton.blogspot.com/2010/03/haiku-two.html>



Pictured left-to-right: John Scott, Carl Backstrom, and Dimitri Gielis at IOUG Collaborate event 2007



Scott Spadafore (standing) deep in discussion with John Scott

# About the Authors



■ **John Edward Scott** has been using Oracle since version 7 (around 1993) and has used pretty much every release since then. He had the good fortune to start working with Oracle Application Express when it was first publicly released, and has worked with it nearly every day since (and loves it).

John is an Oracle ACE Director and was named Application Express Developer of the Year 2006 by Oracle Magazine. John is an extremely prolific contributor to the Oracle APEX Forums on OTN. He is the author of the best selling APEX book *Pro Oracle Application Express*. He is also the co-founder of APEX Evangelists (<http://www.apex-evangelists.com>), a company that specializes in providing training, development, and consulting specifically for the Oracle Application Express product. You can contact John at [john.scott@apex-evangelists.com](mailto:john.scott@apex-evangelists.com).



■ **Dietmar Aust** is working as a freelance consultant in Germany, focusing on Oracle Application Express. Starting in 1997, he worked for three years as a consultant for Oracle in Germany. Since then, he helped numerous leading companies in Germany to successfully deliver web-based applications based on the Oracle product stack, especially the Internet application server, Oracle Portal and Reports. He is a regular presenter at various Oracle conferences (ODTUG, OOW, DOAG), conducts training classes on APEX, and recently co-authored a book on APEX best practices in German (*Oracle APEX und Oracle XE in der Praxis*). You can reach him at <http://www.opal-consulting.com> or <http://daust.blogspot.com>.



■ **Martin Giffy D'Souza** is a co-founder and CTO at ClariFit Inc., a consulting firm and custom solutions provider which specializes in APEX and PL/SQL development. Martin's experience in the technology industry has been focused on developing database-centric web applications using the Oracle APEX technology stack.

Prior to co-founding ClariFit Inc., Martin's career has seen him hold a range of positions within award-winning companies. Martin is also the author of the highly recognized blog, [www.TalkApex.com](http://www.TalkApex.com), which boasts a multitude of posts on a wide array of APEX-focused topics. He has also presented at numerous international conferences such as ODTUG, APEXposed, and COUG.

Martin is an Oracle ACE and holds a Computer Engineering degree from Queen's University in Kingston, Ontario, Canada.





■ **Doug Gault** is a Director and Co-Founder at Sumneva, a world-class Oracle Application Express (APEX) consulting, training, and solutions firm founded in 2010. He has been working with Oracle since 1988, starting with version 5.1B, SQL\*Forms 2.0, and RPT/RPF. He has focused his career on Oracle's development technologies, spending the last decade on web-based technologies and the last five years specifically on APEX.

Prior to co-founding Sumneva, Gault was Vice President of Sumner Technologies, an Oracle APEX consulting, training, and solutions firm. Prior to that, he served as the Product Development Director for Hotsos Enterprises, during which time he was the Lead Architect/Developer and Product Manager for two commercial products written exclusively in APEX. His 21 years of

Oracle experience have taken him all over the world to participate in some truly ground-breaking projects.

Gault has presented and participated in roundtable discussions at a number of conferences including Oracle OpenWorld, UKOUG, and ODTUG's APEXposed. He holds an Associate's Degree in Computer Science and an honorary Master's Degree from The School of Hard Knocks, believing there is no replacement for hard-earned experience.



■ **Dimitri Gielis** began his career working as a consultant for Oracle Belgium where he got in touch with almost every Oracle product. His main expertise was in the database area, but at that time he was also exposed to HTMLDB which was renamed Oracle Application Express later on. From the very start he liked the Oracle database and APEX so much he never stopped working with it. Dimitri then switched to another company to create an Oracle team and do pre-sales, and later create and manage an Oracle Business Unit.

In 2007 Dimitri co-founded APEX Evangelists (<http://www.apex-evangelists.com>), together with John Scott. APEX Evangelists is a company which specializes in providing training, development, and consulting specifically for the Oracle Application Express product.

On his blog (<http://dgielis.blogspot.com>) he shares his thoughts and experience about Oracle and especially Oracle Application Express.

Dimitri is a frequent presenter at OBUG Connect, IOUG Collaborate, ODTUG Kaleidoscope, UKOUG conference and Oracle Open World. He likes to share his experience and meet other people. In 2009 he received the Best Speaker Award at ODTUG Kaleidoscope. Dimitri is also President of the OBUG (Oracle Benelux User Group) APEX SIG.

In 2008 Dimitri became an Oracle ACE Director. Oracle ACE Directors are known for their strong credentials as Oracle community enthusiasts and advocates. In 2009 he received the "APEX Developer of the year" award by Oracle Magazine. You can contact Dimitri at [dimitri.gielis@apex-evangelists.com](mailto:dimitri.gielis@apex-evangelists.com).



■ **Roel Hartman** is a very experienced Oracle Software Architect. He started about 20 years ago using Oracle RDBMS 5, Oracle Forms 2.3, RPT/RPF and Oracle\*Case 4.5—since then he has used all versions of these products. For the last few years he has focused mainly on Oracle Application Express.

Working for Logica, he has acted as a technical lead on numerous projects using Designer, Developer, PL/SQL and APEX.

Roel has been a speaker at UKOUG, OOW, Collaborate, and ODTUG. He is an active participant in the Oracle APEX Forum and keeps an APEX-related blog on <http://roelhartman.blogspot.com>. In June 2009 Roel received an Oracle ACE award and in August 2010 he was appointed an Oracle ACE Director.





■ **Michael Hichwa** is the original developer and architect of Oracle Application Express (APEX), aka HTML DB. Michael created APEX as a 100% rewrite of an earlier browser-based application development tool he also created called Oracle WebDB. He had invaluable technical assistance and guidance from Tom Kyte and the addition of Joel Kallman as a co-developer. (Michael and Joel have led APEX development efforts since 1999).

Michael remains committed and fully engaged in Oracle APEX design and development efforts. He also leads the development teams responsible for Oracle SQL Developer, SQL Developer Data Modeler, Migration Tools, the Oracle development tools for Visual Studio .NET

and other data access technologies. Michael also leads APEX-driven Oracle internal system development efforts including the new Oracle online store.



■ **Sharon Kennedy** is part of the Application Express development team. She likes to stay behind the scenes supporting release management issues, early adopter releases, working on special projects (both internally and externally) as well as core development and bug fixing.

Sharon has been with Oracle for over 20 years and part of the APEX team for over 10 years. Prior to APEX, she was part of Oracle Consulting responsible for delivering custom applications to the HealthCare, Navy, and Intel markets. Working life before Oracle began at Grumman Data Systems, which is where she got handed an Oracle 5 reference manual one day and asked to “help out” on a project.



■ **Denes Kubicek** is CEO and founder of bi-Cubes. He has been working with Oracle for more than 12 years. Denes is an Oracle ACE Director and was APEX Developer of the Year 2008. Denes is also a co-author of the first APEX book in German, *Oracle APEX und Oracle XE in der Praxis*. You can reach him at [www.bi-cubes.com](http://www.bi-cubes.com).



■ **Raj Mattamal** is Co-President of Niantic Systems, LLC ([www.nianticsystems.com](http://www.nianticsystems.com)). Raj Mattamal started developing web applications at Oracle in 1995 with the very same people who came to create Oracle Application Express. In his more than 10 years with the company he has helped customers in a wide range of industries deliver web-based solutions on the Oracle Database. In addition to helping customers with their applications, Raj has developed numerous web applications for use internally at Oracle. Outside of database application development, Raj has spent much remaining time with Oracle evangelizing the Oracle Application Express. This entailed teaching Oracle Software Development and APEX classes globally, writing articles for Oracle Magazine, Technotes for the Oracle Technology Network, and assisting with the development of training material and workshops.

Having earned bachelor's degrees in Decision and Information Studies as well as Marketing from the University of Maryland, Raj continues to apply his knowledge of and passion for technology and business to real world issues to this day. Since leaving Oracle in 2006, Raj offers his services and training to customers in a wide range of business lines to help businesses get the most out of their Oracle environments. In recent years, Raj has been recognized by his Oracle professional colleagues as an Oracle Ace Director—an honor, indeed, to be earned among so many knowledgeable colleagues.



■ **Dan McGhan** is a Senior Developer and Instructor with SkillBuilders. He suffers from Compulsive Programming Disorder which is believed to be linked to his balding. Having started his development career in the land of MySQL and PHP, he was only too happy to have stumbled upon APEX. Since then, he's dedicated his programming efforts to learning more about Oracle and web-based technologies in general.

Dan is an Oracle Application Express Certified Expert, an Oracle PL/SQL Developer Certified Associate, as well as an Oracle ACE. In addition to his "day job," he is one of the top contributors to the APEX forum, maintains his own Oracle and APEX blog, and is a regular presenter at various events and user group meetings including ODTUG Kaleidoscope and APEXposed, the New York, New England, and Suncoast Oracle User Groups. His most recent addiction, as you may have guessed, is developing plug-ins for APEX.

When not programming, Dan may be found studying languages other than those used for development, notably Spanish and Italian. He's also been sighted at various venues dancing Salsa with his wife, Sonia, and even enjoying an occasional cigar, a time when Sonia prefers not to be around.



■ **Francis Mignault** As an Information Technology Professional, Francis Mignault has nearly 25 years of experience in IT and with Oracle databases. He started as a developer on version 5 of Oracle using Forms 2.3 as the development tool. He then quickly specialized as a database administrator (DBA). In 2002 he co-founded Insum Solutions, where he currently holds the role of Chief Technology Officer. He participated in the development of a SAAS (Software As A Service) multitenant and multi-lingual association management application developed with Oracle Application Express. Francis Mignault has presented at several APEX seminars and conferences, including Oracle Open World, IOUG Collaborate, ODTUG Apexposed, ODTUG Kaleidoscope and Ora\*GEC. Due to his involvement in the Application Express community, Francis Mignault is also responsible for the implementation of all new APEX practices and is now in charge of a team of resources that develop and support APEX applications for customers around the globe.

■ **Anton Nielsen** is president of C2 Consulting, a technology solutions firm specializing in Oracle technologies. Anton is an Oracle Fusion Middleware ACE Director and has presented at ODTUG Kaleidoscope, Oracle OpenWorld, and APEXposed. Prior to founding C2 Consulting, he was a Technical Director at Oracle USA and an officer and scientist in the U.S. Air Force. Anton has a Bachelor's degree in Mathematics from the University of Chicago and a Master's from Northeastern University, where he concentrated in combinatorics, encryption, and error correction codes. He has worked with Oracle Application Express since its inception and with various aspects of software security since 1982.

# About the Technical Reviewers



■ **Scott Wesley** is a database consultant and trainer with the Sage Computing Services team. Since joining the industry at the turn of the century, he has gained analyst programming experience in a wide variety of applications within retail, government, and financial sectors, predominantly using PL/SQL, Oracle Forms and, more recently, Oracle Application Express.

Scott actively researches and applies cutting edge technologies from the Oracle product range and is keenly interested in researching and sharing product knowledge on underutilized database-level functionality.

Occasionally you'll find Scott in the OTN forums, AskTom, PL/SQL Challenge, or helping with Australian Oracle User Group (AUSOUG) events. He also blogs occasionally at <http://triangle-circle-square.blogspot.com> and has side interests in science and skepticism.



■ **Lan Tran Faroult** graduated from French Grande Ecole : Ecole Supérieure Nationale des Télécommunications, Paris, France in 1983 and went on to obtain her Masters of Computer Science and Computer Engineering, from Stanford, California, USA in 1985. For two years, she worked as a Software Engineer at Daisy Systems, Mountain View, California, USA. Since then, she has held various positions as pre sales engineer, system engineer, network manager, and network coordinator. Currently she is mainly developing internal applications using Oracle technology.

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Dietmar Aust

To my wife, Sonia, who supported me continuously while writing this chapter—even when it spilled into our honeymoon. I love you with all my heart.

Dan McGhan

Firstly I would like to thank John Scott for coming up with the idea for this book and facilitating the process of writing.

Although I have already written articles before and have been a technical reviewer on other APEX books, this is the first time I have actually written a complete chapter for a book.

It has been quite an experience to say the least. . . I have enjoyed the writing, focusing on the technical side of things, and doing the research and testing. However I didn't realize it would take up so much time.

Therefore I would like to thank my wife, Kristel, my children, Matthias and Emmelin, and my family and friends for their support and giving me that time during the weekends and evenings.

I would also like to thank Hilary Farrell and Scott Wesley for reviewing my chapter, even with their own tight deadlines. Having their comments was very valuable and made it a better chapter.

Finally, I would like to give special thanks to my parents, for their love and support over the years. Without them I wouldn't be the man I am now.

Dimitri Gielis

I would like to thank John Scott for initiating this project for an extremely good cause. I would also like to thank the other authors for donating their time and expertise. Last but not least, many thanks to my family and friends for their continued support and encouragement.

Martin Giffy D'Souza



# OHS, EPG, and APEX Listener Compared

By John Edward Scott

When I first started using APEX, I didn't really have a choice when it came to deciding which web server to use; in a similar vein to the often-quoted Henry Ford ("any colour as long as it's black"), it was a case of "Use any web server as long as it's the OHS". The *OHS* is the commonly used name for the Oracle HTTP Server.

However, as with all things technology related, times change. Oracle 9i Release 2 brought XML DB and with it an embedded web server. As of Oracle 10g Release 2, this embedded web server can be used as an embedded PL/SQL gateway to run PL/SQL via a browser. It is commonly known as the *EPG* (Embedded PL/SQL Gateway) and controlled via the `DBMS_EPG` package.

So, things were good: we now had a choice of the OHS and the EPG, both of which were officially supported by Oracle. But, never being content to sit on their laurels, the Oracle team decided to give us a third option, the APEX Listener, which is a J2EE alternative to the OHS. The APEX Listener was created to explicitly fulfill the needs of the web server that has to sit between the web browser and your Oracle APEX application, but it can also support many other configurations, since it can be deployed using Oracle Web Logic Server (WLS), Oracle Glassfish Server, and OC4J.

## Why Should I Care About This Chapter?

When I first came up with the idea for this book (and before I'd approached the other authors), I thought a lot about what sort of chapter I'd write. There are so many areas of APEX that interest me, particularly with the release of APEX 4.0, it seemed like an impossible choice. I learned with my first book, *Pro Oracle Application Express*, that no matter what you write about, some people will love a chapter while others won't find it that relevant to them.

So, I thought to myself, what is the one thing that everyone who uses APEX has to use, yet probably never gives a second thought to? The answer (of course!) is the web server aspect.

You might be thinking "Okay, but I'm going to skip this chapter, because that's something my System Admin takes care of." Well, dear reader, please bear with me. As an APEX developer myself, I know that there are things you can do with your web-server configuration that will really impact the performance and scalability of your APEX applications (you should care about that!), and there are also some really great features available in the web server than you can leverage in your applications (and you should care about that!).

So, while at first glance this chapter might not seem as cool, sexy, or "APEX 4.0" as some of the other chapters in this book, I hope that you will find some things that make you think or, even better, make you use them!