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OraPub Class Review

Class reviewed by Brian Hitchcock

Class Title: Reactive Performance Management
Instructor: Craig Shallahamer
September 2004, Cupertino, CA
OraPub, Inc.
www.orapub.com

Summary

Overall review: Excellent, possibly the best training experience I have had.

Target audience: Anyone who needs to solve application performance issues where an Oracle database is involved.

Would you recommend it to others? Yes, if you are experienced with Oracle architecture and tuning.

Who will get the most from this class? The more experience students have with their operating system and actual hands-on Oracle tuning, the more they will get from this class. This is not the class for students who are new to Oracle and have not dealt with performance issues before.

Is this class platform specific? The focus is on applications using an Oracle database running on a Linux or UNIX operating system. However, the techniques and overall philosophy can be productively applied to any database on any operating system. Certainly, the course is targeted to systems using Oracle databases, and the database server used in class for the hands-on exercises was a Linux server.

Overall Review

The class focused on Oracle performance tuning by including the operating system, the Oracle database, and the SQL of the application. This approach allows you to find the real bottlenecks that may exist in one or more of these areas. The traditional approach to Oracle tuning is to look only at the database, and perhaps the application SQL that is moving through the database.

The class was three days long, with about 80% instructor-led presentations and 20% in-class, hands-on exercises. The other participants were all full-time Oracle DBAs, and the way the instructor ran the class encouraged everyone to participate. Compared with other classes, I got much more time with the instructor and the other students, which makes this class a better value than most.

I attended this class specifically for its focus on the bottlenecks that can exist in the operating system layer of Oracle database systems. In my own work experience, I haven't had much success in the past looking at the OS level, and I've seen cases where this limited what I could do. Even when I found the database bottleneck, I wasn't confident I could relate it to what was going on at the OS level.

The general approach taught in this class is that you have to be confident in your abilities to find performance issues in all three areas of the overall system: application SQL, database, and operating system .

This approach is very different from what I've seen before in other classes and in the popular Oracle press. While it was very familiar as far as the details of how Oracle works, the integration of the operating system was refreshing. I think many DBAs don't want to see this level of complexity, preferring to stay in their comfort zone, focused on the details of how they think the Oracle database works. (I'm not sure a DBA can truly understand how Oracle works without understanding the interactions with both the application and the operating system, but I see a lot of DBAs who attempt this.)

Now that I have more experience with looking at all three aspects of performance, I will be more adamant that all three areas must be examined at once. In many cases, I am asked to verify that there *isn't* a performance problem, which can be much harder than dealing with a situation where there is at least the perception of a specific performance issue. After attending the class, I am much more confident that I can offer my customers detailed explanations of why I don't think their system is having a problem and, where I would expect the problems to come from as their application grows over time.

The Course Materials

The course materials are presented in two volumes, the **Core Material Note Set** and the **Reference and Optional Evening Sessions Note Set**. Additionally, each student was supplied with a tar file containing all the scripts needed to perform the in-class hands-on exercises.

In addition to the two volumes of course materials, the class had a Linux server running Oracle 9i. We used this for the three in-class hands-on exercises that involved performance troubleshooting

What Was Good

The focus of the course was examining all three areas of overall performance management, namely the application (specifically the SQL that is being processed by the database), the Oracle database and the operating system that the database is running on. This focus on all three areas is rare and very valuable. The operating system is usually forgotten when Oracle DBAs start in on a performance issue.

Whether this is due to ignorance or fear or lack of experience, the result is the same. The odds of producing an accurate, verifiable diagnosis of the real performance issue are reduced. Further, without an understanding of what is going on at the OS level, the ability to come up with the best options for resolving the performance issue are also reduced.

While you may find that the specific performance bottleneck is in the Oracle database, if you have also been looking at the operating system level you would know if you have spare CPU, memory, or I/O resources available. This knowledge gives you a head start on selecting possible solutions. If you know you don't have spare CPU capacity, you don't want to pursue tuning solutions that require more CPU if that isn't feasible for the system you are working on.

Identifying performance issues

The class emphasized being able to confidently identify the performance issues. The standard tuning course puts the emphasis on how to solve performance issues. In a complex, globally deployed application environment, it can be very difficult to identify the true performance bottleneck. If this isn't done correctly, there isn't much value in being able to solve any performance issue.

The instructor made a very important point as the class was getting started. DBAs who understand the OS issues involved with overall performance management are more valuable. This is something to think about as outsourcing—and the more real threat of automation—continue to change the nature of the DBA job. If you have an interest in staying employed, this point must not be ignored.

Gathering data

Before we got to the details of overall performance management, the difference between summary data and data gathered over a specific interval was examined. This was very valuable, and based on the questions asked by some of the students, it is not something that we can assume everyone has dealt with before. (This is another example of how a focus on details can cause you to lose sight of the bigger picture.)

A graph of buffer cache hit ratio was shown with a red line plotting the cumulative buffer cache hit ratio. A blue line plotted the same data, but it plotted the buffer hit ratio for each smaller interval within the overall time span. The red line was much smoother since the data, over time, tends to settle to some average value. The blue line showed what the data was doing over much smaller time intervals, and it showed much more variation. After this, students would routinely discuss what they saw during the in-class exercises and ask each other if the data was "red line" or "blue line." This concept is very worthwhile, and the fact that this was brought out early, in such an easily understood way, shows how much this class is focused on *understanding* versus simply teaching techniques.

Teaching an approach

It was refreshing that the instructor was not trying to sell a particular tool or product. Instead, the instructor was teaching an approach that isn't dependent on any tool or product. For the class itself, the instructor provided a set of scripts that students used to identify the performance issues on the database server that was available in class. These scripts were given to each student to use indefinitely.

The instructor also explained that what was being taught was largely focused on the performance of the Oracle database, the SQL passing through it and the OS supporting it. In many real-world applications, there are many more components that can affect overall performance than just the Oracle database. This class does not address SQL tuning, or how an application server can affect overall performance, for example. This assumption needs to be understood by the general DBA community. Having expertise in the details of how Oracle works may not have any value to your business if you can't help the business identify the true performance problem. Many times, in my experience, the DBA will be called on to verify that the Oracle database is not the performance problem. This can be difficult for DBAs who have been trained to believe that any wait event is evidence of a poorly performing database.

Performance bottlenecks

The course included detailed examinations of the cause of the major types of Oracle database performance bottlenecks such as contention for latches, shared pool, and redo resources. These explanations went a lot deeper than

what I had seen over the years in the Oracle manuals and in many of the books and white papers available.

In-class exercises

During the class, there were three in-class exercises using the in-class Oracle system. These in-class, hands-on examples were great because they really gave a feel for what it is like to have to look at lots of data and figure out what is happening. The source of the performance problem was not obvious and multiple scripts had to be used to review the OS, the application SQL, and the database before the student could determine what to do next. Overall, this was the single most valuable part of the course, and I believe it is this unique approach to getting students to actually experience the approach being taught that makes this class so valuable.

OS-level I/O issues

A specific topic that was very meaningful to me was that of OS-level I/O issues. The instructor was very clear that he was teaching us how to identify I/O issues but that after that, you must engage the experts that support the I/O subsystem for the application. This is something that means a

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lot to me because I support many systems where the I/O subsystem really is a black box. I have no control over the configuration of the disk, arrays, controllers, fiber channels etc., and therefore I can't provide any value in resolving I/O subsystem issues. The same thing applies to network issues. Being able to identify the performance issue is the key task. Once identified, the DBA may need to let other experts resolve the issue depending on where the problem is. Too many DBAs think they are experts in all areas, and this wastes time. Once the DBA has identified an I/O issue from the Oracle database perspective, for example, the experts that handle the I/O subsystem must be the ones to resolve the issue.

What Could Be Better

When looking at the Oracle database, this class still assumes that the response time is between the Oracle client and the Oracle server. This may be true in some systems, but as more and more businesses are connected to customers that are farther away, the true meaning of response time must expand to include everything between the end user and the Oracle database. The response time as seen by the end user starts when they hit Return and ends when their screen is completely updated ready for the next user action. While this is typical of Oracle classes,

it avoids a whole class of performance issues that can't be found or solved within the Oracle world. I would strongly encourage the instructor to make this point very clear on the first day.

Similarly, I would like to see more emphasis on what is the real goal of any performance management task, namely, to help the business make money. It doesn't matter how well a database is tuned if the overall business process is not making money. Focusing on the performance management at the application, database, and OS levels is very, very good, but I think the context should be set early on that this is all within the broader picture of a business process that needs to serve the business. No one cares if Oracle or an application is slow or fast; what really matters is moving the business forward. I think the question needs to be asked at every step of the performance tuning process, "What is the business value of the work we are doing?" Everyone working on the project must be able to answer this question before any of the detailed performance tuning work begins. I believe DBAs need to look at the value to their business of everything they do. I believe DBAs that ignore this do so at their own peril.

Scripts

The scripts supplied as part of the course were great; they worked as advertised and were a valuable part of the learning experience. However, as tools for the students to use long term, these scripts require maintenance. Since the structure of the scripts was not examined, the amount of maintenance needed as we move from one Oracle database version to the next is unknown. Students who depend on these scripts to perform their tuning tasks back on the job may find that the scripts fail at the most inopportune time. I would like to see more emphasis placed on what the scripts were doing for us so we would be better able to support them in the future. More understanding of what the scripts were doing would also allow us to decide if each script was the best way to gather the relevant data in our specific environment.

The course makes no mention of STATSPACK. This seems odd to me. Granted, I focus on STATSPACK because it is what I can use when I support production performance issues in my work environment. Because of this, some of the data supplied by the scripts used in class will be easier to get, in my work environment, from STATSPACK.

The scripts also require some amount of installation. This was done for us on the in-class server before class. This was great for us during the class, but it meant that when I arrived back at work, I didn't know ahead of time what I would have to do to install the set of scripts. A single page in the class notes that showed the steps to install the scripts would have solved this problem. I would have liked to know, before I left class, which Oracle database user would own the objects created by the scripts and what privileges this user would need. This would have allowed me to determine which of the scripts I could use in my work environment where I have to work within some very specific security restrictions.

More in-class exercises

The greatest strength of this class also points to the biggest area where I think the value could be increased substantially. I'm referring to the in-class exercises. As I've stated previously, these were the most valuable part of the class and they set this class apart from the typical tuning courses available. I would like to see more of the class dedicated to more of these exercises. I realize that it may not be practical to set up more cases where the students actually run the scripts to determine the problem. For those cases where it isn't practical, it would be valuable to have the instructor walk through output from the scripts showing the results.

Specific tuning issues I'd like to see addressed in class, with real data from real systems, would include the following situations: database machines that have multiple CPUs, systems that have application servers, multiple databases on a single machine, remote databases with database links used between them, distributed transactions, and standby or other disaster recovery systems in place. I believe most of the students returned to work environments where these issues are present. I would like to see discussion of how to manage performance when you have to look at the performance on the local database/app/OS and the remote database/app/OS at the same time.

I realize that it may not be practical to bring a 6-way box

to class. However, I know from my work that the issues listed above come up all the time. I suggest that they be addressed in future versions of this class, or perhaps as a separate class. I'm not asking for in-class hands-on exercises for two databases on two continents. These issues could be covered with charts showing data from tuning work done on systems with multiple databases on multiple machines, etc. Perhaps the class material could show how the data for these cases differ from what is seen in class for the simpler cases.

Since I am advocating more in-class focus on more complex environments, I'm also advocating a reduction in the class time devoted to the details of how Oracle works. I did learn more about how the database does what it does, but I would have gained more useful knowledge from seeing more case studies. I know that the details of Oracle internals are very popular, but I don't think it has nearly the business value of a review of more tuning cases, especially cases that involve issues that are very likely to come up in modern application systems.

Finally, some of the videos were simply awful. Just say "No" to *9i Man*. Whoever produced these must have been an agent from Redmond.

What Was It Like in Class?

Yes, you had to buy your own lunch, and dinner after

the second day of class, if you choose to attend. I highly recommend you attend lunch and dinner. It was at the dinner that I learned more than I should have about the many personal conflicts going on behind the scenes in the highly charged world of Oracle consulting. Who knew? It sounds quite exciting. The lunch and dinner gatherings provided lots of time to discuss many Oracle questions and find out what others are doing in the field. This is a very good complement to the formal instruction in class and adds to the value of the training experience.

Day 1 – the Instructor impressed us with the fact that the covers to both volumes had been printed in color. One wonders if color printing is just now making its way to Oregon. One wonders what other marvels will follow. One assumes the instructor was attempting to be humorous. The afternoon brownies were great.

Day 2 – Lunch caused an embarrassing situation. Our group of highly experienced technical professionals decided to try the restaurant next to the hotel where the class was being held. Too bad the restaurant turned out to be a bank. (Maybe we should have studied foreign languages after all.)

Day 3 – Due to watching too many videos, time ran short, so we had pizza in class for lunch. Pizza was great— doing the math when the bill had to be paid was challenging.

The Instructor: Craig A. Shallahamer, from OraPub, Inc.

Mr. Shallahamer's 18-plus years of experience in the IT marketplace brings a unique balance of controlled creativity to any person, team, or classroom. As the president of OraPub, Inc., his objective is to empower Oracle performance managers. His specializations include "doing" and teaching others to "do" whole system performance optimization (reactive and proactive) for Oracle-based systems.

The website has lots more details on Mr. Shallahamer if you wish to know more about him and his many experiences.

Conclusion

Overall, this class was great, one of the best training experiences I have ever had. It is rare that I am excited about the daily DBA tasks that I face most of the time, but this class made me look forward to tuning tasks. This is not something I was expecting and speaks to the quality of the instructor and the class content. Note that unlike most, if not all, training offerings, OraPub classes are written and delivered by the same person. Craig teaches all the classes himself; no one else will show up to lead the class after you have paid your money. This means the OraPub instructor is highly motivated to deliver.

I don't get to go to training very often. This was the first class I've been sent to in over three years. Therefore, I had a very definite reason for wanting to go to this class in particular; I wasn't sent just to satisfy some corporate training requirement.

Many of the training classes I have attended were led by instructors who simply read from a manual and rarely had any real-world experience. Craig doesn't run his classes this way. He prepares the class materials and provides in-class hands-on exercises that force you to practice what is present-

ed. The in-class exercises are the most valuable part of this class because they can't be faked; you have to understand what you have been taught to work through the exercises.

This class was very valuable to me, and allowed me to go to work the very next day and be more productive, a very good and all-too-rare training value. If you are looking for an Oracle performance training class, I don't know of anything that comes close.

Finally, how do I know that this class was valuable? The Monday after I took the class I was tasked with finding the bottleneck in a performance test system that had suddenly started to run poorly. I applied what I had learned and indeed, I did find the bottleneck quickly, without lots of trial and error. The conclusion is clear, the focus on the OS aspects of Oracle tuning allowed me to be more productive the very next day I was at work. It is hard to top this for proof of the value of this class. ▲

Brian Hitchcock has worked at Sun Microsystems in Newark, California, for the past nine years. Before that he worked at Sybase in Emeryville, California. Even further into the past he spent 12 years at Lockheed in Sunnyvale, California, designing microwave antennas for spacecraft. He supports development databases for many different applications at Sun, handling installation, tuning, NLS and character set issues as well as Unicode conversions. Other interests include Formula One racing, finishing a Tiffany Wisteria lamp, Springbok puzzles, Marklin model trains, Corel Painter 8, and watching TV (TiVo® rules!). Brian can be reached at **brian.hitchcock@aol.com** *or* **brhora@aol.com**.