

Get More from Your Oracle Database:
Best Practice Performance Management for
Real Results



Ignite IT Performance™

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SUMMARY:

“Wait-Event” analysis has become the industry best practice replacing methods that simply count the occurrence of system operations.

Resource Mapping Methodology defines what data must be captured to understand the exact source of system bottlenecks and to identify the highest impact performance changes.

Executive Summary

This white paper looks at the deficiencies in the traditional tools used by database administrators as they are asked to continually increase database performance and keep costs down, and it highlights a new method of performance tuning and the outstanding results that have been achieved with it.

We will discuss “Wait-Time” or “Wait-Event” analysis as it has become the industry best-practice and replaced the “event counter” method of measuring database performance. Next, we will look at Resource Mapping Methodology, (RMM), which defines a methodology for performing a complete Wait-Event analysis to identify the highest impact changes. Finally, we will prove the value of these methodologies and conclude with a brief overview of Confio’s flagship product, Ignite for Oracle, which implements the RMM in an inclusive package designed for the expert DBA.

Database Wait-Time is Now the Best Measure of Performance

As enterprise decision-makers look for new ways to cut costs, they are calling on database administrators to squeeze every ounce of performance out of their current systems.

Enterprise IT managers have traditionally measured database productivity with counter-based tools, where I/O operations and CPU cycles are simply counted, with attempts made to minimize the number of operations. In contrast, Wait-Event analysis is a method of optimizing database performance by measuring how long it takes to complete each portion of a task. Confio, the leading innovator of Wait-Event performance and analysis tools, now delivers this industry best-practice analysis through its Ignite software product. Using Confio’s Wait-Event-based Resource Mapping Methodology (RMM), Ignite solves Oracle database problems faster and more efficiently.

As enterprise systems became more complex and customized, the statistical measurement of IT efficiency began losing its relevance. “Optimizing database performance by watching system statistics was like counting how many times your car’s wheels rotated on the drive to work, rather than how long it actually took you to get there,” said Matt Larson, Confio CTO and founder. “Today’s business managers don’t care about how many cycles are taken, they care about how long their users must wait for an application to respond.”

Resource Mapping Methodology

Wait-Event analysis and Resource Mapping Methodology are the cornerstones of Confio’s flagship software, Ignite. Resource Mapping Methodology defines the set of data that must be captured to do an effective job of performance management. If you do not have this, you are not looking in the right places for sources of performance degradation.

Resource Mapping Methodology (RMM) includes three elements essential to an accurate understanding of database performance:

- **Time View** – Report time for every Wait-Event as the true measure of performance,
- **SQL View** – Uniquely monitor each SQL statement as the primary unit of work,
- **Full View** – Capture data in its full granularity of every distinct Wait-Event, not the limited statistics exposed by packaged database interfaces.

Confio is the first vendor to implement all three of these analytical principles in a commercial database performance optimization tool.

Time View Principle

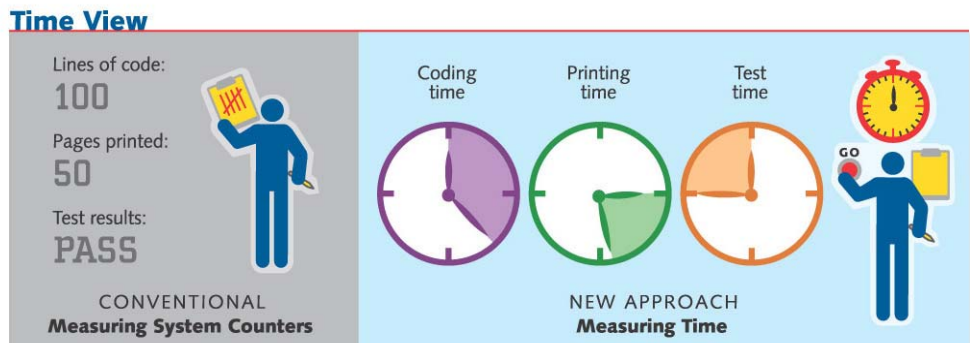
The first principle of RMM states that measurement should be based on how much time was spent on the resource, not by how many times the resource was utilized. *It is the time to complete the task and pass the work on to the next process that should be measured.*

Using a metaphor to explain these three principles, the following three figures will look at measuring database performance as if an observer were measuring company productivity. As shown in Figure 1, If you were trying to measure your cookie company's performance to see if there were any bottlenecks in the process, counting the repetitions of each task for employees would give you very little information. Using the new approach and measuring time, however, allows the observer to see that significant employee time is spent waiting for testing, and by optimizing that resource – faster test machines for example – the entire production cycle could be shortened.

Time View: "You can't tell how long something took by counting how many times it happened."

- Millsap & Holt,
Optimizing Oracle Performance, 2003
O'Reilly

Figure 1: Time View
Counting system statistics is irrelevant. Time is the true indicator of performance.

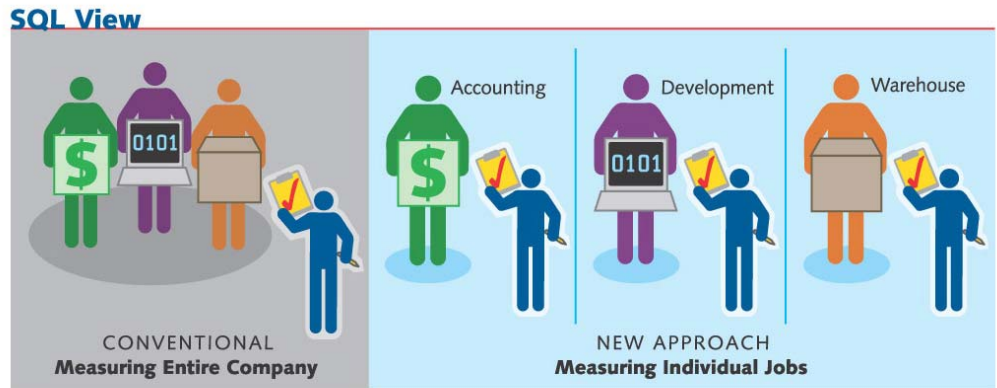


Counting system statistics does not provide meaningful information. You must measure time, as it is the true indicator of performance.

SQL View Principle

This principle states that all database performance statistics must be collected on an individual SQL statement level, and not averaged across the database. This is the only true way to tune understand where the system is experiencing delays. Using the company metaphor in Figure 2 below, just like an observer measuring employee performance cannot average across different jobs and get an accurate picture of employee performance, a DBA cannot average across SQL's and understand database performance.

Figure 2: SQL View
Averaging over the entire company also provides no information. You can't mix separate tasks and expect meaningful averages.



Averaging over entire company provides no information. You must observe each job separately.

Full View Principle

Full View: Wait-Events by all SQL statements should be distinctly identified.

The third RMM principle, Full View, declares that all Wait-Events by all SQL statements should be distinctly identified. The purpose of this principle is to ensure that database analysts can account for each Wait-event imposed on SQL, so that the resource causing the delays can be correctly identified. When resources are grouped together or omitted completely, blind spots in the analysis are created and the DBA is forced to make assumptions on the true cause of the performance bottleneck. For example, in the figure 3 below the company observer cannot measure warehouse performance or the source of shipping delays unless they identify all the distinct steps in the shipping process.

Figure 3: Full View:
Without direct visibility to each step, valuable information is lost.



Without direct visibility of each step, valuable information is lost. You must be able to distinctly measure each step in the process.

Return on Investment Analysis: Proven Value

Real results from existing customers has shown that Ignite customers achieve a Return on Investment, (ROI), of over 800% based on their ability to support more applications, comply with new SLAs, and accommodate rapidly expanding databases without adding more personnel, servers, or Oracle licenses. In fact, Ignite users are able to increase database capacity by over 35% without adding additional hardware capacity.

IGNITE BENEFITS

SUMMARY:

- Identify database bottlenecks
- Quantify steps to improve apps support
- Identify solutions in Oracle terminology
- Captures long-term trends in performance
- Enables pro-active database management through “Alerts”

Ignite reduces the overall costs of running production Oracle environments by recovering unused hardware and license capacity, eliminating consulting expenses, and reducing project management costs required to support an ever-growing Oracle installation.

Business Benefits of Ignite

For the IT Director responsible for managing DBAs and delivering highly reliable database development service to the organization, Ignite offers a high return on a small investment.

- Reduce by 35% the need for new hardware and software licenses to support increased application demands.
- Accelerate the introduction of new applications, both outside and internally developed.
- Maintain and demonstrate compliance with application SLAs for internal and external customers.
- Assign responsibility and manage projects by identifying the right ownership for each problem – DBA, developer, network or system administrator.
- Eliminate over-investment for capacity planning. Enables planning of capital expenditures based on true needs for database operation, rather than relying on excess capacity to cover up database inefficiencies.

Ignite Answers Key Questions for DBAs

Ignite is the only tool that answers the key questions yielding highest impact on database performance in both development and production operation:

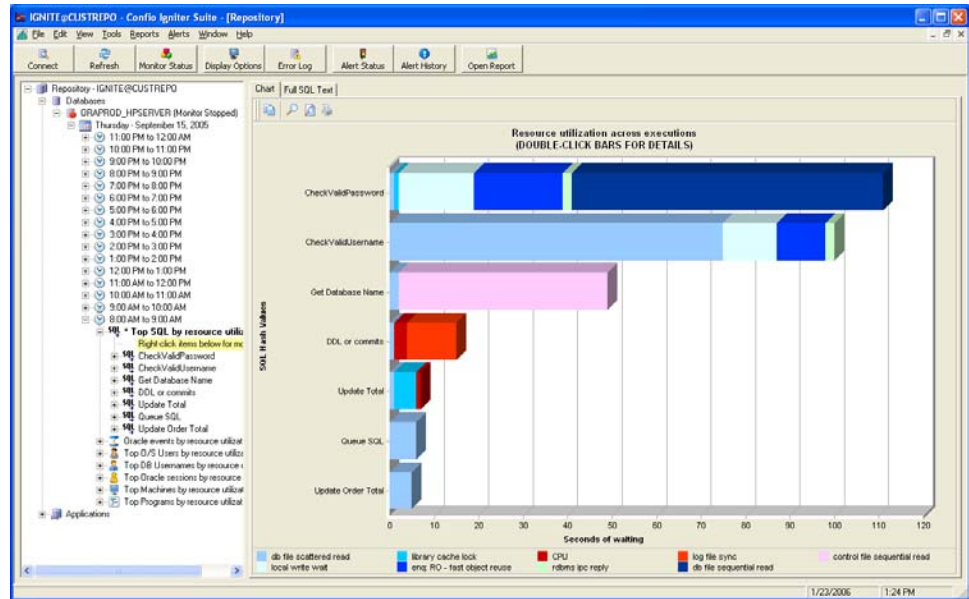
- Which individual SQL statements are most responsible for delays at any current or historical period?
- Which database resources are the biggest bottlenecks, and exactly how much time will be gained by fixing each problem?
- How long are specific transactions, users, applications and systems waiting on each Oracle resource at any time?
- Can this bottleneck be addressed by database tuning, or should it be pushed back to the developer or a network administrator?
- Which applications and databases have shown performance changes over the past months or year?
- Which database applications are operating outside of their normal bounds, indicating threshold conditions that may affect users in not addressed?

If you are a development or production DBA who needs expert tools to match your expertise, or a manager of DBAs who must do more without expanding, Ignite is the best in class with highly cost effective, specialized help.

Ignite for Oracle Examples

The first step for Ignite users is to identify the specific SQL statements incurring the highest Wait time, and identify the Wait-events most responsible for the delays. Figure 4 below illustrates SQL statements (long colored bars) with their total Wait-time accumulation graphed. Each different color represents a separate Wait-event – such as Sequential Reads, Buffer Busy Wait, or Enqueue. Up to 900 different Wait-events are identified for each SQL, and the chart immediately brings the highest Wait-event SQLs to the top.

Figure 4: Ignite detailed charts quickly identify the SQL statement, Oracle resource, program, session, user or server impacting database performance.

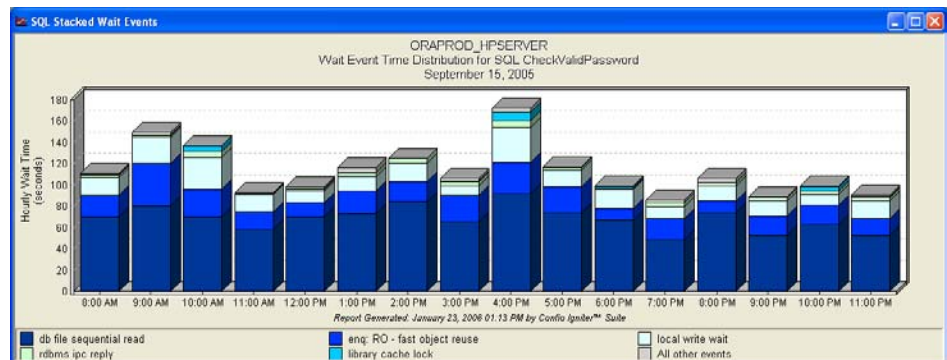


The result is the instant ability to determine which SQL is the bottleneck, and at which Oracle resource it is spending time. Drilling down further by Program, Session, or Server provides even more detail. Block level analysis exposes Hot Blocks and their contribution to delays.

Trend Reports

Another example Ignite usage is to communicate performance trends to management, customers and across departments. Trend reports enable a DBA to publish long term trends, using detailed RMM data, for quick understanding by non-DBAs and non-Ignite users. An example Trend Report is shown in the figure 5 below. Here, “Top Resource Wait Times for a SQL”, identifies the 10 highest resource waits generated by named SQL “Create Invoice” each day during the month of November.

Figure 5: Trend Report Identifies 10 highest resource waits generated by named SQL.



Alerts and Thresholds

As a final example, DBAs need to keep ahead of their database users, and find problems before the phone rings with a “trouble report”. Ignite watches for customized thresholds, and when they are exceeded, notifies the DBA anytime, anywhere. Since the Alerts are based on RMM data, they can be triggered using Wait-event data for any SQL, or on traditional Oracle criteria, such as table space limits. Figure 6 below shows the Alert Monitor, with highest severity Alerts (in red) sorted to the top.

Figure 6: Alert Status:
Enables proactive performance management allowing DBAs to find problems before their customers do.

Status	Meaning	Current Value	Monitored DB	Alert Name	Last Run	Comment
High	High	14	DRA1B	Pct Redo Logs Unarchived	12/8/2004	Critical - Needs attention ir
High	High	11	DRA2B	Jobs Waiting In Queue	12/8/2004	Critical - Needs attention ir
High	High	11	DRA3B	Tablespace Space	12/8/2004	Critical - Needs attention ir
Med	Med	11	DRA2B	Jobs Waiting In Queue	12/9/2004	Moderate - Needs attentio
Med	Med	8	DRA3B	Tablespace Space	12/9/2004	Moderate - Needs attentio
Low	Low	8	DRA7B	Pct Redo Logs Unarchived	12/9/2004	Low - Will require attentio
Low	Low	8	DRA8B	Log File Sync Waits	12/9/2004	Low - Will require attentio
Low	Low	5	DRA9B	Enqueue Waits	12/9/2004	Low - Will require attentio
Normal	Normal	5	DRA3B	Tablespace Space	12/9/2004	Running without triggering
Normal	Normal	5	DRA4B	Average I/O Time	12/9/2004	Running without triggering
Normal	Normal	2	DRA5B	Hot Files	12/9/2004	Running without triggering
Normal	Normal	2	DRA6B	Rollback Waits	12/9/2004	Running without triggering
Normal	Normal	2	DRA7B	Pct Redo Logs Unarchived	12/9/2004	Running without triggering

Summary

Wait-time based performance analysis methods are gaining wide use because of their effectiveness. Confio Resource Mapping defines a strict methodology of how to perform an accurate Wait-time analysis. Confio Ignite is a software tool that implements the Resource Mapping Methodology in its entirety, giving DBAs an integrated, cost effective package for performing expert database performance analysis and tuning.

Ignite is a tool for skilled DBAs with tough problems to solve. Customers have demonstrated results with ROI exceeding 800% based on savings of hardware investment, reduced consulting fees, and demonstrated SLA compliance. Typical users achieve a 35% increase in database capacity through use of Ignite.

With detailed insight into Oracle Wait-events, Ignite identifies exactly where performance is drained from the database. Reports add the ability to communicate long term trends across an organization. Alerts make proactive monitoring an anytime/anywhere reality.

Learn more about Ignite from Confio Software at www.confio.com or info@confio.com

About Confio

Corporate Overview

Confio Software develops Application Performance Management software which is revolutionizing the way enterprise applications are monitored, analyzed and optimized. Built on an industry best-practice Wait-Time methodology, Confio's Igniter™ Suite improves service levels for IT end users, and reduces total cost of operating IT infrastructure.

IT managers and their organizations spend inordinate amounts of time responding to application performance issues, often in crisis mode. Increasing pressure is placed on them to improve service levels for both internal and external customers. Without tools to find the actual root cause of problems, improvement projects spend billions of dollars on hardware, software licenses, and consulting projects that do not improve user service levels.

Confio's Ignite for Java and Ignite for Oracle give IT managers the capability to unlock the value of their IT systems, ensure service levels and avoid unnecessary expenditures. Customers worldwide have achieved ROI in excess of 800% using Ignite to identify critical problems and manage their resolution.

Beginning with development of first licensed software products in 2002, Confio established reference customers in 2003, and closed an initial round of external financing in March 2004. 2005 marked a year of rapid growth for the company and its DBFlash for Oracle product. 2006 brings the launch of the Igniter Suite for Oracle and Java and continued expansion of the end-to-end application performance management solution.

Confio Software products today are used by customers in North America, Europe, South America, Africa and Asia whose mission includes getting most value out of their business critical Oracle and Java systems. Customers are reached directly through the Confio salesforce and through a network of partners in the US and internationally.

Confio is privately held. Its operations are based out of its new headquarters in Boulder, Colorado, where it enjoys access to the concentration of technology and software expertise in this vibrant, young, outdoor oriented community.

For more detailed information or to contact Confio's executive team, Email us at info@confio.com, telephone us at 1.303.938.8282 or see us on the web at www.confio.com.

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