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# CON9210 - Performance Tuning for PeopleSoft Administrators

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Oracle – PeopleSoft Center of Expertise

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# Program Agenda

- Introductory Remarks
- Performance Defined
- Performance Measurement
- Database (Oracle)
- Application Server

# Program Agenda (continued)

- Web Servers
- Conclusions
- Q & A

# Who Am I?

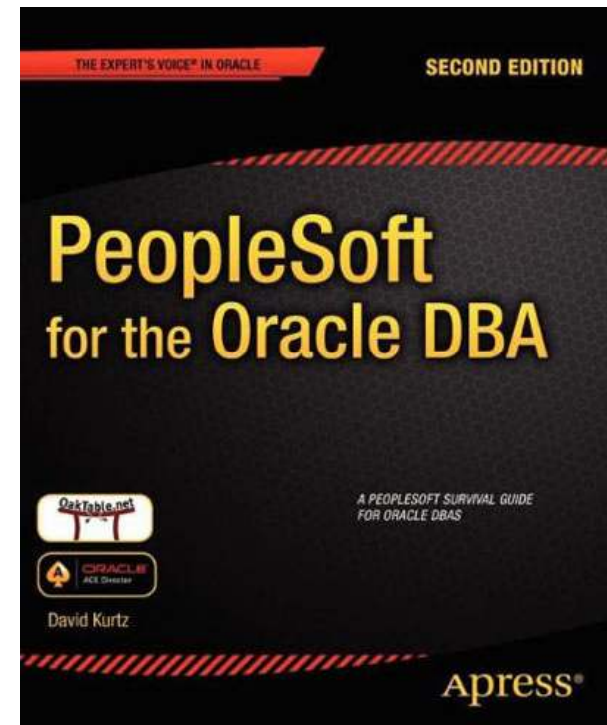
- Oracle Database Specialist
  - Independent consultant
- Performance tuning
  - PeopleSoft ERP
  - Oracle RDBMS
- Book
  - [www.psftdba.com](http://www.psftdba.com)



Oak Table



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ACE Director

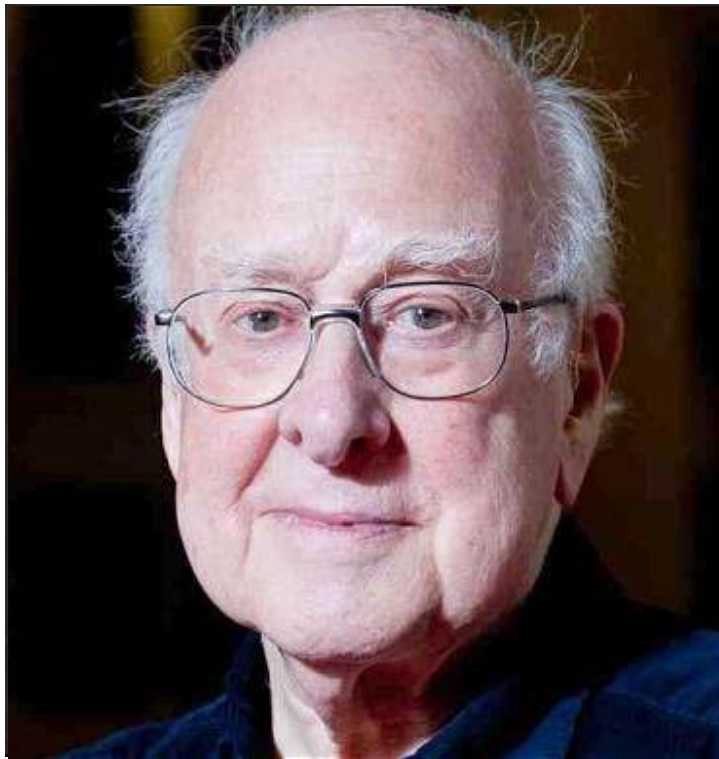


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# It depends...

- The answer to all questions should be deemed to be implicitly prefixed 'it depends' if they are not already explicitly so prefixed. The reasons for this include, but are not limited to:
  - There may be exceptions where the answer is either false or not completely true
  - There may be exceptions to the exceptions and so on ad infinitum.
  - The question may not explicitly scope all the conditions upon which the answer depends

# 'Not Completely True'





# Performance

Performance is exactly what the user perceives it to be. No more, no less.

Performance is 'poor' when the user's perception does not match their expectation.



**“Data, data, data, I cannot make bricks without clay.”**

You don't need fancy monitoring software to tell you that a system is performing poorly.

*That is what users are for.*

But you *do* need to record and monitor metrics to provide diagnostic data

# Performance Tuning is a search for lost time.

*The Sign of Four, Arthur Conan-Doyle*

Detection is, or ought to be, an exact science.

It should be treated in the same cold and unemotional manner.

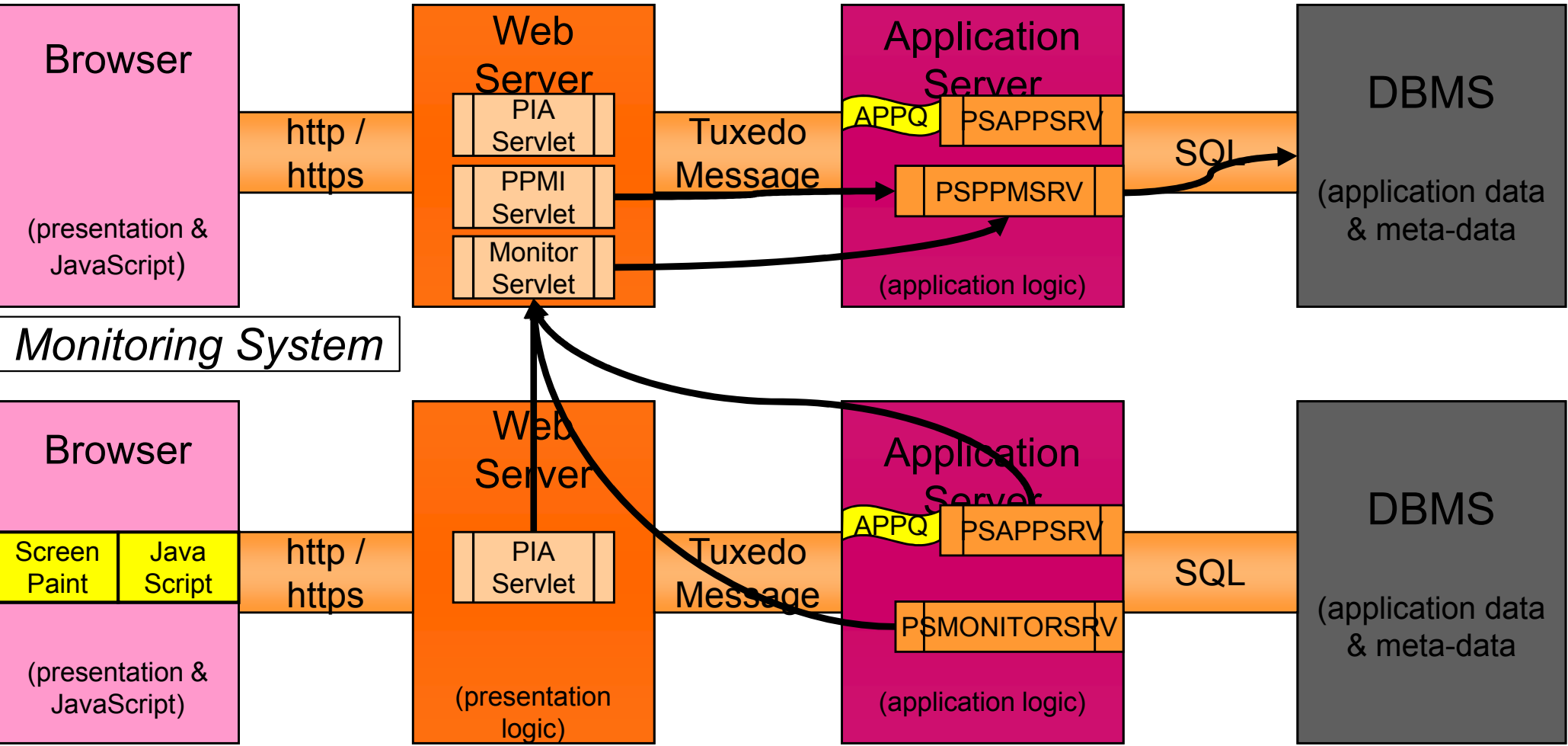
# PeopleTools Performance Monitor



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# Performance Monitor

- Part of PeopleTools
  - PeopleTools to monitor PeopleTools
    - Since PeopleTools 8.44
  - Fully instrumented
  - Including a timed-event interface for the component processor
    - Event 10046 for the application
  - Useful PeopleBook
  - No separate licence



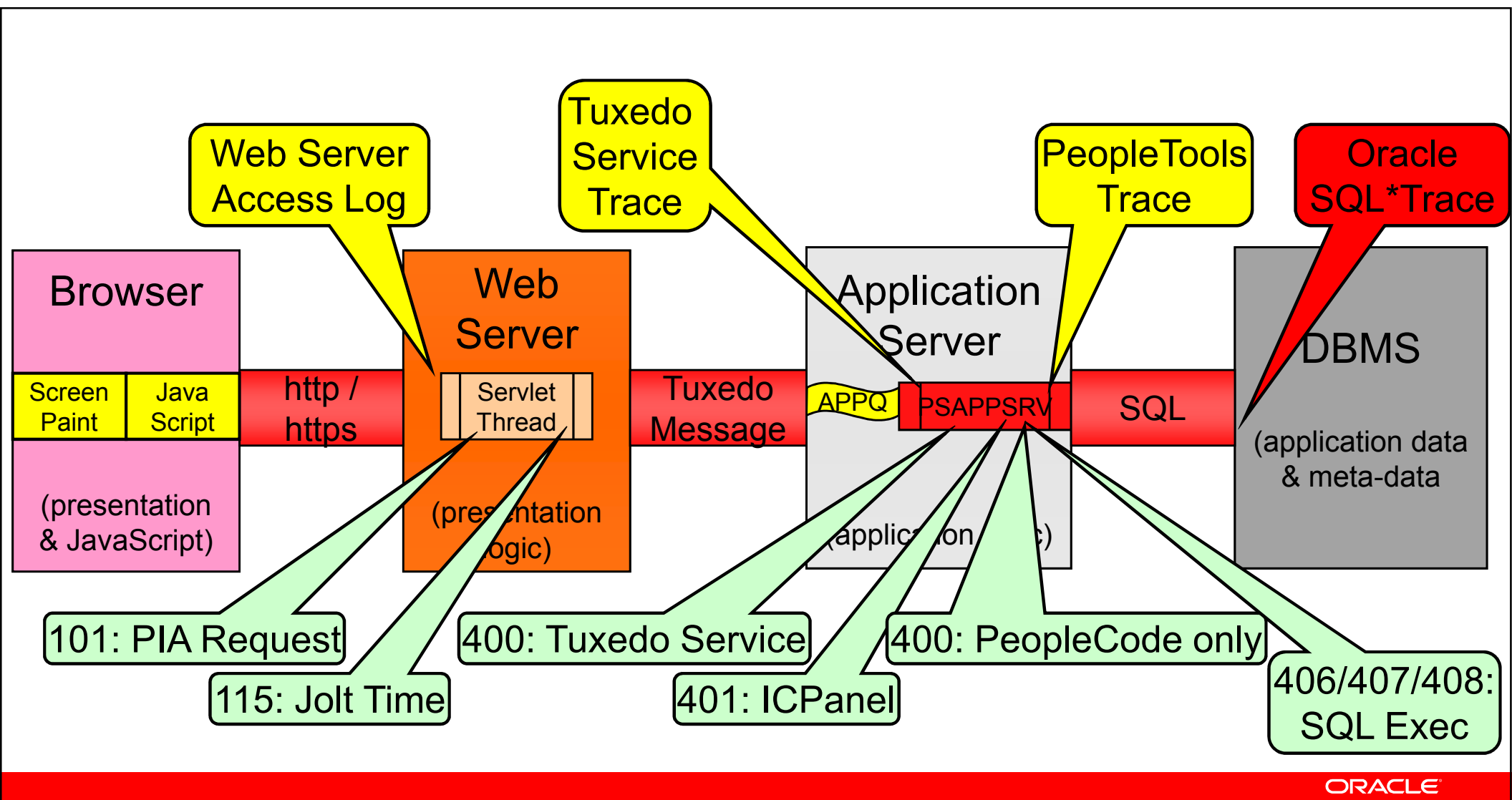
# Performance Monitor Metrics

## ▪ Transactions

- User activities in PIA that cause communications with application server
- Sampled
- Enabled to form a session trace
  - PSPMTRANSHIST

## ▪ Events

- Periodic samples
- Usually initiated by monitoring agents
- eg. CPU, Tuxedo counters
  - PSPMEVENTHIST





# Analytics: System Performance

## System Performance

**System ID:** 1      **Database Name:** psf8live      **Last Page Refresh:** Refresh

### Performance Indices

**User Sessions:** 0      [Current User Sessions](#)

**Tuxedo Requests Queued:** 0

**PMUs in Past Hour:** 0      [Open PMUs](#)    [Completed PMUs](#)

**Alarms in Past Hour:** 0      [Alarm History](#)

**Batch Jobs in Process:** 1      [Master Scheduler](#)

**Batch Jobs in Queue:** 0

### Today's Averages

[View in Grid](#)

■ Average    □ Std. Dev.

Duration (ms)

---

### Web Servers Cust

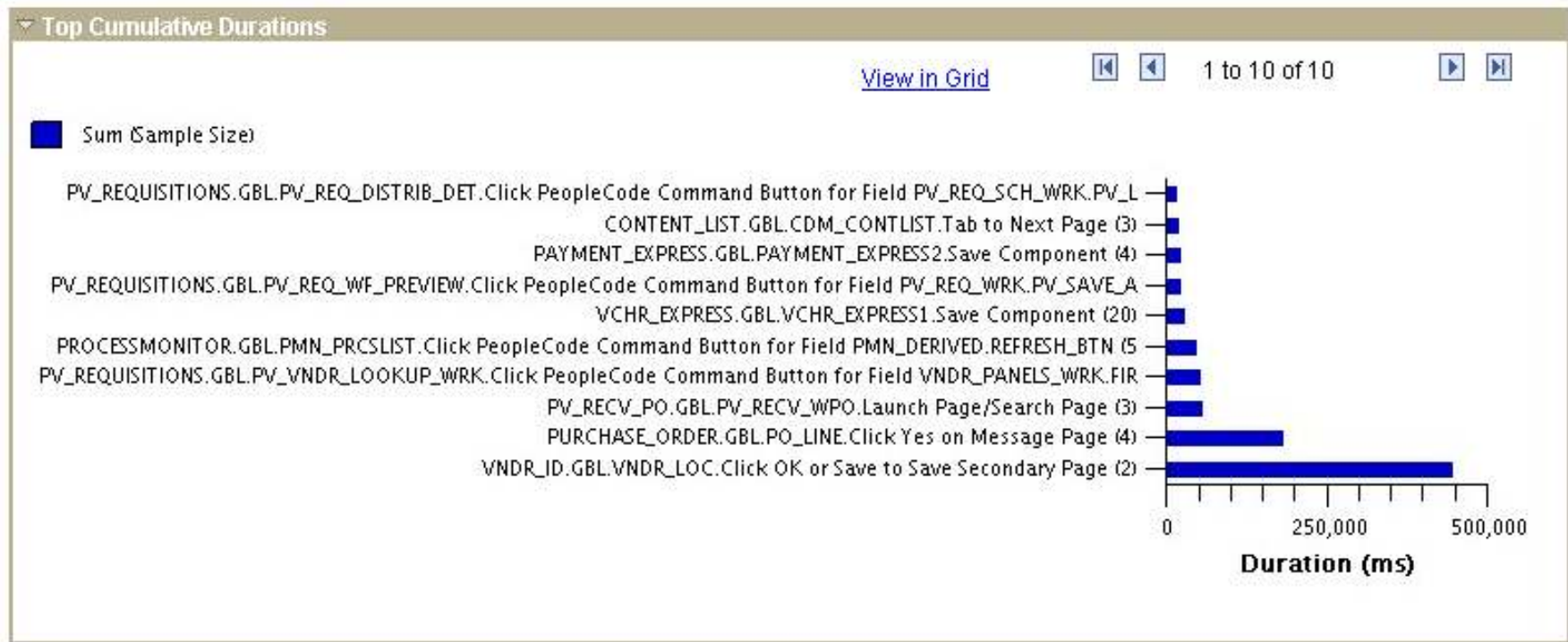
Name	Agent Date/Time	Host/Port	Filter Level	Sessions in Web-App	%JVM Memory Used	Execute Threads
<a href="#">peoplesoft</a>	06/07/2005 11:43:11	peoplesoft01:80:443	<div style="width: 100%; height: 10px; background-color: #ccc; border: 1px solid #000;"></div>	139	14.4803	132

---

### Application Servers Cust

Name	Agent Date/Time	Host/Port	Filter Level	%CPU Used	%Memory Used	Hard Page Faults/Second
<a href="#">psexcel</a>	06/07/2005 11:44:13	PEOPLESOFT01:9020	<div style="width: 100%; height: 10px; background-color: #ccc; border: 1px solid #000;"></div>	16.36	52.54	25.3
<a href="#">psf8live2</a>	06/07/2005 11:43:57	PEOPLESOFT01:9010	<div style="width: 100%; height: 10px; background-color: #ccc; border: 1px solid #000;"></div>	16.57	52.56	25.3
<a href="#">psf8live1</a>	06/07/2005 11:43:40	PEOPLESOFT01:9000	<div style="width: 100%; height: 10px; background-color: #ccc; border: 1px solid #000;"></div>	15.78	52.55	25.5
<a href="#">ibroker</a>	06/07/2005 11:43:33	PEOPLESOFT01:9030	<div style="width: 100%; height: 10px; background-color: #ccc; border: 1px solid #000;"></div>	15.43	52.62	25.1

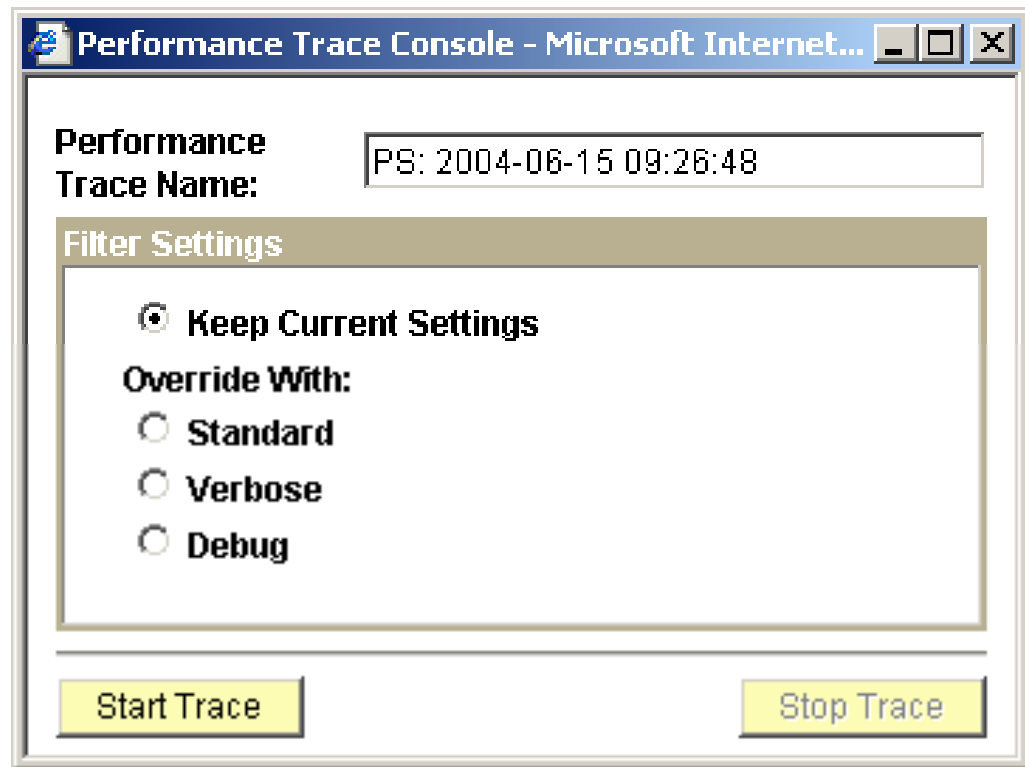
# Analytics: Top Components



# Performance Trace

Generates a group of PMUs for activity in a user session

- Choose an ID to identify records later
- Verbose
  - Includes SQL
  - Significant overhead.
  - Don't use as default. Trace only.



# Performance Monitor Transactions

- User activity in PIA
- Performance Monitoring Unit
  - Hierarchy of transactions
- Similar to Oracle event 10046 trace
  - recursive actions

PMU History Tree

Left | Right

PMU Tree

- 446125.00 ms - PIA Request
  - 446125.00 ms - JOLT Request
    - 446094.00 ms - Tuxedo Service PCode and SQL
      - 2.00 ms - PeopleTools SQL Execute
        - 0.00 ms - SQL Fetch Summary
      - 0.00 ms - Implicit Commit
    - 2.00 ms - PeopleTools SQL Execute
      - 0.00 ms - SQL Fetch Summary
    - 0.00 ms - Implicit Commit
    - 1.00 ms - Implicit Commit
  - 446049.00 ms - ICPanel
  - 446046.00 ms - Modal Level 1
    - 43.00 ms - PeopleCode BuiltIn SQL Execute
      - 0.00 ms - SQL Fetch Summary
    - 455.00 ms - PeopleCode SQL Execute
      - 0.00 ms - SQL Fetch Summary
    - 7203.00 ms - PeopleCode SQL Execute
      - 0.00 ms - SQL Fetch Summary
    - 41898.00 ms - PeopleCode SQL Execute
      - 0.00 ms - SQL Fetch Summary
    - 12983.00 ms - PeopleCode SQL Execute
      - 0.00 ms - SQL Fetch Summary



Context Information

**Generic:**  
VNDR\_ID.GBL

**PeopleCode Program:**  
RECORD.BANK\_ACCT\_SBR.FIELD.BNK\_ID\_NBR.METHOD.SaveEdit

**SQL Origin:**  
SQLExec

# SQL in Verbose Trace

**Round Trip Details**

<b>Action:</b>	Click OK or Save to Save Secondary Page	<b>Component Buffer Size (KB):</b>	387.0332
<b>Component:</b>	VNDR_ID.GBL	<b>PeopleCode Global Size (KB):</b>	0.8789
<b>Page:</b>	VNDR_LOC	<b>SQL Fetches:</b>	159
<b>Round Trip Cache Status:</b>	Cached	<b>SQL Executes:</b>	68
		<b>PeopleCode Program Executions:</b>	0

[PMU Details](#)

Duration Summary		
Measurement	Duration (sec)	% of Trip
Total Trip	446.094	100.00
SQL	446.014	99.98
Pack/Unpack Time	0.000	0.00
PeopleCode	0.028	0.01
PeopleTools Run Time	0.052	0.01

**SQL** Customize | Find | View All | First 1-10 of 68 Last

**SQL Executes** **SQL Fetches**

Seq	SQL Operation and Tables	SQL Statement	SQL Type	Duration (sec)
1	SELECT PS_PYMNT_VCHR_XREF A, PS_VOUCHER B	SELECT 'Y' from ps_pymnt_vchr_xref a, ps_voucher b where a.business_unit = :1 and a.business_unit = b.business_unit and a.voucher_id = b.voucher_id and a.remit_setid = :2 and a.remit_vendor = :3 and a.vndr_loc = :4 and a.bank_acct_seq_nbr = :5 and a.pymnt_method in ( 'BEF', 'GE', 'ACH', 'EFT') and a.pymnt_selct_status not in ( 'P', 'X', 'S') and b.entry_status <> 'X' and b.close_status = 'O' and a.pymnt_action <> 'X' Bind1='PROVP'; Bind2='MEDIC'; Bind3='0000147734'; Bind4='REMIT'; Bind5='1'; SELECT 'Y' from ps_pymnt_vchr_xref a, ps_voucher b where	Inline PeopleCode	55.300

# How much data?

- Proportion of transactions collected
  - Depends upon activity on system
  - On busy self-service system as little as 1 in 1000
    - It depends! You will have to decide for yourself.
- Event sampling frequency
  - For each agent
  - 5 minutes – 15 minutes
    - Depends on whether you want to be able to see short-lived behaviours.

## System Definitions

**System Identifier:** 9      **Database Name:** HCM89

**Unique Identifier:** 89a4dc5e-b75c-11db-a86b-8902d629cc7e

**Description:**

### Archive Mode

After:  days       Delete Data       Archive Nothing  
 Archive Data       Delete System

Allow Performance Trace

**PMU Timeout (days):**       **Agent PMU Sample Rate (1/X):**

**Agent Event Sample Rate (sec):**       **Agent Heartbeat Interval (sec):**

**Agent Buffering Interval (sec):**       **Agent Max Buffer Size (bytes):**

### Versions

Tools Release	Valid From	Valid From Time	Valid To	Valid To Time
8.48	09/12/2007	19:16:06		

**by:** PS      **Last Update Date/Time:** 30/05/2008 17:35:17

# Performance Tuning the Performance Monitor

- Always configure self-monitoring of the monitoring database
  - So you know it works
  - So you can work out why the analytics are slow!
- Performance Tuning the Performance Monitor Archive Process
  - <http://blog.psftdba.com/2008/05/performance-tuning-performance-monitor.html>
- Additional indexes
  - <http://blog.psftdba.com/2006/04/performance-tuning-performance-monitor.html>
  - <http://blog.psftdba.com/2008/12/poor-performance-of-pspmssessionsvw-view.html>



# Performance Monitor Data

- Delivered analytics will only get you so far
  - Take time to understand the data model
  - Write your own analytics
- Data stored in
  - PSPMTRANSHIST
  - PSPMEVENTHIST
- Archived data in
  - PSPMTRANSARCH
  - PSPMEVNTARCH

# Custom Analytics with Excel

- Write a query to extract the data
  - Create ODBC source using Oracle's ODBC driver
  - Use MSQuery to extract the data directly via into Excel workbook
    - Possibly directly into a pivot table
- Chart the data
  - Some of the charts that you will see later in this presentation were derived from PPM data by this method
- When you update the data the chart will also update.

# Performance Monitor Further Reading

- Performance Monitor PeopleBook
- PeopleSoft Performance Monitor Red Paper
  - Doc ID: 747510.1
- PeopleSoft for the Oracle DBA
  - Chapter 10 (2<sup>nd</sup> edition)
- Practical Guidance on the Use of PeopleSoft Performance Monitor
  - [www.go-faster.co.uk/Practical\\_PPM.ppt](http://www.go-faster.co.uk/Practical_PPM.ppt)
  - [www.go-faster.co.uk/Practical\\_PPM\\_2009.ppt](http://www.go-faster.co.uk/Practical_PPM_2009.ppt)
  - [http://blog.psftdba.com/search/label/Performance Monitor](http://blog.psftdba.com/search/label/Performance%20Monitor)

# PeopleTools Instrumentation For Oracle Database



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# PeopleTools Instrumentation for Oracle Database

- DBMS\_APPLICATION\_INFO
  - CLIENT\_INFO since PT7.53
    - Used in audit triggers
  - MODULE and ACTION from PT8.50
  - On-Line
    - Module/Action
      - Component/Page, Query Name, Subscription Message
    - Client ID = Operator ID
  - Scheduled Processes
    - But only sets ACTION to PRCSNAME

# Oracle DBMS: Module & Action

- Enterprise Manager / Grid Control
- Active Session History (ASH)
- Oracle Extended Trace
  - From 10g set trace on Module/Action
- Oracle Resource Manager

# Module & Action in OEM

**Module: RECV\_PO** Latest Data Collected From Target Oct 13, 2010 11:00:03 AM [Refresh](#)

[Actions](#) [Activity](#) [Statistics](#)

Drag the shaded box to change the time period for the detail section below.

**Detail for Selected 5 Minute Interval** [Run ASH Report](#)

Start Time **Oct 13, 2010 10:17:31 AM**

**Top SQL:**

Activity (%)	SQL ID	SQL Type
84.62	1xa9x8h1wxjdg	SELECT
15.38	0vuhkay82mhvs	INSERT

Total Sample Count: 13

**Top Actions**

Activity (%)	Service	Module	Action
84.62	P1PPP.PIP1PPP.PPP	RECV_PO	PO_PICK_ORDERS
15.38	P1PPP.PIP1PPP.PPP	RECV_PO	RECV_WPO_HDR

Total Sample Count: 13

# Augmenting PeopleTools Instrumentation

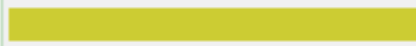

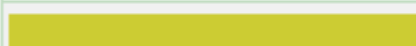
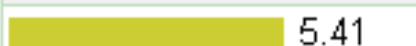
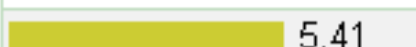
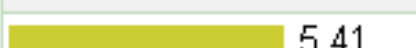
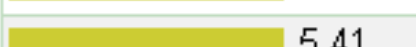
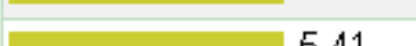
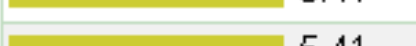

- Trigger on PSPRCSRQST
  - Set Module to PRCSNAME
  - Set Acton to
    - Process Instance
    - Or Run Control ID
    - <http://www.go-faster.co.uk/scripts/psftapi.sql>
  - PeopleTools 8.50
    - Module = program, Action = Process Name



Run ASH Report

### Top Actions

View Top Actions ▾

Activity (%) ▾		Service	Module	Action
 8.11		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18058</u>
 8.11		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18039</u>
 8.11		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18050</u>
 5.41		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18057</u>
 5.41		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18064</u>
 5.41		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18048</u>
 5.41		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18070</u>
 5.41		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18041</u>
 5.41		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18040</u>
 5.41		<u>AAAAAAAA</u>	<u>GPPDPRUN</u>	<u>PI=18051</u>

Total Sample Count: 37

# Oracle RDBMS:Active Session History

- Samples active sessions every second
- Circular buffer in memory
  - *v\$active\_session\_history*
  - It should hold about 1 hour of data
- 1 in 10 samples stored in database
  - *DBA\_HIST\_ACTIVE\_SESS\_HISTORY*
  - Flushed out during AWR snapshot

# Licensing

- ASH is a part of the Diagnostics Pack
  - only available with Enterprise Edition of Oracle database.
  - That's means it costs money.
  - I don't like it either, but that is how it is!

# ASH in OEM

You can run ASH reports via EM

ORACLE Enterprise Manager 10g  
Grid Control

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports

Hosts | Databases | Middleware | Web Applications | Services | **All Targets** | Groups | Systems | PeopleSoft

Database Instance: HRPRD > Logged in As

### Run ASH Report

Specify the time period for the report. Generate Report

Start Date: 21/02/10    
(Example: 15/12/03)

End Date: 21/02/10    
(Example: 15/12/03)

Start Time: 3:01 AM  AM  PM

End Time: 4:51 AM  AM  PM

Filter: Module

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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[About Oracle Enterprise Manager](#)

# Example ASH Report

- These processes were responsible for 86% of total DB activity
- Average 14.8 active sessions (out 32 processes)
- If I go on I get SQL statements
- But I don't get execution plans.

**ASH Report For XXXXXXXX/XXXXXXX**  
(1 Report Target Specified)

DB Name	DB Id	Instance	Inst num	Release	RAC	Host
XXXXXXXX	4200535484	XXXXXXXX	1	10.2.0.4.0	NO	xxxxor03

CPUs	SGA Size	Buffer Cache	Shared Pool	ASH Buffer Size
24	13,312M (100%)	11,440M (85.9%)	1,252M (9.4%)	40.5M (0.3%)

	Sample Time	Data Source
Analysis Begin Time:	21-Feb-10 03:01:49	DBA_HIST_ACTIVE_SESS_HISTORY in AWR snapshot 64162
Analysis End Time:	21-Feb-10 04:51:49	DBA_HIST_ACTIVE_SESS_HISTORY in AWR snapshot 64169
Elapsed Time:	110.0 (mins)	
Sample Count:	9,765	
Average Active Sessions:	14.80	
Avg. Active Session per CPU:	0.62	
Report Target:	MODULE like 'GPPDPRUN'	86% of total database activity

**ASH Report**

- [Top Events](#)
- [Load Profile](#)
- [Top SQL](#)
- [Top PL/SQL](#)
- [Top Sessions](#)
- [Top Objects/Files/Latches](#)
- [Activity Over Time](#)

# What does ASH retain?

- Most of the columns are on *v\$session*
  - Session
    - *Session ID and serial, query coordinator*
  - Wait
    - *event id, name and parameters*
  - SQL
    - *SQL\_ID, plan hash, opcode*
    - *Plan line numbers from 11g*
  - Object
    - *object, file and block numbers*
    - *row numbers from 11g*
  - Application
    - *module, action, client\_id ...*

# Active Session History

- Query ASH repository directly
  - DBA\_HIST\_ACTIVE\_SESS\_HISTORY
- Profile DB Time by
  - Module / Action
  - SQL\_ID
  - SQL Plan Hash Value (if lots of different literals)

# Background Reading

- Sifting through the ASHes, Graham Wood
  - <http://www.oracle.com/technetwork/database/manageability/ppt-active-session-history-129612.pdf>
- The ASHes of (DB) Time, Graham Wood
  - <http://www.ukoug.org/what-we-offer/library/12004ash-why-how-and-howto/ASHUKOUGJuly2010GW.pdf>
- Doug Burns' Oracle Blog
  - <http://oracledoug.com/serendipity/index.php?/plugin/tag/ASH>
- Introduction to DBMS\_XPLAN
  - [http://www.go-faster.co.uk/Intro\\_DBMS\\_XPLAN.ppt](http://www.go-faster.co.uk/Intro_DBMS_XPLAN.ppt)



# Further Reading

- Practical use of Active Session History
  - With examples drawn from PeopleSoft
  - [http://www.go-faster.co.uk/ukougpres.htm#Practical\\_ASH.ppt](http://www.go-faster.co.uk/ukougpres.htm#Practical_ASH.ppt)
  - [http://www.go-faster.co.uk/Practical\\_ASH.pdf](http://www.go-faster.co.uk/Practical_ASH.pdf)

# PeopleTools Traces and Logging



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# Traces

- PeopleTools SQL Trace
  - TraceMagic - MOS Docid (1470578.1)
- Application Server Logs
  - LogFence=4
  - PSWATCHSRV log (if logfence is 4)
- Diagnostic
  - Large Files
  - Difficult to extract performance metrics
  - Timing Inaccuracies
  - Incomplete
  - Measurement Intrusion

# Batch Timings Reports

- Application Engine and COBOL
  - Time spent in each step
  - AE can write this to database
  - Can get negative numbers in some Tools releases
    - Only ever one, can get around this with some arithmetic.

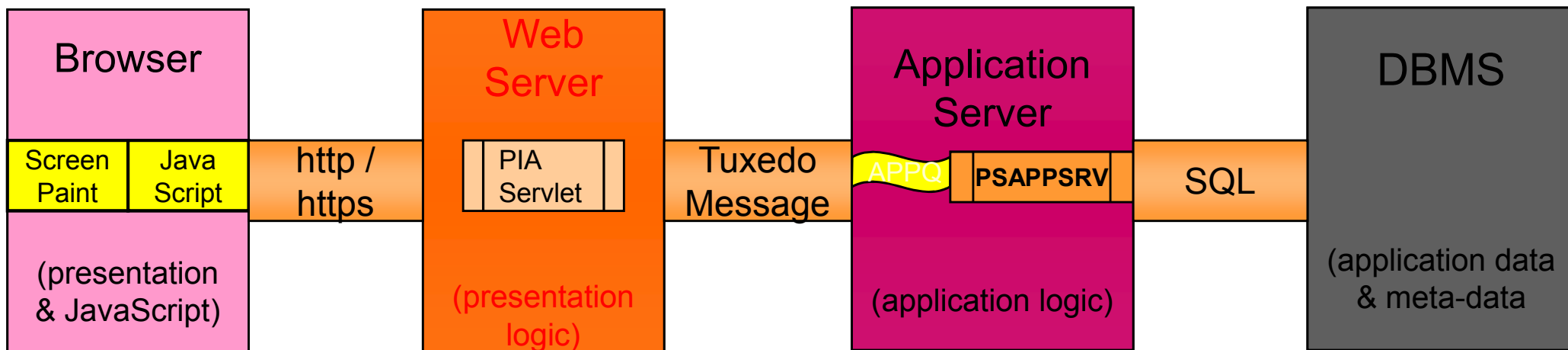
# Web Server Access Log

- Logs every request
  - Large files
  - Time taken for every request
  - Client IP address
    - But it could just be a network component not the actual client
  - Oracle Doc 662319.1

# There are only two kinds of performance problems

- You are working too hard.
  - Consuming resource
    - CPU
    - Disk
    - Memory
- You are being prevented from working
  - Queuing
    - Database Locking
    - Tuxedo Queuing
    - CPU overload
    - ...
  - Waiting for somebody else working too hard!

- It is generally better to queue higher up the stack.
  - The impact of queuing in lower tiers can propagate across the system through mechanisms in higher tiers.
  - Eg. While it is best not to have to queue at all, it is better to queue on the APPQ in the application server domain, than run out of CPU and queue on the operating system run queue.
  - Protect lower tiers for overload by correct configuration
    - But do explain this to DB/OS/disk admins!



**Monitored System**

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# Cost-Based Optimizer Statistics



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# Cost-Based Optimizer Statistics

- Performance of SQL is a significant aspect of any OLTP system
  - PeopleSoft is not an exception to this rule.
- All SQL databases\* use volumetric statistics to make SQL Optimizer determine the 'best' execution plan.
- ⇒ You need to get your statistics right
  - \*at least the ones on which PeopleSoft is certified!
  - But I am only going to talk about Oracle RDBMS

# How should you collect Optimizer Statistics in Oracle?

- Maria Colgen and others – <http://blogs.oracle.com/optimizer/>
  - CON8457 - Oracle Database Optimizer: An Insider's View of How the Optimizer Works
  - CON8455 - Oracle Database Optimizer: Harnessing the Power of Optimizer Hints
  - CON3053 - Get Proactive: Best Practices—SQL Tuning Made Easier with SQLTXPLAIN (SQLT)
- Jonathan Lewis - <http://jonathanlewis.wordpress.com/>
  - CON2803 - The Evolution of Histograms in Oracle Database
- Christian Antognini - <http://www.antognini.ch/blog/>
  - CON3330 - How the Query Optimizer Learns from Its Mistakes
- Wolfgang Breitling - <http://www.centrexcc.com>
  - Tuning by Cardinality Feedback

# How should you collect Optimizer Statistics in Oracle?

- Tell the Optimizer the truth about your data.
  - Or at least as much of the truth as it needs to make the right answer.
  - Making it handle too much of the truth can be prejudicial without being probative.
- Data in Table has a lifecycle
  - Create/Change/Delete data,
  - Collect Statistics
  - Use it

# What does Oracle do by default?

- Oracle collects statistics in the maintenance window
  - 10pm-6am weekdays, and weekends
- Collects statistics on stale objects
  - Automatically determines optimal sample size for collecting statistics
  - Automatically determines whether data is sufficiently skewed to require histograms.

# Implications for PeopleSoft of Default Oracle Behaviour

- PeopleSoft is parse intensive.
  - Literal values in dynamic SQL
  - Non-use of ReUseStatement in Application Engine
  - *%ProcessInstance* and similar macros always resolve to literals
  - Temporary Record corresponds to many tables.
  - Non-sharable SQL
- Skewed Data
  - Default values to avoid NULL
    - 0, single space, 1<sup>st</sup> January 1900.
- Excessive histogram generation
- Processing histograms adds to parse overhead.

# New Optimizer Features in 11g

- Table Preferences
  - Default *dbms\_stats* options at table level
    - CASCADE
    - DEGREE
    - ESTIMATE\_PERCENT
      - However, there are 11g features that only work properly with automatic sample size.
    - GRANULARITY
    - INCREMENTAL
    - METHOD\_OPT
      - Can control histogram collection
    - STALE\_PERCENT
      - Control when statistics are refreshed
  - Set these, and you can safely use standard, default approaches to maintaining statistics with PeopleSoft.

# %UpdateStats macro

- DDL Model calls *dbms\_stats.gather\_table\_statistics*
  - In 11g, can remove most parameters and use table preferences to control the behaviour of DBMS\_STATS.
  - This applies to whenever statistics are collected.
- There can still be a case for intercepting calls from *%UpdateStats* to *dbms\_stats* with custom PL/SQL package.
  - Some processes make excessive use of %UpdateStats
    - eg. TL\_TIMEADMIN
  - Statistics collection can be a significant overhead during batch processing.
  - Sometimes an process may call *%UpdateStats* on a permanent table. If that table is large then incremental difference small. Might only want to collect statistics if sufficient change, ie statistics are STALE.
  - Fine grain control over %UpdateStats can be very useful.
- NB: Default Oracle Statistics History Retention policy is 31 days.
  - Every %UpdateStats call generates history
  - <http://blog.psftdba.com/2009/06/oracle-10g-statistics-history-retention.html>

# GFCPSSTATS11 Package

- Hold table preferences on meta-data table keyed on RECNAME
  - DDL Trigger to set table preferences as table created
  - DML Trigger to set table preferences when metadata changed.
- DDL model also calls GFCPSSTATS11 package
  - Via meta-data, can suppress call to *dbms\_stats*
  - Or only collect statistics if 'stale'.
    - So, no PeopleSoft application code change required.
  - Force collection of locked statistics
  - Catch exception when attempt to update locked statistics



# Temporary Records

- No point collecting statistics during maintenance window.
- Truncated at start of AE
  - Truncate doesn't clear statistics!!!
- Can only collect accurate statistics during process
  - *%UpdateStats* macro
- Recommendation:
  - Lock and Delete Optimizer Statistics
  - OPTIMIZER\_DYNAMIC\_SAMPLING=4

# MOS Document References

## Monitoring and Analysis

- SQLT – [ID 215187.1]
  - Useful for detailed performance analyses of individual SQL statements
  - OOW2012 - CON3053 Get Proactive: Best Practices—SQL Tuning Made Easier with SQLTXPLAIN (SQLT)
- OS Watcher Black Box – [ID 301137.1]
  - Automates collection of OS-Level performance and diagnostic metrics
  - Extensible scripting can include application-specific information. (stay tuned)

# Further Reading

- <http://blog.psftdba.com>
- [www.go-faster.co.uk](http://www.go-faster.co.uk)

# Tuxedo Application Server Sizing



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# Application Server Sizing

- How many server processes should I configure?
  - It is very hard to answer that question with a simply numeric answer.
  - Not too many.
  - Not too few.
  - It depends!

# Application Server Sizing

- Too Few?

- Queuing
- All servers busy

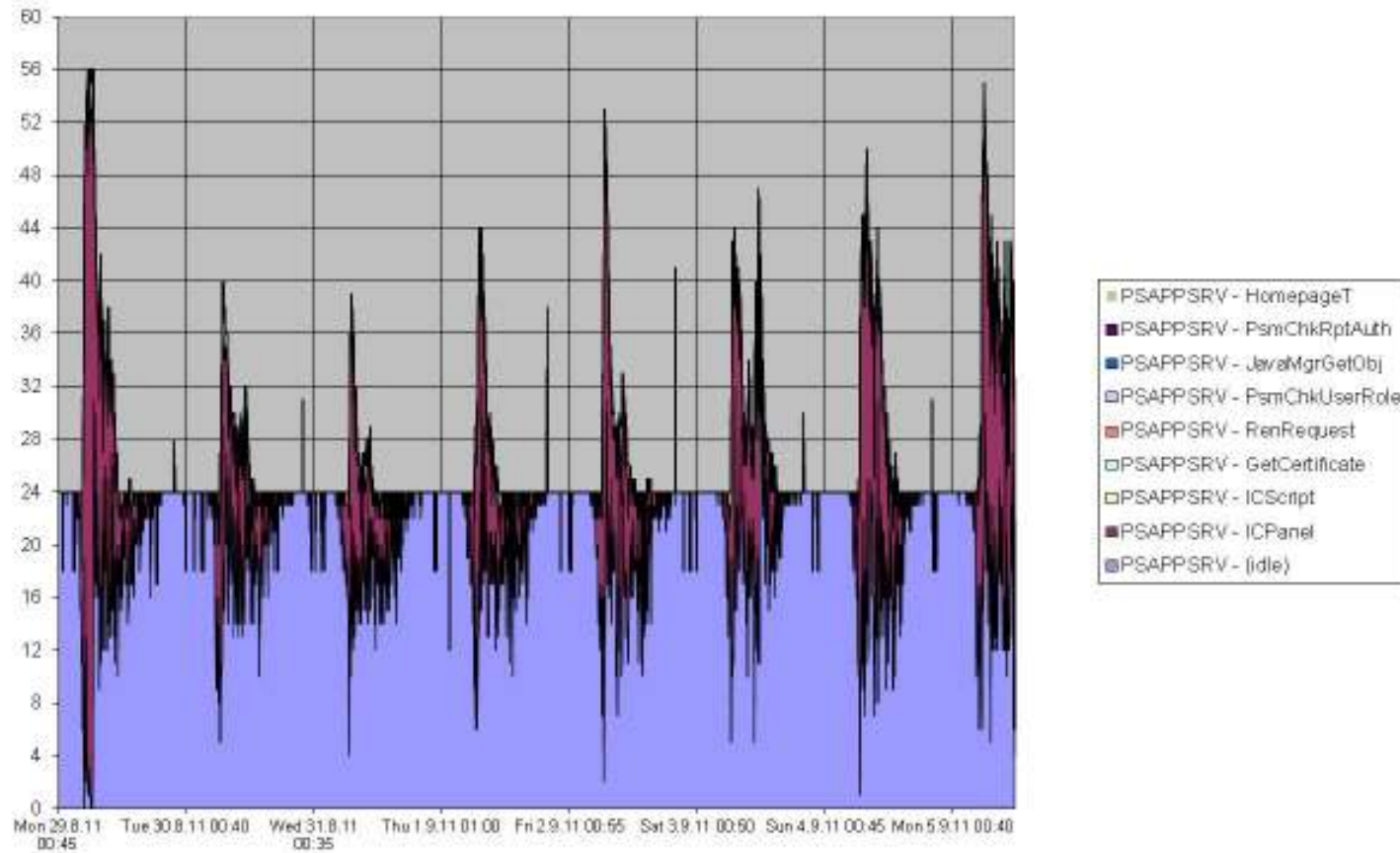
- Too Many?

- Run out of memory/CPU
  - Paging to disk
  - Queue on run queue
- $\geq 10$  per queue
  - IPC Queue Contention
- Overload database causing Application Server to back up

# Detecting Application Server Queuing

- Queuing not reported in PPM due to bug
- Look instead at
  - application server process service status
    - Event 302
  - spawning.
    - Following chart derived from this data
- Interrogate Tuxedo domain directly with *tadmin* CLI with shell/batch script.
  - See <http://www.go-faster.co.uk/scripts/tuxmon.zip>

# Application Server Processes by Service





# Application Server Spawning

- Spawning for enabled when  $\text{Min servers} < \text{Max servers}$ 
  - For PSAPPSRV, PSQRYSRV, PSBRKHND, PSSUBHND, PSPUBHND
- Idea is to adjust number of servers dynamically to meet the demand
- Spawning gets a bad press because
  - Number of Min/Max servers not correctly configured
  - Fallacious belief that application server queuing is universally bad
    - It isn't. It can be the least worst option.
  - Excessive spawning/recycling is a problem

# Recycle Count

- PSAPPSRV
  - Historically, the delivered value has varied between 1000 and 10000 in different versions of PeopleTools
  - It used to be used as a coarse method of controlling memory consumption of application server processes
  - More effective to use MaxCacheMemory  $\geq$  500Mb
- PSQRYSRV
  - Entire query results sets copied into memory
  - A lower recycle count can be used to release memory
    - Particularly on Windows
- Further Reading
  - Document ID 1457385.1

# Application Server Sizing

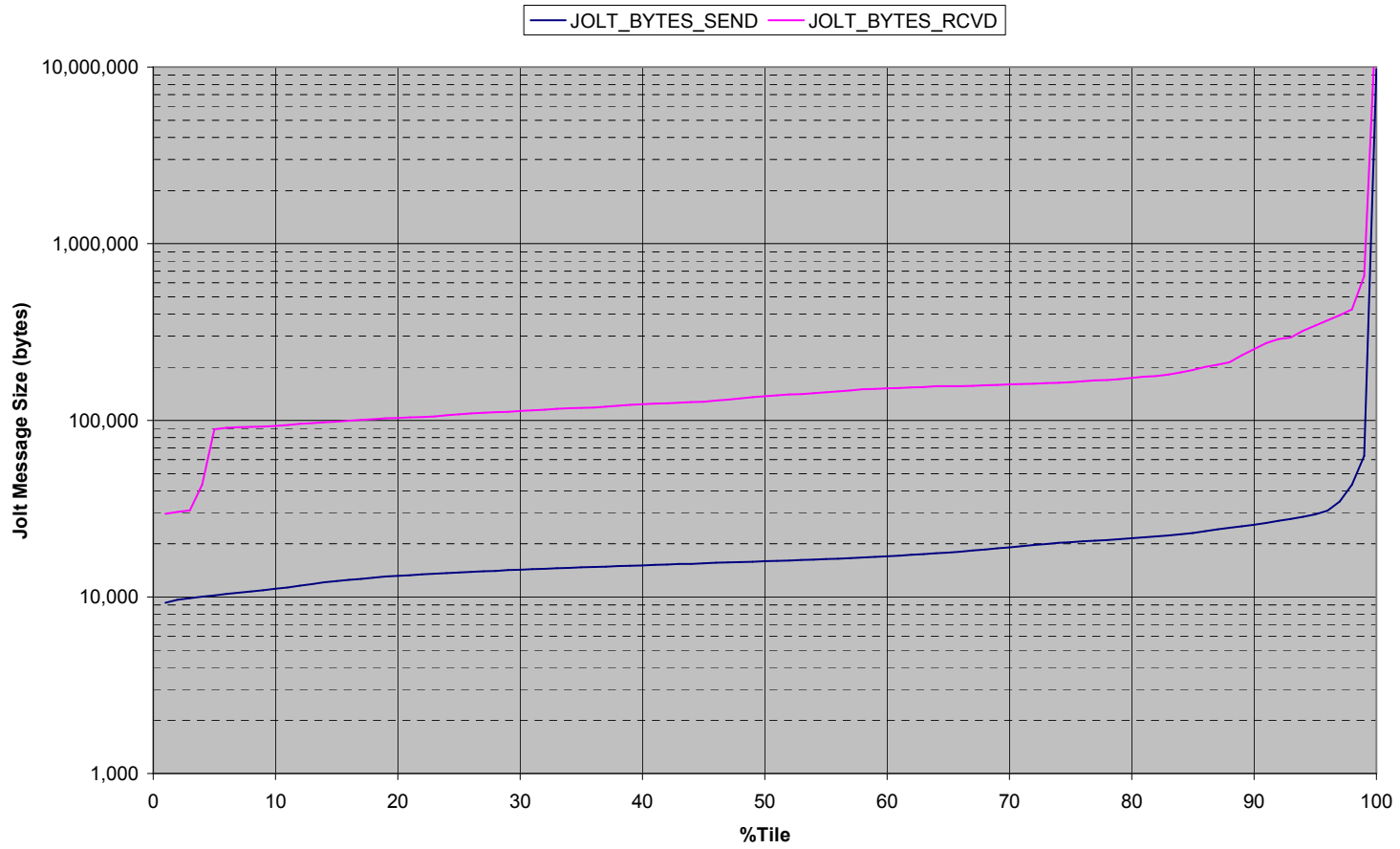
- Understand process types and avoid creating things that you don't need!
  - PSSAMSRV – Only one or two are ever needed .
  - PSQCKSRV – Only used by for 3-tier Application Designer sessions (and then only optional)
- Ensure enough connections are available
  - Turning off Jolt Pooling will require more JSHs
- Understand Application Server Memory Usage
  - My Oracle Support - Document ID 1457385.1

# Avoiding Contention Tuxedo Queues

- Contention on IPC queues occurring if messages on queue and not all servers busy
- Recommendation
  - No more than 10 server processes/queue
  - The only fully supported option is to create multiple domains
    - Each with a single queue.
  - There are other options, but they are not fully supported by Oracle GCS.

# Unix IPC Message Sizing

- (This affects windows too!)
- PeopleSoft Tuxedo Messages typically around 100-120Kb
  - Default message size 64Kb (except AIX)
  - Messages larger than max message size (default  $\frac{3}{4}$  queue size) written to and read from disk
  - Messages that  $\frac{3}{4}$  fill queue also written to disk
- General Recommendation
  - Set queue size 256Kb
    - Although, this will consume more shared memory.
    - *ipcs* shows queues that Tuxedo PrintQueue doesn't!
  - Set maximum message size 128Kb
    - Large PS/Query results will still ping to disk and there is nothing you can do about it



# Application Server – Integration Broker Considerations (Asynch)

- Isolate PUB/SUB processes by dedicating one or more domains to IB.
- **DO NOT** allow multiple domains to concurrently process the same service operations
  - For domain failover, use IB failover groups
  - For further isolation, use dedicated dispatchers
  - To Scale, use slave or template slave dispatchers
- PeopleSoft Integration Performance and Tuning for PeopleTools 8.50 [ID 1169053.1]

# Integration Broker Monitoring

- Integration Broker Service Operations Monitor
- IB Profiling – runtime performance detail for both Synch and Asynch operations
  - Enable at both the Integration Gateway and Application Server
  - Navigation: PeopleTools->Integration Broker->Service Operations Monitor->Statistics



# Further Reading

- Application Servers
  - E-AS: Understanding memory usage and associated settings in PSAPPSRV processes [ID 1457385.1]
  - E-PIA: PeopleTools 8.5x Timeout Settings - Guidelines for Setting Timeout Values and Troubleshooting Timeout-Related Issues [ID 1470518.1]
- PeopleSoft for the Oracle DBA
  - Chapter 13
- Tuxedo Internals
  - *This presentation from 2002 is based on PT7.5x*
  - [http://www.go-faster.co.uk/bea\\_internals.pps](http://www.go-faster.co.uk/bea_internals.pps)

# Web Server Sizing & Configuration



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# Web Server Characteristics

- Primary purpose is serialization/deserialization to build and serve presentation to browsers
- Maintains user session state
- Tuning mostly involves correctly sizing the JVM.
- Scale horizontally by adding web instances

# Web Server Sizing

- Tuning goal is to properly size JVMs, allowing for enough user sessions without extensive GC pauses.
- JVM size is set with Java start-up options (-Xmx, -Xmn)
- Try to keep JVM size between 512M and 2048M (depends on which JRE).
- Watch out for native heap (-Xss to **reduce** thread stack size if necessary)
- Native heap limitations largely a non-issue in PT 8.51+ (64-bit addressing)
- Use verbose GC logging to monitor the Garbage Collector

# Web Server Logging

- GC logging  
(-verboseGC -XX:+PrintGCDetails -XX:+PrintGCTimeStamps)
  - Provides timing and frequency of Java VM Garbage Collection cycles
  - Useful for evaluating Java Heap sizing under load.

# Web Server Configuration

- Timeouts can drastically affect Web Server performance and scalability
- Web Profile Cache settings and Timeouts are important
  - Saved States, State Discard Interval, Home Page Stale Interval
- Consider a dedicated Web Instance for Integration Broker Gateway
  - Things like session affinity and Http keepalives don't matter as much as for the IB Gateway.

# Further Reading

- Web/Network Infrastructure
  - E-PIA: Red Paper On Implementing Clustering And High Availability For PeopleSoft [ID 612096.1]

# Conclusion

- It depends...



Nullius in verba

# QUESTION TIME

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