

Characterizing Workload thru an Oracle Database

*Larry Klein (larry.klein@hotsos.com)
Hotsos Enterprises, Ltd.
Long Island Oracle User's Group
Tuesday June 27, 2006*

Presenter's Background

Larry Klein

- 18+ years, IBM mainframe performance and capacity planning
- 12+ years, Oracle performance and capacity planning
- VP of Consulting, Hotsos Enterprises, Ltd.

Hotsos Enterprises, the company...

- Thought leadership
 - *Optimizing Oracle Performance*
 - www.hotsos.com Library
 - Method R



- Products
 - Hotsos Profiler
 - Laredo
 - HAWCS for eBusiness
 - SQL Test Harness



- Services
 - 1-week performance assessment
 - On-site consulting
 - Remote consulting



- Education
 - Oracle performance curriculum
 - Public and private events
 - Hotsos Symposium

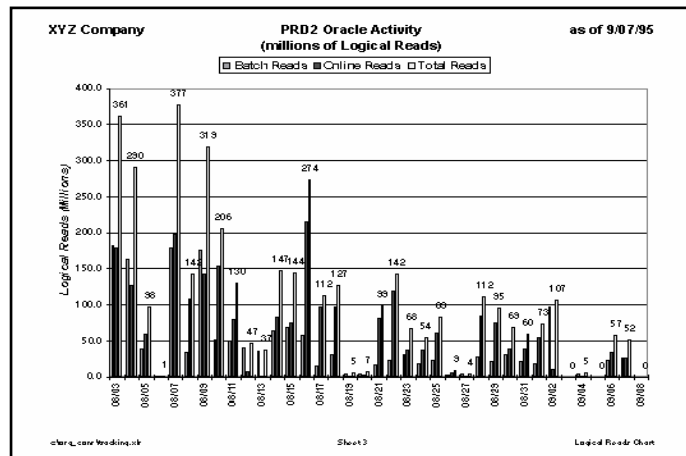
Presentation Agenda

- An Early Case Study
- The Problem – Different People, Different Perspectives
- Seeking Common Ground - The “System” as a Factory
- Measuring the Factory’s Activities
- Another Case Study
- Questions?

A Case Study

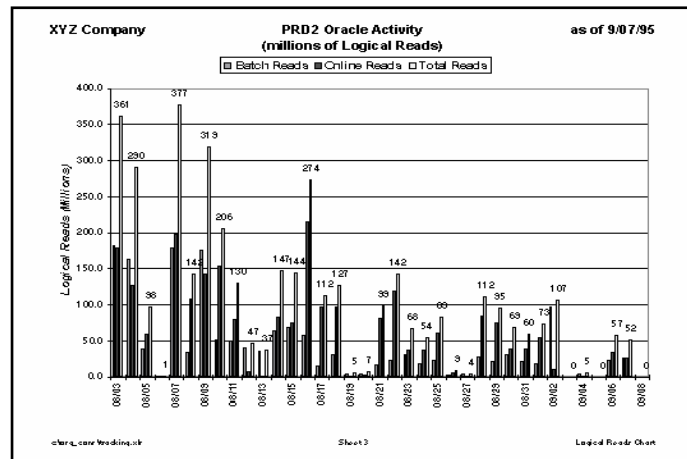
Challenge	Approach
<ul style="list-style-type: none"> Client XYZ Company Custom Order Entry Application Application not meeting needs of the business Database Server max'ed out 	<ul style="list-style-type: none"> Tune Logical Reads Identify/Trace Work Measure and report progress 5 week effort

Project Progress Report to the Client's CIO



Total Daily Logical Read 86% Reduction, over 5 Weeks

Client Feedback...



Client CIO, "Good Work, but What does it Mean to Me???"

How to Show Progress in Relevant Terms?

This is what I "knew" about the past 5 weeks:

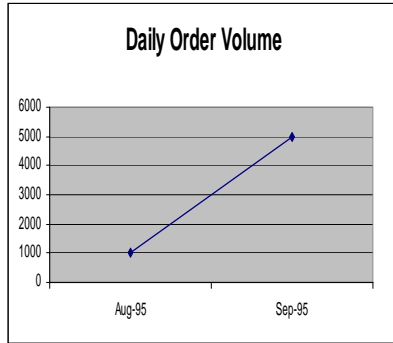
- Custom "Order Entry" Application
- Orders are Everything
- *Users Enter Orders as Fast as the System Permits*
- *Huge Order Entry Backlog – much latent demand*

This is what I learned during the 5 weeks:

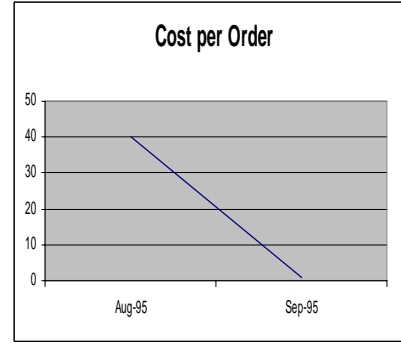
- Detailed Traces
- Data Model
- Mounds of Database and System-level Statistics
- *How the Application "did its thing"*

Ah – Hah!!!

Case Study's Alternative Ways to Report Success



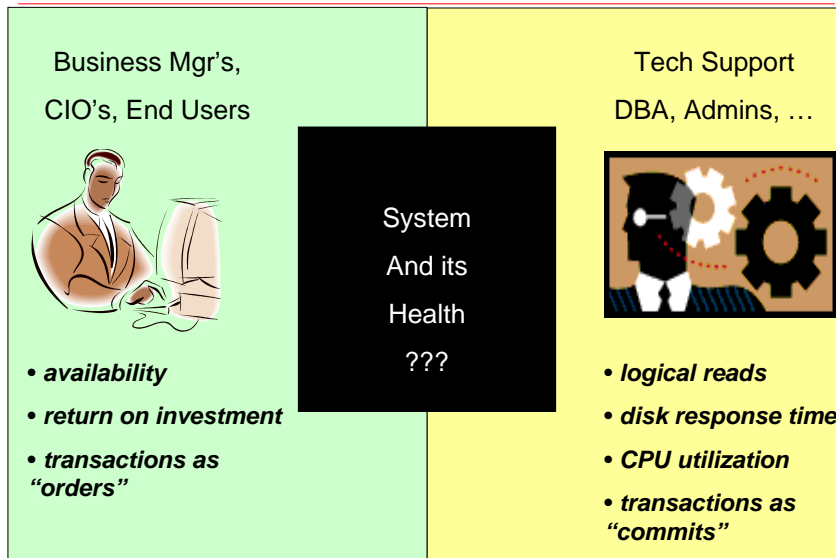
500% Increase
Over 5 weeks



40:1 "Betterment"
Over 5 weeks

Client bought me dinner!!!

Lesson Learned - Different Views, Different Perspectives



Seeking Common Ground - the "System" as a Factory



Workers

- clock in
- perform tasks

Assembly Line

- enables workers
- consumes power
- transports WIP

Widgets

- outputs of tasks

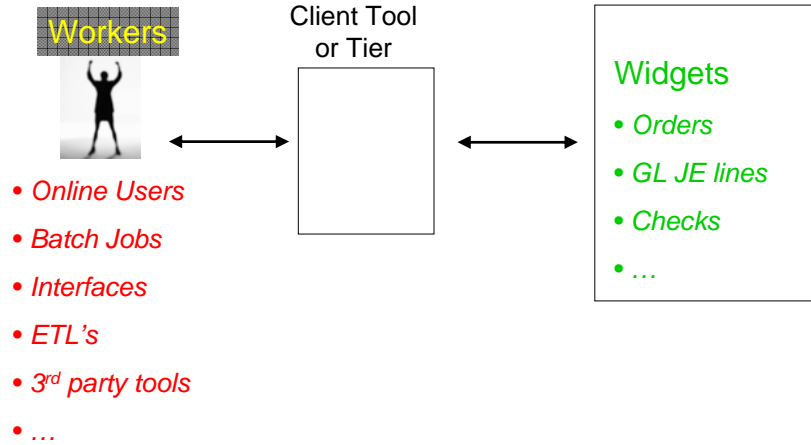
The System as a Factory – Key Metrics

Measured Attribute	Purpose
Workers	The "demanders" of services
Widgets	The "outputs" of services
Assembly Line Costs	The costs to support the Workers producing Widgets
Cost per Widget	A relative measure of Efficiency

A Factory Consisting of an Application and Oracle

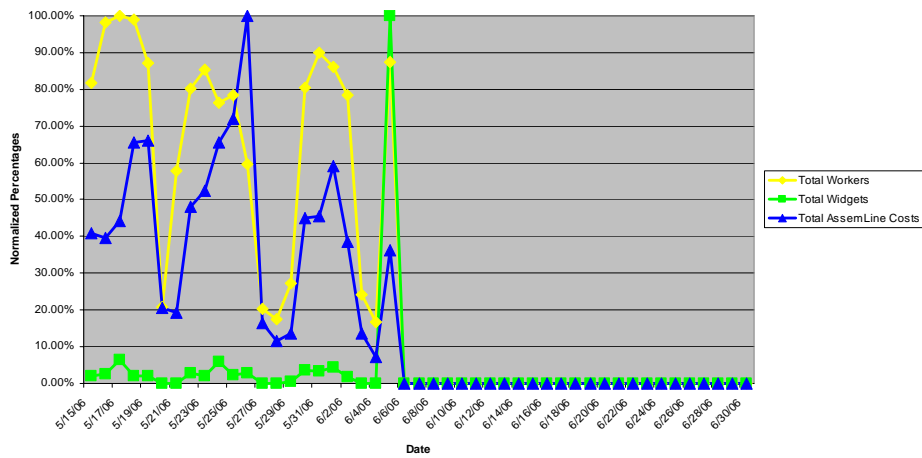
Assembly Line Costs

(LIO, PIO)



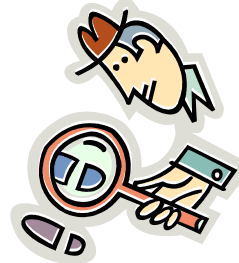
Once Measured, then Managed...

Factory Activities by Day, Normalized



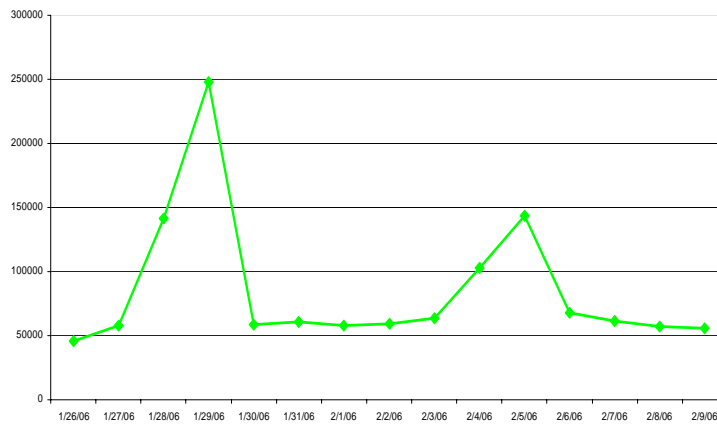
But What do you Do with this Capability?

The Case of...
Some Days Performance is Good,
But on Other Days...



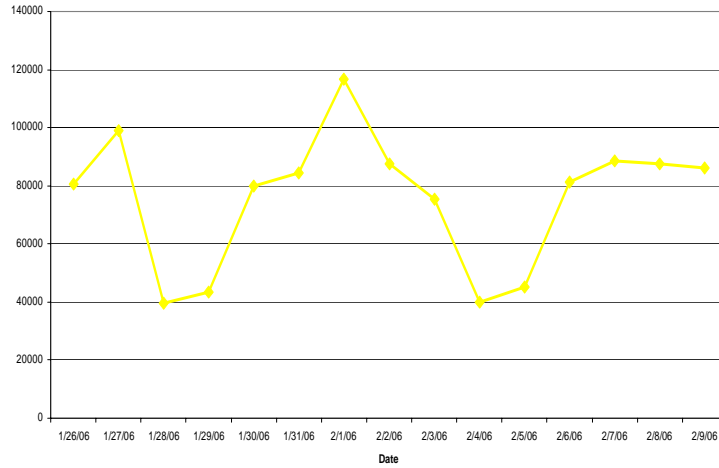
Case Study #1 – A Past Day's Anomaly – January 29?

Cost per Widget by Day



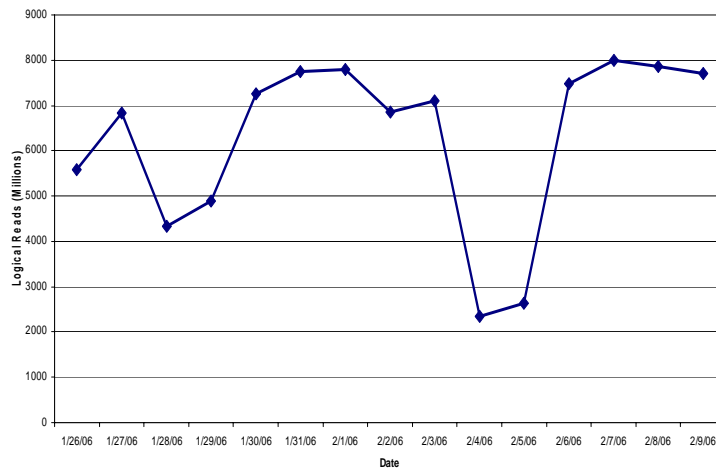
Pretty Normal Worker Pattern...

Workers by Day



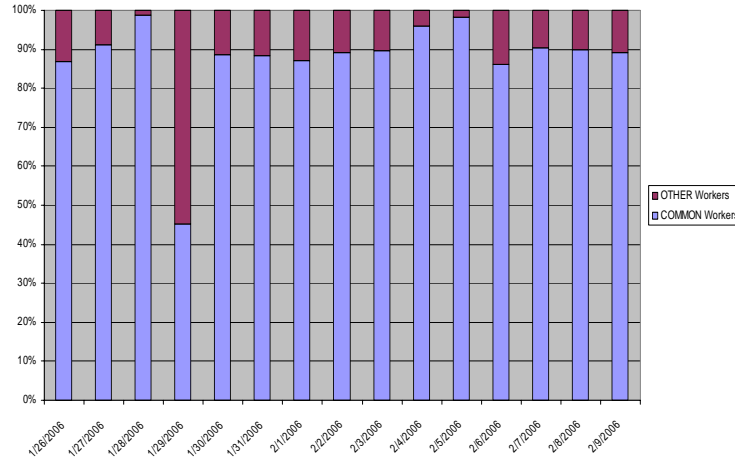
Jan 29 Weekend Cost much higher than Next Weekend

Assembly Line Costs by Day



Jan 29 Cost Dominated by non-COMMON id Worker(s)

Assembly Line Cost by Worker Type



Drilldown to non-COMMON Workers that Day...

Daily Worker Drilldown - OTHER Count

DATE	USERNAME	TOTAL COUNT	OTHER LOGICAL READS	OTHER PHYSICAL READS
01/29 Sun	WADVSY	5733	1,701,721	10,597
	SEEBEOND	378	8,764,023	592,532
	CERTSORA	268	932,375	25,907
	APPLSYSPUB	116	58,703	246
	WILLFLE	7	2,614,037,486	985,071
	RICKRID	2	18,174,305	319,146

sum		18655	2,661,021,386	2,179,071

- Go Find and Talk with WILLFLE!!!
- On Jan 29 WILLFLE ran for the first time:
 - a new, monthly, ad-hoc report
 - that never went thru "code review"

How can you use the Factory Measurements?

Data Analysis answers many Questions

For Workers

Questions	Common Answers
<ul style="list-style-type: none"> Who are my workers? 	<ul style="list-style-type: none"> 30% of yesterday's workers were not considered in the sizing/buy
<ul style="list-style-type: none"> Who are my most costly workers? 	<ul style="list-style-type: none"> That adhoc user Will cost me 45% of all yesterday's LIO's

How can you use the Factory Measurements?

Data Analysis answers many Questions

For the Assembly Line

Questions	Common Answers
<ul style="list-style-type: none"> How were a past day's costs compared to the trend? 	<ul style="list-style-type: none"> Spiked due to the following 12 batch jobs and 5 online forms that need to be evaluated and optimized...
<ul style="list-style-type: none"> How do daily costs attribute to application modules? 	<ul style="list-style-type: none"> 52% of yesterday's cost is charged to the Order Entry module

How can you use the Factory Measurements?

Data Analysis answers many Questions

For Widgets

Questions	Common Answers
<ul style="list-style-type: none"> • How was yesterday's activity compared to the trend? 	<ul style="list-style-type: none"> • It was a busy day – month end – 37% more widget activity than average
<ul style="list-style-type: none"> • Did yesterday's stress test fairly mimic production activity? 	<ul style="list-style-type: none"> • No – the test workload fell 78% short of generating transactions at the same rate as production

How to Measure the Factory – Instrumentation!!!

Factory Measurements
<p>Workers</p> <ul style="list-style-type: none"> • Tier Logs • Database Tables – Login, Authentication
<p>Assembly Line</p> <ul style="list-style-type: none"> • Database Cost Metrics <ul style="list-style-type: none"> – Statspack – Logon Triggers – Database “audit session”
<p>Widgets</p> <ul style="list-style-type: none"> • Transactions in Tables

How to Measure the Factory – Instrumentation!!!

Factory Measurements

Sometimes the instrumentation is built-in

- Oracle eBusinessSuite
 - fnd and other tables

Sometimes the instrumentation can be reaped from tier logs

Sometimes the instrumentation needs to be built into the application

How to Measure the Factory – Instrumentation!!!

Key Metrics

Worker related

- osuser, user, program, module, action
- application user, form name, job name

Assembly Line Cost related

- logoff_lread, logoff_pread

Widget related

- new table rows by time interval, for the most important modules and functions

Putting Factory Measurements to Work – Case Study

How much like current “PROD”
was the Stress Test of the Upgraded System?

Case Study #2 - How Valid is the Stress Test?

*Typical ERP Client Needs to Upgrade,
Will the Upgrade Sustain PROD Volumes?*

- Clone PROD to TEST, then Upgrade TEST
- Stress TEST
 - Focus on current, important PROD activity from 2-4pm
 - Induce similar activity in TEST for 2 hours, monitor
 - No automated test scripts
 - Execute manual “Day in Life” in TEST to mimic PROD
 - Power users to log in, perform work, submit jobs, reports
- Determine if Day in Life (DIL) TEST came close to PROD
- Decide Upgrade go-live based on TEST “closeness” and TEST system performance

Measuring Day in Life TEST - Workers

	Workers Batch		Workers Online		Workers Total
	Count	Run Mins	Count	Distinct	Count
Prod 2-4pm	2546	397	3134	294	9650
TEST	1990	1663	2669	162	6628

Hmmm – TEST

- **light on Workers**
- **heavy on Batch Runtime Minutes**

Measuring Day in Life TEST - Widgets

	Application X		Application Y		Total
	Table A	...	Table B
Prod 2-4pm	41670		1162		55982
TEST	10496		841		12212

Hmmm – TEST was light on Widgets

Measuring Day in Life TEST – Assembly Line Costs

	Logical Reads (millions)		Physical Reads (millions)		Total Logical Reads/ Widgets
	COMMON	OTHER	COMMON	OTHER	“Cost per Widget”
Prod 2-4pm	486	8	11	1	8824
TEST	1038	2	17	0	85162

Hmmm – TEST

- ***much higher Assembly Line costs***
- ***much higher Cost per Widget***

How Much like PROD was TEST?

Probably, Manual Stress TEST users

- ***“underloaded” transaction processing***
- ***“overloaded” reporting***

TEST was not valid!!!

Upon review, many TEST users

- used TEST as “pedal to the metal”
- disregarded instructions and pacing
- loaded up TEST with favorite longrunning month-end reports

Summary – Measuring the “System” as a Factory

Gives you Power, Proaction:

- Hunt for Anomalies
- Characterize the Workload
 - Know your Demanders
 - “Optimize” the Baseline
 - Plan for Capacity



Questions???

Thank You!

References

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