

Enhanced DB2 monitoring with new OMEGAMON V5.1

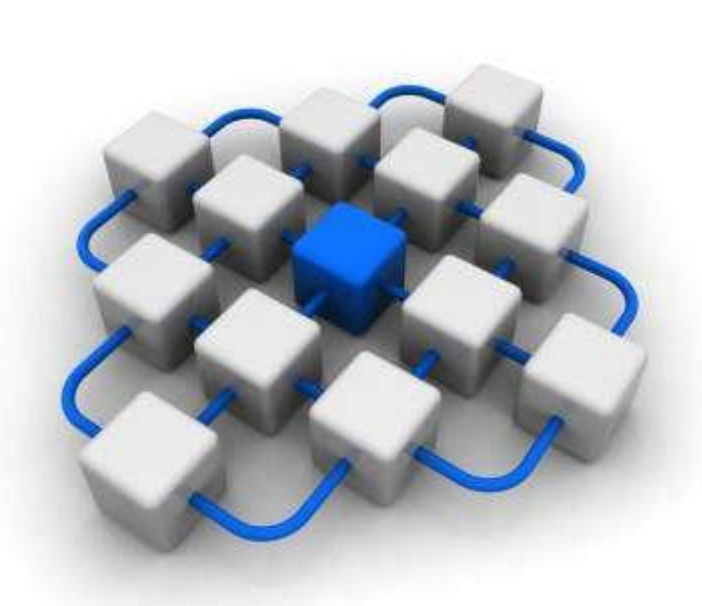


Steve Fafard, Product Manager, OMEGAMON XE for DB2 Performance Expert

Application Performance Management a key component of Business Service Management

Application performance management (APM) refers to discipline within service management focused on monitoring and managing of performance and service availability .

- **End-user experience** monitoring
- **Application and Services** sub-system monitoring
- **Application runtime architecture** discovery, modeling and display
- **User-defined transaction** profiling
- **Application performance** analytics



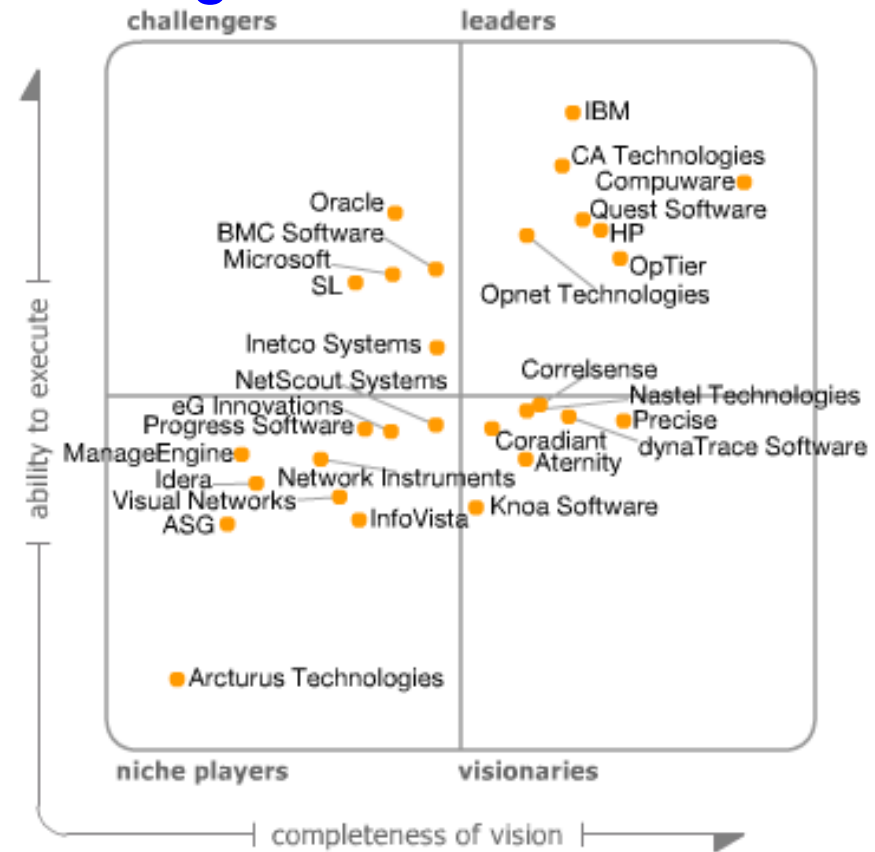
IBM Monitoring solution includes ITM, ITCAM and OMEGAMON

Gartner has recognized IBM as a leader in Application Performance Monitoring

Magic Quadrant for Application Performance Monitoring

Will Cappelli, Jonah Kowall

September 19, 2011



As of September 2011

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http://www.gartner.com/technology/about/ombudsman/omb_guide2.jsp

Business Leaders are looking at IT to drive business agility across their Enterprise with



VISIBILITY



CONTROL



AUTOMATION

**React with
agility to
diverse IT
landscape**

**Execute with
reduced
risk & cost**

**Achieve
desired
business
outcomes**

OMEGAMON working with IT to drive improved visibility

IBM announcing customer-driven, redesigned, simplified OMEGAMON Version 5.1 product family

Visibility with modernized and strengthened OMEGAMON product line for reduced resource usage and faster problem resolution

Increased System Availability with faster problem resolution

- Enhanced 3270 user interface for SMEs
- Built-in Problem Solving Scenarios

Improved Productivity with simplified data

- Faster Install/Configuration/Maintenance
- zEnterprise monitoring across z196/114 and zBX

Reduced Costs with decreased resource usage

- Usage of zIIP specialty servers
- Simplified OMEGAMON architecture



Enhanced 3270 user interface creates Enterprise wide view of information for improved availability

- Understand transactions across multiple sysplexes
- Color coding to provide ability to find and resolve problems quickly
- Eliminates need to move between multiple screens and monitors

“GUI on a green screen”

Command ==> KOBSTART Enterprise Summary

Auto Update Plex ID : 000

All Active Sysplexes z/OS-wide sysplex view

Columns 2 to 6 of 9 ← → ↑ ↓ Rows 1 to 1 of 1

♦Sy Na	ent	Highest LPAR Name	ΔHighest ∇LPAR CPU%	ΔPercent LPAR ∇MSU Capacity	+LPAR Grou Name
_ ZPETPLX2	3	Z2	3	3.4	N/A

Customize Views

All Active CICSplexes CICSplex details views

Columns 2 to 6 of 19 ← → ↑ ↓ 3 of 3

ΔCICSplex ∇Name	ΔNumber of ∇Regions	ΔTransaction ∇Rate	ΔCPU ∇Utilization	∇SOS Regions	SOS Region
_ OMEGPLEX	1	0 / m	0.3%	No	n/a
_ TESTPLEX	8	10985 / m	18.4%	No	n/a
_ WUIPLEX	1	0 / m	0.0%	No	n/a

Customer-designed DB2 problem scenarios and solution paths

- Response time / elapsed time is poor
 1. Long-running batch/online/distributed applications
 - Slow/hung application “now” or
 - Except for distributed, problem solving approaches are generally similar
 - Locking / Lock conflicts can cause trouble
 - Deadlocks, timeouts, ABENDs, rollbacks
 2. CPU problems
 - DB2 address spaces as noticed by z/OS SYSPROG
 - Daily application performance review
 3. Storage problems – DBM1/DIST address space messages
- The first objective is to determine if it's DB2 itself.
- Then, see if it's in areas related to DB2, e.g. application programming
- When it's none of the above, THEN engage the appropriate system personnel



Quickly get to the root of troublesome DB2 threads

DB2 key performance indicators (KPI) on top-level panel

Plan	In-DB2 Elapsed Time	In-DB2 CP CPU	Wait Time	DB2 Status
KO2PLAN	16.3300s	0.02800s	0.05700s	NOT-IN-DB2
KO2PLAN	0.50000s	0.00800s	0.00000s	NOT-IN-DB2
DISTSERV	0.45100s	0.00000s	0.00000s	WAIT-REMREQ
KO2PLAN	0.21100s	0.06500s	0.05400s	NOT-IN-DB2
KO2PLAN	0.00000s	0.00000s	0.00000s	NOT-IN-DB2

Sort on any DB2 KPI

Or define custom thresholds to highlight outliers immediately

Plan	P/C	Auth	Corr	Elapsed Time	CP CPU Rate	In-DB2 E
KO2PLAN		OMPEUSER		13d 14h	0.0	0.00000
KO2PLAN		OMPEUSER		13d 14h	0.0	20m 43
KO2PLAN		OMPEUSER		22h 53m	0.0	5m 28
KO2PLAN		OMPEUSER		9m 20s	0.0	0.00000
KO2PLAN		OMPEUSER		2h 11m	0.0	0.00000
ADB		TAM	TAM	12h 40m	0.0	0.22800
DSNESPRR		PAUL	PAUL	1h 50m	0.0	0.00000
DSNTEP91		PAUL	PAULLOK2	2.00800s	0.0	0.00000
KO2PLAN		OMPEUSER		8m 32s	0.0	0.00000

Navigate to a most likely problem source with one keystroke

Options Menu

1. P DB2 Main Screen
2. T Active Threads
3. S Storage Consumption
4. E EDM Pool
5. L Lock Conflicts
6. A Subsystem Management

...and can stall an application

Lock conflicts is a typical candidate

DB2 Lock Conflicts for SN13

Plan Name	Auth	Elapsed	Lock Level	Lock Resource
DSNESP RR	PAUL	0	Exclusive	DB=PAULSN13 PS=P
DSNTEP91	PAUL	0	Intent exclusive	DB=PAULSN13 PS=P

Compare UPDATES to COMMITS

DB2 Active Threads

Plan	Get Page	Updates	Commits	Locks	Prefetch Requests	Elapsed
KO2PLAN	2984020	941053	469774	14	0	2.4980
KO2PLAN	10649	82	7	4403	3	1d 2
DSNESP RR	172467	50	0	25	10788	1h 3
KO2PLAN	0	0	0	0	0	50m 2
DSNTEP91	1	0	0	0	0	12.380
KO2PLAN	0	0	0	0	0	1h 5
KO2PLAN	0	0	0	0	0	6d 0
KO2PLAN	0	0	0	0	0	22h 4
ADB	0	0	1	0	0	12h 2

Resource availability problems can cause thrashing

File Edit View Tools Options Help 07/27/2012 21:05:34
 Auto Update : Off

Command ==> KDPSTART DB2 Main Screen

All Active DB2 Data Sharing Groups

Columns 3 to 6 of 24

ΔGroup	Type	List %	% Used	Lock %	Rate
DBZ9	LIST	4	16	0	0
DBZ9	LOCK	0	9	0	0
X DBN1	LIST	10	26	0	0
DBN1	LOCK	1	11	0	0
DB2A	LIST	8	26	0	0
B2A	LOCK	0	15	0	0

Examine coupling facility details with one enter key from the DSG workspace

Command ==> KDPXCFD DB2 Coupling Facility Detail for DBN1

DB2 Coupling Facility List Detail for DBN1

List Entries Percent	10	Structure Used Percent	25
Lock Entries Percent	0	False Contention Rate	0
Structure Status	Active	List Entries Allocated	2127
List Entries Used	215	Global Contention	0
Global Contention Rate	0	False Contention	0
Lock Entries Allocated	0	Lock Entries Used	0
Structure Size	3872	Structure Used	800
Structure Connect Count	4	Lock Requests	0
Change Requests	0	Unlock Requests	0
IRLM Suspends	0	XEX Suspends	0

"X" for coupling facility

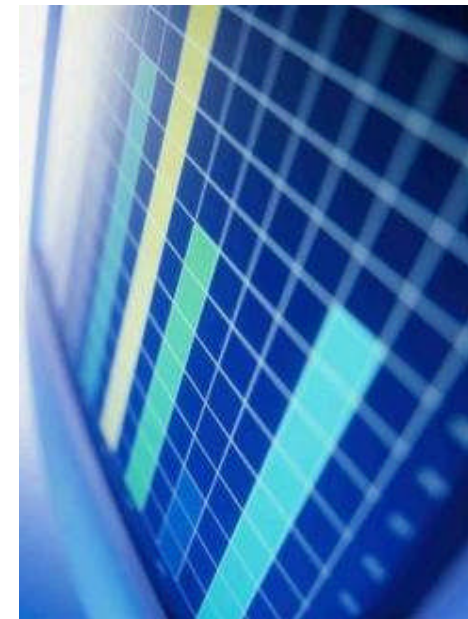
DB2 Coupling Facility Lock Detail for DBN1

List Entries Percent	1	Structure Used Percent	11
Lock Entries Percent	0	False Contention Rate	0
Structure Status	Active	List Entries Allocated	4780
List Entries Used	49	Global Contention	195273
Global Contention Rate	0	False Contention	30573
Lock Entries Allocated	1048576	Lock Entries Used	414
Structure Size	4096	Structure Used	452
Structure Connect Count	4	Lock Requests	32033
Change Requests	20407	Unlock Requests	29944
IRLM Suspends	31379	XEX Suspends	1037

Gain new insight into DB application performance with OMEGAMON for DB2 Performance Expert and Monitor

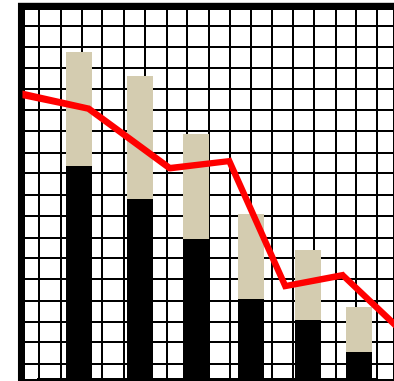
In addition to the OMEGAMON V5.1 family capability:

- **Quickly and concisely identify** primary contributor to poor distributed application response time with *Extended Insight*
 - Single web-UI display with response time metrics
 - Reduce time chasing down problems that turn out to not be DB2
- **Visibility into IBM DB2 Analytics Accelerator (IDAA)** delivering query results for 'Train of Thought' analysis
 - Maximize your organization's ROI from appliances
- **zIIP Enablement of Near Term History** along with core performance improvements for reduced MIPS
- Immediate and **complete support** for the **latest DB2 enhancements**



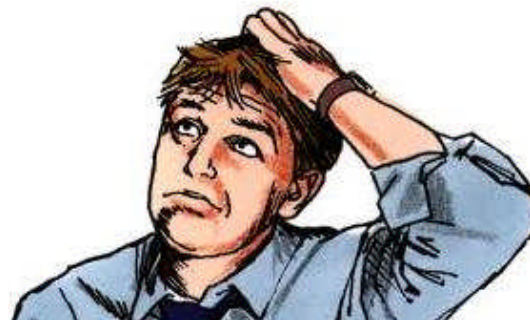
What is Extended Insight?

- Customer pain → Response time is poor
 - You provide distributed customer “self-service” tools that reduce costs to the business plus bring your business closer to your customer
 - Web technology provides a portal to sensitive personal and corporate data
 - **SO IT BETTER WORK and WORK WELL!**
 - Layering technology provides compartmentalization and portability
 - **BUT WHEN THERE ARE PROBLEMS, THAT COMPLICATES THE “WHO DUNNIT” INVESTIGATION**



Summon the DBAs!

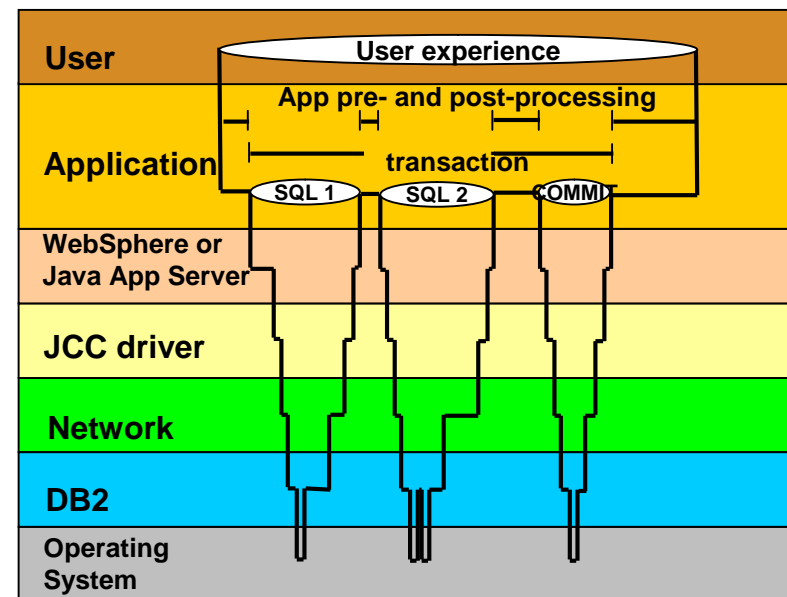
- Is the first reaction finger pointing – and always to DB2 as the source of the problem?
- How do you identify problems outside of DB2 for z/OS?
- How do you communicate / collaborate with the network team, the WAS guys, application server administrators, application development?
 - *Parlez-vous DB2 z/OS?*
 - *No, hablamos Linux!*
 - *“What did they say?”*



Where is my DB2 application spending its time?

- **OMEGAMON XE for DB2 PE's Extended Insight** is an advanced way to monitor the database workload (SQL) of your applications and solutions
 - Get total response times and response time breakdown (appl, driver, network, data server) per defined workload/cluster (e.g. per system, application, user)
 - Compare workload from various servers / applications
 - Select a time period for analysis
 - Get top SQL statements per defined workload
 - Identify top clients contributing in the workload

Extended Insight is included with the Performance Expert Offering



Health Summary and navigation to SQL response-time analysis

The screenshot shows the 'Health Summary' page in InfoSphere Optim Performance Manager. A table lists data sources with various performance metrics. An 'Extended Insight' popup is shown for the 'sn52' data source, displaying 'Average End-to-End Response' and 'Maximum End-to-End Response' values.

Data Source	Critical	Warning	Data Server Status	Monitoring Status	Operations	Partition Status	Member and C...	User-Defined Al...	Memory Usage	CPU Utilization (%)	Connections	Storage	Recovery	z/OS System Log...	Workload	Logging	I/O	Sorting	Locking	Transactions (/min)	Physical Page I/O (/min)	Lock Wait Time	Longest Running SQL	Average End-to-End Response	Maximum End-to-End Response
PMOD911	4	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1.790s	4.968s
gsdb	0	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
sn51	0	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4.470s	12.500s
sn52	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Performance Monitoring Repository Server	0	0	0	0	0	0s	0s	0s	0s
Performance Monitoring Repository Database	0	0	0	0	0	0s	0s	0s	0s

Extended Insight for sn52:

Running SQL	Average End-to-End Response	Maximum End-to-End Response
...	1.790s	4.968s
...	4.470s	12.500s

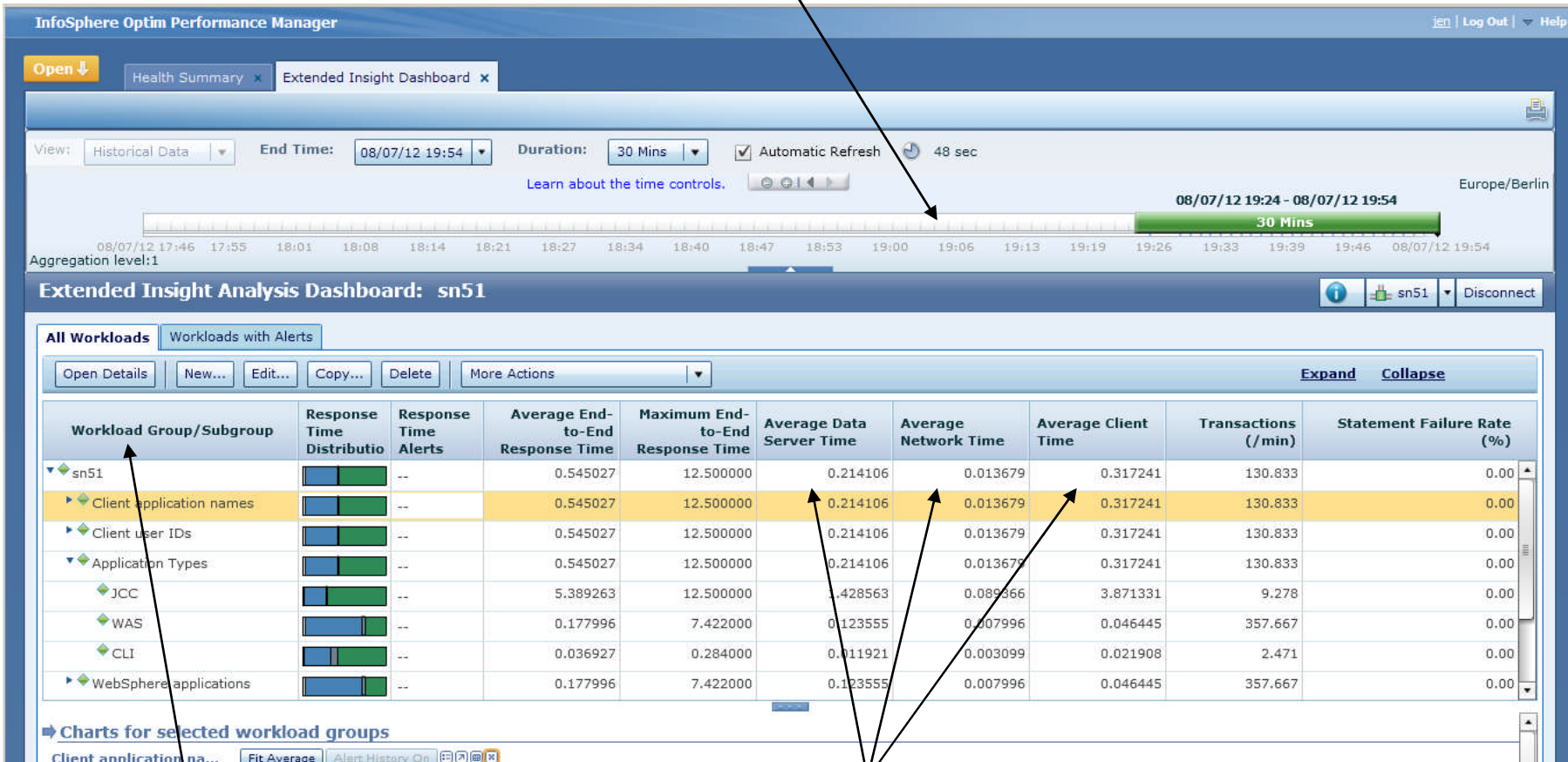
6 total items

10 Items per page Page 1 of 1

Navigate to the **Extended Insight** Analysis Dashboard

Extended Insight Analysis Dashboard

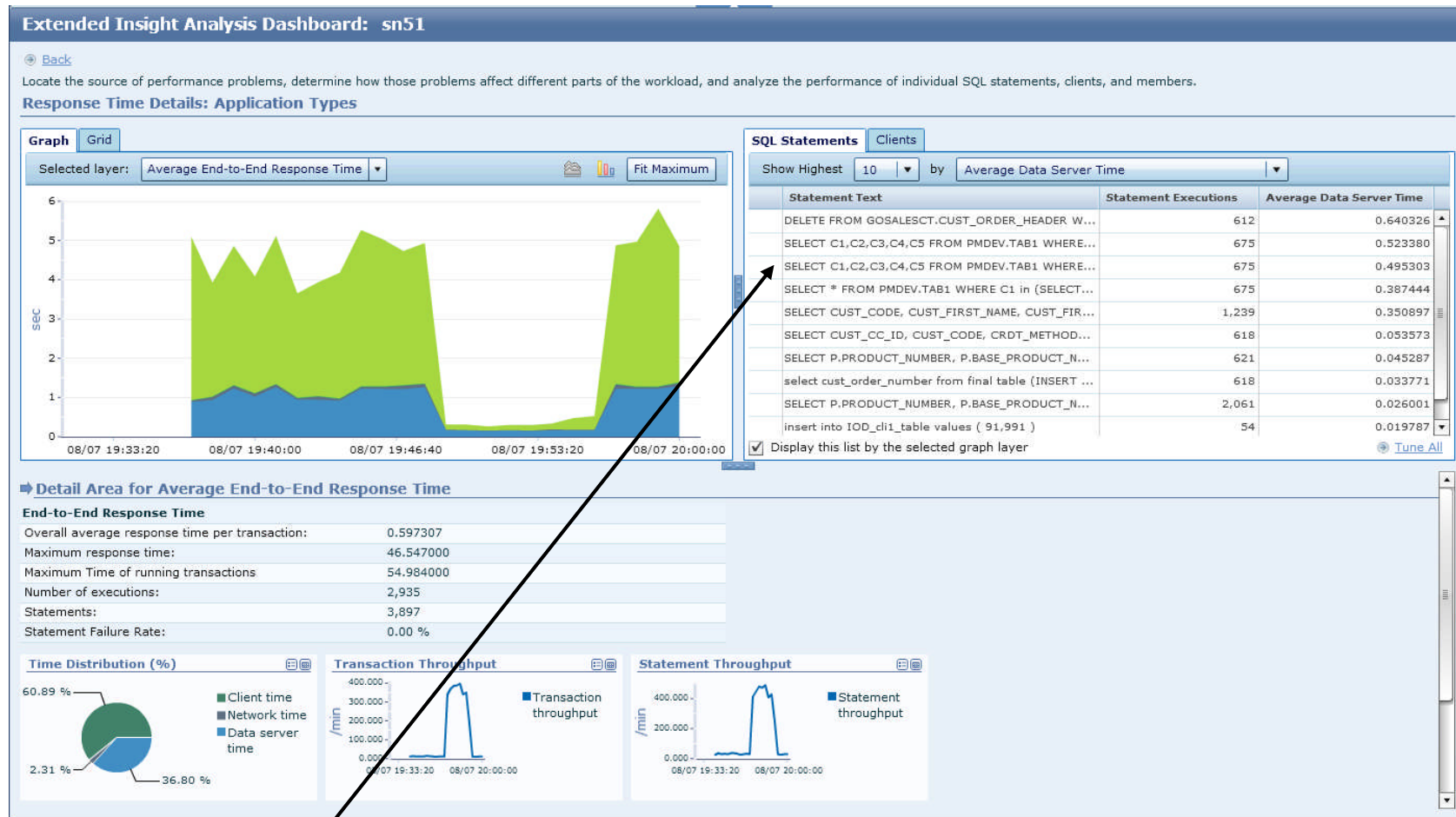
Dynamically change the time period and duration for analysis



Compare response time break down for different workloads

Workload Clusters represent client applications (pre-defined or custom)

Open Details to get to the root of the problem



... like the "top SQL" statements executed by distributed Java or CLI applications like SQW, SAP, Cognos, DataStage, or WebSphere

Optim Query Workload Tuner and IBM pureQuery speed up PSI (problem source identification)

Extended Insight Analysis Dashboard: sn51

Locate the source of performance problems, determine how those problems affect different parts of the workload, and analyze the performance of individual SQL statements, clients, and members.

Response Time Details: Application Types

Graph | Grid
Selected layer: No layer selected | Fit Maximum

SQL Statements | Clients
Show Highest: 10 | by: Average Data Server Time

Statement Text	Statement Executions	Average Data Server Time
SELECT C1,C2,C3,C4,C5 FROM PMDEV.TAB1 WHERE ...	765	0.515527
SELECT C1,C2,C3,C4,C5 FROM PMDEV.TAB1 WHERE ...	765	0.491983
SELECT * FROM PMDEV.TAB1 WHERE C1 in (SELECT ...	765	0.377026

Display this list by the selected graph layer | Tune All

Detail Area for SQL Statements

The detail area displays data for each time that the statement ran during the time interval: 08/07 19:34:34 and 08/07 20:04:34. In some cases, the data that represents execution details inside the data server can comprise more statement executions for the data that represents execution details taken from the database client.

Overview | Server Execution Times | Row Activity | I/O | Locking and Communication | DB Client Information

Statement: `SELECT CUST_CODE, CUST_FIRST_NAME, CUST_FIRST_NAME_MB, CUST_LAST_NAME, CUST_LAST_NAME_MB, CUST_ADDRESS1, CUST_ADDRESS1_MB, CUST_ADDRESS2, CUST_ADDRESS2_MB, CUST_CITY,`

Most Recent Identification

Statement identifier: --
Package name: --
Consistency token: --
Section number: --
Cache insert time: 08/06 18:08:43
Last Execution time: 08/07 19:56:14
Last execution count: 0

Most Recent Compilation

Isolation level: UR
Literal replacement: --
CURSOR WITH HOLD: N
Special Registers for Compilation: --
CURRENT PRECISION: N
CURRENT DEGREE: 1
CURRENT RULES: D
CURRENT SQLID: JEN
CURRENT SCHEMA: JEN
Application Information at Compilation: --
Authorization ID: JEN
Client user ID: --
Client workstation name: --
Client application name: Customer log in
Client provided identification string: --
Bind Options: --
CURRENTDATA: N
DYNAMICRULE: R

First referenced table: GOSALECT.CUST_CUSTOMER
Failure ratio: 0.00 %
First negative SQL code: --

Location in Application Source Code

Location in Application Source Code	Value
Source Expression	N/P
Java Class	GOSales
Package	GOS_Cust
Method	main
Signature	N/P
Source Line Number	47
Build Version	V1.35
Application Name	blah
Meta Data File	capture...

Show All Text | Tune

Open Data Studio to analyze this SQL statement.

pureQuery can identify the source program artifacts

Launch Optim Query (Workload) Tuner (or Data Studio) to explain and Tune the selected SQL statement

Extended Insight Feature Summary

- An advanced way to monitor the DB2 for z/OS database workload (SQL) of your distributed applications and solutions
 - Get response times and time breakdown (appl, driver, network, data server) per defined workload/cluster, e.g. per system, per application, per user
 - Easily understood user interface using generic application terminology



If it's not DB2, you're done!

If it is DB2....

- Get top SQL statements per defined workload
- Identify top clients contributing in the workload
- Optionally, launch and integrate with:
 - Optim Query Workload Tuner
 - IBM pureQuery
 - ITCAM for WebSphere applications accessing DB2 via JDBC

IBM DB2 Analytics Accelerator

Capitalizing on the best of both worlds – System z and Netezza

- IDAA reporting supported via OMEGAMON New Function PTF (APAR PM49684)
 - IDAA Accelerator usage statistics by DB2 subsystem
 - ☑ Am I getting efficient use of the appliance?
 - Application acceleration accounting metrics for accelerated SQL queries
 - ☑ What is the application impact of accelerated queries?



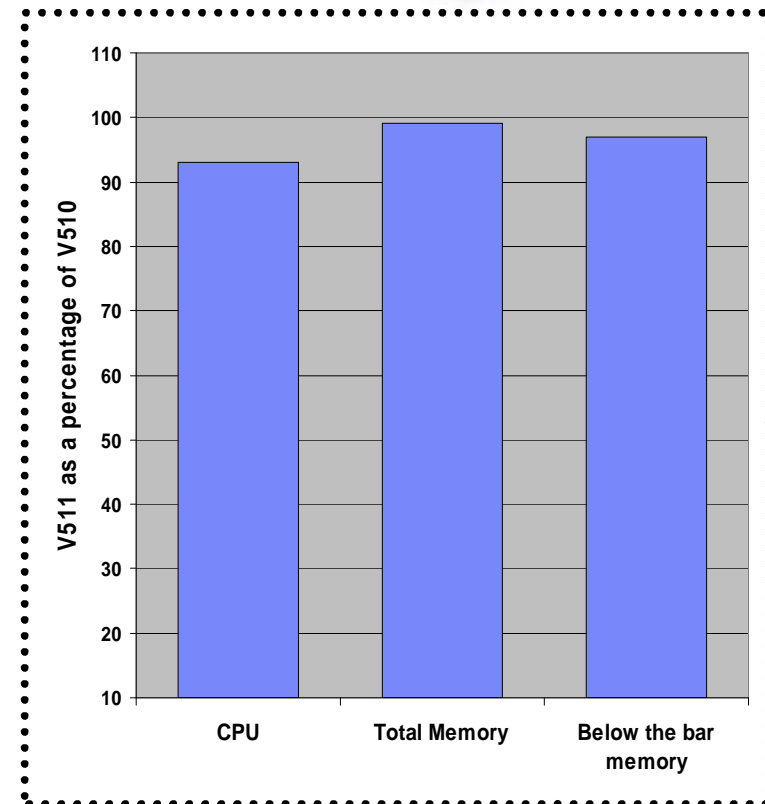
OMEGAMON PE V511 performance reduces TCO

- V510 already delivered measurable improvements:

- ☑ *Measurable CPU savings across all user scenarios for online monitoring*
- ☑ *Below the bar memory usage improvements*
- ☑ *CPU improvements in batch reporting processing*



➔ V511 continues core performance improvements - aside from those realized with zIIP offload



zIIP offload for Near-term history

Reduces main central processing cycles by redirecting near-term history processing to available zIIPs

- **OMEGAMON PE's Near-term history** component is indispensable in every DB2 z/OS application shop

- ☑ Background task captures every completed DB2 z/OS application unit-of-work (UOW) and records them to VSAM for later retrieval and analysis
- ☑ Ready when you need it to identify what was happening "then"



"Any idea what was going on with credit-card processing at about 10:45 this morning? I was hung for easily 3 or 4 minutes!"

DB2 service stream enhancements

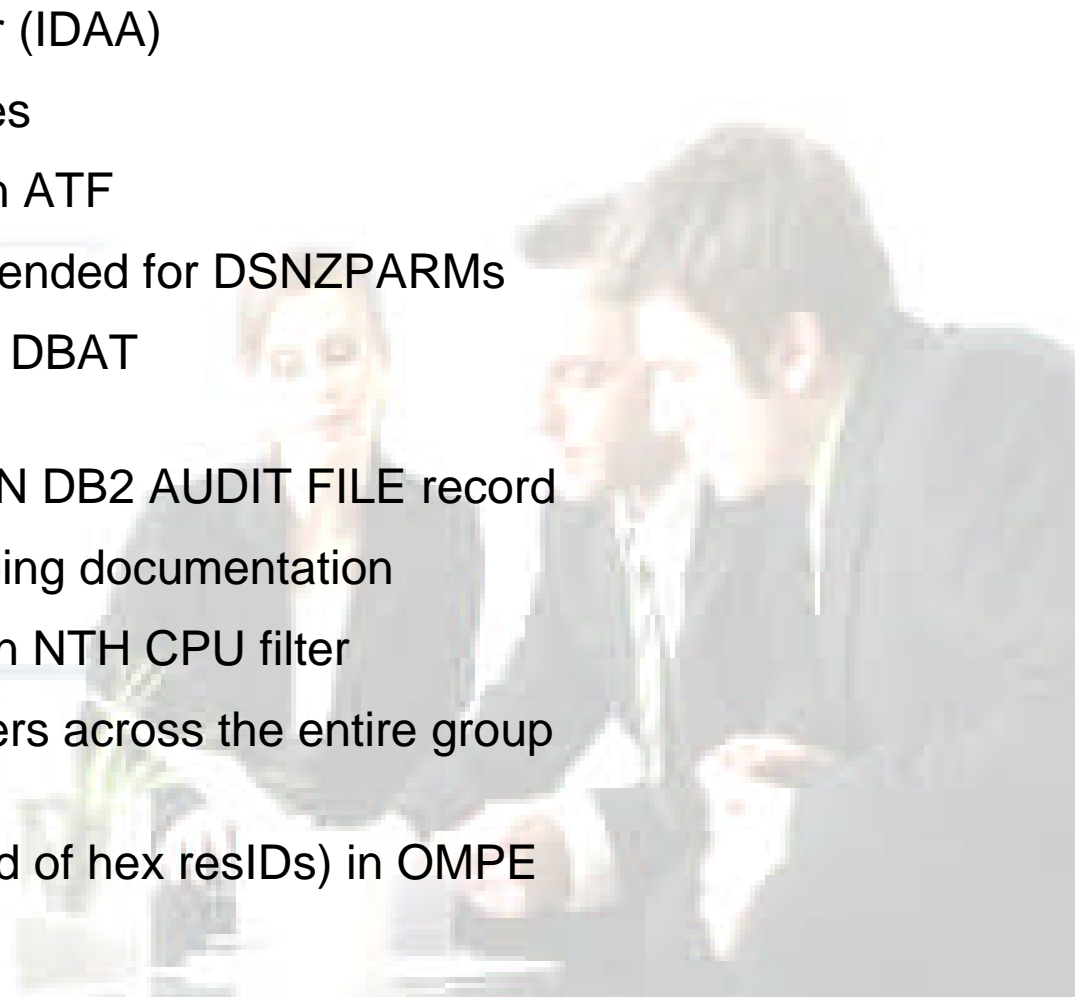
Count on **complete** day one support for DB2 version and service stream enhancements

- Application Trace (ATF)
 - Displays new DB2 10 metrics for CLOSE CURSOR
- Batch Reporting
 - SQL Activity Trace shows new DB2 10 metrics for CLOSE CURSOR
 - Audit TRACE and REPORT supports new IFCID 271. Data relate to objects ROW PERMISSION and COLUMN MASK are shown
 - Record Trace shows additional DB2 10 post GA instrumentation
- Performance database (PDB)
 - Columns expanded to support large counters
- Realtime GUI displays for new DB2 10 Static SQL cache
- PDB and reporting support for new DB2 10 evicted SQL Statement Cache statements
- Extensions to DB2 real storage usage in reports and displays (IFCID 225)
- Report on SOS (Short-On-Storage) metrics in statistics
- Trace Dataset Open and Close activities in DB2 9 and 10



OMEGAMON DB2 V511 features and customer-driven requirements

- o IBM DB2 Analytics Accelerator (IDAA)
- o Drill into DB2 stored procedures
- o Analyze application hostvars in ATF
- o Datasharing group support extended for DSNZPARMs
- o Report min, max, and average DBAT queuing time in DB2 for z/OS
- o Add System ID to OMEGAMON DB2 AUDIT FILE record
- o Configuration parameter mapping documentation
- o Increased precision (< 1 sec) in NTH CPU filter
- o See data sharing waiters/holders across the entire group and store in NTH
- o Now see object names (instead of hex resIDs) in OMPE displays – **even x-LPAR!**



Analysts already agree that OMEGAMON V5 provides value to customers

Ptak / Noel

On OMEGAMON moving to simplified architecture and a common view across multiple domains, Rich Ptak of **PNA** commented, *"This is an important and much needed enhancement. We've heard consistently – there is a need for this kind of integration. Consistent interface – a couple of years ago, some people liked to be in a silo and just toss things over to someone else. But, they can't live that way anymore."* PNA also gave IBM high marks for doing so without losing functionality.

<http://ptaknoel.com/ibm-omegamon-v5-1-good-reasons-for-customer-interest-and-excitement/>

Clabby Analytics

On OMEGAMON Enhanced 3270 User Interface, Joe Clabby with **Clabby Analytics** commented: *What you've done to your 3270 interface is kind of a "wow"! I'm not a 3270 fan and I love what you've done with it"*

ftp://public.dhe.ibm.com/software/data/ECM/industry/TWDIBMTivoli_OMEGAMON.pdf



Extended Insight ensures a positive end-user response time experience for distributed apps

Challenge

- A Finnish insurance institution wanted to ensure continued positive end-user performance results as they increased the number of applications accessing DB2 for z/OS from distributed platforms.

Solution

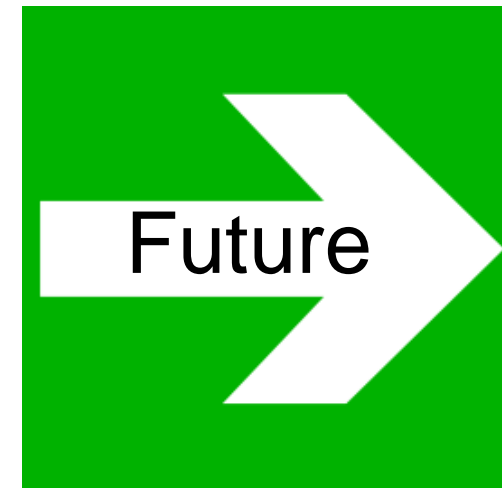
- OMPE with Extended Insight provided them with the capabilities to track user response time that would built up in a distributed environment, keep the level of dynamic SQL as low as possible, and monitor SQL historically.

Business Benefits

- The customer learned where the WAS transaction time was consumed, how dynamic SQL can affect performance, and the value of reviewing historical data in a flexible interface.

OMEGAMON Family announcement includes significant new capability across number of products

- **General Availability on 3/9/12**
 - OMEGAMON XE on z/OS V5.1
 - OMEGAMON XE for CICS on z/OS V5.1
 - OMEGAMON Dashboard Edition V5.1
- **General Availability on 6/15/12**
 - OMEGAMON XE for DB2 PE V 5.1.1
- **Statement of Direction**
 - OMEGAMON XE for IMS V 5.1
 - OMEGAMON XE for Storage V 5.1
 - OMEGAMON XE for Messaging V 7.1
 - OMEGAMON XE for Mainframe Networks V5.1
 - OMEGAMON for z/OS Management Suite V5.1



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