

A Mission-Critical Approach to Managing DB2 in the z Enterprise

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OMEGAMON XE for DB2 Performance Expert on z/OS

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13823



Abstract

- DB2 for z/OS is behind many mission-critical transaction-based applications and data-mining style applications alike. Meeting performance objectives for both may require different approaches but overall enterprise performance objectives can't be compromised. This session explores how to marry different monitoring strategies without managing totally divergent monitoring tool implementations.
- This session will cover transactional-cross-enterprise monitoring; the monitoring and management for mining/warehousing queries that are accelerated through IBM DB2 Analytics Accelerator; and monitoring Stored Procedures to lower the footprint for DRDA apps and even offloading such workloads to zIIPs.

Mission-Critical Monitoring

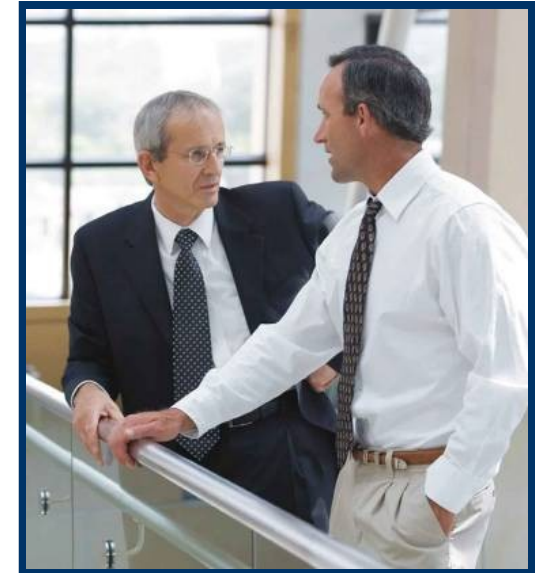
- Mission-critical refers to any factor of a system (equipment, process, procedure, software, etc.) whose failure will result in the failure of business operations. That is, it is critical to the organization's 'mission'.
- With today's “do less with more” mantra, we have time only to focus on elements critical to your business – the “mission-critical” elements.

Agenda

- Mission-Critical
- Monitoring blueprint
- DB2 for z/OS in the Enterprise
- Advanced techniques for critical components
- Summary, take-aways, and conclusion

In today's economic environment, clients tell us they face three key demands:

1. Higher service expectations
 - Improve efficiencies across the business
 - Respond to new opportunities quickly
2. Rising cost pressures
 - Shorten ROI and lower costs
 - Add value now!
3. Ever-increasing complexity
 - New technologies, new opportunities
 - Faster rate of change



➤ **while acting with a sense of speed and urgency**

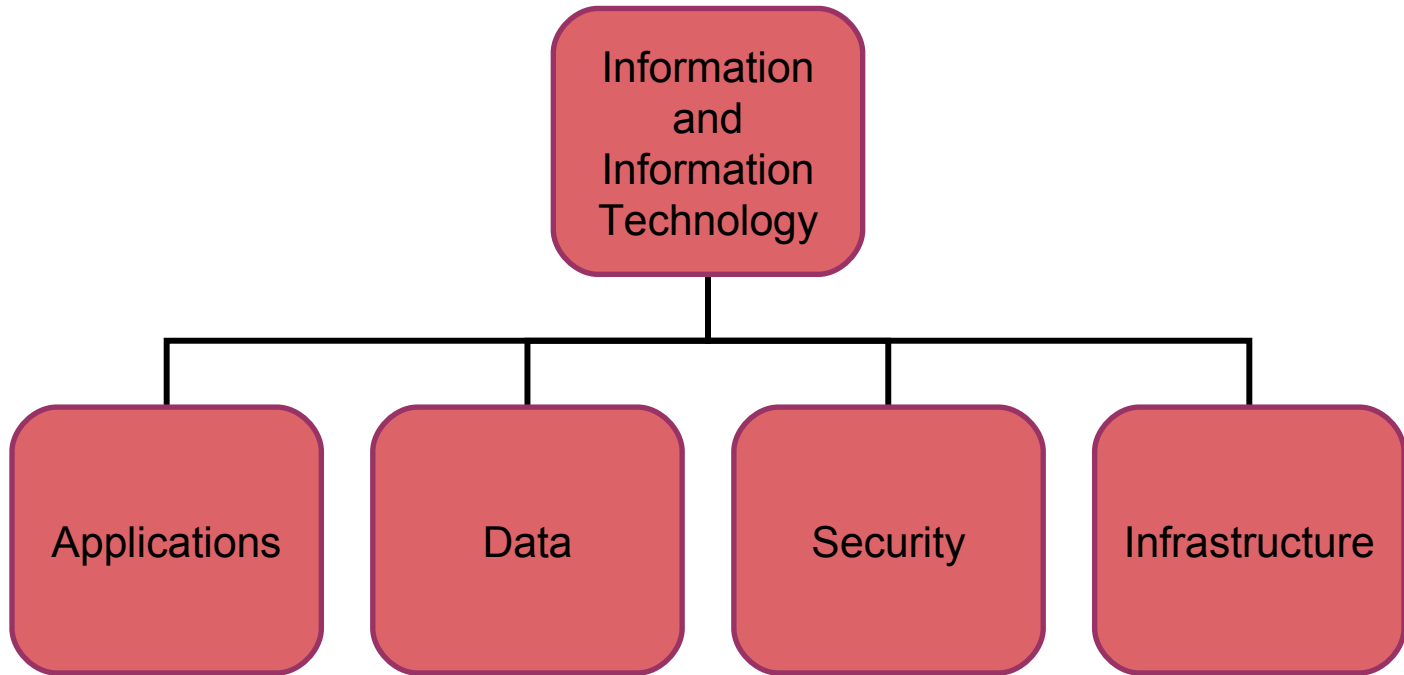
- A mission-critical approach is the best way to meet these demands

What is mission-critical to your organization?

- What are today's CIOs charged with?
 - IT's contribution to profit
 - Customer satisfaction
 - Security – protection of your intellectual capital
 - Accuracy – sound business decisions
 - Availability – are the doors open for business?
 - Performance – response time
 - Efficient use of IT resources (ROI)



A CIO's org may look roughly like this



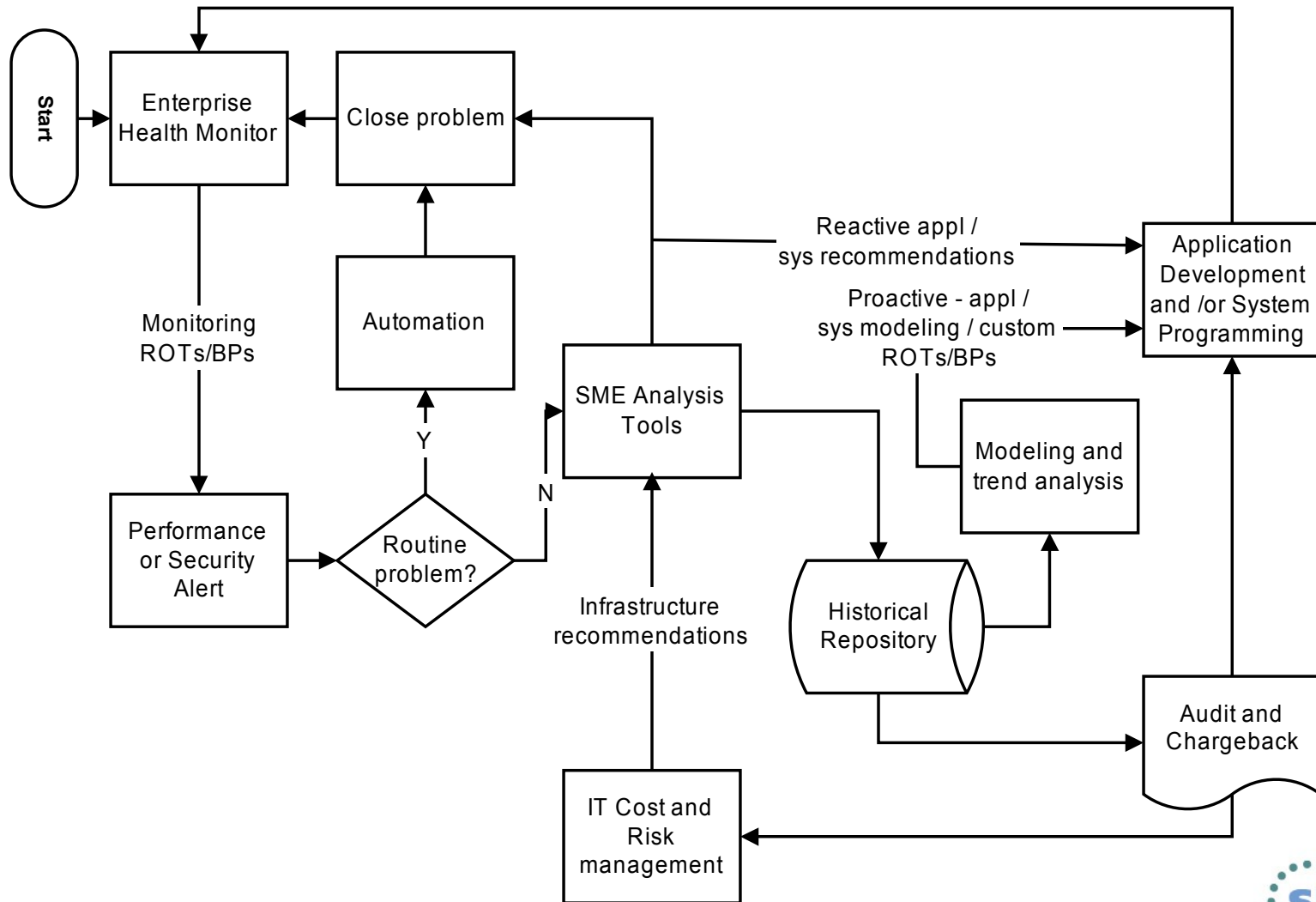
DB2 for z/OS

Performance

Basics and Best Practices for monitoring Performance

- How can those charged with managing IT's assets contribute to those three key demands?
 - With a low-cost, mission-critical methodology for protecting your investment, focused on:
 - Enterprise health
 - Support for trend analysis
 - Integrated problem management
 - Application lifecycle support
 - Security / Accountability
 - A simple, seamless, executive-level view that
 - Highlights opportunities for improved efficiencies and maximized capacity
 - Ensures the best-possible customer satisfaction

A Best Practice monitoring blueprint proposal



Monitoring DOs

- FOCUS ON WHAT'S **MISSION-CRITICAL**
 - DO develop and watch **KPIs** (Key Performance Indicators)
 - DO keep a watchful eye on the **end-user experience** – especially external customers
 - DO understand the performance of heavily **reused components**
 - DO monitor your **hardware assists** (zIIPs / zAPPs / Accelerators) and analyze their ROI and capacity
 - DO keep an **historical** performance database
 - And analyze this data on a prescribed basis

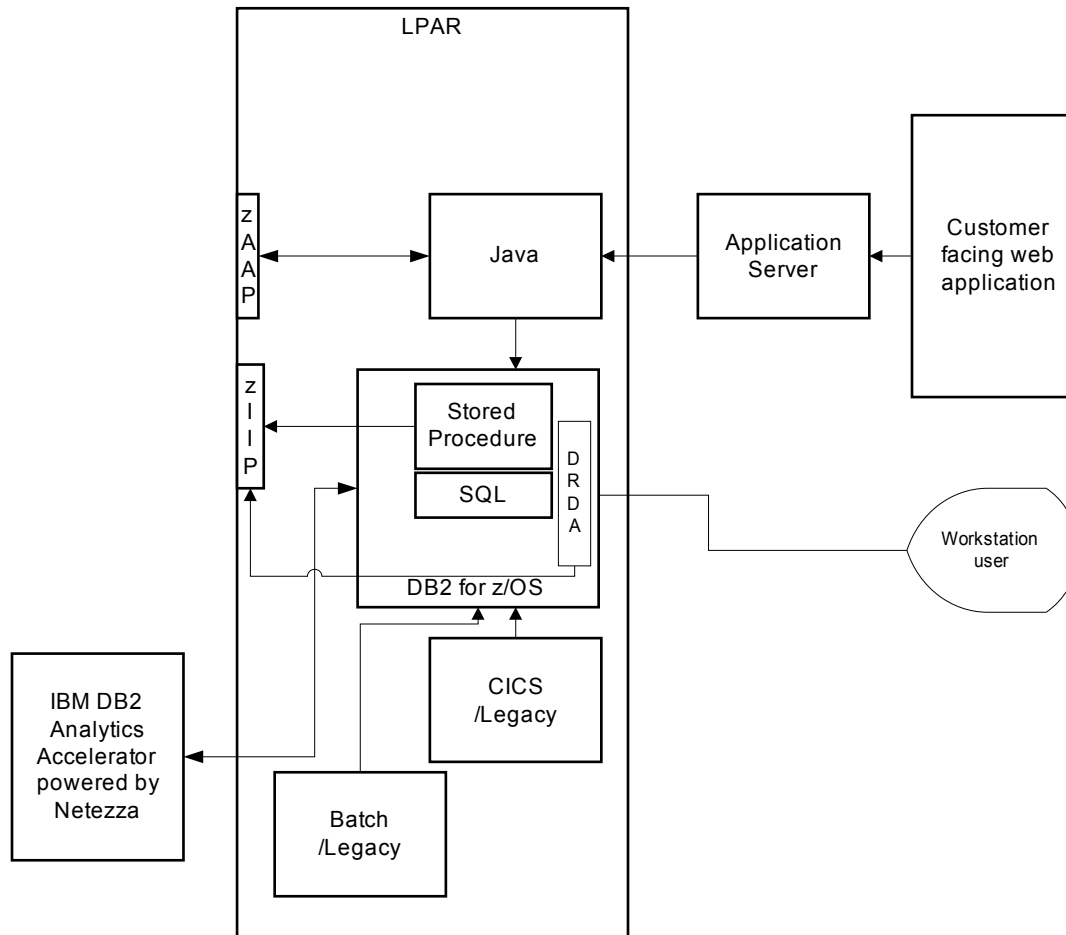
Monitoring DON'Ts

- DON'T over monitor.
 - Avoid unnecessary collection overhead
 - DON'T capture and store data you won't use
 - Avoid unnecessary noise and wasted storage
- DON'T make your DO list too long

IBM DB2 for z/OS tools to support mission-critical DB2 application monitoring

- Enterprise Health via the **Tivoli Enterprise Portal** web UI
- Response time monitoring for distributed front-ends with the **Extended Insight** feature from OMEGAMON DB2 Performance Expert
- Ensure peak performance of key business logic components with OMEGAMON DB2's Expert stored procedure analysis and **SQL Dashboard**
- Analytics Accelerator ROI analysis support with OMEGAMON DB2 Performance Expert
- Historical trending support for DB2 via the OMEGAMON DB2 Performance Expert **Performance Database (PDB)**
 - Focused storage management with the **Buffer Pool Analyzer**

DB2-centric application architecture

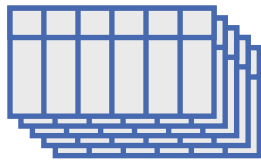


Types of application workload serviced by DB2 for z/OS

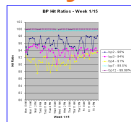
- ❑ **Transactional** applications require sub-second response time
 - ❑ **Data-mining / analysis** applications
 - Remember when **hours** used to be acceptable?¹
 - ❑ DB2-based **Legacy** “inboard” (or host) applications still drive core business processes that haven’t changed for decades
 - Use traditional ways to monitor
 - ❑ **Distributed and web** applications drive the way we deliver value to the consumer and “open” the relationship between consumer and provider
 - Use advanced ways to monitor
- ¹ **Accelerators** like the **IBM DB2 Analytics Accelerator** support “near-transactional” application performance for “train of thought” analysis on almost incomprehensible volumes of data

DB2-centric application architecture with mission-critical monitoring overlays

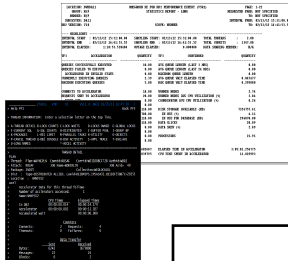
Performance Database



Buffer Pool Analysis



Accelerator monitoring

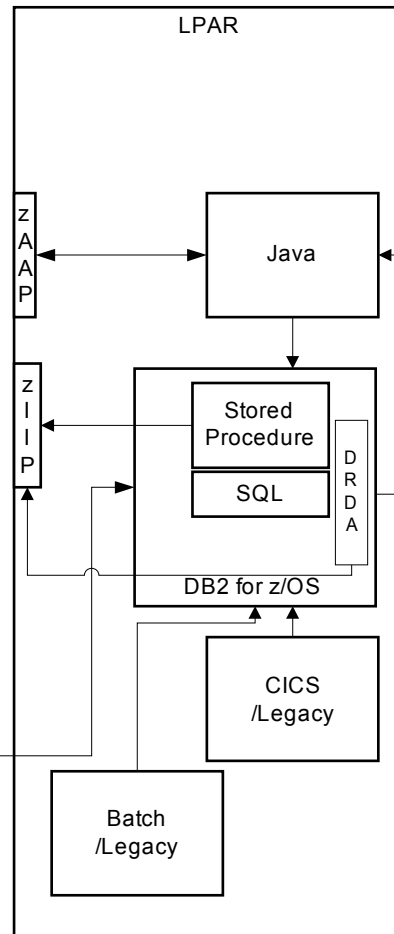
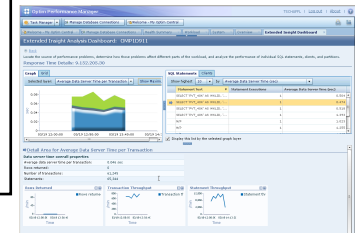


IBM DB2 Analytics Accelerator powered by Netezza

Enterprise Health



Extended Insight



Customer facing web application

Application Server

Java

Stored Procedure
SQL

DB2 for z/OS

CICS /Legacy

Batch /Legacy

ZAAP

ZIIP

Workstation user

SQL Dashboard / Stored Procedure monitoring

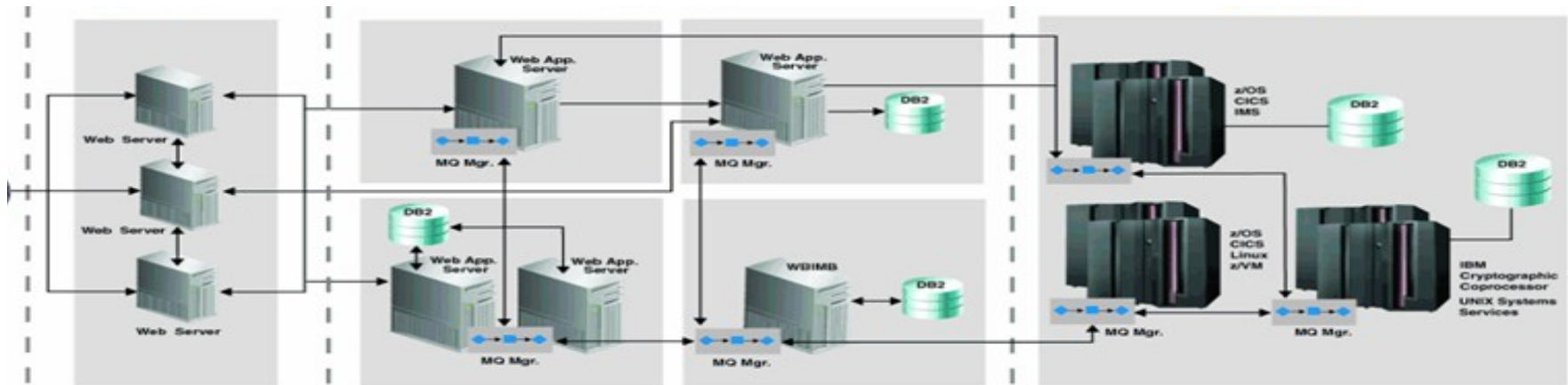
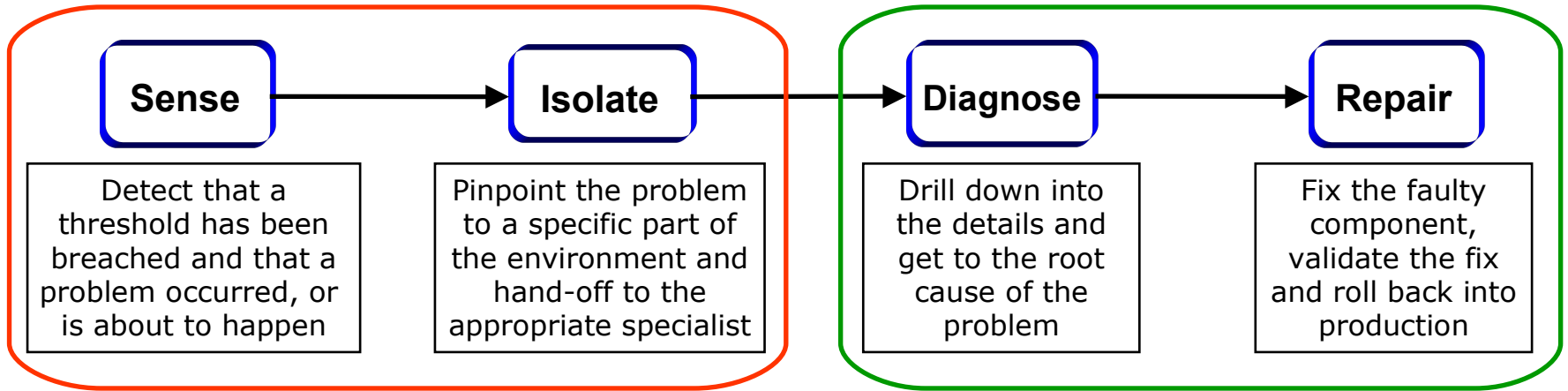
Statement Text	Execution ID	Number of Calling Paths	Execution Elapsed Time	Number of Execs	CPU Time
CALL SYSTEM_SQLINOCURSORCOLSE IN VARCHAR, IN VARCHAR, IN ...	-2,147,483,102	1	1.1600591	168	0.148540
CALL SPMON_COMP_JOB FAMILY 511	-2,147,483,976	1	0.403268	40	0.018785
CALL SYSTEM_SQLINOCURSORCOLSE IN VARCHAR, IN VARCHAR, IN ...	-2,147,483,148	2	0.372614	13	0.002611
CALL SYSTEM_SQLINOCURSORCOLSE IN VARCHAR, IN VARCHAR, IN ...	-2,147,483,124	1	0.360520	1	0.002382
CALL SYSTEM_SQLINOCURSORCOLSE IN VARCHAR, IN VARCHAR, IN ...	-2,147,483,101	1	0.268017	84	0.001966
CALL SPMON_COMP_JOB DISPATCHER 511	-2,147,483,977	2	0.142337	60	0.006750
CALL SPMON_COMP_JOB DISPATCHER 511	-2,147,482,979	4	0.108440	144	0.002070
CALL SPMON_COMP_JOB DISPATCHER 511	-2,147,482,978	2	0.002720	52	0.000261
CALL QRM_DEMON_LOC_VCI OUT VARCHAR	-2,147,482,972	1	0.0023140	1	0.004644

Enterprise / landscape monitoring

- Tivoli Transaction Tracking and the Enterprise Portal
 - At a glance potential trouble-spot identification
 - Portal to overall enterprise health
 - Alerts and automation
 - Integrated problem ticket management

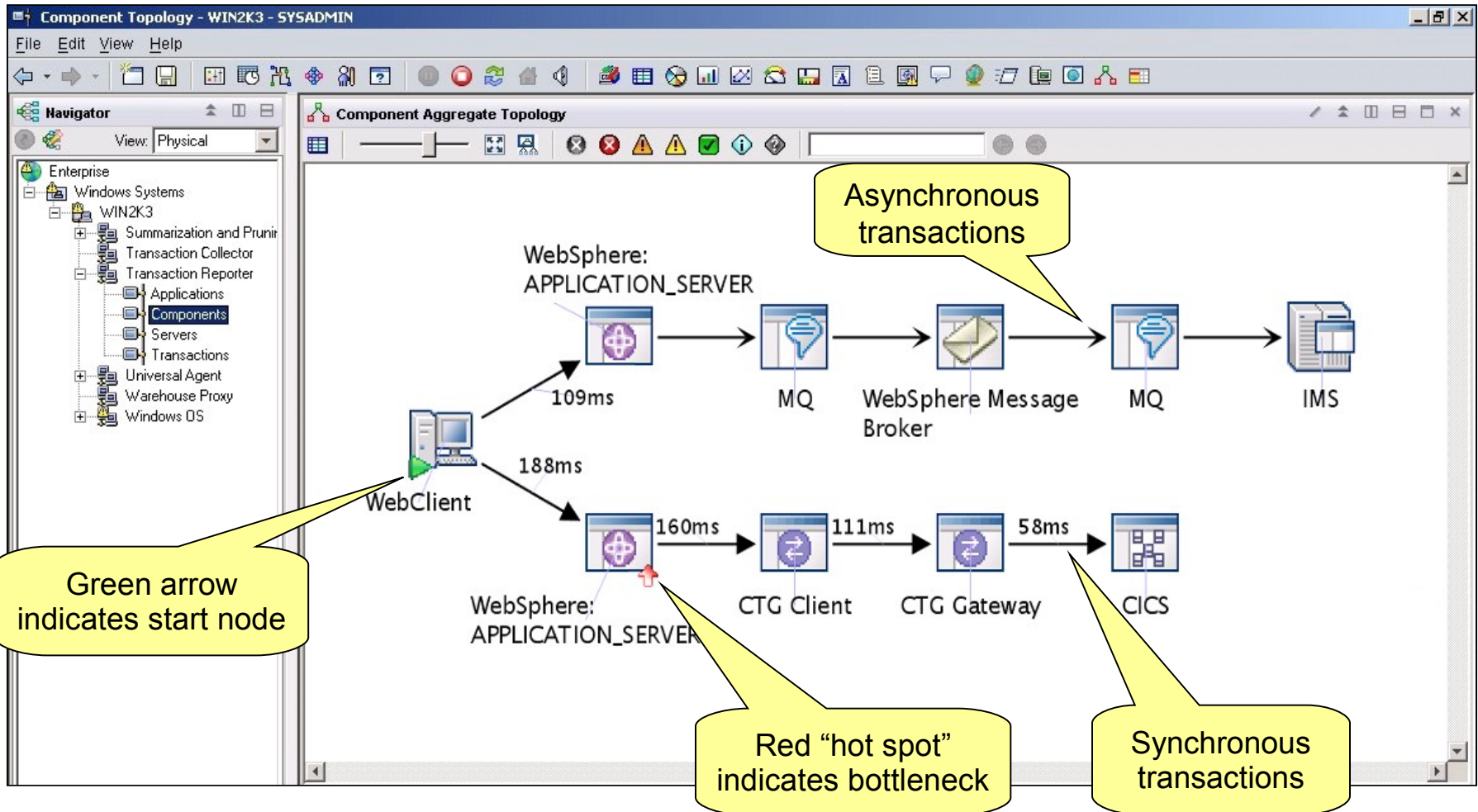
Application Performance Management Workflow

ITCAM for Transactions and OMEGAMON

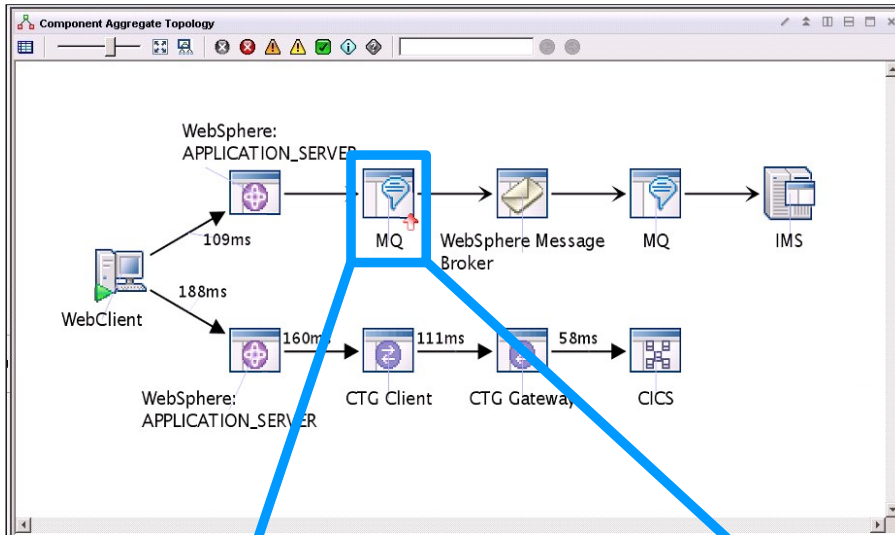


← ITCAM for Transactions for the horizontal end to end →
 OMEGAMON for vertical deep dive in context ↔

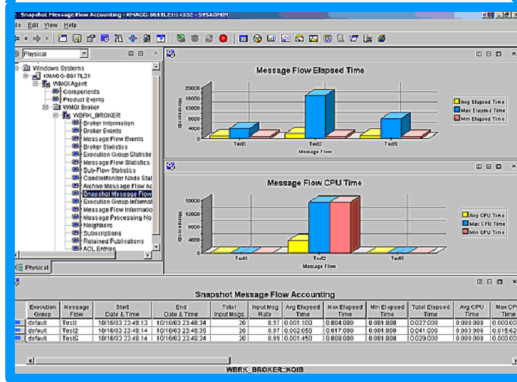
Transaction Tracking Topology



Drill to the next level of detail



ITCAM for Transactions

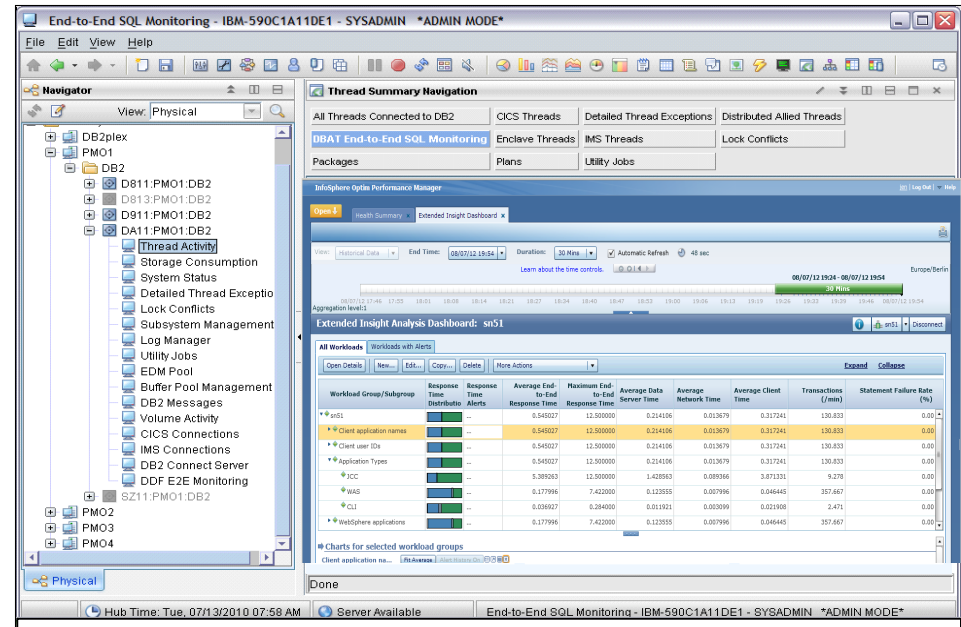


OMEGAMON XE for Messaging

- Uses Dynamic Workspace Links to launch in context into appropriate SME tool.
- Launch destinations depend on type on data source, e.g.:
 - DB2 => OMEGAMON for DB2
 - MQ => OMEGAMON XE for MSG
 - WAS => ITCAM for WAS
 - CICS => OMEGAMON for CICS
 - IMS => OMEGAMON for IMS
- Where appropriate, will drill down to specific workspace (ie. In MQ, Queue Manager drilldown links to the Queue Manager Status Workspace for the specific Queue Manager).

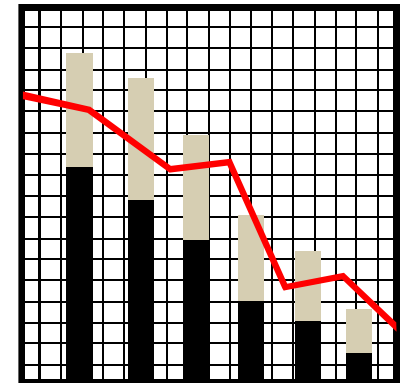
Get an initial look at what's going on behind the scenes

- The physical view provides a combination of out-of-the-box as well as customizable views to focus your team on metrics that are key to operating DB2 for z/OS or any middleware component



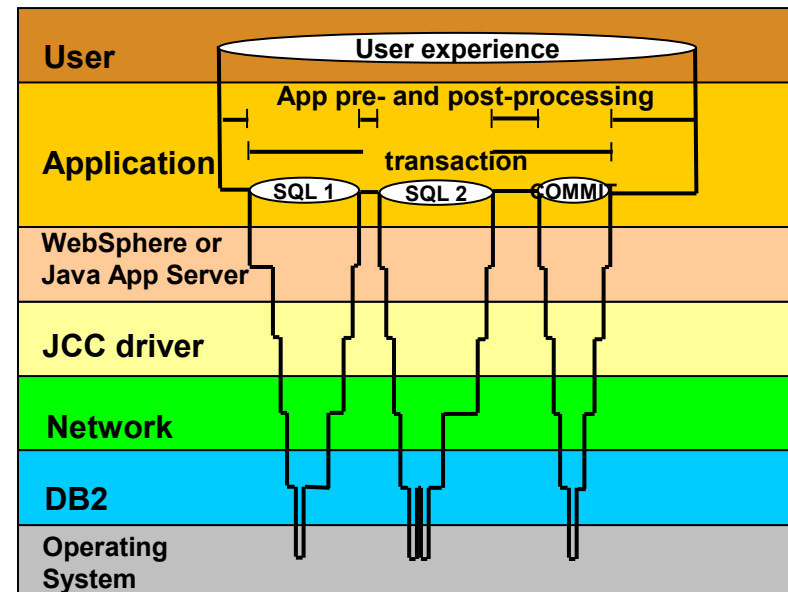
Why is performance critical for your distributed apps?

- Your internal and external customer “self-service” tools coming to DB2 from “distributed” end-points reduce costs to the business plus bring your business closer to your customer
- Web technology provides a portal to “everyone” for personal and sensitive corporate data
- These types of users are accustomed to fast response times. This has to work or -
THESE CUSTOMERS WILL WALK



Where's 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 Analysis Dashboard

Dynamically change the time period and duration for analysis

InfoSphere Optim Performance Manager jen | Log Out | Help

Open Health Summary Extended Insight Dashboard

View: Historical Data End Time: 08/07/12 19:54 Duration: 30 Mins Automatic Refresh 48 sec

[Learn about the time controls.](#) Europe/Berlin

08/07/12 17:46 17:55 18:01 18:08 18:14 18:21 18:27 18:34 18:40 18:47 18:53 19:00 19:06 19:13 19:19 19:26 19:33 19:39 19:46 08/07/12 19:54

Aggregation level:1 08/07/12 19:24 - 08/07/12 19:54 30 Mins

Extended Insight Analysis Dashboard: sn51 sn51 Disconnect

All Workloads Workloads with Alerts

Open Details New... Edit... Copy... Delete More Actions Expand Collapse

Workload Group/Subgroup	Response Time Distributio	Response Time Alerts	Average End-to-End Response Time	Maximum End-to-End Response Time	Average Data Server Time	Average Network Time	Average Client Time	Transactions (/min)	Statement Failure Rate (%)
sn51		--	0.545027	12.500000	0.214106	0.013679	0.317241	130.833	0.00
Client application names		--	0.545027	12.500000	0.214106	0.013679	0.317241	130.833	0.00
Client user IDs		--	0.545027	12.500000	0.214106	0.013679	0.317241	130.833	0.00
Application Types		--	0.545027	12.500000	0.214106	0.013679	0.317241	130.833	0.00
JCC		--	5.389263	12.500000	0.428563	0.089566	3.871331	9.278	0.00
WAS		--	0.177996	7.422000	0.123555	0.007996	0.046445	357.667	0.00
CLI		--	0.036927	0.284000	0.011921	0.003099	0.021908	2.471	0.00
WebSphere applications		--	0.177996	7.422000	0.123555	0.007996	0.046445	357.667	0.00

Charts for selected workload groups

Client application na... Fit Average Alert History On

Compare response time break down for different workloads

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

Extended Insight Feature summary



If it's not DB2, as a DBA you're done!

- 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 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
 - Optim Configuration Manager

Application architecture creates opportunity and risk

- Reuse makes a lot of sense – economically and for quality
- Centralization of program logic to centers of competency should ensure accuracy
- Centralization may also create single points of failure and / or bottlenecks

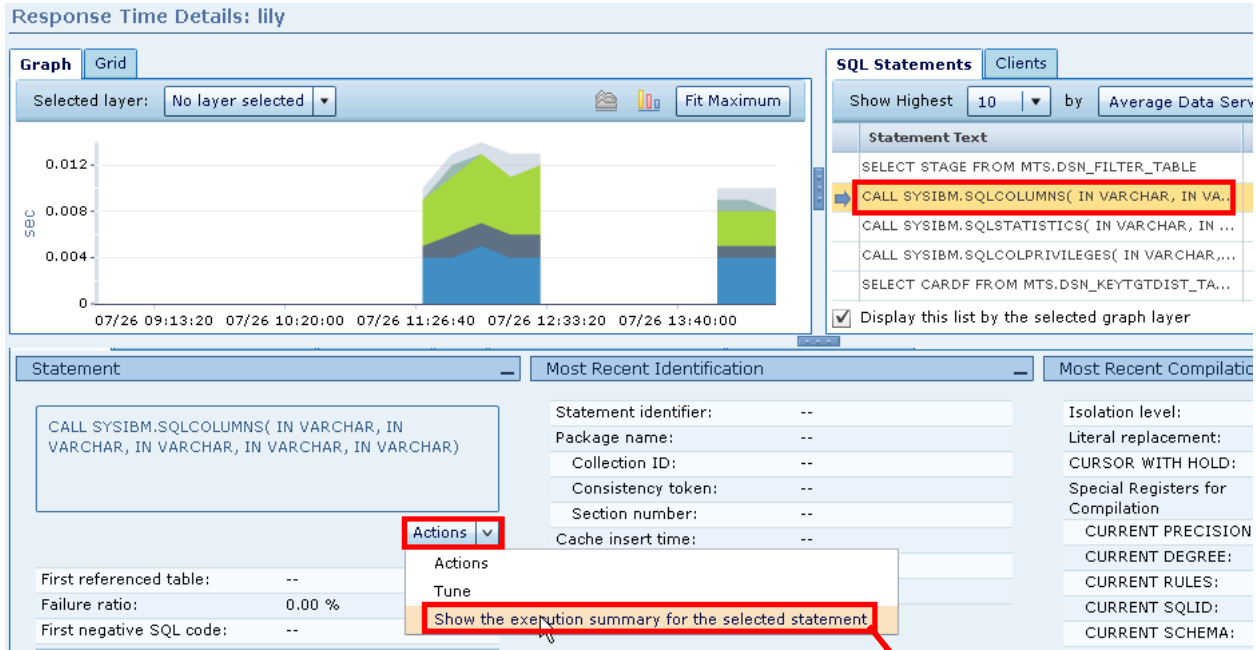
What is a stored procedure?

- A user-written program that can be called by an application with an SQL CALL statement.
- A compiled program that is stored at a DB2 server
- Can execute business logic and SQL statements
- Can call another stored procedure
- Stored procedure types:
 - External high level language procedures COBOL, PL/I, C, C++, Assembler, REXX, and Java
 - External SQL procedures
 - Native SQL procedures introduced by DB2 9 for z/OS

Why are application programmers using Stored Procedures?

- Modularity in application development
- Data will be processed always in a consistent way according to the rules defined in the stored procedure
- Improved application security
- Reusability
- Application integration solutions / Enforcement of business rules
- Reduced network traffic for distributed applications
- Cost of ownership reduction → zAAP and zIIP exploitation for SPs written in Java and Native SPs

Stored procedure monitoring in the OMEGAMON DB2 PE “SQL Dashboard”



Execution Summary

All Statements

Dashboard filter: Highest 20 by Total Execution Elapsed Time

Statement text Equals CALL SYSIBM.SQLCOLUMNS(IN VARCHAR, IN VARCHAR, IN VARCHAR, IN VARCHAR, IN VARCHAR) ;

Statement Text	Routine ID	Number of Calling P:	Execution Elap:	Numb
CALL SYSIBM.SQLCOLUMNS(IN VARCHAR, IN VARCHAR, IN VARCHAR, IN VARCHAR, IN V...	-2,147,483,...	1	39.600685	

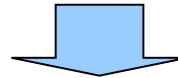
Drill into the SQL executed by the SP

Dashboard filter: Highest 20 by Total Execution Elapsed Time

Statement Text Contains CALL ;

Statement Text	Routine ID	Number of C	Execution Elap	Number of Execution	CP				
CALL SYSPROC.ADMIN_INFO_SYSLOG(IN VARCHAR, IN VARCHAR, IN DATE, I...	-2,147,48...	1	11.750643	48	1.4				
CALL SYSPROC.ADMIN_COMMAND_DB2(IN VARCHAR, IN INTEGER, IN VARCH...	-2,147,48...	1	1.446675	66	0.243775	--	--	--	0
CALL SPMON_CONF.FAMILY.V1()	-2,147,48...	1	0.704594	46	0.151073	--	--	--	0
CALL SPMON_CONF.SON.V1(IN INTEGER)	-2,147,48...	1	0.457175	184	0.099174	--	--	--	1

Actions
Tune All
Select Calling Path
Show SQL for This Calling Path



CALL SPMON_CONF.FAMILY.V1() [Nesting Level 0]

Stored Procedure View

Dashboard filter: Highest 20 by Total Execution Elapsed Time

Statement Text	Routine ID	Number of C	Execution Elap	Number of Execution	CPU Time	Rows	Rows R	I/O	Lo	Ne
CALL SPMON_CONF.SON.V1(IN INTEGER)	-2,147,48...	1	0.457175	184	0.099174	--	--	--	--	1
CALL SPMON_CONF.DAUGHTER.V1()	-2,147,48...	1	0.136201	184	0.032441	--	--	--	--	1
SELECT count(*) AS FAMILY INTO :H:H FROM sysibm.sysdummy1 t1	--	--	0.054738	46	0.011194	46	--	--	0..	--
SELECT count(*) AS FAMILY2 INTO :H:H FROM sysibm.sysdummy1	--	--	0.020179	184	0.004564	184	--	--	0..	--

Stored procedures – mission-critical application design technique

- Many-to-many relationships between applications
 - Have the potential to be reused millions of times daily
- A key tuning opportunity

Analytics for a significant competitive edge

- Mission-critical analytics can be data intensive analytics but are crucial to translating data into a competitive advantage
 - Organizations are using analytics to outperform their competition
 - More users across the organization want access to business critical analytics applications
 - Business critical analytic applications **demand low latency, high qualities of service and performance**
- The IBM DB2 Analytics Accelerator delivers the competitive edge for “train of thought” analysis

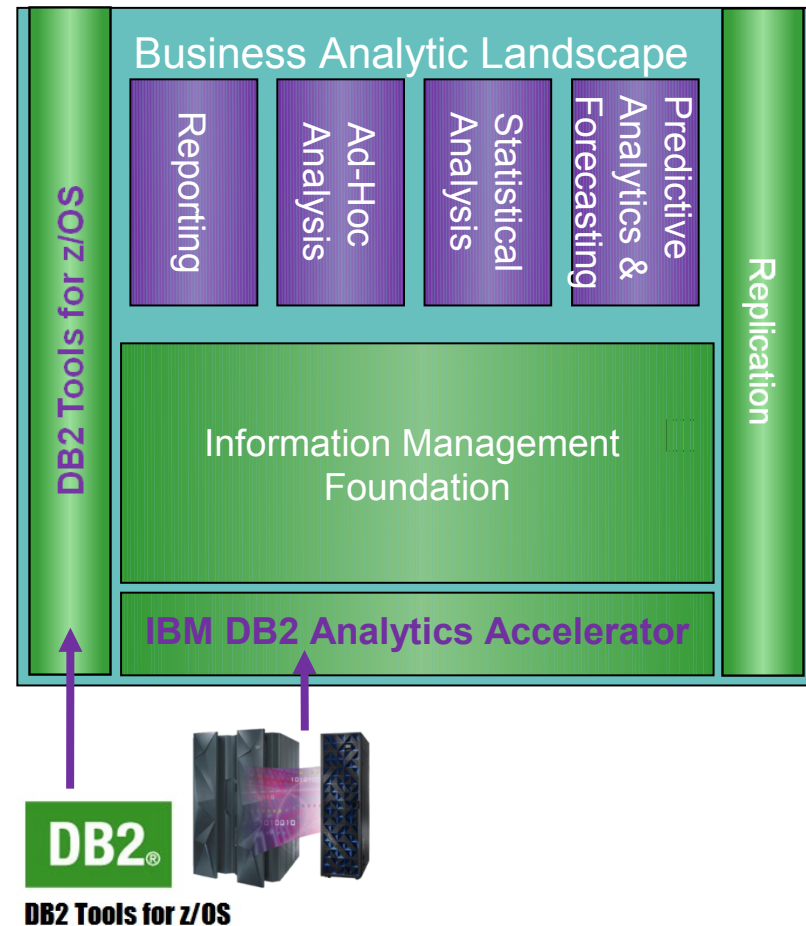
The IBM DB2 Analytics Accelerator

- What is it?
 - A high performance appliance that integrates Netezza technology with zEnterprise technology, to deliver dramatically faster business analysis
- What does it do?
 - Speed up complex queries up to 2000x
 - Lowers the cost of long term storage
 - Minimizes latency of data
 - Improves security and reduces risk
 - Complements existing investments

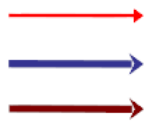
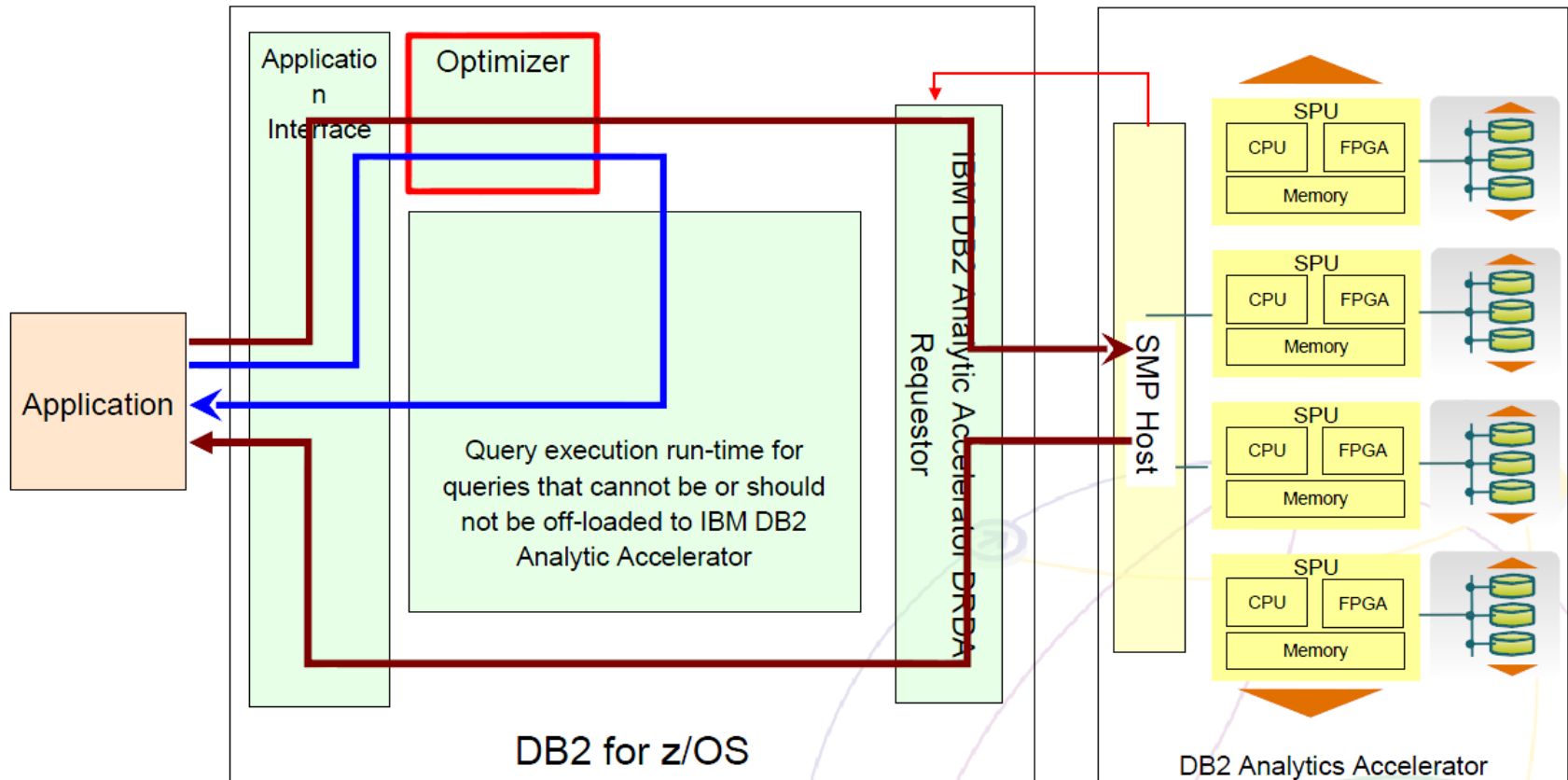


The role of DB2 Tools and the Analytics Accelerator

- DB2 Analytics Accelerator
 - Integrates **Netezza** technology with **zEnterprise** technology to deliver dramatically faster query acceleration
- DB2 Tools for z/OS
 - Help optimize and manage accelerated analytic queries and applications



Query Execution Process Flow



—————> Heartbeat (DB2 Analytics Accelerator availability and performance indicators)
 —————> Queries executed without DB2 Analytics Accelerator
 —————> Queries executed with DB2 Analytics Accelerator

Understand the IBM DB2 Analytics Accelerator with OMEGAMON DB2 Performance Expert



- Understand appliance utilization and what other opportunities may exist to maximize ROI
- Immediate feedback on accelerated query performance via online monitoring
- Detailed performance measurements via online and comprehensive batch reporting of the accelerator and its applications
- Analyze performance trends with accelerator specific performance metrics saved to a performance database
- Chargeback reporting for usage accountability

Statistics batch report showing Accelerator performance metrics

LOCATION: DB20A11		OMEGAMON DB2 FOR DB2 PERFORMANCE EXPERT (V5R4)		PAGE: 1-25	
GROUP: M/P	MEMBER: M/P	STATISTICS REPORT - LONG		REQUESTED FROM: DB2 SPECI	
SEQUENCE: DA11	DB2 VERSION: V10	SCOPE: MEMBER		TO: DB2 SPECI	
		INTERVAL FROM: 02/13/12	INTERVAL TO: 02/13/12	TO: 02/13/12	
INTERVAL START :	02/13/12 15:31:00.00	SAMPLE START :	02/13/12 15:31:00.00	TOTAL THREADS :	2.00
INTERVAL END :	02/13/12 16:01:53.52	SAMPLE END :	02/13/12 16:01:53.52	TOTAL COMMENTS :	1347.00
INTERVAL ELAPSED :	3:10:53.526488	OUTAGE ELAPSED :	0.000000	DATA SHARING MEMBER :	N/A
----- HIGHLIGHTS -----					
TF3	ACCELERATION	QUANTITY	TF3	CONTINUED	QUANTITY
10.00	AVG QUEUE LENGTH (LAST 3 HRS)	0.00			0.00
0.00	AVG QUEUE LENGTH (LAST 24 HRS)	0.00			0.00
0.00	AVG QUEUE LENGTH	0.00			0.00
2.39	AVG QUEUE WAIT ELAPSED TIME	0.047477			0.047477
3.00	AVG QUEUE WAIT ELAPSED TIME	0.295600			0.295600
10.00	WORKER RIBES	2.74			2.74
20.00	WORKER RIBES AVG CPU UTILIZATION (%)	3.84			3.84
0.00	COORDINATOR AVG CPU UTILIZATION (%)	0.26			0.26
0.00	DISK STORAGE AVAILABLE (GB)	732475.61			732475.61
0.00	DM USE (%)	4.11			4.11
0.00	DM USE FOR DATABASE (DB)	294976.00			294976.00
0.00	DATA SLICES	28.09			28.09
0.00	DATA SIZES (%)	2.89			2.89
0.00	PROCESSORS	21.91			21.91
0.00	ELAPSED TIME IN ACCELERATOR	3:05:01.256753			3:05:01.256753
0.00	CPU TIME SPENT IN ACCELERATOR	11.022993			11.022993

```

> Help PF1          ZINCL  IBM  DB2  V10.1.0 0311/02/20/13 16:01:53.52
Back PF3

> THREAD INFORMATION: Enter a selection letter on the top line.

> A-THREAD DETAIL  B-LOCK COUNTS  C-LOCK WATTS  D-LOCKS OWNED  E-GLOBAL LOCKS
> F-CURRENT SQL  G-SQL COUNTS  H-DISTRIBUTED  I-BUFFER POOL  J-GROUP BP
> K-PACKAGES  L-SEC LIMIT  M-PARALLEL TASKS  N-UTILITY  O-OBJECTS
> P-CANCEL THREAD Q-DB2 CONSOLE  R-DBN ACTIVITY  S-APPL TRACE  T-ENCLAVE
> U-LONG NAMES          -ACCEL ACTIVITY

THREAD DETAIL
PLAN
+ Thread: Plan-WAVEPLAN  ComId=4854F  Corrid=031108CF728  AuthId=QRI
+ Attach: BMSF  300  Name=SERVLIB  200  AsId= 49
+ Package: INDI5  Collection=MEMLOCKCOL
+ DBS : Type=DISTRIBUTED  ALIED, LowId=DEBMPG, IPASAK1, CDIDJF5807C=29235
+ Location : WNP52

+ accl
+ Accelerator data for this thread follows
+ Name:WAVE02
+ Number of accelerators accessed:
+ 1
+ CPU Times
+ In DB2 00:00:00.000 00:00:11.879
+ Accelerator 00:00:00.000 00:00:13.927
+ Accumulated wait 00:00:00.000 00:00:00.000

+ Counters
+ Connects: 2 Requests: 4
+ Timeouts: 0 Failures: 0

+ Data Transfer
+ Bytes: Sent 6742 Received 207000
+ Messages: 22 24
+ Blocks: 0 7
    
```

Real time display of a thread with accelerated queries

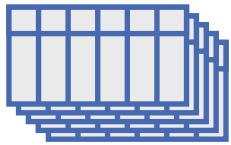


Historical analysis

- Background capture of performance data for post-analysis is a mission-critical monitoring technique

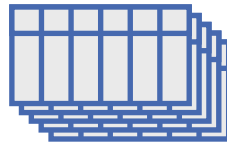
The historical performance database – Analyze Trends and Plan for the Future

Statistics Detail
Statistics Summary



IFCIDs 1, 2, 225, 199

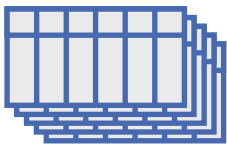
Accounting Detail
Accounting Summary



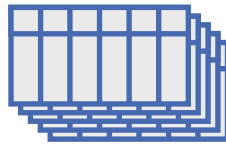
IFCIDs 3, 239

Locking

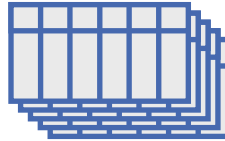
System parameters



IFCIDs 106, 201, 202,
230, 256

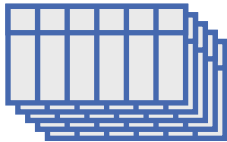


Record traces



(IFCIDs 22, 63, 96,
125)

Audit



IFCIDs 24, 55, 83, 87, 105,
107, 142, 143, 144, 145,
169, 319

Exceptions



(from OMEGAMON)

- Why a performance database?
 - Can help determine if DB2 is being a good z/OS neighbor
 - Identify good and bad application and DB2 system trends
 - Use to compare application performance before and after changes
 - Can help identify patterns regarding security

Some key performance queries using the PDB

❑ **Deadlock / timeout trending:**

- Provides an overall summary of locking issues
- Provides insight into tablespace hot-spots

❑ **Perform Lock Analysis to:**

- Identify those applications that are most likely to have the largest number of deadlocks / timeouts
- Use the lock rate to determine if the GBPs are appropriately sized

❑ **GETPAGE / CPU analysis provides us:**

- Two primary vehicles for reducing application CPU usage and improving efficiency and elapsed times

❑ **Accelerator analysis**

- Compare application performance pre and post acceleration

❑ **Exception scenarios**

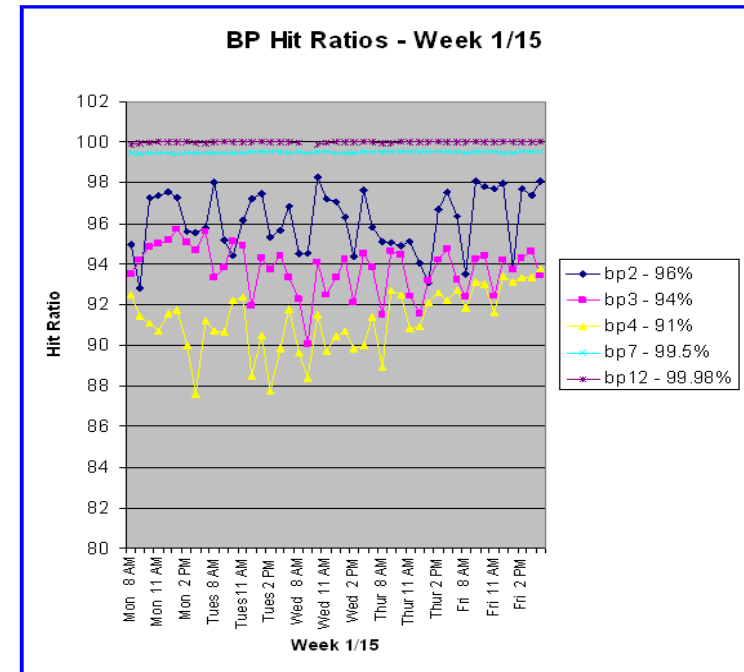
- Queuing is an indicator of resource constraints
- Failures are a pre-cursor to major application performance issues / DB2 system issues

❑ **STC monitoring:**

- Provides a summary view of the overall system health
- Monitor trends to see if ZPARMS / application need to be tuned

Buffer pool / storage management with the PDB and Buffer Pool Analyzer

- Buffer Pool Tuning
 - **Information gathering:** Gather the buffer pool hit ratios and DB2 elapsed time for production applications.
 - **Frequency:** Could be collected weekly and plotted in spreadsheet graphing tools for week to week comparison.
 - **Buffer Pool Analysis:** Use IBM Buffer Pool Analyzer (BPA) to simulate moving objects to different buffer pools and change buffer pool sizes.
 - **Effectiveness:** The Performance database provides the flexibility to make changes to the buffer pools and then compare the effect of these changes from week to week.



Use the Performance Database to...

- Pro-actively identify potential application performance problems
- Effectively forecast and monitor application CPU and transaction growth rates
- Identify and assess the impact of application changes

Where does the rest fit?

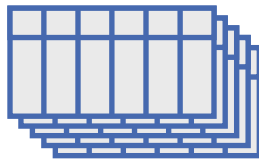
- Everyday spot checking
- Daily customer-support troubleshooting
- Experience and expertise-based monitoring and analysis practices

Hardware and software are perfect and never need tuning

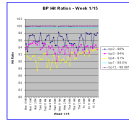
- So why monitor?
 - Monitoring is a good and necessary management technique
- Your business is built on applications that are critical to staying competitive and in business
 - These applications are a significant investment
 - The middleware to run them is a significant investment as well
 - Can you afford not to keep a watchful eye on them?

DB2-centric application architecture with mission-critical monitoring overlays

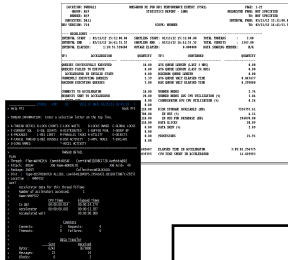
Performance Database



Buffer Pool Analysis

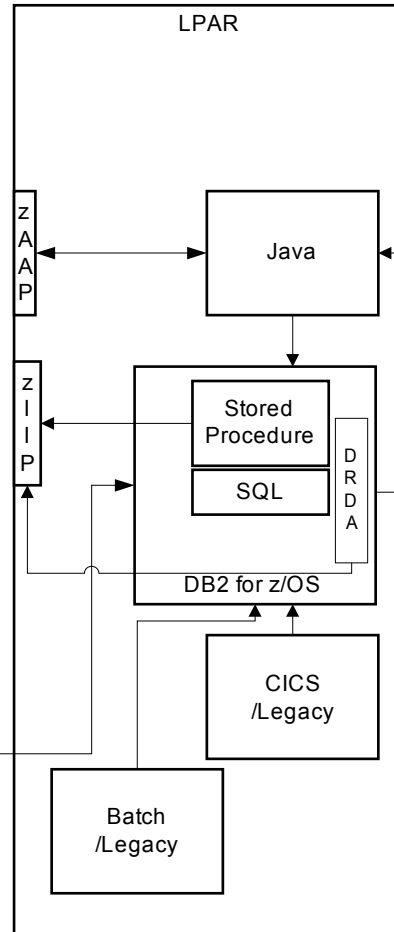


Accelerator monitoring



IBM DB2 Analytics Accelerator powered by Netezza

Enterprise Health



Customer facing web application

Application Server

Java

Stored Procedure

SQL

DB2 for z/OS

CICS / Legacy

Batch / Legacy

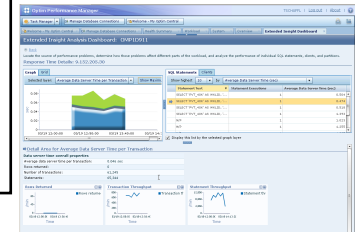
ZAAP

ZIIP

DRDA

Workstation user

Extended Insight



SQL Dashboard / Stored Procedure monitoring

Statement Text	Routes ID	Number of Calling Paths	Execution Elapsed Time	Number of Execs	CPU Time
CALL SYSTEM_SQLINOCURSORCOLSE IN VARCHAR, IN VARCHAR, IN ...	-2,147,483,102	1	1.1600591	168	0.1485401
CALL SPMON_COMP_JOBPARLY(51)	-2,147,483,976	3	0.4032688	40	0.0187925
CALL SYSTEM_SQLINOCURSORCOLSE IN VARCHAR, IN VARCHAR, IN ...	-2,147,483,148	2	0.3726114	13	0.0026411
CALL SYSTEM_SQLINOCURSORCOLSE IN VARCHAR, IN VARCHAR, IN ...	-2,147,483,124	1	0.3605202	1	0.0023242
CALL SYSTEM_SQLINOCURSORCOLSE IN VARCHAR, IN VARCHAR, IN ...	-2,147,483,101	1	0.268017	84	0.0019366
CALL SPMON_COMP_JOBMONITER(51)	-2,147,483,977	2	0.142337	60	0.0062760
CALL SPMON_COMP_JOBMONITER(51)	-2,147,482,979	4	0.108440	144	0.0020710
CALL SPMON_COMP_JOBMONIVER(51)	-2,147,482,978	2	0.002720	52	0.0002641
CALL GRM_DEMON_LOC_VCI IN VARCHAR	-2,147,482,972	1	0.0023140	1	0.0046441

Mission-critical DB2 for z/OS application elements to monitor

- Overall enterprise health
- End-user response time satisfaction
- SQL and Stored procedures
- Query Acceleration
- Performance Analysis support
 - Storage usage (buffer pool analysis)

Command ==> KOBSTART Enterprise Summary

Auto Update: [On] Plex ID: [] Sys ID: []

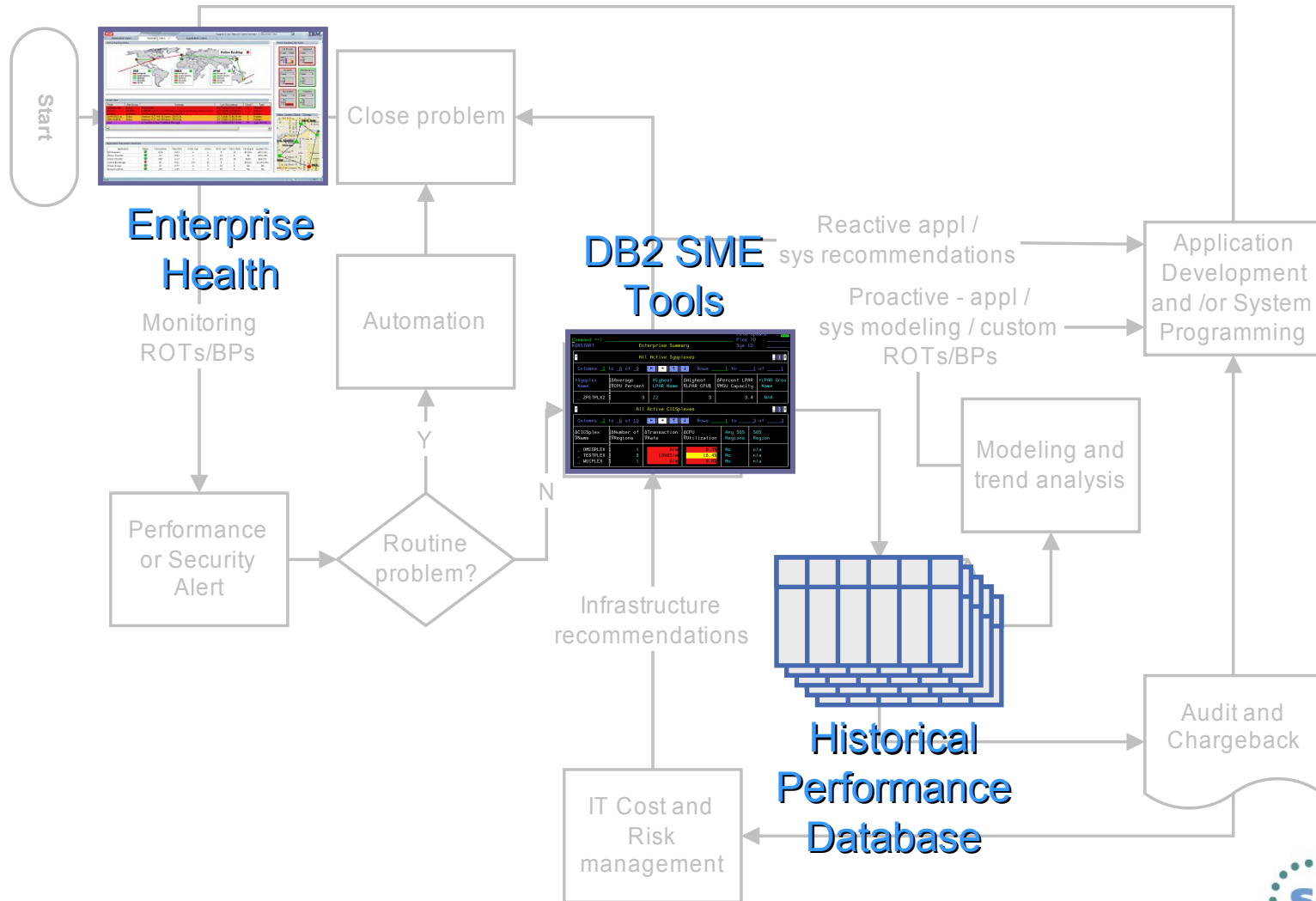
All Active Sysplexes

◊Sysplex Name	ΔAverage %CPU Percent	Highest LPAR Name	ΔHighest %LPAR CPU%	ΔPercent LPAR %VMSU Capacity	+LPAR Group Name
_ ZPETPLX2	3	Z2	3	3.4	N/A

All Active CICSplexes

ΔCICSplex %Name	ΔNumber of %Regions	ΔTransaction %Rate	ΔCPU %Utilization	Any 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

A Best Practice monitoring blueprint proposal



Conclusion and Takeaways

- You don't need nor want complex methods to ensure your mission-critical IT assets are safe and sound
 - Take a “less-is-more” approach
- Integrate Expert Tools for what's mission-critical in your enterprise
- A focused, low-cost monitoring approach will enable IT to support corporate objectives by ensuring systems deliver on:
 - Customer satisfaction
 - Security
 - Accuracy
 - Availability
 - Speed
 - Return on Investment

OMEGAMON delivers mission-critical monitoring

Challenge

- Expanding growth of applications accessing DB2 for z/OS from distributed platforms
- Lack of visibility and understanding of how different segments of transactions affected response time
- Rising levels of dynamic SQL suspected of increasing response time
- Challenged in managing performance trends from a historic perspective

Solution

- IBM Tivoli OMEGAMON XE for DB2 Performance Expert on z/OS
- IBM DB2 10 for z/OS

Business Benefits

- Lowered CPU requirements by up to 15 percent, resulting in lower overall software costs
- New insights through increased response time visibility enabling the optimization of execution parameters of a variety of transactions
- Enhanced knowledge of performance rates of dynamic SQL as well as transaction consumption rates within their web application server
- Enhanced capacity planning and trend analysis capabilities via historical performance tracking

“By improving the performance and efficiency of the Kela database processing capabilities, we’re now better able to meet the growing demand for social services among our main constituency, the citizens of Finland.”

Jarmo Männikkö, Database Senior System Programmer, Kela

Thank you!



Bibliography and References

- IDUG 2010 Session ID F13 “How a Performance Database Can Help Save The Day”, Petras (IBM), Wilkinson (Amica)
- IDUG 2011 Session ID VSP “I’m telling you, it’s not DB2, and I can prove it.”, Fafard (IBM)
- IOD 2011 Session ID IDZ3312a “OMEGAMON Performance Database”, Sundarrajan (Fifth-Third Bank), Fafard (IBM)
- IBM 2013 zTech Summit “Stored Procedure Monitoring and Analysis”, IBM