

# DB2 10 for z/OS

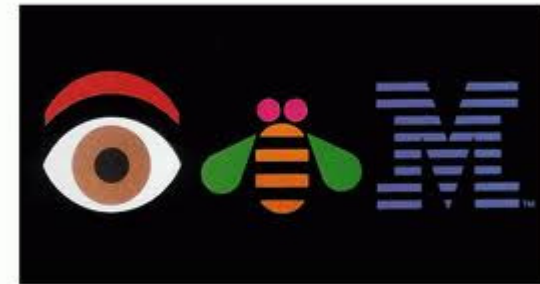
## DB2 10 Performance Tips and Lessons Learned



Massimiliano Castellini

Executive I/T Specialist – DB2 Advisor for Italy

April 2013





## Please note

**IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion.**

**Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision.**

**The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.**

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.



# Acknowledgements and Disclaimers:



The workshops, sessions and materials have been prepared by IBM or the session speakers and reflect their own views. They are provided for informational purposes only, and are neither intended to, nor shall have the effect of being, legal or other guidance or advice to any participant. While efforts were made to verify the completeness and accuracy of the information contained in this presentation, it is provided AS-IS without warranty of any kind, express or implied. IBM shall not be responsible for any damages arising out of the use of, or otherwise related to, this presentation or any other materials. Nothing contained in this presentation is intended to, nor shall have the effect of, creating any warranties or representations from IBM or its suppliers or licensors, or altering the terms and conditions of the applicable license agreement governing the use of IBM software.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer. Nothing contained in these materials is intended to, nor shall have the effect of, stating or implying that any activities undertaken by you will result in any specific sales, revenue growth or other results.

© **Copyright IBM Corporation 2012. All rights reserved.**

- **U.S. Government Users Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.**

IBM, the IBM logo, ibm.com and DB2 are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at “Copyright and trademark information” at [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml)

Other company, product, or service names may be trademarks or service marks of others.

**Availability.** References in this presentation to IBM products, programs, or services do not imply that they will be available in all countries in which IBM operates.



## DB2 10 Performance Tips and Lessons Learned





# DB2 10 Migration Performance – 1



- **Agent CPU time reduction when equivalent of better access paths are taken**
  - Good improvement from heavy SELECT from SYSDUMMY1 users
    - Example : `SELECT CURRENT TIMESTAMP FROM SYSIBM.SYSDUMMY`
  - DB2 10 can bypass catalog look up for simple SYSDUMMY1 queries in CM SELECT from sysdummy
  - Up to 20-30% CPU reduction in statement level
- **DB2 DBM1 SRB time reduction**
  - zIIP usage for prefetch and deferred write
  - Buffer pool scan avoidance
- **Concurrent insert throughput improvement**
  - Log latch reduction
  - LRSN Spin avoidance
- **Good DBM1 virtual storage reduction**
- **No more slowdown reported because of DB2 latch contention**



# DB2 10 Performance Experience – 2



- No.1 reason of less improvement than expected
  - Vender online monitoring
- Other issues frequently seen
  - Less hit in package authorization cache (CACHEPAC)

PKG-AUTH SUCC-W/O CATALOG	1368.4K
PKG-AUTH SUCC-PUB-W/O CAT	124.9K
PKG-AUTH UNSUCC-CACHE	1011.5K
PKG CACHE OVERWRT - AUTH ID	0.00
PKG CACHE OVERWRT - ENTRY	1002.7K

- Higher BP0 getpages for index for SYSPACKAUTH
- CACHEPAC is applied to non RACF users in DB2 10 and need to increase
  - Default CACHEPAC is changed to 5M which solves most of customer issues
- High rate of Package Table NOT FOUND in steady state
  - V8->DB2 10 migration using default EDM\_SKELETON\_POOL (10MB)

	QUANTITY	/SECOND	/THREAD	/COMMIT
PT REQUESTS	639224	10.7K	60.15	9.91
PT NOT FOUND	64538	1075.54	6.07	1.00

- Increase EDM\_SKELETON\_POOL



## DB2 10 Migration Performance – 3



- LAST USED PACKAGE in Real Time Stats
  - PM31614 less frequently checked to reduce the overhead
  - PM37672 to disable LAST USED package checking
    - New zparm DISABLE\_EDMRTS YES
- Index Probing
  - Unnecessary index probing can cause performance issues
  - PM56542, PM60233 and others
- DB2 system CPU time
  - High DB2 MSTR SRB
    - PM65360 : Eliminate unnecessary z/OS DISCARD requests
  - High DB2 MSTR TCB during idle time
    - Monitoring activity issuing z/OS COUNTPAGES
    - PM49816 (DB2) and OA37821 (z/OS) to reduce CPU usage
  - High DB2 DDF PREEMPT SRB
    - zOS ptf OA35146 and OA37201 were missing on z/OS 1.10



## **ECSA usage reported by RMF**

- **DB2 9 and below**
  - **Storage is under reported by about 80% or more**
  - **A lot exists as OG owner gone storage**
  - **Customers see DB2 using about 3-5M per subsystem**
  
- **DB2 10 and later**
  - **DB2 changes the way storage is obtained**
  - **Ownership is specified**
  - **Little or no owner gone storage**
  - **Customers see DB2 using about 12-15M per subsystem**





## DB2 10 Migration Performance – 4

- DB2 Directory space increase (SPT01/DBD01) in NFM
  - Growth in both base table as well as LOB
  - IN\_LINE LOBs for SPT01 as ZPARM (PM27073/PM27811)
    - Default SPT01\_INLINE\_LENGTHinlinde (32K)
  - Externalized zparm COMPRESS\_SPT01 with default NO
  - PM64226 addressing LOB growth in DB2 directory
  - PM74659 addressing base table growth in DB2 directory
  - PM81485 coreq of PM74659
  - PM80804 user lob tablespace growth when shared buffer pool with DSNDB01.SPT01
  - Correcting **PTF UK91435 (APAR PM79520)** was COR closed on February 21 and is flagged HIPER/Dataloss.



## OPEN/CLOSE Related Information



- **MEMDSENQMGMT ENABLE/DISABLE (z/OS 1.12 above)**
  - z/OS allocation will manage DB2 data set ENQs in memory, and suppress certain DB2 DD-level accounting in the SMF records to save significant overhead.
  - PM46045(DB2) and z/OS APARs ([OA36101](#), [OA37361](#), [OA37362](#)) required before turning o MEMDSENQMGMT ENABLE
  - Details in PM46045
    - PARMLIB(ALLOCxx) : update SYSTEM MEMDSENQMGMT(ENABLE)
- **PM56725 – Unnecessary OPEN/CLOSE when DSMAX reached**
- **IFCIDs are added (PM19528) for OPEN/CLOSE monitoring**
  - Record elapsed time and data set name for OPEN (IFCID 370) and CLOSE (IFCID 371) data set

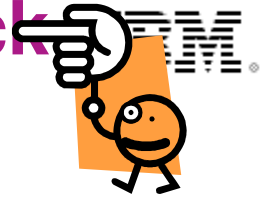


# DB2 10 New Function Performance





# NFM Performance – A Quick Look



**Possible Improvement by taking advantages of performance features.**

- CPU or Elapsed time reduction without application change but with schema or setting changes
  - Include index to reduce insert cost
  - Hash Access to pin point the data faster
  - Inline LOB to reduce AUX TS and Index overhead
  - Literal replacement for Dynamic Statements
  - Copy utility Flash Copy support
- New Functions which provide you more concurrency
  - UTS (PBG/PBR) Member Cluster support
  - UTSERIAL elimination for running multiple utilities in a group
  - Concurrent DDL and BIND
  - Access Currently Committed option
- Monitoring Enhancements
  - Statistics Statement level monitoring (IFCID 402)
    - ✓ Requires REBIND in new function mode

# DB2 for z/OS Request for Enhancements (RFE)

*More Effectively Communicating with Customer on Requirements*

- Historically... internal IBM tool (FITS). No direct customer access to requirements
- Going forward with [DB2 for z/OS RFE](#) you can:
  - Directly manage/track your requirements – greater accessibility
  - Access, vote, comment, and watch other public requirements
  - Directly interact with DB2 development
- DB2 for z/OS RFE Community link: <http://www.ibm.com/developerworks/rfe/infomgmt/>
- Online help and tutorials available from the RFE Community – including YouTube videos

YouTube videos: [http://www.ibm.com/developerworks/rfe/execute?use\\_case=tutorials](http://www.ibm.com/developerworks/rfe/execute?use_case=tutorials)





### Typical Utilization for Servers

Windows: 5-10%    Unix: 10-20%    **System z: 85-100%**

System z can help **reduce** your floor space up to **75%-85%** in the data center



# Thank You



**System z** can lower your total cost of ownership, requiring **as little as 30%** of the power of a distributed server farm running equivalent workloads

The cost of storage is typically **three times more** in distributed environments

