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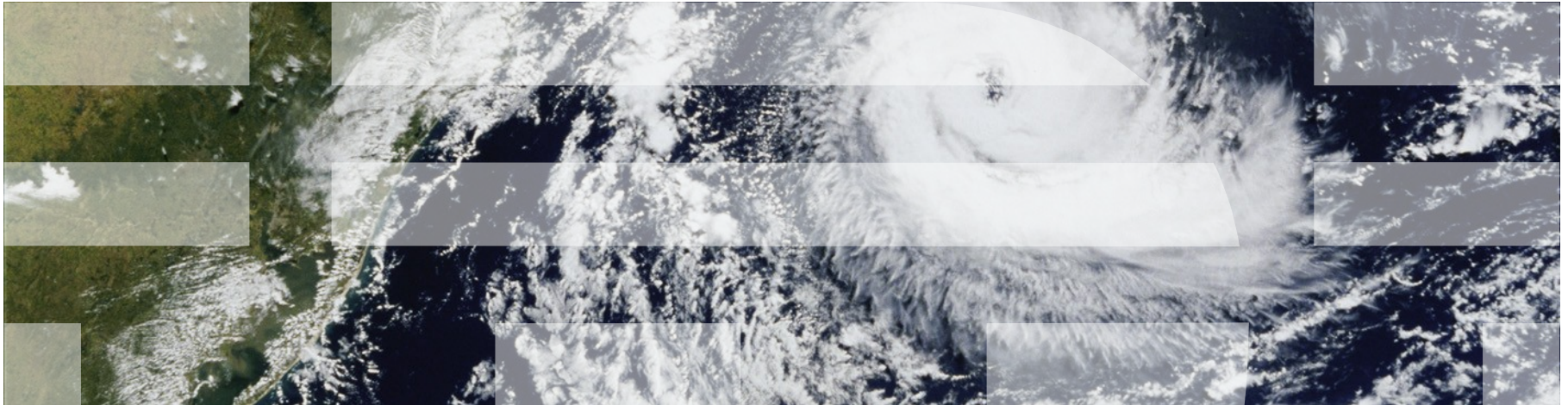
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IBM DB2 for z/OS Utilities Update



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Agenda



- **Introduction**
- **REORG Recent Updates**
- **LOAD & UNLOAD Recent Updates**
- **Backup & Recovery Recent Updates**
- **Other News**
- **Some Upcoming Enhancements**
- **Summary**

Introduction



- **DB2 Utilities Suite is critical for core function enablement in DB2**
- **DB2 Utilities Suite provides data & meta-data conversion capability**
 - REORG/LOAD row format conversion in DB2 9
 - REORG catalog/directory conversion during DB2 10 ENFM
 - REORG non-disruptive meta-data changes in DB2 10
 - Pageset conversion, page size alteration, etc.
 - REORG/LOAD inline LOBs in DB2 10
 - Including non-disruptive conversion of existing LOB data
 - Utility support for hash pagesets in DB2 10
 - Including auto-estimation of required hash space in REORG
 - Utility support for spatial indexes in DB2 10
 - Retrofit to DB2 9

DB2 10 REORG



- Reduced need for REORG INDEX
 - List prefetch of index leaf pages based on non-leaf information for range scans
- Reduced need for REORG with compress on insert
- New REORGCLUSTERSENS RTS column
 - If no clustering-sensitive queries then avoid REORG to restore clustering
 - DSNACCOX and Automation Tool enhanced
- Improved performance for part-level REORG with NPIs & REORG INDEX
 - Index list prefetch results in up to 60% elapsed time reduction
- Reduced application outage for REORG with inline stats
 - Update catalog after dedrain
- REORG support for multiple part ranges
 - LISTDEF... PARTLEVEL(1:6,47,287:509)

DB2 10 REORG



- REORG SHRLEVEL CHANGE for all cat/dir page sets
- REORG SHRLEVEL REFERENCE|CHANGE to remove REORP
- REORG SHRLEVEL CHANGE for LOBs
 - Independent of whether LOBs are LOG NO or LOG YES
 - No mapping table required
 - Base table space must be LOGGED
 - **REORG SHRLEVEL NONE for LOBs deprecated in V10 NFM**
 - **Will end rc0 but no REORG will be performed**
- REORG FORCE option to cancel blocking threads
 - FORCE ALL or just READERS
 - Same process as –CANCEL THREAD so requires thread to be active in DB2 for it to be cancelled
 - Threads cancelled on final drain
 - Give well-behaved applications a chance to get out of the way

REORG APARs



- Retrofit of support of multiple part ranges
 - More efficient, improved availability, exploit parallelism
 - PK87762 & PM13259 (V9)
 - E.g. REORG PART 1,45:71,500:503,4010

 - Note: LISTDEF parts will now process in a single REORG
 - 2 implications to consider:
 - - Might not have the disk space for sortwork or shadow pagesets
 - - OFFPOSLIMIT/INDREFLIMIT apply to entire set of partitions
 - If cannot tolerate the above, then set new zparm to SERIAL

 - PM25525 (V9) – new PARALLEL keyword on REORG
 - PM37293 (V9) – new REORG_LIST_PROCESSING zparm to control PARALLEL REORG processing

REORG APARs



- Online REORG materialisation of inline LOBs
 - PM29037 (V10)

- Faster REORG with no NPIs
 - PM37112 (V9)
 - Improve SYSLGRNX processing reduced SYSLGRNX GETPAGEs by up to 97%

- REORG CPU reduction
 - PM37630 (V9)
 - Up to 10% CPU reduction through sort efficiency/avoidance

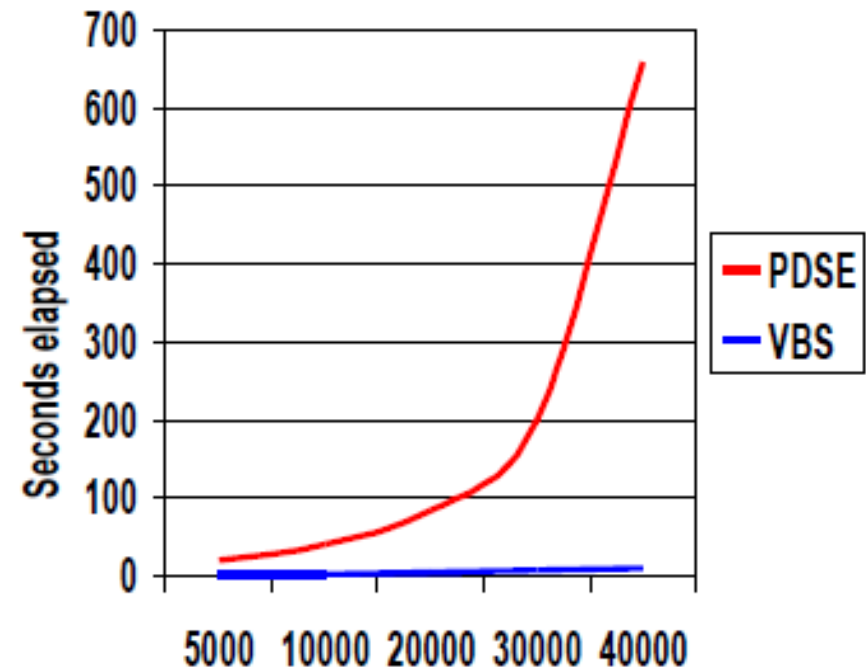
- More zIIP offload for REORG
 - PM37622 (V9)
 - Up to 20% additional zIIP offload

- REORG to correct BRF/RRF mismatch after DSN1COPY
 - PM40646 (V9)

DB2 10: LOAD & UNLOAD



- Remove MAX_UTIL_PARTS zparm
 - Restriction removed for REORG in V9
- Improved performance for LOAD REPLACE with LOB data
 - Up to 50% elapsed time reduction
- Spanned record support for LOB/XML data
 - LOBs & XML documents inlined in SYSREC with base data
 - Option in addition to FRVs
 - Performance & portability



LOBs Unloaded

LOAD & UNLOAD APARs



- Faster handling of zero length LOBs in LOAD/UNLOAD
 - PM12286 (V9)

- Faster UNLOAD TABLESPACE
 - PM34858 (V9)
 - More efficient scan of SYSTABSTATS
 - Est. by one customer to reduce UNLOAD elapsed time from 44 mins to 55 secs

LOAD & UNLOAD APARs



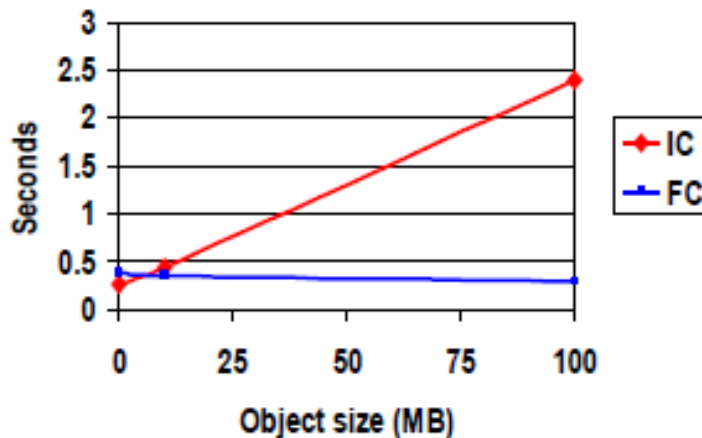
- LOAD/UNLOAD FORMAT INTERNAL
 - PM19584
 - Unload and load data in true internal format
 - 85% CPU & elapsed time reduction on UNLOAD
 - 77% elapsed time, 56% CPU reduction on LOAD
 - Supported by High Performance Unload
- LOAD PRESORTED
 - PM19584
 - Avoid sort overhead when data already sorted in clustering order
 - Up to 25% CPU reduction, 33% ET reduction depending on no. of indexes
 - Works well with Utility Enhancement Tool PRESORT option
- Fast LOAD through index avoidance
 - PM27962 (V9)
 - New INDEXDEFER option to skip index key insert
 - Leaves indexes or logical partitions in RBDP
 - For LOAD RESUME or partition-level LOAD REPLACE with NPIs
 - Can even skip unique indexes
 - LOAD single part (5% of data) with 5 NPIs: Save 64% ET

DB2 10: Backup & Recovery

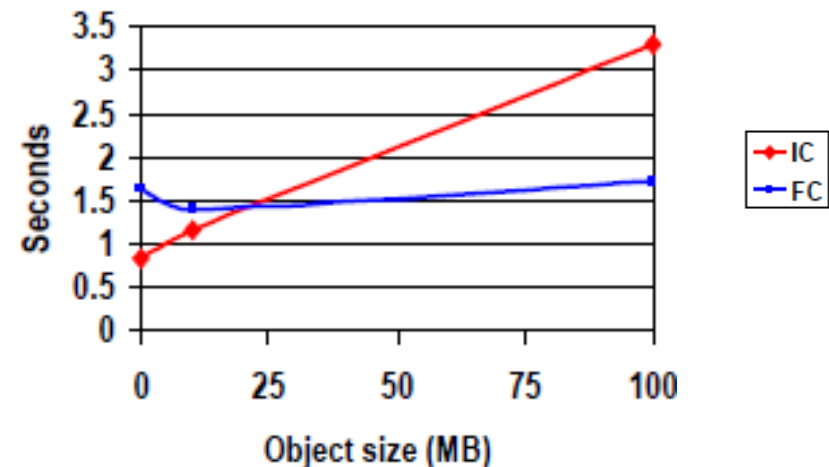


- Dataset-level Flashcopy support
 - COPY, RECOVER, REORG, LOAD, REBUILD INDEX, REORG INDEX
 - New zparms & utility parms to govern
 - Virtually eliminate CPU & elapsed time for large pagesets
 - Create transaction-consistent image copies from COPY SHRLEVEL CHANGE
 - Create partition-level inline image copies from REORG

CPU time per object (z10)



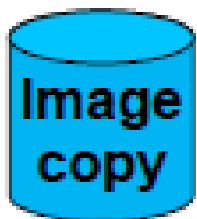
Elapsed time per object (z10)



DB2 10: Backup & Recovery



- VERIFYSET option to fail PIT recovery if entire set not included
 - Base, LOB, XML & history objects
- ENFORCE NO option to avoid CHKP/ACHKP on PIT recovery of subset of set
 - Improved performance due to avoidance of set checking (RI, aux)
- Fast recovery to point in time through new BACKOUT option
 - Include indexes in RECOVER list to avoid the need to rebuild them
 - Indexes must be COPY YES
 - No imagecopy required though
 - LOBs requires APAR PM45650
 - PIT recovery always with consistency since V9



Backup & Recovery APARs



- LOB pageset support for RECOVER BACKOUT YES
 - PM45650 (V10)
 - Lost LOBs will be marked invalid if necessary
 - Tablespace will be placed in AUXW
- Improved MODIFY RECOVERY support for SLBs
 - PM24237 (V9)
 - MODIFY will check for existence of SLB before setting copy-pending
 - REPORT RECOVERY support for SLBs delivered in base V10
- Faster image copy to tape
 - PM23786 (V9)
 - Improved tape mark handling when copying multiple pagesets to same tape
 - One customer measured 40% elapsed time improvement
- SELECT from SYSLGRNX
 - PM35190 & PM42331 (V10)
 - ISO(UR) enforced

DB2 10: Statistics



- KEYCARD deprecated and is now the default
- RUNSTATS PROFILE support for simplification
- Autonomic features through new stored procedures & catalog tables
- All catalog statistics columns made updatable
- RUNSTATS SHRLEVEL REFERENCE updates RTS
 - TOTALROWS & TOTALENTRIES columns
- zIIP-enablement for RUNSTATS
- Auto sampling rates & page sampling instead of row sampling
 - Significant CPU & ET savings
 - TABLESAMPLE SYSTEM AUTO
- DSNACCOX enhancements
 - Support hashed pagesets
 - New RTS columns for SSD, other

DB2 10: Other



- CHECK DATA
 - CHECK utilities will no longer set CHKP/ACHKP
 - CHECK DATA enhanced for XML support
 - Document validation
 - Schema validation
 - Automated exception table processing for XML documents
- Spatial index support for REORG, REBUILD INDEX & CHECK INDEX
- Removed UTSERIAL lock for greater utility concurrency
- LISTDEF support for DEFINED YES|NO|ALL
 - Improved utility performance since unnecessary to build & then discard structures for undefined objects
 - Default changed to DEFINED YES

Other utility APARs



- Retrofit utility spatial index support to V9
 - PM35200 (V9)
- Prevent read-only outage from CHECK SHRLEVEL CHANGE utility when Flashcopy support not available
 - PM19034 (V9)
 - New CHECK_FASTREPLICATION zparm
 - Recommend setting to REQUIRED
- Empty lists generated by LISTDEF changed to return RC4
 - PM27099 (V10)
 - Previously returned RC8
 - RC4 desirable, and necessary since default changed to DEFINED YES
- Improve DSN1COPY usability with REPAIR VERSIONS
 - PM27940 (V9)
 - For DSN1COPY of partitioned tablespaces

Other utility APARs



- Allow utility restart when template uses &UNIQ or &UQ
 - PM19063 (V9)

- Extend DFSORT variable length record sort limit from 2bn to 4bn
 - PM43006 (V9)
 - 2bn limit affects single REORG data sort subtask
 - Prevent ICE121A FILE SIZE IS TOO LARGE error

Summary



- Innovation continuing & delivery pace accelerating
- Day 1 GA utility support for core DB2 function
- Continuous delivery of performance enhancements & features of real value
- Eliminate application impact from utilities
- Reduce elapsed time & CPU consumption
- Reduce resource consumption
- Reduce complexity & improve automation