

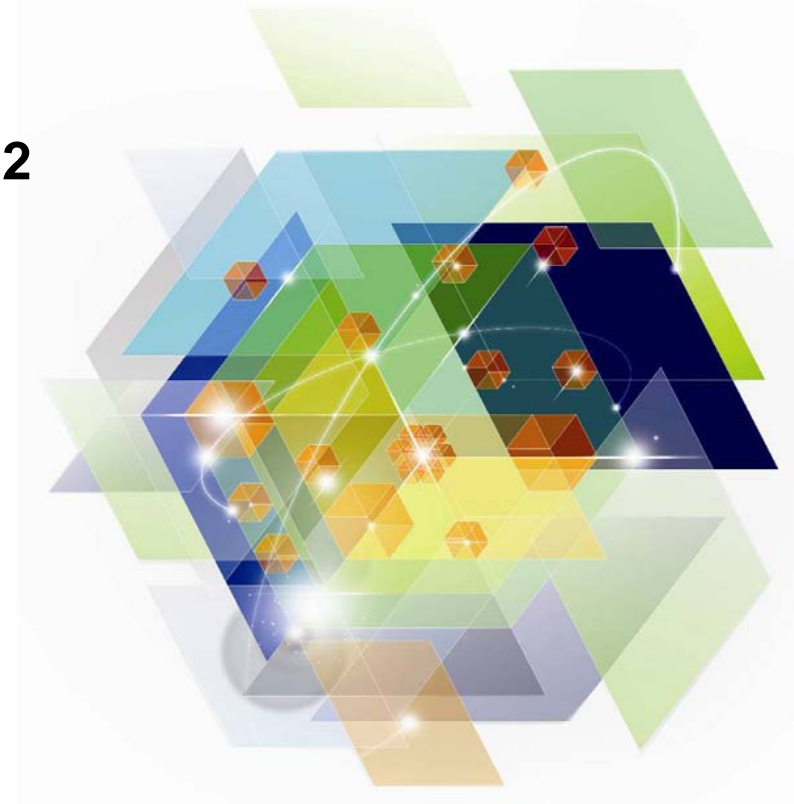
IBM System z Technology Summit



Beyond Migration — Reduce CPU in DB2 10 using DB2 Utilities and Tools

Presenter Name

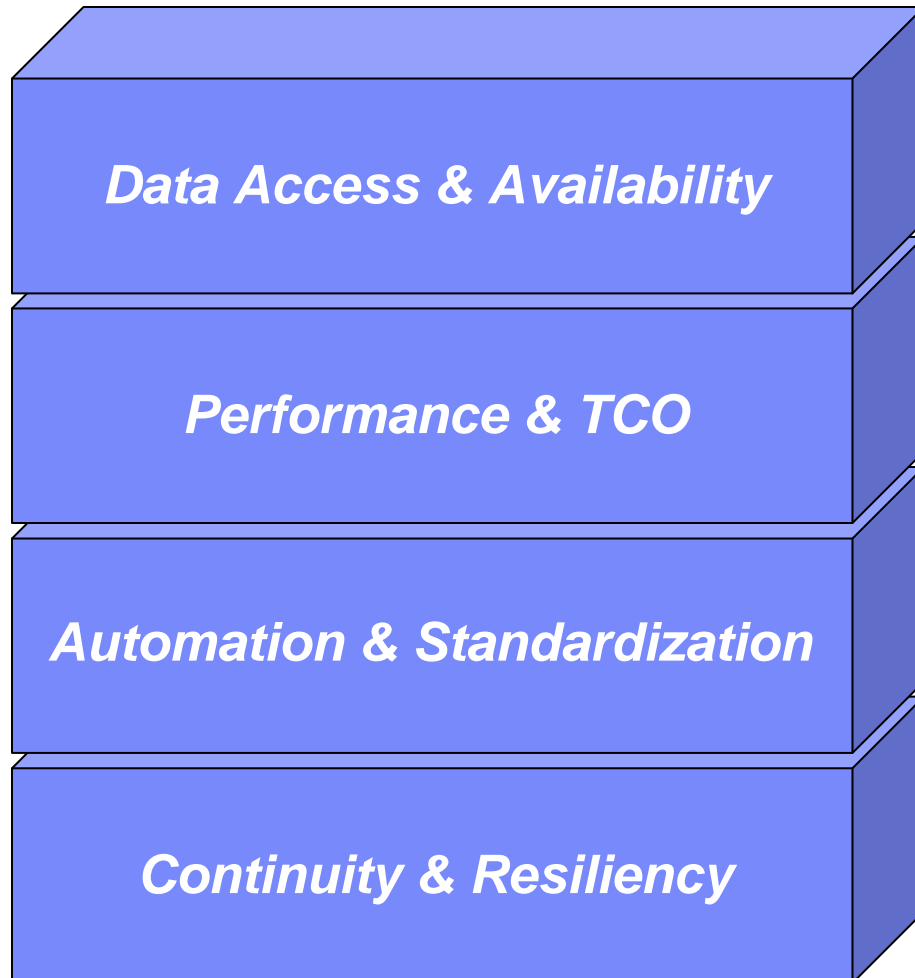
Title



Agenda

- **IBM Investment in Utility Management**
- **DB2 10 Utilities – Supporting Core DAY 1 functionality and adding additional value**
- **Taking advantage of utility and product enhancements:**
 - DB2 Sort for z/OS
 - DB2 High Performance Unload for z/OS
 - DB2 Utilities Enhancement Tool for z/OS
 - DB2 Automation Tool for z/OS
- **Summary**

IBM Investment Areas for Managing Utilities



▪ Data Access & Availability

- Fast retrieval of information
- Reducing the amount of down time or minimizing batch window for maintenance

▪ Performance & TCO

- Meeting or exceeding SLA's and/or chargeback
- Reducing CPU and ET to achieve lowest TCO

▪ Automation & Standardization

- Reducing repeated tasks, manual effort and error
- Ensuring consistency at company level

▪ Continuity & Resiliency

- Ensuring data integrity
- Ensuring Day-1 support of new versions of DB2 for z/OS

The Importance of DB2 Utilities in DB2

- 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



REORG News

DB2 10 REORG

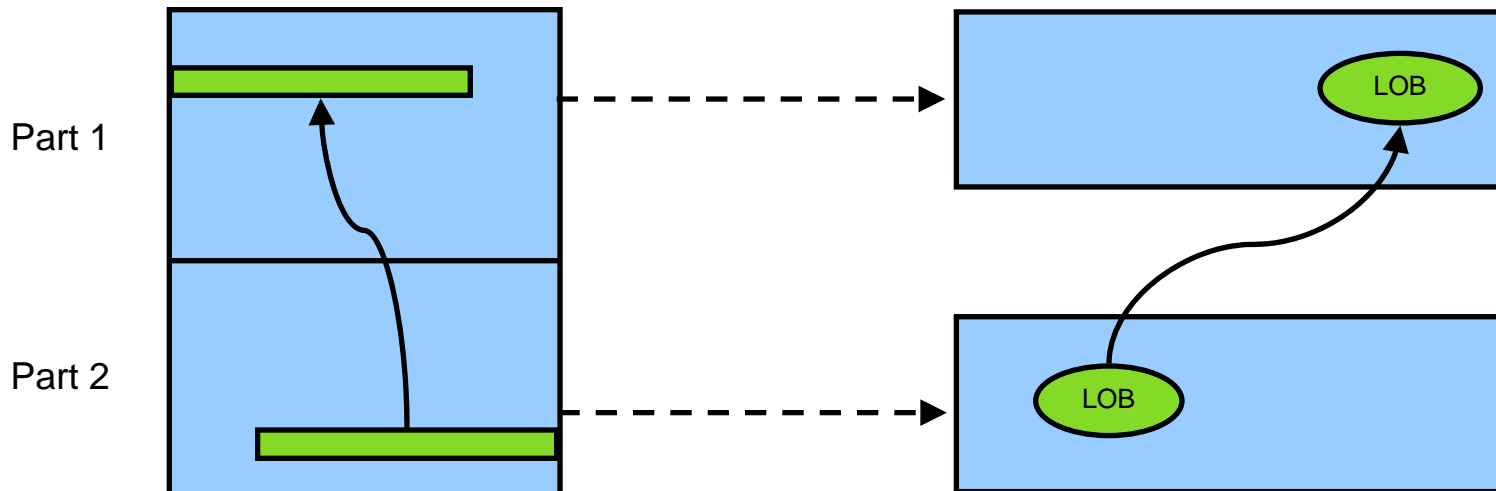
- Avoidance & performance
- **Reduced need for REORG INDEX**
 - List prefetch of index leaf pages based on non-leaf information for range scans
- **Reduced need for REORG with compress on insert**
- **New REORGCLUSTERSENS RTS column**
 - If no clustering-sensitive queries then avoid REORG to restore 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
- Improved availability & removed restrictions - do things you could not do before
- **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

DB2 10 REORG

- **New AUX keyword on REORG of partitioned base for improved LOB handling**
 - Permits rows to flow between partitions
 - Allows REORG REBALANCE with LOB columns
 - Allows ALTER of LIMITKEY with LOB columns
 - Permits move of rows between parts on PBG REORG
 - Permits deletion of corresponding LOBs on REORG DISCARD
 - Default is AUX NO unless LOB objects required to complete REORG
 - No XML column support for classic partitioned or PBR
 - No mapping table change required



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 REORG parallel processing when input is a part-level LISTDEF

REORG APARs

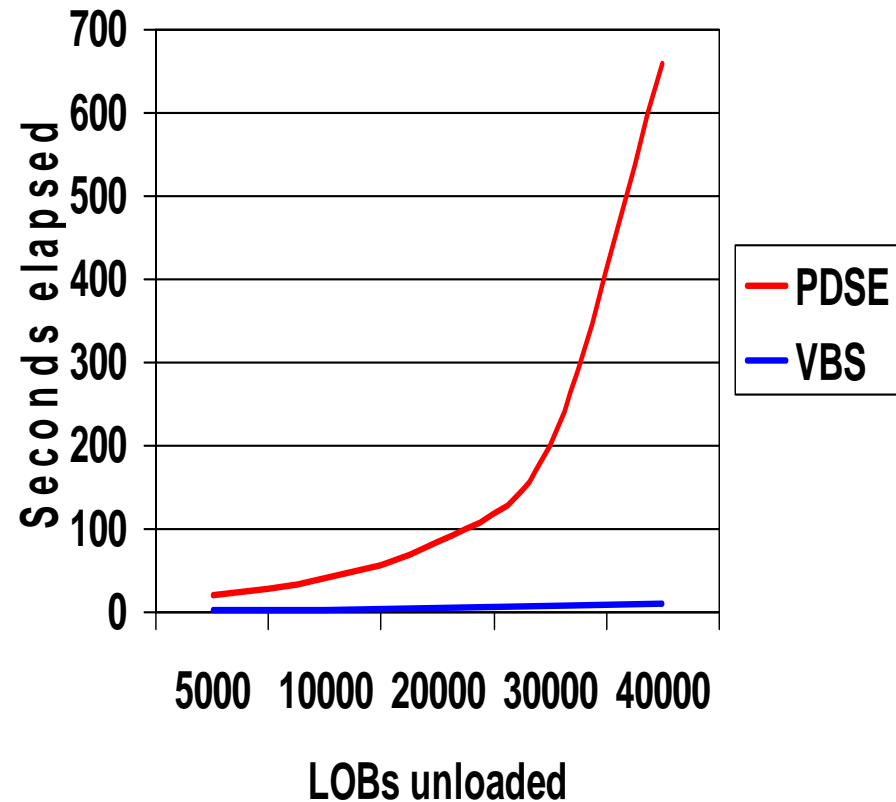
- **Online REORG materialisation of inline LOBs**
 - PM29037 (V10)
- **Faster REORG with no NPIs**
 - PM37112 (V9)
 - Improved SYSLGRNX processing reduced SYSLGRNX GETPAGES by up to 97%
- **REORG CPU reduction**
 - PM37630 (V9)
 - Up to 10% CPU reduction through sort efficiency/avoidance
- **More zIIP offload for REORG**
 - PM37622 (V9)
 - Up to 20% additional zIIP offload
- **REORG to correct BRF/RRF mismatch after DSN1COPY**
 - PM40646 (V9)
- **REORG outage reduction**
 - Reduce final incremental processing in last log iteration
 - PM46632 (V9)
 - One customer: 7 minutes to zero



LOAD & UNLOAD news

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



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



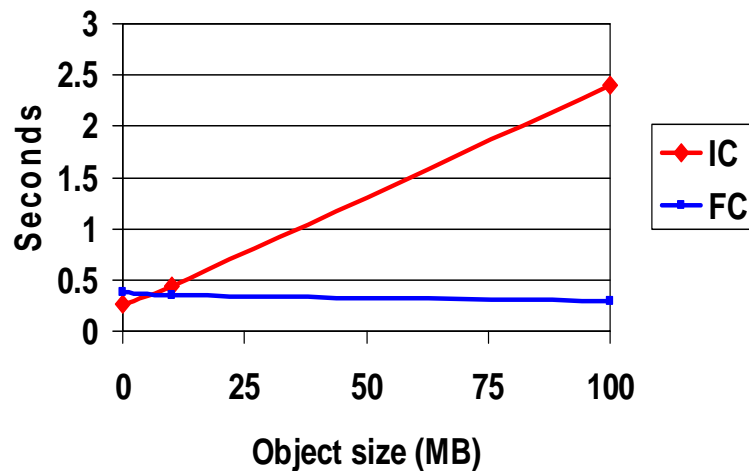
Backup & Recovery News

DB2 10: Backup & Recovery

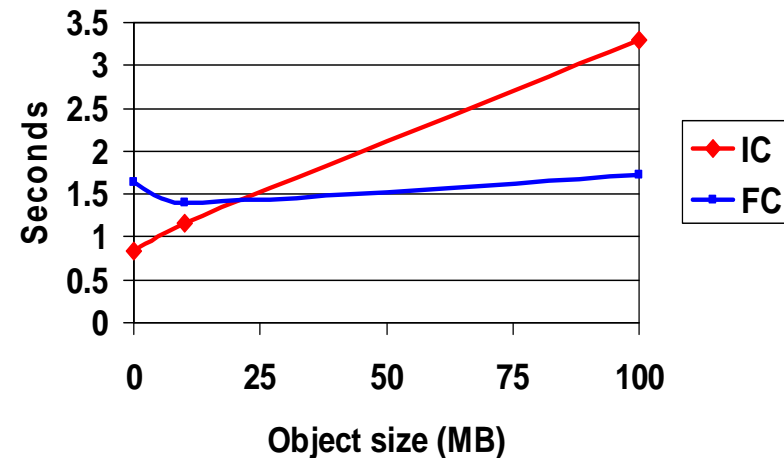
▪ Dataset-level Flashcopy support

- 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)

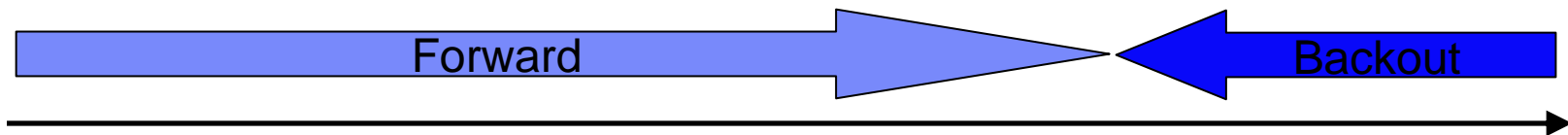
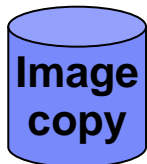


Elapsed time per object (z10)



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 News

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

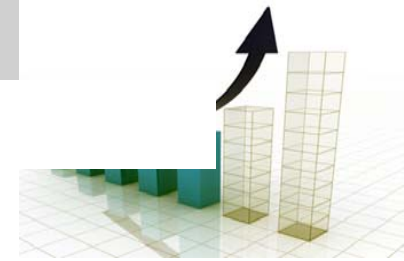


**DB2 Utility Management
Tools – to help you reduce
costs and effectively manage
complex DB2 Utility
environments**

In this section...

- **DB2 Sort for z/OS v1.2**
 - Provides high-speed sort processing for data stored in DB2 for z/OS, reducing CPU and elapsed time and increasing zIIP offload during utility processing
- **DB2 High Performance Unload for z/OS v4.1**
 - Flexible, easy-to-use product that provides a fast and efficient tool to unload and extract data for movement across enterprise
- **DB2 Automation Tool v4.1**
 - Automates recurring DB2 utility jobs based on your business needs for conditional and routine maintenance tasks, consuming less system and staff resources
- **DB2 Utilities Enhancement Tool v2.2**
 - Extends the value of DB2 Utilities to make it easier for you to customize and control DB2 utility tasks to meet your business needs

DB2 Sort 1.2 Benefits



- **Use of DB2 Sort 1.2 with DB2 Utilities, may see:**
 - Up to 39% reduction of sort CPU usage *
 - Up to 41% reduction of utility elapsed time *
- **Exploiting zIIPs may result in additional benefit**
- **IBM DB2 Utilities where you'll see performance benefits**
 - LOAD, REBUILD INDEX, REORG, RUNSTATS, CHECK INDEX / DATA / LOB
 - DB2 Utilities Enhancement Tool 2.2 LOAD Presort
 - DB2 High Performance Unload 4.1 (APAR PM41087)
 - DB2 Log Analysis Tool 3.3
 - Supports DB2 V8, 9 & 10
- **Workloads more likely to benefit from DB2 Sort 1.2**
 - Highly-transactional workloads performing lots of insert, update, delete operations requiring REORG
 - Applications such as data warehousing applications performing frequent or large volumes of loading data requiring LOAD & REBUILD INDEX
- **Sophisticated disk allocations reduce Sort Capacity Exceeded errors caused by large data volumes and/or inaccurate statistics**

* The information contained on this slide is distributed AS IS. Performance data and results presented were determined in various controlled laboratory environments, using specific, limited test configurations, and are for reference purposes only. The results that may be obtained in other operating and production environments may vary significantly. Based on system reports of CPU utilization and elapsed time generated in the specific customer's environment and provided to IBM. Results obtained in other operating environments may differ significantly. Users of the product should verify the applicable results they might achieve for their specific environment. Aug. 9, 2011

What's New in DB2 High Performance Unload (HPU) for z/OS?

- HPU v4.1 provides DB2 10 support
- Additionally, product was enhanced to include:
 - INTERNAL format
 - RTS – Real Time Statistics
 - Uncommitted Read – WITH UR
 - Tape handling
 - COPYDDN_STRICT
 - XML data
 - HFS & USS
 - UNLOAD from IC
 - TIMESTAMP Precision
 - Concurrent Access
 - UNLOAD from FlashCopy® IC

What's New in Automation Tool 4.1?

- **More integration for ease of use, including:**
 - Integration with DB2 10 Autonomic Statistics Stored Procedures
 - Run DB2 10 Autonomic Statistics to gather the right stats when you need them using Profile*
 - Integration with DB2 Administrative Task Scheduler – end to end automated database maintenance!
 - Add batch builds and utility execution jobs to the DB2 Admin Scheduler to automatically run at intervals determined by your needs
 - Exception jobs can execute automatically at regular intervals to evaluate objects,
 - Eliminate any unnecessary manual intervention
 - Check out the white paper at http://public.dhe.ibm.com/software/data/sw-library/db2/zos/Auto_Tool_and_Admin_Scheduler.pdf
 - Support for the CHECK DATA utility
 - Add the CHECK DATA utility to the list of available utilities
 - Integration with IBM Tools Customizer for z/OS
 - One interface to provide common look and feel for customizing all DB2 tools. Integrate with DB2 Admin Scheduler

CHECK DATA Utility Support in Automation Tool v4.1

- **CHECK DATA utility added to the list of available utilities**
- **Specify exception tables to use**
 - Optionally have DB2 Automation Tool create unique exception tables
 - Optionally include a RID column or a timestamp column in exception tables
- **Resolve DB2 RI using Object Profiles**
- **Easily generate CHECK DATA utility JCL for related sets of objects!!**

CHECK DATA Support in Automation Tool (1)

```

AUTOTOOL V4R1 ----- Utility Profile Options ----- 2011/07/11 13:16:31
Option  ==> _____

Creator: CSJENN      Profile: TEMPLATE SUPPORT      User: CSJENNA
Description _____
Share Option U (U - Update, V - View, N - No)

More:  -

Reallocation . . . . . N (Yes/No)  N (Yes/No)
Recover . . . . . N (Yes/No)  N (Yes/No)
Image Copy . . . . . N (Yes/No)  N (Yes/No)
Recovery Expert Image Copy . . . . . N (Yes/No)  N (Yes/No)
Copy to Copy . . . . . N (Yes/No)  N (Yes/No)
Runstats . . . . . N (Yes/No)  N (Yes/No)
TS Reorg . . . . . U (Yes/No)  N (Yes/No)
IX Reorg . . . . . N (Yes/No)  N (Yes/No)
Quiesce . . . . . N (Yes/No)  N (Yes/No)
Modify . . . . . N (Yes/No)  N (Yes/No)
Repair . . . . . N (Yes/No)  N (Yes/No)
Check Data . . . . . N (Yes/No)  N (Yes/No)
Rebind . . . . . N (Yes/No)  N (Yes/No)

```

*HAA\$UOP -DSL IST

CHECK DATA Support in Automation Tool (2)

```
AUTOTOOL V4R1    ---- Update Object Profile Display    --- 2012/01/13 16:25:43
Option  ==>                               Scroll ==> CSR
```

```
-----
Commands: Explode - View all objects.
```

```
Line Commands: A - Add  D - Delete  E - Explode  U - Update  R - Repeat
```

```
Creator: CSJENN      Profile: CAT TEST PROFILE      User: CSJENN
```

```
Description:
```

```
----- Enter Tablespaces Like to Display -----
```

```
Database Like. . ABP*_____ Wildcard   N (Yes/No)
Tablespace Like. *_____ Exclude   I (E - Exclude, I - Include)
Creator Like . . *_____ >

Process Dependent Indexes . . . . . N (Yes/No)
Process Referentially Dependent Tablespaces. y (Y - Yes, N - No,
                                             B - Build time Expansion,
                                             R - Run time Expansion)
Process Cloned Tables. . . . . N (Yes/No)
```

```
*HAA$OTL
```

CHECK DATA Support in Automation Tool (3)

```

File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      CSJENN.HAA410.JCL(CHECKD) - 01.01      Columns 00001 00072
Command ==> _____ Scroll ==> CSR_
000224 //SYSIN DD *
000225 CHECK DATA
000226 TABLESPACE ABPBC01.ABPAUDTS
000227 TABLESPACE ABPBC01.ABPLOGTS
000228 TABLESPACE ABPBC01.ABPUTDTB
000229 TABLESPACE ABPBC01.ABPUTFSP
000230 SHRLEVEL REFERENCE
000231 SCOPE PENDING
000232 AUXERROR REPORT
000233 LOBERROR REPORT
000234 XMLERROR REPORT
000235 FOR EXCEPTION
000236 IN "ABPBC01","ABPAUDIT"
000237 USE "CSJENN","ABPAUDITDAT"
000238 IN "ABPBC01","ABPLOG"
000239 USE "CSJENN","ABPLOGDAT"
000240 IN "ABPBC01","ABPUDISCARDTBL"
000241 USE "CSJENN","ABPUDISCARDTBLOAT"
000242 IN "ABPBC01","ABPUFIELDSPEC"
*ISREDD

```

What's New in DB2 Utilities Enhancement Tool (UET) v2.2?

▪ **Utility Syntax Monitor Enhanced**

- Utility Syntax Monitor (GA in 2.1) allows you to establish, maintain and enforce company-wide DB2 utility syntax policies
- Enables senior-level DB2 professionals the confidence to know that utility jobs can be set and executed by junior-level staff, reducing effort and errors
- Provides a standard that assists with auditing DB2 utility processes
- In v2.2, can monitor all DB2 Utilities with the exception of BACKUP SYSTEM/RESTORE SYSTEM, CATMAINT and CATENFM.

▪ **Utility Message Monitor enables users to change return code based on DB2 messages**

- Customize DB2 utility return code messages to fit your application needs

▪ **Ability to invoke IBM DB2 Sort for z/OS**

- Provides additional zIIP offload, reduced CPU usage and Elapsed Time during DB2 utility sort processing

▪ **Increased performance with reduced CPU and Elapsed Time for hash tables using LOAD PRESORT**

▪ **Support for the IBMTools Customizer for z/OS (TCz)**

- Provides one look and feel for customizing all IBM DB2 products

Using the Syntax Monitor in UET to Help w/ DB2 10

- **The UET Syntax Monitor can be used to easily update and change DB2 Utility syntax**
 - Tool with generate JCL without manual intervention and/or errors
 - Helps you take advantage of DB2 10 utility and features!
- **Automatically add new DB2 10 syntax to your utilities without making JCL changes**
 - Dynamically add TABLESAMPLE to your RUNSTATS jobs
 - Dynamically add FORCE(UPDATE) to your REORG jobs
- **Change the job return code when specific messages are emitted**
 - Change to fit your application needs

Automatically add new DB2 10 syntax to your utilities without making JCL changes (1)

```

File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT          CSJENN.ABP.CNTL(JENLAB5) - 01.02          Columns 00001 00072
Command ==> _____ Scroll ==> CSR_
000143 //*
000144 //RUNSTATS EXEC PGM=DSNUTILB,PARM='QA1B,JENLAB5',REGION=0M
000145 //*
000146 //STEPLIB DD DISP=SHR,DSN=RSQA.ABP220.UK75013.SABPLOAD
000147 // DD DISP=SHR,DSN=DSN.VA10.SDSNLOAD
000148 //*
000149 //SYSERR DD SYSOUT=*
000150 //SYSPRINT DD SYSOUT=*
000151 //UTPRINT DD SYSOUT=*
000152 //*
000153 //SYSIN DD *
000154
000155 RUNSTATS TABLESPACE ABPLAB5.ABPTS5
000156 TABLE (ALL)
000157 INDEX ALL
000158 UPDATE NONE
000159 SHRLEVEL REFERENCE
000160 REPORT YES
***** ***** Bottom of Data *****
*DSLST -SDSF DSLIST DSLIST ADB21K11 SDSF

```


Automatically add new DB2 10 syntax to your utilities without making JCL changes (2)

```

File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      CSJENN.ABP.CNTL(PCYLAB5) - 01.02      Columns 00001 00072
Command ==> |                               Scroll ==> CSR
000003 <DSNUTILB_INTERCEPT>
000004
000005     <PRACTICE NAME="RUNSTATS_RULES">
000006         <UTILITY NAME="RUNSTATS">
000007             <MONITOR>
000008                 <SYNTAX ADD="TABLESAMPLE SYSTEM AUTO"/>
000009             </MONITOR>
000010         </UTILITY>
000011     </PRACTICE>
000012
000013     <POLICY>
000014
000015         <DB2SYSTEM SSID="QA1B" ACTION="MONITOR UTILITY">
000016             <USE_PRACTICE NAME="RUNSTATS_RULES"/>
000017             <INCLUDE>
000018                 <RULE UTILITY_COMMAND="RUNSTATS"/>
000019             </INCLUDE>
000020         </DB2SYSTEM>
000021
*DSLIST  -SDSF  DSLIST  DSLIST  ADB21K11 SDSF

```

Automatically add new DB2 10 syntax to your utilities without making JCL changes (3)

```

Display Filter View Print Options Search Help
-----
SDSF OUTPUT DISPLAY LAB#5      J0196915  DSID    111 LINE 10      COLUMNS 02- 81
COMMAND INPUT ==>              SCROLL ==>  CSR
ABPU5008I 016 12:31:41.45 Utility execution started. Step=1
DSNU000I   016 12:31:41.53 DSNUGUTC - OUTPUT START FOR UTILITY, UTILID = JENLAB
DSNU1044I  016 12:31:41.56 DSNUGTIS - PROCESSING SYSIN AS EBCDIC
DSNU050I   016 12:31:41.56 DSNUGUTC - RUNSTATS TABLESPACE ABPLAB5.ABPT55 TABLE
SHRLEVEL REFERENCE REPORT YES TABLESAMPLE SYSTEM AUTO
DSNU1373I !QA1B 016 12:31:41.56 DSNUSTTS - PAGE SAMPLING NOT DONE FOR TABLESPACE
DSNU613I !QA1B 016 12:31:41.58 DSNUSUTP - SYSTABLEPART CATALOG STATISTICS FOR A
CARD = 9
CARDF = 9.0E+00
NEARINDREF = 0
FARINDREF = 0
PERCACTIVE = 0
PERCDROP = 0
PAGESAVE = 0
SPACE = 720
SPACEF = 7.2E+02
PQTY = -1
SQTY = -1
DSNUM = 1
DSLST -SDSF DSLIST DSLIST ADB21K11 *SDSF

```

Automatically add new DB2 10 syntax to your utilities without making JCL changes (4)

```

Display  Filter  View  Print  Options  Search  Help
-----
SDSF OUTPUT DISPLAY LAB#5      J0196915  DSID    111 LINE 134      COLUMNS 02- 81
COMMAND INPUT ==> █          SCROLL ==> CSR

                                NAME
                                FREQUENCY          COLVALUE
                                -----
                                1.1111111111111E-01 X'00C2D6D5D5C5E840404040404040
                                1.1111111111111E-01 X'00C4C1E5C9E240404040404040
                                1.1111111111111E-01 X'00C8E4E3C3C8C9E2D6D540404040
                                1.1111111111111E-01 X'00D1D6C8D5E2D6D54040404040
                                1.1111111111111E-01 X'00D4C5D9C3C8C1D5E34040404040
                                1.1111111111111E-01 X'00D4C9D3D3C5D9404040404040
                                1.1111111111111E-01 X'00D5C5D3E2D6D5404040404040
                                1.1111111111111E-01 X'00D9D6C7C5D9E2404040404040
                                1.1111111111111E-01 X'00E2E3C5D7C8C5D5E24040404040
DSNU568I  !QA1B 016 12:31:41.62 DSNUGSRX - INDEX ABPL5.ABPTB1IX1 IS IN INFORMATI
DSNU568I  !QA1B 016 12:31:41.62 DSNUGSRX - INDEX ABPL5.ABPTB1IX2 IS IN INFORMATI
DSNU010I  016 12:31:41.62 DSNUGBAC - UTILITY EXECUTION COMPLETE, HIGHEST RETUR
ABPU5403I 016 12:31:43.66 Utility statement altered by policy practice RUNSTATS_
ABPU5003I 016 12:31:43.66 Utility execution completed. SYS-0000, CSR-0004
ABPU5003I 016 12:31:43.67 DB2 Utilities Enhancement Tool intercept completed.
*****
***** BOTTOM OF DATA *****
DSLST    -SDSF    DSLST    DSLST    ADB21K11 *SDSF

```

Change the job return code when specific messages are emitted (1)

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      CSJENN.ABP0969.TESTLIB(POLICY) - 01.03      Columns 00001 00080
Command ==> _                                         Scroll ==> CSR
***** ***** Top of Data *****
000001 <?xml version="1.0" encoding="UTF-8"?>
000002 <!DOCTYPE OPTIONS SYSTEM "DD:DTD(ABPDTOPPL)">
000003 <DSNUTILB_INTERCEPT>
000004 <!--                                           -->
000005     <RULESET NAME="ALLOW_USERIDS">
000006         <INCLUDE>
000007             <RULE UTILITY_USERID="CSJENN%"/>
000008         </INCLUDE>
000009     </RULESET>
000010
000011     <PRACTICE NAME="LOAD_RULES">
000012         <UTILITY NAME="LOAD">
000013             <MONITOR >
000014                 <SYNTAX VALUE="LOG NO" SUBSTITUTE="LOG YES"/>
000015                 <SYNTAX ADD="LOG YES"/>
000016                 <MESSAGE ID="DSNU1150I" RETURN_CODE="08"/>
000017             </MONITOR>
000018         </UTILITY>
000019     </PRACTICE>
000020
000021     <POLICY>
SDSF      -DSLST  SDSF      DSLIST
```

Change the job return code when specific messages are emitted (2)

```

Display Filter View Print Options Search Help
-----
SDSF OUTPUT DISPLAY LAB#5      J0179602  DSID   124 LINE 1      COLUMNS 02- 133
COMMAND INPUT ==>             SCROLL ==> CSR
DSNU000I   075 10:16:26.28 DSNUGUTC - OUTPUT START FOR UTILITY, UTILID = LAB5
DSNU1044I   075 10:16:26.40 DSNUGTIS - PROCESSING SYSIN AS EBCDIC
DSNU050I   075 10:16:26.43 DSNUGUTC - LOAD DATA INDDM SYSREC LOG NO RESUME YES EBCDIC CCSID(37, 0, 0)
DSNU650I   IQA1B 075 10:16:26.49 DSNURWI - INTO TABLE "JEN"."ABPTB4"
DSNU650I   IQA1B 075 10:16:26.49 DSNURWI - ("ID_SHOP" POSITION(3:4) SMALLINT,
DSNU650I   IQA1B 075 10:16:26.49 DSNURWI - "ID_GOOD" POSITION(5:6) SMALLINT,
DSNU650I   IQA1B 075 10:16:26.49 DSNURWI - "QUANTITY" POSITION(7:10) INTEGER,
DSNU650I   IQA1B 075 10:16:26.49 DSNURWI - "DATESALE" POSITION(11:20) DATE EXTERNAL)
DSNU353I   IQA1B 075 10:16:27.18 DSNURWBF - RECORD (1) WILL BE DISCARDED DUE TO CHECK CONSTRAINT ID_GOOD VIOLATION ON
TABLE JEN.ABPTB4
DSNU304I   IQA1B 075 10:16:27.26 DSNURWT - (RE)LOAD PHASE STATISTICS - NUMBER OF RECORDS=0 FOR TABLE JEN.ABPTB4
DSNU1147I  IQA1B 075 10:16:27.26 DSNURWT - (RE)LOAD PHASE STATISTICS - TOTAL NUMBER OF RECORDS LOADED=0 FOR TABLESPACE
ABPMMDB.ABPTS4
DSNU1150I  IQA1B 075 10:16:27.26 DSNURWT - (RE)LOAD PHASE STATISTICS - NUMBER OF INPUT RECORDS NOT LOADED=1
DSNU302I   075 10:16:27.26 DSNURILD - (RE)LOAD PHASE STATISTICS - NUMBER OF INPUT RECORDS PROCESSED=1
DSNU300I   075 10:16:27.26 DSNURILD - (RE)LOAD PHASE COMPLETE, ELAPSED TIME=00:00:00
DSNU375I   075 10:16:27.28 DSNURDNP - DISCARD PHASE STATISTICS - 1 INPUT DATA SET RECORDS DISCARDED
DSNU376I   075 10:16:27.28 DSNURDIS - DISCARD PHASE COMPLETE, ELAPSED TIME=00:00:00
DSNU381I  IQA1B 075 10:16:27.29 DSNUGSRX - TABLESPACE ABPMMDB.ABPTS4 IS IN COPY PENDING
DSNU010I   075 10:16:27.29 DSNUGBAC - UTILITY EXECUTION COMPLETE, HIGHEST RETURN CODE=4
*****
***** BOTTOM OF DATA *****
DSLIST  DSNEKP01 *SDSF  -DSLIST

```

Change the job return code when specific messages are emitted (3)

```

Display Filter View Print Options Search Help
-----
SDSF OUTPUT DISPLAY LAB#5      J0180492  DSID      2 LINE 0      COLUMNS 02- 133
COMMAND INPUT ==> █          SCROLL ==> CSR
***** TOP OF DATA *****
                JES2 JOB LOG -- SYSTEM RS25 -- NODE BOSTON

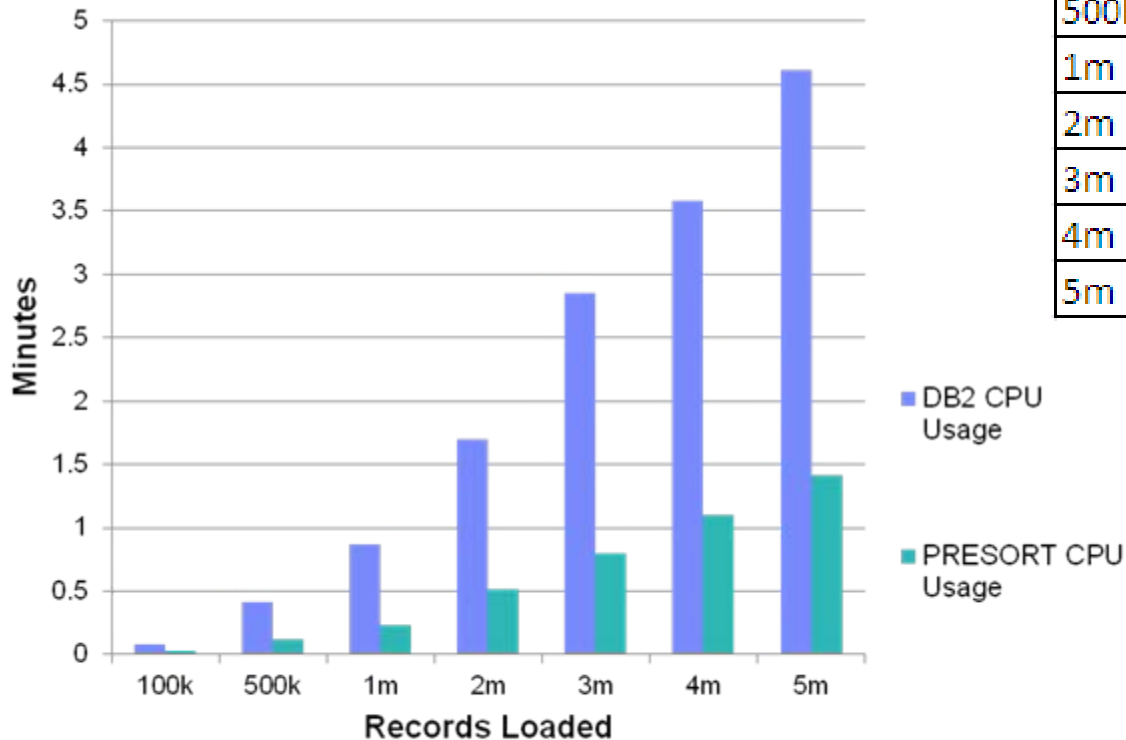
13.22.21 J0180492 ---- WEDNESDAY, 16 MAR 2011 ----
13.22.21 J0180492 IRR010I  USERID CSJENN  IS ASSIGNED TO THIS JOB.
13.22.21 J0180492 ICH70001I CSJENN  LAST ACCESS AT 12:34:41 ON WEDNESDAY, MARCH 16, 2011
13.22.21 J0180492 $HASP373 LAB#5   STARTED - INIT 4   - CLASS A - SYS RS25
13.22.21 J0180492 IEF403I  LAB#5 - STARTED - TIME=13.22.21
13.22.37 J0180492 RKTSW01I          LOAD                10      08  00:00:00.91  00:00:00.75  00:00
13.22.37 J0180492 IEF404I  LAB#5 - ENDED - TIME=13.22.37
13.22.37 J0180492 RKTSW01I  LAB#5   JOB TOTALS:                00:00:00.91  00:00:00.75  00:00
13.22.37 J0180492 $HASP395 LAB#5   ENDED

----- JES2 JOB STATISTICS -----
  16 MAR 2011 JOB EXECUTION DATE
    204 CARDS READ
    341 SYSOUT PRINT RECORDS
     0 SYSOUT PUNCH RECORDS
    21 SYSOUT SPOOL KBYTES
    0.27 MINUTES EXECUTION TIME
  1 //LAB#5 JOB (ACCTINFO), 'MSG MON TRAINING',                J0180492
    //      CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID,REGION=0M,RESTART=LOAD
    /**
DSLIST  ADB21      *SDSF      -DSLIST  SDSF      DSLIST

```

LOAD PRESORT on hash tables – By the numbers

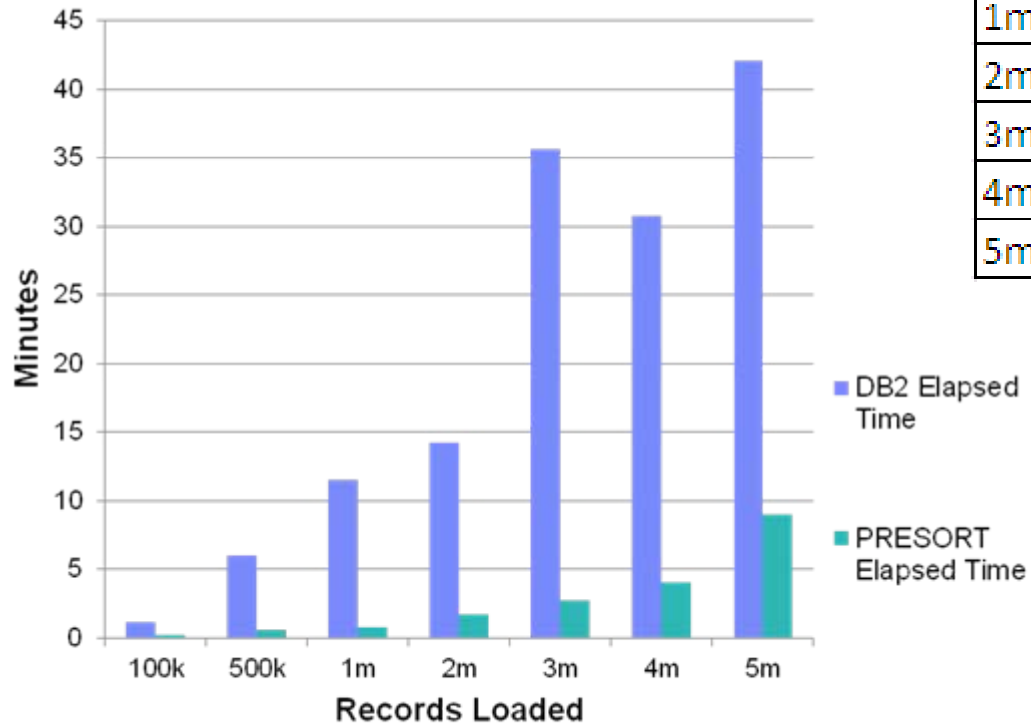
**Average CPU
Consumption Savings:
30%**



Rows	DB2 CPU Usage	PRESORT CPU Usage
100k	0.08	0.03
500k	0.42	0.12
1m	0.87	0.23
2m	1.70	0.52
3m	2.85	0.80
4m	3.58	1.10
5m	4.62	1.42

LOAD PRESORT on hash tables – By the numbers

Average Elapsed Time
Savings: **87%**



Rows	DB2 Elapsed Time	PRESORT Elapsed Time
100k	1.13	0.25
500k	5.97	0.55
1m	11.55	0.80
2m	14.23	1.75
3m	35.63	2.77
4m	30.80	4.08
5m	42.12	9.02

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**