What's New with CA DB2 Tools

Administration, Utilities, Performance, and Recovery

Dhananjay Joshi (DJ)
Senior Director – Product Management, CA Technologies
Abstract

Attend this session to get a comprehensive update on the latest enhancements to mainframe DB2® Tools in areas including zIIP enablement, IDAA support, real-time diagnostics, performance, 100 percent online reorg, usability, analytics, and version support. Learn how to take advantage of new enhancements and features to keep your DB2 subsystems running at their optimized best, plus learn top tips that will help you get the most out of your products.

Dhananjay Joshi (DJ)
CA Technologies
Senior Director, Product Management
Agenda

1. WHAT’S NEW IN RELEASE 19
2. CA ADMINISTRATION SUITE FOR DB2 FOR Z/OS
3. CA PERFORMANCE SUITE FOR DB2 FOR Z/OS
4. CA UTILITIES SUITE FOR DB2 FOR Z/OS
5. CA RECOVERY SUITE FOR DB2 FOR Z/OS
6. CA REPORT FACILITY FOR DB2 FOR Z/OS
CA DB2 Tools – What’s new in Release 19

Value Delivered

Mainframe Economics
Examples:
• Additional zIIP offloads (20%-90+%)
• Perf. Monitoring – O/H Optimization
• CPU reduction during cloning:
  (Flashcopy) 90+% CPU/elapsed time

Skills Management
Examples:
• Simplification
• Automation
• DB2 Performance Analytics
  (under validation)

Business Agility / Automation
Examples:
• Online / High Availability Reorg
• Full IBM Unload Integration
• Reduced cycle time for DB Change Mgmnt.
• Fully automated object recovery

Security and Compliance
Examples:
• RC/QUERY – HGRANT function; New reports for Row permission, Column masks
CA Administration Suite for DB2 for z/OS
CA Administration Suite for DB2 for z/OS

Highlights of Release 19

- Additional change management automation, accelerated DB2 Version Support
  - v10/v11 exploitation including Online Schema support
  - DB2 v12 Tolerance

- Reduced risks, higher flexibility with support for IBM Unload

- Slash downtime, CPU Costs, elapsed time for cloning datasets

- Improved usability and customer experience
CA Administration Suite for DB2 for z/OS

Highlights of Release 19 (continued)

- Continued streamlining of processes through batch APIs in RC/Migrator
- Enhanced Usability through new report definitions and additional line commands in reports
- Continued support for Big Data initiatives including vastly simplified DB2 Accelerator Administration
Support for IBM Unload

Significantly reduces application outage risks associated with schema changes

**Value Delivered**

- **Increased Flexibility and Improved DBA productivity**
- **Reduced risk of Application Outage**

**PAIN**

- CA DB2 Admin customers who prefer to use IBM Utilities cannot invoke IBM unload and have to perform manual tasks that are tedious, error prone and carry high risks of application outage
- To avoid these risks, customers need to buy CA Fast Unload (resulting in redundant Utilities) OR use legacy CA BP Unload which is highly limited in functionality

**SOLUTION**

- Provide an option within RC/Migrator Utility Profile Services that allows customers to select IBM Unload as their preferred Unload tool thus automating their processes during DB2 schema changes

**BENEFIT**

- Eliminate outage risks by automating Admin processes during DB2 schema changes
- Enhance usability by providing customers flexibility in their selection of Utilities
- Improve DBA productivity by eliminating unnecessary manual steps while processing schema changes
Flashcopy Support during data cloning
Reduced downtime and virtually eliminate CPU elapsed time during data cloning

**PAIN**

- Customers often feel the need to clone datasets or DB2 objects for a variety of reasons including merging of DB2 subsystems
- Traditional cloning methods are highly CPU intensive and impact application availability

**SOLUTION**

- Further improve data cloning (dataset or object level) performance of RC/Merger by leveraging existing flashcopy thereby drastically improving the cloning process and efficiency

**BENEFIT**

- Virtually eliminate CPU elapsed time by upto 90% or over **
- Reduce downtime by upto 90%**

** Customer Proven results**
Accelerated DB2 Version Support
Reduce DB2 risks such as outage, performance degradation and data loss

**PAIN**
- Due to lack of DB2 v10 and v11 exploitation within RC/Migrator, DBAs need to perform unload, drop, create and load processes for every unsupported DB2 change, which is cumbersome
- The manual changes also increase the chances of errors that increase the associated risks i.e. application outage, performance degradation and data loss

**SOLUTION**
- Accelerate DB2 Version Exploitation (mainly Online Schema Changes) within RC/Migrator for DB2 v10 and v11 along with toleration for DB2 vNext

**BENEFIT**
- Eliminate risks associated with manual errors such as application outage, performance degradation and data loss
- Enhance DBA productivity and usability by further automating database change management tasks for additional DB2 functionality

Increased DBA Productivity
Reduced risks of Application Outage, Performance degradation and data loss
RC Migrator
DB2 Version Support

- ALTER DSSIZE support
- ALTER TABLE DROP COLUMN
- ALTER INDEX BUFFERPOOL treated as Pending Change
- CREATE/ALTER INLINE LOB support
- ALTER SEGSIZE DDL support w/ Syntax Checker & Import DDL
- Running w/ DB2 11 level of functionality on DB2 12
RC Query
Line Commands and Support

- New reports & Commands
- Continued support for IDAA - RCQ-1433
- RI TURN ON/OFF IN HDDL COMMAND
- HGRANT (function like HDDL)
- Smartly execute the Table space utility commands
  - 'COPY', 'RECOVER', 'REORG' and 'RUNSTATS' from Storage Group, Database, Table and View levels
- DB2 11 Archive Table support
- DB2 v12 Toleration
RC/Query: IBM DB2 Analytics Accelerator support

- Familiar RC/Query interface
- Table level administration of IDAA
- Load DB2 Table into IDAA
- Start/Stop/Display and PING Accelerator

IDAA Table level functions

- ACCEL: Add table to the DB2 Analytics Accelerator for z/OS
- ACCALT: Alter Accelerated table Dist. & Org Keys
- ACCARCH: Archive Accelerated table
- ALOAD: Load table to the accelerator
- DACCRLF: Forcefully Remove Table from DB2 Analytics Accelerator
- DISABLE: Disable table acceleration
- DISRL: Disable table replication
- ENABLE: Enable table for acceleration
- ENABLE: Enable table for replication

RC/Query interface
CA Performance Suite for DB2 for z/OS
CA Performance Suite for DB2 for z/OS

Highlights of Release 19

- Optimized Detector Collection engine for reduced overhead
- Leveraging zIIP for Detector Collection
- Improved Subsystem Analyzer Performance through sampling
- Tighter SYSVIEW and SYSVIEW for DB2 (Insight) integration
- Quicker identification, analysis & remediation of poor DB2 performance; including Virtual Index support and Instant REBIND preview
CA Performance Suite for DB2 for z/OS

Highlights of Release 19 (continued)

- Enhanced DB2 version exploitation and usability, including online and batch interface usability within Sysview for DB2
- Continued support for IDAA (IBM DB2 Analytics Accelerator)
- DB2 v12 Tolerance & Selective Exploitation
- Improve customer experience with easier installation and configuration
Detector Collection Engine: Perf. Overhead reduction

Lower overhead on performance metrics currently collected

**PAIN**
- Current data collection is highly important but can be costly for some systems and applications
- Customers may need to turn off Detector during times of peak system workload, thus losing visibility into performance metrics when it may be needed the most

**SOLUTION**
- New asynchronous collection lowering overhead in DB2 applications and improving performance
- Higher zIIP eligibility as the majority of processing to occur in a format which is always eligible

**BENEFIT**
- **Improve System Performance** majority of collection efforts happen in space which is always zIIP eligible
- **Improve System Stability** updates from the collected data happen outside of the SQL thread allowing for higher reliability
CA Detector
Detector – SQL Collection Engine Redesign

**CURRENT**

- SQL Intercept
- Gather DB2 Info
- **Plan Program Statement**
  - Calculate DB2 Stats
  - Update Stats
  - SQL Exceptions

**FUTURE**

- SQL Intercept
- Gather DB2 Info
- **Plan Program Statement**
  - Calculate DB2 Stats
  - Update Stats
  - SQL Exceptions

**DB2**

**Queue**
Subsystem Analyzer: Perf. Overhead reduction
Lower overhead on subsystem performance metrics collection

**Sampling: 95% Confidence Level; 1% Confidence Interval**

<table>
<thead>
<tr>
<th>Sampling Rate</th>
<th>Highly Accurate Getpage Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>3%</td>
<td>300,000 or more</td>
</tr>
<tr>
<td>6%</td>
<td>150,000 or more</td>
</tr>
<tr>
<td>12%</td>
<td>70,000 or more</td>
</tr>
<tr>
<td>25%</td>
<td>30,000 or more</td>
</tr>
<tr>
<td>50%</td>
<td>10,000 or more</td>
</tr>
<tr>
<td>100%</td>
<td>No minimum</td>
</tr>
</tbody>
</table>

**PAIN**
- Current GetPage monitoring is highly important but can be costly for some systems
- Customers may need to turn off Subsystem Analyzer during times of peak system workload, thus losing visibility into performance metrics when it may be needed the most

**SOLUTION**
- Read only Nth GetPage activity
- Accurate metrics for objects with high activity
- Good enough metrics for objects with low activity

**BENEFIT**
- Dramatic reduction in CPU overhead
- Less impact DB2 Applications
- Customers can now run full-time collection to obtain performance data
zIIP support
Offload eligible processing to lower costs

**PAIN**
- The costs of running business critical applications continues to grow with complexity and data size
- Performance based code revisions can only go so far to lower the operating cost

**SOLUTION**
- Leverage specialty zIIP processors as much as possible to limit the burden on expensive general processors
- Offloading eligible processing to zIIP engines can lower running costs and free up general processors for other critical processing

**BENEFIT**
- **Lower Costs** unburden general use processors when applicable
- **Meet SLAs** general processors will be available sooner as eligible tasks are moved onto zIIP engines
## CA DB2 Tools: zIIP Enablement

<table>
<thead>
<tr>
<th>CA DB2 Tools Product Suite</th>
<th>zIIP Enabled Products</th>
<th>zIIP Enablement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>CA Database Analyzer™</td>
<td>Up to 25% (new)</td>
</tr>
<tr>
<td></td>
<td>CA Fast Unload®</td>
<td>Up to 50% (new)</td>
</tr>
<tr>
<td></td>
<td>CA Rapid Reorg®</td>
<td>Up to 90% (new)</td>
</tr>
<tr>
<td></td>
<td>Up to 25% (new)</td>
<td>Up to 50% (new)</td>
</tr>
<tr>
<td></td>
<td>Up to 90% (new)</td>
<td>Up to 90% (new)</td>
</tr>
<tr>
<td>Performance Suite</td>
<td>CA Detector®</td>
<td>Up to 25% (new)</td>
</tr>
<tr>
<td></td>
<td>CA SYSVIEW® for DB2</td>
<td>Up to 90% (new)</td>
</tr>
<tr>
<td></td>
<td>If the collected SQL runs under zIIP, the captured statistics also run under zIIP</td>
<td></td>
</tr>
<tr>
<td>Administration Suite</td>
<td>CA RC/Migrator™</td>
<td>Up to 90% (new)</td>
</tr>
<tr>
<td></td>
<td>The Cloning process leverages flash copy (feature of the DASD software) and has provided a customer 98% CPU and elapsed time savings (though not directly through zIIP processors)</td>
<td></td>
</tr>
<tr>
<td>Recovery Suite</td>
<td>CA Quick Copy</td>
<td>Up to 50% (new)</td>
</tr>
</tbody>
</table>
# IBM DB2 Analytics Accelerator (IDAA) support

<table>
<thead>
<tr>
<th>DB2 features in r18/r19</th>
<th>Value to DB2 Analytics Accelerator (IDAA) customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thread Terminator (<em>Value Pack</em>)</td>
<td>Visibility into DB2 threads running on IDAA</td>
</tr>
<tr>
<td>Batch Processor (<em>Value Pack</em>)</td>
<td>IDAA jobs can be run in batch and automated without the need to always run interactive</td>
</tr>
<tr>
<td>Command processor (<em>Value Pack</em>)</td>
<td>Manage IDAA through simple line commands</td>
</tr>
</tbody>
</table>
| Detector & Plan Analyzer (PPA) (*Provide FUTURE EXPLAIN/Access path information for packages without issuing a REBIND*) | Help focus on most expensive queries  
Understand the cost-benefit of Query Acceleration  
Illustrate, if Query is eligible and bound for acceleration  
Provide a reason code, if not eligible i.e. bound for execution in DB2 |
| Accell Profiles | Ability to take Detector metrics/statements captured and parse these to PPA – then PPA can create ACCELL PROFILES simulating an IDAA appliance without having one installed and find statements which will benefit from acceleration |
IBM IDAA support in CA SYSVIEW for DB2

<table>
<thead>
<tr>
<th>SYSVIEW for DB2 features in r18/r19</th>
<th>Value to DB2 Analytics Accelerator (IDAA) customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsystem statistics</td>
<td>Clear visibility into IDAA utilization by the current and all connected DB2 subsystems</td>
</tr>
<tr>
<td>Accounting statistics</td>
<td>Identify workload executed or eligible for execution on IDAA</td>
</tr>
<tr>
<td>Archive tables</td>
<td>Analyze longer term IDAA utilization</td>
</tr>
<tr>
<td>EXPLAIN enhancements</td>
<td>Identify SQL statements that are eligible or will be executed on DB2 accelerator</td>
</tr>
<tr>
<td>IDB2ACCT SQL details</td>
<td>Identify SQL statements within a thread that were executed on the DB2 Accelerator</td>
</tr>
<tr>
<td>Support for new subsystem and thread level statistics (IFCID 2/1002 and 3/148)</td>
<td>All related real-time, history and batch reports reviewed and updated to include IBM IDAA metrics</td>
</tr>
</tbody>
</table>
CA DB2 Performance Analytics (pre-release under validation)
Gain deeper insight to currently collected performance metrics

**PAIN**
- Base lining and trend analysis on DB2 is a tedious manual process
- Trend analysis can provide insights to slow drains which are hard to identify and can cause issues to critical operations

**SOLUTION**
- Generate baselines of your DB2 system with a new CA product which will take the performance metrics already captured by CA DB2 performance monitoring solutions
- Spot trends on your system performance over long periods of time

**BENEFIT**
- **Improve System Awareness** see your performance data in a new light
- **Manage Performance** see how changes in your DB2 system impact baselines and standard operation over time
CA Utilities Suite for DB2 for z/OS
CA Utilities Suite for DB2 for z/OS

Highlights of Release 19

- High performance, High availability Online Reorg
- CPU cost reduction through additional zIIP exploitation
  - Fast Unload, Online Reorg
- Utility optimization through real-time prioritization of Objects
- DB2 v12 Tolerance
- Improved customer experience with easier installation and configuration
Online Reorg
High Performance, High availability business continuity reorg

PAIN

• Customers have increasingly strict SLA requirements for 100% availability
• CPU intensive process, including reorg, are expensive
• Rapid Reorg functionality took the database offline during reorg, causing application outage which is unacceptable

SOLUTION

• Enhance Rapid Reorg with “Online Reorg” functionality which performs database reorganization “online” and leverages zIIP processors, thus eliminating the application outage i.e. object being unavailable to a user or application as well as reducing general CPU usage

BENEFIT

• Minimize SLA penalties related to database availability / downtime
• Eliminate outage risks through high performance, high availability online reorg
• Reduce CPU usage costs by offloading processing to zIIP processors

High Availability through Online Reorg

Reduction in elapsed time upto 50% through zIIP enablement**
Online Reorg

High Performance, High availability business continuity reorg

Release 19 Online Reorg highlights:

• Eliminate Quiesce/SQL timeouts
• FastSwitch/Update DBD to eliminate rename/repair
• 64-bit in-memory cache logging
• Also, Rapid Reorg is zIIP enabled with over 50% offloads*

* Customer and Internal Benchmark Tests have shown reduction in CPU time of over 50% due to zIIP exploitation
Prioritized Object Maintenance
Minimize waste in execution of Utilities and improve efficiency of system usage

**Efficient use of system resources, Increased DBA productivity**

**Reduced CPU Costs**

**Minimized unnecessary utility execution i.e. waste**

**PAIN**

- Customers have limited maintenance windows which are dwindling. It is necessary to perform highest priority maintenance on critical objects in that limited time window. Today it is not possible for customers to establish those priorities

**SOLUTION**

- CA’s prioritized object maintenance provides real-time prioritization of jobs within the maintenance window. This ensures execution of the highest priority maintenance jobs and optimizes the use of system resources within the limited maintenance window

**BENEFIT**

- **Optimized CPU Usage**: Critical objects take priority and make the most optimum use of CPU cycles
- **Eliminate ongoing manual effort**: DBAs can now automatically establish high priority critical maintenance
- **Minimized Risks** of erratic performance behavior and SLA penalties
- **Efficient use of maintenance window**

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Database Analyzer

- **Object Selection Profiles**
  - Allows for a Common #INCLUDE to be used across Extracts
  - Create Object level extracts

- **DSNACCOX REORGCLUSTERSENS NULLs Support added**
  - DB2 consistency

- **JOB Name flexibility**
  - Customers needed for naming conventions
CA Recovery Suite for DB2 for z/OS
CA Recovery Suite for DB2 for z/OS

Highlights of Release 19

- Reduce Application outages by providing a Quiet Point Analysis report in CA Log Analyzer
- Consistent Point in Time Service
- Autonomics through Automated Drop Recovery of Objects
- Lower Cost of Ownership by enhanced logic and providing additional zIIP exploitation in CA Quick Copy
CA Recovery Suite for DB2 for z/OS

Highlights of Release 19 (continued)

- Accelerated Version Support for DB2 v10, DB2 V11 and DB2 v12 tolerance
- Simplify & automate through Date and Time expressions and Log Label feature
- Simplify Software Usage by providing a single keyword for CA Quick Copy to copy the DB2 catalog and directory, and Backup & Recovery predefined Object Lists.
Date and Time Expressions and Log Label

Simplify software usage and provide advanced autonemics

**[Delivered Feature]**

- LOG_LABEL_DAILY_REPORT_START (00CF53B75583D49000000)
- START=CURRENT END=CURRENT_TIMESTAMP – 2 HOURS
- LOG_LABEL_DAILY_REPORT_END (00CF53B75583D49000000)

**PAIN**

- Options to specify a log/time range for log analysis reporting is limited and deficient
- Difficult for the user to easily set the point in time for recovery from the errant batch job stream

**SOLUTION**

- Date and Time Expressions in CA Log Analyzer and Log Label in CA Log Analyzer, CA Fast Recover and CA Merge/Modify
- Provide the ability to name (label) a point in the log and use this labeled point to set a log range for log analysis reporting and/or point in time for recovery
- Allow user to specify any valid date and time expression in log processing range definition for log analysis reporting

**BENEFIT**

- Convenient and much more easier way to specify log points for processing of backup/recovery tasks or log analysis reports
- Ability to create automated log analysis reports which reduces time to maintain them
Dropped Object Recovery

Recover dropped object in few easy steps and minimize outage

**PAIN**
- Frustrating and highly manual process to define, set-up and run all steps necessary to recover dropped object
- Long time of outage and highly error prone process
- Business data unusable

**SOLUTION**
- Single, easy-to-use interface do define dropped object recovery scenario
- Fully automated process of recovering object to original state

**BENEFIT**
- Significant complexity reduction of dropped object recovery scenario
- Minimized outage of business data
- Removal of human error factor from the dropped object recovery process
Quiet Point Analysis

Find a consistent recovery point in the log for a point in time recoveries

PAIN

- Many shops avoid taking QUIESCE for their critical objects to setup proper and consistent point of recovery
- Doing a QUIESCE stops objects from processing, delays applications accessing those objects and cause outages

SOLUTION

- There is usually a short time interval where there was no activity performed on a group of (critical) objects. This time interval is called a quiet point and is a logical consistent point of recovery which can substitute QUIESCE.
- This solution will scan the log to find and report on all quiet points suitable to be used in a recovery process.

BENEFIT

- Removes outages needed when setting up recovery points using QUIESCE
- Helps to identify long-running applications that are not committing properly and impede in finding a recovery point
Consistent Point in Time Service
Create consistent snapshot image copies

PAIN
- Create consistent snapshot image copy
- Migrate consistent data between DB2 subsystems
- Do object check
- All above cause unacceptable outage of business critical data

SOLUTION
- Create a snapshot image copy and make it consistent by removing un-committed and applying unwritten changes
- Database object is fully available during whole copy process.

BENEFIT
- Create consistent snapshot image copy without any outage
- Migrate consistent data between DB2 subsystems without any outage
- Do object check without any outage
- SNAPSHOT/FLASH enabled hardware will maximize speed of the process, but is not strictly required.
Mainframe and Workload Automation

For more information on Mainframe and Workload Automation, please visit: http://cainc.to/9GQ2J1
# Recommended Sessions

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<th>TITLE</th>
<th>DATE/TIME</th>
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<tbody>
<tr>
<td>MFX79E</td>
<td>Protecting and Tapping Into your Data Goldmine: leveraging what resides in your mainframe</td>
<td>11/15/2016 at 9:00 am</td>
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<tr>
<td>MFX80E</td>
<td>Intelligent Mainframe Management - Data Driven Database Performance Management</td>
<td>11/15/2016 at 10:00 am</td>
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<td>MFX81E</td>
<td>How to Get the Most out of Your DB2, DB2 Management, and Analytics Investment</td>
<td>11/15/2016 at 11:00 am</td>
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<td>MFX88S</td>
<td>Strategy and Vision for CA DB2 Database Management</td>
<td>11/17/2016 at 12:45 pm</td>
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<tr>
<td>MFX90S</td>
<td>Driving Down Costs for DB2 Management</td>
<td>11/17/2016 at 1:45 pm</td>
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<td>MFX91S</td>
<td>Birds of a Feather/Stump the Techie for CA DB2 Tools!</td>
<td>11/17/2016 at 3:00 pm</td>
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Must See Demos

- Demo Name
  - Product X
  - Theater # location

- Demo Name
  - Solution Y
  - Theater # location

- Demo Name
  - Product X
  - Theater # location

- Demo Name
  - Services Y
  - Theater # location
Thank you.

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