Driving Down Costs for DB2 Management

James Eduljee - Vice President – Software Engineering - CA Technologies
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Abstract

Join the discussion with CA Technologies DB2 experts and learn how you can manage better, spend less and increase business agility – yes, it’s possible! Discover how you can lower operating costs and reduce administrative overhead associated with managing and scaling your DB2 databases, systems and applications. Learn how you can accelerate business responsiveness to efficiently administer, manage and recover DB2 data. Hear about new features and strategic plans that can help your business reduce the total cost of ownership (TCO) for managing your DB2 data and increase your overall efficiency.

James Eduljee
CA Technologies
Vice President, Software Engineering
Agenda

1. DRIVERS BEHIND MAINFRAME COST MANAGEMENT
2. WHAT IS DRIVING COSTS FOR DB2 CUSTOMERS
3. CA DB2 TOOLS SUITE AND COST OPTIMIZATION
4. COST SAVINGS IN DAY-TO-DAY PROCESSING
5. PREVENTING COSTS / WASTAGE
6. ACCELERATE IMPLEMENTATION OF COST SAVING INITIATIVES
Mainframe = Mission Essential Apps

Mainframe Is Core Part of Application Economy

99.999% availability for billions of interactions per day

55% of apps touch mainframe

63% experiencing MIPS Growth

70% world’s corporate data is on a mainframe

Sources: IBM, CA Voice of Customer Study conducted by IDC
What’s Driving MF MIPS Growth
A Single Transaction Drives up to 100 System Interactions

Fraud checks
Purchase histories
Customer loyalty
User verification
System level reconciliations
Data encryption/decryption
Real-time reporting

Sources: IBM
The Application Economy Drives New Challenges
Growing Customer Demands Put New Pressures on Mainframes

INCREASING VOLUMES

450 Billion transactions on the Mainframe each day

>3 years of data stored by most organizations

RISING CUSTOMER EXPECTATIONS

25% of users abandon an app after a 3 second delay

$500M cost of trading losses during a recent IPO due to ‘system problems’

INCREASING COMPLEXITY

>90% of world’s critical applications run on the Mainframe

SOURCE: IBM, Gartner, Aberdeen Research, Enterprise Systems Media
What is keeping mainframe clients up at night?

Justifying the Value and Cost of the Mainframe

Mainframe Economics
- Driving Down Costs – SW and Operational
- Managing Growing Transaction Volumes

Security and Compliance
- Protecting sensitive data
- Overcoming Barriers to Data / Analytics

Business Agility
- Faster delivery of value
- Quicker, proactive response to business application needs

Automation and Management
- Simplified, Smarter, Modernized Technologies

System Intelligence
Cultural Skills

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CA DB2 Tools Product Suite
Summary of Capabilities to Help Drive Lower Costs

Performance Suite
Reduce CPU costs and optimize application and subsystem performance through monitoring, issue identification and resolution, and performance analysis and resolution.

Administration Suite
React faster to business/application changes by automating repetitive, complex database changes with high data integrity and availability.

Utilities Suite
Efficient DB2 housekeeping (reorgs, data load/unload while altering databases) to lower CPU costs and maximize availability, through automated DB2 utility execution.
CA DB2 Tools Product Suite
Summary of Capabilities to Help Drive Lower Costs

**Recovery Suite**
Ensure business continuity and auditability by automating complex DB2 object, data and catalog recoveries with minimal outage

**Report Facility**
Help simplify reporting on business data while reducing MLC costs

**Other Capabilities**
Reduce time and cost to manage and implement IBM DB2 Analytics Accelerator
Cost Savings in Day-to-Day Processing
Saving Costs on General CPU Processing
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

**BENEFITS**
- **Lower Costs** unburden general use processors when applicable
- **Meet SLAs** general processors will be available sooner as eligible tasks are moved onto zIIP engines
## Saving Costs on General CPU Processing

### zIIP enablement within CA DB2 Tools

<table>
<thead>
<tr>
<th>CA DB2 Tools Product Suite</th>
<th>zIIP Enabled Products</th>
<th>zIIP Enablement</th>
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<tbody>
<tr>
<td><strong>Utilities</strong></td>
<td>CA Database Analyzer™</td>
<td>Up to 25% (new)</td>
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<tr>
<td></td>
<td>CA Fast Unload®</td>
<td>Up to 50% (new)</td>
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<tr>
<td></td>
<td>CA Rapid Reorg®</td>
<td>Up to 90% (new)</td>
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<tr>
<td></td>
<td>CA Rapid Reorg®</td>
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</tr>
<tr>
<td><strong>Performance Suite</strong></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>
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<tr>
<td><strong>Administration Suite</strong></td>
<td>CA RC/Migrator™</td>
<td>Up to 90% (new)</td>
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<td>The Cloning process leverages flash copy (feature of the DASD software)</td>
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<td>and has provided a customer 98% CPU and elapsed time savings (though not directly</td>
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<td></td>
<td>through zIIP processors)</td>
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<tr>
<td><strong>Recovery Suite</strong></td>
<td>CA Quick Copy</td>
<td>Up to 50% (new)</td>
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<td>CA Quick Copy</td>
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Saving Costs 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

BENEFITS

• Virtually eliminate CPU elapsed time by up to 90% or over **
• Reduce downtime by up to 90%**

** Customer Proven results
Saving Costs During Data Cloning
Customer Statistics Moving From Standard Unload/Load Method to RC/Merger

Note: Cloning process is now handling 2-3x the data originally processed

UsingUnload/Load Processing
Removed some unnecessary indexes
Implemented SNAPSHOT with RC/Merger
Converted to RC/Merger process
Saving Costs With 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.

**BENEFITS**
- 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.
Preventing Costs / Wastage
### Costs of Performance Degradation, Missed SLAs

**Ever Increasing Application Volumes and Complexity**

<table>
<thead>
<tr>
<th>INCREASING COMPLEXITY</th>
<th>REACTIVE TO PROACTIVE</th>
<th>EARLY WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies are developing <strong>complex SQL</strong> applications on DB2. Performance often <strong>degrades over time</strong> without anyone noticing (the creeping trend).</td>
<td>A DBA often does not recognize degradation until <strong>customers complain</strong> or <strong>service level agreements</strong> have been missed.</td>
<td>An <strong>intelligent system</strong> that can recognize and prioritize significant changes in SQL performance before it starts to <strong>impact resource overheads</strong> and <strong>service level agreements</strong>.</td>
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</tbody>
</table>
Challenge in Avoiding Performance Degradation Costs

How do you resolve performance problems?

- How do you determine when performance started to degrade?
- How long does it take to identify the problematic SQL statements?
- Do you know how the statements executed before the performance degraded?
- Do you have a log of application performance problems and resolutions?
  - Can you compare this log with current problems?
- Many customers offload CA Detector datastore into DB2 tables
  - Query heaviest plans/packages and manually compare to “baselines”
  - No efficient method to re-evaluate baselines when “the world changes”
  - How to monitor “standard deviation” and “creeping trend” is complex and cumbersome
Save Costs With Anomaly Detection

Problem Avoidance/Prediction

SOLUTION

- Detect anomalies and predict issues real-time, alert based on predefined rules
- Leverage historical data and machine learning for dynamic thresholds
- Simplified U/X – browser access and designed for collaboration

BOTTOM LINE

- High Availability
- Problem avoidance
- Reduced MTTR
- Reduce SME dependence for issue detection
Saving Costs With Prioritized Object Maintenance
Minimize Waste in Execution of Utilities and Improve Efficiency of System Usage

**BENEFITS**

- **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

**BENEFITS**

- **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**
Accelerate Implementation of Cost Saving Initiatives
## Saving Costs in IDAA Implementations

<table>
<thead>
<tr>
<th>DB2 features in r18/r19</th>
<th>Value to DB2 Analytics Accelerator (IDAA) customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save precious time and effort on day to day administration of IDAA</td>
<td>Visibility into DB2 threads running on IDAA</td>
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<td></td>
<td>IDAA jobs can be run in batch and automated without the need to always run interactive</td>
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<td>Manage IDAA through simple line commands</td>
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<tr>
<td>Provide FUTURE EXPLAIN/Access path information for packages without issuing a REBIND</td>
<td><strong>Detector and Plan Analyzer (PPA)</strong></td>
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<td></td>
<td>Help focus on most expensive queries</td>
</tr>
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<td></td>
<td>Understand the cost-benefit of Query Acceleration</td>
</tr>
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<td></td>
<td>Illustrate, if Query is eligible and bound for acceleration</td>
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<tr>
<td></td>
<td>Provide a reason code, if not eligible i.e. bound for execution in DB2</td>
</tr>
<tr>
<td>Accell Profiles</td>
<td><strong>Assess benefits of IDAA before investing in it</strong></td>
</tr>
<tr>
<td></td>
<td>Ability to take Detector metrics/statements captured and parse these to PPA – then PPA can create ACCCELL PROFILES simulating an IDAA appliance without having one installed and find statements which will benefit from acceleration</td>
</tr>
</tbody>
</table>
Save Costs in IDAA Implementations

Familiar RC/Query interface

IDAA Table level functions

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 Clst. & Org Keys
- ACCARCH - Archive Accelerated table
- ALOG - Load table to the accelerator
- DACCEL - Remove table from the DB2 Analytics Accelerator for z/OS
- DACCELF - Forcely Remove Table from DB2 Analytics Accelerator
- DISABLE - Disable table acceleration
- DISRPL - Disable table replication
- ENABLE - Enable table for acceleration
- ENABFL - Enable table for replication

USER-DEFINED LINE COMMANDS
- LISTCAT - IDCAMS Listcat of tablespace/indexspace
- XX = Execute Clst or REXX Exec
- TESTEX1 = SAMPLE REXX EXEC

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# Recommended Sessions

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<th>SESSION #</th>
<th>TITLE</th>
<th>DATE/TIME</th>
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<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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<tr>
<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>Strategy and Vision for CA DB2 Database Management</td>
<td>11/17/2016 at 12:45 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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Thank you.

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Mainframe and Workload Automation

For more information on Mainframe and Workload Automation, please visit: [http://cainc.to/9GQ2JI](http://cainc.to/9GQ2JI)