DB2 for z/OS – Ultimate Database for Cloud, Analytics and Mobile

Industry-leading performance, security, scale and reliability

DB2 12 for z/OS Preview

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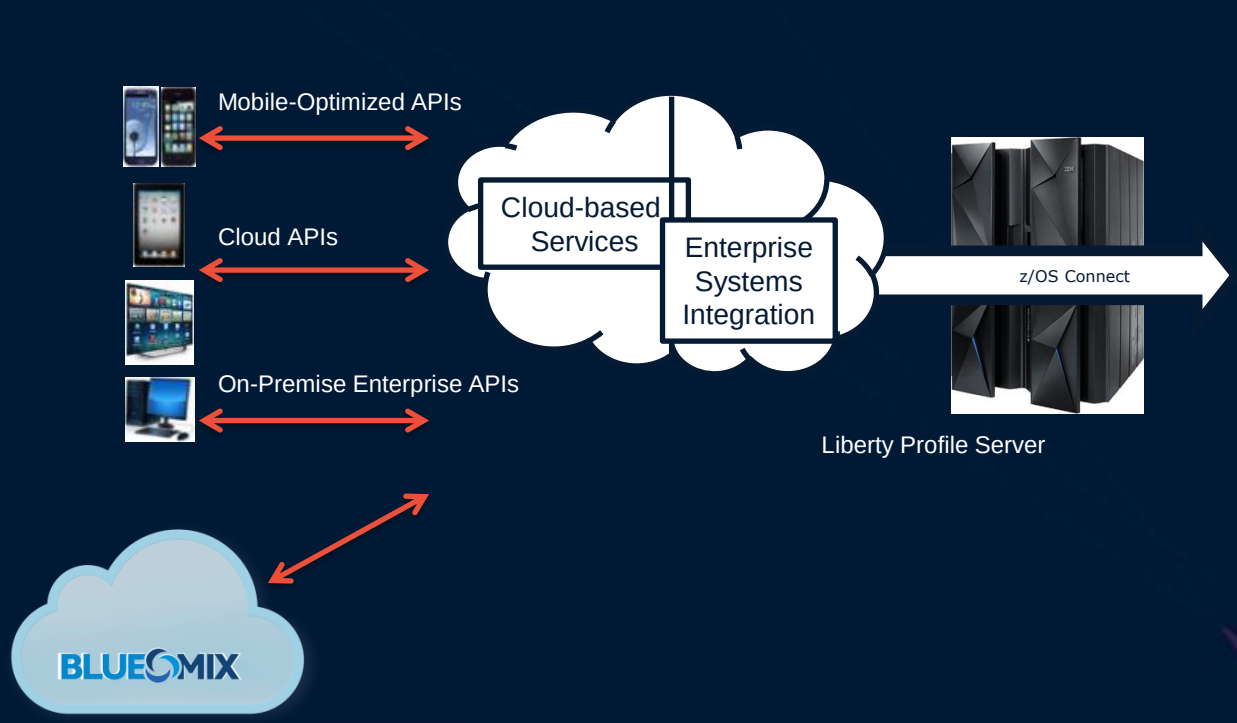
Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, 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.

Simplifying life for DB2 Developers & Administrators

Developer self service
Fast DB2 provisioning
DB2 Cloud/Mobile modernization with RESTful APIs and JSON



Serving mobile data directly from z/OS is 40% less expensive than exporting to a system of engagement

DB2 Analytics Accelerator Version 5.1

Right-time analytics on a single, integrated system combining transactional data, historical data & predictive analytics

WHAT'S NEW . . .

- In-database transformation and multi-step processing
- Real-time, in-database analytics
- Encryption of data at rest and in motion
- Enterprise Incremental Update enhancements

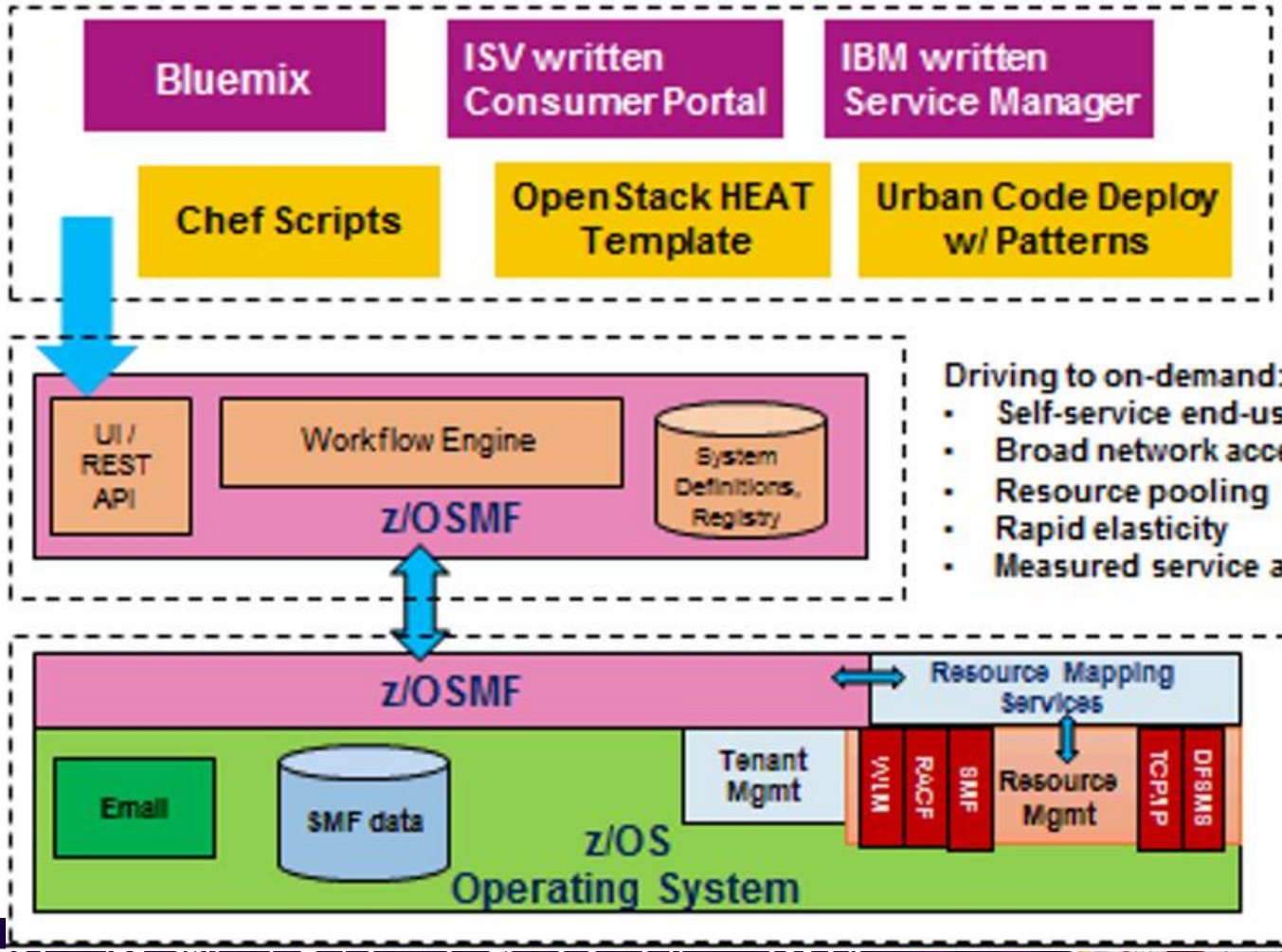
"The way forward with our Analytics requirements for the next 20 years was with DB2 plus the DB2 Analytics Accelerator. We looked at Oracle, Teradata and every option available, IBM & System z could not be beat"

Toine Straathof
Executive Vice President, Rabobank

Speed. Savings. Simplicity. Security.

z/OS Cloud Open Beta – Turn z Clients into Service Providers

Sign up at: http://www-03.ibm.com/systems/z/solutions/hybrid-cloud/

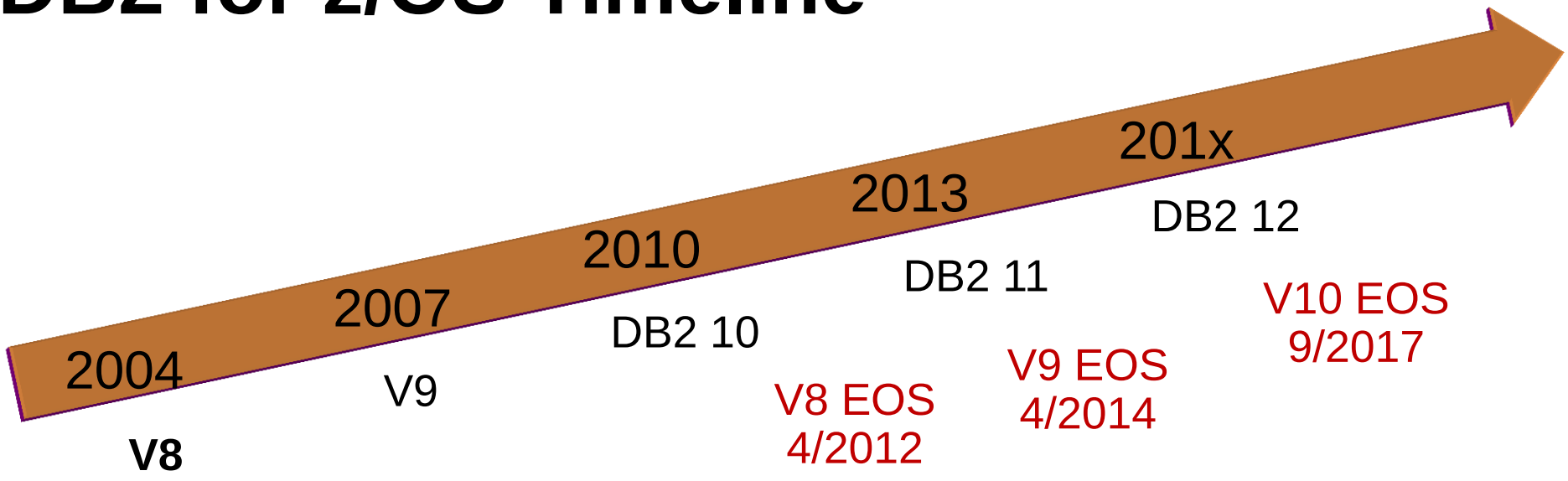


DB2 Fast Provisioning

- z/OSMF support for automated DB2 install/migration workflows
  - Sysprog productivity
  - Cloud-style DBaaS
  - Sub system lifecycle support

- DB2 Services
  - DB2 plans to provide customizable templates to define z/OSMF workflows for automatic provisioning of DB2 resources at various granularities:
    - DB2 install/migrate
    - Schema provisioning
  - DB2 will also provide RESTful APIs to call these provisioning services from a variety of tools
    - IBM Bluemix, IBM Data Server Manager (DSM), UCD, or other service catalogs/portal

DB2 for z/OS Timeline



Version	GA
V7	3/2001
V8	3/2004
V9	3/2007
V10	10/2010
V11	10/2013

Cypress ESP to start in March, 2016

ESP announced Oct. 6, 2015

DB2 12: Open for Data

An early look

Scale and speed for the next era of mobile applications

Over 8.6 Million Inserts per second measured (so far)

280 trillion rows in a single table, with agile partition technology

In Memory database

23% CPU reduction for lookups with advanced in-memory techniques

Next Gen application support

Up to 384 million transactions per hour through RESTful web API

Deliver analytical insights faster

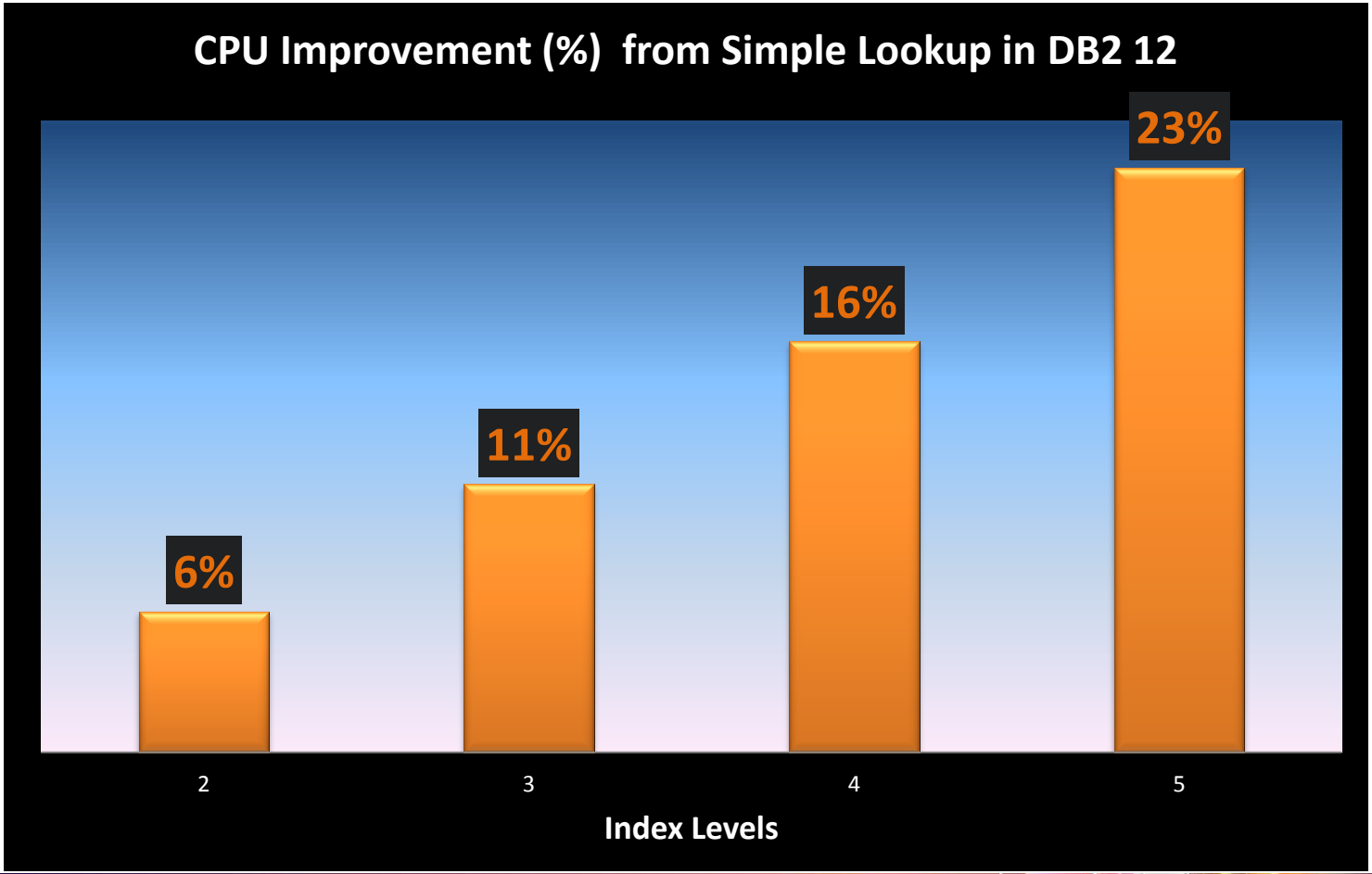
Up to 100x speedup for query workloads

DB2 12 Performance Enhancements

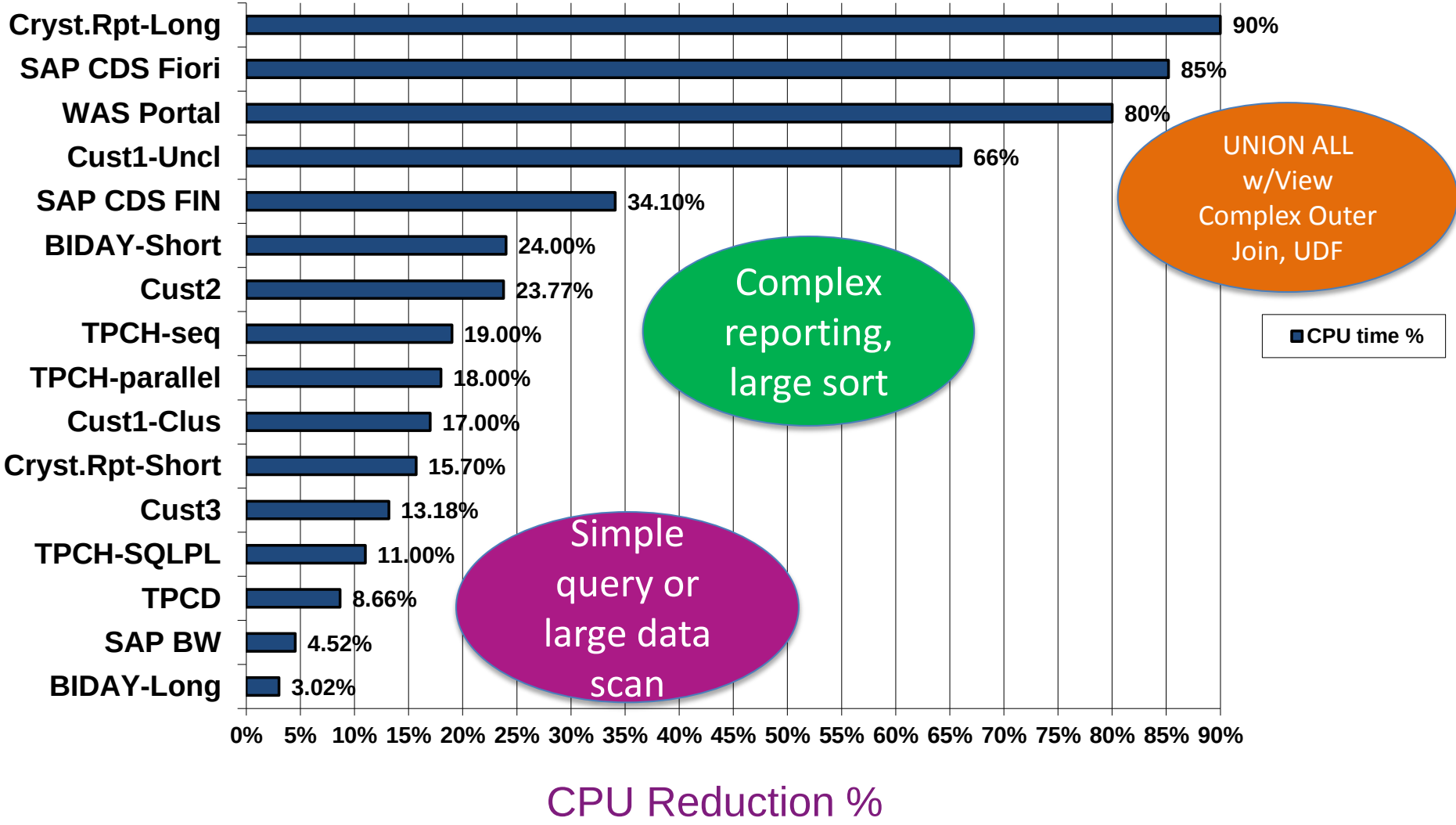
- In-memory contiguous buffer pools
  - Direct row access in-memory, avoid GetPage overhead
- In-memory index for fast traversal
- More granular Global Commit LSN
  - Potential huge improvement in lock avoidance (data sharing)
  - Also will help space reuse for insert
- Faster INSERT performance
  - 3x faster, 20% less CPU
  - Non-clustered, journal table pattern (common)
- >4G active logs
- BP size limit raised to 16 TB

Simple Look-up : Faster & Cheaper

Up to 23% CPU reduction for index look up using DB2 12 In-memory index tree



Significant CPU Reduction in DB2 Query Workloads



DB2 12: Simplicity and RAS

- Dynamic SQL Plan Stability
  - Stabilize performance of repeating dynamic SQL statements
- RUNSTATS automation
  - Optimizer automatically update profile with RUNSTATS recommendations
- RLF control for static packages
- LOB compression
  - Using zEDC hardware
- DRDA Fast Load
  - Callable command for fast load of data into DB2 directly from files on distributed client

DB2 12: application enablement

- Several SQLPL Improvements
  - SQLPL in triggers, including versioning and debug support
  - SQLPL obfuscation
  - Support for constants
  - Dynamic SQL in SQLPL UDFs and stored procedures
- ARRAY and LOB global variables
- Enhanced MERGE support
- New SQL Pagination syntax
- Piece-wise modification of data (DELELTE)
- XMLModify multiple update support
- Bi-temporal improvements
  - Inclusive/inclusive support
  - Temporal RI
  - Logical transaction for system time

DBA Productivity – DB2 12 Goals

- Relief for table scalability limits
- Simplify large table management
- Improve availability
- Agile schemas (more online schema changes)
- Security and compliance improvements
- Streamline migration process
- Utility performance, availability, usability

Partition By Range Current Limitations

- Maximum table size limited to 16Tb (4k pages) or 128Tb (32k pages)

- Maximum number of partitions is also dependent on DSSIZE and page size
  - E.g. if DSSIZE = 256 GB and page size = 4K then Max Parts is 64

- When Altering DSSIZE REORG must run on Entire Table Space

- DSSIZE is at Table Space Level not Part Level
  - All Parts inherit the same DSSIZE set at Table Space
  - No ability to have differing Partition sizes
  - Altering DSSIZE requires REORG of entire tablespace

DB2 12 Lifting the Limits

- New PBR tablespace structure called ‘PBR RPN’
- Relative page numbers (RPN) instead of absolute
- Remove dependency between #partitions & partition size
- New RID is Relative RID
  - Part Number stored in Partition Header Page
  - Page number stored in Data Page, relative to start of the partition
- Up to 1TB Partition Size, or 4 Petabytes (PB) per table space
- Maximum number of rows with 4K pages increased from 1.1 to 280 Trillion
  - @1,000 rows inserted per second, more than 8800 years to fill!
- Increasing DSSIZE is supported at partition-level
- New DSSIZE support for indexes
- Infrastructure changes positions for future enhancements
  - Increase in partition limits, increase number of rows per page
  - Attribute variance by partition, schema changes vis REORG PART

DB2 12 Online Schema Improvements

- Insert partition
- Online deferred ALTER INDEX COMPRESS YES
  - Previously placed indexes in RBDP
- Option to defer column-level ALTERs
  - Materialize through online REORG
  - Avoid availability constraints & conflict with other deferred alters
- TRANSFER OWNERSHIP

Migration & Catalog

- Single phase migration process
  - No ENFM phase
  - New function activated through new command
    - -ACTIVATE NEW FUNCTION
  - APPLCOMPAT rules, fallback rules continue to apply
- BSDS conversion to support 10 byte log RBA is pre-requisite
- BRF is deprecated
  - BRF pagesets still supported, but zparm & REORG options are removed
- Temporal RTS tables
  - Defined in catalog, enablement is optional

Thank You

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Session: S01

Title: The Latest on DB2 11 for z/OS and Introduction to DB2 12

Photo by Steve from Austin, TX, USA