Linux, UNIX, Windows and z/OS

Comparing and Contrasting the DB2's

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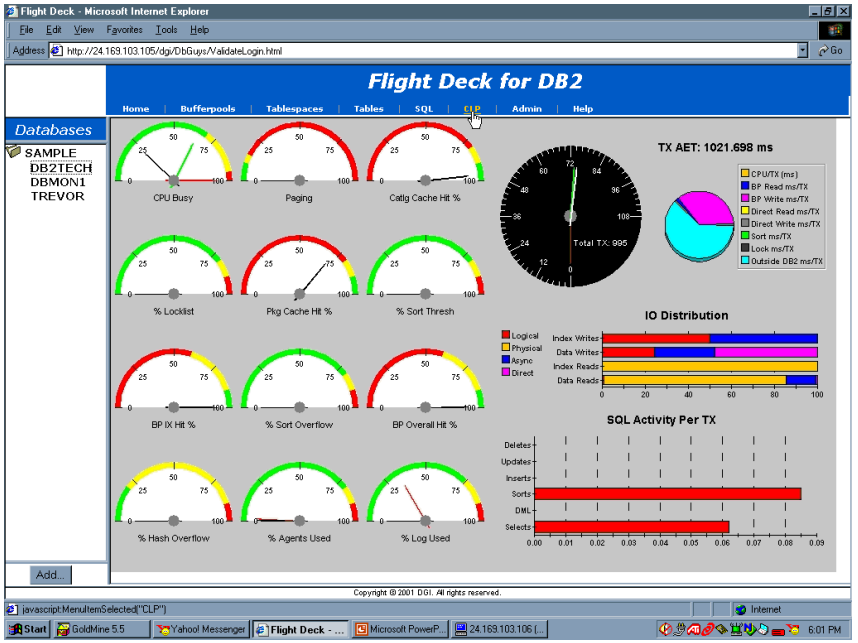

General

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General

- This session is designed with the DB2 for Z/OS DBA in mind
- This session will help DB2 for z/OS DBAs understand DB2 UDB for Linux, UNIX, and Windows better and be able to “see” how entities relate across the platforms
- DB2 UDB for Linux, UNIX, and Windows DBAs will be able to get a good understanding of how DB2 for z/OS operates

General

- DB2 for z/OS and DB2 UDB for Linux, UNIX, and Windows have many similarities
- But …. Many differences
- Enough to require skills retraining
- But .. I'd take a DB2 for z/OS DBA anytime and transition them to DB2 UDB for Linux, UNIX, and Windows
- DB2 UDB easier to learn for total "newbies"

Session Agenda

- System Architecture -- Differences and Similarities
  - Subsystems
  - Instances
  - Security
  - Databases
  - Tablespaces
  - Tables
  - Indexes
- Optimization
- SQL
- Monitoring
- Commands
- Utilities
- Recovery
- Futures

System Architecture

- Subsystem
- ZPARMS
- Can have 1 to many subsystems
- Subsystems are a complete “entity”
- SSID

- Instance
- Database Manager Configuration Parameters
- Can have 1 to many instances
- Instances are a complete “entity”
- Database Admin Server per instance is required to allow for remote administration

  via Control Center and other “tools”
- Instance Name

System Architecture

- DB2 Catalog and Directory
- Accessed via bufferpool and special access mechanisms
- Now can be isolated to BP0
- EDM Pool

- DB2 Catalog and SYSCAT User Views
- Catalog Access via Direct Reads
- No bufferpool used
- Catalog Cache used at the Database Level and monitored via Snapshots

System Architecture

- Dynamic Cache
- EDM Pool
- Bufferpools (A child of a subsystem)
- Install SYSADM
- SYSADM at the SSID level
- IRLM (ECSA or Cross Memory)
- Package Cache but also used for static SQL
- Catalog Cache
- Bufferpools (A child of a database)
- Instance Owner
- SYSADM at the Instance level
- Locklist (memory area)

Security

- Uses Operating System Security SecureWay Security Server (RACF) or other Third Party Vendor provided security software
- Privileges can be granted externally
- KERBEROS
- DCE

- Uses Operating System Security to authenticate users
- Privileges granted internally
- DCE
- KERBEROS
- GRANTS

Databases

- A Database is an object at a lower level in z/OS
- Can contain tablespaces and tables
- But no system level stuff like logs or ZPARMS are strictly associated or dedicated to a particular database

- A Database is a higher level entity in DB2 UDB
- Database is like a small subsystem, has it's own logs, catalog, Database Global Memory and Agent Private Memory, Bufferpools
- But shares Instance level memory and DBM parameter values

Tablespaces

- Simple, Segmented, and Partitioned
- Can have more than 1 table per tablespace, not usually recommended
- Partitioned Tablespace by key range (limit key) within the tablespace
- Assigned to physical datasets

- Tablespace for data, long, and index can all be in same tablespace
- Can have more than 1 table per tablespace, standard way of doing business
- Can create indexes in separate table space as well as long data
- No partitioning within a tablespace, must use EEE which is shared nothing and hashes table data across nodes
- Assigned to containers

Tables

- Is an Entity that is comprised of rows (tuples) and attributes (columns)
- Reorg at Tablespace level
- Must be assigned to a tablespace
- No Summary Tables
- Declared Temporary Tables
- No Hierarchies
- Global Temporary Table

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Indexes

- Can Alter Index
- Partitioned Index
- Can Image Copy
- Clustering Index
- Index not automatically created on primary or unique key

- No Alter Index command, must drop and recreate
- INCLUDE Columns
- Index can be defined in same tablespace as data or separate tablespace
- Allows Forward or Reverse Scans
- Cluster Index
- Index automatically created on primary or unique key

Optimization

- One Optimization Level
- Optimizer Hints
- Query Rewrite
- Well documented Stage 1 and Stage 2 predicates and default filter factors

- Optimization classes 0-9, Default of 5
- Class 3 most like optimization on DB2 for z/OS
- No Hints
- Query Rewrite
- Not well documented

SQL

- Complies with SQL STD
- Some Differences but not major

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Object Relational Capabilities

- User Defined Functions
- User Defined Data Types

- User Defined Functions
- User Defined Data Types
- Structures
  - Hierarchies
- OBJECT SPEAK
  - INHERITANCE

Monitoring

- DB2 Accounting and Performance Classes
- SMF Records
- IFCIDS
- MSTR LOG
- Other Address Space Logs
- System Log
- SYS1.LOGREC
- Snapshot and Event Monitoring
- Event monitors can write to pipes or files
- Formatting Tool
- DB2DIAG.LOG
- ALERT.LOG
- OS System Logs
- Windows Event Monitor
- Windows Performance Monitor

Performance and Tuning

- Same Concepts Apply
- Start with the SQL
- Third Party Products "second nature"

- Same Concepts Apply
- Start with the SQL
- Harder to do without Third Party Products
- School of Hard Knocks

Commands

- Commands associated with a SSID
- DISPLAY
- TERMINATE
- RECOVER
- STOP SSID
- START SSID
- START DATABASE
- START TABLESPACE
- Must first connect to a Database
- LIST
  - GET
- RESTORE
- ATTACH
- SET
- START DATABASE
- DB2ADMIN START
- NO DATABASE/ TABLESPACE START EQUIVALENT

Utilities

- LOAD
- DSNTIAUL
- DCLGEN
- RECOVER
- DSNTIAD
- Make Use of Parallelism

- LOAD
- Nothing Similar
- DCLGEN
- RESTORE
- DB2LOOK
- DB2MOVE
- Make Use of Parallelism

Logging

- Automatic Logging
- No such thing
- At the Subsystem level

- Automatic Logging
- Circular Logging
  - No forward recovery
- Primary and Secondary logs
- At the Database Level

Recovery

- Subsystem has Boot Strap Dataset (BSDS) that is saved with every archived log
- Can just issue Recover command and DB2 would automatically know how to recover a tablespace
- Database has a Recovery History File that is stored with every database backup
- This has just been added to DB2 UDB V7.2 FP5

Problem Determination

- MSTR LOG
- Other Address Space Logs
- System Log
- SYS1.LOGREC
- IBM Utilities
- Third Party Vendor Products

- DB2DIAG.LOG
- ALERT.LOG
- OS System Logs
- Windows Event Monitor
- Windows Performance Monitor
- IBM Utilities*
- Third Party Vendor Products*

Parallelism

- Intra-Parallelism
- Query and IO Parallelism enabled via ZPARMS, Bufferpool settings, and degree > 1
- Partitioned Tablespaces

- Intra-Parallelism enabled at Instance Level with DBM CFG parameter intra_parallel enabled and degree > 1
- IO Parallelism enabled via containers and registry variables DB_Parallel_IO and DB2 Striped_Containers
- Massive Parallelism with DB2 UDB EEE

Parallelism

- Utilities
- Load
- Partitioning
- CP and IO – Shared Disk
- Sysplex
- Determined at actual RUNTIME

- Utilities
- Load
- Intra_Parallel
- SMP and Shared Nothing
- EEE

Data Movement Between the 2

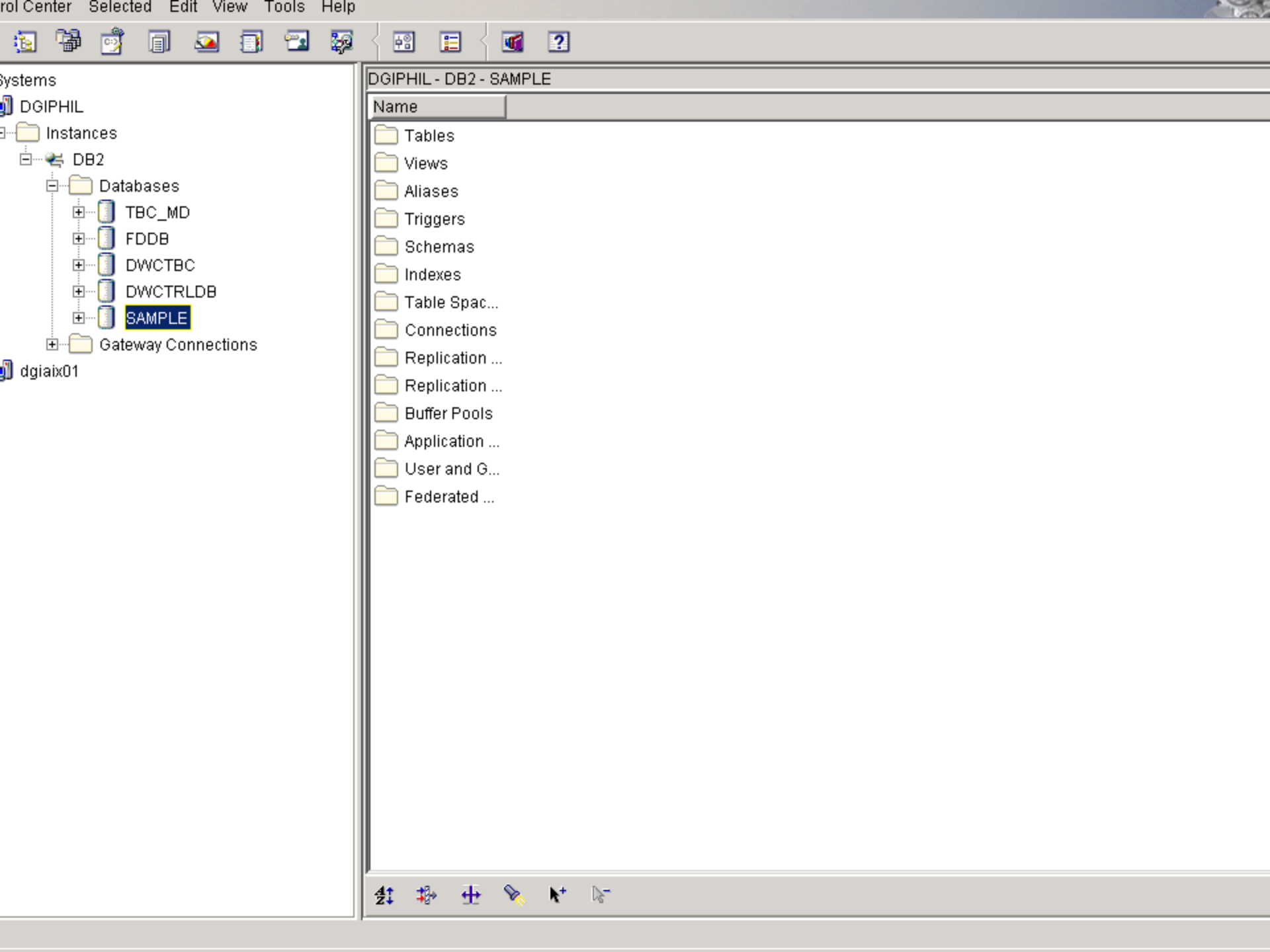
- Import/Export Utility of DB2 Connect
- Cross System Loader
- QMF
- SPUFI
- FTP

- Import/Export Utility of DB2 Connect
- Application Programs via DRDA SQL Error Continue Bind Option
- Dynamic and Static SQL
- SQL Error Continue Enabled in V7 or late FP in V6
- DCLGEN Available
- QMF
- SPUFI
- FTP

Data Access Products

- SPUFI
- QMF
- DSN Command
- Many “Query” or “Reporting” Third Party Products Available

- Can Bind SPUFI Packages and then use SPUFI to access
- Dynamic and Static SQL via Distributed Unit of Work
- Can Access via QMF after creation of QMF tables and right level of QMF
- No Equivalent of QMF QBE
- Many “Query” or “Reporting” Third Party Products Available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Thank you!

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