

DDF Best Practices

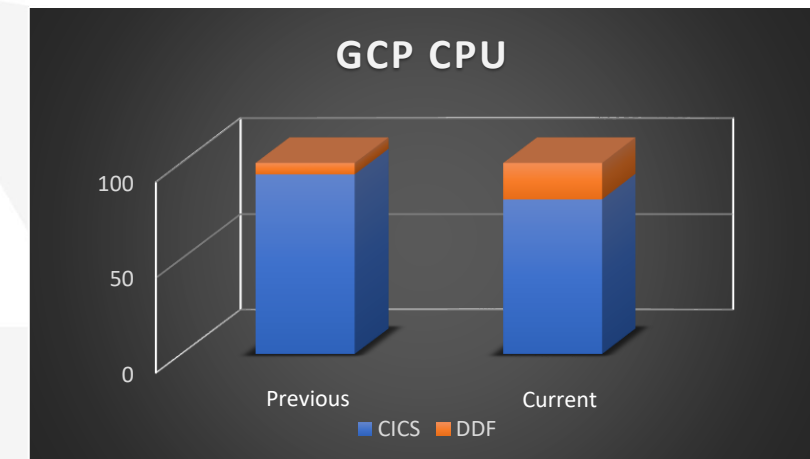
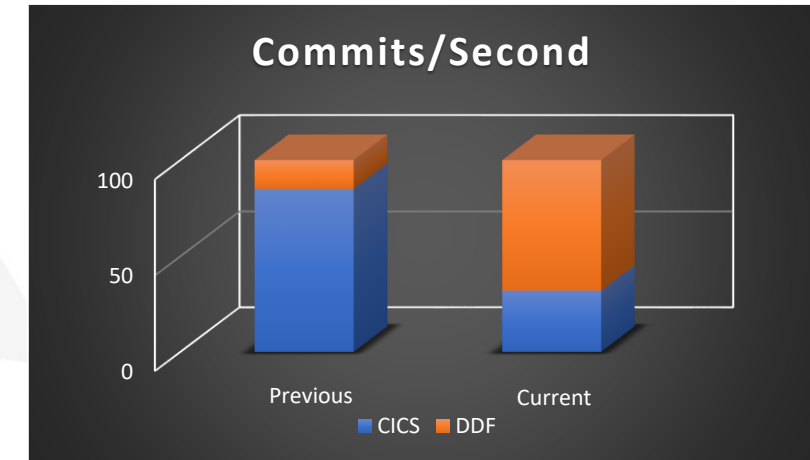
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Db2 for z/OS Distributed Database Facility

Agenda

- Objectives
- Overview of Common Topologies and Terminologies
- Db2 Thread and Connection Pooling
- High Availability
- Transaction Identification and Monitoring
- Configure for Resiliency – Profiles
- SNA/VTAM?
- Questions

Objectives

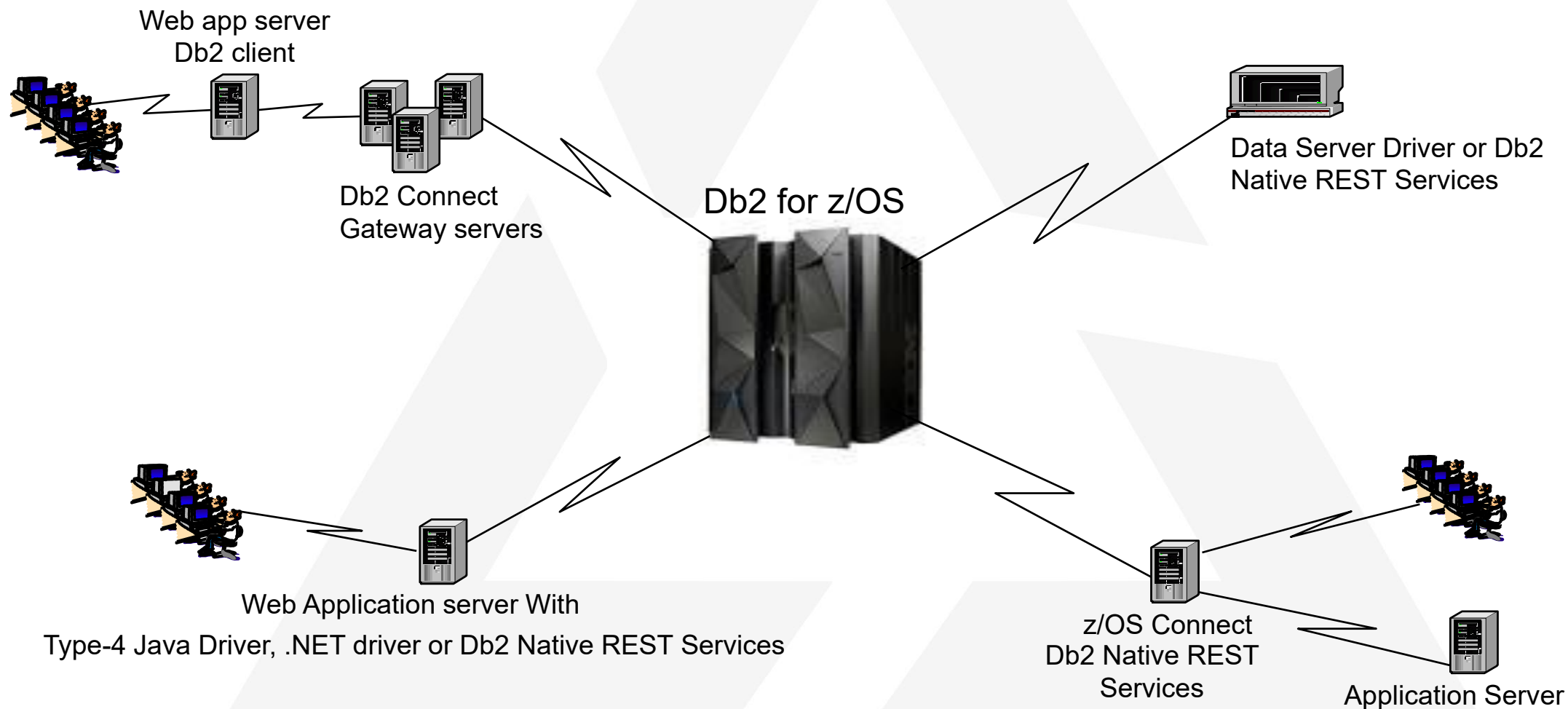
- DDF online mainstream (OTLP) workload has significantly increased in adoption over the past several years
- Why DDF?
 - Lower CPU cost per transaction (zIIP offload)
 - Simplify the architectural infrastructure 2-tier client server
 - Familiar coding techniques for developers accessing data residing on Db2 for z/OS
 - DDF maturity evolution
 - Focusing development on availability, redundancy and efficiencies
- Apprehensiveness when discussing DRDA
- The session objective:
 - address the common concerns
 - describe technology solutions to ultimately decrease the fear and anxiety of exploiting DRDA





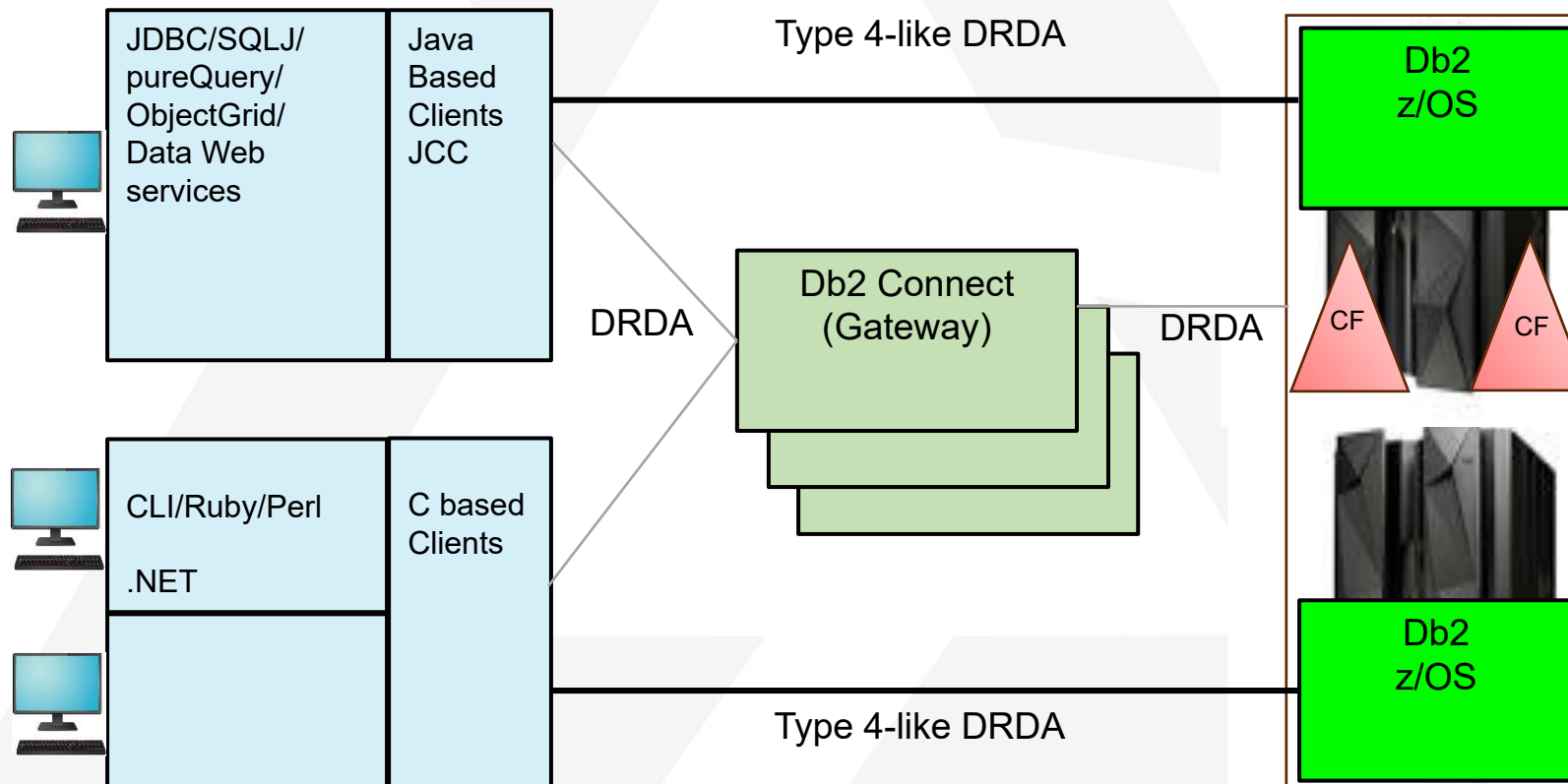
COMMON TOPOLOGIES AND TERMINOLOGIES

Remote access to Db2 – Common Topologies



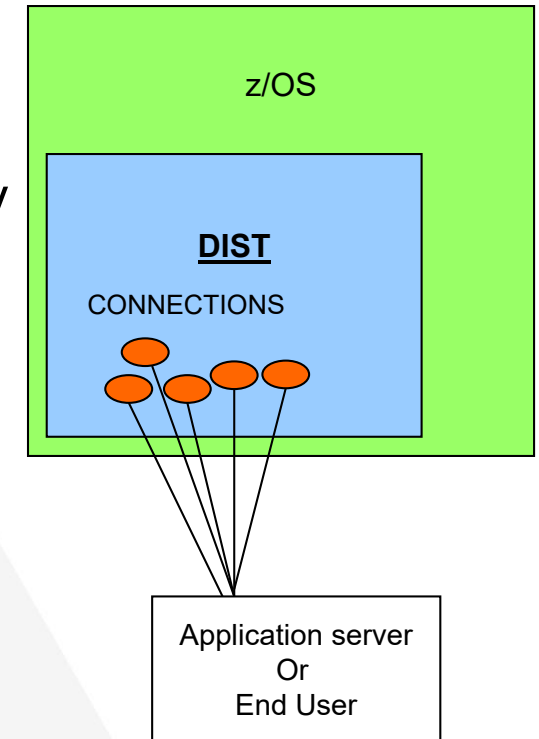
Remote access to Db2 – Strategic Topology

- IBM's strategic direction is toward the IBM Data Server Driver embedded within the application servers for enterprise applications



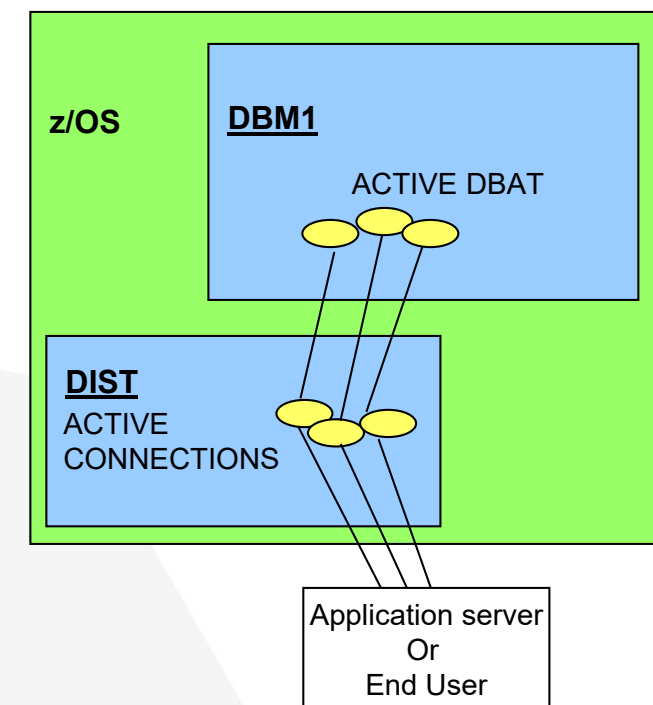
What is a connection?

- DRDA over TCP/IP = IP address (domain) and port resulting in an end-point or socket and a control block in DIST address space
 - Total number governed by ZPARM CONDBAT (default = 10,000)
 - At 80% of CONDBAT, DSNL074I message in MSTR log
 - If CONDBAT is exceeded, DSNL030I message in MSTR log and connection requests are rejected and Db2 cannot be accessed remotely
 - Socket not released until remote requestor closes connection
 - ZPARM **TCPKPALV** determines interval to ping socket to ensure connection is still there – avoid hung thread if connection drops
 - Default is 120 seconds
 - ENABLE means takes COMM Server default of 120 minutes
- Legacy myth that connections are expensive
 - 2-4K in memory footprint above 2GB bar in DIST address space
 - Still have 210 bytes in Comm server ECSA
 - Max for CONDBAT has been 150,000



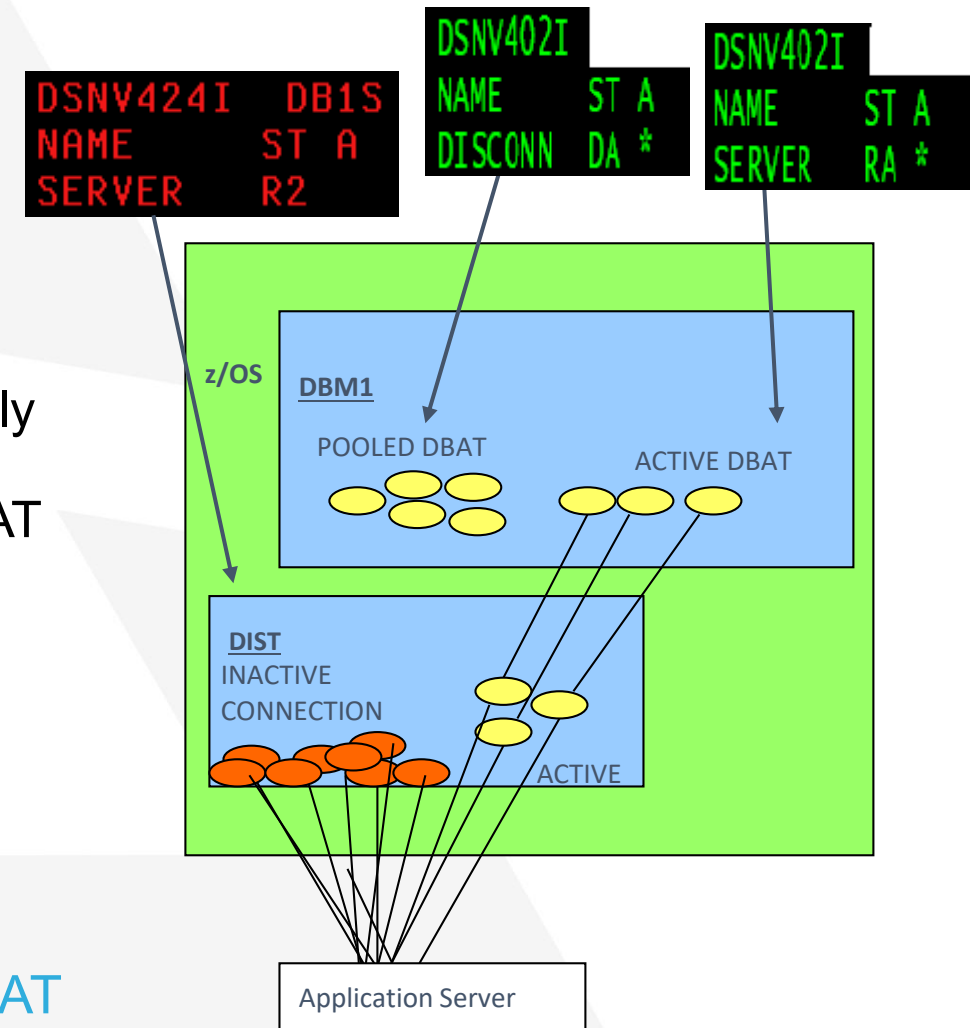
What is a Database Access Thread (DBAT)?

- What is a database access thread (DBAT)?
 - Executed under WLM managed Enclave SRB mode
 - A DBAT is associated with a connection until the connection terminates
 - ZPARM **MAXDBAT** still 200 by default
 - If MAXDBAT is hit, DSNL092I in -DIS DDF will increment and requests queue up to CONDBAT, then requests rejected
 - ZPARM **MAXCONQN** limits the depth of the queue for a DBAT after MAXDBAT has been hit before being canceled/rerouted (default OFF)
 - ZPARM **MAXCONQW** limits the time a DBAT request remains queued until it is canceled/rerouted (default OFF)
 - ZPARM **IDTHTOIN** determines how long a thread remains active between issuances of SQL
 - Default 120 seconds
 - Memory in DBM1 (common range 12KB-2MB, or larger)
 - About 12KB in 31-bit private, the rest in 64-bit shared
 - -DIS THREAD(*) SERVICE(STORAGE) to see 31-bit usage
 - DBAT **ECSA** footprint
 - Db2 12 ~7k per thread
 - Db2 13 ~4k per thread



Db2 Thread Pooling

- ZPARM **CMTSTAT** determines whether threads are disassociated with a connection at commit or at connection termination
 - **CMTSTAT=INACTIVE** (default)
 - At commit, threads are pooled to be reused by any new/resumed request
 - Connection becomes an inactive connection (formerly called a type 2 inactive DBAT)
 - Still holds a socket and counts against CONDBAT
 - ZPARM **POOLINAC** determines how long a DBAT remains unused in the pool before being terminated
 - Default 120 seconds
 - **CMTSTAT=ACTIVE**
 - Thread stays associated with a connection until connection terminates
- Command **-DIS THREAD(*) DETAIL** for status
- Both active and pooled DBATs count towards **MAXDBAT**

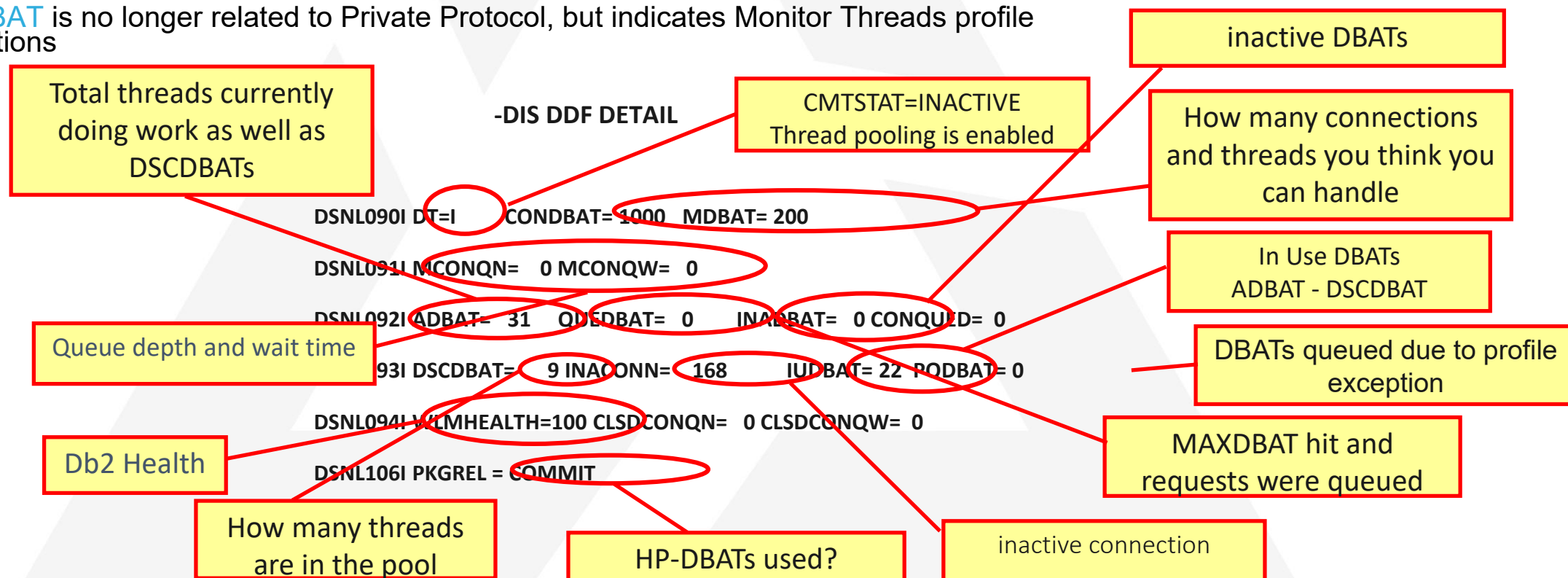


Db2 Thread Pool Recommendation

- Recommendation is to utilize thread pooling and inactive connection support
 - Benefits for Db2 z/OS thread pooling:
 - CPU savings in Db2, by avoiding repeated creation and destruction of DBAT
 - Real memory savings in z/OS, by reducing the number of concurrent DBATs
 - Virtual memory savings in DBM1, by reducing the number of DBATs
 - Small number of threads can typically be used to service many connections
 - Greater capacity to support DRDA connections avoiding need for re-authentication (SSL)
 - WLM granularity at a unit of work boundary for enclaves
 - What prevents a thread from going inactive?
 - Packages bound with **KEEPDYNAMIC(YES)**
 - Statement is held in local statement cache across commit boundary (SAP)
 - Held cursors and/or open LOB streams
 - Application server connection verification query (test-on-borrow) defaults to SYSLH200 package
 - Declared Global Temporary Tables result sets held beyond commit (no Drop on Commit)
 - High-performance DBATs (JCC packages bound **DEALLOCATE** and **-MODIFY DDF** issued)
 - DBAT reused 200 times (Db2 12) and 500 times (Db2 13) then recycled
 - ZPARM **POOLINAC** controls duration of inactivity
 - There should be a 'separate' NULLID collection for applications using high-performance DBATs

Db2 Thread Pooling ...

- The display DDF detail command provides a snapshot of the remote work going on
 - The presence of **DSCDBAT** proves that thread pooling is enabled
 - Ideally **QUEDBAT** and **CONQUED** will always equal 0
 - PKGREL **BNDOPT** or **BNDPOOL** allows the use of high-performance DBATs
 - INADBAT** is no longer related to Private Protocol, but indicates Monitor Threads profile exceptions



Application Connection Pooling

- Optimal transaction behavior and performance relies on Db2 thread pooling in partnership with application connection pooling for a complete end to end solution
 - Pooling throughout the infrastructure will deliver:
 - Efficiency, Pool integrity, Resiliency, Availability

WAS connection pool properties	Description	Db2dsdriver.cfg	Description
enableSysplexWLB	Specifies whether transaction-level workload balancing is in effect	enableWLB parameter	Specifies whether transaction-level workload balancing is in effect
Maximum connections	Max connections from JVM instance	MaxTransports	Max number of connections that a request can make to a data sharing group
Minimum connections	Lazy minimum number of connections in pool		
Reap time	How often cleanup of pool is scheduled in seconds	maxRefreshInterval	Max elapsed time in seconds before the server list is refreshed
Unused timeout	How long to let a connection sit in the pool unused (inactive conn. in Db2)	MaxTransportIdleTime	Max elapsed time in seconds before a transport is dropped
Aged timeout	How long to let a connection live before recycling (active or inactive conn in Db2)		
Purge policy	After <i>stale connection</i> , does the entire pool get purged or only individual connection	MaxTransportWaitTime	Number of seconds that the client waits for a transport to become available

Dynamic Location Alias

- Similar to subgroup attach you can use a dynamic location alias for member specific access or to point connection requests to a subset of the data sharing members accepting DDF work
 - SUBGROUP1 is created and is stopped by default
 - SUBGROUP1 is associated with port 448

```
-MODIFY DDF ALIAS(SUBGROUP1) ADD  
-MODIFY DDF ALIAS(SUBGROUP1) PORT(448)  
-MODIFY DDF ALIAS(SUBGROUP1) START
```

- Stopping the alias only stops work coming from applications using that alias without the need to stop the DIST address space
 - **MODIFY DDF ALIAS(SUBGROUP1) STOP**
 - Behaves similar to a quiesce where currently executing work completes
 - DISPLAY DDF DETAIL (DSNL080I) of alias will show all associated DBATs, connections, as well as weighted order of other Db2 members with the same alias
 - DSNL096I ADBAT= 100 CONQUED= 1000 TCONS= 1000
 - DSNL101I WT IPADDR

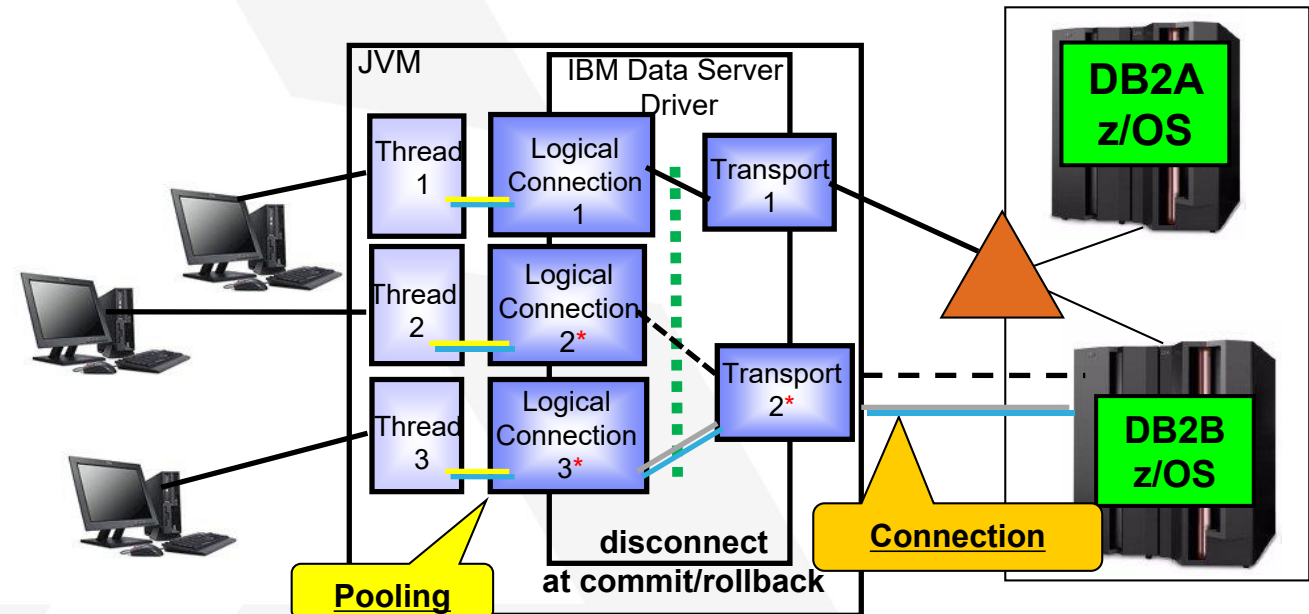


HIGH AVAILABILITY

- Installations are not always properly configured for high availability with regards to remote connections to a Db2 data sharing group
 - Need the ability to mask single points of failure both inside and outside of Db2
 - Planned maintenance/unplanned outages in a 24x7 environment
 - Rolling maintenance and release migrations
 - Guaranteed connection to Db2 on the first attempt
 - Applications should not need to know which member is down or when
 - Remove the need to for a “ping” transaction
 - Avoid stale connection exceptions in connection pools when Db2 bounces but app server is up
 - Distribution of connections/threads across Db2 data sharing group
 - In the event an LPAR is lost, need ability for connections to ‘follow’ Db2 to another LPAR or seamlessly route to a surviving Db2 member
- High availability requires a combination of z/OS and driver functions
 - **Sysplex Distributor** to guarantee the initial connection
 - **Sysplex Workload** Balancing to provide:
 - **Automatic client reroute**
 - Intelligent workload distribution at transaction level

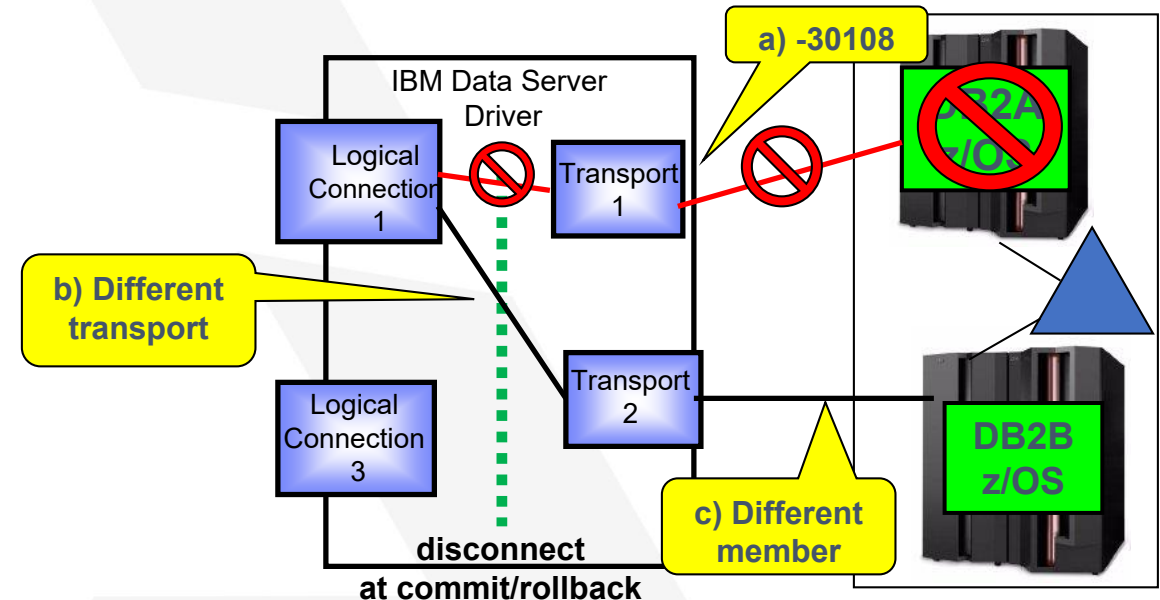
Sysplex WLB

- Sysplex Workload Balancing
 - Enables transport pooling (connection concentration)
 - Separates the logical connection from the application to the driver and the physical connection from the driver to Db2 for z/OS
 - Global pool of Transport objects per instance
 - Initial connection goes through Sysplex Distributor, then driver relies on its WLM server list to route to the member directly
 - Connection reuses/changes transport at transaction boundary (commit)
- Provides Automatic Client Reroute (ACR)
 - Masks connectivity issue with Db2 including Db2 failure/shutdown



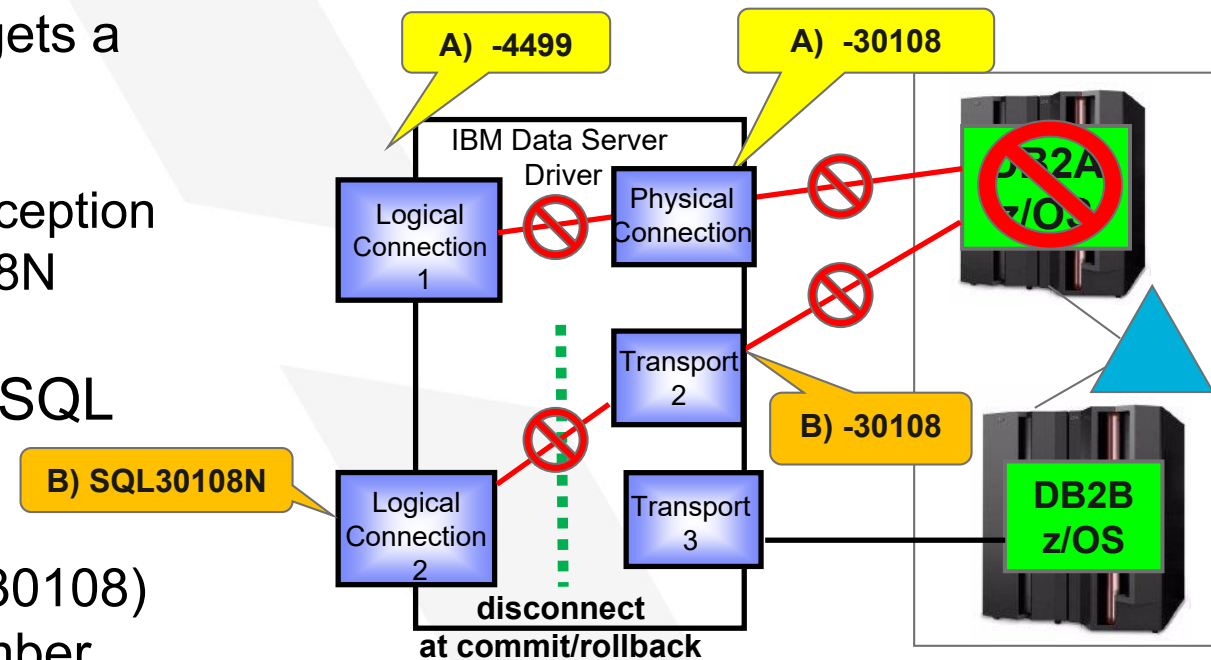
Sysplex WLB

- With ACR, application connectivity is *NOT* lost if DB2A is brought down or crashes
 - The intent is to route around connection failures and mask them from the applications
 - This also avoids stale connection exceptions in app server connection pools
 - If connectivity to DB2A is lost i.e., taken down for maintenance or crashes
 - If the first SQL statement of a transaction encounters this situation:
 - a) Driver receives network failure (-30108) - That transport would then be recycled to avoid being used by other requests
 - b) Driver seamlessly routes transaction to another transport on another member - Logical connection 1 moves to transport 2
 - c) Application receives no negative SQL code and continues processing



Sysplex WLB

- Without ACR, application connectivity is lost if DB2A is brought down or crashes (A)
 - Without Sysplex WLB, physical connection gets a stale connection exception
 - Driver receives network failure (-30108)
 - Application receives a stale connection exception
 - SQLCODE -4499 (JAVA) or SQL30108N (non-JAVA)
- With ACR, if the failure occurs after the first SQL statement of a transaction (B)
 - Transaction rolled back in Db2
 - Driver (transport) receives network failure (-30108)
 - Connection is re-established to another member
 - Set statements replayed on connection
 - Application receives SQL code (SQL30108N)
 - Must re-drive SQL statement itself



Enable Sysplex WLB

- Provides intelligent workload distribution **at transaction level**
 - **Every 30 seconds** driver polls WLM to refresh the weighted list of data sharing members
 - When the client first establishes a connection using the Sysplex-wide IP address called the group IP address, or when a connection is reused by another connection object, the server returns member workload distribution information
 - The default lifespan of the cached server list is 30 seconds
 - Driver does the routing, Sysplex Distributor only provides the first connection to the group
 - Enabling Sysplex WLB means the driver should distribute the work to the appropriate Db2 based on (IWMSRSRS WLM interface) **3 main factors**
 - **Displaceable capacity**
 - Sysplex WLB favors LPARs with more CPs/zIIPs over smaller LPARs
 - Also favors single member per LPAR because system weight is divided by # of servers on it
 - After the initial connection using Sysplex distributor the driver takes over
 - Changing the Sysplex Distributor DISTMETHOD will not have any effect on DDF workload distribution
 - Recommendation:
 - Try to define and maintain a symmetric configuration

Enable Sysplex WLB

- Enabling Sysplex WLB means the driver should distribute the work to the appropriate Db2 based on (IWMSRSRS WLM interface) *3 main factors ...*
 - *Performance index of enclaves as well as queue time*
 - If threads delayed on LPAR 1 miss their WLM goal, they may 'slosh' to a Db2 on another LPAR
 - If the WLM goal is too loose the driver will not re-route work in a timely manner and DBAT requests will queue, possibly encroaching on CONDBAT
 - Recommendation:
 - WLM goals must be realistic and ACHIEVABLE i.e., may mean moving from Execution Velocity to Response time goal
 - Avoid PI = .5 (over achievers)
 - Avoid PI = 4 (massively under achieving)
 - Monitor -DIS THREAD(*) DETAIL DSNV482I during peak times as well as RMF 72-3 Workload activity reports to determine effectiveness of the WLM policy and adjust if necessary
 - Monitor for Queue Time (RMF report)
 - For under or overachieving service classes consider setting RTPIFACTOR
 - SET RTPIFACTOR ~35 (default 100)
 - Default is 100% setting to a lower value lowers the impact of a bad PI
 - Adjust service class with appropriate goals

Queue Time

TRANS-TIME	HHH.MM.SS.FFFFFFFF
ACTUAL	6078
EXECUTION	6047
QUEUED	31
R/S AFFIN	0
INELIGIBLE	0
CONVERSION	0
STD DEV	123035

Enable Sysplex WLB

- Db2 13 Sysplex WLB Enhancements
 - Installations require appropriate workload distribution but find it a difficult effort to get application teams to enable Db2's Sysplex high availability function for client drivers
 - Requires client configuration on multiple systems
 - Application developers are not leveraging z-specific configuration settings
 - V13R1M502 enables Db2 Sysplex Workload Balancing capabilities without requiring any application changes
 - Applications connecting to a DDF location alias can seamlessly enable or disable the SysplexWLB behavior by issuing MODIFY DDF command
 - RQSTWLB
 - MODIFY DDF RQSTWLB (location-name|alias-name)
 - Db2 returns to the remote client a request to enable Sysplex Workload Balancing
 - Client decides where to honor the request or not
 - Driver level 11.5 FP0/JCC driver level 4.26/SQL11050
 - DFLTWLB
 - MODIFY DDF DFLTWLB (location-name|alias-name)
 - Db2 honors the Sysplex Workload Balancing option requested by the client
 - Default



TRANSACTION IDENTIFICATION AND MONITORING

Transaction Identification

- Historically a common problem has been the inability to properly identify Db2 for z/OS DRDA transactions
 - How does one differentiate remote applications?
 - User IDs were often created and distributed to application teams to access Db2
 - Application teams would use the same User ID for all workload executing from their application servers
 - Eliminating the ability to properly identify business specific transactions
 - Without proper classification numerous customers referred to Db2 connect applications as attempting to monitoring the “black box”
 - Resulting in not embracing the infrastructure
- As a result, customers had limited ability to properly monitor and tune
 - Db2 Accounting reports grouping and filtering on a User ID
 - Db2 DDF DISPLAY LOCATION DETAIL
 - Db2 Statistic – subsystem level reporting

Transaction Identification

- Db2 DRDA statistical instrumentation enhancements (Db2 SMF 112 records)
 - IFCID 365 – statistics class 7
 - provides detailed statistics about the remote locations with which a Db2 subsystem communicates using the DRDA protocol

TIMESTAMP	REMOTE LOCATION	PRDID	INITIATED FROM REMOTE SITE	COMMITTS RECEIVED	ABORTS RECEIVED	REST REQUESTS	SysplexWLB	XA TRANS	CSR WITH HOLD NOT CLOSE	DGTT NOT DROPPED	KEEPDYNAMIC	HP-DBATS	PROFILE EXCEPTIONS	MAXCONQN REACHED	CONNECTIONS HWM	THREADS HWM
2023-09-15-10.00.00.542139	::xxx.xxx.xx.11	SQL11055	10,000,145	35,468,515	23,173,988	0	0	0	195,849	0	0	0	0	0	15	2
2023-09-15-10.00.00.542139	::xxx.xxx.xx.12	SQL11055	10,001,456	34,924,033	22,722,438	0	0	0	187,570	0	0	0	0	0	12	2
2023-09-15-10.00.00.542139	::xxx.xxx.xx.122	SQL11055	10,100,357	36,383,864	23,815,120	0	0	0	196,028	0	0	0	0	0	13	4
2023-09-15-10.00.00.542139	::xxx.xxx.xx.123	SQL11055	10,030,555	34,276,691	22,442,466	0	0	0	191,602	0	0	0	0	0	9	2
2023-09-15-10.00.00.542139	::xxx.xxx.xx.124	SQL11055	10,000,569	39,837,342	26,119,479	0	0	0	213,017	0	0	0	0	0	6	0

- IFCID 411 – statistics class 10
 - detailed statistics about remote applications that connect to a Db2 subsystem based on the CURRENT CLIENT_APPLNAME special register

TIMESTAMP	APPLICATION_NAME	PRDID	INITIATED FROM REMOTE SITE	COMMITTS RECEIVED	ABORTS RECEIVED	REST REQUESTS	SysplexWLB	XA TRANS	CSR WITH HOLD NOT CLOSE	DGTT NOT DROPPED	KEEPDYNAMIC	HP-DBATS	PROFILE EXCEPTIONS	MAXCONQN REACHED	CONNECTIONS HWM	THREADS HWM
2023-09-15-10.00.00.542139	BANK_ACCT_QUERY	SQL11055	10,000,145	35,468,515	23,173,988	0	0	0	195,849	0	0	0	0	0	15	2
2023-09-15-10.00.00.542139	ACCOUNT_PAYMENTS	SQL11055	10,001,456	34,924,033	22,722,438	0	0	0	187,570	0	0	0	0	0	12	2
2023-09-15-10.00.00.542139	CUSTOMER_EBILLS	SQL11055	10,100,357	36,383,864	23,815,120	0	0	0	196,028	0	0	0	0	0	13	4
2023-09-15-10.00.00.542139	BALANCE	SQL11055	10,030,555	34,276,691	22,442,466	0	0	0	191,602	0	0	0	0	0	9	2
2023-09-15-10.00.00.542139	AUTO_PAYMENTS	SQL11055	10,000,569	39,837,342	26,119,479	0	0	0	213,017	0	0	0	0	0	6	0

- IFCID 412 – statistics class 11
 - detailed statistics about the client user IDs that are associated with remote connections to a Db2 subsystem based on the CURRENT C LIENT_USERID special register

TIMESTAMP	USER_ID	PRDID	INITIATED FROM REMOTE SITE	COMMITTS RECEIVED	ABORTS RECEIVED	REST REQUESTS	SysplexWLB	XA TRANS	CSR WITH HOLD NOT CLOSE	DGTT NOT DROPPED	KEEPDYNAMIC	HP-DBATS	PROFILE EXCEPTIONS	MAXCONQN REACHED	CONNECTIONS HWM	THREADS HWM
2023-09-15-10.00.00.542139	ONLMAIN	SQL11055	10,000,145	35,468,515	23,173,988	0	0	0	195,849	0	0	0	0	0	15	2
2023-09-15-10.00.00.542139	ONLPPP	SQL11055	10,001,456	34,924,033	22,722,438	0	0	0	187,570	0	0	0	0	0	12	2
2023-09-15-10.00.00.542139	ONLMAN	SQL11055	10,100,357	36,383,864	23,815,120	0	0	0	196,028	0	0	0	0	0	13	4
2023-09-15-10.00.00.542139	ONLXAP	SQL11055	10,030,555	34,276,691	22,442,466	0	0	0	191,602	0	0	0	0	0	9	2
2023-09-15-10.00.00.542139	ONLALC	SQL11055	10,000,569	39,837,342	26,119,479	0	0	0	213,017	0	0	0	0	0	6	0

Db2 System Monitor Profiles

- Provides a central control point to set various ZPARMs at a more granular level than what is set at the subsystem level
 - Use Cases
 - Reserve connection and threads for critical applications
 - Prioritize and assign resources to critical workload
 - Place limits/throttles on less important workload
 - Protect the system from any unexpected rogue access
 - Denial-of-service attack characteristics
 - Ability to supply appropriate settings to support a variety of applications
 - Manage migration to a new driver
 - Resources to manage
 - Connections (including security)
 - Threads (Idle Thread)
 - Special Registers / Global Variables
 - Db2 13 support of local threads
 - Modes
 - Warnings
 - Exceptions

System Monitor Profiles (example)

- Any remote connections running on Db2 with user ID (AUTHID) that begins with 'USER' is monitored
- The threshold allowed is 20 concurrent active / in-use threads
- if the profile exception is exceeded connection is terminated, DBAT pooled
- The 21st concurrent thread matching this profile will be rejected by Db2
- SQLCODE -30041 is returned to the client application

```
INSERT INTO  
SYSIBM.DSN_PROFILE_TABLE(PROFILEID,AUTHID,PROFILE_ENABLED)  
VALUES(3,'USER*','Y');
```

```
INSERT INTO SYSIBM.DSN_PROFILE_ATTRIBUTES(PROFILEID,KEYWORDS,ATTRIBUTE1,ATTRIBUTE2,ATTRIBUTE3)  
VALUES(3,'MONITOR THREADS','EXCEPTION_DIAGLEVEL3',20,0);
```

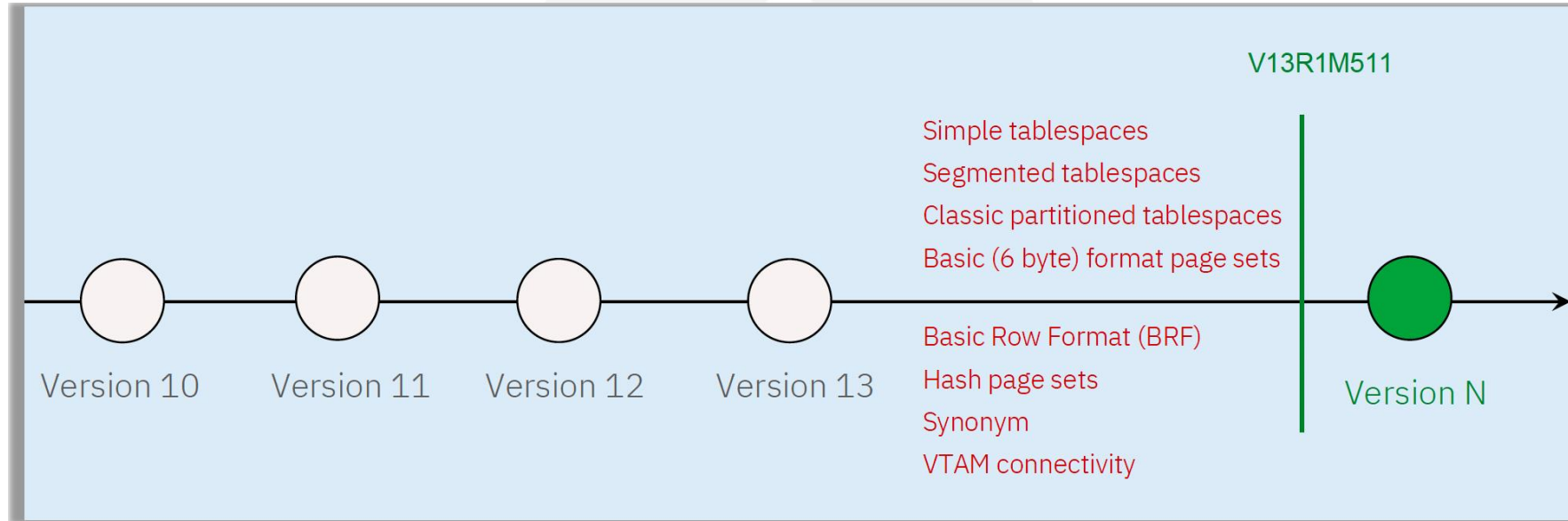
Db2 AI for z/OS – Monitoring & controlling remote connections

- a feature called Distributed connection control (DCC)
- The DCC feature leverages AI to learn the distributed connection behavior to control the flood of connections and threads using Db2 profile function.
- It recommends Db2 profile controls to prevent a remote application from impacting other remote applications and shows users the detailed thread and connection information so they can better manage connections.
- See [Overview of IBM Db2 AI for z/OS](#) and [Monitoring and controlling distributed connections](#)



SNA/VTAM ?

V13R1M511 – Obsolete, Deprecated Functions



[Important news regarding Db2 for z/OS versions](#)

V13: SNA/VTAM Support has been deprecated

- V13 is the LAST version of Db2 for z/OS to support the SNA communications protocol
 - Next future version of Db2 will have NO SNA support
 - When migrating to the next version of Db2, one must have activated to the last function level of V13 (V13R1M511)
 - Migration to utilizing TCP/IP for all inbound/outbound communications must have been completed
 - To activate the last function level of V13, all **active** data sharing group members will be required to be running in VTAM independence mode
 - Once the last function level of V13 has been activated, any subsequent member that is started without VTAM independence will be assumed to be running VTAM independence
 - Warning message will be issued as to Db2 assuming an IPNAME
 - IPNAME will be derived from:
 - Other member current IPNAME value
 - When data sharing group, IPNAME will be derived from BSDS generic LUNAME parameter, OR the current BSDS LUNAME parameter (if generic LUNAME unavailable, or standalone subsystem), OR
 - IPNAME will be DSNIPNAM

V13: SNA/VTAM Support has been deprecated ...

- VTAM Independence
 - Db2 Change Log Inventory (DSNJU003) must have been run against the member's BSDS to update the DDF record's IPNAME field to an up to 8 non-blank alphanumeric characters (first character alphabetic) string
 - When DDF is then started, no SNA/VTAM support is activated, only TCP/IP support is available

```
DSNJCNUVU CONVERSION PROGRAM HAS RUN DDNAME=SYSUT1
DSNJCNUVU CONVERSION PROGRAM HAS RUN DDNAME=SYSUT2
DDF IPNAME=SYEC4DB2
DSNJ225I DDF OPERATION COMPLETED SUCCESSFULLY
DSNJ200I DSNJU003 CHANGE LOG INVENTORY UTILITY PROCESSING COMPLETED
SUCCESSFULLY
```

V13: SNA/VTAM Support has been deprecated ...

- -DISPLAY GROUP command to be updated with a new DDF option to show the status of DDF settings across the group, including whether Db2 is running with an IPNAME value:
 - -DISPLAY GROUP DDFINFO
 - modified command output

DDF CONFIGURATION						

DB2					SEC	RES
MEMBER	DDFSTART	LOCATION	IPNAME	PORT	PORT	PORT

DB2A	COMMAND	STLEC1	SYEC1GLU	446	448	5001
		GRPIPv4:	101.102.103.100			
		IPV4:	101.102.103.101			
		GRPIPv6:	1111:2222:3333:4444:5555:6666:7777:0100			
		IPV6:	1111:2222:3333:4444:5555:6666:7777:0101			
DB2B	AUTO	STLEC1	SYEC1GLU	446	448	5002
		GRPIPv4:	101.102.103.100			
		IPV4:	101.102.103.102			
		GRPIPv6:	1111:2222:3333:4444:5555:6666:7777:0100			
		IPV6:	1111:2222:3333:4444:5555:6666:7777:0102			
DB2C	NO					

Converting from SNA/VTAM to TCP/IP

- V13 manuals have been updated with the following section:
 - [Converting to TCP/IP communication from VTAM in Db2 for z/OS](#)
- To migrate, one must make changes to the requesting Db2's Communications DataBase (CDB)
 - SYSIBM.LOCATIONS table rows must have a PORT value representing the target Db2's main, secure, regular alias, or secure alias port
 - SYSIBM.IPNames table rows must be inserted where the LINKNAME column of the SYSIBM.IPNames row must match the LINKNAME column of a SYSIBM.LOCATIONS row
 - Utilize the existing LINKNAME column value of the SYSIBM.LOCATIONS table row to be the value of the LINKNAME column of the new SYSIBM.IPNames table row
 - Unlike SNA communications, there are NO CDB tables accessed at the serving Db2
 - i.e. no bypassing authentication, etc. (inbound userid translation is not available)
 - No SYSIBM.LUNAMES table rows are accessed at the serving Db2

Converting from SNA/VTAM to TCP/IP ...

- Currently many SYSIBM.LUNAMES rows have SECURITY_OUT='A' (Already-verified)
 - Db2 servers should never allow TCP/IP already-verified (i.e. TCPALVER should never be YES)
 - SYSIBM.IPNAMES rows should use SECURITY_OUT='T' (Identity token) ---- OR ----
 - If SECURITY_OUT is 'R' (RACF PassTickets), then userid from requester must not be a RACF protected userid (next version will not allow RACF protected userids with a PassTicket)
 - RACF Passtickets will work with protected userids (in the following way):
 - SYSIBM.LOCATIONS row must have TRUSTED column set to 'Y'
 - SYSIBM.IPNAMES row USERNAMES column should be an 'S' and SECURITY_OUT column should be an 'R'
 - SYSIBM.USERNAMES TYPE='S' row exists for the **system authid** of the trusted context to be used at the server
 - Server should have a defined Trusted Context for connections from the requester's TCPIP stack ip-address:

```
CREATE TRUSTED CONTEXT <some name representing requester>  
  BASED UPON CONNECTION USING SYSTEM AUTHID <system_authid>  
  ENABLE ATTRIBUTES (ADDRESS '<ip address/hostname of requester (not its serving ip address)>')  
  WITH USE FOR PUBLIC WITHOUT AUTHENTICATION
```

- Requester may have to perform outbound userid translations
 - If SYSIBM.LUNAMES rows at server have USERNAMES column of 'B' or 'I' and SYSIBM.USERNAMES table has rows of TYPE='I' and LINKNAME column matches LUNAME value of SYSIBM.LUNAMES row

Questions





REFERENCES

References

- Configuration of Sysplex workload balancing and automatic client reroute for Java clients
<https://www.ibm.com/docs/en/db2/11.5?topic=jcdcshacdzs-configuration-sysplex-workload-balancing-automatic-client-reroute-java-clients>
- Configuration of Sysplex workload balancing and automatic client reroute for applications other than Java
<https://www.ibm.com/docs/en/db2/11.5?topic=njcshacdzs-configuration-sysplex-workload-balancing-automatic-client-reroute-applications-other-than-java>
- Calculating the storage requirement for the extended common service area
<https://www.ibm.com/docs/en/db2-for-zos/13?topic=requirements-calculating-storage-requirement-extended-common-service-area>
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References

- General questions for setting maxTransportObjects
<https://www.ibm.com/support/pages/general-questions-setting-maxtransportobjects>
- Monitoring storage utilization
<https://www.ibm.com/docs/en/zos/2.5.0?topic=growth-monitoring-storage-utilization>
- SMF type 72 Subtype 3
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<https://www.ibm.com/docs/en/zos/2.5.0?topic=entries-performance-index>
- Viewing performance index details
<https://www.ibm.com/docs/en/zos/2.5.0?topic=resources-viewing-performance-index-details>

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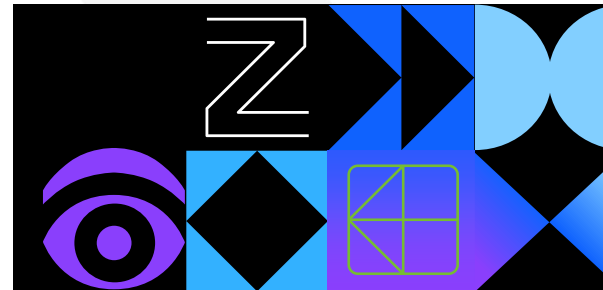
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