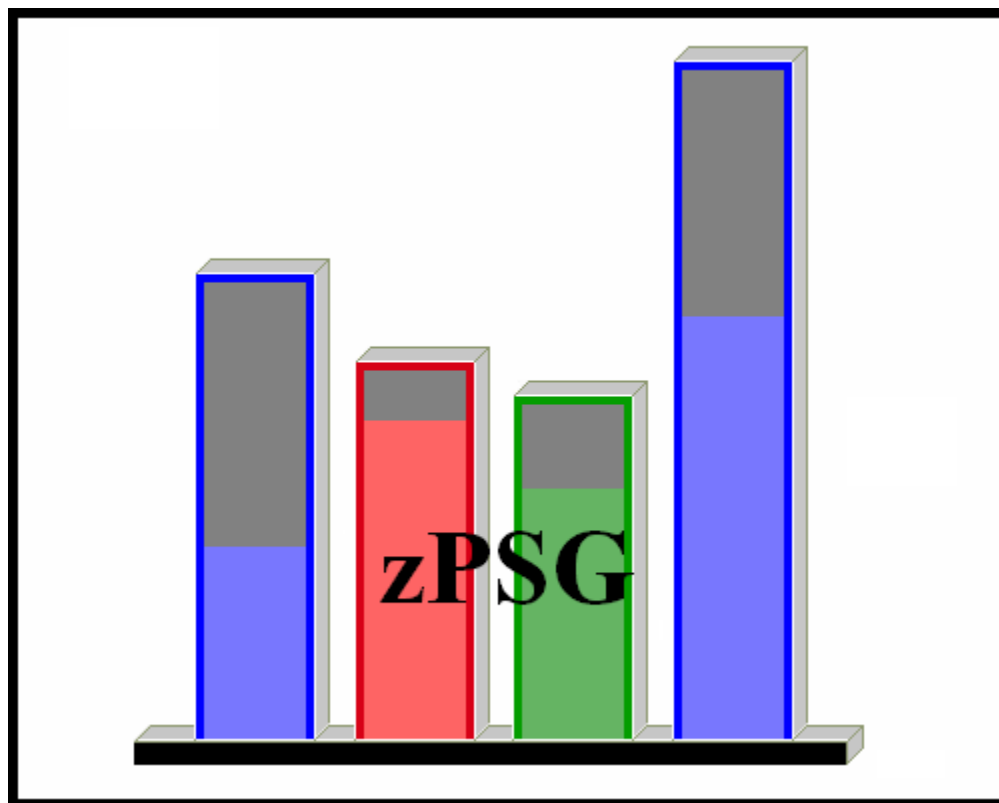


Processor Selection Guide
for
IBM System z

zPSG
User's Guide
for
DB2 Transaction



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DB2 Transaction

z/OS

This tool provides estimates of System z processor capacity for DB2 transaction processing using IBM DB2 V8 or V9 for z/OS.

See the [DB2 Transaction Glossary of Terms](#) for a definition of terms used in describing DB2 Transaction applications.

[DB2 for z/OS Overview](#)

Features and benefits

IBM DB2 for z/OS is the leading enterprise data server, designed and tightly integrated with IBM System z™ mainframe to leverage the strengths of IBM System z, and to reduce total cost of ownership through process enhancements and productivity improvements for database administrators and application developers. New structures, such as the ability to make changes to data definitions without disrupting online performance, continue to enhance availability and scalability in DB2, and bottlenecks have been removed to ensure the position of DB2 as a performance leader. Enhancements such as pureXML™, extended SQL, additional features that continue to deliver unparalleled security and streamlined compliance, and enablement of high-volume transaction processing for new applications, DB2 for z/OS provides the core infrastructure for the next wave of Web business applications and SOA initiatives.

Total cost of ownership

Reduced people costs and hardware-software-operating system synergy ensure more resilience, better function, and improved value in DB2 for z/OS:

- Integration with the latest IBM [System z9](#) processors including [zIIP Enterprise & Business class](#)
- IPv6, Secure Socket Layer (SSL), Channel improvements (MIDAW), and new data types including XML, BIGINT, decimal float
- Improved hardware compression
- New z/Architecture instructions

Availability and business resiliency

DB2 for z/OS remains a leader in continuous availability with unique improvements such as online schema evolution, including the ability to add partitions and change data definitions with ALTER statements, online unload and replace, and improved [backup and recovery](#) utilities.

Scalability to grow without impacting performance

New partitioning, clustering, and index options, along with important optimization improvements, such as improved INSERT, UPDATE, and DELETE processing, buffer scalability enhancements, make DB2 for z/OS the right choice for large and growing databases.

Queries and data warehousing

[Faster response and reduced processing times](#) come from improvements to optimization and better information for the optimizer, which benefits a host of query types. Combined with new database design options for indexes, clustering, materialized query tables, and the ability to rotate partitions provide the capabilities to support complex support warehouses. [Learn More](#)

Portability, productivity, and ease of migration

Rich SQL enhancements, including new data types for decimal floating point and spatial data, and new built-in functions provide better compatibility within the DB2 family and throughout the industry. Whether you develop on Windows, UNIX, or Linux, the move to z/OS has become easier. DB2 for z/OS provides a secure, available, and efficient environment for SAP applications. [Learn More](#)

Bet-your-business security and compliance

Legendary mainframe security and enhanced data encryption mean that DB2 for z/OS is ready to protect your data and comply with growing compliance and audit requirements. [Learn More](#)

Service oriented architecture

Leading-edge standards-based capabilities enable SOA requirements, and Improved SQLJ and JDBC support, a new Java Universal Driver, enhanced UNICODE support, Websphere integration, and new pureXML functions make Java and web applications more robust and productive. [Learn More](#)

DB2 Query Management Facility

Your ability to distribute reporting information quickly throughout the enterprise has been exponentially increased thru the WebSphere® component of QMF™ Enterprise Edition. The Eclipse based product extends QMF-supported platforms to Linux, Solaris and HP-UX. QMF Enterprise Edition also extends its support beyond DB2 9 to include IDS support.

How To Do a DB2 Transaction Sizing

When you select DB2 Transaction sizing support from the *Product Selection* window to begin a new sizing, the [DB2 Transaction Application Definition](#) input window is presented.

The general approach to sizing DB2 Transaction applications on System z is to determine which of the transaction profiles best represent the customer's application and provide an average transaction rate per second during a peak interval and detailed SQL information for each of these profiles. Refer to [Transaction Profile Descriptions](#) for a complete list of the transaction profiles that can be included in a sizing. The **Profile** button for each profile must be used to define the processing included in that profile. In addition to the transaction rate, also provide the percent of the DB2 objects involved in Data Sharing, the location of the transaction accessing DB2 and the access/connector where applicable for each profile included in the sizing. Default values are provided for each of these input fields.

There are four categories of transaction profiles supported:

1. Data Load
2. DB2 Access from Traditional z/OS OLTP Transaction
3. DB2 Access from WAS, other J2EE or C Transaction
4. DB2 Access from Batch Jobs (J2EE or non-Java)

The Data Load category contains a profile for the Load Utility and a profile for Batch SQL programs. Each of the other three categories contains profiles that represent three levels of complexity that include trivial, moderate, and complex.

The profiles included in a sizing should be running concurrently during the same peak interval of activity. There may be more than one peak interval of activity in a day, week, or month. For example, the peak interval for online transaction processing (OLTP) may be from 10am to 11am each day and the peak interval for batch processing may be from 10pm to 11pm each day. If you include OLTP and batch processing profiles in one sizing you will be over-estimating the capacity requirement. As a result, a sizing for each peak interval is required to determine the capacity needed to support all DB2 processing being sized by using the largest sizing estimate.

The usual span of time for a peak interval is 15 minutes, and you want to specify the average transactions per second for that interval. Note that if you have statistics for the average transaction rate for prime shift or for a day or week, you might want to apply a peak-to-average multiplier factor to averages for long periods of time to arrive at an average rate for a 15 minute interval.

To see results, click on the **Summary Report**, **CPU Utilization** or **Transaction Rate** buttons in the **Reports and Capacity Projections** section of the window.

The application window images shown in this user guide have been provided as a representation of the windows the user will see when using zPSG but there may be minor differences from the current version of zPSG, such as version numbers and dates.

DB2 Transaction Application Definition

zPSG - DB2 Transaction Application Definition [untitled]

File Help

IBM System z Processor Sizing
DB2 Transaction Sizing Support on z/OS

Customer : Application name :

Transaction Descriptions

Which profiles run during the same period of time?

	Avg. DB2 Trans per	Unit of Time	% of DB2 objects involved in Data Sharing	Where does tran accessing DB2 run?	Access/ Connector	
Data Load						
1: Load Utility	0.0000	Hour	0.00	Local		Profile
2: Batch SQL program	0.0000	Hour	0.00	Local		Profile
DB2 Access from Traditional z/OS OLTP Transaction						
3: OLTP-Trivial	0.0000	Second	0.00	Local		Profile
4: OLTP-Moderate	0.0000	Second	0.00	Local		Profile
5: OLTP-Complex	0.0000	Second	0.00	Local		Profile
DB2 Access from WAS, Other J2EE or C Transaction						
6: J2EE-Trivial	0.0000	Second	0.00	Local	Type 2 - JDBC	Profile
7: J2EE-Moderate	0.0000	Second	0.00	Local	Type 2 - JDBC	Profile
8: J2EE-Complex	0.0000	Second	0.00	Local	Type 2 - JDBC	Profile
DB2 Access from Batch Jobs (J2EE or non-Java)						
9: Batch-Trivial	0.0000	Hour	0.00	Local	Legacy Batch	Profile
10: Batch-Moderate	0.0000	Hour	0.00	Local	Legacy Batch	Profile
11: Batch-Complex	0.0000	Hour	0.00	Local	Legacy Batch	Profile

Reports and Capacity Projections

characterizing the average transaction

to support peak transaction rate

support within SDP of %

Enter Transaction information and press Profile Button to enter profile.

This window is displayed when the **PSG** button is clicked on the **Product Selection** window when **DB2 Transaction** has been selected for z/OS.

Note: A transaction rate greater than zero must be specified for at least one profile that has valid profile input to get a sizing estimate.

Description of Input Fields

Menu bar

File

New	Start a new study. Sets all fields to initialization values.
Load	Load a previously saved study
Save	Save the current study
Save as	Save the current study as a new file
Exit (Ctrl-E)	Exit window and return to the <i>Product Selection</i> window
Exit zPSG	Terminate zPSG execution (Ctrl-Q). Exit zPSG can also be invoked from the Exit zPSG button on the tool bar.

Help

Context Help (F1)	Help for this window
About zPSG	Product information

Toolbar

- ? button** Click this button to go to Help for this window.
- Exit zPSG button** Click this button to terminate **zPSG** execution.

Customer =

Input field, for documentation purposes, not required. If you want to save a copy of the sizing estimate, you can use this field to document which sizing it is.

Application name =

Input field, for documentation purposes, not required. If you want to save a copy of the sizing estimate, you can use this field to document which sizing it is.

Transaction Profile Descriptions

This section provides a list of the profiles that can be included in a sizing. A profile is included in a sizing by providing a transaction rate per second greater than zero and pressing the **Profile** button to provide detailed information requested. You should also provide input values for percent of objects involved in data sharing, location where the transaction accessing DB2 runs, and access/connector where applicable. The profiles are divided into four categories of processing named Data Load, DB2 Access from Traditional z/OS OLTP Transaction, DB2 Access from WAS, J2EE or C Transaction, and DB2 Access from Batch Jobs.

The user specifies which categories of profiles run during the same period of time so the appropriate profiles are included in the same sizing report.

Data Load

The Data Load profiles characterize processing that loads data into one or more DB2 tables. This processing typically involves inserting millions of rows into a new or existing DB2 tables.

Load Utility

Batch SQL Program

DB2 Access from Traditional z/OS OLTP Transaction

OLTP (online transaction processing) is a class of program that facilitates and manages transaction-oriented applications, typically for data entry and retrieval transactions in a number of industries, including banking, airlines, mail order, supermarkets, and manufacturers. Probably the most widely installed OLTP product is IBM's CICS (Customer Information Control System).

OLTP-Trivial

OLTP-Moderate

OLTP-Complex

DB2 Access from WAS, other J2EE or C Transaction

Note that the notion of a "transaction" for WAS and other J2EE applications is modeled on a "business transaction" and can often involve multiple interactions between the user and WAS, as well as multiple back-end OLTP & DB2 transactions. The transaction rates here should be specified in terms of DB2 transactions, which can be different from WAS transaction rates. If a J2EE transaction accesses an IMS or CICS transaction that then access DB2, use the OLTP section for them, not this section.

J2EE-Trivial

J2EE-Moderate

J2EE-Complex

DB2 Access from Batch Jobs (J2EE or non-Java)

These transaction profiles support accessing DB2 transactions from batch jobs running legacy and J2EE applications.

Note that SQL calls in an online transaction (OLTP) tend to go after a very small subset of rows. For example, an Open Cursor followed by less than 10 or 100 rows fetched. On the other hand, SQL calls in a batch transaction tend to go after a large subset of rows. For example, fetching, updating, and/or inserting thousands or even millions of rows. As a result, the number of SQL calls issued in a batch transaction tends to be much higher than that in an online transaction. There is a much higher opportunity to exploit multi-row fetch and/or insert in a batch transaction as a result. A batch transaction which issues millions of Insert calls is the same as "Data Load" via Batch SQL Program.

Batch-Trivial

Batch-Moderate

Batch-Complex

Input Fields and Buttons

Which profiles run during the same period of time?

Indicate which profiles run during the same period of time by selecting one of the following three options:

1. All profiles
2. Data Load Profiles only
3. All but Data Load Profiles (default)

When the first option is selected all profiles are available for a sizing. Use this option when the Data Load profiles will be executing during the same peak interval as the other transaction profiles.

When the second option is selected only the two data load profiles are available for a sizing and all other transaction profiles are disabled. Use this option when the Data Load profiles will be executing during a different peak interval than the other transaction profiles.

When the third option is selected all the profiles are available for a sizing except the Data Load profiles. Use this option when the Data Load profiles will be executing during a different peak interval than the other transaction profiles or when you want to exclude the Data Load profiles in the sizing.

Avg. DB2 Trans per

Specify an average transaction rate per unit of time specified for each of the profiles that should be included in the sizing. Specify a value of zero if the profile should not be included in the sizing. The default value for each of the profiles is zero.

Unit of Time

Specify the unit of time the average transaction rate is measured in. Select from Hour, Minute or Second.

% of DB2 Objects involved in Data Sharing

Specify the percentage of the objects that are involved in Data Sharing.

The data sharing function of DB2 for z/OS enables applications that run on more than one DB2 for z/OS subsystem to read from and write to the same set of data concurrently.

DB2 subsystems that share data must belong to a DB2 data sharing group, which runs on a System z Parallel Sysplex cluster. A *data sharing group* is a collection of one or more DB2 subsystems that access shared DB2 data.

Where Does Tran Accessing DB2 Run?

Select from one of the following options:

- Local – select this if the transaction accessing DB2 runs on the same system as DB2.
- Remote - select this if the transaction accessing DB2 runs on a different system than DB2 is running on.

Note: For the Load Utility, Local is the only option available.

Access/Connector

This an input field for the DB2 Access from WAS, other J2EE or C Transaction and DB2 Access from Batch Jobs profiles. The selection list changes based on the option selected for **Where does tran accessing DB2 Run** as shown below:

DB2 Access from WAS, other J2EE or C Transaction

Local: Type 2-JDBC, Type 2-SQLJ, Type 4-JDBC and Type 4-SQLJ.

Remote: Type 4-JDBC and Type 4-SQLJ

DB2 Access from Batch Jobs

Local: Legacy Batch, Type 2-JDBC, Type 2-SQLJ, Type 4-JDBC and Type 4-SQLJ.

Remote: Legacy Batch, Type 4-JDBC and Type 4-SQLJ

Note: JDBC vs SQLJ - JDBC supports dynamic SQL which requires dynamic bind or Prepare while SQLJ supports static SQL which avoids dynamic bind. Therefore, short-running SQL calls can be much more efficient with static SQL under SQLJ in contrast to dynamic SQL under JDBC.

Note: Legacy Batch should be used for those old COBOL, C and SQL programs which were written to access DB2. They are compiled, bound and are run to access DB2 data on a z/OS host system.

Profile button

Click this button to define specific information for the profile associated with this button. There are two different flavors of the profile definition window. The Load Utility profile definition window is different than the window used for the other profiles. Profile information must be entered along with the transaction rate before the profile can be included in a sizing.

Note: The short description for each profile is displayed in a tool tip when the mouse pointer is over the name of the profile.

Reports and Capacity Projections

This section provides buttons to view output windows with summary reports and capacity projections.

Summary Report button

Click this button to view a summary of the input assumptions for the sizing and a breakdown of the CPU/transaction among the transaction profiles included in the sizing.

CPU Utilization button

Click this button to see an output window with estimates of processor utilization for all System z processors supported in zPSG.

Transaction Rate button

Click this button to see an output window with estimates of transaction rates that can be supported on all System z processors supported in zPSG. You can also see the transaction rates that can be supported within a Saturation Design Point (SDP) specified for the processors.

SDP %

Description

Input field, numeric, valid range is 1 to 100.

SDP stands for Saturation Design Point. This is a classic capacity planning concept which allows you to examine the amount of workload than can be supported in less than the full capacity of the processor model. It applies to the Transaction Rate output window and enables you to determine how much work can fit into a processor that is already being used for other applications.

Default

The default is 90%.

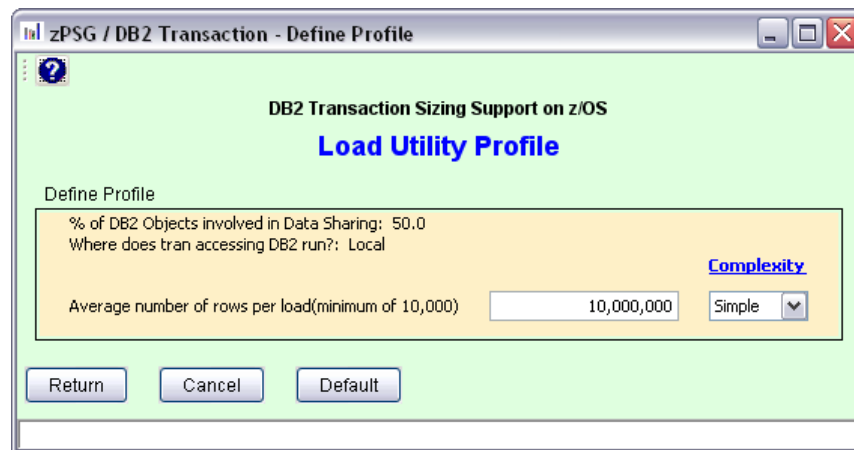
Return button

Click this button to return to the *Product Selection* window.

Reference-CPU button

Click this button to go to a window to change the System z processor used as a basis for capacity ratings. See the Reference-CPU section in the zPSG User's Guide for information about this setting.

Load Utility Profile Definition Window



This window is displayed when the Load Utility **Profile** button is clicked on the primary **DB2 Transaction Definition** window. It is used to enter detailed profile information for the Load Utility.

Note: The first two lines displayed in the Define Profile area provide information entered on the primary input window for the selected profile. This information can't be changed on this window.

Load Utility Input Fields and Buttons

Average number of rows per load

This is a required input field. The default is 10,000,000 rows.

Complexity

Specify the complexity of the rows being loaded by selecting Simple, Medium, or Complex from the drop-down option list. There are many variables that affect the complexity but the most important factor is the number of indexes. Specify Simple if there is 0 or 1 index, Medium if there are 2 or 3 indexes, or Complex if there are more than 3 indexes. The default complexity is Simple.

Return button

Click this button to return to the **DB2 Transaction Application Definition** window with using inputs you have entered.

Cancel button

Click this button to return to the **DB2 Transaction Application Definition** window without saving any changes that you entered.

Default button

Click this button to restore defaults of this window.

Profile Definition Window

DB2 Transaction Sizing Support on z/OS
OLTP-Trivial Profile

Define Profile Per Typical Transaction

% of DB2 Objects involved in Data Sharing: 0.0
Where does tran accessing DB2 run?: Local
Access/Connector: N/A

Thread Management

% of Thread Reuse 30.00 % of Thread Create/Terminate
% of Release De-allocate 90.00 % of Release Commit

SQL statements

Number of Open Cursors (includes cost of Close) Number of rows: single-row fetched
multi-row fetched
Number of Prepares % hit in Global DSC
Number of Selects without an Open Cursor
Number of rows: single-row inserted
multi-row inserted
Number of rows updated
Number of rows deleted
Number of Stored Procedure Calls
Number of Read-Only Commits
Number of Update Commits

This window is displayed when the **Profile** button is clicked on the primary **DB2 Transaction Definition** window. It is used to enter detailed profile information for every profile except for the Load Utility profile.

Note: The first three lines displayed in the Define Profile area provide information entered on the primary input window for the selected profile. This information can't be changed on this window.

Profile Input Fields and Buttons

Message Send/Receive

Number of Send/Receive Message Pairs for access from remote system

This is used to estimate the CPU cost of sending and/or receiving messages in the distributed environment. If there are more messages received than sent, or vice-versa, add the two numbers and then divide by 2 to get a rough approximation to the cost of send/receive message pairs. For example, if 100 messages are sent but 10000 messages are received, then an estimated number of message pairs for a rough cost estimation is $(100+10000)/2 = 5050$.

This is a required input field when DB2 is accessed from Remote system. Specify the number of Send/Receive Message Pairs from remote system. This value must be greater than zero.

Thread Management

% of Thread Reuse

Thread reuse can be determined from DB2 Accounting record.

The default is 70%. The % of thread Create/Terminate will be calculated based on this value. The two values add up to 100%.

% of Release De-allocate

Release De-allocate or Commit is a bind option.

The default is 10%. The % of Release Commit is calculated based on this value. The two values add up to 100%.

Note: This section is not applicable and will not be displayed for the Batch SQL Program profile as the cost of thread creation/allocation and de-allocation/termination is typically insignificant relative to the amount of SQL processing in the batch environment.

SQL Statements

Number of Open Cursors (include cost of close)

Number of rows: single-row fetched

Multi-row fetched

When number of Open Cursors(include cost of close) is defined the sum of single-row fetched and Multi-row fetched should be greater than zero.

Number of Prepares

This is a required field when JDBC connector is selected from the main input screen for the selected profile

This field and the % hit in Global DSC field are ignored if SQLJ connector is selected. In fact these two fields will be grayed out when SQLJ is selected.

% hit in Global DSC

The default Value for this is 75.

Number of Selects without an Open Cursor

This is ignored when JDBC connector is selected from the main input screen for the selected profile and will be grayed out.

Number of row: single-row inserted

Multi-row inserted

Number of rows updated

Number of rows deleted

Number of Stored Procedure Calls

Number of Read-Only Commits

Number of Update Commits

Note: The number for SQL statements and rows above should be average numbers.

Complexity

Specify the complexity of each SQL statement included in the sizing by selecting Simple, Medium, or Complex from the corresponding drop-down option list. The complexity selection is used to characterize the CPU consumption of the SQL statement, not the complexity of the statement itself.

The factors which can influence Simple, Medium, or Complex categorization includes the use of trigger, user defined functions, number of predicates evaluated, number of tables, columns, and rows scanned, column type, Java and DB2 column type matching, compression, encryption, row-level security, trace options, CPU for I/O, sort, referential integrity check and table check constraints, LOB, data sharing overhead (e.g. distance of remote Coupling Facility), number of indexes updated in Insert, Update, Delete, table and index size, etc.

The result of such estimation should be taken with great caution. Simple tends to represent the lower bound of CPU consumption which should be realistically reasonable. Simple represents SQL processing typically against a single table, i.e. no join or sub-query, processing one or a small number of rows less than 10 via matching semi-unique index with equal predicate with none of the special features such as trigger, user defined function, referential integrity check, etc. Medium and Complex SQL statements will be dealing with more rows in more tables using more of the special features listed above. As a result, Medium and Complex SQL statements can have a much wider range of CPU consumption and can't be as precise. This sizing model assumes that the CPU consumption for Medium complexity is 2 to 3 times higher than Simple complexity and Complex is 5 to 10 times higher than Simple. This characterization of complexity may not reflect any given workload being modeled. There is also no accounting for any resource contention impact coming from many concurrent transactions competing for various locks and latches, resulting in dramatically higher lock requests, Getpage requests, lock/latch contentions which all lead to higher CPU consumption than expected.

The default complexity values will be Simple for all Trivial profiles, Medium for all Moderate profiles, and Complex for all Complex profiles.

Return button

Click this button to return to the ***DB2 Transaction Application Definition*** window with using inputs you have entered.

Cancel button

Click this button to return to the ***DB2 Transaction Application Definition*** window without saving any changes that you entered.

Default button

Click this button to restore defaults of this window.

DB2 Transaction Application Activity Summary

Profile	Single Profile Capacity	Profile Rate / sec	Total Profile Capacity	CPU Distribution
Data Load				
1. Load Utility	83,262.227	0.0020	166.524	31.5%
2. Batch SQL Program	0.520	10.0000	5.204	1.0%
DB2 Access from Traditional z/OS OLTP Transaction				
3. OLTP-Trivial	0.548	10.0000	5.484	1.0%
4. OLTP-Moderate	1.589	10.0000	15.886	3.0%
5. OLTP-Complex	9.227	10.0000	92.266	17.5%
DB2 Access from WAS, Other J2EE or C Transaction				
6. J2EE-Trivial	0.670	10.0000	6.700	1.3%
7. J2EE-Moderate	1.901	10.0000	19.006	3.6%
8. J2EE-Complex	10.384	10.0000	103.840	19.7%
DB2 Access from Batch Jobs (J2EE or non-Java)				
9. Batch-Trivial	0.548	10.0000	5.484	1.0%
10. Batch-Moderate	1.539	10.0000	15.389	2.9%
11. Batch-Complex	9.227	10.0000	92.266	17.5%
Load overall Total:	5.280	100.0020	528.048	100%

Percent of workload estimated to be eligible for zIIP processing varies significantly, please refer to on-line help for additional information.

Return Utilization Report Transaction Rate Report Show Assumptions

This window is displayed when the **Summary Report** button is clicked on the primary **DB2 Transaction Application Definition** window. It shows a breakdown of the CPU per transaction for the various profiles included in the sizing.

Menu bar

File

Output Write contents to a flat (PRN) file.

Copy Write contents to Window's clipboard

Graph

Generates a pie chart showing the distribution of application activity

Help

Context Help (F1) Help for this window

About zPSG Product information

Toolbar**1st button**

Click this button to send sizing information to a PRN file for processing outside of zPSG.

2nd button

Click this button to send sizing information to the clipboard, so that you can copy it into a note or other document.

? button

Click this button to go to Help for this window.

Profile column

Lists the transaction profiles available on the primary ***DB2 Transaction Application Definition*** window.

Single Scenario Capacity column

Reflects the amount of CPU (as represented by the Capacity Rating) for each scenario, and at the bottom for all transactions.

Scenario Rate / sec column

Reflects the number of scenarios completed per second for each of the transaction profiles as specified on the ***DB2 Transaction Application Definition*** window.

Total Tran Capacity column

Reflects the amount of CPU (as represented by the Capacity Rating) for each scenario multiplied by the transaction rate specified in the ***Scenario Rate / sec*** column, and at the bottom for all transactions.

CPU Distribution column

Shows the percentage of the CPU/transaction used by each scenario.

Percent of workload estimated to be eligible for zIIP Processing = (z/OS only)

Currently four DB2 functions support offload from general purpose CP to zIIP or zAAP, typically in the range of 10 to 50%.

- DRDA transaction over TCP/IP (distributed) - a portion of DRDA transaction CPU time offloaded to zIIP. This is used by the JDBC Type 4 connector to access a remote DB2 database.
- Load utility in the Bulk Data Load - a portion of Build Index phase offloaded to zIIP.
- Parallel query - typically not applicable in the transaction environment.
- Some XML System Services offloaded to zAAP.

Push Buttons

Click the **Return** button to return to the primary ***DB2 Transaction Application Definition*** input window.

Click the **Utilization Report** button to go to the ***DB2 Transaction Processor Capacity Projections - Processor Utilization*** output window.

Click the **Transaction Rate Report** button to go to the ***DB2 Transaction Processor Capacity Projections - Transaction Rate Supported*** output window.

Click the **Show Assumptions** button to see a list of the assumptions for the sizing in the ***DB2 Transaction Application Transaction Assumptions*** window.

DB2 Transaction Assumptions

zPSG - DB2 Transaction Scenario Assumptions [C:\Work\John\zpsg\studyfiles\DB2 Tran\zpsgug.zpsgdb2tranz]

For this application ...
the DB2 Transaction workload is characterized by the following assumptions

	Average DB2 Rate/sec	% of DB2 Object Involved In Data Sharing	Where Does Tran Accessing DB2 Run	Access/ Connector
Data Load				
DB2 Maintenance Period: During online processing (sizing includes all profiles)				
1. Load Utility	0.0020	50.0	Local	
2. Batch SQL Program	10.0000	50.0	Local	
DB2 Access from traditional z/OS OLTP Transa				
3. OLTP-Trivial	10.0000	50.0	Local	
4. OLTP-Moderate	10.0000	50.0	Local	
5. OLTP-Complex	10.0000	50.0	Local	
DB2 Access from WAS, Other J2EE or C Transac				
6. J2EE-Trivial	10.0000	50.0	Local	Type 2 - JDBC
7. J2EE-Moderate	10.0000	50.0	Local	Type 2 - JDBC
8. J2EE-Complex	10.0000	50.0	Local	Type 2 - JDBC
DB2 Access from Batch Jobs (J2EE or non-Java				
9. Batch-Trivial	10.0000	50.0	Local	Legacy Batch
10. Batch-Moderate	10.0000	50.0	Local	Legacy Batch
11. Batch-Complex	10.0000	50.0	Local	Legacy Batch
Profile 1: Load Utility				
Average number of rows per load (minimum of 10,000)		10,000,000.0	Complexity:	Simple
Assumed to be 200 bytes with 20 columns				
Profile 2: Batch SQL Program				
SQL Statement				Complexity
Number of Open Cursors (includes cost of Close)	1.0	Number of rows: single-row fetched	10.0	Simple
		multi-row fetched	0.0	
Number of Prepares	1.0	% hit in Global DSC	75.0	Simple
Number of Selects without an Open Cursor	1.0			Simple
Number of rows: single-row inserted	1.0			Simple
multi-row inserted	0.0			
Number of rows updated	1.0			Simple
Number of rows deleted	1.0			Simple
Number of Stored Procedure Calls	1.0			Simple

Return

This window is displayed when the **Show Assumptions** button is clicked on the **DB2 Transaction Application Activity Summary** window.

All assumptions as listed will be included when generating output for the **Summary** window.

DB2 Transaction Processor Utilization

DB2 Transaction Processor Capacity Projections

IBM System z Processor Sizing
DB2 Transaction on z/OS
 IBM - DB2App
 Processor Utilization to Support 100.0020 Transactions per Second
 General Purpose CPs
 Capacity based on z/OS-1.9 LSPR Data (10/21/2008) using "LoIO-Mix" workload
 Capacity values are relative to the IBM 2094-701 assumed at 602 MIPS

Processor	Feature	Flag	MSU	Capacity Rating	Projected Utilization	# Servers Required
System z9 EC/700						
2094-701	1W	=	81	602	88%	
2094-702	2W	=	158	1,184	45%	
2094-703	3W	=	229	1,747	30%	
2094-704	4W	=	298	2,292	23%	
2094-705	5W	=	363	2,818	19%	
2094-706	6W	=	422	3,327	16%	
2094-707	7W	=	479	3,819	14%	
2094-708	8W	=	532	4,295	12%	
2094-709	9W	=	584	4,757	11%	
2094-710	10W	=	640	5,206	10%	
2094-711	11W	=	690	5,643	9%	
2094-712	12W	=	742	6,067	9%	
2094-713	13W	=	795	6,480	8%	
2094-714	14W	=	843	6,881	8%	
2094-715	15W	=	893	7,271	7%	
2094-716	16W	=	938	7,650	7%	

Reference-CPU set to the IBM 2094-701 rated at 602
 Processors in view = 16; In listbox = 16; Selected = 001

Table View
 General Purpose CPs IFL CPs
 Family z9 EC/700
 All Within SDP Selected

Return

To view FLAG information, place pointer on a processor flag indicator

This window is displayed when the **Utilization** button is clicked on the **DB2 Transaction Application Definition** window or the **Utilization Report** button is clicked on the **DB2 Transaction Application Activity Summary** window.

Menu bar**File****Output** Write report contents to a flat (PRN) file.**Copy** Write report contents to Window's clipboard**Graph** (for processors currently selected in table)**Capacity** Generate bar graph depicting capacity values**Utilization** Generate bar graph showing utilization on selected processors**Help****Context Help (F1)** Help for this window**About zPSG** Product information**Toolbar****1st button**

Click this button to send sizing information to a PRN file, for processing outside of zPSG.

2nd button

Click this button to send sizing information to the clipboard, so that you can copy it into a note or other document.

? button

Click this button to go to Help for this window.

Table***Processor column***

A list of all processor models supported in zPSG

Feature column**For z/OS & Linux**Using the General Purpose CPs option under Table View, a designation of how many general purpose processing engines (CPs) for this entry. For example, 4W ("W" is short for "way") indicates 4 CPs or engines. Also see ***Flag*** column below.***Feature column*****For Linux only**Using the IFL CPs option under Table View, a designation of how many IFL engines for this entry. For example, 4W IFL ("W" is short for "way") indicates 4 IFL engines. Also see ***Flag*** column below.***Flag column***

If you place your cursor on a row in this column, an explanatory message about the System z model designation and the number of CP or IFL engines for the entry.

MSU column

Only for the General Purpose CPs Table View (does not apply to IFLs). Shows the MSU rating assigned to the number of CP engines for this entry.

Capacity Rating column

The capacity ratings reflect the relative capacity of each processor table entry to the reference-CPU and its capacity rating assigned on the Reference-CPU window. When **zPSG** is started the reference-CPU will be set to a 2094-701 (a z9 EC/700 processor with 1 general purpose CP) with a capacity rating of 602 MIPS.

Projected Utilization column

Shows the estimated CPU% for each processor entry in the table, based on the transaction rate(s), other options on the primary input window, and inputs specified for the profiles. This is the primary output for a sizing.

Servers Required column

If the estimated CPU% is greater than 100% (and therefore cannot fit on the processor), this column reflects the number of these models that would be needed to accommodate the load.

Table View Options Box

Click a radio button in each section to customize the processor entries shown in the table:

- **General Purpose CPs** shows entries with some number of general CP engines
- **IFL CPs** shows entries with some number of IFL engines (for Linux only)
- **Family** shows all processor models for the family selected (Default)
- **All** shows all processor models supported in zPSG
- **Within SDP** shows all models that can accommodate the load within the Saturation Design Point
- **Selected** shows only selected models. Models are selected by clicking on the entry while holding down the Ctrl key on your keyboard.

Return button

Click this button to return to the primary ***DB2 Transaction Application Definition*** window.

DB2 Transaction - Transaction Rate Supported DB2 Transaction Processor Capacity Projections

IBM System z Processor Sizing
DB2 Transaction on z/OS
IBM - DB2App
Transaction Rate Supported
General Purpose CPs
Capacity based on z/OS-1.9 LSPR Data (10/21/2008) using "LoIO-Mix" workload
Capacity values are relative to the IBM 2094-701 assumed at 602 MIPS

Processor	Feature	Flag	MSU	Capacity Rating	SDP = 90% ETR	SDP = 100% ITR
System z9 EC/700						
2094-701	1W	=	81	602	102.6	114.0
2094-702	2W	=	158	1,184	201.9	224.3
2094-703	3W	=	229	1,747	297.8	330.9
2094-704	4W	=	298	2,292	390.6	434.0
2094-705	5W	=	363	2,818	480.4	533.7
2094-706	6W	=	422	3,327	567.1	630.1
2094-707	7W	=	479	3,819	651.0	723.3
2094-708	8W	=	532	4,295	732.0	813.3
2094-709	9W	=	584	4,757	810.8	900.9
2094-710	10W	=	640	5,206	887.4	985.9
2094-711	11W	=	690	5,643	961.8	1,068.7
2094-712	12W	=	742	6,067	1,034.2	1,149.1
2094-713	13W	=	795	6,480	1,104.5	1,227.2
2094-714	14W	=	843	6,881	1,172.9	1,303.2
2094-715	15W	=	893	7,271	1,239.3	1,377.0
2094-716	16W	=	938	7,650	1,303.8	1,448.7

Reference-CPU set to the IBM 2094-701 rated at 602
Processors in view = 16; In listbox = 16; Selected = 001

Table View
 General Purpose CPs IFL CPs
 Family z9 EC/700
 All Within SDP Selected

Return

To view FLAG information, place pointer on a processor flag indicator

This window is displayed when the **Transaction Rate** button is clicked on the **DB2 Transaction Application Definition** window or the **Transaction Rate Report** button is clicked on the **DB2 Transaction Application Activity Summary** window.

Menu bar**File****Output** Write report contents to a flat (PRN) file.**Copy** Write report contents to Window's clipboard**Graph** (for processors currently selected in table)**Capacity** Generate a bar graph depicting capacity values**ETR** Generate bar graph showing transaction rate supported at SDP**ITR** Generate bar graph showing maximum transaction rate supported**Help****Context Help (F1)** Help for this window**About zPSG** Product information**Toolbar****1st button**

Click this button to send sizing information to a PRN file, for processing outside of zPSG.

2nd button

Click this button to send sizing information to the clipboard, so that you can copy it into a note or other document.

? button

Click this button to go to Help for this window.

Table***Processor column***

A list of all processor models supported in zPSG

Feature column**For z/OS & Linux**Using the General Purpose CPs option under Table View, a designation of how many general purpose processing engines (CPs) for this entry. For example, 4W ("W" is short for "way") indicates 4 CPs or engines. Also see **Flag** column below.***Feature column*****For Linux only**Using the IFL CPs option under Table View, a designation of how many IFL engines for this entry. For example, 4W IFL ("W" is short for "way") indicates 4 IFL engines. Also see **Flag** column below.***Flag column***

If you place your cursor on a row in this column, an explanatory message about the System z model designation and the number of CP or IFL engines for the entry.

MSU column

Only for the General Purpose CPs Table View (does not apply to IFLs). Shows the MSU rating assigned to the number of CP engines for this entry.

Capacity Rating column

The capacity ratings reflect the relative capacity of each processor table entry to the reference-CPU and its capacity rating assigned on the Reference-CPU window. When **zPSG** is started the reference-CPU will be set to a 2094-701 (a z9 EC/700 processor with 1 general purpose CP) with a capacity rating of 602 MIPS.

SDP= xx % -- ETR column

Shows the transaction rate for the application that can be supported within the Saturation Design Point specified on the ***DB2 Transaction Application Definition*** window (the default SPD is 90%). ETR stands for External Throughput Rate, which is a standard System z term for transaction rate.

SDP=100% -- ITR column

Shows the transaction rate for the application that can be supported at 100% CPU. ITR stands for Internal Throughput Rate, which is a standard System z term indicating the throughput that can be achieved at 100% CPU. ITR is computed by dividing the ETR by the CPU% (expressed as a decimal). This is the way to correctly rate the processor capacity of each entry in the processor table for this workload (as opposed to MIPS ratings, which are generally erroneous).

Table View Options Box

Click a radio button in each section to customize the processor entries shown in the table:

- **General Purpose CPs** shows entries with some number of general CP engines
- **IFL CP's** shows entries with some number of IFL engines (for Linux only)
- **Family** shows all processor models for the family selected (Default)
- **All** shows all processor models supported in zPSG
- **Within SDP** shows all models that can accommodate the load within the Saturation Design Point
- **Selected** shows only selected models. Models are selected by clicking on the entry while holding down the Ctrl key on your keyboard.

Return button

Click this button to return to the primary ***DB2 Transaction Application Definition*** window.

DB2 Transaction Sizing Assistance

Here are instructions for accessing the System z questionnaire from Techline. Note that on the Techline websites there are sizing questionnaires for distributed platforms in addition to System z. Be sure to use System z questionnaires for System z sizings. The questions and sizing methodologies are different from distributed platforms.

For IBMers:

1. Obtain the latest copy of the DB2 Transaction for z/OS sizing questionnaire from the following website:
 - <http://w3-03.ibm.com/support/americas/techline/sizewise2f.html>
2. Submit a sizing request to Techline using the instructions found in the sizing questionnaire.

For Business Partners:

1. Obtain the latest copy of the DB2 Transaction for z/OS sizing questionnaire via:
 - Phone: Call PartnerLine at 1-800-426-9990 (US and Canada)
 - Email: pwcs@us.ibm.com
 - Online: <http://www.ibm.com/partnerworld/techline>
2. Submit a sizing request to Techline using the instructions found in the sizing questionnaire.

DB2 Transaction Glossary of Terms

Cursor

See DB2 Cursor

Data connector

Software that provides support for communication between WAS and back-end applications. Data connectors are used to send transactions or requests, with the accompanying input data and parameters, to a back-end application like CICS or IMS, and to return the transaction response or request results to WAS.

DB2 Connect

The IBM middleware product that provides access from WAS to DB2 data bases running in separate system images from WAS when ASCII to EBCDIC translation is needed. DB2 Connect is used in our performance measurements to access DB2 on z/OS from WAS on Linux.

DB2 Cursor

An API used when multiple rows (records) may be returned by DB2 for a SQL select (read) statement. The API consists of a Declare Cursor, an Open Cursor which initiates the building of the result set of rows by DB2, and a processing loop of Fetch to return each row to the application. Cursors may be open for read only or for update.

JDBC

Java Data Base Connectivity. JDBC is commonly used to access data in DB2, or other relational data bases, from Java applications.

J2EE

Java 2 Platform, Enterprise Edition. The server side platform which provides standard support for EJBs and other enterprise-class technologies in Java.

Predicate

An element of a search condition which implies a comparison operation.

SQLJ

Standard Query Language for Java. Another means (in addition to JDBC) to access data in DB2, or other relational data bases, from Java applications. In general, SQLJ access uses less CPU than JDBC, but cannot be dynamically created.

Thread

A DB2 structure that describes an application's connection and traces its progress.