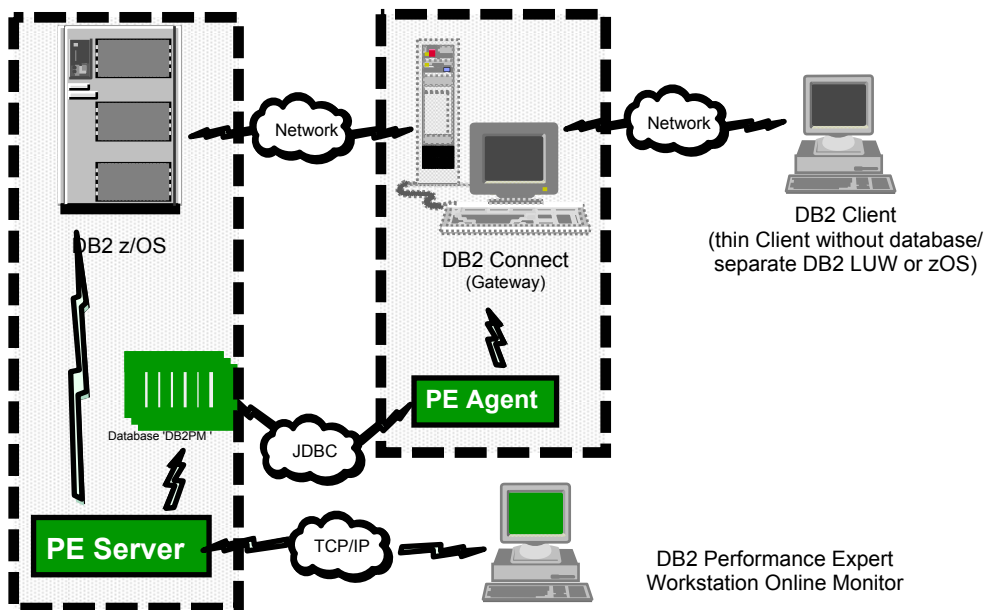


IBM DB2 Performance Expert for z/OS and Multiplatforms V2 Whitepaper



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Introduction

DB2 Connect gateway monitoring, AKA e2e monitoring, is a new feature of DB2 Performance Monitor V8 for z/OS and DB2 Performance Expert Version 2 for z/OS and Multiplatforms (DB2 PE V2). This paper assumes you have licensed DB2 PE V2 for z/OS. If you only license DB2 PE V2 for Multiplatforms, the information you receive for e2e monitoring will be limited to a single screen – the DB2 Connect gateway statistics (page 10).

This paper is a collection of key information from various sources listed in the Resources section and my own observations. The goal is to make the reader aware of the benefits and resources available.



Components

There are 3 pieces of code that need to be installed in order to utilize e2e monitoring. The Performance Expert Client (workstation GUI), the Performance Expert Agent (on the DB2 Connect gateway) and the Performance Expert Server (on the DB2 for z/OS server) all work together to give a single view of the connection from the application to the DB2 for z/OS server.

The Performance Expert Agent (PE Agent) collects DCS snapshot information and sample SQL statement timings and sends it to the DB2 PE database on the host. The HISTORYDATA keyword must be updated with DB2CAPPLIC and DB2CSYSTEM on the DB2 PE Server. This enables the synchronization of performance data and history collection. The PE Agent is controlled by the e2e command interface. When starting the PE Agent on Unix or Linux, run the e2e – start command via “nohup ./e2e –start &” to avoid the process being killed when the administrative user logs off.

Data is viewed via:

- 1) DB2 Connect gateways
- 2) DB2 Thread information
- 3) DB2 Statistics information

The next section is based on a DB2 Connect Gateway db2inst1 on ccgtch50.ibm.com port 50000 in Chicago and DSNB on demomvs.demopkg.ibm.com port 6561 in Dallas. Each field on the following screens is described in detail in the product online help. In addition to a brief explanation, I have pasted the applicable help from the product below each screen shot.



Installation Tips

The Performance Expert Agent must be installed on each DB2 Connect workstation. The code is located in host MVS library SFPEWS01.

- FPEKAGNT for Windows
- FPEKAGAX on AIX
- FPEKAGHP on HP-UX
- FPEKAGLX on Linux
- FPEKAGL3 on zLinux
- FPEKAGSL on Solaris

Sample FTP session

```
/tmp> ftp boepm01 Connected to boepm01.boeblingen.de.ibm.com.
220-FTPD1 IBM FTP CS V1R2 at BOEPM01.boeblingen.de.ibm.com, 08:53:44 on 2003-06-24
220 Connection will close if idle for more than 60 minutes.
User (boepm01.boeblingen.de.ibm.com:(none)): wtn
331 Send password please.
Password:
230 WTN is logged on. Working directory is "WTN.".
ftp> cd..
250 "" is the working directory name prefix.
ftp> cd sys1.fpe.v210.sfpews01
250 The working directory "SYS1.FPE.V210.SFPEWS01" is a partitioned data set
ftp> bin
200 Representation type is Image
ftp> get FPEKAGAX db2peage.install-on-aix
200 Port request OK.
125 Sending data set SYS1.FPE.V210.SFPEWS01(FPEKAGNT)
250 Transfer completed successfully. ftp: 51194200 bytes received in 32.08Seconds 1595.98Kbytes/sec.
ftp> quit
221 Quit command received. Goodbye.
```

Next, run the installation program.

On Windows

- Run **db2peagent.install-on-win.exe** (which is the downloaded FPEKAGENT) and follow instruction
- After installation you will be asked to configure the PE agent setup. You can do it now or later using e2e.exe command

On AIX

Installation via GUI: **<mount-point>/db2peage.install-on-aix**

Or

In console mode: **<mount-point>/db2peage.install-on-aix \is:javaconsole -console**

where db2peage.install.on.aix is the downloaded FPEKAGAX member.

Configuration

- Log on as root by using the command `su -`
- Change to the directory `/opt/IBM/db2peage/V2.1/bin`
- `./db2peage-config`
- Type the name of the DB2 instance and Select **Add a host to your instance**



The e2e command is used to register and customize the agent.

Change directory to “/opt/IBM/db2peage/V2.1/bin” (AIX) or “C:\Program Files\IBM\DB2 Performance Expert Agent\bin” (Windows). For example, on Windows:

```
>e2e --help
E2E agent initialization. Please refer to log file messages. Current operating system has been set to
'WINDOWS'.
JNI library 'E:\Program Files\IBM\DB2 Performance Expert Agent\bin\e2elib.dll' was successfully loaded.
Command line parameters:
--start[log]           : Start collection process, [log snapshot buffer];
--help                : Displays this help;
--level               : Displays PE agent's release info;
--addhost             : Registers a remote host to process;
                    [host name/IP address] [port number] [DB name] [DCS DB Y/N]
[login] [password];
--listhosts           : Displays a list of registered remote hosts;
--removehost[num]    : Removes and deregisters the host;
--uncatalog           : Uncatalogs all E2E-registered DB2 entries;
--change              : Changes user login/password for E2E host; [num] [login] [password]
--update              : Updates new release of the agent from the host;
--rollback            : Restores previous release of the agent;
--test[num]          : Tests connection to the registered remote host;

User directory default folder : "..\instances\DB2\"
Version of E2E agent/stream   : 3/3
New version file name        : E:\Program Files\IBM\DB2 Performance Expert Agent\bin\newver\e2e.jar
E2E agent has been stopped.
```

The e2e command can be used after the initial setup. For example, on Windows:

```
E:\Program Files\IBM\DB2 Performance Expert Agent V2\bin>e2e --listhosts
IBM(c) Performance Expert Agent.
Current operating system is 'WINDOWS'.
The library 'E:\Program Files\IBM\DB2 Performance Expert Agent V2\bin\e2elib.dll' successfully loaded.
Servers registered in '..\instances\DB2\e2e.ini' file :
```

Num)	Host name	Port	Database	Alias	M-Frame	UserLogin	Paused
1)	127.0.0.1	50000	DB2PMLQC	D8708810	No	jen	No
2)	9.152.87.192	5090	SYSDSNI	D8770289	Yes	jen1	No
3)	9.152.87.191	5140	SYSDB2E	D8826650	Yes	jen1	No
4)	9.152.87.222	5721	PMO2D721	D0569923	Yes	jen1	No

```
Registered DB2 entries :
```

Host name	Port	Database	Alias	Node	M-Frame
9.152.87.222	5721	D0569923	D0569923	N0569922	Yes
9.152.87.192	5090	D8770289	D8770289	N5690111	Yes
9.152.87.191	5140	D8826650	D8826650	N5691393	Yes

The e2e.ini file contains the information as well.

On Windows: C:\Program Files\IBM\DB2 Performance Expert Agent\instances\<DB2>\e2e.ini

On AIX: /var/db2pe/<DB2 instance>/e2e.ini

```
127.0.0.1 50000 D8708810 DB2PMLQC N kilw liIq5UgYYOg= A
9.152.87.192 5090 D8770289 SYSDSNI Y kilw7Q== liIq5UgYYOg= A
9.152.87.191 5140 D8826650 SYSDB2E Y kilw7Q== liIq5UgYYOg= A
9.152.87.222 5721 D0569923 PMO2D721 Y kilw7Q== liIq5UgYYOg= A
```

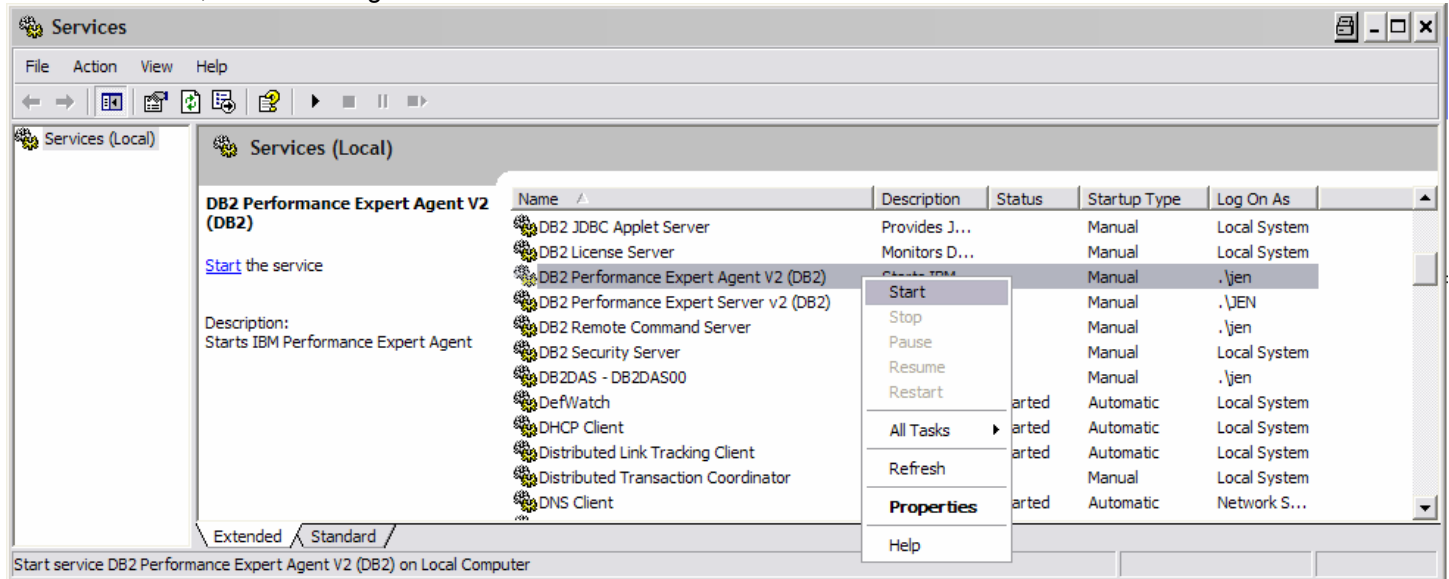


Before the PE agent is started, the PE Server parameters must be set up.

1. Activate the internal DB2PM DB2 tables to receive the PE agent data
PERFORMANCEWAREHOUSE= YES (Abbr. PWH=YES)
2. Granting privileges
To grant those privileges for the UIDs defined in E2E.INI, you can use the sample member *hlqdb2pe.SFPEINS0(FPEZPDCA)*.
3. Setting of history parameter
HISTORYDATA=(...,DB2CAPPLIC n,DB2CSYSTEM m) (Abbr. ...,DB2CA,DB2CS) where n and m are multipliers to the standard history interval

Next Start the PE agent. Stopping the agent is a similar procedure.

On Windows XP, select Settings -> Control -> Administrative Tools -> Services:



On AIX,:

Change directory to: /opt/IBM/db2peage/V2.1/bin.
nohup ./e2e --start & respectively **./e2e --stop**

Messages are written to the e2elog.

```
Mon Dec 20 11:46:21 CET 2004 - Current agent version : 12
Mon Dec 20 11:46:21 CET 2004 - Current result data stream version : 3
Mon Dec 20 11:46:21 CET 2004 - Last compatible data stream version : 3
Mon Dec 20 11:46:21 CET 2004 - Level : java/com/ibm/db2pm/e2e/E2EVersion.java, jE2E, N210_FP2HOT, E073
Mon Dec 20 11:46:21 CET 2004 - Executing command : --start
Mon Dec 20 11:46:21 CET 2004 - CheckActive : lock [E:\Program Files\IBM\DB2 Performance Expert Agent
V2\instances\DB2\e2e.lock] does not exist.
Mon Dec 20 11:46:21 CET 2004 - Executing getHostList...
Mon Dec 20 11:46:21 CET 2004 - Executing getDatabaseAlias...
...
Mon Dec 20 11:46:21 CET 2004 - -----
Mon Dec 20 11:46:21 CET 2004 - Tracing the content of e2e.ini file...
Mon Dec 20 11:46:21 CET 2004 - 1) 127.0.0.1 50000 D8708810 DB2PMLOC N kilw liIq5UgYYOg= A
Mon Dec 20 11:46:21 CET 2004 - 2) 9.152.87.192 5090 D8770289 SYSDSNI Y kilw7Q== liIq5UgYYOg= A
Mon Dec 20 11:46:21 CET 2004 - 3) 9.152.87.191 5140 D8826650 SYSDB2E Y kilw7Q== liIq5UgYYOg= A
Mon Dec 20 11:46:21 CET 2004 - 4) 9.152.87.222 5721 D0569923 PMO2D721 Y kilw7Q== liIq5UgYYOg= A
Mon Dec 20 11:46:21 CET 2004 - Refreshing host list from 'e2e.ini' file.
Mon Dec 20 11:46:21 CET 2004 - Servers from 'e2e.ini' file successfully retrieved.
Mon Dec 20 11:46:21 CET 2004 - [4] server(s) accepted.
Mon Dec 20 11:46:21 CET 2004 - Executing getHostList...
Mon Dec 20 11:46:21 CET 2004 - Executing getDatabaseAlias...
```



e2elog continued...

```
Mon Dec 20 11:46:22 CET 2004 - Testing connection to [jdbc:db2:D8770289; 9.152.87.192]...
Mon Dec 20 11:46:23 CET 2004 - Cannot establish connection to 'jdbc:db2:D8770289' :
COM.ibm.db2.jdbc.DB2Exception: [IBM][CLI Driver] SQL30081N A communication error has been detected.
Communication protocol being used: "TCP/IP". Communication API being used: "SOCKETS". Location where the
error was detected: "". Communication function detecting the error: "connect". Protocol specific error
code(s): "10061", "", "". SQLSTATE=08001
Mon Dec 20 11:46:23 CET 2004 - Testing connection to [jdbc:db2:D8826650; 9.152.87.191]...
Mon Dec 20 11:46:24 CET 2004 - Host OS from 'jdbc:db2:D8826650' successfully retrieved as 'z/OS'. Mainframe
type.
Mon Dec 20 11:46:24 CET 2004 - Checking status, 'D8826650' host...
Mon Dec 20 11:46:25 CET 2004 - This gateway is not registered with '192.168.2.100_B99FF913_DB2' on
'D8826650'alias. Registering...
Mon Dec 20 11:46:25 CET 2004 - Generating agent ID for [9.152.87.191] host...
Mon Dec 20 11:46:26 CET 2004 - Updating current timezone value with '3600'...
Mon Dec 20 11:46:26 CET 2004 - Agent ID for '9.152.87.191' generated/maintained as '8'.
Mon Dec 20 11:46:26 CET 2004 - IP address of network resource '9.152.87.191' retrieved as 9.152.87.191
Mon Dec 20 11:46:26 CET 2004 - <!-- Server found '9.152.87.191'.
Mon Dec 20 11:46:22 CET 2004 - Testing connection to [jdbc:db2:D8770289; 9.152.87.222]...
....
Mon Dec 20 11:46:31 CET 2004 - -----
Mon Dec 20 11:46:31 CET 2004 - Getting settings for each configured server...
Mon Dec 20 11:46:31 CET 2004 - ----- [9.152.87.191; D8826650] server -----
Mon Dec 20 11:46:31 CET 2004 - Timezone difference value [3600] found on the '9.152.87.191' host from
'VERSION.V_VALUE'.
Mon Dec 20 11:46:32 CET 2004 - History collection flag with value [Y] found on the host '9.152.87.191'.
Mon Dec 20 11:46:32 CET 2004 - History collection interval with value [15] found on the host '9.152.87.191'.
Mon Dec 20 11:46:32 CET 2004 - System collection multiplier with value [1] and system collection flag with
value [Y] found on the host '9.152.87.191'.
Mon Dec 20 11:46:32 CET 2004 - Application collection multiplier with value [1] and application collection
flag with value [Y] found on the host '9.152.87.191'.
Mon Dec 20 11:46:32 CET 2004 - Automatic agent update flag with value [N] found on the host '9.152.87.191'.
Mon Dec 20 11:46:33 CET 2004 - ----- [9.152.87.222; D0569923] server -----
Mon Dec 20 11:46:33 CET 2004 - Timezone difference value [3600] found on the '9.152.87.222' host from
'VERSION.V_VALUE'.
```

The PE agent then checks the setup parameters every 10 minutes.

```
Sat Dec 18 22:05:23 CET 2004 - Getting settings for each configured server...
Sat Dec 18 22:05:23 CET 2004 - ----- [9.152.87.191; D8826650] server -----
Sat Dec 18 22:05:23 CET 2004 - Snapshot successfully retrieved.
Sat Dec 18 22:05:23 CET 2004 - Calculating 'Package statistics'...
Sat Dec 18 22:05:23 CET 2004 - Chains= null; STINBYTESRC counter= null; Result AVGRESPTSZIN= null;
STOUTBYTESRC= null; Result AVGRESPTSZOUT= null; STINBYTESSD= null; Result AVGRESQSZIN= null; STOUTBYTESSD= null;
Result AVGRESQSZOUT= null; HOSTRESPNCE= null; STMTEXEETIME= null; Result NETWORKTIME= null; Result AVGNETTME=
null; TRANSMISSIONS_GROUP= null; Result STMTGROUP= null;
Sat Dec 18 22:05:23 CET 2004 - Collecting 'Task list' counters...
Sat Dec 18 22:05:23 CET 2004 - Windows detected.
Sat Dec 18 22:05:23 CET 2004 - Timezone difference value [3600] found on the '9.152.87.191' host from
'VERSION.V_VALUE'.
Sat Dec 18 22:05:23 CET 2004 - History collection flag with value [Y] found on the host '9.152.87.191'.
Sat Dec 18 22:05:23 CET 2004 - History collection interval with value [15] found on the host '9.152.87.191'.
Sat Dec 18 22:05:24 CET 2004 - System collection multiplier with value [1] and system collection flag with
value [Y] found on the host '9.152.87.191'.
Sat Dec 18 22:05:24 CET 2004 - [20] 'Task list' counters successfully collected.
Sat Dec 18 22:05:24 CET 2004 - System data/error codes retrieved.
Sat Dec 18 22:05:24 CET 2004 - Processing result stream...
Sat Dec 18 22:05:24 CET 2004 - Result telegram 'DCS_DB Transmissions' with 1008 ID skipped. No data collected.
Sat Dec 18 22:05:24 CET 2004 - Result telegram 'RemoteDatabases' with 1006 ID skipped. No data collected.
Sat Dec 18 22:05:24 CET 2004 - Inserting data stream for '9.152.87.191' host...
Sat Dec 18 22:05:24 CET 2004 - Application collection multiplier with value [1] and application collection
flag with value [Y] found on the host '9.152.87.191'.
Sat Dec 18 22:05:24 CET 2004 - Automatic agent update flag with value [N] found on the host '9.152.87.191'.
Sat Dec 18 22:05:24 CET 2004 - ----- [9.152.87.222; D0569923] server -----
Sat Dec 18 22:05:25 CET 2004 - Timezone difference value [3600] found on the '9.152.87.222' host from
'VERSION.V_VALUE'.
Sat Dec 18 22:05:26 CET 2004 - History collection flag with value [Y] found on the host '9.152.87.222'.
Sat Dec 18 22:05:26 CET 2004 - System data/error codes successfully stored for '9.152.87.191' host.
Sat Dec 18 22:05:26 CET 2004 - System collection time for [9.152.87.191; D8826650] is [Fri Dec 17 21:40:41 CET
2004].
```




The PE agent also checks for a new version after startup and then every 10 minutes.

```
Sat Dec 18 21:29:48 CET 2004 - -----  
Sat Dec 18 21:29:48 CET 2004 - Executing automatic version check...  
Sat Dec 18 21:29:48 CET 2004 - New versions not found.  
Sat Dec 18 21:29:48 CET 2004 - Version control execution time is [Sat Dec 18 21:29:38 CET 2004].  
Sat Dec 18 21:29:48 CET 2004 - -----
```

Some fairly common error situations include:

```
Sat Dec 18 21:24:53 CET 2004 - Inserting data stream for '9.152.87.222' host...  
Sat Dec 18 21:24:54 CET 2004 - <!> ERROR: Error inserting system data for the host '9.152.87.222' :  
COM.ibm.db2.jdbc.DB2Exception: [IBM][CLI Driver][DB2] SQL0803N One or more values in the INSERT statement,  
UPDATE statement, or foreign key update caused by a DELETE statement are not valid because the primary key,  
unique constraint or unique index identified by "" constrains table "" from having duplicate rows for those  
columns. SQLSTATE=23505  
Sat Dec 18 21:24:54 CET 2004 - The server is stopped or collection interval changed. Waiting for the next  
collection interval...  
Sat Dec 18 21:24:54 CET 2004 - <!> ERROR: Error storing system information for '9.152.87.222' host.  
Sat Dec 18 21:24:54 CET 2004 - Error(s) found in System information collection for host '9.152.87.222'.  
Waiting for the next collection.
```

PE Agent tries to add new data into the DB2 tables but PE server does not read and store them into the snapshot history dataset.

- PE server not running

- DB2 PE server not correctly setup

 - PWH = YES not set

 - Privileges not granted

 - DB2CAPPLIC and DB2CSYSTEM (resp.DB2CA and DB2CS) not defined for parameter HISTORYDATA

- Control interval was changed between two agents communications => Agent is waiting for next interval

 - No action is needed.

A successful execution may look like this:

```
Sat Dec 18 21:24:58 CET 2004 - Inserting data stream for '9.152.87.191' host...  
Sat Dec 18 21:25:00 CET 2004 - System data/error codes successfully stored for '9.152.87.191' host.  
Sat Dec 18 21:25:00 CET 2004 - System collection time for [9.152.87.191; D8826650] is [Fri Dec 17 20:49:11 CET  
2004].
```



When fixpaks are applied to the PE agent files, the agent must be updated. This can be done 1) manually to test a new version of the agent or 2) automatically to apply the updates to all agents once the new version has been tested.

Manual

- Download and install the PTF / Fixpak
- Stop PE agent via Service panel
- Run “e2e --update” command
- Re-start via Service panel
- Test it
- Potentially recover (Stop service, “e2e --rollback”, restart service)

Automatic

- Set PE server startup parameter in the parameter file to AUTOMATICAGENTUPDATE=YES and reset it after automatic updates to 'NO'

Or

- Use MVS command
/f xxxxxxxx,AUTOMATICAGENTUPDATE=YES whereas xxxxxxxx is the PE server started task job or
/f xxxxxxxx,AAU=YES
After all PE agents are updated you may reset AAU=NO again.

E2ELOG.DB2 will show the new version after successful update:

```
Mon Dec 20 11:46:21 CET 2004 - Last compatible data stream version : 3
Mon Dec 20 11:46:21 CET 2004 - Level : java/com/ibm/db2pm/e2e/E2EVersion.java, jE2E, N210_FP2HOT, E073
Mon Dec 20 11:46:21 CET 2004 - Executing command : --start
```



Features and Functions Detail

Monitoring via a DB2 Connect Gateway

The screenshot shows the DB2 Performance Expert - System Overview window. The interface includes a menu bar (Monitor, Selected, View, Tools, Window, Help), a toolbar, and a main content area. The main content area is divided into three panes: a tree view of Monitored Objects, a details pane for the selected object (TECCON), and a pane for 20 Most Recent Event Exceptions. The Monitored Objects tree shows a hierarchy: All DB2 Systems > Multiplatforms > Instances > CCGTCH50_50000_INSTANCE > CCGTCH50_50100_DB2INST2 > DB2INST1_RH_VMWare_50000. The details pane for TECCON shows an Application Summary and Statistics section with instructions: "To log on to this DB2 system, open the Logon window. To log on to one or more DB2 systems, open the Multiple Logon window." The table below lists the monitored DB2 systems.

Server Sta...	Logon	DB2 System	Group	User ID	Exception	Trace Stat...	Session	Operating...	System Name	DB2	Server	Host	Port	Description
		CCGTCH50_50000_INST...		DB2INST1	N/A	N/A	0	AIX	ccgtch50	V8R2	V2.1	ccgtch50	50000	Remote instance [C...
		CCGTCH50_50100_DB2I...		DB2INST2	N/A	N/A	0	AIX	ccgtch50.ibmus2.ibm.com	V8R2	V2.1	ccgtch50.ibm...	50100	Remote instance [C...
		DB2INST1_RH_VMWare_...		DB2INST1	N/A	N/A	0	LINUX	localhost	V8R1	V2.1	localhost	50000	Remote instance [D...
		DSNB		DBA032	N/A	N/A	0	ZOS	DEMOMVS	V7	V2	demomvs.de...	6561	
		TECCON		DBA032	N/A	N/A	0	ZOS	Unknown	V7	V2	N/A	N/A	DB2 Connect TEC.L...

DB2 Connect gateways are listed in the PE Client Monitored Objects list. In order to add an object, you must know the DB2 System Alias (eg DSNB). The list to select from is generated from the client node directory. This will already be populated if you set up the DB2 subsystem to be monitored. Next, push the "retrieve" button to generate a list of gateways that are sending information to the PE Server.



Application Handle (Agent ID)	Application name	User login ID	Host Database Name	DCS Database Name	Sequence number	Authorization ID	Configuration ID
27	db2bp	db2inst1	NDCDB202	DCS57B64	0001	DBA032	ccgtch50
68	java	db2inst1	NDCDB202	D9217095	0001	DBA032	ccgtch50

The Application Summary window shows the DCS applications that are currently connected to any DB2 subsystem. Any number of DB2 Connect gateways could be represented here. Only key information is shown for each application connection.

Application handle (agent ID)

Shows the system-wide unique ID for the application. On a single-partitioned database, this identifier consists of a 16-bit counter. On a multi-partitioned database, it consists of the coordinating partition number concatenated with a 16-bit counter. In addition, it is the same on every partition where the application might make a secondary connection.

The application handle can be used to uniquely identify an active application (application handle is synonymous with agent ID).

The behavior of the agent ID depends on your DB2 version. When taking snapshots from DB2 with version SQLM_DBMON_VERSION1 or SQLM_DBMON_VERSION2 to a DB2 Universal Database (Version 5 or greater) database, the agent ID returned cannot be used as an application identifier, rather it is the agent PID of the agent serving the application. In this case, an agent ID is returned for back-level compatibility, but internally the DB2 Universal Database server does not recognize the value as an agent ID.

The value for this counter can be used as input to GET SNAPSHOT commands that require an agent ID. When reading event traces, it can be used to match event records with a given application.



Application name

Shows the name of the application running at the client as known to the database manager or DB2 Connect. Together with the Application ID counter, it can be used to relate data items with your application.

In a client/server environment, this name is passed from the client to the server to establish the database connection. For DRDA-AS connections, this name is the DRDA external name. In situations where the client application code page is different from the code page under which the database system monitor is running, you can use the Code page used by application counter to translate this counter.

Authorization ID

Shows the authorization ID of the user who invoked the application that is being monitored. On a DB2 Connect gateway node, this is the user's authorization ID on the host.

Configuration name of client

Shows the NNAME in the database manager configuration file at the client node. You can use this counter to identify the client node that is running the application.

DCS database name

Shows the name of the remote database as cataloged in the DCS directory. Use this counter for problem determination on DCS applications.

Host database name

Shows the real name of the host database for which information is being collected or to which the application is connected. This is the name that was given to the database when it was created.

Sequence number

Is incremented whenever a unit of work ends, that is, when a COMMIT or ROLLBACK terminates a unit of work. Together with the Application ID counter, this counter uniquely identifies a transaction.

User login ID

Shows the ID that the user specified when logging in to the operating system. This ID differs from authorization ID, which the user specifies when connecting to the database.

You can use this counter to determine the operating system user ID of the individual running the application that you are monitoring.



The screenshot shows the 'TECCON - Application Details' window in Microsoft Word. The window is divided into two main sections: 'Application Information' and 'Overall transaction data'. The 'Application Information' section lists various attributes such as Application handle (agent ID), Application name, Application ID, Authorization ID, Code page used by application, Client process ID, Client operating platform, Client communication protocol, Host coded character set ID, Configuration name of client, Client productVersion ID, Inbound communication address, DCS application status, Application status change time, User login ID, Sequence number, Database alias at the gateway, DCS database name, Outbound application ID, Outbound sequence number, Outbound communication address, Outbound communication protocol, Host database name, and Host productVersion ID. The 'Overall transaction data' section lists metrics such as Transaction ID, Number of open cursors, Application idle time, Last reset timestamp, DB2 connect first connect, Elapsed time DB2CONN execution, Total host response time, Unit of work completion status, Previous UOW completion timestamp, Unit of work start timestamp, Unit of work stop timestamp, Most recent UOW elapsed time, Number of SQL stmt attempted, Failed statements operations, Commit statements attempted, Rollback statements attempted, Rows selected, Number of transmissions, Total Stmt Exec elapsed time, Total inbound bytes sent, Inbound bytes received, Total outbound bytes sent, and Total out bytes received.

Application Information	
Application handle (agent ID)	27
Application name	db2bp
Application ID	*LOCAL_db2inst1.041102214029
Authorization ID	DBA032
Code page used by application	819
Client process ID	42 680
Client operating platform	AXX
Client communication protocol	LOCAL
Host coded character set ID	37
Configuration name of client	ccgtch50
Client productVersion ID	SQL08020
Inbound communication address	*LOCAL_db2inst1
DCS application status	UOWWAITINBOUND
Application status change time	11/2/04 10:55:44 AM
User login ID	db2inst1
Sequence number	0001
Database alias at the gateway	DSNB
DCS database name	DCS57B64
Outbound application ID	G95B8DBA.BA02.041102214027
Outbound sequence number	0001
Outbound communication address	9.39.64.151 446
Outbound communication protocol	TCPIP
Host database name	NDCDB202
Host productVersion ID	DSN07011

Overall transaction data	
Transaction ID	N/P
Number of open cursors	0
Application idle time	0.00002
Last reset timestamp	N/P
DB2 connect first connect	11/2/04 10:55:25 AM
Elapsed time DB2CONN execution	0.00186
Total host response time	2.36719
Unit of work completion status	N/P
Previous UOW completion timestamp	N/P
Unit of work start timestamp	11/2/04 10:55:42 AM
Unit of work stop timestamp	N/P
Most recent UOW elapsed time	0.00000
Number of SQL stmt attempted	3
Failed statements operations	0
Commit statements attempted	0
Rollback statements attempted	0
Rows selected	1
Number of transmissions	6
Total Stmt Exec elapsed time	1.33042
Total inbound bytes sent	0
Inbound bytes received	301
Total outbound bytes sent	325
Total out bytes received	4 944

Drilling down on a DCS application listed on the Application Summary screen yields more Overview details about the single, selected application including counters and status information.

Code page used by application

Shows the code page identifier.

For snapshot monitor data, this is the code page at the partition where the monitored application started. This identifier can be used for problem determination for remote applications. You can use this information to ensure that data conversion is supported between the application code page and the database code page or, for DRDA host databases, the host coded character set identifier (CCSID).

For event monitor data, this is the code page of the database for which event data is collected. You can use this counter to determine whether your event monitor application is running under a different code page from that used by the database. Data written by the event monitor uses the database code page. If your event monitor application uses a different code page, you might need to perform some character conversion to make the data readable.



Client process ID

Shows the process ID of the client application that made the connection to the database.

You can use this counter to correlate monitor information such as CPU and I/O time to your client application. In the case of a DRDA-AS connection, this counter is set to 0.

Client operating platform

Shows the operating system on which the client application is running. You can use this counter for problem determination on remote applications.

Client communication protocol

Shows the communication protocol that the client application is using to communicate with the server. You can use this counter for problem determination on remote applications.

Valid values for this counter are:

API Constant Communication Protocol
SQLM_PROT_UNKNOWN (Note 1)
SQLM_PROT_LOCAL none (Note 2)
SQLM_PROT_APPC APPC
SQLM_PROT_TCPIP TCP/IP
SQLM_PROT_IPXSPX IPX/SPX
SQLM_PROT_NETBIOS NETBIOS

Notes:

The client is communicating using an unknown protocol. This value is only returned if future clients connect with a down-level server.

The client is running on the same node as the server and no communications protocol is in use.

Host coded character set ID

Shows the coded character set identifier (CCSID) of the host database. Use this counter for problem determination on DCS applications.

Configuration name of client

Shows the NNAME in the database manager configuration file at the client node. You can use this counter to identify the client node that is running the application.

Client product/version ID

Shows the product and version that is running on the client.

You can use this counter to identify the product and code version of the database client. It is in the form pppvrrm, where:

ppp identifies the product, which is "SQL" for the DB2 products.

vv identifies a 2-digit version number (with high-order 0 in the case of a 1-digit version).

rr identifies a 2-digit release number (with high-order 0 in the case of a 1-digit release).

m identifies a 1-digit modification level.

Inbound communication address

Shows the communication address of the client. For example, it could be an SNA net ID and LU partner name, or an IP address and port number for TCP/IP.

DCS application status

Shows the current status of the application. It can help you diagnose potential application problems.



Application status change time

Shows the date and time the application entered its current status.

This counter allows you to determine how long an application has been in its current status. If it has been in the same status for a long period of time, this can indicate a problem.

User login ID

Shows the ID that the user specified when logging in to the operating system. This ID differs from authorization ID, which the user specifies when connecting to the database.

You can use this counter to determine the operating system user ID of the individual running the application that you are monitoring.

Sequence number

Is incremented whenever a unit of work ends, that is, when a COMMIT or ROLLBACK terminates a unit of work. Together with the Application ID counter, this counter uniquely identifies a transaction.

Database alias at the gateway

Shows the alias used at the DB2 Connect gateway to connect to the host database.

DCS database name

Shows the name of the remote database as cataloged in the DCS directory. Use this counter for problem determination on DCS applications.

Outbound application ID

Is generated when the application connects to the DRDA host database. It is used to connect the DB2 Connect gateway to the host, while the application ID is used to connect a client to the DB2 Connect gateway.

You can use this counter in conjunction with the Application ID counter to correlate the client and server parts of the application information. This identifier is unique across the network.

Format: Network.LU Name.Application instance

Example: CAIBMTOR.OSFDBM0.930131194520

Details: This application ID is the displayable format of an actual SNA LUWID (logical unit-of-work ID) that flows on the network when an APPC conversation is allocated. APPC-generated application IDs are made up by concatenating the network name, the LU name, and the LUWID instance number, which creates a unique label for the client/server application. The network name and LU name can each be a maximum of 8 characters. The application instance corresponds to the 12-decimal-character LUWID instance number.

Outbound sequence number

Is reserved for future use. In this release, its value will is always 0001. It can contain different values in future releases of the product.

Outbound communication address

Shows the communication address of the target database. For example, it could be an SNA net ID and LU partner name, or an IP address and port number for TCP/IP.

Use this counter for problem determination on DCS applications.

Outbound communication protocol

Shows the communication protocol used between the DB2 Connect gateway and the host.

Use this counter for problem determination on DCS applications. Valid values are:

SQLM_PROT_APPC

SQLM_PROT_TCPIP



Host database name

Shows the real name of the host database for which information is being collected or to which the application is connected. This is the name that was given to the database when it was created.

Host product/version ID

Shows the product and version that is running on the server.

This counter is used to identify the product and code version of the DRDA host database product. It is in the form ppvrrm, where:

ppp identifies the host DRDA product:

ARI for DB2 for VSE & VM

DSN for DB2 for OS/390 and z/OS

QSQ for DB2 UDB for AS/400

SQL for other DB2 products

vv identifies a 2-digit version number (with high-order 0 in the case of a 1-digit version)

rr identifies a 2-digit release number (with high-order 0 in the case of a 1-digit release)

m identifies a 1-digit modification level

Transaction ID

Shows the unique transaction identifier across all databases generated by a transaction manager in a two-phase commit transaction.

You can use this identifier to correlate the transaction generated by the transaction manager with the transactions executed against multiple databases. In addition, it can help you diagnose transaction manager problems by tying database transactions that involve a two-phase commit protocol with the transactions that are originated by the transaction manager.

Number of open cursors

Shows the number of cursors currently open for an application.

Use this counter to assess how much memory is being allocated. The amount of memory allocated by the DB2 client, DB2 Connect, or the database agent on the target database is related to the number of cursors that are currently open. Knowing this information can help with capacity planning. For example, each open cursor that is blocking has a buffer size of RQRIOBLK. If DEFERRED_PREPARE is enabled, two buffers are allocated.

Application idle time

Shows the number of seconds since an application issued any requests to the server. This includes applications that have not terminated a transaction, for example, not issued a commit or rollback.

You can use this information to implement applications that force users that have been idle for a specified number of seconds.

Last reset timestamp

Shows the date and time that the monitor counters were reset for the application issuing the GET SNAPSHOT.

You can use this counter to determine the scope of information returned by the database system monitor. If the database manager counters have never been reset, this counter is zero. The database manager counters is only reset if you reset all active databases.

DB2 Connect first connect

Shows the date and time at which the first connection to the host database was initiated from the DB2 Connect gateway.



Elapsed time DB2CONN execution

Shows the time, in seconds and microseconds, at the DB2 Connect gateway to process an application request (since the connection was established), or to process a single statement.

Use this counter to determine what portion of the overall processing time is due to DB2 Connect gateway processing.

Total host response time

For a DCS statement, this is the elapsed time between the time that the statement was sent from the DB2 Connect gateway to the host for processing and the time when the result was received from the host.

For a DCS database or DCS application, it is the sum of the elapsed times for all the statements that were executed for a particular database or application.

For a data transmission, this is the sum of host response times for all the statements that used this many data transmissions.

Use this counter with the Overall transaction data - Total outbound bytes sent and Overall transaction data - Total out bytes received counters to calculate the outbound response time (transfer rate):

$((\text{Total outbound bytes sent}) + (\text{Total out bytes received})) / \text{Total host response time}$

Unit of work completion status

Shows the status of the unit of work and how it stopped.

You can use this counter to determine if the unit of work ended due to a deadlock or abnormal termination. It can have been:

Committed due to a commit statement

Rolled back due to a rollback statement

Rolled back due to a deadlock

Rolled back due to an abnormal termination

Committed at normal application termination.

Unknown as a result of a FLUSH EVENT MONITOR command for which units of work were in progress

Note: API users should refer to the sqlmon.h header file containing definitions of database system monitor constants.

Previous UOW completion timestamp

Shows the time the unit of work completed.

You can use this counter with the Overall transaction data - Unit of work stop timestamp counter to calculate the total elapsed time between COMMIT or ROLLBACK points, and with the Overall transaction data - Unit of work start timestamp counter to calculate the time spent in the application between units of work:

For applications currently within a unit of work, this is the time at which the latest unit of work completed.

For applications not currently within a unit of work (the application has completed a unit of work, but not yet started a new one), this is the stop time of the last unit of work that completed prior to the one that just completed. The stop time of the one just completed is indicated by the Overall transaction data - Unit of work stop timestamp counter.

For applications within their first unit of work, this is the database connection request completion time.

Unit of work start timestamp

Shows the date and time at which the unit of work first required database resources.

This resource requirement occurs at the first SQL statement execution of that unit of work:

For the first unit of work, it is the time of the first database request (SQL statement execution) after connection completion

For subsequent units of work, it is the time of the first database request (SQL statement execution) after the previous COMMIT or ROLLBACK.

Note: The SQL Reference defines the boundaries of a unit of work as the COMMIT or ROLLBACK points.



Unit of work stop timestamp

Shows the date and time at which the most recent unit of work completed, which occurs when database changes are committed or rolled back.

You can use this counter with the Overall transaction data - Previous UOW completion timestamp counter to calculate the total elapsed time between COMMIT or ROLLBACK points, and with the Overall transaction data - Unit of work start timestamp counter to calculate the elapsed time of the latest unit of work. The timestamp contents are set as follows:
When the application has completed a unit of work and has not yet started a new one (as defined by the Overall transaction data - Unit of work start timestamp counter), this counter is a valid, nonzero timestamp
When the application is currently executing a unit of work, this counter contains zeros
When the application first connects to the database, this counter is set to the connection completion time.

As a new unit of work is started, the contents of this counter are moved to the Overall transaction data - Previous UOW completion timestamp counter.

Most recent UOW elapsed time

Shows the elapsed execution time of the most recently completed unit of work.

Use this counter as an indicator of the time it takes for units of work to complete.

Number of SQL stmt attempted

Shows the number of SQL statements that have been attempted since the latter of: application startup, database activation, or last reset.

For a data transmission, this is the number of SQL statements that have been attempted against this DCS database or in this DCS application since the database was activated, the connection to it was established by the application, or RESET MONITOR was issued against the database, and that used this number of data transmissions between the DB2 Connect gateway and the host during statement processing.

Use this counter to measure the database activity for a database or application. To calculate the SQL statement throughput for a given period, you can divide this counter by the elapsed time between two snapshots.

For a data transmission, use this counter to get statistics on how many statements used two, three, four, etc. data transmissions during their processing. At least two data transmissions are necessary to process a statement: a send and a receive. These statistics can give you a better idea of the database or application activity and network traffic for a database or an application.

Rows selected

Shows the number of rows that have been selected and returned to the application.

You can use this counter to gain insight into the current level of activity within the database. This counter does not include a count of rows read for actions, such as COUNT(*) or joins.

For a federated system;, you can calculate the average time to return a row to the federated server from the data source:

average time = rows returned / aggregate query response time

You can use these results to modify CPU speed or communication speed parameters in SYSCAT.SERVERS. Modifying these parameters can impact whether the optimizer does or does not send requests to the data source.

Note: This counter is collected at the DCS database and DCS application if the gateway being monitored is at DB2 Version 7.2 or lower.



Number of transmissions

Shows the number of data transmissions between the DB2 Connect gateway and the host that was used to process this DCS statement. (One data transmission consists of one send or one receive.)

Use this counter to get a better understanding of the reasons why a particular statement took longer to execute. For example, a query returning a large result set might need many data transmissions to complete.

Total stmt exec elapsed time

For a DCS statement, this is the elapsed time spent processing an SQL request on a host database server. This value is reported by this server. In contrast to the Overall transaction data - Total host response time counter, this counter does not include the network elapsed time between DB2 Connect and the host database server.

At other levels, this value represents the sum of the host execution times for all the statements that were executed for a particular database or application, or for those statements that used a given number of data transmissions.

Use this counter, along with other elapsed time monitor elements, to evaluate the database server's processing of SQL requests and to help isolate performance issues.

Subtract the value for this counter from the value for the Overall transaction data - Total host response time counter to calculate the network elapsed time between DB2 Connect and the host database server.

Total inbound bytes sent

Shows the number of bytes sent by the DB2 Connect gateway to the client, excluding communication protocol overhead, for example, TCP/IP or SNA headers.

Inbound bytes received

Shows the number of bytes received by the DB2 Connect gateway from the client, excluding communication protocol overhead (for example, TCP/IP or SNA headers).

Total outbound bytes sent

Shows the number of bytes sent by the DB2 Connect gateway to the host, excluding communication protocol overhead, for example, TCP/IP or SNA headers.

For a data transmission, this is the number of bytes sent by the DB2 Connect gateway to the host during the processing of all the statements that used this number of data transmissions.

Total out bytes received

Shows the number of bytes received by the DB2 Connect gateway from the host, excluding communication protocol overhead, for example, TCP/IP or SNA headers.

For a data transmission, this is the number of bytes received by the DB2 Connect gateway from the host during the processing of all the statements that used this number of data transmissions.



The screenshot displays the 'Statement Information' section of the DB2 Performance Expert interface. The window title is 'TECCON - Application Details'. The interface includes a menu bar (DCS Databases, View, Tools, Window, Help), a toolbar with navigation icons, and a timeline at the top showing the current time as 11/2/04 3:58:43 PM. On the left, a tree view shows 'Statement Information' selected. The main area is divided into three sections: 'SQL statements', 'Times', and 'Network statistic'. Each section contains a table of performance metrics.

SQL statements	
Section number	201
Query cost estimate	0
Query number of rows estimate	0
Statement operation	DESCRIBE
Number of successful fetches	0
Blocking cursor	0
Outbound blocking cursor	0
Application creator	NULLID
Package name	SQLC2E06
Stmt trans: No of transmissions	2
Stmt trans: No of statements	3

Times	
Statement start timestamp	11/2/04 10:55:44 AM
Statement stop timestamp	11/2/04 10:55:44 AM
Time spent on gateway processing	0.00050
Host response time	0.05225
Most recent stmt elapsed time	0.05273
Stmt elapsed execution time	0.00005
Local: system CPU time	N/P
Local: user CPU time	N/P

Network statistic	
Inbound number of bytes sent	0
Inbound number of bytes received	78
Outbound number of bytes sent	86
Outbound bytes received	529

The Statement Information section of the Application Details screen provides information about the last SQL statement that was executed by the application. An analyst may want to look at the number of rows estimate and compare it to the actual rows retrieved to determine if the optimizer is doing a good job of estimating and accessing the data. The network statistics section gives a measure of the throughput of the network from the gateway to the host database. Most importantly, the times section shows the portion of the total time that gateway and host are using.



Section number

Shows the internal section number in the package for the SQL statement that is currently processing or has processed most recently.

For a static SQL, you can use this counter together with the creator, package version, and package name to query the SYSCAT.STATEMENTS system catalog table and obtain the static SQL statement text, using the sample query as follows:

```
SELECT SEQNO, SUBSTR(TEXT,1,120)
FROM SYSCAT.STATEMENTS
WHERE PKGNAME = 'package_name' AND
PKGSHEMA = 'creator' AND
VERSION = 'package_version_id' AND
SECTNO = section_number
ORDER BY SEQNO
```

Note: This query can cause lock contentions. Therefore, try to use it only when there is little other activity against the database.

Query cost estimate

Shows the estimated cost, in timerons, for a query, as determined by the SQL compiler. It allows correlation of actual run-time with the compile-time estimates. In addition, it returns information for the following SQL statements when you are monitoring DB2 Connect.

PREPARE represents the relative cost of the prepared SQL statement.

FETCH contains the length of the row retrieved if the DRDA server is DB2 for OS/400. Otherwise, this counter is set to zero.

Note: If the DRDA server is DB2 for OS/390 and z/OS, this estimate could be higher than $2^{32} - 1$ (the maximum integer number that can be expressed through an unsigned long variable). In that case, the value returned by the monitor for this counter is $2^{32} - 1$.

Query number of rows estimate

Shows the estimated number of rows that is returned by a query. This estimate by the SQL compiler can be compared with the run-time actuals.

This counter also returns information for the following SQL statements when you are monitoring DB2 Connect.

INSERT, UPDATE, and DELETE indicate the number of rows affected.

PREPARE estimates the number of rows that are returned if the DRDA server is DB2 Universal Database, DB2 for VM and VSE, or DB2 for OS/400.

FETCH sets to the number of rows fetched if the DRDA server is DB2 for OS/400. Otherwise, this counter is set to zero.

Statement operation

Shows the statement operation that is currently being processed or has processed most recently (if none is currently running).

You can use this counter to determine the operation that is executing or recently finished. It can be one of the following.

For SQL operations:

```
SELECT
PREPARE
EXECUTE
EXECUTE IMMEDIATE
OPEN
FETCH
CLOSE
DESCRIBE
STATIC COMMIT
STATIC ROLLBACK
FREE LOCATOR
```



PREP_COMMIT
CALL
PREP_OPEN
PREP_EXEC
COMPILE

For non-SQL operations:

RUN STATISTICS
REORG
REBIND
REDISTRIBUTE
GET TABLE AUTHORIZATION
GET ADMINISTRATIVE AUTHORIZATION

Note: API users should refer to the sqlmon.h header file containing definitions of database system monitor constants.

Number of successful fetches

For statement snapshot monitoring and the statement event type, this is the number of successful fetches performed on a specific cursor.

For DCS statement snapshot monitoring, this is the number of attempted physical fetches during the execution of a statement regardless of how many rows were fetched by the application. That is, this counter shows the number of times the server needed to send a reply data back to the gateway while processing a statement.

You can use this counter to gain insight into the current level of activity within the database manager.

Background and tuning information

For performance reasons, a statement event monitor does not generate a statement event record for every FETCH statement. A record event is only generated when a FETCH returns a nonzero SQLCODE.

Blocking cursor

Indicates whether the statement being executed is using a blocking cursor.

Using blocking for data transfer for a query can improve its performance. The SQL used for a query can affect the use of blocking and might require some modification.

Outbound blocking cursor

Indicates whether blocking is used for data transfer from the DRDA server to the DB2 Connect gateway for a particular query.

Using blocking for data transfer for a query can improve its performance. The SQL used for a query can affect the use of blocking and might require some modification.

Application creator

Shows the authorization ID of the user who precompiled the application.

You can use this counter to identify the SQL statement that is processing, in conjunction with the CREATOR column of the package section information in the catalogs.

Package name

Shows the name of the package that contains the SQL statement that is currently executing.

You can use this counter to identify the application program and the SQL statement that is executing.

Stmt trans: No of transmissions

Shows the number of data transmissions between the DB2 Connect gateway and the host that was used to process this DCS statement. One data transmission consists of one send or one receive.



Stmt trans: No of statements

Shows the number of SQL statements that have been attempted since the latter of: application startup, database activation, or last reset.

For a data transmission, this is the number of SQL statements that have been attempted against this DCS database or in this DCS application since the database was activated, the connection to it was established by the application, or RESET MONITOR was issued against the database, and that used this number of data transmissions between the DB2 Connect gateway and the host during statement processing.

Inbound number of bytes sent

Shows the number of bytes sent by the DB2 Connect gateway to the client, excluding communication protocol overhead, for example, TCP/IP or SNA headers.

Inbound number of bytes received

Shows the number of bytes received by the DB2 Connect gateway from the client, excluding communication protocol overhead, for example, TCP/IP or SNA headers.

Outbound number of bytes sent

Shows the number of bytes sent by the DB2 Connect gateway to the host, excluding communication protocol overhead, for example, TCP/IP or SNA headers.

For a data transmission, this is the number of bytes sent by the DB2 Connect gateway to the host during the processing of all the statements that used this number of data transmissions.

Outbound bytes received

Shows the number of bytes received by the DB2 Connect gateway from the host, excluding communication protocol overhead, for example, TCP/IP or SNA headers.

For a data transmission, this is the number of bytes received by the DB2 Connect gateway from the host during the processing of all the statements that used this number of data transmissions.



	sent	received	sent top	rcvd top	sent bot	rcvd bot						
Outbound data	325	4 944	138	4 081	86	334						
Sent data	128	256	512	1024	2048	4096	8192	16384	31999	64000	GT64	
Received data	0	0	1	1	0	1	0	0	0	0	0	0
Network time	2 ms	4 ms	8 ms	16 ms	32 ms	GT32 ms	N/P	N/P	N/P	N/P	N/P	N/P

The Package Statistics section of the Application Details screen helps you determine the throughput of the network between the host database and the gateway. Outbound data is measured in bytes. Sent/Received data and Network time counters are measured in number of statements.

Outbound data - sent

Shows the number of bytes sent by the DB2 Connect gateway to the host, excluding communication protocol overhead, for example, TCP/IP or SNA headers.

For a data transmission, this is the number of bytes sent by the DB2 Connect gateway to the host during the processing of all the statements that used this number of data transmissions.

Sent data - 128

Shows the number of statements with outbound bytes sent from 1 through 128.

Received data - 128

Shows the number of statements with outbound bytes received from 1 through 128.

Network time - 2 ms

Shows the number of statements whose network time was less than, or equal to, 2 milliseconds.

Network time is the difference between the host response time and the elapsed execution time for a statement.



The screenshot shows the DB2 Performance Expert - System Overview interface. The main window is titled "TECCON - Statistics" and displays the following data:

DB2 Connect Information	
Name	CCGTCH50
IP address	9.91.141.186
Node name	N/P
Node Number	0
Server Product/Version ID	SQL08020
Server Instance Name	db2inst1
Server Status	ACTIVE
Server Version	5
Time Zone Displacement	-6h00mn
Gateway Snapshot Time	11/2/04 10:58:00 AM

Agents	
Agents registered	9
Agents waiting for token	0
Maximum agents registered	9
Maximum agents waiting	0
Committed private memory	196 608
Agents assigned from pool	140 885
Agents created due to empty pool	11
Maximum coordinating agents	9
Stolen agents	0
Connection switches	0
Total inactive DRDA agents	N/P
Idle agents	5
Maximum agent overflows	0

Connections	
Current connections	1
Attempted connections for DB2 Connect	56 359
Conn. waiting for host reply	0
Conn. waiting for client to send request	1
Remote connections to DBM	2
Remote connections executing in the DBM	0

Sorts	
Sort Heap allocated	0

The interface also includes a "Monitored Objects" tree on the left, a "TECCON - Statistics" window with a zoom slider, and a "Description" pane on the right. The taskbar at the bottom shows the Start button, system tray, and open applications including "DB2 Performance Expert" and "TECCON - Statistics".

The Statistics window under the DB2 Connect gateway object monitoring section provides DCS snapshot information. Usage of this information is discussed in the Practical Usage section. The Agents section is particularly useful in determining if the gateway is effectively handling the demand.

Gateway snapshot time

Shows the date and time at which the database system monitor information was collected.

IP address

Shows the current IP address.

Name

Shows the name in the database manager configuration file at the client node. It identifies the client node that is running the application.

If you are using the database system monitor APIs, note that the API constant `SQLM_IDENT_SZ` is used to define the length of the name. Only the first 8 characters are currently used.

**Node name**

Shows the name of the node being monitored by the database system monitor. It identifies the database server node you are monitoring.

This information can be useful if you are saving your monitor output in a file or database for later analysis and you need to differentiate the data from different database server nodes. This node name is determined based on the NNAME configuration parameter.

If you are using the database system monitor APIs, note that the API constant SQLM_IDENT_SZ is used to define the length of the name. Only the first 8 characters are currently used.

Node number

Shows the number assigned to the node in the db2nodes.cfg file.

Server instance name

Shows the name of the database manager instance for which the snapshot was taken.

If a system contains more than one instance of the database manager, this name is used to uniquely identify the instance for which the snapshot call was issued. Along with configuration NNAME at monitoring (server) node, this information can be useful if you are saving your monitor output in a file or database for later analysis, and you need to differentiate the data from different instances of the database manager.

If you are using the database system monitor APIs, note that the API constant SQLM_IDENT_SZ is used to define the length of this counter. Only the first 8 characters are currently used.

Server product/version ID

Shows the product and version that is running on the server in the form pppvrrm, where

ppp stands for SQL

vv identifies a 2-digit version number (with high-order 0 in the case of a 1-digit version)

rr identifies a 2-digit release number (with high-order 0 in the case of a 1-digit release)

m identifies a 1-digit modification level

If you are using the database system monitor APIs, note that the API constant SQLM_IDENT_SZ is used to define the length of this counter. Only the first 8 characters are currently used.

Server status

Shows whether the server is active or inactive.

Server version

Shows the version of the server returning the information.

Time zone displacement

Shows the number of seconds that the local time zone is displaced from Greenwich Mean Time (GMT).

Current connections

Shows the number of applications that are currently connected to the database

You can use this counter to understand the level of activity within a database and the amount of system resource being used. It can help you adjust the setting of the MAXAPPLS (maximum number of applications) and MAXAGENTS (maximum number of agents) configuration parameters. If its value is always the same as MAXAPPLS, you may want to increase the value of MAXAPPLS. If it is always less than MAXAPPLS, you may want to increase the value of MAXAGENTS.



Attempted connections for DB2 Connect

Shows the total number of current connections initiated from remote clients to the instance of the database manager that is being monitored. It also shows the level of activity between this instance and other instances of the database manager.

Conn. waiting for host reply

Shows the current number of connections to the host databases that are handled by the DB2 Connect gateway and are waiting for a reply from the host.

Conn. waiting for client to send request

Shows the current number of connections to the host databases that are handled by the DB2 Connect gateway and are waiting for the client to send a request.

Remote connections to DBM

Shows the current number of connections initiated from remote clients to the instance of the database manager that is being monitored.

Remote connections executing in the DBM

Shows the number of remote applications that are currently connected to a database and are currently processing a unit of work within the database manager instance being monitored.

Agents registered

Shows the number of agents registered in the database manager instance that is being monitored.

You can use this counter in conjunction with the Agents - Agents waiting for token counter to determine the percentage of agents waiting for a token so they can perform a transaction in the database manager. If the percentage is high, you can improve the concurrency in the database manager by increasing the MAXCAGENTS (maximum number of concurrent agents) configuration parameter. This number is always greater than, or equal to, the number of local databases with current connects.

Background and tuning information

Each application has a dedicated agent to process database requests within the database manager. Each agent has to get a token before it can perform a transaction. The maximum number of agents that can execute database manager transactions is limited by the MAXCAGENTS configuration parameter.

Agents waiting for token

Shows the number of agents waiting for a token so they can perform a transaction in the database manager.

You can use this counter in conjunction with the Agents - Agents registered counter to determine the percentage of "sleeping" agents. If the percentage is high, you can improve the concurrency in the database manager by increasing the MAXCAGENTS (maximum number of concurrent agents) configuration parameter.

Background and tuning information

Each application has a dedicated agent to process database requests within the database manager. Each agent has to get a token before it can perform a transaction. The maximum number of agents that can execute database manager transactions is limited by the MAXCAGENTS configuration parameter.

Maximum agents registered

Shows the maximum number of agents that the database manager has registered at the same time since it was started.

You can use this counter to evaluate your setting of the MAXAGENTS (maximum number of agents) configuration parameter. The number of agents registered at the time the snapshot was taken is recorded in the Agents - Agents registered counter.



Maximum agents waiting

Shows the maximum number of agents that have been waiting for a token at the same time since the database manager was started.

You can use this counter to evaluate your setting of the MAXCAGENTS (maximum number of concurrent agents) configuration parameter. If the MAXCAGENTS parameter is set to its default value, which is -1, no agents should wait for a token and the value for this counter should be zero.

The number of agents waiting for a token at the time the snapshot was taken is recorded in the Agents waiting for token counter.

Committed private memory

Shows the amount of private memory that the instance of the database manager has committed at the time of the snapshot.

You can use this counter to set the MIN_PRIV_MEM (minimum committed private memory) configuration parameter to ensure you have enough private memory available. This counter is only applicable to platforms containing an agent pool, such as OS/2.

Agents assigned from pool

Shows the number of agents assigned by an agent pool.

Agents created due to empty pool

Shows the number of agents created because the agent pool was empty.

Maximum coordinating agents

Shows the maximum number of coordinating agents working at one time.

Stolen agents

Shows the number of times that agents are stolen from an application. Agents are stolen when an idle agent associated with an application is reassigned to work on a different application.

Connection switches

Shows the number of the times that an agent from the agent pool was primed with a connection and was stolen for use with a different DRDA database.

Total inactive DRDA agents

Shows the number of connections made by a subagent to the database at the node.

Idle agents

Shows the number of agents in the agent pool that are currently unassigned to an application and are, therefore, idle.

You can use this counter to set the MAX_IDLEAGENTS (maximum number of idle agents) configuration parameter. Having idle agents available to service requests for agents can improve the performance.

Maximum agent overflows

Shows the number of times a request to create a new agent was received when the MAXAGENTS (maximum number of agents) configuration parameter had already been reached.



Sort heap allocated

Shows the total number of allocated pages of sort heap space for all sorts at the level chosen and at the time the snapshot was taken.

The amount of memory allocated for each sort can be part of or the entire sort heap size available. Sort heap size is the amount of memory available for each sort as defined in the SORTHEAP database configuration parameter. It is possible for a single application to have concurrent sorts active. For example, in some cases a SELECT statement with a subquery can cause concurrent sorts. Information can be collected at two levels:

At the database manager level, it represents the sum of sort heap space allocated for all sorts in all active databases in the database manager.

At the database level, it represents the sum of the sort heap space allocated for all sorts in a database.

Background and tuning information

Normal memory estimates do not include sort heap space. If excessive sorting occurs, the extra memory used for the sort heap should be added to the base memory requirements for running the database manager. Generally, the larger the sort heap, the more efficient the sort. Appropriate use of indexes can reduce the amount of sorting required.

You can use the information returned at the database manager level to tune the SHEAPTHRES configuration parameter. If the value is greater than, or equal to, SHEAPTHRES, the sorts are not getting the full sort heap as defined by the SORTHEAP parameter.



The screenshot shows the DB2 Performance Expert - System Overview interface. The main window is titled 'TECCON - Statistics' and displays a 'Tasks List' table. The table has the following columns: Process name, Process owner name, Gateway process ID, User process time, System process time, Overall process time, Memory usage by process, and CPU usage per process (%). The table lists various processes such as java -Ddb2pe..., /usr/bin/ps -efl, db2fcm dm 0, db2fcm dm 1, db2fmp (1716...), db2agent (idle...), db2agent (inst...), db2agent (idle...), java -Ddb2pe..., db2pclr 0, db2pchr 0, db2agent (idle...), db2pclr 0, db2loggr (TPC...), db2pclr 0, db2fmp (idle) 0, db2pclr 0, db2agent (idle...), and rpc.tdbserver ... root.

Process name	Process owner name	Gateway process ID	User process time	System process time	Overall process time	Memory usage by process	CPU usage per process (%)
java -Ddb2pe...	db2inst1	26 716	N/P	N/P	0.00920	50 064	23
/usr/bin/ps -efl	db2inst1	66 088	N/P	N/P	0.00000	976	20
db2fcm dm 0	db2inst2	16 596	N/P	N/P	0.00769	3 064	3
db2fcm dm 1	db2inst2	70 018	N/P	N/P	0.00763	3 060	2
db2fmp (1716...	db2fepe	72 006	N/P	N/P	0.00416	20 916	1
db2agent (idle...	db2inst2	29 754	N/P	N/P	0.00211	6 652	1
db2agent (inst...	db2inst1	15 898	N/P	N/P	0.00020	3 296	1
db2agent (idle...	db2impe	81 198	N/P	N/P	0.00067	11 916	0
java -Ddb2pe...	db2impe	81 004	N/P	N/P	0.00344	91 008	0
db2pclr 0	db2impe	80 538	N/P	N/P	0.00001	2 648	0
db2pchr 0	db2inst2	80 324	N/P	N/P	0.00000	2 352	0
db2agent (idle...	db2impe	79 944	N/P	N/P	0.00004	4 852	0
db2pclr 0	db2impe	79 650	N/P	N/P	0.00001	2 640	0
db2loggr (TPC...	db2inst2	79 398	N/P	N/P	0.00001	2 300	0
db2pclr 0	db2impe	78 638	N/P	N/P	0.00000	2 364	0
db2fmp (idle) 0	db2fepe	78 252	N/P	N/P	0.00002	4 280	0
db2pclr 0	db2impe	77 982	N/P	N/P	0.00002	2 616	0
db2agent (idle...	db2impe	77 132	N/P	N/P	0.00000	4 248	0
rpc.tdbserver ...	root	76 846	N/P	N/P	0.00000	2 520	0
db2agent (TP...	db2inst2	76 784	N/P	N/P	0.00000	4 172	0

The Tasks List screen displays information about the processing workload on the gateway. The memory and process id columns are only filled in if the PE Agent is running on a Unix or Linux based server. Use this screen to determine if the gateway server is overloaded by DB2 Connect or some other collocated application.

CPU usage per process (%)

Shows the percentage of time that a process used the CPU since the last update.

Gateway process ID

Shows the numerical identifier that uniquely distinguishes a process while it runs.

Memory usage by process

Shows the current working set of a process, in kilobytes. The current working set is the number of pages currently resident in memory.

This column only contains a value if Performance Expert Agent is installed on a UNIX-based operating system, such as AIX, HP-UX, Linux, Linux on zSeries, or the Solaris Operating Environment. Otherwise, these columns show N/P (Not present).

Overall process time

Shows the sum of the times contained in the System process time and User process time columns.

**Process name**

Shows the name of the process.

Process owner name

Shows the session ID that owns the process.

This column only contains a value if Performance Expert Agent is installed on a UNIX-based operating system, such as AIX, HP-UX, Linux, Linux on zSeries, or the Solaris Operating Environment. Otherwise, these columns show N/P (Not present).

System process time

Shows the total system CPU time, in seconds and microseconds, used by the database manager agent process, the unit of work, or the statement.

User process time

Shows the total user CPU time, in seconds and microseconds, used by the database manager agent process, the unit of work, or the statement.



The screenshot shows the DB2 Performance Expert - System Overview interface. The main window displays the Performance screen for a sample SQL statement. The Performance section is titled "Performance" and contains a table of "Times for sample SQL Statement". The table has four rows and two columns: the metric name and the time value in seconds and microseconds.

Times for sample SQL Statement	
Total statement time	0.05116
Time in DB2 Connect	0.00095
Time on DB2 host	0.00119
Time in network connection	0.04902

The interface also shows a navigation pane on the left with "Performance" selected, a timeline at the top, and a task list on the right. The system tray at the bottom shows the time as 8:26:59 on Tuesday, 11/2/04.

The Performance screen displays information obtained from running a sample SQL statement between the gateway and the host database. This key screen illustrates where a bottleneck may be located. For instance, an analyst could review past executions of the statement to determine the normal time for each segment. Then, by looking at an execution during a problem time, the offending segment may contain a larger time value than normal. For example, if the Time in network connection (in seconds and microseconds) is normally around .04, a current value of 5.2 may point towards a network issue.

Total statement time

This counter shows the response time between start and end (response) of a SQL statement measured by DB2 Connect. For a DCS statement, this counter shows the elapsed time between the time the statement was sent from the DB2 Connect gateway to the host for processing and the time at which the result was received from the host.

For a DCS database or application, this counter shows the sum of the elapsed times for all the statements that were executed for a particular application or database.

This counter shows the sum of the values for the Times for sample SQL statement - Time in DB2 Connect and Times for sample SQL statement - Time in network connection counters.



Time in DB2 Connect

Shows the total time, in seconds and microseconds, at the DB2 Connect gateway to process the sample statement.

Time on DB2 host

Shows the total time, in seconds and microseconds, that was reported by the DB2 host system to DB2 Connect for this SQL statement.

Time in network connection

Is the calculated time spent in the network in seconds and microseconds. = (Total Statement Time - (Time in DB2 Connect + Time on DB2 host))



DB2 Performance Expert - System Overview

TECCON - Statistics

Parent DB name	Statement group	Network time	Average network time	Average response size outbound	Average request size outbound
NDCDB202	2	1.03877	0.34559	1 648	108
NDCDB202	2	0.13741	0.04580	359	126

The Package statistics screen displays details about packages that were received at the gateway. The average time is generated from the sample SQL statement.

Average network time

Show the result of the value for the Network time counter divided by the number of SQL chains being transferred.

Average request size outbound

Shows the number of bytes received by the DB2 Connect gateway from the client, excluding communication protocol overhead, divided by the number of SQL chains being transferred.

Average response size outbound

Shows the number of bytes received by the DB2 Connect gateway from the client, excluding communication protocol overhead, divided by the number of SQL chains being transferred.

Network time

Shows the difference between the value for the Times for sample SQL statement - Total statement time counter and the value of the Times for sample SQL statement - Time on DB2 host counter. Both counters are on the Performance page.

Parent DB name

Shows the name of the remote database to which the remote application is connected.



Statement group

Shows the number of statements with outbound bytes



Monitoring via Thread Summary

The screenshot shows the DB2 Performance Expert - System Overview window. The left pane displays a tree view of Monitored Objects, including All DB2 Systems, Multiplatforms, Instances, z/OS, Subsystems, DB2 Connect / Gateways, and My Shortcuts. The right pane shows the Thread Summary for the DSNB subsystem, with a list of 20 Most Recent Event Exceptions. The bottom pane displays a table of monitored DB2 systems.

Server Sta...	Logon	DB2 System	Group	User ID	Exception	Trace Stat...	Session	Operating...	System Name	DB2	Server	Host	Port	Description
		CCGTCH50_50000_INST...		DB2INST1	N/A	N/A	0	ADP	ccgtch50	V8R2	V2.1	ccgtch50	50000	Remote instance [C...
		CCGTCH50_50100_DB2I...		DB2INST2	N/A	N/A	0	ADP	ccgtch50.ibmus2.ibm.com	V8R2	V2.1	ccgtch50.ibm...	50100	Remote instance [C...
		DB2INST1_RH_VMWare_...		DB2INST1	N/A	N/A	0	LINUX	localhost	V8R1	V2.1	localhost	50000	Remote instance [D...
		DSNB		DBA032	N/A	N/A	0	ZOS	DEMOQMS	V7	V2	demomws.de...	6561	
		TECCON		DBA032	N/A	N/A	1	ZOS	Unknown	V7	V2	N/A	N/A	DB2 Connect TEC L...

Information regarding distributed applications is also displayed via normal DB2 subsystem object monitoring.



DB2 Performance Expert - System Overview

Monitor Selected View Tools Window Help

DSNB - Thread Summary

Thread Summary Selected View Tools Window Help

11/2/04 4:02:50 PM Zoom 0:00:20

11/1/04 1:05:32 PM 11/2/04 4:02:50 PM 11/2/04 4:03:16 PM

Primary Authorization	Member	Plan	Program Name	Elapsed Class 1	Elapsed Class 2	Total Class 3	CPU Class 1	CPU Class 2	Connection ID	Reg
DB2PE	NP	FPEPLAN	DGO@DB2I	14 1:58:01	0:00:45	0:00:31	0:00:12	0:00:10	DB2CALL	2 52
DB2PE	NP	FPEPLAN	DGO@EXCP	14 2:09:43	0:00:37	0:00:35	2:16072	2:09370	DB2CALL	7 09
DB2PE	NP	FPEPLAN	DGO@EXCP	14 2:09:43	0:00:37	0:00:34	2:01240	1:94028	DB2CALL	7 08
DB2PE	NP	FPEPLAN	DGO@EXCP	14 2:09:43	0:00:37	0:00:35	2:16358	2:09741	DB2CALL	7 09
DB2PE	NP	FPEPLAN	DGO@WR2C	34 2:54:49	0:03:09	0:02:32	0:00:25	0:00:23	DB2CALL	19 0
DB2PE	NP	FPEPLAN	DGO@WR2C	34 2:54:49	0:02:50	0:02:14	0:00:25	0:00:23	DB2CALL	23 1
DB2PE	NP	FPEPLAN	DGO@WR2C	34 2:54:49	0:00:56	0:00:40	0:00:17	0:00:10	DB2CALL	17 2
DB2PE	NP	FPEPLAN	DGO@WR2C	34 2:55:16	0:00:43	0:00:36	5:74083	3:08033	DB2CALL	12 9
DB2PE	NP	FPEPLAN	DGO@WR2C	34 2:55:16	0:01:11	0:00:36	0:00:18	0:00:11	DB2CALL	12 4
DB2PE	NP	DB2PM	DGO@PC1	34 2:55:20	0:18:56	0:00:12	0:21:20	0:17:11	DB2CALL	45 0
DB2PE	NP	NP	NP	34 2:55:46	0:21:353	0:01:328	0:96187	0:18637	DB2CALL	9 42
DB2PE	NP	FPEPLAN	DGO@SDOB	34 2:55:47	0:00:19	0:00:18	0:00:13	0:92417	DB2CALL	11 4
DB2PE	NP	FPEPLAN	DGO@EXCP	34 2:55:47	0:03:05	0:02:22	0:00:35	0:00:31	DB2CALL	1 19
DBA032	NP	DISTSERV	SYSSH200	3:16744	0:02102	0:01805	0:00415	0:00288	SERVER	35
DBA062	NP	DISTSERV	SPLC2E06	0:05:40	1:38065	1:31310	0:01271	0:01212	SERVER	46
DBA032	NP	FPEPLAN	NP	0:04:13	0:02433	0:02101	0:00372	0:00230	DB2CALL	5
DBA198	NP	ADB	ADDMAN	1:24:57	0:04943	0:02196	0:04039	0:02541	TSO	391
DBA248	NP	DISTSERV	SYSSH200	0:00:14	0:00653	0:00071	0:00807	0:00562	SERVER	5 18
DBA248	NP	DISTSERV	SYSSH200	0:00:15	0:00366	0:00068	0:00428	0:00298	SERVER	5 53
DBA248	NP	FPEPLAN	NP	2:48:05	0:00469	0:00139	0:00387	0:00302	DB2CALL	6
DNET018	NP	TJHPGM01	TJHPGM01	0:01:24	0:19854	0:00001	0:20597	0:19134	BATCH	1 52

Server Sta... | Logon

Start 8:28:31 - AT&T Ne... DB2 Performance ... Telnet ccgctch50.b... DB2 Performance ... DSNB - Thread S... 100% 4:04 PM Tuesday

Distributed threads are identified via the DISTSERV plan.



Thread Details (DBA032)

11/2/04 4:03:50 PM

Zoom 0.00:20

11/2/04 3:57:46 PM 11/2/04 4:03:50 PM

11/2/04 4:03:52 PM

Overview

- Identification
 - LUWs and others
 - Requester correlation
- DBRM/Package
- Suspensions (Class 8)
 - Class 1,2,3
 - Suspensions
 - Other
- Locking
 - Locked Resources
 - RID List
- SQL Activity (DML)
 - DCL
 - DDL
 - Miscellaneous
 - Buffer Manager
 - SQL Statement**
- Used Buffer Pools (Class 9)
 - Distributed Data
 - Data Capt./Logging
 - Query Parallelism
 - Parallel Threads
 - Data Sharing Locking
 - Group Buffer Pool
 - Nested SQL Activity
 - DB2 Connect Server

Server Sta...

SQL Statement

Location	NDCDB202	Database name	DBA03201
Collection ID	NULLID	Database ID	296
Program name	SQLC2E06	Page set name	16
Consistency token	14141634555'	Page set ID	16
Version	N/P	Page number within page set	3 145 730
Nested activity name and type	N/P	Elapsed time	0:06:00
Statement type	CLOSE	CPU time	0.00000
Statement number	210	Total number of getpages	32
Thread status	In DB2	Total synch read I/O	20

Current SQL ID DBA032

Is dynamic SQL statement X'90'

SQL statement text

```
select * from dba032.emp order by empno
```

Explain

Start 8:28:58 - AT&T Ne... DB2 Performance ... Telnet ccgtch50.b... DB2 Performance ... DSNB - Thread Su... DSNB - Thread ... 100% 4:04 PM Tuesday

The SQL statement executing at the time of the snapshot is displayed in the Thread Details screen. The statement can be explained via the Explain button. As of November 2004, DB2 Visual Explain V7 can be launched via the button, but DB2 Visual Explain V8 can not.



Thread Details View Tools Window Help

11/2/04 4:03:50 PM Zoom 0.00:20

11/2/04 3:57:46 PM 11/2/04 4:03:50 PM 11/2/04 4:03:52 PM

Overview

- Identification
 - LUWs and others
 - Requester correlation
- DBRM/Package
 - Suspensions (Class 8)
- Times
 - Class 1,2,3
 - Suspensions
 - Other
- Locking
 - Locked Resources
 - RID List
- SQL Activity (DML)
 - DCL
 - DDL
 - Miscellaneous
- Buffer Manager
 - SQL Statement
- Used Buffer Pools (Class 9)
- Distributed Data
- Data Capt./Logging
- Query Parallelism
- Parallel Threads
- Data Sharing Locking
- Group Buffer Pool
- Nested SQL Activity
- DB2 Connect Server**

Server Sta...

Name	IP address	Node name	Node Number	Server ProductVersion ID	Server Instance Name	Time Zone Displacement	Server Version
CCGTCH50	9.91.141.1...	N/P	0	SQL08020	db2Inst1	-8h00rm	5

Start 8:29:18 - AT&T Ne... DB2 Performance ... Telnet ccgtch50.b... DB2 Performance ... DSNB - Thread Su... DSNB - Thread ... 100% 4:04 PM Tuesday

Also on the Thread Details screen, the DCS information that pertains to this thread is displayed. Drill-down is available to obtain more information.



DB2 Performance Center - DSNB - Thread Details (DBA032)

Thread Details View Tools Window Help

11/2/04 4:03:50 PM Zoom 0.00:20

11/2/04 3:57:46 PM 11/2/04 4:03:50 PM 11/2/04 4:03:52 PM

Main DB2 Connect Server: *LOCAL.db2inst...

- Overview
- Statement information
- Package statistics

Server Sta...

Overview

Application information		Overall transaction data	
Application handle (agent ID)	27	Transaction ID	N/P
Application name	db2bp	Number of open cursors	0
Application ID	*LOCAL.db2inst1.041102214029	Application idle time	0.00032
Authorization ID	DBA032	Last reset timestamp	N/P
Code page used by application	819	DB2 connect first connect	11/2/04 10:55:25 AM
Client process ID	42 680	Elapsed time DB2CONN execution	0.00196
Client operating platform	AIX	Total host response time	2.36719
Client communication protocol	LOCAL	Unit of work completion status	N/P
Host coded character set ID	37	Previous UOW completion timestamp	N/P
Configuration name of client	ccgtch50	Unit of work start timestamp	11/2/04 10:55:42 AM
Client product/version ID	SQL08020	Unit of work stop timestamp	N/P
Inbound communication address	*LOCAL.db2inst1	Most recent UOW elapsed time	0.00000
DCS application status	UOWWAITINBOUND	Number of SQL stmt attempted	3
Application status change time	11/2/04 10:55:44 AM	Failed statements operations	0
User login ID	db2inst1	Commit statements attempted	0
Sequence number	0001	Rollback statements attempted	0
Database alias at the gateway	DSNB	Rows selected	1
DCS database name	DCS57B64	Number of transmissions	6
Outbound application ID	G95B8DBA.BA02.041102214027	Total Stmt Exec elapsed time	1.33042
Outbound sequence number	0001	Total inbound bytes sent	0
Outbound communication address	9.39.64.151 446	Inbound bytes received	301
Outbound communication protocol	TCPIP	Total outbound bytes sent	325
Host database name	NDCDB202	Total out bytes received	4 944
Host product/version ID	DSN07011		

Start 8:29:33 - AT&T Ne... DB2 Performance ... Telnet ccgtch50.b... DB2 Performance ... DSNB - Thread Su... DSNB - Thread ... 100% 4:05 PM Tuesday

This is the same information that can be accessed via the application details screen of the DB2 Connect gateway object monitoring.



The screenshot shows the 'Thread Details (DBA032)' window in the DB2 Performance Center. The window title bar includes 'Monitor', 'Thread Details', 'View', 'Tools', 'Window', and 'Help'. The main content area is titled 'Statement information' and is divided into three sections: 'SQL statements', 'Times', and 'Network statistic'. The 'SQL statements' section contains a table with various metrics. The 'Times' section contains a table with execution time metrics. The 'Network statistic' section contains a table with network-related metrics. Below these tables is a large empty text box labeled 'SQL statement text'. The window also features a navigation pane on the left with 'Overview', 'Statement information', and 'Package statistics' options. The bottom of the window shows a Windows taskbar with the time 8:29:47 and date Tuesday, 11/2/04.

Section number	201
Query cost estimate	0
Query number of rows estimate	0
Statement operation	DESCRIBE
Number of successful fetches	0
Blocking cursor	0
Outbound blocking cursor	0
Application creator	NULLID
Package name	SQLC2E06
Stmt trans: No of transmissions	2
Stmt trans: No of statements	3

Statement start timestamp	11/2/04 10:55:44 AM
Statement stop timestamp	11/2/04 10:55:44 AM
Time spent on gateway processing	0.00050
Host response time	0.05225
Most recent stmt elapsed time	0.05273
Stmt elapsed execution time	0.00005
Local: system CPU time	N/P
Local: user CPU time	N/P

Inbound number of bytes sent	0
Inbound number of bytes received	78
Outbound number of bytes sent	86
Outbound bytes received	529

This is the same information that can be accessed via the application details screen of the DB2 Connect gateway object monitoring. The difference is the SQL statement text window. According to product development, this window may be removed from this screen in a future release. It rarely contains the statement – if ever.



DB2 Performance Center - DSNB - Thread Details (DBA032)

Thread Details View Tools Window Help

11/2/04 4:03:50 PM Zoom 0.00:20

11/2/04 3:57:46 PM 11/2/04 4:04:50 PM

11/2/04 4:03:52 PM

Main DB2 Connect Server: *LOCAL.db2inst...

- Overview
- Statement information
- Package statistics**

	sent	received	sent top	rcvd top	sent bot	rcvd bot					
Outbound data	325	4 944	139	4 081	86	334					
	128	256	512	1024	2048	4096	8192	16384	31999	64000	GT64K
Sent data	2	1	0	0	0	0	0	0	0	0	0
Received data	0	0	1	1	0	1	0	0	0	0	0
	2 ms	4 ms	8 ms	16 ms	32 ms	GT32 ms					
Network time	N/P	0	N/P	0	N/P	N/P					

Server Sta...

Start 8:30:06 - AT&T Ne... DB2 Performance ... Telnet ccgtch50.l... DB2 Performance ... DSNB - Thread Su... DSNB - Thread ... 100% 4:05 PM Tuesday

This is the same information that can be accessed via the application details screen of the DB2 Connect gateway object monitoring.



Monitoring via Statistics Details

The screenshot displays the 'DSNB - Statistics Details' application window. The main content area shows a table titled 'DB2 Connect Server' with the following data:

Name	IP address	Node name	Node Number	Server status	Server ProductVersion ID	Server Instance Name	Gateway Snapshot Time	Time Zone D
CCGTCH50	9.91.141.186	N/P	0	ACTIVE	SQL08020	db2inst1	11/2/04 11:02:01 AM	-6h00mn
IBM-1BXVSPJNDM	192.168.0.4	N/P	0	N/A	SQL08015	DB2	11/2/04 11:19:24 AM	-5h00mn

The left sidebar contains a tree view with categories such as Overview, EDM Pool, Buffer Management, Locking, Open/Close, Bind, Plan / Package / Routine, Log Manager, Subsystem, SQL Activity DML, Dynamic SQL Statements, SQL Statements, Query Parallelism, RID List, CPU Times, Miscellaneous, Nested SQL Activity, Distributed Data, Data Sharing Locking, and DB2 Connect Server. The Windows taskbar at the bottom shows the time as 8:30:28 on Tuesday, 11/2/04, and the system tray displays 100% battery and 4:06 PM on Tuesday.

The final way to access DB2 Connect gateway information is via the subsystem Statistic Details screens. The last option, DB2 Connect Server, displays all of the DB2 Connect Servers that are connected to the subsystem.



DSNB - Statistic Details

Statistics Details View Tools Window Help

11/2/04 4:04:50 PM Zoom 0:00:20

11/2/04 4:05:29 PM new logs.

Main DB2 Connect Server: 9.91.141.186-C...

DB2 Connect/Gateway S
Tasks List
Performance
Package statistics

DB2 Connect/Gateway Statistics

DB2 Connect Information	
Name	CCGTCH50
IP address	9.91.141.186
Node name	N/P
Node Number	0
Server Product/Version ID	SQL08020
Server Instance Name	db2inst1
Server Version	5
Time Zone Displacement	-6h00mn
Gateway Snapshot Time	11/2/04 11:02:01 AM
Server status	ACTIVE

Agents	
Agents registered	9
Agents waiting for token	0
Maximum agents registered	9
Maximum agents waiting	0
Committed private memory	196 608
Agents assigned from pool	140 912
Agents created due to empty pool	11
Maximum coordinating agents	9
Stolen agents	0
Connection switches	0
Total inactive DRDA agents	N/P
Idle agents	5
Maximum agent overflows	0

Connections	
Current connections	1
Attempted connections for DB2 Connect	55 371
Conn. waiting for host reply	0
Conn. waiting for client to send request	1
Remote connections to DBM	2
Remote connections executing in the DBM	0

Sorts	
Sort Heap allocated	0

8:30:47 - AT&T Ne... DB2 Performance ... Telnet ccgtch50.l... DB2 Performance ... DSNB - Statistic ... 100% 4:06 PM Tuesday

This is the same information that can be accessed via the statistics screen of the connect gateway object monitoring.



DSNB - Statistic Details

Statistics Details View Tools Window Help

11/2/04 4:04:50 PM Zoom 0:00:20

11/2/04 1:09:32 PM 11/2/04 4:04:50 PM 11/2/04 4:05:29 PM

Main DB2 Connect Server: 9.91.141.186-C...

- DB2 Connect/Gateway S
- Tasks List
- Performance
- Package statistics

Process name	Process owner name	Gateway process ID	User process time	System process time	Overall process time	Memory usage by process	CPU usage per process (%)
java -Ddb2pe.homedir=Va...	db2inst1	26 716	N/P	N/P	0.00920	50 064	19
usr/bin/ps -efl	db2inst1	20 706	N/P	N/P	0.00000	776	17
db2fcmdm 1	db2inst2	70 018	N/P	N/P	0.00763	3 060	2
db2fcmdm 0	db2inst2	16 596	N/P	N/P	0.00769	3 064	2
db2agenttp (D9217095) 0	db2inst1	49 408	N/P	N/P	0.00073	10 100	1
usr/opt/db2_08_01/bin/db...	root	16 770	N/P	N/P	0.02442	3 072	1
db2agent (instance) 0	db2inst1	15 898	N/P	N/P	0.00020	3 296	1
db2agent (idle) 0	db2inpe	81 198	N/P	N/P	0.00067	11 916	0
java -Ddb2pe.group=db2p...	db2inpe	81 004	N/P	N/P	0.00344	91 008	0
db2pclnr 0	db2inpe	80 538	N/P	N/P	0.00001	2 648	0
db2pfchr 0	db2inst2	80 324	N/P	N/P	0.00000	2 352	0
db2agent (idle) 0	db2inpe	79 944	N/P	N/P	0.00004	4 852	0
db2pclnr 0	db2inpe	79 650	N/P	N/P	0.00001	2 640	0
db2loggr (TPCH) 0	db2inst2	79 398	N/P	N/P	0.00001	2 300	0
db2pclnr 0	db2inpe	78 638	N/P	N/P	0.00000	2 364	0
db2fmp (idle) 0	db2fepc	78 252	N/P	N/P	0.00002	4 280	0
db2pclnr 0	db2inpe	77 982	N/P	N/P	0.00002	2 616	0
db2agent (idle) 0	db2inpe	77 132	N/P	N/P	0.00000	4 248	0
rpc.tds.server.100083 1	root	76 846	N/P	N/P	0.00000	2 520	0
db2agent (TPCH) 0	db2inst2	76 784	N/P	N/P	0.00000	4 172	0

Start 8:30:57 - AT&T Ne... DB2 Performance ... Telnet ccgtch50.l... DB2 Performance ... DSNB - Statistic ... 100% 4:06 PM Tuesday

This is the same information that can be accessed via the statistics screen of the connect gateway object monitoring.



The screenshot shows the 'DSNB - Statistic Details' application window. The main content area displays performance statistics for a sample SQL statement. The statistics are as follows:

Times for sample SQL Statement	
Total statement time	0.05755
Time in DB2 Connect	0.00094
Time on DB2 host	0.00086
Time in network connection	0.05575

The application window includes a menu bar (Statistics, Details, View, Tools, Window, Help), a toolbar with navigation icons, and a status bar at the bottom showing the system clock (8:31:13) and date (Tuesday, 4:06 PM). The taskbar at the bottom shows several open applications, including 'DB2 Performance ...' and 'DSNB - Statistic ...'.

This is the same information that can be accessed via the statistics screen of the connect gateway object monitoring.



The screenshot shows the IBM DSNB - Statistic Details application window. The title bar reads "DSNB - Statistic Details". The menu bar includes "Statistics Details", "View", "Tools", "Window", and "Help". The status bar at the top shows the date and time "11/2/04 4:05:29 PM".

The main content area is titled "Package statistics" and contains a table with the following data:

Parent DB name	Statement group	Network time	Average network time	Average response size outbound	Average request size outbound
NDCCDB202	2	1.03677	0.34559	1 648	108
NDCCDB202	2	0.14266	0.04755	359	126

The left sidebar shows a tree view with "Main" selected, and sub-items including "DB2 ConnectGateway S", "Tasks List", "Performance", and "Package statistics". The Windows taskbar at the bottom shows the Start button, system tray with time "8:31:28 - AT&T Ne...", and several open applications including "DB2 Performance ...", "Telnet ccgtch50.b...", "DB2 Performance ...", and "DSNB - Statistic ...". The system clock shows "4:07 PM Tuesday".

This is the same information that can be accessed via the statistics screen of the connect gateway object monitoring.



Practical Usage

These usage tips are documented in detail in the [IBM DB2 Performance Expert for z/OS Version 2 Redbook](#) (see Resources).

Connection Pooling – If there is a high number in the “Agents created due to empty pool” field, you may want to adjust NUM_POOLAGENTS. This number should be less than 2% of MAXAGENTS. A high number in the “Agents assigned from the pool” shows that connection pooling is providing some benefit in your system. Samples of this output are located on pages 9 and 22.

Busy Connections – An increasing number in “Connections waiting for host reply” may indicate the need to increase MAXAGENTS.

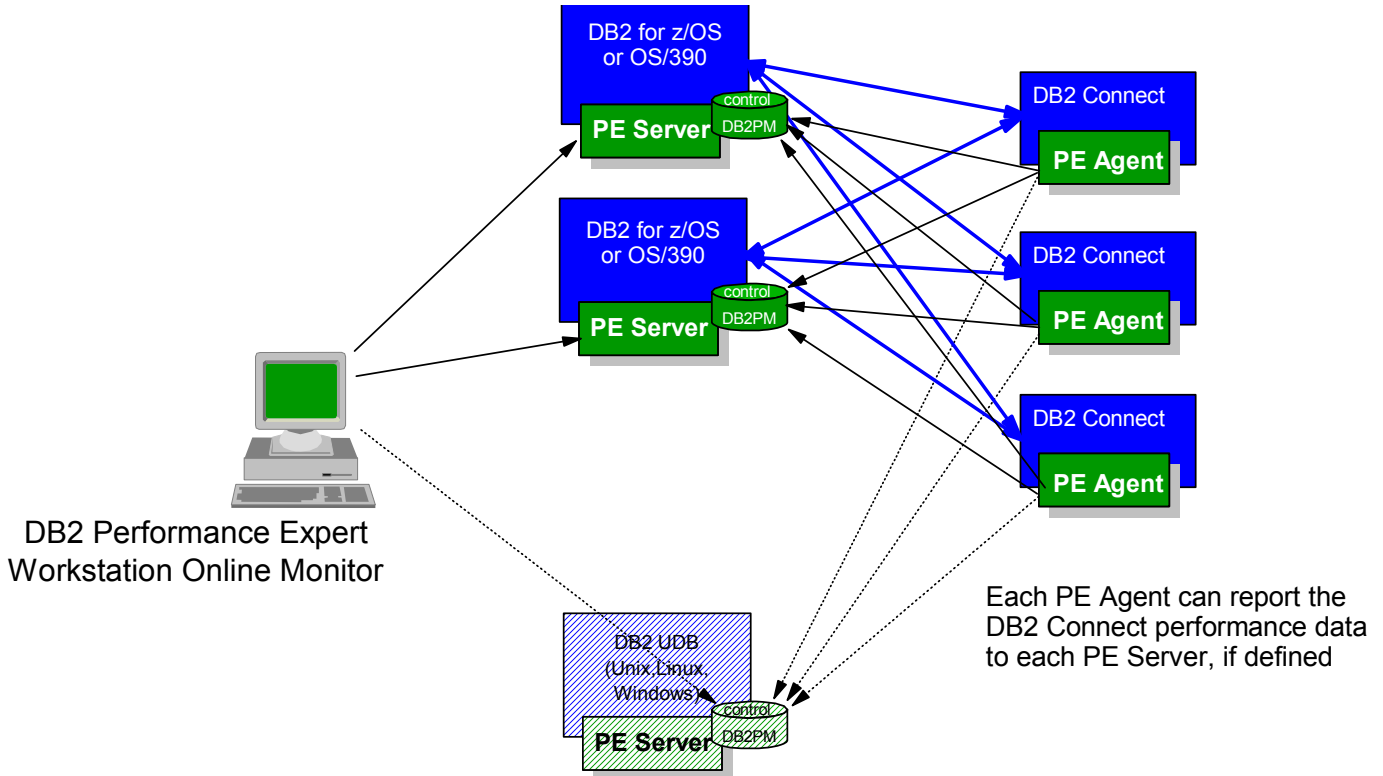
CPU and Working set size – CPU for DB2 Connect agents on a server should be less than 25%.

Response Time – Utilize the Sample SQL Statement information to determine the effect each part of the solution is having on total performance.



DB2 Performance Expert for z/OS versus Multiplatforms

What is the difference in support between DB2 PE for z/OS and DB2 PE for MP?



DB2 PE for MP (pink outline) allows only monitoring of general DB2 Connect Statistics data, but not any application related data. Also, there is no correlation to the DB2 for z/OS performance data.

DB2 Performance Expert - System Overview

DB2 Connect - Statistics

DB2 Connect Information

Name	B555Z6AH
IP address	9.152.113.214
Node name	N0024153
Node Number	0
Server ProductVersion ID	SQL08015
Server Instance Name	DB2
Server Version	5
Time Zone Displacement	N/P
Gateway Snapshot Time	9/14/04 4:29:54 PM

Connections

System Name	DB2	Server
PMO3	Unknown	Unknown
PMO4	Unknown	Unknown
FCS1	V6	V6
Unknown	V7	V1
Unknown		
Unknown		
127.0.0.1	V8R1	V2.1
evcp	v7	v7



Resources

IBM DB2 Performance Expert for z/OS Version 2 at <http://www.redbooks.ibm.com/redbooks/pdfs/sg246867.pdf>
Chapter 8, DB2 Connect Monitoring contains an overview of DB2 Connect Monitoring, Essential Components, Command Line Interface, Statistics Details, Monitoring from Thread Details

Monitoring Performance from the Workstation at <http://publib.boulder.ibm.com/epubs/pdf/fpempb12.pdf>
Chapter 8, Monitoring activities of DB2 Connect gateways and connections of DCS applications

Installation and Configuration at <http://publib.boulder.ibm.com/epubs/pdf/fpeinb12.pdf>
Chapters regarding installing the agent on Unix and Windows

Norbert Jenninger and Ernie Mancill presentations provided some screen shots and setup advice – see the DB2 and IMS Tools and Engine Team Room.