

The Complete Sybase IQ Quick Reference Guide

IQ versions 15.0, 15.1, 15.2, 15.3 & 15.4

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The Complete Sybase IQ Quick Reference Guide

IQ versions 15.0, 15.1, 15.2, 15.3 & 15.4

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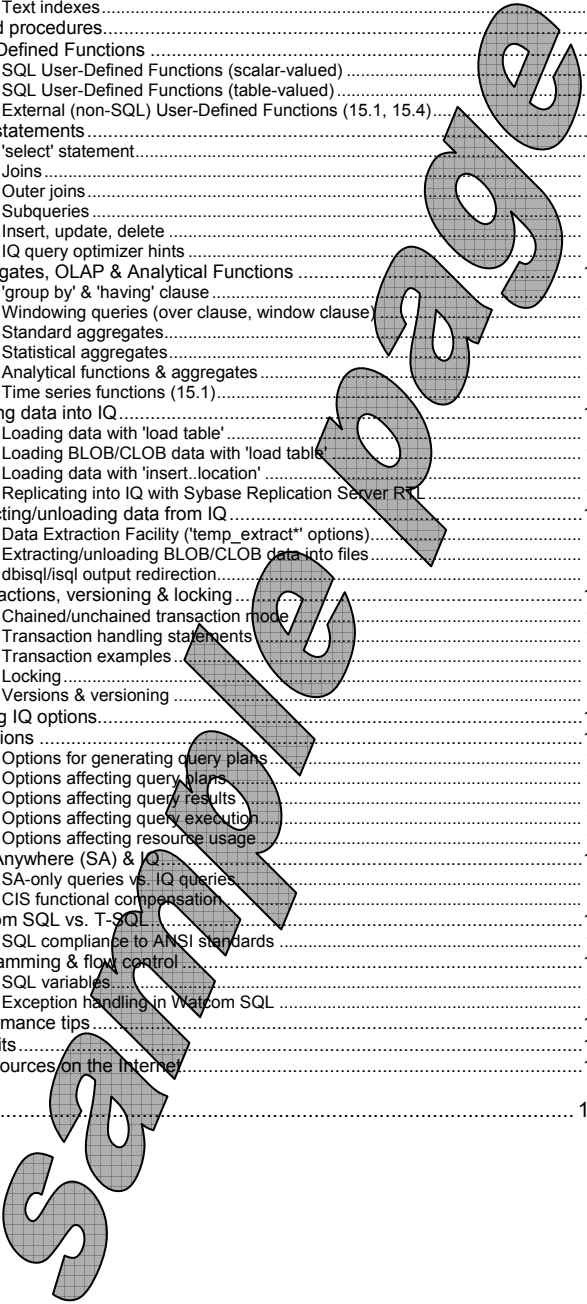
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purposes. Higher settings consume more memory, so do not set unnecessarily high. When higher than 1001, IQ will not start. **-gm 1** starts IQ in single-user mode; this is often combined with **-gd dba** to avoid interference by non-**dba** users.

To restrict access to 1 connection after starting IQ normally, use **sa_server_option 'disable_connections', 'on'**; when **'off'**, normal access is restored (this sets the server property **ConnsDisabled**).

-iqmt *nr-of-threads*

Number of threads to create for the IQ server. Default= approx. 60*nr-of-CPU's + setting of **-gm**; max. value is 4096 (64-bit IQ) or 2048 (32-bit). The actual #threads is logged during IQ startup in the **.stderr** file (>p.18).

-gt *nr-of-CPU's*

-gtc *nr-of-CPU's*

-gt defines the maximum number of physical CPU's that may be used by IQ, and **-gtc** the maximum number of logical CPU's (i.e. when using hyperthreading).

-iqnumbercpus *nr-of-CPU's*

Defines the number of CPU's (=cores) available to IQ (1-512), overriding the physical CPU's (=cores) IQ detects itself. This option is only to help the optimizer to run parallel queries better, or when physical CPU availability to IQ has been restricted.

-p *size-in-bytes*

Maximum size of network packets for client connections to IQ, in bytes. Default=1460; min=500, max=16000. Native IQ clients can independently set the packet size with **CommBufferSize (cbsize)** connection parameter (max=16000). OpenClient/TDS connections must use a packet size below the server maximum specified with **-p**.

-pc

-pt *minimum-size*

For native IQ connections, **-pc** will compress client-server network packets(except when the client runs on the same host as the IQ server); **-pt** specifies the *minimum-size* (in bytes) of a packet in order to be compressed. Default *minimum-size* is 120.

11.2 Security and permission-related switches

-gd { **dba** | **all** | **none** }

Defines who can explicitly start/stop a database (with **start database** or **restore backup**). The default **.cfg** file has **-gd all** (=any user); other values are **dba** (=dba authority) and **none** (=nobody). The setting is in server property **StartDBPermission**.

-gk { **dba** | **all** | **none** }

Defines who can stop the IQ server with **stop engine** or the **dbstop** utility. Default=**dba** (=dba authority); other values are **all** (=any user); **none** (=nobody; IQ can only be stopped with **stop iq**). When IQ is started with **-gk all**, the IQ documentation speaks of a "personal server".

-gl { **dba** | **all** | **none** }

Defines who can run **load table**. The default **.cfg** file has **-gl all** (=any user); other values are **dba** (=dba authority) and **none** (=nobody). Note that **alter** permission on the actual table is also required to run **load table**.

-gu { **dba** | **all** | **none** | **utility_db** }

Defines who can run **create/drop database**. Default=**dba** (=dba authority); other values are **all** (=any user); **none** (=nobody) or **utility_db** (=only the **dba** user, when connecting to the **utility_db** database with the password in **util_db.ini**; >p.17).

-su *password*

Specifies the **dba** user's password for connecting to the utility database (>p.17).

-ek '*encryption-key*'

Encryption key for an IQ database that was created with strong encryption (>p.27). Must be specified on the **start iq** command line following the **.db** filename; cannot be specified in the **.cfg** file.

-ep

On Windows only, prompts for the encryption key for an IQ database that was created with strong encryption (>p.27).

-ec [**none**],[**simple**],[**tls**(*TLS-specification*)]

For native IQ connections only, specifying **simple** or **tls(...)** enables encrypted client-

the amount of internal IQ-to-SA communication (also, >p.125).

When specifying a number, displays only the connection with that connection handle.

sp_iqcontext [*connection-handle*]

Without parameters, displays information about currently executing queries. The currently executing SQL is displayed in column **CmdLine**.

When specifying a number, displays only the connection with that connection handle.

sp_iqclient_lookup ['*client-IP-address*' [, *client-IP-port* [, '*user-name*']]

Without parameters, for all currently active connections, displays the client-side IP address and port number of the client's connection (the only item not shown by **sp_iqconnection**), and the user name. When specified, the parameters act as filters; specifying **NULL** matches all connections.

23.2 Workload monitoring

Workload by client applications can be monitored in various ways:

- 'request logging' using startup switches **-zr sql** and **-zo** (>p.19). This collects the actual SQL statements sent to the IQ server by client applications.
- **sp_iqcontext** (>p.52) displays currently executing SQL.
- **sp_iqworkmon** (below) collects information about usage of tables, columns and indexes in queries.

sp_iqworkmon ['*action*'] [, '*monitor-mode*']

Collects information about usage of IQ tables, columns and indexes in **select/update/delete** queries. SA tables are ignored by **sp_iqworkmon**.

action can be **start**, **stop**, **status** (=default, shows current status and #distinct tables/columns/indexes items counted), or **reset** (resets collected information to 0). *monitor-mode* indicates what is monitored and can be **table**, **column**, **index** (for non-FP indexes) or **all** (= all three). The collected information (number of accesses and the time of the last access) can be viewed with the following stored procedures:

- **sp_iqtableuse**: reports access count for IQ tables.
- **sp_iqcolumnuse**: reports access count for columns in IQ tables.
- **sp_iqindexuse**: reports access count for non-FP indexes.

Stored procedures **sp_iqunusedtable**, **sp_iqunusedcolumn** & **sp_iqunusedindex** report tables, columns and indexes that were not accessed by queries while **sp_iqworkmon** was active (since the last **reset** action).

The collected information is kept only in memory and is lost after an IQ reboot.

23.3 Monitoring space usage

For information about the amount of space being used, use these procedures:

- **sp_iqspaceused** (>p.28): reports total size and amount used for the database
- **sp_iqdbspace** (>p.32): reports total size and amount used for each dbspace
- **sp_iqfile** (>p.32): reports total size and amount used for each dbfile

For more information about the tables, indexes, partitions etc. that are consuming space, see the list of stored procedures on p.32.

23.4 Performance-related monitoring

Various aspects of IQ performance and resource usage can be monitored with **sp_iqsysmon**, **iq utilities** and **sp_statistics**; **sp_iqstatus** also provides some information. In addition, Sybase Central (>p.54) has a graphical performance monitor (right-click the IQ icon for the IQ server; then, in the right-hand window, select the 'Performance Monitor' tab).

sp_iqsysmon [...*options*...]

Based on **iq utilities** (see below), reports details on IQ's buffer management, CPU utilization, and other aspects related to resource usage and performance.

sp_iqsysmon can be used in various ways:

- **sp_iqsysmon 'hh:mm:ss'** [, '*sections*']
Displays a report over the specified time interval; optionally, *sections* limits the output (see below).
- **sp_iqsysmon start_monitor**
... run some workload...
sp_iqsysmon stop_monitor [, '*sections*']
Displays a report over the interval between **start_monitor** and **stop_monitor**; optionally, *sections* limits the output (see below).
- **sp_iqsysmon start_monitor, filemode** [, '*monitor-options*']
... run some workload...
sp_iqsysmon stop_monitor

Example: **create table MyTable (a varchar(10) null);**
insert MyTable values ("");
 -- returns 1 row when **non_ansi_null_varchar=on**; 0 rows when **off**.
select * from MyTable where a is null;

string_truncation (option, on/off)

When **off** (=default), no error is raised when a character string is truncated by an **insert** or **update** command of a **var[char]** column, or assignment to a **var[char]** variable. When **on** (=default, =ANSI SQL-compliant), an error is raised only when non-space characters are truncated; also, the specific **insert/update** causing the truncation is rolled back (but the transaction continues). NB: in pre-15, the default was **off**.
set string_truncation on/off (T-SQL syntax) is equivalent to **set temporary option string_truncation=on/off**.

escape_character (option, on/off)

When **on** (=default for native IQ connections), a backslash character (\) is interpreted as an escape character rather than as a normal character. This escape is required for specifying non-printable characters like '\x0a' or '\n'. Also, when **on**, double backslashes must be used for Windows pathnames (i.e. **C:\\Windows\\System32**). When **off** (=default for OpenClient/TDS connections), the backslash is a regular character with no special meaning.

tds_empty_string_is_null (option, on/off)

For TDS connections only (it is ignored for native IQ connections), affects the client-side representation of an empty string value. When **off** (=default) an empty string is converted to a single space; when **on**, to a **NULL** string. How these values are eventually formatted depends on the particular client application. Note that the conversion is performed by the TDS driver, after all server-side SQL processing has been performed (i.e. the SQL results are not affected by **tds_empty_string_is_null**).

ansi_blanks (option)

In embedded SQL, affects string truncation when reading data into host variables.

34 Operators

Numeric/mathematical operators

For all numeric datatypes, the operators **+**, **-**, *****, **/** and **%** (modulo) are supported. For additional mathematical functions, such as **abs()** and **power()**, >p.76.

ASE-IQ compatibility: In IQ queries, a numeric expression cannot contain **NULL** (e.g. **3+NULL**). In ASE, and in SA-only queries, this evaluates to **NULL**.

String operators

Operators **||** and **+** both concatenate two strings (for **[var]binary** as well as character strings). **||** converts all operands to character strings, while **+** does no conversions.

|| and **+** cannot handle **long varchar** data; these must be converted to **[var]char** first.

Examples: **select 'Right now is: ' || now()**

select ' Right now is: ' + cast(now() as varchar)

For string functions such as **like substring()**, >p.78.

Date & time operators

For date & time-related datatypes, the **+** and **-** can be used in different ways:

- For **date** or **timestamp** datatypes, when used with a numeric expression, the **+** and **-** operators add and subtract, respectively, a number of days.
- For **date** or **timestamp** datatypes, when used with another **date** or **timestamp**, the **-** operator calculates their difference, as an integer number of days.
- When used with a **date** and a **time** datatype, the **+** operator combines both into a **timestamp** datatype.

Examples: **select '36 hours from now' = now() + 1.5;**

select '4 weeks ago' = now() - 28;

select 'days as an SAP company' = now()-cast('May 12 2010' as date);

For date & time functions (like **now()**), >p.72.

Logical operators

Logical operators are used in logical expressions (such as in predicates), which evaluate to true or false (except when involving **NULL** with **ansinull=on**, when the result can also be unknown):

- **=, <>, !=, >, >=, <, <=, !>** (not greater than), **!<** (not less than) - comparisons
- **and, or** - combines two logical expressions: **if (@a > @b) and (@x != @y)**
- **not** - negates a logical expression: **if not (@a > @b)**
- **[not] like** - a pattern matching operator for strings; see below.
- **contains()** - used with **WD** (word) and text indexes, >p.91, p.94.
- **[not] in** - matches a list of values: **where a in (3,4,5)** - this is equivalent to **where a=3 or a=4 or a=5**

cache) than this number (in MB) are not executed, but raise an error. Default = 0 = no limit. **sp_iqshowpsex** shows the current setting.

In 15.3, for a distributed query, this limit applies to the sum of **iq_shared_temp** space and **iq_system_temp** space used by all MPX nodes participating in the query.

max_temp_space_per_connection (option)

When set to a number > 0, any statement or load operation causing the total amount of temp store space (not temp cache) used by the current connection to exceed this number (in MB), will be aborted during execution. Default = 0 = no limit. **sp_iqshowpsex** shows the current setting. This is a run-time limit, as opposed to **query_temp_space_limit** which applies prior to execution.

In 15.3, for a distributed query, this limit applies to the sum of **iq_shared_temp** space and **iq_system_temp** space used by all MPX nodes participating in the query.

sp_iqshowpsexiq [*connection-handle*]

For all connections, or only for the specified connection, displays information about option settings for task priority and resource limits (like **iqgovern_priority** or **max_query_time**).

53.5 Options affecting resource usage

The options below affect the amount of resources available when executing a query.

-iqgovern max-nr-statements (startup switch)

Defines the maximum number of statements that can be executed concurrently (across all users) in the IQ server. Default=2*(nr of CPUs)+10. Setting this value too high or too low may affect overall performance.

iqgovern_priority (option)

Defines the execution priority for a query waiting to be executed. Values are 1 (high priority), 2 (medium,=default), and 3 (low); the query is placed into a queue with corresponding priority; all queries in higher-priority queues are executed before moving to a lower-priority queue. The current setting for a connection is displayed by **sp_iqshowpsex** as HIGH/MEDIUM/LOW (for 1/2/3).

iqgovern_priority cannot be set lower than option **iqgovern_max_priority**, whose default is 2 (otherwise an error message is raised, mentioning only 'invalid setting').

iqgovern_priority_time (option)

Defines the number of seconds a priority 1 query waits in the queue before starting execution. When reaching the time limit, the query starts even if this exceeds the max. number of concurrent statements defined by the **-iqgovern** switch. Default = 0 = no waiting; maximum is 1000000 (seconds, = 11 days).

max_query_parallelism (option)

Defines the maximum level of parallelism allowed for query operators. Default=64; maximum=512. When 1, parallelism is disabled (not recommended). It can sometimes be beneficial to use a value higher than the actual number of cores available to IQ.

max_iq_threads_per_connection (option)

Defines the maximum number of processing threads available to a connection for use in IQ operations. Values are 3-10000, default=144.

max_iq_threads_per_team (option)

Defines the maximum number of processing threads for a particular operation in a query. Values are 1-10000, default=144. The total #threads for a parallel processed query must remain below option **max_iq_threads_per_connection**.

max_statement_count (option)

Defines the max. number of prepared statements that can be used per connection. Default = 100; when 0, no limit applies. **sp_iqshowpsex** shows the current setting.

max_cursor_count (option)

Defines the maximum number of cursors that can be used per connection. Default = 50; when 0, no limit applies. **sp_iqshowpsex** shows the current setting.

hash_pinnable_cache_percent (option)

Defines the maximum percentage of the currently available temp cache that a hash operation can allocate (a run-time limit). Values are 0-100, default=20. This is an advanced setting; higher values may impact other user's queries.

Index

Legend

- Index entries followed by **' , sp_ ' , ' sp_iq ' or ' sa '** are stored procedures where the **sp_ , sp_iq or sa_** prefix has been chopped off to make a better index reference; for example, **connection , sp_iq** refers to **sp_iqconnection**.
- To maximize the usefulness of the index, index entries are often followed by **(option) , (dbisql command) , (aggregate) ,** etc. as a quick hint about the meaning of the entry.

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