



[Select a country](#)

← [Technical Studio Home](#)

[OS/400 Maximum Capacities - V5R1](#)

- [Database and SQL Limits](#)
- [Journal Limits](#)
- [Communications Limits](#)
- [Work Management Limits](#)
- [Security Limits](#)
- [Save and Restore Limits](#)
- [File System Limits](#)
- [Miscellaneous Limits](#)

[OS/400 Maximum Capacities - V4R5 PDF](#)

[OS/400 Maximum Capacities - V4R4 PDF](#)

[OS/400 Maximum Capacities - V4R2 PDF](#)

OS/400 Maximum Capacities - V5R1

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These tables list the limits or maximum values corresponding to V5R1. Changes or additions since V4R5 are highlighted in **red**. Some of these maximum values are different (lower) on prior releases. Also, there are environments or configurations where the actual limit may be less than the stated maximum. For example, certain high-level languages can have more restrictive limits.

Note: The values listed in these tables represent theoretical limits, not thresholds or recommendations. Approaching some of these limits may be unreasonable and can degrade performance. Therefore, practical limits may be lower, depending on system size, configuration, and application environment.

Database and SQL Limits

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[back to top](#)

DB2 for iSeries - Database Manager Limits	Value
Most columns in a table (number of fields in a record)	8,000
Most columns in a view (number of fields in a record)	8,000
Maximum number of parameters in a function	90
Maximum number of parameters in a procedure ¹	254
Maximum length of a row without LOBs including all overhead (number of bytes in a record)	32,766
Maximum length of a row with LOBs including all overhead (number of bytes in a record)	3,758,096,383
Maximum size of a table (number of bytes in a database physical file member)	1 terabyte
Maximum size of an index (number of bytes in an access path) ²	1 terabyte
Most rows in a table (number of records in a database physical file member)	4,294,967,288
Longest index key (size of key for database files)	2,000
Most columns in an index key (number of key fields in a database file)	120
Most indexes on a table (number of access paths on a database physical file member)	~ 4,000

Most tables referenced in an SQL statement (number of members that can be joined)	256
Most tables referenced in an SQL view (number of physical file members in a logical file member)	32
Most host variable declarations in a precompiled program 3	Amount of storage
Most host variables in an SQL statement	Amount that can fit within the longest SQL statement of 32,767 bytes
Longest host variable used for insert or update	32,766
Longest SQL statement	32,767
Most elements in a select list 4	~ 8,000
Most predicates in a WHERE or HAVING clause	4,690
Maximum number of columns in a GROUP BY clause	120
Maximum total length of columns in a GROUP BY clause	2,000
Maximum number of columns in an ORDER BY clause	10,000
Maximum total length of columns in an ORDER BY clause	10,000
Maximum size of an SQLDA	16,777,215
Maximum number of prepared statements	Amount of storage
Most declared cursors in a program	Amount of storage
Maximum number of cursors opened at one time	Amount of storage
Most tables in a relational database	Amount of storage
Maximum number of constraints on a table	300
Maximum levels allowed for a subselect	32
Maximum length of a comment	2,000
Maximum length of a path	3,483
Maximum number of schemas in a path	268
Maximum number of rows changed in a unit of work (number of records locked in a single transaction under commitment control)	~ 500,000,000
Maximum number of triggers on a table	300
Maximum number of nested trigger invocations	200
Maximum procedures with result sets waiting to be fetched	100
Maximum number of members in a physical or logical file	32,767
Maximum number of database format and directory objects that can be on a system to successfully execute a Reclaim Storage (RCLSTG) command 5	~ 1,572,500
Maximum number of database objects that can be in use at one time	~ 500,000

DB2 for iSeries - SQL Identifier Limits	Value
Longest alias name	128
Longest authorization name	10
Longest column label	60
Longest correlation name	128
Longest cursor name	18
Longest host identifier	64
Longest server name	18
Longest SQL routine label	128
Longest statement name	18
Longest table, package, or alias label	50
Longest unqualified schema name	10
Longest unqualified column name	30
Longest unqualified constraint name	128
Longest unqualified data type name	128
Longest unqualified external program name 6	10
Longest unqualified function name	128
Longest unqualified nodegroup name	10
Longest unqualified package name	10
Longest unqualified procedure name	128
Longest unqualified specific name	128
Longest unqualified SQL parameter name	128
Longest unqualified SQL variable name	128
Longest unqualified table, view, and index name	128
Longest unqualified trigger name	128
Unqualified system column name	10
Unqualified system table, view, and index name	10
DB2 for iSeries - Numeric Limits	Value
Smallest BIGINT value	-9 223 372 036 854 775 808
Largest BIGINT value	+9 223 372 036 854 775 807
Smallest INTEGER value	-2 147 483 648
Largest INTEGER value	+2 147 483 647
Smallest SMALLINT value	-32 768
Largest SMALLINT value	+32 767
Largest decimal precision	31
Smallest FLOAT value	~ -1.79x10 ³⁰⁸
Largest FLOAT value	~ +1.79x10 ³⁰⁸

Smallest positive FLOAT value	~ +2.23x10 ⁻³⁰⁸
Largest negative FLOAT value	~ -2.23x10 ⁻³⁰⁸
Smallest REAL value	~ -3.4x10 ³⁸
Largest REAL value	~ +3.4x10 ³⁸
Smallest positive REAL value	~ +1.17x10 ⁻³⁸
Largest negative REAL value	~ -1.17x10 ⁻³⁸
DB2 for iSeries - String Limits	Value
Maximum length of BLOB	2,147,483,647
Maximum length of CHAR	32,766
Maximum length of VARCHAR	32,740
Maximum length of CLOB	2,147,483,647
Maximum length of C NUL-terminated	32,740
Maximum length of GRAPHIC	16,383
Maximum length of VARGRAPHIC	16,370
Maximum length of DBCLOB	1,073,741,823
Maximum length of C NUL-terminated graphic	16,370
Maximum length of character constant	32,740
Maximum length of a graphic constant	16,370
Longest concatenated character string	32,766
Longest concatenated graphic string	16,370
DB2 for iSeries - Date and Time Limits	Value
Smallest DATE value	0001-01-01
Largest DATE value	9999-12-31
Smallest TIME value	00:00:00
Largest TIME value	24:00:00
Smallest TIMESTAMP value	0001-01-01 - 00.00.00.000000
Largest TIMESTAMP value	9999-12-31 - 24.00.00.000000
DB2 for iSeries - Datalink Limits	Value
Maximum length of DATALINK	32,718
Maximum length of DATALINK comment	254

Journal Limits

[back to top](#)

Journal Limits	Value
Maximum size of a single journal receiver	~ 1 terabyte
Maximum length of a single journal entry (bytes)	4,000,000,000

Maximum sequence number for journal entries	9,999,999,999
Maximum number of objects that can be associated with one journal 7	250,000
Maximum number of objects allowed on a single APYJRNCHG or RMVJRNCHG command	65,535
Maximum number of remote journal target systems for broadcast mode	255

Communications Limits

[back to top](#)

General Communications Configuration Limits	Value
Maximum number of communications configuration objects that can be varied online at IPL	32,767
Maximum number of communications configuration objects that can be in a varied on state	64,926
Maximum number of device descriptions for display devices	32,767
Recommended maximum number of devices allocated to an interactive or communications subsystem	250 to 300
Maximum number of virtual devices that can be specified as automatically configured (QAUTOVRT system value)	32,500 or *NOMAX
Maximum Communications/LAN hardware capabilities	See <i>iSeries Handbook</i> , GA19-5486
SNA Communications Limits	Value
Maximum number of SNA controllers per LAN line plus the Network controller	256
Maximum number of SNA CDs across a Frame Relay's NWI lines	256
Maximum number of lines per Frame Relay NWI	256
Maximum number of logical channels per X.25 line	256
Maximum number of controllers on SDLC multidrop lines	254
Maximum number of communication arbiters (maximum value of QCMNARB system value)	99
Maximum number of active sessions per APPC mode	512
Maximum number of modes per APPC device (or APPN location) 8	14
Maximum combined number of APPC devices (in any state) and APPN devices (in varied on state)	25,300
Maximum number of APPN intermediate sessions	9,999
Maximum number of devices per APPC controller	254
Maximum number of switched lines per APPC controller	64

Maximum size of APPN local location list	476
Maximum size of APPN remote location list	1,898
Maximum size of Asynchronous network address list	294
Maximum size of Asynchronous remote location list	32,000
Maximum size of Retail pass-through list	450
Maximum size of SNA pass-through group	254
TCP/IP Communications Limits	Value
Maximum number of interfaces per line	2,048
Maximum number of interfaces per system	16,384
Maximum number of routes per system	65,535
Maximum number of ports for TCP	65,535
Maximum number of ports for UDP	65,535
Maximum TCP receive buffer size	8MB
Maximum TCP send buffer size	8MB
Maximum size of a transmission unit on an interface	16,388 bytes
Maximum number of TELNET server jobs	100
Maximum number of TELNET server sessions (non-SSL)	Maximum number of interactive jobs
Maximum number of TELNET server sessions using SSL protocol	~ 50,000
Default maximum number of socket and file descriptors per job 9	200
Maximum number of socket and file descriptors per job	~ 524,000
Maximum number of socket descriptors on the system	~ 46,420,000
Maximum size of database files for FTP	1TB
Maximum size of integrated file system files for FTP	Amount of storage
Maximum number of recipients for SMTP	14,000
Maximum number of simultaneous inbound connections for SMTP	~ 32,000 (1 connection per prestart job)
Maximum number of simultaneous outbound connections for SMTP	~ 32,000 (1 connection per prestart job plus 1 listening)
Maximum number of MX records handled by MX resolver (Client) for SMTP	80
Maximum document size for SMTP	2.1GB
Maximum number of active threads per HTTP Server	9,999
Maximum number of connections that can be displayed using WRKTCPSTS or NETSTAT commands	32,767
OptiConnect Limits	Value

Maximum number of systems that can be connected using SPD OptiConnect	64
Maximum number of logical connection paths that can be established between two systems using OptiConnect 10	6
Maximum distance between systems that are connected using SPD OptiConnect	500 meters (1063 Mbps) or 2 kilometers (266 Mbps)
Maximum number of systems that can be connected on a single HSL OptiConnect loop	2
Maximum distance between systems that are connected using HSL OptiConnect	15 meters
Maximum number of active jobs that can communicate with any one system using OptiConnect 11	16,382
Maximum total number of active jobs on one system that can use OptiConnect 11	262,135
Maximum number of TCP/IP subnets per system 12	8
Communications Trace Service Tool Limits	Value
Maximum amount of storage allocated for a single communications trace buffer	64MB
Maximum total amount of storage allocated for all communications trace buffers	128MB
Maximum number of active traces per multiline IOP on pre-V4R1 IOP hardware (limit is removed with new V4R1 IOP hardware)	2
Maximum record size when using the TRCTCPAPP trace tool for Host Server and DDM/DRDA Server	6,000 bytes

Work Management Limits

[back to top](#)

Work Management Limits	Value
Maximum number of jobs on the system	485,000
Maximum number of active subsystems	32,767
Maximum number of jobs in a subsystem	32,767
Maximum number of prestart jobs initially started when subsystem started	9,999
Maximum number of spooled files per job	999,999
Maximum amount of temporary auxiliary storage that can be specified for a job	2TB or *NOMAX
Maximum number of active memory storage pools	64

Security Limits

[back to top](#)

Security Limits	Value
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Maximum number of entries for a user profile 13 14 15 16	5,000,000
Maximum number of objects that can be secured by an authorization list	2,097,070
Maximum number of private authorities to an authorization list 17	4,999,999
Maximum number of entries in a validation list	2,147,483
Maximum number of user profiles on a system 16	~ 340,000
Maximum length of a password	128

Save and Restore Limits

[back to top](#)

Save and Restore Limits	Value
Maximum number of related internal objects that can be saved in a single save operation 18	~ 65,500
Maximum number of database files in a library that can be saved in a single save operation	No limit for save
Maximum number of private authorities a user profile can have to successfully save the profile using SAVSYS or SAVSECDTA commands	No limit for save
Maximum number of user profiles that can be saved using SAVSYS or SAVSECDTA commands	No limit for save
Maximum number of names in a save or restore command specifying which objects or libraries to include or exclude in the save or restore operation 19	300
Maximum number of concurrent save or restore operations	Limited only by available machine resources
Maximum size of an object that can be saved	~ 1TB
Maximum size of a save file	~ 1TB

File System Limits

[back to top](#)

File System Limits	Value
Maximum number of libraries in the system part of the library list	15
Maximum number of libraries in the user part of the library list 20	250
Maximum number of objects in a library	~ 360,000
Maximum number of documents and folders (DLOs) in a user ASP	349,000
Maximum number of DLOs in a folder	65,510
Maximum size of a document	2GB - 1
Maximum number of objects on the system	1,073,741,823

Maximum number of directories in one directory in the "root" (/), QOpenSys, or user-defined file systems	32,765
Maximum number of directories in an ASP	1,073,741,823
Maximum number of links for an object in the "root" (/), QOpenSys, or user-defined file systems	32,767
Maximum size of a stream file	256GB
Default maximum number of file and socket descriptors per job 21	200
Maximum number of file and socket descriptors per job	~ 524,000
Maximums for directory levels, path names, and object attributes and links	See File System Comparison in <i>Integrated File System Introduction</i> , SC41-5711
Maximum number of files that the File Server can have open at one time 22	65,535

Miscellaneous Limits

[back to top](#)

Miscellaneous Limits	Value
Maximum system and I/O hardware configurations and capacities	See <i>iSeries Handbook</i> , GA19-5486
Maximum number of DASD arms	1,080
Minimum number of DASD arms required for acceptable performance 23	See <i>iSeries Disk Arm Requirements</i>
Maximum number of auxiliary storage pools (ASPs)	1 system ASP, 31 user ASPs, 67 independent ASPs
Maximum number of logical partitions	32 (up to 4 per processor on selected models)
Maximum number of cluster nodes	128
Maximum database size for Domino	256GB
Maximum size of a user space 24	16,773,120 bytes
Maximum size of a user index	~ 4GB
Maximum size of a data queue	2GB
Maximum size of a message queue 25	16MB (~75,000 messages)
Maximum number of new messages of any one message type on a message queue	Limited only by size of message queue

Maximum number of records for each version of the history log	65,535
Maximum number of input fields that can be specified for a display file	256
Maximum size of files when filing OfficeVision mail locally	16MB

Footnotes

[back to top](#)

¹ Procedures with PARAMETER STYLE SQL are limited to 90 parameters. SQL procedures with PARAMETER STYLE GENERAL are limited to 253. Procedures with PARAMETER STYLE GENERAL WITH NULLS are limited to 254. External procedures with PARAMETER STYLE GENERAL are limited to 255. The maximum number of parameters is also limited by the maximum number of parameters allowed by the licensed program used to compile the external program.

² If ACCPTHISIZ(*MAX4GB) is specified, then the access paths associated with that file can only occupy a maximum of four gigabytes (4,294,966,272 bytes) of auxiliary storage.

³ In RPG/400 and PL/I programs when the old parameter passing technique is used, the limit is approximately 4000. The limit is based on the number of pointers allowed in the program. In all other cases, the limit is based on architectural constraints within the operating system.

⁴ The limit is based on the size of internal structures generated for the parsed SQL statement.

⁵ Directory objects contain information about the relationships between database files. Refer to the Display Database Relations (DSPDBR) command for more information.

⁶ For a service program entry point name, the limit is 279. For REXX procedures, the limit is 33.

⁷ This maximum includes objects whose changes are currently being journaled, objects for which journaling was ended while the current receiver was attached, and journal receivers that are or were associated with the journal while the current journal receiver is attached. If the number of objects is larger than this maximum, journaling does not start.

⁸ An APPN location refers to all devices that have the same values for RMTLOCNAME, RMTNETID, and LCLLOCNAME.

⁹ Default can be changed with DosSetRelMaxFH() - Change the Maximum Number of File Descriptors (see *OS/400 UNIX-Type APIs* in the AS/400 Softcopy Library).

¹⁰ Only 2 of the 6 logical connection paths can be using SPD Bus adapters (others must be HSL).

¹¹ The following count as jobs toward OptiConnect job limits: DDM/DRDA source jobs (user jobs), DDM/DRDA target jobs on server, DB2 multisystem system jobs, APPC controllers and TCP/IP interfaces using OptiConnect (type *OPC, count as 2 jobs for each controller or interface), jobs using ObjectConnect over OptiConnect, jobs using OptiMover API, and active Remote Journals. Some of these uses are transient for the duration of a function (for example, ObjectConnect SAVRSTxxx) and some are more long term (for example, DDM conversations until reclaimed by RCLDDMCNV or ending the job).

¹² The following count as TPC/IP subnets: Each OptiConnect TCP/IP interface with no associated local interface (ADDTCPIFC keyword LCLIFC(*NONE)). Each unique interface associated with an OptiConnect

TCP/IP interface.

[13](#) A user profile contains four categories of entries: 1) every object owned by the profile, 2) every private authority the profile has to other objects, 3) every private authority other profiles have to objects owned by this profile, and 4) every object for which this profile is the primary group. The sum of these categories equals the total number of entries for the profile.

[14](#) OS/400 maintains internal user profiles that own objects that are shared or cannot be assigned to a single individual user (for example, QDBSHR owns shared database objects such as database formats, access paths, and so on). These internal user profiles are subject to the same limits as any other user profile on the system.

[15](#) Using authorization lists or group profiles reduces the number of private authorities and helps avoid this limit (see *Security - Reference*, SC41-5302).

[16](#) As of V5R1, the SAVSYS and SAVSECDTA commands support saving this maximum.

[17](#) Limit is due to the maximum number of entries allowed for the user profile that owns the authorization list (one less because a category 01 entry is used for the ownership of the authorization list).

[18](#) Some examples of related objects are:

- o All database file objects in a library that are related to each other by dependent logical files.
- o All database file objects in a library that are journaled to the same journal when using the save-while-active function.
- o All objects in a library when SAVACT(*LIB) is specified.
- o All objects in a library when saving to a diskette device.

For most object types, one internal object is saved for each OS/400 object. Some exceptions are:

- o Subsystem descriptions:
 - 9 internal objects per subsystem description.
- o Database files:
 - At least 1 internal object per physical file member.
 - At least 2 internal objects per member for physical files of TYPE(*DATA) with keyed access paths or constraints.
 - At least 1 internal object per dependent logical file member when ACCPTH(*YES) is specified.

[19](#) Using generic names to specify groups of objects or libraries can help avoid this limit.

[20](#) There are compatibility considerations for application programs that retrieve library lists and are not prepared for the longer lists. For more details, see the V5R1 Memo to Users.

[21](#) Default can be changed with DosSetRelMaxFH() - Change the Maximum Number of File Descriptors (see *OS/400 UNIX-Type APIs* in the AS/400 Softcopy Library).

[22](#) This limit is cumulative across all File Server jobs (QPWFSxxxx and QZLSFILE jobs) on the system. Once a file is closed, it no longer counts toward the limit. Some applications that can be affected by this limit are Client Access, AS/400 NetServer, Network Station boot up (which keeps over 200 files open, unless using Compact Flash Memory which only requires about 25 files) and applications, and the QFileSvr.400 file system.

[23](#) See *iSeries Disk Arm Requirements* in the Resource Library on the iSeries Performance Management web site at

<http://www.ibm.com/eserver/series/perfmgmt>.

²⁴ Listed size is the maximum when the machine is allowed to choose the alignment. Absolute maximum size of a user space is 16,776,704 bytes.

²⁵ As of V4R3, message queue QSYSOPR is shipped with a message queue full action of *WRAP. When the message queue is full, the oldest informational and answered messages are removed from the message queue to allow space for new messages to be added. If the removing of the informational and answered messages does not provide enough space, then unanswered inquiry messages are removed until there is space to add the new message. The default reply is sent before an unanswered inquiry message is removed. For more information, see the MSGQFULL parameter on the CHGMSGQ command.

[back to top](#)

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