IBM Power Systems Performance Capabilities Reference

IBM i operating system 7.2

October 2014

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Note!

Before using this information, be sure to read the general information under "Special Notices."

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Purpose of this Document

The purpose of this document is to help provide guidance in terms of IBM i operating system performance, capacity planning information, and tips to obtain optimal performance on IBM i operating system.

This document is typically updated with each new release or more often if needed. This new edition of the IBM i 7.2 Performance Capabilities Reference Guide is an update to previous editions in order to reflect new products announced on April 28, 2014.

This edition includes performance information on newly announced IBM Power System S814 and IBM Power System S824 featuring POWER8 technology.

This document also includes performance information on IBM Power Systems featuring POWER7 processor technology and predecessors.

The wide variety of applications available makes it extremely difficult to describe a "typical" workload. The data in this document is the result of measuring or modeling certain application programs in very specific and unique configurations, and should not be used to predict specific performance for other applications. The performance of other applications can be predicted using a system sizing tool such as IBM Systems Workload Estimator.

IBM i Performance Tips and Techniques

For performance tips and techniques for IBM i systems, guidance is available at the following websites:

IBM i performance white papers and resources:

Performance Management on IBM i

IBM i performance tips and techniques document:

IBM i on Power – Performance FAQ

IBM developerWorks

IBM developerWorks provides a wide variety of information on topics for IBM i including performance:
developerWorks

CPW Rating Description

"Due to road conditions and driving habits, your results may vary." "Every workload is different." These are two hallmark statements of measuring performance in two very different industries. They are both absolutely correct. For systems that run IBM i, IBM has provided a measure called the CPW rating to represent the relative computing power (more specifically, transactional capacity) of these systems in a commercial environment. The type of caveats listed above are always included because no prediction can be made that a specific workload will perform in the same way that the workload used to generate CPW information performs.

The CPW rating provides a measure to show how on-line transactions processing (OLTP) workloads perform on systems that run IBM i.   The CPW rating is built using workloads that can utilize the full processing power of the system. This includes processor capabilities such as SMT (simultaneous multi-threading) and optionally enabled features such as TurboCore.

Many, but clearly not all, IBM i applications tend to follow the same patterns as the CPW rating - which stands for **Commercial Processing Workload rating**. These applications tend to have many jobs running brief transactions in an environment that is dominated by IBM system code performing database operations. The CPW rating is not intended to represent workloads that are single-threaded ("batch" jobs can be a subset of this class of applications). Single-threaded workloads tend to consume a single processor or processor thread for an extended period of time and utilize different CPU pathlengths and I/O characteristics from OLTP workloads. Therefore single-threaded workloads that are typically found in batch environments tend to have different characteristics than what is represented by the CPW rating. The CPW rating is also not intended to represent applications which spend a large portion of their overall processor pathlength in application code. These applications tend to have different scaling behaviors than the CPW rating due to longer pathlength per transaction and less I/O processing.

The CPW rating is a self-referential capacity metric. Because of this, it should be used for representing the relative capacity of different systems running IBM i. Such capacity metrics can not be used to represent the execution speed of any given thread of execution.   Use the IBM Systems Workload Estimator sizing tool (see Appendix B for details) for assistance in sizing systems for specific workloads.

CPW Rating

The CPW rating of a system is generated using measurements of a specific workload that is maintained internally within the IBM i Systems Performance group. The CPW rating is designed to evaluate a computer system and associated software in the commercial environment. It is rigidly defined as a relative capacity metric for rough model comparisons and relative CPU consumption. It is NOT representative of any specific environment, but it is generally applicable to the commercial computing environment.

What the CPW rating is:

>   Test of a range of database applications, including various complexity updates and various complexity queries with commitment control and journaling
>   Test of concurrent data access by users running a single group of programs.
>   Reasonable approximation of a steady-state, database oriented commercial application's relative performance.

What the CPW rating is not:

>   An indication of the performance capabilities of a system for any specific customer situation
>   A test of "ad-hoc" (query) database performance
>   A test of single-threaded (batch) application throughput (e.g. batch processing steps per minute)

A test of single-threaded (batch) application run time or "batch window" (e.g. job completes in 4 hour batch window)

When to use the CPW rating results:
Approximate product positioning between different systems running IBM i where the primary application is expected to be oriented to traditional commercial business uses (order entry, payroll, billing, etc.).

CPW Rating vs Public Benchmarks

Specific choices were made in creating the CPW rating to try to best represent the relative positioning of IBM i systems. Some of the differences between the CPW rating and public benchmarks are:
The code base for public benchmarks is constantly changing to try to obtain the best possible results, while an attempt is made to keep the base for the CPW rating as constant as possible to better represent relative improvements from release to release and system to system.
Public benchmarks typically do not require full security, but since IBM customers tend to run on secure systems, Security Level 50 is specified for the CPW rating.
Public benchmarks are super-tuned to obtain the best possible results for that specific benchmark, whereas for the CPW rating we tend to use more of the system defaults to better represent the way the system is shipped to our customers.
Public benchmarks can use different applications for different sized systems and take advantage of all of the resources available on a particular system, while the CPW rating has been designed to run as the same application at all levels with approximately the same disk and memory resources per simulated user on all systems
Public benchmarks require extensive, sophisticated driver and middle tier configurations. In order to simplify the environment and add a small computational component into the workload, all the required components to drive the CPW rating have been included as a part of the overall workload.
The net result is that the CPW rating is an application model that IBM believes provides an excellent indicator of multi-user transaction processing performance capacity when comparing between members of the IBM i system families. As indicated above, the CPW rating is not intended to be a guarantee of performance, but can be viewed as a good indicator for multi-user transaction processing workloads

CPW Rating deployment

For systems that were announced before October 2011, the CPW3 workload (or it's predecessor workloads) was used to characterize system performance. The results were provided as a CPW rating. Starting with the October 2011 system announcements, a new workload called "COPR" will be used to provide performance results that produce the CPW rating. This new workload will allow IBM to provide CPW rating information more effectively. The resulting CPW rating is very similar between the two workloads. For OLTP workload sizing, there should be virtually no difference between the previous CPW3-based CPW rating and the new COPR-based CPW rating.
There is no plan to publish new unique COPR-based metrics. This would be of little value without establishing measurements over a wide range of older servers for comparison points. Plus the similarity of the COPR workload and the CPW3 workload metrics means that it would not be expected to change any decision making parameters.

CPW3 (Commercial Processing Workload)

The CPW3 workload simulates the database server of an OLTP environment. Requests for transactions are received from an outside source and are processed by application service jobs on the database server.

It is based, in part, on the business model from benchmarks owned and managed by the Transaction Processing Performance Council. However, there are substantive differences between this workload and public benchmarks that preclude drawing any correlation between them. For more information on public benchmarks from the Transaction Processing Performance Council, refer to their web page at www.tpc.org.

There are five business functions of varying complexity that are simulated. These transactions are all executed by batch server jobs, although they could easily represent the type of transactions that might be done interactively in a customer environment. Each of the transactions interacts with 3-8 of the 9 database files that are defined for the workload. Database functions and file sizes vary. Functions exercised are single and multiple row retrieval, single and multiple row insert, single row update, single row delete, journal, and commitment control. These operations are executed against files that vary from 100's of rows to 100's of millions of rows. Some files have multiple indexes, some only one. Some accesses are to the actual data and some take advantage of advanced functions such as index-only access.

COPR (Commercial Performance Rating)

We are introducing a new OLTP workload called COPR (COmmercial Performance Rating). It's purpose and characteristics are very much like that of the CPW3 workload.

As with the CPW3 workload, COPR is a relative-performance workload, not a benchmark. Although roughly based upon a public benchmark, it is to be used to assist in determining the relative performance capacity of various commercial POWER based systems. It is not unduly optimized to produce the very best performance ratings - as would be the case in a benchmark - but instead uses capabilities expected to be used by customers. As the name COPR - Commercial Performance Rating - implies, its purpose is to provide guidance for gauging system capacity. Since it is an OLTP workload, the focus of COPR is on many jobs that run simultaneously and execute relatively short transactions, similar to the CPW3 workload concepts.

What are the reasons for migrating to a new workload to generate the CPW rating for IBM i environments? The CPW3 workload and its variations have been used as a relative performance workload for many years and will continue to be so. Over time, though, the means of and support for database operations have changed. Where the CPW3 workload is largely based upon languages like RPG and COBOL using native database interfaces, the COPR workload accesses the database tables using a higher level query language (e.g., SQL, JDBC) and stored procedures.

As with the CPW3 workload, COPR acts primarily as a database server with a set of jobs - "Job Sets" in COPR nomenclature - acting independently to drive the random high level database requests. The number of jobs accepting such input is set to exceed the number of "processors" (i.e., the number of processor cores multiplied by the SMT - Simultaneous Multi-Threading - capability of each core) by enough to tend to keep all "processors" busy much of the time. This also means that the many database tables and indexes are frequently being concurrently accessed, strongly and intentionally driving database contention and integrity capabilities.

The types of transactions executed by COPR tend to be more complex and longer running than those found in the CPW3 workload. COPR spends much of its processing time doing what you would expect it to be doing, executing within the IBM i componentry supporting such database accesses.

The COPR workload allows IBM to be more effective in providing CPW rating information. The robust nature of the COPR workload also helps IBM better leverage performance insights for our operating system and firmware development teams.

IBM i Sizing and Performance Data Collection Tools

The following section presents some of the tools available for sizing and capacity planning. (Note: There are products from vendors not included here that perform similar functions.)   All of the tools discussed here support the current range of System i products, and include the capability to model logical partitions, partial processors (micropartitions) and server workload consolidation.

Performance Data Collection Services
This tool which is part of the operating system collects system and job performance data which is the input for many of the performance tools that are available today.   Collection Services is started automatically when subsystem QSYSWRK is started.
The default collection library is QPFRDATA but QMPGDATA may still be used if set up in a prior release. Collected data is stored in Management Collection Objects (type *MGTCOL). The CRTPFRDTA command is used to process that data and produce the performance database files used by other tools. CRTPFRDTA may be run manually or configured within collection services to run automatically during collection. For more information on Collection Services see the IBM i information center web page at:
   Collection Services

IBM Systems Workload Estimator
The wide variety of applications available makes it extremely difficult to describe a "typical" workload. The data in this document is the result of measuring or modeling certain application programs in very specific and unique configurations, and should not be used to predict specific performance for other applications. The performance of other applications can be predicted using a system sizing tool such as IBM Systems Workload Estimator.

The IBM Systems Workload Estimator (WLE) is a web-based sizing tool for IBM Systems. Included are Power Systems, System x, System z, IBM Flex Systems™, and IBM PureFlex™ Systems. WLE is available at:
   http://www.ibm.com/systems/support/tools/estimator/.

IBM i Batch Model

Batch model was introduced in IBM i 7.2. The purpose of this new function is to help you analyze batch job performance characteristics as well as predict batch workload run times after changes are made to disk, processor, or workload volumes. This new function is found in IBM Navigator for i under the Performance category and uses Collection Services data as input.

 To use Batch Model, you must have the Manager feature (option 1) of the Performance Tools Licensed Program Product (5770PT1) installed. You do need to have a 7.2 partition in order to access the Batch Model function in IBM Navigator for i. However, you can use Batch Model on Collection Services data from the 6.1 or 7.1 releases – by moving this data to the 7.2 partition.

Additional usage information can be found here:

developerWorks - How to use the Batch Model

IBM Knowledge Center - Batch Model

For more information on other IBM i Performance Tools, see the Performance Management web page at the following link:
   http://www.ibm.com/systems/power/software/i/management/performance/index.html

and the IBM Redbook End to End Performance Management on IBM I SG24-7808-00 at the following link:

http://publib-b.boulder.ibm.com/abstracts/sg247808.html?Open

IBM i Performance Capabilities Reference

CPW Rating Relative Performance Values for IBM i

This chapter details the relative system performance values:

- Commercial Processing Workload (**CPW**). CPW rating values are relative system performance metrics and reflect the relative system capacity for the OLTP workloads. CPW rating values can be used with caution in a capacity planning analysis (e.g., to scale CPU-constrained capacities, CPU time per transaction). However, these values may not appropriately reflect the performance of workloads than OLTP because of differing detailed characteristics (e.g., cache miss ratios, average cycles per instruction, software contention, I/O characteristics, memory requirements, and application performance characteristics). The CPW rating values shown in the tables are based on IBM internal tests. Actual performance in a customer environment may vary significantly. Use the "IBM Systems Workload Estimator" for assistance with sizing.

- User-based Licensing. For assistance in determining the required number of user licenses, see the product web pages (for example: http://www.ibm.com/systems/i/hardware or http://www.ibm.com/systems/power/hardware) . Note that user-based licensing is not a performance statement or a replacement for system sizing; instead, user-based licensing only enables appropriate user connectivity to the system. Application environments differ in their requirements for system resources. Use the "IBM Systems Workload Estimator" for assistance with sizing based on performance.

- Relative Performance metric for System p (**rPerf**). System i systems that run AIX can be expected to produce the same performance as equivalent System p models given the same memory, disk, I/O, and workload configurations. The relative capacity of System p is often expressed in terms of rPerf values. The definition and the performance ratings for System p can be found at:

- rPerf definition: http://www.ibm.com/systems/p/hardware/rperf.html

- rPerf table: http://www.ibm.com/systems/p/hardware/system_perf.html

IBM i Performance Capabilities Reference

1 IBM i 7.2 Addition (October 2014)

New POWER8 processor based system models were announced in October 2014.
- IBM Power System E870
- IBM Power System E880

1.1 IBM Power System E870

1.1.1 CPW values for IBM Power System E870 EPBA

Table 1.1.1. CPW values for IBM Power System E870 EPBA				
			Processor CPW	
Model	Processor Feature	Chip Speed GHz	32 cores	2x32 cores[4]
E870 (9119-MME)	EPBA	4.02	359000	711000

*Note:
1. These configurations were run with SMT8 enabled
2. Nominal system values were used for energy settings.
3. This processor feature has 8 cores per chip
4. The 64 core system was configured as 2 32-core partitions

1.1.2 CPW values for IBM Power System E870 EPBC

Table 1.1.2. CPW values for IBM Power System E870 EPBC				
			Processor CPW	
Model	Processor Feature	Chip Speed GHz	40 cores	2x40 cores[4]
E870 (9119-MME)	EPBC	4.19	460000	911000

*Note:
1. These configurations were run with SMT8 enabled
2. Nominal system values were used for energy settings.
3. This processor feature has 10 cores per chip
4. The 80 core system was configured as 2 40-core partitions

1.2 IBM Power System E880

1.2.1 CPW values for IBM Power System E880 EPBB

Table 1.2.1. CPW values for IBM Power System E880 EPBB				
			Processor CPW	
Model	Processor Feature	Chip Speed GHz	32 cores	2x32 cores[4]
E880 (9119-MHE)	EPBB	4.35	381000	755000

*Note:
1. These configurations were run with SMT8 enabled
2. Nominal system values were used for energy settings.
3. This processor feature has 8 cores per chip
4. The 64 core system was configured as 2 32-core partitions

2 IBM i 7.2 Addition (June 2014)

A new POWER8 processor based system model was announced in June 2014.
- IBM Power System S814 - 4c offering

2.1 IBM Power System S814

2.1.1 CPW values for IBM Power System S814

Table 2.1. CPW values for IBM Power System S814				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
S814 (8286-41A)	EPXK	3.02	4 [3]	39500

*Note:
5. These configurations were run with SMT8 enabled
6. Nominal system values were used for energy settings.
7. This processor feature has 2 cores per chip

3 IBM i 7.2 Additions (April 2014)

New POWER8 processor based system models were announced in April 2014.
- IBM Power System S814
- IBM Power System S824

3.1 IBM Power System S814

3.1.1 CPW values for IBM Power System S814

Table 3.1. CPW values for IBM Power System S814				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
S814 (8286-41A)	EPX0	3.02	6 [3]	59500
S814 (8286-41A)	EPX6	3.72	8 [4]	85500

*Note:
1. These configurations were run with SMT8 enabled
2. Nominal system values were used for energy settings.
3. This processor feature has 3 cores per chip
4. This processor feature has 4 cores per chip

3.2 IBM Power System S824

3.2.1   CPW values for IBM Power System S824 - EPXE

Table 3.2.1. CPW values for IBM POWER System Model S824 - EPXE			Processor CPW	
Model	Processor Feature	Chip Speed GHz	6 cores	12 cores
S824 (8286-42A)	EPXE	3.89	72000	130000

*Note:
1. These configurations were run with SMT8 enabled
2. Nominal system values were used for energy settings.
3. This processor feature has 3 cores per chip and 2 chips per socket

3.2.2   CPW values for IBM Power System S824 - EPXF

Table 3.2.2. CPW values for IBM POWER System Model S824 - EPXF			Processor CPW	
Model	Processor Feature	Chip Speed GHz	8 cores	16 cores
S824 (8286-42A)	EPXF	4.15	94500	173500

*Note:
1. These configurations were run with SMT8 enabled
2. Nominal system values were used for energy settings.
3. This processor feature has 4 cores per chip and 2 chips per socket

3.2.3   CPW values for IBM Power System S824 – EPXH

Table 3.2.3. CPW values for IBM POWER System Model S824 - EPXJ			Processor CPW
Model	Processor Feature	Chip Speed GHz	24 cores
S824 (8286-42A)	EPXH	3.52	230500

*Note:
1. These configurations were run with SMT8 enabled
2. Nominal system values were used for energy settings.
3. This processor feature has 6 core per chip and 2 chips per socket

4   IBM i 7.1 Additions (August 2013)

New POWER7 based Compute Nodes for the IBM PureFlex System were announced in August 2013.

- IBM Flex System p260 compute node (7895-23A)
- IBM Flex System p460 compute node (7895-43X)
- IBM Flex System p270 compute node (7954-24X)

4.1 IBM Flex System p260

4.1.1   CPW values for IBM Flex System p260 compute nodes

Table 4.1. CPW values for IBM Flex System p260 compute nodes				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
p260 (7895-23A)	EPRC	4.0	4 [3]	25400

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. CPW value is for a 3.5-core partition with shared processors and a 0.5-core VIOS partition
4. This model has 2 sockets; 2 cores per socket

4.2 IBM Flex System p460

4.2.1   CPW values for IBM Flex System p460 compute nodes

Table 4.2. CPW values for IBM Flex System p460 compute nodes				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
p460 (7895-43X)	EPRH	3.6	32 [3]	198900
p460 (7895-43X)	EPRJ	4.1	32 [3]	219900
p460 (7895-43X)	EPRK	4.0	16 [4]	109500

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. CPW value is for a 31-core partition with dedicated processors and a 1-core VIOS partition
4. CPW value is for a 15-core partition with dedicated processors and a 1-core VIOS partition
5. This model has 4 sockets

4.3 IBM Flex System p270

4.3.1   CPW values for IBM Flex System p270 compute nodes

Table 4.3. CPW values for IBM Flex System p270 compute nodes				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
p270 (7954-24X)	EPRF	3.1	24 [3]	123500
p270 (7954-24X)	EPRE	3.4	24 [3]	131500

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. CPW value is for a 23-core partition with dedicated processors and a 1-core VIOS partition
4. This model has 2 sockets

5 IBM i 7.1 Additions (February 2013)

5.1 POWER 710, 720, 730, and 740 models

This section provides CPW values for the POWER 710 models, POWER 720 models, POWER 730 models, and POWER 740 models announced in February 2013.

5.1.1   CPW values for IBM POWER Systems - IBM i operating system - model 710

Table 5.1.1. CPW values for IBM POWER System Model 710				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
710 (8231-E1D)	EPCE	3.6	4	28400
710 (8231-E1D)	EPCG	4.2	6	49400
710 (8231-E1D)	EPCJ	4.2	8	64500

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 1 socket configuration

5.1.2   CPW values for IBM POWER Systems - IBM i operating system - model 720

Table 5.1.2. CPW values for IBM POWER System Model 720				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
720 (8202-E4D)	EPCK	3.6	4	28400
720 (8202-E4D)	EPCL	3.6	6	42400
720 (8202-E4D)	EPCM	3.6	8	56300

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 1 socket configuration

5.1.3 CPW values for IBM POWER Systems - IBM i operating system - model 730

Table 5.1.3. *CPW values for IBM POWER System Model 730*				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
730 (8231-E2D)	EPCF	4.3	8	59700
730 (8231-E2D)	EPCG	4.2	12	89200
730 (8231-E2D)	EPCH	3.6	16	104700
730 (8231-E2D)	EPCJ	4.2	16	117600

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 2 socket configuration

5.1.4 CPW values for IBM POWER Systems - IBM i operating system - model 740

Table 5.1.4. *CPW values for IBM POWER System Model 740*				
Model	Processor Feature	Chip Speed GHz	CPU Range[3]	Processor CPW
740 (8205-E6D)	EPCP	4.2	6-12	49000-91700
740 (8205-E6D)	EPCQ	3.6	8-16	56300-106500
740 (8205-E6D)	EPCR	4.2	8-16	64500-120000

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The range of the number of processor cores per system.

5.2 POWER 750 models

This section provides CPW values for the POWER 750 models announced in February 2013.

5.2.1 CPW values for IBM POWER Systems - IBM i operating system - model 750

Table 5.2.1. *CPW values for IBM POWER System Model 750*			Processor CPW			
Model	Processor Feature	Chip Speed GHz	8 cores	16 cores	24 cores	32 cores
750 (8408-E8D)	EPT7	4.0	59000	108000	158000	208000
750 (8408-E8D)	EPT8	3.5	52000	96000	141500	185000

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.

5.3 POWER 760 models

This section provides CPW values for the POWER 760 models announced in February 2013.

5.3.1 CPW values for IBM POWER Systems - IBM i operating system - model 760

Table 5.3.1. CPW values for IBM POWER System Model 760			Processor CPW			
Model	Processor Feature	Chip Speed GHz	12 cores	24 cores	2x18 cores[3]	2x24 cores[4]
760 (9109-RMD)	EPT5	3.1	69800	129000	195700	258000
760 (9109-RMD)	EPT6	3.4	75200	137000	209000	274000

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 36 core system was configured as 2 18-core partitions
4. The 48 core system was configured as 2 24-core partitions

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6 IBM i 7.1 Additions (November 2012)

New POWER7+ based Compute Nodes for the IBM PureFlex System were announced in November 2012.
- IBM Flex System p260 compute node (7895-23X)

6.1 IBM Flex System p260

This section provides CPW values for the IBM Flex System p260 compute nodes announced in November 2012.

6.1.1 CPW values for IBM Flex System p260 compute nodes

Table 6.1. CPW values for IBM Flex System p260 compute nodes				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
p260 (7895-23X)	EPRD	4.0[5]	8 [3]	51400
p260 (7895-23X)	EPRB	3.6	16[4]	99500
p260 (7895-23X)	EPRA	4.1	16[4]	110000

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. CPW value is for a 7-core partition with dedicated processors and a 1-core VIOS partition
4. CPW value is for a 15-core partition with dedicated processors and a 1-core VIOS partition
5. This model has 4 cores per socket; all others have 8 cores per socket

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7 IBM i 7.1 Additions (October 2012)

New POWER7+ system models were announced in October 2012.
- 9117-MMD
- 9179-MHD

7.1 IBM POWER 770 and 780 models

This section provides CPW values for the POWER 770 and 780 models announced in October 2012.

7.1.1   CPW values for IBM POWER Systems - IBM i operating system - model 770 feature EPM0

Table 7.1.1. CPW values for IBM POWER System Models							
			Processor CPW				
Model	Processor Feature	Chip Speed GHz	6 cores [3]	9 cores	12 cores	24 cores	2x24 cores[4]
770 (9117-MMD)	EPM0	4.22	45800	68200	90000	154800	306600

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. This 770 processor feature EPM0 has 3-cores per socket.
4. The 48 core system was configured as 2 24-core partitions

7.1.2   CPW values for IBM POWER Systems - IBM i operating system - model 770 feature EPM1

Table 7.1.2. CPW values for IBM POWER System Models								
			Processor CPW					
Model	Processor Feature	Chip Speed GHz	4 cores	8 cores	16 cores	32 cores	2x24 cores[3]	2x32 cores[4]
770 (9117-MMD)	EPM1	3.80	28700	56100	110000	191500	290500	379300

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 48 core system was configured as 2 24-core partitions
4. The 64 core system was configured as 2 32-core partitions

7.1.3   CPW values for IBM POWER Systems - IBM i operating system - model 780 feature EPH0

Table 7.1.3. CPW values for IBM POWER System Models								
			Processor CPW					
Model	Processor Feature	Chip Speed GHz	4 cores	8 cores	16 cores	32 cores	2x24 cores[3]	2x32 cores[4]
780 (9179-MHD)	EPH0	4.42	32400	63200	123500	214000	326100	424400

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 48 core system was configured as 2 24-core partitions
4. The 64 core system was configured as 2 32-core partitions

7.1.4 CPW values for IBM POWER Systems - IBM i operating system - model 780 feature EPH2

Table 7.1.4. CPW values for IBM POWER System Models								
			Processor CPW					
Model	Processor Feature	Chip Speed GHz	8 cores	16 cores	32 cores	2x32 cores[3]	3x32 cores[4]	4x32 cores[5]
780 (9179-MHD)	EPH2	3.72	56000	108500	209500	414900	622300	829800

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 64 core system was configured as 2 32-core partitions
4. The 96 core system was configured as 3 32-core partitions
5. The 128 core system was configured as 4 32-core partitions

8 IBM i 7.1 Additions (April 2012)

New POWER7 based Compute Nodes for the IBM PureFlex System were announced in April 2012.
- IBM Flex System p260 compute node (7895-22X)
- IBM Flex System p460 compute node (7895-42X)

8.1 IBM Flex System p260 and p460

This section provides CPW values for the IBM Flex System p260 and p460 compute nodes announced in April 2012.

8.1.1 CPW values for IBM Flex System p260 and p460 compute nodes

Table 8.1. CPW values for IBM Flex System p260 and p460 compute				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
p260 (7895-22X)	EPR1	3.3[6]	8 [3]	38500
p260 (7895-22X)	EPR3	3.2	16[4]	80500
p260 (7895-22X)	EPR5	3.55	16[4]	87000
p460 (7895-42X)	EPR2	3.3[6]	16 [4]	80500
p460 (7895-42X)	EPR4	3.2	32 [5]	150000
p460 (7895-42X)	EPR6	3.55	32 [5]	162000

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. CPW value is for a 7-core partition with dedicated processors and a 1-core VIOS partition
4. CPW value is for a 15-core partition with dedicated processors and a 1-core VIOS partition
5. CPW value is for a 30-core partition with dedicated processors and a 2-core VIOS partition
6. These models have 4 cores per socket; all others have 8 cores per socket

9 IBM i 7.1 Additions (October 2011)

New POWER7 system models were announced in October 2011.
- 9117-MMC
- 9179-MHC
- 8231-E1C & 8231-E2C
- 8202-E4C
- 8205-E6C

9.1 POWER 770 and 780 models

This section provides CPW values for the POWER 770 and 780 models announced in October 2011.

9.1.1 CPW values for IBM POWER Systems - IBM i operating system - model 770 feature 4984

Table 9.1.1. CPW values for IBM POWER System Models							
			Processor CPW				
Model	Processor Feature	Chip Speed GHz	8 cores	16 cores	24 cores	32 cores	2x32 cores[3]
770 (9117-MMC)	4984	3.3	48200	93000	124400	162000	321100

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 64 core system was configured as 2 32-core partitions

9.1.2 CPW values for IBM POWER Systems - IBM i operating system - model 770 feature 4983

Table 9.1.2. CPW values for IBM POWER System Models							
			Processor CPW				
Model	Processor Feature	Chip Speed GHz	6 cores	12 cores	18 cores	24 cores	2x24 cores[3]
770 (9117-MMC)	4983	3.72	39800	77000	107500	135900	270500

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 48 core system was configured as 2 24-core partitions

9.1.3 CPW values for IBM POWER Systems - IBM i operating system - model 780 feature 5003 with MaxCore mode

Table 9.1.3. CPW values for IBM POWER System Models							
			Processor CPW				
Model	Processor Feature	Chip Speed GHz	8 cores	16 cores	24 cores	32 cores	2x32 cores[4]
780 (9179-MHC)	5003	3.92	55200	106000	140700	183000	363000

*Note:
1. This processor feature is also available as a 4-core per chip configuration
2. These configurations were run with SMT4 enabled
3. Nominal system values were used for energy settings.
4. The 64 core system was configured as 2 32-core partitions

9.1.4 CPW values for IBM POWER Systems - IBM i operating system - model 780 feature 5003 with TurboCore mode

Table 9.1.4. *CPW values for IBM POWER System Models*

Model	Processor Feature	Chip Speed GHz	Cores [4]	Processor CPW
780 (9179-MHC)	5003	4.14	1x8 cores	57450
780 (9179-MHC)	5003	4.14	2x8 cores	114850
780 (9179-MHC)	5003	4.14	3x8 cores	172450
780 (9179-MHC)	5003	4.14	4x8 cores	229650

*Note:
1. This processor feature is also available as a 8-core per chip configuration
2. These configurations were run with SMT4 enabled
3. Nominal system values were used for energy settings.
4. Each system was configured with partitions each of which are allocated with 8 processor cores

9.1.5 CPW values for IBM POWER Systems - IBM i operating system - model 780 feature 4982 andMaxCore mode

Table 9.1.5. *CPW values for IBM POWER System Models*

Model	Processor Feature	Chip Speed GHz	Processor CPW					
			6 cores	12 cores	24 cores	2x24 cores[4]	3x24 cores[5]	4x24 cores[6]
780 (9117-MHC)	EP24	3.44	36300	71400	138500	276000	413000	550700

*Note:
1. This processor feature is also available as a 4-core per chip configuration
2. These configurations were run with SMT4 enabled
3. Nominal system values were used for energy settings.
4. The 48 core system was configured as 2 24-core partitions
5. The 64 core system was configured as 3 24-core partitions
6. The 96 core system was configured as 4 24-core partitions

9.2 POWER 710, 720, 730, and 740 models

This section provides CPW values for the POWER 710 models, POWER 720 models, POWER 730 models, and POWER 740 models announced in October 2011.

9.2.1 CPW values for IBM POWER Systems - IBM i operating system - model 710

Table 9.2.1. CPW values for IBM POWER System Model 710				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
710 (8231-E1C)	EPC1	3.0	4	23800
710 (8231-E1C)	EPC2	3.7	6	40900 [4]
710 (8231-E1C)	EPC3	3.55	8	51800 [4]

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 1 chip configuration
4. The value listed is unconstrained CPW (assuming that there is sufficient memory such that the processors would be the first constrained resource).

9.2.2   CPW values for IBM POWER Systems - IBM i operating system - model 720

Table 9.2.2. CPW values for IBM POWER System Model 720				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
720 (8202-E4C)	EPC5	3.0	4	23800
720 (8202-E4C)	EPC6	3.0	6	34900
720 (8202-E4C)	EPC7	3.0	8	46300

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 1 chip configuration

9.2.3   CPW values for IBM POWER Systems - IBM i operating system - model 730

Table 9.2.3. CPW values for IBM POWER System Model 730				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
730 (8231-E2C)	EPC1	3.0	8	44600
730 (8231-E2C)	EPC4	3.7	8	51900
730 (8231-E2C)	EPC2	3.7	12	77200 [4]
730 (8231-E2C)	EPC3	3.55	16	97700 [4]

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 2 chip configuration
4. The value listed is unconstrained CPW (assuming that there is sufficient memory such that the processors would be the first constrained resource).

9.2.4   CPW values for IBM POWER Systems - IBM i operating system - model 740

Table 9.2.4. CPW values for IBM POWER System Model 740				
Model	Processor Feature	Chip Speed GHz	CPU Range[3]	Processor CPW
740 (8205-E6C)	EPC9	3.3	4-8	25500-47800
740 (8205-E6C)	EPC8	3.7	4-8	27900-52200
740 (8205-E6C)	EPCA	3.7	6-12	41600-77200
740 (8205-E6C)	EPCB	3.55	8-16	52600-97700

*Note:
  1. These configurations were run with SMT4 enabled
  2. Nominal system values were used for energy settings.
  3. The range of the number of processor cores per system.

10 IBM i 7.1 Additions (April 2011)

This section provides CPW values for the POWER 750 models and the PS703/PS704 models announced in April 2011.

10.1.1 CPW values for IBM POWER Systems - IBM i operating system - model 750 features EPA1/EPA4

Table 10.1. CPW values for IBM POWER System Models						
			Processor CPW			
Model	Processor Feature	Chip Speed GHz	8 cores	16 cores	24 cores	32 cores
750 (8233-E8B)	EPA4	3.2	47800	89600	131500	171400
750 (8233-E8B)	EPA1	3.6	52700	97000	141400	183200

*Note:
  1. These configurations were run with SMT4 enabled
  2. Nominal system values were used for energy settings.

10.1.2 CPW values for IBM POWER Systems - IBM i operating system - model 750 features EPA3

Table 10.2. CPW values for IBM POWER System Models						
			Processor CPW			
Model	Processor Feature	Chip Speed GHz	4 cores	8 cores	12 cores	16 cores
750 (8233-E8B)	EPA3	3.7	27300	51000	74700	97700

*Note:
  1. These configurations were run with SMT4 enabled
  2. Nominal system values were used for energy settings.

10.1.3 CPW values for IBM POWER Systems - IBM i operating system - model 750 features EPA2

Table 10.3. CPW values for IBM POWER System Models			Processor CPW			
Model	Processor Feature	Chip Speed GHz	6 cores	12 cores	18 cores	24 cores
750 (8233-E8B)	EPA2	3.7	40800	75500	109100	145600

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.

10.1.4 CPW values for IBM POWER Systems - IBM i operating system - PS703/PS704 family

Table 10.4. CPW values for IBM POWER System Models				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
PS703 (7891-73X)	52CC	2.4	16 [3]	64000 [5]
PS704 (7891-74X)	52CC	2.4	32 [4]	110000 [6]

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. CPW value is for a 15-core partition with dedicated processors and a 1-core VIOS partition
4. CPW value is for a 30-core partition with dedicated processors and a 2-core VIOS partition
5. The value listed is unconstrained CPW (assuming that there is sufficient memory such that the processor would be the first constrained resource).
6. The value listed is unconstrained CPW (assuming that there is sufficient disk I/O such that the processor would be the first constrained resource).

11 IBM i 7.1 Additions (August/October 2010)

This section provides CPW values for the POWER 710 models, POWER 720 models, POWER 730 models, POWER 740 models, POWER 750 models and the POWER 795 models announced in August 2010.

11.1.1 CPW values for IBM POWER Systems - IBM i operating system - model 710

Table 11.1. CPW values for IBM POWER System Model 710				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
710 (8231-E2B)	8350	3.0	4	23800
710 (8231-E2B)	8349	3.7	6	40900 [4]
710 (8231-E2B)	8359	3.55	8	51800 [4]

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 1 chip configuration
4. The value listed is unconstrained CPW (assuming that there is sufficient memory such that the processors would be the first constrained resource).

11.1.2 CPW values for IBM POWER Systems - IBM i operating system - model 720

Table 11.2. CPW values for IBM POWER System Model 720				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
720 (8202-E4B)	8350	3.0	4	23800
720 (8202-E4B)	8351	3.0	6	34900
720 (8202-E4B)	8352	3.0	8	46300

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 1 chip configuration

11.1.3 CPW values for IBM POWER Systems - IBM i operating system - model 730

Table 11.3. CPW values for IBM POWER System Model 730				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
730 (8231-E2B)	8350	3.0	8	44600
730 (8231-E2B)	8348	3.7	8	51900
730 (8231-E2B)	8349	3.7	12	77200[4]
730 (8231-E2B)	8359	3.55	16	97700[4]

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. Each model listed is a 2 chip configuration
4. The value listed is unconstrained CPW (assuming that there is sufficient memory such that the processors would be the first constrained resource).

11.1.4 CPW values for IBM POWER Systems - IBM i operating system - model 740

Table 11.4. CPW values for IBM POWER System Model 740				
Model	Processor Feature	Chip Speed GHz	CPU Range[3]	Processor CPW
740 (8205-E6B)	8353	3.3	4-8	25500-47800
740 (8205-E6B)	8347	3.7	4-8	27900-52200
740 (8205-E6B)	8354	3.7	6-12	41600-77200
740 (8205-E6B)	8355	3.55	8-16	52600-97700

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The range of the number of processor cores per system.

11.1.5 CPW values for IBM POWER Systems - IBM i operating system - model 795 - feature 4702

Table 11.5. *CPW values for IBM POWER System Model 795*

Model	Processor Feature	Chip Speed GHz	Processor CPW			
			6 cores	12 cores	24 cores	48 (2x24 cores) [3]
795 (9119-FHB)	4702	3.7	39300	77600	149100	288500

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 48 core system was configured as 2 24-core partitions
4. The 795 model (feature 4702) can be configured as large as 192 cores total. Use IBM Systems Workload Estimator to configure systems larger than those listed in this document (http://www.ibm.com/systems/support/tools/estimator).

11.1.6 CPW values for IBM POWER Systems - IBM i operating system - model 795 - feature 4700

Table 11.6. *CPW values for IBM POWER System Model 795*

Model	Processor Feature	Chip Speed GHz	Processor CPW			
			8 cores	16 cores	32 cores	64 (2x32 cores) [3]
795 (9119-FHB)	4700	4.0	55100	107500	204300	399200

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 64 core system was configured as 2 32-core partitions
4. The 795 model (feature 4700) can be configured as large as 256 cores total. Use IBM Systems Workload Estimator to configure systems larger than those listed in this document (http://www.ibm.com/systems/support/tools/estimator).

11.1.7 CPW values for IBM POWER Systems - IBM i operating system - model 795 - feature 4700 with TurboCore mode

Table 11.7. *CPW values for IBM POWER System Model 795 with TurboCore mode*

Model	Processor Feature	Chip Speed GHz	Processor CPW					
			4 cores	8 cores	12 cores	16 cores	24 cores	32 (2x16 cores) [3]
795 (9119-FHB)	4700	4.25	29300	59600	88800	115800	162100	218400

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 32 core system was configured as 2 16-core partitions

4. The 795 model (feature 4700) with TurboCore enabled can be configured as large as 128 cores total. Use IBM Systems Workload Estimator to configure systems larger than those listed in this document (http://www.ibm.com/systems/support/tools/estimator).

11.1.8 CPW values for IBM POWER Systems - IBM i operating system - model 750 feature 8336 (additional CPW values for IBM i 6.1.1)

Table 11.8. CPW values for IBM POWER System Models			Processor CPW			
Model	Processor Feature	Chip Speed GHz	8 cores	16 cores	24 cores	32 cores
750 (8233-E8B)	8336	3.55	52200	95700	138500	181000

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. All CPW values were measured with IBM i 6.1.1.

12 V6R1 Additions (April 2010)

This section provides CPW values for the IBM POWER systems announced in April 2010 and IBM POWER 780 TurboCore.

12.1.1 CPW values for IBM POWER Systems - IBM i operating system - PS700 family

Table 12.1. CPW values for IBM POWER System Models				
Model	Processor Feature	Chip Speed GHz	CPUs	Processor CPW
PS700 (8406-70Y)	52CA	3.0	4 [3]	21100
PS701 (8406-71Y)	52C2	3.0	8 [4]	42100
PS702 (8406-71Y) + 8358	52C2	3.0	16 [5]	76300

*Note:
4. These configurations were run with SMT4 enabled
5. Nominal system values were used for energy settings.
6. CPW value is for a 3.7-core partition with shared processors and a 0.3-core VIOS partition
7. CPW value is for a 7.5-core partition with shared processors and a 0.5-core VIOS partition
8. CPW value is for a 15-core partition with shared processors and a 1-core VIOS partition

12.1.2 CPW values for IBM POWER Systems - IBM i operating system - model 780 with TurboCore mode

Table 12.2. CPW values for IBM POWER System Models				
Model	Processor Feature	Chip Speed GHz	Cores [4]	Processor CPW
780 (9179-MHB)	4982	4.14	1x8 cores	57450
780 (9179-MHB)	4982	4.14	2x8 cores	114850
780 (9179-MHB)	4982	4.14	3x8 cores	172450

Table 12.2. CPW values for IBM POWER System Models				
Model	Processor Feature	Chip Speed GHz	Cores [4]	Processor CPW
780 (9179-MHB)	4982	4.14	4x8 cores	229650

*Note:
   1. This processor feature is also available as a 8-core per chip configuration
   2. These configurations were run with SMT4 enabled
   3. Nominal system values were used for energy settings.
   4. Each system was configured with partitions each of which are allocated with 8 processor cores

13 V6R1 Additions (February 2010)

This section provides CPW values for the POWER 750 models, POWER 770 models, and the POWER 780 models announced in February 2010. These models use POWER7 processor technology.

13.1.1 CPW values for IBM POWER Systems - IBM i operating system - model 750 feature 8332/8334

Table 13.1. CPW values for IBM POWER System Models						
			Processor CPW			
Model	Processor Feature	Chip Speed GHz	8 cores	16 cores	24 cores	32 cores
750 (8233-E8B)	8334	3.0	44600	82600	122500	158300
750 (8233-E8B)	8332	3.3	47800	88700	129700	168800

*Note:
   1. These configurations were run with SMT4 enabled
   2. Nominal system values were used for energy settings.

13.1.2 CPW values for IBM POWER Systems - IBM i operating system - model 750 feature 8335

Table 13.2. CPW values for IBM POWER System Models						
			Processor CPW			
Model	Processor Feature	Chip Speed GHz	6 cores	12 cores	18 cores	24 cores
750 (8233-E8B)	8335	3.3	37200	69200	94900	135300

*Note:
   1. These configurations were run with SMT4 enabled
   2. Nominal system values were used for energy settings.

13.1.3 CPW values for IBM POWER Systems - IBM i operating system - model 750 feature 8336

Table 13.3. CPW values for IBM POWER System Models				
Model	Processor Feature	Chip Speed GHz	Cores	Processor CPW
750 (8233-E8B)	8336	3.55	32	181000

*Note:
1. This processsor feature is only available as a 32 core system
2. These configurations were run with SMT4 enabled
3. Nominal system values were used for energy settings.

13.1.4 CPW values for IBM POWER Systems - IBM i operating system - model 770 feature 4981

Table 13.4. *CPW values for IBM POWER System Models*								
			Processor CPW					
Model	Processor Feature	Chip Speed GHz	4 cores	8 cores	16 cores	32 cores	2x24 cores[3]	2x32 cores[4]
770 (9117-MMB)	4981	3.1	22750	45000	88800	155850	229800	292700

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 48 core system was configured as 2 24-core partitions
4. The 64 core system was configured as 2 32-core partitions

13.1.5 CPW values for IBM POWER Systems - IBM i operating system - model 770 feature 4980

Table 13.5. *CPW values for IBM POWER System Models*								
			Processor CPW					
Model	Processor Feature	Chip Speed GHz	4 cores	6 cores	12 cores	18 cores	24 cores	2x24 cores[3]
770 (9117-MMB)	4980	3.5	24900	37400	73100	99000	131050	248550

*Note:
1. These configurations were run with SMT4 enabled
2. Nominal system values were used for energy settings.
3. The 48 core system was configured as 2 24core partitions

13.1.6 CPW values for IBM POWER Systems - IBM i operating system - model 780 feature 4982 and MaxCore mode

Table 13.6. *CPW values for IBM POWER System Models*								
			Processor CPW					
Model	Processor Feature	Chip Speed GHz	4 cores	8 cores	16 cores	32 cores	2x24 cores[4]	2x32 cores[5]
780 (9179-MHB)	4982	3.86	26600	54400	105200	177400	265200	343050

*Note:
1. This processor feature is also available as a 4-core per chip configuration
2. These configurations were run with SMT4 enabled
3. Nominal system values were used for energy settings.
4. The 48 core system was configured as 2 24-core partitions
5. The 64 core system was configured as 2 32-core partitions

14 V6R1 Additions (April 2009)

14.1.1 CPW values for IBM Power Systems - IBM i operating system - model 520

Table 14.1. *CPW values for Power System Models*

Model	Processor Feature	Chip Speed GHz	L2/L3 cache [1] per chip	CPUs	Processor CPW
520 (8203-E4A)	5577	4.7	2x4MB / 32MB	2	9500
520 (8203-E4A)	5587	4.7	2x4MB / 32MB	4	18300

*Note:
   1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.

14.1.2 CPW values for IBM Power Systems - IBM i operating system - model 550

Table 14.2. *CPW values for Power System Models*

Model	Processor Feature	Chip Speed GHz	L2/L3 cache [1] per chip	Processor CPW			
				2 cores	4 cores	6 cores	8 cores
550 (8204-E8A)	4967	5.0	2x4MB / 32MB	10600	20550	28800	37950

*Note:
   1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.

14.1.3 IBM i5/OS running on IBM BladeCenter JS23/JS43 using POWER6 processor technology

Table 14.3. *IBM BladeCenter models*

Blade Model	Processor Feature	Chip Speed MHz	L2/L3 cache [1] per chip	CPUs	Processor CPW
JS23 (7778-23X)	52C1	4200	2x4MB / 32 MB	3.7 of 4 [2]	14400
JS43 (7778-23X)	52C0	4200	2x4MB / 32 MB	7 of 8 [3]	24050

*Note:
   1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.
   2. CPW value is for a 3.7-core partition with shared processors and a 0.3-core VIOS partition
   3. CPW value is for a 7-core dedicated partition and a 1-core VIOS

15 V6R1 Additions (October 2008)

15.1.1 CPW values for the IBM Power Systems - IBM i operating system - model 570 features 7387 and 7388

Table 15.1. CPW values for Power System Models								
				Processor CPW				
Model	Processor Feature	Chip Speed GHz	L2/L3 cache [1] per chip	2 cores	4 cores	8 cores	12 cores	16 cores
570 (9117-MMA)	7387	4.4	2x4MB / 32MB	9850	19400	36200	51500	70000
570 (9117-MMA)	7388	5.0	2x4MB / 32MB	11000	21600	40300	56800	77600

*Note:
1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.
2. Memory speed differences account for some slight variations in performance difference between models.
3. CPW values for Power System models introduced in October 2008 were based on IBM i 6.1 plus enhancements in post-release PTFs.

15.1.2 15.2 CPW values for the IBM Power Systems - IBM i operating system - model 570 feature 7540

Table 15.2. CPW values for Power System Models								
				Processor CPW				
Model	Processor Feature	Chip Speed GHz	L2/L3 cache [1] per chip	4 cores	8 cores	16 cores	24 cores	32 cores
570 (9117-MMA)	7540	4.2	2x4MB / 32MB	16200	31900	56400	81600	104800

*Note:
1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.
2. Memory speed differences account for some slight variations in performance difference between models.
3. For large partitions, some workloads may experience nonlinear scaling at high system utilization on these new models.
4. CPW values for Power System models introduced in October 2008 were based on IBM i 6.1 plus enhancements in post-release PTFs.

15.1.3 CPW values for IBM Power Systems - IBM i operating system - model 560

Table 15.3. CPW values for Power System Models						
				Processor CPW		
Model	Processor Feature	Chip Speed GHz	L2/L3 cache [1] per chip	4 cores	8 cores	16 cores
560 (8234-EMA)	7537	3.6	2x4MB / 32MB	14100	27600	48500

*Note:
1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.
2. Memory speed differences account for some slight variations in performance difference between models.

3. CPW values for Power System models introduced in October 2008 were based on IBM i 6.1 plus enhancements in post-release PTFs.

15.1.4 CPW values for IBM Power Systems - IBM i operating system - models 520 and 550

Table 15.4. *CPW values for Power System Models*					
Model	Processor Feature	Chip Speed GHz	L2/L3 cache [1] per chip	CPU [2] Range	Processor CPW
520 (8203-E4A)	5633	4.2	2x4MB / 0MB	1	4300
520 (8203-E4A)	5634	4.2	2x4MB / 0MB	2	8300
520 (8203-E4A)	5635	4.2	2x4MB / 0MB	4	15600
550 (8204-E8A)	4965	3.5	2x4MB / 32MB	2 - 8	7750-27600
550 (8204-E8A)	4966	4.2	2x4MB / 32MB	2 - 8	9200-32650

*Note:
1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.
2. The range of the number of processor cores per system.
3. Memory speed differences account for some slight variations in performance difference between models.
4. CPW values for Power System models introduced in October 2008 were based on IBM i 6.1 plus enhancements in post-release PTFs.

16 V6R1 Additions (August 2008)

16.1.1 CPW values for the IBM Power 595 - IBM i operating system using POWER6 processor technology

Table 16.1. *CPW values for Power System Models*				Processor CPW				
Model	Processor Feature	Chip Speed MHz	L2/L3 cache [1] per chip	8 cores	16 cores	24 cores	32 cores	64 cores [2] (2x32)
595 (9119-FHA)	4695	5000	2x4MB / 32MB	41000	77000	108100	147900	294700
595 (9119-FHA)	4694	4200	2x4MB / 32MB	35500	66400	93800	128000	256200

*Note:
1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.
2. This configuration was measured with two 32-core partitions running simultaneously on a 64 core system

17 V6R1 Additions (April 2008)

17.1.1 CPW values for IBM Power Systems - IBM i operating system using POWER6 processor technology

Table 16.1. CPW values for Power System Models					
Model	Processor Feature	Chip Speed MHz	L2/L3 cache [1] per chip	CPU [2] Range	Processor CPW
520 (9407-M15)	5633	4200	2x4MB / 0MB	1	4300
520 (9408-M25)	5634	4200	2x4MB / 0MB 1 - 2		4300-8300
550 (9409-M50)	4966	4200	2x4MB / 32MB1 - 4		4800-18000

*Note:
  1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.
  2. The range of the number of processor cores per system.

17.1.2 CPW values for IBM BladeCenter JS12 - IBM i operating system

Table 17.2. IBM BladeCenter models					
Blade Model	Processor Feature	Chip Speed MHz	L2/L3 cache [1] per chip	CPUs[2]	Processor CPW [3]
JS12 (7998-60X)	52BF	3800	2x4MB / 0 MB	1.8 of 2	7100

*Note:
  1. These models have a dedicated L2 cache per processor core, and no L3 cache
  2. CPW value is for a 1.8-core partition with shared processors and a 0.2-core VIOS partition
  3. The value listed is unconstrained CPW (there is sufficient I/O such that the processor would be the first constrained resource). The I/O constrained CPW value for a 12-disk configuration is approximately 1200 CPW (100 CPW per disk).

17.1.3 CPW values for IBM Power Systems - IBM i operating system

Table 17.3. CPW values for Power System Models				Processor CPW			
Model	Processor Feature	Chip Speed MHz	L2/L3 cache [1] per chip	2 cores	4 cores	8 cores	16 cores
570 (9117-MMA)	5620	3500	2x4MB / 32MB	8150	16100	30100	57600
570 (9117-MMA)	5621/5622	4200	2x4MB / 32MB	9650	19200	35500	68600
570 (9117-MMA)	7380	4700	2x4MB / 32MB	10800	21200	40100	76900

*Note:
  📂✍️   These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.

18 V6R1 Additions (January 2008)

18.1.1 IBM i5/OS running on IBM BladeCenter JS22 using POWER6 processor technology

Table 18.1. IBM BladeCenter models							
Blade Model	Server Feature	Edition Feature	Processor Feature	Chip Speed MHz	L2/L3 cache [1] per chip	CPUs	Processor CPW
JS22 (7998-61X)	n/a	n/a	52BE	4000	2x4MB / 0 MB	3 of 4 [2]	11040

Table 18.1. IBM BladeCenter models							
Blade Model	Server Feature	Edition Feature	Processor Feature	Chip Speed MHz	L2/L3 cache [1] per chip	CPUs	Processor CPW
JS22 (7998-61X)	n/a	n/a	52BE	4000	2x4MB / 0 MB	3.7 of 4 [3]	13800

*Note:
1. These models have a dedicated L2 cache per processor core, and no L3 cache
2. CPW value is for a 3-core dedicated partition and a 1-core VIOS
3. CPW value is for a 3.7-core partition with shared processors and a 0.3-core VIOS partition

19 V5R4 Additions (July 2007)

19.1.1 IBM System i using the POWER6 processor technology

Table 19.1. System i models							
Model	Server Feature	Edition Feature [2]	Processor Feature	Chip Speed MHz	L2/L3 cache [1] per chip	CPU [4] Range	Processor CPW
i570 (9406-MMA)	4910	5460	7380	4700	2x4MB / 32MB	1 - 4	5500-21200
i570 (9406-MMA)	4911	5461	7380	4700	2x4MB / 32MB	2 - 8	10800-40100
i570 (9406-MMA)	4912	5462	7380	4700	2x4MB / 32MB	4 - 16	20100-76900
i570 (9406-MMA)	4922	7053[3]	7380	4700	2x4MB / 32MB	1 - 4	5500-21200
i570 (9406-MMA)	4923	7058[3]	7380	4700	2x4MB / 32MB	1 - 8	5500-40100
i570 (9406-MMA)	4924	7063[3]	7380	4700	2x4MB / 32MB	2 - 16	10800-76900

*Note:
1. These models have a dedicated L2 cache per processor core, and share the L3 cache between two processor cores.
2. This is the Edition Feature for the model. This is the feature displayed when you display the system value QPRCFEAT.
3. Capacity Backup model.
4. The range of the number of processor cores per system.

20 V5R4 Additions (January/May/August 2006 and January/April 2007)

20.1.1   IBM System i using the POWER5 processor technology

Table 20.1.1. *System* i models

Model	Edition Feature [2]	Accelerator Feature	Chip Speed MHz	L2/L3 cache per CPU [1]	CPU Range	Processor CPW	5250 OLTP CPW
9406-595	5892	NA	2300	1.9/36MB	32 - 64 [8]	108000-216000	Per Processor
9406-595	5872	NA	2300	1.9/36MB	32 - 64 [8]	108000-216000	0
9406-595	5891	NA	2300	1.9/36MB	16 - 32	61000-108000	Per Processor
9406-595	5871	NA	2300	1.9/36MB	16 - 32	61000-108000	0
9406-595	5896[4]	NA	2300	1.9/36MB	4 - 32	16000-108000	Per Processor
9406-595	5876[4]	NA	2300	1.9/36MB	4 - 32	16000-108000	0
9406-595	5890	NA	2300	1.9/36MB	8-16	31500-58800	Per Processor
9406-595	5870	NA	2300	1.9/36MB	8-16	31500-58800	0
9406-595	5895[4]	NA	2300	1.9/36MB	2-16	8200-58800	Per Processor
9406-595	5875[4]	NA	2300	1.9/36MB	2-16	8200-58800	0
9406-595	7583[5]	NA	1900	1.9/36MB	32 - 64 [8]	92000-184000	Per Processor
9406-595	7487	NA	1900	1.9/36MB	32 - 64 [8]	92000-184000	Per Processor
9406-595	7486	NA	1900	1.9/36MB	32 - 64 [8]	92000-184000	0
9406-595	7581[5]	NA	1900	1.9/36MB	16 - 32	51000-92000	Per Processor
9406-595	7483	NA	1900	1.9/36MB	16 - 32	51000-92000	Per Processor
9406-595	7482	NA	1900	1.9/36MB	16 - 32	51000-92000	0
9406-595	7590[4]	NA	1900	1.9/36MB	4 - 32	13600-92000	Per Processor
9406-595	7912[4]	NA	1900	1.9/36MB	4 - 32	13600-92000	Per Processor
9406-595	7580[5]	NA	1900	1.9/36MB	8 - 16	26700-50500	Per Processor
9406-595	7481	NA	1900	1.9/36MB	8 - 16	26700-50500	Per Processor
9406-595	7480	NA	1900	1.9/36MB	8 - 16	26700-50500	0
9406-595	7910[4]	NA	1900	1.9/36MB	2 - 16	6675-50500	Per Processor
9406-595	7911[4]	NA	1900	1.9/36MB	2 - 16	6675-50500	Per Processor
9406-570	7760[4]	NA	2200	1.9/36MB	2 - 16	8100-58500	Per Processor
9406-570	7918[4]	NA	2200	1.9/36MB	2 - 16	8100-58500	Per Processor
9406-570	7765[5]	NA	2200	1.9/36MB	8 - 16	31100-58500	Per Processor
9406-570	7749	NA	2200	1.9/36MB	8 - 16	31100-58500	Per Processor
9406-570	7759	NA	2200	1.9/36MB	8 - 16	31100-58500	0
9406-570	7764[5]	NA	2200	1.9/36MB	4 - 8	16700-31100	Per Processor
9406-570	7748	NA	2200	1.9/36MB	4 - 8	16700-31100	Per Processor
9406-570	7758	NA	2200	1.9/36MB	4 - 8	16700-31100	0
9406-570	7916[4]	NA	2200	1.9/36MB	1 - 8	4200-31100	Per Processor
9406-570	7917[4]	NA	2200	1.9/36MB	1 - 8	4200-31100	Per Processor
9406-570	7763[5]	NA	2200	1.9/36MB	2 - 4	8400-16000	Per Processor
9406-570	7747	NA	2200	1.9/36MB	2 - 4	8400-16000	Per Processor
9406-570	7757	NA	2200	1.9/36MB	2 - 4	8400-16000	0
9406-570	7914[4]	NA	2200	1.9/36MB	1 - 4	4200-16000	Per Processor

Model	Edition Feature [2]	Accelerator Feature	Chip Speed MHz	L2/L3 cache per CPU [1]	CPU Range	Processor CPW	5250 OLTP CPW
9406-570	7915[4]	NA	2200	1.9/36MB	1 - 4	4200-16000	Per Processor
9406-550	7551[5]	NA	1900	1.9/36MB	1 - 4	3800-14000	Per Processor
9406-550	7629[6]	NA	1900	1.9/36MB	1 - 4	3800-14000	0
9406-550	7155	NA	1900	1.9/36MB	1 - 4	3800-14000	Per Processor
9406-550	7154	NA	1900	1.9/36MB	1 - 4	3800-14000	0
9406-550	7920[4]	NA	1900	1.9/36MB	1 - 4	3800-14000	Per Processor
9406-550	7921[4]	NA	1900	1.9/36MB	1 - 4	3800-14000	Per Processor
9406-525	7792[11]	NA	1900	1.9/36MB	1-2	3800-7100	3800-7100
9406-525	7791[11]	NA	1900	1.9/36MB	1-2	3800-7100	3800-7100
9406-525	7790[11]	NA	1900	1.9/36MB	1-2	3800-7100	3800-7100
9407-515	6028[11]	NA	1900	1.9/36MB	2	7100[12]	7100
9407-515	6021[11]	NA	1900	1.9/36MB	2	7100[12]	7100
9407-515	6018[11]	NA	1900	1.9/36MB	1	3800[12]	3800
9407-515	6011[11]	NA	1900	1.9/36MB	1	3800[12]	3800
9407-515	6010[11]	NA	1900	1.9/36MB	1	3800[12]	3800
9406-520	7375[5]	NA	1900	1.9/36MB	1 - 2	3800-7100	3800-7100
9406-520	7736	NA	1900	1.9/36MB	1 - 2	3800-7100	3800-7100
9406-520	7785	NA	1900	1.9/36MB	1 - 2	3800-7100	0
9406-520	7784	NA	1900	1.9/36MB	1	3800	0
9406-520	7691[10]	NA	1900	1.9/36MB	1	3800	0
9406-520	7374[5]	NA	1900	1.9/36MB	1[3]	2800	2800
9406-520	7735	NA	1900	1.9/36MB	1[3]	2800	2800
9406-520	7373[5]	NA	1900	1.9/36MB	1[3]	1200	1200
9406-520	7734	NA	1900	1.9/36MB	1[3]	1200	1200
Value Editions							
9406-520	7352	7357	1900	1.9/36MB	1[3]	1200-3800 [9]	60
9406-520 (7350)	7350	7355	1900	1.9MB/NA	1[3]	600-3100 [9]	30
Express Configs							
9405-520	7152	NA	1900	1.9/36MB	1	3800	60
9405-520	7144	NA	1900	1.9/36MB	1	3800	60
9405-520	7143	7354	1900	1.9/36MB	1[3]	1200-3800 [9]	60
9405-520	7148	7687	1900	1.9/36MB	1[3]	1200-3800 [9]	60
9405-520	7156	7353	1900	1.9/NA	1[3]	600-3100 [9]	30
9405-520	7142	7682	1900	1.9MB/NA	1[3]	600-3100 [9]	30
9405-520	7141	7681	1900	1.9MB/NA	1[3]	600-3100 [9]	30
9405-520	7140	7680	1900	1.9MB/NA	1[3]	600-3100 [9]	30

Table 20.1.1. *System* i models

*Note:

1. These models share L2 and L3 cache between two processor cores.
2. This is the Edition Feature for the model. This is the feature displayed when you display the system value QPRCFEAT.
3. CPU Range - entry model is a partial processor model, offering multiple price/performance points for the entry market.
4. Capacity Backup model.
5. High Availability model.
6. Domino edition.
7. NR - Not Recommended: the 600 CPW processor offering is not recommended for Domino.
8. The 64-way CPW value is reflects two 32-way partitions.
9. These models are accelerator models. The base CPW value is the capacity with the default processor feature. The max CPW value is the capacity when purchasing the accelerator processor feature.
10. Collaboration Edition. (Announced May 9, 2006)
11. User based pricing models.
12. These values listed are unconstrained CPW values (there is sufficient I/O such that the processor would be the first constrained resource). The I/O constrained CPW value for an 8-disk configuration is approximately 800 CPW (100 CPW per disk).