

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

CLASSIFICATION ORDER 1826

November 4, 2003

Project No. E-6458

	<u>Class</u>	<u>Subclass</u>	<u>Art Unit</u>	<u>Ex'r Search Room No.</u>
Abolished:	709	1, 100-108	2127	ELEC 00-00
		310-332	2126	ELEC 00-00
Established:	718 (new) 719 (new)	1, 100-108	2127	ELEC 00-00
		310-332	2126	ELEC 00-00
Title Change:	709	Class Title		

The following classes are impacted by this project:

Class (es): 345, 700, 703, 706, 707, 710, 711, 712, 713, and 717

This order includes the following:

- A. CLASSIFICATION MANUAL CHANGES
- B. LISTING OF PRINCIPAL SOURCE OF ESTABLISHED AND DISPOSITION OF ABOLISHED PAGES
- C. CHANGES TO THE U.S. – I.P.C. CONCORDANCE
- D. DEFINITION CHANGES

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

CLASSIFICATION ORDER 1826

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Project No. E-6458

Project Leader(s):	D. Shute
Project Classifier(s):	D. Shute
Examiner(s):	M. Banankhah, A. Caldwell, S. Courtenay, S. Lao
Editor:	E. La Touche
Editorial Assistant:	Y. Smith

200 MULTICOMPUTER DATA TRANSFERRING
 201 .Distributed data processing
 202 ..Processing agent
 203 ..Client/server
 204 .Computer conferencing
 205 ..Cooperative computer processing
 206 ..Demand based messaging
 207 ..Priority based messaging
 208 .Master/slave computer controlling
 209 ..Master/slave mode selecting
 210 ..Slave computer locking
 211 ..Master accessing slave storage
 212 .Computer-to-computer direct memory
 accessing
 213 .Multicomputer data transferring via
 shared memory
 214 ..Plural shared memories
 215 ..Partitioned shared memory
 216 ..Accessing another computer's memory
 217 .Remote data accessing
 218 ..Using interconnected networks
 219 ..Accessing a remote server
 220 .Network computer configuring
 221 ..Reconfiguring
 222 ..Initializing
 223 .Computer network managing
 224 ..Computer network monitoring
 225 ..Computer network access regulating
 226 ..Network resource allocating
 227 .Computer-to-computer session/connection
 establishing
 228 ..Session/connection parameter setting
 229 ..Network resources access controlling
 230 .Computer-to-computer protocol
 implementing
 231 ..Computer-to-computer data streaming
 232 ..Computer-to-computer data transfer
 regulating
 233 ...Transfer speed regulating
 234 ...Data flow compensating
 235 ...Congestion avoiding
 236 ..Computer-to-computer data framing
 237 ..Computer-to-computer handshaking
 238 .Computer-to-computer data routing
 239 ..Alternate path routing
 240 ..Prioritized data routing
 241 ..Least weight routing
 242 ..Routing data updating
 243 ..Decentralized controlling
 244 ..Centralized controlling
 245 .Computer-to-computer data addressing
 246 .Computer-to-computer data modifying
 247 ..Compressing/decompressing
 248 .Multicomputer synchronizing
 249 .Multiple network interconnecting
 250 .Network-to-computer interfacing
 251 .Ring computer networking
 252 .Star or tree computer networking
 253 .Bused computer networking
 400 SYNCHRONIZATION OF PLURAL PROCESSORS

 FOREIGN ART COLLECTIONS

FOR 000 CLASS-RELATED FOREIGN DOCUMENTS

Any foreign patents or non-patent literature from subclasses that have been reclassified have been transferred directly to FOR Collections listed below. These Collections contain ONLY foreign patents or non-patent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

FOR 100 .Communication engineering (364/FOR 514)
 FOR 101 ..Object detection or tracking (364/FOR 516)
 FOR 102 ..Signal evaluation (target or noise) (364/FOR 517)
 FOR 103 MULTICOMPUTER DATA TRANSFERRING (364/200.3)
 FOR 104 .Distributed data processing (395/200.31)
 FOR 105 ..Processing agent (395/200.32)
 FOR 106 ..Client/server (395/200.33)
 FOR 107 .Computer conferencing (395/200.34)
 FOR 108 ..Cooperative computer processing (395/200.35)
 FOR 109 ..Demand based messaging (395/200.36)
 FOR 110 ..Priority based messaging (364/200.37)
 FOR 111 .Master/slave computer controlling (364/200.38)
 FOR 112 ..Master/slave mode selecting (395/200.39)
 FOR 113 ..Slave computer locking (395/200.4)
 FOR 114 ..Master accessing slave storage (395/200.41)
 FOR 115 .Computer-to-computer direct memory accessing (395/200.42)
 FOR 116 .Multicomputer data transferring via shared memory (395/200.43)
 FOR 117 ..Plural shared memories (395/200.44)
 FOR 118 ..Partitioned shared memory (395/200.45)
 FOR 119 ..Accessing another computer's memory (395/200.46)
 FOR 120 .Remote data accessing (395/200.47)
 FOR 121 ..Using interconnected networks (395/200.48)
 FOR 122 ..Accessing a remote server (395/200.49)
 FOR 123 .Network computer configuring (395/200.5)
 FOR 124 ..Reconfiguring (395/200.51)
 FOR 125 ..Initializing (395/200.52)
 FOR 126 .Computer network managing (395/200.53)
 FOR 127 ..Computer network monitoring (395/200.54)
 FOR 128 ..Computer network access regulating (395/200.55)
 FOR 129 ..Network resource allocating (395/200.56)
 FOR 130 .Computer-to-computer session/connection establishing (395/200.57)

Title Change
 * Newly Established Subclass

@ Indent Change
 & Position Change

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MULTICOMPUTER DATA TRANSFERRING

(364/200.3)

- .Computer-to-computer session/connection
establishing (395/200.57)
- FOR 131 ..Session/connection parameter setting
(395/200.58)
- FOR 132 ..Network resources access controlling
(395/200.59)
- FOR 133 .Computer-to-computer protocol
implementing (395/200.6)
- FOR 134 ..Computer-to-computer data streaming
(395/200.61)
- FOR 135 ..Computer-to-computer data transfer
regulating (395/200.62)
- FOR 136 ...Transfer speed regulating
(395/200.63)
- FOR 137 ...Data flow compensating (395/200.64)
- FOR 138 ...Congestion avoiding (395/200.65)
- FOR 139 ..Computer-to-computer data framing
(395/200.66)
- FOR 140 ..Computer-to-computer handshake
(395/200.67)
- FOR 141 .Computer-to-computer data routing
(395/200.68)
- FOR 142 ..Alternate path routing (395/200.69)
- FOR 143 ..Prioritized data routing (395/200.7)
- FOR 144 ..Least weight routing (395/200.71)
- FOR 145 ..Routing dating updating (395/200.72)
- FOR 146 ..Decentralized controlling (395/200.73)
- FOR 147 ..Centralized controlling (395/200.74)
- FOR 148 .Computer-to-computer data addressing
(395/200.75)
- FOR 149 .Computer-to-computer data modifying
(395/200.76)
- FOR 150 ..Compressing/decompressing (395/200.77)
- FOR 151 .Multicomputer synchronizing
(395/200.78)
- FOR 152 .Multiple network interconnecting
(395/200.79)
- FOR 153 .Network-to-computer interfacing
(395/200.8)
- FOR 154 .Ring computer networking (395/200.81)
- FOR 155 .Star or tree computer networking
(395/200.82)
- FOR 156 .Bused computer networking (395/200.83)
- FOR 158 SYNCHRONIZATION OF PLURAL PROCESSORS
(395/553)

CLASS 718 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: VIRTUAL MACHINE TASK
OR PROCESS MANAGEMENT OR TASK MANAGEMENT/CONTROL

NOVEMBER 2003

- * 1 VIRTUAL MACHINE TASK OR PROCESS
MANAGEMENT
- * 100 TASK MANAGEMENT OR CONTROL
- * 101 .Batch or transaction processing
- * 102 .Process scheduling
- * 103 ..Priority scheduling
- * 104 ..Resource allocation
- * 105 ..Load balancing
- * 106 ..Dependency based cooperative
processing of multiple programs
working together to accomplish a
larger task
- * 107 ..Multitasking, time sharing
- * 108 ...Context switching

* *****

* FOREIGN ART COLLECTIONS

* *****

* FOR 000 CLASS-RELATED FOREIGN DOCUMENTS

Any foreign patents or non-patent literature from subclasses that have been classified have been transferred directly to FOR Collection listed below. These collections contain ONLY foreign patents or non-patent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

- * FOR 157 VIRTUAL MACHINE TASK AND PROCESS
MANAGEMENT (395/406)
- * FOR 159 TASK MANAGEMENT OR CONTROL (395/670)
- * FOR 160 .Batch or transaction processing
(395/671)
- * FOR 161 .Process scheduling (395/672)
- * FOR 162 ..Priority scheduling (395/673)
- * FOR 163 ..Resource allocation (395/674)
- * FOR 164 ..Load balancing (395/675)
- * FOR 165 ..Dependency based cooperative
processing of multiple programs
working together to accomplish a
larger task (395/676)
- * FOR 166 ..Multitasking, time sharing (395/677)
- * FOR 167 ...Context switching (395/678)

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- * 311 COMMON GATEWAY INTERFACE PROGRAM
COMMUNICATION
- * 312 INTERPROGRAM COMMUNICATION USING SHARED
MEMORY
- * 313 INTERPROGRAM COMMUNICATION USING MESSAGE
- * 314 .Message using queue
- * 315 .Object oriented message
- * 316 ..Managed object system
- * 317 .Agent
- * 318 EVENT HANDLING OR EVENT NOTIFICATION
- * 319 DATA TRANSFER BETWEEN OPERATING SYSTEMS
- * 320 HIGH LEVEL APPLICATION CONTROL
- * 321 DEVICE DRIVER COMMUNICATION
- * 322 .Multimedia device driver
- * 323 .Video graphics device driver
- * 324 .Virtual device driver (VxD)
- * 325 .RAID metadriver
- * 326 .SCSI device driver
- * 327 .Device driver configuration
- * 328 APPLICATION PROGRAM INTERFACE (API)
- * 329 .Data transfer between application
windows
- * 330 REMOTE PROCEDURE CALL (RPC)
- * 331 DYNAMIC LINKING, LATE BINDING
- * 332 .Object oriented dynamic linking, late
binding
- * 310 MISCELLANEOUS
- * *****
- * FOREIGN ART COLLECTIONS
- * *****
- * FOR 000 CLASS-RELATED FOREIGN DOCUMENTS

Any foreign patents or non-patent literature from subclasses that have been classified have been transferred directly to FOR Collection listed below. These collections contain ONLY foreign patents or non-patent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

- * FOR 168 INTERPROGRAM COMMUNICATION, INTERPROCESS
COMMUNICATION (395/680)
- * FOR 169 .Device Driver Communication (395/681)
- * FOR 170 .Application program interfacing (API)
(395/682)
- * FOR 171 .Object oriented messaging (395/683)
- * FOR 172 .Remote procedure calling (RPC)
(395/684)
- * FOR 173 .Dynamic linking, late binding (395/685)

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**SOURCE CLASSIFICATION(S) OF PATENTS
IN NEWLY ESTABLISHED SUBCLASSES REPORT**

New Classification -----	Number Of ORs -----	Source Classification -----	Number Of ORs -----
718/1	45	709/1	46
718/100	227	709/100	227
718/101	90	709/101	90
718/102	187	709/102	187
718/103	120	709/103	120
718/104	191	709/104	191
718/105	116	709/105	116
718/106	92	709/106	92
718/107	100	709/107	100
718/108	78	709/108	78
719/310	1	709/1	46
	1	709/313	66
	83	709/310	83
719/311	9	709/311	9
719/312	25	709/312	25
719/313	65	709/313	66
719/314	34	709/314	34
719/315	149	709/315	149

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**SOURCE CLASSIFICATION(S) OF PATENTS
IN NEWLY ESTABLISHED SUBCLASSES REPORT**

New Classification -----	Number Of ORs -----	Source Classification -----	Number Of ORs -----
719/316	107	709/316	107
719/317	17	709/317	17
719/318	59	709/318	59
719/319	7	709/319	7
719/320	28	709/320	28
719/321	67	709/321	67
719/322	7	709/322	7
719/323	13	709/323	13
719/324	13	709/324	13
719/325	4	709/325	4
719/326	4	709/326	4
719/327	8	709/327	8
719/328	103	709/328	103
719/329	22	709/329	22
719/330	49	709/330	49
719/331	47	709/331	47
719/332	14	709/332	14

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Project No. E-6458

**DISPOSITION CLASSIFICATION(S) OF PATENTS
FROM ABOLISHED SUBCLASSES REPORT**

Source Classification	Number of ORs	New Classification	Number of ORs
-----	-----	-----	-----
718/1	45	709/1	46
718/100	227	709/100	227
718/101	90	709/101	90
718/102	187	709/102	187
718/103	120	709/103	120
718/104	191	709/104	191
718/105	116	709/105	116
718/106	92	709/106	92
718/107	100	709/107	100
718/108	78	709/108	78
719/310	1	709/1	46
	1	709/313	66
	83	709/310	83
719/311	9	709/311	9
719/312	25	709/312	25
719/313	65	709/313	66
719/314	34	709/314	34
719/315	149	709/315	149

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Project No. E-6458

DISPOSITION CLASSIFICATION(S) OF PATENTS
FROM ABOLISHED SUBCLASSES REPORT

Source Classification	Number of ORs	New Classification	Number of ORs
719/316	107	709/316	107
719/317	17	709/317	17
719/318	59	709/318	59
719/319	7	709/319	7
719/320	28	709/320	28
719/321	67	709/321	67
719/322	7	709/322	7
719/323	13	709/323	13
719/324	13	709/324	13
719/325	4	709/325	4
719/326	4	709/326	4
719/327	8	709/327	8
719/328	103	709/328	103
719/329	22	709/329	22
719/330	49	709/330	49
719/331	47	709/331	47
719/332	14	709/332	14

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C. CHANGES TO THE U.S. - I.P.C. CONCORDANCE

<u>Class</u>	<u>U.S.</u> <u>Subclass</u>	<u>I.P.C.</u> <u>Subclass</u>	<u>Notation</u>
718	1 100 – 108	G06F G06F	9/455 9/46
719	310 – 332	G06F	9/46 13/00 3/00 9/44

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 345 – COMPUTER GRAPHICS PROCESSING, OPERATOR INTERFACE
PROCESSING, AND SELECTIVE VISUAL DISPLAY SYSTEMS

Subclass 769: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram
Communication or Interprocess Communication (IPC), appropriate
subclasses for details of interprogram and interprocess communication.

Subclass 804: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram
Communication or Interprocess Communication (IPC), subclass 329
for details of data transfer between two windowed programs.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 700 - DATA PROCESSING: GENERIC CONTROL SYSTEMS OR SPECIFIC APPLICATIONS

Subclass 11: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for computer task management or control.

Subclass 23: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for computer task management or control.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 703 - DATA PROCESSING: STRUCTURAL DESIGN, MODELING, SIMULATION,
AND EMULATION

Class Definition: In Section II:

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclass 1 for virtual machine task and process management.

Subclass 20: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclass 1 for virtual machine task and process management.

Subclass 23: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass 1 for virtual machine task and process management.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 706 - DATA PROCESSING: ARTIFICIAL INTELLIGENCE

Class Definition: In Section II:

Delete:

The reference to Class 709.

Insert:

- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 200-253 for multicomputer data transferring, and subclass 400 for synchronization of plural processors.

- 718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for a task management system.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 707 - DATA PROCESSING: DATABASE AND FILE MANAGEMENT, DATA STRUCTURES, OR DOCUMENT PROCESSING

Subclass 2: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 201-203 for distributed data processing.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

Subclass 6: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass 106 for multiple programs working together to accomplish a larger task.

Subclass 8: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

Subclass 101: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

Subclass 201: Under SEE OR SEARCH CLASS

Delete:

The reference to class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 213-216 for multicomputer data transferring with shared memory.

- 718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

- 719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprocess and interprogram communication.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 709 – ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS:
MULTICOMPUTER DATA TRANSFERRING OR PLURAL PROCESSOR
SYNCHRONIZATION

Definitions Abolished

Subclasses

1, 100–108, 310 -332

Definitions Modified (Place modifications in numerical sequence, where applicable):

Class Definition: In the class title

Delete

The existing class title

Insert:

ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS:
MULTICOMPUTER DATA TRANSFERRING OR PLURAL PROCESSOR
SYNCHRONIZATION

Delete:

The entire Class Definition: Section I – Class Definition, Section II –
References to Other Classes, and Section III – Glossary.

Insert:

SECTION I - CLASS DEFINITION

GENERAL STATEMENT OF THE CLASS SUBJECT MATTER

This class provides for an electrical computer or digital data processing system or corresponding data processing method including apparatus or steps for transferring data or instruction information between a plurality of computers wherein the computers employ the data or instructions before or after transferring and the employing affects said transfer of data or instruction information.

This class also provides for the synchronization of plural processors.

The class includes the following subject matter:

A. Process or apparatus for transferring data among a plurality of spatially distributed (i.e. situated at plural locations) computers or digital data processing systems via one or more communications media (e.g., computer networks).

B. Process or apparatus for synchronizing control or regulation of clocking or timing operations of two or more processors.

SCOPE OF THE CLASS

This class is limited to digital data processing systems and functions for transferring unspecified data or instruction information and the processing thereof by digital data processing systems. Systems concerned with movement or processing of other specific types of information and digital signals, per se, are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

A. Electrical Computers and Data Processing Systems, Related Systems and Functions in General

(1) Systems directed to a specific end use of information, for example, sensor data processed by a computer means for control purposes in systems classified external to this class, are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

B. Communications Classes

This class includes significant data processing in combination with communication of data, and allowed types of information, amongst digital data processing systems.

For multiplexing see the SEE OR SEARCH CLASS notes below.

For systems directed to selective communication systems. See the SEE OR SEARCH CLASS notes below.

For systems directed to communication techniques such as pulse or digital communications. See the SEE OR SEARCH CLASS notes below.

SECTION II - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 235, Registers, appropriate subclasses for basic machines and associated indicating mechanisms for ascertaining the number of movements of various devices and machines, plus machines made from these basic machines alone (e.g., cash registers, voting machines), and in combination with various perfecting features, such as printers and recording means, and for various data bearing record controlled systems.
- 326, Electronic Digital Logic Circuitry, appropriate subclasses for generic digital logic devices, circuitry, and subcombinations thereof, wherein operations other than arithmetical are performed upon discrete electrical signals representing a value normally described by numerical digits.
- 340, Communications: Electrical, subclasses 825 through 825.98 for controlling one or more devices to obtain a plurality of results by transmission of a designated one of plural distinctive control signals over a smaller number of communication lines or channels, particularly subclasses 2.1-2.8 for path selection, subclasses 3.1-3.9 for communication systems where status of a controlled device is communicated, subclass 825.02 for tree or cascade selective communication, subclasses 825.2-825.21 for synchronizing selective communication systems, subclasses 825.5-825.51 for lockout or priority in selective communication systems, subclasses 825.52 and 825.53 for addressing, and subclasses 825.57-825.69 for pulse responsive actuation in selective communication.
- 341, Coded Data Generation or Conversion, subclasses 50 through 172 for electrical pulse and digit code converters (e.g., systems for originating or emitting a coded set of discrete signals or translating one code into another code wherein the meaning of the data remains the same but the formats may differ).
- 345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses 530 through 574 for visual display, and subclasses 30 through 111 for the selective control of two or more light generating or light controlling display elements in accordance with a received image signal.
- 360, Dynamic Magnetic Information Storage or Retrieval, appropriate subclasses, for record carriers and systems wherein information is stored and retrieved by interaction with a magnetic medium and there is relative motion between said magnetic medium and a transducer, for example, a magnetic disk drive device, and control thereof, per se.

- 365, Static Information Storage and Retrieval, appropriate subclasses for addressable static singular storage elements or plural singular storage elements of the same type (i.e., the internal elements of memory, per se).
- 369, Dynamic Information Storage or Retrieval, appropriate subclasses for record carriers and systems wherein information is stored and retrieved by interaction with a medium and there is relative motion between a medium and a transducer.
- 370, Multiplex Communications, appropriate subclasses, for the simultaneous transmission of two or more signals over a common medium, particularly subclasses 351 - 430 for multiplex switching.
- 375, Pulse or Digital Communications, appropriate subclasses for generic pulse or digital communication systems and synchronization of clocking signals from input data.
- 377, Electrical Pulse Counters, Pulse Dividers, and Shift Registers: Circuits and Systems, appropriate subclasses for generic electric circuits for pulse counting.
- 379, Telephonic Communications, appropriate subclasses for two-way electrical communication of intelligible audio information of arbitrary content over a communication link.
- 380, Cryptography, appropriate subclasses for cryptographic apparatus or process in general which includes electric signal modification.
- 381, Electrical Audio Signal Processing Systems and Devices, appropriate subclasses for wired one-way audio systems, per se.
- 382, Image Analysis, appropriate subclasses for operations performed on image data with the aim of measuring a characteristic of an image, detecting variations, detecting structures, or transforming the image data, and for procedures for analyzing and categorizing patterns present in image data.
- 388, Electricity: Motor Control Systems, cross-reference art collection 907.5 for computer or processor control of DC motor acceleration or speed.
- 455, Telecommunications, appropriate subclasses for modulated carrier wave communication, per se, and subclass 26.1 for subject matter which blocks access to a signal source or otherwise limits usage of modulated carrier equipment.
- 700, Data Processing: Generic Controls Systems or Specific Applications, subclasses 1 through 89 for generic data processing control system,

apparatus, or process and subclasses 90 through 306 for applications of computers in various environments where there is significant claim recitation of the data computer system or calculating computer and only nominal recitation of an external art environment (where significant structure of an external device is claimed, classification is in the appropriate device class).

- 701, Data Processing: Vehicles and Navigation, appropriate subclasses, for applications of computers in vehicular and navigational environments.
- 702, Data Processing: Measuring and Testing, appropriate subclasses, for applications of computers in measuring and testing.
- 704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses 1 - 10 for applications of computers in linguistics, subclasses 200 - 278 for applications of computers in speech signal processing, and subclasses 500 - 504 for applications of computers in audio compression/decompression.
- 705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, appropriate subclasses, for applications of computers and calculators in business and management environments.
- 706, Data Processing: Artificial Intelligence, appropriate subclasses, for subject matter directed to artificial intelligence data computer which is disclosed or claimed in plural diverse arts both in combination and in the alternative (e.g., digital data computer system for use in image analysis or electrical audio signal computer, and for artificial intelligence per se).
- 707, Data Processing: Databases and File Management, Data Structures, and Document Processing, subclasses 1 through 206 for database processing.
- 708, Data Processing: Arithmetic Processing and Calculating, subclasses 1 - 9 for hybrid computers; and subclasses 100 - 714 for calculators, digital signal computer, and arithmetical and logical computer, per se; and subclasses 800 - 854 for electric analog computers.
- 710, Electrical Computers and Digital Processing Systems: Input/Output, appropriate subclasses, for computer input or output.
- 711, Electrical Computers and Digital Processing Systems: Memory, appropriate subclasses, for memory addressing and management in a computer system.

- 712, Electrical Computers and Digital Processing Systems: Processing Architecture and Instruction Processing (e.g., Processors), appropriate subclasses for computer architecture and instruction processing.
- 713, Electrical Computers and Digital Processing Systems: Support, subclass 1 and 2 for digital processing system initialization and configuration (e.g., initializing, set-up, resetting), subclass 100 for reconfiguring digital data computer system (e.g., changing system settings), subclasses 150 through 181 for multiple computer communication protection by cryptography, subclass 187 for computer program modification detection by cryptography, subclass 188 for computer virus detection by cryptography, subclasses 300 -340 for computer power control, subclasses 400 and 401 for synchronization of computer clocks, data timing signals, or pulses, and subclasses 500 - 503 for computer clock, pulse, or timing signal or analysis.
- 714, Error Detection/Correction and Fault Detection/Recovery, various subclasses for detecting or correcting errors in generic electrical pulse or pulse data and for detecting and recovering from faults of computers, digital data computer systems, and logic level based systems.
- 715, Data Processing: Presentation Processing of Document, appropriate subclasses for document processing.
- 718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for administering over processor or job execution in a digital data processing system.
- 719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for exchanging data or messages between two executing programs or processes, independent of the hardware used in the communication.

SECTION III - GLOSSARY

ACCESS

To obtain entry to, or to locate, read into memory, and make ready for, some operation, for example, regarding disks, files, records, and network entry procedures.

APPLICATION PROGRAM

A computer program designed to perform a certain type of work, such as an application to manipulate text, numbers, graphics, or a combination of these elements. An application differs from an operating system (which runs a

computer), a utility (which performs maintenance or general-purpose chores), and a language (with which computer programs are created).

BUS

A conductor used for transferring data, signals, or power.

COMPUTER

A machine that inputs data, processes data, stores data, and outputs data.

DATA

Representation of information in a coded manner suitable for communication, interpretation, or processing.

Address data: data that represent or identify a source or destination.

Instruction data: data that represent an operation and identify its operands, if any.

Status data: data that represent conditions of data, digital data processing systems, computers, peripherals, memory, etc.

Streamed data: data consisting of a more-or-less continuous series of bits, bytes, or other small, structurally uniform units.

User data: data other than address data, instruction data, or status data.

DATA PROCESSING

See PROCESSING, below.

DIGITAL DATA PROCESSING SYSTEM

An arrangement of processor(s) in combination with either memory or peripherals, or both, performing data processing.

ENTITY

A computer or process that can be treated as a unit and, often, as a member of a particular category or type.

ENVIRONMENT

A set of resources made available to the user of a system which defines specifications such as the command path (where to look for files), the system prompt and, sometimes, the location of resources or working files.

INFORMATION

Meaning that a human being assigns to data by means of the conventions applied to that data.

INTERFACE

A connection between two elements so that they can work with one another.

MEMORY

A functional unit to which data can be stored and from which data can be retrieved.

MULTITASKING

A mode of operation in which a computer works on more than one task at a time.

NETWORK

A group of computers and associated devices that are connected by communications facilities which exists to provide computer users with the means of communicating and transferring information electronically. Some types of communication are simple user-to-user messages; others, of the type known as distributed processes, can involve several computers and the sharing of workloads or cooperative efforts in performing a task.

OBJECT

A variable comprising routines and data that is treated as a discrete entity.

OPERATING SYSTEM

Software responsible for controlling the allocation and usage of hardware resources such as memory, central processing unit (CPU) time, disk space, and peripheral devices. The operating system is the foundation on which applications programs (e.g., word processing, spreadsheets) are built.

PERIPHERAL

A functional unit that transmits data to or receives data from a computer to which it is coupled.

PROCESS

A coherent sequence of steps undertaken by a program to manipulate data such as an internal or external data-transfer operation, handling an interrupt, or evaluation of a function.

PROCESSING

Methods or apparatus performing systematic operations upon data or information exemplified by functions such as data or information transferring, merging, sorting, and computing (e.g., arithmetic operations or logical operations).

- (1) Note. In this class, the glossary term data is used to modify processing in the term data processing; whereas the term digital data processing system refers to a machine performing data processing.
- (2) Note. In an effort to avoid redundant constructions, in this class, where appropriate, the term address data processing is used in place of address data data processing.

PROCESSOR

A functional unit that interprets and executes instruction data.

PROTOCOL

A set of rules or processes which enable computers to exchange information with as little error as possible.

RESOURCE

Any part of computer system or a network, such as a disk drive, printer, or memory, that can be allotted to a program or process while it is running. In programming, a resource can be used by more than one program or in more than one place in a program; for example, dialog boxes, bitmaps, and fonts are resources in many windowing programs.

ROUTING

Receiving transmitted messages within a network and forwarding them to their correct destinations over an available route selected according to a predetermined criteria.

SERVER

A computer running administrative software that controls access to all or part of a network and its resources (such as disk drives and printers). A computer acting as a server makes resources available to computers acting as workstations on the network.

SYNCHRONIZATION

Matching of timing between separate computers or among the components of a system so that all are coordinated.

TASK

A standalone application or a subprogram that is run as an independent entity.

THREAD

A path of processing execution within a larger process or program.

TRANSFER

The movement of data from one location to another or the passing of program control from one portion of a program to another.

Subclass 200: After the (9) Note,

Delete:

The entire SEE OR SEARCH THIS CLASS, SUBCLASS section.

Under SEE OR SEARCH CLASS:

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control,

appropriate subclasses for administrating process or job execution over a digital data processing system.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprogram or interprocess communicating.

Subclass 201: Under SEE OR SEARCH THIS CLASS, SUBCLASS

Delete:

100+, for means or steps for controlling operations to execute processes or jobs within the operating system environment of a digital data computer system with only nominal recitation of computer data transferred between the computers.

310-332, for means or steps for exchanging data or messages between two executing programs or processes with only nominal recitation of computer data transferred between the computers.

Under SEE OR SEARCH CLASS:

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for means or steps for controlling operations to execute processes or jobs within the operating system environment of a digital data computer system with only nominal recitation of computer data transferred between the computers.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for means or steps for exchanging data or messages between two executing programs or processes with only nominal recitation of computer data transferred between the computers.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 710 - ELECTRICAL COMPUTERS AND DIGITAL DATA PROCESSING SYSTEMS:
INPUT/OUTPUT

Subclass 25: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass 400 for synchronization maintenance of plural processors, per se.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management.

Subclass 28: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task and process management.

Subclass 48: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management which generally is triggered by an interrupt event.

Subclass 58: Under SEE OR SEARCH CLASS

Delete:

The reference to class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 200-253 for data transferring between plural computers, per se, particularly subclass 248 for synchronizing the operations of plural digital data processing systems and computers.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management which generally is triggered by an interrupt event.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprogram and interprocess communication.

Subclass 107: Under SEE OR SEARCH CLASS

Delete:

The reference to class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass 225 for computer network access regulating in multicomputer data transferring.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management and control related to process or job execution.

Subclass 260: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for data processing task management.

Subclass 269: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management and control.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprogram communication.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 711 - ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS:
MEMORY

Subclass 6: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclass 1 for virtual machine task or process management.

Subclass 147: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 213-216 for a plurality of computers transferring data through one or more memories accessible by the plurality of computers.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclasses 102 through 108 for process scheduling involving balancing the work load or resources, memory use, register use, resource availability, time constraints, semaphores, and mutual exclusion mechanisms used for programs or process synchronization.

Subclass 151: Under SEE OR SEARCH CLASS

Delete:

The reference to class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclass 103 for priority scheduling of process (e.g., deciding which resources to use, deciding which jobs to do first and what order to do them; scheduling constraints may include resource characteristics such as performance, availability, data coherency, etc.).

Subclass 153: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for processing task management, in particular subclasses 107 and 108 for multi-tasking and context switching.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprogram or interprocess communication.

Subclass 167: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass 248 for multicomputer synchronization in a network.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task and process scheduling.

Subclass 168: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclasses 107 and 108 for multitasking and time sharing/slicing.

Subclass 169: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management and control related to process or job execution.

Subclass 170: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 220-222 for network computer configuring.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control,

appropriate subclasses for task management, in particular subclass 104 for resource allocation (e.g., deciding how best to use the available resources to get the job done) and also subclasses 107 and 108 for multitasking and context switching.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 712 - ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS:
PROCESSING ARCHITECTURES AND INSTRUCTION PROCESSING (E.G.,
PROCESSORS)

Class Definition: In Section III, References to Other Classes:

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 200-253 for transferring data between plural, spatially distributed computers or digital data processing systems.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management or task control, particularly subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

Subclass 28: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass 201 for distributed data processing having significant multicomputer data transfer.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclasses 102-108 for process scheduling in a computer task management or control system.

Subclass 214: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management or task control.

Subclass 216: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

Subclass 217: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management.

Subclass 220: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for operating system task management and control.

Subclass 227: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management.

Subclass 228: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclass 108 for context switching at the task or operating system level.

Subclass 229: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclass 108 for context switching at the task or operating system level.

Subclass 233: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management and control related to process or job execution, particularly subclasses 102-108 for process scheduling.

Subclass 241: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management and control related to process or job execution, particularly subclasses 102-108 for process scheduling.

Subclass 244: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclasses 107-108 for multitasking, time sharing.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 713 - ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS:
SUPPORT

Subclass 100: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass 221 for network computer reconfiguring.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclasses 107-108 for multitasking and context switching under task management and control.

Subclass 164: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for computer task management and control.

Subclass 400: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass 248 for multi-computer synchronization in a network.

- 718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management or control, particularly subclass 102-108 for process scheduling.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 717 - DATA PROCESSING: SOFTWARE DEVELOPMENT, INSTALLATION, AND MANAGEMENT

Class Definition: In Section II, References to Other classes

Delete:

The reference to Class 709

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 200-253 for transferring data between a plurality of computers.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses and particularly subclasses 331-332 for dynamic linking, late binding.

Subclass 100: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprocess communication such as function calls and particularly subclasses 315 and 316 for object-oriented messaging.

Subclass 104: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), subclasses 315 and 316 for interprogram communication using object-oriented message.

Subclass 106: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), subclasses 315 and 316 for interprogram communication using object-oriented message.

Subclass 107: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprocess and interprogram communication, particularly subclasses 331 and 332 for dynamic linking of objects to an executing program at run time.

Subclass 108: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate

subclasses for interprocess communication such as function calls, particularly subclasses 315 and 316 for object-oriented messaging.

Subclass 114: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 200-253 for transferring data between a plurality of computers.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses and particularly subclasses 331-332 for dynamic linking, late binding in interprogram communication.

Subclass 116: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprocess communication such as function calls, particularly subclasses 315-316 for object-oriented messaging.

Subclass 123: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly

subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

Subclass 146: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), particularly subclasses 331 and 332 for dynamic linking, late binding.

Subclass 149: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 201-203 for a distributed data processing system having multicomputer data transfer.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

Subclass 151: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control,

appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass 104 for resource allocation, subclass 106 for dependency based cooperative processing of multiple programs working together to accomplish a larger task, and subclass 108 for context switching of processes or tasks during program execution.

Subclass 162: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 200 through 253 for multicomputer data transferring,

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), subclass 330 for a remote procedure call, and subclasses 331 and 332 for dynamic linking, late binding.

Subclass 164: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), subclasses 331 and 332 for dynamic linking, late binding.

Subclass 165: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), subclasses 331 and 332 for dynamic linking during execution of an already developed program.

Subclass 166: Under SEE OR SEARCH CLASS

Delete:

The reference to Class 709.

Insert:

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), subclasses 315-316 for interprogram and interprocess communication including object-oriented message and subclass 332 for object-oriented dynamic linking.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

Definition Established **NEW CLASS Established**

CLASS 718 – ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS:
VIRTUAL MACHINE TASK OR PROCESS MANAGEMENT OR TASK
MANAGEMENT/CONTROL

SECTION I - CLASS DEFINITION

GENERAL STATEMENT OF THE CLASS SUBJECT MATTER

This class provides for an electrical computer or digital data processing system or corresponding data processing method including apparatus or steps for administrating over processor or job execution in a digital data processing system whether in a virtual machine or otherwise.

- (1) Note. For clarification, a "process" and a "task" are equivalent terms in the art. In addition, a "thread" is a path of execution within a process.
- (2) Note. Control functions such as subroutine calling and control are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

The class includes the following subject matter:

- A. Virtual Machine Task or Process Management
- B. Task Management or Control in General.

SECTION II – REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 235, Registers, appropriate subclasses for basic machines and associated indicating mechanisms for ascertaining the number of movements of various devices and machines, plus machines made from these basic machines alone (e.g., cash registers, voting machines), and in combination with various perfecting features, such as printers and recording means, and for various data bearing record controlled systems.
- 326, Electronic Digital Logic Circuitry, appropriate subclasses for generic digital logic devices, circuitry, and subcombinations thereof, wherein operations other

than arithmetical are performed upon discrete electrical signals representing a value normally described by numerical digits.

- 340, Communications: Electrical, subclasses 825 through 825.98 for controlling one or more devices to obtain a plurality of results by transmission of a designated one of plural distinctive control signals over a smaller number of communication lines or channels, particularly subclasses 2.1-2.8 for path selection, subclasses 3.1-3.9 for communication systems where status of a controlled device is communicated, subclass 825.02 for tree or cascade selective communication, subclasses 825.2-825.21 for synchronizing selective communication systems, subclasses 825.5-825.51 for lockout or priority in selective communication systems, subclasses 825.52 and 825.53 for addressing, and subclasses 825.57-825.69 for pulse responsive actuation in selective communication.
- 341, Coded Data Generation or Conversion, subclasses 50 through 172 for electrical pulse and digit code converters (e.g., systems for originating or emitting a coded set of discrete signals or translating one code into another code wherein the meaning of the data remains the same but the formats may differ).
- 345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses 530 through 574 for visual display, and subclasses 30 through 111 for the selective control of two or more light generating or light controlling display elements in accordance with a received image signal.
- 360, Dynamic Magnetic Information Storage or Retrieval, appropriate subclasses, for record carriers and systems wherein information is stored and retrieved by interaction with a magnetic medium and there is relative motion between said magnetic medium and a transducer, for example, a magnetic disk drive device, and control thereof, per se.
- 365, Static Information Storage and Retrieval, appropriate subclasses for addressable static singular storage elements or plural singular storage elements of the same type (i.e., the internal elements of memory, per se).
- 369, Dynamic Information Storage or Retrieval, appropriate subclasses for record carriers and systems wherein information is stored and retrieved by interaction with a medium and there is relative motion between a medium and a transducer.
- 370, Multiplex Communications, appropriate subclasses, for the simultaneous transmission of two or more signals over a common medium, particularly subclasses 351 - 430 for multiplex switching.
- 375, Pulse or Digital Communications, appropriate subclasses for generic pulse or digital communication systems and synchronization of clocking signals from input data.

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- 377, Electrical Pulse Counters, Pulse Dividers, and Shift Registers: Circuits and Systems, appropriate subclasses for generic electric circuits for pulse counting.
- 379, Telephonic Communications, appropriate subclasses for two-way electrical communication of intelligible audio information of arbitrary content over a communication link.
- 380, Cryptography, appropriate subclasses for cryptographic apparatus or process in general which includes electric signal modification.
- 381, Electrical Audio Signal Processing Systems and Devices, appropriate subclasses for wired one-way audio systems, per se.
- 382, Image Analysis, appropriate subclasses for operations performed on image data with the aim of measuring a characteristic of an image, detecting variations, detecting structures, or transforming the image data, and for procedures for analyzing and categorizing patterns present in image data.
- 388, Electricity: Motor Control Systems, cross-reference art collection 907.5 for computer or processor control of DC motor acceleration or speed.
- 455, Telecommunications, appropriate subclasses for modulated carrier wave communication, per se, and subclass 26.1 for subject matter which blocks access to a signal source or otherwise limits usage of modulated carrier equipment.
- 700, Data Processing: Generic Controls Systems or Specific Applications, subclasses 1 through 89 for generic data processing control system, apparatus, or process and subclasses 90 through 306 for applications of computers in various environments where there is significant claim recitation of the data computer system or calculating computer and only nominal recitation of an external art environment (where significant structure of an external device is claimed, classification is in the appropriate device class), particularly subclasses 99-102 for manufacturing control systems that involves accommodating for interrelated control and manufacturing processes and resource allocation.
- 701, Data Processing: Vehicles and Navigation, appropriate subclasses, for applications of computers in vehicular and navigational environments.
- 702, Data Processing: Measuring and Testing, appropriate subclasses, for applications of computers in measuring and testing.
- 703, Data Processing: Structural Design, Modeling, Simulation and Emulation, appropriate subclasses for compatibility, emulation, or simulation of systems or system components.
- 704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses 1 - 10 for applications of computers in linguistics, subclasses 200 - 278 for applications of computers in

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speech signal processing, and subclasses 500 - 504 for applications of computers in audio compression/decompression.

- 705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, appropriate subclasses, for applications of computers and calculators in business and management environments.
- 706, Data Processing: Artificial Intelligence, appropriate subclasses, for subject matter directed to artificial intelligence data computer which is disclosed or claimed in plural diverse arts both in combination and in the alternative (e.g., digital data computer system for use in image analysis or electrical audio signal computer, and for artificial intelligence per se).
- 707, Data Processing: Databases and File Management, Data Structures, and Document Processing, subclasses 1 through 206 for database processing.
- 708, Data Processing: Arithmetic Processing and Calculating, subclasses 1 - 9 for hybrid computers; and subclasses 100 - 714 for calculators, digital signal computer, and arithmetical and logical computer, per se; and subclasses 800 - 854 for electric analog computers.
- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, appropriate subclasses for transferring data or instruction information between a plurality of computers wherein the computers employ the data or instructions before or after transferring and the employing affects said transfer of data or instruction information and for the synchronization of plural processors.
- 710, Electrical Computers and Digital Processing Systems: Input/Output, appropriate subclasses, for computer input or output.
- 711, Electrical Computers and Digital Processing Systems: Memory, subclass 6 for accommodating addressing requirements for software emulation of a target computer or digital data processing system on a base computer or digital data processing system, and subclasses 202 - 210 for address mapping and virtual addressing, per se.
- 712, Electrical Computers and Digital Processing Systems: Processing Architecture and Instruction Processing (e.g. Processors), subclasses 220 - 248 for control functions such as subroutine calling and control, including subclass 228 for context preserving, and subclass 229 for mode switch or change.
- 713, Electrical Computers and Digital Processing Systems: Support, subclass 1 and 2 for digital processing system initialization and configuration (e.g., initializing, set-up, resetting), subclass 100 for reconfiguring digital data computer system (e.g., changing system settings), subclasses 150 through 181 for multiple computer communication protection by cryptography, subclass 187 for computer program modification detection by cryptography, subclass 188 for computer virus detection by cryptography, subclasses 300 -340 for computer

power control, subclasses 400 and 401 for synchronization of computer clocks, data timing signals, or pulses, and subclasses 500 -503 for computer clock, pulse, or timing signal or analysis.

- 714, Error Detection/Correction and Fault Detection/Recovery, various subclasses for detecting or correcting errors in generic electrical pulse or pulse data and for detecting and recovering from faults of computers, digital data computer systems, and logic level based systems.
- 715, Data Processing: Presentation Processing of Document, appropriate subclasses for document processing.
- 719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for exchanging data or messages between two executing programs or processes, independent of the hardware used in the communication.

SECTION III - GLOSSARY

ACCESS

To obtain entry to, or to locate, read into memory, and make ready for, some operation, for example, regarding disks, files, records, and network entry procedures.

APPLICATION PROGRAM

A computer program designed to perform a certain type of work, such as an application to manipulate text, numbers, graphics, or a combination of these elements. An application differs from an operating system (which runs a computer), a utility (which performs maintenance or general-purpose chores), and a language (with which computer programs are created).

BUS

A conductor used for transferring data, signals, or power.

COMPUTER

A machine that inputs data, processes data, stores data, and outputs data.

DATA

A representation of information in a coded manner suitable for communication, interpretation, or processing.

Address data: data that represent or identify a source or destination.

Instruction data: data that represent an operation and identify its operands, if any.

Status data: data that represent conditions of data, digital data processing systems, computers, peripherals, memory, etc.

Streamed data: data consisting of a more-or-less continuous series of bits, bytes, or other small, structurally uniform units.

User data: data other than address data, instruction data, or status data.

DATA PROCESSING

See PROCESSING, below.

DIGITAL DATA PROCESSING SYSTEM

An arrangement of processor(s) in combination with either memory or peripherals, or both, performing data processing.

ENTITY

A computer or process that can be treated as a unit and, often, as a member of a particular category or type.

ENVIRONMENT

A set of resources made available to the user of a system which defines specifications such as the command path (where to look for files), the system prompt and, sometimes, the location of resources or working files.

INFORMATION

Meaning that a human being assigns to data by means of the conventions applied to that data.

INTERFACE

A connection between two elements so that they can work with one another.

MEMORY

A functional unit to which data can be stored and from which data can be retrieved.

MULTITASKING

A mode of operation in which a computer works on more than one task at a time.

NETWORK

A group of computers and associated devices that are connected by communications facilities which exists to provide computer users with the means of communicating and transferring information electronically. Some types of communication are simple user-to-user messages; others, of the type known as distributed processes, can involve several computers and the sharing of workloads or cooperative efforts in performing a task.

OBJECT

A variable comprising routines and data that is treated as a discrete entity.

OPERATING SYSTEM

Software responsible for controlling the allocation and usage of hardware resources such as memory, central processing unit (CPU) time, disk space, and peripheral devices. The operating system is the foundation on which applications programs (e.g., word processing, spreadsheets) are built.

PERIPHERAL

A functional unit that transmits data to or receives data from a computer to which it is coupled.

PROCESS

A coherent sequence of steps undertaken by a program to manipulate data such as an internal or external data-transfer operation, handling an interrupt, or evaluation of a function.

PROCESSING

Methods or apparatus performing systematic operations upon data or information exemplified by functions such as data or information transferring, merging, sorting, and computing (e.g., arithmetic operations or logical operations).

- (1) Note. In this class, the glossary term data is used to modify processing in the term data processing; whereas the term digital data processing system refers to a machine performing data processing.

- (2) Note. In an effort to avoid redundant constructions, in this class, where appropriate, the term address data processing is used in place of address data data processing.

PROCESSOR

A functional unit that interprets and executes instruction data.

PROTOCOL

A set of rules or processes which enable computers to exchange information with as little error as possible.

RESOURCE

Any part of computer system or a network, such as a disk drive, printer, or memory, that can be allotted to a program or process while it is running. In programming, a resource can be used by more than one program or in more than one place in a program. For example, dialog boxes, bitmaps, and fonts are resources in many windowing programs.

ROUTING

Receiving transmitted messages within a network and forwarding them to their correct destinations over a available route selected according to a predetermined criteria.

SERVER

A computer running administrative software that controls access to all or part of a network and its resources (such as disk drives and printers). A computer acting as a server makes resources available to computers acting as workstations on the network.

SYNCHRONIZATION

Matching of timing between separate computers or among the components of a system so that all are coordinated.

TASK

A standalone application or a subprogram that is run as an independent entity.

THREAD

A path of processing execution within a larger process or program.

TRANSFER

The movement of data from one location to another or the passing of program control from one portion of a program to another.

SUBCLASSES

1 VIRTUAL MACHINE TASK OR PROCESS MANAGEMENT:

This subclass is indented under the class definition. Subject matter comprising means or steps operating on a computer or digital data processing system which enable a first type of processor to emulate and execute instructions associated with one or more different types of processors.

- (1) Note. This subclass is directed to subject matter encompassing one or more virtual machines that execute in single task, or multitasking, operating system environments.
- (2) Note. This subclass includes computers or digital data processing systems executing a plurality of virtual machines that are preemptively or nonpreemptively scheduled. For example, Microsoft Windows 3.1 provides a Virtual Machine Manager which schedules a plurality of DOS Virtual Machines (which emulate the Intel 8086 real mode environment) along with a single System Virtual Machine which cooperatively or nonpreemptively runs Windows applications. DOS applications are preemptively multitasked by the Virtual Machine Manager along with the System Virtual Machine, with each Virtual Machine receiving a time slice. Other schedulers that do not schedule virtual machines are classified elsewhere. See the SEE OR SEARCH CLASS notes below.
- (3) Note. This subclass includes means or steps for mimicking the performance of one processing device within another processing device. For example, this includes a software program that allows applications written for a first computer to be executed on a different second computer interpreting the machine instructions for the first computer, thereby becoming a virtual machine.

SEE OR SEARCH THIS CLASS, SUBCLASS:

100-109, for task management, per se, particularly subclasses 107 and 108 directed to multitasking and content switching.

SEE OR SEARCH CLASS:

- 703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, appropriate subclasses for compatibility, emulation, or simulation of systems or system components.
- 711, Electrical Computers and Digital Processing Systems: Memory, subclass 6 for accommodating addressing requirements for software emulation of a target computer or digital data processing system on a base computer or digital data processing system, and subclasses 202-210 for address mapping and virtual addressing, per se.
- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclass 228 for context preserving, and subclass 229 for mode switch or change.

100 TASK MANAGEMENT OR CONTROL:

This subclass is indented under the class definition. Subject matter comprising means or steps for administrating over processor or job execution in a digital data processing system.

- (1) Note. For clarification, a "process" and a "task" are equivalent terms in the art, in addition, a "thread" is a path of execution within a process.
- (2) Note. Control functions such as subroutine calling and control are classified elsewhere. See the SEE OR SEARCH CLASS notes below

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 1, for virtual machine task or process management.

SEE OR SEARCH CLASS:

- 700, Data Processing: Generic Control Systems or Specific Applications, subclasses 1-89 for generic control systems, and subclasses 99-102 for manufacturing control systems that involve accommodating for interrelated control and manufacturing processes and resource allocation.
- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 220-248 for control functions such as subroutine calling and control.

101 Batch or transaction processing:

This subclass is indented under the subclass 100. Subject matter comprising means or steps directed to (a) managing processes by collecting, listing, and storing jobs for later sequential execution as a group without user intervention (i.e., batch processing), or (b) executing jobs immediately after they are received by a system and occurring in groups (i.e., transaction processing).

- (1) Note. Data processing where jobs are executed on a computer immediately after they are received by the system is properly classified here, however, interpreters which interpret and execute one instruction at a time are classified elsewhere. See the SEE OR SEARCH CLASS notes below.
- (2) Note. Subject matter of this subclass may include transaction processing and job processing between multiple processors, computers, or digital data processing systems and may involve user intervention.
- (3) Note. The term "batch" historically takes on slightly different meaning depending on the scale of the data processing system. In a microcomputer, a stored batch file contains a "batch" of operating system commands to be executed automatically when the batch file is invoked. On larger systems, jobs and their associated data are typically collected and stored for later processing as a "batch".
- (4) Note. This subclass is directed to process transactions, per se. Database transaction processing and business transaction processing are classified elsewhere. See the SEE OR SEARCH CLASS noted below.

SEE OR SEARCH CLASS:

- 705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclasses 7-11 for operations research, per se, including systems directed to generalized linear programming problem solving and cost function analysis, resource allocating in business transaction processing and scheduling of interrelated processes.
- 707, Data Processing: Database and File Management or Data Structures, subclasses 1-10 for database accessing and control.
- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 220-248 for interpreters which interpret and execute one instruction at a time
- 717, Data Processing: Software Development Installation and Management, subclasses 136-161 for code translators (e.g., compilers).

102 Process scheduling:

This subclass is indented under subclass 100. Subject matter comprising means or steps for scheduling multiple tasks based upon any considered factors, e.g., priority of execution, balancing the work load or resources, memory use, register use, resource availability, time constraints, etc.

- (1) Note. Included here is task assignment, (i.e., deciding which processor or other resources will be used to execute one or more tasks).

- (2) Note. Signaling, semaphores, and mutual exclusion mechanisms (i.e., mutexes) used for program or process synchronization purposes are classified here. However, interprocess communication (IPC) is classified elsewhere. Mutual exclusion mechanisms are used to synchronize data access across multiple processes. Mutual exclusion mechanisms can be acquired or "owned" by only one process or thread at a time. A semaphore controls access to a shared system resource by using a reference count scheme.

SEE OR SEARCH CLASS:

- 710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses 36-51 for input/output access regulation, subclasses 107-125 for bus access regulating, subclasses 240-244 for access arbitrating, per se, and subclasses 260-269 for interrupt processing, per se.

- 711, Electrical Computers and Digital Processing Systems: Memory, subclass 169 for memory access pipelining.

- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 28-31 for distributed computer system architecture, subclasses 220-248 for control functions such as subroutine calling and control, particularly, subclasses 237-238 for instruction prefetching.

- 719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprocess communication.

103 Priority scheduling:

This subclass is indented under the subclass 102. Subject matter for determining an order of execution of jobs to be done based on the level of relative importance or precedence assigned with each job.

- (1) Note. For the purpose of this subclass, scheduling constraints may include resource characteristics, e.g., performance, availability, data coherency, etc.

104 Resource allocation:

This subclass is indented under subclass 102. Subject matter for allocating digital data processing system resources for tasks and often including deciding how best to use the available resources to get the job done.

- (1) Note. This subclass is directed to deciding which resources to use, the process of deciding which jobs to do first and what order to do them in is classified above.

SEE OR SEARCH THIS CLASS, SUBCLASS

103, for priority scheduling.

SEE OR SEARCH CLASS:

- 345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses 804 and 805 for interwindow links and communication.
- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 170-173 for memory configuring.
- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 214-215 for instruction issuing.

105 Load balancing:

This subclass is indented under the subclass 102. Subject matter directed to minimizing processing execution time by efficiently distributing workload amongst operational computers, processors and other system resources.

- (1) Note. This may be done by a centralized mechanism which monitors the system processors, or by a distributed method, where idle processors query busy processors for extra work to reduce idle time. Polling of peripherals, however, is classified elsewhere.
- (2) Note. This subclass includes initial task assignment to certain resources based on utilization of the resources (e.g., sending a task to the processor with the least utilization or load).

SEE OR SEARCH CLASS:

- 345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses 804 and 805 for interwindow links and communication.
- 710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses 15-19 for polling of peripherals, and subclasses 36-51 for input/output access regulation.
- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 133-136 for cache memory entry replacement strategies.

106 Dependency based cooperative processing of multiple programs working together to accomplish a larger task:

This subclass is indented under the subclass 102. Subject matter comprising means or steps for identifying and dealing with dependencies between executing programs, tasks and processes (e.g., data dependencies, control flow dependencies, etc.).

- (1) Note. This subclass is directed to the analysis for dependencies in executing programs, for example, for situations where at least one executing program requires data from at least one other executing program and wherein the requisite data is used to make decisions affecting the operational sequence of at least one program. Compilers that analyze program code dependencies during compiling are classified elsewhere.
- (2) Note. This subclass provides for signaling and communicating which allows two executing programs or processes to cooperate. Signaling and communicating between two computers/processors, independent of the tasks being executed, for example, to synchronize the processors, by handshaking is classified elsewhere. See the SEE OR SEARCH CLASS notes below.
- (3) Note. Signaling, semaphores, and mutual exclusion mechanisms used for program or process synchronization purposes are classified here. For clarification, mutual exclusion mechanisms (i.e., mutexes) are used to synchronize data access across multiple processes. Mutexes can be acquired or "owned" by only one process or thread at a time. A semaphore controls access to a shared system resource by using a reference count scheme. Interprocess communication (IPC) is classified elsewhere. See the SEE OR SEARCH CLASS notes below.
- (4) Note. Redundant systems for fault tolerance and fault avoidance often include multiple, redundant processors executing the same program so that if one fails, another can be substituted. Cooperative processing

such as this, done for fault avoidance, is classified elsewhere. See the SEE OR SEARCH CLASS notes below.

SEE OR SEARCH CLASS:

- 713, Electrical Computers and Digital Processing Systems: Support, subclasses 400-401 for synchronization of computer clocks, data timing signals, or pulses.
- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 1-57 for redundant systems where some fault-tolerant systems may include multiple, redundant processors executing the same program so that if one fails, another can be used.
- 717, Data Processing: Software Development Installation and Management, subclasses 136-161 for code translators (e.g., compilers).
- 719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclasses for interprocess communication.

107 Multitasking, time sharing:

This subclass is indented under the subclass 102. Subject matter comprising means or steps for dividing processor time of a computer or digital data processing system between multiple executing programs or processes.

- (1) Note. This subclass is directed to multitasking systems characterized by operating system means or steps for managing or supervising a switch between two or a plurality of discrete executing processes or tasks. For the purpose of this definition, each process or task has its own instruction data pointer and an address space comprised of code, data and free memory, and may include other data necessary to restore a process undergoing a context switch. Since each process has its own instruction data pointer and an address space comprised of code, data and free memory, every process at any given point in time has a state or context defined by the contents of its instruction data pointer and address space. Multitasking systems classified here facilitate the switching from one context to another. Recovering a digital data processing system or computer process combined with the detection of a fault, however is classified elsewhere. See the SEE OR SEARCH CLASS notes below.
- (2) Note. Preemptive multitasking (also called "time slicing") is included under this subclass. For clarification, preemptive multitasking is characterized by an operating system periodically (i.e., according to a set schedule) interrupting the execution of a process and passing control to another waiting process and performing a context switch after which the context for the next pending process is restored, and the

next process is executed for the duration of its time slice or "quantum". Instruction processing related to context switching and mode switching is classified elsewhere. See the SEE OR SEARCH CLASS notes below.

- (3) Note. Nonpreemptive and cooperative multitasking are included under this subclass. Nonpreemptive multitasking is where a currently executing task yields control to another task when it is ready, rather than being forcibly preempted by an operating system. Cooperative multitasking is where one or more background tasks are given processing time during idle times in the foreground task. In contrast, user-implemented task or context switching between two or more applications programs which are both resident in memory at the same time where only the foreground application is given processing time and a user may manually activate a background task by bringing the window or screen of the background task to the front is classified elsewhere. See the search notes below.
- (4) Note. For clarity, time-sharing is a form of multitasking. Time-sharing is generally characterized by multiple users executing programs on a client-server system. A client-server system is characterized by at least one server computer and a plurality of clients or users which operate from terminals or computers programmed to emulate terminals. Examples of time sharing systems are systems which implement the UNIX (TM) or Windows NT (TM) operating systems. On a time sharing system the processing time allotted to each user program is interleaved by the operating system, privileged users can be assigned higher priority and will receive more processing time than nonprivileged users. Access control determination for process arbitration, per se, is classified elsewhere in this class. See the search notes below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 101, for batch computer and transaction computer where complete programs are executed in their entirety from start to finish.

SEE OR SEARCH CLASS:

- 700, Data Processing: Generic Control Systems or Specific Applications, subclasses 2 through 7 for generic data processing control systems including plural processors and fault recovery.
- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 228 and 229 for instruction and register level context preserving, context swapping, mode switching and mode swapping.

- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 2-24 for fault recovery, per se, in computer systems and digital data computer systems, particularly subclasses 15-22 for recovery from detected faults in a process or data file using stored state data and history logs, and subclass 23 for resetting a processor combined with fault detection.

108 Context switching:

This subclass is indented under the subclass 107. Subject matter comprising means or steps for saving and restoring state data (i.e., context) of a task, process, or thread in a preemptive, nonpreemptive, or cooperative multitasking system.

- (1) Note. This subclass is directed to the specific implementation details of performing a context switch in a preemptive, nonpreemptive, or cooperative multitasking system.
- (2) Note. Also included in this subclass is the user-implemented task or context switch between two or more application programs which are resident in memory at the same time. In this arrangement only the foreground application is given processing time. A user may manually activate a background task by bringing the window or screen of the background task to the front. An example of this type of task switch is when a user switches between a WINDOWS 3.1 (TM) program and a MS DOS (TM) program by invoking the Alt-Tab keypress combination.
- (3) Note. A context switching is typically implemented with interrupts and multitasking patents often use language directed to interrupts to explain how time-sharing takes place. Therefore, a patent directed to context switching and reciting interrupt processing is properly classified here. Interrupt processing, per se, is classified elsewhere. See the SEE OR SEARCH CLASS notes below.

SEE OR SEARCH CLASS:

- 710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses 260-269 for interrupt processing, per se.
- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 228 for context preserving at the instruction computer level.

FOREIGN ART COLLECTIONS

The definitions below correspond to abolished subclasses from which these collections were formed. See the Foreign Art Collection schedule of this class for specific correspondences. [Note: The titles and definitions for *indented* art collections include all the details of the one(s) that are hierarchically superior.]

FOR 157 VIRTUAL MACHINES TASK AND PROCESSES MANAGEMENT:

Foreign art collection including subject matter wherein addresses are determined in a memory system accommodating addressing requirements for software emulation of a target computer or digital data processing system on a base computer or digital data processing system.

FOR 159 TASK MANAGEMENT OR CONTROL:

Foreign art collection including subject matter comprising means or steps for administrating over processor or job execution in a digital data processing system.

FOR 160 Batch or transaction processing:

Foreign art collection including subject matter comprising means or steps directed to (a) managing processes by collecting, listing, and storing jobs for later sequential execution as a group with user intervention (i.e., batch processing), or (b) executing jobs immediately after they are received by a system and occurring in groups (i.e., transaction processing).

FOR 161 Process scheduling:

Foreign art collection including subject matter comprising means or steps for scheduling multiple tasks based upon any considered factors, e.g., priority of execution, balancing the work load or resources, memory use, register use, resource availability, time constraints, etc.

FOR 162 Priority scheduling:

Foreign art collection including subject matter for determining an order of execution of jobs to be done based on the level of relative importance or precedence assigned with each job.

FOR 163 Resource allocation:

Foreign art collection including subject matter for allocating digital data processing system resources for tasks and often including deciding how best to use the available resources to get the job done.

FOR 164 Load balancing:

Foreign art collection including subject matter directed to minimizing processing execution time by efficiently distributing work load amongst operating computers, processors and other system resources.

FOR 165 Dependency-based cooperative processing of multiple programs working together to accomplish a larger task:

Foreign art collection including subject matter comprising means or steps for identifying and dealing with dependencies between executing programs, tasks and processes (e.g., data dependencies, control flow dependencies, etc.).

FOR 166 Multitasking, time sharing:

Foreign art collection including subject matter comprising means or steps for dividing processor time of a computer or digital data processing system between multiple executing programs or processes.

FOR 167 Context switching:

Foreign art collection including subject matter comprising means or steps for saving and restoring state data (i.e., context) of a task, process, or thread in a preemptive, nonpreemptive, or cooperative multitasking system.

D. CHANGES TO THE DEFINITIONS (Project No. E-6458)

CLASS 719 - ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS:
INTERPROGRAM COMMUNICATION OR INTERPROCESS COMMUNICATION (IPC)

Definition Established **NEW CLASS Established**

SECTION I – CLASS DEFINITION

GENERAL STATEMENT OF THE CLASS SUBJECT MATTER

This class provides for an electrical computer or digital data processing system or corresponding data processing method including apparatus or steps for exchanging data or messages between two executing programs or processes, independent of the hardware used in the communication.

- (1) Note. Classification herein requires more than nominal recitation of the data or message exchange between two executing programs or processes.
- (2) Note. If the programs or processes are drawn to specific processing environments such as database/file processing, business processing, or networking, these programs or processes are classified elsewhere.

SCOPE OF THE CLASS

This class is limited to digital data processing systems and functions for communication between programs or processes.

Hardware mechanisms such as bus transaction processing and data transfer between computers and digital data processing systems are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

LINES WITH OTHER CLASSES

A. Electrical Computers and Data Processing Systems, Related Systems and Functions in General

This class is for communication between programs or processes. Communication between computers or digital data processing systems and peripherals is classified elsewhere. See the SEE OR SEARCH CLASS notes below.

B. Communication Classes

The basic distinctions between this class and the communications classes are:

(A) The subclasses here include a digital data processing system or computer, rather than other data communications devices, and

(B) The communication herein is between programs or processes in a digital data processing system or computer. See the SEE OR SEARCH CLASS notes below.

Overall combinations directed to a system for performing communications functions only is classified in the appropriate communication class. See the SEE OR SEARCH CLASS notes below for examples.

Preprocessing or postprocessing of signals in a data transfer to effect a particular communications method (e.g., modulating, demodulating, encoding, decoding, or phase locking) is classified in the appropriate communications class. See the SEE OR SEARCH CLASS notes below for examples.

C. Other Classes

Subject matter relating to transmission or interconnection systems not classifiable herein and not appropriate for the communication classes should be classified in the residual class for all transmission or interconnection systems. See the SEE OR SEARCH CLASS notes below.

SECTION II – REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 235, Registers, appropriate subclasses for basic machines and associated indicating mechanisms for ascertaining the number of movements of various devices and machines, plus machines made from these basic machines alone (e.g., cash registers, voting machines), and in combination with various perfecting features, such as printers and recording means, and for various data bearing record controlled systems.
- 307, Electrical Transmission or Interconnection Systems appropriate subclasses for a residual transmission or interconnection system not classifiable elsewhere, including interconnection systems, per se.
- 326, Electronic Digital Logic Circuitry, appropriate subclasses for generic digital logic devices, circuitry, and subcombinations thereof, wherein operations other than arithmetical are performed upon discrete electrical signals representing a value normally described by numerical digits.
- 329, Demodulators, appropriate subclasses for data demodulators.
- 332, Modulators, appropriate subclasses for data modulators.
- 340, Communications: Electrical, subclasses 825 through 825.98 for controlling one or more devices to obtain a plurality of results by transmission of a designated one of plural distinctive control signals over a smaller number of

- communication lines or channels, particularly subclasses 2.1-2.8 for path selection, subclasses 3.1-3.9 for communication systems where status of a controlled device is communicated, subclass 825.02 for tree or cascade selective communication, subclasses 825.2-825.21 for synchronizing selective communication systems, subclasses 825.5-825.51 for lockout or priority in selective communication systems, subclasses 825.52 and 825.53 for addressing, and subclasses 825.57-825.69 for pulse responsive actuation in selective communication.
- 341, Coded Data Generation or Conversion, subclasses 50 through 172 for electrical pulse and digit code converters (e.g., systems for originating or emitting a coded set of discrete signals or translating one code into another code wherein the meaning of the data remains the same but the formats may differ).
- 342, Communications: Directive Radio Wave Systems and Devices, appropriate subclasses for systems and processes for transmission or reception of radio wave energy for obtaining or utilizing information (using radio wave transmitters or receivers), as to an object, or as to the directional characteristics of the radio wave energy, per se.
- 345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses 530 through 574 for visual display, subclasses 30 through 111 for the selective control of two or more light generating or light controlling display elements in accordance with a received image signal, and subclasses 804 - 805 for interwindow links and communication..
- 358, Facsimile and Static Presentation Processing, various subclasses for the recordation, reproduction and transmission of images of arbitrary composition.
- 360, Dynamic Magnetic Information Storage or Retrieval, appropriate subclasses, for record carriers and systems wherein information is stored and retrieved by interaction with a magnetic medium and there is relative motion between said magnetic medium and a transducer, for example, a magnetic disk drive device, and control thereof, per se.
- 365, Static Information Storage and Retrieval, appropriate subclasses for addressable static singular storage elements or plural singular storage elements of the same type (i.e., the internal elements of memory, per se).
- 369, Dynamic Information Storage or Retrieval, appropriate subclasses for record carriers and systems wherein information is stored and retrieved by interaction with a medium and there is relative motion between a medium and a transducer.
- 370, Multiplex Communications, appropriate subclasses for the simultaneous transmission of two or more signals over a common medium, particularly subclasses 351-430 for multiplex switching.

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- 375, Pulse or Digital Communications, appropriate subclasses for generic pulse or digital communication systems and synchronization of clocking signals from input data.
- 377, Electrical Pulse Counters, Pulse Dividers, and Shift Registers: Circuits and Systems, appropriate subclasses for generic electric circuits for pulse counting.
- 379, Telephonic Communications, appropriate subclasses for two-way electrical communication of intelligible audio information of arbitrary content over a communication link.
- 380, Cryptography, appropriate subclasses for cryptographic apparatus or process in general which includes electric signal modification.
- 381, Electrical Audio Signal Processing Systems and Devices, appropriate subclasses for wired one-way audio systems, per se.
- 382, Image Analysis, appropriate subclasses for operations performed on image data with the aim of measuring a characteristic of an image, detecting variations, detecting structures, or transforming the image data, and for procedures for analyzing and categorizing patterns present in image data.
- 388, Electricity: Motor Control Systems, cross-reference art collection 907.5 for computer or processor control of DC motor acceleration or speed.
- 455, Telecommunications, appropriate subclasses for modulated carrier wave communication, per se, and subclass 26.1 for subject matter which blocks access to a signal source or otherwise limits usage of modulated carrier equipment.
- 700, Data Processing: Generic Controls Systems or Specific Applications, subclasses 1 through 89 for generic data processing control system, apparatus, or process, particularly subclasses 2 through 7 for plural processors in a digital control system application, and subclasses 90 through 306 for applications of computers in various environments where there is significant claim recitation of the data computer system or calculating computer and only nominal recitation of an external art environment (where significant structure of an external device is claimed, classification is in the appropriate device class).
- 701, Data Processing: Vehicles and Navigation, appropriate subclasses, for applications of computers in vehicular and navigational environments.
- 702, Data Processing: Measuring and Testing, appropriate subclasses, for applications of computers in measuring and testing.
- 704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses 1 - 10 for applications of computers in linguistics, subclasses 200 - 278 for applications of computers in

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speech signal processing, and subclasses 500 - 504 for applications of computers in audio compression/decompression.

- 705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, appropriate subclasses, for applications of computers and calculators in business and management environments.
- 706, Data Processing: Artificial Intelligence, appropriate subclasses, for subject matter directed to artificial intelligence data computer which is disclosed or claimed in plural diverse arts both in combination and in the alternative (e.g., digital data computer system for use in image analysis or electrical audio signal computer, and for artificial intelligence per se).
- 707, Data Processing: Databases and File Management, Data Structures, and Document Processing, subclasses 1 through 206 for database processing.
- 708, Data Processing: Arithmetic Processing and Calculating, subclasses 1 - 9 for hybrid computers; subclasses 100 - 714 for calculators, digital signal computer, and arithmetical and logical computer, per se; and subclasses 800 - 854 for electric analog computers.
- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, appropriate subclasses for transferring data or instruction information between a plurality of computers wherein the computers employ the data or instructions before or after transferring and the employing affects said transfer of data or instruction information and for the synchronization of plural processors even if the transferring employs peripherals, e.g., modems, or line adaptors.
- 710, Electrical Computers and Digital Processing Systems: Input/Output, subclasses 1 through 74 for transferring data from one or more peripherals to one or more computers for the latter to process, store, or further transfer or for transferring data from the computers to the peripherals, and subclasses 100 - 132 for data transferring among memories, processors, and buses of a computer.
- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 100 through 173 for accessing or controlling memories that are peripherals.
- 712, Electrical Computers and Digital Processing Systems: Processing Architecture and Instruction Processing, subclasses 1- 43 for digital data computer system architectures such as multiple instruction multiple data (MIMD) computers, vector and array computers, and single-chip computers.
- 713, Electrical Computers and Digital Processing Systems: Support, subclass 1 and 2 for digital processing system initialization and configuration (e.g., initializing, set-up, resetting), subclass 100 for reconfiguring digital data computer system (e.g., changing system settings), subclasses 150 through 181 for multiple computer communication protection by cryptography, subclass 187 for computer program modification detection by cryptography, subclass 188 for

computer virus detection by cryptography, subclasses 200 – 202 for methods and apparatus serving to protect a digital data computer system from unauthorized use (e.g., virus detecting, user identifying, etc.), subclasses 300 - 340 for computer power control, subclasses 400 and 401 for synchronization of computer clocks, data timing signals, or pulses, and subclasses 500 - 503 for computer clock, pulse, or timing signal or analysis.

- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 1 through 57 for methods and apparatus for increasing the probability of a system performing correctly, and subclasses 746-797 for correcting errors in the transmitted data such as parity checking and cyclical redundancy checking.
- 715, Data Processing: Presentation Processing of Document, appropriate subclasses for document processing.
- 718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for administering over processor or job execution in a digital data processing system

SECTION III - GLOSSARY

ACCESS

To obtain entry to, or to locate, read into memory, and make ready for, some operation, for example, regarding disks, files, records, and network entry procedures.

APPLICATION PROGRAM

A computer program designed to perform a certain type of work, such as an application to manipulate text, numbers, graphics, or a combination of these elements. An application differs from an operating system (which runs a computer), a utility (which performs maintenance or general-purpose chores), and a language (with which computer programs are created).

BUS

A conductor used for transferring data, signals, or power.

COMPUTER

A machine that inputs data, processes data, stores data, and outputs data.

DATA

A representation of information in a coded manner suitable for communication, interpretation, or processing.

Address data: data that represent or identify a source or destination.

Instruction data: data that represent an operation and identify its operands, if any.

Status data: data that represent conditions of data, digital data processing systems, computers, peripherals, memory, etc.

Streamed data: data consisting of a more-or-less continuous series of bits, bytes, or other small, structurally uniform units.

User data: data other than address data, instruction data, or status data.

DATA PROCESSING

See PROCESSING, below.

DIGITAL DATA PROCESSING SYSTEM

An arrangement of processor(s) in combination with either memory or peripherals, or both, performing data processing.

ENTITY

A computer or process that can be treated as a unit and, often, as a member of a particular category or type.

ENVIRONMENT

A set of resources made available to the user of a system which defines specifications such as the command path (where to look for files), the system prompt and, sometimes, the location of resources or working files.

INFORMATION

Meaning that a human being assigns to data by means of the conventions applied to that data.

INTERFACE

A connection between two elements so that they can work with one another.

MEMORY

A functional unit to which data can be stored and from which data can be retrieved.

MULTITASKING

A mode of operation in which a computer works on more than one task at a time.

NETWORK

A group of computers and associated devices that are connected by communications facilities which exists to provide computer users with the means of communicating and transferring information electronically. Some types of communication are simple user-to-user messages; others, of the type known as distributed processes, can involve several computers and the sharing of workloads or cooperative efforts in performing a task.

OBJECT

A variable comprising routines and data that is treated as a discrete entity.

OPERATING SYSTEM

Software responsible for controlling the allocation and usage of hardware resources such as memory, central processing unit (CPU) time, disk space, and peripheral devices. The operating system is the foundation on which applications programs (e.g., word processing, spreadsheets) are built.

PERIPHERAL

A functional unit that transmits data to or receives data from a computer to which it is coupled.

PROCESS

A coherent sequence of steps undertaken by a program to manipulate data such as an internal or external data-transfer operation, handling an interrupt, or evaluation of a function.

PROCESSING

Methods or apparatus performing systematic operations upon data or information exemplified by functions such as data or information transferring, merging, sorting, and computing (e.g., arithmetic operations or logical operations).

- (1) Note. In this class, the glossary term data is used to modify processing in the term data processing; whereas the term digital data processing system refers to a machine performing data processing.

- (2) Note. In an effort to avoid redundant constructions, in this class, where appropriate, the term address data processing is used in place of address data data processing.

PROCESSOR

A functional unit that interprets and executes instruction data.

PROTOCOL

A set of rules or processes which enable computers to exchange information with as little error as possible.

RESOURCE

Any part of computer system or a network, such as a disk drive, printer, or memory, that can be allotted to a program or process while it is running. In programming, a resource can be used by more than one program or in more than one place in a program. For example, dialog boxes, bitmaps, and fonts are resources in many windowing programs.

ROUTING

Receiving transmitted messages within a network and forwarding them to their correct destinations over a available route selected according to a predetermined criteria.

SERVER

A computer running administrative software that controls access to all or part of a network and its resources (such as disk drives and printers). A computer acting as a server makes resources available to computers acting as workstations on the network.

SYNCHRONIZATION

Matching of timing between separate computers or among the components of a system so that all are coordinated.

TASK

A standalone application or a subprogram that is run as an independent entity.

THREAD

A path of processing execution within a larger process or program.

TRANSFER

The movement of data from one location to another or the passing of program control from one portion of a program to another.

SUBCLASSES

310 MISCELLANEOUS:

This subclass is indented under the class definition. Subject matter not provided for in any of the above subclasses of this class.

311 COMMON GATEWAY INTERFACE PROGRAM COMMUNICATION:

This subclass is indented under the class definition. Subject matter wherein a server program, or script is executed at the request of a client program through a web browser.

- (1) Note. User input information is passed to the programs/scripts using the Common Gateway Interface (CGI) convention and the server side CGI program sends the result back to the client using dynamic html.

312 INTERPROGRAM COMMUNICATION USING SHARED MEMORY:

This subclass is indented under the class definition. Subject matter comprising means or steps for communication between plural processes or application programs using a memory which can be shared between those processes or programs.

313 INTERPROGRAM COMMUNICATION USING MESSAGE:

This subclass is indented under the class definition. Subject matter comprising means or steps for communication between processes or application programs using pieces of information which suggest actions to be taken or indicate conditions or indicate that an event has occurred.

- (1) Note. Sending a message to an object is equivalent to calling a procedure in traditional programming languages, except that the actual code executed is selected at run-time depending on the class of the object. For example, in response to a message to draw an object, the code invoked would be different if the object were a circle or a square.

SEE OR SEARCH THIS CLASS, SUBCLASS:

312, for sending a message between processes via a shared memory.

314, for sending a message between processes using a queue.

314 Message using queue:

This subclass is indented under the subclass 313. Subject matter comprising means or steps for communication between processes or application programs using messages that are lined up in a particular order.

(1) Note. Examples of queues are FIFOs, named pipes, streams, and the like.

315 Object oriented message:

This subclass is indented under the subclass 313. Subject matter comprising means or steps for communication between objects (e.g., a message tells a receiving object what to do) wherein a method or member function of a receiving object is invoked or called by a sending method of a sending object and the message passing may involve passing actual parameters (e.g., either by reference or by value) to the target object.

(1) Note. Object-oriented data structure principles employed in message passing are properly classified here. Mere recitations to object oriented data structures, per se, do not automatically cause classification in this subclass. Object-oriented data structures, per se, are classified elsewhere, see the SEE OR SEARCH CLASS notes below.

(2) Note. Messaging techniques abound in the data communications arts in the form of signaling protocols, message protocols, semaphore techniques, token passing, etc. An object oriented paradigm will present generalized functionality in a neatly reusable or customizable program code "module", therefore, a concept search for a messaging technique should also consider the other communications classes as appropriate.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, for residual subject matter related to transmission or interconnection systems.

340, Communications: Electrical, subclasses 825 - 825.98 for controlling one or more devices to obtain a plurality of results by transmission of a

designated one of plural distinctive control signals over a smaller number of communication lines or channels.

- 342, Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation), various subclasses for systems and processes for transmission or reception of radio wave energy for obtaining or utilizing information (using radio wave transmitters or receivers), as to an object, or as to the directional characteristics of the radio wave energy, per se.
- 345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses 804-805 for interwindow links and communication and subclasses 835-839 for items and metaphoric icon objects.
- 358, Facsimile and Static Presentation Processing, various subclasses for the recordation, reproduction and transmission of images of arbitrary composition.
- 370, Multiplex Communications, appropriate subclasses for the simultaneous transmission of two or more signals over a common medium.
- 375, Pulse or Digital Communications, various subclasses for digital communications processing including modulating, demodulating, encoding, decoding, and phase locking.
- 379, Telephonic Communications, various subclasses for two-way electrical communication of audio information of arbitrary content.
- 380, Cryptography, appropriate subclasses for concealing, obscuring and extracting intelligence by for example coding and decoding.
- 455, Telecommunications, for modulated carrier wave communications, per se.
- 707, Data Processing: Database and File Management or Data Structures, subclass 103 for an object oriented data structure, per se.
- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 200-253 for multicomputing, data transferring, per se, particularly subclasses 213-219 for transferring data via shared memory.
- 710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclass 105 for bus protocols, per se.

712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 220-248 for processing control including branch instruction processing.

714, Error Detection/Correction and Fault Detection/Recovery, subclasses 746-797 for correcting errors by transmittal data such as parity checking and cyclical redundancy checking.

316 Managed object system:

This subclass is indented under the subclass 315. Subject matter comprising means or steps for managing an object system that may include distributed object systems or distributed object models.

SEE OR SEARCH CLASS:

707, Data Processing: Database and File Management or Data Structures, subclass 103 for an object oriented database.

317 Agent:

This subclass is indented under the subclass 313. Subject matter comprising means or steps for using a software program that automatically performs some information gathering or processing task in the background on behalf of another entity which would otherwise require some form of manual or directed intervention.

318 EVENT HANDLING OR EVENT NOTIFICATION:

This subclass is indented under the class definition. Subject matter comprising means or steps for communication of events between application programs or processes or within the context of application programs or processes.

(1) Note. Event handling, event notification and system level exception processing are properly classified here.

319 DATA TRANSFER BETWEEN OPERATING SYSTEMS:

This subclass is indented under the class definition. Subject matter comprising means or steps for communication of data or messages between discrete operating systems.

(1) Note. An operating system is a software platform on top of which application programs run.

320 HIGH LEVEL APPLICATION CONTROL:

This subclass is indented under the class definition. Subject matter comprising means or steps for communication of data, commands, or messages between at

least one controlling script, macro or other high level controlling program, and at least one controlled application program.

- (1) Note. The high-level control program, macro, or script automatically controls the flow of input commands or data to the application program so as to provide automated high level control of at least one application program.

321 DEVICE DRIVER COMMUNICATION:

This subclass is indented under the class definition. Subject matter comprising means or steps for communication between application programs or operating systems and callable interfacing programs (i.e., device driver programs) which further facilitate communication or control of peripheral hardware devices such as printers, disk drives, tape drives, CRT displays, etc.

- (1) Note. Subject matter under this subclass is directed to high-level communication from an operating system or application program to a device driver program (i.e., program to program). Device drivers are software programs which are custom designed to handle the low-level implementation details required to directly access and control a particular peripheral device (i.e., program to hardware). See the appropriate peripheral device area for details of how the low-level control of the hardware device is implemented.

SEE OR SEARCH CLASS:

- 358, Facsimile and Static Presentation Processing, subclasses 1.1 - 1.18, various subclasses for the recordation, reproduction and transmission of images of arbitrary composition, particularly for a static presentation computer per se, and specifically subclasses 1.14 and 1.15 for reliability and data communication, per se.
- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 220 – 222 for configuring a network computer.
- 710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses 1–74 for Input/Output data processing, per se, including subclass 8 for generalized peripheral configuration, per se, subclass 10 for address assignment and configuration initialization, subclass 11 for protocol selection, and subclass 20 for concurrent Input/Output computer and data transfer.
- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 100 through 173, for managing memory and for memory accessing and control.

322 Multimedia device driver:

This subclass is indented under the subclass 321. Subject matter comprising means or steps for communication between application programs or operating systems and callable interfacing programs (i.e., device driver programs) which further facilitate communication or control of peripheral multimedia hardware devices, such as CD-ROM and audio peripheral devices.

323 Video graphics device driver:

This subclass is indented under the subclass 321. Subject matter comprising means or steps for communication between application programs or operating systems and callable interfacing programs (i.e., device driver programs) which further facilitate communication or control of peripheral video graphics hardware devices.

324 Virtual device driver (VxD):

This subclass is indented under the subclass 321. Subject matter comprising software which virtualizes physical hardware by intercepting application requests to use the hardware and arbitrating between requests to access physical hardware from different applications.

- (1) Note. In the more extreme case, VxDs can provide a "virtual" device that is not actually present at all, by emulating the behavior of a hardware device. VxDs, by virtue of their privileged access to the system, can also be used to implement software monitors, debuggers, and to modify the behavior of other software on the system.

325 RAID metadriver:

This subclass is indented under the subclass 321. Subject matter comprising means or steps for communication between an operating system and meta device drivers associated with a RAID (Redundant Array of Independent Disks) disk drive array.

326 SCSI device driver:

This subclass is indented under the subclass 321. Subject matter comprising means or steps for communication between application programs or operating systems and callable interfacing programs (i.e., device driver programs) which further facilitate communication or control of SCSI (Small Computer System Interface) peripheral devices.

327 Device driver configuration:

This subclass is indented under the subclass 321. Subject matter comprising means or steps for configuring or matching a peripheral hardware device with its appropriate corresponding software device driver using lists, device description tables, device managers, device libraries, dynamic matching techniques, device binding techniques, and the like.

- (1) Note. Device driver configuration or matching may be performed dynamically at any time, but is typically performed subsequent to the physical installation of a new peripheral hardware device.
- (2) Note. Device driver matching may also be performed during the booting process, and whenever the computer system is configured or reconfigured.

328 APPLICATION PROGRAM INTERFACE (API):

This subclass is indented under the class definition. Subject matter comprising a set of routines, procedures, or interfaces which facilitate requests or calls from one or more application programs to lower-level operating system routines.

- (1) Note. This subclass is directed to the tools which allow application programs to utilize an operating system, application programs for specific information processing tasks, such as, simulation and design. Program development environments, business data processing, database systems, machine translation and document processing are classified elsewhere, see the SEE OR SEARCH CLASS notes below.
- (2) Note. This subclass is directed to the tools which allow application programs to utilize an operating system. Programming tools, per se, are classified elsewhere, SEE OR SEARCH CLASS notes below.
- (3) Note. Object oriented data structure principles may be employed in the development of an API and are properly classified here. Object oriented data structures, per se, are classified elsewhere. See the SEE OR SEARCH CLASS notes below.
- (4) Note. An application program interface (API) is a set of programming tools included with a software program or operating system that allows a programmer to write applications that work with that program or operating system. APIs save programmers much work by giving them easy ways to "hook into" the various capabilities of a program or operating system, instead of "reinventing the wheel" themselves.

SEE OR SEARCH CLASS:

- 345, Computer Graphics Processing, Interface Processing, and Selective Display Systems, subclasses 733 through 749 for operator interface aspects of workgroup for plural users or sites; subclasses 764-862 for on-screen workspaces or objects; particularly subclasses 804-805 for interwindow links and communication.
- 703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclasses 23 through 28 for emulation of computer system components.

- 705, Data Processing: Financial Business Practice, Management, or Cost/Price Determination, various subclasses for applications of computers and calculators in business and management environments.
- 707, Data Processing: Database and File Management or Data Structures, subclass 103 for object oriented schema types.
- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 200 through 253 for multicomputer data transferring, per se.
- 710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses 360 through 269 for interrupt processing, per se.
- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 220 through 248 for computer control including branch instruction computer.
- 717, Data Processing: Software Development Installation and Management, subclasses 100 – 167 for software development tools, per se.

329 Data transfer between application windows:

This subclass is indented under the subclass 328. Subject matter comprising means or steps for effecting communication or data transfer between application programs or processes executing within a graphical windowing environment.

SEE OR SEARCH CLASS:

- 345, Computer Graphics Processing, Interface Processing, and Selective Display Systems, subclasses 804 and 805 for interwindow links and communication.

330 REMOTE PROCEDURE CALL (RPC):

This subclass is indented under the class definition. Subject matter comprising means or steps for invoking a target procedure in a remote address space.

- (1) Note. A remote procedure call is distinguished from local subroutine calls because the target procedure of a RPC is invoked in a remote address space, therefore, pointers or references to local data are invalid within the address space of the remote machine. Addressing, per se, branch instruction processing and compilers, per se, are classified elsewhere.

- (2) Note. For clarification, remote procedure calls are used in a distributed programming environment, communication with a remote environment is simplified in that programmers of distributed applications need not concern themselves with implementation details of communication with another address space, as support for the remote procedure call is provided by a kernel of each machine, distributed data processing, per se, and software development tools, however, are classified elsewhere.
- (3) Note. The subject matter of this subclass is directed to remote procedure calls (RPC), although RPCs look a lot like local procedure calls to the programmer, there are slight differences in the calling semantics. In addition, branching is a related topic. A concept search on RPC, branching or local procedure calling should consider these related topics.

SEE OR SEARCH CLASS:

- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses 201 - 203 for a distributed data computer.
- 712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 220 through 248 for computer control including branch instruction handling.
- 717, Data Processing: Software Development Installation and Management, subclasses 100 – 167 for software development tools, per se.

331 DYNAMIC LINKING, LATE BINDING:

This subclass is indented under the class definition. Subject matter wherein functions contained within one or more executable code libraries (e.g., a dynamic link library or DLL) are called as needed at runtime by one or more application programs.

- (1) Note. For clarification, dynamic linking is distinguished from static linking in that very large programs can be executed in a limited memory space by loading and invoking external executable libraries only when needed at run time. The main executable program is much smaller than would result if the libraries and object files had been statically linked prior to runtime. In addition, multiple applications may reference a single dynamic link library (DLL). This eliminates redundant code and results in a more modular system. Also, existing programs can be readily updated without recompilation by providing updated DLLs.
- (2) Note. In implicit dynamic linking, links between calls in the application and functions in the DLL are resolved at link time. In

explicit dynamic linking, links between calls in the application and functions in the DLL are resolved at run time.

SEE OR SEARCH CLASS:

717, Data Processing: Software Development, Installation, and Management, subclasses 162-167 for generic linking.

332 Object oriented dynamic linking, late binding:

This subclass is indented under the subclass 331. Subject matter wherein dynamic linking or binding occurs in the context of an object oriented environment.

FOREIGN ART COLLECTIONS

The definitions below correspond to abolished subclasses from which these collections were formed. See the Foreign Art Collection schedule of this class for specific correspondences. [Note: The titles and definitions for *indented* art collections include all the details of the one(s) that are hierarchically superior.]

FOR 168 INTERPROGRAM COMMUNICATION, INTERPROCESS COMMUNICATION:

Foreign art collection including subject matter comprising means or steps for exchanging data or messages between two executing programs or processes, independent of the hardware used in the communication.

FOR 169 Device driver communication:

Foreign art collection including subject matter comprising means or steps for communication between application programs or operating systems and callable interfacing programs (i.e., device driver programs) which further facilitate communication or control of peripheral hardware devices such as printers, disk drives, tape drives, CRT displays, etc.

FOR 170 Application program interfacing (API):

Foreign art collection including subject matter comprising a set of routines, procedures, or interfaces which facilitate requests or calls from one or more application programs to lower-level operating system routines.

FOR 171 Object-oriented messaging:

Foreign art collection including subject matter comprising means or steps for communication between objects (e.g., a message tells a receiving object what to

do) wherein a method or member function of a receiving object is invoked or called by a sending method of a sending object and the message passing may involve passing actual parameters (i.e., for example, either by reference or by value) to the target object.

FOR 172 Remote procedure calling (RPC):

Foreign art collection including subject matter comprising means or steps for invoking a target procedure in a remote address space.

FOR 173 Dynamic linking, late binding:

Foreign art collection including subject matter wherein functions contained within one or more executable code libraries (e.g., a dynamic link library or DLL) are called as needed at runtime by one or more application programs.