

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H04 ELECTRIC COMMUNICATION TECHNIQUE

(NOTE omitted)

H04L TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters [B41J](#); order telegraphs, fire or police telegraphs [G08B](#); visual telegraphy [G08B](#), [G08C](#); teleautographic systems [G08C](#); ciphering or deciphering apparatus *per se* [G09C](#); coding, decoding or code conversion, in general [H03M](#); arrangements common to telegraphic and telephonic communication [H04M](#); selecting [H04Q](#))

NOTE

This subclass covers transmission of signals having been supplied in digital form and includes data transmission, telegraphic communication and methods or arrangements for monitoring.

WARNINGS

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

| | | |
|---------------------------------------|------------|--|
| H04L 9/18 | covered by | H04L 9/065 |
| H04L 9/20 | covered by | H04L 9/0656 |
| H04L 9/22 | covered by | H04L 9/0662 |
| H04L 9/24 | covered by | H04L 9/0662 |
| H04L 9/26 | covered by | H04L 9/0668 |
| H04L 9/28 | covered by | H04L 9/002 , H04L 9/008 , H04L 9/06 , H04L 9/08 , H04L 9/30 , H04L 9/32 |
| H04L 12/20 | covered by | H04L 29/00 |
| H04L 12/24 | covered by | H04L 41/00 |
| H04L 12/26 | covered by | H04L 43/00 |
| H04L 12/58 | covered by | H04L 51/00 |
| H04L 12/60-H04L 12/62 | covered by | H04L 12/54 |
| H04L 12/70 | covered by | H04L 47/00 |
| H04L 12/701 | covered by | H04L 45/00 |
| H04L 12/703 | covered by | H04L 45/28 |
| H04L 12/705 | covered by | H04L 45/18 |
| H04L 12/707 | covered by | H04L 45/22 , H04L 45/24 |
| H04L 12/709 | covered by | H04L 45/245 |
| H04L 12/711 | covered by | H04L 45/22 , H04L 45/24 |
| H04L 12/713 | covered by | H04L 45/586 |
| H04L 12/715 | covered by | H04L 45/04 , H04L 45/46 , H04L 45/64 |
| H04L 12/717 | covered by | H04L 45/42 |
| H04L 12/721 | covered by | H04L 45/06 , H04L 45/12 , H04L 45/123 , H04L 45/124 , H04L 45/127 , H04L 45/14 , H04L 45/26 , H04L 45/32 , H04L 45/34 , H04L 45/36 , H04L 45/38 , H04L 45/40 , H04L 45/44 , H04L 45/566 , H04L 45/62 , H04L 45/66 , H04L 45/68 , H04L 45/70 , H04L 45/72 |
| H04L 12/723 | covered by | H04L 45/50-H04L 45/507 |
| H04L 12/725 | covered by | H04L 45/30-H04L 45/308 |
| H04L 12/727 | covered by | H04L 45/121 |
| H04L 12/729 | covered by | H04L 45/125 |
| H04L 12/733 | covered by | H04L 45/122 , H04L 45/126 , H04L 45/20 |
| H04L 12/735 | covered by | H04L 45/128-H04L 45/1287 |
| H04L 12/741 | covered by | H04L 45/54 , H04L 45/74 , H04L 45/745 |
| H04L 12/743 | covered by | H04L 45/7453 , H04L 45/7457 |
| H04L 12/745 | covered by | H04L 45/748 |
| H04L 12/747 | covered by | H04L 45/742 |
| H04L 12/749 | covered by | H04L 45/741 |
| H04L 12/751 | covered by | H04L 45/02 , H04L 45/025 , H04L 45/026 , H04L 45/08 , H04L 45/10 |

H04L

H04L

(continued)

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| H04L 12/753 | covered by | H04L 45/48 |
| H04L 12/755 | covered by | H04L 45/021 |
| H04L 12/757 | covered by | H04L 45/023 |
| H04L 12/759 | covered by | H04L 45/023 |
| H04L 12/761 | covered by | H04L 45/16 |
| H04L 12/763 | covered by | H04L 45/00 |
| H04L 12/771 | covered by | H04L 45/56 , H04L 45/563 |
| H04L 12/773 | covered by | H04L 45/60 |
| H04L 12/775 | covered by | H04L 45/58 , H04L 45/583 |
| H04L 12/781 | covered by | H04L 45/52 |
| H04L 12/801 | covered by | H04L 47/10 , H04L 47/11 , H04L 47/115 , H04L 47/12 , H04L 47/127 , H04L 47/13 - H04L 47/196 , H04L 47/29 , H04L 47/33 , H04L 47/34 , H04L 47/35 , H04L 47/37 , H04L 47/39 H04L 47/122 , H04L 47/125 |
| H04L 12/803 | covered by | H04L 47/36 , H04L 47/365 |
| H04L 12/805 | covered by | H04L 47/27 |
| H04L 12/807 | covered by | H04L 47/38 |
| H04L 12/811 | covered by | H04L 47/20 |
| H04L 12/813 | covered by | H04L 47/22 , H04L 47/225 , H04L 47/23 |
| H04L 12/815 | covered by | H04L 47/21 , H04L 47/215 |
| H04L 12/819 | covered by | H04L 47/32 - H04L 47/326 |
| H04L 12/823 | covered by | H04L 47/25 - H04L 47/266 |
| H04L 12/825 | covered by | H04L 47/25 - H04L 47/266 |
| H04L 12/827 | covered by | H04L 47/25 - H04L 47/266 |
| H04L 12/829 | covered by | H04L 47/2458 , H04L 47/31 |
| H04L 12/833 | covered by | H04L 47/30 |
| H04L 12/835 | covered by | H04L 47/28 - H04L 47/286 |
| H04L 12/841 | covered by | H04L 47/24 , H04L 47/2408 , H04L 47/2425 , H04L 47/2433 , H04L 47/245 , H04L 47/2483 |
| H04L 12/851 | covered by | H04L 47/2416 |
| H04L 12/853 | covered by | H04L 47/2466 |
| H04L 12/855 | covered by | H04L 47/2491 |
| H04L 12/857 | covered by | H04L 47/2475 |
| H04L 12/859 | covered by | H04L 49/90 , H04L 49/9005 , H04L 49/9031 - H04L 49/9094 |
| H04L 12/861 | covered by | H04L 47/50 , H04L 47/54 , H04L 47/62 - H04L 47/627 , H04L 47/628 , H04L 47/6285 , H04L 47/6295 |
| H04L 12/863 | covered by | H04L 47/6275 |
| H04L 12/865 | covered by | H04L 47/629 |
| H04L 12/867 | covered by | H04L 47/58 , H04L 47/60 |
| H04L 12/869 | covered by | H04L 47/52 , H04L 47/521 , H04L 47/522 , H04L 47/524 , H04L 47/527 , H04L 47/528 |
| H04L 12/873 | covered by | H04L 47/56 - H04L 47/568 |
| H04L 12/875 | covered by | H04L 47/525 |
| H04L 12/877 | covered by | H04L 49/901 , H04L 49/9026 |
| H04L 12/879 | covered by | H04L 49/9015 , H04L 49/9021 |
| H04L 12/883 | covered by | H04L 49/90 , H04L 49/9005 , H04L 49/9031 - H04L 49/9094 |
| H04L 12/885 | covered by | H04L 47/41 |
| H04L 12/891 | covered by | H04L 47/40 |
| H04L 12/893 | covered by | H04L 2012/5603 - H04L 2012/5687 |
| H04L 12/901 | covered by | H04L 2012/5603 - H04L 2012/5687 |
| H04L 12/903 | covered by | H04L 2012/5603 - H04L 2012/5687 |
| H04L 12/905 | covered by | H04L 47/70 - H04L 47/748 , H04L 47/78 , H04L 47/781 , H04L 47/782 , H04L 47/783 , H04L 47/788 , H04L 47/82 - H04L 47/829 |
| H04L 12/911 | covered by | H04L 47/724 |
| H04L 12/913 | covered by | H04L 47/785 , H04L 47/787 , H04L 47/787 |
| H04L 12/915 | covered by | H04L 47/76 |
| H04L 12/917 | covered by | H04L 47/765 , H04L 47/767 |
| H04L 12/919 | covered by | H04L 47/762 |
| H04L 12/923 | covered by | H04L 47/722 |
| H04L 12/925 | covered by | H04L 47/80 - H04L 47/808 |
| H04L 12/927 | covered by | |

H04L

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| H04L (continued) | H04L 12/931 | covered by | H04L 49/00 , H04L 49/20 - H04L 49/208 , H04L 49/35 - H04L 49/508 , H04L 49/60 - H04L 49/70 |
| | H04L 12/933 | covered by | H04L 49/10 - H04L 49/1592 |
| | H04L 12/935 | covered by | H04L 49/30 - H04L 49/3009 |
| | H04L 12/937 | covered by | H04L 49/253 - H04L 49/255 |
| | H04L 12/939 | covered by | H04L 49/55 - H04L 49/557 |
| | H04L 12/943 | covered by | H04L 49/55 - H04L 49/557 |
| | H04L 12/945 | covered by | H04L 49/55 - H04L 49/557 |
| | H04L 12/947 | covered by | H04L 49/25 , H04L 49/251 , H04L 49/252 , H04L 49/256 , H04L 49/257 , H04L 49/258 |
| | H04L 12/951 | covered by | H04L 2012/5603 - H04L 2012/5687 |
| | H04L 12/953 | covered by | H04L 2012/5603 - H04L 2012/5687 |
| | H04L 12/955 | covered by | H04L 2012/5603 - H04L 2012/5687 |
| | H04L 25/04 | covered by | H04L 25/03 |
| | H04L 25/17 | covered by | H04L 25/02 - H04L 25/0298 |
| | H04L 25/18 | covered by | H04L 25/027 |
| | H04L 25/28 | covered by | H04L 25/0268 |
| | H04L 25/30 | covered by | H04L 25/061 |
| | H04L 25/32 | covered by | H04L 25/49 |
| | H04L 25/34 | covered by | H04L 25/4917 |
| | H04L 25/48 | covered by | H04L 25/49 |
| | H04L 25/52 | covered by | H04L 25/20 |
| | H04L 25/54 | covered by | H04L 25/20 |
| | H04L 25/56 | covered by | H04L 25/202 |
| | H04L 25/58 | covered by | H04L 25/20 |
| | H04L 25/60 | covered by | H04L 25/207 |
| | H04L 25/62 | covered by | H04L 25/205 |
| | H04L 25/64 | covered by | H04L 25/245 |
| | H04L 25/66 | covered by | H04L 25/247 |
| 2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme. | | | |

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| 1/00 | Arrangements for detecting or preventing errors in the information received (correcting synchronisation H04L 7/00; {for digital computers G06F 11/00}; arrangements in the transmission path H04B) | 1/0018 | {based on latency requirement} |
| | | 1/0019 | . . . {in which mode-switching is based on a statistical approach} |
| | | 1/002 | {Algorithms with memory of the previous states, e.g. Markovian models} |
| 1/0001 | . {Systems modifying transmission characteristics according to link quality, e.g. power backoff (adaptive data allocation for multicarrier modulation H04L 5/0044 ; controlling transmission power for radio systems H04W 52/04)} | 1/0021 | {in which the algorithm uses adaptive thresholds} |
| | | 1/0022 | . . . {in which mode-switching is influenced by the user} |
| 1/0002 | . . {by adapting the transmission rate} | 1/0023 | . . {characterised by the signalling} |
| 1/0003 | . . . {by switching between different modulation schemes} | 1/0025 | . . . {Transmission of mode-switching indication} |
| | | 1/0026 | . . . {Transmission of channel quality indication} |
| 1/0004 | {applied to control information} | 1/0027 | . . . {Scheduling of signalling, e.g. occurrence thereof} |
| 1/0005 | {applied to payload information} | 1/0028 | . . . {Formatting} |
| 1/0006 | . . {by adapting the transmission format} | 1/0029 | {Reduction of the amount of signalling, e.g. retention of useful signalling or differential signalling (power control H04W 52/04)} |
| 1/0007 | . . . {by modifying the frame length} | | |
| 1/0008 | {by supplementing frame payload, e.g. with padding bits} | 1/003 | {Adaptive formatting arrangements particular to signalling, e.g. variable amount of bits} |
| 1/0009 | . . {by adapting the channel coding (H04L 1/1812 takes precedence)} | 1/0031 | {Multiple signaling transmission (H04L 1/1664 , F15 take precedence)} |
| 1/001 | . . . {applied to control information} | 1/0032 | . . . {Without explicit signalling} |
| 1/0011 | . . . {applied to payload information} | 1/0033 | . . {arrangements specific to the transmitter} |
| 1/0013 | . . . {Rate matching, e.g. puncturing or repetition of code symbols} | 1/0034 | . . . {where the transmitter decides based on inferences, e.g. use of implicit signalling} |
| 1/0014 | . . {by adapting the source coding} | 1/0035 | . . . {evaluation of received explicit signalling} |
| 1/0015 | . . {characterised by the adaptation strategy} | 1/0036 | . . {arrangements specific to the receiver} |
| 1/0016 | . . . {involving special memory structures, e.g. look-up tables} | 1/0038 | . . . {Blind format detection (for detection of modulation format H04L 27/0012)} |
| 1/0017 | . . . {where the mode-switching is based on Quality of Service requirement} | | |

- 1/0039 . . . {other detection of signalling, e.g. detection of TFCI explicit signalling ([H04L 1/0046](#), [H04L 27/0012](#) and [H04L 25/0262](#) take precedence)}
- 1/004 . . {by using forward error control ([H04L 1/0618](#) takes precedence; coding, decoding or code conversion, for error detection or correction [H03M 13/00](#))}
- 1/0041 . . {Arrangements at the transmitter end}
- 1/0042 . . . {Encoding specially adapted to other signal generation operation, e.g. in order to reduce transmit distortions, jitter, or to improve signal shape ([H04L 1/0067](#) takes precedence)}
- 1/0043 . . . {Realisations of complexity reduction techniques, e.g. use of look-up tables}
- 1/0044 {specially adapted for power saving}
- 1/0045 . . {Arrangements at the receiver end}
- 1/0046 . . . {Code rate detection or code type detection ([H04L 1/0038](#) takes precedence; detection of the data rate [H04L 25/0262](#); for packet format [H04L 1/0091](#))}
- 1/0047 . . . {Decoding adapted to other signal detection operation (in conjunction with sequence estimation or equalization [H04L 25/03286](#))}
- 1/0048 {in conjunction with detection of multiuser or interfering signals, e.g. iteration between CDMA or MIMO detector and FEC decoder (for spatial equalizer [H04L 25/03286](#))}
- 1/005 {Iterative decoding, including iteration between signal detection and decoding operation}
- 1/0051 {Stopping criteria}
- 1/0052 . . . {Realisations of complexity reduction techniques, e.g. pipelining or use of look-up tables}
- 1/0053 {specially adapted for power saving}
- 1/0054 . . . {Maximum-likelihood or sequential decoding, e.g. Viterbi, Fano, ZJ algorithms}
- 1/0055 . . . {MAP-decoding}
- 1/0056 . . {Systems characterized by the type of code used ([H04L 1/08](#) takes precedence)}
- 1/0057 . . . {Block codes ([H04L 1/0061](#), [H04L 1/0064](#) take precedence)}
- 1/0058 {Block-coded modulation}
- 1/0059 . . . {Convolutional codes}
- 1/006 {Trellis-coded modulation}
- 1/0061 . . . {Error detection codes}
- 1/0063 {Single parity check}
- 1/0064 . . . {Concatenated codes}
- 1/0065 {Serial concatenated codes}
- 1/0066 {Parallel concatenated codes}
- 1/0067 . . . {Rate matching ([H04L 1/0013](#) and [H04L 1/08](#) take precedence)}
- 1/0068 {by puncturing}
- 1/0069 {Puncturing patterns}
- 1/007 . . . {Unequal error protection (for format [H04L 1/0078](#); for codes per se [H03M 13/35](#))}
- 1/0071 . . . {Use of interleaving (interleaving per se [H03M 13/27](#))}
- 1/0072 . . {Error control for data other than payload data, e.g. control data}
- 1/0073 . . . {Special arrangements for feedback channel}
- 1/0075 . . {Transmission of coding parameters to receiver ([H04L 1/0023](#) takes precedence)}
- 1/0076 . . {Distributed coding, e.g. network coding, involving channel coding (coding in both space and time [H04L 1/0618](#); cooperative diversity [H04B 7/022](#))}
- 1/0077 . . . {Cooperative coding}
- 1/0078 . . {Avoidance of errors by organising the transmitted data in a format specifically designed to deal with errors, e.g. location (forward error control, e.g. FEC, CRC [H04L 1/004](#); adaptive formatting [H04L 1/0006](#); mappings [H04L 27/00](#))}
- 1/0079 . . {Formats for control data ([H04L 1/16](#) takes precedence; training sequences [H04L 25/00](#) and [H04L 27/00](#))}
- 1/008 . . . {where the control data relates to payload of a different packet}
- 1/0081 . . . {Formats specially adapted to avoid errors in the feedback channel ([H04L 1/1607](#) takes precedence)}
- 1/0082 . . . {fields explicitly indicating existence of error in data being transmitted, e.g. so that downstream stations can avoid decoding erroneous packet; relays}
- 1/0083 . . {Formatting with frames or packets; Protocol or part of protocol for error control}
- 1/0084 . . {Formats for payload data}
- 1/0085 . . {Formatting with cells}
- 1/0086 . . {Unequal error protection ([H04L 27/00](#) and [H04L 1/004](#) take precedence for layer 1/2 aspects, e.g. bit loading)}
- 1/0088 . . . {in control part}
- 1/0089 . . . {in payload}
- 1/009 . . {arrangements specific to transmitters}
- 1/0091 . . {arrangements specific to receivers, e.g. format detection (detection of data rate [H04L 25/0262](#); detection of coding rate [H04L 1/0046](#))}
- 2001/0092 . {Error control systems characterised by the topology of the transmission link}
- 2001/0093 . . {Point-to-multipoint}
- 2001/0094 . . {Bus}
- 2001/0095 . . {Ring}
- 2001/0096 . . {Channel splitting in point-to-point links}
- 2001/0097 . . {Relays}
- 2001/0098 . {Unequal error protection}
- 1/02 . . by diversity reception (in general [H04B 7/02](#))
- 1/04 . . using frequency diversity
- 1/06 . . using space diversity
- 1/0606 . . . {Space-frequency coding}
- 1/0612 . . . {Space-time modulation}
- 1/0618 . . . {Space-time coding}
- 1/0625 {Transmitter arrangements}
- 1/0631 {Receiver arrangements}
- 1/0637 {Properties of the code}
- 1/0643 {block codes}
- 1/065 {by means of convolutional encoding}
- 1/0656 {Cyclotomic systems, e.g. Bell Labs Layered Space-Time [BLAST]}
- 1/0662 {Limited orthogonality systems}
- 1/0668 {Orthogonal systems, e.g. using Alamouti codes}
- 1/0675 {characterised by the signaling}
- 1/0681 {adapting space time parameters, i.e. modifying the space time matrix}
- 1/0687 {Full feedback}

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| 1/0693 | {Partial feedback, e.g. partial channel state information [CSI]} | 1/1841 | {Resequencing} |
| 1/08 | . by repeating transmission, e.g. Verdan system {(H04L 1/1858 and H04L 1/189 take precedence)} | 1/1845 | {Combining techniques, e.g. code combining} |
| 1/12 | . by using return channel | 1/1848 | {Time-out mechanisms} |
| 2001/125 | . . {Arrangements for preventing errors in the return channel} | 1/1851 | {using multiple timers} |
| 1/14 | . . in which the signals are sent back to the transmitter to be checked {echo systems} | 1/1854 | {Scheduling and prioritising arrangements} |
| 1/16 | . . in which the return channel carries supervisory signals, e.g. repetition request signals | 1/1858 | {Transmission or retransmission of more than one copy of acknowledgement message (repetition in general H04L 1/08)} |
| 1/1607 | . . . {Details of the supervisory signal} | 1/1861 | {Physical mapping arrangements (for ACK signaling see also H04L 5/0053)} |
| 1/1614 | . . . {using bitmaps} | 1/1864 | {ARQ related signaling (H04L 1/1607 takes precedence)} |
| 1/1621 | . . . {Group acknowledgement, i.e. the acknowledgement message defining a range of identifiers, e.g. of sequence numbers} | 1/1867 | {Arrangements specific to the transmitter end} |
| 1/1628 | . . . {List acknowledgements, i.e. the acknowledgement message consisting of a list of identifiers, e.g. of sequence numbers (H04L 1/1614 takes precedence)} | 1/187 | {Details of sliding window management} |
| 1/1635 | . . . {Cumulative acknowledgement, i.e. the acknowledgement message applying to all previous messages} | 1/1874 | {Buffer management} |
| 1/1642 | . . . {Formats specially adapted for sequence numbers} | 1/1877 | {for semi-reliable protocols, e.g. for less sensitive applications like streaming video (buffer level management for video bitstream control arrangements H04N 21/44004)} |
| 1/165 | {Variable formats} | 1/188 | {Time-out mechanisms} |
| 1/1657 | . . . {Implicit acknowledgement of correct or incorrect reception, e.g. with a moving window} | 1/1883 | {using multiple timers} |
| 1/1664 | . . . {the supervisory signal being transmitted together with payload signals; piggybacking} | 1/1887 | {Scheduling and prioritising arrangements} |
| 1/1671 | . . . {the supervisory signal being transmitted together with control information} | 1/189 | {Transmission or retransmission of more than one copy of a message (repetition in general H04L 1/08)} |
| 1/1678 | {where the control information is for timing, e.g. time stamps} | 1/1893 | {Physical mapping arrangements (physical resource mapping in general H04L 5/00)} |
| 1/1685 | . . . {the supervisory signal being transmitted in response to a specific request, e.g. to a polling signal} | 1/1896 | {ARQ related signaling} |
| 1/1692 | . . . {Physical properties of the supervisory signal, e.g. acknowledgement by energy bursts} | 1/20 | . using signal quality detector |
| 1/18 | . . . Automatic repetition systems, e.g. van Duuren system {; ARQ protocols} | 1/201 | . . {Frame classification, e.g. bad, good or erased (frame indication per se H04L 1/0082)} |
| 1/1803 | {Stop-and-wait protocols} | 1/203 | . . {Details of error rate determination, e.g. BER, FER or WER} |
| 1/1806 | {Go-back-N protocols} | 1/205 | . . {jitter monitoring} |
| 1/1809 | {Selective-repeat protocols} | 1/206 | . . {for modulated signals} |
| 1/1812 | {Hybrid protocols} | 1/208 | . . {involving signal re-encoding} |
| 1/1816 | {with retransmission of the same, encoded, message} | 1/22 | . using redundant apparatus to increase reliability {(see G06F 11/08 - G06F 11/20)} |
| 1/1819 | {with retransmission of additional or different redundancy} | 1/24 | . Testing correct operation |
| 1/1822 | {involving configuration of ARQ with parallel processes} | 1/241 | . . {using pseudo-errors} |
| 1/1825 | {Adaptation of specific ARQ protocol parameters according to transmission conditions} | 1/242 | . . {by comparing a transmitted test signal with a locally generated replica} |
| 1/1829 | {Arrangements specific to the receiver end} | 1/243 | . . . {at the transmitter, using a loop-back} |
| 1/1832 | {Details of sliding window management} | 1/244 | . . . {test sequence generators} |
| 1/1835 | {Buffer management} | 1/245 | . . {by using the properties of transmission codes} |
| 1/1838 | {for semi-reliable protocols, e.g. for less sensitive applications such as streaming video (buffer level management for video bitstream receiver H04N 21/44004)} | 1/246 | . . . {two-level transmission codes, e.g. binary} |
| | | 1/247 | . . . {three-level transmission codes, e.g. ternary} |
| | | 1/248 | . . {Distortion measuring systems (measurement of non-linear distortion G01R 23/20; measuring characteristics of individual pulses, e.g. deviation from pulse flatness, rise time, duration G01R 29/02)} |
| | | 5/00 | Arrangements affording multiple use of the transmission path (multiplex communication in general H04J; {orthogonal multiplex systems H04J 11/00}) |

- 5/0001 . {Arrangements for dividing the transmission path (duplexing [H04L 5/14](#); multiplexing of different sources on one path [H04J](#))}
- 5/0003 . . {Two-dimensional division (time-code division [H04J 11/00](#), [H04J 13/00](#); for time-space division [H04B 7/0413](#), [H04B 7/0697](#))}
- 5/0005 . . . {Time-frequency}
- 5/0007 {the frequencies being orthogonal, e.g. OFDM(A), DMT}
- 5/0008 {Wavelet-division}
- 5/001 {the frequencies being arranged in component carriers}
- 5/0012 {Hopping in multicarrier systems (for frequency hopping in spread spectrum systems [H04B 1/713](#))}
- 5/0014 . . {Three-dimensional division (time-code-space division [H04B 7/0413](#), [H04B 7/0697](#))}
- 5/0016 . . . {Time-frequency-code}
- 5/0017 {in which a distinct code is applied, as a temporal sequence, to each frequency}
- 5/0019 {in which one code is applied, as a temporal sequence, to all frequencies}
- 5/0021 {in which codes are applied as a frequency-domain sequences, e.g. MC-CDMA}
- 5/0023 . . . {Time-frequency-space}
- 5/0025 {Spatial division following the spatial signature of the channel}
- 5/0026 . . {Division using four or more dimensions}
- 5/0028 . . {Variable division (signaling therefor [H04L 5/0092](#))}
- 5/003 . {Arrangements for allocating sub-channels of the transmission path}
- 5/0032 . . {Distributed allocation, i.e. involving a plurality of allocating devices, each making partial allocation}
- 5/0033 . . . {each allocating device acting autonomously, i.e. without negotiation with other allocating devices}
- 5/0035 . . . {Resource allocation in a cooperative multipoint environment}
- 5/0037 . . {Inter-user or inter-terminal allocation}
- 5/0039 . . . {Frequency-contiguous, i.e. with no allocation of frequencies for one user or terminal between the frequencies allocated to another}
- 5/0041 . . . {Frequency-non-contiguous}
- 5/0042 . . {intra-user or intra-terminal allocation}
- 5/0044 . . {allocation of payload}
- 5/0046 . . . {Determination of how many bits are transmitted on different sub-channels}
- 5/0048 . . {Allocation of pilot signals, i.e. of signals known to the receiver}
- 5/005 . . . {of common pilots, i.e. pilots destined for multiple users or terminals}
- 5/0051 . . . {of dedicated pilots, i.e. pilots destined for a single user or terminal}
- 5/0053 . . {Allocation of signaling, i.e. of overhead other than pilot signals}
- 5/0055 . . . {Physical resource allocation for ACK/NACK (for physical mapping arrangements in ARQ protocols [H04L 1/1861](#))}
- 5/0057 . . . {Physical resource allocation for CQI}
- 5/0058 . . {Allocation criteria}
- 5/006 . . . {Quality of the received signal, e.g. BER, SNR, water filling}
- 5/0062 . . . {Avoidance of ingress interference, e.g. ham radio channels}
- 5/0064 . . . {Rate requirement of the data, e.g. scalable bandwidth, data priority}
- 5/0066 . . . {Requirements on out-of-channel emissions}
- 5/0067 . . . {Allocation algorithms which involve graph matching}
- 5/0069 . . . {Allocation based on distance or geographical location (allocation based on terminal or device properties in general, [H04W 72/048](#))}
- 5/0071 . . . {Allocation based on fairness other than the proportional kind}
- 5/0073 . . . {Allocation arrangements that take into account other cell interferences (for intercell interference mitigation or co-ordination in orthogonal multiplex systems [H04J 11/005](#))}
- 5/0075 . . . {Allocation using proportional fairness}
- 5/0076 . . . {Allocation utility-based}
- 5/0078 . . {Timing of allocation}
- 5/008 . . . {once only, on installation}
- 5/0082 . . . {at predetermined intervals}
- 5/0083 {symbol-by-symbol}
- 5/0085 . . . {when channel conditions change}
- 5/0087 . . . {when data requirements change}
- 5/0089 {due to addition or removal of users or terminals}
- 5/0091 . {Signaling for the administration of the divided path}
- 5/0092 . . {Indication of how the channel is divided}
- 5/0094 . . {Indication of how sub-channels of the path are allocated}
- 5/0096 . . {Indication of changes in allocation}
- 5/0098 . . . {Signalling of the activation or deactivation of component carriers, subcarriers or frequency bands}
- 5/02 . Channels characterised by the type of signal
- 5/023 . . {Multiplexing of multicarrier modulation signals (multicarrier modulation [H04L 27/2601](#))}
- 5/026 . . . {using code division}
- 5/04 . . the signals being represented by different amplitudes or polarities, e.g. quadruplex
- 5/06 . . the signals being represented by different frequencies (combined with time-division multiplexing [H04L 5/26](#))
- 5/08 . . . each combination of signals in different channels being represented by a fixed frequency { (, e.g. twinplex; see [H04L 27/16](#)) }
- 5/10 . . . with dynamo-electric generation of carriers; with mechanical filters or demodulators
- 5/12 . . the signals being represented by different phase modulations of a single carrier
- 5/14 . Two-way operation using the same type of signal, i.e. duplex ({duplex repeaters [H04L 25/22](#)}; conditioning for two-way transmission in general [H04B 3/20](#); {for interconnection between telephone switching centres [H04Q 3/00](#)})
- 5/1407 . . {Artificial lines or their setting (for line transmission systems in general [H04B 3/40](#))}
- 5/1415 . . {using control lines}
- 5/1423 . . {for simultaneous baseband signals}
- 5/143 . . {for modulated signals ([H04L 5/1469](#) takes precedence)}

- 5/1438 . . {Negotiation of transmission parameters prior to communication ([modified according to link quality H04L 1/0001](#))}
- 5/1446 . . . {of transmission speed}
- 5/1453 . . . {of modulation type}
- 5/1461 . . {Suppression of signals in the return path, i.e. bidirectional control circuits}
- 5/1469 . . {using time-sharing}
- 5/1476 . . . {operating bitwise}
- 5/1484 . . . {operating byte-wise}
- 5/1492 {with time compression, e.g. operating according to the ping-pong technique}
- 5/16 . . Half-duplex systems; Simplex-duplex switching; Transmission of break signals {non automatically inverting the direction of transmission}
- 5/18 . . Automatic changing of the traffic direction
- 5/20 . . using different combinations of lines, e.g. phantom working {(phantom interconnection between telephone switching centres [H04M 7/08](#); coupling arrangements therefor [H04L 25/0272](#))}
- 5/22 . . using time-division multiplexing {(in general [H04J 3/00](#))}
- 5/225 . . {combined with the use of transition coding ([transition coding H04L 25/493](#))}
- 5/24 . . with start-stop synchronous converters
- 5/245 . . . {with a number of discharge tubes or semiconductor elements which successively connect the different channels to the transmission channels ([see: H04L 13/00 - H04L 23/00](#), [H03K 5/15](#), [H03K 17/62](#), [H04J 3/047](#))}
- 5/26 . . combined with the use of different frequencies
- 7/00 Arrangements for synchronising receiver with transmitter** {(synchronisation of electronic time-pieces [G04G 7/00](#); synchronisation of generators of electric oscillations or pulses [H03L](#); synchronising in TV system [H04N 5/04](#); regeneration of clock signals for television systems [H04N 7/0352](#))}
- 7/0004 . {Initialisation of the receiver ([H04L 7/0075](#) and [H04L 7/10](#) take precedence)}
- 7/0008 . {Synchronisation information channels, e.g. clock distribution lines}
- 7/0012 . . {by comparing receiver clock with transmitter clock}
- 7/0016 . {correction of synchronization errors}
- 7/002 . . {correction by interpolation}
- 7/0025 . . . {interpolation of clock signal}
- 7/0029 . . . {interpolation of received data signal}
- 7/0033 . . {Correction by delay}
- 7/0037 . . . {Delay of clock signal}
- 7/0041 . . . {Delay of data signal}
- 7/0045 . . {Correction by a latch cascade}
- 7/005 . . {Correction by an elastic buffer}
- 7/0054 . {Detection of the synchronisation error by features other than the received signal transition ([by means of signal transition H04L 7/033](#))}
- 7/0058 . . {detection of error based on equalizer tap values}
- 7/0062 . . {detection of error based on data decision error, e.g. Mueller type detection}
- 7/0066 . . {detection of error based on transmission code rule}
- 7/007 . . {detection of error based on maximum signal power, e.g. peak value, maximizing autocorrelation}
- 7/0075 . {with photonic or optical means}
- 7/0079 . {Receiver details}
- 7/0083 . . {taking measures against momentary loss of synchronisation, e.g. inhibiting the synchronisation, using idle words or using redundant clocks}
- 7/0087 . . {Preprocessing of received signal for synchronisation, e.g. by code conversion, pulse generation or edge detection}
- 7/0091 . {Transmitter details}
- 7/0095 . {with mechanical means}
- 7/02 . Speed or phase control by the received code signals, the signals containing no special synchronisation information {([H04L 7/0075](#) takes precedence; [tuning or selecting resonant circuits H03J](#); using the properties of error detecting or correcting codes [H04L 7/048](#))}
- 7/027 . . extracting the synchronising or clock signal from the received signal spectrum, e.g. by using a resonant or bandpass circuit
- 7/0272 . . . {with squaring loop}
- 7/0274 . . . {with Costas loop}
- 7/0276 . . . {Self-sustaining, e.g. by tuned delay line and a feedback path to a logical gate}
- 7/0278 . . . {Band edge detection}
- 7/033 . . using the transitions of the received signal to control the phase of the synchronising-signal-generating means, e.g. using a phase-locked loop
- 7/0331 . . . {with a digital phase-locked loop [PLL] processing binary samples, e.g. add/subtract logic for correction of receiver clock ([H04L 7/0337](#) takes precedence)}
- 7/0332 . . . {with an integrator-detector}
- 7/0334 . . . {Processing of samples having at least three levels, e.g. soft decisions}
- 7/0335 {Gardner detector}
- 7/0337 . . . {Selecting between two or more discretely delayed clocks or selecting between two or more discretely delayed received code signals}
- 7/0338 {the correction of the phase error being performed by a feed forward loop}
- 7/04 . Speed or phase control by synchronisation signals {([H04L 7/0075](#) takes precedence)}
- 7/041 . . {using special codes as synchronising signal}
- 7/042 . . . {Detectors therefor, e.g. correlators, state machines ([digital correlators in general G06F 17/15](#))}
- 7/043 . . . {Pseudo-noise [PN] codes variable during transmission ([synchronisation of spread spectrum receivers H04B 1/69](#))}
- 7/044 . . . {using a single bit, e.g. start stop bit}
- 2007/045 . . . {Fill bit or bits, idle words}
- 7/046 . . . {using a dotting sequence}
- 2007/047 . . . {using a sine signal or unmodulated carrier}
- 7/048 . . {using the properties of error detecting or error correcting codes, e.g. parity as synchronisation signal}
- 7/06 . . the synchronisation signals differing from the information signals in amplitude, polarity, or frequency {or length}
- 7/065 . . . {and superimposed by modulation}

- 7/08 . . the synchronisation signals recurring cyclically
- 7/10 . . Arrangements for initial synchronisation
- 9/00 {Cryptographic mechanisms or cryptographic arrangements for secret or secure communication}**
 {(network architectures or network communication protocols for network security [H04L 63/00](#) or for wireless network security [H04W 12/00](#); security arrangements for protecting computers or computer systems against unauthorized activity [G06F 21/00](#))}
- NOTES**
1. This group covers:
- 1.1 Cryptographic mechanisms including cryptographic protocols and cryptographic algorithms, whereby a cryptographic protocol is a distributed cryptographic algorithm defined by a sequence of steps precisely specifying the actions required of two or more entities to achieve specific security objectives (e.g. cryptographic protocol for key agreement), and whereby a cryptographic algorithm is specifying the steps followed by a single entity to achieve specific security objectives (e.g. cryptographic algorithm for symmetric key encryption).
- 1.2 [H04L 9/00](#) focuses on cryptographic mechanisms such as encryption schemes, digital signatures, hash functions, random number generation, key management, said cryptographic mechanisms providing information security such as privacy or confidentiality, data integrity, message authentication, entity authentication, authorization, validation, certification, time-stamping, anonymity, revocation, non-repudiation.
- 1.3 [H04L 9/00](#) covers also countermeasures against attacks on cryptographic mechanisms.
2. This group does not cover:
- 2.1 Networking architectures or network communication protocols for securing the traffic flowing through data packet networks and providing secure exchanges among applications communicating through data packet networks, which are covered by [H04L 63/00](#). Attention is drawn to the Note 1. after group [H04L 63/00](#)
- 2.2 Security arrangements for protecting computers or computer systems against unauthorised activity, which are covered by [G06F 21/00](#)
3. In subgroups [H04L 9/001](#) - [H04L 9/38](#), the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.
- 9/001 . {using chaotic signals}
- 9/002 . {Countermeasures against attacks on cryptographic mechanisms (network architectures or network communication protocols for protection against malicious traffic [H04L 63/1441](#))}
- 9/003 . . {for power analysis, e.g. differential power analysis [DPA] or simple power analysis [SPA]}
- 9/004 . . {for fault attacks}
- 9/005 . . {for timing attacks}
- 9/006 . {involving public key infrastructure [PKI] trust models (network architecture or network communication protocol for supporting authentication of entities using certificates in a packet data network [H04L 63/0823](#))}
- 9/007 . . {involving hierarchical structures}
- 9/008 . {involving homomorphic encryption}
- 9/06 . the encryption apparatus using shift registers or memories for block-wise {or stream} coding, e.g. DES systems {or RC4; Hash functions; Pseudorandom sequence generators}
- 9/0618 . . {Block ciphers, i.e. encrypting groups of characters of a plain text message using fixed encryption transformation}
- 9/0625 . . . {with splitting of the data block into left and right halves, e.g. Feistel based algorithms, DES, FEAL, IDEA or KASUMI}
- 9/0631 . . . {Substitution permutation network [SPN], i.e. cipher composed of a number of stages or rounds each involving linear and nonlinear transformations, e.g. AES algorithms}
- 9/0637 . . . {Modes of operation, e.g. cipher block chaining [CBC], electronic codebook [ECB] or Galois/counter mode [GCM]}
- 9/0643 . . {Hash functions, e.g. MD5, SHA, HMAC or f9 MAC}
- 9/065 . . {Encryption by serially and continuously modifying data stream elements, e.g. stream cipher systems, RC4, SEAL or A5/3}
- 9/0656 . . . {Pseudorandom key sequence combined element-for-element with data sequence, e.g. one-time-pad [OTP] or Vernam's cipher}
- 9/0662 {with particular pseudorandom sequence generator}
- 9/0668 {producing a non-linear pseudorandom sequence}
- 9/08 . Key distribution {or management, e.g. generation, sharing or updating, of cryptographic keys or passwords (network architectures or network communication protocols for supporting key management in a packet data network [H04L 63/06](#))}
- 9/0816 . . {Key establishment, i.e. cryptographic processes or cryptographic protocols whereby a shared secret becomes available to two or more parties, for subsequent use}
- 9/0819 . . . {Key transport or distribution, i.e. key establishment techniques where one party creates or otherwise obtains a secret value, and securely transfers it to the other(s) (network architectures or network communication protocols for key distribution in a packet data network [H04L 63/062](#))}
- 9/0822 {using key encryption key}
- 9/0825 {using asymmetric-key encryption or public key infrastructure [PKI], e.g. key signature or public key certificates}
- 9/0827 {involving distinctive intermediate devices or communication paths (network architectures or network communication protocols using different networks [H04L 63/18](#))}
- 9/083 {involving central third party, e.g. key distribution center [KDC] or trusted third party [TTP]}

- 9/0833 {involving conference or group key
([network architectures or network communication protocols for key management in group communication in a packet data network H04L 63/065](#))}
- 9/0836 {using tree structure or hierarchical structure}
- 9/0838 . . . {Key agreement, i.e. key establishment technique in which a shared key is derived by parties as a function of information contributed by, or associated with, each of these ([network architectures or network communication protocols for key exchange in a packet data network H04L 63/061](#))}
- 9/0841 {involving Diffie-Hellman or related key agreement protocols}
- 9/0844 {with user authentication or key authentication, e.g. ElGamal, MTI, MQV-Menezes-Qu-Vanstone protocol or Diffie-Hellman protocols using implicitly-certified keys}
- 9/0847 {involving identity based encryption [IBE] schemes}
- 9/085 . . . {Secret sharing or secret splitting, e.g. threshold schemes}
- 9/0852 . . . {Quantum cryptography ([transmission systems employing electromagnetic waves other than radio waves, e.g. light, infra-red H04B 10/00; wavelength-division multiplex systems H04J 14/02](#))}
- 9/0855 {involving additional nodes, e.g. quantum relays, repeaters, intermediate nodes or remote nodes}
- 9/0858 {Details about key distillation or coding, e.g. reconciliation, error correction, privacy amplification, polarisation coding or phase coding}
- 9/0861 . . {Generation of secret information including derivation or calculation of cryptographic keys or passwords}
- 9/0863 . . . {involving passwords or one-time passwords ([network architectures or network communication protocols for using one-time keys in a packet data network H04L 63/067](#))}
- 9/0866 . . . {involving user or device identifiers, e.g. serial number, physical or biometrical information, DNA, hand-signature or measurable physical characteristics}
- 9/0869 . . . {involving random numbers or seeds}
- 9/0872 . . . {using geo-location information, e.g. location data, time, relative position or proximity to other entities}
- 9/0875 . . . {based on channel impulse response [CIR]}
- 9/0877 . . . {using additional device, e.g. trusted platform module [TPM], smartcard, USB or hardware security module [HSM]}
- 9/088 . . {Usage controlling of secret information, e.g. techniques for restricting cryptographic keys to pre-authorized uses, different access levels, validity of crypto-period, different key- or password length, or different strong and weak cryptographic algorithms ([network architectures or network communication protocols for using time-dependent keys in a packet data network H04L 63/068](#))}
- 9/0891 . . {Revocation or update of secret information, e.g. encryption key update or rekeying}
- 9/0894 . . {Escrow, recovery or storing of secret information, e.g. secret key escrow or cryptographic key storage}
- 9/0897 . . . {involving additional devices, e.g. trusted platform module [TPM], smartcard or USB}
- 9/10 . . with particular housing, physical features or manual controls
- 9/12 . . Transmitting and receiving encryption devices synchronised or initially set up in a particular manner
- 9/14 . . using a plurality of keys or algorithms {([network architectures or network communication protocols wherein the sending and receiving network entities apply hybrid encryption, i.e. combination of symmetric and asymmetric encryption H04L 63/045](#))}
- 9/16 . . the keys or algorithms being changed during operation
- 9/30 . . Public key, i.e. encryption algorithm being computationally infeasible to invert or user's encryption keys not requiring secrecy
- 9/3006 . . {underlying computational problems or public-key parameters}
- 9/3013 . . . {involving the discrete logarithm problem, e.g. ElGamal or Diffie-Hellman systems}
- 9/302 . . . {involving the integer factorization problem, e.g. RSA or quadratic sieve [QS] schemes}
- 9/3026 . . . {details relating to polynomials generation, e.g. generation of irreducible polynomials}
- 9/3033 . . . {details relating to pseudo-prime or prime number generation, e.g. primality test}
- 9/304 . . {based on error correction codes, e.g. McEliece}
- 9/3066 . . {involving algebraic varieties, e.g. elliptic or hyper-elliptic curves}
- 9/3073 . . . {involving pairings, e.g. identity based encryption [IBE], bilinear mappings or bilinear pairings, e.g. Weil or Tate pairing}
- 9/3093 . . {involving Lattices or polynomial equations, e.g. NTRU scheme}
- 9/32 . . including means for verifying the identity or authority of a user of the system {or for message authentication, e.g. authorization, entity authentication, data integrity or data verification, non-repudiation, key authentication or verification of credentials} ([network architectures or network communication protocols for supporting entities authentication in a packet data network H04L 63/08; applying verification of the received information H04L 63/12;](#)) computer systems [G06F](#); coin-freed or like apparatus with coded identity card or credit card [G07F 7/08](#))
- 9/321 . . {involving a third party or a trusted authority}
- 9/3213 . . . {using tickets or tokens, e.g. Kerberos ([network architectures or network communication protocols for entities authentication using tickets in a packet data network H04L 63/0807](#))}
- 9/3215 . . {using a plurality of channels ([network architectures or network communication protocols using different networks H04L 63/18](#))}
- 9/3218 . . {using proof of knowledge, e.g. Fiat-Shamir, GQ, Schnorr, or non-interactive zero-knowledge proofs}

- 9/3221 . . . {interactive zero-knowledge proofs}
- 9/3226 . . {using a predetermined code, e.g. password, passphrase or PIN ([network architectures or network communication protocols for supporting authentication of entities using passwords in a packet data network H04L 63/083](#))}
- 9/3228 . . . {One-time or temporary data, i.e. information which is sent for every authentication or authorization, e.g. one-time-password, one-time-token or one-time-key}
- 9/3231 . . . {Biological data, e.g. fingerprint, voice or retina ([network architectures or network communication protocols for supporting authentication of entities using biometrical features in a packet data network H04L 63/0861](#))}
- 9/3234 . . {involving additional secure or trusted devices, e.g. TPM, smartcard, USB or software token ([network architectures or network communication protocols for supporting authentication of entities using an additional device in a packet data network H04L 63/0853](#))}
- 9/3236 . . {using cryptographic hash functions}
- 9/3239 . . . {involving non-keyed hash functions, e.g. modification detection codes [MDCs], MD5, SHA or RIPEMD}
- 9/3242 . . . {involving keyed hash functions, e.g. message authentication codes [MACs], CBC-MAC or HMAC}
- 9/3247 . . {involving digital signatures}
- 9/3249 . . . {using RSA or related signature schemes, e.g. Rabin scheme}
- 9/3252 . . . {using DSA or related signature schemes, e.g. elliptic based signatures, ElGamal or Schnorr schemes}
- 9/3255 . . . {using group based signatures, e.g. ring or threshold signatures}
- 9/3257 . . . {using blind signatures}
- 9/3263 . . {involving certificates, e.g. public key certificate [PKC] or attribute certificate [AC]; Public key infrastructure [PKI] arrangements ([network architectures or network communication protocols for supporting authentication of entities using certificates in a packet data network H04L 63/0823](#))}
- 9/3265 . . . {using certificate chains, trees or paths; Hierarchical trust model}
- 9/3268 . . . {using certificate validation, registration, distribution or revocation, e.g. certificate revocation list [CRL]}
- 9/3271 . . {using challenge-response}
- 9/3273 . . . {for mutual authentication ([network architectures or network communication protocols for achieving mutual authentication in a packet data network H04L 63/0869](#))}
- 9/3278 . . . {using physically unclonable functions [PUF]}
- 9/3297 . . {involving time stamps, e.g. generation of time stamps}
- 9/34 . Bits, or blocks of bits, of the telegraphic message being interchanged in time {(for speech signals [H04K 1/06](#))}
- 9/36 . with means for detecting characters not meant for transmission
- 9/38 . Encryption being effected by mechanical apparatus, e.g. rotating cams, switches, keytape punchers
- 12/00** **Data switching networks** ([interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units G06F 13/00](#))
 - 12/02 . Details
 - 12/04 . . Switchboards
 - 12/06 . . Answer-back mechanisms or circuits
 - 12/08 . . Allotting numbers to messages; Counting characters, words or messages
 - 12/10 . . Current supply arrangements
 - 12/12 . . Arrangements for remote connection or disconnection of substations or of equipment thereof
 - 12/14 . . {Metering,} charging {or billing} arrangements {specially adapted for data wireline or wireless communications ([payment schemes, architectures or protocols per se G06Q 20/00](#))}
 - 12/1403 . . . {Architecture for metering, charging or billing}
 - 12/1407 {Policy-and-charging control [PCC] architecture}
 - 12/141 . . . {Indication of costs}
 - 12/1414 {in real-time}
 - 12/1417 {Advice of charge with threshold, e.g. user indicating maximum cost}
 - 12/1421 {Indication of expected costs}
 - 12/1425 . . . {involving dedicated fields in the data packet for billing purposes}
 - 12/1428 . . . {Invoice generation, e.g. customization, lay-out, database processing, algorithms for calculating the bill or formatting invoices as WWW pages ([invoicing in general G06Q 30/04](#))}
 - 12/1432 . . . {Metric aspects}
 - 12/1435 {volume-based}
 - 12/1439 {time-based}
 - 12/1442 . . . {at network operator level}
 - 12/1446 {inter-operator billing}
 - 12/145 {trading network capacity or selecting route based on tariff}
 - 12/1453 . . . {Methods or systems for payment or settlement of the charges for data transmission involving significant interaction with the data transmission network}
 - 12/1457 {using an account}
 - 12/146 {using digital cash}
 - 12/1464 {using a card, such as credit card, prepaid card or SIM}
 - 12/1467 {involving prepayment}
 - 12/1471 {splitting of costs}
 - 12/1475 {the splitting involving a third party}
 - 12/1478 {the splitting involving only the communication parties}
 - 12/1482 {involving use of telephony infrastructure for billing for the transport of data, e.g. call detail record [CDR] or intelligent network infrastructure}
 - 12/1485 . . . {Tariff-related aspects}
 - 12/1489 {dependent on congestion}
 - 12/1492 {negotiation of tariff}
 - 12/1496 {involving discounts}

- 12/16 . . Arrangements for providing special services to substations
- 12/18 . . . for broadcast or conference {, e.g. [multicast \(multicast or broadcast switches H04L 49/201\)](#)}
- 12/1804 {for stock exchange and similar applications}
- 12/1809 {for auctioneering devices}
- 12/1813 {for computer conferences, e.g. chat rooms (protocols for multimedia communication [H04L 29/06027](#); signaling and real-time protocols for multimedia conference [H04L 29/06414](#); instant messaging [H04L 51/04](#); telephonic conference arrangements [H04M 3/56](#); television conference systems [H04N 7/15](#))}
- 12/1818 {Conference organisation arrangements, e.g. handling schedules, setting up parameters needed by nodes to attend a conference, booking network resources, notifying involved parties}
- 12/1822 {Conducting the conference, e.g. admission, detection, selection or grouping of participants, correlating users to one or more conference sessions, prioritising transmission}
- 12/1827 {Network arrangements for conference optimisation or adaptation}
- 12/1831 {Tracking arrangements for later retrieval, e.g. recording contents, participants activities or behavior, network status}
- 12/1836 {with heterogeneous network architecture}
- 12/184 {with heterogeneous receivers, e.g. layered multicast}
- 12/1845 {broadcast or multicast in a specific location, e.g. geocast (protocols for adapting network applications to user terminal location [H04L 29/08657](#); services specially adapted for wireless communication networks making use of the location of users or terminals [H04W 4/02](#))}
- 12/185 {with management of multicast group membership}
- 12/1854 {with non-centralised forwarding system, e.g. chaincast}
- 12/1859 {adapted to provide push services, e.g. data channels}
- 12/1863 {comprising mechanisms for improved reliability, e.g. status reports (arrangements for detecting or preventing errors by carrying supervisory signal the return channel [H04L 1/16](#))}
- 12/1868 {Measures taken after transmission, e.g. acknowledgments}
- 12/1872 {avoiding ACK or NACK implosion}
- 12/1877 {Measures taken prior to transmission}
- 12/1881 {with schedule organisation, e.g. priority, sequence management}
- 12/1886 {with traffic restrictions for efficiency improvement, e.g. involving subnets or subdomains}
- 12/189 {in combination with wireless systems (selective distribution or broadcast in wireless communication networks [H04W 4/06](#))}
- 12/1895 {for short real-time information, e.g. alarms, notifications, alerts, updates}
- 12/22 . . Arrangements for preventing the taking of data from a data transmission channel without authorisation (means for verifying the identity or the authority of a user of a secure or secret communication system [H04L 9/32](#))
- 12/28 . characterised by path configuration, e.g. local area networks [LAN], wide area networks [WAN]
- 12/2801 . . {Broadband local area networks}
- 12/2803 . . {Home automation networks}
- 12/2805 . . . {Home Audio Video Interoperability [HAVI] networks}
- 12/2807 . . . {Exchanging configuration information on appliance services in a home automation network (address allocation [H04L 29/12207](#); arrangements for maintenance or administration involving network analysis for automatically determining the actual topology of a network [H04L 41/12](#); hardware or software tools for network management using graphical user interfaces [H04L 41/22](#))}
- 12/2809 {indicating that an appliance service is present in a home automation network (arrangements for service discovery [H04L 29/08648](#); monitoring functionality [H04L 43/0817](#))}
- 12/281 {indicating a format for calling an appliance service function in a home automation network (protocols for network applications involving the use of web-based technology [H04L 29/08099](#))}
- 12/2812 {describing content present in a home automation network, e.g. audio video content (retrieval from the Internet [G06F 16/95](#))}
- 12/2814 {Exchanging control software or macros for controlling appliance services in a home automation network (arrangements for maintenance or administration involving configuration of the network and network elements [H04L 41/08](#))}
- 12/2816 . . . {Controlling appliance services of a home automation network by calling their functionalities (arrangements in telecontrol or telemetry systems for selectively calling a substation from a main station; in which substation desired apparatus is selected for applying a control signal thereto or for obtaining measured values therefrom [H04Q 9/00](#))}
- 12/2818 {from a device located outside both the home and the home network (access arrangements [H04L 12/2856](#); protocols for network applications involving the use of web-based technology for remote control or remote monitoring [H04L 29/08099](#); telephonic communication systems adapted for combination with remote control systems [H04M 11/007](#); arrangements for transmitting signals characterised by the use of a wireless electrical link [G08C 17/00](#))}
- 12/282 {based on user interaction within the home (receiver circuitry for displaying additional information being controlled by a remote control apparatus [H04N 5/44582](#))}

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|-----------|-----------|--|---|-------|--|
| 12/2821 | | {Avoiding conflicts related to the use of home appliances (arrangements for network security H04L 29/06551)} | 12/2854 | . . | {Wide area networks, e.g. public data networks} |
| 12/2823 | . . . | {Reporting information sensed by appliance or service execution status of appliance services in a home automation network (device-related reporting H04L 43/065 ; arrangements in telecontrol or telemetry systems for selectively calling a substation from a main station, in which substation desired apparatus is selected for applying a control signal thereto or for obtaining measured values therefrom H04Q 9/00)} | 12/2856 | . . . | {Access arrangements, e.g. Internet access (asynchronous transfer mode networks H04L 12/5601 ; broadband local area networks H04L 12/2801 ; optical access or distribution networks H04Q 11/0067 ; access to open networks H04L 12/5691 ; digital subscriber line end-user equipment and bit-level processing of data on a PSTN-based network H04M 11/00 ; home network gateways H04L 12/2834 ; wireless access networks H04W)} |
| 12/2825 | | {Reporting to a device located outside the home and the home network (access arrangements H04L 12/2856 ; protocols for network applications involving the use of web-based technology for remote control or remote monitoring H04L 29/08099 ; telephonic communication systems adapted for combination with telemetering systems H04M 11/002)} | NOTES | | |
| 12/2827 | | {Reporting to a device within the home network; wherein the reception of the information reported automatically triggers the execution of a home appliance functionality} | 1. This group covers: | | |
| 12/2829 | | {involving user profiles according to which the execution of a home appliance functionality is automatically triggered} | <ul style="list-style-type: none"> access to a public data network, such as an IP network, for subscribers, i.e. customers of a network service provider, over a wired network. communication of generic types of data between end-user equipments, located typically at the subscriber premises, and an access server, which acts as interface between the access network and the public data network. | | |
| 12/283 | . . . | {Processing of data at an internetworking point of a home automation network} | 2. This group does not cover: | | |
| 12/2832 | | {Interconnection of the control functionalities between home networks (single bridge functionality H04L 12/4625)} | <ul style="list-style-type: none"> wireless access networks, which are covered by H04W optical distribution networks, which are covered by H04Q 11/0067 bit-level, or PHY layer, processing of data between digital subscriber line equipments, which is covered by H04M 11/06 design of DSL, digital subscriber line, modems, which is covered by H04M 11/06 exchange of data related to functionalities of home network appliances between a home network and an external network, which is covered by H04L 12/2803 management of WDM parameters in optical multiplex systems, which is covered by H04J 14/02 circuit-switched access networks, which are covered by H04M 7/1205 access arrangements for providing telephone service in networks other than PSTN/ISDN, which are covered by H04M 7/0066 | | |
| 12/2834 | | {Switching of information between an external network and a home network (access arrangements H04L 12/2856)} | 3. In this group the following terms or expressions are used with the meaning indicated: | | |
| 12/2836 | | {Protocol conversion between an external network and a home network (protocol conversion H04L 29/06068 ; adaptation of digital video signals for transport over a specific home network H04N 7/24 ; controlling appliance services of a home automation network from a device located outside the home and the home network H04L 12/2818)} | <ul style="list-style-type: none"> ATM means Asynchronous Transfer Mode LAN means Local Area Network BRAS means Broadband Remote Access Server DSLAM means Digital Subscriber Line Access Multiplexer MSAN means MultiService Access Node DSL means Digital Subscriber Line IP means Internet Protocol WDM means Wavelength Division Multiplexing SDH means Synchronous Digital Hierarchy | | |
| 12/2838 | . . . | {Distribution of signals within a home automation network, e.g. involving splitting/multiplexing signals to/from different paths (adaptations of television systems for transmission by electric cable for domestic distribution H04N 7/106 ; hybrid transport H04L 12/6418 ; home network arrangements specially adapted for distribution of digital video signals H04N 7/24)} | | | |
| 2012/284 | . . . | {characterised by the type of medium used} | | | |
| 2012/2841 | | {Wireless} | | | |
| 2012/2843 | | {Mains power line} | | | |
| 2012/2845 | | {Telephone line} | | | |
| 2012/2847 | . . . | {characterised by the type of home appliance used} | | | |
| 2012/2849 | | {Audio/video appliances} | | | |
| 2012/285 | | {Generic home appliances, e.g. refrigerators} | | | |
| 12/2852 | . . | {Metropolitan area networks} | | | |

- OTN means Optical Transport Network
- PSTN means Public Switched Telephone Network
- ISDN means Integrated Services Digital Network
- TDM means Time-Division Multiplexing
- TDMA means Time Division Multiple Access

- 12/2858 {Access network architectures}
- 12/2859 {Point-to-point connection between the data network and the subscribers (encapsulation [H04L 12/4633](#); virtual LANs [H04L 12/4641](#); routing of packets [H04L 45/00](#))}
- 12/2861 {Point-to-multipoint connection from the data network to the subscribers}
- 12/2863 {Arrangements for combining access network resources elements, e.g. channel bonding (modem pooling [H04L 25/14](#); multichannel protocols [H04L 29/06088](#); routing of packets [H04L 45/00](#))}
- 12/2865 {Logical combinations}
- 12/2867 {Physical combinations}
- 12/2869 {Operational details of access network equipments (admission control or resource allocation in access networks [H04L 12/5692](#))}
- 12/287 {Remote access server, e.g. BRAS}
- 12/2872 {Termination of subscriber connections}
- 12/2874 {Processing of data for distribution to the subscribers}
- 12/2876 {Handling of subscriber policies (group policies management [H04L 41/0893](#))}
- 12/2878 {Access multiplexer, e.g. DSLAM (generic distributed time multiplexers, e.g. TDM/TDMA [H04J 3/1694](#))}
- 12/2879 {characterised by the network type on the uplink side, i.e. towards the service provider network}
- 12/2881 {IP/Ethernet DSLAM}
- 12/2883 {ATM DSLAM}
- 12/2885 {Arrangements interfacing with optical systems (optical network equipment [H04B 10/00](#); optical multiplexers [H04J 14/00](#))}
- 12/2887 {characterised by the offered subscriber services}
- 12/2889 {Multiservice, e.g. MSAN}
- 12/289 {Single service}
- 12/2892 {characterised by the access multiplexer architecture}
- 12/2894 {Centralized processing}
- 12/2896 {Distributed processing, e.g. on line cards}
- 12/2898 {Subscriber equipments (DSL modems [H04M 11/062](#); cable modems [H04L 12/2801](#))}
- 12/40 . . . Bus networks

- 12/40006 . . . {Architecture of a communication node (current supply arrangements [H04L 12/10](#); intermediate storage or scheduling [H04L 49/90](#))}

NOTE

In this group the following terms or expressions are used with the meaning indicated:

- a bus controller is a microprocessor dedicated to input and output of data by a node on a bus;
- a bus master is a device controlling which node accesses the bus at a particular time;
- a bus guardian is a device monitoring the timing of node accesses on the bus;
- a bus interface enhancer is a hardware or software arrangement managing the bus controller or the bus interface to modify its behaviour or providing a transparent interface to the bus controller

- 12/40013 {Details regarding a bus controller}
- 12/40019 {Details regarding a bus master}
- 12/40026 {Details regarding a bus guardian}
- 12/40032 {Details regarding a bus interface enhancer}
- 12/40039 {Details regarding the setting of the power status of a node according to activity on the bus}
- 12/40045 {Details regarding the feeding of energy to the node from the bus}
- 12/40052 . . . {High-speed IEEE 1394 serial bus (bus transfer protocol on a daisy chain bus using an embedded synchronisation [G06F 13/426](#))}
- 12/40058 {Isochronous transmission}
- 12/40065 {Bandwidth and channel allocation (home automation networks [H04L 12/2803](#); flow control [H04L 47/10](#))}
- 12/40071 {Packet processing; Packet format (adaptation of digital video signals for transport over a specific network [H04N 21/2381](#), [H04N 21/4363](#), [H04N 21/4381](#); packet switches [H04L 49/00](#); intermediate storage or scheduling [H04L 49/90](#))}
- 12/40078 {Bus configuration (home automation networks [H04L 12/2803](#); arrangements for maintenance or administration [H04L 41/00](#))}
- 12/40084 {Bus arbitration}
- 12/40091 {Bus bridging (LAN interconnection over a bridge based backbone [H04L 12/462](#); single bridge functionality [H04L 12/462](#))}
- 12/40097 {Interconnection with other networks (LAN interconnection over a bridge based backbone [H04L 12/462](#); single bridge functionality [H04L 12/462](#))}
- 12/40104 {Security; Encryption; Content protection (arrangements for network security [H04L 29/06551](#))}
- 12/4011 {Wireless (wireless communication networks [H04W](#))}

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|---|---------|--|--|
| 12/40117 | | {Interconnection of audio or video/imaging devices (home automation networks H04L 12/2803 ; bitstream network arrangements specially adapted for distribution of digital video signals H04N 7/24)} | by BMBF, the German department of education and research; |
| 12/40123 | | {Interconnection of computers and peripherals (printer information exchange with computer G06F 3/1293)} | • Modbus designates a serial communications protocol published by Modicon in 1979 for use with its programmable logic controller; |
| 12/4013 | . . . | {Management of data rate on the bus (systems modifying transmission characteristics according to link quality H04L 1/0001 ; negotiation of transmission parameters of transmission speed prior to communication H04L 5/1446 ; adaptive data allocation for multicarrier modulation H04L 27/2608)} | • LIN-Bus (Local Interconnect Network) designates a computer networking bus-system released in 1999 used within current automotive network architectures; |
| 12/40136 | | {Nodes adapting their rate to the physical link properties (LAN switches H04L 49/351)} | • FlexRay designates an automotive network communications protocol developed by the FlexRay Consortium; |
| 12/40143 | . . . | {involving priority mechanisms (hybrid switching fabrics H04L 12/6402 ; intermediate storage or scheduling H04L 49/90 ; time-division multiplex systems H04J 3/00)} | • LON or LonWorks designates a network standard operating on twisted pair or electrical wiring or coaxial cable and used for building automation; |
| 12/4015 | | {by scheduling the transmission of messages at the communication node} | • ASI or AS-Interface (Actuator Sensor Interface) designates the simplest of the industrial networking protocols used in programmable logic controller systems |
| 12/40156 | | {by using dedicated slots associated with a priority level} | |
| 12/40163 | | {by assigning priority to messages according to a message field} | |
| 12/40169 | . . . | {Flexible bus arrangements (arrangements for maintenance or administration involving management of faults; events, alarms H04L 41/06 ; automatic restoration of network faults H04L 41/0654)} | |
| 12/40176 | | {involving redundancy (error detection or correction of the data by redundancy in hardware using active fault-masking in interconnections G06F 11/2002 ; error detection or correction of the data by redundancy in hardware using active fault-masking in storage systems using spares or by reconfiguring G06F 11/2053)} | |
| 12/40182 | | {by using a plurality of communication lines} | |
| 12/40189 | | {by using a plurality of bus systems} | |
| 12/40195 | | {by using a plurality of nodes} | |
| 12/40202 | | {by using a plurality of master stations} | |
| 2012/40208 | . . . | {characterized by the use of a particular bus standard} | |
| NOTE | | | |
| In this group the following terms or expressions are used with the meaning indicated: | | | |
| • Controller-area network (CAN or CAN-bus) designates a computer network protocol and bus standard developed in 1983 by Intel Corporation and Robert Bosch GmbH to allow microcontrollers and devices to communicate with each other without a host computer; | | | |
| • PROFIBUS (Process Field Bus) designates a standard for field bus communication in automation technology first implemented in 1989 | | | |
| 2012/40215 | | {Controller Area Network CAN} | |
| 2012/40221 | | {Profibus} | |
| 2012/40228 | | {Modbus} | |
| 2012/40234 | | {Local Interconnect Network LIN} | |
| 2012/40241 | | {Flexray} | |
| 2012/40247 | | {LON} | |
| 2012/40254 | | {Actuator Sensor Interface ASI} | |
| 2012/4026 | . . . | {Bus for use in automation systems} | |
| 2012/40267 | . . . | {Bus for use in transportation systems} | |
| 2012/40273 | | {the transportation system being a vehicle} | |
| 2012/4028 | | {the transportation system being an aircraft} | |
| 2012/40286 | | {the transportation system being a waterborne vessel} | |
| 2012/40293 | | {the transportation system being a train} | |
| 12/403 | . . . | with centralised control, e.g. polling | |
| 12/4035 | | {in which slots of a TDMA packet structure are assigned based on a contention resolution carried out at a master unit (TDM/TDMA multiplex systems per se H04J 3/1694 ; hybrid switching systems H04L 12/64)} | |
| 12/407 | . . . | with decentralised control | |
| 12/413 | | with random access, e.g. carrier-sense multiple-access with collision detection (CSMA-CD) | |
| 12/4135 | | {using bit-wise arbitration} | |
| 12/417 | | with deterministic access, e.g. token passing | |
| 12/42 | . . | Loop networks | |
| 2012/421 | . . . | {Interconnected ring systems} | |
| 12/422 | . . . | {Synchronisation for ring networks (Time Division Multiplex ring networks, e.g. SDH/SONET H04J 3/085)} | |
| 12/423 | . . . | with centralised control, e.g. polling | |
| 12/427 | . . . | with decentralised control | |
| 12/43 | | with synchronous transmission, e.g. time division multiplex [TDM], slotted rings | |
| 12/433 | | with asynchronous transmission, e.g. token ring, register insertion | |
| 12/437 | . . . | Ring fault isolation or reconfiguration {(for SDH/SONET ring networks H04J 3/085)} | |
| 12/44 | . . | Star or tree networks | |
| 2012/445 | . . . | {with switching in a hub, e.g. ETHERNET switch} | |

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|--------------|--|---|-------------------------------------|
| 12/46 | . . . | Interconnection of networks | • VTP means VLAN Trunking Protocol} |
| 12/4604 | . . . | {LAN interconnection over a backbone network, e.g. Internet, Frame Relay} | |
| 12/4608 | | {LAN interconnection over ATM networks} | |
| 12/4612 | | {LAN interconnection over narrowband networks, e.g. N-ISDN, PSTN, X.25} | |
| 12/4616 | | {LAN interconnection over a LAN backbone} | |
| 12/462 | | {LAN interconnection over a bridge based backbone} | |
| 12/4625 | | {Single bridge functionality, e.g. connection of two networks over a single bridge} | |
| 2012/4629 | | {using multilayer switching, e.g. layer 3 switching} | |
| 12/4633 | . . . | {Interconnection of networks using encapsulation techniques, e.g. tunneling} | |
| 12/4637 | . . . | {Interconnected ring systems} | |
| 12/4641 | . . . | {Virtual LANs, VLANs, e.g. virtual private networks [VPN] (LAN interconnection over a bridge based backbone H04L 12/462 ; encapsulation techniques H04L 12/4633 ; virtual private networks for security H04L 29/06612 ; routing of packets H04L 45/00 ; packet switches H04L 49/00)} | |
| NOTES | | | |
| 1. | {This group covers: | <ul style="list-style-type: none"> a group of hosts with a common set of requirements that communicate as if they were attached to the same broadcast domain, regardless of their physical location. } | |
| 2. | {This group does not cover: | <ul style="list-style-type: none"> group multicasting, which is covered by group H04L 12/18 configuration of switches supporting VLANs, which is covered by group H04L 41/08 multiprotocol label switching [MPLS], which is covered by group H04L 45/00 spanning tree protocols [STP], which are covered by group H04L 12/462 arrangements for network security, which are covered by group H04L 29/06612 encapsulation techniques, which are covered by group H04L 12/4633 access arrangements, which are covered by group H04L 12/2856 | |
| 3. | {In this group the following terms or expressions are used with the meaning indicated: | <ul style="list-style-type: none"> B-Tag means Backbone VLAN Tag C-Tag means Customer VLAN Tag GARP means Generic Attribute Registration Protocol GVRP means GARP VLAN Registration Protocol I-SID means Service Instance Identifier MVRP means Multiple VLAN Registration Protocol PBB means Provider Backbone Bridges S-Tag means Service VLAN Tag VLAN means Virtual Local Area Network VPN means Virtual Private Network | |
| 12/4645 | | {Details on frame tagging (routing of packets H04L 45/00 ; support for virtual LAN H04L 49/354)} | |
| 12/465 | | {wherein a single frame includes a plurality of VLAN tags} | |
| 12/4654 | | {wherein a VLAN tag represents a customer VLAN, e.g. C-Tag} | |
| 12/4658 | | {wherein a VLAN tag represents a service provider backbone VLAN, e.g. B-Tag, S-Tag} | |
| 12/4662 | | {wherein a VLAN tag represents a service instance, e.g. I-SID in PBB} | |
| 12/4666 | | {Operational details on the addition or the stripping of a tag in a frame, e.g. at a provider edge node} | |
| 12/467 | | {Arrangements for supporting untagged frames, e.g. port-based VLANs} | |
| 12/4675 | | {Dynamic sharing of VLAN information amongst network nodes (configuration of the network or of network elements H04L 41/08)} | |
| 12/4679 | | {Arrangements for the registration or de-registration of VLAN attribute values, e.g. VLAN identifiers, port VLAN membership} | |
| 12/4683 | | {characterized by the protocol used} | |
| 12/4687 | | {MVRP [multiple VLAN registration protocol]} | |
| 12/4691 | | {GVRP [GARP VLAN registration protocol]} | |
| 12/4695 | | {VTP [VLAN trunking protocol]} | |
| 12/50 | . . . | Circuit switching systems, i.e. systems in which the path is physically permanent during the communication | |
| 12/52 | . . . | using time division techniques (in digital transmission systems H04L 5/22) | |
| 12/525 | . . . | {involving a stored program control} | |
| 12/54 | . . . | Store-and-forward switching systems (packet switching systems H04L 12/56) | |
| 12/56 | . . . | {Packet switching systems} | |
| 12/5601 | . . . | {Transfer mode dependent, e.g. ATM} | |
| 12/5602 | | {Bandwidth control in ATM Networks, e.g. leaky bucket} | |
| 2012/5603 | | {Access techniques} | |
| 2012/5604 | | {Medium of transmission, e.g. fibre, cable, radio} | |
| 2012/5605 | | {Fibre} | |
| 2012/5606 | | {Metallic} | |
| 2012/5607 | | {Radio} | |
| 2012/5608 | | {Satellite} | |
| 2012/5609 | | {Topology} | |
| 2012/561 | | {Star, e.g. cross-connect, concentrator, subscriber group equipment, remote electronics} | |
| 2012/5612 | | {Ring} | |
| 2012/5613 | | {Bus (including DQDB)} | |
| 2012/5614 | | {User Network Interface} | |
| 2012/5615 | | {Network termination, e.g. NT1, NT2, PBX} | |
| 2012/5616 | | {Terminal equipment, e.g. codecs, synch.} | |
| 2012/5617 | | {Virtual LANs; Emulation of LANs} | |

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|-----------|-----------|--|-----------|-----------|---|
| 2012/5618 | | {Bridges, gateways [GW] or interworking units [IWU]} | 2012/5671 | | {Support of voice} |
| 2012/5619 | | {Network Node Interface, e.g. tandem connections, transit switching} | 2012/5672 | | {Multiplexing, e.g. coding, scrambling} |
| 2012/562 | | {Routing} | 2012/5673 | | {Coding or scrambling} |
| 2012/5621 | | {Virtual private network [VPN]; Private-network - network-interface (P-NNI)} | 2012/5674 | | {Synchronisation, timing recovery or alignment} |
| 2012/5623 | | {Network design, dimensioning, topology or optimisation} | 2012/5675 | | {Timeslot assignment, e.g. TDMA} |
| 2012/5624 | | {Path aspects, e.g. path bundling} | 2012/5676 | | {Code Division Multiple Access [CDMA]} |
| 2012/5625 | | {Operations, administration and maintenance [OAM]} | 2012/5678 | | {Traffic aspects, e.g. arbitration, load balancing, smoothing, buffer management} |
| 2012/5626 | | {Network management, e.g. Intelligent nets} | 2012/5679 | | {Arbitration or scheduling} |
| 2012/5627 | | {Fault tolerance and recovery} | 2012/568 | | {Load balancing, smoothing or shaping} |
| 2012/5628 | | {Testing} | 2012/5681 | | {Buffer or queue management} |
| 2012/5629 | | {Admission control} | 2012/5682 | | {Threshold; Watermark} |
| 2012/563 | | {Signalling, e.g. protocols, reference model} | 2012/5683 | | {for avoiding head of line blocking} |
| 2012/5631 | | {Resource management and allocation} | 2012/5684 | | {Characteristics of traffic flows} |
| 2012/5632 | | {Bandwidth allocation} | 2012/5685 | | {Addressing issues} |
| 2012/5634 | | {In-call negotiation} | 2012/5686 | | {Use of neural networks} |
| 2012/5635 | | {Backpressure, e.g. for ABR} | 2012/5687 | | {Security aspects} |
| 2012/5636 | | {Monitoring or policing, e.g. compliance with allocated rate, corrective actions} | 12/5691 | | {Access to open networks; Ingress point selection, e.g. ISP selection} |
| 2012/5637 | | {Leaky Buckets} | 12/5692 | | {Selection among different networks} |
| 2012/5638 | | {Services, e.g. multimedia, GOS, QOS} | 12/64 | | Hybrid switching systems |
| 2012/5639 | | {Tariffs or charging} | 12/6402 | | {Hybrid switching fabrics} |
| 2012/564 | | {Connection-oriented} | 2012/6405 | | {Space} |
| 2012/5641 | | {Unicast/point-to-point} | 2012/6408 | | {Shared Medium, e.g. memory, bus, ring} |
| 2012/5642 | | {Multicast/broadcast/point-multipoint, e.g. VOD} | 2012/641 | | {Time switching} |
| 2012/5643 | | {Concast/multipoint-to-point} | 2012/6413 | | {Switch peripheries} |
| 2012/5645 | | {Connectionless} | 2012/6416 | | {Switch multicast} |
| 2012/5646 | | {Cell characteristics, e.g. loss, delay, jitter, sequence integrity} | 12/6418 | | {Hybrid transport} |
| 2012/5647 | | {Cell loss} | 2012/6421 | | {Medium of transmission, e.g. fibre, cable, radio, satellite} |
| 2012/5648 | | {Packet discarding, e.g. EPD, PTD} | 2012/6424 | | {Access arrangements} |
| 2012/5649 | | {Cell delay or jitter} | 2012/6427 | | {Subscriber Access Module; Concentrator; Group equipment} |
| 2012/565 | | {Sequence integrity} | 2012/6429 | | {Terminal adapters} |
| 2012/5651 | | {Priority, marking, classes} | 2012/6432 | | {Topology} |
| 2012/5652 | | {Cell construction, e.g. including header, packetisation, depacketisation, assembly, reassembly} | 2012/6435 | | {Bus} |
| 2012/5653 | | {using the ATM adaptation layer [AAL]} | 2012/6437 | | {Ring} |
| 2012/5654 | | {using the AAL1} | 2012/644 | | {Star} |
| 2012/5656 | | {using the AAL2} | 2012/6443 | | {Network Node Interface, e.g. Routing, Path finding} |
| 2012/5657 | | {using the AAL3/4} | 2012/6445 | | {Admission control} |
| 2012/5658 | | {using the AAL5} | 2012/6448 | | {Medium Access Control [MAC]} |
| 2012/5659 | | {using the AALX} | 2012/6451 | | {Deterministic, e.g. Token, DQDB} |
| 2012/566 | | {using the ATM layer} | 2012/6454 | | {Random, e.g. Ethernet} |
| 2012/5661 | | {Minicells} | 2012/6456 | | {Channel and bandwidth allocation} |
| 2012/5662 | | {Macrocells or frames} | 2012/6459 | | {Multiplexing, e.g. TDMA, CDMA} |
| 2012/5663 | | {Support of N-ISDN} | 2012/6462 | | {Movable boundaries in packets or frames} |
| 2012/5664 | | {Support of Video, e.g. MPEG} | 2012/6464 | | {Priority} |
| 2012/5665 | | {Interaction of ATM with other protocols} | 2012/6467 | | {Information loss recovery, e.g. error correction, prediction} |
| 2012/5667 | | {IP over ATM} | 2012/647 | | {Frame Relay, X.25} |
| 2012/5668 | | {Next hop resolution protocol [NHRP]} | 2012/6472 | | {Internet} |
| 2012/5669 | | {Multiprotocol over ATM [MPOA]} | 2012/6475 | | {N-ISDN, Public Switched Telephone Network [PSTN]} |
| 2012/567 | | {Frame Relay over ATM} | 2012/6478 | | {Digital subscriber line, e.g. DSL, ADSL, HDSL, XDSL, VDSL} |
| | | | 2012/6481 | | {Speech, voice} |
| | | | 2012/6483 | | {Video, e.g. MPEG} |
| | | | 2012/6486 | | {Signalling Protocols} |

- 2012/6489 . . . {Buffer Management, Threshold setting, Scheduling, Shaping}
- 2012/6491 . . . {Echo cancellation}
- 2012/6494 . . . {Silence suppression}
- 2012/6497 . . . {Feedback to the source}
- 12/66 . Arrangements for connecting between networks having differing types of switching systems, e.g. gateways

13/00 Details of the apparatus or circuits covered by groups [H04L 15/00](#) or [H04L 17/00](#)

- 13/02 . Details not particular to receiver or transmitter
- 13/04 . . Driving mechanisms; Clutches ([in general F16](#))
- 13/06 . . Tape or page guiding or feeding devices
- 13/08 . . Intermediate storage means
- 13/10 . . Distributors
- 13/12 . . . Non-mechanical distributors, e.g. relay distributors
- 13/14 Electronic distributors ([in general H03K 17/00](#))
- 13/16 . of transmitters, e.g. code-bars, code-discs
- 13/18 . of receivers
- 13/182 . . {Printing mechanisms}
- 13/184 . . . {Photographic printing and recording}
- 13/186 . . {Page printing; tabulating}
- 13/188 . . {Projection of the printed matter}

15/00 Apparatus or local circuits for transmitting or receiving dot-and-dash codes, e.g. Morse code ([teaching apparatus therefor G09B](#); [keyboard switches in general H01H 13/70](#), [H03K 17/94](#); [telegraph tapping keys H01H 21/86](#); [coding in connection with keyboards or like devices, in general H03M 11/00](#))

- 15/03 . Keys structurally combined with sound generators
- 15/04 . Apparatus or circuits at the transmitting end
- 15/06 . . with a restricted number of keys, e.g. separate key for each type of code element
- 15/08 . . . with a single key which transmits dots in one position and dashes in a second position
- 15/10 . . . combined with perforating apparatus
- 15/12 . . with keyboard co-operating with code-bars
- 15/14 . . . combined with perforating apparatus
- 15/16 . . with keyboard co-operating with code discs
- 15/18 . . Automatic transmitters, e.g. controlled by perforated tape
- 15/20 . . . with optical sensing means
- 15/22 . . Apparatus or circuits for sending one or a restricted number of signals, e.g. distress signals
- 15/24 . Apparatus or circuits at the receiving end
- 15/26 . . operating only on reception of predetermined code signals, e.g. distress signals, party-line call signals
- 15/28 . . Code reproducing apparatus
- 15/285 . . . {Telegraph sounders; Apparatus for acoustic reception}
- 15/30 . . . Writing recorders
- 15/32 . . . Perforating recorders
- 15/34 . . Apparatus for recording received coded signals after translation, e.g. as type-characters

17/00 Apparatus or local circuits for transmitting or receiving codes wherein each character is represented by the same number of equal-length code elements, e.g. Baudot code ([keyboard switches in general H01H 13/70](#), [H03K 17/94](#); [coding in connection with keyboards or like devices, in general H03M 11/00](#))

- 17/02 . Apparatus or circuits at the transmitting end
- 17/04 . . with keyboard co-operating with code-bars
- 17/06 . . . Contact operating means
- 17/08 . . . combined with perforating apparatus
- 17/10 . . with keyboard co-operating with code-discs
- 17/12 . . Automatic transmitters, e.g. controlled by perforated tape
- 17/14 . . . with optical sensing means
- 17/16 . Apparatus or circuits at the receiving end
- 17/18 . . Code selection mechanisms
- 17/20 . . using perforating recorders
- 17/22 . . using mechanical translation and type-bar printing
- 17/24 . . using mechanical translation and type-head printing, e.g. type-wheel, type-cylinder
- 17/26 . . using aggregate motion translation
- 17/28 . . using pneumatic or hydraulic translation
- 17/30 . . using electric or electronic translation

19/00 Apparatus or local circuits for step-by-step systems

21/00 Apparatus or local circuits for mosaic printer telegraph systems

- 21/02 . at the transmitting end
- 21/04 . at the receiving end

23/00 Apparatus or local circuits for systems other than those covered by groups [H04L 15/00](#) - [H04L 21/00](#)

- 23/02 . adapted for orthogonal signalling

25/00 Baseband systems

- 25/02 . Details ([circuits in general for handling pulses H03K](#); [in line transmission systems in general H04B 3/02](#); {Arrangements for supplying electrical power along data transmission lines (systems for transmitting signals via power distribution lines [H04B 3/54](#))}
- 25/0202 . . {Channel estimation}
- 25/0204 . . . {of multiple channels}
- 25/0206 {of each channel individually}
- 25/0208 {of the composite channel}
- 25/021 . . . {Estimation of channel covariance}
- 25/0212 . . . {of impulse response}
- 25/0214 {of a single coefficient}
- 25/0216 {with estimation of channel length}
- 25/0218 {with detection of nulls}
- 25/022 . . . {of frequency response}
- 25/0222 . . . {Estimation of channel variability, e.g. coherence bandwidth, coherence time, fading frequency}
- 25/0224 . . . {using sounding signals}
- 25/0226 {sounding signals *per se*}
- 25/0228 {with direct estimation from sounding signals}
- 25/023 {with extension to other symbols}
- 25/0232 {by interpolation between sounding signals}
- 25/0234 {by non-linear interpolation}

| | | | |
|----------|--|--|--|
| 25/0236 | {using estimation of the other symbols} | 25/03025 | {using a two-tap delay line} |
| 25/0238 | . . . {using blind estimation} | 25/03031 | {using only passive components (H04L 25/03025 takes precedence)} |
| 25/024 | . . . {channel estimation algorithms} | 25/03038 | {with a non-recursive structure (H04L 25/03031 takes precedence)} |
| 25/0242 | {using matrix methods} | 25/03044 | {using fractionally spaced delay lines or combinations of fractionally integrally spaced taps} |
| 25/0244 | {with inversion} | 25/0305 | {using blind adaptation} |
| 25/0246 | {with factorisation} | 25/03057 | {with a recursive structure (H04L 25/03031 takes precedence)} |
| 25/0248 | {Eigen-space methods} | 25/03063 | {using fractionally spaced delay lines or combinations of fractionally and integrally spaced taps} |
| 25/025 | {using least-mean-square [LMS] method} | 25/0307 | {using blind adaptation} |
| 25/0252 | {using third or higher order statistics} | 25/03076 | {not using decision feedback} |
| 25/0254 | {using neural network algorithms} | 25/03082 | {Theoretical aspects of adaptive time domain methods} |
| 25/0256 | {Channel estimation using minimum mean square error criteria} | 25/03089 | {Theory of blind algorithms, recursive or not} |
| 25/0258 | {Channel estimation using zero-forcing criteria} | 25/03095 | {Theory of fractional equalisers, recursive or not} |
| 25/026 | . . {Arrangements for coupling transmitters, receivers or transceivers to transmission lines; Line drivers (duplexing arrangements H04L 5/14)} | 25/03101 | {Theory of the Kalman algorithm} |
| 25/0262 | . . {Arrangements for detecting the data rate of an incoming signal} | 25/03108 | {Theory of recursive equalisers, other than Kalman} |
| 25/0264 | . . {Arrangements for coupling to transmission lines (duplexing arrangements H04L 5/14; line equalisers, line build-out devices H04L 25/03878)} | 25/03114 | {non-adaptive, i.e. not adjustable, manually adjustable, or adjustable only during the reception of special signals} |
| 25/0266 | . . . {Arrangements for providing Galvanic isolation, e.g. by means of magnetic or capacitive coupling} | 25/03121 | {using a two-tap delay line} |
| 25/0268 | {with modulation and subsequent demodulation} | 25/03127 | {using only passive components (H04L 25/03121 takes precedence)} |
| 25/027 | {specifically for telegraph signals (induction coil interrupters H01H 51/34 dynamo- electric generators H02K)} | 25/03133 | {with a non-recursive structure (H04L 25/03127 takes precedence)} |
| 25/0272 | . . . {Arrangements for coupling to multiple lines, e.g. for differential transmission} | 25/0314 | {using fractionally spaced delay lines or combinations of fractionally integrally spaced taps} |
| 25/0274 | {Arrangements for ensuring balanced coupling} | 25/03146 | {with a recursive structure (H04L 25/03127 takes precedence)} |
| 25/0276 | {Arrangements for coupling common mode signals} | 25/03152 | {Theoretical aspects of non-adaptive time domain methods} |
| 25/0278 | . . . {Arrangements for impedance matching} | 25/03159 | {operating in the frequency domain (H04L 25/03165, H04L 25/03178 take precedence)} |
| 25/028 | . . . {Arrangements specific to the transmitter end} | 25/03165 | {using neural networks} |
| 25/0282 | {Provision for current-mode coupling} | 25/03171 | {Arrangements involving maximum a posteriori probability [MAP] detection} |
| 25/0284 | {Arrangements to ensure DC-balance} | NOTE | |
| 25/0286 | {Provision of wave shaping within the driver (wave shaping per se H04L 25/03834)} | This group contains provisionally all documents which deal with turbo equalisation | |
| 25/0288 | {the shape being matched to the transmission line (pre-equalisation per se H04L 25/03343)} | 25/03178 | {Arrangements involving sequence estimation techniques} |
| 25/029 | {Provision of high-impedance states} | 25/03184 | {Details concerning the metric} |
| 25/0292 | . . . {Arrangements specific to the receiver end} | 25/03191 | {in which the receiver makes a selection between different metrics} |
| 25/0294 | {Provision for current-mode coupling} | 25/03197 | {methods of calculation involving metrics} |
| 25/0296 | {Arrangements to ensure DC-balance} | 25/03203 | {Trellis search techniques} |
| 25/0298 | . . . {Arrangement for terminating transmission lines} | 25/0321 | {Sorting arrangements therefor} |
| 25/03 | . . Shaping networks in transmitter or receiver, e.g. adaptive shaping networks (impedance networks per se H03H); {Receiver end arrangements for processing baseband signals} | 25/03216 | {using the M-algorithm} |
| 25/03006 | . . . {Arrangements for removing intersymbol interference} | 25/03222 | {using the T-algorithm} |
| 25/03012 | {operating in the time domain (H04L 25/03165, H04L 25/03178 take precedence)} | | |
| 25/03019 | {adaptive, i.e. capable of adjustment during data reception} | | |

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|--|-----------|--|----------|-----------|---|
| 25/03229 | | { with state-reduction using grouping of states } | 25/03452 | | { Systolic arrays } |
| 25/03235 | | { with state-reduction using feedback filtering } | 25/03458 | | { Lattice } |
| 25/03242 | | { Methods involving sphere decoding } | 25/03464 | | { Neural networks } |
| 25/03248 | | { Arrangements for operating in conjunction with other apparatus } | 25/03471 | | { Tapped delay lines (H04L 2025/03464 takes precedence) } |
| NOTE | | | 25/03477 | | { not time-recursive } |
| This group <u>covers</u> arrangements in which the sequence estimator is specially adapted to provide signals to, or receive signals from, the other apparatus. The group <u>does not cover</u> the mere juxtaposition of elements | | | 25/03484 | | { time-recursive } |
| | | | 25/0349 | | { as a feedback filter } |
| | | | 25/03496 | | { as a prediction filter } |
| | | | 25/03503 | | { as a combination of feedback and prediction filters } |
| | | | 25/03509 | | { fractionally spaced (H04L 2025/03515 takes precedence) } |
| 25/03254 | | { Operation with other circuitry for removing intersymbol interference } | 25/03515 | | { irregularly spaced } |
| 25/03261 | | { with impulse-response shortening filters } | 25/03522 | | { Frequency domain } |
| 25/03267 | | { with decision feedback equalisers } | 25/03528 | | { Other transform domain } |
| 25/03273 | | { with carrier recovery circuitry } | 25/03535 | | { Variable structures } |
| 25/0328 | | { with interference cancellation circuitry (adaptations for interference cancellation within a sequence estimator H04L 25/03305 ; interference related aspects of direct sequence spread spectrum H04B 1/7097 ; interference related aspects of frequency hopping spread spectrum H04B 1/715 ; see also H04B 1/10) } | 25/03541 | | { Switching between domains, e.g. between time and frequency } |
| | | | 25/03547 | | { Switching between time domain structures } |
| 25/03286 | | { with channel-decoding circuitry } | 25/03554 | | { between neural networks and tapped delay lines } |
| 25/03292 | | { with channel estimation circuitry } | 25/0356 | | { Switching the time direction of equalisation } |
| 25/03299 | | { with noise-whitening circuitry } | 25/03566 | | { between different tapped delay line structures } |
| 25/03305 | | { Joint sequence estimation and interference removal (joint detection of several desired signals H04L 25/03331) } | 25/03573 | | { between recursive and non-recursive } |
| 25/03312 | | { Arrangements specific to the provision of output signals } | 25/03579 | | { Modifying the tap spacing } |
| 25/03318 | | { Provision of soft decisions } | 25/03585 | | { Modifying the length } |
| 25/03324 | | { Provision of tentative decisions } | 25/03592 | | { Adaptation methods } |
| 25/03331 | | { Arrangements for the joint estimation of multiple sequences } | 25/03598 | | { Algorithms } |
| 25/03337 | | { Arrangements involving per-survivor processing } | 25/03605 | | { Block algorithms } |
| 25/03343 | | { Arrangements at the transmitter end } | 25/03611 | | { Iterative algorithms } |
| 2025/0335 | | { characterised by the type of transmission } | 25/03617 | | { Time recursive algorithms (H04L 2025/03643 takes precedence) } |
| 2025/03356 | | { Baseband transmission } | 25/03624 | | { Zero-forcing } |
| 2025/03363 | | { Multilevel (H04L 2025/03369 takes precedence) } | 25/0363 | | { Feature restoration, e.g. constant modulus } |
| 2025/03369 | | { Partial response } | 25/03636 | | { Algorithms using least mean square [LMS] } |
| 2025/03375 | | { Passband transmission } | 25/03643 | | { Order recursive } |
| 2025/03382 | | { Single of vestigial sideband } | 25/03649 | | { Algorithms using recursive least square [RLS] } |
| 2025/03388 | | { ASK } | 25/03656 | | { Initialisation } |
| 2025/03394 | | { FSK } | 25/03662 | | { to a fixed value } |
| 2025/03401 | | { PSK } | 25/03668 | | { to the value at the end of a previous adaptation period } |
| 2025/03407 | | { Continuous phase } | 25/03675 | | { Blind algorithms using gradient methods } |
| 2025/03414 | | { Multicarrier } | 25/03681 | | { Control of adaptation } |
| 2025/0342 | | { QAM } | 25/03687 | | { of step size } |
| 2025/03426 | | { transmission using multiple-input and multiple-output channels } | 25/03694 | | { Stop and go } |
| 2025/03433 | | { characterised by equaliser structure } | 25/037 | | { Detection of convergence state } |
| 2025/03439 | | { Fixed structures } | 25/03707 | | { Detection or avoidance of local extrema } |
| 2025/03445 | | { Time domain } | 25/03713 | | { Subspace algorithms } |
| | | | 25/03719 | | { Super-exponential } |
| | | | 25/03726 | | { Switching between algorithms } |

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| 2025/03732 | | {according to the convergence state} | 25/03987 | . . . | {Equalisation for sparse channels} |
| 2025/03738 | | {Manual adaptation} | 25/03993 | . . . | {Noise whitening} |
| 2025/03745 | | {Timing of adaptation} | 25/05 | . . | Electric or magnetic storage of signals before transmitting or retransmitting for changing the transmission rate |
| 2025/03751 | | {only once, at installation (H04L 2025/03738 takes precedence)} | 25/06 | . . | Dc level restoring means; Bias distortion correction {decision circuits providing symbol by symbol detection (detection of unique words or other known elements H04L 7/00, H04J 3/0602)} |
| 2025/03757 | | {only on the request of a user} | 25/061 | . . . | {providing hard decisions only; arrangements for tracking or suppressing unwanted low frequency components, e.g. removal of dc offset (removal of dc offset in coupling arrangements H04L 25/029, H04L 25/0296)} |
| 2025/03764 | | {only during predefined intervals} | 25/062 | | {Setting decision thresholds using feedforward techniques only} |
| 2025/0377 | | {during the reception of training signals} | 25/063 | | {Setting decision thresholds using feedback techniques only} |
| 2025/03777 | | {characterised by the signalling} | 25/064 | | {Subtraction of the threshold from the signal, which is then compared to a supplementary fixed threshold} |
| 2025/03783 | | {Details of reference signals} | 25/065 | | {Binary decisions} |
| 2025/03789 | | {Codes therefore} | 25/066 | | {Multilevel decisions, not including self-organising maps} |
| 2025/03796 | | {Location of reference signals} | 25/067 | . . . | {providing soft decisions, i.e. decisions together with an estimate of reliability (H04L 25/068 and H04L 25/069 take precedence; sequence estimation techniques H04L 25/03178)} |
| 2025/03802 | | {Signalling on the reverse channel} | 25/068 | . . . | {by sampling faster than the nominal bit rate} |
| 2025/03808 | | {Transmission of equaliser coefficients} | 25/069 | . . . | {by detecting edges or zero crossings} |
| 2025/03815 | | {Transmission of a training request} | 25/08 | . . | Modifications for reducing interference; Modifications for reducing effects due to line faults {; Receiver end arrangements for detecting or overcoming line faults} |
| 25/03821 | | {Inter-carrier interference cancellation [ICI]} | 25/085 | . . . | {Arrangements for reducing interference in line transmission systems, e.g. by differential transmission} |
| 25/03828 | . . . | {Arrangements for spectral shaping; Arrangements for providing signals with specified spectral properties (partial response systems H04L 25/497)} | 25/10 | . . | Compensating for variations in line balance {(balancing during the coupling of signals H04L 25/0282)} |
| 25/03834 | | {using pulse shaping} | 25/12 | . . | Compensating for variations in line impedance {(impedance matching in coupling arrangements H04L 25/0278)} |
| 25/0384 | | {Design of pulse shapes (pulse shape for impulse radio H04B 1/7172)} | 25/14 | . . | Channel dividing arrangements {in which a single bit stream is divided between several baseband channels and reassembled at the receiver} |
| 25/03847 | | {Shaping by selective switching of amplifying elements} | 25/20 | . . | Repeater circuits; Relay circuits |
| 25/03853 | | {Shaping by digital methods other than look up tables or up/down converters} | 25/202 | . . . | {using mechanical devices (H04L 25/205 takes precedence)} |
| 25/03859 | | {shaping using look up tables for partial waveforms} | 25/205 | . . . | {using tuning forks or vibrating reeds} |
| 25/03866 | | {using scrambling} | 25/207 | . . . | {using electromagnetic switches} |
| 25/03872 | | {Parallel scrambling or descrambling} | 25/22 | . . . | Repeaters for converting two wires to four wires (in general H04B); Repeaters for converting single current to double current |
| 25/03878 | . . . | {Line equalisers; line build-out devices} | 25/24 | . . . | Relay circuits using discharge tubes or semiconductor devices {(H04L 25/22 takes precedence)} |
| 25/03885 | | {adaptive} | 25/242 | | {with retiming} |
| 25/03891 | . . . | {Spatial equalizers (MIMO diversity systems H04B 7/0413)} | 25/245 | | {for start-stop signals (detection of start or stop bits H04J 3/0602)} |
| 25/03898 | | {codebook-based design (selection of codebook or precoding matrix for MIMO diversity systems H04B 7/0456)} | 25/247 | | {for synchronous signals} |
| 25/03904 | | {cooperative design, e.g. exchanging of codebook information between base stations} | 25/26 | . . . | Circuits with optical sensing means {, i.e. using opto-couplers for isolation} |
| 25/0391 | | {construction details of matrices} | | | |
| 25/03917 | | {according to the size of the codebook} | | | |
| 25/03923 | | {according to the rank} | | | |
| 25/03929 | | {with layer mapping, e.g. codeword-to layer design (for space-time coding H04L 1/0618)} | | | |
| 25/03936 | | {multi-resolution codebooks} | | | |
| 25/03942 | | {switching between different codebooks} | | | |
| 25/03949 | | {equalizer selection or adaptation based on feedback (multiple signaling inclusive of a precoding command for adapting the transmitter H04L 1/0031; feedback for transmit diversity systems H04B 7/0619; selection of codebook or precoding matrix for MIMO diversity systems H04B 7/0456)} | | | |
| 25/03955 | | {in combination with downlink estimations, e.g. downlink path losses} | | | |
| 25/03961 | | {design criteria} | | | |
| 25/03968 | | {mean-square error [MSE]} | | | |
| 25/03974 | | {throughput maximization} | | | |
| 25/0398 | . . . | {Restoration of channel reciprocity} | | | |

- 25/38 . Synchronous or start-stop systems, e.g. for Baudot code
- 25/40 . . Transmitting circuits; Receiving circuits ([repeater circuits, relay circuits H04L 25/20](#))
- 25/42 . . . using mechanical distributors
- 25/44 . . . using relay distributors
- 25/45 . . . using electronic distributors ([electronic distributors in general H03K 17/00](#))
- 25/46 . . . using tuning forks or vibrating reeds
- 25/49 . . . using code conversion at the transmitter; using predistortion; using insertion of idle bits for obtaining a desired frequency spectrum; using three or more amplitude levels {; Baseband coding techniques specific to data transmission systems ([spectral shaping H04L 25/03828](#))}
- 25/4902 {Pulse width modulation; Pulse position modulation}
- 25/4904 {using self-synchronising codes, e.g. split-phase codes}
- 25/4906 {using binary codes}
- 25/4908 {using mBnB codes}
- 25/491 {using 1B2B codes}
- 25/4912 {using CMI or 2-HDB-3 code}
- 25/4915 {using pattern inversion or substitution ([H04L 25/4908 takes precedence](#))}
- 25/4917 {using multilevel codes}
- 25/4919 {using balanced multilevel codes ([H04L 25/4927 takes precedence](#))}
- 25/4921 {using quadrature encoding, e.g. carrierless amplitude-phase coding}
- 25/4923 {using ternary codes ([H04L 25/4927 takes precedence](#))}
- 25/4925 {using balanced bipolar ternary codes}
- 25/4927 {using levels matched to the quantisation levels of the channel}
- 25/493 by transition coding, i.e. the time-position or direction of a transition being encoded before transmission
- 25/497 by correlative coding, e.g. partial response coding or echo modulation coding {transmitters and receivers for partial response systems ([transversal equalizers H04L 25/03](#); [partial response continuous phase modulation systems H04L 27/18](#))}
- 25/4975 {Correlative coding using Tomlinson precoding, Harashima precoding, Trellis precoding or GPRS}
- 27/00** **Modulated-carrier systems** {(code shift keying in combination with frequency multiplexing [H04L 5/06](#); simultaneous bidirectional transmission of ac signals [H04L 5/143](#); code shift keying [H04L 23/02](#); polarisation shift keying [H04B 14/008](#); transmission of data during the active part of a television frame [H04N 7/025](#))}
- 27/0002 . {analog front ends; means for connecting modulators, demodulators or transceivers to a transmission line ([duplex arrangements H04L 5/143](#))}
- 27/0004 . {using wavelets}
- 27/0006 . {Assessment of spectral gaps suitable for allocating digitally modulated signals, e.g. for carrier allocation in cognitive radio ([for spectrum sharing between different networks H04W 16/14](#))}
- 27/0008 . {arrangements for allowing a transmitter or receiver to use more than one type of modulation ([negotiating modulation type for two-way transmission paths H04L 5/1453](#))}
- 27/001 . {using chaotic signals ([for secret or secure communication H04L 9/001](#))}
- 27/0012 . {arrangements for identifying the type of modulation}
- 27/0014 . {Carrier regulation ([of chaotic carriers H04L 27/001](#); [for multicarrier receivers H04L 27/2657](#))}
- 27/0016 . . {Stabilisation of local oscillators}
- 27/0018 . . {Arrangements at the transmitter end}
- 27/002 . . . {using feedback from a remote receiver}
- 27/0022 . . . {using the carrier of the associated receiver of a transceiver}
- 27/0024 . . {at the receiver end}
- 27/0026 . . . {Correction of carrier offset}
- 27/0028 {at passband only}
- 27/003 {at baseband only}
- 27/0032 {at baseband and passband}
- 27/0034 {using hypothesis testing}
- 27/0036 {using a recovered symbol clock}
- 27/0038 {using an equaliser}
- 27/004 {the equaliser providing control signals}
- 27/0042 {the equaliser providing the offset correction [per se](#)}
- 27/0044 . . {Control loops for carrier regulation}
- 27/0046 . . . {Open loops}
- 27/0048 {Frequency multiplication}
- 27/0051 {Harmonic tracking}
- 27/0053 . . . {Closed loops}
- 27/0055 {single phase}
- 27/0057 {quadrature phase}
- 27/0059 {more than two phases}
- 27/0061 {remodulation}
- 27/0063 . . . {Elements of loops}
- 27/0065 {Frequency error detectors ([H04L 2027/0067 takes precedence](#))}
- 27/0067 {Phase error detectors}
- 27/0069 {Loop filters}
- 27/0071 . . . {Control of loops}
- 27/0073 {Detection of synchronisation state}
- 27/0075 {Error weighting}
- 27/0077 {stop and go}
- 27/0079 {Switching between loops}
- 27/0081 {between loops of different bandwidths}
- 27/0083 . . {Signalling arrangements}
- 27/0085 . . . {with no special signals for synchronisation}
- 27/0087 . . . {Out-of-band signals, (e.g. pilots)}
- 27/0089 . . . {In-band signals}
- 27/0091 {Continuous signals}
- 27/0093 {Intermittant signals}
- 27/0095 {in a preamble or similar structure}
- 27/0097 . . . {Adaptive synchronisation signals}
- 27/01 . Equalisers {(baseband equalisers [H04L 25/03](#); control of amplification [H03G](#); in analogue transmission systems [H04B 3/04](#), [H04B 7/005](#))}
- 27/02 . Amplitude-modulated carrier systems, e.g. using on-off keying; Single sideband or vestigial sideband modulation ([H04L 27/32 takes precedence](#))
- 27/04 . . Modulator circuits ([in general H03C H03K 7/02](#)); Transmitter circuits

- 27/06 . . Demodulator circuits (in general [H03D](#) [{H03K 9/02}](#)); Receiver circuits
- 27/063 . . . {Superheterodyne receivers}
- 27/066 . . . {Carrier recovery circuits ([H04L 27/2271](#) takes precedence)}
- 27/08 . . Amplitude regulation arrangements
- 27/10 . Frequency-modulated carrier systems, i.e. using frequency-shift keying ([H04L 27/32](#) takes precedence {; continuous phase systems [H04L 27/18](#)})
- 27/103 . . {Chirp modulation (for spread spectrum techniques [H04B 1/69](#); for spread spectrum using chirp [H04B 2001/6912](#))}
- 27/106 . . {M-ary FSK}
- 27/12 . . Modulator circuits (in general [H03C](#) [{H03K 7/06}](#)); Transmitter circuits {(continuous phase modulation [H04L 27/20](#))}
- 27/122 . . . {using digital generation of carrier signals (digital function generators [G06F 1/02](#), [H04L 17/10](#); generating pulses having stepped portions using digital techniques [H03K 4/026](#))}
- 27/125 . . . {using a controlled oscillator in an open loop}
- 27/127 . . . {using a controlled oscillator in a feedback loop}
- 27/14 . . Demodulator circuits (in general [H03D](#) [{H03K 9/06}](#)); Receiver circuits {(for continuous phase modulation systems [H04L 27/22](#))}
- 27/142 . . . {Compensating direct current components occurring during the demodulation and which are caused by mistuning}
- 27/144 . . . with demodulation using spectral properties of the received signal, e.g. by using frequency selective- or frequency sensitive elements
- 27/148 using filters, including PLL-type filters
- 27/152 using controlled oscillators, e.g. PLL arrangements
- 27/1525 {using quadrature demodulation}
- 27/156 . . . with demodulation using temporal properties of the received signal, e.g. detecting pulse width
- 27/1563 {using transition or level detection}
- 27/1566 {using synchronous sampling}
- 27/16 . . Frequency regulation arrangements
- 27/18 . Phase-modulated carrier systems, i.e. using phase-shift keying ([H04L 27/32](#) takes precedence) {includes continuous phase systems}
- 27/183 . . {Multiresolution systems}
- 27/186 . . {in which the information is carried by both the individual signal points and the subset to which the individual signal points belong, e.g. coset coding or related schemes}
- 27/20 . . Modulator circuits (in general [H03C](#) [{H03K 7/04}](#)); Transmitter circuits
- 27/2003 . . . {for continuous phase modulation (frequency shift keying [H04L 27/10](#))}
- 27/2007 {in which the phase change within each symbol period is constrained (coset coding [H04L 27/186](#))}
- 27/201 {in which the allowed phase changes vary with time, e.g. multi-h modulation}
- 27/2014 {in which the phase changes in a piecewise linear manner during each symbol period, e.g. minimum shift keying, fast frequency shift keying ([H04L 27/201](#) takes precedence)}
- 27/2017 {in which the phase changes are non-linear, e.g. generalized and Gaussian minimum shift keying, tamed frequency modulation ([H04L 27/201](#) takes precedence)}
- 27/2021 {in which the phase change per symbol period is not constrained}
- 27/2025 {in which the phase changes in a piecewise linear manner within each symbol period}
- 27/2028 {in which the phase changes are non-linear}
- 27/2032 . . . {for discrete phase modulation, e.g. in which the phase of the carrier is modulated in a nominally instantaneous manner}
- 27/2035 {using a single or unspecified number of carriers}
- 27/2039 {using microwave technology}
- 27/2042 {with more than two phase states}
- 27/2046 {in which the data are represented by carrier phase}
- 27/205 {in which the data are represented by the change in phase of the carrier}
- 27/2053 {using more than one carrier, e.g. carriers with different phases}
- 27/2057 {with a separate carrier for each phase state}
- 27/206 {using a pair of orthogonal carriers, e.g. quadrature carriers}
- 27/2064 {using microwave technology}
- 27/2067 {with more than two phase states ([H04L 27/2064](#) takes precedence)}
- 27/2071 {in which the data are represented by the carrier phase, e.g. systems with differential coding}
- 27/2075 {in which the data are represented by the change in carrier phase}
- 27/2078 {in which the phase change per symbol period is constrained (coset coding [H04L 27/186](#))}
- 27/2082 {for offset or staggered quadrature phase shift keying}
- 27/2085 {with more than one phase shift per symbol period}
- 27/2089 {with unbalanced quadrature channels}
- 27/2092 {with digital generation of the modulated carrier (does not include the modulation of a digitally generated carrier)}
- 27/2096 . . . {Arrangements for directly or externally modulating an optical carrier (optical modulation [H04B 10/503](#))}
- 27/22 . . Demodulator circuits (in general [H03D](#) [{H03K 9/04}](#)); Receiver circuits
- 27/223 . . . {Demodulation in the optical domain (optical demodulation [H04B 10/676](#))}
- 27/227 . . . using coherent demodulation
- 27/2271 {wherein the carrier recovery circuit uses only the demodulated signals}
- 27/2272 {using phase locked loops ([H04L 27/2273](#) takes precedence)}
- 27/2273 {associated with quadrature demodulation, e.g. Costas loop}

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| 27/2275 | {wherein the carrier recovery circuit uses the received modulated signals} | 27/2639 | {Discrete cosine transform modulators} |
| 27/2276 | {using frequency multiplication or harmonic tracking} | 27/264 | {Filterbank multicarrier [FBMC]} |
| 27/2277 | {using remodulation} | 27/2642 | {Wavelet transform modulators (wavelets in general H04L 27/0004 ; wavelet-division H04L 5/0008)} |
| 27/2278 | {using correlation techniques, e.g. for spread spectrum signals} | 27/2643 | {using symbol repetition, e.g. time domain realization of distributed FDMA} |
| 27/233 | . . . using non-coherent demodulation | 27/2644 | {with oversampling} |
| 27/2331 | {wherein the received signal is demodulated using one or more delayed versions of itself} | 27/2646 | {using feedback from receiver for adjusting OFDM transmission parameters, e.g. transmission timing or guard interval length} |
| 27/2332 | {using a non-coherent carrier} | 27/2647 | . . . {Arrangements specific to the receiver (equalisation H04L 25/03006 , H04L 27/01)} |
| 27/2334 | {using filters} | 27/2649 | {Demodulators} |
| 27/2335 | {using temporal properties of the received signal} | 27/265 | {Fourier transform demodulators} |
| 27/2337 | {using digital techniques to measure the time between zero-crossings} | 27/2652 | {with polyphase implementation} |
| 27/2338 | {using sampling (H04L 27/2331 - H04L 27/2335 take precedence)} | 27/2653 | {with direct demodulation of individual subcarriers} |
| 27/24 | . . Half-wave signalling systems | 27/2655 | {Synchronisation arrangements} |
| 27/26 | . Systems using multi-frequency codes (H04L 27/32 takes precedence) | 27/2656 | {Frame synchronisation} |
| 27/2601 | . . {Multicarrier modulation systems} | 27/2657 | {Carrier synchronisation} |
| 27/2602 | . . . {Signal structure} | 27/2659 | {Coarse or integer frequency offset determination and synchronisation} |
| 27/2604 | {Multiresolution systems (by means of multiresolution subcarriers H04L 27/183 , H04L 27/3488)} | 27/266 | {Fine or fractional frequency offset determination and synchronisation} |
| 27/2605 | {Symbol extensions} | 27/2662 | {Symbol synchronisation} |
| 27/2607 | {Cyclic extensions} | 27/2663 | {Coarse synchronisation, e.g. by correlation} |
| 27/2608 | {Allocation of payload} | 27/2665 | {Fine synchronisation, e.g. by positioning the FFT window} |
| 27/261 | {Details of reference signals (H04L 27/262 takes precedence)} | 27/2666 | {Acquisition of further OFDM parameters, e.g. bandwidth, subcarrier spacing, or guard interval length} |
| 27/2611 | {Distribution thereof} | 27/2668 | {Details of algorithms} |
| 27/2613 | {Structure of the reference signals <u>per se</u> } | 27/2669 | {characterised by the domain of operation} |
| 27/2614 | . . . {Peak power aspects} | 27/2671 | {Time domain} |
| 27/2615 | {Reduction thereof using coding} | 27/2672 | {Frequency domain} |
| 27/2617 | {using block codes} | 27/2673 | {characterised by synchronisation parameters} |
| 27/2618 | {Reduction thereof using auxiliary subcarriers} | 27/2675 | {Pilot or known symbols (structure of pilot symbols H04L 27/2613 ; cell search in orthogonal multiplex systems H04J 11/0069 ; allocation of pilot signals H04L 5/0048)} |
| 27/262 | {Reduction thereof by selection of pilot symbols} | 27/2676 | {Blind, i.e. without using known symbols} |
| 27/2621 | {Reduction thereof using phase offsets between subcarriers} | 27/2678 | {using cyclostationarities, e.g. cyclic prefix or postfix} |
| 27/2623 | {Reduction thereof by clipping} | 27/2679 | {Decision-aided} |
| 27/2624 | {by soft clipping} | 27/2681 | {characterised by constraints} |
| 27/2626 | . . . {Arrangements specific to the transmitter} | 27/2682 | {Precision} |
| 27/2627 | {Modulators} | 27/2684 | {Complexity} |
| 27/2628 | {Inverse Fourier transform modulators, e.g. IFFT/IDFT (DFT or FFT computation methods or devices in general G06F 17/141)} | 27/2685 | {Speed of convergence} |
| 27/263 | {modification of IFFT/IDFT modulator for performance improvement} | 27/2686 | {Range of frequencies or delays tested} |
| 27/2631 | {with polyphase implementation} | 27/2688 | {Resistance to perturbation, e.g. noise, interference or fading} |
| 27/2633 | {using partial FFTs} | 27/2689 | {Link with other circuits, i.e. special connections between synchronisation arrangements and other circuits for achieving synchronisation} |
| 27/2634 | {IFFT/IDFT in combination with other circuits for modulation (DFT or FFT computation methods or devices in general G06F 17/141)} | | |
| 27/2636 | {with FFT/DFT, e.g. standard SC-FDMA transmitter or DFT-SOFDM} | | |
| 27/2637 | {with direct modulation of individual subcarriers} | | |

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| 27/2691 | {involving interference determination or cancellation (interference mitigation or coordination in orthogonal multiplex systems in general H04J 11/0023)} | 27/3477 | {by using the outer points of the constellation or of the constituent two-dimensional constellations} |
| 27/2692 | {with preamble design, i.e. with negotiation of the synchronisation sequence with transmitter or sequence linked to the algorithm used at the receiver} | 27/3483 | {using a modulation of the constellation points} |
| 27/2694 | {adaptive design} | 27/3488 | . . . {Multiresolution systems} |
| 27/2695 | {with channel estimation, e.g. determination of delay spread, derivative or peak tracking (channel estimation per se H04L 25/0202)} | 27/3494 | . . . {using non - square modulating pulses, e.g. using raised cosine pulses; Partial response QAM, i.e. with partial response pulse shaping (QAM over partial response channels H04L 25/497)} |
| 27/2697 | . . . {in combination with other modulation techniques} | 27/36 | . . . Modulator circuits; Transmitter circuits |
| 27/2698 | . . . {double density OFDM/OQAM system, e.g. OFDM/OQAM-IOTA system} | 27/361 | {Modulation using a single or unspecified number of carriers, e.g. with separate stages of phase and amplitude modulation} |
| 27/28 | . . with simultaneous transmission of different frequencies each representing one code element | 27/362 | {Modulation using more than one carrier, e.g. with quadrature carriers, separately amplitude modulated (H04L 27/366 takes precedence)} |
| 27/30 | . . wherein each code element is represented by a combination of frequencies | 27/363 | {using non - square modulating pulses, modulators specifically designed for this (transmission of non - square QAM H04L 27/3494)} |
| 27/32 | . Carrier systems characterised by combinations of two or more of the types covered by groups H04L 27/02 , H04L 27/10 , H04L 27/18 or H04L 27/26 | 27/364 | {Arrangements for overcoming imperfections in the modulator, e.g. quadrature error or unbalanced I and Q levels} |
| 27/34 | . . Amplitude- and phase-modulated carrier systems, e.g. quadrature-amplitude modulated carrier systems | 27/365 | {Modulation using digital generation of the modulated carrier (not including modulation of a digitally generated carrier)} |
| 27/3405 | . . . {Modifications of the signal space to increase the efficiency of transmission, e.g. reduction of the bit error rate, bandwidth, or average power} | 27/366 | {Arrangements for compensating undesirable properties of the transmission path between the modulator and the demodulator} |
| 27/3411 | {reducing the peak to average power ratio or the mean power of the constellation; Arrangements for increasing the shape gain of a signal set} | 27/367 | {using predistortion} |
| 27/3416 | {in which the information is carried by both the individual signal points and the subset to which the individual points belong, e.g. using coset coding, lattice coding, or related schemes} | 27/368 | {adaptive predistortion} |
| 27/3422 | {in which the constellation is not the n - fold Cartesian product of a single underlying two-dimensional constellation} | 27/38 | . . . Demodulator circuits; Receiver circuits |
| 27/3427 | {in which the constellation is the n - fold Cartesian product of a single underlying two-dimensional constellation} | 27/3809 | {Amplitude regulation arrangements} |
| 27/3433 | {using an underlying square constellation} | 27/3818 | {using coherent demodulation, i.e. using one or more nominally phase synchronous carriers (H04L 27/227 and H04L 27/389 take precedence)} |
| 27/3438 | {using an underlying generalised cross constellation} | 27/3827 | {in which the carrier is recovered using only the demodulated baseband signals} |
| 27/3444 | {by applying a certain rotation to regular constellations} | 27/3836 | {in which the carrier is recovered using the received modulated signal or the received IF signal, e.g. by detecting a pilot or by frequency multiplication} |
| 27/345 | . . . {Modifications of the signal space to allow the transmission of additional information} | 27/3845 | {using non - coherent demodulation, i.e. not using a phase synchronous carrier} |
| 27/3455 | {in order to facilitate carrier recovery at the receiver end, e.g. by transmitting a pilot or by using additional signal points to allow the detection of rotations} | 27/3854 | {using a non - coherent carrier, including systems with baseband correction for phase or frequency offset} |
| 27/3461 | {in order to transmit a subchannel} | 27/3863 | {Compensation for quadrature error in the received signal} |
| 27/3466 | {by providing an alternative to one signal point} | 27/3872 | {Compensation for phase rotation in the demodulated signal} |
| 27/3472 | {by switching between alternative constellations} | 27/3881 | {using sampling and digital processing, not including digital systems which imitate heterodyne or homodyne demodulation} |
| | | 27/389 | {with separate demodulation for the phase and amplitude components} |
| | | 29/00 | Arrangements, apparatus, circuits or systems, not covered by a single one of groups H04L 1/00 - H04L 27/00 |

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|---|---------|--|--|---------|--|
| 29/02 | | Communication control {(in satellite networks H04B 7/185); Communication processing (H04L 29/12 , H04L 29/14 take precedence)} | 29/06129 | | {involving combined use or selection criteria between TCP and UDP protocols (multi-protocol arrangements in general H04L 29/06163 ; multilink protocols in general H04L 29/06088)} |
| 29/04 | . . | for plural communication lines | | | |
| 29/06 | . . | characterised by a protocol | | | |
| 29/06006 | . . . | {Protocol performance} | 29/06136 | | {IP fragmentation or TCP segmentation aspects (evaluation of maximum transfer unit H04L 47/36 ; assembly or disassembly of packets in wireless networks H04W 28/065)} |
| 29/06013 | . . . | {Protocol definition or specification (protocol conformance testing H04L 1/244)} | | | |
| 29/0602 | . . . | {Protocols characterised by their application (H04L 29/08081 takes precedence)} | 29/06142 | | {Transitional provisions between IPv4 and IPv6 (address translation between IPv4 and IPv6 H04L 29/12358 ; involvement of different protocol versions in wireless network layer protocols, e.g. MIPv4 and MIPv6, H04W 80/045)} |
| 29/06027 | | {Protocols for multimedia communication} | | | |
| WARNING | | | | | |
| This group is no longer used for the classification of new documents as from April 21, 2008. The backlog of this group is being continuously reclassified to subgroups of H04L 29/06176 | | | | | |
| 29/06034 | | {Protocols for telewriting; Protocols for networked simulations, virtual reality or games} | 29/06149 | | {Special adaptations of TCP, UDP or IP to match specific link layer protocols, e.g. ATM, SONET or PPP (IP over ATM H04Q 11/0478 ; special adaptation of TCP protocol for wireless media H04W 80/06)} |
| 29/0604 | | {Protocols for data compression (compression in general H03M 7/30)} | 29/06156 | | {Special adaptations of TCP, UDP or IP for interworking of IP based networks with other networks (protocols for interworking in general H04L 29/06068)} |
| 29/06047 | | {Protocols for client-server architecture} | 29/06163 | | {Multi-protocol handler, e.g. single device capable of handling multiple protocols} |
| 29/06054 | | {Access to distributed or replicated servers, e.g. using brokers} | 29/0617 | | {Protocols for remote procedure call} |
| 29/06061 | . . . | {Notations for structuring of protocol data, e.g. Abstract Syntax Notation One (ASN 1)} | 29/06176 | | {Arrangements for real-time multimedia communications (data switching systems for broadcast or conference H04L 12/18 ; network applications in general H04L 29/08081 ; message switching systems H04L 51/00 ; systems providing special services to telephonic subscribers H04M 3/42 ; interconnection arrangements between switching centres for working between exchanges having different types of switching equipment where the types of switching equipment comprise PSTN/ISDN equipment and equipment of networks other than PSTN/ISDN H04M 7/1205 ; television systems H04N 7/00)} |
| 29/06068 | . . . | {Protocols for interworking or protocol conversion} | NOTES | | |
| 29/06074 | . . . | {Streamlined, light-weight or high-speed protocols, e.g. express transfer protocol [XTP], byte stream} | 1. [N: This group covers: | | |
| 29/06081 | . . . | {Protocol engines, e.g. VLSIs, transputer} | <ul style="list-style-type: none"> only communications which fulfil the following two conditions: <ol style="list-style-type: none"> they are based on packet data; there is real-time or pseudo-real-time temporal association between source and destination, or source and network, or destination and network; provided that the above two conditions are met, this group covers arrangements relating to <ol style="list-style-type: none"> the transmission of the multimedia data itself, the user-to-user, user-to-network, inter-network or intra-network signalling supporting: <ol style="list-style-type: none"> the establishment of a session for the subsequent transmission of the multimedia data, or the maintenance of the session or the application services available to the user during the session | | |
| 29/06088 | . . . | {Multichannel or multilink protocols} | | | |
| 29/06095 | . . . | {Special adaptations or provisions of the transmission control protocol/internet protocol [TCP/IP] or the user datagram protocol [UDP] (flow control in data switching networks in general H04L 47/10 ; adapting video multiplex streams to a specific network H04N 21/2381 ; network layer protocol adaptations for supporting mobility, e.g. mobile IP H04W 80/04)} | | | |
| 29/06102 | | {Implementation details of TCP/IP or UDP/IP stack architecture; specification of modified or new header fields (protocols engines in general H04L 29/06081 ; OSI stack based layering aspects H04L 29/08009 ; protocol header analysis in general H04L 29/0653)} | | | |
| 29/06108 | | {involving adaptations of sockets based mechanisms (secure socket layer H04L 29/06965)} | | | |
| 29/06115 | | {Adaptation of TCP data exchange control procedures (generic OSI layer 4 protocols, e.g. SCTP H04L 29/08045 ; TCP or UDP flow control procedures H04L 47/19 ; error control procedures in general H04L 1/18)} | | | |
| 29/06122 | | {Adaptation or special uses of UDP protocol} | | | |

(unless explicitly excluded in certain cases).

2. This group does not cover:
- non-real-time multimedia file transfer, which is covered by group [H04L 29/08117](#).
 - multimedia store or forward messaging as in e-mail, MMS or the like, which are covered by group [H04L 51/00](#)
 - analogue multimedia streaming, as in analogue television systems, which is covered by groups [H04N 7/00](#) or [H04N 5/00](#)
 - bit streaming, i.e. not packet-based, such as in ISDN, which is covered by group [H04Q 11/04](#)
 - instant messaging, which is covered by group [H04L 51/04](#)
 - any other multimodal data communications which do not meet the conditions of being packet-based and real-time or pseudo-real-time.
3. In this group the following terms or expressions are used with the meaning indicated:
- H.323 means International Telecommunication Union Recommendation no. 323, series H, entitled "Packet-based multimedia communications systems"
 - IP means Internet Protocol
 - IMS means IP Multimedia Subsystem
 - ISDN means Integrated Services Digital Network
 - MGC means Media Gateway Control/Controller
 - MGCP means Media Gateway Control Protocol
 - MMS means Multimedia Messaging Service
 - PBX means Private Branch Exchange
 - PSTN means Public Switched Telephone Network
 - QoS means Quality of Service
 - RTP means Real Time Protocol
 - RTCP means Real Time Control Protocol
 - SIP means Session Initiation Protocol
 - SPAM means unsolicited electronic mail
 - SPIT means SPAM Prevention in IP Telephony

WARNING

Group [H04L 29/06176](#) or subgroups are not complete pending reorganisation. See also [H04L 29/06027](#)

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| 29/06183 | | {Signalling, control or architecture (data network management H04L 41/00 ; data network testing or monitoring H04L 43/00 ; selecting or control in telephonic networks H04Q 3/00)} |
| 29/0619 | | {Signalling or session protocols} |
| 29/06197 | | {SIP [Session Initiation Protocol]} |
| 29/06204 | | {H.323} |
| 29/0621 | | {Network architectures, gateways, control or user entities} |
| 29/06217 | | {IMS [IP multimedia subsystem] (wireless communication networks H04W)} |
| 29/06224 | | {Gateways (protocols for interworking or protocol conversion H04L 29/06068 ; interconnection between PSTN/ISDN networks and networks other than PSTN/ISDN H04M 7/1205 ; arrangements for connecting between networks having differing types of switching systems H04L 12/66)} |
| 29/06231 | | {Media gateways} |
| 29/06238 | | {at the edge} |
| 29/06244 | | {in the network} |
| 29/06251 | | {Signalling gateways} |
| 29/06258 | | {at the edge} |
| 29/06265 | | {in the network} |
| 29/06272 | | {MGC [media gateway control], MGCP or Megaco (decomposed PSTN/ISDN-IP gateways H04M 7/1255)} |
| 29/06278 | | {Call controllers; Call servers} |
| 29/06285 | | {Proxies, e.g. SIP proxies} |
| 29/06292 | | {Arrangements providing PBX functionality, e.g. IP PBX (circuit switched PBXs H04M 3/42314 ; PBX networks H04M 7/009)} |
| 29/06299 | | {for multi-site} |
| 29/06306 | | {End-user terminal functionality (substation equipment for use by subscribers H04M 1/00 ; terminal profiles H04L 29/08927 ; terminal emulation H04L 29/08126 ; adaptation for terminals with limited resources or for terminal portability H04L 29/08108)} |
| 29/06312 | | {Application servers (systems providing special services to telephonic subscribers H04M 3/42)} |
| 29/06319 | | {Session control} |
| 29/06326 | | {Setup (connection or session management in network applications H04L 29/08576 ; arrangements for peer-to-peer networking in network applications H04L 29/08306 ; negotiation of communication capabilities H04L 29/06537)} |
| 29/06333 | | {Registration (arrangements for addressing or naming in data networks H04L 29/12009)} |
| 29/0634 | | {Screening (arrangements for screening incoming telephone calls H04M 3/436 ; arrangements for network security H04L 29/06551)} |
| 29/06346 | | {of unsolicited session attempts, e.g. SPIT [SPAM prevention in IP telephony] (message switching systems H04L 51/00)} |
| 29/06353 | | {In-session procedures} |
| 29/0636 | | {session scope modification} |
| 29/06367 | | {by adding or removing media} |
| 29/06374 | | {by adding or removing participants} |

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|----------|-----------|--|----------|-----------|--|
| 29/0638 | | {Features, e.g. call-forwarding or call hold (systems providing special services to telephonic subscribers H04M 3/42)} | 29/06482 | | {Media manipulation, adaptation or conversion (transmission of television signals using pulse code modulation H04N 7/24 ; adaptation for terminals or networks with limited resources or for terminal portability H04L 29/08108 ; data reduction or adaptation H04L 29/08792 ; network application being adapted for the location of the user terminal H04L 29/08657)} |
| 29/06387 | | {Services or applications (systems providing special services to telephonic subscribers H04M 3/42 ; contact center services H04M 3/51 ; information services comprising voice H04M 3/487)} | 29/06489 | | {at the source} |
| 29/06394 | | {Services involving a main real time session and one or more additional parallel sessions (multichannel or multilink protocols H04L 29/06088 ; services and arrangements where telephone services are combined with data services H04M 7/0024)} | 29/06496 | | {at the destination} |
| 29/06401 | | {where at least one of the additional parallel sessions is real time or time sensitive, e.g. white board sharing, collaboration, spawning of a subconference (telewriting, virtual reality or network gaming H04L 29/06034)} | 29/06503 | | {intermediate} |
| 29/06408 | | {where none of the additional parallel sessions is real time or time sensitive, e.g. downloading a file in a parallel FTP session, initiating an email, combinational services (web-based applications H04L 29/0809 ; file transfer H04L 29/08117 ; message switching systems H04L 51/00 ; instant messaging H04L 51/04)} | 29/0651 | | {Stream encoding details (transmission of television signals using pulse code modulation H04N 7/24 ; protocols for data compression H04L 29/0604 ; header parsing or analysis H04L 29/0653)} |
| 29/06414 | | {Arrangements for multiparty communication, e.g. conference (television conferencing systems H04N 7/15 ; telephonic conference systems H04M 3/56 ; data switching systems for broadcast or conference H04L 12/18)} | 29/06517 | | {Streaming protocols, e.g. RTP, RTCP} |
| 29/06421 | | {with central floor control} | 29/06523 | | {Quality of Service (QoS) aspects (arrangements for scheduling or organising the servicing of requests whereby quality of service or priority requirements are taken into account H04L 29/08954 ; adaptation for terminals and/or networks with limited resources or for terminal portability H04L 29/08108 ; data reduction and/or adaptation H04L 29/08792 ; network application is adapted for the location of the user terminal H04L 29/08657)} |
| 29/06428 | | {with distributed floor control} | 29/0653 | | {Header parsing and analysis} |
| 29/06435 | | {without floor control} | 29/06537 | | {Negotiation of communication capabilities} |
| 29/06442 | | { "Push-to-X" services (Push-to-Talk services in wireless networks H04W 4/025)} | 29/06544 | | {Special purpose or proprietary protocols or architectures (H04L 29/08558 takes precedence)} |
| 29/06448 | | {Services related to one way streaming} | 29/06551 | | {Arrangements for network security (security arrangements for protecting computers or computer systems against unauthorised activity G06F 21/00 ; arrangements for secret or secure communication H04L 9/00 ; security arrangements specially adapted for wireless communication networks H04W 12/00)} |
| 29/06455 | | {Multicast or broadcast (data switching systems for broadcast or conference H04L 12/18 ; television systems in general H04N 5/00 , H04N 7/00 ; arrangements for broadcast or distribution combined with broadcast H04H 20/00 ; arrangements for broadcast applications with a direct linkage of broadcast information H04H 60/00 ; arrangements for push based network services H04L 29/08693)} | 29/06557 | | {Separating internal and external traffic, e.g. firewalls} |
| 29/06462 | | {Content on demand (television systems using two way working H04N 7/173)} | 29/06564 | | {Architectural arrangements, e.g. perimeter networks, demilitarized zones} |
| 29/06469 | | {Control of source by destination, e.g. user controlling streaming rate of server (television systems using two way working H04N 7/173)} | 29/06571 | | {Distributed architectures} |
| 29/06476 | | {Media handling, encoding, streaming or conversion} | 29/06578 | | {Filtering policies} |
| | | | 29/06585 | | {Filtering by address, protocol, port number or service, e.g. IP-address, URL} |
| | | | 29/06591 | | {Filtering by information in the payload} |
| | | | 29/06598 | | {Stateful filtering} |
| | | | 29/06605 | | {Rule management} |
| | | | 29/06612 | | {Virtual private networks} |
| | | | 29/06619 | | {Proxies} |
| | | | 29/06625 | | {Firewall traversal, e.g. tunnelling, creating pinholes} |
| | | | 29/06632 | | {Protecting information from access by third parties} |
| | | | 29/06639 | | {Protecting a party's identity, e.g. anonymous} |

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|----------|-----------|---|--|-----------|--|
| 29/06646 | | {during transmission, i.e. identity only known to the other party or parties involved in the communication} | 29/06931 | | {Session hijacking, e.g. TCP sequence number attacks} |
| 29/06653 | | {Anonymous communication, i.e. identity not known to any party at all} | 29/06938 | | {Session spying, e.g. eavesdropping} |
| 29/06659 | | {Protecting the content, e.g. encryption} | 29/06945 | | {Security features implemented at a particular protocol layer} |
| 29/06666 | | {using symmetric encryption, i.e. same key used for encryption and decryption} | 29/06952 | | {at the data link layer, e.g. SILS, EAP} |
| 29/06673 | | {using asymmetric encryption, i.e. different keys for encryption and decryption} | 29/06959 | | {at the network layer, e.g. IPsec AH, ESP} |
| 29/0668 | | {using hybrid encryption, i.e. combination of symmetric and asymmetric encryption} | 29/06965 | | {at the transport layer, e.g. SSL, TLS} |
| 29/06687 | | {using dynamic encryption, e.g. stream encryption} | 29/06972 | | {above the transport layer, e.g. https, JAVA} |
| 29/06693 | | {Re-encryption} | 29/06979 | | {using a different network or path for securing the traffic} |
| 29/067 | | {Hardware and software architectures for enhanced packet encryption processing} | 29/06986 | | {Security management; Security policies in general (filtering policies H04L 29/06578)} |
| 29/06707 | | {Key management} | 29/06993 | | {Timer mechanisms used in protocols} |
| 29/06714 | | {Key exchange, e.g. in peer-to-peer networks} | 29/08 | | Transmission control procedure, e.g. data link level control procedure |
| 29/06721 | | {Key distribution, e.g. centrally by trusted party} | 29/08009 | | {Open systems interconnection [OSI] architecture, e.g. layering, entities, standards; Interface between layers; Software aspects} |
| 29/06727 | | {Hierarchical key distribution, e.g. by multi-tier trusted parties} | 29/08018 | | {Physical layer, i.e. layer one} |
| 29/06734 | | {for group communications} | 29/08027 | | {Data link layer, i.e. layer two, e.g. HDLC} |
| 29/06741 | | {One-time keys} | 29/08036 | | {Network layer, i.e. layer three, e.g. X.25} |
| 29/06748 | | {Time-dependent keys, e.g. periodically changing keys} | 29/08045 | | {Transport layer, i.e. layer four} |
| 29/06755 | | {Authentication mechanisms} | 29/08054 | | {Session layer, i.e. layer five} |
| 29/06761 | | {Tickets, e.g. Kerberos} | 29/08063 | | {Presentation layer, i.e. layer six} |
| 29/06768 | | {Single-sign-on} | 29/08072 | | {Application layer, i.e. layer seven (not used)} |
| 29/06775 | | {Certificates} | WARNING from 01.01.2006 onwards, documents relating to the application layer, and in particular to protocols for network applications are classified in H04L 29/08081 and subgroups. All documents previously classified in H04L 29/08072 are reclassified in these groups | | |
| 29/06782 | | {Passwords} | | | |
| 29/06789 | | {One-time-passwords} | | | |
| 29/06795 | | {Time-dependent-passwords, e.g. periodically changing passwords} | | | |
| 29/06802 | | {using an additional device, e.g. smartcard, SIM} | | | |
| 29/06809 | | {using biometrical features, e.g. fingerprint, retina-scan} | 29/08081 | | {Protocols for network applications (protocols for multimedia communication H04L 29/06027 ; protocols for telewriting H04L 29/06034 ; message switching systems H04L 51/00)} |
| 29/06816 | | {Mutual authentication} | | | |
| 29/06823 | | {Access control} | 29/0809 | | {involving the use of web-based technology, e.g. Hyper Text Transfer Protocol [HTTP], (information retrieval from the Internet G06F 16/95)} |
| 29/06829 | | {Access control lists [ACL]} | | | |
| 29/06836 | | {User profiles} | 29/08099 | | {for remote control or remote monitoring (network management using Internet technology H04L 41/0246 ; network monitoring H04L 43/00)} |
| 29/06843 | | {Grouping of users} | | | |
| 29/0685 | | {Multiple levels of security} | 29/08108 | | {adapted for terminals or networks with limited resources and for terminal portability, e.g. Wireless Application Protocol [WAP] (services or facilities specially adapted for wireless communication networks H04W 4/00)} |
| 29/06857 | | {Verifying the information received} | | | |
| 29/06863 | | {Checking the content, e.g. message integrity} | 29/08117 | | {adapted for file transfer, e.g. File Transfer Protocol [FTP]} |
| 29/0687 | | {Checking the source, e.g. non-repudiation} | | | |
| 29/06877 | | {Detection of malicious traffic; protection against malicious traffic} | | | |
| 29/06884 | | {Monitoring network traffic} | | | |
| 29/06891 | | {Event detection} | | | |
| 29/06897 | | {Traffic logging} | | | |
| 29/06904 | | {Vulnerability analysis} | | | |
| 29/06911 | | {Countermeasures against attacks} | | | |
| 29/06918 | | {Viruses; Trojans; Worms} | | | |
| 29/06925 | | {Denial of Service} | | | |

| | | | |
|---|---|--------------------|---|
| 29/08126 | {adapted for terminal emulation, e.g. telnet (protocols for telewriting or protocols for networked simulations, virtual reality or games H04L 29/06034)} | 29/08279 | {Reaction to server failures by a load balancer} |
| 29/08135 | {in which application tasks are distributed across nodes in the network (multiprogramming arrangements G06F 9/46)} | 29/08288 | {Load balancing of requests to servers for services different from user content provisioning, e.g. load balancing to DNS servers or firewalls (internet service provider selection H04L 12/5691)} |
| 29/08144 | {Network arrangements or communication protocol arrangements for accessing one among a plurality of replicated servers, e.g. load balancing (rebalancing the processing load in a distributed system G06F 9/5083 ; arrangements for peer-to-peer networking H04L 29/08306 ; wireless network traffic load balancing H04W 28/08 ; network load balancing, traffic engineering H04L 47/125 ; video servers using load balancing strategies H04N 21/23103)} | 29/08297 | {Load balancing arrangements to avoid a single path through a load balancer} |
| NOTE | | 29/08306 | {Arrangements for peer-to-peer networking [P2P]; functionalities, architectural details or applications of P2P networks (provisions for file transfer, upload, download H04L 29/08117 ; provisions for accessing replicated servers H04L 29/08144 ; security provisions H04L 29/06551 ; addressing provisions H04L 29/12009 ; scheduling provisions H04L 29/08945 ; presence management provisions H04L 29/08684 ; multimedia provisions H04L 29/06176 ; information retrieval provisions, file indexing, file systems G06F 16/00 ; wireless interfaces between terminal devices H04W 92/18 ; small scale hierarchical wireless network topologies H04W 84/10 ; peer-to-peer connection between video clients H04N 21/632 ; peer-to-peer connection between video game machines A63F 13/34)} |
| In this group and its subgroups, the term "servers" includes non-dedicated servers, such as peer nodes in a peer-to-peer architecture | | 29/08315 | {involving topology management mechanisms} |
| 29/08153 | {Server selection in load balancing (allocation of processing resources to service a request in a distributed system G06F 9/5027)} | 29/08324 | {Group management mechanisms} |
| 29/08162 | {with static server selection, e.g. the same server being selected for a specific client (allocation of processing resources considering data affinity G06F 9/5033)} | 29/08333 | {Joining mechanisms} |
| 29/08171 | {based on parameters of servers, e.g. available memory or workload (allocation of processing resources considering the load G06F 9/505)} | 29/08342 | {Departure and maintenance mechanisms (counter-measures to a fault H04L 29/14)} |
| 29/0818 | {based on network conditions} | 29/08351 | {Group master selection mechanisms} |
| 29/08189 | {based on compliance of requirements or conditions with available server resources} | 29/0836 | {with pre-configuration of logical or physical connections with a determined number of other peers} |
| 29/08198 | {based on the content of a request} | 29/08369 | {involving connection limits (involving dynamic management of active down/uploading connections H04L 29/08495)} |
| 29/08207 | {based on round robin mechanisms} | 29/08378 | {involving pre-assessment of levels of reputation of peers} |
| 29/08216 | {based on random server selection} | 29/08387 | {Inter-group management mechanisms, e.g. splitting, merging or interconnection of groups} |
| 29/08225 | {based on locations of client and servers} | 29/08396 | {involving resource based peer discovery mechanisms (access to replicated servers H04L 29/08144 ; arrangements for service discovery H04L 29/08648 ; topology discovery for routing H04L 45/02)} |
| 29/08234 | {based on other criteria, e.g., hash applied to IP address, specific algorithms or cost} | 29/08405 | {Discovery through centralizing entities} |
| 29/08243 | {Dynamic adaptation of server selection criteria for load balancing} | | |
| 29/08252 | {Persistence of sessions during load balancing} | | |
| 29/08261 | {Collection and organization of data related to the state of servers by a load balancer} | | |
| 29/0827 | {Controlling of the operation of servers by a load balancer, e.g. adding or removing servers that serve requests} | | |

| | | | |
|--------------------|--|--------------------|---|
| 29/08414 | {Discovery involving distributed pre-established resource-based relationships among peers, e.g. based on DHTs (pre-configuration of logical or physical connections H04L 29/0836)} | 29/08576 | {Arrangements for session management (real-time session management for multimedia connections H04L 29/06176 ; negotiation of communication capabilities H04L 29/06537 ; packet switching or routing H04L 12/56 ; connection management in wireless networks, e.g. connection set-up, manipulation or release H04W 76/00 ; session management for telephonic communication and services H04M 7/00 ; intertask communications in multiprogramming arrangements G06F 9/54)} |
| 29/08423 | {Discovery involving direct consultation/announcement among potential requesting and potential source peers} | | |
| 29/08432 | {with limitation/expansion of the discovery scope} | | |
| 29/08441 | {Discovery involving ranked list compilation of candidate peers} | | |
| 29/0845 | {involving resource distribution mechanisms} | | |
| 29/08459 | {Resource dissemination mechanisms and resource keeping policies for optimal resource availability in the overlay network} | | |
| 29/08468 | {Resource delivery mechanisms} | 29/08585 | {provided for setup of an application session} |
| 29/08477 | {characterized by resources being split in blocks or fragments} | 29/08594 | {provided for managing session state for stateless protocols, e.g. HTTP; Signalling a session state; State transitions; Keeping-state mechanisms} |
| 29/08486 | {involving incentive schemes} | 29/08603 | {provided for session termination, e.g., event controlled end of session} |
| 29/08495 | {involving dynamic management of active down/uploading connections} | 29/08612 | {provided for avoiding end of session (e.g. keep-alive, heartbeats, resumption message, wake-up for inactive or interrupted session)} |
| 29/08504 | {involving cross functional aspects} | 29/08621 | {markers provided for unambiguous identification of a particular session, e.g. session identifier, session cookie or URL-encoding (verifying the identity or authority of a user or a system, ID-based authentication H04L 9/32 ; ID-based key exchange H04L 9/08)} |
| 29/08513 | {Hierarchical topologies} | 29/0863 | {provided for signalling methods or particular messages providing extensions to IETF, ITU, ETSI or 3GPP protocols, e.g. additional proprietary messages, standard messages enhanced by additional header fields or standard messages being used for purposes other than originally intended} |
| 29/08522 | {Interfacing with client/server systems and between P2P systems} | 29/08639 | {provided for migration or transfer of sessions} |
| 29/08531 | {Some peer nodes performing special functions} | 29/08648 | {Arrangements for service discovery, e.g. Service Location Protocol [SLP] (address allocation to terminals or nodes connected to a network H04L 29/12009)} |
| 29/0854 | {Arrangements for replication or mirroring of data, e.g. data synchronisation between network nodes and/or user terminals} | 29/08657 | {in which the network application is adapted for the location of the user terminal (services specially adapted for wireless communication networks making use of the location of users or terminals H04W 4/02)} |
| 29/08549 | {Arrangements and networking functions for distributed storage of data in a network, e.g. Storage Area Networks [SAN], Network Attached Storage [NAS]} | 29/08666 | {involving third party service providers (e-commerce G06Q 30/00)} |
| 29/08558 | {adapted for proprietary or special purpose networking environments, e.g. medical networks, sensor networks, networks in a car (home automation networks H04L 12/2803 ; total factory control characterised by the network communication G05B 19/4185 ; games involving transmission A63F 13/30)} | 29/08675 | {Arrangements for tracking the activity of the application user (monitoring arrangements in general H04L 43/00 ; e-commerce G06Q 30/00)} |
| 29/08567 | {involving the management of devices over a network (device management using web-based technology H04L 29/08099 ; network management H04L 41/00)} | 29/08684 | {Arrangements for presence management (instant messaging H04L 51/04)} |

NOTE

This group covers session signaling at higher OSI layers to support networked applications.

- 29/08693 {Arrangements for push based network services (broadcast and multicast push services [H04L 12/1859](#))}
- 29/08702 {involving intermediate processing or storage in the network, e.g. proxy (billing provisions [H04L 12/14](#); multimedia network architectures, gateways and control entities [H04L 29/0621](#); multimedia handling, encoding and conversion [H04L 29/06476](#); security provisions [H04L 29/06551](#); addressing provisions [H04L 29/12009](#); network management provisions [H04L 41/00](#); monitoring provisions [H04L 43/00](#))}

WARNING

The subgroups [H04L 29/08711](#), [H04L 29/08738](#) - [H04L 29/08783](#), and [H04L 29/08801](#) - [H04L 29/08855](#) are not complete pending reorganisation. See also [H04L 29/0872](#), [H04L 29/08729](#) and [H04L 29/08792](#))

- 29/08711 {Arrangements for adding application control or application functional data, e.g. adding metadata}
- 29/0872 {Arrangements for brokering (protocols for client-server architecture [H04L 29/06047](#); negotiation of communication capabilities [H04L 29/06537](#); e-commerce [G06Q 30/00](#))}

WARNING

This group is no longer used for the classification of new documents as from December 1, 2009. The backlog of this group is being continuously reclassified to the subgroups [H04L 29/08711](#) - [H04L 29/08909](#)

- 29/08729 {Arrangements for intermediate storage, e.g. caching (browsing optimisation of access to content [G06F 16/9574](#))}

WARNING

This group is no longer used for the classification of new documents as from December 1, 2009. The backlog of this group is being continuously reclassified to the subgroups [H04L 29/08711](#) - [H04L 29/08909](#)

- 29/08738 {Arrangements for data redirection (access network selection [H04L 12/5691](#); load balancing [H04L 29/08144](#); context based routing [H04L 29/08972](#); addressing aspects [H04L 29/12009](#); routing path selection [H04L 45/00](#))}
- 29/08747 {Arrangements for evaluation of intercepted application data aiming at enhancement of application control}

- 29/08756 {Arrangements for conversion or adaptation of application content or format ([H04L 29/08783](#) takes precedence; protocol conversion [H04L 29/06068](#))}
- 29/08765 {Arrangements for grouping or aggregating service requests, e.g. for unified processing of service requests}
- 29/08774 {Arrangements for integrating service provisioning from a plurality of service providers}
- 29/08783 {Arrangements for reducing the amount or size of exchanged application data (protocols for header compression [H04L 29/0604](#); optimizing visualization of content [G06F 16/9577](#); digital video compression [H04N 19/00](#))}
- 29/08792 {Arrangements for data reduction and/or adaptation (protocols for data compression [H04L 29/0604](#); optimising the visualization of content [G06F 16/9577](#); digital video signal compression [H04N 19/00](#))}

WARNING

This group is no longer used for the classification of new documents as from December 1, 2009. The backlog of this group is being continuously reclassified to the subgroups [H04L 29/08711](#) - [H04L 29/08909](#)

- 29/08801 {Arrangements for storing temporarily data at an intermediate stage, e.g. caching (browsing optimization of access to content by caching [G06F 16/9574](#))}
- 29/0881 {involving pre-fetching or pre-delivering data}
- 29/08819 {involving policies or rules for updating, deleting or replacing the stored data}
- 29/08828 {involving storage of data provided by user terminals, i.e. reverse caching}
- 29/08837 {Arrangements for providing operational support to end devices when they are unavailable, e.g. being off-line; off-loading of end devices (counter-measures to a fault [H04L 29/14](#))}
- 29/08846 {Arrangements to globally emulate or virtualize the functionalities of an end device ([H04L 29/08837](#) takes precedence)}
- 29/08855 {Architectural aspects}
- 29/08864 {Implementation details of a single intermediate entity}
- 29/08873 {Pairs of interprocessing entities at each side of the network, e.g. split proxies}
- 29/08882 {Distributed intermediate devices, i.e. intermediate device interaction with other intermediate devices on the same level}
- 29/08891 {Hierarchically arranged intermediate devices, e.g. hierarchical caching}

- 29/089 { where the intermediate processing is functionally located closer to the data consumer application, e.g. in same machine, in same home or in same subnetwork }
- 29/08909 { where the intermediate processing is functionally located closer to the data provider application, e.g. reverse proxies; in same machine, in same cluster or subnetwork }
- 29/08918 { involving profiles }
- 29/08927 { Terminal profiles }
- 29/08936 { User profiles }
- 29/08945 { Arrangements for scheduling and organising the servicing of requests, e.g. requests for data transmissions involving the analysis and optimisation of the requires network resources ([broadcast or conference with schedule organisation H04L 12/1881](#)) }
- 29/08954 { whereby quality of service and priority requirements are taken into account }
- 29/08963 { whereby a time schedule is established for servicing the requests }
- 29/08972 { whereby the routing of a service request to a node providing the service depends on the content and context of the request, e.g. profile, connectivity status }
- 29/08981 { involving the movement of software and/or configuration parameters, e.g. applets, ([programme loading or initiating G06F 9/445](#)) }
- 29/0899 { involving the display to the application user of network conditions affecting the network application ([terminal emulation H04L 29/08126](#); graphical user interfaces for network management [H04L 41/22](#)) }
- 29/10 . . characterised by an interface, e.g. the interface between the data link level and the physical level
- 29/12 . . characterised by the data terminal
- 29/12009 . . { Arrangements for addressing and naming in data networks }

NOTES

1. [H04L 61/00](#) covers aspects of data networks, excluding pure telephone solutions ([H04M 7/00](#)) or addressing within a device, e.g. process, memory etc. ([G06F 13/42](#) or [G06F 12/00](#)) .
2. Aspects relating to switching and routing are classified in [H04L 12/56](#).
3. Main aspects covered by this groups are:
address resolution;
directories and name-to-address resolution;
allocation of addresses;
conversion of addresses;
logical names and non-standard use of addresses

WARNING

This subgroup is no longer used for classification as from 01.05.2012. The backlog of this subgroup is being continuously reclassified to [H04L 61/00](#)

- 29/12018 . . . { Mapping of addresses of different types; address resolution }

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/10](#)

- 29/12028 { across network layers, e.g. resolution of network layer into physical layer addresses, Address Resolution Protocol [ARP] }

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/103](#)

- 29/12037 { across networks, e.g. mapping telephone numbers to data network addresses }

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/106](#)

- 29/12047 . . . { Directories; name-to-address mapping ([telephone directories in user terminals H04M 1/27](#)) }

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/15](#)

- 29/12056 { involving standard directories and standard directory access protocols }

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1505](#)

- 29/12066 { using Domain Name System [DNS] }

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1511](#)

- 29/12075 { using Open Systems Interconnection Directories, i.e. X.500 }

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1517](#)

29/12084 {using Lightweight Directory Access Protocol [LDAP]}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1523](#)

29/12094 {using Voice over IP [VoIP] directories, e.g. Session Initiation Protocol [SIP] registrar or H.323 gatekeeper}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1529](#)

29/12103 {using an address exchange platform which sets up a session between two nodes, e.g. Rendezvous server ([H04L 29/12094](#) takes precedence for address exchange for Voice over IP)}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1535](#)

29/12113 {for service discovery ([network applications for service discovery H04L 29/08648](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1541](#)

29/12122 {for personal communications, i.e. using a personal identifier}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1547](#)

29/12132 {Mechanisms for table lookup, also between directories; Directory data structures; Synchronization of directories ([information retrieval in file systems G06F 16/10](#); [information retrieval in structured data stores G06F 16/20](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1552](#)

29/12141 {Object oriented directories, e.g. CORBA name server}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1558](#)

29/1215 {Directories for electronic mail or instant messaging ([message switching systems per se H04L 51/00](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1564](#)

29/1216 {Directories for hybrid networks, e.g. including also telephone numbers}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/157](#)

29/12169 {Metadirectories, i.e. all encompassing global directory which interfaces to various underlying directories}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1576](#)

29/12179 {containing identifiers of data entities on a computer, e.g. file names}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1582](#)

29/12188 {containing mobile subscriber information, e.g. Home Subscriber Server [HSS]}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1588](#)

29/12198 {Address books, i.e. directories containing contact information about correspondents, e.g. on a user device ([directories providing the best way to reach a correspondent H04L 29/12122](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/1594](#)

29/12207 . . . {Address allocation}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/20](#)

29/12216 {Internet Protocol [IP] addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2007](#)

29/12226 {using the Dynamic Host Configuration Protocol [DHCP] or variants}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2015](#)

29/12235 {using the Bootstrap Protocol [BOOTP] or variants}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2023](#)

29/12245 {using an authentication, authorization and accounting [AAA] protocol, e.g. remote authentication dial-in user service [RADIUS] or diameter ([authentication mechanisms H04L 29/06755](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/203](#)

29/12254 {for local use, e.g. on Local Area Networks [LAN] or on Universal Serial Bus [USB] networks ([bus addresses inside a computer G06F 13/42](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2038](#)

29/12264 {involving the solving of address allocation conflicts; involving testing of addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2046](#)

29/12273 {involving timing and renewal aspects}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2053](#)

29/12283 {involving aspects of pools of addresses, e.g. assignment of different pools of addresses to different Dynamic Host Configuration Protocol [DHCP] servers}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2061](#)

29/12292 {for group-, multicast- and broadcast-communication}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2069](#)

29/12301 {involving update or notification mechanisms, e.g. update of a Domain Name Server with Dynamic Host Configuration Protocol [DHCP] assigned addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2076](#)

29/12311 {involving portability aspects (mobility data transfer in wireless communication networks [H04W 8/26](#); mobile IP, network layer protocols in wireless communication networks [H04W 80/04](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2084](#)

29/1232 {by self assignment, e.g. pick address randomly and test if already in use}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2092](#)

29/1233 . . . {Mapping of addresses of the same type; Address translation}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/25](#)

29/12339 {Internet Protocol [IP] address translation}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2503](#)

29/12349 {Translating between special types of IP addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2507](#)

29/12358 {between different IP versions}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/251](#)

29/12367 {between local and global IP addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2514](#)

29/12377 {involving port numbers}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2517](#)

29/12386 {Special translation architecture, different from a single Network Address Translation [NAT] server}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2521](#)

29/12396 {Translation at a client}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2525](#)

29/12405 {Translation at a proxy}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2528](#)

29/12415 {Clique of NAT servers}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2532](#)

29/12424 {Multiple local networks, e.g. resolving potential IP address conflicts}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2535](#)

29/12433 {for hiding addresses or keeping them anonymous}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2539](#)

29/12443 {involving dual-stack hosts}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2542](#)

29/12452 {Mechanisms for avoiding unnecessary translation}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2546](#)

29/12462 {Map-table maintenance and indexing}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/255](#)

29/12471 {Binding renewal aspects; Keep-alive messages}

29/12481 {Translation policies and rules}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2557](#)

29/1249 {NAT-Traversal}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/256](#)

29/125 {for a higher-layer protocol, e.g. for SIP}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2564](#)

29/12509 {for reachability, e.g. inquiring the address of a correspondent behind a NAT server}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2567](#)

29/12518 {for identification, e.g. for authentication, for billing}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2571](#)

29/12528 {using address mapping retrieval, e.g. Simple Traversal of UDP through NATs [STUN]}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2575](#)

29/12537 {transparent to the NAT server}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2578](#)

29/12547 {through control of the NAT server, e.g. using Universal Plug and Play (UPnP)}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2582](#)

29/12556 {through Application Level Gateway [ALG]}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2585](#)

29/12566 {over a relay server, e.g. traversal using relay NAT [TURN]}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/2589](#)

29/12575 {involving tunneling or encapsulation
(protecting information from access by
third parties [H04L 29/06632](#))}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/2592](#)

29/12584 {Non-IP address translation}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/2596](#)

29/12594 {Arrangements for managing names, e.g. use
of aliases or nicknames (retrieval from the
Internet by using information identifiers, e.g.
URLs [G06F 16/955](#); name-to-address mapping
[H04L 29/12047](#))}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is being
continuously reclassified to [H04L 61/30](#)

29/12603 {Mechanisms for avoiding name conflicts}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/3005](#)

29/12613 {Name conversion}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is being
continuously reclassified to [H04L 61/301](#)

29/12622 {Name registration, generation or
assignment}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/3015](#)

29/12632 {Administrative registration, e.g. for
domain names at internet corporation for
assigned names and numbers [ICANN]
(data processing for administration
[G06Q 10/00](#))}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/302](#)

29/12641 {Domain name generation or assignment}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/3025](#)

29/1265 {Name structure}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is being
continuously reclassified to [H04L 61/303](#)

29/1266 {containing non-Latin characters, e.g.
Chinese domain names}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/3035](#)

29/12669 {containing protocol addresses or
telephone numbers (address type involved
[H04L 29/1283](#))}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/304](#)

29/12679 {containing wildcard characters}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/3045](#)

29/12688 {containing special prefixes}

WARNING

This subgroup is no longer used for
classification as from 01.05.2012.
The backlog of this subgroup is
being continuously reclassified to
[H04L 61/305](#)

29/12698 {containing special suffixes}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/3055](#)

29/12707 {Name types}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/306](#)

29/12716 {Application layer names, e.g. buddy name, unstructured name chosen by a user or home appliance name}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/3065](#)

29/12726 {E-mail addresses (message switching systems [H04L 51/00](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/307](#)

29/12735 {Access point names [APN], i.e. name of a gateway GPRS support node [GGSN] connecting a mobile user to a packet data network [PDN]}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/3075](#)

29/12745 {Telephone URI}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/308](#)

29/12754 {Session initiation protocol [SIP] URI}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/3085](#)

29/12764 {Globally routable user-agent URI [GRUU] for SIP}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/309](#)

29/12773 {IP multimedia private identity [IMPI] or IP multimedia public identity [IMPU]}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/3095](#)

29/12783 {involving non-standard use of addresses for implementing network functionalities, e.g. coding subscription information within the address, functional addressing, i.e. assigning an address to a function}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/35](#)

29/12792 {Details}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/60](#)

29/12801 {about the structures and formats of addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6004](#)

29/12811 {Caching of addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6009](#)

29/1282 {Proxying of addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6013](#)

29/1283 {about address types}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6018](#)

29/12839 {Layer 2 addresses, e.g. Medium Access Control [MAC] addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6022](#)

29/12849 {Control Area Network [CAN] identifiers (vehicle networks [B60R 16/0315](#))}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6027](#)

29/12858 {Small Computer System Interface [SCSI] addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6031](#)

29/12867 {IEEE1394 (FireWire) identification numbers}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6036](#)

29/12877 {Asynchronous Transfer Mode [ATM] addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/604](#)

29/12886 {Fibre channel identifiers}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6045](#)

29/12896 {Telephone numbers}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/605](#)

29/12905 {International Mobile Subscriber Identity [IMSI] numbers}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6054](#)

29/12915 {Internet Protocol version 6 (IPv6) addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6059](#)

29/12924 {Transport layer addresses, e.g. aspects of Transmission Control Protocol [TCP] or User Datagram Protocol [UDP] ports}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6063](#)

29/12933 {IP addresses subnets}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6068](#)

29/12943 {Short addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6072](#)

29/12952 {Multiple interfaces, e.g. multihomed nodes}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6077](#)

- 29/12962 {involving addresses for wireless personal area networks and wireless sensor networks, e.g. Zigbee addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6081](#)

- 29/12971 {involving dual-stack hosts, e.g. in IPv4/IPv6 networks}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6086](#)

- 29/12981 {involving geographic information, e.g. room number}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/609](#)

- 29/1299 {involving masks or ranges of addresses}

WARNING

This subgroup is no longer used for classification as from 01.05.2012.
The backlog of this subgroup is being continuously reclassified to [H04L 61/6095](#)

- 29/14 . Counter-measures to a fault

41/00 {Arrangements for maintenance or administration or management of packet switching networks}

- 41/02 . {involving integration or standardization}
- 41/0206 . . {using standardized network management architectures, e.g. telecommunication management network [TMN] or unified network management architecture [UNMA]}
- 41/0213 . . {using standardized network management protocols, e.g. simple network management protocol [SNMP] or common management interface protocol [CMIP]}
- 41/022 . . {Multivendor or multistandard integration}
- 41/0226 . . {Mapping or translation of multiple network management protocols}
- 41/0233 . . {using object oriented techniques, e.g. common object request broker architecture [CORBA] for representation of network management data}
- 41/024 . . {using relational databases for representation of network management data, e.g. managing via structured query language [SQL] ([information retrieval in structured data stores G06F 16/20](#))}

- 41/0246 . . {exchanging or transporting network management information using Internet, e.g. aspects relating to embedding network management web servers in network elements, web service for network management purposes, aspects related to Internet applications or services or web-based protocols, simple object access protocol [SOAP] ([web-based network application protocols H04L 67/02](#); [web-based network application protocols for remote control of end-devices or monitoring of remote application data H04L 67/025](#); [proprietary application protocols for remote control of end-devices in special networking environments H04L 67/125](#); [retrieval from the Internet G06F 16/95](#))}

- 41/0253 . . . {involving a browser or web-pages for accessing management information ([graphical user interface for network management H04L 41/22](#))}

- 41/026 . . . {involving e-messaging for transporting management information, e.g. email, instant messaging or chat}

- 41/0266 . . . {involving management internet meta-data, objects or commands, e.g. by using mark-up language}

- 41/0273 . . . {involving the use of web services for network management, e.g. SOAP}

- 41/028 {for synchronization between service call and response}

- 41/0286 {for search or classification or discovery of web services providing management functionalities ([network applications and protocols for service discovery H04L 67/16](#))}

- 41/0293 {for accessing web services by means of a binding identification of the management service or element ([aspects of naming and addressing in general H04L 61/00](#))}

- 41/04 . {Architectural aspects of network management arrangements}

- 41/042 . . {Arrangements involving multiple distributed management centers cooperatively managing the network}

- 41/044 . . {Arrangements involving a hierarchical management structure}

- 41/046 . . {Aspects of network management agents}

- 41/048 . . . {mobile agents}

- 41/06 . {involving management of faults or events or alarms}

- 41/0604 . . {Alarm or event filtering, e.g. for reduction of information}

- 41/0609 . . . {based on severity or priority}

- 41/0613 . . . {based on the type or category of the network elements}

- 41/0618 . . . {based on the physical or logical position}

- 41/0622 . . . {based on time}

- 41/0627 . . . {by acting on the notification or alarm source}

- 41/0631 . . {Alarm or event or notifications correlation; Root cause analysis}

- 41/0636 . . . {based on a decision tree analysis}

- 41/064 . . . {involving time analysis}

- 41/0645 . . . {by additionally acting on or stimulating the network after receiving notifications}

- 41/065 . . . {involving logical or physical relationship, e.g. grouping and hierarchies}

- 41/0654 . . {Network fault recovery (backup route selection [H04L 45/22](#); route fault recovery [H04L 45/28](#); techniques for recovering from a failure of a protocol instance or entity [H04L 69/40](#))}
- 41/0659 . . . {by isolating the faulty entity}
- 41/0663 {involving offline failover planning}
- 41/0668 . . . {selecting new candidate element}
- 41/0672 . . . {by re-configuring the faulty entity}
- 41/0677 . . {localization of fault position}
- 41/0681 . . {involving configuration of triggering conditions}
- 41/0686 . . {involving notification enrichment}
- 41/069 . . {involving storage or log of alarms or notifications or post-processing thereof}
- 41/0695 . . {involving fault of the network management or monitoring system}
- 41/08 . . {Configuration management of network or network elements (proprietary application protocols for remote control of end-devices in special networking environments [H04L 67/125](#); automatic configuration specially adapted for wireless networks [H04W 24/02](#))}
- 41/0803 . . {Configuration setting of network or network elements (communication protocols supporting networked applications involving the movement of software or networked applications configuration parameters [H04L 67/34](#))}
- 41/0806 . . . {for initial configuration or provisioning}
- 41/0809 {Plug-and-play configuration}
- 41/0813 . . . {Changing of configuration}
- 41/0816 {due to adaptation, e.g. in response to network events}
- 41/082 {due to updating or upgrading of network functionality, e.g. firmware (topology update or discovery for routing purposes [H04L 45/02](#))}
- 41/0823 . . . {Configuration optimization}
- 41/0826 {for network cost reduction}
- 41/083 {for network speed increase}
- 41/0833 {to reduce network energy consumption}
- 41/0836 {to enhance reliability, e.g. reduce downtime}
- 41/084 . . . {Configuration by copying}
- 41/0843 {based on generic templates}
- 41/0846 {based on copy from other elements}
- 41/085 . . {Keeping track of network configuration}
- 41/0853 . . . {by actively collecting or retrieving configuration information}
- 41/0856 . . . {by archiving or backing up configuration information}
- 41/0859 . . . {by keeping history of different configuration generations or versions}
- 41/0863 . . . {by rolling back to previous configuration versions}
- 41/0866 . . {Checking configuration}
- 41/0869 . . . {by validating configuration within one network element}
- 41/0873 . . . {by checking configuration conflicts with other network elements}
- 41/0876 . . {Aspects of the degree of configuration automation}
- 41/0879 . . . {Manual configuration through operator}
- 41/0883 . . . {Semiautomatic configuration, e.g. proposals from system}
- 41/0886 . . . {Fully automatic configuration}
- 41/0889 . . {Techniques to speed-up the configuration process}
- 41/0893 . . {Assignment of logical groupings to network elements; Policy based network management or configuration}
- 41/0896 . . {Bandwidth or capacity management, i.e. automatically increasing or decreasing capacities, e.g. bandwidth on demand (reallocation of resources, renegotiation of resources, e.g. in-call [H04L 47/76](#))}
- 41/12 . . {network topology discovery or management (topology discovery for routing [H04L 45/02](#))}
- 41/14 . . {involving network analysis or design, e.g. simulation, network model or planning (network monitoring [H04L 43/00](#))}
- 41/142 . . {using statistical or mathematical methods}
- 41/145 . . {involving simulating, designing, planning or modelling of a network}
- 41/147 . . {for prediction of network behaviour}
- 41/16 . . {Network management using artificial intelligence}
- 41/18 . . {Arrangements involving CNM [Customer Network Management]}
- 41/20 . . {Network management software packages}
- 41/22 . . {using GUI [Graphical User Interface]}
- 41/24 . . {using dedicated network management hardware}
- 41/26 . . {using dedicated tools for LAN [Local Area Network] management}
- 41/28 . . {Security in network management, e.g. restricting network management access (network architectures or network communication protocols for network security [H04L 63/00](#); cryptographic mechanisms or cryptographic arrangements for secret or secure communication [H04L 9/00](#); network architectures or network communication protocols for wireless network security [H04W 12/00](#); security arrangements for protecting computers or computer systems against unauthorised activity [G06F 21/00](#))}
- 41/30 . . {Decision processes by autonomous network management units using voting and bidding}
- 41/32 . . {Specific management aspects for broadband networks}
- 41/50 . . {Network service management, i.e. ensuring proper service fulfillment according to an agreement or contract between two parties, e.g. between an IT-provider and a customer}
- 41/5003 . . {Managing service level agreement [SLA] or interaction between SLA and quality of service [QoS]}
- 41/5006 . . . {Defining or negotiating SLA contracts, guarantees or penalties (SLA negotiation in wireless networks [H04W 28/24](#))}
- 41/5009 . . . {Determining service level performance, e.g. measuring SLA quality parameters, determining contract or guarantee violations, response time or mean time between failure [MTBF] (monitoring performance metrics on a simple network level [H04L 43/08](#))}
- 41/5012 {determining service availability, e.g. which services are available at a certain point in time}
- 41/5016 {based on statistics of service availability, e.g. in percentage or over a given time}
- 41/5019 . . {Ensuring SLA (flow or congestion control at network level [H04L 47/10](#))}

- 41/5022 . . . {by giving priorities, e.g. assigning classes of service}
- 41/5025 . . . {by proactively reacting to service quality change, e.g. degradation or upgrade, by reconfiguration (mere recovery after a network faults [H04L 41/0654](#))}
- 41/5029 . . {Service quality level based billing, e.g. dependent on measured service level customer is charged more or less (general charging or billing for transport of data packets [H04L 12/14](#))}
- 41/5032 . . {Generating service level reports}
- 41/5035 . . {Measuring contribution of individual network components to actual service level (alarm or event correlation [H04L 41/0631](#))}
- 41/5038 . . {Testing of service level quality, e.g. simulating service usage}
- 41/5041 . . {Service implementation}
- 41/5045 . . . {Making service definitions prior to deployment}
- 41/5048 . . . {Automatic or semi-automatic definitions, e.g. definition templates}
- 41/5051 . . . {Service on demand, i.e. services are defined and provided in real time as requested by the user}
- 41/5054 . . . {Automatic provisioning of the service triggered by the service manager, e.g. concrete service implementation by automatic configuration of network components (for initializing configuration, i.e. provisioning of network or devices [H04L 41/0806](#))}
- 41/5058 . . {Service discovery by the service manager (automatically determining the actual topology of a network [H04L 41/12](#); topology discovery for routing [H04L 45/02](#); arrangements for service discovery, e.g. service location protocol [H04L 67/16](#))}
- 41/5061 . . {Customer care}
- 41/5064 . . . {Customer relationship management (arrangements involving customer network management, i.e. giving the customer access to network management functions [H04L 41/18](#))}
- 41/5067 . . . {Customer-centric quality of service [QoS] measurement}
- 41/507 . . . {Filtering out customers affected by service problems}
- 41/5074 . . . {Handling of trouble tickets}
- 41/5077 . . {wherein the managed service relates to simple transport services, i.e. providing only network infrastructure}
- 41/508 . . {based on type of value added network service under agreement}
- 41/5083 . . . {wherein the managed service relates to web hosting (web-based network application protocols [H04L 67/02](#); web site content organization and management [G06F 16/958](#); video-hosting [H04N 21/2743](#))}
- 41/5087 . . . {wherein the managed service relates to voice services (protocols for real-time multimedia communications [H04L 65/00](#); management of telephonic communication services [H04M 3/22](#); management of VoIP services [H04M 7/0081](#))}
- 41/509 . . . {wherein the managed service relates to media content delivery, e.g. audio / video / TV (protocols for real-time multimedia communications [H04L 65/00](#); interactive television or VoD [H04N 21/00](#))}
- 41/5093 . . . {wherein the managed service relates to messaging or chat services (conducting a computer conference [H04L 12/1822](#); messaging, such as e-mail in packet-switching networks [H04L 51/00](#); instant messaging [H04L 51/04](#))}
- 41/5096 . . . {wherein the managed service relates to distributed or central networked applications (management of file systems [G06F 16/10](#); management of structured data stores [G06F 16/20](#))}
- 43/00** **{Arrangements for monitoring or testing packet switching networks (networking arrangements or communications protocols for supporting networked applications for tracking the activity of the application user [H04L 67/22](#); monitoring of computing systems [G06F 11/30](#); monitoring of computer activity [G06F 11/34](#))}**
 - 43/02 . {involving a reduction of monitoring data}
 - 43/022 . . {using sampling of monitoring data, i.e. storing only a selection of packets}
 - 43/024 . . . {using adaptive sampling}
 - 43/026 . . {using flow generation}
 - 43/028 . . {using filtering (alarm or event filtering [H04L 41/0604](#))}
 - 43/04 . {Processing of captured monitoring data}
 - 43/045 . . {for graphical visualization of monitoring data (graphical user interfaces [H04L 41/22](#); display of network or application conditions affecting the network application to the application user [H04L 67/36](#); visual indication of the functioning of a computing machine [G06F 11/32](#))}
 - 43/06 . {Report generation}
 - 43/062 . . {for traffic related reporting}
 - 43/065 . . {for device related reporting (reporting of sensed information of home appliances [H04L 12/2803](#))}
 - 43/067 . . {for time frame related reporting}
 - 43/08 . {Monitoring based on specific metrics}
 - 43/0805 . . {Availability}
 - 43/0811 . . . {Connectivity}
 - 43/0817 . . . {functioning (networked applications tracking the activity of users [H04L 67/22](#); monitoring appliance functionality of home appliances [H04L 12/2803](#))}
 - 43/0823 . . {Errors (management of events, faults or alarms in networks or network elements [H04L 41/06](#))}
 - 43/0829 . . . {Packet loss}
 - 43/0835 {One way packet loss}
 - 43/0841 {Round trip packet loss}
 - 43/0847 . . . {Transmission error}
 - 43/0852 . . {Delays}
 - 43/0858 . . . {One way delays}
 - 43/0864 . . . {Round trip delays}
 - 43/087 . . . {Jitter}
 - 43/0876 . . {Network utilization}
 - 43/0882 . . . {Utilization of link capacity}
 - 43/0888 . . . {Throughput}
 - 43/0894 . . . {Packet rate}

- 43/10 . {using active monitoring, e.g. heartbeat protocols, polling, ping, trace-route}
- 43/103 . . {with adaptive polling, i.e. dynamically adapting the polling rate}
- 43/106 . . {by adding timestamps to packets}
- 43/12 . {using dedicated network monitoring probes}
- 43/14 . {using software, i.e. software packages ([network security related monitoring H04L 63/1408](#))}
- 43/16 . {using threshold monitoring}
- 43/18 . {using protocol analyzers}
- 43/50 . {Testing arrangements}
- 45/00** **{Routing or path finding of packets in data switching networks (specially adapted for wireless routing [H04W 40/00](#))}**
- 45/02 . {Topology update or discovery ([topology discovery for network management H04L 41/12](#); LAN interconnection over a backbone network [H04L 12/4604](#); node-based peer discovery mechanisms in peer-to-peer networks [H04L 67/1061](#))}
- 45/021 . . {Routing table update consistency, e.g. epoch number}
- 45/023 . . {Delayed use of routing table update}
- 45/025 . . {Updating only a limited number of routers, e.g. fish-eye update}
- 45/026 . . {Details of "hello" or keep-alive messages}
- 45/028 . . {Dynamic adaptation of the update interval, e.g. event-triggered update}
- 45/04 . {Interdomain routing, e.g. hierarchical routing}
- 45/06 . {Deflection routing, e.g. hot-potato routing}
- 45/08 . {Learning-based routing, e.g. neural networks}
- 45/10 . {Routing in connection-oriented networks, e.g. X.25, ATM}
- 45/12 . {Shortest path evaluation}
- 45/121 . . {Minimizing delay}
- 45/122 . . {Minimizing distance, e.g. number of hops}
- 45/123 . . {Evaluation of link metrics ([techniques for monitoring network metrics H04L 43/08](#))}
- 45/124 . . {using a combination of metrics}
- 45/125 . . {based on throughput or bandwidth}
- 45/126 . . {minimizing geographical or physical path length}
- 45/127 . . {based on intermediate node capabilities}
- 45/128 . . {for finding disjoint paths}
- 45/1283 . . . {with disjoint links}
- 45/1287 . . . {with disjoint nodes}
- 45/14 . {Routing performance; Theoretical aspects}
- 45/16 . {Multipoint routing ([arrangements for multicast or broadcast in data networks H04L 12/18](#))}
- 45/18 . {Loop free}
- 45/20 . {Hop count for routing purposes, e.g. TTL}
- 45/22 . {Alternate routing}
- 45/24 . {Multipath}
- 45/245 . . {Link aggregation, e.g. trunking}
- 45/26 . {Route discovery packet}
- 45/28 . {Route fault recovery ([network fault recovery H04L 41/0654](#))}
- 45/30 . {Special provisions for routing multiclass traffic}
- 45/302 . . {Route determination based on requested QoS}
- 45/304 . . {Route determination for signaling traffic}
- 45/306 . . {Route determination based on the nature of the carried application ([communications protocols whereby the routing of a service request to a node providing the service depends on the content or context of the request, e.g. profile, connectivity status H04L 67/327](#))}
- 45/3065 . . . {for real time traffic}
- 45/308 . . {Route determination based on user's profile, e.g. premium users}
- 45/32 . {Flooding ([denial of service attacks H04L 63/1458](#))}
- 45/34 . {Source routing}
- 45/36 . {Backward learning}
- 45/38 . {Flow based routing}
- 45/40 . {Wormhole routing}
- 45/42 . {Centralized routing}
- 45/44 . {Distributed routing}
- 45/46 . {Cluster building}
- 45/48 . {Routing tree calculation}
- 45/50 . {using label swapping, e.g. multi-protocol label switch [MPLS]}
- 45/502 . . {Frame based}
- 45/505 . . {Cell based}
- 45/507 . . {Label distribution}
- 45/52 . {Multiprotocol routers}
- 45/54 . {Organization of routing tables}
- 45/56 . {Routing software}
- 45/563 . . {Software download or update ([software deployment in general G06F 8/60](#))}
- 45/566 . . {Routing instructions carried by the data packet, e.g. active networks}
- 45/58 . {Association of routers}
- 45/583 . . {Stackable routers}
- 45/586 . . {Virtual routers}
- 45/60 . {Router architecture}
- 45/62 . {Wavelength based ([optical switching H04Q 11/0062](#))}
- 45/64 . {using an overlay routing layer ([Peer-to-Peer networks H04L 67/104](#))}
- 45/66 . {Layer 2 routing, e.g. in Ethernet based MAN's}
- 45/68 . {Pseudowire emulation, e.g. IETF WG PWE3}
- 45/70 . {Routing based on monitoring results ([techniques for monitoring network metrics H04L 43/08](#))}
- 45/72 . {Routing based on the source address}
- 45/74 . {Address processing for routing}
- 45/741 . . {Routing in networks with a plurality of addressing schemes, e.g. IPv4 and IPv6}
- 45/742 . . {Route cache and its operation}
- 45/745 . . {Address table lookup or address filtering}
- 45/7453 . . . {using hashing}
- 45/7457 . . . {using content-addressable memories [CAM]}
- 45/748 . . . {Longest matching prefix}
- 47/00** **{Traffic regulation in packet switching networks ([arrangements for detecting or correcting errors in the information received H04L 1/00](#))}**
- NOTE**
- This group covers:
 1. Flow control or congestion control
 2. Queue scheduling
 3. Admission control or resource allocation
- 47/10 . {Flow control or congestion control}

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|---------|---|---------|---|
| 47/11 | . . {Congestion identification} | 47/28 | . . {using time considerations} |
| 47/115 | . . . {using a dedicated packet} | 47/283 | . . . {Network and process delay, e.g. jitter or round trip time [RTT]} |
| 47/12 | . . {Congestion avoidance or recovery} | 47/286 | . . . {Time to live} |
| 47/122 | . . . {Diverting traffic away from congested spots} | 47/29 | . . {Using a combination of thresholds} |
| 47/125 | . . . {Load balancing, e.g. traffic engineering (load balancing among servers H04L 67/1002)} | 47/30 | . . {using information about buffer occupancy at either end or transit nodes} |
| 47/127 | . . . {Congestion prediction} | 47/31 | . . {Tagging of packets, e.g. discard eligibility [DE] bit} |
| 47/13 | . . {in a LAN segment, e.g. ring or bus} | 47/32 | . . {Packet discarding or delaying} |
| 47/135 | . . . {by jamming the transmission media} | 47/323 | . . . {Discarding or blocking control packets, e.g. ACK packets} |
| 47/14 | . . {in wireless networks} | 47/326 | . . . {With random discard, e.g. random early discard [RED]} |
| 47/15 | . . {in relation to multipoint traffic (arrangements for broadcast or multicast in data networks H04L 12/18)} | 47/33 | . . {Forward notification} |
| 47/16 | . . {in connection oriented networks, e.g. frame relay} | 47/34 | . . {Sequence integrity, e.g. sequence numbers} |
| 47/17 | . . {Hop by hop} | 47/35 | . . {Embedded flow control information in regular packets, e.g. Piggybacking} |
| 47/18 | . . {End to end} | 47/36 | . . {Evaluation of the packet size, e.g. maximum transfer unit [MTU]} |
| 47/19 | . . {at layers above network layer (general aspects of TCP H04L 69/16; network arrangements for networked applications for scheduling or organising the servicing of application requests H04L 67/32)} | 47/365 | . . . {Dynamic adaptation of the packet size} |
| 47/193 | . . . {at transport layer, e.g. TCP related} | 47/37 | . . {Slow start} |
| 47/196 | . . . {Integration of transport layer protocols, e.g. TCP and UDP} | 47/38 | . . {Adapting coding or compression rate} |
| 47/20 | . . {Policing} | 47/39 | . . {Credit based} |
| 47/21 | . . {using leaky bucket} | 47/40 | . . {Using splitted connections, e.g. IP spoofing} |
| 47/215 | . . . {Token bucket} | 47/41 | . . {Actions on aggregated flows or links} |
| 47/22 | . . {Traffic shaping} | 47/50 | . {Queue scheduling} |
| 47/225 | . . . {Determination of shaping rate, e.g. using a moving window} | 47/52 | . . {Bandwidth attribution to queues} |
| 47/23 | . . {Bit dropping} | 47/521 | . . . {Static queue service slot or fixed bandwidth allocation} |
| 47/24 | . . {depending on the type of traffic, e.g. priority or quality of service [QoS] (network arrangements for networked applications for scheduling or organising the servicing of application requests whereby quality of service or priority requirements are taken into account H04L 67/322)} | 47/522 | . . . {Dynamic queue service slot or variable bandwidth allocation} |
| 47/2408 | . . . {Different services, e.g. type of service [ToS]} | 47/524 | {Queue skipping} |
| 47/2416 | . . . {Real time traffic (arrangements for real-time multimedia communications H04L 65/00)} | 47/525 | . . . {Redistribution of residual bandwidth} |
| 47/2425 | . . . {Service specification, e.g. SLA (general aspects of SLA management H04L 41/50)} | 47/527 | . . . {Quantum based scheduling, e.g. credit or deficit based scheduling or token bank} |
| 47/2433 | {Allocation of priorities to traffic types} | 47/528 | . . . {Minimum bandwidth guarantee} |
| 47/2441 | . . . {Flow classification} | 47/54 | . . {Loss aware scheduling} |
| 47/245 | . . . {using preemption} | 47/56 | . . {Delay aware scheduling} |
| 47/2458 | . . . {Modification of priorities while in transit} | 47/562 | . . . {Attaching a time tag to queues} |
| 47/2466 | . . . {Modification of handling priority for control packets, e.g. for ACK or signaling packets} | 47/564 | . . . {Attaching a deadline to packets, e.g. earliest due date first} |
| 47/2475 | . . . {Application aware} | 47/566 | {Deadline varies as a function of time spent in the queue} |
| 47/2483 | . . . {Flow identification} | 47/568 | . . . {Calendar queues or timing rings} |
| 47/2491 | . . . {Mapping QoS requirements between different networks} | 47/58 | . . {Changing or combining different scheduling modes, e.g. multimode scheduling} |
| 47/25 | . . {Rate modification upon detection by the source of changing network conditions} | 47/60 | . . {Hierarchical scheduling} |
| 47/26 | . . {Explicit feedback to the source, e.g. choke packet} | 47/62 | . . {General aspects} |
| 47/263 | . . . {Source rate modification after feedback} | 47/6205 | . . . {Arrangements for avoiding head of line blocking} |
| 47/266 | {Stopping or restarting the source, e.g. X-on or X-off} | 47/621 | . . . {Individual queue per connection or flow, e.g. per VC} |
| 47/27 | . . {Window size evaluation or update, e.g. using information derived from ACK packets} | 47/6215 | . . . {Individual queue per QOS, rate or priority} |
| | | 47/622 | . . . {Queue service order} |
| | | 47/6225 | {fixed service order, e.g. Round Robin} |
| | | 47/623 | {weighted service order (H04L 47/52, H04L 47/54, H04L 47/56 take precedence)} |
| | | 47/6235 | {variable service order} |
| | | 47/624 | . . . {Altering the ordering of packets in an individual queue} |
| | | 47/6245 | . . . {Modifications to standard FIFO or LIFO} |
| | | 47/625 | . . . {Other criteria for service slot or service order} |

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|---------|--|--------------|---|
| 47/6255 | {queue load conditions, e.g. longest queue first} | 47/827 | {Aggregation of resource allocation or reservation requests} |
| 47/626 | {channel conditions} | 47/828 | {Allocation of resources per group of connections, e.g. per group of users} |
| 47/6265 | {past bandwidth allocation} | 47/829 | {Topology based} |
| 47/627 | {policing} | 49/00 | {Packet switching elements (selecting arrangements for multiplex arrangements using optical switching H04Q 11/0001)} |
| 47/6275 | {priority} | 49/10 | . {Switching fabric construction} |
| 47/628 | {packet size, e.g. shortest packet first} | 49/101 | . . {Crossbar or matrix} |
| 47/6285 | . . . {Provisions for avoiding starvation of low priority queues} | 49/102 | . . {using shared medium, e.g. bus or ring} |
| 47/629 | . . . {Fair share of resources, e.g. WFQ} | 49/103 | . . {using shared central buffer, shared memory, e.g. time switching} |
| 47/6295 | . . . {Multiple queues per individual QOS, connection, flow or priority} | 49/104 | . . {ATM switching fabrics} |
| 47/70 | . {Admission control or resource allocation (medium access in wavelength-division multiplex systems H04J 14/0227)} | 49/105 | . . . {ATM switching elements} |
| 47/72 | . . {Reservation actions} | 49/106 | {using space switching, e.g. crossbar or matrix} |
| 47/722 | . . . {at the end terminals, e.g. buffer space} | 49/107 | {using shared medium} |
| 47/724 | . . . {involving intermediate nodes, e.g. RSVP} | 49/108 | {using shared central buffer} |
| 47/726 | . . . {over a plurality of alternate paths, e.g. for load balancing} | 49/109 | . . {integrated on microchip, e.g. switch-on-chip} |
| 47/728 | {for backup paths} | 49/15 | . {Interconnection of switching modules} |
| 47/74 | . . {Reactions to resource unavailability} | 49/1507 | . . {Distribute and route fabrics, e.g. sorting-routing or Batcher-Banyan} |
| 47/741 | . . . {Holding a request until resources become available} | 49/1515 | . . {Non-blocking multistage, e.g. Clos} |
| 47/743 | . . . {Reaction at the end points} | 49/1523 | . . . {Parallel switch fabric planes} |
| 47/745 | . . . {Reaction in network} | 49/153 | {ATM switching fabrics having parallel switch planes} |
| 47/746 | . . . {Reaction triggered by a failure} | 49/1538 | {Cell slicing} |
| 47/748 | . . . {Negotiation of resources, e.g. modification of a request} | 49/1546 | . . . {Pipelined operation} |
| 47/76 | . . {Reallocation of resources, renegotiation of resources, e.g. in-call} | 49/1553 | . . {Interconnection of ATM switching modules, e.g. ATM switching fabrics} |
| 47/762 | . . . {triggered by the network} | 49/1561 | . . . {Distribute and route fabrics, e.g. Batcher-Banyan} |
| 47/765 | . . . {triggered by the end-points} | 49/1569 | . . . {Clos switching fabrics} |
| 47/767 | {after changing the attachment point, e.g. after hand-off} | 49/1576 | . . . {Crossbar or matrix} |
| 47/78 | . . {Resource allocation architecture} | 49/1584 | . . . {Full Mesh, e.g. knockout} |
| 47/781 | . . . {Centralized allocation of resource} | 49/1592 | . . . {Perfect Shuffle} |
| 47/782 | . . . {Hierarchical allocation of resource, e.g. involving a hierarchy of local and centralized entities} | 49/20 | . {Support for services or operations} |
| 47/783 | . . . {Distributed allocation of resources, e.g. bandwidth brokers} | 49/201 | . . {Multicast or broadcast} |
| 47/785 | {Involving several network domains, e.g. multilateral agreements} | 49/203 | . . . {ATM switching fabrics with multicast or broadcast capabilities} |
| 47/786 | {Mapping reservation between domains} | 49/205 | . . {Quality of Service based} |
| 47/787 | {Bandwidth trade among domains} | 49/206 | . . . {Real Time traffic} |
| 47/788 | . . . {Autonomous allocation of resources} | 49/208 | . . {Port mirroring} |
| 47/80 | . . {Actions related to the nature of the flow or the user} | 49/25 | . {Routing or path finding through a switch fabric} |
| 47/801 | . . . {Real time traffic} | 49/251 | . . {Cut-through or wormhole routing} |
| 47/803 | . . . {Application aware} | 49/252 | . . {Store and forward routing} |
| 47/805 | . . . {QOS or priority aware} | 49/253 | . . {Connections establishment or release between ports} |
| 47/806 | . . . {Broadcast or multicast traffic} | 49/254 | . . . {Centralized controller, i.e. arbitration or scheduling} |
| 47/808 | . . . {User-type aware} | 49/255 | . . . {Control mechanisms for ATM switching fabrics} |
| 47/82 | . . {Miscellaneous aspects} | 49/256 | . . {Routing or path finding in ATM switching fabrics} |
| 47/821 | . . . {Prioritising resource allocation or reservation requests} | 49/257 | . . . {Cut-through or wormhole routing} |
| 47/822 | . . . {Collecting or measuring resource availability data} | 49/258 | . . . {Grouping} |
| 47/823 | . . . {Prediction of resource usage} | 49/30 | . {Peripheral units, e.g. input or output ports} |
| 47/824 | . . . {Applicable to portable or mobile terminals} | 49/3009 | . . {Header conversion, routing tables or routing tags} |
| 47/825 | . . . {Involving tunnels, e.g. MPLS} | 49/3018 | . . {Input queuing} |
| 47/826 | . . . {Involving periods of time} | 49/3027 | . . {Output queuing} |

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|---------|--|--------------|--|
| 49/3036 | . . {Shared queuing} | 49/9036 | . . {Common buffer combined with individual queues} |
| 49/3045 | . . {Virtual queuing} | 49/9042 | . . {Separate storage for different parts of the packet, e.g. header and payload} |
| 49/3054 | . . {Auto-negotiation, e.g. access control between switch gigabit interface connector [GBIC] and link} | 49/9047 | . . {Buffer pool} |
| 49/3063 | . . {Pipelined operation} | 49/9052 | . . . {with buffers of different sizes} |
| 49/3072 | . . {Packet splitting} | 49/9057 | . . {Arrangements for supporting packet reassembly or resequencing} |
| 49/3081 | . . {ATM peripheral units, e.g. policing, insertion or extraction} | 49/9063 | . . {Intermediate storage in different physical parts of a node or terminal} |
| 49/309 | . . . {Header conversion, routing tables or routing tags} | 49/9068 | . . . {in the network interface card} |
| 49/35 | . {Application specific switches} | 49/9073 | {Early interruption upon arrival of a fraction of a packet} |
| 49/351 | . . {LAN switches, e.g. ethernet switches} | 49/9078 | . . . {using an external memory or storage device} |
| 49/352 | . . . {Gigabit ethernet switching [GBPS]} | 49/9084 | . . {Reactions to storage capacity overflow} |
| 49/353 | . . {Support for fire wire switches, i.e. according to IEEE 1394} | 49/9089 | . . . {replacing packets in a storage arrangement, e.g. pushout} |
| 49/354 | . . {Support for virtual LAN, VLAN tagging or multiple registration, e.g. according to IEEE 802.1q} | 49/9094 | . . {Arrangements for simultaneous transmit and receive, e.g. simultaneous reading/writing from/to the storage element} |
| 49/355 | . . {Application aware switches, e.g. HTTP} | 51/00 | {Arrangements for user-to-user messaging in packet-switching networks, e.g. e-mail or instant messages} |
| 49/356 | . . {Storage area network switches} | 51/02 | . {with automatic reactions or user delegation, e.g. automatic replies or chatbot} |
| 49/357 | . . . {Fibre channel switches} | 51/04 | . {Real-time or near real-time messaging, e.g. instant messaging [IM] (network arrangements or protocols for real-time communications H04L 65/00)} |
| 49/358 | . . . {Infiniband Switches} | 51/043 | . . {use or manipulation of presence information in messaging (presence management H04L 67/24)} |
| 49/40 | . {Physical details, e.g. power supply, mechanical construction or backplane} | 51/046 | . . {interacting with other applications or services} |
| 49/405 | . . {Physical details, e.g. power supply, mechanical construction or backplane of ATM switches} | 51/06 | . {Message adaptation based on network or terminal capabilities (networked arrangements for intermediate processing of conversion or adaptation of application content or format H04L 67/2823)} |
| 49/45 | . {Provisions for supporting expansion} | 51/063 | . . {with adaptation of content} |
| 49/455 | . . {Provisions for supporting expansion in ATM switches} | 51/066 | . . {with adaptation of format} |
| 49/50 | . {Overload detection; Overload protection} | 51/08 | . {Messages including annexed information, e.g. attachments} |
| 49/501 | . . {Overload detection} | 51/10 | . {Messages including multimedia information (network arrangements or protocols for real-time communication H04L 65/00 ; voice messaging in telephonic communication using automatic or semi-automatic exchanges with non-audio components H04M 3/5307)} |
| 49/503 | . . . {Policing} | 51/12 | . {with filtering and selective blocking capabilities} |
| 49/505 | . . {Corrective Measures, e.g. backpressure} | 51/14 | . {with selective forwarding} |
| 49/506 | . . . {Backpressure} | 51/16 | . {including conversation history, e.g. threads} |
| 49/508 | . . . {Head of Line Blocking Avoidance} | 51/18 | . {Messages including commands or codes to be executed either at an intermediate node or at the recipient to perform message-related actions (computer aided management of electronic mail G06Q 10/10 ; networked applications for remote control or remote monitoring of the application H04L 67/025 ; networked applications involving the movement of software or configuration parameters H04L 67/34)} |
| 49/55 | . {Error prevention, detection or correction} | 51/20 | . {Messaging using geographical location information (protocols for adapting network applications to user terminal location H04L 67/18 ; services specially adapted for wireless communication networks making use of the location of users or terminals H04W 4/02)} |
| 49/552 | . . {Error prevention, e.g. sequence integrity of packets redundant connections through the switch fabric} | | |
| 49/555 | . . {Error detection} | | |
| 49/557 | . . {Error correction, e.g. fault recovery or fault tolerance} | | |
| 49/60 | . {Hybrid or multiprotocol packet, ATM or frame switches} | | |
| 49/602 | . . {Multilayer or multiprotocol switching, e.g. IP switching} | | |
| 49/604 | . . {Hybrid IP/Ethernet switches} | | |
| 49/606 | . . {Hybrid ATM switches, e.g. ATM&STM, ATM&Frame Relay or ATM&IP} | | |
| 49/608 | . . {ATM switches adapted to switch variable length packets, e.g. IP packets} | | |
| 49/65 | . {Fast packet switch re-configuration} | | |
| 49/70 | . {Virtual switches} | | |
| 49/90 | . {Queuing arrangements} | | |
| 49/9005 | . . {Dynamic buffer space allocation} | | |
| 49/901 | . . {Storage descriptor, e.g. read or write pointers} | | |
| 49/9015 | . . . {for supporting a linked list} | | |
| 49/9021 | . . {Plurality of buffers per packet} | | |
| 49/9026 | . . {Single buffer per packet} | | |
| 49/9031 | . . {Wraparound memory, e.g. overrun or underrun detection} | | |

- 51/22 . {Mailbox-related details (computer aided management of electronic mail [G06Q 10/10](#))}
- 51/24 . {with notification on incoming messages}
- 51/26 . {Prioritized messaging (networked applications for intermediate processing whereby quality of service or priority requirements are taken into account [H04L 67/322](#))}
- 51/28 . {Details regarding addressing issues (arrangements and protocols for addressing and naming [H04L 61/00](#))}
- 51/30 . {with reliability check, e.g. acknowledgments or fault reporting}
- 51/32 . {Messaging within social networks}
- 51/34 . {with provisions for tracking the progress of a message}
- 51/36 . {Unified messaging, e.g. interactions between instant messaging, e-mail or other types of messages such as converged IP messaging [CPM]}
- 51/38 . {in combination with wireless systems (mobile application service signalling using messaging, e.g. SMS, [H04W 4/12](#))}
- 61/00** **{Network arrangements or network protocols for addressing or naming}**
NOTE
 This group does not cover:
 - aspects relating to switching or routing which are covered by groups [H04L 45/00](#) or [H04L 49/00](#);
 - aspects relating to configuration management of data networks or network elements in general, which are covered by group [H04L 41/08](#)
 - aspects of addressing in telephony which are covered by group [H04M 7/00](#);
 - aspects of addressing within devices, e.g. process or memory, which are covered by groups [G06F 13/42](#) or [G06F 12/00](#).
- 61/10 . {Mapping of addresses of different types; Address resolution}
- 61/103 . . {across network layers, e.g. resolution of network layer into physical layer addresses or address resolution protocol [ARP]}
- 61/106 . . {across networks, e.g. mapping telephone numbers to data network addresses}
- 61/15 . {Directories; Name-to-address mapping (telephone directories in user terminals [H04M 1/27](#))}
- 61/1505 . . {involving standard directories or standard directory access protocols}
- 61/1511 . . . {using domain name system [DNS]}
- 61/1517 . . . {using open systems interconnection [OSI] directories, i.e. X.500}
- 61/1523 . . . {using lightweight directory access protocol [LDAP]}
- 61/1529 . . . {using voice over internet protocol [VoIP] directories, e.g. session initiation protocol [SIP] registrar or H.323 gatekeeper (real-time signaling or sessions protocols [H04L 65/1003](#))}
- 61/1535 . . {using an address exchange platform which sets up a session between two nodes, e.g. "rendezvous" server (address exchange for voice over internet protocol [VoIP] [H04L 61/1529](#))}
- 61/1541 . . {for service discovery (network applications for service discovery [H04L 67/16](#); discovery of network devices in wireless communication networks [H04W 8/005](#))}
- 61/1547 . . {for personal communications, i.e. using a personal identifier}
- 61/1552 . . {Mechanisms for table lookup, e.g. between directories; Directory data structures; Synchronization of directories (information retrieval in file systems [G06F 16/10](#); information retrieval in structured data stores [G06F 16/20](#))}
- 61/1558 . . {Object oriented directories, e.g. common object request broker architecture [CORBA] name server}
- 61/1564 . . {Directories for electronic mail or instant messaging (arrangements for user-to-user messaging in packet-switching networks [H04L 51/00](#))}
- 61/157 . . {Directories for hybrid networks, e.g. including telephone numbers}
- 61/1576 . . {Metadirectories, i.e. all encompassing global directory which interfaces to various underlying directories}
- 61/1582 . . {containing identifiers of data entities on a computer, e.g. file names}
- 61/1588 . . {containing mobile subscriber information, e.g. home subscriber server [HSS]}
- 61/1594 . . {Address books, i.e. directories containing contact information about correspondents, e.g. on a user device (directories providing the best way to reach a correspondent [H04L 61/1547](#))}
- 61/20 . {Address allocation (configuration management of network or network elements [H04L 41/08](#))}
- 61/2007 . . {internet protocol [IP] addresses}
- 61/2015 . . . {using the dynamic host configuration protocol [DHCP] or variants}
- 61/2023 . . . {using the bootstrap protocol [BOOTP] or variants}
- 61/203 . . . {using an authentication, authorization and accounting [AAA] protocol, e.g. remote authentication dial-in user service [RADIUS] or diameter (supporting authentication of entities communicating through a packet data network [H04L 63/08](#); cryptographic mechanisms or cryptographic arrangements for entity authentication [H04L 9/32](#))}
- 61/2038 . . {for local use, e.g. on local area networks [LAN] or on universal serial bus [USB] networks (bus addresses inside a computer [G06F 13/42](#))}
- 61/2046 . . {involving the solving of address allocation conflicts or involving testing of addresses}
- 61/2053 . . {involving timing or renewal aspects}
- 61/2061 . . {involving aspects of pools of addresses, e.g. assignment of different pools of addresses to different dynamic host configuration protocol [DHCP] servers}
- 61/2069 . . {for group-, multicast- and broadcast-communication (broadcast or conference [H04L 12/18](#))}
- 61/2076 . . {involving update or notification mechanisms, e.g. update of a domain name server with dynamic host configuration protocol [DHCP] assigned addresses}

- 61/2084 . . {involving portability aspects ([network addressing or numbering for mobility support H04W 8/26](#); wireless network layer protocols, e.g. mobile IP [H04W 80/04](#))}
- 61/2092 . . {by self assignment, e.g. pick address randomly and test if already in use}
- 61/25 . {mapping of addresses of the same type; address translation}
- 61/2503 . . {Internet protocol [IP] address translation}
- 61/2507 . . . {translating between special types of IP addresses}
- 61/251 {between different IP versions}
- 61/2514 {between local and global IP addresses}
- 61/2517 {involving port numbers}
- 61/2521 . . . {Special translation architecture, i.e. being different from a single network address translation [NAT] server}
- 61/2525 {Translation at a client}
- 61/2528 {Translation at a proxy}
- 61/2532 {Clique of NAT servers}
- 61/2535 {Multiple local networks, e.g. resolving potential IP address conflicts}
- 61/2539 . . . {for hiding addresses or keeping them anonymous}
- 61/2542 . . . {involving dual-stack hosts}
- 61/2546 . . . {Mechanisms for avoiding unnecessary translation}
- 61/255 . . . {Map-table maintenance and indexing}
- 61/2553 {Binding renewal aspects; Keep-alive messages}
- 61/2557 . . . {Translation policies and rules}
- 61/256 . . . {Network address translation [NAT] traversal}
- 61/2564 {for a higher-layer protocol, e.g. for session initiation protocol [SIP] ([SIP for real-time communications H04L 65/1006](#))}
- 61/2567 {for reachability, e.g. inquiring the address of a correspondent behind a NAT server}
- 61/2571 {for identification, e.g. for authentication or billing ([charging arrangements H04L 12/14](#))}
- 61/2575 {using address mapping retrieval, e.g. simple traversal of user datagram protocol through NAT [STUN]}
- 61/2578 {transparent to the NAT server}
- 61/2582 {through control of the NAT server, e.g. using universal plug and play [UPnP]}
- 61/2585 {through application level gateway [ALG]}
- 61/2589 {over a relay server, e.g. traversal using relay NAT [TURN]}
- 61/2592 . . . {involving tunneling or encapsulation ([providing a confidential data exchange among entities communicating through data packet networks H04L 63/04](#))}
- 61/2596 . . {Non - internet protocol [IP] address translation}
- 61/30 . {Arrangements for managing names, e.g. use of aliases or nicknames ([retrieval from the Internet by using information identifiers, e.g. uniform resource locators \[URLs\] G06F 16/955](#); name-to-address mapping [H04L 61/15](#))}
- 61/3005 . . {Mechanisms for avoiding name conflicts}
- 61/301 . . {Name conversion}
- 61/3015 . . {Name registration, generation or assignment}
- 61/302 . . . {Administrative registration, e.g. for domain names at internet corporation for assigned names and numbers [ICANN] ([data processing specially adapted for administration or management G06Q 10/00](#))}
- 61/3025 . . . {Domain name generation or assignment}
- 61/303 . . {Name structure}
- 61/3035 . . . {containing non-Latin characters, e.g. Chinese domain names}
- 61/304 . . . {containing protocol addresses or telephone numbers ([address type involved H04L 61/6018](#))}
- 61/3045 . . . {containing wildcard characters}
- 61/305 . . . {containing special prefixes}
- 61/3055 . . . {containing special suffixes}
- 61/306 . . {Name types}
- 61/3065 . . . {Application layer names, e.g. buddy name, unstructured name chosen by a user or home appliance name}
- 61/307 . . . {E-mail addresses ([arrangements for user-to-user messaging in packet-switching networks H04L 51/00](#))}
- 61/3075 . . . {Access point names [APN], i.e. name of a gateway general packet radio service support node [GGSN] connecting a mobile user to a packet data network [PDN]}
- 61/308 . . . {Telephone uniform resource identifier [URI]}
- 61/3085 . . . {Session initiation protocol [SIP] uniform resource identifier [URI]}
- 61/309 . . . {Globally routable user-agent [GRUU] uniform resource identifier [URI] for the session initiation protocol [SIP]}
- 61/3095 . . . {Internet protocol multimedia private identity [IMPI] or internet protocol multimedia public identity [IMPU]}
- 61/35 . {involving non-standard use of addresses for implementing network functionalities, e.g. coding subscription information within the address or functional addressing, i.e. assigning an address to a function}
- 61/60 . {Details}
- 61/6004 . . {Structures or formats of addresses}
- 61/6009 . . {Caching of addresses ([caching data temporarily at an intermediate stage in general H04L 67/2842](#))}
- 61/6013 . . {Proxying of addresses}
- 61/6018 . . {Address types}
- 61/6022 . . . {Layer 2 addresses, e.g. medium access control [MAC] addresses}
- 61/6027 . . . {Control area network [CAN] identifiers ([electric circuits specially adapted for vehicles for transmission of signals between vehicle parts and subsystems B60R 16/023](#))}
- 61/6031 . . . {Small computer system interface [SCSI] addresses}
- 61/6036 . . . {IEEE1394 identification numbers}
- 61/604 . . . {Asynchronous transfer mode [ATM] addresses}
- 61/6045 . . . {Fibre channel identifiers}
- 61/605 . . . {Telephone numbers}
- 61/6054 . . . {International mobile subscriber identity [IMSI] numbers}
- 61/6059 . . . {Internet protocol version 6 [IPv6] addresses}

- 61/6063 . . . {Transport layer addresses, e.g. aspects of transmission control protocol [TCP] or user datagram protocol [UDP] ports (TCP/IP or UDP protocol aspects or techniques [H04L 69/16](#))}
- 61/6068 . . {Internet protocol [IP] addresses subnets}
- 61/6072 . . {Short addresses}
- 61/6077 . . {Multiple interfaces, e.g. multihomed nodes}
- 61/6081 . . {involving addresses for wireless personal area networks and wireless sensor networks, e.g. Zigbee addresses ([network addressing or numbering for mobility support H04W 8/26](#))}
- 61/6086 . . {involving dual-stack hosts, e.g. in internet protocol version 4 [IPv4]/ internet protocol version 6 [IPv6] networks ([implementation details of transmission control protocol \[TCP\]/ internet protocol \[IP\] or user datagram protocol \[UDP\]/internet protocol \[IP\] stack architecture H04L 69/161](#))}
- 61/609 . . {involving geographic information, e.g. room number}
- 61/6095 . . {involving masks or ranges of addresses}
- 63/00** **{Network architectures or network communication protocols for network security (cryptographic mechanisms or cryptographic arrangements for secret or secure communication [H04L 9/00](#); network architectures or network communication protocols for wireless network security [H04W 12/00](#); security arrangements for protecting computers or computer systems against unauthorised activity [G06F 21/00](#))}**
- 63/02 . {for separating internal from external traffic, e.g. firewalls}
- 63/0209 . . {Architectural arrangements, e.g. perimeter networks or demilitarized zones}
- 63/0218 . . . {Distributed architectures, e.g. distributed firewalls}
- 63/0227 . . {Filtering policies ([mail message filtering H04L 51/12](#))}
- 63/0236 . . . {Filtering by address, protocol, port number or service, e.g. IP-address or URL}
- 63/0245 . . . {Filtering by information in the payload}
- 63/0254 . . . {Stateful filtering}
- 63/0263 . . . {Rule management}
- 63/0272 . . {Virtual private networks}
- 63/0281 . . {Proxies}
- 63/029 . . {Firewall traversal, e.g. tunnelling or, creating pinholes}
- 63/04 . {for providing a confidential data exchange among entities communicating through data packet networks}
- 63/0407 . . {wherein the identity of one or more communicating identities is hidden ([cryptographic mechanisms or cryptographic arrangements for anonymous credentials or for identity based cryptographic systems H04L 9/00](#))}
- 63/0414 . . . {during transmission, i.e. party's identity is protected against eavesdropping, e.g. by using temporary identifiers, but is known to the other party or parties involved in the communication}
- 63/0421 . . . {Anonymous communication, i.e. the party's identifiers are hidden from the other party or parties, e.g. using an anonymizer}
- 63/0428 . . {wherein the data content is protected, e.g. by encrypting or encapsulating the payload}
- 63/0435 . . . {wherein the sending and receiving network entities apply symmetric encryption, i.e. same key used for encryption and decryption ([cryptographic mechanisms or cryptographic arrangements for symmetric key encryption H04L 9/06](#))}
- 63/0442 . . . {wherein the sending and receiving network entities apply asymmetric encryption, i.e. different keys for encryption and decryption ([cryptographic mechanisms or cryptographic arrangements for public-key encryption H04L 9/30](#))}
- 63/045 . . . {wherein the sending and receiving network entities apply hybrid encryption, i.e. combination of symmetric and asymmetric encryption ([cryptographic mechanisms or cryptographic arrangements using a plurality of keys or algorithms H04L 9/14](#))}
- 63/0457 . . . {wherein the sending and receiving network entities apply dynamic encryption, e.g. stream encryption ([cryptographic mechanisms or cryptographic arrangements for stream encryption H04L 9/065](#))}
- 63/0464 . . . {using hop-by-hop encryption, i.e. wherein an intermediate entity decrypts the information and re-encrypts it before forwarding it}
- 63/0471 . . . {applying encryption by an intermediary, e.g. receiving clear information at the intermediary and encrypting the received information at the intermediary before forwarding}
- 63/0478 . . . {applying multiple layers of encryption, e.g. nested tunnels or encrypting the content with a first key and then with at least a second key ([cryptographic mechanisms or cryptographic arrangements using a plurality of keys or algorithms H04L 9/14](#))}
- 63/0485 . . . {Networking architectures for enhanced packet encryption processing, e.g. offloading of IPsec packet processing or efficient security association look-up}
- 63/0492 . . . {by using a location-limited connection, e.g. near-field communication or limited proximity of entities}
- 63/06 . {for supporting key management in a packet data network ([cryptographic mechanisms or cryptographic arrangements for key management H04L 9/08](#))}
- 63/061 . . {for key exchange, e.g. in peer-to-peer networks ([cryptographic mechanisms or cryptographic arrangements for key agreement H04L 9/0838](#))}
- 63/062 . . {for key distribution, e.g. centrally by trusted party ([cryptographic mechanisms or cryptographic arrangements for key distribution involving a central third party H04L 9/0819](#))}
- 63/064 . . . {Hierarchical key distribution, e.g. by multi-tier trusted parties}
- 63/065 . . {for group communications ([cryptographic mechanisms or cryptographic arrangements for key management involving conference or group key H04L 9/0833](#))}
- 63/067 . . {using one-time keys ([cryptographic mechanisms or cryptographic arrangements for generation of one-time passwords H04L 9/0863](#))}

- 63/068 . . {using time-dependent keys, e.g. periodically changing keys (cryptographic mechanisms or cryptographic arrangements for controlling usage of secret information [H04L 9/088](#))}
- 63/08 . {for supporting authentication of entities communicating through a packet data network (cryptographic mechanisms or cryptographic arrangements for entity authentication [H04L 9/32](#))}
- 63/0807 . . {using tickets, e.g. Kerberos (cryptographic mechanisms or cryptographic arrangements for entity authentication using tickets or tokens [H04L 9/3213](#))}
- 63/0815 . . {providing single-sign-on or federations}
- 63/0823 . . {using certificates (cryptographic mechanisms or cryptographic arrangements for entity authentication involving certificates [H04L 9/3263](#))}
- 63/083 . . {using passwords (cryptographic mechanisms or cryptographic arrangements for entity authentication using a predetermined code [H04L 9/3226](#))}
- 63/0838 . . . {using one-time-passwords}
- 63/0846 . . . {using time-dependent-passwords, e.g. periodically changing passwords}
- 63/0853 . . {using an additional device, e.g. smartcard, SIM or a different communication terminal (cryptographic mechanisms or cryptographic arrangements for entity authentication involving additional secure or trusted devices [H04L 9/3234](#))}
- 63/0861 . . {using biometrical features, e.g. fingerprint, retina-scan (cryptographic mechanisms or cryptographic arrangements for entity authentication using biological data [H04L 9/3231](#))}
- 63/0869 . . {for achieving mutual authentication (cryptographic mechanisms or cryptographic arrangements for mutual authentication [H04L 9/3273](#))}
- 63/0876 . . {based on the identity of the terminal or configuration, e.g. MAC address, hardware or software configuration or device fingerprint}
- 63/0884 . . {by delegation of authentication, e.g. a proxy authenticates an entity to be authenticated on behalf of this entity vis-à-vis an authentication entity}
- 63/0892 . . {by using authentication-authorization-accounting [AAA] servers or protocols}
- 63/10 . {for controlling access to network resources (restricting network management access [H04L 41/28](#))}
- 63/101 . . {Access control lists [ACL]}
- 63/102 . . {Entity profiles}
- 63/104 . . {Grouping of entities}
- 63/105 . . {Multiple levels of security}
- 63/107 . . {wherein the security policies are location-dependent, e.g. entities privileges depend on current location or allowing specific operations only from locally connected terminals}
- 63/108 . . {when the policy decisions are valid for a limited amount of time}
- 63/12 . {Applying verification of the received information (cryptographic mechanisms or cryptographic arrangements for data integrity or data verification [H04L 9/32](#))}
- 63/123 . . {received data contents, e.g. message integrity}
- 63/126 . . {the source of the received data}
- 63/14 . {for detecting or protecting against malicious traffic}
- 63/1408 . . {by monitoring network traffic (monitoring network traffic per se [H04L 43/00](#))}
- 63/1416 . . . {Event detection, e.g. attack signature detection}
- 63/1425 . . . {Traffic logging, e.g. anomaly detection}
- 63/1433 . . {Vulnerability analysis}
- 63/1441 . . {Countermeasures against malicious traffic (countermeasures against attacks on cryptographic mechanisms [H04L 9/002](#))}
- 63/145 . . . {the attack involving the propagation of malware through the network, e.g. viruses, trojans or worms}
- 63/1458 . . . {Denial of Service}
- 63/1466 . . . {Active attacks involving interception, injection, modification, spoofing of data unit addresses, e.g. hijacking, packet injection or TCP sequence number attacks}
- 63/1475 . . . {Passive attacks, e.g. eavesdropping or listening without modification of the traffic monitored}
- 63/1483 . . . {service impersonation, e.g. phishing, pharming or web spoofing (detection of rogue wireless access points [H04W 12/12](#))}
- 63/1491 . . . {using deception as countermeasure, e.g. honeypots, honeynets, decoys or entrapment}
- 63/16 . {Implementing security features at a particular protocol layer}
- 63/162 . . {at the data link layer}
- 63/164 . . {at the network layer}
- 63/166 . . {at the transport layer}
- 63/168 . . {above the transport layer}
- 63/18 . {using different networks or paths for security, e.g. using out of band channels (cryptographic mechanisms or cryptographic arrangements for key distribution involving distinctive intermediate devices or communication paths [H04L 9/0827](#); cryptographic mechanisms or cryptographic arrangements for authentication using a plurality of channels [H04L 9/3215](#))}
- 63/20 . {for managing network security; network security policies in general (filtering policies [H04L 63/0227](#))}
- 63/205 . . {involving negotiation or determination of the one or more network security mechanisms to be used, e.g. by negotiation between the client and the server or between peers or by selection according to the capabilities of the entities involved (negotiation of communication capabilities [H04L 69/24](#))}
- 63/30 . {for supporting lawful interception, monitoring or retaining of communications or communication related information (circuit switched telephony call monitoring [H04M 3/2281](#))}
- 63/302 . . {gathering intelligence information for situation awareness or reconnaissance}
- 63/304 . . {intercepting circuit switched data communications (lawful interception of wireless network communications [H04W 12/02](#))}
- 63/306 . . {intercepting packet switched data communications, e.g. Web, Internet or IMS communications}

- 63/308 . . {retaining data, e.g. retaining successful, unsuccessful communication attempts, internet access, or e-mail, internet telephony, intercept related information or call content}
- 65/00 **{Network arrangements or protocols for real-time communications}** (computer conference [H04L 12/1813](#); real time or near real time messaging in message switching systems, e.g. instant messaging [H04L 51/04](#); network applications in general [H04L 67/00](#); systems providing special services to telephonic subscribers [H04M 3/42](#); interconnection arrangements between switching centres for working between exchanges having different types of switching equipment where the types of switching equipment comprise PSTN/ISDN equipment and equipment of networks other than PSTN/ISDN [H04M 7/1205](#); television systems [H04N 7/00](#); selective video distribution [H04N 21/00](#))
- NOTES**
- {This group covers:
 - only communications which fulfill the following two conditions:
 - they are based on packet data;
 - there is real-time or pseudo-real-time temporal association between source and destination, or source and network, or destination and network;
 - provided that the above two conditions are met, this group covers arrangements relating to
 - the transmission of the multimedia data itself,
 - the user-to-user, user-to-network, inter-network or intra-network signalling supporting:
 - the establishment of a session for the subsequent transmission of the multimedia data, or
 - the maintenance of the session or
 - the application services available to the user during the session (unless explicitly excluded in certain cases). }
 - {This group does not cover:
 - non-real-time multimedia file transfer, which is covered by group [H04L 67/06](#);
 - multimedia store or forward messaging as in e-mail, MMS or the like, which is covered by group [H04L 51/00](#);
 - analogue video streaming, as in analogue television systems, which is covered by group [H04N 7/00](#);
 - selective distribution of MPEG elementary or transport streams, containing video and/or additional data, which is covered by group [H04N 21/00](#);
 - bit streaming, i.e. not packet-based, such as in ISDN, which is covered by group [H04Q 11/0428](#);
 - instant messaging, which is covered by group [H04L 51/04](#);
 - any other multimodal data communications which do not meet the conditions of being packet-based and real-time or pseudo-real-time;
 - flow control in packet switching networks, which is covered by group [H04L 47/10](#). }
3. {In this group the following terms or expressions are used with the meaning indicated:
- H.323 means International Telecommunication Union Recommendation no. 323, series H, entitled "Packet-based multimedia communications systems"
 - IP means Internet Protocol
 - IMS means IP Multimedia Subsystem
 - ISDN means Integrated Services Digital Network
 - MGC means Media Gateway Control/Controller
 - MGCP means Media Gateway Control Protocol
 - MMS means Multimedia Messaging Service
 - PBX means Private Branch Exchange
 - PSTN means Public Switched Telephone Network
 - QoS means Quality of Service
 - RTP means Real Time Protocol
 - RTCP means Real Time Control Protocol
 - RTSP means Real Time Streaming Protocol.
 - SIP means Session Initiation Protocol
 - SPAM means unsolicited electronic mail
 - SPIT means SPAM Prevention in IP Telephony }
- 65/10 . {Signalling, control or architecture (data network management [H04L 41/00](#); data network testing or monitoring [H04L 43/00](#); admission control or resource reservation in packet switching networks [H04L 47/70](#); control signalling related to video distribution [H04N 21/63](#); selecting or control in telephonic networks [H04Q 3/00](#))}
- 65/1003 . . {Signalling or session protocols}
- 65/1006 . . . {SIP}
- 65/1009 . . . {H.323}
- 65/1013 . . {Network architectures, gateways, control or user entities}
- 65/1016 . . . {IMS (wireless communication networks [H04W](#))}
- 65/102 . . . {Gateways (arrangements for connecting between networks having differing types of switching systems, e.g. gateways [H04L 12/66](#))}
- 65/1023 {Media gateways}
- 65/1026 {at the edge}
- 65/103 {in the network}
- 65/1033 {Signalling gateways}
- 65/1036 {at the edge}
- 65/104 {in the network}
- 65/1043 . . . {MGC, MGCP or Megaco (decomposed PSTN/ISDN-IP gateways [H04M 7/1255](#))}
- 65/1046 . . . {Call controllers; Call servers}
- 65/105 . . . {Proxies, e.g. SIP proxies}
- 65/1053 . . . {Arrangements providing PBX functionality, e.g. IP PBX (circuit switched PBXs [H04M 3/42314](#); PBX networks [H04M 7/009](#))}
- 65/1056 {for multi-site}
- 65/1059 . . . {End-user terminal functionality (substation equipment for use by subscribers [H04M 1/00](#); terminal profiles [H04L 67/303](#); terminal emulation [H04L 67/08](#); adaptation for terminals with limited resources or for terminal portability [H04L 67/04](#); management of video client characteristics [H04N 21/258](#), [H04N 21/4516](#))}

- 65/1063 . . . {Application servers (systems providing special services to telephonic subscribers [H04M 3/42](#))}
- 65/1066 . . {Session control (conducting a computer conference, e.g. admission, detection, selection or grouping of participants, correlating users to one or more conference session or prioritising transmission, [H04L 12/1822](#); admission control/resource reservation in packet switching networks [H04L 47/70](#))}
- 65/1069 . . . {Setup (computer conference organisation arrangements, e.g. handling schedules, setting up parameters needed by nodes to attend a conference, booking network resources or notifying involved parties [H04L 12/1818](#); admission control or resource reservation in packet switching networks [H04L 47/70](#); arrangements for peer-to-peer networking in network applications [H04L 67/104](#); session management in network applications [H04L 67/14](#); negotiation of communication capabilities [H04L 69/24](#))}
- 65/1073 . . . {Registration (arrangements for addressing or naming in data networks [H04L 61/00](#))}
- 65/1076 . . . {Screening (arrangements for screening incoming telephone calls [H04M 3/436](#); arrangements for network security [H04L 63/00](#))}
- 65/1079 {of unsolicited session attempts, e.g. SPIT (message switching systems, e.g. electronic mail systems, with filtering and selective blocking capabilities [H04L 51/12](#))}
- 65/1083 . . . {In-session procedures (computer conferences, network arrangements for conference optimisation or adaptation [H04L 12/1827](#); reactions to resource unavailability in packet switching networks [H04L 47/74](#); reallocation or renegotiation of resources in packet switching networks [H04L 47/76](#))}
- 65/1086 {session scope modification}
- 65/1089 {by adding or removing media}
- 65/1093 {by adding or removing participants}
- 65/1096 . . . {Features, e.g. call-forwarding or call hold (systems providing special services to telephonic subscribers [H04M 3/42](#))}
- 65/40 . . {Services or applications (network service management for ensuring proper service fulfilment [H04L 41/50](#); information services comprising voice [H04M 3/487](#); systems providing special services to telephonic subscribers [H04M 3/42](#); contact center services [H04M 3/51](#))}
- 65/4007 . . {Services involving a main real-time session and one or more additional parallel sessions (real time messaging, e.g. instant messaging, interacting with other applications or services [H04L 51/046](#); multichannel or multilink protocols [H04L 69/14](#); services and arrangements where telephone services are combined with data services [H04M 7/0024](#))}
- 65/4015 . . . {where at least one of the additional parallel sessions is real time or time sensitive, e.g. white board sharing, collaboration or spawning of a subconference (telewriting, virtual reality or network gaming [H04L 67/38](#))}
- 65/4023 . . . {where none of the additional parallel sessions is real time or time sensitive, e.g. downloading a file in a parallel FTP session, initiating an email or combinational services (message switching systems [H04L 51/00](#); instant messaging [H04L 51/04](#); file transfer [H04L 67/06](#); web-based applications [H04L 67/02](#))}
- 65/403 . . {Arrangements for multiparty communication, e.g. conference (television conferencing systems [H04N 7/15](#); telephonic conference systems [H04M 3/56](#); data switching systems for computer conference [H04L 12/1813](#))}
- 65/4038 . . . {with central floor control (data switching systems for conducting a computer conference, e.g. admission, detection, selection or grouping of participants [H04L 12/1822](#))}
- 65/4046 . . . {with distributed floor control}
- 65/4053 . . . {without floor control}
- 65/4061 . . {"Push-to-X" services (push-to-talk services in wireless networks [H04W 4/10](#); connection management, e.g. connection set-up, manipulation or release for push-to-talk or push-on-call services in wireless communication networks [H04W 76/45](#))}
- 65/4069 . . {Services related to one way streaming}
- 65/4076 . . . {Multicast or broadcast (data switching systems for broadcast or conference [H04L 12/18](#); analog television systems in general [H04N 7/00](#); creating video channels for a dedicated end-user group [H04N 21/2668](#); arrangements for broadcast or distribution combined with broadcast [H04H 20/00](#); arrangements for broadcast applications with a direct linkage of broadcast information [H04H 60/00](#); arrangements for push based network services [H04L 67/26](#))}
- 65/4084 . . . {Content on demand (analog television systems using two way working [H04N 7/173](#); end-user applications for requesting content, additional data or services [H04N 21/472](#))}
- 65/4092 . . . {Control of source by destination, e.g. user controlling streaming rate of server (explicit feedback from the destination to the source to modify data rate for flow control or congestion control in packet switching networks, e.g. choke packet [H04L 47/26](#); end-to-end flow control in packet switching networks [H04L 47/18](#); analog television systems using two way working [H04N 7/173](#); control signals to video servers issued by video clients [H04N 21/6377](#))}
- 65/60 . . {Media handling, encoding, streaming or conversion}

- 65/601 . . {Media manipulation, adaptation or conversion (computer conferences, network arrangements for conference optimisation or adaptation [H04L 12/1827](#); flow control or congestion control in packet switching networks [H04L 47/10](#); message switching systems, e.g. electronic mail systems, with message adaptation based on network or terminal capabilities [H04L 51/06](#); adaptation for terminals or networks with limited resources or for terminal portability [H04L 67/04](#); network application being adapted for the location of the user terminal [H04L 67/18](#); involving intermediate processing or storage in the network [H04L 67/28](#); transmission of television signals using pulse code modulation [H04N 7/24](#))}
- 65/602 . . . {at the source (reformatting of video signals in video distribution servers [H04N 21/2343](#); reformatting of additional data in video distribution servers [H04N 21/2355](#))}
- 65/604 . . . {at the destination (reformatting of video signals in video clients [H04N 21/4402](#); reformatting of additional data in video clients [H04N 21/4355](#))}
- 65/605 . . . {intermediate}
- 65/607 . . {Stream encoding details (interfacing the downstream path of a video distribution network [H04N 21/238](#), [H04N 21/438](#); controlling the complexity of a video stream [H04N 21/2662](#), [H04N 21/4621](#), [H04N 21/64792](#); protocols for data compression [H04L 69/04](#); header parsing or analysis [H04L 69/22](#))}
- 65/608 . . {Streaming protocols, e.g. RTP or RTCP}
- 65/80 . {QoS aspects (monitoring of the downstream path of a video distribution network [H04N 21/2402](#), [H04N 21/44209](#); network service management, ensuring proper service fulfillment according to an agreement or contract between two parties, e.g. between an IT-provider and a customer [H04L 41/50](#); monitoring arrangements, testing arrangements, with monitoring of QoS metrics [H04L 43/08](#); traffic-type related flow control in packet switching networks, e.g. priorities or QoS [H04L 47/24](#); admission control/resource reservation in packet switching networks based on QoS or priority awareness [H04L 47/805](#); adaptation for terminals or networks with limited resources, or for terminal portability [H04L 67/04](#); network application adapted for the location of the user terminal [H04L 67/18](#); reducing the amount or size of exchanged application data [H04L 67/2828](#); arrangements for scheduling or organising the servicing of requests whereby quality of service or priority requirements are taken into account [H04L 67/322](#))}

67/00

{Network-specific arrangements or communication protocols supporting networked applications} (message switching systems [H04L 51/00](#); network management protocols [H04L 41/00](#); routing or path finding of packets in data switching networks [H04L 45/00](#); protocols for real-time multimedia communication [H04L 65/00](#); information retrieval [G06F 16/00](#); services or facilities specially adapted for wireless communication networks [H04W 4/00](#); network structures or processes for video distribution between server and client or between remote clients [H04N 21/00](#); exchange systems providing special services or facilities to subscribers involving telephonic communications [H04M 3/42](#); distributed information systems [G06F 9/00](#), [G06F 17/00](#); lower layer network functionalities which support application layer provisions [H04L 12/00](#))}

NOTES

1. This group covers:

1. Networking arrangements or communication protocols to support networked applications which occur at the abstract network layers 5 to 7 of the OSI layer model. The higher layers constitute the interface between the network and the computer applications that use the network to communicate.
2. Network-specific aspects of client-server applications as well as of networking arrangements supporting networked/distributed applications, e.g. data transport, scheduling. This group also covers specific networked application layer protocols, e.g. FTP, WAP, HTTP.

2. This group does not cover:

1. Distributed applications which are network-agnostic, i.e. distributed information systems for which the network functions are transparent. These field are covered, e.g. by [G06F 9/00](#), [G06F 17/00](#). Data switching network provisions in general and the lower layer network functionalities which support application layer provisions are covered by [H04L 12/00](#)

- 67/02 . {involving the use of web-based technology, e.g. hyper text transfer protocol [HTTP] (information retrieval from the Internet [G06F 16/95](#))}
- 67/025 . . {for remote control or remote monitoring of the application (network management using Internet technology [H04L 41/0246](#); network monitoring [H04L 43/00](#); management of end-device applications over a special purpose or proprietary network [H04L 67/125](#))}
- 67/04 . {adapted for terminals or networks with limited resources or for terminal portability, e.g. wireless application protocol [WAP] (services or facilities specially adapted for wireless communication networks [H04W 4/00](#))}
- 67/06 . {adapted for file transfer, e.g. file transfer protocol [FTP]}
- 67/08 . {adapted for terminal emulation, e.g. telnet (protocols for telewriting or protocols for networked simulations, virtual reality or games [H04L 67/38](#); emulation or software simulation [G06F 9/455](#))}

- 67/10 . . . {in which an application is distributed across nodes in the network ([multiprogramming arrangements G06F 9/46](#))}
- 67/1002 . . . {for accessing one among a plurality of replicated servers, e.g. load balancing (arrangements or protocols for peer-to-peer networking [H04L 67/104](#); protocols for client-server architectures [H04L 67/42](#); allocation of processing resources to service requests in a distributed system [G06F 9/5027](#); rebalancing the processing load in a distributed system [G06F 9/5083](#); wireless network traffic load balancing [H04W 28/08](#); network load balancing, traffic engineering [H04L 47/125](#); video servers using load balancing strategies [H04N 21/23103](#); error detection or correction of the data by redundancy in hardware [G06F 11/16](#))}
- 67/1004 . . . {Server selection in load balancing}
- 67/1006 {with static server selection, e.g. the same server being selected for a specific client (allocation of processing resources considering data affinity [G06F 9/5033](#))}
- 67/1008 {based on parameters of servers, e.g. available memory or workload (allocation of processing resources to a machine considering the load [G06F 9/505](#))}
- 67/101 {based on network conditions}
- 67/1012 {based on compliance of requirements or conditions with available server resources}
- 67/1014 {based on the content of a request}
- 67/1017 {based on a round robin mechanism}
- 67/1019 {based on random server selection}
- 67/1021 {based on client or server locations}
- 67/1023 {based on other criteria, e.g. hash applied to IP address, specific algorithms or cost}
- 67/1025 . . . {dynamic adaptation of the criteria on which the server selection is based}
- 67/1027 . . . {Persistence of sessions during load balancing}
- 67/1029 . . . {using data related to the state of servers by a load balancer (server selection based on server parameters [H04L 67/1008](#); performance measurement for load balancing [G06F 11/3433](#); information retrieval in structured data stores [G06F 16/20](#))}
- 67/1031 . . . {Controlling of the operation of servers by a load balancer, e.g. adding or removing servers that serve requests}
- 67/1034 . . . {Reaction to server failures by a load balancer (network fault restoration [H04L 41/0654](#); departure or maintenance mechanisms in Peer-to-Peer networks [H04L 67/1048](#); intermediate processing providing operational support to end devices by emulation or by off-loading in the network [H04L 67/2861](#); techniques for recovering from a failure of a protocol instance or entity [H04L 69/40](#); error detection or correction of the data by redundancy in hardware [G06F 11/16](#); failing over workload from one server to another one [G06F 11/202](#))}
- 67/1036 . . . {Load balancing of requests to servers for services different from user content provisioning, e.g. load balancing to DNS servers or firewalls (internet service provider selection [H04L 12/5691](#))}
- 67/1038 . . . {Load balancing arrangements to avoid a single path through a load balancer}
- 67/104 . . . {for peer-to-peer [P2P] networking; Functionalities or architectural details of P2P networks (file transfer, upload, download [H04L 67/06](#); accessing replicated servers [H04L 67/1002](#); presence management [H04L 67/24](#); scheduling provisions [H04L 67/32](#); real-time communications [H04L 65/00](#); information retrieval using distributed database systems [G06F 16/27](#); small scale hierarchical wireless network topologies [H04W 84/10](#); wireless interfaces between terminal devices [H04W 92/18](#); P2P connections between video clients [H04N 21/632](#); P2P connections between video game machines [A63F 13/34](#))}
- 67/1042 . . . {involving topology management mechanisms}
- 67/1044 {Group management mechanisms (user group management in wireless communication networks [H04W 4/08](#); management of multicast group membership [H04L 12/185](#); reconfiguring of node membership in a computing system to eliminate errors [G06F 11/1425](#))}
- 67/1046 {Joining mechanisms}
- 67/1048 {Departure or maintenance mechanisms (methods for recovering from a failure of a protocol instance or entity [H04L 69/40](#); intermediate processing providing operational support to end devices by emulation or by off-loading in the network [H04L 67/2861](#); reactions to server failures by a load balancer [H04L 67/1034](#); error detection or correction of the data by redundancy in operation [G06F 11/14](#))}
- 67/1051 {Group master selection mechanisms}
- 67/1053 {with pre-configuration of logical or physical connections with a determined number of other peers}
- 67/1055 {involving connection limits (involving dynamic management of active down- or uploading connections [H04L 67/1085](#))}
- 67/1057 {involving pre-assessment of levels of reputation of peers}
- 67/1059 {Inter-group management mechanisms, e.g. splitting, merging or interconnection of groups}
- 67/1061 . . . {involving node-based peer discovery mechanisms (access to replicated servers [H04L 67/1002](#); service discovery [H04L 67/16](#); topology discovery for routing [H04L 45/02](#); information retrieval in distributed file systems [G06F 16/10](#); information retrieval in structured data stores, indexing, querying [G06F 16/20](#))}
- 67/1063 {Discovery through centralizing entities}
- 67/1065 {Discovery involving distributed pre-established resource-based relationships among peers, e.g. based on distributed hash tables [DHT] (pre-configuration of logical or physical connections [H04L 67/1053](#))}
- 67/1068 {Discovery involving direct consultation or announcement among potential requesting and potential source peers}

- 67/107 {with limitation or expansion of the discovery scope}
- 67/1072 {Discovery involving ranked list compilation of candidate peers}
- 67/1074 {for supporting resource transmission mechanisms (routing over an overlay routing layer [H04L 45/64](#); file transfer [H04L 67/06](#))}
- 67/1076 {Resource dissemination mechanisms or network resource keeping policies for optimal resource availability in the overlay network}
- 67/1078 {Resource delivery mechanisms}
- 67/108 {characterized by resources being split in blocks or fragments}
- 67/1082 {involving incentive schemes}
- 67/1085 {involving dynamic management of active down- or uploading connections}
- 67/1087 {involving cross functional networking aspects}
- 67/1089 {Hierarchical topologies}
- 67/1091 {Interfacing with client-server systems or between P2P systems}
- 67/1093 {Some peer nodes performing special functions}
- 67/1095 {for supporting replication or mirroring of data, e.g. scheduling or transport for data synchronisation between network nodes or user terminals or syncML (synchronisation in information retrieval in file systems [G06F 16/10](#); synchronisation in structured data stores [G06F 16/27](#); mass storage redundancy by mirroring for error detection or correction of data [G06F 11/2056](#))}
- 67/1097 {for distributed storage of data in a network, e.g. network file system [NFS], transport mechanisms for storage area networks [SAN] or network attached storage [NAS] (temporary storage of data at an intermediate stage [H04L 67/2842](#); dedicated interfaces to storage systems [G06F 3/0601](#))}
- 67/12 {adapted for proprietary or special purpose networking environments, e.g. medical networks, sensor networks, networks in a car or remote metering networks (home automation networks [H04L 12/2803](#); total factory control characterised by the network communication [G05B 19/4185](#); games involving transmission systems [A63F 13/30](#))}
- 67/125 {involving the control of end-device applications over a network (network management of network elements [H04L 41/00](#); end-device control or monitoring using web-based technology [H04L 67/025](#))}
- 67/14 {for session management (session control for real-time communications [H04L 65/1066](#); session initiation protocol [H04L 65/1006](#); negotiation of communication capabilities [H04L 69/24](#); computer conference arrangements [H04L 12/1813](#); connection management in wireless networks [H04W 76/00](#); session management for telephonic communication and services [H04M 7/00](#); intertask communications in multiprogramming arrangements [G06F 9/54](#))}
- 67/141 {provided for setup of an application session (session setup for real-time communications [H04L 65/1069](#))}
- 67/142 {provided for managing session state for stateless protocols; Signalling a session state; State transitions; Keeping-state mechanisms}
- 67/143 {provided for session termination, e.g., event controlled end of session}
- 67/145 {provided for avoiding end of session, e.g. keep-alive, heartbeats, resumption message, wake-up for inactive or interrupted session}
- 67/146 {Markers provided for unambiguous identification of a particular session, e.g. session identifier, session cookie or URL-encoding (IP multimedia subsystem [H04L 65/1016](#); cryptographic mechanisms for verifying the identity or authority of a user or a system, ID based authentication [H04L 9/32](#); cryptographic mechanisms for ID based key exchange [H04L 9/08](#))}
- 67/147 {provided for signalling methods or particular messages providing extensions to IETF, ITU, ETSI or 3GPP protocols, e.g., additional proprietary messages, standard messages enhanced by additional header fields or standard messages being used for purposes other than originally intended}
- 67/148 {provided for migration or transfer of sessions (in-session procedures in real-time communications [H04L 65/1083](#); control or signalling for completing the hand-off in wireless networks [H04W 36/0005](#))}
- 67/16 {Service discovery or service management, e.g. service location protocol [SLP] or Web services (network service management for ensuring proper service fulfilment according to an agreement or contract between two parties [H04L 41/50](#); address allocation to terminals or nodes connected to a network [H04L 61/30](#); mobile application services specially adapted for wireless communication networks [H04W 4/00](#))}
- 67/18 {in which the network application is adapted for the location of the user terminal (wireless application services making use of the location of users or terminals [H04W 4/02](#) takes precedence; location based Web retrieval [G06F 16/9537](#))}
- 67/20 {involving third party service providers (e-commerce [G06Q 30/00](#))}
- 67/22 {Tracking the activity of the user (network monitoring arrangements [H04L 43/00](#); recording of computer activity [G06F 11/34](#); e-commerce [G06Q 30/00](#))}
- 67/24 {Presence management (use and manipulation of presence information in instant messaging [H04L 51/043](#))}
- 67/26 {Push based network services (broadcast or multicast push services [H04L 12/1859](#))}
- 67/28 {for the provision of proxy services, e.g. intermediate processing or storage in the network (network management provisions [H04L 41/00](#); network monitoring provisions [H04L 43/00](#); proxies for network security [H04L 63/0281](#); media manipulation, adaptation or conversion in real-time communications [H04L 65/601](#); protocol conversion [H04L 69/08](#))}
- 67/2804 {for adding application control or application functional data, e.g. adding metadata}

- 67/2809 . . {for brokering (negotiation of communication capabilities [H04L 69/24](#); e-commerce [G06Q 30/00](#))}
- 67/2814 . . {for data redirection (load balancing of replicated servers [H04L 67/1002](#); access network selection [H04L 12/5691](#); routing or path finding of packets [H04L 45/00](#); content or context based routing [H04L 67/327](#); network addressing or naming provisions [H04L 61/00](#))}
- 67/2819 . . {Enhancement of application control based on intercepted application data}
- 67/2823 . . {for conversion or adaptation of application content or format (message adaptation based on network or terminal capabilities [H04L 51/06](#); media manipulation, adaptation or conversion in real-time communications [H04L 65/601](#); protocol conversion [H04L 69/08](#); optimising visualization of content for web browsing [G06F 16/9577](#))}
- 67/2828 . . . {for reducing the amount or size of exchanged application data (protocols for data compression [H04L 69/04](#); digital video compression [H04N 19/00](#))}
- 67/2833 . . {for grouping or aggregating service requests, e.g. for unified processing of service requests (networking arrangements or communication protocols for scheduling or organising the servicing of application requests [H04L 67/32](#))}
- 67/2838 . . {for integrating service provisioning from a plurality of service providers (web site content organization and management [G06F 16/958](#))}
- 67/2842 . . {for storing data temporarily at an intermediate stage, e.g. caching (distributed storage of data in a network [H04L 67/1097](#); browsing optimization of access to content by caching [G06F 16/9574](#); addressing of a cache within a hierarchically structured memory system [G06F 12/0802](#); disk caching [G06F 12/0866](#))}
- 67/2847 . . . {involving pre-fetching or pre-delivering data based on network characteristics (cache prefetching within a hierarchical structured memory system [G06F 12/0862](#))}
- 67/2852 . . . {involving policies or rules for updating, deleting or replacing the stored data based on network characteristics (replacement control in memory systems [G06F 12/12](#))}
- 67/2857 . . . {involving storage of data provided by user terminals, i.e. reverse caching}
- 67/2861 . . {for providing operational support to end devices by emulation, e.g. when they are unavailable, or by off-loading in the network (techniques for recovering from a failure of a protocol instance or entity [H04L 69/40](#); reactions to server failures by a load balancer [H04L 67/1034](#); departure or maintenance mechanisms in peer-to-peer networks [H04L 67/1048](#); terminal emulation [H04L 67/08](#); disconnected operation in file systems [G06F 16/10](#); emulation or software simulation [G06F 9/455](#); input/output emulation function for peripheral devices [G06F 13/105](#))}
- 67/2866 . . {Architectural aspects}
- 67/2871 . . . {Implementation details of a single intermediate entity}
- 67/2876 . . . {Pairs of interprocessing entities at each side of the network, e.g. split proxies}
- 67/288 . . . {Distributed intermediate devices, i.e. intermediate device interaction with other intermediate devices on the same level}
- 67/2885 . . . {Hierarchically arranged intermediate devices, e.g. hierarchical caching}
- 67/289 . . . {where the intermediate processing is functionally located closer to the data consumer application, e.g. in same machine, in same home or in same subnetwork}
- 67/2895 . . . {where the intermediate processing is functionally located closer to the data provider application, e.g. reverse proxies; in same machine, in same cluster or subnetwork}
- 67/30 . {involving profiles}
- 67/303 . . {Terminal profiles}
- 67/306 . . {User profiles (configuring for programme initiating [G06F 9/44505](#); information retrieval by personalized querying [G06F 16/9535](#))}
- 67/32 . {for scheduling or organising the servicing of application requests, e.g. requests for application data transmissions involving the analysis and optimisation of the required network resources (computer conference arrangements [H04L 12/1813](#); broadcast or conference with schedule organisation [H04L 12/1881](#); network service management, ensuring proper service fulfilment according to an agreement or contract between two parties [H04L 41/50](#); intermediate grouping or aggregating of service requests [H04L 67/2833](#))}
- 67/322 . . {whereby quality of service [QoS] or priority requirements are taken into account (monitoring of QoS metrics [H04L 43/08](#); QoS aspects in real-time communications [H04L 65/80](#))}
- 67/325 . . {whereby a time schedule is established for servicing the requests}
- 67/327 . . {whereby the routing of a service request to a node providing the service depends on the content or context of the request, e.g. profile, connectivity status, payload or application type}
- 67/34 . {involving the movement of software or configuration parameters (configuration management of network or network elements [H04L 41/08](#); remote booting [G06F 9/4416](#); programme loading or initiating [G06F 9/445](#))}
- 67/36 . {involving the display of network or application conditions affecting the network application to the application user (graphical user interfaces for network management [H04L 41/22](#))}
- 67/38 . {Protocols for telewriting; Protocols for networked simulations, virtual reality or games (games using an electronically generated display [A63F 13/00](#); remote windowing or X-Windows [G06F 9/452](#))}
- 67/40 . {Protocols for remote procedure calls [RPC] (remote procedure calls [G06F 9/547](#))}
- 67/42 . {Protocols for client-server architectures (access to replicated servers [H04L 67/1002](#))}

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|--------|--|--------|---|
| 69/00 | {Application independent communication protocol aspects or techniques in packet data networks} (data switching networks H04L 12/00 ; broadcast or multicast H04L 12/18 ; network topologies, i.e. networks characterized by the path configuration, media access control H04L 12/28 ; hybrid switching systems H04L 12/64 ; gateways H04L 12/66 ; network management H04L 41/00 ; network monitoring or testing H04L 43/00 ; routing of packets H04L 45/00 ; flow control H04L 47/10 ; packet switches and switching fabrics H04L 49/00 ; intermediate storage or scheduling H04L 49/90 ; message switching systems, e.g. email, H04L 51/00 ; interconnection arrangements between CPUs, memories, or peripherals within a single computer G06F 13/00 ; transmission systems H04B ; networks specially adapted for wireless communication H04W)} | 69/164 | . . {Adaptation or special uses of UDP protocol} |
| | | 69/165 | . . {involving combined use or selection criteria between TCP and UDP protocols (multi-protocol arrangements in general H04L 69/18 ; multilink protocols in general H04L 69/14)} |
| | | 69/166 | . . {IP fragmentation or TCP segmentation aspects (evaluation of maximum transfer unit [MTU] H04L 47/36 ; assembly or disassembly of packets in wireless networks H04W 28/065)} |
| | | 69/167 | . . {Transitional provisions between IPv4 and IPv6 (address translation between IPv4 and IPv6 H04L 61/251 ; involvement of different protocol versions in wireless network layer protocols, e.g. MIPv4 and MIPv6 H04W 80/045)} |
| | | 69/168 | . . {Special adaptations of TCP, UDP or IP to match specific link layer protocols, e.g. ATM, SONET or PPP (IP over ATM H04L 2012/5667 ; special adaptation of TCP protocol for wireless media H04W 80/06)} |
| 69/02 | . {Protocol performance} | 69/169 | . . {Special adaptations of TCP, UDP or IP for interworking of IP based networks with other networks (protocols for interworking in general H04L 69/08)} |
| 69/03 | . {Protocol definition or specification (protocol conformance testing H04L 1/244 ; specification techniques G06F 8/10)} | 69/18 | . {Multi-protocol handler, e.g. single device capable of handling multiple protocols (multilayer or multiprotocol switches H04L 49/602)} |
| 69/04 | . {Protocols for data compression (compression in general H03M 7/30 ; reduction of the amount or size of exchanged application data at an intermediate network processing stage H04L 67/2828 ; optimizing, e.g. header compression, information sizing in wireless communication networks H04W 28/06)} | 69/22 | . {Header parsing or analysis (traffic monitoring by flow aggregation or filtering H04L 43/02 ; flow identification in packet switching networks H04L 47/2483)} |
| 69/06 | . {Notations for structuring of protocol data, e.g. abstract syntax notation one [ASN.1]} | 69/24 | . {Negotiation of communication capabilities} |
| 69/08 | . {Protocols for interworking or protocol conversion (arrangements for connecting between networks having differing types of switching systems, e.g. gateways, H04L 12/66 ; network management protocols conversion H04L 41/0226)} | 69/26 | . {Special purpose or proprietary protocols or architectures (network applications for proprietary or special purpose networking environments H04L 67/12)} |
| 69/10 | . {Streamlined, light-weight or high-speed protocols, e.g. express transfer protocol [XTP] or byte stream} | 69/28 | . {Timer mechanisms used in protocols} |
| 69/12 | . {Protocol engines, e.g. VLSIs or transputers} | 69/30 | . {Definitions, standards or architectural aspects of layered protocol stacks} |
| 69/14 | . {Multichannel or multilink protocols} | 69/32 | . . {High level architectural aspects of 7-layer open systems interconnection [OSI] type protocol stacks} |
| 69/16 | . {Transmission control protocol/internet protocol [TCP/IP] or user datagram protocol [UDP] (flow control or congestion control in data switching networks H04L 47/10 ; transport layer addressing aspects H04L 61/6063 ; special adaptations of TCP, UDP or IP for interworking of IP based networks with other networks H04L 69/169 ; adapting video multiplex streams to a specific network H04N 21/2381 ; network layer protocol adaptations for supporting mobility, e.g. mobile IP, H04W 80/04)} | 69/321 | . . . {Aspects of inter-layer communication protocols or service data unit [SDU] definitions; Interfaces between layers} |
| | | 69/322 | . . . {Aspects of intra-layer communication protocols among peer entities or protocol data unit [PDU] definitions} |
| | | 69/323 | {in the physical layer, i.e. layer one (arrangements for detecting or preventing errors in the information received H04L 1/00 ; baseband systems H04L 25/00 ; modulated-carrier systems H04L 27/00)} |
| 69/161 | . . {Implementation details of TCP/IP or UDP/IP stack architecture; Specification of modified or new header fields (protocols engines in general H04L 69/12 ; OSI stack based layering aspects H04L 69/32 ; protocol header analysis in general H04L 69/22 ; addressing aspects in multiple interfaces involving dual-stack hosts H04L 61/6086)} | 69/324 | {in the data link layer, i.e. layer two, e.g. HDLC (arrangements for detecting or preventing errors in the information received H04L 1/00 ; bus networks H04L 12/40)} |
| 69/162 | . . . {involving adaptations of sockets based mechanisms (secure socket layer H04L 63/168)} | 69/325 | {in the network layer, i.e. layer three, e.g. X.25 (packet switching systems, packet routing H04L 45/00 ; TCP/IP H04L 69/16)} |
| 69/163 | . . {Adaptation of TCP data exchange control procedures (generic OSI layer 4 protocols, e.g. SCTP H04L 69/326 ; TCP or UDP flow control procedures H04L 47/19 ; error control procedures in general H04L 1/18)} | 69/326 | {in the transport layer, i.e. layer four (TCP/IP H04L 69/16 ; streaming protocols, e.g. RTP, H04L 65/608)} |

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| 69/327 | {in the session layer, i.e. layer five (session initiation protocol H04L 65/1006 ; session control in real time communications H04L 65/1066 ; arrangements for session management H04L 67/14)} | 2209/26 | . Testing cryptographic entity, e.g. testing integrity of encryption key or encryption algorithm |
| 69/328 | {in the presentation layer, i.e. layer six (graphical user interfaces G06F 3/048 ; terminal emulation, e.g. telnet, H04L 67/08)} | 2209/30 | . Compression, e.g. Merkle-Damgard construction |
| 69/329 | {in the application layer, i.e. layer seven (network arrangements or network communication protocols for networked applications H04L 67/00 ; data processing systems and methods specially adapted for administrative, commercial, financial or managerial purposes G06Q)} | 2209/34 | . Encoding or coding, e.g. Huffman coding or error correction |
| 69/40 | . {Techniques for recovering from a failure of a protocol instance or entity, e.g. failover routines, service redundancy protocols, protocol state redundancy or protocol service redirection in case of a failure or disaster recovery (network fault management H04L 41/06 ; route fault recovery in network routing H04L 45/28 ; fault recovery in packet switches H04L 49/557 ; reactions to failures of replicated servers by a load balancer H04L 67/1034 ; departure or maintenance mechanisms in peer-to-peer networks H04L 67/1048 ; intermediate processing of operational support to end devices when they are unavailable, H04L 67/2861)} | 2209/38 | . Chaining, e.g. hash chain or certificate chain |
| | | 2209/42 | . Anonymization, e.g. involving pseudonyms |
| | | 2209/46 | . Secure multiparty computation, e.g. millionaire problem |
| | | 2209/463 | . . . Electronic voting |
| | | 2209/466 | . . . Electronic auction |
| | | 2209/50 | . Oblivious transfer |
| | | 2209/56 | . Financial cryptography, e.g. electronic payment or e-cash |
| | | 2209/60 | . Digital content management, e.g. content distribution |
| | | 2209/601 | . . . Broadcast encryption |
| | | 2209/603 | . . . Digital right management [DRM] |
| | | 2209/605 | . . . Copy protection |
| | | 2209/606 | . . . Traitor tracing |
| | | 2209/608 | . . . Watermarking |
| | | 2209/64 | . Self-signed certificates |
| | | 2209/68 | . Special signature format, e.g. XML format |
| | | 2209/72 | . Signcrypting, i.e. digital signing and encrypting simultaneously |
| | | 2209/76 | . Proxy, i.e. using intermediary entity to perform cryptographic operations (network architectures or network communication protocols using hop-by-hop encryption H04L 63/0464) |
| 2201/00 | Algorithms used for the adjustment of time-domain equalizers | 2209/80 | . Wireless (network architectures or network communication protocols for wireless network security H04W 12/00) |
| 2201/02 | . minimizing an error signal, e.g. least squares, minimum square error | 2209/805 | . . . Lightweight hardware, e.g. radio-frequency identification [RFID] or sensor |
| 2201/04 | . zero-forcing | 2209/84 | . Vehicles |
| 2201/06 | . using the output of a maximum likelihood decoder (Viterbi detector) | 2209/88 | . Medical equipments |
| 2201/08 | . Algorithms not covered by groups H04L 2201/02 - H04L 2201/06 | 2212/00 | Encapsulation of packets |
| 2203/00 | Characteristics of phase shift key signals | 2463/00 | Additional details relating to network architectures or network communication protocols for network security covered by H04L 63/00 |
| 2203/02 | . differential | 2463/041 | . using an encryption or decryption engine integrated in transmitted data |
| 2203/04 | . continuous phase | 2463/061 | . applying further key derivation, e.g. deriving traffic keys from a pair-wise master key (cryptographic mechanisms or cryptographic arrangements for generation of secret information including derivation or calculation of cryptographic keys or passwords H04L 9/0861) |
| 2209/00 | Additional information or applications relating to cryptographic mechanisms or cryptographic arrangements for secret or secure communication H04L 9/00 | 2463/062 | . applying encryption of the keys (cryptographic mechanisms or cryptographic arrangements for key distribution using key encryption key H04L 9/0822) |
| 2209/04 | . Masking or blinding | 2463/081 | . applying self-generating credentials, e.g. instead of receiving credentials from an authority or from another peer, the credentials are generated at the entity itself (cryptographic mechanisms or cryptographic arrangements for generation of secret information including derivation or calculation of cryptographic keys or passwords H04L 9/0861) |
| 2209/043 | . . . of tables, e.g. lookup, substitution or mapping | 2463/082 | . applying multi-factor authentication (cryptographic mechanisms or cryptographic arrangements including means for verifying the identity or authority of a user of the system or for message authentication H04L 9/32) |
| 2209/046 | . . . of operations, operands or results of the operations | | |
| 2209/08 | . Randomization, e.g. dummy operations or using noise | | |
| 2209/12 | . Details relating to cryptographic hardware or logic circuitry | | |
| 2209/122 | . . . Hardware reduction or efficient architectures | | |
| 2209/125 | . . . Parallelization or pipelining, e.g. for accelerating processing of cryptographic operations | | |
| 2209/127 | . . . Trusted platform modules [TPM] | | |
| 2209/16 | . Obfuscation or hiding, e.g. involving white box | | |
| 2209/20 | . Manipulating the length of blocks of bits, e.g. padding or block truncation | | |
| 2209/24 | . Key scheduling, i.e. generating round keys or sub-keys for block encryption | | |

- 2463/101 . applying security measures for digital rights management ([data processing systems or methods, specially adapted for commerce, e.g. marketing, shopping, billing, auctions or e-commerce G06Q 30/00](#))
- 2463/102 . applying security measure for e-commerce ([data processing systems or methods, specially adapted for e-commerce G06Q 30/00](#))
- 2463/103 . applying security measure for protecting copy right (protecting software against unauthorised usage in a vending or licensing environment, e.g. protection the software providers copyright [G06F 21/10](#); data processing systems or methods, specially adapted for payment schemes, architectures or protocols [G06Q 20/00](#); secrecy systems or subscription systems [H04N 7/16](#))
- 2463/121 . Timestamp ([cryptographic mechanisms or cryptographic arrangements involving time stamps H04L 9/3297](#))
- 2463/141 . Denial of service attacks against endpoints in a network
- 2463/142 . Denial of service attacks against network infrastructure
- 2463/143 . Denial of service attacks involving systematic or selective dropping of packets
- 2463/144 . Detection or countermeasures against botnets
- 2463/145 . Detection or countermeasures against cache poisoning
- 2463/146 . Tracing the source of attacks