CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY
(NOTE omitted)

H04 ELECTRIC COMMUNICATION TECHNIQUE
(NOTE omitted)

H04L TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (arrangements common to telegraphic and telephonic communication H04M)

NOTES

1. This subclass <u>covers</u> transmission of signals having been supplied in digital form and includes data transmission, telegraphic communication, or methods or arrangements for monitoring.
2. In this subclass, it is desirable to add the indexing codes of group H04L 2101/00.

WARNINGS

1. 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 69/00
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.

1/00	**Arrangements for detecting or preventing errors in the information received {**(correcting synchronisation H04L 7/00)**}**	
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)}	
1/0002	. . {by adapting the transmission rate}	
1/0003	. . . {by switching between different modulation schemes}	
1/0004	. . . . {applied to control information}	
1/0005	. . . . {applied to payload information}	
1/0006	. . {by adapting the transmission format}	

1/0007	. . . {by modifying the frame length}
1/0008	. . . . {by supplementing frame payload, e.g. with padding bits}
1/0009	. . {by adapting the channel coding (H04L 1/1812 takes precedence)}
1/001	. . . {applied to control information}
1/0011	. . . {applied to payload information}
1/0013	. . . {Rate matching, e.g. puncturing or repetition of code symbols}
1/0014	. . {by adapting the source coding}
1/0015	. . {characterised by the adaptation strategy}
1/0016	. . . {involving special memory structures, e.g. look-up tables}

1/0017 · · · {where the mode-switching is based on Quality of Service requirement}

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}

1/0021 · · · · {in which the algorithm uses adaptive thresholds}

1/0022 · · · {in which mode-switching is influenced by the user}

1/0023 · · {characterised by the signalling}

1/0025 · · · {Transmission of mode-switching indication}

1/0026 · · · {Transmission of channel quality indication}

1/0027 · · · {Scheduling of signalling, e.g. occurrence thereof}

1/0028 · · · {Formatting}

1/0029 · · · · {Reduction of the amount of signalling, e.g. retention of useful signalling or differential signalling (power control H04W 52/04)}

1/003 · · · · {Adaptive formatting arrangements particular to signalling, e.g. variable amount of bits}

1/0031 · · · · {Multiple signaling transmission (H04L 1/1664, F15 take precedence)}

1/0032 · · · {Without explicit signalling}

1/0033 · · {arrangements specific to the transmitter}

1/0034 · · · {where the transmitter decides based on inferences, e.g. use of implicit signalling}

1/0035 · · · {evaluation of received explicit signalling}

1/0036 · · {arrangements specific to the receiver}

1/0038 · · · {Blind format detection (for detection of modulation format H04L 27/0012)}

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
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}
1/0693	. . . .	{Partial feedback, e.g. partial channel state information [CSI]}
1/08	.	by repeating transmission, e.g. Verdan system {(H04L 1/1858 and H04L 1/189 take precedence)}
1/12	.	by using return channel
2001/125	. .	{Arrangements for preventing errors in the return channel}
1/14	. .	in which the signals are sent back to the transmitter to be checked {; echo systems}
1/16	. .	in which the return channel carries supervisory signals, e.g. repetition request signals
1/1607	. . .	Details of the supervisory signal
1/1614	. . . .	{using bitmaps}
1/1621	. . . .	{Group acknowledgement, i.e. the acknowledgement message defining a range of identifiers, e.g. of sequence numbers}
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)}
1/1635	. . . .	{Cumulative acknowledgement, i.e. the acknowledgement message applying to all previous messages}
1/1642	. . . .	{Formats specially adapted for sequence numbers}
1/165	. . . . .	{Variable formats}
1/1657	. . . .	{Implicit acknowledgement of correct or incorrect reception, e.g. with a moving window}
1/1664	. . . .	{the supervisory signal being transmitted together with payload signals; piggybacking}
1/1671	. . . .	{the supervisory signal being transmitted together with control information}
1/1678	. . . . .	{where the control information is for timing, e.g. time stamps}
1/1685	. . . .	{the supervisory signal being transmitted in response to a specific request, e.g. to a polling signal}
1/1692	. . . .	{Physical properties of the supervisory signal, e.g. acknowledgement by energy bursts}
1/18	. . .	Automatic repetition systems, e.g. Van Duuren systems
1/1803	. . . .	Stop-and-wait protocols
1/1806	. . . .	Go-back-N protocols
1/1809	. . . .	Selective-repeat protocols
1/1812	. . . .	Hybrid protocols; Hybrid automatic repeat request [HARQ]
1/1816	. . . . .	{with retransmission of the same, encoded, message}
1/1819	. . . . .	{with retransmission of additional or different redundancy}
1/1822	. . .	involving configuration of automatic repeat request [ARQ] with parallel processes
1/1825	. . . .	Adaptation of specific ARQ protocol parameters according to transmission conditions
1/1829	. . . .	Arrangements specially adapted for the receiver end
1/1832	. . . . .	{Details of sliding window management}
1/1835	. . . . .	{Buffer management}
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)}
1/1841	. . . . . .	{Resequencing}
1/1845	. . . . . .	{Combining techniques, e.g. code combining}
1/1848	. . . . .	{Time-out mechanisms}
1/1851	. . . . . .	{using multiple timers}
1/1854	. . . . .	{Scheduling and prioritising arrangements}
1/1858	. . . . .	{Transmission or retransmission of more than one copy of acknowledgement message}
1/1861	. . . . .	{Physical mapping arrangements (for ACK signaling see also H04L 5/0053)}
1/1864	. . . . .	{ARQ related signaling (H04L 1/1607 takes precedence)}
1/1867	. . . .	Arrangements specially adapted for the transmitter end
1/187	. . . . .	{Details of sliding window management}
1/1874	. . . . .	{Buffer management}
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)}
1/188	. . . . .	{Time-out mechanisms}
1/1883	. . . . . .	{using multiple timers}
1/1887	. . . . .	{Scheduling and prioritising arrangements}
1/189	. . . . .	{Transmission or retransmission of more than one copy of a message}

1/1893 . . . . . {Physical mapping arrangements (physical resource mapping in general H04L 5/00)}
1/1896 . . . . . {ARQ related signaling}
1/20 . using signal quality detector
1/201 . . {Frame classification, e.g. bad, good or erased (frame indication per se H04L 1/0082)}
1/203 . . {Details of error rate determination, e.g. BER, FER or WER}
1/205 . . {jitter monitoring}
1/206 . . {for modulated signals}
1/208 . . {involving signal re-encoding}
1/22 . using redundant apparatus to increase reliability
1/24 . Testing correct operation
1/241 . . {using pseudo-errors}
1/242 . . {by comparing a transmitted test signal with a locally generated replica}
1/243 . . . {at the transmitter, using a loop-back}
1/244 . . . {test sequence generators}
1/245 . . {by using the properties of transmission codes}
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**

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 72/51)}
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. quadriplex
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
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
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 bytewise}
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
5/22	.	using time-division multiplexing
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 generators of electric oscillations or pulses H03L 7/00)}
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)}
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 communications; Network security protocols**

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, infrared H04B 10/00; wavelength-division multiplex systems H04J 14/02; WDM arrangements H04J 14/03)}

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

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}

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, ornon-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
9/40	.	Network security protocols

NOTE

{When allocating H04L 9/40 to patent documents, attention should be made to check whether other subgroups from H04L 63/00 need to be allocated also for a complete classification.}

WARNING

Group H04L 9/40 is impacted by reclassification into groups H04L 61/09, H04L 63/00, H04L 65/60, H04L 65/61, H04L 65/611, H04L 65/612, H04L 65/613, H04L 65/65, H04L 65/70, H04L 65/75, H04L 65/752, H04L 65/756, H04L 67/01, H04L 67/1001, H04L 67/10015, H04L 67/131, H04L 67/133, H04L 67/1396 and H04L 67/50.

All groups listed in this Warning should be considered in order to perform a complete search.

9/50	.	{using hash chains, e.g. blockchains or hash trees}
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	. .	Charging {, metering or billing} arrangements {for data wireline or wireless communications}

WARNING

Group H04L 12/14 is incomplete pending reclassification of documents from group G06Q 50/40.

Groups G06Q 50/40 and H04L 12/14 should be considered in order to perform a complete search.

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, prepay 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}

12/1804 · · · · {for stock exchange and similar applications}

12/1809 · · · · {for auctioneering devices}

12/1813 · · · · {for computer conferences, e.g. chat rooms (instant messaging H04L 51/04; protocols for multimedia communication H04L 65/1101; arrangements for multi-party communication H04L 65/403; 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 67/52; 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. LAN [Local Area Networks] or WAN [Wide Area Networks] (wireless communication networks H04W {; arrangements for dividing the transmission path H04W 40/00})

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 (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; address allocation H04L 61/50)}

12/2809 · · · · {indicating that an appliance service is present in a home automation network (monitoring functionality H04L 43/0817; discovery or management thereof, e.g. service location protocol [SLP] or web services, H04L 67/51)}

12/281 · · · · {indicating a format for calling an appliance service function in a home automation network (for remote control or remote monitoring of applications H04L 67/025)}

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; for remote control or remote monitoring of applications H04L 67/025; arrangements for transmitting signals characterised by the use of a wireless eletrical link G08C 17/00; telephonic communication systems adapted for combination with remote control systems H04M 11/007)}

12/282 · · · · {based on user interaction within the home (receiver circuitry for displaying additional information being controlled by a remote control apparatus H04N 21/42204)}

12/2821 · · · · {Avoiding conflicts related to the use of home appliances (cryptographic protocols H04L 9/00; protocols for network security H04L 63/00)}

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)}

12/2825 · · · · {Reporting to a device located outside the home and the home network (access arrangements H04L 12/2856; for remote control or remote monitoring of applications H04L 67/025; telephonic communication systems adapted for combination with telemetering systems H04M 11/002)}

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}

12/2829 · · · · · {involving user profiles according to which the execution of a home appliance functionality is automatically triggered}

12/283 · · · {Processing of data at an internetworking point of a home automation network}

12/2832 · · · · {Interconnection of the control functionalities between home networks (single bridge functionality H04L 12/4625)}

12/2834 · · · · {Switching of information between an external network and a home network (access arrangements H04L 12/2856)}

12/2836 · · · · {Protocol conversion between an external network and a home network (controlling appliance services of a home automation network from a device located outside the home and the home network H04L 12/2818; protocol conversion H04L 69/08; adaptation of digital video signals for transport over a specific home network H04N 7/24)}

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}

12/2854 · · {Wide area networks, e.g. public data networks}

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)}

NOTES

1. This group covers:
   - 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.
2. This group does not cover:
   - 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

H04L 12/2856
(continued)

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](#)

3. In this group the following terms or expressions are used with the meaning indicated:
- 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
- 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;](#) routing of packets [H04L 45/00;](#) multichannel or multilink protocols [H04L 69/14](#))}
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 14/05](#) and [H04J 14/07](#))}
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 (cryptographic protocols H04L 9/00; protocols for network security H04L 63/00)}

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)}

12/40123 . . . . {Interconnection of computers and peripherals (printer information exchange with computer G06F 3/1293)}

12/4013 . . . {Management of data rate on the bus (systems modifying transmission characteristics according to link quality H04L 1/0001)}

12/40136 . . . . {Nodes adapting their rate to the physical link properties (LAN switches H04L 49/351)}

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)}

12/4015 . . . . {by scheduling the transmission of messages at the communication node}

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) designatesa standard for field bus communication in automation technology first implemented in 1989 by BMBF, the german department of education and research;
- Modbus designates a serial communications protocol published by Modicon in 1979 for use with its programmable logic controller;
- LIN-Bus (Local Interconnect Network) designates a computer networking bus-system released in 1999 used within current automotive network architectures;
- FlexRay designates an automotive network communications protocol developed by the FlexRay Consortium;
- LON or LonWorks designates a network standard operating on twisted pair or electrical wiring or coaxial cable and used for building automation;
- ASI or AS-Interface (Actuator Sensor Interface) designates the simplest of the industrial networking protocols used in programmable logic controller systems

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}
12/46	. .	Interconnection of networks
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; routing of packets H04L 45/00; packet switches H04L 49/00; virtual private networks for security H04L 63/0272)}

NOTES

1. {This group covers:
   - 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:
   - 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 63/0272
   - 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:
   - 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
   - VTP means VLAN Trunking Protocol}

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 45/00, H04L 47/00)
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}
2012/5618	. . . . .	{Bridges, gateways [GW] or interworking units [IWU]}
2012/5619	. . . .	{Network Node Interface, e.g. tandem connections, transit switching}
2012/562	. . . . .	{Routing}
2012/5621	. . . . .	{Virtual private network [VPN]; Private-network - network-interface (P-NNI)}
2012/5623	. . . . .	{Network design, dimensioning, topology or optimisation}
2012/5624	. . . . .	{Path aspects, e.g. path bundling}
2012/5625	. . . .	{Operations, administration and maintenance [OAM]}
2012/5626	. . . . .	{Network management, e.g. Intelligent nets}
2012/5627	. . . . .	{Fault tolerance and recovery}
2012/5628	. . . .	{Testing}
2012/5629	. . . .	{Admission control}
2012/563	. . . . .	{Signalling, e.g. protocols, reference model}
2012/5631	. . . . .	{Resource management and allocation}
2012/5632	. . . . . .	{Bandwidth allocation}
2012/5634	. . . .	{In-call negotiation}
2012/5635	. . . .	{Backpressure, e.g. for ABR}
2012/5636	. . . . . .	{Monitoring or policing, e.g. compliance with allocated rate, corrective actions}
2012/5637	. . . .	{Leaky Buckets}
2012/5638	. . . . .	{Services, e.g. multimedia, GOS, QOS}
2012/5639	. . . . .	{Tariffs or charging}
2012/564	. . . . .	{Connection-oriented}
2012/5641	. . . . . .	{Unicast/point-to-point}
2012/5642	. . . . . .	{Multicast/broadcast/point-multipoint, e.g. VOD}
2012/5643	. . . . . .	{Concast/multipoint-to-point}
2012/5645	. . . . .	{Connectionless}
2012/5646	. . . . .	{Cell characteristics, e.g. loss, delay, jitter, sequence integrity}
2012/5647	. . . . . .	{Cell loss}
2012/5648	. . . .	{Packet discarding, e.g. EPD, PTD}
2012/5649	. . . .	{Cell delay or jitter}
2012/565	. . . .	{Sequence integrity}
2012/5651	. . . .	{Priority, marking, classes}
2012/5652	. . . .	{Cell construction, e.g. including header, packetisation, depacketisation, assembly, reassembly}
2012/5653	. . . .	{using the ATM adaptation layer [AAL]}
2012/5654	. . . .	{using the AAL1}
2012/5656	. . . .	{using the AAL2}
2012/5657	. . . .	{using the AAL3/4}
2012/5658	. . . .	{using the AAL5}
2012/5659	. . . .	{usint the AALX}
2012/566	. . . .	{using the ATM layer}
2012/5661	. . . .	{Minicells}
2012/5662	. . . .	{Macrocells or frames}
2012/5663	. . . . .	{Support of N-ISDN}
2012/5664	. . . . .	{Support of Video, e.g. MPEG}
2012/5665	. . . . .	{Interaction of ATM with other protocols}
2012/5667	. . . . . .	{IP over ATM}
2012/5668	. . . . . .	{Next hop resolution protocol [NHRP]}
2012/5669	. . . . . .	{Multiprotocol over ATM [MPOA]}
2012/567	. . . . . .	{Frame Relay over ATM}
2012/5671	. . . . .	{Support of voice}
2012/5672	. . . .	{Multiplexing, e.g. coding, scrambling}
2012/5673	. . . . .	{Coding or scrambling}
2012/5674	. . . . .	{Synchronisation, timing recovery or alignment}
2012/5675	. . . . .	{Timeslot assignment, e.g. TDMA}
2012/5676	. . . . .	{Code Division Multiple Access [CDMA]}
2012/5678	. . . .	{Traffic aspects, e.g. arbitration, load balancing, smoothing, buffer management}
2012/5679	. . . . .	{Arbitration or scheduling}
2012/568	. . . . .	{Load balancing, smoothing or shaping}
2012/5681	. . . . .	{Buffer or queue management}
2012/5682	. . . . . .	{Threshold; Watermark}
2012/5683	. . . . . .	{for avoiding head of line blocking}
2012/5684	. . . . .	{Characteristics of traffic flows}
2012/5685	. . . .	{Addressing issues}
2012/5686	. . . .	{Use of neural networks}
2012/5687	. . . .	{Security aspects}
12/5691	. . .	{Access to open networks; Ingress point selection, e.g. ISP selection}
12/5692	. . . .	{Selection among different networks}
12/64	.	Hybrid switching systems
12/6402	. .	{Hybrid switching fabrics}
2012/6405	. . .	{Space}
2012/6408	. . .	{Shared Medium, e.g. memory, bus, ring}
2012/641	. . .	{Time switching}
2012/6413	. . .	{Switch peripheries}
2012/6416	. . .	{Switch multicast}
12/6418	. .	{Hybrid transport}
2012/6421	. . .	{Medium of transmission, e.g. fibre, cable, radio, satellite}
2012/6424	. . .	{Access arrangements}
2012/6427	. . .	{Subscriber Access Module; Concentrator; Group equipment}
2012/6429	. . .	{Terminal adapters}
2012/6432	. . .	{Topology}
2012/6435	. . . .	{Bus}
2012/6437	. . . .	{Ring}

2012/644	. . . .	{Star}
2012/6443	. . .	{Network Node Interface, e.g. Routing, Path finding}
2012/6445	. . .	{Admission control}
2012/6448	. . . .	{Medium Access Control [MAC]}
2012/6451	. . . . .	{Deterministic, e.g. Token, DQDB}
2012/6454	. . . . .	{Random, e.g. Ethernet}
2012/6456	. . . .	{Channel and bandwidth allocation}
2012/6459	. . . .	{Multiplexing, e.g. TDMA, CDMA}
2012/6462	. . . .	{Movable boundaries in packets or frames}
2012/6464	. . .	{Priority}
2012/6467	. . .	{Information loss recovery, e.g. error correction, prediction}
2012/647	. . .	{Frame Relay, X.25}
2012/6472	. . .	{Internet}
2012/6475	. . .	{N-ISDN, Public Switched Telephone Network [PSTN]}
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
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
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; telegraph tapping keys H01H 21/86)

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**

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 {; 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}
25/021	. . .	{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}

25/0238 · · · {using blind estimation}

25/024 · · · {channel estimation algorithms}

25/0242 · · · · {using matrix methods}

25/0244 · · · · · {with inversion}

25/0246 · · · · · {with factorisation}

25/0248 · · · · · {Eigen-space methods}

25/025 · · · · {using least-mean-square [LMS] method}

25/0252 · · · · {using third or higher order statistics}

25/0254 · · · · {using neural network algorithms}

25/0256 · · · · {Channel estimation using minimum mean square error criteria}

25/0258 · · · · {Channel estimation using zero-forcing criteria}

25/026 · · {Arrangements for coupling transmitters, receivers or transceivers to transmission lines; Line drivers (duplexing arrangements H04L 5/14)}

25/0262 · · {Arrangements for detecting the data rate of an incoming signal}

25/0264 · · {Arrangements for coupling to transmission lines (duplexing arrangements H04L 5/14; line equalisers, line build-out devices H04L 25/03878)}

25/0266 · · · {Arrangements for providing Galvanic isolation, e.g. by means of magnetic or capacitive coupling}

25/0268 · · · · {with modulation and subsequent demodulation}

25/027 · · · · {specifically for telegraph signals (induction coil interrupters H01H 51/34; dynamo-electric generators H02K)}

25/0272 · · · {Arrangements for coupling to multiple lines, e.g. for differential transmission}

25/0274 · · · · {Arrangements for ensuring balanced coupling}

25/0276 · · · · {Arrangements for coupling common mode signals}

25/0278 · · · {Arrangements for impedance matching}

25/028 · · · {Arrangements specific to the transmitter end}

25/0282 · · · · {Provision for current-mode coupling}

25/0284 · · · · {Arrangements to ensure DC-balance}

25/0286 · · · · {Provision of wave shaping within the driver (wave shaping per se H04L 25/03834)}

25/0288 · · · · · {the shape being matched to the transmission line (pre-equalisation per se H04L 25/03343)}

25/029 · · · · {Provision of high-impedance states}

25/0292 · · · {Arrangements specific to the receiver end}

25/0294 · · · · {Provision for current-mode coupling}

25/0296 · · · · {Arrangements to ensure DC-balance}

25/0298 · · · {Arrangement for terminating transmission lines}

25/03 · · Shaping networks in transmitter or receiver, e.g. adaptive shaping networks

25/03006 · · · {Arrangements for removing intersymbol interference}

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}

25/03025 · · · · · · {using a two-tap delay line}

25/03031 · · · · · · {using only passive components (H04L 25/03025 takes precedence)}

25/03038 · · · · · · {with a non-recursive structure (H04L 25/03031 takes precedence)}

25/03044 · · · · · · · {using fractionally spaced delay lines or combinations of fractionally integrally spaced taps}

25/0305 · · · · · · · {using blind adaptation}

25/03057 · · · · · · {with a recursive structure (H04L 25/03031 takes precedence)}

25/03063 · · · · · · · {using fractionally spaced delay lines or combinations of fractionally and integrally spaced taps}

25/0307 · · · · · · · {using blind adaptation}

25/03076 · · · · · · · {not using decision feedback}

25/03082 · · · · · · {Theoretical aspects of adaptive time domain methods}

25/03089 · · · · · · · {Theory of blind algorithms, recursive or not}

25/03095 · · · · · · · {Theory of fractional equalisers, recursive or not}

25/03101 · · · · · · · {Theory of the Kalman algorithm}

25/03108 · · · · · · · {Theory of recursive equalisers, other than Kalman}

25/03114 · · · · · {non-adaptive, i.e. not adjustable, manually adjustable, or adjustable only during the reception of special signals}

25/03121 · · · · · · {using a two-tap delay line}

25/03127 · · · · · · {using only passive components (H04L 25/03121 takes precedence)}

25/03133 · · · · · · {with a non-recursive structure (H04L 25/03127 takes precedence)}

25/0314 · · · · · · · {using fractionally spaced delay lines or combinations of fractionally integrally spaced taps}

25/03146 · · · · · · {with a recursive structure (H04L 25/03127 takes precedence)}

25/03152 · · · · · · {Theoretical aspects of non-adaptive time domain methods}

25/03159 · · · · {operating in the frequency domain (H04L 25/03165, H04L 25/03178 take precedence)}

25/03165 · · · · {using neural networks}

25/03171 · · · · {Arrangements involving maximum a posteriori probability [MAP] detection}

NOTE

This group contains provisionally all documents which deal with turbo equalisation

25/03178 · · · · {Arrangements involving sequence estimation techniques}

25/03184	. . . . .	{Details concerning the metric}
25/03191	. . . . . .	{in which the receiver makes a selection between different metrics}
25/03197	. . . . . .	{methods of calculation involving metrics}
25/03203	. . . . .	{Trellis search techniques}
25/0321	. . . . . .	{Sorting arrangements therefor}
25/03216	. . . . . .	{using the M-algorithm}
25/03222	. . . . . .	{using the T-algorithm}
25/03229	. . . . . .	{with state-reduction using grouping of states}
25/03235	. . . . . .	{with state-reduction using feedback filtering}
25/03242	. . . . . .	{Methods involving sphere decoding}
25/03248	. . . . .	{Arrangements for operating in conjunction with other apparatus}

NOTE

This group covers arrangements in which the sequence estimator is specially adapted to provide signals to, or receive signals from, the other apparatus. The group does not cover the mere juxtaposition of elements

25/03254	. . . . . .	{Operation with other circuitry for removing intersymbol interference}
25/03261	. . . .	{with impulse-response shortening filters}
25/03267	. . . .	{with decision feedback equalisers}
25/03273	. . . . . .	{with carrier recovery circuitry}
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)}
25/03286	. . . . . .	{with channel-decoding circuitry}
25/03292	. . . . . .	{with channel estimation circuitry}
25/03299	. . . . . .	{with noise-whitening circuitry}
25/03305	. . . . .	{Joint sequence estimation and interference removal (joint detection of several desired signals H04L 25/03331)}
25/03312	. . . . .	{Arrangements specific to the provision of output signals}
25/03318	. . . . . .	{Provision of soft decisions}
25/03324	. . . . . .	{Provision of tentative decisions}
25/03331	. . . . .	{Arrangements for the joint estimation of multiple sequences}
25/03337	. . . . .	{Arrangements involving per-survivor processing}
25/03343	. . . .	{Arrangements at the transmitter end}
2025/0335	. . . .	{characterised by the type of transmission}
2025/03356	. . . . .	{Baseband transmission}
2025/03363	. . . . . .	{Multilevel (H04L 2025/03369 takes precedence)}
2025/03369	. . . . . .	{Partial response}
2025/03375	. . . . .	{Passband transmission}
2025/03382	. . . . . .	{Single of vestigal sideband}
2025/03388	. . . . . .	{ASK}
2025/03394	. . . . . .	{FSK}

2025/03401	. . . . . .	{PSK}
2025/03407	. . . .	{Continuous phase}
2025/03414	. . . . . .	{Multicarrier}
2025/0342	. . . . . .	{QAM}
2025/03426	. . . .	{transmission using multiple-input and multiple-output channels}
2025/03433	. . . .	{characterised by equaliser structure}
2025/03439	. . . . .	{Fixed structures}
2025/03445	. . . . . .	{Time domain}
2025/03452	. . . .	{Systolic arrays}
2025/03458	. . . .	{Lattice}
2025/03464	. . . .	{Neural networks}
2025/03471	. . . .	{Tapped delay lines (H04L 2025/03464 takes precedence)}
2025/03477	. . . .	{not time-recursive}
2025/03484	. . . .	{time-recursive}
2025/0349	. . . .	{as a feedback filter}
2025/03496	. . . .	{as a prediction filter}
2025/03503	. . . .	{as a combination of feedback and prediction filters}
2025/03509	. . . .	{fractionally spaced (H04L 2025/03515 takes precedence)}
2025/03515	. . . .	{irregularly spaced}
2025/03522	. . . . . .	{Frequency domain}
2025/03528	. . . . . .	{Other transform domain}
2025/03535	. . . . .	{Variable structures}
2025/03541	. . . . . .	{Switching between domains, e.g. between time and frequency}
2025/03547	. . . . . .	{Switching between time domain structures}
2025/03554	. . . .	{between neural networks and tapped delay lines}
2025/0356	. . . .	{Switching the time direction of equalisation}
2025/03566	. . . .	{between different tapped delay line structures}
2025/03573	. . . .	{between recursive and non-recursive}
2025/03579	. . . .	{Modifying the tap spacing}
2025/03585	. . . .	{Modifying the length}
2025/03592	. . . .	{Adaptation methods}
2025/03598	. . . . .	{Algorithms}
2025/03605	. . . . . .	{Block algorithms}
2025/03611	. . . . . .	{Iterative algorithms}
2025/03617	. . . .	{Time recursive algorithms (H04L 2025/03643 takes precedence)}
2025/03624	. . . .	{Zero-forcing}
2025/0363	. . . .	{Feature restoration, e.g. constant modulus}
2025/03636	. . . .	{Algorithms using least mean square [LMS]}
2025/03643	. . . .	{Order recursive}
2025/03649	. . . .	{Algorithms using recursive least square [RLS]}
2025/03656	. . . . . .	{Initialisation}
2025/03662	. . . .	{to a fixed value}
2025/03668	. . . .	{to the value at the end of a previous adaptation period}
2025/03675	. . . . . .	{Blind algorithms using gradient methods}

2025/03681	. . . . . .	{Control of adaptation}
2025/03687	. . . .	{of step size}
2025/03694	. . . .	{Stop and go}
2025/037	. . . .	{Detection of convergence state}
2025/03707	. . . .	{Detection or avoidance of local extrema}
2025/03713	. . . . . .	{Subspace algorithms}
2025/03719	. . . . . .	{Super-exponential}
2025/03726	. . . . .	{Switching between algorithms}
2025/03732	. . . . .	{according to the convergence state}
2025/03738	. . . . .	{Manual adaptation}
2025/03745	. . . . .	{Timing of adaptation}
2025/03751	. . . . . .	{only once, at installation (H04L 2025/03738 takes precedence)}
2025/03757	. . . . . .	{only on the request of a user}
2025/03764	. . . . . .	{only during predefined intervals}
2025/0377	. . . .	{during the reception of training signals}
2025/03777	. . . .	{characterised by the signalling}
2025/03783	. . . .	{Details of reference signals}
2025/03789	. . . . .	{Codes therefore}
2025/03796	. . . . .	{Location of reference signals}
2025/03802	. . . . .	{Signalling on the reverse channel}
2025/03808	. . . . .	{Transmission of equaliser coefficients}
2025/03815	. . . . .	{Transmission of a training request}
25/03821	. . . .	{Inter-carrier interference cancellation [ICI]}
25/03828	. . .	{Arrangements for spectral shaping; Arrangements for providing signals with specified spectral properties (partial response systems H04L 25/497)}
25/03834	. . .	{using pulse shaping}
25/0384	. . . .	{Design of pulse shapes (pulse shape for impulse radio H04B 1/7172)}
25/03847	. . . .	{Shaping by selective switching of amplifying elements}
25/03853	. . . .	{Shaping by digital methods other than look up tables or up/down converters}
25/03859	. . . .	{shaping using look up tables for partial waveforms}
25/03866	. . . .	{using scrambling}
25/03872	. . . .	{Parallel scrambling or descrambling}
25/03878	. . .	{Line equalisers; line build-out devices}
25/03885	. . .	{adaptive}
25/03891	. . .	{Spatial equalizers (MIMO diversity systems H04B 7/0413)}
25/03898	. . .	{codebook-based design (selection of codebook or precoding matrix for MIMO diversity systems H04B 7/0456)}
25/03904	. . . .	{cooperative design, e.g. exchanging of codebook information between base stations}
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}
25/03987	. . .	{Equalisation for sparse channels}
25/03993	. . .	{Noise whitening}
25/05	. .	Electric or magnetic storage of signals before transmitting or retransmitting for changing the transmission rate
25/06	. .	Dc level restoring means; Bias distortion correction {; Decision circuits providing symbol by symbol detection}
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)}
25/062	. . . .	{Setting decision thresholds using feedforward techniques only}
25/063	. . . .	{Setting decision thresholds using feedback techniques only}
25/064	. . . . .	{Subtraction of the threshold from the signal, which is then compared to a supplementary fixed threshold}
25/065	. . . .	{Binary decisions}
25/066	. . . .	{Multilevel decisions, not including self-organising maps}
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)}
25/068	. . .	{by sampling faster than the nominal bit rate}
25/069	. . .	{by detecting edges or zero crossings}
25/08	. .	Modifications for reducing interference; Modifications for reducing effects due to line faults {; Receiver end arrangements for detecting or overcoming line faults}
25/085	. . .	{Arrangements for reducing interference in line transmission systems, e.g. by differential transmission}
25/10	. .	Compensating for variations in line balance
25/12	. .	Compensating for variations in line impedance
25/14	. .	Channel dividing arrangements {, i.e. in which a single bit stream is divided between several baseband channels and reassembled at the receiver}
25/20	. .	Repeater circuits; Relay circuits
25/202	. . .	{using mechanical devices (H04L 25/205 takes precedence)}
25/205	. . .	{using tuning forks or vibrating reeds}
25/207	. . .	{using electromagnetic switches}
25/22	. . .	Repeaters for converting two wires to four wires; Repeaters for converting single current to double current

25/24	. . .	Relay circuits using discharge tubes or semiconductor devices {(H04L 25/22 takes precedence)}
25/242	. . . .	{with retiming}
25/245	. . . . .	{for start-stop signals (detection of start or stop bits H04J 3/0602)}
25/247	. . . . .	{for synchronous signals}
25/26	. . .	Circuits with optical sensing means {, i.e. using opto-couplers for isolation}
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
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 at the transmitter end H04L 25/03343)}
25/4975	. . . .	{Correlative coding using Tomlinson precoding, Harashima precoding, Trellis precoding or GPRS}
27/00		**Modulated-carrier systems**
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)}
2027/0016	. .	{Stabilisation of local oscillators}
2027/0018	. .	{Arrangements at the transmitter end}
2027/002	. . .	{using feedback from a remote receiver}
2027/0022	. . .	{using the carrier of the associated receiver of a transceiver}
2027/0024	. .	{at the receiver end}
2027/0026	. . .	{Correction of carrier offset}
2027/0028	. . . .	{at passband only}
2027/003	. . . .	{at baseband only}
2027/0032	. . . .	{at baseband and passband}
2027/0034	. . . .	{using hypothesis testing}
2027/0036	. . . .	{using a recovered symbol clock}
2027/0038	. . . .	{using an equaliser}
2027/004	. . . . .	{the equaliser providing control signals}
2027/0042	. . . . .	{the equaliser providing the offset correction per se}
2027/0044	. .	{Control loops for carrier regulation}
2027/0046	. . .	{Open loops}
2027/0048	. . . .	{Frequency multiplication}
2027/0051	. . . .	{Harmonic tracking}
2027/0053	. . .	{Closed loops}
2027/0055	. . . .	{single phase}
2027/0057	. . . .	{quadrature phase}
2027/0059	. . . .	{more than two phases}
2027/0061	. . . .	{remodulation}
2027/0063	. . .	{Elements of loops}
2027/0065	. . . .	{Frequency error detectors (H04L 2027/0067 takes precedence)}
2027/0067	. . . .	{Phase error detectors}
2027/0069	. . . .	{Loop filters}
2027/0071	. . .	{Control of loops}
2027/0073	. . . .	{Detection of synchronisation state}
2027/0075	. . . .	{Error weighting}
2027/0077	. . . . .	{stop and go}
2027/0079	. . . .	{Switching between loops}
2027/0081	. . . . .	{between loops of different bandwidths}
2027/0083	. .	{Signalling arrangements}
2027/0085	. . .	{with no special signals for synchronisation}
2027/0087	. . .	{Out-of-band signals, (e.g. pilots)}
2027/0089	. . .	{In-band signals}
2027/0091	. . . .	{Continuous signals}
2027/0093	. . . .	{Intermittant signals}
2027/0095	. . . . .	{in a preamble or similar structure}
2027/0097	. . .	{Adaptive synchronisation signals}
27/01	.	Equalisers {(baseband equalizers at the transmitter end H04L 25/03343; 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; Transmitter circuits
27/06	. .	Demodulator circuits; 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)
27/103	. .	{Chirp modulation (for spread spectrum techniques H04B 1/69)}
27/106	. .	{M-ary FSK}
27/12	. .	Modulator circuits; Transmitter circuits
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; Receiver circuits
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)
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; 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; 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}
27/2275	. . . .	{wherein the carrier recovery circuit uses the received modulated signals}
27/2276	. . . . .	{using frequency multiplication or harmonic tracking}
27/2277	. . . . .	{using remodulation}
27/2278	. . . . .	{using correlation techniques, e.g. for spread spectrum signals}

27/233 . . . using non-coherent demodulation

27/2331 . . . . {wherein the received signal is demodulated using one or more delayed versions of itself}

27/2332 . . . . {using a non-coherent carrier}

27/2334 . . . . {using filters}

27/2335 . . . . {using temporal properties of the received signal}

27/2337 . . . . . {using digital techniques to measure the time between zero-crossings}

27/2338 . . . . {using sampling (H04L 27/2331 - H04L 27/2335 take precedence)}

27/24 . . Half-wave signalling systems

27/26 . Systems using multi-frequency codes (H04L 27/32 takes precedence)

27/2601 . . {Multicarrier modulation systems}

27/2602 . . . {Signal structure}

27/26025 . . . {Numerology, i.e. varying one or more of symbol duration, subcarrier spacing, Fourier transform size, sampling rate or down-clocking (allocating sub-channels of the transmission path H04L 5/003)}

27/2603 . . . . {Signal structure ensuring backward compatibility with legacy system}

27/26035 . . . . {Maintenance of orthogonality, e.g. for signals exchanged between cells or users, or by using covering codes or sequences (using different training sequence per antenna H04B 7/0684; code allocation H04J 13/16)}

27/2604 . . . . {Multiresolution systems (by means of multiresolution subcarriers H04L 27/183, H04L 27/3488)}

27/2605 . . . . {Symbol extensions, e.g. Zero Tail, Unique Word [UW]}

27/2607 . . . . . {Cyclic extensions}

27/261 . . . . {Details of reference signals}

27/2613 . . . . . {Structure of the reference signals}

27/26132 . . . . . . {using repetition}

27/26134 . . . . . . {Pilot insertion in the transmitter chain, e.g. pilot overlapping with data, insertion in time or frequency domain}

27/26136 . . . . . . {Pilot sequence conveying additional information}

27/2614 . . . {Peak power aspects}

27/2615 . . . . {Reduction thereof using coding}

27/2617 . . . . . {using block codes}

27/2618 . . . . {Reduction thereof using auxiliary subcarriers}

27/262 . . . . {Reduction thereof by selection of pilot symbols}

27/2621 . . . . {Reduction thereof using phase offsets between subcarriers}

27/2623 . . . . {Reduction thereof by clipping}

27/2624 . . . . . {by soft clipping}

27/2626 . . . {Arrangements specific to the transmitter only}

27/26265 . . . . {Arrangements for sidelobes suppression specially adapted to multicarrier systems, e.g. spectral precoding}

27/2627 . . . . {Modulators}

27/2628 . . . . . {Inverse Fourier transform modulators, e.g. inverse fast Fourier transform [IFFT] or inverse discrete Fourier transform [IDFT] modulators (H04L 27/2634 takes precedence)}

27/263 . . . . . . {modification of IFFT/IDFT modulator for performance improvement}

27/2631 . . . . . . {with polyphase implementation}

27/2633 . . . . . . {using partial FFTs}

27/2634 . . . . . {Inverse fast Fourier transform [IFFT] or inverse discrete Fourier transform [IDFT] modulators in combination with other circuits for modulation}

27/2636 . . . . . . {with FFT or DFT modulators, e.g. standard single-carrier frequency-division multiple access [SC-FDMA] transmitter or DFT spread orthogonal frequency division multiplexing [DFT-SOFDM]}

27/26362 . . . . . . {Subcarrier weighting equivalent to time domain filtering, e.g. weighting per subcarrier multiplication (arrangements for removing intersymbol interference at the transmitter end H04L 25/03343)}

27/2637 . . . . . {with direct modulation of individual subcarriers}

27/2639 . . . . . {Modulators using other transforms, e.g. discrete cosine transforms, Orthogonal Time Frequency and Space [OTFS] or hermetic transforms}

27/264 . . . . . {Pulse-shaped multi-carrier, i.e. not using rectangular window}

27/26412 . . . . . . {Filtering over the entire frequency band, e.g. filtered orthogonal frequency-division multiplexing [OFDM]}

27/26414 . . . . . . {Filtering per subband or per resource block, e.g. universal filtered multicarrier [UFMC] or generalized frequency division multiplexing [GFDM]}

27/26416 . . . . . . {Filtering per subcarrier, e.g. filterbank multicarrier [FBMC]}

27/2642 . . . . . {Wavelet transform modulators (wavelet-division H04L 5/0008)}

27/2643 . . . . . {using symbol repetition, e.g. time domain realization of distributed FDMA}

27/2644 . . . . . {with oversampling}

27/2646 . . . . {using feedback from receiver for adjusting OFDM transmission parameters, e.g. transmission timing or guard interval length}

27/2647 . . . {Arrangements specific to the receiver only (equalisation H04L 27/01)}

27/2649 . . . . {Demodulators}

27/265 . . . . . {Fourier transform demodulators, e.g. fast Fourier transform [FFT] or discrete Fourier transform [DFT] demodulators (H04L 27/26524 takes precedence)}

27/2651 . . . . . . {Modification of fast Fourier transform [FFT] or discrete Fourier transform [DFT] demodulators for performance improvement}

27/2652 . . . . . . {with polyphase implementation}

27/26522 . . . . . . {using partial FFTs}

27/26524 . . . . . {Fast Fourier transform [FFT] or discrete Fourier transform [DFT] demodulators in combination with other circuits for demodulation}

27/26526	. . . . . .	{with inverse FFT [IFFT] or inverse DFT [IDFT] demodulators, e.g. standard single-carrier frequency-division multiple access [SC-FDMA] receiver or DFT spread orthogonal frequency division multiplexing [DFT-SOFDM]}
27/2653	. . . . .	{with direct demodulation of individual subcarriers}
27/26532	. . . . .	{Demodulators using other transforms, e.g. discrete cosine transforms, Orthogonal Time Frequency and Space [OTFS] or hermetic transforms}
27/26534	. . . . .	{Pulse-shaped multi-carrier, i.e. not using rectangular window}
27/26536	. . . . . .	{Filtering over the entire frequency band, e.g. filtered orthogonal frequency division multiplexing [OFDM]}
27/26538	. . . . . .	{Filtering per subband or per resource block, e.g. universal filtered multicarrier [UFMC] or generalized frequency division multiplexing [GFDM]}
27/2654	. . . . . .	{Filtering per subcarrier, e.g. filterbank multicarrier [FBMC]}
27/26542	. . . . .	{Wavelet transform demodulators (wavelet-division H04L 5/0008)}
27/26544	. . . . .	{Demodulators for signals generated by symbol repetition (synchronisation arrangements H04L 27/2655)}
27/26546	. . . . .	{with oversampling}
27/2655	. . . .	{Synchronisation arrangements}
27/2656	. . . . .	{Frame synchronisation, e.g. packet synchronisation, time division duplex [TDD] switching point detection or subframe synchronisation}
27/2657	. . . . .	{Carrier synchronisation}
27/2659	. . . . . .	{Coarse or integer frequency offset determination and synchronisation}
27/266	. . . . . .	{Fine or fractional frequency offset determination and synchronisation}
27/2662	. . . . .	{Symbol synchronisation}
27/2663	. . . . . .	{Coarse synchronisation, e.g. by correlation}
27/2665	. . . . . .	{Fine synchronisation, e.g. by positioning the FFT window}
27/2666	. . . . .	{Acquisition of further OFDM parameters, e.g. bandwidth, subcarrier spacing, or guard interval length}
27/2668	. . . . .	{Details of algorithms}
27/2669	. . . . . .	{characterised by the domain of operation}
27/2671	. . . .	{Time domain}
27/2672	. . . .	{Frequency domain}
27/2673	. . . . . .	{characterised by synchronisation parameters}
27/2675	. . . .	{Pilot or known symbols}
27/2676	. . . .	{Blind, i.e. without using known symbols}
27/2678	. . . .	{using cyclostationarities, e.g. cyclic prefix or postfix}
27/2679	. . . .	{Decision-aided}
27/2681	. . . . . .	{characterised by constraints}
27/2682	. . . .	{Precision}
27/2684	. . . .	{Complexity}
27/2685	. . . .	{Speed of convergence}
27/2686	. . . .	{Range of frequencies or delays tested}
27/2688	. . . .	{Resistance to perturbation, e.g. noise, interference or fading}
27/26885	. . . .	{Adaptation to rapid radio propagation changes, e.g. due to velocity}
27/2689	. . . . .	{Link with other circuits, i.e. special connections between synchronisation arrangements and other circuits for achieving synchronisation}
27/2691	. . . . . .	{involving interference determination or cancellation}
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}
27/2694	. . . .	{adaptive design}
27/2695	. . . . . .	{with channel estimation, e.g. determination of delay spread, derivative or peak tracking (channel estimation H04L 25/0202)}
27/2697	. . .	{in combination with other modulation techniques}
27/2698	. . .	{double density OFDM/OQAM system, e.g. OFDM/OQAM-IOTA system}
27/28	. .	with simultaneous transmission of different frequencies each representing one code element
27/30	. .	wherein each code element is represented by a combination of frequencies
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
27/34	. .	Amplitude- and phase-modulated carrier systems, e.g. quadrature-amplitude modulated carrier systems
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}
27/3411	. . . .	{reducing the peak to average power ratio or the mean power of the constellation; Arrangements for increasing the shape gain of a signal set}
27/3416	. . . .	{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}
27/3422	. . . . .	{in which the constellation is not the n - fold Cartesian product of a single underlying two-dimensional constellation}
27/3427	. . . . .	{in which the constellation is the n - fold Cartesian product of a single underlying two-dimensional constellation}
27/3433	. . . . . .	{using an underlying square constellation}
27/3438	. . . . . .	{using an underlying generalised cross constellation}
27/3444	. . . .	{by applying a certain rotation to regular constellations}
27/345	. . .	{Modifications of the signal space to allow the transmission of additional information}

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}
27/3461	. . . .	{in order to transmit a subchannel}
27/3466	. . . . .	{by providing an alternative to one signal point}
27/3472	. . . . .	{by switching between alternative constellations}
27/3477	. . . . .	{by using the outer points of the constellation or of the constituent two-dimensional constellations}
27/3483	. . . . .	{using a modulation of the constellation points}
27/3488	. . .	{Multiresolution systems}
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)}
27/36	. . .	Modulator circuits; Transmitter circuits
27/361	. . . .	{Modulation using a single or unspecified number of carriers, e.g. with separate stages of phase and amplitude modulation}
27/362	. . . .	{Modulation using more than one carrier, e.g. with quadrature carriers, separately amplitude modulated (H04L 27/366 takes precedence)}
27/363	. . . . .	{using non - square modulating pulses, modulators specifically designed for this (transmission of non - square QAM H04L 27/3494)}
27/364	. . . . .	{Arrangements for overcoming imperfections in the modulator, e.g. quadrature error or unbalanced I and Q levels}
27/365	. . . .	{Modulation using digital generation of the modulated carrier (not including modulation of a digitally generated carrier)}
27/366	. . . .	{Arrangements for compensating undesirable properties of the transmission path between the modulator and the demodulator}
27/367	. . . . .	{using predistortion}
27/368	. . . . . .	{adaptive predistortion}
27/38	. . .	Demodulator circuits; Receiver circuits
27/3809	. . . .	{Amplitude regulation arrangements}
27/3818	. . . .	{using coherent demodulation, i.e. using one or more nominally phase synchronous carriers (H04L 27/227 and H04L 27/389 take precedence)}
27/3827	. . . . .	{in which the carrier is recovered using only the demodulated baseband signals}
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}
27/3845	. . . .	{using non - coherent demodulation, i.e. not using a phase synchronous carrier}
27/3854	. . . . .	{using a non - coherent carrier, including systems with baseband correction for phase or frequency offset}
27/3863	. . . . . .	{Compensation for quadrature error in the received signal}
27/3872	. . . . . .	{Compensation for phase rotation in the demodulated signal}

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}

41/00   **Arrangements for maintenance, administration or management of data switching networks, e.g. of packet switching networks**

> **WARNING**
>
> Group H04L 41/00 is impacted by reclassification into groups H04L 41/34, H04L 41/342, H04L 41/344 and H04L 41/40.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

41/02	.	Standardisation; Integration
41/0213	. .	Standardised network management protocols, e.g. simple network management protocol [SNMP]
41/022	. .	Multivendor or multi-standard integration
41/0226	. .	Mapping or translating multiple network management protocols
41/0233	. .	Object-oriented techniques, for representation of network management data, e.g. common object request broker architecture [CORBA]
41/024	. .	{using relational databases for representation of network management data, e.g. managing via structured query language [SQL]}
41/0246	. .	Exchanging or transporting network management information using the Internet; Embedding network management web servers in network elements; Web-services-based protocols
41/0253	. . .	using browsers or web-pages for accessing management information
41/026	. . .	using e-messaging for transporting management information, e.g. email, instant messaging or chat
41/0266	. . .	using meta-data, objects or commands for formatting management information, e.g. using eXtensible markup language [XML]
41/0273	. . .	using web services for network management, e.g. simple object access protocol [SOAP]
41/028	. . . .	{for synchronisation between service call and response}
41/0286	. . . .	{for search or classification or discovery of web services providing management functionalities}
41/0293	. . . .	{for accessing web services by means of a binding identification of the management service or element}
41/04	.	Network management architectures or arrangements

> **WARNING**
>
> Group H04L 41/04 is impacted by reclassification into groups H04L 41/045, H04L 41/052, H04L 41/34, H04L 41/342 and H04L 41/344.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

41/042	. .	comprising distributed management centres cooperatively managing the network
41/044	. .	comprising hierarchical management structures

41/045	. .	comprising client-server management architectures

> **WARNING**
>
> Group H04L 41/045 is incomplete pending reclassification of documents from group H04L 41/04.
>
> Groups H04L 41/04 and H04L 41/045 should be considered in order to perform a complete search.

41/046	. .	comprising network management agents or mobile agents therefor
41/048	. . .	{mobile agents}
41/052	. .	using standardised network management architectures, e.g. telecommunication management network [TMN] or unified network management architecture [UNMA]

> **WARNING**
>
> Group H04L 41/052 is incomplete pending reclassification of documents from group H04L 41/04.
>
> Groups H04L 41/04 and H04L 41/052 should be considered in order to perform a complete search.

41/06	.	Management of faults, events, alarms or notifications
41/0604	. .	using filtering, e.g. reduction of information by using priority, element types, position or time
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	. .	using root cause analysis; using analysis of correlation between notifications, alarms or events based on decision criteria, e.g. hierarchy, tree or time 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	. .	using network fault recovery (ring fault isolation or reconfiguration in loop networks without recovery actions by a network management system H04L 12/437)
41/0659	. . .	by isolating or reconfiguring faulty entities

> **WARNING**
>
> Group H04L 41/0659 is impacted by reclassification into group H04L 41/0661.
>
> Groups H04L 41/0659 and H04L 41/0661 should be considered in order to perform a complete search.

41/0661	. . . .	{by reconfiguring faulty entities}

> **WARNING**
>
> Group H04L 41/0661 is incomplete pending reclassification of documents from group H04L 41/0659.
>
> Groups H04L 41/0659 and H04L 41/0661 should be considered in order to perform a complete search.

41/0663	. . .	Performing the actions predefined by failover planning, e.g. switching to standby network elements
41/0668	. . .	by dynamic selection of recovery network elements, e.g. replacement by the most appropriate element after failure
41/0677	. .	Localisation of faults
41/0681	. .	Configuration of triggering conditions
41/0686	. .	Additional information in the notification, e.g. enhancement of specific meta-data
41/069	. .	using logs of notifications; Post-processing of notifications
41/0695	. .	the faulty arrangement being the maintenance, administration or management system
41/08	.	Configuration management of networks or network elements (address allocation H04L 61/50)

> **WARNING**
>
> Group H04L 41/08 is impacted by reclassification into group H04L 41/0895.
>
> Groups H04L 41/08 and H04L 41/0895 should be considered in order to perform a complete search.

41/0803	. .	Configuration setting
41/0806	. . .	for initial configuration or provisioning, e.g. plug-and-play
41/0809	. . . .	{Plug-and-play configuration}
41/0813	. . .	characterised by the conditions triggering a change of settings
41/0816	. . . .	the condition being an adaptation, e.g. in response to network events
41/082	. . . .	the condition being updates or upgrades of network functionality
41/0823	. . .	characterised by the purposes of a change of settings, e.g. optimising configuration for enhancing reliability (for optimising operational conditions of wireless networks H04W 24/02)
41/0826	. . . .	for reduction of network costs (H04L 41/0833 takes precedence)
41/083	. . . .	for increasing network speed
41/0833	. . . .	for reduction of network energy consumption
41/0836	. . . .	{to enhance reliability, e.g. reduce downtime}
41/084	. . .	Configuration by using pre-existing information, e.g. using templates or copying from other elements
41/0843	. . . .	{based on generic templates}
41/0846	. . . .	{based on copy from other elements}
41/085	. .	Retrieval of network configuration; Tracking network configuration history
41/0853	. . .	by actively collecting configuration information or by backing up configuration information

41/0856 . . . . {by backing up or archiving configuration information}

41/0859 . . . by keeping history of different configuration generations or by rolling back to previous configuration versions

41/0863 . . . . {by rolling back to previous configuration versions}

41/0866 . . Checking the configuration

41/0869 . . . Validating the configuration within one network element

41/0873 . . . Checking configuration conflicts between 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 groups to network elements

> **WARNING**
>
> Group H04L 41/0893 is impacted by reclassification into group H04L 41/0894.
>
> Groups H04L 41/0893 and H04L 41/0894 should be considered in order to perform a complete search.

41/0894 . . Policy-based network configuration management

> **WARNING**
>
> Group H04L 41/0894 is incomplete pending reclassification of documents from group H04L 41/0893.
>
> Groups H04L 41/0893 and H04L 41/0894 should be considered in order to perform a complete search.

41/0895 . . Configuration of virtualised networks or elements, e.g. virtualised network function or OpenFlow elements

> **WARNING**
>
> Group H04L 41/0895 is incomplete pending reclassification of documents from group H04L 41/08.
>
> Groups H04L 41/08 and H04L 41/0895 should be considered in order to perform a complete search.

41/0896 . . Bandwidth or capacity management, i.e. automatically increasing or decreasing capacities (flow or congestion control using dynamic resource allocation, e.g. in-call renegotiation, H04L 47/76)

> **WARNING**
>
> Group H04L 41/0896 is impacted by reclassification into group H04L 41/0897.
>
> Groups H04L 41/0896 and H04L 41/0897 should be considered in order to perform a complete search.

41/0897 . . . by horizontal or vertical scaling of resources, or by migrating entities, e.g. virtual resources or entities

> **WARNING**
>
> Group H04L 41/0897 is incomplete pending reclassification of documents from group H04L 41/0896.
>
> Groups H04L 41/0896 and H04L 41/0897 should be considered in order to perform a complete search.

41/12 . Discovery or management of network topologies

> **WARNING**
>
> Group H04L 41/12 is impacted by reclassification into groups H04L 41/122, H04L 41/34, H04L 41/342, H04L 41/344 and H04L 41/40.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

41/122 . . of virtualised topologies, e.g. software-defined networks [SDN] or network function virtualisation [NFV]

> **WARNING**
>
> Group H04L 41/122 is incomplete pending reclassification of documents from group H04L 41/12.
>
> Groups H04L 41/12 and H04L 41/122 should be considered in order to perform a complete search.

41/14 . Network analysis or design

> **WARNING**
>
> Group H04L 41/14 is impacted by reclassification into group H04L 41/149.
>
> Groups H04L 41/14 and H04L 41/149 should be considered in order to perform a complete search.

41/142 . . using statistical or mathematical methods

41/145 . . {involving simulating, designing, planning or modelling of a network}

41/147 . . for predicting network behaviour

> **WARNING**
>
> Group H04L 41/147 is impacted by reclassification into group H04L 41/149.
>
> Groups H04L 41/147 and H04L 41/149 should be considered in order to perform a complete search.

41/149 . . for prediction of maintenance

> **WARNING**
>
> Group H04L 41/149 is incomplete pending reclassification of documents from groups H04L 41/14 and H04L 41/147.
>
> Groups H04L 41/14, H04L 41/147 and H04L 41/149 should be considered in order to perform a complete search.

41/16 . using machine learning or artificial intelligence

41/18	.	Delegation of network management function, e.g. customer network management [CNM]
41/20	.	{Network management software packages}
41/22	.	comprising specially adapted graphical user interfaces [GUI]
41/24	.	{using dedicated network management hardware}
41/26	.	{using dedicated tools for LAN [Local Area Network] management}
41/28	.	Restricting access to network management systems or functions, e.g. using authorisation function to access network configuration
41/30	.	{Decision processes by autonomous network management units using voting and bidding}
41/32	.	{Specific management aspects for broadband networks}
41/34	.	Signalling channels for network management communication

WARNING

> Groups H04L 41/34, H04L 41/342 and H04L 41/344 are incomplete pending reclassification of documents from groups H04L 41/00, H04L 41/04 and H04L 41/12.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

41/342	. .	between virtual entities, e.g. orchestrators, SDN or NFV entities
41/344	. .	Out-of-band transfers
41/40	.	using virtualisation of network functions or resources, e.g. SDN or NFV entities

WARNING

> Group H04L 41/40 is incomplete pending reclassification of documents from groups H04L 41/00 and H04L 41/12.
>
> Groups H04L 41/00, H04L 41/12 and H04L 41/40 should be considered in order to perform a complete search.

41/50	.	Network service management, e.g. ensuring proper service fulfilment according to agreements
41/5003	. .	Managing SLA; Interaction between SLA and QoS
41/5006	. . .	Creating or negotiating SLA contracts, guarantees or penalties
41/5009	. . .	Determining service level performance parameters or violations of service level contracts, e.g. violations of agreed response time or mean time between failures [MTBF]
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 fulfilment of SLA
41/5022	. . . .	by giving priorities, e.g. assigning classes of service
41/5025	. . . .	by proactively reacting to service quality change, e.g. by reconfiguration after service quality degradation or upgrade
41/5029	. .	{Service quality level-based billing, e.g. dependent on measured service level customer is charged more or less}

41/5032	. .	{Generating service level reports}
41/5041	. .	characterised by the time relationship between creation and deployment of a service
41/5045	. . .	{Making service definitions prior to deployment}
41/5048	. . .	{Automatic or semi-automatic definitions, e.g. definition templates}
41/5051	. . .	Service on demand, e.g. definition and deployment of services in real time
41/5054	. . .	Automatic deployment of services triggered by the service manager, e.g. service implementation by automatic configuration of network components
41/5058	. .	{Service discovery by the service manager}
41/5061	. .	characterised by the interaction between service providers and their network customers, e.g. customer relationship management
41/5064	. . .	{Customer relationship management}
41/5067	. . .	Customer-centric QoS measurements
41/507	. . .	Filtering out customers affected by service problems
41/5074	. . .	Handling of user complaints or 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}
41/5087	. . .	{wherein the managed service relates to voice services (management of VoIP services H04M 7/0081)}
41/509	. . .	{wherein the managed service relates to media content delivery, e.g. audio, video or TV}
41/5093	. . .	{wherein the managed service relates to messaging or chat services}
41/5096	. . .	{wherein the managed service relates to distributed or central networked applications}
43/00		**Arrangements for monitoring or testing data switching networks**
43/02	.	Capturing of monitoring data
43/022	. .	by sampling
43/024	. . .	by adaptive sampling
43/026	. .	using flow identification
43/028	. .	by filtering
43/04	.	Processing captured monitoring data, e.g. for logfile generation
43/045	. .	for graphical visualisation of monitoring data
43/06	.	Generation of reports
43/062	. .	related to network traffic
43/065	. .	related to network devices
43/067	. .	using time frame reporting
43/08	.	Monitoring or testing based on specific metrics, e.g. QoS, energy consumption or environmental parameters

WARNING

> Group H04L 43/08 is impacted by reclassification into group H04L 43/20.
>
> Groups H04L 43/08 and H04L 43/20 should be considered in order to perform a complete search.

43/0805	. .	by checking availability

43/0811	. . .	by checking connectivity
43/0817	. . .	by checking functioning
43/0823	. .	Errors, e.g. transmission errors
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 utilisation, e.g. volume of load or congestion level
43/0882	. . .	Utilisation of link capacity
43/0888	. . .	Throughput
43/0894	. . .	Packet rate
43/091	. .	Measuring contribution of individual network components to actual service level
43/10	.	Active monitoring, e.g. heartbeat, ping or trace-route
43/103	. .	with adaptive polling, i.e. dynamically adapting the polling rate
43/106	. .	using time related information in packets, e.g. by adding timestamps
43/12	.	Network monitoring probes
43/14	.	{using software, i.e. software packages (network security related monitoring H04L 63/1408)}
43/16	.	Threshold monitoring
43/18	.	Protocol analysers
43/20	.	the monitoring system or the monitored elements being virtualised, abstracted or software-defined entities, e.g. SDN or NFV

> **WARNING**
>
> Group H04L 43/20 is incomplete pending reclassification of documents from group H04L 43/08.
>
> Groups H04L 43/08 and H04L 43/20 should be considered in order to perform a complete search.

43/50	.	Testing arrangements
43/55	. .	Testing of service level quality, e.g. simulating service usage
45/00		**Routing or path finding of packets in data switching networks** (routing or path finding in wireless networks H04W 40/00)

> **WARNING**
>
> Group H04L 45/00 is impacted by reclassification into groups H04L 45/17, H04L 45/243, H04L 45/247, H04L 45/645, H04L 45/655, H04L 45/76, H04L 45/80, H04L 45/85 and H04L 45/851.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

45/02	.	Topology update or discovery

> **WARNING**
>
> Group H04L 45/02 is impacted by reclassification into groups H04L 45/03, H04L 45/033, H04L 45/036, H04L 45/037 and H04L 45/0377.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

45/021	. .	Ensuring consistency of routing table updates, e.g. by using epoch numbers
45/023	. .	Delayed use of routing table updates
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 intervals, e.g. event-triggered updates
45/03	. .	by updating link state protocols

> **WARNING**
>
> Group H04L 45/03 is incomplete pending reclassification of documents from group H04L 45/02.
>
> Groups H04L 45/02 and H04L 45/03 should be considered in order to perform a complete search.

45/033	. .	by updating distance vector protocols

> **WARNING**
>
> Group H04L 45/033 is incomplete pending reclassification of documents from group H04L 45/02.
>
> Groups H04L 45/02 and H04L 45/033 should be considered in order to perform a complete search.

45/036	. .	Updating the topology between route computation elements, e.g. between OpenFlow controllers

> **WARNING**
>
> Groups H04L 45/036, H04L 45/037 and H04L 45/0377 are incomplete pending reclassification of documents from group H04L 45/02.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

45/037	. . .	Routes obligatorily traversing service-related nodes
45/0377	. . . .	for service chaining
45/04	. .	{Interdomain routing, e.g. hierarchical routing}
45/06	. .	{Deflection routing, e.g. hot-potato routing}
45/08	. .	{Learning-based routing, e.g. using neural networks or artificial intelligence}
45/10	. .	{Routing in connection-oriented networks, e.g. X.25 or ATM}
45/12	.	Shortest path evaluation
45/121	. .	by minimising delays
45/122	. .	by minimising distances, e.g. by selecting a route with minimum of 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	. .	{minimising 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
45/17	.	Shortcut routing, e.g. using next hop resolution protocol [NHRP]

> **WARNING**
>
> Group H04L 45/17 is incomplete pending reclassification of documents from group H04L 45/00.
>
> Groups H04L 45/00 and H04L 45/17 should be considered in order to perform a complete search.

45/18	.	Loop-free operations
45/20	.	{Hop count for routing purposes, e.g. TTL}
45/22	.	{Alternate routing}

> **WARNING**
>
> Group H04L 45/22 is impacted by reclassification into group H04L 45/247.
>
> Groups H04L 45/22 and H04L 45/247 should be considered in order to perform a complete search.

45/24	.	Multipath
45/243	. .	using M+N parallel active paths

> **WARNING**
>
> Group H04L 45/243 is incomplete pending reclassification of documents from group H04L 45/00.
>
> Groups H04L 45/00 and H04L 45/243 should be considered in order to perform a complete search.

45/245	. .	{Link aggregation, e.g. trunking}
45/247	. .	using M:N active or standby paths

> **WARNING**
>
> Group H04L 45/247 is incomplete pending reclassification of documents from groups H04L 45/00 and H04L 45/22.
>
> Groups H04L 45/00, H04L 45/22 and H04L 45/247 should be considered in order to perform a complete search.

45/26	.	{Route discovery packet}
45/28	.	using route fault recovery
45/30	.	Routing of multiclass traffic
45/302	.	Route determination based on requested QoS
45/304	. .	{Route determination for signalling traffic}
45/306	. .	{Route determination based on the nature of the carried application}
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	.	Centralised routing
45/44	.	Distributed routing
45/46	.	{Cluster building}
45/48	.	Routing tree calculation

> **WARNING**
>
> Group H04L 45/48 is impacted by reclassification into groups H04L 45/484 and H04L 45/488.
>
> Groups H04L 45/48, H04L 45/484 and H04L 45/488 should be considered in order to perform a complete search.

45/484	. .	using multiple routing trees

> **WARNING**
>
> Group H04L 45/484 is incomplete pending reclassification of documents from group H04L 45/48.
>
> Groups H04L 45/48 and H04L 45/484 should be considered in order to perform a complete search.

45/488	. .	using root node determination

> **WARNING**
>
> Group H04L 45/488 is incomplete pending reclassification of documents from group H04L 45/48.
>
> Groups H04L 45/48 and H04L 45/488 should be considered in order to perform a complete search.

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}
45/566	. .	{Routing instructions carried by the data packet, e.g. active networks}
45/58	.	Association of routers
45/583	. .	{Stackable routers}
45/586	. .	of virtual routers
45/60	.	Router architectures
45/62	.	{Wavelength based (optical switching H04Q 11/0062)}
45/64	.	using an overlay routing layer

45/645	.	Splitting route computation layer and forwarding layer, e.g. routing according to path computational element [PCE] or based on OpenFlow functionality

> **WARNING**
>
> Groups H04L 45/645 and H04L 45/655 are incomplete pending reclassification of documents from group H04L 45/00.
>
> Groups H04L 45/00, H04L 45/645 and H04L 45/655 should be considered in order to perform a complete search.

45/655	. .	Interaction between route computation entities and forwarding entities, e.g. for route determination or for flow table update
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}
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. with both IPv4 and IPv6
45/742	. .	{Route cache; Operation thereof}
45/745	. .	Address table lookup; Address filtering

> **WARNING**
>
> Group H04L 45/745 is impacted by reclassification into groups H04L 45/7452 and H04L 45/7459.
>
> Groups H04L 45/745, H04L 45/7452 and H04L 45/7459 should be considered in order to perform a complete search.

45/7452	. . .	Multiple parallel or consecutive lookup operations (lookup operation involving Bloom filters H04L 45/7459)

> **WARNING**
>
> Group H04L 45/7452 is incomplete pending reclassification of documents from group H04L 45/745.
>
> Groups H04L 45/745 and H04L 45/7452 should be considered in order to perform a complete search.

45/7453	. . .	using hashing
45/7459	. . . .	using Bloom filters

> **WARNING**
>
> Group H04L 45/7459 is incomplete pending reclassification of documents from group H04L 45/745.
>
> Groups H04L 45/745 and H04L 45/7459 should be considered in order to perform a complete search.

45/74591	. . .	{using content-addressable memories [CAM]}
45/748	. . .	using longest matching prefix

45/76	.	Routing in software-defined topologies, e.g. routing between virtual machines

> **WARNING**
>
> Group H04L 45/76 is incomplete pending reclassification of documents from group H04L 45/00.
>
> Groups H04L 45/00 and H04L 45/76 should be considered in order to perform a complete search.

45/80	.	Ingress point selection by the source endpoint, e.g. selection of ISP or POP

> **WARNING**
>
> Groups H04L 45/80, H04L 45/85 and H04L 45/851 are incomplete pending reclassification of documents from group H04L 45/00.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

45/85	. .	Selection among different networks
45/851	. . .	Dynamic network selection or re-selection, e.g. after degradation of quality
47/00		**Traffic control in data switching networks** (arrangements for detecting or preventing 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; Congestion control

> **WARNING**
>
> Group H04L 47/10 is impacted by reclassification into groups H04L 47/43 and H04L 47/431.
>
> Groups H04L 47/10, H04L 47/43 and H04L 47/431 should be considered in order to perform a complete search.

47/11	. .	Identifying congestion
47/115	. . .	{using a dedicated packet}
47/12	. .	Avoiding congestion; Recovering from congestion

> **WARNING**
>
> Group H04L 47/12 is impacted by reclassification into group H04L 47/129.
>
> Groups H04L 47/12 and H04L 47/129 should be considered in order to perform a complete search.

47/122	. . .	by diverting traffic away from congested entities
47/125	. . .	by balancing the load, e.g. traffic engineering
47/127	. . .	by using congestion prediction

47/129	. . .	at the destination endpoint, e.g. reservation of terminal resources or buffer space

> **WARNING**
>
> Group H04L 47/129 is incomplete pending reclassification of documents from group H04L 47/12.
>
> Groups H04L 47/12 and H04L 47/129 should be considered in order to perform a complete search.

47/13	. . .	{in a LAN segment, e.g. ring or bus}
47/135	. . .	{by jamming the transmission media}
47/15	. .	{in relation to multipoint traffic (arrangements for broadcast or multicast in data networks H04L 12/18)}
47/16	. .	{in connection oriented networks, e.g. frame relay}
47/17	. .	Interaction among intermediate nodes, e.g. hop by hop
47/18	. .	{End to end}
47/19	. .	at layers above the network layer (network arrangements for networked applications for scheduling or organising the servicing of application requests H04L 67/60)
47/193	. . .	at the transport layer, e.g. TCP related
47/196	. . .	{Integration of transport layer protocols, e.g. TCP and UDP}
47/20	. .	Traffic policing
47/21	. .	using leaky-bucket
47/215	. .	using token-bucket
47/22	. .	Traffic shaping
47/225	. . .	{Determination of shaping rate, e.g. using a moving window}
47/23	. .	{Bit dropping}
47/24	. .	Traffic characterised by specific attributes, e.g. priority or QoS
47/2408	. . .	for supporting different services, e.g. a differentiated services [DiffServ] type of service
47/2416	. . .	Real-time traffic
47/2425	. . .	for supporting services specification, e.g. SLA
47/2433	. . . .	{Allocation of priorities to traffic types}
47/2441	. . .	relying on flow classification, e.g. using integrated services [IntServ]
47/245	. . .	{using preemption}
47/2458	. . .	{Modification of priorities while in transit}
47/2466	. . .	using signalling traffic
47/2475	. . .	for supporting traffic characterised by the type of applications
47/2483	. . .	involving identification of individual flows
47/2491	. . .	Mapping quality of service [QoS] requirements between different networks
47/25	. .	with rate being modified by the source upon detecting a change of network conditions

47/26	. .	using explicit feedback to the source, e.g. choke packets

> **WARNING**
>
> Group H04L 47/26 is impacted by reclassification into groups H04L 47/265 and H04L 47/267.
>
> Groups H04L 47/26, H04L 47/265 and H04L 47/267 should be considered in order to perform a complete search.

47/263	. . .	Rate modification at the source after receiving feedback
47/265	. . .	sent by intermediate network nodes

> **WARNING**
>
> Group H04L 47/265 is incomplete pending reclassification of documents from group H04L 47/26.
>
> Groups H04L 47/26 and H04L 47/265 should be considered in order to perform a complete search.

47/266	. . .	{Stopping or restarting the source, e.g. X-on or X-off}
47/267	. . .	sent by the destination endpoint (network streaming of media packets with control of the source by the destination H04L 65/613)

> **WARNING**
>
> Group H04L 47/267 is incomplete pending reclassification of documents from group H04L 47/26.
>
> Groups H04L 47/26 and H04L 47/267 should be considered in order to perform a complete search.

47/27	. .	Evaluation or update of window size, e.g. using information derived from acknowledged [ACK] packets
47/28	. .	in relation to timing considerations
47/283	. . .	in response to processing delays, e.g. caused by jitter or round trip time [RTT]
47/286	. . .	{Time to live}
47/29	. .	{using a combination of thresholds}
47/30	. .	in combination with information about buffer occupancy at either end or at transit nodes
47/31	. .	by tagging of packets, e.g. using discard eligibility [DE] bits
47/32	. .	by discarding or delaying data units, e.g. packets or frames
47/323	. . .	{Discarding or blocking control packets, e.g. ACK packets}
47/326	. . .	{with random discard, e.g. random early discard [RED]}
47/33	. .	using forward notification
47/34	. .	ensuring sequence integrity, e.g. using sequence numbers
47/35	. .	by embedding flow control information in regular packets, e.g. piggybacking
47/36	. .	by determining packet size, e.g. maximum transfer unit [MTU]
47/365	. . .	{Dynamic adaptation of the packet size}
47/37	. .	{Slow start}
47/38	. .	by adapting coding or compression rate

47/39	. .	{Credit based}
47/40	. .	using split connections
47/41	. .	by acting on aggregated flows or links
47/43	. .	Assembling or disassembling of packets, e.g. segmentation and reassembly [SAR]

WARNING

Groups H04L 47/43 and H04L 47/431 are incomplete pending reclassification of documents from group H04L 47/10.

Groups H04L 47/10, H04L 47/43 and H04L 47/431 should be considered in order to perform a complete search.

47/431	. . .	using padding or de-padding
47/50	.	Queue scheduling
47/52	. .	by attributing bandwidth to queues
47/521	. . .	{Static queue service slot or fixed bandwidth allocation}
47/522	. . .	{Dynamic queue service slot or variable bandwidth allocation}
47/524	. . . .	{Queue skipping}
47/525	. . .	by redistribution of residual bandwidth
47/527	. . .	{Quantum based scheduling, e.g. credit or deficit based scheduling or token bank}
47/528	. . .	{Minimum bandwidth guarantee}
47/54	. .	{Loss aware scheduling}
47/56	. .	implementing delay-aware scheduling
47/562	. . .	{Attaching a time tag to queues}
47/564	. . .	{Attaching a deadline to packets, e.g. earliest due date first}
47/566	. . . .	{Deadline varies as a function of time spent in the queue}
47/568	. . .	{Calendar queues or timing rings}
47/58	. .	{Changing or combining different scheduling modes, e.g. multimode scheduling}
47/60	. .	implementing hierarchical scheduling
47/62	. .	characterised by scheduling criteria
47/6205	. . .	{Arrangements for avoiding head of line blocking}
47/621	. . .	{Individual queue per connection or flow, e.g. per VC}
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}
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	. . .	for service slots or service orders
47/6255	. . . .	{queue load conditions, e.g. longest queue first}
47/626	. . . .	{channel conditions}
47/6265	. . . .	{past bandwidth allocation}
47/627	. . . .	{policing}
47/6275	. . . .	based on priority
47/628	. . . .	based on packet size, e.g. shortest packet first
47/6285	. . .	{Provisions for avoiding starvation of low priority queues}
47/629	. . .	Ensuring fair share of resources, e.g. weighted fair queuing [WFQ]

47/6295	. . .	using multiple queues, one for each individual QoS, connection, flow or priority
47/70	.	Admission control; Resource allocation

WARNING

Group H04L 47/70 is impacted by reclassification into group H04L 47/83.

Groups H04L 47/70 and H04L 47/83 should be considered in order to perform a complete search.

47/72	. .	using reservation actions during connection setup
47/722	. . .	at the destination endpoint, e.g. reservation of terminal resources or buffer space
47/724	. . .	at intermediate nodes, e.g. resource reservation protocol [RSVP]
47/726	. . .	Reserving resources in multiple paths to be used simultaneously (by balancing the load H04L 47/125)
47/728	. . . .	{for backup paths}
47/74	. .	measures in reaction to resource unavailability
47/741	. . .	{Holding a request until resources become available}
47/743	. . .	{Reaction at the end points}
47/745	. . .	{Reaction in network}
47/746	. . .	{Reaction triggered by a failure}
47/748	. . .	{Negotiation of resources, e.g. modification of a request}
47/76	. .	using dynamic resource allocation, e.g. in-call renegotiation requested by the user or requested by the network in response to changing network conditions
47/762	. . .	triggered by the network
47/765	. . .	triggered by the end-points
47/767	. . . .	{after changing the attachment point, e.g. after hand-off}
47/78	. .	Architectures of resource allocation
47/781	. . .	{Centralised allocation of resources}
47/782	. . .	{Hierarchical allocation of resources, e.g. involving a hierarchy of local and centralised entities}
47/783	. . .	Distributed allocation of resources, e.g. bandwidth brokers
47/785	. . . .	among multiple network domains, e.g. multilateral agreements
47/786	. . . . .	{Mapping reservation between domains}
47/787	. . . .	{Bandwidth trade among domains}
47/788	. . .	{Autonomous allocation of resources}
47/80	. .	Actions related to the user profile or the type of traffic
47/801	. . .	{Real time traffic}
47/803	. . .	{Application aware}
47/805	. . .	{QOS or priority aware}
47/806	. . .	{Broadcast or multicast traffic}
47/808	. . .	{User-type aware}
47/82	. .	{Miscellaneous aspects}
47/821	. . .	{Prioritising resource allocation or reservation requests}
47/822	. . .	{Collecting or measuring resource availability data}
47/823	. . .	{Prediction of resource usage}
47/824	. . .	{Applicable to portable or mobile terminals}
47/825	. . .	{Involving tunnels, e.g. MPLS}
47/826	. . .	{Involving periods of time}

47/827	. . .	{Aggregation of resource allocation or reservation requests}
47/828	. . .	{Allocation of resources per group of connections, e.g. per group of users}
47/829	. . .	{Topology based}
47/83	. .	based on usage prediction

> **WARNING**
>
> Group H04L 47/83 is incomplete pending reclassification of documents from group H04L 47/70.
>
> Groups H04L 47/70 and H04L 47/83 should be considered in order to perform a complete search.

49/00		**Packet switching elements**
49/10	.	characterised by the switching fabric construction

> **WARNING**
>
> Group H04L 49/10 is impacted by reclassification into groups H04L 49/111, H04L 49/112, H04L 49/113, H04L 49/115, H04L 49/116 and H04L 49/118.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

49/101	. .	using crossbar or matrix
49/102	. .	using shared medium, e.g. bus or ring
49/103	. .	using a shared central buffer; using a shared memory
49/104	. .	Asynchronous transfer mode [ATM] switching fabrics
49/105	. . .	{ATM switching elements}
49/106	. . . .	{using space switching, e.g. crossbar or matrix}
49/107	. . . .	{using shared medium}
49/108	. . . .	{using shared central buffer}
49/109	. .	Integrated on microchip, e.g. switch-on-chip
49/111	. .	Switch interfaces, e.g. port details

> **WARNING**
>
> Group H04L 49/111 is incomplete pending reclassification of documents from group H04L 49/10.
>
> Groups H04L 49/10 and H04L 49/111 should be considered in order to perform a complete search.

49/112	. .	Switch control, e.g. arbitration

> **WARNING**
>
> Group H04L 49/112 is incomplete pending reclassification of documents from group H04L 49/10.
>
> Groups H04L 49/10 and H04L 49/112 should be considered in order to perform a complete search.

49/113	. .	Arrangements for redundant switching, e.g. using parallel planes

> **WARNING**
>
> Groups H04L 49/113, H04L 49/115, H04L 49/116 and H04L 49/118 are incomplete pending reclassification of documents from group H04L 49/10.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

49/115	. . .	Transferring a complete packet or cell through each plane
49/116	. . .	Transferring a part of the packet through each plane, e.g. by bit-slicing
49/118	. . .	Address processing within a device, e.g. using internal ID or tags for routing within a switch
49/15	.	Interconnection of switching modules
49/1507	. .	{Distribute and route fabrics, e.g. sorting-routing or Batcher-Banyan}
49/1515	. .	Non-blocking multistage, e.g. Clos
49/1523	. . .	{Parallel switch fabric planes}
49/153	. . .	{ATM switching fabrics having parallel switch planes}
49/1538	. . . .	{Cell slicing}
49/1546	. . .	using pipelined operation
49/1553	. .	{Interconnection of ATM switching modules, e.g. ATM switching fabrics}
49/1561	. . .	{Distribute and route fabrics, e.g. Batcher-Banyan}
49/1569	. . .	{Clos switching fabrics}
49/1576	. . .	{Crossbar or matrix}
49/1584	. . .	{Full Mesh, e.g. knockout}
49/1592	. . .	{Perfect Shuffle}
49/20	.	Support for services
49/201	. .	Multicast operation; Broadcast operation
49/203	. . .	{ATM switching fabrics with multicast or broadcast capabilities}
49/205	. .	{Quality of Service based}
49/206	. . .	{Real Time traffic}
49/208	. .	{Port mirroring}
49/25	.	Routing or path finding in a switch fabric
49/251	. .	{Cut-through or wormhole routing}
49/252	. .	{Store and forward routing}
49/253	. .	using establishment or release of connections between ports
49/254	. . .	{Centralised controller, i.e. arbitration or scheduling}
49/255	. . .	{Control mechanisms for ATM switching fabrics}
49/256	. .	{Routing or path finding in ATM switching fabrics}
49/257	. . .	{Cut-through or wormhole routing}
49/258	. . .	{Grouping}
49/30	.	{Peripheral units, e.g. input or output ports}
49/3009	. .	{Header conversion, routing tables or routing tags}
49/3018	. .	{Input queuing}
49/3027	. .	{Output queuing}
49/3036	. .	{Shared queuing}
49/3045	. .	{Virtual queuing}

49/3054	. .	{Auto-negotiation, e.g. access control between switch gigabit interface connector [GBIC] and link}
49/3063	. .	{Pipelined operation}
49/3072	. .	{Packet splitting}
49/3081	. .	{ATM peripheral units, e.g. policing, insertion or extraction}
49/309	. . .	{Header conversion, routing tables or routing tags}
49/35	.	Switches specially adapted for specific applications
49/351	. .	for local area network [LAN], e.g. Ethernet switches
49/352	. . .	{Gigabit ethernet switching [GBPS]}
49/353	. .	{Support for fire wire switches, i.e. according to IEEE 1394}
49/354	. .	for supporting virtual local area networks [VLAN]
49/355	. .	{Application aware switches, e.g. for HTTP}
49/356	. .	for storage area networks
49/357	. . .	{Fibre channel switches}
49/358	. . .	{Infiniband Switches}
49/40	.	Constructional details, e.g. power supply, mechanical construction or backplane
49/405	. .	{Physical details, e.g. power supply, mechanical construction or backplane of ATM switches}
49/45	.	Arrangements for providing or supporting expansion
49/455	. .	{Provisions for supporting expansion in ATM switches}
49/50	.	Overload detection or protection within a single switching element
49/501	. .	{Overload detection}
49/503	. . .	{Policing}
49/505	. .	Corrective measures
49/506	. . .	Backpressure
49/508	. . .	{Head of Line Blocking Avoidance}
49/55	.	Prevention, detection or correction of errors
49/552	. .	by ensuring the integrity of packets received through redundant connections
49/555	. .	{Error detection}
49/557	. .	{Error correction, e.g. fault recovery or fault tolerance}
49/60	.	Software-defined 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	.	Re-configuration of fast packet switches
49/70	.	{Virtual switches}
49/90	.	Buffering arrangements

WARNING

Group H04L 49/90 is impacted by reclassification into group H04L 49/9023.

Groups H04L 49/90 and H04L 49/9023 should be considered in order to perform a complete search.

49/9005	. .	using dynamic buffer space allocation
49/901	. .	using storage descriptor, e.g. read or write pointers
49/9015	. .	for supporting a linked list
49/9021	. .	{Plurality of buffers per packet}
49/9023	. .	for implementing a jitter-buffer

WARNING

Group H04L 49/9023 is incomplete pending reclassification of documents from group H04L 49/90.

Groups H04L 49/90 and H04L 49/9023 should be considered in order to perform a complete search.

49/9026	. .	{Single buffer per packet}
49/9031	. .	{Wraparound memory, e.g. overrun or underrun detection}
49/9036	. .	{Common buffer combined with individual queues}
49/9042	. .	{Separate storage for different parts of the packet, e.g. header and payload}
49/9047	. .	including multiple buffers, e.g. buffer pools
49/9052	. . .	{with buffers of different sizes}
49/9057	. .	Arrangements for supporting packet reassembly or resequencing
49/9063	. .	{Intermediate storage in different physical parts of a node or terminal}
49/9068	. . .	{in the network interface card}
49/9073	. . . .	{Early interruption upon arrival of a fraction of a packet}
49/9078	. . .	{using an external memory or storage device}
49/9084	. .	{Reactions to storage capacity overflow}
49/9089	. . .	{replacing packets in a storage arrangement, e.g. pushout}
49/9094	. . . .	{Arrangements for simultaneous transmit and receive, e.g. simultaneous reading/writing from/to the storage element}

51/00		**User-to-user messaging in packet-switching networks, transmitted according to store-and-forward or real-time protocols, e.g. e-mail**

WARNING

Group H04L 51/00 is impacted by reclassification into groups H04L 51/07 and H04L 51/21.

Groups H04L 51/00, H04L 51/07 and H04L 51/21 should be considered in order to perform a complete search.

51/02	.	using automatic reactions or user delegation, e.g. automatic replies or chatbot-generated messages
51/04	.	Real-time or near real-time messaging, e.g. instant messaging [IM]
51/043	. .	using or handling presence information
51/046	. .	Interoperability with other network applications or services
51/06	.	Message adaptation to terminal or network requirements
51/063	. .	Content adaptation, e.g. replacement of unsuitable content
51/066	. .	Format adaptation, e.g. format conversion or compression

| 51/07 | . | characterised by the inclusion of specific contents |

WARNING

> Group H04L 51/07 is incomplete pending reclassification of documents from group H04L 51/00.
>
> Groups H04L 51/00 and H04L 51/07 should be considered in order to perform a complete search.

51/08	. .	Annexed information, e.g. attachments
51/10	. .	Multimedia information
51/18	. .	Commands or executable codes
51/21	.	Monitoring or handling of messages

WARNING

> Group H04L 51/21 is incomplete pending reclassification of documents from group H04L 51/00.
>
> Groups H04L 51/00 and H04L 51/21 should be considered in order to perform a complete search.

51/212	. .	using filtering or selective blocking
51/214	. .	using selective forwarding
51/216	. .	Handling conversation history, e.g. grouping of messages in sessions or threads
51/222	. .	using geographical location information, e.g. messages transmitted or received in proximity of a certain spot or area
51/224	. .	providing notification on incoming messages, e.g. pushed notifications of received messages
51/226	. .	Delivery according to priorities
51/23	. .	Reliability checks, e.g. acknowledgments or fault reporting
51/234	. .	for tracking messages
51/42	.	Mailbox-related aspects, e.g. synchronisation of mailboxes
51/48	.	Message addressing, e.g. address format or anonymous messages, aliases
51/52	.	for supporting social networking services
51/56	.	Unified messaging, e.g. interactions between e-mail, instant messaging or converged IP messaging [CPM]
51/58	.	Message adaptation for wireless communication

61/00 **Network arrangements, protocols or services 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.

| 61/09 | . | Mapping addresses |

WARNING

> Group H04L 61/09 is incomplete pending reclassification of documents from group H04L 9/40.
>
> Groups H04L 9/40 and H04L 61/09 should be considered in order to perform a complete search.

61/10	. .	of different types
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
61/25	. .	of the same type
61/2503	. . .	Translation of Internet protocol [IP] addresses
61/251	. . . .	between different IP versions
61/2514	. . . .	between local and global IP addresses
61/2517	. . . .	using port numbers
61/2521	. . . .	Translation architectures other than single NAT servers
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	. . . .	Hiding addresses; Keeping addresses anonymous
61/2542	. . . .	{involving dual-stack hosts}
61/2546	. . . .	Arrangements for avoiding unnecessary translation
61/255	. . . .	Maintenance or indexing of mapping tables
61/2553	. . . . .	Binding renewal aspects, e.g. using keep-alive messages
61/2557	. . . .	Translation policies or rules
61/256	. . . .	NAT traversal
61/2564	. . . . .	{for a higher-layer protocol, e.g. for session initiation protocol [SIP]}
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 session traversal utilities for NAT [STUN]
61/2578	. . . . .	without involvement of 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 for network address translation [TURN]
61/2592	. . . .	using tunnelling or encapsulation
61/2596	. . .	Translation of addresses of the same type other than IP, e.g. translation from MAC to MAC addresses
61/30	.	Managing network names, e.g. use of aliases or nicknames (name-to-address mapping H04L 61/45)
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]}
61/3025	. . .	{Domain name generation or assignment}
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}
61/45	.	Network directories; Name-to-address mapping
61/4505	. .	using standardised directories; using standardised directory access protocols
61/4511	. . .	using domain name system [DNS]
61/4517	. . .	using open systems interconnection [OSI] directories, e.g. X.500
61/4523	. . .	using lightweight directory access protocol [LDAP]
61/4535	. .	using an address exchange platform which sets up a session between two nodes, e.g. rendezvous servers, session initiation protocols [SIP] registrars or H.323 gatekeepers
61/4541	. .	Directories for service discovery
61/4547	. .	{for personal communications, i.e. using a personal identifier}
61/4552	. .	Lookup mechanisms between a plurality of directories; Synchronisation of directories, e.g. metadirectories
61/4553	. .	{Object oriented directories, e.g. common object request broker architecture [CORBA] name server}
61/4555	. .	{Directories for electronic mail or instant messaging}
61/4557	. .	Directories for hybrid networks, e.g. including telephone numbers
61/457	. .	{containing identifiers of data entities on a computer, e.g. file names}
61/4588	. .	containing mobile subscriber information, e.g. home subscriber server [HSS]
61/4594	. .	Address books, i.e. directories containing contact information about correspondents (telephone directories in user terminals H04M 1/27453)
61/50	.	Address allocation
61/5007	. .	Internet protocol [IP] addresses
61/5014	. . .	using dynamic host configuration protocol [DHCP] or bootstrap protocol [BOOTP]
61/503	. . .	using an authentication, authorisation and accounting [AAA] protocol, e.g. remote authentication dial-in user service [RADIUS] or Diameter
61/5038	. .	for local use, e.g. in LAN or USB networks, or in a controller area network [CAN]
61/5046	. .	Resolving address allocation conflicts; Testing of addresses (testing when self-assigning an address H04L 61/5092)
61/5053	. .	Lease time; Renewal aspects
61/5061	. .	Pools of addresses
61/5069	. .	for group communication, multicast communication or broadcast communication
61/5076	. .	Update or notification mechanisms, e.g. DynDNS
61/5084	. .	Providing for device mobility (network addressing or numbering for mobility support in wireless networks H04W 8/26; mobile IP H04W 80/04)
61/5092	. .	by self-assignment, e.g. picking addresses at random and testing if they are already in use
61/58	.	Caching of addresses or names
61/59	.	using proxies for addressing

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)**}**

WARNING

     Group H04L 63/00 is incomplete pending reclassification of documents from group H04L 9/40.

     Groups H04L 9/40 and H04L 63/00 should be considered in order to perform a complete search.

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 51/212)}
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 authentication of entities (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 devices or network resources}
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 channels, 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, protocols or services for supporting real-time applications in data packet communication** (real-time or near real-time messaging, e.g. instant messaging [IM] H04L 51/04; selective video distribution H04N 21/00)

NOTES

1. {This group covers:
   - only communications which fulfill the following two conditions:
     i. they are based on packet data;
     ii. 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
     a. the transmission of the multimedia data itself,
     b. the user-to-user, user-to-network, inter-network or intra-network signalling supporting:
       b1. the establishment of a session for the subsequent transmission of the multimedia data, or
       b2. the maintenance of the session or
       b3. the application services available to the user during the session (unless explicitly excluded in certain cases). }
2. {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

H04L 65/00
(continued)

- • 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	.	Architectures or entities
65/1013	. .	{Network architectures, gateways, control or user entities}
65/1016	. .	IP multimedia subsystem [IMS]
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	. . .	Gateway controllers, e.g. media gateway control protocol [MGCP] controllers
65/1045	. .	Proxies, e.g. for session initiation protocol [SIP]
65/1046	. .	Call controllers; Call servers
65/1053	. .	IP private branch exchange [PBX] functionality entities or arrangements (circuit switched PBXs H04M 3/00)

> **WARNING**
>
> Group H04L 65/1053 is impacted by reclassification into group H04L 65/1055.
>
> Groups H04L 65/1053 and H04L 65/1055 should be considered in order to perform a complete search.

65/1055	. . .	Single-site

> **WARNING**
>
> Group H04L 65/1055 is incomplete pending reclassification of documents from group H04L 65/1053.
>
> Groups H04L 65/1053 and H04L 65/1055 should be considered in order to perform a complete search.

65/1056	. . .	Multi-site
65/1059	. .	End-user terminal functionalities specially adapted for real-time communication
65/1063	. .	Application servers providing network services (systems providing special services to telephonic subscribers H04M 3/42)
65/1066	.	Session management
65/1069	. .	Session establishment or de-establishment
65/1073	. .	Registration or de-registration
65/1076	. .	Screening of IP real time communications, e.g. spam over Internet telephony [SPIT]
65/1079	. . .	{of unsolicited session attempts, e.g. SPIT}

65/1083	. .	In-session procedures

> **WARNING**
>
> Group H04L 65/1083 is impacted by reclassification into groups H04L 65/1094 and H04L 65/1095.
>
> Groups H04L 65/1083, H04L 65/1094 and H04L 65/1095 should be considered in order to perform a complete search.

65/1086	. . .	{session scope modification}
65/1089	. . .	by adding media; by removing media
65/1093	. . .	by adding participants; by removing participants
65/1094	. . .	Inter-user-equipment sessions transfer or sharing

> **WARNING**
>
> Group H04L 65/1094 is incomplete pending reclassification of documents from group H04L 65/1083.
>
> Groups H04L 65/1083 and H04L 65/1094 should be considered in order to perform a complete search.

65/1095	. . .	Inter-network session transfer or sharing

> **WARNING**
>
> Group H04L 65/1095 is incomplete pending reclassification of documents from group H04L 65/1083.
>
> Groups H04L 65/1083 and H04L 65/1095 should be considered in order to perform a complete search.

65/1096	. .	Supplementary features, e.g. call forwarding or call holding (systems providing special services or facilities to telephony subscribers H04M 3/42)
65/1101	. .	Session protocols

> **WARNING**
>
> Group H04L 65/1101 is impacted by reclassification into group H04L 65/1108.
>
> Groups H04L 65/1101 and H04L 65/1108 should be considered in order to perform a complete search.

65/1104	. . .	Session initiation protocol [SIP]
65/1106	. . .	Call signalling protocols; H.323 and related
65/1108	. . .	Web based protocols, e.g. webRTC

> **WARNING**
>
> Group H04L 65/1108 is incomplete pending reclassification of documents from group H04L 65/1101.
>
> Groups H04L 65/1101 and H04L 65/1108 should be considered in order to perform a complete search.

65/40	.	Support for services or applications

> **WARNING**
>
> Group H04L 65/40 is impacted by reclassification into groups H04L 65/401, H04L 65/4015, H04L 65/402, H04L 65/403, H04L 65/4038, H04L 65/4046, H04L 65/4053 and H04L 65/4061.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

65/401	. .	wherein the services involve a main real-time session and one or more additional parallel real-time or time sensitive sessions, e.g. white board sharing or spawning of a subconference

> **WARNING**
>
> Groups H04L 65/401 and H04L 65/4015 are incomplete pending reclassification of documents from group H04L 65/40.
>
> Groups H04L 65/40, H04L 65/401 and H04L 65/4015 should be considered in order to perform a complete search.

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}
65/402	. .	wherein the services involve a main real-time session and one or more additional parallel non-real time sessions, e.g. downloading a file in a parallel FTP session, initiating an email or combinational services

> **WARNING**
>
> Group H04L 65/402 is incomplete pending reclassification of documents from group H04L 65/40.
>
> Groups H04L 65/40 and H04L 65/402 should be considered in order to perform a complete search.

65/4025	. . .	{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}
65/403	. .	Arrangements for multi-party communication, e.g. for conferences (data switching systems for conference H04L 12/18; arrangements for connecting several subscribers to a common circuit, i.e. affording conference facilities H04M 3/56; television conferencing systems H04N 7/15)

> **WARNING**
>
> Groups H04L 65/403, H04L 65/4038, H04L 65/4046 and H04L 65/4053 are incomplete pending reclassification of documents from group H04L 65/40.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

65/4038	. . .	with floor control
65/4046	. . .	{with distributed floor control}
65/4053	. . .	without floor control
65/4061	. .	Push-to services, e.g. push-to-talk or push-to-video

> **WARNING**
>
> Group H04L 65/4061 is incomplete pending reclassification of documents from group H04L 65/40.
>
> Groups H04L 65/40 and H04L 65/4061 should be considered in order to perform a complete search.

65/60	.	Network streaming of media packets

> **WARNING**
>
> Groups H04L 65/60, H04L 65/61, H04L 65/611, H04L 65/612, H04L 65/613, H04L 65/65 and H04L 65/70 are incomplete pending reclassification of documents from group H04L 9/40.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

65/61	. .	for supporting one-way streaming services, e.g. Internet radio
65/611	. . .	for multicast or broadcast (systems for broadcast or conference H04L 12/18; arrangements for broadcast or distribution combined with broadcast H04H 20/00; arrangements for broadcast applications with a direct linkage to broadcast information or to broadcast space-time H04H 60/00; selective distribution of broadcast services, e.g. multimedia broadcast multicast service [MBMS], H04W 4/06)
65/612	. . .	for unicast
65/613	. . .	for the control of the source by the destination (control signals issued by the client directed to the server or network components specially adapted for selective content distribution H04N 21/637)
65/65	. .	Network streaming protocols, e.g. real-time transport protocol [RTP] or real-time control protocol [RTCP]
65/70	. .	Media network packetisation
65/75	. .	Media network packet handling

> **WARNING**
>
> Group H04L 65/75 is incomplete pending reclassification of documents from group H04L 9/40.
>
> Group H04L 65/75 is also impacted by reclassification into groups H04L 65/752 and H04L 65/756.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

65/752 . . . adapting media to network capabilities

> **WARNING**
>
> Group H04L 65/752 is incomplete pending reclassification of documents from groups H04L 9/40 and H04L 65/75.
>
> Groups H04L 9/40, H04L 65/75 and H04L 65/752 should be considered in order to perform a complete search.

65/756 . . . adapting media to device capabilities

> **WARNING**
>
> Group H04L 65/756 is incomplete pending reclassification of documents from groups H04L 9/40 and H04L 65/75.
>
> Groups H04L 9/40, H04L 65/75 and H04L 65/756 should be considered in order to perform a complete search.

65/762 . . . {at the source (reformatting of additional data in video distribution servers H04N 21/2355)}

65/764 . . . {at the destination (reformatting of additional data in video clients H04N 21/4355)}

65/765 . . . {intermediate}

65/80 . Responding to QoS

67/00 **Network arrangements or protocols for supporting network services or applications** (user-to-user messaging H04L 51/00; network arrangements, protocols or services for supporting real-time applications in data packet communications networks H04L 65/00)

> **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

67/01 . Protocols

> **WARNING**
>
> Group H04L 67/01 is incomplete pending reclassification of documents from group H04L 9/40.
>
> Group H04L 67/01 is also impacted by reclassification into groups H04L 67/02, H04L 67/025, H04L 67/04, H04L 67/06, H04L 67/08, H04L 67/10, H04L 67/1001, H04L 67/1004, H04L 67/1006, H04L 67/1008, H04L 67/101, H04L 67/1012, H04L 67/1014, H04L 67/1017, H04L 67/1019, H04L 67/1021, H04L 67/1023, H04L 67/1025, H04L 67/1027, H04L 67/1029, H04L 67/1031, H04L 67/1034, H04L 67/1036, H04L 67/1038, H04L 67/104, H04L 67/1042, H04L 67/1044, H04L 67/1046, H04L 67/1048, H04L 67/1051, H04L 67/1053, H04L 67/1055, H04L 67/1057, H04L 67/1059, H04L 67/1061, H04L 67/1063, H04L 67/1065, H04L 67/1068, H04L 67/107, H04L 67/1072, H04L 67/1074, H04L 67/1076, H04L 67/1078, H04L 67/108, H04L 67/1082, H04L 67/1085, H04L 67/1087, H04L 67/1089, H04L 67/1091, H04L 67/1093, H04L 67/1095, H04L 67/1097, H04L 67/12, H04L 67/125, H04L 67/131, H04L 67/133, H04L 67/1396, H04L 67/2866, H04L 67/2869, H04L 67/2871, H04L 67/2876, H04L 67/288, H04L 67/2885, H04L 67/289, H04L 67/2895, H04L 67/30, H04L 67/303 and H04L 67/306.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

67/02 . . based on web technology, e.g. hypertext transfer protocol [HTTP]

> **WARNING**
>
> Groups H04L 67/02 and H04L 67/025 are incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01, H04L 67/02 and H04L 67/025 should be considered in order to perform a complete search.

67/025 . . . for remote control or remote monitoring of applications

67/04 . . specially adapted for terminals or networks with limited capabilities; specially adapted for terminal portability

> **WARNING**
>
> Group H04L 67/04 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/04 should be considered in order to perform a complete search.

67/06 · · specially adapted for file transfer, e.g. file transfer protocol [FTP]

> **WARNING**
>
> Group H04L 67/06 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/06 should be considered in order to perform a complete search.

67/08 · · specially adapted for terminal emulation, e.g. Telnet

> **WARNING**
>
> Group H04L 67/08 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/08 should be considered in order to perform a complete search.

67/10 · · in which an application is distributed across nodes in the network (software deployment G06F 8/60; multiprogramming arrangements G06F 9/46)

> **WARNING**
>
> Group H04L 67/10 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/10 should be considered in order to perform a complete search.

67/1001 · · · for accessing one among a plurality of replicated servers

> **WARNING**
>
> Group H04L 67/1001 is incomplete pending reclassification of documents from groups H04L 9/40 and H04L 67/01.
>
> Groups H04L 9/40, H04L 67/01 and H04L 67/1001 should be considered in order to perform a complete search.

67/10015 · · · · {Access to distributed or replicated servers, e.g. using brokers}

> **WARNING**
>
> Group H04L 67/10015 is incomplete pending reclassification of documents from group H04L 9/40.
>
> Groups H04L 9/40 and H04L 67/10015 should be considered in order to perform a complete search.

67/1004 · · · · Server selection for load balancing

> **WARNING**
>
> Group H04L 67/1004 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1004 should be considered in order to perform a complete search.

67/1006 · · · · · with static server selection, e.g. the same server being selected for a specific client

> **WARNING**
>
> Group H04L 67/1006 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1006 should be considered in order to perform a complete search.

67/1008 · · · · · based on parameters of servers, e.g. available memory or workload (monitoring of computer activity G06F 11/30)

> **WARNING**
>
> Group H04L 67/1008 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1008 should be considered in order to perform a complete search.

67/101 · · · · · based on network conditions

> **WARNING**
>
> Group H04L 67/101 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/101 should be considered in order to perform a complete search.

67/1012 · · · · · based on compliance of requirements or conditions with available server resources

> **WARNING**
>
> Group H04L 67/1012 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1012 should be considered in order to perform a complete search.

67/1014 · · · · · based on the content of a request

> **WARNING**
>
> Group H04L 67/1014 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1014 should be considered in order to perform a complete search.

67/1017 · · · · · based on a round robin mechanism

> **WARNING**
>
> Group H04L 67/1017 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1017 should be considered in order to perform a complete search.

67/1019   **. . . . .**   Random or heuristic server selection

> **WARNING**
>
> Group H04L 67/1019 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1019 should be considered in order to perform a complete search.

67/1021   **. . . . .**   based on client or server locations

> **WARNING**
>
> Group H04L 67/1021 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1021 should be considered in order to perform a complete search.

67/1023   **. . . . .**   based on a hash applied to IP addresses or costs

> **WARNING**
>
> Group H04L 67/1023 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1023 should be considered in order to perform a complete search.

67/1025   **. . . . .**   Dynamic adaptation of the criteria on which the server selection is based

> **WARNING**
>
> Group H04L 67/1025 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1025 should be considered in order to perform a complete search.

67/1027   **. . . .**   Persistence of sessions during load balancing

> **WARNING**
>
> Group H04L 67/1027 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1027 should be considered in order to perform a complete search.

67/1029   **. . . .**   using data related to the state of servers by a load balancer

> **WARNING**
>
> Group H04L 67/1029 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1029 should be considered in order to perform a complete search.

67/1031   **. . . .**   Controlling of the operation of servers by a load balancer, e.g. adding or removing servers that serve requests

> **WARNING**
>
> Group H04L 67/1031 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1031 should be considered in order to perform a complete search.

67/1034   **. . . .**   Reaction to server failures by a load balancer

> **WARNING**
>
> Group H04L 67/1034 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1034 should be considered in order to perform a complete search.

67/1036   **. . . .**   Load balancing of requests to servers for services different from user content provisioning, e.g. load balancing across domain name servers

> **WARNING**
>
> Group H04L 67/1036 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1036 should be considered in order to perform a complete search.

67/1038   **. . . .**   Load balancing arrangements to avoid a single path through a load balancer

> **WARNING**
>
> Group H04L 67/1038 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1038 should be considered in order to perform a complete search.

67/104	**.** **.** **.**	Peer-to-peer [P2P] networks

> **WARNING**
>
> Groups H04L 67/104, H04L 67/1042, H04L 67/1044, H04L 67/1046, H04L 67/1048, H04L 67/1051, H04L 67/1053, H04L 67/1055, H04L 67/1057, H04L 67/1059, H04L 67/1061, H04L 67/1063, H04L 67/1065, H04L 67/1068, H04L 67/107, H04L 67/1072, H04L 67/1074, H04L 67/1076, H04L 67/1078, H04L 67/108, H04L 67/1082, H04L 67/1085, H04L 67/1087, H04L 67/1089, H04L 67/1091 and H04L 67/1093 are incomplete pending reclassification of documents from group H04L 67/01.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

67/1042	**.** **.** **.** **.**	using topology management mechanisms
67/1044	**.** **.** **.** **.**	{Group management mechanisms (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}
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	**.** **.** **.** **.**	using node-based peer discovery mechanisms (static access to replicated servers H04L 67/1006; service discovery H04L 67/51)
67/1063	**.** **.** **.** **.** **.**	{Discovery through centralising 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 data block transmission mechanisms (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	**.** **.** **.** **.** **.** **.**	{characterised 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	**.** **.** **.**	using 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	**.** **.** **.**	Replication or mirroring of data, e.g. scheduling or transport for data synchronisation between network nodes

> **WARNING**
>
> Group H04L 67/1095 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1095 should be considered in order to perform a complete search.

67/1097	**.** **.** **.**	for distributed storage of data in networks, e.g. transport arrangements for network file system [NFS], storage area networks [SAN] or network attached storage [NAS]

> **WARNING**
>
> Group H04L 67/1097 is incomplete pending reclassification of documents from group H04L 67/01.
>
> Groups H04L 67/01 and H04L 67/1097 should be considered in order to perform a complete search.

67/12	**.** **.**	specially adapted for proprietary or special-purpose networking environments, e.g. medical networks, sensor networks, networks in vehicles or remote metering networks

> **WARNING**
>
> Groups H04L 67/12 and H04L 67/125 are incomplete pending reclassification of documents from group H04L 67/01.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

67/125	**.** **.** **.**	involving control of end-device applications over a network

67/131	. .	Protocols for games, networked simulations or virtual reality

> **WARNING**
>
> Group H04L 67/131 is incomplete pending reclassification of documents from groups H04L 9/40 and H04L 67/01.
>
> Groups H04L 9/40, H04L 67/01 and H04L 67/131 should be considered in order to perform a complete search.

67/133	. .	Protocols for remote procedure calls [RPC]

> **WARNING**
>
> Group H04L 67/133 is incomplete pending reclassification of documents from groups H04L 9/40 and H04L 67/01.
>
> Groups H04L 9/40, H04L 67/01 and H04L 67/133 should be considered in order to perform a complete search.

67/1396	. .	specially adapted for monitoring users' activity

> **WARNING**
>
> Group H04L 67/1396 is incomplete pending reclassification of documents from groups H04L 9/40 and H04L 67/01.
>
> Groups H04L 9/40, H04L 67/01 and H04L 67/1396 should be considered in order to perform a complete search.

67/14	.	Session management (for real-time applications in data packet communications networks H04L 65/1066)
67/141	. .	Setup of application sessions (admission control or resource allocation in data switching networks H04L 47/70)
67/142	. .	Managing session states for stateless protocols; Signalling session states; State transitions; Keeping-state mechanisms
67/143	. .	Termination or inactivation of sessions, e.g. event-controlled end of session
67/145	. . .	avoiding end of session, e.g. keep-alive, heartbeats, resumption message or wake-up for inactive or interrupted session
67/146	. .	Markers for unambiguous identification of a particular session, e.g. session cookie or URL-encoding
67/147	. .	Signalling methods or messages providing extensions to protocols defined by standardisation
67/148	. .	Migration or transfer of sessions
67/2866	.	Architectures; Arrangements

> **WARNING**
>
> Groups H04L 67/2866, H04L 67/2869, H04L 67/2871, H04L 67/2876, H04L 67/288, H04L 67/2885, H04L 67/289, H04L 67/2895, H04L 67/30, H04L 67/303 and H04L 67/306 are incomplete pending reclassification of documents from group H04L 67/01.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

67/2869	. .	Terminals specially adapted for communication
67/2871	. .	Implementation details of single intermediate entities
67/2876	. .	Pairs of inter-processing entities at each side of the network, e.g. split proxies
67/288	. .	Distributed intermediate devices, i.e. intermediate devices for interaction with other intermediate devices on the same level
67/2885	. .	Hierarchically arranged intermediate devices, e.g. for hierarchical caching
67/289	. .	Intermediate processing functionally located close to the data consumer application, e.g. in same machine, in same home or in same sub-network
67/2895	. .	Intermediate processing functionally located close to the data provider application, e.g. reverse proxies
67/30	. .	Profiles
67/303	. . .	Terminal profiles
67/306	. . .	User profiles
67/34	.	{involving the movement of software or configuration parameters (network booting or remote initial program loading [RIPL] G06F 9/4416)}
67/50	.	Network services

> **WARNING**
>
> Group H04L 67/50 is incomplete pending reclassification of documents from group H04L 9/40.
>
> Groups H04L 9/40 and H04L 67/50 should be considered in order to perform a complete search.

67/51	. .	Discovery or management thereof, e.g. service location protocol [SLP] or web services
67/52	. .	specially adapted for the location of the user terminal
67/53	. .	using third party service providers
67/535	. .	{Tracking the activity of the user (network monitoring arrangements H04L 43/00; recording of computer activity G06F 11/34)}
67/54	. .	Presence management, e.g. monitoring or registration for receipt of user log-on information, or the connection status of the users
67/55	. .	Push-based network services
67/56	. .	Provisioning of proxy services (store-and-forward switching systems in data switching networks H04L 12/54)
67/561	. . .	Adding application-functional data or data for application control, e.g. adding metadata
67/562	. . .	Brokering proxy services
67/563	. . .	Data redirection of data network streams
67/564	. . .	Enhancement of application control based on intercepted application data
67/565	. . .	Conversion or adaptation of application format or content (adding application control or application functional data H04L 67/561)
67/5651	. . . .	Reducing the amount or size of exchanged application data
67/566	. . .	Grouping or aggregating service requests, e.g. for unified processing
67/567	. . .	Integrating service provisioning from a plurality of service providers
67/568	. . .	Storing data temporarily at an intermediate stage, e.g. caching

67/5681	. . .	Pre-fetching or pre-delivering data based on network characteristics
67/5682	. . .	Policies or rules for updating, deleting or replacing the stored data
67/5683	. . .	Storage of data provided by user terminals, i.e. reverse caching
67/59	. . .	Providing operational support to end devices by off-loading in the network or by emulation, e.g. when they are unavailable
67/60	. .	Scheduling or organising the servicing of application requests, e.g. requests for application data transmissions using the analysis and optimisation of the required network resources (admission control or resource allocation H04L 47/70)
67/61	. . .	taking into account QoS or priority requirements
67/62	. . .	Establishing a time schedule for servicing the requests
67/63	. . .	Routing a service request depending on the request content or context
67/75	. .	Indicating network or usage conditions on the user display

69/00   **Network arrangements, protocols or services independent of the application payload and not provided for in the other groups of this subclass** (networks security protocols H04L 9/40; wireless communication networks H04W)

69/02	.	{Protocol performance}
69/03	.	{Protocol definition or specification (protocol conformance testing H04L 1/244)}
69/04	.	Protocols for data compression, e.g. ROHC
69/06	.	Notations for structuring of protocol data, e.g. abstract syntax notation one [ASN.1]
69/08	.	Protocols for interworking; Protocol conversion

> **WARNING**
>
> Group H04L 69/08 is impacted by reclassification into group H04L 69/085.
>
> Groups H04L 69/08 and H04L 69/085 should be considered in order to perform a complete search.

69/085	. .	specially adapted for interworking of IP-based networks with other networks

> **WARNING**
>
> Group H04L 69/085 is incomplete pending reclassification of documents from group H04L 69/08.
>
> Groups H04L 69/08 and H04L 69/085 should be considered in order to perform a complete search.

69/10	.	Streamlined, light-weight or high-speed protocols, e.g. express transfer protocol [XTP] or byte stream
69/12	.	Protocol engines
69/14	.	Multichannel or multilink protocols
69/16	.	Implementation or adaptation of Internet protocol [IP], of transmission control protocol [TCP] or of user datagram protocol [UDP]
69/161	. .	{Implementation details of TCP/IP or UDP/IP stack architecture; Specification of modified or new header fields}
69/162	. . .	{involving adaptations of sockets based mechanisms (secure socket layer H04L 63/168)}
69/163	. .	In-band adaptation of TCP data exchange; In-band control procedures
69/164	. .	Adaptation or special uses of UDP protocol
69/165	. .	Combined use of TCP and UDP protocols; selection criteria therefor
69/166	. .	IP fragmentation; TCP segmentation
69/167	. .	Adaptation for transition between two IP versions, e.g. between IPv4 and IPv6 (translation of Internet protocol [IP] addresses H04L 61/2503)
69/168	. .	specially adapted for link layer protocols, e.g. asynchronous transfer mode [ATM], synchronous optical network [SONET] or point-to-point protocol [PPP]
69/169	. .	{Special adaptations of TCP, UDP or IP for interworking of IP based networks with other networks (protocols for interworking, protocol conversion H04L 69/08)}
69/18	.	Multiprotocol handlers, e.g. single devices capable of handling multiple protocols
69/22	.	Parsing or analysis of headers
69/24	.	Negotiation of communication capabilities
69/26	.	{Special purpose or proprietary protocols or architectures (network applications for proprietary or special purpose networking environments H04L 67/12)}
69/28	.	Timers or timing mechanisms used in protocols
69/30	.	Definitions, standards or architectural aspects of layered protocol stacks
69/32	. .	Architecture of open systems interconnection [OSI] 7-layer type protocol stacks, e.g. the interfaces between the data link level and the physical level

> **WARNING**
>
> Group H04L 69/32 is impacted by reclassification into groups H04L 69/321, H04L 69/322, H04L 69/323, H04L 69/324, H04L 69/325, H04L 69/326, H04L 69/327, H04L 69/328, and H04L 69/329.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

69/321	. . .	Interlayer communication protocols or service data unit [SDU] definitions; Interfaces between layers

> **WARNING**
>
> Group H04L 69/321 is incomplete pending reclassification of documents from group H04L 69/32.
>
> Groups H04L 69/32 and H04L 69/321 should be considered in order to perform a complete search.

69/322	. . .	Intralayer communication protocols among peer entities or protocol data unit [PDU] definitions

> **WARNING**
>
> Groups <u>H04L 69/322</u> <u>H04L 69/323</u>, <u>H04L 69/324</u>, <u>H04L 69/325</u>, <u>H04L 69/326</u>, <u>H04L 69/327</u>, <u>H04L 69/328</u> and <u>H04L 69/329</u> are incomplete pending reclassification of documents from group <u>H04L 69/32</u>.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

69/323	. . . .	in the physical layer [OSI layer 1]
69/324	. . . .	in the data link layer [OSI layer 2], e.g. HDLC
69/325	. . . .	in the network layer [OSI layer 3], e.g. X.25 (H04L 69/16 takes precedence)
69/326	. . . .	in the transport layer [OSI layer 4] (H04L 69/16 takes precedence)
69/327	. . . .	in the session layer [OSI layer 5]
69/328	. . . .	in the presentation layer [OSI layer 6]
69/329	. . . .	in the application layer [OSI layer 7]
69/40	.	for recovering from a failure of a protocol instance or entity, e.g. service redundancy protocols, protocol state redundancy or protocol service redirection (management of faults, events, alarms or notifications in data switching networks H04L 41/06)

2101/00		**Indexing scheme associated with group H04L 61/00**
2101/30	.	Types of network names
2101/32	. .	containing non-Latin characters, e.g. Chinese domain names
2101/33	. .	containing protocol addresses or telephone numbers
2101/345	. .	containing wildcard characters
2101/35	. .	containing special prefixes
2101/355	. .	containing special suffixes
2101/365	. .	Application layer names, e.g. buddy names, unstructured names chosen by a user or home appliance name
2101/37	. .	E-mail addresses
2101/375	. .	Access point names [APN]
2101/38	. .	Telephone uniform resource identifier [URI]
2101/385	. .	Uniform resource identifier for session initiation protocol [SIP URI]
2101/39	. .	Globally routable user-agent uniform resource identifier [GRUU] for the session initiation protocol [SIP]
2101/395	. .	Internet protocol multimedia private identity [IMPI]; Internet protocol multimedia public identity [IMPU]
2101/60	.	Types of network addresses
2101/604	. .	Address structures or formats
2101/618	. .	Details of network addresses
2101/622	. . .	Layer-2 addresses, e.g. medium access control [MAC] addresses
2101/627	. . .	Controller area network [CAN] identifiers
2101/631	. . .	Small computer system interface [SCSI] addresses
2101/636	. . .	IEEE1394 identification numbers

2101/64	. . .	Asynchronous transfer mode [ATM] addresses
2101/645	. . .	Fibre channel identifiers
2101/65	. . .	Telephone numbers
2101/654	. . .	International mobile subscriber identity [IMSI] numbers
2101/659	. . .	Internet protocol version 6 [IPv6] addresses
2101/663	. . .	Transport layer addresses, e.g. aspects of transmission control protocol [TCP] or user datagram protocol [UDP] ports
2101/668	. .	Internet protocol [IP] address subnets
2101/672	. .	Short addresses
2101/677	. .	Multiple interfaces, e.g. multihomed nodes
2101/681	. .	using addresses for wireless personal area networks or wireless sensor networks, e.g. Zigbee addresses
2101/686	. .	using dual-stack hosts, e.g. in Internet protocol version 4 [IPv4]/Internet protocol version 6 [IPv6] networks
2101/69	. .	using geographic information, e.g. room number
2101/695	. .	using masks or ranges of addresses

2201/00		**Algorithms used for the adjustment of time-domain equalizers**
2201/02	.	minimizing an error signal, e.g. least squares, minimum square error
2201/04	.	zero-forcing
2201/06	.	using the output of a maximum likelihood decoder (Viterbi detector)
2201/08	.	Algorithms not covered by groups H04L 2201/02 - H04L 2201/06

2203/00		**Characteristics of phase shift key signals**
2203/02	.	differential
2203/04	.	continuous phase

2209/00		**Additional information or applications relating to cryptographic mechanisms or cryptographic arrangements for secret or secure communication H04L 9/00**
2209/04	.	Masking or blinding
2209/043	. .	of tables, e.g. lookup, substitution or mapping
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
2209/26	.	Testing cryptographic entity, e.g. testing integrity of encryption key or encryption algorithm
2209/30	.	Compression, e.g. Merkle-Damgard construction
2209/34	.	Encoding or coding, e.g. Huffman coding or error correction
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 managament [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)
2209/80	.	Wireless (network architectures or network communication protocols for wireless network security H04W 12/00)
2209/805	. .	Lightweight hardware, e.g. radio-frequency identification [RFID] or sensor
2209/84	.	Vehicles
2209/88	.	Medical equipments
2212/00		**Encapsulation of packets**
2463/00		**Additional details relating to network architectures or network communication protocols for network security covered by H04L 63/00**
2463/041	.	using an encryption or decryption engine integrated in transmitted data
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)
2463/062	.	applying encryption of the keys (cryptographic mechanisms or cryptographic arrangements for key distribution using key encryption key H04L 9/0822)
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)
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)
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