LANCOM SYSTEMS

lancom-systems.com

LCOS 10.90

LANCOM WLC-1000

WLAN-management - centrally, intelligently, in your hands

As the central WLAN controller, the LANCOM WLC-1000 provides full control over mid-sized installations with 25 to 1,000 access points and WLAN routers, while keeping administrator workloads to a minimum. Zero-touch deployment automatically installs new access points and provisions them with custom configurations. Smart features, such as roaming optimization and the selection of bandwidth and Wi-Fi channels, ensure the best possible performance across even complex wireless networks. The LANCOM WLC-1000 saves time for the administrator and offers an outstanding Wi-Fi user experience.

- → Central management of 25 to 1,000 access points and WLAN routers
- → Zero-touch deployment of access points
- → Optimized roaming behavior of Wi-Fi clients thanks to IEEE 802.11r and OKC
- → Comprehensive VLAN, RADIUS and IEEE 802.1X/EAP functions
- → Highest operational reliability without single points of failure
- → Dynamic WLAN optimization thanks to LANCOM Active Radio Control (ARC)
- → High availability of WLAN infrastructures through the High Availability Clustering option
- → Integrated LANCOM Public Spot Option

LANCOM SYSTEMS

lancom-systems.com

LCOS 10.90

LANCOM WLC-1000

Central firmware rollout, monitoring & management

Positioned locally, the LANCOM WLC-1000 centrally configures and controls up to 1,000 access points and WLAN routers, so relieving the workload on network administrators and bringing massive time savings. WLAN controllers ensure uniform network control, security and reliability.

Zero-touch deployment

Quick and easy network integration of new access points as well as automatic provision of the configuration—without manual intervention. Once authenticated with the network, the Wi-Fi device immediately receives the appropriate configuration from the LANCOM WLC-1000.

Optimized roaming behavior of WLAN clients

LANCOM WLAN controllers enable communications between managed access points and WLAN routers. This ensures that clients moving between two radio fields are efficiently transferred from one Wi-Fi device to the next—without disconnections.

VLAN-, RADIUS-, and IEEE 802.1X/EAP functions

A comprehensive array of virtualization and security features allows the highly efficient design of Wi-Fi networks in close accordance with the company's own security policies. The integrated VLAN feature supports multiple securely isolated Wi-Fi networks on a shared infrastructure. Professional security features give administrators precise control over who is authorized for network access.

Highest operational security

The LANCOM Smart Controller principle ensures the highest operational reliability: While the administrative data are routed through the controller, client payload data are sent directly from the access point to the router. If a controller fails, the access point switches to “stand-alone mode” and the communication between the client and access point remains intact. This avoids downtimes during everyday business due to employees losing access to the network or the failure of WLAN-controlled production facilities.

Active Radio Control for dynamic radio-field optimization

The LANCOM WLC-1000 supports the WLAN optimization feature LANCOM Active Radio Control. This intelligent combination of innovative features included with the LCOS operating system—such as Client Management (for client and band steering), adaptive noise immunity and RF optimization—improves Wi-Fi performance and supports administrators with professional tools for Wi-Fi management.

High availability

Combined with the LANCOM High Availability Clustering option, multiple WLAN controllers are grouped into one highly available device group. In this way, configuration changes, features and enhancements made on one WLC are automatically transferred between the other WLCs in the cluster: Not having to make manual changes on each individual device means massive time savings for administrators.

LCOS 10.90

LANCOM WLC-1000

Maximum future viability

From the very start, LANCOM products are designed for a product life of several years. They are equipped with hardware dimensioned for the future. Even reaching back to older product generations, updates to the LANCOM Operating System—LCOS—are available several times a year, free of charge and offering major features.

LCOS 10.90

LANCOM WLC-1000

WLAN profile settings*	
Radio channels 6 GHz	Up to 24 non-overlapping channels (EU; 20 MHz channel width)
Radio channels 5 GHz	Up to 26 non-overlapping channels (available channels and further obligations such as automatic DFS dynamic channel selection depending on national regulations)
Radio channels 2.4 GHz	Up to 13 channels, max. 3 non-overlapping (depending on country-specific restrictions)
Concurrent WLAN clients	Depends on the access points in operation
IEEE 802.11u	Managed LANCOM Access Points support the WLAN standard IEEE 802.11u (Hotspot 2.0) which allows mobile clients a seamless transition from the cellular network into WLAN hotspots. Authentication methods using SIM card information, certificates or username and password, enable an automatic, encrypted login to WLAN hotspots of roaming partners - without the need to manually enter login credentials
Roaming	Seamless handover between radio cells, IAPP support with optional restriction to an ARF context, IEEE 802.11d support
Opportunistic Key Caching	Opportunistic key caching allows fast roaming processes between access points. WLAN installations utilizing a WLAN controller and IEEE 802.1X authentication cache the access keys of the clients and are transmitted by the WLAN controller to all mananged access points
Fast roaming	Based on IEEE 802.11r, allows fast roaming procedures between access points. This is possible by using IEEE 802.1X authentication or pre-shared keys in controller based WLAN installations, which save the access keys temporarily and distribute them to the managed access points.
Security	WPA3-Personal, IEEE 802.11i / WPA2 with passphrase (WPA2-Personal) or IEEE 802.1X (WPA3-Enterprise, WPA2-Enterprise) and hardware-accelerated AES, closed network, WEP64, WEP128, WEP152, user authentication, IEEE 802.1x /EAP, WPA1/TKIP, LEPS-MAC, LEPS-U
Time Control	time-based activation and deactivation of WLAN networks
Quality of Service	Prioritization according to Wireless Multimedia Extensions (WME, subset of IEEE 802.11e)
Background scanning	Detection of rogue AP's and the channel information for all WLAN channels during normal AP operation. The Background Scan Time Interval defines the time slots in which an AP or Router searches for a foreign WLAN network in its vicinity. The time interval can be specified in either milliseconds, seconds, minutes, hours or days
Client detection	Rogue WLAN client detection based on probe requests
Auto WDS*	Auto WDS allows wireless integration of access points in existing WLAN infrastructure, including managment via WLAN controller.
Space Time Block Coding (STBC)*	Coding method according to IEEE 802.11n. The Space Time Block Coding improves reception by coding the data stream in blocks.
Low Density Parity Check (LDPC)*	Low Density Parity Check (LDPC) is an error correcting method. IEEE 802.11n uses convolution coding (CC) as standard error correcting method, the usage of the more effective Low Density Parity Check (LDPC) is optional.
*) Note	Depends on the access points in operation

LCOS 10.90

LANCOM WLC-1000

Security	
Encryption options	WPA3-Personal, IEEE 802.1X (WPA3-Enterprise, WPA2-Enterprise), IEEE 802.11i (WPA2-Personal), Wi-Fi Certified™ WPA2™, WPA, WEP, IEEE 802.11w (Protected Management Frames), LEPS-MAC (LANCOM Enhanced Passphrase Security MAC), LEPS-U (LANCOM Enhanced Passphrase Security User)
Encryption	AES-CCMP AES-GCMP, TKIP, RC4 (only used by WEP)
EAP types (authenticator)	EAP-TLS, EAP-TTLS/MSCHAPv2, PEAPv0/EAP-MSCHAPv2, PEAPv1/EAP-GTC, EAP-FAST
RADIUS/EAP-server	User administration MAC-based, rate limiting, passphrases, VLAN user based, authentication of IEEE 802.1X clients via EAP-TLS, EAP-TTLS, EAP-MD5, EAP-GTC, PEAP, MSCHAP, MSCHAPv2, Dynamic Peer Discovery
Others	WLAN protocol filters, IP-redirection of any packet received over the WLAN interface, IEEE 802.1X supplicant, background scanning, client detection ("rogue WLAN client detection"), Wireless Intrusion Detection System (WIDS)
Others	IEEE 802.1X supplicant, background scanning, client detection ("rogue WLAN client detection"), Wireless Intrusion Detection System (WIDS)

LANCOM Active Radio Control	
Client Management	Steering of WLAN clients to the ideal access point using 802.11k and 802.11v
Band Steering	Steering of 5GHz clients to the corresponding high-performance frequency band
Managed RF Optimization*	Selection of optimal WLAN channels by the administrator
Adaptive Noise Immunity	Better WLAN throughput due to immunity against interferences
Spectral Scan	Monitoring your WLAN for sources of interference
Adaptive RF Optimization	Dynamic selection of the optimal WLAN channel
Airtime Fairness	Improved utilization of the WLAN bandwidth
*) Note	Depends on the access points in operation. Steering of WLAN clients is not available in US version

WLAN-Controller	
Number of managed devices	Up to 25 LANCOM Access Points and WLAN routers can be centrally managed by the WLAN controller. Expansion options are available to extend support up to 1000 LANCOM Access Points and WLAN routers to be managed. Capacities can be expanded even further by clustering multiple controllers
Smart Controller technology	The WLAN controller can switch user data per AP Radio or per SSID in the following ways: – Direct switching to the LAN at the AP (for maximum performance, e.g. for IEEE 802.11n-based access points) – Logical seperation of user data into VLANs (e.g. for WLAN guest access accounts) – Central tunneling to the Controller* (layer 3 tunneling between different IP Subnets)
Auto Discovery	LANCOM access points and WLAN routers automatically discover the WLAN controller by means of DNS name or IP addresses. Even AP's at remote sites or in home offices with no direct access to the Controller can be integrated into the central Controller

LCOS 10.90

LANCOM WLC-1000

WLAN-Controller	
Authentication and Authorization	Access Points can be authenticated manually or automatically. Signaling of new access points by LED, e-mail message, SYSLOG and SNMP traps. Manual authentication via LANmonitor or WEBconfig GUI tools. Semi-automatic authentication based on access-point lists in the Controller ('bulk mode'). Fully automatic authentication with default configuration assignement (can be activated/deactivated separately, e.g. during the rollout phase). Authenticated access points can be identified by means of digital certificates; certificate generation by integrated CA (Certificate Authority); certificate distribution by SCEP (Simple Certificate Enrollment Protocol). Access points can be blocked by CRL (Certificate Revocation List).
Management communication protocol	CAPWAP (Control and Provisioning Protocol for Wireless Access Points)
Layer-3 Tunneling	Layer-3 Tunneling in conformity with the CAPWAP standard allows the bridging of WLANs per SSID to a separate IP subnet. Layer-2 packets are encapsulated in Layer-3 tunnels and transported to a LANCOM WLAN controller. By doing this the access point is independent of the present infrastructure of the network. Possible applications are roaming without changing the IP address and compounding SSIDs without using VLANs
Encryption	DTLS encryption of the control channel between WLAN controller and Access Point (256-bit AES encryption with digital certificates, incl. hardware encryption accelerator; encryption can be disabled for diagnostic purposes).
Firmware deployment	Central Firmware deployment and management of the Access Points. Requires an external web server. Automatic Firmware update on the Access Points is also possible. The Controller checks every day, depending on the defined policy, for the latest Firmware and compares it with the versions in the devices. This can also be activated using Cron jobs. If there is a Firmware mismatch, then the Controller downloads the matching Firmware from the server and updates the corresponding Access Points and Routers.
Script distribution	Enables the complete configuration of non-WLAN specific functions such as Redirects, Protocol Filter, ARF etc. Internal storage of up to three script files (max. 64 kByte) for provisioning access points without a separate HTTP server
RF management and automatic RF optimization	The channel deployment can be static or can be automated. Upon activation of the RF Optimization setting, the Access Points search for an optimal channel in the 2.4 GHz band. The selected channels are sent to the Controller saves these channels on the corresponding Access Points. RF Optmization can also be activated for individual Access Points. Transmit power setting static between 0 to -20 dB. Alarm notification in case of Access Point failure by LED, e-mail, SYSLOG and SNMP traps.
Configuration management	Definition and grouping of all logical and physical WLAN parameters by means of WLAN configuration profiles. Fully automatic or manual profile assignment to WLAN Access Points; automatic transfer and configuration verification (policy enforcement).
Inheritance of configuration profiles	Support of hierarchical WLAN profile groups. New profiles can be easily created by inheriting parameters from existing profiles.
Management operating modes	The AP can be set to 'managed' or 'unmanaged' mode for each radio interface. With LANCOM WLAN routers, the Controller manages the WLAN part only (split management).
Stand alone operation	In 'Managed' mode, an adjustable setting defines the time-span for which the AP continues Stand-alone operation in the event the connection to the Controller fails. After this time-span the AP configuration is deleted and the AP resumes operation only after the connection to the Controller is reestablished. By default this value is set to zero and AP ceases operation as soon as connection to the Controller is lost. Alternatively, a special time setting allows the AP to function in Stand-alone mode indefinetly. In Stand-alone mode only Pre-shared Key SSID's are functional.

LCOS 10.90

LANCOM WLC-1000

WLAN-Controller	
VLAN and IP contexts	A fixed VLAN can be set for each SSID. The WLAN controller can independently provide up to 64 separate IP networks, and each of these can be individually mapped to VLANs and, consequently, to SSIDs (Advanced Routing and Forwarding, ARF). The Controller can provide, among others, individual DHCP, DNS, routing, firewall and VPN functions for these networks.
Dynamic VLAN assignment	Dynamic VLAN assignment for target user groups based on MAC addresses, BSSID or SSID by means of external RADIUS server.
RADIUS server	Integrated RADIUS server for MAC address list management. Support for RADSEC (Secure RADIUS) for secure communication with RADIUS servers.
EAP server	Integrated EAP server for authentication of IEEE 802.1X clients via EAP-TLS, EAP-TTLS, EAP-MD5, EAP-GTC, PEAP, MSCHAP or MSCHAPv2
RADIUS/EAP proxy per SSID	Proxy mode for external RADIUS/EAP servers (forwarding and realm handling) per SSID
Redundancy, Controller backup and load balancing	Every managed LANCOM AP can be assigned to a group of alternative WLAN controllers. A suitable Controller is selected within this group depending on AP load. This ensures that also in backup state the load of larger installations remains equally distributed.
LED control	The LEDs of administrated WLAN devices can be centrally deactivated via the WLAN controller
CA hierarchy	The Certificate Authority (CA) can be structured hierarchically when using multiple WLAN controllers. This allows access points to swap between different WLAN controllers without certificate conflicts. The Certificate Revocation Lists (CRL) can be shared between the different devices
Load balancing	When using multiple WLAN controllers the access points are distributed evenly among the different WLAN controllers to offer the best load balancing. In case one WLAN controller is unavailable the access points are edistributed among the remaining WLAN controllers automatically. Once it is restored they are redistributed again.
Backup	A priority can be set for the WLAN Controller which allows operating in hot standby mode. Access points switch automatically to the WLAN controller with the highest priority
Fast roaming	VoWLAN devices require seamless roaming for ensuring optimal speech quality. The Access Points support PMK caching and Pre-authentication for such demanding applications. WPA2 and WPA2-PSK operate with sub-85 ms roaming times (requirements: adequate signal quality, sufficient RF overlap, clients with a low roaming threshold).
QoS	IEEE 802.11e / WME: Automatic VLAN tagging (IEEE 802.1p) in the Access Points. Mapping to DiffServ attributes in the WLAN controller if this is deployed as a layer-3 router
Background scanning, rogue-AP and rogue-client detection	Background scanning does not interupt normal AP operation and collects information on the radio channel load (AP acts as a 'Probe' or 'Sensor' by going off-channel). Foreign Access Points and clients is sent to the Rogue AP Detection in LANCOM WLANmonitor.
WLAN visualization	The management tool LANCOM WLANmonitor acts as a central monitoring program for the WLAN controller and visualizes the performance of all WLAN controllers, Access Points, SSIDs and clients.
WLAN guess access accounts	Static mapping of guest SSIDs in VLANs, access limitations and VLAN routing by means of ARF (Advanced Routing and Forwarding).

LCOS 10.90

LANCOM WLC-1000

WLAN-Controller	
Public Spot function	Integrated Public Spot XL-functionality. Easy set-up of guest accounts with just a few mouse clicks using the Voucher-Wizard. The vouchers can be printed over any standard Printer on the network. The Voucher-Wizard can be customized by uploading an individual logo. Function works without external RADIUS and Accounting Servers. Configuration of time and/or traffic budgets as well as when accounting should start. Support of public certificates and certificate chains from trust centers for Public Spots. This allows popular browsers to access trustworthy login pages with secure access (HTTPS) without warnings
WLAN client limiting	To ensure that load is evenly balanced between multiple Access Points, each one can be set with a maximum number of allowable WLAN clients.
Automatic configuration alignment (Config Sync)*	Due to the grouping of several individual devices to one device group (cluster), configuration changes conducted for one device can be automatically synchronized with all cluster devices, without having to manage each device manually (Config Sync).
Management software	LANconfig, LANmonitor, WLANmonitor
*)	Only with WLC Clustering XL Option

Supported Access Points and WLAN routers	
Indoor	→ LANCOM L-151gn Wireless, LANCOM L-151E Wireless, LANCOM L-54g Wireless, LANCOM L-54ag Wireless, LANCOM L-54 dual Wireless → LANCOM L-305agn Wireless, LANCOM L-310agn Wireless, LANCOM L-315agn dual Wireless → LANCOM L-320agn Wireless, LANCOM L-320agn Wireless (white), LANCOM L-321agn Wireless, LANCOM L-322agn dual Wireless, LANCOM L-322E Wireless, LANCOM L-330agn dual Wireless → LANCOM L-451agn Wireless, LANCOM L-452agn dual Wireless, LANCOM L-460agn dual Wireless → LANCOM LN-630acn dual Wireless, LANCOM LN-830acn dual Wireless, LANCOM LN-830E Wireless, LANCOM L-822acn dual Wireless, LANCOM LN-830U, LANCOM L-1302acn dual Wireless, LANCOM L-1310acn dual Wireless, LANCOM LN-860, LANCOM LN-862 → LANCOM LN-1700, LANCOM LN-1702 → LANCOM LN-1700B, LANCOM LN-1702B, LANCOM LN-1700UE → LANCOM LW-500, LANCOM LW-600 → LANCOM LX-6200, LANCOM LX-6200E → LANCOM LX-6400, LANCOM LX-6402, LANCOM LX-6500, LANCOM LX-6500E → LANCOM LX-7000 series
Outdoor	→ LANCOM OAP-54 Wireless, LANCOM OAP-54-1 Wireless → LANCOM OAP-310 Wireless → LANCOM OAP-321, LANCOM OAP-321-3G → LANCOM OAP-382, LANCOM OAP-322 → LANCOM OAP-821, LANCOM OAP-822, LANCOM OAP-830 → LANCOM OAP-1700B, LANCOM OAP-1702B → LANCOM OW-602 → LANCOM OX-6400, LANCOM OX-6402

LCOS 10.90

LANCOM WLC-1000

Supported Access Points and WLAN routers	
Industrial	→ LANCOM IAP-54 Wireless → LANCOM XAP-40-2 Wireless → LANCOM IAP-321, LANCOM IAP-321-3G, LANCOM IAP-322 → LANCOM IAP-821, LANCOM IAP-822 → LANCOM IAP-1781VAW+
UMTS/HSPDA	→ LANCOM 1780EW-4G, LANCOM 1780EW-3G, LANCOM 1780EW-4G+
WLAN-Router and IADs	→ LANCOM 1781VAW, LANCOM 1781AW, LANCOM 1781EW(+) → LANCOM 1783VAW, LANCOM 883 VoIP → LANCOM 1793VAW, LANCOM 1790VAW → LANCOM 1800VAW, LANCOM 1800VAW-4G, LANCOM 1800EFW

Functions in layer-3 routing mode	
Note:	Some of the below functions are only active when the device is operating as a router, firewall or VPN gateway.

Layer 2 features	
VLAN	4.096 IDs based on IEEE 802.1q, dynamic assignment
Quality of Service	WME based on IEEE 802.11e, Wi-Fi Certified™ WMM®
Rate limiting	SSID based, WLAN client based
Multicast	IGMP-Snooping, MLD-Snooping
Protocols	Ethernet over GRE-Tunnel (EoGRE), L2TPv3, ARP-Lookup, LLDP, DHCP option 82, IPv6-Router-Advertisement-Snooping, DHCPv6-Snooping, LDRA (Lightweight DHCPv6 Relay Agent), Spanning Tree, Rapid Spanning Tree, ARP, Proxy ARP, BOOTP, DHCP, LACP
OAM	Ethernet link OAM 802.3ah, IEEE 802.1ag CFM

Layer 3 features	
Firewall	Stateful inspection firewall including paket filtering, extended port forwarding, N:N IP address mapping, paket tagging, support for DNS targets, user-defined rules and notifications
Quality of Service	Traffic shaping, bandwidth reservation, DiffServ/TOS, packetsize control, layer-2-in-layer-3 tagging, support for 8 QoS queues (6 free configurable)
Security	Intrusion Prevention, IP spoofing, access control lists, Denial of Service protection, detailed settings for handling reassembly, session-recovery, PING, stealth mode and AUTH port, URL blocker, password protection, programmable reset button
PPP authentication mechanisms	PAP, CHAP, MS-CHAP, and MS-CHAPv2
High availability / redundancy	VRRP (Virtual Router Redundancy Protocol)

LCOS 10.90

LANCOM WLC-1000

Layer 3 features	
Router	IPv4-, IPv6-, IPv4/IPv6 dual stack
SD-WAN Application Routing	SD-WAN Application Routing in connection with the LANCOM Management Cloud
SD-WAN dynamic path selection	SD-WAN dynamic path selection in connection with the LANCOM Management Cloud
Router virtualization	ARF (Advanced Routing and Forwarding) up to separate processing of 128 contexts
IPv4 services	HTTP and HTTPS server for configuration by web interface, DNS client, DNS server, DNS relay, DNS proxy, dynamic DNS client, DHCP client, DHCP relay and DHCP server including autodetection, NTP client, SNTP server, policy-based routing, Bonjour-Proxy, RADIUS
IPv6 services	HTTP and HTTPS server for configuration by web interface, DHCPv6 client, DHCPv6 server, DHCPv6 relay, DNS client, DNS server, dynamic DNS client, NTP client, SNTP server, Bonjour-Proxy, RADIUS
Dynamic routing protocols	RIPv2, BGPv4, OSPFv2, LISP (Locator/ID Separation Protocol)
IPv4 protocols	DNS, HTTP, HTTPS, ICMP, NTP/SNTP, PPPoE (server), RADIUS, RADSEC (secure RADIUS), RTP, SNMPv1,v2c,v3, TFTP, TACACS+, IGMPv3
IPv6 protocols	NDP, stateless address autoconfiguration (SLAAC), stateful address autoconfiguration (DHCPv6), router advertisements, ICMPv6, DHCPv6, DNS, HTTP, HTTPS, PPPoE, RADIUS, SMTP, NTP, BGP, LISP, Syslog, SNMPv1,v2c,v3, MLDv2, PIM, NPTv6 (NAT66), VRRPv3
Multicast Routing	PIM (Protocol Independent Multicast), IGMP proxy, MLD proxy
WAN operating mode	VDSL, ADSL1, ADSL2 or ADSL2+ additional with external DSL modem at an ETH port
WAN protocols	PPPoE, Multi-PPPoE, ML-PPP, GRE, EoGRE, PPTP (PAC or PNS), L2TPv2 (LAC or LNS), L2TPv3 with Ethernet-Pseudowire, IPoE (using DHCP or no DHCP), RIP-1, RIP-2, VLAN, IPv6 over PPP (IPv6 and IPv4/IPv6 dual stack session), IP(v6)oE (autokonfiguration, DHCPv6 or static)
Tunneling protocols (IPv4/IPv6)	6to4, 6in4, 6rd, Dual Stack Lite, 464XLAT

VPN	
IPSec over HTTPS	Enables IPsec VPN based on TCP (at port 443 like HTTPS) which can go through firewalls in networks where e. g. port 500 for IKE is blocked. Suitable for client-to-site connections and site-to-site connections. IPSec over HTTPS is based on the NCP VPN Path Finder technology
Number of VPN tunnels	Max. number of concurrent active IPSec, PPTP (MPPE) and L2TPv2 tunnels: 5. Unlimited configurable connections.
Hardware accelerator	Integrated hardware accelerator for 3DES/AES encryption and decryption
Realtime clock	Integrated, buffered realtime clock to save the date and time during power failure. Assures timely validation of certificates in any case
Random number generator	Generates real random numbers in hardware, e. g. for improved key generation for certificates immediately after switching-on

LCOS 10.90

LANCOM WLC-1000

VPN	
1-Click-VPN Site-to-Site	Creation of VPN connections between LANCOM routers via drag and drop in LANconfig
IKE, IKEv2	IPSec key exchange with Preshared Key or certificate (RSA signature, ECDSA-Signature, digital signature)
Smart Certificate	Convenient generation of digital X.509 certificates via an own certifaction authority (SCEP-CA) on the webpage or via SCEP.
Certificates	X.509 digital multi-level certificate support, compatible with Microsoft Server / Enterprise Server and OpenSSL. Secure Key Storage protects a private key (PKCS#12) from theft.
Certificate rollout	Automatic creation, rollout and renewal of certificates via SCEP (Simple Certificate Enrollment Protocol) per certificate hierarchy
Certificate revocation lists (CRL)	CRL retrieval via HTTP per certificate hierarchy
OCSP Client	Check X.509 certifications by using OCSP (Online Certificate Status Protocol) in real time as an alternative to CRLs
OCSP Server / Responder	Offers validity information for certificates created with Smart Certificate via OCSP
XAUTH	XAUTH client for registering LANCOM routers and access points at XAUTH servers incl. IKE-config mode. XAUTH server enables clients to register via XAUTH at LANCOM routers. Connection of the XAUTH server to RADIUS servers provides the central authentication of VPN-access with user name and password. Authentication of VPN-client access via XAUTH and RADIUS connection additionally by OTP token
Proadaptive VPN	Automated configuration and dynamic creation of all necessary VPN and routing entries based on a default entry for site-to-site connections.
Algorithms	3DES (168 bit), AES-CBC and -GCM (128, 192 or 256 bit), RSA (1024-4096 bit), ECDSA (P-256-, P-384-, P-521-curves) and Chacha20-Poly 1305. OpenSSL implementation with FIPS-140 certified algorithms. MD-5, SHA-1, SHA-256, SHA-384 or SHA-512 hashes
NAT-Traversal	NAT-Traversal (NAT-T) support for VPN over routes without VPN passthrough
MOBIKE	IKEv2 VPN clients can seamlessly switch between different networks (e.g. from WLAN to mobile radio) without having to re-establish the VPN tunnel
Dynamic DNS	Enables the registration of IP addresses with a Dynamic DNS provider in the case that fixed IP addresses are not used for the VPN connection
Specific DNS forwarding	DNS forwarding according to DNS domain, e.g. internal names are translated by proprietary DNS servers in the VPN. External names are translated by Internet DNS servers
Split DNS	Allows the selective forwarding of traffic for IKEv2 depending on the addressed DNS domain.
IPv4 VPN	Connecting private IPv4 networks
IPv4 VPN over IPv6 WAN	Use of IPv4 VPN over IPv6 WAN connections
IPv6 VPN	Connecting private IPv6 networks
IPv6 VPN over IPv4 WAN	Use of IPv6 VPN over IPv4 WAN connections

LCOS 10.90

LANCOM WLC-1000

VPN	
Radius	RADIUS authorization and accounting, outsourcing of VPN configurations in external RADIUS server in IKEv2, RADIUS CoA (Change of Authorization)
High Scalability VPN (HSVPN)	Transmission of multiple, securely separated networks within a VPN tunnel
Advanced Mesh VPN	On demand dynamic VPN tunnel establishment between branches

Content Filter (optional)	
Demo version	Activate the 30-day trial version after free registration under http://www.lancom-systems.com/routeroptions
URL filter database/rating server*	Worldwide, redundant rating servers from IBM Security Solutions for querying URL classifications. Database with over 100 million entries covering about 10 billion web pages. Web crawlers automatically search and classify web sites to provide nearly 150,000 updates per day: They use text classification by optical character recognition, key word searches, classification by word frequency and combinations, web-site comparison of text, images and page elements, object recognition of special characters, symbols, trademarks and prohibited images, recognition of pornography and nudity by analyzing the concentration of skin tones in images, by structure and link analysis, by malware detection in binary files and installation packages
URL check*	Database based online check of web sites (HTTP/HTTPS). HTTPS websites are checked based on DNS names of HTTPS server certificates or based on “Reverse DNS lookup“ of IP addresses.
Categories/category profiles*	Filter rules can be defined in each profile by collecting category profiles from 58 categories, for example to restrict Internet access to business purposes only (limiting private use) or by providing protection from content that is harmful to minors or hazardous content (e.g. malware sites). Clearly structured selection due to the grouping of similar categories. Content for each category can be allowed, blocked, or released by override
Override**	Each category can be given an optional manual override that allows the user to access blocked content on a case-by-case basis. The override operates for a limited time period by allowing the category or domain, or a combination of both. Optional notification of the administrator in case of overrides
Black-/whitelist	Lists that are manually configured to explicitly allow (whitelist) or block (blacklist) web sites for each profile, independent of the rating server. Wildcards can be used when defining groups of pages or for filtering sub pages
Profiles	Timeframes, blacklists, whitelists and categories are collected into profiles that can be activated separately for content-filter actions. A default profile with standard settings blocks racist, pornographic, criminal, and extremist content as well as anonymous proxies, weapons/military, drugs, SPAM and malware
Time frames	Timeframes can be flexibly defined for control over filtering depending on the time of day or weekday, e.g. to relax controls during break times for private surfing
Flexible firewall action	Activation of the content filter by selecting the required firewall profile that contains content-filter actions. Firewall rules enable the flexible use of your own profiles for different clients, networks or connections to certain servers
Individual display pages (for blocked, error, override)	Response pages displayed by the content filter in case of blocked sites, errors or overrides can be custom designed. Variables enable the inclusion of current information such as the category, URL, and rating-server categorization. Response pages can be issued in any language depending on the language set in the user's web browser
Redirection to external pages	As an alternative to displaying the device's own internal response pages to blockings, errors or overrides, you can redirect to external web servers

LANCOM WLC-1000

Content Filter (optional)	
License management	Automatic notification of license expiry by e-mail, LANmonitor, SYSLOG or SNMP trap. Activation of license renewal at any time before expiry of the current license (the new licensing period starts immediately after expiry of the current license)
Statistics	Display of the number of checked and blocked web pages by category in LANmonitor. Logging of all content-filter events in LANmonitor; log file created daily, weekly or monthly. Hit list of the most frequently called pages and rating results. Analysis of the connection properties; minimum, maximum and average rating-server response time
Notifications	Messaging in case of content-filter events optionally by e-mail, SNMP, SYSLOG or LANmonitor
Wizard for typical configurations	Wizard sets up the content filters for a range of typical scenarios in a few simple steps, including the creation of the necessary firewall rules with the corresponding action
Max. users	Simultaneous checking of HTTP(S) traffic for a maximum of 400 different IP addresses in the LAN
*) Note	Categorization is maintained by IBM. Neither IBM or LANCOM can guarantee full accuracy of the categorization.
**) Note	The Override function is only available for HTTP websites.
VoIP	
SIP ALG	The SIP ALG (Application Layer Gateway) acts as a proxy for SIP communication. For SIP calls the ALG opens the necessary ports for the corresponding media packets. Automatic address translation (STUN is no longer needed).
Interfaces	
Ethernet ports	4 individual combo ports (ETH/SFP) and 1 ETH port 10/100/1000 Mbps Ethernet; up to 4 ports can be operated as additional WAN ports with load balancing. Ethernet ports can be electrically disabled within LCOS configuration
Port configuration	Each Ethernet port can be freely configured (LAN, DMZ, WAN, monitor port, off). Additionally, external DSL modems or termination routers can be operated as a WAN port with load balancing and policy-based routing.
USB 2.0 host port	USB 2.0 hi-speed host port for connecting USB printers (USB print server), serial devices (COM port server), USB data storage (FAT file system); bi-directional data exchange is possible
Serial interface	Serial configuration interface / COM port (RJ-45): 9,600 - 115,000 baud. Supports internal COM port server and allows for transparent asynchronous transmission of serial data via TCP
Management and monitoring	
Management	LANconfig, WEBconfig, LANCOM Layer 2 management (emergency management)
Management functions	Alternative boot configuration, voluntary automatic updates for LCMS and LCOS, individual access and function rights up to 16 administrators, RADIUS and RADSEC user management, remote access (WAN or (W)LAN, access rights (read/write) adjustable seperately), SSL, SSH, HTTPS, Telnet, TFTP, SNMP, HTTP, access rights via TACACS+, scripting, timed control of all parameters and actions through cron job
FirmSafe	Two stored firmware versions, incl. test mode for firmware updates
automatic firmware update	configurable automatic checking and installation of firmware updates

LCOS 10.90

LANCOM WLC-1000

Management and monitoring	
Monitoring	LANCOM Management Cloud, LANmonitor, WLANmonitor
Monitoring functions	Device SYSLOG, SNMPv1,v2c,v3 incl. SNMP-TRAPS, extensive LOG and TRACE options, PING and TRACEROUTE for checking connections, internal logging buffer for firewall events
Monitoring statistics	Extensive Ethernet, IP and DNS statistics; SYSLOG error counter, accounting information exportable via LANmonitor and SYSLOG, Layer 7 Application Detection including application-centric tracking of traffic volume
IPerf	IPerf is a tool for measurements of the bandwidth on IP networks (integrated client and server)
SLA-Monitor (ICMP)	Performance monitoring of connections
Netflow	Export of information about incoming and outgoing IP traffic
Hardware	
Weight	3,5 kg
Power supply	Internal power supply unit (110–230 V, 50-60 Hz)
Environment	Temperature range 5–40° C; humidity 0–95%; non-condensing
Housing	Robust metal housing, 19" 1 HU, 435 x 45 x 207 mm, with removable mounting brackets, network connectors on the front
Fans	3
Power consumption (max)	30 watt
Declarations of conformity*	
CE	EN 62368, EN 55022, EN 55024
FCC	FCC Part 15, Class B with FTP cabling
Country of Origin	Made in Germany
*) Note	You will find all declarations of conformity in the products section of our website at www.lancom-systems.com
Scope of delivery	
Cable	EU version: IEC power cord, WW version: country-specific IEC power cords are separately available
Support	
Warranty extension	Free warranty extension up to 3 years (replacement service for defects) For details, please refer to the service and support conditions at www.lancom-systems.com/support-conditions or at www.lancom.de/rma.

LCOS 10.90

LANCOM WLC-1000

Support	
Security updates	Up to 2 years after End of Sale of the device (but min. 3 years, see www.lancom-systems.com/product-tables), can be extended by purchasing LANcare products
Software updates	Regular free updates including new features as part of the LANCOM Lifecycle Management (www.lancom-systems.com/lifecycle)
Manufacturer support	Technical manufacturer support as part of a support contract (LANcommunity partner, LANcare Direct, or LANcare Premium Support)
LANcare Basic L	Security updates until EOL (min. 5 years) and 5 years replacement service with shipment of the replacement device within 5 days after arrival of the defective device (8/5/5Days), item no. 10722
LANcare Advanced L	Security updates until EOL (min. 5 years) and 5 years NBD advance replacement with delivery of the replacement device within one business day (8/5/NBD), item no. 10732
LANcare Direct Advanced 24/7 L	Direct, prioritized 10/5 manufacturer support incl. 24/7 emergency hotline and security updates for the device, NBD advance replacement with delivery of the device on the next business day (24/7/NBD), guaranteed first response times (SLA) of max. 30 minutes for reporting massive operational disruptions by telephone (priority 1) and max. 4 hours for all other concerns (priority 2), term-based for 1, 3, or 5 years (item no. 10782, 10783 or 10784)
LANcare Direct 24/7 L	Direct, prioritized 10/5 manufacturer support incl. 24/7 emergency hotline and security updates for the device, guaranteed first response times (SLA) of max. 30 minutes for reporting massive operational disruptions by telephone (priority 1) and max. 4 hours for all other concerns (priority 2), term-based for 1, 3, or 5 years (item no. 10758, 10759 or 10760)
LANcare Direct Advanced 10/5 L	Direct, prioritized 10/5 manufacturer support and security updates for the device, NBD advance replacement with delivery of the device on the next business day (10/5/NBD), guaranteed first response times (SLA) of max. 2 hours for reporting massive operational disruptions by telephone (priority 1) and max. 4 hours for all other concerns (priority 2), term-based for 1, 3, or 5 years.(item no. 10770, 10771 or 10772)
LANcare Direct 10/5 L	Direct, prioritized 10/5 manufacturer support and security updates for the device, guaranteed first response times (SLA) of max. 2 hours for reporting massive operational disruptions by telephone (priority 1) and max. 4 hours for all other concerns (priority 2), term-based for 1, 3, or 5 years.(item no. 10746, 10747 or 10748)

Software	
Lifecycle Management	After discontinuation (End of Sale), the device is subject to the LANCOM Lifecycle Management. Details can be found at: www.lancom-systems.com/lifecycle
Anti-backdoor policy	Products from LANCOM are free of hidden access paths (backdoors) and other undesirable features for introducing, extracting or manipulating data. The trust seal “IT Security made in Germany” (ITSMIG) and certification by the German Federal Office for Information Security (BSI) confirm the trustworthiness and the outstanding level of security.

Options	
LANCOM Content Filter	LANCOM Content Filter +10 user (additive up to 1,000), 1 year subscription, item no. 61590
LANCOM Content Filter	LANCOM Content Filter +25 user (additive up to 1,000), 1 year subscription, item no. 61591
LANCOM Content Filter	LANCOM Content Filter +100 user (additive up to 1,000), 1 year subscription, item no. 61592

LANCOM WLC-1000

Options	
LANCOM Content Filter	LANCOM Content Filter +10 user (additive up to 1,000), 3 year subscription, item no. 61593
LANCOM Content Filter	LANCOM Content Filter +25 user (additive up to 1,000), 3 year subscription, item no. 61594
LANCOM Content Filter	LANCOM Content Filter +100 user (additive up to 1,000), 3 year subscription, item no. 61595
LANCOM BPjM Filter	LANCOM BPjM Filter Option, 5 years subscription, item no. 61418
LANCOM Public Spot PMS Accounting Plus	Extension of the LANCOM Public Spot (XL) Option for the connection to hotel billing systems with FIAS interface (such as Micros Fidelio) for authentication and billing of guest accesses for 178x/19xx routers, 2100EF, WLCs, and current central-site gateways, item no. 61638
LANCOM WLC AP Upgrade +10	LANCOM WLC AP Upgrade +10 Option, enables your WLC to manage 10 Access Points/WLAN router in addition, item no. 61630
LANCOM WLC AP Upgrade +25	LANCOM WLC AP Upgrade +25 Option, enables your WLC to manage 25 Access Points/WLAN router in addition, item-no. 61631
LANCOM WLC AP Upgrade +100	LANCOM WLC AP Upgrade +100 Option, enables your WLC to manage 100 Access Points/WLAN router in addition, item-no. 61632
LANCOM WLC AP Upgrade +500	LANCOM WLC AP Upgrade +500 Option, enables your WLC to manage 500 Access Points/WLAN router in addition, item.-no. 61627
LANCOM WLC High Availability Clustering XL Option	Comfortable administration of cluster devices like one single device — even at networks across locations, item no. 61636
*) Note	Further details on LANCOM Service Packs are available at the following Internet address: www.lancom-systems.com/products/services-and-support

Accessories	
1000Base-BX20-U SFP module	LANCOM SFP-AON-1, item no. 60200
1000Base-BX20 SFP module pair	LANCOM SFP-BiDi1550-SC1, item no. 60201
1000Base-SX SFP module, 550 m	LANCOM SFP-SX-LC1, item no. 61556
1000Base-SX SFP module, 550 m (Bulk 10)	LANCOM SFP-SX-LC1 (Bulk 10), item no. 60184
1000Base-SX SFP module, 2 km	LANCOM SFP-SX2-LC1, item no. 60183
1000Base-LX SFP module	LANCOM SFP-LX-LC1, item no. 61557
1000Base-LX SFP module (Bulk 10)	LANCOM SFP-LX-LC1 (Bulk 10), item no. 60185
SFP copper module 1G	LANCOM SFP-CO1, item no. 61494
SFP copper module 1G (Bulk 10)	LANCOM SFP-CO1 (Bulk 10), item no. 60186

LANCOM SYSTEMS

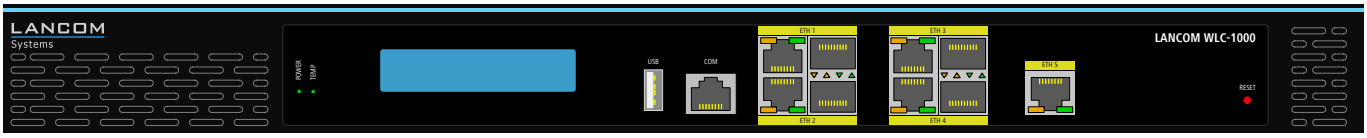
lancom-systems.com

LCOS 10.90

LANCOM WLC-1000

Accessories	
LANCOM Power Cord (UK)	IEC power cord, UK plug, item no. 61650
LANCOM Power Cord (US)	IEC power cord, US plug, item no. 61651
LANCOM Power Cord (CH)	IEC power cord, CH plug, item no. 61652
LANCOM Power Cord (AU)	IEC power cord, AU plug, item no. 61653
*) Note	Support for third-party accessories (SFP and DAC) is excluded and cannot be granted

Item number(s)	
LANCOM WLC-1000 (EU)	61783
LANCOM WLC-1000 (WW)	61784



LANCOM Systems GmbH
A Rohde & Schwarz Company
Adenauerstr. 20/B2
52146 Wuerselen | Germany
info@lancom.de | www.lancom-systems.com