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03/14

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See our web site www.lancom-systems.eu under "How to buy" and use your postcode to find a LANCOM Partner close to you. Our partners will welcome your call.



■ connecting your business

LANCOM Solutions

Network solutions for professional users

- Network Connectivity
- Wireless LAN
- Management
- Services



“Networking“ with LANCOM Systems

When it comes to implementing professional network infrastructure solutions, it is LANCOM that – from development to support – stands out in this field through quality, expertise, and reliability. For more than ten years, we have been establishing ourselves as the leading German manufacturer of network components such as routers or access points. We apply our know-how in designing stable networks – across locations, wired or wireless – to different industry sectors, tailoring our solutions to the very needs of our customers. To keep up with the pace of technological development, our customers benefit from regular software updates free of charge of our LANCOM Operating System (LCOS) as well as from comprehensive features. LANCOM products, therefore, offer long-term investment protection.

Security comes first

Amongst others, we at LANCOM build our successful business relationships on experience and expertise. Our customer base of renowned companies, located in Germany and throughout Europe, rely on us especially when high demands are placed on security. Our entire core product range is developed and manufactured in Germany. Therefore, we are truly in control of all processes involved, making sure our customers’ expectations on security are fully met: We guarantee that all LANCOM products are free of backdoors. Flip over to the next page and find your LANCOM solution!

„Connecting your business“ We network enterprises

Our references

Many well-known customers are already satisfied with the solutions from LANCOM. Have a look for yourself:



You will find further references under: www.lancom-systems.eu/references

Network Connectivity

Wireless LAN

Management

Services

Network Connectivity with LANCOM

Comprehensive and professional network design

How does your average working day look like? LANCOM solutions offer you a flexible, mobile, networked, and secure ways of working.

Securely connected, wherever your are

- 08:30** Your working day starts. You and all your colleagues are connected to the company network and have secure, high-speed access to the Internet.
- 11:05** In the course of this morning, unfortunately the wireline Internet connection fails. Even though DSL is down, your router switches to 3G/4G cellular networking to provide a secure Internet connection.
- 12:25** At last – your confidential CAD drawings are complete. Satisfied with the results, you send them over a secure virtual and private network to your colleagues – be they in the office next door or on the other side of the world.
- 14:00** You are on the move through your company’s production facilities. It’s noisy, dusty, hot, and there are machines distributed all over the production hall. Even in this harsh environment, your mobile device has full access to the Internet and to the company network
- 15:15** In the subsequent meeting, all your colleagues with their laptops are connected to the network via WLAN, and your external visitor also has “guest access” to his company’s network. Your colleague in America is connected by video phone.
- 16:30** The afternoon has come and you are working from home. Here, too, you have access to your company’s intranet, you can place internal calls, and you can edit documents in the company database – just as if you were in the office.

Your success is in our best interests.
 Our outstanding products, solutions, and services should not just satisfy you, they should inspire you.

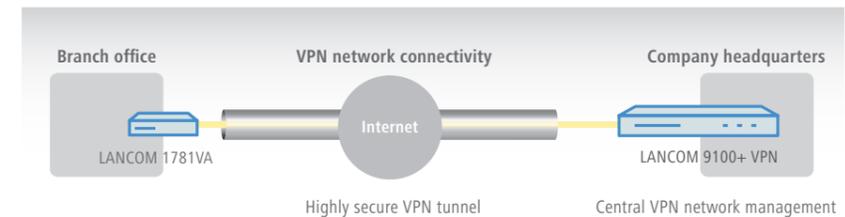


Securely networked with LANCOM VPN

Cost-efficient communications and the secure exchange of confidential data: This is just a sample of the functions available when company sites are inter-connected over a secure data channel (VPN). The VPN concept exploits the wide availability of the Internet and adds all aspects of security. Leased lines are no longer required and it offers geographical flexibility. VPNs are suitable for all sizes of business and allow branch offices, home offices, and mobile staff to be connected securely.

We offer solutions for challenging scenarios:

- Secure site and branch office connectivity
- Wired or wireless Internet access
- Comprehensive management of network environments
- Mobile access to company networks
- Home office connectivity
- Integration of production and logistics for real-time data acquisition





More security via VPN!
 The powerful routers of the LANCOM 1781 series guarantee maximum VPN security and extensive support of digital certificates. On top of that, LANCOM offers special CC variants for highest demands for security .

Professional site connectivity

for main and branch offices and their traveling employees

The mobile conference room – LANCOM 3G/4G routers with WLAN

The LANCOM 3G/4G routers with WLAN are ideal for conferences away from the office, from the home office, and for setting up temporary networks. Thanks to their integrated 3G/4G module and IEEE 802.11n wireless LAN, all they need is a power supply to provide secure and high-speed Internet access from any location and to connect to company networks over an IPSec VPN.

Mobile access to the company's network

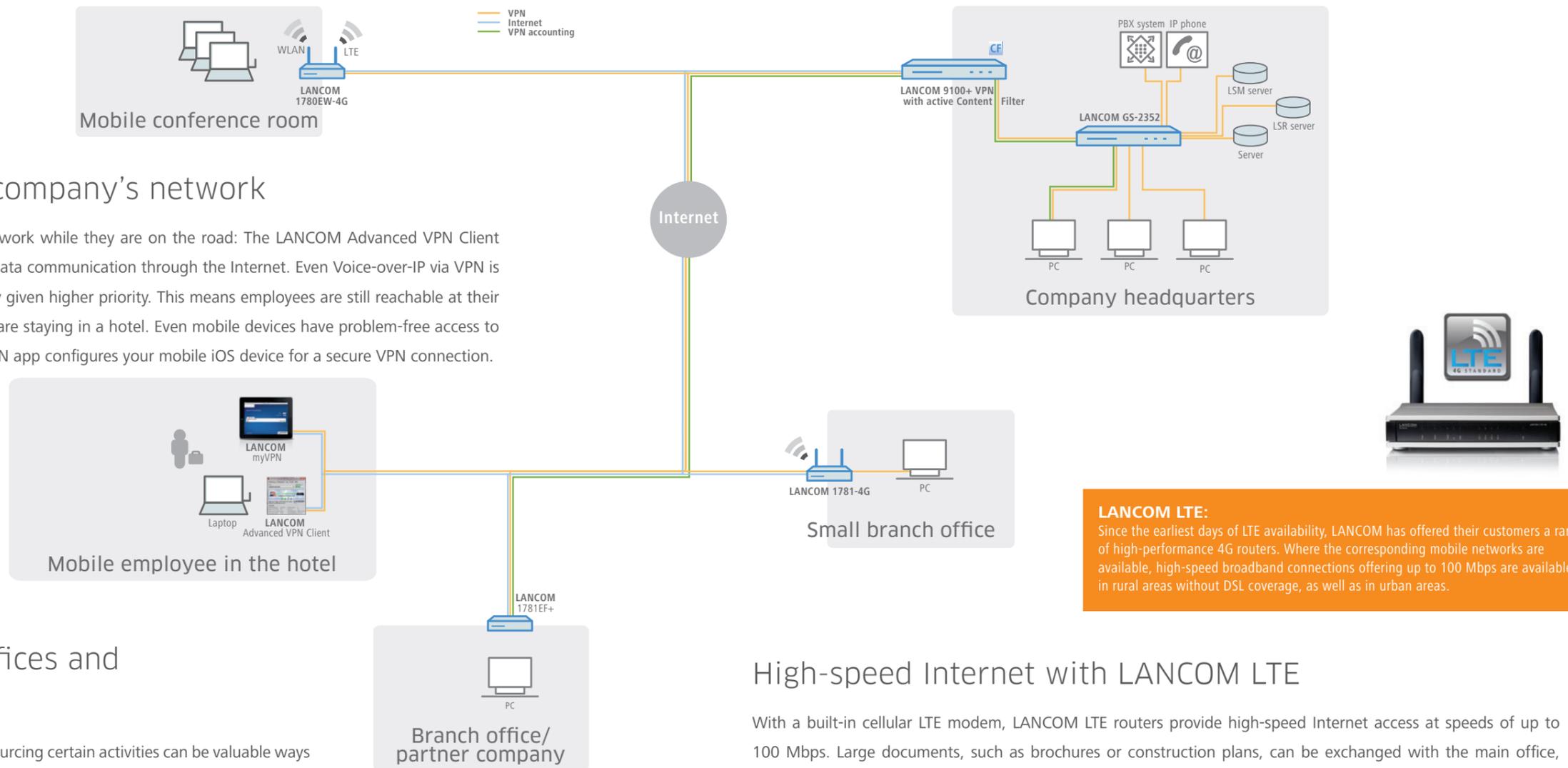
Employees can log into the company's network while they are on the road: The LANCOM Advanced VPN Client has an integrated firewall enabling secure data communication through the Internet. Even Voice-over-IP via VPN is no problem since VoIP data is automatically given higher priority. This means employees are still reachable at their personal telephone extension, even if they are staying in a hotel. Even mobile devices have problem-free access to the company network. The LANCOM myVPN app configures your mobile iOS device for a secure VPN connection.

Connecting branch offices and partner companies

Working with cooperation partners or outsourcing certain activities can be valuable ways of saving on costs. A VPN connection guarantees that you can exchange data with external partners in full security. You won't have to worry about sensitive information being intercepted, such as when the payroll data is sent to the accounting company.

LANCOM central site VPN gateways – The high-performance basis for your infrastructure

For years now, companies have established sites around the world and are operating business-critical applications online. The necessary VPN site connectivity demands a powerful network management. You can implement complex and secure high-performance network structures using central site VPN gateways. Depending on the model, you can run up to 1,000 simultaneous IPSec VPN connections.



LANCOM LTE: Since the earliest days of LTE availability, LANCOM has offered their customers a range of high-performance 4G routers. Where the corresponding mobile networks are available, high-speed broadband connections offering up to 100 Mbps are available in rural areas without DSL coverage, as well as in urban areas.

High-speed Internet with LANCOM LTE

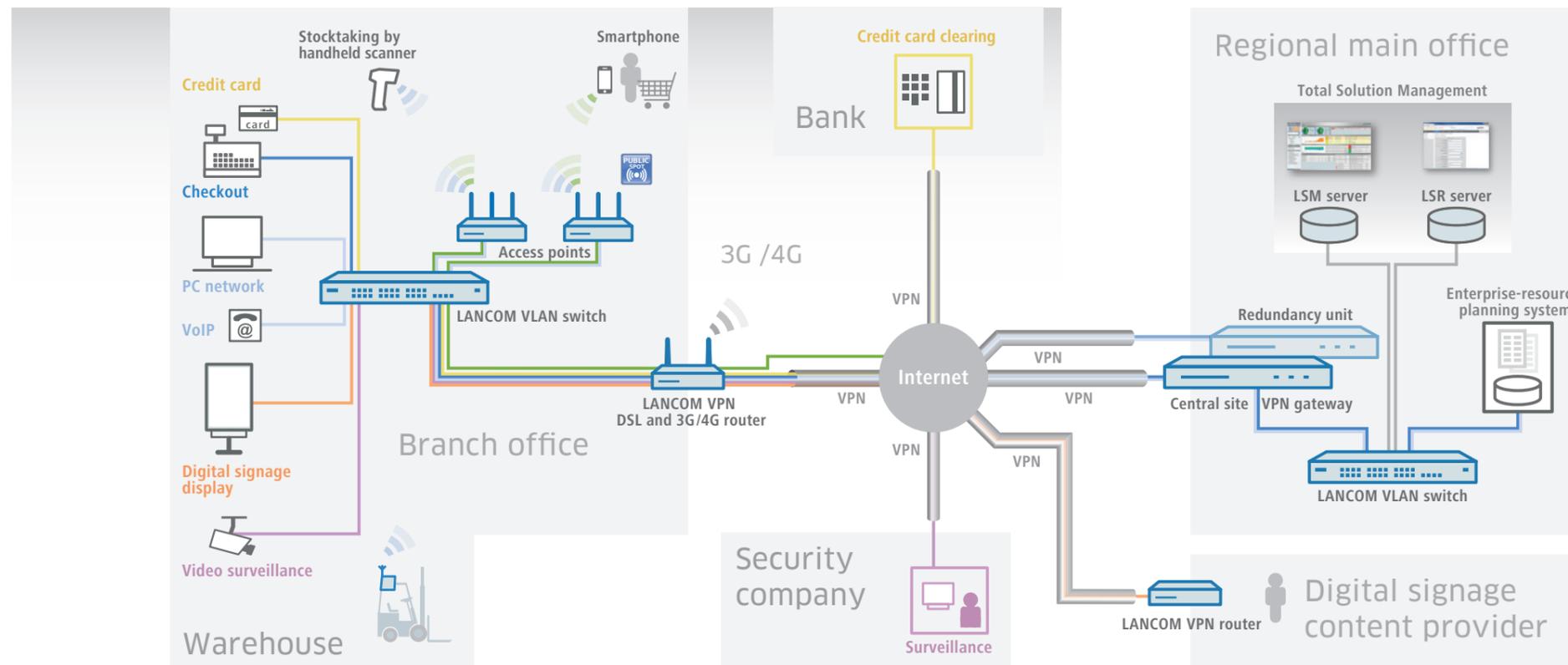
With a built-in cellular LTE modem, LANCOM LTE routers provide high-speed Internet access at speeds of up to 100 Mbps. Large documents, such as brochures or construction plans, can be exchanged with the main office, or processed over a VPN connection. LANCOM LTE routers supply everything that a modern enterprise network needs, such as comprehensive Quality-of-Service capabilities and an object-oriented firewall.

Network virtualization with LANCOM

Example: A chain-store branch

Multipurpose network infrastructure

Retail stores can potentially use a wide variety of applications, which makes them ideal candidates for network virtualization: Telephone calls are made with the main office and the central enterprise-resource planning system is connected directly to the server. They offer their customers WLAN guest access for a fast Internet connection by smartphone. Increasingly popular today are electronic displays with advertising which is updated online by external service providers. Payment by electronic cash card is available just about everywhere. This requires a server connection to different banks. Instead of requiring dedicated infrastructure for every application and different Internet access accounts, all of the data can be directed over VLANs (logically separated networks on a single infrastructure) and encrypted VPN.



PCI-DSS compliance: Did you know?
 Unlike EC card data, credit card data is transmitted unencrypted. To ensure that your personal details remain protected despite this, major credit card companies have established a security standard: PCI-DSS compliance. This standard describes how networks must be designed in order to ensure data security. LANCOM routers and managed switches comply with this specification and they feature an end-to-end implementation of the TACACS+ protocol (AAA). Learn more about this subject in our whitepaper on PCI compliance at www.lancom-systems.eu



Example: Data transfer from checkout systems to EC clearing institutes

When using electronic cash payments with PIN entry, online contact to the EC clearing institute is essential. An IPSec-based VPN ensures that the connections between the check-outs and the ERP at company headquarters remain completely secure. Thanks to LANCOM DSL routers with 3G backup paying procedures are ensured in case of during a blackout of the primary DSL connection.



Example: Online updating of electronic displays

By means of VLAN and VPN, external service providers can directly access, monitor, and update the electronic displays. At the same time, the owner can rest assured that service providers have no access to any other data in the company network.

High-security Networking

With the LANCOM Common Criteria portfolio

Cyber crime poses an ever-growing threat to your data. Whether it be sniffing attacks, hacking or industrial espionage, your data may get into the wrong hands and cause a lot of damage. The security of your data thus comes first for LANCOM Systems, since the exchange of highly sensitive data requires a big trust in the applied network technology.

Complete protection against cyber attacks...

Our VPN router portfolio, developed and manufactured in Germany, provides cross-site networks and critical infrastructures with highest protection against cyber attacks. It perfectly protects LAN and WAN against all sorts of cyber attacks: sniffing, manipulation, and sabotage. This way, highly secure data, telephony, and video communication becomes a reality – also across country borders.

...with certified security according to the Common Criteria

Our CC routers were certified by the German Federal Office for Information Security (BSI) and thus guarantee trustworthy and secure IT infrastructures according to the Common Criteria with the level of certification CC EAL 4+. This is the highest security certification a commercial network product of this complexity can obtain and is the foundation for the application in many security-sensitive areas.

The security LCOS: Our foundation for high-security operations

LCOS 8.70 CC is a special security version of the LANCOM firmware LCOS, particularly developed for LANCOM CC routers, enabling an operation compliant with the Common Criteria. The firmware is hardened, which is why only highly secure functionalities of the standard LCOS are available in the certified CC mode.






Security
made in Germany

The LANCOM Security Pledge

<p>Proprietary operating system Full control over our own "closed source" operating system LCOS</p>	<p>German products Soft- and hardware development in Germany Manufacturing in Germany</p>	<p>Highest encryption Headquartered in Germany, 100 % German circle of owners</p>	<p>Guaranteed free of backdoors Consistent avoidance of any hidden means of access</p>	<p>Highest encryption Highest security and encryption standards in all LANCOM products</p>
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The LANCOM CC portfolio: Versatile, powerful, one of a kind

The LANCOM CC portfolio is based on our versatile, high-performance, and field-tested standard business routers. The scope of certification comprises IPSec VPN and routing, as well as backup and redundancy, firewalling, digital certificates, and network virtualization with Advanced Routing and Forwarding (ARF). The portfolio comprises special models for all current connections up to fiber optics and LTE. Furthermore, special models in robust metal-housing are ideal for applications in complex environmental conditions.



The advantage of LANCOM products is obvious

LANCOM CC products with the certified high-security firmware LCOS 8.70 CC provide a complete scope of interfaces as well as comprehensive functionalities for versatile areas of application. This combination of cost-efficient, highly integrated VPN routers with certified security technology without hidden backdoors is unique on the market.

Areas of application

The LANCOM CC portfolio is ideal for deployment in all areas where the exchange of highly sensitive data plays a role:

- **High-security site-connectivity**
- **Protection of critical sub-areas**, such as management board offices and R&D departments
- High-security access to **secure cloud services**
- Protection of **IP telephony and videoconferencing solutions**
- Highly secure connectivity for critical infrastructures

Common Criteria certification – Guarantee for highest security

The LANCOM CC routers are certified by the German Federal Office for Information Security (BSI). The Common Criteria are internationally recognized security standards, EAL 4+ is the highest level of certification for commercial network components. The certification by the German BSI ensures that our products fulfill the very high German and European requirements for security and data security.



One network. Countless possibilities.

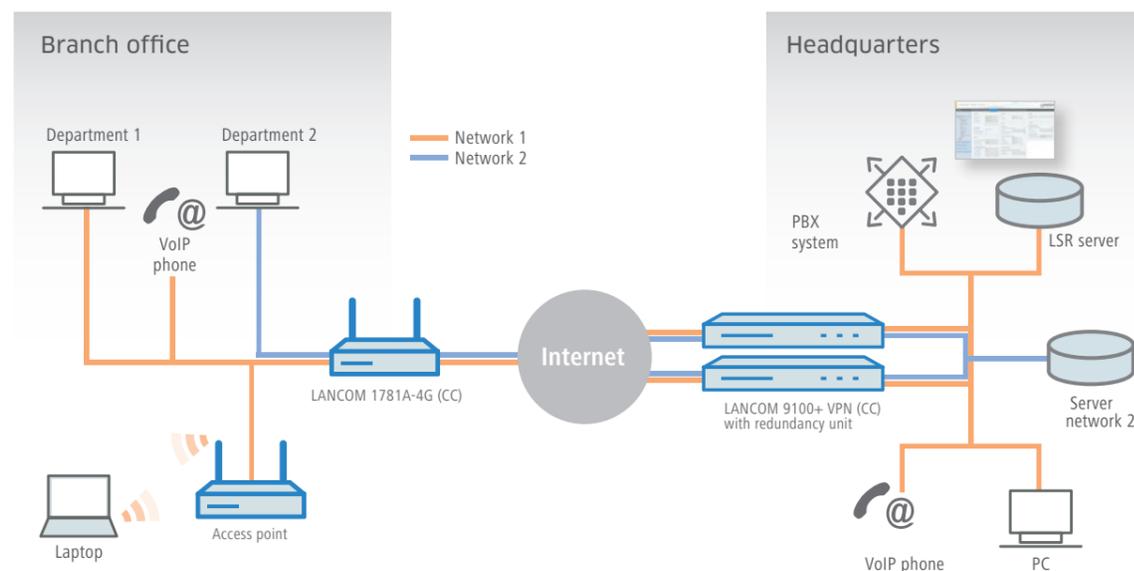
Infrastructures for high-security site-connectivity

The figure below represents site-connectivity between a main office (public authority, financial institution or enterprise) and one of its branch offices. The central site VPN gateway LANCOM 9100+ VPN (CC) and the VPN router LANCOM 1781A-4G (CC) are the highly secure interfaces to the Internet, and a VPN tunnel connects them. The Advanced Routing & Forwarding (ARF) function provides each department with a logically separated virtual network. Thanks to the firmware LCOS 8.70 CC and a router configuration according to CC EAL 4+, data transfer becomes secure and tamper-proof, including IP telephony. At the same time, it is easy to set up a redundant Internet connection via 3G/4G cellular networking for maximum failure safety. With a redundant instance of the central site VPN gateway installed, conditions are ideal for business-critical connections.



Did you know?

Even in certified CC mode, you can integrate WLAN infrastructures that offer convenient WLAN access for internal and external users. Thanks to network virtualization the internal and external WLAN accesses can be operated separately in a secure way.



Highly secure sub-areas. Upgrade your network.

Overlay networks for confidential sub-areas

LANCOM CC products enable you to extend your existing network infrastructures with high-security sub-areas. This assures you that highly sensitive data is exchanged exclusively within this highly secure network. Your development departments, management-board offices, or other critical areas remain separate from the rest of the company network.

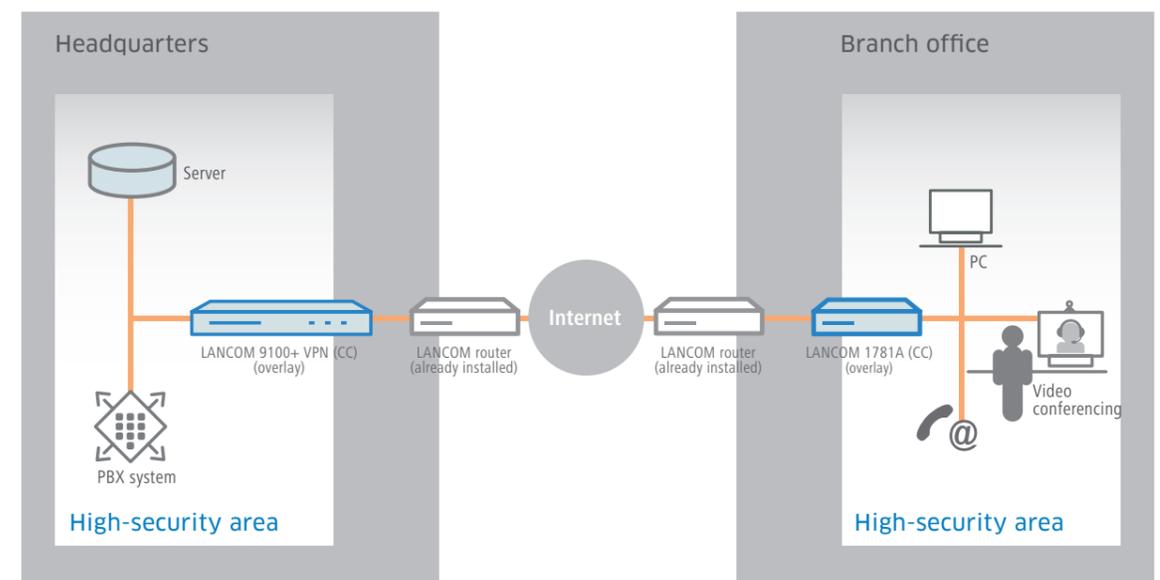
Highest security for critical data

To set up a high-security area, any existing VPN routers are supplemented with certified CC routers, which act as the interface between these areas. By using LANCOM CC devices, you can set up highly secure in-house network sub-areas without the time-consuming and expensive installation of separate network cables. The multi-site data exchange only functions from one high-security segment to another high-security segment. Access to the highly sensitive data is impossible both for employees with access to the other segments and for external attackers from the Internet.



Did you know?

LANCOM CC infrastructures allow you to implement highly cost-efficient encrypted IP telephony or videoconferencing, for example to your offices in other countries.



Indoor Wireless LAN Solutions

Wireless solutions for enterprises and institutions

A „Wireless Local Area Network“ (WLAN) offers wireless freedom and efficient workflows in modern enterprises.

The advantages of wireless LAN

More flexibility, more mobility, and convenience at a lower cost than wired networks. There is no need of expensive cabling. WLANs can be quickly installed without any changes to the building’s construction, and they offer more flexibility for employees than wired LANs. Working at their laptops, tablet PCs or smartphones, your employees use the WLAN for full access to the company network or the Internet – whether they are at the neighboring colleague’s desk, in a conference room, or even in another building.

We offer solutions for challenging scenarios

- **Connecting mobile devices** to the corporate network
- **Free or paid Internet guest access** for customers or guests with their own mobile devices (bring your own device)
- **Connectivity for individual corporate buildings** via WLAN connections
- **Connecting mobile machinery** to company networks by WLAN
- **Direct forwarding of orders** entered into handheld devices, for example in cafés or restaurants
- **Real-time updates of stock inventories** through WLAN-based recording of goods in and goods out
- **Voice over WLAN** for wireless telephony

Your demands are our goal.
In close cooperation with you we design and implement customized solutions, and subsequently we continue to support you as a reliable partner.

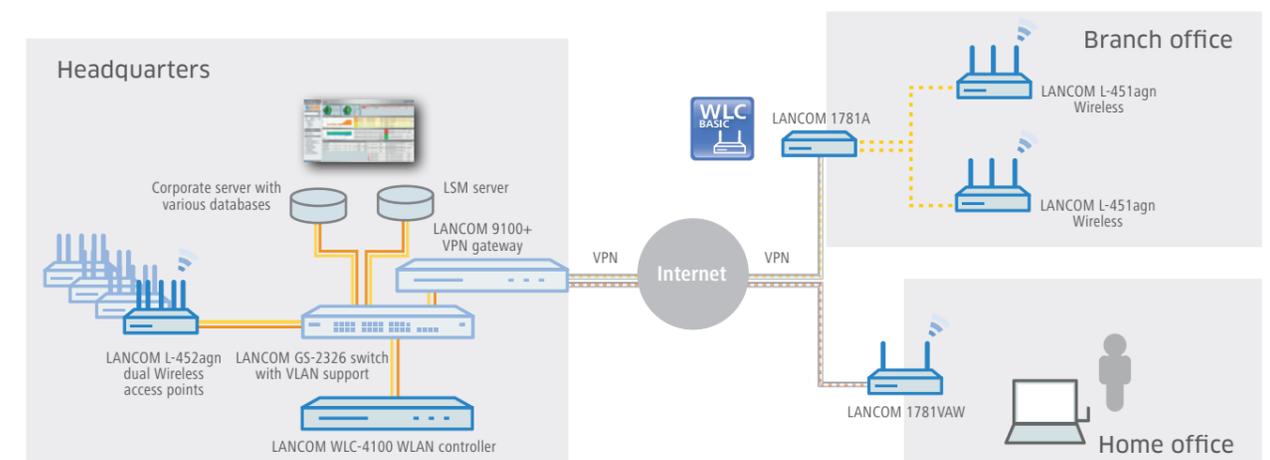


Automatic configuration via your WLAN controller

LANCOM WLAN controllers facilitate the fully automatic configuration of access points, both locally and remotely. The controller’s management software detects rogue access points and, if desired, it alerts the administrator. WLAN routers at remote sites can be securely managed. If the connection to the controller should fail, the local WLAN automatically switches to stand-alone mode and keeps your network operational.

Upgrade your LANCOM router to a WLAN controller

The LANCOM WLC Basic Option allows you to manage your WLAN infrastructure with your LANCOM router. Up to 6 LANCOM access points (optionally up to 12) or WLAN routers in the LAN or accessible at remote branch offices or home offices can be managed by a LANCOM router with the LANCOM WLC Basic Option. This is a cost-efficient alternative to a separate WLAN controller.



Gigabit WLAN – IEEE 802.11ac

A massive leap of performance in the evolution of WLAN

With the rapid increase of mobile end devices in corporate environments and the habitually grown comfort of a wireless access, the demand for more bandwidth is growing as well. The new WLAN standard IEEE 802.11ac combines wireless freedom with the speed of wired networks. With a gross data rate of up to 1.3 Gbps the path is paved towards modern corporate applications with high demands for bandwidth.



More performance for modern WLAN applications

In comparison to its predecessor IEEE 802.11n, the standard 802.11ac transmits exclusively at 5 GHz, with the benefit of more free non-overlapping channels in contrast to the 2.4 GHz frequency band. This and other extensions, such as 80 MHz wide channels, lead to a gain of performance of close to 300%.

This gain of performance enables:

- **Faster data transmissions** for 11ac-capable end devices and thus an increased battery lifetime, especially for mobile clients such as tablet PCs or smartphones
- **High-speed connection** for a high number of clients with an increasing demand for bandwidth
- **Modern corporate applications** with high data traffic, such as HD video transmissions
- **All-wireless office** – professional, high-speed, wireless connection



High-speed connection for all clients

LANCOM access points with 11ac support provide two WLAN radio modules. This way, both 11n clients at 2.4 GHz, as well as the increasing number of modern 11ac-capable end devices at 5 GHz can be provided with high-speed WLAN. On top of that, LANCOM access points with IEEE 802.11ac are fully backwards compatible to older WLAN standards – so all clients supporting 5 GHz can automatically be steered towards this more powerful frequency band with Band Steering. For further information on the new standard IEEE 802.11ac, please visit www.lancom-systems.eu/en/ac

LANCOM Active Radio Control

Activate the full potential of your WLAN!

For an efficient, wireless workflow a professional WLAN management is essential in order to provide a high-performance throughput for clients and to prevent sources of interference. Keep the control over your wireless infrastructure and increase the performance of your WLAN sustainably with the intelligent WLAN optimization concept LANCOM Active Radio Control (ARC). The intelligent combination of several features, included in the LANCOM firmware LCOS, comes absolutely free of charge.

For further information, please visit:
www.lancom-systems.eu/en/arc



Optimized WLAN performance by professional functions:



RF Optimization – Automatic selection of optimal WLAN channels

Due to reduced channel overlaps, WLAN clients benefit from an improved data throughput. In controller-based installations, an automatic selection of optimal channels is conducted for all managed access points.



Band Steering – Use the bandwidth of your WLAN to an optimal extent

Due to the automatic steering towards the 5 GHz frequency band, your WLAN performance is doubled since mostly only here a sufficient number of channels for channel bonding is available.



Adaptive Noise Immunity – Better WLAN throughput due to immunity against interferences

With Adaptive Noise Immunity WLAN clients benefit from significantly more data throughput, thanks to a trouble-free WLAN coverage. With Adaptive Noise Immunity the access point dismisses interferences in the radio field and focuses only on WLAN clients with sufficient signal strength.



Spectral Scan – Monitor your WLAN radio field spectrum for sources of interference

With LANCOM Spectral Scan you have a professional tool for an efficient WLAN troubleshooting. By scanning the entire RF spectrum, interferences in the WLAN can be identified and graphically illustrated.

LANCOM Hotspot Solutions

Comfortable Internet access for your customers

Whether on the train, at work, in the restaurant or in their holiday – modern people like to use WLAN hotspots to get information or contact family and friends spontaneously. However, a hotspot solution is only convincing, if it is easy to configure, visitors get comfortable Internet access, and the hotspot provider is guaranteed that his proprietary corporate network and his guest network are securely separated. The LANCOM Public Spot solutions combine all these aspects. They are scalable and can be perfectly adapted to the respective size of your network – and to your budget.



Easy login – with LANCOM Smart Ticket
Smart Ticket is the comfortable end-user self-service portal for the LANCOM Public Spot. The user receives his login credentials via e-mail or SMS, enabling an autonomous guest login to the hotspot. This way, the hotspot operator saves costs for infrastructure components such as printers as well as personnel for handing out vouchers.

Integrate your Public Spot into your existing infrastructures – easily and cost-efficiently!

The LANCOM Public Spot Option can be easily installed via software update into your existing LANCOM hardware such as access points, WLAN controllers, WLAN routers, and VPN gateways. This way, your network infrastructure can remain as it is without the need for installing further devices.

Possibilities for hotspot operators

- Comfortable setup of WLAN guest access
- Flexibly configurable login procedures for the WLAN hotspot (via Smart Ticket or voucher print)
- Comprehensive configuration options with regard to the validity period of the guest access
- Secure separation of guest and internal corporate network
- Voucher layout and login portals can be adapted individually according to the corporate design
- Connection to external servers (via XML or RADIUS interfaces) or Property Management Systems (PMS)

Hotspot 2.0 – The next-generation hotspot

WLAN as easy to use as cellular!

The burdensome entry of access credentials for logging in to a hotspot and the selection of the correct SSID belong to the past! Hotspot 2.0 offers the user maximum comfort thanks to the automatic login to WLAN hotspots. The selection of the correct SSID take place unnoticed from the user in the background – comfortable and securely encrypted. The underlying WLAN standard IEEE 802.11u enables an automated, encrypted authentication of clients for WLAN access.

Benefit from Hotspot 2.0!



Advantages for end customers

- Using WLAN becomes as easy as using cellular
- No manual selection of SSIDs or input of access credentials
- Secure authentication on WLAN hotspots thanks to WPA2/EAP encryption
- Automatic access to WLAN hotspots at different locations
- Faster Internet experience compared to cellular networks

Advantages for hotspot operators

- WLAN access as a competitive advantage leads to higher customer satisfaction among multimedia users
- Increased turnover as customers stay longer thanks to WLAN access
- Simple provision of the necessary technology through cooperation with providers or roaming brokers
- Provision of hotspot login data is no longer necessary



Did you know?

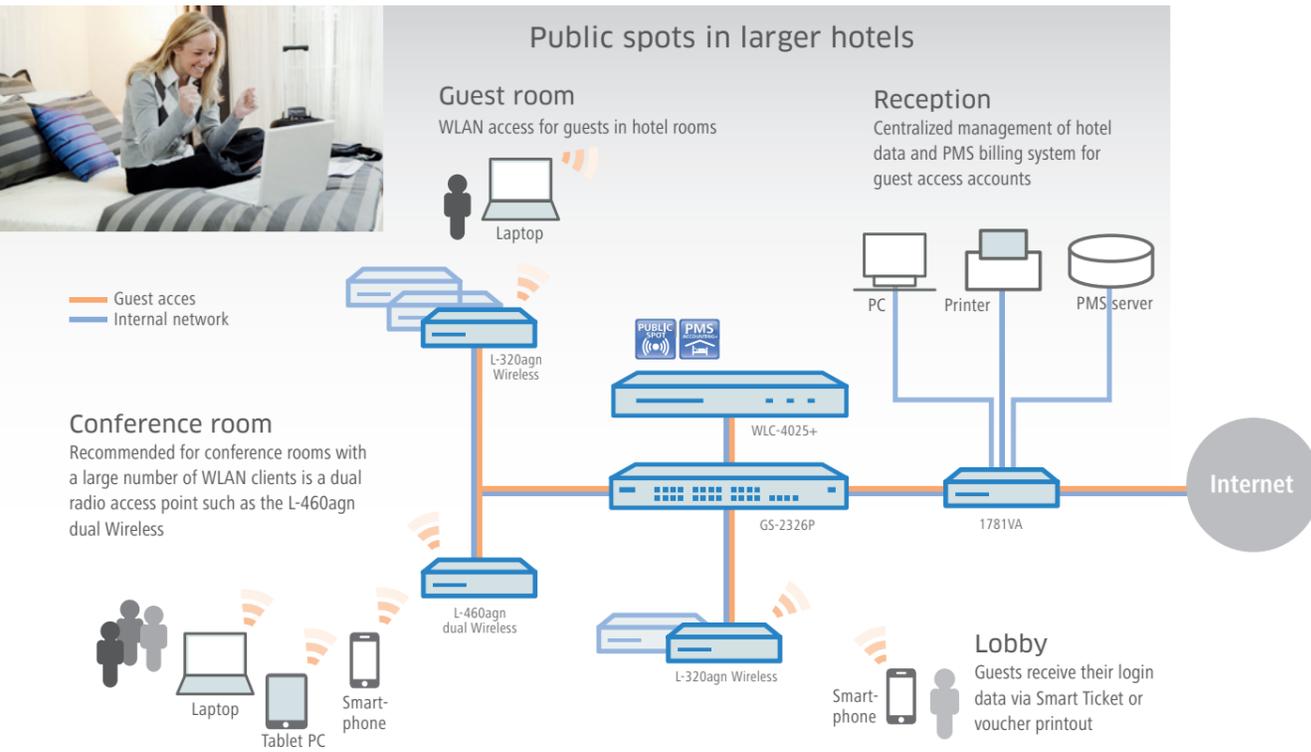
Many current LANCOM WLAN devices are already Hotspot 2.0-ready since they have been certified by the Wi-Fi Alliance based on the WLAN standard IEEE 802.11u and have been awarded the label Wi-Fi CERTIFIED Passpoint™. Also there are already hundreds of millions IEEE 802.11u-compatible end devices in the field – tendency upwards. For more information, please visit: www.lancom-systems.eu/en/hotspot20

Guest access accounts in hotels

LANCOM Public Spot – the all-in-one hotspot solution

Wireless LAN makes it easier than ever for hotel operators to offer their guests high-speed Internet. Quick and easy to install, WLAN Public Spot solutions enable guests to use their own laptop, tablet or smartphone to access the Internet. In hotel rooms or in selected areas only, such as the lobby, the restaurant or conference rooms, guest access accounts can comfortably be configured.

The integrated Smart Ticket function ensures that the client receives the login data for the Public Spot automatically via SMS or e-mail. As an alternative, vouchers can be printed out. The LANCOM PMS Accounting Plus Option is the recommended central billing system for guest access accounts. All Public Spot connections are automatically logged and billed by the central PMS server on which the hotel billing system is installed (e.g. MICROS-Fidelio or protel). Free guest access accounts are also easy to set up – just as required. Thanks to virtualization (VLAN), the operational network can be separated from the guest network, even though they share the same network infrastructure. This absolutely secure separation into logical networks makes it impossible to gain unauthorized access to internal data



LANCOM L-1310acn dual Wireless, L-460agn dual Wireless, and L-320agn Wireless in an elegant white housing for operations in modern environments.



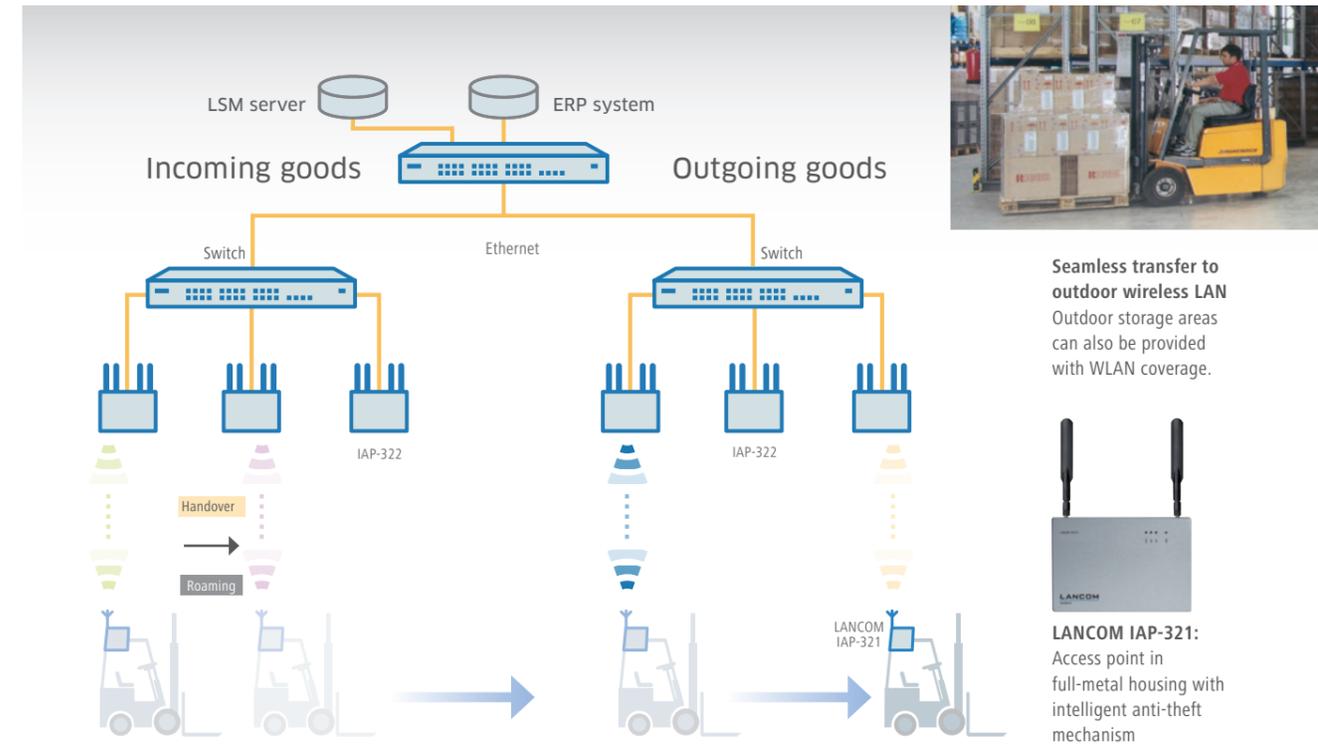
Wireless LAN and logistics

Example: Real-time warehouse inventories

Be it in retail or in the manufacturing trade: It is of decisive importance that competitive companies can optimize their lead times and the flow of materials and goods. Barcode scanners that communicate with enterprise resource planning systems by means of WLAN enable the movement of goods to be recorded in real-time. This provides a constantly updated overview of the goods movements and allows related processes to be planned and executed more efficiently. Ordering materials, dispatching goods, and billing of customers take place faster.

Access points suitable for warehouses

Warehousing environments frequently require access points to have robust housings which are impact resistant, dust-proof, and are fit for an extended temperature range. One of our models that meets these requirements is the LANCOM IAP-322. Where different clients are operating in the 2.4 GHz and 5 GHz bands simultaneously, the ideal solution is an access point with two radio modules, such as the LANCOM IAP-322.



Roaming
Roaming refers to a client's ability to associate with other cells in the same wireless network (SSID). LANCOM LSM makes it easy to comprehend WLAN client roaming histories – even with complex client movements such as for WLAN-enabled fork-lift trucks.

Handover
On behalf of the client, the access point informs the network that a client is associated with it. This is handled by a broadcast featuring the client's sender address (MAC address) to update the network switching information. Also, using the IAPP protocol, the access point informs its predecessor that a roaming procedure has been concluded.

Outdoor Wireless LAN Solutions

Professional outdoor networking solutions

Some scenarios present an extraordinary challenge. Especially outdoors.

Outdoor devices for the most extreme conditions

Ski stations and secluded ski lifts that require surveillance by video cameras; large campsites where tourists should be able to access the Internet; or remote outdoor storage areas without wired Internet access, but which still need to be connected to the administration. To meet challenges like these we need devices that offer not only the various wireless technologies including 3G and wireless LAN, but which also come with special physical properties. The outdoor equipment from LANCOM meets these requirements: Thanks to their robust IP66 outdoor housings and an extended temperature range from -33° to +70°C, they stand up to even the most extreme weather conditions.

2.4 GHz or 5 GHz – which is better, and when?

In outdoor areas free of obstructions, the 5 GHz frequency band provides significant benefits in terms of longer range and lower susceptibility to interference by neighboring WLAN users. There are more non-overlapping channels available than in the 2.4 GHz range and, as a consequence, overlapping with neighboring WLAN installations is

unlikely, even when multiple channels are bonded. The higher signal strengths permitted in the 5 GHz range allow greater, unobstructed distances to be bridged with higher data rates. Directional antennas amplify the output signal of the WLAN modules up to the maximum legal value for this purpose.



Exceptional solutions to exceptional challenges. Mobile freedom with LANCOM outdoor solutions.



Outdoor wireless LAN – your options

The outdoor WLAN range of products from LANCOM includes versatile access points and outdoor antennas for establishing wireless LAN infrastructures in open air environments. For example:

- **Point-to-point links** over several kilometers to connect different company sites
- **Fast wireless Internet access** as an alternative to wired solutions
- **Coverage over open areas** for wireless Internet access in hotels, restaurants and educational institutions for guests or students
- **WLAN connectivity between mobile machinery** and the company server for data acquisition in real time
- **Real-time status monitoring** of equipment that is exposed to extreme weather conditions
- **3G uplink for autonomous hotspots** or autonomous surveillance systems with LANCOM OAP-321-3G
- **Connectivity via cellular** for remote sites



OAP-322



OAP-321-3G

WLAN applications in extreme environments

Point-to-point connections

LANCOM access points serve not only as central base stations in a wireless network, they can also operate in point-to-point (P2P) mode to bridge long distances. For example, they can provide a secure connection between two networks that are several kilometers apart – without direct cabling or expensive leased lines. Bandwidths of up to 130 Mbps are possible.

Antenna alignment for P2P operations

The precise alignment of the antennas is of critical importance for establishing P2P connections. The more central the receiving antenna is located in the “ideal line” of the transmitting antenna, the better is the actual power and the effective bandwidth. For the alignment of the antennas in your P2P link the free-of-charge LANmonitor is a great tool: After a first installation the link signal strength can be optimized via an optical or acoustical illustration.

The right overvoltage protection

Outdoor wireless LAN installations should always allow for lightning protection:

Even when there are no visible phenomena such as thunderstorms or a direct lightning strike, invisible electrical discharges from the atmosphere can still occur that can lead to damage or destruction of sensitive wireless LAN modules or other electronic devices. For comprehensive protection against overvoltage, LANCOM offers you the right surge arrester.

When to apply an external antenna?

In some scenarios, the antennas integrated into an access point or the rod antennas shipped with it may not provide optimal performance. One reason may be the distance that must be bridged. Distances of several kilometers require the concentrated signal offered by sector antennas, and for extreme cases a directional antenna with a minimal beam angle may be necessary to amplify the signals from the radio module. The structural situation could also favor the use of a sector antenna, for example: If an access point cannot be installed in a location with a clear line of sight to its peer, it can be connected to a suitably positioned antenna by means of an extension cable.

Try out our LANCOM Antenna Distance Calculator available from www.lancom.eu/publications

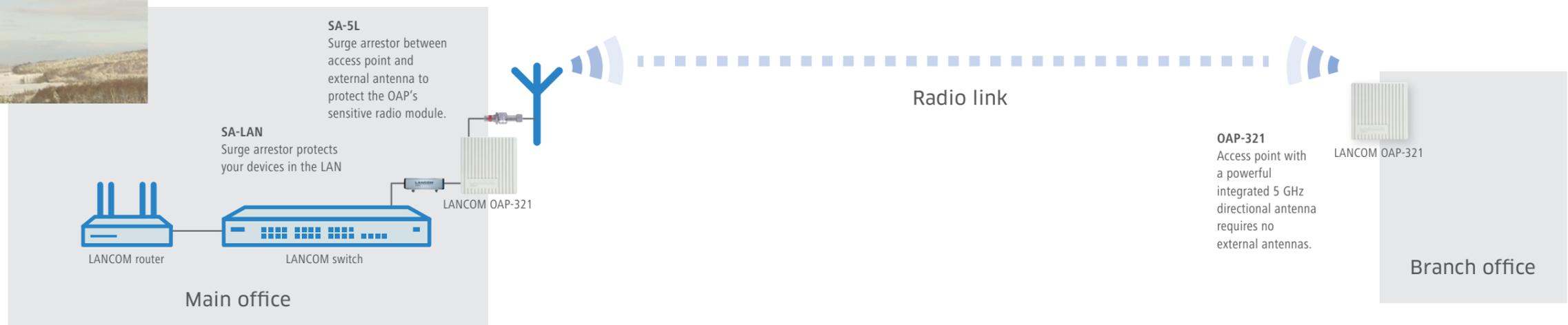


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360° omni-directional antenna
Omni-directional antenna attached to the access point via an extension cable. Sufficient for shorter ranges.
- 

Sector antenna
The antenna's beam pattern is focused for transmissions in one direction only. Suitable for longer ranges.
- 

Directional antenna
For strongly focused antenna transmissions. With opening angles <math><10^\circ</math>, these antennas can bridge ranges of several kilometers.



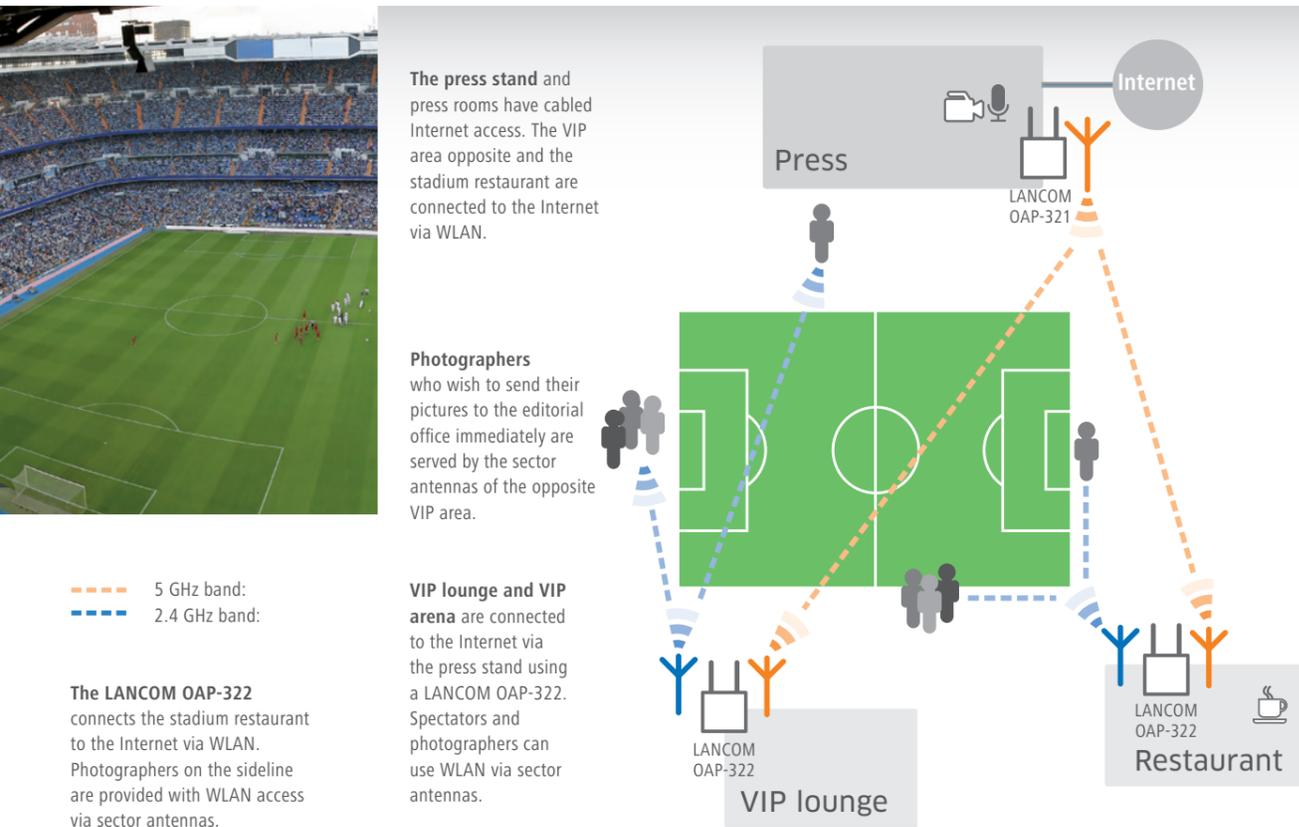
Wireless distribution systems

WLAN in sport arenas

Sport arenas that host large sporting events are increasingly modern and must provide state-of-the-art information transmission. Very often, however, the kind of high-performance Internet access that enables real-time reporting by journalists is not available throughout the stadium. In many cases, structural alterations and cable installation are unrealistic and/or uneconomical. Frequently users also need to be mobile. This is why outdoor WLAN solutions are an ideal way of enabling journalists and photographers to access the Internet over wireless.

It is also possible to offer Internet access via wireless LAN to the spectators. A wireless distribution system allows radio cells to be connected to each other without the need for cabling. This means that large areas can go online without a complex installation. This infrastructure can also be made available to caterers, fast-food outlets, and ticket desks. An online connection to ERP and online ordering systems simplifies administration and speeds up transactions. Replenishment orders can be made directly on site, which guarantees that there are adequate supplies for guest hospitality.

Wireless distribution: Solutions for sport arenas



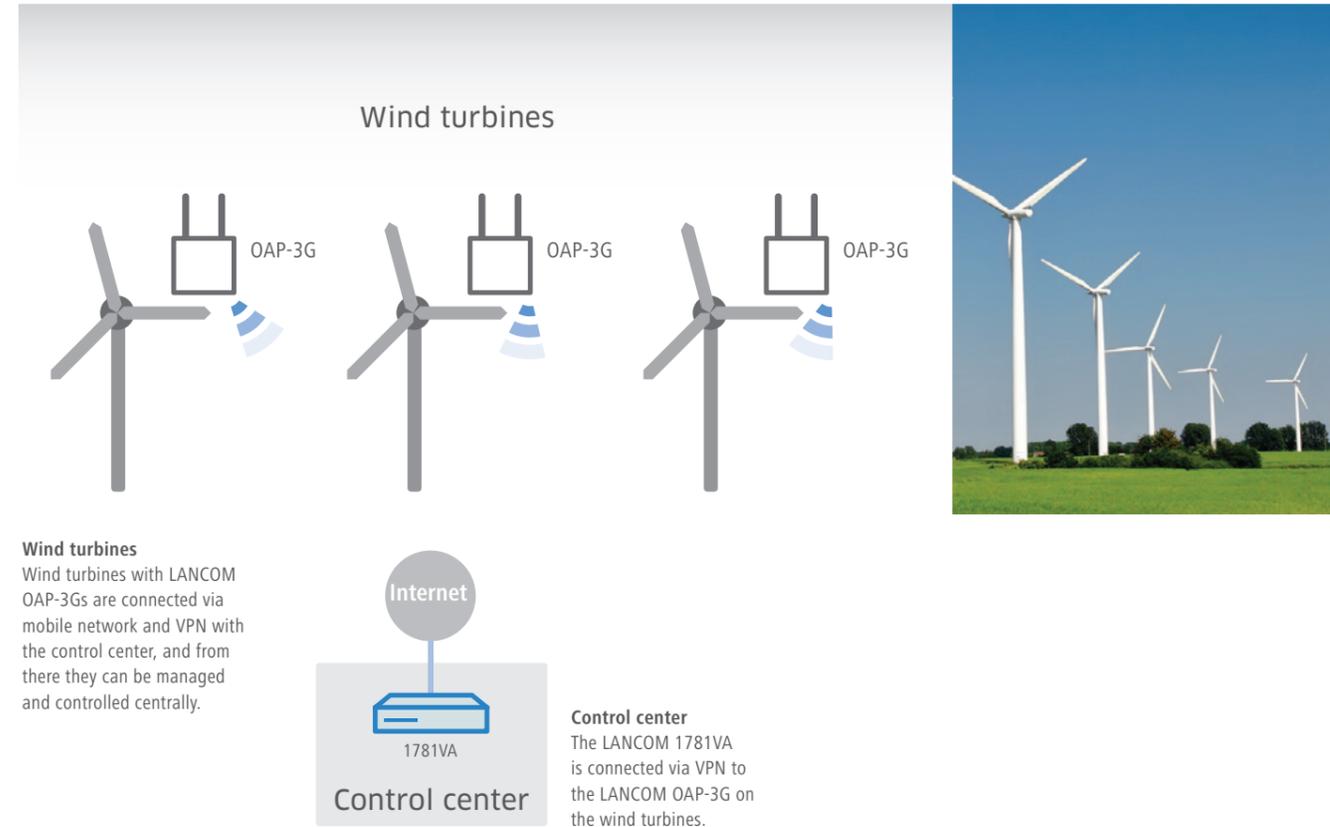
Stationary connectivity with outdoor 3G routers

Real-time status monitoring of wind generators

Wind turbines are exposed to considerable stresses and therefore require continuous monitoring to avoid defects, expensive maintenance work, and to minimize downtime. This applies especially to offshore facilities that can be difficult to reach at some times of the year due to the forces of nature. Continuous monitoring of performance data allows emergent faults to be recognized early on and more serious damage to be avoided. A secure VPN connection via 3G/4G facilitates the centralized real-time status monitoring.

In many cases it can be advantageous to service the equipment by wireless from the wind farm's control center. This is accomplished with robust outdoor 3G routers installed on the wind turbines. Data from the wind turbines is captured locally in real-time and relayed to the wind farm control center over a 3G-based VPN connection. This minimizes the need to have staff on site.

3G networking for wind farm management



LANCOM Management Solutions

Your network. Your management.

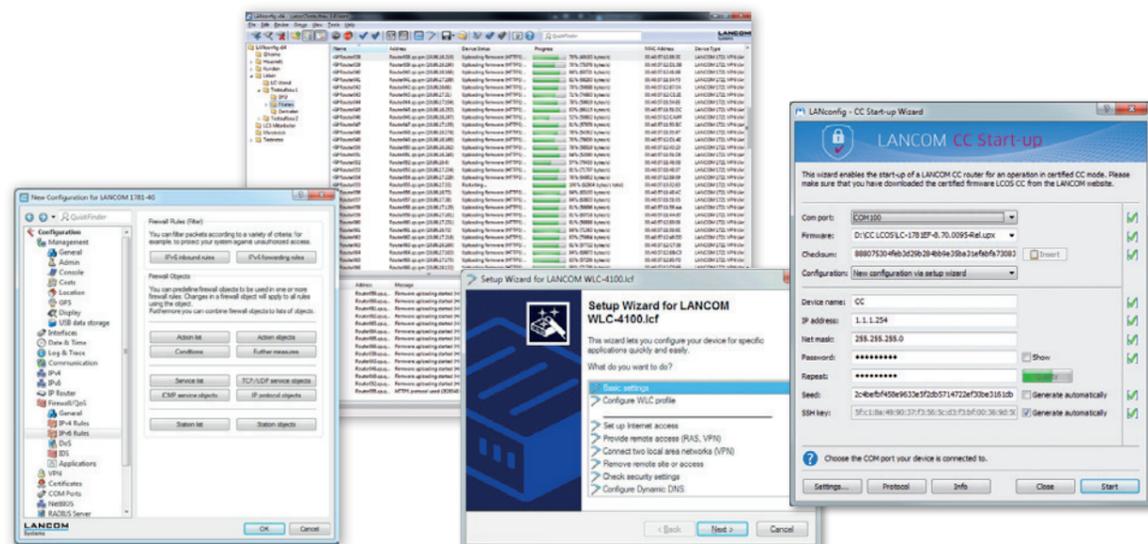
The LANCOM Management System - the free software package for the configuration and monitoring of your network.

Make no mistake about it:

A network solution is only a good solution if it is manageable. Years of experience give LANCOM a keen awareness of the needs of today's modern companies for lean network processes. For this reason, our software package offers a comprehensive management system that facilitates the creation of configurations which are consistent and efficient.

LCMS - LANCOM Management System

LANCOM customers don't just buy a product - they receive an all-round solution. An important part of this solution package is the free LANCOM Management System LCMS, the management software for all LANCOM routers, access points, and wireless LAN controllers. It offers an easy-to-use user interface for configuring and monitoring LANCOM devices in both local and remote networks.



The LANCOM Management System is a high-performance software solution with high usability and intuitive design



LANconfig

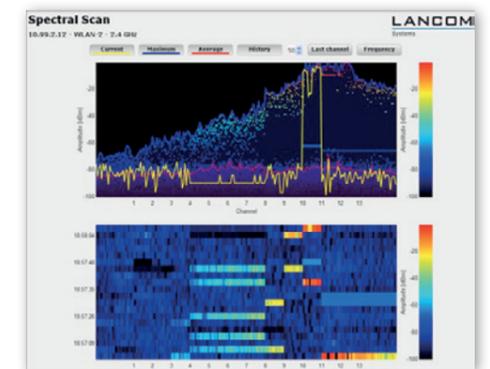
LANconfig has a huge spectrum of applications, from the user-friendly commissioning of a single device with installation wizards to the comprehensive management of large-scale installations.

LANmonitor

LANmonitor is the ideal program for convenient monitoring of networks. It enables the monitoring of all VPN connections, the inspection of security-related data, and the listing of accounting information for cost control.

Basic functions of LANmonitor:

- Display of connection and interface statuses
- Transfer rates, protocols, and IP addresses
- Display of software version, CPU load, and memory usage
- Logging of online times and transfer volumes
- Firewall event display and device SYSLOG
- Logging of device activities to a file
- Graphical interface for diagnostic traces
- Spectral Scan for graphical representation of interference in the WLAN



WLANmonitor

LANCOM WLANmonitor can centrally monitor the status of a wireless network. It presents information about the entire network in general and detailed information about individual access points and clients.

LANCOM Large Scale Monitor

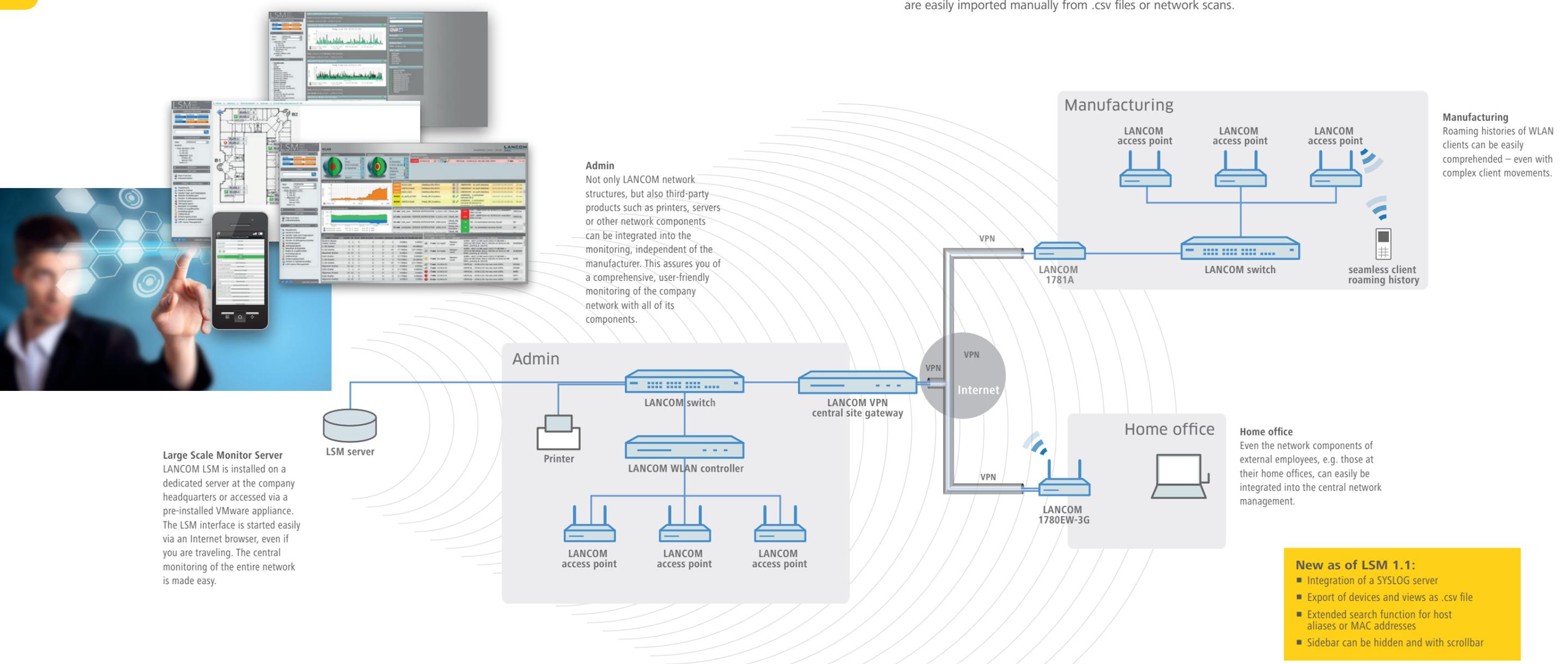
Everything under control.

LANCOM LSM – a comprehensive monitoring solution

Complex businesses often have an equally complex network infrastructure. Our comprehensive monitoring solution helps you to keep the upper hand: LANCOM Large Scale Monitor, LANCOM's own monitoring system is ideal for the efficient and structured monitoring of installations of any size featuring routers, access points, and switches.

The LANCOM Large Scale Monitor is more than just a monitoring tool. It gives you an overview of the entire network infrastructure of your company:

The clearly structured web interface GUI provides efficient monitoring of 25 to more than 1,000 LANCOM routers, switches, and access points. Time histories can be displayed and stored seamlessly, as can the uninterrupted roaming profiles of WLAN clients. LANCOM LSM also features fully configurable user, role and rights management along with a versatile trigger and alarm function. All network components and the corresponding access rights can be managed in a convenient folder structure. Even real-time monitoring is no problem – graphical floor plans with a versatile map-like display and with active content give you the full overview of ongoing network processes at all times. New devices are easily imported manually from .csv files or network scans.



Admin
Not only LANCOM network structures, but also third-party products such as printers, servers or other network components can be integrated into the monitoring, independent of the manufacturer. This assures you of a comprehensive, user-friendly monitoring of the company network with all of its components.

Manufacturing
Roaming histories of WLAN clients can be easily comprehended – even with complex client movements.

Home office
Even the network components of external employees, e.g. those at their home offices, can easily be integrated into the central network management.

Large Scale Monitor Server
LANCOM LSM is installed on a dedicated server at the company headquarters or accessed via a pre-installed VMware appliance. The LSM interface is started easily via an Internet browser, even if you are traveling. The central monitoring of the entire network is made easy.

- New as of LSM 1.1:**
- Integration of a SYSLOG server
 - Export of devices and views as .csv file
 - Extended search function for host aliases or MAC addresses
 - Sidebar can be hidden and with scrollbar

LANCOM Large Scale Rollout & Management

Powerful system for rollout and change management

Professional management for large networks

The larger and more complex the network, the more important it is to have a comprehensive and clearly structured management of all its components. The commissioning, configuration, and ongoing maintenance of individual devices is not only difficult to control, it is also very time-consuming. The powerful LANCOM Large Scale Rollout & Management (LSR) offers LANCOM customers a new product that is a forward-looking solution which addresses these challenges effectively and sustainably. The LANCOM LSR can save you a great deal of time – and money.

Rollout management

LANCOM LSR offers a user-friendly way of commissioning large-scale network installations. New devices register with LANCOM LSR automatically, after which the rollout of the corresponding configurations starts immediately. The newly configured components are then integrated into the ongoing centralized change management.

Change management

Be it for single, multiple, or all devices, the LANCOM LSR offers various configuration options, whatever the scale of your requirements. You can use group configurations to set up various LANCOM components consistently and comprehensively. Thereafter, updates or configuration changes are rolled out automatically for the selected group. If a device is unavailable at the time of an update, then the configuration changes are stored and automatically carried out once it becomes available again.



Central management

LANCOM Large Scale Rollout is a browser-based central point for maintaining and managing complex networks. You benefit not only from a user-friendly network management system, but also from massive savings in time and cost. Multiple administrators can access the system with rights that are freely definable, ensuring an uninterrupted systems maintenance.

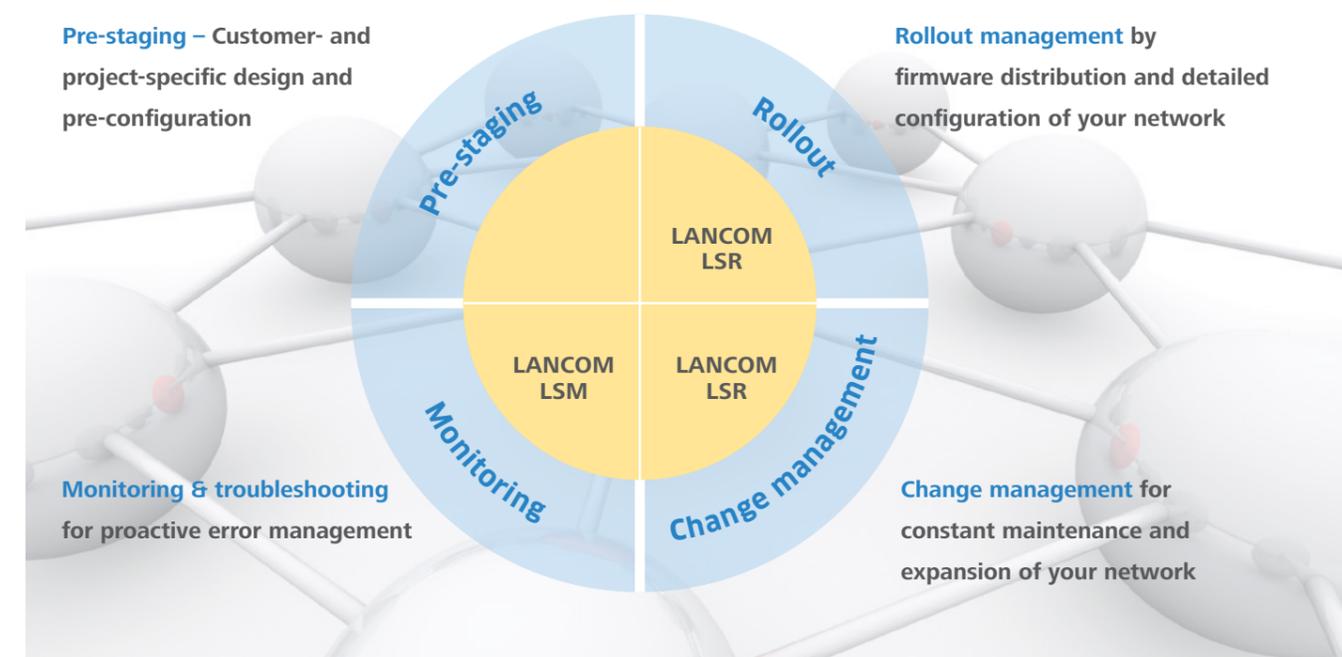
Functions

- Mass or group updates
- Firmware and configuration updates
- Detailed log-files (protocoll data)
- Rollout: Commissioning of entire network structures and new devices
- Time-controlled execution of individual functions
- Push and pull operation in device updates



LANCOM Total Solution Management

With the Total Solution Management, we realize our vision – and also our expectations – of a truly comprehensive network solution that offers fully compatible tools. In perfect interaction, all of the components mesh with one another comprehensively to yield maximum synergies and streamlined IT processes. Our goal is to achieve the efficient operation of large and complex networks with a minimum of staff effort, and also to cater for all of your needs in professional network management.



LANCOM Training & Support

We are here to help you!

Products and solutions are only as good as the service that backs them up. For this reason, consulting, training, and support play a central role at LANCOM.

LANCOM service and support products

With the LANCOM service and support products we stay at your site – whether it be in case of emergency, for network changes after hours, in case of hardware failure or for supporting your projects..

Benefit from:

- Professional support for configuring your infrastructure – by phone or on-site
- Emergency support, e.g. in case of infrastructure failure with a guaranteed reaction time of 30 minutes
- Next business day replacement of defective devices (Monday to Friday)
- Warranty extension for LANCOM devices to 5 years
- Premium support contract – tailored to your individual needs

For further information, please visit: www.lancom-systems.eu/en/service-support

LANCOM KnowledgeBase

A full text search will find any document with relevant terms. You will find the LANCOM KnowledgeBase under:

www.lancom-systems.eu/en/knowledgebase

LANCOM solutions represent more than the sum of the parts in our first-class and innovative product portfolio. We support you with a comprehensive range of consulting, training courses and services.



LANCOM Consulting Day

Our LANCOM trainers are coming to you! You can book our LANCOM experts for consulting days at your location. Benefit from both our technical expertise as well as from the convenience of personalized on-site training.

These contents are available for your Consulting Day:

- Setup and optimization of your configuration, setup of configuration templates
- Implementation of a rollout
- Interconnectivity between branch offices and the central site via VPN
- Central access point management via WLAN controller (WLC)
- Embedding layer 3 tunneling into the existing infrastructure

Consulting and booking

We will gladly consult you and make you an offer that fits your needs!

Contact us via **+49 2405 49 93 6-220** or training@lancom.eu

LANCOM Partner Support

As a LANCOM partner you enjoy exclusive benefits – including our support. The LANvantage partner program offers you the following:

- Preferential support – depending on your partner status
- Dedicated phone number and e-mail address
- Access to extended support hours (for LANCOM Solution Partners)

