



. . . c o n n e c t i n g y o u r b u s i n e s s

Overview of LANCOM software version 7.6

March 2009

© 2009, LANCOM Systems GmbH
www.lancom.eu

LCOS 7.6
[LANCOM OPERATING SYSTEM]

LANCOM
Systems

Highlights (1/2)



The LANCOM operating system LCOS and the corresponding management tools regularly provide **free** new functions to all current LANCOM routers, access points and gateways.

These are the main new functions and improvements:

- **Firewall** – Firewall re-design with a new graphical user interface for object-orientated configuration in LANconfig, backup trigger, new QoS settings (session limits, relative bandwidth settings)
- **WEBconfig** – Fully overhauled Web interface in LANconfig style for configuring LANCOM routers and access points
- **COM-port server and COM-port forwarding** – Devices connected to the serial port can be remotely controlled over any IP connection (RFC2217)



Highlights (2/2)



- **LANconfig** – Exchange of configuration files between similar devices, e.g. for migrating configurations from devices that are due to be replaced.
- **LL2M – LANCOM Layer 2 Management:** Rescue mechanism that allows the secure execution of commands via encrypted layer-2 packets
- **iPhone VPN access** – XAUTH client and server for VPN access to local networks via UMTS using the iPhone as of software version 2.0

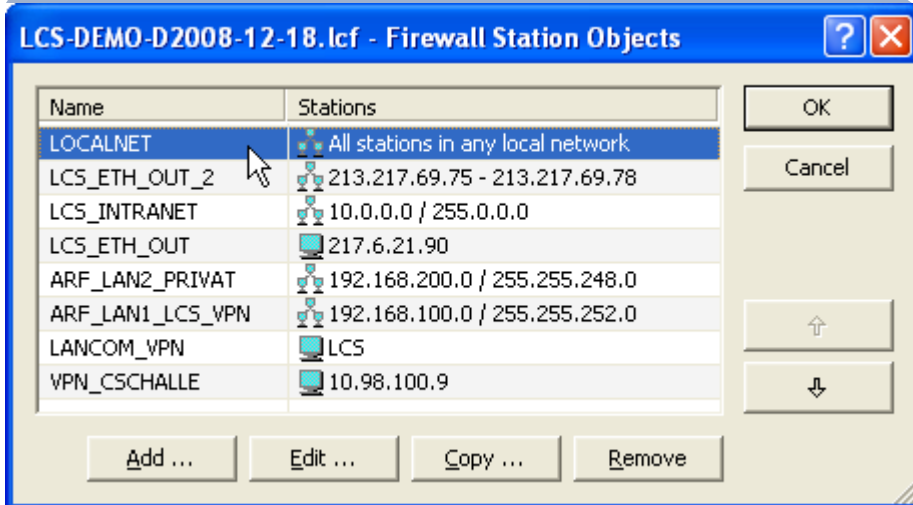
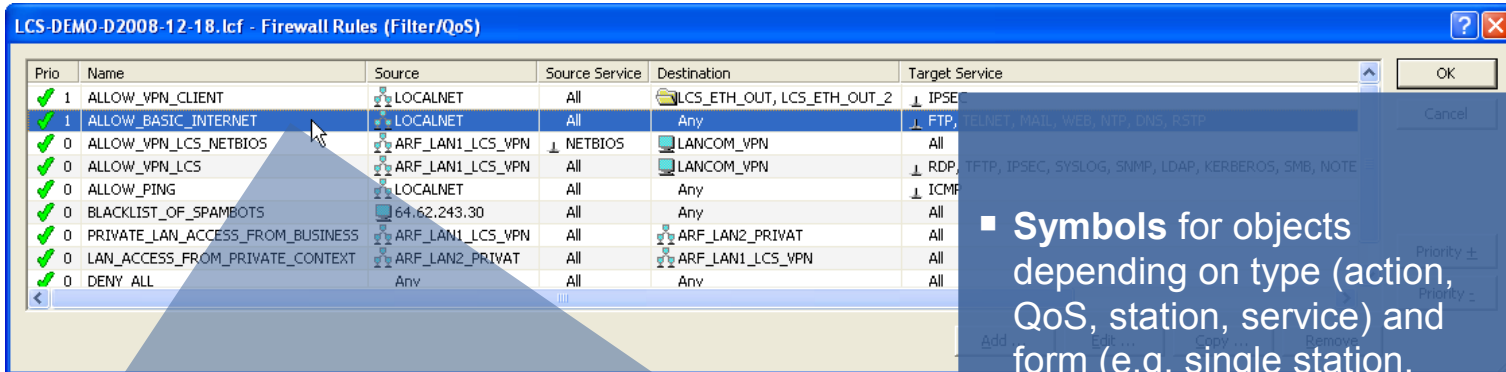


Other improvements

- **LANmonitor** – Export of support files with sysinfo, bootlog & configuration
- **HTTPS client** – For downloading firmware and configuration files
- **IPSec VPN backup** – Backup of VPN connections across hierarchy levels, e.g. in case of failure of a central VPN concentrator
- **Certificates** – New OpenSSL implementation with FIPS-140-certified algorithms
- **WLAN Controller** – Combined monitoring view of WLAN Controller clusters, internal storage of up to three script files (max. 64K)
- **Public Spot** – Support of public certificates and certificate chains
- **SIP proxy** – Configurable registration, monitoring and privacy method ("CLIR" in SIP) per line, "CLIR" for SIP user
- **Routing** – Routing tags learned from the routing table for ARF, and support of RIP sources with wildcards in names
- **PPP** – Choice of protocol for authentication

LCOS 7.6
[LANCOM OPERATING SYSTEM]

Firewall – New graphical user interface



- **Symbols** for objects depending on type (action, QoS, station, service) and form (e.g. single station, subnet, collection of MAC addresses...)
- **Line display** with grid lines, alternating background color, or a combination of both
- **Tip:** Templates for object-oriented firewall rules can be downloaded from the Support KnowledgeBase on the LANCOM Web site

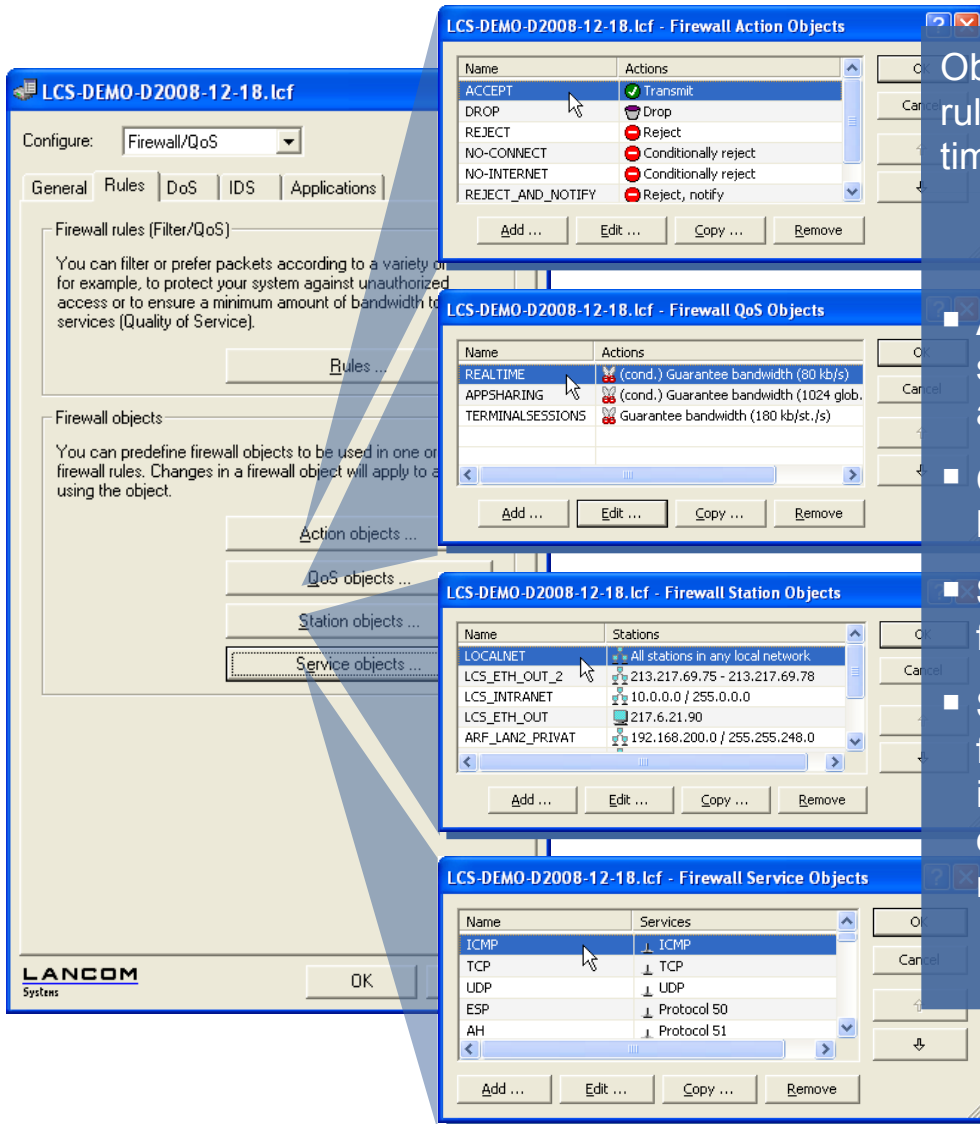
LCOS 7.6
[LANCOM OPERATING SYSTEM]

Feature Notes LCOS 7.6

Page 5

LANCOM
Systems

Firewall – Object-orientated configuration



Objects make it easy to define rules that can be used several times:

- **Action objects** for entire sets of limits, rejections and acceptances of connections
- **QoS objects** collect rules for bandwidths and priorities
- **Station objects** as wildcards for source/target definitions
- **Service objects** with rules for protocols and ports, including pre-defined service objects for many typical network applications

LCOS 7.6
[LANCOM OPERATING SYSTEM]

Feature Notes LCOS 7.6

Page 6

LANCOM
Systems

Firewall – New functions for backup & QoS

- Firewall rules depending on **backup status** (new condition)

→ This makes it possible to activate a different set of rules when the backup line is being used, for example to minimize demands on bandwidth

- Allocation of relative **bandwidths in percent**

→ Useful if the actual bandwidth of the line is unknown when carrying out the configuration

- Limitation of bandwidth** for connections **per station**

- Limitation of the number of sessions** per station or globally

→ For example, to slow file sharing or to limit server services

The screenshot displays the 'Trigger/Actions Set' configuration window in LANCOM OS 7.6. It is divided into four sections, each showing a different trigger configuration. Blue arrows point from the text on the left to specific settings in these sections:

- Section 1:** The 'Conditions' section has 'for backup connections' checked. The 'Trigger' section has '1' in the input field, '% bandwidth' in the dropdown, and 'absolute' in the second dropdown.
- Section 2:** The 'Trigger' section has '1' in the input field, '% bandwidth' in the dropdown, and 'absolute' in the second dropdown. The 'Per session' radio button is selected.
- Section 3:** The 'Trigger' section has '1' in the input field, '% bandwidth' in the dropdown, and 'absolute' in the second dropdown. The 'Per station' radio button is selected.
- Section 4:** The 'Trigger' section has 'sessions' in the dropdown and 'absolute' in the second dropdown. The 'Per station' radio button is selected.

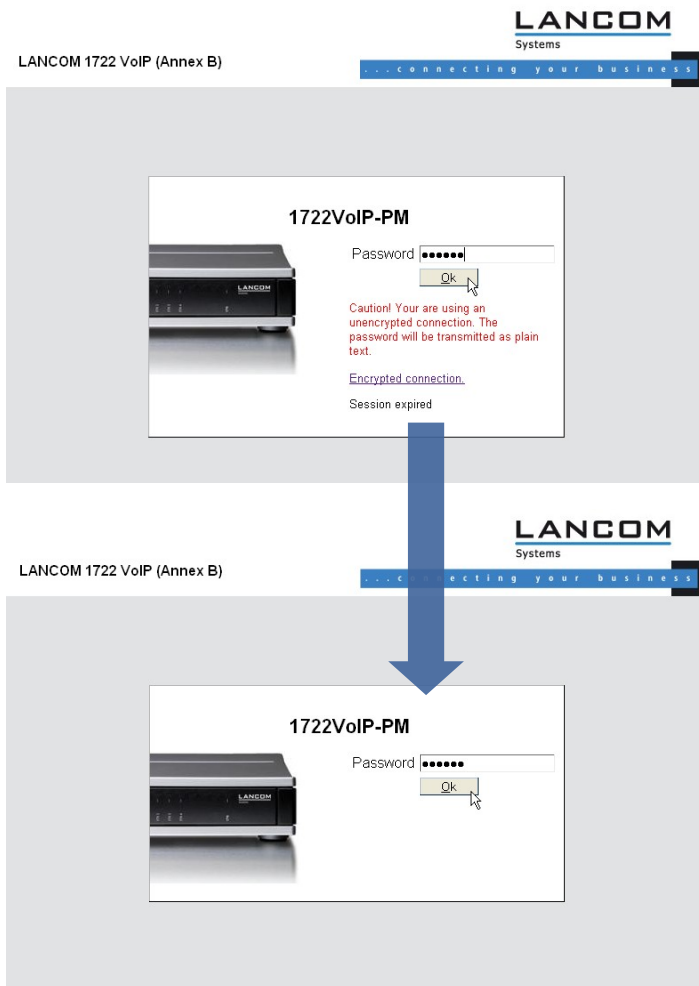
LCOS 7.6
[LANCOM OPERATING SYSTEM]

Feature Notes LCOS 7.6

Page 7

LANCOM
Systems

WEBconfig – Login page with security notice



- **Login page** in new design with a picture of the device and its name in a separate login area
- **Device type** in the page header
- **Security notice** when accessing via an unsecured access with a link to an encrypted page

LCOS 7.6
[LANCOM OPERATING SYSTEM]

Feature Notes LCOS 7.6

Page 8

LANCOM
Systems

WEBconfig – New graphical user interface

1722VoIP-PM - Connected as root - Mozilla Firefox

https://192.168.253.1/config2/15/5/?CONFSID=50843eaebdd473cdca7ed30658f517047c883146

LANCOM Systems GmbH: Startseite

1722VoIP-PM - Connected as root

Setup Wizards

- Basic Settings
- Check Security Settings
- Set up Internet connection
- Selection of Internet Provider
- Setup a RAS Account
- Connect Two Local Area Networks
- Configure dynamic DNS
- Configure Voice-over-IP Call-Man

System information

Configuration

Management

Interfaces

Date & Time

Log & Trace

Communication

TCP/IP

IP Router

Firewall/QoS

VoIP Call Manager

Logout

General Lines Users Call Router Codecs

Country specific profile for: Germany

SIP parameters

☒ Echo cancelling from SIP to ISDN

Prefixes for calling number display of incoming calls

From internal to SIP user

From external to SIP user

PMTU reduction & Fragmentation

No change

576

Send Reset

Fertig

192.168.253.1

- **Menu tree** for navigation with symbols and expanding/contracting folders
- **Side tabs** that collect related configuration pages, similar to LANconfig
- **Parameter setting** as in LANconfig: Division, grouping and fields
- **Setup Wizards** for the fast setup even of complex scenarios, e.g. when setting up VPN

LCOS 7.6
[LANCOM OPERATING SYSTEM]

Feature Notes LCOS 7.6

Page 9

LANCOM
Systems

WEBconfig – New "System information" area

The screenshot shows the LANCOM WEBconfig interface in a Mozilla Firefox browser. The address bar shows the URL: <https://192.168.253.1/frames/Status.html?CONFSID=0ac8425d12519228773cbe8cd54a7fc8ba17ae70>. The left sidebar contains a tree view with categories like Setup Wizards, Configuration, Management, Interfaces, Date & Time, Log & Trace, and Communication. The main content area is titled 'System information' and includes a 'Logout' button. Below this, there are tabs for 'System data', 'Device status', and 'Syslog'. The 'Device status' tab is active, showing a table with columns 'Interface/Port' and 'State/Mode'. The table lists CPU-Load (Current: 1.08%), Memory (Total: 26.8 MBytes, Free: 14.2 MBytes), and ETH-1. Below the table, there are icons for different network interfaces. The 'Syslog' tab is also visible, showing a list of system events with columns for Index, Time, Source, Level, and Message. The LANCOM logo is visible at the bottom of the interface.

System information

Logout

System data Device status Syslog

Interface/Port	State/Mode
CPU-Load	Current: 1.08%
Memory	Total: 26.8 MBytes Free: 14.2 MBytes
ETH-1	

Assignment: ...
Private-Mode: ...
Link-Active: ...
Connector: ...
Auto-Negotiation: ...
Flow-Control: ...
MDI-Mode: ...

Assignment: ...
Private-Mode: ...
Link-Active: ...
Connector: ...
Auto-Negotiation: ...
Flow-Control: ...
MDI-Mode: ...

Update

Fertig

- **New: Device status** displaying the interfaces for an overview at a glance
- **New: Syslog** that displays the events stored recently to the main memory
- **New:** As of LCOS 7.6, each LANCOM device has factory settings for Syslog for diagnostic purposes
- **Tip:** Existing devices can be loaded with the same settings for Syslog by means of script (in the KnowledgeBase for download)

LCOS 7.6
[LANCOM OPERATING SYSTEM]

Feature Notes LCOS 7.6
Page 10

LANCOM
Systems

WEBconfig – Online help in the LCOS menu tree

1722VoIP-PM - Connected as root - Mozilla Firefox

File Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe

https://192.168.253.1/config/2/19/?CONFSID=9f2f9da5f916f17a68d56b4f71334358de33d...

Meistbesuchte Seiten Aktuelle Nachrichten - ... Weltzeit, Zeitzonena...

Soll Firefox dieses Passwort speichern? Speichern

LCOS Menu Tree

- Logout
- VPN-PEERS
- AggrMode-IKE-Group-Default 2
- AggrMode-Proposal-List-Default IKE_PRESH_KEY
- Allow-Remote-Network-Selection no
- Establish-SAs-Collective
- legacy-dyn-VPN(LCOS5
- MainMode-IKE-Group-De
- MainMode-Proposal-List
- NAT-T-Operating
- Operating
- QuickMode-PFS-Group-
- QuickMode-Proposal-List
- QuickMode-Shorthold-Ti
- Simple-Cert-RAS-Operat

VPN: Allow-Remote-Network-Selection

If simplified dial-in with certificates is activated for the LANCOM device at headquarters, then the remote routers can suggest a network to be used for the connection during the IKE negotiation in phase 2. This network is entered, for example, when setting up the VPN connection on the remote router. The LANCOM at headquarters accepts the suggested network when the option 'Allow remote site to select the remote network' is activated. Moreover, the parameters used by the client during dial in must agree with the default values in the VPN router.

Default: off

Fertig

LANCOM Webconfig Help - Mozilla Firefox

http://www.lancom-systems.de/webconfig/help.php?_path=2...

LCOS 7.6
[LANCOM OPERATING SYSTEM]

- Online help for entries in the LCOS menu tree via the question-mark symbol (if an Internet connection is available)

- Tip: The **source path** to the help files can also be directed to a local HTTP server under "Setup/ HTTP/ Document root"

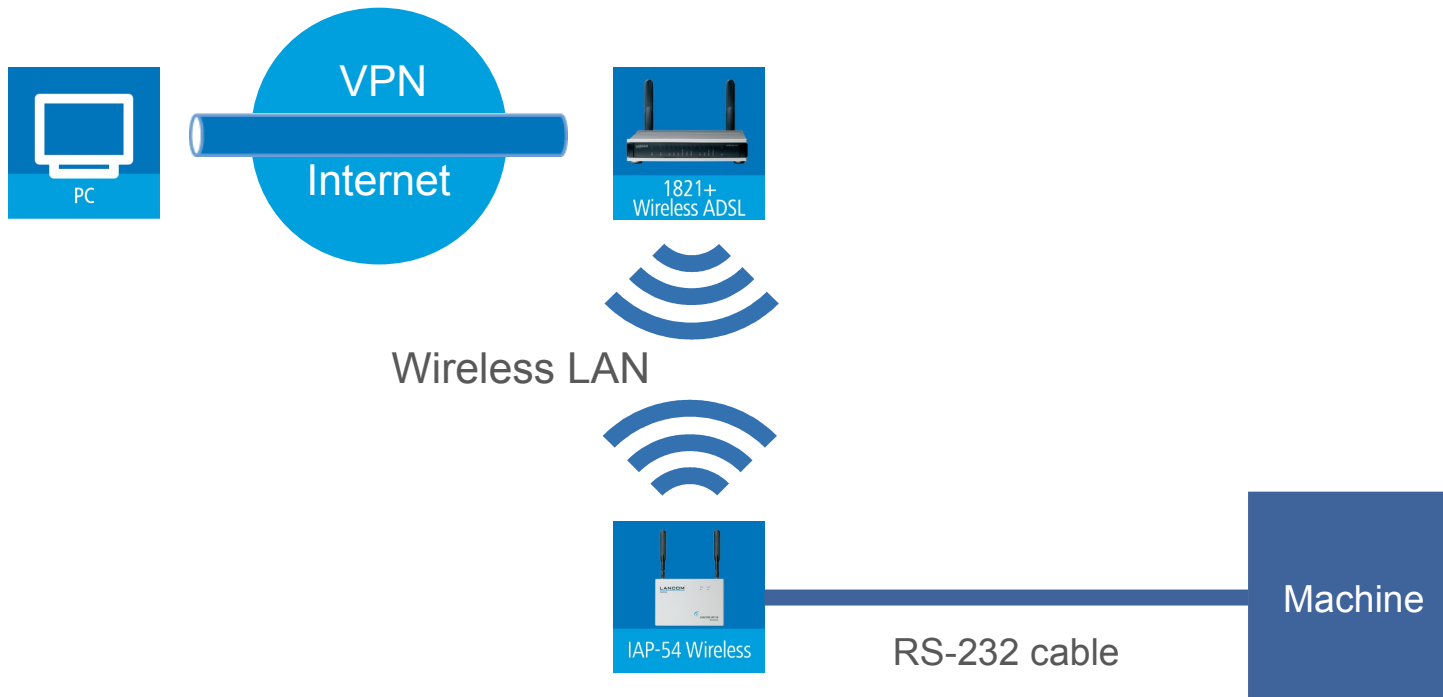
Feature Notes LCOS 7.6

Page 11

LANCOM
Systems

COM-port forwarding

- **Serial communication** over an IP connection, e.g. **via WLAN or VPN**
- When connected to the COM port (or USB port) of a LANCOM device, the **serial port is virtually extended** to a **target PC**
- A virtual **COM-port driver** (freely configurable under Windows) emulates the serial connector on the PC
- Compliant with **RFC2217** (Telnet Com Port Control Option)
- Applications: Automated building management, machine control, **remote maintenance of older PBX systems with serial port**



LCOS 7.6
[LANCOM OPERATING SYSTEM]

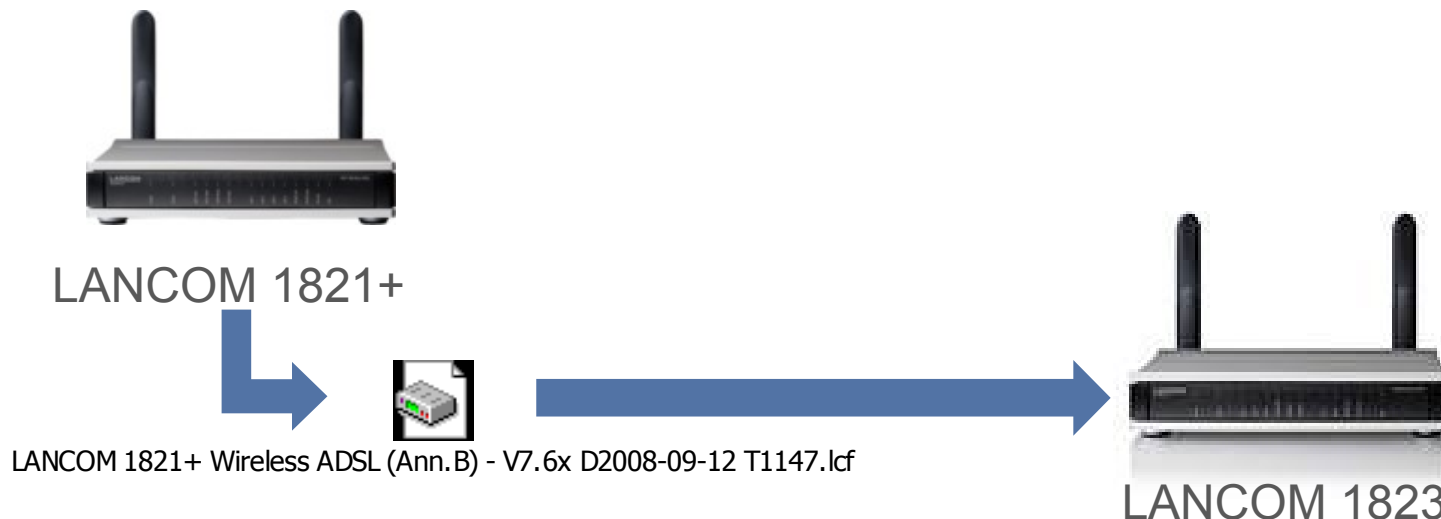
Feature Notes LCOS 7.6

Page 12

LANCOM
Systems

LANconfig – Exchange of configurations

- Exchange of configurations **between different devices and software versions**, e.g. LANCOM 1821+ Wireless ADSL to LANCOM 1823 VoIP
- All that is required for the exchange is the **normal configuration file** (".lcf"), e.g. a backup file
- This allows **existing configurations** to be **migrated easily** to new devices (e.g. when replacing discontinued LANCOM products)
- Where configurations are standardized at multiple sites, but different devices are being used (e.g. due to different interfaces), **a master configuration can be distributed between the different systems**.



LCOS 7.6
[LANCOM OPERATING SYSTEM]

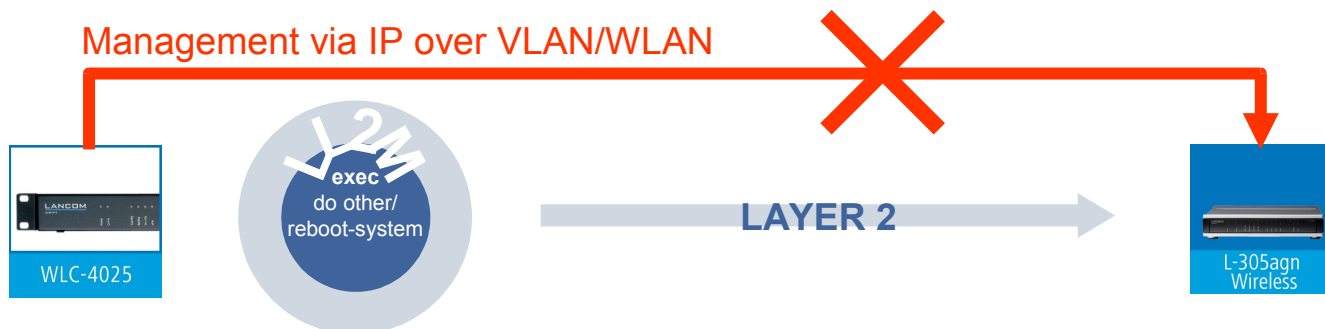
Feature Notes LCOS 7.6

Page 13

LANCOM
Systems

LL2M – LANCOM Layer -2 management:

- **LANCOM Layer-2 Management Protocol:** Encrypted Layer-2 packet that transmits executable script commands as payload to a LANCOM device
- With LL2M, **rescue & recovery** is possible for erroneously configured devices (e.g. VLAN errors), even if the error prevent admin access
- **Devices can be found** with ll2mdetect in the local segment (LAN, WLAN) and multicast or broadcast
- ll2mexec **allows to execute commands** at specific devices
- **Security** is equivalent to TLS-PSK with device passwords, making man-in-the-middle attacks impossible; to prevent a brute-force attack on the password (dictionary attack), we recommend that you use secure device passwords
- The **IPS mechanism** takes effect with a temporary lock in case of encryption with a wrong password, so preventing DoS attacks



iPhone VPN Support

Extended IKE Authentication (XAUTH)

- XAUTH is an extended authentication protocol can be used to provide additional username/password protection with IPSec connections

What is new in the LANCOM?

- XAUTH client and server in the LANCOM
- XAUTH can additionally be used for each VPN connection

How secure is XAUTH?

- Not supported by LANCOM are multiple VPN connections with the same keys (PSK or certificate) that rely on different XAUTH usernames/passwords only (this is a known security problem with XAUTH)
- A corresponding VPN entry is required for each XAUTH connection

What are the new possibilities with VPN?

- VPN connection with the Apple iPhone
- LANCOM as XAUTH client against rogue routers
- LANCOM as XAUTH server against rogue clients (e.g. Cisco Anyconnect)

LCOS 7.6
[LANCOM OPERATING SYSTEM]



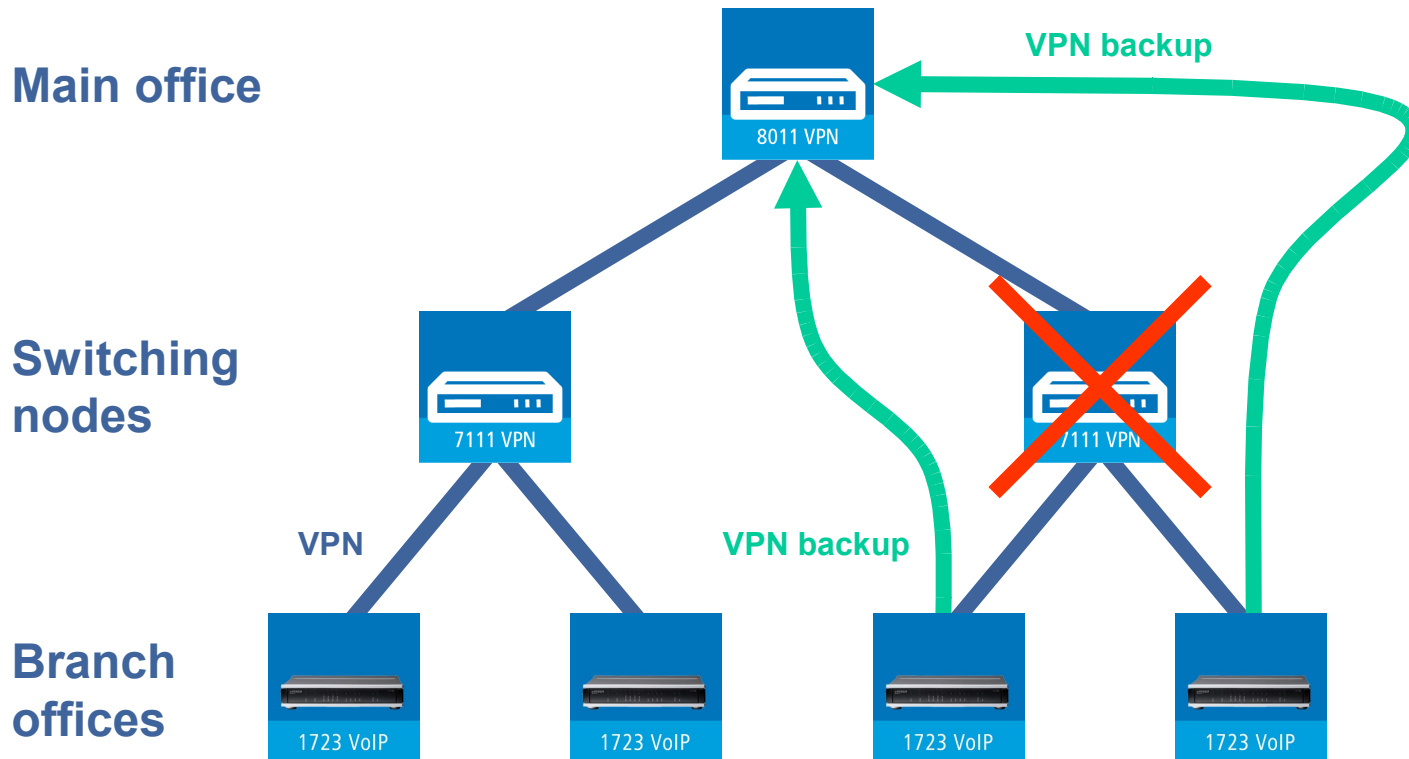
Feature Notes LCOS 7.6

Page 15

LANCOM
Systems

VPN backup across multiple hierarchy levels

- In **backup** events, the connection is to be established directly between the branch office and main office, and not via the switching node
- The **SAs** are **updated** for the new connection accordingly
- **Return** to the standard connection **when available**



WLAN Controller – Cluster monitoring

- **Controller cluster status** is displayed in LANmonitor
- **Status information for the cluster is summarized** in a single WLANmonitor window.
- The **data from all devices** belonging to the cluster are automatically collected in LANmonitor and shown **consolidated**

LCOS 7.6
[LANCOM OPERATING SYSTEM]

WLANmonitor

File Group Access Point WLAN Controller View Tools ?

Groups

- WLANmonitor
 - WLAN-Controller (2)
 - Rogue AP Detection
 - All APs (250)
 - Eigene APs (12)
 - Neue APs (180)
 - New APs (53)
 - Rogue APs
 - Unknown APs
 - Known APs
 - Own APs (5)
 - Rogue Client Detection
 - All Clients (380)
 - Neue Clients (233)
 - New Clients (147)
 - Rogue Clients
 - Unknown Clients
 - Known Clients
 - Own Clients

Controller

Name	New ...	Missi...	Activ...	IP-Address
LC_WLC-4025	0	2	9	10.1.1.15
LC_BKP_WLC-4025	0	2	9	10.1.1.16

Network Profiles

Name
VISITOR-H
WPA2-802
WPA2-HAU

Access Points / Active Radios

Name	Interface	Clients	Band	Cha...	IP Address	Background Scan
L305n-MPlu...	WLAN-1	0	5 GHz	140	10.98.1.35	200 s
L315-Sallus	WLAN-2	0	5 GHz	140	10.98.100...	200 s
L54-MPlum...	WLAN-1	0	5 GHz	100	10.98.1.37	180 s
lc-1821-SALL...	WLAN-1	0	2,4 ...	0	10.98.100...	180 s
lc-e202-3550	WLAN-1	0	2,4 ...	0	10.1.10.186	3600 s
lc-e202-3550	WLAN-2	0	-	0	10.1.10.186	3600 s
lc-e203-L310	WLAN-1	1	5 GHz	100	10.1.10.190	No scan
lc-e203-L54...	WLAN-1	0	2,4 ...	0	10.1.10.195	3600 s
lc-e203-L54...	WLAN-2	0	5 GHz	0	10.1.10.195	3600 s

Clients

MAC Address	Identification	Signal	Controller	Access Point
00:0b:6b:b0:04:6d	Martin PCI 802.11n	44 %	LC_WLC-4025	OAP310agn...
00:0e:35:cc:87:87	AFries IBM 54bg	50 %	LC_WLC-4025	lc-e360-L54ag
00:13:e8:47:37:23	CSchalle Intel 4965agn	22 %	LC_BKP_WLC...	lc-e213-XAP
00:13:e8:47:c3:e7	UBrocker Toshiba AGN	60 %	LC_BKP_WLC...	lc-e203-L310
00:16:6f:8d:25:6c	RAbe Centrino 54bg	--	LC_BKP_WLC...	lc-e213-XAP
00:1f:3b:26:7b:6f	TKirschke 4965AGN	11 %	LC_BKP_WLC...	lc-e213-XAP
00:80:48:3a:4d:ab	QS-Okowalew ?	47 %	LC_BKP_WLC...	lc-e303b-L54ag

LANmonitor - temporary (1)

File Device View Tools Help

LANCOM Systems

- LC_WLC-4025
 - Wireless LAN
 - Network profiles
 - New APs: None
 - Missing APs: 2
 - Active APs: 18
 - WLC connections: 1
 - WLC: LC_BKP_WLC-4025
 - WAN connections: 1
 - Certificates
 - VRPP
 - Firewall: 12/18/2008 11:17:44 intruder detection - Packet dropped
 - System information
- LC_BKP_WLC-4025
 - Wireless LAN
 - Network profiles
 - New APs: None
 - Missing APs: 2
 - Active APs: 18
 - WLC connections: 1
 - WLC: LC_WLC-4025
 - WAN connections: 1
 - Certificates
 - VRPP
 - Firewall: 12/18/2008 11:17:43 intruder detection - Packet dropped
 - System information

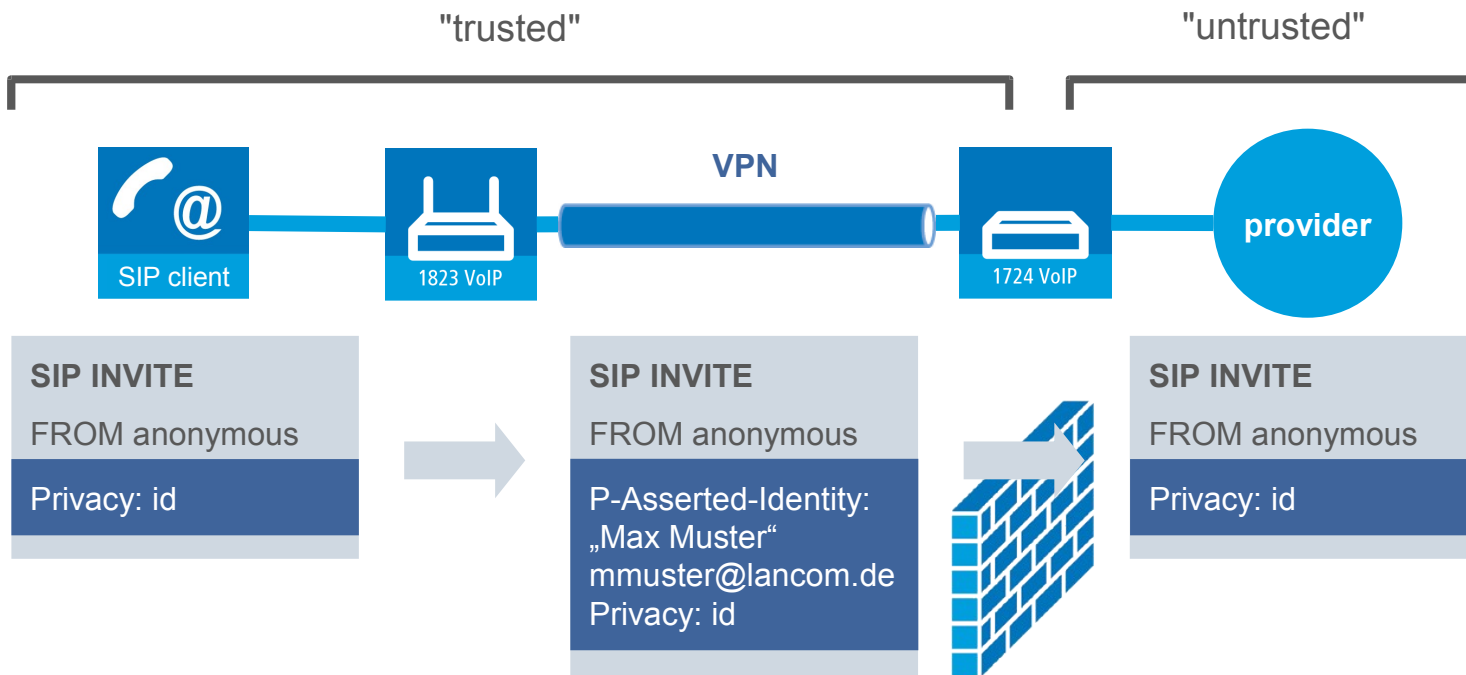
Feature Notes LCOS 7.6

Page 17

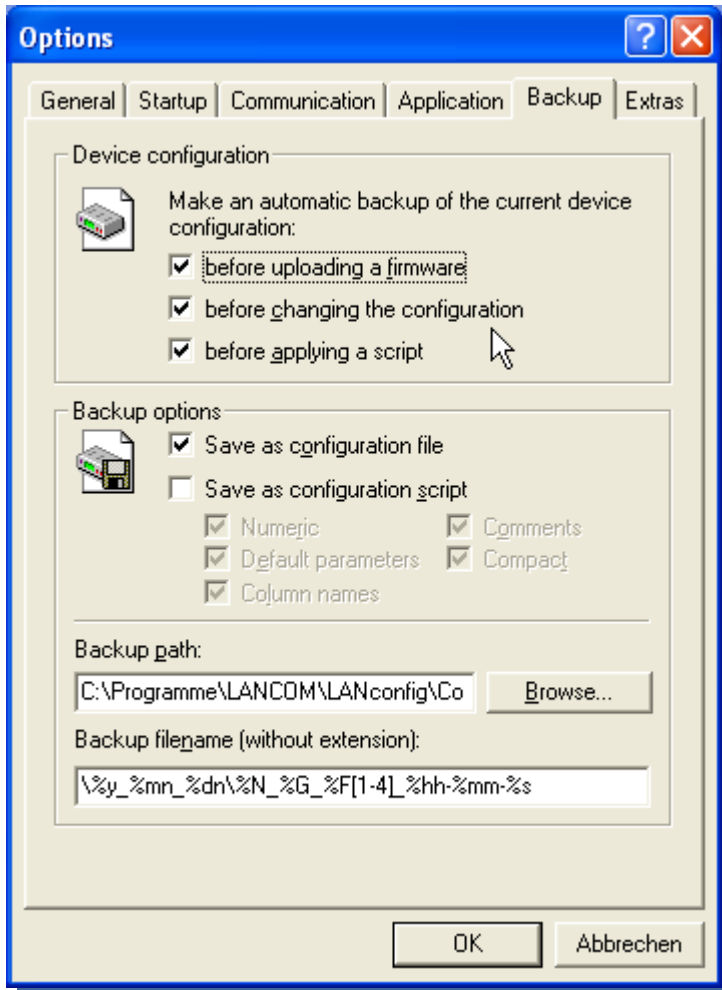
LANCOM
Systems

SIP proxy – "CLIR" in SIP

- SIP privacy/screening for **call number suppression/display** ("CLIR")
- **Filtering** at the border to untrusted networks
- Support for different methods (**RFC3325, IETF draft SIP privacy 04**)
- **CLIR** for analog, ISDN or SIP subscribers



LANconfig – Automatic backup

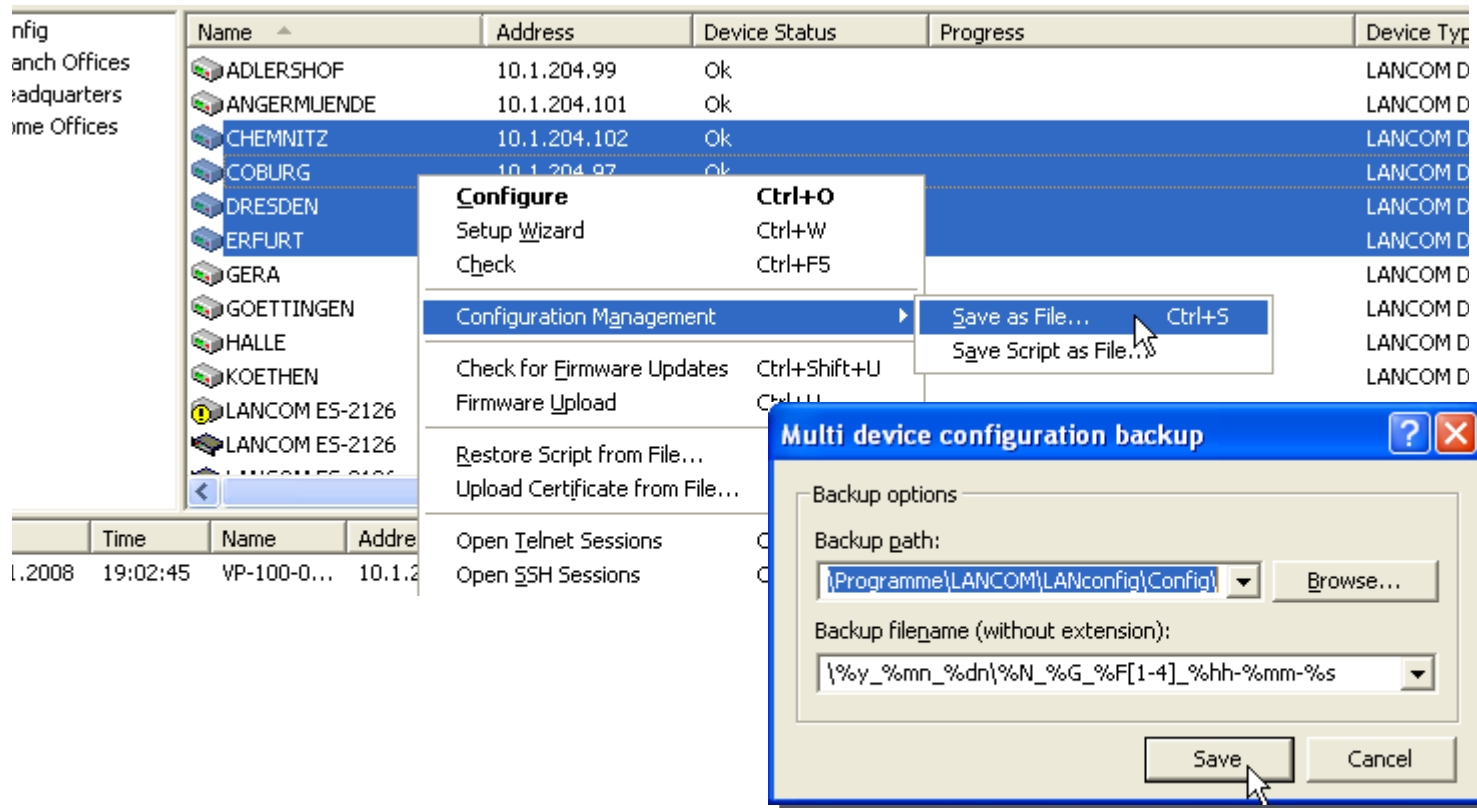


- **Automatic backup** of device configurations when uploading firmware, changing the configuration or when executing a script (all active by default)
- Backup as **configuration file or script**
- **Generic file names** (configurable) with wildcards (e.g. for date, time, device name, type and firmware) and a standard backup path

LANconfig – Multiple backups

- **Backup multiple configuration files** for various devices in one step
- Ideal for **backups for project installations** with different devices
- **Generic file names** (configurable) and standardized backup path

LCOS 7.6
[LANCOM OPERATING SYSTEM]



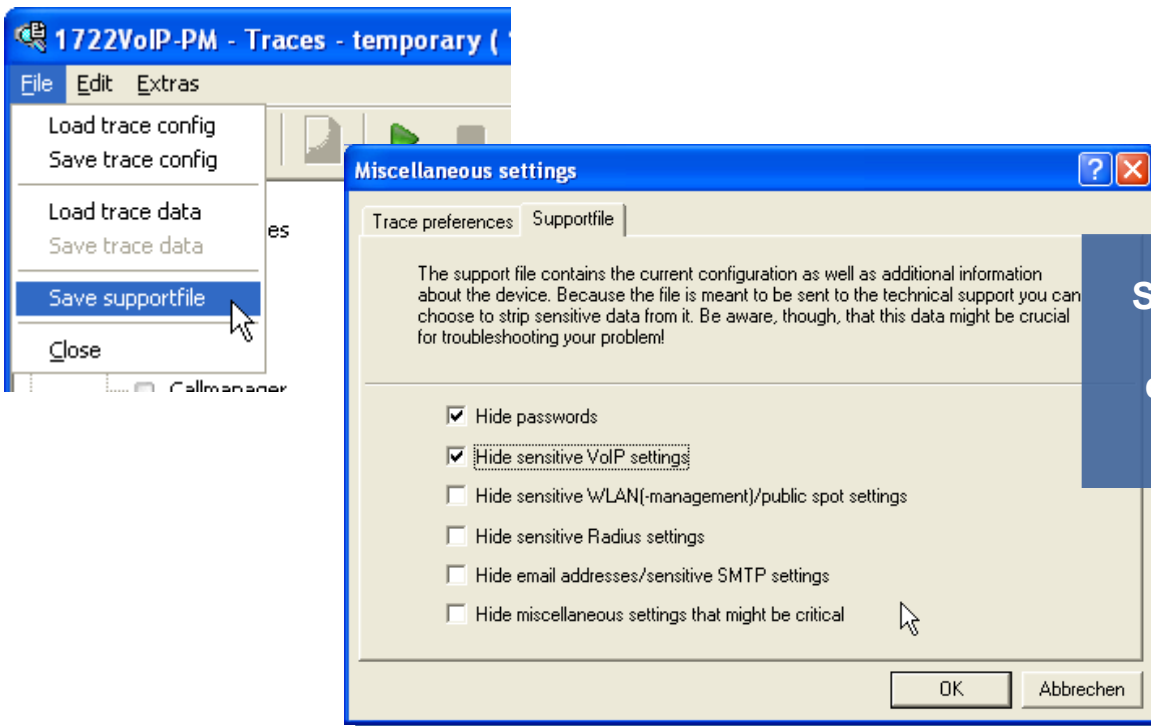
Feature Notes LCOS 7.6

Page 20

LANCOM
Systems

LANmonitor – New to traces/support file

- **SSL-encrypted access** for executing traces on devices
- **Continual backup** with settings for maximum file sizes
- **Time set** for devices without a valid system time
- **Export a support file** containing sysinfo, bootlog and configuration
➔ This greatly improves response times and quality of support



Security-related
information is
excluded from
support files

LCOS 7.6
[LANCOM OPERATING SYSTEM]

Service and Support

We wish you every success with your new LANCOM product!

We look forward to your **praise and criticism, suggestions or questions** to
info@lancom.de.

The latest information about Service and Support can be found on our Support flyer,
our Internet site or from our **Knowledge Base** under
www.lancom-systems.de/eu/support.

If the manual and our current support themes in the Internet are of no help to you,
then our **Support Hotline** is available to you in Germany on work days from
9:00 – 17:00h under

0900-1-LANCOM (= 0900-1-526266)

(1.24 € / Min. from German landlines).

Your LANCOM Systems Team

LCOS 7.6
[LANCOM OPERATING SYSTEM]

LANCOM

Systems