Feature Notes

LCOS 9.0

[LANCOM OPERATING SYSTEM]

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LCOS 9.0
[LANCOM OPERATING SYSTEM]

The LANCOM operating system LCOS and the corresponding management tools (LCMS) **regularly provide free new functions** for current LANCOM routers, access points, and gateways.

We expand our WLAN optimization concept LANCOM Active Radio Control!

With **Client Steering** LCOS 9.0 offers an **optimal distribution of clients** in the radio field.

Furthermore, LCOS 9.0 features **Auto WDS** for **wireless integration of access points** in the infrastructure, **Fast Roaming** for an **improved roaming experience,** and a lot more!

Read on for more of the most important features and improvements summarized in brief.

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LCOS 9.0
The new highlight features

Client Steering
More performance for WLAN clients thanks to an intelligent steering to the ideal access point
The new highlight of our WLAN optimization concept LANCOM Active Radio Control: Thanks to an active steering of WLAN clients to the most suitable access point, the WLAN performance is significantly increased. Client Steering is ideal for an optimal load balancing especially in WLAN scenarios with a high number of end devices.

Auto WDS
Automatic network integration of access points via WLAN in controller-based infrastructures
Auto WDS enables the wireless integration of APs into an existing infrastructure. The access points can be administrated centrally by a WLAN controller, wired or wireless. The admin keeps full control over his network structure, guaranteeing the secure integration of the access points.

Fast Roaming
Fast roaming in controller-based WLAN environments
Fast Roaming, based on the WLAN standard IEEE 802.11r, enables fast roaming processes between access points for an optimal WLAN user experience. In controller-based WLAN installations with authentication via pre-shared key or based on IEEE 802.1X, the access keys of the clients are cached and automatically passed on to all managed access points.

Client Steering

- Intelligent steering of end devices in controller-based environments
- Automatic connection of clients to the most ideal access point
- Optimal distribution of the clients to the available access points
- Select from predefined scenarios or adjust the parameters individually

CLIENT STEERING

Client distribution based on:
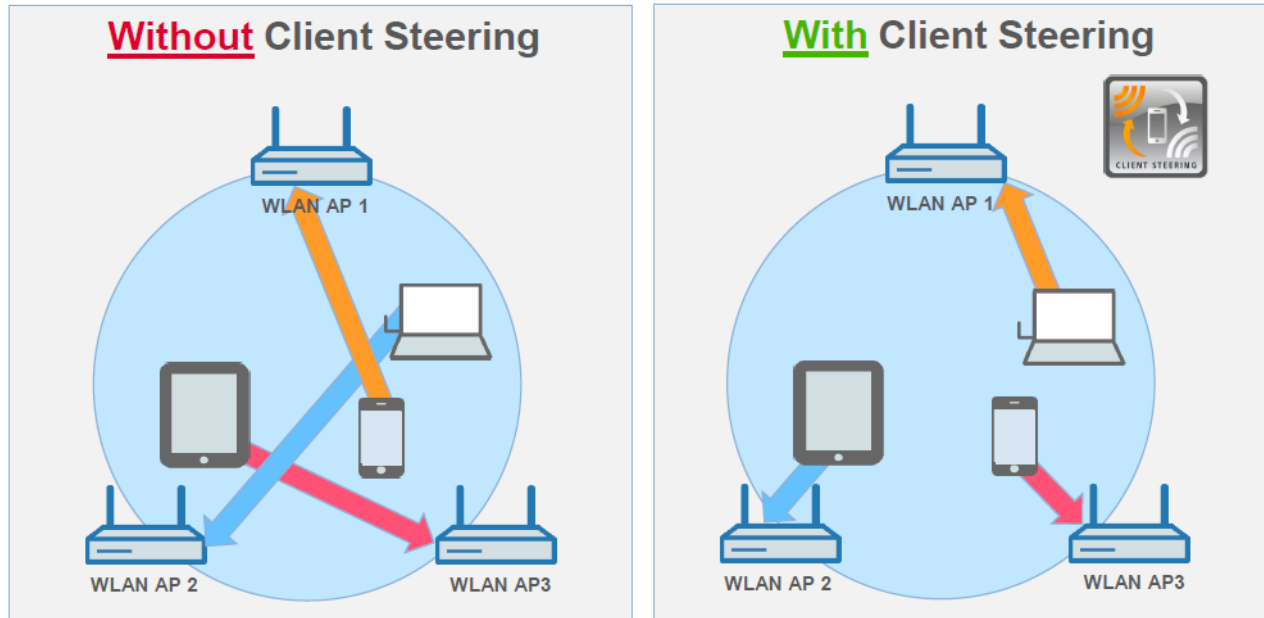
- Number associated clients

- Signal strength

- Frequency band

LANCOM **A**ctive **R**adio **C**ontrol

New extension for LANCOM Active Radio Control

Client Steering

Intelligent distribution of WLAN clients with regard to **signal strength**

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Client Steering

Intelligent distribution of WLAN clients with regard to **the number of associated clients per access point**

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Client Steering

Prioritization of different parameters for the client distribution:

Priority	High-density	Normal mode	Custom mode
1	Number of clients	Frequency band	
2	Frequency band	Signal strength	Freely configurable
3	Signal strength	Number of clients	

Client Steering can be individually configured, according to your needs!

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The new highlight features

LANCOM Active Radio Control

Professional WLAN optimization tools for…

…more WLAN throughput due to less channel overlaps thanks to the automatic selection of optimal WLAN channels **(RF Optimization)**

…optimized load distribution in the WLAN by actively steering clients to the less congested and more powerful 5 GHz frequency band **(Band Steering)**

…an active steering of WLAN clients to the most suitable access point **(Client Steering)**

…significantly more data throughput for clients in heavily loaded WLAN environments with many foreign interference signales in the radio field **(Adaptive Noise Immunity)**

…efficient WLAN troubleshooting by graphical representation of interferences in the radio field **(Spectral Scan)**

**Client Steering –
The new feature for the full
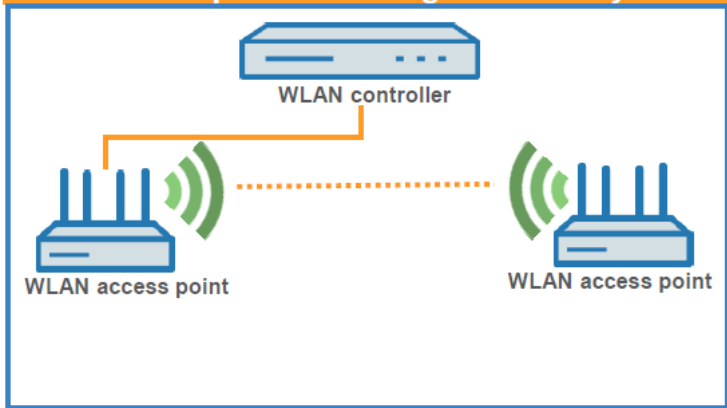potential of your WLAN**

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Auto WDS

- Automatic radio connection between access points in controller-based infrastructures
- Central administration of the access points by the WLAN controller

Troublesome installation of cables for every access point is no longer necessary!

WLAN controller

WLAN access point   WLAN access point

Advantages:

- Full control over the network structure

- Due to pairing* the secure integration of the APs is guaranteed

AUTO WDS

* Onetime connection of access points and WLC via cable for start-up

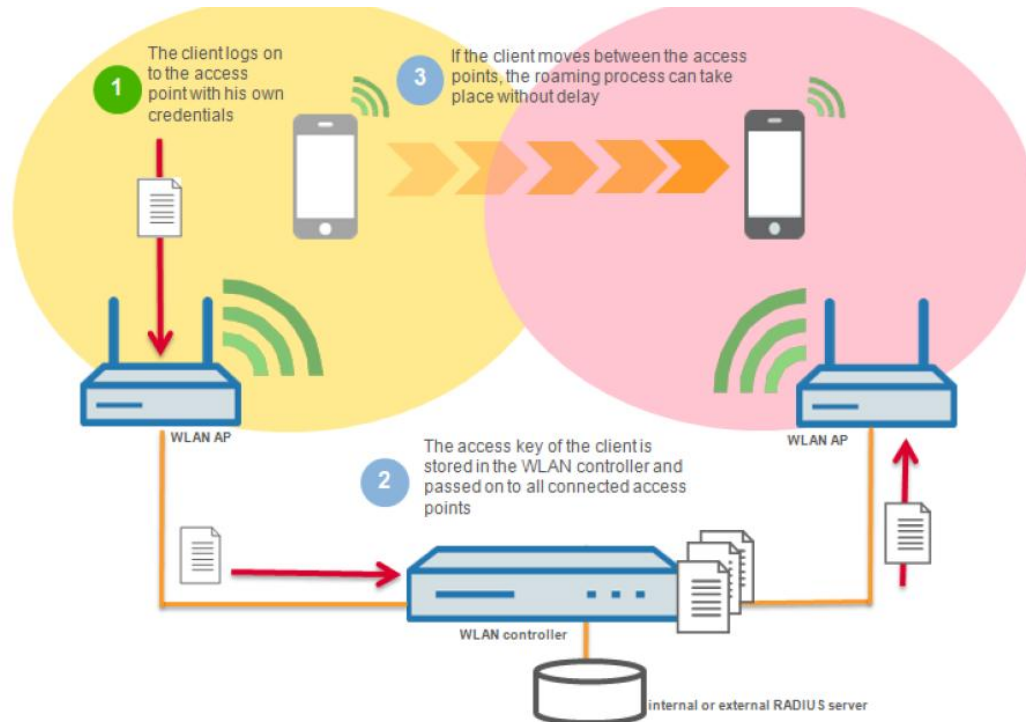LANCOM
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The new highlight features

Fast Roaming

- For controller-based WLAN installations with WPA2 encryption
- Due to the new WLAN standard IEEE 802.11r the access keys of the clients are cached and automatically passed on to all managed access points
- IEEE 802.11r supports pre-shared key and IEEE 802.1X
- With IEEE 802.1X no new request to the central RADIUS server is required

Currently this is supported by current iOS devices (iPhone, iPad)
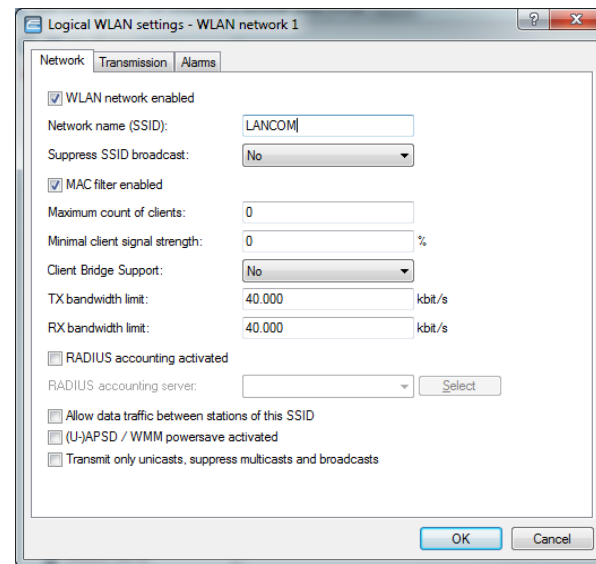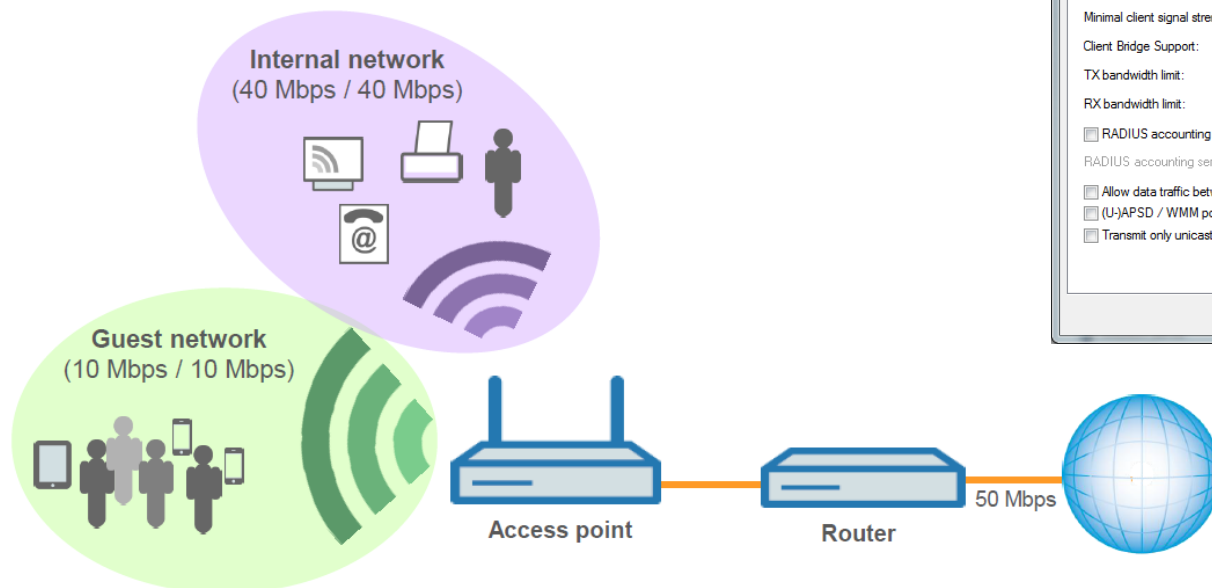
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Fast Roaming with IEEE 802.11r

Bandwidth management per SSID in the WLAN

- The provided bandwidth can be individually configured for each SSID (upload/download)

Logical WLAN settings - WLAN network 1

Network | Transmission | Alarms

☑ WLAN network enabled

Network name (SSID):	LANCOM
Suppress SSID broadcast:	No

☑ MAC filter enabled

Maximum count of clients:	0
Minimal client signal strength:	0 %
Client Bridge Support:	No
TX bandwidth limit:	40.000 kbit/s
RX bandwidth limit:	40.000 kbit/s

☐ RADIUS accounting activated

RADIUS accounting server: [Select]

☐ Allow data traffic between stations of this SSID
☐ (U-)APSD / WMM powersave activated
☐ Transmit only unicasts, suppress multicasts and broadcasts

[OK] [Cancel]

Internal network
(40 Mbps / 40 Mbps)

Guest network
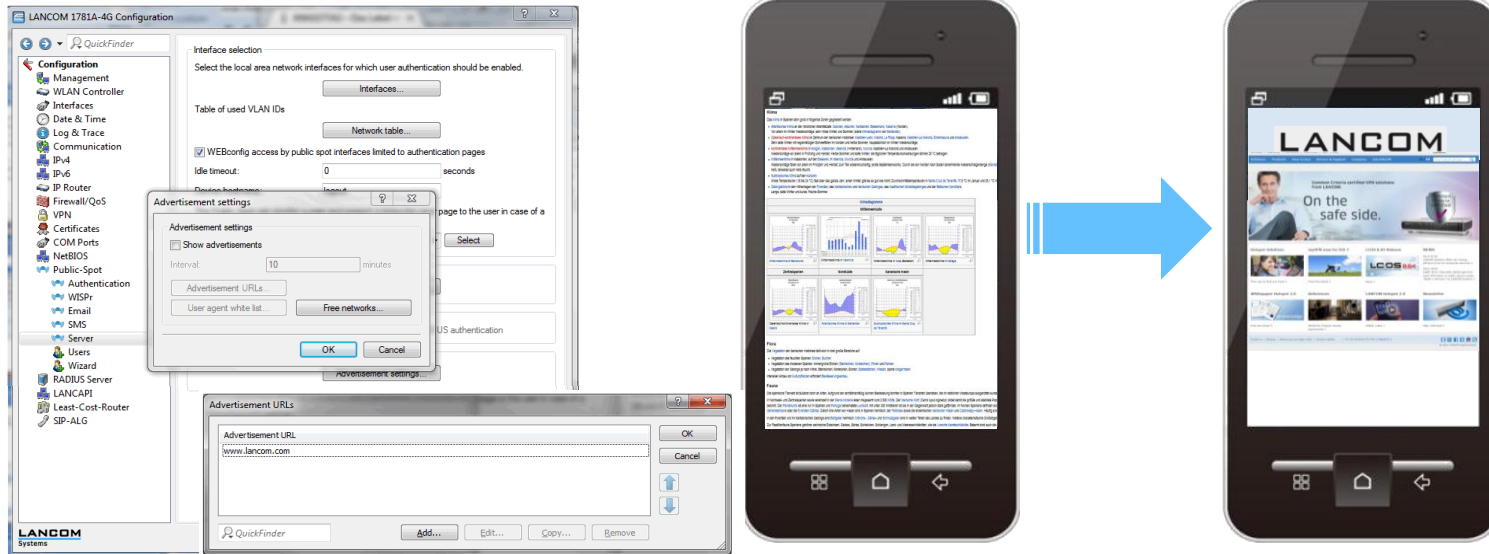(10 Mbps / 10 Mbps)

Access point

Router

50 Mbps

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further features

Advertisement in the LANCOM Public Spot

- The hotspot user can be redirected to advertisement websites in configurable time slots
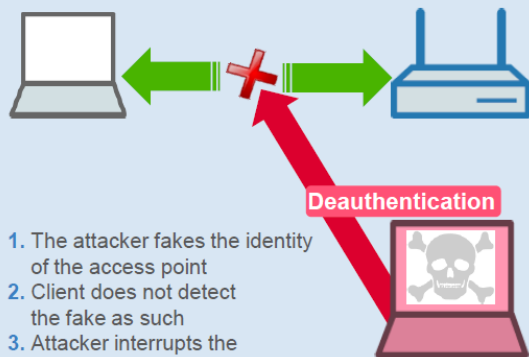
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further features

Protected Management Frames (IEEE 802.11w) in the WLAN

- Protection of WLAN management frames like authentication or de-authentication against man-in-the-middle attacks, such as tracing or the feigning of packages
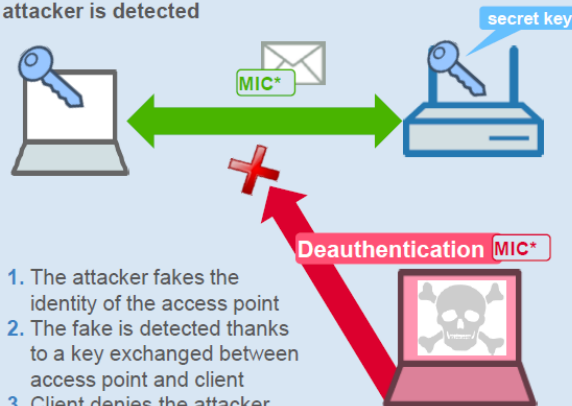
Without Protected Management Frames

Data exchange between the client and the access point is disrupted by a man-in-the-middle attack

Deauthentication

1. The attacker fakes the identity of the access point
2. Client does not detect the fake as such
3. Attacker interrupts the connection between access point and client

With Protected Management Frames

Data exchange is not disrupted because the wrong or non-existent MIC (Message Integrity Code) of the attacker is detected
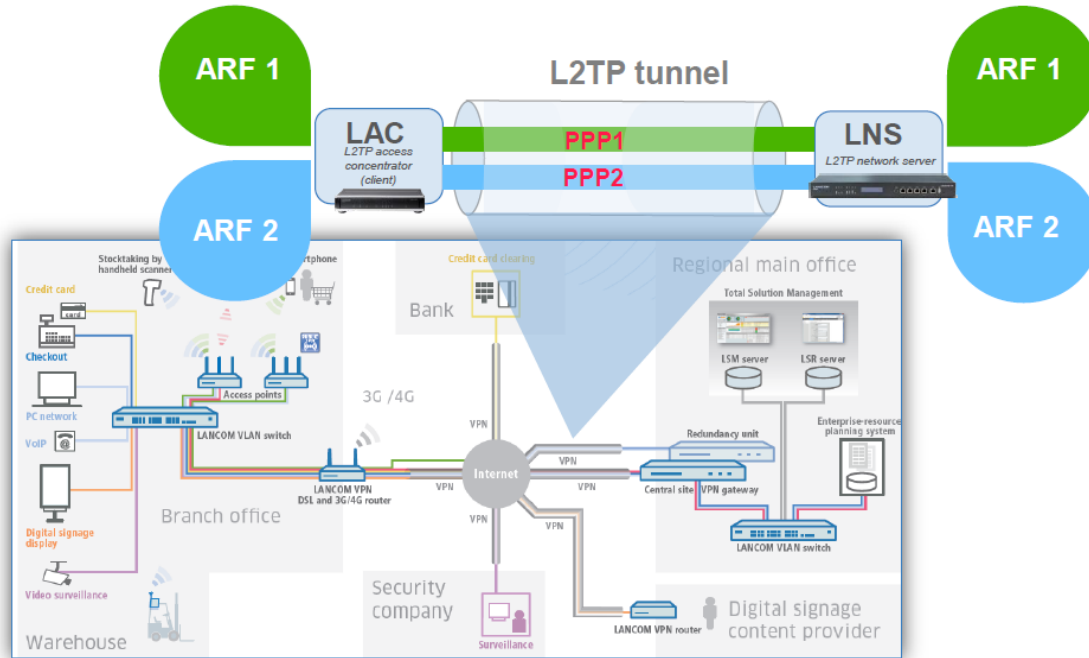
secret key

MIC*

Deauthentication MIC*

1. The attacker fakes the identity of the access point
2. The fake is detected thanks to a key exchanged between access point and client
3. Client denies the attacker access

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Support of L2TP

- Support of the protocol L2TP – ideal for a secure and comfortable network virtualization

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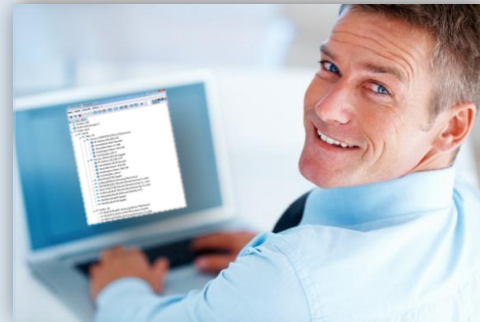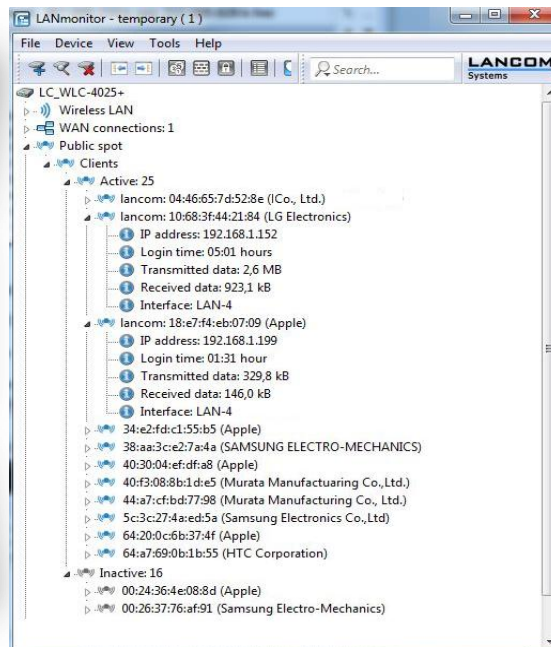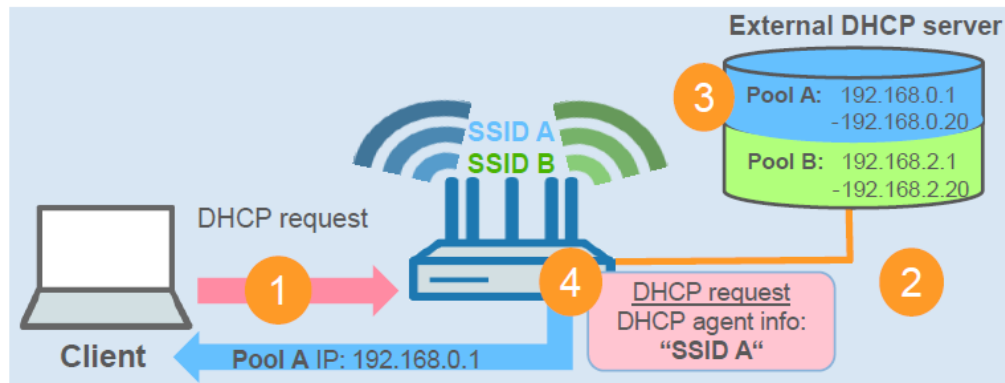Systems

Display of LANCOM Public Spot clients via LANmonitor

- Public Spot clients can be specially marked as such in LANmonitor

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Support of DHCP option 82

- Logical distinction of WLAN user groups thanks to the marking of DHCP messages for a subsequent classification into different address pools
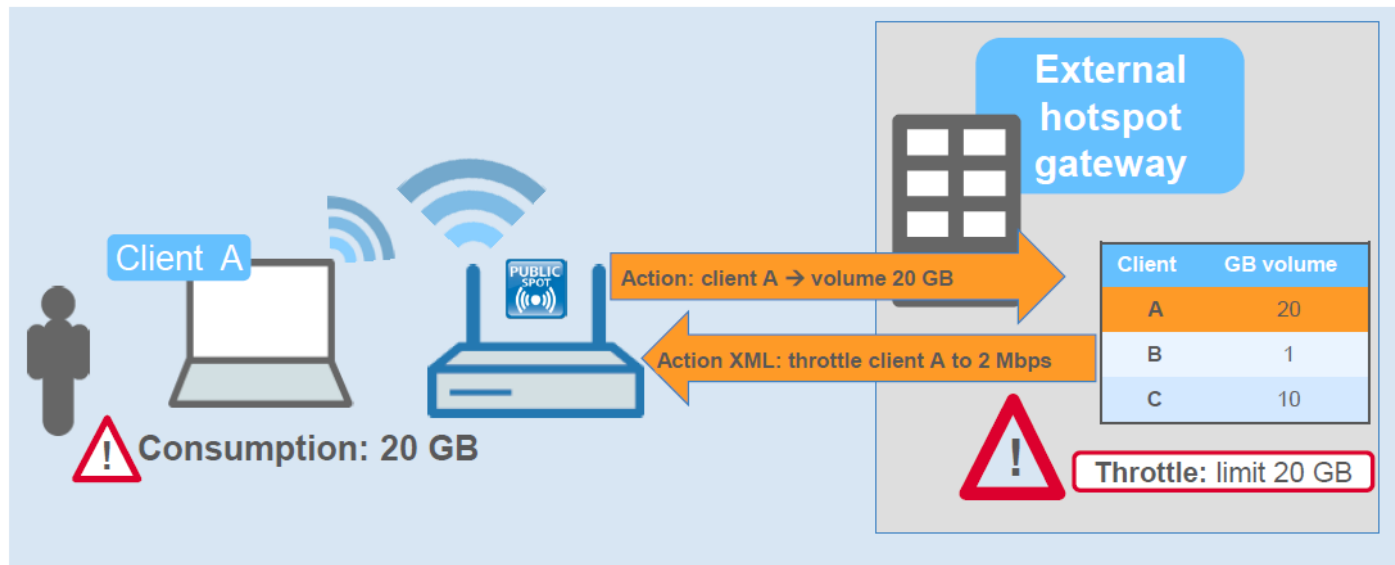

External DHCP server

SSID A
SSID B

DHCP request

Pool A: 192.168.0.1
        -192.168.0.20
Pool B: 192.168.2.1
        -192.168.2.20

1 DHCP request from the client

2 Access point inserts DHCP agent information (DHCP option 82) →here SSID A

3 DHCP server selects appropriate pool for SSID A

4 The client receives an IP address from pool A

DHCP request
DHCP agent info:
"SSID A"

Client
Pool A IP: 192.168.0.1

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Dynamic change of user sessions in the XML interface

- The bandwidth of Public Spot users can be reduced during a session

External hotspot gateway
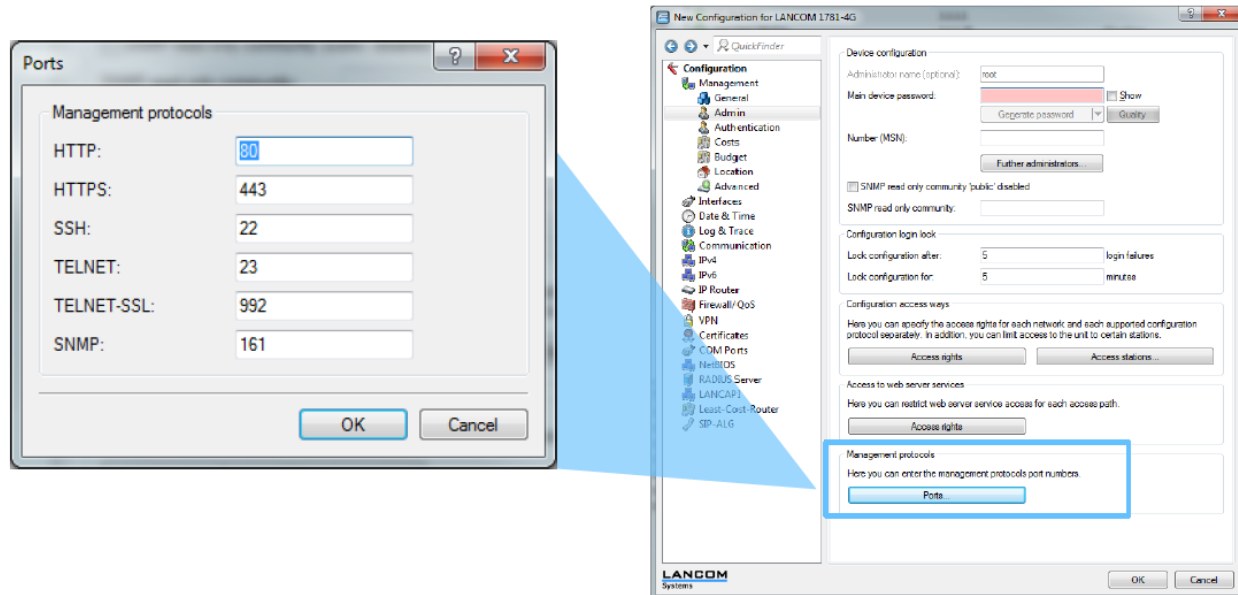
Client A

PUBLIC SPOT

Action: client A → volume 20 GB

Action XML: throttle client A to 2 Mbps

! Consumption: 20 GB

Client	GB volume
A	20
B	1
C	10

! **Throttle:** limit 20 GB

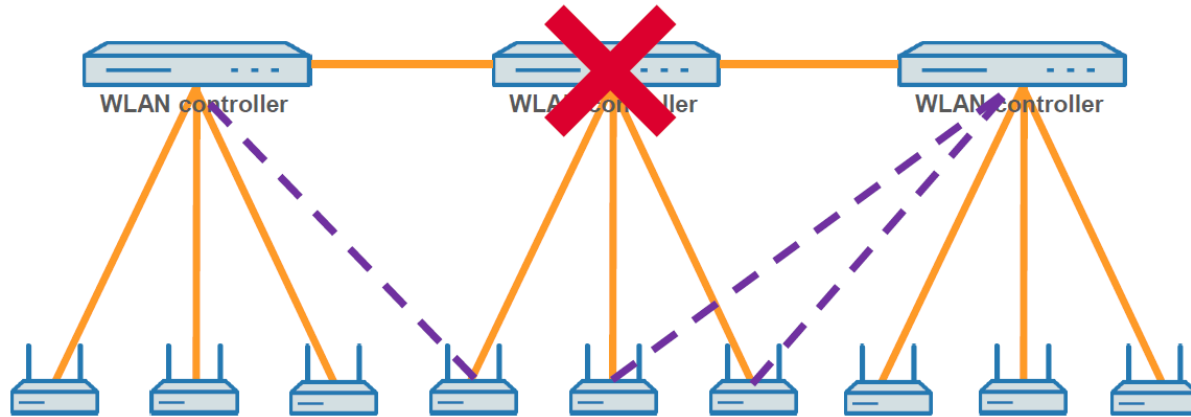LANCOM
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Central configuration of management ports in LANconfig

- Management ports such as SSH, HTTP(S), TELNET(-SL) or SNMP can be centrally configured via a separate menu item

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further features
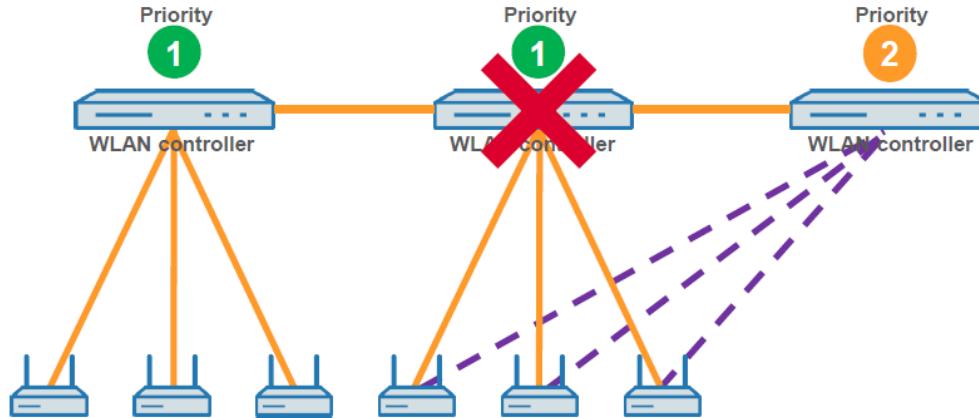
WLC Load Balancing

- Optimal load balancing due to an equal distribution of access points to the WLCs

- Equal distribution of access points after failure of one WLC

- Redistribution can be conducted during maintenance periods or during times of little traffic

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WLC Backup

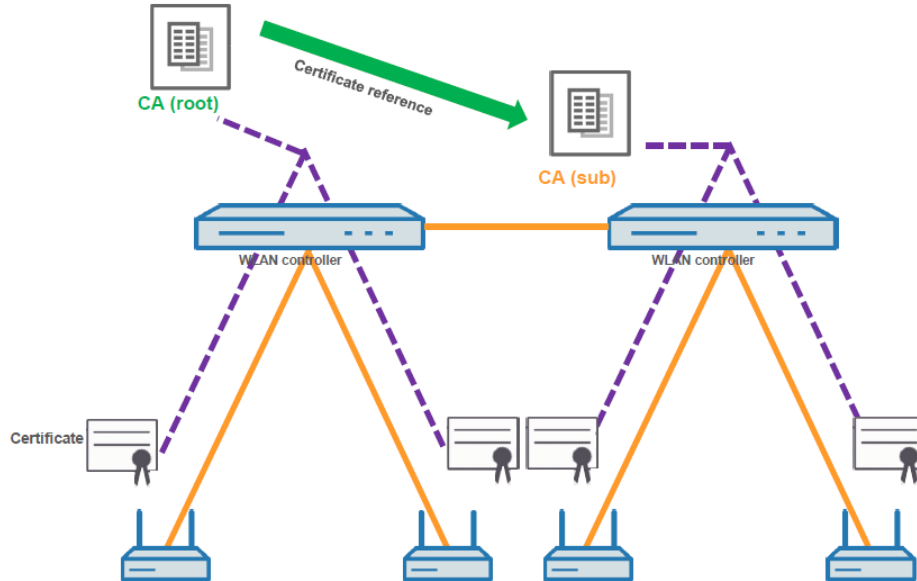**High availability due to reliable backups**

- In case of WLC failure or if the capacity of a higher prioritized WLC is exceeded, access points are automatically distributed to lower prioritized WLCs

- Automatic redistribution to the re-available, higher prioritized WLC

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WLC CA Hierarchization

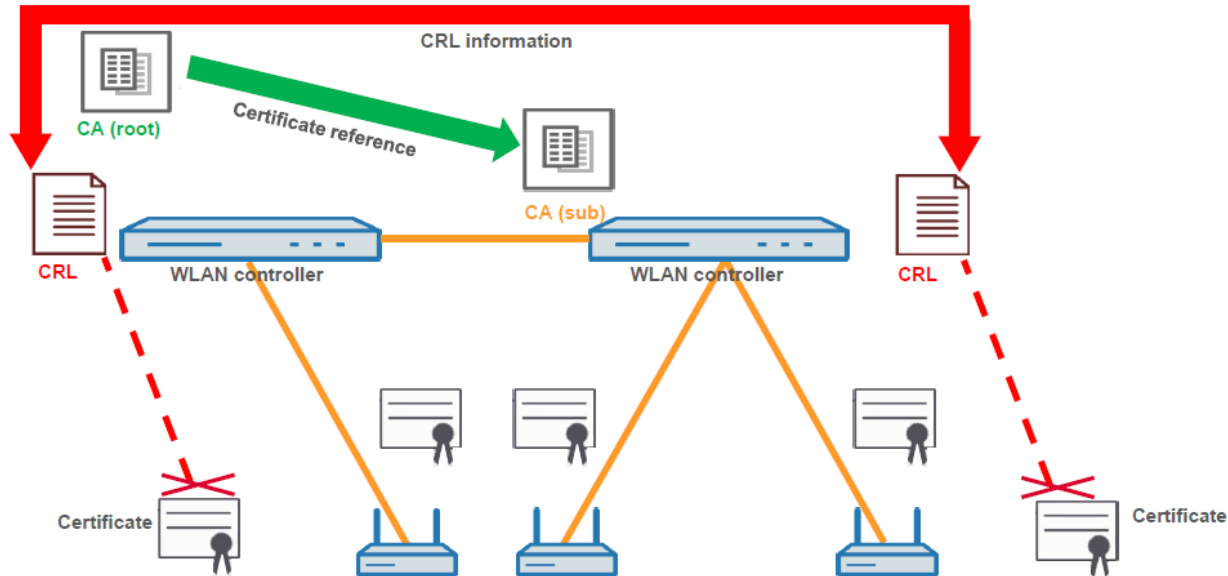Application 1: Trusted chain between the CAs (Certificate Authorities) on connected WLAN controllers

WLC CA Hierarchization

Application 2: WLCs exchange information about withdrawn certificates (Certificate Revocation List), so a certificate is not usable for another WLC
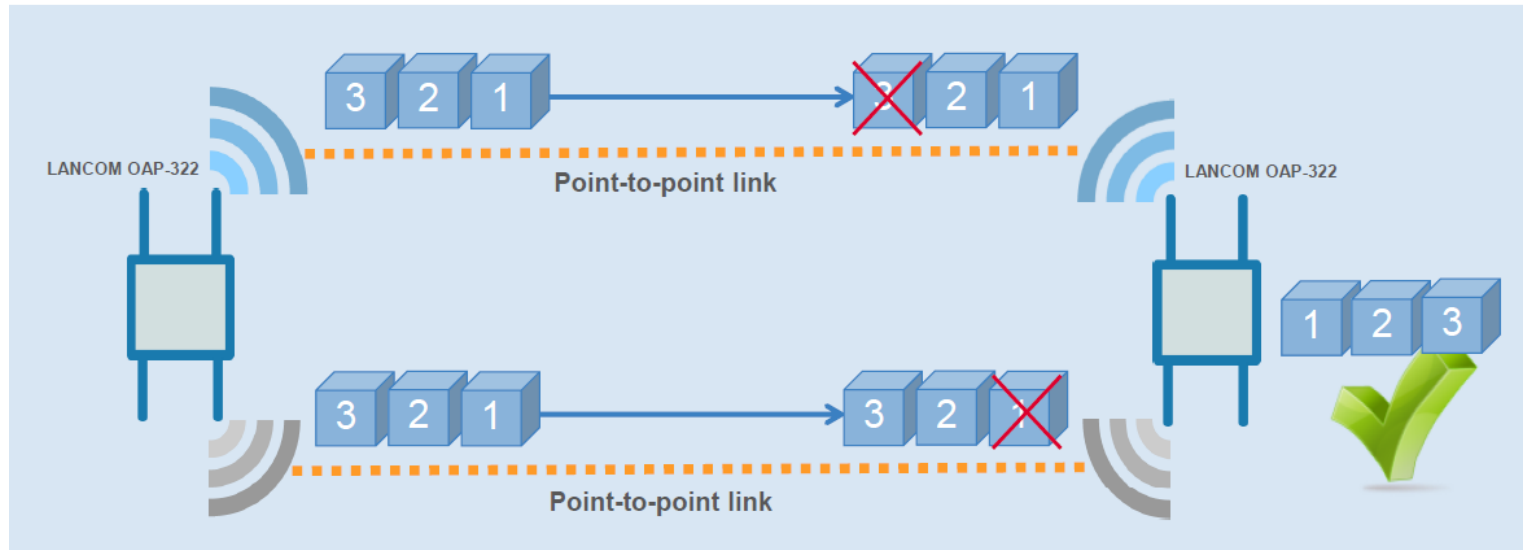
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PRP (Parallel Redundancy Protocol)

- Significant reduction of package losses in point-to-point scenarios with dual radio access points* due to redundant package transmissions

*Functionality for LANCOM OAP-322, LANCOM OAP-382, LANCOM IAP-322

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further features

- **New IPv6 features**
  Dual Stack Lite, RAS dial-in via IPv6, IPv6 support for RADIUS servers and clients, additional loopback addresses

- **Security features**
  Forward Secrecy and ECDH for TLS, larger key length in SSL

- **Blocking of rogue routers and DHCP servers (snooping)**
  Due to RA Guard and DHCP Guard, illegal IPv6 routers and DHCP servers (IPv4, IPv6) in the network can be blocked in layer 2

- **Separate RADIUS accounting servers for each SSID**
  For each SSID, a dedicated RADIUS server can be defined to allow a separate accounting for each SSID

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further features

- **LEDs can be deactivated boot-persistently**
  LEDs can be deactivated via LANconfig and stay deactivated or activated even after a restart of the device

- **Display of statically configured WAN IPs in LANmonitor**
  Static IP addresses of configured WAN connections can be displayed in LANmonitor

- **Addition of several ISPs in the Internet wizard**
  The Internet access wizard offers the selection of further Internet service providers for a comfortable configuration

- **Content Filter extension for HTTPS websites**
  Blocking of HTTPS websites due to the removal of DNS names by HTTPS server certificates or by "reverse DNS lookup" of IP addresses

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Thank you
Further information...

You can find more information on our products, solutions and services at:

www.lancom.eu

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