

LANCOM™ Techpaper

Layer-3-Tunneling

Introduction

Layer-3-Tunneling involves the extended application of the CAPWAP protocol (control and provisioning of wireless access points) as used by wireless LAN (WLAN) controllers to manage WLAN access points. It allows WLAN data to be fed into the LAN from a central WLAN controller by establishing a data tunnel between the WLAN controller and the access point. Please refer to LANCOM Techpaper Smart WLAN Controlling for basic information on the CAPWAP standard.

Technology

The CAPWAP standard differentiates between the control channel and data channel. In normal operation, only the control channel is used for management functions, and all data received from the wireless LAN is transferred into the LAN directly at the access point. When using the optional data channel, an IP data tunnel is set up between the access point and WLAN controller, which initially transfers all WLAN data traffic to the controller.

Areas of application and examples

The examples below cover the usual applications of Layer-3-Tunneling and show the particular benefits.

Overlay networks

No VLAN infrastructure is required between the WLAN controller and access point in order for individual SSIDs to be allowed or prohibited from accessing certain parts of the network. A VLAN infrastructure is only required at the transfer point between the WLAN controller and the local networks because data from the individual SSIDs is transported in a layer-3 tunnel between the access point and WLAN controller. This is an interesting setup where certain network resources should only be available in a specific network. Figure 1 shows one possibility of splitting a network through Layer-3-Tunneling. In the example, only the WLC, the L2 core switch and the servers need to be configured for a VLAN. The remaining infrastructure requires no VLAN configuration and actually does not even have to support VLAN. The essential prerequisite is successful communication between the WLAN controller and access point.

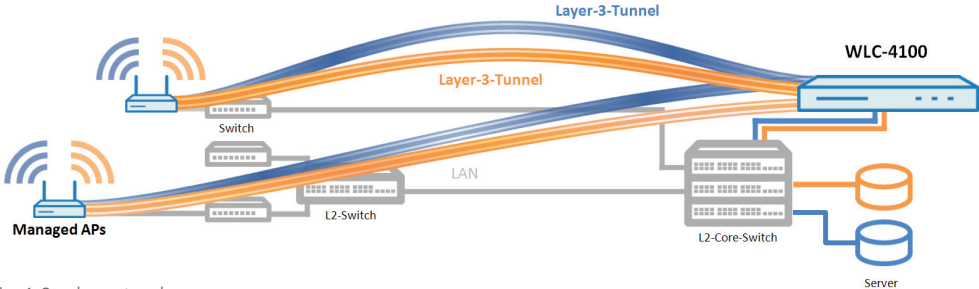


Fig. 1 Overlay networks

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Layer-3-Tunneling

Wireless LAN guest access

Data from a guest account is separated off from the rest of the network in the interests of security. In contrast to having to configure all the components of the infrastructure when using VLAN, Layer-3-Tunneling only requires a portion of them to be configured. These include the WLAN controller itself and any additional components that forward the data after they have been fed into the network by the WLAN controller. This setup is feasible because the Public Spot data is transferred through a layer-3 tunnel to the WLAN controller instead of being fed into the local network directly at the access point (Fig. 2). This guarantees the necessary level of security while reducing the administrative overhead.

Remote Public Spot

It is not possible to operate a Public Spot at different remote locations over a WAN connection. However, Layer-3-Tunneling is independent of the infrastructure and also functions beyond the boundaries of broadcast domains. This means that access points that communicate with the WLAN controller over a WAN connection can be used to operate a Public Spot that is managed by the WLAN controller. The advantages of this is that a single central instance can manage the Public Spot, meaning that there is no need to individually configure the Public Spot at every location. For example, a restaurant owner with two outlets can provide both outlets with a Public Spot. The administrative overhead is greatly reduced (Fig. 3) because there is no need to maintain multiple configurations, content filters, etc.

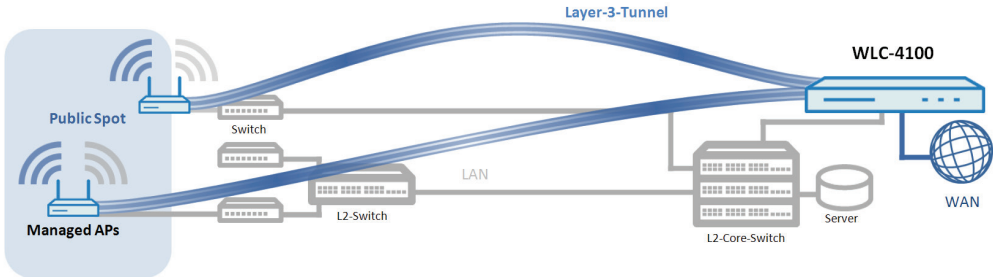


Fig. 2 Wireless LAN guest access

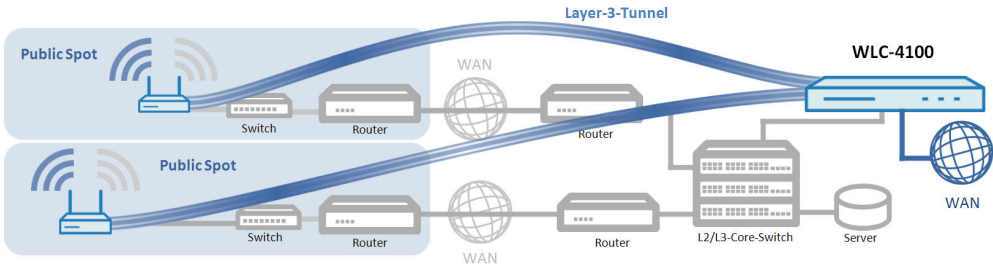


Fig. 3 Remote Public Spot

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Layer-3-Tunneling

Layer-3 roaming

Another application for Layer-3-Tunneling is to extend a logical network across access points located in different IP networks. This allows seamless roaming for wireless LAN clients, something which was not previously possible owing to different broadcast domains. Voice over wireless LAN (VoWLAN) benefits greatly from this; previously, the connection was cut when switching from one subnet to the next. It also facilitates the creation of extensive wireless networks; for example, a university has networks in each building, but some of these are not directly connected to the campus backbone but via WAN connections, instead (Fig. 4).

Summary

Layer-3-Tunneling can be used to provide solutions in various scenarios such as voice over WLAN, for remote Public Spots, wireless LAN guest access and overlay networks. Also, the possibility of logically combining SSIDs without having to resort to VLANs reduces the administrative overhead in the network.

Additional information sources

Specific configuration examples are given in the LANCOM documentation dealing with Layer-3-Tunneling. You will find further information on the CAPWAP standard both in the Reference Manual and the LANCOM Techpaper on Smart WLAN Controlling.

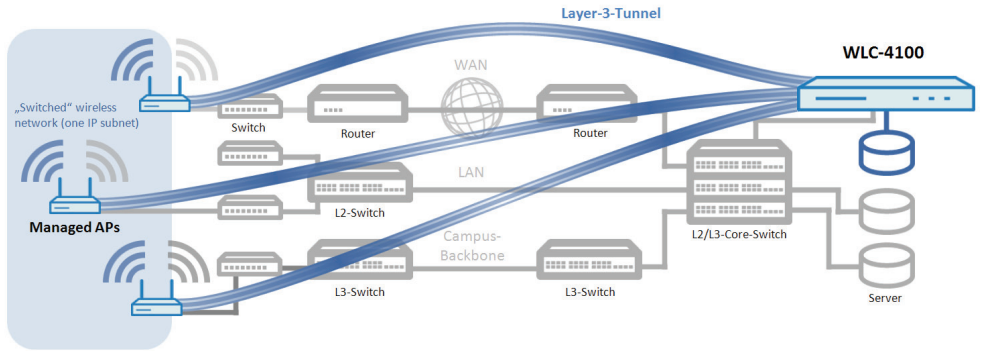


Fig. 4 Layer-3 roaming