



LigoController

DATASHEET



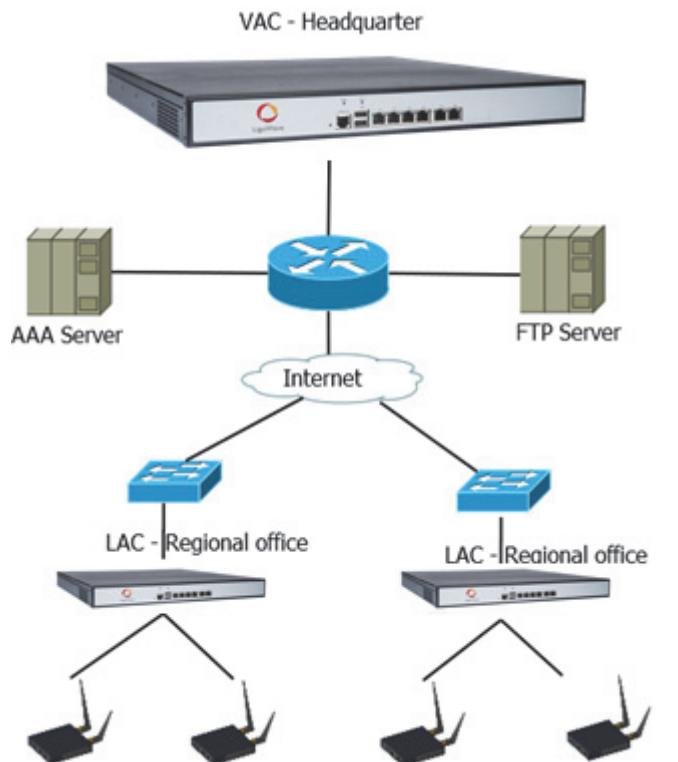
Introduction

LigoWiFi is a managed WiFi hotspot deployment turn-key solution for enterprise, retail, and vertical sector owners. The LigoWiFi solution is composed of 2 major parts: LigoController and the CLN series AP. The LigoController gives you the ability to manage the WiFi equipment, subscribers' authentication, create customizable access portals containing powerful proximity marketing, advertising, social media and analytics applications redefining the WiFi engagement experience.

LigoWiFi solution can be deployed in LAN environment or across the internet(NAT) only if the WiFi device/AP can reach AC, providing the extreme flexibility to deploy over DSL, WiMAX, 3G, 4G, FTTH, Ethernet, CMTS, cable or any network.

The LigoController allows the VAC and LAC endpoints to reside on different interconnected devices. While the VAC provides firewall, VPN, wireless RF optimization, access control authentication, portal content and services across the network, roaming, robust wired and wireless unified management control functions; the LAC is the node acting on the other side of the tunnel endpoint. The LAC is the peer to the VAC, sitting between the VAC and client APs, it offers management for access points at a local level, offloading additional access or security requirements from the VAC. The result is an improved user experience and streamlined workflow for managing the AP infrastructure, securely and easily. The flexible network architecture uniquely designed for the LigoWave solution gives industries and enterprises the edge to expand quickly and effectively, while maintaining a streamlined and manageable, cost-effective network.

From the-service provider perspective, the shared infrastructure offers simple access to multilevel management, advertising, content delivery, hardware maintenance, social media providers. In this way, the LigoController platform turns WiFi engagement into multilevel management and operation for every provider.



- LigoWiFi: The Ligowave managed turn-key hotspot solution
- LigoController: The Access controller of the LigoWiFi solution providing WiFi devices management, authentication, portal service and network functionalities. It includes VAC, LAC and WAC



LigoWiFi solution

LigoWiFi is composed of the LigoController and the CLN AP series.

LigoController: The Access Controller (AC) providing WiFi devices management, Authentication, Portal and Content services. It includes VAC, LAC and the WAC

- **VAC**

The VAC is a tightly integrated unit offering virtualized distributed firewalls, distributed switching, advanced security, and layer 4-7 services. The VAC provides a variety of virtual networking and network services, such as end-to-end physical and virtual automation and a unified licensing scheme for all virtual security and services through a single perpetual license, ensuring consistent and streamlined functionality across all virtual machine managers.

The VAC automates the installation, licensing, and provisioning of all included LACs through an integrated GUI, allowing you to provide a fluid experience for each network user system integrator, and service developer.

VAC provides central management for WiFi devices, radio optimization, multiple authentication methods for terminals, portal service, reliable and advanced networking features, and etc.

- **LAC**

LAC is the mirroring of the VAC to offload the VAC jobs locally, while the policy is set centrally in the VAC, and the LAC is the actual execution unit locally. Under the management of VAC, the distributed LAC located in different regions should be responsible for the access and the management of local WiFi devices and the users. It equips with firewall, NAT, VPN, QoS, and many advanced networking features.

LAC is plug and play, and provides flexibility for business owners to install and expand. Also, in case of the malfunctioning for any LAC, the nearby LAC (coordinated by the VAC) will pick up the WiFi devices and users management automatically.

- **WAC**

WAC is an all-in-one unit with VAC and LAC functionalities integrated, light weight, flexible but still powerful. Fit for small and medium size businesses with limited number of AP deployment or low quantity of subscribers WiFi coverage areas.

CLN AP series (CloudNet AP series) AP are the series of WiFi Access Point product supports LigoController, providing WiFi coverage to the local area



Main Features

3-IN-ONE PLATFORM

WiFi devices management, authentication and portal service 3 major platforms are all integrated in one unit providing easy-management and flexibility for business owners to deploy their own WiFi hotspots.

- **WiFi DEVICE MANAGEMENT PLATFORM**

The policy for the radio, security, and so on can be managed and optimized centrally on the VAC, and the AP can be divided by into groups, locations and admin accounts to assign individual policy of its own.

- **AUTHENTICATION PLATFORM**

Role based authentication, the access policy can be assigned to the subscriber or the terminals according to the time login, the location of the AP, and the profile of the account to deliver unique portal for authentication and provisioning plans.

- **PORTAL SERVICE PLATOFRM**

Portal had become an effective way for business owners to engage your visitors over the free WiFi service offered. By offering marketing and advertising strategies to third-parties, you can build branding platform, generate additional revenue and enhance your visitors' online experience.

In the meantime, the portal can be either adopted from the built-in templates or to be customized on your own.

FLEXIBLE AND UNIQUE AC ARCHITECTURE

- **CLOUD-BASED SERVICE OR NAAS**

You can build a Network as a Service business model for delivering network services virtually over the Internet on a pay-per-use or monthly subscription basis. Plug and play capabilities allow AP integration, surpassing traditional networking. In using the platform, you can offer solutions to adopt to current networking architecture, 3G, FTTH, Ethernet, CMTS, and cable, and position your clients for tomorrow's offerings.

- **N +1 BACKUP AND AUTOMATIC REDUNDANCY**

Redundancy throughout LAC network, management to ensure the transfer of interconnected APs and clients to available LAC during the failure.

- **EASY TO EXPAND**

It's never being so easy to expand the scale by just adding a new LAC and APs in any new location, the LAC and the AP will be adding to the network by assigning the correct policy on the VAC



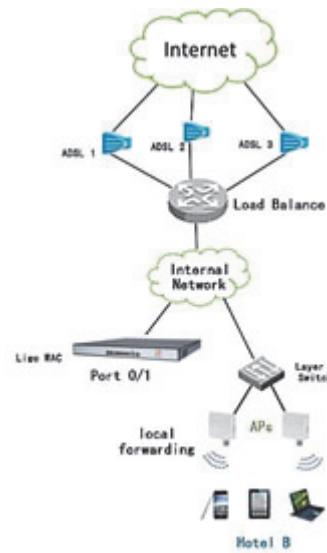


- IMPROVED USER EXPERIENCE

Not to worry too much of the internet stability, the user experience is improved greatly by offering greater accessibility to data on the local LAC. When the LAC mirrors from VAC, the data transfer is actually executed in local network between the AP and the LAC, the user experience can be improved as a result.

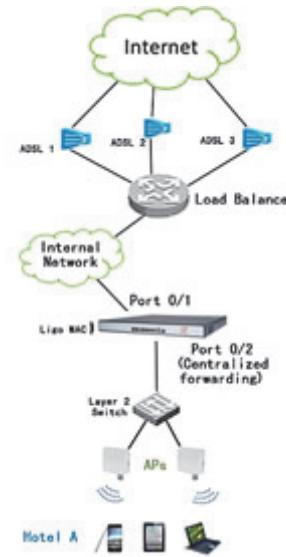
IPv6 SUPPORT

For local forwarding, the AP is getting directly IPv6 IP address from the LAN network. It is supported with our AC. Our AC currently are able to manage IPv6 IP address device by can't provide IPv6 DHCP.



LOCAL FORWARDING

For central forwarding mode, the AP data and management information traffic will be centralized in the WAC⁽¹⁾



CENTRAL FORWARDING

POWERFUL DATA TRACKING SERVICES

Collect and analyze visitor location, deliver engaging location based marketing and advertising strategies.

ZERO CONFIGURATIONS

Auto-registration and management of AP infrastructure, virtual architecture eliminates the need for onsite maintenance.

INTELLIGENT RF MANAGEMENT

Cross ecosystem management of RF channels, power, and status for coordinated, intelligent, and enhanced management assurance.

POWERFUL ANALYTICS

Your customer engagement is developed further through tracking and monitoring of the WiFi usability experience.

Collect and analyze relevant data across the WiFi hotspot environment to improve the visitor engagement relationship.



⁽¹⁾ Available in Q3 2016

CLN AP SERIES

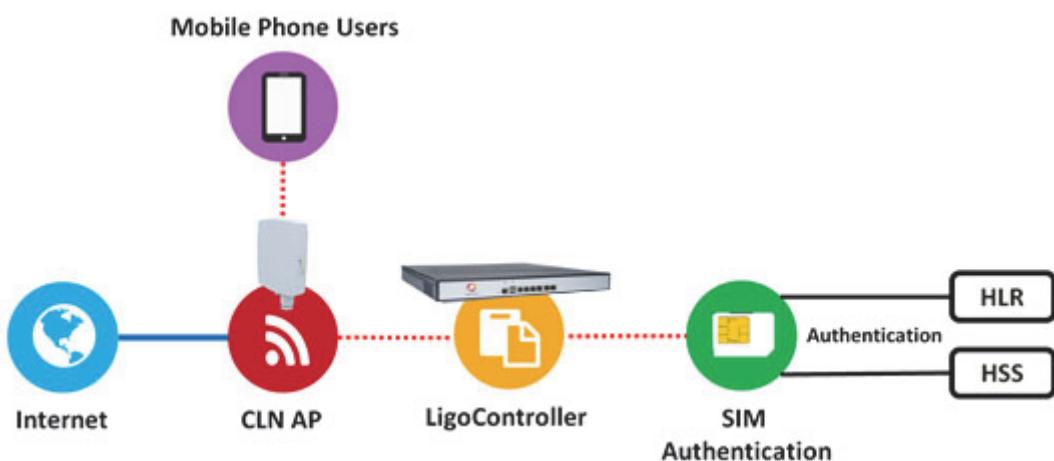
LigoWave CLN product line is targeting for Carrier WiFi solution with models supporting carrier base wifi hotspot application. CLN series is Cloud Networking AP solution with simple setup, Plug-and-Play support. Working with LigoController series, the Cloud Networking solution offers large capacity with high performance, which is meeting the application of different scenarios, by providing uniform forwarding, control, and polices for wired and wireless data.

- EAP-SIM

EAP-SIM is an Extensible Authentication Protocol (EAP) mechanism for authentication and session key distribution using the Global System for Mobile communications (GSM) Subscriber Identity Module (SIM). EAP-SIM uses a SIM authentication algorithm between the client and an Authentication, Authorization and Accounting (AAA) server providing mutual authentication between the client and the network. In EAP-SIM the communication between the SIM card and the Authentication Centre (AuC) replaces the need for a pre-established password between the client and the AAA server.

- WIFI OFFLOAD

With the ever-growing popularity of smart phones, mobile data usage is rapidly increasing, resulting in a major 3G/4G capacity crunch. For service providers, the solution to offer fast and reliable mobile data service while optimizing network resources grow increasingly challenging. The solution is to offload 3G/4G internet usage to provider's WiFi network automatically and seamlessly without interruption in service. So providers can relief and offload 3G network data traffic to their WiFi network hotspots.





Specifications

WiFi Device/AP Management	
WiFi Device Management	<ul style="list-style-type: none">● Auto-discovery of VAC and LAC● VAC/LAC discovery via DHCP OPTION 43● VAC/LAC discovery via DNS● VAC access across NAT● AP and VAC access through internet● Fixed or auto channel and output power selection● 802.11a/b/g/n, HT 20//40 configuration● Up to 8 SSID per radio● AP clock auto synchronization● Auto firmware upgrade● AP location● Basic networking parameters set up● Restart or reset to factory default from AC
RF Access Control	<ul style="list-style-type: none">● Open, pre-shared key, WEP, WPA, WPA2 ,TKIP, CCMP● Subscribers numbers limit per SSID-based or radio
Authentication	
Authentication Types	<ul style="list-style-type: none">● Local and remote Portal authentication● Remote portal authentication● SSID select Portal server based on virtual network● Local authentication using account and password● MAC-based local authentication● LDAP authentication● Centralized authentication in local forwarding mode.● SSID selects AAA server based on virtual network● AAA server backup● Simultaneous wired user authentication (Ligo VAC cascade)
User Authentication	<ul style="list-style-type: none">● Authorized configuration based on user role● Authorized configuration based on time range● Authorized configuration based on different access locations● Authorized configuration based on role, time, and location● Support role information requirement from AAA server● Authority strategy supports VLAN tag revision● Authority strategy supports VLAN tag adding● Authority strategy supports VLAN tag removal● Authorized bandwidth configuration● Rule setting for maximum allocated users by single authorized profile 100● Simultaneous wired user authority management
Spam Filtering: Black & Whitelisting	<ul style="list-style-type: none">● Black/ White listing based on IP/IP range● Black/ White listing based on MAC



	<ul style="list-style-type: none">● Black/ White listing based on virtual network domain
Access Auditing	<ul style="list-style-type: none">● Real-time user AP access requirement● Real-time user SSID access requirement● Real-time user role requirement● User log-in and log-off tracking● User access record
Data Access Control	<ul style="list-style-type: none">● User role settings● User role assignment● User MAC binding● User IP binding● User ESSID binding● Virtual network binding● User validity setting● One key wireless guest access control
Portal	
Built-in Portal	<ul style="list-style-type: none">● Multiple virtual portal servers● Customizable portal page● Self-developed Portal
LigoController Features	
Forwarding Mode	<ul style="list-style-type: none">● Centralized forwarding● Local forwarding● Local forwarding with NAT● Local forwarding with VLAN tag per SSID● Local and centralized forwarding coexisting
Virtual AC	<ul style="list-style-type: none">● Support virtual AC creation● Number of virtual AC manager (administrator) 1● Support AP remote registration● Virtual AC can add local users● Create virtual networks● Allow WLAN allocation strategy● Built-in portal server● Self-developed portal interface● Authority settings
Roaming	<ul style="list-style-type: none">● Different AP L2/L3 roaming in the same VAC/WAC.● Within the same VAC/WAC and the same virtual network, L2/L3 roaming in different SSIDs and APs.● L2/L3 roam in different APs and different LAC. Partial support, no need to re-authenticate● In different LAC, the same virtual network, different SSID L2/L3 roam in different APs. Partially support: no need to re-authenticate● Within the same VAC, and the same virtual network, switching between local forwarding and centralized forwarding in different/ the same AP(s). Partially support: no need to re-authenticate

Networking and Management

Networking	<ul style="list-style-type: none"> ● Policy based routing ● ARP response ● 802.1P/Q ● IGMP Snooping ● OSPF dynamic routing ● DHCP Server ● DHCP relay ● DHCP can relay to multi servers
Security	<ul style="list-style-type: none"> ● Hidden SSID ● Wireless user isolation ● LAN user isolation ● Auto disconnect timeout (default 300s) ● Broadcast suppression ● Rouge AP detection
VPN	<ul style="list-style-type: none"> ● VPN between AP and VAC ● Dynamic negotiation of encryption key ● No encryption, or DES, 3DES, AES
Load Balance	<ul style="list-style-type: none"> ● load balancing among APs under same LAC
Firewall	<ul style="list-style-type: none"> ● Firewall status detection ● URL access log
NAT Function	<ul style="list-style-type: none"> ● Source network address translation (SNAT) ● Destination network address translation (DNAT) ● Service mirroring (DPAT) ● Service type Settings for NAT rules
Logs and Warnings	<ul style="list-style-type: none"> ● Local logs ● Syslog remote logs ● Device status warning ● License warning ● Maximum number of user warning event
Management	<ul style="list-style-type: none"> ● HTTPS-based Web interface ● SSH-based CLI ● Console ● SNMP



LigoWave

Ordering Information



VAC Models

Model		VAC-L32
License Number	LAC	32
	AP	1024
	Subscriber	10240
Console		1
10/100/1000Base-T		6
1000M SFP		0
USB 2.0 port		2
Weight		4kg
Dimension (1U=4.445cm)		320mm*450mm*1U
Power supply		220V AC , 100W
Operating temperature		0°C~40°C (32°F~104°F)
Storage temperature		-20°C~80°C (-68°F~176°F)
Humidity		10% ~ 90% Non-condensing

LAC Models

Models	LAC-E128
AP license	128
Subscriber license	1280
Console	1
10/100/1000Base-T	6
SFP	0
USB2.0 port	2
Weight	4kg
Dimension	320mm*450mm*1U
Power supply	100~240V AC 100W
Operating	0°C~40°C (32°F~104°F)
Storage	-20°C~80°C (-68°F~176°F)
Humidity	10% ~ 90% Non-condensing

CLN AP Series

Picture						
Model	CLN 2-90	CLN 5-90	CLN 2	CLN 5	CLN 2-9B	CLN 5-15B
Description	11n 2 × 2 Outdoor	11n 2 × 2 Outdoor	11n 2 × 2 Outdoor	11n 2 × 2 Outdoor	11n 2 × 2 Outdoor	11n 2 × 2 Outdoor
Antenna angle	90	90	NA	NA	60	35
Antenna Gain	14dBi	16dBi	NA	NA	9dBi	15dBi
Transmission	300Mbps					
Power	12 ~ 24V PoE					
IP Grade	IP55	IP55	IP65	IP65	IP65	IP65
Mounting	wall /hole					



Product	CLN 1Ni	CLN 1N	CLN 1N AF
Role description	High power 2.4 GHz indoor AP with two Ethernet ports and PoE pass-through for small to medium enterprise applications	2.4 GHz indoor AP with three Ethernet ports for small to medium enterprise applications	2.4 GHz indoor AP with 3 Ethernet ports and 802.3af power for small to medium enterprise applications
Radio			
Frequency	2.402 – 2.484 GHz		
Channel size	20, 40 MHz		
Stream	MIMO 2x2		
Wireless protocol	802.11b/g/n		
Powering			
Method	Passive PoE; 4,5 pin (+) and 7,8 pin (-)		
Input voltage	12 – 24 V	12-24V	48V
Power consumption	4.5 W	6.24 W	