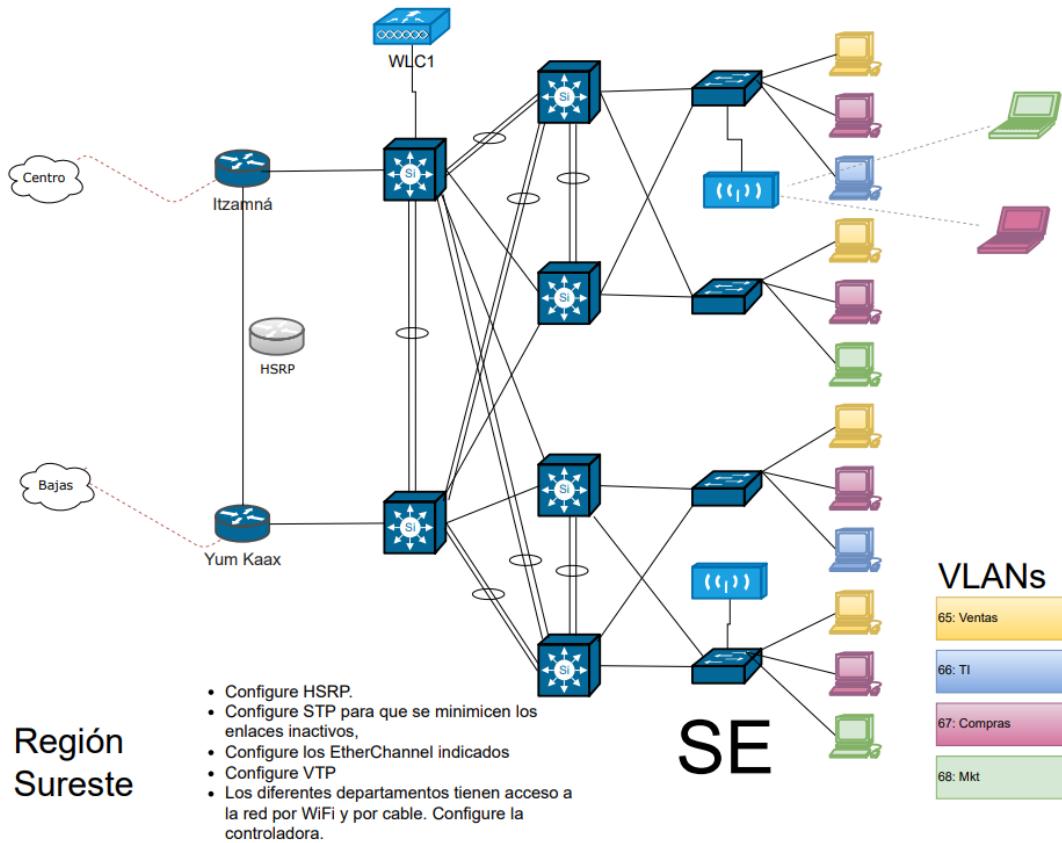


Topología 3



Vista general de la topología de red implementada en la Región Sureste. Se observa la estructura jerárquica con una capa de distribución redundante (Switches Multilayer interconectados en malla) y una capa de acceso (Switches 2960). Se destaca la configuración de enlaces EtherChannel (óvalos verdes) para la agregación de ancho de banda y la redundancia de Gateway mediante HSRP entre los routers Itzamná y Yum Kaax. También se visualizan los dispositivos inalámbricos (WLC y APs) integrados a la infraestructura.

Scripts de Configuración de Red

Router Principal (Itzamná / Router0)

```
enable
configure terminal
hostname Router_Itzamna

ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
  transport input ssh
  login local
exit
service password-encryption
```

```
! --- 1. Enrutamiento Dinámico (RIPv2) ---
```

router rip

```
version 2
network 148.60.0.0
no auto-summary
! Evitamos ruido RIP en las VLANs de usuarios
passive-interface g0/0/0.65
passive-interface g0/0/0.66
passive-interface g0/0/0.67
passive-interface g0/0/0.68
exit
```

```
! --- 2. Pools de DHCP ---
```

```
ip dhcp pool VENTAS
  network 148.60.65.0 255.255.255.0
  default-router 148.60.65.1
  dns-server 8.8.8.8
```

```
ip dhcp pool TI
  network 148.60.66.0 255.255.255.0
  default-router 148.60.66.1
  dns-server 8.8.8.8
```

```
ip dhcp pool COMPRAS
  network 148.60.67.0 255.255.255.0
  default-router 148.60.67.1
  dns-server 8.8.8.8
```

```
ip dhcp pool MKT
  network 148.60.68.0 255.255.255.0
  default-router 148.60.68.1
  dns-server 8.8.8.8
```

```
! --- 3. Subinterfaces y HSRP (Activo) ---
```

```

interface g0/0/0
no shutdown
exit

! VLAN 65 - Ventas
interface g0/0/0.65
encapsulation dot1Q 65
ip address 148.60.65.2 255.255.255.0
standby 65 ip 148.60.65.1
standby 65 priority 150
standby 65 preempt
exit

! VLAN 66 - TI / Gestión
interface g0/0/0.66
encapsulation dot1Q 66
ip address 148.60.66.2 255.255.255.0
standby 66 ip 148.60.66.1
standby 66 priority 150
standby 66 preempt
exit

! VLAN 67 - Compras
interface g0/0/0.67
encapsulation dot1Q 67
ip address 148.60.67.2 255.255.255.0
standby 67 ip 148.60.67.1
standby 67 priority 150
standby 67 preempt
exit

! VLAN 68 - Marketing
interface g0/0/0.68
encapsulation dot1Q 68
ip address 148.60.68.2 255.255.255.0
standby 68 ip 148.60.68.1
standby 68 priority 150
standby 68 preempt
exit
interface Serial0/0/1
description Enlace_a_YumKaax
ip address 148.60.0.1 255.255.255.252
! Ponemos reloj porque es cable serial
clock rate 128000
no shutdown
exit

```

Router de Respaldo (Yum Kaax / Router1)

```

enable
configure terminal
hostname Router_YumKaax

```

```
ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
  transport input ssh
  login local
  exit
service password-encryption
```

```
! --- 1. Enrutamiento Dinámico ---
```

router rip

```
version 2
network 148.60.0.0
no auto-summary
passive-interface g0/0/0.65
passive-interface g0/0/0.66
passive-interface g0/0/0.67
passive-interface g0/0/0.68
exit

! --- 2. Subinterfaces y HSRP (Standby) ---
interface g0/0/0
  no shutdown
  exit

interface g0/0/0.65
  encapsulation dot1Q 65
  ip address 148.60.65.3 255.255.255.0
  standby 65 ip 148.60.65.1
  standby 65 priority 100
  standby 65 preempt
  exit

interface g0/0/0.66
  encapsulation dot1Q 66
  ip address 148.60.66.3 255.255.255.0
  standby 66 ip 148.60.66.1
  standby 66 priority 100
  standby 66 preempt
  exit

interface g0/0/0.67
  encapsulation dot1Q 67
  ip address 148.60.67.3 255.255.255.0
  standby 67 ip 148.60.67.1
  standby 67 priority 100
  standby 67 preempt
  exit
interface g0/0/0.68
  encapsulation dot1Q 68
```

```

ip address 148.60.68.3 255.255.255.0
standby 68 ip 148.60.68.1
standby 68 priority 100
standby 68 preempt
exit

interface Serial0/0/0
description Enlace_a_Itzamna
ip address 148.60.0.2 255.255.255.252
no shutdown

```

configuracion Switch server

```

enable
configure terminal
hostname DSW1
vtp domain JuanMark
vtp version 2
vtp mode server
vtp password cisco

ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
transport input ssh
login local
exit
service password-encryption

vlan 65
name Ventas
vlan 66
name Gestion_TI
vlan 67
name Compras
vlan 68
name MKT
exit

interface range g1/0/1-2
channel-protocol pagp
channel-group 1 mode desirable
no shutdown
exit

interface range g1/0/3-4
channel-protocol pagp
channel-group 2 mode desirable
no shutdown
exit

```

```

interface range g1/0/5-6
channel-protocol pagp
channel-group 3 mode desirable
no shutdown
exit

interface Port-channel 1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface Port-channel 2
! Si el switch es Capa 3 (Multilayer), descomenta la siguiente línea:
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface Port-channel 3
! Si el switch es Capa 3 (Multilayer), descomenta la siguiente línea:
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface gig1/0/7
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/24
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
no shutdown
exit
spanning-tree vlan 65,66 root primary
spanning-tree vlan 67,68 root secondary

```

Switch 1

```

enable
configure terminal
hostname ASW1

```

```
ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
  transport input ssh
  login local
  exit
service password-encryption

vtp domain JuanMark
vtp version 2
vtp mode client
vtp password cisco

interface range g1/0/1-2
  channel-protocol pagp
  channel-group 1 mode desirable
  no shutdown
exit

interface range g1/0/3-4
  channel-protocol pagp
  channel-group 2 mode desirable
  no shutdown
exit

interface range g1/0/5-6
  channel-protocol pagp
  channel-group 3 mode desirable
  no shutdown
exit

interface Port-channel 1
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

interface Port-channel 2
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

interface Port-channel 3
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit
```

```

interface g1/0/8
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/7
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface f0/10
switchport mode access
switchport access vlan 65
spanning-tree portfast
no shutdown
exit

interface f0/11
switchport mode access
switchport access vlan 66
spanning-tree portfast
no shutdown
exit

spanning-tree vlan 67,68 root primary
spanning-tree vlan 65,66 root secondary

```

Switch 2

```

enable
configure terminal
hostname ASW2

ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
transport input ssh
login local
exit
service password-encryption

vtp domain JuanMark
vtp version 2
vtp mode client
vtp password cisco

interface range g1/0/1-2

```

```
channel-protocol pagp
channel-group 1 mode desirable
no shutdown
exit

interface range g1/0/3-4
channel-protocol pagp
channel-group 2 mode desirable
no shutdown
exit

interface range g1/0/5-6
channel-protocol pagp
channel-group 3 mode desirable
no shutdown
exit

interface Port-channel 1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface Port-channel 2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface Port-channel 3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/8
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/7
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface f0/10
```

```

switchport mode access
switchport access vlan 65
spanning-tree portfast
no shutdown
exit

interface f0/11
switchport mode access
switchport access vlan 66
spanning-tree portfast
no shutdown
exit

```

Switch 3

```

enable
configure terminal
hostname ASW3

ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
  transport input ssh
  login local
  exit
service password-encryption

vtp domain JuanMark
vtp version 2
vtp mode client
vtp password cisco

interface range g1/0/1-2
  channel-protocol pagp
  channel-group 1 mode desirable
  no shutdown
exit

interface Port-channel 1
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

interface g1/0/3
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

```

```

interface g1/0/4
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/5
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/6
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

```

Switch 4

```

enable
configure terminal
hostname ASW4

vtp domain JuanMark
vtp version 2
vtp mode client
vtp password cisco

interface range g1/0/1-2
channel-protocol pagp
channel-group 1 mode desirable
no shutdown
exit

interface Port-channel 1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

```

```

interface g1/0/4
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/5
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

interface g1/0/6
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
exit

```

Switch 5

```

enable
configure terminal
hostname ASW5

ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
transport input ssh
login local
exit
service password-encryption

vtp domain JuanMark
vtp version 2
vtp mode client
vtp password cisco

interface range g1/0/1-2
channel-protocol pagp
channel-group 1 mode desirable
no shutdown
exit

interface range g1/0/3-4
channel-protocol pagp
channel-group 2 mode desirable
no shutdown

```

```

exit

interface range g1/0/5-6
  channel-protocol pagp
  channel-group 3 mode desirable
  no shutdown
exit

interface Port-channel 1
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

interface Port-channel 2
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

interface Port-channel 3
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

interface g1/0/8
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

interface g1/0/7
  switchport trunk encapsulation dot1q
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
exit

```

Switch 1 capa 2

```

enable
configure terminal
hostname ASW0_ConAP

ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024

```

```
line vty 0 4
transport input ssh
login local
exit
service password-encryption

vtp domain JuanMark
vtp version 2
vtp mode client
vtp password cisco
no ip domain-lookup

interface range g0/1-2
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
no shutdown
exit

interface f0/3
description Link_to_AP
switchport mode trunk
switchport nonegotiate
switchport trunk native vlan 66
switchport trunk allowed vlan 1,65-68
no shutdown
exit

interface range f0/1-2, f0/4-5
switchport mode access
switchport access vlan 65
spanning-tree portfast
switchport port-security
exit

interface range f0/6-10
switchport mode access
switchport access vlan 66
spanning-tree portfast
switchport port-security
exit

interface range f0/11-15
switchport mode access
switchport access vlan 67
spanning-tree portfast
switchport port-security
exit

interface range f0/16-20
switchport mode access
switchport access vlan 68
spanning-tree portfast
```

```
switchport port-security  
exit
```

Switch 2 capa 2

```
enable  
configure terminal  
hostname ASW1_ConAP  
  
ip domain-name juanmark.com  
username admin secret Cisco123  
crypto key generate rsa general-keys modulus 1024  
line vty 0 4  
  transport input ssh  
  login local  
  exit  
service password-encryption  
  
vtp domain JuanMark  
vtp version 2  
vtp mode client  
vtp password cisco  
no ip domain-lookup  
  
interface range g0/1-2  
  switchport mode trunk  
  switchport nonegotiate  
  switchport trunk allowed vlan 1,65-68  
  no shutdown  
exit  
  
interface f0/3  
  description Link_to_AP  
  switchport mode trunk  
  switchport nonegotiate  
  switchport trunk native vlan 66  
  switchport trunk allowed vlan 1,65-68  
  no shutdown  
exit  
  
interface range f0/1-2, f0/4-5  
  switchport mode access  
  switchport access vlan 65  
  spanning-tree portfast  
  switchport port-security  
exit  
  
interface range f0/6-10  
  switchport mode access  
  switchport access vlan 66  
  spanning-tree portfast  
  switchport port-security
```

```
exit

interface range f0/11-15
  switchport mode access
  switchport access vlan 67
  spanning-tree portfast
  switchport port-security
exit

interface range f0/16-20
  switchport mode access
  switchport access vlan 68
  spanning-tree portfast
  switchport port-security
exit
```

Switch 3 capa 2

```
enable
configure terminal
hostname ASW2_PCs

ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
  transport input ssh
  login local
  exit
service password-encryption

vtp domain JuanMark
vtp version 2
vtp mode client
vtp password cisco
no ip domain-lookup

interface range g0/1-2
  switchport mode trunk
  switchport nonegotiate
  switchport trunk allowed vlan 1,65-68
  no shutdown
exit

interface range f0/1-5
  switchport mode access
  switchport access vlan 65
  spanning-tree portfast
  switchport port-security
exit

interface range f0/6-10
```

```

switchport mode access
switchport access vlan 66
spanning-tree portfast
switchport port-security
exit

interface range f0/11-15
switchport mode access
switchport access vlan 67
spanning-tree portfast
switchport port-security
exit

interface range f0/16-20
switchport mode access
switchport access vlan 68
spanning-tree portfast
switchport port-security
exit

```

Switch 4 capa 2

```

enable
configure terminal
hostname ASW3_PCs

ip domain-name juanmark.com
username admin secret Cisco123
crypto key generate rsa general-keys modulus 1024
line vty 0 4
  transport input ssh
  login local
  exit
service password-encryption

vtp domain JuanMark
vtp version 2
vtp mode client
vtp password cisco
no ip domain-lookup

interface range g0/1-2
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan 1,65-68
no shutdown
exit

interface range f0/1-5
switchport mode access
switchport access vlan 65
spanning-tree portfast

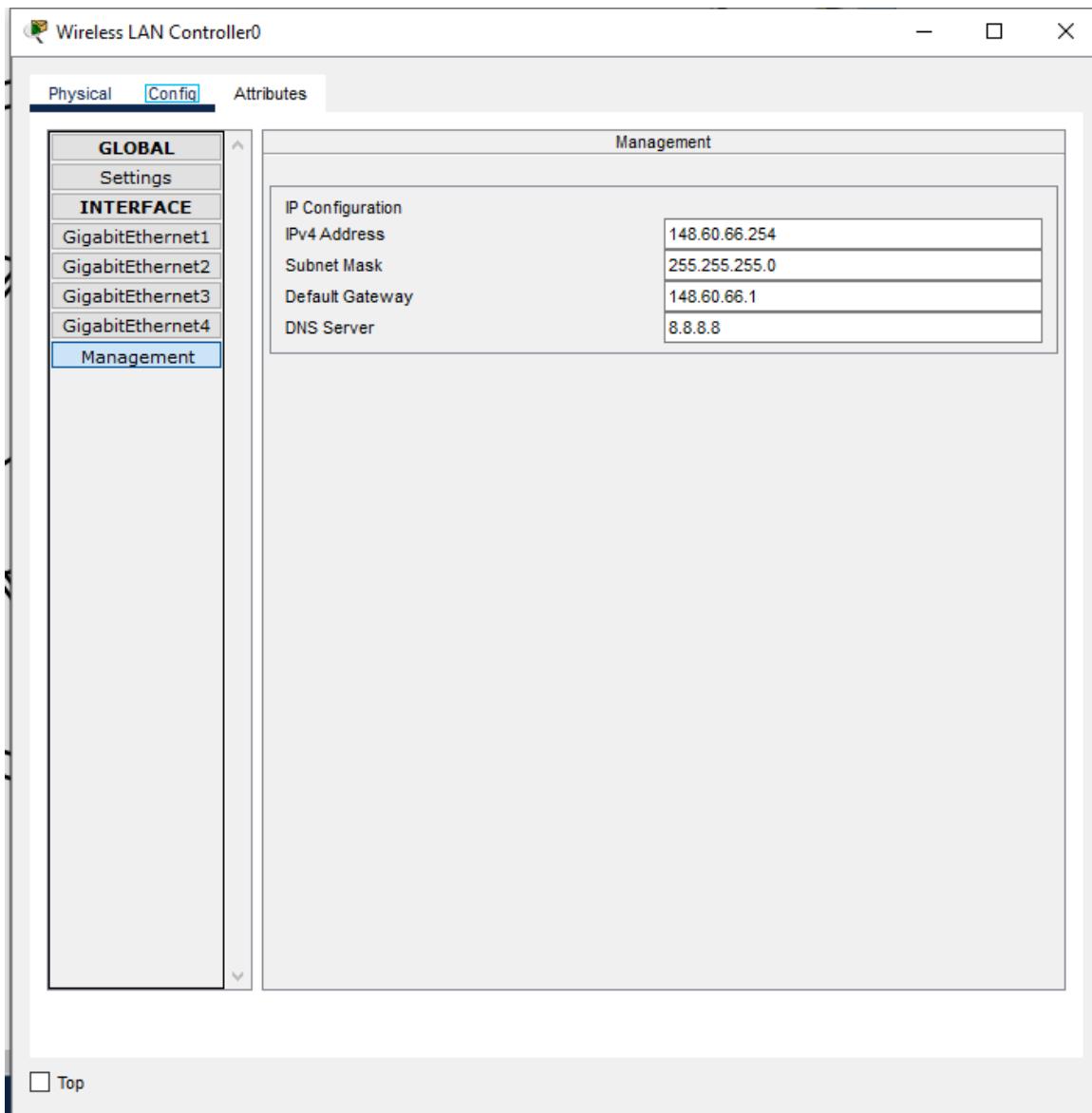
```

```
switchport port-security
exit

interface range f0/6-10
  switchport mode access
  switchport access vlan 66
  spanning-tree portfast
  switchport port-security
exit

interface range f0/11-15
  switchport mode access
  switchport access vlan 67
  spanning-tree portfast
  switchport port-security
exit

interface range f0/16-20
  switchport mode access
  switchport access vlan 68
  spanning-tree portfast
  switchport port-security
exit
```



Panel de control principal (Dashboard) del Wireless LAN Controller (WLC). La sección 'Access Point Summary' confirma el estado operativo de la red inalámbrica, mostrando **2 Access Points en estado 'Up'** (verde), lo que indica que ambos APs se han unido exitosamente al controlador a través de la red de gestión (VLAN 66). También se verifica la versión de software y el tiempo de actividad del sistema.



La imagen muestra el **Panel de Control Principal (Dashboard)** del Wireless LAN Controller (WLC). Esta vista es la primera que se accede después de iniciar sesión en el interfaz web seguro (<https://148.60.66.254>) y ofrece un resumen del estado de la red inalámbrica.



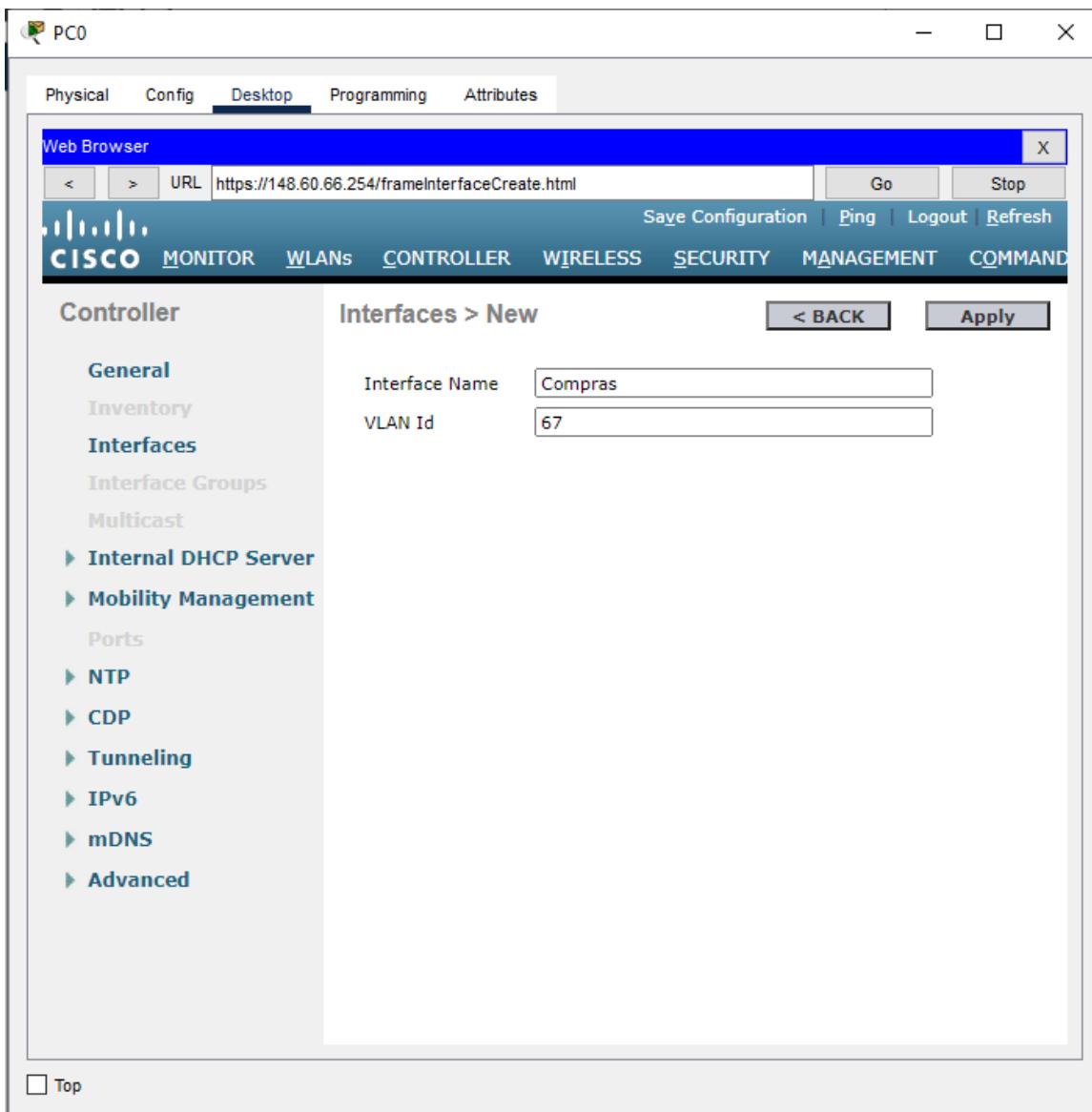
La imagen muestra la utilidad de configuración de la tarjeta de red **Wireless-N Notebook Adapter** de la Laptop. Esta interfaz confirma el estado de la conexión del cliente final a la red inalámbrica.

The screenshot shows a desktop window titled 'PC0' containing a web browser. The browser's address bar shows the URL <https://148.60.66.254/frameInterfaceList.html>. The page has a header with tabs: MONITOR, WLANs, **CONTROLLER**, WIRELESS, SECURITY, MANAGEMENT, COMMANDS, HELP, and FEEDBACK. The 'CONTROLLER' tab is active. On the left, a sidebar menu includes: General, Inventory, **Interfaces** (selected), Interface Groups, Multicast, Internal DHCP Server, Mobility Management, Ports, NTP, CDP, Tunneling, IPv6, mDNS, and Advanced. The main content area is titled 'Controller' and 'Interfaces'. It displays a table of network interfaces:

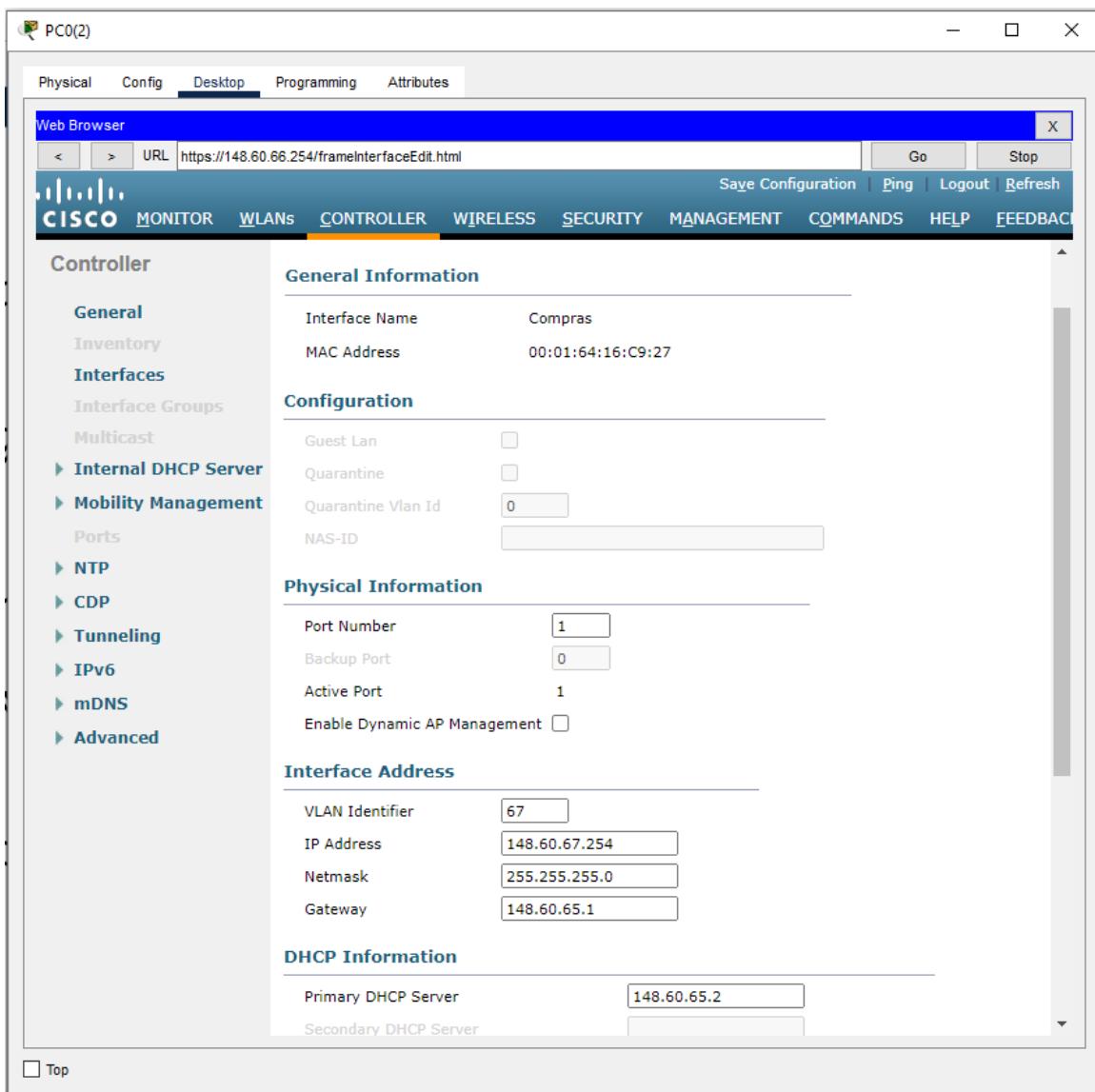
Interface Name	VLAN Identifier	IP Address	Interface Type	Dynamic AP Management	IPv6 Address
Compras	67	148.60.67.254	Dynamic	Disabled	
MKT	68	148.60.68.254	Dynamic	Disabled	
Ventas	65	148.60.65.245	Dynamic	Disabled	
management	untagged	148.60.66.254	Static	Enabled	::/128
virtual	N/A	192.0.2.1	State	Not Supported	

Buttons for 'New...', 'Remove', and 'Home' are visible at the top right of the table. The status bar at the bottom indicates 'Entries 1 - 5 of 5'.

La imagen corresponde a la pestaña **Interfaces** bajo el menú **CONTROLLER** en la interfaz de gestión web del Wireless LAN Controller (WLC). Esta vista es crucial para el **enrutamiento de datos** y la segmentación de la red inalámbrica.



La imagen corresponde a la ventana Interfaces > New en el menú CONTROLLER de la interfaz de gestión web del Wireless LAN Controller (WLC). Esta ventana se utiliza para iniciar la creación de una Interfaz Dinámica.



La imagen corresponde a la ventana de **edición** de la interfaz dinámica "**Compras**" en el Wireless LAN Controller (WLC). Esta vista muestra todos los parámetros de Capa 3 asociados a la **VLAN 67**.

The screenshot shows the Cisco Wireless LAN Controller (WLC) web interface. The URL is https://148.60.66.254/frameWlan.html. The top navigation bar includes MONITOR, WLANS (highlighted in orange), CONTROLLER, WIRELESS, SECURITY, MANAGEMENT, COMMANDS, HELP, FEEDBACK, and Home. On the left, a sidebar shows WLANS (selected) and Advanced AP Groups. The main content area is titled 'WLANS' and shows a table of four entries:

WLAN ID	Type	Profile Name	WLAN SSID	Admin Status	Security Policies
1	WLAN	JuanMark-TI	JuanMark-TI	Enabled	[WPA2][Auth(PSK)]
2	WLAN	Ventas	JuanMark-Ventas	Enabled	[WPA2][Auth(PSK)]
3	WLAN	Compras	JuanMark-Compras	Enabled	[WPA2][Auth(PSK)]
4	WLAN	MKT	JuanMark-MKT	Enabled	[WPA2][Auth(PSK)]

La imagen corresponde a la pestaña **WLANS** en la interfaz de gestión web del Wireless LAN Controller (WLC). Esta vista muestra las **cuatro redes inalámbricas** que han sido creadas para la segmentación departamental en la red.

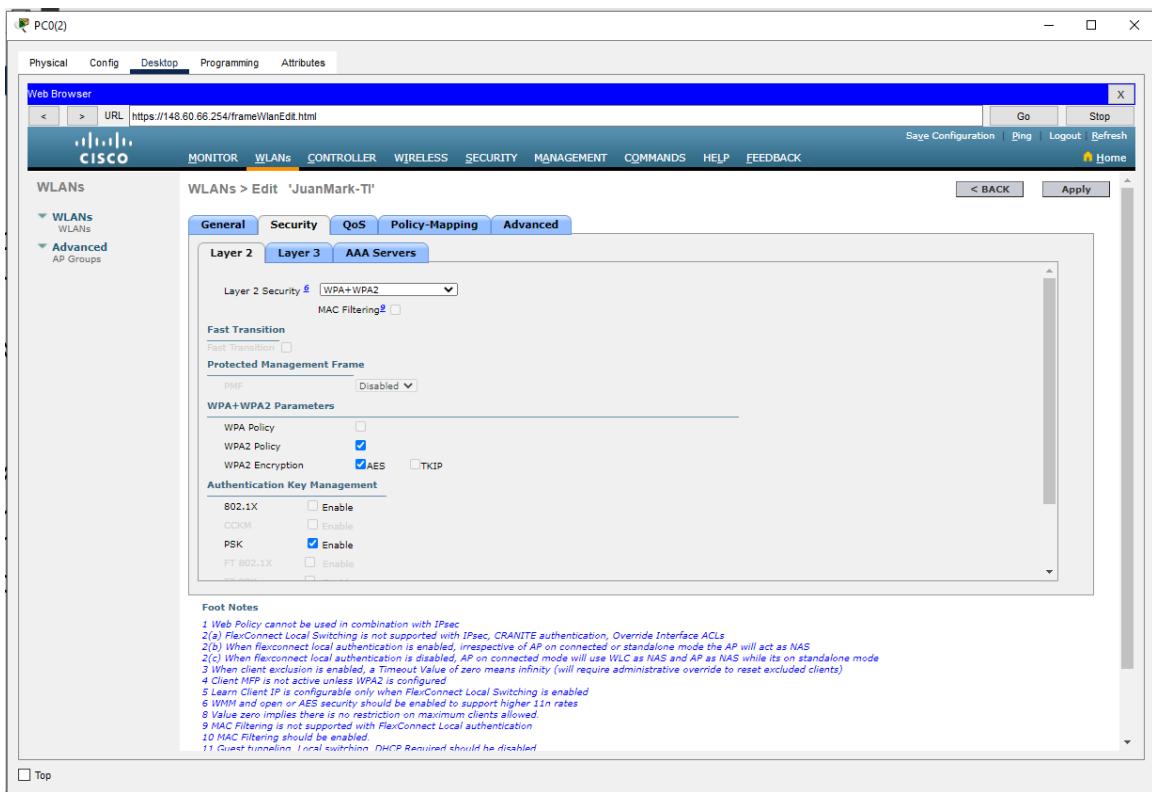
The screenshot shows the Cisco WLC web interface for editing a WLAN profile named 'JuanMark-TI'. The URL is https://148.60.66.254/frameWlanEdit.html. The top navigation bar includes MONITOR, WLANS (selected), CONTROLLER, WIRELESS, SECURITY, MANAGEMENT, COMMANDS, HELP, FEEDBACK, and Home. The left sidebar shows WLANS (selected) and Advanced AP Groups. The main content area is titled 'WLANS > Edit 'JuanMark-TI'' and shows the 'General' tab selected. The configuration fields include:

- Profile Name:** JuanMark-TI
- Type:** WLAN
- SSID:** JuanMark-TI
- Status:** Enabled (checkbox checked)
- Security Policies:** [WPA2][Auth(PSK)]
- Radio Policy:** All
- Interface/Interface Group(G):** management (highlighted in yellow)
- Multicast Vlan Feature:** Enabled (checkbox unchecked)
- Broadcast SSID:** Enabled (checkbox checked)
- NAS-ID:** (empty input field)

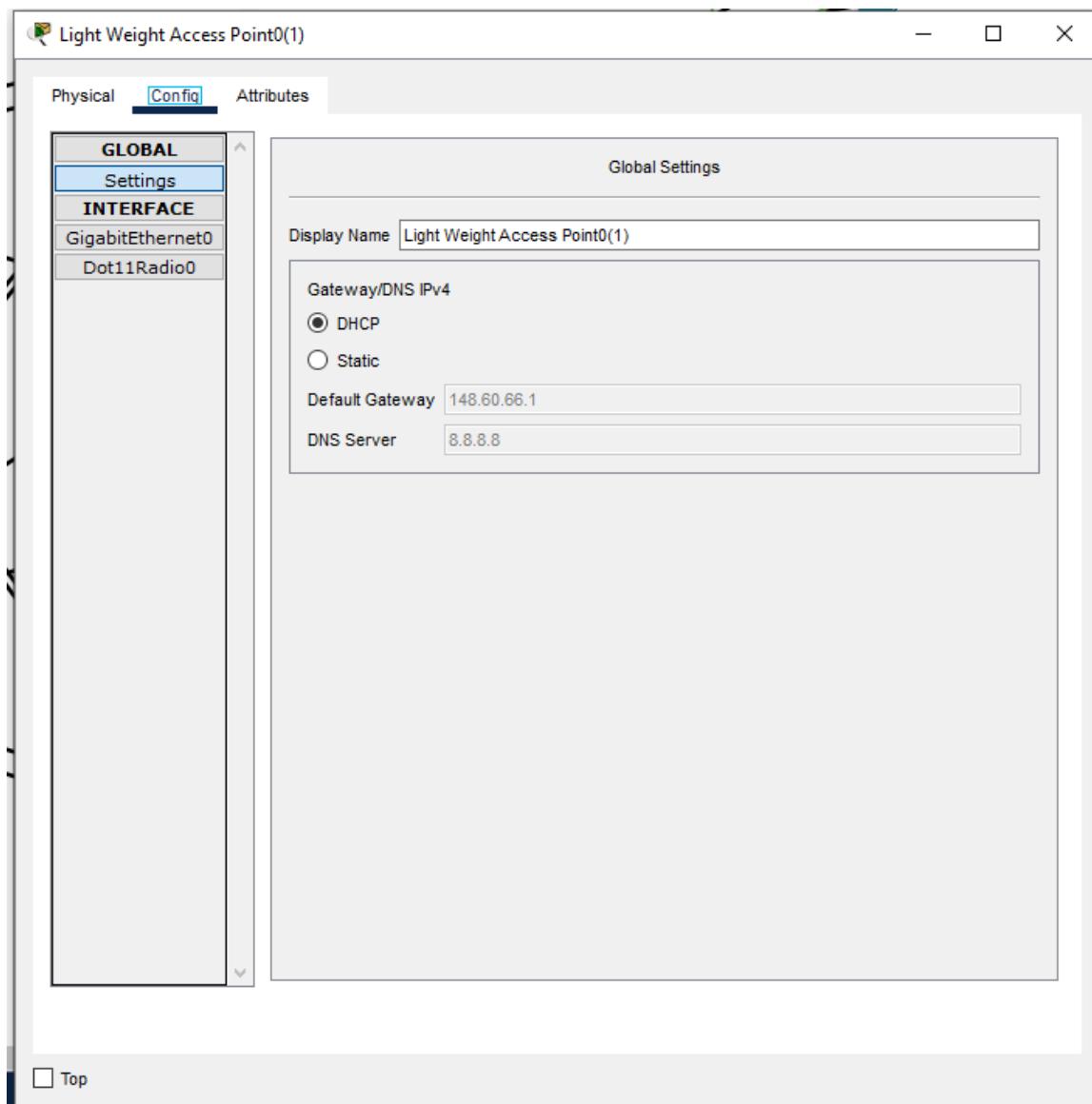
Foot Notes:

- 1 Web Policy cannot be used in combination with IPsec.
- 2(a) FlexConnect Local Switching is not supported with IPsec, CRANITE authentication, Override Interface ACLs
- 2(b) When flexconnect local authentication is enabled, irrespective of AP on connected or standalone mode the AP will act as NAS
- 2(c) When flexconnect local authentication is disabled, AP on connected mode will use WLC as NAS and AP as NAS while its on standalone mode
- 3 When client exclusion is enabled, a Timeout Value of zero means infinity (will require administrative override to reset excluded clients)
- 4 Client MFP is not active unless WPA2 is configured

La imagen corresponde a la pestaña **General** dentro de la ventana de edición de la WLAN "JuanMark-TI" en la interfaz web del Wireless LAN Controller (WLC).



La imagen corresponde a la pestaña **Security** > **Layer 2** dentro de la ventana de edición de la WLAN "JuanMark-TI". Esta vista confirma la implementación del estándar de seguridad para la autenticación de los clientes.



La imagen corresponde a la ventana de inicio de sesión o **Autenticación Requerida** del Wireless LAN Controller (WLC).