

Descripción

Configuración con segmentación VLAN de la red cableada e inalámbrica.

Topología de red

En este cuaderno se explica el procedimiento realizado para la segmentación del tráfico de red mediante el uso de VLAN's, tanto en la red cableado como en la red inalámbrica. Atendiendo a una configuración típica, se determinaron los siguientes flujos de red:

- LAN (VLAN = 1), segmento de red de los PC's conectados a los switches, y los propios equipos de red.
- VoIP (VLAN = 20), segmento de red destinado al servicio de voz (telefonía).
- EyE_Pub (VLAN = 30), red inalámbrica para uso público.
- EyE_Priv (VLAN = 40), red inalámbrica para uso exclusivo por el profesorado del IES.

Router Mikrotik

Interfaces VLAN

Se crea una interfaz VLAN para cada uno de los flujos de datos etiquetados que se asociarán a cada servicio.

| | | | | |
|----------------------------------|--------------------|------|---------|----------------------------------|
| Flags: X - disabled, R - running | | | | |
| # | NAME | MTU | ARP | VLAN-ID INTERFACE |
| 0 | R vlan1_mgmt | 1500 | | proxy-arp 1 bridge_tplink |
| 1 | R vlan20_VoIP | 1500 | enabled | 20 bridge_tplink |
| 2 | R vlan30_WIFI_Pub | 1500 | enabled | 30 bridge_tplink |
| 3 | R vlan40_WIFI_Priv | 1500 | enabled | 40 bridge_tplink |

Importante: Activar proxy-arp en la interfaz vlan1_mgmt

Se asigna una IP a cada interfaz VLAN y le se asocia el correspondiente DHCP, para que asigne IP a los equipos conectados a cada VLAN.

| | | | |
|----|------------------------|---------------------|-------------------------|
| 0 | 192.168.0.5/24 | 192.168.0.0 | ether1-gw |
| 1 | 172.17.5.1/24 | 172.17.5.0 | ether2-A5 |
| 2 | 172.17.6.1/24 | 172.17.6.0 | ether3-A6 |
| 3 | X 172.17.3.1/24 | 172.17.3.0 | ether5-WIFI |
| 4 | 172.17.4.1/24 | 172.17.4.0 | ether4-T4 |
| 5 | 172.17.100.1/24 | 172.17.100.0 | ether6-PROXMOX |
| 6 | X 172.17.200.1/24 | 172.17.200.0 | ether7-TPLINK |
| 7 | 172.20.0.1/16 | 172.20.0.0 | ether4-T4 |
| 8 | 172.17.200.1/24 | 172.17.200.0 | vlan1_mgmt |
| 9 | 192.168.20.1/24 | 192.168.20.0 | vlan20_VoIP |
| 10 | D 172.17.200.1/32 | 172.17.200.227 | <pptp-tplink> |
| 11 | 192.168.30.1/24 | 192.168.30.0 | vlan30_WIFI_Pub |
| 12 | D 172.17.100.1/32 | 172.17.100.25 | <pptp-leo> |
| 13 | 192.168.40.1/24 | 192.168.40.0 | vlan40_WIFI_Priv |
| 14 | D 172.17.100.1/32 | 172.17.100.13 | <pptp-leo-1> |

Los servidores DHCP y los Pools configurados son los siguientes:

DHCP Server

| | | | |
|---|------------------------------|-------------------------|------------------------------|
| Flags: D - dynamic, X - disabled, I - invalid | | | |
| # | NAME | INTERFACE | RELAY ADDRESS-POOL |
| 0 | dhcp-PROXMOX | ether6-PROXMOX | pool-PROXMOX |
| 1 | dhcp-T4 | ether4-T4 | pool-T4 |
| 2 | dhcp-A6 | ether3-A6 | pool-A6 |
| 3 | dhcp-A5 | ether2-A5 | pool-A5 |
| 4 | X dhcp_TPLINK | ether7-TPLINK | pool-TPLINK |
| 5 | X dhcp_WIFI | ether5-WIFI | pool-WIFI |
| 6 | dhcp_vlan1_mgmt | vlan1_mgmt | pool-TPLINK |
| 7 | dhcp_vlan20_VoIP | vlan20_VoIP | pool_vlan20_VoIP |
| 8 | dhcp_vlan30_WIFI_Pub | vlan30_WIFI_Pub | pool_vlan30_WIFI_Pub |
| 9 | dhcp_vlan40_WIFI_Priv | vlan40_WIFI_Priv | pool_vlan40_WIFI_Priv |

IP Pool

| | | |
|---|------------------------------|-------------------------------------|
| # | NAME | RANGES |
| 0 | pool-TPLINK | 172.17.200.20-172.17.200.252 |
| 1 | pool-PROXMOX | 172.17.100.10-172.17.100.254 |
| 2 | pool-WIFI | 172.17.3.20-172.17.3.254 |
| 3 | pool-T4 | 172.17.4.20-172.17.4.254 |
| 4 | pool-A6 | 172.17.6.20-172.17.6.254 |
| 5 | pool-A5 | 172.17.5.20-172.17.5.254 |
| 6 | pool_vlan20_VoIP | 192.168.20.2-192.168.20.254 |
| 7 | pool_vlan30_WIFI_Pub | 192.168.30.2-192.168.30.254 |
| 8 | pool_vlan40_WIFI_Priv | 192.168.40.2-192.168.40.254 |

Finalmente, se configura VLAN Filtering en el bridge creado para la configuración de la red.

Bridge

| | | | | |
|---|---------------------------------|----------|-----------------|---|
| Flags: X - disabled, R - running | | | | |
| 0 | R name=" bridge_tplink " | mtu=auto | actual-mtu=1500 | l2mtu=1598 arp=enabled arp-timeout=auto |
| mac-address=2C:C8:1B:0C:4B:3F protocol-mode=rstp fast-forward=yes igmp-snooping=no auto-mac=yes | | | | |
| ageing-time=5m priority=0x8000 max-message-age=20s forward-delay=15s transmit-hold-count=6 | | | | |
| vlan-filtering=yes ether-type=0x8100 pvid=1 frame-types=admit-all ingress-filtering=no dhcp-snooping=no | | | | |

Bridge Port

| | | | | | | | |
|--|---------------|---------------|-----|------|----------|-----------|----------------------------|
| Flags: X - disabled, I - inactive, D - dynamic, H - hw-offload | | | | | | | |
| # | INTERFACE | BRIDGE | HW | PVID | PRIORITY | PATH-COST | INTERNAL-PATH-COST HORIZON |
| 0 | ether7-TPLINK | bridge_tplink | yes | 1 | 0x80 | 10 | 10 none |

Bridge Vlan

Flags: X - disabled, D - dynamic

| # | BRIDGE | VLAN-IDS | CURRENT-TAGGED | CURRENT-UNTAGGED |
|---|---------------|----------|----------------|------------------|
| 0 | bridge_tplink | 1 | bridge_tplink | |
| | | | ether7-TPLINK | |
| 1 | bridge_tplink | 20 | bridge_tplink | |
| | | | ether7-TPLINK | |
| 2 | bridge_tplink | 30 | bridge_tplink | |
| | | | ether7-TPLINK | |
| 3 | bridge_tplink | 40 | bridge_tplink | |
| | | | ether7-TPLINK | |

Importante: Es necesario incluir la interfaz bridge_tplink como puerto etiquetado para poder acceder a los servidores DHCP.

Controlador TPLink Omada OC200

Dado que a través de la red cableada se tiene que permitir tráfico de todas las VLAN, es necesario crear una interfaz VLAN para servicio de red.

| NAME | PURPOSE | SUBNET | PORTAL | PORTAL NAME | ACCESS CONTROL RULE | RATE LIMIT | VLAN | ACTION |
|----------------|-----------|------------------|--------|-------------|---------------------|------------|------|--------|
| LAN | Interface | 192.168.200.1/24 | | | | | 1 | |
| VLAN20_VoIP | VLAN | | | | | | 20 | |
| VLAN30_WifiPub | VLAN | | | | | | 30 | |
| VLAN40_WifiPub | VLAN | | | | | | 40 | |

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La VLAN se utilizará para las conexiones de teléfonos IP a los puertos de los switches. A modo de ejemplo, se configuran los cuatro primeros puertos del switch ubicado en el Aula6 (A6_005F6775E303) para la conexión telefónica (VoIP).

Search or select tag

All Gateway/Switches APs

| DEVICE NAME | IP ADDRESS | STATUS | MODEL | VERSION | UPTIME | DOWN |
|--------------------|----------------|-----------|----------------------|---------|---------------------|-----------|
| A6-003192B484C0 | 172.17.200.230 | CONNECTED | TL-SG3210XHP-M2 v1.0 | 1.0.6 | 66day(s) 4h 55m 27s | 9.47 GB |
| A6_005F6775E303 | 172.17.200.238 | CONNECTED | TL-SG3428 v2.0 | 2.0.3 | 2day(s) 23h 56m 59s | 32.39 MB |
| RTE-003192B484C1 | 192.168.200.96 | CONNECTED | TL-SG3210XHP-M2 v1.0 | 1.0.6 | 66day(s) 4h 45m 41s | 2.07 GB |
| RTE-C006C33620A... | 192.168.200.1 | CONNECTED | ER7206 v1.0 | 1.1.1 | 2day(s) 21h 52m 25s | 0 Bytes |
| T4-003192B484BF | 172.17.200.232 | CONNECTED | TL-SG3210XHP-M2 v1.0 | 1.0.6 | 66day(s) 4h 40m 5s | 3.59 GB |
| T4-005F6777B28D | 172.17.200.231 | CONNECTED | TL-SG3428 v2.0 | 2.0.3 | 66day(s) 5h 41m 34s | 565.26 MB |
| T4-E4C32ADB8DE2 | 172.17.200.229 | CONNECTED | TL-SG3428 v1.0 | 1.1.2 | 66day(s) 5h 40m 9s | 579.53 MB |

Showing 1-7 of 7 records < 1 > 10 /page Go To page: GO

A6_005F6775... CONNECTED

1 3 5 7 9 11 13 15 17 19 21 23 25 27

2 4 6 8 10 12 14 16 18 20 22 24 26 28

Disabled

10/100 Mbps

10 Gbps

Mirroring

Disconnected

2.5 Gbps

PoE

STP Blocking

1000 Mbps

5 Gbps

Uplink

Details Ports Clients Config Statistics

Port LAG

Edit Selected

| # | Name | Status | Prof | ACTION |
|-------------------------------------|---------|--------|-------------|--------|
| <input checked="" type="checkbox"/> | 1 Port1 | | VLAN 0_V... | |
| <input checked="" type="checkbox"/> | 2 Port2 | | VLAN 0_V... | |
| <input checked="" type="checkbox"/> | 3 Port3 | | VLAN 0_V... | |
| <input checked="" type="checkbox"/> | 4 Port4 | | VLAN 0_V... | |
| <input type="checkbox"/> | 5 Port5 | | VLAN 0_V... | |
| <input type="checkbox"/> | 6 Port6 | | VLAN 0_V... | |

Search or select tag

AllGateway/SwitchesAPs

| DEVICE NAME | IP ADDRESS | STATUS | MODEL | VERSION | UPTIME | DOWN |
|--------------------|----------------|-----------|----------------------|---------|---------------------|-----------|
| A6-003192B484C0 | 172.17.200.230 | CONNECTED | TL-SG3210XHP-M2 v1.0 | 1.0.6 | 66day(s) 4h 55m 27s | 9.47 GB |
| A6_005F6775E303 | 172.17.200.238 | CONNECTED | TL-SG3428 v2.0 | 2.0.3 | 2day(s) 23h 56m 59s | 32.39 MB |
| RTE-003192B484C1 | 192.168.200.96 | CONNECTED | TL-SG3210XHP-M2 v1.0 | 1.0.6 | 66day(s) 4h 45m 41s | 2.07 GB |
| RTE-C006C33620A... | 192.168.200.1 | CONNECTED | ER7206 v1.0 | 1.1.1 | 2day(s) 21h 52m 25s | 0 Bytes |
| T4-003192B484BF | 172.17.200.232 | CONNECTED | TL-SG3210XHP-M2 v1.0 | 1.0.6 | 66day(s) 4h 40m 5s | 3.59 GB |
| T4-005F6777B28D | 172.17.200.231 | CONNECTED | TL-SG3428 v2.0 | 2.0.3 | 66day(s) 5h 41m 34s | 565.26 MB |
| T4-E4C32ADB8DE2 | 172.17.200.229 | CONNECTED | TL-SG3428 v1.0 | 1.1.2 | 66day(s) 5h 40m 9s | 579.53 MB |

Showing 1-7 of 7 records10 /pageGo To page:GO

A6_005F6775...CONNECTED

13579111315171921232527

246810121416182022242628

Disabled

10/100 Mbps

10 Gbps

Mirroring

Disconnected

2.5 Gbps

PoE

STP Blocking

1000 Mbps

5 Gbps

Uplink

DetailsPortsClientsConfigStatistics

Batch Edit (4)

Name:

Keep Existing

Profile:

VLAN20_VoIP

Manage Profiles

☒ Profile Overrides

Operation:

☒ Keep Existing

☐ Switching

PoE Mode:

☒ Keep Existing

☐ Off

☐ 802.3at/af

802.1X Control:

☒ Keep Existing

Para verificar la correcta asignación de IP en los puertos configurados, se conecta un PC y se muestra su configuración IP:

*** poner captura ipconfig ***

Para dar servicio WiFi se configuran las dos SSID sólo para la banda de 2,4GHz con el etiqueta VLAN adecuada.

WLAN Group: Default

| SSID NAME | SECURITY | BAND | GUEST NETWORK | Portal | ACCESS CONTROL RULE | RATE LIMIT | VLAN | ACTION |
|-----------|--------------|--------|---------------|--------|---------------------|------------|------|--------|
| WIFI_Priv | WPA-Personal | 2.4GHz | | | | | 40 | |
| WIFI_Pub | WPA-Personal | 2.4GHz | | | | | 30 | |

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Edit Wireless Network

Network Name (SSID):WIFI_Pub

Band:☒ 2.4GHz☐ 5GHz

Guest Network:☐ Enable

Security:

☐ None

☒ WPA-Personal

☐ WPA-Enterprise

Security Key:

☐ Advanced Settings

SSID Broadcast:☒ Enable

VLAN:

☒ Enable30(1-4094)

WPA Mode:WPA2-PSK / AES

Group Key Update Period:☐ Enable GTK rekeying every0Seconds(30-80400)

Rate Limit:Default

☐ WLAN Schedule

☐ 802.11 Rate Control

☐ MAC Filter

Edit Wireless Network

Network Name (SSID):WIFI_Priv

Band:☒ 2.4GHz☐ 5GHz

Guest Network:☐ Enable

Security:

☐ None

☒ WPA-Personal

☐ WPA-Enterprise

Security Key:

☐ Advanced Settings

SSID Broadcast:☒ Enable

VLAN:

☒ Enable40(1-4094)

WPA Mode:WPA2-PSK / AES

Group Key Update Period:☐ Enable GTK rekeying every0Seconds(30-80400)

Rate Limit:Default






☐ WLAN Schedule

☐ 802.11 Rate Control

☐ MAC Filter






Para permitir la conexión de los usuarios a las WiFi configuradas, se asignan estos perfiles a los puntos de acceso y se habilita en los mismos la radio a 2,4GHz. La banda de 5,0GHz no se utiliza.

AllGateway/SwitchesAPsOverviewMeshPerformanceConfig

| DEVICE NAME | IP ADDRESS | STATUS | MODEL | VERSION | UPTIME | CLIENTS | DOWN TIME |
|---|-----------------|-----------|-------------------------|---------|---------------------|---------|-----------|
|  A6_6032B16D3DBE | 172.17.200.237 | CONNECTED | EAP265 HD(EU) v1.0 | 5.0.4 | 6h 46m 45s | 0 | 0 By |
|  A6_60A4B76B0EB2 | 172.17.200.233 | CONNECTED | EAP225-Outdoor(EU) v1.0 | 5.0.4 | 7h 30m 16s | 0 | 127. |
|  AT4_60A4B76B143... | 172.17.200.234 | CONNECTED | EAP225-Outdoor(EU) v1.0 | 5.0.4 | 29day(s) 8h 49m 9s | 0 | 5.07 |
|  RTE_003192E80B3... | 192.168.200.191 | CONNECTED | EAP265 HD(EU) v1.0 | 5.0.4 | 65day(s) 8h 20m 10s | 0 | 14.2 |
|  T4_003192E80970 | 172.17.200.236 | CONNECTED | EAP265 HD(EU) v1.0 | 5.0.4 | 66day(s) 4h 50m 48s | 0 | 14.0 |

Showing 1-5 of 5 records110 /pageGo To page:GO

DevicesConfig

| Devices Name | Model | Action |
|---|-------------------------|--------|
|  A6_6032B16D3... | EAP265 HD(EU) v1.0 | X |
|  A6_60A4B76B0... | EAP225-Outdoor(EU) v1.0 | X |
|  AT4_60A4B76B... | EAP225-Outdoor(EU) v1.0 | X |
|  RTE_003192E8... | EAP265 HD(EU) v1.0 | X |
|  T4_003192E80... | EAP265 HD(EU) v1.0 | X |

Showing 1-5 of 5 records110 /pageGo To page:GO

General

Radios

If some functions are not supported on some selected EAPs, the corresponding configurations will not take effect. Consider your device model before configuring EAPs in batch.

2.4GHz5GHz

Status:Enable

Channel Width:Keep Existing

Channel:Keep Existing

Tx Power:Keep Existing

ApplyCancel

WLANs

Services

Advanced

Manage Device

General

Radios

If some functions are not supported on some selected EAPs, the corresponding configurations will not take effect. Consider your device model before configuring EAPs in batch.

2.4GHz5GHz

Status:Disable

Channel Width:Keep Existing

Channel:Keep Existing

Tx Power:Keep Existing

ApplyCancel

WLANs

Services

Advanced

Manage Device

General

Radios

WLANs

WLAN Group:Default

| Name | Band | Overrides | ACTION |
|-----------|--------|-----------|--------|
| WiFi_Pub | 2.4GHz | | |
| WiFi_Priv | 2.4GHz | | |

Showing 1-2 of 2 records1

ApplyCancel

Services

Advanced

Manage Device

Para comprobar que el servicio inalámbrico en ambas SSID están funcionando correctamente, conectamos varios dispositivos y mostramos las conexiones establecidas.

*** insertar conexiones wifi ***

Resultados obtenidos

- > Captura de portales
- > Captura de estadísticas de conexiones