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Университет ИТМО

Отчет по лабораторной работе №5

«Администрирование систем и сетей»

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Оглавление

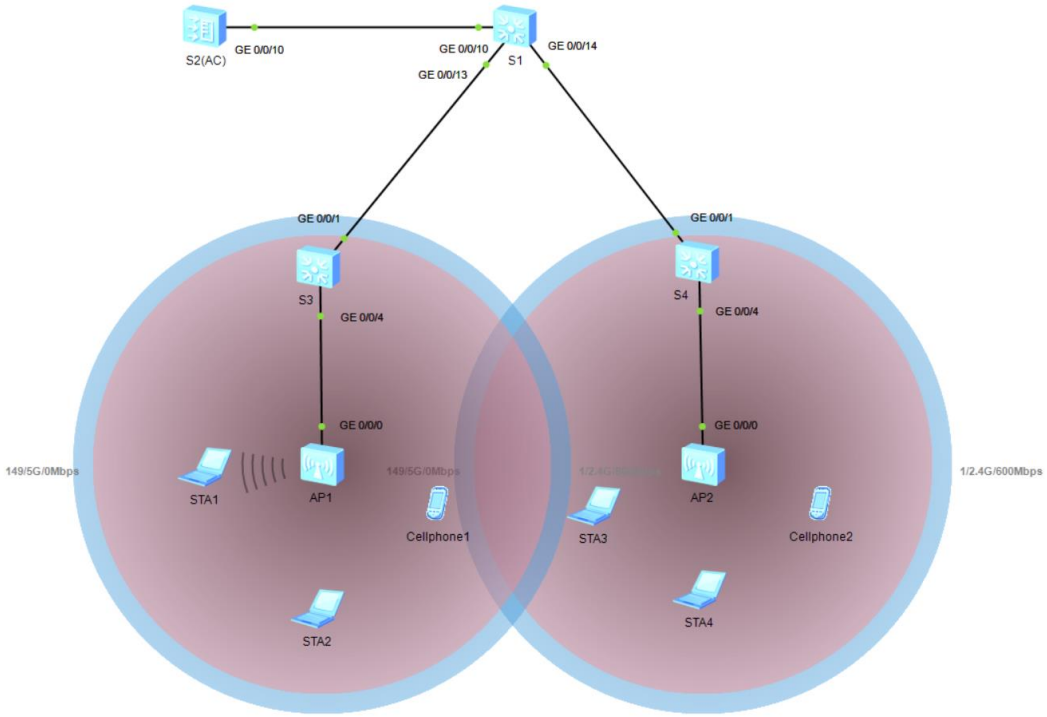
Создание WLAN

Цели

Лабораторная работа помогает получить практические навыки по изучению следующих тем:

- Процедура аутентификации точек доступа
- Процедура настройки профилей WLAN
- Процесс настройки основных параметров WLAN

Топология



План работы

1. Настройка подключения к проводной сети.
2. Настройка точек доступа и перевод их в режим онлайн.

(1) Создание групп точек доступа и добавление точек доступа с одинаковой

1. конфигурацией в одну группу для унифицированной настройки.

(2) Настройка системных параметров контроллера доступа, включая код страны

2. и интерфейс-источник, используемый контроллером для связи с точками
3. доступа.

(3) Настройка режима аутентификации AP и импорт AP для выхода точек
4. доступа в сеть.
3. Настройка параметров сервисов WLAN и передача конфигурации точкам
5. доступа, чтобы обеспечить доступ STA к WLAN.

Процедура конфигурирования

Шаг 1. Настройте основные параметры устройства.

Присвойте имена устройствам (назовите S2 в топологии AC).

```
<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]sysname S1
[S1]

<AC6605>system-view
Enter system view, return user view with Ctrl+Z.
[AC6605]sysname AC
[AC]

<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]sysname S3
[S3]

<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]sysname S4
[S4]
```

Отключите ненужные порты между S1 и AC. Этот шаг можно выполнять только в среде, описанной в Руководстве по выполнению лабораторных работ для подготовки к сертификации HCIA-Datacom V1.0.

```
[S1]interface g0/0/11
[S1-GigabitEthernet0/0/11]shutdown
[S1-GigabitEthernet0/0/11]interface g0/0/12
[S1-GigabitEthernet0/0/12]shutdown
```

Включите функцию PoE на портах S3 и S4, подключенных к точкам доступа.

Шаг 2. Настройте параметры проводной сети.

Настройте VLAN.

```
[S1]vlan batch 100 101
Info: This operation may take a few seconds. Please wait for a moment...done.
[S1]interface g0/0/13
[S1-GigabitEthernet0/0/13]port link-type trunk
[S1-GigabitEthernet0/0/13]port trunk allow-pass vlan 100 101
[S1-GigabitEthernet0/0/13]quit
[S1]interface g0/0/14
[S1-GigabitEthernet0/0/14]port link-type trunk
[S1-GigabitEthernet0/0/14]port trunk allow-pass vlan 100 101
[S1-GigabitEthernet0/0/14]quit
[S1]interface g0/0/10
[S1-GigabitEthernet0/0/10]port link-type trunk
[S1-GigabitEthernet0/0/10]port trunk allow-pass vlan 100 101
[S1-GigabitEthernet0/0/10]quit

[AC]vlan batch 100 101
Info: This operation may take a few seconds. Please wait for a moment...done.
[AC]interface g0/0/10
[AC-GigabitEthernet0/0/10]port link-type trunk.
[AC-GigabitEthernet0/0/10]port trunk allow-pass vlan 100 101
[AC-GigabitEthernet0/0/10]quit

[S3]vlan batch 100 101
Info: This operation may take a few seconds. Please wait for a moment...done.
[S3]interface g0/0/1
[S3-GigabitEthernet0/0/1]port link-type trunk
[S3-GigabitEthernet0/0/1]port trunk allow-pass vlan 100 101
[S3-GigabitEthernet0/0/1]quit
```

```
[S3]interface g0/0/4
[S3-GigabitEthernet0/0/4]port link-type trunk
[S3-GigabitEthernet0/0/4]port trunk pvid vlan 100
[S3-GigabitEthernet0/0/4]port trunk allow-pass vlan 100 101
[S3-GigabitEthernet0/0/4]quit

[S4]vlan batch 100 101
Info: This operation may take a few seconds. Please wait for a moment...done.
[S4]interface g0/0/1
[S4-GigabitEthernet0/0/1]port link-type trunk
[S4-GigabitEthernet0/0/1]port trunk allow-pass vlan 100 to 101
[S4-GigabitEthernet0/0/1]quit
[S4]interface g0/0/4
[S4-GigabitEthernet0/0/4]port link-type trunk
[S4-GigabitEthernet0/0/4]port trunk pvid vlan 100
[S4-GigabitEthernet0/0/4]port trunk allow-pass vlan 100 to 101
[S4-GigabitEthernet0/0/4]quit
```

Настройте IP-адреса интерфейсов.

```
[S1]interface Vlanif 101
[S1-Vlanif101]ip addr 192.168.101.254 24

[S1-Vlanif101]quit
[S1]interface LoopBack 0
[S1-LoopBack0] ip address 10.0.1.1 32
[S1-LoopBack0]quit

[AC]interface Vlanif 100
[AC-Vlanif100]ip addr 192.168.100.254 24
```

Настройте DHCP.

```
[S1]dhcp enable
Info: The operation may take a few seconds. Please wait for a moment.done.
[S1]ip pool sta
Info:It's successful to create an IP address pool.
[S1-ip-pool-sta]network 192.168.101.0 mask 24
[S1-ip-pool-sta]gateway-list 192.168.101.254
[S1-ip-pool-sta]quit [S1]interface Vlanif 101
[S1-Vlanif101]dhcp select global
[S1-Vlanif101]quit

[AC]dhcp enable
Info: The operation may take a few seconds. Please wait for a moment.done.
[AC]ip pool ap
Info: It is successful to create an IP address pool.
[AC-ip-pool-ap]network 192.168.100.254 mask 24
[AC-ip-pool-ap]gateway-list 192.168.100.254
[AC-ip-pool-ap]quit
[AC]interface Vlanif 100
[AC-Vlanif100]dhcp select global
[AC-Vlanif100]quit
```

Шаг 3. Настройте параметры точек доступа для выхода в сеть.

Создайте группу AP и назовите ее ap-group1.

```
[AC]wlan
[AC-wlan-view]ap-group name ap-group1
Info: This operation may take a few seconds. Please wait for a moment.done.
[AC-wlan-ap-group-ap-group1]quit
```

Создайте профиль регулирующего домена и настройте код страны AC в профиле.

```
[AC]wlan
[AC-wlan-view]regulatory-domain-profile name default
[AC-wlan-regulate-domain-default]country-code on
Error: The country code is invalid.
```

Установите привязку профиля регулирующего домена к группе AP.

```
[AC]wlan
[AC-wlan-view]ap-group name ap-group1
[AC-wlan-ap-group-ap-group1]regulatory-domain-profile default
Warning: Modifying the country code will clear channel, power and antenna gain c
onfigurations of the radio and reset the AP. Continue?[Y/N]:Y
[AC-wlan-ap-group-ap-group1]quit
```

Укажите интерфейс-источник на AC для установления туннелей CAPWAP.

```
[AC]capwap source interface Vlanif 100
```

Импортируйте точки доступа в AC и добавьте их в группу AP с именем ap-group1.

```
[AC]wlan
[AC-wlan-view]ap auth-mode mac-auth
[AC-wlan-view]ap-id 0 ap-mac 00e0-fc57-02f0
[AC-wlan-ap-0]ap-name ap1
[AC-wlan-ap-0]ap-group ap-group1
Warning: This operation may cause AP reset. If the country code changes, it will clear
channel, power and antenna gain configurations of the radio, Whether to continue?
[Y/N]:Y
[AC-wlan-ap-0]quit

[AC-wlan-view]ap-id 1 ap-mac 00e0-fc3b-07c0
[AC-wlan-ap-1]ap-name ap2
[AC-wlan-ap-1]ap-group ap-group1
Warning: This operation may cause AP reset. If the country code changes, it will clear
channel, power and antenna gain configurations of the radio, Whether to continue?
[Y/N]:Y
[AC-wlan-ap-1]quit
```

Выведите на экран информацию о текущей AP.

```
[AC]wlan
[AC-wlan-view]display ap all
Info: This operation may take a few seconds. Please wait for a moment.done.
Total AP information:
nor  : normal          [2]
--------------------------------------------------------------------------------
--------------
ID   MAC             Name Group     IP              Type            State STA Upt
ime
--------------------------------------------------------------------------------
--------------
0    00e0-fc57-02f0 ap1  ap-group1 192.168.100.198 AP2050DN        nor   1   7M:
55S
1    00e0-fc3b-07c0 ap2  ap-group1 192.168.100.190 AP2050DN        nor   0   8M:
33S
--------------------------------------------------------------------------------
--------------
Total: 2
```

Шаг 4. Настройте параметры сервисов WLAN.

Создайте профиль безопасности HCIA-WLAN и настройте политику безопасности.

```
[AC-wlan-view]security-profile name HCIA-WLAN
[AC-wlan-sec-prof-HCIA-WLAN]security wpa-wpa2 psk pass-phrase HCIA-Datacom aes
[AC-wlan-sec-prof-HCIA-WLAN]quit
```

Создайте профиль SSID HCIA-WLAN и задайте имя SSID HCIA-WLAN.

```
[AC-wlan-view]ssid-profile name HCIA-WLAN
[AC-wlan-ssid-prof-HCIA-WLAN]ssid HCIA-WLAN
Info: This operation may take a few seconds, please wait.done.
[AC-wlan-ssid-prof-HCIA-WLAN]quit
```

Создайте профиль VAP HCIA-WLAN, настройте режим передачи данных и сервисную VLAN и примените профиль безопасности и профиль SSID к профилю VAP.

```
[AC-wlan-view]vap-profile name HCIA-WLAN
[AC-wlan-vap-prof-HCIA-WLAN]forward-mode direct-forward
[AC-wlan-vap-prof-HCIA-WLAN]service-vlan vlan-id 101
Info: This operation may take a few seconds, please wait.done.
[AC-wlan-vap-prof-HCIA-WLAN]security-profile HCIA-WLAN
Info: This operation may take a few seconds, please wait.done.
[AC-wlan-vap-prof-HCIA-WLAN]ssid-profile HCIA-WLAN
Info: This operation may take a few seconds, please wait.done.
[AC-wlan-vap-prof-HCIA-WLAN]quit
```

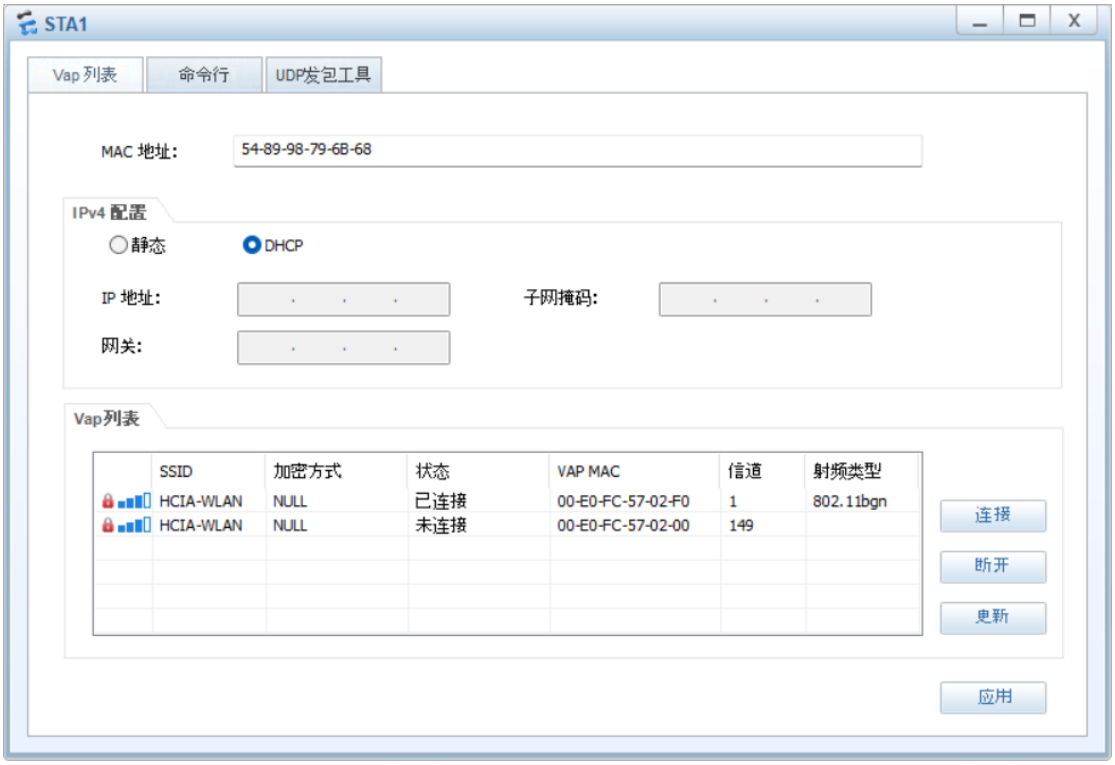
Установите привязку профиля VAP к группе AP и примените конфигурацию профиля VAP HCIA-WLAN к радиомодулю 0 и радиомодулю 1 точек доступа в группе AP.

```
[AC-wlan-view]ap-group name ap-group1
[AC-wlan-ap-group-ap-group1]vap-profile HCIA-WLAN wlan 1 radio all
Info: This operation may take a few seconds, please wait...done.
```

Проверка

Перед проверкой нужно подключиться к WLAN

Пароль: HCIA-Datacom




```
STA>ping 10.0.1.1

Ping 10.0.1.1: 32 data bytes, Press Ctrl_C to break
From 10.0.1.1: bytes=32 seq=1 ttl=255 time=141 ms
From 10.0.1.1: bytes=32 seq=2 ttl=255 time=156 ms
From 10.0.1.1: bytes=32 seq=3 ttl=255 time=140 ms
From 10.0.1.1: bytes=32 seq=4 ttl=255 time=141 ms
From 10.0.1.1: bytes=32 seq=5 ttl=255 time=156 ms
```

```
--- 10.0.1.1 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 140/146/156 ms
```

```
[AC]display station all
Rf/WLAN: Radio ID/WLAN ID
Rx/Tx: link receive rate/link transmit rate(Mbps)
--------------------------------------------------------------------------------
----------------------
STA MAC          AP ID Ap name  Rf/WLAN  Band  Type  Rx/Tx      RSSI  VLAN  IP a
ddress      SSID
--------------------------------------------------------------------------------
----------------------
5489-9879-6b68   0     ap1      0/1      2.4G  -     -/-        -     101   192.
168.101.253 HCIA-WLAN
--------------------------------------------------------------------------------
----------------------
Total: 1 2.4G: 1 5G: 0
```

Справочные конфигурации

S1

```
#
sysname S1
#
vlan batch 100 to 101
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
dhcp enable
#
diffserv domain default
#
drop-profile default
#
ip pool sta
 gateway-list 192.168.101.254
 network 192.168.101.0 mask 255.255.255.0
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface Vlanif100
#
interface Vlanif101
 ip address 192.168.101.254 255.255.255.0
 dhcp select global
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
#
interface GigabitEthernet0/0/2
```

```
#
interface GigabitEthernet0/0/3
#
interface GigabitEthernet0/0/4
#
interface GigabitEthernet0/0/5
#
interface GigabitEthernet0/0/6
#
interface GigabitEthernet0/0/7
#
interface GigabitEthernet0/0/8
#
interface GigabitEthernet0/0/9
#
interface GigabitEthernet0/0/10
 port link-type trunk
 port trunk allow-pass vlan 100 to 101
#
interface GigabitEthernet0/0/11
 shutdown
#
interface GigabitEthernet0/0/12
 shutdown
#
interface GigabitEthernet0/0/13
 port link-type trunk
 port trunk allow-pass vlan 100 to 101
#
interface GigabitEthernet0/0/14
 port link-type trunk
 port trunk allow-pass vlan 100 to 101
#
interface GigabitEthernet0/0/15
#
interface GigabitEthernet0/0/16
#
interface GigabitEthernet0/0/17
#
interface GigabitEthernet0/0/18
#
interface GigabitEthernet0/0/19
#
interface GigabitEthernet0/0/20
#
interface GigabitEthernet0/0/21
#
interface GigabitEthernet0/0/22
#
interface GigabitEthernet0/0/23
#
interface GigabitEthernet0/0/24
#
interface NULL0
#
interface LoopBack0
 ip address 10.0.1.1 255.255.255.255
#
user-interface con 0
user-interface vty 0 4
#
return
```

S2(AC)

```
[V200R007C10SPC300]
#
 sysname AC
#
 set memory-usage threshold 0
#
ssl renegotiation-rate 1
```

```
#
vlan batch 100 to 101
#
authentication-profile name default_authen_profile
authentication-profile name dot1x_authen_profile
authentication-profile name mac_authen_profile
authentication-profile name portal_authen_profile
authentication-profile name macportal_authen_profile
#
dhcp enable
#
diffserv domain default
#
radius-server template default
#
pki realm default
 rsa local-key-pair default
 enrollment self-signed
#
ike proposal default
 encryption-algorithm aes-256
 dh group14
 authentication-algorithm sha2-256
 authentication-method pre-share
 integrity-algorithm hmac-sha2-256
 prf hmac-sha2-256
#
free-rule-template name default_free_rule
#
portal-access-profile name portal_access_profile
#
ip pool ap
 gateway-list 192.168.100.254
 network 192.168.100.0 mask 255.255.255.0
#
aaa
 authentication-scheme default
 authentication-scheme radius
  authentication-mode radius
 authorization-scheme default
 accounting-scheme default
 domain default
  authentication-scheme radius
  radius-server default
 domain default_admin
  authentication-scheme default
 local-user admin password irreversible-cipher
$1a$WYts3za|>U$j_R~7~aOu<x(P{7oJs35+jAJF@^`$G`5w[Q-kgpC$
 local-user admin privilege level 15
 local-user admin service-type http
#
interface Vlanif100
 ip address 192.168.100.254 255.255.255.0
 dhcp select global
#
interface MEth0/0/1
 undo negotiation auto
 duplex half
#
interface GigabitEthernet0/0/1
#
interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
#
interface GigabitEthernet0/0/4
#
interface GigabitEthernet0/0/5
#
interface GigabitEthernet0/0/6
#
interface GigabitEthernet0/0/7
#
interface GigabitEthernet0/0/8
#
```

```
interface GigabitEthernet0/0/9
#
interface GigabitEthernet0/0/10
 port link-type trunk
 port trunk allow-pass vlan 100 to 101
#
interface GigabitEthernet0/0/11
#
interface GigabitEthernet0/0/12
#
interface GigabitEthernet0/0/13
#
interface GigabitEthernet0/0/14
#
interface GigabitEthernet0/0/15
#
interface GigabitEthernet0/0/16
#
interface GigabitEthernet0/0/17
#
interface GigabitEthernet0/0/18
#
interface GigabitEthernet0/0/19
#
interface GigabitEthernet0/0/20
#
interface GigabitEthernet0/0/21
 undo negotiation auto
 duplex half
#
interface GigabitEthernet0/0/22
 undo negotiation auto
 duplex half
#
interface GigabitEthernet0/0/23
 undo negotiation auto
 duplex half
#
interface GigabitEthernet0/0/24
 undo negotiation auto
 duplex half
#
interface XGigabitEthernet0/0/1
#
interface XGigabitEthernet0/0/2
#
interface NULL0
#
 snmp-agent local-engineid 800007DB03000000000000
 snmp-agent
#
ssh server secure-algorithms cipher aes256_ctr aes128_ctr
ssh server key-exchange dh_group14_sha1
ssh client secure-algorithms cipher aes256_ctr aes128_ctr
ssh client secure-algorithms hmac sha2_256
ssh client key-exchange dh_group14_sha1
#
capwap source interface vlanif100
#
user-interface con 0
 authentication-mode password
user-interface vty 0 4
 protocol inbound all
user-interface vty 16 20
 protocol inbound all
#
wlan
 traffic-profile name default
 security-profile name default
 security-profile name HCIA-WLAN
  security wpa-wpa2 psk pass-phrase %^%#L~boRa20b%rr~z=17{Y6~}iz<}(<v)1s2N@Y2Ow<%^%# aes
 security-profile name default-wds
 security-profile name default-mesh
 ssid-profile name default
 ssid-profile name HCIA-WLAN
```

```
  ssid HCIA-WLAN
 vap-profile name default
 vap-profile name HCIA-WLAN
  service-vlan vlan-id 101
  ssid-profile HCIA-WLAN
  security-profile HCIA-WLAN
 wds-profile name default
 mesh-handover-profile name default
 mesh-profile name default
 regulatory-domain-profile name default
 air-scan-profile name default
 rrm-profile name default
 radio-2g-profile name default
 radio-5g-profile name default
 wids-spoof-profile name default
 wids-profile name default
 wireless-access-specification
 ap-system-profile name default
 port-link-profile name default
 wired-port-profile name default
 serial-profile name preset-enjoyor-toeap
 ap-group name default
 ap-group name ap-group1
  radio 0
   vap-profile HCIA-WLAN wlan 1
  radio 1
   vap-profile HCIA-WLAN wlan 1
  radio 2
   vap-profile HCIA-WLAN wlan 1
 ap-id 0 type-id 69 ap-mac 00e0-fc57-02f0 ap-sn 2102354483102F681B1A
  ap-name ap1
  ap-group ap-group1
 ap-id 1 type-id 69 ap-mac 00e0-fc3b-07c0 ap-sn 2102354483106B77715E
  ap-name ap2
  ap-group ap-group1
 provision-ap
#
dot1x-access-profile name dot1x_access_profile
#
mac-access-profile name mac_access_profile
#
return
```

S3

```
#
sysname S3
#
vlan batch 100 to 101
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
```

```
#
interface GigabitEthernet0/0/1
 port link-type trunk
 port trunk allow-pass vlan 100 to 101
#
interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
#
interface GigabitEthernet0/0/4
 port link-type trunk
 port trunk pvid vlan 100
 port trunk allow-pass vlan 100 to 101
#
interface GigabitEthernet0/0/5
#
interface GigabitEthernet0/0/6
#
interface GigabitEthernet0/0/7
#
interface GigabitEthernet0/0/8
#
interface GigabitEthernet0/0/9
#
interface GigabitEthernet0/0/10
#
interface GigabitEthernet0/0/11
#
interface GigabitEthernet0/0/12
#
interface GigabitEthernet0/0/13
#
interface GigabitEthernet0/0/14
#
interface GigabitEthernet0/0/15
#
interface GigabitEthernet0/0/16
#
interface GigabitEthernet0/0/17
#
interface GigabitEthernet0/0/18
#
interface GigabitEthernet0/0/19
#
interface GigabitEthernet0/0/20
#
interface GigabitEthernet0/0/21
#
interface GigabitEthernet0/0/22
#
interface GigabitEthernet0/0/23
#
interface GigabitEthernet0/0/24
#
interface NULL0
#
user-interface con 0
user-interface vty 0 4
#
return
```

S4

```
#
sysname S4
#
vlan batch 100 to 101
#
cluster enable
ntdp enable
ndp enable
#
```

```
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port link-type trunk
 port trunk allow-pass vlan 100 to 101
#
interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
#
interface GigabitEthernet0/0/4
 port link-type trunk
 port trunk pvid vlan 100
 port trunk allow-pass vlan 100 to 101
#
interface GigabitEthernet0/0/5
#
interface GigabitEthernet0/0/6
#
interface GigabitEthernet0/0/7
#
interface GigabitEthernet0/0/8
#
interface GigabitEthernet0/0/9
#
interface GigabitEthernet0/0/10
#
interface GigabitEthernet0/0/11
#
interface GigabitEthernet0/0/12
#
interface GigabitEthernet0/0/13
#
interface GigabitEthernet0/0/14
#
interface GigabitEthernet0/0/15
#
interface GigabitEthernet0/0/16
#
interface GigabitEthernet0/0/17
#
interface GigabitEthernet0/0/18
#
interface GigabitEthernet0/0/19
#
interface GigabitEthernet0/0/20
#
interface GigabitEthernet0/0/21
#
interface GigabitEthernet0/0/22
#
interface GigabitEthernet0/0/23
#
interface GigabitEthernet0/0/24
#
interface NULL0
#
user-interface con 0
```

```
user-interface vty 0 4
#
return
```

Вывод

В ходе выполнения данной лабораторной работы мы сконфигурировали WLAN с помощью контроллера доступа (AC) и точек доступа AP, чтобы обеспечить доступ STA к WLAN.