# CT5760控制器和Catalyst 3850交换机配置示例

## 目录

## 简介

本文档介绍在5760无线LAN控制器(WLC)和3850交换机上安装和准备无线服务的步骤。本文档介绍两个平台的初始配置和接入点(AP)加入过程。

## 先决条件

### 要求

本文档没有任何特定的要求。

### 使用的组件

本文档中的信息基于以下软件和硬件版本：

- 统一接入CT5760无线控制器 — 版本3.02.02SE

- 统一接入Catalyst 3850交换机 — 版本3.02.02SE

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

# 统一接入CT5760无线控制器的背景信息

CT5760 WLC是首款基于Cisco IOS-XE$^®$软件的控制器，内置智能ASIC，旨在作为下一代统一无线架构中的集中控制器进行部署。该平台还支持融合接入3850系列交换机的新移动功能。

CT5760控制器通常部署在核心附近。连接到核心交换机的上行链路端口可以配置为EtherChannel中继端口，以确保端口冗余。这款新控制器是可扩展的高性能无线控制器，可扩展至1000个AP和12,000个客户端。控制器有6个10 Gbps数据端口，总容量为60 Gbps。

5760系列与Cisco Aironet AP、Cisco Prime基础设施和思科移动服务引擎配合使用，以支持业务关键型无线数据、语音、视频和位置服务应用。

# Unified Access Catalyst 3850交换机的背景信息

Cisco Catalyst 3850系列是下一代企业级堆叠式接入层交换机，可在单一平台上提供有线和无线之间的完全融合。无线服务由IOS-XE软件支持，通过无线接入点控制和调配(CAPWAP)协议受支持。思科新的统一接入数据平面(UADP)ASIC为交换机供电，并实现统一的有线 — 无线策略实施、应用可视性、灵活性和应用优化。此融合基于新的和改进的Cisco StackWise-480的恢复能力。Cisco Catalyst 3850系列交换机支持全IEEE 802.3at增强型以太网供电(PoE+)、模块化且可现场更换的网络模块、冗余风扇和电源。

# 5760 WLC初始配置

本节概述成功配置5760 WLC以托管无线服务的步骤。

# 配置

## 设置脚本

```
        --- System Configuration Dialog ---

Enable secret warning
----------------------------------
In order to access the device manager, an enable secret is required
If you enter the initial configuration dialog, you will be prompted for the
enable secret
If you choose not to enter the intial configuration dialog, or if you exit setup
without setting the enable secret,
please set an enable secret using the following CLI in configuration mode-
enable secret 0 <cleartext password>
----------------------------------
```

```
Would you like to enter the initial configuration dialog? [yes/no]: yes

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: yes

Configuring global parameters:

  Enter host name [Controller]: w-5760-1

 The enable secret is a password used to protect access to
 privileged EXEC and configuration modes. This password, after
 entered, becomes encrypted in the configuration.
  Enter enable secret: cisco

 The enable password is used when you do not specify an
 enable secret password, with some older software versions, and
 some boot images.
  Enter enable password: cisco

 The virtual terminal password is used to protect
 access to the router over a network interface.
  Enter virtual terminal password: cisco

Configure a NTP server now? [yes]:
Enter ntp server address : 192.168.1.200
Enter a polling interval between 16 and 131072 secs which is power of 2:16


 Do you want to configure wireless network? [no]: no

Setup account for accessing HTTP server? [yes]: yes
    Username  [admin]: admin
   Password  [cisco]: cisco
   Password is UNENCRYPTED.

 Configure SNMP Network Management? [no]: no

Current interface summary

Any interface listed with OK? value "NO" does not have a valid configuration
```

| Interface | IP-Address | OK? | Method | Status | Protocol |
|-----------|------------|-----|--------|--------|----------|
| Vlan1 | unassigned | NO | unset | up | up |
| GigabitEthernet0/0 | unassigned | YES | unset | up | up |
| Te1/0/1 | unassigned | YES | unset | up | up |
| Te1/0/2 | unassigned | YES | unset | down | down |
| Te1/0/3 | unassigned | YES | unset | down | down |
| Te1/0/4 | unassigned | YES | unset | down | down |
| Te1/0/5 | unassigned | YES | unset | down | down |
| Te1/0/6 | unassigned | YES | unset | down | down |

```
Enter interface name used to connect to the
management network from the above interface summary: vlan1

Configuring interface Vlan1:

Configure IP on this interface? [yes]: yes
```

```
    IP address for this interface: 192.168.1.20
    Subnet mask for this interface [255.255.255.0] : 255.255.255.0
    Class C network is 192.168.1.0, 24 subnet bits; mask is /24

Wireless management interface needs to be configured at startup
It needs to be mapped to an SVI that's not Vlan 1 (default)

Enter VLAN No for wireless management interface:  120
Enter IP address :192.168.120.94
Enter IP address mask:  255.255.255.0
```

## The following configuration command script was created:

```
w-5760-1
enable secret 4 tnhtc92DXBhelxjYk8LWJrPV36S2i4ntXrpb4RFmfqY^Q
enable password cisco
line vty 0 15
password cisco
ntp server 192.168.1.200 maxpoll 4 minpoll 4
username admin privilege 15 password cisco
no snmp-server
!
no ip routing

!
interface Vlan1
no shutdown
ip address 192.168.1.20 255.255.255.0
!
interface GigabitEthernet0/0
shutdown
no ip address
!
interface TenGigabitEthernet1/0/1
!
interface TenGigabitEthernet1/0/2
!
interface TenGigabitEthernet1/0/3
!
interface TenGigabitEthernet1/0/4
!
interface TenGigabitEthernet1/0/5
!
interface TenGigabitEthernet1/0/6
vlan 120
interface vlan 120
ip addr  192.168.120.94 255.255.255.0
exit
wireless management interface Vlan120
!
end


[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2

Building configuration...
Compressed configuration from 2729 bytes to 1613 bytes[OK]
Use the enabled mode 'configure' command to modify this configuration.
```

```
Press RETURN to get started!
```

## 接入点加入所需的配置

> **注意：**重要信息 — 确保交换机在全局配置下具有正确的boot命令。如果已在闪存中解压，则需要w-5760-1(config)#boot system flash:packages.conf boot命令。

1. 配置网络连通性。配置连接到CAPWAP流量流入/出站的主干网络的TenGig接口。在本例中，使用的接口为TenGigabitEthernet1/0/1。允许VLAN 1和VLAN 120。
   ```
   interface TenGigabitEthernet1/0/1
   switchport trunk allowed vlan 1,120
   switchport mode trunk
   ip dhcp relay information trusted
   ip dhcp snooping trust
   ```
   配置出站默认路由：
   ```
   ip route 0.0.0.0 0.0.0.0 192.168.1.1
   ```
2. 配置 Web 访问。可通过https://<*ipaddress*>/wireless访问GUI登录凭证已在初始配置对话框中定义。
   ```
   username admin privilege 15 password cisco
   ```
3. 确保无线管理接口配置正确。
   ```
        wireless management interface Vlan120
   w-5760-1#sh run int vlan 120
   Building configuration...

   Current configuration : 62 bytes
   !
   interface Vlan120
   ip address 192.168.120.94 255.255.255.0
   end
   ```

   ```
   w-5760-1#sh ip int br
   Interface              IP-Address        OK?    Method    Status      Protocol
   Vlan1                  192.168.1.20      YES    manual    up          up
   Vlan120                192.168.120.94    YES    manual    up          up
   GigabitEthernet0/0     unassigned        YES    unset     down        down
   Te1/0/1                unassigned        YES    unset     up          up
   Te1/0/2                unassigned        YES    unset     down        down
   Te1/0/3                unassigned        YES    unset     down        down
   Te1/0/4                unassigned        YES    unset     down        down
   Te1/0/5                unassigned        YES    unset     down        down
   Te1/0/6                unassigned        YES    unset     down        down
   Capwap2                unassigned        YES    unset     up          up
   ```

   ```
   w-5760-1#
   ```
4. 确保激活许可证已启用，且AP计数正确。**注意：**1)5760没有激活的许可证级别，映像已为ipservices。2)作为移动控制器(MC)的5760最多可支持1000个AP。
   ```
   w-5760-1#license right-to-use activate apcount <count> slot 1 acceptEULA
   ```
5. 确保在WLC上配置了正确的国家/地区代码，以符合AP所部署的国家/地区的管制范围。
   ```
   w-5760-1#show wireless country configured

   Configured Country...........................: US  - United States
   Configured Country Codes
      US  - United States : 802.11a Indoor,Outdoor/ 802.11b / 802.11g
   ```
   要修改国家/地区代码，请输入以下命令：
   ```
   w-5760-1(config)#ap dot11 24ghz shutdown

   w-5760-1(config)#ap dot11 5ghz shutdown
   ```

```
w-5760-1(config)#ap country BE
Changing country code could reset channel and RRM grouping configuration.
If running in RRM One-Time mode, reassign channels after this command.
Check customized APs for valid channel values after this command.
Are you sure you want to continue? (y/n)[y]: y
w-5760-1(config)#no ap dot11 24ghz shut
w-5760-1(config)#no ap dot11 5ghz shut
w-5760-1(config)#end
w-5760-1#wr
Building configuration...
Compressed configuration from 3564 bytes to 2064 bytes[OK]


w-5760-1#show wireless country configured

 Configured Country.............................: BE  - Belgium
 Configured Country Codes
    BE  - Belgium : 802.11a Indoor,Outdoor/ 802.11b / 802.11g
```

6. 确保AP能够通过DHCP选项43、域名服务(DNS)或CAPWAP中的任何其他发现机制获知WLC（本例中为192.168.120.94）的IP地址。

# 验证

为确保AP已加入，请输入show ap summary命令：

```
w-5760-1#show ap summary

Number of APs: 1

Global AP User Name: Not configured
Global AP Dot1x User Name: Not configured

AP Name              AP Model  Ethernet MAC   Radio MAC      State
--------------------------------------------------------------------------
APa493.4cf3.232a     1042N     a493.4cf3.232a  10bd.186d.9a40  Registered
```

# 故障排除

排除AP加入问题故障的有用调试：

```
w-5760-1#debug capwap ap events
capwap/ap/events debugging is on

w-5760-1#debug capwap ap error
capwap/ap/error debugging is on

w-5760-1#debug dtls ap event
dtls/ap/event debugging is on

w-5760-1#debug capwap ios event
CAPWAP Event debugging is on

5760-1#debug capwap ios error
CAPWAP Error debugging is on
```

# 3850交换机初始配置

本节包括在3850上托管无线服务所需的配置。

## 配置

### 设置脚本

```
        --- System Configuration Dialog ---

Enable secret warning
----------------------------------
In order to access the device manager, an enable secret is required
If you enter the initial configuration dialog, you will be prompted
for the enable secret
If you choose not to enter the intial configuration dialog, or if you
exit setup without setting the enable secret,
please set an enable secret using the following CLI in configuration mode-
enable secret 0 <cleartext password>
---------------------------------
Would you like to enter the initial configuration dialog? [yes/no]: yes

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.


Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: yes
Configuring global parameters:

 Enter host name [Switch]: sw-3850-1

 The enable secret is a password used to protect access to
 privileged EXEC and configuration modes. This password, after
 entered, becomes encrypted in the configuration.
 Enter enable secret: Cisco123

 The enable password is used when you do not specify an
 enable secret password, with some older software versions, and
 some boot images.
 Enter enable password: Cisco123

 The virtual terminal password is used to protect
 access to the router over a network interface.
  Enter virtual terminal password: Cisco123

 Do you want to configure country code? [no]: yes

 Enter the country code[US]:US

Note :  Enter the country code in which you are installing this 3850 Switch and
the AP(s). If your country code is not recognized, enter one that is compliant
with the regulatory domain of your own country
```

```
Setup account for accessing HTTP server? [yes]: yes
   Username  [admin]: admin
   Password  [cisco]: cisco
   Password is UNENCRYPTED.

 Configure SNMP Network Management? [no]: no

Current interface summary

Any interface listed with OK? value "NO" does not have a valid configuration

Interface              IP-Address      OK? Method Status    Protocol
Vlan1                  unassigned      NO  unset up         down
GigabitEthernet0/0     unassigned      YES unset up         up
GigabitEthernet2/0/1   unassigned      YES unset  down      down
GigabitEthernet2/0/2   unassigned      YES unset  down      down
GigabitEthernet2/0/3   unassigned      YES unset  down      down
...

...
...
GigabitEthernet2/0/46  unassigned      YES unset  down      down
GigabitEthernet2/0/47  unassigned      YES unset  down      down
GigabitEthernet2/0/48  unassigned      YES unset  up        up
GigabitEthernet2/1/1   unassigned      YES unset  down      down
GigabitEthernet2/1/2   unassigned      YES unset  down      down
GigabitEthernet2/1/3   unassigned      YES unset  down      down
GigabitEthernet2/1/4   unassigned      YES unset  down      down
Te2/1/1                unassigned      YES unset  down      down
Te2/1/2                unassigned      YES unset  down      down
Te2/1/3                unassigned      YES unset  down      down
Te2/1/4                unassigned      YES unset  down      down

Enter interface name used to connect to the
management network from the above interface summary: vlan1

Configuring interface Vlan1:
 Configure IP on this interface? [yes]: yes
   IP address for this interface: 192.168.1.2
    Subnet mask for this interface [255.255.255.0] : 255.255.255.0
    Class C network is 192.168.1.0, 24 subnet bits; mask is /24
```

**此配置命令脚本已创建：**

```
hostname sw-3850-1
enable secret 4 vwcGVdcUZcRMCyxaH2U9Y/PTujsnQWPSbt.LFG8lhTw
enable password Cisco123
line vty 0 15
password Cisco123
 ap dot11 24ghz shutdown
 ap dot11 5ghz shutdown
 ap country US
 no ap dot11 24ghz shutdown
 no ap dot11 5ghz shutdown

username admin privilege 15 password 0 cisco
no snmp-server
!
no ip routing

!
interface Vlan1
```

```
no shutdown
ip address 192.168.1.2 255.255.255.0
!
interface GigabitEthernet0/0
shutdown
no ip address
!
interface GigabitEthernet2/0/1
!
interface GigabitEthernet2/0/2
!
interface GigabitEthernet2/0/3
...


...


...
interface GigabitEthernet2/0/46
!
interface GigabitEthernet2/0/47
!
interface GigabitEthernet2/0/48
!
interface GigabitEthernet2/1/1
!
interface GigabitEthernet2/1/2
!
interface GigabitEthernet2/1/3
!
interface GigabitEthernet2/1/4
!
interface TenGigabitEthernet2/1/1
!
interface TenGigabitEthernet2/1/2
!
interface TenGigabitEthernet2/1/3
!
interface TenGigabitEthernet2/1/4
!
end


[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]:    2
The enable password you have chosen is the same as your enable secret.
This is not recommended.  Re-enter the enable password.
Changing country code could reset channel and RRM grouping configuration.
If running in RRM One-Time mode, reassign channels after this command.
Check customized APs for valid channel values after this command.
Are you sure you want to continue? (y/n)[y]: y
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)

Building configuration...
Compressed configuration from 4414 bytes to 2038 bytes[OK]
Use the enabled mode 'configure' command to modify this configuration.



Press RETURN to get started!
```

## 接入点加入所需的配置

**注意：重要信息** — 确保在全局配置下配置了正确的boot命令。如果已在闪存中解压，则需**要boot system switch all flash:packages.conf命令。**

1. 配置无线必备条件。要启用无线服务，3850必须运行ipservices**或ipbase许**可证。
2. 在交换机上启用无线。**注意：** AP需要连接到同一VLAN中的接入模式交换机端口！启用无线管理

   ```
   sw-3850-1(config)#wireless management interface vlan <1-4095>
   ```
   定义MC必须定义MC才能允许AP加入。如果此3850将是MC，请输入无线**移动控制器**命令：
   ```
   sw-3850-1(config)#wireless mobility controller
   ```
   **注意：** 此配置更改需要重新启动！如果此3850作为移动代理(MA)运行，则使用以下命令将其指向MC IP地址：
   ```
   sw-3850-1(config)#wireless mobility controller ip a.b.c.d
   ```
   在MC上，输入以下命令：
   ```
   3850MC(config)#wireless mobility controller peer-group
   ```

   ```
   3850MC(config)#wireless mobility controller peer-group
   ```

3. 确保许可证可用性。确保活动AP许可证在MC上可用（MA使用在MC上激活的许可证）：**注意：** 1)3850必须运行ipservices或ipbase许可证才能在3850上启用无线服务。2)AP计数许可证在MC上应用，并在MA上自动调配和实施。3)作为MC的3850最多可支持50个AP。

   ```
   sw-3850-1#show license right-to-use summary

           License Name    Type        Count    Period left
           --------------------------------------------
           ipservices      permanent   N/A      Lifetime
           apcount         base        1        Lifetime
           apcount         adder       49       Lifetime
           --------------------------------------------

   License Level In Use: ipservices
   License Level on Reboot: ipservices
   Evaluation AP-Count: Disabled
   Total AP Count Licenses: 50
   AP Count Licenses In-use: 1
   AP Count Licenses Remaining: 49
   ```
   要激活3850上的AP计数许可证，请在MC上输入此命令，并输入所需的AP计数：
   ```
   sw-3850-1#license right-to-use activate apcount
   ```

4. 配置AP发现过程。要使AP加入控制器，必须将交换机端口**配置设置为无线管理vlan**中的接入端口：如果VLAN 100用于无线管理接口：
   ```
   sw-3850-1(config)#interface gigabit1/0/10
   ```

```
sw-3850-1(config-if)#switchport mode access
sw-3850-1(config-if)#switchport access vlan 100
```

5. 配置 Web 访问。可通过https://<ipaddress>/wireless访问GUI登录凭证已在初始配置对话框中定义。
```
username admin privilege 15 password 0 cisco ( username for Web access)
```

6. 确保交换机上配置了正确的国家/地区代码，以符合AP所部署国家/地区的管制范围。
```
sw-3850-1#show wireless country configured

 Configured Country.............................: US  - United States
 Configured Country Codes
 US  - United States : 802.11a Indoor,Outdoor/ 802.11b / 802.11g
```

要修改国家/地区代码，请输入以下命令：
```
sw-3850-1(config)#ap dot11 24ghz shutdown

sw-3850-1(config)#ap dot11 5ghz shutdown

sw-3850-1(config)#ap country BE
Changing country code could reset channel and RRM grouping configuration.
If running in RRM One-Time mode, reassign channels after this command.
Check customized APs for valid channel values after this command.
Are you sure you want to continue? (y/n)[y]: y
sw-3850-1(config)#no ap dot11 24ghz shut
sw-3850-1(config)#no ap dot11 5ghz shut
sw-3850-1(config)#end
sw-3850-1#wr
Building configuration...
Compressed configuration from 3564 bytes to 2064 bytes[OK]


sw-3850-1#show wireless country configured

 Configured Country.............................: BE  - Belgium
 Configured Country Codes
   BE  - Belgium : 802.11a Indoor,Outdoor/ 802.11b / 802.11g
```

## 验证

为确保AP已加入，请输入show ap summary命令：

```
sw-3850-1#show ap summary

Number of APs: 1

Global AP User Name: Not configured
Global AP Dot1x User Name: Not configured

AP Name              AP Model  Ethernet MAC    Radio MAC         State
--------------------------------------------------------------------------------

APa493.4cf3.232a     1042N     a493.4cf3.231a  10bd.186e.9a40      Registered
```

## 故障排除

排除AP加入问题故障的有用调试：

```
sw-3850-1#debug capwap ap events
capwap/ap/events debugging is on
```

```
sw-3850-1#debug capwap ap error
capwap/ap/error debugging is on

sw-3850-1#debug dtls ap event
dtls/ap/event debugging is on

sw-3850-1#debug capwap ios event
CAPWAP Event debugging is on

sw-3850-1#debug capwap ios error
CAPWAP Error debugging is on
```