如何在运行 CatOS 的 Catalyst 交换机上配置 SSH

目录

简介

本文档分步说明如何在运行 Catalyst OS (CatOS) 的 Catalyst 交换机上配置Secure Shell (SSH) 版本 1。 测试的版本是 cat6000-supk9.6-1-1c.bin。

先决条件

要求

此表显示交换机中的 SSH 支持状态。注册用户可以通过访问软件中心来访问这些软件映像。

CatOS SSH	
设备	**SSH 支持**
Cat 4000/4500/2948G/2980G	自 6.1 起的 K9 映像

(CatOS)	
Cat 5000/5500 (CatOS)	自 6.1 起的 K9 映像
Cat 6000/6500 (CatOS)	自 6.1 起的 K9 映像
IOS SSH	
设备	**SSH 支持**
Cat 2950*	12.1(12c)EA1 及更高版本
Cat 3550*	12.1(11)EA1 及更高版本
Cat 4000/4500（集成了 Cisco IOS 软件）*	12.1(13)EW 及更高版本**
Cat 6000/5500（集成了 Cisco IOS 软件）*	12.1(11b)E 及更高版本
Cat 8540/8510	12.1(12c)EY 及更高版本，12.1(14)E1 及更高版本
无 SSH	
设备	**SSH 支持**
Cat 1900	否
Cat 2800	否
Cat 2948G-L3	否
Cat 2900XL	否
Cat 3500XL	否
Cat 4840G-L3	否
Cat 4908G-L3	否

*在运行Cisco IOS的路由器和交换机上配置Secure Shell中介绍了配置。

** 对于运行集成的 Cisco IOS 软件的 Catalyst 4000，在 12.1E 系列中不支持 SSH。

若要申请 3DES，请参见 Encryption Software Export Distribution Authorization Form（加密软件导出分发权表）。

本文档假设在实施 SSH（通过 Telnet 口令 TACACS+）或 RADIUS 之前进行了认证工作。在实施 SSH 之前，不支持带有 Kerberos 的 SSH。

使用的组件

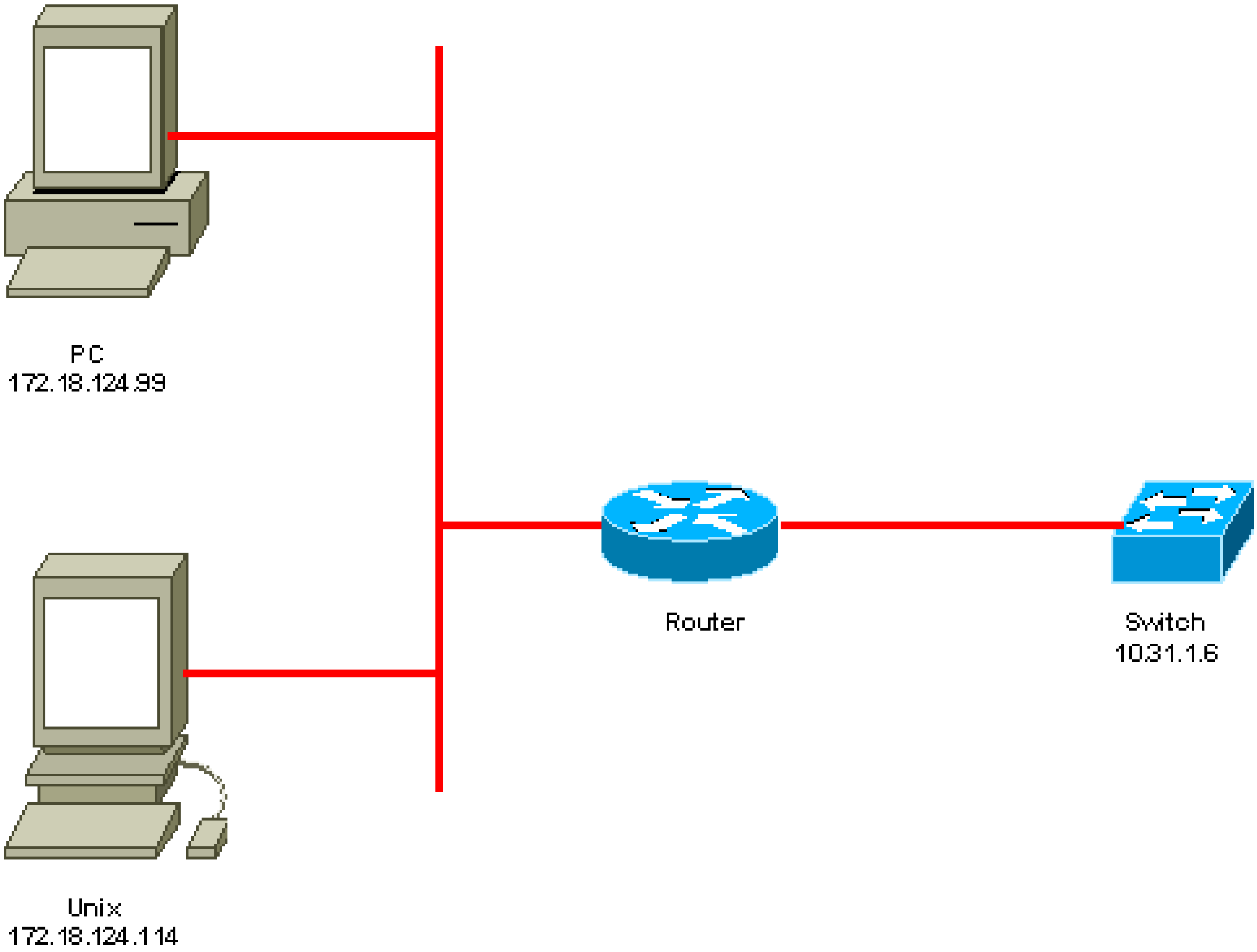
本文档仅讨论运行 CatOS K9 映像的 Catalyst 2948G、Catalyst 2980G、Catalyst 4000/4500 系列、Catalyst 5000/5500 系列和 Catalyst 6000/6500 系列。有关更详细信息，请参见本文档的要求部分。

本文档中的信息都是基于特定实验室环境中的设备创建的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您是在真实网络上操作，请确保您在使用任何命令前已经了解其潜在影响。

规则

有关文档规则的详细信息，请参阅 Cisco 技术提示规则。

网络图



交换机配置

```
!--- Generate and verify RSA key. sec-cat6000> (enable) set crypto key rsa 1024
Generating RSA keys..... [OK]
sec-cat6000> (enable) ssh_key_process: host/server key size: 1024/768
 !--- Display the RSA key. sec-cat6000> (enable) show crypto key
RSA keys were generated at: Mon Jul 23 2001, 15:03:30 1024 65537 1514414695360
577332853671704785709850606634768746869716963940352440620678575338701550888525
699691478330537840066956987610207810959498648179965330018010844785863472773067
697185256418386243001881008830561241137381692820078674376058275573133448529332
1996682019301329470978268059063378215479385405498193061651
!--- Restrict which host/subnets are allowed to use SSH to the switch. !--- Note: If you do not
do this, the switch will display the message !--- "WARNING!! IP permit list has no entries!"
sec-cat6000> set ip permit 172.18.124.0 255.255.255.0
172.18.124.0 with mask 255.255.255.0 added to IP permit list.
!--- Turn on SSH. sec-cat6000> (enable) set ip permit enable ssh
SSH permit list enabled.
!--- Verity SSH permit list. sec-cat6000> (enable) show ip permit
Telnet permit list disabled.
Ssh permit list enabled.
Snmp permit list disabled.
Permit List Mask Access-Type
---------------- ---------------- -------------
172.18.124.0 255.255.255.0 telnet ssh snmp

Denied IP Address Last Accessed Time Type
```

```
----------------- ----------------- ------
```

禁用 SSH

在某些情况下，可能有必要在交换机上禁用 SSH。您必须验证是否在交换机上配置了 SSH，如果已配置，则禁用它。

若要验证是否在交换机上配置了 SSH，请发出 **show crypto key 命令。**如果输出显示 RSA 密钥，则已在交换机上配置并启用 SSH。此处给出了一个示例。

```
sec-cat6000> (enable) show crypto key
RSA keys were generated at: Mon Jul 23 2001, 15:03:30 1024 65537 1514414695360
577332853671704785709850606634768746869716963940352440620678575338701550888525
699691478330537840066956987610207810959498648179965330018010844785863472773067
697185256418386243001881008830561241137381692820078674376058275573133448529332
1996682019301329470978268059063378215479385405498193061651
```

若要删除加密密钥，请发出 **clear crypto key rsa 命令以在交换机上禁用 SSH。**此处给出了一个示例。

```
sec-cat6000> (enable) clear crypto key rsa
Do you really want to clear RSA keys (y/n) [n]? y
RSA keys has been cleared.
sec-cat6000> (enable)
```

Catalyst 中的调试

若要打开调试，请发出 **set trace ssh 4 命令。**

若要关闭调试，请发出 **set trace ssh 0 命令。**

针对正常连接执行 debug 命令的示例

Solaris 到 Catalyst、三重数据加密标准 (3DES)、Telnet 密码

Solaris

```
rtp-evergreen# ssh -c 3des -v 10.31.1.6
SSH Version 1.2.26 [sparc-sun-solaris2.5.1], protocol version 1.5.
Compiled with RSAREF.
rtp-evergreen: Reading configuration data /opt/CISssh/etc/ssh_config
rtp-evergreen: ssh_connect: getuid 0 geteuid 0 anon 0
rtp-evergreen: Allocated local port 1023.
rtp-evergreen: Connecting to 10.31.1.6 port 22.
rtp-evergreen: Connection established.
rtp-evergreen: Remote protocol version 1.5, remote software version 1.2.26
rtp-evergreen: Waiting for server public key.
rtp-evergreen: Received server public key (768 bits) and host key (1024 bits).
Host key not found from the list of known hosts.
Are you sure you want to continue connecting (yes/no)? yes
Host '10.31.1.6' added to the list of known hosts.
rtp-evergreen: Initializing random; seed file //.ssh/random_seed
rtp-evergreen: Encryption type: 3des
rtp-evergreen: Sent encrypted session key.
```

```
rtp-evergreen: Installing crc compensation attack detector.
rtp-evergreen: Received encrypted confirmation.
rtp-evergreen: Doing password authentication.
root@10.31.1.6's password:
rtp-evergreen: Requesting pty.
rtp-evergreen: Failed to get local xauth data.
rtp-evergreen: Requesting X11 forwarding with authentication spoofing.
Warning: Remote host denied X11 forwarding, perhaps xauth program
   could not be run on the server side.
rtp-evergreen: Requesting shell.
rtp-evergreen: Entering interactive session.

Cisco Systems Console

sec-cat6000>
```

催化剂

```
sec-cat6000> (enable) debug: _proc->tty = 0x8298a494, socket_index = 3
debug: version: SSH-1.5-1.2.26

debug: Client protocol version 1.5; client software version 1.2.26
debug: Sent 768 bit public key and 1024 bit host key.
debug: Encryption type: 3des
debug: Received session key; encryption turned on.
debug: ssh login by user: root
debug: Trying Local Login
Password authentication for root accepted.
debug: ssh received packet type: 10
debug: ssh received packet type: 34
Unknown packet type received after authentication: 34
debug: ssh received packet type: 12
debug: ssh88: starting exec shell
debug: Entering interactive session.
```

PC 到 Catalyst、3DES、Telnet密码

催化剂

```
debug: Client protocol version 1.5; client software version W1.0
debug: Sent 768 bit public key and 1024 bit host key.
debug: Encryption type: des
debug: Received session key; encryption turned on.
debug: ssh login by user:
debug: Trying Local Login
Password authentication for accepted.
debug: ssh received packet type: 10
debug: ssh received packet type: 37
Unknown packet type received after authentication: 37
debug: ssh received packet type: 12
debug: ssh89: starting exec shell
debug: Entering interactive session.
```

Solaris 到 Catalyst、3DES、身份验证、授权和记账 (AAA) 认证

Solaris

```
Solaris with aaa on:
```

```
rtp-evergreen# ssh -c 3des -l abcde123 -v 10.31.1.6
SSH Version 1.2.26 [sparc-sun-solaris2.5.1], protocol version 1.5.
Compiled with RSAREF.
rtp-evergreen: Reading configuration data /opt/CISssh/etc/ssh_config
rtp-evergreen: ssh_connect: getuid 0 geteuid 0 anon 0
rtp-evergreen: Allocated local port 1023.
rtp-evergreen: Connecting to 10.31.1.6 port 22.
rtp-evergreen: Connection established.
rtp-evergreen: Remote protocol version 1.5, remote software version 1.2.26
rtp-evergreen: Waiting for server public key.
rtp-evergreen: Received server public key (768 bits) and host key (1024 bits).
rtp-evergreen: Host '10.31.1.6' is known and matches the host key.
rtp-evergreen: Initializing random; seed file //.ssh/random_seed
rtp-evergreen: Encryption type: 3des
rtp-evergreen: Sent encrypted session key.
rtp-evergreen: Installing crc compensation attack detector.
rtp-evergreen: Received encrypted confirmation.
rtp-evergreen: Doing password authentication.
abcde123@10.31.1.6's password:
rtp-evergreen: Requesting pty.
rtp-evergreen: Failed to get local xauth data.
rtp-evergreen: Requesting X11 forwarding with authentication spoofing.
Warning: Remote host denied X11 forwarding, perhaps xauth program
   could not be run on the server side.
rtp-evergreen: Requesting shell.
rtp-evergreen: Entering interactive session.

Cisco Systems Console

sec-cat6000>
```

催化剂

```
sec-cat6000> (enable) debug: _proc->tty = 0x82a07714, socket_index = 3
debug: version: SSH-1.5-1.2.26

debug: Client protocol version 1.5; client software version 1.2.26
debug: Sent 768 bit public key and 1024 bit host key.
debug: Encryption type: 3des
debug: Received session key; encryption turned on.
debug: ssh login by user: abcde123
debug: Trying TACACS+ Login
Password authentication for abcde123 accepted.
debug: ssh received packet type: 10
debug: ssh received packet type: 34
Unknown packet type received after authentication: 34
debug: ssh received packet type: 12
debug: ssh88: starting exec shell
debug: Entering interactive session.
```

针对可能出现的错误执行 debug 命令的示例

对尝试 [不支持的] Blowfish 口令的客户端的 Catalyst 调试

```
debug: Client protocol version 1.5; client software version W1.0
debug: Sent 768 bit public key and 1024 bit host key.
debug: Encryption type: blowfish
cipher_set_key: unknown cipher: 6
debug: Calling cleanup
```

对错误的 Telnet 口令的 Catalyst 调试

```
debug: _proc->tty = 0x82897414, socket_index = 4
debug: version: SSH-1.5-1.2.26
debug: Client protocol version 1.5; client software version W1.0
debug: Sent 768 bit public key and 1024 bit host key.
debug: Encryption type: 3des
debug: Received session key; encryption turned on.
debug: ssh login by user:
debug: Trying Local Login
debug: Password authentication for failed.
```

对错误的 AAA 认证的 Catalyst 调试

```
cat6000> (enable) debug: _proc->tty = 0x829abd94, socket_index = 3
debug: version: SSH-1.5-1.2.26

debug: Client protocol version 1.5; client software version 1.2.26
debug: Sent 768 bit public key and 1024 bit host key.
debug: Encryption type: 3des
debug: Received session key; encryption turned on.
debug: ssh login by user: junkuser
debug: Trying TACACS+ Login
debug: Password authentication for junkuser failed.
SSH connection closed by remote host.
debug: Calling cleanup
```

故障排除

本节介绍与Cisco交换机上的SSH配置相关的不同故障排除场景。

无法通过SSH连接到交换机

问题：

无法使用SSH连接到交换机。

debug ip ssh命令显示以下输出：

```
Jun 15 20:29:26.207: SSH2 1: RSA_sign: private key not found
Jun 15 20:29:26.207: SSH2 1: signature creation failed, status -1
```

解决方案：

出现此问题的原因如下：

- 更改主机名后，新的SSH连接失败。
- 使用非标记密钥（具有路由器FQDN）配置SSH。

此问题的解决方法如下：

- 如果主机名已更改且SSH不再工作，则清空新密钥并使用正确的标签创建另一个新密钥。
  ```
  crypto key zeroize rsa
  crypto key generate rsa general-keys label (label) mod (modulus) [exportable]
  ```
- 请勿使用匿名RSA密钥（以交换机的FQDN命名）。 改用标记密钥。

```
    crypto key generate rsa general-keys label (label) mod (modulus) [exportable]
```

为了永久解决此问题，请将IOS软件升级到解决此问题的任何版本。

已针对此问题提交了错误。有关详细信息，请参阅Cisco Bug ID CSCtc41114（仅限注册客户）。

相关信息

- SSH Support Page（SSH 技术支持页面）
- 在运行 Cisco IOS 的路由器与交换机上配置Secure Shell
- Bug Toolkit
- 技术支持 - Cisco Systems

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