Bridge Security

Document ID: 12540

Introduction

Security is a vital consideration when designing a bridged wireless link between Ethernet segments. This document demonstrates how to secure the traffic crossing a bridged wireless link by the use of an IPSEC tunnel.

In this example, two Cisco Aironet 350 Series Bridges establish WEP; the two routers set up an IPSEC tunnel.

Prerequisites

Requirements

Before attempting this configuration, ensure that you are comfortable with the use of these:

- Cisco Aironet Bridge configuration interface
- Cisco IOS command line interface

Components Used

The information in this document is based on these software and hardware versions:

- Cisco 2600 Series routers running IOS version 12.1
- Cisco Aironet 350 Series Bridges running firmware version 11.08T

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Background Theory

Cisco Aironet 340, 350, and 1400 Series Bridges provide up to 128−bit WEP encryption. This cannot be relied upon for secure connectivity due to well−known problems in WEP algorithms and the ease of exploitation, as described in Security of the WEP algorithm and in the Cisco Aironet Response to Press − Flaws in 802.11 Security.

One method of increasing the security of traffic passed across a wireless bridged link is to create an encrypted router−to−router IPSEC tunnel that crosses the link. This works because bridges operate at layer 2 of the OSI model. You can run IPSEC router−to−router over the connection between the bridges.

If the security of the wireless link is breached, the traffic it contains remains encrypted and secure.

Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

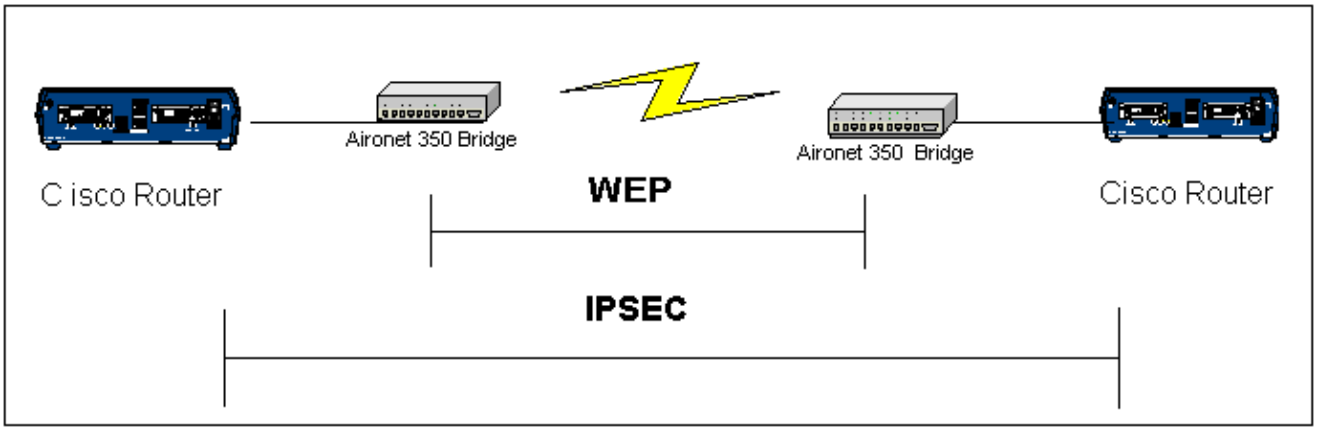
Configure

This section presents information to configure the features described in this document.

Note: To find additional information on the commands used in this document, use the IOS Command Lookup tool.

Network Diagram

This document uses the network setup shown in this diagram:



Configurations

This document uses these configurations:

- RouterA
- RouterB
- Bridge example

RouterA (Cisco 2600 Router)

```
RouterA#show running−config
Building configuration...

Current configuration : 1258 bytes
!
version 12.1
no service single−slot−reload−enable
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password−encryption
```

```
!
hostname RouterA
!
logging rate-limit console 10 except errors
!
ip subnet-zero
no ip finger
ip dhcp excluded-address 10.1.1.20
ip dhcp excluded-address 10.1.1.30
!
ip dhcp pool wireless
 network 10.1.1.0 255.255.255.0
!
ip audit notify log
ip audit po max-events 100
call rsvp-sync
!
crypto isakmp policy 10
hash md5
authentication pre-share
crypto isakmp key cisco address 10.1.1.30
!
!
crypto ipsec transform-set set esp-3des esp-md5-hmac
!
crypto map vpn 10 ipsec-isakmp
set peer 10.1.1.30
set transform-set set
match address 120
!
interface Loopback0
ip address 20.1.1.1 255.255.255.0
!
interface Ethernet0
ip address 10.1.1.20 255.255.255.0
crypto map vpn
!
!
ip classless
ip route 0.0.0.0 0.0.0.0 10.1.1.30
no ip http server
no ip http cable-monitor
!
access-list 120 permit ip 20.1.1.0 0.0.0.255 30.1.1.0 0.0.0.255
!
!
line con 0
transport input none
line vty 0 4
!
end
```

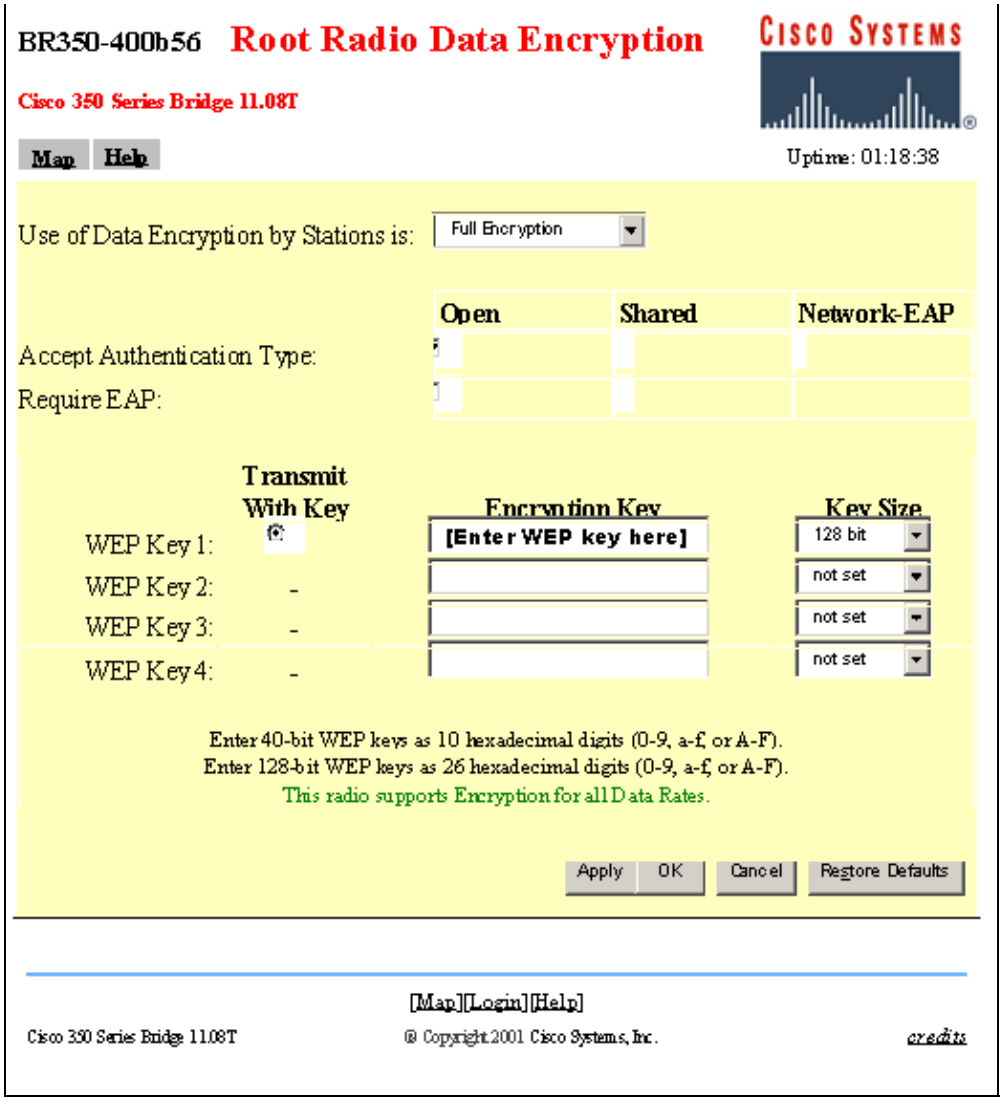
RouterB (Cisco 2600 Router)

```
RouterB#show running-config
Building configuration...

Current configuration : 1177 bytes
!
version 12.1
no service single-slot-reload-enable
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
```

```
!
hostname RouterB
!
logging rate-limit console 10 except errors
!
ip subnet-zero
no ip finger
!
ip audit notify log
ip audit po max-events 100
call rsvp-sync
crypto isakmp policy 10
hash md5
authentication pre-share
crypto isakmp key cisco address 10.1.1.20
!
!
crypto ipsec transform-set set esp-3des esp-md5-hmac
!
crypto map vpn 10 ipsec-isakmp
set peer 10.1.1.20
set transform-set set
match address 120
interface Loopback0
ip address 30.1.1.1 255.255.255.0
!
interface Ethernet0
ip address 10.1.1.30 255.255.255.0
no ip mroute-cache
crypto map vpn
!
ip classless
ip route 0.0.0.0 0.0.0.0 10.1.1.20
no ip http server
no ip http cable-monitor
!
access-list 120 permit ip 30.1.1.0 0.0.0.255 20.1.1.0 0.0.0.255
!
!
line con 0
transport input none
line vty 0 4
login
!
end
```

Cisco Aironet Bridges



Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

- **show crypto engine connections active** − this command is used to view the current active encrypted session connections

```
RouterA#show crypto engine connection active
  ID Interface   IP-Address      State Algorithm            Encrypt Decrypt
   1 Ethernet0   10.1.1.20       set   HMAC_MD5+DES_56_CB         0       0
2002 Ethernet0   10.1.1.20       set   HMAC_MD5+3DES_56_C         0       3
2003 Ethernet0   10.1.1.20       set   HMAC_MD5+3DES_56_C         3       0

RouterB#show crypto engine connection active
  ID Interface    IP-Address     State Algorithm            Encrypt Decrypt
   1  <none>         <none>      set   HMAC_MD5+DES_56_CB         0       0
2000 Ethernet0    10.1.1.30      set   HMAC_MD5+3DES_56_C         0       3
2001 Ethernet0    10.1.1.30      set   HMAC_MD5+3DES_56_C         3       0
```

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

To troubleshoot IPSEC connectivity, refer to:

- IP Security Troubleshooting Understanding and Using debug Commands
- Configuring and Troubleshooting Cisco Network−Layer Encryption: IPSec and ISAKMP, Part 1 and Part 2

For troubleshooting the wireless connection, refer to:

- TAC Case Collection Tool − Wireless LAN
- Troubleshoot Common Problems with Wireless Bridged Networks
- Troubleshooting Connectivity in a Wireless LAN Network

Related Information

- **Technical Support − Wireless LAN**
- **Technical Support − IPSec Negotiation/IKE Protocols**
- **Technical Support − Cisco Systems**

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