



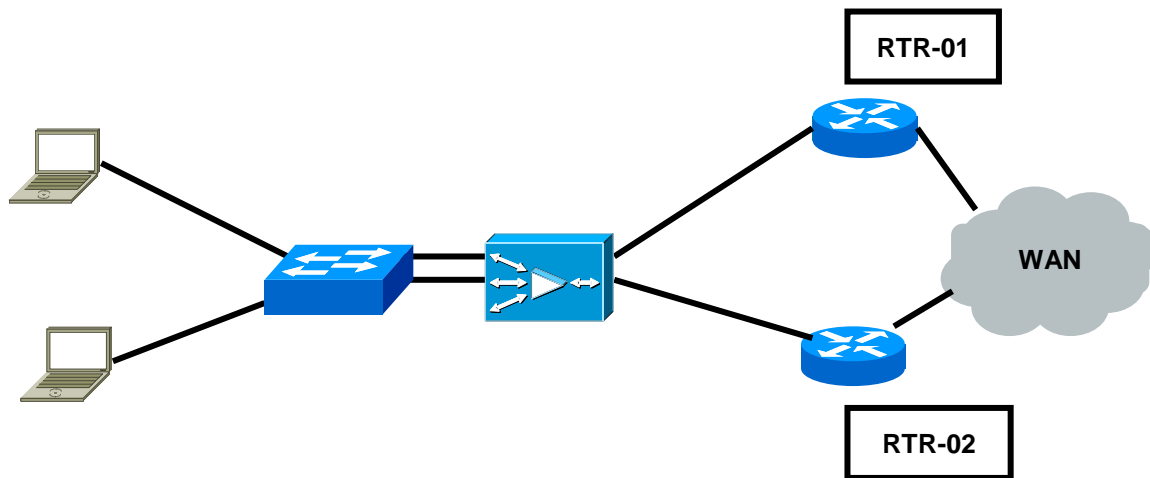
## CISCO WIDE AREA APPLICATION SERVICES – INLINE DESIGN WITH MULTIPLE EXTERNAL ROUTERS

Certain Cisco WAAS inline deployments involving HSRP can cause traffic to traverse the Cisco WAAS WAE inline interface twice causing packets to be dropped. This document provides a recommended design solution to avoid this problem.

### PROBLEM SCENARIO

Figure 1 shows a simplified diagram of the problematic network configuration. The Cisco WAAS WAE is connected in line with each inline group connected to a different router. Both routers, RTR-01 and RTR-02, are configured with HSRP. This setup can cause a routing loop on the Cisco WAAS WAE inline interface and caused packets to be dropped.

Figure 1 Cisco WAAS inline deployment with multiple routers



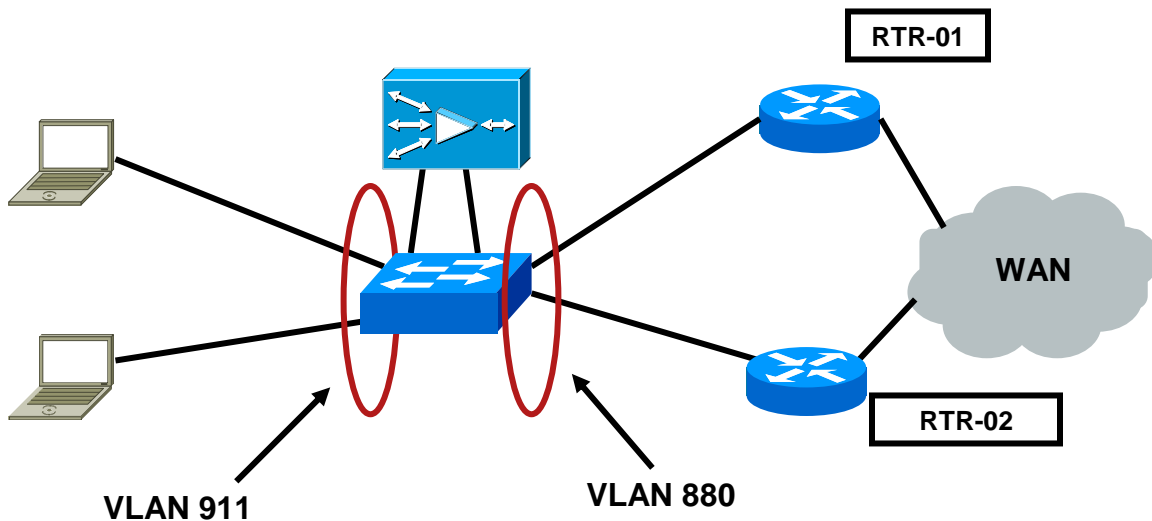
### SOLUTION

The proposed solution in such cases where Cisco WAAS is deployed inline is to place all clients on one VLAN and all routers on another VLAN. The Cisco WAAS WAE is then connected with one leg on the clients VLAN and another leg on the routers VLAN. In the case where the routers and clients are currently connected on the same VLAN, a new VLAN should be created to enable this deployment.

The diagram in Figure 2 demonstrates the proposed solution:

- Instead of connecting the WAE inline between the switch and the router on a single VLAN, a new VLAN is created.
- The WAE is connected with LAN inline port connected to the clients VLAN (VLAN 911) and WAN port on the routers VLAN (VLAN 880).
- Traffic is bridged between VLAN 880 and VLAN 911 through the WAE.

Figure 2 Recommended Inline Deployment with Multiple VLANs



After applying these changes the routing loop is no longer detected and traffic was optimized by WAE.

The configuration for the routers, switch and WAE in the second scenario described in the CLI listings below.

**RTR-01 configuration:**

```
RTR-01#sh run int gi 2/5
Building configuration...

Current configuration : 183 bytes
!
interface GigabitEthernet2/5
  description >>> LAN-880 Interface <<<
  switchport
  switchport trunk allowed vlan 880
  switchport mode trunk
end

RTR-01#sh run int vlan 880
Building configuration...

Current configuration : 324 bytes
!
interface Vlan880
  description >>> LAN Interface <<<
  ip address 2.43.170.3 255.255.255.240
  standby 99 ip 2.43.170.1
  standby 99 priority 80
  standby 99 preempt
end

RTR-01#sh stand br
P indicates configured to preempt.
|
```

Interface	Grp	Prio	P	State	Active	Standby	Virtual IP
Vl880	99	80	P	Standby	2.43.170.2	local	2.43.170.1
RTR-01#							

### RTR-02 configuration:

```
RTR-02#sh run int gi 2/5
Building configuration...
```

```
Current configuration : 145 bytes
!
interface GigabitEthernet2/5
  description >>> LAN-880 Interface <<<
  switchport
  switchport trunk allowed vlan 880
  switchport mode trunk
end
```

```
RTR-02#sh run int vlan 880
Building configuration...
```

```
Current configuration : 347 bytes
!
interface Vlan880
  description >>> LAN Interface <<<
  ip address 2.43.170.2 255.255.255.240
  ip policy route-map REDIRECT
  standby 99 ip 2.43.170.1
  standby 99 priority 120
  standby 99 preempt
end
```

```
RTR-02#sh standby br
```

P indicates configured to preempt.

Interface	Grp	Prio	P	State	Active	Standby	Virtual IP
Vl880	99	120	P	Active	local	2.43.170.3	2.43.170.1

### Switch Configuration:

```
interface GigabitEthernet7/0/33
  description >> RTR-02-Gi2/5 <<
  switchport trunk encapsulation dot1q
  switchport trunk allowed vlan 880
  switchport mode trunk
!
interface GigabitEthernet7/0/34
  description >> RTR-01-Gi2/5 <<
  switchport trunk encapsulation dot1q
  switchport trunk allowed vlan 880
  switchport mode trunk
!
interface GigabitEthernet7/0/26
  description >> WAE-INLINE-W0 <<
  switchport access vlan 880
  switchport mode access
!
interface GigabitEthernet6/0/20
  description >> WAE-INLINE-W1 <<
  switchport access vlan 880
```

```

switchport mode access
!
interface GigabitEthernet6/0/17
description >> WAE-INLINE-L0 <<
switchport access vlan 911
switchport mode access
!
interface GigabitEthernet6/0/37
description >> WAE-INLINE-L1 <<
switchport access vlan 911
switchport mode access
!
!
interface GigabitEthernet2/0/22
description >> CLIENT PC <<
switchport access vlan 911
switchport mode access
spanning-tree portfast

```

#### WAE Configuration:

```

WAE#sh running
<...>
interface GigabitEthernet 1/0
ip address 2.43.170.10 255.255.255.240
exit
interface GigabitEthernet 2/0
shutdown
exit
interface InlineGroup 1/0
inline vlan all
exit
interface InlineGroup 1/1
inline vlan all
shutdown
exit
!

```

Note that with the Cisco WAAS WAE configuration above, only one inline groups (1/0) is connected to the switch while the other (1/1) is not. The scenario will still function well even in the case where both inline groups are connected. In that case, spanning tree will block one port so only one ports pair will be forwarding all the traffic.

Another case where the deployment option described above is useful is for inline deployments in sites that include more routers then the number of inline groups available on a Cisco WAAS WAE.

A Cisco WAAS WAE inline card contains either 2 or 4 inline ports depends on the WAE model. The number of inline ports limits the number of devices that can be connected to the WAE, and enables only 1 or 2 inline groups to be connected to the routers facing the WAN. Some environments include several WAN facing routers in a certain site, and this number may be larger than the number of inline groups on the Cisco WAAS WAE. In such cases, the deployment described in Figure 2 is a viable option.

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