# GRE VPN

## 前言

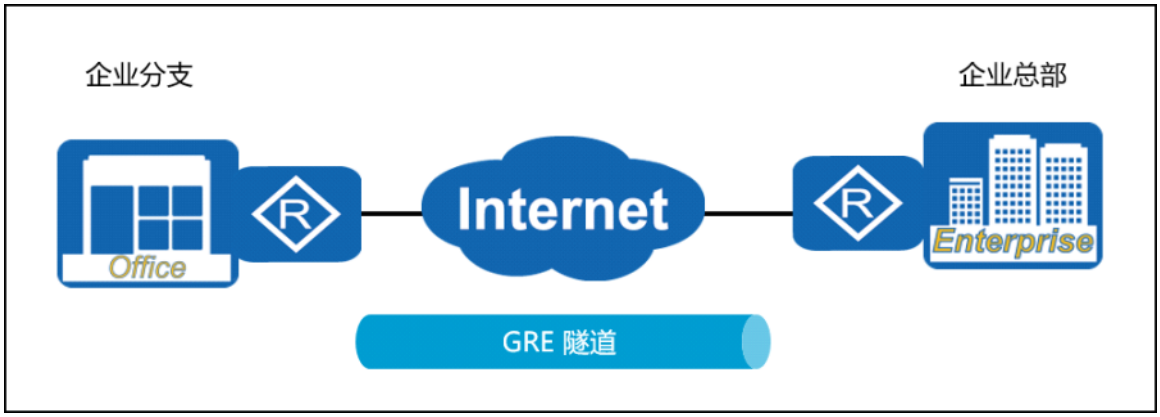
通用路由封装协议GRE（Generic Routing Encapsulation）提供了将一种协议的报文封装在另一种协议报文中的机制，是一种隧道封装技术。GRE可以封装组播数据，并可以和IPSec结合使用，从而保证语音、视频等组播业务的安全。

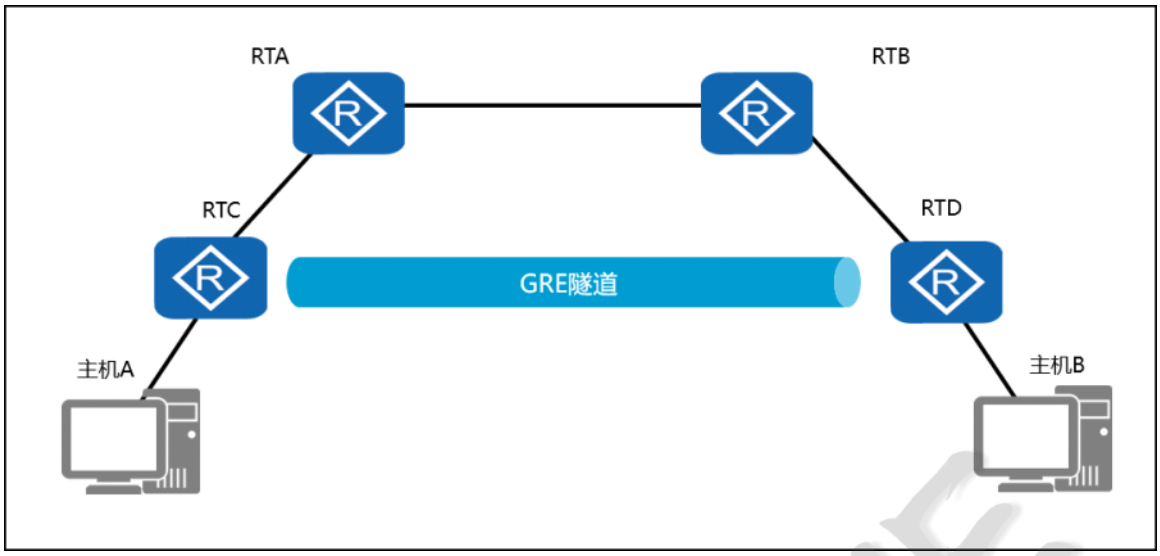
**GRE：Generic Routing Encapsulation，通用路由封装**

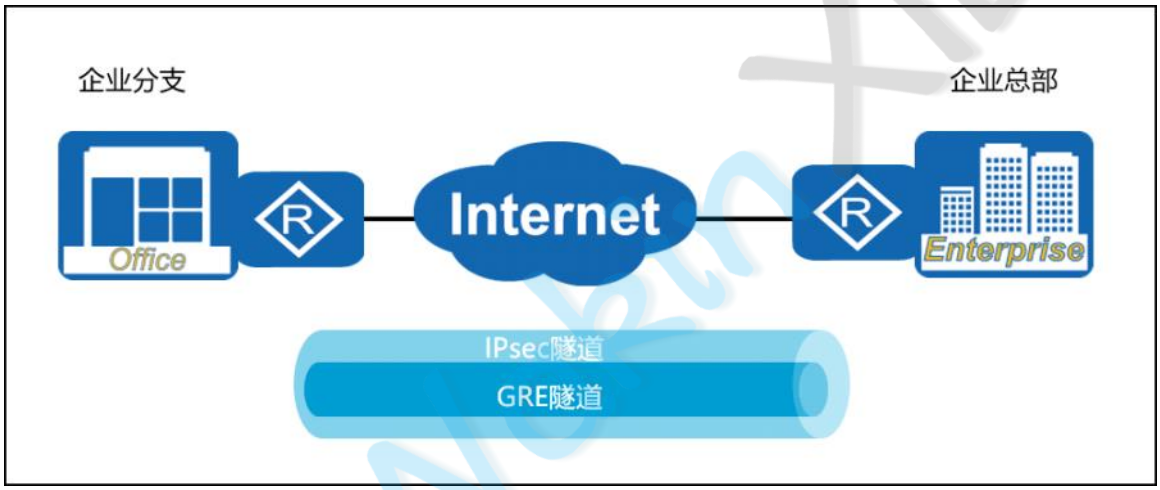
- 一种三层VPN封装技术
- 在任意一种网络协议上传送任意一种其它网络协议的封装方法
- 解决了跨越异种网络的报文传输问题，异种报文传输的通道称为Tunnel（隧道）


| GRE优点 | GRE缺点 |
| --- | --- |
| 建立隧道 | 点对点隧道 |
| 支持多种网络层协议 | 静态配置隧道参数 |
| 支持路由组播 | 布署复杂连接关系时代价巨大 |
| 配置简单，容易布署 | 缺乏安全性 |

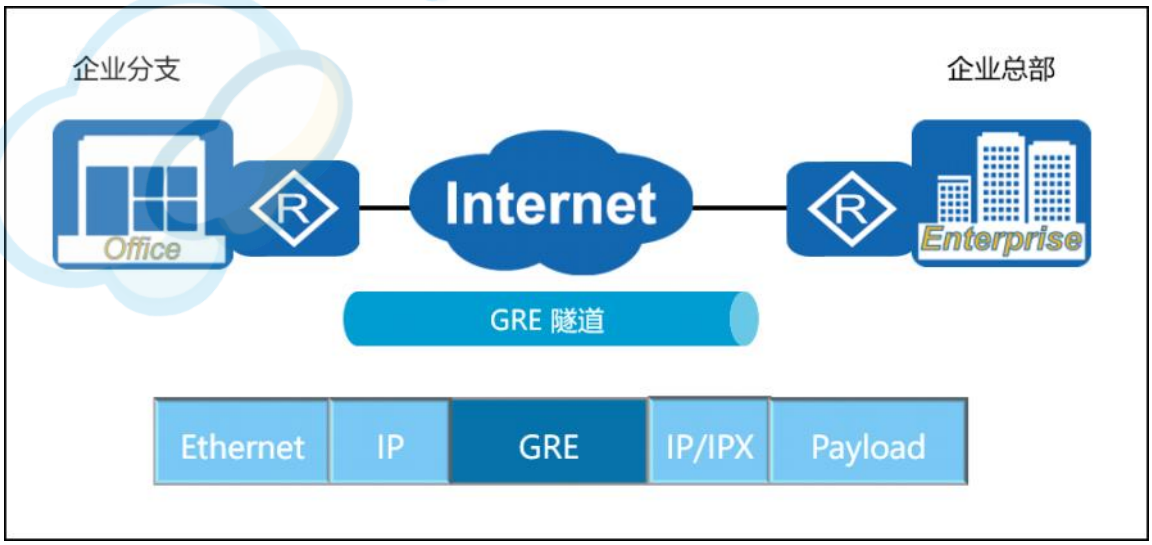
**GRE核心功能：建立隧道，打通私网**

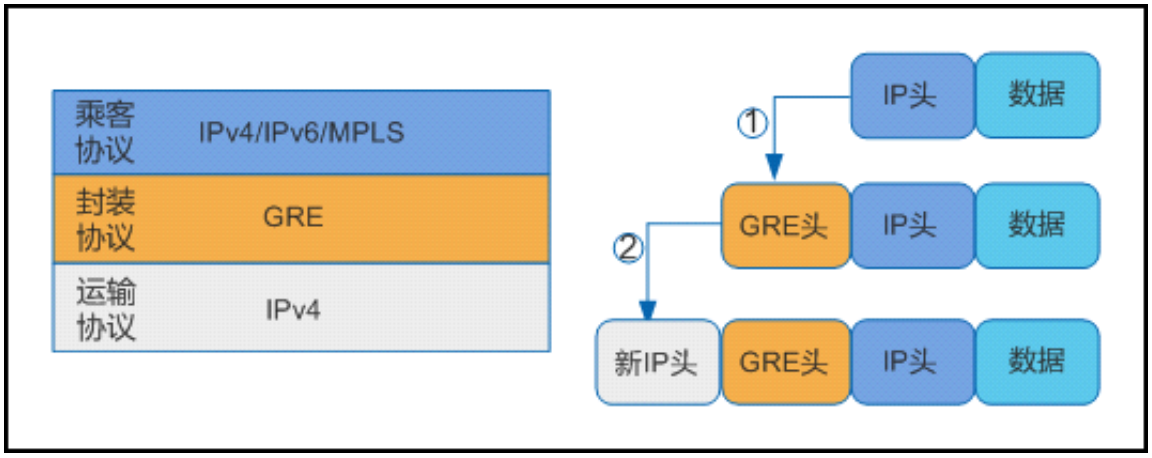


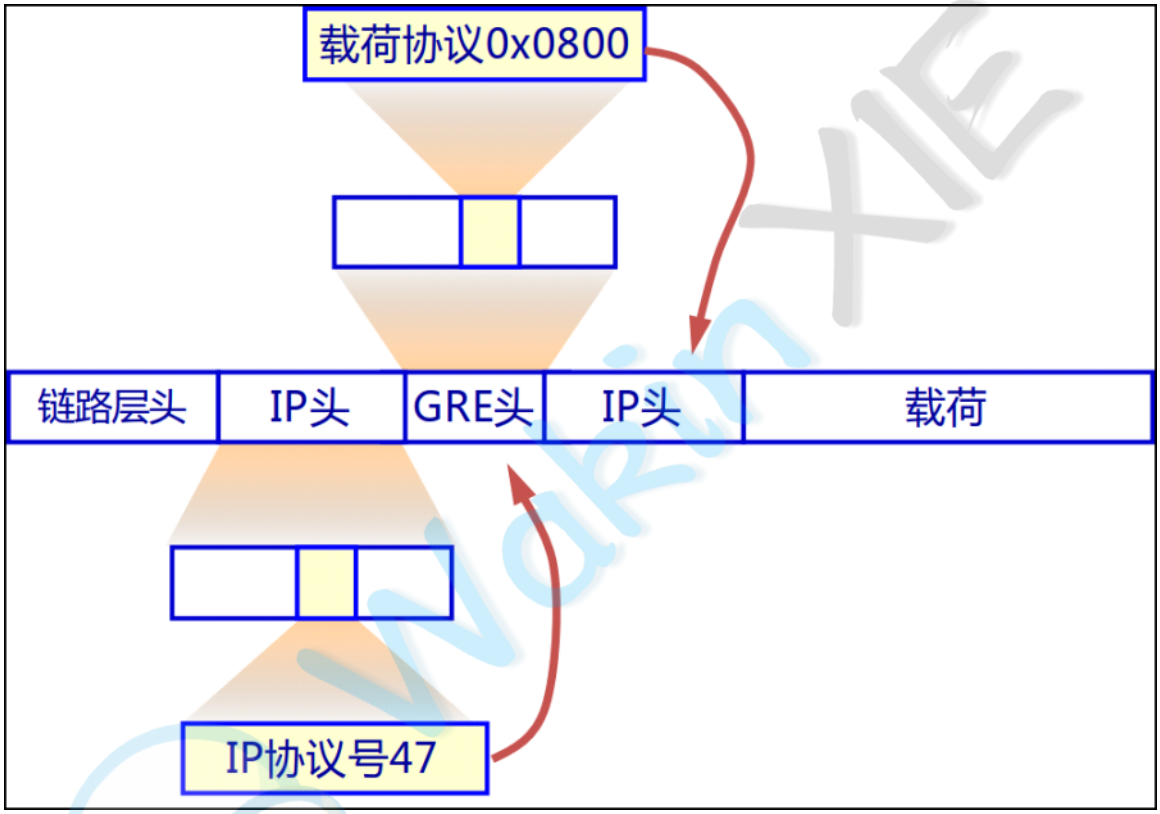
- 

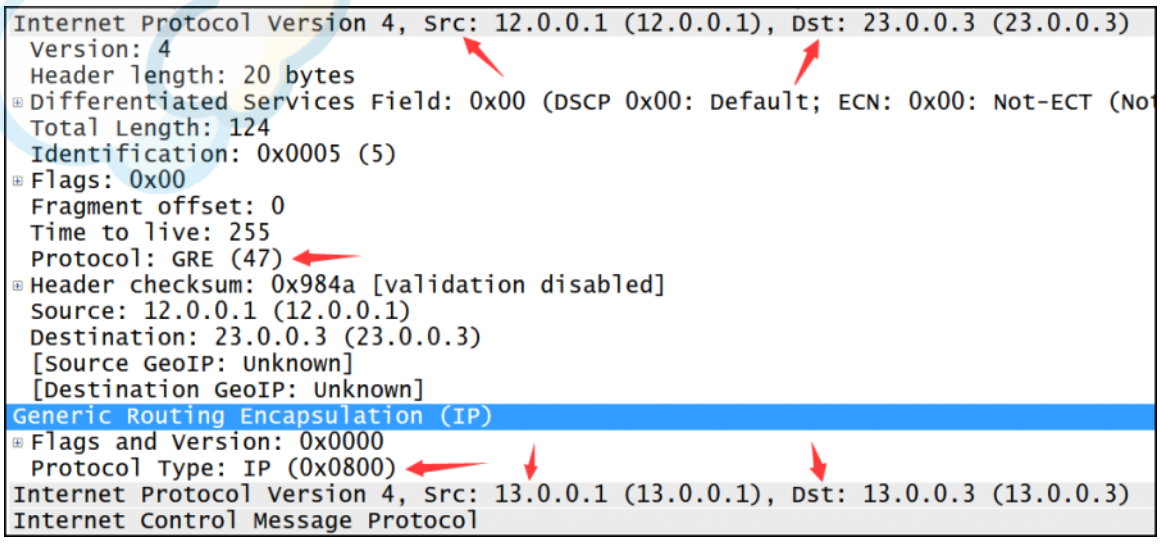
- 


**GRE封装：穿马甲**

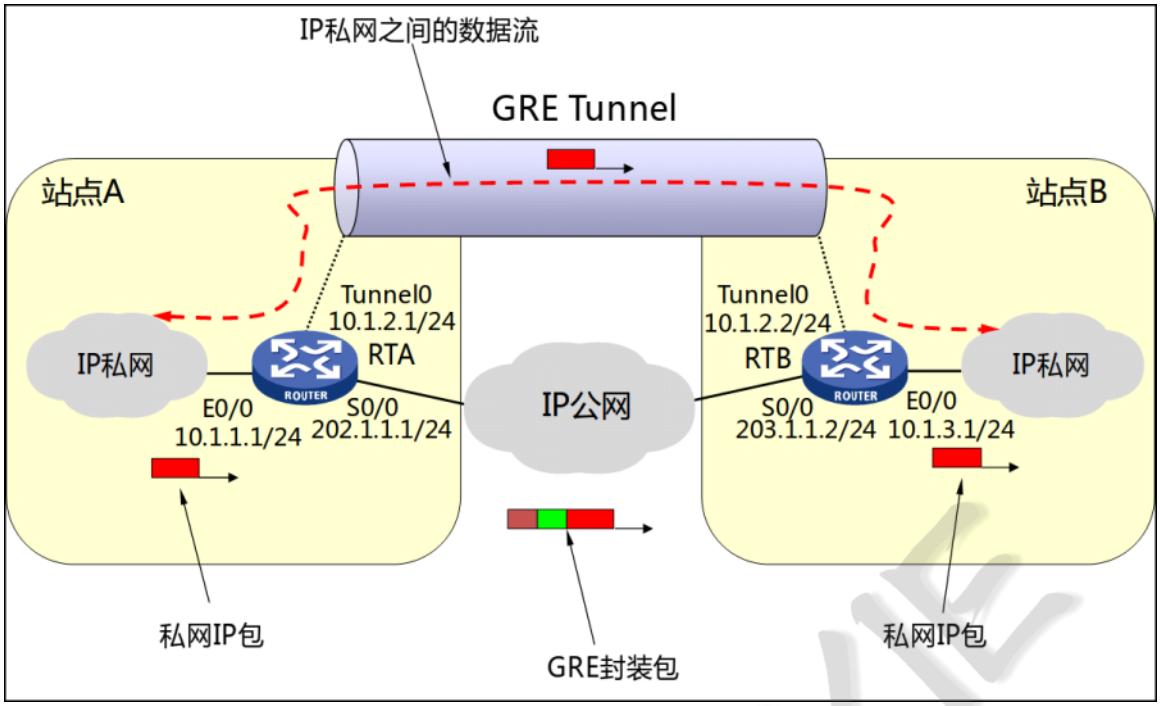
- 

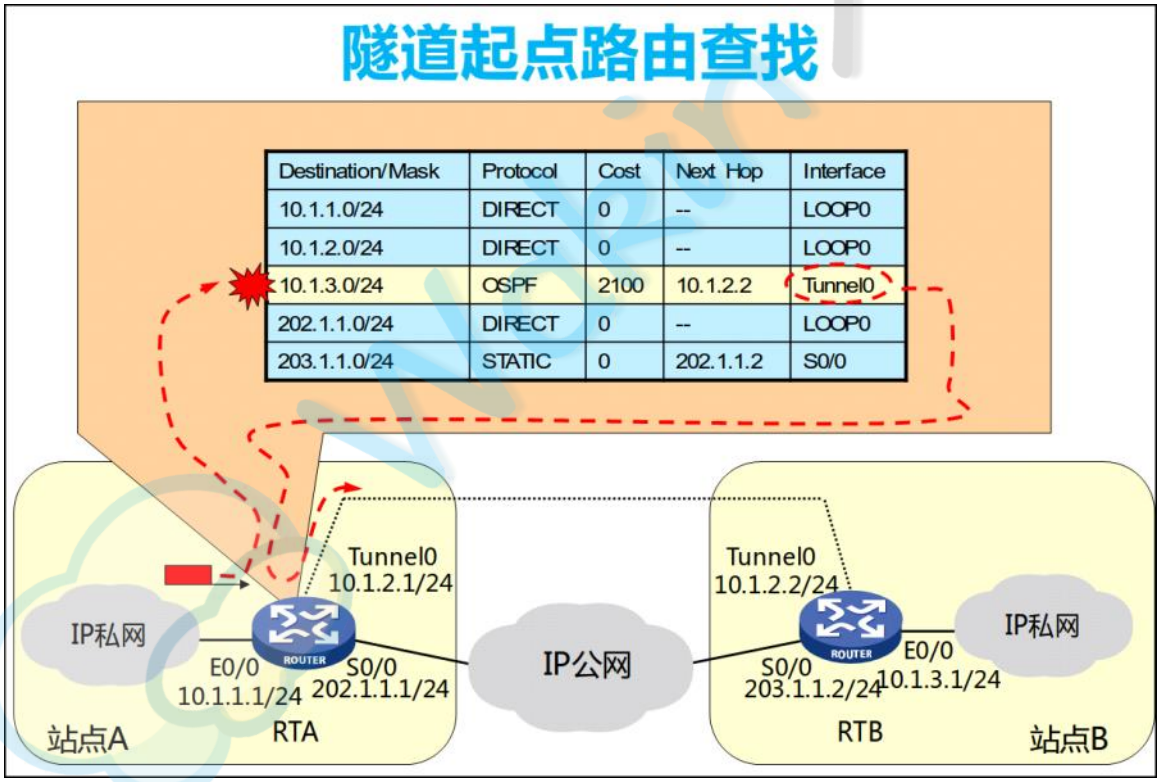
- 

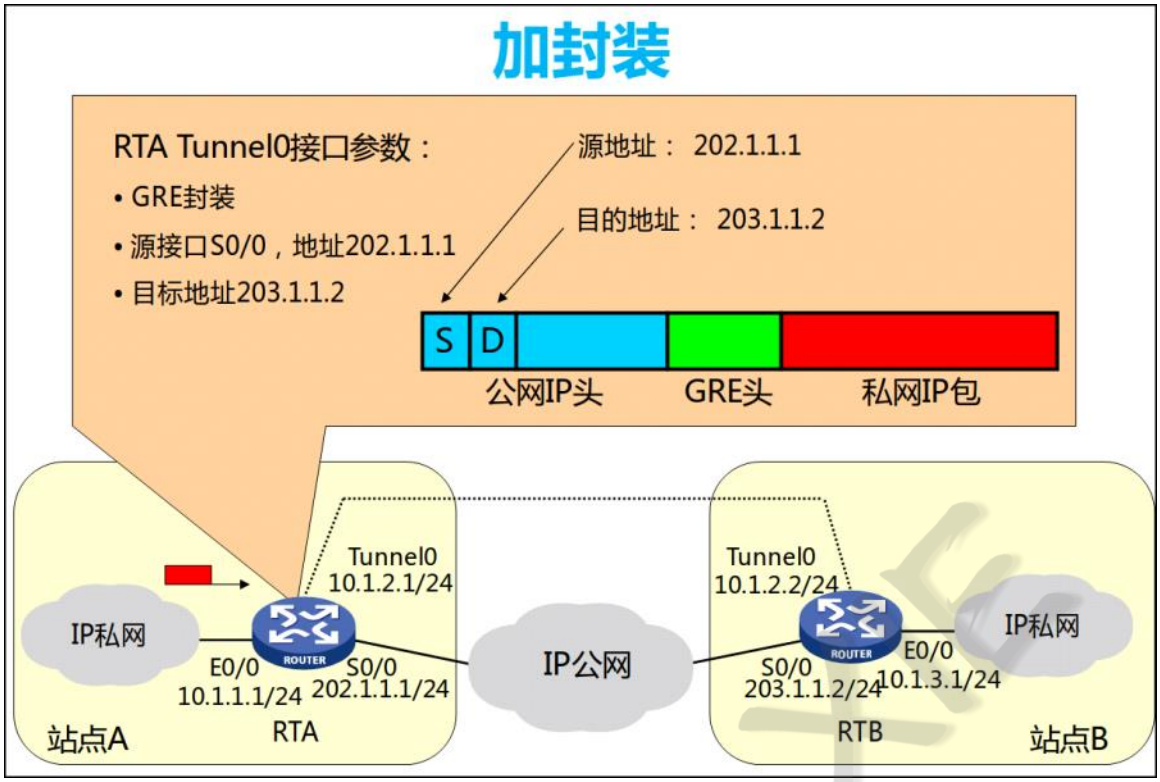

- 

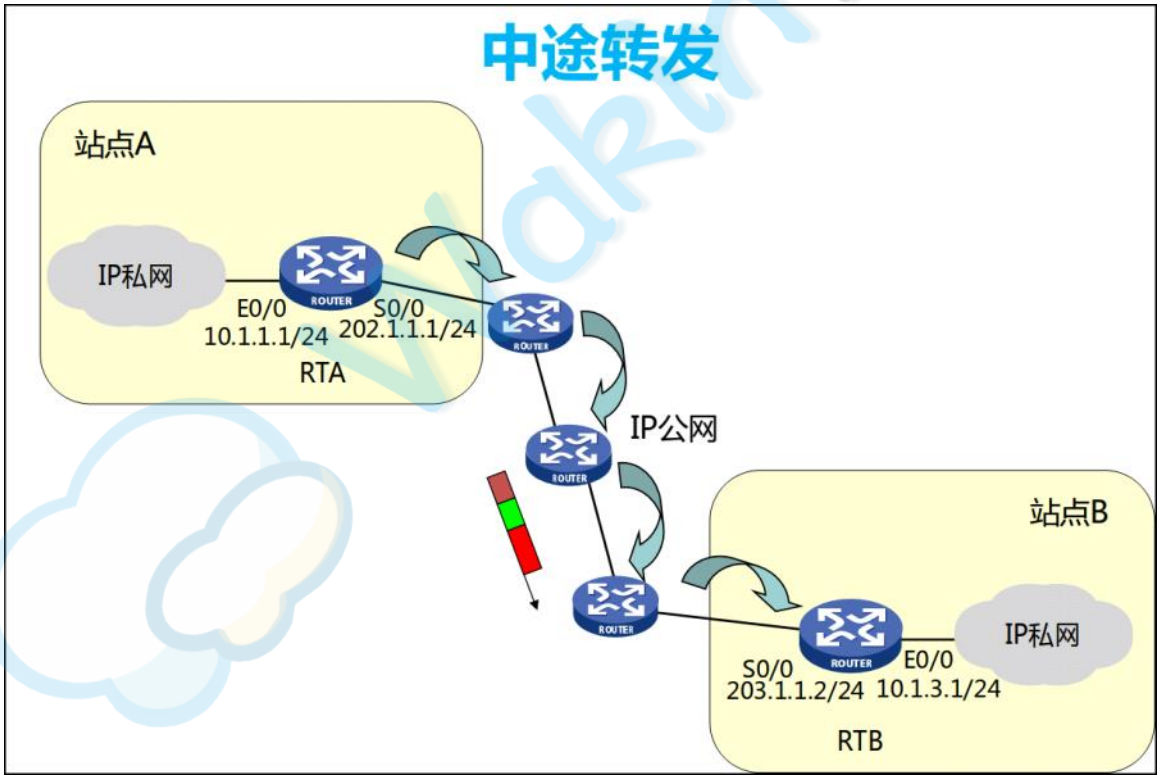

- 

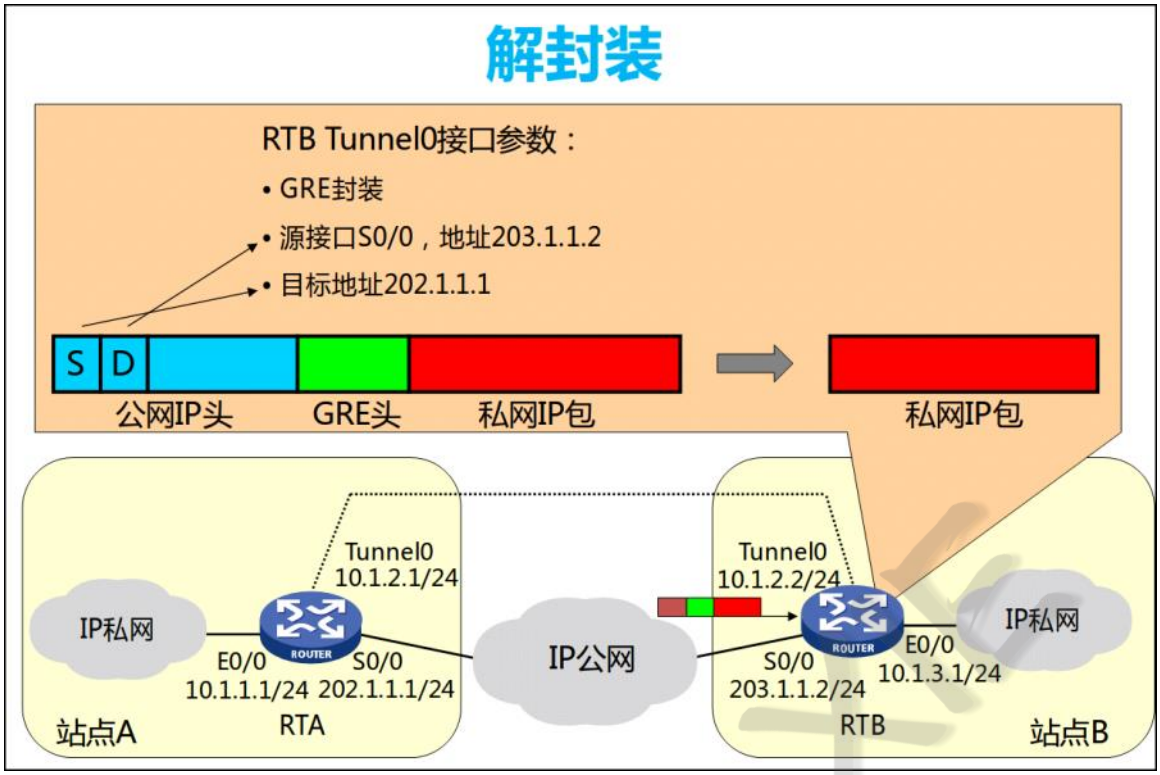

## GRE VPN转发过程详解：

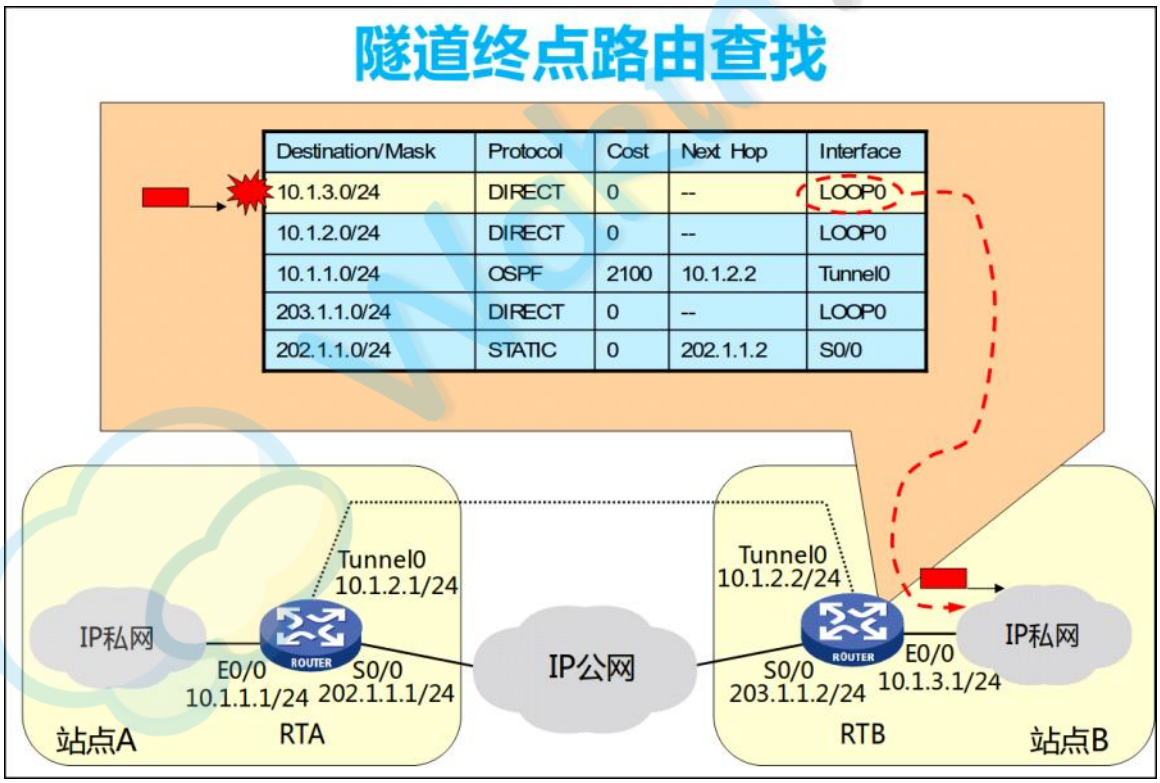
- 

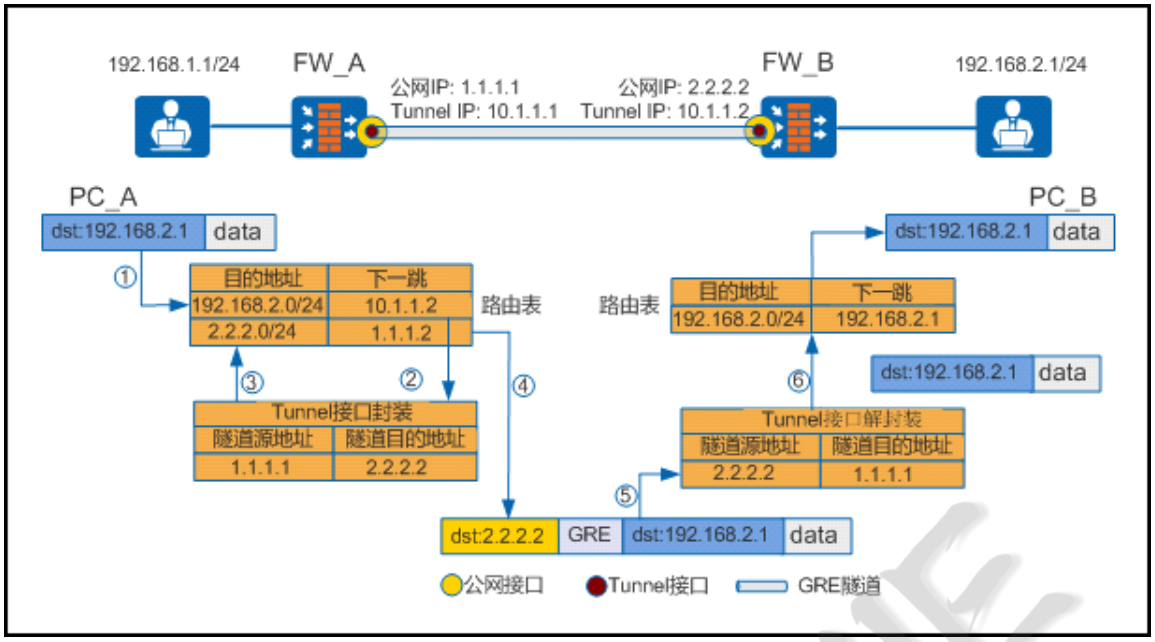

- 

- 

- 

- 


- 

- 


## GRE VPN的配置：

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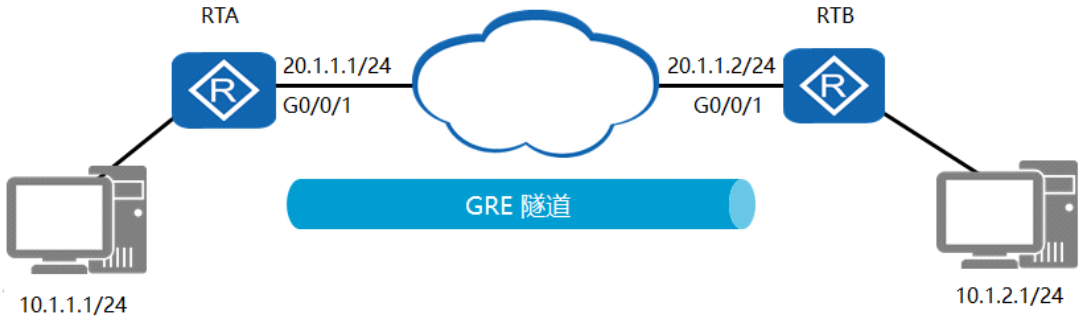
| 命令 | 备注 |
| --- | --- |
| interface tunnel 0/0/1 | 创建隧道口。 |
| tunnel-protocol gre | 指定协议。 |
| source 12.0.0.2 | 指定隧道源。 |
| destination 13.0.0.3 | 指定隧道目标。 |
| 配置IP地址、路由 | 注意下一跳、出站口、宣告口。 |
| display interface tunnel 0/0/1 | 查看隧道口状态。 |
| keepalive period 5 retry-times 3 | 开启Keeplive检测避免数据黑洞。 |

## GRE配置




```
[RTA]interface Tunnel 0/0/1
[RTA-Tunnel0/0/1]tunnel-protocol gre
[RTA-Tunnel0/0/1]ip address 40.1.1.1 24
[RTA-Tunnel0/0/1]source 20.1.1.1
[RTA-Tunnel0/0/1]destination 20.1.1.2
[RTA-Tunnel0/0/1]quit
[RTA]ip route-static 10.1.2.0 24 Tunnel 0/0/1
```

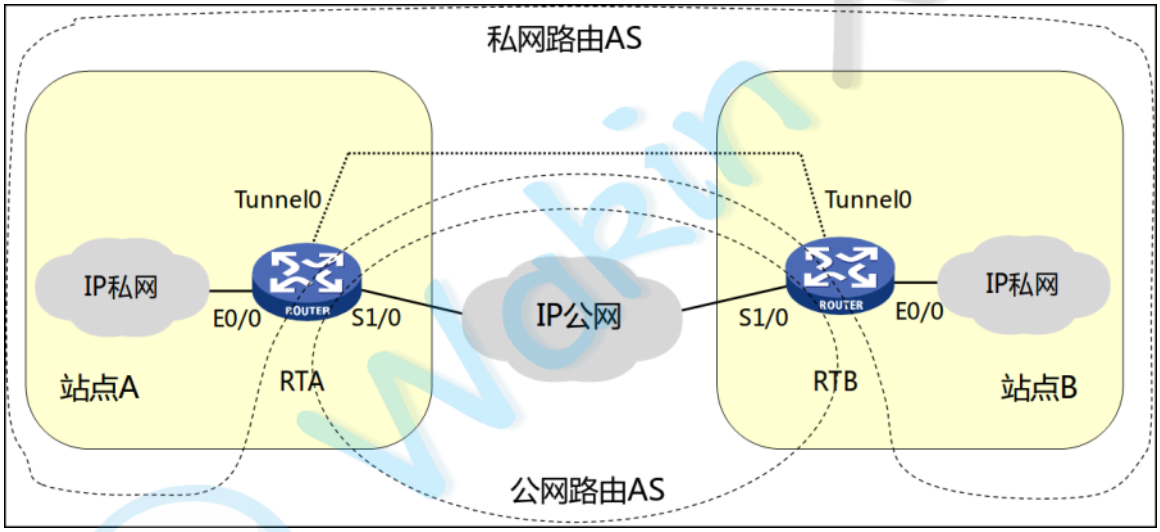
## 配置验证

```
[RTA]display interface Tunnel 0/0/1
Tunnel0/0/1 current state : UP
Line protocol current state : UP
Last line protocol up time : 2013-08-21 13:37:38
Description:HUAWEI, AR Series, Tunnel0/0/1 Interface
Route Port, The Maximum Transmit Unit is 1476
Internet Address is 40.1.1.1/24
Encapsulation is TUNNEL, loopback not set
Tunnel source 20.1.1.1 (GigabitEthernet0/0/1), destination 20.1.1.2
Tunnel protocol/transport GRE/IP, key disabled
keepalive disabled
Checksumming of packets disabled
……
```

## 配置验证

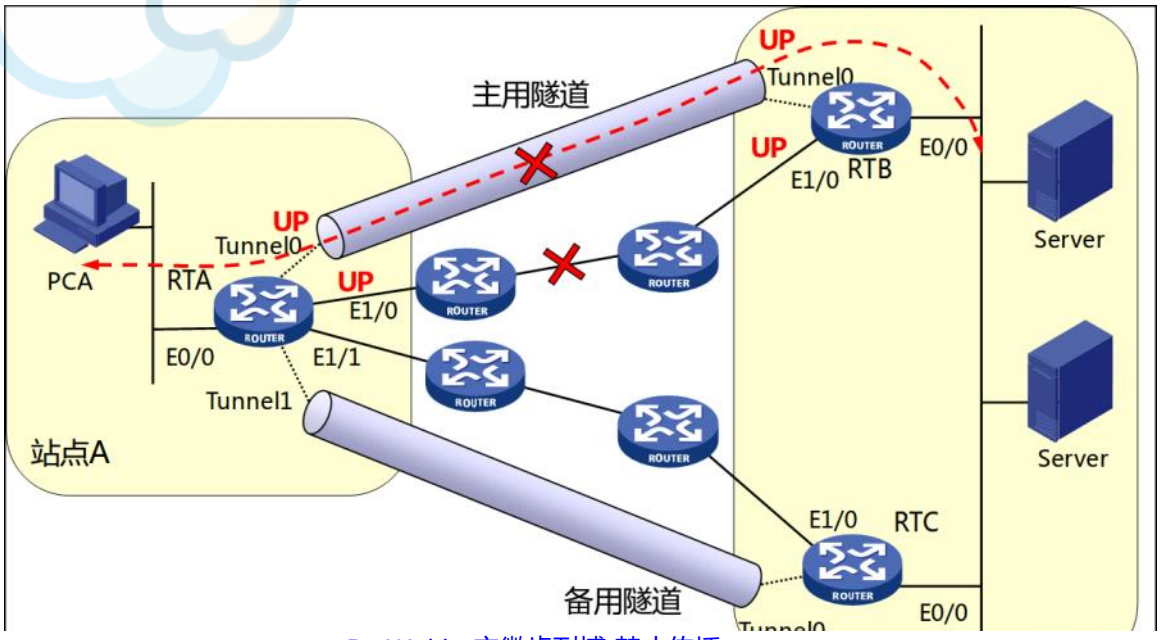
```
[RTA]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public         Destinations : 13        Routes : 14
Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface
......
10.1.2.0/24         Static  60   0           RD  40.1.1.2        Tunnel0/0/1
......
```

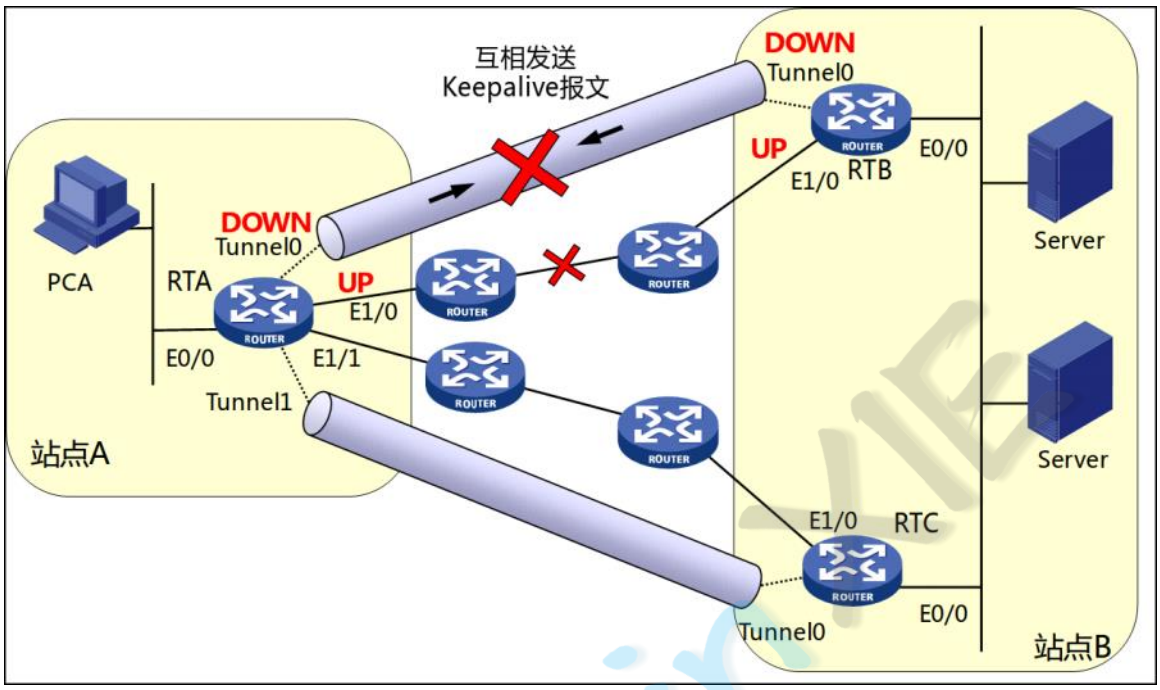
**GRE VPN路由宣告注意事项：**使用动态路由协议宣告接口时千万不能宣告公网接口。

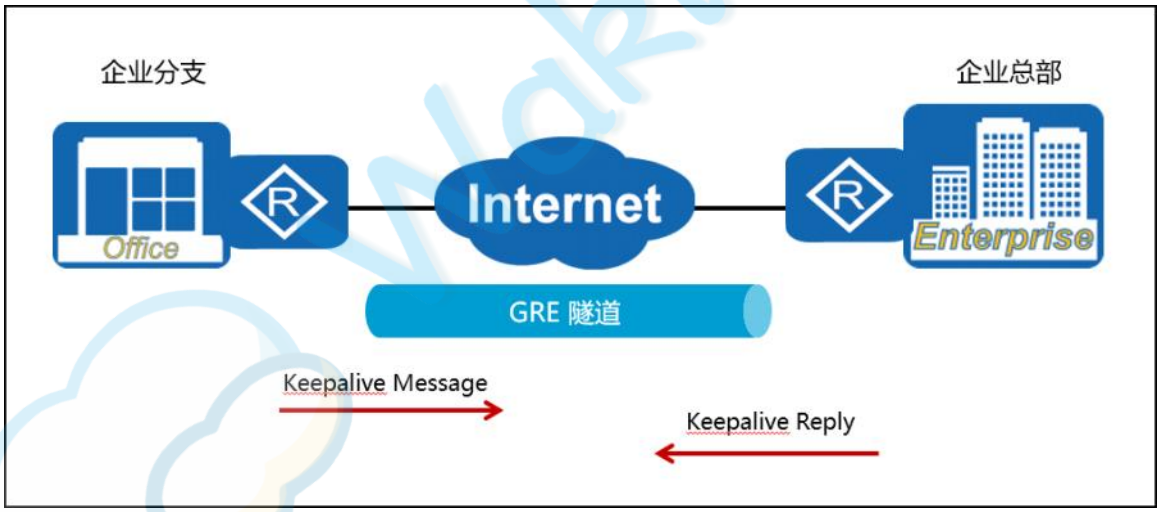


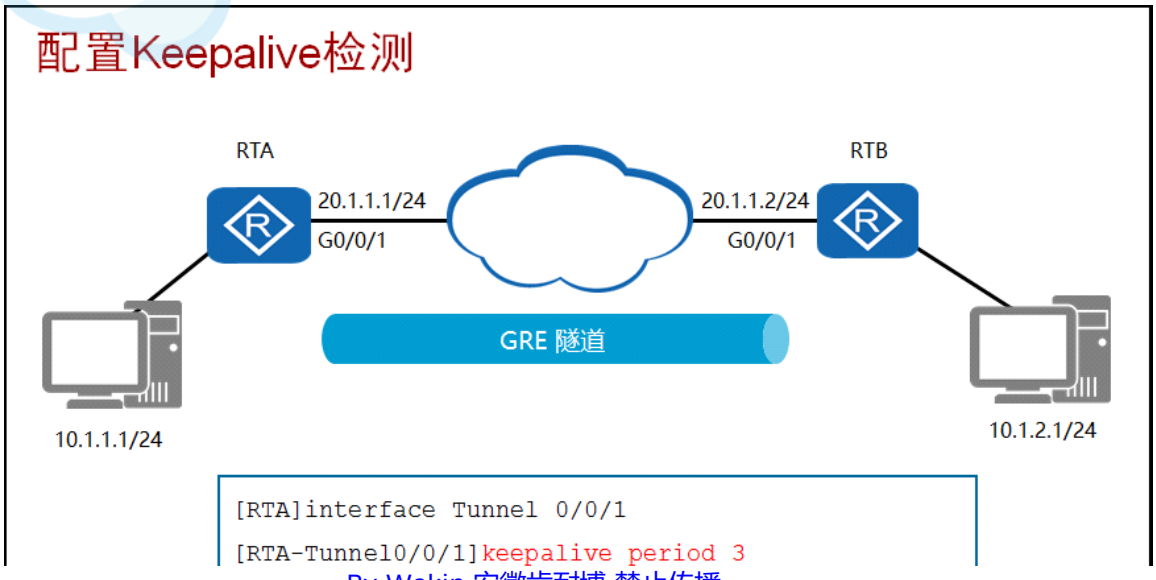

**GRE VPN隧道口虚假状态问题：**只要有到达隧道目标的路由，隧道口即可激活

- 解决方法：开启GRE的Keeplive，用于检测隧道对端是否可达。




- 


- 


- 

```
[RTA]interface Tunnel 0/0/1
[RTA-Tunnel0/0/1]keepalive period 3
[RTA-Tunnel0/0/1]quit
```

## 配置验证

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```
[RTA]display interface Tunnel 0/0/1
Tunnel0/0/1 current state : UP
Line protocol current state : DOWN
Description:HUAWEI, AR Series, Tunnel0/0/1 Interface
Route Port, The Maximum Transmit Unit is 1476
Internet Address is 40.1.1.1/24
Encapsulation is TUNNEL, loopback not set
Tunnel source 20.1.1.1 (GigabitEthernet0/0/1), destination 20.1.1.2
Tunnel protocol/transport GRE/IP, key disabled
keepalive enable period 3 retry-times 3
Checksumming of packets disabled
……
```