# IPNext180
# IP-PBX System

High-performance Hybrid IP-PBX Solution

## IP Port Mirroring for 3'rd Party Application

**AddPac Technology**

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# What is Port Mirroring ?

- Port mirroring is one of the most common network troubleshooting techniques.

- SPAN - Switch Port Analyzer

  - sends a copy of the monitored traffic to a local device.

- RSPAN – Remote Switch Port Analyzer

  – sends a copy of the monitored traffic to a remote device via VLAN tagging.

- ERSPAN - Encapsulated Remote SPAN

  – uses GRE encapsulation to extend the basic port mirroring capability from Layer 2 to Layer 3 which allows the mirrored traffic to be sent through a routable IP network.

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# Port Mirroring Examples

- Host A sends traffic to Host B
- A copy of the traffic is forwarded to sniffer
- Three ways:
  - SPAN: sniffer is at the same switch
  - RSPAN: sniffer is at different switch
  - ERSPAN: sniffer is across IP network

B     C

mirrored packet

A

Sniffer
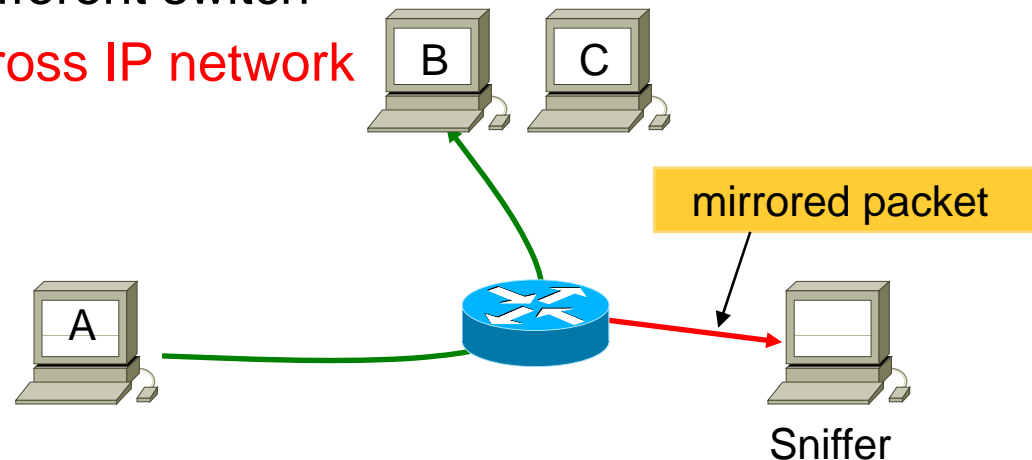
- Use cases:
  - Analyze, diagnose, detect malicious traffic

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# ERSPAN ?

- Mirrors traffic on source port(s) and delivers the mirrored traffic to destination port(s) on another switch.
- Traffic (inner packet) is encapsulated in GRE (Generic Routing Encapsulation) so routable across a layer 3 network
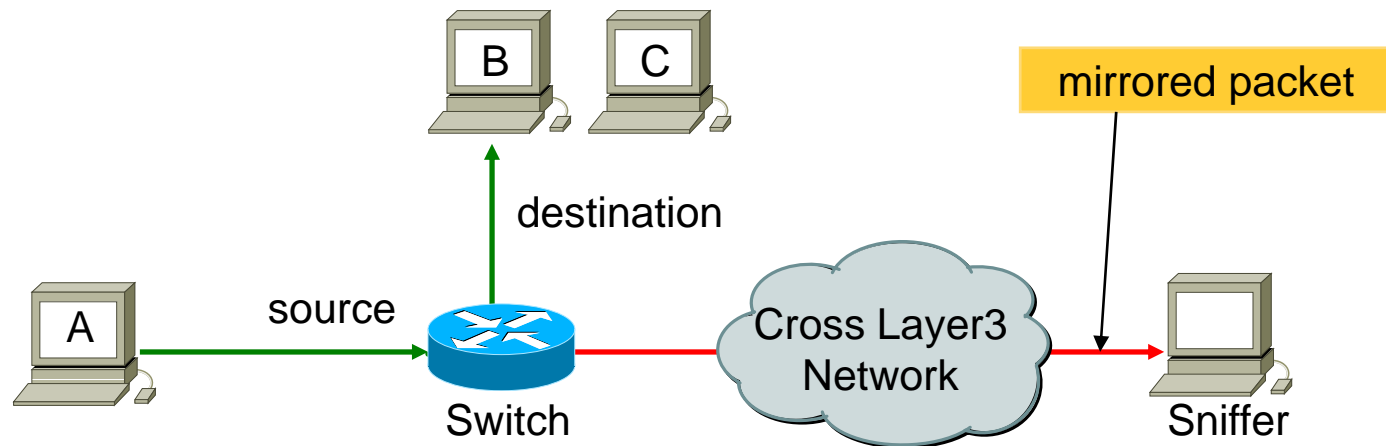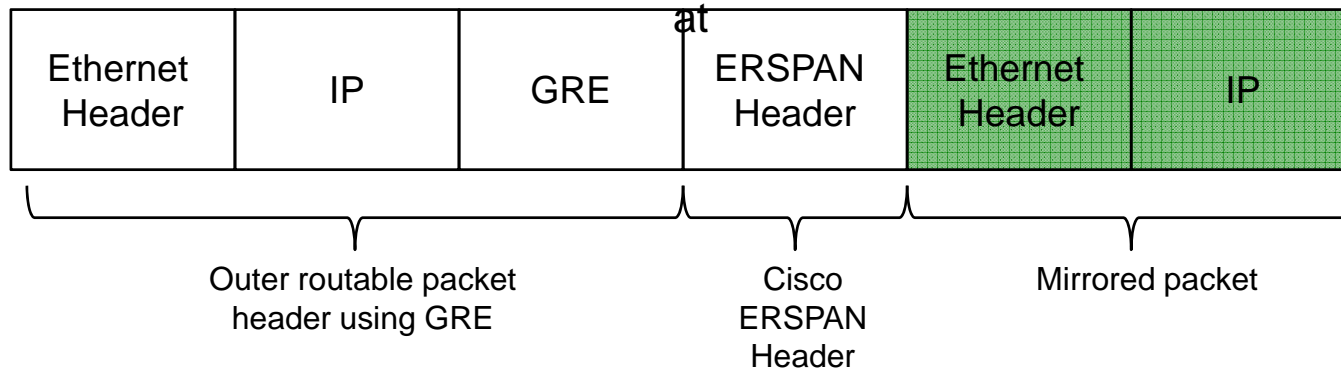
# Common ERSPAN Use Cases
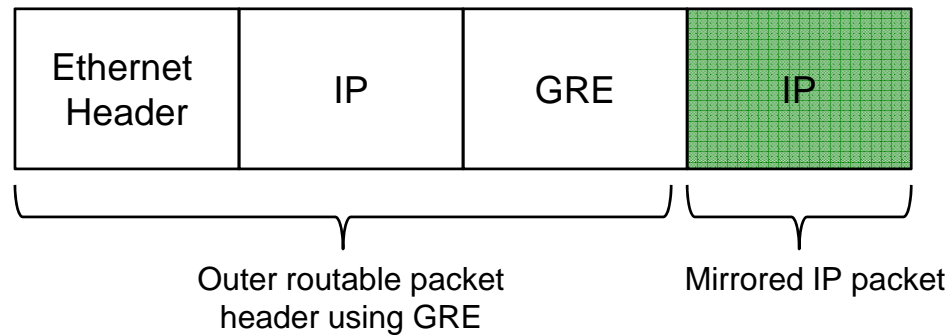
- Debugging network issues by tracking the control and data frames.
- Monitoring Voice-over-IP, VoIP, Packets for delay and jitter analysis
- Monitoring network transactions for latency analysis
- Monitoring network traffic for anomaly detection

# ERSPAN Packet Format

## Cisco ERSPAN-II (0x88be), ERSPAN-III (0x22be) Packet Format

| Ethernet Header | IP | GRE | ERSPAN Header | Ethernet Header | IP |
|---|---|---|---|---|---|

Outer routable packet header using GRE      Cisco ERSPAN Header      Mirrored packet

## GRE IPv4 (0x0800) Packet Format

| Ethernet Header | IP | GRE | IP |
|---|---|---|---|

Outer routable packet header using GRE      Mirrored IP packet

*\* 0x88be, 0x22be, 0x0800 :  GRE Protocol Type*

# Standard GRE Header Format

| Bits 0-3 | | 4-12 | 13-15 | 16-31 |
|---|---|---|---|---|
| C | K S | Reserved 0 | Version | Protocol Type |
| Checksum *(optional)* | | | Reserved 1 | |
| Key *(optional)* | | | | |
| Sequence Number *(optional)* | | | | |

| Field | Description |
|---|---|
| C | Checksum bit. Set to 1 if a checksum is present. |
| K | Key bit. Set to 1 if a key is present. |
| S | Sequence number bit. Set to 1 if a sequence number is present. |
| Reserved 0 | Reserved bits; set to 0. |
| Version | GRE Version number; set to 0. |
| Protocol Type | Indicates the ether protocol type of the encapsulated payload. |
| Checksum | Present if the C bit is set; contains the checksum for the GRE header and payload. |
| Reserved 1 | Present if the C bit is set; is set to 0. |
| Key | Present if the K bit is set; contains an application-specific key value. |
| Sequence Number | Present if the S bit is set; contains a sequence number for the GRE packet. |

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# AddPac CLI Configuration Example

```
!
mirroring 1
 type ip
 source ip 172.16.8.25
 destination ip 172.16.14.2
!
mirroring 2
 type erspan-3
 destination ip 172.16.1.8
 erspan session-id 123
 erspan cos 5
 erspan-3 hwid 17
!
interface FastEthernet0/0
 ip address 172.16.8.25 255.255.0.0
 mirroring id 1 mode both
 mirroring id 2 mode both
 speed auto
!
```

Mirroring template # 1
• Type is IP (0x0800)
• Sniffer is 172.16.14.2 Local 172.16.8.25

Mirroring template # 1
• Type is ERSPAN-III (0x22be)
• Sniffer is 172.16.1.8
•  define ERSPAN Header Values
   - Session-id, COS, HWID

Apply Port Mirroring
• Mode (in, out or both)

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# Standards

- RFC 1701 : *Generic Routing Encapsulation (GRE)* (informational)
  - https://tools.ietf.org/html/rfc1701

- RFC 1702 : *Generic Routing Encapsulation over IPv4 networks* (informational)
  - https://tools.ietf.org/html/rfc1702

- ERSPAN Cisco Draft : Cisco Systems' Encapsulated Remote Switch Port Analyzer (ERSPAN) draft-foschiano-erspan-00.txt
  - https://tools.ietf.org/html/draft-foschiano-erspan-00

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# Thank you!

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