



IMSI Filtering with Cubro Products

APPLICATION NOTE

Why IMSI* Filtering?

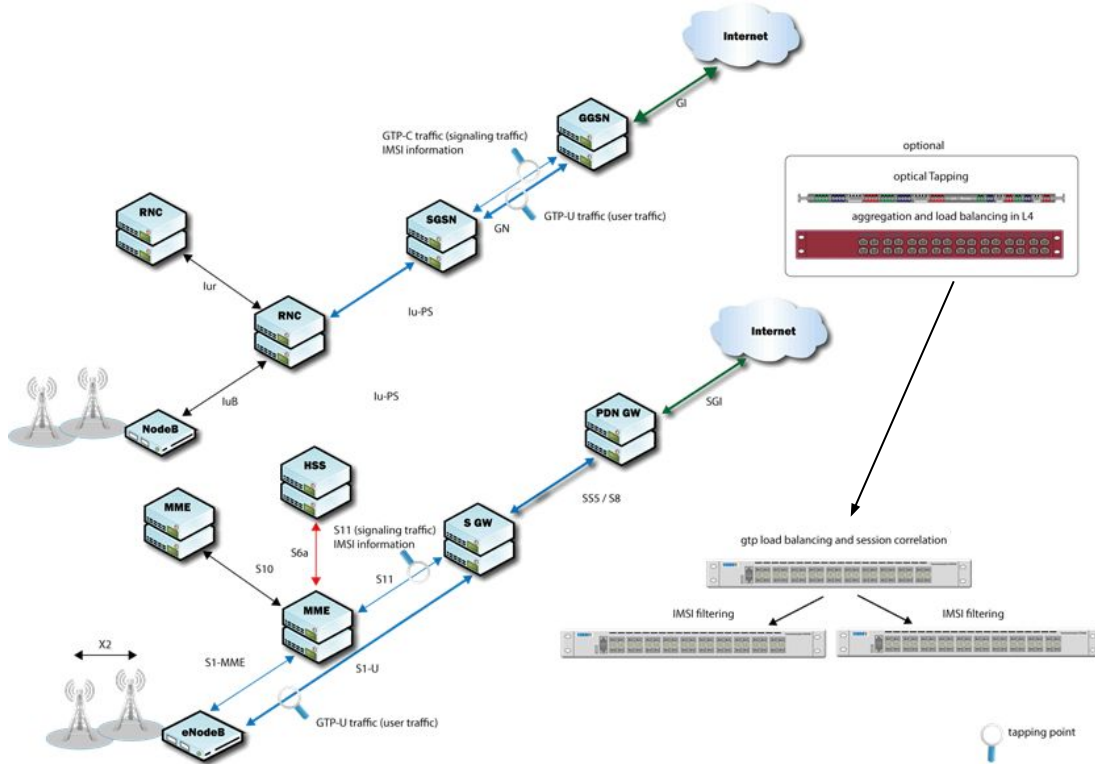


- To reduce the load towards monitoring solutions by allowing selection of subscribers by IMSI
- Selection and tracing of subscribers requested by the law enforcement
- Selection of specified subscribers for troubleshooting and for network quality and assurance, possibly using Wireshark and similar tools
- Help for drive test analytics



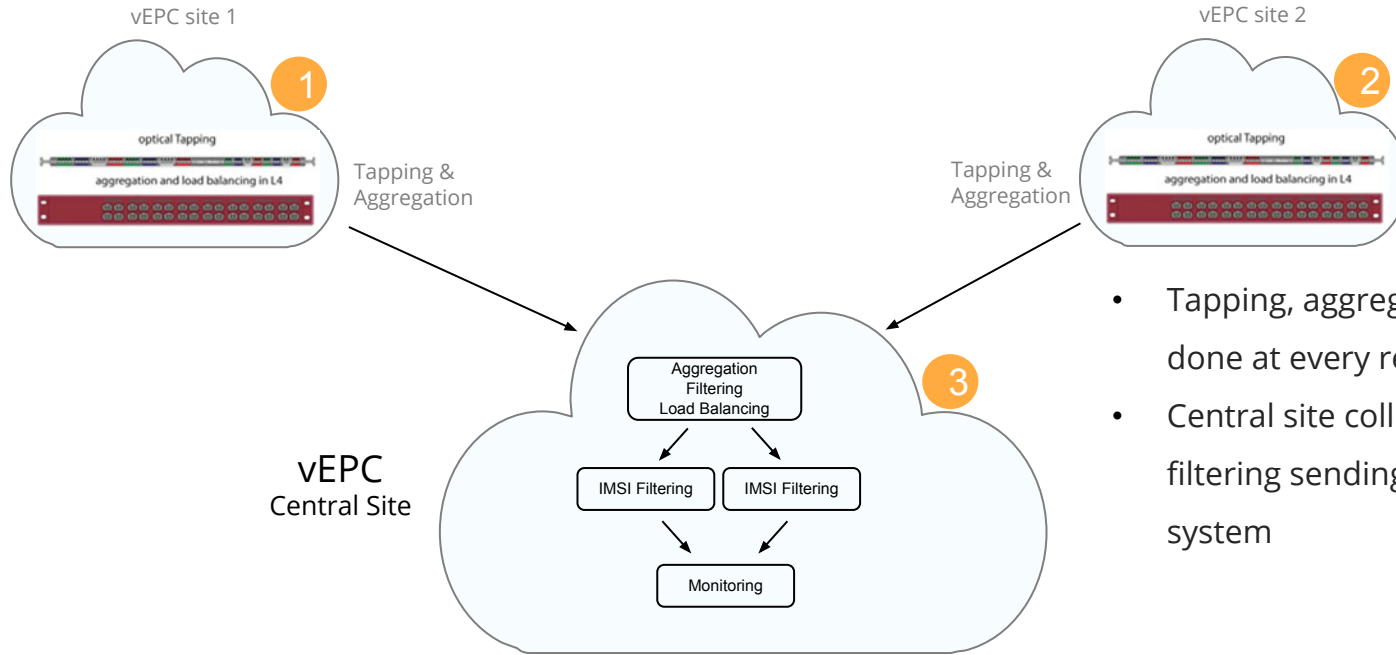
*The international mobile subscriber identity (IMSI) is a number that uniquely identifies every user of a cellular network

Challenges on IMSI Filtering



- In order to find specified IMSIs all the packets need to be checked resulting in high load.
- IMSI is not found in all packets – not all network events carry IMSI (depends also on network design and used technology)
- Successful IMSI filtering requires packet collection, aggregation, load balancing and session correlation used in combination (see drawing on the left)

Solution - Deployment Overview



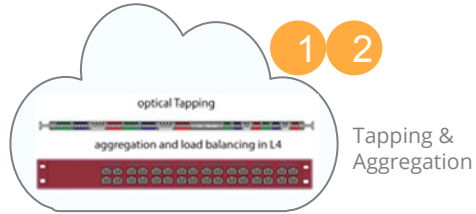
- Tapping, aggregation and load balancing is done at every remote site
- Central site collects the data and does IMSI filtering sending the data to monitoring system

Deployment Example

Layer 1 Tapping at Site 1 and 2



vEPC site 1 and 2

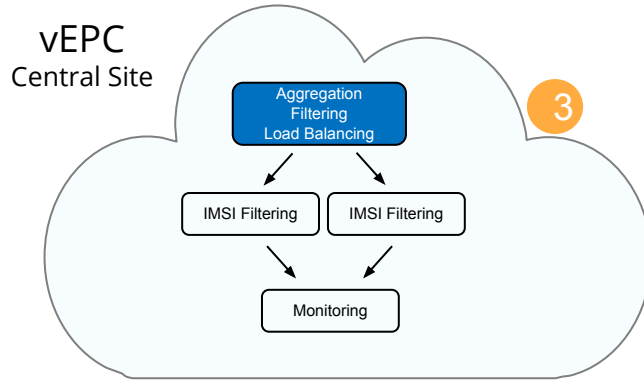


Cubro MTP TAP

- ↪ 4 MTP Links in 1/3 U 19"
- ↪ Supports 40G and 100G
- ↪ Totally passive and secure



Central Site – Filtering & Load-balancing



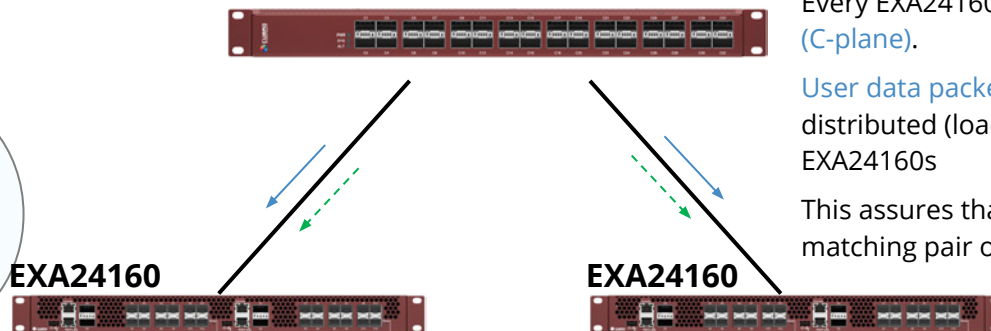
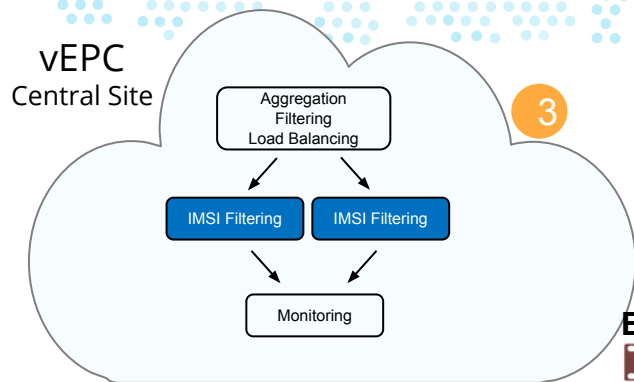
Cubro EXA32100

- 32 x 40G/100G ports (can also be used as 128 x 10G solution)
- Filtering including GTP Layer; separates signalling and user traffic
- GTP Load-balancing based on inner (user) IP address; distribute user traffic evenly to the IMSI filtering solution.



Load-balancing S1-U traffic using GTP inner IP is the only feasible way to share user traffic between the different IMSI Filter boxes

Central Site - IMSI Filtering



Every EXA24160 gets full signaling (C-plane).

User data packets (U-plane) are distributed (load-balanced) among the EXA24160s

This assures that every EXA24160 has matching pair of C- and U-plane



Cubro EXA24160

- Correlation between GTP-U and GTP-C
- Forward only traffic from selected user
- Up to 80Gb/s correlation performance per unit

De-Duplication and Keyword search are available on this unit

IMSI Filtering Overview of functionality



- ✓ IMSI Filtering provides ALL signalling and user packets of a call
- ✓ Enables finding of signalling messages that contain the IMSI
- ✓ Certain messages only include the IMSI information – correlation is required
 - ❑ PDP Context Request (3G)
 - ❑ Session Create Request (4G)
 - ❑ After finding these messages a correlation mechanism is applied
- ✓ Find ALL signalling and ALL user traffic data that belong to this call
 - ❑ Send all correlated packets to an external analyser/probe



Example - Session Create Message



Cubro **EXA24160** Sessionmaster finds the message and ALL other packets that belong to this call

The image shows a Wireshark packet capture window. The top pane displays a list of packets. Packet 1 (No. 1, Time 0.000000) is a GTP packet from source 202.69.206.55 to destination 202.69.206.10, with a length of 210 bytes and info 'Create PDP context request'. Packet 2 (No. 2, Time 4.79804.539801) is a GTP packet from source 202.69.206.10 to destination 202.69.206.55, with a length of 164 bytes and info 'create PDP context response'. Packet 3 (No. 3, Time 2.264758) is a GTP <TCP> packet from source 10.168.219.220 to destination 45.249.246.251, with a length of 118 bytes and info '118 1037 -> 9090 [SYN, Seq=0 Win=64000 Len=0 MSS=1360 WS=1 TS...'. Packet 4 (No. 4, Time 2.817349) is a GTP <TCP> packet from source 45.249.246.251 to destination 10.168.219.220, with a length of 114 bytes and info '114 9090 -> 1037 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1...'. The bottom pane shows the details of the selected packet (Frame 1). The Ethernet II, Internet Protocol Version 4, User Datagram Protocol, and GPRS Tunneling Protocol sections are expanded. The GPRS Tunneling Protocol section shows the message type 'Create PDP context request (0x10)', length 156, TEID 0x00000000 (0), and sequence number 0xe10b (57611). The IMSI is 413000000000000. The selection mode is 'MS or network provided APN, subscribed verified'. The TEID Data I is 0x305031a0 (810561952) and the TEID Control Plane is 0x96dd2e6d (2531077741). The NSAPI is 6. The end user address is IETF/IPv4. The access point name is PPNAP. The protocol configuration options show GSN address 202.69.206.55 and GSN address 202.69.206.35. The MS international PSTN/ISDN number is 3522000000000000. The quality of service is Common Flags. The RAT type is GERAN. The user location information is MS Time Zone: GMT + 5 hours 30 minutes. The MEI(SV) is 3522000000000000. The private extension is HUAWEI Technology Co.,Ltd (2011).

Summary



Future-proof (investment protected) – Just add EXA24160s when traffic grows

Easy to use and straightforward to implement

Flexible – add/remove probes/analyzers without affecting others

Full solution from Layer 1 tapping to traffic correlation from a single vendor



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THANK YOU



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