

PIONEERS IN

REVOLUTIONIZING

LAWFUL INTERCEPT



Demystifying Lawful Interception **A Technical Deep Dive**

WE'RE REWRITING THE RULES

Ronog, October 2024

Lawful Intercept

[expecting sighs now and for people to avoid me later, but please don't, if nothing else beer is on me 🙄



Everyone has this big aversion toward Lawful Intercept and Data Retention. Why?

- government mandated - regulatory compliance / cost of doing business
- usually quite costly
- complex to implement properly
- **ROI is always 0 – whatever anyone is telling you**
- PEGASUS?!

Myths

- MITM
- Mass-Surveillance
- No privacy
- Historical access - recording all data for years – how / yes / **no**

Lawful Intercept

Nomenclature

Definition

Lawful Intercept (LI)

refers to the **legally authorized** monitoring and collection of telecommunications data by law enforcement agencies (LEAs). **In the European Union, LI is strictly regulated**, and service providers must comply with ETSI (European Telecommunications Standards Institute) standards, ensuring compliance while safeguarding privacy.

Data Retention (DR)

refers to the **mandatory** storage of telecommunications and internet-related data by service providers for a specified period. This data is retained to assist law enforcement and government agencies in criminal investigations, national security efforts, and legal compliance.

Importantly, data retention does not include the content of communications (such as call or email content) but focuses on metadata.

Legal Basis

Lawful Intercept

- **ETSI** (European Telecommunications Standards Institute): ETSI standards, such as TS 101 671 and TS 102 232, define the technical and security requirements for intercepting and transmitting communications data to law enforcement agencies. These standards ensure a unified framework across EU member states.
- **CALEA** (Communications Assistance for Law Enforcement Act): In the US, CALEA mandates that telecom providers design their networks with lawful interception capabilities.
- **SORM** (System of Operative Search Measures): In Russia, SORM offers more direct access to communications for security services, in contrast to the more regulated EU framework.

Data Retention

- **EU Data Retention Directive (2006/24/EC)**: Initially mandated member states to require service providers to retain telecommunications data for a period of 6 to 24 months. The aim was to harmonize data retention laws across the EU
- **Current Situation**: The 2014 **European Court of Justice (ECJ)** ruling declared the Directive invalid due to concerns over privacy and mass data collection. Since then, individual countries have developed their own laws, often influenced by national security needs.

Local regulation

ANCOM DECISION NO. 987/2012 - ... the service provider is inter alia obliged to:

- 1. technically allow the relevant authorities to perform interceptions** and to make available all technical data regarding interceptions, in the format established by the authorities;
- ...
- ...
4. take all necessary technical measures to enable interceptions in general and immediately enable the enforcement of interception warrants in particular;
5. place at the disposal of the relevant authorities the interception management servers and the administration and operation consoles it holds, as required to ensure interceptions;
- 6. bear the costs of the interception interface**

As per Article 8(2)(k) of the Government Emergency Ordinance No. 111/2011 on electronic communications, the conditions under which service providers are to bear the costs related to the interception interface are established by the general authorisation issued by ANCOM to the service provider.

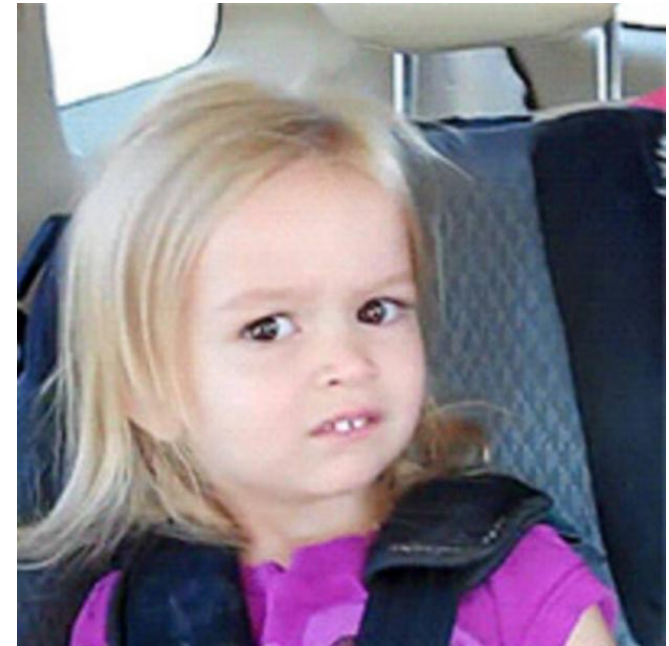
Local legal basis

- Law 14/1992 regarding the organization of the Romanian intelligence Agency (i.e., Serviciul Roman de Informatii – SRI)
- Law 51/1991 regarding National Security
- Decision 338/2010 of the President of ANCOM (i.e., Romanian regulatory body)
- Law 508/2004 regarding the organization of DIICOT (department under the Public Ministry in charge with investigating the cases of organized crime and terrorism)
- Penal Procedural Code
- Law 235/2015 modifying The Law 506/2004 regarding the processing of the personal data and the protection of private life in the field of electronic communication.

OK, so now we know
definitions

Let's dive in...

A “typical” ISP/Telco network



OSPFv3 / LDPv6

area: 0.0.0.0

type: backbone

edge-01
lo6: 2a14:19c0:d127:1::21

core-01
lo6: 2a14:19c0:d127:1::1

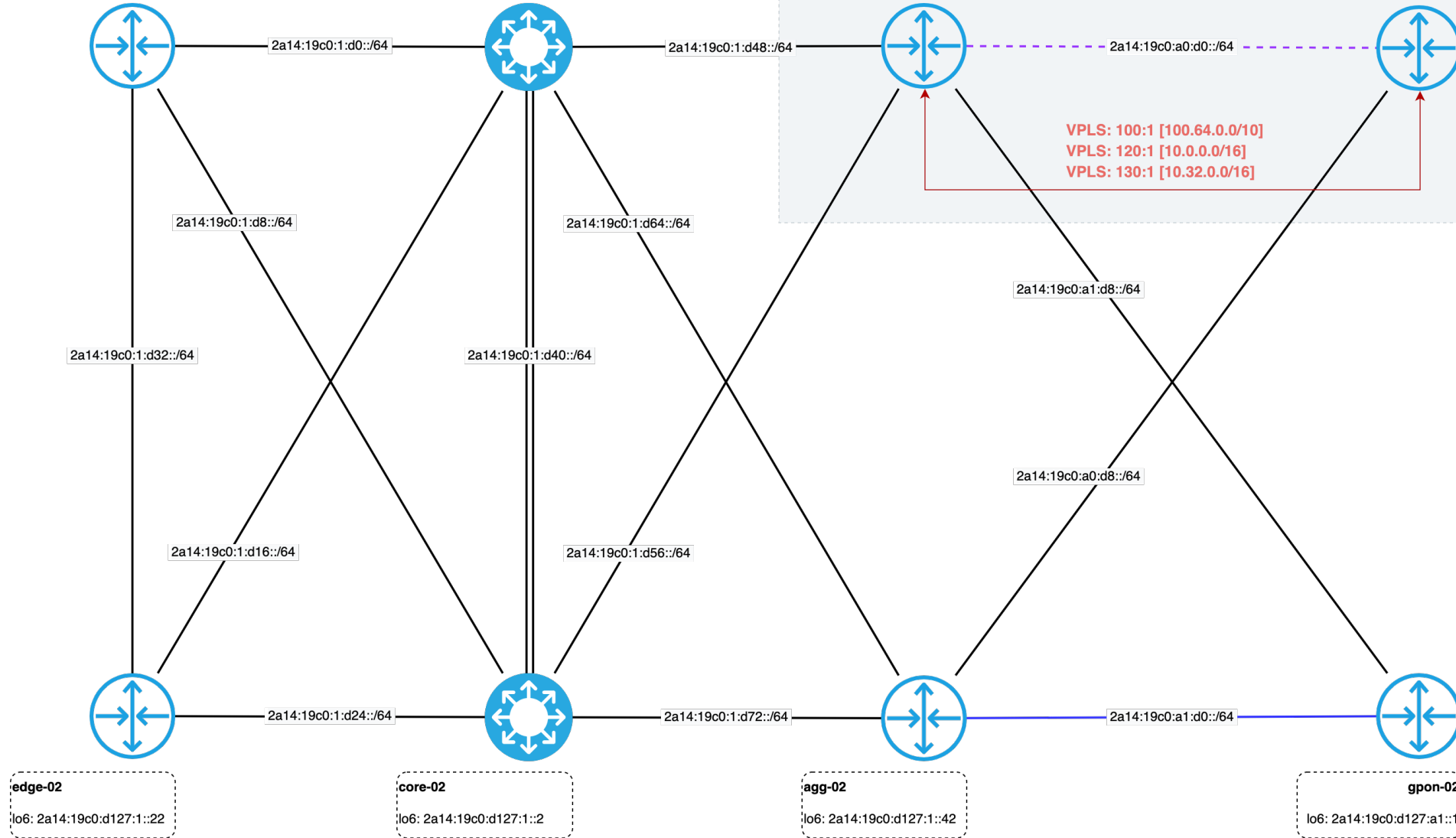
agg-01
lo6: 2a14:19c0:d127:1::41

gpon-01
lo6: 2a14:19c0:d127:a0::1

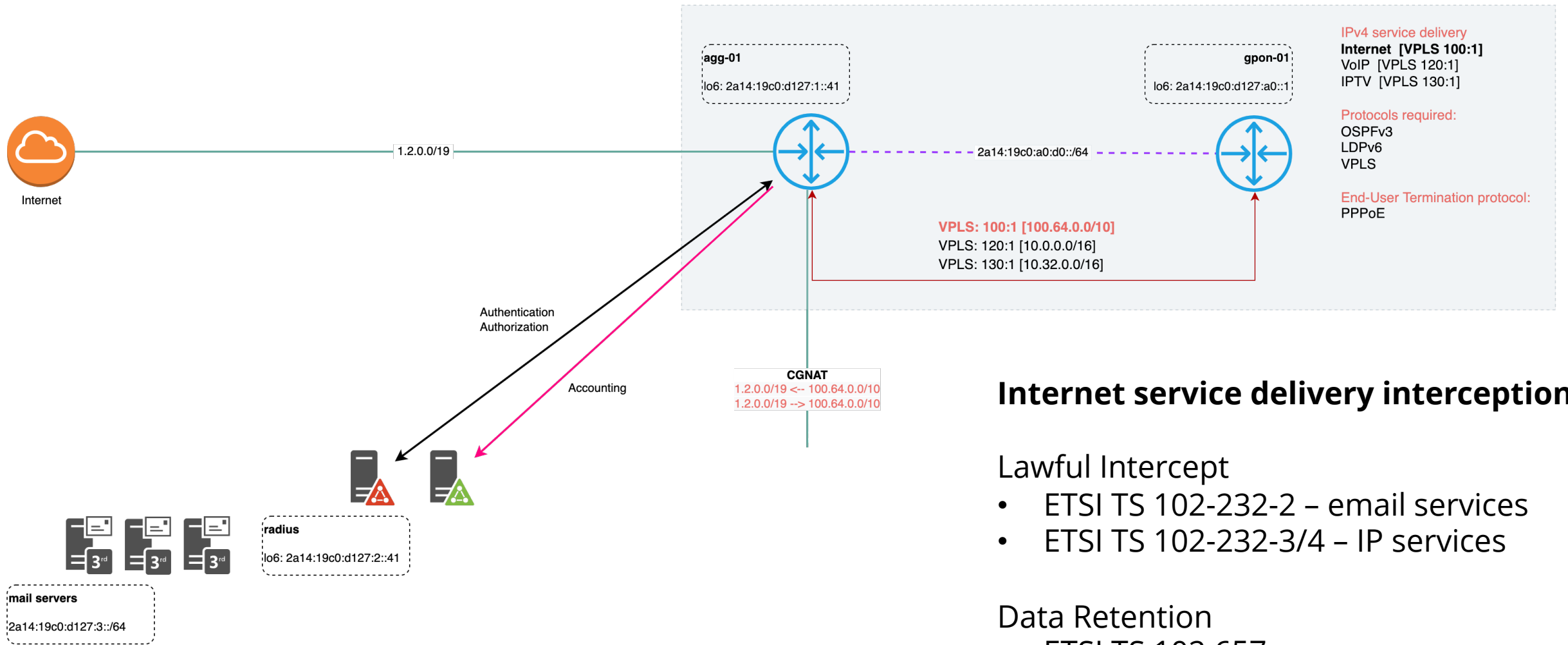
IPv4 service delivery
Internet [VPLS 100:1]
VoIP [VPLS 120:1]
IPTV [VPLS 130:1]

Protocols required:
OSPFv3
LDPv6
VPLS

End-User Termination protocol:
PPPoE



Let us take a closer look at
Internet service delivery



Internet service delivery interception

Lawful Intercept

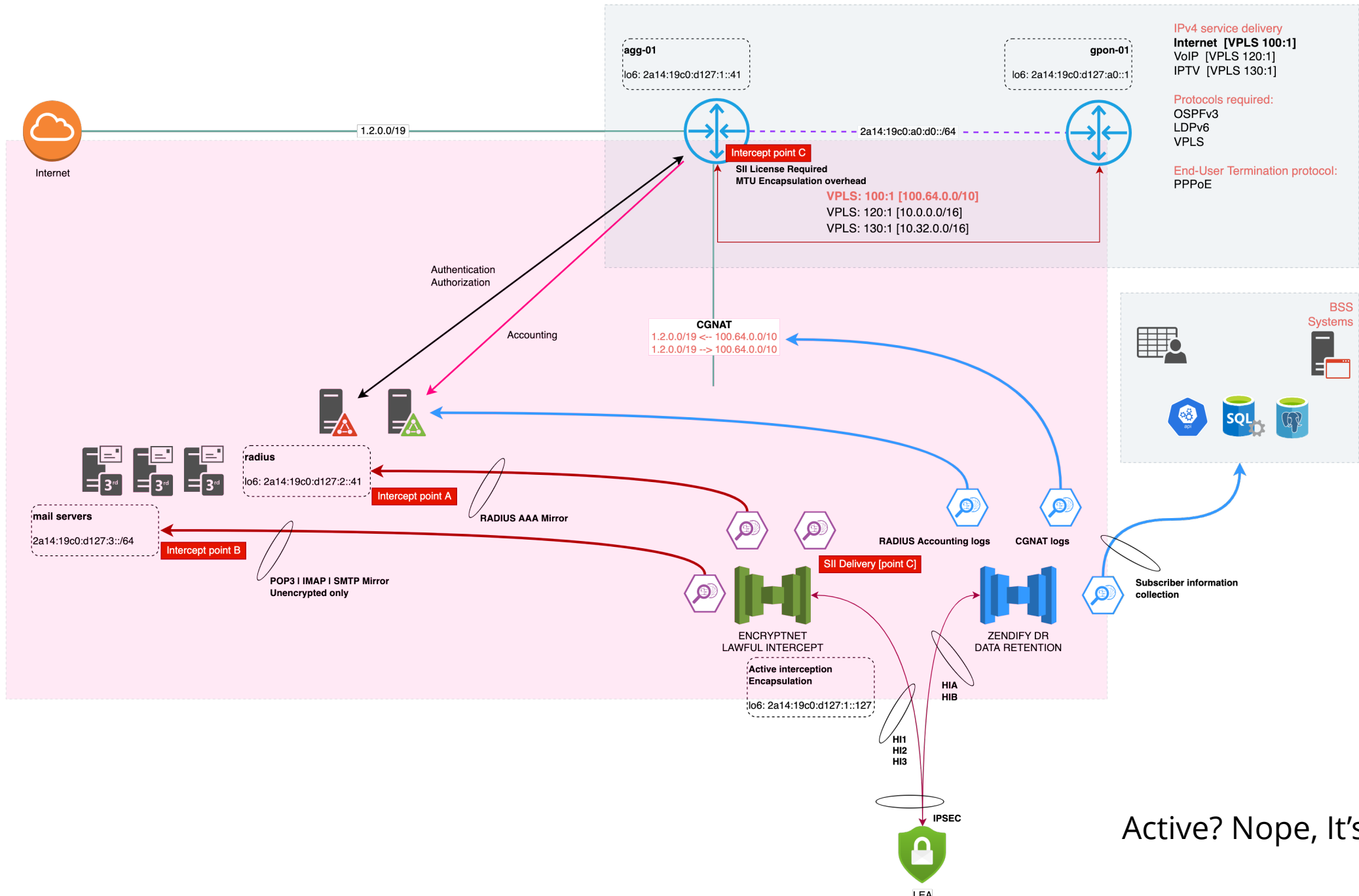
- ETSI TS 102-232-2 – email services
- ETSI TS 102-232-3/4 – IP services

Data Retention

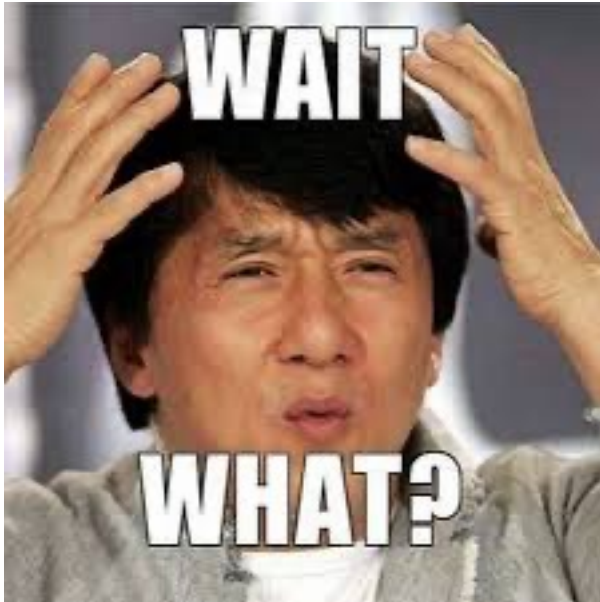
- ETSI TS 102 657

**OK, so how to implement
LI and DR?**

Active? Passive? Hybrid?

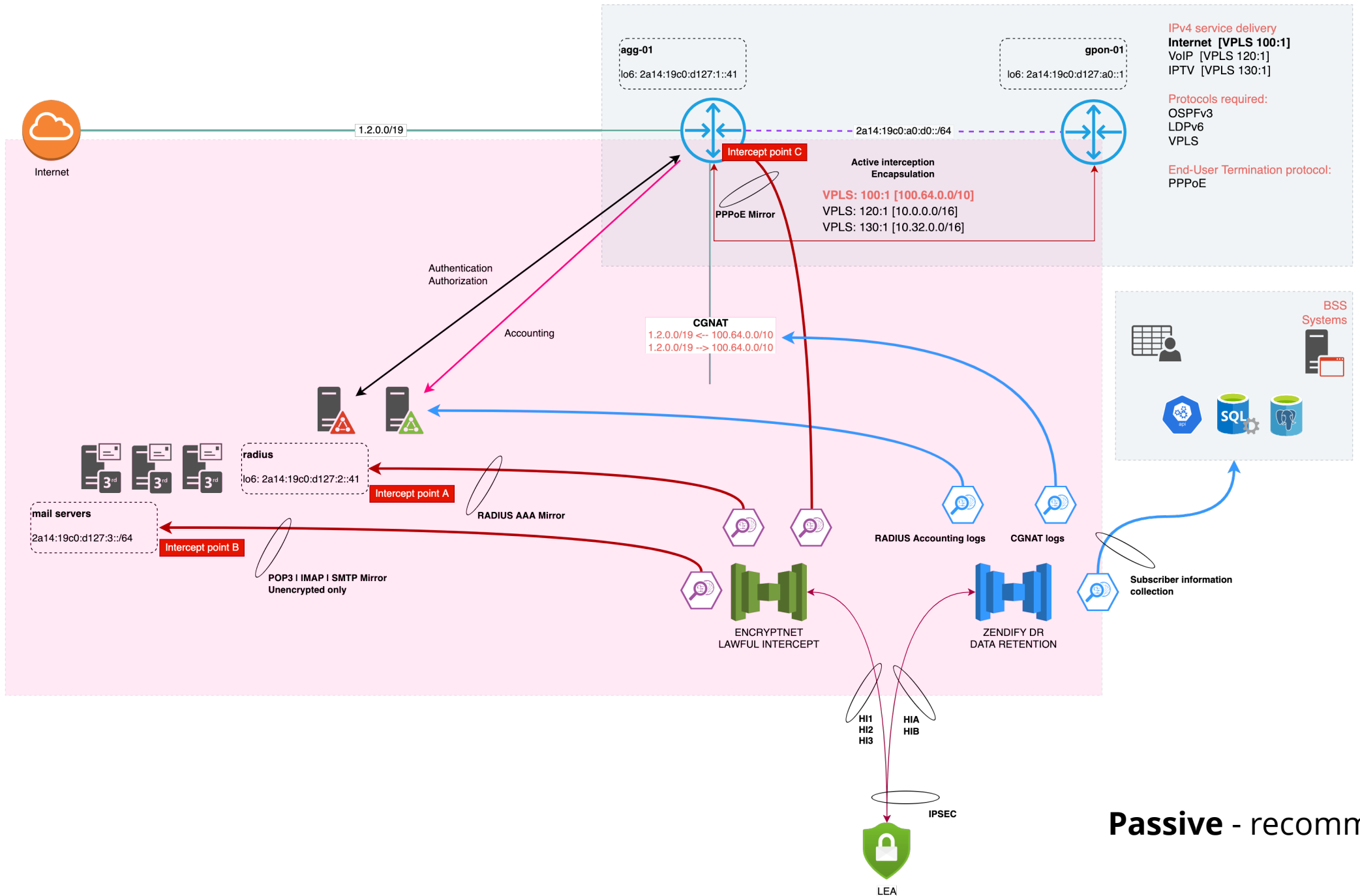


Active? Nope, It's **Hybrid**



Purely Active interception is impossible. Chances are:

- You use **PPPoE** or **IPoE** for Internet services delivery – 99% that you implemented already
Radius AAA for authorising your users, controlling their allowed bandwidth and qos + assigning/rotating IP addresses
- If you provide email service to your customers, you **MUST** provide **clean** decrypted traffic to the IAP
- You will have to combine it with Passive Voice Interception if you provide Telephony services

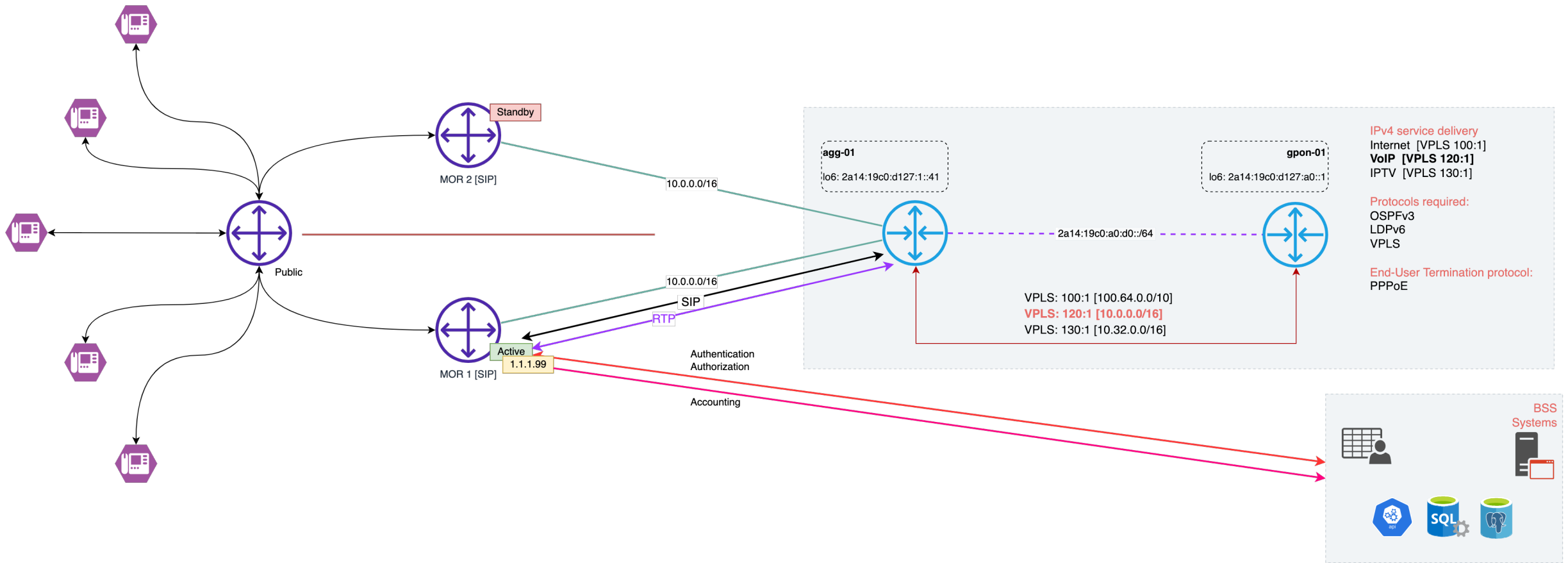


Passive - recommended.

Why is Passive recommended over Hybrid?

- Future proof – no changes if you change hardware vendor
- No Router CPU/Memory sizing cost – active interception is always done in software
- Easier to deal with when doing network/software upgrade
- No additional license cost
- Additional privacy – employees cannot see list of active targets and targets cannot see impact on their services!

Let us take a closer look at
VoIP service delivery



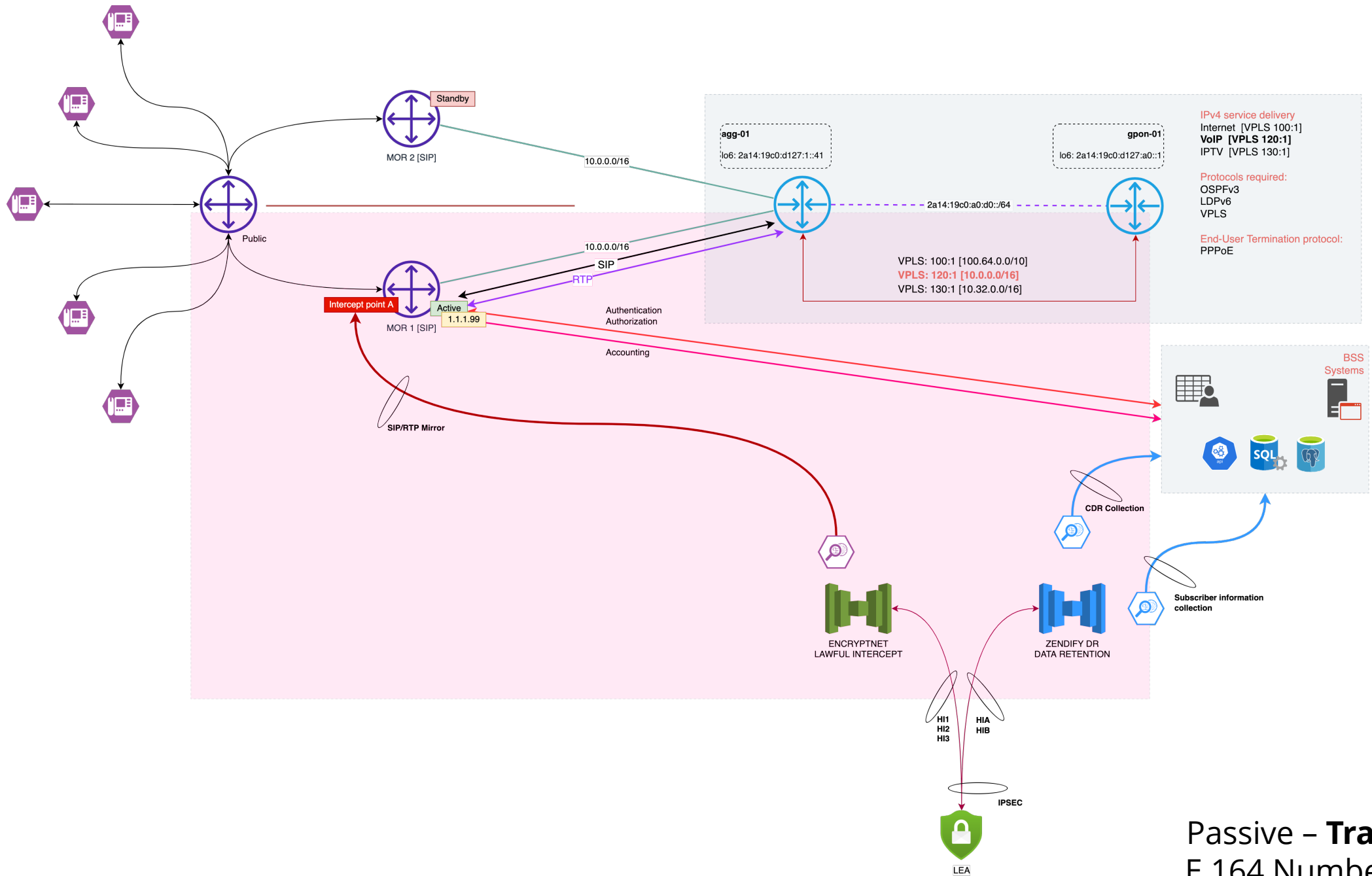
Internet service delivery interception

Lawful Intercept

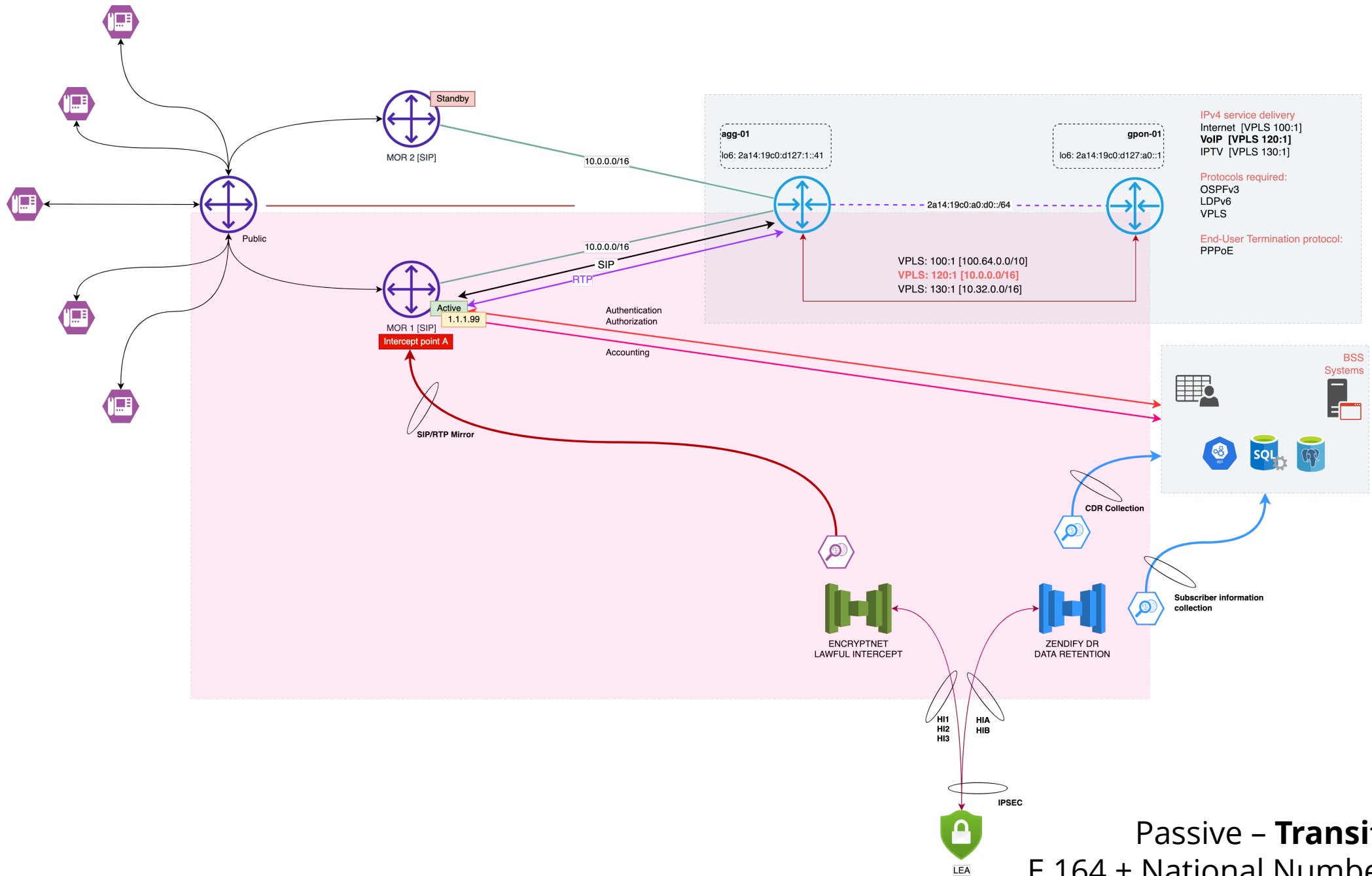
- ETSI TS 102-232-5 – Telephony services

Data Retention

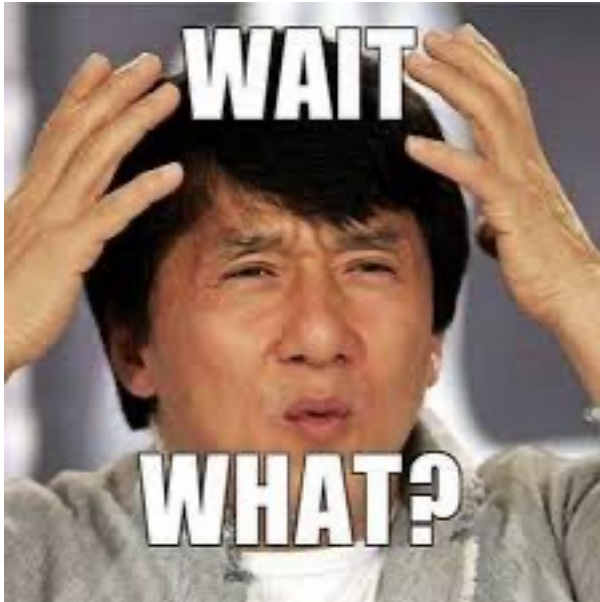
- ETSI TS 102 657



Passive – **Transit only**
E.164 Numbering plan



Passive – **Transit + onnet**
E.164 + National Numbering plan



Transit only or Full?

Asterisk* was envisioned as PBX system, people tend to forget it

If your Softswitch is Asterisk* based

- dialog-transparency is an issue, so you will have duplicate calls for each intercepted call
- We have a solution for that in place – **RFC7329** – however it requires a configuration change to add custom sip header on your softswitch

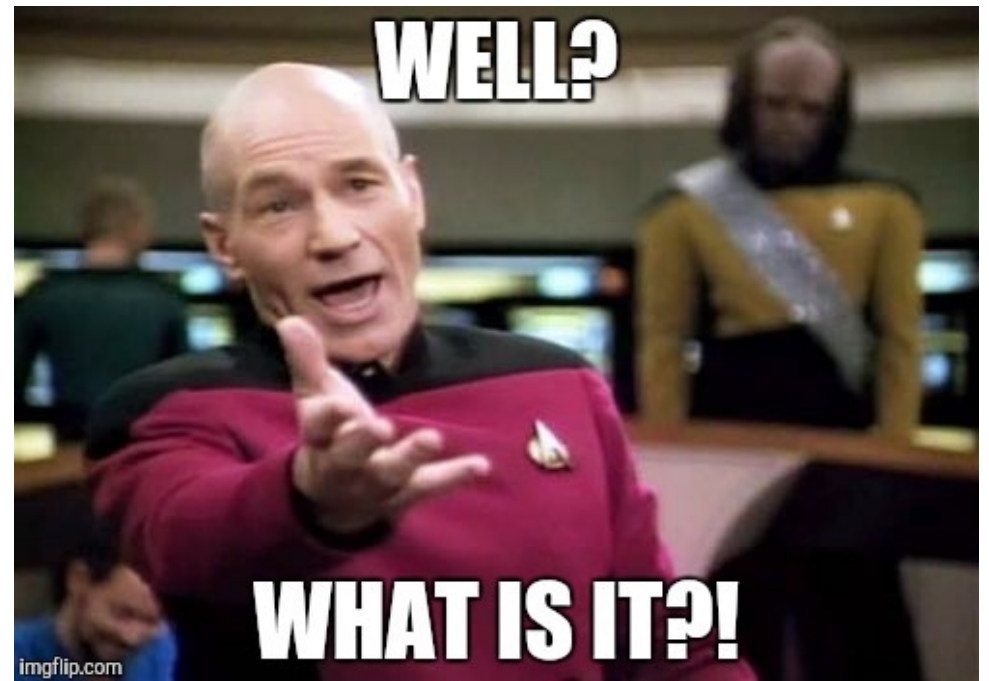
If LEA insists on **E.164 Only?**

- Many LEAs live in an age of ISDN, they refuse to comprehend SIP try to enforce A and B numbers – For the love of God it is URI!
- Inside network you use National numbers, not International!
- PAI helps, but not in all cases.

Lawful Intercept is a Black Box

- there are no fancy Graphical interfaces
- there is no access
- there are no monitoring tools exposed to your Operations team
- only a handful of people will ever know about it inside your company

What about Data Retention?



Subscriber information

- Basically, a phonebook, but not just a phonebook
 - LEAs require subscriber information (like name, surname, government id, addresses – for billing, service delivery and official one), **Service NAI** (basically a phone number, username, IP address, mac address...), all of his services over time (historic data usually kept for 1 year)
- It allows LEA to identify current information and what to use to “target” the user using Lawful Intercept IAP

CDRs

- Incoming and outgoing phone calls information with additional services information (i.e. Call Forwarding parties, CLIR...)
- Internet connectivity session details (start/stop, transferred bytes, IP address, ...)
- CGNAT records

NETFLOW/IPFIX?

- Yes, in some countries there is national requirement to store this data as well

DPI?

- It is coming! We are already implementing it in some countries.

Problem?

- How do you get all this data, store it efficiently and deliver it on request to LEA??
 - Many different systems, with different interfaces that change over time?
 - Delivery can be different locally as well and change over time. i.e. national regulation superseded by ETSI
 - EU Digital Evidence Act is complicating things
 - There can really be a LOT of data (CGNAT, NETFLOW/IPFIX, DPI) – you can't just drop the data to MySQL
 - Data deduplication and merging
 - Uptime for such a system

Solution? Zendify.DR

- It can connect to almost any type of API, Database, FTP, ... and ingest and enrich source data
- We configure/map input processors to match your internal BSS systems and gather and store data
- For each country – based on local regulations we apply a profile for LEA to access the data in the format they want
- Gone are the days where we require custom solutions for each ISP – in most cases ;)

Example you say?

Let's take Voice CDR's:

- Get data from **MOR** Softswitch? – Configure hourly FTP export that we will ingest with following fields and remap it per requirements

AUTOMATIC CDR EXPORT EDIT

ⓘ CDR will be sent via email so make sure that emails are configured correctly before creating Automatic CDR Export

Query

User:
Hangup Cause:
Source:
Reseller:
Card number:
Calls: from Users to Users to DIDs

Device:
Destination Group:
Destination:
Reseller in any DIDs:
Card PIN:

Status:
Provider:
DID:
DID Provider:
Card ID:

Settings

Name:
Time Zone:
Repeat period:
Start CDR Export at:
Template:
Filename prefix:
Archive extension:
Send CDR to: User (to his email):
 Custom Email:
 FTP Server:

Name:	<input type="text" value="ftn"/>
Column #1:	<input type="text" value="Call ID"/>
Column #2:	<input type="text" value="Unique ID"/>
Column #3:	<input type="text" value="Called From"/>
Column #4:	<input type="text" value="Called To"/>
Column #5:	<input type="text" value="PAI Number"/>
Column #6:	<input type="text" value="Start Time"/>
Column #7:	<input type="text" value="End Time"/>
Column #8:	<input type="text" value="Forwarded Call DID Number"/>
Column #9:	<input type="text" value="Hangup Cause"/>
Column #10:	<input type="text"/>

- **PortaONE?** Use their REST API or connect to their DB... Iskratel? Process BELL CDR records...
- How about getting data from **Chaosnet** Softswitch? – We configure mysql connector and pull data from voicecdrs table and remap it per requirements

```

MariaDB [dr_voice]> describe cdrs;
+-----+-----+-----+-----+-----+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| id | int(10) unsigned | NO | PRI | NULL | auto_increment |
| calldate | timestamp | NO | PRI | current_timestamp() | |
| clid | varchar(80) | NO | MUL | | |
| src | varchar(80) | NO | MUL | | |
| dst | varchar(80) | NO | MUL | | |
| dcontext | varchar(80) | NO | | | |
| channel | varchar(80) | NO | | | |
| dstchannel | varchar(80) | NO | | | |
| lastapp | varchar(80) | NO | | | |
| duration | bigint(20) | NO | | 0 | |
| billsec | bigint(20) | NO | | 0 | |
| disposition | varchar(45) | NO | MUL | | |
| amaflags | bigint(20) | NO | | 0 | |
| accountcode | varchar(40) | NO | | | |
| uniqueid | varchar(32) | NO | | | |
| e164a | varchar(255) | YES | MUL | NULL | |
| e164b | varchar(255) | YES | MUL | NULL | |
| customer_id | int(10) unsigned | YES | | NULL | |
| customer_dgid | int(10) unsigned | YES | | NULL | |
| customer_rate_id | int(10) unsigned | YES | | NULL | |
| customer_cost | double(11,4) | NO | | 0.0000 | |
| provider_in_id | int(10) unsigned | YES | | NULL | |
| provider_in_dgid | int(10) unsigned | YES | | NULL | |
| provider_in_cost | double(11,4) | NO | | 0.0000 | |
| provider_out_id | int(10) unsigned | YES | | NULL | |
| provider_out_dgid | int(10) unsigned | YES | | NULL | |
| provider_out_cost | double(11,4) | NO | | 0.0000 | |
| status | varchar(255) | YES | | NULL | |
| cid_hidden | tinyint(1) | NO | MUL | 0 | |
| diverted | tinyint(1) | NO | MUL | 0 | |
| diversions | text | YES | MUL | NULL | |
+-----+-----+-----+-----+-----+-----+
32 rows in set (0.001 sec)

```

disposition	status	TotalCalls	Extra
ANSWERED	OK	12334673	
BUSY	OK	3745394	
FAILED	NULL	952450	
NO ANSWER	Exception	17659	- Cause Code 16: Normal call clearing - The call has been cleared normally.
NO ANSWER	ExCustomerNotFound	1286	- Cause Code 17: User busy - The dialed user is busy.
NO ANSWER	ExDeniedByCallerId	687	- Cause Code 21: Call rejected - The call was rejected by the receiver.
NO ANSWER	ExInvalidCallerId	24498	- Cause Code 41: Temporary failure - The network is experiencing a temporary failure.
NO ANSWER	ExNoDestinationGroupFound	7	- Cause Code 38: Network out of order - The network is not functioning correctly.
NO ANSWER	ExNoDestinationGroupFound	80336	- Cause Code 1: Unallocated (unassigned) number - The dialed number does not exist.
NO ANSWER	ExNoDestinationGroupFound	45	- Cause Code 57: Bearer capability not authorized - The caller is not authorized to use the requested bearer capability.
NO ANSWER	ExNoDestinationGroupFound	13	- Cause Code 3: No route to destination - Cannot route the call to the final destination.
NO ANSWER	ExNoDestinationGroupFound	80	- Cause Code 57: Bearer capability not authorized - The caller is not authorized to use the requested bearer capability.
NO ANSWER	ExNoDestinationGroupFound	426	- Cause Code 43: Access information discarded - The caller has discarded access information.
NO ANSWER	ExNoDestinationGroupFound	1711	- Cause Code 1: Unallocated (unassigned) number - The dialed number does not exist.
NO ANSWER	ExNoDestinationGroupFound	118	- Cause Code 28: Invalid number format (address incomplete) - The number is not in a valid format or is incomplete.
NO ANSWER	ExNoDestinationGroupFound	35267	- Cause Code 1: No route to specified transit network - The switch cannot route the call through the intermediate network.
NO ANSWER	ExNoDestinationGroupFound	402	- Cause Code 2: No route to specified transit network - The switch cannot route the call through the intermediate network.
NO ANSWER	ExNoDestinationGroupFound	2255	- Cause Code 19: No answer from user (user alerted) - The dialed user was alerted but did not answer.
NO ANSWER	ExNoDestinationGroupFound	12	
NO ANSWER	ExNoDestinationGroupFound	4817209	

- **Freeradius** or some fork of it? Need to keep track of IP accounting?
 - In most cases it retains **radacct** table to which we could connect, however our system can also generate those records from Encryptnet LI IAP automatically, so even if you don't use freeradius we got you covered

```
mysql> describe radacct;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| radacctid      | bigint        | NO   | PRI | NULL     | auto_increment |
| acctsessionid  | varchar(64)   | NO   | MUL |          |                |
| acctuniqueid   | varchar(32)   | NO   | UNI |          |                |
| username       | varchar(64)   | NO   | MUL |          |                |
| realm          | varchar(64)   | YES  |    |          |                |
| nasipaddress   | varchar(15)   | NO   | MUL |          |                |
| nasportid      | varchar(32)   | YES  |    | NULL     |                |
| nasporttype    | varchar(32)   | YES  |    | NULL     |                |
| acctstarttime  | datetime      | YES  | MUL | NULL     |                |
| acctupdatetime | datetime      | YES  |    | NULL     |                |
| acctstoptime   | datetime      | YES  | MUL | NULL     |                |
| acctinterval   | int           | YES  | MUL | NULL     |                |
| acctsessiontime | int unsigned | YES  | MUL | NULL     |                |
| acctauthentic  | varchar(32)   | YES  |    | NULL     |                |
| connectinfo_start | varchar(50)  | YES  |    | NULL     |                |
| connectinfo_stop  | varchar(50)  | YES  |    | NULL     |                |
| acctinputoctets | bigint        | YES  |    | NULL     |                |
| acctoutputoctets | bigint        | YES  |    | NULL     |                |
| calledstationid | varchar(50)   | NO   |    |          |                |
| callingstationid | varchar(50)  | NO   |    |          |                |
| acctterminatecause | varchar(32) | NO   |    |          |                |
| servicetype     | varchar(32)   | YES  |    | NULL     |                |
| framedprotocol  | varchar(32)   | YES  |    | NULL     |                |
| framedipaddress | varchar(15)   | NO   | MUL |          |                |
| framedipv6address | varchar(45)  | NO   | MUL |          |                |
| framedipv6prefix | varchar(45)  | NO   | MUL |          |                |
| framedinterfaceid | varchar(44)  | NO   | MUL |          |                |
| delegatedipv6prefix | varchar(45) | NO   | MUL |          |                |
+-----+-----+-----+-----+-----+-----+
28 rows in set (0.00 sec)
```

```
***** 14. row *****
radacctid: 6497962
acctsessionid: 6c113103
acctuniqueid: 859f7f7bdc6f97dce087bf29458e55
username: release14.kneg11@mt-metro
realm:
nasipaddress: 10.200.10.10
nasportid: 113103
nasporttype: Ethernet
acctstarttime: 2024-09-23 13:51:10
acctupdatetime: 2024-09-25 13:46:10
acctstoptime: 2024-09-25 13:51:10
acctinterval: 300
acctsessiontime: 172800
acctauthentic: RADIUS
connectinfo_start: 1000000000
connectinfo_stop: 1000000000
acctinputoctets: 3130391909
acctoutputoctets: 92160543099
calledstationid:
callingstationid: 2c:c8:1b:c1:89:e8
acctterminatecause: Session-Timeout
servicetype: Framed-User
framedprotocol: PPP
framedipaddress: 42.240.126
framedipv6address:
framedipv6prefix:
framedinterfaceid:
delegatedipv6prefix:
***** 15. row *****
radacctid: 6512318
acctsessionid: df225568
acctuniqueid: 6c1c4843159eb2315c0e599e51aa58e1
username: release14.kneg11@mt-metro
realm:
nasipaddress: 10.200.10.10
nasportid: 225568
nasporttype: Ethernet
acctstarttime: 2024-09-25 13:51:12
acctupdatetime: 2024-09-26 08:06:12
acctstoptime: NULL
acctinterval: 300
acctsessiontime: 65700
acctauthentic: RADIUS
connectinfo_start: 1000000000
connectinfo_stop:
acctinputoctets: 1197546107
acctoutputoctets: 31326666969
calledstationid:
callingstationid: 2c:c8:1b:c1:89:e8
acctterminatecause:
servicetype: Framed-User
framedprotocol: PPP
framedipaddress: 42.240.126
framedipv6address:
framedipv6prefix:
framedinterfaceid:
delegatedipv6prefix:
```

CGNAT or NAT?

We already have prebuilt support for:

- A10
- Cisco
- Juniper
- Huawei
- NetElastic
- NFWare
- Fortigate
- Mikrotik
- and few others...

```
nat log server 0 type syslog ip 172.16.1.1 port 32781
nat log server 1 type netflow ip 172.16.1.2 port 9555
nat log server 2 type netflow ip 172.16.1.1 port 515
nat log server 3 type syslog ip 172.16.1.17 port 9556
nat log type session enable
nat log type session-64 enable
nat log enable
```

Total number of sessions: 75*10^6

NAT44: 4.5 mcps
NAT64: 3.6 mcps

```
NAT01-200G# show memory dataplane pools
-----
Statistics for Socket 0
-----

```

	Total	Used	Free	Drops	Load
Subscribers	2019968	63622	1956346	0	3.1%
Mappings	80019968	63622	79956346	0	0.1%
Sessions	80019968	76171857	3848111	0	95.2%
Fragments	65536	0	65536	0	0.0%
Pending Fragments	1024	0	1024	0	0.0%

```
-----
Statistics for Socket 1
-----

```

	Total	Used	Free	Drops	Load
Subscribers	2019968	136379	1883589	0	6.8%
Mappings	80019968	136379	79883589	0	0.2%
Sessions	80019968	73828143	6191825	0	92.3%
Fragments	65536	0	65536	0	0.0%
Pending Fragments	1024	0	1024	0	0.0%

```
-----
NAT01-200G# start-shell bash
admin@NAT01-200G:~$ bc -l
bc 1.07.1
Copyright 1991-1994, 1997, 1998, 2000, 2004, 2006, 2008, 2012-2017 Free Software Foundation, Inc.
This is free software with ABSOLUTELY NO WARRANTY.
For details type 'warranty'.
76171857*73828143
150000000
admin@NAT01-200G:~$ exit
NAT01-200G# show nat counters vrf ixia
-----
Counter          Current          Limit (Load)
-----
Active Subscribers 100000          0 ( 0%)
Address Map Entries 0               0 ( 0%)
Port Map Entries 100000         0 ( 0%)
Session Entries 75000000       0 ( 0%)
Pending Fragments 0               0 ( 0%)
-----
NAT01-200G# show nat64 counters vrf ixia
-----
Counter          Current          Limit (Load)
-----
Active Subscribers 100000          0 ( 0%)
Address Map Entries 0               0 ( 0%)
Port Map Entries 100000         0 ( 0%)
Session Entries 75000000       0 ( 0%)
Pending Fragments 0               0 ( 0%)
-----
```

A10 Merged Session

A10 Thunder has a great built-in feature - for others **Encryptnet does it inline.**

- Feature is stable from release 4.1.4-GR1-P5

Merged Session Log

Whenever a CGN session was created, a corresponding log message is generated. When the session was deleted, then another corresponding log message is generated. To save database space, you can merge both session creation and session deletion logs into one. The merged session log is supported for all formats.

When the option to merge session logs is enabled, ACOS generates a log message when the session is deleted. There is a chance that ACOS performance may be reduced as the session creation timestamp will be stored on the ACOS device until the log is created. ACOS syncs the session creation timestamp with VRRP-A so that when the active CGN fails and the session is deleted, the log message will still be generated.

Configuring Merged Session Logs

To configure a merged session log, enter the following command at the NAT logging template level:

```
log sessions merged-style
```

To configure a merged session log for Fixed-NAT, enter the following command at the NAT logging template level:

```
log fixed-nat sessions merged-style
```

For the list of example log outputs of merged session logs, see ["Merged Session Log Samples" on page 132](#).

Merged Session Log Samples

For details on how to configure merged session log, see ["Merged Session Log" on page 31](#).

Below are some sample outputs of merged session logs:

Compact Logging

A sample compact log message with a merged session creation and session deletion is shown below:

```
LOCAL0.DEBUG: Sep 18 14:25:18.68 Sep 18 14:25:22.68 AX3030 I: 5101016b:37d6-5001016e:0, 5001016e:0-5001011f:37d6
```

Default Logging

A sample default log message with a merged session creation and session deletion is shown below:

```
LOCAL0.DEBUG: Sep 18 14:25:36.67 Sep 18 14:25:40.66 AX3030 NAT-ICM: 81.1.1.107:14296<-->80.1.1.110:0, 80.1.1.110:0<-->80.1.1.31:14296
```

RFC5424 Logging

A sample RFC5424 log message with a merged session creation and session deletion is shown below:

```
LOCAL0.DEBUG: 1 2014-09-18T14:25:45.22+01:00 2014-09-18T14:25:51.22+01:00 192.168.105.132 AX3030 - SessionDeleted:ICMP [- 81.1.1.107 14297 - 80.1.1.110 0 - 80.1.1.110 0 - 80.1.1.31 14297]
```

Custom Logging

A sample custom log message, using the NAT logging template custom header for syslog messages, with a merged session creation and session deletion is shown below:

```
LOCAL0.DEBUG: 1 2014-09-18T14:25:27.83+01:00 2014-09-18T14:25:31.83+01:00 192.168.105.132 AX3030 - Session:ICMP 81.1.1.107:14295 80.1.1.110:0
```

**OK, so how does DR config
look on our end?**

Engines and revisions

Engines definitions

Id	Name	Path	Latest version	Tags	Source Type	Runtime group	Has draft	Autostart	Business Unit
89	Record logic phone	/record-logic-phone	36	Data Retention	HttpEngineRevisionSource	DEFAULT	Has draft	Autostart	INTERNAL - Initial BU
<p>Revision: 37 Id: 368 Type: JSON Path: /record-logic-phone Method: POST Source Type: HttpEngineRevisionSource Last Update On: 24.06.2024 / 08:47:44 (ivicabelic)</p> <p>Revision: 36 Id: 324 Type: JSON Path: /record-logic-phone Method: POST Source Type: HttpEngineRevisionSource Last Update On: 19.06.2024 / 10:14:34 (ivicabelic)</p> <p>Revision: 35 Id: 322 Type: JSON Path: /record-logic-phone Method: POST Source Type: HttpEngineRevisionSource Last Update On: 19.06.2024 / 09:32:57 (ivicabelic)</p>									
90	postprocess phone	/dataRetention/postprocessPhone	23	Phone, Data Retention	HttpEngineRevisionSource	DEFAULT			INTERNAL - Initial BU
91	Insert list - logic phone	/record-logic-phone	7	Data Retention	HttpEngineRevisionSource	DEFAULT			INTERNAL - Initial BU
92	Update list - logic phone	/record-logic-phone	3	Data Retention	HttpEngineRevisionSource	DEFAULT			INTERNAL - Initial BU
93	Record internet phone	/record-logic-internet	4	Data Retention	HttpEngineRevisionSource	DEFAULT			INTERNAL - Initial BU
94	Insert list - logic internet	/record-logic-internet	1	Data Retention	HttpEngineRevisionSource	DEFAULT			INTERNAL - Initial BU
95	Update list - logic internet	/record-logic-internet	1	Data Retention	HttpEngineRevisionSource	DEFAULT			INTERNAL - Initial BU
118	doSubscriber	doSubscriber	9	Data Retention, gogo	HttpEngineRevisionSource	DEFAULT			INTERNAL - Initial BU
119	[DR] [MTNET] import internet usages	/dr/import/usage/internet	17	Data Retention	HttpEngineRevisionSource	DEFAULT			INTERNAL - Initial BU
<p>Revision: 17 Id: 438 Type: JSON Path: /dr/import/usage/internet Method: POST Source Type: HttpEngineRevisionSource Last Update On: 26.08.2024 / 18:55:15 (iponudic)</p>									

- Dashboard
- Diagnostics
- Configuration Management
- Calls Definition
- Adapters Definition
- Data Source
- JDBC Operation
- FTP
- Authentications
- Email
- Engines Definition

Revision Details

ID: 438 Engine ID: 119 Revision: 17

Comment:

Autostart Verbose Troubleshooting

Help page URL:

Runtime Group: **DEFAULT** Excluded Variables:

Source Type: **Http Engine Revision Source**

Request Path: **/dr/import/usage/internet** Variable Name: **request**

Methods: **POST** Types: **JSON** Last Modified: 26.08.2024 / 18:55:15 (iponudic)

Error Handler

Drag and drop adapter

Authentication List

+

Configuration management

0 ID: 63 revision: 1 Verbose Troubleshooting

Name: [DR] MTNET InternetUsage maxId maxOrigId Variable mapping

Comment:

1 Verbose Troubleshooting

Expression: maxIds[0].maxId Variable Name: maxId

2 Verbose Troubleshooting

Expression: maxIds[0].maxOriginalId Variable Name: maxOriginalId

3 Verbose Troubleshooting

Static Variable: 0 Variable Name: processed

4 Verbose Troubleshooting

Static Variable: 3000 Variable Name: recordLimit

5 Verbose Troubleshooting

- Dashboard
- Diagnostics
- Configuration Management
- Calls Definition
- Adapters Definition
- Data Source
- JDBC Operation
- FTP
- Authentications
- Email
- Engines Definition
- Business Units
- Tags Management
- Roles
- System Management
- Libraries
- jdjurici
- Logout
- Language English (US)
- Admin Version: 2.5.16

6.X.1
ID: 63
revision: 12
Verbose Troubleshooting

Name: [DR] NAServiceUsage mapper
Comment:

Variable mapping

<input type="text" value="inputRecordList"/>	<input type="text" value="inputLimit"/>	<input type="text" value="id"/>
--	---	---------------------------------

inputRecordList

inputLimit

id

Variable Name

mapperResult

6.X.2
ID: 64
revision: 3
Verbose Troubleshooting

Name: [DR] MTNET insert NAServiceUsage bulk
Comment:

Variable mapping

<input type="text" value="__BATCH"/>		
--------------------------------------	--	--

__BATCH

Variable Name

insertInternetUsages

6.X.3
Verbose Troubleshooting

Expression

Variable Name

continue

6.X.4

Condition

WHEN

6.X.4.0

Expression

6.X.4.0.0
Verbose Troubleshooting

Expression

6.X.4.0.1
Verbose Troubleshooting

Expression

Variable Name

maxId

Variable Name

maxOriginalId

6.X.4.1

OTHERWISE

no items to show

6.X.5
Verbose Troubleshooting

Expression

Variable Name

processed

6.X.6

Condition

Engines definitions

Id | Name | Path | Latest version | Tags: Data Retention | Source Type | Runtime group | Has draft | Autostart | Business Unit

Id	Name	Path	Latest version	Has draft	Autostart	Help page	Comment	Path	Runtime group	Tags	Business Unit
127	Process Request Data	/processRequestData	19	<input type="checkbox"/>	<input checked="" type="checkbox"/>			/processRequestData	DEFAULT	Data Retention, DR_message	INTERNAL - Initial BU
128	[DR] [MTNET] import phone usages		8	<input type="checkbox"/>	<input type="checkbox"/>				DEFAULT	Data Retention	INTERNAL - Initial BU
132	Network Access Data Request	/network-access-data	57	<input type="checkbox"/>	<input type="checkbox"/>		xml	/network-access-data	DEFAULT	Data Retention, DR_message	INTERNAL - Initial BU

Revision: 57
 Id: 748
 Type: XML
 Path: /network-access-data
 Method: POST
 Source Type: HttpEngineRevisionSource
 Last Update On: 25.09.2024 / 16:05:19 (ivicabelic)

CREATE DRAFT DEPLOY UNDEPLOY DOWNLOAD CLONE

Autostart

Revision: 56
 Id: 746
 Type: XML
 Path: /network-access-data
 Method: POST
 Source Type: HttpEngineRevisionSource
 Last Update On: 25.09.2024 / 16:03:07 (ivicabelic)

CREATE DRAFT DEPLOY DOWNLOAD CLONE

Autostart

Revision: 55
 Id: 744
 Type: XML
 Path: /network-access-data
 Method: POST
 Source Type: HttpEngineRevisionSource
 Last Update On: 25.09.2024 / 15:55:37 (ivicabelic)

CREATE DRAFT DEPLOY DOWNLOAD CLONE

Autostart

Revision: 54
 Id: 741
 Type: XML
 Path: /network-access-data
 Method: POST
 Source Type: HttpEngineRevisionSource
 Last Update On: 25.09.2024 / 15:52:14 (ivicabelic)

CREATE DRAFT DEPLOY DOWNLOAD CLONE

Autostart

Revision: 53
 Id: 739
 Type: XML
 Path: /network-access-data
 Method: POST
 Source Type: HttpEngineRevisionSource
 Last Update On: 25.09.2024 / 15:43:58 (ivicabelic)

CREATE DRAFT DEPLOY DOWNLOAD CLONE

Autostart

Revision: 52
 Id: 737
 Type: XML
 Path: /network-access-data
 Method: POST
 Source Type: HttpEngineRevisionSource
 Last Update On: 25.09.2024 / 15:42:14 (ivicabelic)

CREATE DRAFT DEPLOY DOWNLOAD CLONE

Autostart

Revision: 51
 Id: 735
 Type: XML
 Path: /network-access-data
 Method: POST
 Source Type: HttpEngineRevisionSource
 Last Update On: 25.09.2024 / 15:37:00 (ivicabelic)

CREATE DRAFT DEPLOY DOWNLOAD CLONE

Autostart

Revision: 50
 Id: 733

CREATE DRAFT DEPLOY DOWNLOAD CLONE

Autostart

Revision Details

ID: 611 Engine ID: 140 Revision: 2

Comment Verbose Troubleshooting

Help page URL:

Runtime Group: DEFAULT Excluded Variables:

Source Type: Internal Engine Revision Source

Input fields

Field name: record

Error Handler

Drag and drop adapter

Authentication List

Configuration management

0 Verbose Troubleshooting

Static Variable

```
{ "version": "1.0", "encoding": "utf-8", "standalone": "no" }
```

Variable Name: xmlAttributes

1 Verbose Troubleshooting

Static Variable

```
{ "xmlns:xsi": "http://www.w3.org/2001/XMLSchema-instance" }
```

Variable Name: rootAttributes

2 ID: 71 revision: 1 Verbose Troubleshooting

Name: to XML

Comment:

Variable mapping: data

data: #fromJson(#toJson(record))

Variable Name: response2

3 ID: 69 revision: 1 Verbose Troubleshooting

Name: json to xml

Comment:

Variable mapping: rootAttributes xmlAttributes jsonObject

rootAttributes: rootAttributes

xmlAttributes: xmlAttributes

jsonObject: #fromJson(#toJson(record))

Variable Name: result

**OK, so we will develop
it ourselves...**



Not saying it is impossible, however...

- You will require Low level developers or be one yourself
- Understand low level networking and protocols, get familiar with ETSI, IETF, RFC, ASN.1, fragmentation, encryption...
- **Network speeds are increasing, PPS is getting crazy, you will need to learn Vector Packet Processing models**
- Be ready to spend years implementing and debugging something that is not your core business
- Figure out deduplication and decapsulation
- Be ready to deal with different network vendors and their problems and their view on implementations ;) Iskratel and Mikrotik we love you, but please ;)
- You will have to think about multi-tenancy since EU is getting ready to share it across borders
- It is almost impossible to test LEA endpoints for receiving HI2 and HI3 data. You better be 100% sure you are compliant
- **Cost will negate any gain. Our products start at 225 EUR per month! Even our most expensive package is still less than 1 developer salary per month!**
- There is an added value – with our know-how, we build configurations and deployments for you.

**We are too small – No
one will know**



Law is law, and fine is a penalty

- Fines defined are usually hefty for non-compliance and for some they include daily penalties for non-compliance until you become compliant
- In many countries there is jail time for Company decision makers
- Do you really want to risk your business or potentially jail time if you can solve it with a monthly subscription fee.
 - **We understand how it was;** it was unattainable for small and medium sized ISP/Telcos, prices ran from couple of hundred thousand EUR to millions for the system
 - Support alone for some of our customers was running at 2mil USD annually - there are very few ISPs that can look at that and say it's cost of business – **it doesn't have to be anymore:**

MICRO	SMALL	MEDIUM	LARGE	XXL
2.5 Gbps VOICE + DATA	5 Gbps VOICE + DATA	10 Gbps VOICE + DATA	20 Gbps VOICE + DATA	30 Gbps VOICE + DATA
€225,00 € 2.700,00 per year when paid upfront	€333,33 € 4.000,00 per year when paid upfront	€625,00 € 7.500,00 per year when paid upfront	€891,67 € 10.700,00 per year when paid upfront	€1.166,67 € 14.000,00 per year when paid upfront
GET STARTED	GET STARTED	GET STARTED	GET STARTED	GET STARTED
Optional: DATA RETENTION 800,00 EUR/per year	Optional: DATA RETENTION 1.000,00 EUR/per year	Optional: DATA RETENTION 1.750,00 EUR/per year	Optional: DATA RETENTION 4.000,00 EUR/per year	Optional: DATA RETENTION 4.000,00 EUR/per year
ENCRYPTED LEA LINK 375,00 EUR/per year	ENCRYPTED LEA LINK 600,00 EUR/per year	ENCRYPTED LEA LINK 1.300,00 EUR/per year	ENCRYPTED LEA LINK 3.000,00 EUR/per year	ENCRYPTED LEA LINK 3.000,00 EUR/per year



encryptnet.io

We are in it since 2012



Actually, we are closely observing it since **2005**, and this is our **ONLY** thing.

We know and understand the real effort required to implement it.

More importantly – standards are changing, evolving. New requirements are coming, DPI is almost there, end-user bandwidth is increasing day by day.

LEAs don't want to receive all your user data traffic, they don't care about Netflix, Prime, YouTube video, Facebook video. It's encrypted, "empty" bandwidth and LEA have to deliver all this data as evidence to courts.

TrafficPolicyObject is being pushed in newer revisions. For now, it is about filtering out unwanted traffic based on netmasks, but soon this will change to **Application based filtering** since IPs are useless.

**Don't take our
word for it**

TrafficPolicyObject

```

H11Message Payload RequestPayload ActionRequest CREATE HI1Object
5 <CountryCode>XX</CountryCode>
6 <UniqueIdentifier>ACTOR01</UniqueIdentifier>
7 </SenderIdentifier>
8 <ReceiverIdentifier>
9 <CountryCode>XX</CountryCode>
10 <UniqueIdentifier>ACTOR02</UniqueIdentifier>
11 </ReceiverIdentifier>
12 <TransactionIdentifier>c02358b2-76cf-4ba4-a8eb-f6436ccaa8eb</TransactionIdentifier>
13 <Timestamp>2022-07-01T12:00:00.000000Z</Timestamp>
14 <Version>
15 <ETSIVersion>V1.13.1</ETSIVersion>
16 <NationalProfileOwner>XX</NationalProfileOwner>
17 <NationalProfileVersion>v1.0</NationalProfileVersion>
18 </Version>
19 </Header>
20 <Payload>
21 <RequestPayload>
22 <ActionRequests>
23 <ActionRequest>
24 <ActionIdentifier>0</ActionIdentifier>
25 <CREATE>
26 <HI1Object xsi:type="policy:TrafficRuleObject">
27 <ObjectIdentifier>f69eb93b-a85b-4ff7-abaa-6f3aead286d5</ObjectIdentifier>
28 <CountryCode>XX</CountryCode>
29 <OwnerIdentifier>ACTOR01</OwnerIdentifier>
30 <policy:Criteria>
31 <policy:Criteria>
32 <policy:IPPolicyCriteria>
33 <policy:SourceIPRange>
34 <etsi:IPv4CIDR>203.0.113.0/24</etsi:IPv4CIDR>
35 </policy:SourceIPRange>
36 </policy:IPPolicyCriteria>
37 </policy:Criteria>
38 </policy:Criteria>
39 <policy:Action>
40 <common:Owner>ETSI</common:Owner>
41 <common:Name>PolicyAction</common:Name>
42 <common:Value>PDSR</common:Value>
43 </policy:Action>
44 </HI1Object>
45 </CREATE>
46 </ActionRequest>
47 <ActionRequest>
48 <ActionIdentifier>1</ActionIdentifier>
49 <CREATE>
50 <HI1Object xsi:type="policy:TrafficPolicyObject">
51 <ObjectIdentifier>55e25c0a-787b-4049-b7fb-518a13a9483b</ObjectIdentifier>
52 <CountryCode>XX</CountryCode>
53 <OwnerIdentifier>ACTOR01</OwnerIdentifier>
54 <policy:TrafficPolicyName>Template Rule 1</policy:TrafficPolicyName>
55 <policy:TrafficRules>
56 <policy:TrafficRuleReference>
57 <policy:Order>1</policy:Order>
58 <policy:ObjectIdentifier>f69eb93b-a85b-4ff7-abaa-6f3aead286d5</policy:ObjectIdentifier>
59 </policy:TrafficRuleReference>
60 </policy:TrafficRules>
61 </HI1Object>
62 </CREATE>
63 </ActionRequest>
64 <ActionRequest>
65 <ActionIdentifier>1</ActionIdentifier>
66 <UPDATE>
67 <HI1Object xsi:type="task:LITaskObject">
68 <ObjectIdentifier>2b36a78b-b628-416d-bd22-404e68a0cd36</ObjectIdentifier>
69 <task:ListOfTrafficPolicyReferences>
70 <task:TrafficPolicyReference>
71 <task:Order>1</task:Order>
72 <task:ObjectIdentifier>f69eb93b-a85b-4ff7-abaa-6f3aead286d5</task:ObjectIdentifier>
73 </task:TrafficPolicyReference>
74 </task:ListOfTrafficPolicyReferences>
75 </HI1Object>
76 </UPDATE>
77 </ActionRequests>
78 </RequestPayload>
79 </Payload>

```

Mark our words, **DPI** is already here.

```

---
336 <Dictionary>
337 <!--TrafficAction: see Clause 7.6.3 Table 7.25-->
338 <Owner>ETSI</Owner>
339 <Name>TrafficAction</Name>
340 <DictionaryEntries>
341 <DictionaryEntry>
342 <Value>PDSR</Value>
343 <Meaning>Traffic that matches this policy is delivered as Packet Data Summary Reports</Meaning>
344 </DictionaryEntry>
345 <DictionaryEntry>
346 <Value>PDHR</Value>
347 <Meaning>Traffic that matches this policy is delivered as Packet Data Header Reports</Meaning>
348 </DictionaryEntry>
349 <DictionaryEntry>
350 <Value>NotDelivered</Value>
351 <Meaning>Traffic that matches this policy is not delivered</Meaning>
352 </DictionaryEntry>
353 <DictionaryEntry>
354 <Value>Delivered</Value>
355 <Meaning>Traffic that matches the policy is delivered</Meaning>
356 </DictionaryEntry>
357 <DictionaryEntry>
358 <Value>Truncate</Value>
359 <Meaning>Deliver only the specified number of the first octets of each datagram</Meaning>
360 </DictionaryEntry>
361 </DictionaryEntries>
362 </Dictionary>

```

**Don't take our
word for it**

Some Statistics

Bills (Current Period) Previous Period + Add Bill

pro-ping:data All Types User Search

Billing name: **pro-ping:data:tier:li:hr:encryptnet.io** CDR 95th 30Gbps 54.5Gbps 24.5Gbps 181.79% 0% Edit Reset Delete

1st September 2024 to 30th September 2024

li:pro-ping:hr:encryptnet.io

One of our smaller customers

- Over 7million PPS and over 55Gbps
 - Averaged out, bursts are going over 12million PPS!
 - half **WISP** half **FISP**
- There is some duplicated data present, so think about how will you handle it :)
- CGNAT is over 100GB daily – **MERGED**



Bills (Current Period) Previous Period Add Bill

signum:voice All Types User Search

Billing name

[::signum:voice:tier:li:hr:encryptnet.io](#)

1st September 2024 to 30th September 2024

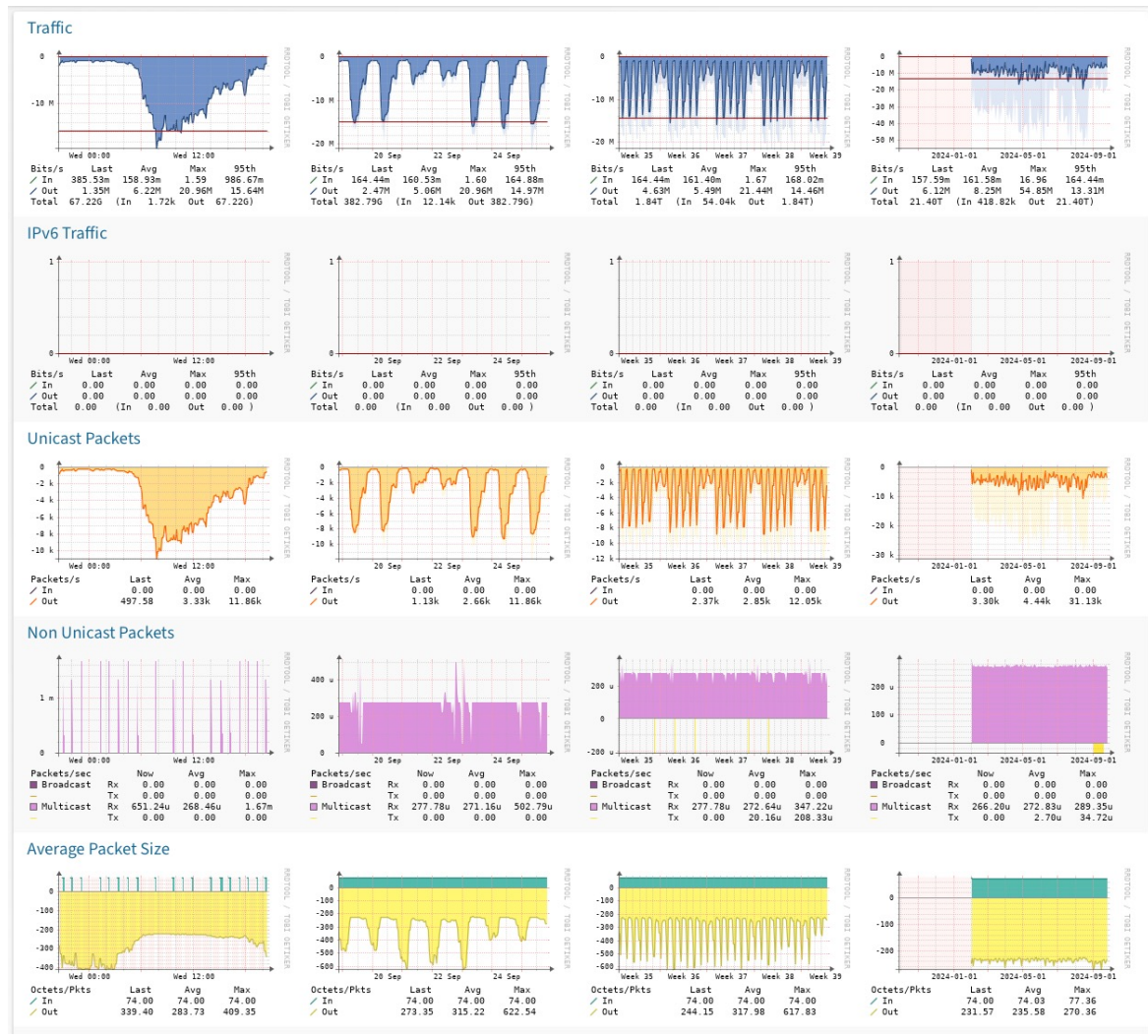
[::li:signum:hr:encryptnet.io](#)

Type	Allowed	Used	Oversage
CDR 95th	25Mbps	15.4Mbps	-

61.78% 38.22% Edit Reset Delete

Our smallest customer

- only voice, no data



Bills (Current Period) Previous Period Add Bill

signum:voice All Types User Search

Billing name Type Allowed Used Overusage

signum:voice:tier:li:hr:encryptnet.io CDR 95th 25Mbps 15.4Mbps - 61.78% 38.22% Edit Reset Delete

1st September 2024 to 30th September 2024

li:signum:hr:encryptnet.io

Our smallest customer

- sending us **duplicate data** – 3 packets out, 2 packets in
- **deduplication** required

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0x7c1a, seq=0/0, ttl=62 (no response found!)
2	0.000017	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0x7c1a, seq=0/0, ttl=61 (no response found!)
3	0.000021	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0x7c1a, seq=0/0, ttl=61 (no response found!)
4	0.000034	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0x7c1a, seq=0/0, ttl=60 (reply in 5)
5	0.022697	52.59.189.32	92.242.240.126	ICMP	102	Echo (ping) reply id=0x7c1a, seq=0/0, ttl=56 (request in 4)
6	0.022715	52.59.189.32	92.242.240.126	ICMP	102	Echo (ping) reply id=0x7c1a, seq=0/0, ttl=55
7	2.033121	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0x7c1a, seq=1/256, ttl=62 (no response found!)
8	2.033136	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0x7c1a, seq=1/256, ttl=61 (no response found!)
9	2.033136	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0x7c1a, seq=1/256, ttl=61 (no response found!)
10	2.033153	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0x7c1a, seq=1/256, ttl=60 (reply in 11)
11	2.055851	52.59.189.32	92.242.240.126	ICMP	102	Echo (ping) reply id=0x7c1a, seq=1/256, ttl=56 (request in 10)
12	2.055867	52.59.189.32	92.242.240.126	ICMP	102	Echo (ping) reply id=0x7c1a, seq=1/256, ttl=55

```
##
## Traffic map connection configurations
##
map alias voip-signum
type regular byRule
roles replace admin to owner_roles
comment " "
rule add pass ipsrc [redacted] 255.255.255.255 ipver 4 macsrc bc:24:11:50:b3:c1 ff:ff:ff:ff:ff:ff protocol udp comment ::signum-mor-master
rule add pass ipdst [redacted] 255.255.255.255 ipver 4 macdst bc:24:11:50:b3:c1 ff:ff:ff:ff:ff:ff protocol udp comment ::signum-mor-master
rule add pass ipsrc [redacted] 255.255.255.255 ipver 4 macsrc bc:24:11:e1:05:05 ff:ff:ff:ff:ff:ff protocol udp comment ::signum-mor-slave
rule add pass ipdst [redacted] 255.255.255.255 ipver 4 macdst bc:24:11:e1:05:05 ff:ff:ff:ff:ff:ff protocol udp comment ::signum-mor-slave
to 1/1/x1
from 1/1/x12
exit
```

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0xb51b, seq=0/0, ttl=62 (reply in 2)
2	0.022521	52.59.189.32	92.242.240.126	ICMP	102	Echo (ping) reply id=0xb51b, seq=0/0, ttl=55 (request in 1)
3	1.005676	92.242.240.126	52.59.189.32	ICMP	102	Echo (ping) request id=0xb51b, seq=1/256, ttl=62 (reply in 4)
4	1.029015	52.59.189.32	92.242.240.126	ICMP	102	Echo (ping) reply id=0xb51b, seq=1/256, ttl=55 (request in 3)

**Don't take our
word for it**



Some interesting vendor bugs

Mikrotik – bug: SUP-165739

- As of this moment we are still waiting on Mikrotik’s acknowledgment
- We first identified it at one of our customers running NAT on their CCR1072 on September 12, 2024. It took us some time to double check our code and organize packet capture – not easy when you are receiving over 30k events per second!

```
Flow 2
Observation Time Milliseconds: Sep 16, 2024 13:50:33.534000000 CEST
Protocol: UDP (17)
SrcAddr: 100.72.22.29
DstAddr: 142.251.221.99
SrcPort: 49992 (49992)
DstPort: 443 (443)
Post NAT Source IPv4 Address: 5.59.36.29
Post NAT Destination IPv4 Address: 142.251.221.99
Post NATPT Source Transport Port: 49992
Post NATPT Destination Transport Port: 443
Nat Event: NAT44 session create (4)

Flow 3
Observation Time Milliseconds: Sep 16, 2024 13:50:33.534000000 CEST
Protocol: UDP (17)
SrcAddr: 100.72.22.29
DstAddr: 142.251.221.99
SrcPort: 49992 (49992)
DstPort: 443 (443)
Post NAT Source IPv4 Address: 5.59.36.29
Post NAT Destination IPv4 Address: 142.251.221.99
Post NATPT Source Transport Port: 49992
Post NATPT Destination Transport Port: 443
Nat Event: NAT44 session create (4)

Flow 4
Observation Time Milliseconds: Sep 16, 2024 13:50:33.534000000 CEST
Protocol: UDP (17)
SrcAddr: 100.72.22.29
DstAddr: 142.251.221.99
SrcPort: 49992 (49992)
DstPort: 443 (443)
Post NAT Source IPv4 Address: 5.59.36.29
Post NAT Destination IPv4 Address: 142.251.221.99
Post NATPT Source Transport Port: 49992
Post NATPT Destination Transport Port: 443
Nat Event: NAT44 session create (4)

Flow 5
Observation Time Milliseconds: Sep 16, 2024 13:50:33.534000000 CEST
Protocol: TCP (6)
SrcAddr: 100.72.6.98
DstAddr: 3.223.15.108
SrcPort: 1709 (1709)
DstPort: 5222 (5222)
Post NAT Source IPv4 Address: 176.61.153.98
Post NAT Destination IPv4 Address: 3.223.15.108
Post NATPT Source Transport Port: 1709
Post NATPT Destination Transport Port: 5222
Nat Event: NAT44 session create (4)
```

MikroTik support #[SUP-165739]: traffic-flow nat-events duplicate + missing

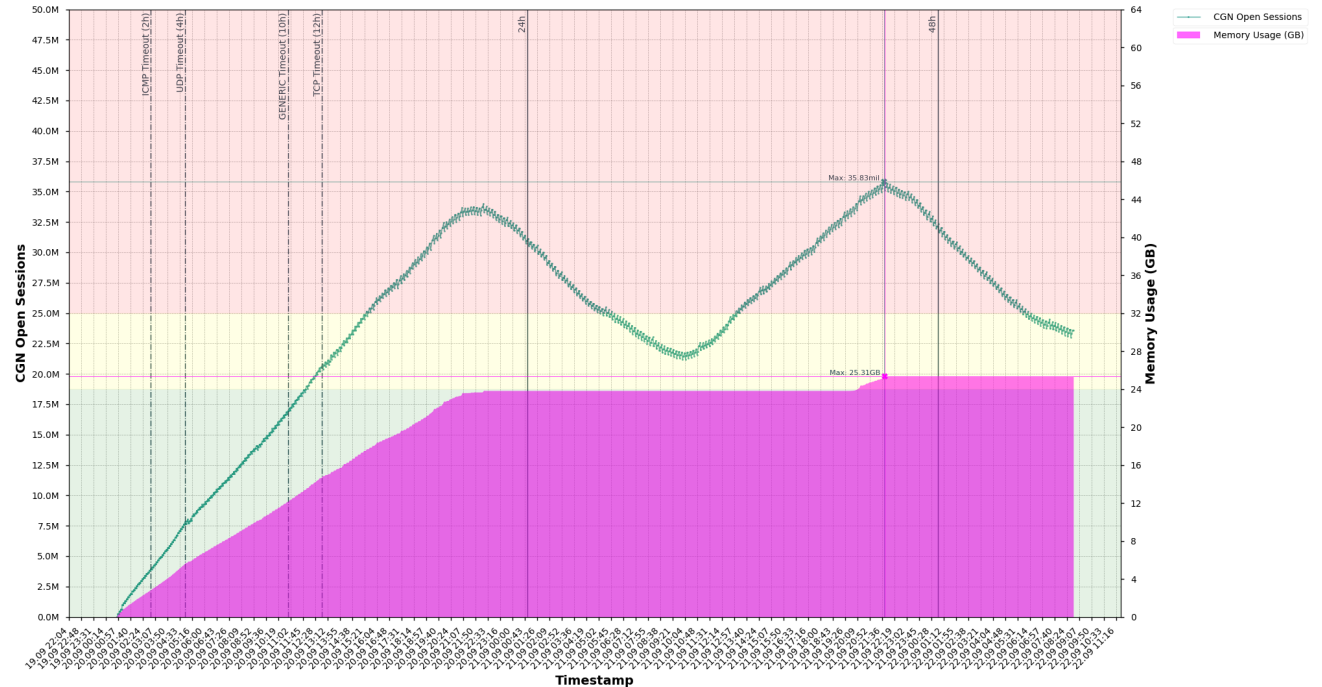


josip.duricic@r14.io (Jira) <support@mikrotik.com>

To: Josip Duricic



Friday, 20 September 2024 at 11:30



Iskratel – bug: R14-220516120

- As of this moment fix is still not confirmed
- We wrote a hotfix for our customer while we wait on Iskratel to fix it
- Issue is with CSEQ not being increased properly – it causes retries on all of their transit vendors, many of them did not work correctly, even our session machine was unable to properly track calls – proving again that you really must know RFCs

Ako pogledas debug ovako je izgledalo za fax:

```
May 16 16:01:15 probe-01 digitalact-collector[30462]: DigitalACT: creating new VOIP session for LIID fax (callID=isbc30258-XF-b20ae9cb-2b4be0754)
May 16 16:01:15 probe-01 digitalact-collector[30462]: DigitalACT: Received 180 or 183
May 16 16:01:15 probe-01 digitalact-collector[30462]: DigitalACT: Before cseq check
May 16 16:01:15 probe-01 digitalact-collector[30462]: DigitalACT: Before while
May 16 16:01:15 probe-01 digitalact-collector[30462]: DigitalACT: Inside while
May 16 16:01:15 probe-01 digitalact-collector[30462]: DigitalACT: Before rtp_stream_announcing
May 16 16:01:15 probe-01 digitalact-collector[30462]: DigitalACT: RTP stream for LIID fax (10.23.168.153:(null))
```

Ovo je bilo za :

```
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: creating new VOIP session for LIID 1230 (callID=isbc19973-RR-b2)
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: Received 180 or 183
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: Before cseq check
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: Before while
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: Before rtp_stream_announcing
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: RTP stream for LIID 1230 ((null):(null))
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: Invalid SIP Packet. Will not log further.
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: Received 180 or 183
May 16 15:58:09 probe-01 digitalact-collector[29790]: DigitalACT: Before cseq check
```

Nakon patcha ovako izgleda. ne vidi se UPDATE jer se poziv ne ostvari, ali sada ulovi uredno zvonjavu, pa prepostavljam da ce raditi:

```
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: creating new VOIP session for LIID 1230 (callID=isbc24264-YG)
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Received 180 or 183
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Before cseq check: 560829015 INVITE == 560829015 INVITE
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Before while
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Before rtp_stream_announcing
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: RTP stream for LIID 1230 ((null):(null))
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Received 180 or 183
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Before cseq check: 560829015 INVITE == 560829015 INVITE
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Before while
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Inside while
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: Before rtp_stream_announcing
May 16 16:45:12 probe-01 digitalact-collector[37377]: DigitalACT: RTP stream for LIID 1230 (10.24.168.153:(null))
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: Collector statistics for the last minute:
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: Packets... captured: 18993 dropped: 0 intercepted: 552
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: Packets sent to IP sync: 0, sent to VOIP sync: 47
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: Bad SIP packets: 0 Bad RADIUS packets: 0
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: Records created... IPCCs: 0 IPIRIs: 0 MobIRIs: 0
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: Records created... IPMMCCs: 552 IPMMIRIs: 12
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: IP intercepts added: 0 (all-time: 0)
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: IP intercepts ended: 0 (all-time: 0)
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: VOIP intercepts added: 0 (all-time: 4)
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: VOIP intercepts ended: 0 (all-time: 0)
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: IP sessions added: 0 (all-time: 0)
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: IP sessions ended: 0 (all-time: 0)
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: VOIP sessions added: 1 (all-time: 5)
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: VOIP sessions ended: 0 (all-time: 0)
May 16 16:45:33 probe-01 digitalact-collector[37377]: DigitalACT: === statistics complete ===
```

Kod je promijenjen za vas, dugorocno nemogu održavati dupli kod pa je preporuka zbog updatea da se fix-a sustav.

Release14

quick overview

Challenges and Considerations

Open discussion

- **Cost:** No ROI just a Regulatory compliance nightmare?
- **Internal know-how:** Hard to find people with necessary skills to manage and run internally + employee security compliance (TS generally required)?
- **Technological Challenges:** encryption, over-the-top services (WhatsApp, Signal), scaling for large datasets, FTTH higher and higher link speeds?
- **Privacy vs. Security:** Balancing the need for surveillance with privacy rights (GDPR concerns, human rights debates)?
- **Evolving Threats:** New technologies like 5G, IoT, and how they complicate LI and DR?
- **Other questions?**

Thank you for your time.



We invite you to visit our booth and see the latest system iteration in person.

Together with Ronog we will be giving away 1 year license at the end of the day to 1 lucky ISP*

info@encryptnet.io

LET



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