

# IPv6 implementation in mobile network Orange Poland

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# IPv6 implementation

- **DualStack**
  - single PDP ipv4v6
  - dual PDP, IPv4 & IPv6  
simultaneously
- **IPv6-only**

# DualStack

## Single PDP IPv4v6

- PROS :
  - 100% Ipv4/Ipv6 content access
  
- CONS :
  - Does not solve IPv4 number problem
  - Roaming issues
  - 2 addresses Ipv4&Ipv6 per one PDP



# DualStack

## Dual PDP IPv4&IPv6

- PROS :
  - 100% Ipv4/Ipv6 content access
  
- CONS :
  - 2 addresses Ipv4&Ipv6 per subscriber
  - 2 PDP's per subscriber
  - High costs
  - Does not solve IPv4 number problem



# IPv6-only - NAT64+DNS64

## IPv6-only PDP

- PROS :
  - One PDP per subscriber
  - IPv6 unlimited capacity
  - Cost effective
  - WP, Symbian, Android supported
  
- CONS :
  - IPv4 literals will not work
  - Authorisation problem



# IPv6-only - CLAT+NAT64+DNS64

## IPv6-only PDP

- PROS :

- One PDP per subscriber
- IPv6 unlimited capacity
- Cost effective
- Solve IPv4 number problem



- CONS :

- Each end device must support CLAT feature
- CLAT+DNS64 - problems with apps where ipv4 literals&domain names are used

# IPv6-only - CLAT+NAT64+DNS-DualStack Orange Poland solution

## IPv6-only PDP

- PROS :
  - resolve issues with apps seen in CLAT/DNS64
  - overall performance better than CLAT/DNS64
- CONS :
  - Each end device must support CLAT feature





# Chapter 4

- **NAT64 box in mobile network**

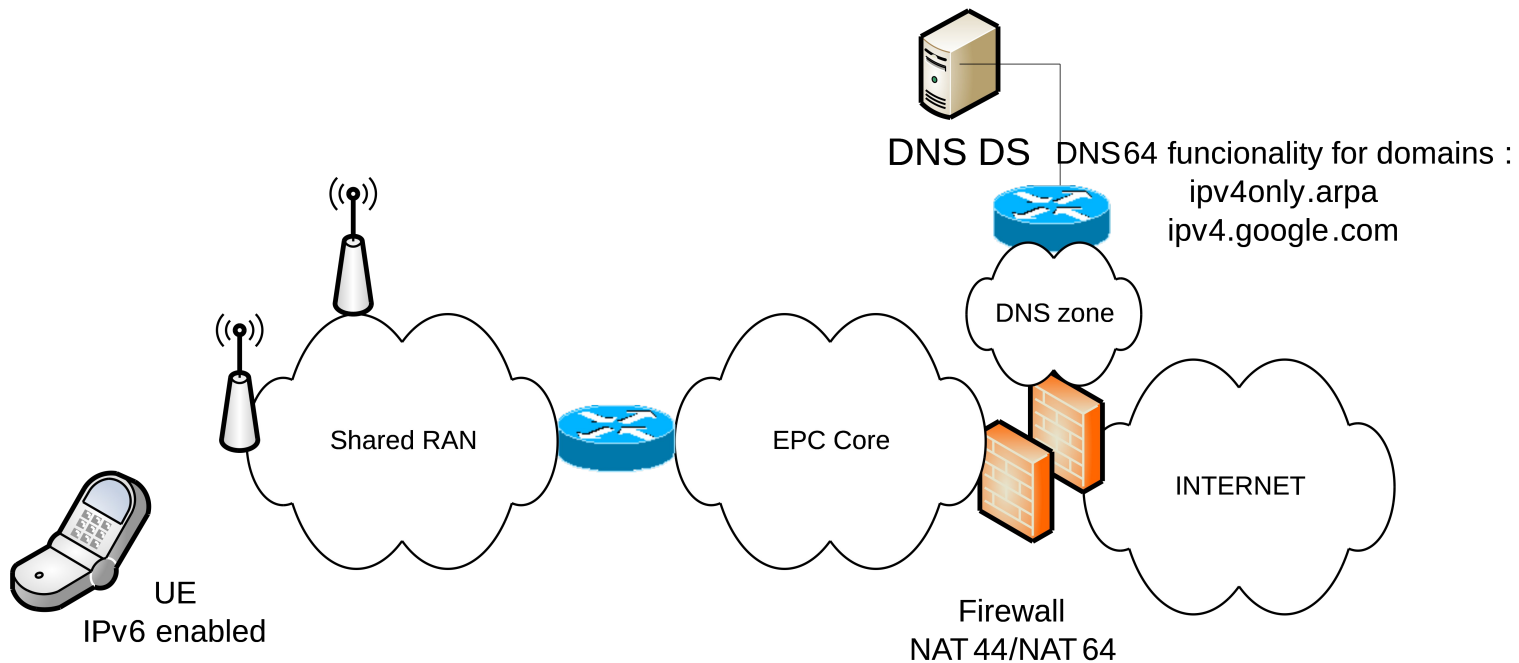
# NAT64 box - needs and issues

- IPv6 fragmentation header added when IPv4 server set DF bit
- Hash algorithm based on IID only
- CLAT-awareness (behavior as NAT44)
- ALGs problems (FTP,RTSP,PPTP)



## NAT64+DNS-DualStack???

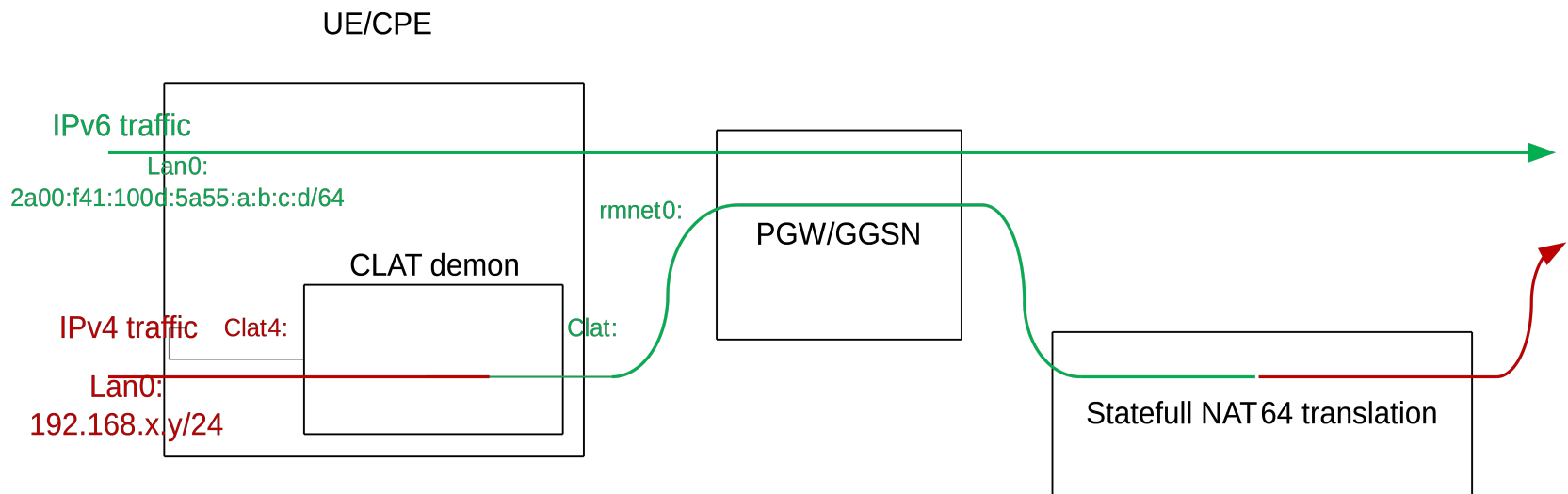
- Anyway we need DNS64 for NAT64 prefix discovery



# Chapter 3

- **Customer side Translator CLAT (RFC6877)**

# Customer side Translator CLAT (RFC6877)



## CLAT function:

- Default IPv4 route
- Stateless NAT46 translation
- IPv4 DNS-proxy

## New version of CLAT

### supports:

- ICMP, UDP, TCP, GRE
- Fragmented packet


# Chapter 4

- **Roaming & IPv6-only**

## Roaming & IPv6-only

- **IPv6 or IPv4v6 is not populated in all roaming partners**
  - IPv4 PDP guarantee failsafe automatic data roaming regardless of visited network
  
- **OPL failsafe mechanism for roaming case**
  - Mechanism works for Android
  - Roaming indicator triggers fallback to ipv4 APN when first one fail (IPv6)
  - When LTE access the first one should never fail □

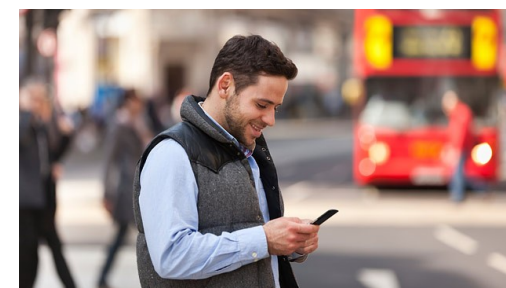
# Roaming & IPv6-only failsafe mechanism

 Informacje o urządzeniu

IMEI: 351869050156192  
Phone number:  
Current network: Telekom.de

Run ping test

Ping IpAddr:  
Ping Hostname(www.google.com):  
HTTP Client test:  
Signal strength: -111 dBm 1 asu  
Location: LAC = 5791 CID = a96a7  
Neighboring CID: unknown  
CellInfo:  
Roaming: Roaming  
GSM service: Działła  
GPRS service: Łączenie  
Network type: UMTS:3  
Message waiting: false  
Call redirect: false  
Call status: Idle  
Radio resets: 0  
Data attempts: 0  
Data successes: 0  
GSM disconnects: =====DATA=====



APN protocol  
IPV6

APN roaming protocol  
IPv4





# Chapter 5

- **Devices**

## IPv6 devices (March 2014)

- **Generic Google devices\***
  - Nexus 5, Nexus 7
- **OPL certified Ipv6 devices**
  - **Xperia Z Family\***
  - **Xperia SP**
  - **\*-latest SW required**



# Orange IPv6 devices

## OPL ipv6 APN configuration

Name:	Orange Internet
MCC/MNC	26003
APN	<b>Internetipv6</b>
Username/password	internet
APN state	readonly
APN protocol	<b>IPV6</b>
APN Protocol when roaming	IPv4
APN type	<b>default</b> , hipri, dun, supl

# Chapter 6

- **Tethering**

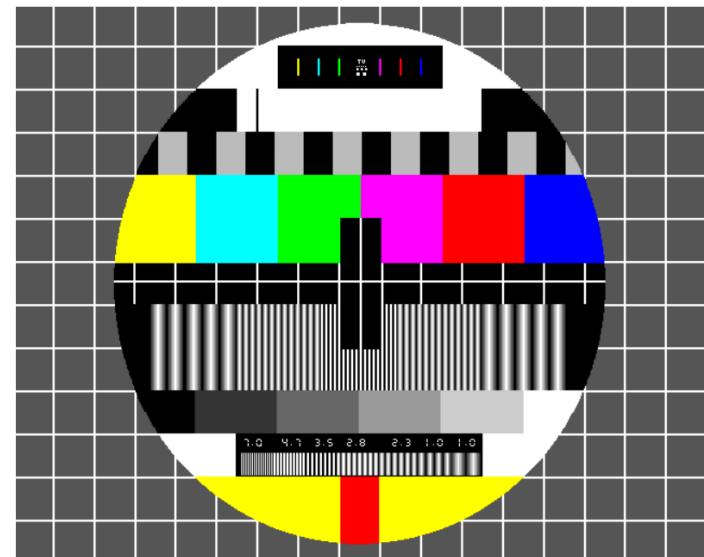
# Live demo

Tethering hotspots

**Voyager1** pass. **1234567890**

**Voyager2** pass. **1234567890**

**Voyager3** pass. **1234567890**



Go to page

[http://www.vyncke.org/countv6/stats  
.php](http://www.vyncke.org/countv6/stats.php)

## Tethering WiFi/USB/BT

- **How to share /64 routed to the Device**
  - **A Single Global Address Assigned to 3GPP Radio and LAN link**

<http://tools.ietf.org/html/draft-ietf-v6ops-64share-09>



### TIPS:

- Send RA messages with IPv6 prefix /64 and set router lifetime to 9000s
- Add directly DNS-DS IPv6 addresses via DHCPv6

# ASCII IPv6 STAR WARS

## EPISODE IV

Open telnet [towel.blinkenlights.nl](http://towel.blinkenlights.nl)

# Chapter 7

- **Orange Poland IPv6 Statistics**



- **Orange Poland Statistics**

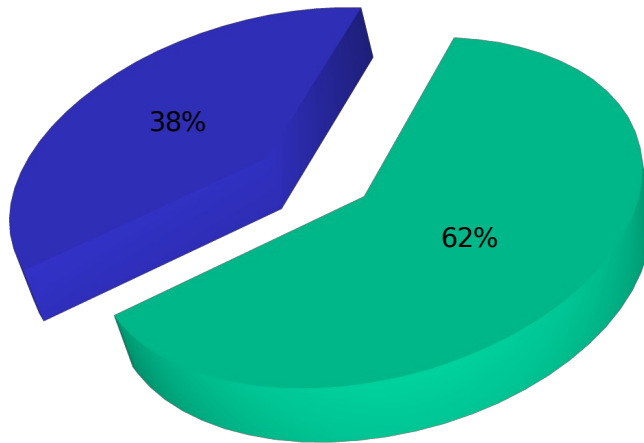
**10%**

**1 % - PDP Ipv6 vs PDP Ipv4  
in OPL mobile network**

# IPv4 & Ipv6 Content summary

■ Native Ipv6 Sessions

■ NAT64 Sessions



# Alexa ranking IPv6 readines Poland top 10

Name	Alexa	Web
 <a href="#">Search Google whois</a>	1/90	 <a href="http://www.google.pl">www.google.pl</a> <a href="https://2a00:1450:4007:803::1017">2a00:1450:4007:803::1017</a> 2011-06-08
 <a href="#">onet.pl</a> <a href="#">More whois</a>	2/191	FAILED
 <a href="#">allegro.pl</a> <a href="#">whois</a>	3/196	FAILED
 <a href="#">wp.pl</a> <a href="#">whois</a>	4/257	FAILED
 <a href="#">kwejk.pl</a> <a href="#">whois</a>	5/356	FAILED
 <a href="#">zippyshare.com</a> <a href="#">whois</a>	6/361	FAILED
 <a href="#">B2C getresponse.com</a> <a href="#">whois</a>	7/382	FAILED
 <a href="#">gazeta.pl</a> <a href="#">More whois</a>	8/443	FAILED
 <a href="#">interia.pl</a> <a href="#">whois</a>	9/741	FAILED
 <a href="#">wiocha.pl</a> <a href="#">whois</a>	10/846	FAILED

# Chapter 8

## • Q&A

thank you

