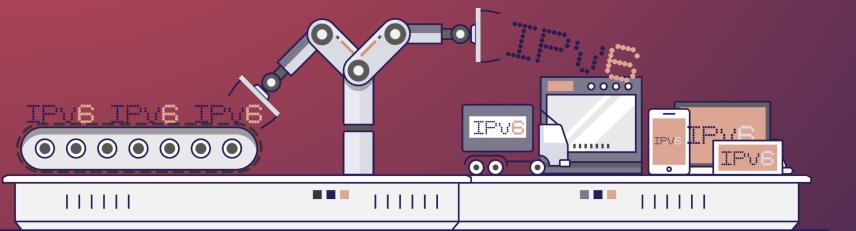


London Nov 28<sup>th</sup> 2022

# IPv6 taskforce FR

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Member, FRANCE IPv6 Taskforce (by ARCEP and ISOC FR)





## What will I address

- ::A ARCEP yearly IPv6 Barometer
- ::B Taskforce
- ::B:1 Handbook
- ::B:2 Next project
- ::D Carrier's choices
- ::E What's next for IPv6?



### ::A ARCEP Annual IPv6 BAROMETER

- Collect KPIs & forecasts
- Fine & granular report
  - Public VS Pro Customers
  - xDSL, Cable, FttH, mobile
  - Android, iPhone, (Both for Data and Tethering/hotspot)
  - Available VS enabled by default
  - IPv4 address sharing policy
  - Top domain AAAA and MX, IPv6 DNS server
- New questions in the next release

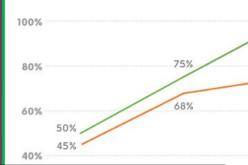


# Some KPIs e.g

#### FIXED NETWORK: PERCENTAGE OF IPv6-ENABLED CUSTOMERS EVOLUTION

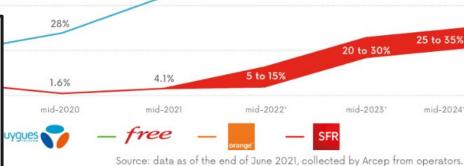
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## MOBILE NETWORK: PERCENTAGE OF IPv6-READY AND IPv6-ENABLED CUSTOMERS EVOLUTION

		bouygues		free		orange"		SFR	
		IPv6- ready	IPv6- enabled	IPv6- ready	IPv6- enabled	IPv6- ready	IPv6- enabled	IPv6- ready	IPv6- enabled
Android	Mid-2019	100%	79%	0%	0%	100%	3%	0%	0%
	Mid-2020	100%	87%	0%	0%	100%	35%	2%	0.2%
	Mid-2021	100%	87%	100%	1%	100%	47%	100%	13%
	Mid-2022*	100%	85-95%	100%	not provided	100%	50-60%	100%	25-35%
	Mid-2023*	100%	85-95%	100%	not provided	100%	60-70%	100%	40-50%
	Mid-2024*	100%	85-95%	100%	not provided	100%	65-75%	100%	60-70%
Android tethering	Mid-2019	100%	79%	0%	0%	0%	0%	0%	0%
	Mid-2020	100%	87%	0%	0%	100%	15%	2%	0.2%
	Mid-2021	100%	87%	100%	1%	100%	35%	100%	13%
	Mid-2022*	100%	85-95%	100%	not provided	100%	40-50%	100%	25-35%
	Mid-2023*	100%	85-95%	100%	not provided	100%	50-60%	100%	40-50%
	Mid-2024*	100%	85-95%	100%	not provided	100%	60-70%	100%	60-70%



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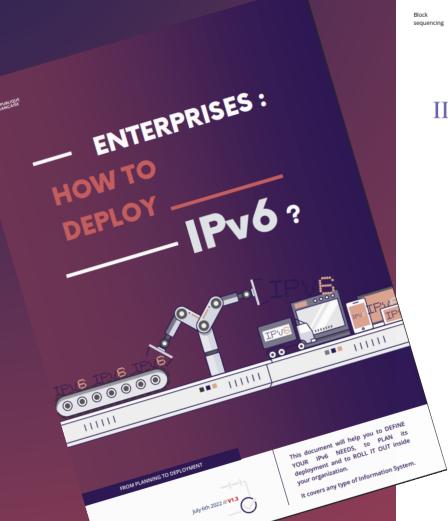
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85 to 95%

90 to 100%

70 to 80%

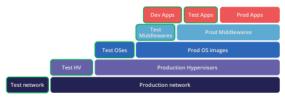
# ::B1 Handbook (124 pages)



# III. Block sequencing

IPv6 deployment is logically to be done starting with the bottom, the network layer. And before any deployment it is coherent to prototype the behavior of each component. Very few organizations have an end-to-end lab and qualification environment, both horizontally within the same layer and vertically between layers. For example, your campus, datacenter and security network prototypes may be managed by different teams and are not interconnected in a topology close to the production one, this is a horizontal break. If a qualification server is running on a network with production routers, we have a vertical break. This makes sense, otherwise how can you debug a problem if all the stack layers are in test, it would look like a multi-level rola-bol.

We will retain that each layer has its own test environments, and that those run on lower layers' production environments. In short, every qualification runs itself on an underlying production environment (except for the foundation that is network). This can be represented as follows:



#### 1. Warm up

Before you even decide where to begin, start by making sure that all of your current and future specifications / RFPs / subcontractors requests include IPv6 compatibility and guarantee its proper functioning. These processes often take a long time to change, so it is advisable to start working on them right away.

This also includes build, run, life cycle processes and everything related to them.

IPv6 Transition Guide | 40

en.arcep.fr/publications/task-force-ipv6.html

Grasp of the sujbect





# What's in ? Double St&ack or lighter :F00D: ?

- Help to know who you need and when
- Choose your path according to your needs
  - Scope, mechanism, process
  - Hiking through layers, in the right order
- Include many advices and best practices
  - Topology
  - Addressing
  - Security



#### Internal DC



- Servers
- VMs
- Containers
- Infra Services
- FW, IPS, SLB,...

DC access & Core NET

В A K В 0 N Ε

#### Partner InterConnect



- Internet (IPsec, TLS,...)
- **Private lines**



Cloud

**BACK HAUL** 

**EDGE** 

**NETW ORKS** 

#### **Remote Workers**



- **VPN Gateways**
- MDM
- Reverse proxies
- **FW**



Home Office

#### Campus



- **Local Services**
- LAN, Wi-Fi
- **FW**

Campus NET







#### Visible ressources



- Reverse proxies
- Front ends
- **SLB**
- DNS, MX
- **FW**



Client

Some edges may be connected to internal DC with a shorter path, Campus may have local breakout internet, possibilities are endless...

Where do you need IPv6?

#### Common internet access



- **Proxies**
- SMTP, DNS
- **FW**



**Various** 

## ::B2 An ADRESS and then?

- Let people use all of IPv6
  - Router cascading with DHCPv6-PD, flush renumbering and many more
  - Port dynamic (PCP) and manual opening (tracking ND changes)
- Let developers try it
  - Provide easy testing connectivity through our next project
  - Check Happy Eyeballs

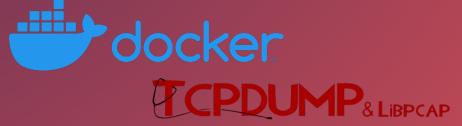
 Today, some consumer products softwares/games are still requesting you to disable IPv6!



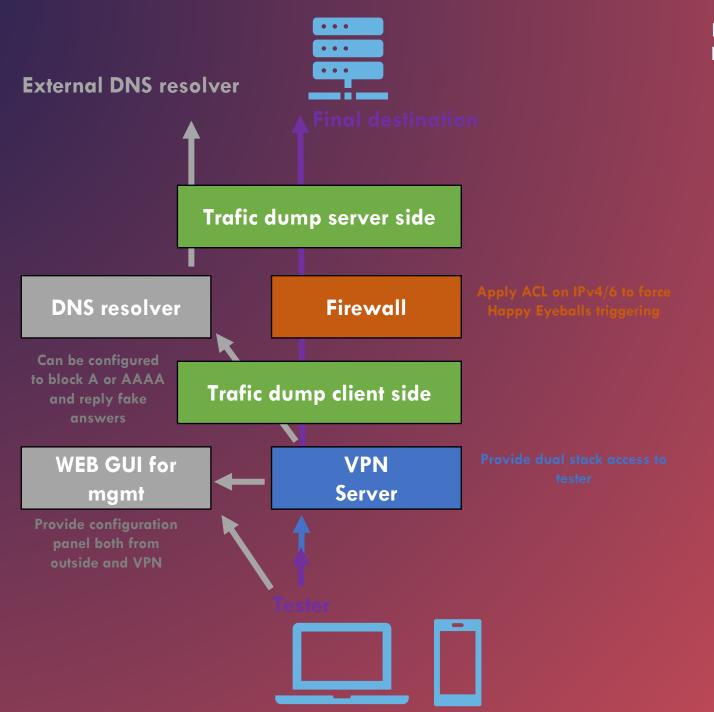
# ::C Taskforce next project Ensure same level user experience

- VPN Docker image to help developers to test IPv6
- Include IPv4/6 and DNS+stack cutoff to trigger Happy-Eyeballs
- Trafic capture included
- Web management portal
- Find compatible hosting services (L3 IP Docker no NAT, DHCP-PD)









Project is PoC candidate for ETSI IPE working group



### ::D Carrier's choices for broadband

- Many different technologies, different paths.
- DS-lite (include NAT44 on core, to avoid)
- Dual-stack and stick with it
- 6rd over IPv4 then dual-stack then 4rd over IPv6
- Dual-stack then MAP-T
- Go stateless, 1 IPv4 < 32 customers</li>
- Offload transition mechanism on CPE



## What's next for IPv6?

- Specialized protocols
  - Transport, routing, higher functions
  - IoT, smart home, ...
- SRv6
  - All in one collapse
  - Carriers, corps, mobiles,...
  - App awareness
  - Already in use in a few places



## :FEED:BAC4::

- Join US
- Send your ideas, new topics to cover
- Translate

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