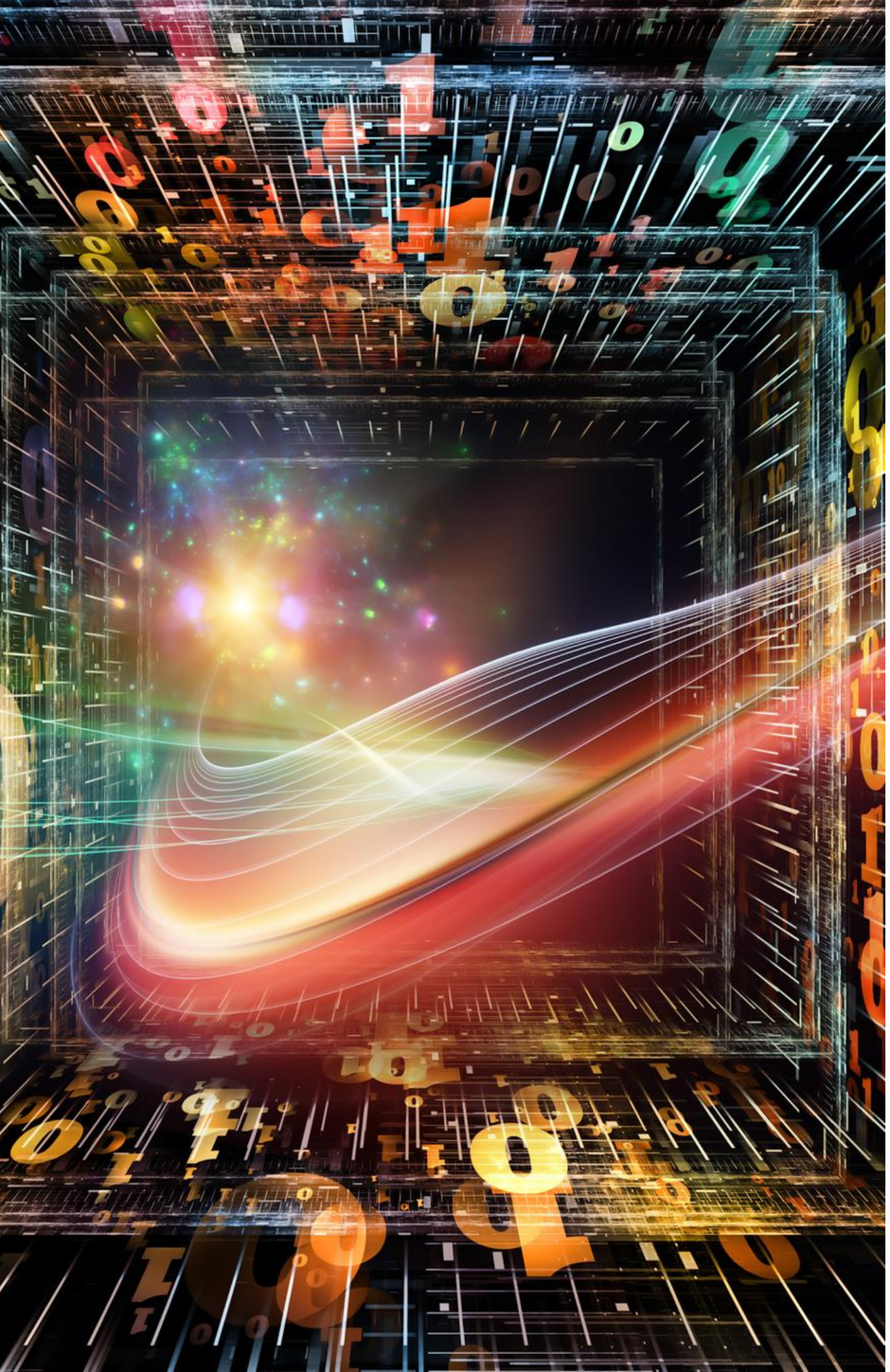


Mukhammad ANDRI Setiawan, PhD

Accelerating IPv6 Deployment in Enterprises through Strategic Adoption, Governance, and Automation

A Human-Centric Approach Perspectives

We start with bitter truths

Our IPv6 adoption (in Indonesia), is SLOW

01

IPV4 ARE STILL ABUNDANT

Even, there is a university in Indonesia that said something like,"Fortunately, we do have plenty of IPv4, so we don't worry that much ...."

02

NAT/CGNAT SAVES ENGINEER LIFE

What would be a better solution than providing NAT-only IP addresses to our clients/customers? They are not running any internet-reachable services anyway. No demand, why should I give one!

03

CONTENT PROVIDERS ARE REFUSING TO IMPLEMENT IPV6

Their excuse is, "We don't want to break our services. We live from ads. If our service is unreachable even for a few seconds, publishers will drop ads from our website."

04

NO INCENTIVES FROM THE REGULATOR

The government loves to have meetings and talk about IPv6 implementation, but not some "real" actions.

isif asia



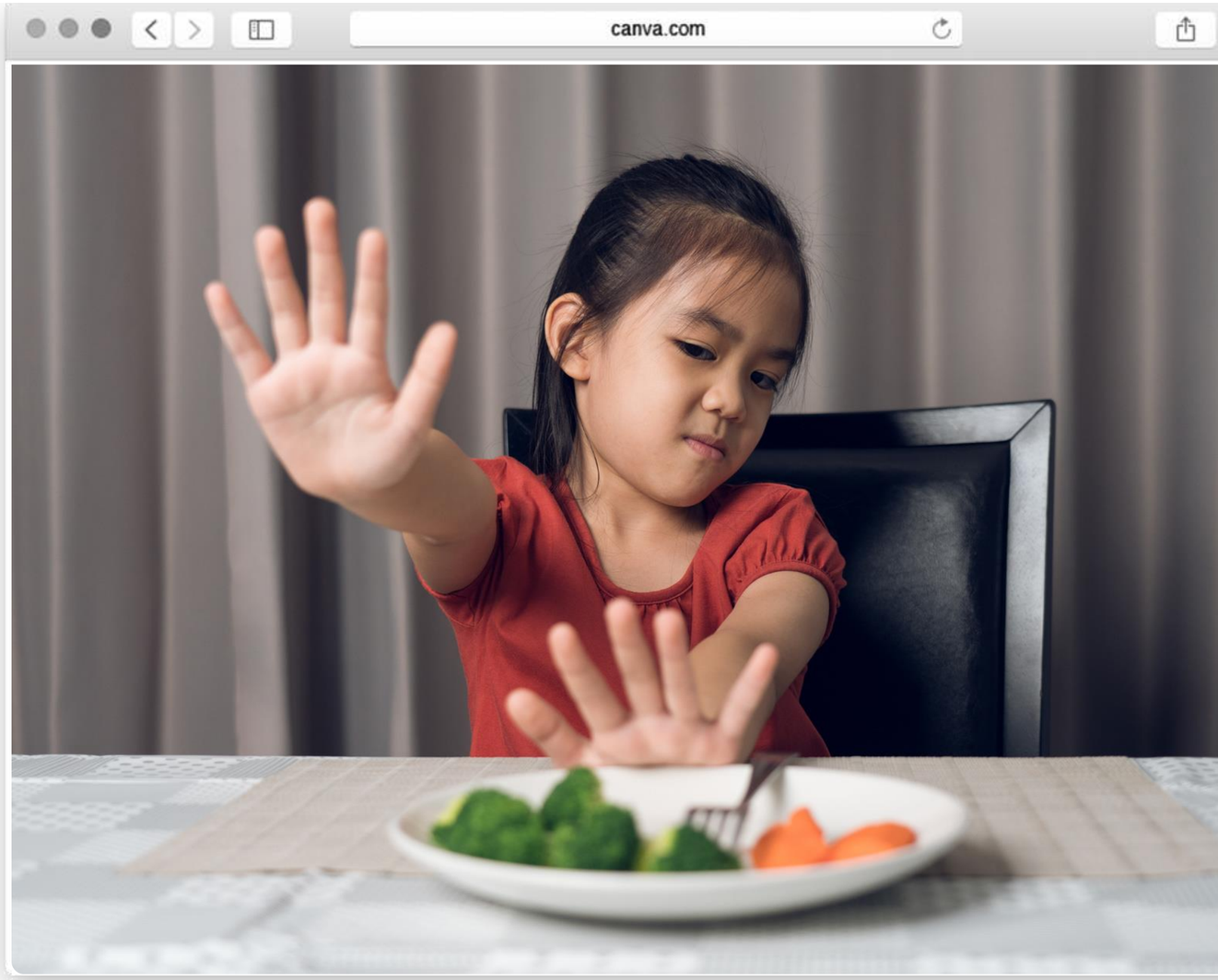
We all know this to well,

There is nothing wrong with IPv6

It’s faster. It has a smaller header. It has a happy eyeballs algorithm. It’s secure by design. No changes in routing mechanism.

In the end, it’s always human who has the authority to implement the IPv6

Yet, we rarely pay attention to this issue.



For so many years, we focused more on providing workshops, assuming that once everybody understands IPv6, they will implement it.

Or striving so hard in building an IPv6 policy, hoping that organizations will simply adopt it. But in the end, they will just say, "**Nope, not today!**"



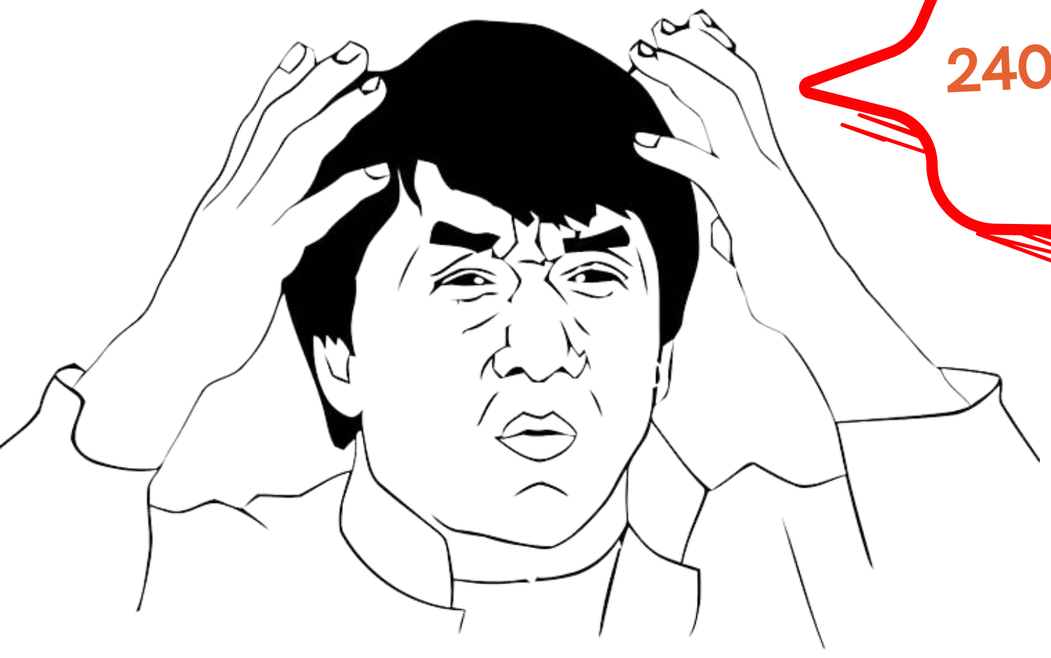
Shifting Perspectives

The internet communities are so convinced that IPv6 is good. But out there, people respond with …. “Meh !”

We need to **shift the perspective** to make IPv6 implementation a mental game rather than just a technical task that we need help to convince people to adopt.

The first “hurdle”

We have to agree, that long number is intimidating everybody



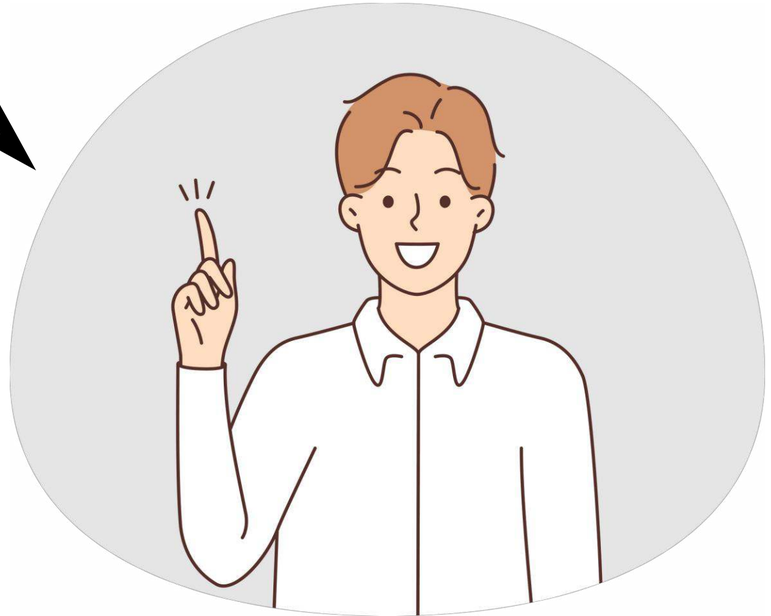
2401:dbe1:3cff:2d00:a456:fe33:89ff:0300

Yes it can be shortened!

2401:dbe1:0abc::1

fe80::1

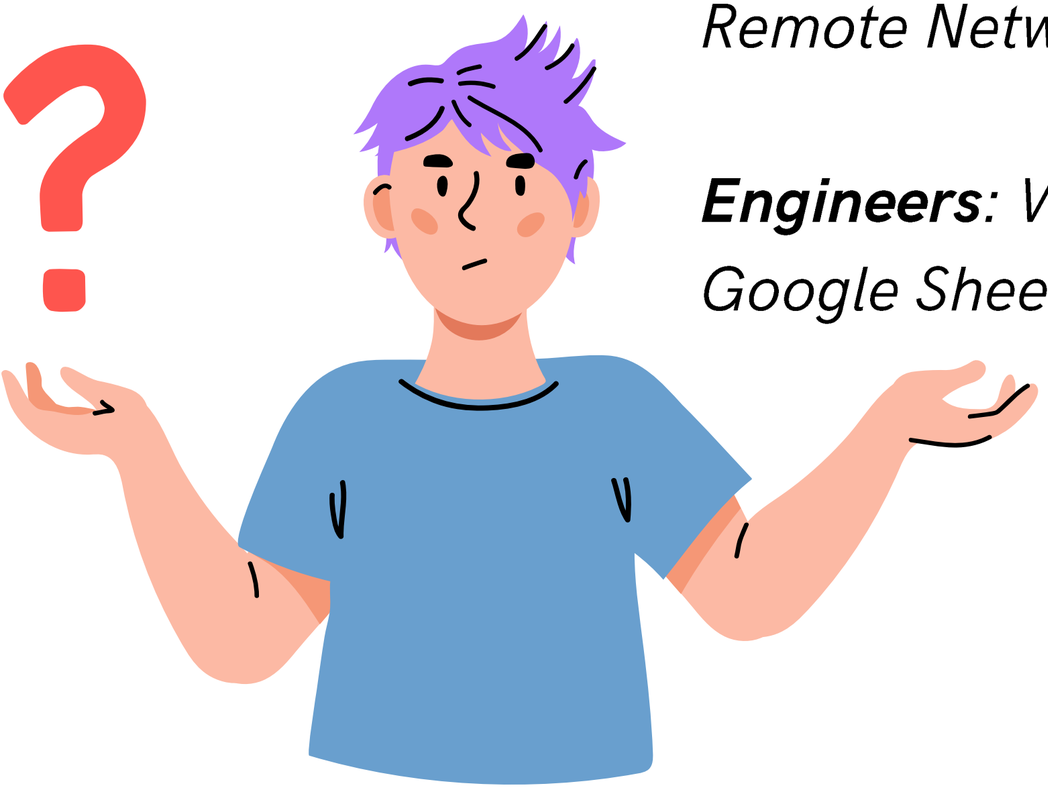
But, it still doesn't make sense for many.



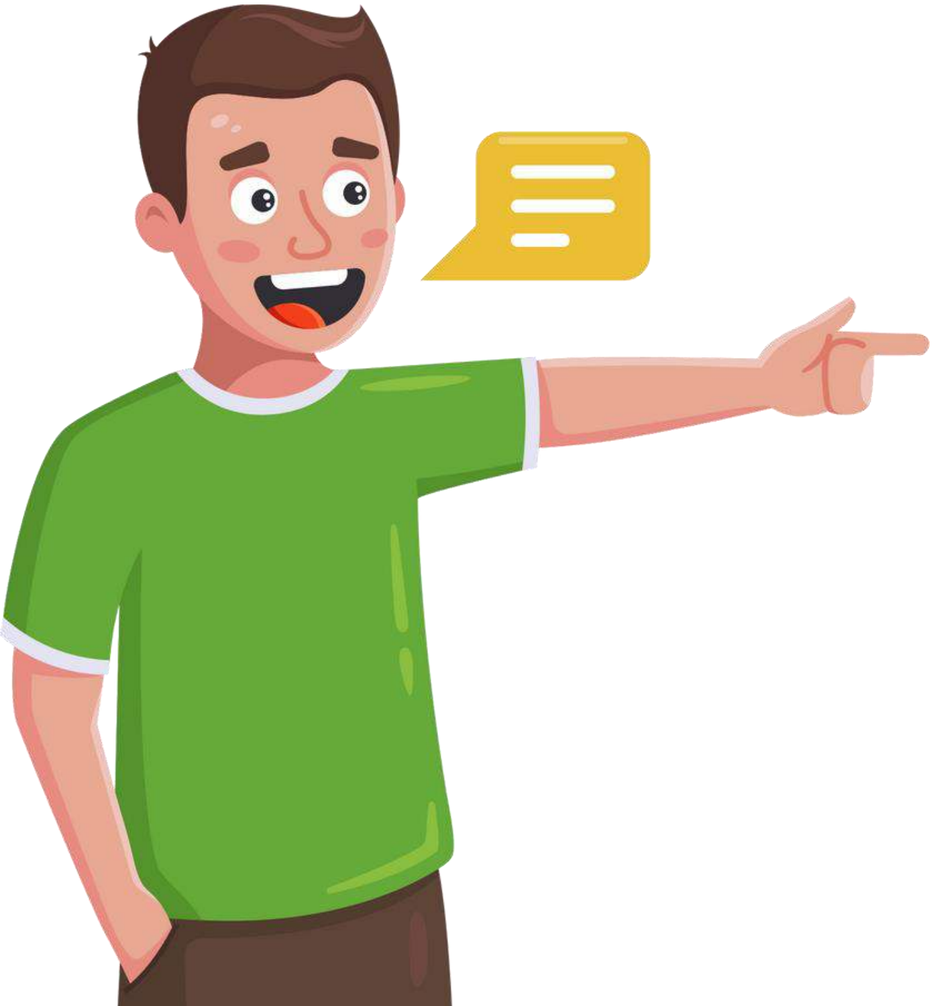
A boss has a question to his engineer

Boss: *Guys, can you tell me of this IP,* ***103.55.139.77****. Where does this IP address reside, VLAN 1000? 2500? Remote Network? HQ?VPN? Or …???*

Engineers*: Wait, boss! We need to look it up first from our Google Sheet.*



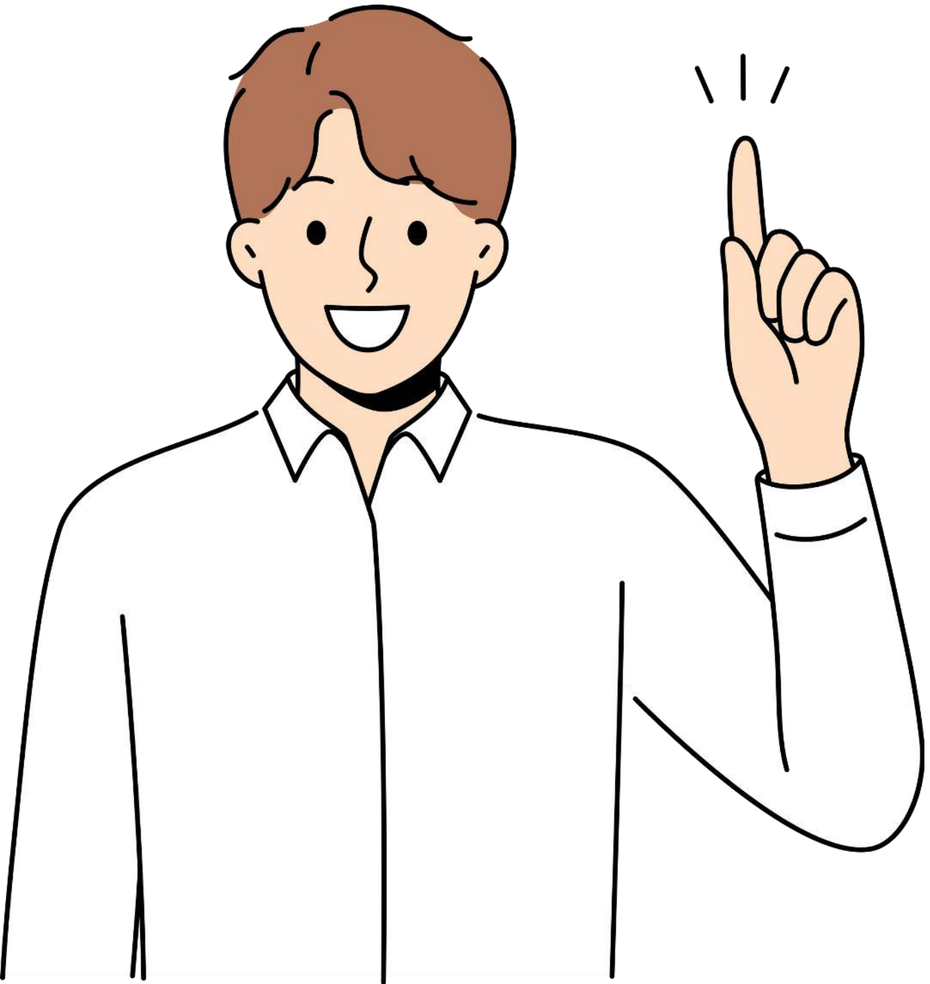
No Google Sheet? No Problem



- *Suppose an enterprise/organisation has multiple buildings/branches or whatever, and we label the buildings/branches as* ***1000, 1100, 1200, 2000, 2100, 2200***
- *Wouldn't it be easier for us to remember the networks as* ***1000, 1100, 1200, 2000, 2100, 2200***

- *What do you think?*

Our IPv6 block is 2404:a640::/32



- *Let's forget the whole IPv6 address and focus on highlighted part*
  - ~~2404:a640~~::**1000**::/48
  - ~~2404:a640~~::**1100**::/48
  - …
  - ~~2404:a640~~::**2200**::/48
- We **deliberately** forget the IPv6 block. The first two/three blocks will be there at all times. They won't go away :D
- You will remember the **2404:a640** address eventually

Hence



- *If a boss asks an engineer about a certain client who is abusing the network if the identifiable IP address is*
  - *2402:a640:**2200:0001**:ac54:bb43:d201:a342/64*

- Here's a potential response:

  - *Engineer:* "**Oh, the abuse came from the student of the Architecture department**."
  - *Boss:* "**And how do you know that?**"
  - *Engineer:* "**Easy, 2200:0001, 2200 is Engineering Building, 0001 is the VLAN for students at Architecture Department**".

Now, engineers feel less burden. **Happy engineer, happy network! ^_^**



Making More Manageable

- Now that we understand how to set up the network topology, what shall we do next?
- We teach our IPv6 workshop participants with the adoption strategies
- Remember, STRATEGIES are not always the best technically, but strategies give people peace of mind

Adoption Approaches

How different approach can help IPv6 being adopted.



PILOT

Set up IPv6 at the IT Department first, know how it behaves, and scrutinize all errors before finally deploying them.



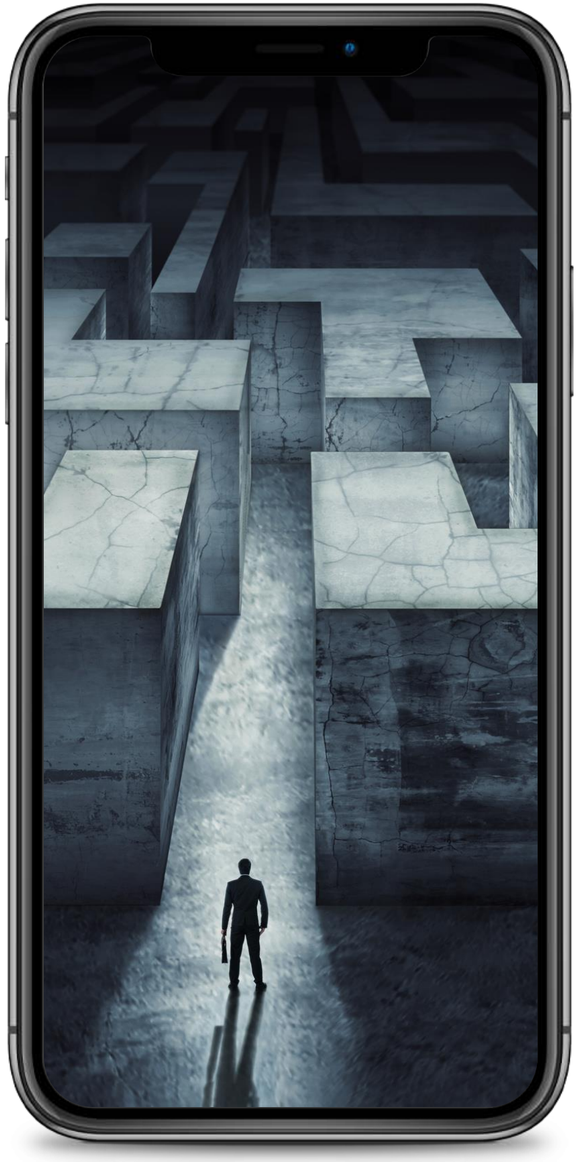
PARALLEL

We have to be honest, DUAL STACK; even though it's not a preferable option in the eye of technical perspectives, it's still the best approach for engineers in Indonesia. With the low adoption of IPv6 (less than 15%), engineers are more confident that IPv4 is still reachable.



CUT-OFF

Goes native? Currently, we are recommending this approach only for the not faint-hearted. There will be high risk of that our network is unreachable from outside.



Addressing (leftover) Challenges (yet critical)

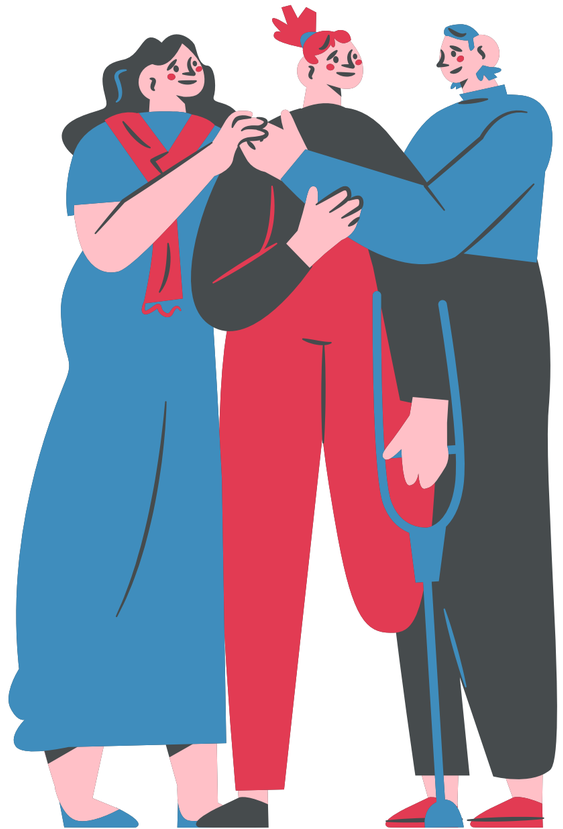
- Enterprises (whose most of our workshop participants are coming from), such as universities and government agencies often have sheer numbers of devices
- They often have tens if not hundreds of switches, both L2 and L3, thousands of Access Points, edge routers (BGP and IGP), firewalls, monitoring systems, etc
- When you decide to adopt IPv6, you'll have hundreds/thousands of equipment to be renumbered with IPv6

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Be more empathetic



- Less empathy can push engineers back to square one
- We need to understand that IPv6 not only happens in edge routers, but also in the rest of enterprises' equipment
- If we can't help engineers to make their work more accessible (renumbering whole equipment), they will resort back to this saying, **"If things ain't broken, why should I fix it (with IPv6)?"**

Starting this year (2024), we are going to introduce automation to help enterprises reconfigure their equipment.

We are going to push Ansible to be on their discussion table throughout the workshops

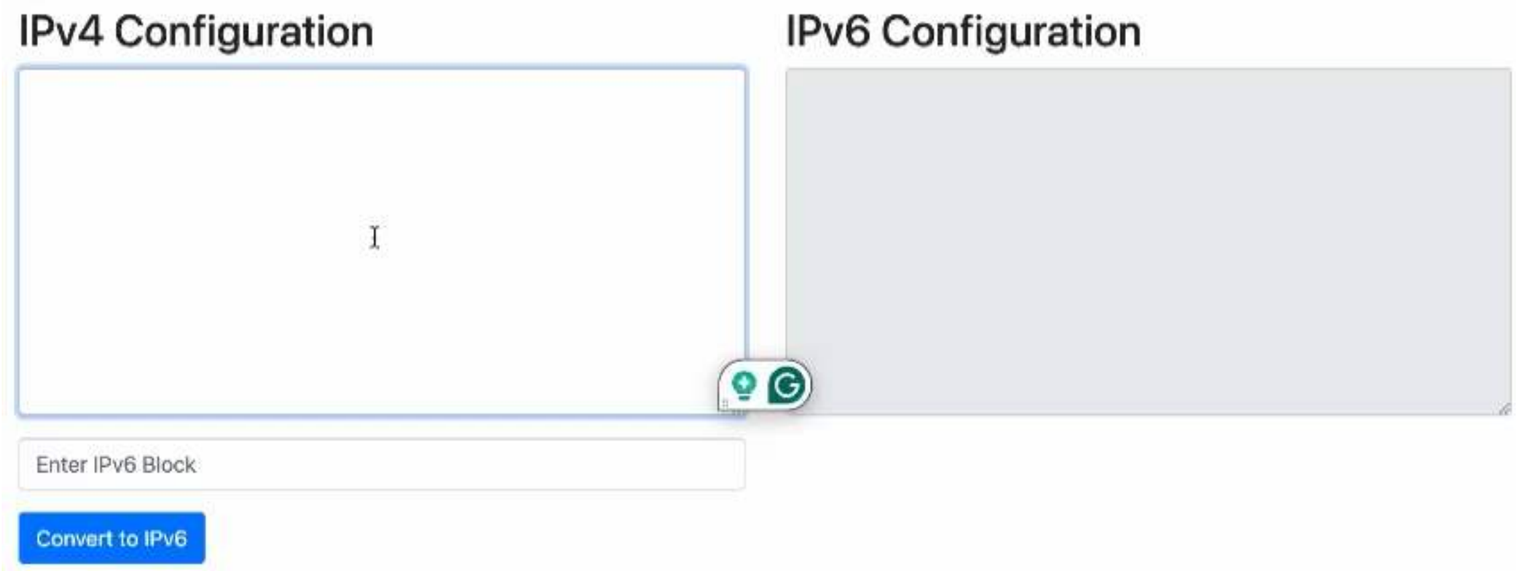
We even go further with Generative AI

- Our motto will be, **“Just sit back, relax, and enjoy the show …”**
- AI will help us identify current configurations to all devices
- And then, based on the provided scenario, AI will reconfigure all equipments now with IPv6 ready



Demo, Proof of Concept

- This demo is a minimalistic version, simply reconfiguring existing configuration from IPv4 only to dual-stack, both IPv4 and IPv6
- We can use any configuration from any brand. So far, we have tested it for Cisco, Juniper, Ruckus, and Mikrotik.





Thank you.

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