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# Practical Ways to Reduce IPv4 Usage

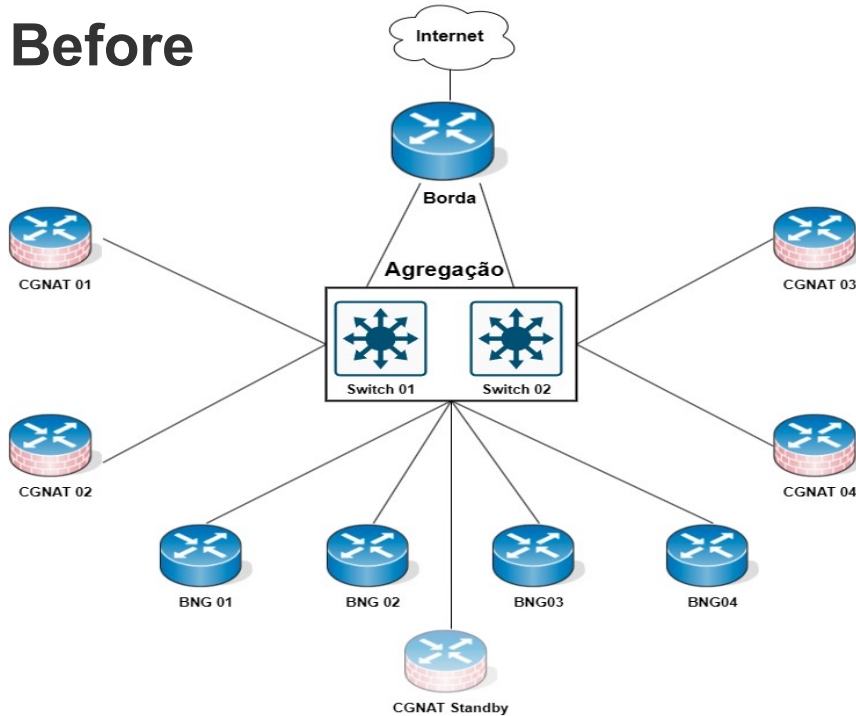
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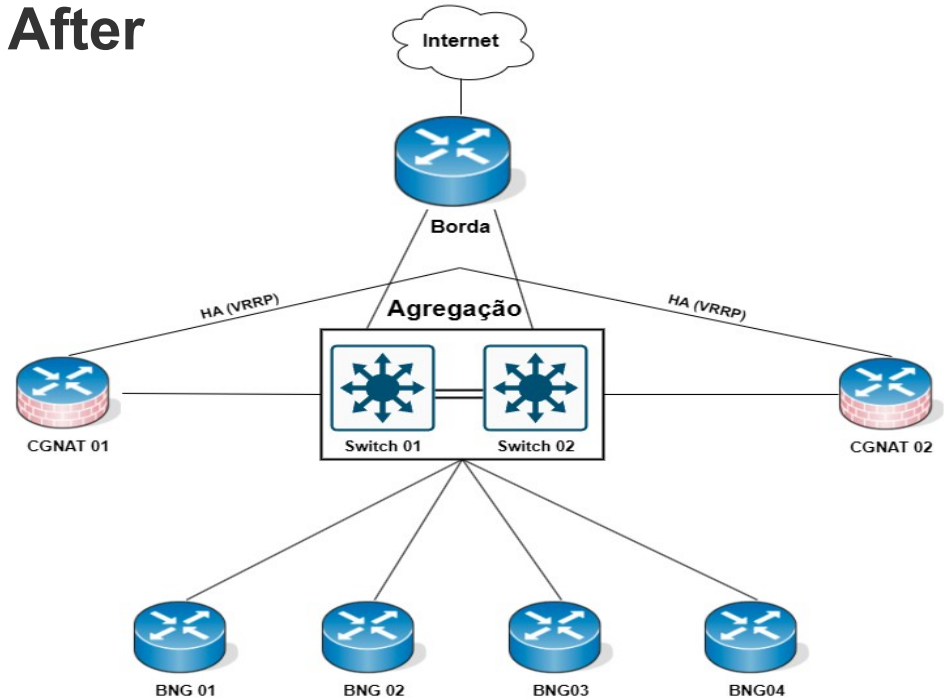


# CGNAT Optimization

## Before



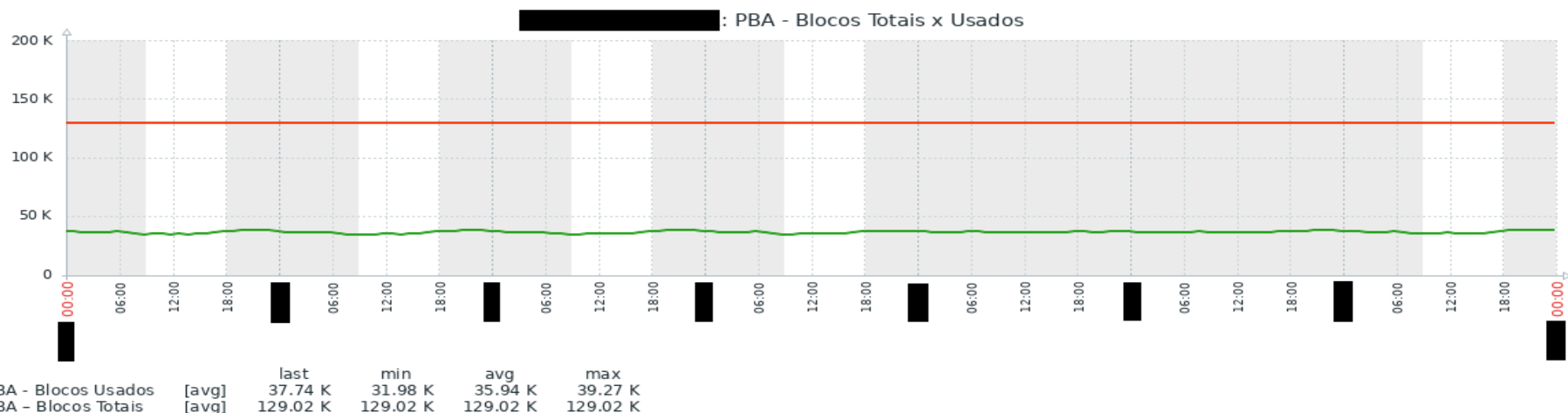
## After



- **Reduction of operating costs** (from 5 to 2 devices with redundancy)
- **Reduce the amount of IPv4 addresses needed to serve the same customer base**
- **The use of Bulk Port Allocation (BPA) provides a significant gain in the usage of available Public IPv4.**
  - Very simple and easy block Log Storage

# CGNAT Optimization

## ■ Number of blocks allocated (BPA)



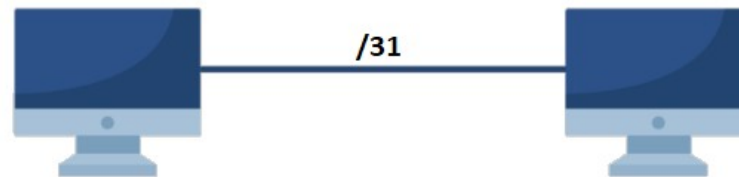
## ■ Number of blocks used

		last	min	avg	max
■ Qtd Bloco Usados - 1	[avg]	31.14 K	31.14 K	31.14 K	31.14 K
■ Qtd Bloco Usados - 2	[avg]	684	684	684	684
■ Qtd Bloco Usados - 3	[avg]	122	122	122	122
■ Qtd Bloco Usados - 4	[avg]	48	48	48	48
■ Qtd Bloco Usados - 5	[avg]	23	23	23	23
■ Qtd Bloco Usados - 6	[avg]	23	23	23	23
■ Qtd Bloco Usados - 7	[avg]	24	24	24	24
■ Qtd Bloco Usados - 8	[avg]	64	64	64	64

# /31 Usage (RFC 3021)

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- Defined by RFC 3021
- Use /31 instead of /30 saves 50% of IPv4 addresses
- Internal Policy for allocating /31 to corporate clients
- Don't be afraid to use /31 in all cases
  - It works perfectly on all modern manufacturers. (Cisco, Juniper, Huawei, Datacom, Mikrotik, Fortinet, SonicWall, Ubiquiti, Linux, etc).
  - There are no usage restrictions compared to /30



Point to Point Connection

# Standardization of use (Internal and External)

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- **Standardize internal usage for assigning Public IPv4 addresses to client interfaces.**
  - Train technical and sales staff
  - Adjust the marketing and sales material to mention "1 IP" instead of /30 or /31
- **Use for point-to-point links within the backbone, even with private addresses.**
  - It's not about saving private addresses, but about standardization and processes (eating your own dog food).
- **Leave the evaluation of exceptions to the technical team.**

# Allocation of smaller blocks for clients

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- **Educate customers to do more with fewer IPv4 addresses**
  - Today, with techniques like Vhosts and Port Forwarding, it's possible to do a lot with every IPv4 address.
  - Not every Server needs a dedicated public IPv4 address.
- **If the use is by an Broadband Provider without an ASN with a mere /29 to /27 it is possible to serve a very reasonable amount of broadband customers with CGNAT (32 to 64 customers per IP minimum).**
- **The use of IPv6 is essential to reduce the use of CGNAT and, consequently, IPv4 Public addresses and blocks needed.**



**Thank you**

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