
ROSV7
@stubarea51
IPV6
MIKROTIK
ROSv7 IPv6
improvements &
single stack design
Meeting of the Bulgarian MikroTik community
mikrotik.bg - May 2024

About me: Kevin Myers

MikroTik Certified Trainer since 2015

Focus on R&D of MikroTik ROSv7.

Worked with hundreds of WISPs/FISPs and other types of MikroTik users.

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https://stubarea51.net

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Areas of interest

- IPv6 Adoption
- Whitebox & Commodity Design
- Tier 2/3 ISP design
- Network engineer professional development communities

BGP - ROSv7 IPv6 improvements

IPv6 recursive routing support makes iBGP practical for IPv6. It was possible in ROSv6 by hacking next hop self. ECMP support for IPv6 is also new and works in parallel with recursion.

iBGP route reflection is now possible for IPV6 with an IGP like OSPF or IS-IS. Along with the new VRF & BGP role support this creates a solid overlay/underlay foundation with IPv6.

VPNv6 support has been added in 7.15. This allows multiple VRFs to be carried in an AFI by BGP and create multi-tenancy for IPv6 networks

RFC 5549 support is on the roadmap but not yet functional. This allows BGP to advertise IPv4 prefixes using IPv6 nexthops. This creates another tool to deliver IPv4 over IPv6 single stack.

IGP - ROSv7 IPv6 improvements

IS-IS support was added in 7.13. IS-IS is a more efficient IGP and scales better on the same software/hardware. IPv6 support was added in 7.15.

OSPF single configuation menu is an improvement that was added in ROSv7 from 7.1. It allows for more streamlined config of OSPFv2 and OSPFv3 instances.

AIGP has been added in 7.12 for IPv4/IPv6. This allows BGP to include the metric of the IGP in BGP messages to peers.

OSPF TE Metric Extensions now support OSPFv3 to provide an alternative to cost like bandwidth, loss and delay to be used by CSPF/RSVP-TE for path decisions.

MPLS - ROSv7 IPv6 improvements

LDPv6 support was added in 7.1. This is one of the most important elements for single stack networks as it allows for the overlay of IPv4 and other services on a native IPv6 network.

LDP Dual Stack has been supported since 7.3 but was not stable until after a fix in 7.4 and improvements to the preferred-afi setting starting in 7.8.

Fast Reroute (FRR) began support in 7.10 for IPv4/IPv6 and allows for immediate failover of MPLS services to a pre-computed backup path. This minimizes downtime in MPLS networks.

RSVP-TE is supported for IPv4/IPv6 as of 7.3 and allows for the creation of tunnels that can be used to "steer" L2/L3VPN traffic onto a different path than the IGP best path.

Management & VRF - ROSv7 IPv6 improvements

IPv6 VRF support for all of the management protocols like SSH, HTTP, HTTPS & Winbox.

DNS in a VRF is now possible for IPv4 and IPV6

SNMP in a VRF is now possible for IPv4 and IPV6

NTP in a VRF is now possible for IPv4 and IPV6

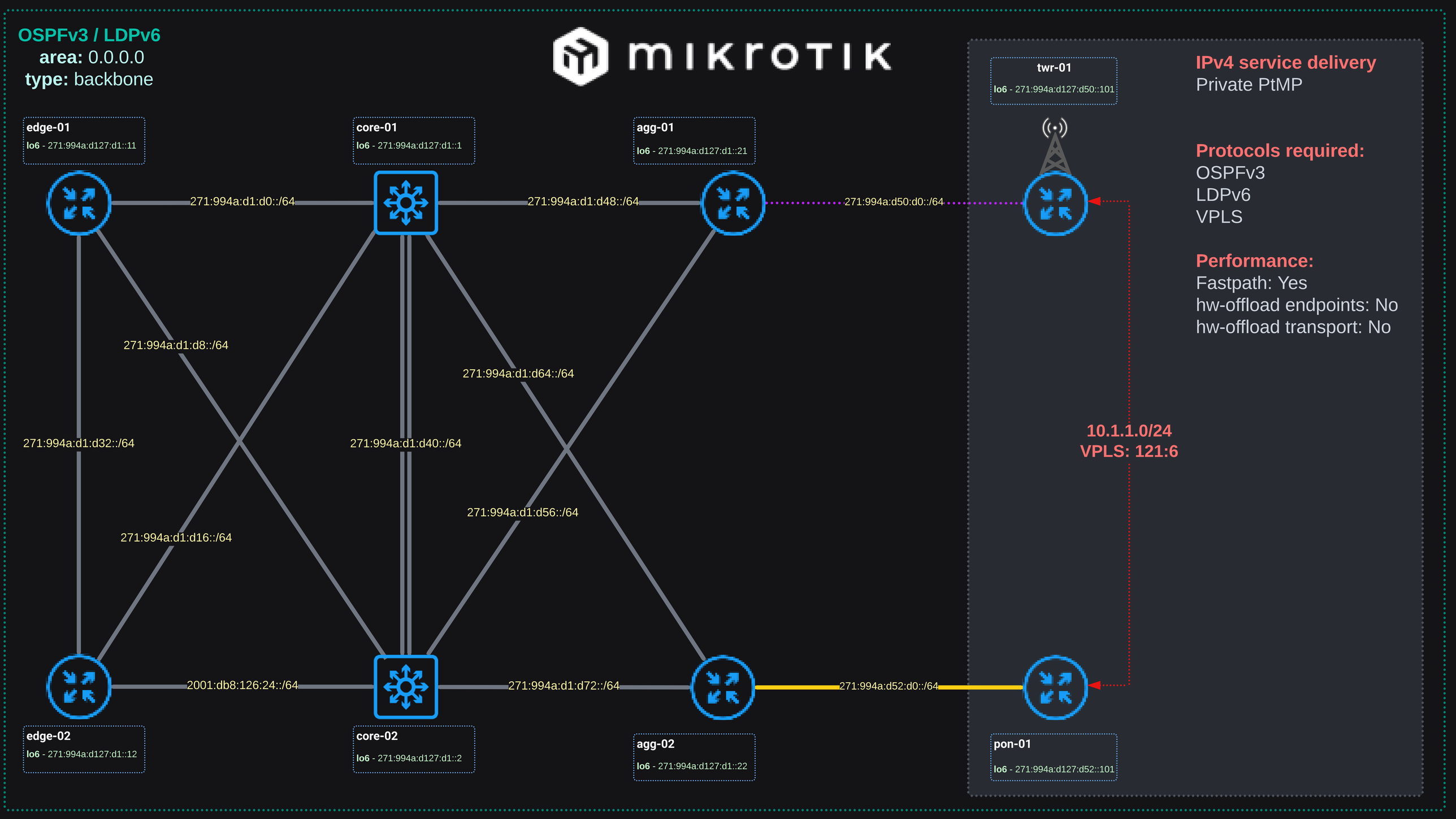
IPv6 single stack benefits

Simpler to manage - As opposed to running dual stack, where every router needs IPv4 & IPv6 address planning as well as routing protocol adjacencies/peerings, single stack creates a more efficient design by using only IPv6 in the underlay.

Faster migration/merger - Network mergers and migrations are often delayed by trying to reconcile RFC1918 overlap between two or more networks. When GUA is used instead, merging companies have confidence the underlay addressing is unique which speeds up the migration/merging process significantly.

IPv4 addressing as an overlay - Instead of requiring IPv4 in every part of the network, a single stack network can use overlays in MikroTik like VPLS, VxLAN, VPNv4, EoIPv6 or ZeroTier depending on the requirements. This allows IPv4 service delivery only at routers that need it.

Resource utilization - By reducing the number of routes, IGP adjacancies and peerings, resource usage on the control plane is lowered. For platforms that use ASICs, the chip shares route space with IPv4/IPv6 and single stack optimizes ASIC usage.


OSPFv3 / LDPv6
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mikrotik
edge-01
lo6 - 271:994a:d127:d1::11
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agg-01
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twr-01
lo6 - 271:994a:d127:d50::101
271:994a:d1:d0::/64
271:994a:d1:d48::/64
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271:994a:d1:d8::/64
271:994a:d1:d64::/64
271:994a:d1:d32::/64
271:994a:d1:d40::/64
271:994a:d1:d56::/64
271:994a:d1:d16::/64
10.1.1.0/24
VPLS: 121:6
2001:db8:126:24::/64
271:994a:d1:d72::/64
271:994a:d52:d0::/64
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agg-02
lo6 - 271:994a:d127:d1::22
pon-01
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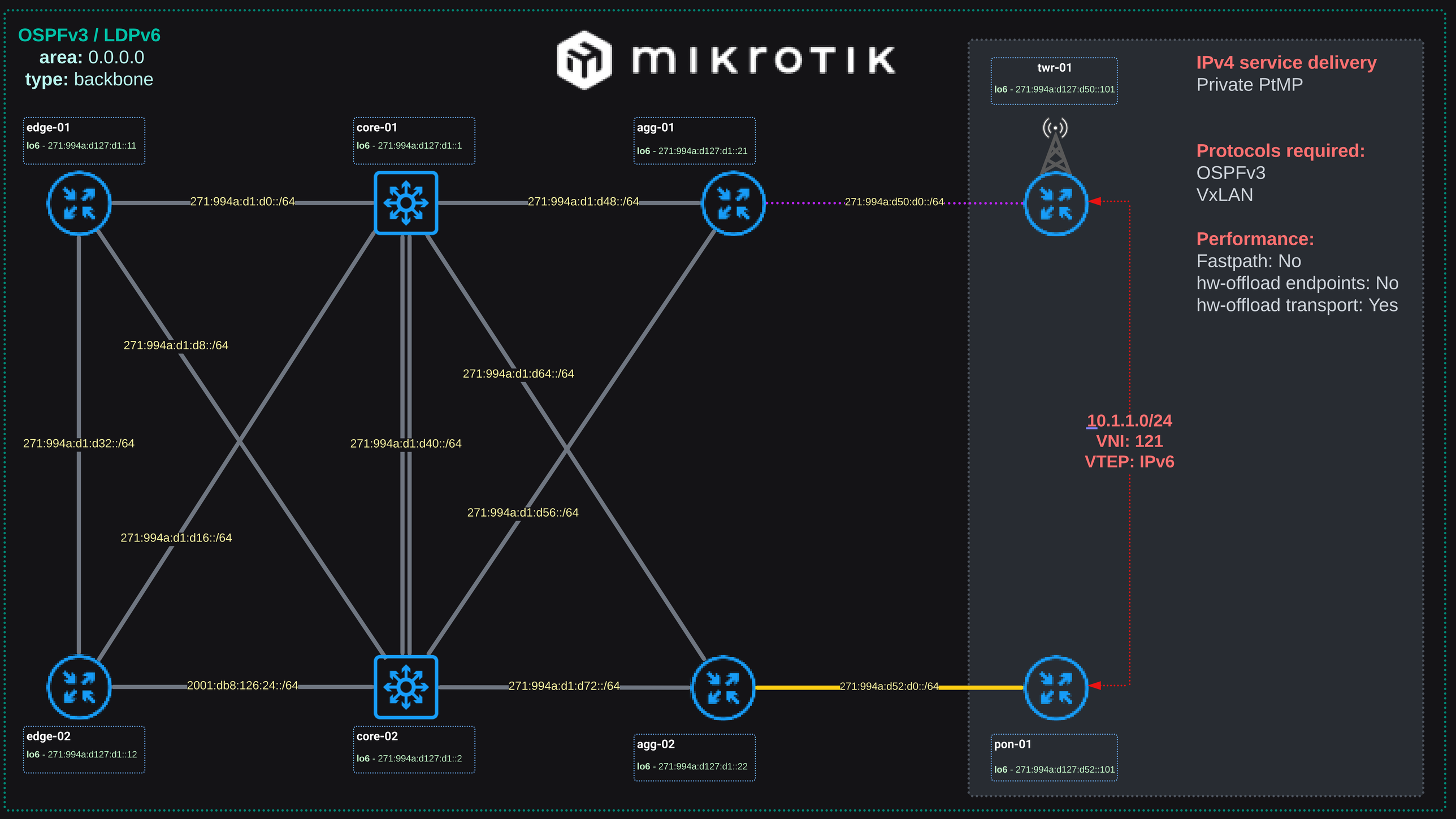
IPv4 service delivery
Private PtMP
Protocols required:
OSPFv3
LDPv6
VPLS
Performance:
Fastpath: Yes
hw-offload endpoints: No
hw-offload transport: No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271:994a:d1:d64::/64
271:994a:d1:d32::/64
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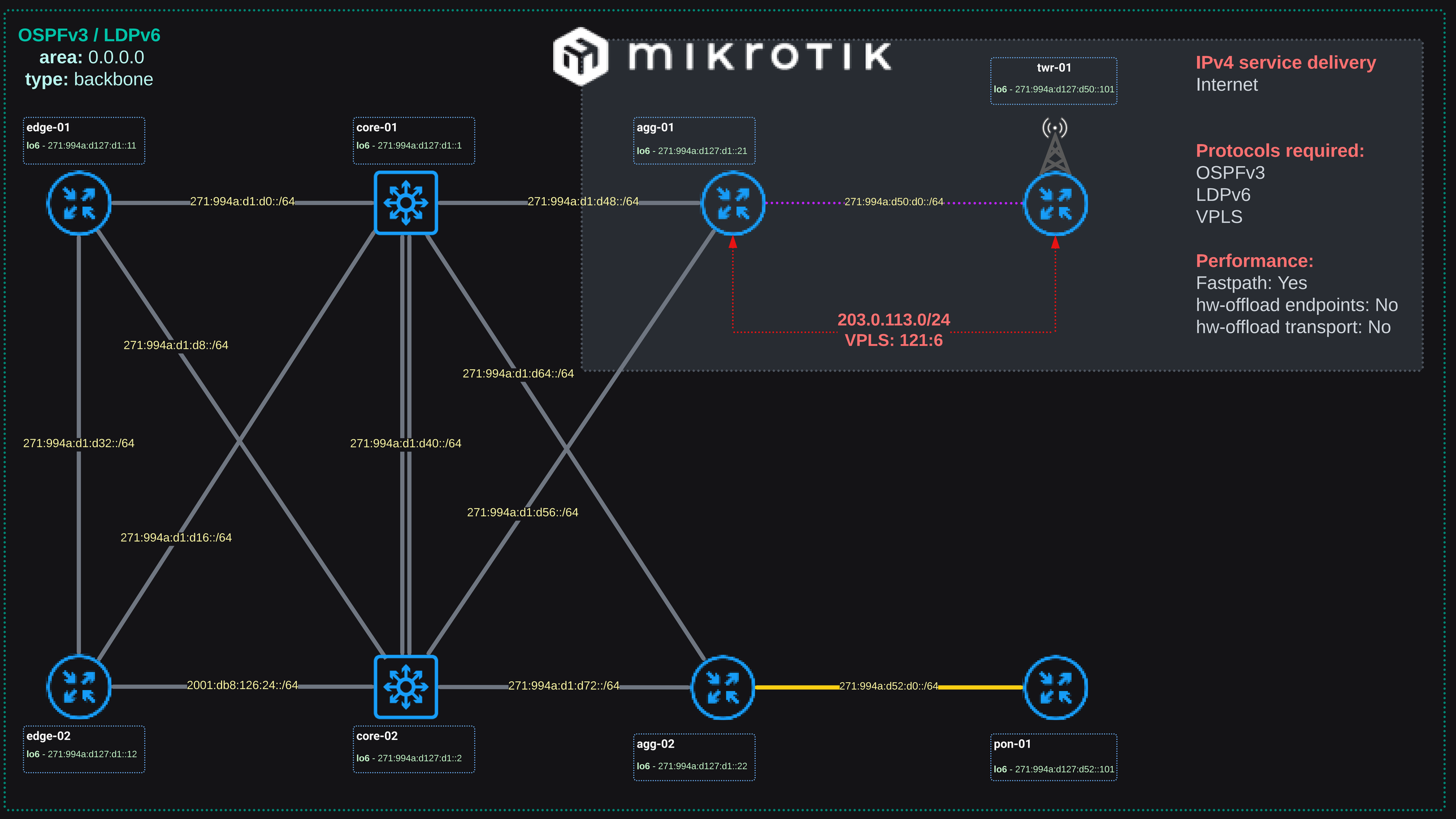
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IPv4 service delivery
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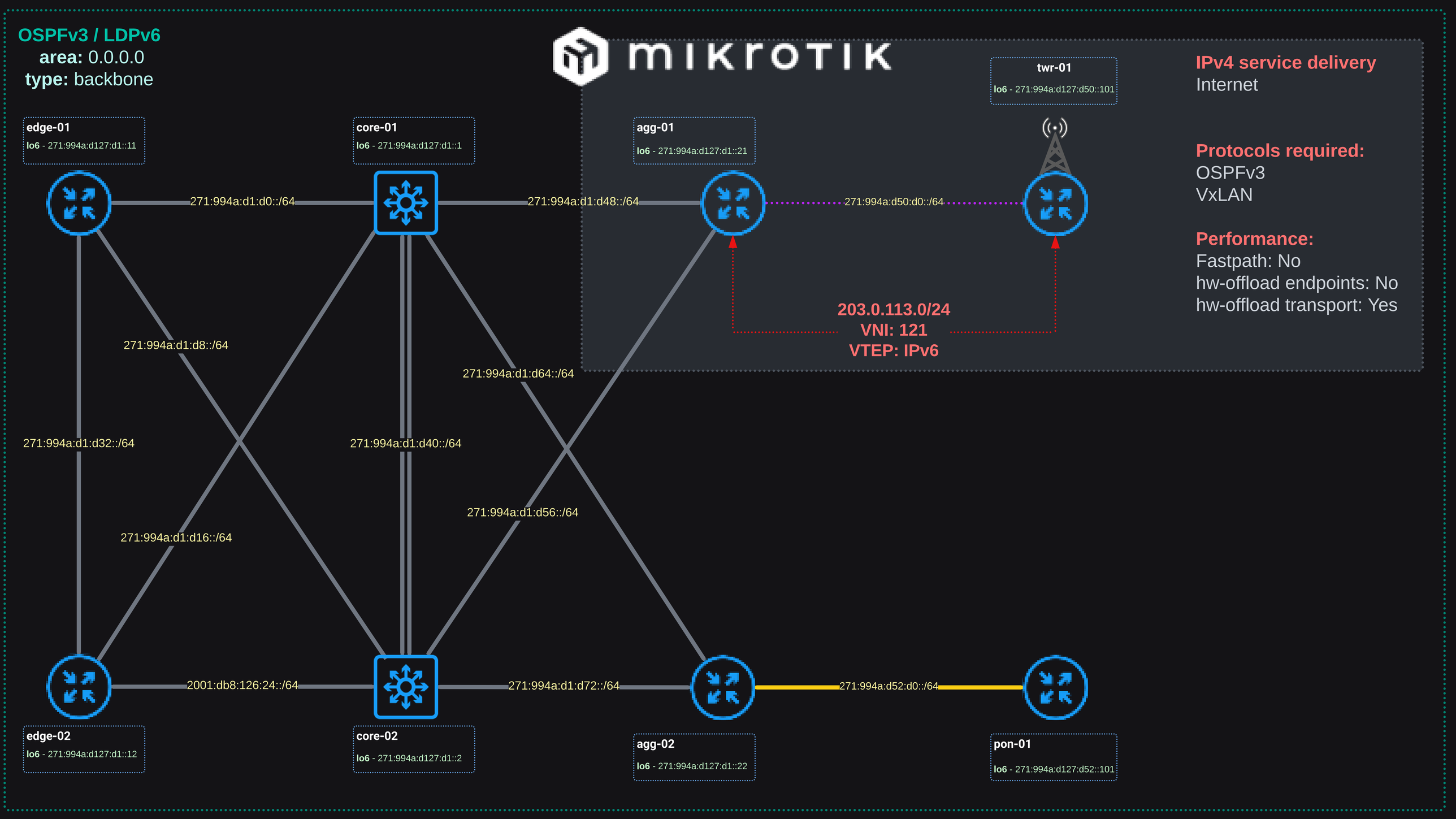
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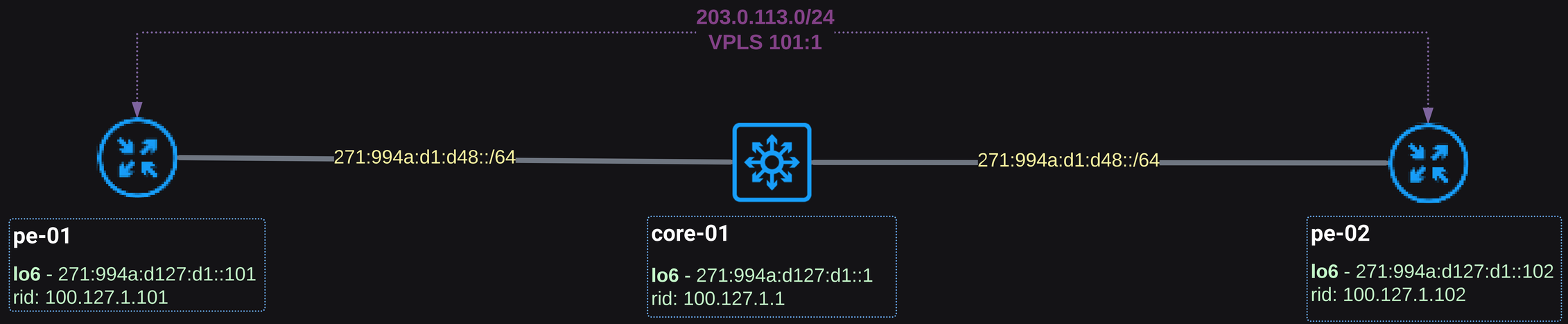
ROSv7 - Single stack EVE-NG lab

EVE-NG is a fantastic and free way to lab designs like single stack using the MikroTik CHR.
The configs for the lab topology below will be available after the conference on stubarea51.net

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Thank You !!!
Please send questions to @stubarea51