Sovereign Cloud Stack

SCS CONNECT

BY THE COMMUNITY. FOR THE COMMUNITY.

Let’s stay connected!

Mastodon @scs@social.osb-alliance.de

LinkedIn: @SovereignCloudStack

Sovereign
Cloud Stack

Team Forum SCS-Standards

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IPv6 Connectivity in SCS/OpenStack

Freerk-Ole Zakfeld, 2025-11-20

Sovereign Cloud Stack

ScaleUp Technologies

Über mich

- Head of Cloud Operations @ ScaleUp Technologies
- Arbeite seit 2022 mit OpenStack

About ScaleUp

- Managed Service Provider seit 1998
- Colocation, Cloud Services und Managed Hosting
- OpenStack seit 2012

Agenda

Warum IPv6 Implementieren?

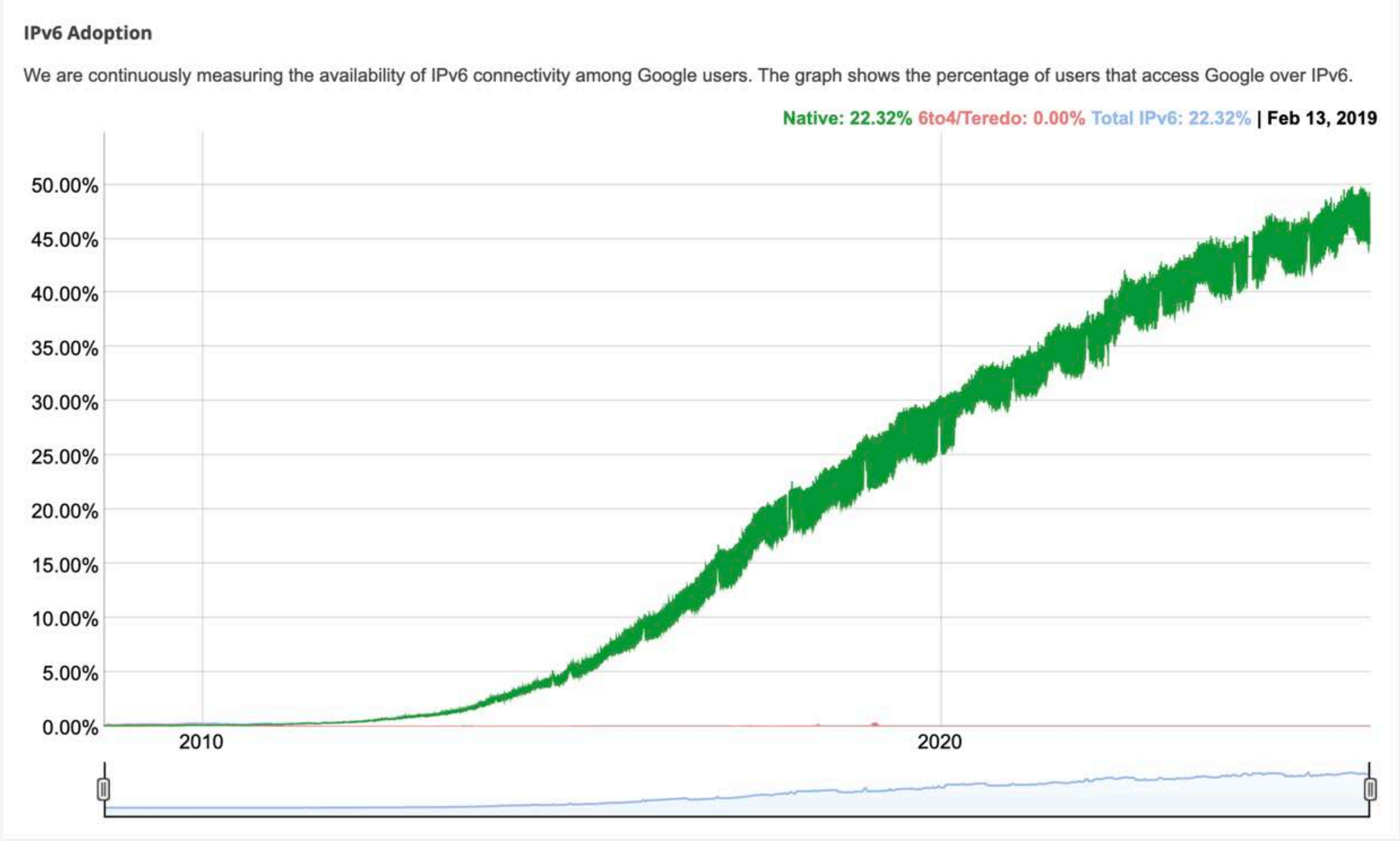
Wie IPv6 Implementieren?

Warum IPv6 Implementieren?

Souverenitätsgedanke vs IPv4

- IPv4 Adressraum als Handelsvermögen (durch Markt reguliert)
- Ein /24 (256 Adressen) - ungefähr 10.000 EUR
- Große Mengen an IPv4 gehören Hyperscalern
- -> Einstiegshürde für neue und kleinere Provider

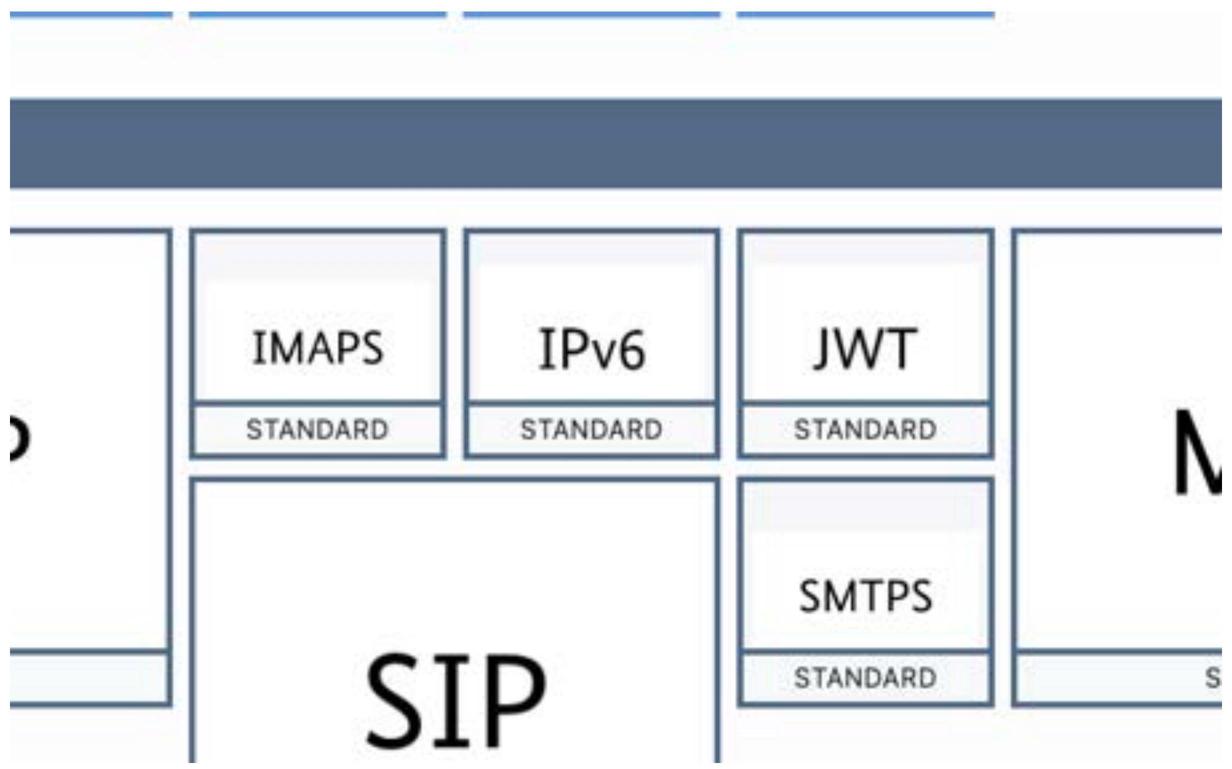
Verbreitung nimmt zu



https://www.google.com/intl/en/ipv6/statistics.html - Abgefragt am 2025-11-06

Behörden fordern IPv6

- IPv6 als Teil vom Deutschland Stack
- Tschechien plant ein “IPv4 Ende” 2032
- Wir als SCS sollten Vorreiter sein



https://technologie.deutschland-stack.gov.de

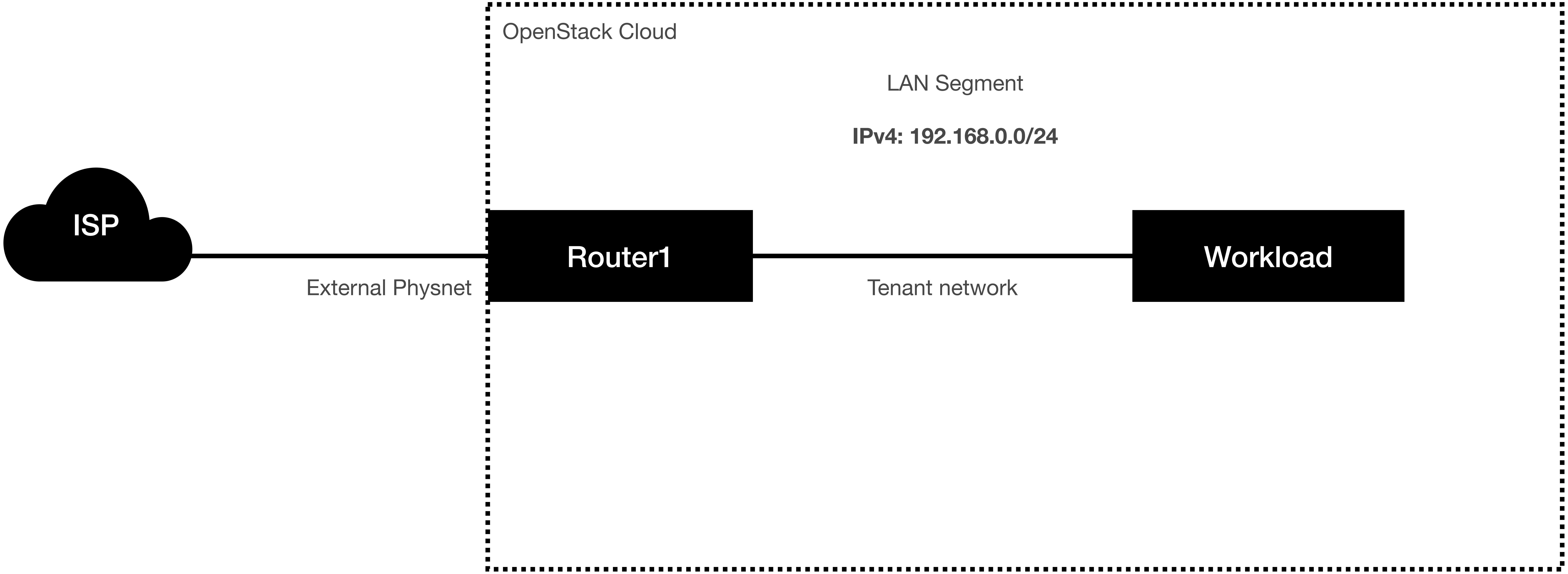
https://konecipv4.cz/en/

SCS IaaS Standard

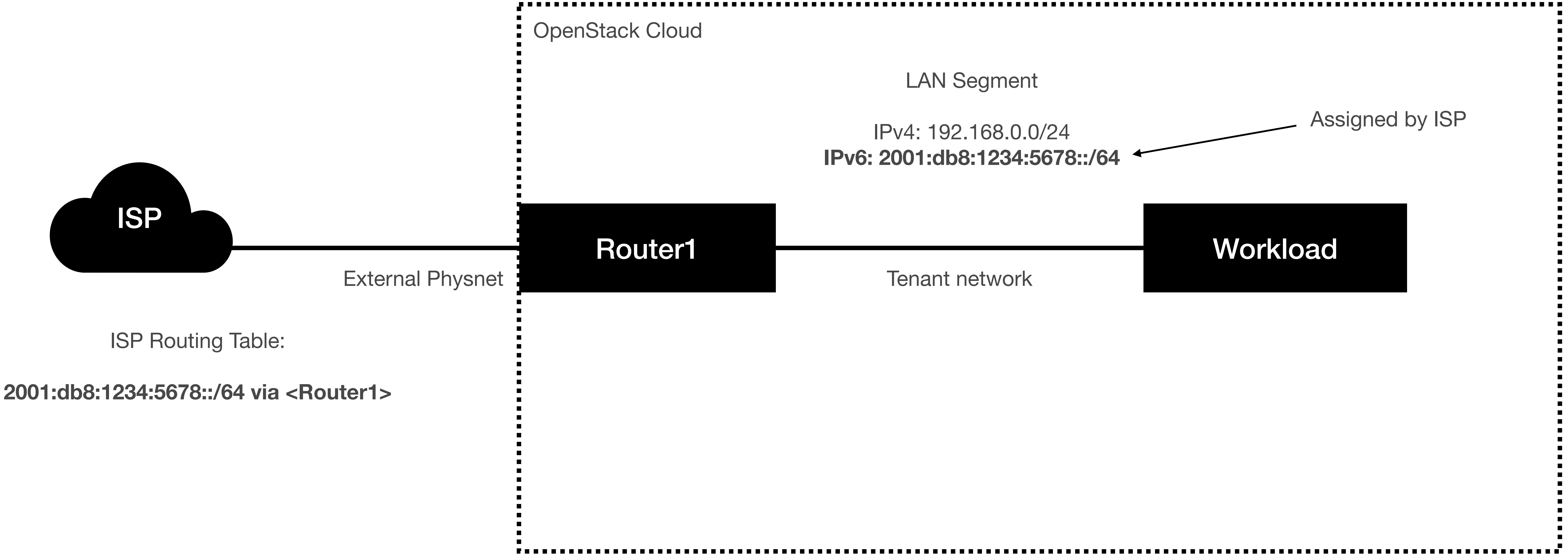
- Draft für IPv6 support
- https://github.com/SovereignCloudStack/issues/issues/166
- Status “Open”
- Aktuelle Situation bei CSPs eher gemischt

Wie IPv6 Implementieren?

Netzwerkdiagramm



Netzwerkdiagramm



Herausforderungen

- IPv6 Adressraum (GUA Präfixe) dem Kunden zuweisen
- Routing der IPv6-Adressen vom Internet ermöglichen

Neutron Subnet Pools

- Standardgröße für Subnet -> /64
- /48 Präfix -> 65.536 Subnets

```
openstack subnet pool create --share --pool-prefix 2a00:12e8:703::/48 \
--default-prefix-length 64 default-pool-ipv6
```

Neutron Subnet Pools

- User kann nun eigenes IPv6 Subnet bekommen

```
openstack subnet create --ip-version 6 --subnet-pool \
default-pool-ipv6 --network test-network test-subnet-ipv6
```

Ausgabe:

```
+---------------------+---------------------------------------------------+
| Field               | Value                                             |
+---------------------+---------------------------------------------------+
| allocation_pools    | 2a00:12e8:703:a::2-2a00:12e8:703:a:ffff:ffff:ffff:ffff |
| cidr                | 2a00:12e8:703:a::/64                              |
| created_at          | 2025-11-06T17:26:10Z                              |
```

Adressierung

- Stateless DHCPv6 (SLAAC) statt DHCP möglich
- Neutron Ports bekommen vorhersehbare EUI-64 Adressen
- Tipp: Privacy Extension in OS Images deaktivieren

2a00:12e8:703:a:f816:3eff:feef:86c5

Subnet

2a00:12e8:703:a::/64

MAC address

fa:16:3e:ef:86:c5

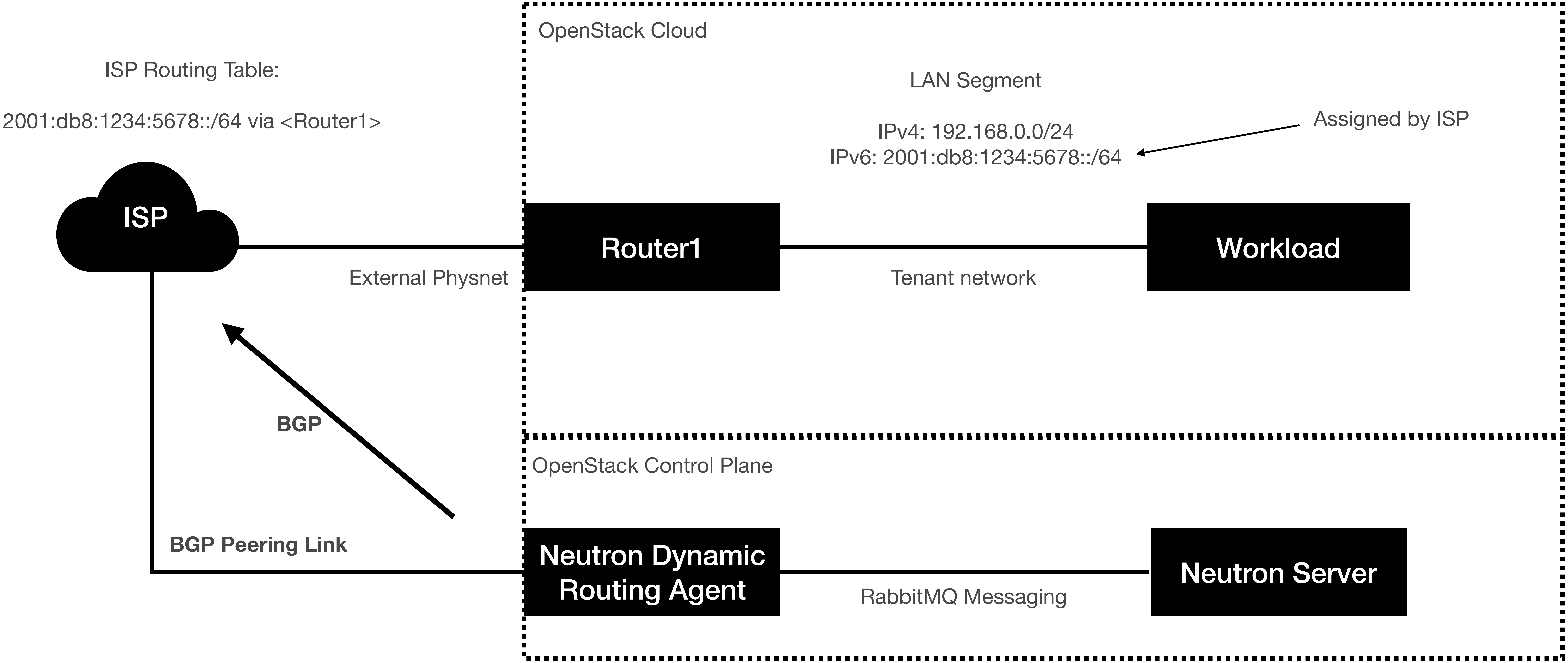
Routing ermöglichen

- Dynamische Änderungen
- Industriestandard BGP für dynamisches Routing

Neutron Dynamic Routing

- BGP “Speaker” (Route-Server)
- Verbindung zu Neutron via Messaging / RabbitMQ
- Agent auf Control Plane, steuert viele Router
- Keine BGP Session zu Tenant Routern notwendig (/ möglich)

Netzwerkdiagramm



Live Demo

Weitere Ressourcen

- https://docs.openstack.org/neutron-dynamic-routing/2024.1/admin/system-design.html
- https://docs.openstack.org/neutron-dynamic-routing/2024.1/install/usecase-ipv6.html

Vielen dank!

- fzakfeld@scaleuptech.com
- Matrix: @fzakfeld:scaleup.cloud

Sovereign Cloud Stack

Next time on SCS Connect...

DECEMBER 10, 2025 | 11:00 AM – 12:00 PM | ONLINE

Sovereign AI - Customize, Host & Manage Secure AI Infrastructure on SCS Cloud

CHRISTIAN SCHWALLER
CHIEF SALES OFFICER
ARTCODIX GMBH

Sovereign Cloud Stack

Next Meeting...

DECEMBER 3, 2025 | 14:05 – 14:35 | ONLINE

Team IaaS Meeting

Look here for event details:

https://docs.scs.community/community/collaboration

Every 11 minutes, someone joins the SCS Community....

Contact Forum SCS-Standards: scs-contact@osb-alliance.com
→ For collaboration **on the SCS Standards**

Contact Lean SCS Operator Coffee: fkr@osb-alliance.com
→ For collaboration **on operating SCS and the various topics around it**

Contact SCS Community: fkr@osb-alliance.com
→ For collaboration **on broader SCS community topics**

Contact SIG Standardization: matthias.buechse@alasca.cloud
→ To collaborate **on standardization and certification topics**

Check out our Community Calendar: https://docs.scs.community/community/collaboration/
→ For joint collaboration **on all SCS community topics in upcoming meetings**

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