

Could an IPv6-Only Kernel Be a Reality?

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There is a RFC series in netdev mailing list

- <https://lore.kernel.org/netdev/20260712013941.4570-1-fmancera@suse.de/>
- The v1 will be sent in the next development cycle
- 97 files changed, 6314 insertions(+), 5750 deletions(-)

Why?

- Decoupling IPv4 from core networking to enable an IPv6-only kernel
- IoT and Edge environments
- Reduce the Dual-Stack noise and complexity
- Datacenters are moving to IPv6 pure environments
- Kubernetes deployments gain some performance on IPv6 only

Bloat-o-meter results

- add/remove: 52/25057 grow/shrink: 58/565 up/down: 937258/-4632671 (-3695413)
- As expected, the image size is reduced by a 10%



Performance results

Kernel / Configuration	Traffic Type	Offloads ON	Offloads OFF
net-next (Dual-Stack Baseline)	IPv4	20.8 Gbps	7.22 Gbps
net-next (Dual-Stack Baseline)	IPv6	20.4 Gbps	7.55 Gbps
net-next (IPv4-Only Baseline)	IPv4	20.9 Gbps	7.86 Gbps
Patched (Dual-Stack)	IPv4	21.8 Gbps	7.77 Gbps
Patched (Dual-Stack)	IPv6	21.7 Gbps	7.35 Gbps
Patched (IPv4-Only)	IPv4	20.9 Gbps	7.91 Gbps
Patched (IPv6-Only)	IPv6	21.1 Gbps	8.06 Gbps

Follow-up on the series

- Cleaning up the header in files where code was split
- Resolve formatting warnings inherited from the moved code
- Remove IPv4 specific sysctls like IGMP ones

Open questions

- Should we include a NIPA build job to make sure we don't break this in the future?
- Where should `ip_generic_getfrag()` be placed? `net/core/ip.c`?
- To eliminate noise in this series, files like `udp.c`, `tcp.c`, and `raw.c` remain in `net/ipv4/`. Would you prefer to relocate these shared transport files to `net/core/`?

Conclusions

- The overall change is positive in my opinion
- The main issue it introduces is git noise due to code moving around which will be cumbersome when trying to identify breaking commits or blames.