KubeCon CloudNativeCon North America 2026

#KubeCon #CloudNativeCon

SIG Network Intro and Updates



Who we are

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Agenda

1. **What is SIG Network?** Scope, people and subprojects
2. **Kubernetes core** KEP graduations, deprecations and kube-proxy
3. **What's new in the subprojects** Highlights from across the SIG
4. **Subproject Status Survey 2026** What we learned and what we're doing about it
5. **Becoming a contributor** Using AI to become a new k8s contributor
6. **Get involved** Where to find us, how to contribute

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What is SIG Network?



Who runs the SIG

Chairs

Run operations and processes

Bowei Du
@bowei · Google

Guilherme Cassolato
@guicassolato · Red Hat

Michael Zappa
@mikezappa87 · Palantir

Technical Leads

Technical direction, subproject lifecycle

Antonio Ojea
@aojea · Google

Dan Winship
@danwinship · Red Hat

Tim Hockin
@thockin · Google

Subproject leads

Projects with formal leads

Gateway API
Ricardo Katz · Rob Scott · Nick Young

Network Policy
Dan Winship · Nadia Pinaeva · Surya Seetharaman

Multi-Network
Lionel Jouin · Maciej Skrocki

What SIG Network owns

Services & kube-proxy

Service, EndpointSlice, load balancing, iptables / nftables / IPVS

Network Policy

NetworkPolicy and ClusterNetworkPolicy

DNS

Cluster DNS spec, kube-dns, node-local-dns, external-dns

Ingress & Gateway API

North-south and east-west traffic routing APIs, incl. AI inference

Pod networking & IPAM

Dual-stack, IP allocation, node IPAM, multi-network

Network drivers & DRA

DRANET, CNI-DRA driver, device-backed networking

Project mapping

Traffic & policy APIs

Gateway API
Inference Extension
Kube Agentic Networking
Network Policy

Networking for AI hardware

DRANET
Multi-Network
cni-dra-driver
kubernetes-network-drivers

DNS

kube-dns (deprecated)
node-local-dns
External DNS
CPA / CPVA (proportional autoscalers)

Ingress

ingress-nginx (archived)
ingress-gce
ingress-controller-conformance

Dataplane

knftables
iptables-wrappers
ip-masq-agent

Addressing & test networks

node-ipam-controller
nat64
kindnet


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Kubernetes core

KEP graduations & deprecations

Graduated to GA

KEP-4762 Pod hostname override (FQDN)
GA in v1.37

KEP-5311 Relaxed Service name validation
GA in v1.37

KEP-4858 Strict IP / CIDR validation
GA in v1.38 (in progress)

New & promoted

KEP-6032 nftables localhost NodePorts
Alpha v1.37 → Beta, on by default, v1.38 (in progress)

KEP-6313 Network-isolated (hermetic) Pods
Alpha targeted for v1.38 (in progress)

KEP-5343 nftables as default kube-proxy mode
Accepted; default flips in v1.40

Deprecated

KEP-5707 Service.spec.externalIPs
Deprecated in v1.36

KEP-5495 kube-proxy ipvs mode
KubeProxyIPVS gate deprecated in v1.37

KEP-4974 core/v1 Endpoints
Endpoints are deprecated in v1.33, wrap up work removing usage in API server

Feature gates removed: TopologyAwareHints, ServiceTrafficDistribution, PreferSameTrafficDistribution, MultiCIDRServiceAllocator, RelaxedDNSSearchValidation.

kube-proxy nftables & localhost NodePorts

iptables mode

- NodePorts reachable on 127.0.0.1
- Needs route_localnet=1 on the node
- Long-standing security footgun

nftables mode

- GA since v1.33
- No localhost NodePorts out of the box
- Planned to become the default in v1.40 (KEP-5343)

What's changing

- Localhost NodePort functionality is opt-in with nftables
- Kube metrics track if the cluster is reliant on localhost NodePorts
- Configure kube-proxy with localhost in NodePort addresses to migrate



KEP-6032: Alpha in v1.37 → Beta, on by default, in v1.38

Under the hood: knftables v0.0.22 can list chains and sets via netlink instead of the `nft` CLI (NFTablesNetlink gate, on by default since v1.37)

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What's new in the Subprojects?



Gateway API: three releases in 2026

v1.5 February 2026

- **Standard:** TLSRoute, ListenerSet, CORS filter, frontend mTLS, backend client certs
- **Experimental:** Gateway / HTTPRoute authentication (GEP-1494)
- **v1:** ReferenceGrant

v1.6 June 2026

- **Standard:** TCPRoute, UDPRoute
- **Experimental:** XBackend (v1alpha1)
- Controller Matching Wizard, for finding the right controller based on conformance feature set

v1.7 October 2026

- **Standard:** Retries, route rule-name uniqueness, BackendTLSPolicy SAN / TLS options
- **Experimental:** XTelemetryPolicy + OTel attributes, listener filters, address routability, ClusterTrustBundle

- **Decomposing Service:** XBackend + EndpointSelector (KEP-6116, proposed)

Ingress, inference & agents



ingress2gateway

v1.0 → v1.2

- v1.0 in March, days before ingress-nginx was archived
- Providers split from Emitters; new Traefik provider
- Emitters for Envoy Gateway, kgateway, agentgateway, Airlock



Inference Extension

v1.4 → v1.6

- InferencePool v1; v1alpha2 deprecated in v1.5
- v1.6 (Aug): Endpoint Picker (EPP) and Body-Based Router (BBR) moved to the **llm-d** project
- Lightweight reference EPP (lwepp) stays in-repo



Kube Agentic Networking

v0.1 → v0.2

- v0.1 (Jun): v1alpha1 XAccessPolicy — MCP tool authorization, CEL, ExternalAuth
- v0.2 (Sep): MCP parameter-level authorization, OTel decision tracing

Deep dive: Gateway API & Kube Agentic Networking talk — Wed, Nov 11, 3:10-3:40 pm · Salt Palace, Level 2, 250 D-F

Network Policy: subproject updates

API releases

v0.3.0 · Nov 2026

- ClusterNetworkPolicy **v1alpha2** - the first CNP release
- Unifies AdminNetworkPolicy and BaselineAdminNetworkPolicy into Admin and Baseline tiers
- v0.3.0 released in November that added CNP **v1beta1** support - the API is same copy as v1alpha2 API

kube-network-policies

v1.1.0 → v1.1.3

- Reference implementation of the API
- Full ClusterNetworkPolicy **v1alpha2** and **v1beta1** support
- Pod-to-Node egress policies; non-disruptive nftables updates
- Removed support for v1alpha1 CNP

NPEP process

Working well

- Enhancements proposed as NPEPs
- “Even new contributors can file them”
- Close collaboration with Gateway API conformance framework
- Close collaboration with the implementations

Healthy and stable. Main pain point: getting API-review time slots

ClusterNetworkPolicy v1beta1

One cluster-scoped API for admins

1. **Admin tier**
   evaluated before namespace NetworkPolicy
   Accept / Deny / Pass
2. **NetworkPolicy**
   owned by app teams, per namespace
3. **Baseline tier**
   cluster defaults, evaluated after NetworkPolicy

Road to beta

v1alpha1
AdminNetworkPolicy + BaselineAdminNetworkPolicy

v1alpha2
ClusterNetworkPolicy, released in v0.2.0 (April 2026)

v1beta1
ClusterNetworkPolicy, released in v3.0.0 (November 2026)

Getting ready for v1

- **FQDN egress** (NPEP-133) limited to the Admin tier
- **NamedPort** and **Nodes** support
- **Hairpin traffic:** capability model + conformance
- Improving **Conformance** tests

Across the subprojects



DRANET

Five releases in 2026 (v1.1 → v1.5): IPVLAN subinterfaces, Whereabouts IPAM, VRF, RDMA / InfiniBand; support for 6 cloud providers



Multi-Network

PodNetworkKind v1alpha1 API merged in November, built on DRA device attributes; reference implementation prototyped on kindnet



External DNS

v0.21 → v0.24 (Oct): Gateway API v1 sources, ListenerSet, FIPS images; heading to v1.0



kindnet

Donated to kubernetes-sigs; the reference CNI running across Kubernetes CI



cni-dra-driver

Exploration vehicle for CNI in DRA; helped graduate KEP-4817 (status) to GA



ingress-gce

Splitting the different functions (Ingress, L4, …) into independent controllers and codebases

Quiet plumbing & lifecycle changes

Stable, thinly staffed

knftables netlink chains and sets listing landed in v0.0.22

iptables-wrappers underpins distroless-iptables image

node-ipam-controller feature complete; out-of-tree home of KEP-2593 (Multi-ClusterCIDRs)

nat64 stable, scope is right

node-local-dns standalone module; 1.27.x shipped in Sept.

Lifecycle



ingress-nginx
Archived March 24, 2026, with SIG support; migrate with ingress2gateway



kube-dns
Deprecated; CVE fixes possible through v1.40; most clusters already run CoreDNS



kubernetes-network-drivers
Archive candidate; work consolidating into DRANET



Cluster Proportional {Horizontal,Vertical} Autoscaler (CPA, CPVA)
Possible move to SIG Autoscaling (under discussion)

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Subproject Status Survey 2026



Why we ran a subproject survey

We surveyed all 22 SIG Network subprojects (July–Aug 2026) to understand each project's real state, meet the people maintaining them, and see where the SIG helps — or should.

- One pre-filled form per project
- Distributed by Slack DM + email
- ~10–15 min per maintainer

22
subprojects surveyed

32
responses

18/22
projects responded

77%
with substantive answers

What we heard: healthy, but rebalancing



Flagships thriving
Gateway API, Network Policy, Multi-Network, Inference Extension, DRANET all active and shipping



AI/ML is the new center of gravity
and it's creating overlap between projects racing to serve it



Thin maintainership
many utility projects run on 1–2 people; library projects unsure what the SIG is for them



Winding down
ingress-nginx archived, kube-dns deprecated, kubernetes-network-drivers → archive, CPA/CPVA → maybe SIG Autoscaling



Two recurring asks
faster API review and better SIG-wide communication

4.2

/ 5

average rating of SIG Network support

In maintainers' own words

"SIG Network supported us with retiring the project and making decisions or coming up with communications we wouldn't have been able to on our own."

— ingress-nginx

"The fact nobody even knows it runs on all the CI systems and does not have weird network bugs is the best metric."

— kindnet

"The project gets no support at all from SIG Network… [or] is 100% supported by SIG Network, via me acting as SIG Network's representative. I'm not sure which is correct."

— knftables

"K8s does not like to be experimented on… providing unreasonable standards for this level of APIs."

— Multi-Network, on API review

What we're doing about it

1. **AI-networking coordination**
   Gateway API · Inference Extension · Kube Agentic Networking · WG AI Gateway
2. **API-review throughput**
   especially for experimental APIs
3. **Lifecycle cleanup**
   archive, deprecate or relocate the tail
4. **Tackle the bus factor**
   recruit maintainers for at-risk projects
5. **Close the communication gap**
   publicize the SIG meeting, rotate project updates

Full report
Scan for every subproject's results

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Becoming a contributor



Using AI to become a new k8s contributor

Where I started

- I maintain Zarf, which relies heavily on localhost NodePorts
- Found an aligned issue, spoke with maintainers, followed up in the sig-network call.

How AI helped

- Understanding Transactions, proxy lifecycle, networking, test patterns
- Quick implementation to discover gaps in the KEP

Lessons & guardrails

- Challenge every decision, filter decisions to maintainers when unsure
- Breaking changes are complex
- KEPs take time, but improve the implementation

Why it matters here: many subprojects run on 1–2 maintainers. Lowering the barrier for new contributors is how we fix the bus factor.

Get involved

Join us on Slack

#sig-network

kubernetes.slack.com · scan the code →

SIG meeting Thursdays at 09:00 PT, every two weeks

Mailing list groups.google.com/a/kubernetes.io/g/sig-network

Community page git.k8s.io/community/sig-network

Maintainers wanted: node-local-dns · Kube Agentic Networking · External DNS

kubernetes.slack.com/archives/C09QYUH5W

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Thank you! Questions?

