

Introducing **netclab-xp**

Declarative Router Configuration with Crossplane

Extend Kubernetes to manage any resource anywhere

Powered by crossplane.io

Why netclab-xp Matters

- **Declarative & GitOps-ready** → manage routers like cloud resources
- **Kubernetes-native state** → continuous reconciliation
- **OpenConfig** → differences handled automatically
- **RESTCONF, JSON-RPC and eAPI** → one API over three mechanisms, on Arista EOS / cEOS
- **Fast onboarding** → add new routers or services easily

Abstractions

A whole network `Fabric`



One device `Router`



One setting `LoopbackInterface` / `RoutedInterface` / `BgpGlobal` / `BgpNeighbor`



RESTCONF · JSON-RPC · eAPI `provider-http` / `function-eapi`

RoutedInterface

```
cat <<EOF | kubectl apply -f -
apiVersion: eos.netlab.dev/v1alpha1
kind: RoutedInterface
metadata:
  name: r1e1ip
spec:
  endpoint: ceos01.default.svc.cluster.local
  ifName: Ethernet1
  ipv4Address: 10.10.10.1
  ipv4PrefixLength: 24
EOF
```

Check device

```
kubectl exec -ti ceos01 -- Cli
```

```
ceos01>en
ceos01#show run int Ethernet1
interface Ethernet1
    no switchport
    ip address 10.10.10.1/24
```

Two routers with BGP

```
cat <<EOF | kubectl apply -f -
apiVersion: eos.netclab.dev/v1alpha1
kind: Router
metadata:
  name: ceos01
spec:
  endpoint: ceos01.default.svc.cluster.local
  asn: 65001
  routerId: 10.0.0.1
  routedInterfaces:
  - ifName: Ethernet1
    ipv4Address: 10.1.2.1
    ipv4PrefixLength: 24
  bgpNeighbors:
  - neighborAsn: 65002
    neighborIp: 10.1.2.2
EOF
```

```
cat <<EOF | kubectl apply -f -
apiVersion: eos.netclab.dev/v1alpha1
kind: Router
metadata:
  name: ceos02
spec:
  endpoint: ceos02.default.svc.cluster.local
  asn: 65002
  routerId: 10.0.0.2
  routedInterfaces:
  - ifName: Ethernet1
    ipv4Address: 10.1.2.2
    ipv4PrefixLength: 24
  bgpNeighbors:
  - neighborAsn: 65001
    neighborIp: 10.1.2.1
EOF
```

Check resources

```
kubectl get routers
```

NAME	ENDPOINT	ASN	ROUTER-ID	SYNCED	READY	COMPOSITION	AGE
ceos01	ceos01.default.svc.cluster.local	65001	10.0.0.1	True	True	routers.eos.netlab.dev	3m36s
ceos02	ceos02.default.svc.cluster.local	65002	10.0.0.2	True	True	routers.eos.netlab.dev	59s

Check BGP on ceos01

```
kubectl exec ceos01 -- Cli -p15 -c "show ip bgp summary"
```

BGP summary information for VRF default

Router identifier 10.0.0.1, local AS number 65001

Neighbor Status Codes: m - Under maintenance

Neighbor	V	AS	MsgRcvd	MsgSent	InQ	OutQ	Up/Down	State	PfxRcd	PfxAcc	PfxAdv
10.1.2.2	4	65002	5	5	0	0	00:01:19	Estab	0	0	0

Verify more SYNCED and READY

```
kubectl get netclab
```

NAME	ENDPOINT	ASN	ROUTER-ID	SYNCED	READY	COMPOSITION	AGE	
bpgglobal.eos.netclab.dev/ceos01-abc5d7dbd2a	ceos01.default.svc.cluster.local	65001	10.0.0.1	True	True	bpgglobals.eos.netclab.dev	82s	
NAME	ENDPOINT	VRF	REMOTE-AS	REMOTE-IP	SYNCED	READY	COMPOSITION	AGE
bgpneighbor.eos.netclab.dev/ceos01-973c82346f34	ceos01.default.svc.cluster.local	default	65002	10.1.2.2	True	True	bgpneighbors.eos.netclab.dev	82s
NAME	ENDPOINT	SYNCED	READY	COMPOSITION	AGE			
iprouting.eos.netclab.dev/ceos01-5525df60016e	ceos01.default.svc.cluster.local	True	True	ip routings.eos.netclab.dev	82s			
NAME	ENDPOINT	IF	SYNCED	READY	COMPOSITION	AGE		
loopbackinterface.eos.netclab.dev/ceos01-f7043813344c	ceos01.default.svc.cluster.local	Loopback0	True	True	loopbackinterfaces.eos.netclab.dev	82s		
NAME	ENDPOINT	IF	IP	PLEN	SYNCED	READY	COMPOSITION	AGE
routedinterface.eos.netclab.dev/ceos01-466930a040e3	ceos01.default.svc.cluster.local	Loopback0	10.0.0.1	32	True	True	routedinterfaces.eos.netclab.dev	82s
routedinterface.eos.netclab.dev/ceos01-ce9e542ce06c	ceos01.default.svc.cluster.local	Ethernet1	10.1.2.1	24	True	True	routedinterfaces.eos.netclab.dev	82s
NAME	ENDPOINT	ASN	ROUTER-ID	SYNCED	READY	COMPOSITION	AGE	
router.eos.netclab.dev/ceos01	ceos01.default.svc.cluster.local	65001	10.0.0.1	True	True	routers.eos.netclab.dev	82s	

Next Steps

<https://netclab.dev>

Repo:

<https://github.com/netclab/netclab-xp>

Registry:

<https://marketplace.upbound.io/configurations/netclab/netclab-xp>

Listed in Crossplane Adopters:

```
curl -s https://github.com/crossplane/crossplane/blob/main/ADOPTERS.md | grep -o -E  
'netclab'
```