Introducing the Gateway API

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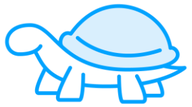
Gateway API

The Kubernetes Gateway API is a collection of resources that model service networking in Kubernetes.

Kubernetes Gateway API, What is the Gateway API?, https://bit.ly/3uE3K27

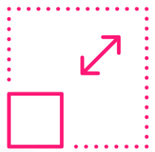
Evolution of Ingress



Ingress API was introduced in 2015 and has changed little in the intervening years

Community of users expressed a wish for a more expressive API to implement ingress

Work on the Gateway API commenced in 2019 and reached v1.0 status in 2023



Gateway API is intended to augment the capabilities provided by the Ingress API

Role-oriented Configuration

The Gateway API facilitates role-oriented configuration of ingress to Kubernetes clusters.

Infrastructure Provider

Supplies controller capability to enable ingress traffic.

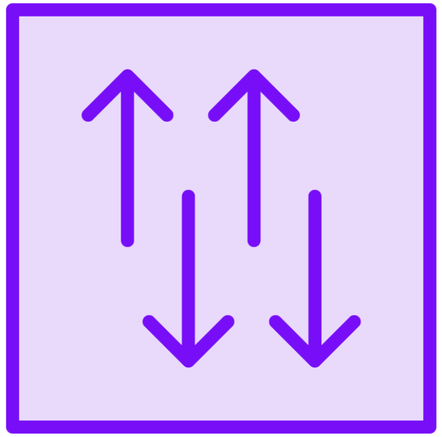
Cluster Administrator

Configures clusters to support the needs of multiple users.

Application Developer

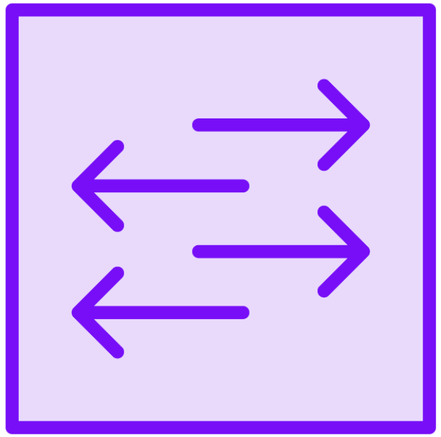
Delivers the app services that clients need to consume.

Traffic Types



North-South

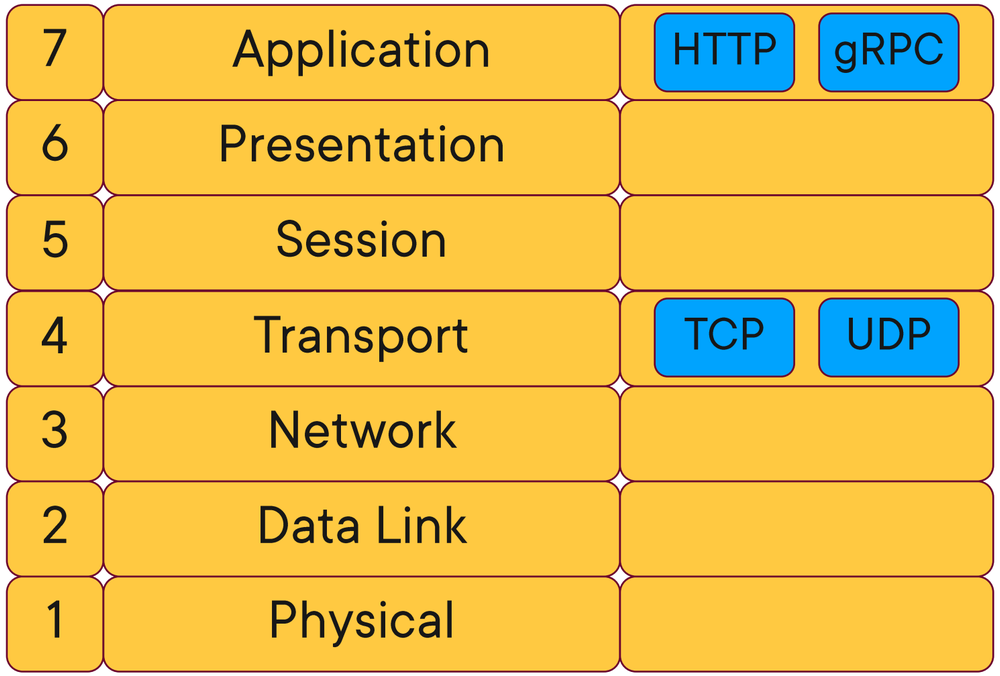
Traffic from outside the cluster for services inside.



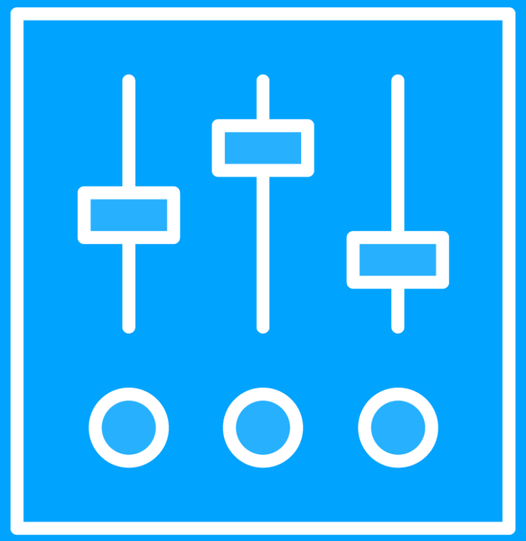
East-West

Traffic between services running in the cluster.

Supported Protocols



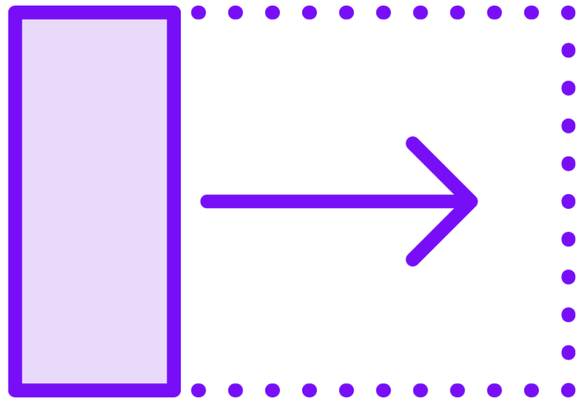
OSI Model



Feature Balance

It’s not possible to create an API that caters for every feature in every third-party proxy software solution!

Extensible



Gateway API is extensible by design

Filters

- Define how to manipulate traffic
- Custom filters are implementation-specific

Policy attachment

- Alter the values of object fields
- Add new fields to an object by reference

Definitions retain portability

Implementation

Custom Resource Definitions

Gateway Controllers

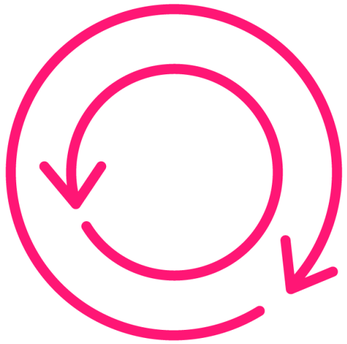
Custom Resource Definitions

Need to be installed before they can be used

Can be installed alongside a gateway controller

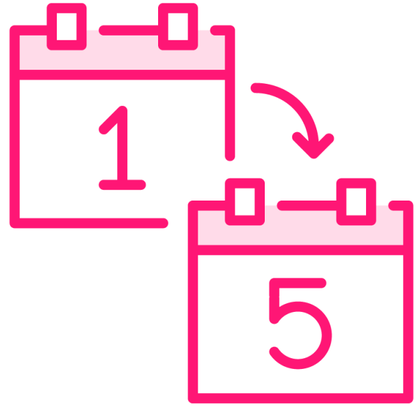
Check the gateway controller's documentation

Gateway API and Kubernetes



Asynchronous Releases

Gateway API release cadence does not follow Kubernetes release cadence.



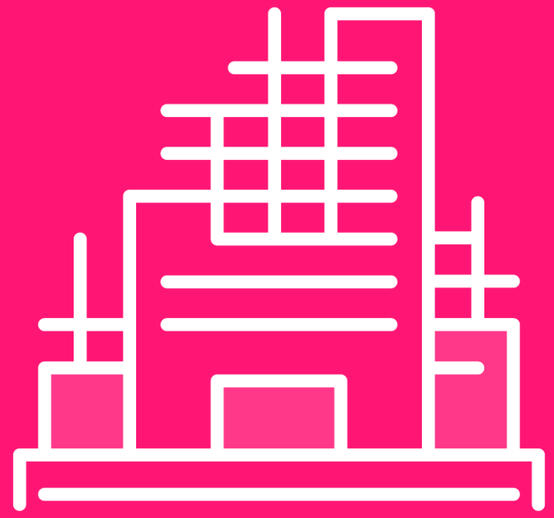
Supported Versions

Gateway API guarantees to support a minimum of 5 minor Kubernetes versions.

```yaml
apiVersion: apiextensions.k8s.io/v1
kind: CustomResourceDefinition
metadata:
  annotations:
    name: httproutes.gateway.networking.k8s.io
    gateway.networking.k8s.io/bundle-version: v1.0.0
```

Bundle Versions

The ‘bundle version’ annotation in the CRDs signifies the version of the Gateway API in use



Evolving API

The Gateway API is evolving as it matures in terms of its function.

Gateway API Release Channels

Standard

Includes resources and fields that have graduated to GA status

(e.g., v1)

Experimental

Standard channel + alpha versions of other resources and new fields

(e.g., v1alpha2)

```yaml
apiVersion: apiextensions.k8s.io/v1
kind: CustomResourceDefinition
metadata:
  annotations:
    name: httproutes.gateway.networking.k8s.io
    gateway.networking.k8s.io/bundle-version: v1.0.0
    gateway.networking.k8s.io/channel: experimental
```

Channel Annotation

The ‘channel’ annotation in the CRDs signifies the release channel in use for the CRD

CRD Annotations

Tell us what features are available to us

Help us to choose the best fit controller

Gateway Controller Implementation Status ¶

- Acnodal EPIC (public preview)
- Amazon Elastic Kubernetes Service (alpha)
- Apache APISIX (beta)
- Avi Kubernetes Operator (tech preview)
- Azure Application Gateway for Containers (preview)
- BIG-IP Kubernetes Gateway (beta)
- Cilium (beta)
- Contour (beta)
- Easegress (GA)
- Emissary-Ingress (Ambassador API Gateway) (alpha)
- Envoy Gateway (beta)
- Flomesh Service Mesh (beta)
- Gloo Gateway 2.0 (beta)
- Google Kubernetes Engine (GA)
- HAProxy Ingress (alpha)
- HashiCorp Consul
- Istio (beta)
- Kong (GA)

Demo

Installing the Envoy Gateway as a Gateway Controller

- Check versions
- Use Helm to install the Envoy Gateway

Up Next:

Routing HTTP Traffic to Backend Services