

Cilium setup

Let's have a look at our lab environment and see if Cilium has been installed correctly. The following command will wait for Cilium to be up and running and report its status:

```
cilium status --wait
```

In this lab's environment, Cilium has been installed using the `cilium` CLI and the following flags:

```
--helm-set ingressController.enabled=true \
--helm-set securityContext.privileged=true
```

Verify that Cilium was started with the Ingress Controller feature:

```
cilium config view | grep ingress-controller
```

In the next challenge, you will deploy an application and set up an Ingress for it, using Cilium's native Ingress class.

ingress

```
```yaml
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
 name: basic-ingress
 namespace: default
spec:
 ingressClassName: cilium
 rules:
 - http:
 paths:
 - backend:
 service:
 name: details
 port:
 number: 9080
 path: /details
 pathType: Prefix
 - backend:
 service:
 name: productpage
 port:
 number: 9080
 path: /
 pathType: Prefix
````
```

```
```bash
kubectl get ingress basic-ingress -o jsonpath='{.status.loadBalancer.ingress[0].ip}'
````
```

Patch to the svc cilium-ingress

```
```bash
kubectl patch svc cilium-ingress-basic-ingress \
--patch '{"spec": {"type": "LoadBalancer", "ports": [{ "name": "http", "port": 80, "protocol": "TCP", "targetPort": 80, "nodePort": 32100 }] }}'
````
```

Adding L7 visibility

i) Annotate pod

```
Dec 25 10:48:03.789: 10.244.0.231:39825 (ingress) <> default/productpage-v1-589b848cc9-qtzgj:9080 (ID:1295) to-overlay FORWARDED (TCP Flags: ACK)
Dec 25 10:48:03.789: 10.244.0.231:39825 (ingress) <> default/productpage-v1-589b848cc9-qtzgj:9080 (ID:1295) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 10:48:08.149: default/reviews-v3-b77c579-cg58x:36278 (ID:21890) <- default/ratings-v1-679fc7bf4-tdk7n:9080 (ID:6614) to-overlay FORWARDED (TCP Flags: ACK)
Dec 25 10:48:08.150: default/reviews-v3-b77c579-cg58x:36278 (ID:21890) <- default/ratings-v1-679fc7bf4-tdk7n:9080 (ID:6614) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 10:48:08.153: default/reviews-v3-b77c579-cg58x:36278 (ID:21890) <- default/ratings-v1-679fc7bf4-tdk7n:9080 (ID:6614) to-overlay FORWARDED (TCP Flags: ACK)
Dec 25 10:48:08.153: default/reviews-v3-b77c579-cg58x:36278 (ID:21890) <- default/ratings-v1-679fc7bf4-tdk7n:9080 (ID:6614) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 10:48:13.160: default/reviews-v3-b77c579-cg58x:36278 (ID:21890) >> default/ratings-v1-679fc7bf4-tdk7n:9080 (ID:6614) to-overlay FORWARDED (TCP Flags: ACK)
Dec 25 10:48:13.160: default/reviews-v3-b77c579-cg58x:36278 (ID:21890) >> default/ratings-v1-679fc7bf4-tdk7n:9080 (ID:6614) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 10:48:18.182: 10.244.1.204:43411 (ingress) <- default/details-v1-586577784f-x56hs:9080 (ID:11515) to-overlay FORWARDED (TCP Flags: ACK, FIN)
Dec 25 10:48:18.183: 10.244.1.204:43411 (ingress) <- default/details-v1-586577784f-x56hs:9080 (ID:11515) to-overlay FORWARDED (TCP Flags: ACK, FIN)
Dec 25 10:48:18.183: 10.244.1.204:43411 (ingress) <- default/details-v1-586577784f-x56hs:9080 (ID:11515) to-overlay FORWARDED (TCP Flags: ACK, FIN)
root@server: # kubectl annotate pod -l app=productpage --overwrite io.cilium.proxy-visibility=<Ingress/9080/TCP/HTTP>
pod/productpage-v1-589b848cc9-qtzgj annotated
root@server: #
```

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 8010 | 8011 | 8012 | 8013 | 8014 | 8015 | 8016 | 8017 | 8018 | 8019 | 8020 | 8021 | 8022 | 8023 | 8024 | 8025 | 8026 | 8027 | 8028 | 8029 | 8030 | 8031 | 8032 | 8033 | 8034 | 8035 | 8036 | 8037 | 8038 | 8039 | 8040 | 8041 | 8042 | 8043 | 8044 | 8045 | 8046 | 8047 | 8048 | 8049 | 8050 | 8051 | 8052 | 8053 | 8054 | 8055 | 8056 | 8057 | 8058 | 8059 | 8060 | 8061 | 8062 | 8063 | 8064 | 8065 | 8066 | 8067 | 8068 | 8069 | 80610 | 80611 | 80612 | 80613 | 80614 | 80615 | 80616 | 80617 | 80618 | 80619 | 80620 | 80621 | 80622 | 80623 | 80624 | 80625 | 80626 | 80627 | 80628 | 80629 | 80630 | 80631 | 80632 | 80633 | 80634 | 80635 | 80636 | 80637 | 80638 | 80639 | 80640 | 80641 | 80642 | 80643 | 80644 | 80645 | 80646 | 80647 | 80648 | 80649 | 80650 | 80651 | 80652 | 80653 | 80654 | 80655 | 80656 | 80657 | 80658 | 80659 | 80660 | 80661 | 80662 | 80663 | 80664 | 80665 | 80666 | 80667 | 80668 | 80669 | 806610 | 806611 | 806612 | 806613 | 806614 | 806615 | 806616 | 806617 | 806618 | 806619 | 806620 | 806621 | 806622 | 806623 | 806624 | 806625 | 806626 | 806627 | 806628 | 806629 | 806630 | 806631 | 806632 | 806633 | 806634 | 806635 | 806636 | 806637 | 806638 | 806639 | 806640 | 806641 | 806642 | 806643 | 806644 | 806645 | 806646 | 806647 | 806648 | 806649 | 806650 | 806651 | 806652 | 806653 | 806654 | 806655 | 806656 | 806657 | 806658 | 806659 | 806660 | 806661 | 806662 | 806663 | 806664 | 806665 | 806666 | 806667 | 806668 | 806669 | 8066610 | 8066611 | 8066612 | 8066613 | 8066614 | 8066615 | 8066616 | 8066617 | 8066618 | 8066619 | 8066620 | 8066621 | 8066622 | 8066623 | 8066624 | 8066625 | 8066626 | 8066627 | 8066628 | 8066629 | 8066630 | 8066631 | 8066632 | 8066633 | 8066634 | 8066635 | 8066636 | 8066637 | 8066638 | 8066639 | 8066640 | 8066641 | 8066642 | 8066643 | 8066644 | 8066645 | 8066646 | 8066647 | 8066648 | 8066649 | 8066650 | 8066651 | 8066652 | 8066653 | 8066654 | 8066655 | 8066656 | 8066657 | 8066658 | 8066659 | 8066660 | 8066661 | 8066662 | 8066663 | 8066664 | 8066665 | 8066666 | 8066667 | 8066668 | 8066669 | 80666610 | 80666611 | 80666612 | 80666613 | 80666614 | 80666615 | 80666616 | 80666617 | 80666618 | 80666619 | 80666620 | 80666621 | 80666622 | 80666623 | 80666624 | 80666625 | 80666626 | 80666627 | 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L7 info

| Source Service | Destination Service | Destination Port | L7 info |
|----------------|---------------------|------------------|--|
| ingress | productpage default | 9080 | — |
| ingress | productpage default | 9080 | — |
| world | productpage default | 9080 | → GET /static/bootstrap/fonts/glyphic... |
| ingress | productpage default | 9080 | — |

GRPC ingress

The above one was HTTP ingress

Demo app <https://github.com/GoogleCloudPlatform/microservices-demo>

```
```bash
curl -o demo.proto
https://raw.githubusercontent.com/GoogleCloudPlatform/microservices-demo/master/pb/demo.proto
```
```

```

```
deployment.apps/adservice created
service/adservice created
error: resource mapping not found for name: "" namespace: "" from "/opt/gcp-microservices-demo.yml": no matches for kind "Kustomization"
ensure CRDs are installed first
root@server:~# curl -o demo.proto https://raw.githubusercontent.com/GoogleCloudPlatform/microservices-demo/master/pb/demo.proto
 % Total % Received % Xferd Average Speed Time Time Current
 Dload Upload Total Spent Left Speed
100 6069 100 6069 0 0 19384 0 --:-- --:-- --:-- 19451
root@server:~# kubectl apply -f grpc-ingress.yaml
ingress.networking.k8s.io/grpc-ingress created
root@server:~# kubectl get ingress
INGRESS_IP=$(kubectl get ingress grpc-ingress -o jsonpath='{.status.loadBalancer.ingress[0].ip}')
NAME CLASS HOSTS ADDRESS PORTS AGE
basic-ingress cilium * 172.18.255.200 80 13m
grpc-ingress cilium * 172.18.255.202 80 7s
root@server:~# cat grpc-ingress.yaml
apiVersion: networking.k8s.io/v1
kind: Ingress
```
1
```

Deploy the ingress

```
  % Total    % Received % Xferd  Average Speed   Time   Time     Current
          Dload  Upload Total Spent   Left Speed
100  6069  100  6069    0     0 19384      0 --:-- --:-- --:-- 19451
root@server:~# kubectl apply -f grpc-ingress.yaml
ingress.networking.k8s.io/grpc-ingress created
root@server:~# kubectl get ingress
INGRESS_IP=$(kubectl get ingress grpc-ingress -o jsonpath='{.status.loadBalancer.ingress[0].ip}')
NAME        CLASS   HOSTS   ADDRESS      PORTS   AGE
basic-ingress cilium * 172.18.255.200  80      13m
grpc-ingress cilium * 172.18.255.202  80      7s
root@server:~#
```

```
```ingress
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
 name: grpc-ingress
 namespace: default
spec:
 ingressClassName: cilium
 rules:
 - http:
 paths:
 - backend:
 service:
 name: productcatalogservice
 port:
 number: 3550
 path: /hipstershop.ProductCatalogService
 pathType: Prefix
 - backend:
```

```
service:
 name: currencyservice
 port:
 number: 7000
path: /hipstershop.CurrencyService
 pathType: Prefix
...
```bash  
grpcurl -plaintext -proto ./demo.proto $INGRESS_IP:80  
hipstershop.CurrencyService/GetSupportedCurrencies  
  
grpcurl -plaintext -proto ./demo.proto $INGRESS_IP:80  
hipstershop.ProductCatalogService/ListProducts  
```
```

## SNI-based Ingress rules

Due to their frontal position in the cluster, Kubernetes Ingress are commonly used as TLS termination proxies.

In this challenge, we will use self-signed certificates for simplicity. In production, it is recommended to either inject known CA credentials, or generate dynamic certificates using e.g. Cert Manager.

<https://github.com/FiloSottile/mkcert>

Create a certificate that will validate *bookinfo.cilium.rocks* and *hipstershop.cilium.rocks*  
**mkcert "\*.cilium.rocks"**

**Mkcert created a key (`_wildcard.cilium.rocks-key.pem`) and a certificate (`_wildcard.cilium.rocks.pem`)**

```
```bash
kubectl create secret tls demo-cert --key=_wildcard.cilium.rocks-key.pem
--cert=_wildcard.cilium.rocks.pem
...```

```

These three services will be secured via TLS and accessible on two domain names:

- `bookinfo.cilium.rocks`
- `hipstershop.cilium.rocks`

```
```tls-ingress
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
 name: tls-ingress
 namespace: default
spec:
 ingressClassName: cilium
 rules:
 - host: hipstershop.cilium.rocks
 http:
 paths:
 - backend:
 service:
 name: productcatalogservice
 port:
 number: 3550
 path: /hipstershop.ProductCatalogService
 pathType: Prefix
 - backend:
 service:
 name: currencyservice
 port:
 number: 7000

```

```
path: /hipstershop.CurrencyService
pathType: Prefix
- host: bookinfo.cilium.rocks
 http:
 paths:
 - backend:
 service:
 name: details
 port:
 number: 9080
 path: /details
 pathType: Prefix
 - backend:
 service:
 name: productpage
 port:
 number: 9080
 path: /
 pathType: Prefix
 tls:
 - hosts:
 - bookinfo.cilium.rocks
 - hipstershop.cilium.rocks
 secretName: demo-cert
...
/etc/hosts
```bash
cat << EOF >> /etc/hosts
${INGRESS_IP} bookinfo.cilium.rocks
${INGRESS_IP} hipstershop.cilium.rocks
EOF
```
```bash
mkcert -install
curl https://bookinfo.cilium.rocks/details/1
grpcurl -proto ./demo.proto hipstershop.cilium.rocks:443
hipstershop.ProductCatalogService/ListProducts3

mkcert -uninstall
```

```



- Cilium installs an Ingress CRD

---

- Cilium ingresses support both HTTP and gRPC requests

---

- Cilium ingresses use Cilium's Envoy Proxy under the hood

---

- Cilium ingresses can create TLS certificates

Multiple answers can be checked as correct.

# Envoy proxy controller

## The CiliumEnvoyConfig CRD

The Envoy proxy provided by Cilium on each node can be configured using Kubernetes CRDS.

Cilium Service Mesh defines `CiliumEnvoyConfig` and `CiliumClusterwideEnvoyConfig` CRDs which allow users to set the configuration of the Envoy component built into Cilium agents.

This feature is enabled using the `--enable-envoy-config` feature flag.

## ⓘ Note: Tunnelling mode required

There is currently an [issue](#) with Envoy traffic not being subjected to datapath processing properly in direct datapath mode. The workaround is to run Cilium in tunnelling mode, by installing with `--datapath-mode=vxlan` as an option on `cilium install`.

Run cilium connectivity test to deploy the test applications used for L7 egress tests:

```
```bash
cilium connectivity test --test egress-l7
````
```

The test workloads run in the namespace `cilium-test` and consist of

two client deployments, `client` and `client2`

two backend services, `echo-other-node` and `echo-same-node`

| Test [client-egress-[7-named-port]]                                           |       |         |          |      |              |              |                |                 |                                                          |               |
|-------------------------------------------------------------------------------|-------|---------|----------|------|--------------|--------------|----------------|-----------------|----------------------------------------------------------|---------------|
| .....                                                                         |       |         |          |      |              |              |                |                 |                                                          |               |
| [±] Skipping Test [to-fqdns]                                                  |       |         |          |      |              |              |                |                 |                                                          |               |
| ✓ All 3 tests (32 actions) successful, 28 tests skipped, 0 scenarios skipped. |       |         |          |      |              |              |                |                 |                                                          |               |
| root@server:~# rubectl get pods -n cilium-test --show-labels -o wide          |       |         |          |      |              |              |                |                 |                                                          |               |
| NAME                                                                          | READY | STATUS  | RESTARTS | AGE  | IP           | NODE         | NOMINATED NODE | READINESS GATES | LABELS                                                   |               |
| client-668b56fb44-m4hjx                                                       | 1/1   | Running | 0        | 2m3s | 10.244.2.94  | kind-worker  | <none>         | <none>          | kind=client,name=client,pod-template-hash=668b56fb44     |               |
| client2-bf46d8f5d-hbdw4                                                       | 1/1   | Running | 0        | 2m3s | 10.244.2.154 | kind-worker  | <none>         | <none>          | kind=client,name=client2,other=client,pod-template-ha    | b746d8f5d     |
| echo-other-node-78958cc957-8x6z4                                              | 2/2   | Running | 0        | 2m2s | 10.244.1.80  | kind-worker2 | <none>         | <none>          | first=echo,kind=echo,name=echo-other-node,pod-template-h |               |
| echo-same-node-6b5794d84f-fgsvx                                               | 2/2   | Running | 0        | 2m3s | 10.244.2.212 | kind-worker  | <none>         | <none>          | kind=echo,name=echo-same-node,other=echo,pod-template-ha | sh=6b5794d84f |

You can see that

Only `client2` is labelled with `other=client` - we will use this in a `CiliumNetworkPolicy` definition later in this example

The pods for `client`, `client2` and `echo-same-node` run on one node, while `echo-other-node` is scheduled to another node

We are going to use Envoy configuration to load-balance requests between these two backend services `echo-other-node` and `echo-same-node`.

```

root@server:~# CLIENT2=$(kubectl -n cilium-test get po -l name=client2 -o jsonpath='{.items[0].metadata.name}')
root@server:~# kubectl exec -it -n cilium-test $CLIENT2 -- curl -so /dev/null -w "%{http_code}\n" echo-same-node:8080/
200
root@server:~# kubectl exec -it -n cilium-test $CLIENT2 -- curl -so /dev/null -w "%{http_code}\n" echo-other-node:8080/foo
404
root@server:~# kubectl exec -it -n cilium-test $CLIENT2 -- curl -so /dev/null -w "%{http_code}\n" echo-other-node:8088/foo
404
root@server:~#

```

CLIENT2=\$(kubectl -n cilium-test get po -l name=client2 -o jsonpath='{.items[0].metadata.name}')  
Try accessing both echo-same-node and echo-other-node services from within the client2 pod:  

```

kubectl exec -it -n cilium-test $CLIENT2 --

```

```

kubectl exec -it -n cilium-test $CLIENT2 --

```

Both should return a code 200.

Notice in > Terminal 1 that Hubble shows all the flows between these pods as being either `to/from-stack` or `to/from-endpoint`: there is no traffic marked as flowing to or from the proxy at this stage (which would be marked as `to-proxy` or `from-proxy`).  
Back to > Terminal 2, verify that you get a 404 error response if you curl to the non-existent URL `/foo` on these services:

```

kubectl exec -it -n cilium-test $CLIENT2 --

```

```

client2-bf46d8f5d-hbdw4
root@server:~# hubble observe --from-pod cilium-test/$CLIENT2 -f
Dec 25 11:26:04.601: cilium-test/client2-bf46d8f5d-hbdw4:43861 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-overlay FORWARDED (UDP)
Dec 25 11:26:04.602: cilium-test/client2-bf46d8f5d-hbdw4:43861 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-endpoint FORWARDED (UDP)
Dec 25 11:26:04.603: cilium-test/client2-bf46d8f5d-hbdw4:58756 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: SYN)
Dec 25 11:26:04.603: cilium-test/client2-bf46d8f5d-hbdw4:58756 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:26:04.603: cilium-test/client2-bf46d8f5d-hbdw4:58756 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:26:04.603: cilium-test/client2-bf46d8f5d-hbdw4:58756 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:26:04.606: cilium-test/client2-bf46d8f5d-hbdw4:58756 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:26:10.852: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> kube-system/coredns-6d4b75cb6d-6rhxr:53 (ID:62256) to-overlay FORWARDED (UDP)
Dec 25 11:26:10.852: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> kube-system/coredns-6d4b75cb6d-6rhxr:53 (ID:62256) to-endpoint FORWARDED (UDP)
Dec 25 11:26:10.853: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-overlay FORWARDED (TCP Flags: SYN)
Dec 25 11:26:10.853: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: SYN)
Dec 25 11:26:10.854: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:26:10.854: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:26:10.854: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:26:10.857: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:26:10.857: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:26:10.857: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:26:10.857: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:26:10.857: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:26:10.857: cilium-test/client2-bf46d8f5d-hbdw4:58045 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, FIN)

Dec 25 11:28:19.039: cilium-test/client2-bf46d8f5d-hbdw4:60138 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-overlay FORWARDED (UDP)
Dec 25 11:28:19.039: cilium-test/client2-bf46d8f5d-hbdw4:60138 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-endpoint FORWARDED (UDP)
Dec 25 11:28:19.040: cilium-test/client2-bf46d8f5d-hbdw4:38840 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: SYN)
Dec 25 11:28:19.040: cilium-test/client2-bf46d8f5d-hbdw4:38840 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:28:19.040: cilium-test/client2-bf46d8f5d-hbdw4:38840 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:28:19.040: cilium-test/client2-bf46d8f5d-hbdw4:38840 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:28:19.045: cilium-test/client2-bf46d8f5d-hbdw4:38840 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK)

Dec 25 11:28:35.996: cilium-test/client2-bf46d8f5d-hbdw4:53093 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-overlay FORWARDED (UDP)
Dec 25 11:28:35.997: cilium-test/client2-bf46d8f5d-hbdw4:53093 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-endpoint FORWARDED (UDP)
Dec 25 11:28:35.998: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-overlay FORWARDED (TCP Flags: SYN)
Dec 25 11:28:35.998: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: SYN)
Dec 25 11:28:35.998: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:28:35.998: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:28:35.998: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:28:36.008: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:28:36.008: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:28:36.009: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:28:36.009: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:28:36.009: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:28:36.009: cilium-test/client2-bf46d8f5d-hbdw4:57258 (ID:5404) -> cilium-test/echo-other-node-78958cc957-6x6z4:8080 (ID:4974) to-endpoint FORWARDED (TCP Flags: ACK, FIN)

Dec 25 11:30:54.792: cilium-test/client2-bf46d8f5d-hbdw4:43418 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) policy-verdict:L3-L4 ALLOWED (UDP)
Dec 25 11:30:54.792: cilium-test/client2-bf46d8f5d-hbdw4:43418 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-proxy FORWARDED (UDP)
Dec 25 11:30:54.793: cilium-test/client2-bf46d8f5d-hbdw4:43418 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) dns-request FORWARDED (DNS Query echo-same-node.cilium-test.svc.c
luster.local. AAA)
Dec 25 11:30:54.793: cilium-test/client2-bf46d8f5d-hbdw4:43418 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) dns-request FORWARDED (DNS Query echo-same-node.cilium-test.svc.c
luster.local. A)
Dec 25 11:30:54.795: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-cb0794d84f-fgsvx:8080 (ID:14070) policy-verdict:L3-L4 ALLOWED (TCP Flags: SYN)
Dec 25 11:30:54.795: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: SYN)
Dec 25 11:30:54.795: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK)
Dec 25 11:30:54.795: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:30:54.796: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) http-request FORWARDED (HTTP/1.1 GET http://echo-same-no
de:8080/)
Dec 25 11:30:54.800: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:30:54.800: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK)

```

## After adding the egress l7 policy

```

404
root@server:~# kubectl -n cilium-test apply -f https://raw.githubusercontent.com/cilium/cilium/master/connectivity/manifests/client-egress-l7-http.yaml
root@server:~# kubectl -n cilium-test apply -f https://raw.githubusercontent.com/cilium/cilium/master/connectivity/manifests/client-egress-only-dns.yaml
ciliumnetworkpolicy.cilium.io/client-egress-l7-http created
ciliumnetworkpolicy.cilium.io/client-egress-only-dns created
root@server:~# kubectl exec -it -n cilium-test $CLIENT2 -- curl -so /dev/null -w "%{http_code}\n" echo-same-node:8080/
200
root@server:~#

```

```

Dec 25 11:30:54.792: cilium-test/client2-bf46d8f5d-hbdw4:43418 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) policy-verdict:L3-L4 ALLOWED (UDP)
Dec 25 11:30:54.792: cilium-test/client2-bf46d8f5d-hbdw4:43418 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-proxy FORWARDED (UDP)
Dec 25 11:30:54.793: cilium-test/client2-bf46d8f5d-hbdw4:43418 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) dns-request FORWARDED (DNS Query echo-same-node.cilium-test.svc.c
luster.local. AAA)
Dec 25 11:30:54.793: cilium-test/client2-bf46d8f5d-hbdw4:43418 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) dns-request FORWARDED (DNS Query echo-same-node.cilium-test.svc.c
luster.local. A)
Dec 25 11:30:54.795: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-cb0794d84f-fgsvx:8080 (ID:14070) policy-verdict:L3-L4 ALLOWED (TCP Flags: SYN)
Dec 25 11:30:54.795: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: SYN)
Dec 25 11:30:54.795: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK)
Dec 25 11:30:54.795: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:30:54.796: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) http-request FORWARDED (HTTP/1.1 GET http://echo-same-no
de:8080/)
Dec 25 11:30:54.800: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:30:54.800: cilium-test/client2-bf46d8f5d-hbdw4:60090 (ID:5404) -> cilium-test/echo-same-node-609794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK)

```

```
kubectl exec -it -n cilium-test $CLIENT2 --
```

Notice in >\_ Terminal 1 that the Hubble output now includes flows `to-proxy`, and also shows the HTTP protocol information at level 7 (for example

```
(HTTP/1.1 GET http://echo-same-node:8080/).
```

This is because adding Layer 7 policy enables Layer 7 visibility, as requests are now routed through the Envoy proxy.

```
kubectl exec -it -n cilium-test $CLIENT2 -- curl -so /dev/null -w "%{http_code}\n" echo-same-node:8080/foo
```

```
Dec 25 11:35:46.474: cilium-test/client2-bf46d0f5d-hbdw4:60409 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rt:53 (ID:62256) policy-verdict:L3-L4 ALLOWED (UDP)
Dec 25 11:35:46.474: cilium-test/client2-bf46d0f5d-hbdw4:60409 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rt:53 (ID:62256) to-proxy FORWARDED (UDP)
Dec 25 11:35:46.475: cilium-test/client2-bf46d0f5d-hbdw4:60409 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rt:53 (ID:62256) dns-request FORWARDED (DNS Query echo-same-node.cilium-test.svc.c
luster.local. AAAA)
Dec 25 11:35:46.475: cilium-test/client2-bf46d0f5d-hbdw4:60409 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rt:53 (ID:62256) dns-request FORWARDED (DNS Query echo-same-node.cilium-test.svc.c
luster.local. A)
Dec 25 11:35:46.477: cilium-test/client2-bf46d0f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) policy-verdict:L3-L4 ALLOWED (TCP Flags: SYN)
Dec 25 11:35:46.477: cilium-test/client2-bf46d0f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: SYN)
Dec 25 11:35:46.477: cilium-test/client2-bf46d0f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK)
Dec 25 11:35:46.477: cilium-test/client2-bf46d0f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:35:46.479: cilium-test/client2-bf46d0f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) http-request DROPPED (HTTP/1.1 GET http://echo-same-node
:8080/foo)
Dec 25 11:35:46.480: cilium-test/client2-bf46d0f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK)
Dec 25 11:35:46.480: cilium-test/client2-bf46d0f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK, FIN)
```

As we can see the `/foo` is getting dropped as this is not there

So adding envoy load-balancing and URL re-writing

We are now going to add an Envoy configuration to achieve two goals:

- load balance requests to both echo-same-node and echo-other-node backends
- rewrite `/foo` to `/`

```
cat envoy-test.yaml
```

```
```yaml
apiVersion: cilium.io/v2
kind: CiliumClusterwideEnvoyConfig
metadata:
  name: envoy-lb-listener
spec:
  services:
    - name: echo-other-node
      namespace: cilium-test
    - name: echo-same-node
      namespace: cilium-test
```

```
resources:
  - "@type": type.googleapis.com/envoy.config.listener.v3.Listener
    name: envoy-lb-listener
    filter_chains:
      - filters:
          - name: envoy.filters.network.http_connection_manager
            typed_config:
              "@type":
                type.googleapis.com/envoy.extensions.filters.network.http_connection_manager.v3.HttpConnectionManager
              stat_prefix: envoy-lb-listener
              rds:
                route_config_name: lb_route
              http_filters:
                - name: envoy.filters.http.router
  - "@type": type.googleapis.com/envoy.config.route.v3.RouteConfiguration
    name: lb_route
    virtual_hosts:
      - name: "lb_route"
        domains: [ "*" ]
        routes:
          - match:
              prefix: "/"
            route:
              weighted_clusters:
                clusters:
                  - name: "cilium-test/echo-same-node"
                    weight: 50
                  - name: "cilium-test/echo-other-node"
                    weight: 50
              retry_policy:
                retry_on: 5xx
                num_retries: 3
                per_try_timeout: 1s
              regex_rewrite:
                pattern:
                  google_re2: { }
                  regex: "^/foo.*$"
                  substitution: "/"
  - "@type": type.googleapis.com/envoy.config.cluster.v3.Cluster
    name: "cilium-test/echo-same-node"
    connect_timeout: 5s
    lb_policy: ROUND_ROBIN
    type: EDS
    outlier_detection:
      split_external_local_origin_errors: true
      consecutive_local_origin_failure: 2
  - "@type": type.googleapis.com/envoy.config.cluster.v3.Cluster
```

```
name: "cilium-test/echo-other-node"
connect_timeout: 3s
lb_policy: ROUND_ROBIN
type: EDS
outlier_detection:
  split_external_local_origin_errors: true
  consecutive_local_origin_failure: 2
...
```

This configuration listens for traffic intended for either of the two `echo-` services and:

- load-balances 50/50 between the two backend `echo-` services:

```
weighted_clusters:
  clusters:
    - name: "cilium-test/echo-same-node"
      weight: 50
    - name: "cilium-test/echo-other-node"
      weight: 50
```

- retries up to 3 times when the backends fail:

```
retry_policy:
  retry_on: 5xx
  num_retries: 3
  per_try_timeout: 1s
```

- retries up to 3 times when the backends fail:

```
retry_policy:

  retry_on: 5xx

  num_retries: 3

  per_try_timeout: 1s
```

- rewrites the path `/foo` to `/`:

```
regex_rewrite:

  pattern:

    google_re2: { }

    regex: "^/foo.*$"

  substitution: "/"
```

kubectl exec -it -n cilium-test \$CLIENT2 -- curl -so /dev/null -w "%{http_code}\n"
echo-same-node:8080/foo

```
[8889/100]
Dec 25 11:35:46.480: cilium-test/client2-bf46d8f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK)
Dec 25 11:35:46.480: cilium-test/client2-bf46d8f5d-hbdw4:37776 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-proxy FORWARDED (TCP Flags: ACK, FIN)

Dec 25 11:42:52.791: cilium-test/client2-bf46d8f5d-hbdw4:35372 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) policy-verdict:L3-L4 ALLOWED (UDP)
Dec 25 11:42:52.791: cilium-test/client2-bf46d8f5d-hbdw4:35372 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) to-proxy FORWARDED (UDP)
Dec 25 11:42:52.792: cilium-test/client2-bf46d8f5d-hbdw4:35372 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) dns-request FORWARDED (DNS Query echo-same-node.cilium-test.svc.c
luster.local. AAAA)
Dec 25 11:42:52.792: cilium-test/client2-bf46d8f5d-hbdw4:35372 (ID:5404) -> kube-system/coredns-6d4b75cb6d-8j8rf:53 (ID:62256) dns-request FORWARDED (DNS Query echo-same-node.cilium-test.svc.c
luster.local. A)
Dec 25 11:42:52.793: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node:8080 (world) to-proxy FORWARDED (TCP Flags: SYN)
Dec 25 11:42:52.793: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node:8080 (world) to-proxy FORWARDED (TCP Flags: ACK)
Dec 25 11:42:52.794: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node:8080 (world) to-proxy FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:42:52.794: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) policy-verdict:L3-L4 ALLOWED (TCP Flags: SYN)
Dec 25 11:42:52.794: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: SYN)
Dec 25 11:42:52.794: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK)
Dec 25 11:42:52.795: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK, PSH)
Dec 25 11:42:52.795: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) http-request FORWARDED (HTTP/1.1 GET http://echo-same-n
ode:8080/)
Dec 25 11:42:52.797: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node:8080 (world) to-proxy FORWARDED (TCP Flags: ACK, FIN)
Dec 25 11:42:52.798: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node:8080 (world) to-proxy FORWARDED (TCP Flags: ACK)
Dec 25 11:42:52.798: cilium-test/client2-bf46d8f5d-hbdw4:38756 (ID:5404) -> cilium-test/echo-same-node-6b9794d84f-fgsvx:8080 (ID:14070) to-endpoint FORWARDED (TCP Flags: ACK, FIN)
```

- Cilium Envoy configs are always cluster wide

- The CiliumEnvoyConfig CRD allows to load balance between two services

- The CiliumEnvoyConfig CRD allows to retry services

- The CiliumEnvoyConfig CRD allows to mesh two Kubernetes clusters

Multiple answers can be checked as correct.