

OPEN POLICY AGENT

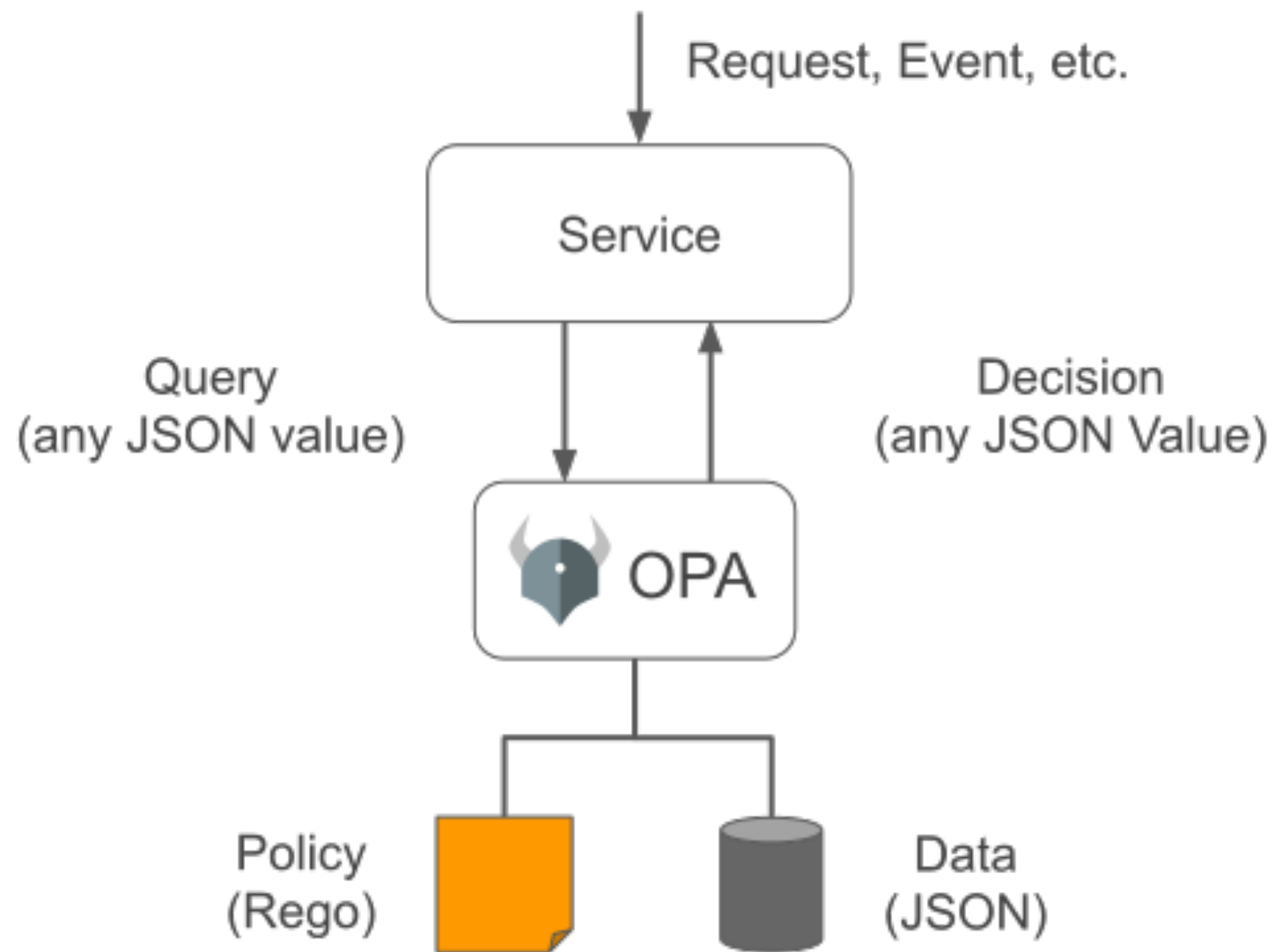
Introduction and Short Demo - <https://github.com/keshavprasadms/opa-demo.git>

KESHAV PRASAD

INTRODUCTION

- Open policy agent is a general purpose policy engine
- Policy as code
- Declarative model
- Offload decision making from source code to Opa
- Simple code language - Rego
- Can be used in Micro Services, Kubernetes, API gateways etc
- Written in Golang and is super fast and super efficient
- Open Source CNCF graduated project
 - <https://www.cncf.io/projects/>
 - <https://www.openpolicyagent.org/>

REQUEST FLOW



JSON WEB TOKENS

- JSON Web Tokens are an open, industry standard RFC 7519 method for representing claims securely between two parties
- JWTs is the most common way a client authenticates with a server
- A JWT usually contains information about the user
- A JWT token usually has an expiry
- JWT can be created with many algorithms such as RS256, RS512, HS256 etc
- A JWT consists of three parts
 - Header
 - Payload
 - Signature
- JWTs can be verified offline

SAMPLE JWT TOKEN - RS256 (RSA WITH SHA-256)

Algorithm	RS256
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Encoded

eyJhbGciOiJSUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWUiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWF0eWVudCI6MTUxNjIzOTAYmn0.NHVaYe26MbT0YhSKkoKYdFVomg4i8ZJd8_-RU8VNbftc4TSMb4bXP3l3YlNWACwyXPGffz5aXC6lty1Y2t4SWRqGteragsVdZufDn5BlnJl9pdR_kdVFUsra2rWKEofkZeIC4yWytE58sMIihvo9H1ScmmVwBcQP6XETqYd0aSHp1gOa9RdUPDvoXQ5oqygTqVtxaDr6wUFKrKIgtgBMzWIIdNZ6y709E0DhEPTbE9rfBo6KTFsHAZnMg4k68CDp2woYIaXbmYTWcvbzIuH07_37GT79XdIwkm95QJ7hYC9RiwrV7mesbY4PAahERJawntho0my942XheVLmGwLMBkQ

Decoded EDIT THE PAYLOAD AND SECRET

HEADER: ALGORITHM & TOKEN TYPE

```
{
  "alg": "RS256",
  "typ": "JWT"
}
```

PAYLOAD: DATA

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "admin": true,
  "iat": 1516239022
}
```

VERIFY SIGNATURE

```
RSASHA256(  
    base64UrlEncode(header) + "." +  
    base64UrlEncode(payload),  
    -----BEGIN PUBLIC KEY-----  
    MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ  
    8AMIIBCgKCAQEau1SU1LFVLPPhCozMx  
    H2Mo  
    -----BEGIN PRIVATE KEY-----
```

SAMPLE JWT TOKEN - HS256 (HMAC WITH SHA-256)

Algorithm

HS256

▼

Encoded

PASTE A TOKEN HERE

eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyfQ.SflKxwRJSMeKKF2QT4fwpMeJf36P0k6yJV_adQssw5c

Decoded

EDIT THE PAYLOAD AND SECRET

HEADER: ALGORITHM & TOKEN TYPE

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

PAYLOAD: DATA

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "iat": 1516239022
}
```

VERIFY SIGNATURE

```
HMACSHA256(
  base64UrlEncode(header) + "." +
  base64UrlEncode(payload),
  your-256-bit-secret
) ☐ secret base64 encoded
```

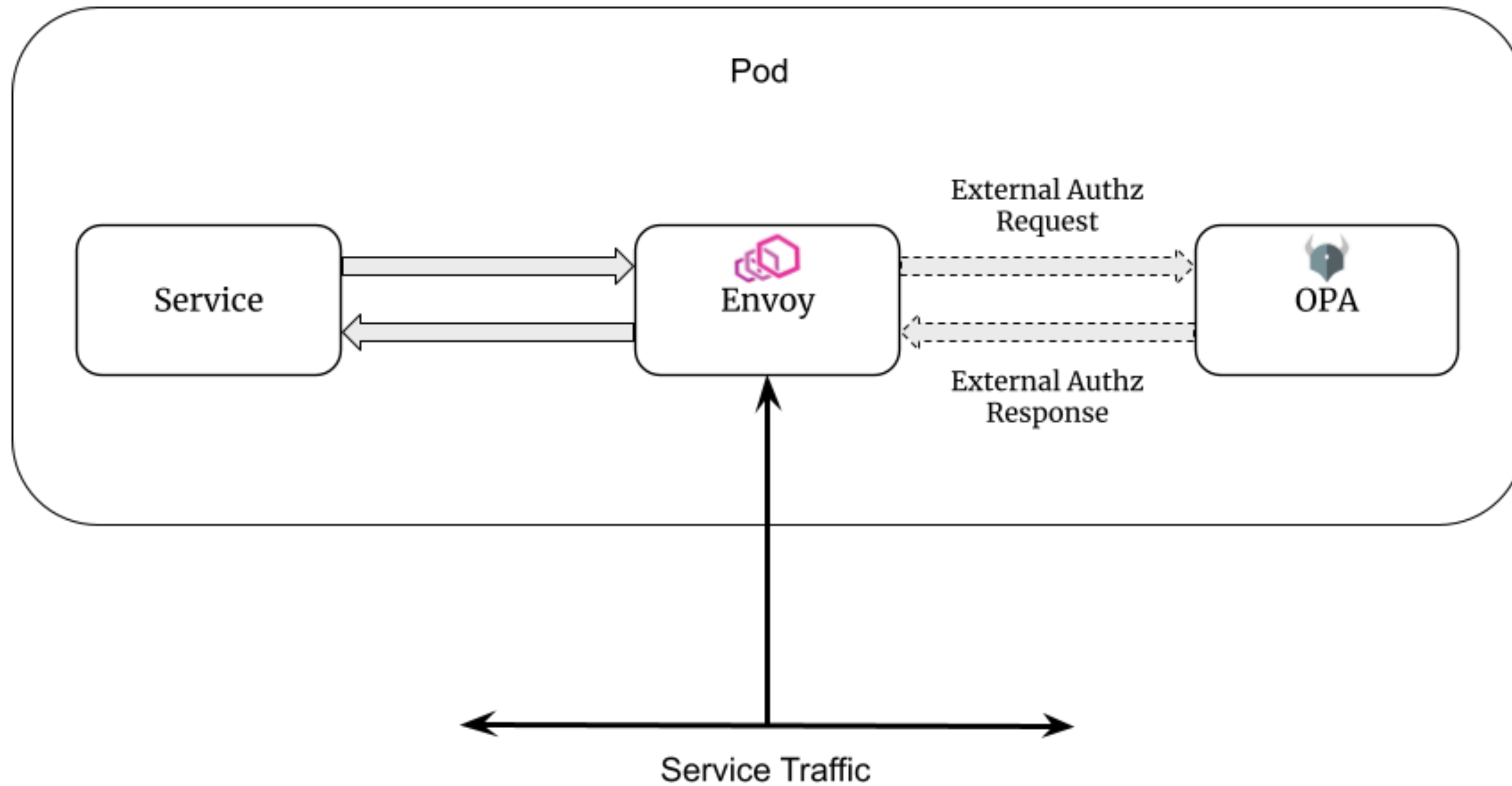
RUNNING OPA

- OPA is a go lang binary that can be downloaded and run without any installation required
- Works on Linux, MacOS, Windows
- Check the download instructions here
 - <https://www.openpolicyagent.org/docs/latest/#running-opa>

OPA DOCUMENTS AND FUNCTIONS

- data
- package
- built in functions
- input
- Check out the below URL for more information, commands and hands on
 - <https://github.com/keshavprasadms/opa-demo/blob/main/README.md>

OPA ARCHITECTURE ON KUBERNETES



OPA ECOSYSTEM

- OPA works with many softwares and packages
- There are OPA libraries also for various languages such as NodeJs, Java etc
- For more details see - <https://www.openpolicyagent.org/docs/latest/ecosystem/>