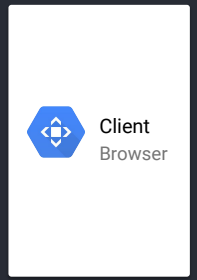
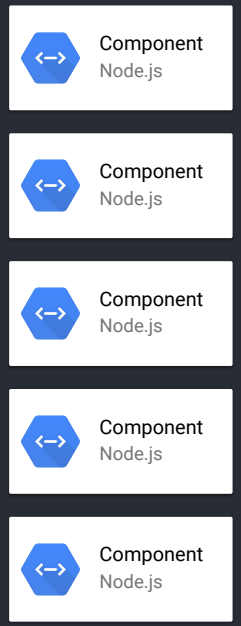
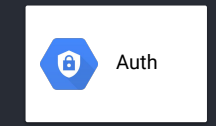
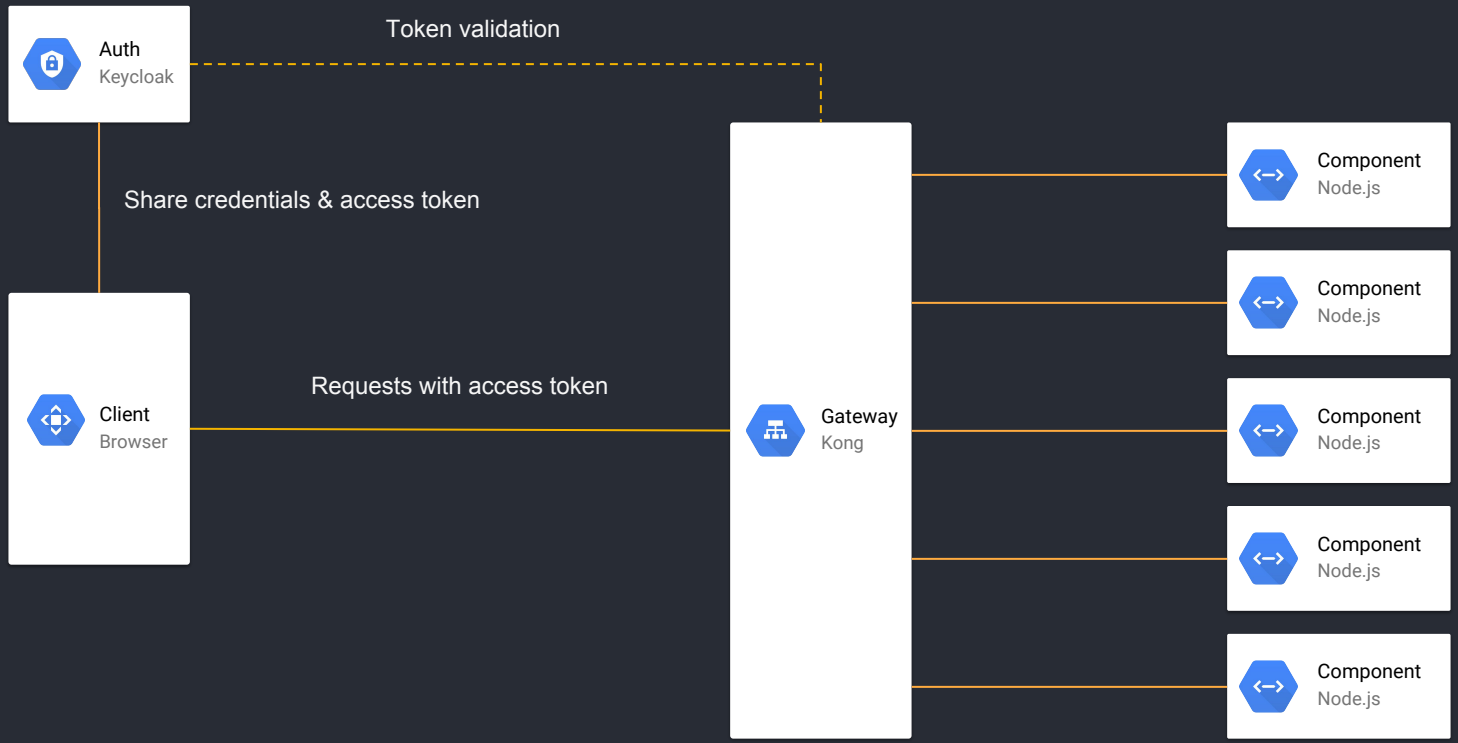
Securing Microservices with Kong and Keycloak


Client
Browser


Component
Node.js
Component
Node.js
Component
Node.js
Component
Node.js
Component
Node.js


Auth


Share credentials & access token
Requests with access token
Client
Browser
Component
Node.js
Component
Node.js
Component
Node.js
Component
Node.js
Component
Node.js
Auth
Token validation


Auth
Keycloak
Token validation
Share credentials & access token
Client
Browser
Requests with access token
Gateway
Kong
Component
Node.js
Component
Node.js
Component
Node.js
Component
Node.js
Component
Node.js

Keycloak by Redhat

Authentication suite

Open source
Admin UI & RESTful API
Customizable login views
Email validation, password resets, one-time passwords, etc
Social Login
LDAP & Active Directory
OpenID Connect, OAuth v2
Adapter & Client libraries

Core Concepts:

- Realms
- Clients
- Users

Kong by Mashape

API Gateway

Open source
Scalable
RESTful API
Plugins
Security
Traffic control
Logging
Transformations

Core Concepts:

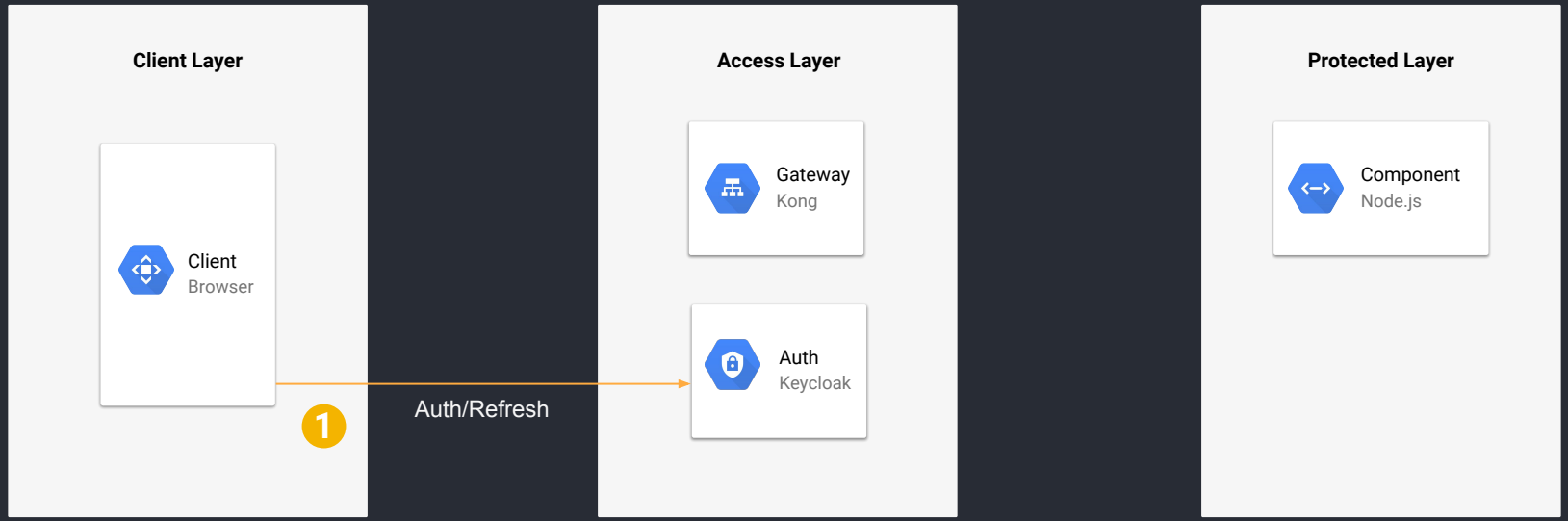
- APIs
- Consumers
- Plugins

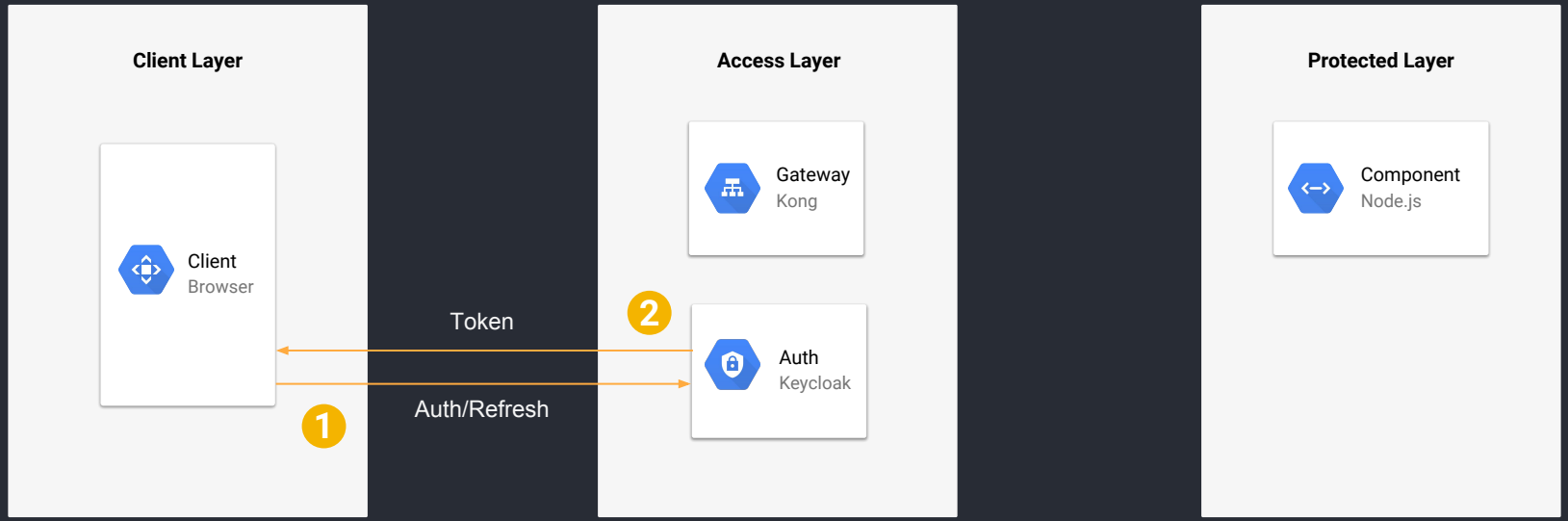
Confused yet?

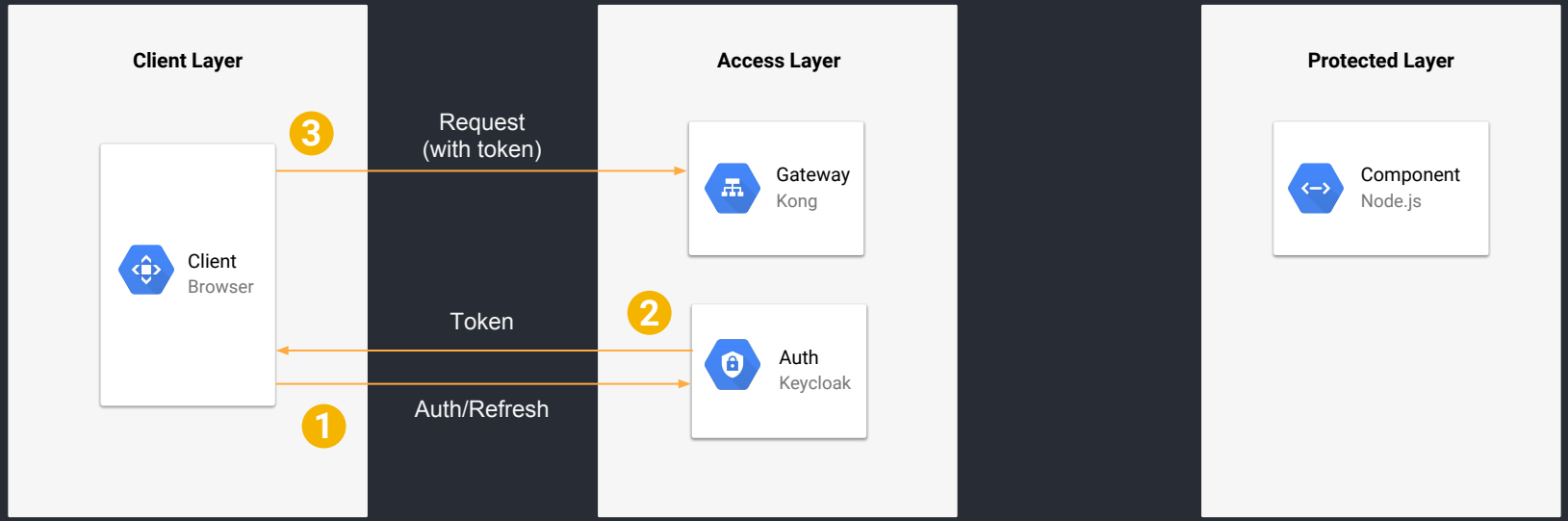
Westeros
=
Realm

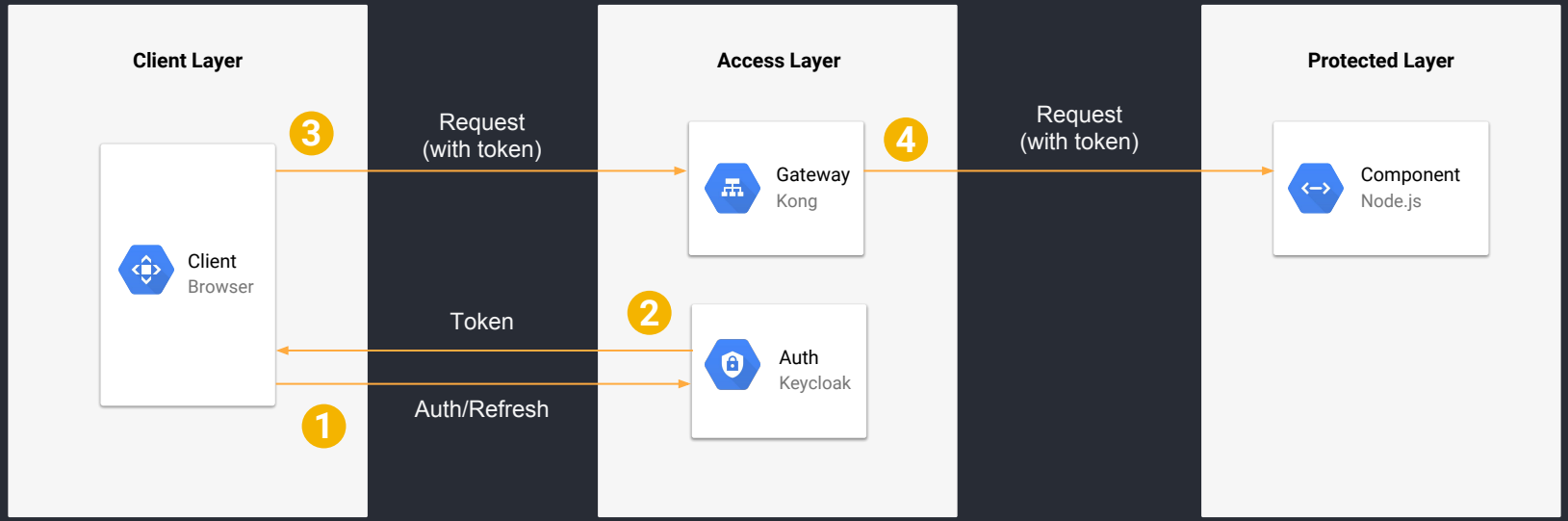
Protector of the Realm
=
Keycloak

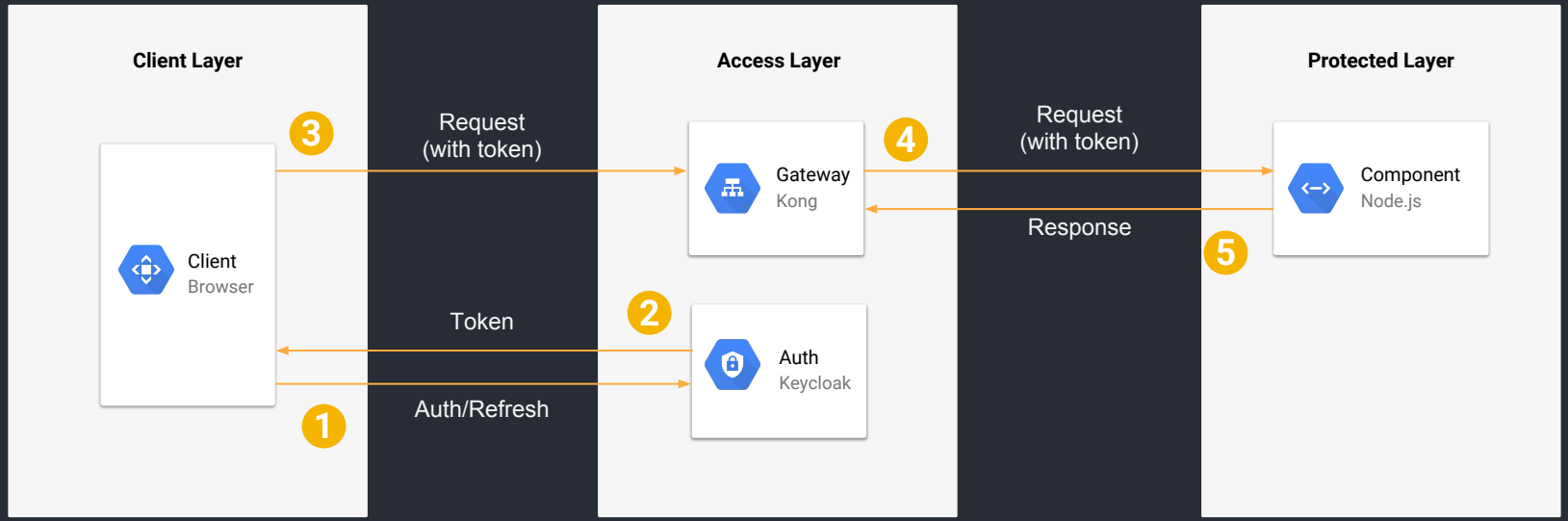
The Wall
=
Kong
Gateway

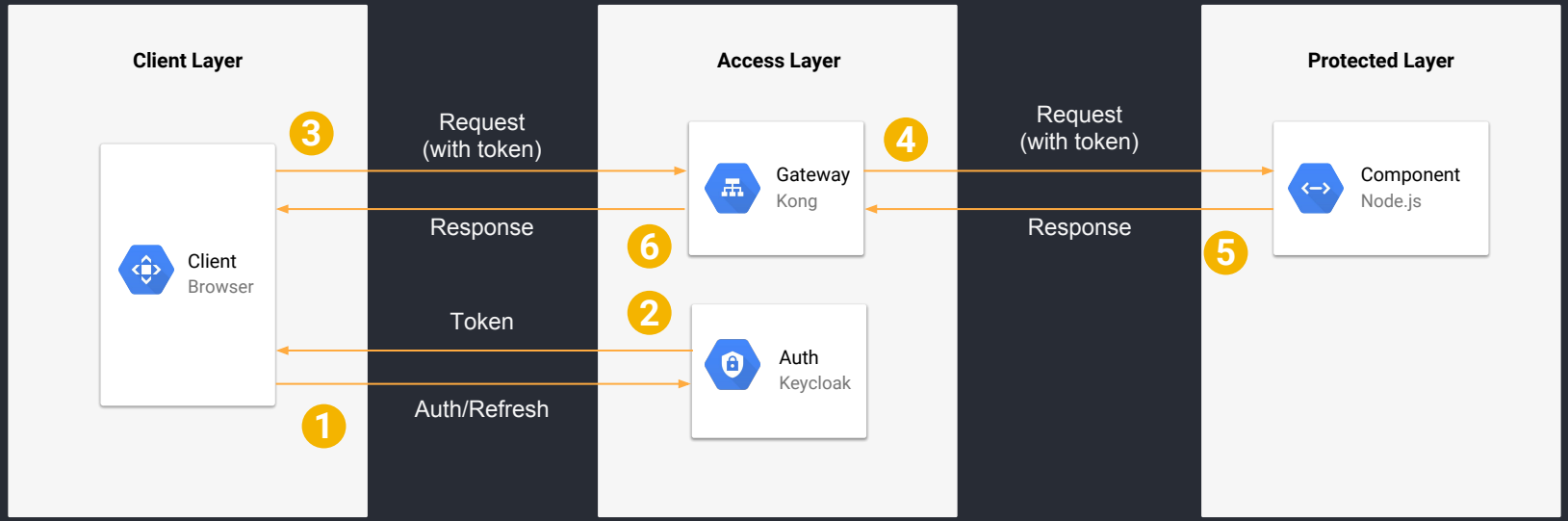

Client Layer
Client
Browser
1
Auth/Refresh
Access Layer
Gateway
Kong
Auth
Keycloak
Protected Layer
Component
Node.js


Client Layer
Client
Browser
Access Layer
Gateway
Kong
Token
2
Auth
Keycloak
Auth/Refresh
1
Protected Layer
Component
Node.js


Client Layer
Access Layer
Protected Layer
3
Request
(with token)
Client
Browser
Gateway
Kong
Component
Node.js
Token
2
Auth
Keycloak
Auth/Refresh
1


Client Layer
Access Layer
Protected Layer
3
Request
(with token)
4
Request
(with token)
Client
Browser
Gateway
Kong
Component
Node.js
2
Token
Auth
Keycloak
1
Auth/Refresh


Client Layer
Access Layer
Protected Layer
3
Request
(with token)
4
Request
(with token)
Gateway
Kong
Component
Node.js
Response
5
Client
Browser
Token
2
Auth
Keycloak
Auth/Refresh
1


Client Layer
Access Layer
Protected Layer
3
Request
(with token)
4
Request
(with token)
Gateway
Kong
Component
Node.js
Response
Response
6
5
Client
Browser
2
Token
Auth
Keycloak
1
Auth/Refresh

Step 0:
Setup example component & client

// setup component

```
app.get('/free', function (req, res) {
  res.json(['cat', 'dog', 'cow'])
})

app.get('/paid', function (req, res) {
  if (!req.headers['authorization']) return res.end()
  let roles = getRoles(req)
  if (roles.includes('subscriber'))
    res.json(['super cat', 'super dog', 'super cow'])
  else
    res.json({ message: 'Nope, pay first' })
})

app.listen(3001)
```

// setup client

```
const keycloak = Keycloak({
  url: 'http://localhost:8080/auth',
  realm: 'demo-realm',
  clientId: 'demo-client'
})

keycloak.init({ onLoad: 'login-required' })
  .error(function () { alert('error') })
  .success(function (authenticated) {
    if (authenticated) alert('Authenticated')
  })

function getFree () {
  get('http://localhost:8000/component/free')
}

function getPaid () {
  get('http://localhost:8000/component/paid')
}
```

// setup client

```
function get (route) {
  let req = new XMLHttpRequest()
  req.open('GET', route, true)
  req.setRequestHeader('Accept', 'application/json')
  req.setRequestHeader('Authorization', 'Bearer ' + keycloak.token)
  req.onreadystatechange = function () {
    if (req.readyState === 4) {
      if (req.status === 200) {
        alert('Response: ' + req.responseText)
      } else {
        alert('Request returned: ' + req.status)
      }
    }
  }
  req.send()
}
```

Step 1:
Initialize Kong + Keycloak… Kongcloak? :)

init postgres

```
docker run -d --name kong-database \
  -p 5432:5432 \
  -e "POSTGRES_USER=kong" \
  -e "POSTGRES_DB=kong" \
  postgres:9.4
```

run db migrations

```
docker run --rm \

  --link kong-database:kong-database \

  -e "KONG_DATABASE=postgres" \

  -e "KONG_PG_HOST=kong-database" \

  kong:latest kong migrations up
```

init kong

```
docker run -d --name kong \
  --link kong-database:kong-database \
  -e "KONG_DATABASE=postgres" \
  -e "KONG_PG_HOST=kong-database" \
  -p 8000:8000 -p 8443:8443 -p 8001:8001 -p 8444:8444 \
  kong
```

init keycloak

```
docker run \

  -e KEYCLOAK_USER=$KEYCLOAK_USERNAME \

  -e KEYCLOAK_PASSWORD=$KEYCLOAK_PASSWORD \

  --name keycloak \

  -p 8080:8080 \

  jboss/keycloak
```

Step 2:
Configure Kongcloak

// keycloak - specify realm

```
"realm": "demo-realm",
"enabled": true,
"registrationAllowed": false,
"sslRequired": "external",
"requiredCredentials": ["password"],
```

// keycloak - specify clients

```
"clients": [
  {
    "clientId": "demo-client",
    "enabled": true,
    "publicClient": true,
    "redirectUris": ["http://localhost:3000/*"],
    "webOrigins": ["http://localhost:3000"]
  }
],
```

// keycloak - specify roles

```
"roles": {
  "client": {
    "demo-client": [
      {
        "name": "subscriber",
        "description": "Someone who pays subscription fees"
      }
    ]
  }
}
```

// keycloak - specify users

```
"users": [
  {
    "username": "jdoe",
    "enabled": true,
    "email": "jdoe@example.com",
    "credentials": [{ "type": "password", "value": "password" }],
    "clientRoles": {
      "account": ["view-profile", "manage-account"]
    }
  },
  {
    "username": "bgates",
    "enabled": true,
    "email": "bgates@example.com",
    "credentials": [{ "type": "password", "value": "password" }],
    "clientRoles": {
      "account": ["view-profile", "manage-account"],
      "demo-client": ["subscriber"]
    }
  }
],
```

// kong - declare endpoints

```
{
  "name": "component",
  "upstream_url": "http://192.168.1.132:3001",
  "uris": ["/component"],
  "strip_uri": true,
  "plugins": [
    {
      "name": "jwt"
    },
    {
      "name": "cors",
      "config": {
        "origins": ["http://localhost:3000/*"],
        "methods": ["GET"],
        "credentials": true,
        "max_age": 3600
      }
    }
  ]
}
```

// remember...

```
function getFree () {
  get('http://localhost:8000/component/free')
}

function getPaid () {
  get('http://localhost:8000/component/paid')
}
```

// kong - declare consumers

```
{
  "username": "demo-consumer",
  "plugins": [
    {
      "name": "jwt"
    }
  ]
}
```

Demo!

github.com/wiredcraft/kongcloak

stelios@wiredcraft.com