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Implementation Spec Document

Scope:

1. To design and implement a standalone analytics service.
2. This service will receive the url which should be tracked as input and look for a particular domain to be tracked in the received url.
3. Every time the the domain of the url is visited, the number of hit count is updated.
4. The service has two endpoint url to send request and receive the response.
5. One endpoint url for sending the referrer url to the system with a specific domain.
6. Second endpoint to receive the top 3 most highly seen domain.

Design vision:

1. To design and build a scalable service.
2. Design a system that can handle multiple transactions at a time.
3. Design a system with less latency and see ways to improvise on the response rate.
4. Design an extensible system.

Source code url:
github link → https://github.com/rprasanakumar/my-referrer-service/tree/master/referrer-endpoint
Project Access link --> http://myurlreferrer.us-east-1.elasticbeanstalk.com/

Design skeleton: fig.1

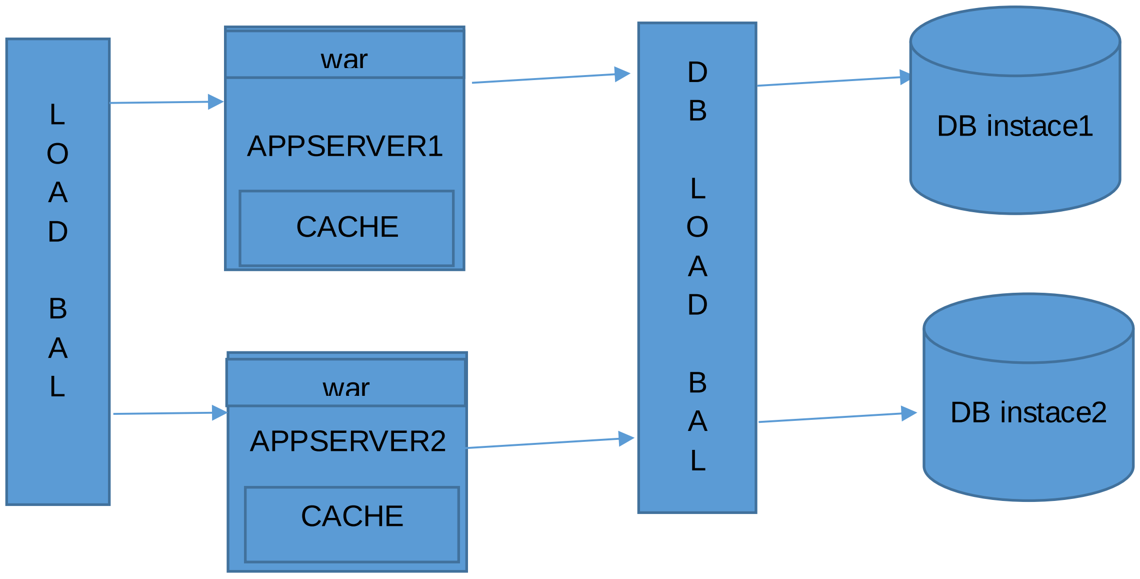

fig.1

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DATA Structures, POJO, Service and Utilities used:

1. PriorityQueue (Min heap)
2. ArrayList<ReferrerURL>
3. Customized DS class < https://github.com/rprasanakumar/my-referrer-service/blob/master/referrer-endpoint/src/main/java/org/service/referrer/model/TopReferrerUrl.java >
4. ReferrerURL < https://github.com/rprasanakumar/my-referrer-service/blob/master/referrer-endpoint/src/main/java/org/service/referrer/model/ReferrerURL.java >
5. Service class with cache logic and core business logic https://github.com/rprasanakumar/my-referrer-service/blob/master/referrer-endpoint/src/main/java/org/service/referrer/service/ReferrerServiceImplementation.java
6. Unit test classes < https://github.com/rprasanakumar/my-referrer-service/tree/master/referrer-endpoint/src/test/java/org/service/referrer >

Business logic:

There will be two endpoint urls.
1 ->: http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
2->: http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/top

a. **1** -> To track the referrer url domain. So, when the request is made with this endpoint, the referrer url domain hit is stored into the data base.
b. **2** -> when this url is hit, the top 3 trending domains responded back with hit count and with their IDs. No database hit is made.
c. As an optimization step, the url hit count is pre-calculated and maintained in the priority queue window and serialized during the endpoint request **1**. When request to the endpoint **2** is made, the priority queue object is de-serialized and the list of trending url is responded back to the user. Because of this caching logic, we need not have to make a call to database during the **2** endpoint url request.

Cloud Deployment Details:
1. This project is deployed on to the EC2 Elastic Beanstalk as a war file
2. RDS mysql AWS instance is the backend database for this project.
3. For high availability and scalability, this project is run as above discussed architecture(**fig.1**)
Endpoint1(getting top trending url): http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/top
<Request type> GET

Endpoint2(registering url as a referrer):
http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
<Request type> POST
<body> { "domain":http://www.intuit.com }

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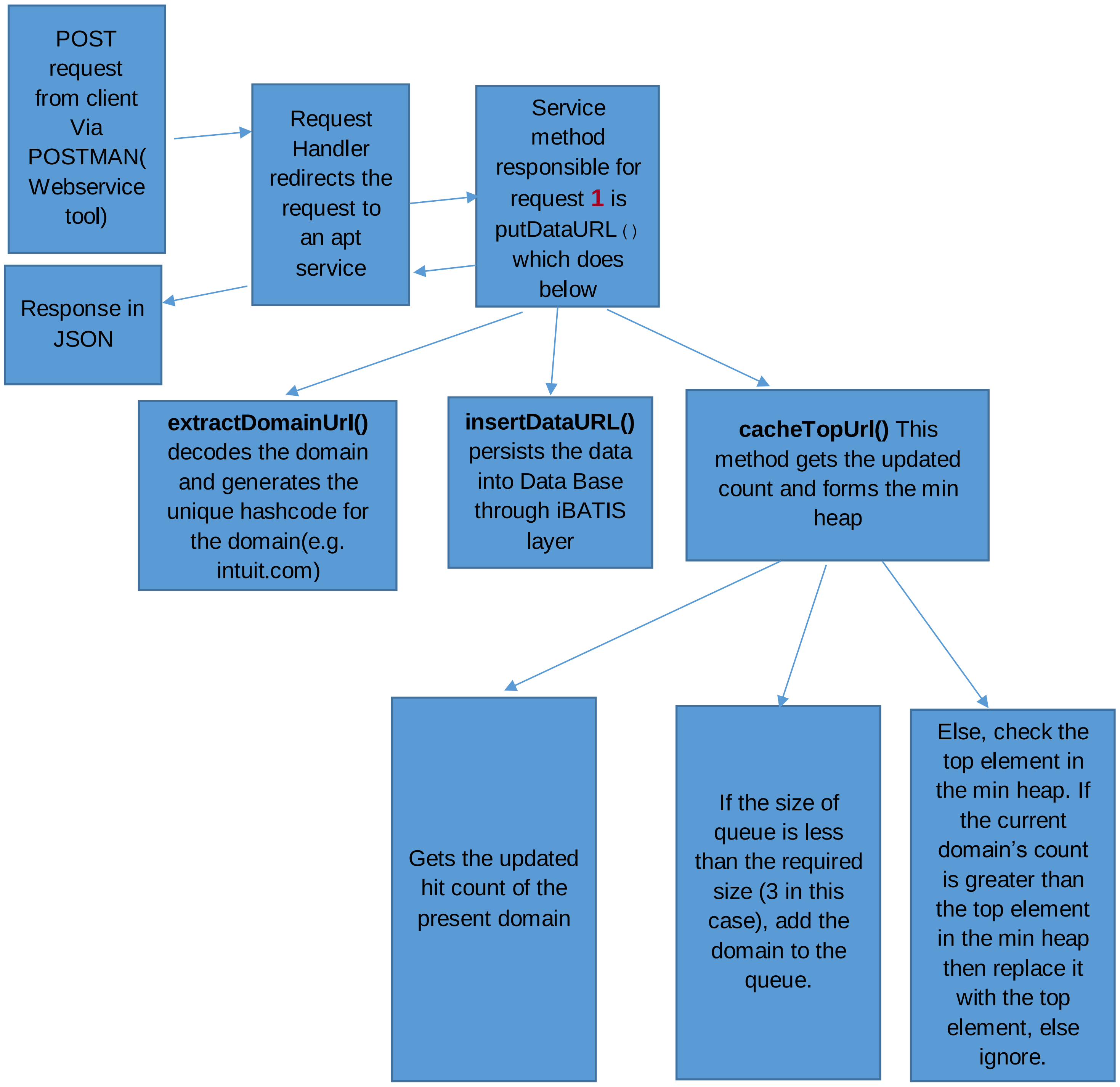
<Content type> application/json

Flow Diagrams: Service flow for request **1**


POST request from client Via POSTMAN(Webservice tool)
Request Handler redirects the request to an apt service
Service method responsible for request 1 is putDataURL ( ) which does below
Response in JSON
extractDomainUrl() decodes the domain and generates the unique hashcode for the domain(e.g. intuit.com)
insertDataURL() persists the data into Data Base through iBATIS layer
cacheTopUrl() This method gets the updated count and forms the min heap
Gets the updated hit count of the present domain
If the size of queue is less than the required size (3 in this case), add the domain to the queue.
Else, check the top element in the min heap. If the current domain's count is greater than the top element in the min heap then replace it with the top element, else ignore.

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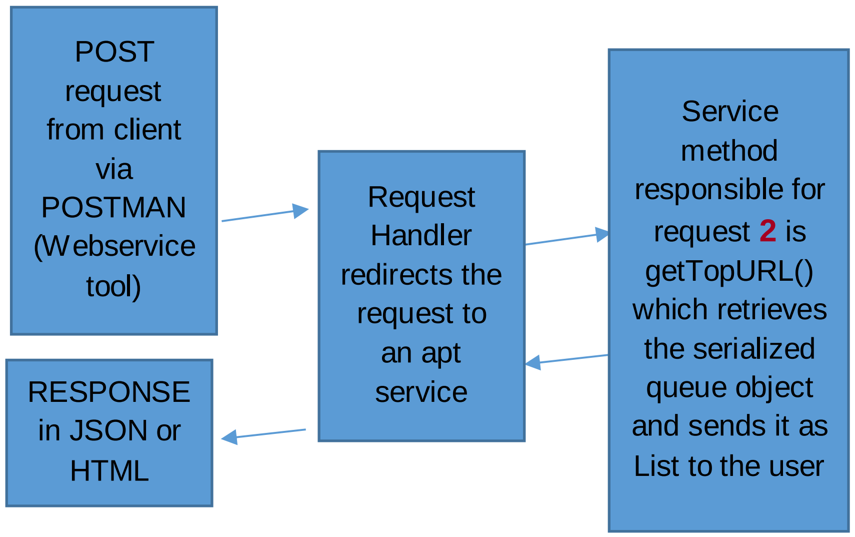
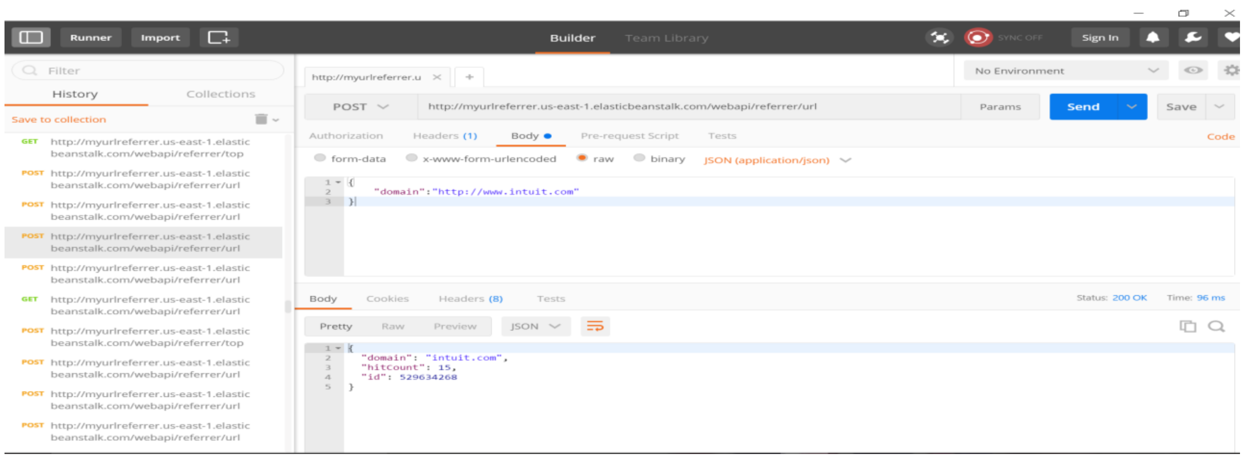
Service flow for request 2


POST request from client via POSTMAN (Webservice tool)
Request Handler redirects the request to an apt service
Service method responsible for request 2 is getTopURL() which retrieves the serialized queue object and sends it as List to the user
RESPONSE in JSON or HTML

Sample Outputs:

Endpoint: http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
Endpoint: http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/top



GET http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/top
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
GET http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/top
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url

POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url

form-data x-www-form-urlencoded ● raw binary JSON (application/json)

```
{
    "domain":"http://www.intuit.com"
}
```

Status: 200 OK Time: 96 ms

```
{
  "domain": "intuit.com",
  "hitCount": 15,
  "id": 529634268
}
```

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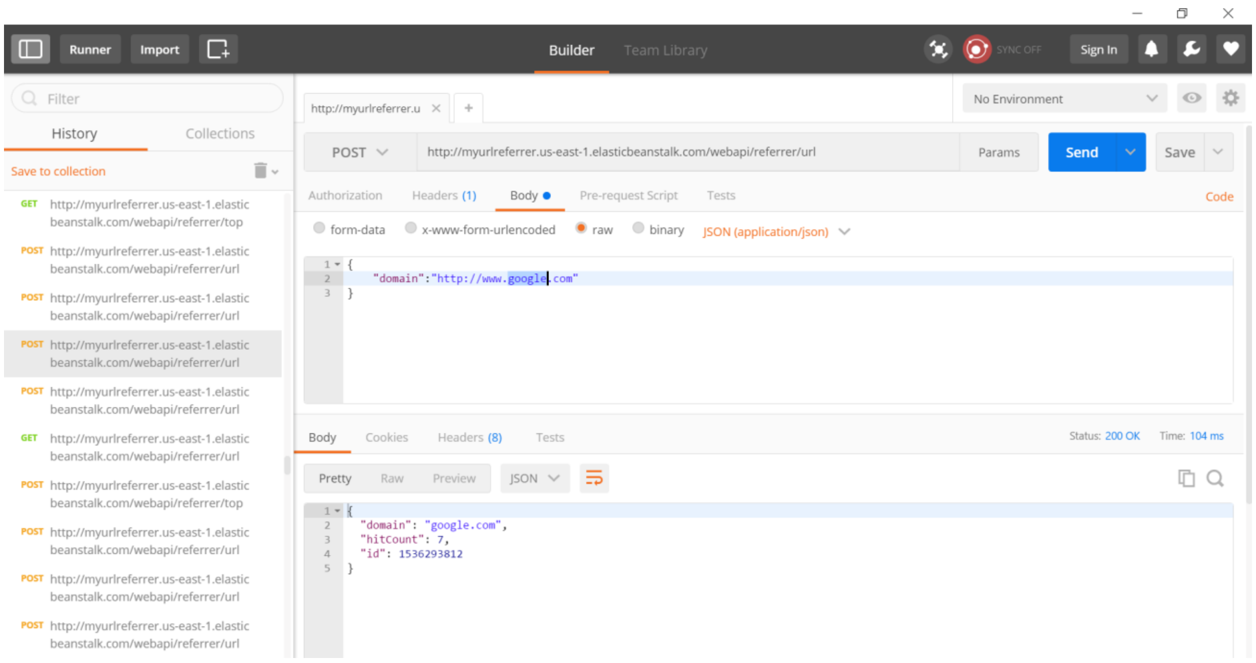
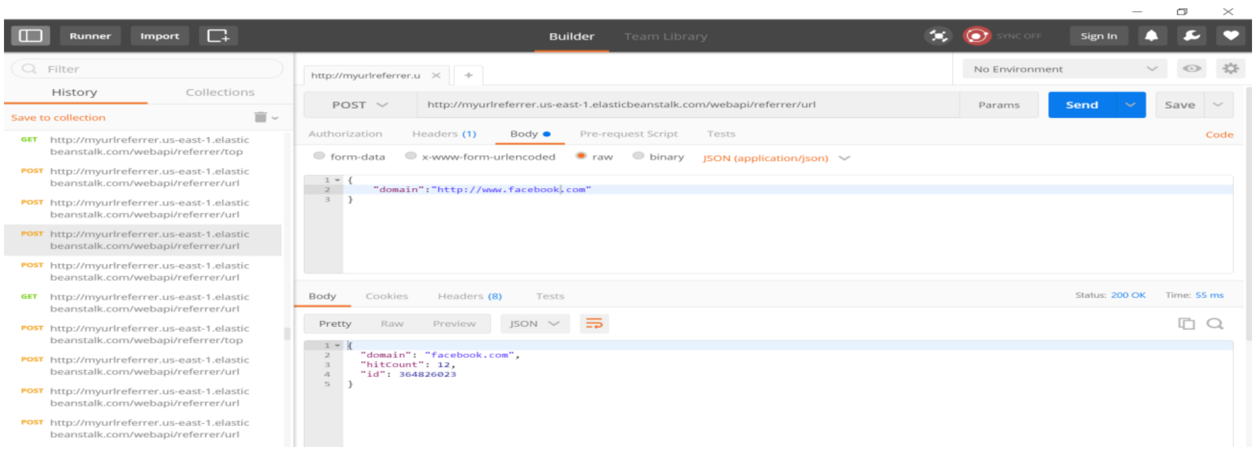

POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url

Body: raw, JSON (application/json)

```
{
    "domain":"http://www.google.com"
}
```

Status: 200 OK Time: 104 ms

```
{
  "domain": "google.com",
  "hitCount": 7,
  "id": 1536293812
}
```

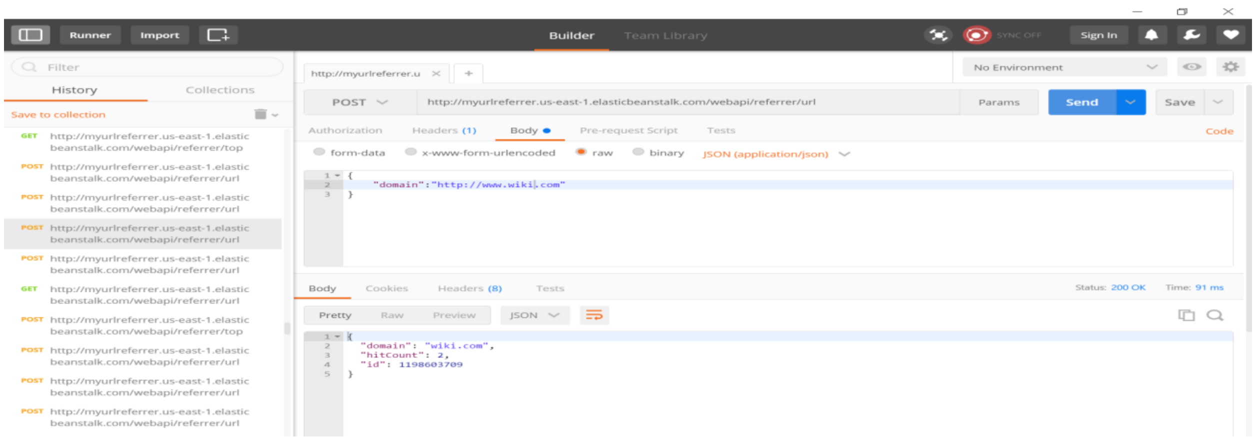

POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url

Body: raw, JSON (application/json)

```
{
    "domain":"http://www.facebook.com"
}
```

Status: 200 OK Time: 55 ms

```
{
  "domain": "facebook.com",
  "hitCount": 12,
  "id": 364826023
}
```


POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url

Body: raw, JSON (application/json)

```
{
    "domain":"http://www.wiki.com"
}
```

Status: 200 OK Time: 91 ms

```
{
  "domain": "wiki.com",
  "hitCount": 2,
  "id": 1198603709
}
```

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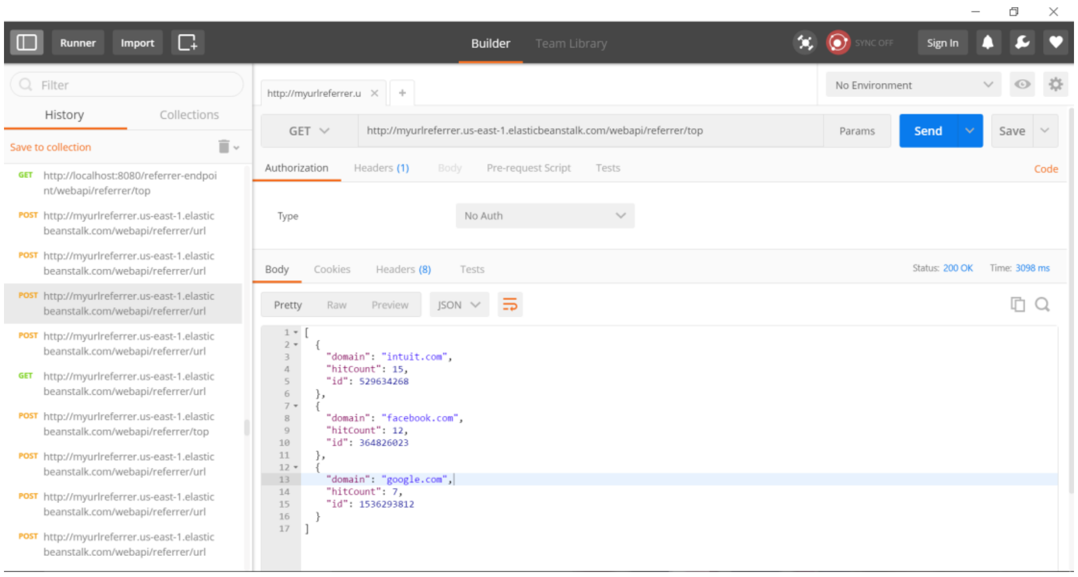
In the above example, the domain google.com is hit 7 times, intuit.com is hit 15 times, facebook.com is hit 12 times and wiki.com is hit 2 times. So, our top trending domains should be

1. google.com
2. intuit.com
3. facebook.com



GET http://localhost:8080/referrer-endpoint/webapi/referrer/top
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
GET http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/top
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url
POST http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/url

http://myurlreferrer.u

GET http://myurlreferrer.us-east-1.elasticbeanstalk.com/webapi/referrer/top

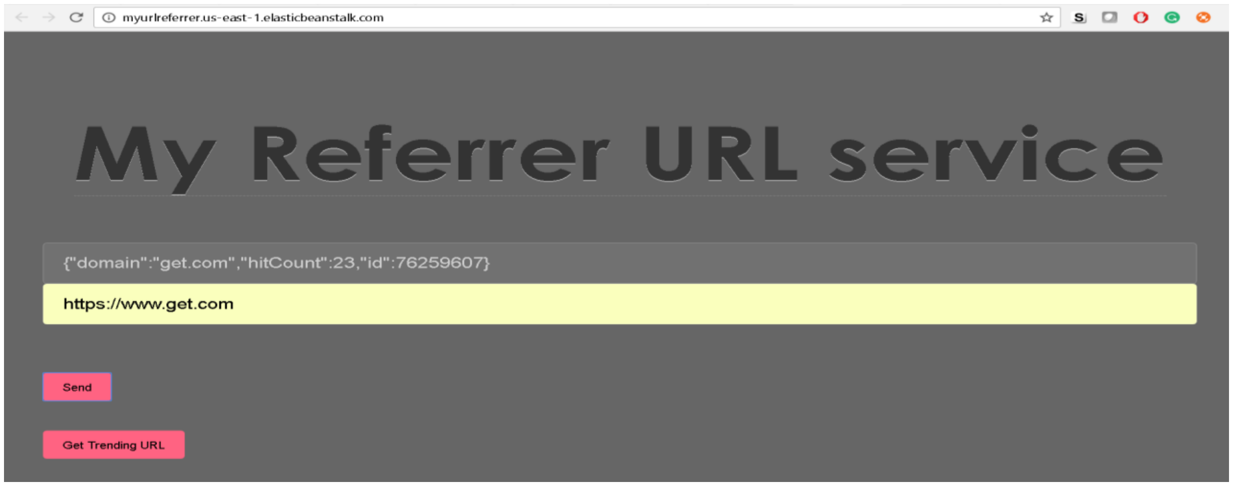
Type: No Auth

Status: 200 OK Time: 3098 ms

```
[
  {
    "domain": "intuit.com",
    "hitCount": 15,
    "id": 529634268
  },
  {
    "domain": "facebook.com",
    "hitCount": 12,
    "id": 364826023
  },
  {
    "domain": "google.com",
    "hitCount": 7,
    "id": 1536293812
  }
]
```

SAMPLE UI for request and response:

http://myurlreferrer.us-east-1.elasticbeanstalk.com/



myurlreferrer.us-east-1.elasticbeanstalk.com

My Referrer URL service

{"domain":"get.com","hitCount":23,"id":76259607}

https://www.get.com

Further Enhancement:

1. Configuration of SSL for secured communication channel
2. Making the service more idempotent.
3. Adding more referrer service methods