Rate limiting
Caching Strategies

Rate limiting

problems:
1. Client can send too many request within a timeframe.

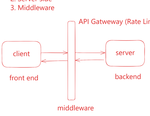
DDOS/DOS

2. Server cost expensive
Each req is expensive.

How many req client can send in any timeframe

Rate Limiting

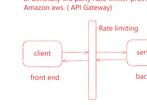
1. Client side : worst
2. Server side
3. Middleware



Application use case:
1. Server side language(Java, C++, javascript, Python)
Server side

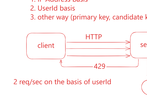
Rate Limiting

2. Generally 3rd party Rate limiter providers.
Amazon aws. (API Gateway)



Rate limiting on What ??

1. IP Address basis
2. UserId basis
3. other way (primary key, candidate key)



2 req/sec on the basis of userId

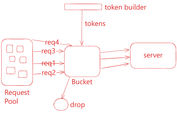
Response codes:
200 : Ok
429 : Too many Request

Headers:
X-api-limit : 2
x-duration : seconds

Algorithms of Rate Limiting

1. Token Bucket
2. Leaky Bucket
3. Fixed window counter
4. Sliding window log
5. sliding window counter

Token Bucket Algorithm



1. Bucket size : 20
2. Inflow : 10 tokens/sec

1. Token builder will push tokens in fixed intervals
2. If bucket size is full all the new tokens will
be overthrown (over flow).
3. whenever a req comes it takes a token from bucket
if available and go to the server
4. if bucket is empty, req is dropped.

use : Amazon

PRos :
1. Simple to implement
2. Can handle burst traffic for small duration

COns:
1. To decide the bucket capacity and inflow

Leaky Bucket (Global Rate limiting)

App : 1000 users
IP level : every unique limit

Bucket capacity : 3
Outflow : 2 req/sec

Shopify

Pros :
Simple to implement
Even though burst traffic is there.
our server will not crash

Cons:
If DDOS/DOS happens, our server misses
valuable Request (Main req --> starve)

APPLICATION :
100 APIS --> API wise

FIXED WINDOW COUNTER

1. In a fixed interval (Say a sec, or a minute)
Only a spcific no. of req can come.

Fixed counter = 3

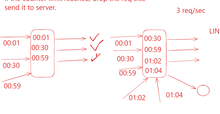
Cons :
If burst traffic comes at edges of window,
it may lead to server crash, high latency.

Sliding window Log Algorithm

Best Algorithm for Rate Limiting
Strict
Slow & memory consuming

Algorithm:
1. It will store each req in a log file.
2. Whenever a req comes, it will first
remove all the outdated req from the file.
3. THen it will log the new req and check,
if the counter limit reached, drop the req else
send it to server.

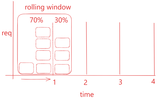
3 req/sec



LINUX --> EPOCH timestamp

Sliding window 2 Algorithm

Hybrid approach --> 7 req/ minute

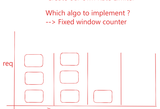


Formula : No. of req in curr interval
+
No. of req in prev interval
*
70%

= 4 + 5 * 0.7 = 7.5

Create our own Rate Limiter

Which algo to implement ?
--> Fixed window counter



Excepted Counter = 3
current counter = 3

Db ? SQL / NoSQl

Db : It is slow.

Cache : In-Memory Cache : Redis