CS681 Assignment 2

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Parameters Used

Parameter	Value
Number of Web Server Cores	4
Number of DBMS Server Cores	8
Web Server Probability(q)	0.5
Web Server Queue Size	100
DBMS Server Queue Size	100

Parameters Used

Parameter	Value
Think Time(sec)	1
Request Timeout(sec)	10
Probability Distribution	Exponential
DBMS Service Distribution Mean Time(sec)	1
WEB Service Distribution Mean Time(sec)	0.75
Interarrival Distribution Mean Time(sec)	0.05
Round Robin Time Quantum(sec)	0.3

System Design

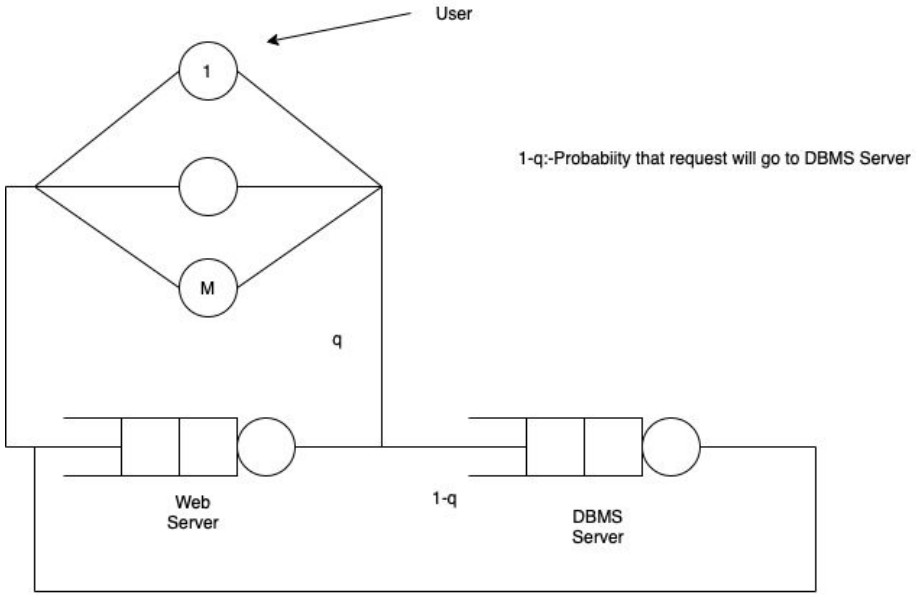


Fig:Closed Queuing Network

Request Class

Variables:

Store information about Request id, web service time, dbms service time,remain time, Next event time, start time

Methods:

Prfloat for print a value(debug purpose)

Server Class

Virtual class

Methods:

arrive() parameter : Request , Simulation ,return : void

depart() parameter : Simulation ,return :Request

Web Class(Inherit Server Class)

Variables:

Store information about previous time,number of web core,queue size,time unit, Probability of next server

Methods:

Constructor Webserver: Parameter core,queue size, probability , round robin time

Arrive : Parameter : Request ,Simulation Return :void

Depart:Parameter :Simulation,return Request

process:Pararmeter : Simulation,Request , return void

DBMS Class(Inherit Server Class)

Variables:

Store information about previous time,number of dbms core,queue size,time unit

Methods:

Constructor Dbmsserver: Parameter core,queue size, round robin time

Arrive : Parameter : Request ,Simulation Return :void

Depart:Parameter :Simulation,return Request

process:Pararmeter : Simulation,Request , return void

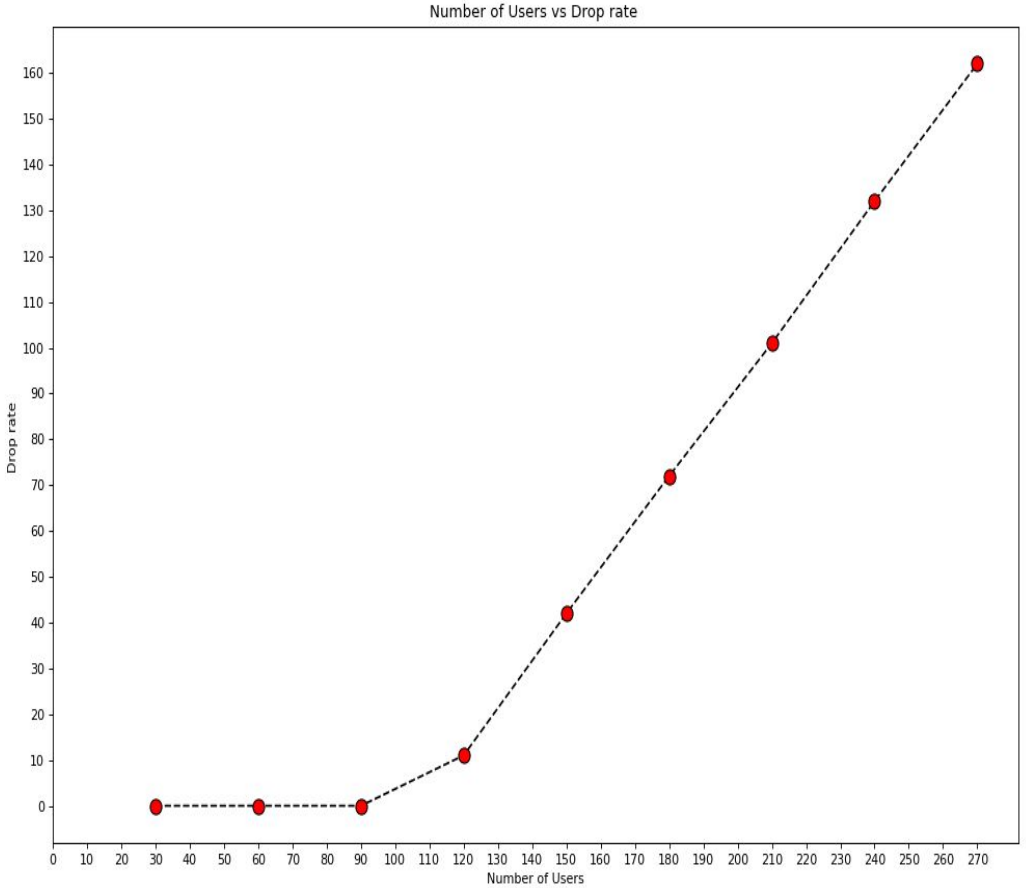
Simulation Class

Variables:

Store information about Number of drop packet, total wait time,success packet,web core utilization, timeout web service time mean,dbms service time mean,dbms wait time

Methods:

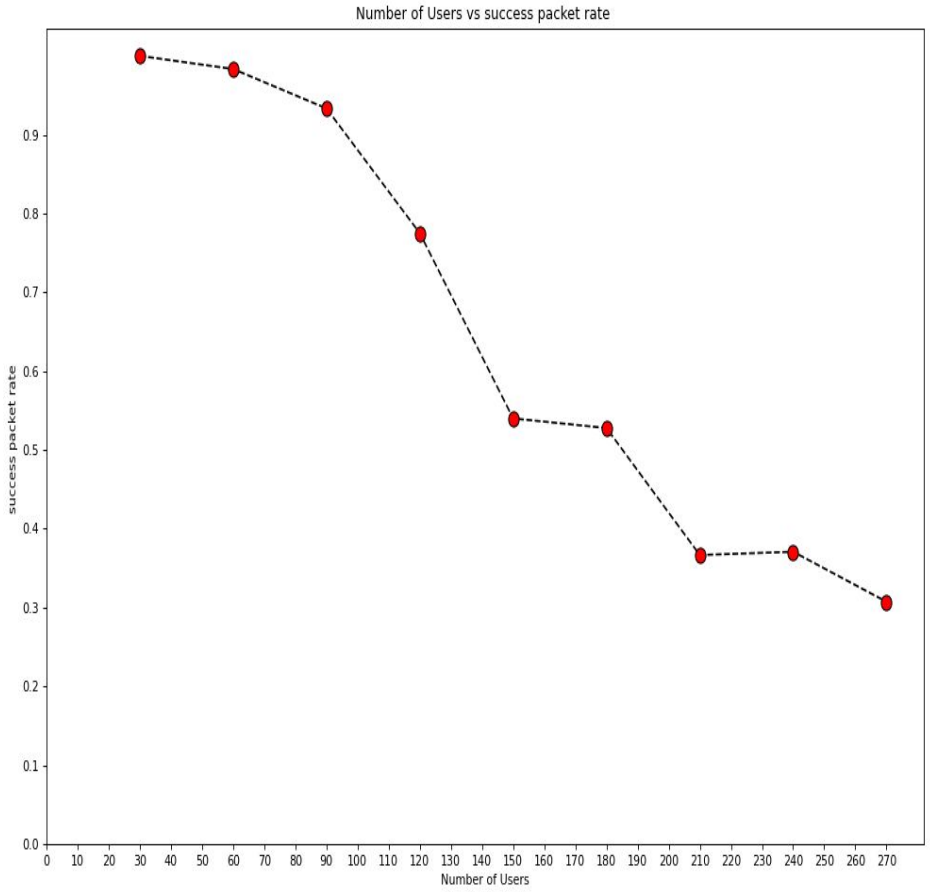
toppacket:Parameter : None : Return type : Request



As number of users are increasing drop rate increases linearly.

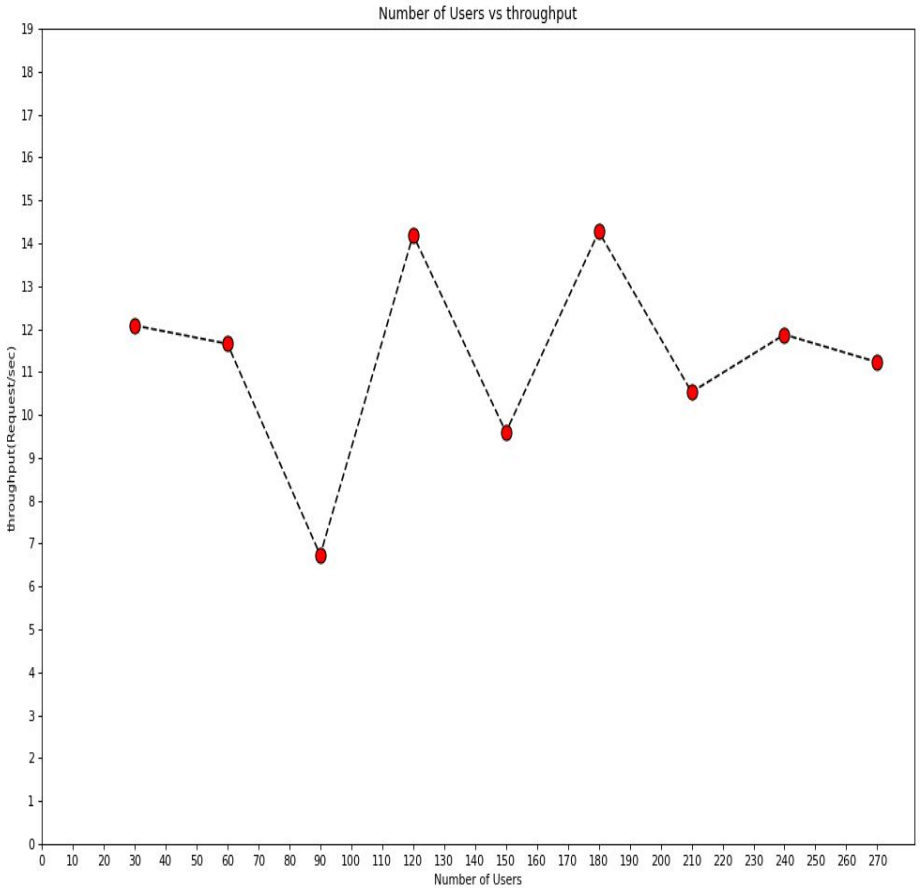
As we have assumed both web and DBMS server queue size as 100.

For Number of users greater than 100 more packets are dropped.



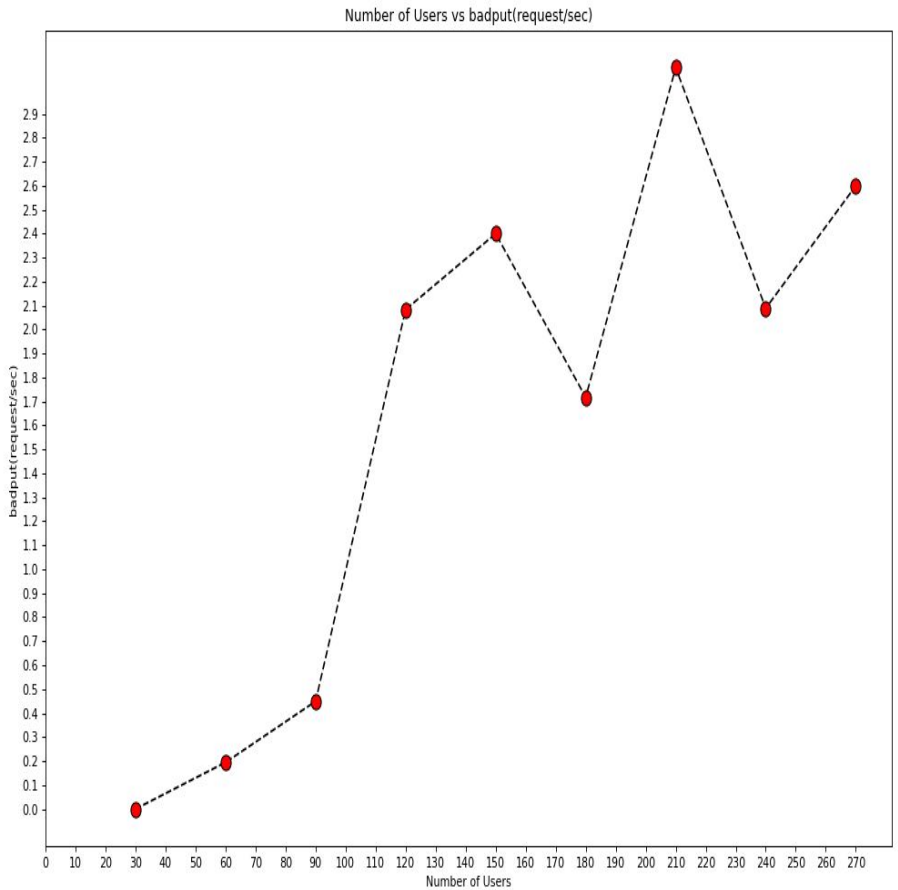
As number of users are increasing number of successful packets are decreasing.

As seen in previous graph,packet drops are increasing for number of users greater than 100.Success packet rate is also decreasing is less for these values .



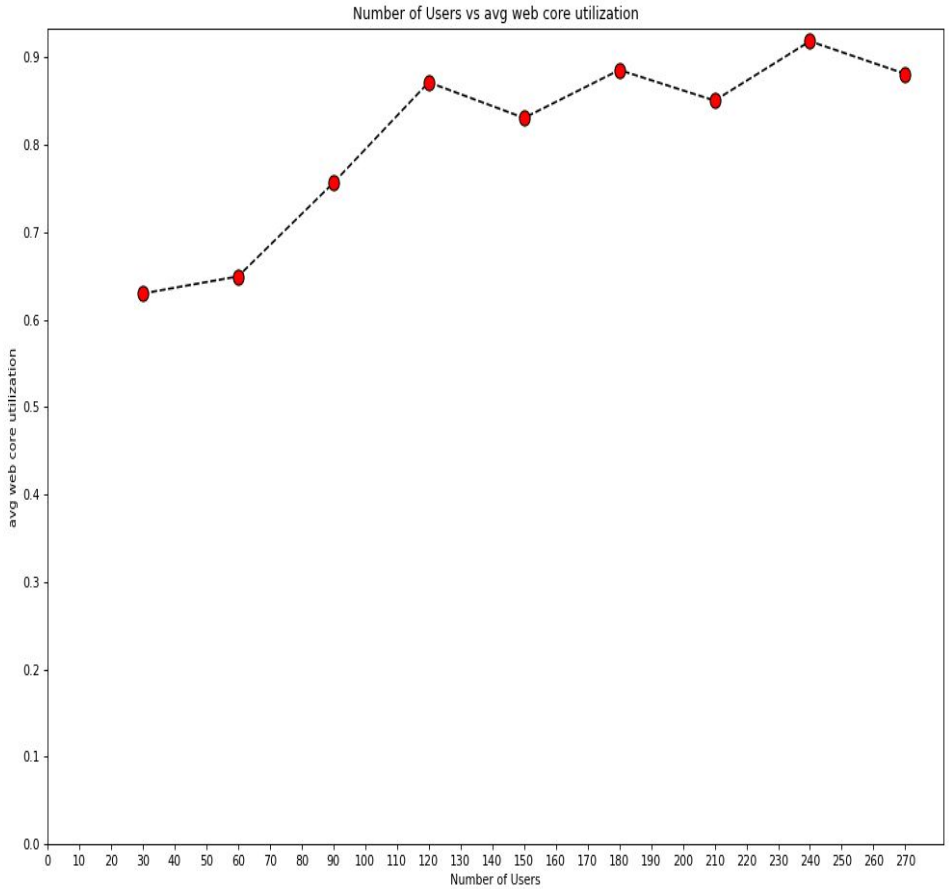
As number of users are increasing we expected increase in throughput and graceful degradation after some saturation point.

But in our graph,throughput saturated at 14 requests/second.



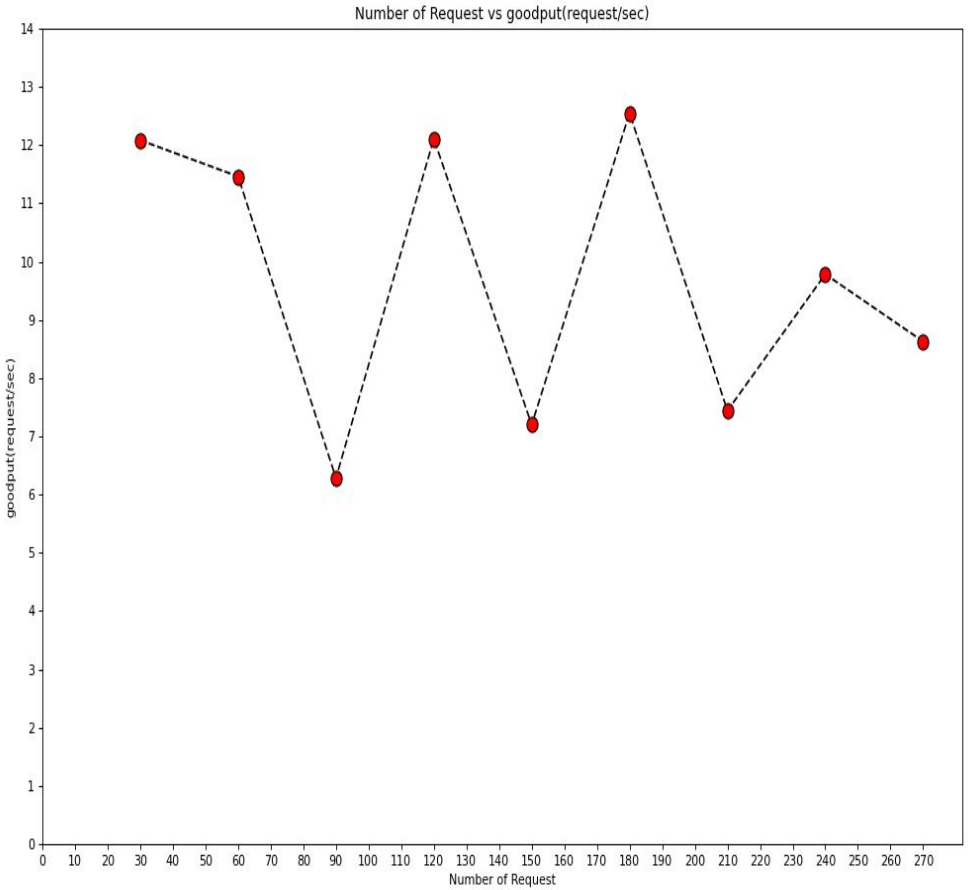
As number of users are increasing we expected increase in badput as timeouts are increasing.

We achieved maximum throughput around 3 requests/sec.



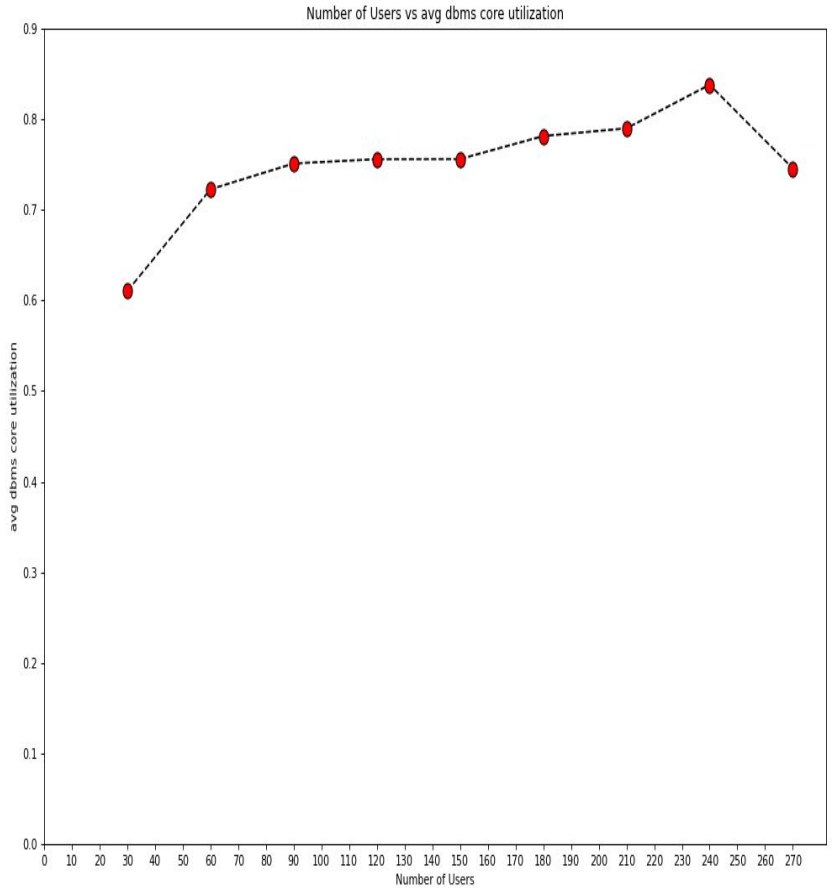
At low load condition i.e. No of users less than 100 we get Web core Utilization around 0.75.

At high load,we see constant value for Web core Utilization which is around 0.85.



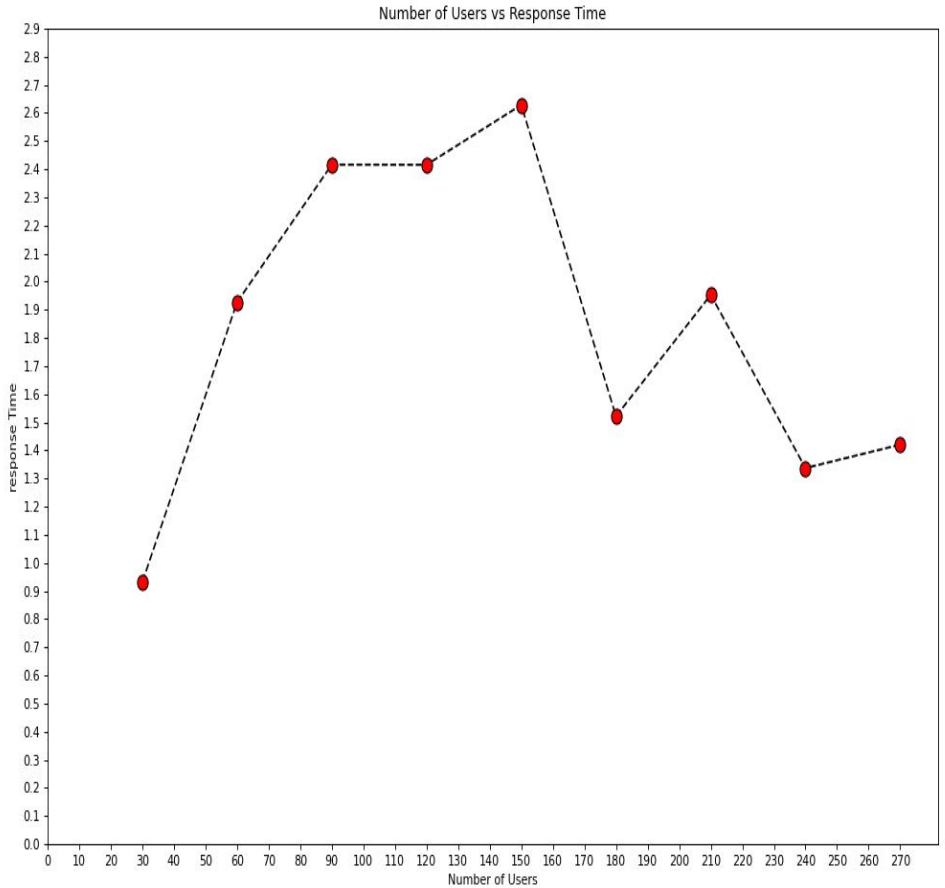
As number of users are increasing we expected increase in throughput and graceful degradation after some saturation point.

But in our graph,goodput saturated around 12 requests/second.



At low load condition i.e. No of users less than 100 we get DBMS core Utilization around 0.7.

At high load,we see constant value for DBMS core Utilization which is around 0.85.



For low load ,as there are very less timeouts,response time is less.But as number of users keep increasing Response Time increases.

But for high load,packet drop rate is also very high which is affecting response time.