

QUEUEING THEORY BASED ON EXPECTED MAX-MIN PROBABILISTIC DECISION FOR REDUCING WORKLOAD

Submitted in partial fulfillment of the requirements for the award of

Master of Science Degree in Mathematics

By

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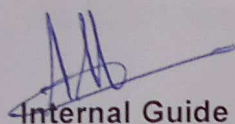
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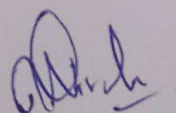
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BONAFIDE CERTIFICATE

This is to certify that this project report is the bonafide work of RAJKUMAR V (41630003) who carried out the project entitled "QUEUEING THEORY BASED ON EXPECTED MAX-MIN PROBABILISTIC DECISION FOR REDUCING WORKLOAD" under our supervision from JANUARY 2023 to APRIL 2023.


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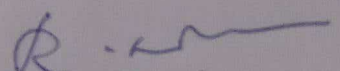

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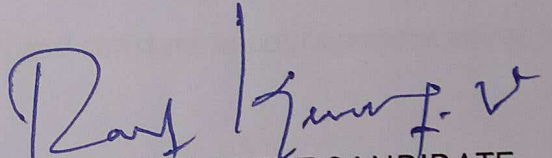

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DECLARATION

I RAJKUMAR V (41630003) hereby declare that the project report entitled "QUEUEING THEORY BASED ON EXPECTED MAX-MIN PROBABILISTIC DECISION FOR REDUCING WORKLOAD" done by me under the guidance of Dr. Andrew Michael (Internal) at SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY submitted in partial fulfillment of the requirements for the award of Master of Science Degree in Mathematics

DATE: 26.04.2023

PLACE: Chennai


SIGNATURE OF THE CANDIDATE

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ABSTRACT:

Calculating probabilistic decision using the queuing theory, is a new technology with the aim of making it easier for the user to obtain the pre-requisite services in hardware and software access to a wide range of Internet-based services. That is, an important aspect of modeling the delivery of workflow data services in the process of efficient load balancing in a shared environment of arrival. To realize the desired level of computation time, we propose a maximum precedence algorithm for scheduling Meta tasks by static illustration to use Enhanced Max-min Algorithm with (EMM) optimized Enhanced decentralized onload data arrival Mode (DO-DAM) with hyper switching methods. by arriving the service distributions are notated as Kendall Notations as (Max-A/S/Min-R/J/D). A queuing model improves the utilization and consumption to manage the resources that uses switch over Probability service time distribution to allot the job to data allotment support on scheduling application on static queue demands. This proposed queuing theory implements to improve the time consumption, utilization, scalability, make span and throughput performance.

Keywords: queuing theory, service availability, Server utilization, ETC Matrix, scheduling, Probabilistic and determination

CONTENTS

	PAGE NO.
CHAPTER 1	
INTRODUCTION	01
1.1 Process of Expected Max-Min probabilistic decision	02
1.2 Queuing state of data arrival	02
1.3 Kendall Notations as (Max-A/S/Min-R/J/D)	02
CHAPTER 2	
2.1 Queuing dependencies on service distribution	03
2.2 Execution process of service distribution	03
CHAPTER 3	
3.1 Queuing state of service execution	06
3.2 Estimated time to complete the service	06
3.3 Data arrival on precedence state	07
CHAPTER 4	
RESULTS & DISCUSSION	08
4.1 Analysis of service arrival rate	08
4.2 Analysis of service transmission rate	09
4.3 Analysis of Queuing service Energy Performance	10
4.4 Queuing service End to End delay	11
CHAPTER 5	
5.1 Conclusion	12
References	13

CHAPTER 1

Introduction

The Queuing theory of sorting, the most powerful in the line of life arrivals today, requires a relatively small amount of data to be very practical and easy to use. For this reason, simplicity and speed can be used to compare it, because they evaluate different options in order to provide the service immediately. Queuing specific service standards needed to achieve the efficiency that determines.

On the otherhand sorting does not require a lot of sample data, especially when the need or arrival data is often recorded, the service time is usually documented. Analyzing the queue, care providers, for example, have spent time in the service request response state, where data collection efforts are needed to assess when service be required.

The probability distribution comes along with the queue, you can get the service procedure given the probability distribution. The large row shows the need for poor service facilities or more. In a small order the service facility. Time Waiting Time refers to the time a customer spends on the queue before starting his or her service. Waiting time system. The basic idea of the theory sorting study is that of the state of the system. Further study of this systemic behavior is needed.

In order to arrive at the computer in accordance with the multiple Poisson arrival process of the job, an employment variable at the time of the job processing. If the computer is busy when it comes to work and placement, the order is kept in order, and the job is placed in order. Sorting theory According to the username, the system is the "server", the job "client". the restore the Sample Theological system in a single server sorting with a simple component. The server will reflect the overall resources of the computer and the operator.

1.1 Process of Expected Max-min probabilistic decision

When you select only the servers from service arrivals, it is intended for the Optimization model. It is proposed by the Achieves the Object, the server optimization model for the average utilization ratio, by undertaking a balance between satisfaction and maintenance-related costs expectations. The server-specific operations are obtained by obtaining optimal number in the following manner.

1.2 Queuing state of data arrival

Data arrival defines the way customers enter the system. Mostly the arrivals are random with intervals between two adjacent arrivals. Typically, the arrival is described by a random distribution of intervals also called data arrival.

1.3 Kendall Notations as (Max-A/S/Min-R/J/D).

The Kendall's Notation is a system of notation according to which the various characteristics of a queuing model are identified. probability distribution of the interarrival time. Probability distribution of the service time. number of servers in the system.

CHAPTER 2

2.1 Queuing dependencies on service distribution:

In the second stage that the corresponding machine is assigned, select the task with different max-minute time for the minimum expected total completed minute. for example, has the maximum time - there is a tendency to schedule a minimum-to-long task, whereas the first end of the short-run gives the time task priority.

2.2 Execution process of service distribution

The data arrival delay model on distributed calculation is given below. Arrival waiting rate refers the service delay, t is the time Or_t is arrival rate. This estimates the average waiting of Each timeslot arrival rate are shown below

$$Or_t = \sum_{i=1}^{\infty} (Qg_i + \sum_{j=1}^t q_{ij}) \dots \dots \dots (1)$$

Representing K is the total service delay arrival phase, group=0,1,2,3 as time slot, q_{ij} means to point the arriving datas at the point of waiting task during interval i and j Queuing representation forms at the amount of waiting data's represent Q_r state, where i is the initialized state of data arrival rate, g represents the service available point, R is the waiting point, Q represents total turns the waiting point of service available make decision to point the Queue arrivals of other ends to ignore the traffic

The data arrival rate in waiting point estimated by point Rer given below,

$$Rer = \sum_{t=1}^{\infty} \left(\sum_{i=1}^{\infty} (Qg_i + \sum_{j=1}^t q_{ij}) \right) \dots \dots \dots (2)$$

After the assigning estimation on delay control Service waiting point the service available needs the point varied from Rer to calculate the opponent time slot T from available service. The Rer represent the total Queue form waiting rate

The data arrival rate in service available point estimated by point Ger given below as single point of Lan arrival rate,

$$Ger = \sum_{t=1}^{\infty} Z_j (Qr_i + \sum_{j=1}^t q_{ij} - q_s * t) \dots \dots \dots (3)$$

Similarly, as total time of service available delay as Sum of Total Queue arrival to Ger point of Queue. From the point of Rer and Ger sum of total Queue arrived at the Each slot, the time be varied by the schedule delay of arrival.

The total delay of each slot is represented by Dly point to sum the single slot delay occurrence be calculated by,

$$Dly = Rer + Ger ; \dots\dots\dots(4)$$

The average service request arrival at the delay point be calculated by

$$AvD = \frac{\sum_{x=1}^y Dly}{Ar} \dots\dots\dots(5)$$

The number data arrival each slot by cycles is Dly for each data to point all the service arrival Ar at the time of waiting time.

All resources are not working (such as calculated time). The minimum completion time for each job is selected by the ETC Group evaluation. Then, the maximum value is allocated to the best resources, select everything in the graph that the minimum completion time will not work. Also, although there is no ETC matrix, the re-calculation of the jobs that are marked, the jobs are all there and the process is repeated until you allocate a resource.

Let us consider a single server queue $q = \frac{\rho^2}{1-\rho}$, MA /min/ represented state equalized

$Lq = \frac{\rho^2}{2*(1-\rho)}$ to generalize the level of arrival state by it formulate queuing representation

$Lq = \frac{\rho^2 (1+C_s^2) (C_a^2 + \rho^2 C_s^2)}{2*(1-\rho)(1+\rho^2 C_s^2)}$, representation by the arrival rate of task by mean rate λ and σ_a^2 inter arrival difference a is variance arrival rate: $C_a^2 = \frac{\sigma_a^2}{(1/\lambda)^2}$ Likewise, if μ execute service availability rate and σ_s^2 where s service time evaluation time, then: $C_s^2 = \frac{\sigma_s^2}{(1/\mu)^2}$ the generalize the approximation as $Lq = \frac{\rho^2 (C_a^2 + C_s^2)}{2*(1-\rho)}$, where g is equalized max if state is max/ Min approximation

$$g = \exp\left(\frac{-2*(1-\rho)(1-C_a^2)^2}{3\rho(C_a^2+C_s^2)}\right), \text{ when is } C_a^2 \leq 1, \text{ and } g = \exp\left(\frac{(1-\rho)(1-C_a^2)}{(C_a^2+4C_s^2)}\right), \text{ when is } C_a^2 > 1$$

$$C_a^2 = \frac{\sigma_a^2}{(1/\lambda)^2} = 0.2, \text{ similarity state } C_s^2 = \frac{\sigma_s^2}{(1/\mu)^2} = 0.39$$

Now using arrival approximation:

$$Lq = \frac{\rho^2(1+C_s^2)(C_a^2+\rho^2C_s^2)}{2*(1-\rho)(1+\rho^2C_s^2)} = 0.801, \text{ whether waiting state in Queue 8.1 sec as } Wq$$

$$\text{Wait in the system } W = Wq + \frac{1}{\mu} = 16:09 \text{ sec,}$$

System count access que length arrival = $L = \lambda W = 1:601$:

Whether server is IDLE at the time = $1 - \rho = 0:2$:

$$\text{Using the estimated values state of execution, } Lq = \frac{\rho^2(C_a^2+C_s^2)}{2*(1-\rho)} g = 0.945g$$

Computing ETC as $g = \exp\left(\frac{-2*(1-\rho)(1-C_a^2)^2}{3\rho(C_a^2+C_s^2)}\right)$ Estimated value is 0.8348 when is $C_a^2 \leq 1$,

Then, $Lq = 0:945(0:8348) = 0:7889$, which implies $Wq = Lq/\lambda = 0:7889(10) = 7:889$ seconds which remains the execution, estimation round of the value simulated to closest value of 8.1 sec which represented to consider as microseconds.

CHAPTER 3

3.1 Queuing state of service execution

The expected execution time of a job shown in the table is assigned to 40 of the three aircraft. The X shows that you don't have the machine skills to do that particular job. Service distributed Onload 12 job, 14 job, 15 job are as follows,

Precedency	Service Execution 1	Service Execution 2	Service Execution 3	Service response state
Queuing state 1	12	14	15	Initialize
Queuing state 2	12	14	13	0-0-1
Queuing state 3	12	11	13	0-1-0
Queuing state 4	10	11	13	1-0-0
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From the table that is planned at different levels of Selected task, the task level is repeatedly plotted by the maximum priority algorithm. Compare the Max state with each other to achieve the task size. It is believed that state 0, still state, is considered to be state 1 running and state of implementation,

3.2 Estimated time to complete the service

Service 1	12	14	15
Service 2	Xn	Xn	14.5
Service 3	Xn	13.0	Xn
Service 4	6.0	Xn	13.7
Service 5	Xn	18.5	13.7
Service 6	3.0	11.3	Xn

The service Xn in the Estimated time to complete the service, there is going to be a more waiting state when switching between assigned jobs and task lists while waiting in a steady state.

3.3 Data arrival on precedence state

Service state 1	Execution state 3	10.5	18.5	12.5
Service state 2	Execution state 2	5.5	15.5	20.5
Service state 3	Execution state 1	25.5	7.3	18.5
Service state 4	Execution state 3	15.5	15.5	10.3
Service state 5	Execution state 2	10.2	15.6	5.2
Service state 6	Execution Queue1	15.5	10.2	15.6
Service state 7	Execution Queue 3	15.6	8.4	12.6
Service state 8	Execution Queue 2	20.1	12.3	8.2

Here, the job ID is $d = 0, 1, \dots, (n-1)$ and $k = 0, 1, \dots, n$. My switch count is exaggerated and the currently available virtual machine. Then, this round can be used with switching state, MAX state of K Assignment Scheduler. Pre-scheduling agricultural products to schedule wells and pseudo-code in order to improve performance over time.

CHAPTER 4

Results and discussion

The distributed hyper dynamic scheduling is used for optimize the service providence system, time state logic methods of sensing the environment is designed to transmit the acquired base station with service request response state. Single server is to predict between the request service transmission depends the waiting, and a transmitting of workload for scheduling state. From the service disciplines, to compare the proposed system with Shortest Remaining Processing Time first (SRPT) as base to the Existing base and also associate Biggest-In-First-Served (BIFS). There is considerable correlation between the Max state of is carried through Time state intelligence in scheduling.

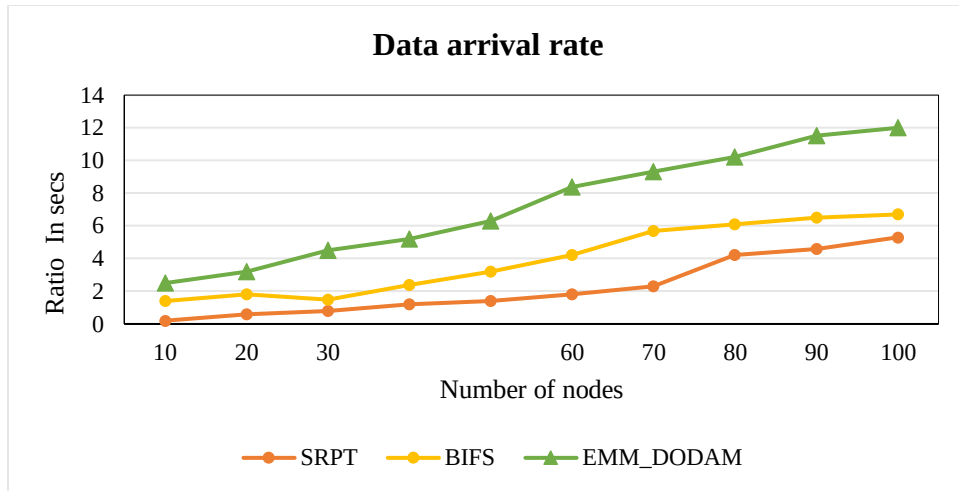
Parameters	Value processed
Type of server	<i>Distributed service</i>
Scheduling controller	Max/Min state
Waiting delay	14 sec
Number of data arrival rate	50

Parameters Processed in Queuing service Environment

The specifics of the Queuing service value to estimate the demonstration of the planned method. This defines the Queuing service simulation parameters that are covered in max state scheduling.

4.1 Analysis of service arrival rate

The vehicle arrival rate in average point of mean time to evaluate the Queuing service. This is what defines the ratio between the arrived Queuing service and the released Queuing service. This can be obtained using a trace file and an active transfer script to generate results. Queuing service controller scheduling mechanism when both control and data channels are used for packet downlink random access procedure control messages. Overlapping Coalition Formation be in overlapping coalition structure corresponds to an equilibrium state.

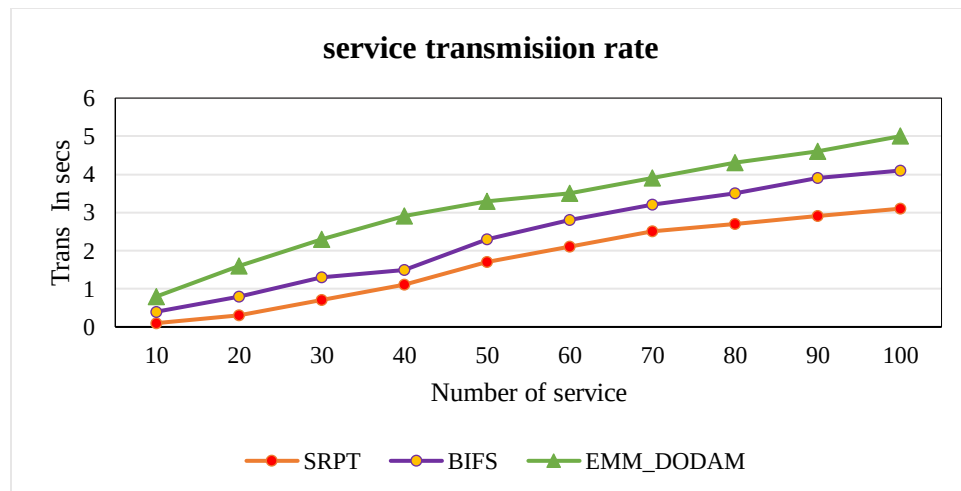


Analysis of service arrival rate

The clearly understood planned method. Consumes pointed out this of Data arrival rate.

4.2 Analysis of service transmission rate

Average measure of transmitting vehicle over better communication which is analyzed by average waiting arrival rate by delivered to the controller. In this way, the vitality utilization is concentrated amid the locale following stage.

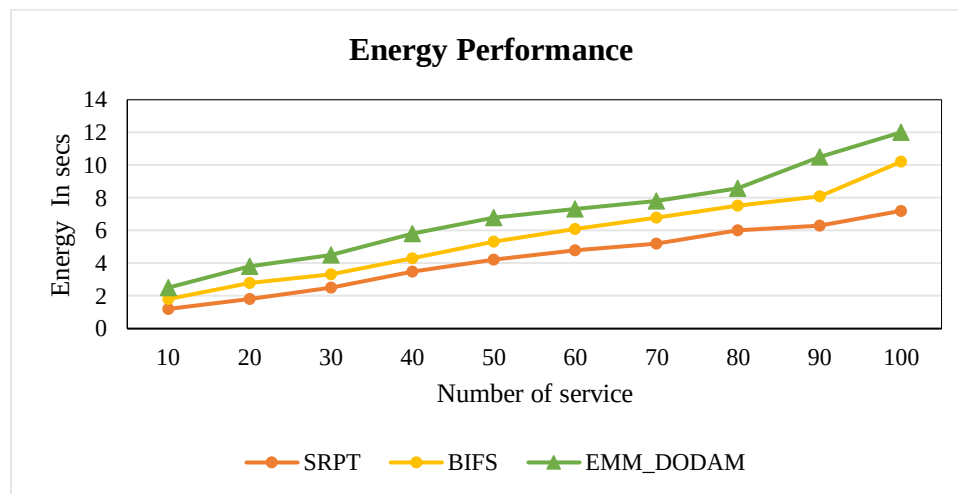


Analysis of Service transmission rate

The Process performance of transmission rate is calculated based on the number of services to a released at any given time. This is a measure of how fast you can send data about the transmission technique definition. The proposed produce higher transmission than existing system

4.3 Analysis of Queuing service Energy Performance:

Process of Queuing service energy along the progressive hyper scheduling system along the multicast chain of importance, transmitting data in the riddle of information can be calculated to the total information form Queuing service arrival. In this way, the vitality utilization is concentrated amid the locale following stage Time to logic was employed to optimize

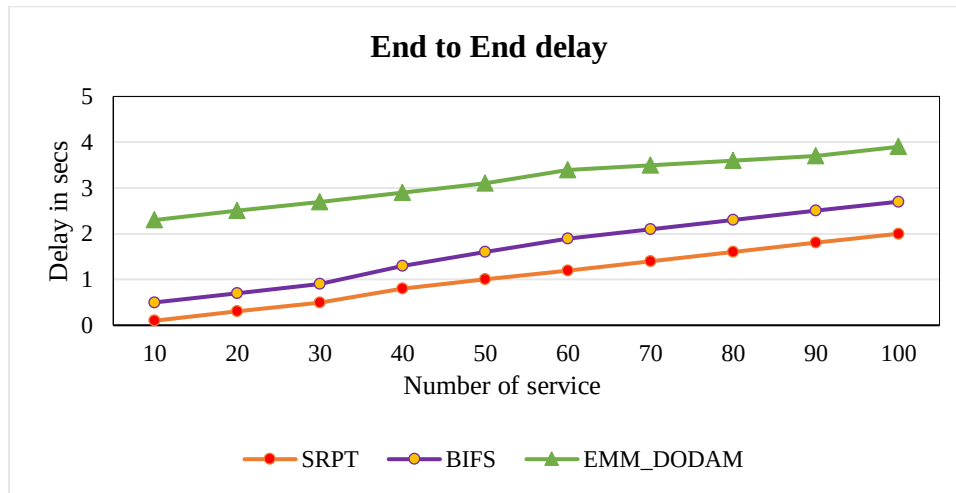


Analysis of Queuing service Energy Performance:

The transmission energy performance produced by different methods, and it indicates the proposed plan has increased the energy period. The proposed produce higher performance of energy level over than existing system

4.4 Queuing service End to End delay

Queuing service delivered to the end of delay and arrival. In this way, the vitality utilization is concentrated amid the locale following stage.



Queuing service End to End delay progress

The delay performance produced by different methods, and it indicates the proposed end to end Queuing service release at response has increased the period of transmission. The proposed produce higher performance than existing system

CHAPTER 5

5.1 Conclusion

This distributed Queuing service provides an approach to planning in real-time.

The theory is that in real-time sorting, it has customer time requirements in the sorting model.

One of the real-time modal sorting explicitly leading time to time bound minus the current time server utilization to process can be characterized by intensive operation.

The proposed Queuing theory based on decentralized Onload data arrival using Expected Max-min probabilistic decision (EM-DODAM) for reducing workload in spite of the infinite dimension of these activities has high performance compared to existing approach.

If heavy on load scheduling, a light weight service at the lead time task is presented, as this description has been proven to be more accurate compared to simulation.

Providing theory in real-time sorting, the promise of behavior that the organization is unable to predict in real-time setting will be defined.

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