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Simulation for Optimizing Repository of COTS

Dr.P.K.Suri[1] and Karambir[2]

[1] Kurukshetra University

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Abstract

Sufficient warehousing management is critical for procurement, storage and delivery of software component. Therefore it is important to find and implement the optimized warehousing system. In Component based software Engineering, it is considered a two-level multi product warehousing control system which controls the requirement of user and fast development of system in the age of hard competition of days. For delivering the software, it is assumed that the client and the developer want their product by minimizing the total cost in mind by reducing the cost of reorder, holding and losses of customer from unavailability of the software in time. The demand of customer for the particular service or component as well as the time of delivering the software component from the vendor are random values with known probability of distribution. Multi location warehousing models are one of the most widely faced real time problem in mathematical warehousing theory, but the analytically models suffer from various restrictive assumptions and solutions.

Index terms— warehousing, component delivery time, client request time, simulation methods, component based software.

1 Introduction

hile developing new software, we search for all library components that satisfy a given requirement of client query. Even the reuse of this component, the environmental constraints decide the compatibility and how much it fulfills the requirements. To select the component, the requirement does not exactly matches the specification of component, then degree of matching takes place like satisfy or relevant or equivalent of behavior. The architecture of software is lay down by the requirement team and then plug and play components allow developers to assemble customized applications without configuration or much programming effort. Dynamically composed plug-and-play components allow users to reconfigure an application on the maintaining the software.

Composition of software points dynamic composability, where components can be added or removed at any time. It may be done at design time or run time. In an architectural system, positions of one component may avail the service of other component or it may provide the service to other component. The big issue for the software developer is that there is a limit of number of components same time in their storage. At present, the repository of library of software component may be huge collection and after some time the new version of this component that has better feature or available at the cheap rate with the change in technology. Then this will be a huge loss or wastage of space to developer. Even this is not possible for developer, that he places order when the client put his requirements in front of him. The distribution and availability of that component may take more time. This may cause the loss of client and delay of development of software. The distribution time of component and arrival of client is assumed stochastic random. Practically, there are many cases when a software developer is involved in ordering process or integrating the component, he has to take into account that the sum of total costs for goods ordering [1], holding and losses from deficit per day and per component should be minimal. In proposed criteria total costs [2] are sum of corresponding costs for all factor taking part in the ordering process i.e. reorder cost, interest on investment on the purchasing of component the loss of client. The developer and client use different ordering strategies. Developer wants to earn more money without much investment. But in client side, the client wants to get software developed early and as per his requirement. Theoretically, it is only possible if the developer has some critical component in his library and the optimum solution is provided to the client. For today's complex production and distribution systems it becomes more and more important to have efficient and easy applicable tools that model [3] and control the flows of goods through the various locations of the system. One of the top questions is how to guarantee in defined sense optimal inventories. In the past answers were found above all by analytical investigations of three tier models. Thus we propose to combine simulation with an appropriate optimization tool and to derive by such a way solutions for complex control, design and availability to client problems.

2 II.

3 Optimization of Cost in Warehousing System

COST system of component Based Software System (CBSE) is the integration of software component as per the service required by the clients. The software developer has to keep the library of the commercial components. The client has different requirement of different service. The services are not exactly matched with the available components. So the developer has to keep a variety of software components with number of user permissions. The warehousing management problem is to maintain the warehousing of these components to meet out an random demand. The developer has to keep the cost of holding the components in own library and the loss of client and wastage of valuable time of client.

4 a) Assumptions

Consider a system with average demand (dem) of a particular component, a reorder number of components Q. The developer has non zero warehousing of components for time t and for (1-t) time backlog of order is kept. As soon as backlog is completed as soon as the next delivery of vendor arrives. The arrival of client and demand for the particular component and time of arrival of order is not fixed. In this algorithm, the following situation is considered (1) the arrival of client to the developer is Poisson Distributed. (2) the lambda for Poisson distribution is 5.0 (3) the arrival of reorder is Erlang distributed. (**??**) Erlang distribution has two variable i.e. m=3, beta=7 was assumed for simulation. The simulation was done for 500 days for fixed value of P and Q. (5) The reorder cost per day, the carrying cost per day and loss due shortage was assumed fixed for different quantity of order and fixed level of reorder. Average of warehousing in warehousing for the time t is given by equation by equation (1) isInv(avg) = Qt 2 ? ? ? ? ? ? 1

For the average time (t), the warehousing is determined by equation (**??**)Inv(avg) T(avg) = Q * ?? 2 2 ? ? ? ?2

If the holding or storing any software and maintaining software is constant k , then for average cost for these is given by equation (**??**)????(??????) = ?? * ???? 2 2 ? ? ? ?3

When the order is placed, then average reorder cost is given below by equation (**??**) is????(??????) = ?? * ?? ?? ? ? ? 4

Total cost average per day is given here below???? = ?? * ???? 2 2 + ?? * ??(1 ? ??) 2 2 + ?? * ?? ?? ? ? ? ?5

To determine the optimal cost for time t , the differentiation of of equation (**??**) w.r.t. to t and for the minimum this is set equal to zero. After differentiation, the equation is?????? ???? = ??[2???? ? 2??(1 ? ??) 2 = 0 ? ? ? ?6

And value of t is equal to?????????????????????? = ?? ?? + ?? ? ? ? ?7

After putting the value of t in equation 6 , the total cost is equal to???? = ?? ? ???? ?? + ?? ? 2 + ???? ?? ? ? ? ?8

In order to determine the optimal number of reorder components, the equation 8 is differentiated with respect to Q and put it equal to zero.?????? ???? = ???? 2(?? + ??) ? ???? ?? 2 = 0 ? ? ? ?9 ??(?????????????????) = ?2???? ?? . ??? + ?? ?? ? ? ? ?10

It was observed that due to finite value of shortage cost b the optimal, the optimum size of reorder number of component increases, but the maximum number of component decreases.

5 b) Algorithm of Simulation of Warehousing of Component

The below mentioned algorithm is for the simulation of arrival of client to the developer and preparation time of software by the developer and arrival of component from the vendor to the developer. Initially the variable h =1 for storing the value by increment step of h, m=3, beta=7 for Erlang distribution and mean value lambda=5 for poison distribution was taken. Here P is the level of warehouse that the developer must place order and Q stands for the number of user for particular component. The warehouse and position of warehousing(invpos0 was taken initially 10. then total software actually given to the client(tus), cumulative warehouse, number of refusal of order of software (nbo), number of reorder(nord) was taken as 0 and time of delivery if order not placed was assumed infinity here it is 999 taken. The demand of software or component (dem) was poison with lambda =5 was calculated. After iteration of 500 days of software developer the average daily sale(adsale), average daily refusal of order of software (adbo), average warehouse (avstok), average buffer warehouse (abstok), cost spent on carrying the component (ccost), the cost spent on the reorder includes phones/internet usage, payment given for time idle of developer(rcost), the loss occurred due to refusal or lost of client (scost), the total cost spent on the whole process of practical case (totcost) was calculated and displayed

Step 1: set h:=1, m:=3, beta:=7.0, lambda:=5.0

Step 2: [start] repeat loop p:=100 to 120 step increment of 5

Step 3: [start] repeat loop q:=50 to 70 step increment of 5

Step 4: initialize nbo:=0, warehouse:=10, invpos:=10, tus:=0, csh:=0, cbfstk:=0, cnbo:=0, nord:=0 Step 5: [start] repeat loop i:=1 to 3(step increment of 1)

Set array dd(i):=999 (end loop)

Step

6 Simulation and Result

The result of running of simulation in octave software is based on the assumptions that the

7 Conclusion

For delivering the software and designing the software, it is assumed that the client, developer and vendor of supplier of component of services and different specification abide by the two layer model. Software developer want their product by minimizing the total cost in mind as well as reducing the cost of reorder, holding and losses of customer from unavailability of the software in time. The customers' demands for the particular service or component and the time of delivering the software component from the vendor are random values with known probability of distribution. In the given paper, a simulation model of the above warehousing assumptions is proposed so that developer may not accumulate the extra and large heaps of components and also may not provide the software to the client in time. It was observed from the fig 9 that the shortage of component has major effect on the cost of maintaining the library of commercial components. It was that the total cost was minimum i.e. 32 at p=110 and at Q=55 on an average optimum as a result of simulation. [1] [2]

1

Figure 1: Fig. 1 :

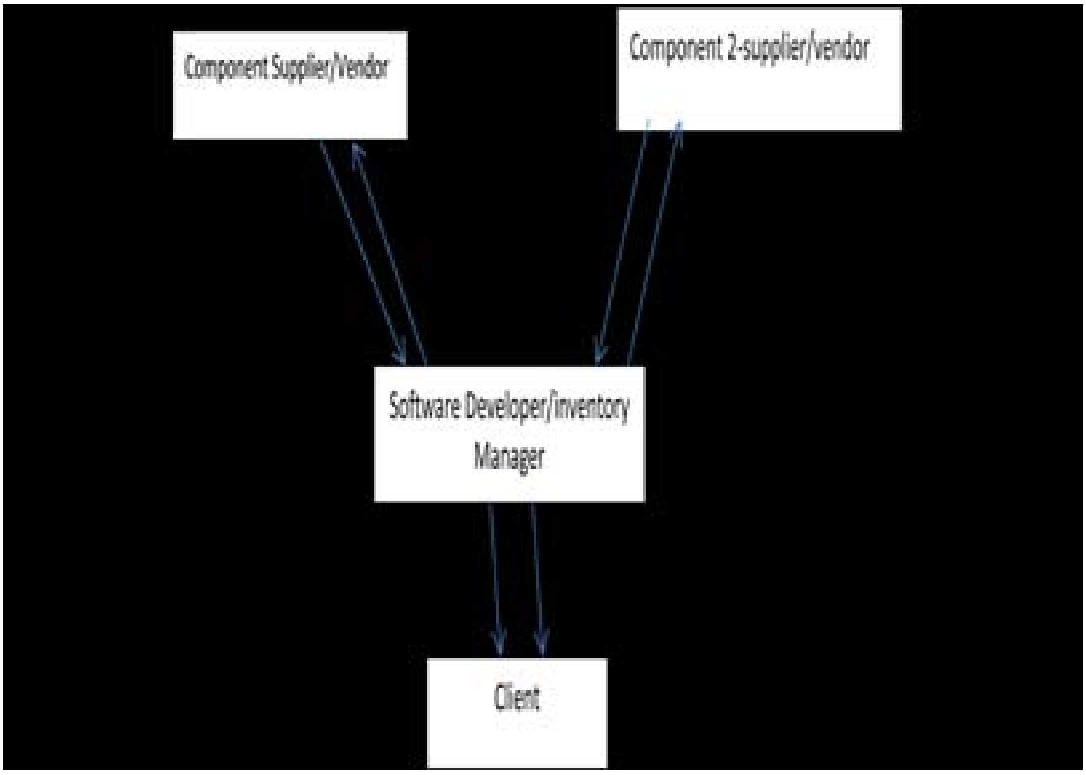

Figure 2: W

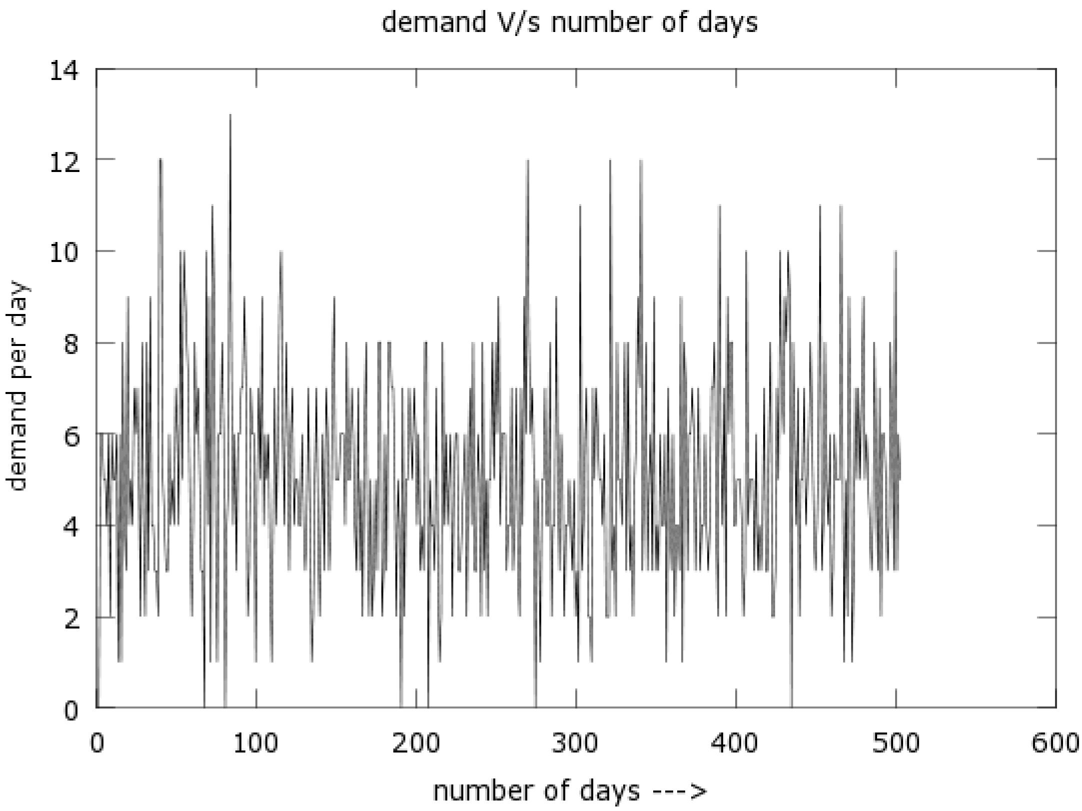

Figure 3:

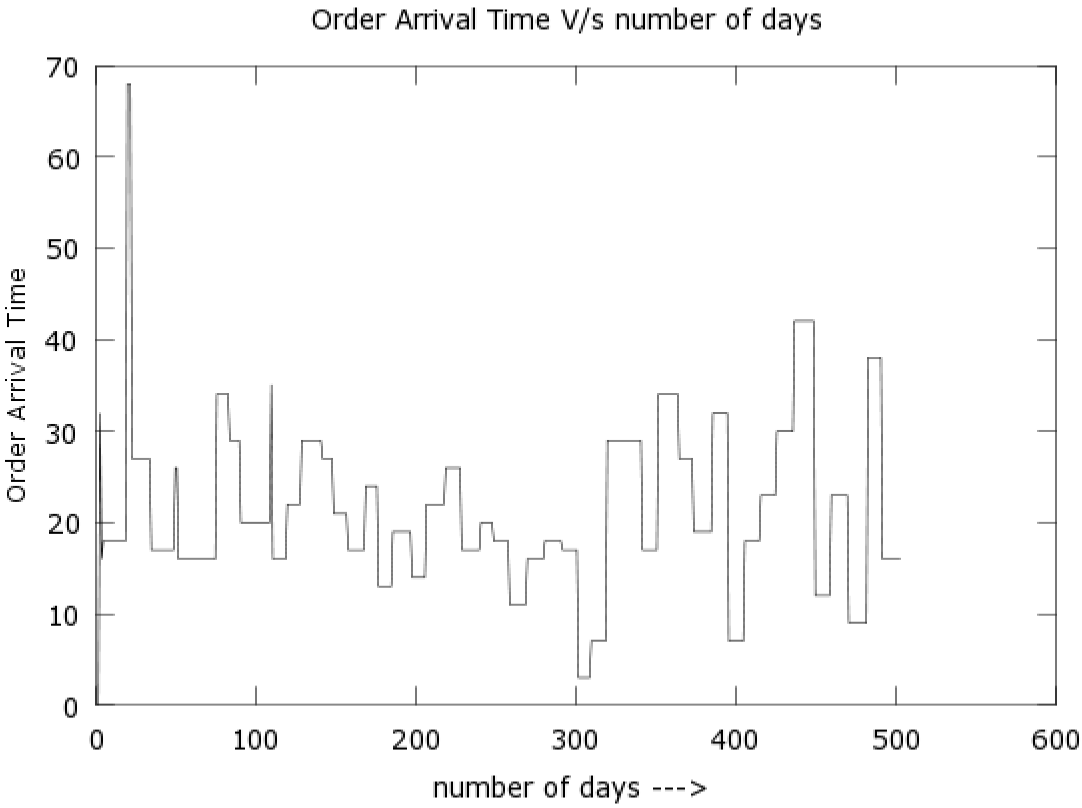

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Figure 4: Fig. 2 :Fig. 3 :Fig. 4 :Fig. 5 :Fig. 6 :Fig. 7 : 1 26Fig. 8 :Fig. 9 :

[Suri et al. (2007)] 'A Simulator for the Assessment of Manpower Requirement for Technology Savvy Banking'. P K Suri , Dilbag Singh , Ramesh Chander . *IJCSNS International Journal of Computer Science and Network Security* April 2007. 7 (4) .

[Kopytov et al. ()] 'Modeling of Two Strategies in Warehousing Control System with Random Lead Time and Demand'. E Kopytov , L Greenglaz , A Muravjov , E Puzinkevich . *Computer Modeling & New Technologies* 2007. 11 (1) p. . Transport and Telecommunication Institute

[Vinay Kumar Nassa and Sri Krishan ()] 'Project Management Efficiency using Soft computing and Risk Analysis'. Vinay Kumar Nassa , Yadav Sri Krishan . *International Journal of Computer Applications* 2012. 50 (16) p. .

[Kopytov et al.] 'Simulation of Warehousing Control System For Supply Chain "Producer -Wholesaler -Client'. G , Eugene Kopytov , Aivars Muravjovs , ; Ecms Tadeusz , Joanna Burczynski , Kolodziej Aleksander , Marco Byrski , Carvalho . *Proceedings 25 th European Conference on Modelling and Simulation*, (25 th European Conference on Modelling and Simulation)

[Wallnau ()] *Volume III: A Technology for Predictable Assembly from Certifiable Components*, K Wallnau . 2003. CMU/SEI