

# Discrete Event Modeling of the Travel Agency Activities in SimEvents

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**Abstract.** The article shows how to simulate the activities of a travel agency in the SimEvents environment and how to calculate the system load. This model allows you to optimally load the system by regrouping services. The considered example of building the architecture of the system model, taking into account the logistics of moving the groupings of objects, can be generalized to the tasks of planning the optimal workload of work centers and other production management tasks. In our case, the agency operates mainly through the Internet. The object of the study is the process of servicing several types of clients of a travel agency. The distribution of various types of tourist destinations is under study. The model is created in Matlab simulation systems in 2017 and Simulink, using a discrete addition SimEvents.

## 1. Introduction

Many companies operating in different market niches reduce operating costs due to the fact that they attract customers through the Internet and other mediums of remote communication.

In the tourism business, this kind of business activity is also applicable. The organization of business processes through the Internet has a number of features:

- a wide selection of types of clients entering the service system;
- a wide range of wishes and requirements for the service provided by the service system.

That is, the agency that provides travel services in real time, works with different segments of the target audience, while at the same time working closely with different tourist destinations.

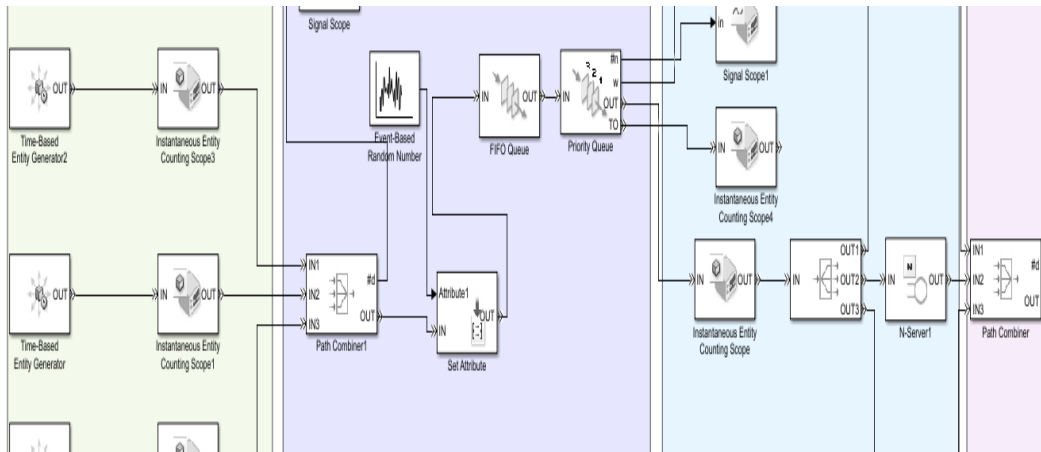
The above features require the use of new, flexible methodologies in the management of the service system. In our work, a service system is simulated that operates on the flow of incoming client-entities and eventually distributes them in accordance with the requirements of the beneficiaries.

**2. Methodology and data**

There were applied methods of synthesis, economic modeling, and simulate the activities of a travel agency in the SimEvents environment.

**3. Results**

Model and method. Figure 1 shows a block diagram of the model with functional zoning and arrangement of blocks and the connections between them.



**Figure 1.** Block diagram of the model with a division into zones.

In recent years, traditional modeling technologies are increasingly being replaced by new technologies for creating and using models called intelligent technologies [1]. The property of intellectuality should be understood in such a way that most of the actions performed earlier by the developer are transferred to the computer, significantly changing the requirements for the developer, the nature of his actions, and the properties of the created model complexes themselves.

The paper discusses the method of creating and conducting research of one of the models of queuing systems in the SimEvents environment, which is one of the components of the MATLAB + SimuLink system.

The model uses three different generators of client entities. Each generator is able to create entities according to different laws of statistical distribution. This displays the different types of target audiences entering simultaneously into the service system. After entering the service system, entities are switched.

The process of customized switching reflects the service of incoming requests management in which ordered orders streams are formed from a diverse mass of orders, which can be processed for optimal time and with high profitability by types and priorities. Obviously, in a system situations are possible when one or another type of applications is the second or third priority, and accordingly, it is not served in the first place - a queue may appear. The next step after switching in the model is the queue. The queue in our model is represented by two blocks:

- FIFO queue
- Prioritized queue

This two-component queue allows you to take into account all the features of working with clients in small and medium businesses. After processing received applications, applications are distributed to affordable destinations, with the help of servers (service racks) communication with specific types of tourist destinations. The final shaft of the processed client orders at the output forms the income and profit of the modeled travel agency.

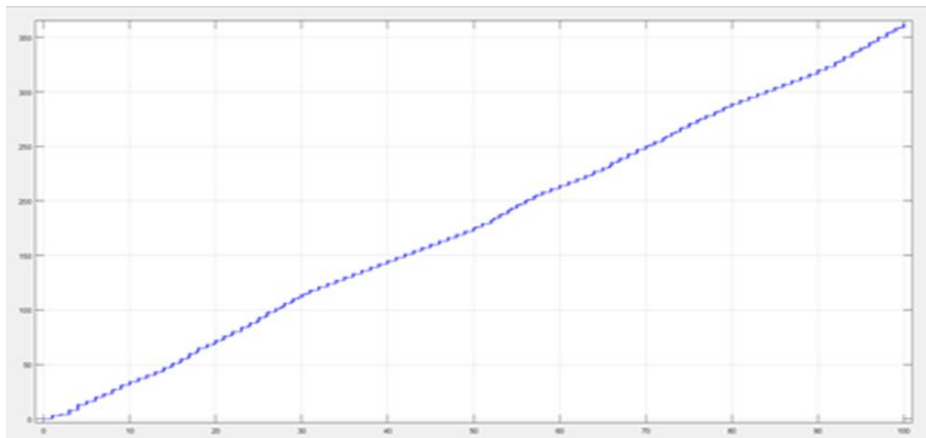
Statement of the model experiment and results.

In our work, we consider several options for the development of events within the service system, depending on external factors and internal management decisions. The first model situation will be a

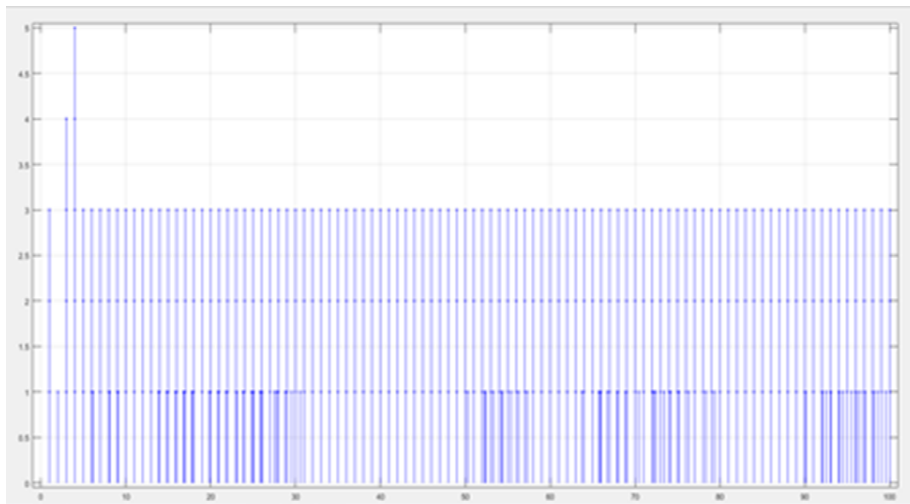
variant of stable operation under the conditions of a roughly constant flow of customer applications and the optimal mood of the service system.

The aggregate stream of requests is switched inside the service system and enters the conditional sales department. In the case of stable "traffic" of orders and the optimal mood of in-system processes, the main task of modeling is to determine the possible fluctuations in the flow of applications and, due to them, respectively, changes in the loading of the service system, in particular uneven staff loads and queues inside the flow applications.

To work with the emerging irregularities, the priority queue system is used. That is, a queue where orders are not processed sequentially (FIFO), but depending on the priority (in our case, the average amount of the transaction for this type of target audience). The results of the simulation are shown in Fig. 2, which shows the number of clients passing through the application receipt node. Figure 3 shows the composition of the weights of incoming customers.



**Figure 2.** Number of customers passing through the application reception center.



**Figure 3.** Composition of the weighting coefficients of incoming customers.

Any queuing system is characterized by indicators of its effectiveness efficiency. Therefore, when formalizing maintenance tasks quite naturally the desire to build a queuing system in such a way to establish a reasonable compromise between rates related to applications and full use system capabilities. When modeling a queuing system, it is necessary to choose such an indicator efficiency, which takes into account temporarily the demands and capabilities of those for who serve and those who serve.

Thus, the following conclusions may be drawn.

#### 4. Conclusions

In our work we have shown the importance of competent and operative management of a travel agency in various situations. Strategic planning of the structure of the service system, in compositions with prompt rapid response, make the work of the model enterprise effective in various conditions.

Obviously, such a management is possible only in conditions of possibility to check and anticipate future market situations. This process can be effective due to the use of methods of mathematical modeling. This model was built in the SimEvents environment using standard blocks. SimEvents allows you to create requirements with user-defined parameters and then connect the blocks together in such a way that the movement and processing of applications correspond to actual conditions.

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