Scientific Research

Simulation on Single Server & Distributed Environment (It's Comparison & Issues)

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ABSTRACT

Simulation has become the evaluation method of choice for many areas of distributing computing research. Simulation has been applied successfully for modeling small and large complex systems and understanding their behavior, especially in the area of distributed systems or parallel environment. The aim of my research is to study and qualitative analysis of simulation on a single server & on distributed environment and finding the related issues & its comparison.

Keywords: Simulation; Simulation on Single Server Environment; Simulation on Distributed Environment; Simulation Issues

1. Introduction

The terms "simulation" and "modeling" are sometimes used alternatively. In reality, they are distinct, though related, terms.

Simulation means mimicking of real life or potential situations, usually using computers. It is the imitative representation of the functioning of one system or process by means of the functioning of another, such as a computer simulation of an industrial process. With simulation, one can examine a problem that is often not subject to direct experimentation.

1.1. Basic Simulation Model

Basic simulation model structure is shown in **Figure 1**. Simulation is the art of using tools—physical or conceptual models, or computer hardware and software, to attempt to create the illusion of reality. The discipline has in recent years expanded to include the modeling of systems that rely on human factors and therefore possess a large proportion of uncertainty, such as social, economic or commercial systems.

Simulation is the technique of using some tools—either physical or conceptual models, or based on computer
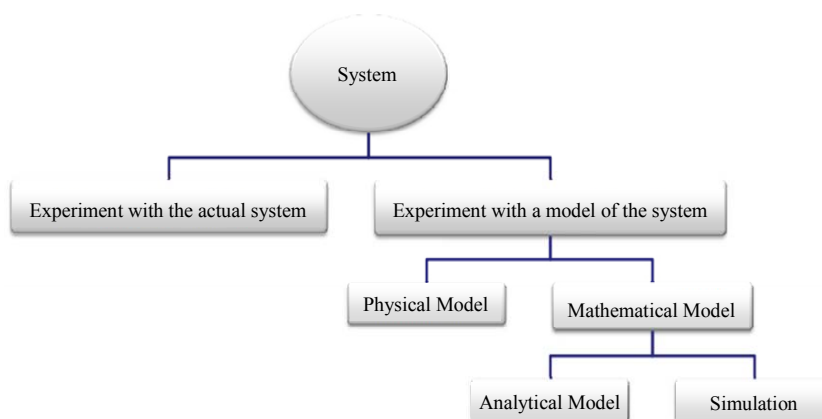

Figure 1. Basic simulation model structure [1].

hardware and software; try to create the virtual illusion of real objects [2].

1.2. Simulation Purpose: When to Use

- The study of experiments: Simulation enables with internal interactions.
- Knowledge gained from simulations very useful in order to improve the system.
- Simulations can be used to verify analytical results, e.g. queuing systems [3].

2. Literature Review

Applications, Models, Simulation & Design Models are shown in **Figure 2**.

2.1. Simulation on Single Server Environment

Simulation on a single server environment is based on client server architecture where its work on single pc environment.

In the area of IT, client-server models exhibit a degree of complexity and richness not amenable to easy analytical solutions, except for some specific algorithms useful in limited contexts. Simulation could, therefore, be a good strategy to analyze the client-server systems and help in better implementation of feasible solutions [4].

2.2. Simulation on Distributed Environment

Any simulation in which the number of processors is more than 1 involved [5].

Distributed systems typically consist of a large number of actors that act and interact with each other in a highly dynamic or changing environment [6].

Design and development of distributed system is widespread in discrete-event simulation, for example: it is use to understand network protocols [7].

Performance and functionality of complex inter component protocol and algorithm is defined by simulation,

these functions and algorithms written in different programming languages.

Simulation gives an opportunity to developer to capture basic functionality at the same time as they are working on topology, bandwidth, timing and overall properties of distributed system. The code that implements a simulation distributed system is formal speciation of the intended functional behavior of that system, whose behavior is parameterized by a well-defined set of controllable distribution properties in addition to normal inputs [8].

According to this observation, simulation can be used within a specification based testing to provide developers of distributed system with a method for selective effective test suites. This analysis give advantage of specification is executable to program code, in concern of distributed system and the simulation code is correct specification.

2.3. Why Use Simulation

- It makes the simulation process faster with large number of processors.
- It simulate larger amount of data with greater memory & resources.
- It integrates geographically distributed simulators [9].

3. Related Work

3.1. Simulation on Single Server Environment

Processing performed in single server environment is shown on **Figure 3**. It clearly shows simulation on a single server environment in which we have single processor.

3.2. Simulation on Distributed Environment

Processing performed in distributed environment is shown in **Figure 4**. It clearly shows simulation on a distributed environment in which we have multiple processors.
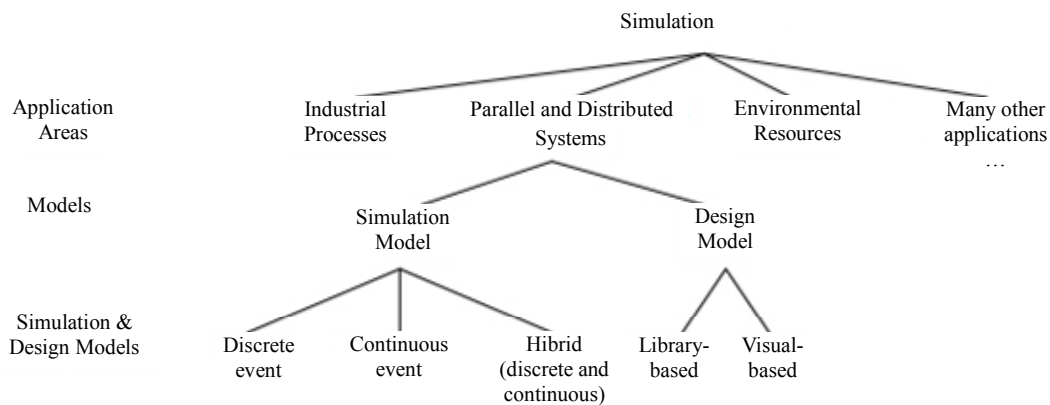

Figure 2. Applications, models, simulation & design models [6].
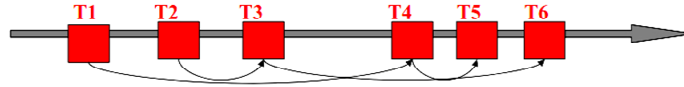

Sequential
1 processors
Example:

Figure 3. Processing performed in single server environment.

Parallel
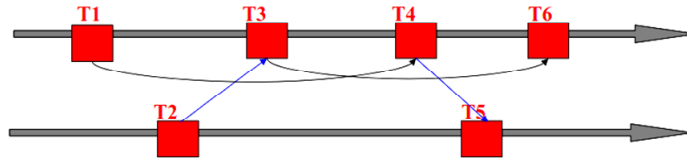n > 1 processors
Example:
2 processors

Figure 4. Processing performed in distributed environment.

3.3. Comparison: Simulation in Single Server Environment

- Simulation performed on single server.
- It has geographic limitation due to single server.
- Single processor use.
- It makes the simulation process slower because single core processor use in simulation.
- The cost of setup is comparatively low.
- To maintain one server is easy as compared to multiple servers.

3.4. Comparison: Simulation in Distributed Environment

- Simulation performed on distributed servers.
- It integrates geographically distributed simulators.
- Multiple processor use.
- It makes the simulation process faster because single core processor use in simulation
- The cost of is high because multiple processors used.
- It's quite difficult job to maintain huge no. of servers on distributed environment.

4. Conclusion

Simulation has been applied successfully for modeling small and large complex systems. Simulation is the art to create a physical and conceptual model which can represent a system or create the illusion of reality. Simulation helps to make experiment for understanding the behavior of system. Computer simulation gives opportunity to observe a real world experience and interact with it. As we all know that purchasing physical equipment for every experiment is almost not possible and required a large amount of funding.

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