

QoS AND MOBILE TECHNOLOGIES

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CHAPTER 12

COMPARISON BETWEEN NETWORK SIMULATORS

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12.1 INTRODUCTION

Simulation is an extremely powerful and flexible tool. It potentially allows studying a large number of possible system configurations controlling the amount of complexity and realism included in the simulation model. The purpose of a simulation study consists to draw conclusions that are at the same time statistically sound, meaningful, and of practical interest. Some of popular simulators will be displayed in this section [1].

12.2 NETWORK SIMULATOR 2 (NS-2)

NS-2 [2] is the de facto standard for network simulation. Its behavior is highly trusted within the networking community. It is developed at ISI, California, and is supported by the DARPA and NSF. NS-2 is a discrete-event simulator organized according to the OSI model and primarily designed to simulate wired networks.

The core of ns-2 is a monolithic piece of C++ code. It is extendable by adding C++ modules. The configuration relies on OTCL (a dialect of TCL, developed by the MIT) scripts. NS-2 then appears to the user as an OTCL interpreter. More precisely, it reads scenarios files written in OTCL and produces a trace file in its own format. This trace needs to be processed by user scripts or converted and rendered using the NAM tool.

Unfortunately it suffers from its lack of modularity as well as from its inherent complexity (NS-2 was candidate to be the basis for the Qualnet [3] simulator but got finally rejected). Indeed, adding components/protocols or modifying existing ones is not as straightforward as it should be. For a long time, NS-2 has been said to have few good documentation. The situation recently changed, as several users have put online their experience in the form of tutorials or example-driven documentations.

Another well-known weakness of NS-2 is its high consumption of computational resources. A harmful consequence is that NS-2 lacks scalability, which impedes the simulation of large networks (NS-2 is typically used for simulations consisting of no more than a few hundreds nodes).