"Modeling and Analysis of a Joint

Source Channel coding system for

4G IP Network"

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Abstract

The 4th generation of wireless systems (4G) will be a globally integrated communication network interconnecting in a transparent way a multitude of heterogeneous networks and systems. A key challenge to the development of 4G will be the definition of a flexible reconfigurable network architecture that enables simultaneous optimization of bandwidth and Quality of Service (QoS) management. That is, optimal allocation of user and system components. This approach, known as **"joint source channel coding and decoding" (JSCC/D),** allows for strategies where the source coding, channel coding, modulation, and possibly network parameters are jointly determined to the best end-to-end system performance. As a summary, the main objectives of Phoenix are:

- To develop innovative schemes to enable JSCC/D. This includes the development of flexible channel coding and modulation schemes and the adaptation of existing source coding schemes with respect their ability for JSCC/D and the development of new ones specifically optimized for this purpose.

- To build a global network architecture based on joint source channel (de)coding for future 4G systems.

- This objective includes the development of JSCC/D controllers which will jointly control the coding blocks and the development of the **network transparency** approach which will allow JSCC/D to be applicable in any kind of network and especially in the 4G ones that should be fully IP-based, to validate and to demonstrate the global architecture and the different building blocks implementing a real time end-to-end platform.

.-Parts of the Document

When I started with this project there was an initial scenario in which some of all the characteristics that will form the final project had already been implemented. The aspect of the initial scenario is the following (Figure 0.1)

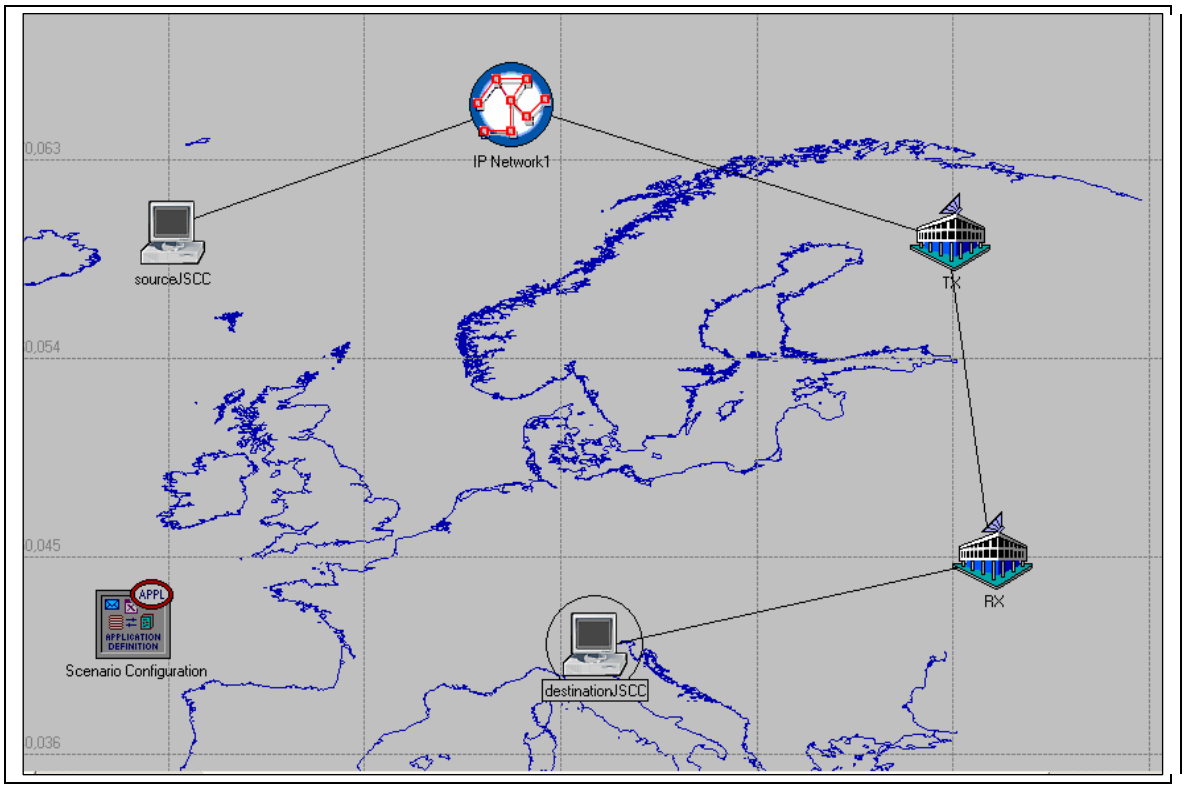

Figure 0.1: Basic Configuration Scenario in OPNET

In Chapter 4 we will explain all the modules that form the initial scenario and in Chapter 5 we will explain the new implementations we have made over the first one. These new implementations consist on new Modules and its C code, including the FSM (Finite State Machine).

Then, in Chapter 6 we show the simulations we have made from the first Scenario we found to the last Scenario with all the modifications. Each Scenario contains several simulations made changing some of the configuration parameters.

At the end, once done this project, we have made some conclusions about the work we have made and some further modifications and suggestions.