

Did@net Project

A Satellite-Based Educational Network

Introduction

The Did@net project is aimed at designing and setting up a satellite network with QoS guarantees for multimedia communications and distance learning applications. The peculiar conditions and requirements of a satellite network require to investigate on Transport and Network layers, and how a specific protocol affects the overall performance from an end-users' point of view.

Project status

Start of the project: 01-01-2003

End: 31-03-2005

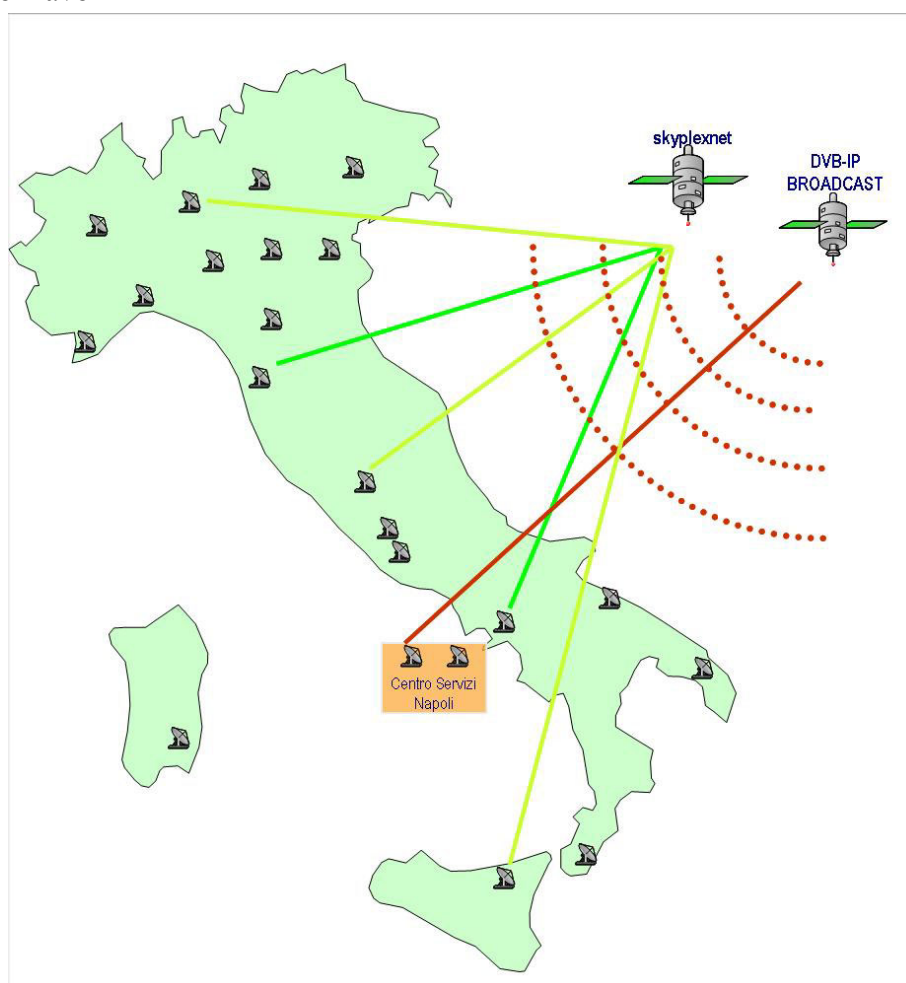
Main Site: CNIT National Laboratory for Multimedia Communications, Naples

P.I.: Prof. Franco Davoli

Goals

Main objectives are:

- to favour the development of the CNIT national network in the South of Italy;
- to implement a multimedia library for services aimed at distance learning contents delivery over satellite links;
- to identify and choose audio, video and data transmission applications for:
 - Distance learning;
 - Manipulation of Remote Measurement Instrumentation.
- to prepare and deliver training lectures in cooperation with the Teledoc2 Project.



Project activities

The project's activities concern:

- Infrastructure
- Protocols
- Applications and field tests

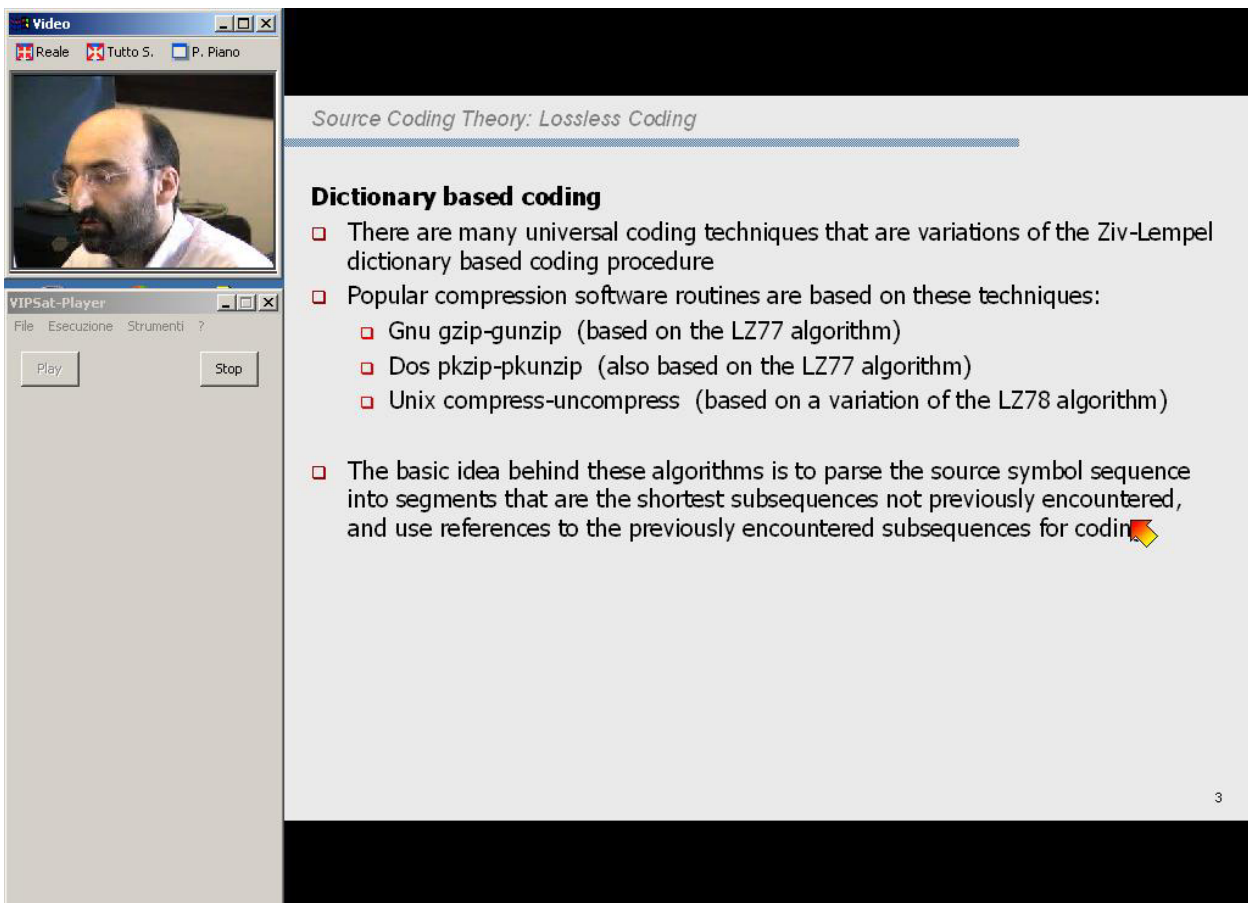
Infrastructure

The proposed infrastructure is based on:

- a Ka band Skyplexnet satellite network
- a Ku band DVB-IP broadcast satellite network

Research Aspects

- Study and experimental comparison of TCP performance enhancement methods over satellite links
- QoS mapping and cross-layer optimization
- Analysis of Perceived QoS in multimedia streams
- Scalable content adaptation and delivery



The image shows a screenshot of a live lecture transmission. On the left, there is a video player window titled 'Video' with a small video feed of a man speaking. Below the video player is a 'VIP5at-Player' window with 'Play' and 'Stop' buttons. On the right, a presentation slide is displayed with the title 'Source Coding Theory: Lossless Coding'. The slide content includes a section on 'Dictionary based coding' with several bullet points.

Source Coding Theory: Lossless Coding

Dictionary based coding

- There are many universal coding techniques that are variations of the Ziv-Lempel dictionary based coding procedure
- Popular compression software routines are based on these techniques:
 - Gnu gzip-gunzip (based on the LZ77 algorithm)
 - Dos pkzip-pkunzip (also based on the LZ77 algorithm)
 - Unix compress-uncompress (based on a variation of the LZ78 algorithm)
- The basic idea behind these algorithms is to parse the source symbol sequence into segments that are the shortest subsequences not previously encountered, and use references to the previously encountered subsequences for coding.

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Figure 1. Snapshot of a live lecture transmission taken from a Ku-band receive-only terminal. The Lecture, transmitted over the Ka band network, is received by the Service Center located in Naples. The video substream is transcoded and the adapted contents is retransmitted in Ka band to the Skylogic Hub located in Turin. The Hub broadcasts the transcoded lecture over the Ku band.