

# An Application Programming Interface for Graphs Databases

# **André Rodrigues Paris**

LabTel (Laboratory of Telecommunications) at Federal University of Espírito Santo Vitória - Espírito Santo, 29075-910, Brazil andre.paris@aluno.ufes.br

# **Maxwell Eduardo Monteiro**

LabTel & Federal Institute of Espírito Santo Serra - Espírito Santo, 29173-087, Brazil maxmont@ifes.edu.br

### Marcia Helena Moreira Paiva

LabTel at Federal University of Espírito Santo Vitória - Espírito Santo, 29075-910, Brazil marcia.paiva@ufes.br

**ABSTRACT** Graphs provide an important tool to model several kinds of problems. Nowadays, lots of research groups are developing case studies using graphs according to their properties, generating a huge quantity of data to be modelled, stored and analysed in order to get solutions for theoretical or real world problems. However, several steps are often necessary to compute graph properties, since not always only a software is used to compute or get all the required analyses. Aiming to improve graph handling, save research time and boost results, this work proposes a tool which is able to integrate programs for computing graph properties and storing graphs. Such a tool is an API RESTful (Application Programming Interface RESTful), which integrates mathematical softwares and a Neo4J graph database.

There are different softwares that implements graph properties computation. In this work, a Wolfram Mathematica's script was developed for computing the desired graph properties (e.g., average degree, diameter, node connectivity, and node and edge betweenness centrality). Other properties could be added as needed. The Neo4J graph database presents a set of services specifically designed to graph handling operations. In this way, users are able to insert files describing graphs and get graphs using their properties as filters. The current version of the proposed graph database allows the file formats el, g6, gagx3, tgf, and lgf. The API RESTful allows users to send request to servers in order to get information about their graphs. Thus, all information about the graphs stored in the Neo4J database are available to the user without being necessary doing several steps; only one request is enough to get results.

Briefly, this work provides a support software framework to improve graph handling, save research time and boost results, by means of: (i) a new strategy to store and handle a huge quantity of graphs, (ii) an extensible graph storage model, (iii) an API RESTful that integrates the graph database with graph computing softwares such as Mathematica, and (iv) an API RESTful to query graphs by its properties. For future work, some applications will be tested, and the performance of the framework will be evaluated. The implemented system is available at <http://github.com/andreparis/-API-JavaScript-2.0>, where all steps to install it can be found. The software framework is open and can be extended to achieve more complex graph applications.

### **KEYWORDS.** API. Neo4.J. Graphs.

Multicriteria Decision Support. OR in Telecommunications and Information Systems. Theory and Algorithms in Graphs.