Peer-to-Peer topology generator

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Project summary

Peer-to-Peer Systems are application-level networks of virtual links. They are deployed in real-world environments with great success in large-scale, resource-sharing scenarios. Their architecture may form a big variety of topologies depending on several factors and exhibiting quite different properties. The result of this project is expected to be two-faceted:

1. Given a topology, the student will have to study the behavior of that network as nodes join/leave the network and links are created/deleted. Symmetrically, the student has to come up with a proposal as to which topology best satisfies a number of requirements and properties.

2. Moreover, the student needs to propose at least one algorithm for creating each of the tested topologies. This facet includes the evaluation of these algorithms based on a set of metrics.

In practice, the project consists of five phases:

1. Study of a number of P2P topologies with focus on the unstructured ones producing a comparative analysis on certain metrics.

2. Devise and implement algorithms that produce these topologies in a distributed manner.

3. Deploy these algorithms in a simulation and emulation environment with proper equipment.

4. Experimentation and evaluation of their performance.

5. Preparation of the report with the analysis of the previous phases.

Prerequisites: Understanding of graph theory basics, familiarity with Java or C++ programming scripting programming languages

Learning Outcomes: Through this project, the student will 1) familiarize with the P2P Topologies and their evolution patterns, 2) learn techniques to reconfigure P2P Network properties on-the-fly and 3) will improve her/his programming skills.