Draft of the poster content

The poster will firstly define the concepts of *energy awareness* and *network dimensioning*, and describe the challenge of modeling the energy profile of a network device/system. It will than detail the formulation of the problem, and the mathematical and software tools employed in the work. The mathematical formulation as exposed in Section 2 will also be reported in the poster.

We will treat in the poster the reasons of the choice of the GEANT network topology (depicted in Figure 2), and the possible alternatives. This is a conservative choice, since it represents a worst case scenario, where all nodes are sources and destination of traffic requests, and can not be generally switched off.

The numerical results of the optimization problem will be then presented, discussing the different parts composing them (i.e., links and nodes), and the conclusions that may be derived from them. The same work will be done comparing the results obtained for the different energy consumption models. Example of the results is shown in Figures 3 and 4.

Figure 3 represents the results for the variation of the achieved energy saving when varying maximum imposed link utilization (i.e., the parameter α. This is the standard way of guaranteeing QoS and robustness in the operators network). This graph is related to the link contribution in the fully proportional case. These results have been obtained as average over different traffic matrices covering a typical day (i.e., 24 traffic matrices, hourly spaced). It is possible to see how the energy saving presents small variations for varying α since the specific worst case scenario selected does not allow high link utilization on a large number of links, due to the high variance in the link capacity. Also this means that operators can set quite conservatively maximum utilization values (α), without compromising the achievable energy saving.

Figure 4 shows the variation of the achieved energy saving while considering different traffic matrices covering a typical day. Dots on the left y-axis report the total energy consumption in the idleEnergy case, both for the standard routing case, and for the energy optimized one. The dashed line on the right y-axis represents the energy saving achieved by the energy optimized solution, with respect to the standard routing one, in percentage. It is possible to see how the achievable energy saving is very low in this case, since the selected worst case scenario does not allow nodes to be switched off. In the idleEnergy model, the idle component of the energy consumption (E_0) represents the dominant component, and can not be eliminated without switching off the network devices. With respect to the used values of the parameters describing the energy profile of the network devices (E_0 and M), the power consumption due to nodes is much more higher than the one due to links. This confirms GEANT to be a rather conservative scenario, in which the achieved energy saving represent the lower bound.

Conclusion will than be drawn and perspectives traced for possible direction of future work.

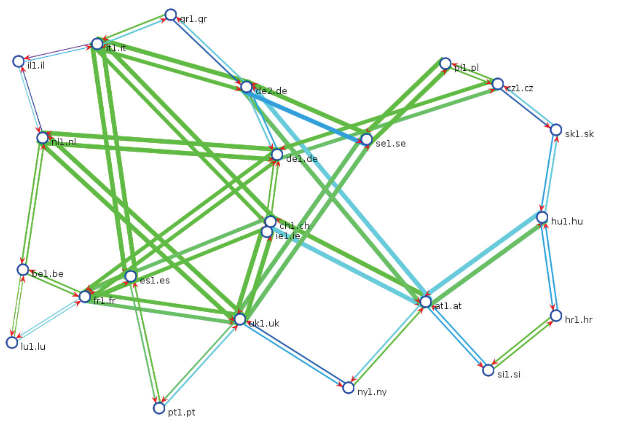

Figure 2: A representation of the GEANT network topology, as used in the solution evaluation.

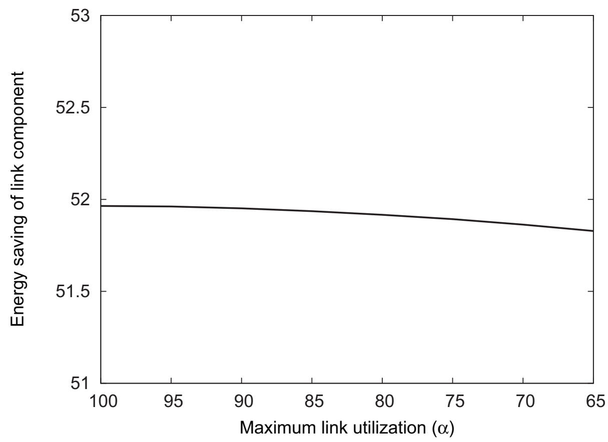

Figure 3: Energy saving in percentage, as a function of the maximum link utilization (α), for the link component in the fully proportional case.

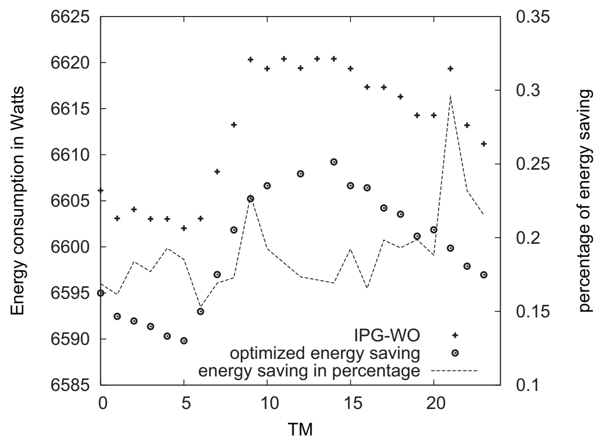

Figure 4: Energy saving in watts, for different traffic matrices, in the idleEnergy case.