universität innsbruck

VU Scheduling Approaches in Distributed Systems.

Task 3 – "Definition of Optimization Constraints".

Student/Group:

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General Feedback:

- **Secret Region Constraint**: For the formulation of the constraint preventing the communication of messages across different regions, your constraint is not fully correct, since it does not prevent all cases where communicating tasks could be mapped into different regions. What you are doing is to say that if the sets of potential regions of the sender and the receiver are disjoint, then neither of them can be mapped into the regions not accessible to the other one, e.g.:
  - Task 1 (sender); Regions A,B,C
  - Task 2 (receiver); Regions A,B,D
  - Effect of your constraint: Task 1 cannot be mapped into region C; Task 2 cannot be mapped into region D
  - Problem: It is still possible to map the tasks into different regions, e.g., Task 1 into region A and Task 2 into region B
- **Minor Remark:** Considering the *noSecreteOnCloudResourcesConstraint* there is, in principle, an argument to formulate many small constraints each saying $\boldsymbol{m}_i = 0$ instead of one big constraint saying $\sum_{i=0}^{n} \boldsymbol{m}_i = 0$, since the latter makes it more difficult for the solver to learn that all these mappings are always 0. In our case, we filter these mappings out in the preprocessing phase anyway, but it is good to keep in mind that these formulations are not the same.
- **Comparison Evaluator/Constraint-based Approach**: As I mentioned in the VO, my design of the exercise was not good, since both approaches ended up using the constraint set encoding a correct routing, which is significantly more complex than the mapping constraint set, making it impossible to observe the differences between the constraint and the evaluation-based approaches. For an actual application, you could expect that the usage of constraints would result in longer run times, but at the same time provide a faster convergence towards high-quality solutions.

Code Feedback:

- Solid code, good comments and structure

Summary:

Overall, a solid solution and a sensible approach to formulate the requested constraints. Have another look at the constraint for the encoding of the secret communication. Can you think of a method to extend your constraint/formulating a different one, so that inter-region communication is completely prevented? Apart from that, a good solution. Well done :)

Best regards,

Fedor