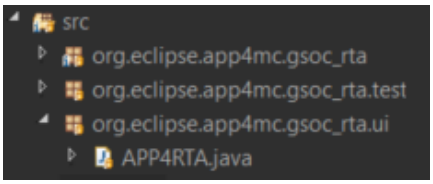
APP4RTA

For Analyzing Response Time & End-to-End Chain Latency

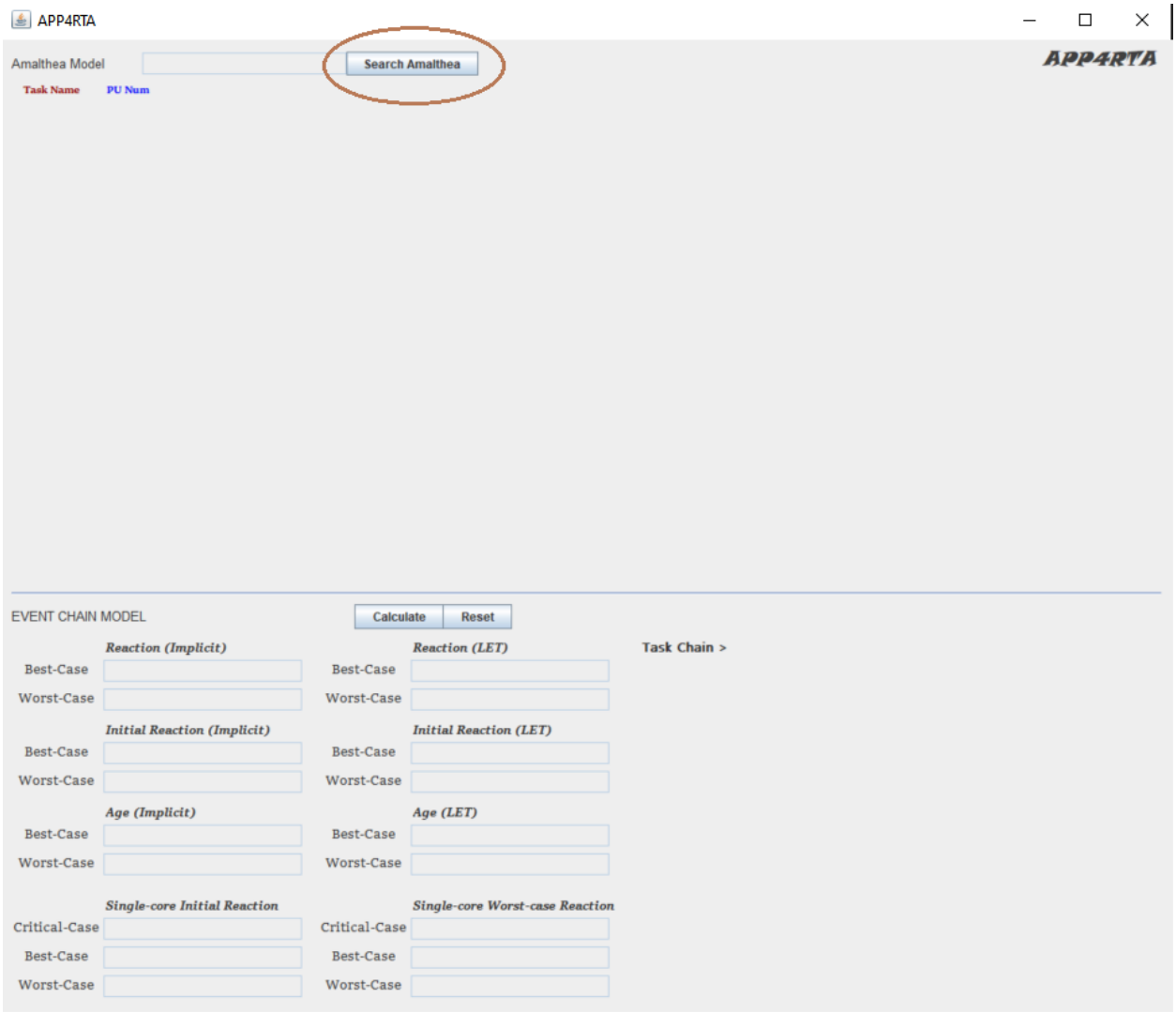
Source: https://gsoc-doc.readthedocs.io/en/latest/contents/ui.html

1. APP4RTA Location



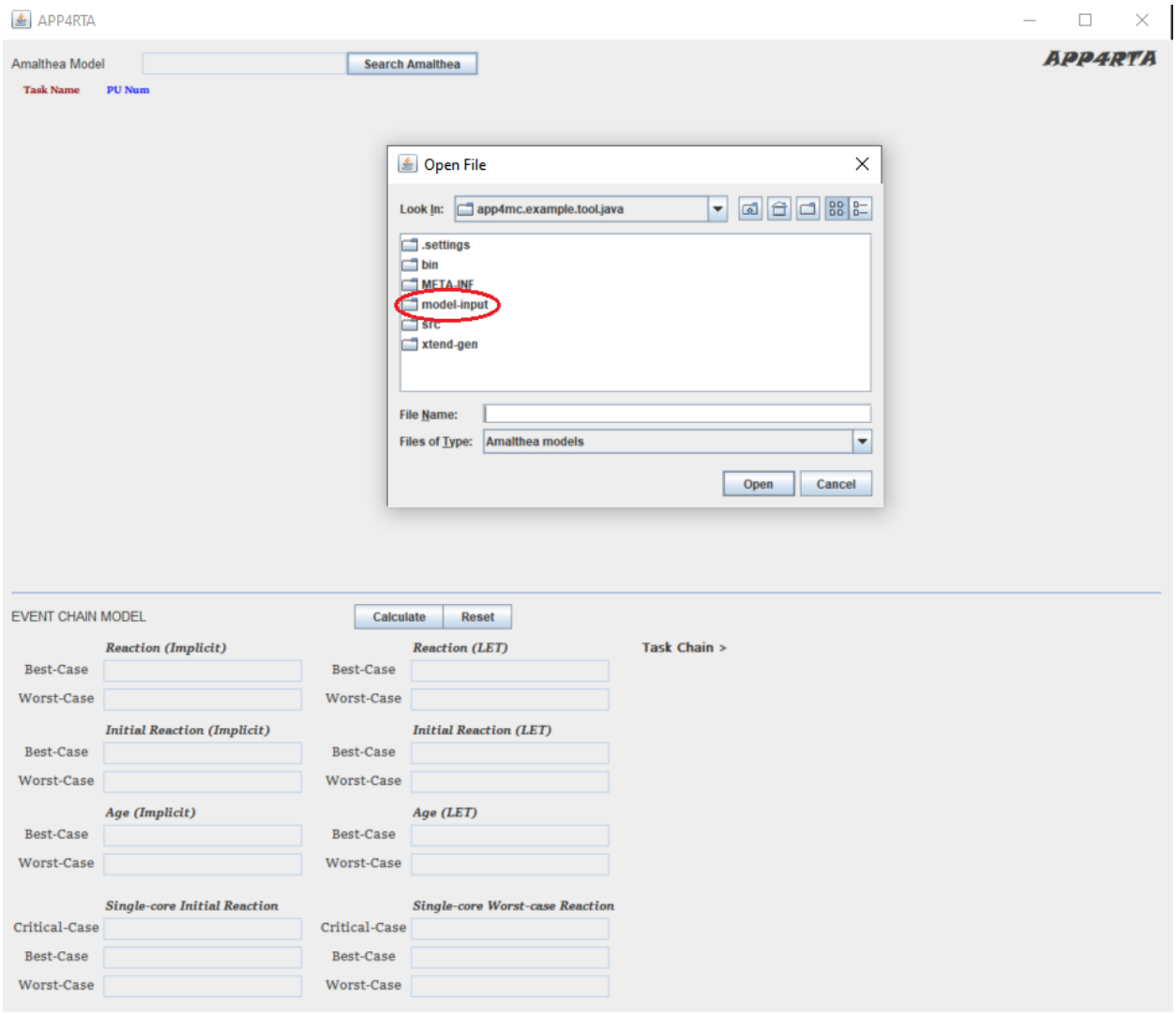
Run '*APP4RTA.java'* in '*org.eclipse.app4mc.gsoc_rta.ui'* package.

2. Search Amalthea



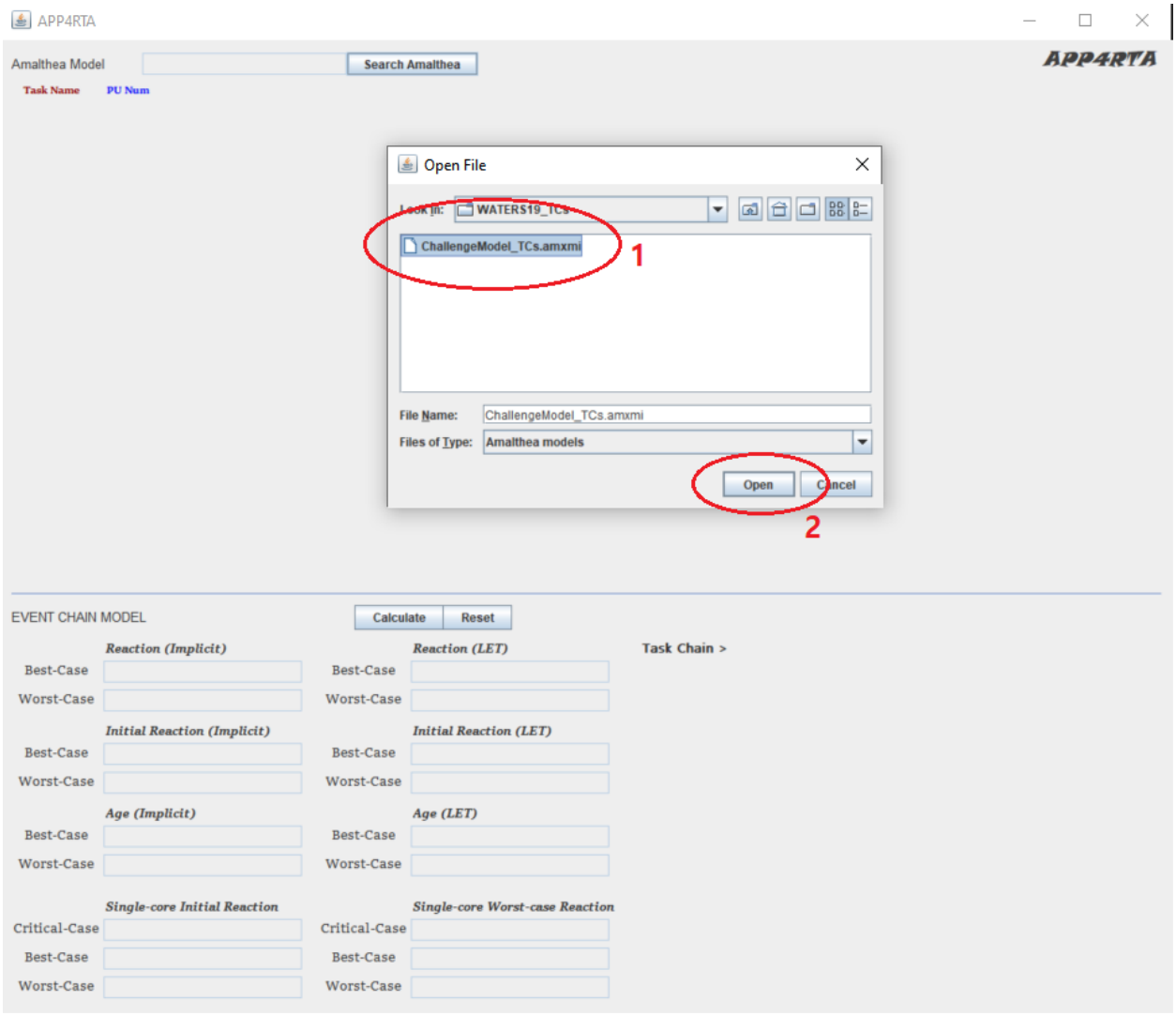
Based on the horizontal line on the middle, the upper part is for response time and mapping analysis and the lower part is for end-to-end event chain latency analysis. The first thing to do is deciding a target Amalthea model. Click the 'Search Amalthea' button.

3. Navigate to The Amalthea Folder



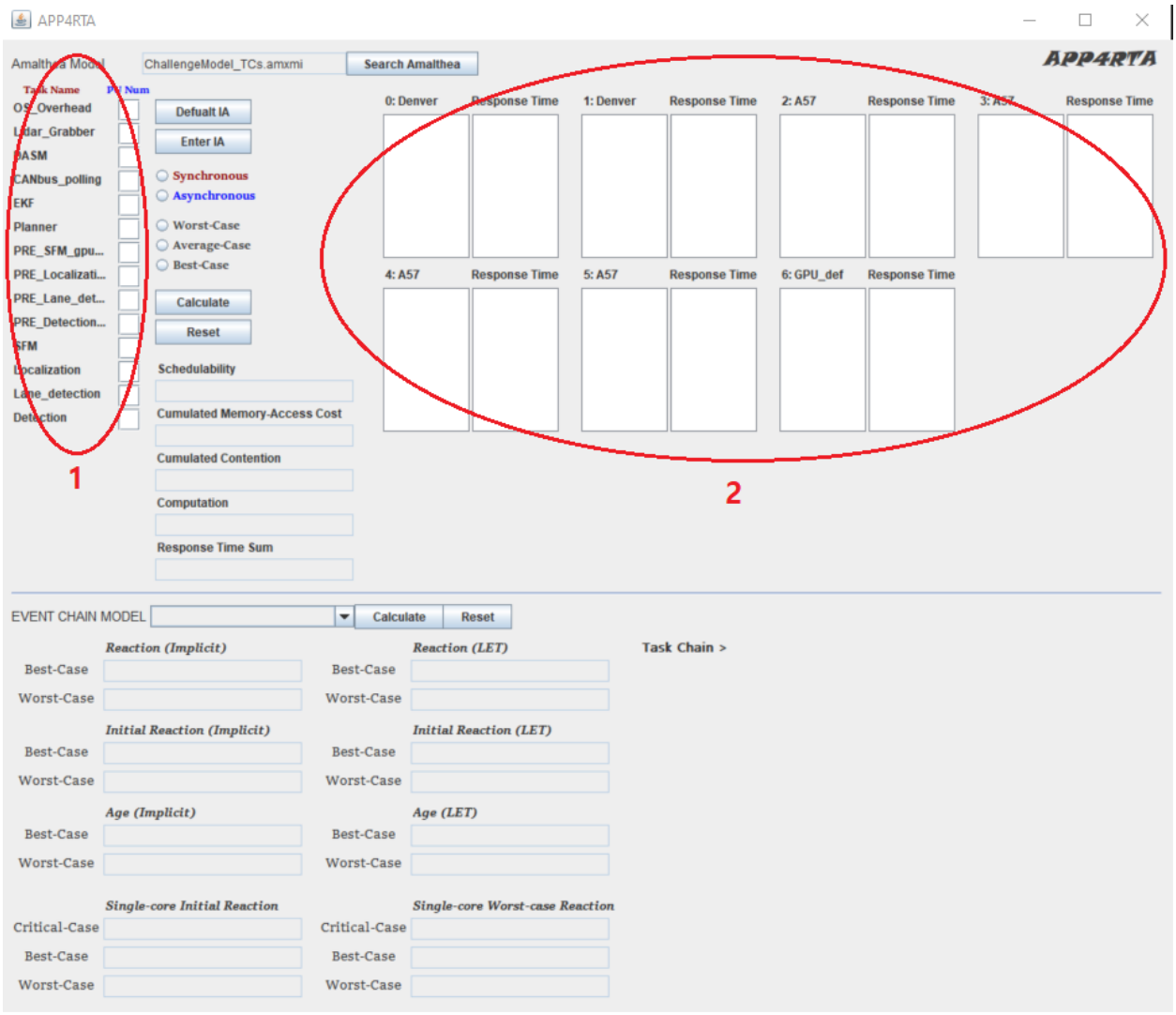
Navigate to the folder where the target Amalthea model file is located.

4. Select & Open Amalthea



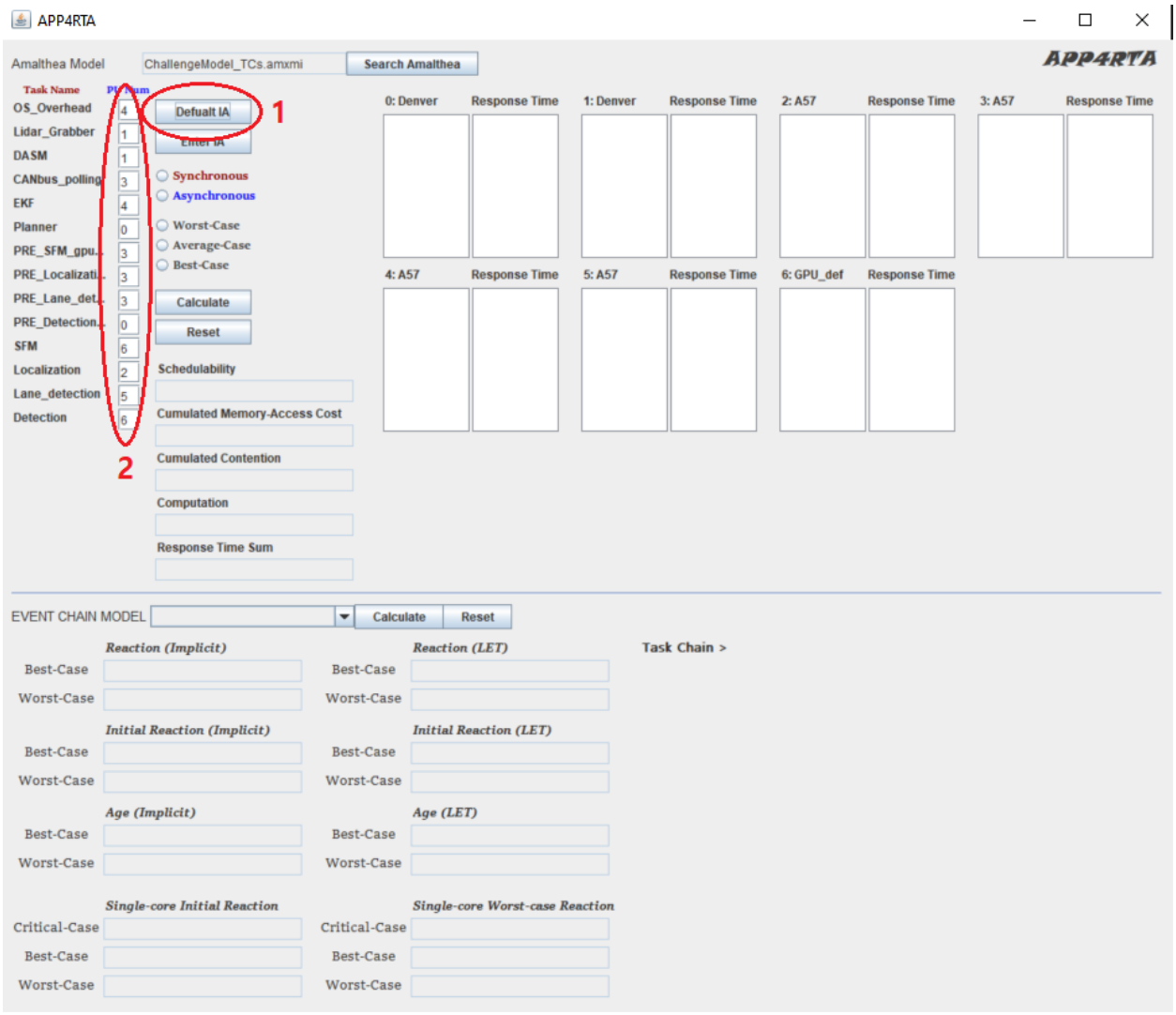
Select and open an Amalthea file. In this example, a multi-core Amalthea model is chosen.

5. Amalthea Model Loaded



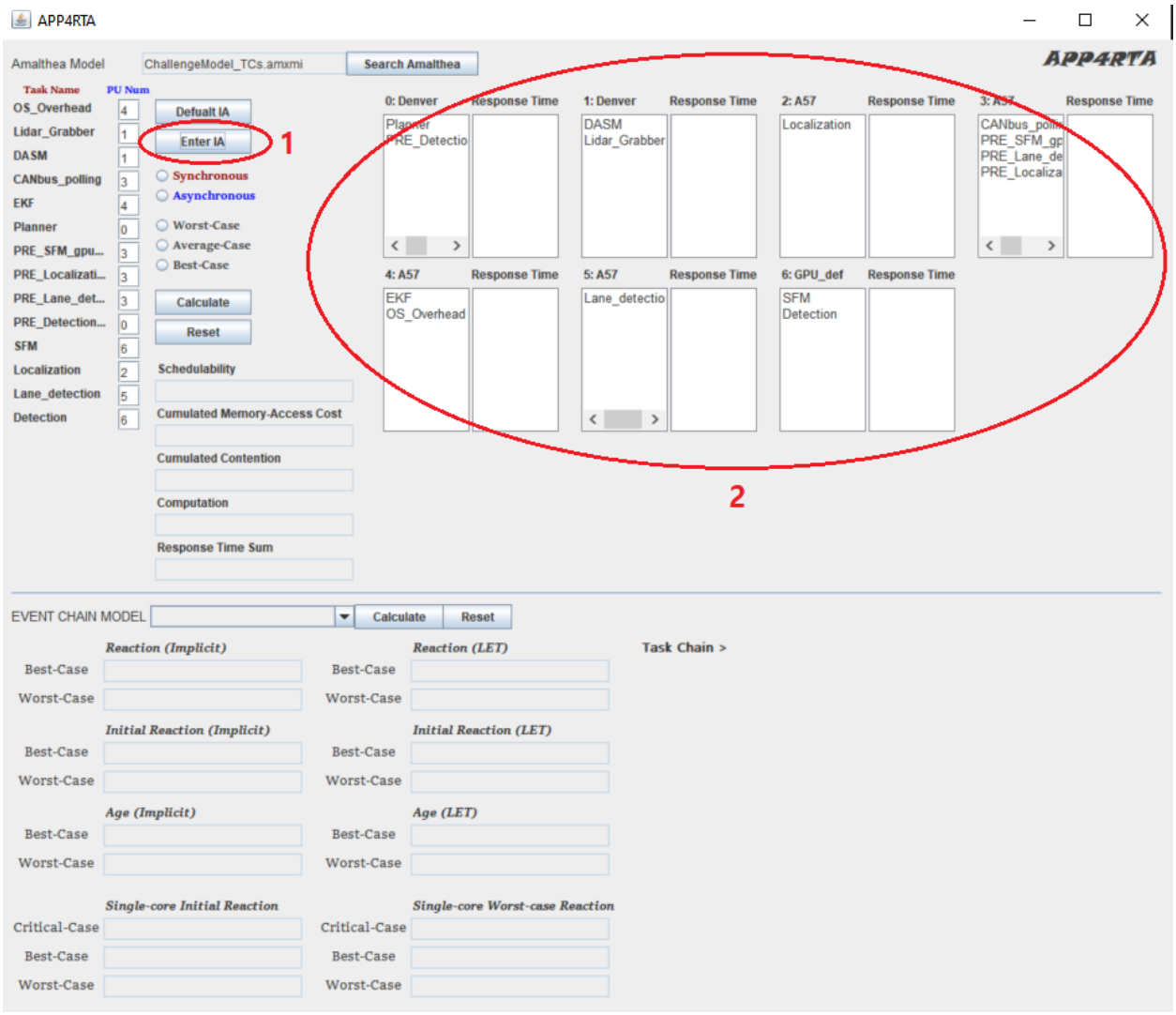
After a model is loaded, it shows all the tasks (1) and processing units (2) that the selected model has.

6. Integer Mapping



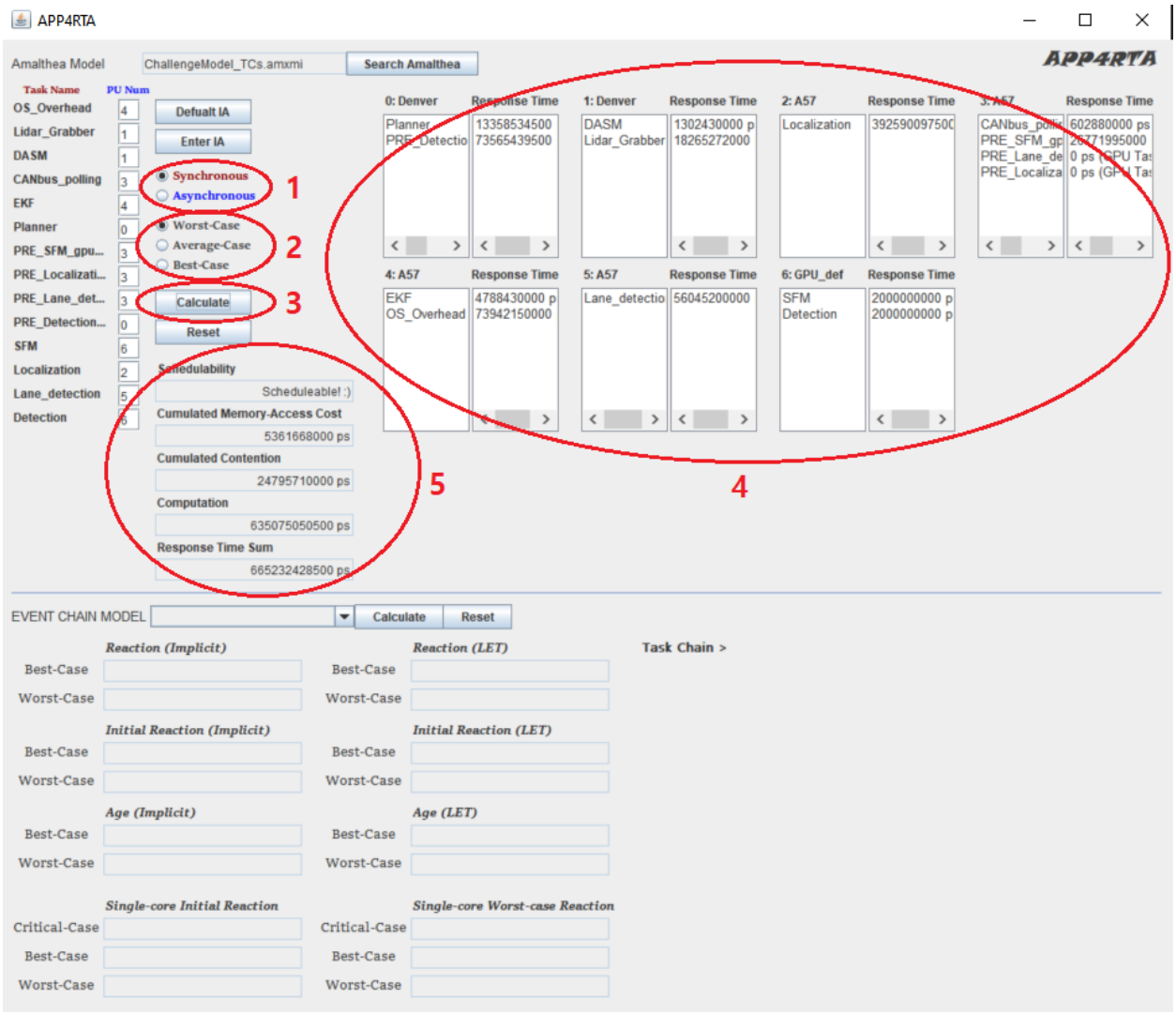
When the 'Default IA' (1) button is clicked, each task's box (2) is automatically filled with an integer number. This indicates that a task is about to be mapped to the corresponding identity number of processing unit. One can also write an integer number in each box manually. The 'Default IA' means an integer array to map all the tasks to processing units and that is specifically designed to make the *'ChallengeModel_TCs.amxmi'* model schedulable. Therefore it is always possible that it does not serve for other multi-core models. However, the 'Default IA' would only contain numbers of 0 when a single-core model is loaded.

7. Assign Tasks to Processing Units



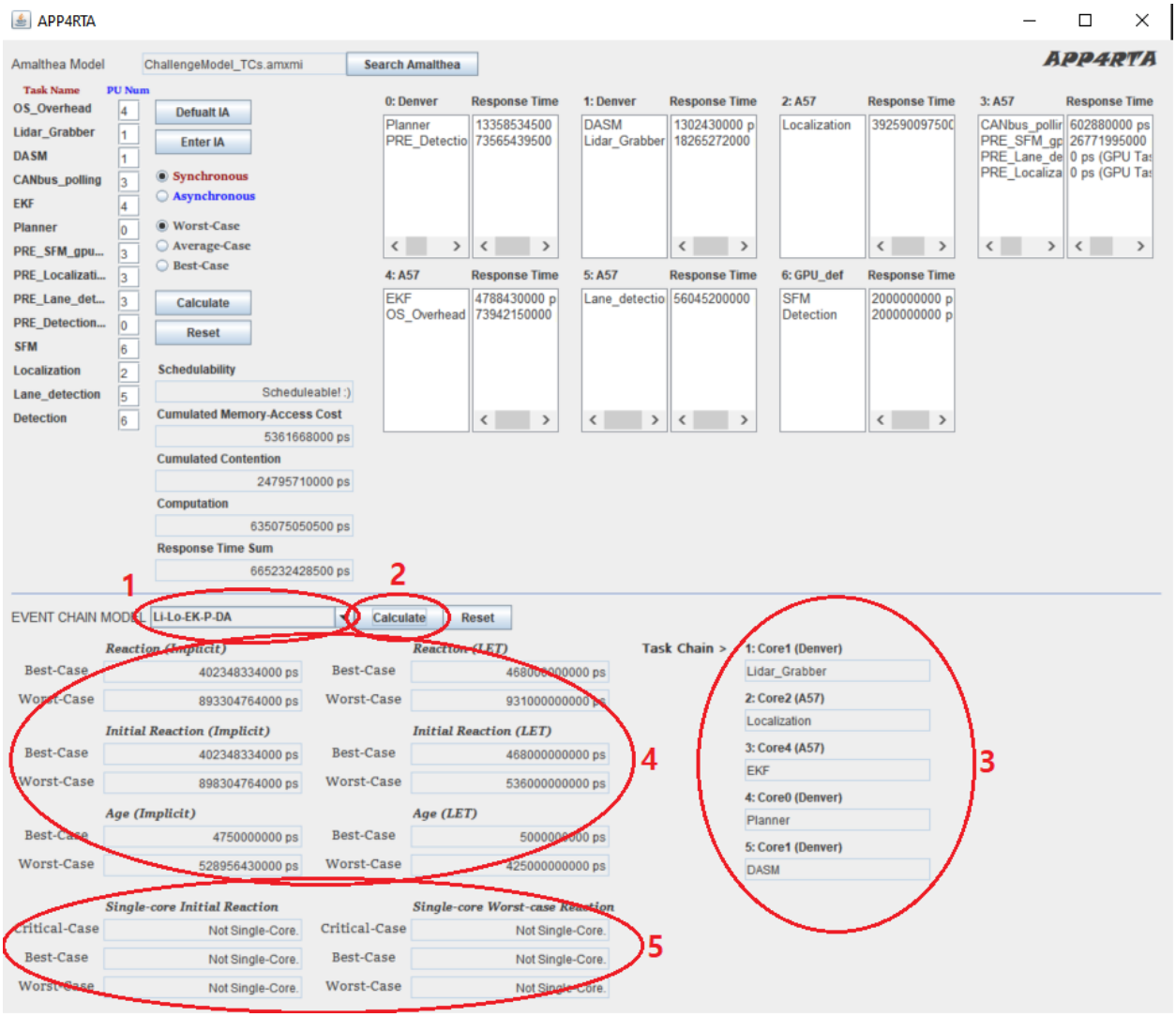
When the 'Enter IA' (1) button is clicked, each task is mapped to the corresponding processing unit (2). Since there are 7 processing units in the *'ChallengeModel_TCs.amxmi'* model, it shows 7 pairs of lists. The list on the left side of each pair is for listing names of the tasks that are mapped to the corresponding processing unit while one on the right side is for listing response times of the corresponding tasks.

8. Measure Response Time



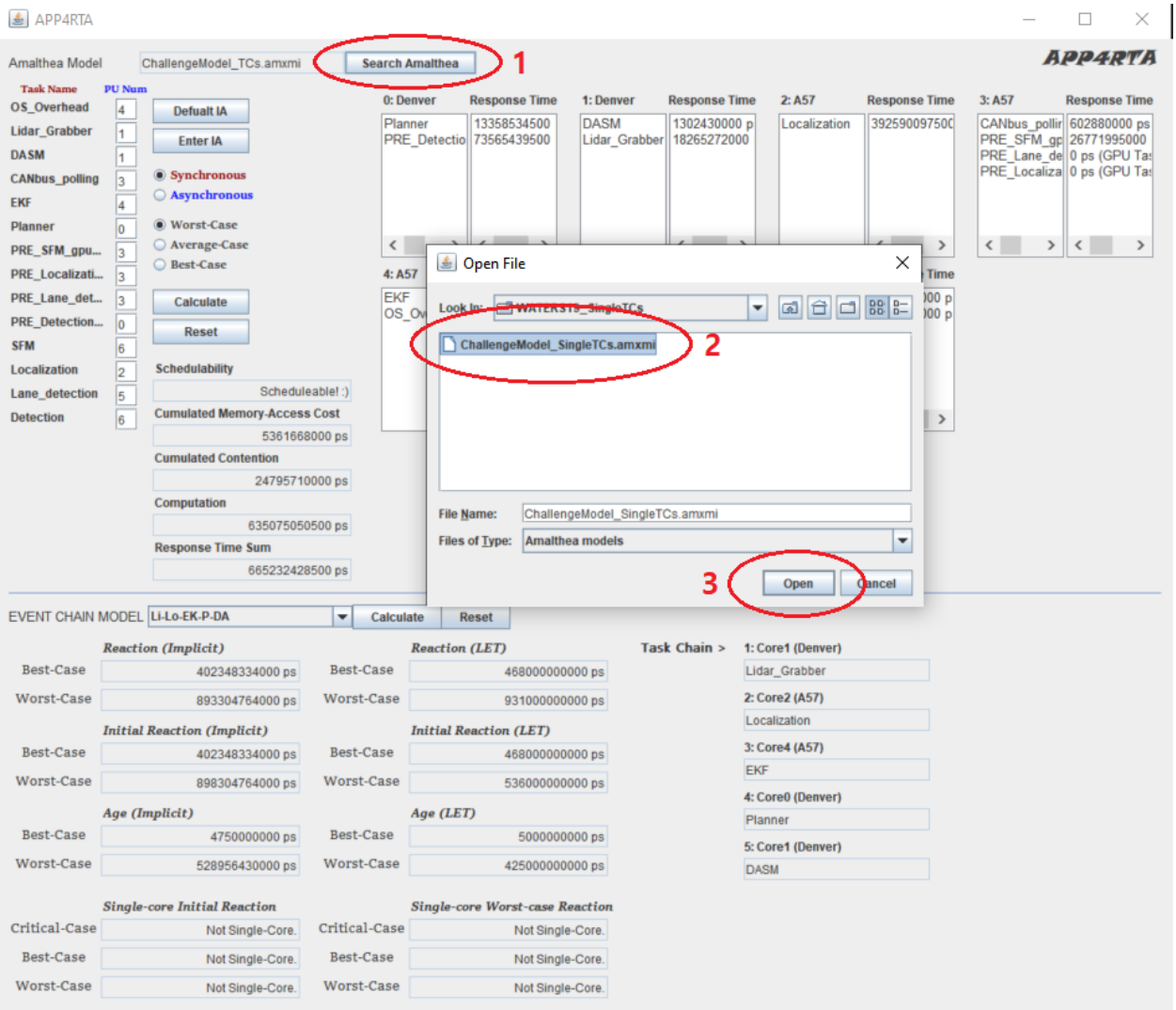
(1) Choose the offloading mode between '*Synchronous*' case and 'Asynchronous' case. (2) Choose the execution case between *'Worst-'*, *'Average-'*, and *'Best-Case'*. (3) By clicking the *'Calculate'* button, each task's response time is calculated and printed on the right list of each list pair (4). All analysis results appear in (5) which include: *'Schedulability'*, *'Cumulated Memory-Access Cost'*, *'Cumulated Contention'*, *'Computation'*, and *'Response Time Sum'*.

9. Task Chain Analysis



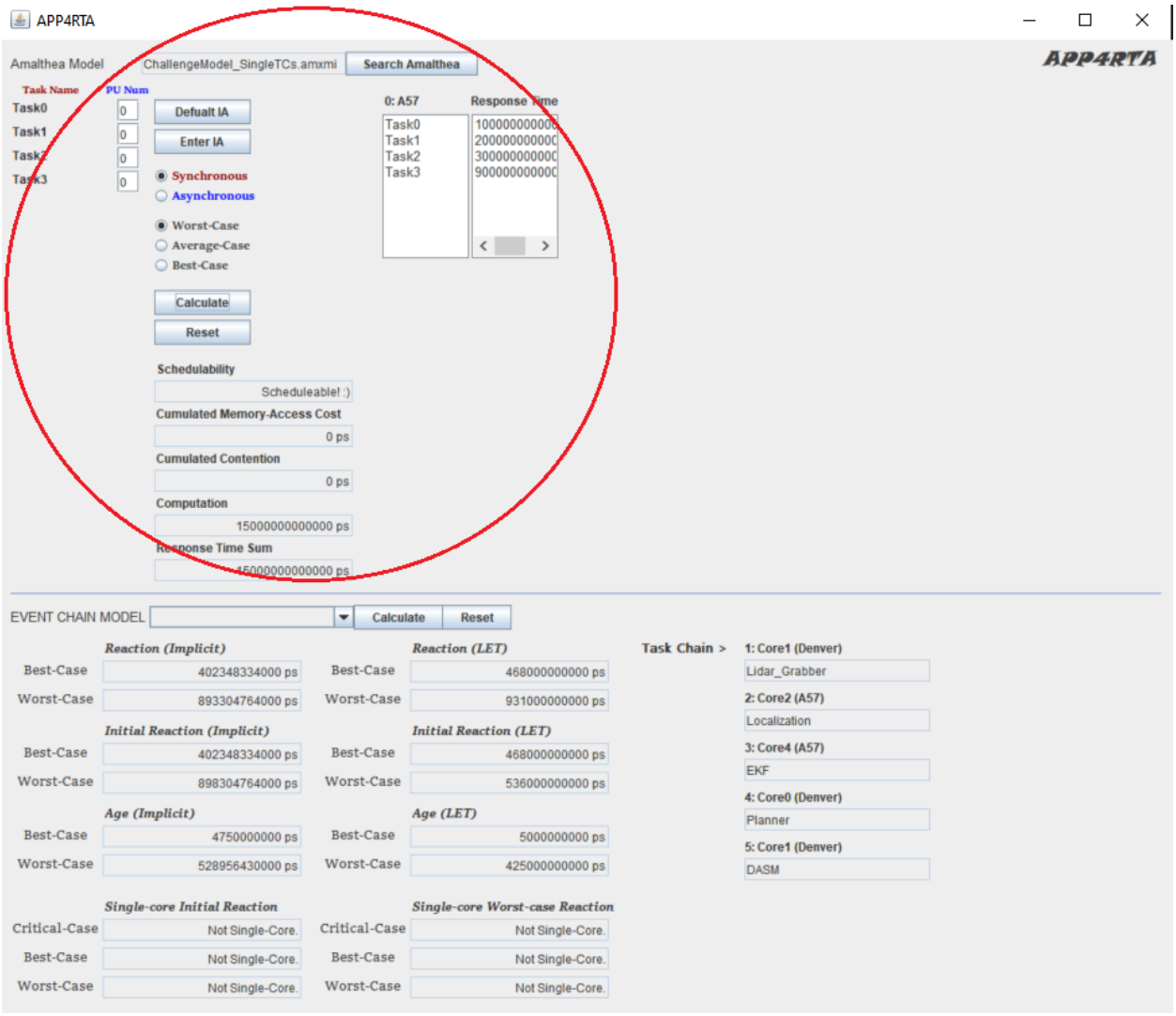
Now that every task's response time is measured, it is possible to measure end-to-end task chain latency with the derived task response times. (1) To analyze end-to-end task chain latency, a task chain in the combo-box should be selected first. (2) Click the *'Calculate'* button, then the selected task chain would be illustrated (3) and all measurement results would also be printed out (4)(5). Since the observed Amalthea model is a multi-core model here, the single-core analysis results are not available (5).

10. Change The Model



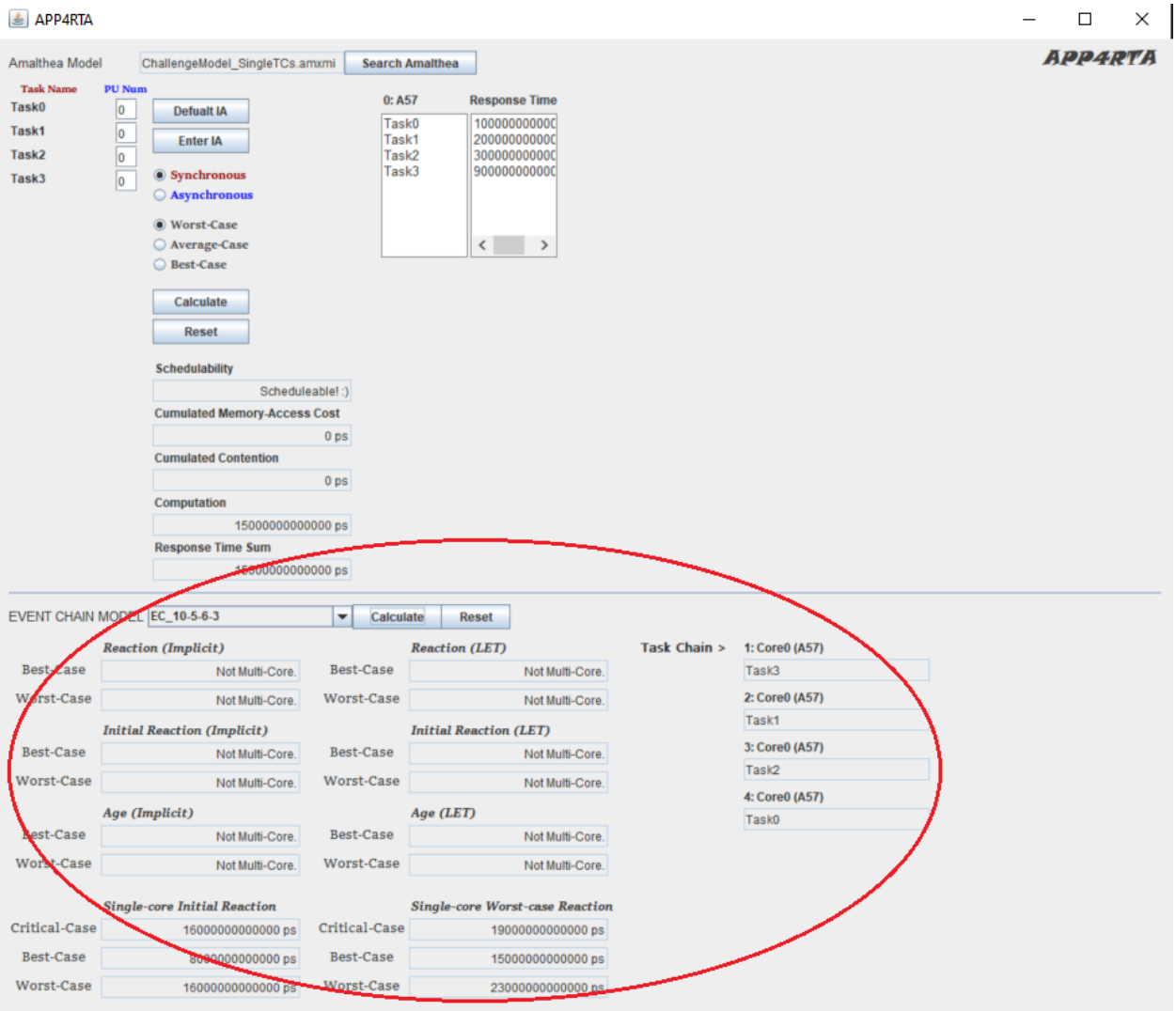
It is possible to change the observed model without clicking the *'Reset'* buttons. Apply the same process but this time with the *'ChallengeModel_SingleTCs.amxmi'* file that is a single-core Amalthea model (1) (2) (3).

11. Single-core RTA



The *'ChallengeModel_SingleTCs.amxmi'* model only has one processing unit with four tasks. As it is already mentioned, the 'Default IA' only contains numbers of 0 because a single-core model is loaded this time. The process is the same.

12. Single-core Task Chain Analysis



Now that every task's response time is measured, it is possible to measure end-to-end task chain latency with the derived task response times. The process is the same. However, a single-core model is analyzed this time. Therefore, latency results regarding single-core are only available while multi-core results are not in this case.