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Poster: A Procedure for Testing Applications Through Cloud Computing Elasticity

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A Procedure for Testing Applications Through Cloud Computing Elasticity

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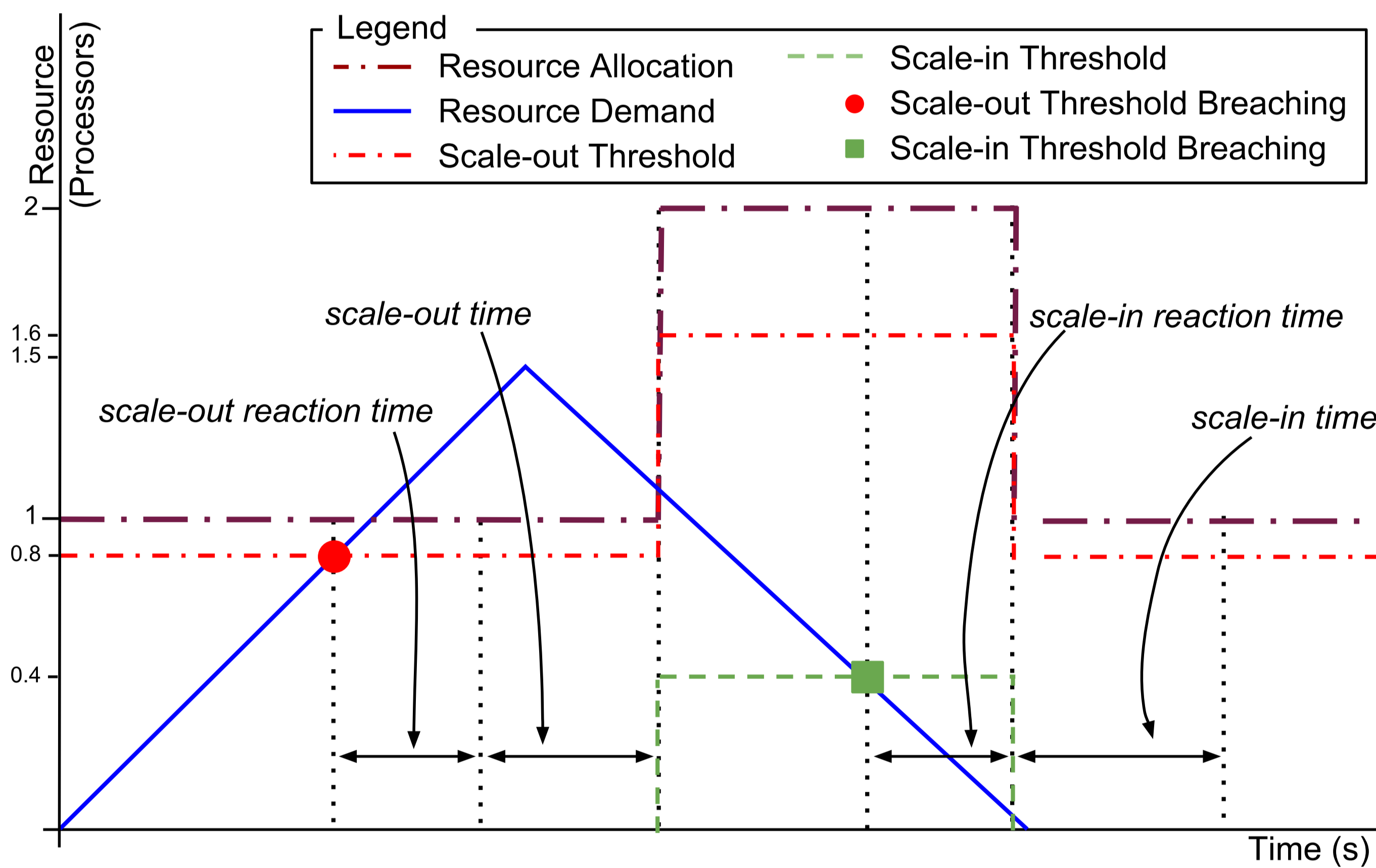
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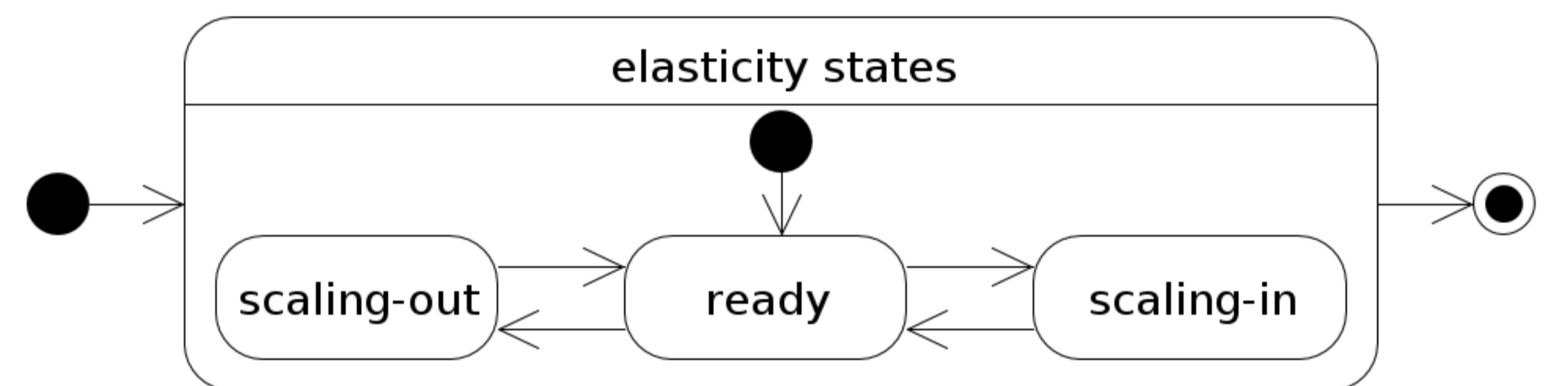
1 Elasticity

- It is the ability of a cloud infrastructure to vary its resources according to demand.
- The resource demand varies over time:
 - When it increases, it may breach the **scale-out threshold**, and remain higher for a while (**scale-out reaction time**). Then, a new resource is added, which takes some time (**scale-out time**);
 - When it decreases, it may breach the **scale-in threshold**, and remain lower for a while (**scale-in reaction time**). Then, the additional resource is removed (within the **scale-in time**).



2 Elasticity States

- A Web application starts by being exposed to the **ready state**: when the resource is steady;
- If a new resource starts being added, the application is exposed to the **scaling-out state**: period while the resource is being added;
- If a resource starts being released, the application is exposed to the **scaling-in state**: period while the resource is being released.

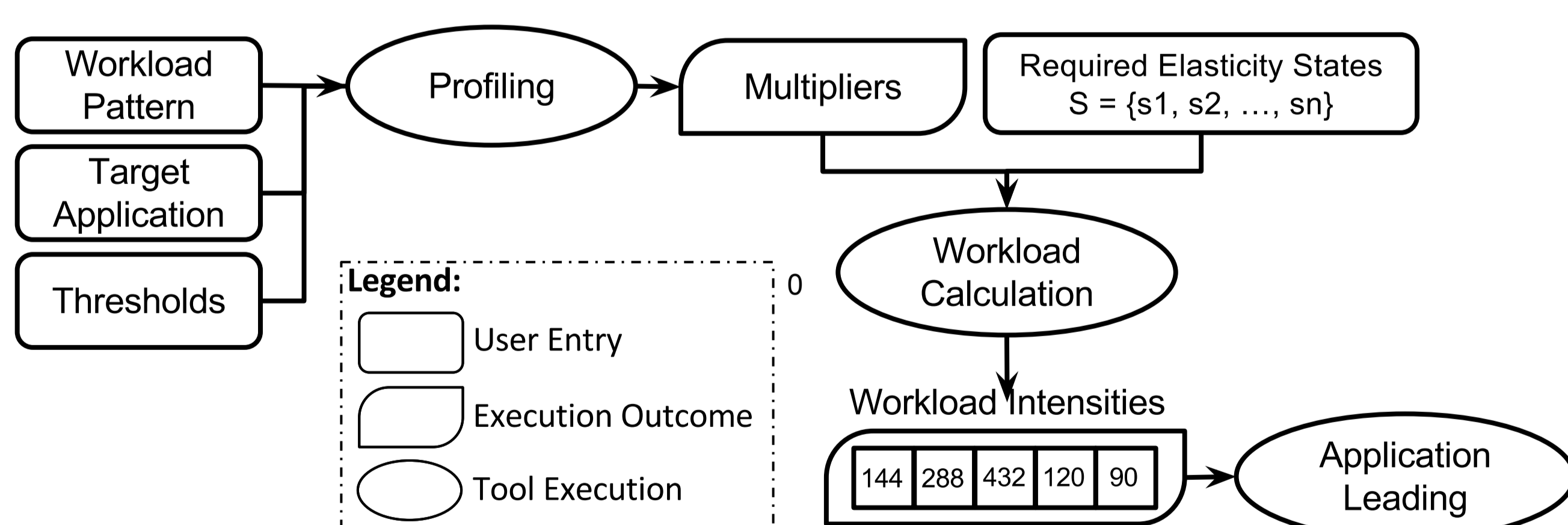


3 Research Problem

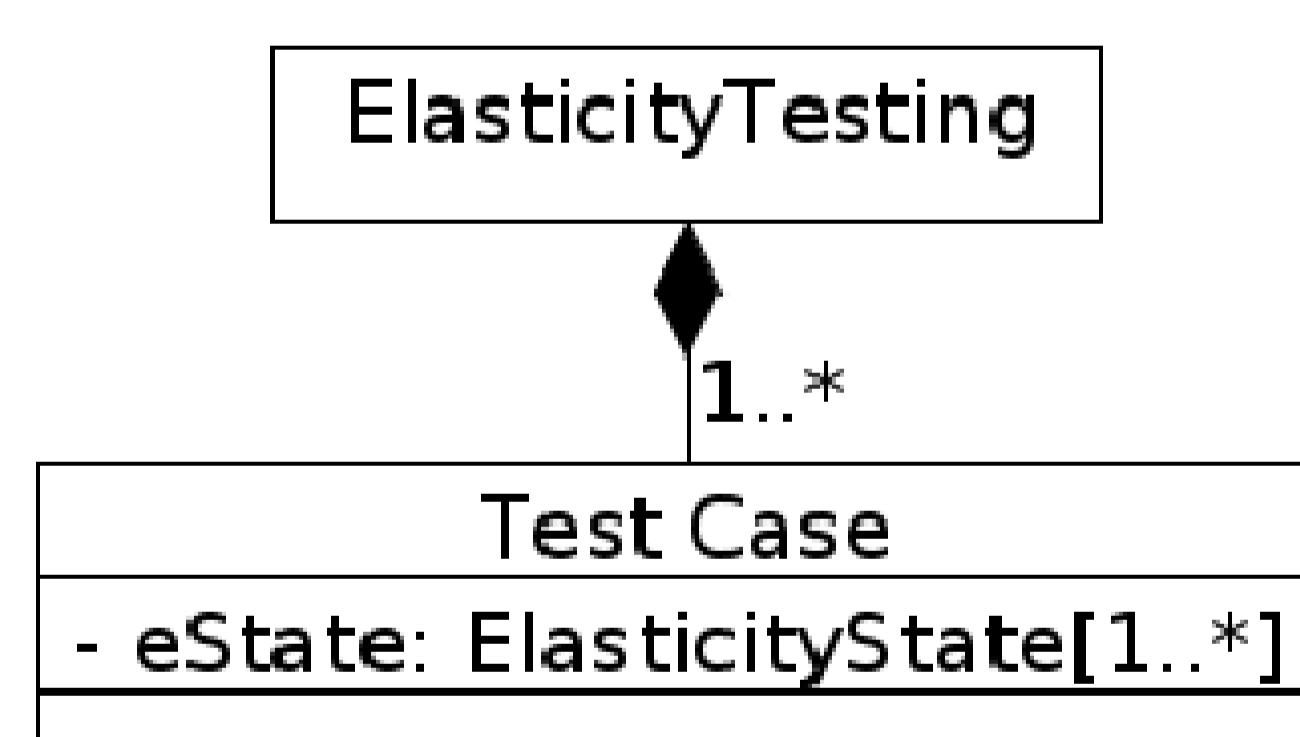
- Errors may happen at any elasticity state. Therefore, we should test applications at every elasticity state;
- Sometimes, we need a specific sequence of elasticity states, e.g., for regression testing, bug reproduction, etc.
- We propose an approach that controls the required sequence of elasticity states, and in parallel, tests the application dynamically, according to the current elasticity state.

4 Our Approach

a) Elasticity Control Workflow



b) Test Suite Metamodel



c) Test Algorithm

```

Data: Test Specification T, Execution Timeout eto
mon ← monitor();
i = 0;
tbegin ← current_time;
while tbegin - current_time < eto do
  foreach tc ∈ T.testCases do
    i = i + 1;
    csi ← mon.currentState();
    if tc.states.contains(csi) then
      Vcsi,tc ← run(tc);
    end
  end
end
end
  
```

5 Experiment Result

- We lead MongoDB through a sequence of elasticity states;
- We find non-functional errors at different elasticity states;
- We correctly assign the test verdicts to the elasticity states.

6 Conclusion and Future Work

- Our approach is able to control the required elasticity states, and test the application dynamically, in parallel.
- Future work:**
 - Functional test cases, and generic cloud applications.