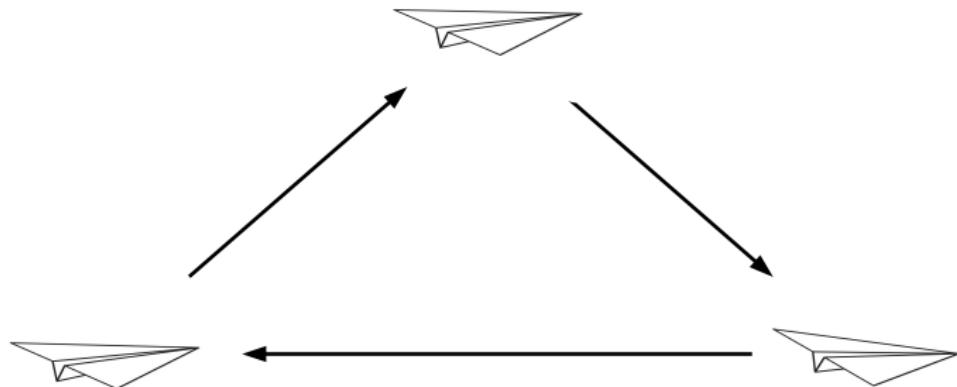


Multi-mode applications on reconfigurable heterogeneous platforms

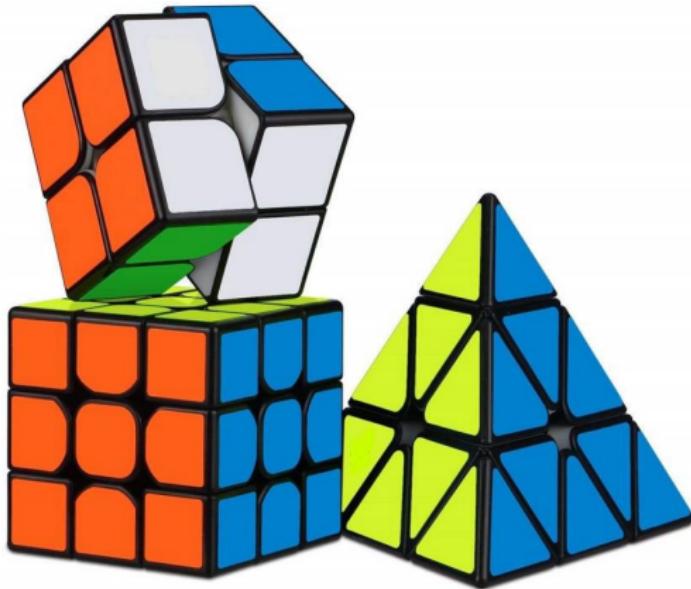
Joël Goossens, Antonio Paolillo, **Xavier Poczekajlo**, Paul Rodriguez

Faculté des Sciences of the Université libre de Bruxelles, Belgium

Multi-mode application



Multiple hardware modes

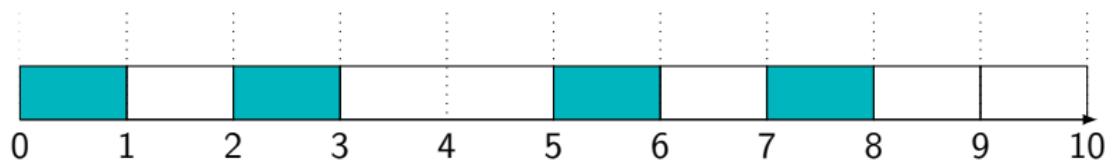


Contributions

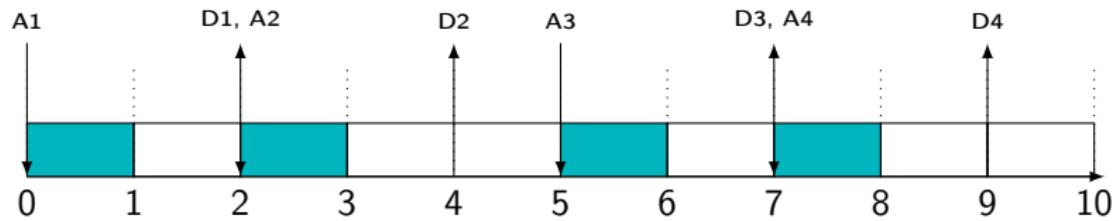
- A new model
- Its first protocol & feasibility test
- A competitive analysis

Model

Software model



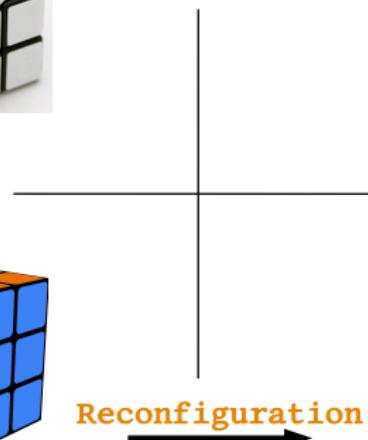
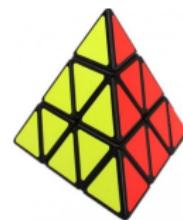
Software model



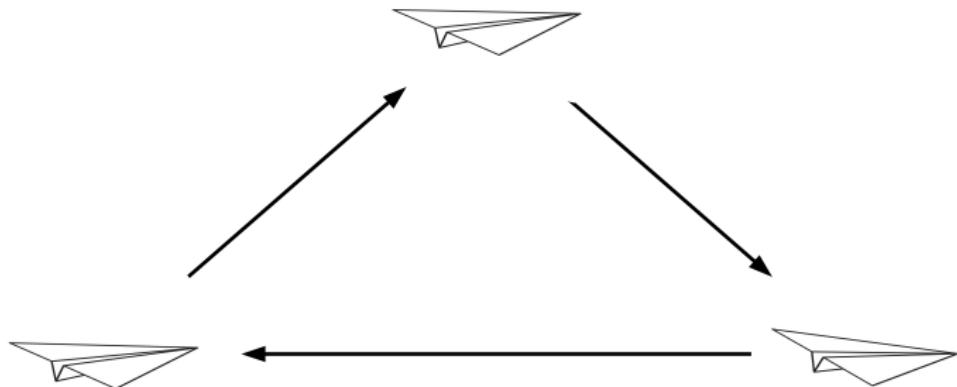
Hardware model



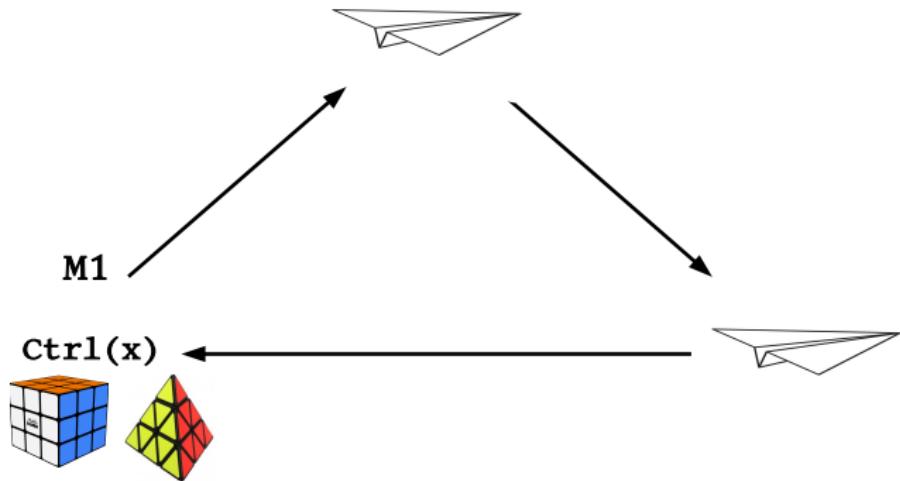
Hardware model



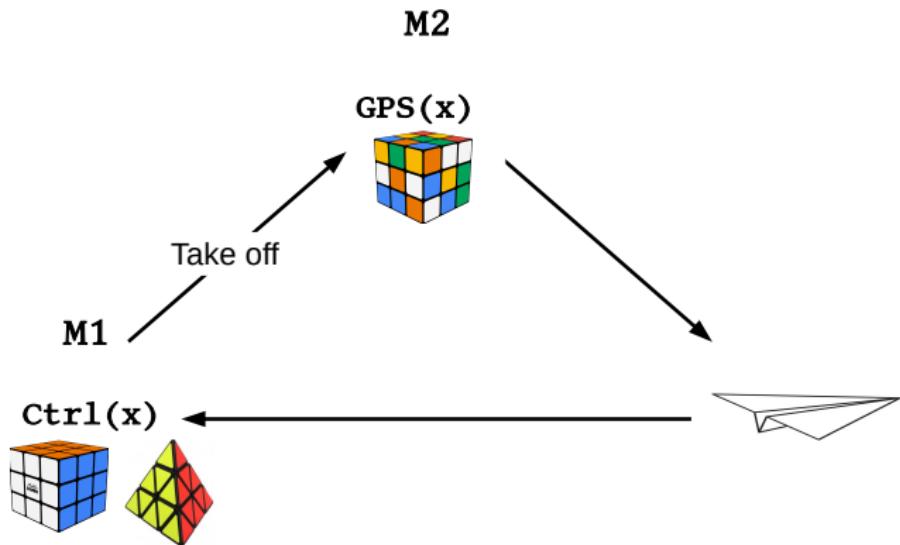
Platform model



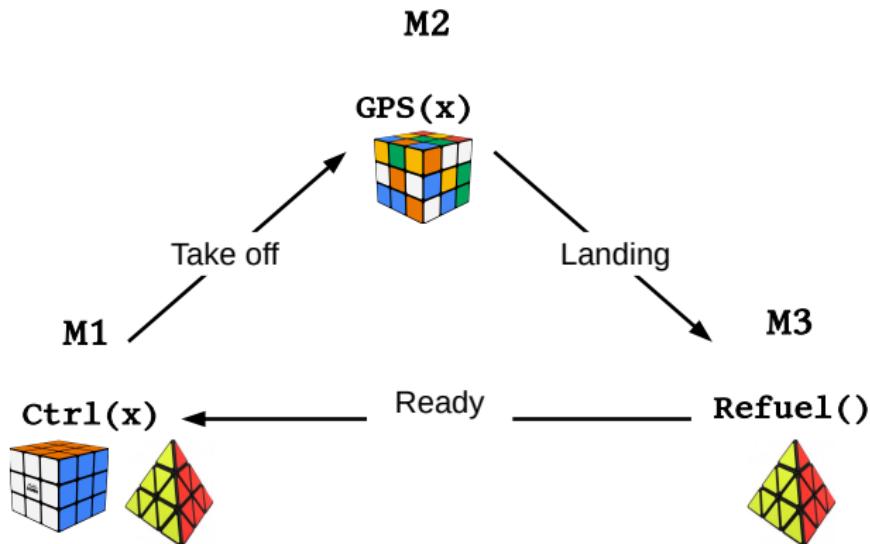
Platform model



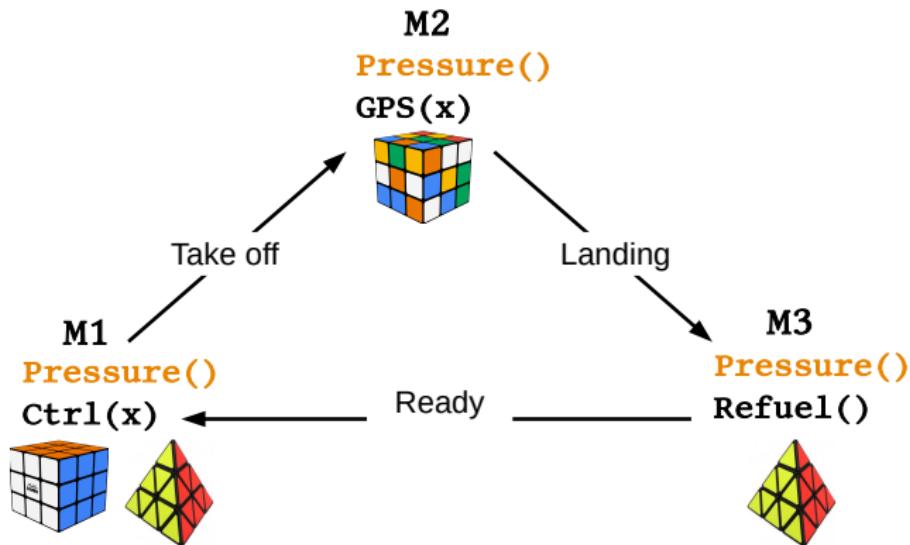
Platform model



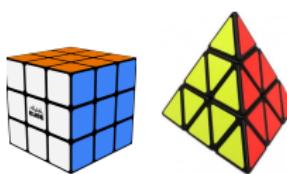
Platform model



Platform model



Model summary

M1	M2	M3
 $\text{Ctrl}(x) - \text{Pressure}()$ 		

Model summary

M1



$\text{Ctrl}(x) - \text{Pressure}()$



M2

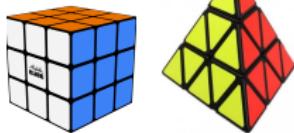


$\text{GPS}(x) - \text{Pressure}()$

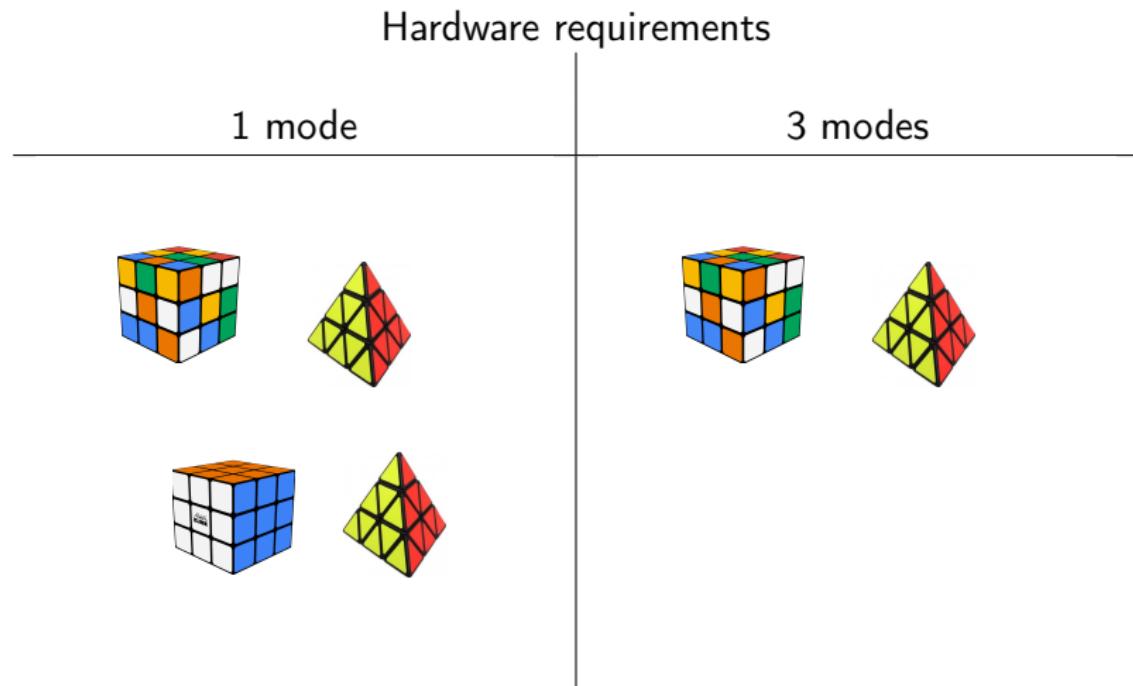


M3

Model summary

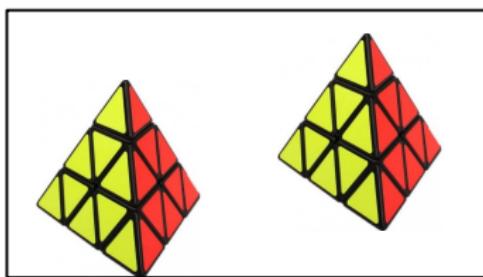
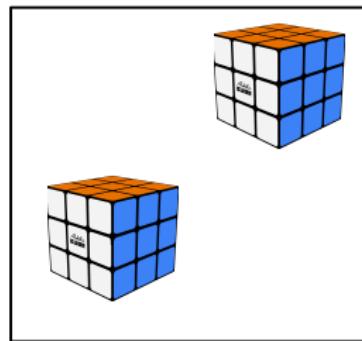
M1	M2	M3
 A standard 3x3 Rubik's cube and a Pyraminx (a triangular Rubik's cube) are shown side-by-side.	 A standard 3x3 Rubik's cube is shown.	 A Pyraminx (a triangular Rubik's cube) is shown.
$\text{Ctrl}(x) - \text{Pressure}()$  A cartoon illustration of the White Rabbit from Alice in Wonderland, wearing a blue jacket and holding a large yellow pocket watch.	$\text{GPS}(x) - \text{Pressure}()$  A cartoon illustration of a rabbit wearing a blue jacket and holding a large yellow pocket watch.	$\text{Refuel}() - \text{Pressure}()$  A cartoon illustration of a rabbit in a dark suit and tie, running while holding a small yellow pocket watch.

Model benefits



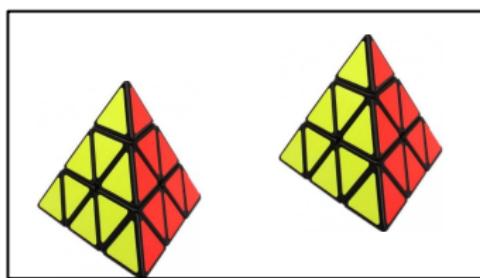
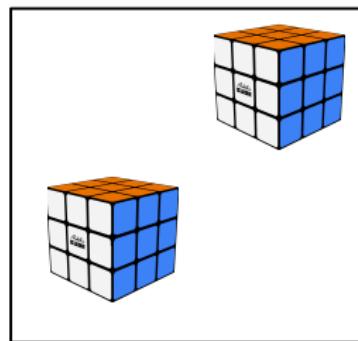
Protocol

Protocol: clustered



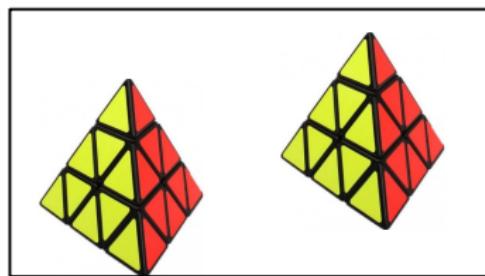
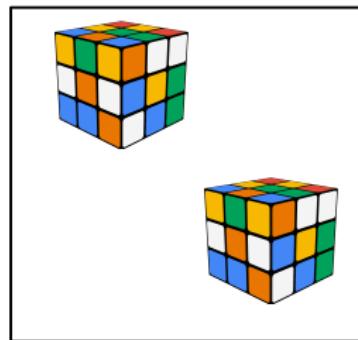
Protocol: computing required reconfigurations

From M^i to M^j : hardware requirements for M^i



Protocol: computing required reconfigurations

From M^i to M^j : hardware requirements for M^j

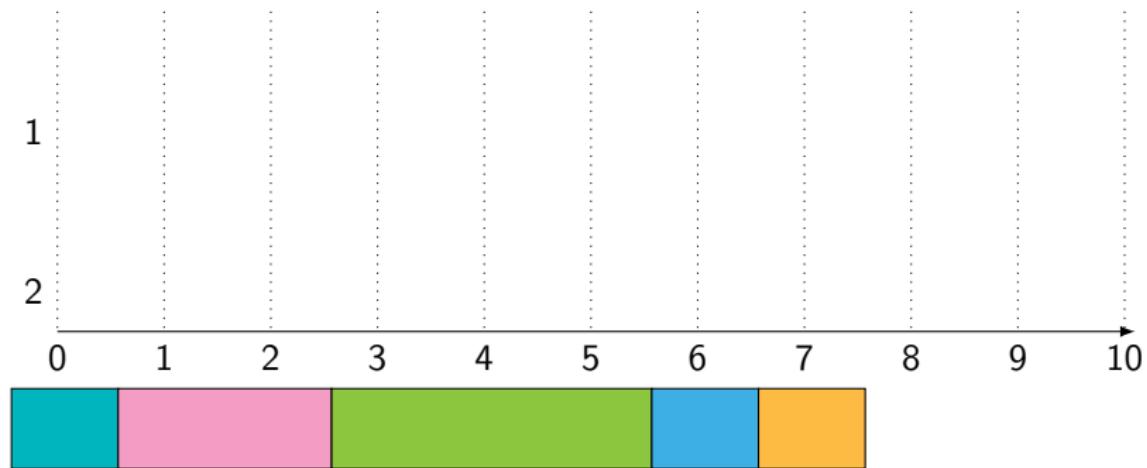


Protocol: computing required reconfigurations

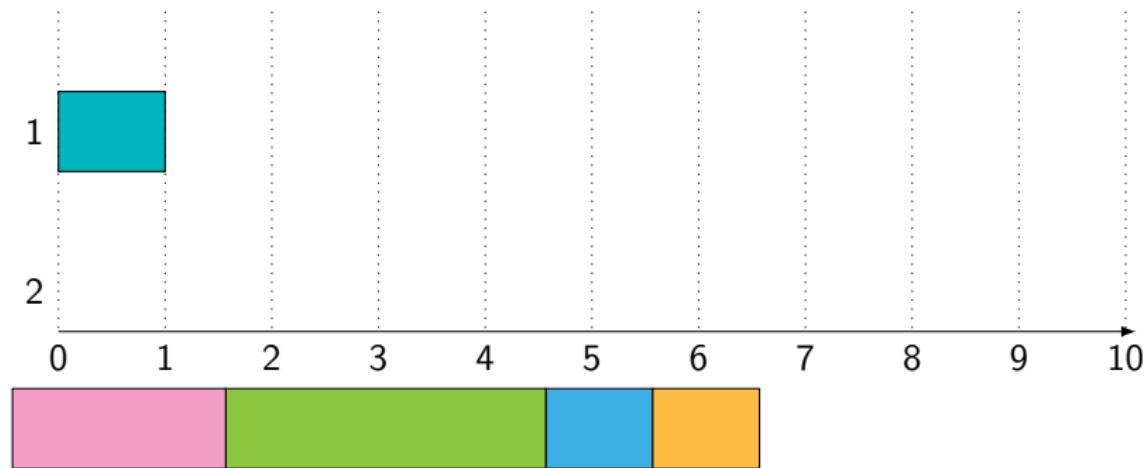
From M^i to M^j : Required reconfigurations



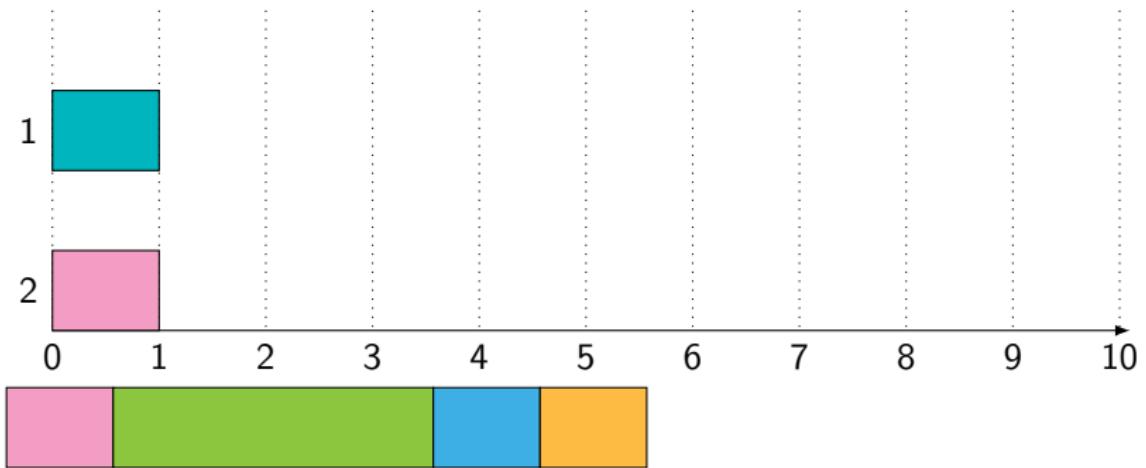
Protocol: run-time phase



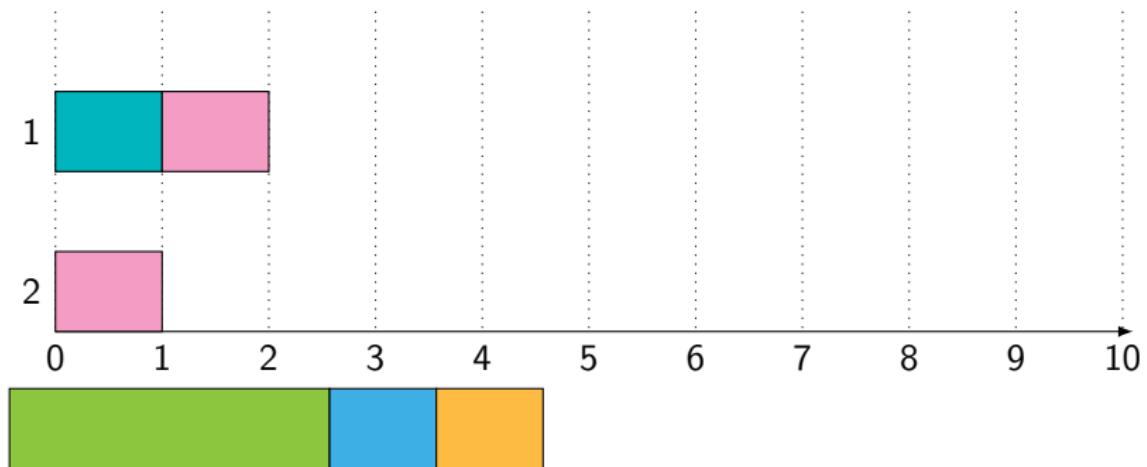
Protocol: run-time phase



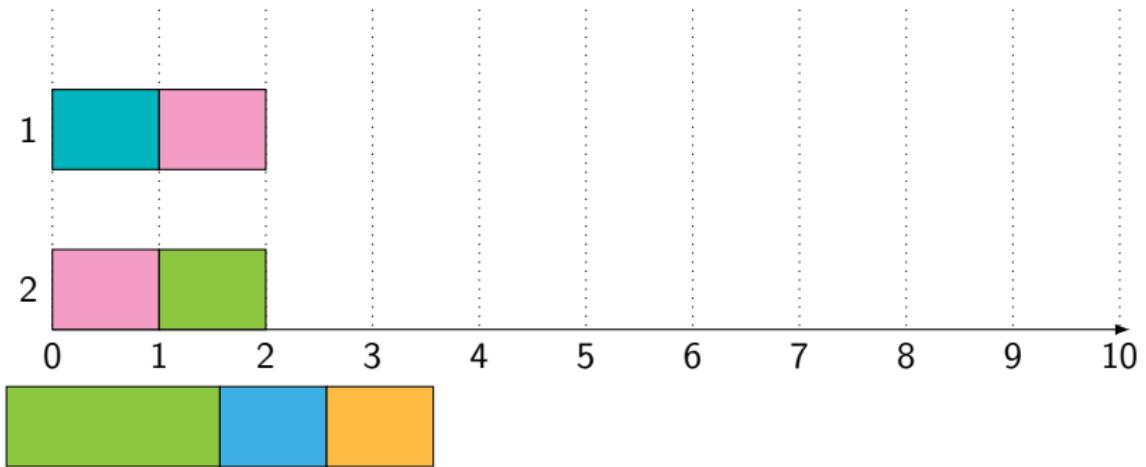
Protocol: run-time phase



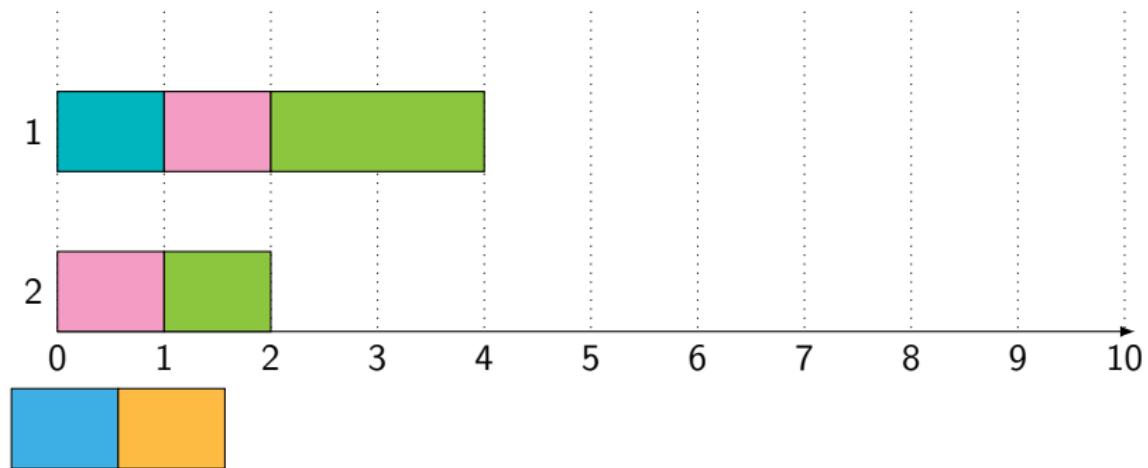
Protocol: run-time phase



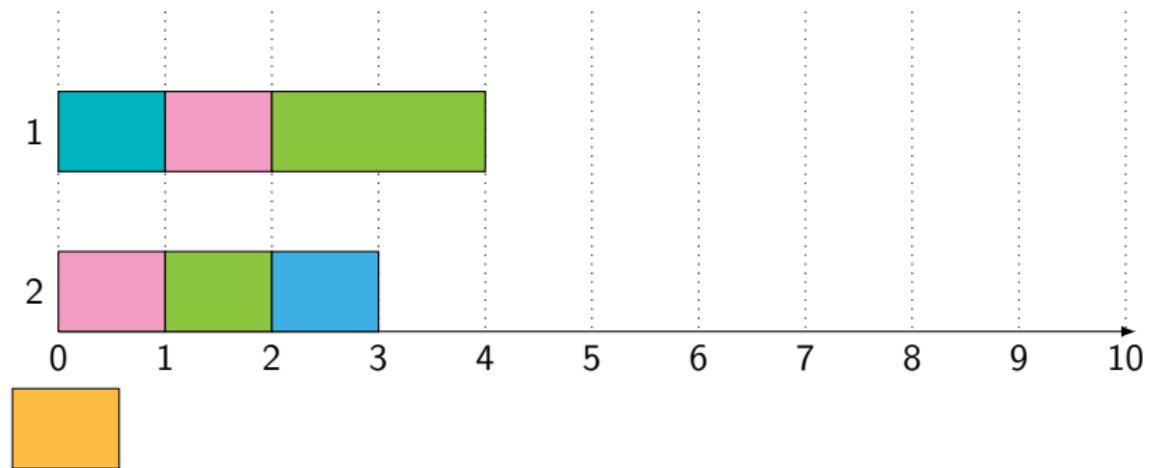
Protocol: run-time phase



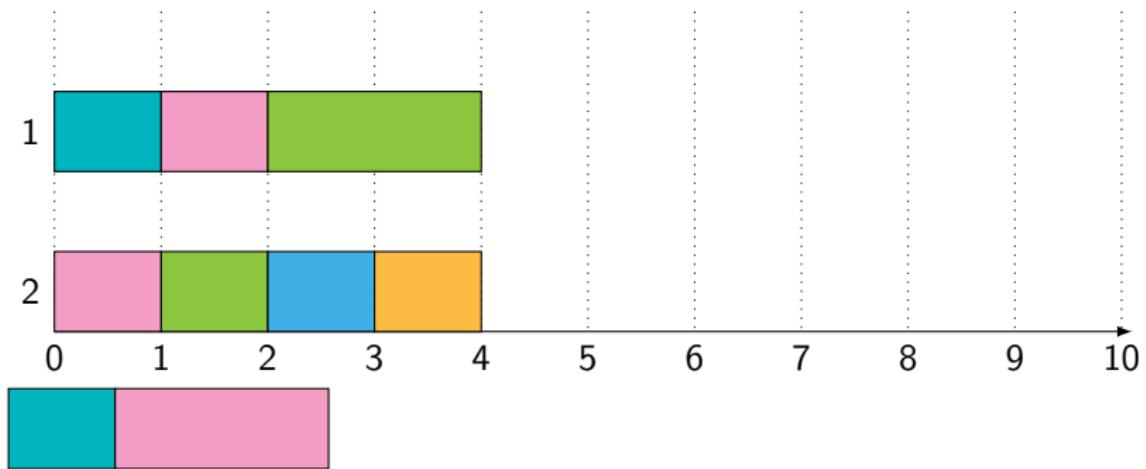
Protocol: run-time phase



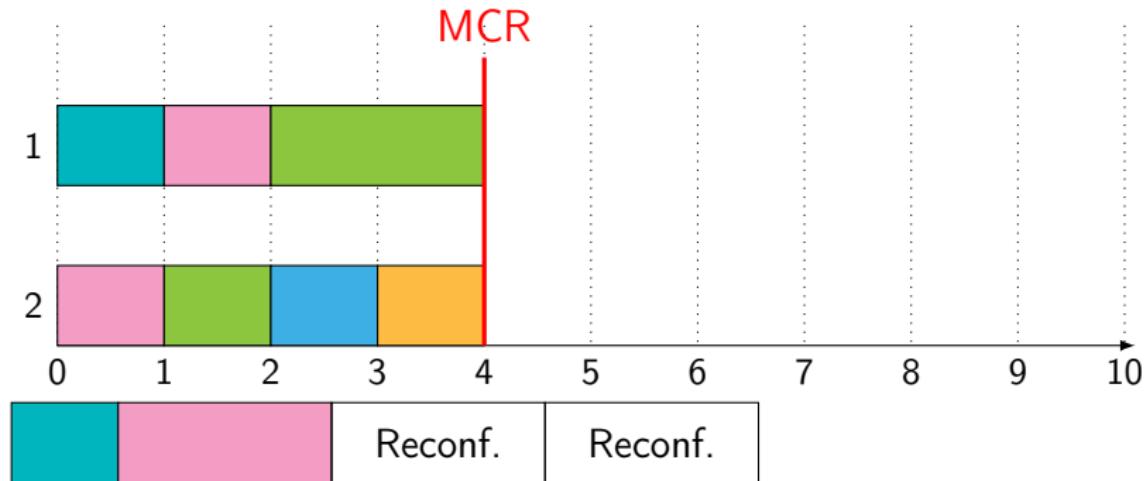
Protocol: run-time phase



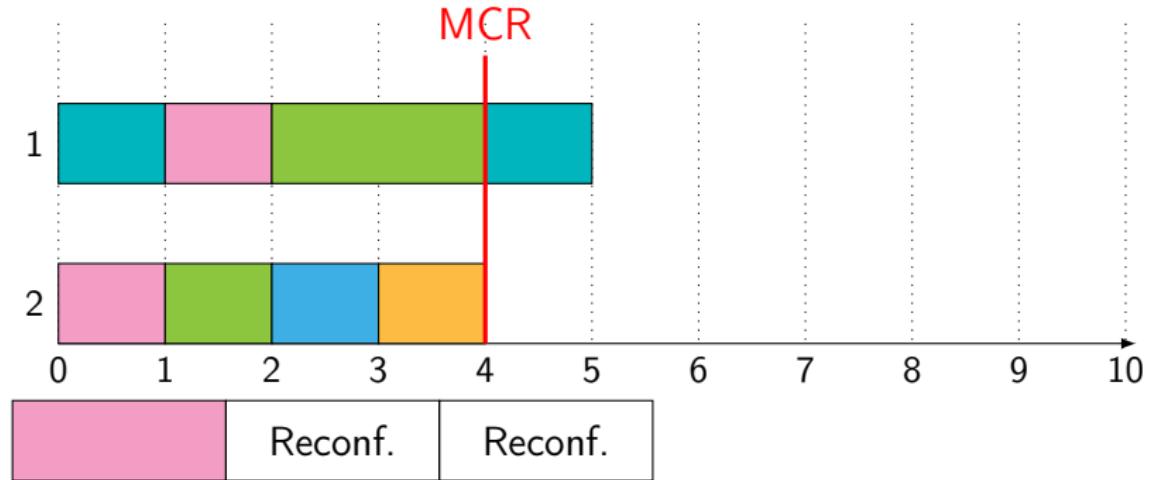
Protocol: run-time phase



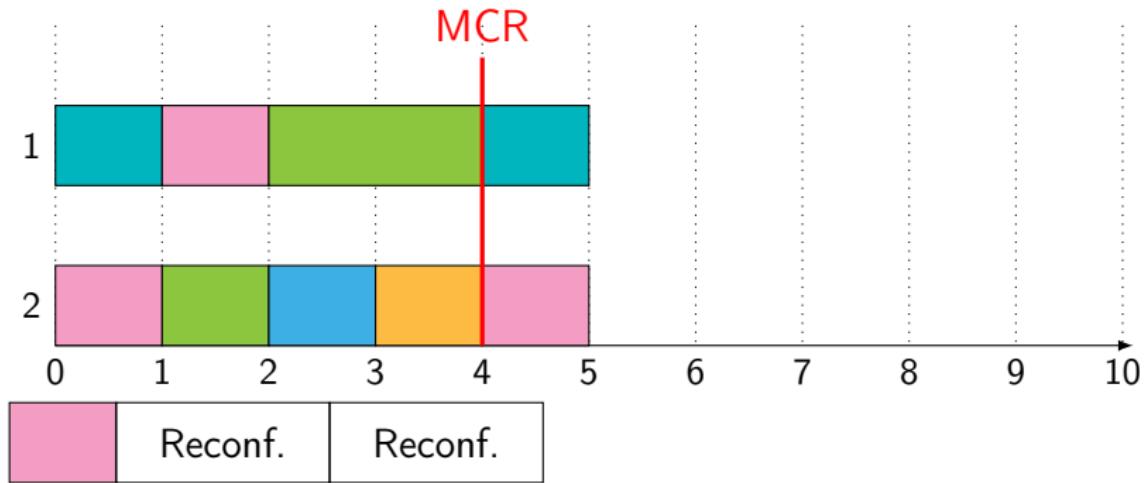
Protocol: run-time phase



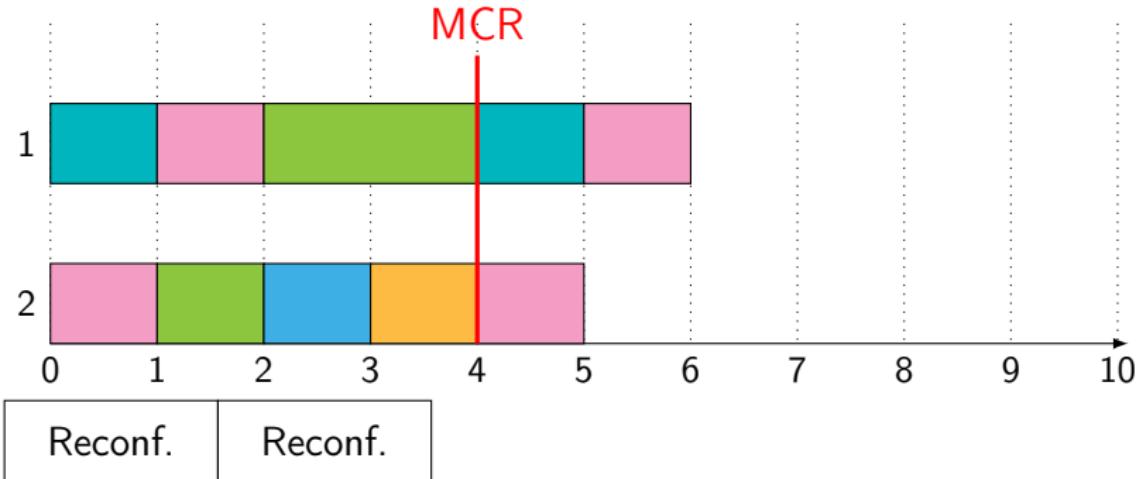
Protocol: run-time phase



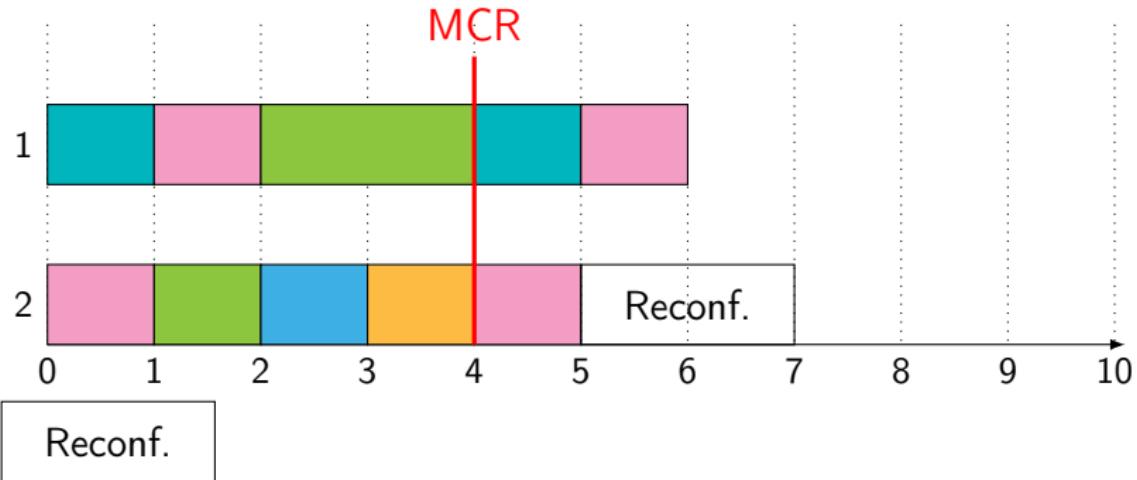
Protocol: run-time phase



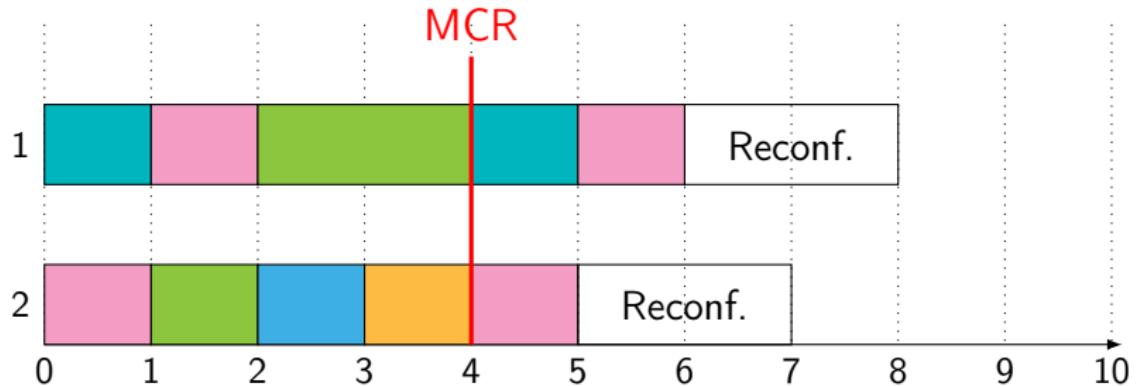
Protocol: run-time phase



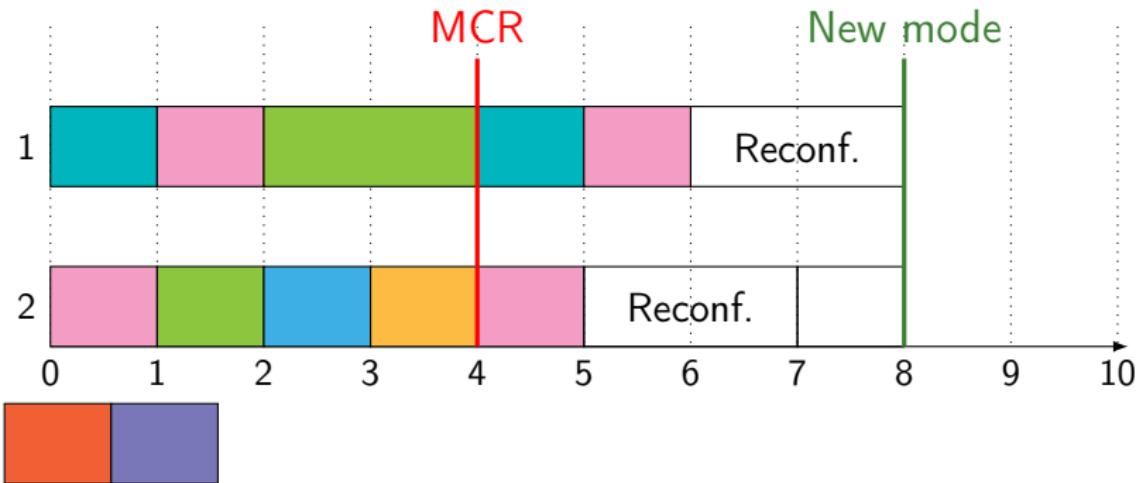
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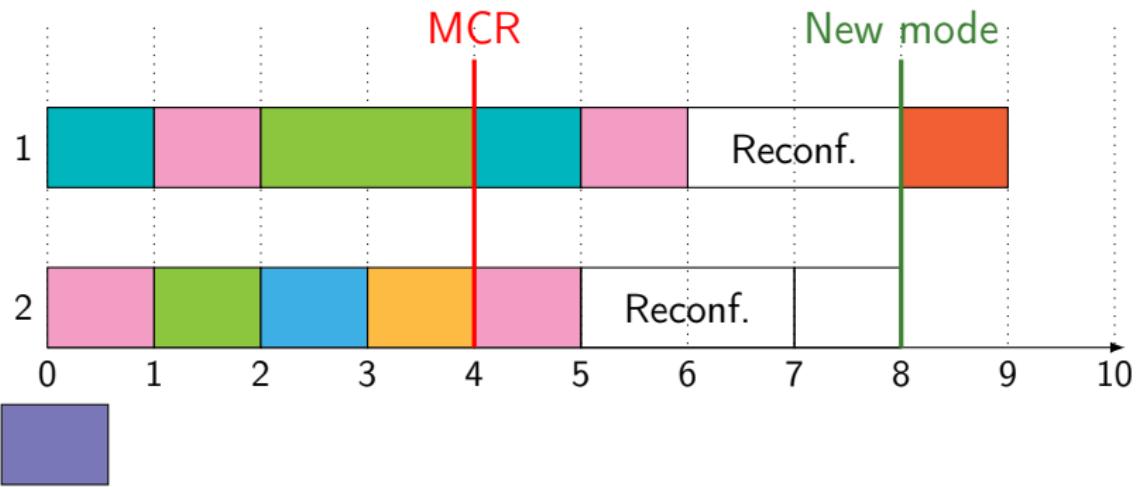
Protocol: run-time phase



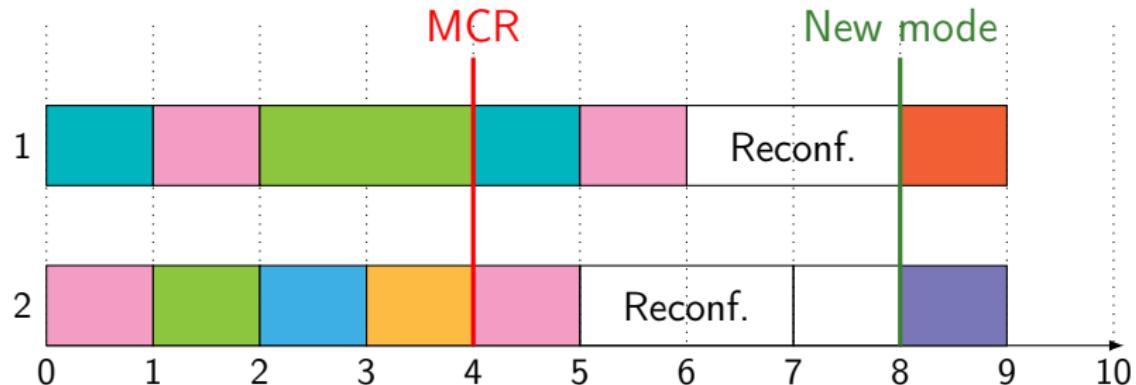
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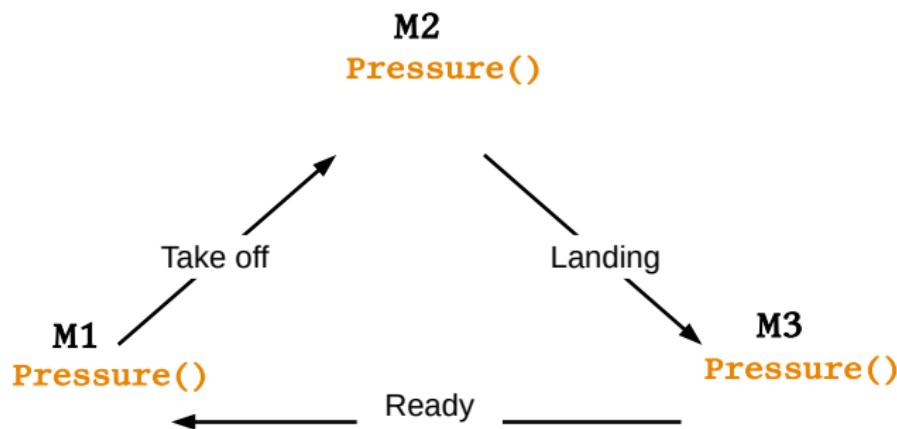
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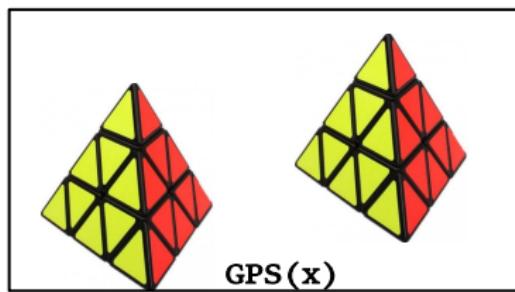
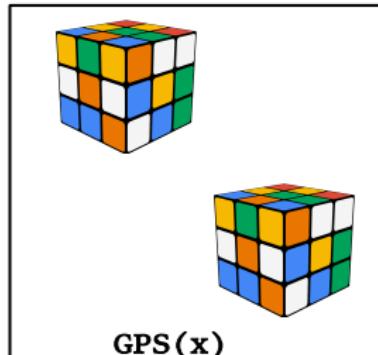
Protocol: run-time phase



Mode-independent tasks: problem?



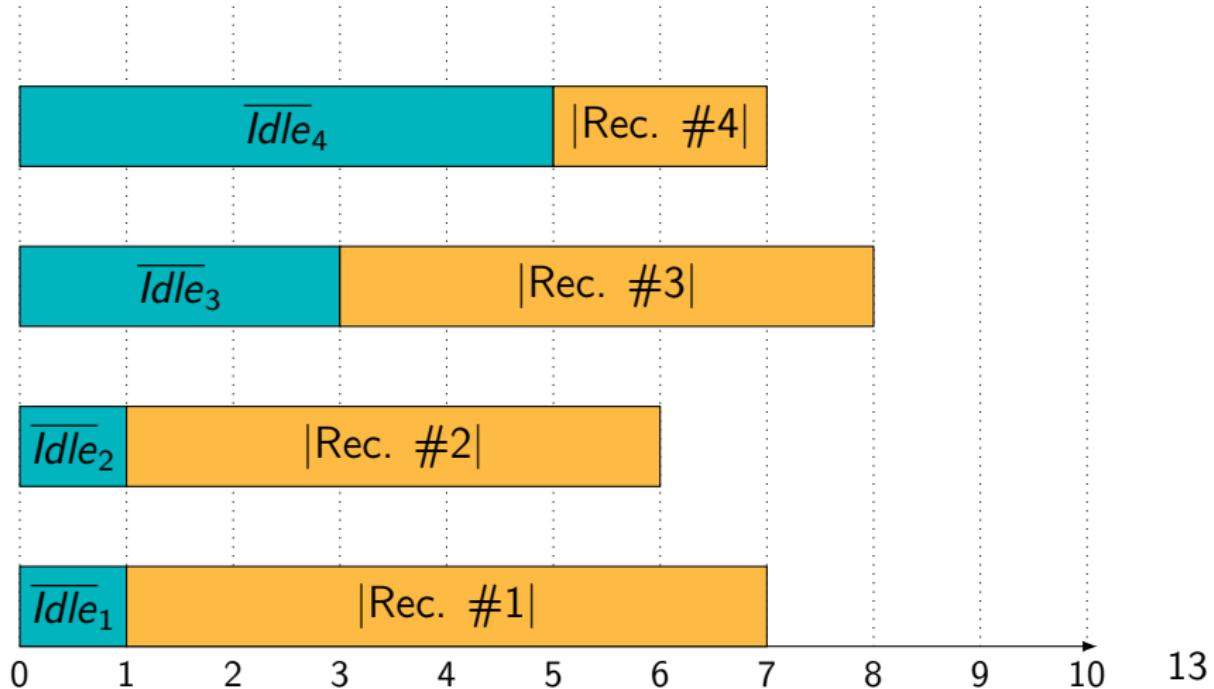
Mode-independent tasks: problem?



Feasibility

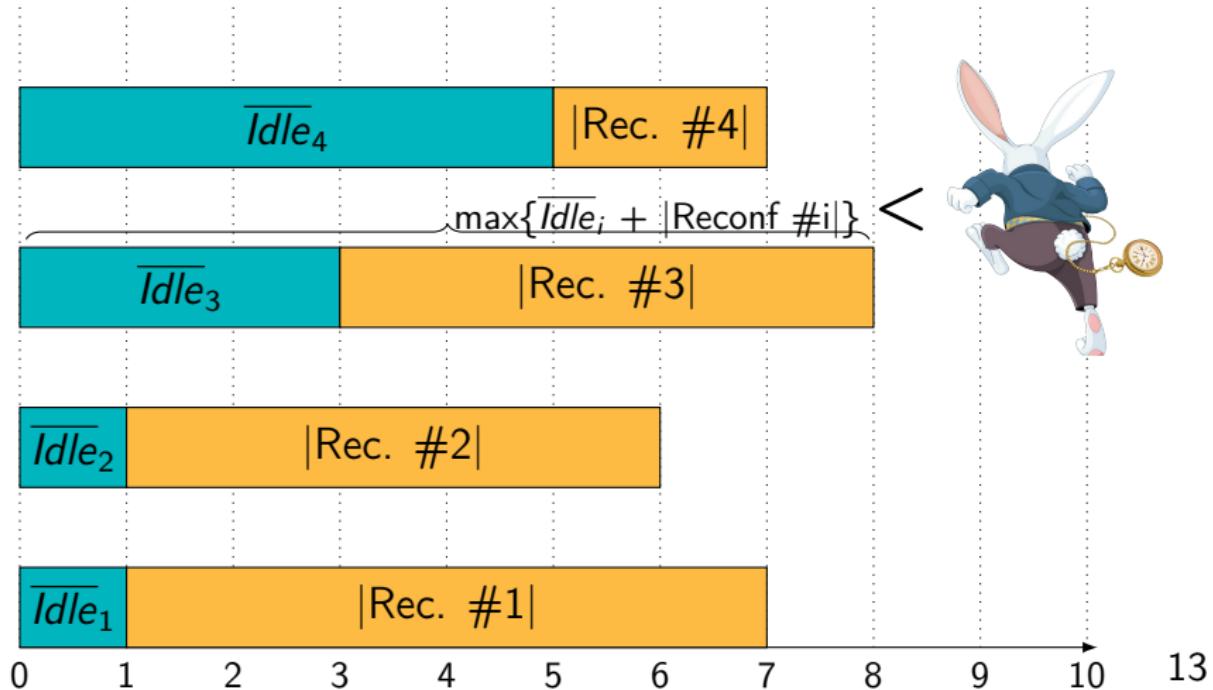
Reconfigured

From M^i to M^j



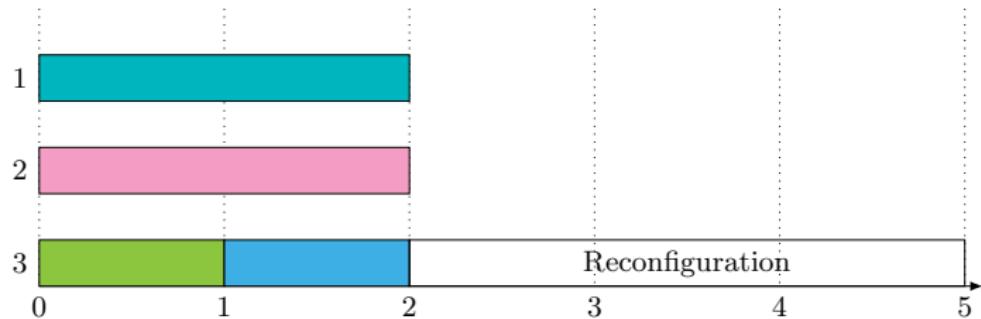
Reconfigured

From M^i to M^j

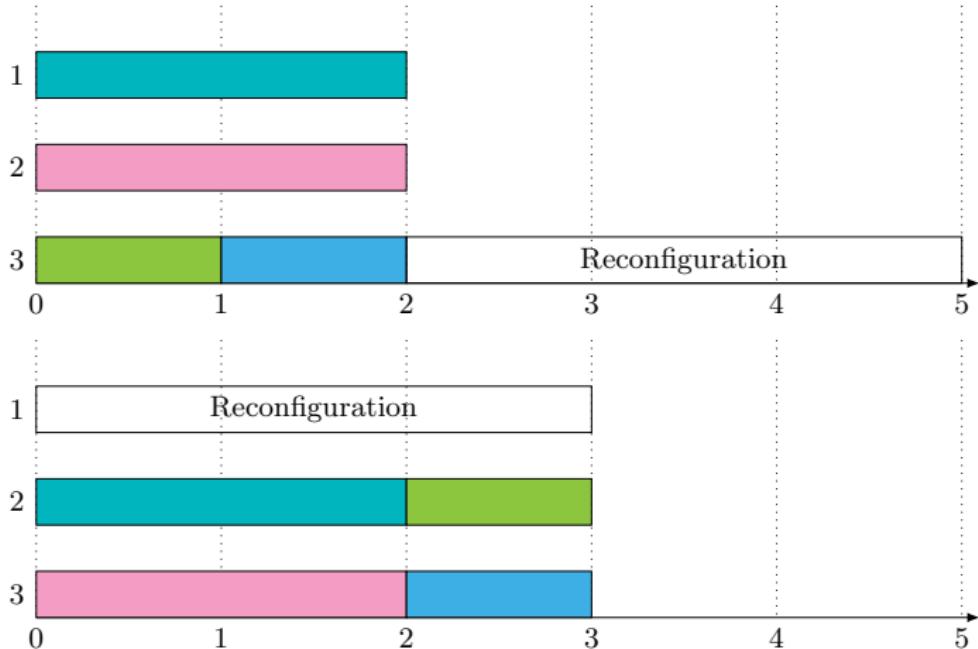


Performance analysis

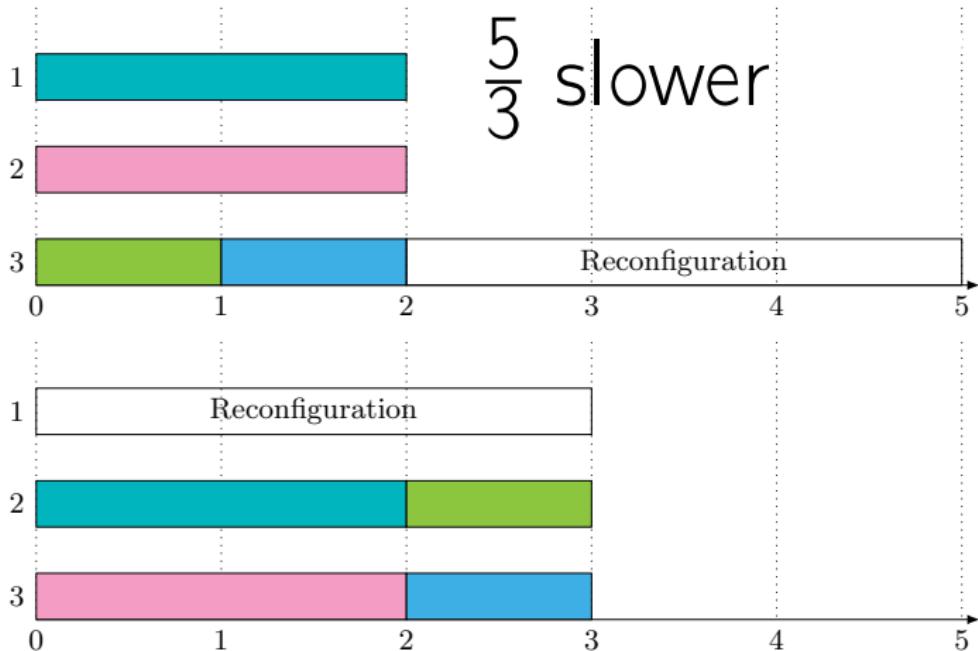
A competitive analysis



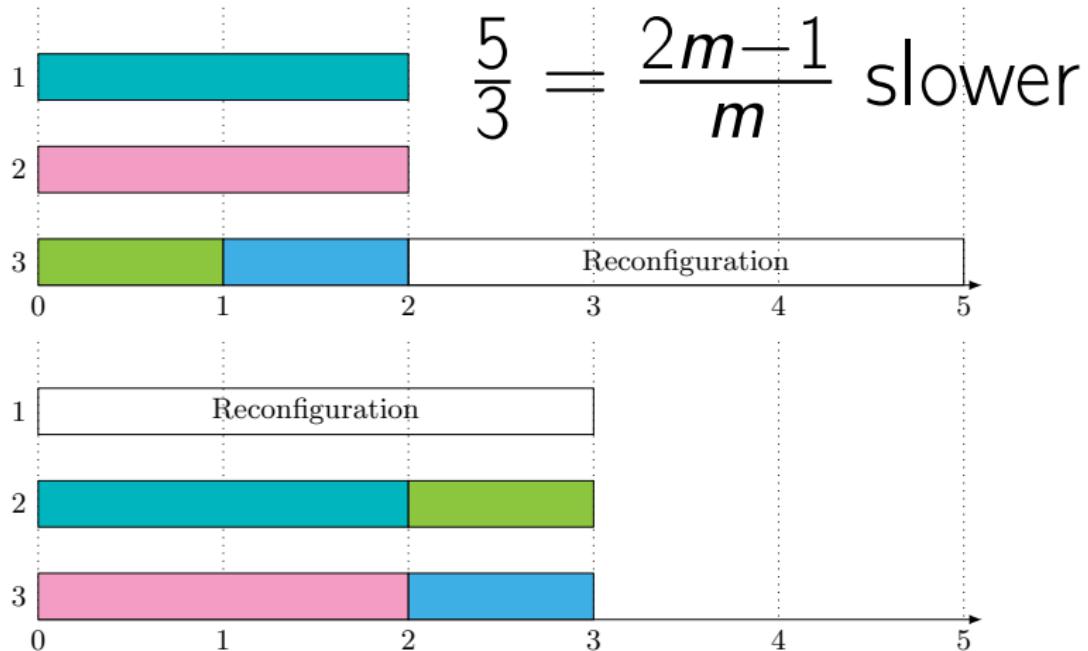
A competitive analysis



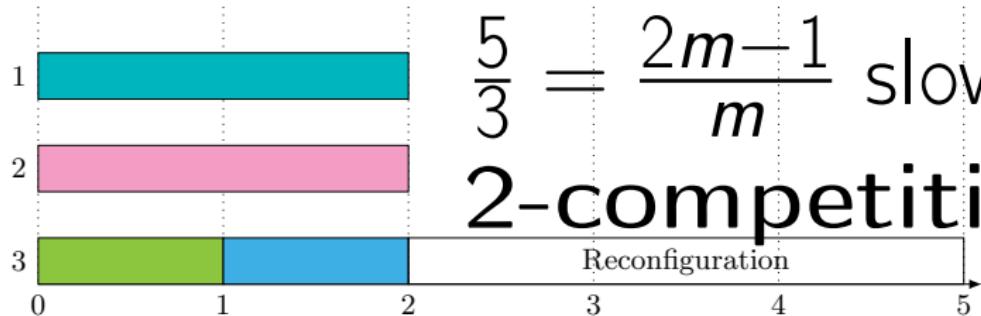
A competitive analysis



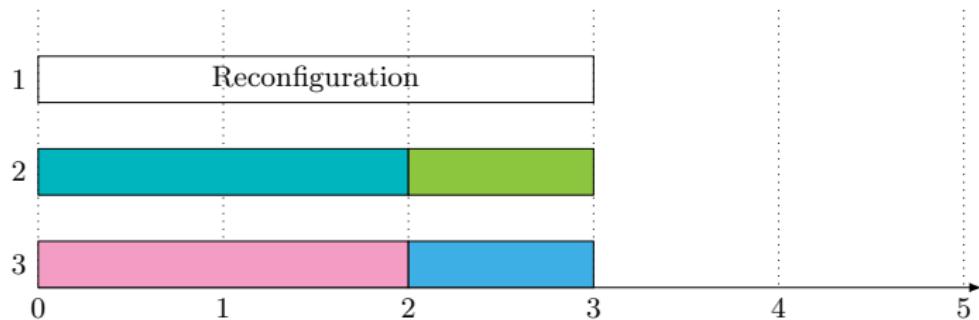
A competitive analysis



A competitive analysis



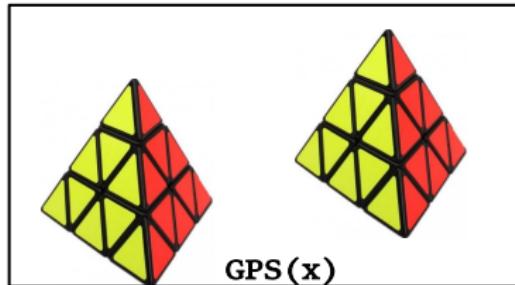
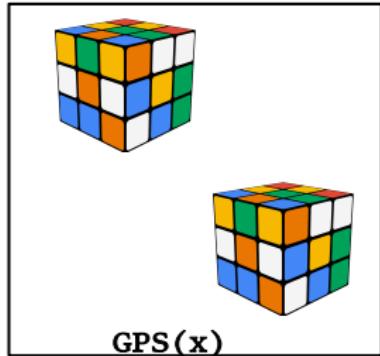
2-competitive



Future work

Future work

- Mode-independent tasks



Future work

- Mode-independent tasks
- Performances



Conclusion

