

EmergenTheta: Verification Beyond Abstraction Refinement

*Levente Bajczi, Dániel Szekeres, Milán Mondok, Zsófia Ádám,
Márk Somorjai, Csanád Telbisz, Mihály Dobos-Kovács and
Vince Molnár*



**Critical Systems
Research Group**





detailed connections not shown

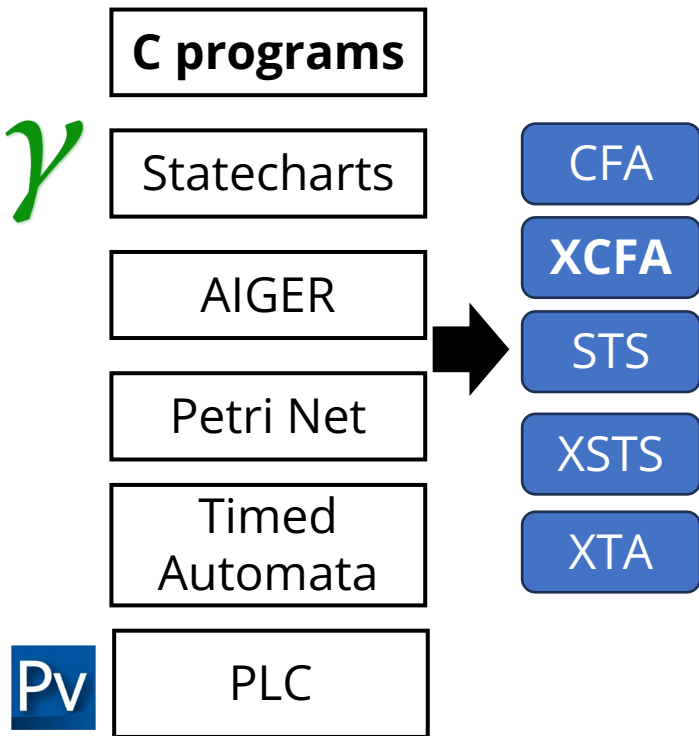


Generic, modular and **configurable** model checking framework

detailed connections not shown



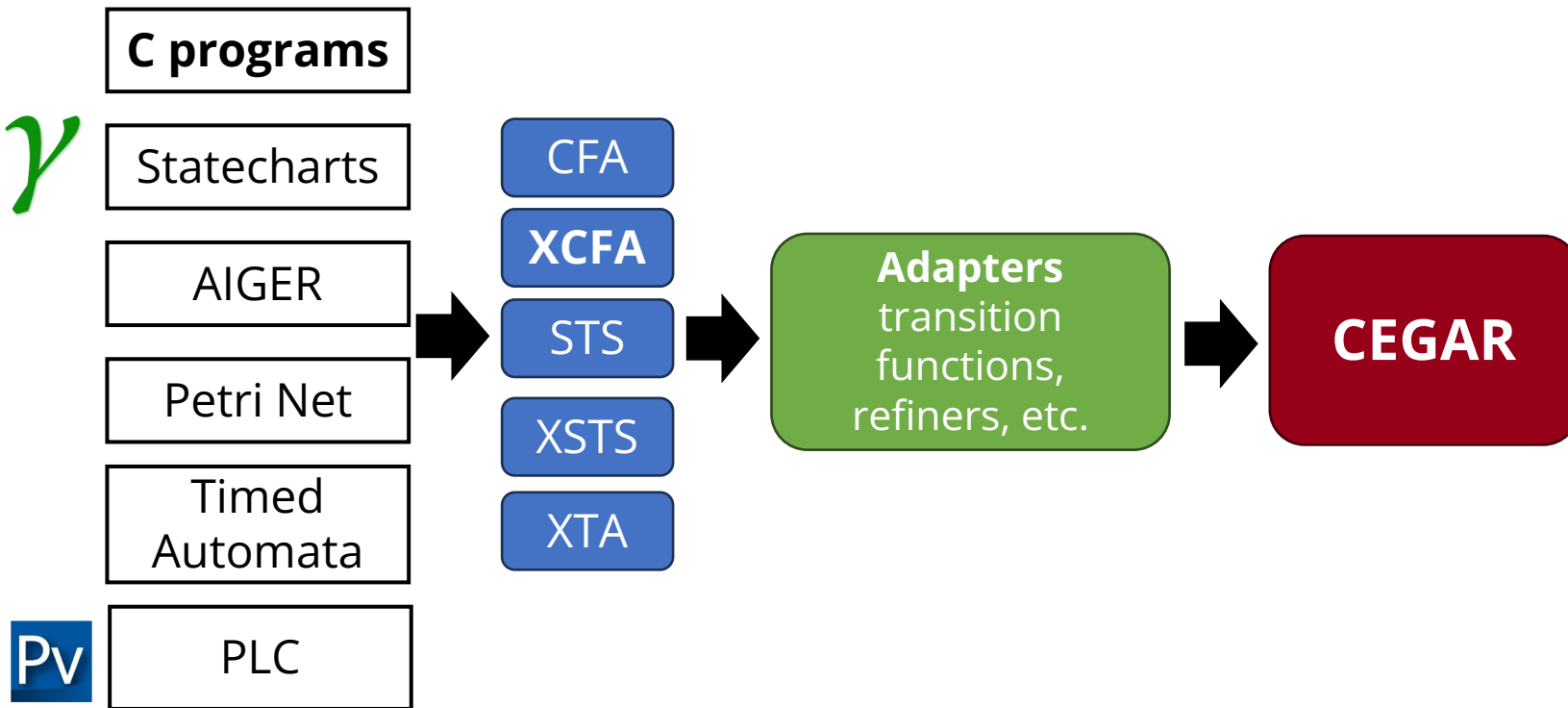
Generic, modular and **configurable** model checking framework



detailed connections not shown



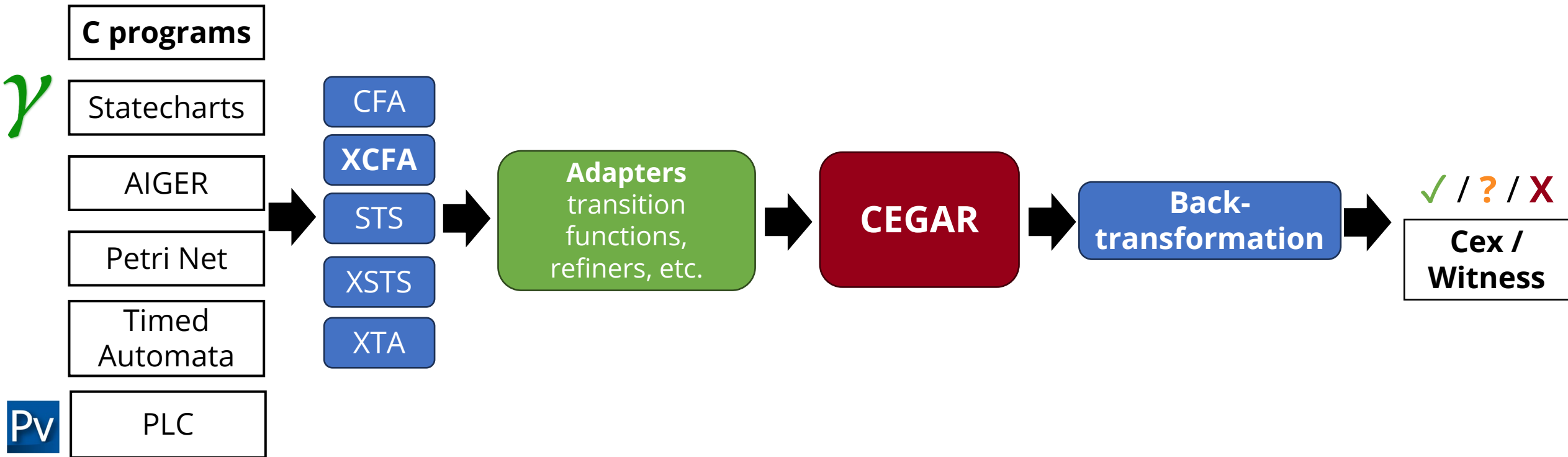
Generic, modular and **configurable** model checking framework



detailed connections not shown



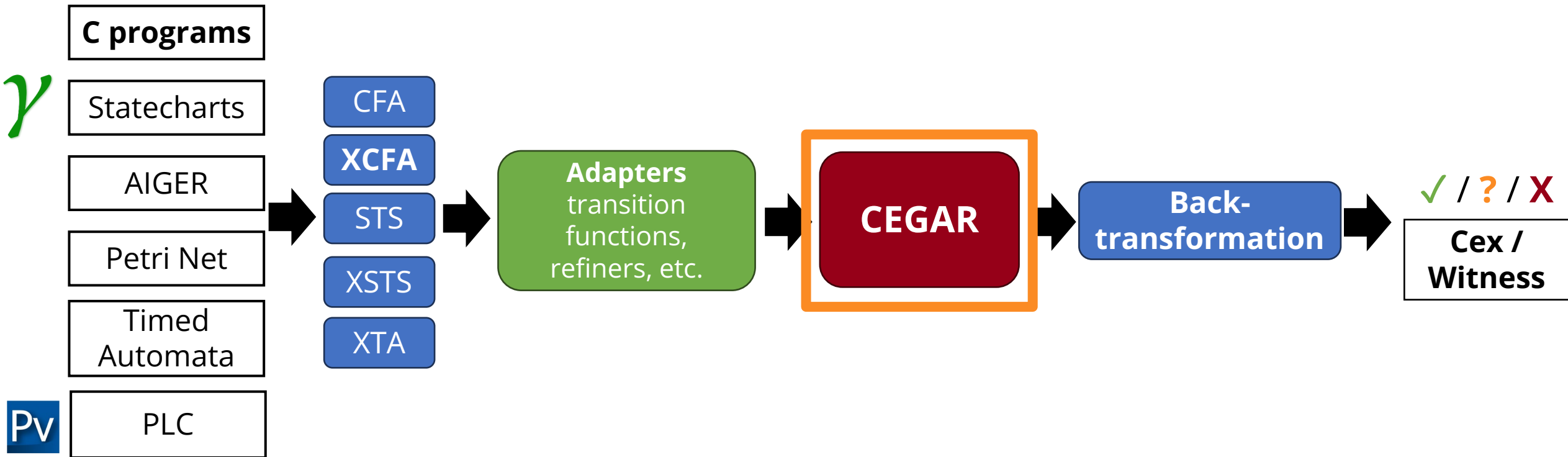
Generic, modular and **configurable** model checking framework



detailed connections not shown



Generic, modular and **configurable** model checking framework
But **CEGAR only** – can not adapt to everything



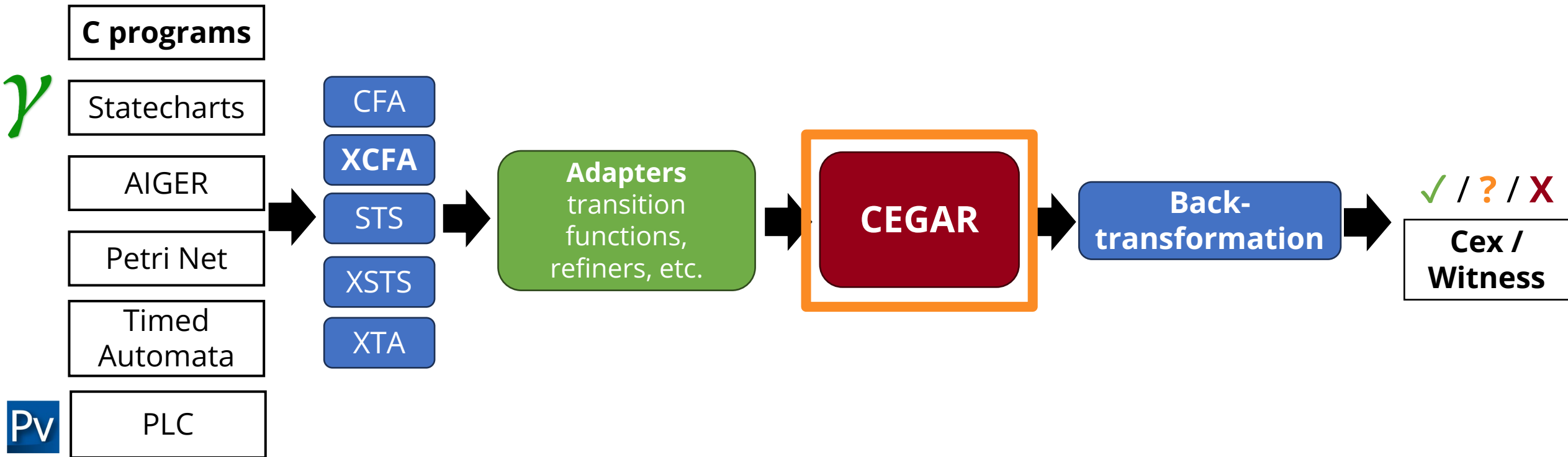
detailed connections not shown



Generic, modular and **configurable** model checking framework

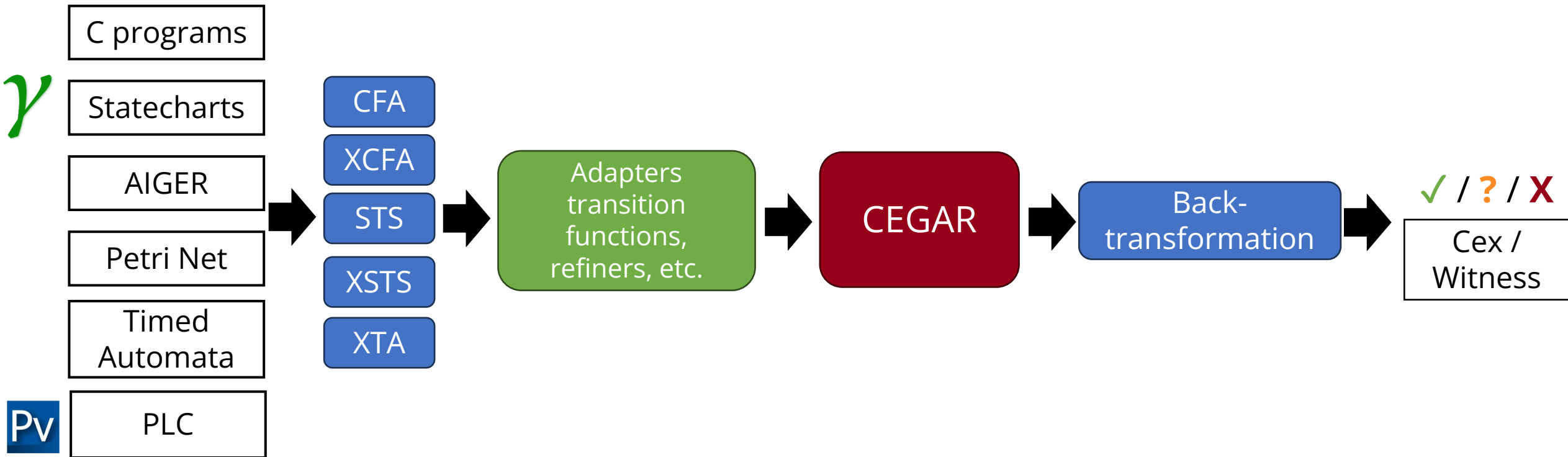
But **CEGAR only** – can not adapt to everything

Goal: add more algorithms



detailed connections not shown

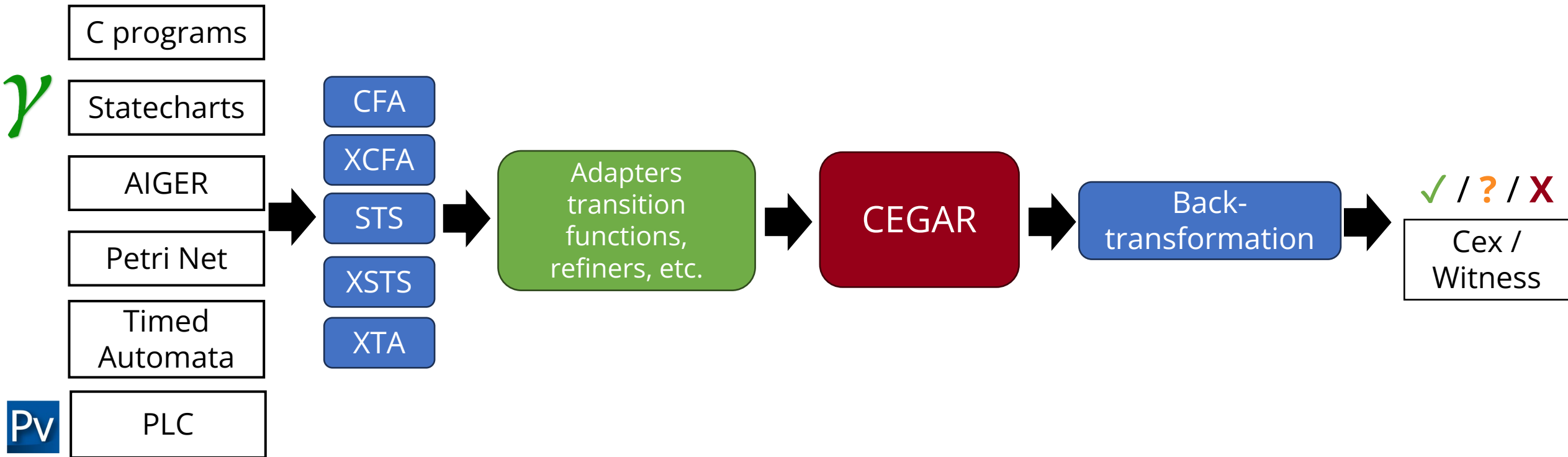
EmergenTheta



detailed connections not shown

EmergenTheta

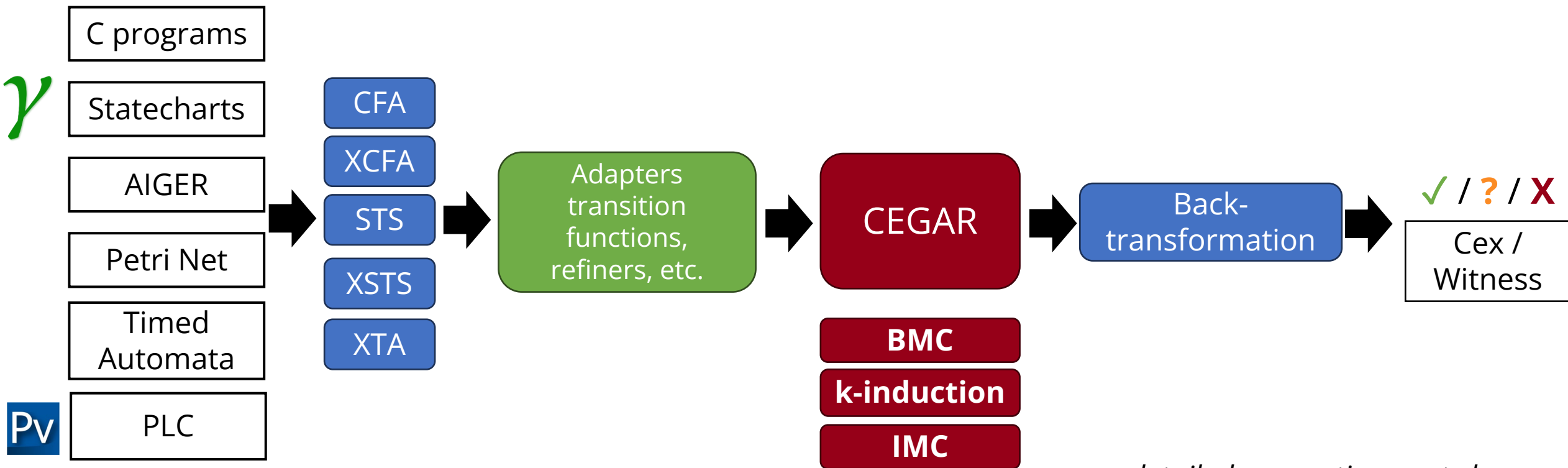
Separate tool for the “**emerging**” techniques (*separate evaluation*)



detailed connections not shown

EmergenTheta

Separate tool for the “**emerging**” techniques (*separate evaluation*)

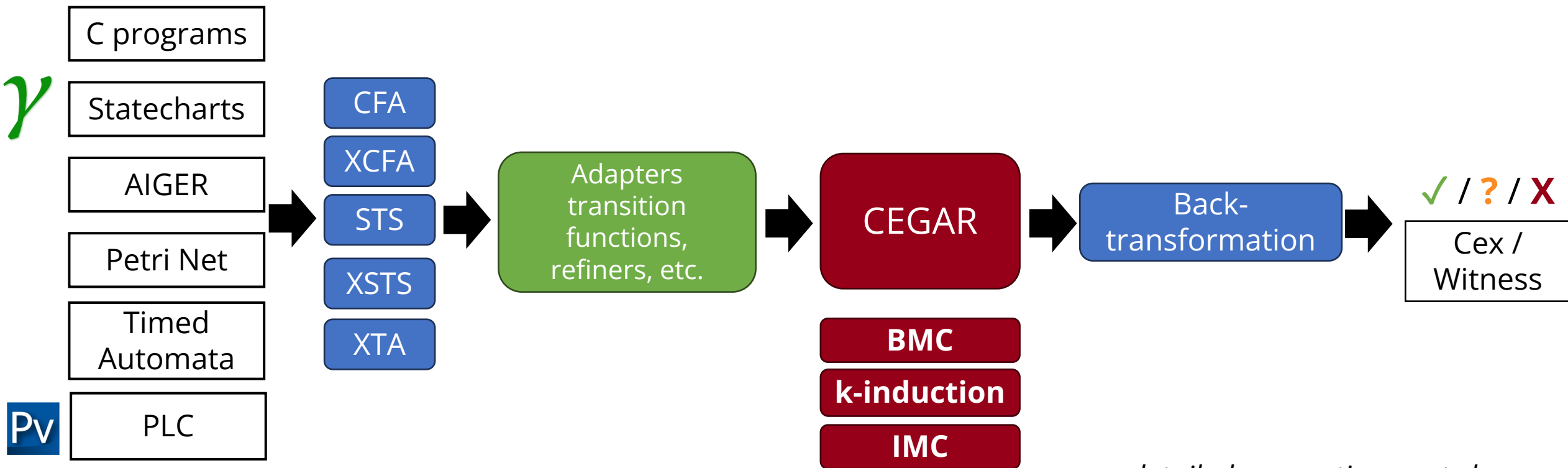


detailed connections not shown

EmergenTheta

Separate tool for the “**emerging**” techniques (*separate evaluation*)

Prerequisite: Remove dependency on **abstraction-specific classes**

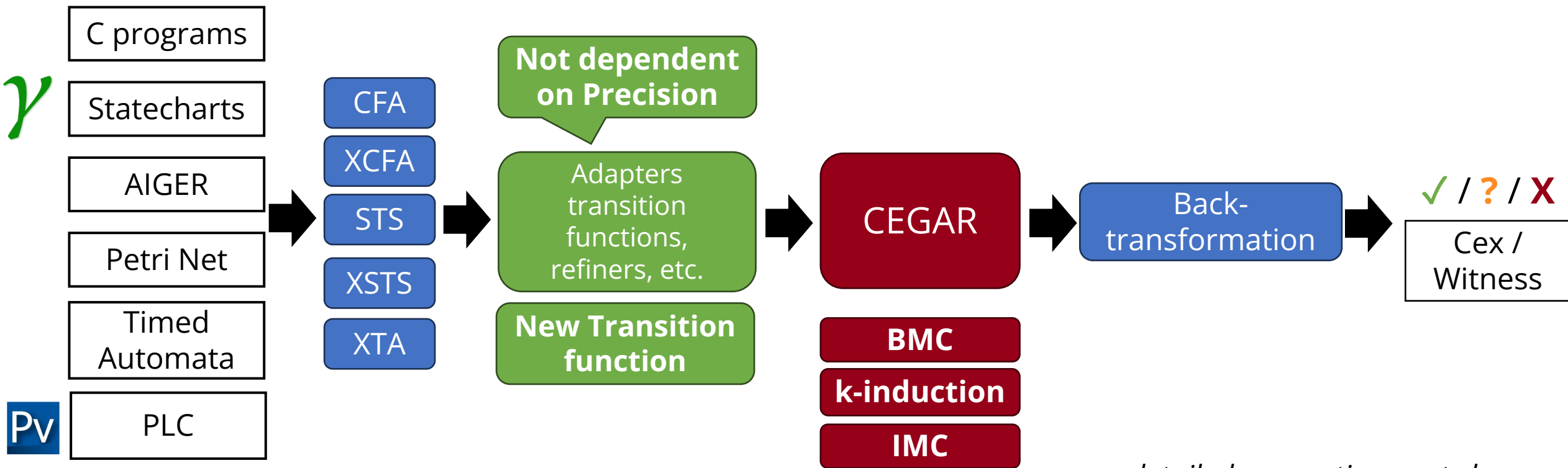


detailed connections not shown

EmergenTheta

Separate tool for the “**emerging**” techniques (*separate evaluation*)

Prerequisite: Remove dependency on **abstraction-specific classes**

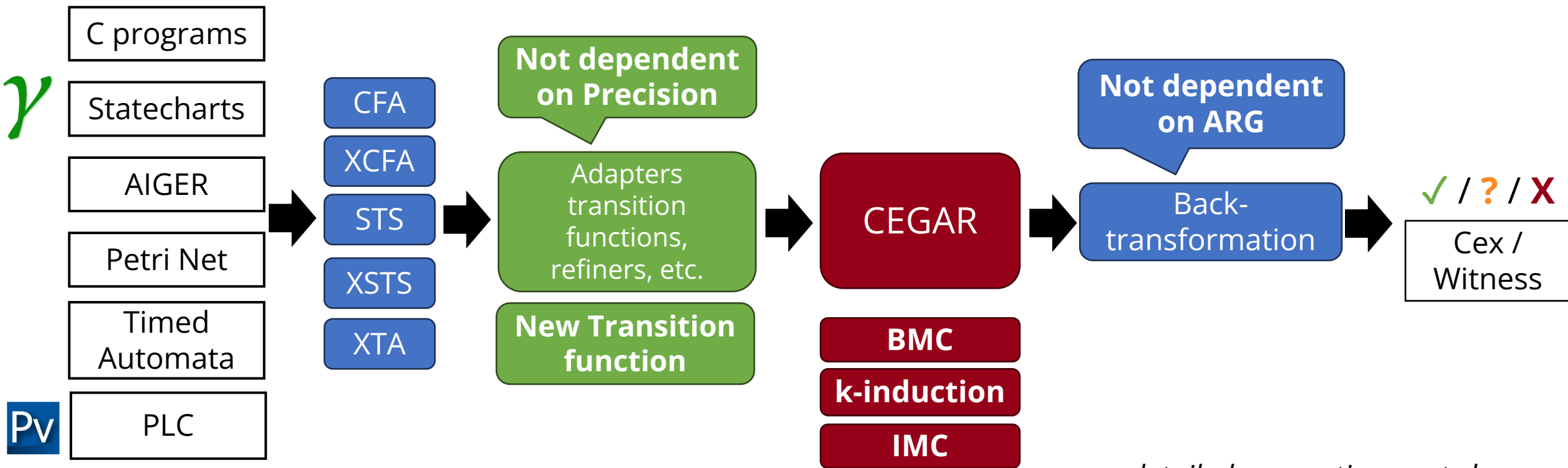


detailed connections not shown

EmergenTheta

Separate tool for the “**emerging**” techniques (*separate evaluation*)

Prerequisite: Remove dependency on **abstraction-specific classes**



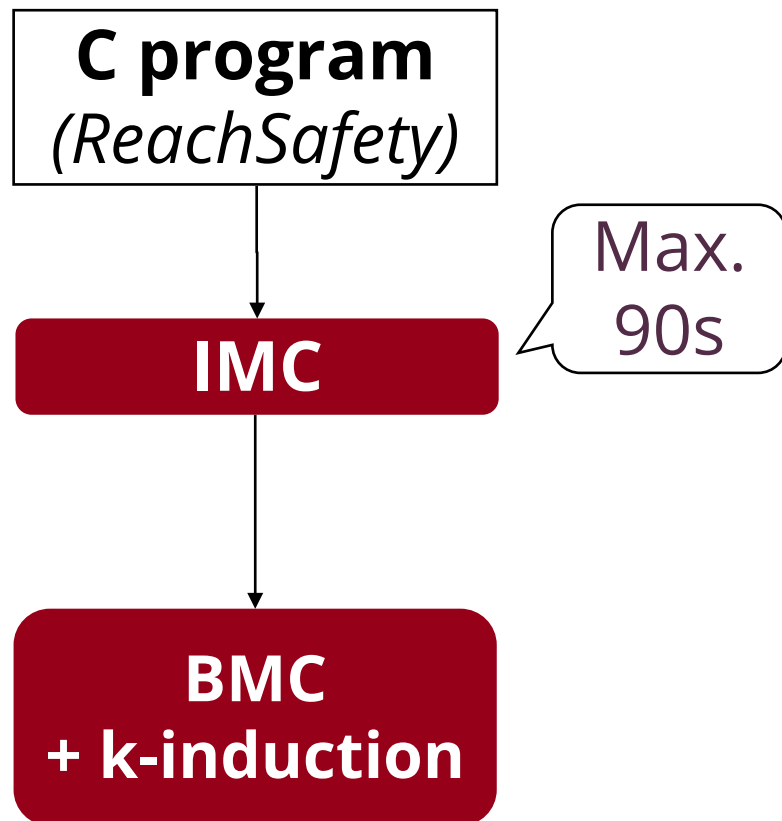
detailed connections not shown

EmergenTheta on SV-COMP

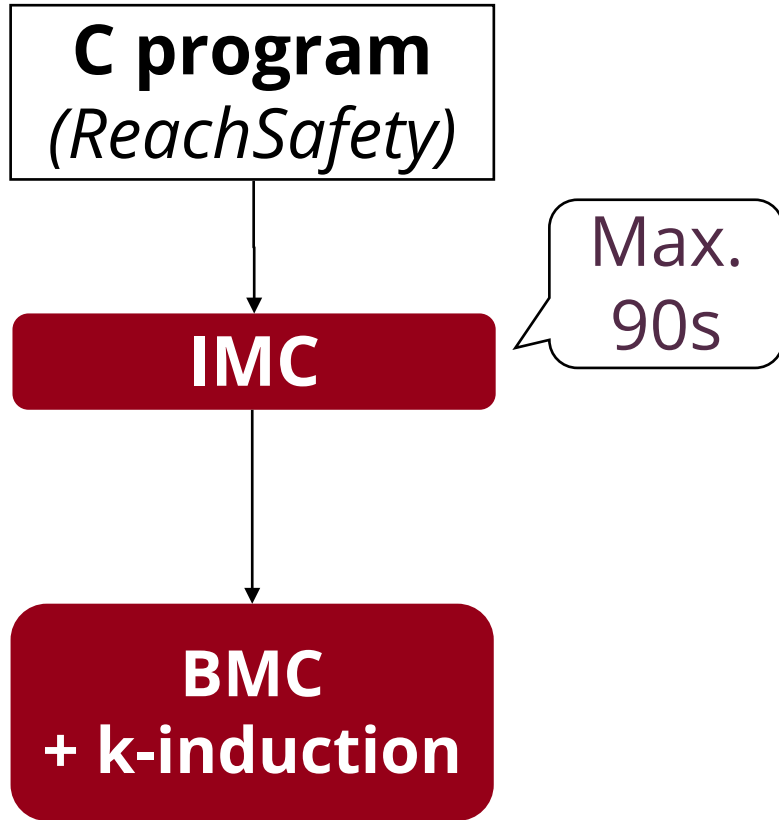
EmergenTheta on SV-COMP

C program
(ReachSafety)

EmergenTheta on SV-COMP

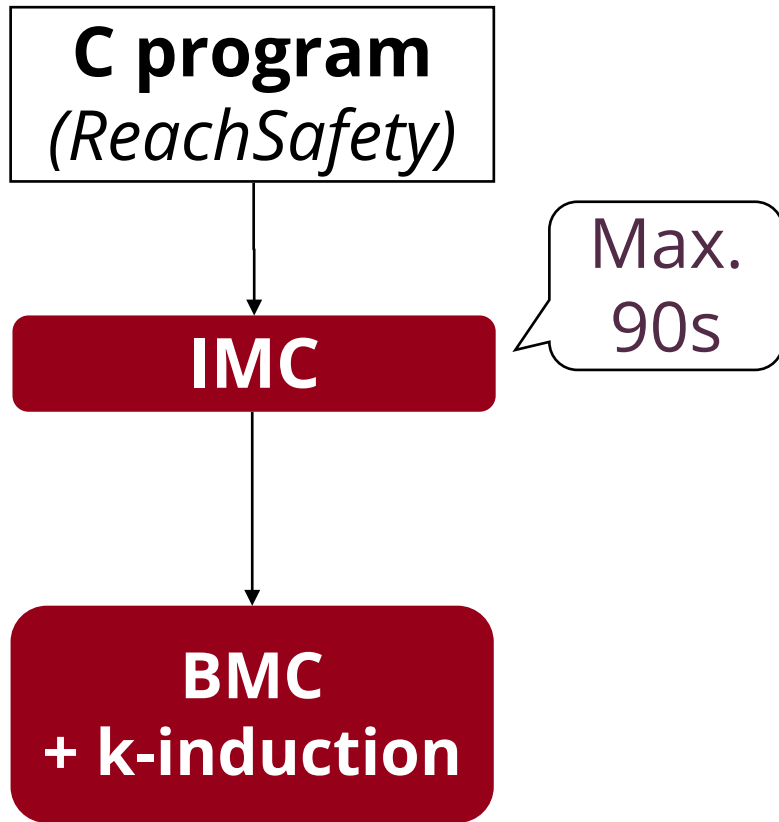


EmergenTheta on SV-COMP



ReachSafety	Theta	EmergenTheta	Both
True	318	399	305
False	443	21	87

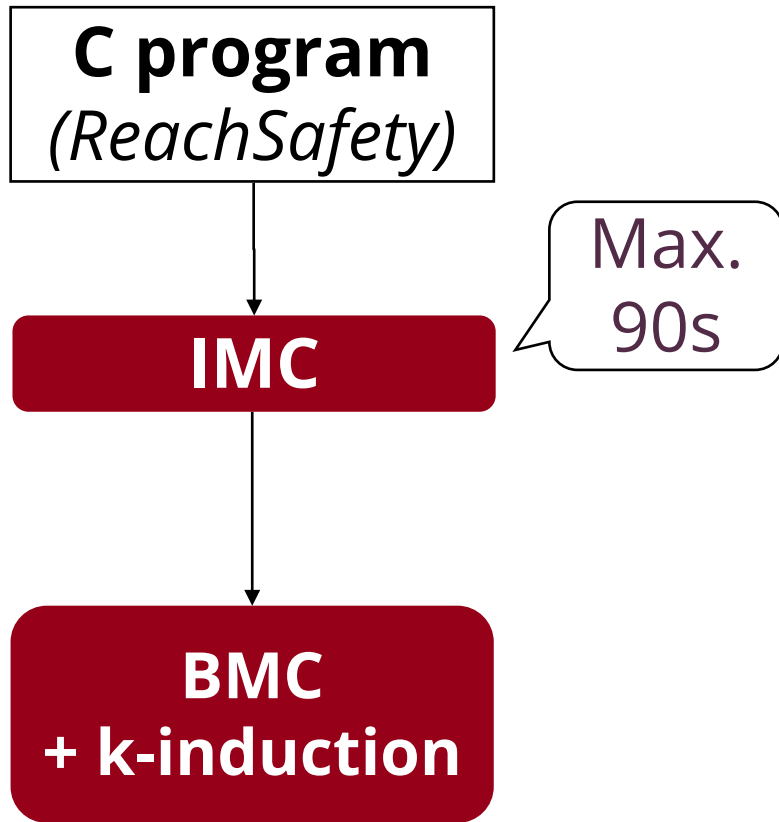
EmergenTheta on SV-COMP



ReachSafety	Theta	EmergenTheta	Both
True	318	399	305
False	443	21	87

- **Theta** (CEGAR) much better in **finding bugs**
 - *Needs further investigation*

EmergenTheta on SV-COMP



ReachSafety	Theta	EmergenTheta	Both
True	318	399	305
False	443	21	87
All	761	420	392

- **Theta** (CEGAR) much better in **finding bugs**
 - *Needs further investigation*
- **More than half** of the tasks solved by each tool was **not solved by the other**
 - **Complementary tools**