

EmergenTheta

Experimental Analyses within the Theta Framework

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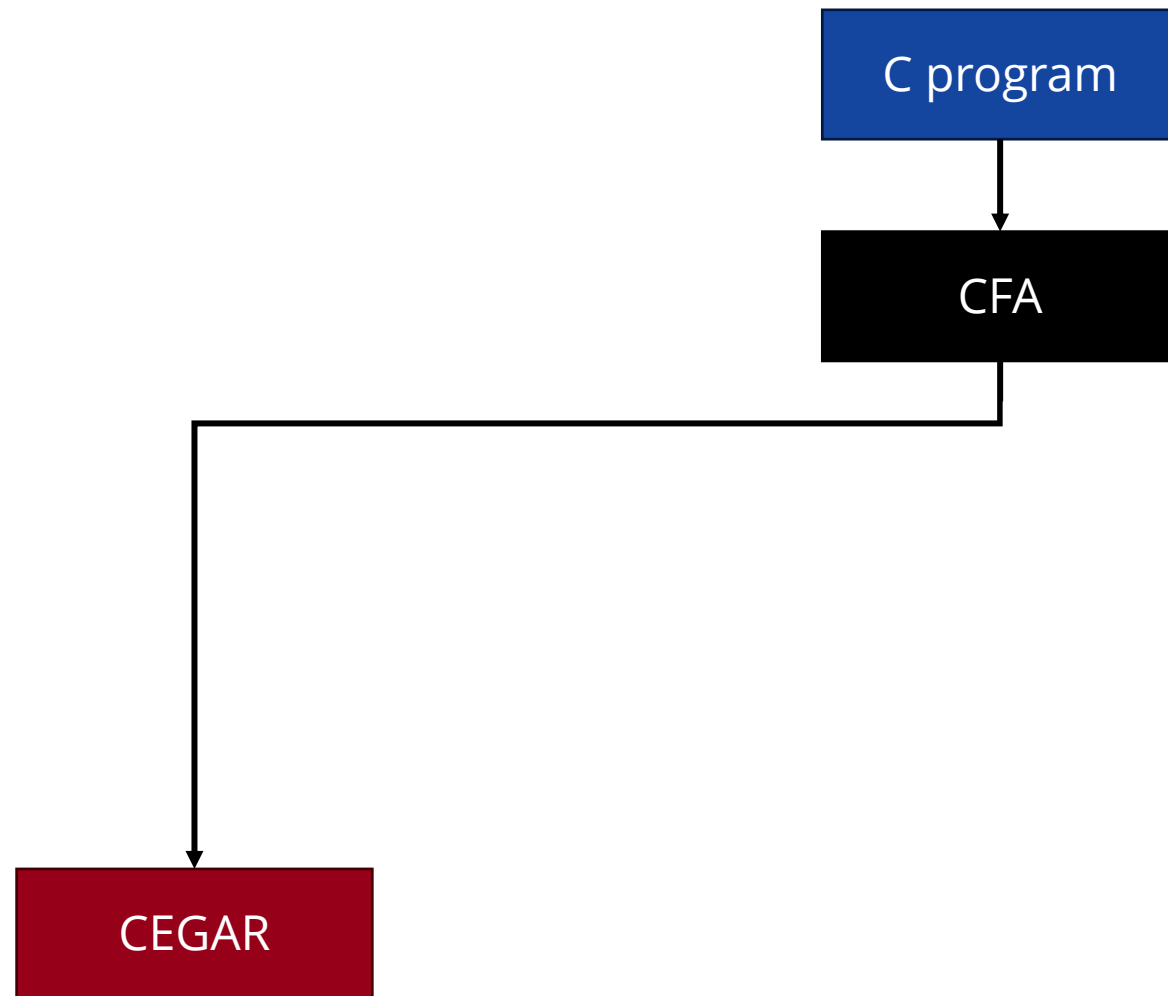
Department of
Artificial Intelligence and
Systems Engineering

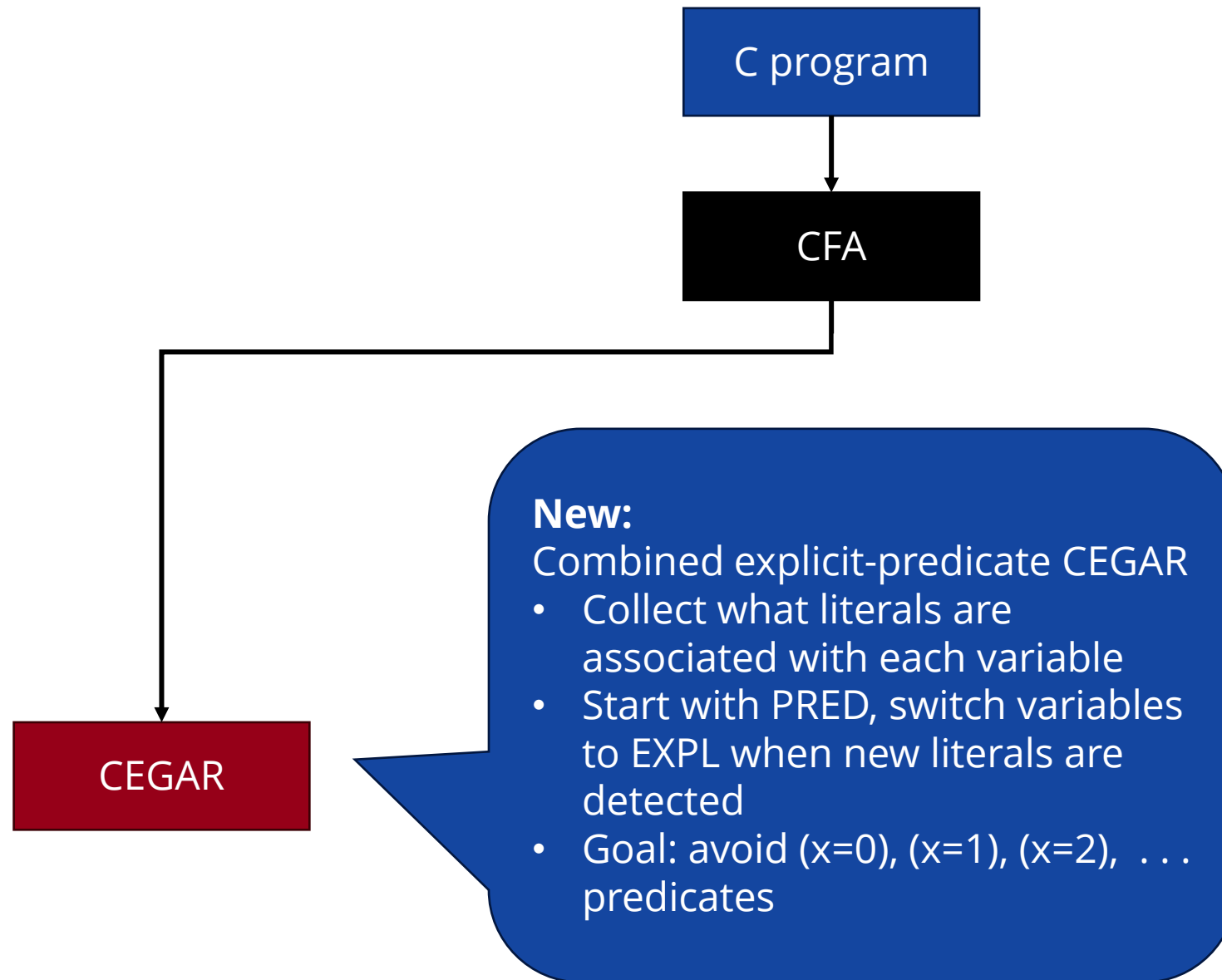


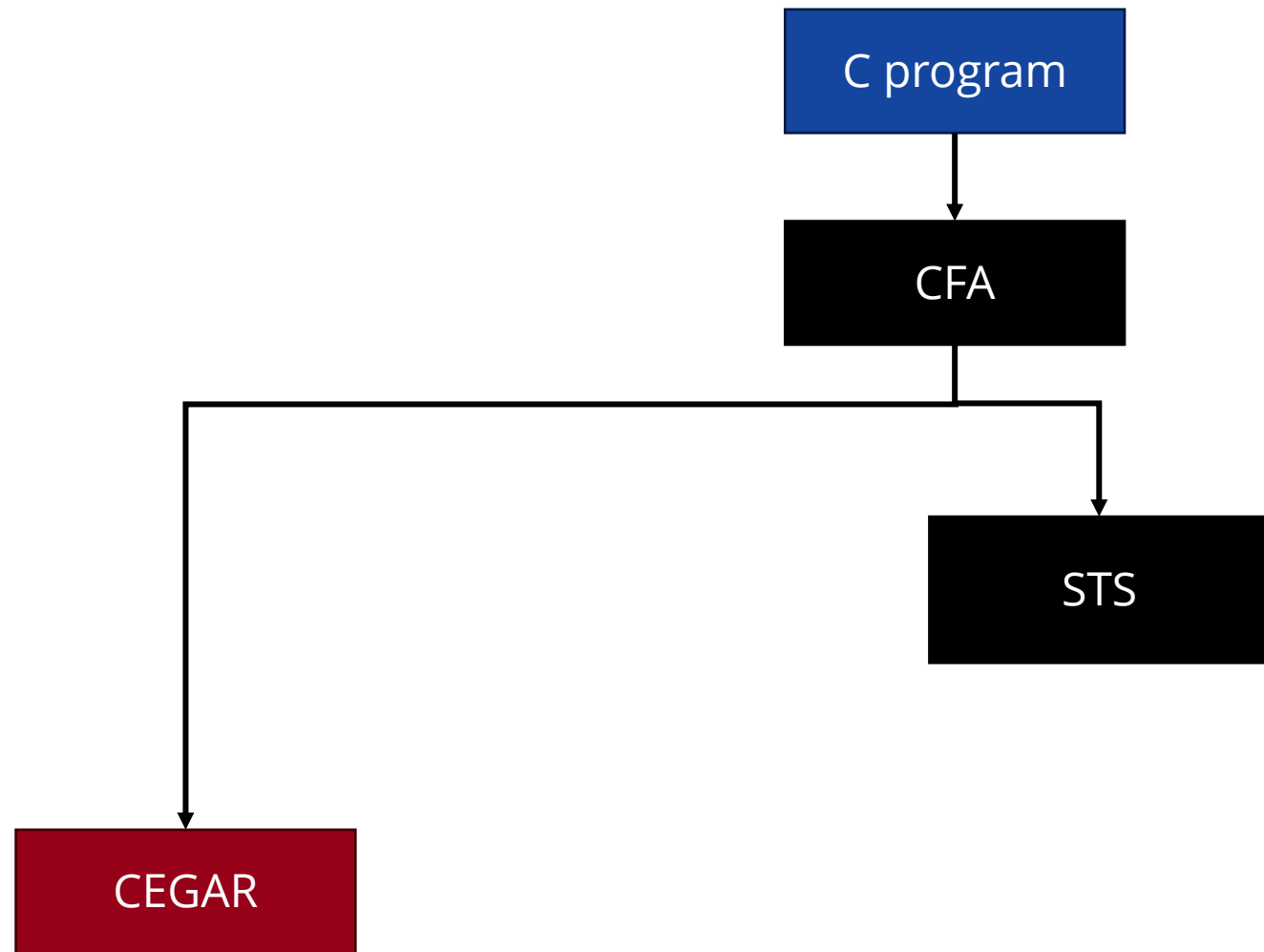
Critical Systems
Research Group

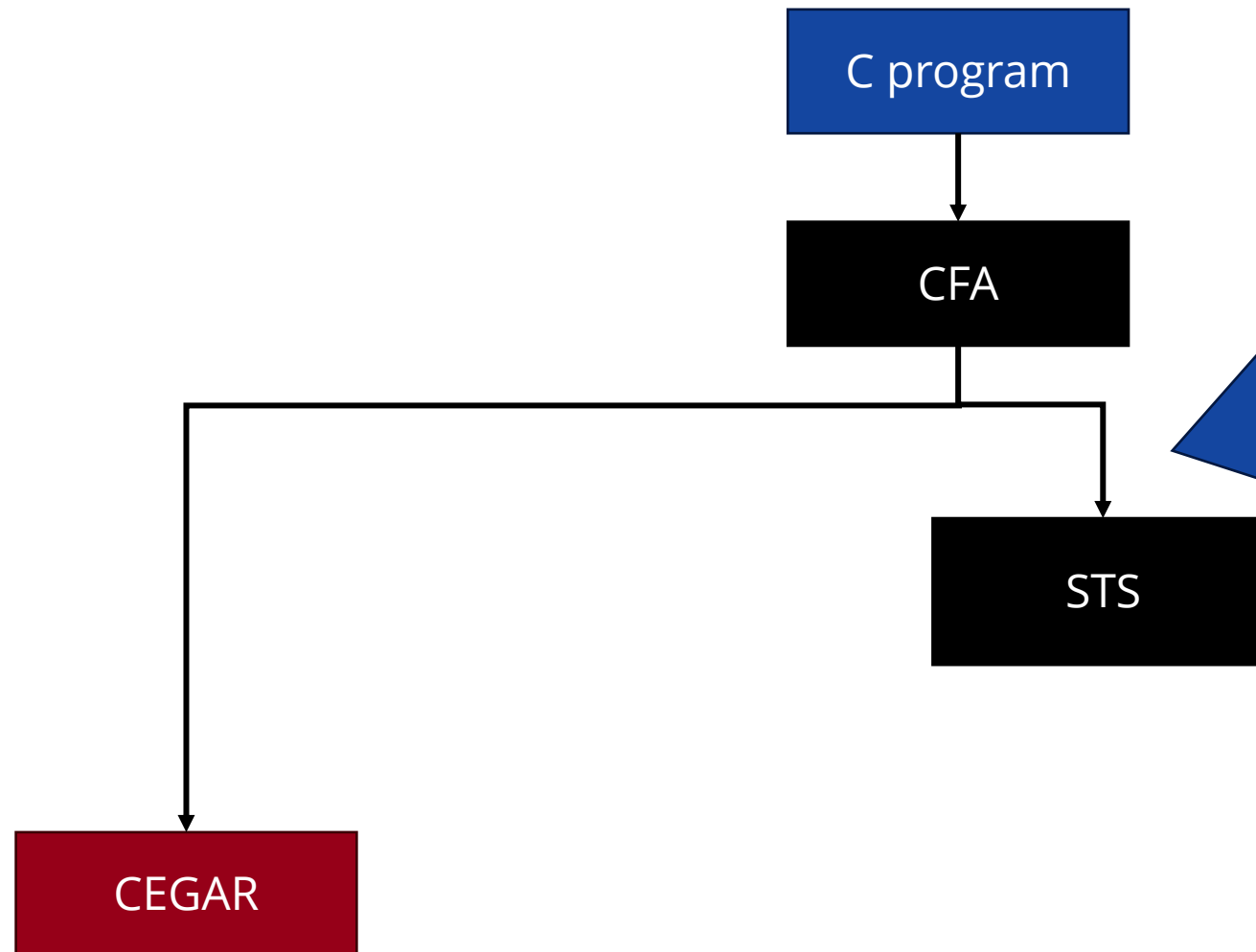
EmergenTheta

- Theta: our main entry
 - We merged best of 2025's Theta and EmergenTheta configs
- EmergenTheta: **sandbox** entry for **experimental analyses**
 - Debut: SVCOMP'24
 - Only techniques that aren't included in Theta's portfolios





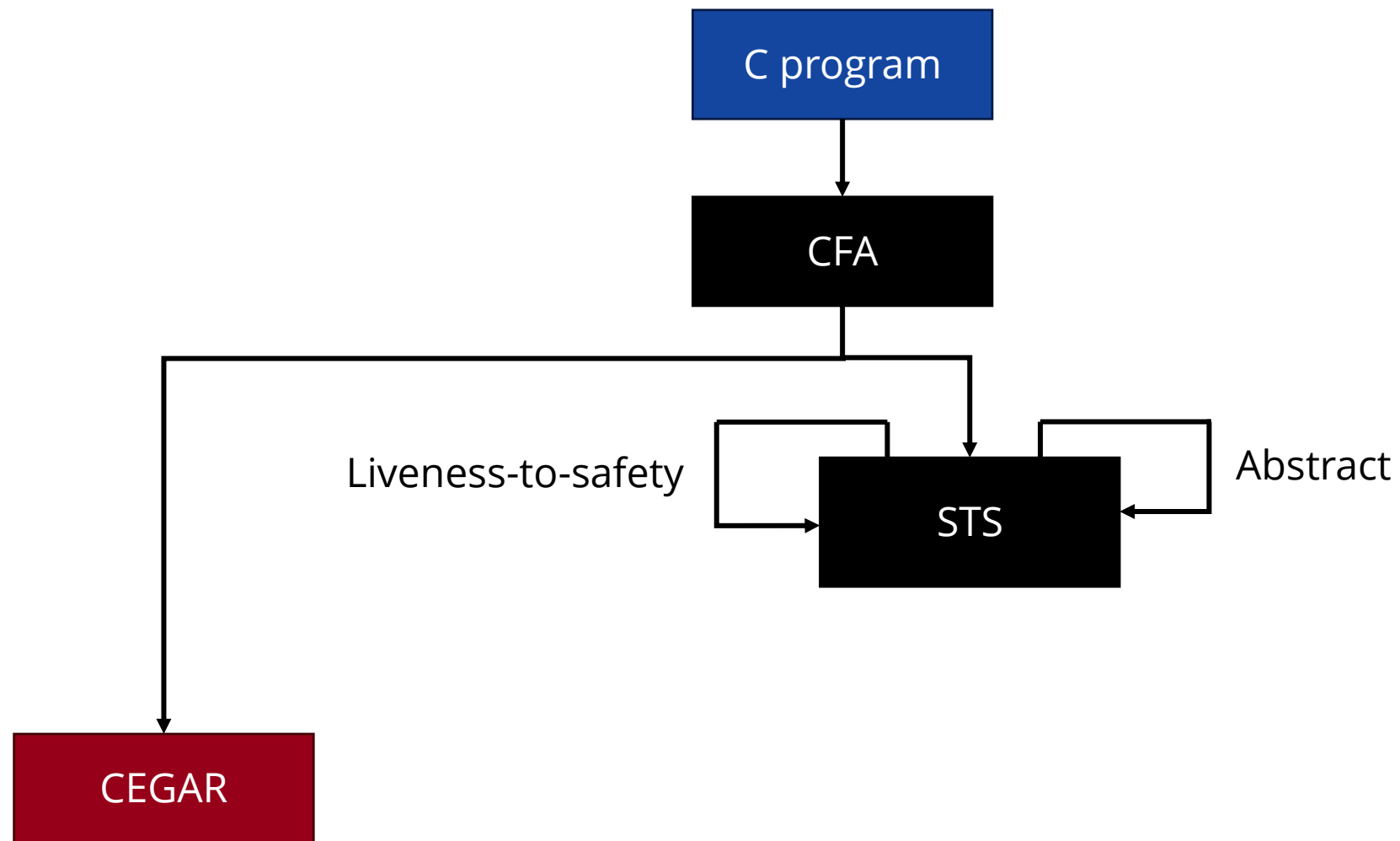


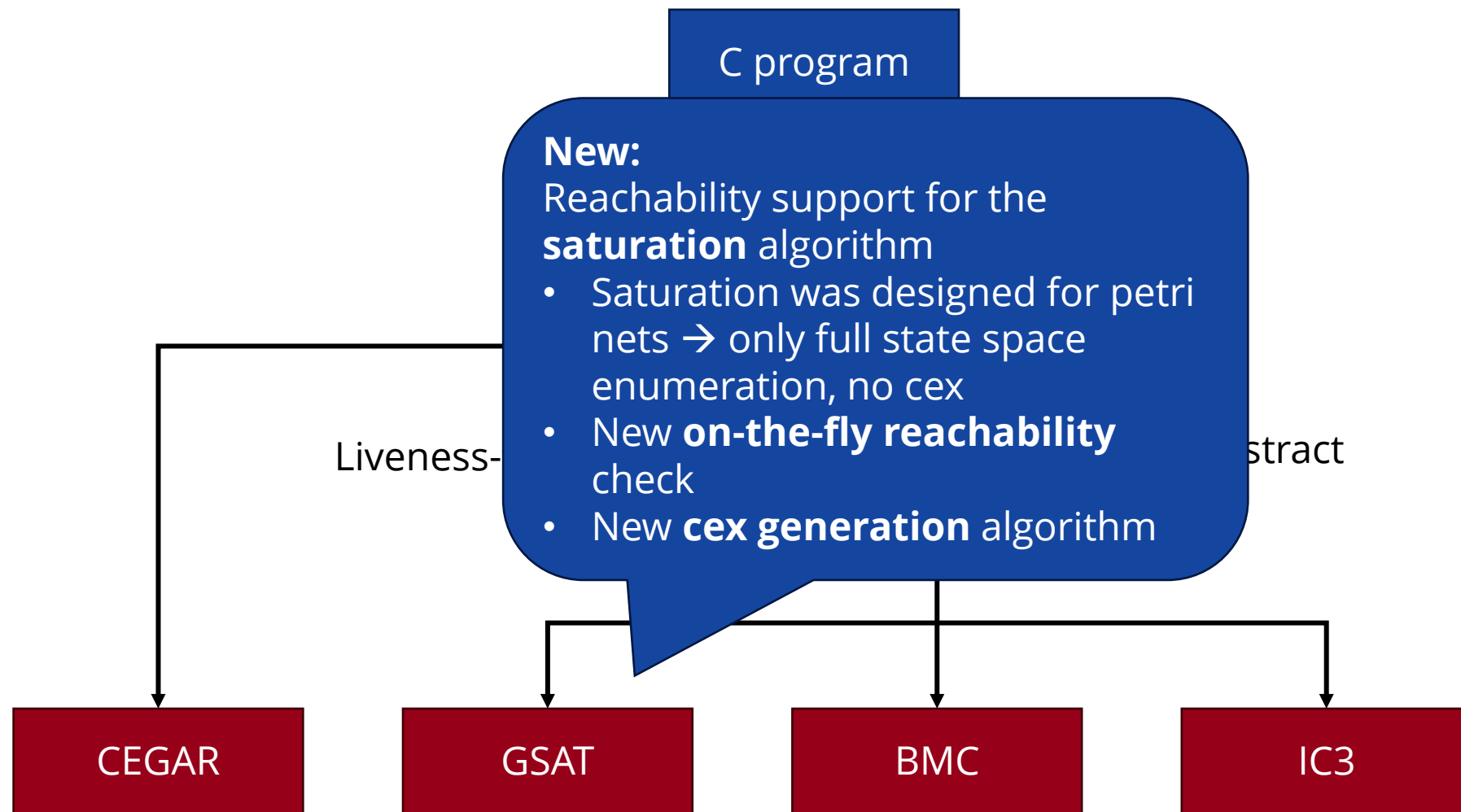


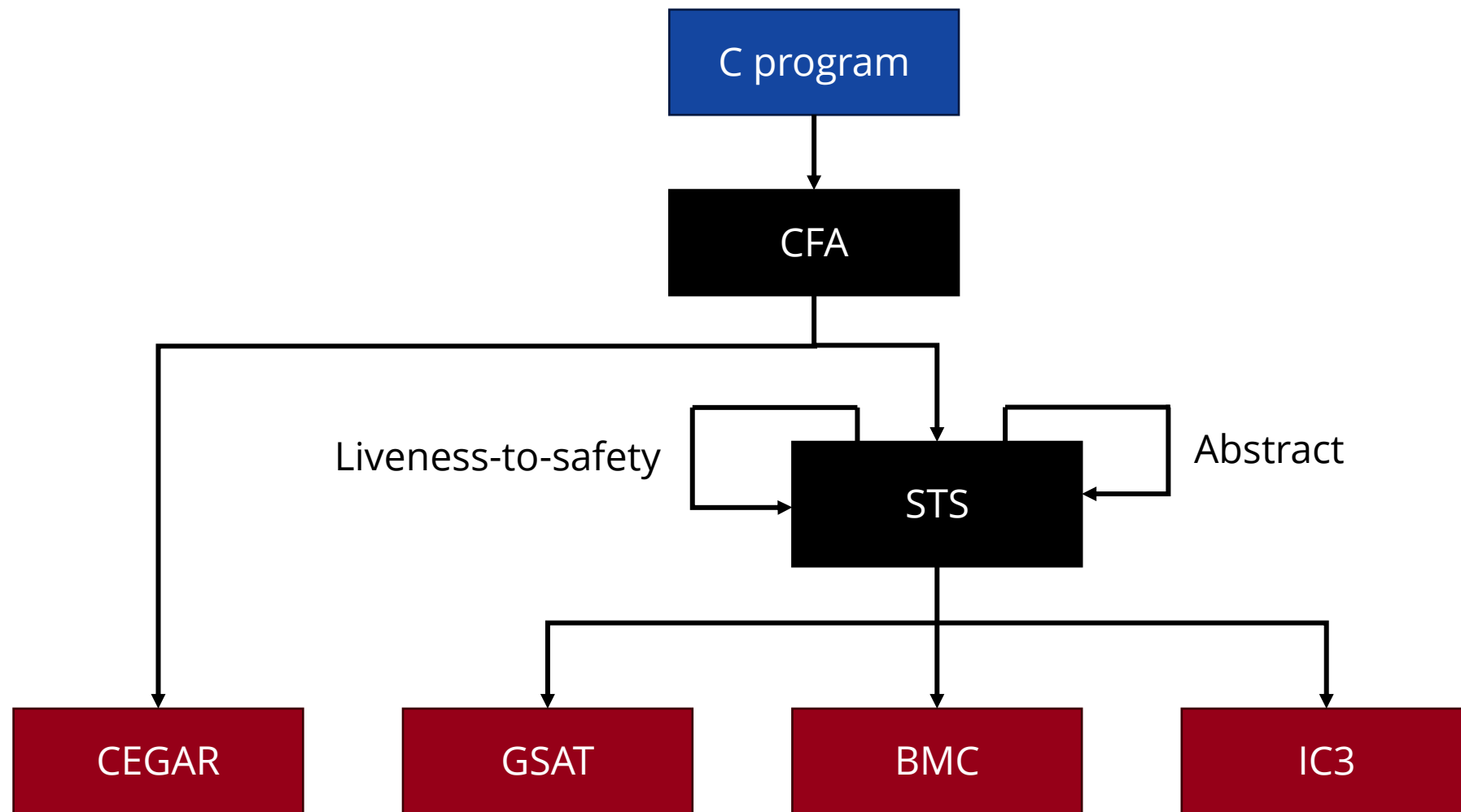
New:

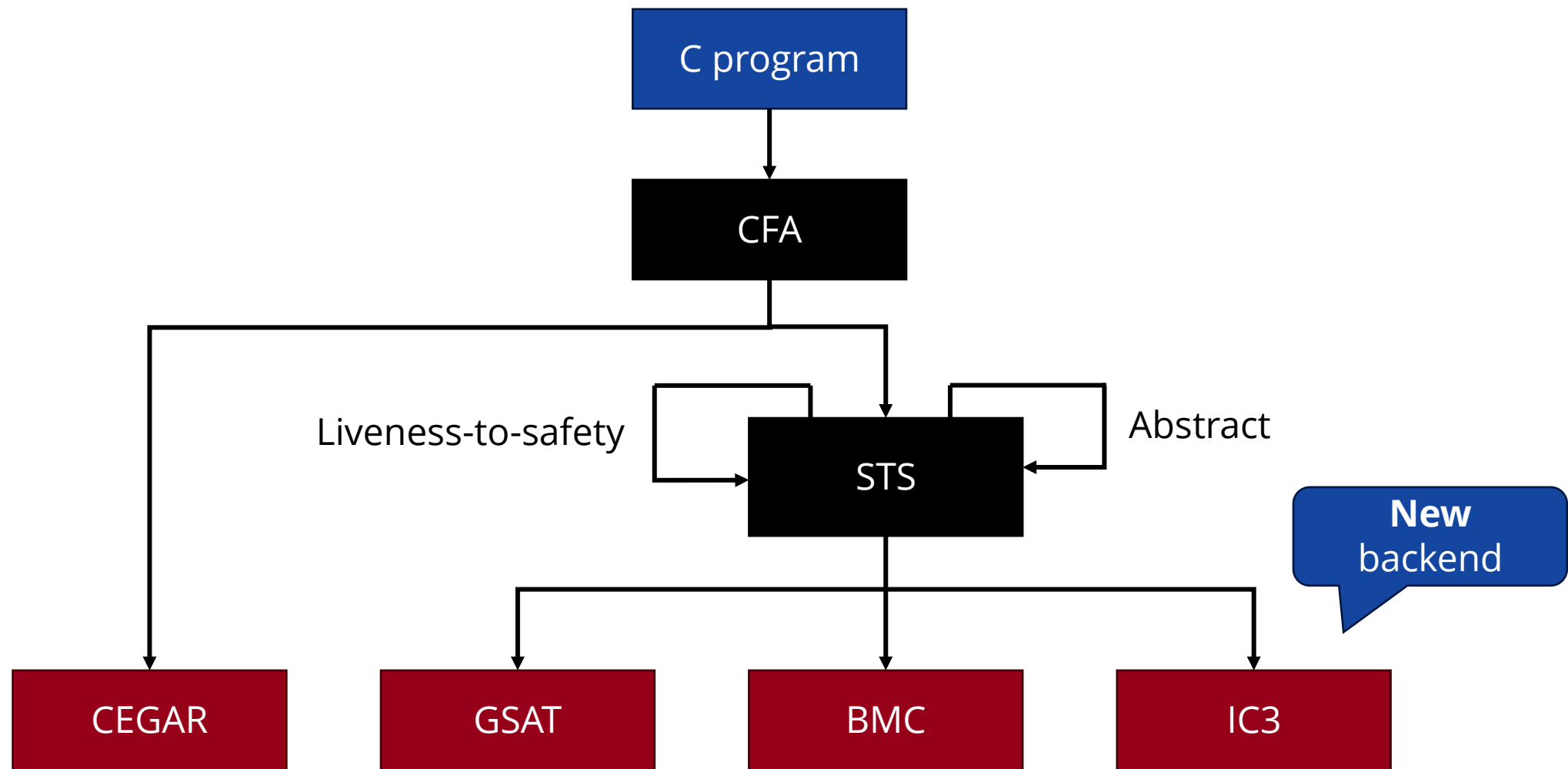
Multithreaded CFA to STS transformation

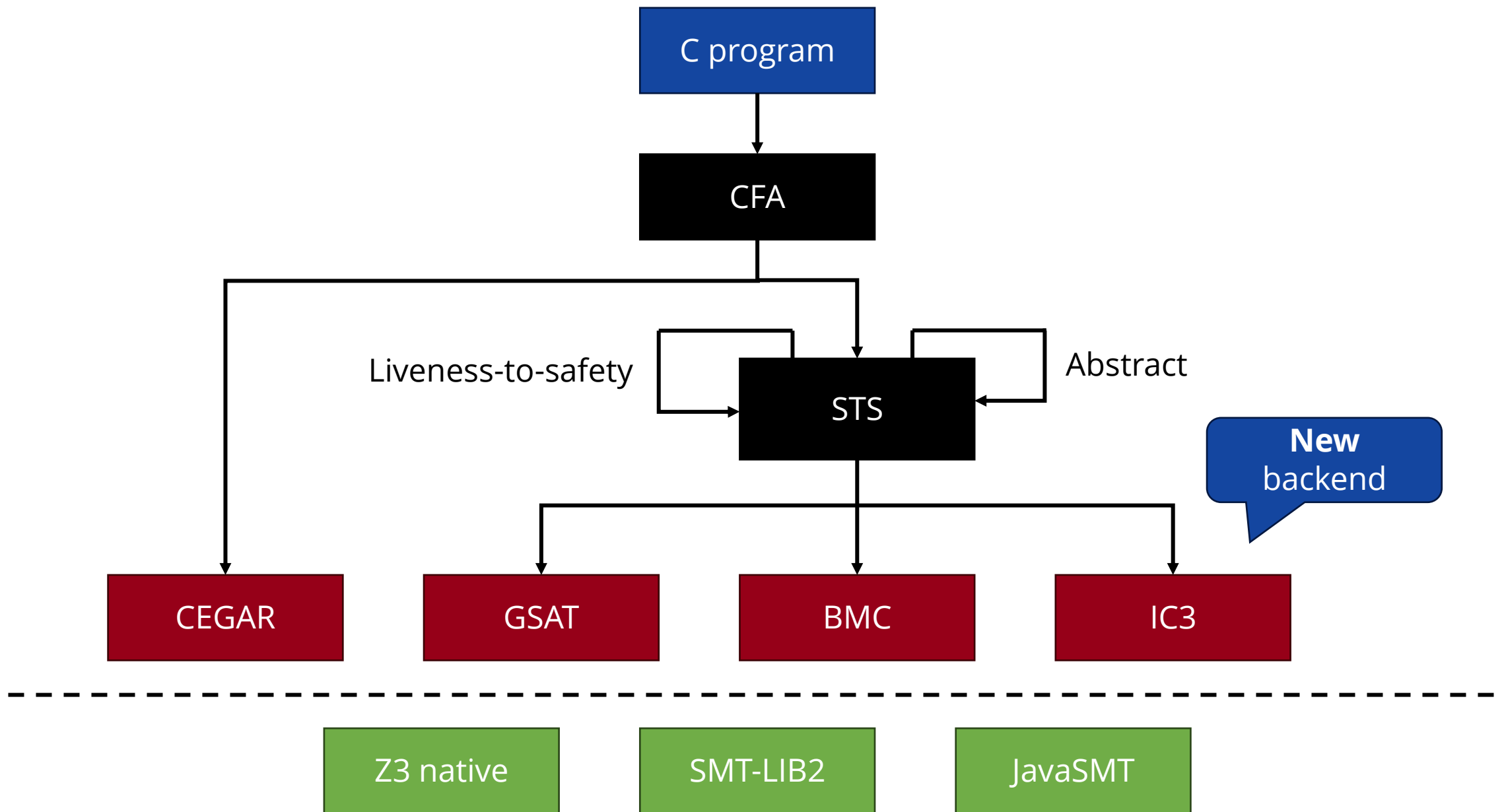
- Preprocessing: determine max number of threads started = N
- Flatten CFA using N location variables
- Allows STS-based algorithms to run on multithreaded tasks











Results

Saturation: very promising on concurrent software, can now produce violation witnesses

Configura	safe unsafe		safe unsafe		termination safe unsafe		unreach-call safe unsafe		memsafety safe unsafe	
GSAT	557	32	163	0	0	0	90	124	191	0
Combined CEGAR	5	10	392	214	0	0	1136	364	204	12
IC3	0	0	0	3	0	0	0	2	0	0
BMC	7	9	8	3	0	0	10	16	16	0
THETA fallback	1	2	191	15	0	0	674	122	15	2
Liveness-CEGAR	0	0	0	0	268	113	0	0	0	0
Liveness-to-safety	0	0	0	0	16	11	0	0	0	0
$\sum$ Correct	570	53	754	235	284	124	1910	628	426	14
$\sum$ Wrong	0	1	1	12	0	0	5	2	2	13
$\sum$ Unconfirmed	0	14	0	33	0	0	118	23	0	6

Results

Configuration	no-data-race		no-overflow		term		Combined CEGAR: seems like a balanced config between EXPL and PRED			
	safe	unsafe	safe	unsafe	safe	unsafe				
GSAT	557	32	163	0	0	0	90	124	191	0
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Liveness-to-safety	0	0	0	0	16	11	0	0	0	0
$\sum$ Correct	570	53	Liveness CEGAR: outperformed last year's TransVer config for termination					8	426	14
$\sum$ Wrong	0	1						2	13	
$\sum$ Unconfirmed	0	14						0	33	0

Results

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