Towards Practical First-Order Model Counting

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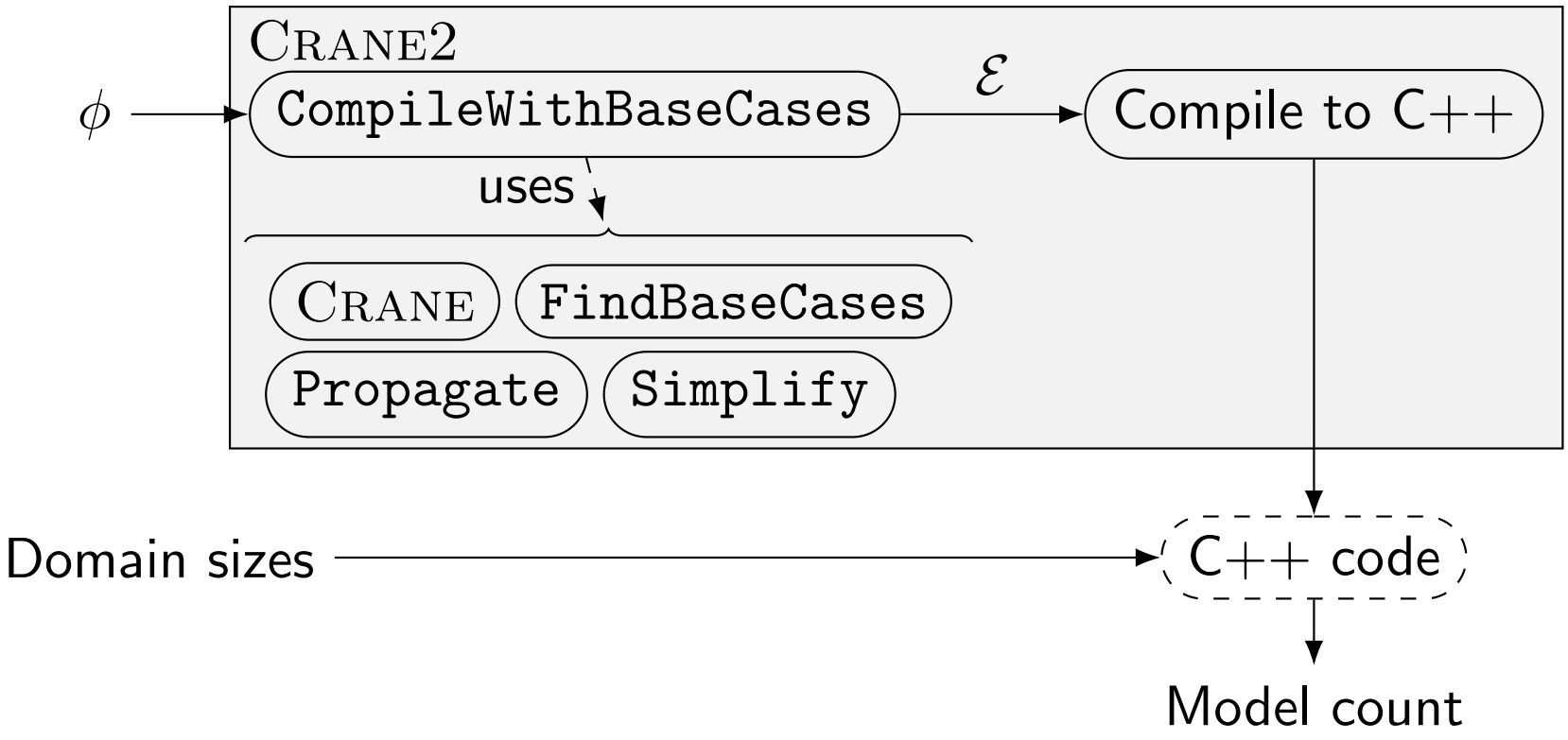
Knowledge Compilation Workflow



Benchmarks

- Friends & Smokers

$$(\forall x, y \in \Delta.\ S(x) \wedge F(x,y) \to S(y)) \wedge (\forall x \in \Delta.\ S(x) \to C(x))$$

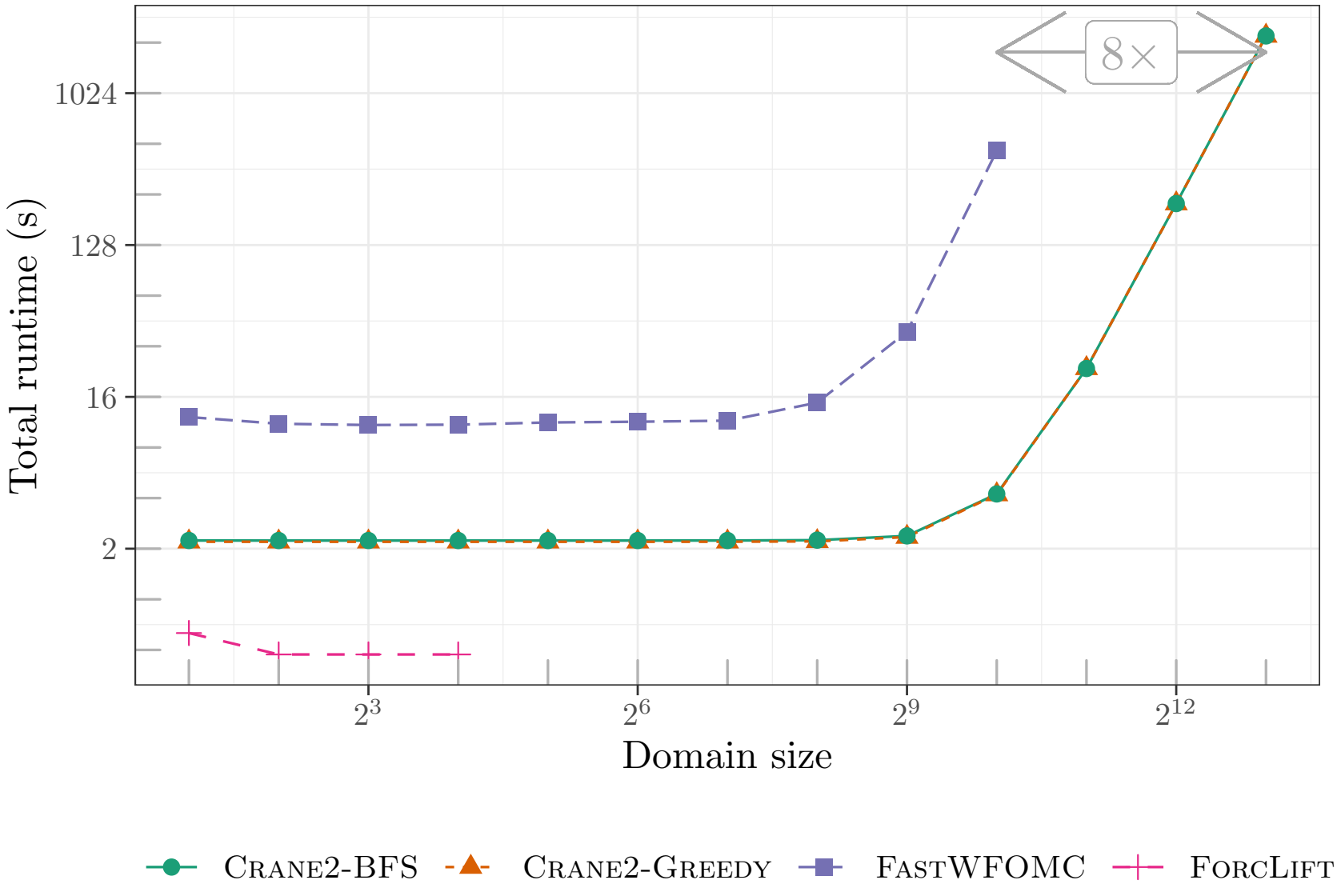
- Functions

$$(\forall x \in \Gamma.\ \exists y \in \Delta.\ P(x,y)) \wedge$$
$$(\forall x \in \Gamma.\ \forall y, z \in \Delta.\ P(x,y) \wedge P(x,z) \to y = z)$$

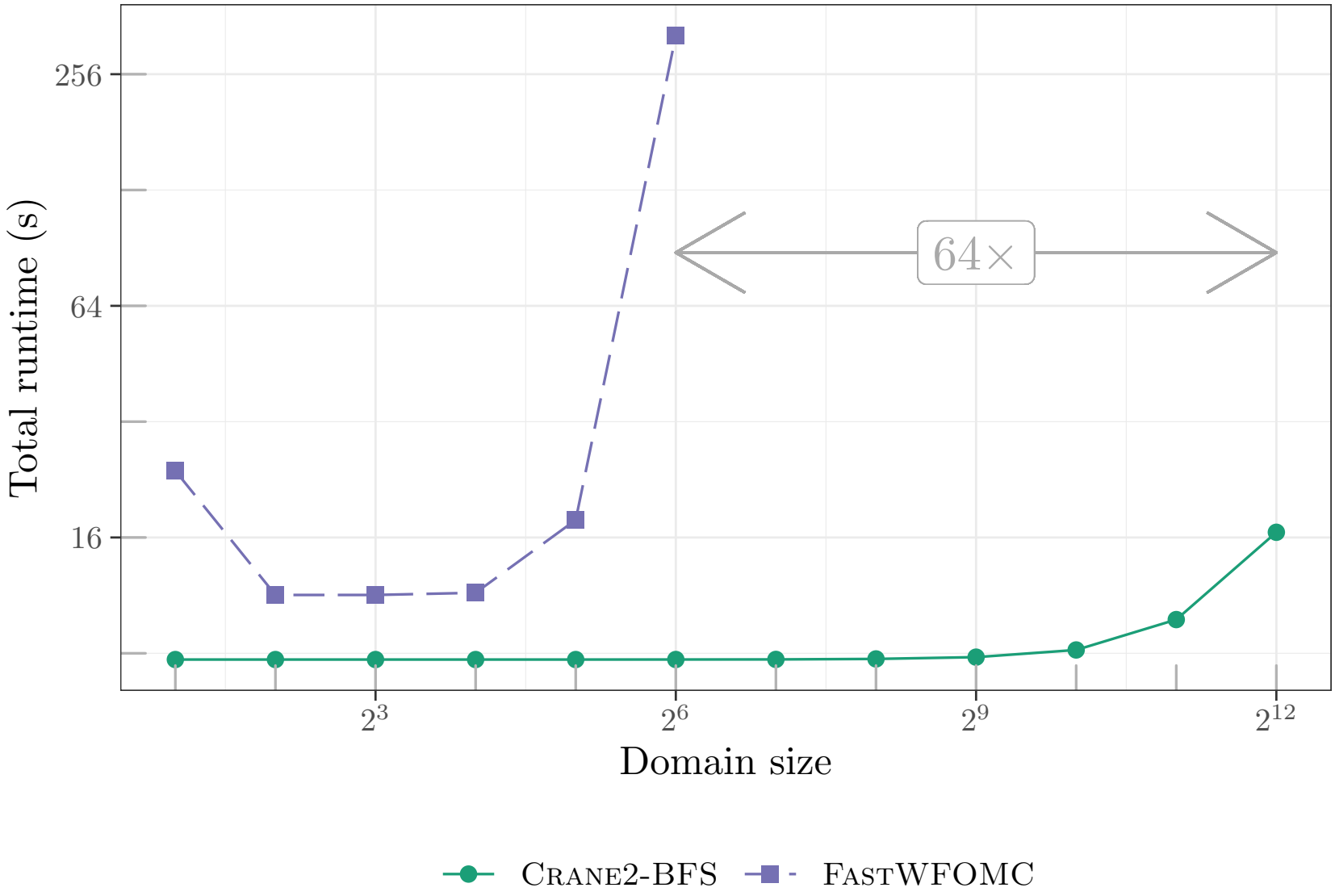
- Bijections

$$(\forall x \in \Gamma.\ \exists y \in \Delta.\ P(x,y)) \wedge$$
$$(\forall y \in \Delta.\ \exists x \in \Gamma.\ P(x,y)) \wedge$$
$$(\forall x \in \Gamma.\ \forall y, z \in \Delta.\ P(x,y) \wedge P(x,z) \to y = z) \wedge$$
$$(\forall x, z \in \Gamma.\ \forall y \in \Delta.\ P(x,y) \wedge P(z,y) \to x = z)$$

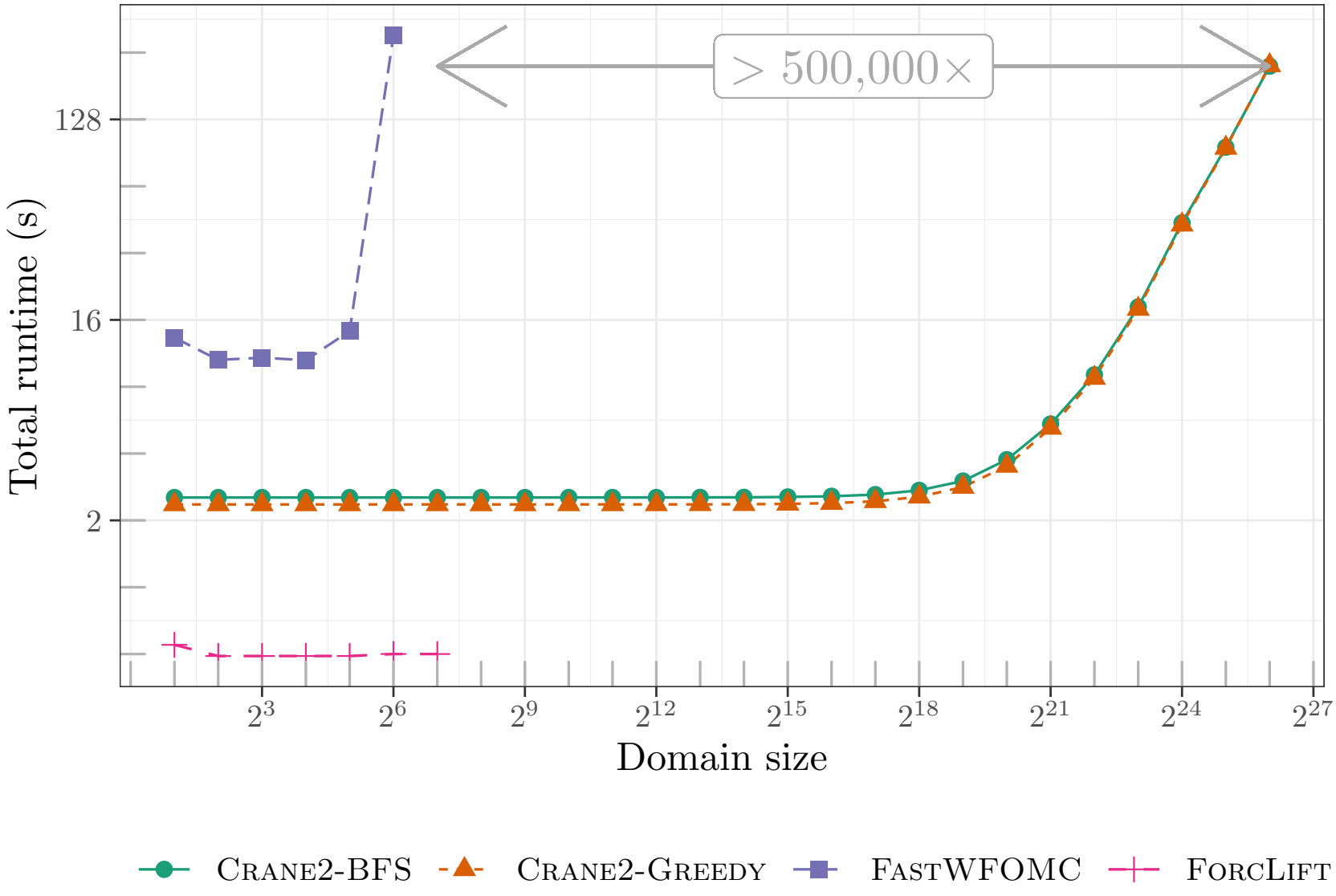
Friends & Smokers



Bijections


256
64
16
Total runtime (s)
64×
2^3
2^6
2^9
2^{12}
Domain size
Crane2-BFS
FastWFOMC

Functions


> 500,000×
128
16
2
Total runtime (s)
2^3
2^6
2^9
2^{12}
2^{15}
2^{18}
2^{21}
2^{24}
2^{27}
Domain size
Crane2-BFS
Crane2-Greedy
FastWFOMC
ForcLift