

# Global Static Analysis of Million Lines of Code

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# Theory

## A general framework for sparse analysis

$$\hat{F} : \hat{D} \rightarrow \hat{D} \quad \Rightarrow \quad \hat{F}_s : \hat{D} \rightarrow \hat{D}$$
$$\begin{array}{ccc} \vdots & & \vdots \\ \downarrow & & \downarrow \\ \text{lfp}\hat{F} & = & \text{lfp}\hat{F}_s \end{array}$$

# Practice



An industrialized static analyzer  
([www.spa-arrow.com](http://www.spa-arrow.com))

Program	LOC	Baseline		Sparse		Spd↑	Mem↓
		Time	Mem	Time	Mem		
gzip-1.2.4a	7 K	772	240	3	63	257 x	74 %
bc-1.06	13 K	1,270	276	7	75	181 x	73 %
less-382	23 K	9,561	1,113	33	127	289 x	86 %
make-3.76.1	27 K	24,240	1,391	21	114	1,154 x	92 %
wget-1.9	35 K	44,092	2,546	11	85	4,008 x	97 %
a2ps-4.14	64 K	∞	N/A	40	353	N/A	N/A
sendmail-8.13.6	130 K	∞	N/A	744	678	N/A	N/A
nethack-3.3.0	211 K	∞	N/A	16,373	5,298	N/A	N/A
emacs-22.1	399 K	∞	N/A	37,830	7,795	N/A	N/A
python-2.5.1	435 K	∞	N/A	11,039	5,535	N/A	N/A
linux-3.0	710 K	∞	N/A	33,618	20,529	N/A	N/A
gimp-2.6	959 K	∞	N/A	3,874	3,602	N/A	N/A
ghostscript-9.00	1,363 K	∞	N/A	14,814	6,384	N/A	N/A