

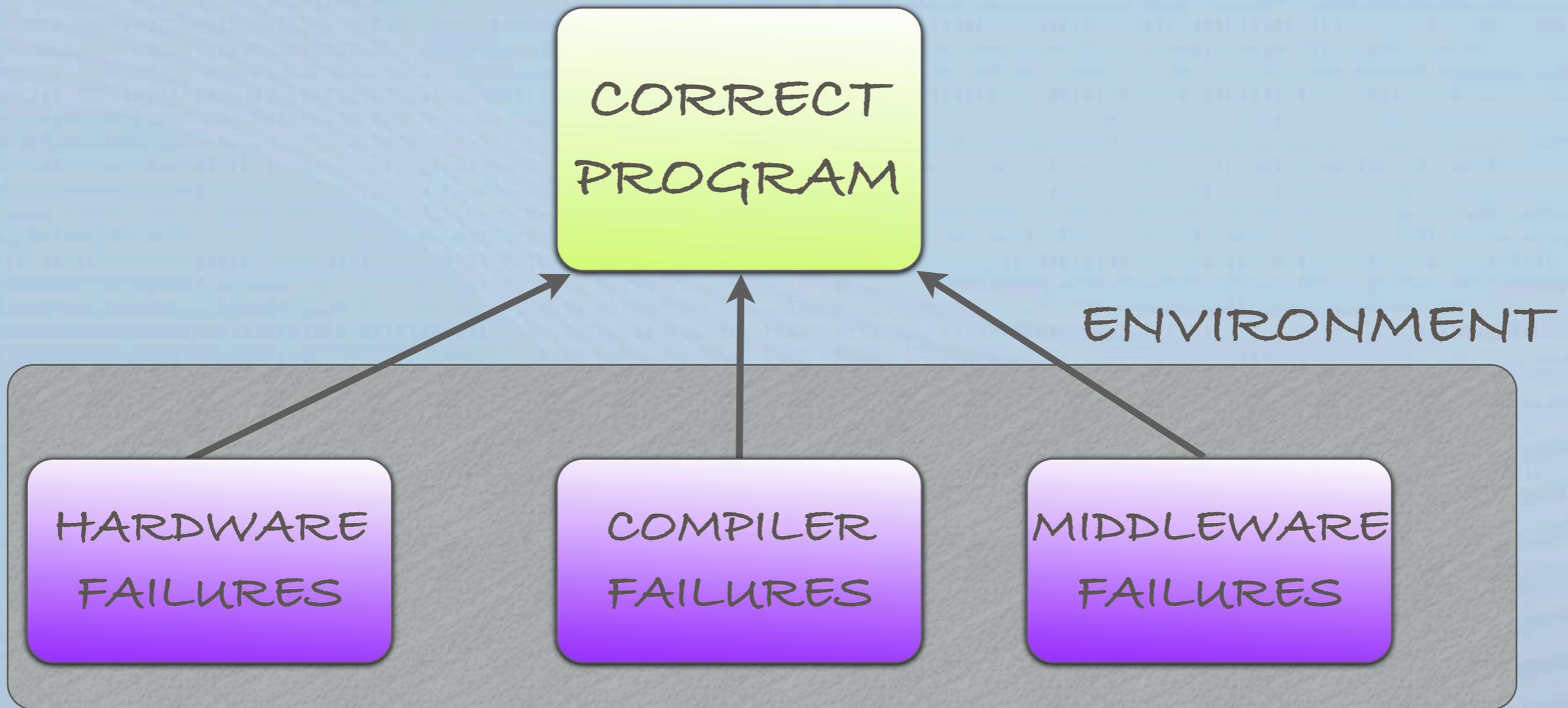
# PAREXC PARALLEL EXECUTION CHECKING

CHRISTOF FETZER

TU DRESDEN

# THREATS?

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HOW TO ENSURE CORRECT EXECUTION?

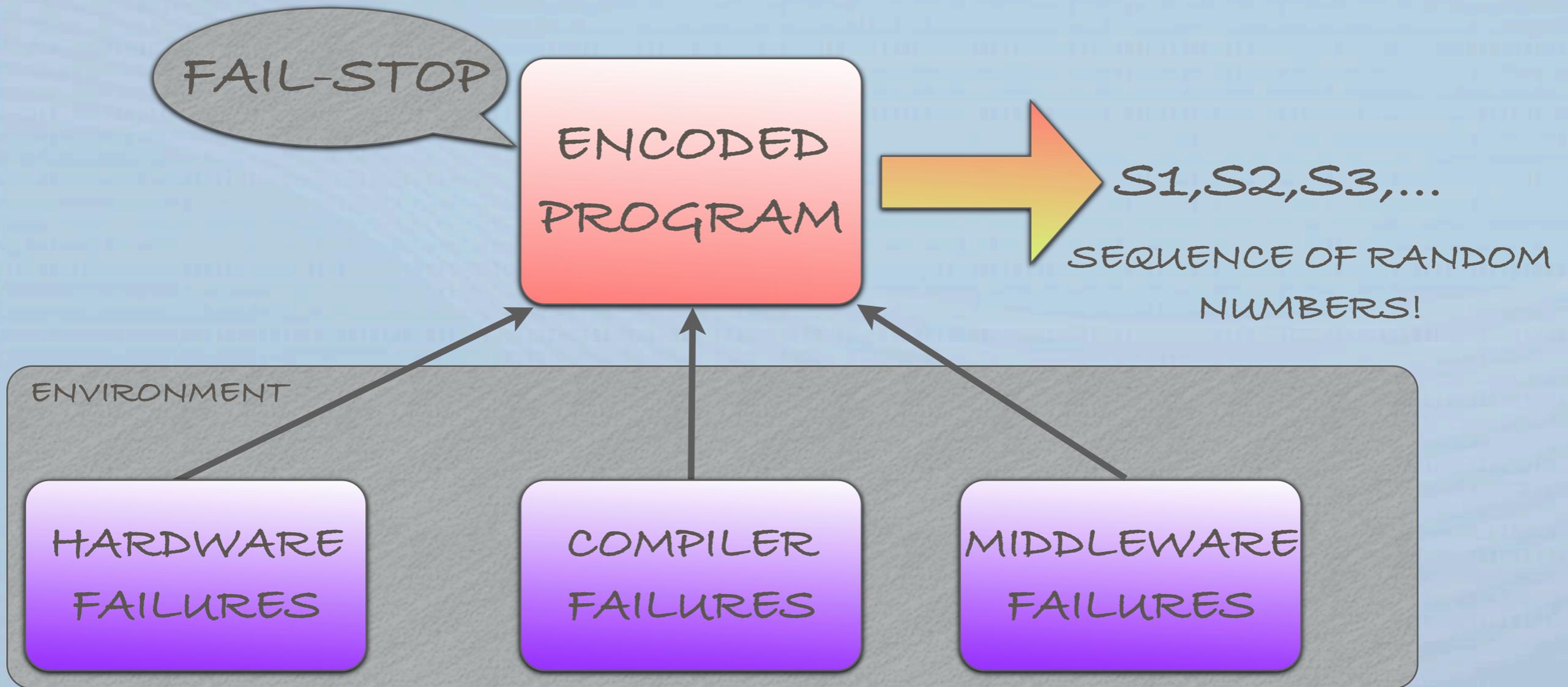
# WHAT FAILURES TO CONSIDER?

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AS WE KNOW,  
THERE ARE **KNOWN KNOWNS**.  
THERE ARE THINGS WE KNOW WE KNOW.  
WE ALSO KNOW  
THERE ARE **KNOWN UNKNOWNNS**.  
THAT IS TO SAY  
WE KNOW THERE ARE SOME THINGS  
WE DO NOT KNOW.  
BUT THERE ARE ALSO **UNKNOWN UNKNOWNNS**,  
THE ONES WE DON'T KNOW  
WE DON'T KNOW.

*Donald Rumsfeld, Feb. 12, 2002, Department of Defense news briefing*

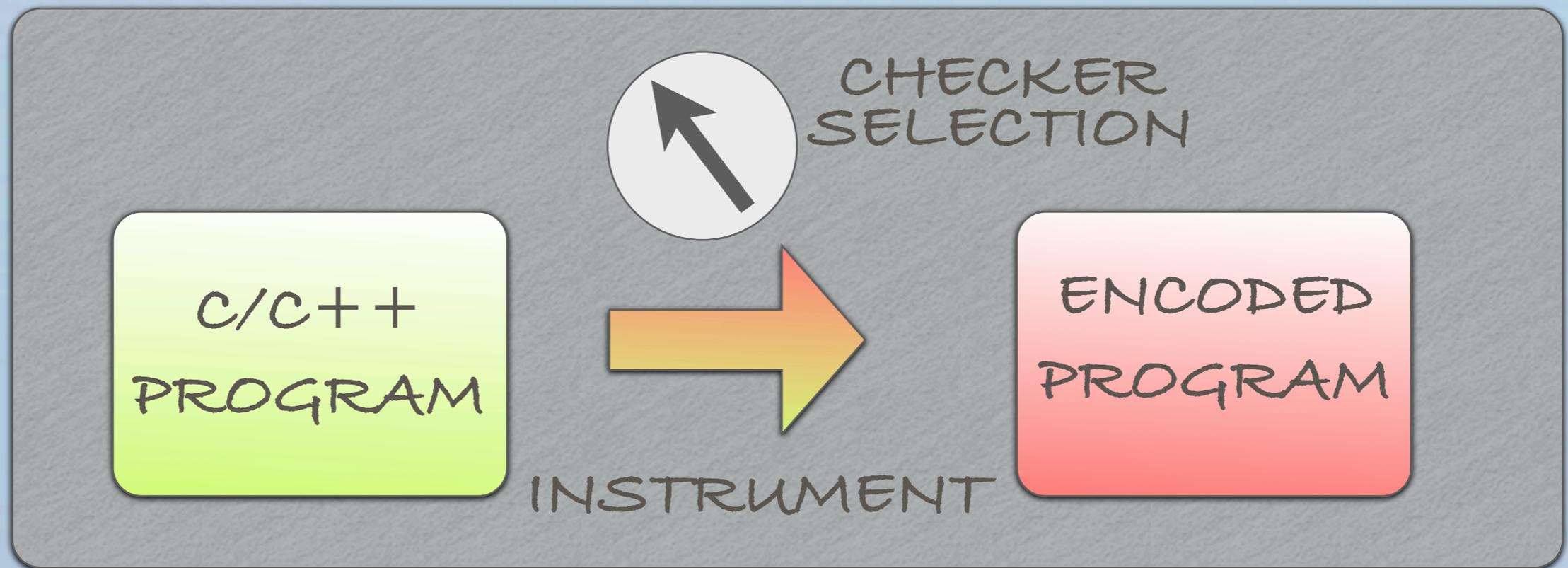
# APPROACH: ENCODE PROGRAM



GOAL: FAIL-STOP BEHAVIOR INDEPENDENT  
OF FAILURE MODEL

# APPROACH

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PAREXC

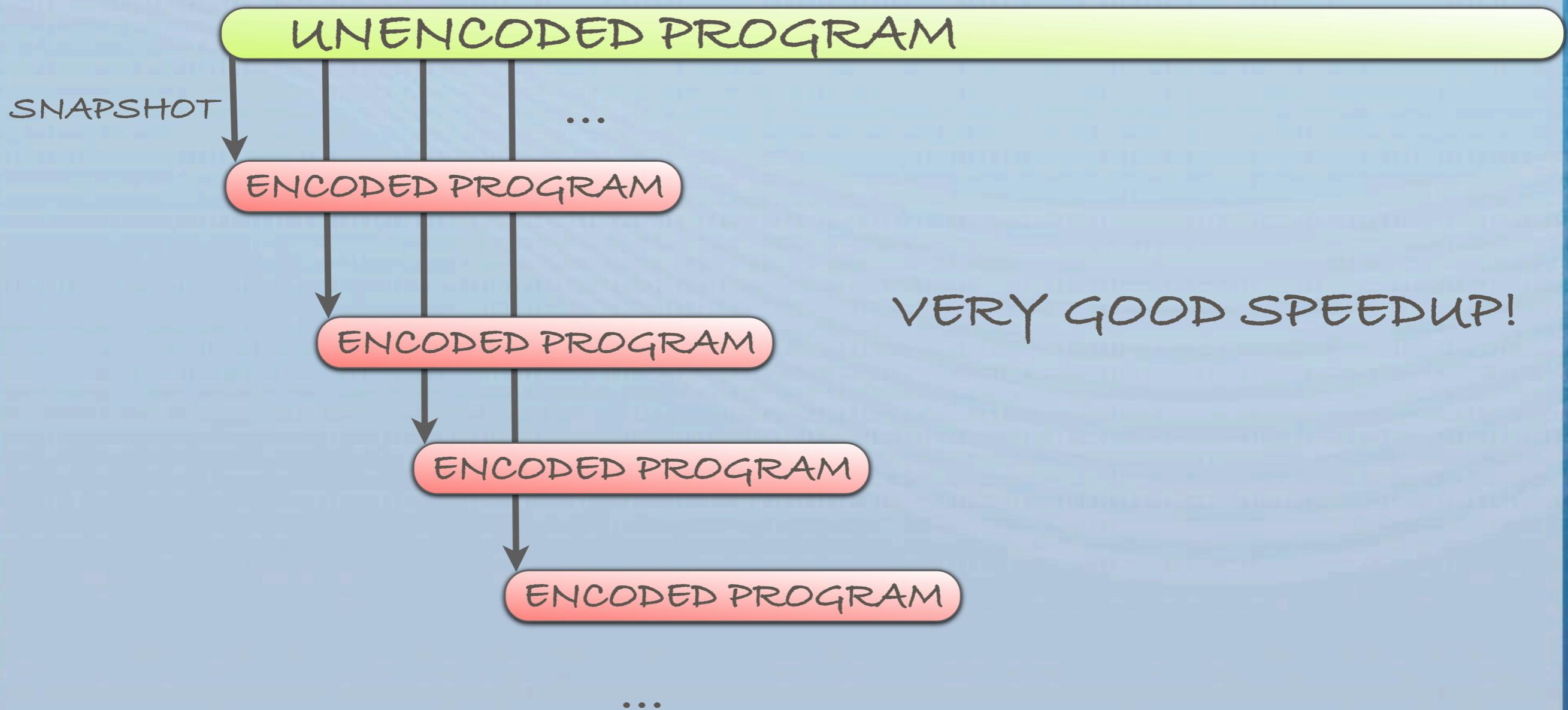
# CHECKERS

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- SUPPORT SEVERAL CODES (AND MORE):
  - $AN+B+D$ ,  $AN+B$ ,  $AN$  CODE
  - ENCODE **ALL** INSTRUCTIONS
    - NOT ONLY ARITHMETIC OPERATIONS
- SLOWDOWNS:  $O(1)$ 
  - FACTOR NON NEGLIGIBLE

# PAREXC ARCHITECTURE

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# SLOWDOWN?

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