

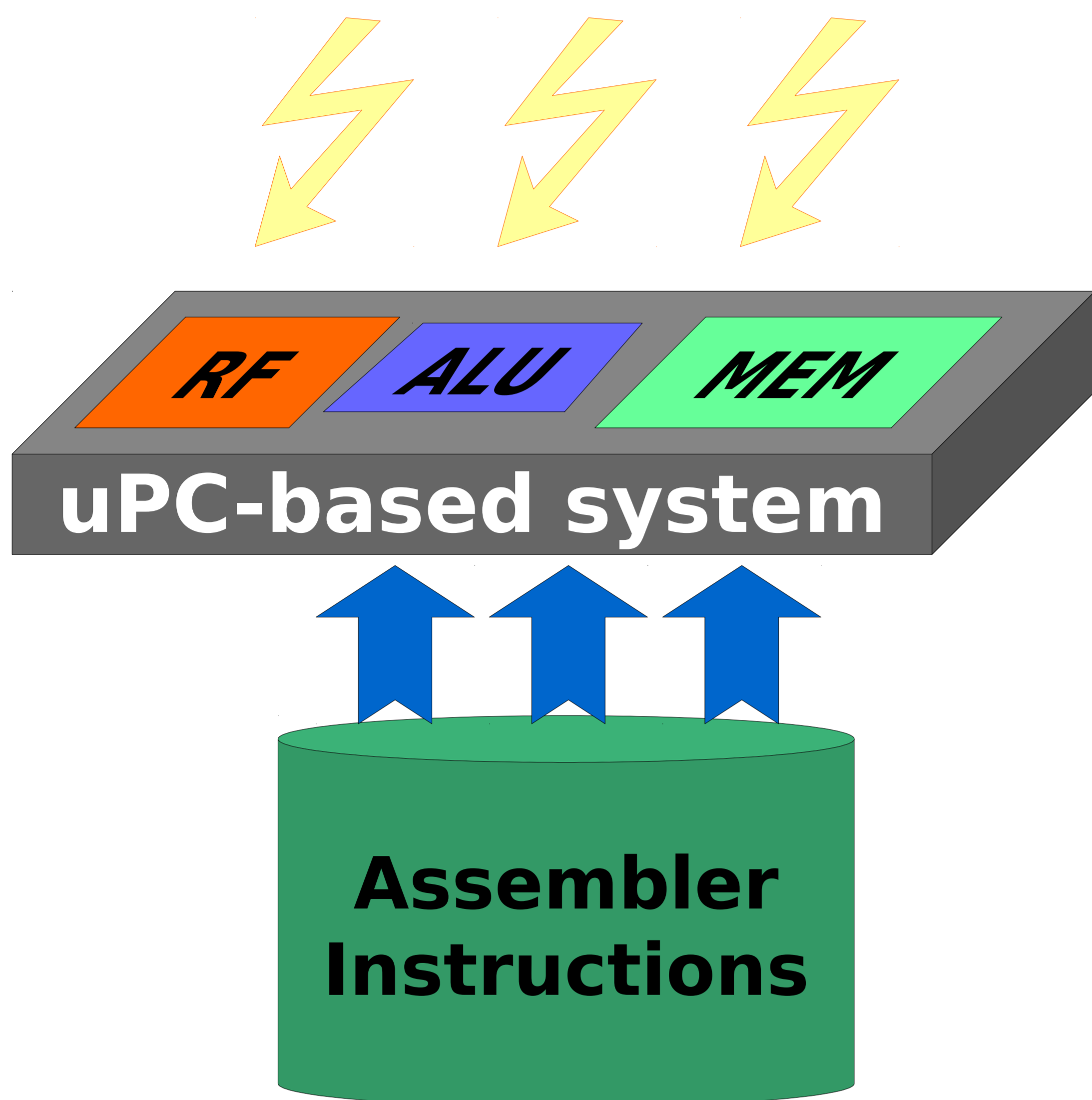
A Bayesian model for system level reliability estimation

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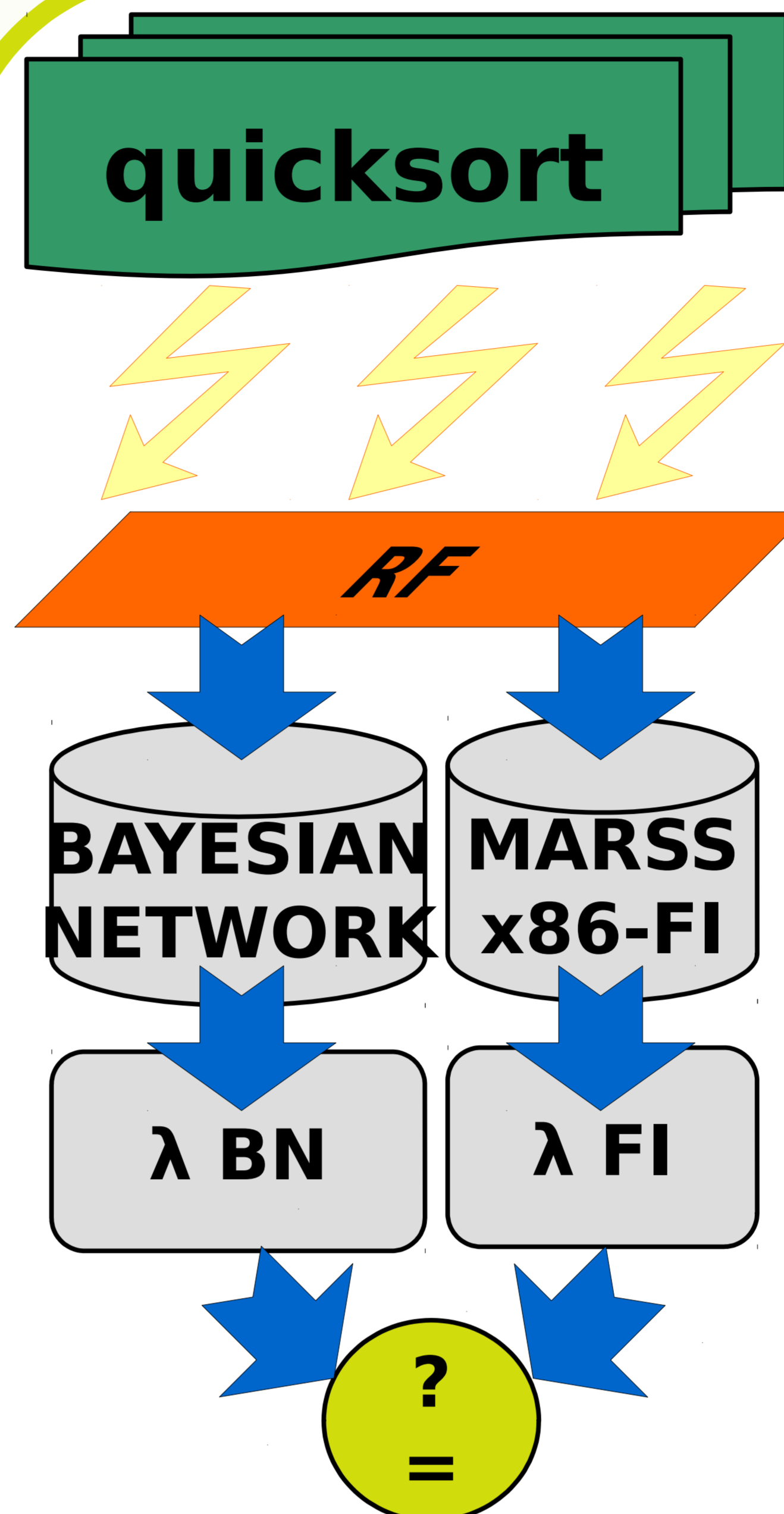
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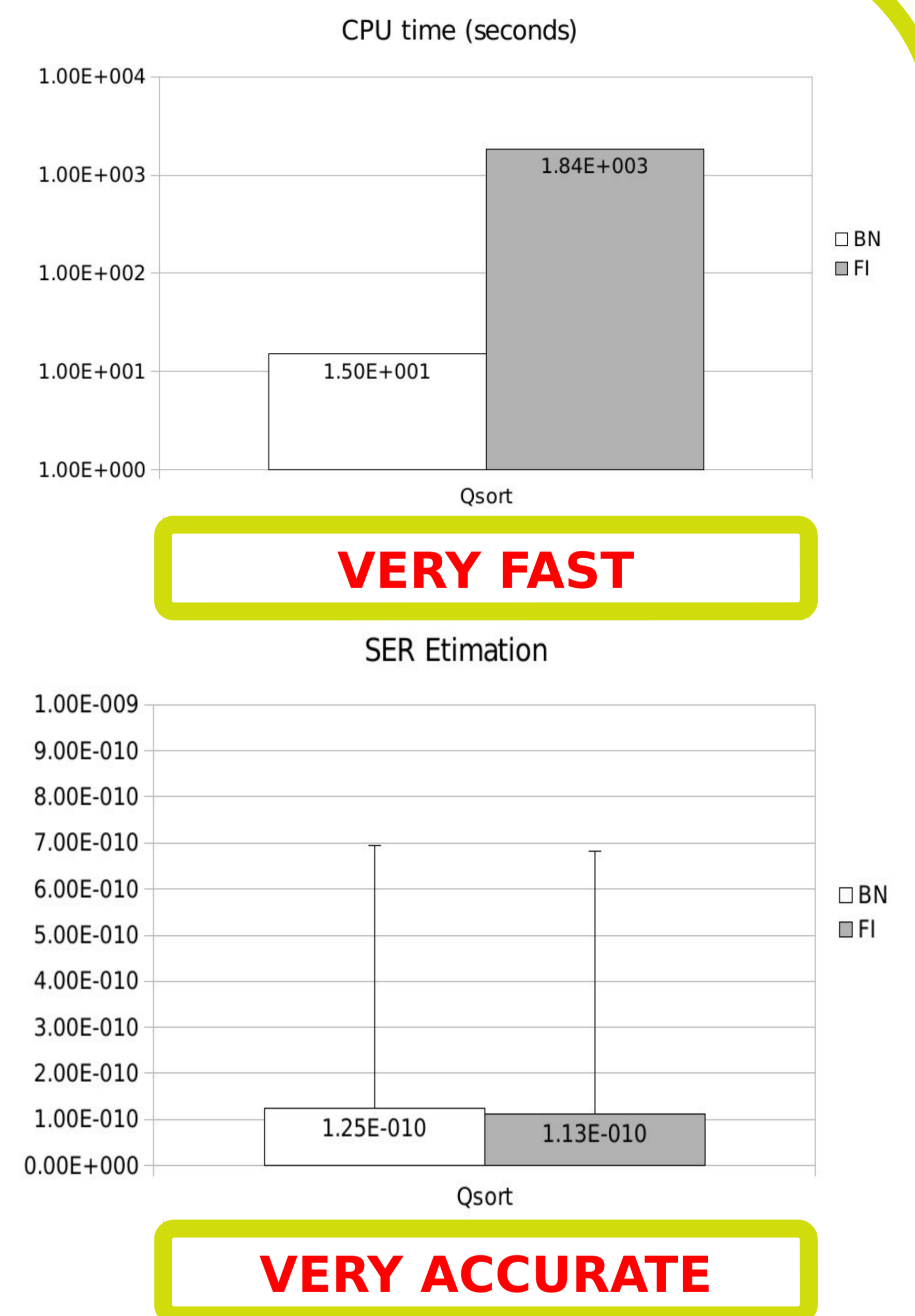
SOFT ERRORS



The Scenario



The Experimental Results



$$P(C_{AND\ I1} | \dots)$$

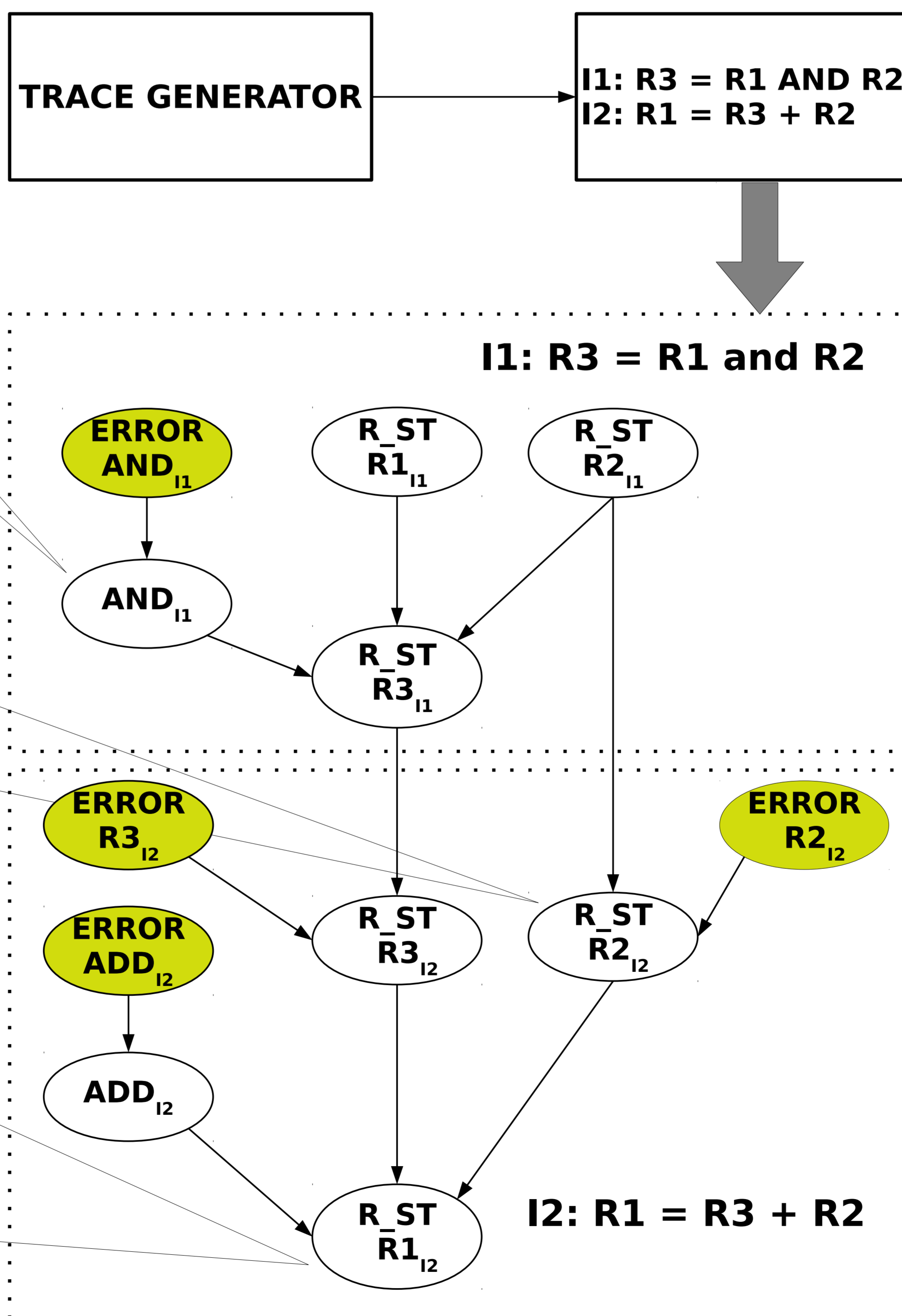
$E_{AND\ I1}$	$\bar{E}_{AND\ I1}$
1	$P(M_{AND})$

$$P(C_{R2} | \dots)$$

	\bar{E}_{R2}	E_{R2}
$R2_{I1}$	$P(M_{R2})$	1
$\bar{R2}_{I1}$	0	$P(M_{R2})$

$$P(C_{R1} | \dots)$$

	$R2_{I2}, R3_{I2}$	$R2_{I2}, \bar{R3}_{I2}$	$\bar{R2}_{I2}, R3_{I2}$	$\bar{R2}_{I2}, \bar{R3}_{I2}$
ADD_{I2}	1	$P(M_{OP\ ADD})$	$P(M_{OP\ ADD})$	0
\bar{ADD}_{I2}	0	0	0	0



The steps to build the network:

- Identify masking properties for every resource of the system.
- For each instruction executed by the uPC identify the nodes that must be added to the Bayesian Network: the involved input resources, the involved output resources and their sources of error.
- Populate the CPTs of nodes according to: input error probabilities for error nodes, error masking probabilities for the involved resources.
- Solve the Bayesian Network to compute the final probability of a fault to manifest during the execution of a trace.
- Compute the masking probability of the full system.

The Bayesian Network approach

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