Categories for Cryptographic Composability

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Advised by Angélica and Adam

Motivation

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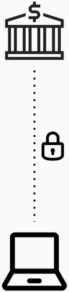

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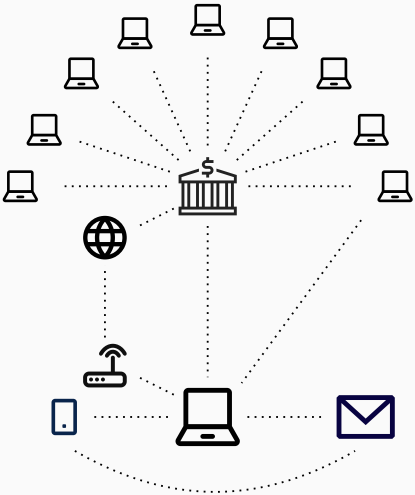

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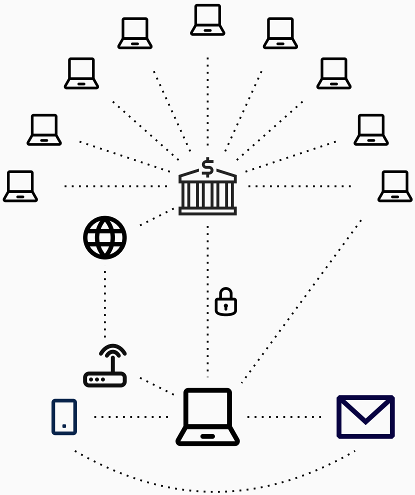

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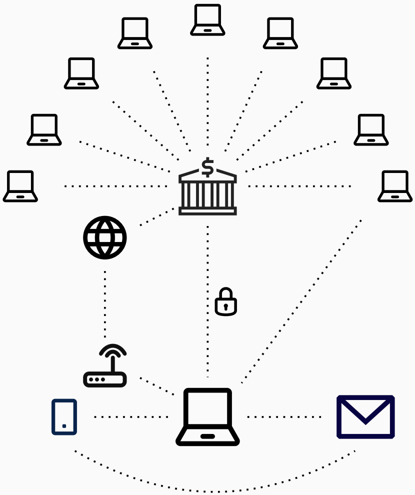
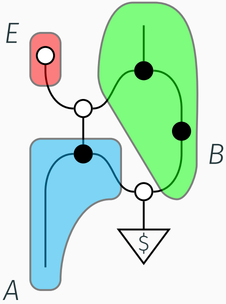


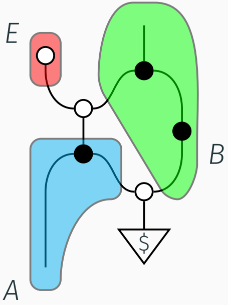
What do we need to prove about a computation in a vacuum so that it's still secure no matter what else is going on?

A Categorical Approach



[Broadbent & Karvonen 2022]

A Categorical Approach



[Broadbent & Karvonen 2022]

Our Contributions:

- Generalizing to enriched bicategories for weak reductions
- Coloring diagrams by party
- Simultaneous reasoning about single- and multi-use resources
- Correlated input
- Novel security proofs
- Heursitic comparison to UC