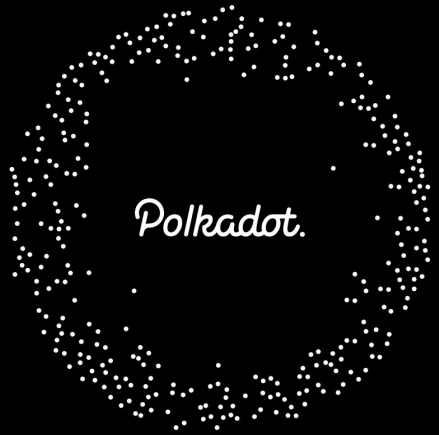


Parachains and XCMP

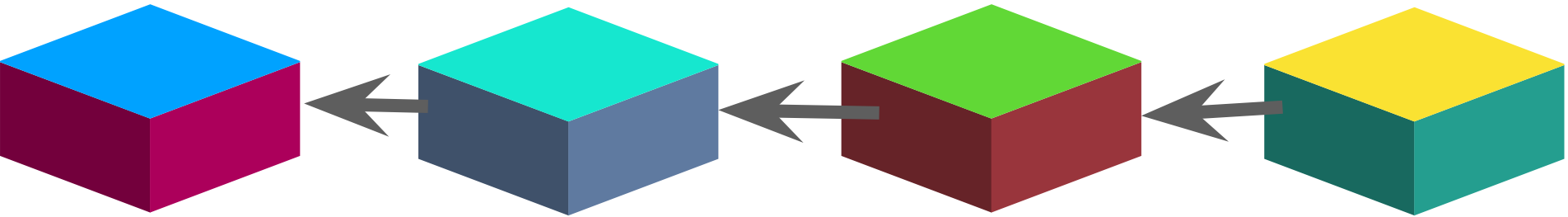
Polkadot.

Alice gives 1 bitcoin to Bob
Sue gives 0.5 bitcoin to Joe
Amy gives 3 bitcoin to Sue

Joe gives 9 bitcoin to Pam
Jay gives 5 bitcoin to Sue

Pam gives 1 bitcoin to Bob

Mo gives 1 bitcoin to Sue
Fred gives 0.5 bitcoin to Al
Sam gives 7 bitcoin to Lynn



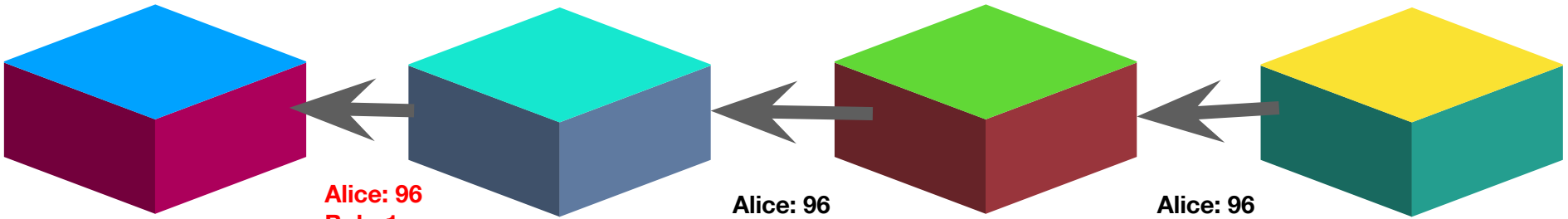
Polkadot.

Alice gives 1 bitcoin to Bob
Sue gives 0.5 bitcoin to Joe
Alice gives 3 bitcoin to Sue

Joe gives 9 bitcoin to Pam
Jay gives 5 bitcoin to Sue

Pam gives 1 bitcoin to Bob

Mo gives 1 bitcoin to Sue
Fred gives 0.5 bitcoin to Al
Sam gives 7 bitcoin to Lynn



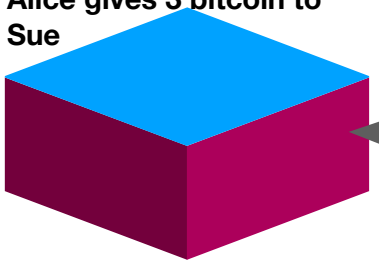
Alice: 96
Bob: 1
Sue: 3
Joe: 10
Pam: 0
Jay: 10

Alice: 96
Bob: 1
Sue: 3
Joe: 1
Pam: 9
Jay: 5
Sue: 6

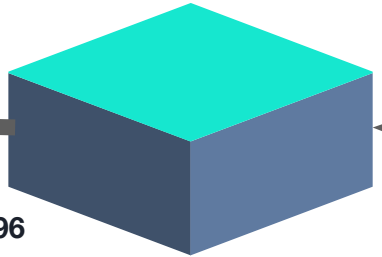
Alice: 96
Bob: 2
Sue: 3
Joe: 1
Pam: 8
Jay: 5
Sue: 6

Polkadot.

Alice gives 1 bitcoin to Bob
Sue gives 0.5 bitcoin to Joe
Alice gives 3 bitcoin to Sue

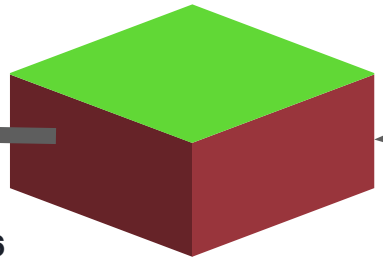


Joe gives 9 bitcoin to Pam
Jay gives 5 bitcoin to Sue
~~Bob gives 100 bitcoin to Sue~~



Alice: 96
Bob: 1
Sue: 3
Joe: 10
Pam: 0
Jay: 10

Pam gives 1 bitcoin to Bob

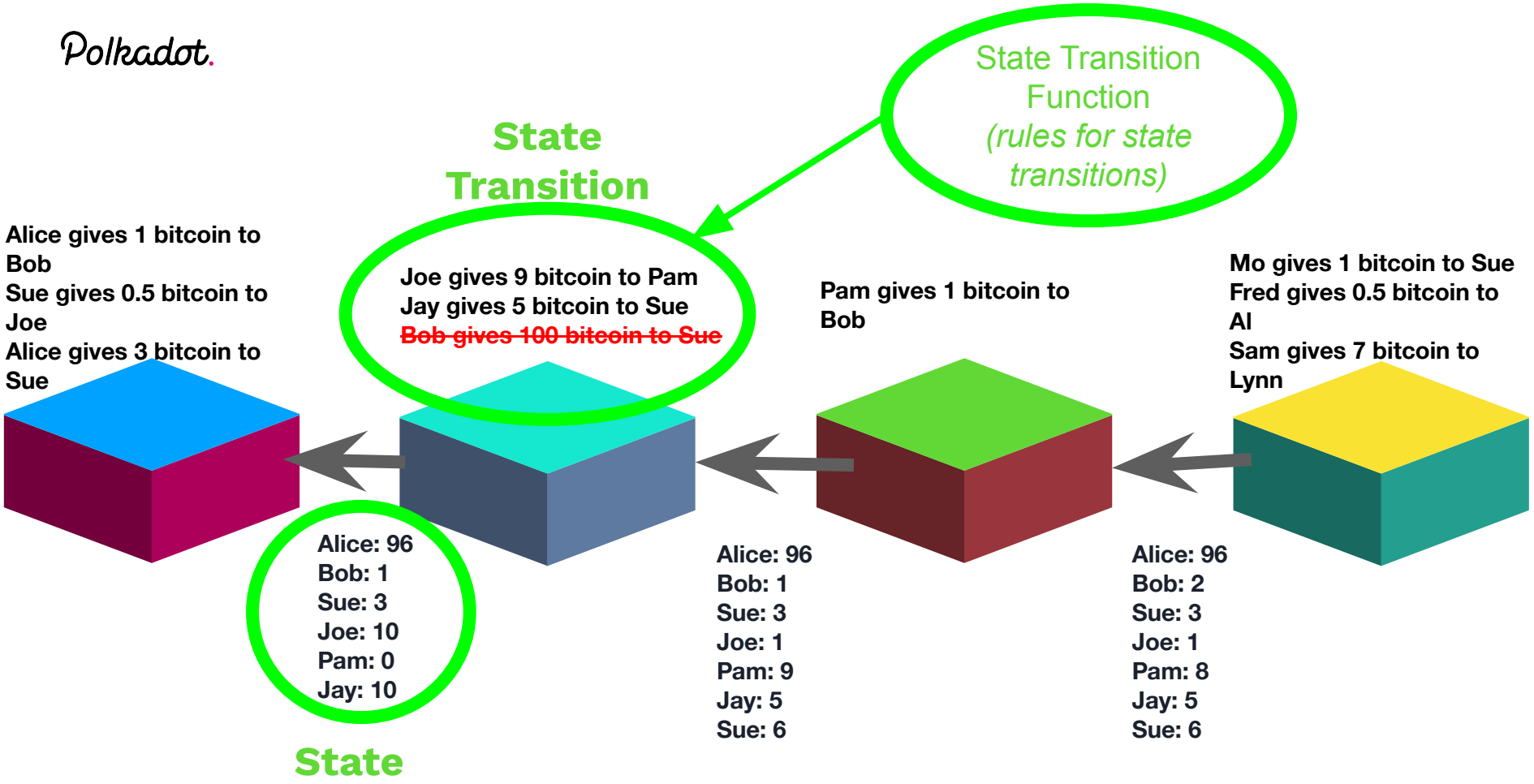


Alice: 96
Bob: 1
Sue: 3
Joe: 1
Pam: 9
Jay: 5
Sue: 6

Mo gives 1 bitcoin to Sue
Fred gives 0.5 bitcoin to Al
Sam gives 7 bitcoin to Lynn

Alice: 96
Bob: 2
Sue: 3
Joe: 1
Pam: 8
Jay: 5
Sue: 6

Polkadot.


State Transition Function
(rules for state transitions)
State Transition
Alice gives 1 bitcoin to Bob
Sue gives 0.5 bitcoin to Joe
Alice gives 3 bitcoin to Sue
Joe gives 9 bitcoin to Pam
Jay gives 5 bitcoin to Sue
~~Bob gives 100 bitcoin to Sue~~
Pam gives 1 bitcoin to Bob
Mo gives 1 bitcoin to Sue
Fred gives 0.5 bitcoin to Al
Sam gives 7 bitcoin to Lynn
Alice: 96
Bob: 1
Sue: 3
Joe: 10
Pam: 0
Jay: 10
Alice: 96
Bob: 1
Sue: 3
Joe: 1
Pam: 9
Jay: 5
Sue: 6
Alice: 96
Bob: 2
Sue: 3
Joe: 1
Pam: 8
Jay: 5
Sue: 6
State

Polkadot Architecture:

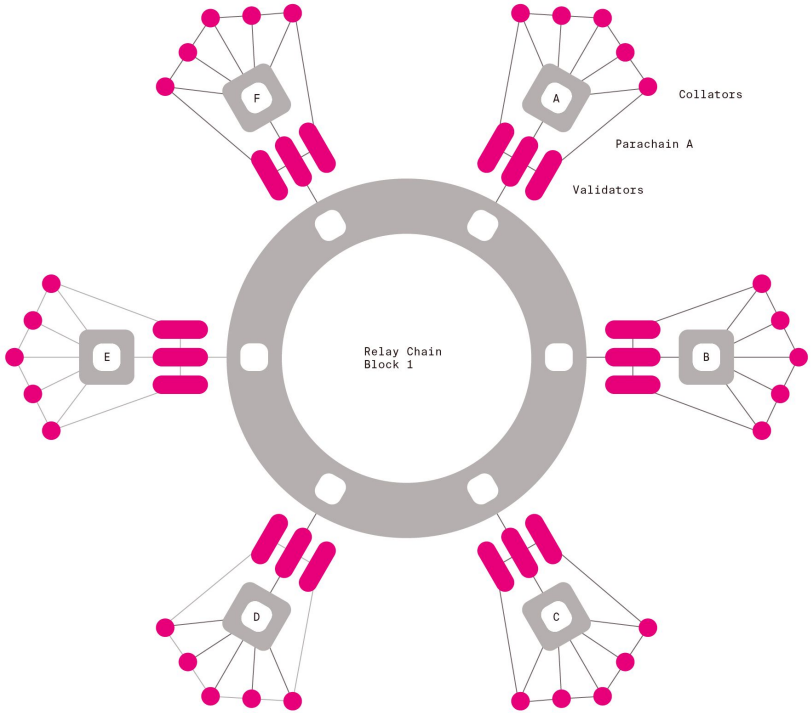
Polkadot.

RELAY CHAIN

The connector chain of Polkadot that provides strong economic security and an interoperability protocol.

PARACHAINS / PARATHREADS

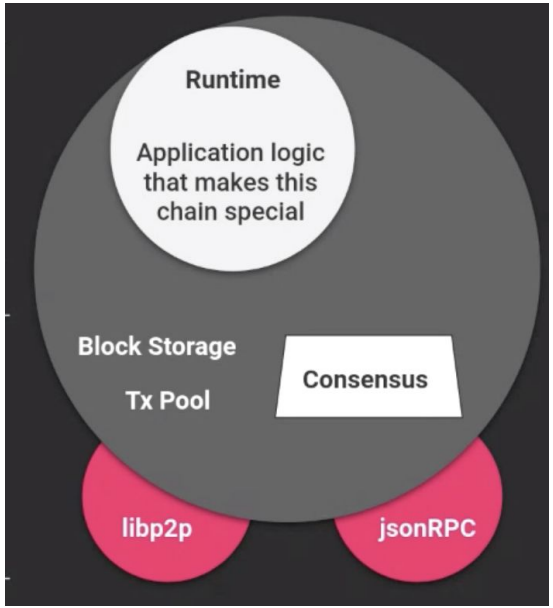
Third-party chains that connect to Polkadot for interoperability, scalability, and pooled security.



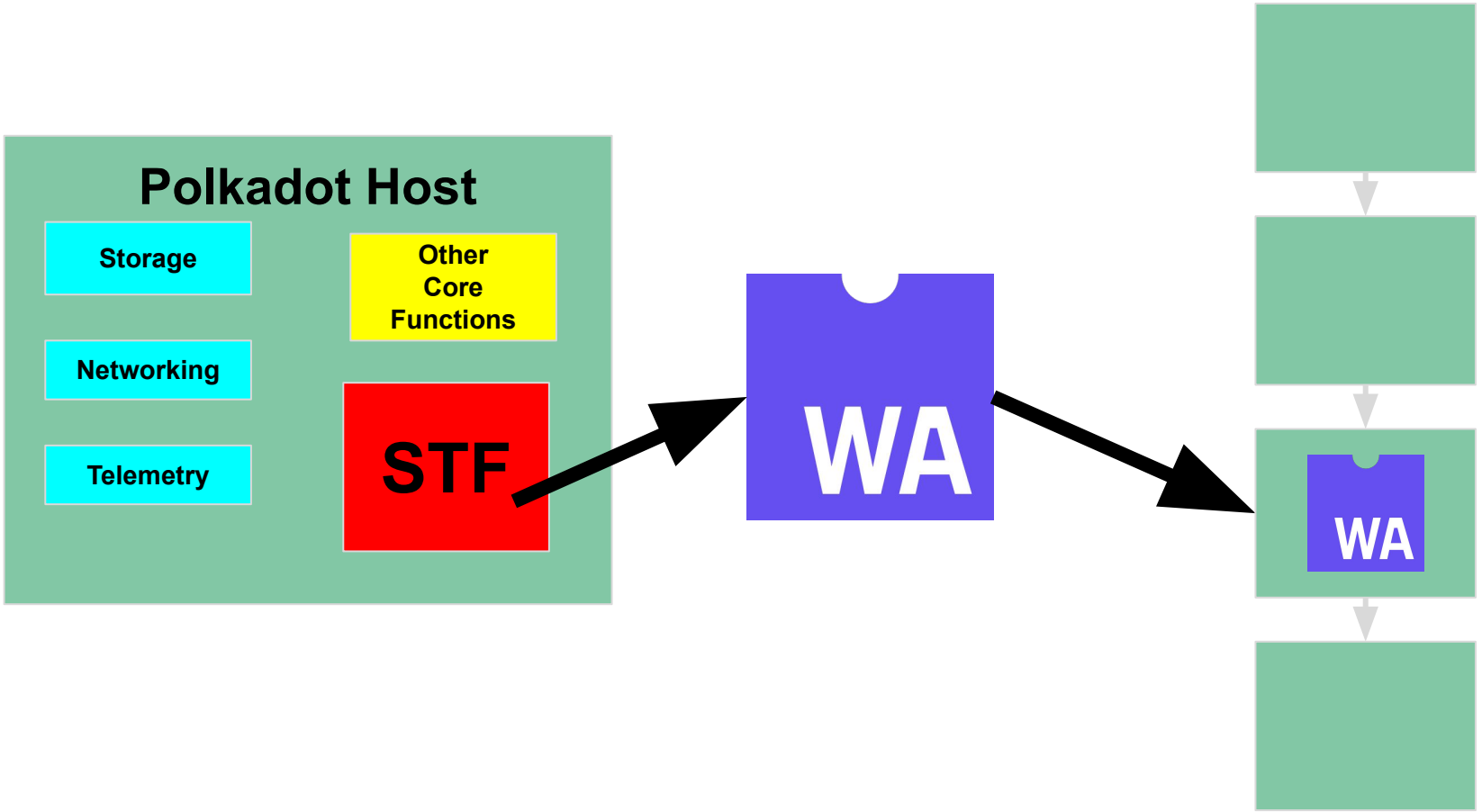
Polkadot. Parachains

With Polkadot, anyone can build a blockchain with a state transition function defined as a WebAssembly blob.

Using Substrate, you get other ancillary features (like networking and consensus) for “free” - you don’t have to write code for this, but rather focus on what makes your chain unique (e.g. governance, tokenomics, smart contract virtual machines, etc.)

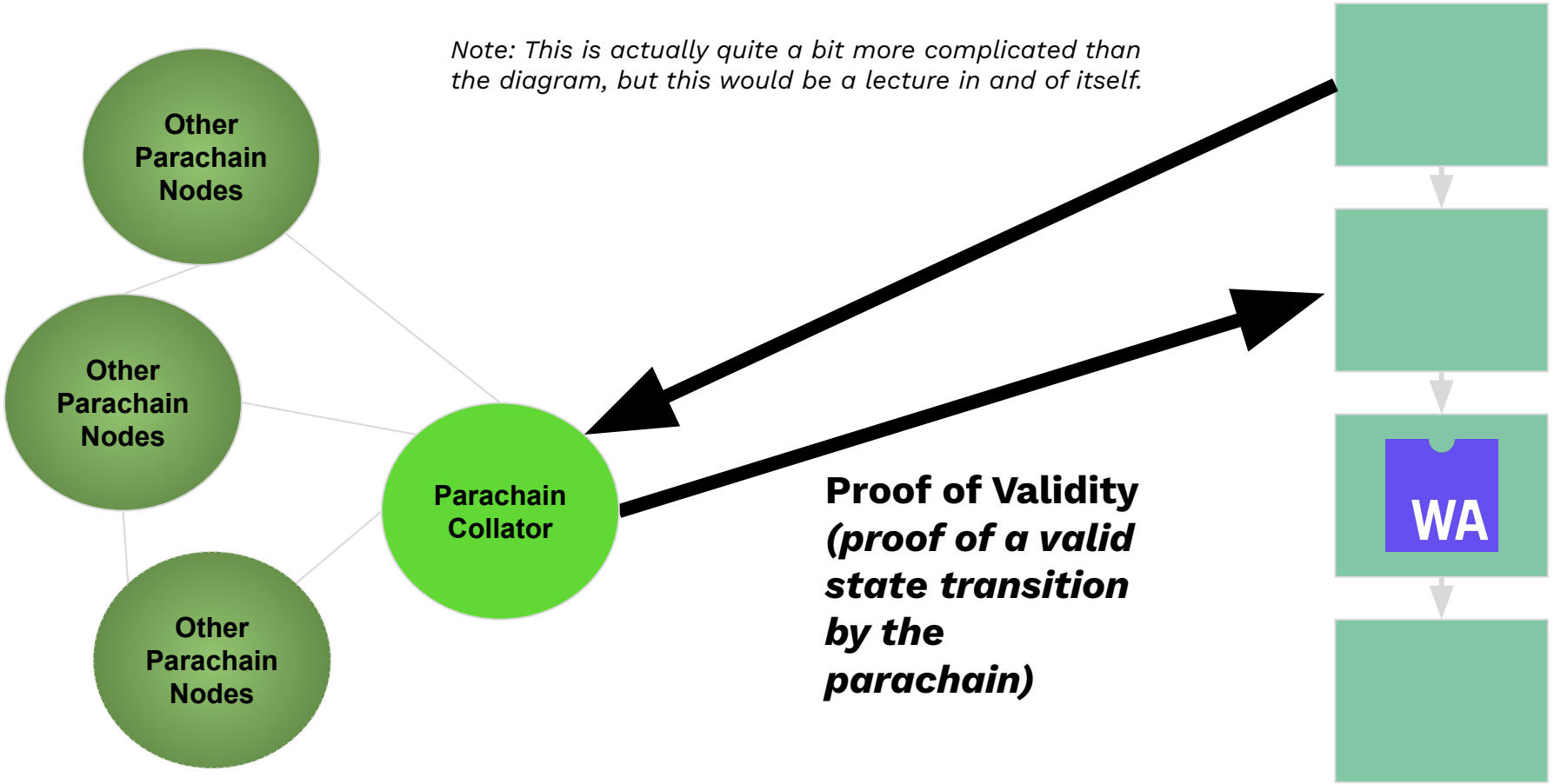


Polkadot.


Polkadot Host
Storage
Other
Core
Functions
Networking
STF
Telemetry
WA
WA

Polkadot.

Note: This is actually quite a bit more complicated than the diagram, but this would be a lecture in and of itself.



Polkadot.

So the question is...
why is this interesting?

Polkadot.

It allows heterogeneous chains to easily and securely communicate and interact with each other.

Polkadot.

Communication can occur through X-Chain Messaging Protocol -

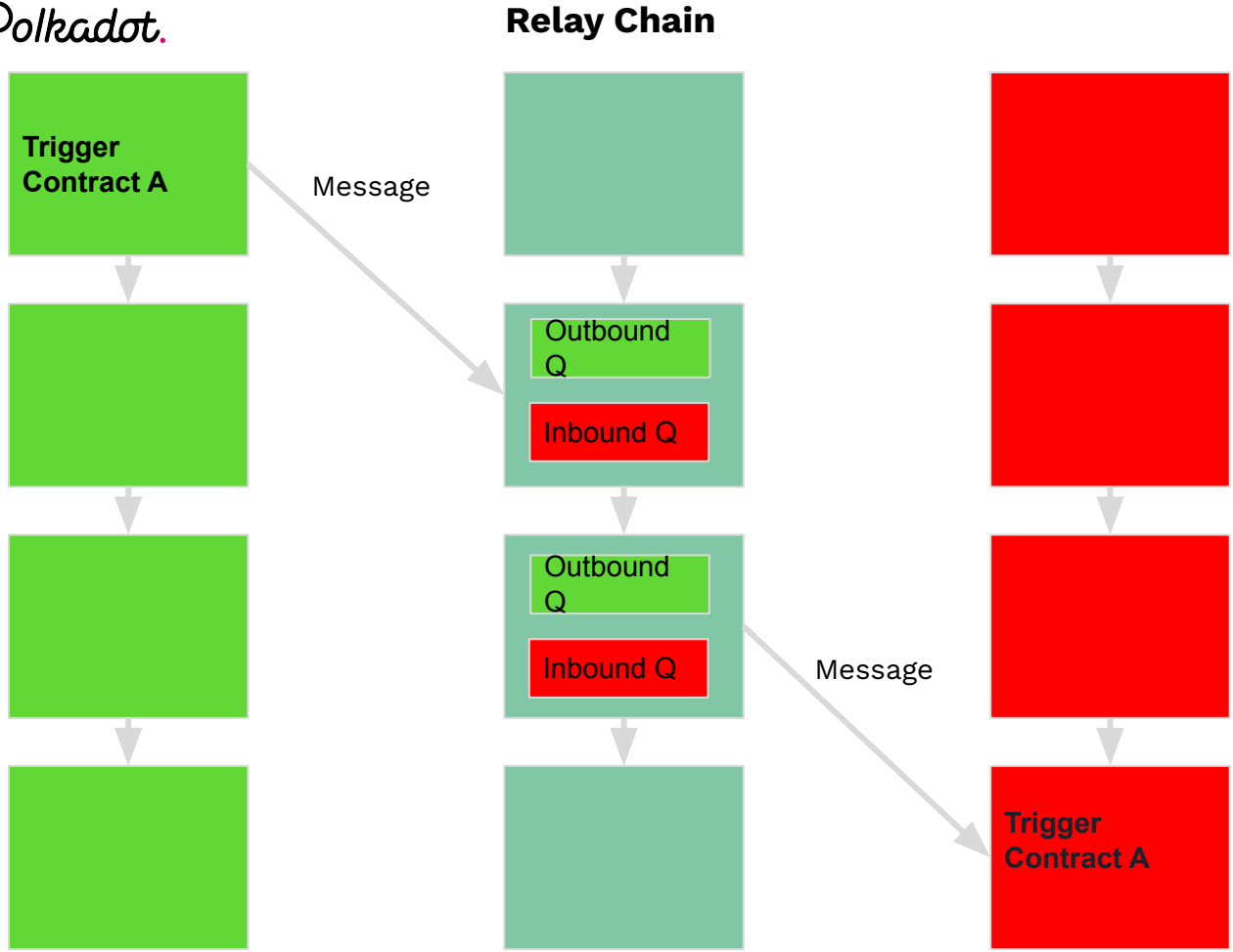
XCMP

Polkadot.

Simple Version:

XCMP-Lite (HRMP)

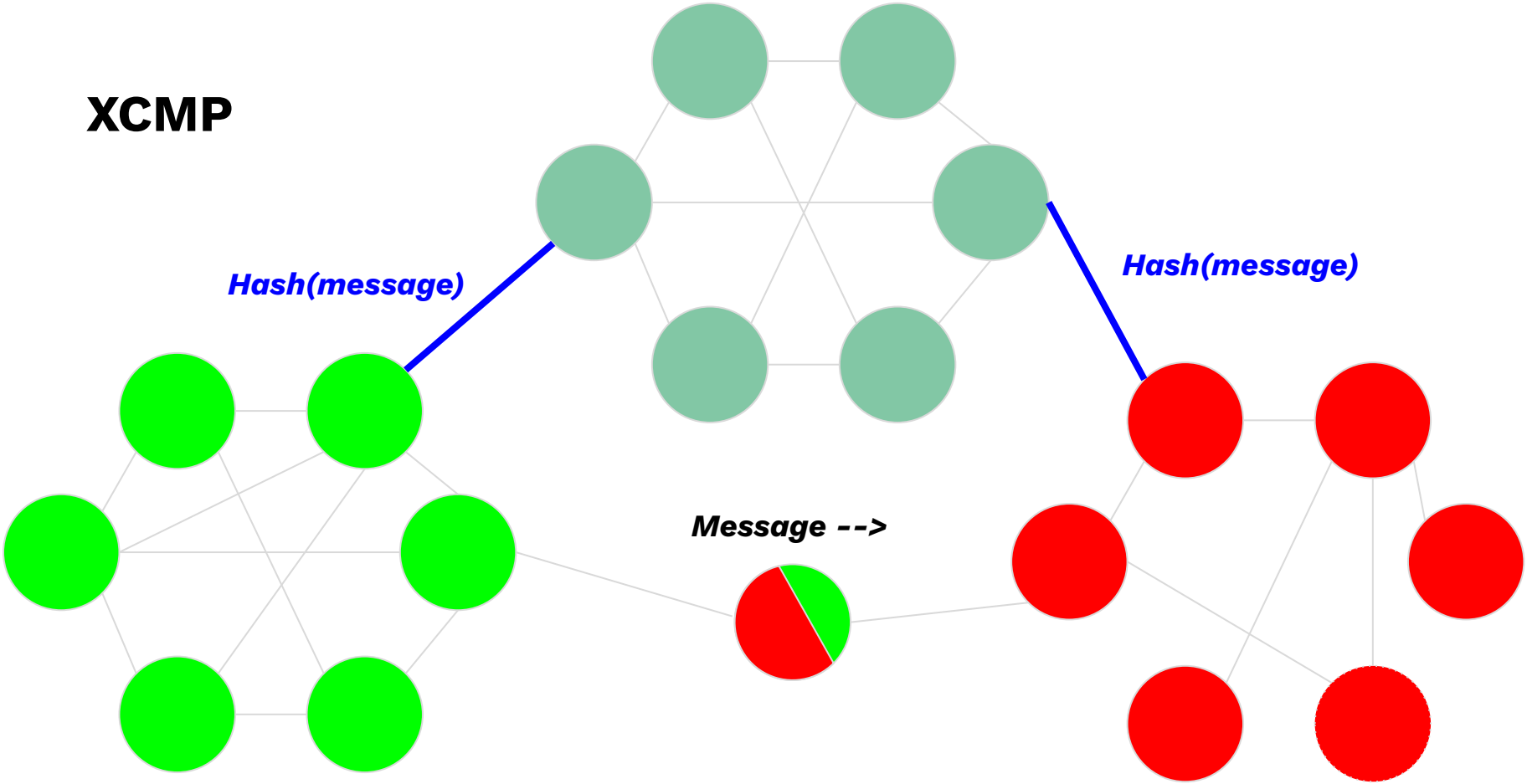
Polkadot.



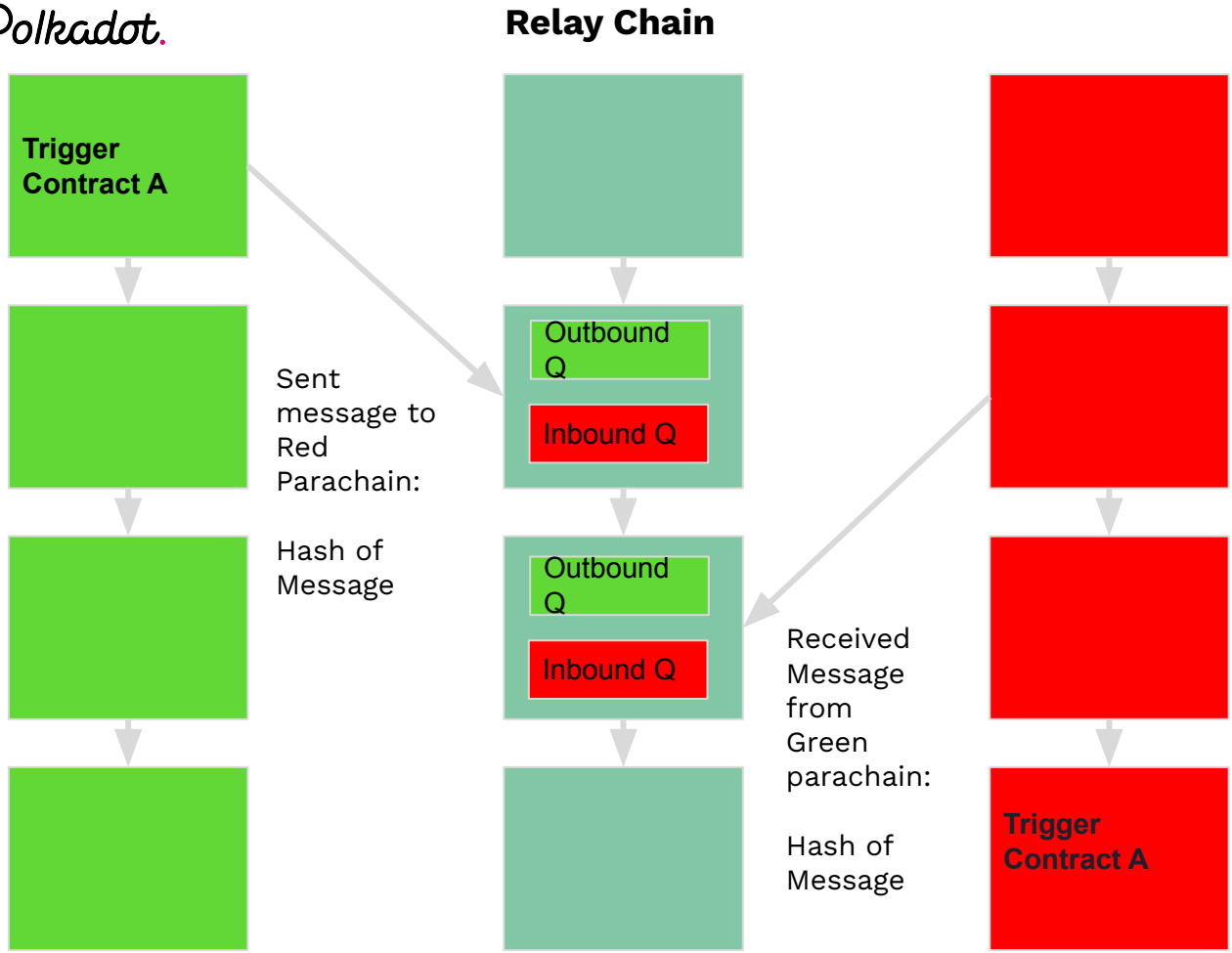
Since parachains "Red" and "Green" depend on consensus of the Relay Chain, we can guarantee delivery as long as there is continued block production and finalization on these chains.

Polkadot.

XCMP



Polkadot.



If Red parachain does not receive the message after a certain number of blocks, it can fall back to requesting the message through HRMP (XCMP-Lite, i.e., directly through the relay chain)