🌈 The Rainbow Network

Dan Robinson

Paradigm

Features

Features

- Hold synthetic assets (USD, ETH, S+P 500, gold…) on the Lightning Network

Features

- Hold synthetic assets (USD, ETH, S+P 500, gold…) on the Lightning Network
- Trade, lend, borrow, and short assets, entirely off-chain

Features

- Hold synthetic assets (USD, ETH, S+P 500, gold…) on the Lightning Network
- Trade, lend, borrow, and short assets, entirely off-chain
- No trusted oracle

Prior work

Prior work

- Many synthetic asset projects on Ethereum (Maker, UMA…)

Prior work

- Many synthetic asset projects on Ethereum (Maker, UMA…)
- Discreet log contracts (Dryja et al.)

Prior work

- Many synthetic asset projects on Ethereum (Maker, UMA…)
- Discreet log contracts (Dryja et al.)
    - Oracle-based derivatives on Bitcoin

Prior work

- Many synthetic asset projects on Ethereum (Maker, UMA…)
- Discreet log contracts (Dryja et al.)
    - Oracle-based derivatives on Bitcoin
- Similar construction explored before by Vitalik Buterin

Channels

Channels

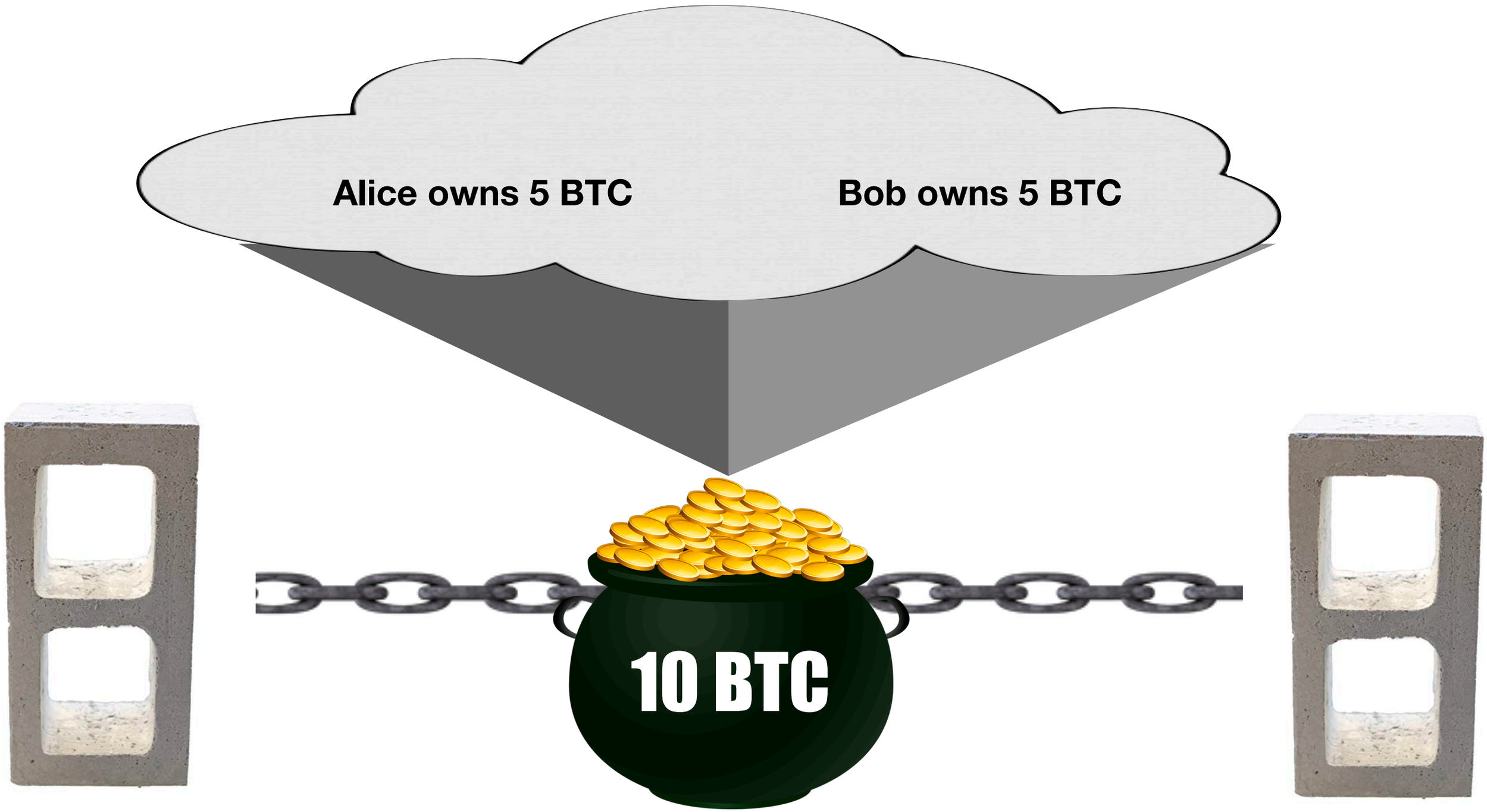
Channels

Channels

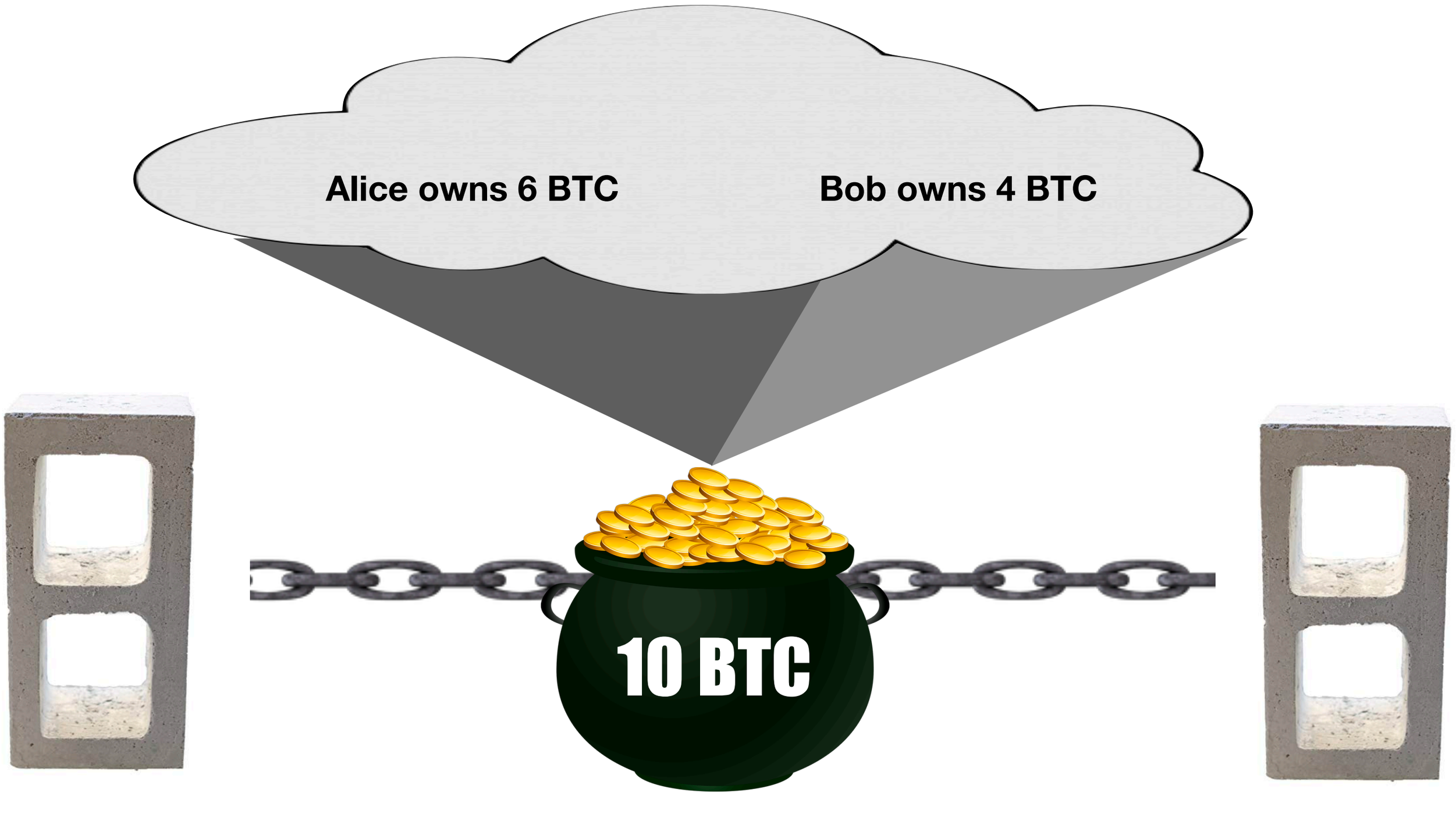
Channels

Channels

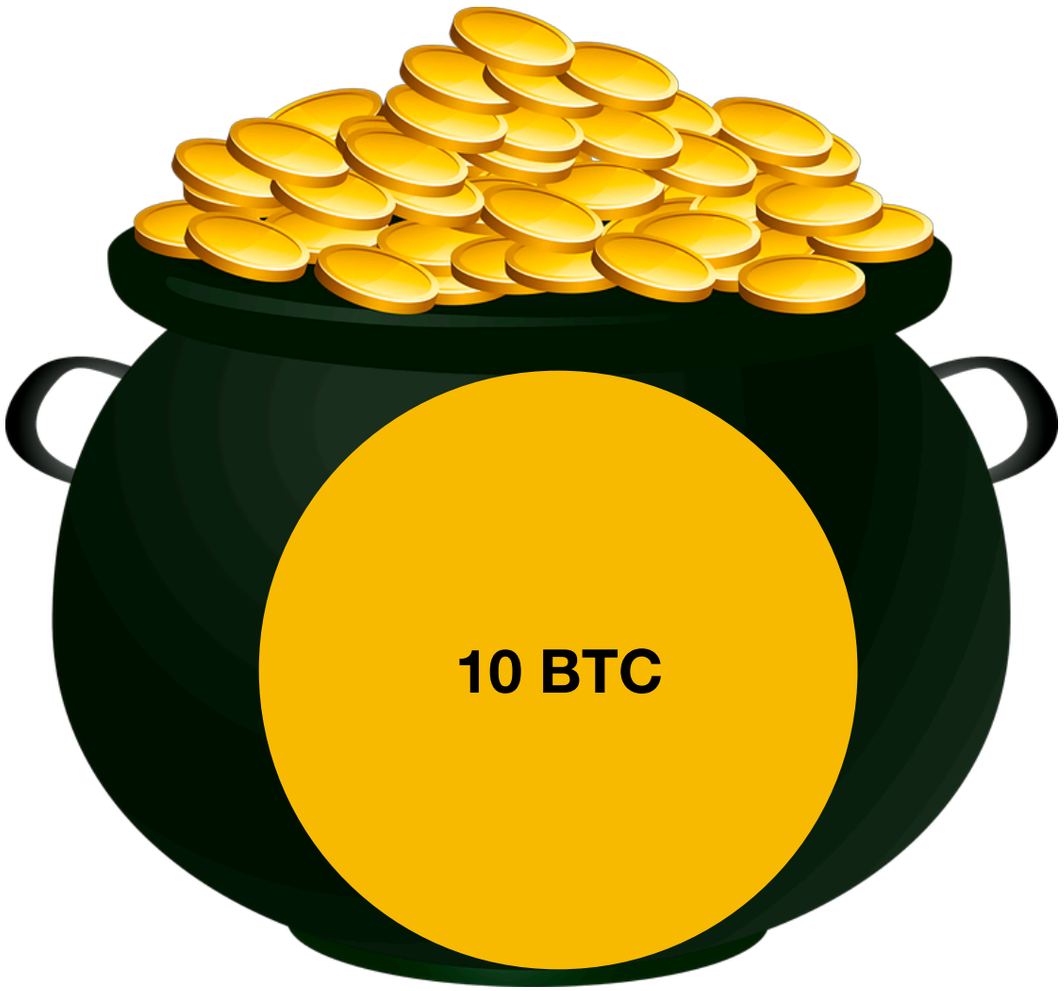
Channels



Channels



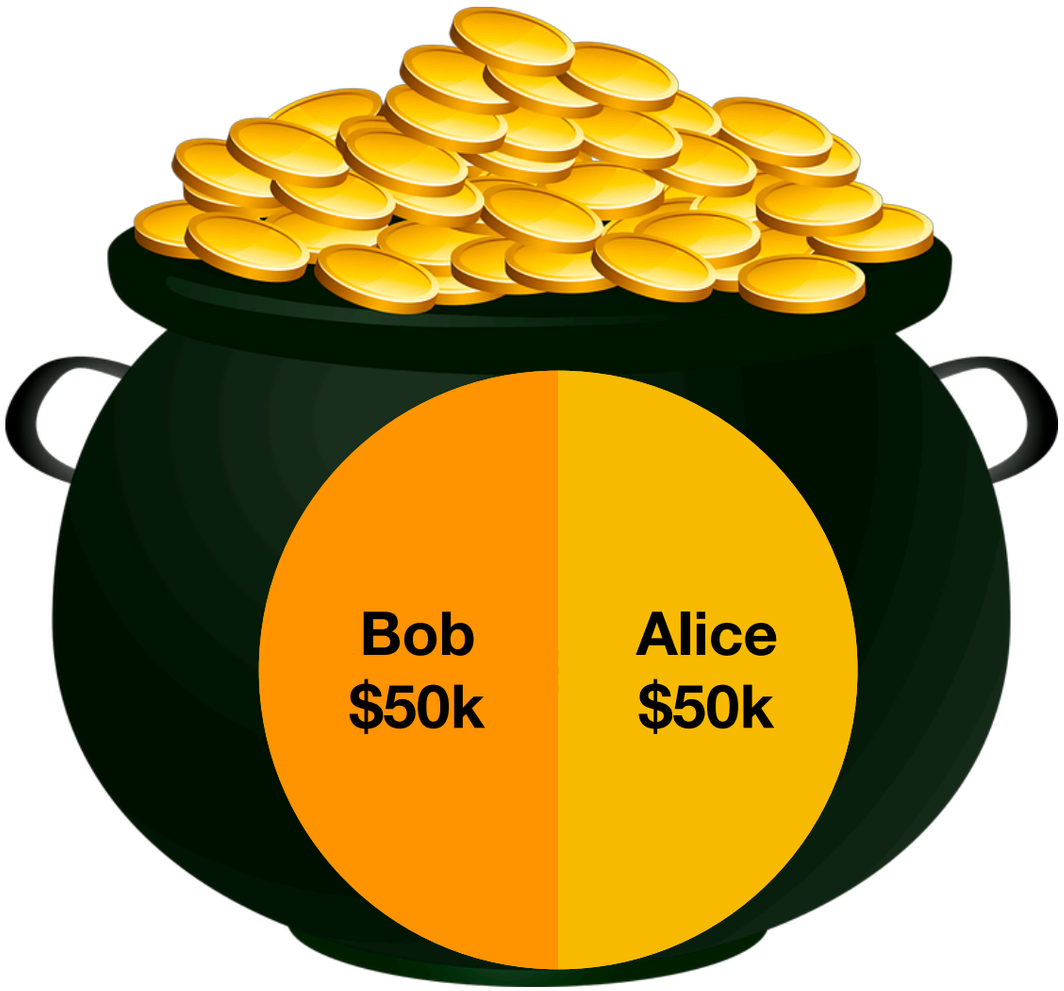
Synthetics



10 BTC collateral

Synthetics

1 Bitcoin $180,956,881,524 $10,000.00

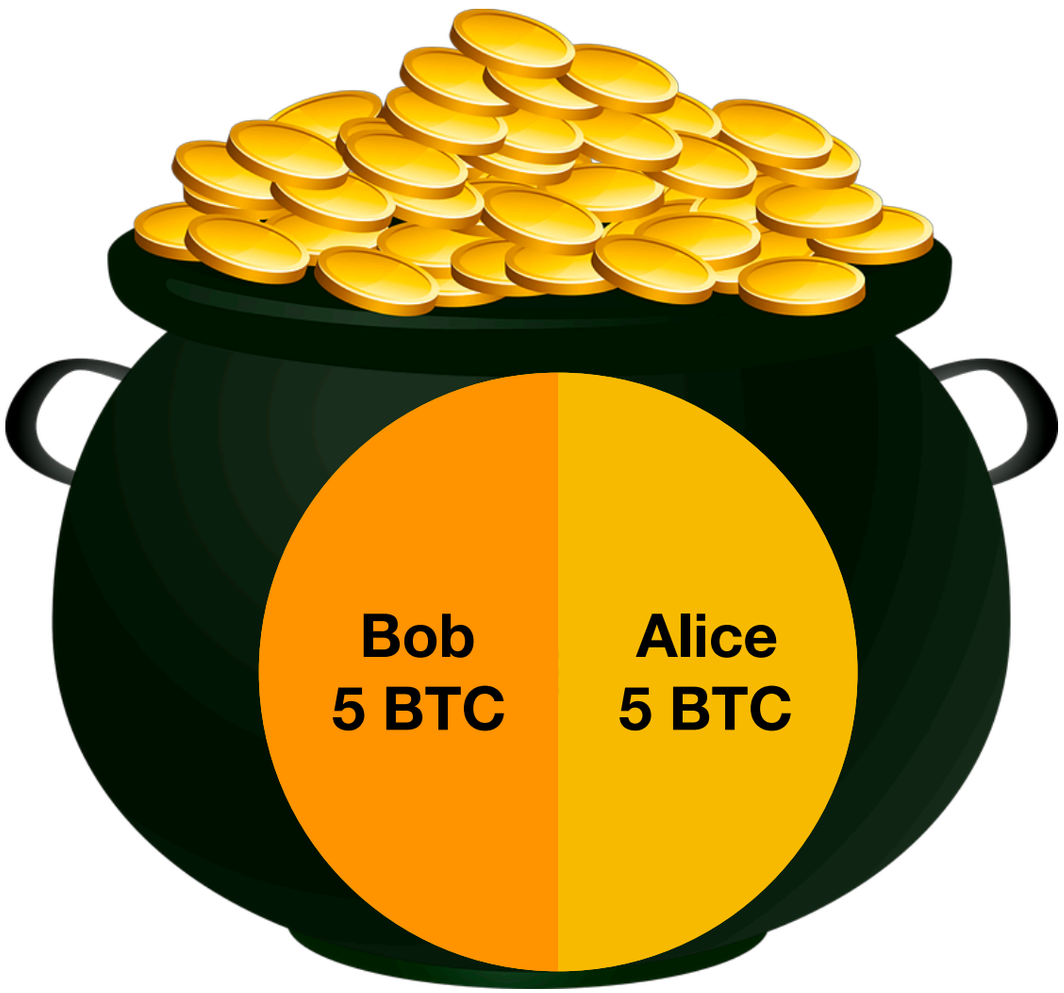


10 BTC collateral

Alice		Bob	
USD	BTC	USD	BTC
-50,000	10	50,000	0
-$50,000	$100,000	$50,000	0
$50,000		$50,000	

Synthetics

1 Bitcoin $180,956,881,524 $10,000.00

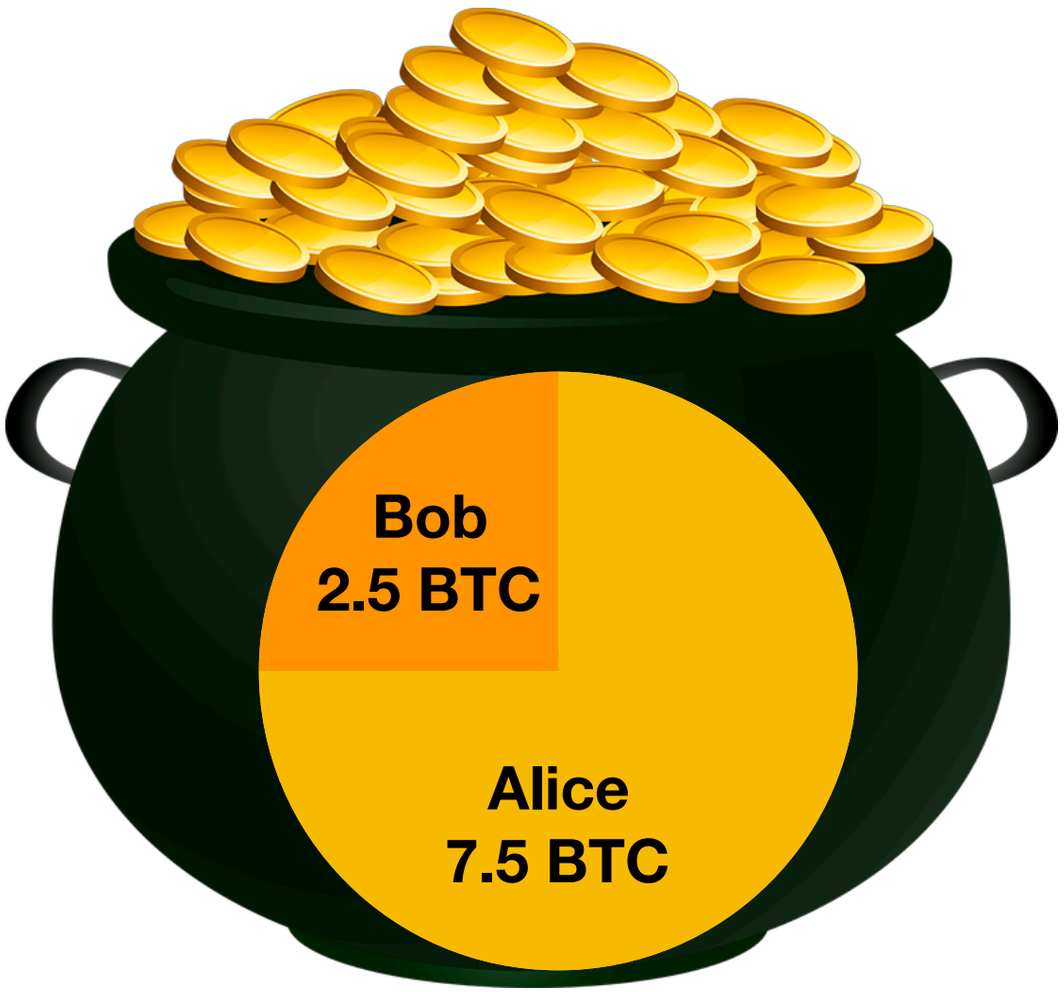


10 BTC collateral

Alice		Bob	
USD	BTC	USD	BTC
-50,000	10	50,000	0
-$50,000	$100,000	$50,000	0
$50,000		$50,000	
5 BTC		5 BTC	

Synthetics

1	Bitcoin	$361,390,596,024	$20,000.00

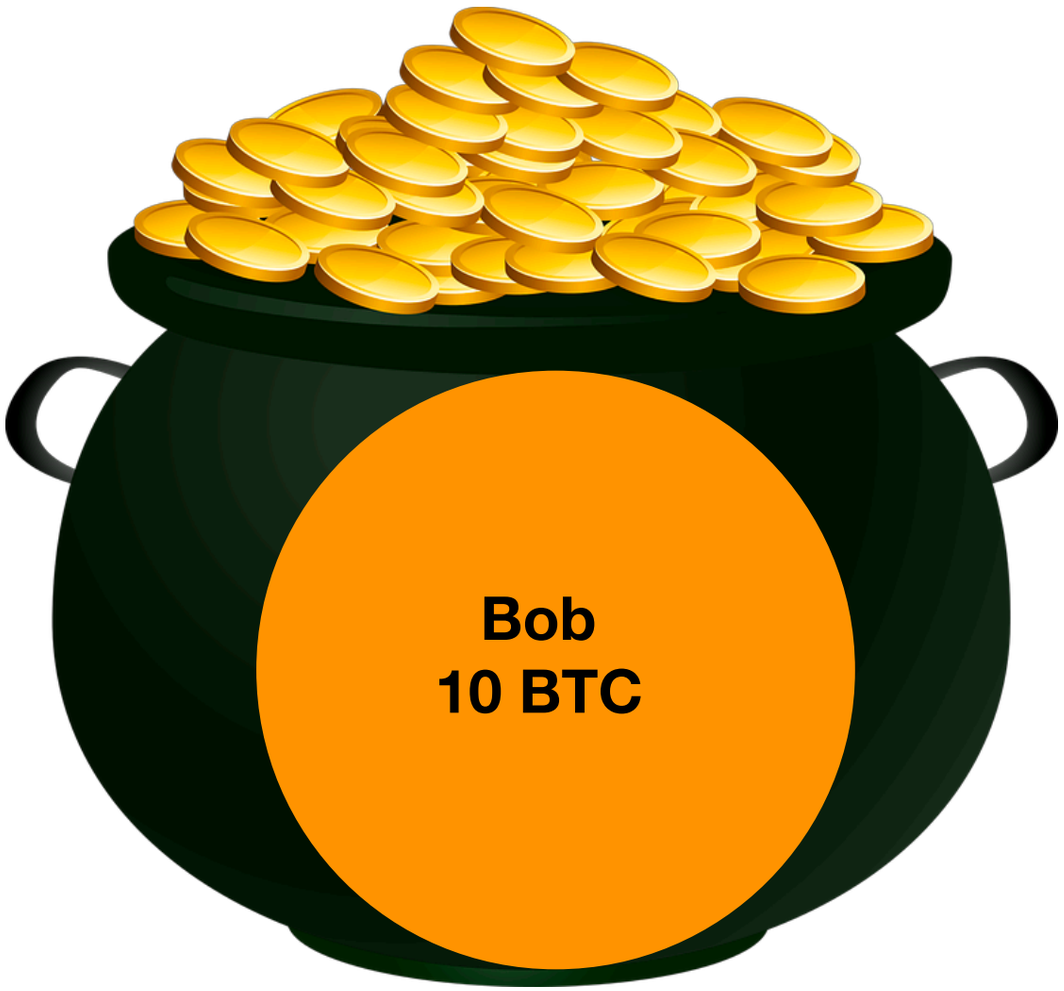


10 BTC collateral

Alice		Bob	
USD	BTC	USD	BTC
-50,000	10	50,000	0
-$50,000	$200,000	$50,000	0
$150,000		$50,000	
7.5 BTC		2.5 BTC	

Synthetics

1 Bitcoin $90,514,335,000 $5,000.00



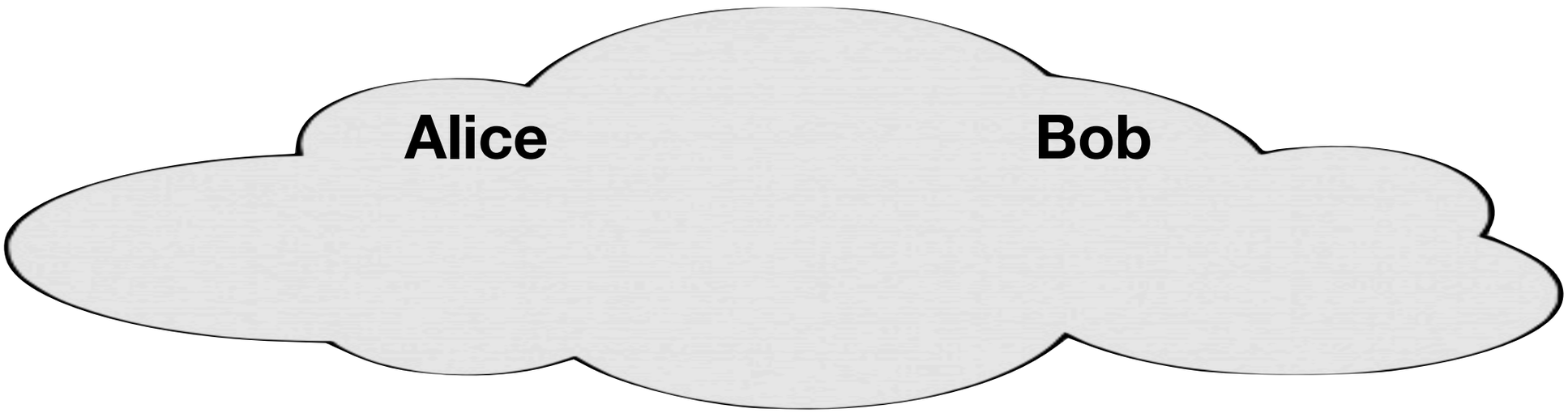
Alice		Bob	
USD	BTC	USD	BTC
-50,000	10	50,000	0
-$50,000	$50,000	$50,000	0
$0		$50,000	
0 BTC		10 BTC	

10 BTC collateral

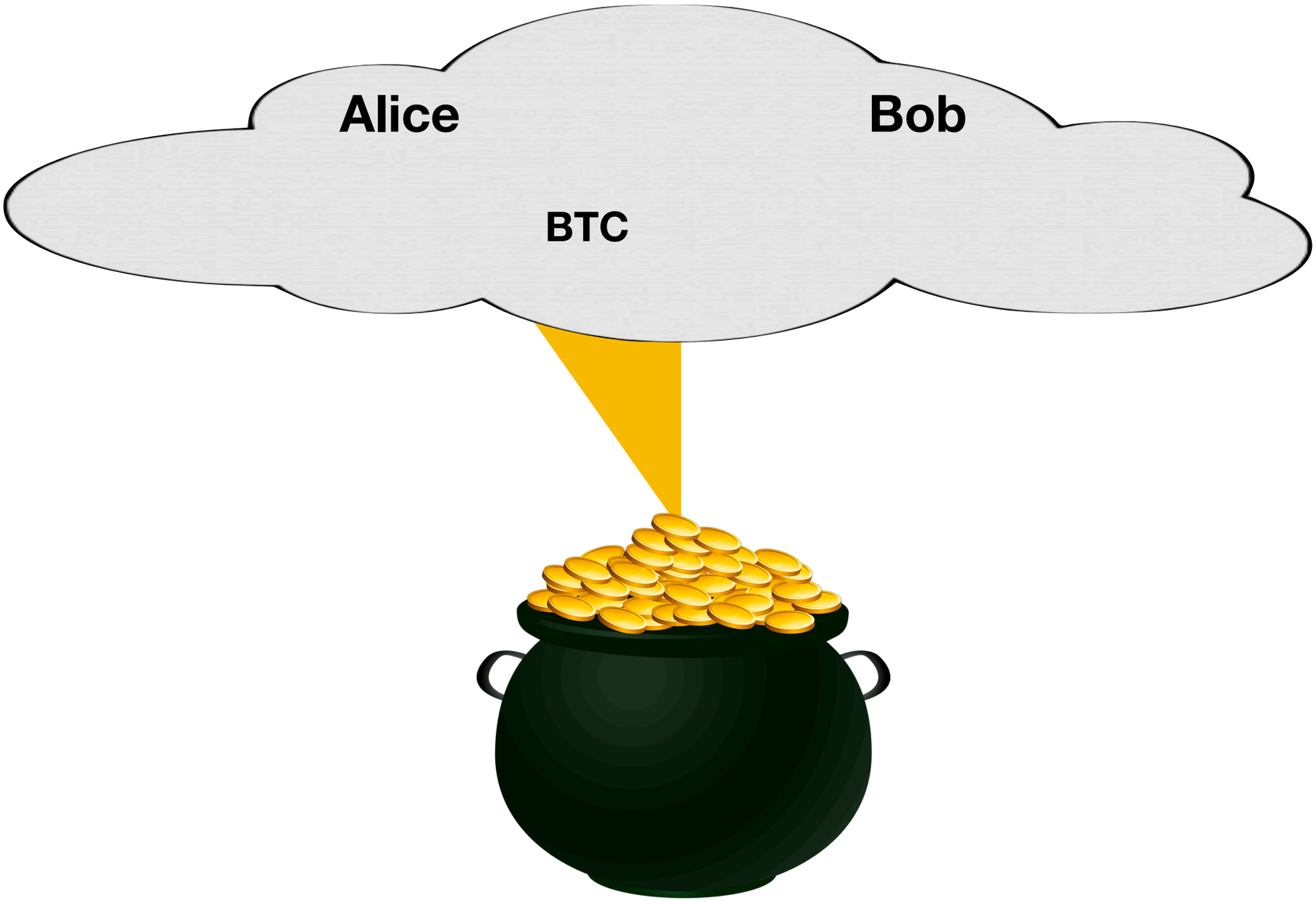
Channels + Synthetics

Rainbow Channels

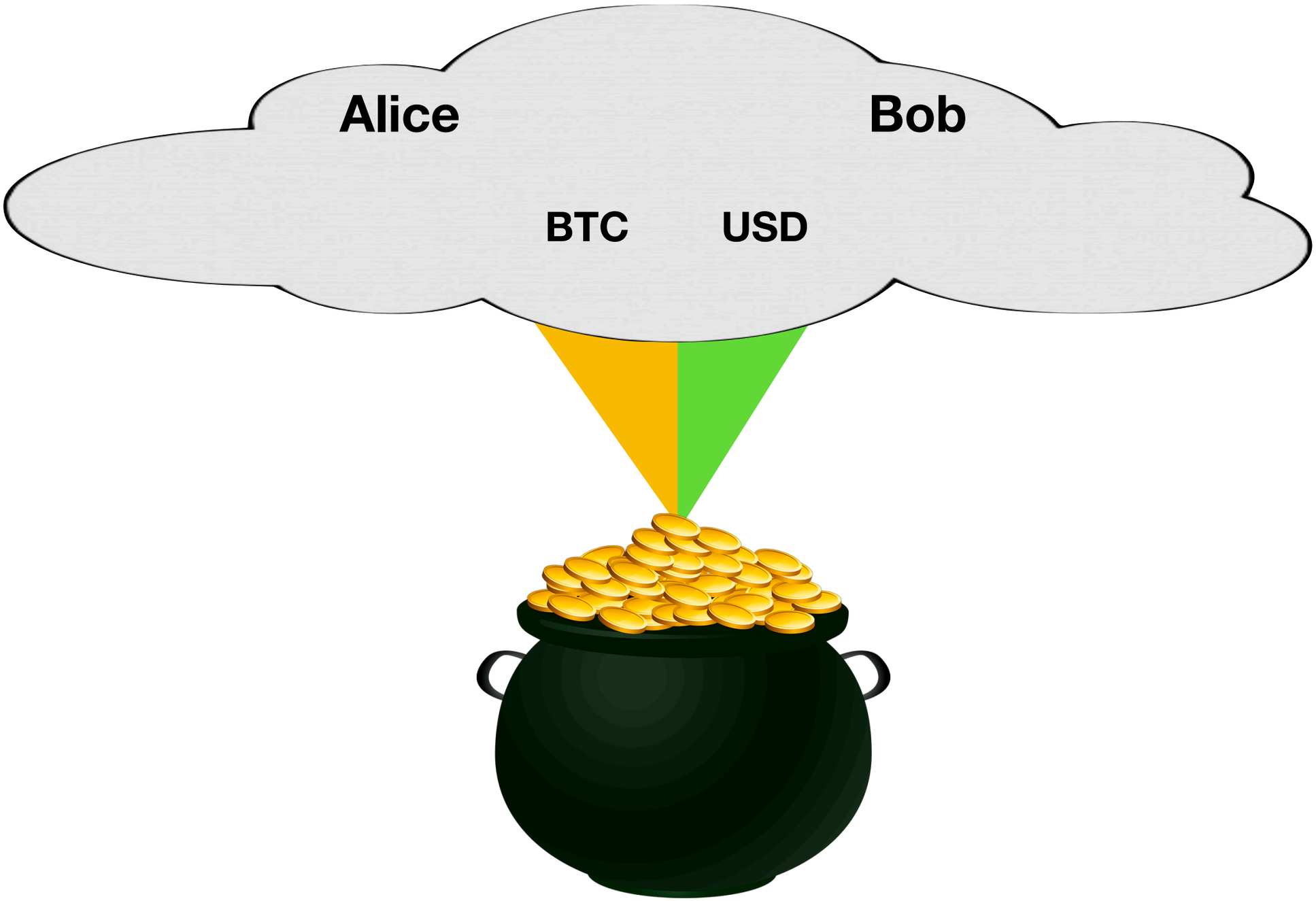
Rainbow Channels



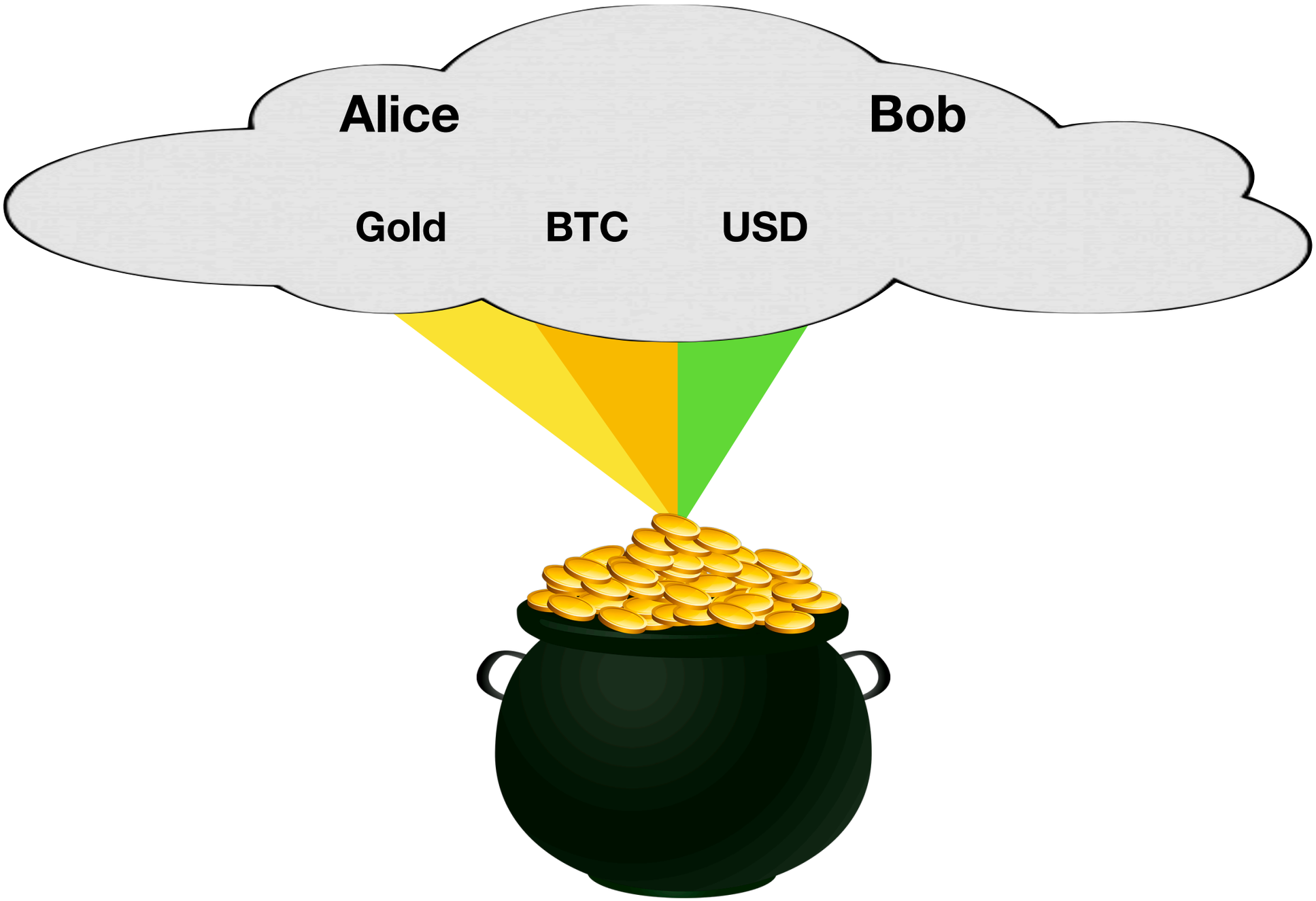
Rainbow Channels



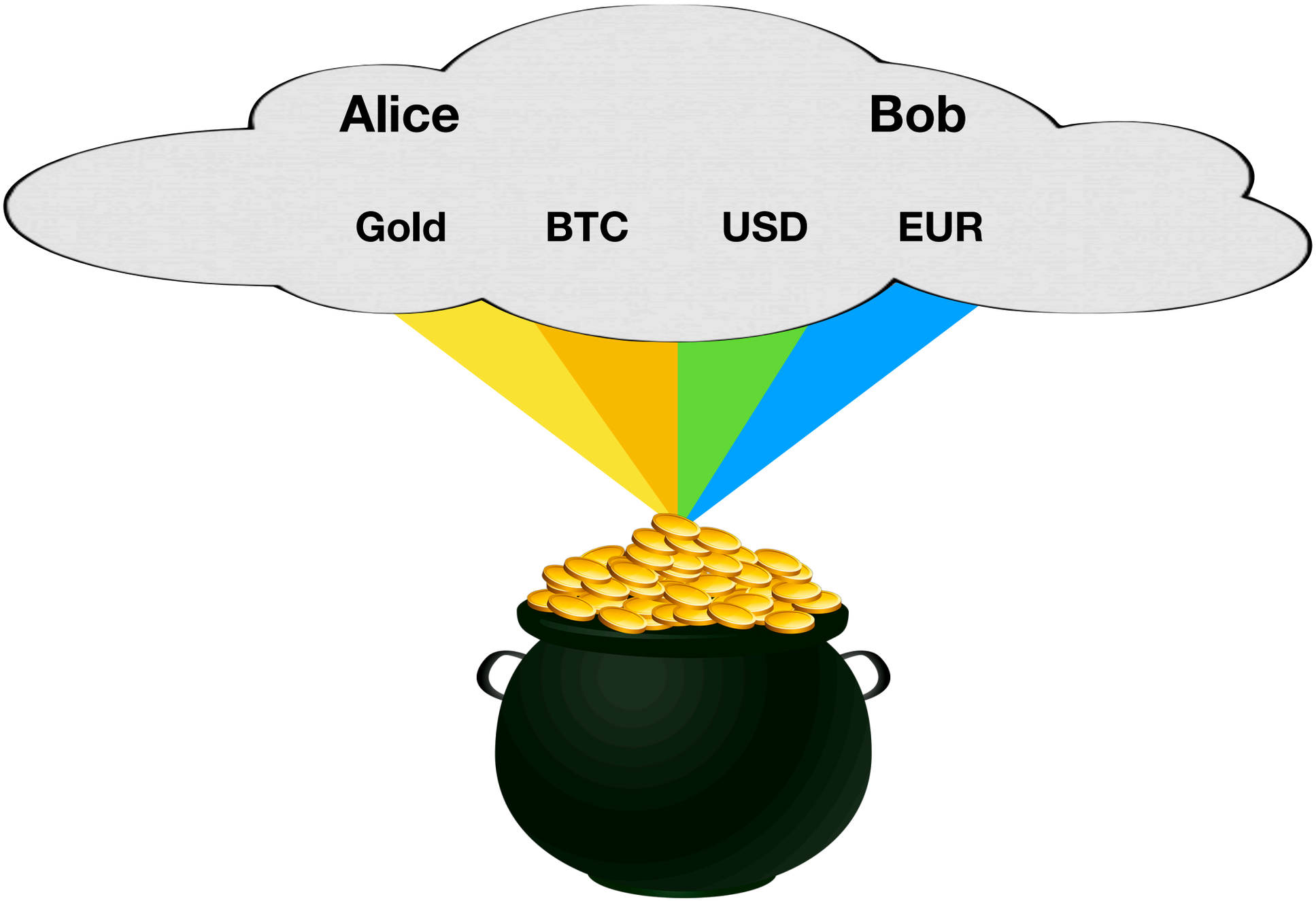
Rainbow Channels



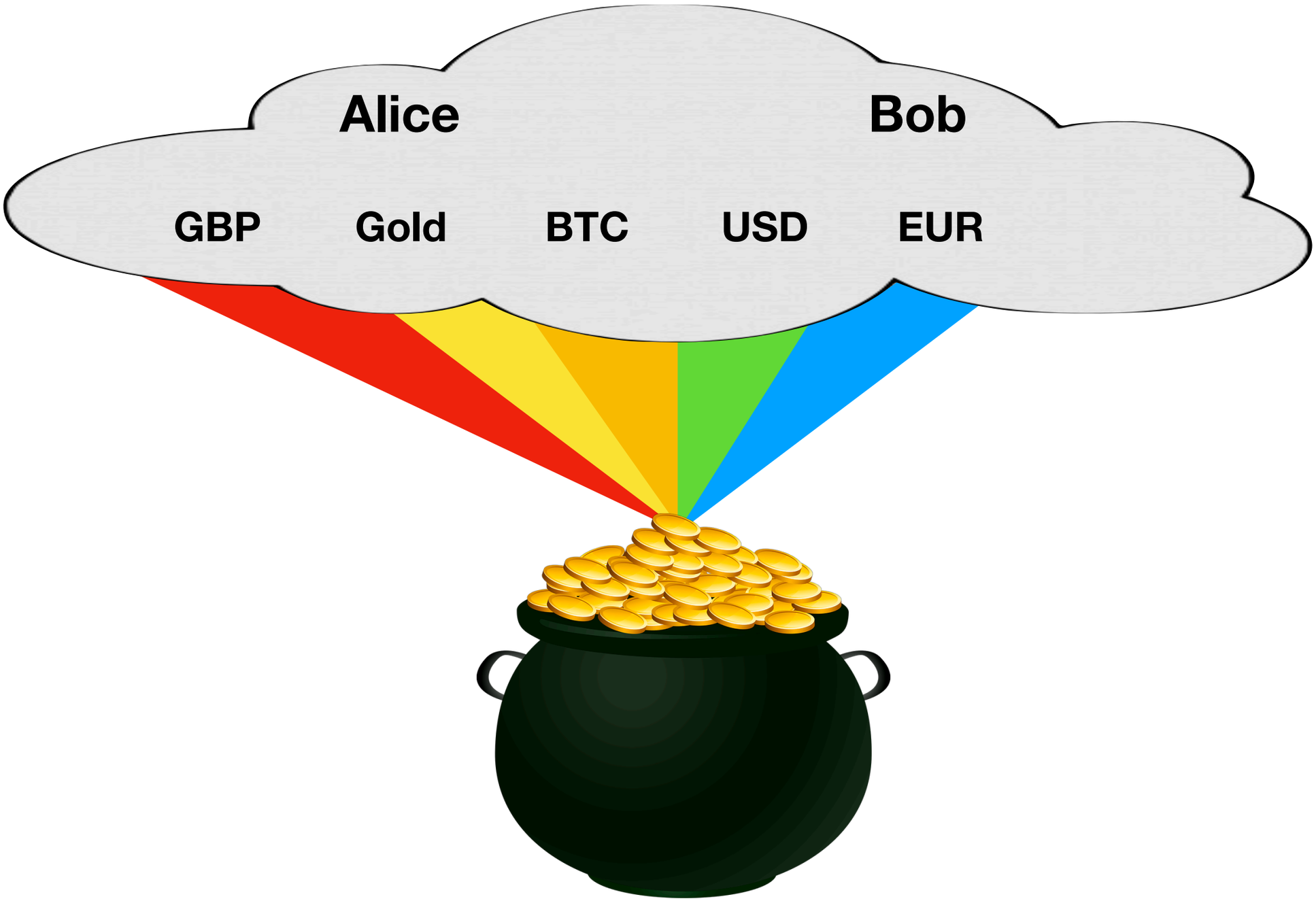
Rainbow Channels



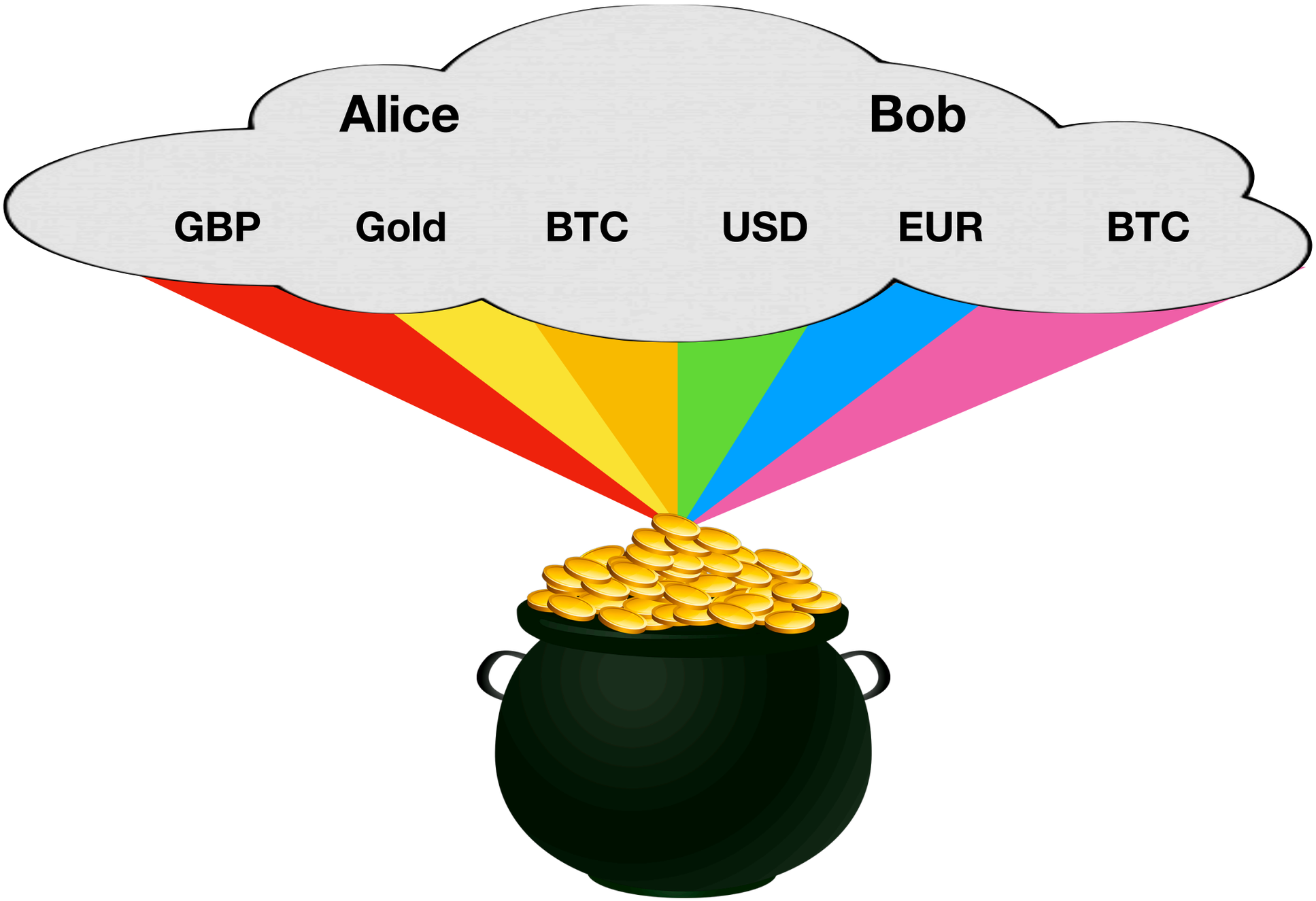
Rainbow Channels



Rainbow Channels



Rainbow Channels

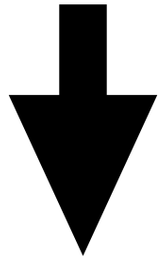


Rainbow Channels

Alice		Bob	
USD	BTC	USD	BTC
0	5	0	5

Rainbow Channels

Alice		Bob	
USD	BTC	USD	BTC
0	5	0	5

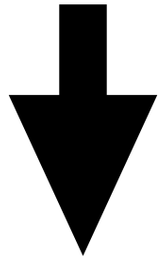


Alice			Bob		
USD	BTC	Interest	USD	BTC	Interest
-50,000	10	-4% APR	500	0	4% APR

Rainbow Channels

Alice		Bob	
USD	BTC	USD	BTC
0	5	0	5

Trading

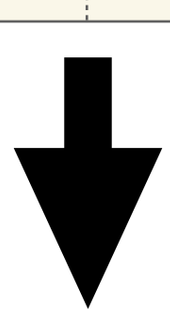


Alice			Bob		
USD	BTC	Interest	USD	BTC	Interest
-50,000	10	-4% APR	500	0	4% APR

Rainbow Channels

Alice		Bob	
USD	BTC	USD	BTC
0	5	0	5

Trading



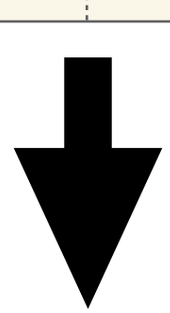
Shorting

Alice			Bob		
USD	BTC	Interest	USD	BTC	Interest
-50,000	10	-4% APR	500	0	4% APR

Rainbow Channels

Alice		Bob	
USD	BTC	USD	BTC
0	5	0	5

Trading



Alice			Bob		
USD	BTC	Interest	USD	BTC	Interest
-50,000	10	-4% APR	500	0	4% APR

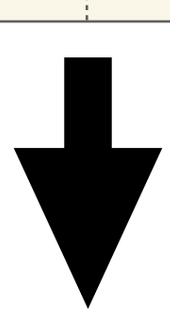
Shorting

Leverage

Rainbow Channels

Alice		Bob	
USD	BTC	USD	BTC
0	5	0	5

Trading



Alice			Bob		
USD	BTC	Interest	USD	BTC	Interest
-50,000	10	-4% APR	500	0	4% APR

Shorting

Interest

Leverage

Rainbow Channels

Alice			Bob		
USD	BTC			BT	
0				5	

Tra

			Bob		
U		nterest	USD	BTC	Interest
-50,000	10	-4% APR	500	0	4% APR

DEFI

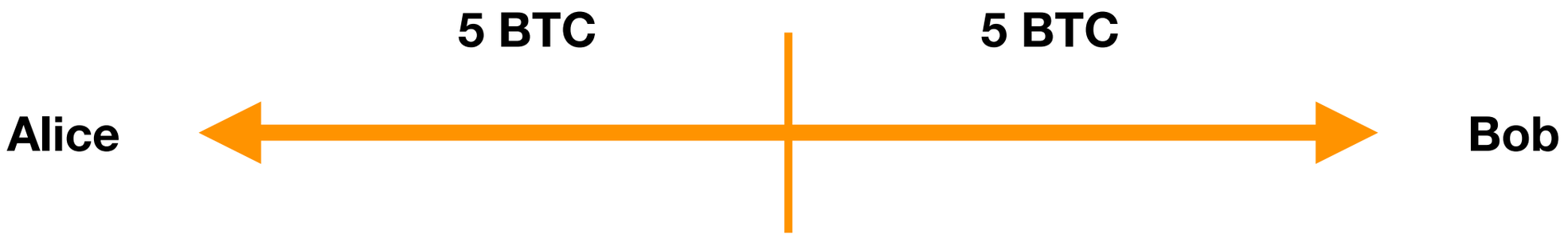
Shorting

Interest

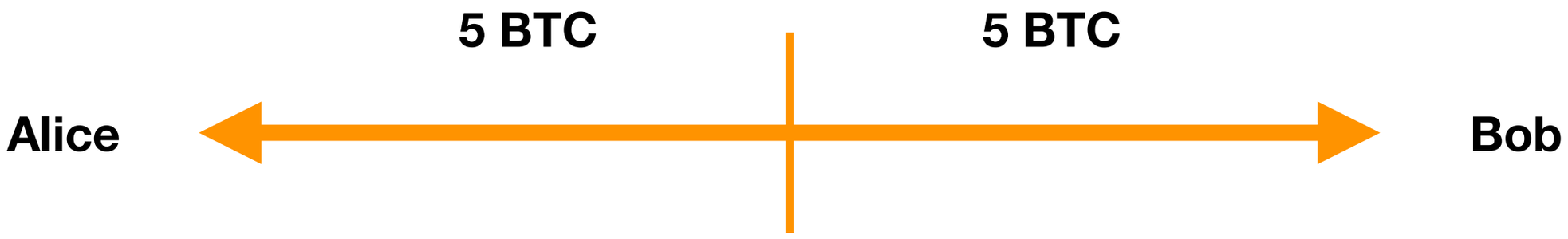
Leverage

But how?

But how?



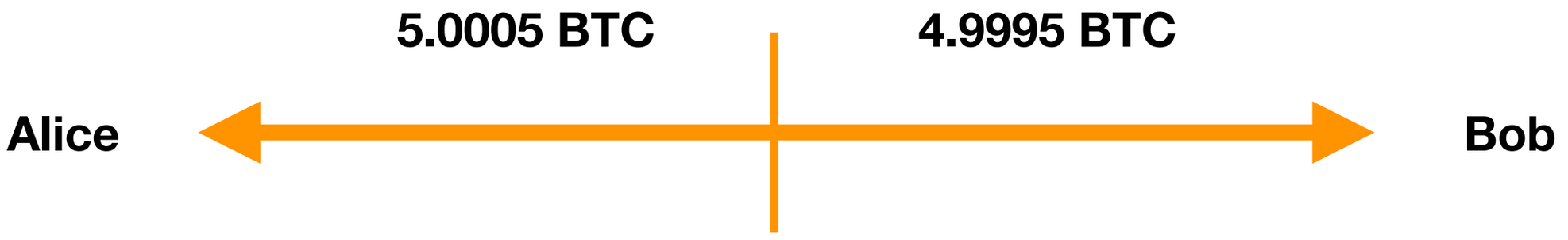
But how?



1 BTC = 10,000 USD

Alice		Bob	
USD	BTC	USD	BTC
-50,000	10	50,000	0
-$50,000	$100,000	$50,000	0
$50,000		$50,000	
5 BTC		5 BTC	

But how?



1 BTC = 10,001 USD

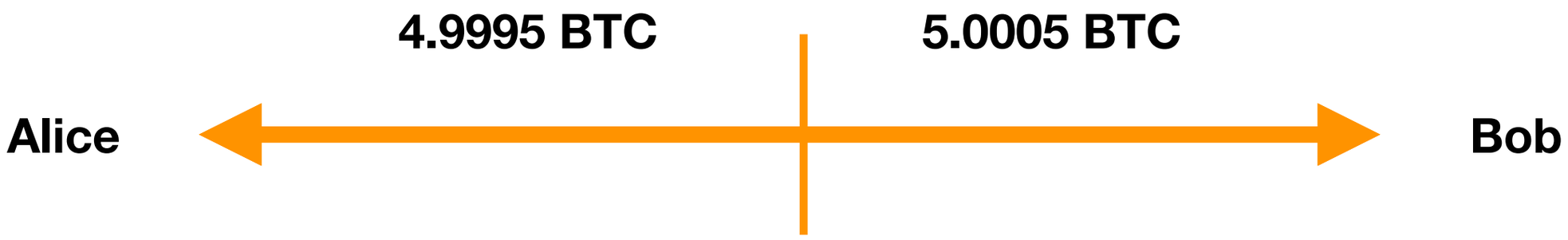
Alice		Bob	
USD	BTC	USD	BTC
-50,000	10	50,000	0
-$50,000	$100,010	$50,000	0
$50,010		$50,000	
5.0005 BTC		4.9995 BTC	

But how?

1 BTC = 10,000 USD

Alice		Bob	
USD	BTC	USD	BTC
-50,000	10	50,000	0
-$50,000	$100,000	$50,000	0
$50,000		$50,000	
5 BTC		5 BTC	

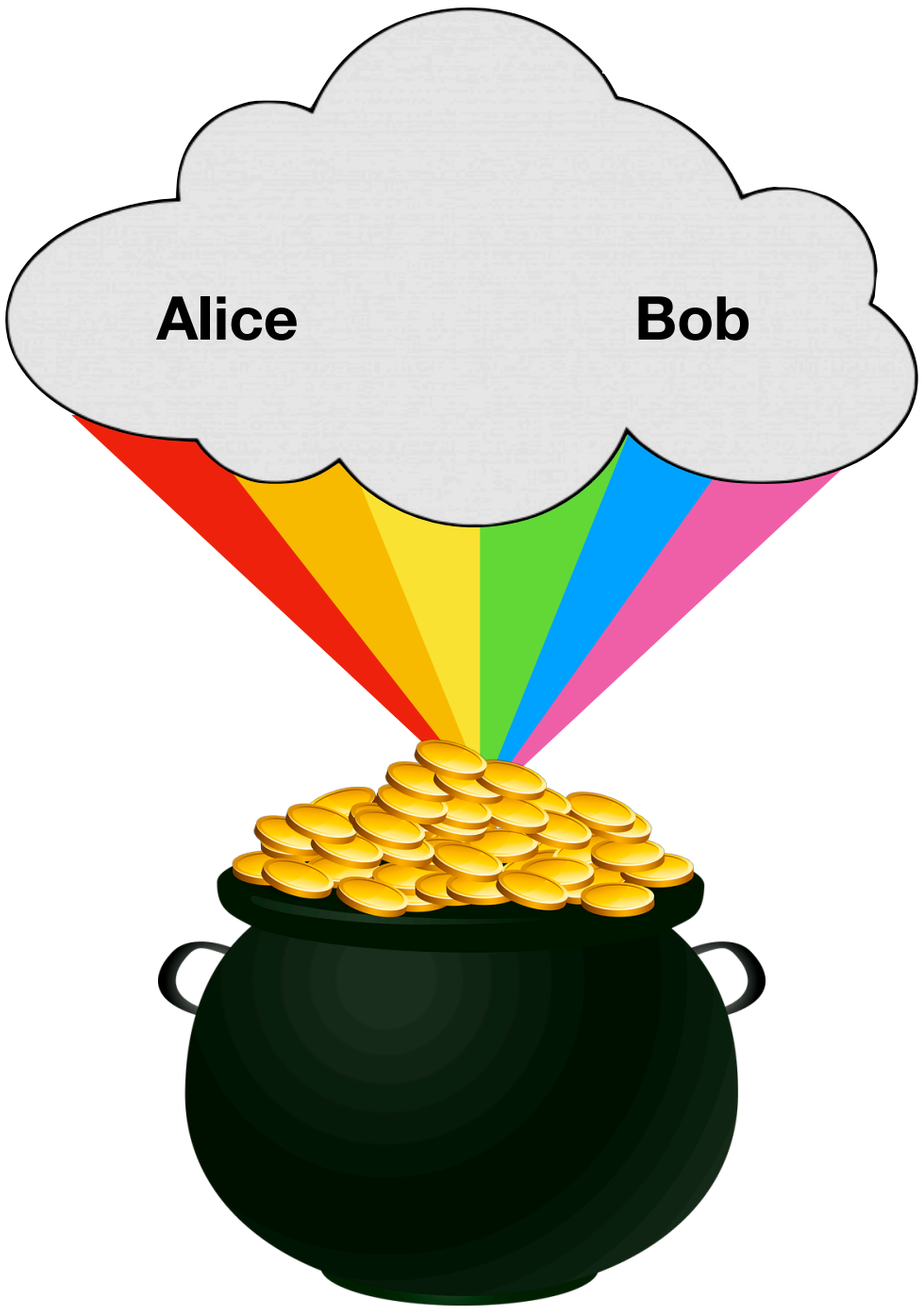
But how?



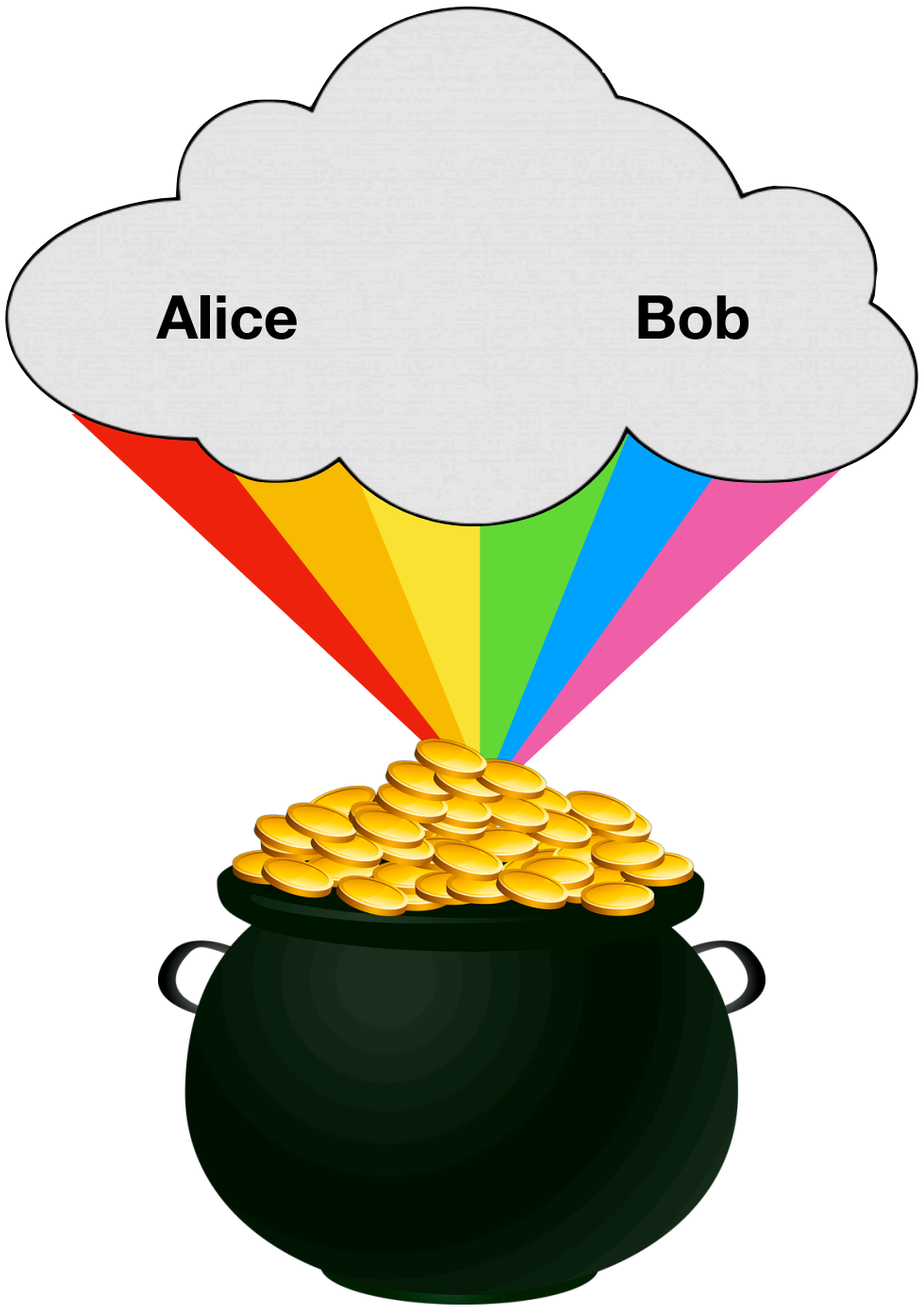
1 BTC = 9,999 USD

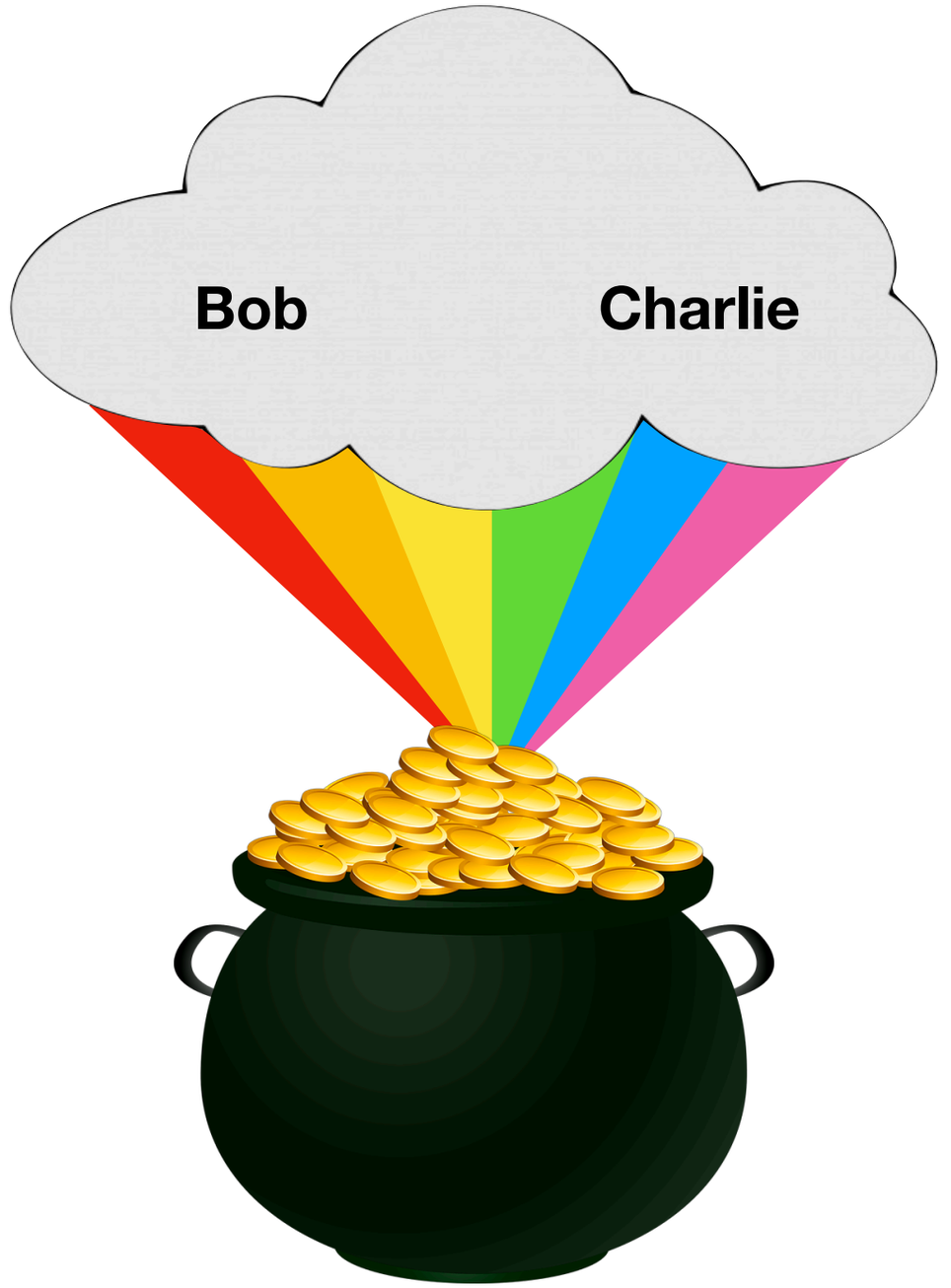
Alice		Bob	
USD	BTC	USD	BTC
-50,000	10	50,000	0
-$50,000	$99,990	$50,000	0
$49,990		$50,000	
4.9995 BTC		5.0005 BTC	

Rainbow Network

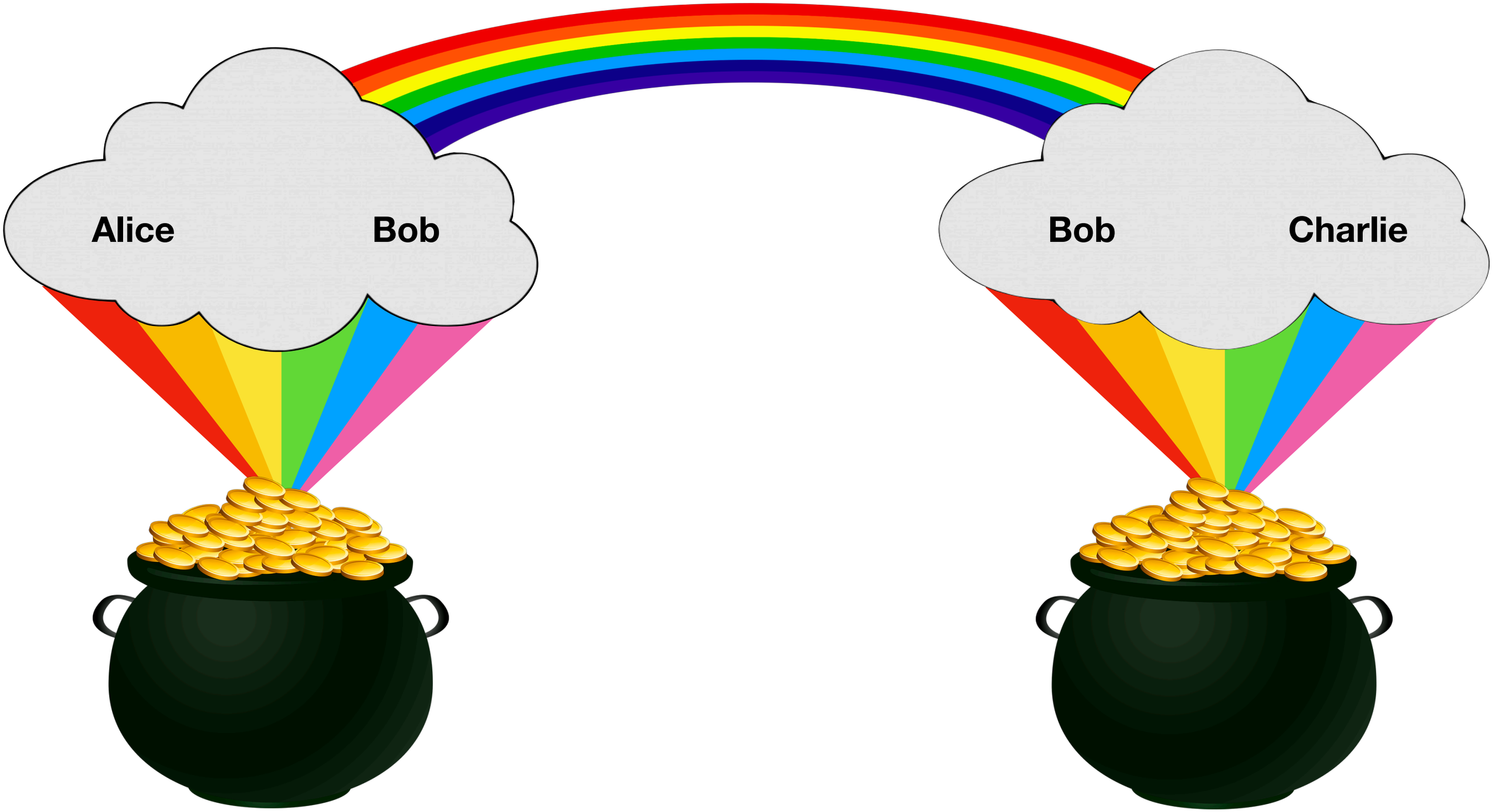


Rainbow Network

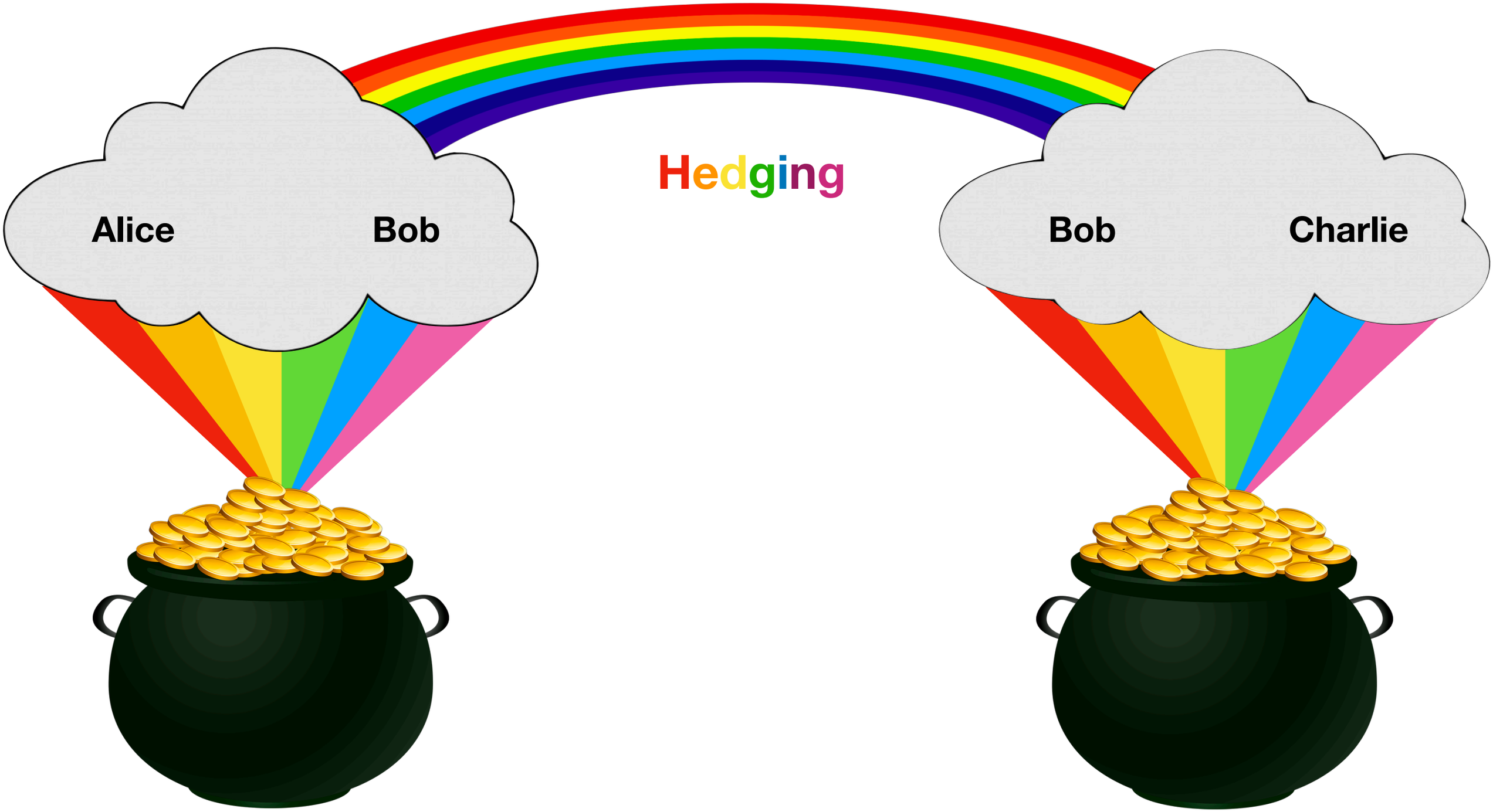




Rainbow Network



Rainbow Network



Downsides

Downsides

- Users must be online all the time

Downsides

- Users must be online all the time
- Users need to agree on price

Downsides

- Users must be online all the time
- Users need to agree on price
- Counterparty can exit position at any time

Downsides

- Users must be online all the time
- Users need to agree on price
- Counterparty can exit position at any time
- Somewhat capital-inefficient

Further work

Further work

- Paper: rainbownet.work

Further work

- Paper: rainbownet.work
- Can be implemented on top of **lnd**

Further work

- Paper: rainbownet.work
- Can be implemented on top of **lnd**
- If you do that, please let me know!

Further work

- Paper: rainbownet.work
- Can be implemented on top of **lnd**
- If you do that, please let me know!
- @danrobinson on Twitter