

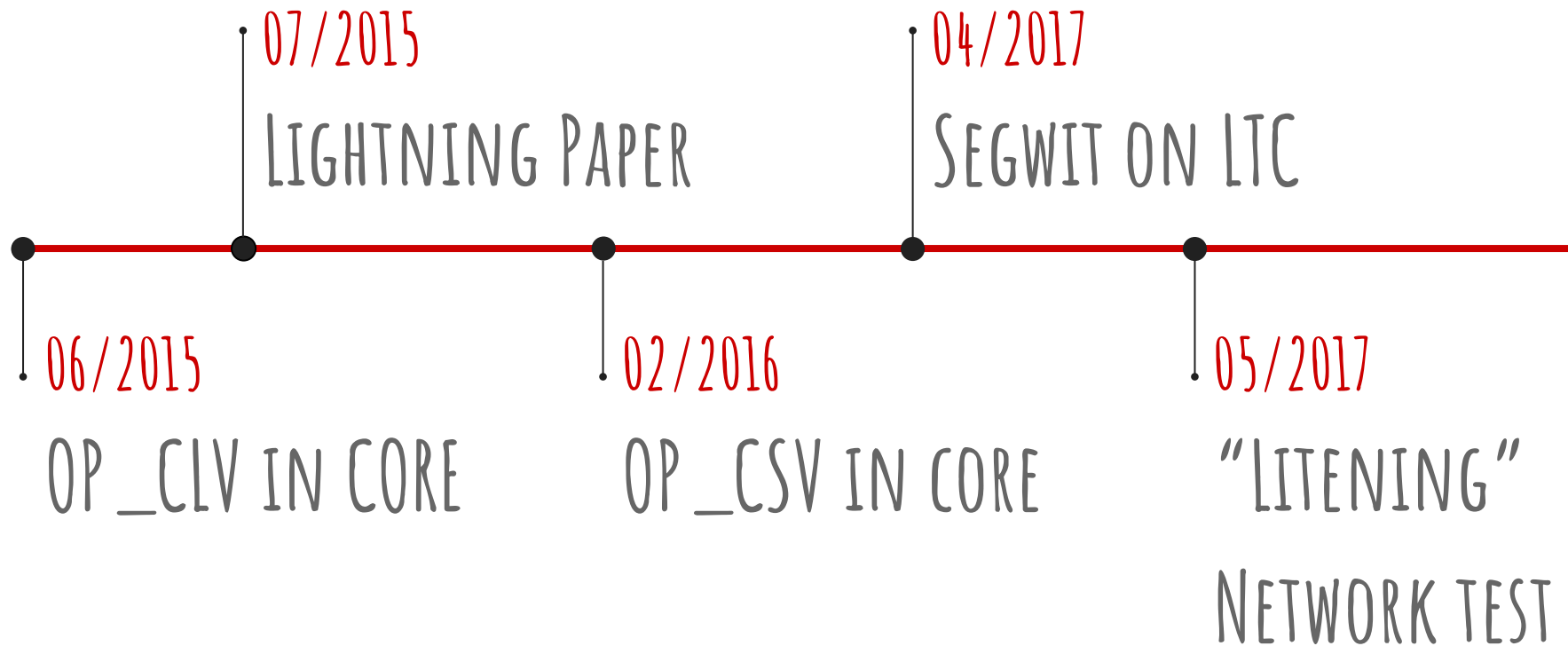
The background of the slide is a dark blue/black field filled with glowing green binary code (0s and 1s). Several bright, jagged white and blue lightning bolts are scattered across the image, with one prominent bolt on the left side.

LIGHTNING NETWORK

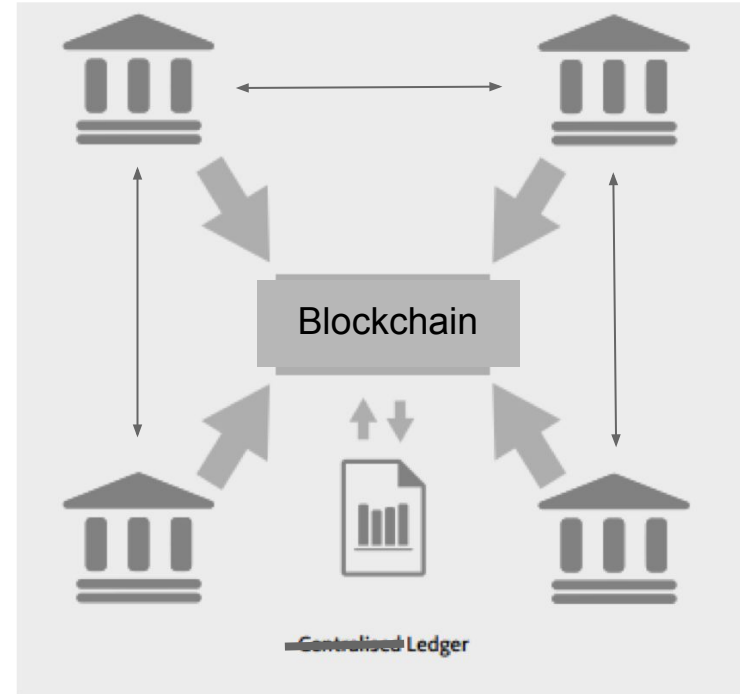
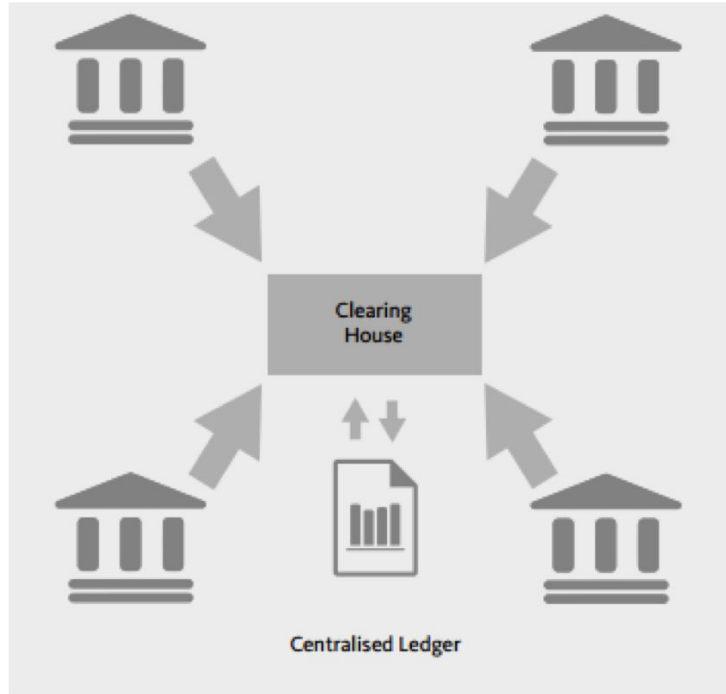
Paralelní Polis, 6. 6. 2017

`jan.capek@{brains.cz,slushpool.com}`

HISTORY



BLOCKCHAIN=ARBITRATION, SETTLEMENT



SETTLEMENT IS LIKE...



BLOCKS ARE SMALL, MKAY!

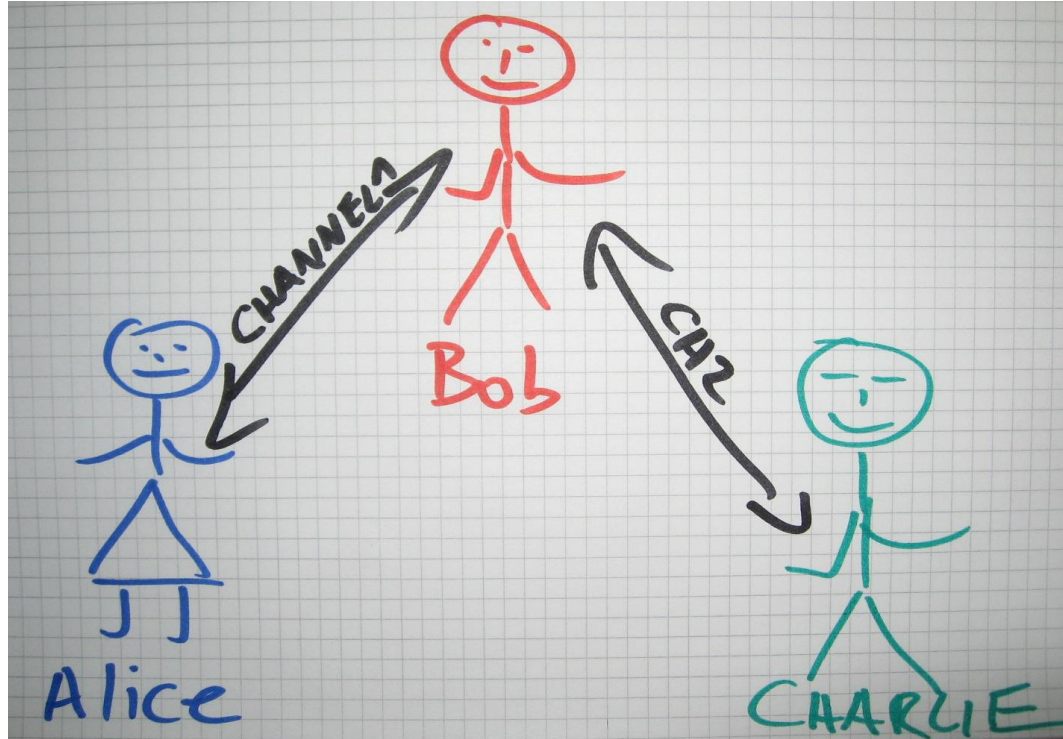
1. AND WILL ALWAYS BE
2. ENLARGE A BIT
3. GO OFF-CHAIN



WHAT'S UNDER THE
HOOD?



ALICE, BOB, CHARLIE...AND THE CASE OF PAYMENT CHANNELS



WHAT ARE PAYMENT CHANNELS?

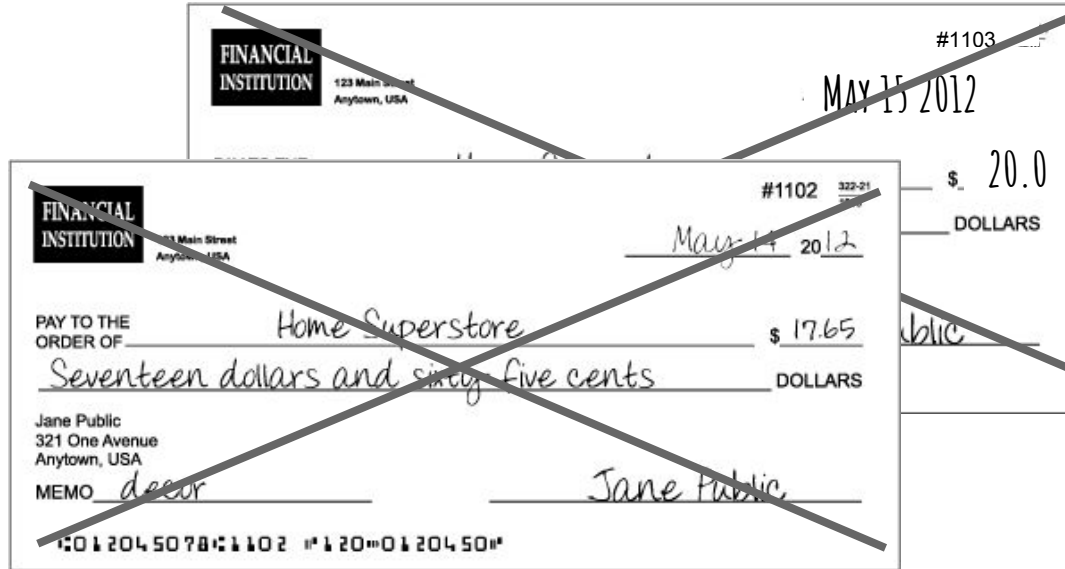
FINANCIAL INSTITUTION <small>123 Main Street Anytown, USA</small>	#1102 <small>322-21 1810</small>
	<u>May 14</u> 20 <u>12</u>
PAY TO THE ORDER OF <u>Home Superstore</u>	\$ <u>17.65</u>
<u>Seventeen dollars and sixty five cents</u>	DOLLARS
Jane Public 321 One Avenue Anytown, USA	
MEMO <u>decor</u>	<u>Jane Public</u>
⑆012045078⑆1102 ⑆120⑆0120450⑆	

WHAT ARE PAYMENT CHANNELS?

FINANCIAL INSTITUTION 123 Main Street Anytown, USA		#1103	21
		MAY 15 2012	
		\$	20.0
		DOLLARS	
		Public	

FINANCIAL INSTITUTION 123 Main Street Anytown, USA		#1102	322-21
		May 14 2012	
PAY TO THE ORDER OF <u>Home Superstore</u>		\$	17.65
<u>Seventeen dollars and sixty five cents</u>		DOLLARS	
Jane Public 321 One Avenue Anytown, USA			
MEMO <u>dear</u>		<u>Jane Public</u>	
⑆012045078⑆1102 ⑆120⑆0120450⑆			

WHAT ARE PAYMENT CHANNELS?



WHAT ARE PAYMENT CHANNELS?

FINANCIAL INSTITUTION 123 Main Street
Anytown, USA

#1104 322-21 1810

MAY 16 2012

\$ 21.0

nts DOLLARS

Jane Public

FINANCIAL INSTITUTION 123 Main Street
Anytown, USA

#1103

MAY 15 2012

\$ 20.0

DOLLARS

Public

FINANCIAL INSTITUTION 123 Main Street
Anytown, USA

#1102 322-21 1810

MAY 14 2012

PAY TO THE ORDER OF Home Superstore \$ 17.65

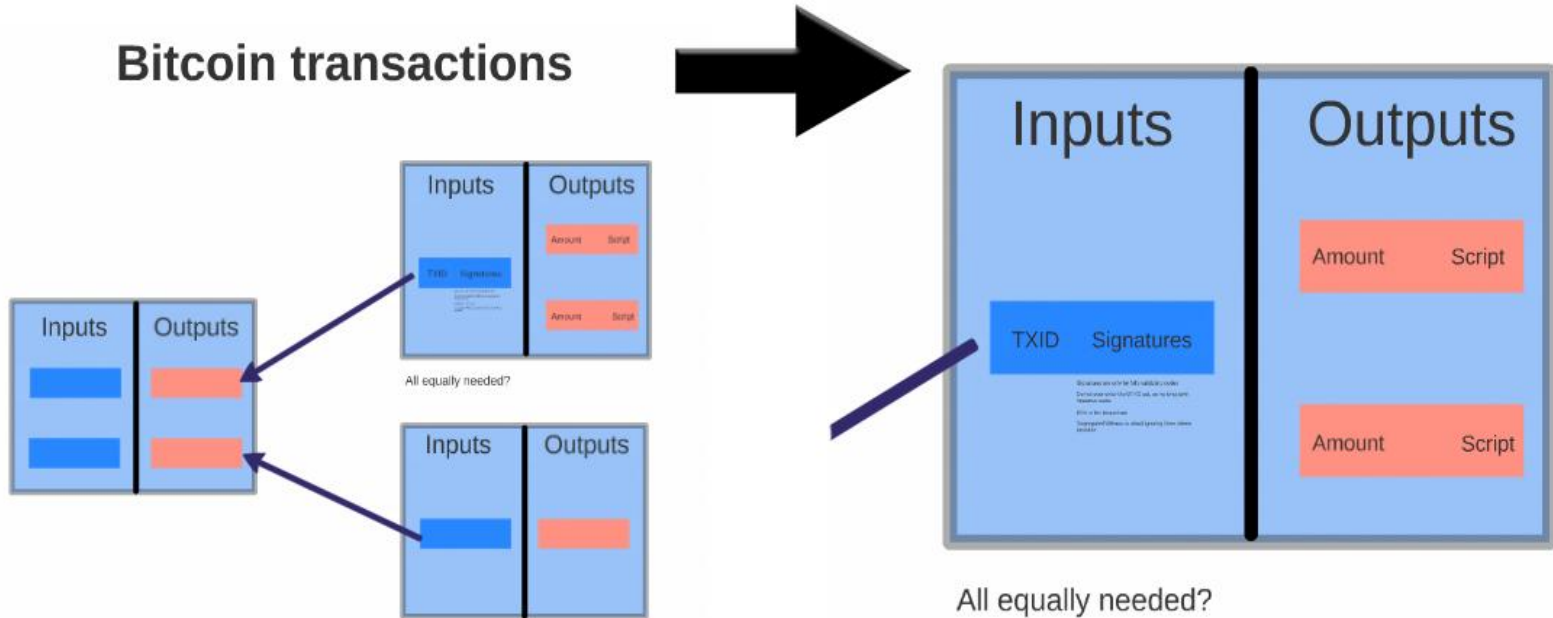
Seventeen dollars and sixty five cents DOLLARS

Jane Public
321 One Avenue
Anytown, USA

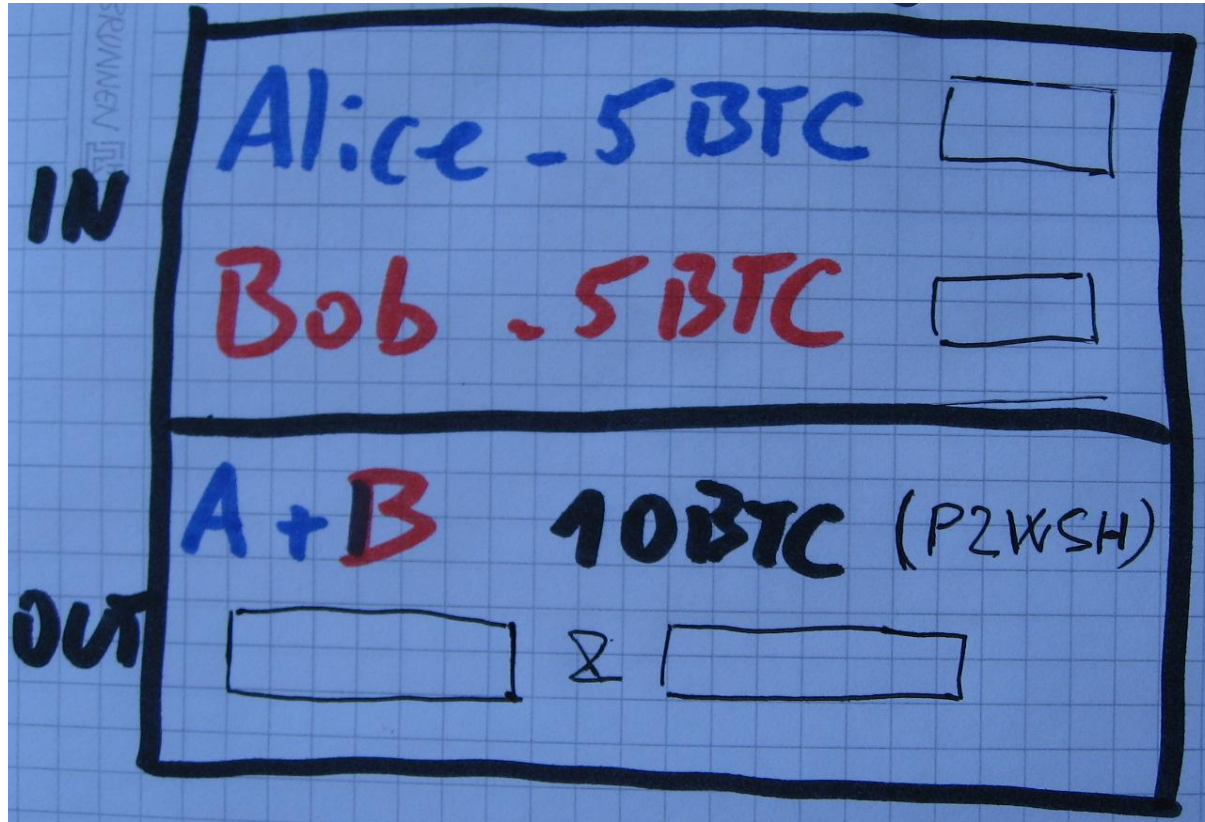
MEMO dear Jane Public

⑆012045078⑆1102 ⑆120⑆0120450⑆

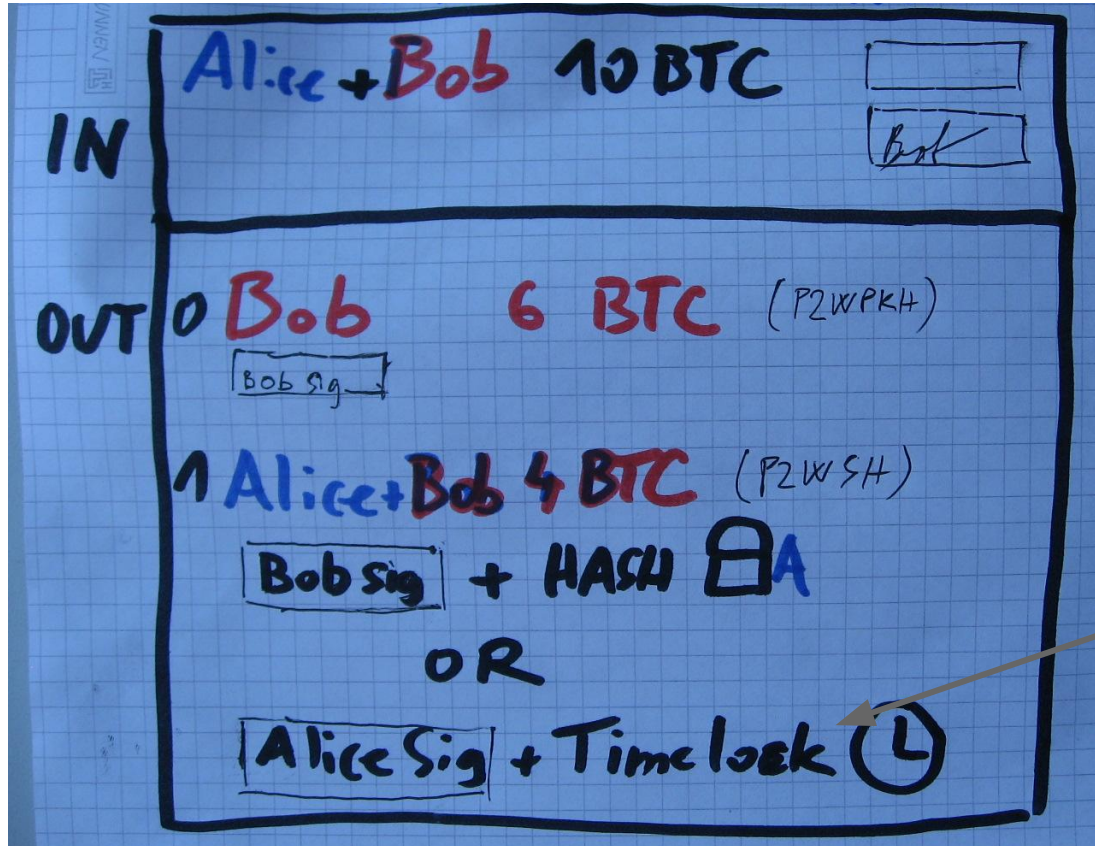
THINGS TO KNOW FROM BITCOIN



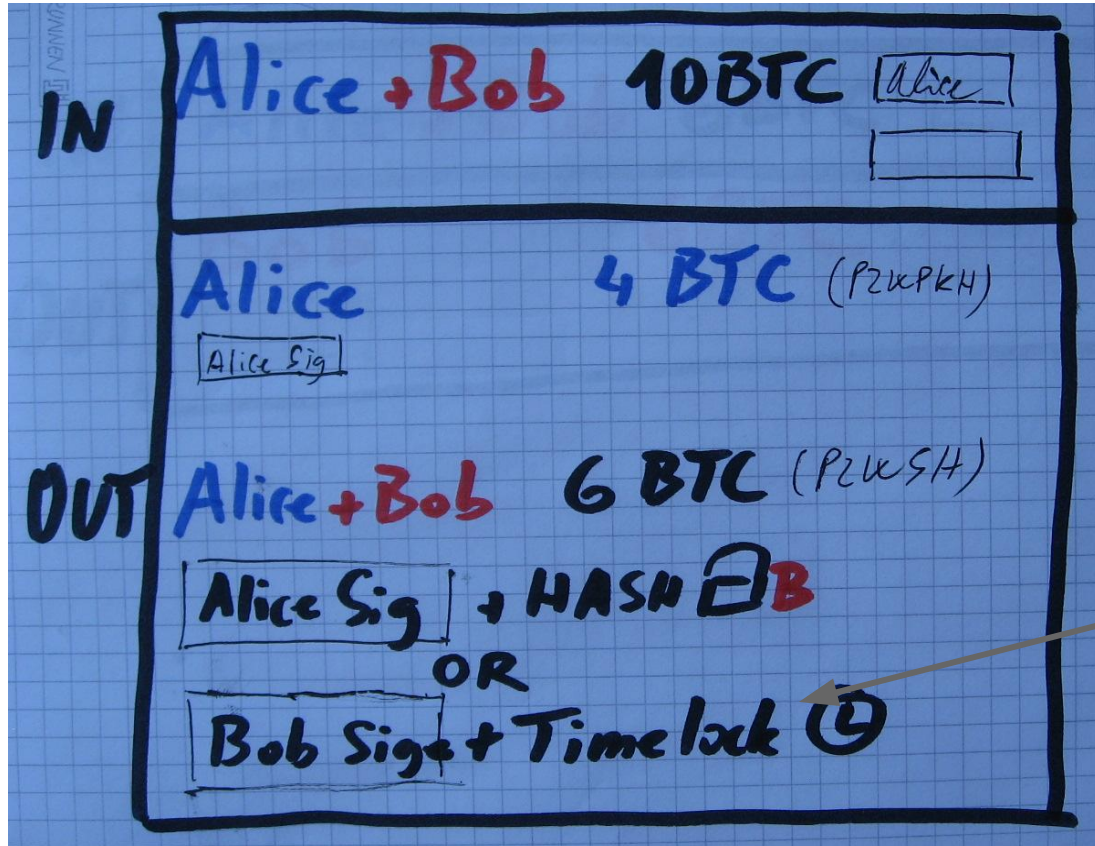
FUNDING TRANSACTION



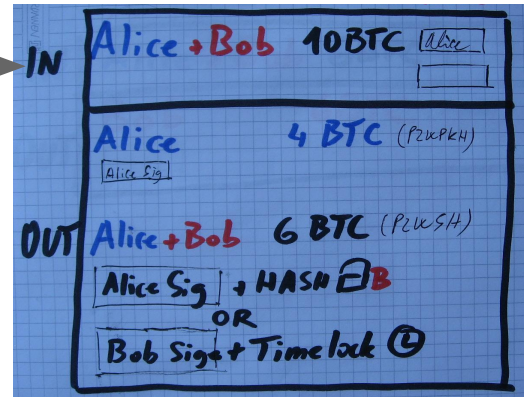
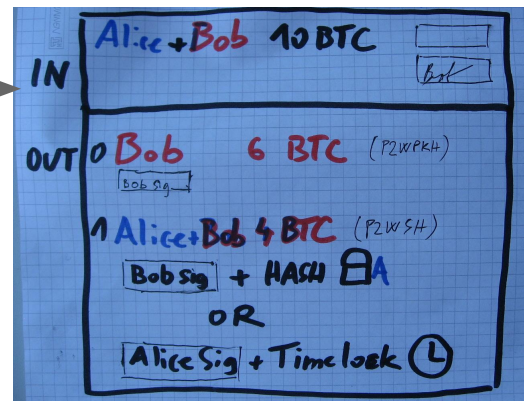
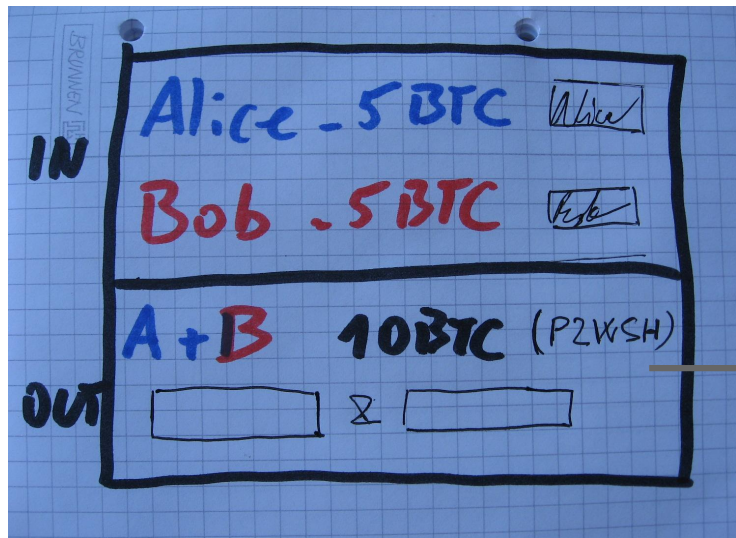
COMMITMENT TRANSACTION (ALICE)



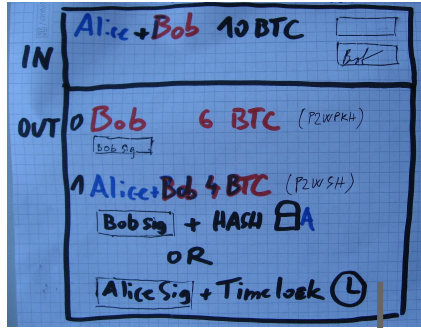
COMMITMENT TRANSACTION (BOB)



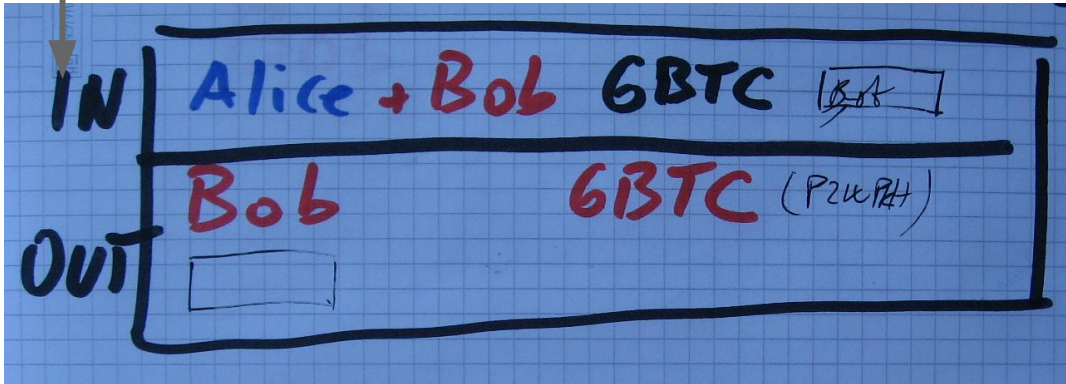
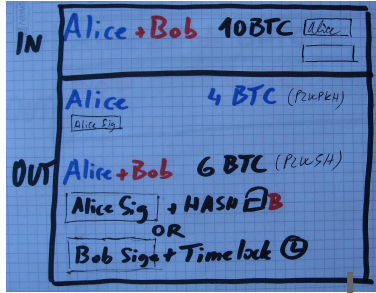
OPENING THE CHANNEL



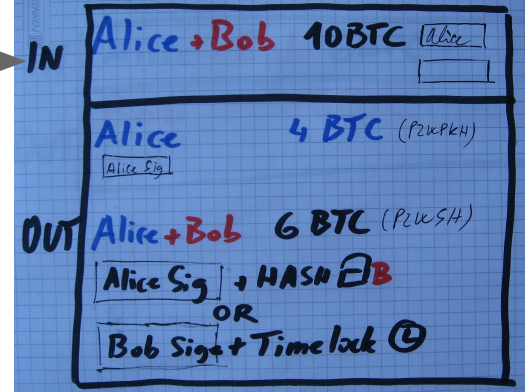
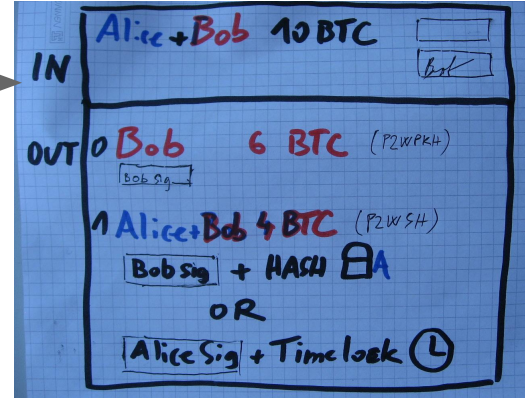
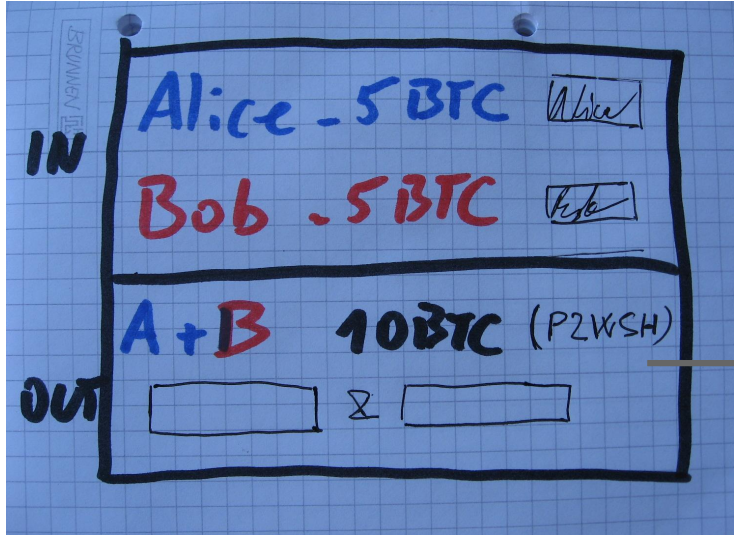
ALICE CLOSES THE CHANNEL



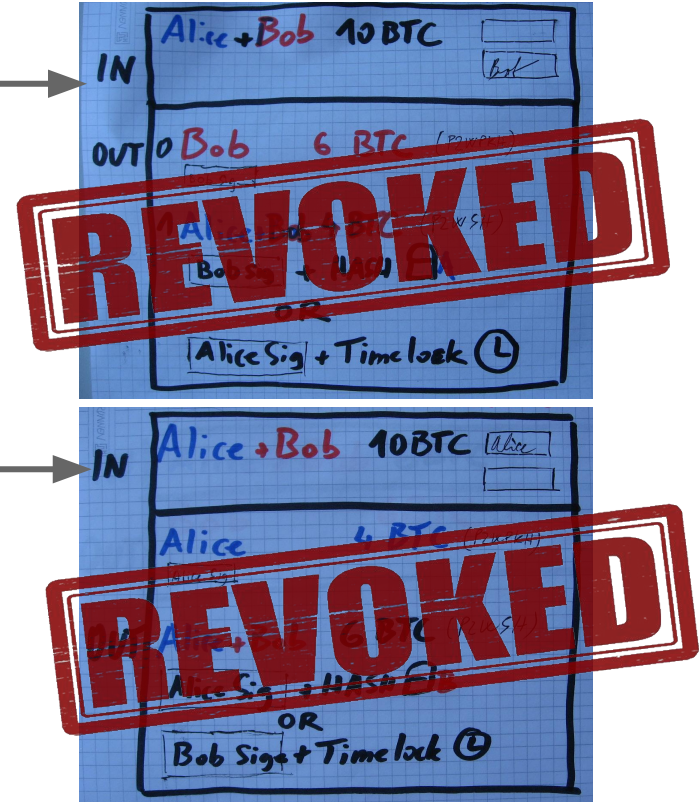
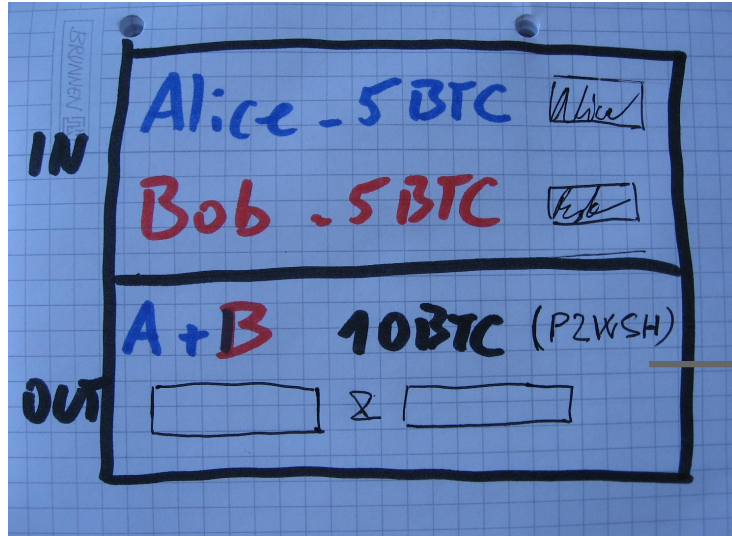
BOB CLOSES THE CHANNEL



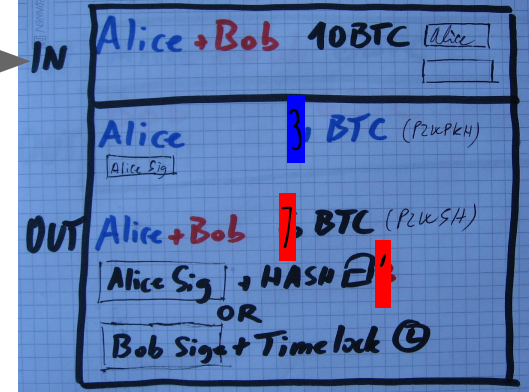
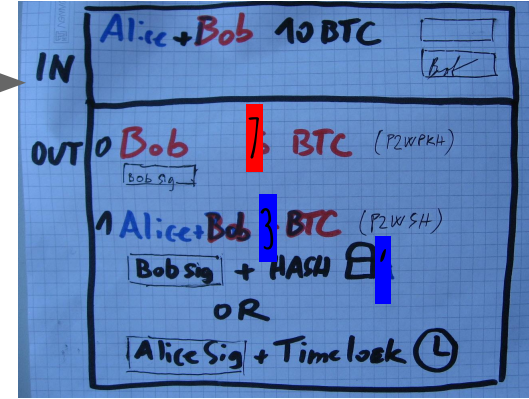
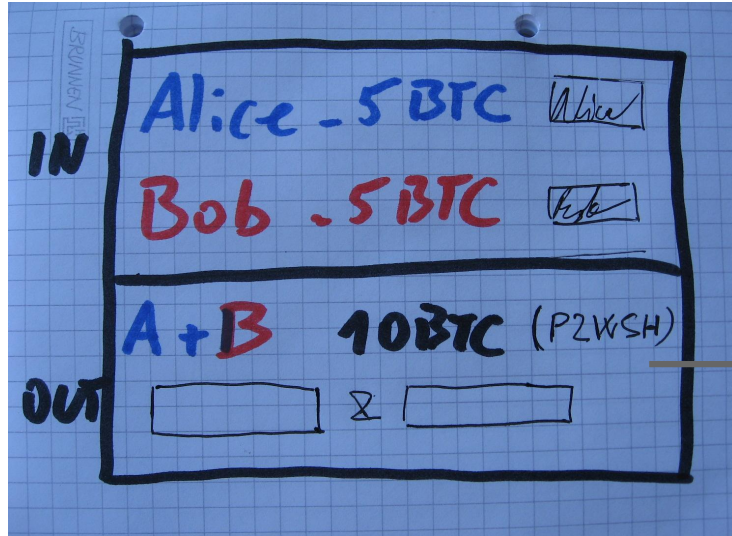
CHANNEL UPDATE



CHANNEL UPDATE



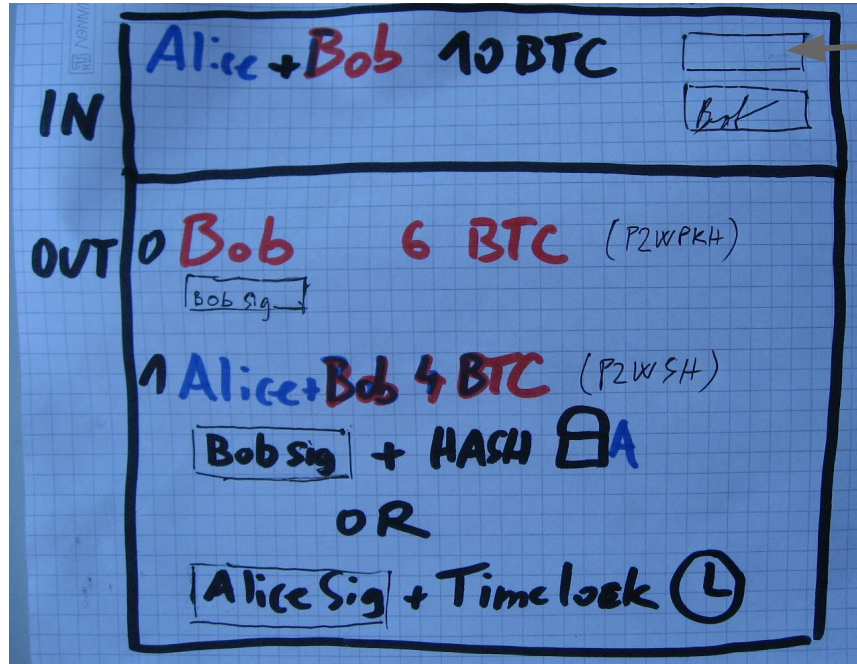
CHANNEL UPDATE



CHEATER LOSES ALL

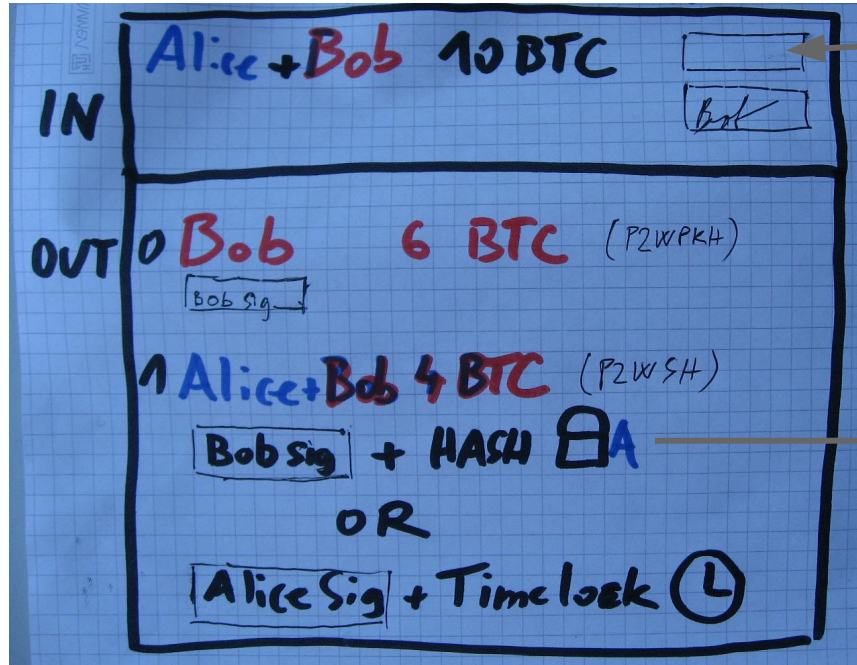


CHEATER LOSES ALL (CONT.)

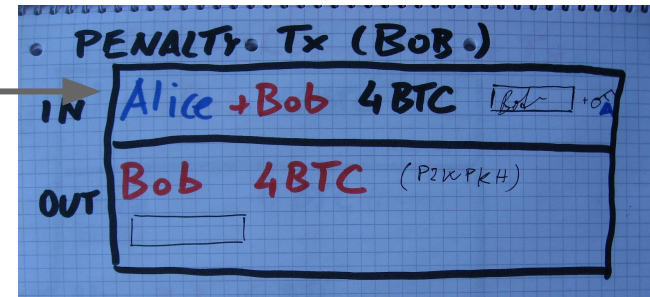


ALICE CHEATING

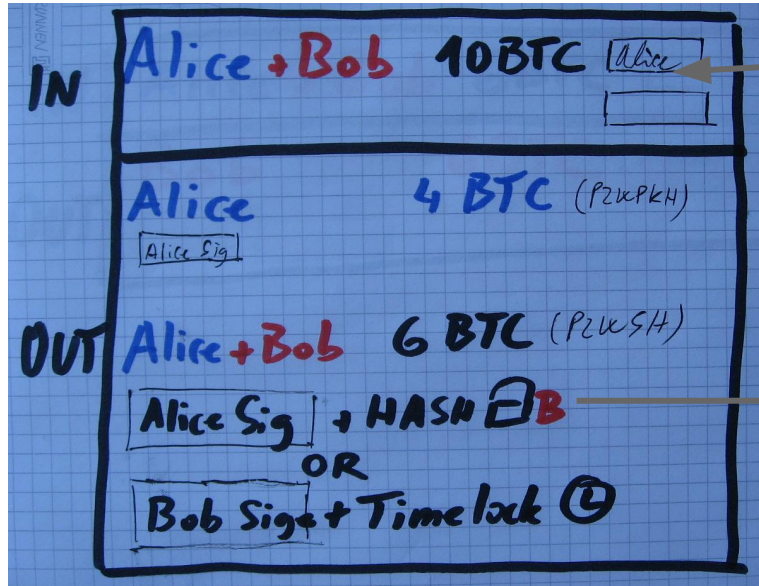
CHEATER LOSES ALL (CONT.)



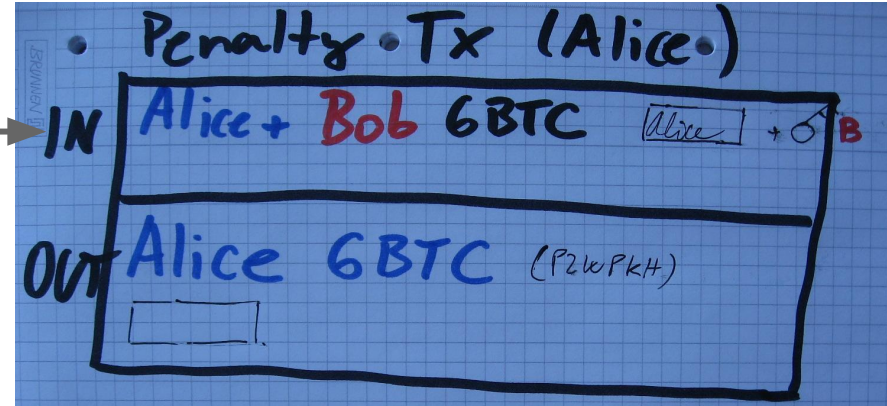
ALICE CHEATING



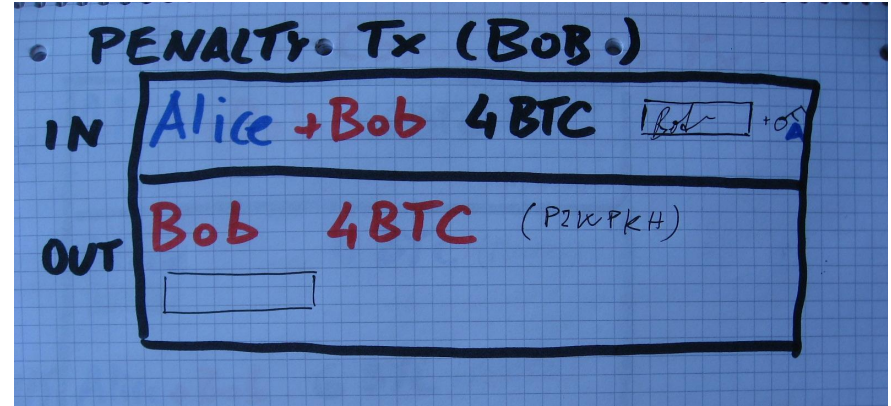
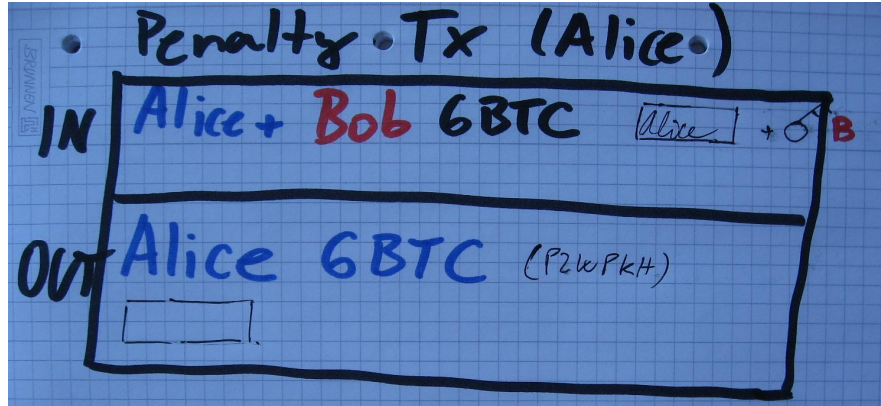
BOB - THE UNSMART CHEATER



BOB CHEATING



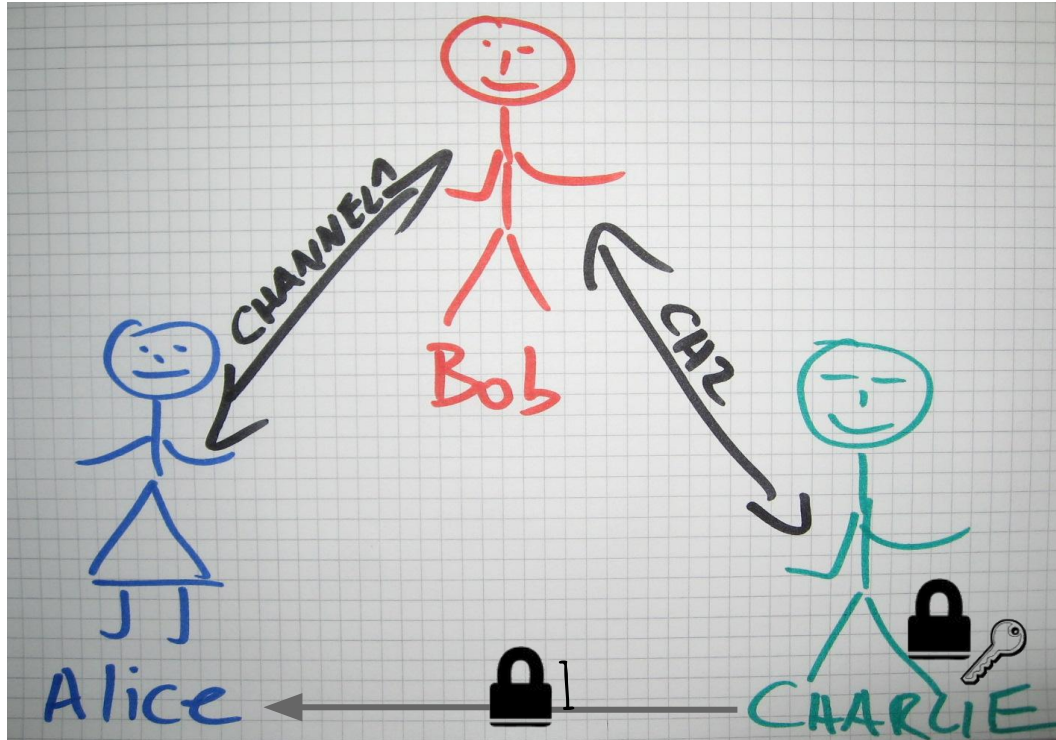
CHEATER LOSES ALL (CONT.)



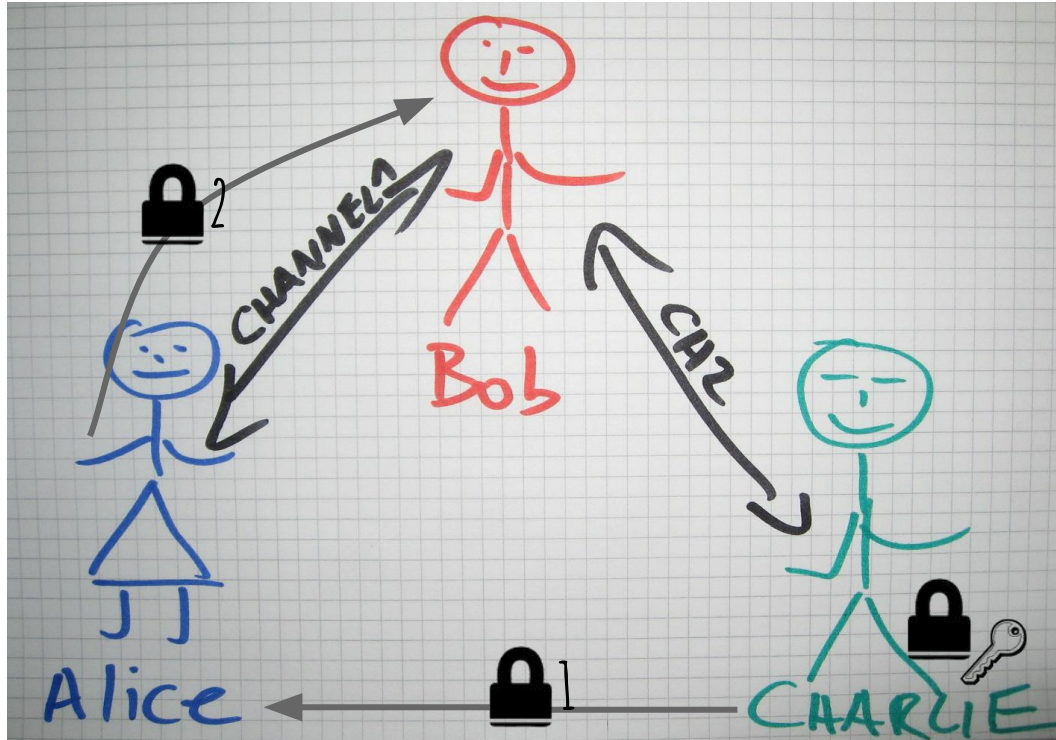


WHAT ABOUT CHARLIE?
(THE NETWORK)

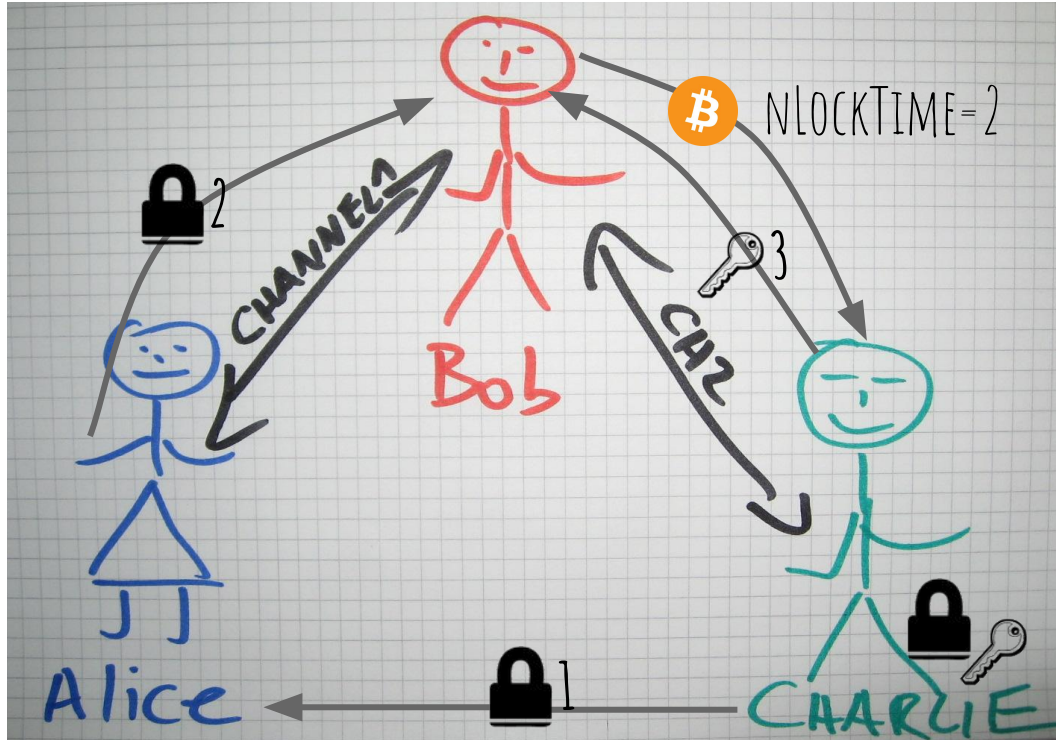
HASH TIMELOCKED CONTRACTS (HTLC's)



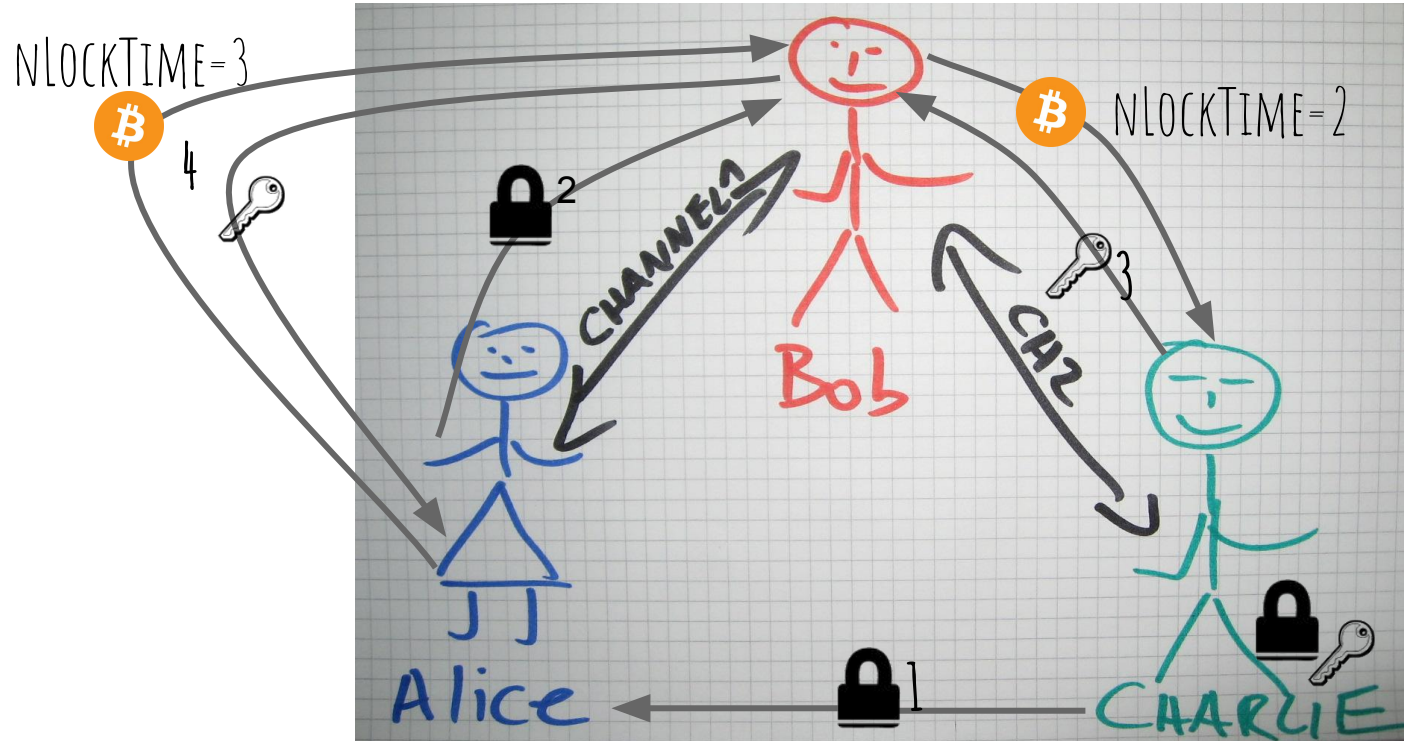
HASH TIMELOCKED CONTRACTS (HTLC's)



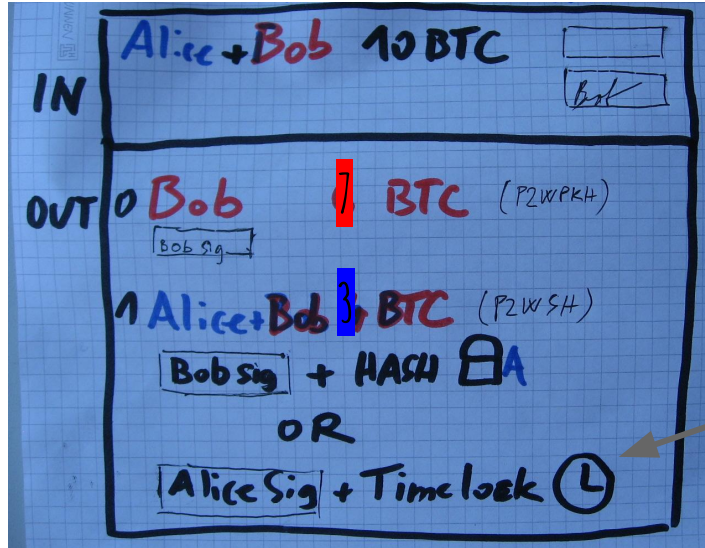
HASH TIMELOCKED CONTRACTS (HTLC's)



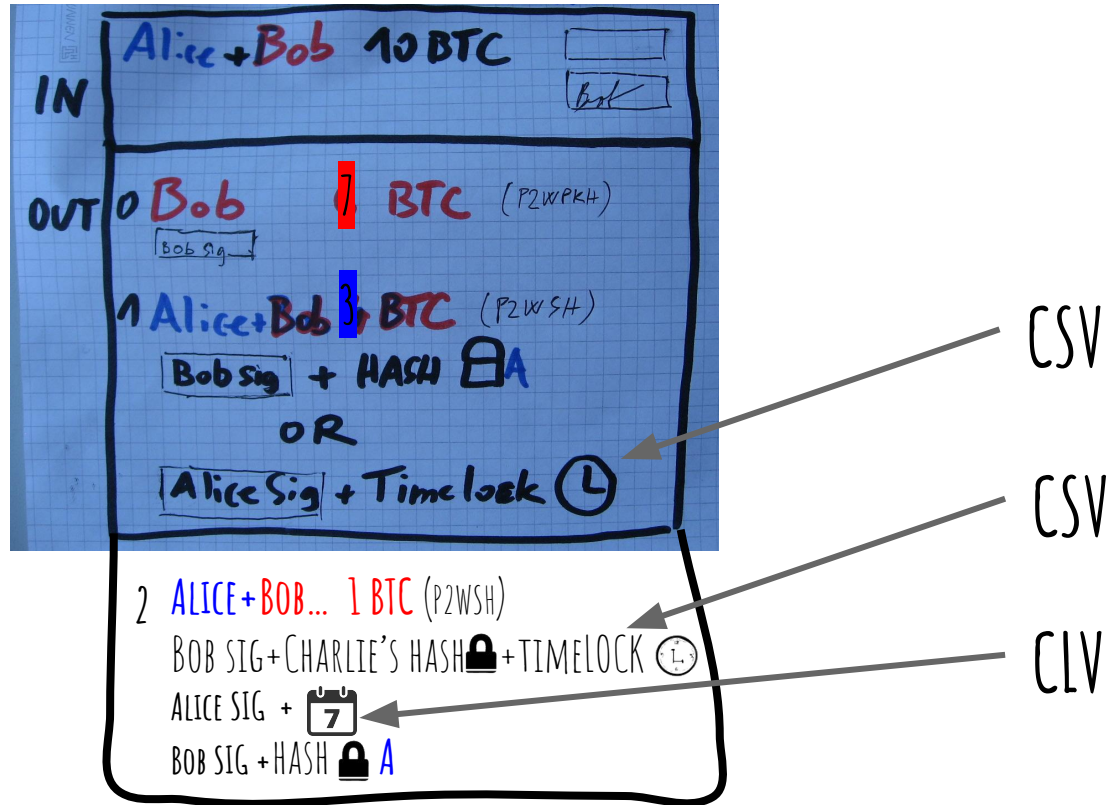
HASH TIMELOCKED CONTRACTS (HTLC's)



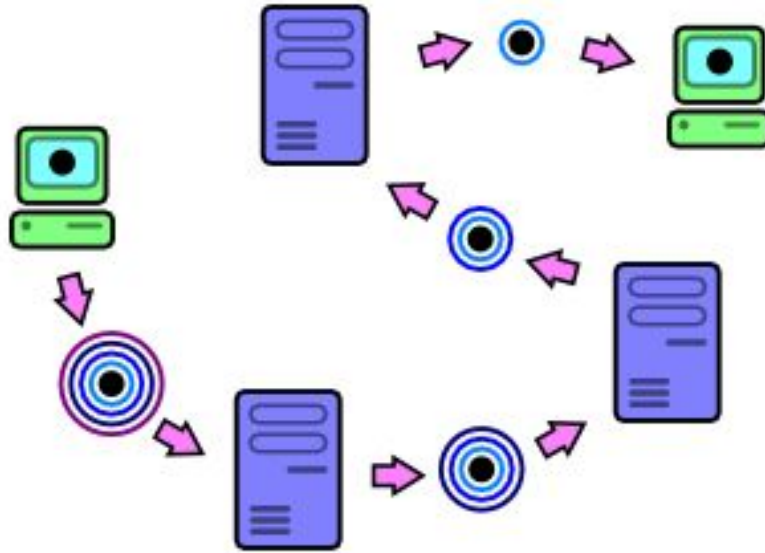
COMMITMENT TRANSACTION - WITH HTLC (ALICE)



COMMITMENT TRANSACTION - WITH HTLC (ALICE)



USE THE ONION ROUTING, LUKE...



HOWEVER...

MONITOR THE
CHEATERS...

42.9MBTC.



OFF-CHAIN=ONLINE.

EARLY ALPHA

AND...





[HTTPS://BRAINS.GITHUB.IO/LIGHTNINGNETWORK-RESEARCH-NOTES/](https://BRAINS.GITHUB.IO/LIGHTNINGNETWORK-RESEARCH-NOTES/)

