

The impact of Blockchain technology on trading and settlement

ETCSEE 2018, Plenary session “The future of trading”

Budapest, 13 June 2018

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Agenda

- ❑ **Blockchain + Energy = ?**

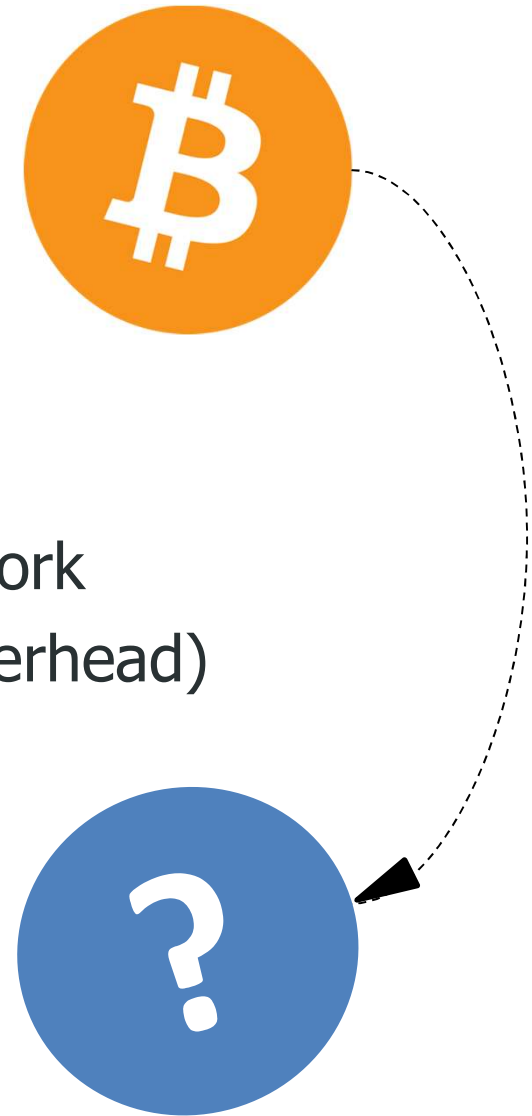
- ❑ Enerchain Case Study

- ❑ Scenarios for the Future

- ❑ Q & A

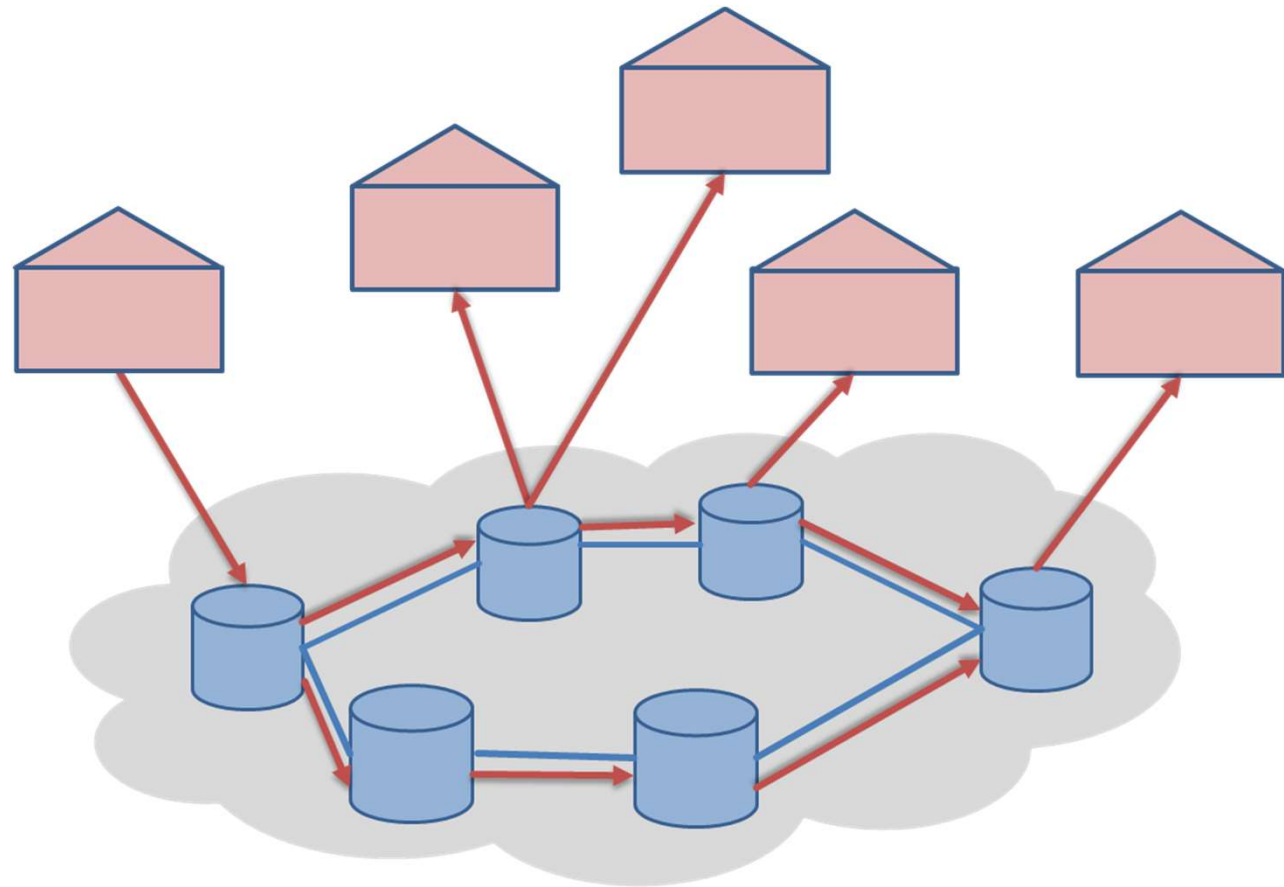
What is a blockchain?

- ❑ Open, distributed ledger
- ❑ Records transactions between parties:
 - ❑ Records are verifiable
 - ❑ Records are immutable
- ❑ Consists of nodes
- ❑ Nodes communicate in peer-to-peer network
- ❑ Nodes follow communication protocol (overhead)
- ❑ Nodes validate new blocks by following:
 - ❑ Secure consensus mechanism
 - ❑ Decentralised consensus mechanism
 - ❑ Incentive for validation?
- ❑ No assumption on trustworthiness



Bits and pieces

- ☐ Open
- ☐ Distributed
- ☐ Transactions
- ☐ Parties
- ☐ Nodes
- ☐ Peer-to-peer
- ☐ Protocol
- ☐ Validation
- ☐ Consensus
- ☐ Trust
- ☐ Incentive



Which Blockchain?

Four simple questions:

- ☐ Open or closed (“permissioned”)?
- ☐ Which consensus mechanism?
- ☐ Using cryptocurrency?
- ☐ Financed by ICO?



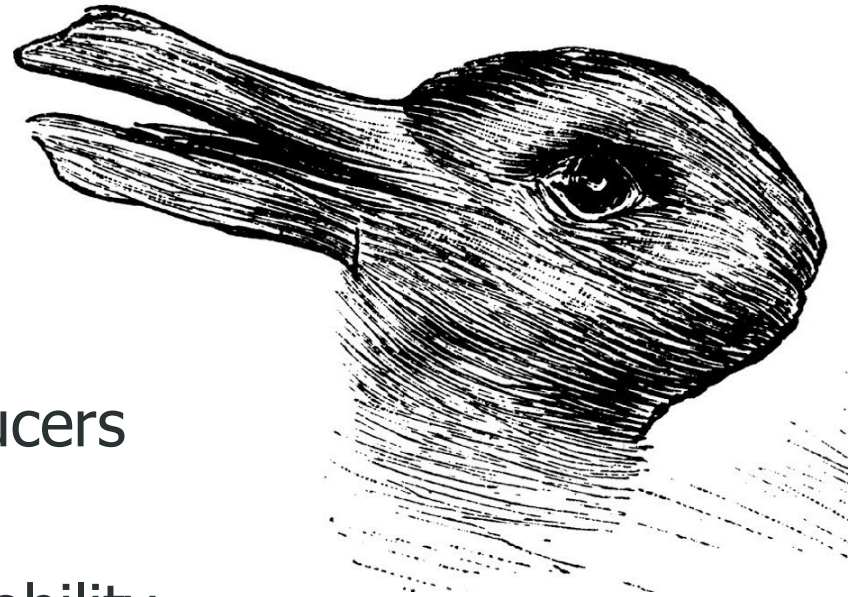
A solution looking for a problem?

Suitable problems:

- ❑ Preventing double-spend in low trust environment
- ❑ High resilience at low cost
- ❑ Synchronization of select data items
- ❑ Network effects without monopoly power – distributed governance
- ❑ Publication as up-front integration



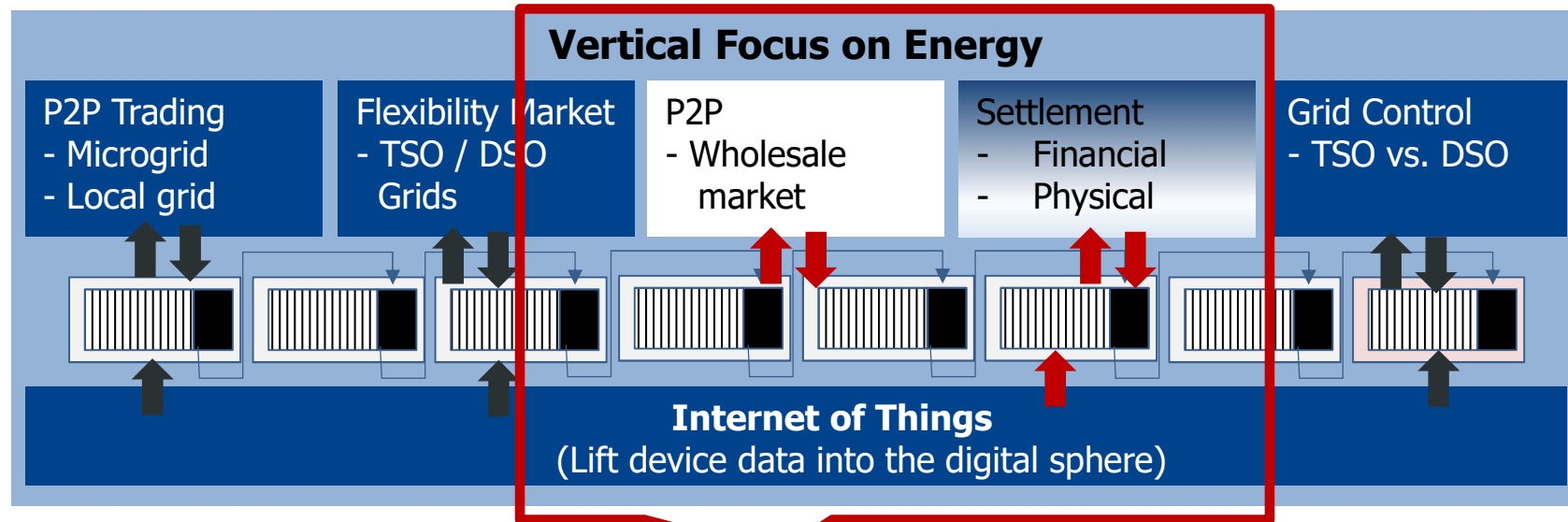
So what is it, duck or rabbit?



Are these suitable problems?

- ☐ Biogas registry, run by producers
- ☐ Physical oil trade finance
- ☐ Billing infrastructure for e-mobility
- ☐ Flexibility market within one TSO zone
- ☐ Mining Ether, rig consumption as balancing power
- ☐ Automation of bilateral trade confirmation process
- ☐ Exchange of power and consumption between prosumers
- ☐ Trading wholesale power between large traders...

Blockchain & Energy: Use Cases



ener
chain

Horizontal Technical Features & Challenges

Access / Identity Management / Archive historic blocks
Load / Mass Data / Performance / Stability / Security / Privacy

Why in Wholesale Energy Trading?

Why participate

- ❑ Lower cost of trading
- ❑ Enable new products
- ❑ Learn to apply blockchain
- ❑ Drive change in market



Barriers to change in energy trading

- ❑ High (fixed) cost of trading at venues
- ❑ High capital requirements for clearing / collateral
- ❑ Lack of choice re. market connectivity (closed stack/API)
- ❑ Complex physical settlement processes
- ❑ Low flexibility for new roles, new products, innovation...

Why closed (“permissioned”)?

- ❑ Limited number of participants in wholesale trading
 - ❑ 13.000 ACER codes vs. 500 spot market MPs vs. 200 EFET Master Agreements
- ❑ Identity is known / can be established:
 - ❑ ACER Code, EIC code, LEI, VAT code...
- ❑ Bilateral trading requires master agreement
 - ❑ Counterparties know each other
- ❑ No cryptocurrency
 - ❑ No money in the system
 - ❑ Could be pegged to EUR though
- ❑ No mining – proof of stake
- ❑ No ICO
 - ❑ Consortium funded, no start-up



Agenda

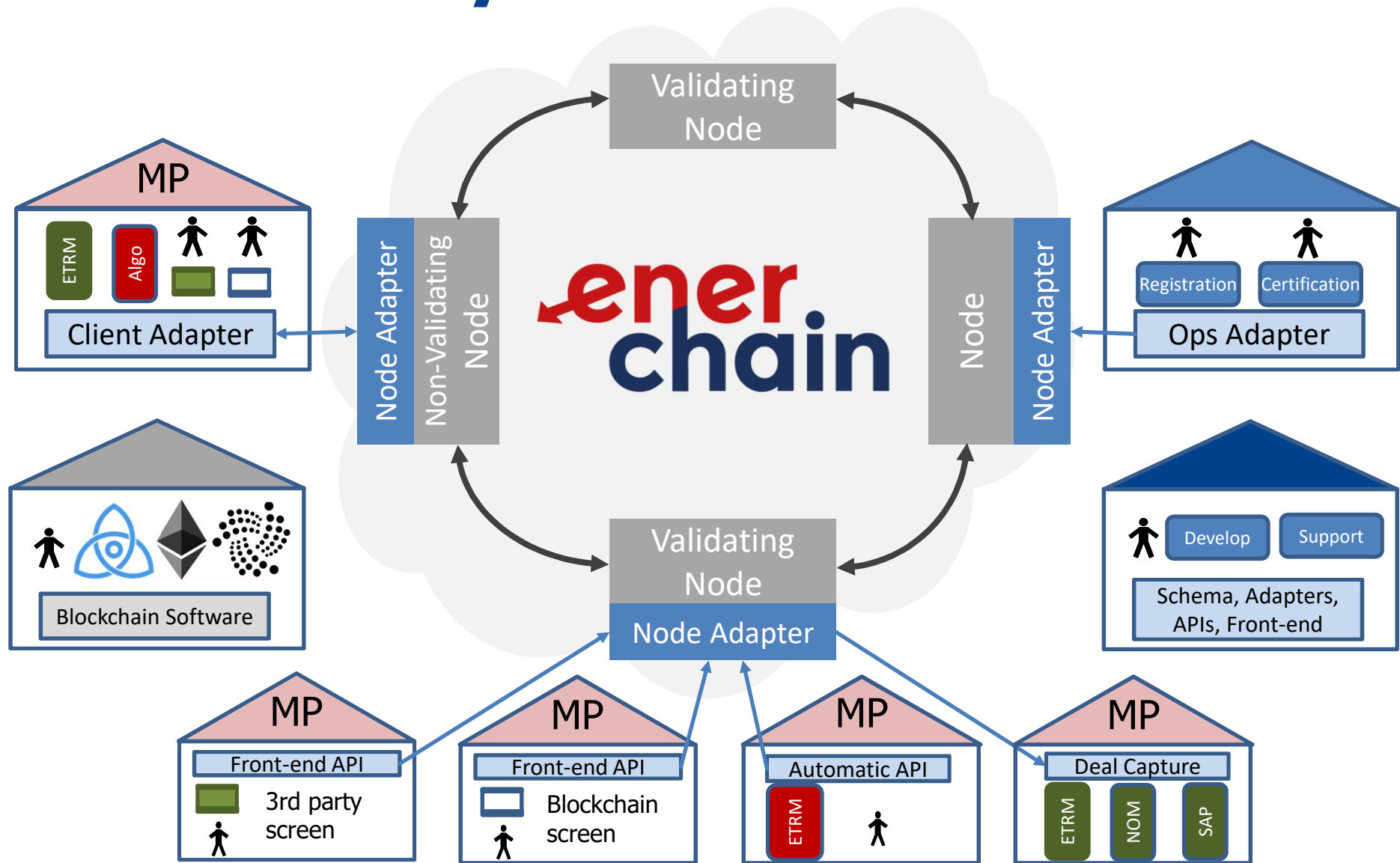
- ❑ Blockchain + Energy = ?

- ❑ **Enerchain Case Study**

- ❑ Scenarios for the Future

- ❑ Q & A

Connectivity



Trading screen

Enerchain - test

Edit

GAS POWER

	POWER - Swiss Control Area				POWER - TenneT TSO GmbH				POWER - Amprion GmbH				POWER - 50Hertz Transmission GmbH				POWER -
	bid vol	bid	ask	ask vol	bid vol	bid	ask	ask vol	bid vol	bid	ask	ask vol	bid vol	bid	ask	ask vol	bid vol
- Quarter hour																	
+ H14 Q2					40	500,00			2,994	1,428,00							
+ H14 Q3									1,657	1,277,00							
+ H14 Q4									3,393	1,797,00							
+ H15 Q1									1,279	1,288,00							
- Intraday																	
+ H15	15	25,00															
H16																	
H17																	
H18																	
H19	25	25,00				80,00	10										
H20																	
H21																	
H22																	
- Day																	
30.08.																	
- 31.08.									10	37,37	55,00	8					
									10	37,37							
- 01.09.									25	40,00							
02.09.																	
03.09.																	
04.09.																	
05.09.																	
06.09.																	
07.09.																	
08.09.																	
09.09.																	
- Week																	
W35																	
W36																	
W37																	

Executions Orders

Trade list

filter trades...

Commodity	Delivery Area	Period	MW	Price	Curr.	Time	Buyer	Seller
POWER	Amprion GmbH	H8 Q2	2,756	143,00	EUR	11:03:56	trader.joe	trader.fat
POWER	Amprion GmbH	H9 Q2	2,526	281,00	EUR	10:37:08	trader.joe	trader.ola
GAS	Net Connect Germany	03.09.	20	20,00	EUR	10:34:45	trader.vanbm	trader.ola
POWER	Swiss Control Area	01.09.	1	1,00	EUR	10:28:50	david.ringhofer	trader.ola
POWER	Swiss Control Area	2018	1	1,00	EUR	10:28:33	david.ringhofer	trader.ola
POWER	Swiss Control Area	2018	1	1,00	EUR	10:28:23	david.ringhofer	trader.ola
POWER	Swiss Control Area	2018	40	86,00	EUR	10:28:19	david.ringhofer	trader.ola
POWER	Swiss Control Area	01.09.	1	1,00	EUR	10:27:56	david.ringhofer	trader.ola
POWER	Swiss Control Area	01.09.	40	86,00	EUR	10:27:29	david.ringhofer	trader.ola
POWER	Amprion GmbH	H8 Q3	3,559	1,999,00	EUR	10:27:21	trader.joe	trader.ola
POWER	Amprion GmbH	H8 Q4	3,470	1,296,00	EUR	10:27:15	trader.joe	trader.ola
GAS	GASPOOL	2018 Q1	20	50,00	EUR	10:26:55	trader.vanbm	trader.ola
POWER	Amprion GmbH	H8 Q2	100	145,00	EUR	10:16:07	trader.fabian	trader.tes
POWER	Amprion GmbH	H8 Q4	3,830	661,00	EUR	10:08:12	trader.joe	trader.var
GAS	TTF	02.09.	10	100,00	EUR	10:06:59	trader.vanbm	trader.dir
GAS	GASPOOL	01.09.	1	1,00	EUR	09:46:21	trader.test	axpo-trad
POWER	Amprion GmbH	H10	1,500	1,000,00	EUR	09:43:03	trader.test	trader.tes
POWER	Amprion GmbH	H9	1,000	1,000,00	EUR	09:43:00	trader.test	trader.tes
POWER	Amprion GmbH	H8 Q2	1,197	1,046,00	EUR	09:40:34	trader.joe	trader.ola
POWER	Amprion GmbH	H8 Q1	3,742	1,972,00	EUR	09:38:30	trader.joe	trader.tes
POWER	Swiss Control Area	2018	5	45,00	EUR	09:36:14	trader.test	trader.tes
POWER	Swiss Control Area	2018	5	40,00	EUR	09:36:08	trader.test	trader.tes
POWER	Swiss Control Area	2018-1	200	100,00	EUR	09:34:56	axpo-trader1	trader.var
POWER	Amprion GmbH	H10	1,500	1,000,00	EUR	09:23:36	trader.fabian	trader.tes
POWER	Amprion GmbH	H7 Q4	1,342	575,00	EUR	09:13:18	trader.joe	trader.tes
POWER	TenneT TSO GmbH	2018	5	35,00	EUR	09:03:52	trader.dirk	trader.lor
POWER	Amprion GmbH	H6 Q1	3,496	110,00	EUR	09:01:19	trader.joe	trader.tes
POWER	Amprion GmbH	H17 Q3	1,446	1,318,00	EUR	30.08. 22:17	trader.joe	trader.tes
POWER	Amprion GmbH	H19 Q4	3,912	1,858,00	EUR	30.08. 21:59	trader.joe	trader.tes
POWER	Amprion GmbH	H19 Q4	4,777	1,946,00	EUR	30.08. 21:59	trader.joe	trader.tes
GAS	GASPOOL	2018 Q1	250	40,00	EUR	30.08. 21:18	trader.test	trader.tot
POWER	TenneT TSO GmbH	H14 Q2	40	500,00	EUR	30.08. 18:01	trader.vanbm	trader.ict
POWER	Amprion GmbH	H13 Q4	100	2,000,00	EUR	30.08. 17:04	trader.ict1	trader.tot
GAS	TTF	H15	30	300,00	EUR	15:45:38	trader.trader1	trader.var
POWER	Amprion GmbH	H12 Q4	4,872	520,00	EUR	15:05:00	trader.joe	trader.fat
POWER	Amprion GmbH	H11 Q1	2,197	1,713,00	EUR	14:58:37	trader.dirk	trader.tes
POWER	Amprion GmbH	H12 Q2	2,660	120,00	EUR	14:52:15	trader.joe	trader.ict

B/S commodity location period start interval quantity price additional order info

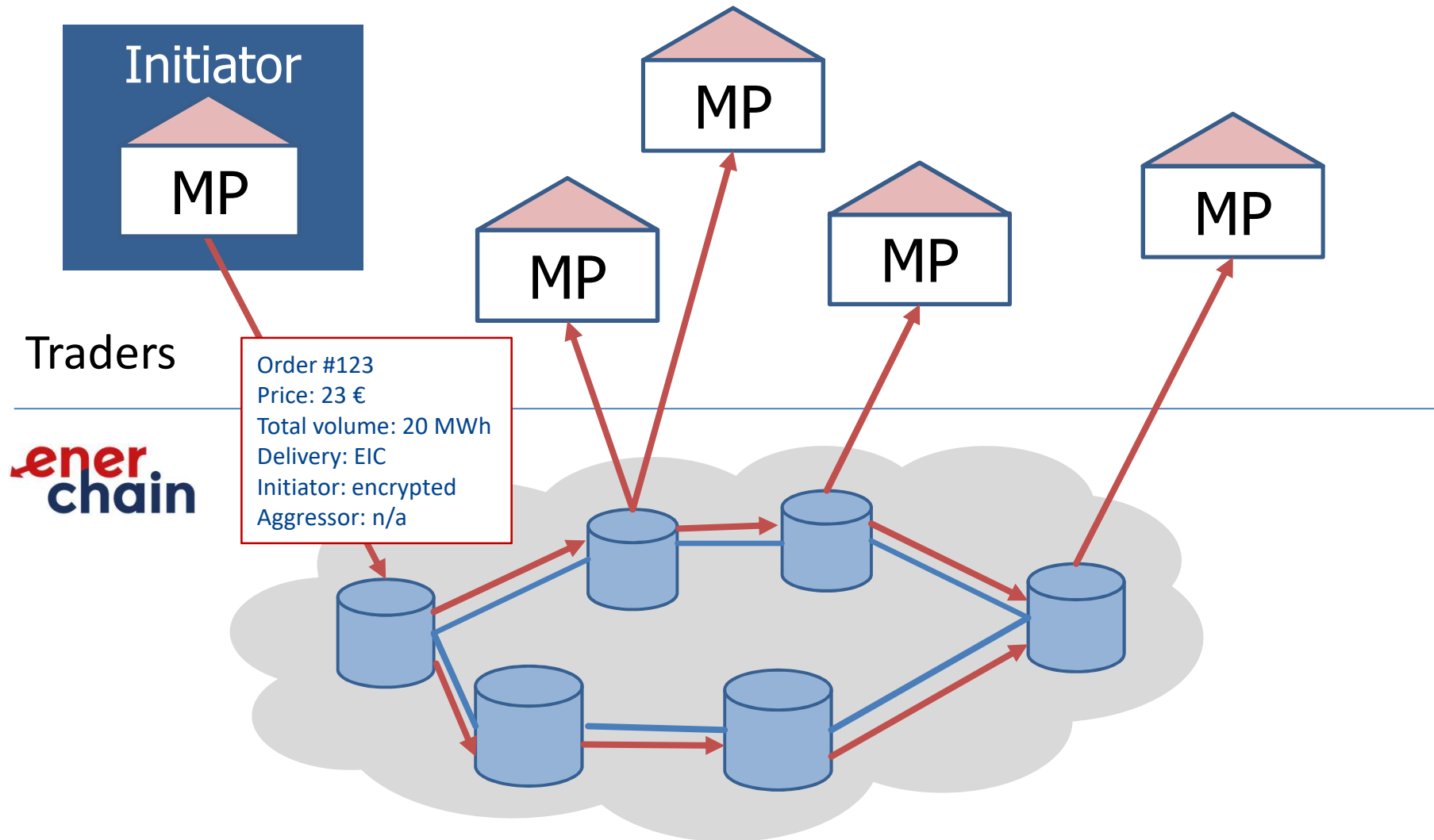
Buy POWER Amprion GmbH Day 01.09.2017 02:00

Buy

success

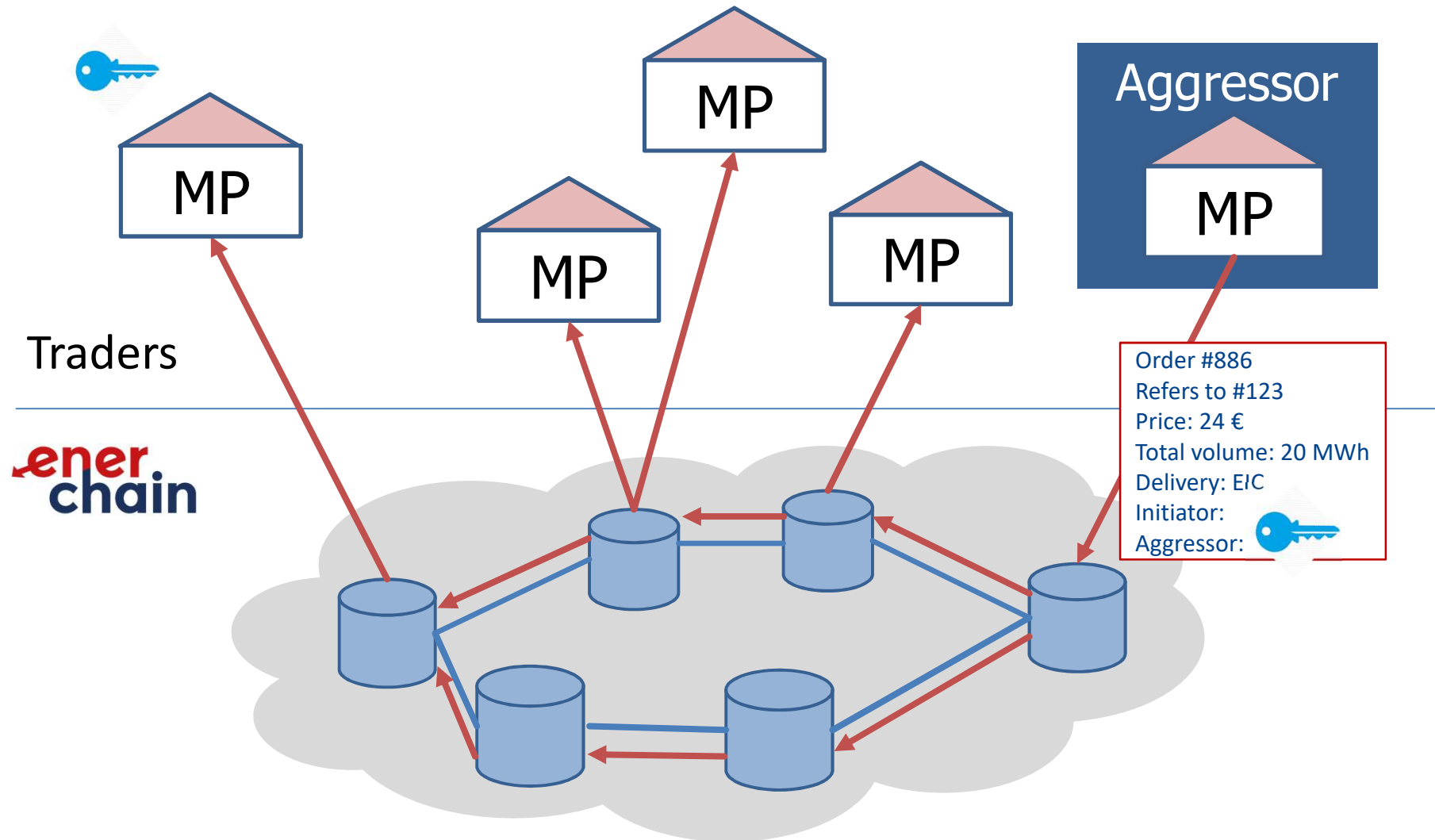
Donnerstag, 31. August 2017

Propagation of non-binding order*



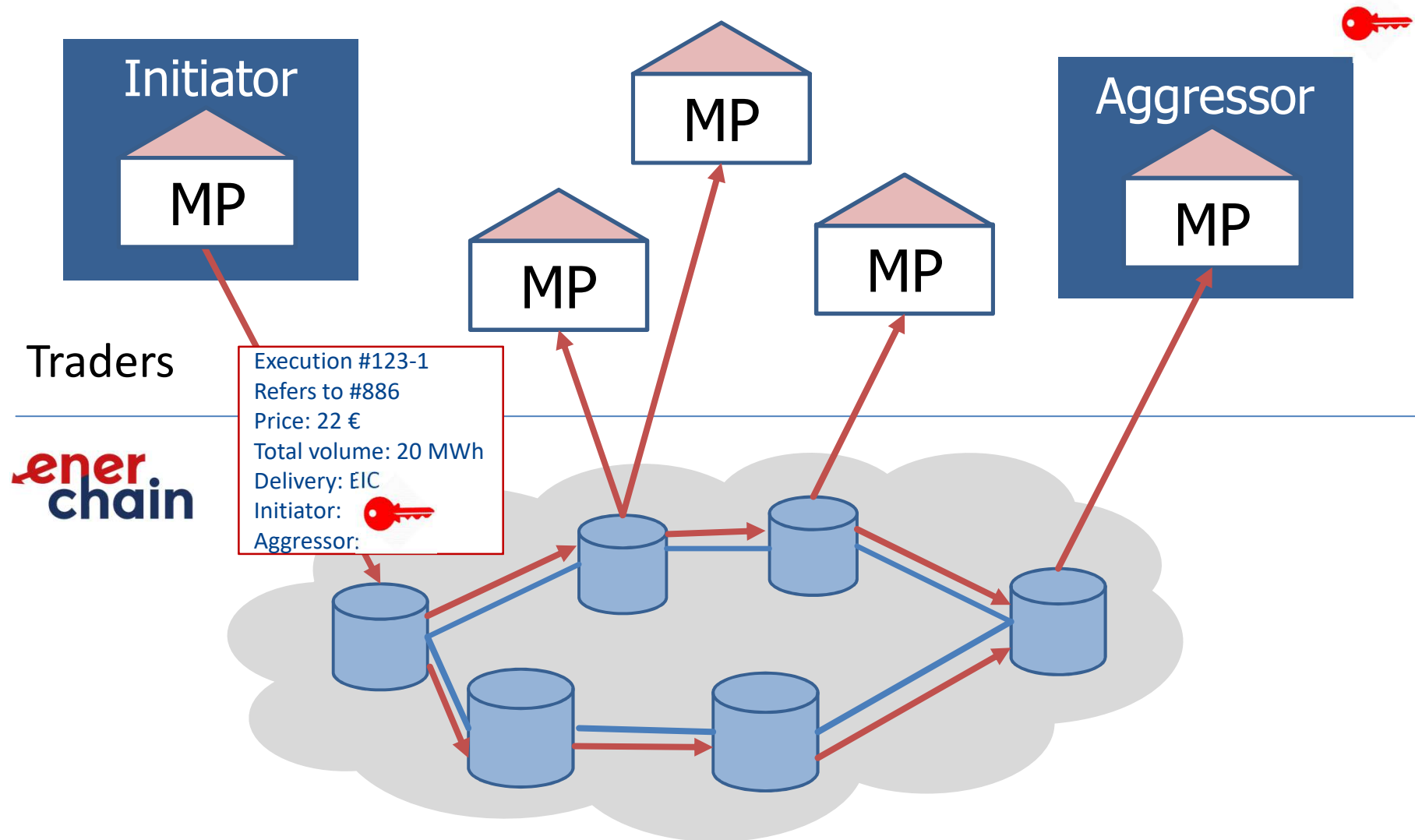
* Invitatio ad offerendum

Response with binding order*



* Offerta ad incertas personas

Trade execution by order acceptance



Market design

Participation

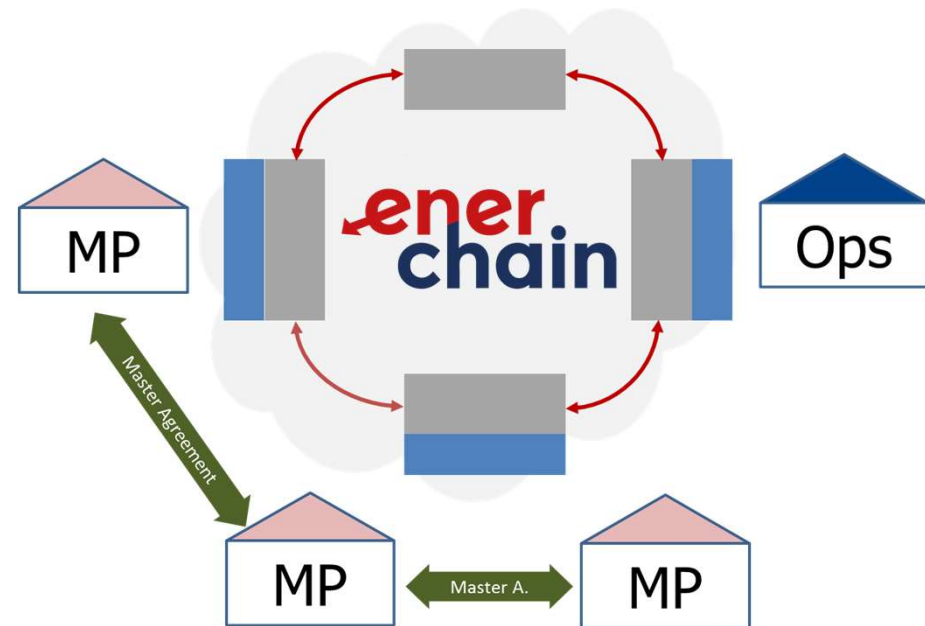
- ❑ Permissioned blockchain
- ❑ Traders only, multi-lateral
- ❑ Joint governance

Settlement & compliance

- ❑ Deal capture, then confirm
- ❑ Transaction reporting
- ❑ Settlement “off-line”

Product and markets

- ❑ Physical settlement only
- ❑ Markets: IDH, DAH, FW



Trading mechanism

- ❑ Decentral orders
- ❑ Credit Limits Process
- ❑ Click & trade / API
- ❑ Bilateral OTC

Enerchain Timeline

- ❑ 2016: PONTON developed P2P energy trading demonstrator “Enerchain”
- ❑ EMART 2016: first energy trade via the blockchain in Europe executed on Enerchain
- ❑ Feb. 2017: Enerchain Kick-off workshop in Berlin
- ❑ May 2017: Project Participation Agreement (PPA) with 22 companies, critical mass achieved
- ❑ Oct. 2017: 33 companies signed, 28 connected
- ❑ EMART 2017: Trades from trading floor
- ❑ 2018: New governance
- ❑ Transfer to new Enerchain entity in 2018



Enerchain started in 2017

- Has ca. 40 participants across Europe as of June 2018:

				
				
				
				
				
				
			+ companies without permission to share logo	

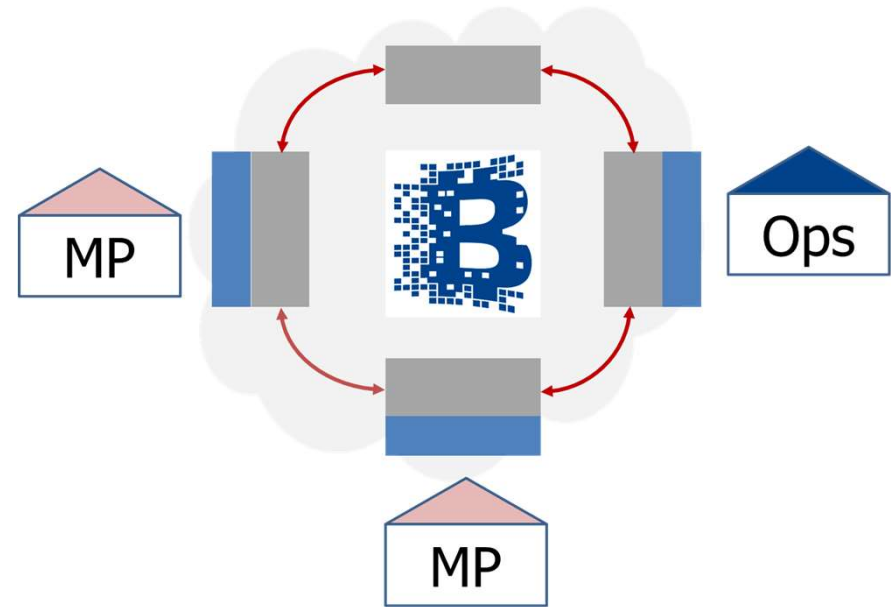
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- ❑ **Scenarios for the Future**
- ❑ Q & A

Liquidity pools

- ❑ Underserved regions
- ❑ Participant clusters
- ❑ New instruments
- ❑ Brokered trading, cleared trading, bilateral trading – blockchain as 4th channel?
- ❑ Secondary effects

Access will be key

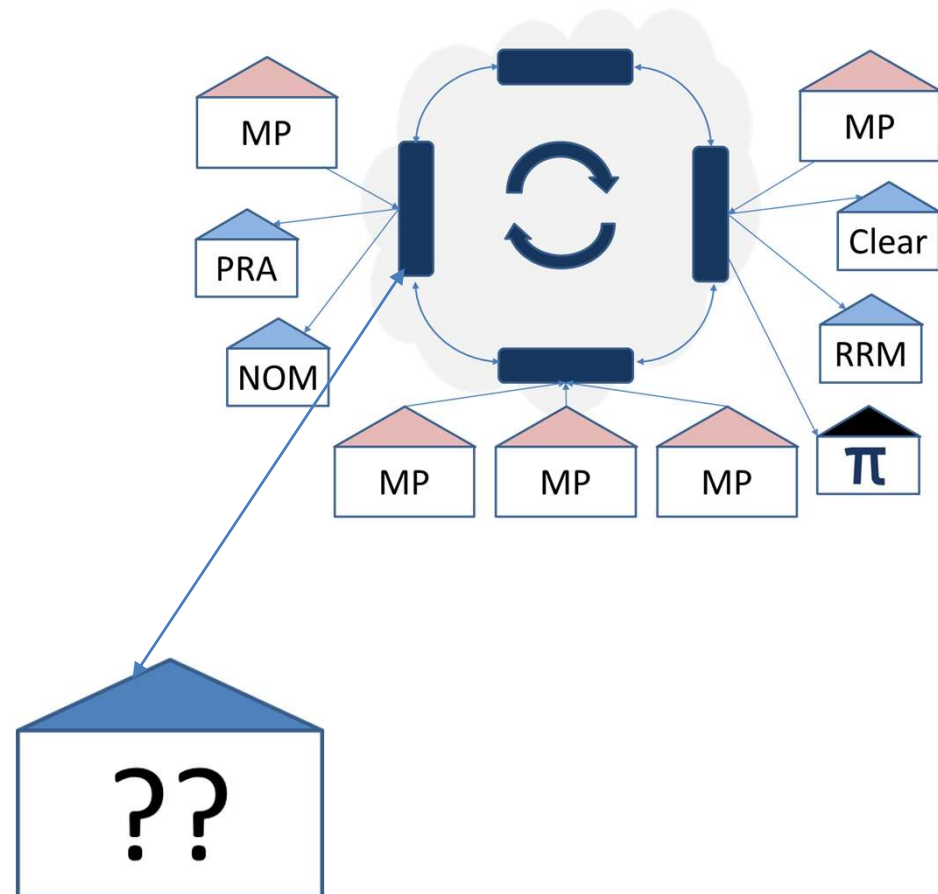


Post-execution services

Blockchain as Operating System:

- ❑ Physical Settlement as a Service
- ❑ Compliance as a Service
- ❑ OTC clearing
- ❑ Netting
- ❑ Portfolio compression
- ❑ ...

Portfolio upload key



Killer app?

- ❑ Infrastructure +
- ❑ Interoperability +
- ❑ Data +
- ❑ Ubiquity
- =
- Killer app

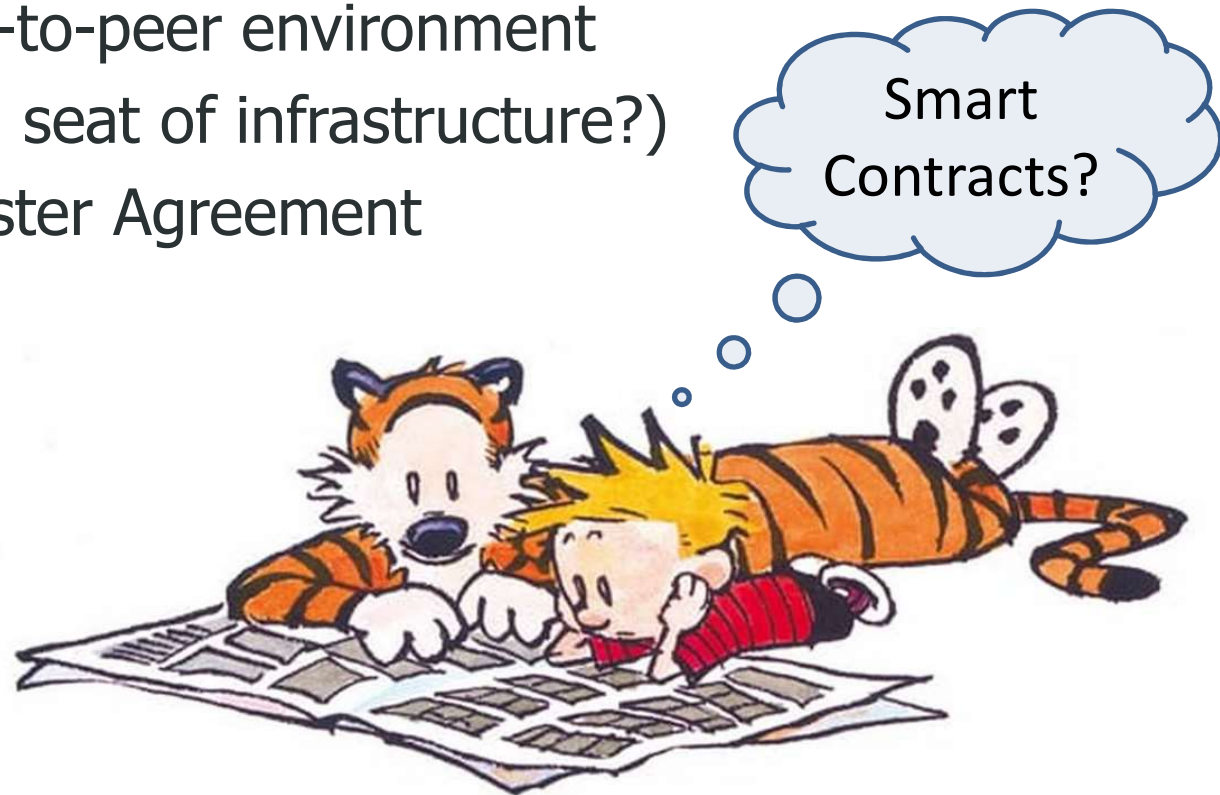


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Legal questions

- ❑ Declaration of intent – where, when, how?
- ❑ Acceptance / consent – where, when, how?
- ❑ Recourse in case of mistakes
- ❑ Liability in a peer-to-peer environment
- ❑ Jurisdiction (legal seat of infrastructure?)
- ❑ Fit with EFET Master Agreement



Regulatory questions

- ❑ How will trading on the blockchain be classified under REMIT?
- ❑ What classification under MiFID II?
- ❑ Artificial limits on financial trading - Nordics
- ❑ Who is the venue operator of a blockchain?
- ❑ How to retain anonymity while revealing identity in case of suspicious behavior?
- ❑ Can there be a statement of non-classification?



Thank you.

Looking forward to your call:

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