



Content Licensing Ledgers

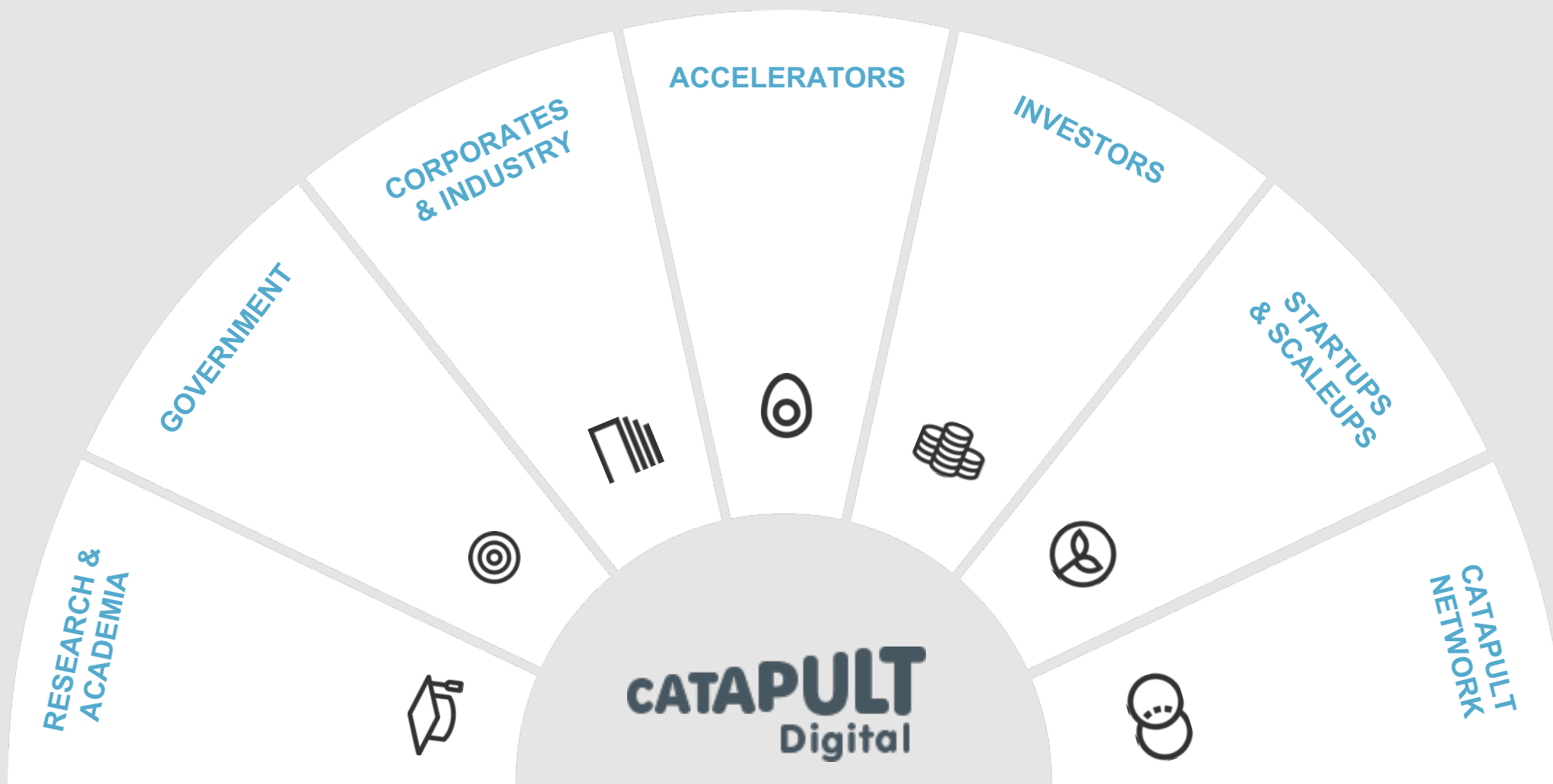
July 2019

Robert M. Learney, Lead Technologist – Blockchain & DLT
robert.learney@digicatapult.org.uk



- Introduction to Digital Catapult
- DLT deep-dive
 - Concept recap
 - Anatomy of a Distributed Ledger
 - Blockers to transformation
- Content licensing ledgers (e.g. CPN)
- Role of JPEG

Unique position – vendor-neutral technology & innovation specialists



Advanced Digital Technologies – we work across 4 technology areas which have maximum economic impact potential

Future Networks



- 5G
- IoT (LoRa & Sigfox)

Immersive



- VR & AR & Mixed
- Haptics

Artificial Intelligence



- Artificial Intelligence
- Machine Learning

Distributed Systems



- DLT
- Blockchain



Industry Focus – Remit is to focus on two broad industry sectors with the greatest growth potential for the UK economy

Manufacturing



Increasing the number of trailblazer companies working with advanced digital technologies in the UK manufacturing sector

Creative



Delivering advanced digital research, development and innovation for the UK's world-leading creative sector





We found evidence of massive investment, a massive global talent pool, and a desire for breakthrough digital innovation

But little engagement with DLT outside the financial sector

Supply Chains



- Turning supply chains into robust networks
- Improving trust and timeliness

Item Provenance



- Ensuring food safety
- Achieving sustainability goals

Rewarding Creators



- Tracking IP rights and usage

Securing our Future



- Managed data access for the AI-enabled economy
- Securing critical national infrastructure



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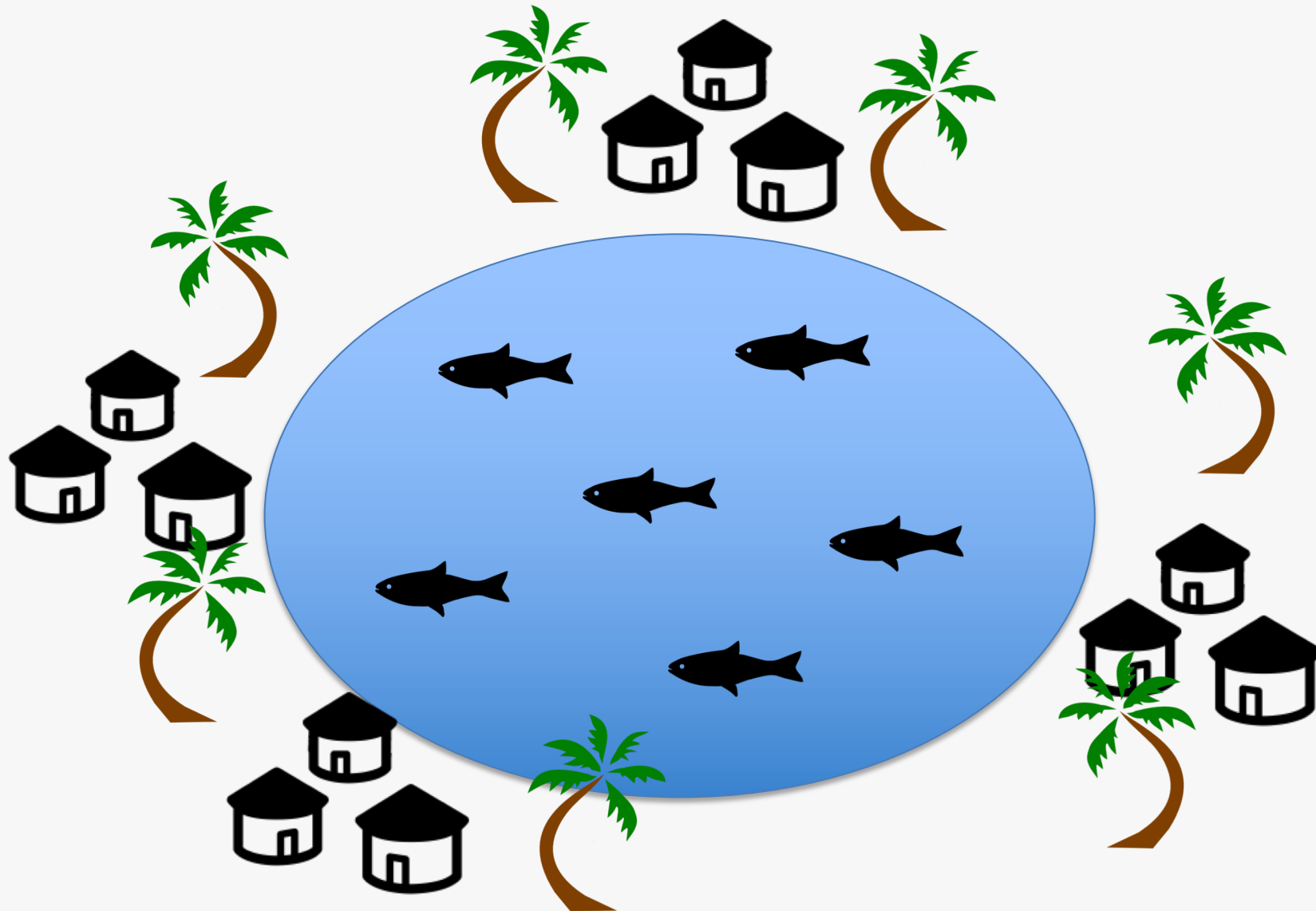
Securing our Future

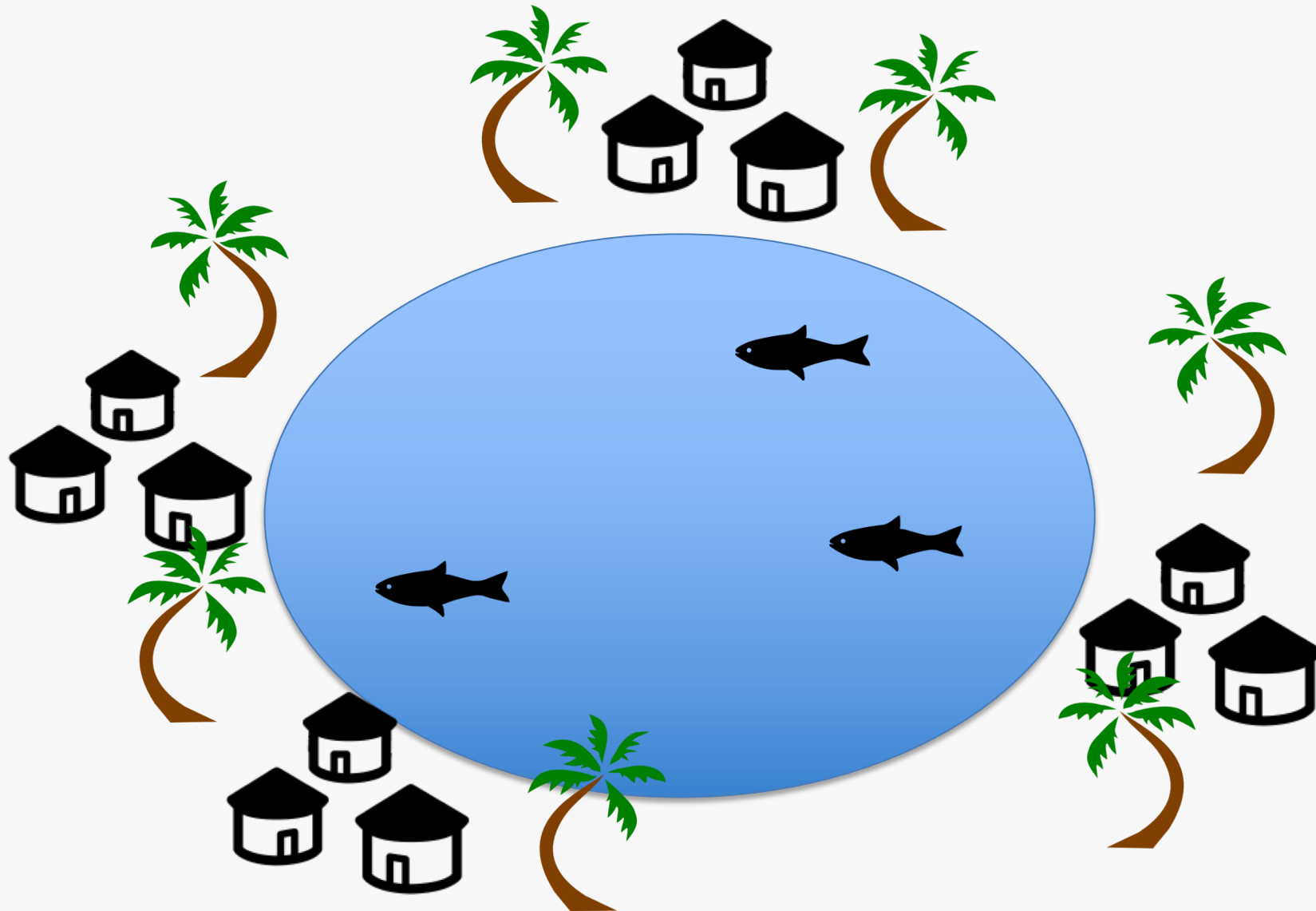


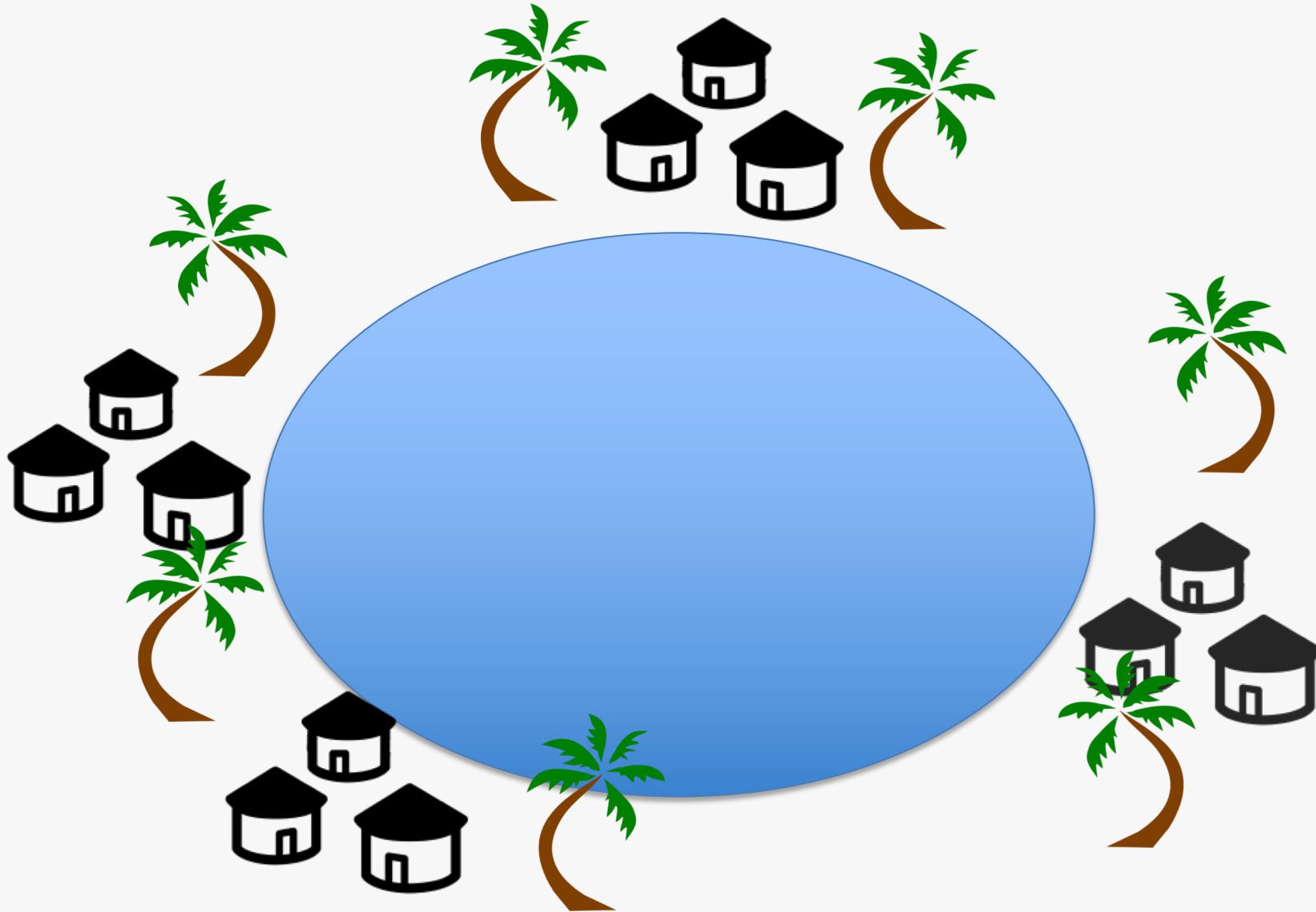
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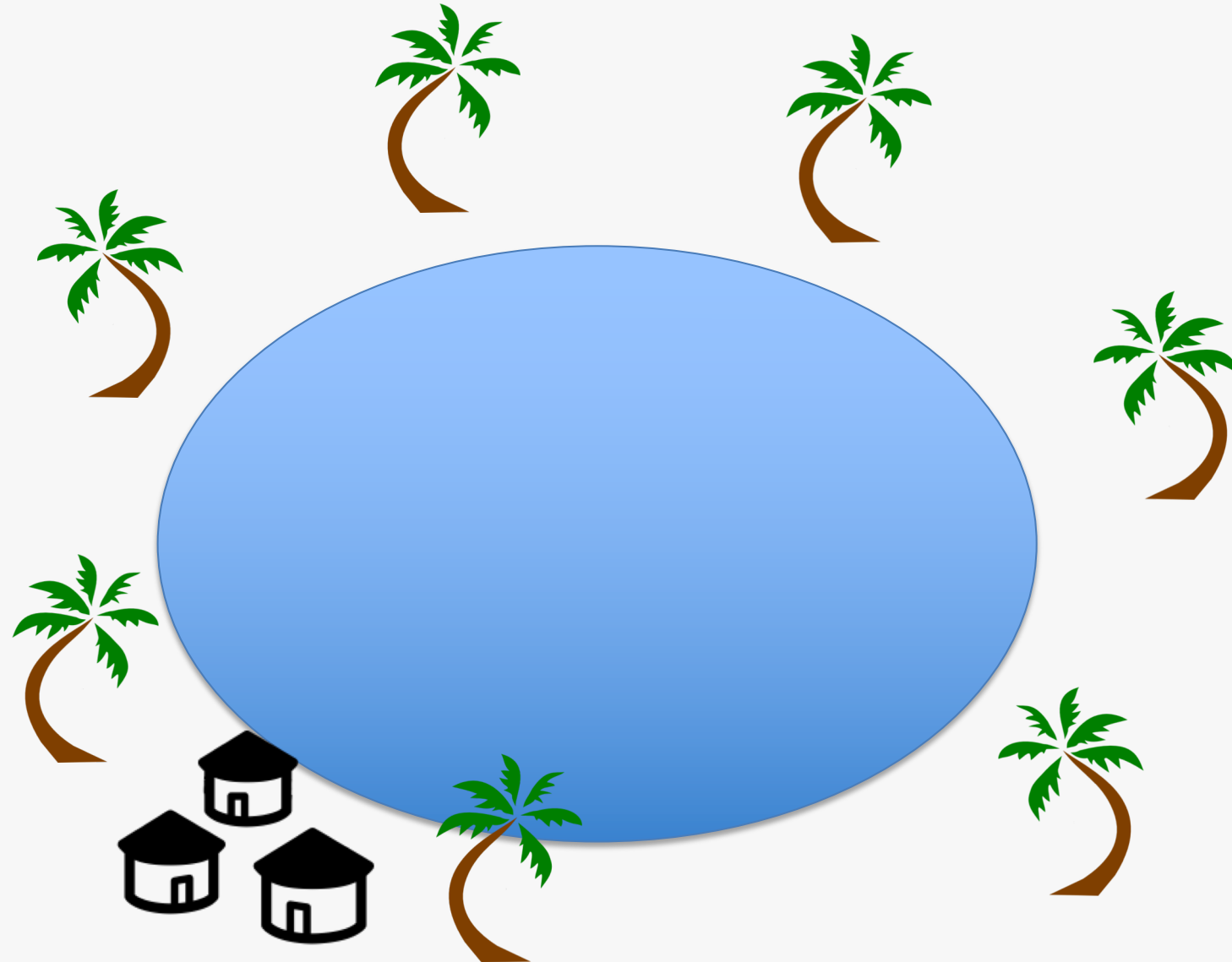


Why use Distributed Ledger Technology?



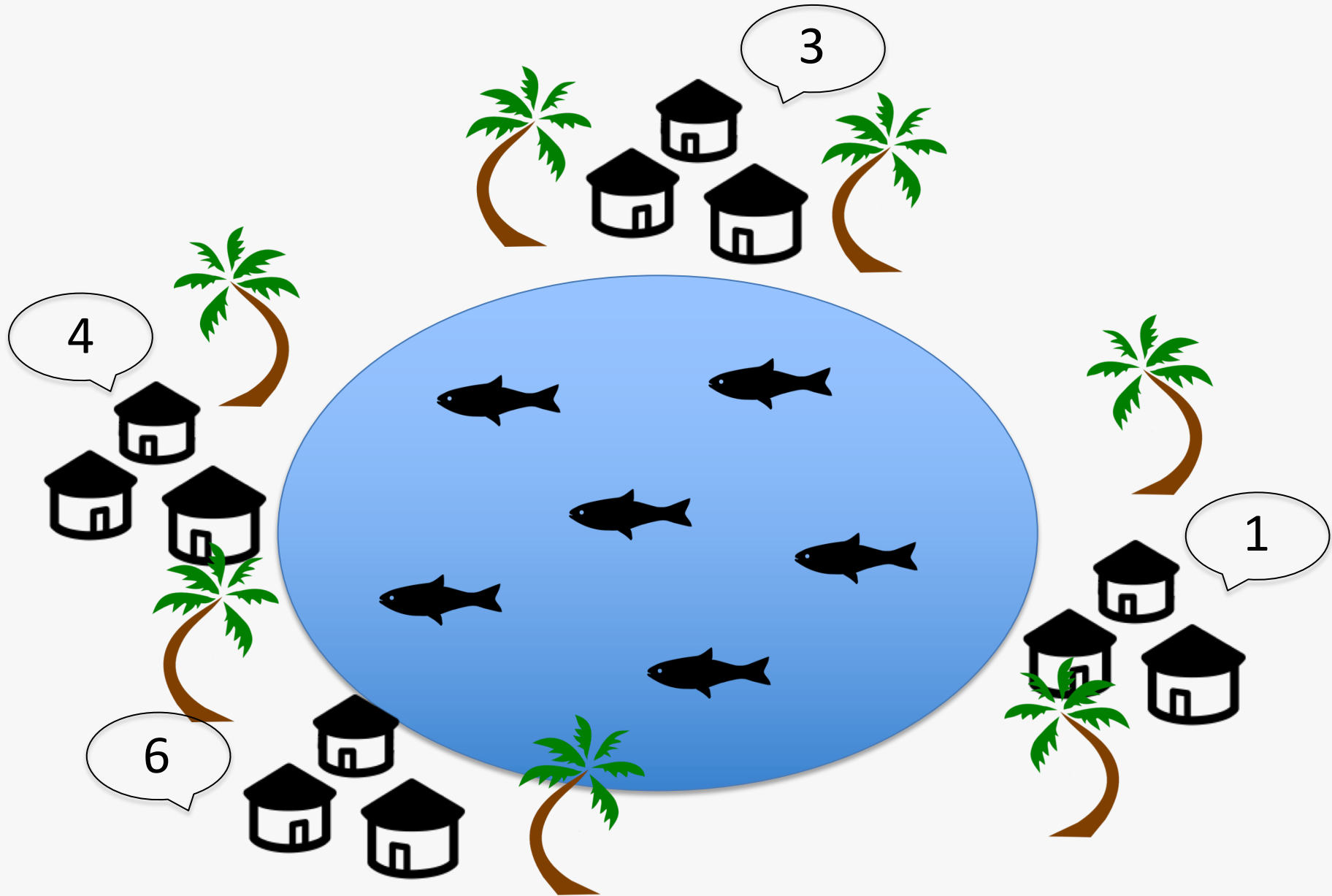








This is a Tragedy of the Commons





What is Distributed Ledger Technology?

Dr Vincent

1817

Jan	28	To Sundries	10	1	6
	30	" Making 10 th Shoes	"	5	"
		" 2 Days Taping Flax	10	"	"
March	19	" Taping & mending 10 th Shoes	2	"	"
	23	" Taping & mending 10 th Shoes	"	2	9
	26	" Mending 1 st Boots	"	1	"
April	5	" Taping & mending 1 st Boots	2	"	"
	26	" Mending 2 nd Boots	3	"	"
May	8	" Mending 1 st Boots 1 st Shoes	"	2	6
			£ 11 1 9		

1814

May	27	To Balance Due	1	"	8
	29	" Making 1 st Shoes binding	6	"	"
June	12	" Making 1 st Shoes	5	6	"
	21	" Making 1 st Shoes	"	1	6
	21	" Making 1 st Shoes	"	6	"
August	9	" Taping 1 st Shoes heels	"	2	6
	1	" Rake	"	2	"
Oct	4	" 1/2 Crushed Uncom	"	4	"
		" 1 Day haying	"	9	"
		" with Proy	"	9	"
		" 1 Day cutting Corn	"	8	"
		" with Proy	"	8	"
	9	" Making 1 st Shoes binding	5	6	"
	20	" Making 1 st Shoes	"	5	6
		" 1 Day when has Corn	2	"	"
	24	" Making 1 st Shoes	"	6	"
Dec	23	" Mending 1 st Shoes	"	2	"
1818	Jan	10	" Mending 1 st Shoes	"	2
	10	" Mending 1 st Shoes	"	1	2

Stillwill Cr

1817

Jan	28	By Sundries	9	16	1
May	17	" Horses & Plow	"	5	" 8
		" Balance due on 1 st of May	£ 11 1 9		

This day received & settled all a/c
& find due two Dollars fifty Eight

Ct's Durham May 27th 1817

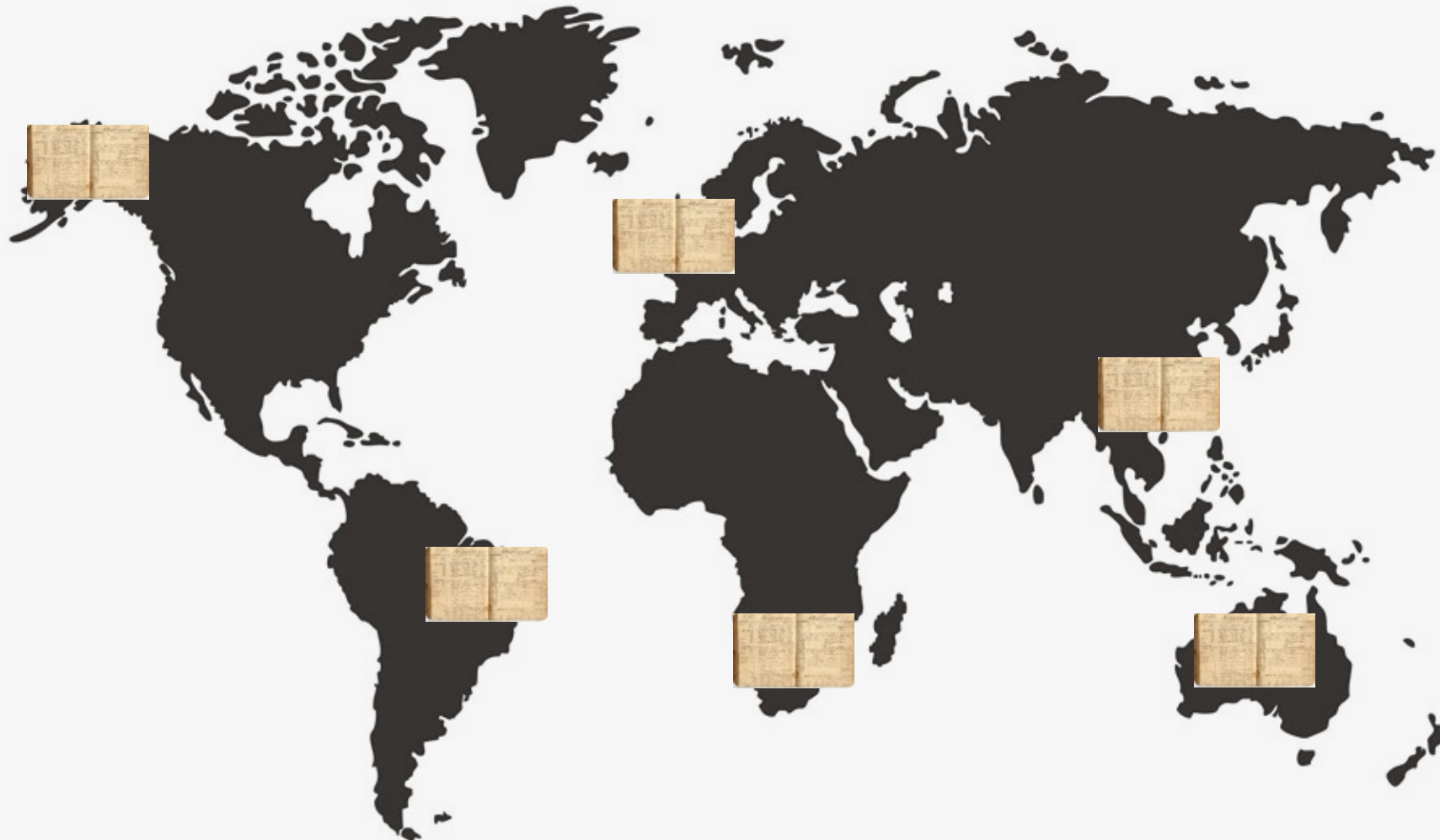
Christo Watrous

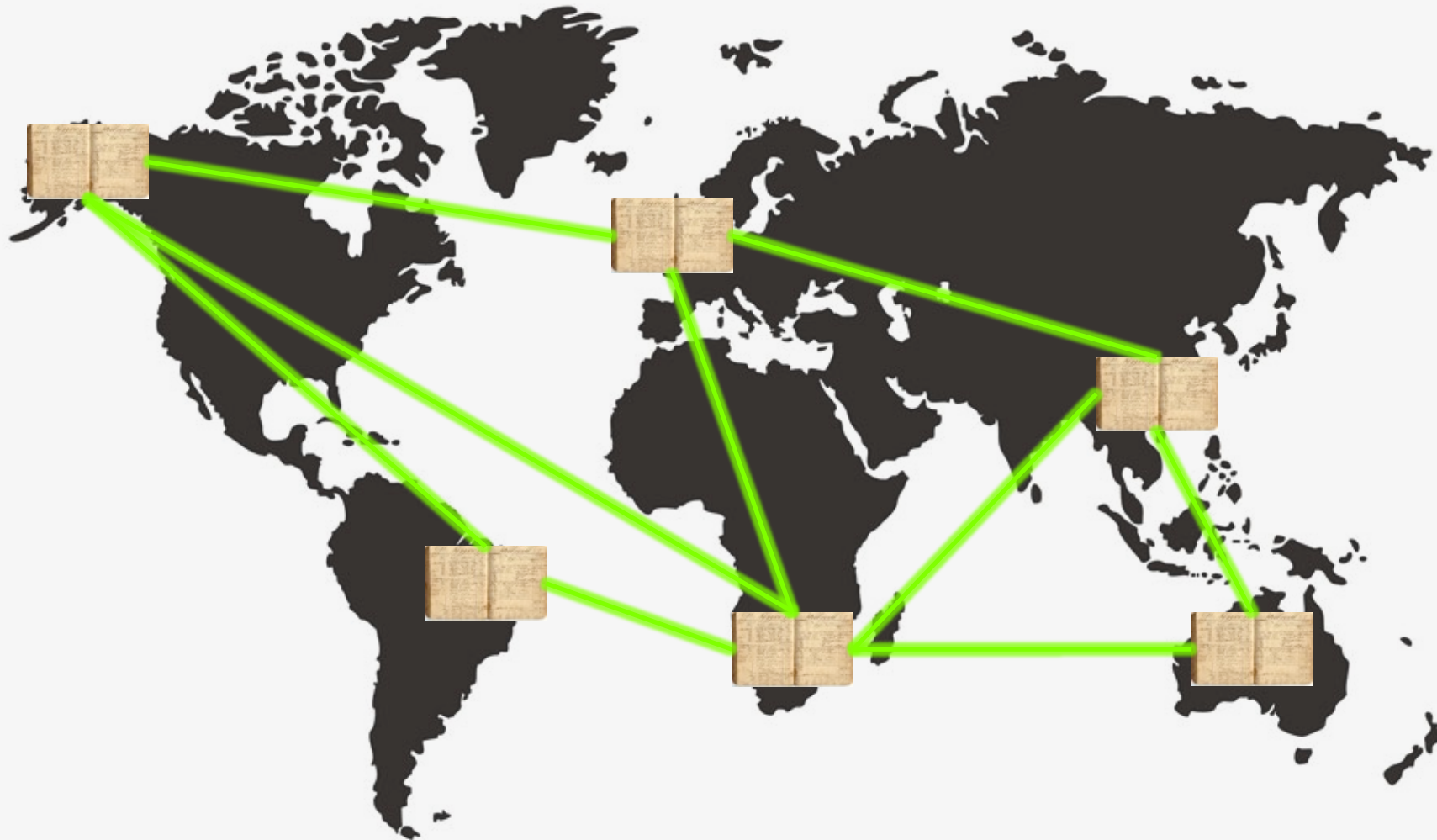
Vincent Stillwill

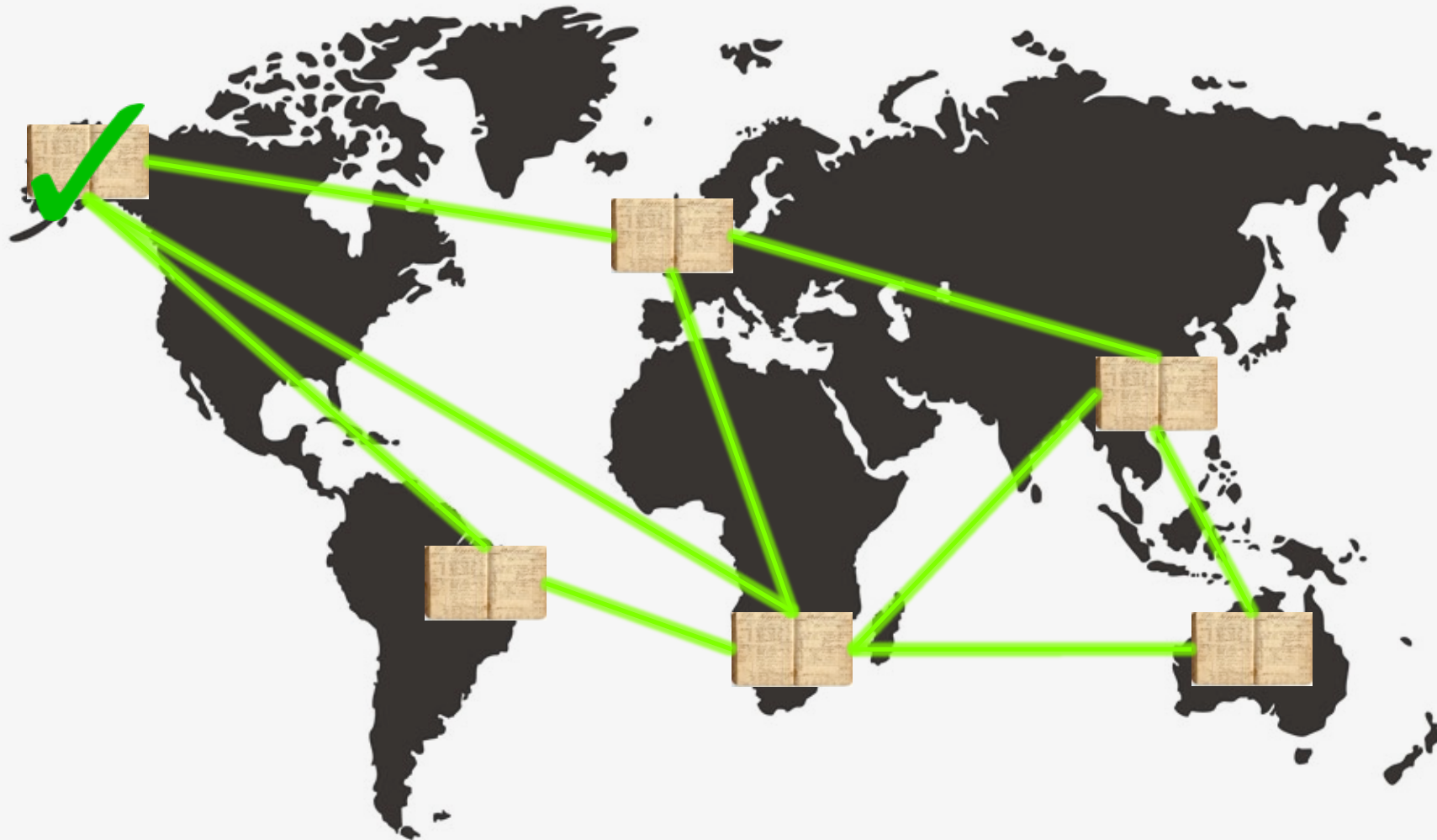
This account settled

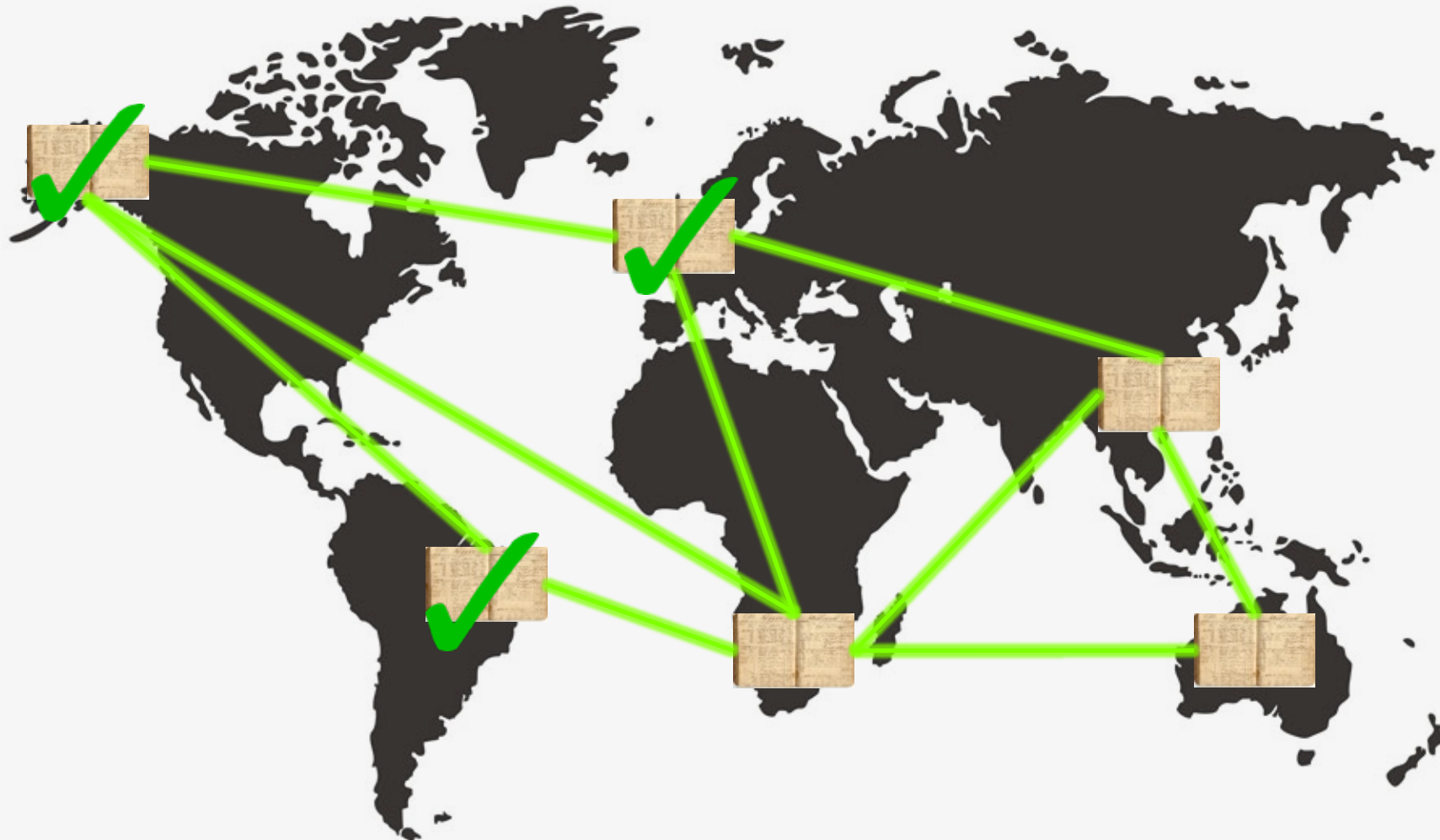
July	1	By 1/2 bushel Plaster	"	4	6
		" horse to Plow Corn	"	2	"
		" Hammer	"	2	"
Oct	4	" Horses & Plow	"	6	"
		" Flax ground	1	"	0
		" Herring flaxseed	"	3	9
Dec	4	" 8 Bus. Dutch wheat	1	4	"
			3 2 3		

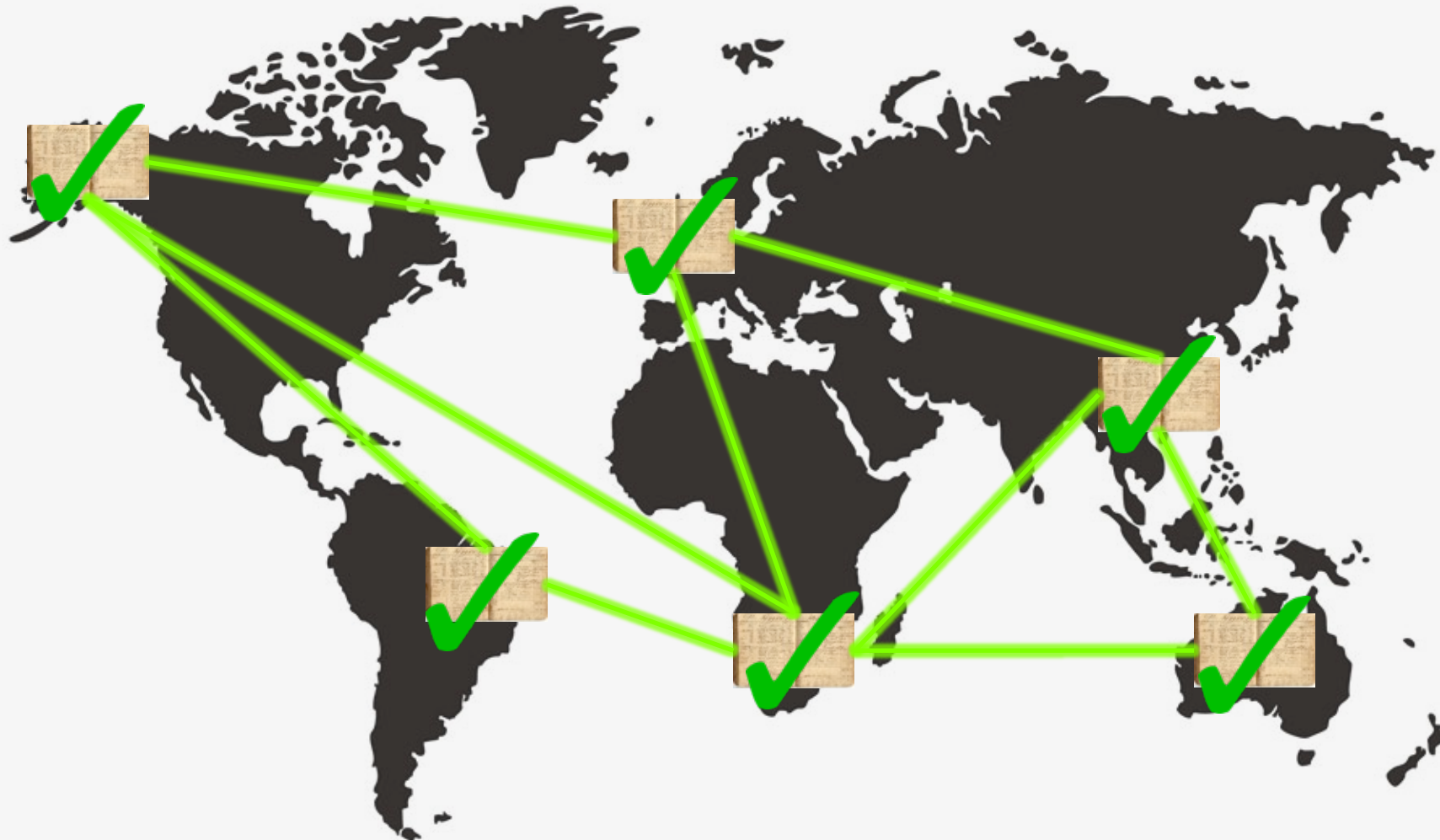
Feb		Dr To Sundries	4	9	5
		" Mending 1 st Shoes & Boots	"	1	6
March	3	" Mending 3 Shoes	"	2	3
	12	" Taping 1 Boot	"	"	9
	21	" Making 1 st Shoes & Boots	"	6	"
		" Mending	4	19	11

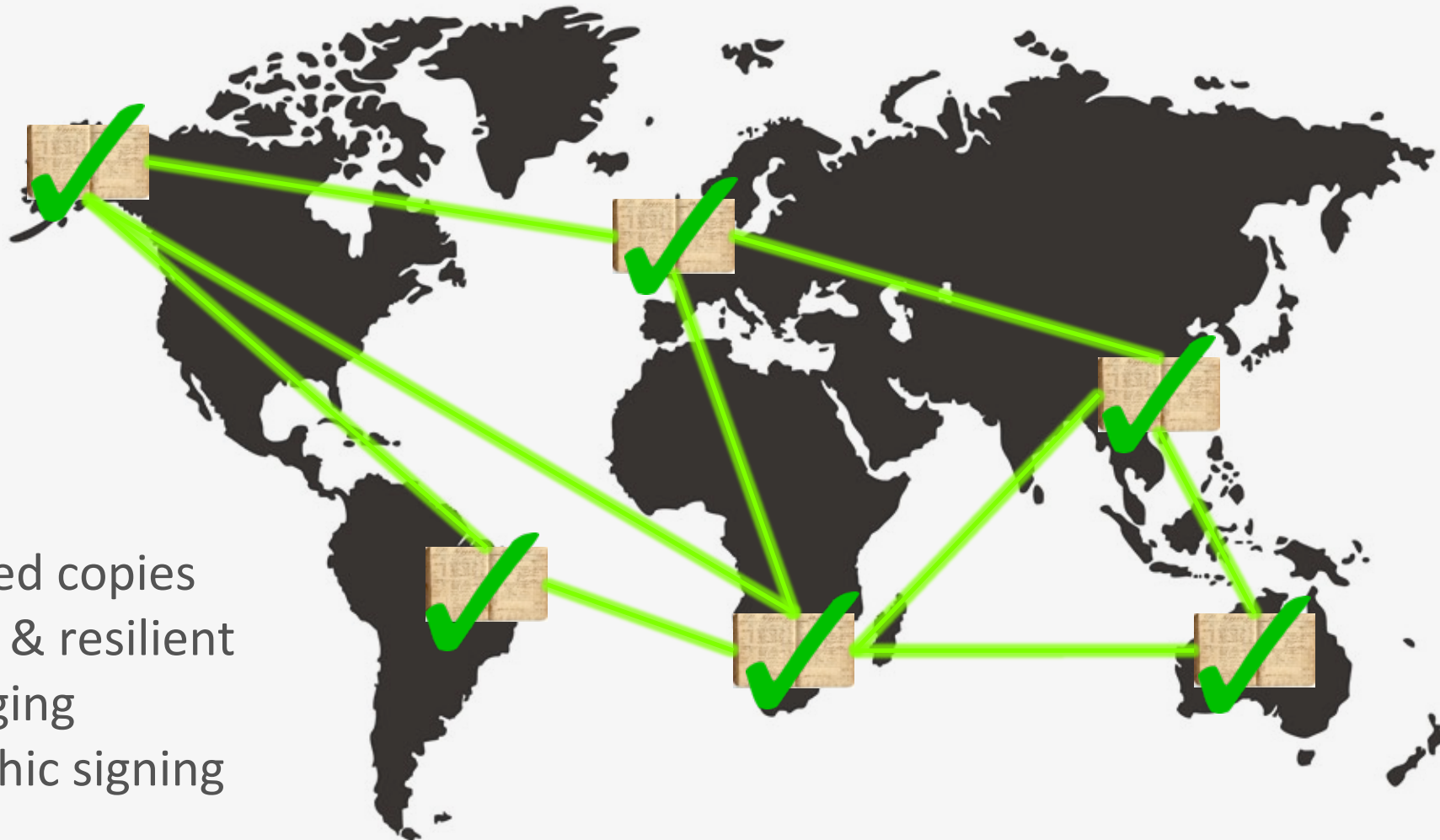




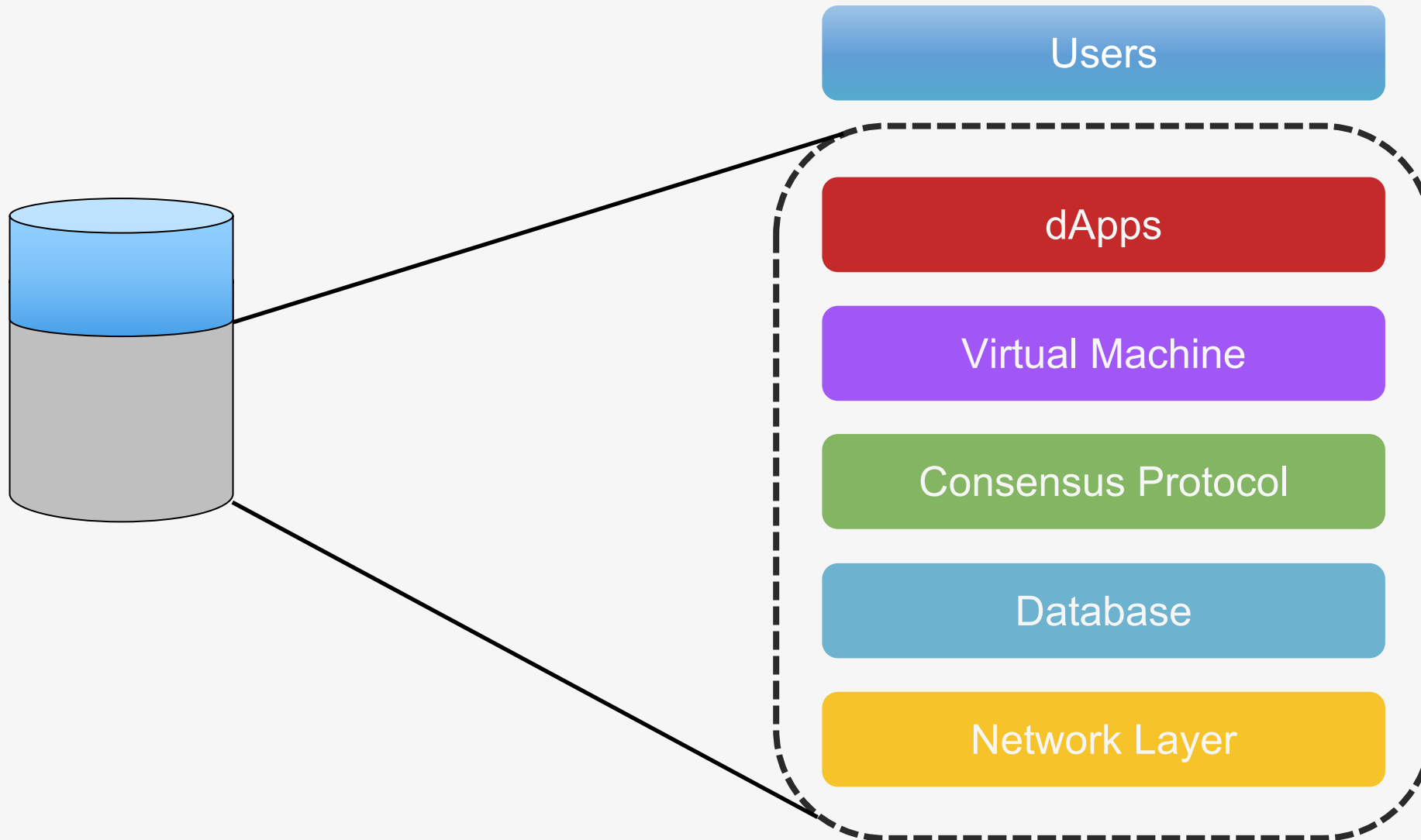


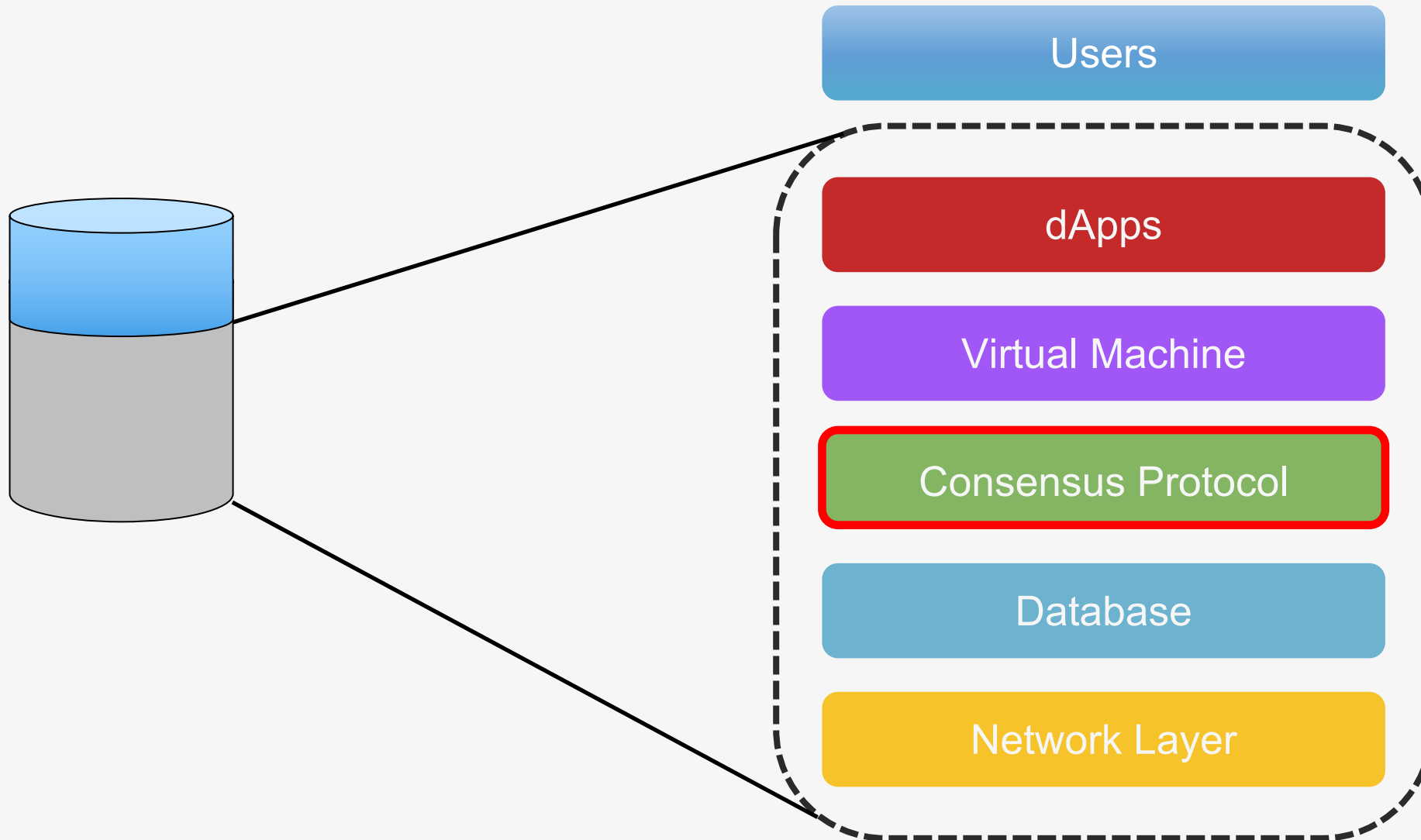


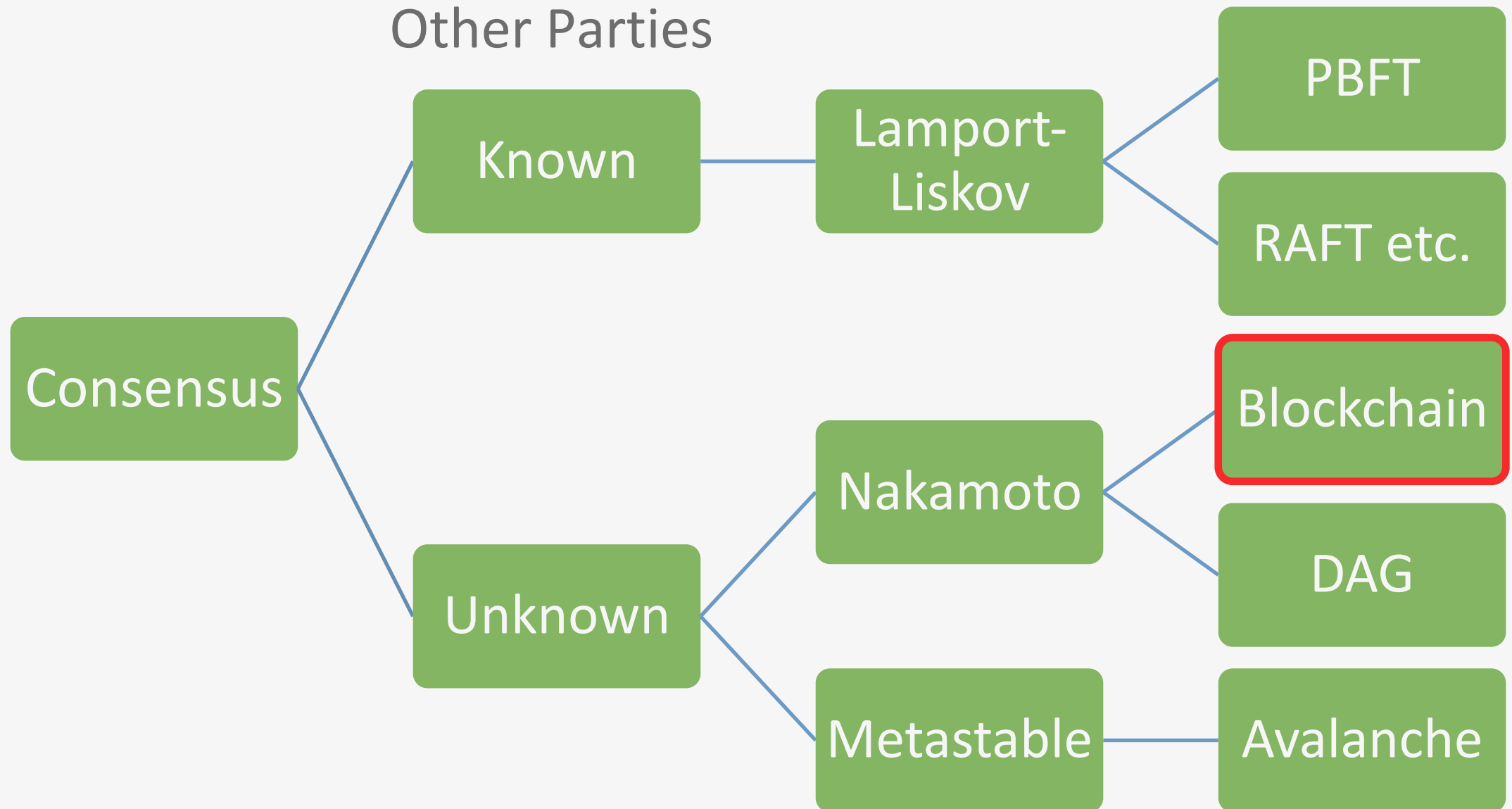


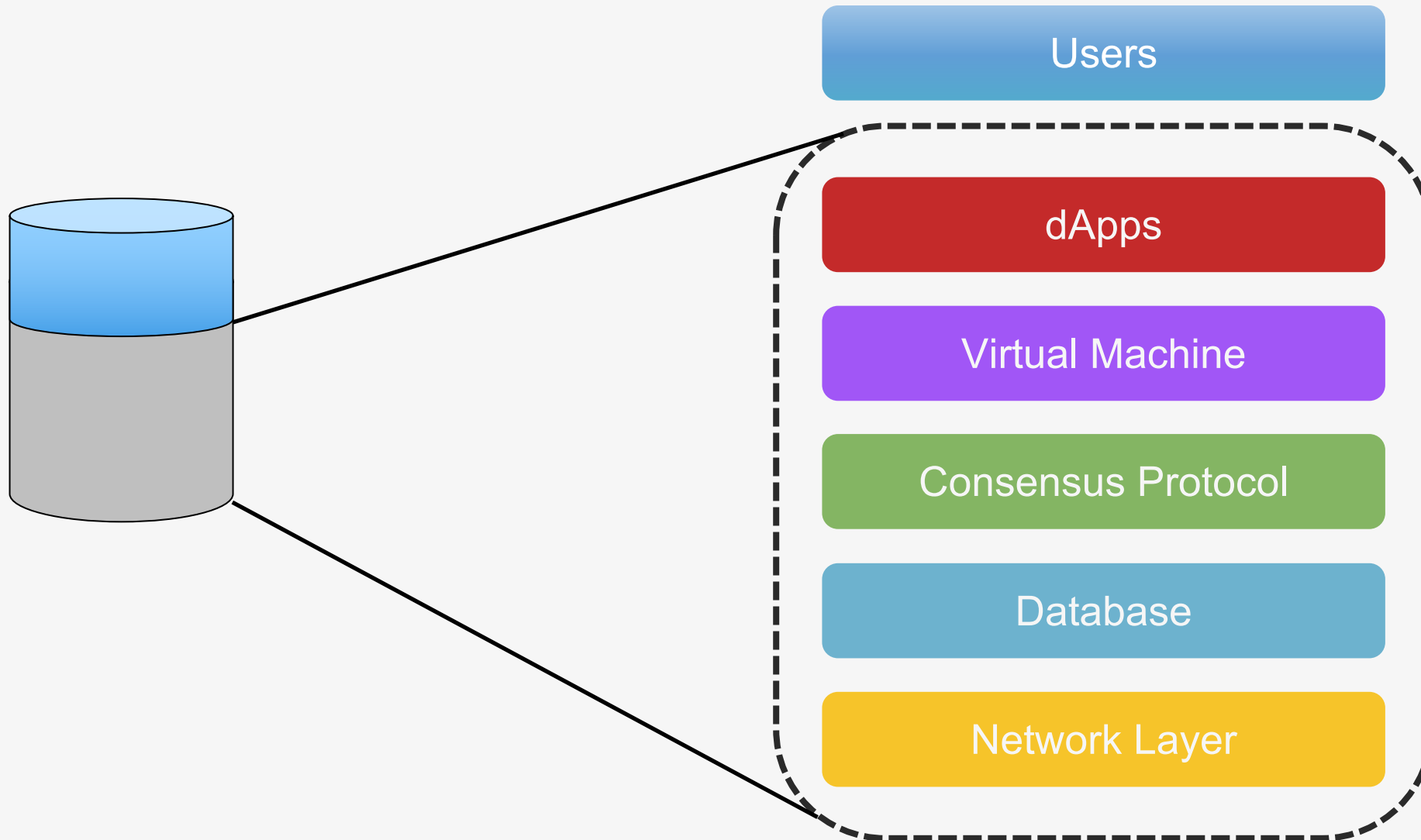


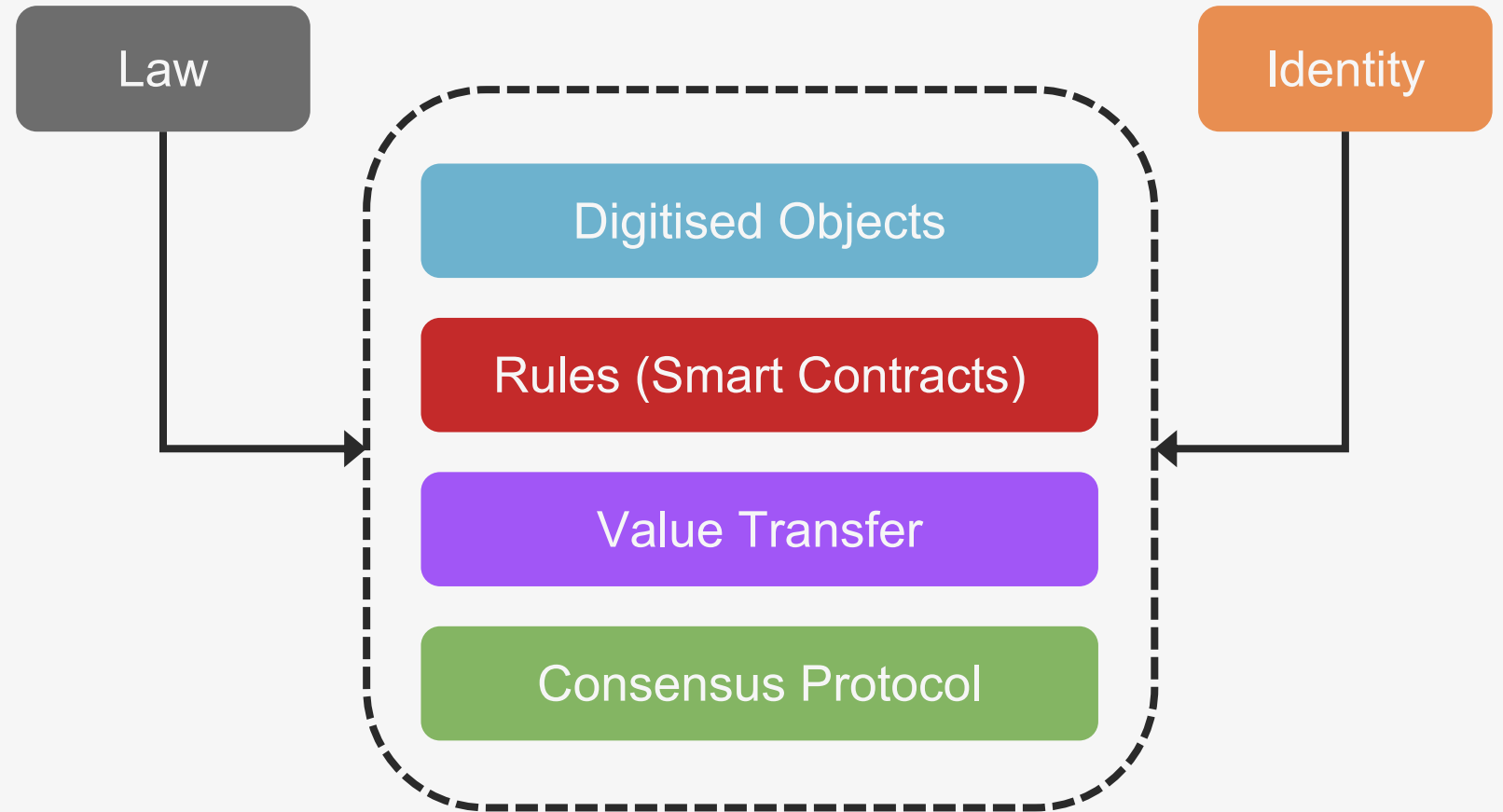
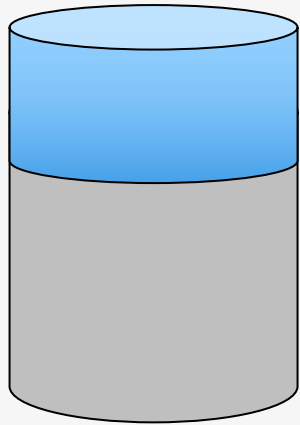
- Synchronised copies
- Distributed & resilient
- P2P messaging
- Cryptographic signing
- Consensus









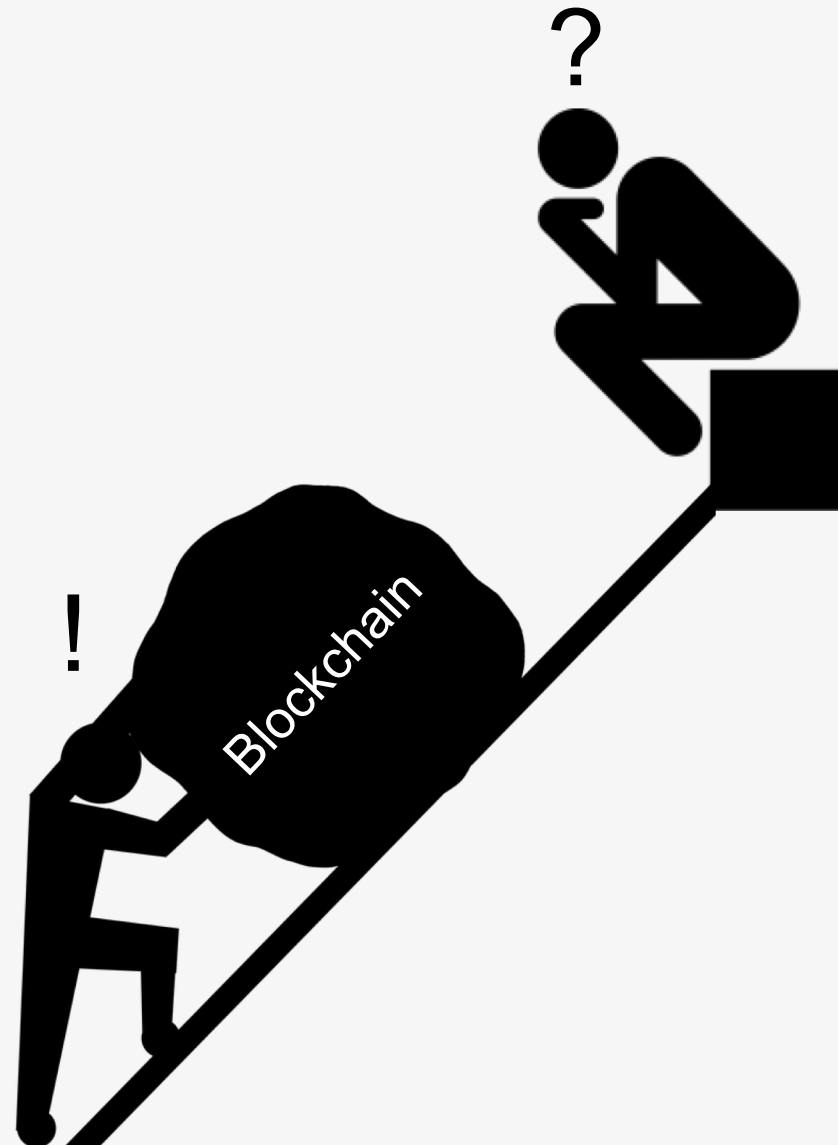




Blockers to Transformation

Developers

- Tech instability
- “Dreamers” facing reality
- Uncertain business models
- Unable to engage with traditional industry
- Unable to mobilise multiple stakeholders simultaneously

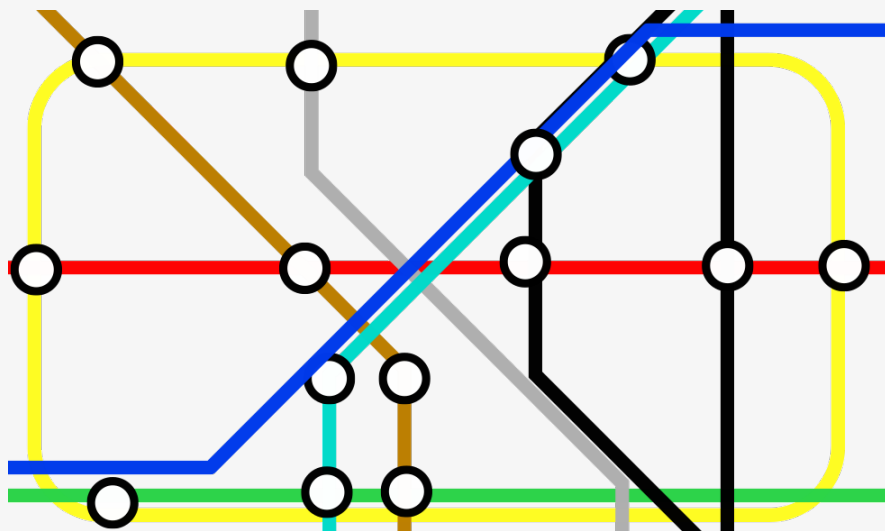
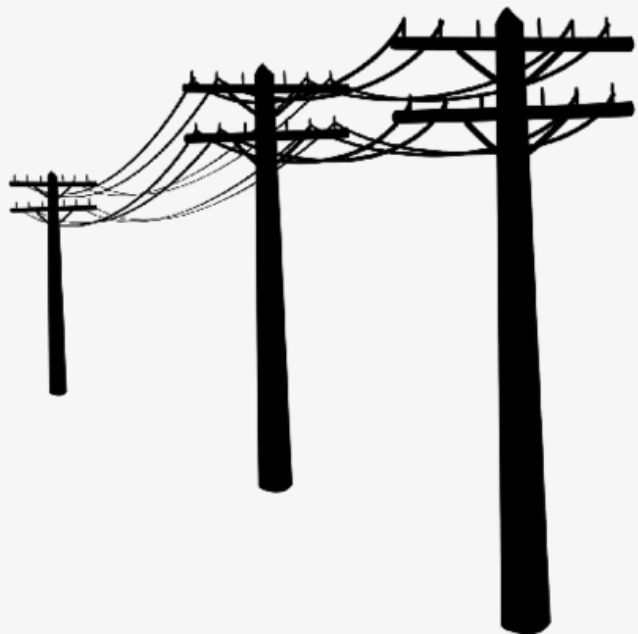


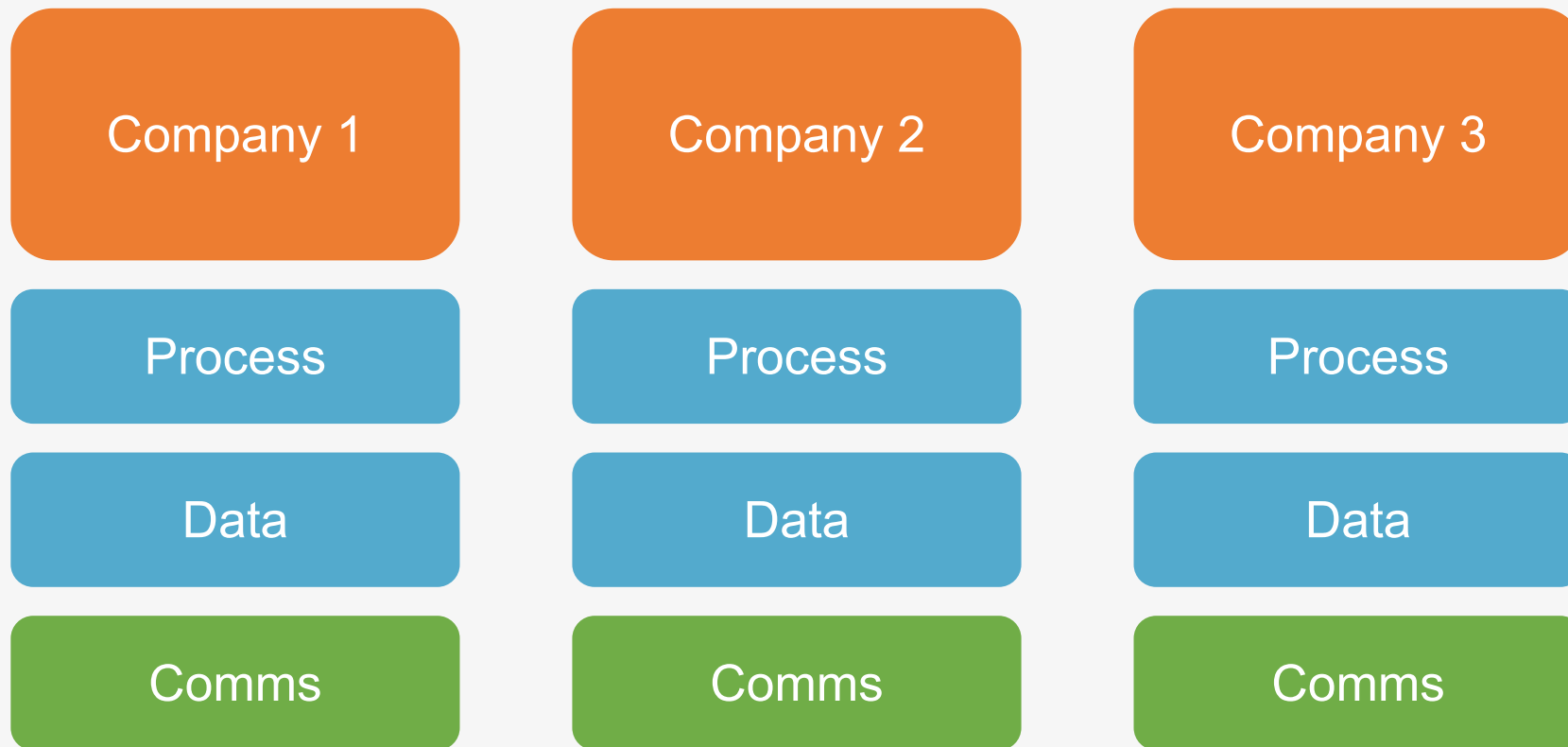
Businesses

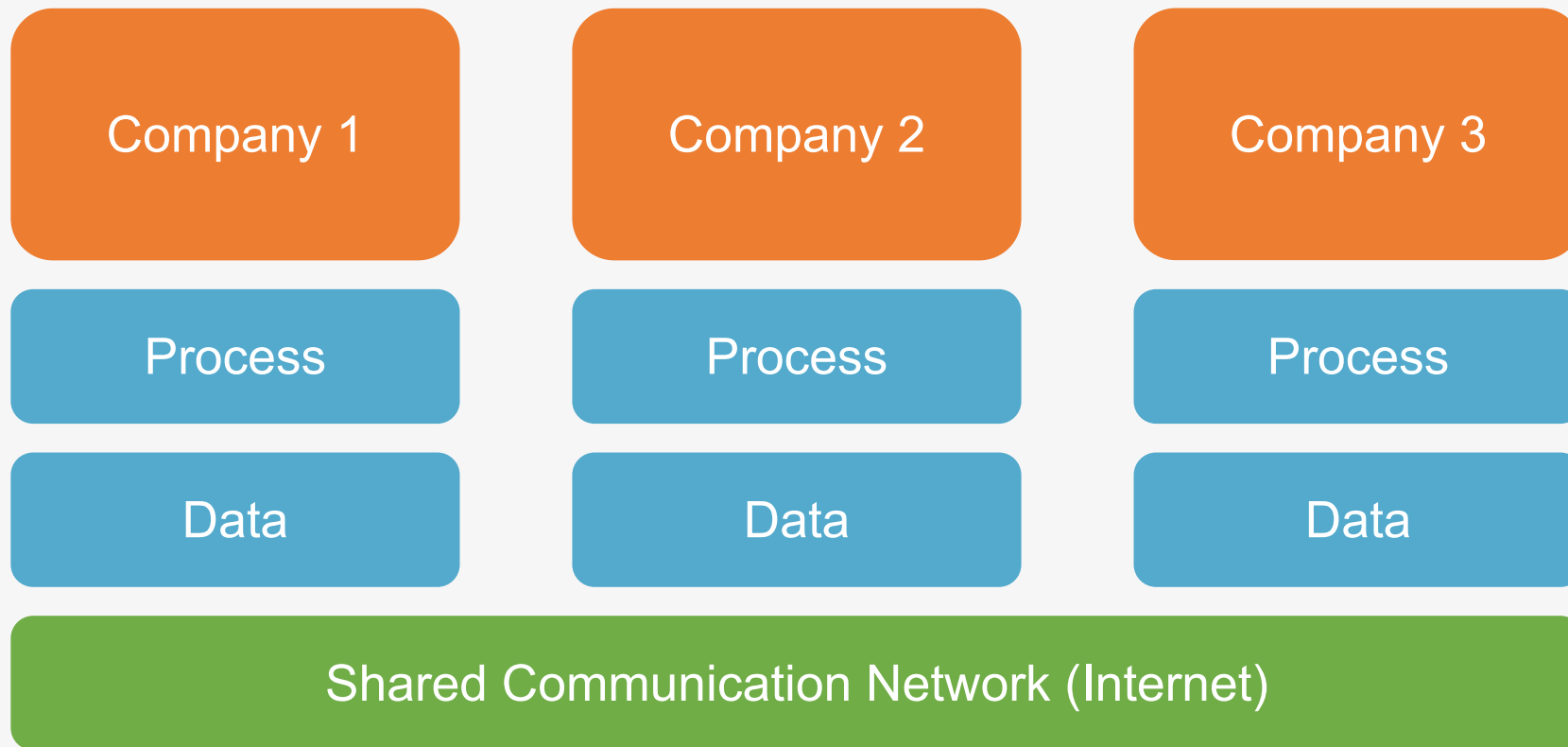
- Technical complexity
- Regulatory uncertainty
- No governance models
- No proven value props
- Can't map mutual benefits
- Inertia of “business as usual”
- Nobody gets fired for playing it safe

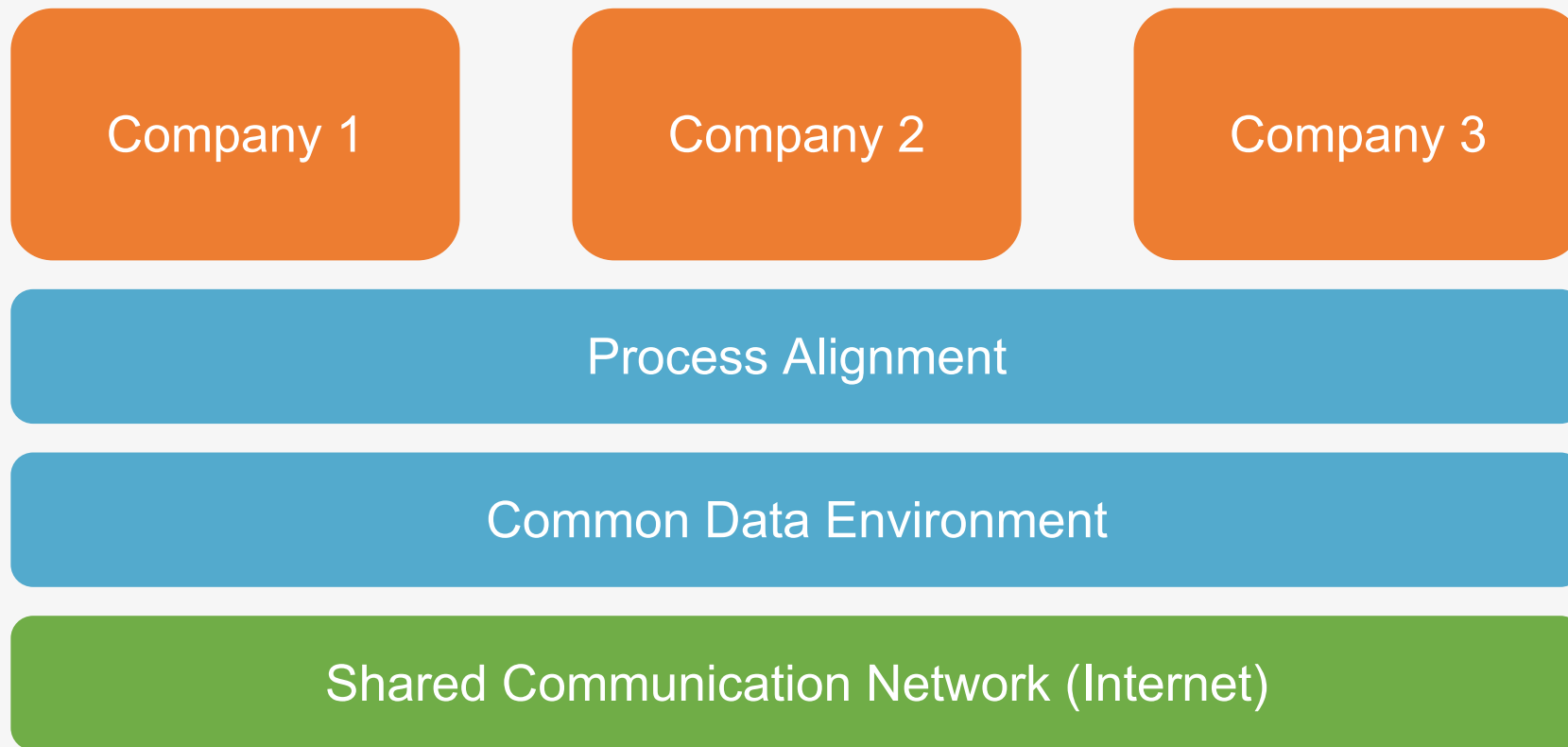


Demand-side Problem



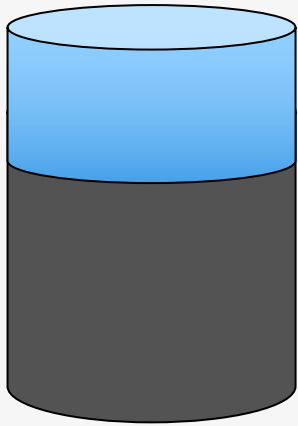




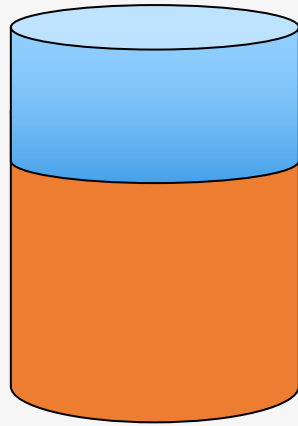




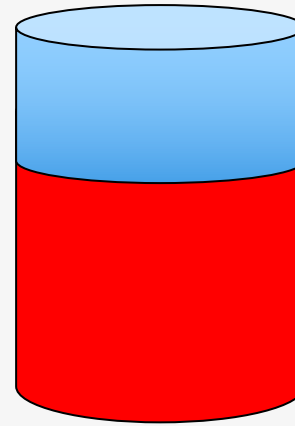
Technical Complexity

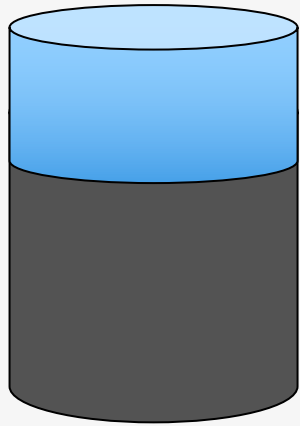


ethereum

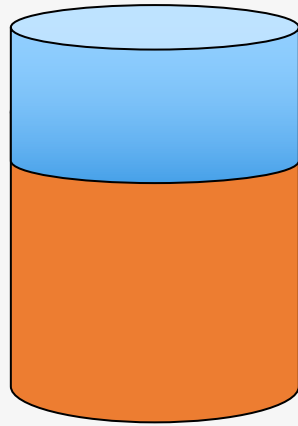


HYPERLEDGER
FABRIC

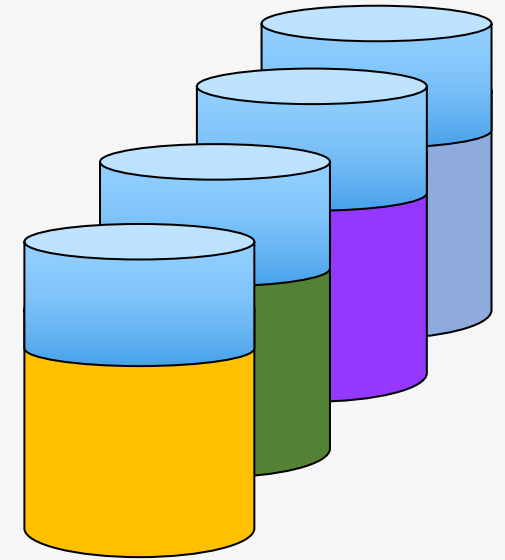
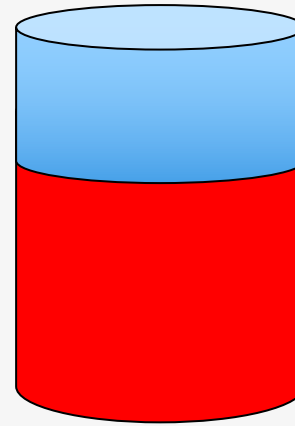




ethereum



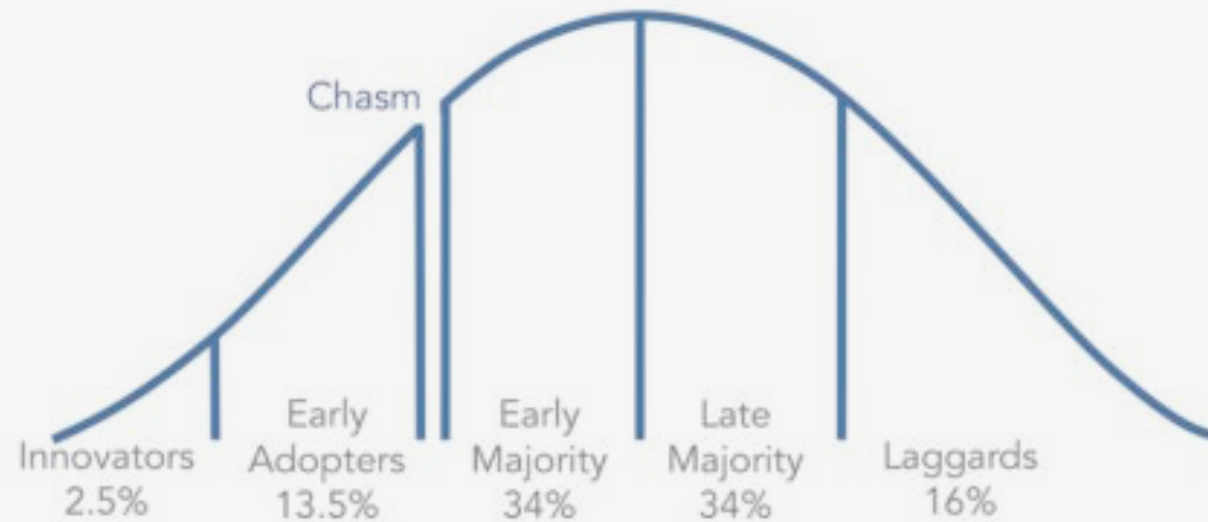
HYPERLEDGER
FABRIC





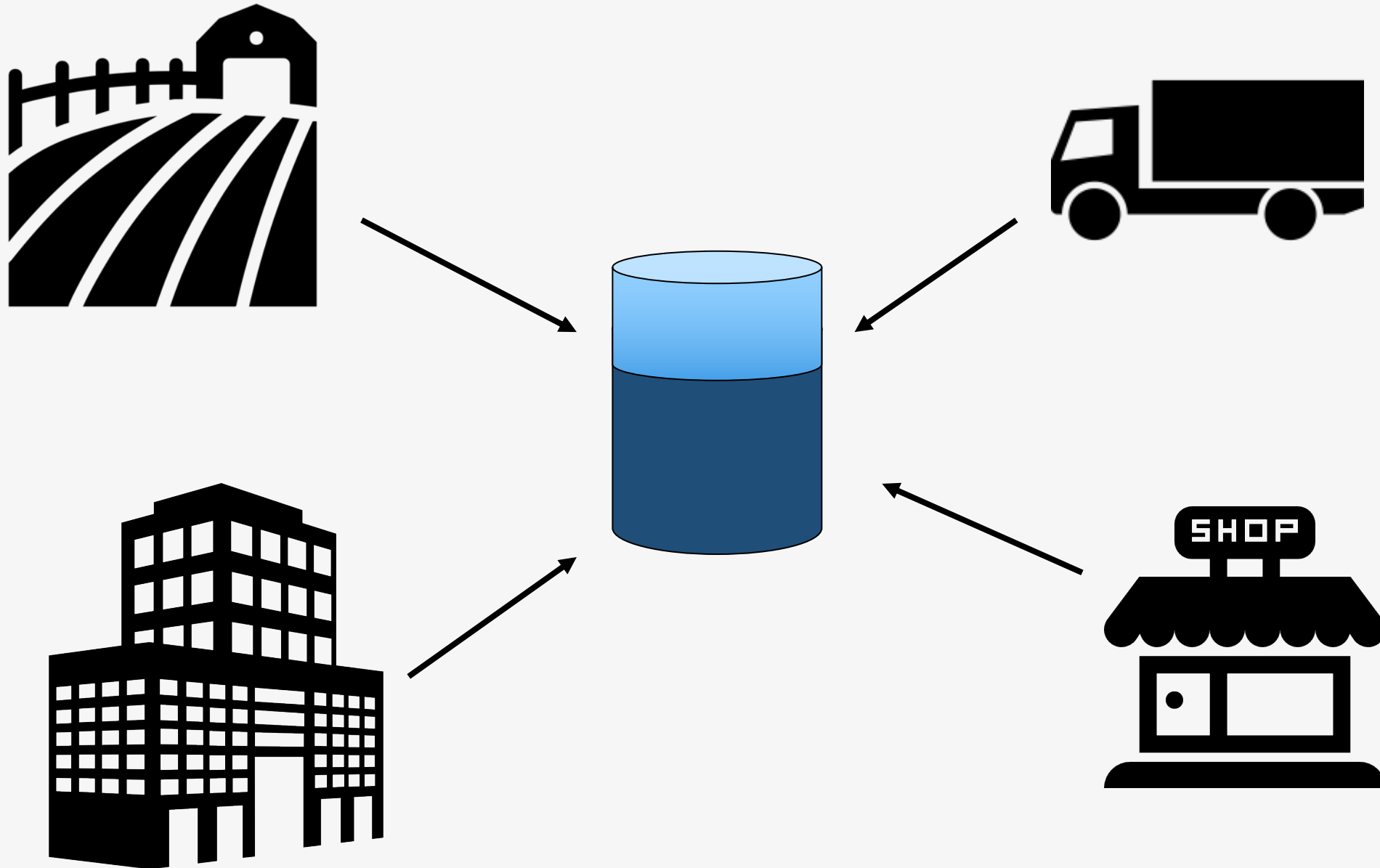
Mobilising Stakeholders

Diffusion of Innovation



Everett Rogers, 1957
Geoffrey Moore, 1993

We are still [here](#)



Pioneers

Shared Future





Value Propositions for Blockchain

WIRED Money 2017

The Blockchain will save healthcare and shipping billions of pounds

The Hyperledger Project and IBM are attempting to remedy distrust in the world's financial transactions

Global Blockchain in Agriculture & Food Market Anticipated to Reach \$1.4 Billion by 2028



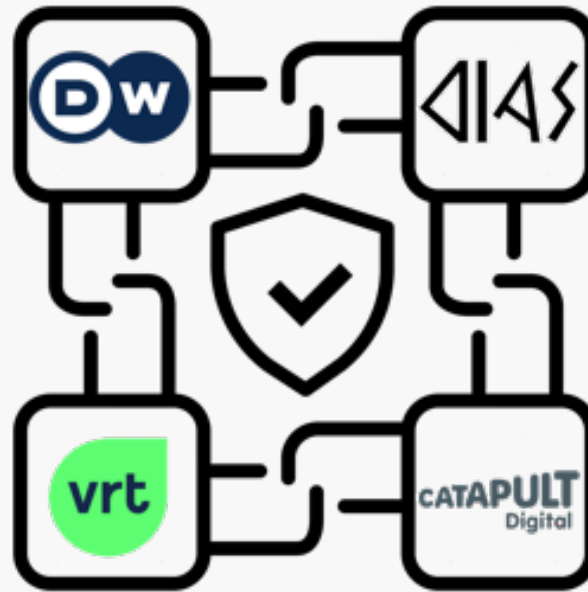
Blockchain Adoption to Save Banks \$27 Billion Annually by 2030: Research

Mark Emem | 06/08/2018 | Blockchain News. News

Blockchain Can Save Environment In 8 Ways: World Economic Forum

By Marvin Dumont | Sep 19, 2018 | 693





www.projectcpn.eu

Collaborative

Distributed

Agile

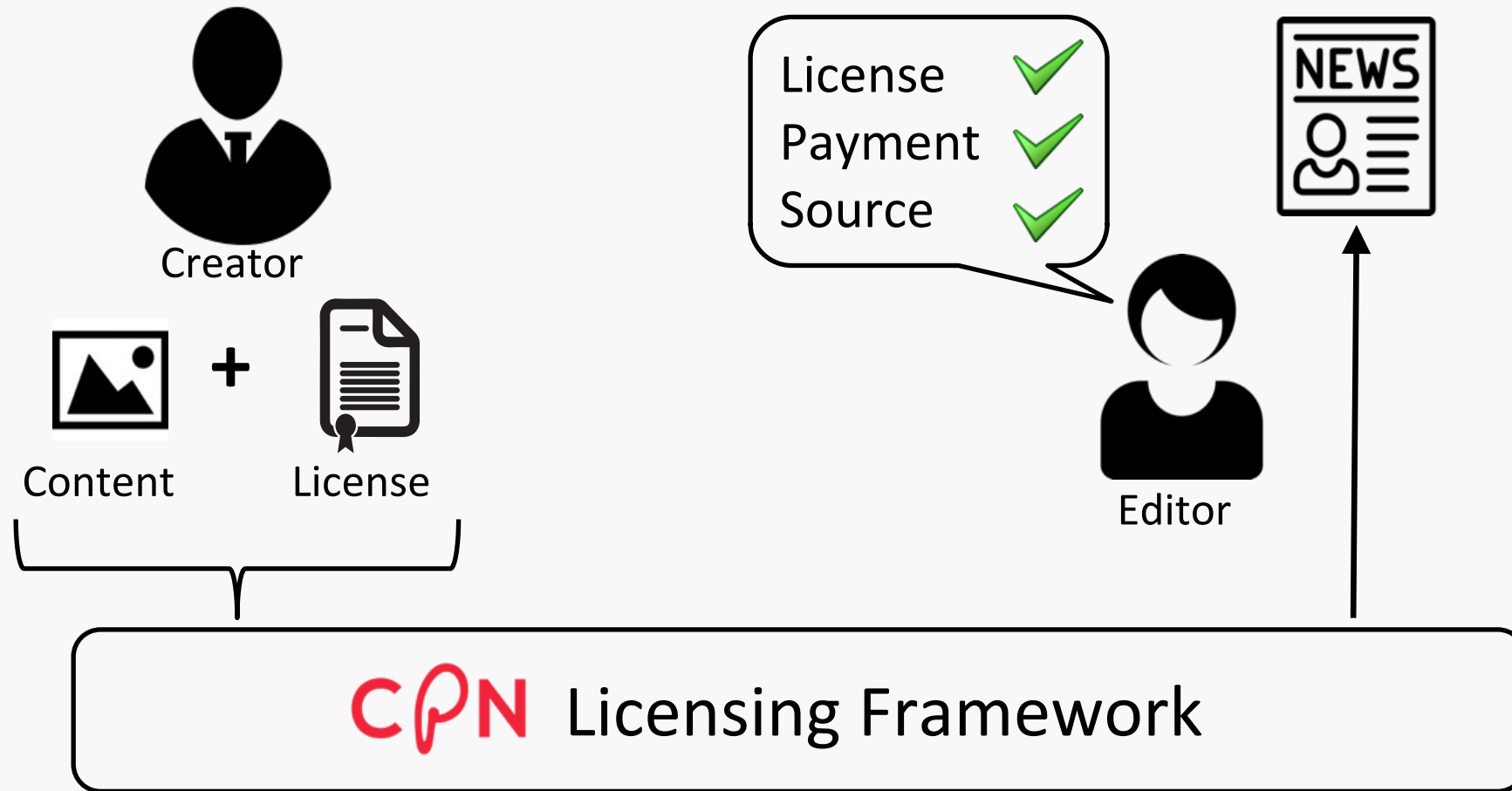




Can we safely use this?

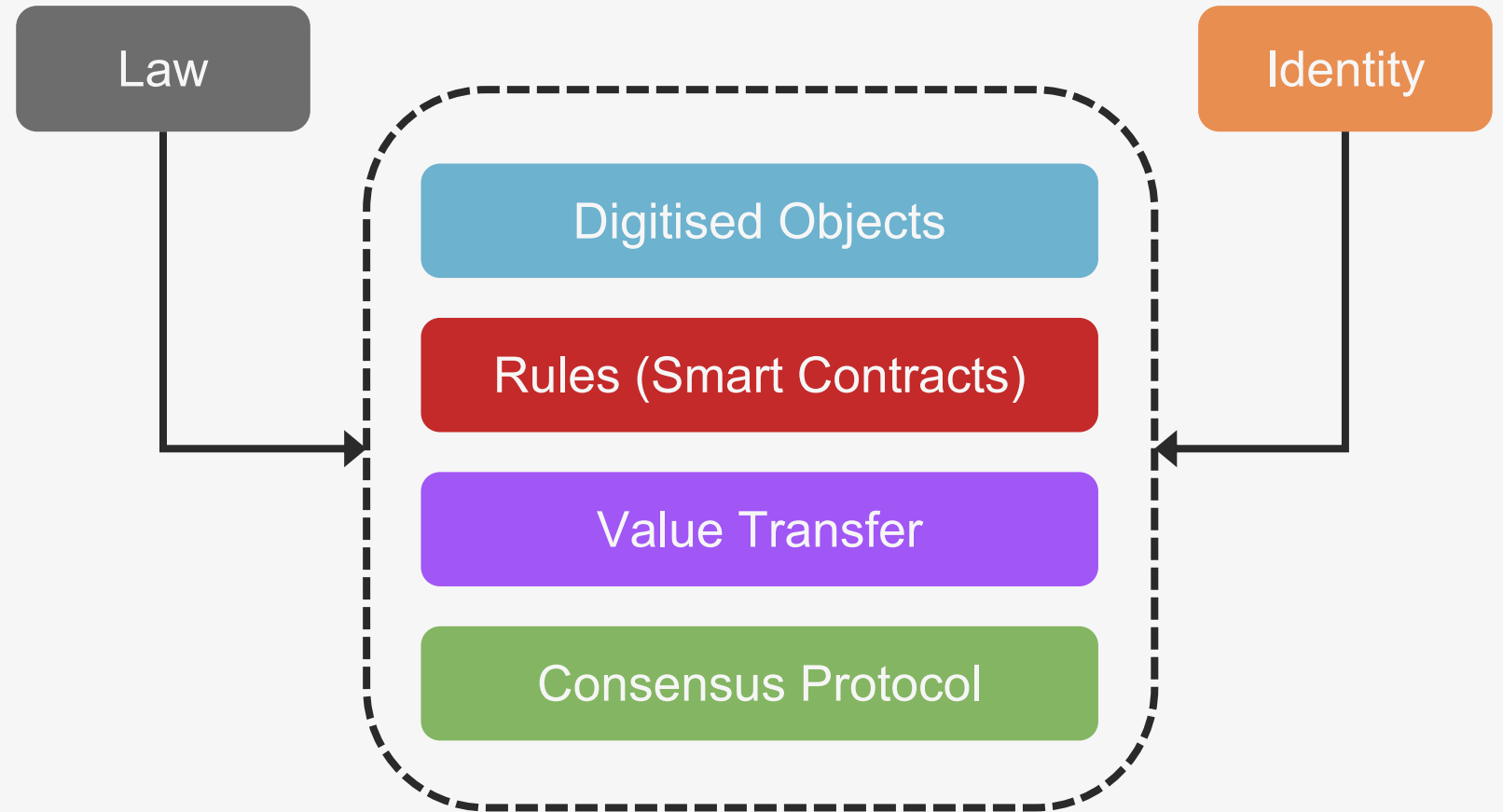
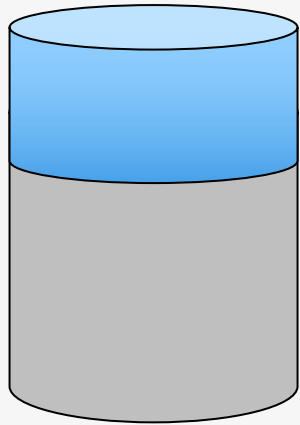


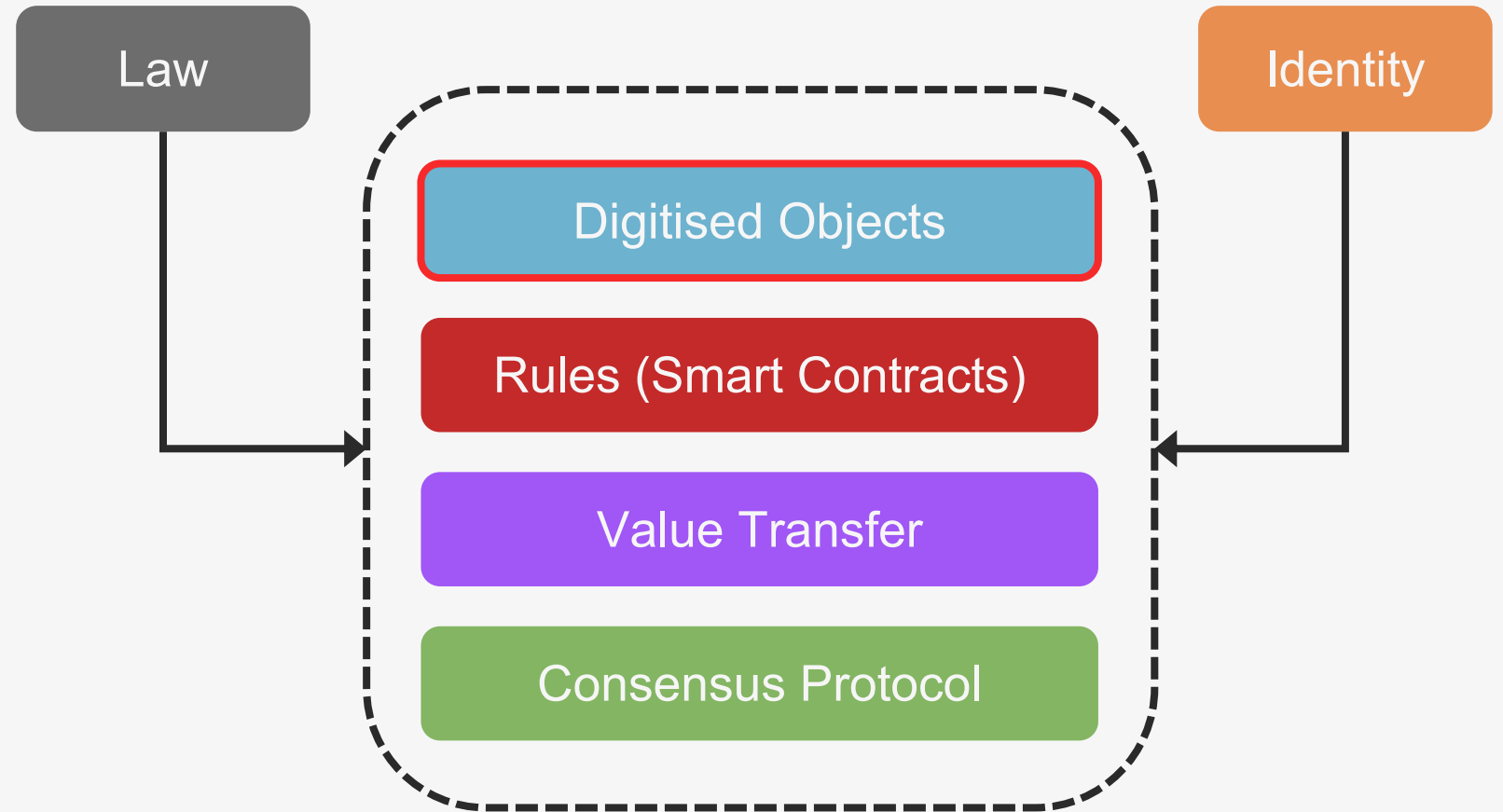
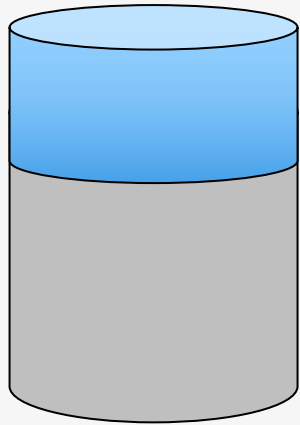
Can I reach an audience?





Equal participants in securing shared resources, no dominant player





Only 3 on-chain JSON objects required to implement a licensing system:

- License Objects
- Consent to Terms
- Revocation of Object



Everything else is **governance!**

JSON Object Details

License Object

- Protocol version:
- Content:
 - URI
 - Plaintext
 - Digest scheme
 - Digest
- Author identifier:
 - Plaintext
 - ID e.g. Public Key
 - Signed content digest
 - Percentage ownership
- Attributor:
 - Plaintext
 - ID e.g. Public Key
- License:
 - URI (e.g. on-chain or off)
 - Plaintext
 - Machine-readable
- Pricing:
 - Model
 - Currency
 - Value

How to interpret this?
What is the content?

Who created it?

Who is asserting this?

What license terms?

What payment terms?

Consent

- Protocol version:
- License Object:
 - URI (on-chain)
 - Digest
- Consent Authority:
 - Plaintext
 - ID e.g. Public Key

Which License Object?

Who is asserting this?

Revocation

- Protocol version:
- On-Chain Object:
 - URI (on-chain)
 - Digest
- Revocation Authority:
 - Plaintext
 - ID e.g. Public Key

Revokes objects & licenses

Basic Use Case



I want my content to
reach a wider
audience



License Object

- Version: 1.0
- Content:
 - <http://x.y.z>
 - Lorem ipsum solor sit amet
 - SHA256
 - d1900cf771cdc853b8345b0376bf6f20c
- Author identifier:
 - Jim Smith
 - e43eefab659604eb39106214d7d64
 - B81fnpa130nap4m239a42ma71242
 - 100%
- Attributor:
 - Jim Smith
 - e43eefab659604eb39106214d7d64
- License:
 - <http://creativecommons.org/licenses/by/>
 - CC4.0-BY
 - <blank>
- Pricing:
 - Per view
 - USD
 - 0.001

CREATIVE COMMONS LICENSES		COPY & PUBLISH	ATTRIBUTION REQUIRED	COMMERCIAL USE	MODIFY & ADAPT	CHANGE LICENSE
	PUBLIC DOMAIN					
	CC BY					
	CC BY-SA					
	CC BY-ND					
	CC BY-NC					
	CC BY-NC-SA					
	CC BY-NC-ND					

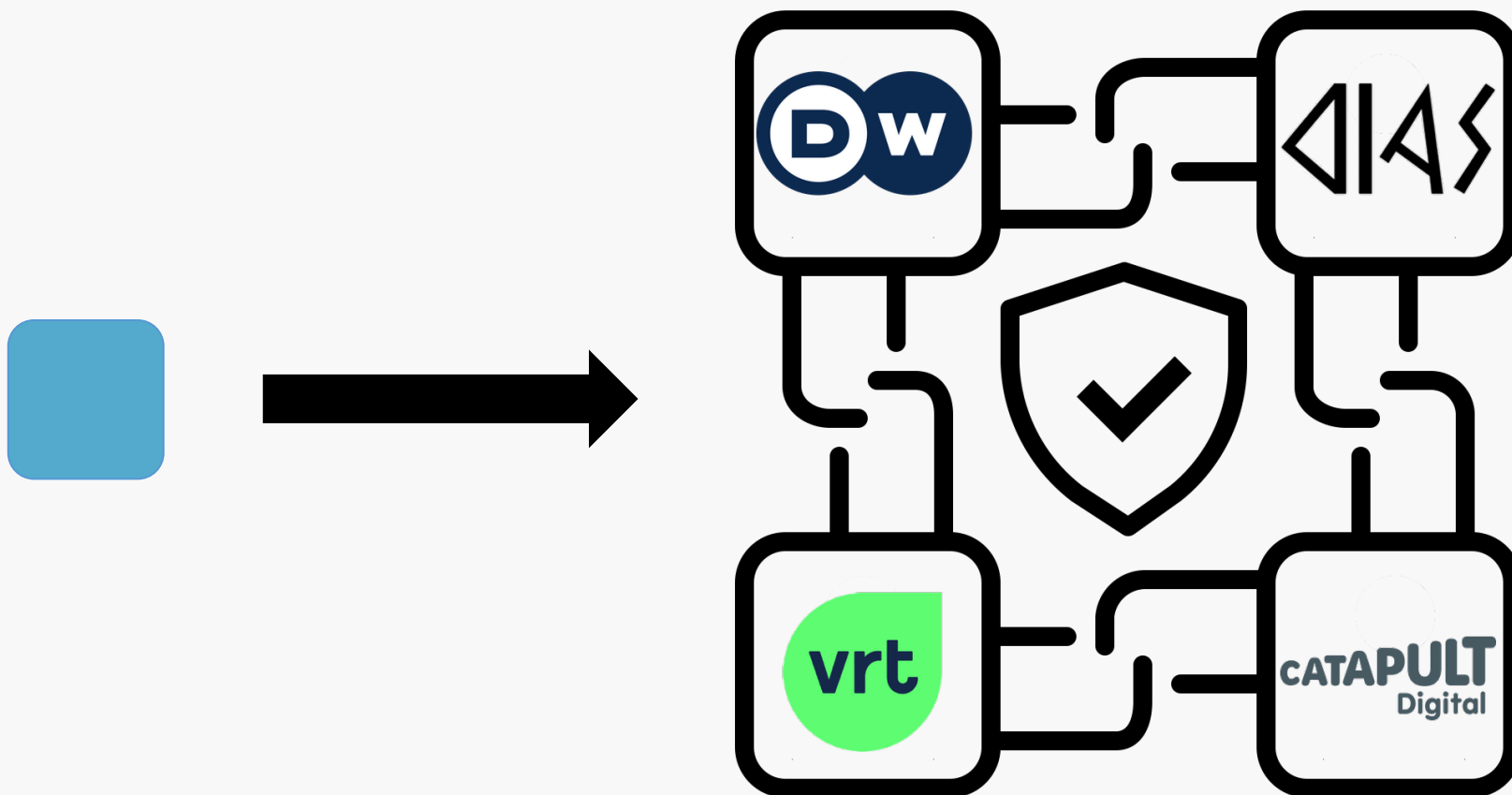
You can redistribute (copy, publish, display, communicate, etc.)

You have to attribute the original work

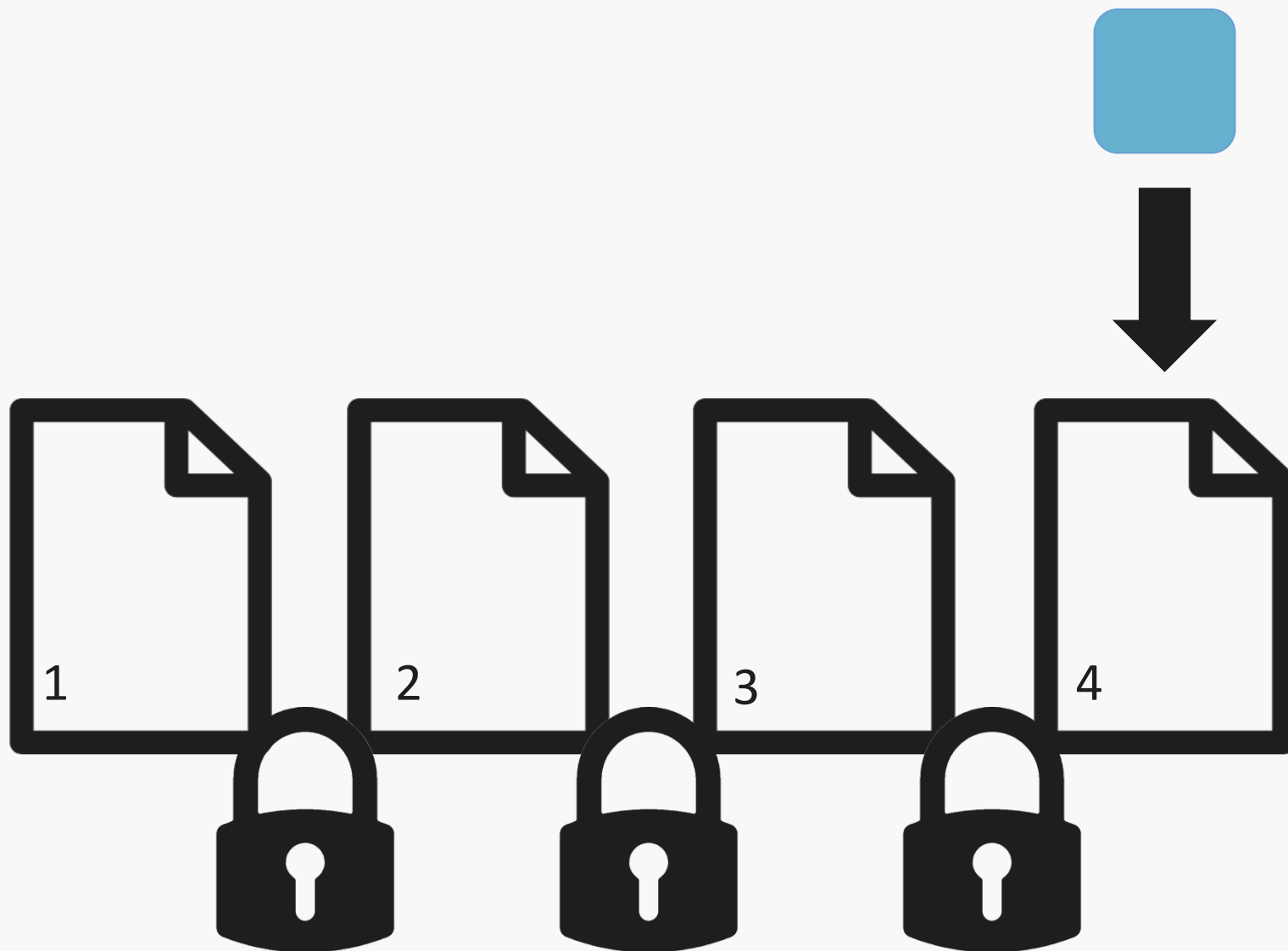
You can use the work commercially

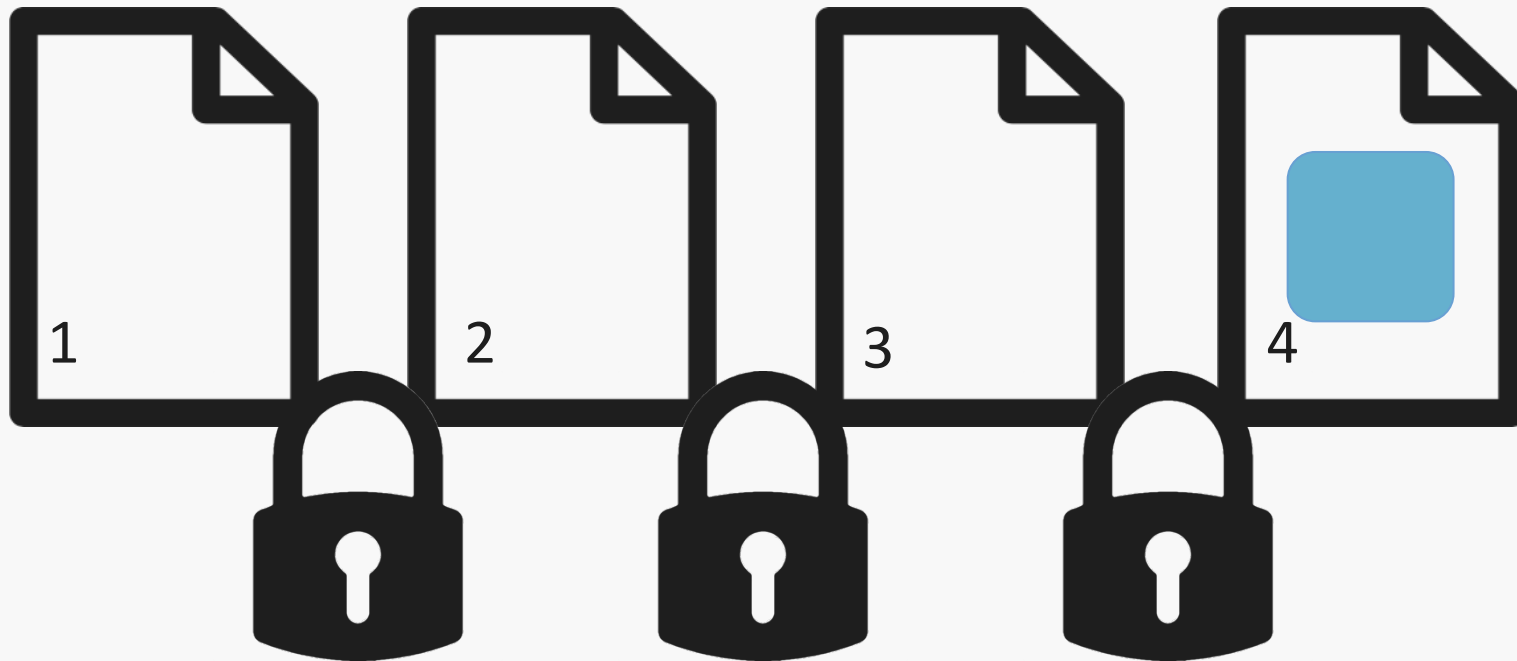
You can modify and adapt the original work

You can choose license type for your adaptations of the work.



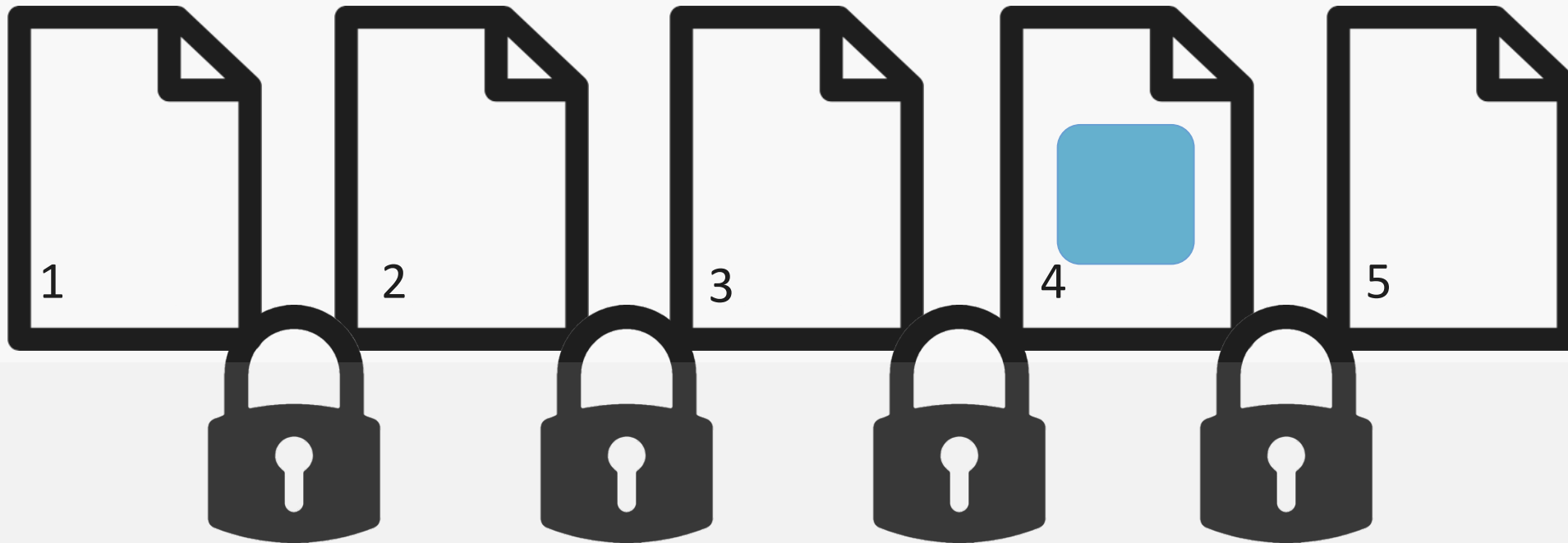
Behind the Scenes





License Object now has:

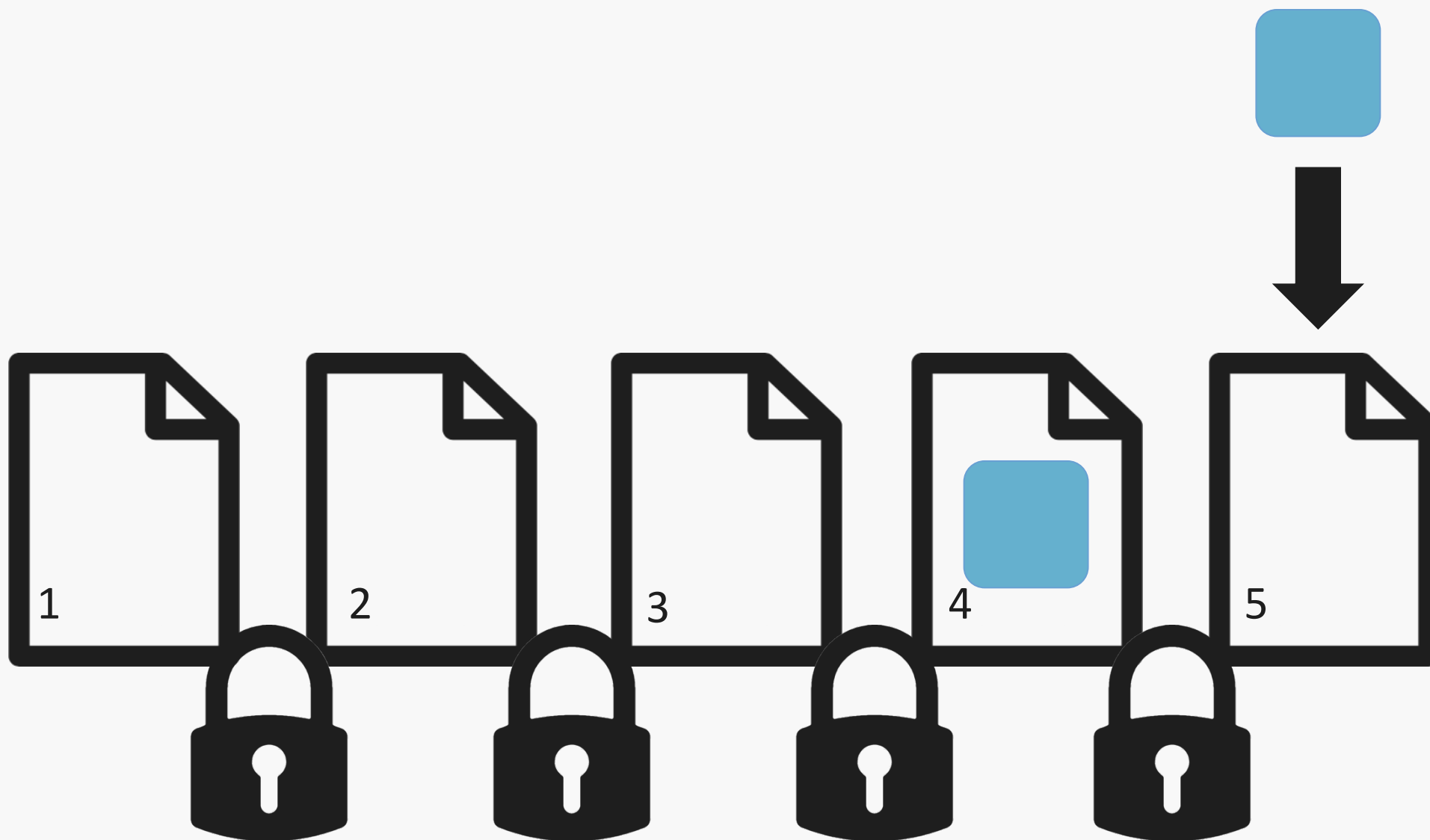
- A timestamp
- An on-chain URI

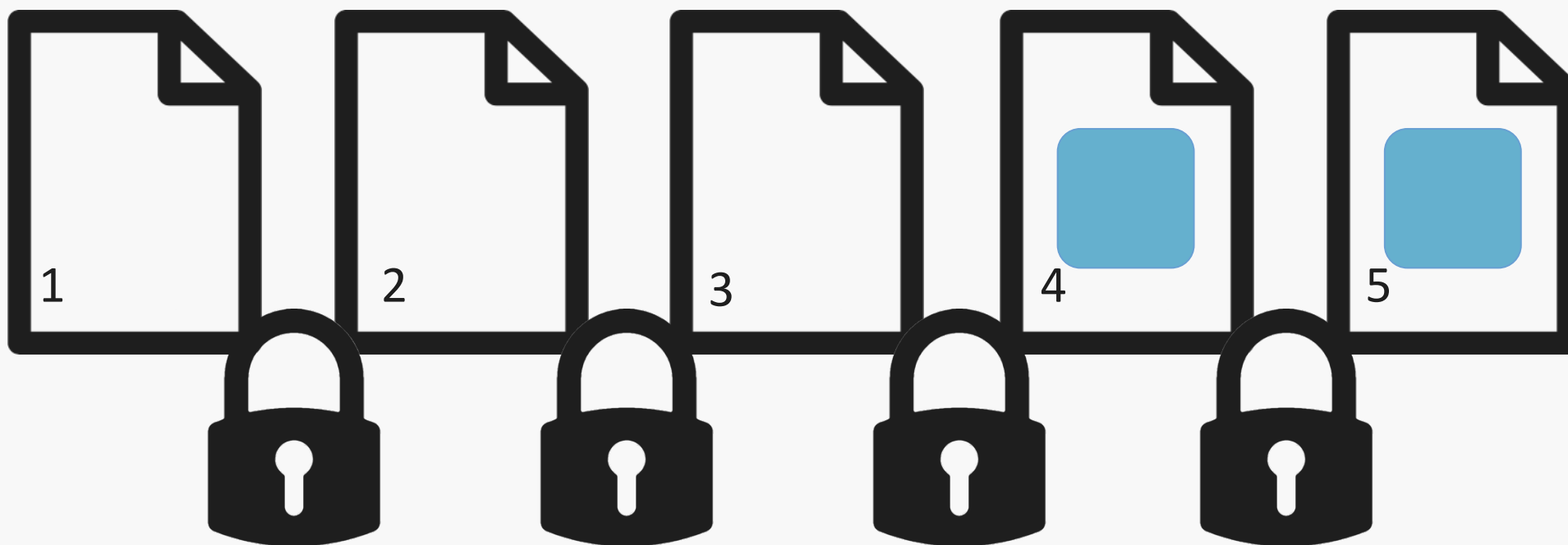


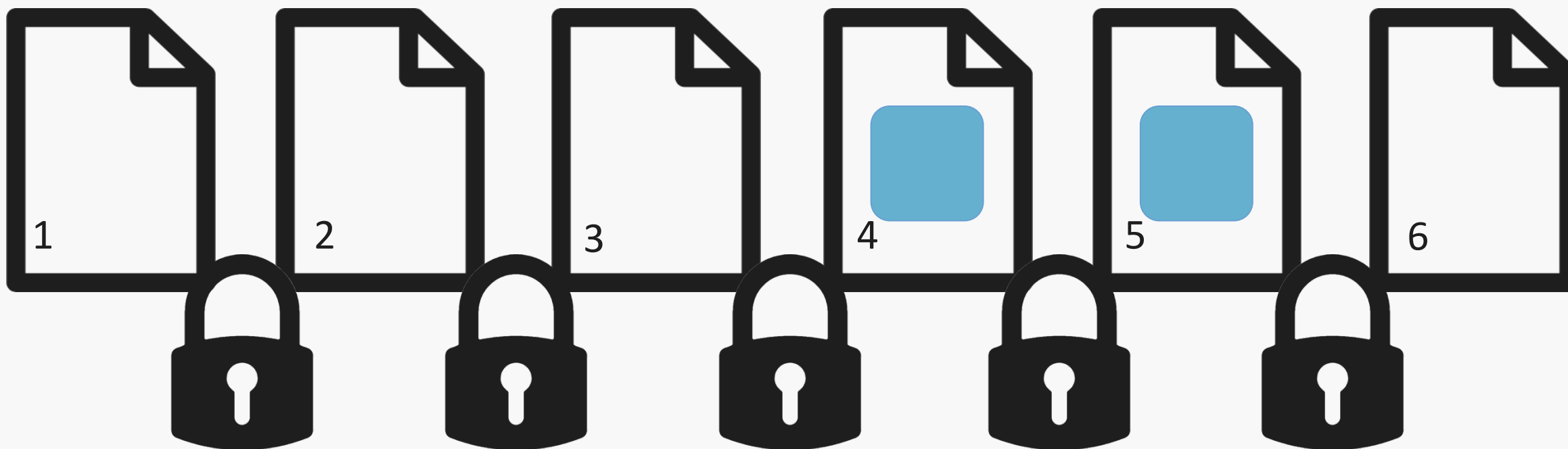
Additional Licensing Terms



I want to add **new**
licensing options and
keep the old ones



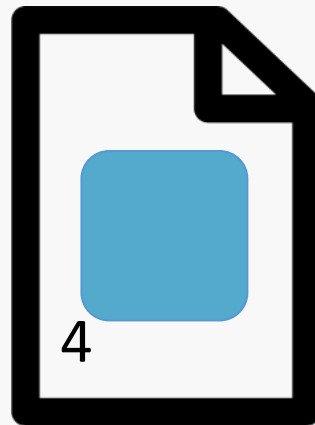




Deleting Licenses

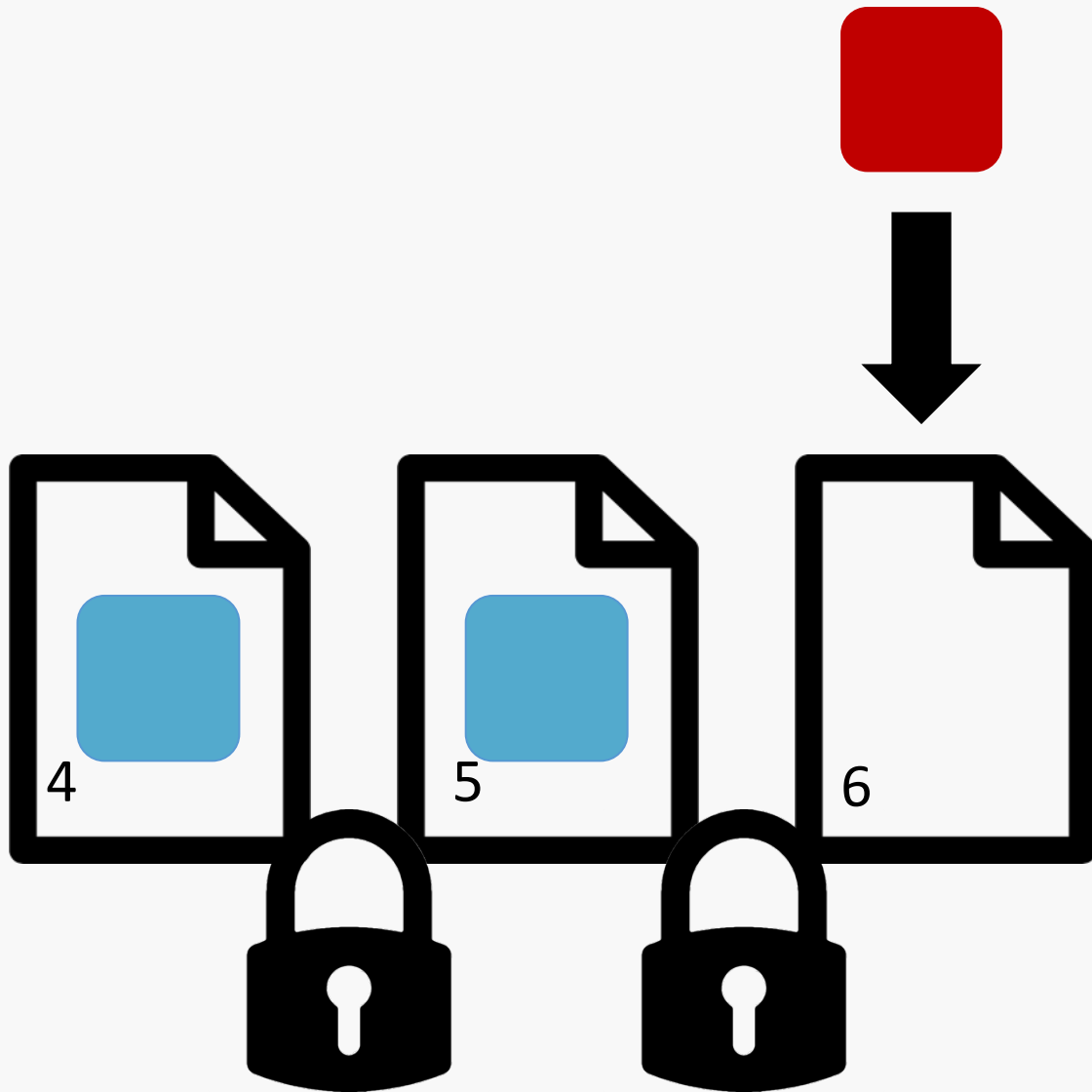


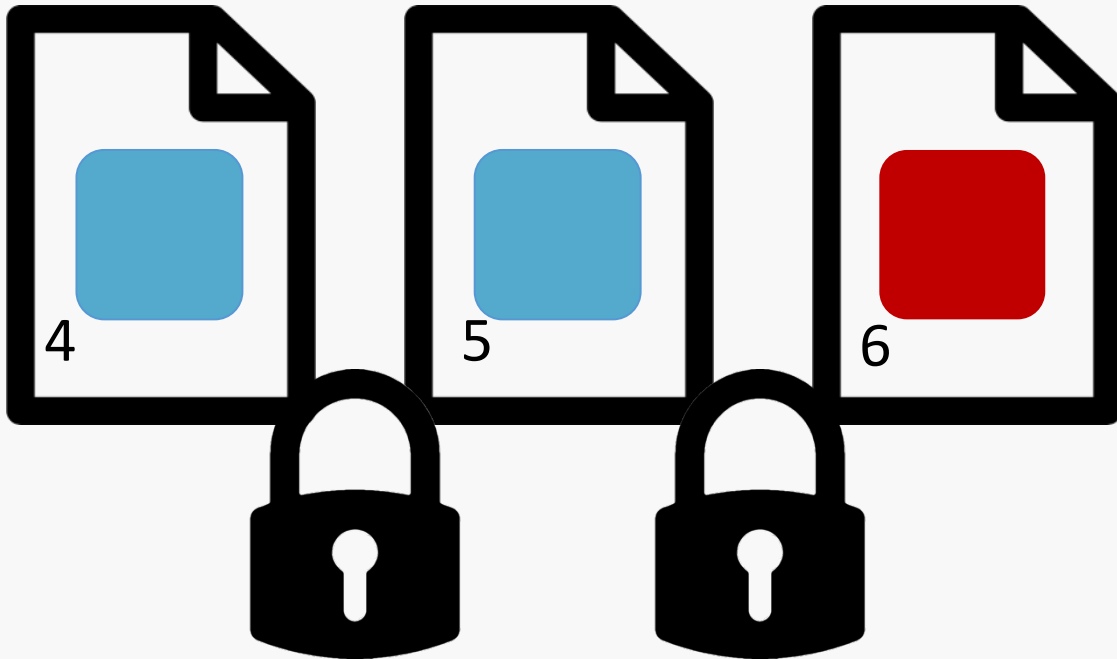
I need to **delete** the
old licensing terms



Revocation

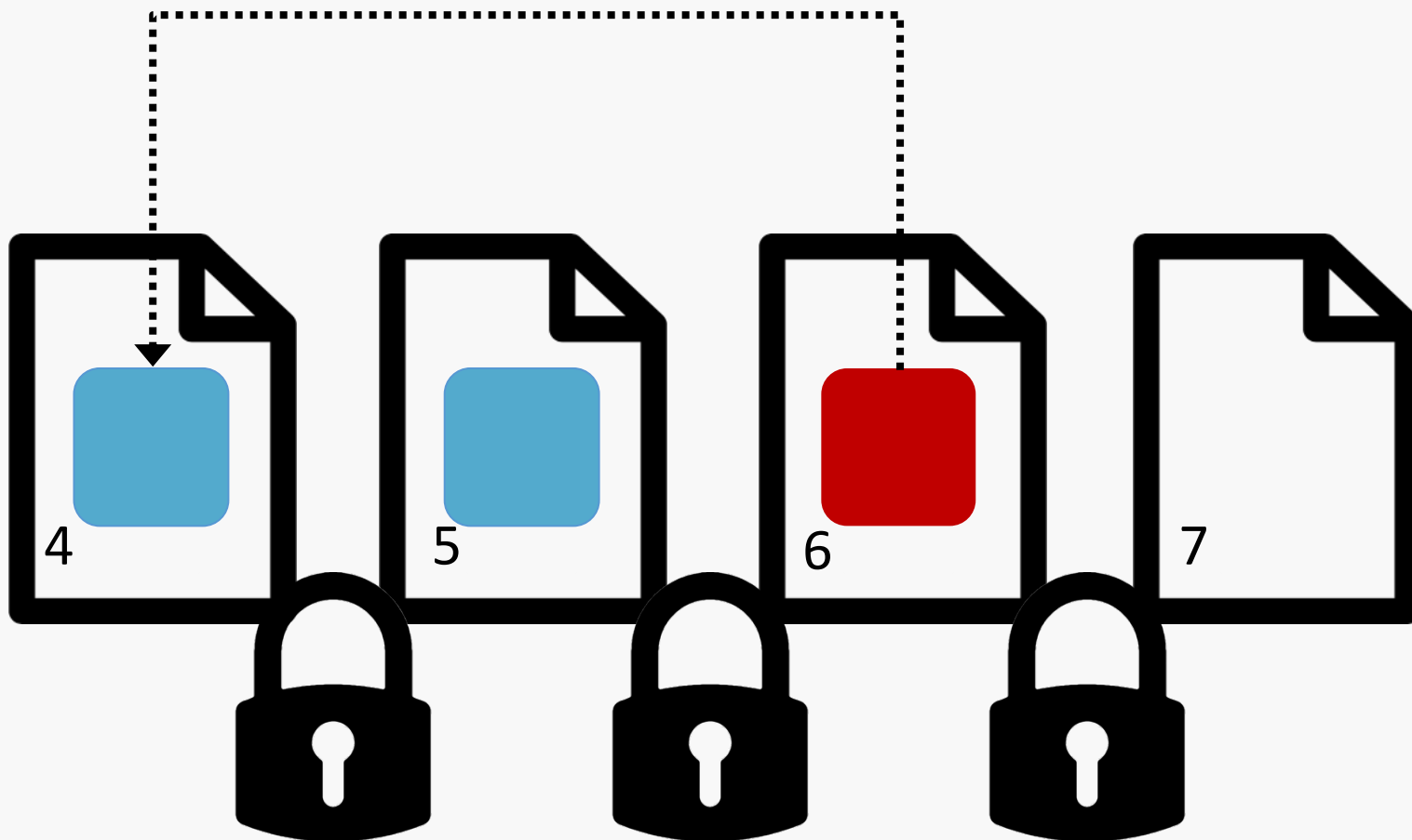
- Version: 1.0
- On-Chain License Object:
 - Block 4
 - d1900cf771cdc853b8345b0376bf6f20c
- Revocation Authority:
 - Jim Smith
 - e43eefab659604eb39106214d7d64
 - b81fnpa130nap4m239a42ma71242



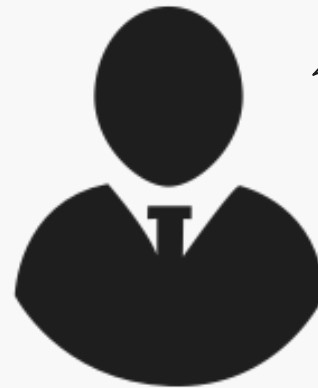




Revokes previous license

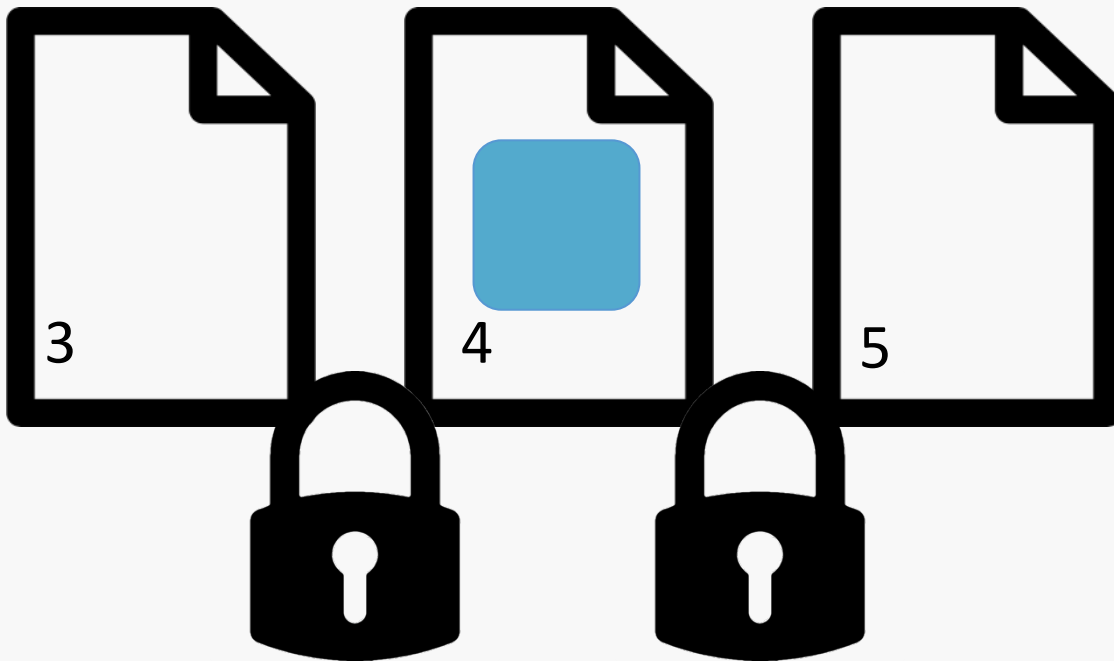


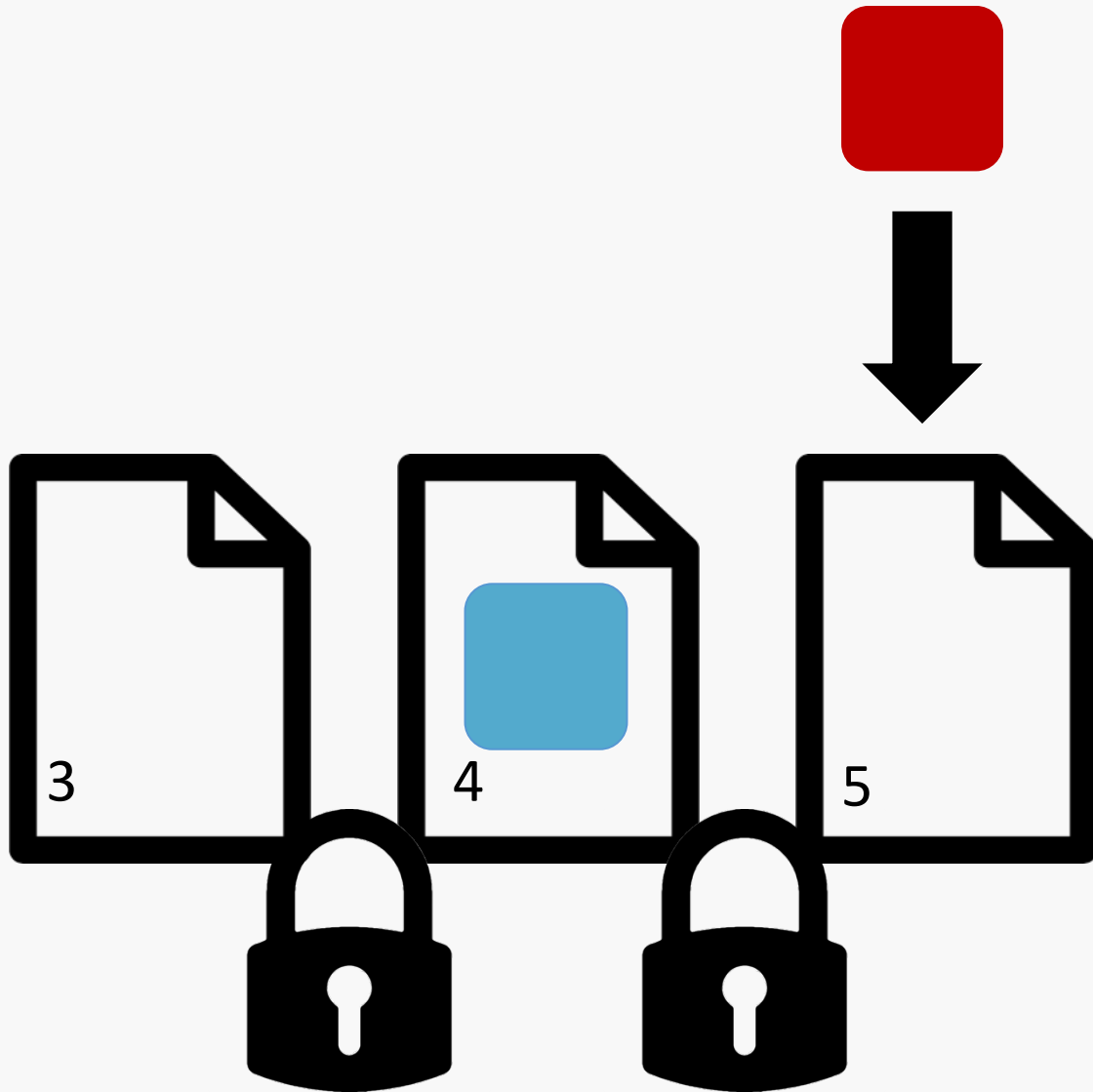
Changing Licensing Terms

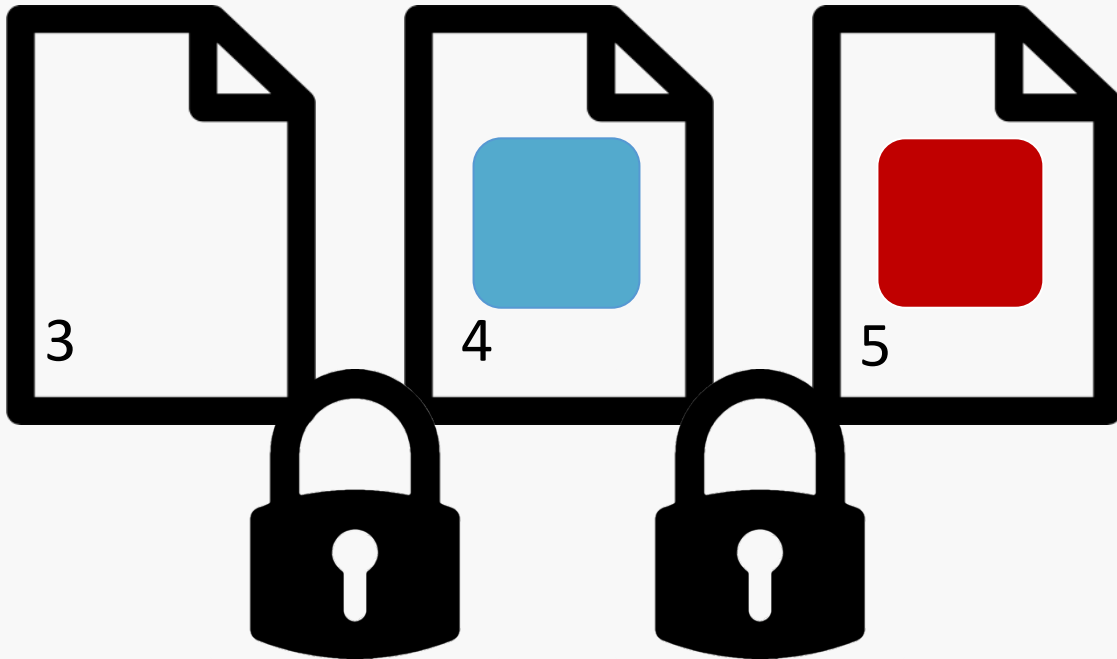


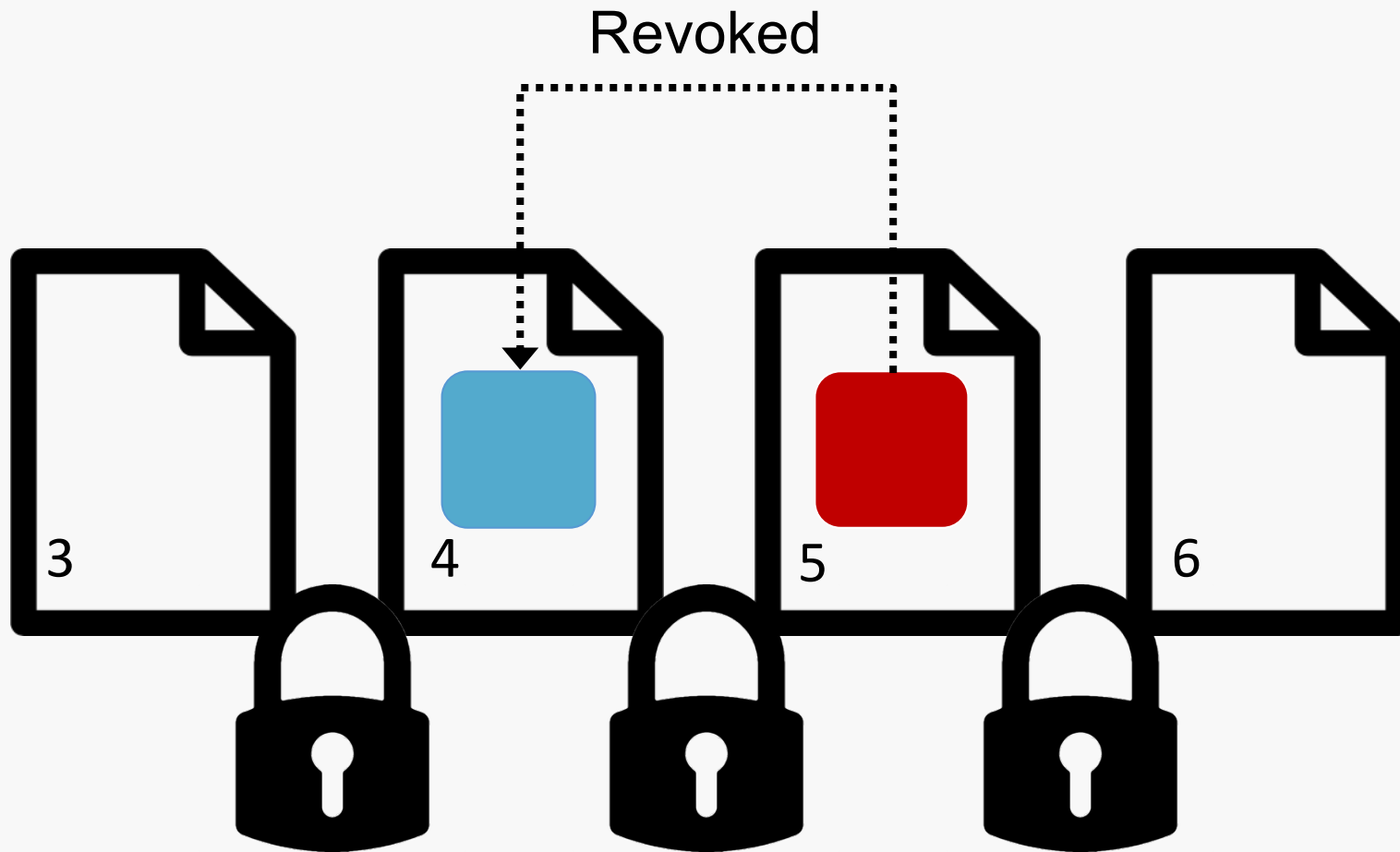
I need to **change**
some important terms
in the existing license

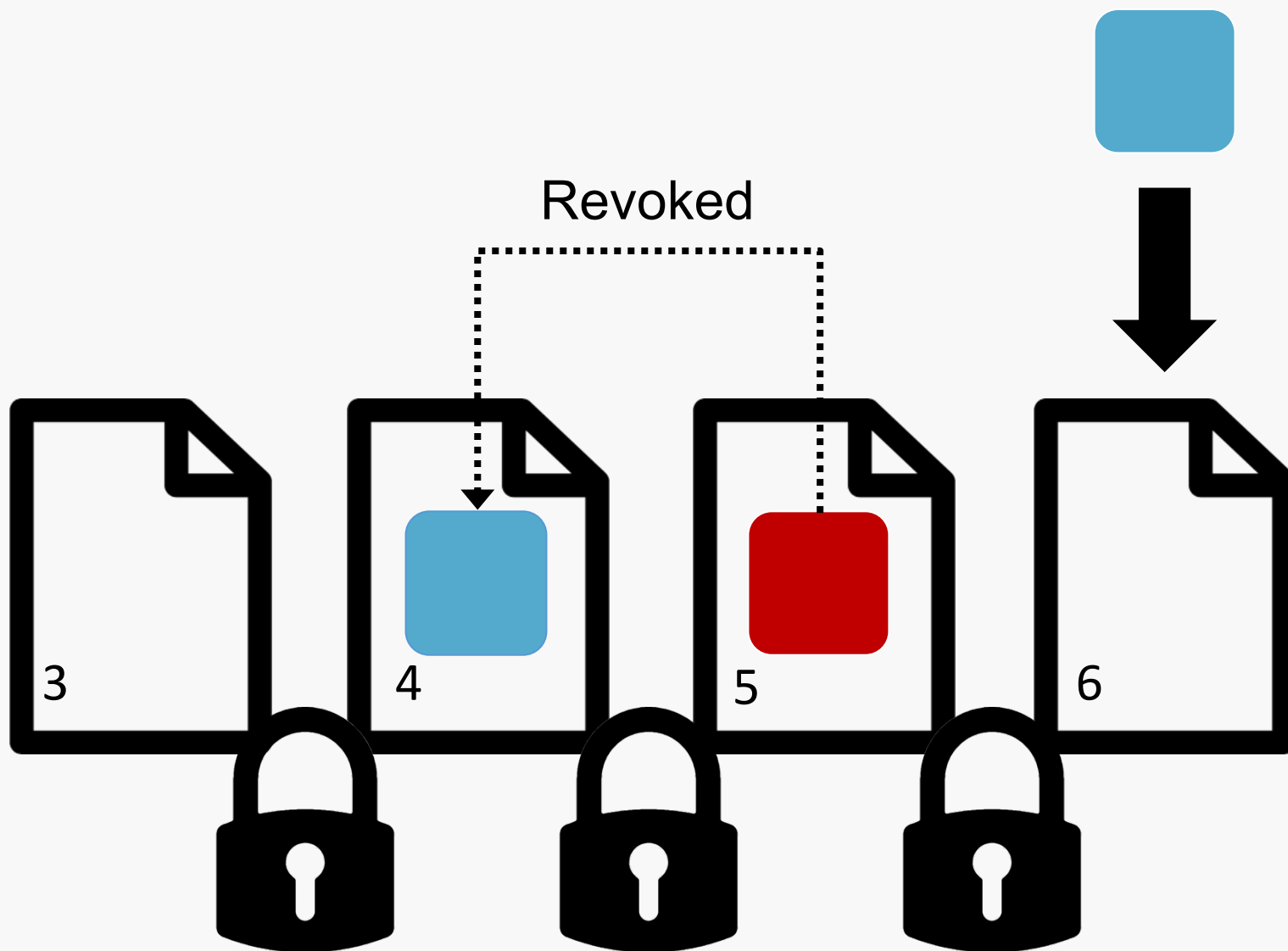
Existing

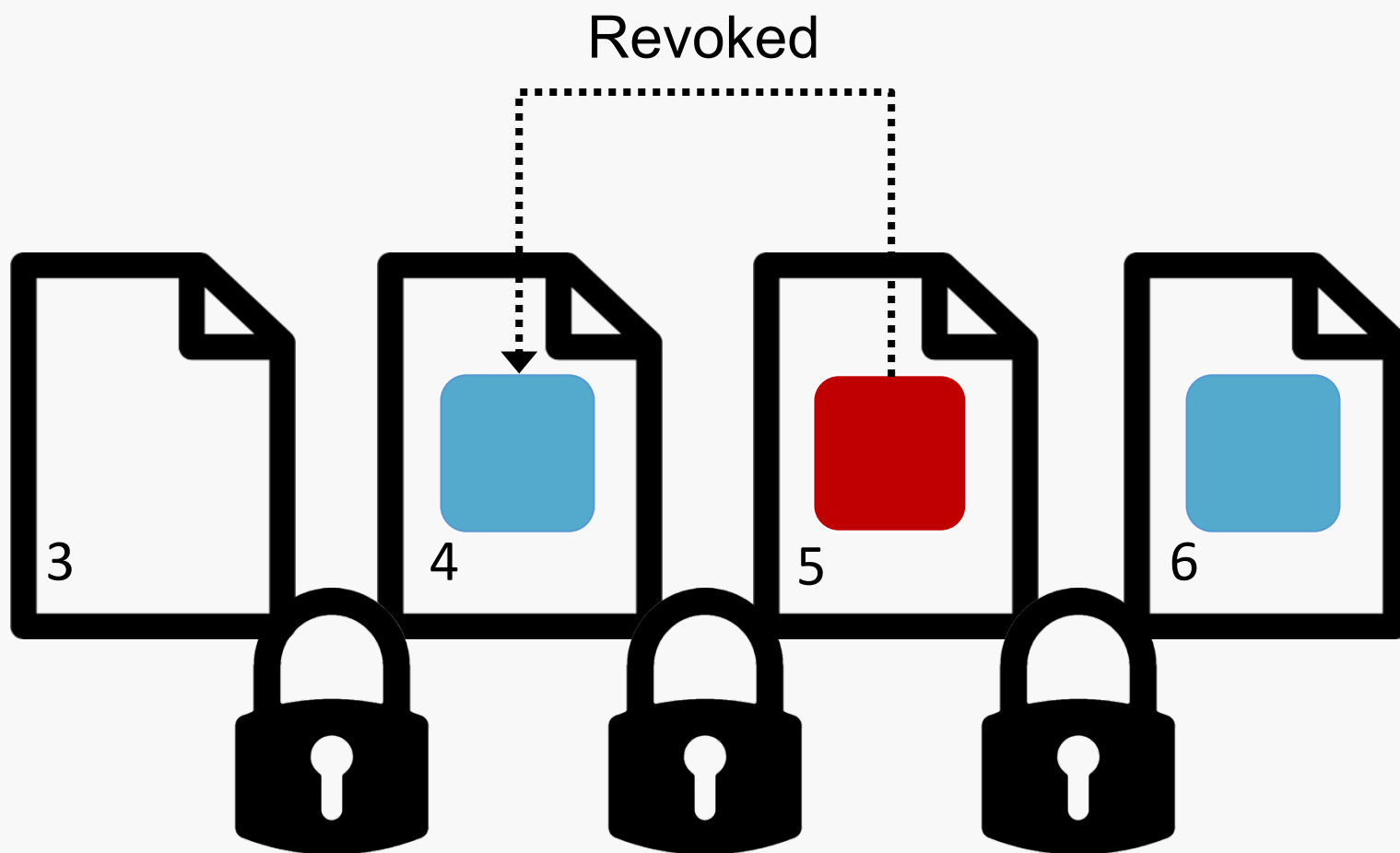


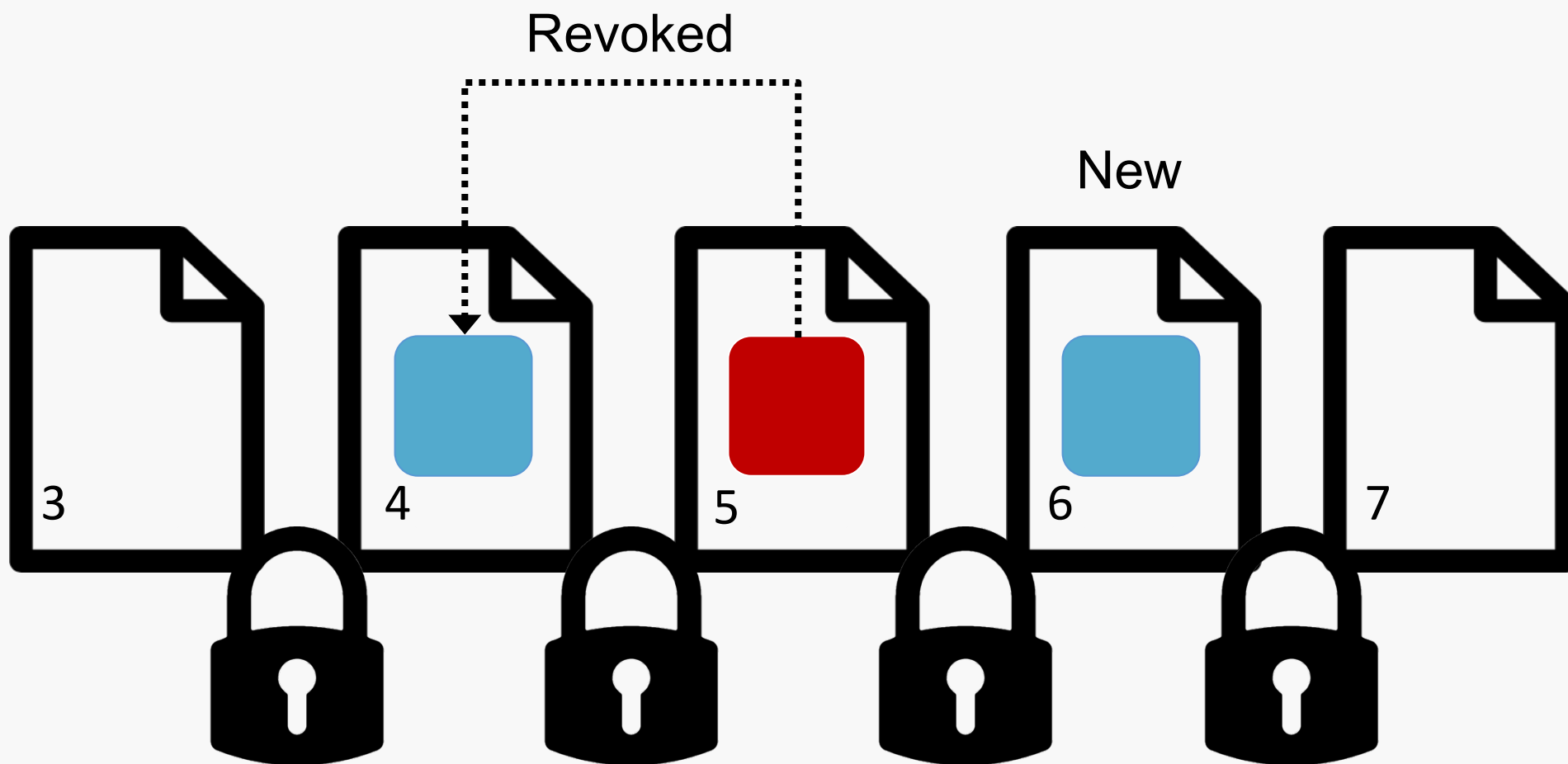












Editing Room Use

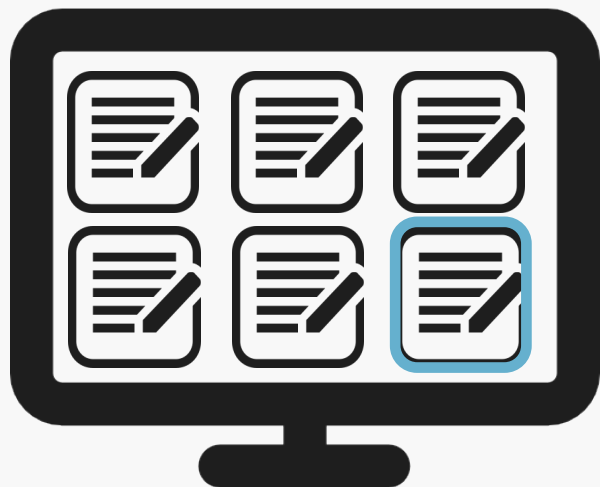


I need some extra
content

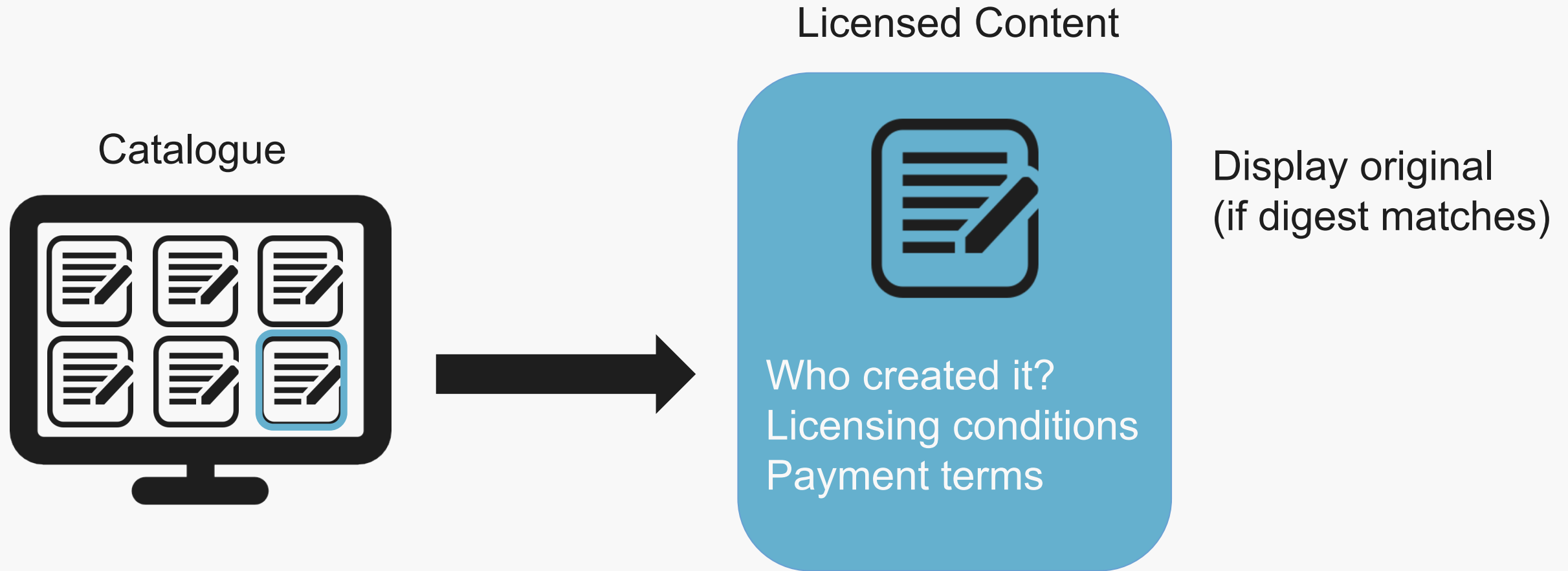
Catalogue



Catalogue



I want **this** content

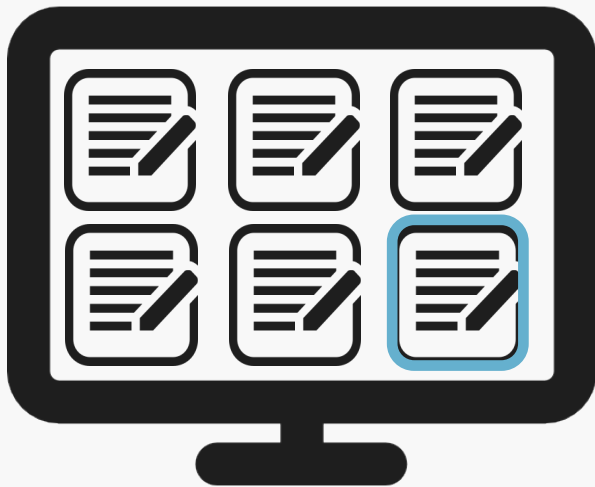


Catalogue



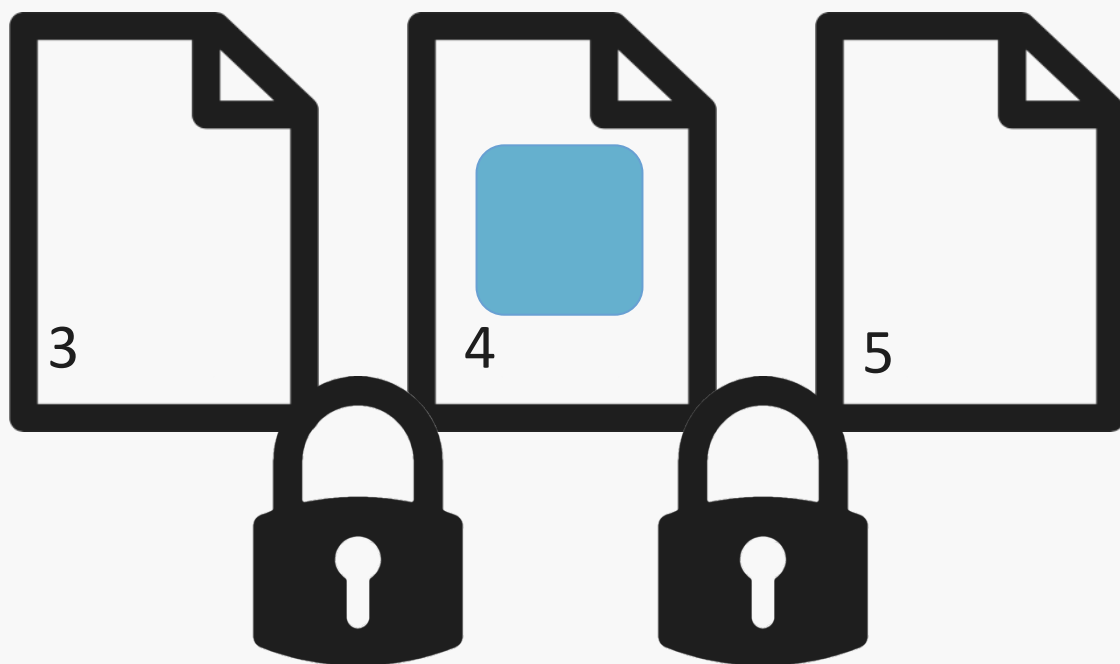
I **agree** with these
terms

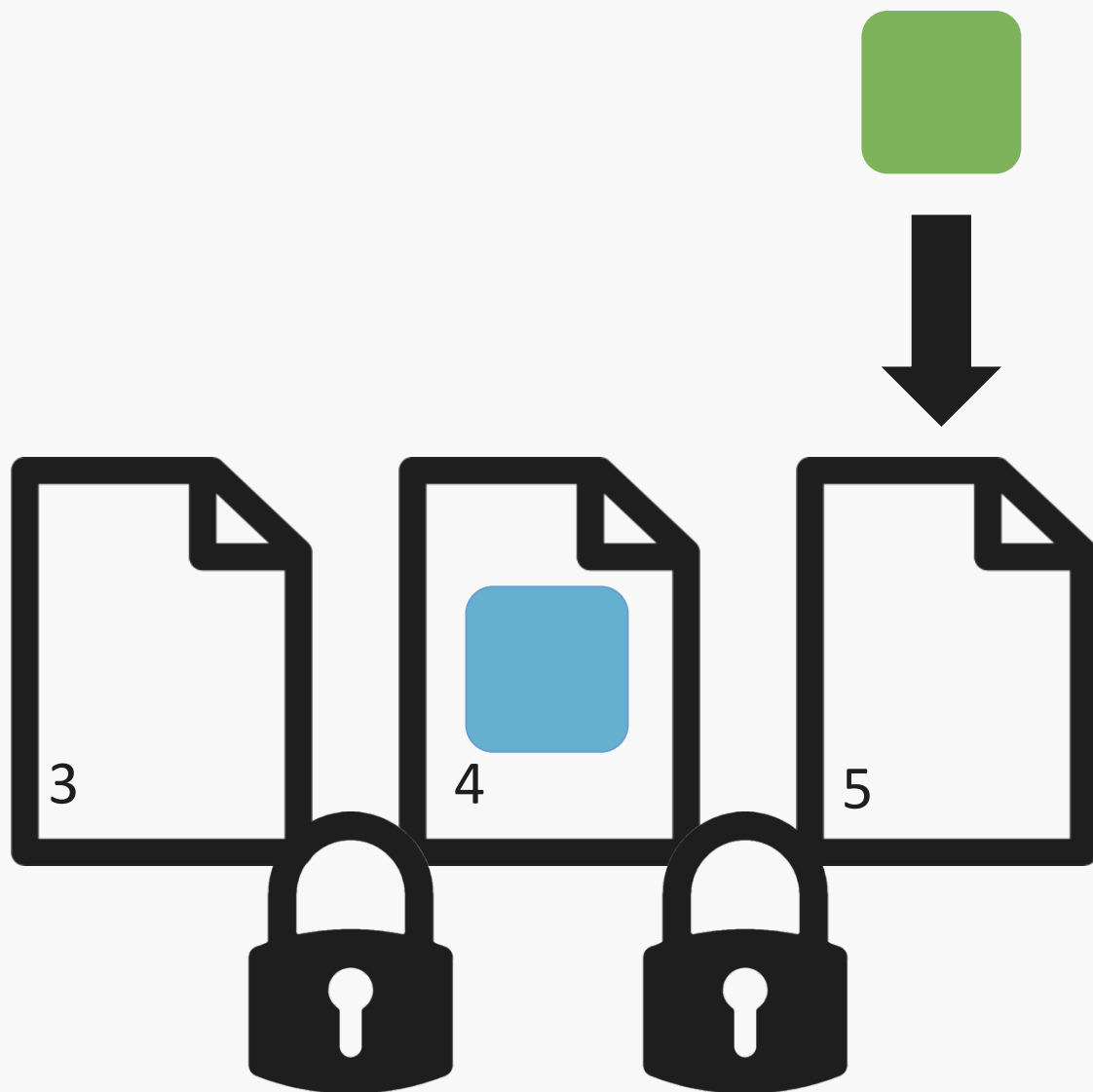
Catalogue

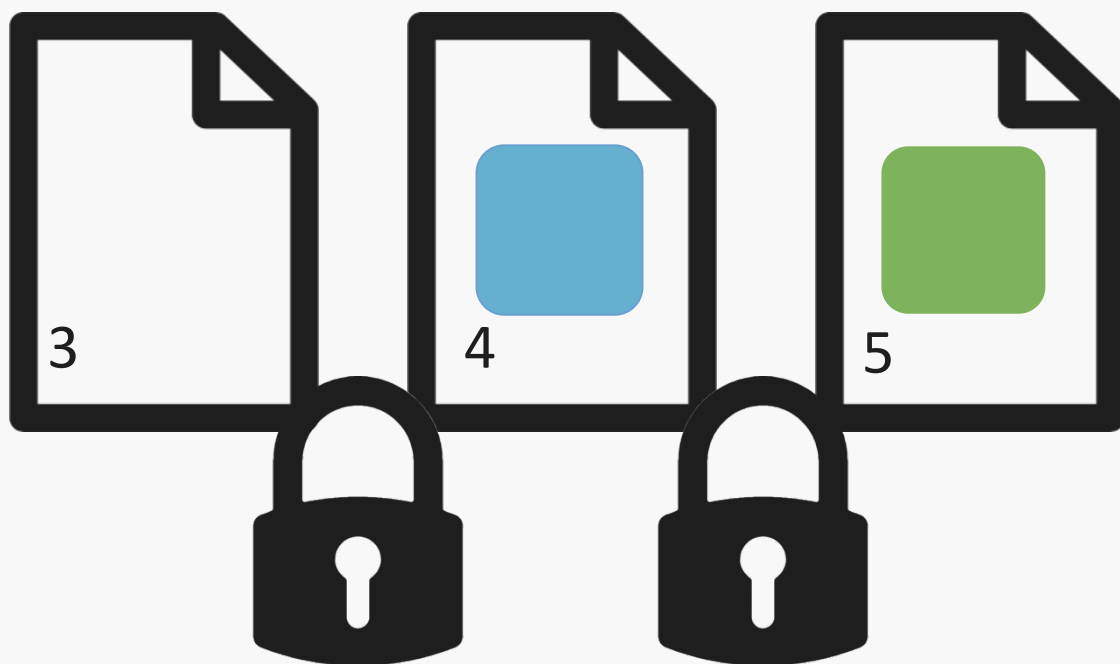


Consent

- Version: 1.0
- On-Chain License Object:
 - Block 4
 - d1900cf771cdc853b8345b0376bf6f2
- Consent Authority:
 - Jane Doe
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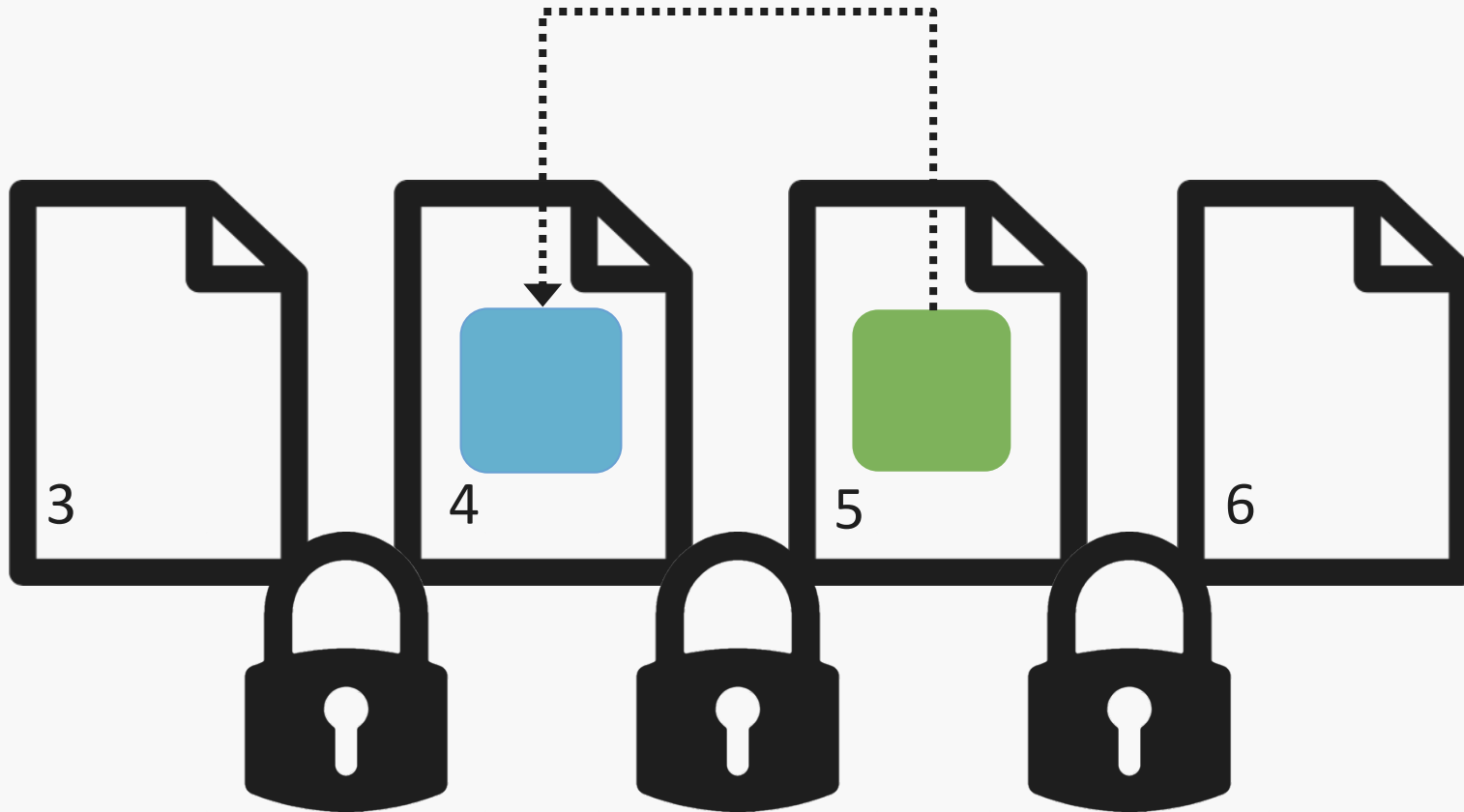









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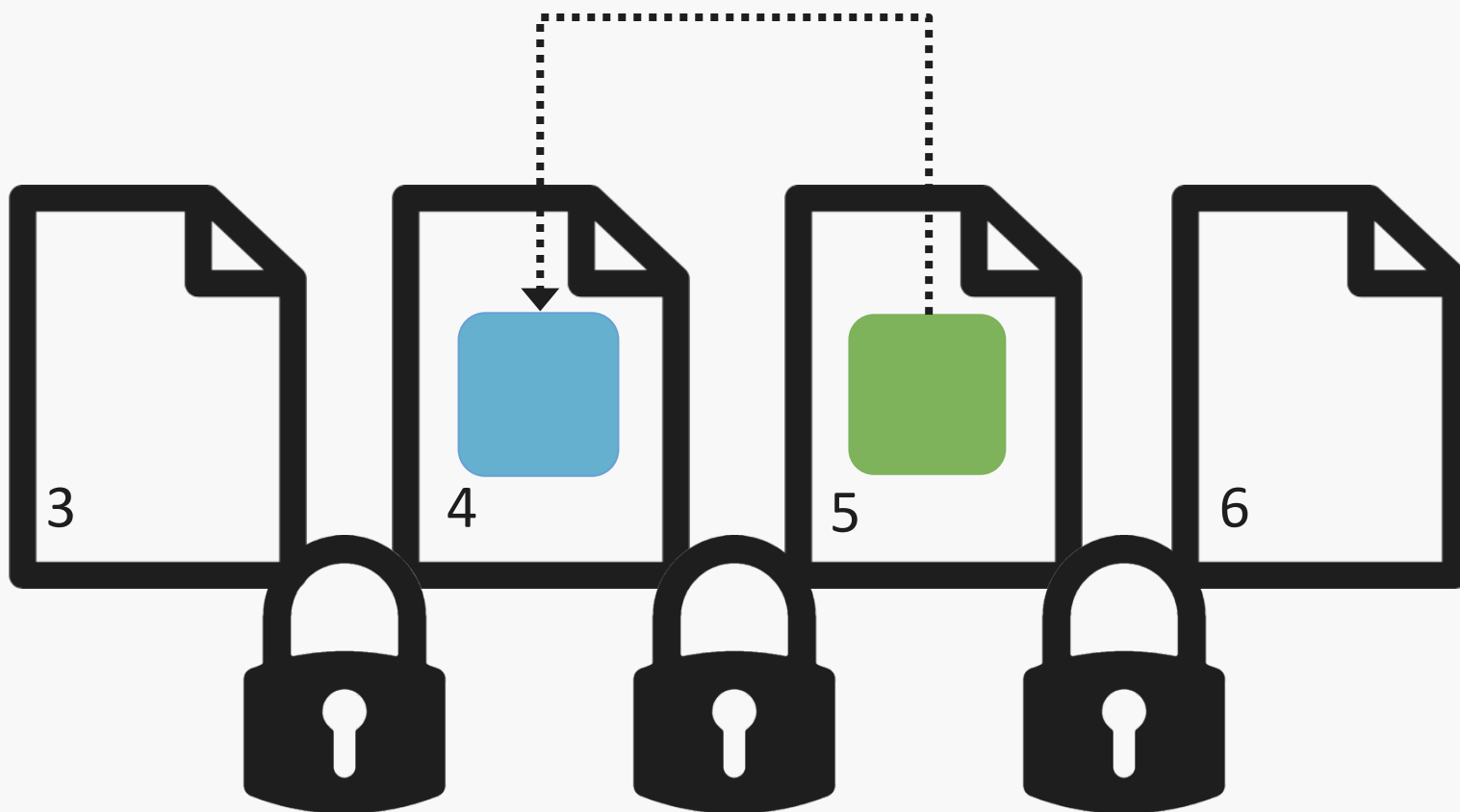


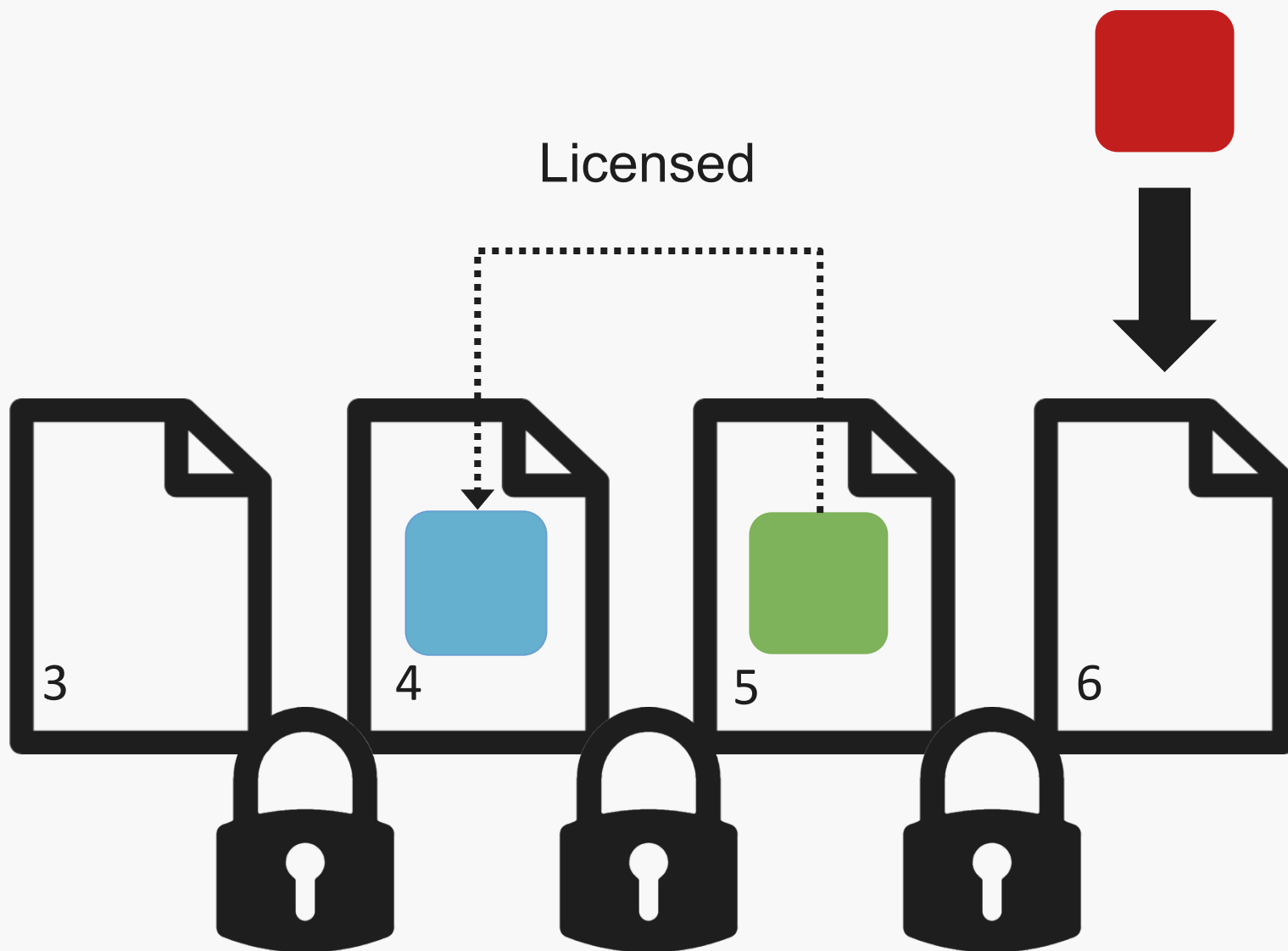
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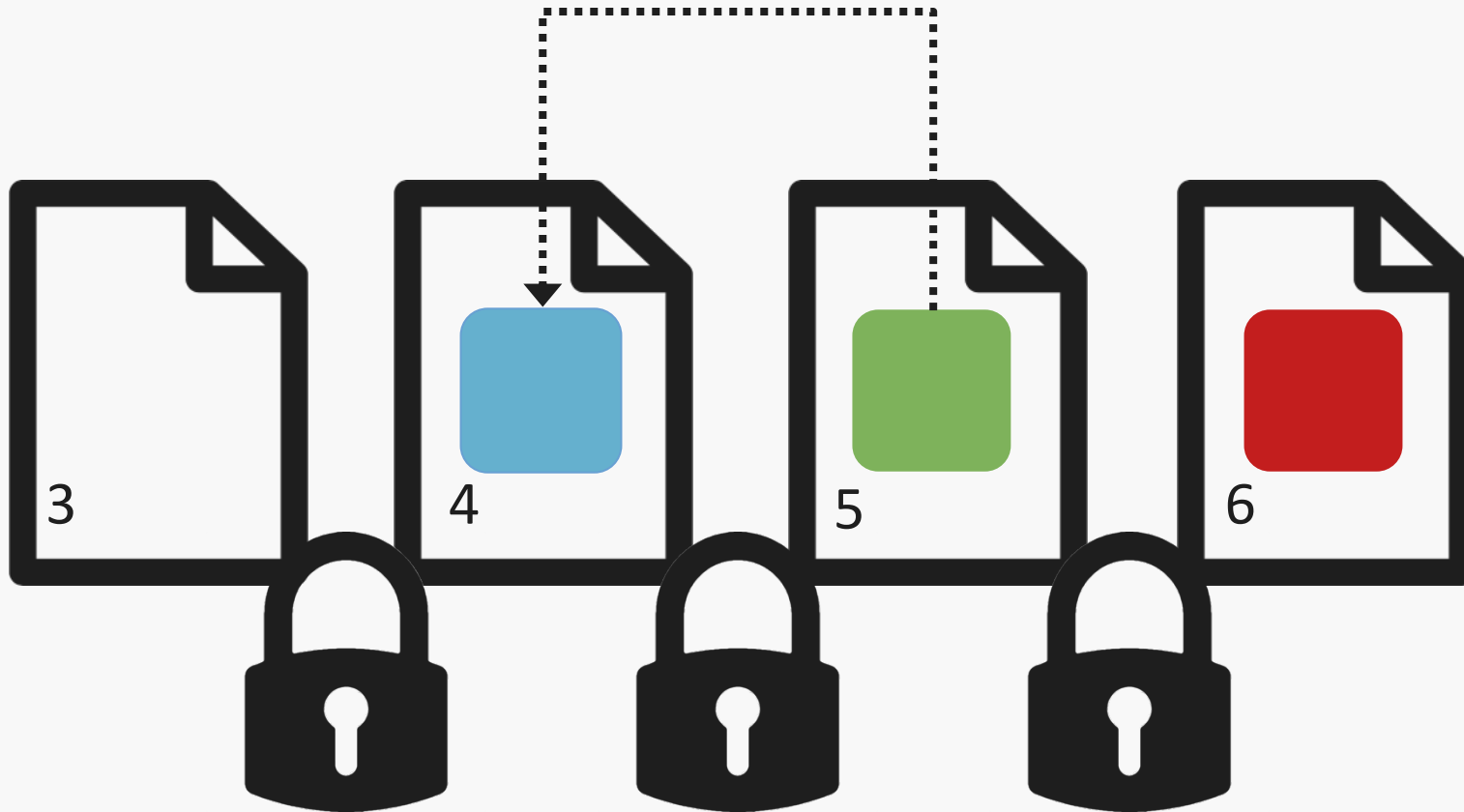
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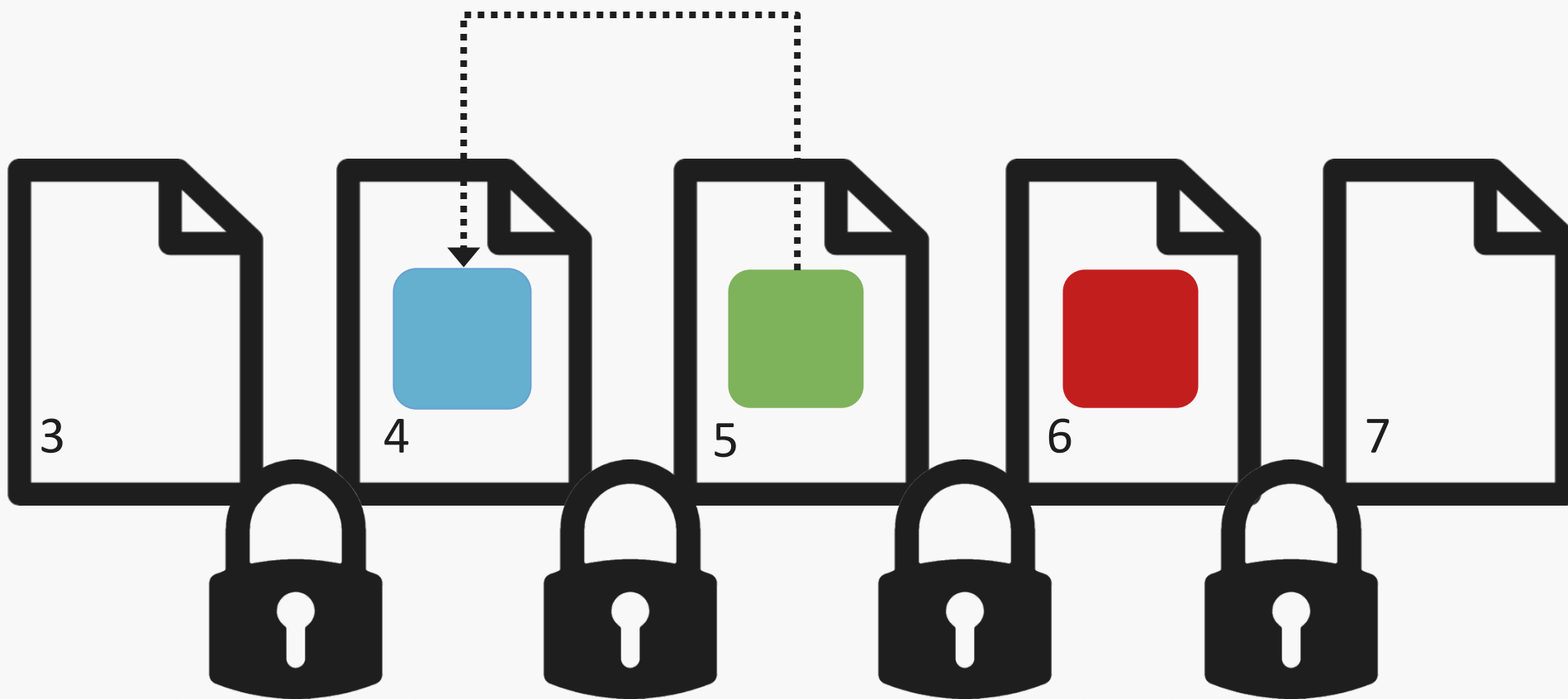


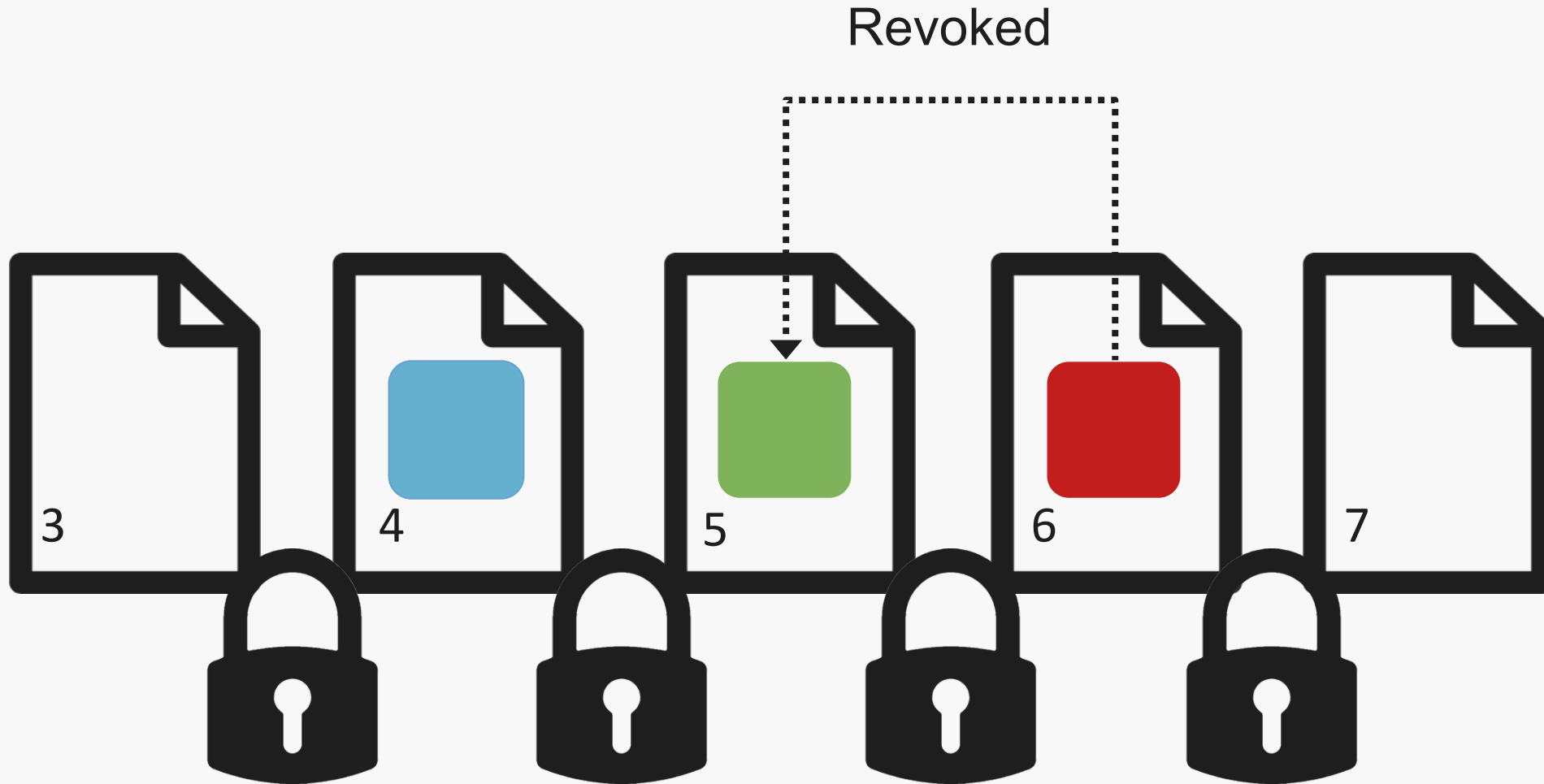
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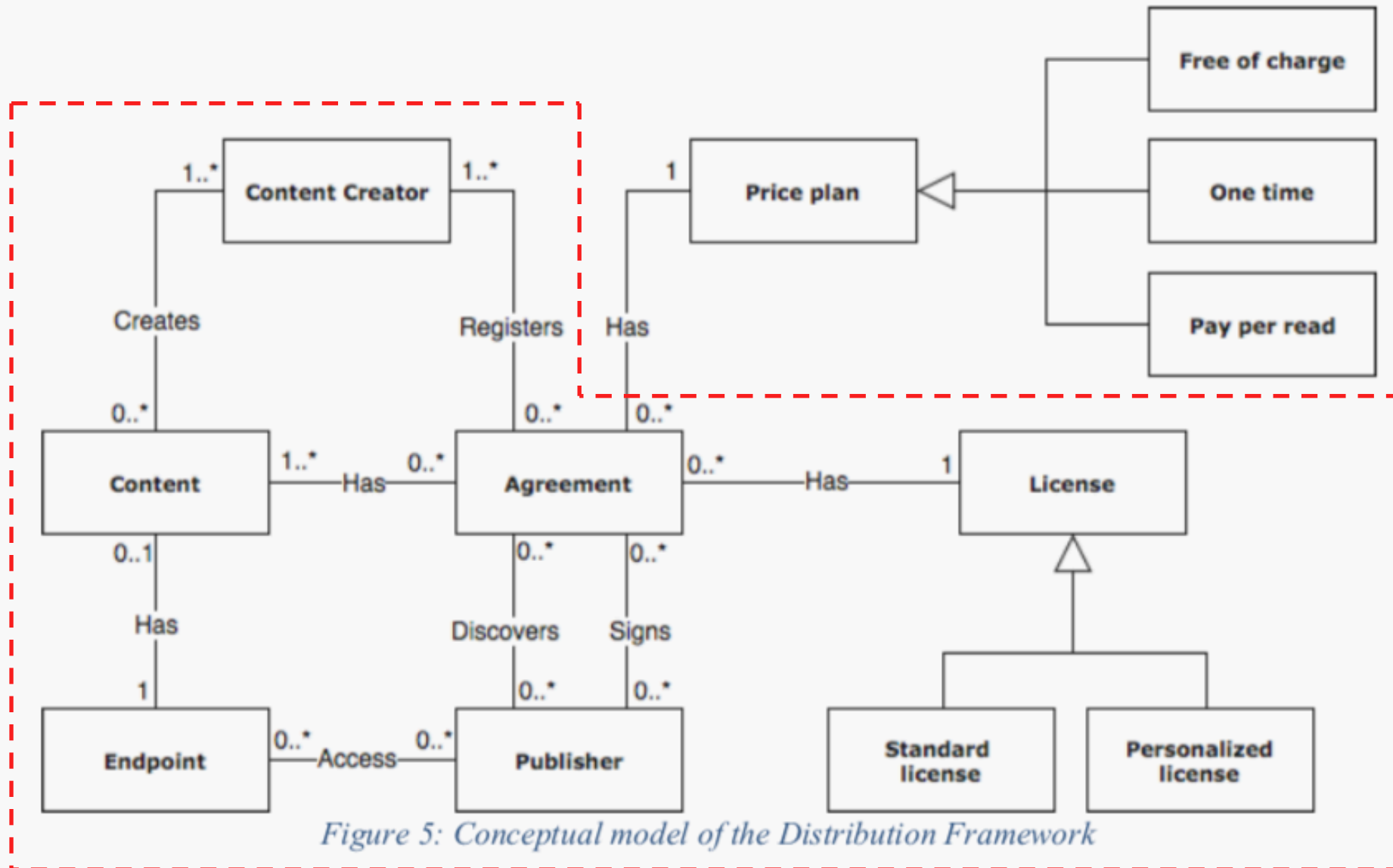




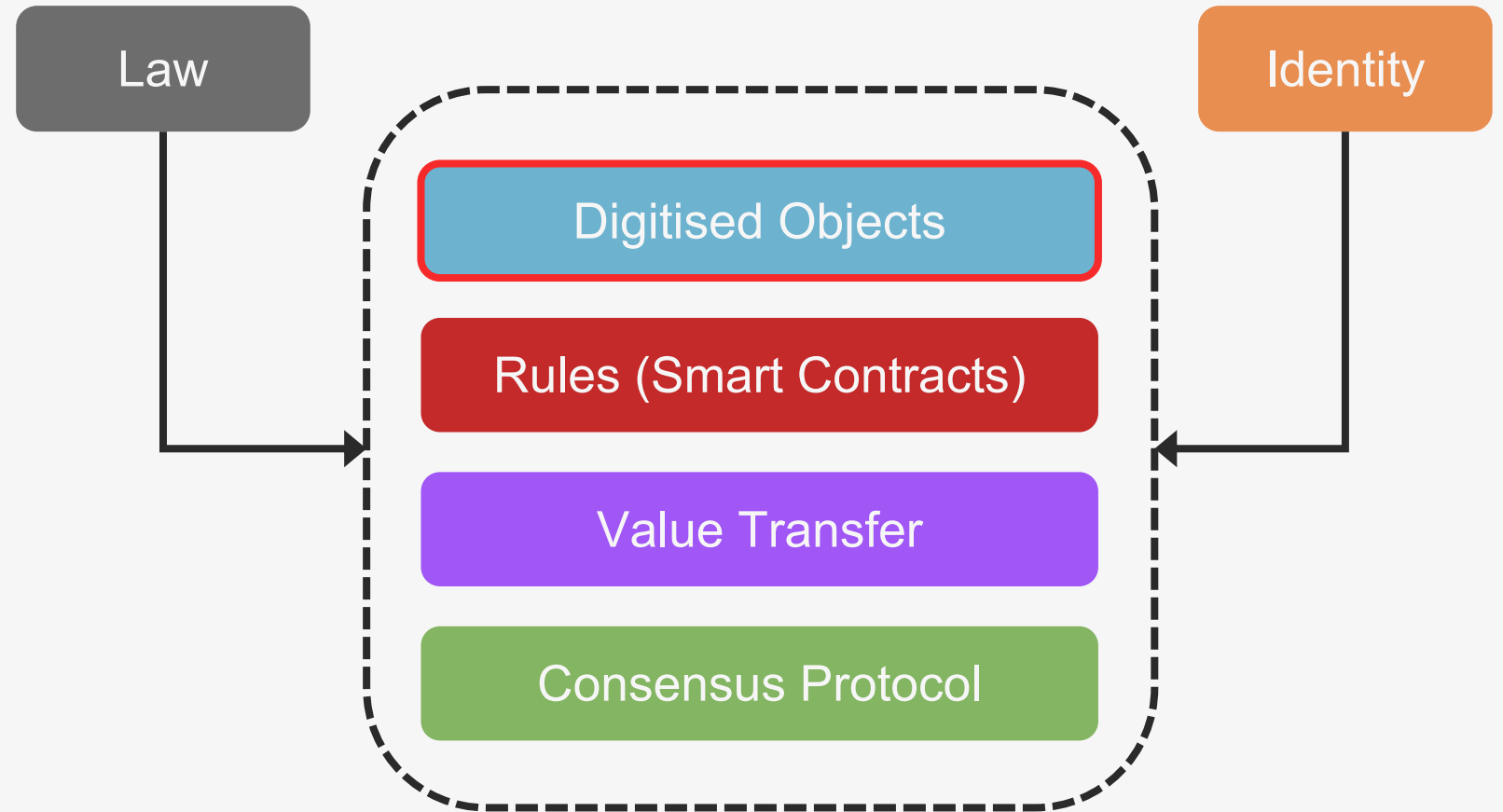
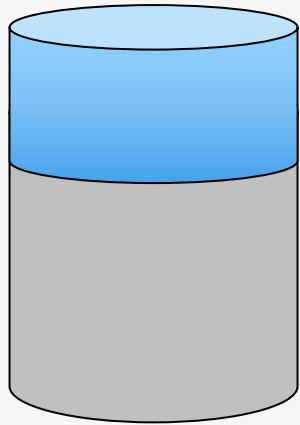
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Role of JPEG





Thank you

Robert M. Learney, Lead Technologist – Blockchain & DLT

Digital Catapult
101 Euston Road
London, NW1 2RA
0300 1233 101

robert.learney@digicatapult.org.uk