

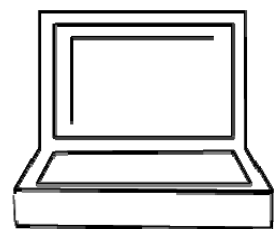
## **Joint Councils Meeting** Blockchain in Public Sector

October 2017

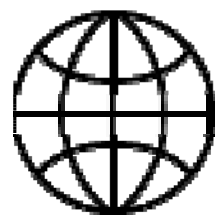
# Blockchain 101

# Introduction to Blockchain

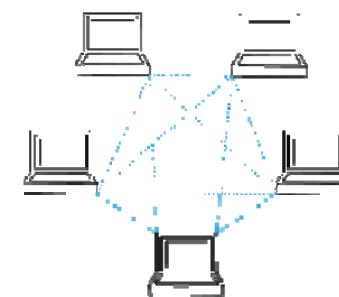
What the Internet is to information, blockchain is to value



Personal computer  
1970s

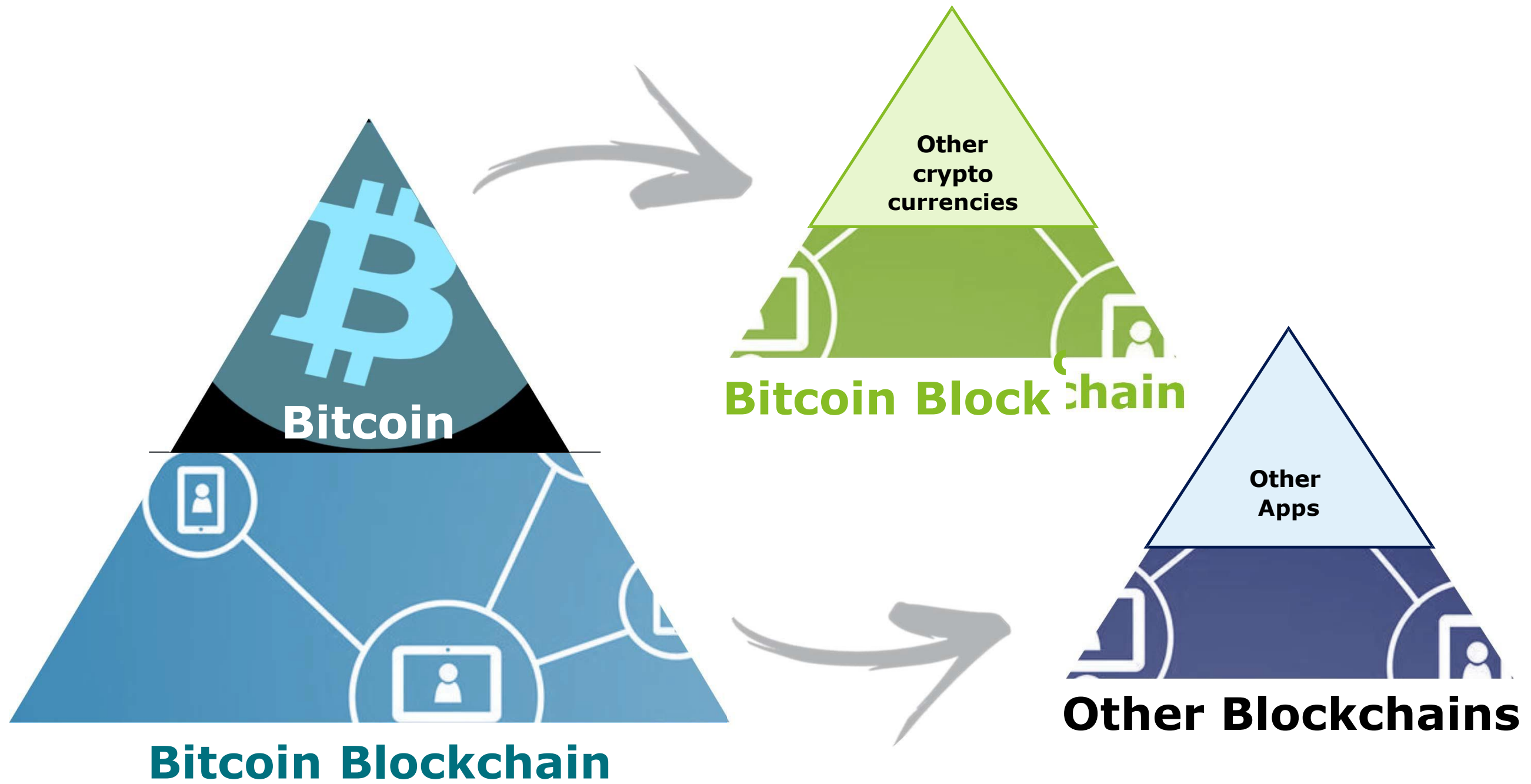


Internet  
1990s



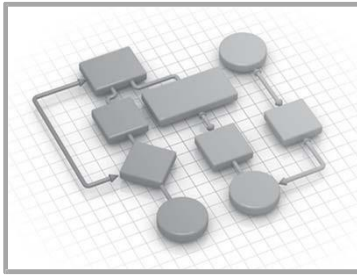
Blockchain  
2010s





# Blockchain - what is it ?

## Four Simple Components that are most relevant for public sector...



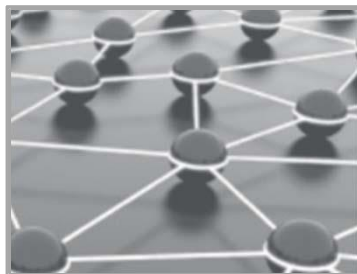
It is super-charged  
through Smart  
Contracts

- *Provides business logic to be applied*
- *to control or execute transactions automatically*



It's based on  
Cryptography

- *This provides the immutability*
- *Allows it to be trusted by the network*
- *Ensures it's tamper proof*



It's Distributed

- *No single owner*
- *No single point of failure*



At its core it's a  
Ledger

- *Double entry – when transferring value*
- *Single entry – when recording a fact*

# Putting them all together – building a Blockchain

Ledger Name	Corporate Matters		Rules (Smart Contracts)				
Page Number	1						
Previous Page							
Date	Who	What	How Much	Date	Who	What	How Much
08.12.17	Joe	Shares of Nuco	+100.00	08.12.17	Treasury	Shares of Nuco	(100.00)
Other information: Joe's new share balance: 100							
08.15.17	Joe	Shares of Nuco	(50.00)	08.15.17	Mary	Shares of Nuco	+50.00
Other information: Joe's new share balance: 50      Mary's new share balance: 50							
08.10.17	Joe	Admitted as Director					
Other information: Subcommittee: Audit   Role: Chair   Status: Active							
Other information:							
Other information:							
Other information:							
Page Hash:						00et7g7d88g9s9900gh	

1. A ledger of a certain type is created

3. A ledger entry could also be a 'single entry' to record a fact

2. A ledger entry could be 'double entry' exchange of value

4. A cryptographic 'hash' is applied to the page based on all the content

## Putting them all together – building a Blockchain

Ledge Page Previous		Corporate Matters		Rules (Smart Contracts)			
		2		If a Director Shares become zero, set Director Status to "Suspended"			
00et7g7d88g9s9900gh							
Date	Who	What	How Much	Date	Who	What	How Much
08.22.17	Joe	Shares of Nuco	(50.00)	08.22.17	Bill	Shares of Nuco	+50.00
Other information: Joe's new share balance: 0							
08.22.17	Joe	Suspended as Director					
Other information: Subcommittee: Audit   Role: Chair   Status: Suspended							
Other information:							
Other information:							
Other information:							
Other information:							
Page Hash:				0066g88d8g1144444			



# Blockchain = Distributed Ledger

The 'Block' – a page of transactions that are grouped together and processed at once

The 'Ledger' – simply a ledger as it was defined in the 15<sup>th</sup> century

The 'Distributed' – how the page (block) is copied to all other nodes as soon as it's committed

Ledger Name: <u>Chocolate Marmalade</u>				Rules (Smart Contracts)			
Page Number (Block): <u>1</u>				Previous Page (Hash):			
Date	Who	What	How Much	Date	Who	What	How Much
08.22.17	Joe	Shares of Nuclo	100.00	08.22.17	Theresa	Shares of Nuclo	100.00
Other information: 08.22.17 Joe Shares of Nuclo 100.00 08.22.17 Mary Shares of Nuclo 100.00							
Other information: 08.22.17 Joe Administered as Director							
Other information: Subcommittee: Audit   Role: Chair   Status: Active							
Other information:							
Other information:							
Other information:							
Other information:							
Page Hash: 00e7q7d88g9e9900qh							

Ledger Name: <u>Chocolate Marmalade</u>				Rules (Smart Contracts)			
Page Number (Block): <u>2</u>				Previous Page (Hash): <u>00e7q7d88g9e9900qh</u>			
Date	Who	What	How Much	Date	Who	What	How Much
08.22.17	Joe	Shares of Nuclo	100.00	08.22.17	Theresa	Shares of Nuclo	100.00
Other information: 08.22.17 Joe Subcommittee: Audit   Role: Chair   Status: Subpending							
Other information:							
Other information:							
Other information:							
Other information:							
Other information:							
Page Hash: 0066g88d8g1144444							

Ledger Name: <u>Chocolate Marmalade</u>				Rules (Smart Contracts)			
Page Number (Block): <u>3</u>				Previous Page (Hash): <u>0066g88d8g1144444</u>			
Date	Who	What	How Much	Date	Who	What	How Much
08.22.17	Theresa	Shares of Nuclo	100.00	08.22.17	Theresa	Shares of Nuclo	100.00
Other information:							
Other information:							
Other information:							
Other information:							
Other information:							
Page Hash: 0066g88d8g1144444							

The 'Chain' – how the page hashes are connected from one block to another to make it practically impossible to tamper with

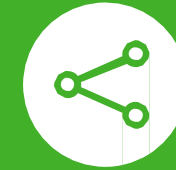


# So what are the benefits we get with a Blockchain ?



## Transparency

All blockchain participants are able to view data added to the chain, while the chain improves data integrity by being the single source of truth



## Disintermediation

By enabling transparency and trust, the blockchain can fulfill the roles that intermediaries traditionally provide



## Trust

Blockchain's connected data blocks and distributed validation structure establishes trust between participants without them having to know one another



## Auditability

Blockchain data is immutable and everlasting, creating an exhaustive means of record keeping

There are many types of blockchain-based solutions  
Most importantly is to understand the Blockchain spectrum

	PUBLIC	ENTERPRISE
Access	Open read and write	Permissioned write and/or read
Speed	Slower	Faster
Security	Open network	Approved participants
Identity	Anonymous or pseudonymous	Known identities
Asset	Native assets	Any asset



Source: Coindesk, State of Blockchain Q1 2017

© Deloitte LLP and affiliated entities.

Blockchain is not a “silver bullet” and should be selectively applied to problems where distributed computing and democratized trust provide value to ecosystem participants

### Characteristics of high-potential use cases



#### Shared repository

**A shared repository** of information is used by multiple parties



#### Multiple writers

**More than one entity** generates transactions that require modifications to the shared repository



#### Minimal trust

A level of **mistrust exists between entities** that generate transactions



#### Intermediaries

**One (or multiple) intermediary** or a central gatekeeper is present to enforce trust



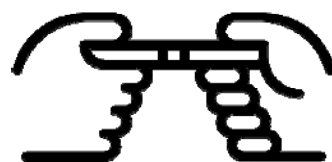
#### Transaction dependencies

Interaction **or dependency between transactions** is created by different entities

# The impact will cut across all industries with 100+ uses identified



Supply chain management



Trade finance



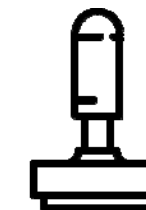
Syndicated loans



Stock trading



Automatic reconciliation



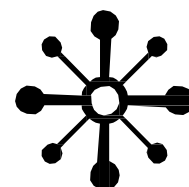
Business Registry & Permits



Real-time payments



Credit ratings



Decentralized infrastructures



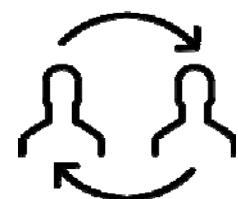
Email integrity



Loyalty points & rewards



Insurance claims



P2P lending



Energy grid



Patents, Copyrights



Digital identities (KYC)

And many more . . .

**Deloitte.**  
**Digital**