INTRODUCTION BLOCKCHAIN TECHNOLOGIES

PvKO Inspiratiesessie Blockchain | Utrecht, 14 February 2017 | M. Oskar van Deventer

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BLOCKCHAIN RAISES MANY QUESTIONS

› What is this "blockchain" stuff that everybody is talking about?
  › Concrete examples of use, financial, voting, other
  › Who guarantees the correct operation and security of the system?
  › Legal aspects, risks, uncontrollability, opposition by "middle man"
› How can blockchain improve my klantgericht ondernemen?
  › Does it make my business better, faster, cheaper, …?
  › Is this something that my customers want?
  › Can I use it to improve the public image of my sector?
› Where do I start with my blockchain use case?
  › What are my first steps?
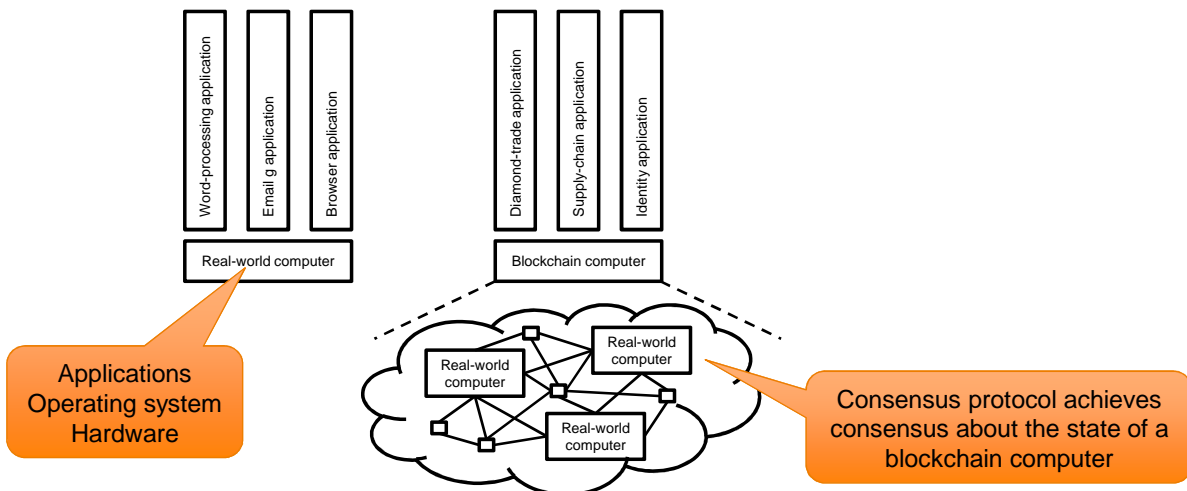 › Which parties or suppliers should I contact?

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CONTENTS

〉 Technology: a blockchain is like a computer

〉 Ecosystem: a blockchain is like a party

〉 Technologies and technology instances

bitcoin **ETHEREUM** **ripple** **HYPERLEDGER**

BIGCHAIN DB R³ **Corda** **eris** INDUSTRIES **MultiChain**

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A BLOCKCHAIN IS LIKE A COMPUTER

Word-processing application
Email g application
Browser application

Diamond-trade application
Supply-chain application
Identity application

Real-world computer

Blockchain computer

Real-world computer
Real-world computer
Real-world computer

Applications
Operating system
Hardware

Consensus protocol achieves consensus about the state of a blockchain computer

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Slide 1

Collection of modifications of the 'shared truth' *.

* e.g. a shared transaction ledger or a shared virtual-computer state

blockchain

Cryptographically linked in a chain-like fashion (using hash functions)

Block header

…
Prev: H( )
Transactions: H( )
…

…
Prev: H( )
Transactions: H( )
…

…
Prev: H( )
Transactions: H( )
…

Block content (transactions)

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Slide 2

PRIVATE/PUBLIC, PERMISSIONED/UNPERMISIONED

> https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf

Government Office for Science

Distributed Ledger Technology: beyond block chain

A report by the UK Government Chief Scientific Adviser

Distributed Ledger Taxonomy

How many copies of the ledger? → One → Traditional ledger eg a personal bank account

Many

Who can use these copies? → Owner group → Permissioned, private shared ledger eg Bankchain, a clearing and settlement network

Anyone

Who maintains integrity of the ledger? → Trusted ledger owners or actors, by validation → Permissioned, public shared ledger (ie a distributed ledger) eg Ripple, a global financial transactions system

Any user, by untrusted consensus → Unpermissioned, public shared ledger eg Bitcoin, a cryptocurrency

Figure courtesy of Dave Birch (Consult Hyperion)

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BLOCKCHAIN FEATURES & CHALLENGES

A blockchain computer is

❯ Highly reliable

But also …

❯ Slow
❯ Memory limited
❯ Expensive

Features	Challenges
Consensus	Speed
Validity	Privacy
Uniqueness	Security
Immutability	Sustainable
Authentication	Cost

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TECHNOLOGIES AND TECHNOLOGY INSTANCES

Transactional	Data-oriented	Smart contracts	Swiss Army Knife
Value transfer on the blockchain	Database on the blockchain	Computing on the blockchain	Assemble your own blockchain
Bitcoin Ripple …	BigchainDB Multichain …	Ethereum Eris/Monax …	Hyperledger various BaaS …

*Thanks to Karim Grini of Accenture for providing this classification

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A BLOCKCHAIN IS LIKE A PARTY

› Somebody has to take the initiative
  › Invite friends to help you with the organisation
› Make decisions together
  › Who arranges what?
  › How are things paid?
  › Outsource food or location?
  › Whom to invite? Open, closed?
  › How do we decide on things?
› Execute the plan and start the party
  › Invitations, publicity, changes
  › …more work ☺☺

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EXAMPLE USE CASE: PAY PER CONTENT ITEM

› More and more people create content items independently
  › Professional, semi-professional, amateur, …
  › Video, blog, column, article, photo, app, …
› Much money and power goes to the "middle man"
  › Broadcasters, VoD services, magazines, newspapers, websites, …

"Could we have a marketplace where independents could sell their content directly to consumers?"

"How do we prevent that our new marketplace turns into an expensive and powerful middle man"

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OK. LET'S START THE PARTY PLANNING

› Who shall I involve in planning my "pay-per-content-item" party?
› What will our system look like to users, mock-ups, proof-of-concept?
› How do we decide on the functionality of the system? Governance?
› Who invests in what aspect of the system? Business models?
› Make, buy, open source?
› What will be our legal status?
  (Note: a cartel on a blockchain is still a cartel)
› On what (blockchain?) infrastructure will we run our system?
  (Our own? A third-party one?)
› PoC → pilot → alpha → beta → operational → …
› … more work ☺☺

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IN CONCLUSION

› Metaphors
  › Blockchain is like a computer
  › Blockchain is like a party
› Different blockchain technologies
  › Public – private
  › Permissioned – permissionless
  › Value-transfer – database – computer – Swiss army knife
  › Single instance – many instances

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LET US HAVE A GREAT BLOCKCHAIN PARTY!