Microsoft Blockchain As a Service

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"LEGO blocks (#0048)" (CC BY 2.0) by regan76 @ flickr





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india





"BUSINESS(es) NEVER OPERATE in ISOLATION; They are ALWAYS Participants in a Business Network"





Magic Internet Money

"bitcoin" (CC BY 2.0) by stevegarfield @ flickr

"bitcoin" (CC BY 2.0) by Sean MacEntee @ flickr

CONO.

"Double Spend Problem"

"Blue And Pink Piggy Banks" (CC BY-SA 2.0) by kenteegardin @ flickr

What's so special about blockchain anyway?

A ledger

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Distributed Shared

"Sibelius Monument" by Carlos ZGZ @ flickr

Immutable

"Written in Gold" (CC BY 2.0) by Anonymous Account @ flickr



Open Anonymised

"Schooling" (CC BY-SA 2.0) by Benson Kua @ flickr

Consensus

POLLING STATION



"Trust" (CC BY 2.0) by schmollmolch @ flickr

Why should I care?

Potential for disruption





Reduces Fraud

Eliminates Intermediaries

new business models.

Highly secure and transparent, making it nearly impossible to change historical records.

Increases Efficiency and Speed Simplifies transactions and enables T+Zero settlement time.

Allows industries to redefine or create

Increases Revenue and Savings Potential savings and new revenue opportunities through more efficient processes and reduced costs. 100 10101010 1011100010 10101010

Consider the "Sharing Economy"

"Enabling people to share and monetize their assets, skills and time" Airbnb – I rent out "spare capacity" in my oh-so-trendy Paris apartment Etsy – I sell the output of my crocheting obsession EasyCar Club – I rent out the 911 when I'm in the Lambo Uber – I proffer my skills, time and asset for modest reward

Democratising? Undeniably yet these are centralised models...

Blockchain could potentially redefine the sharing economy Disintermediation means lower costs, greater efficiency, greater transparency Marketplaces become distributed applications on the blockchain Smart contracts executing transactions

lt's not just about

money

"money 1" (CC BY-SA 2.0) by allenthepostman @ flickr

"The first generation of the digital revolution brought us the Internet of information.

The second generation – powered by blockchain technology – is bringing us the Internet of value: a new platform to reshape the world of business and transform the old order of human affairs for the better."

- Don Tapscott

THERE HAS BEEN SIGNIFICANT GROWTH IN FINANCIAL INCLUSION

More adults have an account (with a financial institution or mobile money service) now than three years ago.



How does it work?



The chain forms



Blockchain x.O



Smart Contracts

Like a physical contract but terms are converted into code and loaded onto the Blockchain

Smart Contracts enforce themselves because they live on the blockchain

Smart Contracts react to events and messages, include complex multiparty actions and actually transfer assets between parties.

Think of a Smart Contract as a program running on the Blockchain that will continue running until it expires. This contract will leave a complete historical ledger of all of its interactions along with the identities of those interacting with it so it is completely transparent for auditing purposes.



Ethereum Platform

"Next generation" blockchain – fully trustless smart contract platform

Ether is the "currency" of Ethereum Ethereum Virtual Machine (EVM) – Turing Complete Ethereum client eg go-ethereum (or Geth), Parity, cpp-ethereum Ethereum wallet / Mist

Ethereum Development

Geth (client) allows us to deploy and exercise smart contracts Geth exposes API over JSON-RPC Web3.js SDK wraps API for JS (also .NET, Java, Ruby SDKs)

Solidity is the language -> compiled to bytecode for deployment Truffle development framework testrpc is a local Ethereum client for testing



Types of blockchain

Public vs Consortium

Public

Unpermissioned (eg Bitcoin, Ethereum)

Anyone has access

No single owner - all participants are "owners"

Anyone can verify transactions and consensus is used to determine "truth"

Consortium

Permissioned Public (eg Ripple)

Anyone has access

One or many "owners"

Only designated actors can verify transactions and achieve consensus

Permissioned Private (eg Bankchain)

Access to the ledger is restricted

One or many "owners"

Only designated actors can verify transactions and achieve consensus

Characteristics

Distributed, peer to peer network architecture Cryptographic tokens Shared database / ledger (everyone has a copy) Blocks of transactions to start of time (genesis block) Immutable Heartbeat - blocks are committed Consensus formation algorithm Virtual machine

Consensus Forming Approach

Consensus requires participants with vested interest Proof of work (need to solve a puzzle) Proof of stake (I can demonstrate I own some stake in the system) Proof of burn (I'm prepared to make a sacrifice to participate)

It must come at a cost but be easy to verify (asymmetric)

Bitcoin

Counterparty

 $MON\Lambda X$









Potential applications

And it will disrupt multiple industries

Financial

Redesign costly legacy workflows, improve liquidity and free up capital. Help reduce infrastructure costs, increase transparency, reduce fraud and improve execution and settlement times.

Retail & Manufacturing

Better supply chain management, smart contract platforms, digital currencies, and tighter cybersecurity.



Healthcare

Removes third-party verifiers such as health information exchanges by directly linking patient records to clinical and financial stakeholders. Provides fast, secure, authenticated access to personal medical records across healthcare organizations and geographies.



Government

Increase transparency and traceability of how money is spent. Track asset registration, such as vehicles. Reduce fraud and operational costs.

New solutions to difficult business problems

Financial

Trading **Deal origination** POs for new securities Equities **Fixed** income Derivatives trading Total Return Swaps (TRS) 2nd generation derivatives The race to a zero middle office Collateral management Settlements **Payments** Transferring of value Know your client (KYC) Anti money laundering Client and product reference data. **Crowd Funding** Peer-to-peer lending Compliance reporting Trade reporting & risk visualizations **Betting & prediction markets**

Insurance

Claim filings MBS/Property payments Claims processing & admin Fraud prediction Telematics & ratings

Media

Digital rights mgmt Game monetization Art authentication Purchase & usage monitoring Ticket purchases Fan tracking Ad click fraud reduction Resell of authentic assets Real time auction & ad placements

Computer Science

Micronization of work (pay for algorithms, tweets, ad clicks, etc.) Expanse of marketplace Disbursement of work Direct to developer payments API platform plays Notarization & certification P2P storage & compute sharing **DNS**

Medical

Records sharing **Prescription sharing** Compliance Personalized medicine DNA sequencing

Asset Titles

Diamonds Designer brands **Car leasing & sales** Home Mortgages & payments **Land title ownership** Digital asset records

Government

Voting Vehicle registration WIC, Vet, SS, benefits, distribution Licensing & identification Copyrights

Identity

Personal Objects Families of objects Digital assets Multifactor Auth Refugee tracking Education & badging Purchase & review tracking Employer & Employee reviews

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Device to Device payments Device directories Operations (e.g. water flow) Grid monitoring Smart home & office management Cross-company maintenance markets

Payments

Micropayments (apps, 402) B2B international remittance Tax filing & collection Rethinking wallets & banks

Consumer

Digital rewards Uber, AirBNB, Apple Pay P2P selling, craigslist Cross company, brand, loyalty tracking

Supply Chain

Dynamic commodities pricing Real time auction for supply delivery Pharmaceutical tracking & purity Agricultural food authentication Shipping & logistics management

Microsoft and blockchain

Open Platform

Accessible Enterprise Ready

Microsoft Azure | An Open Cloud





Tenets of our Strategy



FAIL FAST & CHEAP in a development test environment

MIX & MATCH from the best available blockchain technologies



+

CREATE & INNOVATE by building solutions on blockchain quickly

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F↓[™]

SHARE SOLUTIONS through a worldwide distributed platform

PROVISION with one-click to test & iterate

Project "Bletchley"

Build and learn



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Develop key Azure middleware services

Grow the ecosystem



Create a tight feedback loop between POCs & MS engineering to enable quick iterations on our offerings





Drive partner innovation and scale by providing blockchain tools and pre-configured solutions through or marketplaces

Promote engagement and innovation by onboarding ISVs into Azure Marketplace and AppSource Enable customers and partners to discover, publish and transact blockchain components and services from smart contracts to complete SaaS offerings

Azure Marketplace and AppSource with 3rd party solutions, smart contracts, and other blockchain components



Build enterprise-ready blockchain middleware

Distributed Ledger Gateway Services

Provides communication between multiple Blockchain technologies/implementations.

Identity and Key Services

Helps with authentication, authorization, access, and lifecycle management.

Encryption Services

Provides encryption for blockchain transactions and fields

Cryptlet Services

Provides runtime for cryptlets and communication between blockchain and cryptlet trusted host

Machine Learning and Business Intelligence

Rich data services, such as BI analytics, auditing, and machine learning



Get started



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FIND OUT MORE ABOUT PROJECT 'BLETCHLEY' https://github.com/Azure/azure-blockchainprojects/tree/master/Bletchley/

Thank you