

Artificial Intelligence & Blockchain

Application and Uses for
Tax Professionals

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By

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Half of all work activities globally
have the technical potential to be
automated by adapting currently
demonstrated technologies –

McKinsey, Dec 2017 Report



The proportion of work actually displaced by 2030 will likely be lower (15% midpoint), because of technical, economic, and social factors that affect adoption.

The proportion varies widely across countries, with advanced economies more affected by automation than developing ones.

McKinsey, Dec 2017 Report



Automation is Artificial Intelligence & Blockchain

- What it is
- How it works
- How Tax Professionals can benefit from it?

Transformational Automations for Tax Professionals

- **Artificial Intelligence** - Machines making decisions once reserved for experienced professionals
- **Blockchain** – Securing transactions without the need for trusted intermediaries (Audit Firms, Banks, Title Companies, etc.)



Artificial Intelligence

- Determine the problem you want to solve
- Obtain significant amount of relevant data
- Have access to large amounts of computing capacity
- Hire Data Scientists
 - Clean the data
 - Design algorithms
- Implement into production



Artificial Intelligence - Data Collection Examples

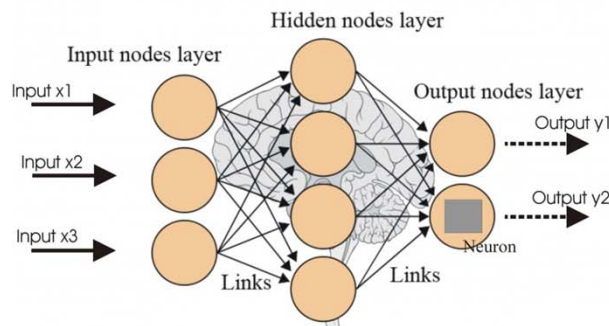
- **Tesla** crowdsources data from its vehicles and drivers (e.g., sensors pick up information about a driver's hand placement on the instruments and how they are operating them).¹
- **Facebook** crowdsources user clicks, likes, and interactions in order to modify the user's news feed (more importantly, allowing it to target its advertising and charge more money to do so)
- **Uber** systemically scraped data from competing ride-hailing companies all over the world, harvesting information about their technology, drivers, and executives.

¹. Forbes, January 8, 2018. "The Amazing Ways Tesla Is Using Artificial Intelligence And Big Data" by Bernard Marr

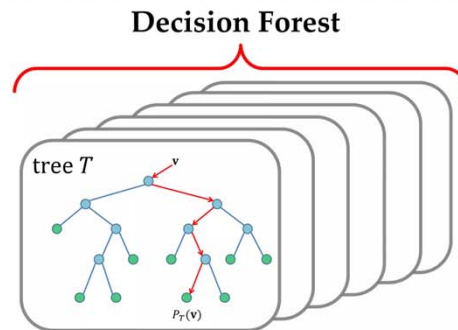


Artificial Intelligence – Algorithms

- Neural Networks
 - Unsupervised
 - Lots and lots of data
 - IBM Watson / DeepMind

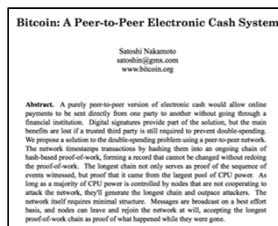


- Machine Learning
 - Supervised Training
 - Not as much data

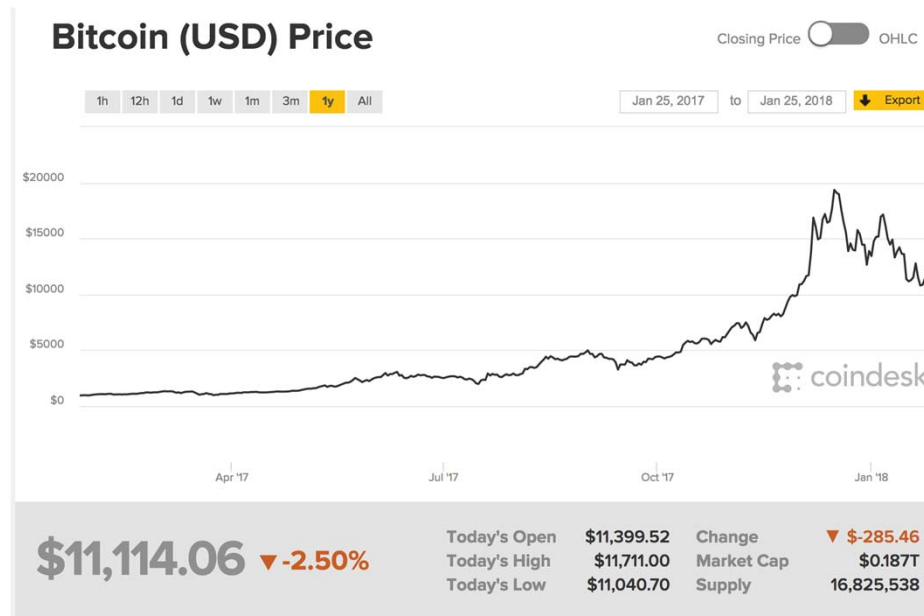


What is Blockchain?

- Satoshi Nakamoto
 - Issued Oct 2008 Paper

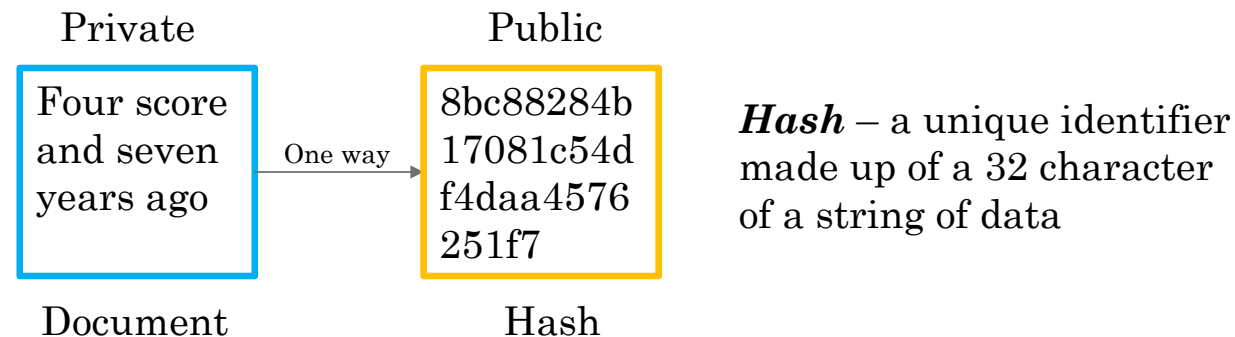


- Owns approximately 1MM bitcoins
- Blockchain technology has the potential to universally reshape the way business transacts across nearly every industry in the global economy



Blockchain – How does it work?

The Cryptographic Proof:



1. A hash can be created from any text or document
2. The hash cannot re-create the document but only the original document can create the hash
3. Any change at all in the document creates a different hash
4. Proves the document exists and has not been modified

Blockchain – Chained Transactions

- Blockchain is a set of individual transactions blocks (cryptographic proofs and other metadata) chained with other transactions
- Chained transactions are impossible to change
- These Blockchains make transactions immutable
- Blockchain is published on a public ledger and never go away



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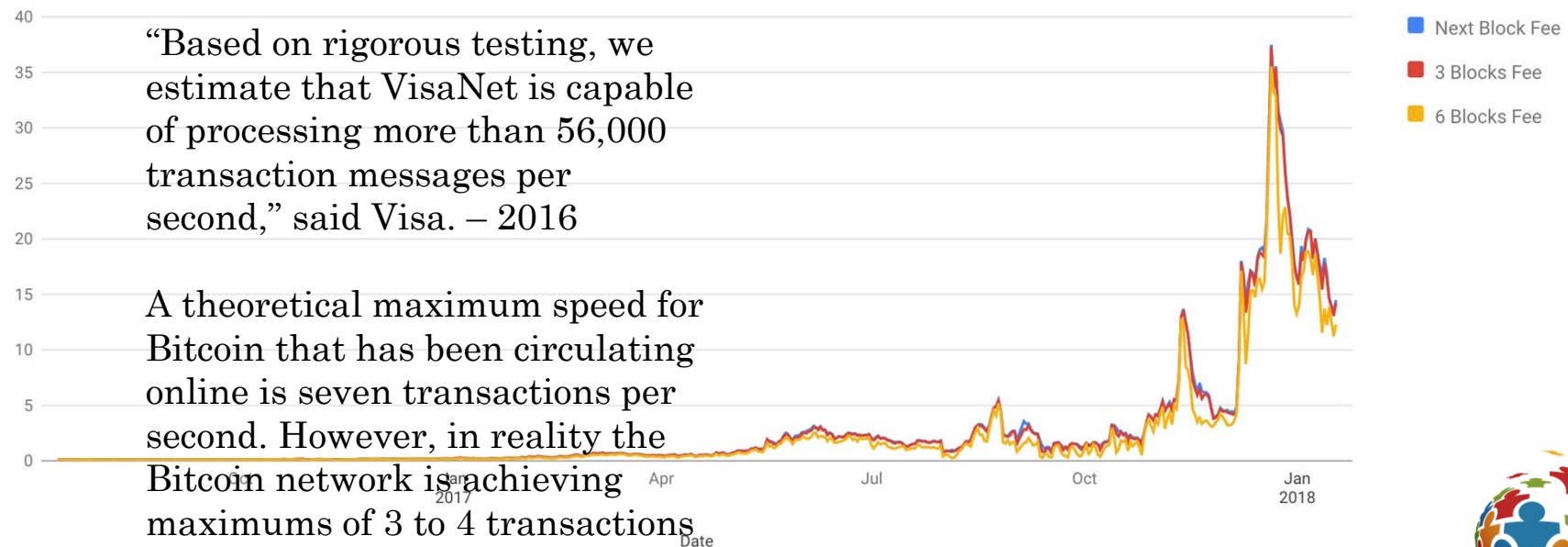
The problem... High transaction costs and slow validation

Slow...

“Based on rigorous testing, we estimate that VisaNet is capable of processing more than 56,000 transaction messages per second,” said Visa. – 2016

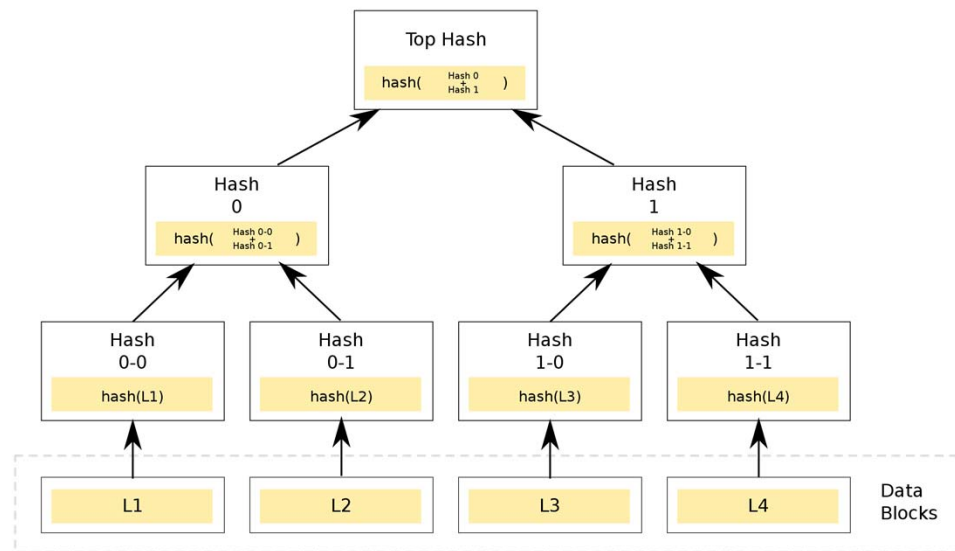
A theoretical maximum speed for Bitcoin that has been circulating online is seven transactions per second. However, in reality the Bitcoin network is achieving maximums of 3 to 4 transactions per second.

AND Expensive...



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Merkle Trees – Solving the velocity and transaction cost issue



Providers who use the Merkle tree approaches charge about \$0.001 per transaction for open source solutions.

Applications for Tax Professionals

Artificial Intelligence & Blockchain



Automation Areas for Tax Professionals

- Where machines replace can humans in our space and where they can't - yet

Artificial Intelligence - Applications for Tax Professionals

- Interpretation of unstructured data
- Trained decision making
 - Return Filing
 - Classification of assets
 - Table/Form selection
 - Assembly Automation
 - Appeal Processing
 - Tax bill processing and payments



Blockchain - Applications for Tax Professionals

- Data Collection
 - Jurisdictional Attributes (Contact info, rates)
 - Jurisdictional Rules (due dates, taxability)
- Return Filing
 - Classification of assets
 - Table/Form selection
- Appeal Processing
 - Settlements
 - Waivers
- Tax bill processing and payments
- Audits

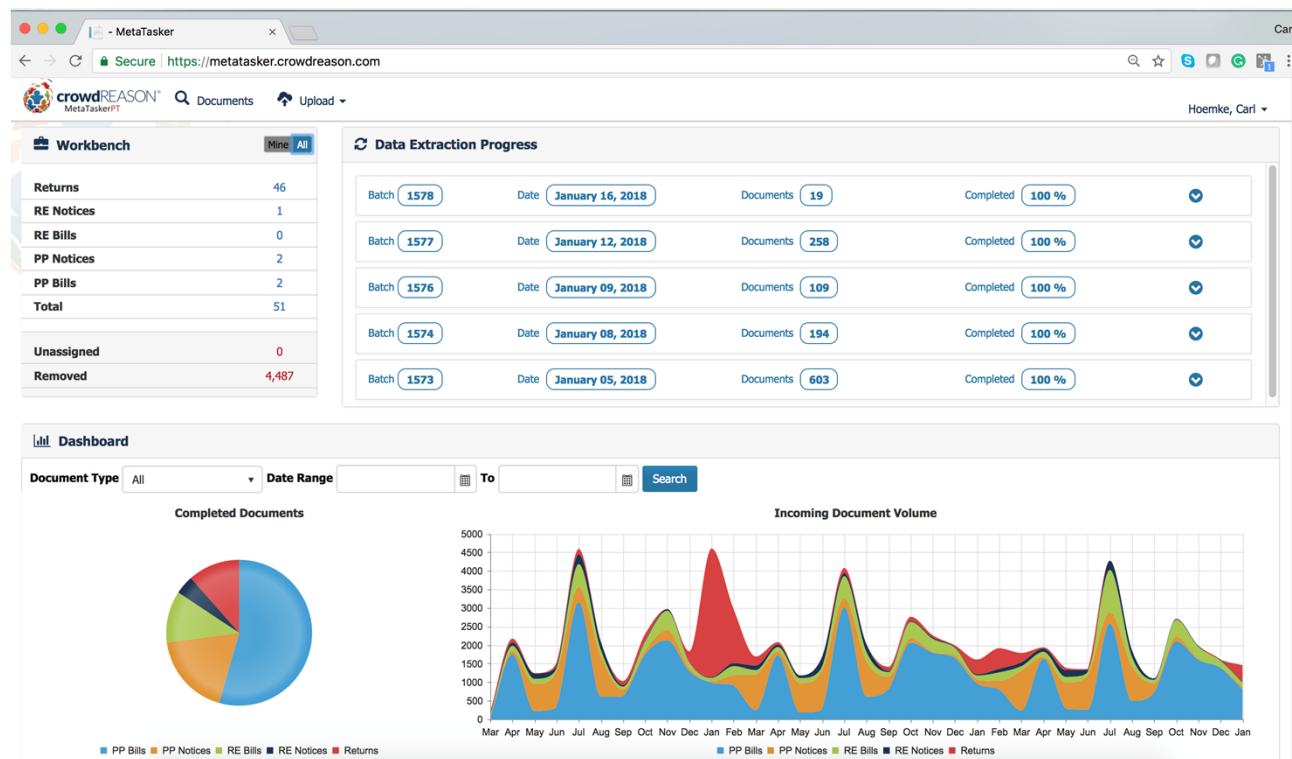


AI & Blockchain value proposition

- Significant reduction in operational costs
 - Companies
 - Consultants
 - Assessors
 - Collectors
- Significant reduction of risk
 - Errors
 - Missed Deadlines
 - Zero penalties
- Audits records are created instantaneously
- Staff can use new availability to ensure assessments are proper



Example Application – CrowdReason's MetaTaskerPT



Property Tax Documents

Challenge:

- Typical Machine Learning
 - Few classes (5, 10, 20)
 - Reasonable size ground truth by class
- Property Tax
 - >10,000 classes of Assessors (Notices and Returns)
 - >10,000 classes of Collectors (Tax Bills)
 - Classes constantly change
 - Variable size of ground truth results

Solution:

- Clean data via isolated datasets created with our trained crowd
- Fingerprinting
 - XML
 - Auto templating
 - Spark clusters (distributed computing)
- Tiers of Classification (i.e. Document Type, State, Jurisdiction)
- Taxonomies based on Source of Truth



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Results

Technical Results

- Auto Classify >98% Documents
 - Document Type
 - Jurisdiction
 - Assessor
 - Collector
- Source of Truth Validation
 - Addresses
 - Due Dates
 - Etc.
- Extraction
 - 60-70% High Confidence Machine Learning
 - 30-40% Validated by crowd then fed back through ML algorithm for retraining
 - 99%+ Accuracy

Operational Impacts

- Gets the grunt work out of the way so value added work can be the focus
- Elevation of careers
- Reduction of overtime
- Happy people 😊

