



With blockchain what comes first, opportunity or threat?

Leveraging blockchain
technology – the benefits and
risks facing asset servicers



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Executive summary

Blockchain technology (sometimes referred to as distributed ledger technology or DLT) is high on the asset servicing industry leadership agenda. Though still in the early stages of development, it is becoming arguably the hottest topic in financial services, with the potential to streamline and accelerate business processes, protect data integrity and transform the asset servicers' business model. As blockchain gains wider recognition, more companies are looking to understand the benefits and potential technology. This realization presents challenges and opportunities for an industry focused on data management, operational efficiencies, cyber security and regulatory compliance.

Asset servicing companies, in particular, are evaluating and investing in disruptive technologies at a faster pace than anyone expected. In fact, more than US\$1.1 billion of venture capital has been invested in blockchain in the past five years.¹ Yet, wider mainstream adoption is still a vision that requires upheaval, risk containment and investment in infrastructure and people. It may take years to overcome the hurdles and complexities but it is not too soon to begin the initially painful process of developing a strategic platform and collaborating on how wider adoption can be achieved. Initial efforts

will result in a new level of transparency and accountability – and prove to be a competitive differentiator.

In this paper, EY explores the added value of blockchain in addressing the asset services industry challenges and ways that it can overcome industry inefficiencies caused by mismanaged data. Capturing data at inception and managing that data through the value chain is a benefit that will result in a continuous cycle of innovation and disruption.

The ability to track transactions securely and transparently also establishes a level of trust in the data. *The Economist* refers to this as "the trust machine." A network of trust is a key prerequisite for using DLT and is a critical enabler for building confidence in financial services processing, promoting greater efficiencies, and serving as a catalyst to support business activities. It can ensure the integrity of data traded among billions of devices without a trusted third party or intermediary involved in each transaction. We believe that reinforcing the trust provided by such a networked process will result in substantial gains and long-term strategic benefits for asset servicers, while the intermediaries help maintain access controls to support the network participants' trust.

¹ "Bitcom Venture Capital Funding," CoinDesk, last updated 26 April 2016. ©2016 CoinDesk.





Is blockchain disrupting asset services?

The asset servicing industry has made great strides since the introduction of global custody in 1974. Recent EY research reveals trends where leading providers of custodial services are investing in more efficient systems and processes to realize cost efficiencies and value-added solutions². Faced with the need to reduce costs to protect margin, companies are revisiting their operating models and applying new technologies such as blockchain to enhance organizational efficiency and manage increasing levels of regulatory compliance.

EY survey shows the strong influence of regulatory change on asset servicing companies: 73% of participants view it as a significant risk and 41% as an opportunity. The regulatory imperative for additional reporting and transparency has increased the demand for asset service offerings.

In the past 10 years, a tsunami of regulations have been released, such as Undertakings for Collective Investment in Transferable Securities (UCITS IV/V), Alternative Investment Fund Managers Directive (AIFMD), Markets in Financial Instruments Directive (MiFID II), European Union Securities Financing Transactions Regulation (SFTR) in Europe and Dodd Frank and the Foreign Account Tax Compliance Act (FATCA) in the US. These regulations have challenged buy-side firms, tightening the requirements for asset managers to monitor risk, provide transparency and communicate with their end-investors as never before. A regulatory focus on business resilience since well-publicized system failures and outages last year has upped the ante downstream as well – raising awareness for depositary liability.

Asset servicers find themselves continually needing to invest in their own infrastructures to ensure that they

can support their clients' changing requirements. These are far from uniform, as regulations emanate from various authorities around the world. Each asset manager is likely to have a different set of requirements, depending on where they, or their end-investors, are active. The need for future flexibility is paramount. It is fundamentally altering the custodian's business model, as the emphasis changes from the traditional mechanical functions of settling trades and safe keeping of assets to value-added services for compliance, hedging services and above all, risk-intermediation.

Attractive features for asset servicers and regulators

DLT technology features certain components that make it attractive to asset servicers seeking enriched offerings or regulators looking to mitigate risks. The distributed nature of blockchain is its single most distinguishing feature, allowing multiple users to share a "golden record". In addition, the peer-to-peer nature of DLT makes it inherently resistant to certain types of cyber attacks, and the use of many nodes, each with a copy of the blockchain, guards against data corruption. While the market has had "hacking" events, they have been the result of poorly designed peripheral applications or controls on the blockchain.

Opportunities both to innovate and achieve efficiency savings exist, but no silver bullet for how firms might leverage blockchain technology has been identified. Usage examples across the enterprise include social engineering, analysis and modeling, regulation and risk management, systems and controls, documentation, contracts and internal audit. On the external side, opportunities exist in branding and marketing, recording and registering

² <http://www.ey.com/GL/en/Industries/Financial-Services/Asset-Management/EY-New-opportunities-for-asset-servicing>

ownership, cash management and financial reporting.

Asset servicers appear to be focusing on in-house applications and, when inter-party work is pursued, the applications center on shared solutions to common issues. Some banks favor developing solutions for contracts or assets that trade infrequently, while others prefer automating what is document-intensive in order to reduce costs and manage operational risks. Some are exploring the means to bolster traditional services, such as improved capabilities in direct custody (e.g., potentially boosting the efficiency of corporate action processing or tax reclaims), global custody by gaining the required transparency across markets and sub-custodians or enhanced fund services (upgrading fund administration, accounting and transfer agency services by linking issuers and fund distributors via DLT).

Several asset servicers have embarked on a combination of pilots for both defensive and offensive reasons. Leaders have done this to cement relations among themselves and their asset or wealth manager clients or to reinforce fiduciary protection for end-investors. The approach also allows them to engage with various technologies as the market collectively hones in on the best solutions.

A vision of improved efficiencies in the securities markets

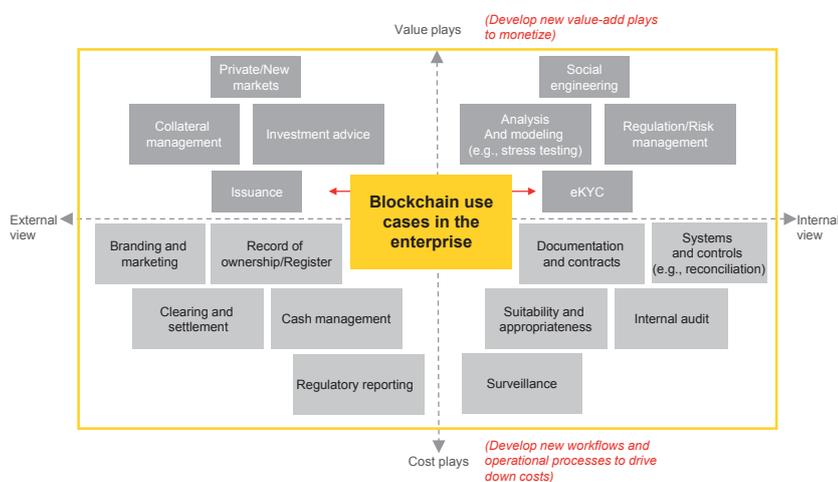
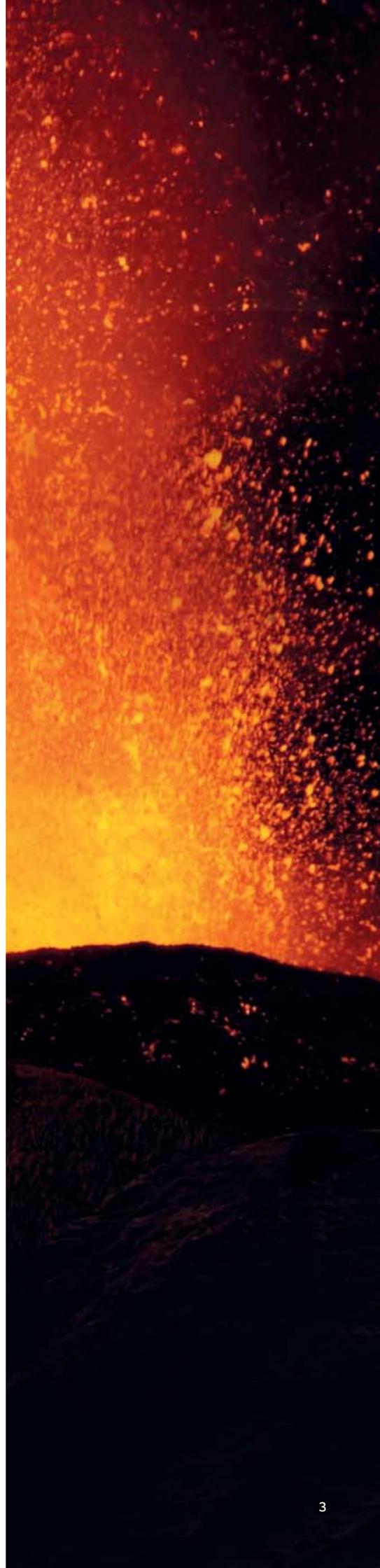
ESMA's recent discussion paper³ describes a list of possible benefits applied to the securities markets, spanning areas such

as improving the efficiencies associated with clearing and settlement, collateral management and counterparty credit risk management. ESMA describes how some DLT proponents believe that the clearing and settlement of transactions could effectively be combined into a single step. This could accelerate certain financial transactions by reducing the number of intermediaries involved and making the reconciliation process more efficient.

ESMA also argues that DLT could facilitate recording the ownership of a variety of securities and the safekeeping of assets (depository or registrar, custody and notary functions) by:

- ▶ Promoting a unique reference database
- ▶ Reducing possible ambiguity of contract terms
- ▶ Increasing automation for processing corporate actions
- ▶ Making reconciliations more efficient

Moreover, ESMA believes that DLT could potentially facilitate the collection, consolidation and sharing of data for reporting, risk management and supervisory purposes, by enlarging the scope of information available from a single source and making access to this information easier and faster. Other functions could lend themselves to managed shared solutions with similar utility potential, such as data modelling for newly-issued securities or corporate action announcements.



³ The Distributed Ledger Technology Applied to Securities Markets, issued 2 June 2016



Data management offers clear benefits

When asset servicers make the decision to utilize blockchain technology, we believe they will benefit from a three-pronged approach: the ability to capture high quality, accurate data; apply data management to correct the errors of mismanagement; and ultimately, deploy technology as a tool to disrupt the entire data chain. There will be many hurdles along the way and it may take years for blockchain to emerge as a disruptor. It is important for firms to understand what steps to take to remain ahead of their competitors.

One of the most promising opportunities is the distributed ledger's ability to significantly curtail errors from mismanaged data. Errors include data that is not collected properly from the source, such as trade details which with blockchain would need to be substantiated by two parties before being applied to the ledger. Another area where data management qualities can apply and errors can be reduced is when securities are issued and facts about the security and how it needs to be mastered throughout its lifetime are made available on the distributed ledger. These errors materialize as early as trade initiation with disagreement on trade price for instance. This simple mistake can easily escalate to costly settlement failure and is only one example of data mismanagement costs. With a DLT environment that is able to capture and share information at origin, mishandling errors that lead to failures will be reduced.

Different models for data origination

The distributed ledger tool can be deployed in three models, all delivering the same net benefits (capturing near real-time immutable, lasting and trusted information), but requiring different efforts to derive the full benefits:

1. Closed network within one controlled organization such as a global custody layer on the provider's own branch network
2. An intercompany closed ledger such as a securities market
3. An open blockchain that has high standards for entry and securities creation

Asset servicers could enjoy benefits, such as the global custody layer or billing, through their internal closed network. This network can be used assuredly, rapidly and with the least technology disruption to gather data for invoices such as the amount of items or assets under custody (AUC). One of the largest industry headaches today is caused by the multitude of services provided to a client's organization from many areas of the bank. Similarly, one of global custody's largest headaches is data aggregation and the current redundancies in data and process. DLT can remove these redundancies. Issuing a timely, accurate invoice and complying with the information needs of the service bundling in force, is a huge challenge. The distributed ledger is a simple means of collecting and substantiating agreements detailing billable work and counting the widgets billed against the terms as they are created across all services.

Points of failure in data and trade processing

Consider an intercompany trading network supported by DLT and smart contracts, where the smart contract originates the security characteristics and financial processing throughout the life cycle on the DLT network. With all end-data users sharing this information from the source, the industry has the potential to eliminate errors, reduce cycle times and propel

settlements. Today, fails, delays and costs are introduced throughout the trade safekeeping lifecycle:

1. Instrument identification and master details
2. Trade specifics: quantity, price, fees, taxes and net amounts
3. Counterparty identifiers
4. Depository specifications
5. Settlement details

This data origination is only part of the data management benefit. Other points of failure in data and trade processing include:

1. Ability for someone to sell something they cannot irrefutably attest to owning or controlling
2. Multiple communications protocols
3. Inability for multiple sources and destinations to seamlessly communicate when operating in point to point integrated environments
4. Humans building these interactions and missing important items
5. Applying manual processes to overcome shortfalls in communication

Using the smart contracts in the blockchain, the security is created and the trade is handled on the network. A commitment cannot be made unless the details of both are known to all parties that have approved access – thus overcoming any issues in today's market. T-zero settlement can be real.

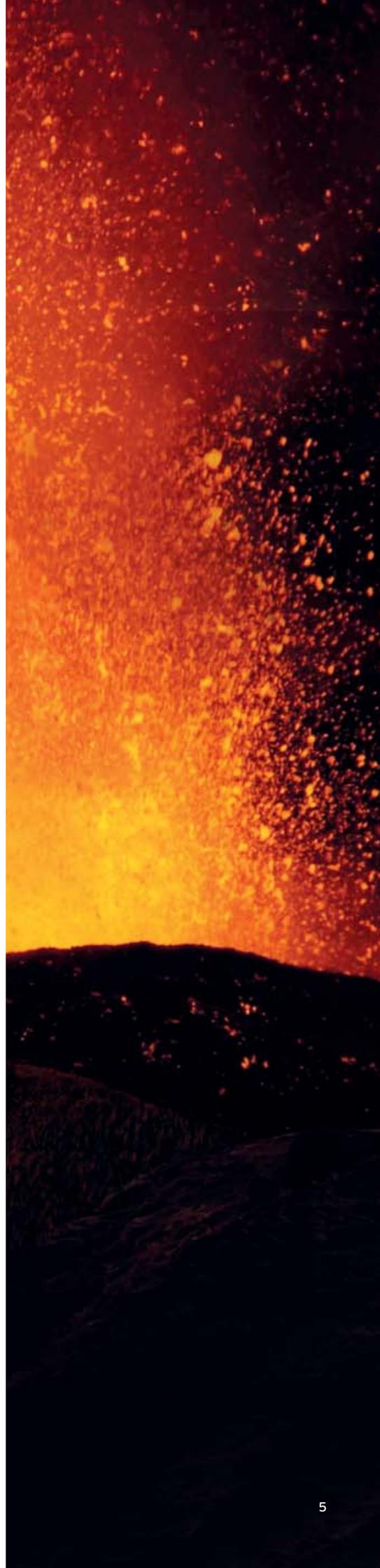
Looking at only one component of the costs introduced by these many failure points – the consequence of the failed trade – in one market (US treasuries), we can see the scale of savings for the business. In the past three months of daily recorded trades at the DTCC, approximately \$50 billion was not delivered on time. Based on current rates charged for fails, this amounts to \$2,783,000 in penalties each day. What if these fails could be eliminated across all markets?

Also, note the complexities of data flows and accuracy of applications in corporate action processing and the fact that single errors can cost an organization hundreds of thousands of dollars. Then extend the savings to the resources needed to manage the fails, correct the failure causes, systems development and support for the failing communications protocols. Blockchain can add value to operational efficiency and effectiveness.

Blockchain offers a wealth of other opportunities and risks

Digitizing assets is one of the most exciting opportunities because of its potential to create tokens which can be readily processed in a blockchain environment. In a US model, the titles of assets are re-assigned within the ledger, with collateral pledged as security interest to effect changes of ownership. In a European Union context, the ledger must perfect an omnibus ledger with title transfer and re-hypothecation such as through a smart-contract tracking the sub-ledger position.

The developmental pattern of use cases will depend to a large extent on the liquidity patterns of the assets being exchanged, the potential for smart contracts (self-executable contracts programed to generate instructions for downstream processes if reference conditions are met) and appropriate agreement from regulators on how to modify the Settlement Finality Directive with blockchain in mind.





There are many types of asset markets that may lend themselves to blockchain use cases or eventual solutions. Publicized examples of commercial ventures and consortiums include: Everledger for the diamond market; itBit's Bankchain and Autilla for gold; Digital Asset Holdings (DAH) and Symbiont for syndicated loans; R3 and Symbiont for smart bonds; or IRSs, R3 for commercial paper; and Cryex for crypto-currencies.

Asset servicers need to track asset and wealth manager interest in these as they seek to invest multi-assets or cross-collateralize using tokenized assets, and adjust their service functionality to keep pace accordingly. This is particularly relevant for asset servicers operating as outsource agents.

Moreover, asset servicers are also looking at product-focused use cases, such as digitizing and streamlining document-heavy over the counter, syndicated loan

or other contract markets. Shared ledgers could facilitate straight-through-processing (STP), replacing manual processes such as email and fax, supporting easier tracking of assets and liabilities and freeing up large amounts of collateral and capital (which can be used to improve the velocity of trading elsewhere). The benefits of automatic "track and trace" approaches are causing most firms to discuss collaboration, including how to involve government authorities and tax authorities in the know your customer (KYC) process.

While these possibilities are promising, one cannot move forward without looking at the risks involved with the new technology. The encryption protocols for access to distributed networks and data are tight. This does not fully protect the participants and their data, as well-reported breaches have shown. The full environment, including the smart contracts and other applications deployed on the blockchain, must be managed to reduce security risks.

Consortia and industry utilities play a major role

The more advanced asset servicing firms contributed to consortiums such as R3, working groups or task forces (i.e., the Post Trade Distributed Ledger (PTDL) group in the UK) and private ventures (i.e., DAH in both the US and Europe). Some banks are exploring the potential commercial application of distributed ledgers in areas including eKYC and anti-money laundering registries and surveillance, the enforcement and clearing of derivatives contracts, and securities asset servicing. Others are assessing the future potential, risks and opportunities of leveraging start-up technology-led businesses.

The operating environment also plays an important role in determining the pace and extent to which blockchain technologies are adopted. Some markets, such as Australia, are arguably better

suited because they operate within a largely autonomous eco system featuring small numbers of vertically integrated private firms operating under complex government regulation. That is why there is activity in the equities market in Australia with the Australian Stock Exchange (ASX) looking to replace its existing clearing and settlement systems with blockchain technology, working with DAH. Similarly, a leading Australian pension fund administrator, has publicly indicated that it is looking to exploit blockchain to streamline client, adviser and regulatory reporting, improve data management and offer account number portability within the government's mandated pension scheme.

With EY assistance, the pension fund administrator identified more than 20 potential blockchain opportunities before

completing a proof of concept for those considered to offer the greatest potential. Finally EY is also playing an active role as convenor of a number of potential blockchain consortia in Australia across funds management, asset servicing and regulatory bodies. Fundamental legal and operational issues will need to be resolved, such as how to treat the final settlement of assets tokenized on a blockchain (real world assets that can be traded digitally) or adapt the current banking and wealth management legal frameworks and

operational infrastructures to a blockchain environment. Also, the challenge of establishing solid business cases to help firms migrate and run DLT are needed. If DLT gains widespread acceptance over the next three-to-five years, financial firms of all sizes across various geographic locations will need to design, build or buy, implement, warehouse, test and migrate their operational components before cost savings or new value-added benefits can be realized.

Trust is a key differentiator

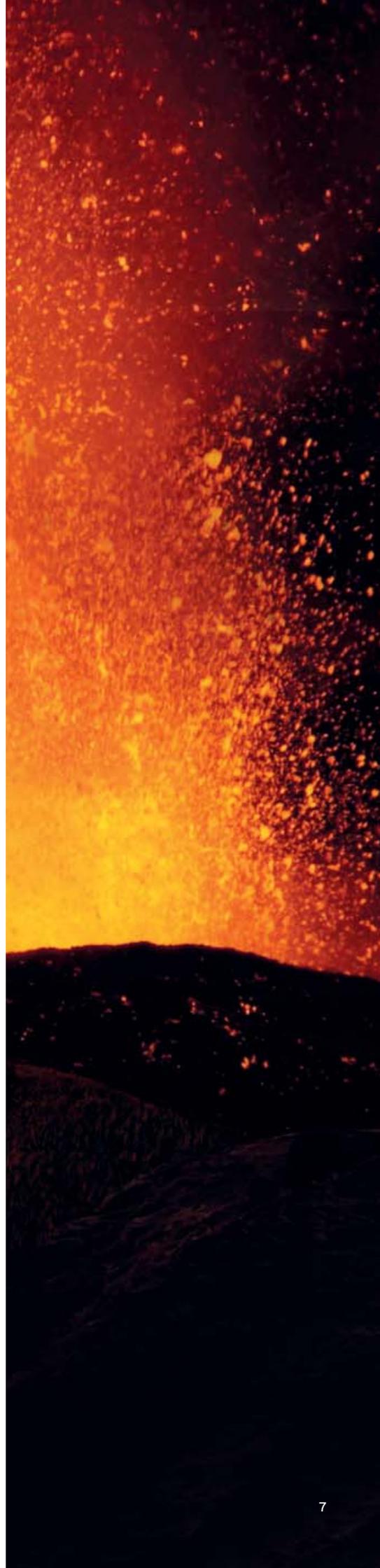
Business relationships and commercial transactions are predicated on trust between firms, intermediaries and others such as banks, governments or regulators. Trusted third parties in securities processing are responsible for delivering straight-through-processing, creating “golden” transaction records and freeing capital to reduce counterparty risks. Over 8,000 such entities use the Society for Worldwide Interbank Financial Telecommunication (Swift) network to remit payments, trade finance instructions, conduct FX transfers and transmit securities and derivatives transactions in a standardized, secure manner.

Traditionally, the process of third parties running data checks on individuals or corporate legal identities has been time consuming, duplicative and increasingly ineffective at pinpointing key areas of risk or error. Blockchain technology applied to digital coins or transactions in tokenized assets establishes trust in a new way. It does this by creating multiple distributed ledgers (with an immutable record of participants' transactions) without having to stand behind conventional payment systems. Smart contracts are used in the trade process and enforced through blockchain-based programming.

Blockchains can be public, open-access or private or permissioned. In a permissioned

network, multiple independent participants protect the integrity of the ledger. Each party can only view the information they are authorized to see within a transaction, which creates tightly-maintained domains of trust. Though technically, there is no need for trusted third parties to act as intermediaries in the transaction process, firms will need to transition to a blockchain-driven model. Industry adoption could take more than five years.

At the same time, testing DLT approaches in a world of digitized relationships must continue to evolve in terms of “trust, but verify”. With the number of cyber-crime attacks and data breaches on the rise, it is no surprise that start-up companies are pursuing the concept of digital identity on the Blockchain. At least a dozen start-ups are focused on digital identity alone, including: Airbitz, Blockstack Labs, Coinfirm, Evernym, HYPR, 2way.io, KYC-Chain, ShoCard, Tradle, UniquID, uPort. Other providers in the domain of Payments specifically include Bitnation, BlockAuth, BlockVerify, Case, CredenCo, CryptID, and Guardtime. With so many proposed solutions addressing the issue of what The Economist terms as the “trust machine”, it is clear that industry standards and market practices will be essential to ensure efficiencies and standard solutions.





Conclusion

Blockchain is the tip of the iceberg – balancing benefits and opportunities against complexities and risks. The technology requires a very high level of authentication to gain access, is tightly closed and can be designed to limit capabilities, thus avoiding unintended use. It also provides transactions that are agreed by all in the network. This eliminates risks of interpretation and disagreement when the network is configured.

Many advantages emerge from greater scalability of technology and operational integration to better security, documentation and widespread applicability. Asset servicers will realize cost savings by building global operating models and platforms and developing holistic data and regulatory solutions to enhance transparency and data management.

On a broader network, the benefits of deployment in the securities markets will take more effort to overcome – dismantling very large systems in each participant operation, market utilities and regulatory structures. The market is moving to these integrated changes by putting the technology to use incrementally, solving an intra-company problem before large scale developments can meet a need, then looking at how inter-company applications can integrate with existing systems and processes. Still, with trust hard-coded into a networked process, the gains will be substantial.

These brief perspectives provide food for thought as you consider how disruptive technologies such as blockchain may affect your business. This major shift will require pilot testing, investment in people and training, and management buy-in. The benefits will far outweigh the uncertainty.

Blockchain is transforming the industry: is your strategy in place?

- ▶ What steps are you taking to leverage blockchain technology? Do you have the protocols in place for widespread adoption?
- ▶ Are you looking to in-house solutions, shared solutions or automating whatever is necessary to reduce costs and manage operational risks?
- ▶ Capturing data at inception and managing it effectively is a major benefit; is it high on your firm's agenda?
- ▶ Is your business model changing to address the fundamental shift from traditional functions to value-added services for compliance, hedging and risk-intermediation?
- ▶ Are you investing short term in technology and infrastructure to achieve ultimate long-term goals?

EY Wealth and Asset Management practice is a dedicated group of professionals assisting our financial services clients in supporting new distributed economies. The group works with a global network of professionals across Financial Services and non-Financial Services sectors, helping to identify, design, develop and deploy new business, product, and operational models and new technology products to capture new revenues and reduce costs. By bringing together performance improvement, technology, compliance, and legal experience, we provide comprehensive, end to end services to bring practical results in the emerging world of blockchain and distributed technologies.

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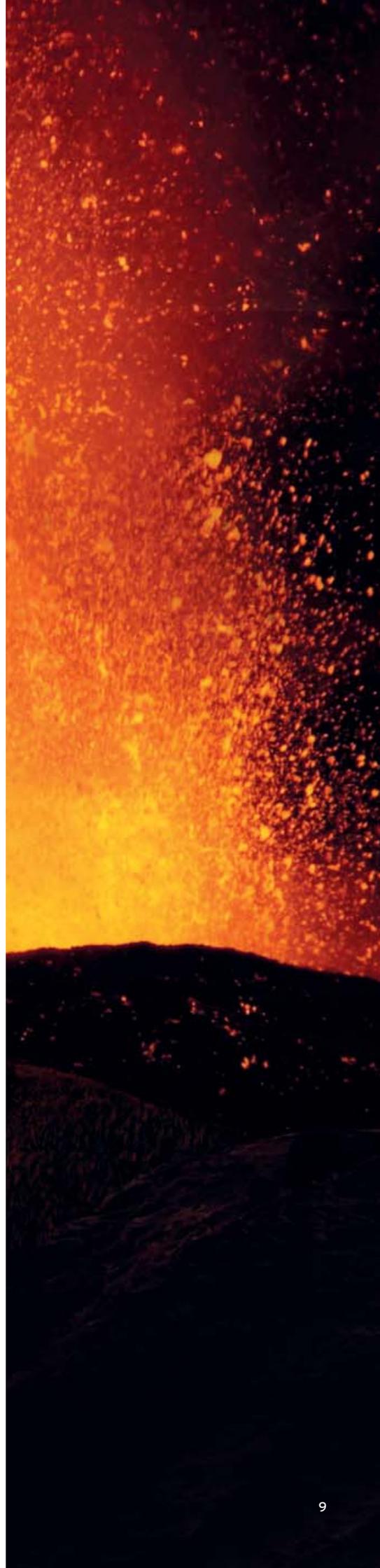
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