EXTENDING THE WORLD OF PAYMENTS TO BLOCKCHAIN
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The objective of this document is to provide you with critical information related to the evolution of payments, as well as blockchain’s impact. Based on ACI blockchain activities over the past two years, blockchain technology has the potential to support the ongoing payments evolution, but non-functional maturity must continue to improve. To be successful, blockchain technology must co-exist alongside current payments processing infrastructure in order to extend the world of payments to leverage its benefits and support movement toward the realization of real-time, any-to-any payments.

Payment ecosystems are evolving at an accelerating pace to embrace new transaction processing methods and technologies. The payment verticals of retail banking, merchant retail, transaction banking, billers and digital banking that have traditionally operated in isolation are evolving toward a consolidated, real-time, any-to-any ecosystem. More has changed in the last 10 years than the previous 35 years in the payments landscape; take a look at the evolution of payments over the past 45 years.
Consumers live in an electronic world, where the Internet-of-Things (IoT) is increasing its reach into more and more elements of their daily lives where information is available in real time. Likewise, consumers expect a real-time experience when it comes to payments; Mercator reported in January 2016: consumers expect real-time processing of payments and the convenience across multiple channels to be seamless.¹

Consumers’ exposure to smart devices, eCommerce and social media are driving their expectations for ubiquitous payment capabilities, anywhere, anytime. To meet these expectations, payment mechanisms are rapidly evolving. According to CEB Tower Group,²,³ 40% of institutions have plans to integrate new digital banking technologies over the next four years.

There have been a significant number of evolutionary changes in payments over the past 45 years. The fundamental imperative of payments throughout their history has remained constant; the ability to transfer value from one party to another; the mechanisms that are currently used are slow and inefficient. It is time for the fundamental imperative of payments to evolve, embracing new technologies that can deliver real-time value transfer capabilities in a trusted and secure manner.

To support the payments evolution and the new payments ecosystem, institutions are actively learning about blockchain technology and understanding how they can leverage it. Institutions are conducting proof of concepts in their innovation labs, participating in blockchain consortium (e.g., R3CEV, Hyper-
INTEGRATION IS THE KEY TO SUCCESS

Existing payments infrastructures and new technologies such as blockchain will co-exist as the world of payments evolves. Institutions are in a situation where they must support the existing payment mechanisms while new technologies are adopted and gain market share. The integration of existing and new payment technologies is key to success in the evolution of payment ecosystems.

BLOCKCHAIN’S IMPACT

Payment ecosystems are evolving toward a real-time, any-to-any payments experience for consumers; blockchain is a fundamentally disruptive technology that will play a role in the evolution toward real time. Blockchain has the ability to modernize a payment’s fundamental imperative of transferring value between multiple parties, securely and with minimal operational or technical friction. Modernizing the fundamental imperative delivers substantial benefits in the future use of computing for banks, businesses and governments. Recent rapid growth of peer-to-peer market exchanges for lending (Zopa, Lending Club and Funding Circle, etc.), accommodation (AirBnB) and taxi services (Uber) has demonstrated the potential of peer-to-peer architectures. Blockchain has the potential to accelerate and simplify such models in both new and existing markets.

The areas of application for blockchain stretch far beyond pure payments. Across the banking industry, uses include post-trade settlement, asset management, securities and trade finance. Beyond banking, blockchain interest includes insurance, government, identity management and accounting services. Not only is this likely to generate new opportunities for payment providers, but also new entrants with disruptive business models, as new market areas become more practically addressable.

ACI is well positioned, with a long and successful payments history, to support the integration of current and new payment technologies as payment ecosystems evolve. ACI is the Universal Payments® (UP®) company and powers electronic payments for more than 5,100 organizations around the world.
ACTIVE BLOCKCHAIN LEADERSHIP

Blockchain technologies are immature and their ability to support the challenging non-functional requirements of payment services has yet to be proven. ACI’s position has been reinforced by the results of a blockchain proof of concept, where it was determined blockchain performance characteristics are not yet capable of supporting high-velocity transaction volumes above 1,000 transactions per second; performance levels that are required by ACI’s customers and solutions. Current blockchain proof-of-work algorithms require seven seconds on average to gain consensus⁴; further technical maturity is required in this area to support consensus in under 25 milliseconds. Recent advancements leveraging a proof-of-stake approach hold promise to improve consensus performance. Technical advancements are being made toward maturity; technical maturity has accelerated over the past year, fueled by increasing blockchain investments worldwide that exceed $1.5B.⁵

ACI provides thought leadership in the industry, sharing blockchain knowledge through payment industry publications, technical presentations at customer events and customer strategy workshops. Below is a summary of recent technical publications that further detail ACI’s blockchain leadership and commitment to new technologies.

- Bank Innovation Blog (Blockchain Still Not Ready to Handle Transactions at Scale)
- CoinDesk (ACI is Paving the Way for Central Bank Blockchains)
- Forbes (Have We Already Found Our Blockchain Startup Winners?)

ACI engages in blockchain hackathons and innovation workshops to understand how the technology can be applied to real-world problems, deepening organizational knowledge of blockchain’s functional and non-functional capabilities. Over time, as these capabilities are advancing, as the maturity process continues, it is important to stay apprised of the progress as well as gain practical experience with multiple blockchain technologies that are in the market.

In a recent innovation workshop, ACI implemented a Department of Motor Vehicles workflow to manage the titles of vehicles as well as other elements associated
with a vehicle using blockchain technology; multiple blockchain technologies were evaluated including Ethereum and Hyperledger. The innovation event proved Hyperledger to be more scalable, more efficient and easier to integrate than Ethereum. Additional insights revealed Ethereum has a complex set of integration APIs and requires execution of smart contracts on every node of the blockchain network, leading to network performance degradation.

As blockchain technology continues to mature, ACI will continue to drive functional and non-functional requirements that blockchain technology must meet to be successful in the payments industry.

ACI has more than 40 years of proven strength in building and supporting high-volume, high-value solutions for payments processing in partnership with you, our customers. ACI’s product strategy will continue to ensure that you can connect to emerging sources of value and transaction volume. Innovative technologies will be incorporated as they become mature and where the business value is clear. ACI will ensure you can engage emerging technologies with confidence with which your core payments processing can coexist and also be integrated. ACI’s UP Framework is central to this strategy; it enables safe and seamless integration of existing and new technologies for ACI customers to thrive in the payments evolution.

The first step in your payments ecosystem is to identify business opportunities for new products, new revenue streams, as well as areas that require improvement where new technologies such as blockchain can deliver value. Below are some of the most popular use cases, identified through ACI research, where blockchain technology can deliver value. Now it’s time to decide which use case(s) represents the most significant business value opportunities in your situation.

ACI is ready to partner with you (our customers), to explore business opportunities to modernize the fundamental imperative (value transfer) of payments as well as many other use cases. There are many instances where blockchain technology can be leveraged in the evolution of integrated payment ecosystems. ACI has the payments history, technology and expertise to support making your new payments ecosystem a reality. Give us a call.

<table>
<thead>
<tr>
<th>USER CASES</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td><strong>VALUE TRANSFER</strong></td>
<td>The use case for transferring funds between parties is the major focus. Blockchain 2.0 technologies could be applied to a variety of different payment scenarios. In single currency domestic payment the impact could be to reduce or remove the need for central counterparty and the delays in setting transaction net or gross in real-time. Transfers in multiple currencies between countries cross border payments.</td>
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<tr>
<td><strong>TRADE FINANCE</strong></td>
<td>The use case for trade finance covers a single common record of the liabilities and obligations of parties in trade finance. Possible users of blockchain 2.0 include: invoice fraud reduction, process efficiency, service improvement.</td>
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<td><strong>REFERENCE DATA</strong></td>
<td>Enable the rapid, auditable and secure updating of records by any authorized participant and sharing the change across the network of users. Potential areas where these technologies could be used to streamline the update process and simplify integration into existing payments processing include hot card files, sanctions lists, routing records etc.</td>
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2 “3 Vital Tech Investments for Business Banks”, CEB TowerGroup, August 2015.
3 “Winning the Payment Triathlon: Racing to Zero, Real-Time, and Revenue”, CEB TowerGroup, August 2015.
ACI Worldwide, the Universal Payments (UP) company, powers electronic payments for more than 5,100 organizations around the world. More than 1,000 of the largest financial institutions and intermediaries, as well as thousands of global merchants, rely on ACI to execute $14 trillion each day in payments and securities. In addition, myriad organizations utilize our electronic bill presentment and payment services. Through our comprehensive suite of software solutions delivered on customers’ premises or through ACI’s private cloud, we provide real-time, immediate payments capabilities and enable the industry’s most complete omni-channel payments experience.