

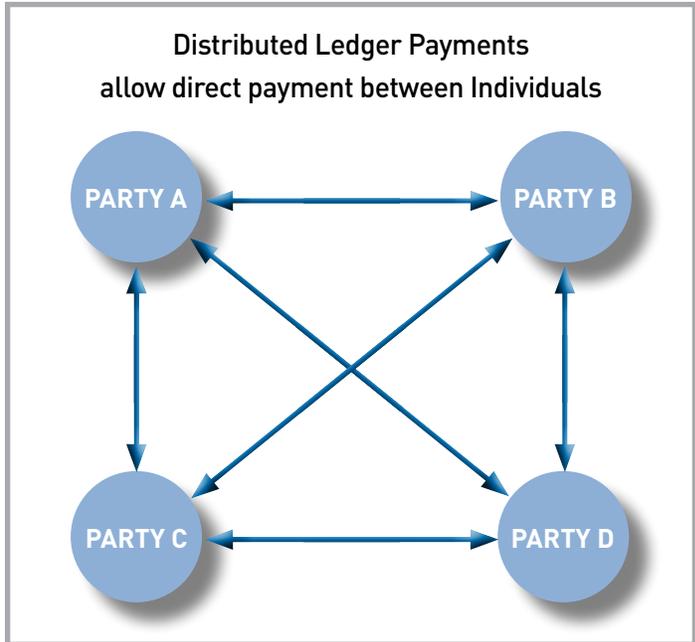
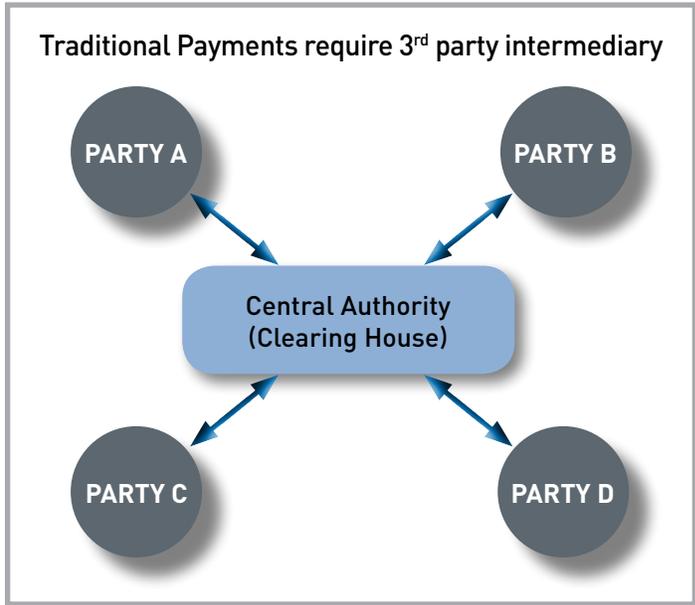
# DISTRIBUTED LEDGERS THE TECHNOLOGY BEHIND BLOCKCHAINS

Over the past year, there has been a lot of press coverage for various innovations within financial services. While FinTech firms are helping to accelerate the pace of technological advancement within the industry, banks are investing in new technologies to provide better/faster/cheaper and more secure services to a client base that is no longer tethered to a branch or ATM network. The results include innovations like mobile wallets, chip cards, faster payments and peer-to-peer payments.

One of the more significant developments has been blockchain technology and its potential applications in the financial industry. Blockchain is one of the technologies behind Bitcoin and it provides a distributed ledger for accounts and transaction. While the jury is still out on Bitcoin (and blockchain), distributed ledger technology offers a number of potential benefits for banks. Over \$1.1 billion of venture capital has been invested in distributed ledger technologies as of 1Q16, up 60% since 1Q15.<sup>1</sup>

Distributed ledger technologies record transactions in a decentralized network, which means that the record of each transaction is shared across a network of computers, as opposed to at a single entity (e.g., a bank or clearinghouse). Each participant in the network has an identical copy of the ledger, to which they can add encrypted transactions and, because it is decentralized, all participants are able to validate transactions. The end result is a highly efficient and secure method of performing transactions.

The World Economic Forum (WEF) predicts that 10% of global GDP will be stored on blockchains by 2025.



## EVOLUTION OF BLOCKCHAINS AND DISTRIBUTED LEDGERS

The financial industry has rebranded blockchain “distributed ledger technology” and it is heading towards becoming core to how future financial markets will work. Indeed, DLT is fast becoming the new medium for the digital economy.<sup>2</sup>

In a recent paper published by the UK’s Government Office for Science, blockchain technology was characterized as just “*the first, though very important step towards a disruptive revolution in ledger technology that could transform the conduct of public and private sector organizations.*”<sup>3</sup>

Blockchain originally came to prominence in 2008 as the underlying technology behind bitcoin. However, these initial applications of blockchain technology involved unpermissioned nodes to validate transactions, which meant that bitcoin and other unpermissioned ledgers could not be owned. In contrast, many emerging distributed ledger-based financial applications require legal entities (permissioned nodes) to validate transactions. These permissioned ledgers have one or more owners, who can enforce rules on who is allowed to use the system.

## DISTRIBUTED LEDGER BENEFITS AND APPLICATIONS

Financial firms have become increasingly interested in (distributed ledger technology) DLT and smart contracts as a way to reduce post-trade settlement time, improve liquidity, improve compliance recordkeeping...and develop a platform to help deliver new products and services.<sup>4</sup>

Distributed ledger security, as well as transparency, a decentralized nature and multi-party access mean that there are a number of potential financial applications for distributed ledgers, particularly as financial transactions become increasingly digital.

One of the key benefits of a distributed ledger is fraud protection. By using encrypted transactions and a shared environment, distributed ledgers are considered to be much more tamper-proof than more traditional transactional platforms and even blockchain-based transactions recorded on unpermissioned ledgers.

Financial areas where distributed ledgers and blockchains have significant potential include:

### Capital Markets

A report by Goldman Sachs Investment Research estimated that capital markets could save \$2 billion annually in the U.S. by adopting distributed ledger technology.<sup>5</sup>

### Trading

11 banks are currently testing a distributed ledger-based trading system. These banks are part of a larger consortium of 42 banks that are studying ways to leverage distributed ledgers in financial markets.<sup>6</sup>

### Payments

Visa’s EVP of innovation and strategic partnerships claims that distributed ledger technology could have useful applications in the areas of loyalty and rewards. Visa® is an investor in Chain, a provider of distributed ledger technology for financial institutions.<sup>7</sup>

### Trade Finance

A December 2015 Global Finance Magazine article discussed distributed ledger’s potential in trade finance, highlighting its ability to create “trade transactions that are secure with digital records of related data visible to various participants in the trade transaction.”<sup>8</sup>

### Banking

According to research commissioned by Pegasystems and Cognizant, 36% of financial industry executives expect distributed ledger technology to significantly disrupt the checking accounts market.<sup>9</sup>

### Wealth Management

John Hancock’s Lab of Forward Thinking (LOFT) is applying distributed-ledger technology to enhance the onboarding of new wealth management clients.<sup>10</sup>

To leverage this potential, financial firms are increasing their focus on distributed ledger technologies. Some examples of this financial involvement include:

- A growing number of events that discuss distributed ledger-based financial solutions, such as the Consensus 2016 Conference (held in New York in May 2016, with 1,500 attendees), and *American Banker’s* third annual Blockchains + Digital Currencies conference in New York in July 2016.

- Industrywide initiatives to develop distributed ledger standards for the industry. These include the Linux Hyperledger Project (an initiative that brings together banks and technology firms to create open-source distributed ledger software), the Open Ledger Project, Chain Open Standard 1 (Chase OS1) and R3CEV.
- Financial firms joining the growing investment in distributed ledger startups. As an indication of the growth of overall investment in distributed ledger firms, venture capital firms invested \$173 million in 39 distributed ledger-related deals in the first quarter of 2016, which exceeded the total invested in the second half of 2015.<sup>11</sup>

### PNC'S INVESTMENT IN DISTRIBUTED LEDGER TECHNOLOGIES

PNC is among the leading banks taking an active and growing interest in distributed ledger technologies. In response to a question at PNC's 4Q15 earnings conference call, CEO Bill Demchak said, *"We're interested in distributed ledger blockchain technology...in terms of our focus and where we think about growth opportunities and how to deploy capital, it would be much more focused in that area than it would be in a traditional bank deal."*<sup>12</sup>

Our interest in blockchain technology led PNC to become one of 12 financial firms that invested \$50 million in **Digital Asset Holdings**, a developer of distributed ledger technology for the financial services industry, in January 2016. In February 2016, Digital Asset partnered with Accenture to help companies assess and implement distributed ledger solutions.<sup>13</sup> Digital Asset is a founding member of the Linux Hyperledger Project.

The CEO of Digital Asset, Blythe Masters, believes that the adoption of distributed ledger technology in the financial industry will take some time. In an interview with Bloomberg in March 2016, Masters claimed that the technology is in a phase that is analogous to the evolution of the internet in the early-to-mid-1990s. Digital Asset is currently developing its first set of systems and solutions for the Australian stock market, which would be the first large-scale deployment of a distributed ledger-based solution in a commercial financial services environment.

- 1 "The Journey to Real-Time Cross Border Commercial Payments using Distributed Ledger Technology," Accenture and Ripple report, 2016
- 2 "The revolutionary technology set to power the advice boom," *Money Marketing*, July 6, 2016
- 3 "Distributed Ledger Technology: beyond block chain," Government Office for Science
- 4 "Blockchain Technology: Disruptive Forces in Financial Services, According to IDC," *Business Wire*, June 20, 2016
- 5 "Goldman Sachs says Blockchain could increase savings for capital markets," *Global Banking News*, May 26, 2016
- 6 "Banks test blockchain-based trading system," *Global Banking News*, January 21, 2016
- 7 "Legacy Payment Companies Pour Cash into Blockchain Technology," *Payments Source*, September 11, 2015
- 8 "Blockchain - a disruptive force for good?," *Global Finance Magazine*, December 2015
- 9 "Blockchain Will be Most Significant Technological Innovation Since the Internet, Say 'In the Know' Financial Services Retailers," *ENP Newswire*, May 26, 2016
- 10 "John Hancock's LOFT to use blockchain to enhance the client experience Proof-of-Concept with ConsenSys and BlockApps," *Plus Company Updates*, April 25, 2016
- 11 "Venture capital interest in blockchain startups on the rise," *St. Louis Business Journal*, May 18, 2016
- 12 "Q4 2015 PNC Financial Services Group Inc Earnings Call," *Fair Disclosure Wire*, January 15, 2016
- 13 "Accenture Forms Blockchain Practice and Digital Asset Alliance," *American Banker*, February 17, 2016

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