Gary Rowe Background

Gary Rowe is a seasoned technology analyst, consultant, advisor, executive and entrepreneur. Mr. Rowe helped architect, build and sell three companies and has been on the forefront the standardization and business application of core infrastructure technologies over the past 35 years. Core areas of focus include IT Trends, Internet infrastructure, organizational design, identity management, blockchain, cloud computing, security/risk management, messaging, privacy and personal clouds. He was President of Burton Group from 1998 to 2010, the leading technology infrastructure research and consulting firm. Burton’s clients included 1/3 of the Global 1000 enterprises and met with them regularly to assess their key initiatives, strategies and challenges and worked to fine tune Burton’s programs to better support these clients. Mr. Rowe grew Burton to over $30+ million in revenue on a self-funded basis, sold Burton to Gartner in 2010 and supported the acquisition as the Burton President at Gartner. He has subsequently been CEO of two Silicon Valley companies, selling one of these companies and has been an active angel investor. Mr. Rowe formed TechVision Research in the summer of 2015 and serves as CEO and Principal Consulting Analyst.
TechVision Research: Who we are

• Integrating research and consulting for the enterprise
• Focusing on business success: leveraging and integrating technology innovation and infrastructure
• Providing answers to the hardest technology decisions by looking at problems from multiple perspectives:
  – Consulting analysts averaging 25 years of relevant experience
  – Industry expertise in banking, finance, health care, education, government, Pharma and other verticals over time
  – Actionable, pragmatic advice, decision support and consulting
• A second opinion to Gartner/legacy research analysis
• Consulting analyst model to leverage “on-the-ground” experience
• Consulting support from the same team that does the research
  – Development of templates and tools to assist clients in decision making
• Enterprise-wide access (everyone) to research and full analyst team
  – About the price of a single seat from “legacy” vendors
World-Class Principal Consulting Analysts

✓ **Chuck Bessant**: 30+ years of industry experience centered on IT infrastructure

✓ **Bill Bonney**: 25+ years in information security, privacy, identity and risk management, led IAM and security at Intuit.

✓ **Dr. Fred Cohen**: One of the leading security/risk experts in the world.

✓ **Scott David**: 30+ years as an attorney, privacy expert, regulatory expert, developer of legal basis for trust frameworks, cyber-security policy and corporate governance.

✓ **Dr. David Goodman**: 30+ years leadership with identity, platform and telecommunication vendors and as a consultant in the identity management area

✓ **Noreen Kendle**: Recognized leading analyst and consultant in information-data strategies, analyst at Gartner & Burton

✓ **Chris Haddad**: One of the leading experts in the world in microservices architecture, containerization, open source, application platforms and integration. Led application platform analyst team at Gartner and Burton

✓ **Michael McGarry**: Focused on health care market. 20+ year health care leader/innovator. Ran innovation group at Ascension

✓ **John Mellars**: IT leader for 25+ years as Director of Infrastructure at Roche and VP of Informatics at Forest Labs through sale for $25B

✓ **Jill Phillips**: Chief Privacy Officer at General Motors, Chevron and Dell and global privacy/regulatory expert

✓ **Gary Rowe**: 35+ years leading technology companies and driving key industry movements

✓ **Doug Simmons**: Security & Identity Management expert, led hundreds of consulting engagements. Ran consulting for Burton & Gartner security consulting for 12 years

✓ **Joe Teplitz**: 30+ years consulting leadership focused on IT governance, portfolio management, business process and M&A.

✓ **Dr. Phil Windley**: Frequent author, speaker, consultant and thought leader on the Internet of Things, digital identity, web services
Agenda

• A Perfect Storm
• Blockchain History/Trends
• Blockchain Basics
• Market Landscape
• Early Use Cases
• Enterprise Blockchain Strategy
• Final Thoughts/Q&A
A Perfect Blockchain Storm

New Business Models

Democratization & Consumerization

Internet of “Me”

Privacy & Regulatory Volatility

New IT Models

IoT at Scale

Sharing Economy Momentum

P2P Reputation Trust at Scale

Aggressive VC & Strategic Investments in this Space

Disintermediation in Banking & other Markets
The Blockchain Tsunami

- A new way to handle:
  - Contracts
  - Settlements
  - Timestamps
  - Trust/proof
  - Financial transactions/records
- Without an intermediary
- Impacting:
  - Banking/Finance/Insurance
  - Government
  - Health Care
  - Real estate…and many more
- At Internet scale
- With a permanent, time-stamped record
Blockchain Reality Check

• Why the Excitement?
  – Heavy VC funding, industry consortium’s emerging, bank/finance heavyweights…
  – Bitcoin press moving to blockchain
  – Addresses real Internet infrastructure issues such as trust, establishing proof without third party, individual empowerment and the luster of peer-to-peer
  – Distributed ledger has massive potential
  – Addresses real world issues such as settlements, identity proof, permanent transaction records, individual empowerment

• What will burst the bubble?
  – Legal and regulatory constraints
  – Legacy migration issues
  – Security challenges without 3rd party
  – Integration with legacy systems
  – Too much, too fast—unrealistic expectations
Blockchain History/Trends
Started with Bitcoin

Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshi@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.
Bitcoin Timeline/Transition to Blockchain

2008-2010
- Nov. 2008: Bitcoin whitepaper released
- Jan. 2009: First Bitcoin transaction
- Oct. 2009: First USD/Bitcoin exchange rate
- Nov. 2010: Bitcoin economy surpasses $1M

2011-2013
- 2011: Bitcoin value rises to $31 and drops to $2
- Sep. 2012: Bitcoin foundation formed
- Mar. 2013: Bitcoin crashes as Bitcoin breaks $1B and price breaks $50
- April 2013: price breaks $250 before crashing
- May 2013: VC investments ramp up
- Dec. 2013: Price breaks $1200 before crashing

2014
- Jan: Overstock supporting Bitcoin
- Mar: UK eliminates tax on Bitcoin trading
- Jul: New York releases proposed rules on regulating virtual currencies
- Dec: Microsoft accepts Bitcoin payments

2015-2016
- Bitcoin start-ups struggle and focuses shifts to Blockchain
- Blockchain projects Etherium, Chain and Ripple Labs get major VC Funding
- R3 CEV gains 60th member in banking
- $1B plus in VC blockchain funding
- IBM/MSFT make major investments

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Bitcoin Terminology

• Bitcoin is used to denote 3 different things:
  1. Digital currency or cryptocurrency
  2. Protocol that describes how assets are transferred over the blockchain
  3. Underlying blockchain technology used to move and record transfer of asset ownership

• Primary focus in this discussion is the blockchain technology platform and ecosystem from an enterprise perspective
# Blockchain Phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>Examples</th>
</tr>
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</table>
| Blockchain 1.0 | • Bitcoin/cryptocurrency-centric  
                 • Public/permissionless  
                 • Computationally intensive proof-of-work to validate transactions  
                 • Significant transaction latency | • Bitcoin  
                 • Altcoins  
                 • Ripple |
| Blockchain 2.0 & 3.0 | • Economic, market and financial use cases  
                           • Introduction of new consensus methods  
                           • Expanding scope to include any financial or economic asset of value  
                           • Introduction of private and permissioned blockchains providing faster validation, better control and stronger compliance in certain markets  
                           • Use of sidechains and other means of allowing multiple blockchains to interoperate  
                           • Programmability and automation through the use of smart contracts  
                           • Easier integration with legacy systems | • R3CEV  
                           • Ethereum  
                           • Factom  
                           • Microsoft  
                           • IBM  
                           • Consensus  
                           • Blockchain Identity Services |
Blockchain Basics
Blockchain Starts with a Ledger
...And then replicates the ledger across all network nodes after verification
Core Blockchain Building Blocks

- Cryptography-based Security
- Consensus & Verification
- Shared Ledger
- Shared Contracts
Core Blockchain Elements

• Network of Computers
  – Multiple nodes with a copy of the ledger
  – Creates fault tolerance if a node goes down

• Peer-to-Peer

• Consensus Mechanism
  – Verify transactions and agree on state of the blockchain
  – In permissioned blockchain consensus can be less stringent (because participants are known/trusted)

• Packaging and Adding Blocks
  – Approved nodes are packaged into block and redistributed to all nodes in the network
  – Revalidated to make sure all records match
Key Blockchain Concepts

• Blockchain can be thought of as a permanent distributed ledger with timestamps
• Blockchain allows us to travel through time being able to view previous transactions
• Law is a form of time travel; proving something happened at a point in time
• Blockchain supports reliable and verifiable communication using people distributed geographically and not necessarily trustworthy
• Keeps a record of all transactions that can’t be change
Blockchain Categories

• Public: Anyone can use and/or verify transactions
• Private: Registration/approval process to use
• Permissionless: Any node can validate
• Permissioned: Control/vetting of validating nodes
Permissionless vs. Permissioned

- Permissionless Blockchain
  - Bitcoin model where nodes are not trusted
  - Uses a computationally heavy proof of work to achieve consensus and validate transactions

- Permissioned Blockchain
  - Only allows known, vetted entities to serve as nodes in the network
  - Allows greater transparency without needing a central node
Permissionless vs. Permissioned

• Permissionless Blockchain Advantages
  – No intermediary needed
  – No previous relationship with blockchain needed
  – Avoid censorship and counterparty exposure
  – Flexible, open to all

• Permissioned Blockchain Advantages
  – Greater control over network nodes
  – Reduced need for computationally-intensive proof of work
  – Better integration into legacy environments
## Permissioned vs. Permissionless

<table>
<thead>
<tr>
<th>Core Characteristic</th>
<th>Permissionless Blockchain</th>
<th>Permissioned Blockchain</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validation by trusted nodes</td>
<td>No</td>
<td>Yes</td>
<td>Bitcoin and other permissionless blockchains use computationally intensive proof of work while permissioned uses a proof of stake in which a simple consensus from trusted nodes.</td>
</tr>
<tr>
<td>Proof of work required</td>
<td>Yes</td>
<td>No</td>
<td>Permissioned blockchain validates, but generally via consensus using known nodes per the earlier comment.</td>
</tr>
<tr>
<td>Anyone can participate</td>
<td>Yes</td>
<td>No</td>
<td>By definition permissionless allows anyone to participate. Permissioned may allow public access, but generally requires trusted validators.</td>
</tr>
<tr>
<td>Computationally intense consensus process</td>
<td>Yes</td>
<td>No</td>
<td>In general, a permissioned blockchain will be faster.</td>
</tr>
<tr>
<td>Pseudo-anonymous or anonymous identity of participants</td>
<td>Yes</td>
<td>Generally no</td>
<td></td>
</tr>
</tbody>
</table>
Market Landscape
Blockchain Platforms/Consortiums

• Ethereum; open-source, decentralized platform with scripting
  – Basis for Microsoft BaaS (partnering with ConsenSys)
  – Hundreds of applications build on this platform
• R3 CEV: Banking-backed consortium building a platform and educating market in support of 60 member banks
  – Focus on private, permissioned blockchain
  – Released Corda, banking-centric shared ledger platform
  – Microsoft Azure BaaS
• Hyperledger: Linux foundation project to advance blockchain with 60 members including IBM and Intel
  – IBM providing blockchain code base and Bluemix cloud platform
  – Open source with focus on a cross-industry ecosystem
• Microsoft announced Azure identity platform in June 2016
• IBM providing BaaS offering for developers
• Sovrin Foundation: Distributed-ledger based open-source identity
Market Momentum

- $1 Billion + VC investment and growing
- Most major technology vendors investing
- Most major banks investing
- Strategic investments by organizations that may be disrupted
  - Early stage companies
  - Alternatives that require a central authority
## Possible Blockchain Impact

### CROSS-BORDER PAYMENTS

<table>
<thead>
<tr>
<th></th>
<th>Traditional</th>
<th>Blockchain-Based</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transaction Fees</strong></td>
<td>7-12% on the dollar, + retail FX fees</td>
<td>Pennies, for any dollar amount (P2P), ~3% for services</td>
<td>250x cheaper on average</td>
</tr>
<tr>
<td><strong>Processing Times</strong></td>
<td>Days to weeks (business days only)</td>
<td>Minutes</td>
<td>576x faster on average</td>
</tr>
<tr>
<td><strong>Geographic Reach</strong></td>
<td>&quot;Effectively&quot; global, requires costly 3rd parties</td>
<td>Inherently global</td>
<td>Matches reach of Internet-Age commerce and communication without extra cost or risk</td>
</tr>
<tr>
<td><strong>Transparency</strong></td>
<td>100% opaque, crucial data inaccessible</td>
<td>100% transparent, auditable by anyone</td>
<td>Service trustworthiness/reputation now assessable, payments inherently trackable</td>
</tr>
<tr>
<td><strong>Costly 3rd party(ies)?</strong></td>
<td>Necessarily, many</td>
<td>Can use single service or go peer to peer</td>
<td>Substantially less costs, less risk</td>
</tr>
<tr>
<td><strong>Last Innovation</strong></td>
<td>SWIFT, 1973 (42 years ago)</td>
<td>ABRA, 2015 (the &quot;Uber of cross-border money transfer&quot;)</td>
<td>Industry relies and drives an active innovation</td>
</tr>
<tr>
<td><strong>Technological Fitness</strong></td>
<td>Obsolete</td>
<td>Unparalleled, bleeding edge</td>
<td></td>
</tr>
<tr>
<td><strong>Outlook</strong></td>
<td>Must adopt blockchains</td>
<td>Ubiquity</td>
<td></td>
</tr>
<tr>
<td><strong>Industry Value</strong></td>
<td>$22 trillion</td>
<td>How disruptive is it</td>
<td></td>
</tr>
</tbody>
</table>

Source: Pantera Capital Investor, 2015
Early Use Cases
Low Hanging Fruit

- Asset issuance, tracking and settlement
- Securing digital property
- Title and land records
- Medical records
- Anti-counterfeit solutions
- Clinical trial applications
- Proof of document existence
- Notary services
- Digital banking (KYC and AML)
- Ridesharing
- Property rentals
- Music sharing rights management
- Value property ownership proof
- Distributed identity management
## Early Use Cases

<table>
<thead>
<tr>
<th>Use Case</th>
<th>Blockchain Value Proposition</th>
<th>Early Examples/Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notary services</td>
<td>Provide a digital hash of a document, with a time stamp and record it on the public blockchain. This provides proof that a document was in possession of the client at a point in time, with an immutable record on the blockchain.</td>
<td>Stampd has an offer (stampd.io) to certify ownership (or at least possession) of a document at specific time. They take a hash of the document (SHA256) and link it on the blockchain with date/time.</td>
</tr>
<tr>
<td>Identity for those without digital IDs</td>
<td>There are an estimated 1.5 billion individuals without digital identities and blockchain can be used to provide identities controlled by the individual without government. The concept is called self-sovereign identity.</td>
<td>United Nations partnership with the non-profit ID2020 organization is gaining support from vendors, industry/political leaders and government agencies. Microsoft, IBM and several early stage blockchain identity companies supporting this initiative.</td>
</tr>
<tr>
<td>Registration and proof of title</td>
<td>Blockchain is finding early use in real estate title proof in that can securely record current ownership and will support the complete title history within the blockchain. Think of this as a self-contained title search. The time-stamping and self-contained audit trail provides portable proof of ownership and a complete history.</td>
<td>A blockchain company called Factom (<a href="http://www.factom.com">www.factom.com</a>) is supporting the government of Honduras with a pilot using blockchain to register land titles and in Sweden they are piloting a blockchain method of transferring and authenticating titles.</td>
</tr>
<tr>
<td>Music Sharing</td>
<td>Blockchain has the potential to allow artists to directly monetize their music, better control their content and directly connect with their fans without requiring an centralized intermediary</td>
<td>Ujo Music (<a href="http://www.ujomusic.com">www.ujomusic.com</a>) is currently piloting a self-contained music ecosystem built on blockchain that is controlled by the artist and contributors to the artist. They are piloting the distribution of a song from artist Imogen Heap and will accept Ether (Ethereum’s cryptocurrency) currently and plan to support credit cards in the next release.</td>
</tr>
<tr>
<td>Health records</td>
<td>Blockchain-based applications can provide for individually controlled and secure storage, management, sharing and use of health care records</td>
<td>The MIT Medrec pilot (<a href="http://jds.mitpress.mit.edu/pub/medrec?version=1">http://jds.mitpress.mit.edu/pub/medrec?version=1</a>) uses public blockchain to store and share medical records and provides an incentive for health care researchers and others with vested interest to gain access to statistical data by providing mining services. An early stage company called Block Verify (<a href="http://blockverify.io">http://blockverify.io</a>) is prototyping solutions for luxury items, pharmaceuticals, diamonds and electronics and Everledger (<a href="http://www.everledger.io">http://www.everledger.io</a>) is providing a similar service for registering diamonds and proof of authenticity fraud detection for diamonds.</td>
</tr>
<tr>
<td>Anti-counterfeit services</td>
<td>Leveraging blockchain to register assets subject to counterfeiting, tag the assets and compare to data stored in blockchain</td>
<td></td>
</tr>
</tbody>
</table>
Enterprise Strategy
Two Credible Blockchain Cases

- Blockchain with Internet-level impact
  - Similar to the early 1990s when AUP was relaxed and browsers emerged
  - Internet is a communication protocol and blockchain is a value exchange protocol
  - Internet value increases exponentially with a supporting ecosystem as does blockchain
  - Massive disruptive potential for both
- Blockchain is a science experiment that won’t ever become mainstream
  - Security and regulatory hurdles are too steep
  - P2P is too difficult to manage
  - Standards don’t emerge with multiple incompatible distributed ledgers
  - Powerful intermediaries such as banks develop competing solutions
Enterprise Recommendations

• High upside, but nascent technology
• Look for broader development of a supporting ecosystem and production-level use cases before making significant investments unless you are:
  – In banking, insurance or a market that may be directly impacted by blockchain
  – A technology vendor/integrator or have a clean slate (no legacy systems)
• Emphasis for other organizations is preparing to move rapidly when the time is right.
Enterprise Action Plan

- Research and Education
- Initial internal sponsor
- Find low hanging fruit—important to the organization, but easy to demo or pilot
- High-level plan and budget
- Start small, learn and iterate—join an industry group, consortium or partner with a vendor
- Prepare to move rapidly when conditions are right
Summary Thoughts

• Blockchain supports value exchange at scale without requiring a third party
• Focus is on value exchange, not cryptocurrencies
• Massive hype, major VC,strategic investment, real game-changing opportunities, but very, very early
• Feeding frenzy for early market share amongst vendors, service providers, integrators and start-ups
• Ecosystem is needed before blockchain hits mainstream—still several years off
• Questions?
Thank You