

# Explore Blockchain



Kirsten Schroeder  
Partner, Federal Civilian  
IBM Public Service  
[Kirsten.e.Schroeder@us.ibm.com](mailto:Kirsten.e.Schroeder@us.ibm.com)

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- Business Drivers that Point to Blockchain

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- Focus on Blockchain and Credentials

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## Blockchain Basics

- Core Underpinnings of Blockchain
- Business Drivers that Point to Blockchain



Dan Ariely ✓

January 6, 2013 · 🌐

Blockchain

Big data is like teenage sex: everyone talks about it, nobody really knows how to do it, everyone thinks everyone else is doing it, so everyone claims they are doing it...

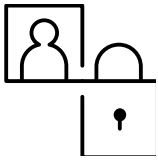
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# Three Government Imperatives are Underpinning the Vision of Blockchain



## Open Government

As Government agencies increasingly **collaborate** with private sector and NGOs to drive economic growth and vitality, the need for **transparency and trust** in data becomes all the more important.



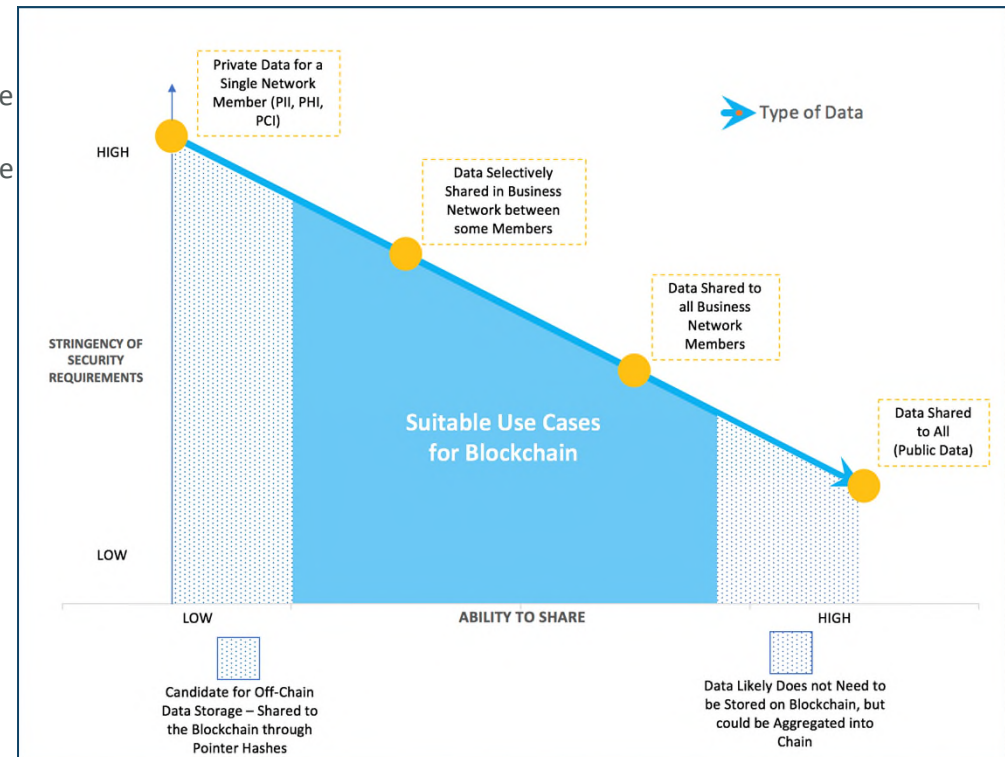
## Cyber Security and Privacy

As cyber attacks on Government agencies increase, security of **Government** systems and data becomes fundamental to the Governments ability to provide **safe communities** and protected **critical infrastructure**.



## Regulations and Compliance

Governments need to **minimize regulations** to enhance **economic vitality** while at the same time ensure **regulatory compliance**. Governments will not only create but also need to manage the implementation of **policy changes at speed**.



# What Makes for a Great Blockchain Use Case?

## Provenance

Enable any asset to be secured to a Blockchain ledger, physical or virtual.

## Immutability

Once data has been written no one, not even a system administrator, can change it.

## Finality

Once an operation is completed, that operation is completed for good.

## Controlled Access & Transformation

Smart agreements on how to use the data embedded in transaction database & executed with transactions.

## Consensus

All parties agree to network verified transactions.

## Privacy & Permissioned

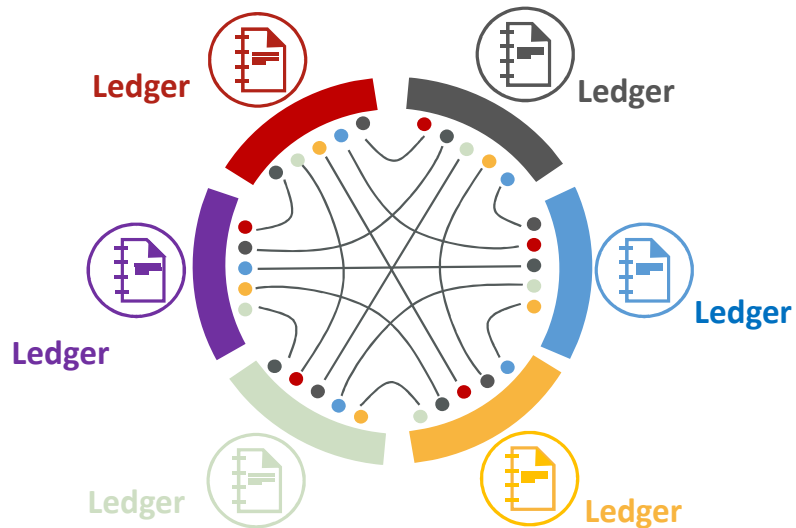
Ensure appropriate visibility; transactions are secure, authenticated & verifiable.

## Results

- Removing Friction
- Getting rid of the “middle man”
- Leveraging an Existing Business Network but not a Closed Network
- Valuing Transparency and History of a Shared Ledger to all participants
- Adding the Citizen/Customer to the value chain

# What Makes for a Great Blockchain Use Case?

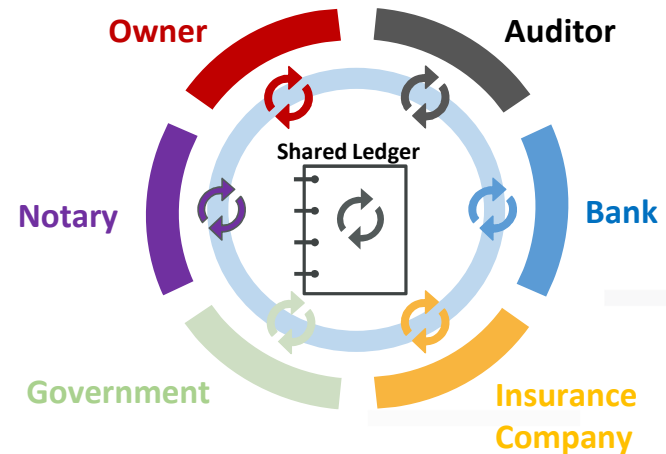
## Current State



### Pain Points

- Siloed Information
- Lack of information-sharing
- Manual paperwork/processes

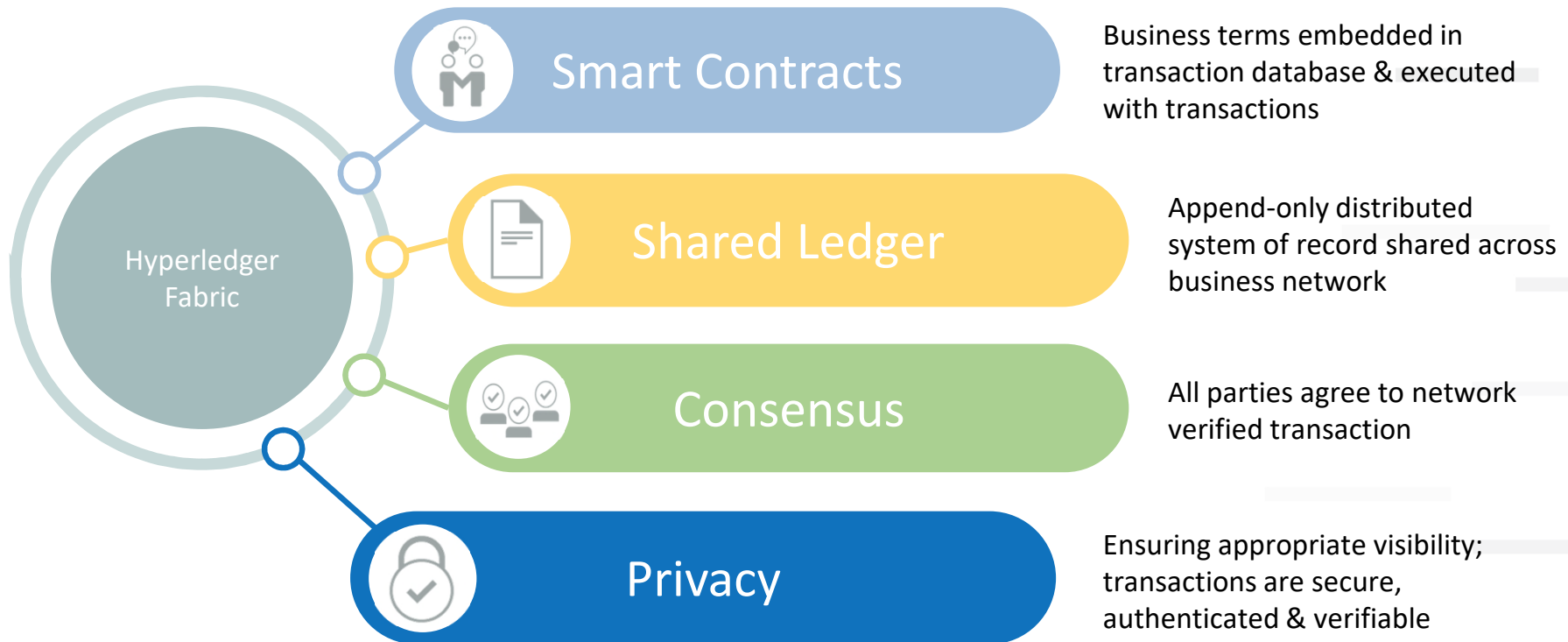
## Future State



### Blockchain Advantages

- Permissioned Information Sharing
- Supply chain visibility
- Provenance of goods
- Easy regulation and compliance
- Increased trust within the business network

# Blockchain for Business and Government



**IBM is a founding member of the Linux Foundation's Hyperledger Fabric project and has been a leading voice in developing collaborative open standards for distributed ledgers and smart contracts**

## Blockchain Use in Commercial and Government

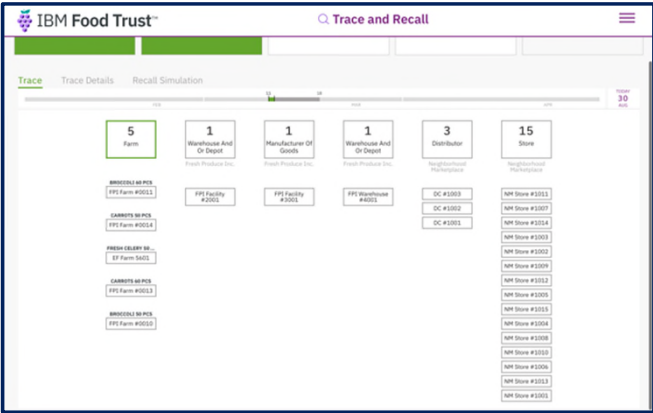
- Where is Blockchain being piloted or used in production



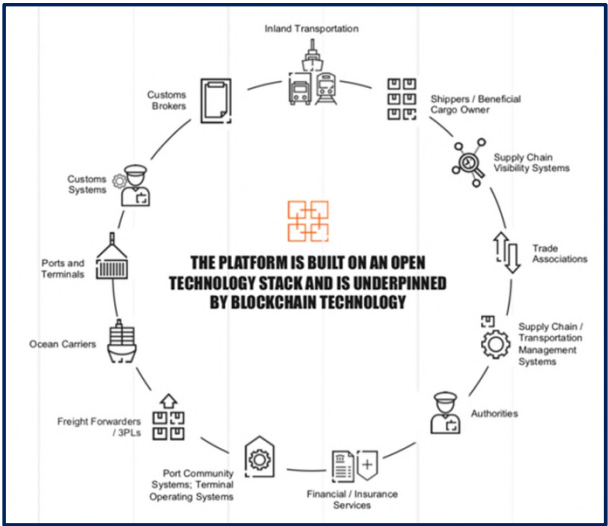
# Production Blockchain Examples on Hyperledger Fabric

Providing Value to Extended Business Network Participants:  
we.trade

Creating a Shadow Chain to Tie into Legacy Systems:  
IBM Global Finance







Digitizing the Global Supply Chain:  
TradeLens



Extending the Business Network:  
Global Food Trade

## IBM Blockchain Government Project Examples

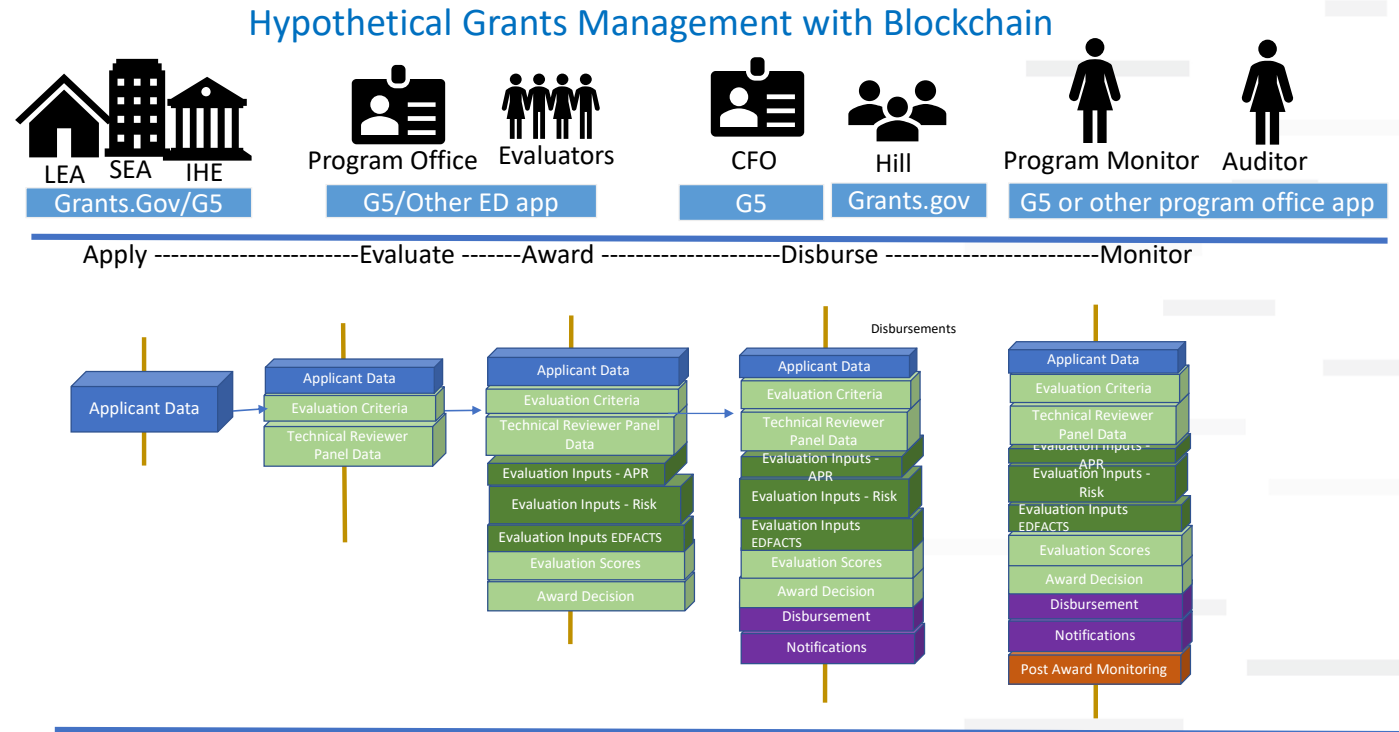
 <p><b>Modernization of Corporate Collateral and Stock Ownership on Blockchain</b></p>	 <p><b>Simplifying Resource Hiring Actions with Visibility, Smart Contracts, and a Blockchain-enabled Business Process</b></p>
<ul style="list-style-type: none"> <li>IBM is building prototypes to address Delaware's UCC filing process between creditor and debtor corporations, registered agents, and legal representatives while using Blockchain to create a shared Stock Ledger capitalization table for corporations/LLCs that are registered in Delaware to track ownership shares.</li> </ul>	<ul style="list-style-type: none"> <li>IBM is working to create a blockchain-enabled process for hiring under the IPA Act. This system will enable USINDOPACOM to more accurately, easily and accountably procure high-value resources at low cost. It addresses the current inefficient, error-prone IPA process to keep IPAs paid and focused on their mission tasks while facilitating procurement of new IPAs.</li> </ul>
 <p><b>EHR Reference Data Chain of Custody and Consent</b></p>	 <p><b>International Mail Tracking, Analytics, Alerts, and Error Resolution</b></p>
<ul style="list-style-type: none"> <li>IBM is addressing a CDC blockchain use case to track the chain of custody of EHRs (Electronic Health Records) and how they are stored, access and moved through the lifecycle in compliance with government regulations - and how to manage the consent and sharing of those EHRs.</li> </ul>	<ul style="list-style-type: none"> <li>IBM is building out blockchain solutions to help USPS better track and understand international mail between itself, air carriers, and foreign post offices. By leveraging the trusted, immutable, Blockchain ledger, we create an actionable data source to feed analytics engines, operational alerts, and reporting on a per-member basis for USPS, carriers, and foreign posts.</li> </ul>

## Application of Blockchain in Education

- Potential use cases in Education
- Focus on Blockchain and Credentials

# Blockchain Use Cases in Education

- Financial Aid
- State-Federal Data Collections
- Academic Research
- Supplier Agreements
- Grants Management
- Learning Credentials/Articulation Agreements



# Credentials Unlock our Lifelong Learning Experiences

- Credentials are evidence of mastery of skill.
- Credentials are issued by 1000s of organizations around the globe.
- Mastery can be demonstrated multiple ways.
- Micro-credentials can unlock their value.



# Industry Challenges Stand in the Way of Unlocking Credentials' Value



- **Costs**

Verifying credentials is inefficient and qualifying prior work for educational credit is costly



- **Trust and Fraud**

Employers report that 33% of employee reported degrees are fraudulent



- **Regulatory Requirements**

Credentials expire and are revoked requiring that they be continuously updated



- **Pathways to Employment**

Pathways have inadequate fidelity to provide clear guidance



- **Learners**

Credentials get lost and destroyed making them unmanageable



- **Transparency and Insight**

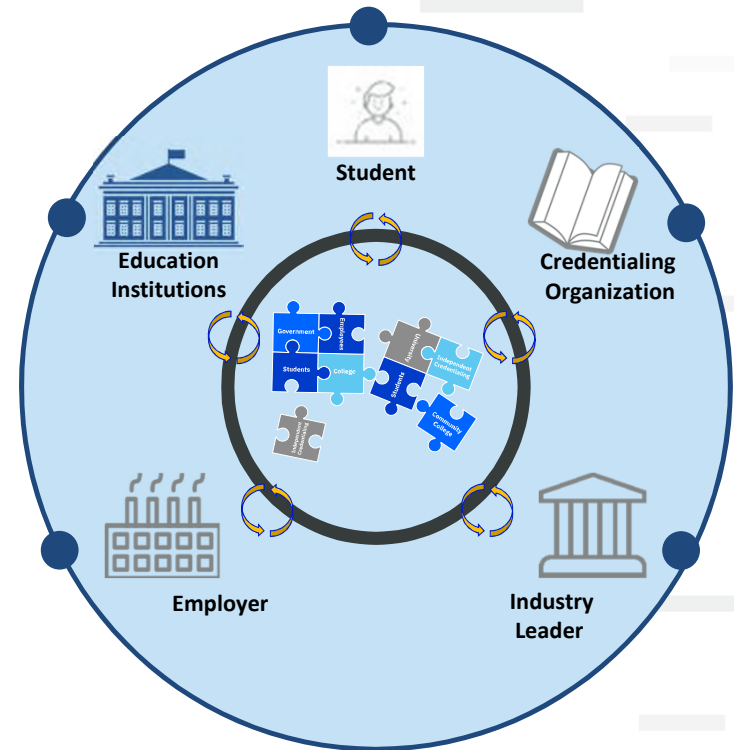
Provenance and content of credentials is often unclear

# A Learning Credential Blockchain is the Transformative Technology to Unlock the Future

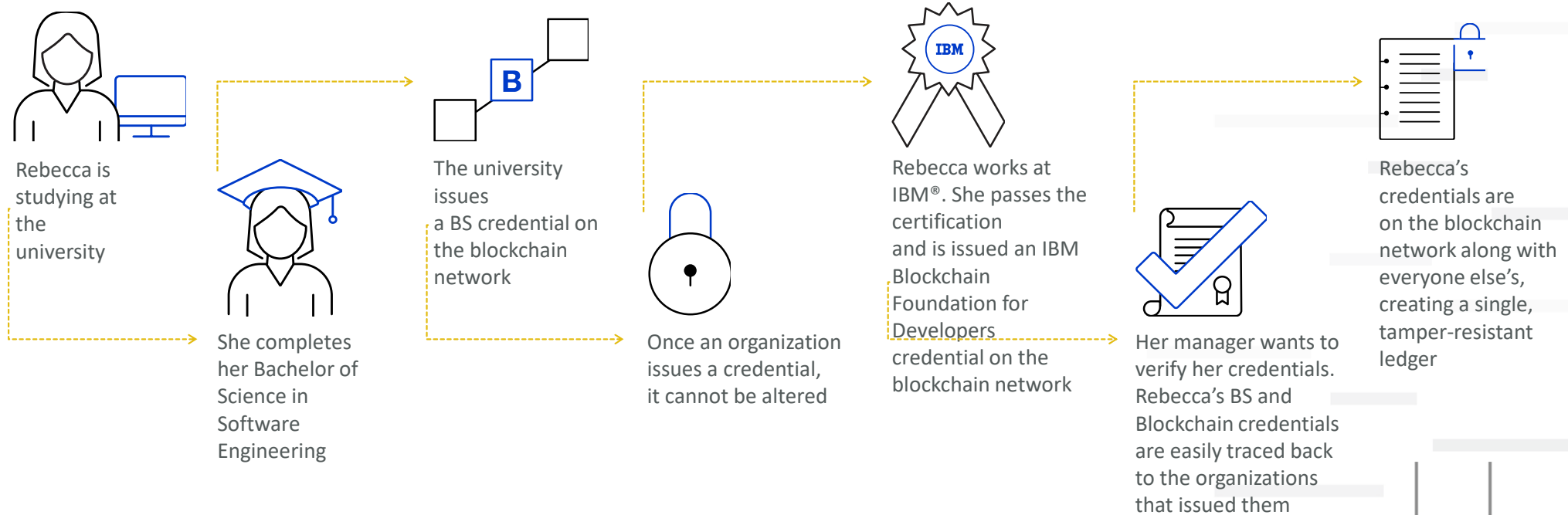
“ A shared, replicated, permissioned ledger with consensus, provenance, immutability and finality for credentials\*”

- Built on existing education industry and technical standards
- Founded by key education institutions and leaders of the education industry
- Supporting all credential use cases
- Available to all stakeholders working with credentials

\* “Blockchain: What It Is, What It Does, and Why You Probably Don’t Need One” David Andolfatto, Economic Research Federal Reserve Bank of St Louis, Vol. 100, No. 2  
Posted 2018-04-16



# A Credentialing Blockchain Empowers Learners to Realize their Aspirations





# Envisioning the an End State for a Blockchain Credential Ecosystem

**Maria Olivera**  
Bronx, New York

in t f Send a Message

**MARIA'S BADGES**

- Retail Industry Foundations  
IBM
- Associate Certified Associate in Visual Communication Using Adobe Photoshop CS6  
Adobe
- Microsoft Office Specialist Excel 2013  
Microsoft
- Citrix NetScaler SD-WAN Certified (CC-SDWAN)  
Citrix
- Project Management Professional (PMP)®  
Project Management Institute
- Watson Discovery Service Foundations  
IBM

**ISSUED ON 23 AUG 2018**  
Retail Industry Foundations  
Issued by IBM

**ISSUED ON 02 AUG 2018**  
IBM Cloud Private - Foundation Technology  
Issued by IBM

**ISSUED ON 11 JUL 2018**  
IBM Cloud Private Infrastructure and Architecture  
Issued by IBM


**ISSUED ON 16 JUN 2018**  
IBM Security Essentials for Architects  
Issued by IBM

**ISSUED ON 14 APR 2018**  
Watson Conversation Service Foundations  
Issued by IBM

**ISSUED ON 13 APR 2018**  
Watson Discovery Service Foundations  
Issued by IBM

- ✓ **Learner:** Owns and manages her record of skills and credentials
- ✓ **Institution:** Processes transfers seamlessly
- ✓ **Employer:** Interview candidates and select based on a complete and verifiable record

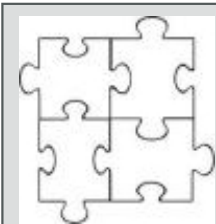
# The Blockchain would be Anchored on 5 Core Capabilities



**Issue Credential:** Streamline the issuance of credentials that demonstrate skill mastery.



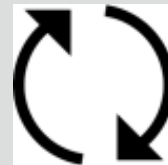
**Search Credentials:** Look inside an individual's skill-wallet and find credential matches for job candidates, school admission, projects, etc. ("the job will find me").



**Manage Credentials:** Update, revoke, and aggregate view of credentials from multiple organizations.



**Verify Credential:** Instant verification by issuer that a learner credential is authentic.



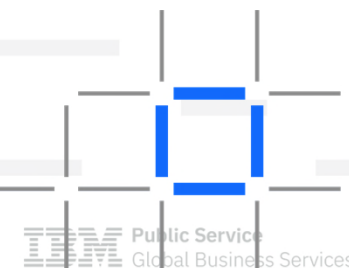
**Exchange Credential:** Share *MY* credentials with others for jobs, admissions, certifications, etc.

# Work in Progress: IBM and Central New Mexico Community College District are Collaborating on the Future of Credentials and Blockchain



CNM and IBM will **expand both organizations' opportunities and skills in supporting the transformation of the education industry through blockchain.**

- **Envision the use of blockchain** by and between institutions, stakeholders, providers, employers and other interested members.
- Envision the **creation of a global learning credential blockchain** and collaborate with others with similar objectives.
- Utilize **IBM as an experienced advisor** in the domain of blockchain governance, methodology, tools and technologies.
- **Collaborate, as appropriate, with standards setting bodies** such as IMS Global Learning Consortium and other standards bodies.



## Useful Links

- **JUST OUT: Congressional Blockchain Caucus Report** - <http://businessofgovernment.org/sites/default/files/The%20Impact%20of%20Blockchain%20for%20Government.pdf>
- Hyperledger Composer Playground - <https://composer-playground.mybluemix.net/login>
- Walmart + IBM Food Trust – <https://www.youtube.com/watch?v=QWijlTDHLMQ&feature=youtu.be>
- TradeLens Announcement - <https://www.marketwatch.com/press-release/maersk-and-ibm-introduce-tradelens-blockchain-shipping-solution-2018-08-09>
- Blockchain Applications Overview - <https://www.comptia.org/resources/harnessing-the-blockchain-revolution-comptia-s-practical-guide-for-the-public-sector>
- Delaware Project Introduction - <https://www.computerworld.com/article/3289484/blockchain/delaware-to-test-blockchain-based-business-filing-system.html>
- Food Safety Introduction - <https://www.youtube.com/watch?v=SV0KXBxSoio&app=desktop>
- Maersk Blockchain Supply Chain Use Case Introduction - <https://www.youtube.com/watch?v=dcddYatMCGQ&app=desktop>
- IGF Dispute Resolution Use Case Introduction - <https://www.youtube.com/watch?v=0DSNdLDOZ5w&index=3>
- IBM Blockchain video - <https://www.youtube.com/watch?v=2O2CLoCxAWA>
- ACT-IAC Whitepaper on Blockchain - <https://www.actiac.org/act-iac-white-paper-enabling-blockchain-innovation-us-federal-government>

## Discussion/Q&A

## IBM Resources to Support More Detailed Blockchain Discussions



Michael Youngdahl  
Blockchain Consultant  
IBM Public Service  
[Michael.Youngdahl@ibm.com](mailto:Michael.Youngdahl@ibm.com)



Alex Kaplan  
Global Strategist  
IBM Global Education  
[alex.kaplan@us.ibm.com](mailto:alex.kaplan@us.ibm.com)



Mark Fisk  
Partner IBM Digital  
Blockchain Leader  
IBM Public Service  
[fiskm@us.ibm.com](mailto:fiskm@us.ibm.com)  
[@fiskm2000](#)



Michael King  
VP and General Manager for IBM  
Education  
[mdking@us.ibm.com](mailto:mdking@us.ibm.com)