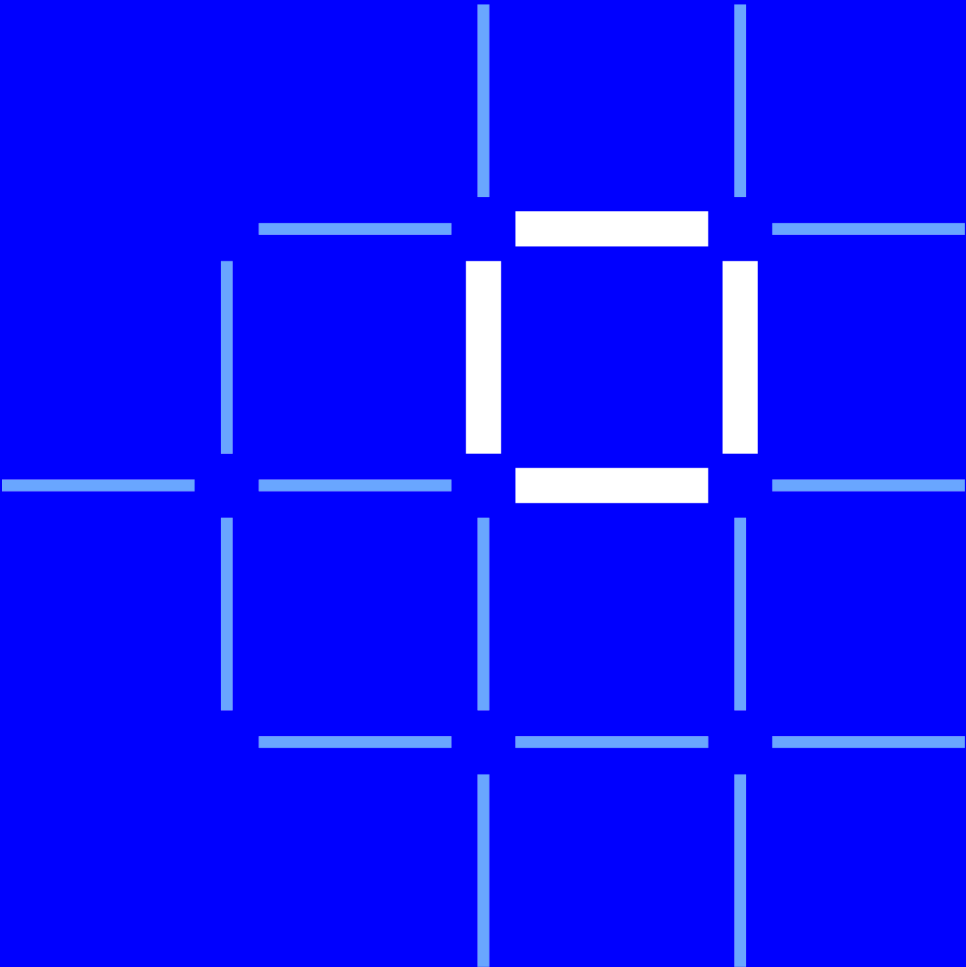


Blockchain as a Disruptive Technology

Jeff Tennenbaum
IBM Blockchain Solutions Architect
October 26, 2017

IBM Blockchain



In and Out list of 2017 (Washington Post)



IN

**Not Being Able
To Explain Blockchain**



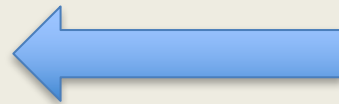
OUT

**Not Being Able
To Explain Bitcoin**

Gartner July Hype Cycle For Emerging Technologies, 2017

Hype Cycle Phases

- Technology Trigger
- Peak of Inflated Expectations
- Trough of Disillusionment
- Slope of Enlightenment
- Plateau of Productivity



Blockchain

Blockchain is moving towards the Trough of Disillusionment
5 to 10 years before reaching the Plateau of Productivity

Source: Gartner, Smarter with Gartner, Top Trends in the Gartner Hype Cycle for Emerging Technologies, 2017, August 15, 2017, <https://www.gartner.com/smarterwithgartner/top-trends-in-the-gartner-hype-cycle-for-emerging-technologies-2017/>

Misappropriation of Aid – (Imagine a World)

”THE ULTIMATE POINT OF FAILURE FOR OUR EFFORTS...WASN'T AN INSURGENCY. IT WAS THE WEIGHT OF ENDEMIC CORRUPTION.”
- Ambassador Ryan Crocker, 2016



- Undocumented Expenses
- Cash Disbursements with no documentation
- Overcharged Procurement Costs
- **No mechanism to enforce disbursement rules**
- \$236.5 Million earmarked for Afghan Ministry of Public Health was in danger of misappropriation

<https://www.sigar.mil/interactive-reports/corruption-in-conflict/index.htm>

<http://www.africareview.com/news/Bill-Gates-cuts-health-funding-to-Sierra-Leone/979180-1649672-7f12m1/index.html>

Counterfeit Pharmaceuticals – (Imagine a World) ^{IBM Blockchain}

- An estimated 10%–30% of medicines sold in developing countries are counterfeit.
- Internet sales of counterfeit drugs account for \$75 billion of the total market
- More than 30% of the counterfeit drugs that are available today don't contain any active ingredients whatsoever.
- A recent survey of seven African countries by WHO found that between 20% and 90% of all anti-malarials failed quality testing.
- Interpol recently estimated that fake medicines now kill one million people each year.
- Over 122 thousand African children under the age of 5 lose their lives as a result of counterfeit antimalarials alone.



Voting – (Imagine a World)

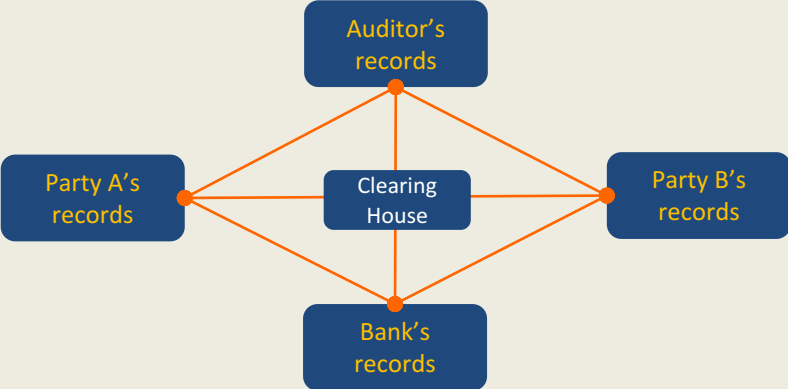
- The Department of Homeland Security last month notified Virginia and 20 other states about Russian efforts to hack their election systems in 2016.
- Suspicion that an election has been rigged may impair a new government's legitimacy and create a constitutional crisis.
- Paper ballots returning to Virginia Elections
- No transparency and traceability after you vote



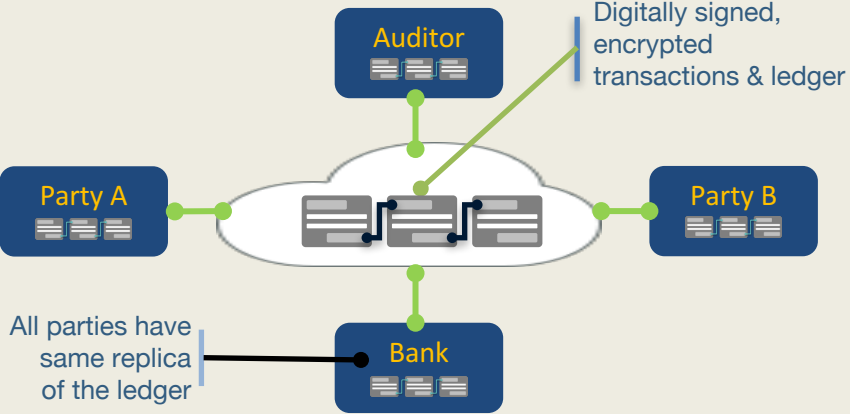
https://www.washingtonpost.com/local/virginia-politics/paper-ballots-make-a-comeback-in-virginia-this-fall/2017/10/07/724106ec-a92b-11e7-850e-2bdd1236be5d_story.html?utm_term=.73c3aed795d7

How Blockchain fundamentally changes business processes

Traditional



With Blockchain



... Inefficient, expensive, vulnerable

... Consensus, provenance, immutability, finality

Global Financing: Dispute Resolution

What?

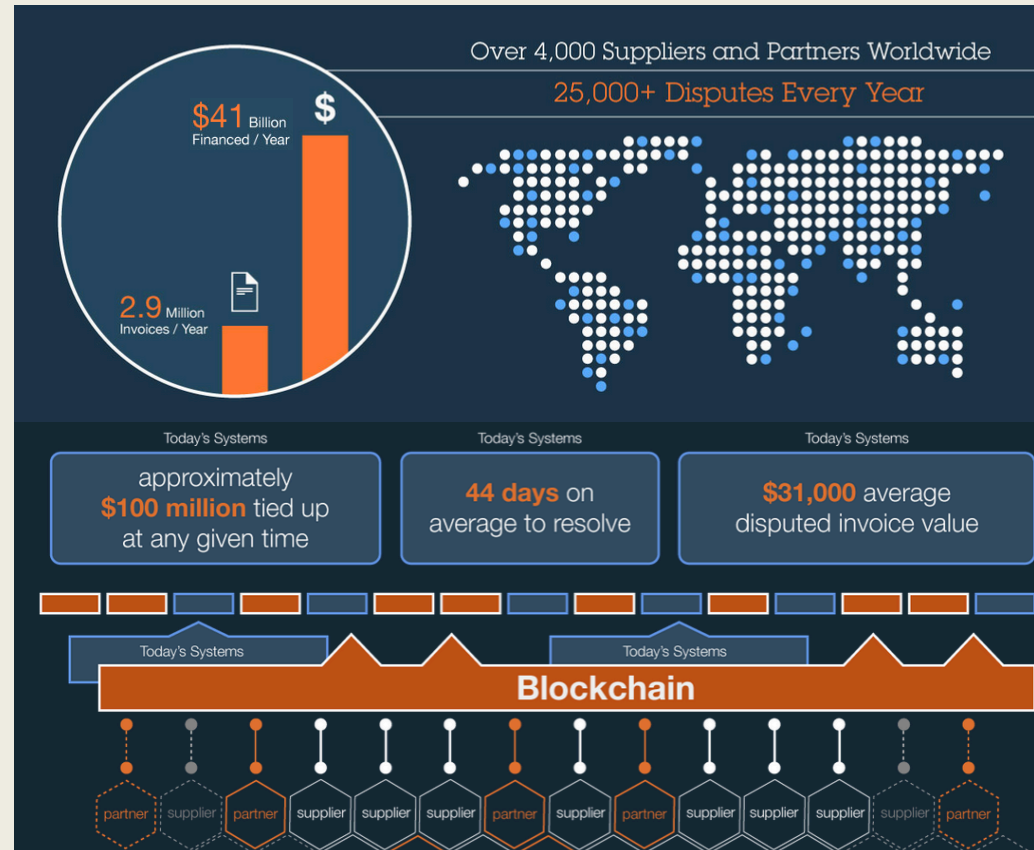
- IBM Global Finance provides a \$41bn channel financing per year. There are a number of disputes that take time to resolve and can lock up transactions costing time and money

How?

- Blockchain provides visibility and provenance end-to-end across supply chain

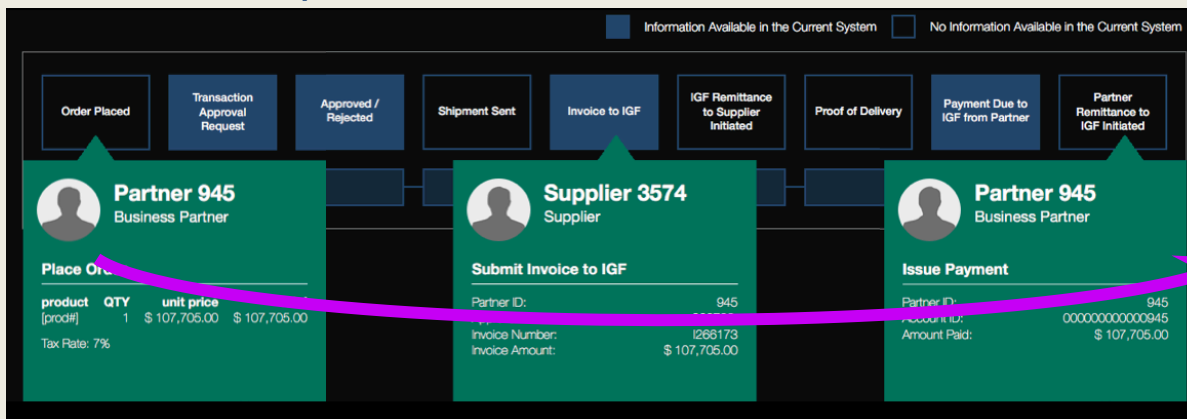
Benefits

1. Reduced dispute resolution time by 75%
2. Released working capital from \$100m
3. Combine IGF and Supplier info to further expand benefits further
4. In production since Sept 2016



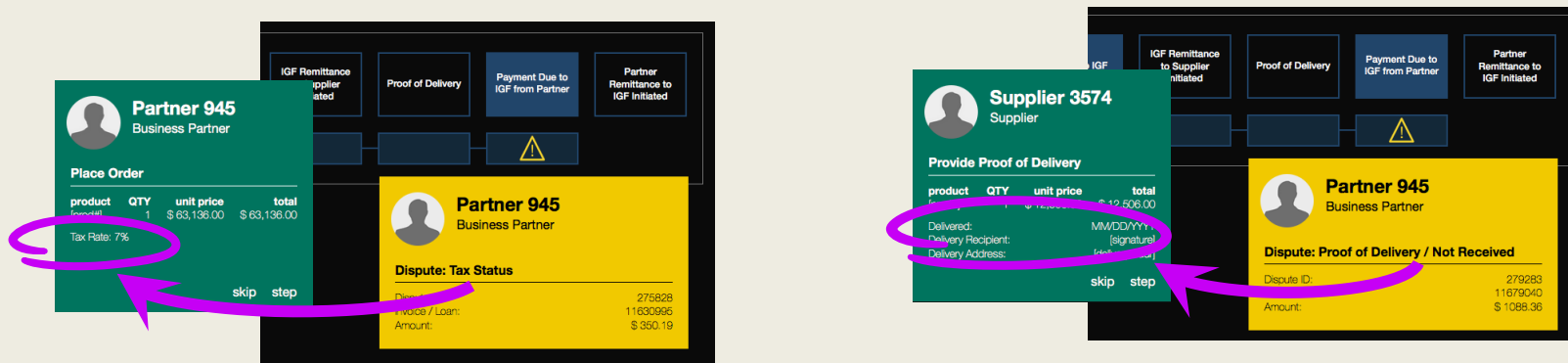
Blockchain provides all stakeholders visibility and trust

An immutable, non-repudiable record of events, shared between Partners, Suppliers and IGF...



...enabling a comprehensive view across the entire transaction lifecycle...

...with enhanced visibility to prevent or speed the resolution of disputes...



Demo Video: <https://youtu.be/F0P7NM7d-ps>

Cross Border Supply Chain

What?

- Ninety percent of goods in global trade are carried by the ocean shipping industry each year. Costs associated with trade documentation processing and administration are estimated to be up to one-fifth the actual physical transportation costs.

How?

- A new blockchain solution from IBM and Maersk will help manage and track the paper trail of tens of millions of shipping containers across the world by digitizing the supply chain process.

Benefits

1. Enhance transparency and the highly secure sharing of information among trading partners and customs officials.
2. Reduce fraud and errors, reduce the time products spend in the transit and shipping process, improve inventory management and ultimately reduce waste.
3. Potential to save the industry billions of dollars.



What?

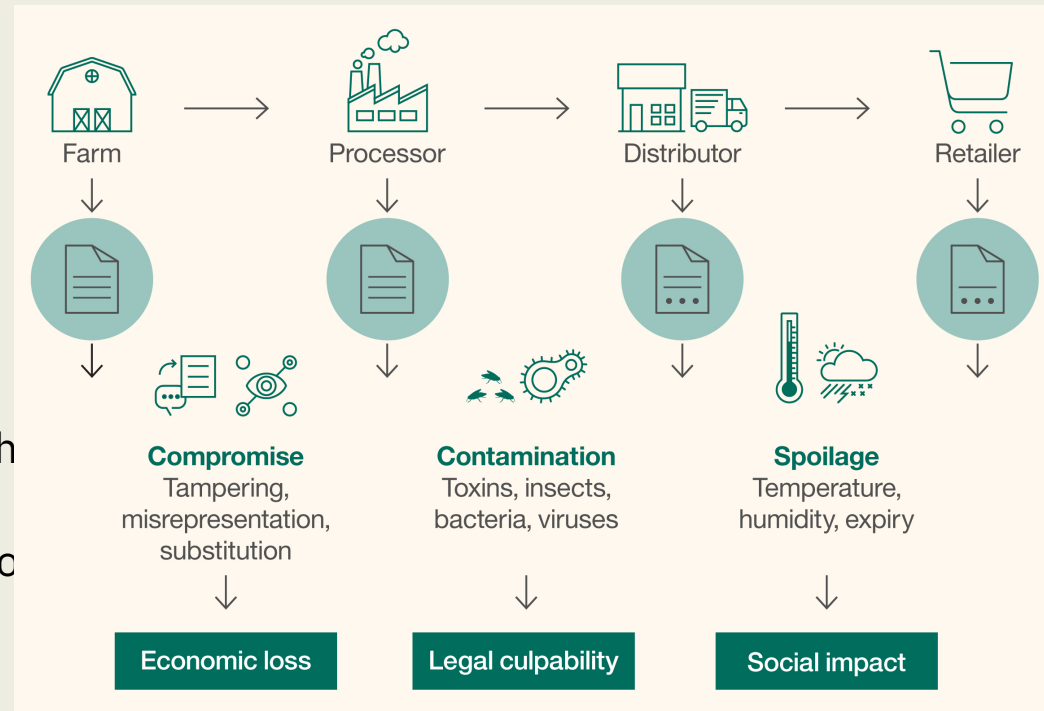
- Traceability of food from “farm to fork”

How?

- Blockchain holds history of food items processed through entire supply chain

Benefits

1. Increased trust – multiplied by each participant in food supply chain
2. Pinpoint source of compromised food reducing the unnecessarily broad recall
3. Improved co-ordination in food supply chain



Legitimize Diamonds and Reduce Fraud

What?

- Track diamonds across supply chain from mine to retail

How?

- Shared ledger for storing digital certification with supporting material

Benefits

1. Protect against the occurrence of fraud, theft, trafficking and black markets
2. Assist in the identification and reduction of synthetic stones being labelled as authentic
3. Increase speed of transparency for cross border transactions for insurance companies, banks and claimants



Example: Additive Manufacturing

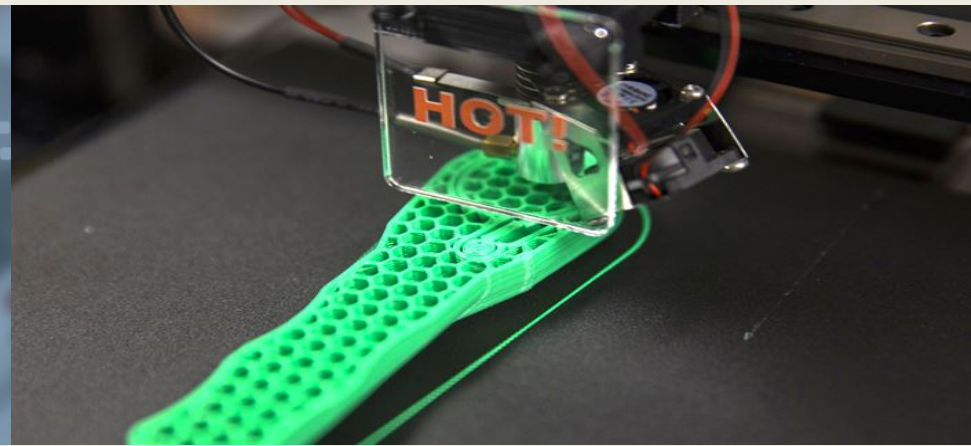


Photo By: Cpl. Justin Updegraff

What

- Prevent introduction of wrong or counterfeit 3D-models into manufacturing processes
- Create audit trail for design modification and approval

How

- 3D-model hash values stored on chain with pointer to design.
- Access and permissions assigned to design managed via Smart Contract code

Benefits

1. Detection of unauthorized modifications
2. Reduce costs from delays or re-work caused by using the wrong digital models
3. Securely share models
4. Track creation of components

Blockchain Healthcare Use Cases

Patient Consent and Health Data Access



- Personal record storage
- Outcome based payments
- Notarization and identity
- Consumer generated data and health IoT
- Health research commons
- Genomics data exchange

Payment and Claims



- Validation and Payment of Claims
- Real-Time / Contextual Forms of Insurance
- Health Document Notary Services
- Medical Banking: Disintermediating counterparties

Provenance and traceability



- Counterfeit Drug Prevention and Detection
- Smart Property for healthcare assets

Clinical Trial Results / Other



- Improve accountability and transparency in the clinical trial
- Doctor-Vendor RFP Services
- Collaborative Crowdsourcing

Hyperledger: A Linux Foundation project

- A collaborative effort created to advance cross-industry blockchain technologies for business
- Announced December 2015, now around 150 members
- Open source, open standards, open governance
- Five frameworks and three tools projects
- IBM is a premier member of Hyperledger



Hyperledger members

Premier

General



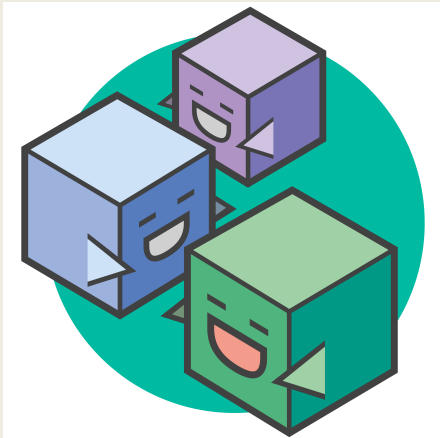
Associate

Source: <https://www.hyperledger.org/about/members>
 Updated 21 August 2017

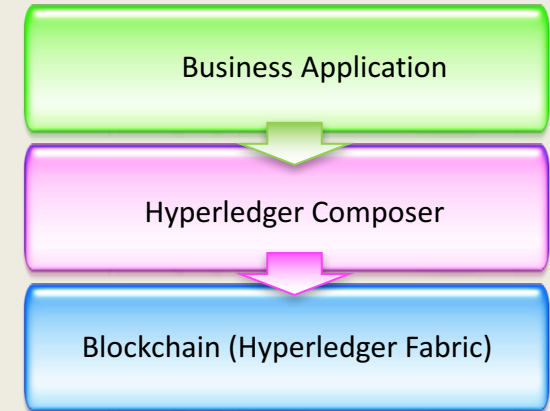
So you want to write some Chain Code? Hyperledger Composer

<https://hyperledger.github.io/composer/>

- A suite of high level application **abstractions** for business networks
- Emphasis on business-centric vocabulary for quick solution creation
- Set up on Ubuntu or Macbook

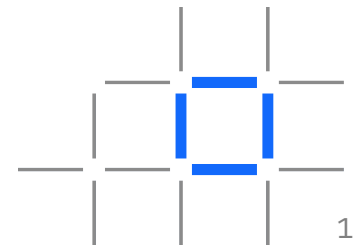


- Features
 - Model assets, participants and transactions, test and expose via APIs
 - Applications invoke APIs transactions to interact with business network
 - Integrate existing systems of record using loopback/REST
- Fully open and part of Linux Foundation Hyperledger
- Try it in your web browser: <http://composer-playground.mybluemix.net/>



Some Places Where you can get Started

- Hyperledger Composer - <https://hyperledger.github.io/composer/index.html>
- Hyperledger Composer Playground - <http://composer-playground.mybluemix.net/editor>
- Hyperledger Fabric Docs (Architecture and Transaction flow) - <http://hyperledger-fabric.readthedocs.io/en/latest/ledger.html>
- IBM Blockchain Developer Sandbox - <https://developer.ibm.com/blockchain/sandbox/>
- IBM Blockchain Use Cases - <https://www.ibm.com/blockchain/business-use-cases.html>
- IBM Blockchain Thought Leadership - <https://www-935.ibm.com/services/us/gbs/thoughtleadership/blockchainlibrary.html>
- Ethereum Command Line Tools - <https://ethereum.org/cli>

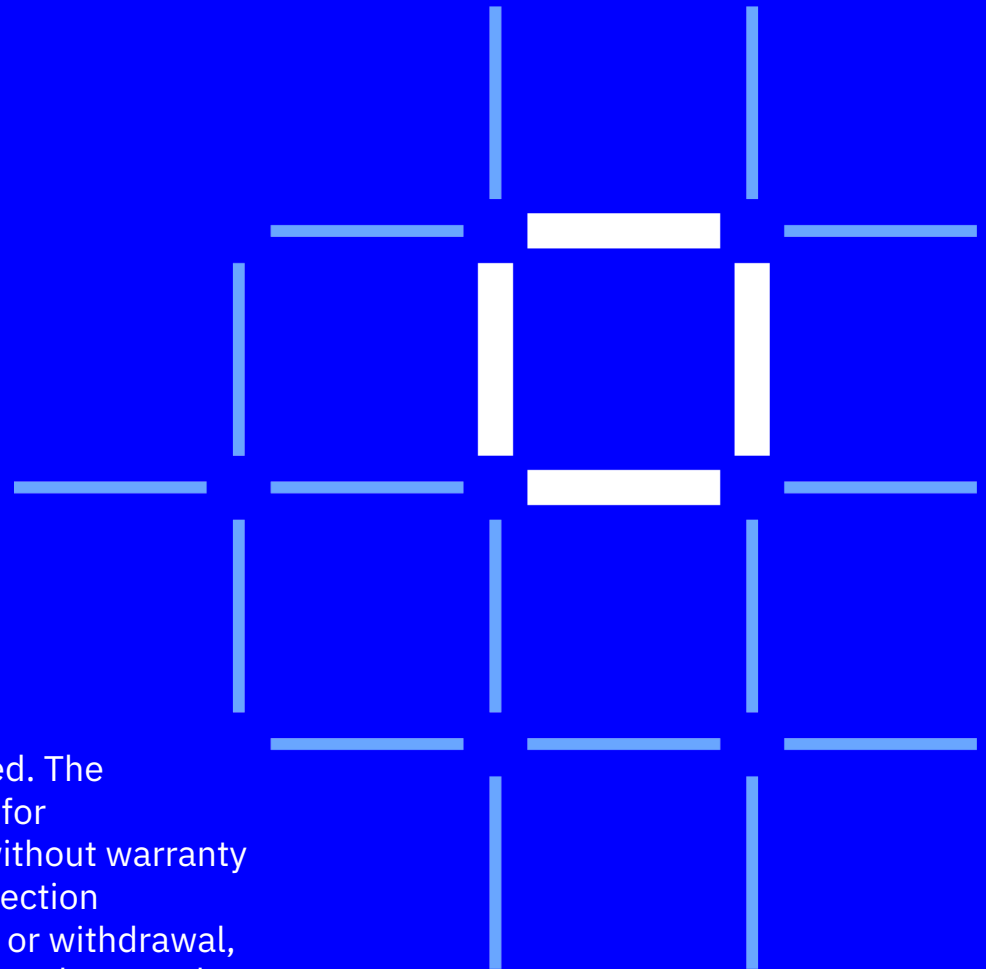


Thank You!

Jeff Tennenbaum

tennenjl@us.ibm.com

@JeffTennenbaum1



© Copyright IBM Corporation 2017. All rights reserved. The information contained in these materials is provided for informational purposes only, and is provided AS IS without warranty of any kind, express or implied. Any statement of direction represents IBM's current intent, is subject to change or withdrawal, and represents only goals and objectives. IBM, the IBM logo, and other IBM products and services are trademarks of the International Business Machines Corporation, in the United States, other



IBM