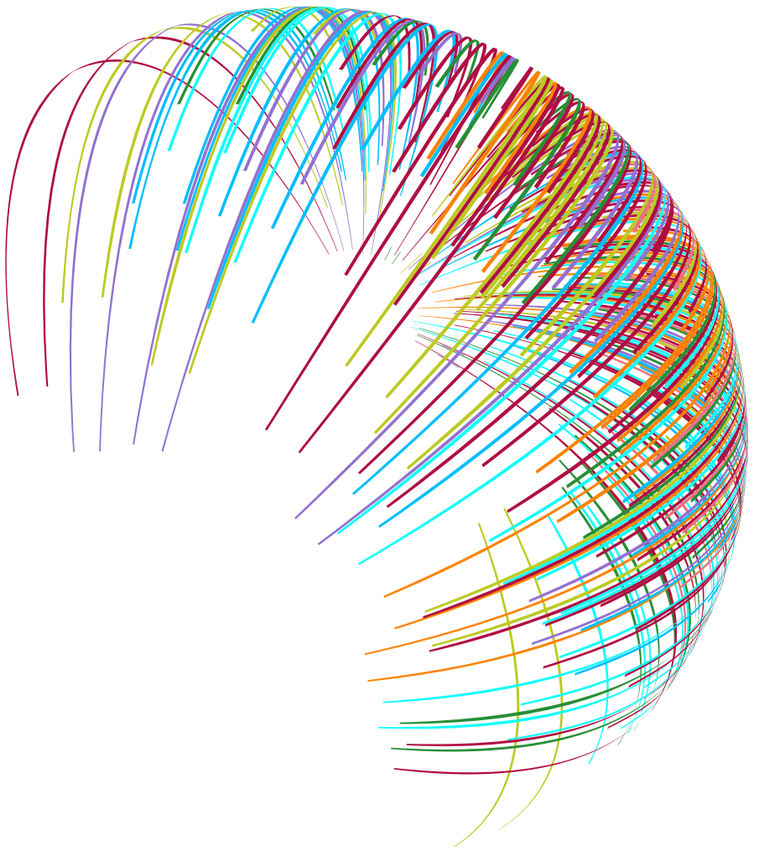
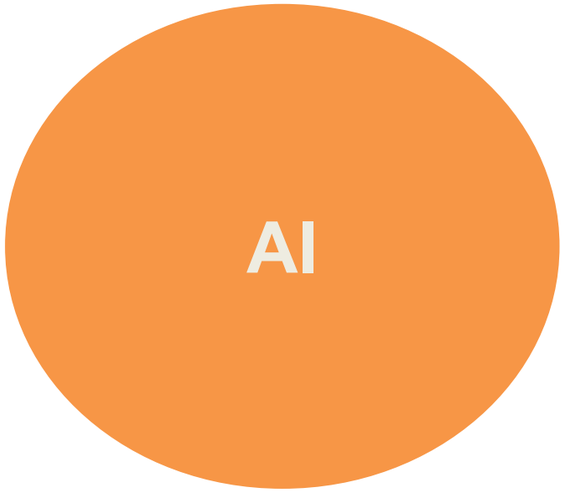
Disruptive Technologies

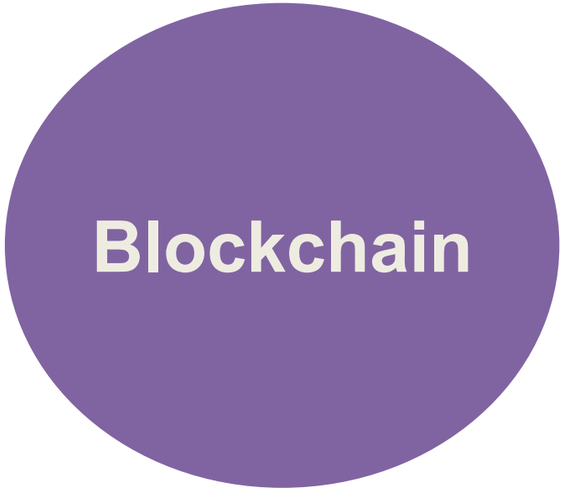


Sriram Raghavan
Vice President, IBM Research – India & Singapore
and CTO, IBM India/South Asia

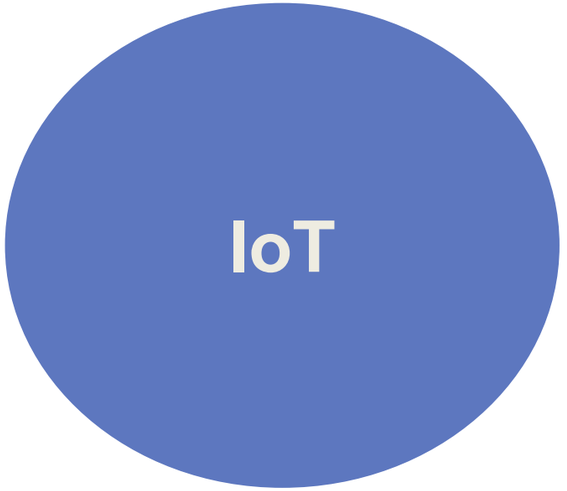
Emerging technologies disrupting industries and professions



Reaching an inflection point in data-driven decision making & interactive systems

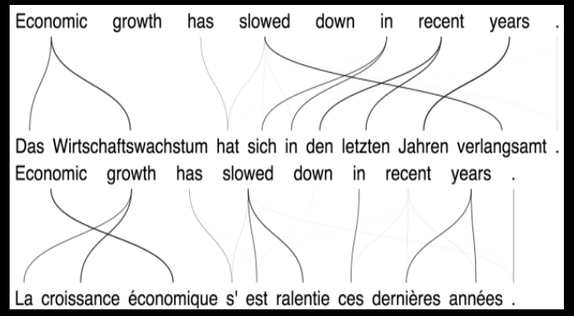


Reshape business models through trusted data sharing & transaction processing in a business network



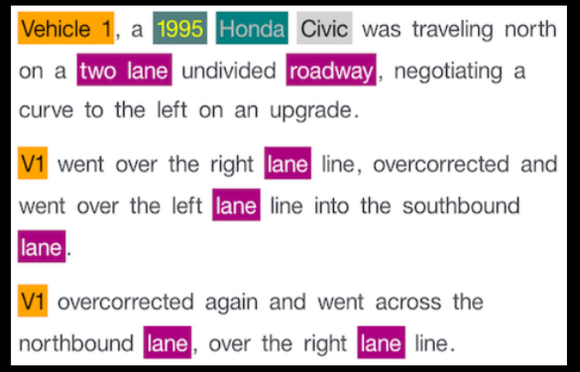
New & importance source of data about the material world that is exponentially growing in volume

Resurgence of AI because Specialized “Narrow” AI Works!

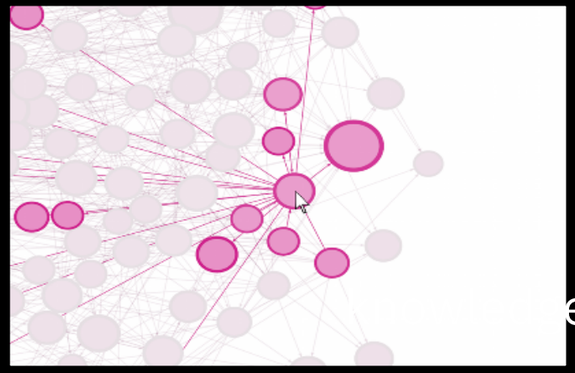


Language Translation

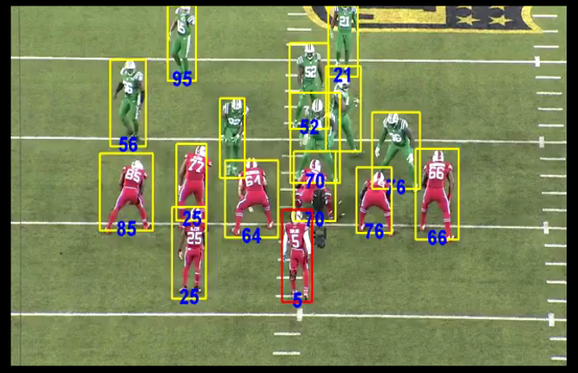
Speech Transcription



Language Understanding



Machine Reasoning



Object Detection

Face Recognition

Evolution of AI

General AI
Revolutionary

Broad AI
Disruptive and
Pervasive

Less data
Transfer learning
Explainable
Ethical
Robust & Secure
Better Development Tools

Narrow AI
Initial
Value Creation

2010 and earlier

2015

▼ We are here

2050 and beyond

AI-driven Decision Making

Government
Campaign Content and Planning, Citizen Experience, Public Security, Policy Planning Support

Finance
High Frequency Trading, Risk Modeling, Equity Research, Asset Mgmt, Underwriting, Investment Planning

Agriculture
UAV / Satellite Crop Field Analysis, Disease Recognition, Comprehensive Strategic Crop Planning

Energy
Strategic Oil Drilling, Risk Minimization, Geological Analysis, Demand Prediction, Adjustment of Resource Generation

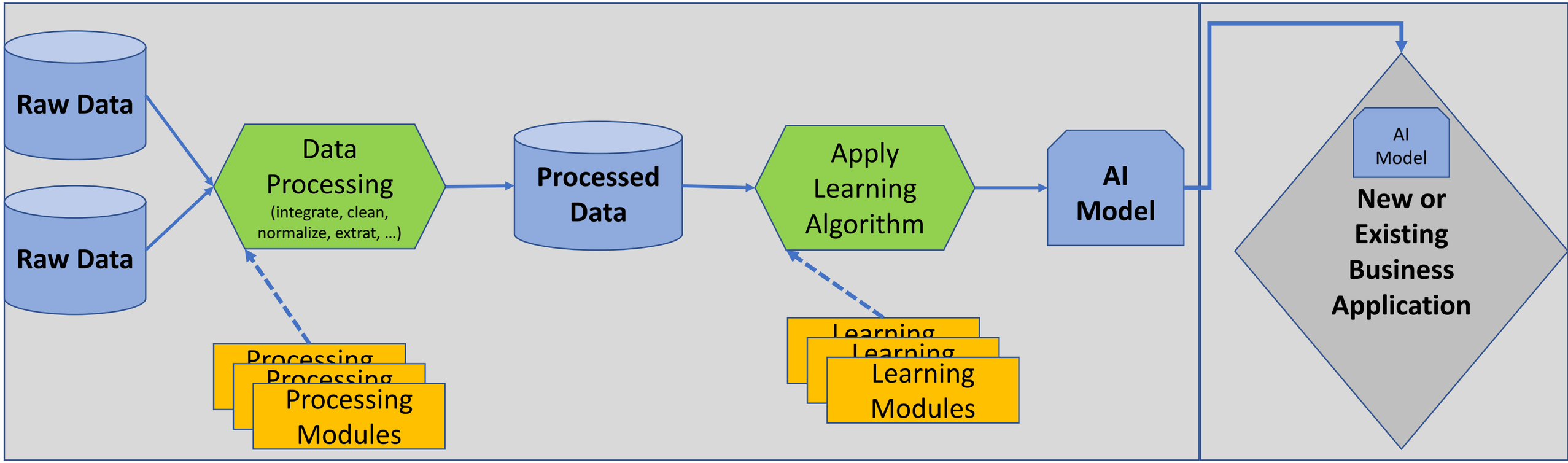
Healthcare
Personalized Healthcare, Diagnostic Tools, Integrated Wellness and Health Systems, Behavior Tracking

Education
Personalized Education, Learning Content Indexing-to-Skill & Search, Custom Teaching Methods, Smart View Devices

Science
Data Analysis, Experiments, Predictive Modeling, Theorem Proving, Deductive Reasoning, Experiment Planning

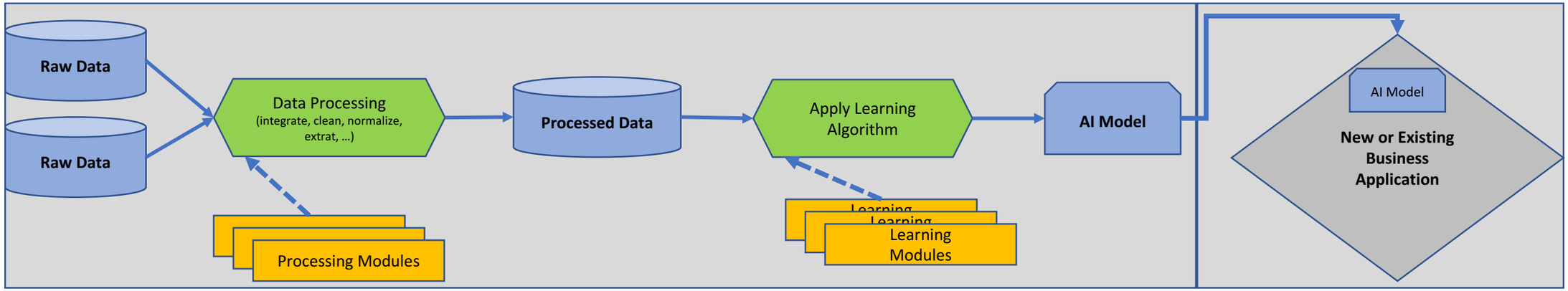
Business Solutions
Interactive Chatbots that Learn from Experience with Customers, Regulatory Support, Prediction, Marketing

The “AI Supply Chain”: From Data to Models



Complex multi-stage supply chain often involving multiple parties belonging to different jurisdictional boundaries

Trust and Governance of the AI Supply Chain



Training an AI Model

Deploying Trained Model

Governance

- Traceability
- Transparency
- Privacy
- Purpose

Models and Data as First Class Objects

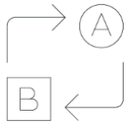
- Ownership
- Rights
- Trademarks
- Copyrights

Ethics

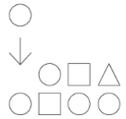
- Bias
- Fairness
- Explainabile models

Bias in AI Models

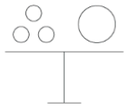
More than 180 human biases have been defined and classified, and any one of which can affect how we make decisions.



Biases find their way into the AI systems we design, and are used to make decisions by many, from governments to businesses.



Bad data used to train AI can contain implicit racial, gender, or ideological biases.



Bias in AI systems could erode trust between humans and machines that learn.

Data Bias

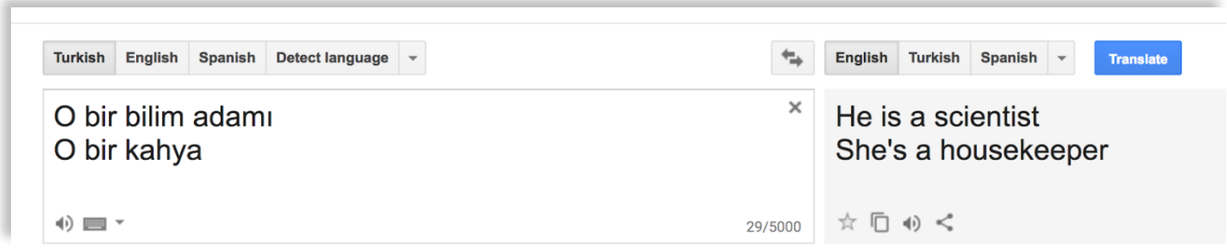
Model Bias

Feedback Data Bias

Amazon Prime and the racist algorithms | Computerworld

www.computerworld.com/article/.../amazon-prime-and-the-racist-algorithms.html

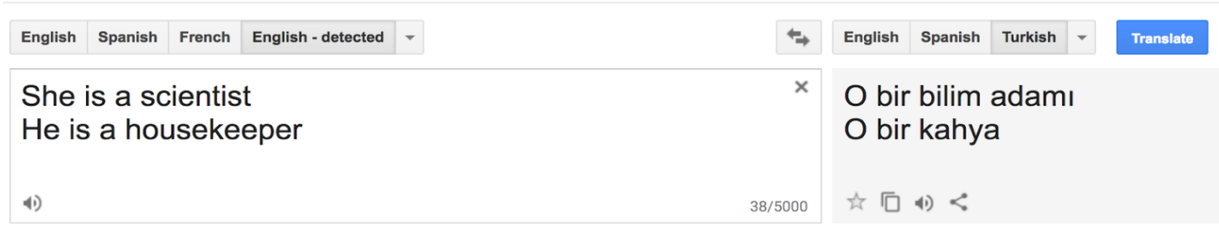
May 11, 2016 - The company's algorithms told it where to offer its Prime Free **Same-Day** Delivery service, but an algorithm that uses data tainted by **racism** will be **racist** in its outcomes. ... First, let's take a look at where **Amazon's** Prime Free **Same-Day** Delivery service is available and where ...



Example: Word Embeddings

father : doctor :: mother : x || x ==nurse

man : computer programmer :: woman : x || x ==homemaker



Increased Focus on Addressing these Issues

IBM to release world's largest annotation dataset for studying bias in facial analysis

Society is paying more attention than ever to the question of bias in artificial intelligence systems, and particularly those used to recognize and analyze images of faces. At IBM, we are taking the following actions to ensure facial recognition technology is built and trained responsibly:

1) One of the biggest issues causing bias in the area of facial analysis is the lack of diverse data to train systems on. So, this fall, we intend to make publicly available the following dataset as a tool for the technology industry and research community:

- *A dataset of annotations for over 1 million images to improve the understanding of bias in facial analysis* being built by IBM Research scientists. Images will be annotated with attributes, leveraging geo-tags from Flickr images to balance data from multiple countries and active learning tools to reduce sample selection bias. Currently, the largest facial attribute dataset available is 200,000 images so this new dataset with a million images will be a monumental improvement.
- *An annotation dataset for up to 36,000 images – equally distributed across skin tones, genders, and ages,* annotated by IBM Research, to provide a more diverse dataset for people to use in the evaluation of their technologies. This will specifically help algorithm designers to identify and address bias in their facial analysis systems. The first step in addressing bias is to know there is a bias — and that is what this dataset will enable.

Data Responsibility

IBM's Principles for Trust and Transparency

May 30, 2018

Categorized: Artificial Intelligence | Cybersecurity | Data Responsibility

Share this post:

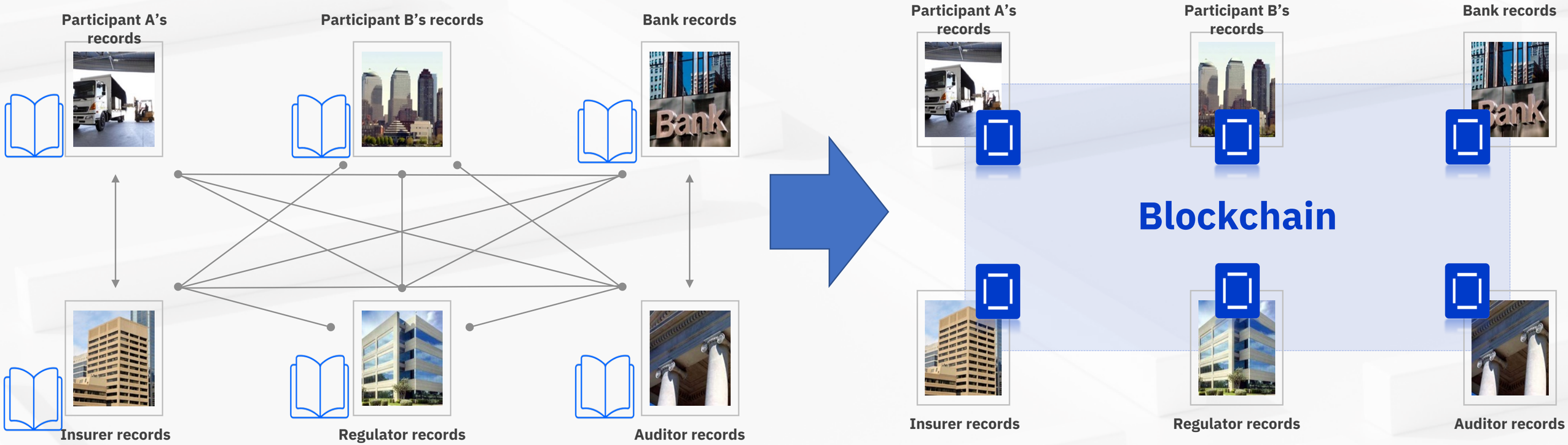
For more than a century, IBM has earned the trust of our clients by responsibly managing their most valuable data, and we have worked to earn the trust of society by ushering powerful new technologies into the world responsibly and with clear purpose.

IBM has for decades followed core principles – grounded in commitments to Trust and Transparency – that guide its handling of client data and insights, and also its responsible development and deployment of new technologies, such as IBM Watson.

We encourage all technology companies to adopt similar principles to protect client data and insights, and to ensure the responsible and transparent use of artificial intelligence and other transformative innovations. We offer our own Trust and Transparency Principles here as a roadmap. They include:

- The purpose of AI is to augment human intelligence
- Data and insights belong to their creator
- New technology, including AI systems, must be transparent and explainable

Blockchain: Transforming Business Ecosystems



A shared, replicated, permissioned ledger…

…with consensus, provenance, immutability and finality

Capabilities of blockchain for business.

SHARED LEDGER

Distributed system of record shared across business network

PERMISSIONING

Ensuring appropriate visibility; transactions are secure & authenticated

SMART CONTRACT

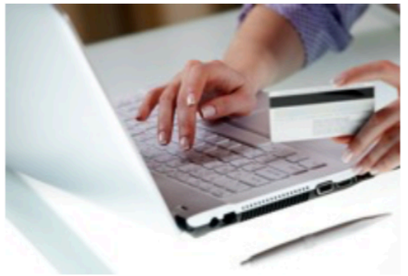
Business terms embedded in database & executed with transactions

CONSENSUS

Transactions are endorsed by relevant participants

Enable time, cost, and risk reduction within business ecosystems through trusted data sharing, trusted transactions, and enhanced visibility

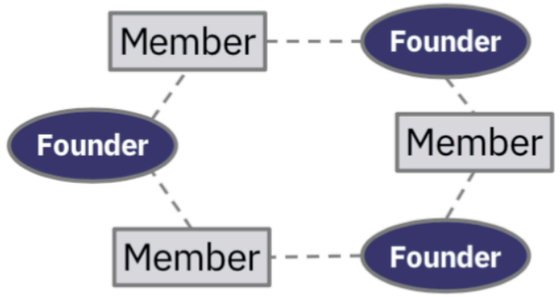
Key Use Cases across Industries



Financial	Public Sector	Retail	Insurance	Manufacturing
• Trade Finance • Identity & KYC Compliance • Post-trade settlement • Payments • Mortgage	• Asset Registry • Citizen Identity • Fraud & Compliance • Supply Chain visibility	• Supply chain visibility • Loyalty programs • Trade Promotions • Provenance & warranty handling	• Claims processing • Complex Risk processing • Subrogation • Parametric insurance	• Supply chain visibility • Product parts provenance • Maintenance tracking

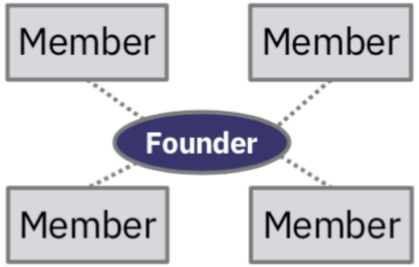
Governance: Roles, Rights, and Responsibilities in Blockchain Networks

Consortium Based Network



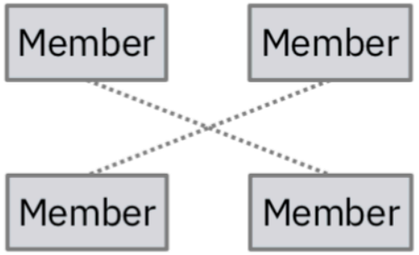
Founders are equal among other participants, may include a joint legal entity among the founders (e.g. – JV)

Founder Directed Network



Individual founder in a position to provide strong direction

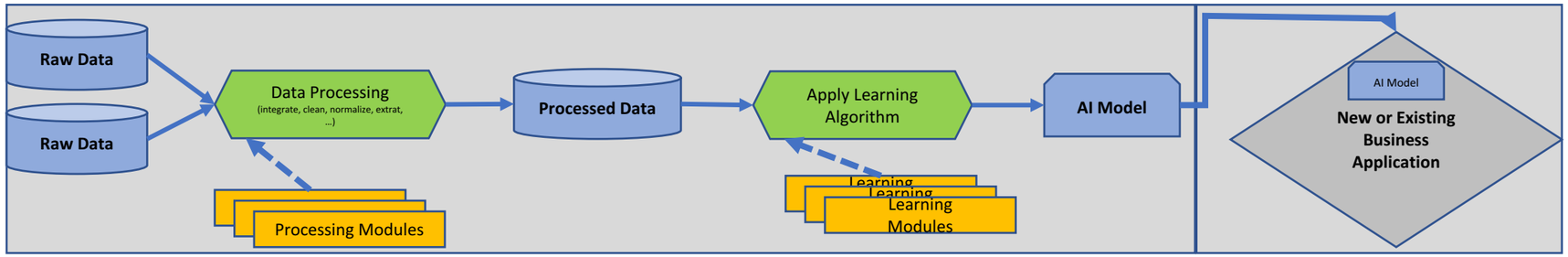
Community Based Network

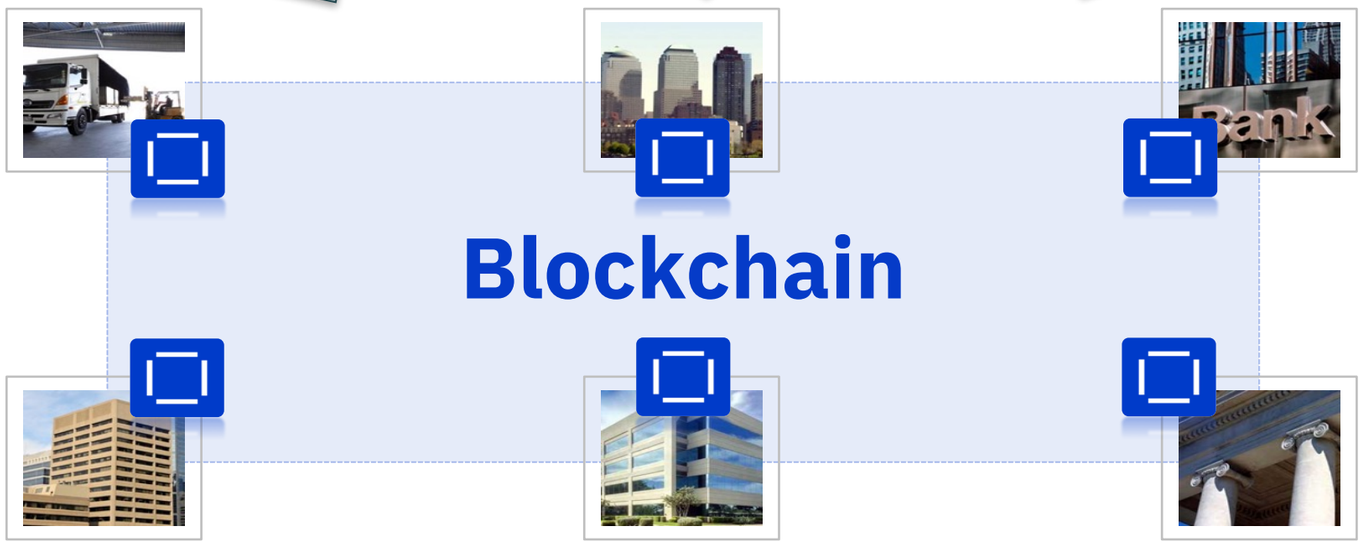


Driven by industry standards bodies or existing non-blockchain network owners

Dichotomous Relationship

Same technologies posing new challenges while also enabling solutions to those problems





Blockchain as an enabler for building trusted AI systems