

# Workforce Health & Safety

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## European Space Agency Digital Workshop "Space for Intelligent Health"

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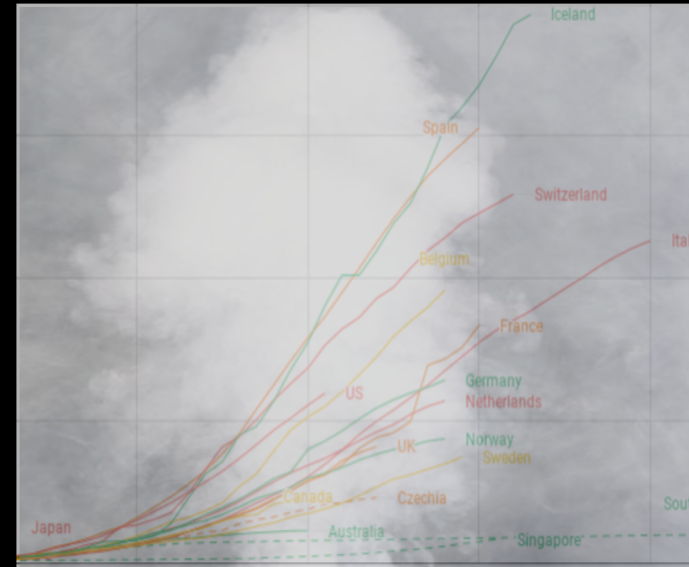
IBM Global Automotive, Aerospace & Defense Industries



# Current COVID-19 makes **employee health & safety** a hot topic for Aerospace & Defense OEMs and Suppliers



Co-located workers in confined space



In many countries infection rates rising



1 sick employee sends the whole team to quarantine for 14 days

Negative impact on public health, risks health officials reclosing manufacturing and maintenance facilities

Production and supply chain disruptions

Impact in billions of dollars for the industry



# Manufacturers will take additional efforts to protect the health of their employees and to avoid further disruptions

## 1. Monitor risks and take informed preventive and corrective actions:

- Avoid access to plant for employees with symptoms.
- Enforce employees to wear the personal protective equipment.
- Optimize (regulate) occupation of production halls, canteens and other spaces.
- Enforce social distancing at any interior or exterior location.
- Define and monitor no-go zones.

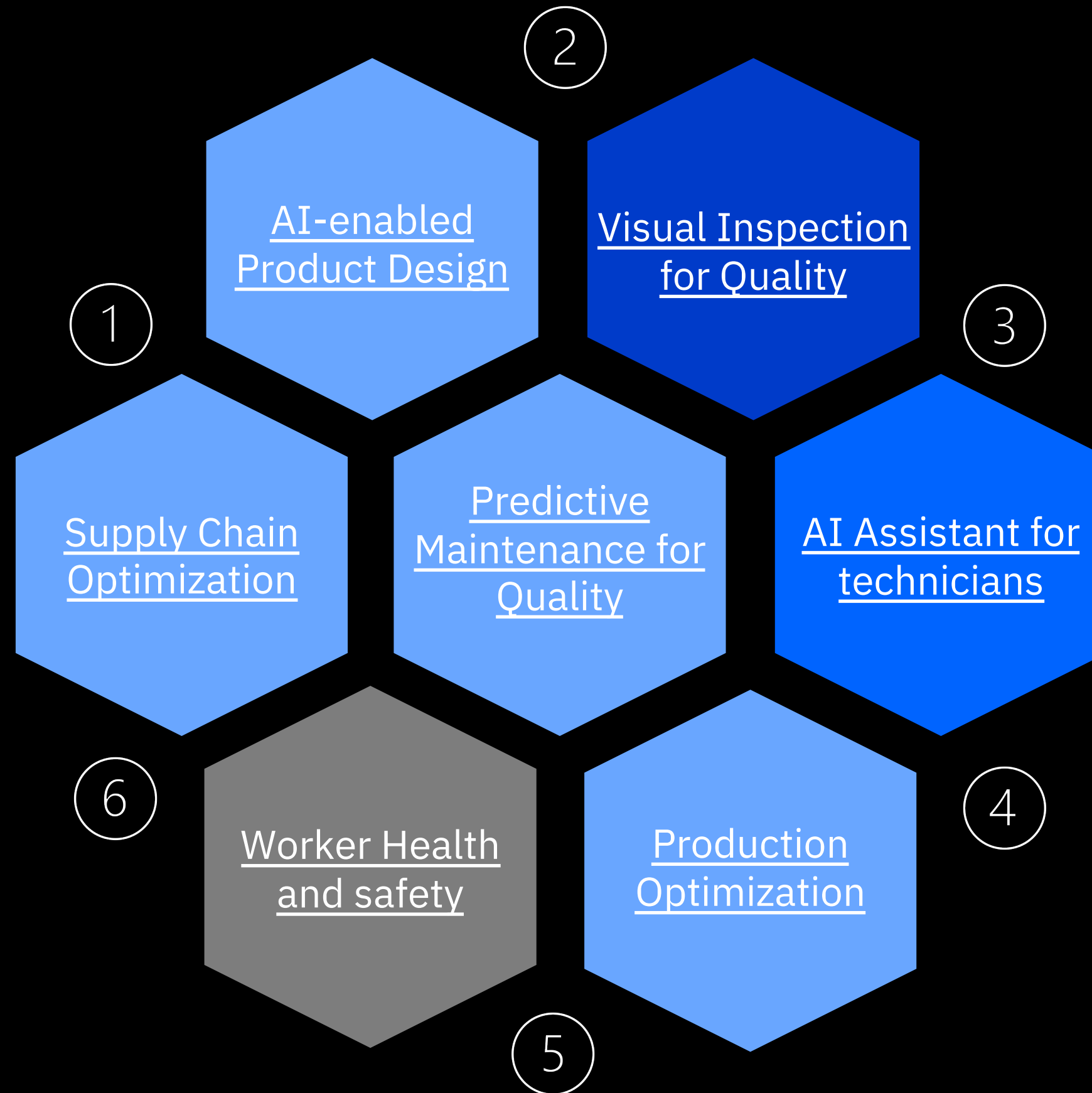
## 2. Optimize environment conditions to minimize disease transmission.

## 3. Enable remote collaboration (e.g. engineering product support) and empower workers to work autonomously to minimize exposure.

## 4. Manage return to work process and provide adequate and timely information on health & safety procedures, risks and actual situation to employees.



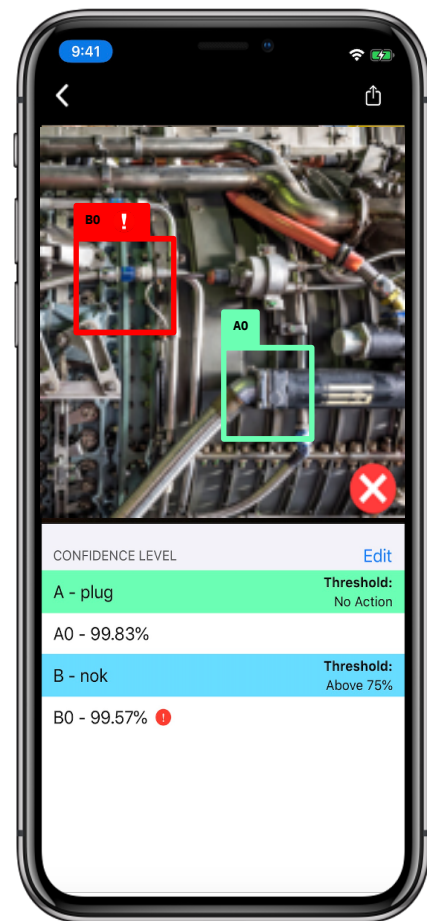
# A&D AI Major Use Cases





# IBM Maximo Visual Inspection Mobile: Game Changing Capability

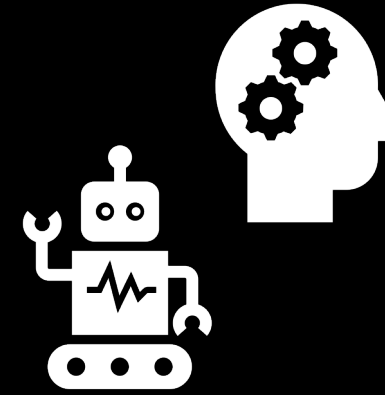
**Quick response** to process issues using off the shelf Visual Inspection technology



- Improves **inspection, failure detection and error-proofing processes** with machine learning, acoustic modeling, and visual recognition.
- To be used in **handheld devices or fixed mounts**.
- **Instant diagnosis** – object detection and defect detection & classification.
- Easy to deploy by using **everyday technology**.
- Dashboard with **trending analytics**.
- **Respond to process issues in hours**, not days or weeks

←.....*Hours*.....→

# AI Assistant for technicians



Manufacturing

Aftermarket

## Challenge:

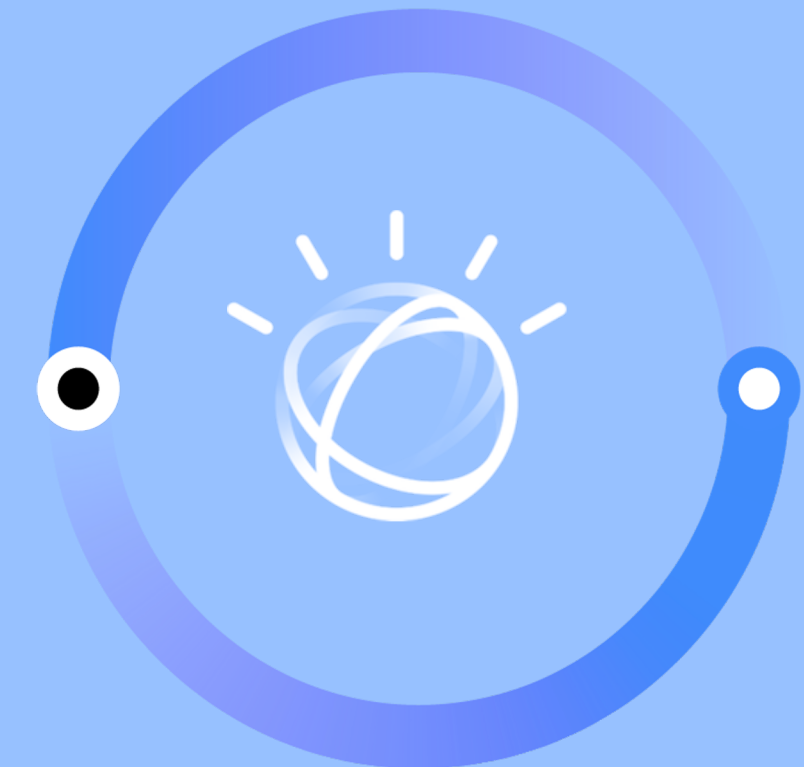
There is a shortage of skills and need to reskill the workforce in A&D. Even on sophisticated production lines, workers face numerous challenges and end up wasting a significant amount of time looking for information. They struggle due to qualification gaps and lack of experienced and knowledgeable senior practitioners.

## Solution:

A&D companies can empower the workforce with AI based digital tools that will help them do their jobs better and faster. Using AI can enable the employee productivity and narrow the skills gap. Equipping them with AI enabled digital tools can help them function at their best in a production environment. This enables faster issue diagnosis using AI and NLP technologies and allows for solution identification in real time, even in remote fashion.

## Benefits:

- Faster issue diagnosis and resolution
- Enhanced worker productivity
- Cost savings
- Able to work virtually



**Infuse AI**  
Enabling worker  
productivity



# IBM IAMA toolkit - designed to enable autonomous work and remote collaboration

- Intelligent Aerospace Manufacturing Advisor (IAMA) is a modular set of digital tools designed to empower and upskill operators, technicians, and engineers on production lines.
- This toolkit applies AI, AR, IoT, and cognitive technologies to gain operational efficiencies, incl. higher workforce productivity, better OEE, and lower cost.
- Tools were designed in cooperation with major Aerospace & Defense and automotive OEMs and evaluated in real shopfloor environments.
- IBM toolkit is modular, built for rapid deployment and offers high reusability and scalability.



**Visual Inspector**  
augments human senses



**Assist**  
helps to diagnose & solve problems in real time



**Peer Assist**  
enables remote collaboration



**Explorer**  
turns searching into finding



**Cockpit**  
provides insights for better decision making

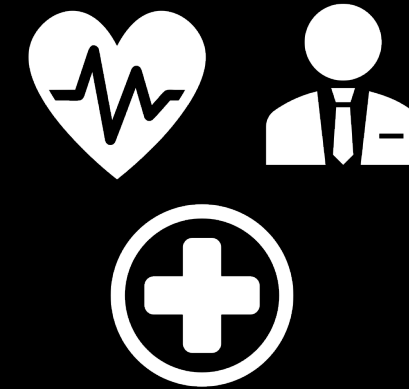


**Marketplace**  
organizes tools in a secure one-stop-shop





# Worker Health & Safety



Manufacturing

Aftermarket

## Challenge:

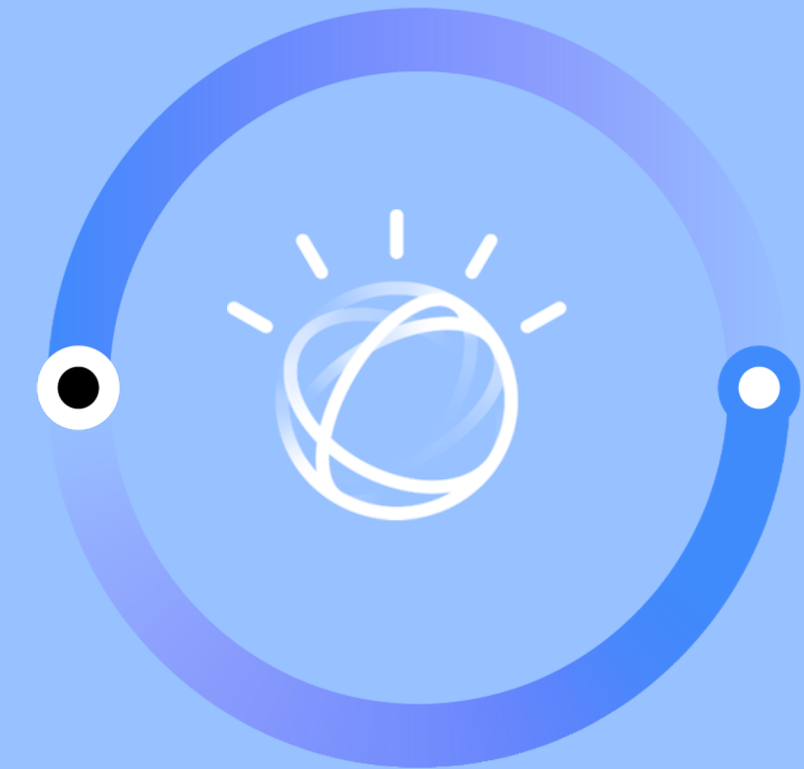
Current COVID-19 makes employee health & safety a key topic for Aerospace & Defense OEMs & Suppliers. Manufacturers need to take additional efforts to protect the health of their employees and to avoid further disruptions as they reopen facilities.

## Solution:

Gain near real-time insights of worksites and employees. Ensure safety of worksites and employees with AI based site monitoring and management of temperature, occupancy, face mask detection and social distancing.

## Benefits:

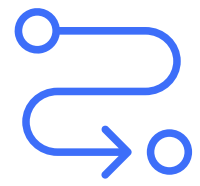
- Create environment for healthy human interactions and sustainable workplace operations
- Protect returning worker health and safety
- Align with safety policies and regulations



**Infuse AI**  
Enabling sustainable workplaces

# IBM **Worker Insights** leverages IBM's powerful and well-established AI platform and pre-built analytics for rapid value

## Solution



- Workplace analytics solution utilizing IoT devices
- Contextual incident detection (event and measurement data captured and processed in near real-time)
- Variances from baseline leveraging Edge-enabled Event Action Engine

## Capabilities

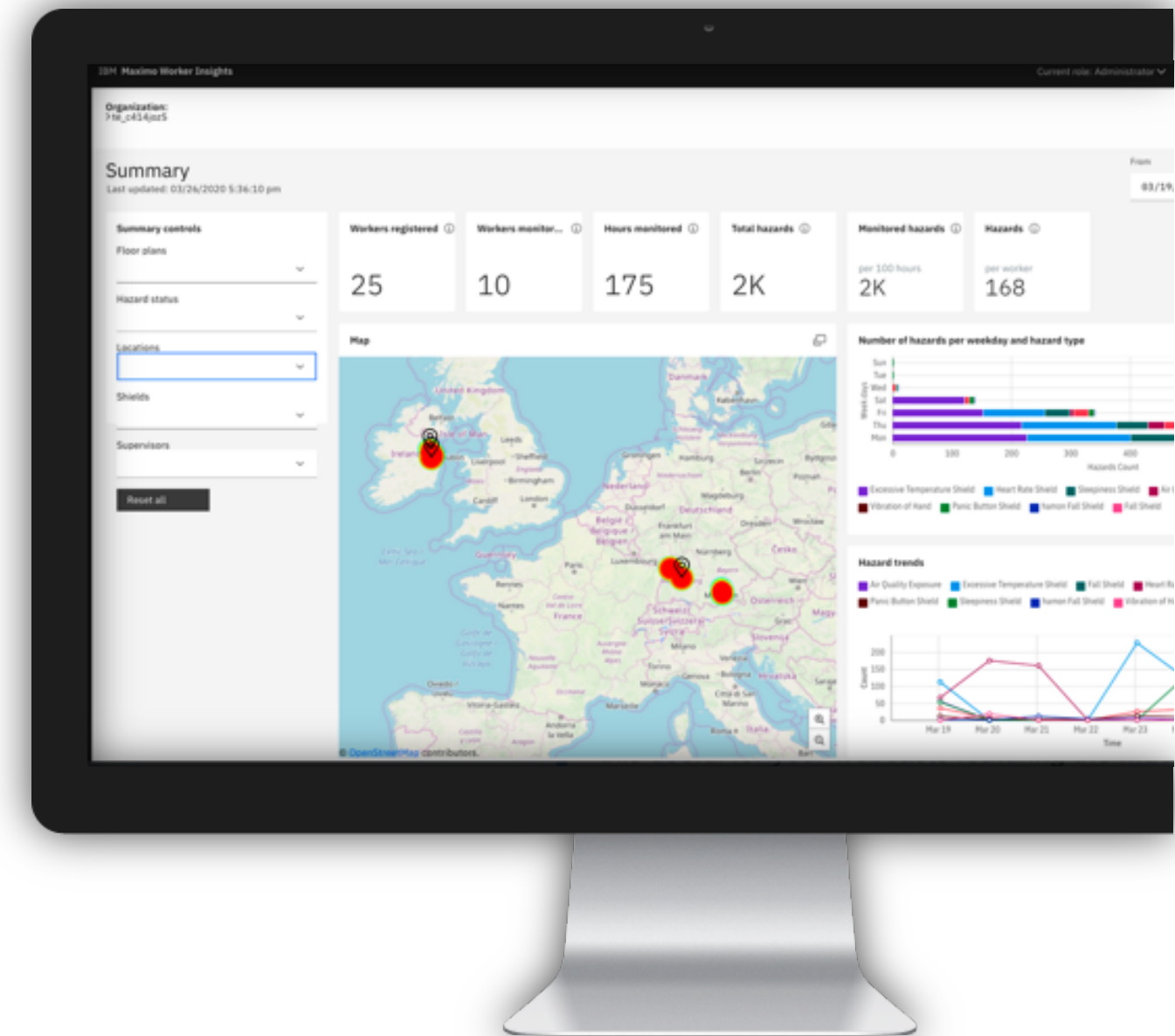
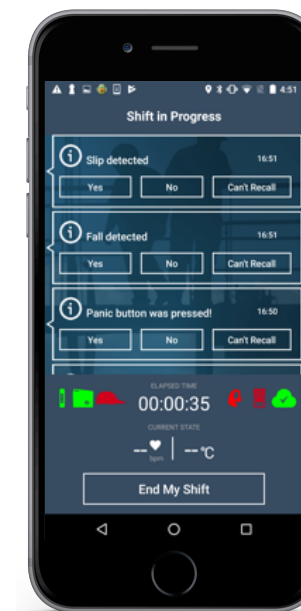


- Mobile App and Dashboards for Worker, Supervisor, Safety Officer
- Pre-integrated devices for key use cases
- Pre-build analytics (KPIs) to determine events
- Pre-integration with Maximo HSE, Incident Management
- Flexible integration with third party systems of engagement

## Business Value

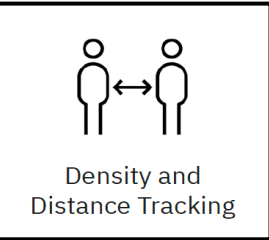

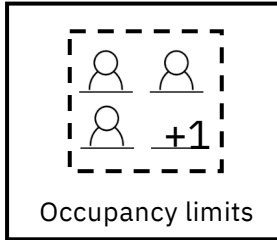
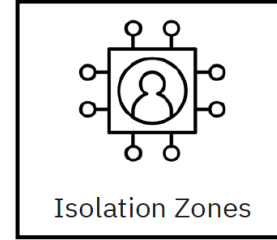
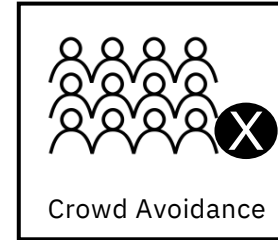
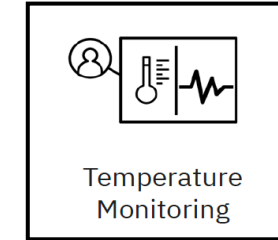

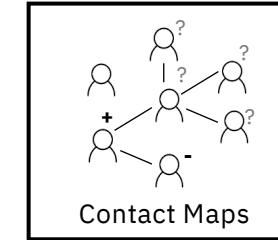
















- Provides insights to leverage in policy adherence
- Compliance with worksite safety plans, policies and procedures



# IBM Worker Insights combines latest sensor technologies with AI and analytics to provide insights and monitor potential risks

IBM Worker Insights utilizes inputs from optical and thermal imaging cameras, Bluetooth beacons and mobile phones to provide analytical insights to workers and supervisors for a wide range of critical use cases.

 <p>Density and Distance Tracking</p>	 <p>Health and Wellness</p>	 <p>Occupancy limits</p>	 <p>Isolation Zones</p>	 <p>Crowd Avoidance</p>	 <p>Temperature Monitoring</p>	 <p>Face Mask</p>	 <p>Contact Maps</p>
  	 	 	 				 
<b>Social Distancing Scoring</b>	<b>Health Monitoring</b>	<b>Occupancy Monitoring</b>	<b>No-Go Zone Monitoring &amp; Alerting</b>	<b>Crowd Density Management</b>	<b>Elevated Body Temperature Monitoring</b>	<b>Face Mask Detection</b>	<b>Contact Event Tracing</b>
Monitoring the distance between one individual and surrounding individuals.	Monitoring biometric data of individuals, to identify body stress and low energy indicators. Provides alerting based on thresholds and rules.	Keeping occupancy levels in a defined space (entire premises) or specific zone (defined room) to a logical maximum.	Designate certain areas as no-go zones and alert supervisors when individuals are detected.	Monitoring of the density and average proximity of number of people in a specific space, based on people counting in the camera's field of view.	Identify elevated body temperature of individuals as an indicator of potential unsuitability for work.	Determine whether an individual is wearing a face mask based on a video feed.	Event-based contact tracing within an enterprise's defined location(s).

Solution based on :

 Bluetooth Beacons & Smart Phones

 Wearables

 Optical Cameras

 Thermal Cameras



# Supply Chain Optimization



## Supply Chain

### Challenge:

Supply chain is a key challenge area for A&D companies specially A&D organizations need a more agile and collaborative supply chain to manage its backlogs, satisfy customers, and deliver on time and on budget.

### Solution:

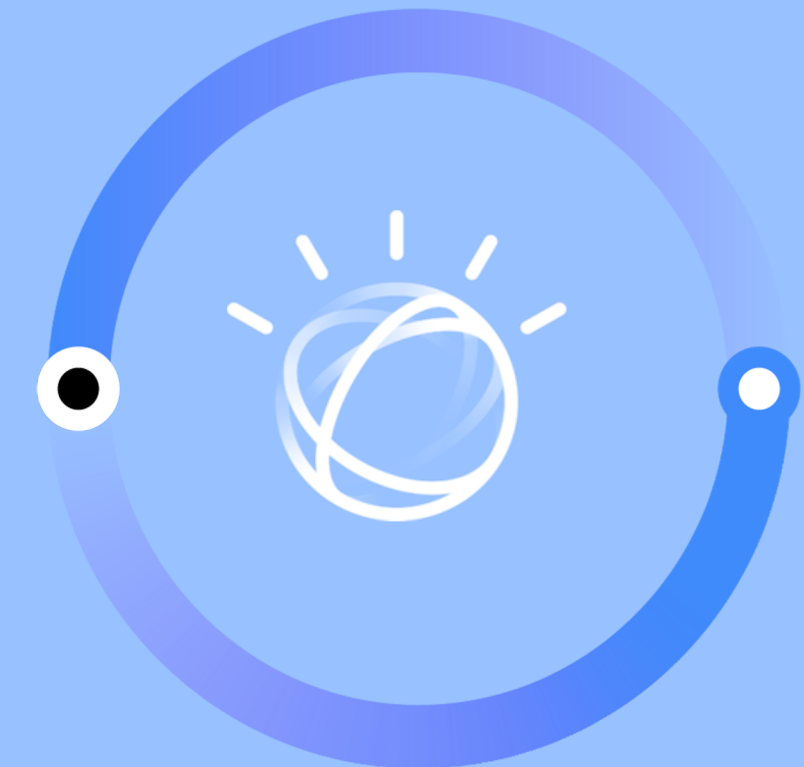
Use AI to optimize the supply chain and protect against disruptions.

Gain end-to-end visibility across systems and partners and optimize collaboration.

Proactively predict, assess and mitigate disruptions and risks to enable a more resilient supply chain.

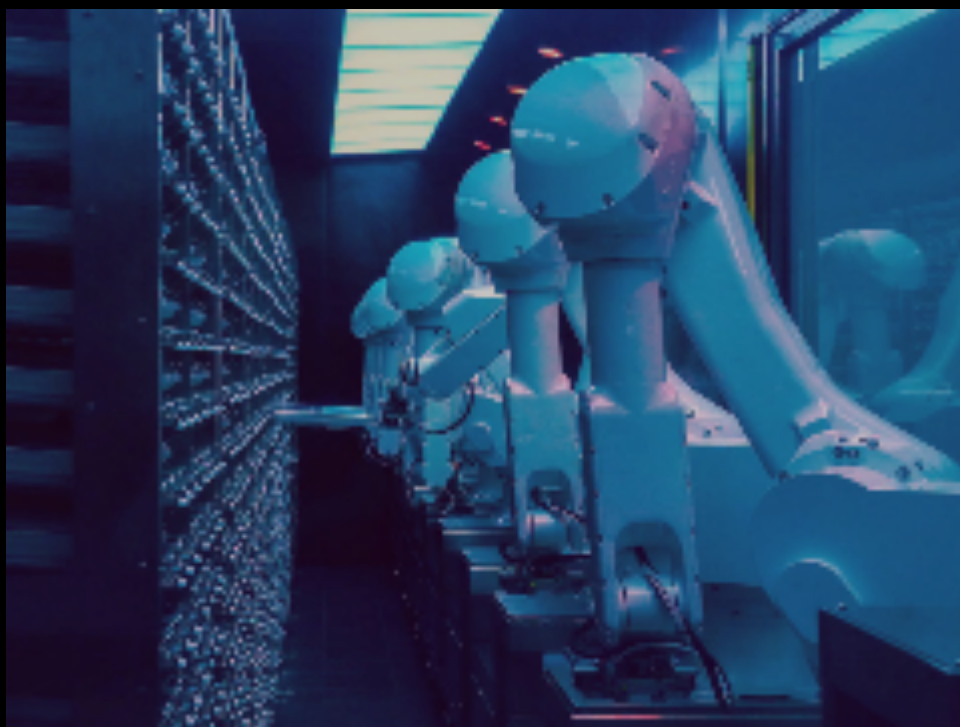
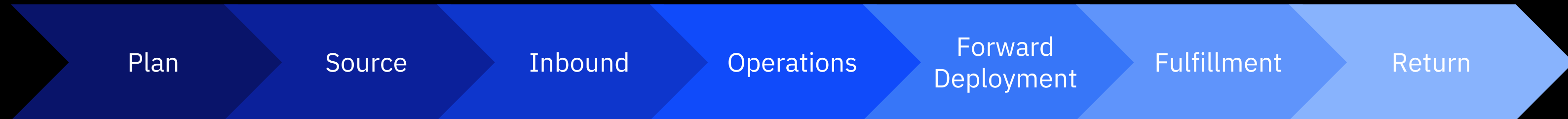
### Benefits:

- Increase production throughput
- Increase on-time delivery reducing material loss
- Deepen visibility and collaboration
- Mitigate disruptions
- Reduce costs



**Infuse AI**  
Enabling intelligent  
supply chains

# Supply Chain 4.0 is using AI technology to drastically reimagine operations to deliver exceptional value



## Automation

Builds on intelligent workflows to remove manual and inefficient tasks



## Data and IoT

Leveraging technologies and data, enabling enterprises to proactively combat the chaotic environment



## Artificial Intelligence

Makes supply chains self-learning and adaptive



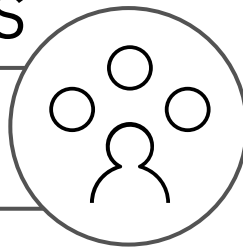
## Blockchain

Drives security, provenance, multi-enterprise visibility and info sharing

# IBM Return-to-Workplace Advisor Solution - a suite of tools designed to enable data-driven decisions and front-line employee support

## FOR EMPLOYEES

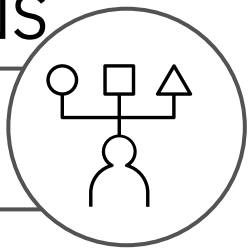
### Employee Support Application



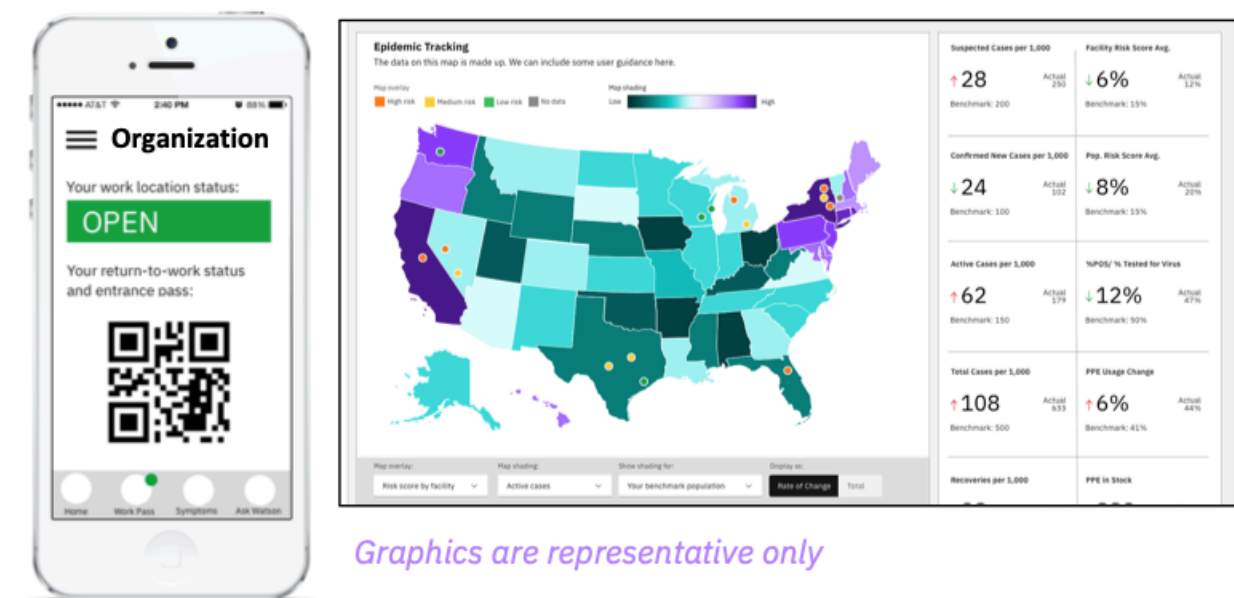
- Gather symptoms and other data to routinely assess and set an individual's return-to-work status
- Answer questions about COVID-19, local circumstances, and company resources, policies and announcements via a Watson virtual assistant
- Integrate COVID-19 test results into the employee risk and readiness analysis through collaborations with testing vendors, onsite or in the home

## FOR ORGANIZATIONS

### Employer Analytics Application



- Use an analytics-based “return to work” score to help identify company locations where conditions have been met
- Surface emerging trends and search for patterns, nationally and locally, with Watson AI



Graphics are representative only

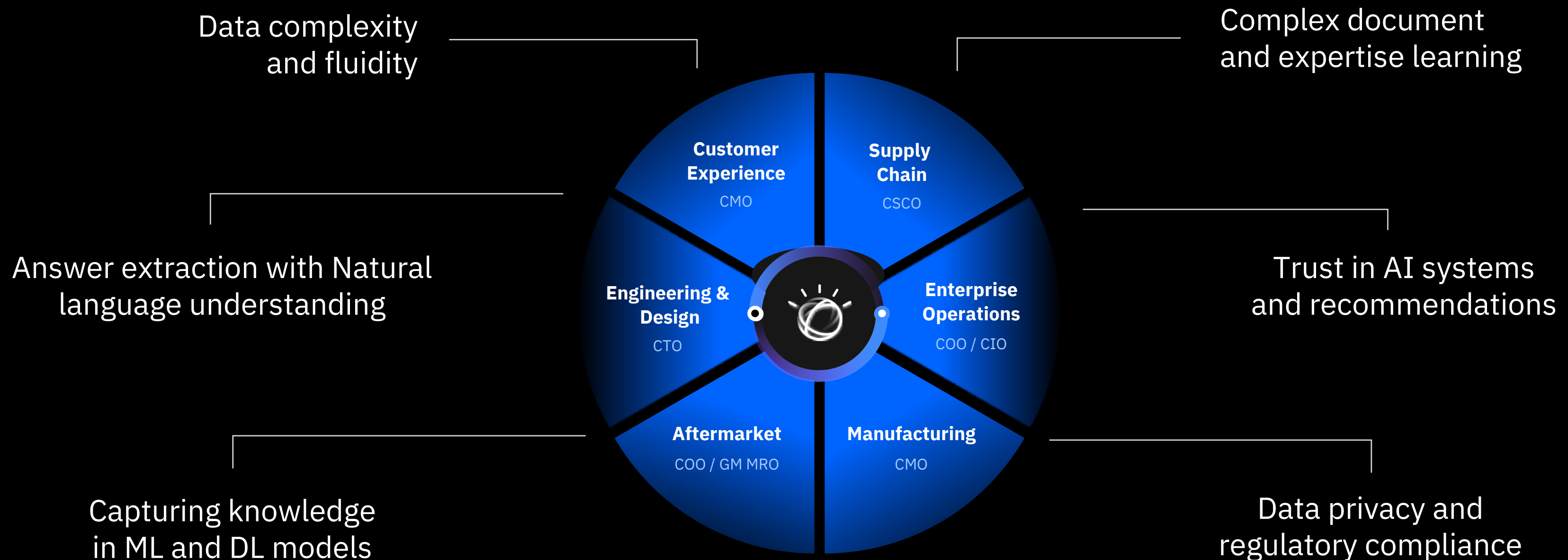
 this offering is currently available only in the USA

# IBM Data & AI Platform



# AI can provide significant value, however, AI is not magic

**Intelligent workflows are too complex to self-build; compounded by AI talent scarcity and cost**



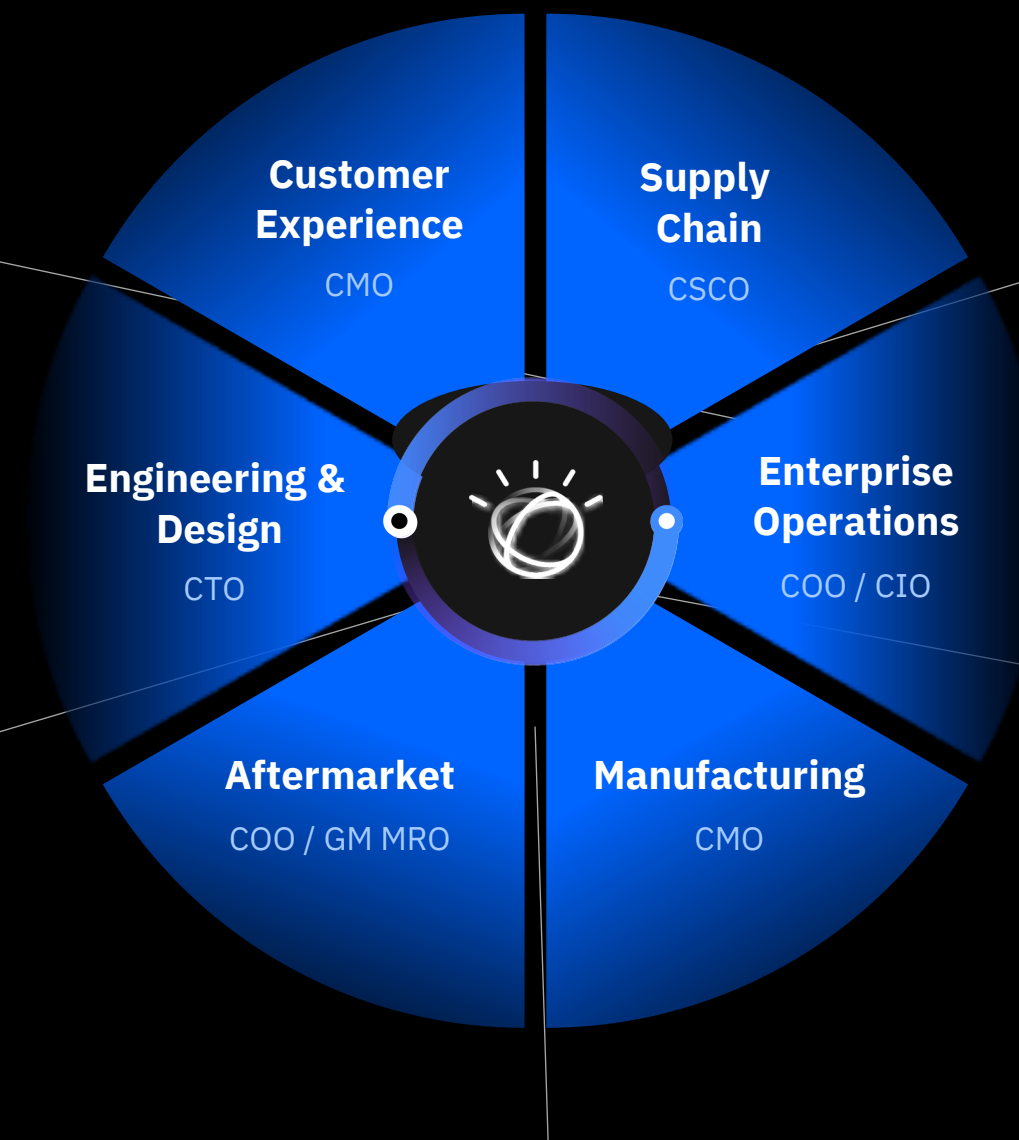
# IBM can help overcome AI challenges & speed up time to value with learnings from thousands of AI engagements and pre-built AI apps



Watson assists astronauts in space



Optimizing Aircraft Design and Development Scheduling



Help reduce inspection time and improve consistency in detecting defects

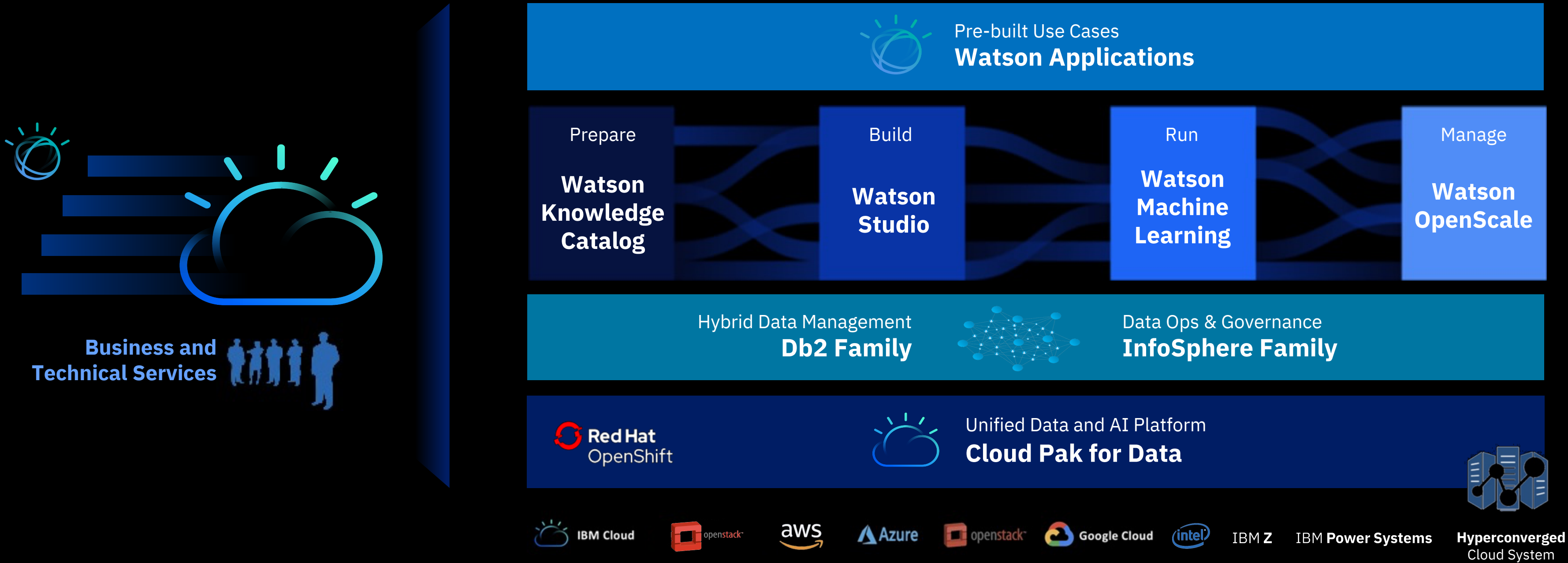


Optimizing Supply Chain Visibility

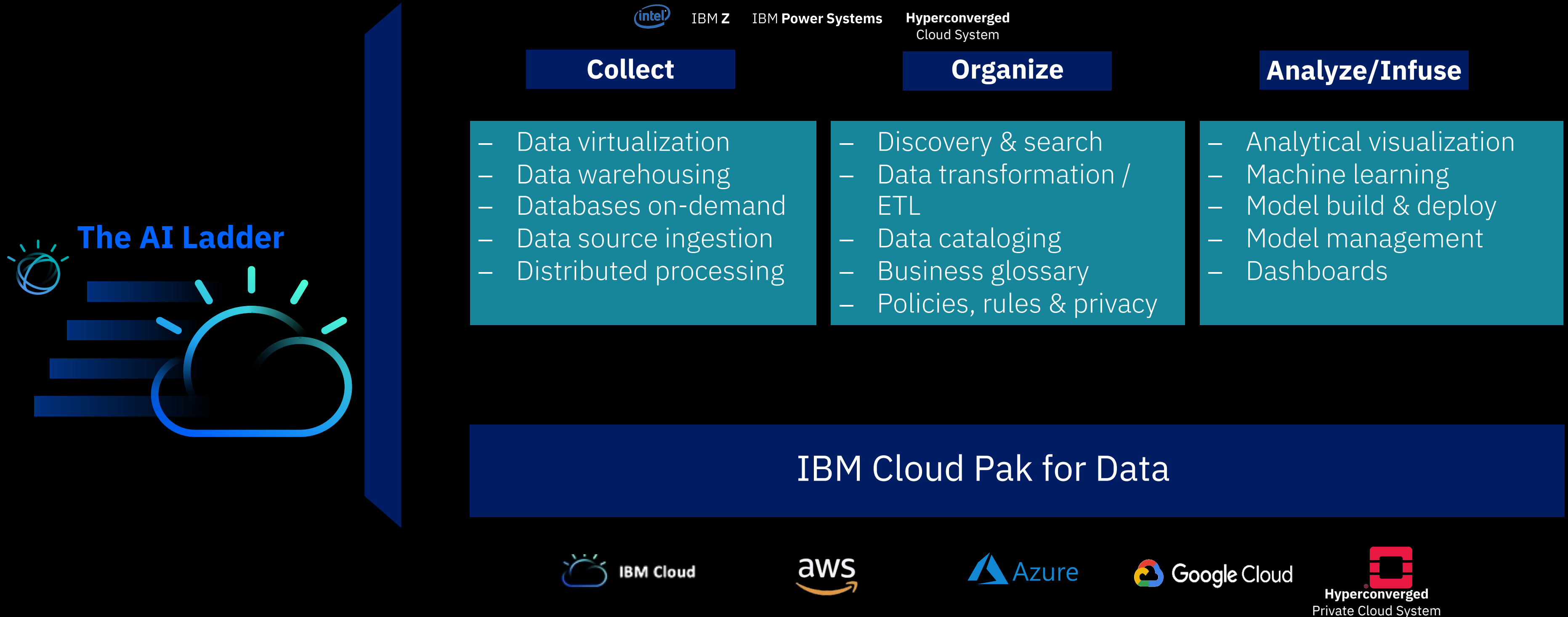


Optimizes utilization of engineering resources

# IBM uniquely delivers the AI ladder – One platform, any cloud



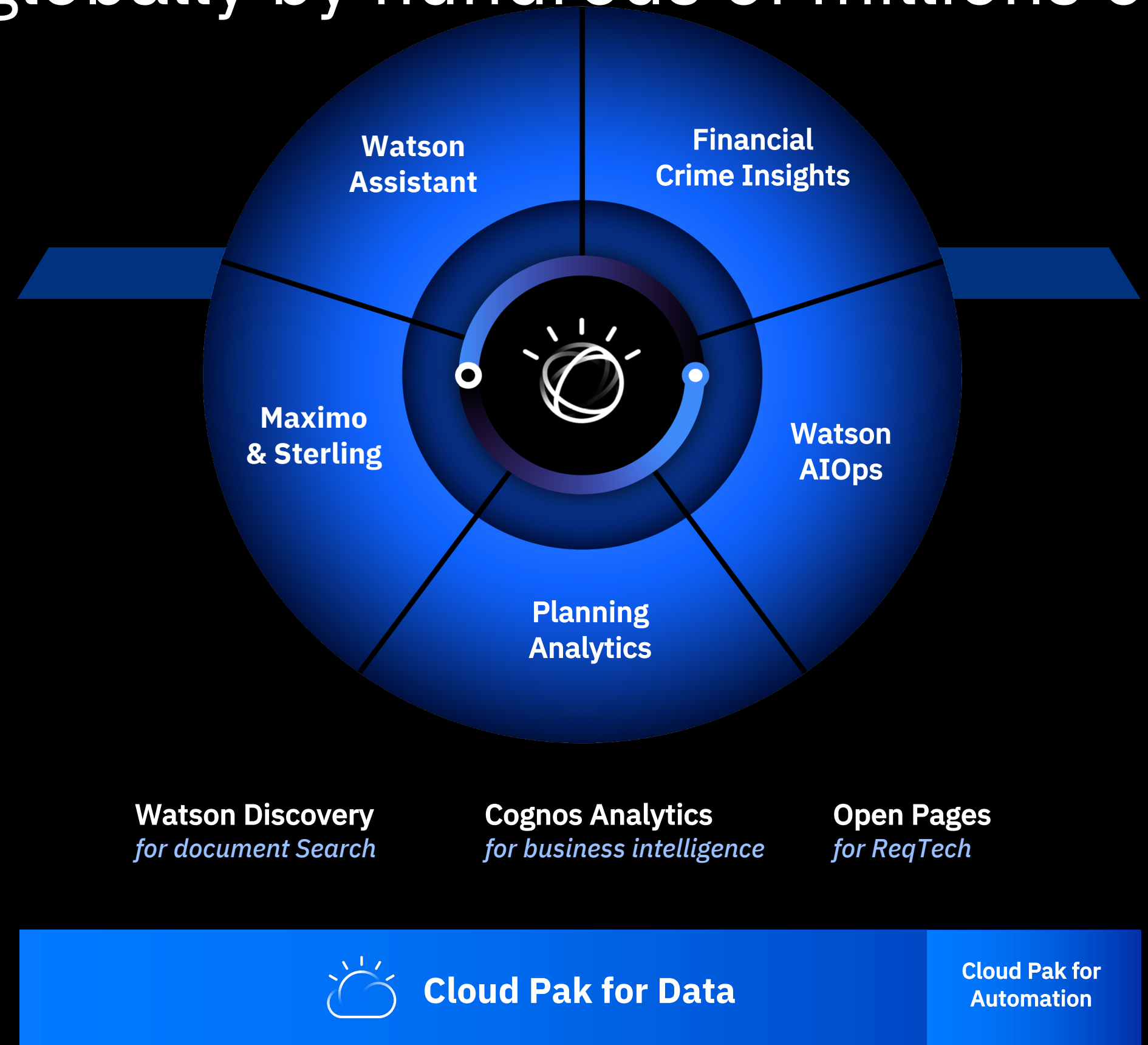
# AI ladder: IBM Cloud Pak for Data capabilities





# Watson applications – Used globally by hundreds of millions of people

- Pre-built, pre-trained and business domain optimized
- Enterprise-grade humanized interaction (NLP)
- Captures and enhances human expertise and decision making
- Intelligently automates workflows, interactions and documentation



# A&D Selected Client Cases

# IBM AI - Some A&D Client examples



## Visual Insights at Boeing

IBM developed a solution to help reduce manual inspection in Boeing's 787 carbon fibre composite fuselage production. At the heart of the solution is advanced image recognition and cognitive analysis, together with continuous machine learning.



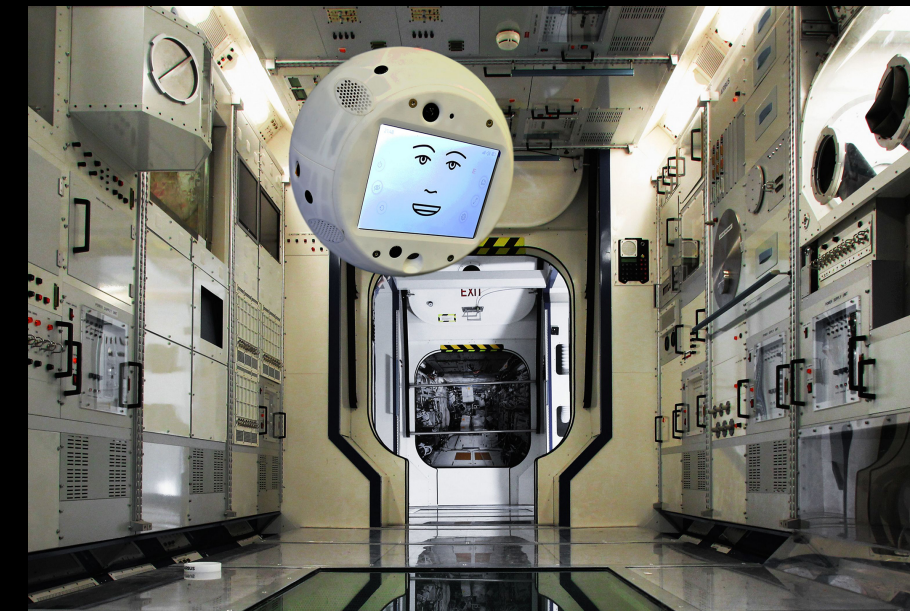
## Optimizing Aircraft Design at Embraer

IBM solution enabled EMBRAER to develop single-level planning dependency between processes to generate synchronization privileging excellence throughout the aircraft development and production process.



## Remodeling workforce at GKN Aerospace

IBM helped the company to remodel its workforce planning processes, ensuring it makes the best use of its 3,500 engineers and can always satisfy clients' demand for cutting-edge technology.



## AI Companion in Space: CIMON

In collaboration with DLR and Airbus, IBM developed CIMON, the first free-flying AI assistant in space. CIMON has the capability to know who it's talking to, and a deliberately simple visual design allows CIMON to show basic facial expressions. The astronaut bot can travel around the European Columbus Research Module of the ISS independently.



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