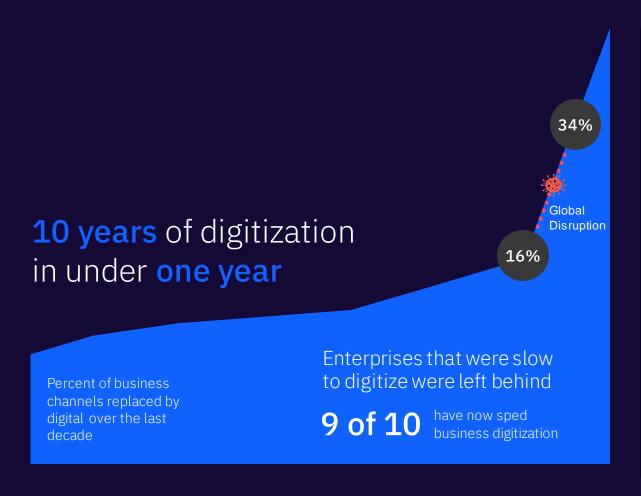
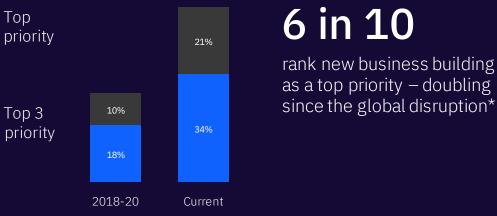
Unlocking Value with Hybrid Cloud



Transformation turns to reinvention



By 2026, half of revenue will come from products, services and businesses that do not exist today



Digital businesses are viewed as more scalable,



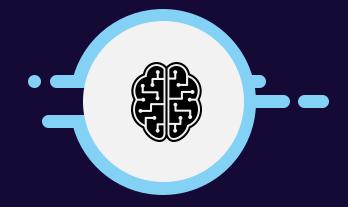
Traditionally, only **20%** of businesses sustain revenues greater than **\$50M**

Digital innovation is mission critical... as Digital Transformation is accelerating



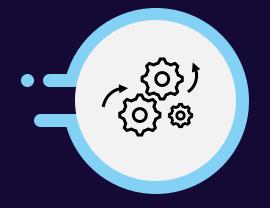
Heterogenous environments become the norm to manage

- 76% users utilizing two+ public clouds¹
- **70%** workloads not on public clouds²
- 20B internet-connected devices by '24



Data explosion triggers urgency for AI at scale

- 2-3x growth in total data by '253
- Chief Data Officer role growing fast⁴
- Top AI needs for decision making and automated operations⁵



Digital automation is essential to keep competitive operations

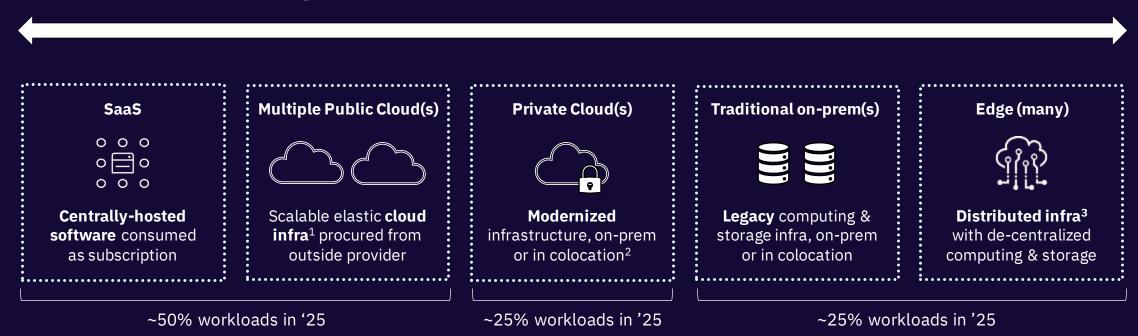
- **83**% Enterprise agree that intelligent automation can improve business results⁶
- **56%** manufacturers implemented Al-driven robotics for autonomous decisions⁶
- Worker shortages turbocharging the imperative for automation



Security challenges are heightened: 40% increase in number of malicious security breaches in 20207

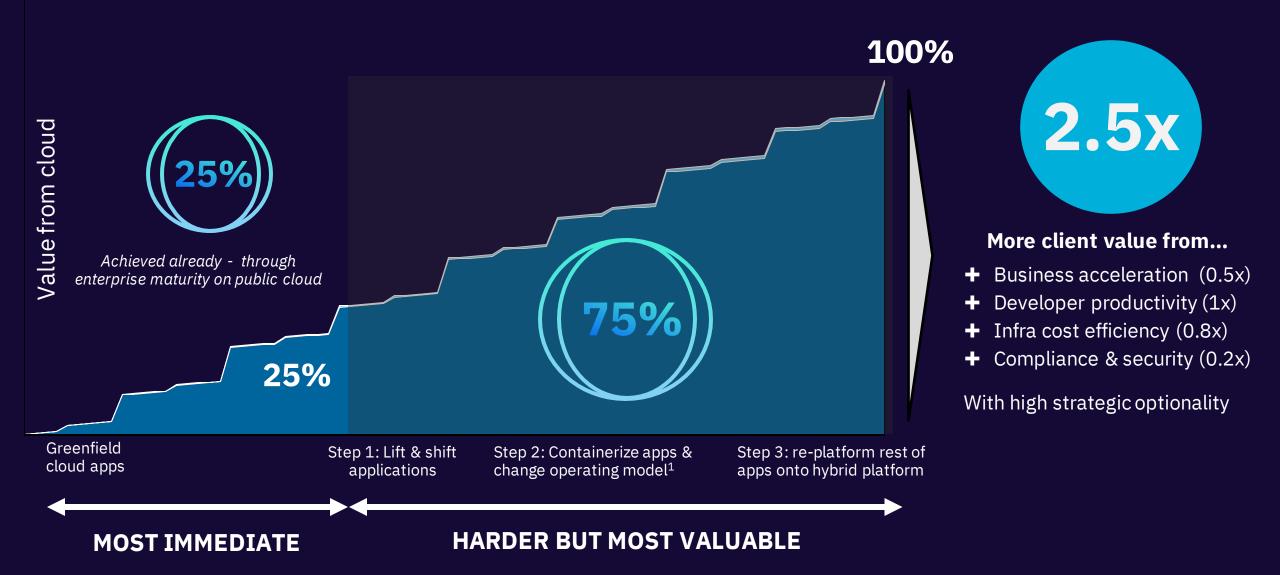
Enterprises must drive innovation across their heterogenous environments

Hybrid Cloud: Integrate and orchestrate enterprise workloads in multiple environments



Enterprise look for flexible, secure and open platforms... to operate and develop services consistently

Hybrid Cloud journey unlocks the full value of digital innovation A catalyst to accelerate innovation & development, while reducing duplications & regulatory risks



IBM approach to deliver Hybrid Cloud and AI value... ... to be the catalyst that makes the world work better

5 Amplified innovation with a broad, open ecosystem

Leader in digital innovation for hybrid environments, turning technologies into business results

IBM Consulting

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Ö

Business Transformation • Technology Consulting • Application Operations

System Integrator Partners

2 Cutting-edge software integrated with Red Hat platform and AI... to modernize, predict, automate, secure environments

IBM Software IBM Cloud Paks

Automation • Data & AI • Security • Transaction Processing

Software and SaaS Partners

Industry-leading hybrid, multi-cloud platform built on open source

Red Hat Hybrid Cloud Platform

Development, Security and Operational Services

OpenShift • Red Hat Enterprise Linux • Ansible Automation Platform

Enabling the most critical transactional and regulated workloads on Hybrid Infrastructure... extended at the edge

IBM Infrastructure

IBM Z • Distributed Infrastructure (IBM Cloud, Power, Storage) • Infrastructure Support



Public CloudsAWS • Azure • Others



Enterprise Infrastructure



Edge



IBM Cloud Pak for Data

A vertically integrated platform that enables our Data Fabric and **more**

- **Unified Data & AI Ecosystems Out-of-the-box** enable a width of complimentary and integrated capabilities that matures with your business over time vs. the react and buy approach of today
- **Supports the Full Lifecycle of Data Management** from data access, persistence, governance, modeling, training, deployment and evaluation which in turn enables scale vs. isolated / departmental skills
- SaaS or Self Managed on IBM, AWS, Azure or GCP
- **Cloud Agnostic** software and compute model that enables flexibility so you can deploy services across ANY public or private cloud on any combination of them so you can have the freedom to deploy wherever you see fit

Data Science Watson Studio Low & No Code Modeling **Decision Optimization** Open Source Notebooks & Explainability & Bias Detection Studios Model Deployment and REST API Real Time Planning Generators **Data Integration** Watson Knowledge Catalog Watson Query Lineage Caching Governance **Ouery Optimization** \leftarrow Data Virtualization Data Prep ETL Data Persistence Netezza / Db2 Warehouse Cloudera / SingleStore Informix MongoDB / DataStax PostgreSQL **Db2 Transactional** Cloud Pak for Data Platform

Self Service

Discovery

Fit for purpose

and

performance

driven repos

Democratized & Trusted Data Query / Access Optimization



Administration



Scalability





Kubernetes

Data Ouality

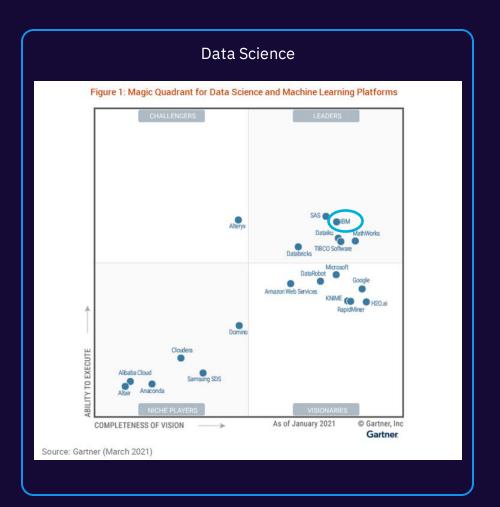
Discovery



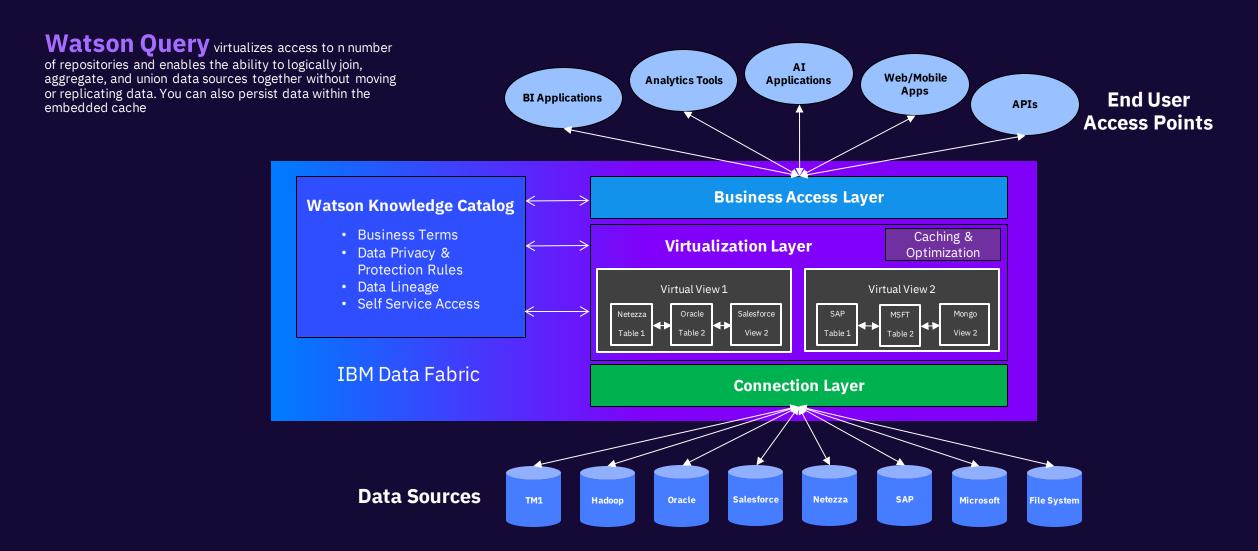
Market Leadership across all 3 ecosystems



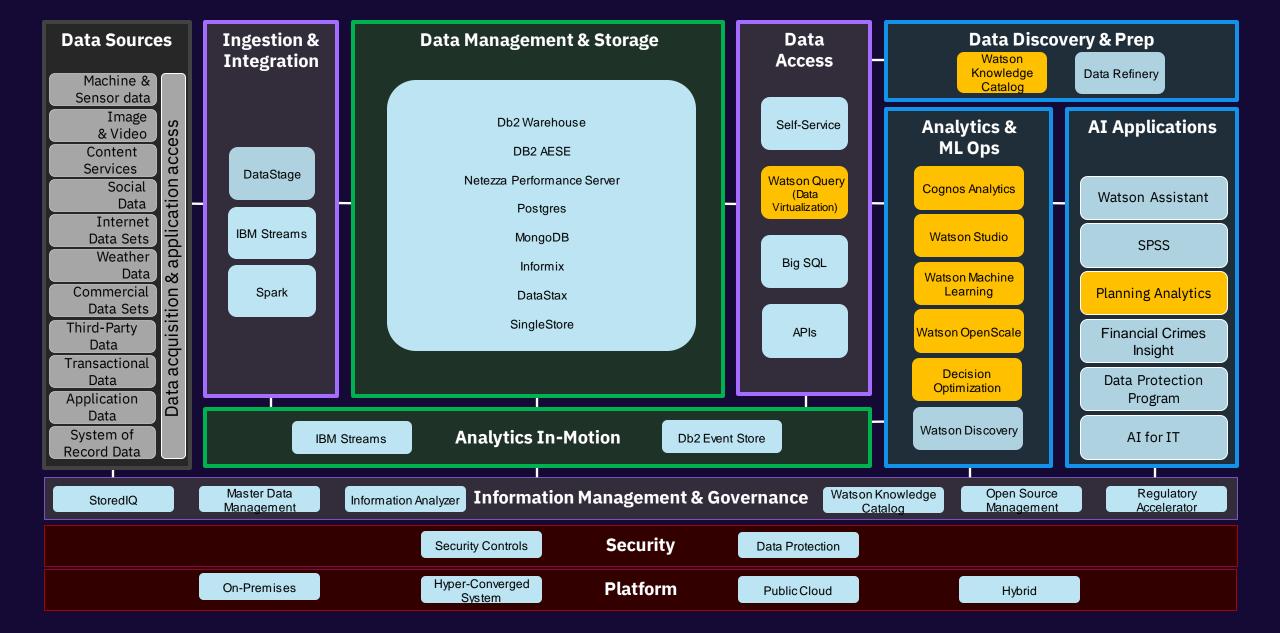




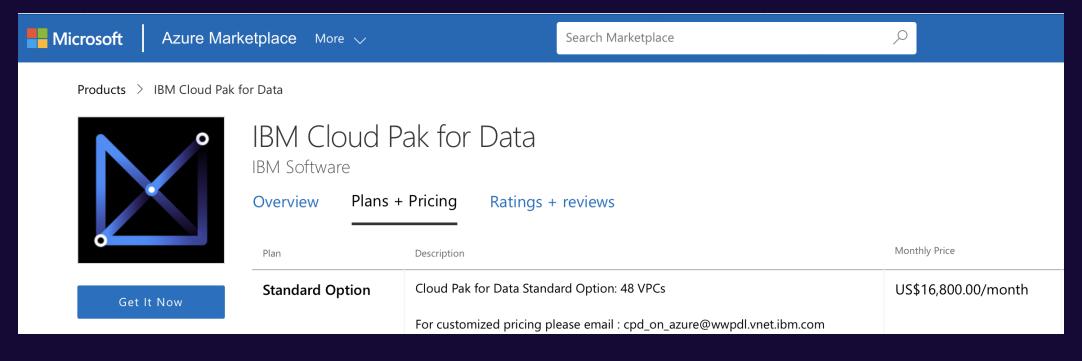
Data Virtualization centralizes access to high quality, governed and curated enterprise data enables Data Scientists to access the right information 8X faster

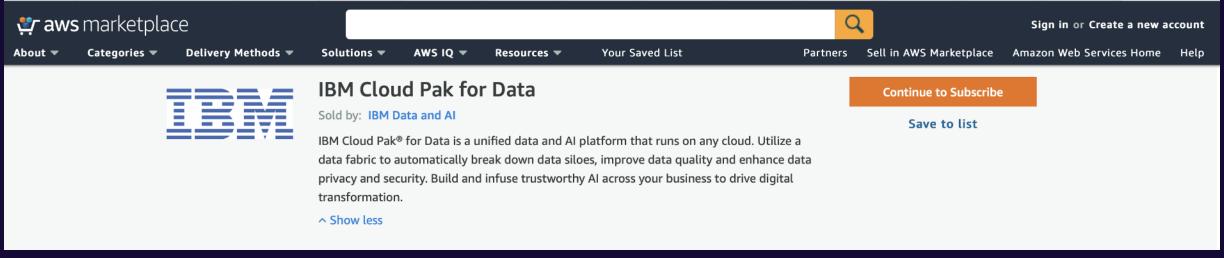


Reference Architecture – IBM Data Fabric



Data Fabric – Deployable in Public Clouds ... or on Prem





ING



https://mediacenter.ibm.com/media/Hybrid+Cloud+Data+Fabric+Vision+with+ING+(Think+2021)/1_af5un2w9

Developing a Hybrid-Cloud Data Fabric On-prem and Azure

Audiogram: ING's Ferd Scheepers shares his vision of using data fabric in a hybrid cloud environment

Blog: ING shares a vision where they use data fabric in a safe, hybrid cloud environment

Ebook: How to drive your DataOps framework with a single layer of business knowledge that supports self-service, data governance, AI, natural language processing, and accelerated data lake generation.

Industry: Banking & Financial Markets Geography: Europe

Business Challenge

- ING is a large, complex bank with mix of disparate data silos with both legacy and modern capabilities.
- Adherence to numerous industry regulatory requirements made accessing and querying data difficult and complex; data lineage was a large factor.
- · Data insight initiatives were often slowed or delayed.

Solution

- ING sought to move to one corporate operating model, in anticipation of GDPR and other cross-border regulatory requirements.
- ING partnered with IBM in order to streamline data management and applications across all operational countries by developing a single operating model strategy and platform.

Outcome

- Ensure proper data governance, while simultaneously leveraging data from across the bank
- Consolidate stacks into a single user experience platform; increasing collaboration, streamlining application management, and optimizing licensing and IT cost drivers
- Leverage data virtualization for existing on-premise investments with data to remove data silos

Solution Components

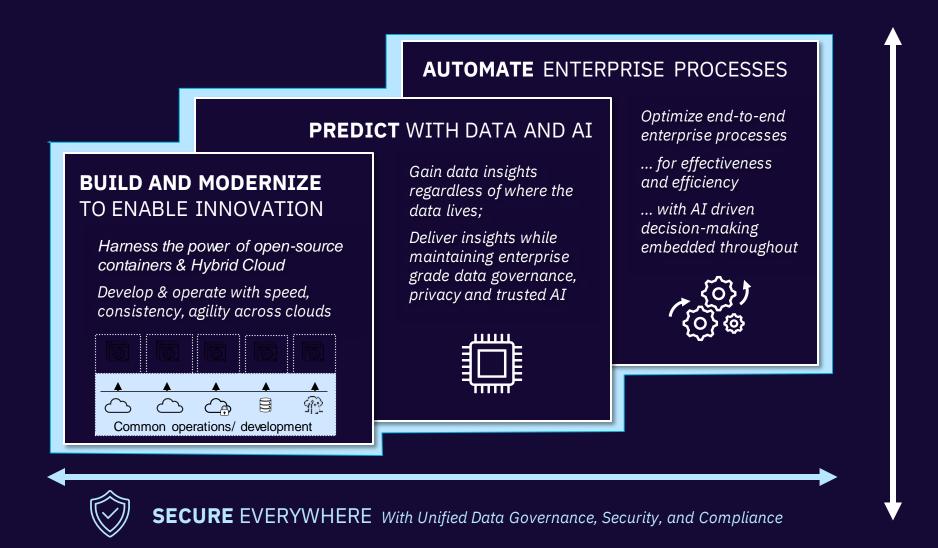
Data Fabric

- IBM Cloud Pak for Data on premise with
 - IBM Data Virtualization
 - IBM DataStage
 - IBM Watson Knowledge Catalog
- Services from IBM's Expert Labs team and IBM's Data Science and AI Elite team



IBM Value Proposition

Flexible, secure, open platform at the core ... scale up solutions for Enterprise digital transformation



TRANSFORM

ENTERPRISE END-TO-END:

By integrating data/ AI for production, trust & security, industries expertise & business processes, partners along Enterprise journey



In Summary

As a catalyst to digital transformation, IBM accelerates client's journey to long-lasting value

Enterprise-focused • Delivering technology & outcomes

Hybrid • Innovating where your business is

AI • Embedded into business processes & workflows

Open Source • Innovation foundation for the future

Trust • Highest level of security and AI explainability



Market leading hybrid platform...more than 94% Fortune 500 use Red Hat¹



40% Fortune 500 have IBM Cloud Paks ... and 2/3rd utilize IBM Security



100% of Top 10 companies in major industries² are IBM Consulting clients



90% top 50 banks run on IBM Z... 450+ clients, 115 ISVs on FS Cloud³

An accelerated expansion with IBM Ecosystem... ... an essential vehicle of end-to-end value

EXAMPLES



And many more...

... enabled through
IBM Garage – an endto-end model for
accelerating digital
transformation

Strategic optionality

Hundreds of best-in-class partners

Business Acceleration

4x faster to market for clients via partnerships

Developer productivity

80% time saved from apps modernized



- Second level
 - Third level



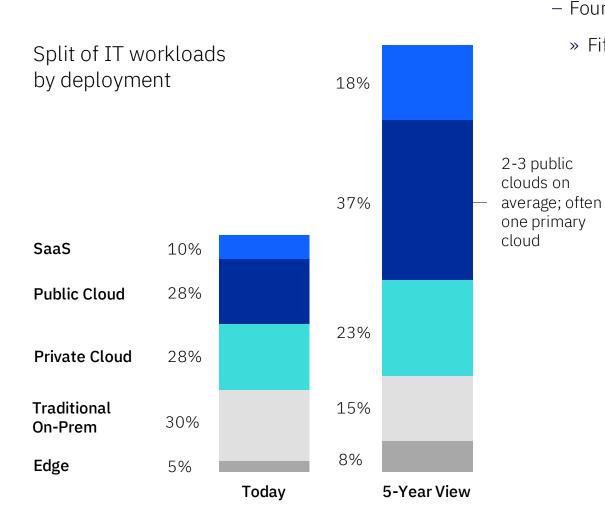


Clients fostering move to public cloud:

- Workloads traditionally considered unsuitable for public clouds
- Global direction across clients, but speeds may vary (5/10 years)
- Multiple clouds choice, driven by financial leverage or specialization

Selected workloads (~35%) to remain on private cloud and traditional on-prem—regulated workloads, strategic IP or difficult-tomigrate critical workloads

Edge workloads to double within 5 years, outsized in Manufacturing and Telco—driven by proliferation of IoT devices & appliances converted to Hybrid Cloud end points





- - - Fourth level

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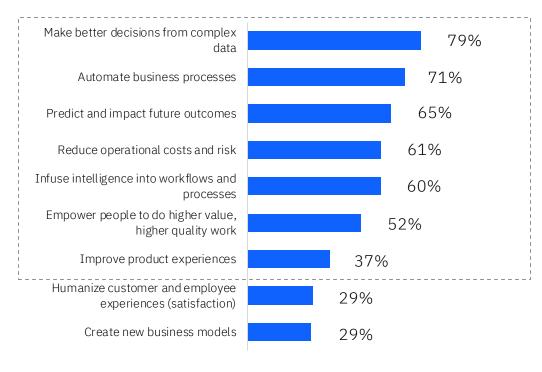
- Second level
 - Third level
 - Fourth level
 - » Fifth level The top 6 desired AI outcomes are about leveraging data for better decisions and automating for improved operations

Chief Data Officer role is increasingly important due to increasing data and analytics need

- Number of CDOs doubled from 2019 to 2020¹
- By 2021, the CDO will be a mission-critical function in 75% of large enterprises¹

Top responsibilities for CDOs	
Defining and implementing data and analytics strategy for the organization	79%
Oversight of data and analytics initiatives	74%
Creating and implementing information or data governance policy	72%
Data and Analytics Center of Excellence	64%
Data management including operations and maintenance of data and analytics	63%
Creating business value from information	61%

Desired outcomes from AI initiatives² (% Selected, Multiple Response, Among Total)



(1) Gartner 2020 CDO Survey, (2) IBM MD&I Watson Perceptions Research 2021, n= 266

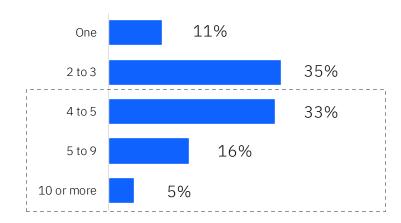
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- Second level
 - Third level
 - Fourth level
 - » Fifth level



54% of respondents in Gartner's survey reported to have 4+ concurrent automation initiatives

How many distinct automation initiatives (e.g., to automate a business process) did you work on in the past 12 months?¹



Improved business results and operations are leading to higher investment in automation

+8%

Increase in revenue from intelligent automation reported by manufacturers²

+20%

Improvement in yields from intelligent manufacturing³

+50%

Improvement in product defect detection from intelligent manufacturing³

85%

Will increase or maintain hyper automation investment strategies in next 12 months⁴

⁽¹⁾ Gartner 2021, n=558; (2) 2020 IBM Institute for Business Value, (3) IW Staff. "Benefits of AI on Manufacturing: A Visual Guide. Industry Week."; (4) Gartner Poll on Dec 1, 2020

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- Second level
 - Third level
 - Fourth level

» Fifth level ... along increasing costs to address data breaches



82%

respondents believe their organizations experienced at least one data breach as a result of digital transformation¹

55%

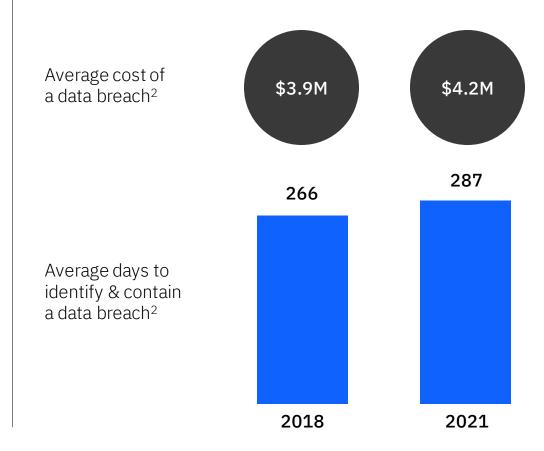
respondents say with certainty that at least one of these breaches was caused by a third party¹

63%

respondents say their organizations have difficulty ensuring there is a secure cloud environment¹

66%

believe cyber security attacks, third party breaches, and system downtime will be their biggest threats in the next two years¹



(1) 2020 survey of 581 IT security and 302 C-suite executives by Ponemor Institute and CyberGRX; (2) IBM Cost of a Data Breach Report, 2021

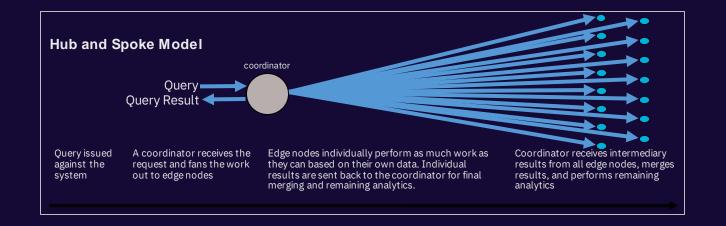
Key Architectural Differentiation

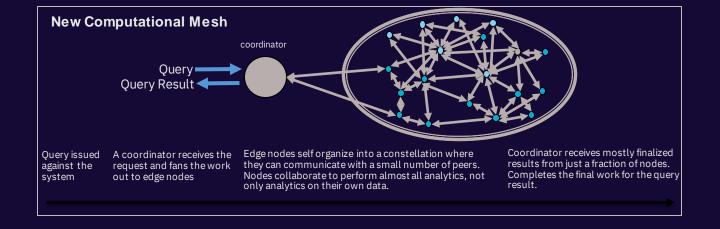
Hub and spoke execution models:

- Lacks scalability
- Performance constrained
- Basis for Federation and our competitors

IBM is first to market with a parallel processing model:

- Theoretically unlimited scalability
- Ease of addition/removal of sources
- Execution pushed down into the constellation mesh





IBM Hybrid Cloud and AI strategy resonates with our clients











Multi-Cloud operability with modernization of applications and new IT operating model

Hybrid Cloud with RH OCP & IBM Cloud Paks



Data-driven decision & predictability by connecting data to people at right time... built on digital modernizing

AI-powered auditing with IBM Cloud Pak for Data



Enterprise workflow automation for better customer & associate experiences

Intelligent automation to scale



Create secure business through real-time threat insights & automation tools

Zero Trust to secure everything

Developer Productivity

30% improvement in productivity 70% reduction in Time to Market

Business Acceleration

More insightful audits deployed by AI Infused Platform

Increased Process Efficiency

50% improvement in institutional account opening; 30% for retail account opening

Compliance & Security

300% reduction in false positive alerts