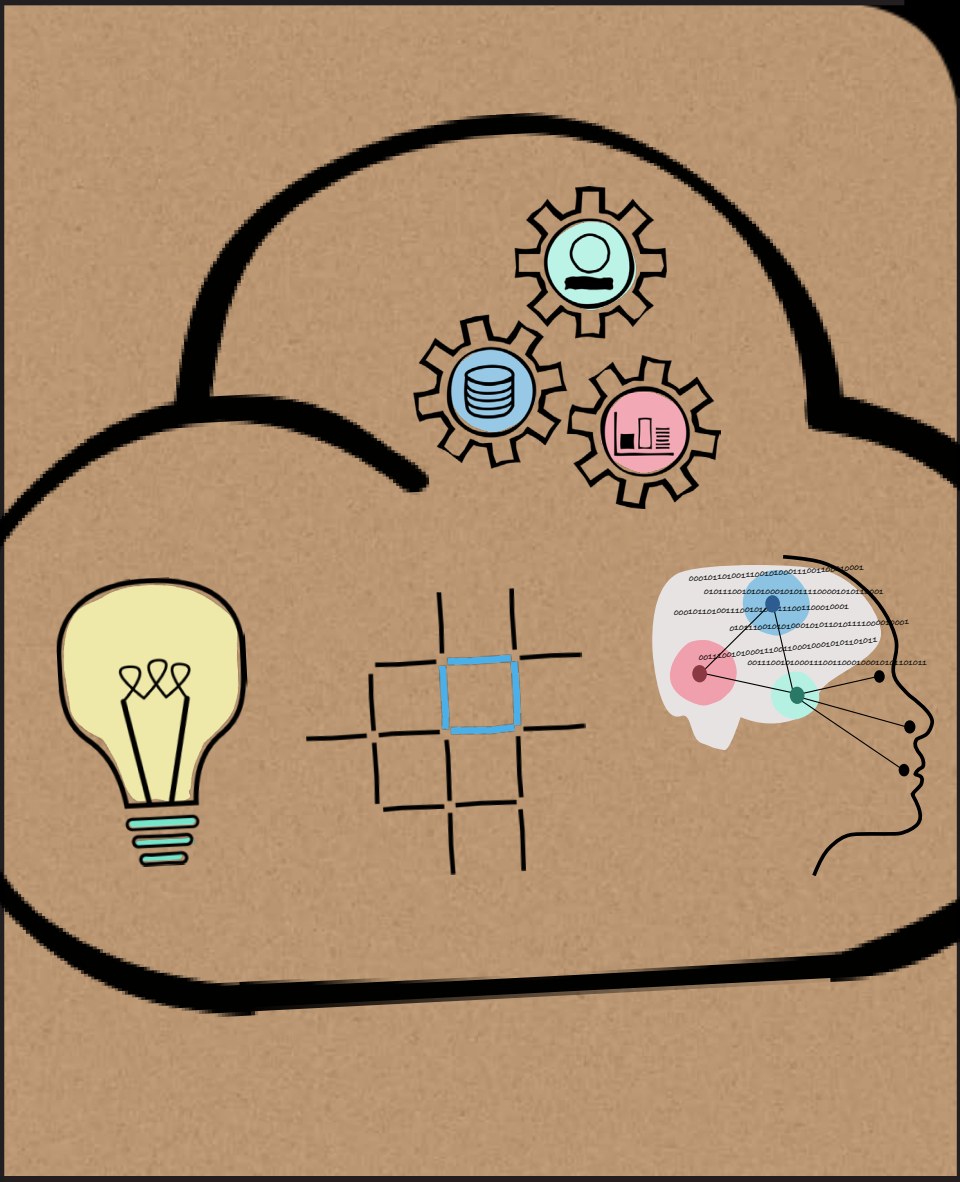


IBM **Cloud** Technical Strategy

Field Guide

IBM

Download the current version of the IBM Cloud Technical Strategy Field Guide

http://ibm.biz/ibm-cloud-technical-strategy-field-guide

Turn the page: a new chapter

Are you getting the most from your cloud investment? After experimenting with Artificial Intelligence (AI), moving simple workloads to the cloud, and committing to "random acts of digital," your business is now ready to scale and truly transform to meet your business goals. IBM can guide you on your cloud journey.

MISSION: MOVE TO CLOUD

Drive mission critical workloads on cloud. Businesses today have completed the first 20% of their cloud journey. The next chapter is about moving mission-critical apps (the other 80%) to the cloud.

Data & AI. Take advantage of the ability to apply AI to solve business problems. Build AI into the applications you deliver and the processes you use to build them.

Hybrid & multicloud. As you transform, the result is a complex web of hybrid, multicloud environments. 94% of enterprises use multiple clouds. To move forward, businesses need the ability to move apps and data between clouds—efficiently and securely.

Motivation for innovation. Deliver innovation faster to beat your competition. Move from experimentation to true enterprise transformation at speed and scale.

What's inside?

This field guide provides a high-level overview of the IBM Cloud® strategy.

LEARN IT
A summary of the concepts.

GET STARTED
Tips to start your journey to the cloud.

Current architecture challenges

80% of mission critical applications have not yet moved to the cloud. Why is this true? You must formulate a modernization strategy to rearchitect your applications to run on the cloud and take advantage of new technologies.

MODERNIZE MISSION CRITICAL APPS

Develop a modernization strategy. Create a modernization strategy to transform your existing architecture to one that is built for the cloud and protects your current investment.

Choose your cloud platform. Central to the platform is an infrastructure — a common operating environment that runs anywhere. Gain the freedom to choose the right platform for your business needs.

Break the monoliths. Monolithic applications are difficult to test and restrict your ability to change rapidly in response to businesss needs. Break the monolith into microservices.

Standardize on modern integration. A flexibile integration platform enables you to quickly implement a variety of integration patterns that connect traditional capabilities into a modern architecture.

Learn more

McKinsey, IT as a service: From build to consume, September 2016. https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/it-as-a-service-from-build-to-consume

Five principles of IBM cloud strategy

IBM Cloud is designed around five key principles to help you embrace and realize a faster, more secure journey to cloud. The journey to cloud has moved to this new chapter, now addressing the complex, mission-critical workloads that are the lifeblood of today's enterprise. Freedom and choice have become the standard to unlock innovation and growth.

MODERNIZE MISSION CRITICAL APPS

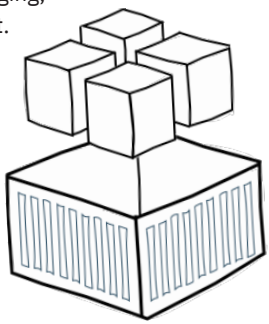
Hybrid. Enable your enterprise to work across public, private, and traditional environments.

Multicloud. Manage multi-vendor clouds, acknowledging the reality of your heterogeneous evironment.

Open. Build capabilities that are open by design, enabling flexibility and reducing vendor lock-in.

Secure. Ensure security and compliance for your environment.

Management. Offer consistent service level support, logging, management, and delivery across the cloud environment.



The IBM and Red Hat mission

By combining the Red Hat® open hybrid cloud technologies with the scale and depth of IBM's innovation and industry expertise, you now have the tools and talent to accelerate your cloud journey.

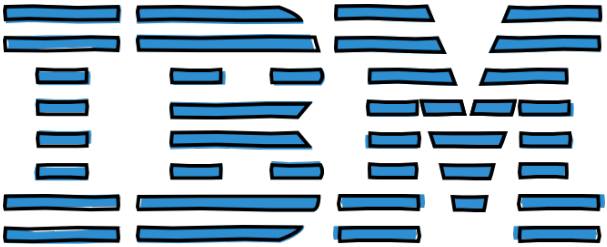
LET'S PUT SMART TO WORK

Build once. Build your mission-critical applications once and run them on all leading public or private clouds with IBM's next-generation hybrid multicloud platform, built on Red Hat technologies.

Deploy anywhere. Open software and open standards. The hybrid cloud portfolio of Red Hat combined with the scale and breadth of IBM.

Innovate everywhere. Select the best architecture to address your unique application, data, and workload requirements. IBM's platform, based on open technologies, such as Linux and Kubernetes, enables you to securely deploy, run, and manage on the cloud of your choice.

Learn more about IBM and Red Hat.
https://www.ibm.com/cloud/redhat

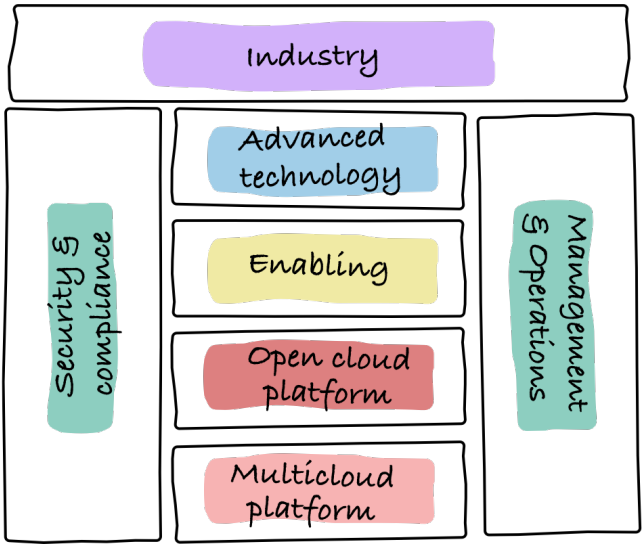


Combine the technology and scale of IBM with the open source leadership of Red Hat.

Jump-start your architecture

The IBM Cloud Architecture Center provides guidance for building apps on the cloud, across multiple clouds, and in hybrid environments where your cloud app links to your on-premises application. Start with your business problem, then use the architectures to guide you as you build your solutions.

IBM Cloud Paks® provide the tools you need to accelerate your efforts to build and manage your applications.



Learn more

Check out IBM Cloud Architectures.
https://www.ibm.com/cloud/garage/architectures

Multicloud platform. A common open platform enables you to deploy to multiple clouds without having to master the details of every provider. Standard infrastructure choices enable you to plan your physical infrastructure, compute platform, networking, and storage requirements.

Open cloud platform. Built on Red Hat technology, the platform provides a flexible combination in choosing where your workloads run and assurance that your workloads run predictably and securely.

Security and compliance. As you develop and run apps on the cloud, implementing security becomes complex. The security architecture and subdomains provide guidance on how to secure your platform, integration points, and applications.

Management and operations. Build out a management and operations architecture that includes automated monitoring, service management, incident and problem management, and multicloud management.

Enabling. Enable your applications for the cloud with containerized middleware runtimes and services. Modernize to deliver applications into production faster and run them more efficiently. Write and use cloud-native apps to meet your business needs. Integrate using messaging, events, or APIs so your apps can communicate and exchange data.

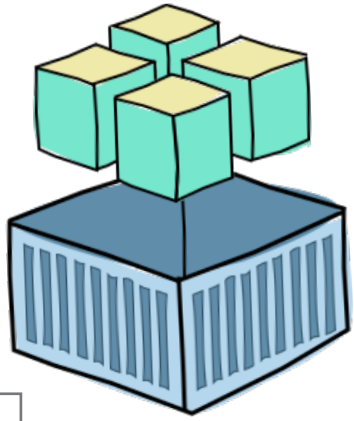
Advanced technology. Focus on the problem that your enterprise needs to solve to meet your business objectives. Use application reference architectures that provide functionality based on specific technology like AI, analytics, blockchain, and more.

Industry. IBM's breakthrough technologies are transforming industries with smarter ways to do business, new growth opportunities, and strategies to compete and win.

What are IBM Cloud Paks?

IBM Cloud Paks are AI-powered software for hybrid cloud that can help you fully implement intelligent workflows in your business to accelerate digital transformation. Tap into the power of IBM Watson® to apply AI to your business to predict and shape future outcomes, automate complex processes, optimize your employees' time and create more meaningful and secure customer experiences.

Built on Red Hat® OpenShift®, develop applications once and deploy them anywhere on any cloud, integrate security across the breadth of your IT estate, and automate your operations with management visibility. IBM Cloud Paks have a common foundation of enterprise components that accelerate development, deliver seamless integration, and help enhance collaboration and efficiency.



Learn more

Check out IBM Cloud Paks.
https://www.ibm.com/cloud/paks/

IBM Cloud Pak for Data. Simplify data management, governance, analytics and data science with a fully integrated, containerized cloud-native data and AI platform. Built on Red Hat OpenShift, you can accelerate your journey to AI with an open platform that runs on any cloud or on-premises.

IBM Cloud Pak for Business Automation. Deploy on any cloud, with low-code tools for business users and real-time performance visibility for business managers. Migrate your automation runtimes without application changes or data migration. Automate at scale without vendor lock-in.

IBM Cloud Pak for Watson AIOps. Deploy advanced, explainable AI across the ITOps toolchain to confidently assess, diagnose, and resolve incidents across workloads. Improve responsiveness and reduce risk with AI at the core of your IT operations.

IBM Cloud Pak for Integration. Deliver both speed and quality, improving your integrations and your applications. With IBM Cloud Pak for Integration, we've seen companies deliver 300% faster, eliminate over 33% of their costs and increase overall operational efficiency, whilemaintaining enhanced security, governance and availability.

IBM Cloud Pak for Network Automation. Transform your network with an AI-powered, Telco cloud platform to enable the automation of network operations, evolve to zero-touch operations, reduce OPEX, and deliver services faster.

IBM Cloud Pak for Security. Uncover hidden threats, make more informed risk-based decisions, and respond to incidents faster. Using an open security platform, connect to your existing data sources for deeper insights and act faster with automation.

Platform architectures

The key to a successful platform architecture is consistency and a minimum number of platform choices that work together and bring value to the overall architecture.

There are literally dozens of choices for operating system, private cloud compute platform, public cloud, and virtualization platform. However, an enterprise can't support them all. Enterprises need a minimal set of platform choices that have demonstrated that they seamlessly work together and provide the desired benefits.

Learn more

Check out the IBM Cloud Architectures.
https://www.ibm.com/cloud/garage/architectures

Virtualization. Existing systems built on mature platforms, like VMWare, are critical to meet the current and future needs of enterprises. IBM provides a set of solutions that enable you to seamlessly extend your VMWare® investment into the public cloud, while providing a path to on-premise, private, and public cloud solutions using Red Hat technologies.

Private Cloud. In a private cloud environment, whether it is on-premises or inside a VPC on a public cloud, you need a consistent environment built on open standards with proven reliability and support for enterprise workloads. Red Hat OpenShift is the foundation of our Private Cloud architecture. It provides that open, scalable, enterprise-ready platform. IBM's Cloud Paks provide the capability to containerize and modernize existing solutions or evolve them into new cloud-native solutions.

Public Cloud. IBM's public cloud provides all of the multi-region networking, compute, and storage features you expect in a public cloud, enhanced with the power of Red Hat OpenShift. IBM's Cloud Pak and SaaS offerings allow you to build either traditional or cloud-native solutions that leverage the power of public cloud.

Edge and Network Automation. Edge computing is an emerging space that will become more important over time as we learn to take advantage of the power of Kubernetes, network automation, and other open-source technologies to push solutions closer to where they are accessed. IBM has a clear point of view on this space and how it intersects with our public and private cloud solutions.

Security architecture

Cloud computing offers simplified application development by providing ready-to-use infrastructure, platform, and services, but security concerns can be a major inhibitor for businesses. As you design, build, deploy, and manage your cloud applications, architect security to protect your business, infrastructure, applications, and data.

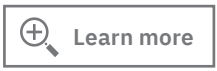
OUTSMART THE BAD GUYS

Identity and access. Manage the identities associated with activities, such as privileged administrator tasks, and development and operations tasks. Manage user and customer access to your cloud applications.

Network security. Provide tenant-specific network protection and isolation on the cloud to protect the cloud infrastructure.

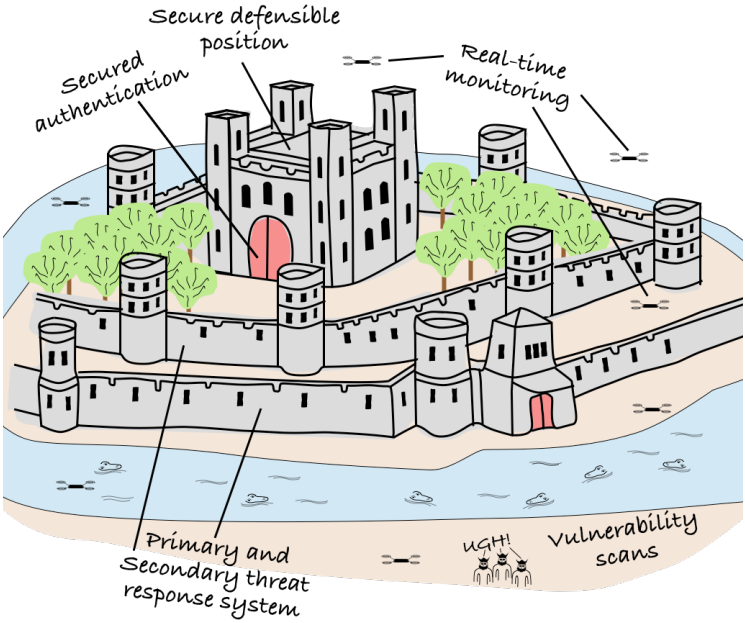
Data security. Encrypt data at rest and in motion. Include steps for how to monitor data activity and processes to verify and audit data that is outsourced to the cloud.

Application security. Design a secure development and operations process (SecDevOps or DevSecOps). Be sure to include steps to identify and manage vulnerabilities in the virtual machine (VM), container, and application code.



Check out the IBM Cloud security architecture.
https://www.ibm.com/cloud/garage/architectures/securityArchitecture

Build a fortress to protect your enterprise



Do what it takes to protect your business.

Management architectures

Your customers expect your applications to be available when they need them, and they expect them to perform. For every application you deliver, implementing new management and operations architectures is critical to your success.

SHOOT FOR 99.999

Multicloud management. Automate and manage your multicloud and multivendor infrastructure. Overcome the common challenges of a multicloud environment: cross-cluster visibility, workload deployment and placement, and compliance and security.

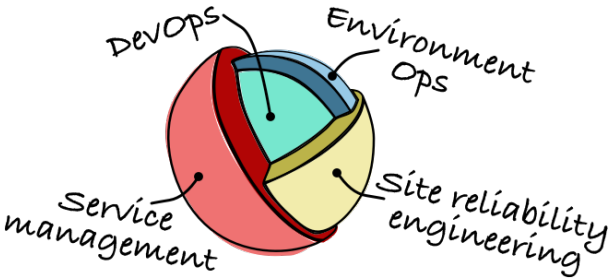
Service management and operations. Plan, design, deliver, operate, and control IT and cloud services. Adopt Site Reliability Engineering (SRE) principles to change the way you respond to problems. Implement a cognitive service management architecture to save on cost and efficiency.

DevOps. Accelerate the delivery of applications to multicloud environments by adopting a modern DevOps approach where the business owner, development, operations, and quality assurance teams collaborate to continuously deliver software.

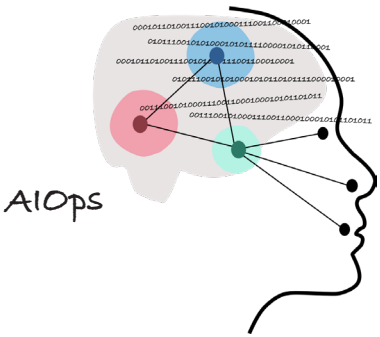
AIOps. Incorporate AI to enable early problem detection and enable proactive action. Your operations team must have the ability to anticipate problems and support new application functions.

Learn more

Check out the IBM Cloud Architectures.
https://www.ibm.com/cloud/garage/architectures



Multicloud management



Deliver apps that meet your customer's availability and performance needs.

IBM Cloud Pak for Watson AIOps

Deploy advanced, explainable AI across the ITOps toolchain to confidently assess, diagnose, and resolve incidents across workloads. Improve responsiveness and reduce risk with AI at the core of your IT operations.

BUILD INTELLIGENT IT OPERATIONS

Diagnose problems faster. Correlate a vast amount of unstructured and structured data in real time with AIOps tools.

Gain insights where you work. Keep teams focused, surfacing insights and recommendations into existing workflows.

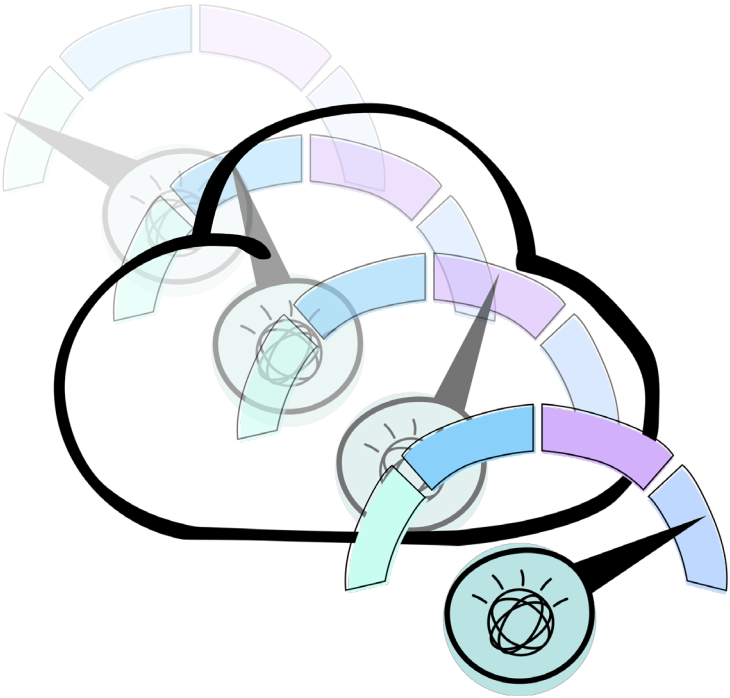
Build and manage securely. Build policy at the microservice level and automate across application components.

Automate with confidence. Empower teams to automate tasks with transparent AI decision-making in ChatOps.

Manage across resources. Manage applications and infrastructure with visibility across environments.

Integrate seamlessly. Integrate with pretrained AI models to gain new insights from existing tools.

Check out the IBM Cloud Pak for Watson AIOps.
https://www.ibm.com/cloud/cloud-pak-for-watson-aiops



Reduce churn and enable efficient teamwork.

Enabling architectures

Explore the enabling architectures to understand the building blocks you can use to modernize your existing applications and build new cloud-native applications.

BUILDING BLOCKS FOR ALL APPS

Application modernization. Create a strategy to modernize and migrate your applications to the cloud. Break monolithic apps into microservices and containerize to reduce cost, simplify orchestration, and streamline cloud migration.

Cloud-native. Build and deploy your applications as microservices that can be individually changed, tested, and deployed without affecting other services.

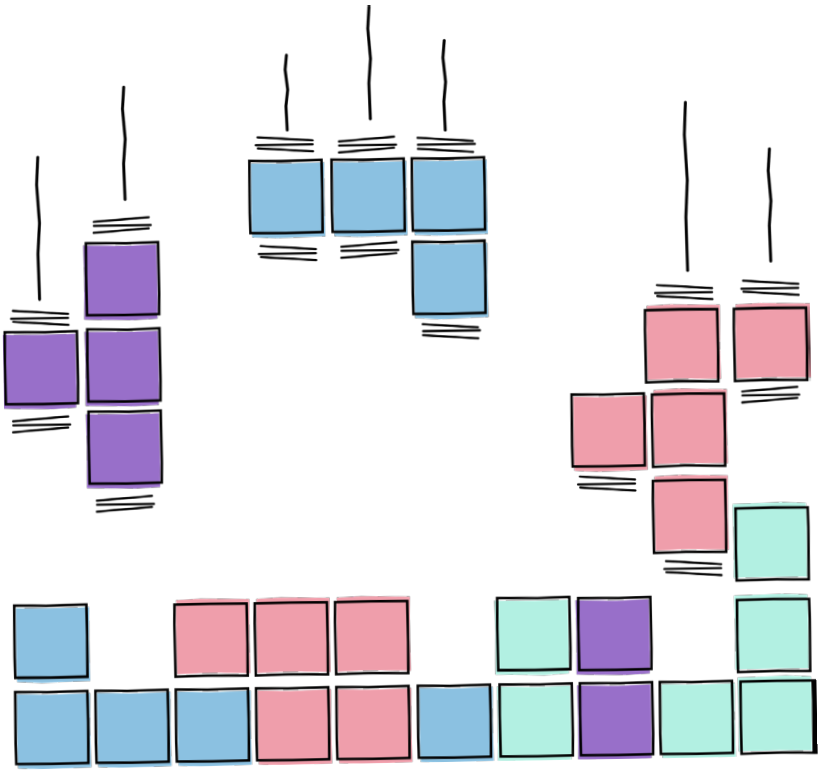
Modern integration. Implement modern integration through APIs, messaging, and events to enable your microservices or hybrid cloud applications to communicate and exchange data.

Data. Collect, organize, manage, control, and analyze data so that it becomes a corporate asset used to transform and add monetary value, communicate, and exchange data.

Event driven. Extend the resilience, agility, and scalable characteristics of cloud-native architectures to also be reactive and responsive.

Digital business automation. Streamline your business operations through work automation, orchestration, and instrumentation.

Check out the IBM Cloud Architectures.
https://www.ibm.com/cloud/garage/architectures



Put all your pieces in the right places.

IBM Cloud Pak for Integration

Organizations need to increase the speed of integrations while lowering their cost. Going fast without the right approach, guided by real-world operational data, will only get you to the wrong place faster. Rethinking your integration strategy helps you integrate faster with higher quality, which changes integration from a bottleneck into a critical enabler of innovation.

MAKE TIME FOR BRILLIANCE

Adopt agile integration. Agile integration spans people, process, architecture and technology to enable you to break free from heavily centralized integration architectures that cannot support the demand.

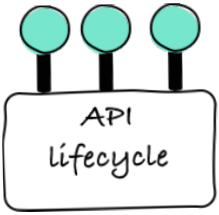
Bring automation into integration. Powered by AI, automating your integrations enables you to leverage best practices and built-in reuse to eliminate the skills barrier and improve efficiency.

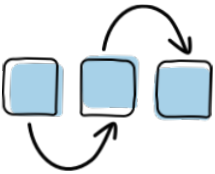
Implement a closed-loop integration lifecycle. Use real-world, company-specific operational data to identify issues and recommendations, and continuously improve integrations.

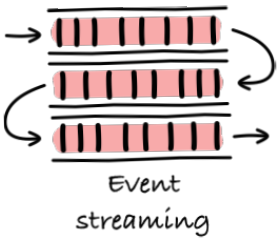
Use multiple integration styles. Using different styles of integration together streamlines the integration lifecycle, allowing your team to deliver faster and better than a one-size-fits-all approach.

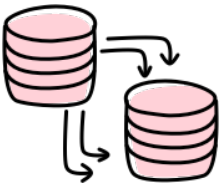
Learn more

Check out the IBM Cloud Pak for Integration.
https://www.ibm.com/cloud/cloud-pak-for-integration









IBM Cloud Pak for Integration - There has never been more demand for new integrations.

IBM Cloud Pak for Data

Natively built on Red Hat OpenShift Container Platform, IBM Cloud Pak for Data provides optimized hardware to increase container performance and accelerates time to value of your workloads.

PREPARE DATA FOR AN AI AND MULTICLOUD WORLD

Eliminate data silos: Connect all data. Handle big data and make queries across multiple data sources fast and simple without moving data. Manage all of your data wherever it lives.

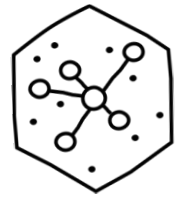
Operationalize AI with trust and transparency. Improve outcomes with trusted data. Simplify data governance so data scientists, developers, engineers, and business experts can improve business outcomes.

Automate and govern the data and AI. Gain visibility into your data landscape. Benefit from tools that manage, mask, and prevent data misuse. Simplify data policy, protection, and management with automated tools and machine learning.

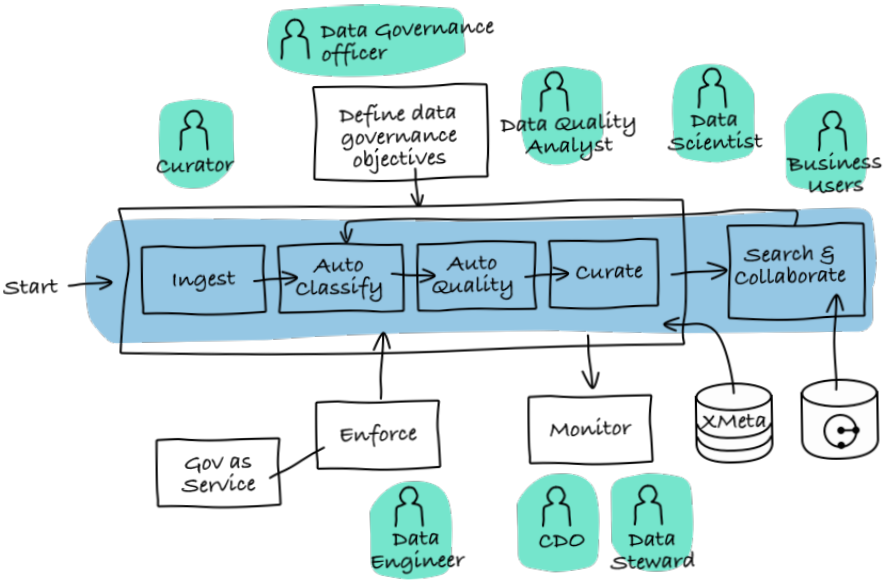
Avoid lock-in and run anywhere. Deploy IBM Watson anywhere, on IBM Cloud, third-party clouds, or hybrid clouds.

Learn more

Check out the IBM Cloud Pak for Data.
https://www.ibm.com/products/cloud-pak-for-data



Eliminate data silos.
Connect all data.



Collect and organize your data to generate insights and set the foundation of AI-driven business.

IBM Cloud Pak for Business Automation

Use automation to drive a new wave of productivity and customer experiences. Built on an analytics layer, you can create and deploy applications and services, and use analytics that provide insight into your daily operations and productivity.

FREE YOUR TEAM FOR HIGH-VALUE WORK

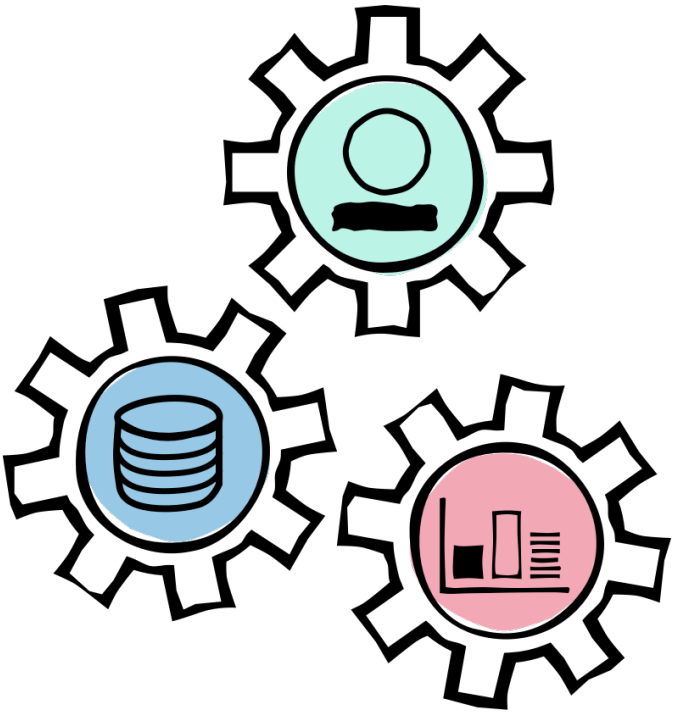
Improve employee productivity. Use bots to automate human tasks. Record and automate repetitive human tasks to automate mundane work, eliminate copy-and-paste and data entry errors, and free your team's time to do higher value work.

Enhance customer experience. Offer customers more choice, improve response times, and achieve significant reach and consistency of experience in customer-facing processes.

Increase operational visibility. Collect and visualize performance data so you can optimize processes. Capture all of the system's events, aggregate them into business-relevant key performance indicators (KPIs), and present a meaningful, real-time view of business operations.

Learn more

Check out the IBM Cloud Pak for Business Automation.
https://www.ibm.com/cloud/cloud-pak-for-business-automation



Optimize your business operations and customer facing processes to save time and money.

IBM Cloud Pak for Network Automation

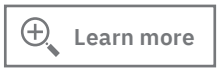
An AI-powered telco cloud platform enables the automation of network operations so communication service providers (CSPs) can transform their networks, evolve to zero-touch operations, reduce operations cost, and deliver services faster.

ACHIEVE ZERO-TOUCH NETWORK OPERATIONS

Improve business process and service assurance while lowering operations costs. Users can continuously optimize both business processes and network operations. Combined with IBM Cloud Pak for Watson AIOps, CSPs can gain insights across complex data sets to proactively detect and resolve anomalies with closed-loop operations before they impact end users.

Accelerate the delivery of networks and services through AI-powered automation. A single point of control with intent-driven orchestration so users can model the desired service operational state. CSPs can rapidly design, deploy and scale new services in minutes instead of days with less operations effort.

Run on any cloud, anywhere, and manage virtually any network vendor infrastructure. Built on Red Hat OpenShift, the IBM Cloud Pak for Network Automation is open and optimized for hybrid multicloud, multivendor core, access and edge networks.



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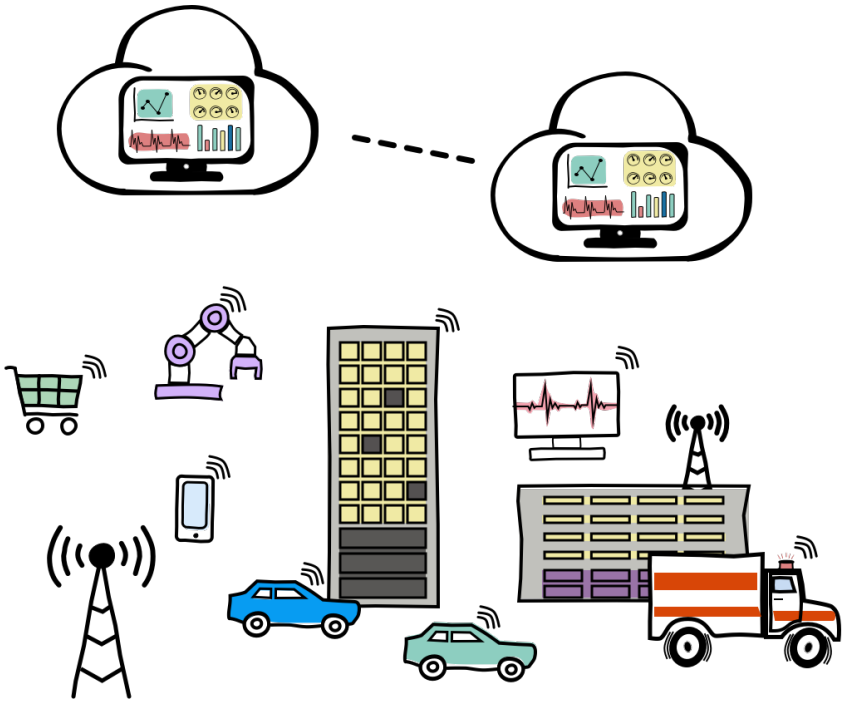


Drive growth and improve customer experiences by using the IBM Cloud Pak for Network Automation.

Advanced technology architectures

Build applications that provide the function you need to solve your business problems. Application styles provide functionality based on leading technologies.

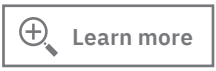
THERE'S AN APP FOR THAT

Artificial intelligence (AI). Incorporate both AI and machine-learning techniques into applications to enable natural language processing, reasoning, and planning. Machine learning provides the basis for statistical analysis for the pattern recognition that is used to make data-driven predictions.

Analytics. Deliver descriptive, prescriptive, and predictive insights across all types of data. Build analytics into your apps and your devOps processes.

Blockchain. Incorporate shared ledger technology into your applications to ensure a single point of truth: a shared, tamper-evident ledger.

Internet of Things (IoT). Connect devices, outfitted with sensors that gather data, to the internet. Data from the sensors is transmitted, stored, and analyzed to provide valuable insight.



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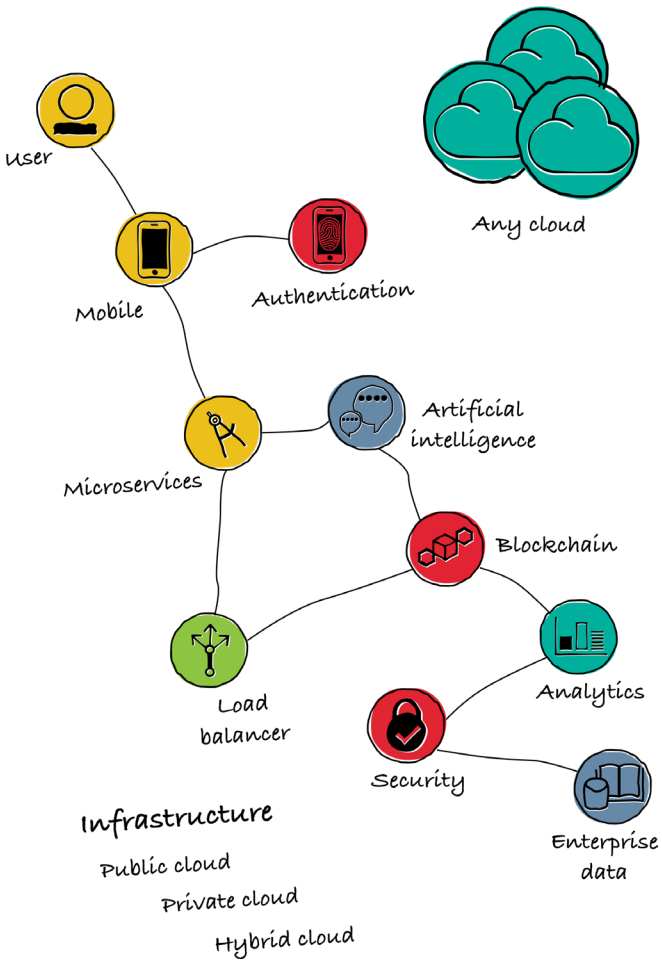

User
Any cloud
Mobile
Authentication
Artificial intelligence
Microservices
Blockchain
Load balancer
Analytics
Security
Enterprise data
Infrastructure
Public cloud
Private cloud
Hybrid cloud

IBM Garage - Accelerate your journey

Modernization comes in many flavors and rewriting your entire estate is not feasible. Big bang modernization efforts are risky, so it is best to break large initiatives into smaller projects with measurable impact. Your goal is to accelerate value, deliver frequently, and reduce risk. IBM Garage™ experts can help.

REFACTOR WHAT'S NECESSARY, BUT DON'T NECESSARILY REFACTOR

Co-create. Identify a business modernization opportunity. Define and build the MVP with your squad, get feedback, and co-create a solution.

Co-execute. Manage risk by choosing the right approach to modernize your current estate. Accelerate your journey through automation and technology.

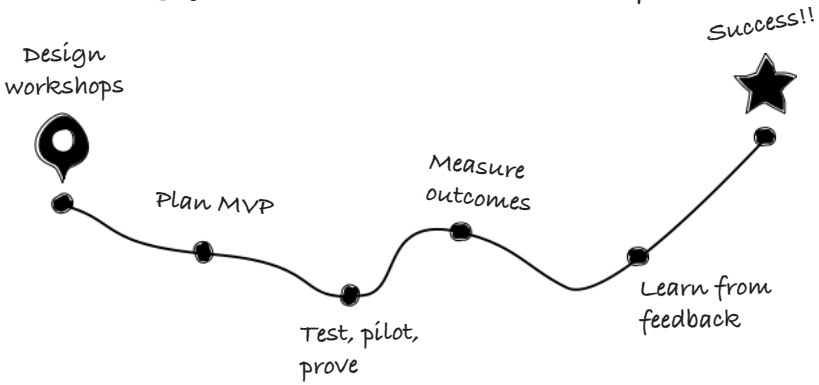
Co-operate. Harden for production, standardize operations, and improve DevOps efficiency across your application estate.

Check out the IBM Garage.
https://www.ibm.com/garage

Modernize your applications quickly and safely using IBM accelerators and tools.

Engage IBM Garage experts!

Cloud modernization roadmap



IBM Garage is a trusted partner, providing technology and prescriptive guidance to deliver immediate business value.

Notes:

Learn more about IBM Cloud Paks

https://www.ibm.com/cloud/paks/

Check out IBM Cloud Transformation Advisor

https://www.ibm.com/cloud/garage/practices/learn/ibm-transformation-advisor

Learn more about Red Hat OpenShift

https://www.openshift.com/

Get Technical with the IBM Cloud Architecture Center

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