Field Guide
Innovate, disrupt, and transform at scale

Disrupters are reinventing business processes and leading their industries with digital transformations. Adopting real-time processes, agile methodologies, data-driven decision making, and innovative technology evens the playing field.

DISRUPT THE DISRUPTERS

The IBM Cloud Garage is a network of physical innovation hubs with the DNA of a startup. At Garages around the world, companies both large and small are empowered to create engaging applications. Garage teams help you start your transformation in workshops, where you design and build real apps that solve your business needs.

What’s inside?

This field guide provides an overview of the IBM Cloud Garage.

LEARN IT
A summary of the garage’s concepts

GET STARTED
Experience a typical journey through an IBM Cloud Garage engagement
Evolve to deliver rapidly

Is your organization still developing apps using the waterfall method, completing one or two major releases each year? Or have you started the move to agile development and removed a few barriers, but find that silos still exist between business and development or development and operations?

IT STARTS WITH CULTURE

Shift the culture. The move to continuous delivery and continuous integration is daunting, but possible. First, focus on shifting the culture and mindset of your organization.

Adopt best practices. For an enterprise to evolve from waterfall to continuous delivery and become agile along the way, it must combine industry-proven best practices with its own experience and knowledge, and then run at scale.

Build on the Cloud. Work with IBM Cloud Garage experts to deliver new apps, modernize your existing apps, and connect to legacy applications using the public, private, and/or multicloud platform.

Learn it

Check out the IBM Cloud Garage website.
https://www.ibm.com/cloud/garage
Act more like a startup

In this evolution, one key to culture change is adopting the startup mindset. Startups are redefining everything: business experimentation, design, development practices, operations, testing, production, tooling, and management. Work with the IBM Cloud Garage to develop your startup mindset.

IT’S A JOURNEY

Embark on your evolution. Get everyone on board and excite them with the opportunity to delight customers and deliver code in new ways.

Unify around your vision. Make sure that everyone understands the end goal and why the culture is changing. Educate your team on new technologies, practices, and principles, and provide guidelines to set up tools, delivery pipelines, and automation. In time, continuous delivery will become the norm.

Architect your applications. Ensure the whole team understands the technologies used to build function into the application and to deliver, run, and manage the app in production.
Foundations of innovation

IBM Cloud provides the platform, expert guidance, and methodology you can rely on to jump-start your business transformation.

**IBM Cloud.** IBM Cloud provides the infrastructure and services that you need to build and deploy your apps in the cloud. IBM Cloud is designed for your data, AI ready, and secure to the core.

**IBM Garage Method for Cloud.** The Method is a collection of practices and workflows that are curated to help organizations rapidly design, build, deploy, and scale innovative cloud apps that are curated to help organizations rapidly design, build, deploy, and scale innovative cloud apps. The methodology reinforces Enterprise Design Thinking, Lean Startup, and agile DevOps concepts. You can scale what you learn in the Garage to your enterprise.

**Cloud Garage.** The Cloud Garage is a collaborative environment staffed with diverse experts who work with clients to rapidly define, design, develop, validate, analyze, operate, and maintain applications on IBM Cloud by using the Method.

**IBM Cloud adoption services.** Cloud adoption services enable you to engage IBM experts who can help you transform your enterprise, move applications to the cloud, and take advantage of emerging technologies to ensure your success.
IBM Cloud

Depend on IBM Cloud to provide the platform and services you can use to run your applications in production.

**IBM Cloud.** Leverage an open standards public cloud platform that enables developers and operations staff to rapidly build, run, and manage all types of applications. IBM Cloud provides a fast way to get an application to production, scale it, secure it, and manage it.

**IBM Cloud Private.** Get the benefits of public cloud in your data center, including rapid deployment, scalability, ease of use, and elasticity. Private cloud provides control, increased performance, predictable cost, tighter security, and flexible management options.

**Multicloud management.** Take advantage of all the cloud has to offer and protect your investment by deploying to and managing across multiple clouds.

**Cloud services.** Take advantage of expert guidance, implementation support and managed services (Blockchain, AI, IoT) to help you simplify and accelerate your journey to cloud.
IBM Garage Method for Cloud

To become a disrupter, choosing how to develop software is as important as defining what to develop. The IBM Garage Method for Cloud practices, along with the architecture center and related education are fundamental to enterprise transformation.

**Practices.** Each practice defines an overall business transformation goal and presents achievable activities that you and your team can do to reach that goal.

**Architectures.** Architectures provide a structure that you can use to integrate cloud services into your solutions. Each architecture includes specific implementations that you can use and customize.

**Courses and tutorials.** Learn how to apply the methodology to your organization and streamline your architecture, design, development, and deployment processes with hands on courses and tutorials.

Check out IBM’s best practices used in the IBM Cloud Garage. [https://www.ibm.com/cloud/garage/practices/overview](https://www.ibm.com/cloud/garage/practices/overview)
Garage Method for Cloud practices

The Method’s practices are divided into seven categories.

**Culture.** Transform your organization by combining business, technology, and process innovations that help you create teams that quickly learn from market experiences.

**Discover.** Dig deep into your problem domain, align everyone on common goals, and identify potential problems and bottlenecks.

**Envision.** Incrementally deliver awesome apps by using Enterprise Design Thinking and related design practices to establish a repeatable approach to rapidly deliver innovative user experiences.

**Develop.** Produce high-quality code that you can confidently deliver to production. Accelerate time-to-market by using continuous integration, continuous delivery, and automation to deliver in a fully tested production app.

**Reason.** Build a solid information architecture to enable you to turn data into knowledge. Develop analytic models using machine learning approaches. Integrate AI into solutions and into the execution of the method practices.

**Operate.** Ensure operational excellence with continuous application monitoring, high availability, and fast recovery practices that expedite problem identification and resolution.

**Learn.** Continuously experiment by testing hypotheses, using clear measurements to inform decisions, and driving findings into the backlog so that you can pivot.
IBM Cloud Garage

The Cloud Garage can lead your business through organizational and technology transformation. Start with one small project or embark on overall organizational and digital transformations.

JUMP-START YOUR TRANSFORMATION

Leverage IBM’s best practices. Understand how to use IBM Garage Method for Cloud to transform an area of the business, an innovation center, or development—with or without the business changing—holistically.

Adopt the cloud. Develop cloud-native applications and modernize applications and data through containerization, DevOps, and site reliability engineering (SRE).

Design and build a solution. Quickly design and build creative solutions with an end-user-centric design approach. Start by creating and validating a minimum viable product (MVP). Deliver the app into production and manage it on the Cloud.

Transform your enterprise. Change how solutions are designed, developed, and deployed. Transform all aspects of what you do to meet your business objectives.

Learn more

Check out the IBM Cloud Garage website. https://www.ibm.com/cloud/garage/services/what-is-the-cloud-garage
World wide locations

Cloud Garages are embedded within tech incubators in some of the world’s largest startup communities. Success requires a fundamental culture shift in work environment. The Garages are intentional spaces for optimal collaboration and innovation.

Come and visit a Cloud Garage near you

We’re compiling practices, architectures, tools, and courses to get you started. IBM’s world-wide experts are ready to help.
The Garage Experience

You’ve decided to engage with the IBM Cloud Garage. What happens when you get there? Work with a team of technical experts. Learn and experience the IBM Garage Method for Cloud best practices as you define, design, and build out an app on the cloud.

DEFINE, DESIGN AND BUILD YOUR MVP

Visit the Garage. Experience the Garage and identify a candidate business problem.

Attend an Enterprise Design Thinking Workshop. Use Enterprise Design Thinking to identify a use case and target users, define business hypotheses, and create a MVP.

Create an MVP. Design, build, and deploy an MVP quickly.

Transform your enterprise. Innovate and transform by adopting and adapting the Method to meet your objectives for speed and quality.

Learn more

Check out the IBM Cloud Garage experience.  
https://www.ibm.com/cloud/garage/services/garage-offering
Build best practices into your process.

Engage to define, design, build and operate your MVP on the Cloud.
Transform your culture

Culture change? Impossible! But if you want to transform your organization and achieve your business outcomes through rapid innovation, culture change is exactly what you need. At its roots, the Garage Method for Cloud is a cultural movement; it’s all about people. The Method can help.

EVERYONE IN THE BOAT!

Build a diverse team. An organization might adopt efficient processes or automated tools, but to successfully innovate at scale, teams must be diverse, be given the freedom to pivot, and decide how they do their work.

Fail fast and learn fast. Develop enough of your idea to determine whether it’s useful to your customers. If a customer doesn’t like the new function, you can pivot before you invest more time or resources into developing the function.

Adopt agile principles. Agile development produces software in short iterations on a continuous delivery schedule. Other agile principles include self-organizing teams, simplicity, sustainable pace of development, and change that is based on customer feedback.

Learn more
Check out the Method’s Culture practices.
https://www.ibm.com/cloud/garage/practices/culture
The business and product owner, designer, developer, and team lead all work together.
Enterprise Design Thinking

Enterprise Design Thinking helps you focus on your users and their needs to deliver more useful, usable, and desirable solutions. When you start up a new product or a new iteration, you must conceptualize, design, refine and prioritize features that will delight your customers. To do this effectively, you’ll bring together business leaders, sales, designers, development, product management, and customers.

WOW YOUR CUSTOMERS!

Understand your users. Define personas that represent your target users. Gain an understanding of your user’s motivations, needs, and frustrations to ensure you deliver an MVP that will delight them.

Define an MVP. An MVP is the absolute minimum function needed for your target persona to have a delightful experience while accomplishing a goal.

Align the team with playbacks. Throughout the development cycle, hold regular playbacks to gather feedback from stakeholders and target users. Take the feedback into account as you iterate on the MVP.

Learn more

Check out the Method’s Envision practices.
https://ibm.biz/method-envision
Bring together diverse stakeholders to define personas, generate ideas, and define an MVP.

Know your audience and meet their needs faster than your competition.
Plan and manage your MVP

Once you’ve defined your MVP, you must manage the work to build it and ensure that everyone on the team understands what needs to be done. Begin with an MVP; the smallest, most tightly focused description of what a team can deliver that still provides measurable customer value.

STAY ON THE SAME PAGE

Create user stories. During an inception the team breaks up an MVP definition into small user stories, written from the perspective of the personas, that can be implemented within about a day each by a pair of developers.

Manage a rank ordered backlog. Rank user stories that are waiting to be started in priority order. Developers will pull user stories from the top of the backlog. Adjust story priorities in the backlog based on feedback and new requirements.

Visualize your work with a Kanban board. Use a Kanban board to make the state of all user stories visible to the team. Track the backlog, along with stories that are in progress, under review, and complete.

Learn more

Check out the Method’s Culture practices. https://www.ibm.com/cloud/garage/practices/culture
Ensure transparency and keep everyone on the same page.
Just enough architecture

How do you know that you’ve defined enough architecture to understand how to build your product and reduce technical risk? Architect only what you need to produce your MVP. If you’ve gone beyond that, you’ve gone too far.

TIMING IS EVERYTHING

Reduce risks. Design decisions made too early introduce risks. Delay decisions until just before they are needed.

Scope your MVP. Keep your MVP in the forefront of your mind at all times. Only architect what is needed to produce the MVP.

Avoid rework. Architecting several iterations ahead slows you down and causes rework. Think ahead but do not architect ahead.

Learn more

Check out the Method’s Develop practices.
https://www.ibm.com/cloud/garage/practices/develop
Architects set up the “Fences” for teams to work within.

End user

Mobile

Authentication

Cognitive conversation

App logic

Blockchain

Load balancer

Back-end logic

Security

Enterprise data

Public cloud

Private cloud
TDD and automation

Set up the groundwork for delivering a high quality MVP by implementing test driven development (TDD) and automated testing. Never write a single line of code that is not covered by an automated test case.

TESTS BEFORE CODE; AUTOMATE EVERYTHING

Practice test driven development. Innovate high quality code faster by writing a failing test case and implementing just enough code for the test to pass.

Continuously integrate and test. Integrate test tools into your automated delivery pipeline to continuously run in a regression suite. Code cannot be integrated without passing its set of tests.

Test everything. Include unit tests, end-to-end tests, and scale and performance tests in your automated regression suite.

Learn more

Check out the Test-driven development (TDD) practice.
Automated tests catch problems before they are released into production.
Build using pair programming

At the Garage, programming is done in pairs. Two developers work together as a team to code, test, and continuously deliver user stories.

TWO HEADS ARE BETTER THAN ONE

Two developers; one computer. Teams who are successful with pair programming ensure that each pair has the equipment they need to do their job. Dual displays and input devices can be the difference between pair programming success and a very unsuccessful experience.

Who is in the driver’s seat? Each pair has a driver and an observer. The driver focuses on how to implement a piece of code. The observer continuously asks whether the implementation is the best solution and if it breaks anything else.

Reap the benefits. Research shows that two programmers, working together on a single user story, solve problems faster and produce higher quality code than single programmers.

Learn more

Check out the pair-programming practice.
Code review is good – so do it all the time.
Simplify through refactoring

Have you ever stumbled across code that keeps breaking or is virtually impossible to extend? If so, you must refactor that code to make it simpler, while ensuring that it preserves the behavior and passes your automated tests.

SIMPLIFY, SIMPLIFY, SIMPLIFY!

Don’t refactor on speculation. Wait until the system tells you to refactor by either breaking or becoming tough to extend.

Recognize the signs. Refactor duplicate code, flawed logic, and code that can be rewritten in a simpler way.

Automate tests. Refactoring only works when used with automated testing. If you refactor code, ensure that it passes your automated tests. If tests don’t exist for the code you intend to refactor, write the automated tests, then refactor the code.

Learn more

Simplify your code by refactoring while preserving behavior.

Make your code shorter, easier to read, and easier to maintain through refactoring.

Increasing development of microservices

Decreasing development on monolith
Continuous improve your MVP

Continuous iterate to deliver quality production ready code. To continuously deliver in a consistent and reliable way, your team must break down the software delivery process into stages and automate the movement of the code through those stages.

INTEGRATE IT. BUILD IT. DEPLOY IT.

Create an integrated DevOps toolchain. Add tool integrations that support development, deployment, and operations tasks.

Continuously integrate and deliver using a delivery pipeline. To achieve continuous delivery in a consistent and reliable way, break the software delivery process into delivery stages. Code should automatically progress through each stage.

Automate deployments. Eliminate manual steps from the creation of environments to the delivery of your code into production. Automation can be incorporated into your delivery pipeline.

Learn more

Check out the delivery pipeline practice.
https://www.ibm.com/cloud/garage/practices/deliver/practice_delivery_pipeline/
Provide your team with a repeatable development-and-deployment process that uses a consistent set of tools.
Automate monitoring

Knowing that your application or service is available and functioning within service level agreements (SLAs) is vital. Automated monitoring is the best way to ensure your apps are always functioning.

CATCH PROBLEMS BEFORE YOUR USERS DO

**Build to manage.** Build monitoring tools in from the beginning. Learn how to monitor an application, what to monitor, and how often. Monitor your application and everything it depends on.

**Know your tools.** Use agent-based monitoring tools to analyze the details of your code, server and user activity. Use synthetic monitoring tools to simulate user traffic so you can determine whether your application is performing correctly. Test your monitoring by simulating outages and performance issues.

**Integrate monitoring.** Integrate automated monitoring into your incident management toolchain with event management and notification tooling to ensure that your operations team can respond to incidents as soon as they occur.

Learn more

Check out the Method’s Operate practices.
Integrate your service management and operations tools.

Catch problems as soon as they occur.
Hypothesis driven development

Continuously gain new insights from your customers’ interaction with your application and the metrics you collect to drive business decisions using hypothesis driven development.

LEARN SOMETHING NEW EVERY DAY

Formulate hypotheses. For each function you develop, formulate a hypothesis that indicates the expected outcome and the metric that can be used to measure success.

Test your hypotheses. Once your feature has been delivered and is in use, gather metrics and end user feedback that will prove or disprove your hypothesis.

Drive development with hypotheses. Developing hypotheses and testing them throughout the evolution of an application is key to delighting your customers. Continuously experiment to deliver the right solution. Experiments have clear metrics that either validate your hypothesis or require you to pivot and try something new.

Learn more

Check out the Method’s Learn practices. https://www.ibm.com/cloud/garage/practices/learn
Learn from your users as they interact with your application.

Hypothesis: Adding Cross References Will Increase Monthly Page Views

Use real time data to test your hypothesis and influence your next MVP.
Transform your enterprise

Meet the challenges of cloud adoption and transformation for the enterprise by using strategic services and proven methodologies from the IBM Cloud Garage. Align your stakeholders with all the right goals, model your outcome on the right architecture, collaborate with the right architects and developers, and, of course, build the right solution.

LET US SHOW YOU THE WAY

Advise. Drive innovation through successful hybrid cloud adoption including, technology modernization, rationalization, remediation and migration to cloud.

Build. Create cloud native applications. Follow an Enterprise Design Thinking based approach for development to build applications using polyglot microservices as well as monolithic architectures.

Move. Migrate your legacy applications to the cloud. Consolidate or decommission applications, interfaces and infrastructure that are no longer needed due to mergers or technology modernization.

Manage. Build a highly available infrastructure that ensures your solution is always available and meets your needs. Smoothly transition and effectively manage your application portfolio to improve efficiency and agility.

Learn more

Check out the IBM Cloud Garage (Services).
https://www.ibm.com/cloud/garage/services
Cloud adoption services

Disrupt and innovate in the cloud. Experience the Cloud Garage, a hands-on experience that is grounded in the IBM Garage Method for Cloud and outcomes based on proven reference architectures and technologies.

Leverage data and analytics. Unlock insights from deep within your data to energize your applications and protect your enterprise. Manage your data so it’s available when you need it.

Adopt the cloud and transform. Reduce the risk and cost of migrating to the cloud by following an agile, collaborative, proven approach that matches your business objectives and cloud readiness, and becomes a blueprint for your success in the cloud.

Modernize your applications. Leverage the benefits of cloud technology to achieve rapid innovation, flexibility, speed to market, and cost savings by modernizing your existing applications.

Build a private cloud. Prepare your team and plan your environment for IBM Cloud Private with guidance regarding your system requirements and readiness, business technical objectives, operations and security, and your private cloud architecture.

Reinvent your cloud operations. Establish the roles, processes, skills, and tools required to build reliable and manageable cloud applications and to maintain a strategic and collaborative operations framework.

Deploy integrated cloud solutions. Power your cloud transformation with pattern-based applications, client-tested practices, and industry-specific experts.
Notes:

Visit an IBM Cloud Garage
ibm.biz/what-is-cloud-garage

Take the course: Explore the Method, and get a badge!!!
ibm.biz/explore-method-course
Explore the Private Cloud Architecture and take the 10-minute guided demo!!

ibm.com/cloud/garage/architecture/private-cloud

Get Book:
“The Cloud Adoption Playbook”, available on amazon.com
ibm.biz/cloud-adoption-playbook
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