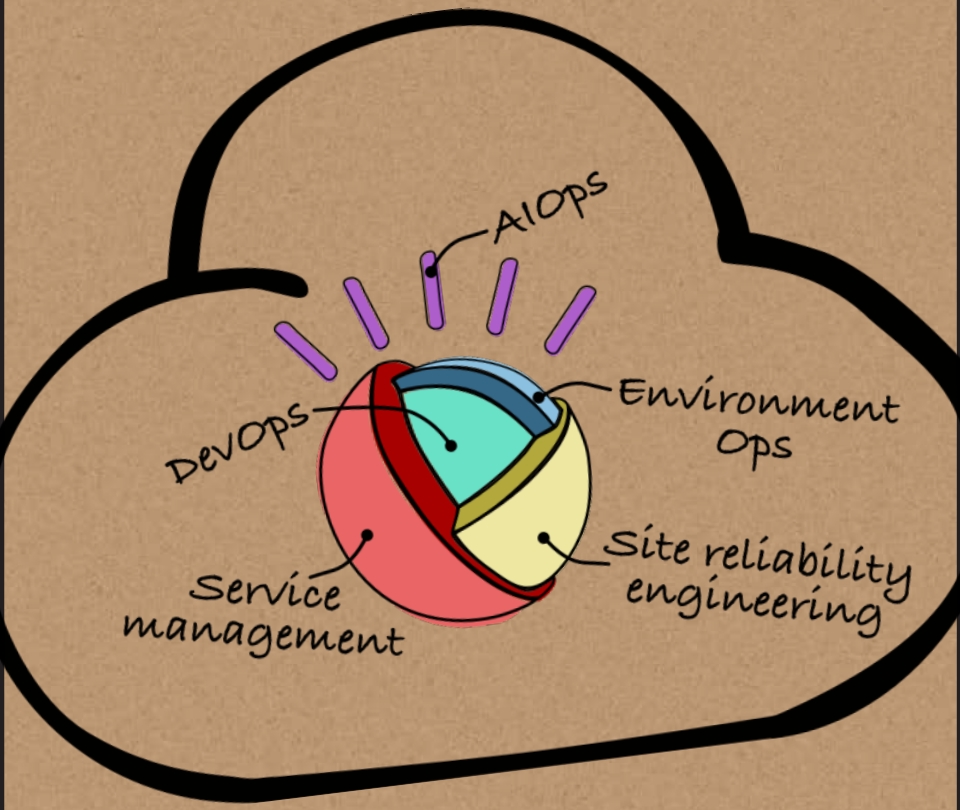

IBM Cloud Service Management & Operations

Field Guide

IBM

Download the current version of the IBM Cloud Service Management & Operations Field Guide

https://ibm.biz/csmo-field-guide

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Cloud service management & operations

Most people who say they are doing DevOps are doing mostly dev and very little ops. Cloud service management and operations is about designing, implementing, and continuously improving the operations management processes you use in your enterprise. Cloud service management and operations is organized into personas who do the work, processes that define what work is needed and how it is performed, and tools to enable and support these activities.

KEEP THE OPS IN DEVOPS

Enable agile for operations. Implement agile and continuous delivery practices for operations in the same way you do for development.

Refine for the cloud. Revisit the activities of plan, design, deliver, operate, and control then transform them to better fit the needs of cloud based operations.

Realize the benefits. Support applications in the cloud to ensure an "always on" experience for your customers.

What's inside?

This field guide provides a high-level overview of cloud service management and operations.

LEARN IT
A summary of the concepts.

GET STARTED
Considerations for moving ops into your development process.

IBM’s unique approach

After an application is pushed to production, it must be managed. Cloud service and management operations addresses the operational aspect of your application and services. Applications are monitored to ensure availability and performance according to service level agreements. As methods to develop, test, and release new functions become more agile, service management must also transform to support this paradigm shift.

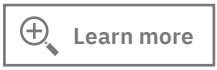
REINVENT YOUR CLOUD OPERATIONS

Organize your team. Create dedicated DevOps teams with full lifecycle responsibility from design to development to operations and global Site Reliability Engineering teams, to ensure availability, stability, and growth.

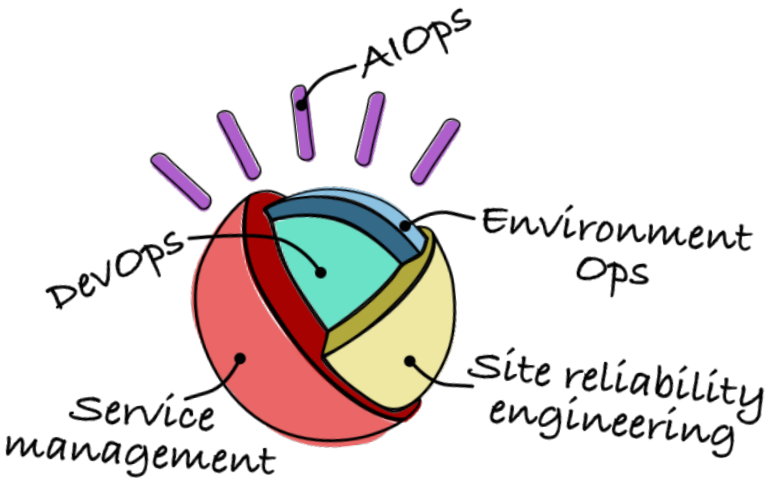
Streamline your processes. Adapt service management processes to work in the context of DevOps automation and continuous delivery.

Choose and use your tools. Adopt tools and methodologies, such as ChatOps and AIOps, to enable collaboration and rapid restoration of service.

Build your culture. Change your existing culture to embrace blameless post-mortems and agile operations.



Check out IBM **Cloud** Service Management architecture.
https://ibm.biz/csmo-guide-ibm



Work with IBM to improve your operations practices.

Slow is the new down

It's all about the customer's experience. Customers demand fast service along with the rapid delivery of new products and features. If your mobile app or website is slow and does not meet your Service Level Objective (SLO), your site might as well be down. Your customer will take their business elsewhere.

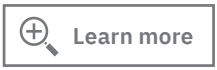
USE OBSERVABILITY TO SUPPORT YOUR SLOW

Shift left. Use automation to test and deploy your applications as early in your development cycle as possible.

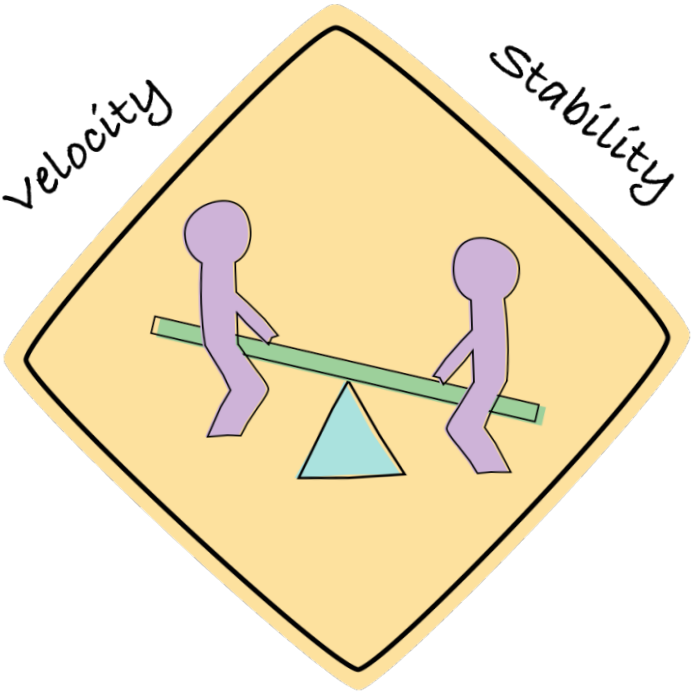
Test your apps. Run your automated tests as part of your DevOps pipeline - every time you deploy. Ensure that the APIs and health checks used by your app are accurate and available.

Observability & the 4 golden signals. To ensure you detect an issue before it causes an outage, prioritize monitoring of the four golden signals: latency, traffic, error rate, and saturation. In addition to these signals, logging and tracing are key to success.

Monitor what is important. Provide observability by instrumenting the application and services. Extend the management and monitoring functionality of containers through sidecars and a service mesh framework such as Istio. Most importantly, monitor the service as it is experienced by the end-user.



Check out the Manage practices in the IBM Garage™ Methodology.
https://ibm.biz/csmo-guide-slow



Customers expect your app to perform on demand.

Relevance of Service Management

Originally developed in the 1980's, the Information Technology Infrastructure Library (ITIL) is one of several competing standards for IT Service development and management. ITIL is comprehensive and has proven its worth in defining key processes and their relationships.

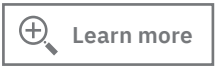
LEARN FROM THE PAST. ADAPT FOR THE FUTURE.

Is ITIL relevant now? With modernization and an understanding of where to deviate, the premise and concepts of ITIL are still relevant. At the same time, they need to evolve towards an agile, cloud-oriented way of working.

Adopt an agile approach. Especially in a hybrid environment, traditional concepts need to evolve and integrate with more agile approaches.

Focus on activities and outcomes. Through collaboration, shift-left, and automation constantly iterate your processes to modernize and achieve a new state of behavior.

Adapt to modern team structures. Break down the silos and evolve to integrated, cross-function team structures inherent in agile DevOps teams.



Check out Service management for IT and cloud services.
https://ibm.biz/csmo-guide-itil

Traditional IT management (ITIL)	Devops and Cloud management
Operations team is often working in isolation, disconnected from the development team	Development team sees successful operations as part of their job
Performed by operations team AFTER product ship	Operations goals defined and addressed throughout the DevOps lifecycle
Primarily process-driven	Heavily focused on embedded and automated capabilities at all stages

Site reliability engineering (SRE)

Service reliability engineers specialize in reliability with the right mix of knowledge and skills in software and systems, responsible to analyze business needs, problem determination, advise & design, build, test, deploy, changes and maintenance of a well engineered information system. These engineers often work hand-in-hand with development scrum team members.

EMBRACE RISK IN A CONTROLLED FASHION

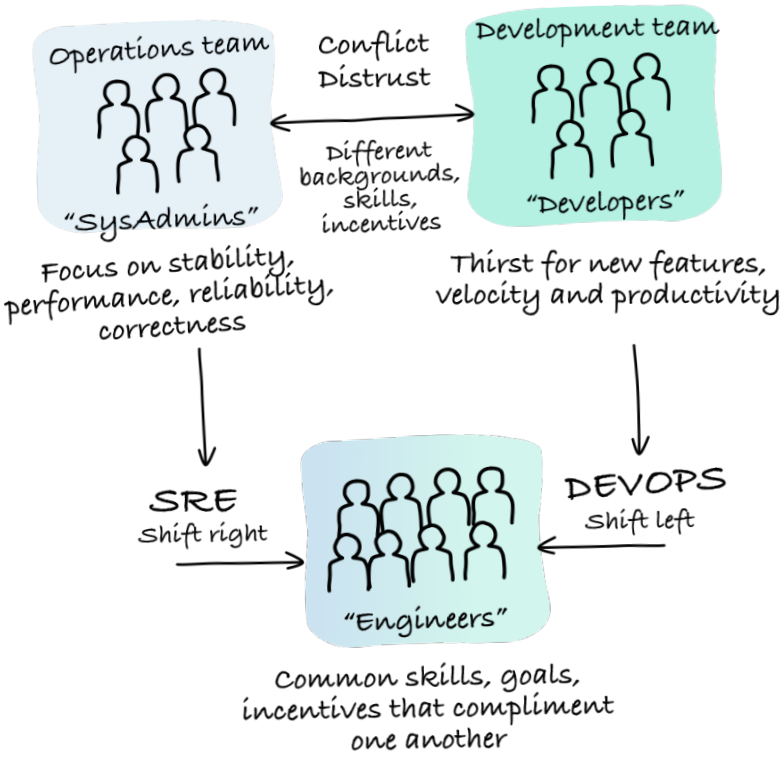
Strengthen the infrastructure. Engage in an operational readiness review to examine all key operational processes and determine the as-is versus the to-be state.

Automate everything. Service reliability engineers use automation to provide reliability resiliency, and availability aspects to an application. They don't stop at automation, they engineer the problem away.

Manage risk using an error budget. The service reliability engineering team defines the quality of a service and manages the velocity and frequency of changes allowed based on this service level objective (SLO).

Get to the root of the problem. Ensure outages do not recur by conducting blameless post mortems to get to the root cause of problems and identify a balanced action plan so that technical debt doesn't grow disproportionately.

Check out the IBM Cloud Service Management architecture.
https://ibm.biz/csmo-guide-sre



An engineering-oriented approach to operations, driven by data.

Incident response

Incident response restores your services as quickly as possible by using a first-responder team that is equipped with automation and well-defined runbooks. To maintain the best possible levels of service quality and availability, the team uses sophisticated obervability to detect issues early, before the service is affected.

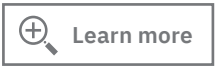
DETECT ISSUES EARLY. QUICKLY RESTORE APP SERVICES.

Enable observability with notifications. Detect outages and performance saturations and alert subject matter experts (SMEs) when something is going wrong.

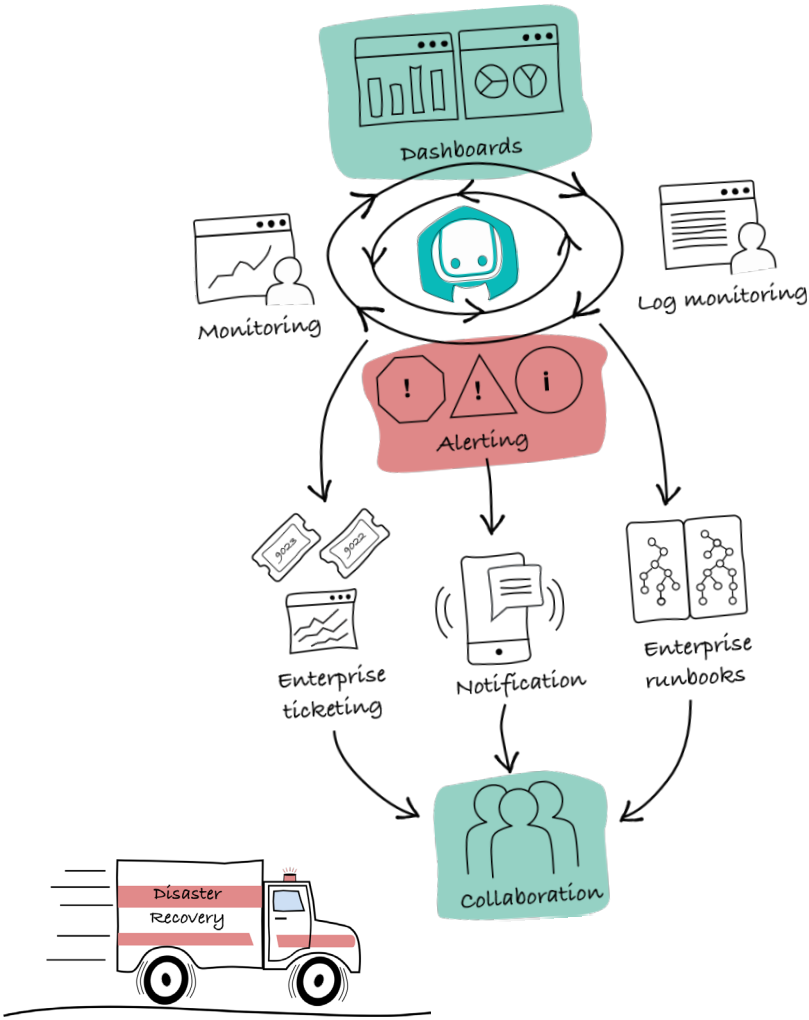
Analyze the incident. Use event management to correlate events, remove noise, and show actionable alerts enriched with additional context.

Plan and collaborate. Use ChatOps to enable SMEs across multiple domains to collaborate, isolate the incident, and identify an effective response.

Resolve the incident. Respond by fixing the problem and informing stakeholders of progress and resolution.



Check out the Incident Management architecture.
https://ibm.biz/csmo-guide-incident



Quickly find and fix your problems to minimize customer impact.

ChatOps

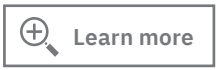
ChatOps integrates development tools, operations tools, and processes into a collaboration platform so that teams can efficiently communicate and easily manage the flow of their work. The solution maintains a time line of team communication that provides a record and keeps everyone up to date, avoiding information overload.

EXTEND THE POWER AT YOUR FINGERTIPS

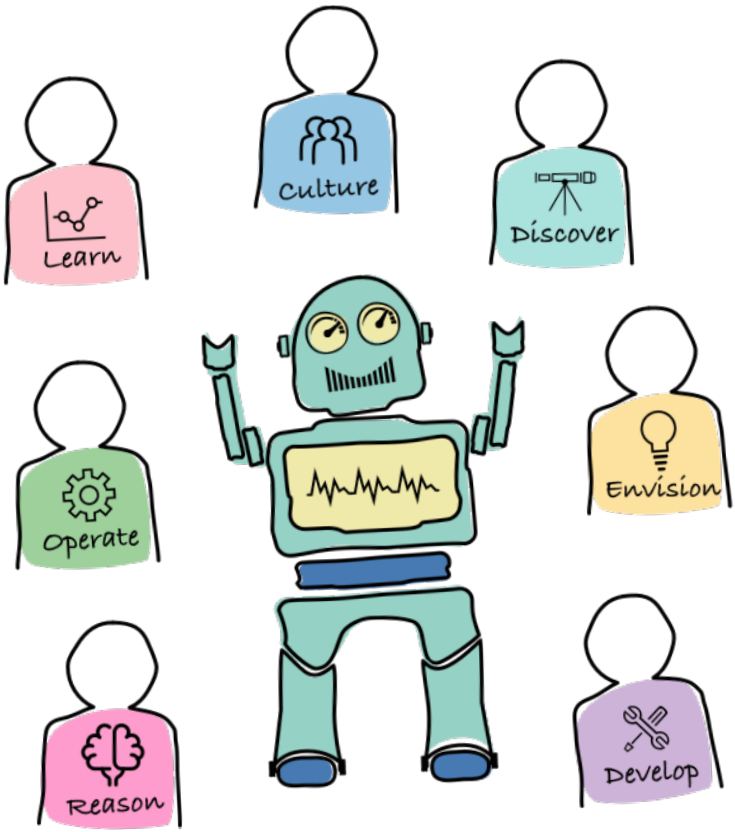
Simplify your processes. Streamline collaboration and increase visibility to other's actions by pushing information to problem solvers, instead of ping-ponging issues and working hard to find information.

Integrate your tools. Integrate Service Management and DevOps tools into the chat platform so the team can concentrate on solving problems without disruptive context switches and lengthy hand-offs.

Automate everything. Increase velocity with bots that answer questions and remotely execute commands, resulting in fewer meetings, less repetition, less manual work and more teamwork and reuse.



See how effective teams use Slack for team communications.
https://ibm.biz/csmo-guide-chatops



Through collaboration tools, teams can get to know each other a little better, work together more efficiently and even have more fun at work!

Post-incident review

People expect cloud services to always be available and to improve continuously. It's the driver to eliminate repeated issues. You must fix the right issue the first time, as repeated problems lead to a loss of faith in your application. Post-incident review means getting to the root cause of a system degradation or unavailability.

BLAMELESS POST-INCIDENT REVIEW

Know when to dig deeper. Perform post-incident reviews when issues occur more than once, when an outage could affect many users, or when the system is not working as designed.

Apply the 5 Hows. State the issue and discuss how it happened. Agree on the answer and again ask how? Repeat until you identify all contributing factors of the problem. Remember, in complex landscapes there will be more than one root cause.

Create a balanced action plan. Identify tactical and strategic activities to create a balanced action plan that addresses contributing factors and reduces technical debt. Manage and measure the backlog with executive focus.

Learn more

Check out Root-cause analysis using the 5 Hows technique.
https://ibm.biz/csmo-guide-problem

Don’t assign blame.

Use the 5 Hows iteratively until you find the cause of the problem.

Build to Manage

The Build to Manage principles mandate that the developers use a set of standards and solutions to make the application manageable and ensure that the application will meet service level objectives.

BUILD MANAGEABLE APPS FROM THE START

Architect for reliability & define standards for manageability. Develop manageable features using Build to Manage principles so you can scale the management of loosely coupled applications developed in different ways by different teams.

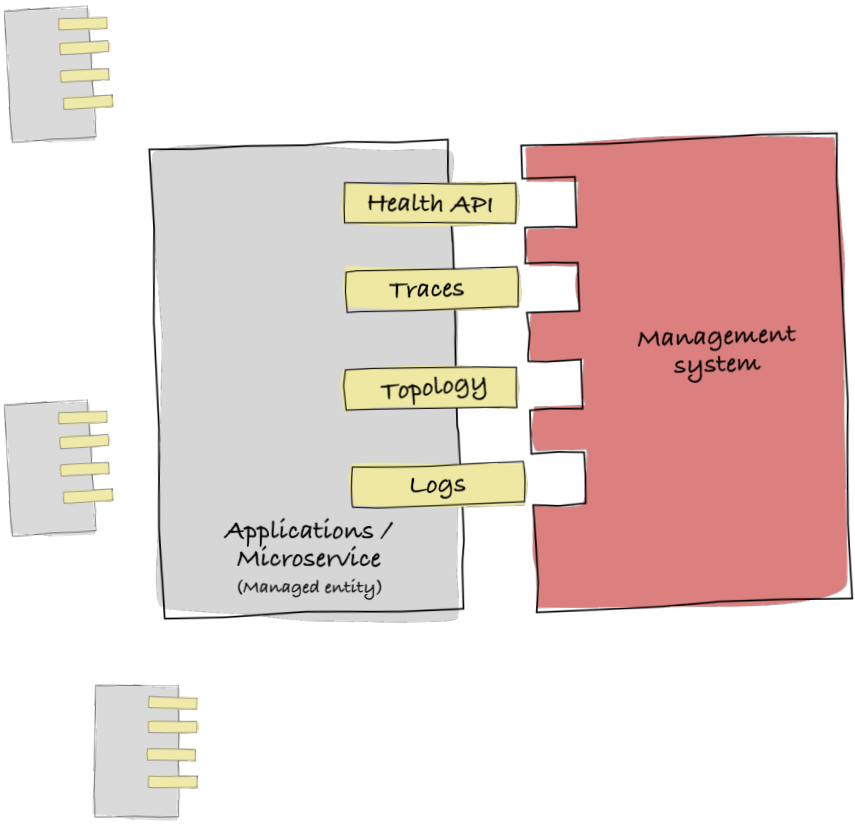
Shift left. More than ever before, application developers have a larger responsibility to develop application management capabilities into their application. They are the ones who know how to create runbooks, analyze logs and traces to identify and solve issues.

Instrumentation & observability. Develop applications with APIs that report health, metrics, logging, traces, topology, and other application information to your management platform.

Test like it runs. Every step in the application lifecycle must be accompanied by an equivalent automated test.

Learn more

Check out Build to Manage principles.
https://ibm.biz/csmo-guide-b2m



Build manageability into your app from the start.

Operational readiness

When apps fail and it takes excessive time to determine the root cause and restore service, customers get frustrated. You want to ensure your customers are delighted. An assessment of your organization's operational readiness answers three questions: what needs to change? how significant is the change? and what are the expected benefits? You can then use these answers to identify the gaps you need to close.

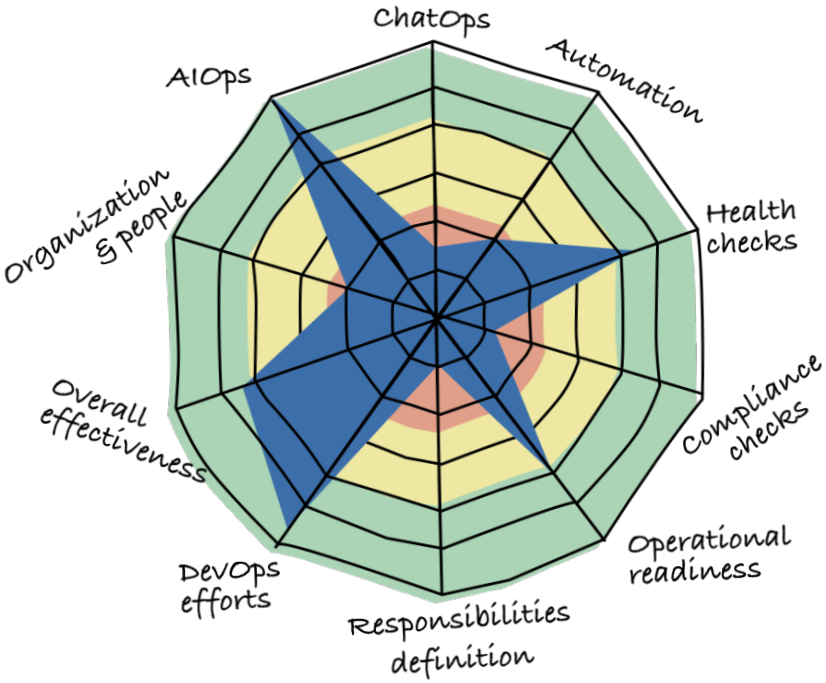
REVIEW. ANALYZE. IMPROVE. REPEAT.

Assess where you are. Engage in an operational readiness review to examine all key operational processes and determine the as-is versus the to-be state.

Determine where you need to be. There are cost and risk tradeoffs inherent in all processes. Assess each process to determine where you need to be.

Improve and assess continuously. Identify gaps, where processes don't meet minimum requirements and put plans in place to address them. As you mature and needs change over time, repeat the whole process regularly.

Check out the IBM Cloud Service Management offering.
https://ibm.biz/csmo-guide-readiness



Assess where you are and determine where you need to be.

Chaos engineering

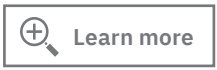
Chaos engineering is the practice of testing a system's response to turbulent behavior, such as infrastructure failures, unresponsive services, or missing components. The goal is to see where the system breaks to correct its architecture, understand its weak points, and anticipate failures and how the system and the people might behave.

A MATURE AND RIGOROUS ENGINEERING METHOD

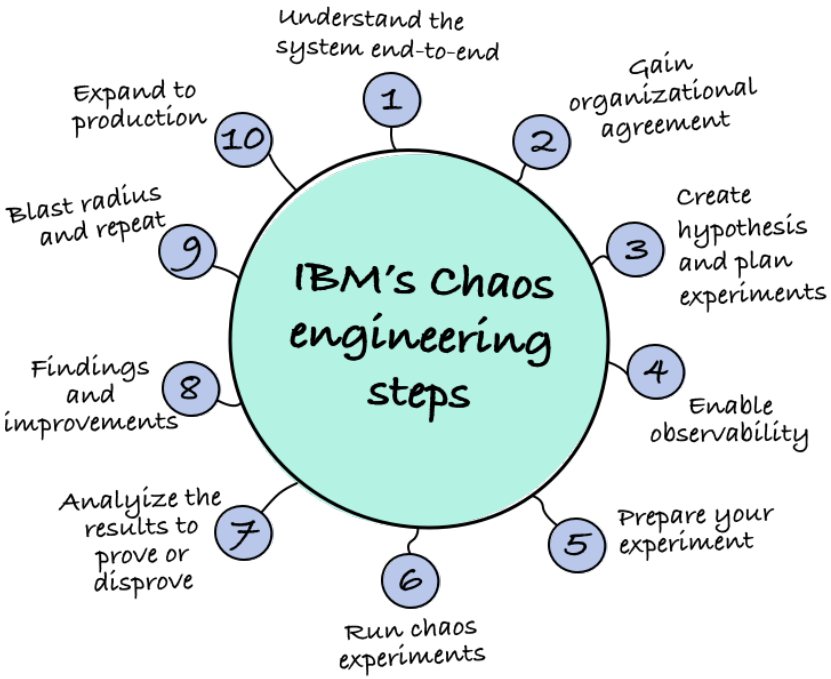
Chaos engineering. Define an experiment that challenges the successful operation of a system. For example, killing a process and ensuring that the service is reliable enough to continue functioning until the process is automatically restarted. The experiment is automated with an element of randomness with a goal to perform these tests in the production environment too.

Strict engineering procedures. Attacks on a system are pre-planned experiments that are contained, observed throughout the experiment, communicated across the organization, and learned from.

Overcoming cultural resistance. Chaos engineering is not about randomly breaking things. To impart chaos engineering practices into an organization that is resistant to using failures as a learning experience, you must emphasize that chaos doesn't mean random and that rigor is at the heart of chaos engineering.



Check out Chaos engineering principles.
https://www.ibm.com/cloud/architecture/architecture/practices/chaos-engineering-principles/



IBM's Chaos Engineering steps.

Culture changes

Historically, organizational models encouraged domain specific processes that limited visibility, shared responsibility, and placed boundaries around teams. Emerging models include new roles and responsibilities that demand cultural changes. As with any significant change, the senior leadership must understand, support and help drive the organizational changes and find ways to make the change successful.

CULTURAL CHANGE STARTS AT THE TOP

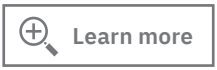
Blame free environment. Encourage understanding without blame so others can learn from mistakes without fear of consequences.

Remove organizational silos. The team owns the deliverables through the entire lifecycle.

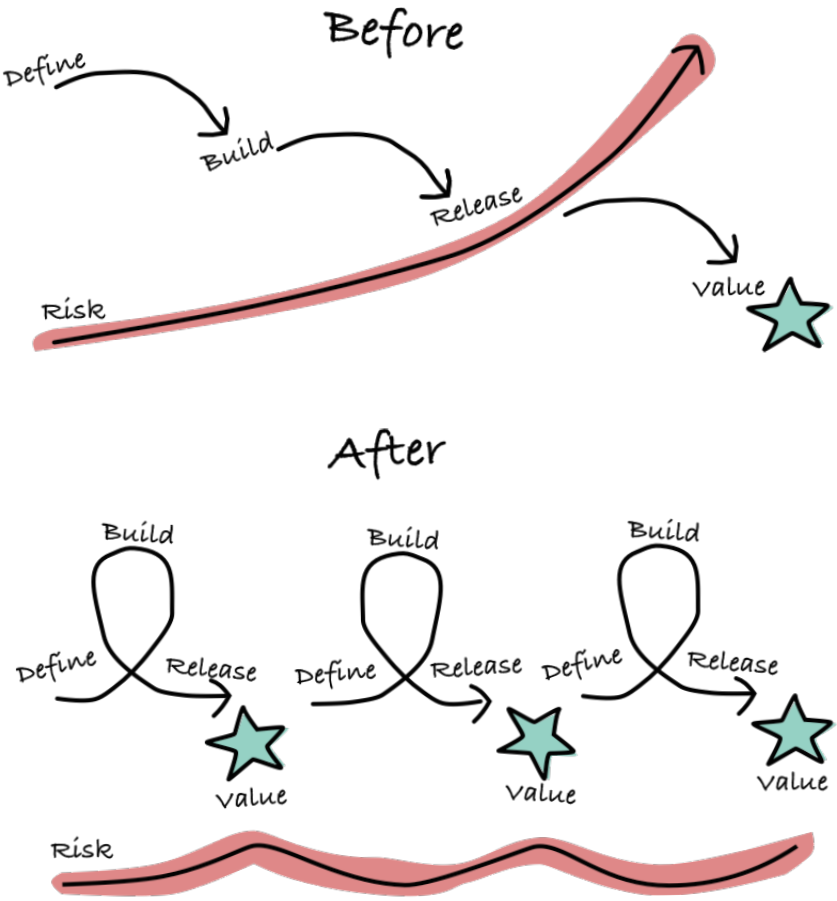
Iterate. Create minimally viable products (MVP) and experiment to gather feedback and provide a delightful user experience.

Rigid engineering. Fail forward and continue to work on the next version.

Transparency. Share your data, share your knowledge, and give people a voice.



Check out the Culture practices of the IBM Garage Methodology.
https://ibm.biz/csmo-guide-culture



Manage risk by removing organizational silos and delivering value at increased speed.

New roles for operations in the cloud

When you move to the cloud, the resulting culture change requires modifications to the structure and roles of your project teams. Some team members can play multiple roles and groups might be merged to create a cohesive, diverse squad. When forming the ops side of your DevOps team, consider the addition of several new roles.

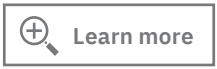
BUILD YOUR OPS TEAM TO FIX PROBLEMS FAST

First responder. Evaluates problems and assigns priority and urgency. This team member is empowered and skilled to solve problems, collaborating with others when needed.

Incident commander. Manages the investigation, communication, and resolution of major incidents.

Subject matter expert. Applies the deep technical skills required to resolve new and unique application issues.

Site reliability engineer. Takes operational responsibility to support applications running on the cloud.



Check out the Roles in a squad practice.
https://ibm.biz/csmo-guide-roles

First responder

Incident commander

Subject matter expert
(SME)

Site reliability engineer

Ensure the solution does not incur technical debt.

The Ops in DevOps

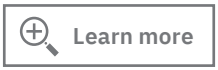
DevOps is a set of practices that automate the processes between development and IT operations teams. The concept is founded on building a culture of collaboration between development and operations teams that historically functioned in relative silos. The promised benefits include increased trust, faster software releases, ability to quickly solve critical issues, and better manage unplanned work.

DEV+OPS = TRUST, QUALITY, FASTER VELOCITY

Configuration management & infrastructure as code. Create code to automate operational tasks, and operating system and host configurations. GitOps makes configuration immutable, repeatable, and automates changes.

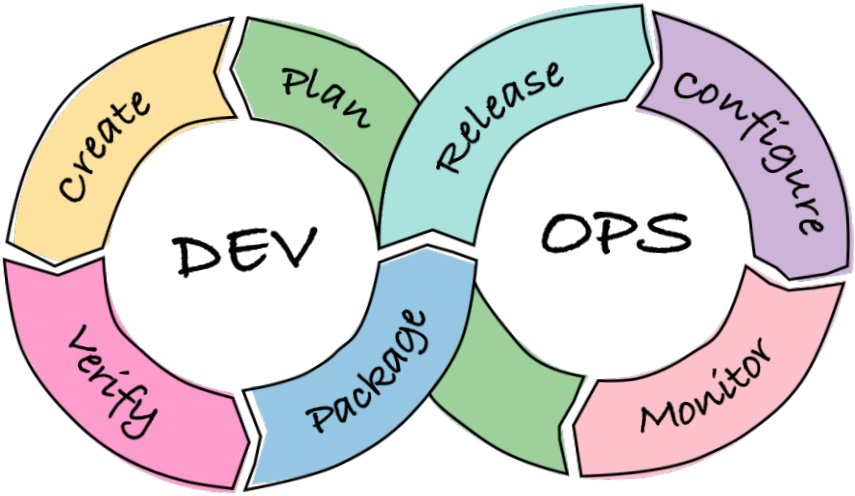
Observability: monitoring, logging, & tracing. Monitor metrics and logs to see how issues impact the user experience. Be proactive and fix things before users are aware an issue exists.

Communication & collaboration. Use tools and automation, including chat applications, issue or project tracking systems, and wikis to keep everyone informed.



Check out Building a DevOps culture and team.
https://ibm.biz/csmo-guide-devops

Teamwork is critical for success!



Remove the silos. Work as a unified DevOps team.

AIOps

Traditional monitoring is changing. Teams can no longer rely on administrators to define a set of monitors and associated thresholds that might or might not detect an issue as it occurs. This lack of insight into a system means that significant events can occur with almost no foresight or warning.

“AI for IT Operations takes data from tickets, metrics, and log sources, and uses deep learning and AI to gain insights from the data. This data is then infused into processes to provide expert guidance for the operations teams.” –Richard Wilkins, IBM Distinguished Engineer

SOLVE IT OPERATIONS PROBLEMS BY USING AI

Learn more

Read about AIOps.
https://www.ibm.com/cloud/architecture/architectures/sm-aiops/overview

Collect relevant data. Monitoring products collect large amounts of data that is streamed into a common centralized data lake, which enables AI models to create a system performance baseline. Relevant data must be defined collaboratively by application and system stakeholders.

Organize and curate data. Understanding the data and ensuring that it is curated, accurate, organized, and up to date is important. A data science team that understands the origin of the data, company policies and rules, and the different data types can make or break the accuracy of your AI predictions. Use big data tools and concepts to organize the data into logical groups, or data sets, that drive AI models.

Analyze by using data models. It is key to select the right AI models to get the most accurate results from a data set. Data scientists select and train the AI models that best suit the available data. Models are fed data through supervised and then unsupervised learning to establish a baseline of predictions that yield high confidence. Models continuously learn with reinforcement learning to correct biases and follow changes in application behavior.

Infuse processes with insight. The true value of AIOps is realized when the insight gained from AI models is infused into operational processes and procedures. Use collaboration tools that surface and publish the results from AI models. These tools bring people together so they can interact while using the insights provided by AI.

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.

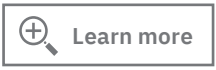
Gain insights where you work. Keep teams focused, surfacing insights and recommendations into existing workflows.

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

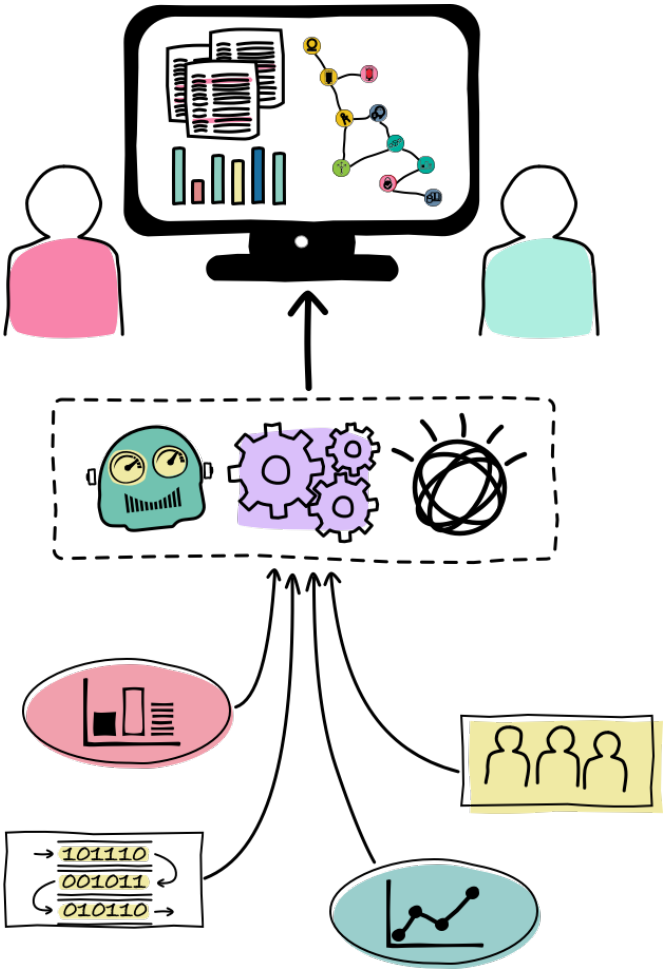
Automate with confidence. Empower teams to automate tasks with transparent AI decision-making in ChatOps.

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



Reduce churn and enable efficient teamwork.

Cloud management in the IBM Garage

Your ideas plus IBM's proven expertise equal great solutions on a global scale. IBM service management subject matter experts have extensive experience with managing applications running on the cloud – private, hybrid and public. Cloud service management and operations reduces the cost of delivering cloud services and helps support and justify your investments.

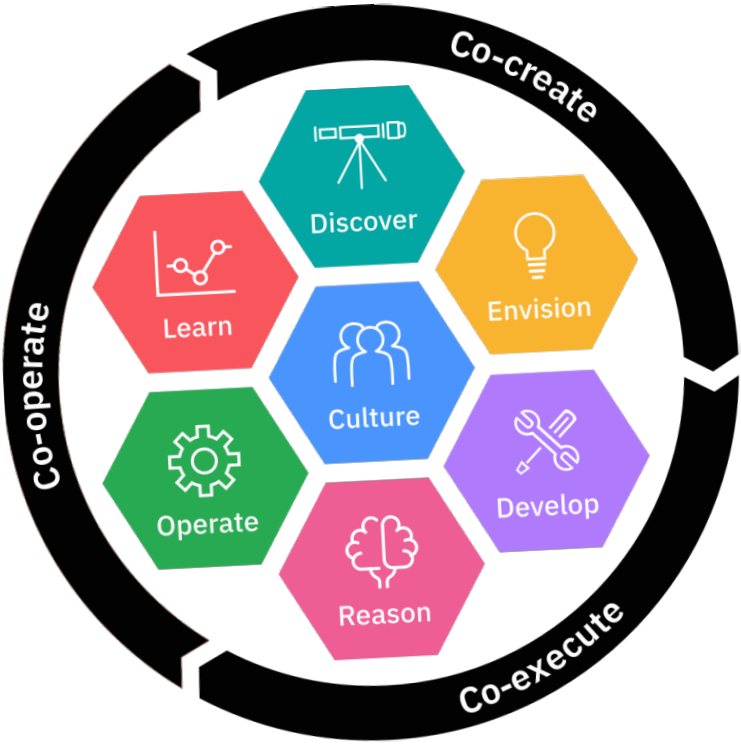
WHEN YOU DON'T KNOW, ASK THE EXPERTS.

Start with an MVP. Understand how to manage and operate on the cloud. Build your service management minimum viable product (MVP) and roadmap.

Work with IBM SMEs. Leverage the expertise of IBM SMEs who have extensive experience defining the processes and using the tools needed to operate and manage your applications and cloud environment.

Implement and repeat. Implement your MVP to demonstrate success quickly. Choose the next MVP on your roadmap and continue your operations transformation journey.

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



Apply the IBM Garage Methodology to your cloud service management & operations.

Notes:

Reinvent your Cloud operations

https://ibm.com/cloud/garage/services/manage-offering

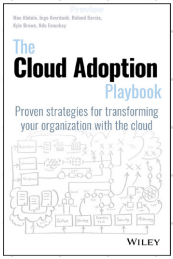
Get your Cloud service management and operations badge

https://ibm.biz/csmo-badge

Explore the IBM Cloud Service Management Architecture

https://www.ibm.com/cloud/garage/architectures/serviceManagementArchitecture

Get the Book:



"The Cloud Adoption Playbook", available on amazon.com

https://ibm.biz/cloud-adoption-playbook

Read the IBM App modernization field guide!!!

https://www.ibm.com/cloud/garage/content/field-guide/app-modernization-field-guide/

Explore the IBM Cloud Pak for Watson AIOps!

https://www.ibm.com/cloud/cloud-pak-for-watson-aiops

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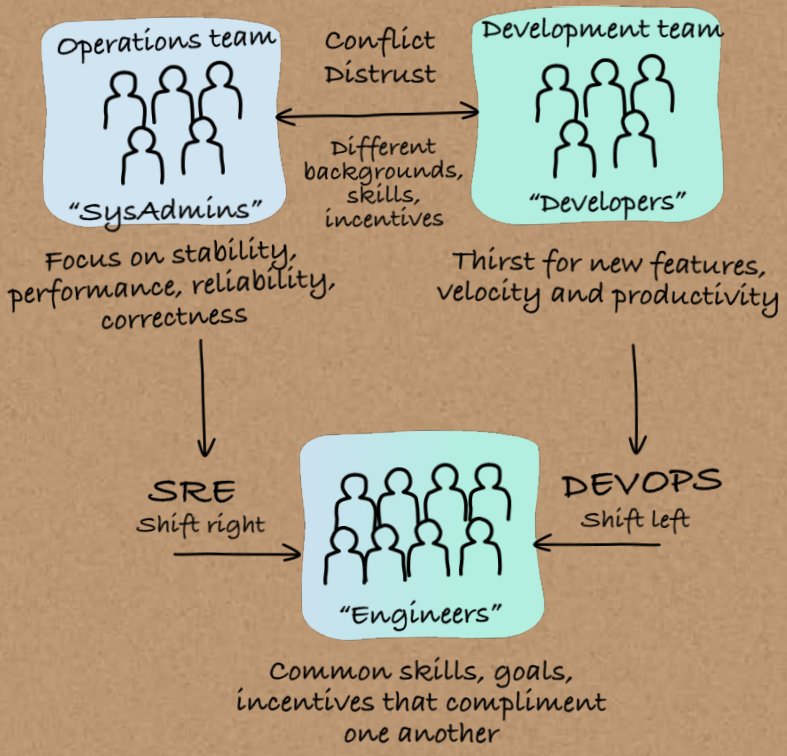

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