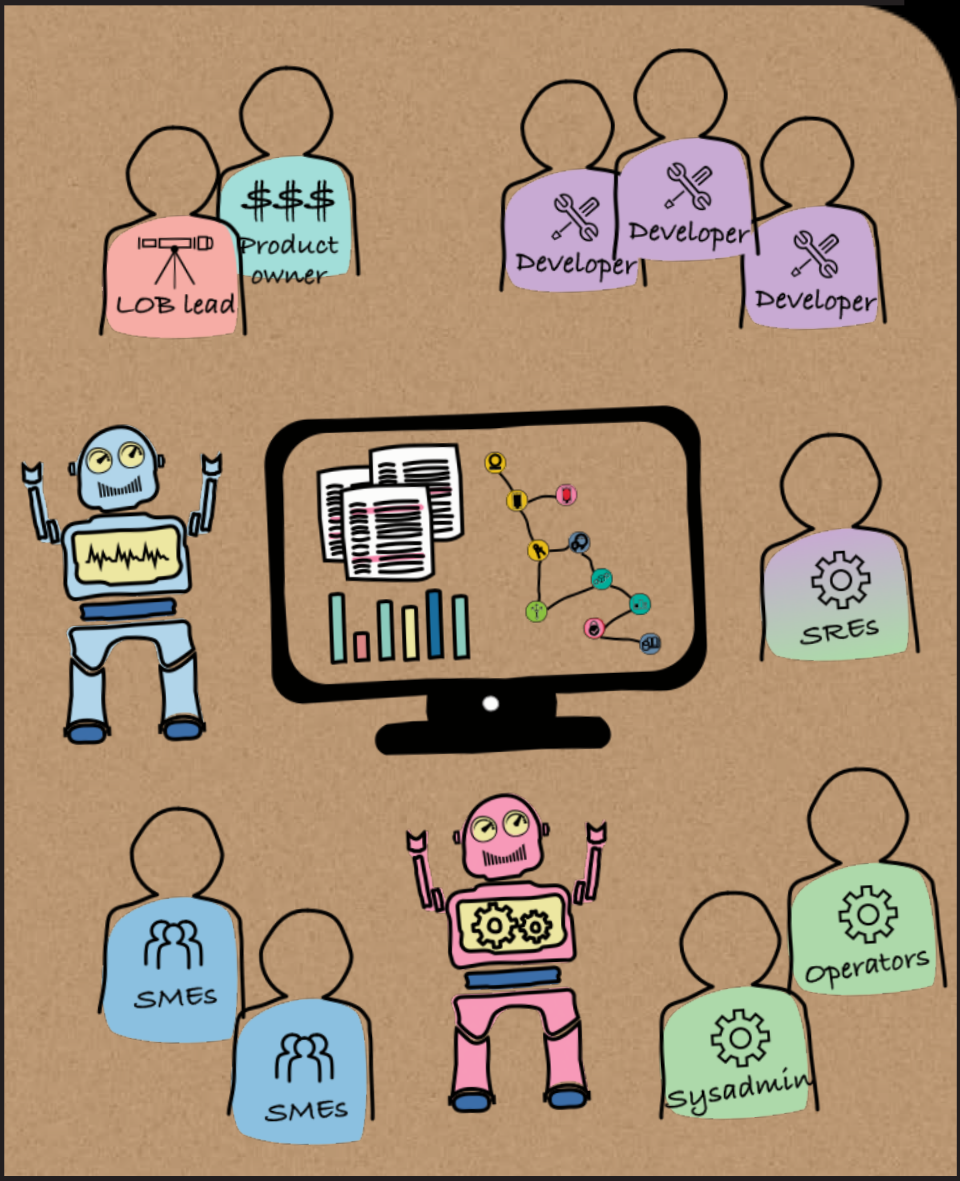


IBM AIOps

Field Guide

IBM

Download the current version of the IBM AIOps Field Guide

https://www.ibm.com/cloud/architecture/content/field-guide/aiops-field-guide

Why do you need AIOps?

Traditional monitoring is changing. Teams can no longer depend on a set of monitors and thresholds that can detect issues. With no insight into a system, significant events can occur with little warning.

EVOLVE: IMPROVE OPERATIONAL EFFICIENCY

Environments are more complex. Consolidate, prioritize, and track the data you need to understand the operational aspects of your hybrid cloud application, which generates a lot of operational data.

Change is a constant. Incorporate AI to enable early problem detection and enable proactive action. As you evolve to a continuous delivery model, your operations team must anticipate problems and support new application functions. They also need to adjust the cloud platform the application runs on and the service dependencies.

Rules and thresholds are not enough. With an expanded focus on availability, reliability, velocity, and quality your customers have high expectations regarding your applications. Harness the power of trusted AI to automatically advise you of problems before or as they occur and fix them, in some cases without operator intervention.

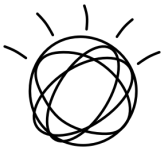
What's inside?

This field guide provides a high-level overview of how AIOps can improve your business.

LEARN IT
A summary of the concepts.

GET STARTED
Tips to get started with AIOps.

What is AIOps?



AIOps is the infusion of AI into existing operational processes including incident, problem, and change management. AIOps provides operational efficiencies, such as predictive alerts and outage avoidance.

INFUSE AI TO STREAMLINE IT OPERATIONS PROCESSES

Collect operational data. Monitor applications, the systems they run on, and the products that support them to collect data to detect performance issues and outages. Gather structured data from events, metrics, traces and topology, and unstructured data from logs, trouble tickets, collaboration tools, and social media.

Organize your data. Understand, curate, organize, and validate the data to ensure it is accurate. Use big data tools and concepts to provide governance and organize the data into logical groups or data sets that can be used to drive AI models.

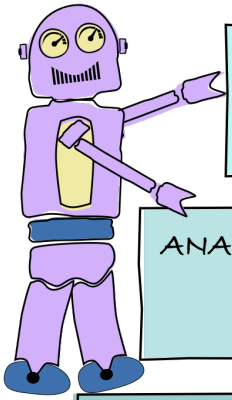
Analyze data using data models. Select the right AI models to get the most accurate insights and predictions from your data set. Build models and use deep learning/machine learning to gain insights.

Infuse AI in operations. Infusion is primarily done by using a collaboration tool or dashboard that can surface and publish the results from the AI models.

Learn more

Check out IBM AI for IT Operations architecture.
https://ibm.biz/aiops-ref-arch

The AI ladder



INFUSE

Operationalize AI with trust and transparency

ANALYZE

Scale insights with AI everywhere

ORGANIZE

Create a trusted analytics framework

COLLECT

Make data simple and accessible

The true value of AIOps is realized when the insights gained from AI models are infused into operational processes and procedures.

Who needs AIOps?

Diagnosing operational problems in hybrid, multicloud, microservices applications is complicated.

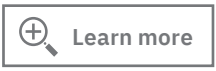
THE WHOLE TEAM BENEFITS FROM AIOPS

Site reliability engineers, sysadmins and operators. Diagnose the problem quickly and efficiently. Select the best possible solutions to address problems in real time and use runbooks that include automation when available. Be sure to pass all relevant information to the development team for a code fix.

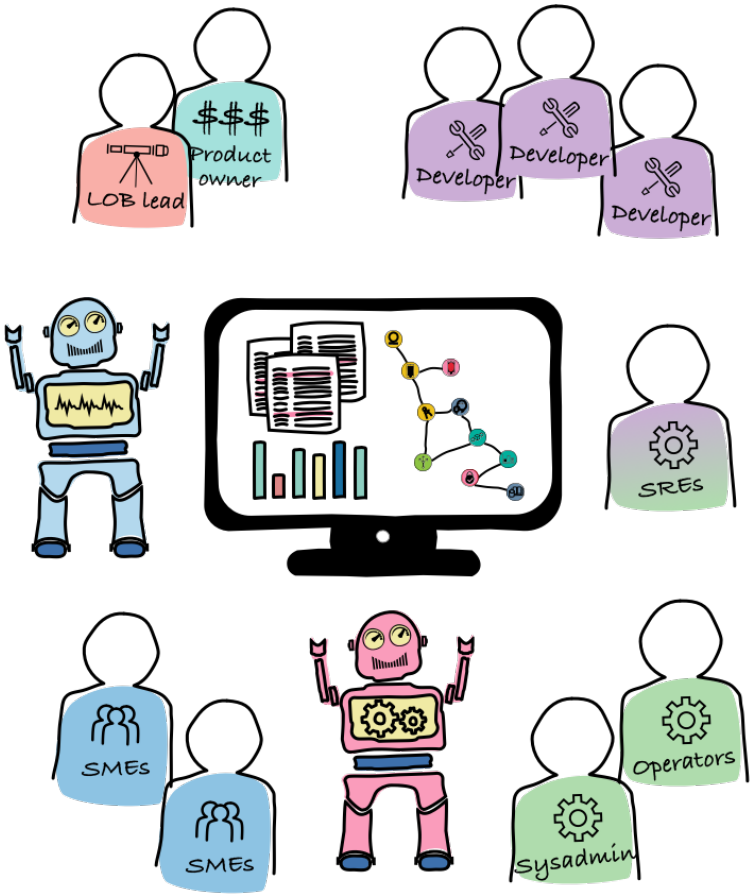
Development teams and DevOps engineers. Resolve problems quickly using diagnostic data and recommended actions provided by the AIOps tools.

Subject matter experts. Learn from AIOps insights to build intelligent workflows with consistent application and deployment policies. Use AIOps data and insights to perform root cause analysis and further harden your applications and infrastructure.

Product owners and Line of Business (LoB) leaders. Apply AI to IT operations to maximize efficiency, reduce cost, and maintain the resiliency and security you need to drive meaningful innovation.



Read more about who needs AIOps.
https://ibm.biz/aiops-guide-who-needs

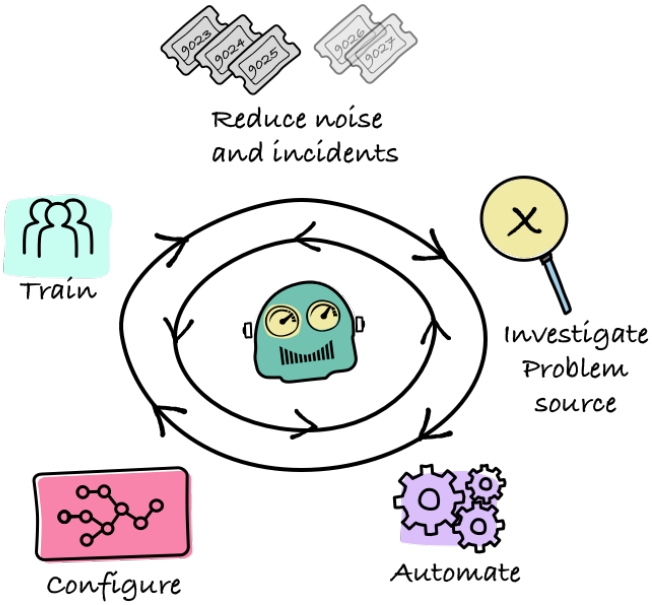


Provide your team with the tools they need to detect, diagnose, and solve problems quickly and efficiently.

Apply AI to IT operations

Transform your IT operations processes by taking advantage of AIOps capabilities including event correlation, monitoring, log monitoring and analysis, runbook automation, configuration management, and more.

STREAMLINE, AUTOMATE, AND APPLY AI



Learn more

Read about applying AI to IT Operations.
https://ibm.biz/aiops-guide-overview

Reduce noise and incidents. Streamline incident management. Use sophisticated base lining to detect issues early. Use AI driven consolidation and grouping of events to identify actionable incidents and speed resolution. Keep all stakeholders and team members informed about the status of an incident.

Get to the source of your problems. Use the relevant incident context to find the best response by using techniques such as entity linking of similar issues into a single story. Take countermeasures to prevent the incident from happening again.

Automate release and change management. Where possible, create automated responses to address the factors contributing to the incident. Contributing factors might include the application, the infrastructure, or the supporting environment. Open issues for changes that cannot be automated. Address prioritized issues in the backlog in an agile manner.

Understand your software and infrastructure configuration. Use configuration management tools to maintain knowledge about your solution's application, infrastructure components, and their relationships.

Training and skills development. Upskill your team using the latest tools to efficiently operate your hybrid, multicloud applications and infrastructure. Make past incident and root cause analysis information available so new team members can learn based on past events.

Embark on the AIOps adoption journey

Incorporating AI into your IT operations processes requires change to your culture, tools, processes, and team member roles.

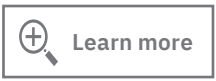
START SIMPLE AND EXPAND

Implement Simplified AIOps to reduce noise and increase efficiency. Reduce incidents and manual effort by automatically grouping related events. Automatically analyze patterns in data to identify waste and automation opportunities, such as recurring incidents, i.e. seasonality.

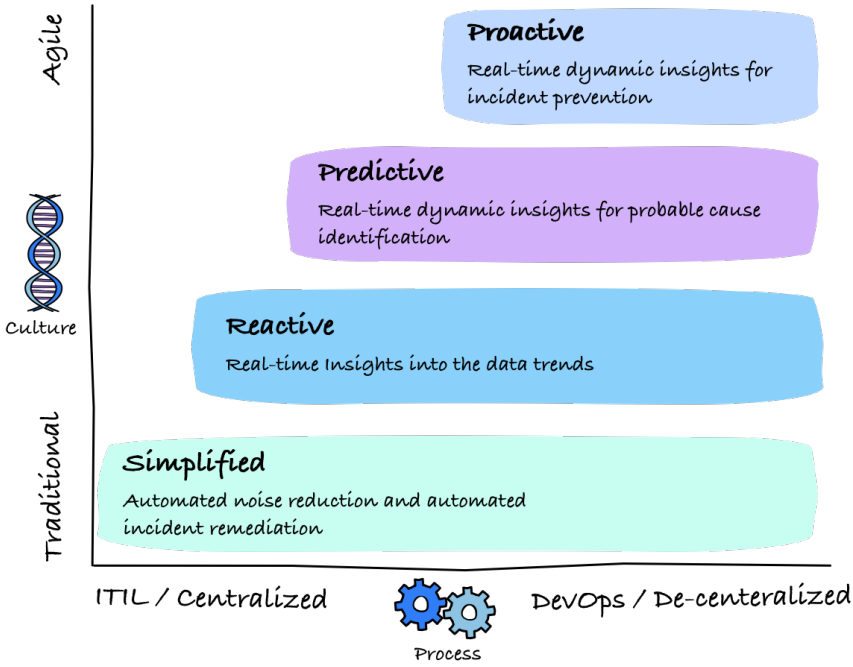
Incorporate real time insights into data trends with Reactive AIOps. Take advantage of real-time, dynamic insights for probable cause identification. Take into account big data searches across operational data including supplemental text and log information.

Use Predictive AIOps for predictive, multivariate correlation. Gain insight into the root cause of incidents as AI tools learn the complex relationships between your application and infrastructure.

Prevent incidents with Proactive AIOps. Avoid outages. Proactively manage critical applications and infrastructure. Detect behavior changes and take corrective action before critical services and users are affected.



Check out the AIOps adoption journey.
https://ibm.biz/aiops-guide-journey

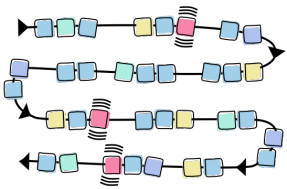


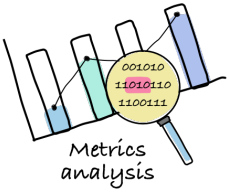
Move through the four phases of the AIOps journey at a pace that is right for you.

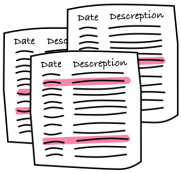
Enable your SREs with AIOps

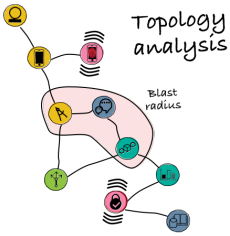
Cloud Pak for Watson AIOps provides many features to improve your IT operations processes and enable you to deliver greater reliability with less risk.

ANALYZE, AUTOMATE, COMMUNICATE, LEARN

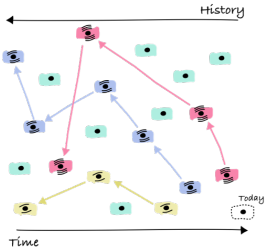








Historical similarity analysis



Learn more

Check out SREs using AIOps.
https://ibm.biz/aiops-guide-sre

Event analysis. Analyze, prioritize, and highlight events that need operator attention to prevent or take action on major incidents.

Structured data analysis (e.g metrics analysis). Ingest cross-domain data from sources such as monitoring and application performance management tools. Use the data to learn the normal behavior of metrics and automatically detect anomalies.

Non-structured data analysis (e.g. log analysis). Analyze events and log entries using machine learning analysis to identify anomalies that enable SREs to quickly identify and diagnose incidents to reduce mean time to diagnosis (MTTD).

Topology analysis. Observe and discover application and infrastructure dependencies, regardless of type, vendor, or source. Conduct cross-layer application and infrastructure dependency mapping for information originating from distinct, disjoint sources of truth, which results in a comprehensive application and infrastructure dependency map for the stack.

Historical similarity. Use historical experience to find patterns to accelerate incident remediation.

Communicate. Inform the right people at the right time.

Event analysis

Analyze events and provide insights that need operator attention to prevent or take action on major incidents. Allow Ops to respond faster to the correct event.

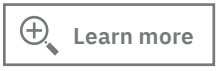
FIND THE NEEDLE IN THE HAYSTACK

Group events. Reduce the noise for your operations team through event grouping. Eliminate duplicate events and group remaining events by time, topology, and business context. Help the team focus on important events that need immediate attention.

Prioritize between and within event groups. Select groups of events to act on first by using severity and urgency to provide business context. Within an event group, use context information to identify the event that caused the problem. Link downstream events to the initial event.

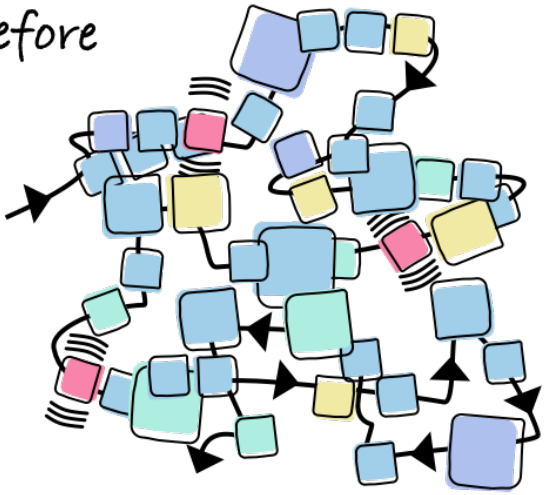
Filter and find repeating event patterns. Reduce the number of events the team has to look at by eliminating irrelevant events. Find repeating event patterns so you can identify the root cause and remediate it instead of just handling the symptoms.

Prevent event storms. Detect anomalies as soon as they occur and work to resolve them to prevent event storms and the chaos they generate. An event storm occurs when a large number of events is generated over a very short period of time.



Learn about event analysis.
https://ibm.biz/aiops-guide-event-analysis

Before



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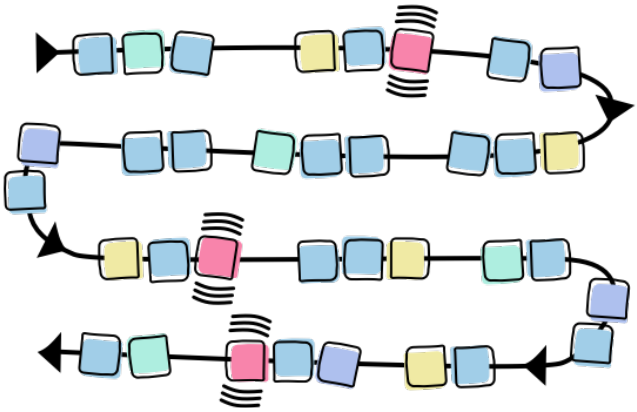


Structured data analysis

Analyze metrics data from monitoring and application performance management solutions to automatically learn the normal behavior of metrics and predict and detect anomalies.

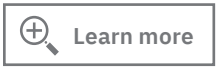
PREDICT WHEN AN IMPENDING ERROR IS LIKELY

Detect anomalies in a metric. When a metric is out of range, notify the SRE/Ops team immediately so they can take a look their dashboard to determine what is going on by comparing the current situation with normal behavior defined set by machine learning that sets adaptive thresholds based on real experience.

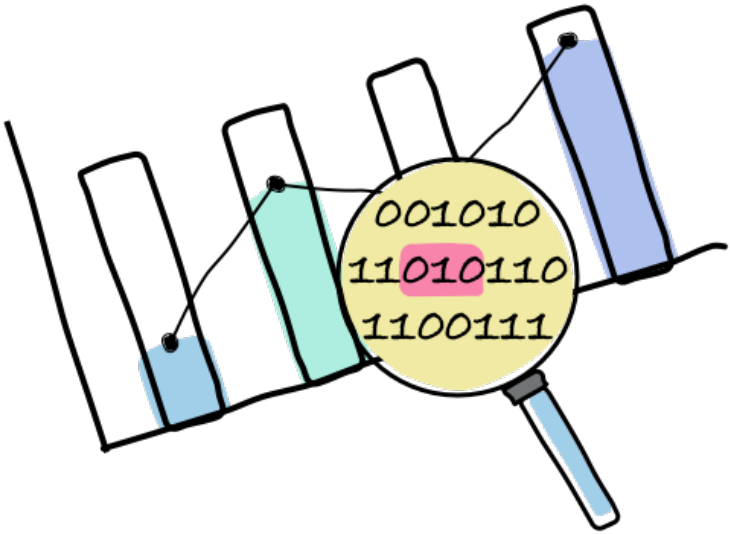
Identify relationships between metrics. Cloud Pak for Watson AIOps can automatically identify related metrics which can be examined. This enables the SRE to understand the full scope of the problem and narrow down solutions right away.

Predict impending errors. Using forecasting and trending statistical analysis of metrics, show when an impending error is likely to occur.

Build long term capacity plans. Use your metrics data to do long term forecasting and trending for the purpose of capacity planning.



Learn about structured data analysis.
https://ibm.biz/aiops-guide-struc-analysis



Cloud Pak for Watson AIOps employs a large set of time-tested, time series algorithms to capture anomolies, significant trends, and relationships to perform forecasting.

Unstructured data analysis

Cloud Pak for Watson AIOps is trained to understand a normally functioning system's event log. As the system runs, anomalies in the log can be identified as soon as they occur. Early warnings are sent to service reliability engineers who proactively resolve the problem, often before the end user is aware that a problem occurred.

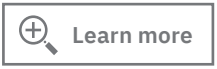
SOLVE PROBLEMS BEFORE YOUR USERS KNOW THEY EXIST

Parse log data automatically. Automate the parsing of non-structured IT application and infrastructure log text. Train the system to understand normal log data without experts spending hours to manually interpret the different fields.

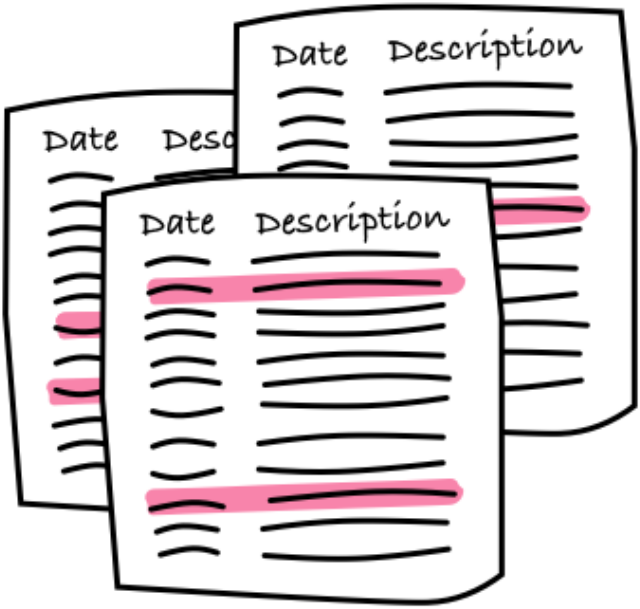
Detect anomalies in the logs. Automatically detect abnormal activities from the system logs to help engineers and operators better react to issues. As log messages are processed, anomalies are identified, marked, and used to send alerts to engineers who can fix the problem before it gets worse.

Take the best-next action. As new issues occur, identify similar past incidents along with recommended actions that might be used to solve the problem.

Continuously learn over time. Processing event logs over time enables Cloud Pak for Watson AIOps to develop a clearer picture of what a normal event log looks like and to identify additional patterns that indicate a problem has occurred.



Learn about unstructured data analysis.
https://ibm.biz/aiops-guide-unstruc-analysis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Topology analysis

Gain an understanding of your application and infrastructure dependencies, regardless of type, vendor, or source. Map information that originates from distinct, disjoint sources of truth to provide a comprehensive application and infrastructure dependency map for the stack.

KNOW YOUR DEPENDENCIES

Application, network, and infrastructure topology. Build a map that identifies connections between mission-critical applications.

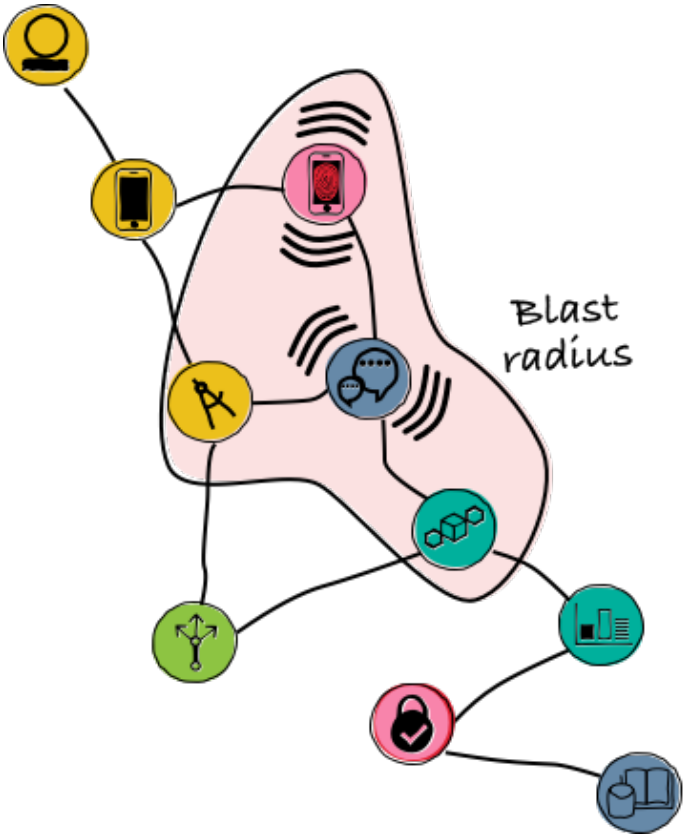
Runtime topology. Provide near real time visibility into your application as it is running. Build a dynamic map that captures the resources and their relationships as the environment changes at application runtime.

Use topology information in incident resolution. Compare the current topology with a historical one to answer questions such as “What happened then?” and “What’s happening now?”. Investigate details that lead to an incident and observe the topology status over time.

Identify and limit the blast radius. When resolving incidents, traverse the topological graph in the application, infrastructure, and network layers to enable SREs to identify the impacted components, known as blast radius. Build in protection to limit the blast radius.

Learn about topology analysis.
https://ibm.biz/aiops-guide-topo-analysis

Identify and limit the blast radius.



For each application, understand the relationships within the application and the infrastructure.

Historical similarity

Accelerate the immediate remediation of current problems, create long term solutions, and prevent problem recurrence by using historical data and operator experience to find patterns.

LEARN FROM HISTORY

Identify similar problems. For a given problem description, find the top-ranked similar incidents, channels, experts, etc. captured in issues, tickets, collaboration platforms, and HR tools. Finding relevant similar incidents leads to faster incident resolution times.

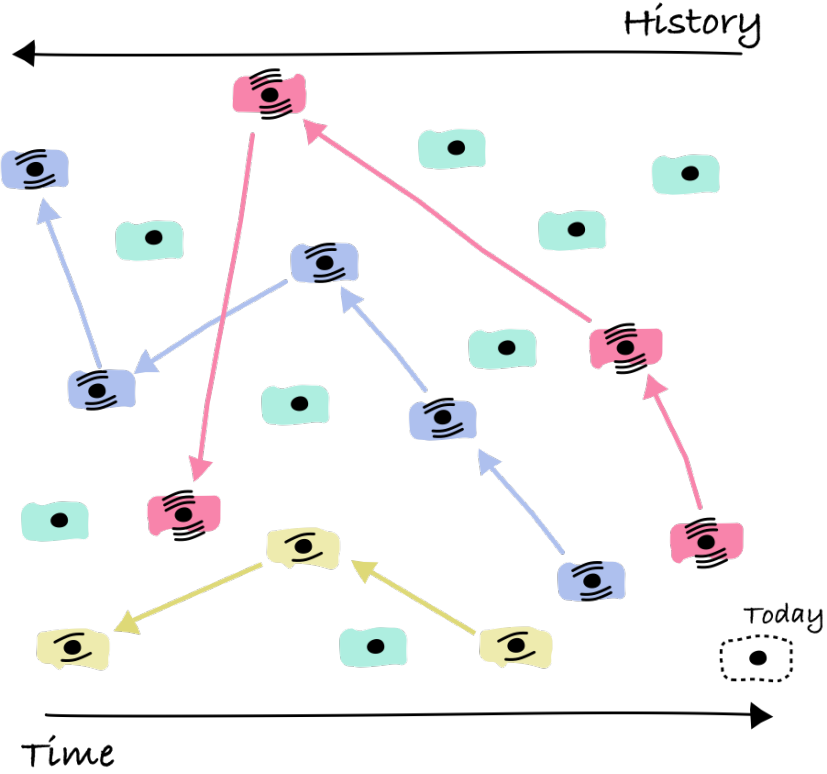
Determine the next best action based on past experience. For a particular incident, Watson AIOps can find the highest ranking actions from similar past incidents.

Perform root cause analysis for recurring problems. Identify repeating incidents that require root cause analysis. The result of the root cause analysis is a solution that prevents the problem from recurring.

Understand risk. AIOps tracks the results of previous changes and calculates the results of future changes to notify you of the potential risk before deploying new applications or performing other changes in your environment.

Learn about historical similarity.
https://ibm.biz/aiops-guide-historical

Fix and prevent future problems



Use tools in Cloud Pak for Watson AIOps to take advantage of your historical data and improve your operations.

Change risk assessment

AIOps improves the availability and performance of your services by reacting faster and proactively responding to issues. AIOps can also help you avoid issues by predicting and instructing you on how to reduce the risk of upcoming changes.

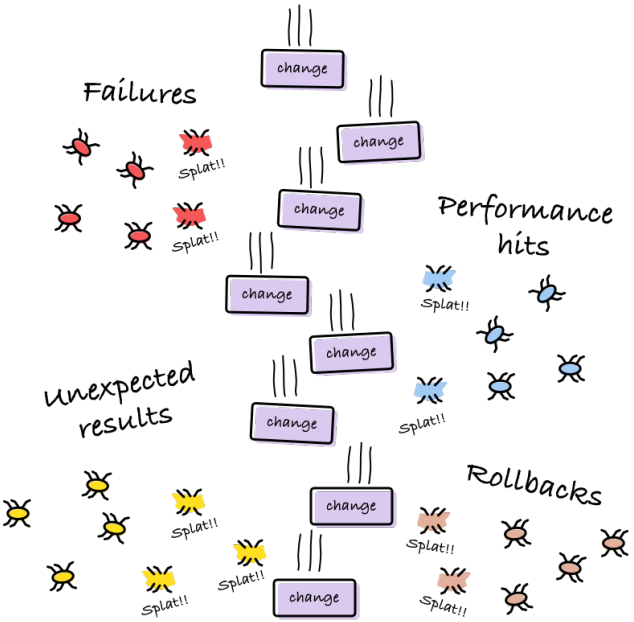
FIX PROBLEMS BEFORE THEY OCCUR

Most problems are caused by a change in production. By keeping a history of your planned changes and cross-referencing with past incident reports, logs and performance data, Watson AIOps can build a profile of change types and categorize upcoming changes.

Confidence in the upcoming change. Previous changes can be categorized depending on the past outcome of the change: success, caused a performance issue, caused an availability issue, was rolled back or not, and so on. The software development lifecycle is input to the AIOps engine, which matches changes and their results. AIOps observes not only the DevOps toolchain, but the operational state of the system in production and the service management ticketing solution.

Shift AIOps left. AIOps is not only the domain of production operational personnel. Once the AIOps solution gets access to development data such as upcoming code changes, it can deliver insights to developers and SREs, which improves their confidence in their work and results in faster and safer delivery of new features.

Learn about risk analysis.
https://ibm.biz/aiops-guide-change-risk


Failures
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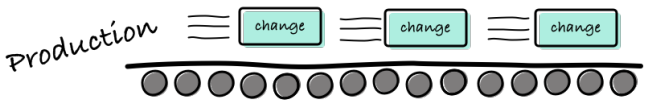

Production
change
change
change


Low
High
Risk assessment

Supercharge with AIOps

AIOps uses or incorporates technologies such as hyperautomation, ChatOps, and semi-supervised learning to enhance automation and make a response more powerful.

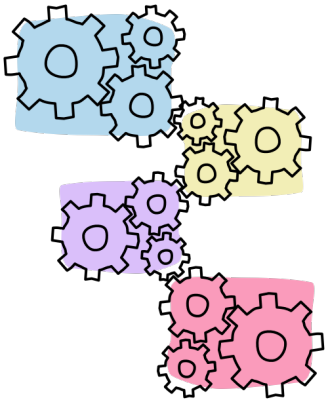
AUTOMATE, COLLABORATE, AND LEARN

Hyperautomation. AI and DevSecOps automation changes the way developers, IT operations, security, compliance and the business collaborate to deliver software. Data and AI automation enables delivery teams to collaborate to release software more efficiently, ensure compliance and security posture, and augment decision making.

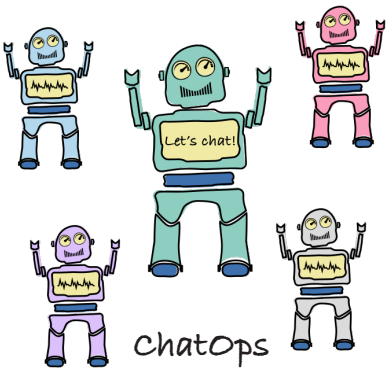
ChatOps. Integrate development and operations tools, people and processes in a collaboration platform so that the team can efficiently communicate and easily manage their daily tasks. ChatOps infuses AIOps insights into a common platform, which makes teams more productive, efficient, and effective.

Semi-supervised learning. Solve the problem of not having enough labeled data (or not being able to afford to label enough data) to train a supervised learning algorithm by using semi-supervised learning. The machine learning semi-supervised learning style offers a happy medium between supervised and unsupervised learning. During model training, a smaller labeled data set is used to guide classification and feature extraction from a larger, unlabeled data set.

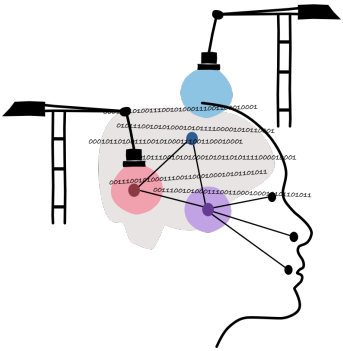
Check out supercharging your operations with AIOps.
https://ibm.biz/aiops-guide-supercharge



Hyperautomate



ChatOps



Semi-supervised learning

Hyperautomation

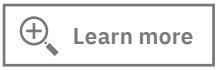
Provide the ability to transform your operational processes with AI managed automation by replacing manual work and reducing the requirement for humans to make decisions.

AUTOMATE EVERYTHING

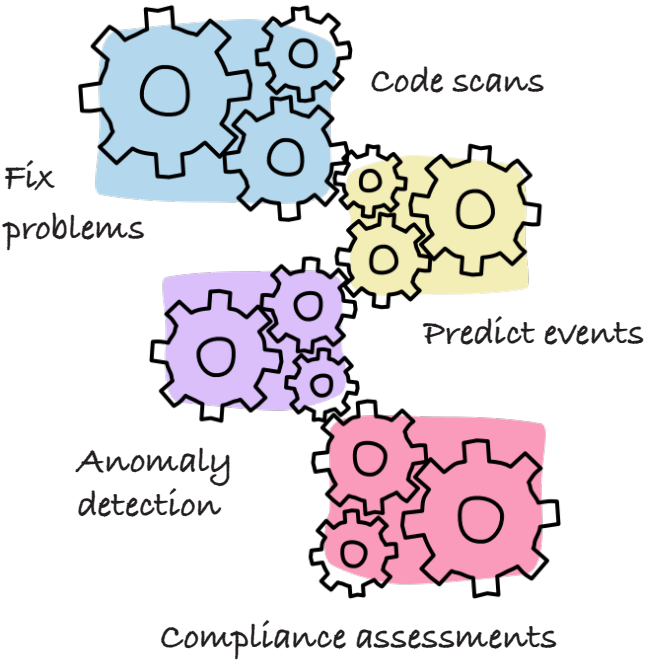
Automate anomaly detection and remediate. For example, use structured and unstructured data to discover and correlate anomalies before a service-impacting incident occurs. Use AI models to predict when and how to remediate the anomaly. After an automated alert, automatically open a change request and ideally provide code to fix the issue.

Eliminate the mundane. Resolve recurring problems based on what happened in the past. Automatically identify similar incidents that occurred in the past and find possible resolutions to successfully remediate the problem.

Automate code compliance. Reduce violations that can be costly to fix after the code is delivered. Scan code as it is checked in and notify developers if they need to make a change to remain compliant. With AIOps, ingest compliance regulation documents.



Learn about Hyperautomation.
https://ibm.biz/aiops-guide-hyperautomation



IBM Cloud Pak® for Watson® AIOps is a converged automation system that embraces diverse data sources and applies advanced machine learning and natural language processing to gain insights that drive automatable actions.

ChatOps

Working in a ChatOps collaboration platform enables you to reduce **Waste by motion,** which occurs when your team must continuously switch context. ChatOps also reduces the need to copy and paste information between tools, or **Waste by transport**. Using ChatOps enables your team to transparently collaborate and learn from each other to grow skills and knowledge.

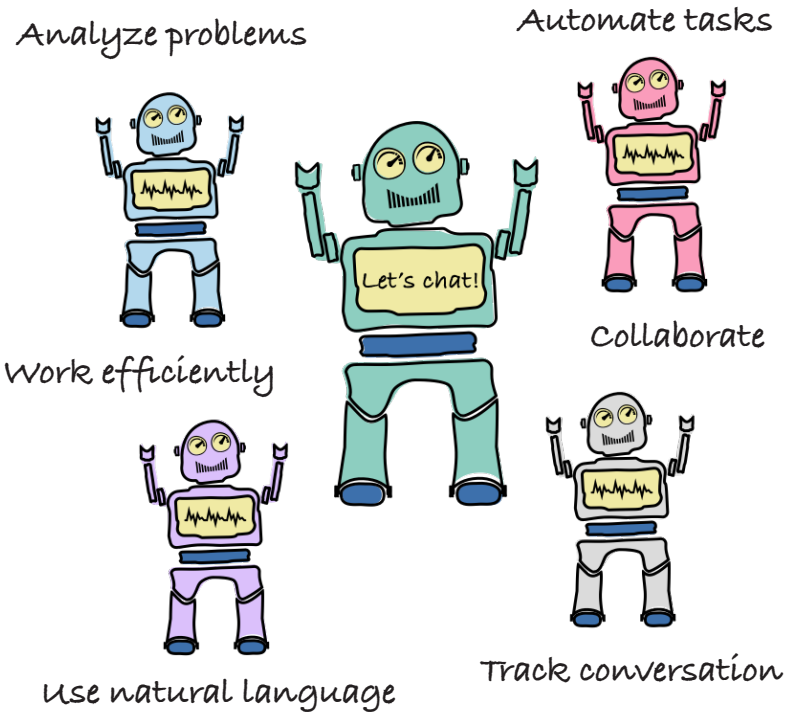
CHATOPS + AIOPS = WASTE REDUCTION + EFFICIENCY

Solve problems in virtual war rooms. Bring together everyone needed to help solve a problem. Manage simultaneous conversations by dividing written conversation into channels or threads. Use conversation history in retrospectives to analyze how to handle a problem, find root causes, and propose improvements for the future.

Build an army of bots. Bring your AIOps tools into your conversations by using a chatbot that automates tasks and boosts collaboration. Configure the chatbot to run through custom scripts and plug-ins that can do anything from code deployment, to security event responses, to team member notifications.

Communicate with your bot using natural language. Build an interface for your chatbot that takes advantage of natural language processing.

Learn about ChatOps.
https://ibm.biz/aiops-guide-chatops



With AIOps as an additional team member, the inherent benefits of ChatOps are super charged.

Semi-supervised learning

The combination of semi-supervised learning and Auto-AI (or self-improving AI) yields a more accurate AI. Without the need for coding, rules, or static thresholds, semi-supervised learning provides the ability to build a base line definition from scratch by learning and observing data.

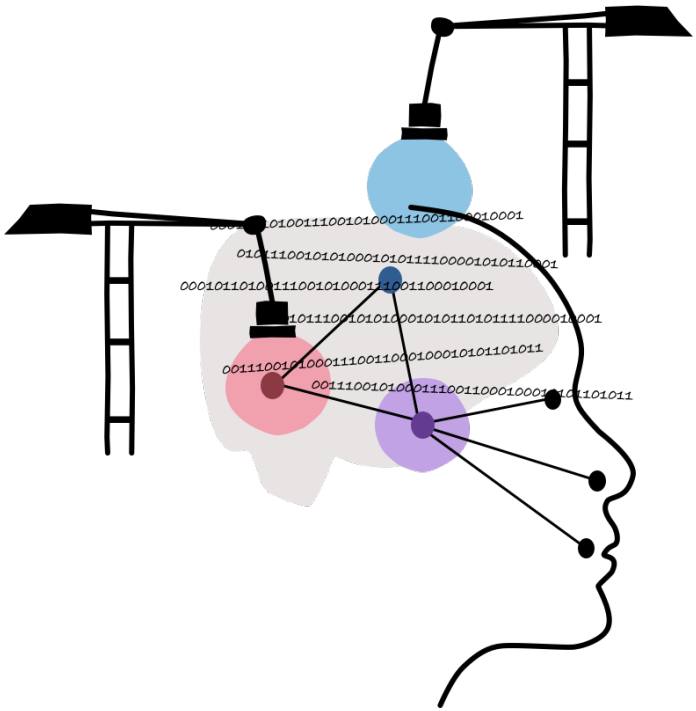
OPTIMIZE, PERFORM, AND GOVERN

Optimize AI recommendations. Observe the work patterns and habits of your operations team and optimize the AI model recommendations based on their responses. Optimized recommendations reduce the need for positive reinforcement of your team members.

Maintain AI model performance. Programmatically determine when an AI model or baseline is no longer performing optimally through the inclusion of Auto-AI.

Define policy and governance. Add manual rules or static thresholds to define additional business policies and governance that the system must adhere to.

Learn about semi-supervised learning.
https://ibm.biz/aiops-guide-semi-super



Semi-supervised learning

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.

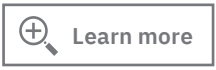
Gain insights where you work. Keep teams focused, surfacing insights and recommendations into existing workflows.

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

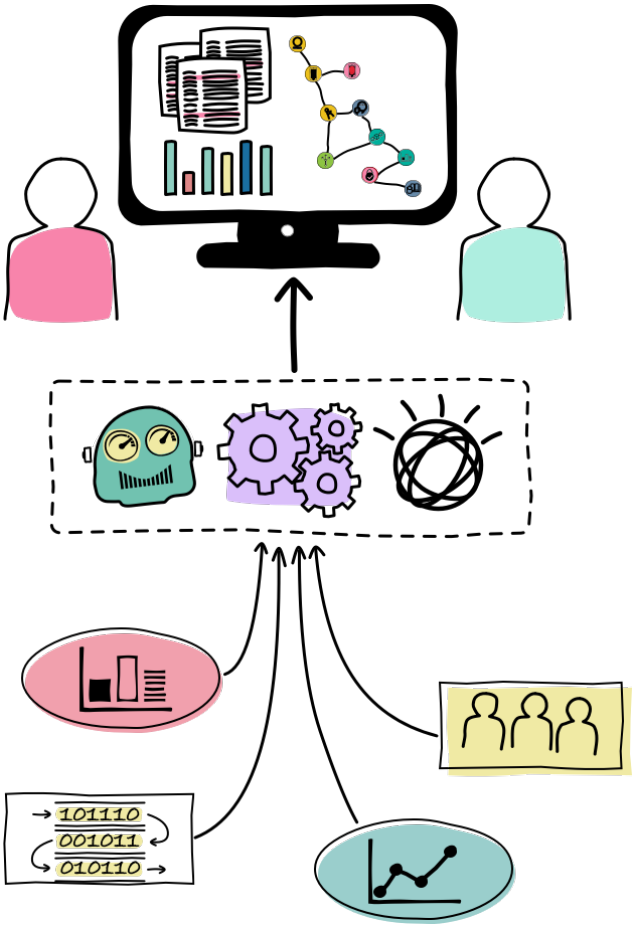
Automate with confidence. Empower teams to automate tasks with transparent AI decision-making in ChatOps.

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://ibm.biz/aiops-guide-watson-aiops



Automate IT operations to reduce churn and enable efficient teamwork.

Accelerate your incident management process

AIOps detects potential problems early, attempts to resolve them independently, notifies engineers about them early, and helps with diagnosis and solution.

IMPROVE MEAN TIME TO EVERYTHING!

Mean Time to Detect (MTTD). Using AI models to detect anomalies early, Watson AIOps finds signals that represent potential problems.

Mean Time to Identify (MTTI). Watson AIOps groups events, alerts, and anomalies together to accelerate incident diagnosis.

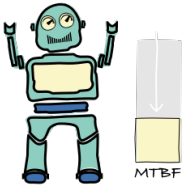
Mean Time to Know (MTTK). Watson AIOps maps the blast radius of the incident to enable faster and more accurate identification of faulty component leads.

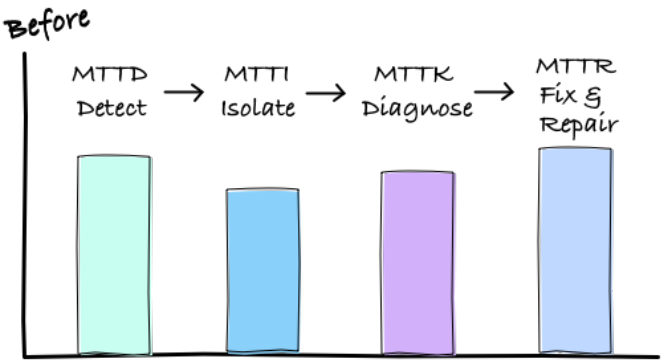
Mean Time to Repair (MTTR). When Watson AIOps detects a potential problem, it uses historical incident information and decides whether an automated solution or a recommended runbook can be used to solve the problem – to nip it in the bud.

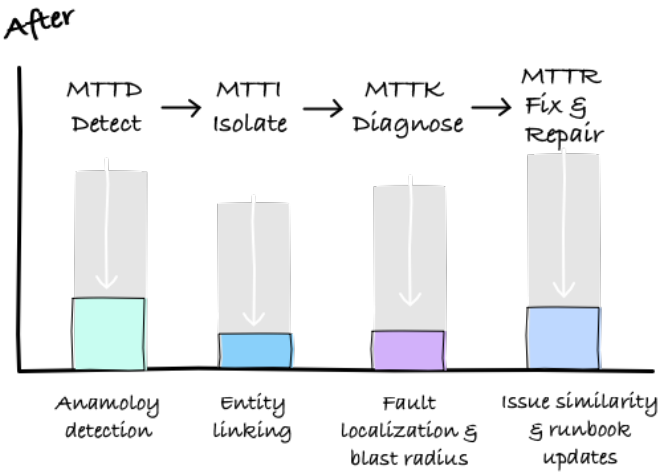
Mean Time Between Failures (MTBF). Transparent collaboration between people and machines leads to better post-incident diagnosis and remediation action plans, updates to runbooks, and long-lasting solutions to root problems.

Learn more

Learn about the incident management process.
https://ibm.biz/aiops-guide-incident-mgmt







Reduce the time it takes to detect, isolate, diagnose, and fix your IT operations problems.

Notes:

Learn more about IBM Cloud Paks

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

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https://www.openshift.com/

Learn more about Watson Services!

https://www.ibm.com/demos/search?query=%22IBM%20Watson%22&lc=en

Check out IBM AI for IT Operations architecture.

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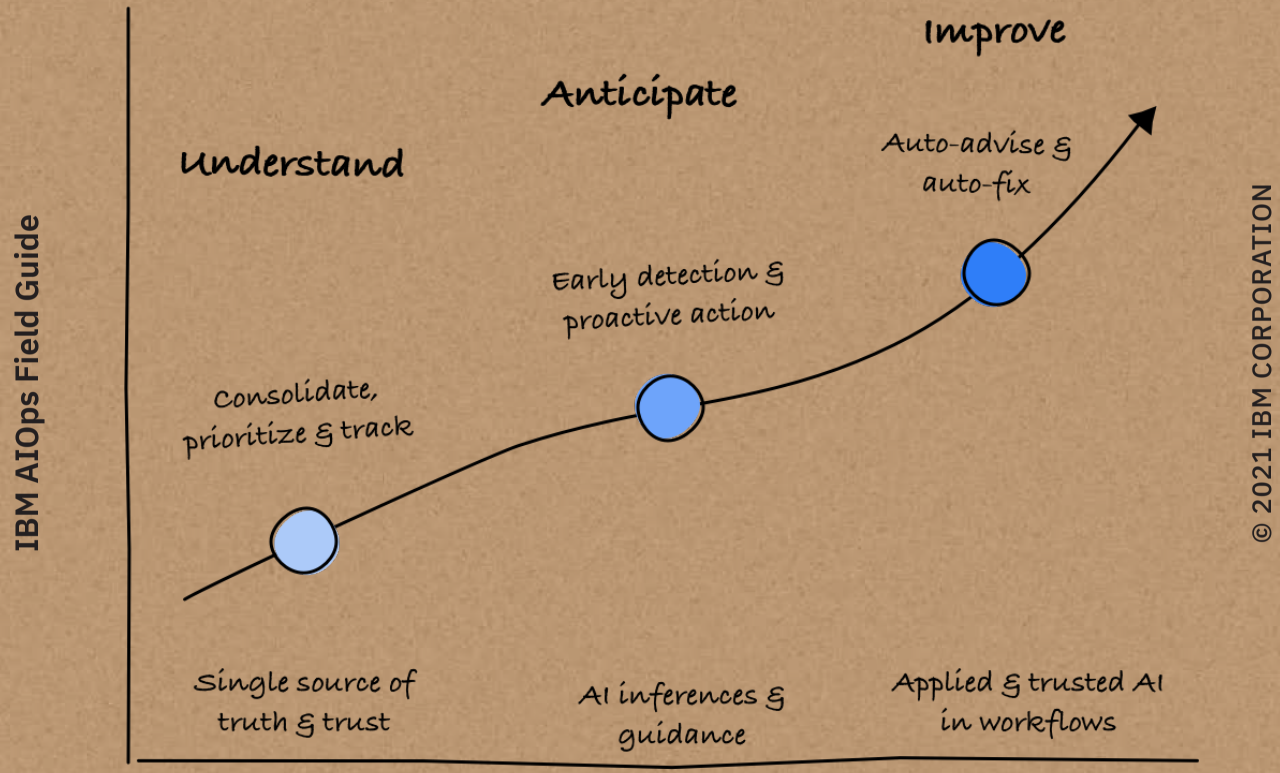
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