From complexity to clarity: AIOps across cloud deployments utilizing IBM products

Artificial Intelligence for IT Operations (AIOps) enables better, more informed decision-making capabilities through contextualizing and consolidating large volumes of data.

As complex data is received from varied sources between hybrid cloud, mainframe and cloud ecosystems, it can be difficult to navigate and connect diverse data segments.

Clarity comes by converging data from each source while gaining the necessary insight to enhance accuracy and speed during both problem resolution and Mean Time to Repair (MTTR).

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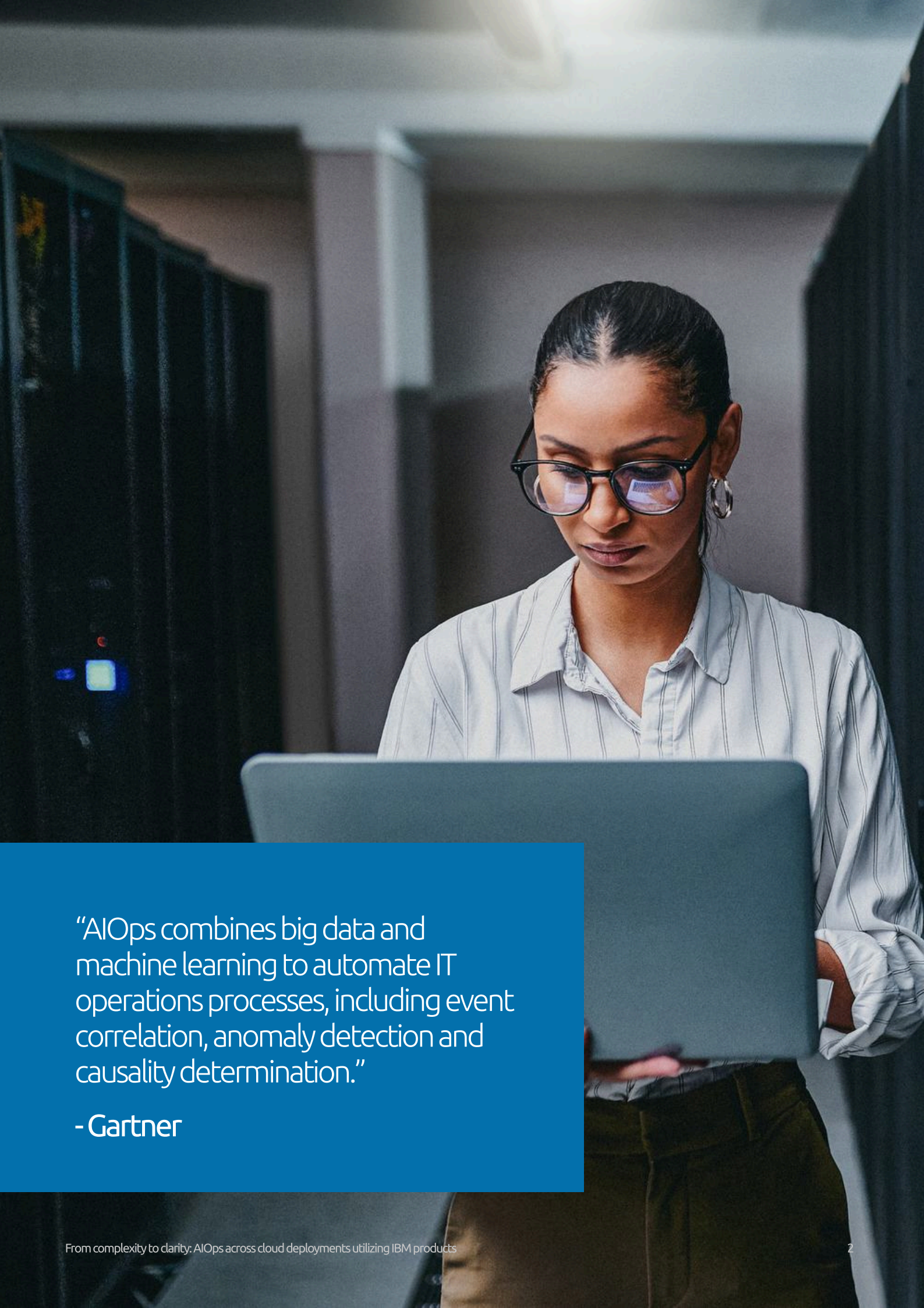


"AIOps combines big data and machine learning to automate IT operations processes, including event correlation, anomaly detection and causality determination."

- Gartner

Digital transformation, it might be one of the top buzz-worthy phrases across organizations of all sizes and industries. It seems every company is striving to consistently find ways to do more with less. But how can this be accomplished effectively and efficiently? As the need for meaningful digital transformation has increased exponentially, so have the methods used to deploy capable solutions.

Over time this has led to the development of complex distributed IT infrastructures, software applications, and microservices within various hybrid and multi-cloud environments. While each of these can provide limited success, they also result in a siloed approach that makes unified solutions difficult to achieve.

Understanding the differences between mainframe and cloud, what's needed is a monitoring solution that can be achieved through a single pane of glass.

Challenges include:

Increased complexity	with services from other providers traditional IT monitors struggle, leading to blind spots and fragmented visibility.
Resource management	with these environments offering on-demand scalability, typical methods can result in over-provisioned resources and wasted costs.
Inefficiencies from manual tasks	these resource-intensive environments leave IT teams overloaded as they sift through alerts and troubleshooting incidents.
Reactive problem-solving	delayed resolutions can increase downtime and impact business continuity as issues can't be anticipated, with actions being taken after issues arise.
Downtime and performance degradation	the process of identifying and remediating most issues can be time consuming, requiring a significant level of manual effort.

While these all might seem daunting, the remedy is rather simple. **By establishing an AIOps solution you can take a crucial first step towards addressing these challenges**, as AIOps can do the necessary heavy lifting to enhance your operation by focusing on data science, specifically machine learning and analytics.

An AIOps platform that utilizes advanced AI and ML gives you the ability to transform your business, using operations data to make correlations that provide prescriptive and predictive answers in real-time. You can then use these insights to produce real-time business performance KPIs, allow teams to resolve incidents faster, and also help avoid incidents altogether.

By collaborating with Capgemini on your AIOps solution, you're partnering with a team backed by vast experience in digital transformation and operations, capable of providing an assortment of critical AIOps services.

While the concept of AIOps might be new to some, it has been around since 2010, emerging initially in response to the growing complexity of IT operations. From there AIOps has experienced rapid growth:

2014 - 2015
Early AIOps solutions focusing on log analysis

2016 - 2017
Momentum builds as AI and ML integrated into IT operations

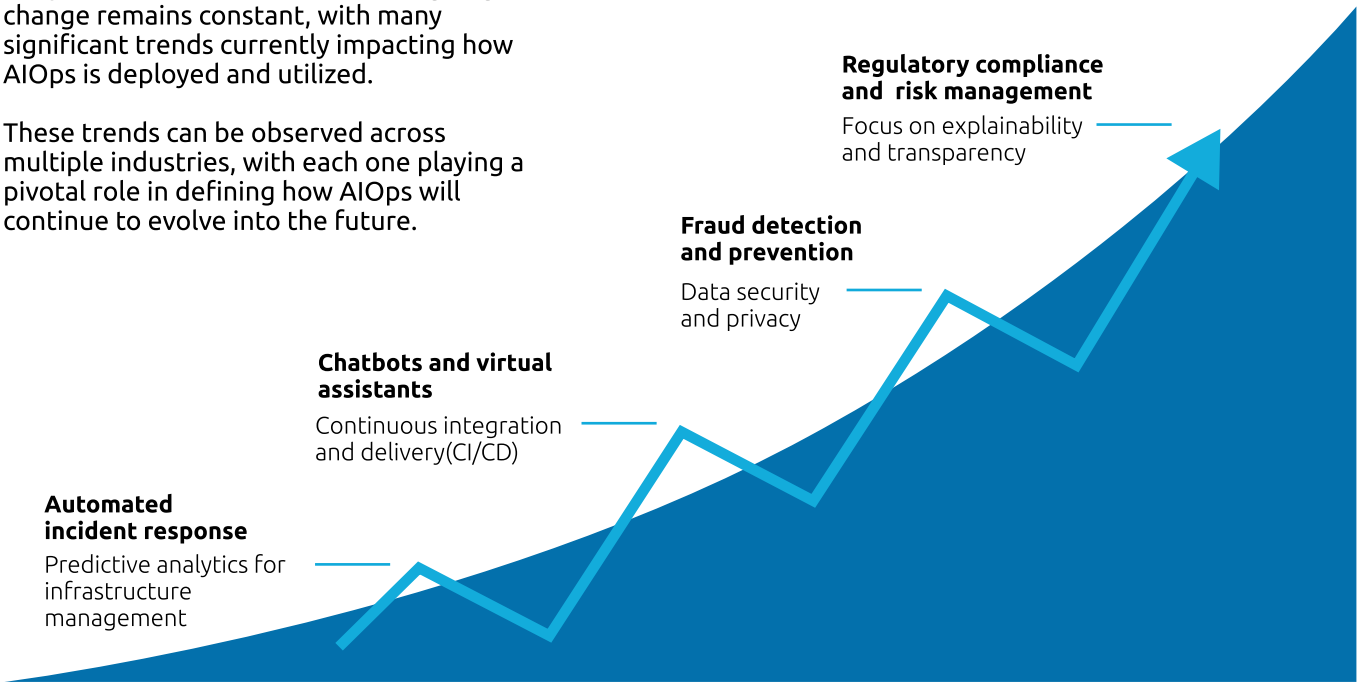
2018
Gartner coins "AIOps" officially, defining its application

2019 - 2020
AIOps platforms expand capabilities to include real-time analytics and automation

2021 - Present
AIOps goes mainstream, evolving to address hybrid and multi-cloud environments, emphasizing advanced analytics and autonomous operation

Despite each of the critical steps in the AIOps evolution outlined above, ongoing change remains constant, with many significant trends currently impacting how AIOps is deployed and utilized.

These trends can be observed across multiple industries, with each one playing a pivotal role in defining how AIOps will continue to evolve into the future.



Due to these changing variables across each of the cloud environments, it's important to examine the key considerations for AIOps across single, hybrid, and multi cloud deployments.

- **Data source and integration** – uniform data sources vs diverse and flexible options, integration complexity, and capability limitations.
- **Implementation complexity** – lower built-in functionalities vs higher, more complex integrations.
- **Vendor lock-in** – the level of concern grows from single to hybrid to multi-cloud and the need for vendor-agnostic tools.
- **Security considerations** – lower for single, higher and more robust for hybrid, very high for multi.
- **Management** – simple for pre-built single integrations, hybrid requires a centralized platform, and multi requires a centralized platform as well as strong support.

Now that you've learned the history, trends, considerations and key challenges AIOps can help you overcome, you may be wondering how you can adopt AIOps within your IT operations. And also how you can begin benefiting from the actionable insights delivered by data generated across various IT assets and systems users.

In order to simplify your AIOps implementation approach, it's essential to frame the application of AI across three key pillars – observability, orchestration, and automation.

Capgemini's approach to AIOps can enable you to better predict outages, catch performance degradation, and improve root-cause analysis, along with comprehensively orchestrating your automation efforts into a meaningful line-up of value-added activities such as:

Seamless Human-in-the-Loop (HITL) automation for IT Service Management (ITSM)

Intuitive chatbots for smoother service request automation

Heightened knowledge management in service orchestration

Improved Configuration Management Database (CMDB) capabilities.

Capgemini's extensive experience working with various clients to recommend the exact right AIOps solution is one of our leading differentiators.

Both our mainframe and on-premises implementation approaches take care of identifying end to end application flow, ingestion of data, analysis by machine learning and remediations. Once completed we can recommend a single or combination of valuable AIOps services:

- Tool recommendation
- AIOps implementation
- AIOps ongoing support

In addition, Capgemini provides specific AIOps guidance during the deployment of each cloud option.

Single cloud

offers simplicity, streamlined operations, and optimized performance within a single provider's ecosystem but can be limited by the provider's capabilities and services.

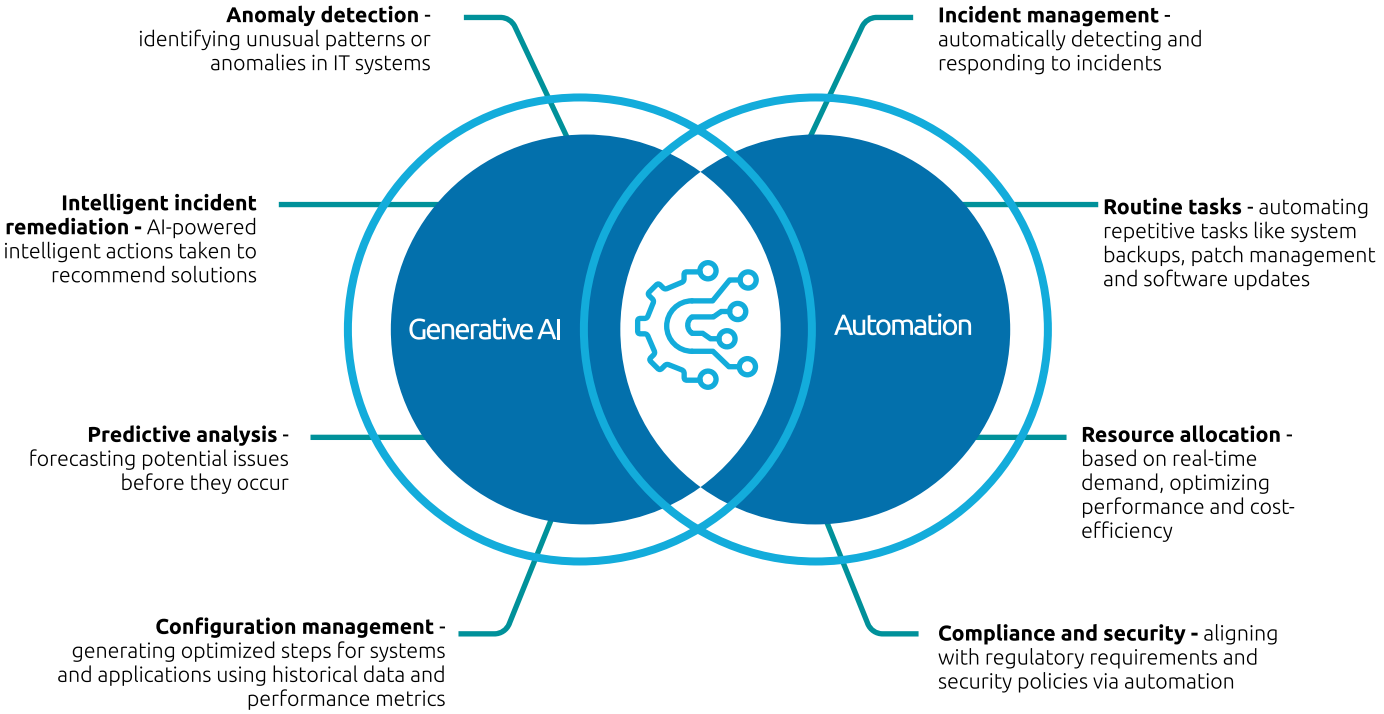
Hybrid cloud

provides flexibility and control by combining on-premises and cloud resources, offering a broader range of tools and data but also includes increased complexity in integration and management.

Multi cloud

offers the greatest flexibility and access to best-of-breed services from multiple providers, enabling comprehensive capabilities, yet this also comes with the highest complexity in terms of integration, management, and orchestration. We should explicitly call out Mainframe not just on prem resources

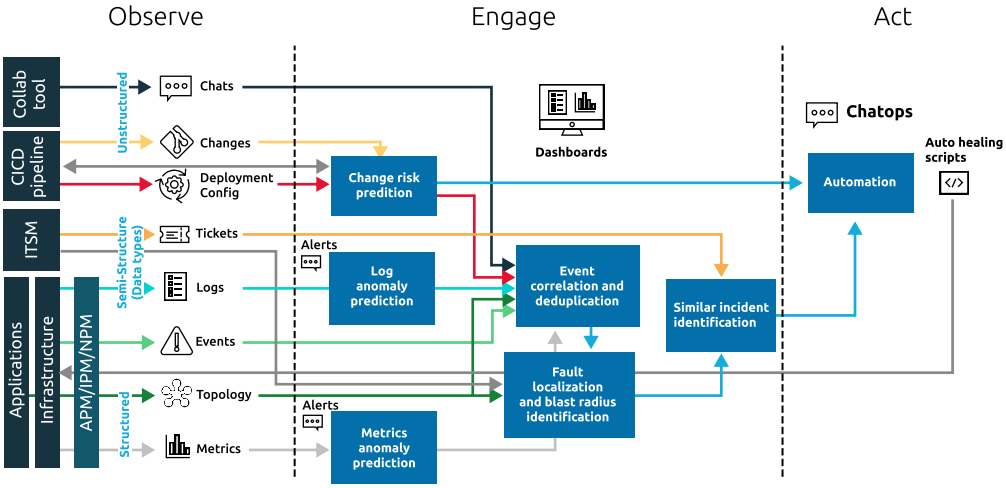
Among the many benefits of AIOps is how it integrates automation and generative AI. By carefully incorporating these two crucial elements, we can create a synergistic effect, resulting in more intelligent and autonomous IT operation.



The result of combining these two powerful tools enables AIOps to deliver unmatched value-driven attributes, that include:

- Self-healing systems
- Intelligent decision-making
- Enhanced monitoring and alerting
- Remarkable scalability and efficiency

When all aspects of Capgemini's AIOps solution come together, they produce a unique, yet productive architecture.



Now that we've covered how IBM products can address specific issues, we'll begin to explain how to implement IBM products within AIOps. This process comes down to three basic principles: observe, engage, and act.

Observe

Assessment and strategy:

Understand IT maturity, tools, and data sources

Identify pain points

Define measurable KPIs

Select an AIOps use case as a pilot

Data integration and collection:

Use IBM concert to collect and harmonize data

Use IBM Instana and IBM SevOne for real-time observability

Use CP4AIOps data pipelines for ingestion and normalization

Engage

AI model training and automation:

Train CP4AIOps AI models with prior incident and event data

Implement anomaly detection and noise reduction algorithms

Integrate Red Hat Ansible for automated incident resolution

Configure proactive alerts and dashboards in Instana

Operationalization and scaling:

Integrate with ITSM tools

Expand use cases to predictive insights and resource optimization

Correlate events using IBM CP4AIOps to identify root causes and reduce noise

Act

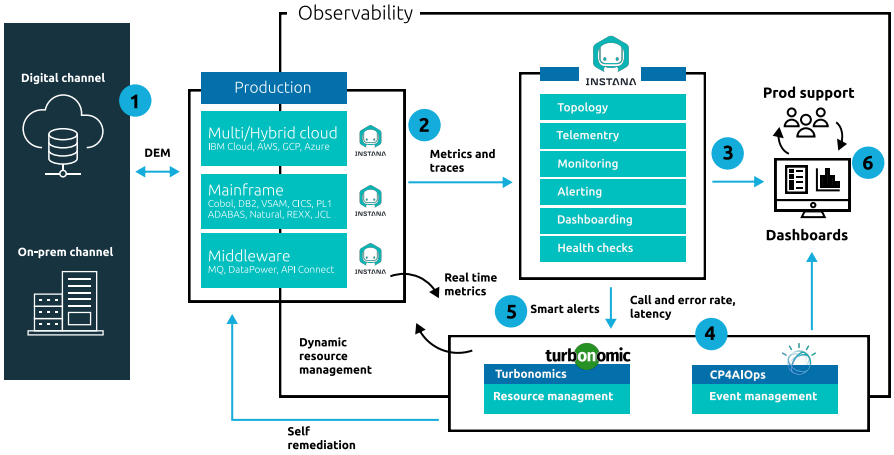
Monitor, measure and finetune:

Implement Automated workflows in IBM CP4AIOps to resolve issues without human intervention

Use IBM Turbonomic to dynamically allocate resources based on real-time demand

Use IBM Concert for automated remediation which ensures higher application uptime

When implemented together, Capgemini's AIOps solution with IBM products create a powerful architecture.



While Capgemini offers a robust AIOps solution, what takes it to the next level is the integration of our solution along with a subset of IBM products. When combined together these IBM products use AI and machine learning to address the complexities of managing hybrid and multi-cloud environments in a significantly effective manner.

In the graphic below you can see how IBM's AIOps solutions help address common challenges and provide invaluable benefits.

Challenge	IBM AIOps Solution(s) Utilized	Benefit
Fragmented visibility across hybrid and multi-cloud environments made it difficult to effectively manage complex IT landscapes	**Products used: IBM CP4AIOps and IBM Concert** **Resolution:** Unified platform ingested data from various sources and used machine learning for correlation	Created a single pane of glass view for proactive management
Reactive problem solving due to waiting for issues to arise, contributing towards potential downtime and performance degradation	**Products used: AIOps for IBM Z, IBM CP4AIOps, IBM Concert** **Resolution:** AI and Machine learning analyzed data to proactively identify potential issues	Proactive mitigation and faster resolution times as well as automated data analysis
Manual tasks and inefficiency from alert overload and troubleshooting, resulting in IT staff overload and inability to focus on strategic work	**Products used: IBM CP4AIOPs, IBM Concert** **Resolution:** Automated tasks like filtering alerts, suggesting root causes, and even taking actions without prompting	Created time for IT staff to perform more strategic work and improve efficiency
Resource waste from over-provisioning in cloud environments, contributing to wasted money on cloud resources	**Products used: Turbonomic by IBM** **Resolution:** Products used: Turbonomic by IBM	Ensured that applications had what they needed while minimizing cloud spending
Downtime and Network Performance Issues from delayed detection and resolution, impacting business continuity	**Products used: Instana by IBM, IBM SevOne** **Resolution:** Faster incident detection through proactive monitoring and automated remediation actions	Minimized downtime and ensured a more seamless and smooth IT infrastructure operation

Now let's bring the impact of AIOps' partnership with IBM to life with two real-life case studies.

Case study 1: Optimizing cloud costs using IBM Turbonomics for a leading US financial services firm

Situation:

A large financial services firm transitioned from Pivotal Cloud Foundry to the OpenShift Container Platform (OCP) for all of their workloads. They also migrated to AWS clusters – adopting Postgres as their enterprise database, and replacing MariaDB and Oracle DB. During this migration, they overprovisioned AWS resources, including EC2 instances, memory, CPU, database instances, and sidecar containers. Overall, this led to significant overspending.

Capgemini's solution:

Capgemini compared leading tools on features like multi/hybrid support, resource management, OCP support, container and RDS optimization, APM tools integration, and cloud cost insight.

Once they'd chosen a tool, they collaborated with the client's product team to set up dev clusters and policies. Capgemini then analyzed the data to give Salesforce their optimal recommendations, before rolling them out.

Focus area:

Optimizing resources and costs

- Implemented cloud cost optimization using IBM Turbonomics
- Collected data on OCP/K8s, cloud services and the cost of resources
- Ran and assessed plans on OCP configurations
- Adjusted configuration with an improved pattern, to increase efficiency and maximize savings

Outcome:

Actioning cost-saving recommendations from IBM Turbonomics

- AWS EC2 right-sizing: changed EC2 machine types from Intel to AMD
- OCP Namespace: reduced memory usage and CPU cores by using historical container data
- RDS right-sizing: updated postgres machine and instance types to drive efficiencies

Benefits:

- By strategically reallocating resources, costs were reduced by **30–40%** and application performance improved
- Dynamic scaling was implemented using IBM Turbonomics for deployments and cloud resources
- Aggressive non-productive environment augmentation, with the ability to scale up, turn on, and turn off as needed

Case study 2: Helping a UK bank leverage AI/ML capabilities to apply predictive notice on their payment platform

Situation:

A leading UK bank was handling different types of payments in a range of countries – as well as delivering services like wealth management, personal internet banking, and investment banking. They needed a customized AIOps solution that could correlate events, reduce duplicate incidents, detect issues early, and perform auto-healing. They also wanted to reduce service disruption and outages, increase service availability and resiliency, and reduce their manual efforts – all while avoiding human error and driving efficiencies.

Capgemini's solution:

Capgemini offered a two-phased approach for easy AIOps adoption.

1. We began by implementing non-production activities with low-impact, high-volume issues.

2. Then we replicated the same non-production approach with specific governance and approvals.

As we worked through each phase, we also built in an auto-healing script and map within each category.

Focus area:

Driving operational resiliency, efficiency, and accuracy.

- Used AI/ML algorithms to compile data over one year of incidents, including historical event collection, data massaging, and applying machine learning to accomplish both level 1 and 2 filtration.
- Categorized the events into buckets, and created an action items map.
- Conducted a feasibility study using their existing technology, environment, and integration with other tools.
- Chose the right use case for correlation and auto-healing.

Outcome:

By making the most of the right tools, process, and operational order, the bank achieved:

- Zero-touch incident acknowledgement and closure.
- Custom solutions with comprehensive onboarding feature of projects and access management.
- UI base solution to monitor event flow for both in-progress and completed items.
- Ready-to-use assisted and auto-healing features.
- No more need to log on to any server, with troubleshooting capabilities performed from the UI.
- Centralized reporting for multiple use cases.

Benefits:

- Significant increase in production support team efficiency.
- Ability to log on to any server to perform troubleshooting.
- The time it took to troubleshoot an incident was reduced by 7–10 minutes.
- Created a single pane of glass for auto-healing and assisted healing tickets.
- Increased platform availability and uptime
- The new AIOps solution gave the bank the freedom and agility to develop new features, without any additional costs or licensing fees.

Now that you've learned about the Capgemini solution and how the IBM products and solutions for AIOps come into play, here is additional information on the key IBM products used in this area.

IBM CP4AIOps

IBM Cloud Pak for AIOps: This platform **integrates AI to help detect, diagnose, and respond to IT anomalies** in real-time, using machine learning models to automate IT operations and improve efficiency.

Learn more ⟶

IBM SevOne NPM

IBM SevOne is a Network Performance Management (NPM) and observability tool designed to provide **real-time visibility and insights into complex networks.** Concert Workflow facilitates the seamless transfer of network performance data to SevOne, enabling real-time monitoring and analysis. In addition, it's application also includes IT infrastructure, Cloud and Network Automation enabling remediation, and closed loop corrective action in an automated way.

Learn more ⟶

IBM Concert

A platform that uses generative AI as a connective tissue that harmonizes data from disparate tools and environments, transforming it into **actionable knowledge designed to improve operational risk** and resiliency while freeing up teams to focus more on innovation.

Learn more ⟶

Turbonomic – an IBM Company

IBM Turbonomics provides AI-driven optimization for application resources. It **automates resource management decisions in real-time** to ensure that applications get the resources they need to perform while maintaining both cost efficiency and compliance.

Learn more ⟶

Instana – an IBM Company

IBM Instana offers a powerful application performance management tool that **provides observability, monitoring, and automation** for applications, using AI to predict and prevent issues before they impact the end user.

Learn more ⟶

Specific information regarding each of the preceeding pages was provided by the following authors:

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SRE Lead Architect

Prabhakaran Arivalagan is a SRE Architect at Capgemini, specializing in site reliability engineering, AIOps, cloud and platform engineering. With 19 years of experience in the field of IT operations and artificial intelligence, Prabhakaran has a deep understanding of AIOps, machine learning, observability, telemetry, DevOps, platform engineering, automation, and its applications in modern IT environments.

Prabhakaran has been instrumental in implementing and optimizing SRE solutions using tools such as IBM Instana, Splunk, AppDynamics, Dynatrace, Azure AppInsight, DevOps, Terraform and other related technologies. He has developed solution accelerators such as Dashboard as a Code (DaaC), Synthetic Monitoring Framework (SMF) and Infrastructure as Code (IaC) framework for rapid adoption.

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Ajay Walgude who envisions big ideas and takes action to bring them to life. He leads IBM and Red Hat Cloud COE for Financial Services globally, and is the Global Senior Executive, IBM Champion, an Architect, a Tester, and Practice Leader helping customers achieve large outcome driven transformations across Banking and Insurance customers.

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An accomplished SRE Lead Architect with over 18 years of comprehensive IT experience, encompassing 7 years in Site Reliability Engineering (SRE), 8 years in performance engineering, and 3 years dedicated to development and production support. Renowned for exceptional organizational, communication, management, leadership, and problem-solving skills, the author specializes in SRE enablement, maturity assessments, transformation strategies, and operational excellence.

Proficient in leveraging advanced Application Performance Management (APM) tools such as Dynatrace, NewRelic, Instana, AppDynamics, and Splunk, as well as cloud platforms including IBM, Azure, AWS, PCF/Tanzu, and GCP. The author has extensive database experience that includes DB2, SQL DB, Oracle and other cloud DB solutions. Skilled in multiple programming languages, including Java (Spring Boot) and COBOL, the author also has expertise in mainframe environments, utilizing technologies such as IMS DC, REXX, JCL, and CICS.

With a strong focus on observability and resilience engineering, the author drives innovative SRE GenAI solutions that enhance system reliability and efficiency.

To learn more about the Capgemini and IBM Partnership:

Detailed information available here ⟶

About Capgemini

Capgemini is a global business and technology transformation partner, helping organizations to accelerate their dual transition to a digital and sustainable world, while creating tangible impact for enterprises and society. It is a responsible and diverse group of 340,000 team members in more than 50 countries.

With its strong, over 55-year heritage, Capgemini is trusted by its clients to unlock the value of technology to address the entire breadth of their business needs. It delivers end-to-end services and solutions leveraging strengths from strategy and design to engineering, all fueled by its market leading capabilities in AI, generative AI, cloud and data, combined with its deep industry expertise and partner ecosystem.

The Group reported 2024 global revenues of €22.1 billion.

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