Cutting Cloud Complexity with AI Automation

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The concept of cloud has been around for a while, but it's becoming a bit complicated. IBM actually launched the first virtual storage operating system for mainframes as far back as the 1970s. But the potential to enable remote functions, eliminate the need to deploy and manage on-premise hardware and software, and the potential to access—and pay for—on-demand resources only when you need them, really kicked things off around the turn of the century. By 1999, Salesforce.com launched with its "no software" motto and by 2010, Microsoft jumped onto the cloud bandwagon with its cloud-based Office 365 suite.

Since then, the rush to cloud has been a bit of a frenzy. Cloud adoption has been fueled by an exponentially expanding range of applications, trends, and emerging technologies, such as edge networking, containerization, cloud computing, memory, and storage; network functions virtualization (NFV), a host of software-as-a-service (SaaS) offerings, and more. In 2020, the global COVID-19 pandemic threw more fuel on the cloud fire as the developed world almost instantly transformed to digital-first, and trends like ecommerce, remote work, and virtual healthcare exploded.

Today, more and more applications, functions and resources are being offloaded to the cloud and shipping software has become all but extinct. According to Gartner, over 85 percent of enterprises will embrace a cloud-first stance by 2025, with 95 percent of new digital workloads deployed on cloud-native platforms—a 300 percent increase over 2021. In fact, Gartner's Distinguished VP Milind Govekar remarked, "there is no business strategy without a cloud strategy," citing applications across a variety of industries. But as with any transformative technology, it just might not be that simple.

Managing cloud complexity

When it comes to the cloud, it's not all silver linings. There are many challenges with the management of multiple clouds and hybrid cloud solutions, particularly when cloud operations differ greatly between cloud providers such as AWS, Azure, and Google. Certifications and expertise don't necessarily or easily transfer.

Also, in a somewhat ironic twist, there's an emerging "bill shock" component to cloud management. Historically, bill shock has referred to service providers' customers being surprised by large bills and unexpected charges. Today, service providers are experiencing a similar surprise when they receive bills from their cloud providers, as they continue to offload large swaths of network and application functions to the cloud. Enterprises are no exception as they spin up cloud resources, and may later lose visibility of them.

The cloud management cost crunch is only exacerbated further, as organizations of all kinds are feeling intense pressure as they face the possibility of a looming global recession.

The complexity of managing cloud resources only grows as enterprises and service providers also contend with a loss of data visibility and limits to application functionality. Cloud-data visibility is critical as regulatory concerns around data privacy and storage, such as GDPR, are an increasing concern, and limits to visibility and application performance can cause customer friction with significant business implications. For example, when business applications don't work, it can cause cascading cost implications. Internally, organizations must troubleshoot their cloud instances and functions and externally, enterprise-application customers contact call centers with performance issues, which can lead to churn. The ultimate goal of the cloud is to provide simplicity and efficiency, yet getting there can be anything but simple or efficient. Enterprises and service providers are facing an increased level of cloud management complexity, all in the hopes of achieving higher performance and productivity. Given the momentum and the stakes, it's essential to get cloud management right, and simplifying the complexity of cloud management will require a unique combination of automation and business-level intelligence. *Pipeline* recently had the opportunity to discuss how to simplify the complexity of cloud management automation with Andrew Coward, General Manager of Software-Defined Networking at IBM. We talked about cloud resource management, AI-powered automation, and how IBM is uniquely poised to help enterprises and service providers capitalize on today's cloud opportunities.
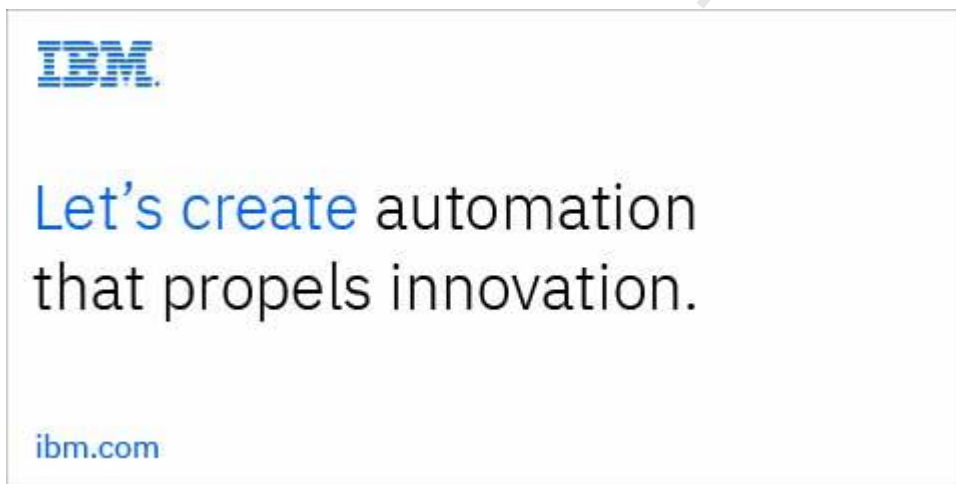
Cloud management and AI automation

AI and machine learning (ML) are being layered across a wide range of industries to optimize automation and unlock efficiencies. According to IDC, by 2026, 85 percent of enterprises will combine human expertise with AI, Machine Learning (ML), Natural Language Processing (NLP), and pattern recognition to drive outcomes like predictive maintenance, productivity, and efficiency. Yet many enterprises, including service providers, face gaps in maturity and technical AI talent that pose obstacles, such as ensuring the right data format or *application of AI and ML technologies.*

This is where IBM's unique positioning, experience and capabilities can help. Coward explained, "IBM provides a unique understanding of applications, customers, industries, networks, and technology to create specific solutions that provide particular business outcomes." He went on to add, "Our experience and technology enables unique insights, pattern-matching, and a holistic understanding of large, complex systems."

Coward went on to describe how IBM is now focused on delivering the same level of automation and holistic knowledge on the networking side as it delivers on the computing side. This combines the strength of IBM's internal, organic development with several strategic acquisitions to put the right array of technology and expertise in place. "IBM Research, for example, is able to bring forward an application for a

new AI or ML mechanism to solve a specific business issue, and we then take that technology and apply it across our portfolio of products," Coward added.

In fact, IBM has been the persistent front runner in AI technology for decades. IBM arguably put AI on the map when its Deep Blue supercomputer publicly beat chess Grandmaster Kasparov in 1997, and again in 2011 when IBM's Watson won *Jeopardy!*, one of the world's most popular trivia television game shows. Meanwhile, IBM's Watson portfolio for business is helping enterprises better serve customers and cut costs across a variety of industries. Historically, Watson Health offered industry-leading data, analytics, and AI solutions to unlock health data to transform healthcare, and Watson was even being evaluated as a potential tool to transform the treatment of cancer. More recently Digital Iris, the AI airport concierge developed by IBM and Soul Machines, is being used to better serve travelers at Dallas-Fort Worth International Airport. Digital Iris uses IBM's Watson for conversational AI and synthetic speech, with Soul Machines' autonomous animation, to anticipate and answer travelers' questions including gate updates, flight information, directions, restaurant information and more, all with human inflection, tone, and expression. However, IBM's AI pedigree is just one piece of the automation puzzle.

The right cloud combination

In recent years, IBM has been strategically acquiring companies to add specific technologies to its AI and automation capabilities for network and cloud management. The acquisition of Accanto by IBM in 2020 strengthened its capabilities for orchestration in multi-vendor networks. In 2021, IBM acquired SevOne to bolster service assurance capabilities and manage applications over multi-vendor and multi-cloud infrastructures across end-to-end networks. Later in 2021, IBM acquired cloud-native virtual routing startup Volta Networks for distributed routing capabilities in cloud operations. This year, IBM announced the acquisition of NS1, which provides authoritative DNS for many of the world's largest content providers, retailers, and banks.

IBM also works with strategic partners worldwide on solutions for enterprise customers. Recent examples include IBM and Nokia's plans to deliver private 5G managed services and a joint Juniper-IBM integrated telco-cloud solution for hosting both virtualized and containerized services. Strategic partners also include AWS and Microsoft, among others. As Coward pointed out, "Through our partner network and global system integrators, we are making it easy to integrate our software with partner products and tie together complete, end-to-end automation around it."

Cloud automation starts with process mining. It is essential to identifying the priority processes to automate, based on the jobs and tasks that teams, such as Development Operations (DevOps), Network Operations (NetOps), Information Technology (IT) and others, perform on a daily basis—and to understand where the bottlenecks are actually occuring in order to improve efficiencies by modeling scenarios across an organization. This helps create an understanding that provides visibility into data silos across applications, systems and processes, leveraging insights to connect clouds—securely—and informs a definitive list of what talks to what, for what purpose, and what control. This creates holistic cloud and infrastructure visibility that provides workers with quick access to the information they need—to keep the applications, network, and services up and running—without flooding them with irrelevant information they don't need or understand.

"In a typical telco environment, changing a single firewall parameter can be a six-week process—and take even longer in a more regulated enterprise, like a bank," Coward explained. "It's about having a holistic understanding to develop a customer-specific transformation strategy, informed by cost projections, modeling, and technology expertise to help solve key problems in the cloud-automation journey for our customers," Coward said.

The logic of business-level automation

Today, AI and automation should be directly tied to business outcomes and success—and it's exactly this approach that IBM is embracing with intelligent automation at the business-logic level. Business-level logic reduces risk, creates efficiency where and when it's needed, and can provide repeatable benefits.

Consider the pitfalls of automation by script, a method that is commonly used to combat network outages. When the network goes down between New York and Chicago, NetOps creates a script that runs and fixes it, and can be reused again should that specific network outage occur again. But over time, there may be a different script for each city, potentially leading to thousands of scripts that must be managed. This creates a paradox, as the scripting that was put in place to create efficiency and reduce risk has created more complexity, and added extra risk. IBM's approach is different and looks at both the problem and solution from the business-logic level.

"Instead of looking at the problem from a connection, instance, or device level, we look at the business logic and say, if the connection between two cities in the US breaks, find an alternate path and increments of bandwidth, and provision them across the infrastructure," Coward stated. "That business rule doesn't care what vendors or cities are involved, but the technology drives the logic across the environment to make it happen." Abstraction driven by business logic reduces risk and unlocks reusable efficiency that can be applied across the organization.

Successful cloud management and transformation can also be derived by enabling proactive AI Operations (AIOps). Think about network operations and fault management. When the network goes down, NetOps scrambles to sift through what changed immediately prior—but this is a job perfectly suited for AIOps' predictive capabilities and proactive resolution. AI's predictive analytics capabilities can identify the alert when it comes on Saturday night, before peak traffic is going to send the network down and cause a massive problem on Monday morning.

Cutting cloud complexity

To fully realize the benefits that the cloud has to offer, service providers and enterprises must effectively tame its complexity. This is no easy task. It requires a unique understanding across businesses, processes, and industry applications. It needs advanced automation technologies, such as AI and ML. It must be supported by a portfolio of products and an ecosystem of partners, all focused on key business outcomes and delivering a specific, tailored strategy designed for individual customer success.

Our conversation with IBM was enlightening. IBM appears to be uniquely positioned to help cut the complexity of cloud for its customers. Its pedigree as pioneer of both cloud and AI technologies, portfolio growth through strategic acquisitions, and broad industry experience—helping enterprises transform for over 100 years—may just be what the industry now needs.