



## POINT OF VIEW

# The Potential of Pipelines and Automation

## A foundational framework for making complexity manageable

A company had just suffered a major outage of one of their business-critical applications. Several hours of troubleshooting had shown no results. Something had to be done as the company was losing thousands of dollars for every hour of downtime. In a hint of desperation, the IT manager turned to the software architect and inquired as to how long it would take to rebuild the whole thing from scratch. The answer shocked him:

“Give me an hour.” ● ● ●



That is a real story, involving real dollars and innovation. The IT operations team did continue working to identify the root cause of the problem, which they did five days later. An incompatible driver was the instigator. Because the architect had everything in a code repository, the pipeline rebuilt the app in the same consistent way as it was originally. This is what the next level of digital transformation looks like.

That was a costly disruption, but even basic trouble tickets concerning frequently used enterprise applications cost money. What if you could get rid of a large swath of those tickets? For one of our customers, 5,000 tickets were generated every month around just ten errors. Now those tickets are a thing of the past. That's because they don't depend on humans to fix those habitual errors anymore. They use the intelligent automation to pipe in the code that does it all.

Sound intriguing? This is what is possible today using an automation and pipeline approach. Companies today must reexamine and overhaul their legacy product development and delivery practices to remain competitive as part of their digital transformation. It's time to move to automated delivery pipelines by transforming to a Modern Operations model that enables you to take advantage of system availability, performance, resiliency, security, and operational improvements. If you aren't considering such a move, your competitors are. According to [Gartner](#), 75% of

## Case Study

### CLIENT:

Automobile Parts Retailer

### CHALLENGE:

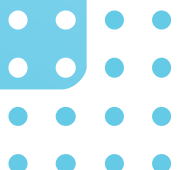
- The existing patch management process required thousands of systems to be patched manually

### HOW WE HELPED:

- Keyva conducted an as-is study for the existing patch management processes, provided best practice automation recommendations for the various processes, and implemented those recommendations
- The work involved integrating various systems, including IT Service Management and CMDB, and more. Automation workflows were developed to automate every step of scheduled and ad-hoc patching end-to-end

### RESULT:

- The organization's IT team was able to allocate time to higher value tasks instead of engaging in mundane and time-consuming patching processes conducted during off-work hours





**According to Gartner, 75% of enterprises will shift from piloting to operationalizing AI by the end of 2024.**



## Case Study

### **CLIENT:**

Medical Device Manufacturer

### **CHALLENGE:**

- A key patient application needed to be migrated from local data centers to a cloud provider, while simultaneously expanding its reach to multiple new geographical locations

### **HOW WE HELPED:**

- The Keyva team utilized a well-architected framework for infrastructure, employing IaC deployed through GitOps and pipelines
- Additionally, we helped migrate the flagship application to the cloud, running it on Kubernetes
- A big data environment was established for analyzing customer usage and trends

### **RESULT:**

- Leveraging our DevOps and Kubernetes expertise, the client extended their services globally, reaching new geographical regions in Europe and China
- This expansion broadened their business scope and allowed them to gain valuable insights into customer trends for enhancing their services

enterprises will shift from piloting to operationalizing AI by the end of 2024.

This point-of-view details the Evolving Solutions perspective concerning Modern Operations and how a strategy involving pipelines and automation can help your business achieve key advantages that can help your enterprise streamline software delivery leading to potential cost savings and operational improvements. While somewhat technical in nature, an automated pipeline strategy is more about helping your business achieve its business goals and objectives, than it is about technology.

### **MOVING TO MODERN OPERATIONS**

A decision to upgrade to a Modern Operations model may seem daunting at first. But just as your software development team was able to adjust from a waterfall to agile approach, the move towards Modern Operations is simply the next step in the evolutionary cycle of your organization. Yes, the conversion process will require a great deal of change, but it doesn't require reinventing the wheel. The transition simply leverages the institutional knowledge your team has already preserved and expands upon it with the smart application of new processes and technologies. DevOps automation will remove human error from processes, improve security, and drive your software delivery velocity to new levels with all of this contributing to a developer friendly environment.



Evolving Solutions sums up our perspective on Modern Operations as:

1. The introduction of new processes, tools, and often, new skills that are known to build on the work our clients have been doing for decades
2. A developer-friendly application environment that doesn't get in the way of how your developers perform and operate

Code doesn't operate in a vacuum. It requires support from the operational team and continuous improvement and integration by developers. The intention of Modern Operations is to align operations teams to developer needs and create a synergy between the two that was simply unobtainable in traditional on-prem environments. This synergy fosters a culture of collaboration in which developers and operations teams work together to identify and resolve issues quickly through an enhanced sense of shared responsibility and accountability. The injection of new tools, data aggregation and analyzation, reporting provide granular insights that feed actionable intelligence to decision makers, auditors and other stakeholders that stimulate better decision making.

Evolving Solutions has experience engaging with customers across many industry verticals including manufacturing, finance, and insurance. This broad exposure to diverse industries provides us insight into digital transformation and Modern Operations from a first-hand experience. We have witnessed the value of breaking the siloed nature that development teams and operations have traditionally had in place.

During the engagement process we examine your operations and analyze why systems aren't running or performing optimally. Our team also probes current resources and capabilities with an eye for what's missing to hasten a transition to Modern Operations. We then work with your team to redefine these capabilities so that they're consumable by your developers in the cloud or as microservices in a Kubernetes environment. Our team also probes current resources and capabilities with an eye for what's missing to ensure that your transition to Modern Operations is successful. We then work with your team to redefine these capabilities so that they're consumable by your developers in the cloud or as microservices in a Kubernetes environment.

Modern enterprises require storage, compute, and other cloud services that can be consumed from either the public cloud, hybrid cloud, or on-prem data center. Our experience at Evolving Solutions shows us that enterprises need the following to ensure success today:

- Automation to free developers and sysadmins from rote tasks that do not add value
- Pipelines that govern the build and deployment of software
- Observability that provides teams the insightful data to report and remediate issues
- Data protection to ensure data resiliency, recovery, and security
- Data connectivity and access to supply and govern access to authorized users





## MODERN OPERATIONS PRINCIPLES AND VALUE PROPOSITION

In the same way that energy pipelines feed the nation with the energy that it needs to operate, your software delivery pipeline is the artery system that feeds new code innovations to your business that create greater value. By automating your pipeline delivery, you streamline the development process, from the initial stages of code writing to the final deployment of an application. The value proposition of Modern Operations doesn't mean eradicating the institutional knowledge and experience of your current IT staff. Instead, the goal is to transfer that existing knowledge base into a new operations model and build on it so that innovative software is delivered faster and with higher quality to ensure an enhanced customer experience. Your pipeline feeds your complex apps for distribution and observability measures the value of that code.

## STANDARD PRACTICES: NEW TOOLS, PROCESSES, AND SKILLS

Traditional practices don't disappear overnight. The goal is to augment and modernize them by automating the laborious facets of these legacy approaches that fail to create value. By reducing the need for manual intervention and dashboard management, your IT teams are liberated from the mundane, allowing them to pursue business-critical activities that directly further your business objectives. Examples include the development of new innovative practices that streamline processes, increase agility, enhance security, and reduce time-to-market for new internal applications.

## SYSTEMS AVAILABILITY

Moving to a public or hybrid cloud allows modern enterprises to improve the availability of systems because their IT department is getting out of the infrastructure business. Enterprises are now relying on the economies of scale made possible by the migration of their application infrastructure to a major cloud services provider (CSP). Cloud hosting eliminates the costly and disruptive practice of updates and maintenance that internal IT has been saddled with for so long that just gets in the way.

## Case Study

### CLIENT:

IT Firewall & Security Software Company

### NEED:

- Development of an app to achieve integration between the client's flagship product offering and ServiceNow

### HOW WE HELP:

- The Keyva team seamlessly integrated the client's compliance tool into ServiceNow's incident and vulnerability modules, employing end-to-end software development in adherence to agile standards
- This encompassed testing, documentation, app certification with ServiceNow, and ongoing support and enhancement for end users

### RESULT:

- The company now offers enhanced integration capabilities to end users, setting them apart from competitors



## **PERFORMANCE**

Application performance has always been a concern, even pre-pandemic. Now that the world has gone hybrid, the performance of applications takes on renewed importance. Modern applications can be delivered to geographically disparate employees and customers alike and automation allows containerized environments to scale these apps to accommodate highly dynamic workloads. All of this allows applications to remain performant regardless of demand fluctuations and scale. Meanwhile, observability, root-cause analysis and automated remediation help identify and address performance before they can impact user experiences.

## **RELIABILITY**

Service reliability has forever been a concern of our customers. The continuous integration and delivery that pipelines offer allow code changes to be made quickly while automated testing, monitoring, and deployment help reduce the risk of human error and help ensure that changes are made in a consistent reliable fashion. When you use code to manage and provision your infrastructure, you reduce the risk of misconfigurations that can chip away at reliability.

## **SECURITY**

Moving to a Modern Operations model injects new security controls, protocols, and strategies for enterprises to secure their data and infrastructure. Outsourcing infrastructure to Amazon Web Services (AWS), Microsoft Azure, or Google Cloud Platform (GCP) enables you to leverage security tools that may have been unaffordable in an on-prem capitalized environment. These providers also have their own inhouse security expertise to protect infrastructure that both of you share, freeing you of the task of recruiting and retaining hard-to-find cybersecurity talent. By migrating your applications to the cloud, you obtain key security initiatives without the burden of heavy investments in tools and personnel.

## **CORE INFRASTRUCTURE FUNCTIONALITY / OPERATIONS AS CODE**

Operations as code replaces manual management tasking with the power of scripting and programming. Infrastructure is now treated as code rather than an entity that must be purchased, supported, upgraded, and deprecated. Operations as code enables your sysadmins to create standard server, storage array, and related environments and configurations using scripting tools that allow them to make or roll back changes on the fly. You can utilize Git hooks to automate or enforce specific actions, checks or validations to streamline your development processes.

## **DEVELOPER-FRIENDLY**

Your developers are your primary innovators so you want to give them the proper environment that will stimulate and enhance the creative process. Developer productivity is a primary goal of Modern Operations as the

introduction of new tools and practices does not interfere with current developer workflows. By encouraging development and operations to work in collaboration, developers can quickly receive feedback to improve future product development. The end result is that developers can focus more on writing code and less time on manual tasks.

## **PIPELINES & AUTOMATION: THE VALUE PROPOSITION FOR ENTERPRISES**

Pipelines and automation are critical for future-ready enterprises and their digital transformation journey. Here's a look at the value proposition for each:

### **AUTOMATION**

Human error is a chief culprit of downtime. Strategic automation seeks to eliminate this weak point by automating software builds, infrastructure management, and other related processes that have introduced the element of human error in the past. Automated pipelines deliver software by automating repetitive tasks and transforming them into standardized repeatable processes that provide greater consistency for code delivery. The end result is that developers can focus more on writing code and less time on manual tasks.

### **PIPELINES**

The advent of pipelines as part of a Modern Operations transformation gives an enterprise the ability to use DevOps practices that define and automate the required task sequences of a project. Pipelines respond to code triggers or prescribed events and are designed to perform these response tasks with repeatable consistency. Eventually, pipelines will subsume the concept of orchestration by incorporating development and scaling tasks into the pipeline itself.

## 5 Principles of a Pipelines & Automation Strategy

Drawing from our experience assisting organizations implement their pipelines and automation approach, we have defined five core principles that serve as the foundation for any pipelines and automation strategy.

- 1** Automation is a requirement for the new hybrid world and for AI initiatives.
- 2** A move towards automation is attainable for most traditional IT organizations.
- 3** It is important to score some quick wins early in your transition that will provide visible evidence of the value that your new strategy can yield.
- 4** You must have a strategic roadmap that can flexibly adapt to new priorities as the project unfolds.
- 5** You need to preserve your core operations principles and use them to bridge between legacy operations and the new world of pipelines and automation



Pipelines offer a developer-friendly methodology to deploy applications and provision infrastructure, thus bringing the power of iteration to both development and operations. Continuous integration/continuous development (CI/CD) pipelines are bound tightly to microservices development. Applications travel these CI/CD pipelines from development through final production and contain associated infrastructure capabilities that you can control via the pipeline using infrastructure as code (IaC) or operations as code (OaC).

## **PIPELINES & AUTOMATION AT SCALE**

Many organizations don't consider automating their application environments until the start of a cloud migration, but the adoption of an automation mindset should start today with your legacy environment. This late adoption often magnifies the struggle of cloud migration. We often hear clients lament about how they have legacy equipment that people continue to run as they always have. The problem is that the world isn't running in the manner it was even three years ago. The world has changed, and so must the approach to which organizations approach technology.

The successful completion of any journey requires preparation, and a cloud migration is no different. A legacy environment gives you the opportunity to discern what is possible with automation and learn how to properly implement it. As with anything, there is a learning curve. It will demand additional personnel with the right skill sets and necessitate new budgetary line items. It is here that the transitional stage begins, giving rise to a Modern Operations mindset that will begin to offer clarity for enterprises as they begin taking advantage of new capabilities in multiple environment types.

Many people don't like change. Personnel that are highly specialized in your current legacy infrastructure may perceive a commitment towards digital transformation as a threat to their job security. This can induce them to create positional roadblocks that delay transformational efforts. This is why it is important to win over the legacy sysadmin and developer mindsets at the outset by educating everyone on the benefits that await at the end of the journey. At Evolving Solutions, we've learned that a cloud migration isn't just about transitioning technologies. It's about transitioning people too. Our approach is to make the extra effort to collaborate with these employees and ensure that they realize the value that their acquired institutional knowledge will bring to the entire process. They must know they have a role in the future. We don't want to change them or diminish their roles. We want them to grow along with the enterprise that they willingly serve.

## **AUTOMATING CLOUD-NATIVE ENVIRONMENTS**

Cloud Native environments are increasingly commonplace and serve as a crucial differentiator for organizations seeking scalability and rapid deployments. Across industry verticals, organizations are leveraging IT to enhance their services and offerings to stand out in the market. Scalability enables companies to expand into new markets and tailor their services to meet regional requirements. Automation is pivotal in ensuring service delivery and accelerating deployment rates for these services.

## **INFRASTRUCTURE-AS-CODE**

Infrastructure-as-Code (IaC) involves defining and managing infrastructure components as code, enabling rapid replication of smaller components according to defined standards. For example,





once a module to create a new S3 bucket is developed, it can be reused by different teams. All the prerequisites for organizational compliance and security are already a part of the developed module, so any new S3 buckets created using this module will also be compliant.

IaC is typically written using declarative language models provided by open source or enterprise software. Pipelines, constructed in YAML, automate the sequential execution of scripts to achieve a predefined and targeted infrastructure model.

## **GITOPS**

GitOps combines version-controlled code with operational aspects of application deployment. Organizations adopting GitOps deploy the entire application set automatically when changes are made to the codebase. Any modifications made to the application code, and pushed into Git, trigger automatic deployment using a continuous delivery (CD) tool.

To maximize GitOps benefits, the infrastructure components need to be immutable. Any changes required, would be made in the code, pushed into Git, and deployed via automation to reduce the risk of configuration drift across various components.

## **CODE OPTIMIZATION**

Applications running on cloud native environments need to be set up with microservices architectures. This means breaking down various application functions into individual services, and leveraging capabilities provided by hyperscalers. For example, utilize serverless compute or functions, when possible, to minimize costs and enhance security. Several optimizations may be necessary based on how the application uses the network and storage components. If it is a user facing application, and the users are across the globe, the application front-end should use Content Delivery Networks (CDNs) to provide the necessary content closer to where they are and decrease response times.

Operational aspects for an application deployment, such as monitoring and logging, also need to be accounted for in these updates. Monitoring microservices in containers differs from monitoring virtual machines, requiring a careful selection and deployment of solutions tailored to this environment for success.

## **COST OPTIMIZATION**

As your cloud workloads expand, costs will also increase. Monitoring and analyzing the overall infrastructure cost are key. Unfortunately, in many organizations, users often bypass the infrastructure-as-code pipelines due to time constraints or lack of awareness. This manual resource creation, besides posing challenges to standardization and security, leads to neglected removal of unnecessary resources, causing unnoticed costs for months.

Overprovisioning is another common issue where teams often increase the size of compute or database instances to address performance bottlenecks. A more effective approach involves analyzing application transaction logs to identify delays and applying necessary remediations, as large and overprovisioned nodes contribute significantly to unexpected bills.

## **HOW PIPELINES & AUTOMATION ALIGN TO MODERN OPERATIONS PRINCIPLES**

Pipelines and automation are foundational to Modern Operations principles because they provide the data, automation, security, and observability tools to propel environments forward. Takes take a closer look at each of these components.

## **DATA CONNECTIVITY & ACCESS**

Data connectivity and access makes it possible for authorized employees, partners, and customers alike to digest data residing across your hybrid environment. IoT devices are playing an ever more important role in data connectivity and access, providing insights and feedback into critical business processes.

## **DATA PROTECTION**

Collaboration and data security may seem to contradict one another, but it is possible to implement a strong data protection strategy that doesn't restrict the ability of your stakeholders to share data and work with another. An automated strategy can bring people and processes together while providing the resiliency you need to secure and recover your data in the event of a cyber-attack, accidental deletion, or catastrophic failure.

## **OBSERVABILITY**

Observability is a key pillar of Modern Operations principles that enables your enterprise to collect and aggregate data from disparate systems within your production environment, analyze that collected data, identify errors and potential sources of disruption, create support tickets, and apply remediation. Tickets are then closed automatically using an already-in-place runbook. This automated process runs on its own 24/7.

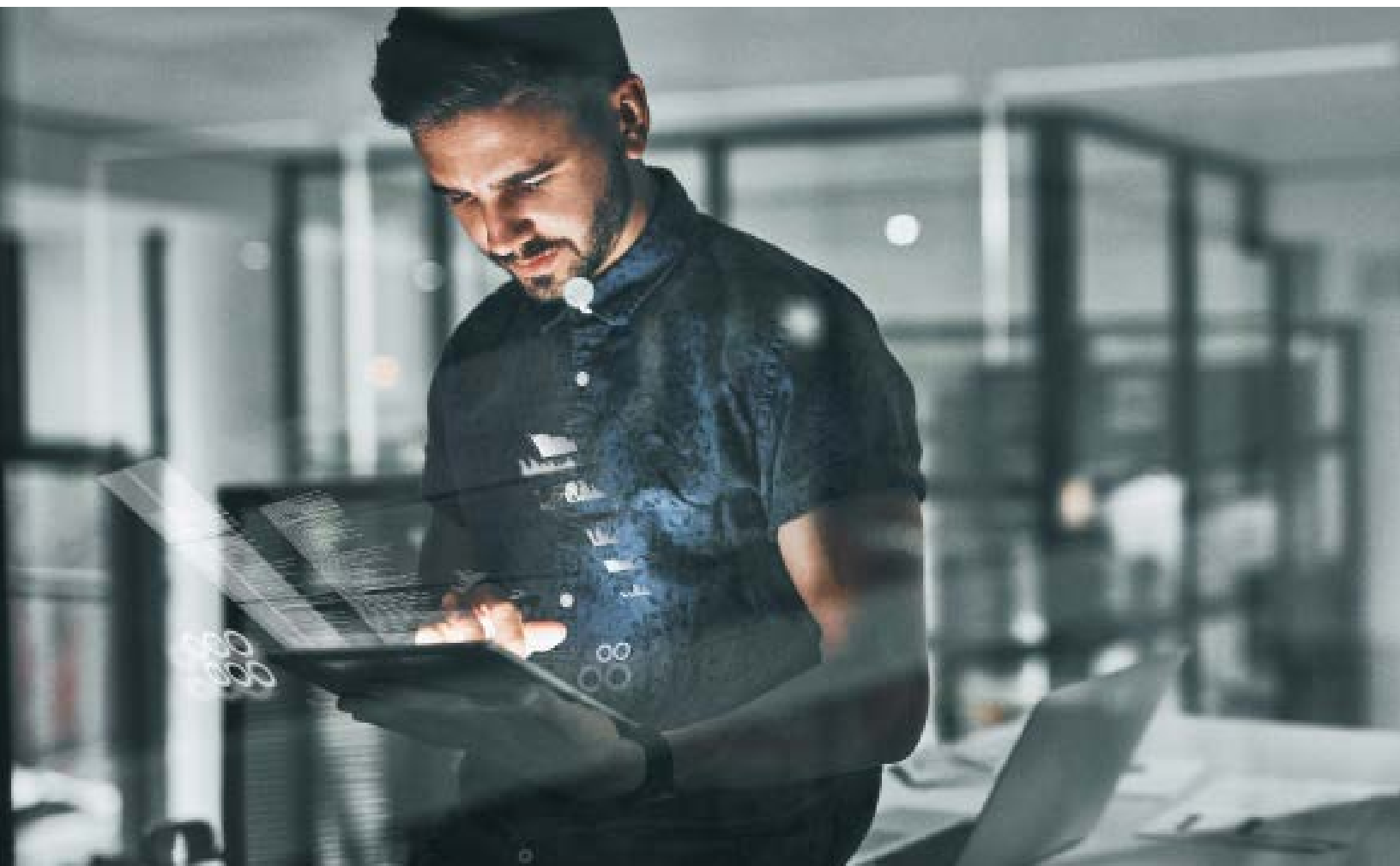


## HOW EVOLVING SOLUTIONS AND KEYVA CAN HELP

Evolving Solutions, and our sister company Keyva, have helped companies across many verticals implement pipelines and automation as part of their cloud and IT modernization initiatives. While technology is our strong suit, our customer engagements begin by learning as much as we can about their business and technology goals. This means sitting down and taking the time to understand where they are currently, and where they want to be to help them choose the appropriate business outcomes for the effort.

Evolving Solutions then applies our knowledge around Modern Operations, automation, and pipelines to our client's existing environment in a way that will achieve their business objectives. Our team then creates a customized and appropriate strategy that moves clients toward achieving their goals. Our approach is designed with agility in mind because your business does not operate in a static environment, which means your IT environment can't either. We also focus on attaining quick wins to generate greater buy-in from your stakeholders.

Any type of migration is a journey, and it's our job to prepare you and accompany you on that journey. It starts with an evaluation phase that helps create a roadmap to take us to the destination where we eventually hand your automated pipeline environment to you. At that point you will be self-sufficient due to extensive training, mentoring and knowledge transfer processes. It is then you will be able to look back and see how much you have achieved, and we will have been glad to be a part of it.





Modern operations  
to enable a future-  
ready business.

**Let's get to work.**