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ESG WHITE PAPER

Why Automation and AI Are Critical for IT Ops

The Four Steps You Should Take Now

By Mike Leone, ESG Senior Analyst; and Bob Laliberte, Senior Analyst

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Contents

The Transition to Modern IT Environments.....	3
IT Complexity Impedes the Pace of Modern Environments	3
From Automation to AI.....	4
Enter AI	5
AIOps as an Agent of (Welcome) Change.....	5
Implementing Automation Technologies in a Phased Approach	6
The Four Steps to Ensure Successful Automation Implementation.....	7
How HPE Can Help.....	8
The Bigger Truth.....	9

The Transition to Modern IT Environments

The digital economy is having a profound impact on both business and IT. Organizations have to become far more agile and responsive to rapidly changing market demands. As a result, they have to transform not only how they conduct business but also the underlying IT infrastructure that supports it. As an example, a recent ESG survey indicated that the vast majority of respondents (86%) reported that they are under pressure to develop and launch new products and services faster (see Figure 1).¹ In order to accelerate new applications and services, organizations will have to evolve their IT environments and processes as part of a digital transformation initiative.

ESG research is tracking the progress of those initiatives and the most recent data indicates that 19% of organizations surveyed have mature digital transformation initiatives and another 57% have initiatives either in process or just beginning. With three-quarters of respondents embarking on or maturing their digital transformation initiatives, it is important to understand the end goals. According to ESG research, the three goals most reported by organizations include the ability to become more operationally efficient (55%), to deliver better and more differentiated experiences (49%), and to develop new data-centric products and services (41%).²

While digital transformation initiatives encompass people, process, and technology, they also have a profound impact on the IT environment. IT teams are modernizing applications and distributing them across on-premises data centers, multiple public cloud services, and to the edge. While this is being done to support business needs and accelerate new application development, it is also putting tremendous pressure on IT operations.

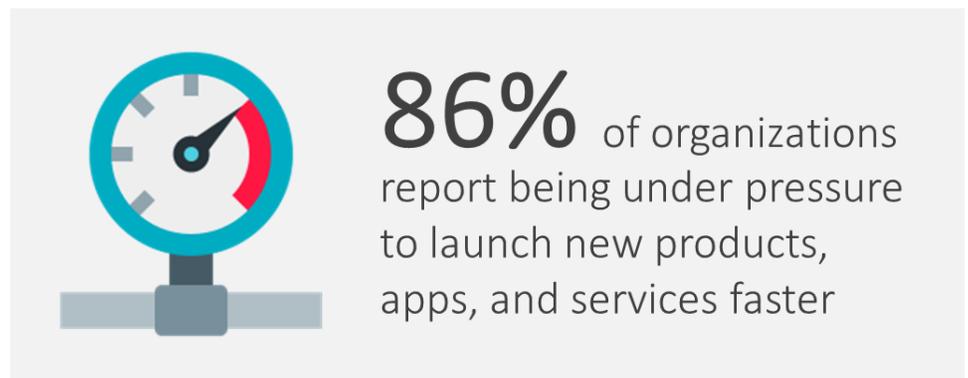
IT Complexity Impedes the Pace of Modern Environments

As a result of these digital transformation efforts and modern application environments, IT operations teams are faced with increasingly complex environments. In fact, ESG research indicates that 64% of respondents cited that their IT environments are either more or significantly more complex than they were two years ago. And this complexity will only get worse moving forward as those organizations with mature digital transformation initiatives were more than three times as likely as those with initiatives in earlier stages to say their IT environments are significantly more complex.

A number of factors contribute to this IT complexity, including:

- **Distributed IT environments.** It is clear that the IT pendulum is swinging away from consolidated and toward distributed computing, as businesses transition deploying applications in cloud services and the edge. Currently, over 94% of respondents state they are using cloud-based services (both IaaS and SaaS) and, for the more than two-thirds

Figure 1. IT Organizations Are Under Pressure



Source: Enterprise Strategy Group

¹ Source: ESG Master Survey Results, [Trends in Modern Application Environments](#), December 2019.

² Source: ESG Master Survey Results, [2020 Technology Spending Intentions Survey](#), January 2020. All ESG research references and charts in this white paper have been taken from this master survey results set unless otherwise noted.

(67%) that use infrastructure-as-a-service, almost half (45%) are using it to run production applications. Continued IoT growth is driving the need for real-time compute and analytics at the edge as well.

- **Higher data volumes.** When ESG specifically asked research respondents what is driving IT complexity, higher data volumes was the most-cited response. This data growth can take many different forms. Because of digitization efforts, every year organizations are setting new records for data growth and the rise of IoT devices and sensors also contributes. In addition, IT devices have more granular levels of telemetry and collect more data that operations teams need to digest, interpret, and analyze than they have before.
- **Modern application environments.** The shift to modern application environments, characterized by microservices architectures that run in containers in distributed clouds, is also creating complexity for IT. If virtual machines were best described as dynamic, these new modern applications are best characterized as being ephemeral, with services turned up and down in only a few seconds. As a result, IT organizations that lack granular observability will be unable to ensure proper control and remediation.

Ultimately, as IT teams proceed down the digital transformation path, IT is becoming increasingly complex and will exceed the ability of IT operations teams to manage these environments manually. The rapid scale and complexity mean enterprises can't realistically put enough resources on the problem to fix it. The ability to correlate all of the inputs, analyze them, and take intelligent actions in increasingly complex and distributed environments will overwhelm the most competent operations team. Organizations need to leverage technology to regain control of their data center, colocation, and edge locations.

From Automation to AI

To address the growing list of IT challenges today, infrastructure and operations teams are leveraging automation software to regain control. Automation software can be programmed based on structured workflows to follow repeatable instructions and processes, or to enforce policies that minimize IT's involvement in system management. By automating manual processes, IT regains its desired levels of productivity and strategic involvement, enabling infrastructure and operations teams to shift from being perceived as a business inhibitor to being a strategic enabler. Traditional automation focuses heavily on provisioning and management of infrastructure lifecycle operations using templates and APIs. The next wave of automation encompasses prevention and proactivity, as operations teams work toward an autonomous infrastructure with self-management that extends well past the traditional infrastructure stack. This level of automation embraces flexibility and agility through deeper integrations across clouds and infrastructure constructs (i.e., containers), as well as incorporating application lifecycle management. The results are streamlined administrative and operational tasks, higher levels of staff efficiency and productivity, an increased pace of introducing new technologies and applications to the environment, lower costs associated with rightsizing infrastructures, business continuity through continuous delivery of right-sized resources, and reduction of downtime and regulatory risks.

Automation can be applied to IT operations through numerous techniques, whether they are manually programmed or leverage next-generation technology like artificial intelligence (AI) and machine learning (ML). Today, automation is commonly embraced with IT vendor guidance through the use of policy-based templates, scripting, and API integration across the IT infrastructure stack. Most approaches leverage a rule-based technique that enables IT to provide ranges of acceptable resource and component behavior. When something falls outside of that acceptable range, alerts are sent to IT that document what happened, why it happened, and how it should be fixed. While answering the "what" is easy for this level of automation, answering the "why" and "how" prove to be a challenge.

Enter AI

This situation is leading more organizations to look to AI and ML via AIOps, where the combination of advanced algorithms and human intelligence can enable a more advanced view into the state of the infrastructure stack, including the optimal performance, efficiency, and reliability of numerous interconnected components and applications. AIOps has proven to answer far more than the “what” of an IT operations problem. AIOps enables IT to become more proactive than reactive, not just alerting IT when something goes wrong, but providing context into why it happened, recommending the actions to take to rectify the problem, and in some cases, taking action by automatically fixing the problem. Further, AIOps can take into account real-time and historic data to accurately predict when something may go wrong, enabling IT (or the AI itself) to take action before the business suffers.

ESG research shows that when it comes to technology spending, AI is a top priority. In fact, of all the areas of technology investment across mid-market and enterprise-class organizations, 64% of ESG research respondents indicate that AI is an area in which they will increase spending in 2020, making it the most-cited area of increased IT spending. And similar to digital transformation objectives, the top business objective reported by surveyed IT professionals for investing in AI is to improve operational efficiency.³ This points back almost exclusively to IT, as numerous organizations view AI in IT as a natural stepping stone to more advanced usage of AI across the business. While it is easy to get lost in all the possibilities of AI to help transform businesses, it’s important to recognize the top two applications of AI are in IT and go hand in hand to enable an operationally efficient IT organization:

- **IT system management and orchestration.** This is all about regaining control of the diverse and complex IT infrastructure stack by driving comprehensive lifecycle operations efficiency. From ensuring the right resource allocation through maintaining optimal performance and resource utilization to predicting future resource requirements, AI for system management and orchestration can redefine IT responsiveness and agility.
- **IT system log file and error analysis.** This is focused heavily on the health of the infrastructure. AI is used to predict when an issue could arise to enable proactive maintenance. And if something does go wrong, AI not only identifies and alerts IT to the problem, but analyzes, troubleshoots, recommends, and automatically resolves if given authorization.

In both cases, there are value adds associated with efficiency and optimization, but planning is a valuable component to be considered. By understanding ongoing trends, patterns, and behaviors of the infrastructure, organizations are set up for success when planning for infrastructure scaling, upgrading, and rightsizing. While this enables IT to gain insight into resource utilization and requirements, the benefit comes down to more accurate budgets and future spending.

Once IT teams have mastered automated infrastructure management, the opportunity to automate then shifts up the stack to application environments. That means API integration becomes critical as it enables IT to connect the infrastructure management layer to the higher-level automation tools. AI can help since the footprint of infrastructure and application environments is unwieldy, real-time, and may require the movement, security, and governance of application data across diverse and heterogeneous environments.

AIOps as an Agent of (Welcome) Change

While AI has numerous benefits to enable IT to take back control of the operating environment, having buy-in from the people—in this case, IT—is important. And the fact that IT is continually asked to do more with less, turning to AI is a

³ Source: ESG Master Survey Results, [Artificial Intelligence and Machine Learning: Gauging the Value of Infrastructure](#), March 2019.

natural solution. They recognize that the dynamic nature of modern IT environments makes it nearly impossible to maintain peak efficiency and optimization, especially as portability, flexibility, and decentralization are constantly being prioritized.

So, what do IT organizations think about AI? ESG research indicates that IT organizations are overwhelmingly positive about leveraging AI technology. In fact, 91% of respondents said their employees have a neutral, if not positive sentiment about their AI initiatives today,⁴ but apprehension within IT still remains. Mandates from upper management are more likely to receive negative acceptance. IT should not be forced to apply this technology on someone else's terms but welcome this change in account of its potential benefits, not only to the business, but also their own working environments. IT needs to both own and drive this natural transition from manual to intelligent, automated operations with AI. And while, for some, embracing a cultural shift with a future growth mindset can be challenging, it should be noted that this shift is not about indispensability. It's about growing and building new skills as an organization to increase IT's position as champions of the business.

Implementing Automation Technologies in a Phased Approach

IT operations teams have to be conservative, much like airline pilots, as their primary objective is to provide good experiences to their customers and ensure that all arrive safely at their destination. For IT operations teams, this means ensuring applications are securely delivered and always available. And, just as airplanes have become more sophisticated, and pilots now trust autopilot programs to safely fly planes, IT operations teams need to begin to leverage automation and AI to help them get better results with less manual intervention.

The transition to infrastructure automation is not an all or nothing proposition. Indeed, the reality is that many IT operations teams have already started their journey using software-defined intelligence enabling infrastructure as code (IaC). This may include performing some basic scripting, taking advantage of templates, or using APIs to connect third-party tools. In some cases, organizations may be using tools that incorporate machine learning for analysis. Therefore, they should take a phased approach to adopting these new automation and AI technologies.

- **Phase One, Notification:** In this phase, organizations would take advantage of AI technologies to provide intelligence and context for any notifications about errors within an environment. Typically, this would leverage some type of machine learning and might even take advantage of an extended user base to compile vast amounts of data to effectively model the environment and provide the most accurate root cause analysis. The key benefit of this phase is that when operations teams are armed with accurate data on the root cause of a problem, they can accelerate problem resolution since they don't have to spend any time finding the problem, just fixing it. For provisioning and management, this could take the form of notifying operations about a potential policy violation for high availability or data sensitivity.
- **Phase Two, Recommendation:** In this phase, organizations could leverage intelligent management solutions to provide recommendations on how to proactively optimize the infrastructure or remedy a future problem. In essence, this phase enables IT teams to become comfortable with technology and the algorithms to recommend how an IT environment should be provisioned. This could take the form of templates or might be initially based on policies. More advanced solutions would understand the existing environment and provide optimized configurations. Organizations in this phase should see faster provisioning times as users gain confidence in the solution.

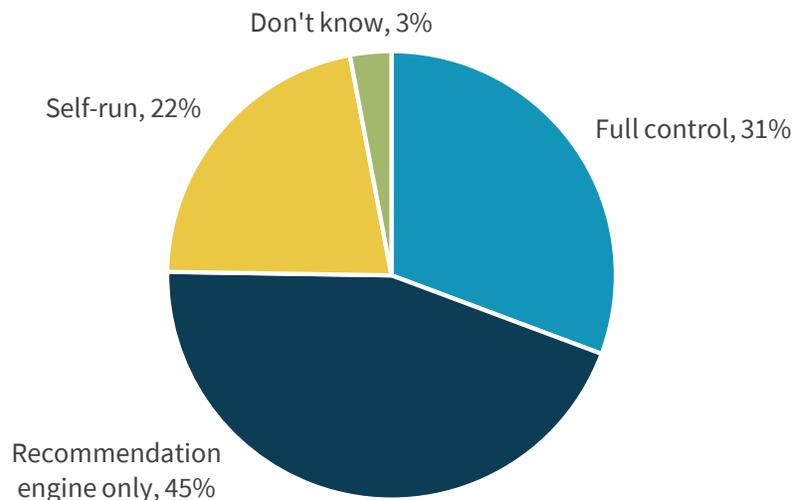
⁴ ibid.

- **Phase Three, Automation:** In this last phase, organizations begin to transition more control to the technology, enabling devices to be configured or reconfigured automatically. This is often referred to as closed loop automation. The technology will monitor the environment, spot problems, automatically make the changes to ensure optimized performance or availability, and then continue to monitor again. In the early stages of automation, organizations can leverage a “semiautomatic mode” in which the operations team is notified of the problem, given the recommendation for how to fix it, and provided an option to “press this button” to automate the corrective actions. Over time, when the operations team is comfortable with the technology, they can turn it over to fully automatic. It’s reasonable to assume that the automation of airplane piloting took a similar approach.

To provide some insight into how a peer community is thinking about automation and AI, ESG asked survey respondents about their intended use of these technologies. Figure 2 illustrates that almost one-third of respondents (31%) indicated that they still want to retain full control of the environment, which was defined as having the staff analyze data, define what should be done, and implement any changes without help from existing tools. However, almost half of the respondents (45%) indicated that they want to use technology as a recommendation engine that provides the actions to take based on learned behavior from historic and real-time data analysis and have staff implement any changes. It is interesting to note that just over one-fifth (22%) indicated they would like to use AI technology to automatically detect, analyze, recommend, and apply changes as needed, with the ability to review outcomes and make adjustments.⁵

Figure 2. Where Is AI in IT Going?

Which of the following statements aligns with your organization’s expectations or preference in terms of leveraging AI/ML as an embedded feature to intelligently automate IT processes? (Percent of respondents, N=300)



Source: Enterprise Strategy Group

The Four Steps to Ensure Successful Automation Implementation

Automation can revolutionize IT operations, but simply jumping right to the end with AIOps could introduce challenges associated with technology, processes, and people. It is important to take the following steps in order to ensure success, acceptance, and continued adoption of AI to improve operational efficiency within IT.

⁵ ibid.

1. **Involve:** Actively involve all stakeholders from the start, whether they're executives, line-of-business leaders, IT personnel, or end-users. It's important to understand all the angles, including those stakeholders who might be hesitant to jump right in. Empathy is a valuable tool when looking to implement automation technology. Emphasize the importance of fostering collaboration and productivity, upskill where there are skills gaps, and enable agility and adaptability of the business as a whole. To create a people-centric culture, IT teams need buy-in from the people, and when it comes to automation, the people who will be impacted are the most important. The earlier you win over that group of people, the better off the business will be in achieving automation and AI success.
2. **Identify:** Identify areas of the IT environment that would most benefit from automation. These areas should be of high value but pose a low risk to the business if disruption or delays occur. With that in mind, these implementations should be able to be deployed/implemented quickly with a goal of rapid time to value. And if you struggle to identify these areas, look for guidance from user groups, peer networks, strategic partners, and technology vendors.
3. **Inventory:** Take an inventory of all existing assets in the environment today. What technology, solutions, tools, and processes are in place today? How are the solutions managed? How is the technology integrated? Where are there gaps in existing tooling? These are some of the critical questions that must be answered. As ESG has discovered when speaking with numerous IT organizations over the years, often times those automation tools are available in enterprises today, possibly sitting idle within systems, or waiting to be activated. The right vendor will provide templates, policy engines, and API interfaces to rapidly implement, monitor, and measure. Arguably more important is the idea of using these available tools to upskill staff as they embark on an automation journey.
4. **Implement:** Implementation is about filling gaps, measuring success, and iterating based on the findings. Activating/deploying the technology is the first step, but after that it's about following best practices and ensuring success. This is done by measuring success with established metrics, such as preventing low latency for a specific application at a certain time of day, ensuring uptime, or minimizing overprovisioned resources once a burst of activity is over. These metrics are critical to understanding the business impact. And based on that impact and the learnings, the next initiative leveraging automation technology will be set up for success. It's important to understand that this step is very iterative. While set-and-forget is appealing in the beginning, it's about implementing, monitoring, and tweaking based on ongoing findings.

How HPE Can Help

As a mainstay leader in the enterprise IT space, HPE's portfolio continues to support IT as organizations digitally transform their businesses to be more modern, responsive, and agile. With operational efficiency on everyone's mind, technology that enables automation is being emphasized more than ever. HPE recognizes that a strategic partner is required to meet IT teams where they are in their automation journeys, whether they are just getting started or expanding to the next level of automation maturity. HPE has numerous ways to accelerate that journey with guidance, best practices, and technology.

For IT teams that are not sure where or how to start, HPE Pointnext Services can help with assessment, design, implementation, and training for your digital transformation initiatives. By helping establish business goals and guiding organizations from the very beginning across people, processes, and technology, HPE Pointnext Services can help achieve maximum return on investment by offering recommendations and guidance to help reach IT operational goals.

HPE's infrastructure software solutions can help IT teams automate and transform their operations with software-defined intelligence, policy-based templates, API integration, and next-generation technologies like AI and ML. These technologies

enable IT to streamline operational tasks, improve productivity, and lower costs, all while providing IT the guidance and time to introduce new technologies confidently and on their terms.

- HPE OneView is the foundation of infrastructure automation, driving efficiency and optimization in a modern, dynamic IT environment. IT administrators can easily provision and manage physical infrastructure as code (IaC) using software-defined templates and APIs that enable the definition and automation of infrastructure configuration and lifecycle operations. Through the HPE OneView API integration with composable ecosystem partners, IT administrators can link HPE OneView as a physical infrastructure provider into open source, DevOps, or cloud tools.
- HPE InfoSight delivers AI-powered automation to manage and digitally transform infrastructure. HPE InfoSight helps eliminate time spent searching for a root cause and managing the most challenging problems by using cloud-based predictive analytics for IT operations to predict and prevent issues across and up the infrastructure stack. Every second, HPE InfoSight collects and analyzes data from more than 100,000 systems worldwide and uses that intelligence to make every system smarter and more self-sufficient. This enables AI-driven autonomous operations across the data center that helps ensure your environment is always on, fast, and agile, delivering an optimized environment that is fully responsive to the dynamic nature of the business.
- HPE GreenLake delivers IT-as-a-service, offering a fully managed, pay-per-use model that enables enterprises to get a modern cloud experience on premises and at the edge, simplifies IT with consistent cloud operations and automation, and drives insights and control across the entire IT estate.

The Bigger Truth

Digital transformation efforts and distributed clouds are driving a significant amount of complexity for IT operations teams. As a result, these increasing levels of complexity will exceed human capacity to effectively manage them. Given that the top goal of digital transformation is to become more operationally efficient, organizations have to change to ensure a successful transformation.

As organizations embark on digital transformation journeys, this is the time for them to embrace automation and AI technology to ensure IT can operate as efficiently as possible. The good news is the decision to adopt automation and AI is a phased approach. This enables businesses to become comfortable with the technology and fully understand and appreciate the benefits automation and AI can provide. As ESG research has demonstrated, the majority of respondents are looking to take advantage of automation and AI in some capacity.

Given the data and advancing maturity of digital transformation initiatives, IT teams should develop a sense of urgency about adopting automation and AI technologies. In fact, IT operations teams should be leading that charge. These teams should be investing in the people, processes, and technologies that enable automation and improve service delivery. The key to making progress is outlined in the four steps highlighted in this paper, but organizations have to get started now. If even the first step is overwhelming, they can leverage strategic partners like HPE to help them get started.

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 www.esg-global.com

 contact@esg-global.com

 508.482.0188