Automation in IT systems for Corporations

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Executive summary

Automation is the use of technology to perform tasks with minimal human input. Automation can improve productivity, efficiency, quality, and customer satisfaction in various domains of IT systems, such as business process automation, IT operations automation, network automation, and system integration automation. However, automation also poses some challenges and risks, such as security, ethical, social, and legal issues, as well as the need for human oversight and intervention. Therefore, corporations should adopt a strategic approach to implement automation in their IT systems, considering the benefits and costs, the alignment with their goals and values, and the implications for their network design and performance.

Introduction

Automation is not a new concept in the field of information technology (IT). Since the advent of computers, humans have been trying to automate various tasks and processes that are repetitive, tedious, error-prone, or beyond human capabilities.

Automation in IT systems can be defined as the use of technology applications that perform tasks with minimal human input. Automation can be applied to various domains of IT systems, such as business process automation - BPA, IT operations automation - IOA, network automation - NA, and system integration automation - SIA. Automation can provide several benefits for corporations, such as improving productivity, efficiency, customer satisfaction, etc.(IBM 2021)

However, automation also poses some challenges and risks for corporations, such as creating security vulnerabilities, ethical dilemmas, social impacts, etc. Therefore, the purpose of this essay is to discuss the benefits and challenges of automation in IT systems for corporation, and to examine how automation can be implemented strategically by corporations to align with their goals and values. This essay will cover the following main points and arguments:

- The benefits of automation in IT systems for corporation, such as improving productivity, efficiency, customer satisfaction, etc and what it is current state
- The challenges and risks of automation in IT systems for corporation, such as creating security vulnerabilities, ethical dilemmas, social impacts, etc.
- The implications of automation in IT systems for the network design of corporations, such as requiring changes in the architecture, topology, protocols, bandwidth, latency, redundancy, scalability, and security of the network.
- The latest trends and technologies in automation in IT systems for corporation, such as AI.

Why Automate IT Systems?

As Business needs and technology grows, It is inevitable that the enterprise IT system environment will become ever more complex with the development of computer information systems projects. The investment priority of enterprises is gradually shifting from system construction to system operation, which means enterprises will focus more on utilizing the available technical resources to attain high efficiency and making the enterprise business environment and IT systems closely integrated. Establishing a process automation system in IT operations and maintenance system is the key to achieving these changes. (Luo et al.). By incorporating a set of process modules and automation into the system, the development efficiency and flexibility of IT operation and maintenance system can be improved.

How IT System are Automated?

To initiate the automation of an IT system, our first step is by streamlining its processes. The processes can be classified into three distinct categories: inbound, storage, and outbound. Following this, we focus on the modularization and architectural design of each flow, this is achieved by recognizing distinct perspectives of the automation. We can use the same framework which is used in product architecture that encompasses four unique views.

1. Situation and Performance
2. Objectives
3. Architectural Design
4. Implementation

(Munsberg & Hvam)

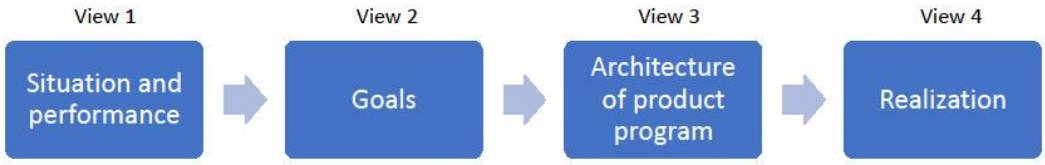

Fig 1 The four views of product architecture (Munsberg & Hvam)

The four view can also aligned be with flow analysis process in a network design and automation flow itself can be consider a part of a network where each process can be viewed as network component. This allows us to use same principle of developing the network to develop the automation

To identify and develop flows

- Identify applications/devices that will generate/terminate traffic flows
- Choose applications and devices to focus on (from prioritization)
- Use requirements specification and map to determine where flows will go

(McCabe 2010)

The Benefits of Automation in IT

IT Automation can bring many benefits to IT organizations, such as reducing operating costs, improving the safety of workers, and increasing accuracy. By automating repetitive tasks, machines can execute the work of several people, thereby reducing labour costs and energy consumption. Automated processes can also eliminate the involvement of workers in certain tasks, reducing the risk to their safety. Additionally, machines are less prone to errors than humans, which can result in increased accuracy and efficiency. Automation can also help IT organizations to improve their service levels by reducing downtime and increasing the speed of service delivery. This can lead to improved customer satisfaction and increased competitiveness in the market.

Current State of IT Automation

The current state of IT automation is rapidly evolving, with advancements in technologies such as AI, robotics, and the Internet of Things (IoT) driving further growth and innovation in the field. Automation is being used to revolutionize various sectors, including manufacturing, healthcare, transportation, and agriculture. In the IT industry, automation is being used to improve efficiency and reduce costs by automating repetitive tasks such as data entry, software testing, and network monitoring.

A report, based on a survey of automation-focused IT professionals worldwide, reveals that data pipelines are agile and complex, requiring sophisticated orchestration across different data sources and tools. It also shows that integrations are essential for automation and orchestration platforms to connect various systems and applications. The role of centralized IT automation teams in delivering automation as a service to end-users across various functions, such as IT Ops, DataOps, CloudOps, DevOps, and PlatformOps cannot be understated. 93% of enterprises report having a centralized IT automation team, even as adoption of federated (or centre of excellence) models has grown to 36%. (Scott Davis 2022)

The findings from this research make it clear that there are many forces changing the world of IT automation. With cloud adoption increasing and driving a much more complex IT landscape, traditionally siloed task automation has evolved into centralized orchestration. Enterprise teams that span all departments — from IT Ops to data, development, and business groups — have a growing thirst for automation. (Scott Davis 2022)

Challenges And Risk Associated With IT Automation

While automation brings many benefits, it also comes with its own set of challenges and risks. In large modern enterprises use not only one but several information systems. These systems create the complex environment of interacting structures which include storage, processing, translation confidential information modules. Often the organization has a special department dedicated to protect of strategically important resources and access to data, processes, monitoring, control and production facilities is implemented by mean of the identification, authentication and authorization methods. (Karlova, Sheptunov & Kuznetsova)

Automation also possess the risk of unintended consequences, such as the obsolescence of existing controls, increased complexity in operations, and the possibility of cascading errors. To fully realize the benefits of automation, organizations need to adopt a holistic change management approach that includes business-IT alignment, employee culture, and new controls designed to address the specific risks associated with automation technologies. Additionally, there are concerns about data privacy and security, as automation technologies often involve the collection and processing of large amounts of data. Organizations need to ensure that they have appropriate measures in place to protect sensitive data and prevent unauthorized access. Overall, while automation brings many benefits, it is important for organizations to carefully consider the challenges and risks associated with its implementation and take appropriate measures to mitigate them.(Karlova, Sheptunov & Kuznetsova)

IT Automation and Strategic Network Design

Automation technologies such as AI, robotics, and the Internet of Things (IoT) require changes in the architecture, topology, protocols, bandwidth, latency, redundancy, scalability, and security of the network. For example, the integration of AI technologies into automation solutions can deliver intelligent automation that goes beyond traditional robotic process automation (RPA). This requires high bandwidth and low latency to support the effective use of drones and self-driving cars, for example. It also requires robust security measures to protect users and data from cyber-attacks. Additionally, automation technologies often involve the collection and processing of large amounts of data, which can place additional demands on the network infrastructure. To fully realize the benefits of automation, corporations need to carefully consider the implications for their network design and take appropriate measures to ensure that their networks are able to support the demands of these technologies. (World Economic Forum 2021)

How AI is changing IT Automation

AI is changing the nature of IT automation in several ways. One of the key ways is through the use of machine learning algorithms, which can learn from data to make predictions and decisions. This allows machines to complete more complex tasks with minimal human intervention. For example, AI-powered chatbots can handle customer service inquiries, freeing up human agents to focus on more complex tasks. AI can also be used to automate decision-making processes, such as credit scoring and fraud detection.

Another way that AI is changing IT automation is through the use of natural language processing (NLP) technologies. NLP enables machines to understand and generate human language, allowing them to interact with humans in a more natural and intuitive way. This can improve the efficiency of IT operations by automating tasks such as network monitoring and incident response. Computer vision is another AI technology that is changing the nature of IT automation. Computer vision enables machines to interpret visual information, such as images and videos. This can be used to automate tasks such as object recognition and

tracking, which can improve the efficiency of IT operations. (Spring, Faulconbridge & Sarwar 2022)

Conclusion

The landscape of IT automation is undeniably experiencing exponential growth, propelled by emerging technologies such as AI, robotics, and the Internet of Things (IoT). While the potential benefits - including increased efficiency, cost savings, and enhanced service delivery - are considerable, so too are the challenges and risks. From the potential job displacements and the need for comprehensive change management strategies to concerns over data security and the demands on network infrastructure, the march toward increased automation in IT systems requires careful planning and strategic foresight. Furthermore, as AI continues to shape and redefine the parameters of automation, corporations must remain adaptive and proactive, ensuring not just the technological adaptability but also the alignment of these innovations with their overarching goals and values. In summary, while automation in IT systems presents an exciting frontier of possibilities for corporations, its successful and ethical implementation is contingent on a holistic and strategic approach, considering both its potential rewards and inherent risks.

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