Automation: Streamlining Development Operations

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Abstract

The Platforms Automation Team under the Global Technology Services (GTS) business line at Deloitte Global decided to streamline database querying, server compliancy, and application delivery, promoting sustainability through the use of automation. To do this, the team utilized API and infrastructure automation to help decrease human error and improve efficiency across development operations. The approach to deliver this solution consisted of gathering Windows 2019 server requirements and utilizing the MuleSoft Anypoint Platform and Progress Chef services. The significance of these projects was to continue Deloitte's innovation and evolution efforts by easing redundant processes through the introduction of automation in infrastructure operations. As these solutions become more refined and secure, they will begin to enter the deployment phase in Deloitte Operations.

1   Introduction

"The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency" – Bill Gates. The end goal of every enterprise or company is to achieve success under the driving force of efficiency. To achieve this, automation has become one of the best ways to streamline development operations and encourage business growth. The use of automation helps a business ensure the efficient and resilient state of technology and infrastructure. As a part of the Platforms Automation Team, automation was utilized in various aspects or projects. The projects worked on dealt with Application Programming Interface (API) development, server compliance automation, and Deloitte's efforts   promoting sustainability around the globe. The guiding principle for this team was to embrace the evolution of the workplace by driving the increased adoption of automation.

2   Related Works

APIs have become essential in business operations. They help execute pre-defined processes efficiently and work as the middleman between various applications allowing them to connect and share data. Van Gorp writes "API automation can speed digital transformation, improve innovation efforts, and accelerate the process of exposing your most valued services in new markets and channels"[1]. In this article the advantages and disadvantages of automation are highlighted, emphasizing the benefits for enterprises such as Deloitte to incorporate automation.

Similar to Deloitte, other companies incorporate API automation to accelerate IT delivery speed in their organization. In a case study published by MuleSoft, "BP's application network, underpinned by APIs, drives faster project delivery and ensures application reliability and scalability" [2]. With the use of these APIS, BP delivered great products such as the BPme app. The app now "allows BP to process over 290,000 transactions daily"[2]. This study   shows the impact API automation has along with the statistical improvements from a development operations perspective.

3   Process Design

Spanning an 8-week virtual period at Deloitte, the Platforms Automation team worked on three projects.

3.1 API Development
The first project was centered on API development. Short for Application Programming Interface, an API is software that offers a service to other pieces of software. The focus for an API is to eliminate manual redundant processes by creating a system or way to implement a callable method that performs the operation. The API for this project was needed to retrieve data from a configuration management database (CMDB). The objectives for this project included learning the development cycle of an API, utilizing platforms such as MuleSoft Anypoint Cloud hub Platform and Application Studio, and understanding the integration and testing principles needed to ensure requirements. During the beginning weeks of this project, the focus is requirement gathering because it was vital to understand the requirements set by the stakeholders. In this project, the stakeholders included other Deloitte Platform teams.

Once the requirements phase was over, the design process for the API began. To begin the design process for an API, it is necessary to create a design specification for the API. An API design spec is used to plan how an API should look structurally and is like the blueprint for the API. The MuleSoft Anypoint Cloud hub platform provides a service to create a design spec with ease and this service was used in this project.

Once the design spec is created, the creation process for the API begins using Anypoint Studio, a MuleSoft offered Integrated Development Environment (IDE). Anypoint Studio offers a low-code drag-and-drop integration tool known as the Anypoint Flow Designer [4]. This tool was used because it allowed the Platforms Automation team to smooth the learning curve and improve readability.

After the stakeholders requirements were met, the last step of the process was to test if the API was working. To do this, Postman was used. Postman is an application that allows the testing of APIs.

Postman was used because it is simple and already configured to properly form an http request to an API.

3 Server Compliance
The second project focused on Server Compliance Automation. The objectives for this project included learning to read and analyze a Center for Internet Security (CIS) benchmark, understanding the security flow and processes required to protect Deloitte servers, and utilizing the Chef Workstation command-line interface. The purpose of this project was to ensure that Deloitte Servers were compliant with the requirements set.

Similar to the first project, the project began with a requirement gathering phase. In this phase, the emphasis was analyzing CIS Benchmark. A CIS benchmark is a document created by the Center for Internet Security and made available to the public to help safeguard against cyber threats. After the requirements were gathered, the next steps were to create the compliancy checks. To do this, Chef InSpec was utilized. Chef InSpec is an open-source framework to test and audit infrastructure [3]. Along with Chef Inspec, Chef Workstation was utilized to create the necessary profiles and controls to harden the servers. Chef Workstation is the automation component. Profiles help to organize the controls allowing for code reuse and support dependency. Controls are the vital pieces of code that ensure that compliancy is met. Once compliancy is achieved in a controlled environment, controls are then configured to the servers. Whenever anything is deployed on the servers, it must pass the compliancy checks set by those controls to ensure the integrity of the Deloitte Servers.

3.3 Promoting Sustainability:
The last project was geared towards helping promote sustainability. The objective of this project was to design a solution to help drive positive climate action. The problem or goal for this project was to design a solution on how businesses such as Deloitte can work with external stakeholders to achieve greater climate impact. In delivering a solution, the criteria to follow was focused on the online shopping component of what it meant to be sustainable.

From there, the problem to solve was the lack of incentives for consumers and companies to buy and sell sustainable products.

4   Results
By the end of the 8-week period, there were deliverables for each of the projects.

In the API development project, the deliverable was an API that retrieves data from a configuration management database. The API would be fed parameters, conduct a search, and then generate a response with server information. After the API was deployed, various other platform teams would utilize the API in their created software.

In the Server Compliance Project, the deliverables included a Windows 2019 Requirements Document and Windows InSpec Controls. The Windows 2019 Requirements document was created after analyzing Windows 2019 CIS benchmarks and using that document, the creation of the controls followed. This project was not implemented immediately, and deployment came later that year.

In the Promoting Sustainability project, the deliverable was a solution prototype. The derived solution was a Browser Extension given the name "BrowseGreen." The idea behind a browser extension would be to encourage sustainable shopping and work like that already on the market extension, Honey. This extension would feature sustainable products and alternatives if in the process of online shopping. This solution would try to incentivize companies to sell sustainable products, allow customers to earn rewards from sustainable shopping, and–set the standard in sustainability certification for Deloitte. The mindset in delivering this prototype was for all to work together to help improve sustainability in online shopping.

5   Conclusion
In the end, the projects were all a success. These projects emphasized the importance of infrastructure automation through the enhancement of workflows while speeding up delivery and deployment. Along with the automation projects, this team helped develop a

roadmap on ways organizations such as Deloitte could positively impact climate change and sustainability efforts through the use of external stakeholders. These projects will help Deloitte's efforts to innovate in the long run.

6   Future Work
The first project was immediately deployed to use internally within the Platform teams. The second project dealing with server compliancy, still requires more refining, and the goal for this project is to be deployed during the next server upgrade as an organization within the 2022-23 Fiscal year. The final project regarding sustainability is yet to be implemented and the timeframe as of the moment is for Deloitte to be net zero carbon emissions by 2030.

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