The Case for Digital Ocean Infrastructure as a Service for MyBikes

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Abstract

MyBikes is a fledgling startup just finding its feet in a brick-and-mortar environment but hopes to expand into an online storefront in hopes of increasing the speed at which the business approaches profitability. As a result, a solution is needed to create and manage online infrastructure for the company without overspending or distracting from the main service of the company, assembling high quality bikes. I propose to fulfill these prerequisites, using infrastructure as a service resources on Digital Ocean, particularly a droplet hosting our MyBikes' website. This will provide flexibility, cost effectiveness, low maintenance and overhead, as well as a quick and simple setup for the business. Additionally, proper design to emphasize user friendliness and ease the customer experience can help to boost sales on this website. To test this solution, a droplet was created and a website with basic functionality and appropriate design was built and hosted on this droplet.

1.Introduction

The problem we solved

Put simply, when expanding MyBikes services online we need a cost-efficient solution, that will help drive demand and improve customer satisfaction. We need a way to set up an online storefront without diverting too much time, effort, and money into this implementation, which will also help facilitate more business by providing an excellent user experience.

Why the problem is not already solved, or other solutions are ineffective in one or more important ways

MyBikes began brick-and-mortar operations a short while ago and has been carving out a niche in the market producing high end bicycles. Since the company has built up a notable customer base and track record, operating entirely at a brick-and-mortar level, we propose expanding onto the web to more quickly reach a financially viable, profitable state. However, in so doing we must also not allow the high quality and standards of our services to fall, nor invest overmuch in setting up this online storefront, and thus hinder our efforts at more quickly approaching profitability.

Why our solution is worth considering and why is it effective in some way that others are not

Our solution is to use cloud resources to set up online services, using an infrastructure as a service method, particularly, a Linux Droplet on Digital Ocean. This will allow the difficult and expensive process of creating and maintaining hardware/infrastructure to be handled by a third-party service, cutting down on costs, effort, time, and the number of employees necessary to set up this infrastructure ourselves. This also allows for a high amount of control over the resources as well as ensuring that as our presence and thus customer base grows online, we will be able to meet demand as necessary by resizing or modifying the Droplet, even though we currently have no indication of what that demand will be, online, in the near future.

How the rest of the paper is structured

The subsequent portions of this write up will go as follows: Section 2 discusses other potential solutions, Section 3 explains the proposed implementation, and Section 4 explains how the effectiveness of this solution was evaluated, as well as the results of said evaluation. Section 5 will provide a conclusion.

2. Related Work

Other efforts that exist to solve this problem and why are they less effective than our method

The first, most direct solution would be to design, build, and maintain our online infrastructure ourselves. This would give us complete control and flexibility over its setup, cost and expertise permitting. However, this is the main downfall of such an approach. There is a tremendous up front cost to purchase and maintain the hardware, in addition to the cost of hiring and training employees to this end as it is a more complex and intensive process, one which does not have much crossover with the main services and expertise our employees need, skill assembling bikes quickly and to a high quality standard. Additionally, the attention and time required to build and maintain such infrastructure as well as training employees could distract from the main service, building bikes, thus negatively affecting their quality and harming the business.

Other efforts that exist to solve related problems that are relevant, how are they relevant, and why are they less effective than our solution for this problem

Some other online cloud hosting companies could also be used to meet similar needs as those of MyBikes. These alternatives to Digital Ocean have been used to meet similar needs by some companies yet Digital Ocean offers extensive documentation, flexibility, and pricing options which makes it the ideal choice for MyBikes' current situation.

3. Implementation

What we (will do | did): Our Solution

To begin with, we set up a Linux Droplet on Digital Ocean. Then we installed Apache server on the virtual machine to serve our web pages. After which we hosted the website on a Domain Name, using Namecheap's DNS services to create an A record linking to a searchable web address for the cite: mybikes.cismj.me. Then we enabled a secure https connection to the site using the Certbot functionality on Linux. After which the various web pages: home, product catalogue, order, and contact info were created in html on the droplet, so that they are accessible to the server. We then filled in the pages, before inserting links to all the other pages from the other pages. After this a css stylesheet was linked to all the pages to customize them so that they better the user experience. It did this by organizing the page links into an organized navigation bar for ease of use, making links and product images grow when moused over for better visibility, highlighting company contact info, as well as modifying the sizing and section separations of each page to be more visually appealing. Thus, we can completely manage our website, infrastructure and functionality through Digital Oceans services.

How our solution (will | does) work

This solution works by taking advantage of a Linux Droplet running Apache webserver on Digital Ocean to host the site. So, we post our web application in this Droplet and the website will be hosted at the Droplet's Ip address. Additionally, a domain name was registered and managed using Namecheap's DNS services, to direct traffic to our desired URL. This allows all required html, css, JavaScript or other files necessary for the site's functionality to be managed on this droplet and served to a web searchable URL. Furthermore, should database services be needed, the use of volumes in the digital ocean framework can accommodate that integration.

4. Evaluation

How we tested our solution

A test implementation of our Droplet/Digital Ocean solution gave us a Droplet with specs of 1CPU, 1GB of Memory and a 25GB SSD at a cost of $6 a month. Additionally, our domain name was obtained for free using a discount, however similar names can be obtained for as little as $10 a year. The use of Apache, certbot, html and css was carried out as described above. This resulted in a web searchable site which is laid out to maximize ease of use, providing contact info, a product catalogue, a brief overview of the company, as well as the ability to input all necessary order information. In essence, a completely functional website meeting the desired goals was created, short of the processing of orders itself, and the parallel, checkout and cart implementations which would accompany that. This all provides a lot of capability for relatively little immediate investment and little need for infrastructure maintenance by MyBikes' employees.

How our solution performed, how its performance compared to that of other solutions mentioned in related work, and how these results show that our solution is effective

This solution provides us with a significant amount of computing power while allowing for later scaling up or down of the Droplet, and thus the cost, according to what is needed for our online storefront.

Context and limitations of our solution as required for summation

Our test shows a very cost-effective and simple infrastructure can be obtained on the cloud to meet our computing needs in a customizable way while minimizing the amount of overhead and maintenance costs and employees with computer technology expertise. Indeed, just one employee could easily make any necessary changes to the site or infrastructure in this implementation. There are still several issues which are unaddressed by this solution however, primarily, we are relying heavily on the services of Digital Ocean, a company outside our control, which necessarily limits our control over the infrastructure. As a result of this, situations might arise where Digital Ocean suspends or changes their services or raises their prices for any number of reasons. Such situations might interrupt our ability to provide online services and necessitate a change in the method we use to fulfill our infrastructure needs, such as using another cloud provider. Additionally, should our online infrastructure persist long into the future, the cumulative cost of monthly billing will eventually overtake the cost of implementing our own, on-premises infrastructure.

5. Conclusions and Future Work

The problem we have solved

We have provided relatively inexpensive, low overhead infrastructure to host our online services while also facilitating website design techniques to ease the consumer experience and drive sales.

Our solution to the problem

We used a Linux Droplet on Digital Ocean to host our web application in combination with Apache server installed on that virtual machine. Additionally, Namecheap's domain name services were used to make this website searchable by a domain name on the web. The Certbot functionality of Linux was then used to create a secure https connection to the site, before the html pages which compose the site were coded and linked to it. Then a css file which styles the site for better ease of use and customer experience was written and linked to the website's pages.

Why our solution is worthwhile in some significant way

This solution is quite cost effective and flexible while meeting the varying needs of the business. Furthermore, it avoids wasting employees' time and effort managing and upkeeping the infrastructure which can be better spent on ensuring the quality of MyBikes' products. Additionally, it allows easy customization of the site to meet changing consumer preferences to help boost sales.

Why the reader should be impressed and/or pleased to have read the paper

This paper has outlined in clear detail the various issues which Digital Ocean's infrastructure as a service resources solve and why those resources are the best solution for MyBikes' online infrastructure needs. Particularly, it provides great cost efficiency, customizability and flexibility.

What we will (or could) do next

This solution could be improved by the addition of database resources via Digital Ocean's volumes technology. This technology could incorporate a database to track customer details, order information and other information which would be useful for the company to keep track of with an efficient database system. Likewise, such a system could be used in implementing a proper order processing and shopping cart system, in combination with additional html and JavaScript pages necessary to facilitate that functionality. Additionally, a backup plan for an additional infrastructure solution should be made, should issues arise with Digital Ocean's services, whether they be functional, cost, or security in nature.

References

For additional context on the capabilities of Digital Ocean's Droplet service:

https://docs.digitalocean.com/products/droplets