



## Speed Trap

*Optimizing Word Press Website Performance with Amazon Web Services Light Sail with Auto Scaling and Load Balancing.*

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### ABSTRACT:

*Hosting a Word Press website on Amazon Web Services (AWS) Light sail, as well as how to optimise the website's performance with auto scaling and load balancing. We investigate how these AWS services can be used to handle increased website traffic while maintaining high website availability. We also discuss the setup process, the costs involved, and the potential benefits for website owners.*

*Load balancing is not a substitute for auto scaling. In fact, when the two work together, it can help to facilitate efficient auto scaling. While load balancing will re-route connections from unhealthy instances, new instances to route connections to are still required.*

*As a result, auto scaling will start these new instances, and your load balancing will connect to them. That is why having both AWS Elastic Load Balancing and AWS Auto Scaling is beneficial.*

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**Keywords** – AWS Light sail, AWS NETWORKING, AWS DATABASE, AWS IAM, AWS AUTO SCALING, AWS LOAD BALANCING, AWS S3, Word Press.

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## I. INTRODUCTION

Optimizing the performance of a WordPress website is crucial to ensure a seamless user experience and improve search engine rankings. Amazon Web Services (AWS) Light Sail offers a cost-effective way to host your WordPress website on the cloud. In this context, Auto Scaling and Load Balancing can help to ensure that your website can handle varying levels of traffic without any downtime.

Auto Scaling allows you to automatically increase or decrease the number of instances of your website depending on the traffic. This means that during peak traffic hours, more instances of your website will be launched to handle the increased load. On the other hand, during low traffic hours, unnecessary instances will be automatically terminated to reduce costs.

Load Balancing distributes the traffic among the different instances of your website to ensure that no single instance is overloaded with traffic. This helps to prevent downtime and ensures that users can access your website without any interruptions.

By combining AWS Light Sail with Auto Scaling and Load Balancing, you can optimize the performance of your WordPress website while also reducing costs. This solution can handle varying levels of traffic and ensures that your website is available and responsive at all times.

The cloud computing platform Light Sail from Amazon Web Services (AWS) offers a quick and affordable way to host websites and applications. Amazon LightSail provides a number of services, including as Identity and Access Management (IAM), Load Balancing, Auto Scaling, and S3, to enhance the functionality and availability of websites and apps.

You may securely manage access to Amazon services and resources with the aid of IAM. IAM enables you to establish, manage, and regulate who has access to which AWS services and resources.

To ensure high availability and scalability, load balancing divides incoming traffic among numerous instances of your website or application. Using Elastic Load Balancing will improve the speed and dependability of your website or application by distributing traffic among several LightSail instances.

You can use auto scaling to automatically change how many instances of your website or application are running based on the volume of incoming traffic. With the help of auto scaling, you can guarantee that your website or application is accessible and responsive to visitors during periods of high traffic while also reducing the number of instances during times of low traffic to save money.

Data can be stored and retrieved using S3, an object storage service, from any location on the internet. You may store and distribute data, photos, and videos using S3 and benefit from its high levels of scalability, availability, and durability.

You may improve the speed and availability of your website or application on Amazon LightSail while simultaneously cutting expenses and streamlining management by utilising IAM, load balancing, auto scaling, and S3.

By combining the power of AWS with autoscaling and load balancing solutions, you can take your WordPress website to the next level. Say goodbye to downtime and slow load times, and hello to a seamless user experience for your visitors. With AWS, you can easily scale your resources to handle increased traffic, ensuring that your website remains responsive and available at all times. Load balancing helps distribute incoming traffic across multiple servers, improving the performance and reliability of your website. With AWS auto scaling and load balancing, you can rest assured that your Word Press website will always be up to the task, delivering a high-performance experience to your users.

**Amazon Light Sail** is an excellent choice for businesses and developers who want to run their web applications and websites in the cloud but don't want to deal with the complexity and expense of managing the underlying infrastructure. With LightSail, you can concentrate on developing and deploying your applications while AWS handles the rest.

**Word Press** is the most widely used content management system for building websites. It is an easy-to-use platform for creating and managing a wide range of websites, from small personal blogs to large e-commerce sites. However, as a website's traffic grows, it can become difficult to manage its performance and ensure that it is always available to users.

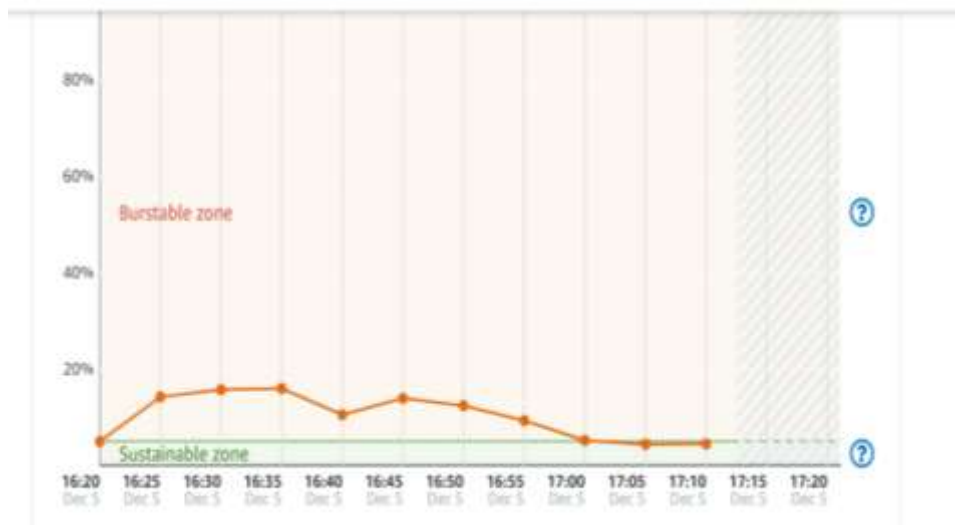


Figure 1. Website Health

### **Load balancing and auto scaling:**

AWS Light sail's auto scaling feature automatically adjusts the number of resources assigned to a website based on current demand. This means that during high traffic periods, the website's resources will be increased to ensure that it can handle the increased load, and during low traffic periods, the resources will be reduced to minimise costs.

Load balancing is another important feature of AWS Lightsail that ensures the website's high availability. It distributes incoming traffic across multiple instances of the website so that if one instance fails, the other instances can take over and ensure that the website remains accessible to users. Load balancers are classified as follows: -

#### **Load Balancer for Applications**

Supports path-based routing and routes and load balances at the application layer (HTTP/HTTPS). An Application Load Balancer can route requests to ports on one or more registered targets in your virtual private cloud, such as EC2 instances (VPC).

Routes and balances traffic at the transport layer (TCP/UDP Layer-4) using address information extracted from the Layer-4 header. Network Load Balancers can handle traffic bursts, retain the client's source IP, and use a fixed IP address for the duration of the load balancer.

The Gateway Load Balancer routes traffic to a group of appliance instances. Scalability, availability, and simplicity are provided for third-party virtual appliances like firewalls, intrusion detection and prevention systems, and other appliances. Gateway Load Balancers collaborate with GENEVE-compliant virtual appliances. Additional technical integration is required, so before selecting a Gateway Load Balancer, consult the user guide.

Traditional Load Balancers route and balance traffic at the transport layer (TCP/SSL) or the application layer (HTTP/HTTPS).

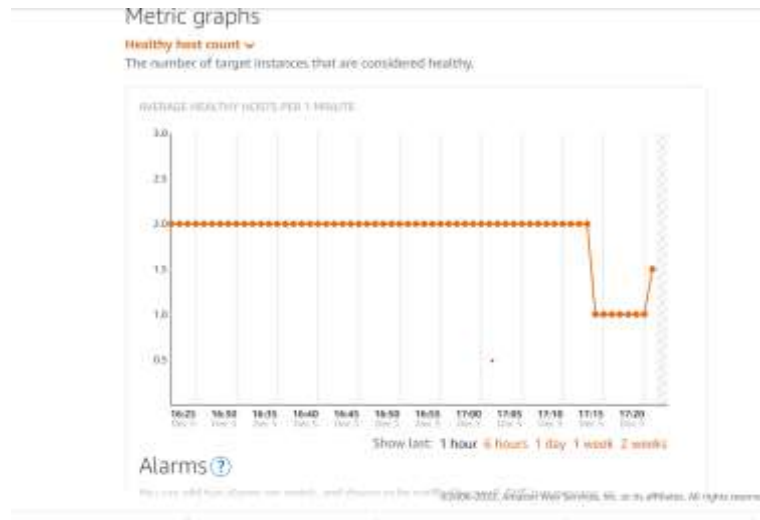


Figure 2. Load balancing graph

**AWS S3:**

Amazon Simple Storage Service (Amazon S3) is a highly scalable, secure, and durable object storage service offered by Amazon Web Services (AWS). It provides users with the ability to store, manage, and access their data and files in the cloud. With Amazon S3, users can store any type of data such as documents, images, videos, backups, and more. The service is designed to handle billions of objects, and provides low latency and high throughput performance..

```
{
  "Version": "2008-10-17",
  "Statement": [
    {
      "Sid": "AllonPublicRead",
      "Effect": "Allow",
      "Principal": {
        "AWS": "*"
      },
      "Action": "s3:GetObject",
      "Resource": "arn:aws:s3:::mywpaws/*"
    }
  ]
}
```

Figure 3. giving public access to S3

**AWS IAM :**

Amazon Identity and Access Management (IAM) is a critical component of Amazon Web Services (AWS) security and compliance, providing a secure and scalable way to control access to AWS resources. With IAM, organizations can manage their AWS users, groups, and permissions, and enforce least privilege access controls to ensure that only authorized users have access to sensitive data and resources.

IAM enables organizations to define their own security policies and manage AWS security programmatically through APIs and the AWS Management Console. This makes it easy to manage AWS security, enforce compliance policies, and respond to changing business requirements.

IAM provides a number of key features to support secure access control and management, including:

**User and Group Management:** IAM enables organizations to create and manage AWS users and groups, and assign permissions to them. This makes it easy to manage large numbers of AWS users and permissions, and to enforce least privilege access controls.

**Role-Based Access Control:** IAM provides support for role-based access control, allowing organizations to grant and revoke access to AWS resources based on specific roles and responsibilities.

**Multi-Factor Authentication:** IAM supports multi-factor authentication, providing an extra layer of security to protect AWS resources.

**Password Policy Management:** IAM includes tools for managing password policies, including password length, complexity, and rotation, making it easy to enforce strong password policies.

Secure Key Management: IAM supports secure key management, making it easy to manage and rotate cryptographic keys used for encryption and decryption.

```

new for iam policy
{
  "Version": "2008-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "s3:CreateBucket",
        "s3:DeleteObject",
        "s3:Put*",
        "s3:Get*",
        "s3:List*"
      ],
      "Resource": [
        "arn:aws:s3:::mywpaws",
        "arn:aws:s3:::mywpaws/*"
      ]
    }
  ]
}

```

Figure 4. IAM policy

## II. Literature Survey

### Algorithms and Methods for Load Balancing

There are various load balancing methods and algorithms that each have their own benefits and drawbacks. The most widely used methods include:

**Round-Robin:** A straightforward and popular load balancing method that places servers in a circular sequence according to the incoming requests.

**Least Connections:** This approach distributes the load evenly by allocating incoming requests to the server with the fewest active connections.

**IP Hash:** This algorithm ensures that requests from the same client are always forwarded to the same server by allocating incoming requests to a server based on the hash value of the client's IP address.

**Weighted Round-Robin:** This technique distributes workloads by allocating incoming requests to servers in accordance with their weight or priority.

There are a variety of auto-scaling algorithms and approaches that each have their own benefits and drawbacks. The most widely used methods include:

**Rule-based scaling:** In this approach, established rules and thresholds are set up to cause auto-scaling reactions in response to variables like CPU consumption, memory usage, and network traffic.

Using machine learning techniques, predictive scaling forecasts future resource needs based on historical data and initiates appropriate auto-scaling responses.

**Online hosting:** Auto-scaling enables websites and web applications to maintain high availability and performance even during periods of high traffic.

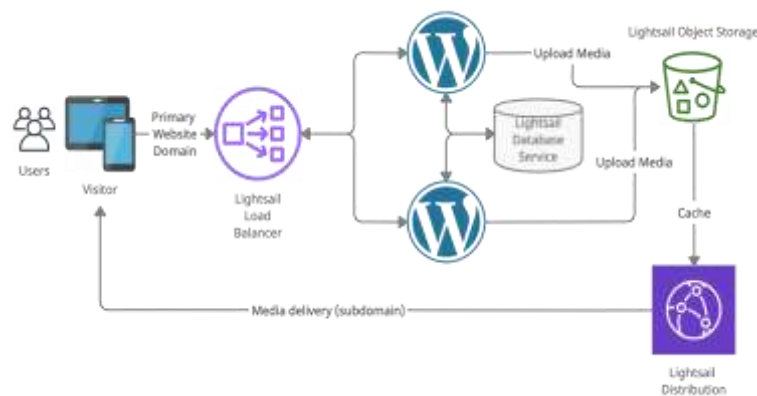


Figure 5. Workflow of website

Mathematical models play a crucial role in the design and implementation of autoscaling and load balancing solutions for a WordPress website on AWS. These models aid in predicting how much of the website's resources will be used and in deciding how many instances to utilise for autoscaling.

For instance, the website's incoming traffic can be modelled using queueing theory to determine how many instances are necessary to accommodate the incoming traffic. The mathematical models can also be utilised to create load-balancing algorithms that effectively divide incoming traffic among numerous instances. These models ensure that the website is always responsive and accessible by taking into account a number of variables, including the quantity of requests, response time, and resource usage. It is feasible to create and deploy efficient autoscaling and load balancing solutions for a WordPress website on Amazon by using mathematical models.

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## IV. Result

The main reason, websites and apps continue to slow down and ultimately crash under load is the disparity between traffic levels and the capacity of your website's infrastructure.

you don't even require to monitor the traffic on your website It is made possible by AWS services named as AUTO SCALLING AND LOAD BALANCING.

An affordable, dependable, and scalable option for website owners is hosting a WordPress website on Amazon Lightsail with autoscaling and load balancing. By adopting these AWS services, website owners can ensure that their website is always available to consumers and can handle rising traffic, while minimising the costs involved with hosting the website.

It provides networking, virtual servers, storage, databases, and monthly plans that are reasonably priced.

Maximize Website Performance and Reliability with AWS Light sail and Auto scaling Load Balancing for Your Word Press Site.

It depends. If your website witnesses sporadic increases in traffic, you should use a load balancer. It also comes in handy if you host content that can generate lots of load in an instance, especially when various users are using the content concurrently. Let's say you have a video-heavy site; load balancing the video requests with other page requests will load your pages faster. Visitors tend to be happier this way.

In other words, a load balancer helps create a highly available website. High availability refers to how long your site or web app stays up over a given period. If you have ever experienced a site outage, then a load balancer might help you have more uptime.

Techniques for Problem Solving or Finding Solutions

**Cost-effective:** Compared to competing AWS services, Lightsail offers pre-configured plans at a lesser price.

**Easier administration:** Lightsail makes it simpler for non-technical individuals to administer your WordPress website by offering a user-friendly interface.

**Built-in security:** Lightsail comes with firewall administration, automatic backups, and SSL certificate management, making it simpler to keep your website secure.

**Performance improvement:** Lightsail makes resource scaling simple, guaranteeing that your website can cope with growing demand.

**Connection with other Amazon services:** Lightsail interfaces with other AWS services, making it simple to switch in the future to more sophisticated AWS services.

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## V. Conclusion and Future

### *Enhancement*

The use of cloud computing to build websites has a bright future. The building of websites using cloud-based technologies is growing in popularity as more and more companies undergo digital transformation.

Scalability is one of the key advantages of cloud computing for website creation. In order to ensure that the website can handle traffic spikes and prevent downtime, cloud-based solutions make it simple for website owners to scale their website resources up or down in response to demand.

Furthermore, cloud computing enables website owners to benefit from cutting-edge technology like artificial intelligence (AI) and machine learning (ML) to improve user experience and customise their websites.

Moreover, cloud computing offers improved security measures that can assist in defending websites against online dangers like DDoS attacks, viruses, and hacking attempts.

Using the Power of AWS Lightsail, Auto-Scaling, and Load Balancing Technologies to Increase the Performance and Availability of a WordPress Website.

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**VI. References**

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<https://docs.aws.amazon.com/elasticloadbalancing/latest/userguide/what-is-load-balancing.html>

<https://docs.aws.amazon.com/codedeploy/latest/userguide/tutorials-auto-scaling-group-create-auto-scaling-group.html>

[https://www.w3schools.com/whatis/whatis\\_aws\\_auto\\_scaling.asp](https://www.w3schools.com/whatis/whatis_aws_auto_scaling.asp)

<https://docs.aws.amazon.com/IAM/latest/UserGuide/introduction.html>

<https://aws.amazon.com/s3/>

[https://lightsail.aws.amazon.com/ls/docs/en\\_us/articles/amazon-lightsail-tutorial-launching-and-configuring-wordpress](https://lightsail.aws.amazon.com/ls/docs/en_us/articles/amazon-lightsail-tutorial-launching-and-configuring-wordpress)