BUILD A WEBSITE WITH AMAZON LIGHTSAIL

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Amazon Lightsail is a cloud computing service offered by Amazon Web Services (AWS) that allows instances (virtual private servers) to be created quickly and easily. The instances are then hosted in the AWS Cloud. AWS Lightsail is the perfect tool for building small startup projects, simple web applications, databases, and for deploying and managing testing/development environments. Out of the box, AWS Lightsail includes all the tools needed to launch these scalable, managed environments with affordable monthly pricing. This paper explains the steps for using Lightsail to set up a website utilizing WordPress as a blueprint.

Below is a basic Lightsail instance running in the East Region (Ohio), on a Linux the platform, using the WordPress blueprint, 1GB RAM, 1 vCPU, 40GB of storage, and has a static IP addressed assigned. This instance will be used to host the website we will build and from here we can manage our instance as needed. We can increase storage by adding additional disk space (Storage), view our instance's incoming/outgoing traffic (Metrics), configure or reconfigure our instance's IP address (Networking), make a backup of our instance (Snapshots), create labels for our instance(s) to make them easier to identify in the console (Tags), track updates to our instance (History), and delete the instance (Delete).

	1 GB R. WordPi Ohio, Z	AM, 1 vCPU, 4 ress cone A (us-eas	} 0 GB SSD t-2a)					Sto	qq	Reboot
Connect	Storage	Metrics	Networking	Snapshots	Tags	Private IP: History	Delete	7	Static IP:	Status: Running

EXHIBIT 1: A BASIC LIGHTSAIL INSTANCE



To create the instance above, we first need to access the AWS Management Console, select the Lightsail service, and then click "Create instance". In the image below, under the "All Services" tab, there is a list of other services offered by AWS that can be used in conjunction with our Lightsail instance, such as Lambda, to run code. Lightsail instances include 5TB of data transfer for both inbound and outbound data. With 5TB of data, your site could easily support over 2000 visitors a day – browsing as well as downloading files.

▼ All services		
Compute		
EC2		
Lightsail 🔼	Instances Databases Networking Storage Snapshots	
Lambda		
Batch		
Elastic Beanstalk		
Serverless Application Repository	ort by Date 🗸	Create instance
AWS Outposts		
EC2 Image Builder		

EXHIBIT 2: AWS SERVICES

As a note, the EC2 service also offers the option to create instances, but those are typically for large-scale projects or large corporations because of the amount of inbound and outbound traffic. An EC2 instance will incur costs for outbound data transfer depending on the amount of data transferred out. Exhibit 3 below is the EC2 pricing to run an an instance in the same region as our Lightsail example.

Region: US East (Ohio) +		Select your instance location Select a Region
	Pricing	The closer your instance is to your users, the less latency they will experience. Learn more about Regions 🗹
Data Transfer IN To Amazon EC2 From Internet		
All data transfer in	\$0.00 per GB	Virginia us-east-1 Virginia us-east-2 Montreal Oregon us-west-2 us-west-2
Data Transfer OUT From Amazon EC2 To Internet		
Up to 1 GB / Month	\$0.00 per GB	eu-west-1
Next 9.999 TB / Month	\$0.09 per GB	Tokyo Soul
Next 40 TB / Month	\$0.085 per GB	ap-northeast-1
Next 100 TB / Month	\$0.07 per GB	G: Singapore
Greater than 150 TB / Month	\$0.05 per GB	ap-southeast-1

EXHIBIT 3: EC2 PRICING EXAMPLE¹

EXHIBIT 4: AVAILABILITY ZONES



After the instance has been created, we choose the region in which we want our instance to be hosted, shown in Exhibit 4 above – each region can have up to six Availability Zones (AZ). An Availability Zone is comprised of one or more physical data centers for AWS. These data centers are highly secured environments that are continuously maintained and updated. Depending on the number of instances running and what they are being used for, it is best practice to host instances in multiple regions/zones in case of any power outage or system failure due to human error or a natural disaster. If an application is replicated across multiple AZs, latency, and downtime are minimal to none.

Next, we select our platform and blueprint. The Linux/Unix blueprints offer both application and operating system options, as well as operating system-only options (shown below), as opposed to Windows blueprints which have the operating system only. Here, we're using WordPress as the blueprint because it has a simple and easy-to-understand interface. The only requirements to begin with are to have a domain name and a hosting service (we're using AWS), and it's free.



EXHIBIT 5: PLATFORM AND BLUEPRINT



Next, we choose our instance plan, with the most basic plan starting at \$3.50 per month.

New!	Check out our ne	w 16 GB a	and 32 GB R	AM bund	les!			
ort by:	Price per month	Memory	Processing	Storage	Transfer			
Fir	st month free!	\$.	5	\$1	0	\$20	\$40	>
	\$3.50 USD	\$5 U	SD	\$10 US	D	\$20 USD	\$40 USD	Price per mont
	512 MB	1 G	B	2 GB		4 GB	8 GB	Memory
	1 vCPU	1 vC	PU	1 vCPU	J	2 vCPUs	2 vCPUs	Processing
	20 GB SSD	40 GB	SSD	60 GB S	SD	80 GB SSD	160 GB SSD	Storage

EXHIBIT 6: INSTANCE PLAN

Name it, create it, and that's it



EXHIBIT 7: CREATE THE INSTANCE



At this point, the instance is automatically assigned a dynamic IP address. For website purposes, the instance will need to be updated to have a static IP

address assigned to it. Otherwise, if the server is rebooted, the location of our website will be changed and thus unreachable.

	WordPress-8 1 GB RAM, 1 VCPU, 40 GB SSD WordPress Ohio, Zone A (us-east-2a) Stop Reboot
	Private IP: 6 Public IP: 21
Connect	Storage Metrics Networking Snapshots Tags History Delete
	Connect securely using your browser ③ You can still use your own compatible ssh client with your device or software to connect to your instance. Learn how to connect using your own SSH client Connect using SSH
	WordPress-8 1 GB RAM, 1 vCPU, 40 GB SSD WordPress Ohio, Zone A (us-east-2a) Stop Reboot
	Manage tags Status: Running Private IP: 172.26.3.56 Public IP: 3.129.209.221
Connect	Storage Metrics Networking Snapshots Tags History Delete
	Connect securely using your browser (?) You can still use your own compatible ssh client with your device or software to connect to your instance. Learn how to connect using your own SSH client
	Connect using SSH

EXHIBIT 8: PUBLIC IP VERSUS PRIVATE IP

	VordPress-8 1 GB RAM, 1 vCPU, 40 GB SSD WordPress Ohio, Zone A (us-east-2a)	Stop Reboot
Connect	Manage tags Storage Metrics Networking	Status: Running Private IP: 172.26.3.56 Public IP: 3.129.209.221 Snapshots Tags History Delete
	IP addresses	
	Public IP (?)	Private IP 🕐
	3.129.209.221	172.26.3.56 Private IP addresses allow you to communicate securely with other internal resources.

To make this change, under the "Networking" tab we select "Create static IP"



From here, we choose our newly created instance, name the assigned static IP- address, and select "Create".

Static IP location (?) You are creating this static IP in Ohio, all zones (us-east-2) Change AWS Region and Availability Zone	dentity your static IP
Attach to an instance Attaching a static IP replaces that instance's dynamic IP address. Static IP addresses can only be attached to instances in the same region	our Lightsail resources must have unique names. WordPress-8_Test-1
Select an instance	Static IP addresses are free only while attached to an instance. You can manage five at no additional cost. Create

EXHIBIT 10: IDENTIFYING THE STATIC IP

A new static IP address has now been assigned to our instance. At this point, if we already have an existing domain (for example, "www.mysite.com"), we can configure that domain to point to your static IP address. Domain names can be registered with sites such as GoDaddy, Domain.Com, and Bluehost.

	1 GB R/ WordPi Ohio, Z	IPress-8 AM, 1 vCPU, 4 ress ione A (us-eas	0 GB SSD t-2a)				s	itop Reboot
	🗹 Mar	age tags				Private IP:	1	Status: Runn Static IP: 3.13
onnect	Storage	Metrics	Networking	Snapshots	Tags	History	Delete	•

EXHIBIT 11: THE NEW STATIC IP

Now, with the instance, or" shell", of the website created and assigned a static IP address, we click "Connect using SSH" so that we can connect to it securely.





We are now in the secure shell of the instance. Below are initial actions that should be executed, along with the associated commands:

- 1. Retrieve the password for the site: **cat bitnami_application_password**
- 2. Remove the default banner (shown in the next set of images below): sudo
- /opt/bitnami/apps/wordpress/bnconfig -- disable_banner 1
- 3. Restart the instance: sudo/opt/bitnami/ctlscript.sh restart apache

lightsail.aws.amazon.com/ls/remote/us-east-2/instances/WordPress-8/terminal?protocol=ssh			
Linux ip-172-26-3-56 4.19.0-9-cloud-amd64 #1 SMP Debian 4.19.118-2 _64	+deb10u1	(2020-06-07)	x86
The programs included with the Debian GNU/Linux system are free so the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright.	ftware;		
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.			
*** Welcome to the Bitnami WordPress 5.4.2-0 *** Documentation: https://docs.bitnami.com/aws/apps/wordpress/ *** https://docs.bitnami.com/aws/ *** Bitnami Forums: https://community.bitnami.com/			
######################################			
Last login: Mon Sep 7 21:11:36 2020 from 52.95.24.65 bitnami@ip-172-26-3-56:~\$ bitnami@ip-172-26-3-56:~\$ bitnami@ip-172-26-3-56:~\$ cat bitnami_application_password			

EXHIBIT 13: SECURE SHELL

Here is what our newly created instance (website) looks like from a web browser before removing the banner:



EXHIBIT 14: THE WEBSITE

To access the admin page going forward, we navigate to our instance's IP address and add "\wpadmin". For example, 123.1.10.1\wp-admin. The default username is "user" and the password was retrieved when initially connecting to the secure shell using the **cat bitnami_application_ password** command as shown on the previous page.

Username or Email Address
Password Password retrieved from SSH Remember Me Log In
Lost your password? — Back to user's Blog!

EXHIBIT 15: ACCESS THE ADMIN PAGE

Dashboard	WordPress 5.5.1 is available! Please update re	<u></u>	Screen Option	is ▼ Help ▼
Updates 1	Dashboard			
 Jetpack Posts Media 	Welcome to WordPress! We've assembled some links to get you	u started:		Oismiss
Pages	Get Started	Next Steps	More Actions	
Comments		Write your first blog post	Manage widgets	
۰	Customize Your Site	+ Add an About page	Manage menus	
Appearance	or, change your theme completely	Set up your homepage	Turn comments on or off	
Plugins Users		View your site	Learn more about getting start	ed
🖗 Tools				
Settings	Site Health Status	▲ Quick Draft		
Collapse menu	Should be imp Your site's health is looking good, but there are st improve its performance and security. Take a look at the 10 items on the <u>Site Health scre</u>	roved Title Content Content What's on your	mind?	
	At a Glance			

EXHIBIT 16: DASHBOARD

This area is where we can now create and configure our new website using the simple WordPress interface. We can do everything here from installing plugins to choosing themes for the website to using an existing backup template.



Overall, Amazon Lightsail provides a quick, easy, cost-effective solution for doing such things as creating a website for a small project, blogging, and creating testing environments. With pricing based on what is hosted versus outbound traffic, Lightsail provides users with virtual private servers with all the necessary components to build their own applications in the cloud without the need to estimate the costs of running these platforms in-house. Migrating to the cloud using AWS also gives small business owners the same opportunities to compete with their larger counterparts by providing the same access to technologies and services that would otherwise be very costly to run on-premises.

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