Exam Tips

Understand the difference between a region, an Availability Zone (AZ) and an Edge Location.

- A Region is a physical location in the world which consists of two or more Availability Zones (AZ's).
- An AZ is one or more discrete data centers, each with redundant power, networking and connectivity, housed in separate facilities.
- Edge Locations are endpoints for AWS which are used for caching content. Typically this consists of CloudFront, Amazon's Content Delivery Network (CDN)

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Exam Tips

What Have We Learnt So Far?

- **IAM is universal**. It does not apply to regions at this time.
- The **"root account"** is simply the account created when first setup your AWS account. It has complete Admin access.
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Exam Tips

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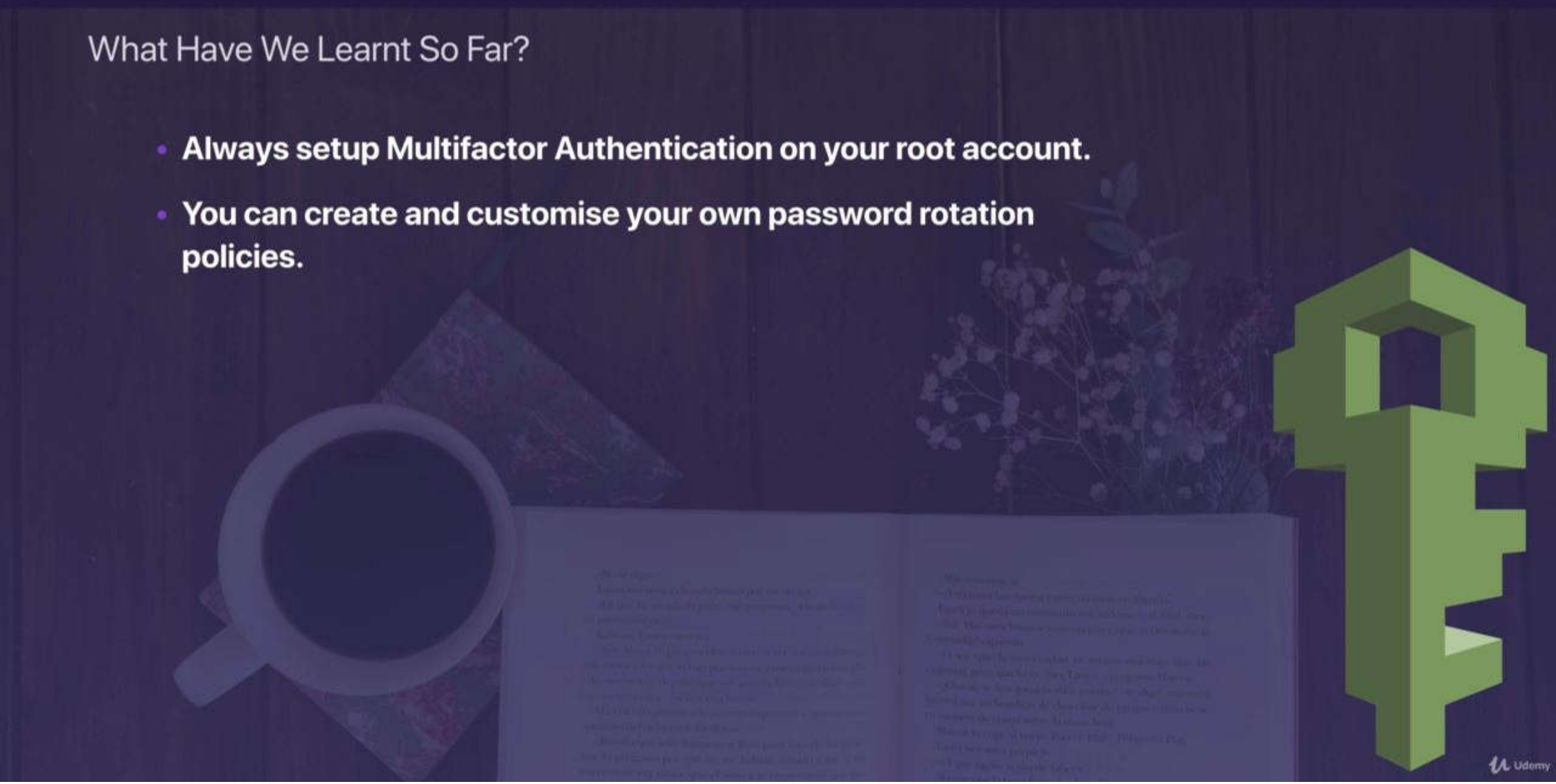

Exam Tips

The Key Fundamentals of S3 Are;

- Key (This is simply the name of the object)
- Value (This is simply the data and is made up of a sequence of bytes).
- Version ID (Important for versioning)
- Metadata (Data about data you are storing
- Subresources;
  - Access Control Lists
  - Torrent

Exam Tips

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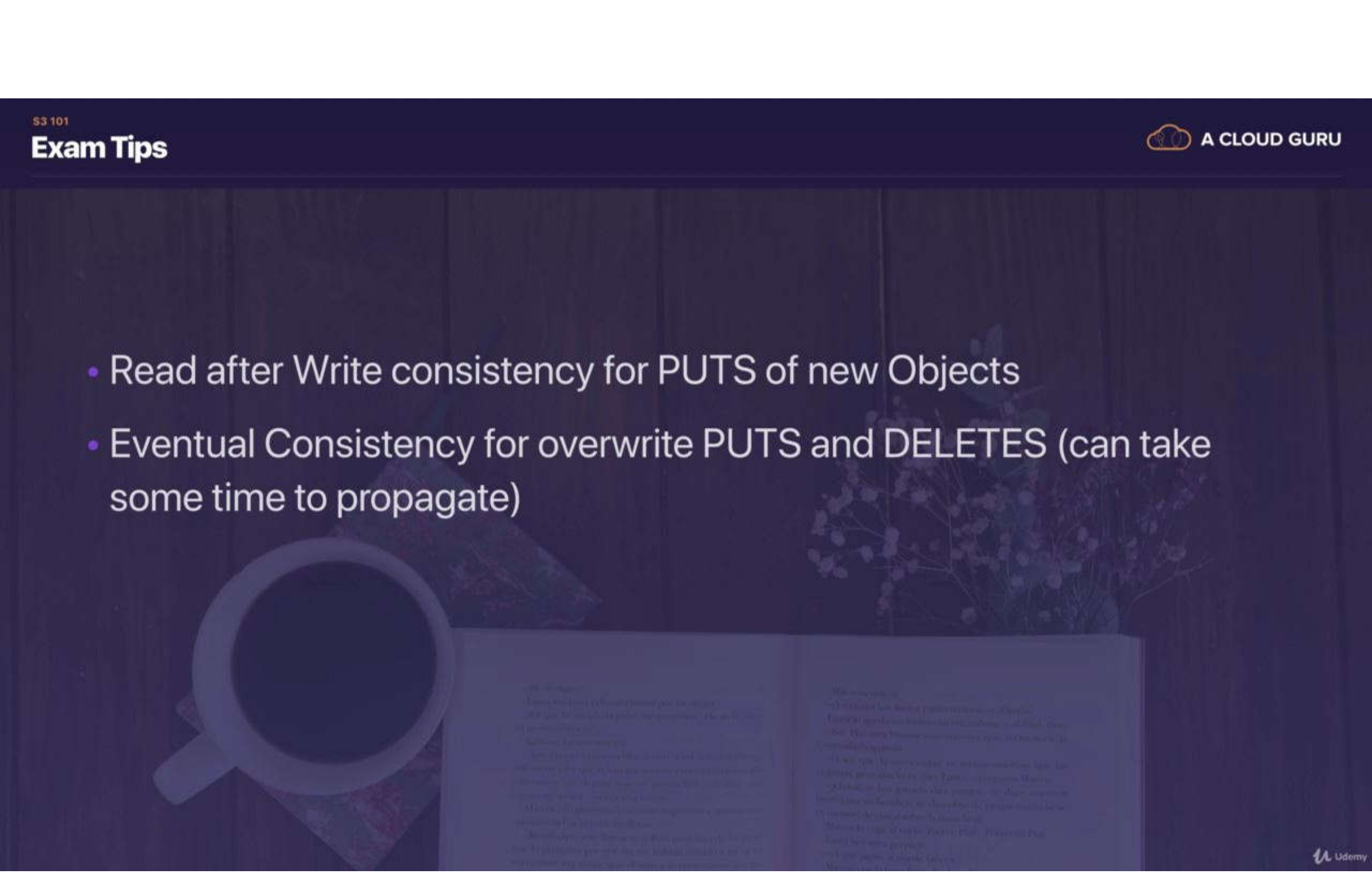
- Eventual Consistency for overwrite PUTS and DELETES (can take some time to propagate)



Exam Tips

1

S3 Standard

99.99% availability
99.999999999% durability, stored redundantly across multiple devices in multiple facilities, and is designed to sustain the loss of 2 facilities concurrently.

2

S3 - IA

(Infrequently Accessed):
For data that is accessed less frequently, but requires rapid access when needed. Lower fee than S3, but you are charged a retrieval fee.

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S3 One Zone - IA

For where you want a lower-cost option for infrequently accessed data, but do not require the multiple Availability Zone data resilience.

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S3 - Intelligent Tiering

Designed to optimize costs by automatically moving data to the most cost-effective access tier, without performance impact or operational overhead.

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S3 Glacier

S3 Glacier is a secure, durable, and low-cost storage class for data archiving. Retrieval times configurable from minutes to hours.

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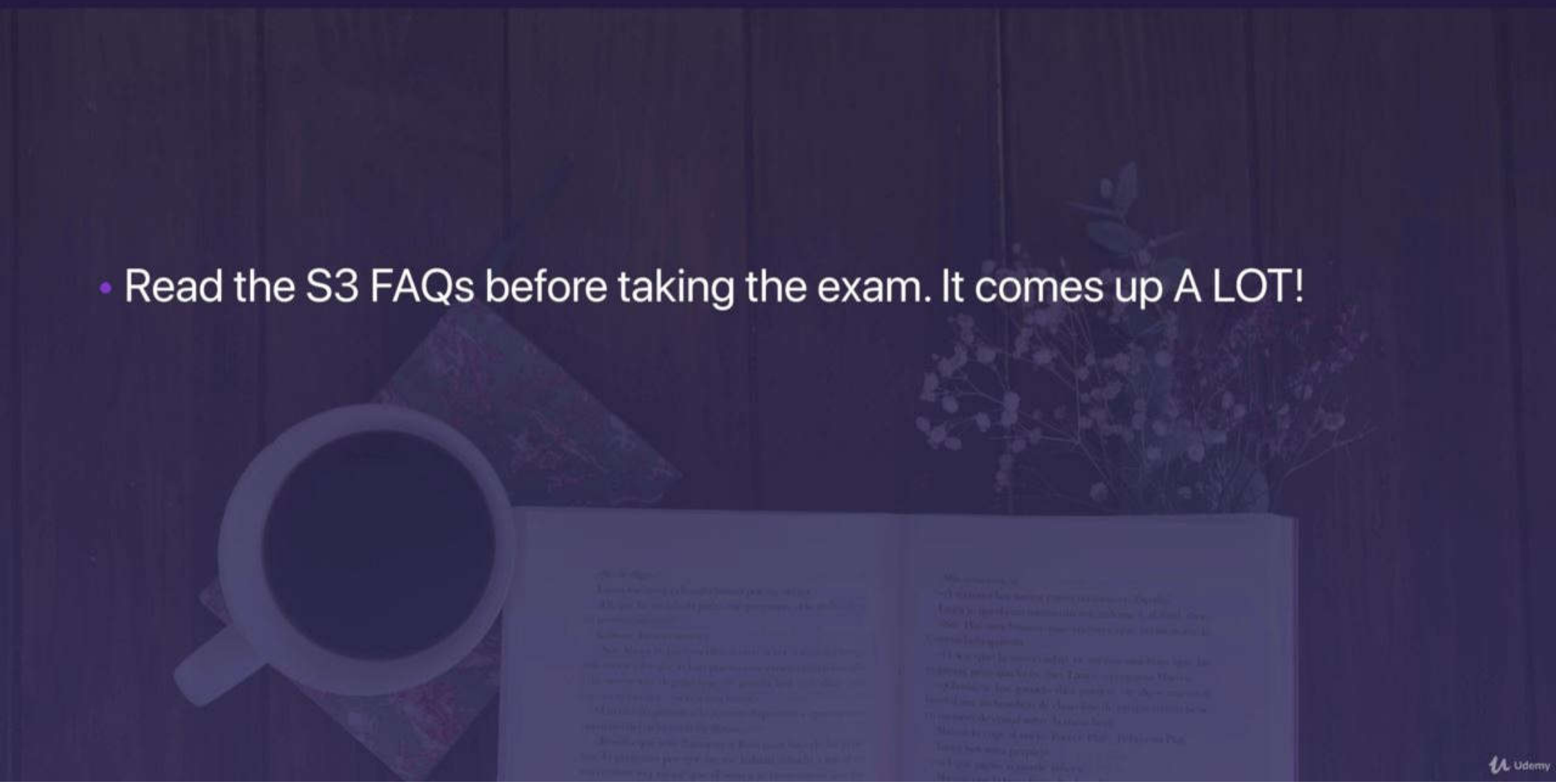
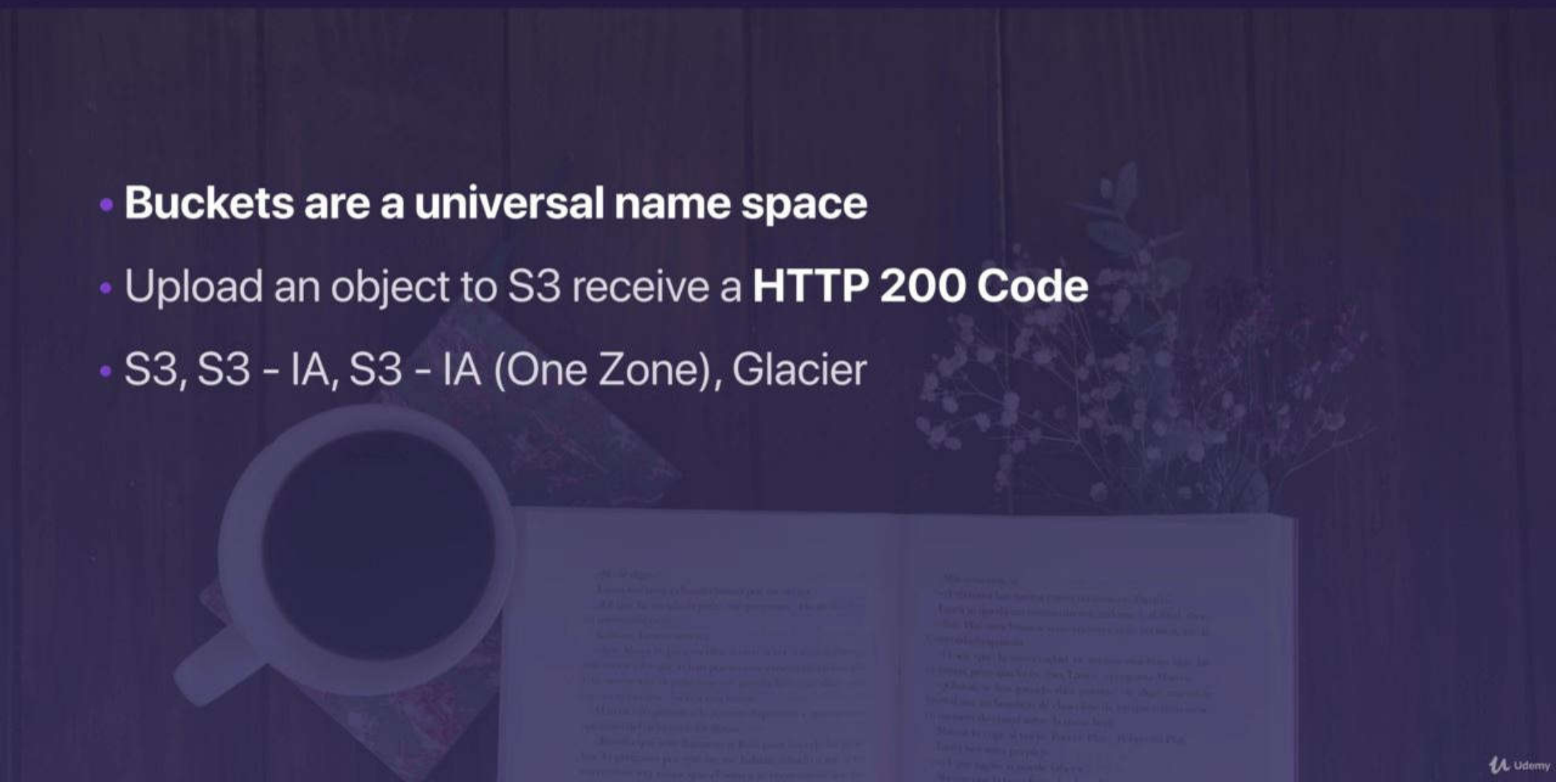
Exam Tips



- Read the S3 FAQs before taking the exam. It comes up A LOT!

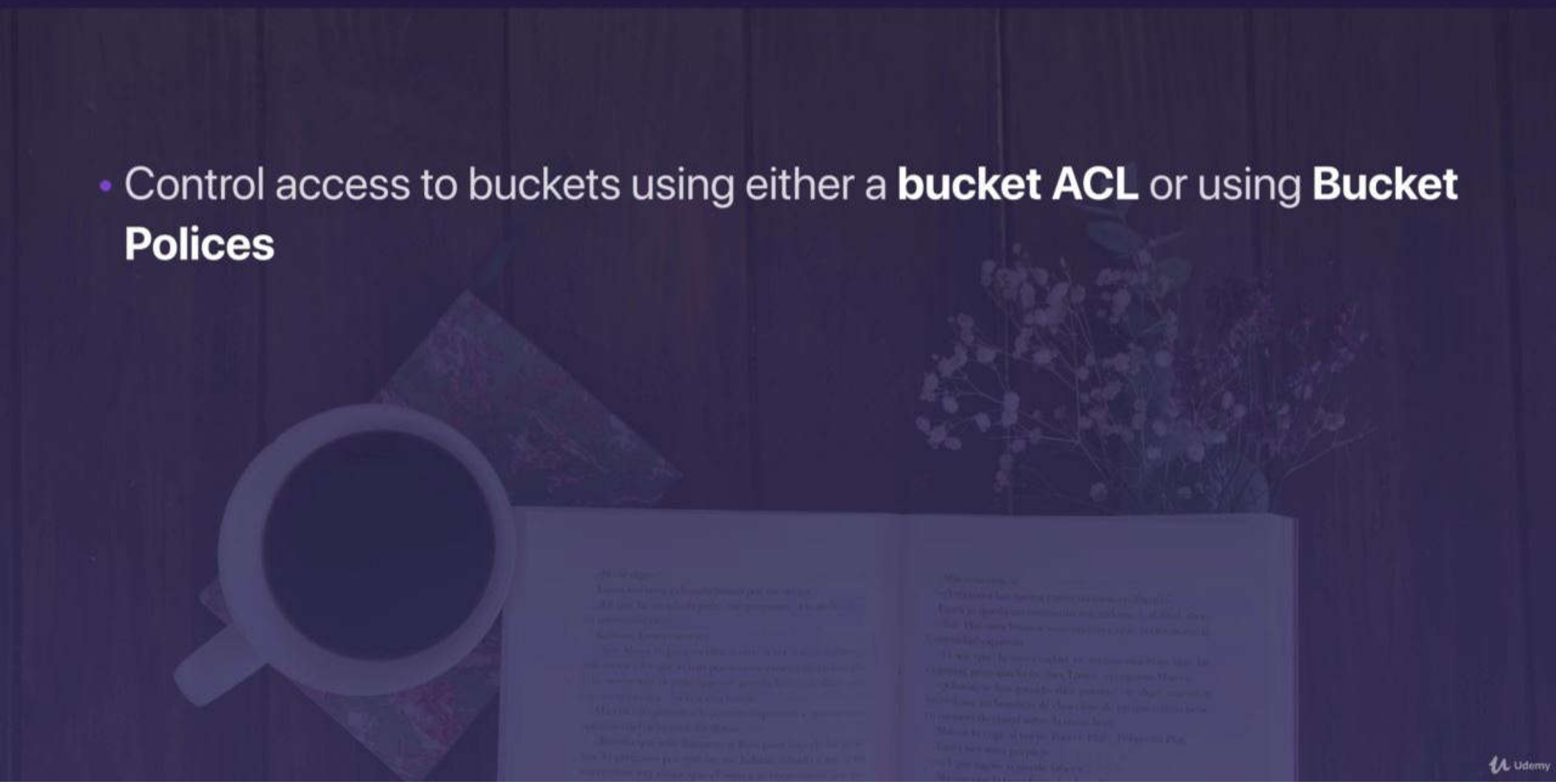
Exam Tips



- **Buckets are a universal name space**
- Upload an object to S3 receive a **HTTP 200 Code**
- S3, S3 - IA, S3 - IA (One Zone), Glacier

Exam Tips

- Control access to buckets using either a **bucket ACL** or using **Bucket Polices**



Exam Tips

- Stores all versions of an object (including all writes and even if you delete an object)
- Great backup tool.
- Once enabled, Versioning cannot be disabled, only suspended.
- Integrates with Lifecycle rules
- Versioning's MFA Delete capability, which uses multi-factor authentication, can be used to provide an additional layer of security.

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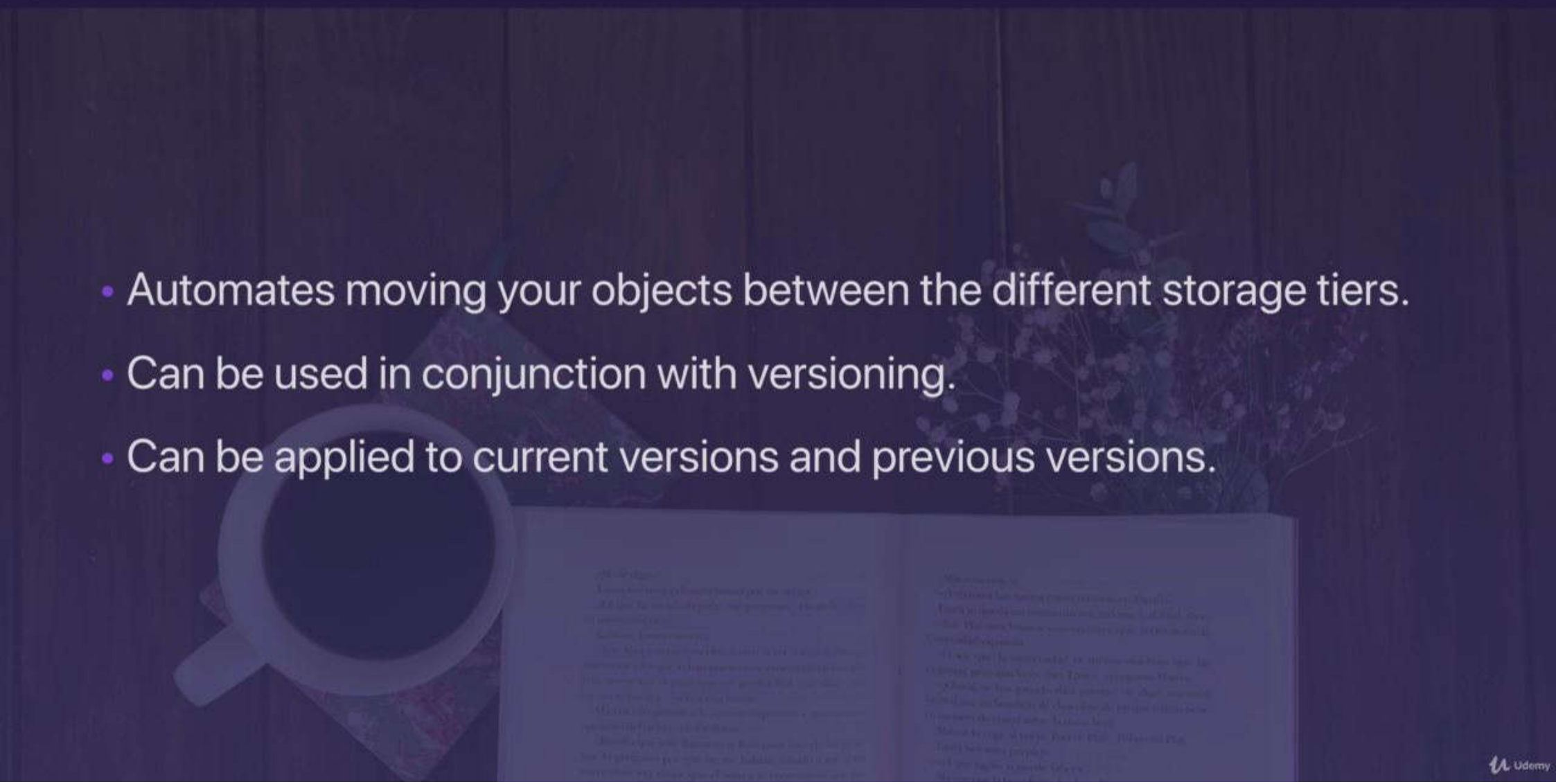
Exam Tips



- Automates moving your objects between the different storage tiers.
- Can be used in conjunction with versioning.
- Can be applied to current versions and previous versions.

CROSS REGION REPLICATION

Exam Tips

A CLOUD GURU

- Versioning must be enabled on both the source and destination buckets.
- Regions must be unique.
- Files in an existing bucket are not replicated automatically.
- All subsequent updated files will be replicated automatically.
- Delete markers are not replicated.
- Deleting individual versions or delete markers will not be replicated.

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Exam Tips

- **Edge Location** - This is the location where content will be cached. This is separate to an AWS Region/AZ.
- **Origin** - This is the origin of all the files that the CDN will distribute. This can be either an S3 Bucket, an EC2 Instance, an Elastic Load Balancer, or Route53.
- **Distribution** - This is the name given the CDN which consists of a collection of Edge Locations.
- **Web Distribution** - Typically used for Websites.
- **RTMP** - Used for Media Streaming.

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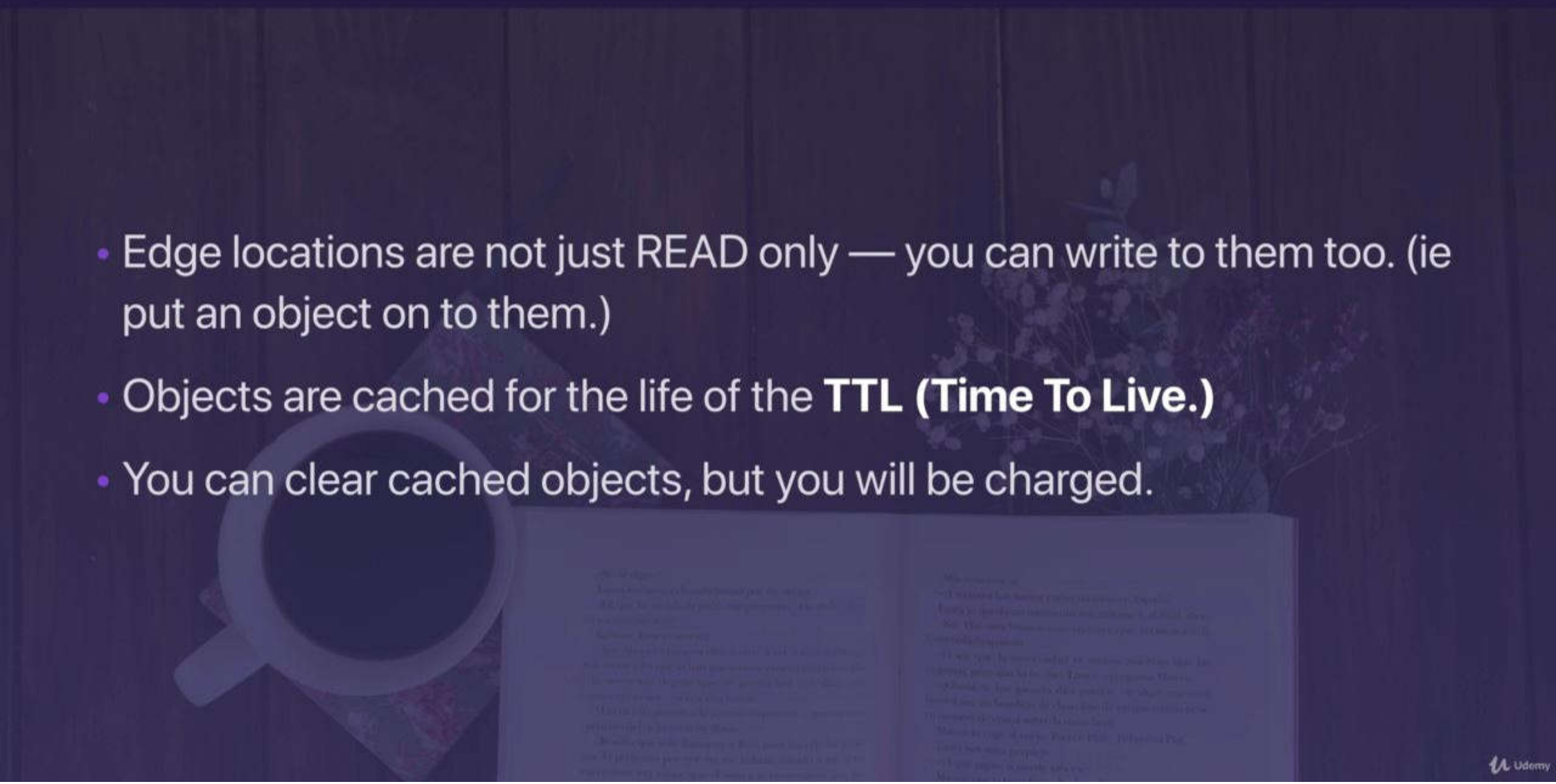
Exam Tips



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Exam Tips

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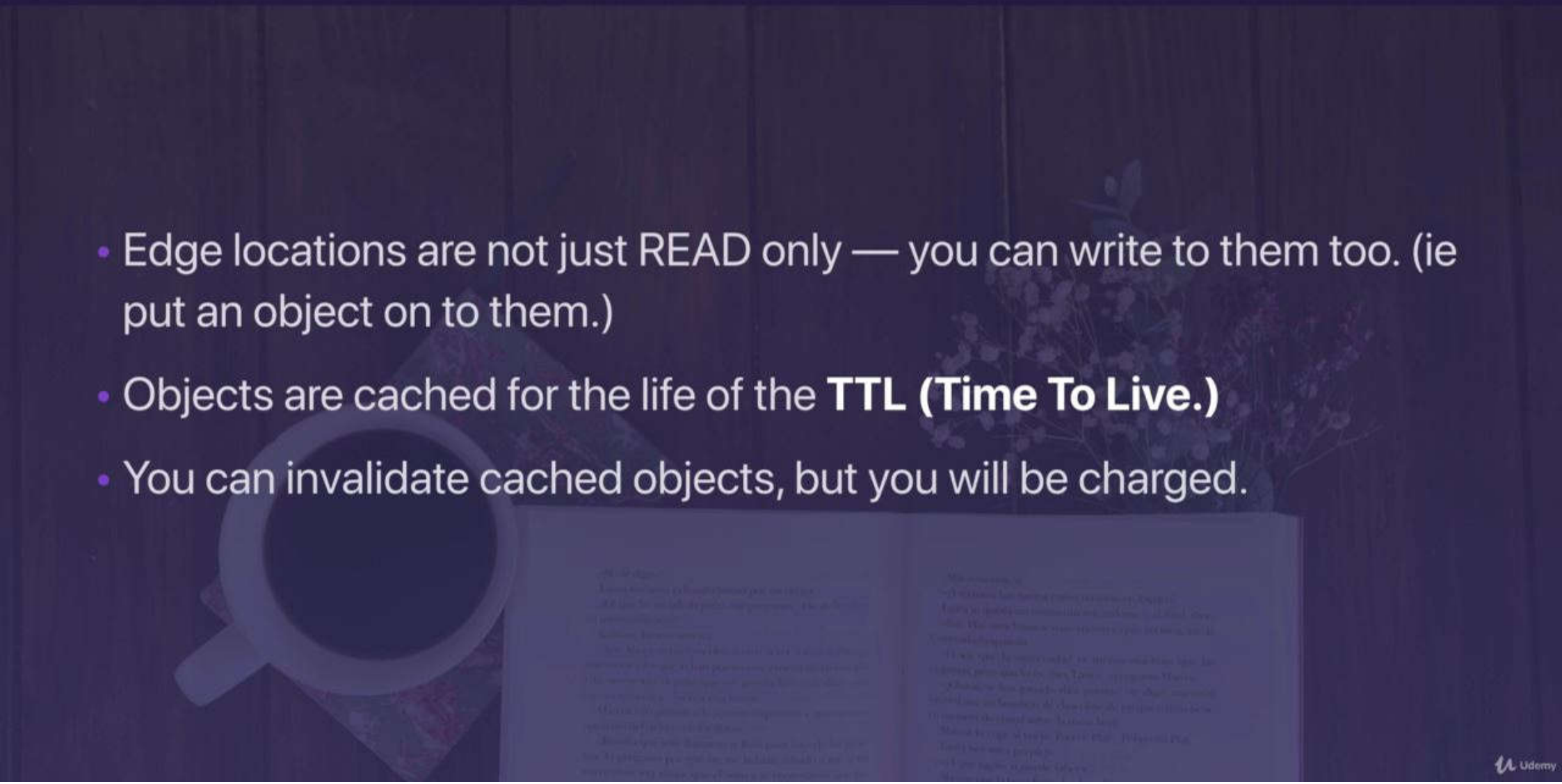

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- Objects are cached for the life of the **TTL (Time To Live.)**
- You can invalidate cached objects, but you will be charged.

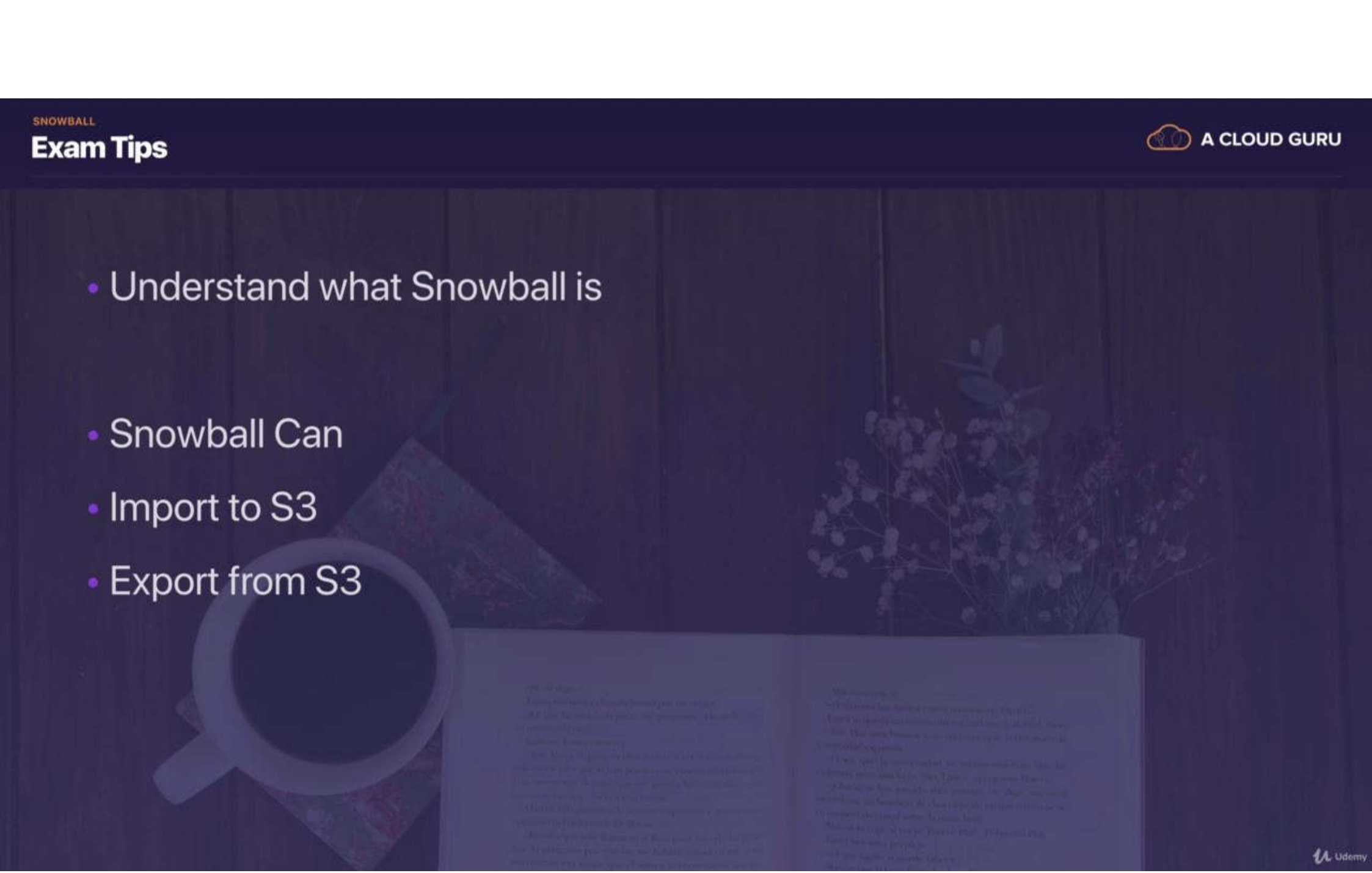
SNOWBALL

Exam Tips

A CLOUD GURU

- Understand what Snowball is

- Snowball Can
- Import to S3
- Export from S3



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Exam Tips

File Gateway

- File Gateway - For flat files, stored directly on S3.

Volume Gateway

- **Stored Volumes** - Entire Dataset is stored on site and is asynchronously backed up to S3.
- **Cached Volumes** - Entire Dataset is stored on S3 and the most frequently accessed data is cached on site.

Gateway Virtual Tape Library

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S3 & IAM SUMMARY

Exam Tips

A CLOUD GURU

Identity Access Management Consists Of The Following;

- Users
- Groups
- Roles
- Policies

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "*",
            "Resource": "*"
        }
    ]
}
```

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Exam Tips

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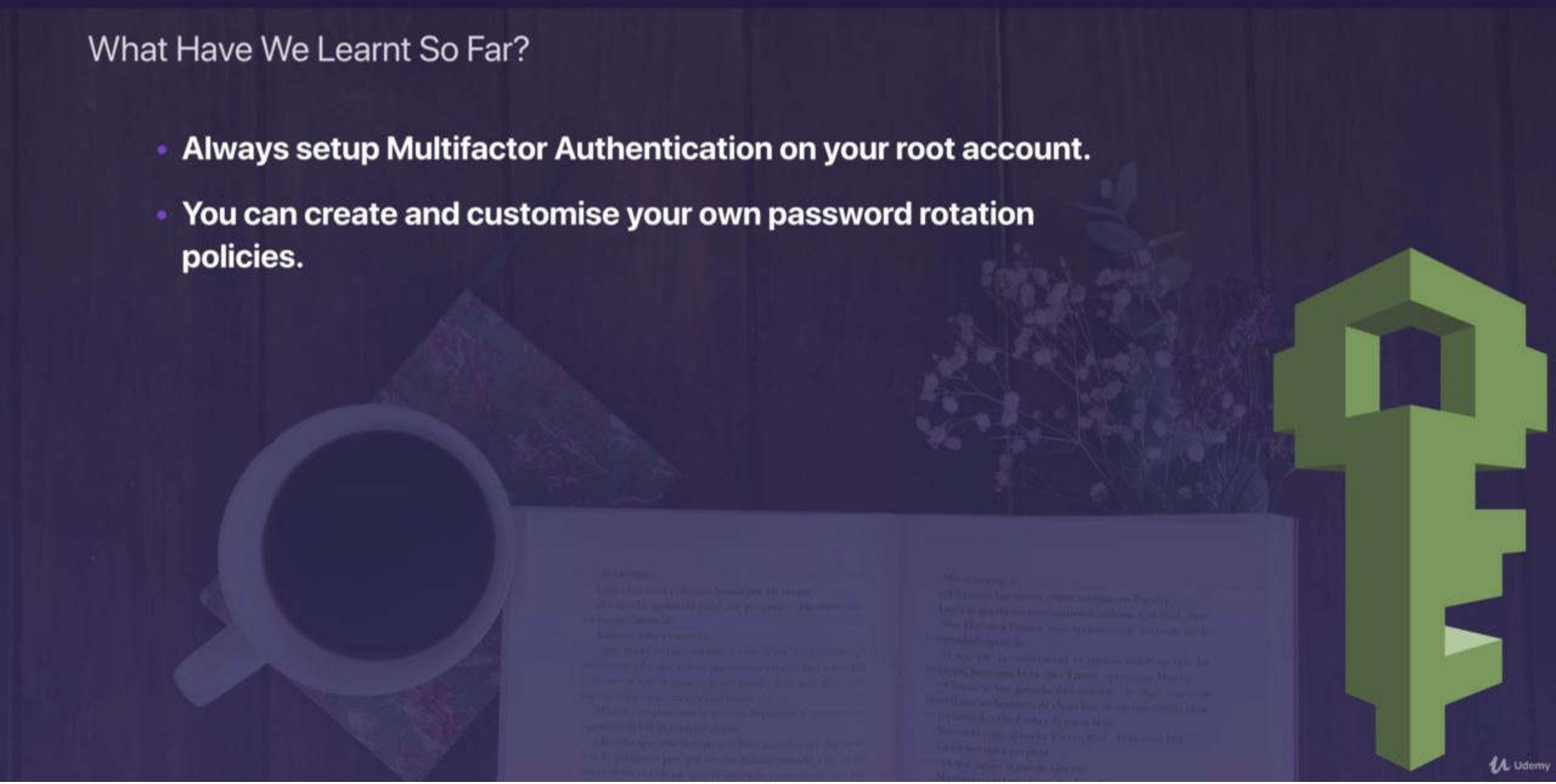

S3 & IAM SUMMARY

S3 Exam Tips

A CLOUD GURU

- Remember that S3 is **Object-based**: i.e. allows you to upload files.
- Files can be from 0 Bytes to 5 TB.
- There is unlimited storage.
- Files are stored in Buckets.
- **S3 is a universal namespace**. That is, names must be unique globally.
- https://s3-eu-west-1.amazonaws.com/acloudguru

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S3 & IAM SUMMARY

S3 Exam Tips

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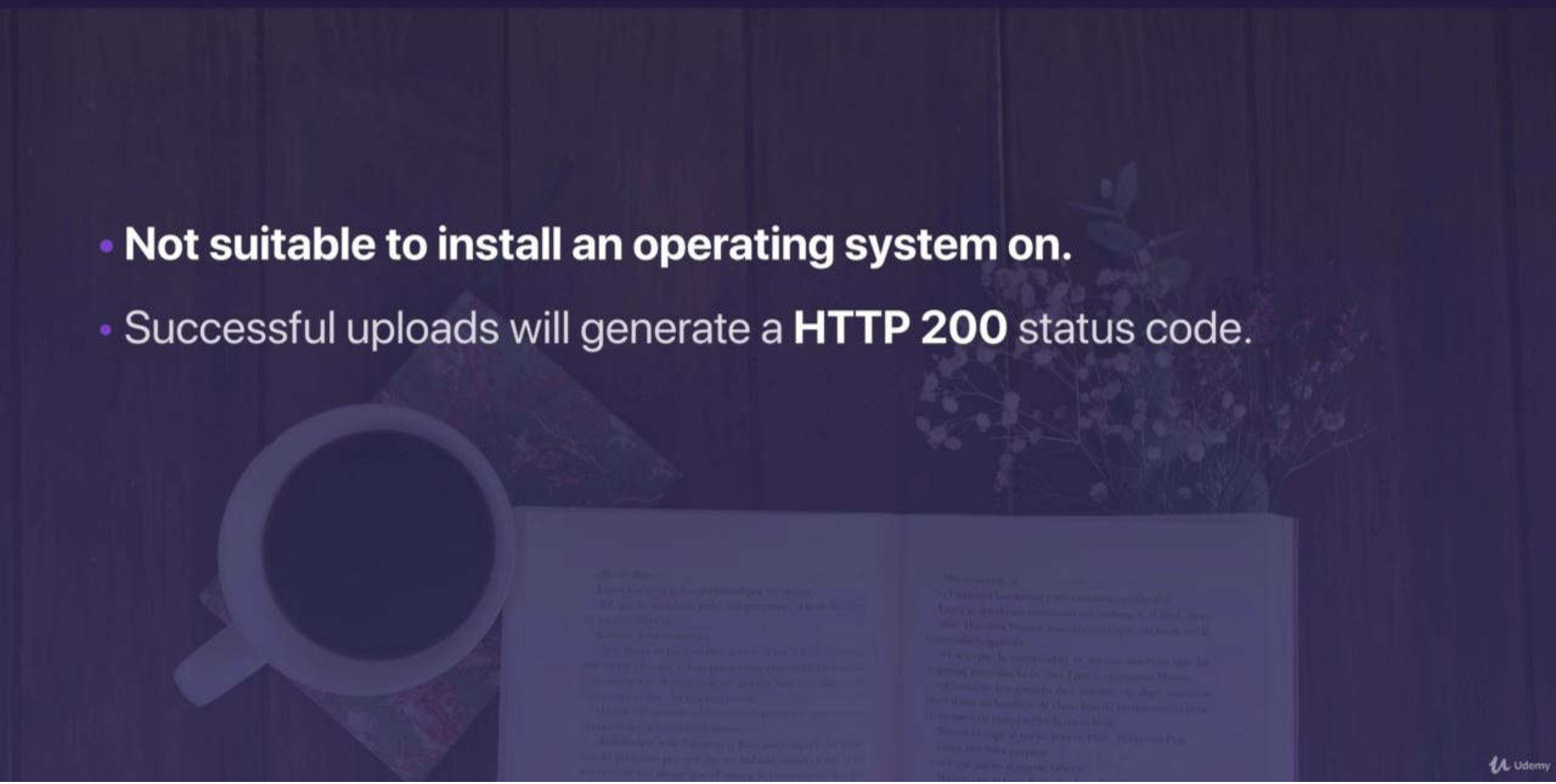

- **Not suitable to install an operating system on.**
- Successful uploads will generate a **HTTP 200** status code.

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S3 & IAM SUMMARY

S3 Exam Tips

A CLOUD GURU

By default, all newly created buckets are **PRIVATE**. You can setup access control to your buckets using;

- **Bucket Policies**
- **Access Control Lists**

S3 buckets can be configured to create access logs which log all requests made to the S3 bucket. This can be sent to another bucket and even another bucket in another account.

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S3 Exam Tips

The Key Fundamentals of S3 Are;

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S3 & IAM SUMMARY

S3 Exam Tips

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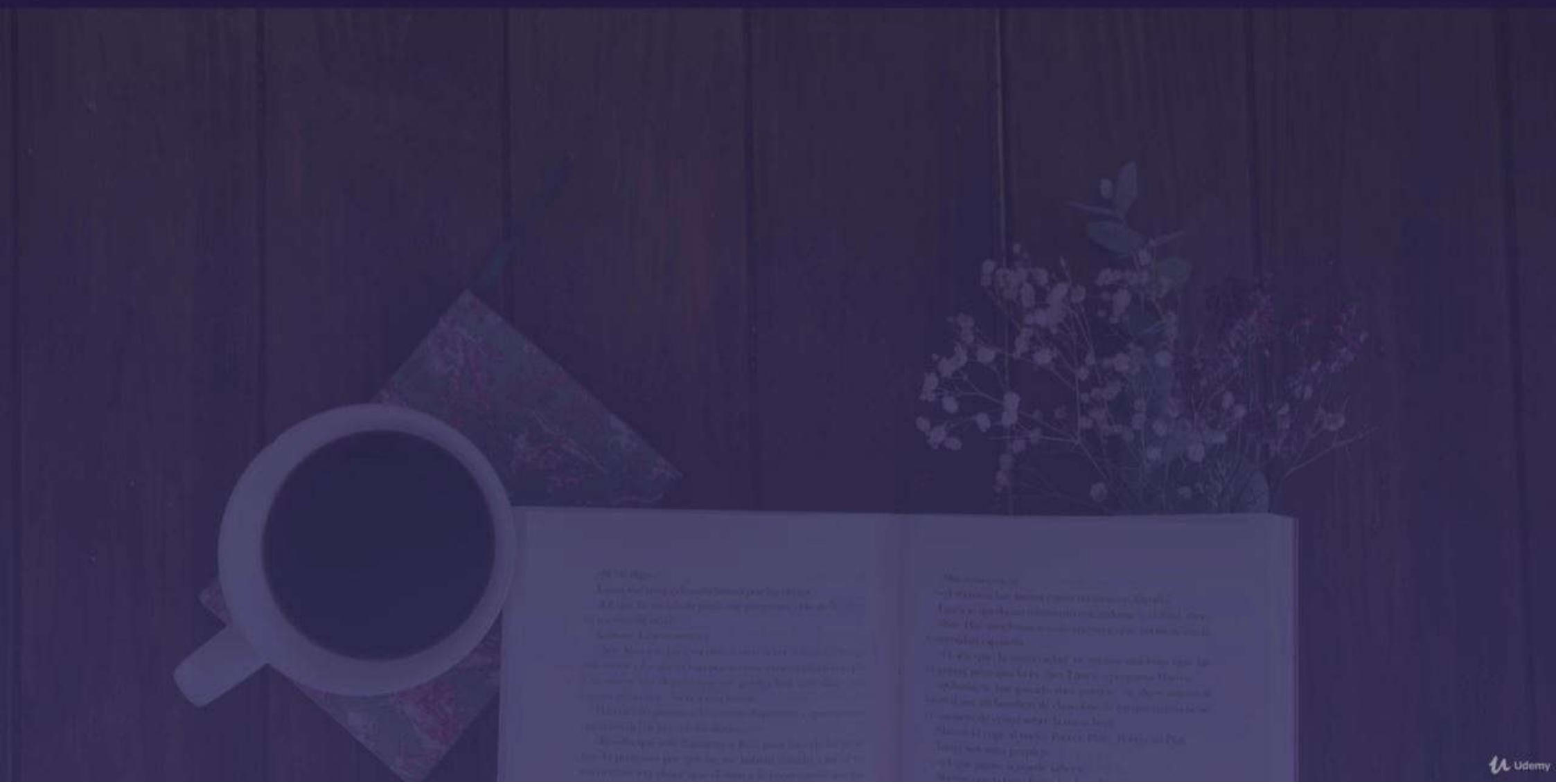

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S3 & IAM SUMMARY

S3 Exam Tips

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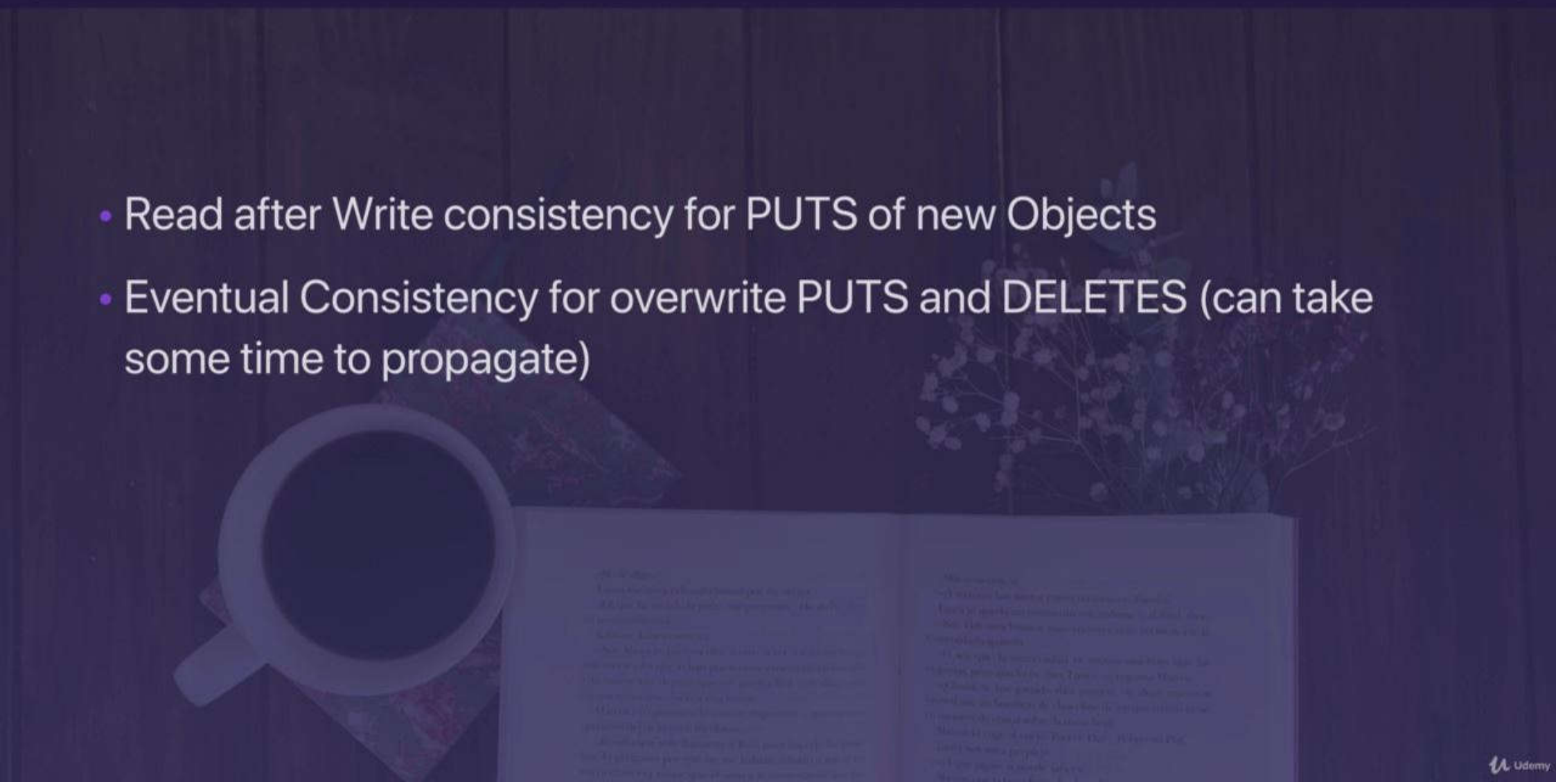

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S3 101

Exam Tips

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S3 Exam Tips

Encryption In Transit is achieved by

- **SSL/TLS**

Encryption At Rest (Server Side) is achieved by

- **S3 Managed Keys - SSE-S3**
- **AWS Key Management Service, Managed Keys - SSE-KMS**
- **Server Side Encryption With Customer Provided Keys - SSE-C**

Client Side Encryption

Exam Tips

Cross Region Replication

- Versioning must be enabled on both the source and destination buckets.
- Regions must be unique.
- Files in an existing bucket are not replicated automatically.
- All subsequent updated files will be replicated automatically.
- Delete markers are not replicated.
- Deleting individual versions or delete markers will not be replicated.
- Understand what Cross Region Replication is at a high level.

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Exam Tips

Lifecycle Policies

- Automates moving your objects between the different storage tiers.
- Can be used in conjunction with versioning.
- Can be applied to current versions and previous versions.

S3 Exam Tips

CloudFront

- **Edge Location** - This is the location where content will be cached. This is separate to an AWS Region/AZ.
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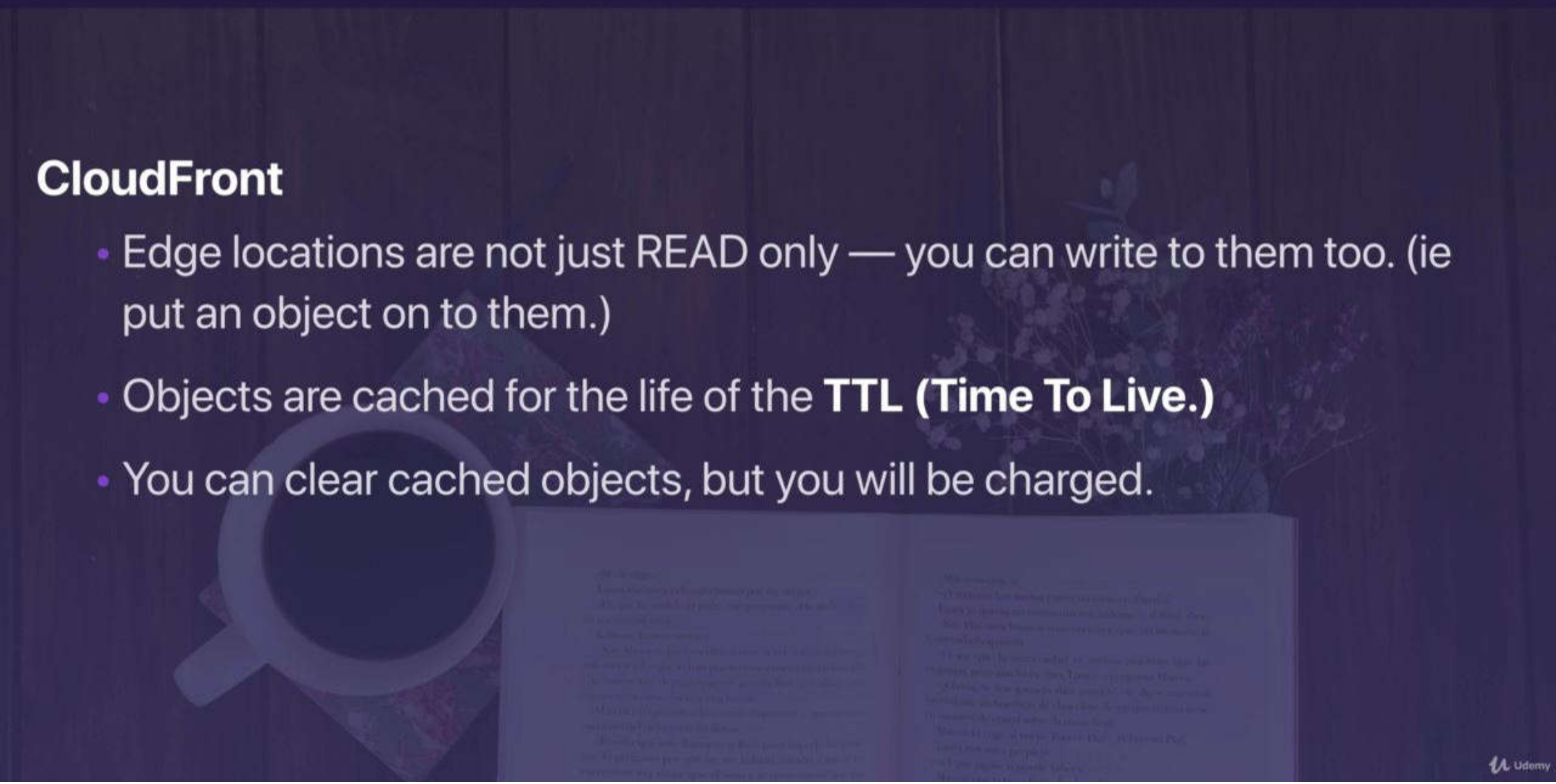
S3 Exam Tips



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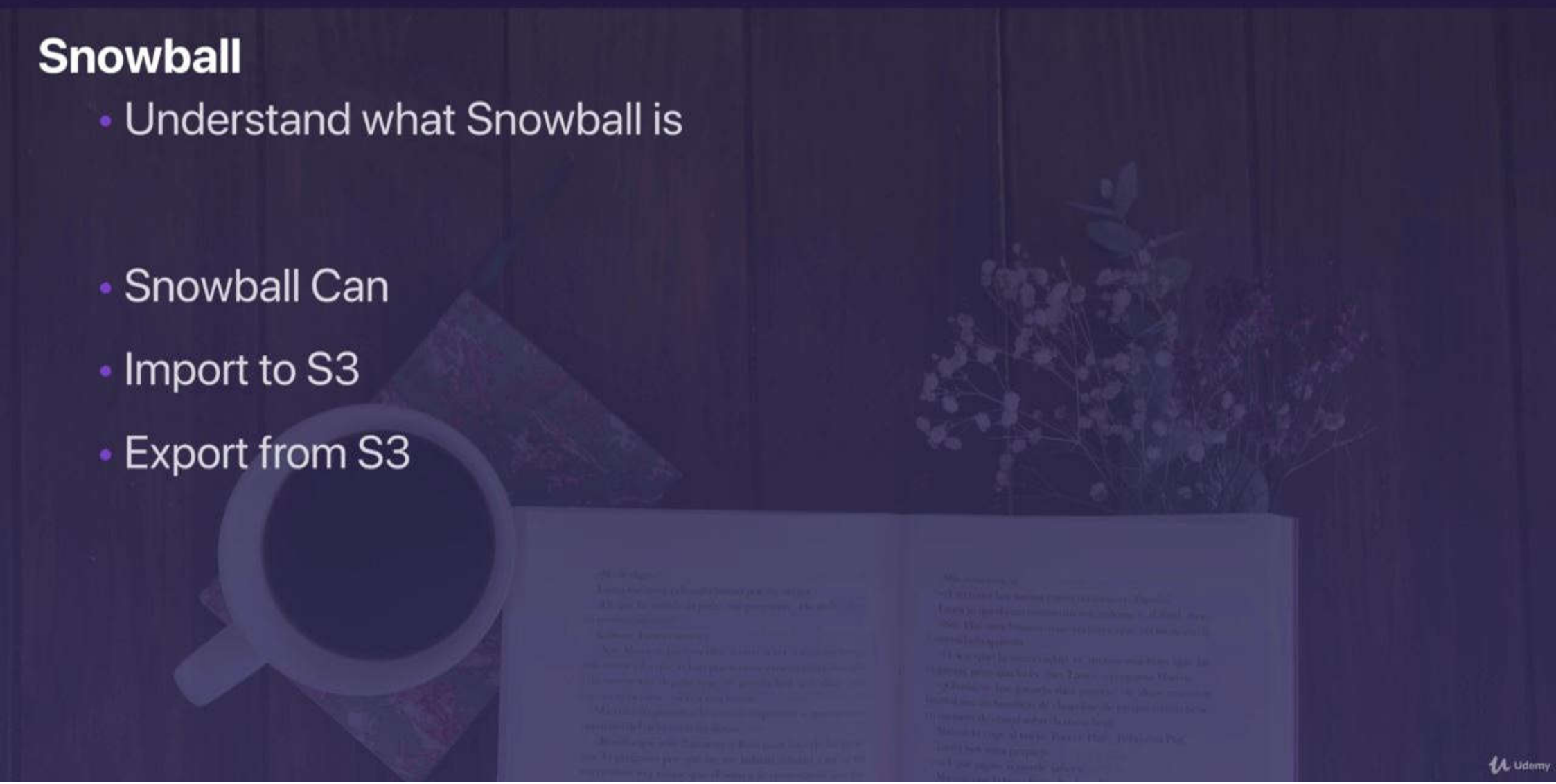

Storage Gateway

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Volume Gateway

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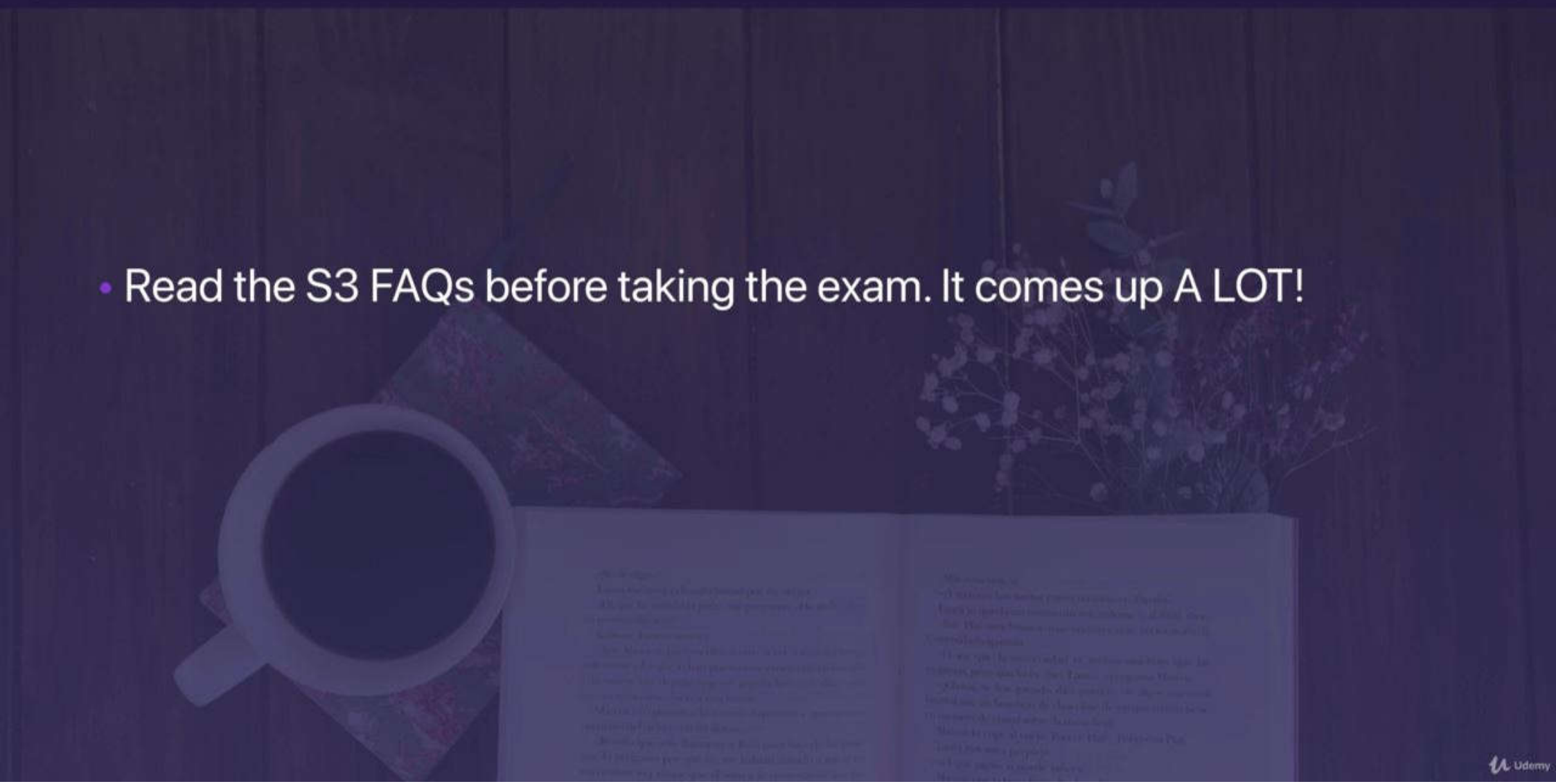
Gateway Virtual Tape Library

- Used for backup and uses popular backup applications like NetBackup, Backup Exec, Veeam etc.

S3 & IAM SUMMARY

S3 Exam Tips

A CLOUD GURU



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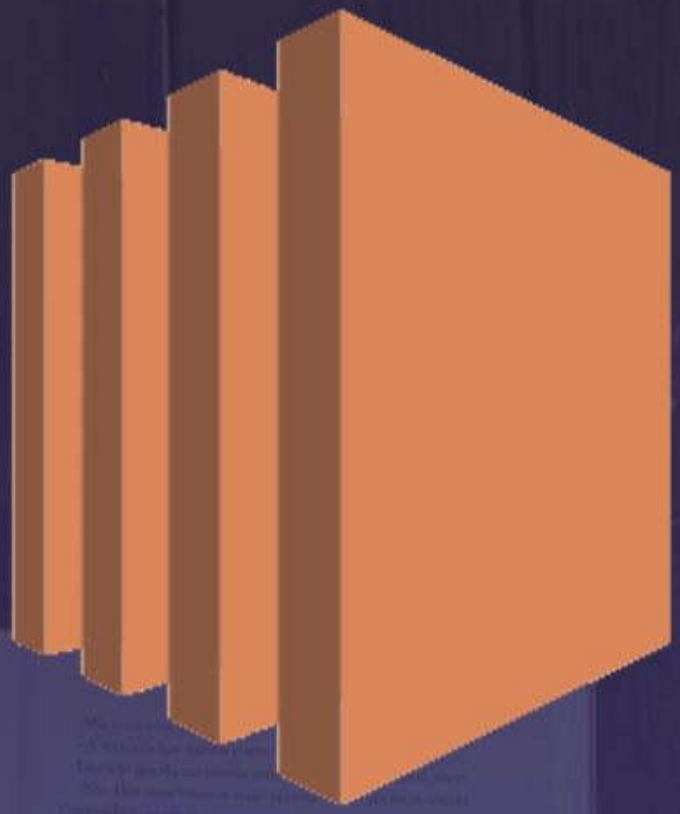
EC2 Exam Tips

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change.



EC2 101

EC2 Exam Tips

A CLOUD GURU

1

On Demand

Allows you to pay a fixed rate by the hour (or by the second) with no commitment.

2

Reserved

Provides you with a capacity reservation, and offer a significant discount on the hourly charge for an instance. Contract Terms are 1 Year or 3 Year Terms.

3

Spot

Enables you to bid whatever price you want for instance capacity, providing for even greater savings if your applications have flexible start and end times.

4

Dedicated Hosts

Physical EC2 server dedicated for your use. Dedicated Hosts can help you reduce costs by allowing you to use your existing server-bound software licenses.

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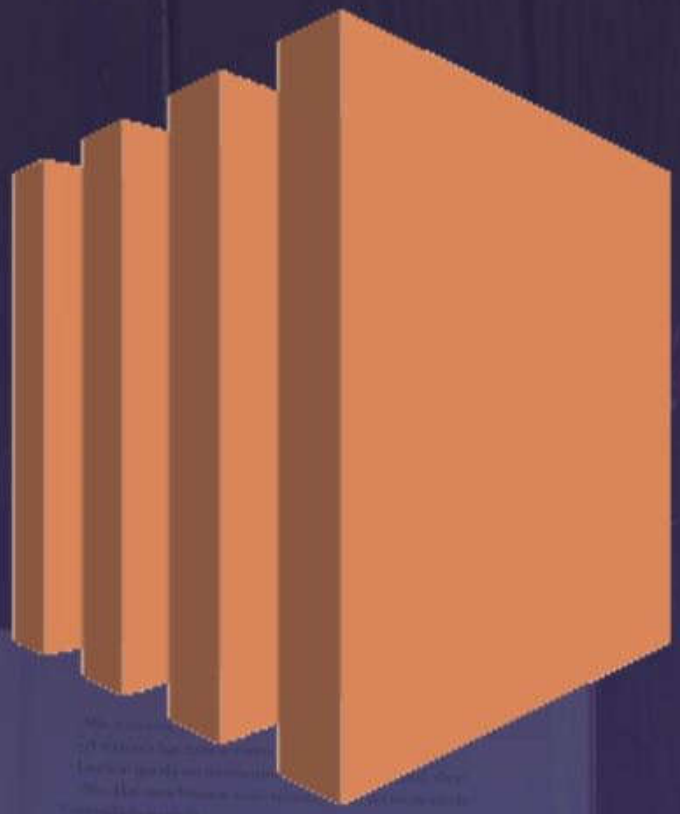
EC2 Exam Tips

If the Spot instance is terminated by Amazon EC2, you will not be charged for a partial hour of usage. However, if you terminate the instance yourself, you will be charged for any hour in which the instance ran.



EC2 Instance Types - Mnemonic

A CLOUD GURU

- **F** - For FPGA
- **I** - For IOPS
- **G** - Graphics
- **H** - High Disk Throughput
- **T** - Cheap general purpose (think T2 Micro)
- **D** - For Density
- **R** - For RAM
- **M** - Main choice for general purpose apps
- **C** - For Compute
- **P** - Graphics (think Pics)
- **X** - Extreme Memory
- **Z** - Extreme Memory AND CPU
- **A** - Arm-based workloads
- **U** - Bare Metal

Exam Tips

- Termination Protection is **turned off** by default, you must turn it on.
- On an EBS-backed instance, the **default action is for the root EBS volume to be deleted** when the instance is terminated.
- EBS Root Volumes of your DEFAULT AMI's cannot be encrypted. You can also use a third party tool (such as bit locker etc) to encrypt the root volume, or this can be done when creating AMI's (lab to follow) in the AWS console or using the API.
- Additional volumes can be encrypted.

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SECURITY GROUPS

Exam Tips

A CLOUD GURU

- All Inbound traffic is blocked by default.
- All Outbound traffic is allowed.
- Changes to Security Groups take effect immediately.
- You can have any number of EC2 instances within a security group.
- You can have multiple security groups attached to EC2 Instances.

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SECURITY GROUPS

Exam Tips

A CLOUD GURU

- Security Groups are **STATEFUL.**
- If you create an inbound rule allowing traffic in, that traffic is automatically allowed back out again.
- You cannot block specific IP addresses using Security Groups, instead use Network Access Control Lists.
- You can specify allow rules, but not deny rules.

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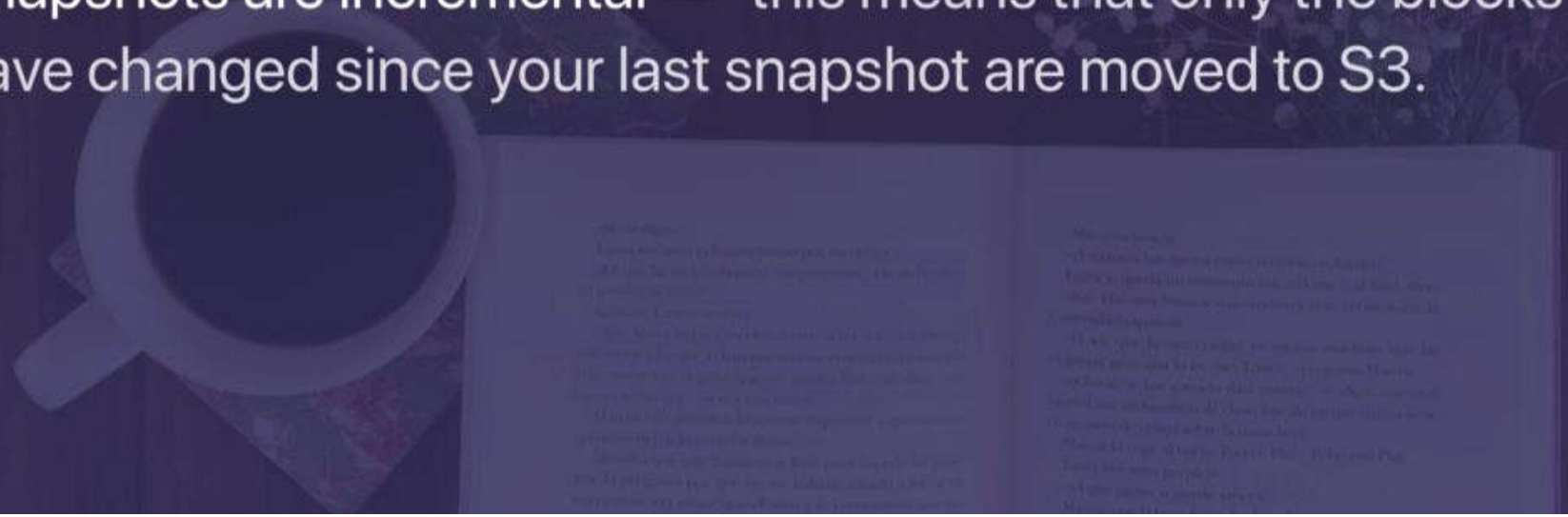
VOLUMES & SNAPSHOTS

Exam Tips

A CLOUD GURU

- Volumes exist on EBS. Think of EBS as a virtual hard disk
- Snapshots exist on S3. Think of snapshots as a photograph of the disk.
- Snapshots are point in time copies of Volumes.
- Snapshots are incremental — this means that only the blocks that have changed since your last snapshot are moved to S3.



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VOLUMES & SNAPSHOTS

Exam Tips

A CLOUD GURU

- To create a snapshot for Amazon EBS volumes that serve as root devices, you should stop the instance before taking the snapshot.
- However you can take a snap while the instance is running.
- You can create AMI's from both Volumes and Snapshots
- You can change EBS volume sizes on the fly, including changing the size and storage type.
- Volumes will ALWAYS be in the same availability zone as the EC2 instance.

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Exam Tips

- To move an EC2 volume from one AZ to another, take a snapshot of it, create an AMI from the snapshot and then use the AMI to launch the EC2 instance in a new AZ.
- To move an EC2 volume from one region to another, take a snapshot of it, create an AMI from the snapshot and then copy the AMI from one region to the other. Then use the copied AMI to launch the new EC2 instance in the new region.

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Exam Tips

- Instance Store Volumes are sometimes called Ephemeral Storage.
- Instance store volumes cannot be stopped. If the underlying host fails, you will lose your data.
- EBS backed instances can be stopped. You will not lose the data on this instance if it is stopped.
- You can reboot both, you will not lose your data.
- By default, both ROOT volumes will be deleted on termination. However, with EBS volumes, you can tell AWS to keep the root device volume.

Exam Tips

- Snapshots of encrypted volumes are encrypted automatically.
- Volumes restored from encrypted snapshots are encrypted automatically.
- You can share snapshots, but only if they are unencrypted.
- These snapshots can be shared with other AWS accounts or made public.

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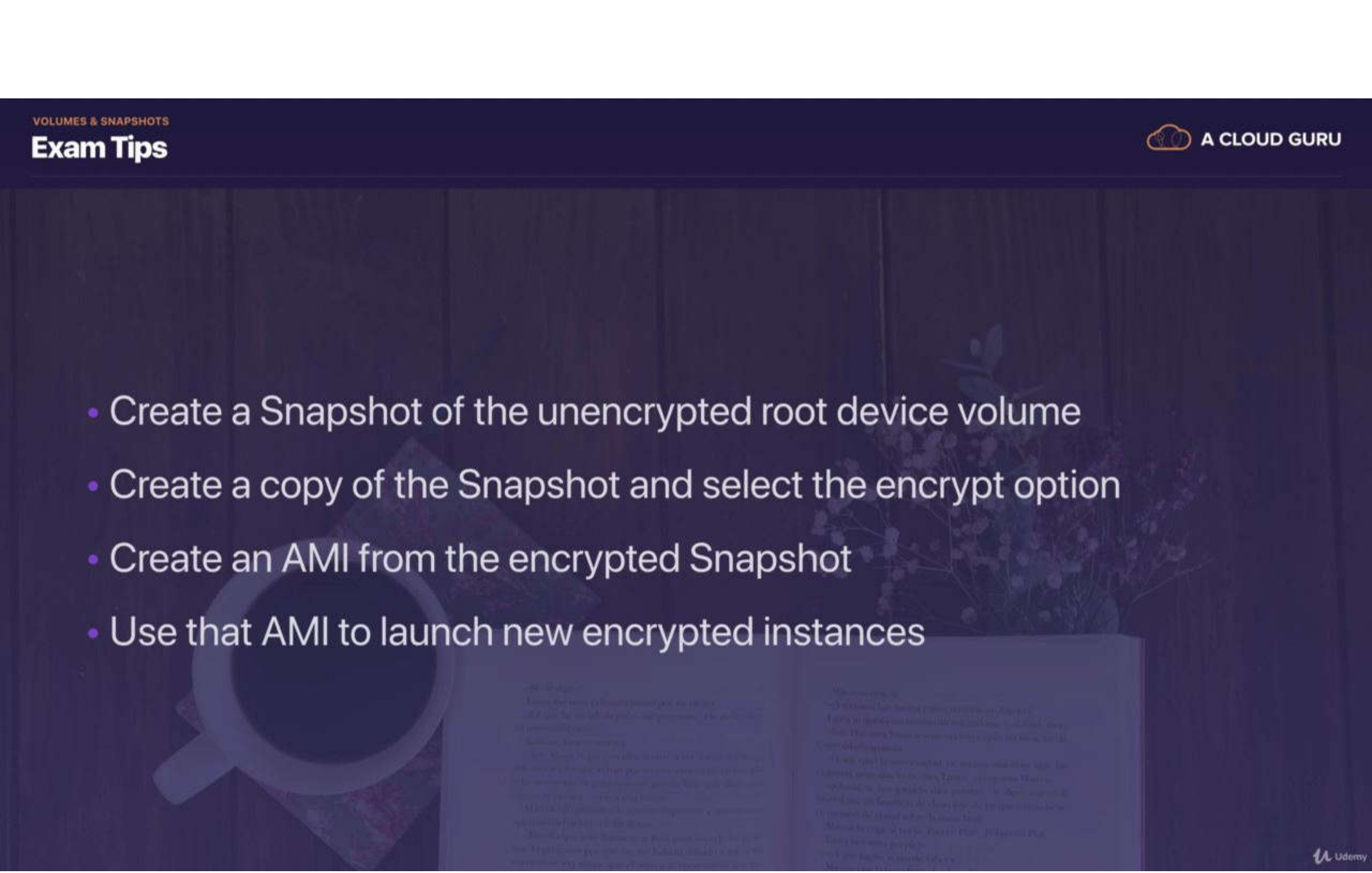
Exam Tips



- Create a Snapshot of the unencrypted root device volume
- Create a copy of the Snapshot and select the encrypt option
- Create an AMI from the encrypted Snapshot
- Use that AMI to launch new encrypted instances

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Exam Tips

Remember;

- CloudWatch is used for monitoring performance.
- CloudWatch can monitor most of AWS as well as your applications that run on AWS.
- CloudWatch with EC2 will monitor events every 5 minutes by default.
- You can have 1 minute intervals by turning on detailed monitoring.
- You can create CloudWatch alarms which trigger notifications.
- CloudWatch is all about performance. CloudTrail is all about auditing.

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What Can I do With CloudWatch?

- Dashboards - Creates awesome dashboards to see what is happening with your AWS environment.
- Alarms - Allows you to set Alarms that notify you when particular thresholds are hit.
- Events - CloudWatch Events helps you to respond to state changes in your AWS resources.
- Logs - CloudWatch Logs helps you to aggregate, monitor, and store logs.

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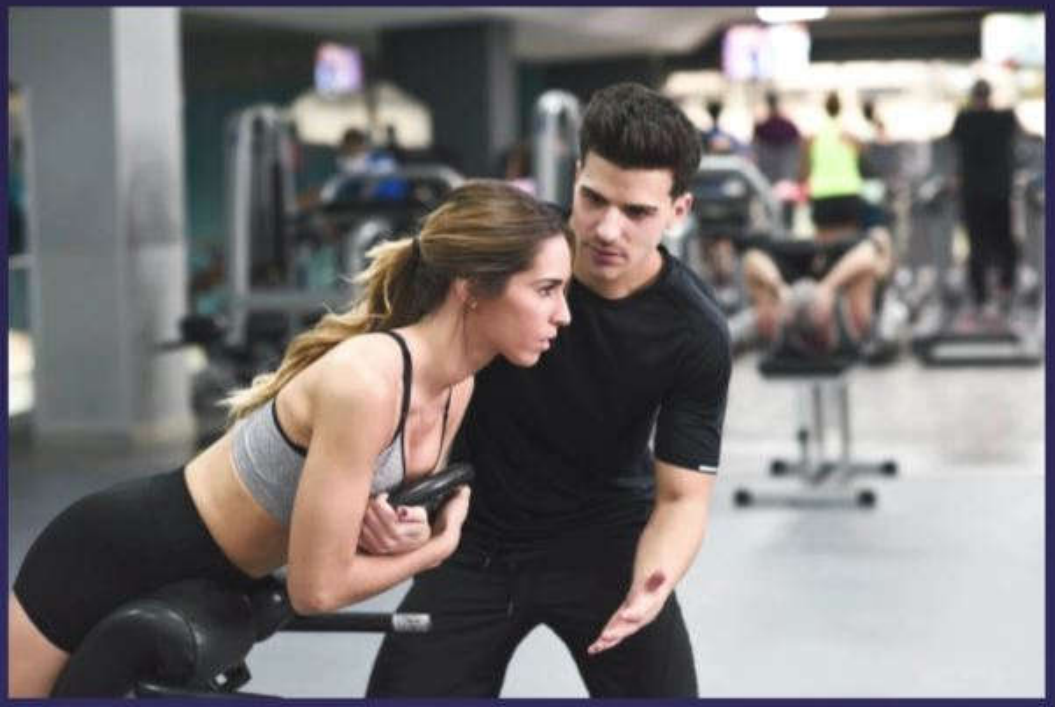
CLOUDWATCH

CloudTrail vs CloudWatch

A CLOUD GURU

- CloudWatch monitors performance.
- CloudTrail monitors API calls in the AWS platform.



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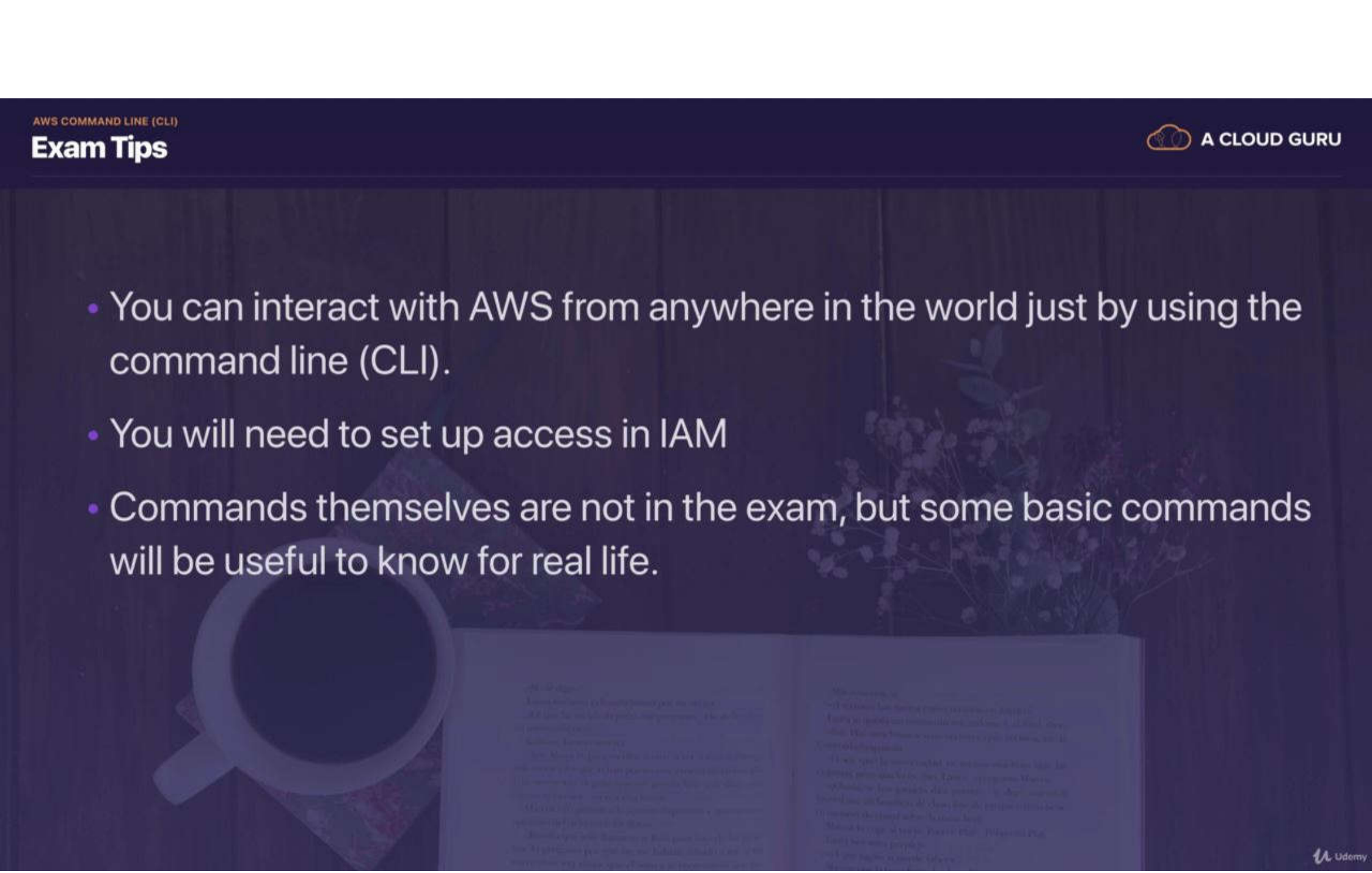
AWS COMMAND LINE (CLI)

Exam Tips

A CLOUD GURU

- You can interact with AWS from anywhere in the world just by using the command line (CLI).
- You will need to set up access in IAM
- Commands themselves are not in the exam, but some basic commands will be useful to know for real life.



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Exam Tips

- Roles are more secure than storing your access key and secret access key on individual EC2 instances.
- Roles are easier to manage.
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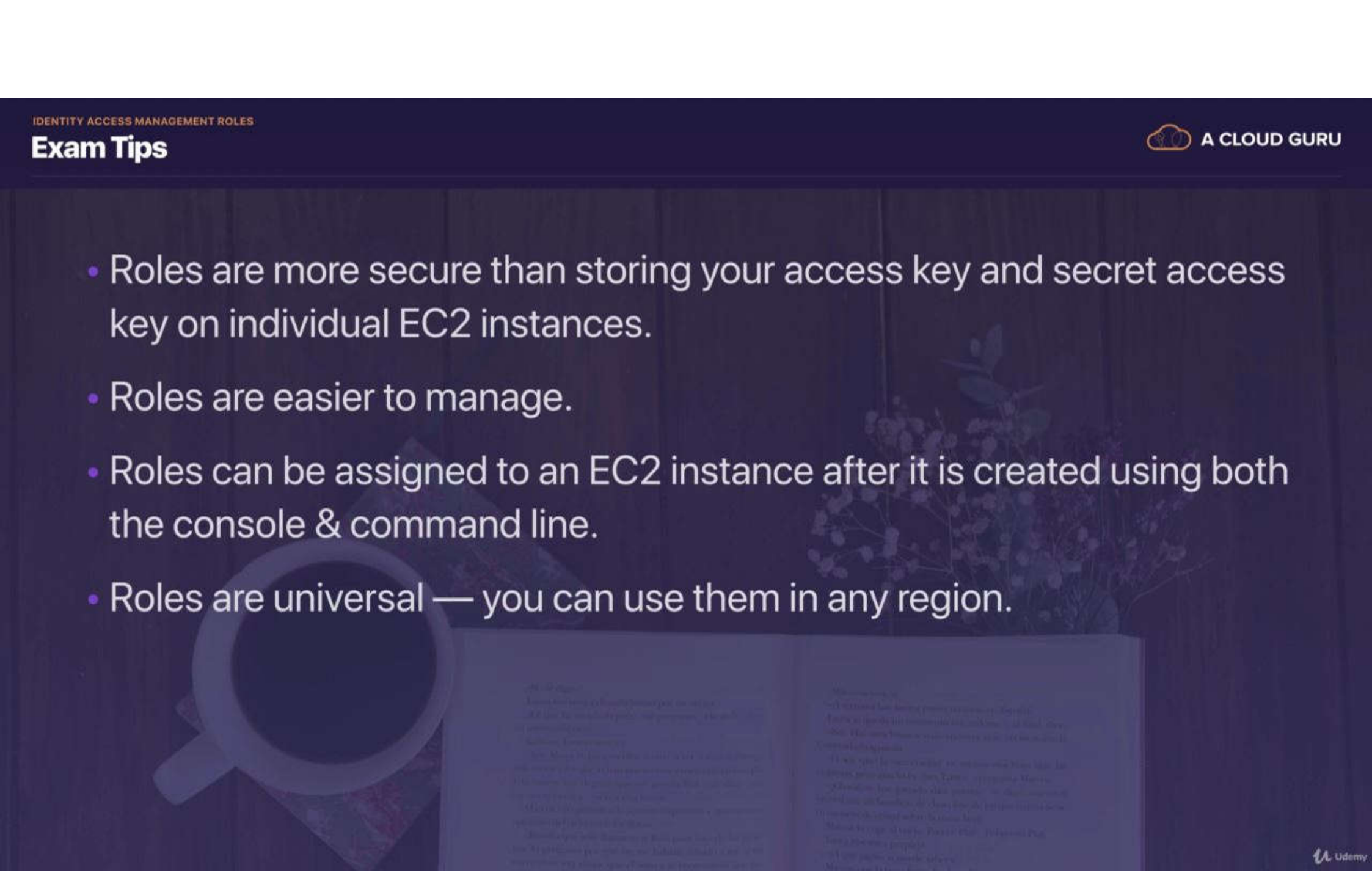
- Roles are universal — you can use them in any region.



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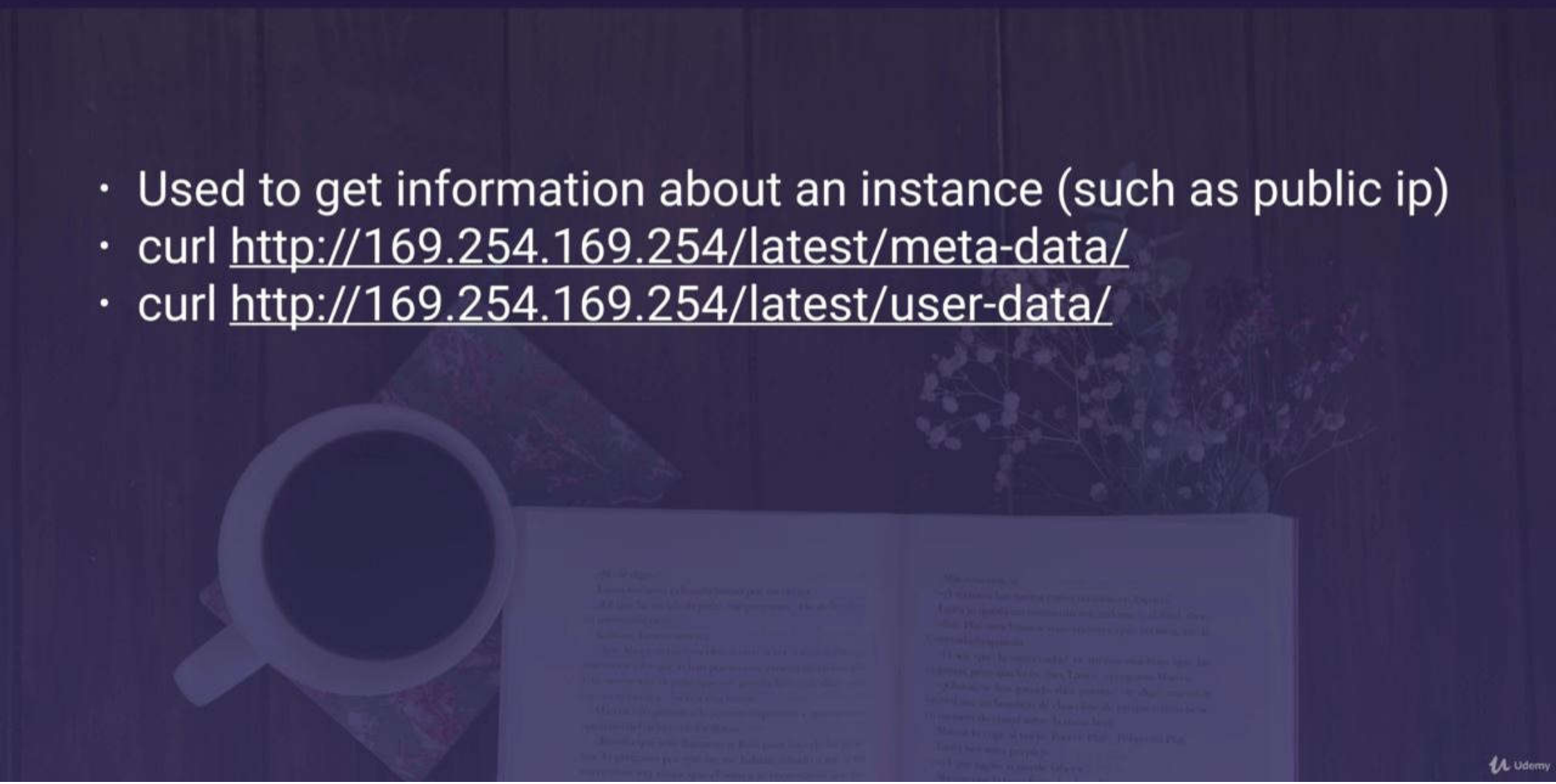
INSTANCE METADATA

Exam Tips

A CLOUD GURU

- Used to get information about an instance (such as public ip)
- curl http://169.254.169.254/latest/meta-data/
- curl http://169.254.169.254/latest/user-data/



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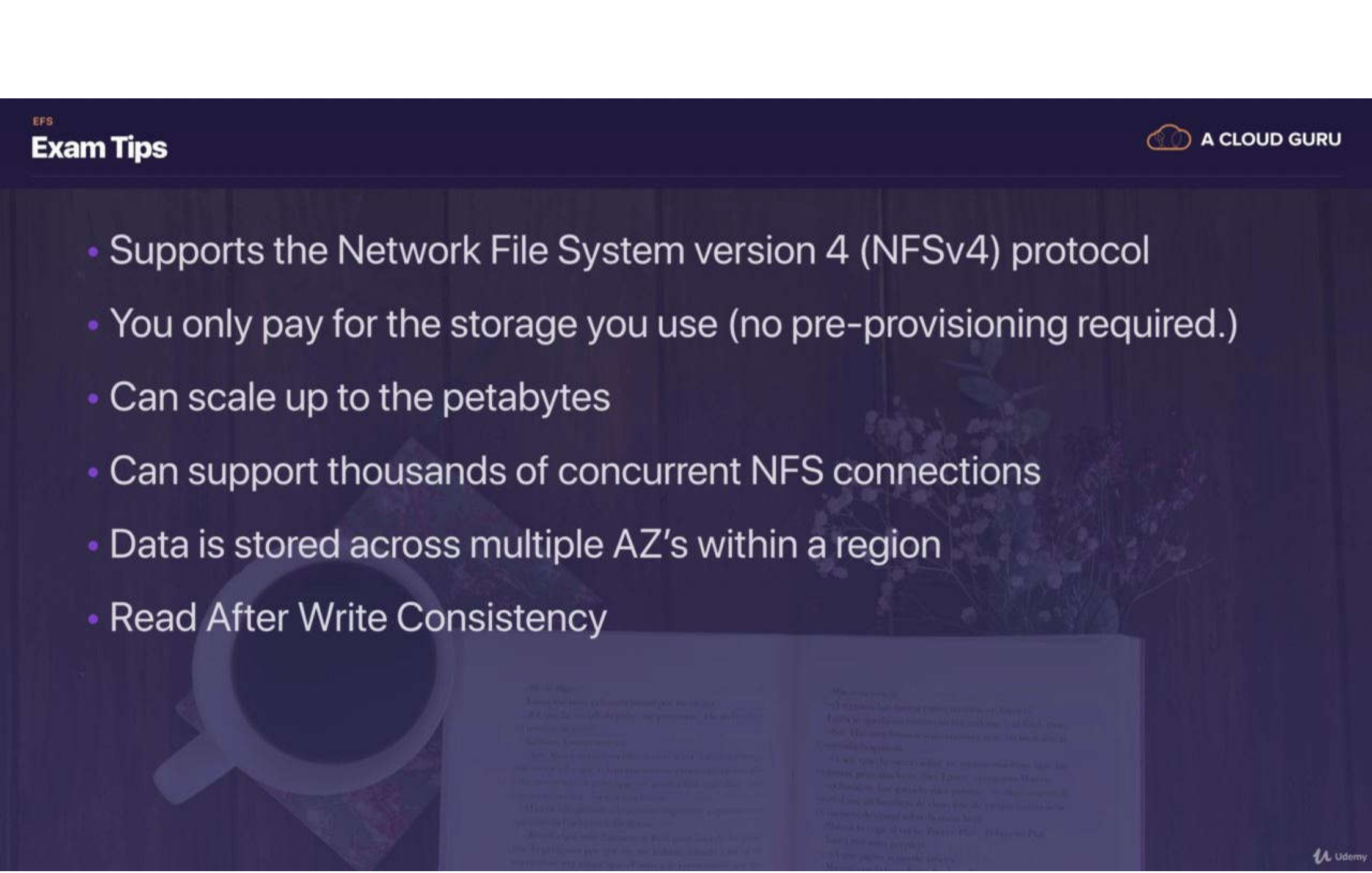
EFS

Exam Tips

A CLOUD GURU

- Supports the Network File System version 4 (NFSv4) protocol
- You only pay for the storage you use (no pre-provisioning required.)
- Can scale up to the petabytes
- Can support thousands of concurrent NFS connections
- Data is stored across multiple AZ's within a region
- Read After Write Consistency



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EC2 PLACEMENT GROUPS

Placement Groups Exam Tips

A CLOUD GURU

- A clustered placement group can't span multiple Availability Zones.
- A spread placement group can.
- The name you specify for a placement group must be unique within your AWS account.
- Only certain types of instances can be launched in a placement group (Compute Optimized, GPU, Memory Optimized, Storage Optimized)
- AWS recommend homogenous instances within placement groups.
- You can't merge placement groups.
- You can't move an existing instance into a placement group. You can create an AMI from your existing instance, and then launch a new instance from the AMI into a placement group.

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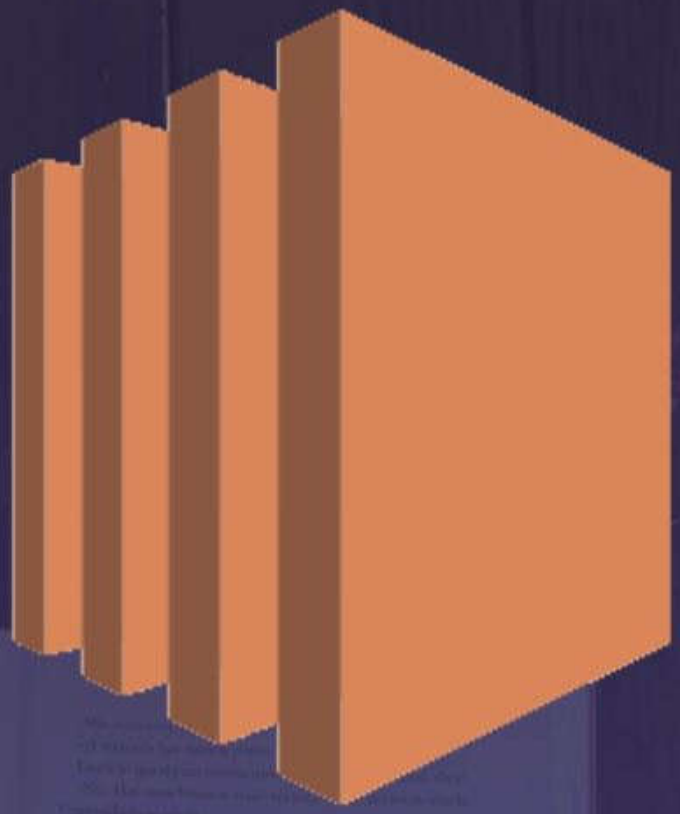
EC2 SUMMARY

EC2 Exam Tips

A CLOUD GURU

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change.



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EC2 SUMMARY

EC2 Exam Tips

A CLOUD GURU

1

On Demand

Allows you to pay a fixed rate by the hour (or by the second) with no commitment.

2

Reserved

Provides you with a capacity reservation, and offer a significant discount on the hourly charge for an instance. Contract Terms are 1 Year or 3 Year Terms.

3

Spot

Enables you to bid whatever price you want for instance capacity, providing for even greater savings if your applications have flexible start and end times.

4

Dedicated Hosts

Physical EC2 server dedicated for your use. Dedicated Hosts can help you reduce costs by allowing you to use your existing server-bound software licenses.

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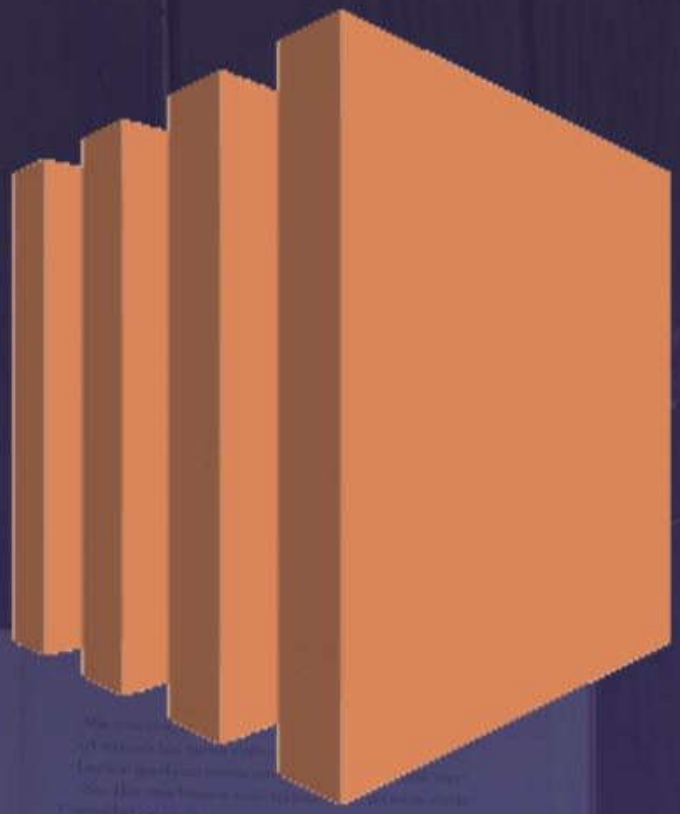
EC2 SUMMARY

EC2 Exam Tips

A CLOUD GURU

If the Spot instance is terminated by Amazon EC2, you will not be charged for a partial hour of usage. However, if you terminate the instance yourself, you will be charged for any hour in which the instance ran.



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EC2 SUMMARY

EC2 Instance Types

A CLOUD GURU

- **F** - For FPGA
- **I** - For IOPS
- **G** - Graphics
- **H** - High Disk Throughput
- **T** - Cheap general purpose (think T2 Micro)
- **D** - For Density
- **R** - For RAM
- **M** - Main choice for general purpose apps
- **C** - For Compute
- **P** - Graphics (think Pics)
- **X** - Extreme Memory
- **Z** - Extreme Memory AND CPU
- **A** - Arm-based workloads
- **U** - Bare Metal

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EC2 SUMMARY

EBS

A CLOUD GURU

- Termination Protection is **turned off** by default, you must turn it on.
- On an EBS-backed instance, the **default action is for the root EBS volume to be deleted** when the instance is terminated.
- EBS Root Volumes of your DEFAULT AMI's cannot be encrypted. You can also use a third party tool (such as bit locker etc) to encrypt the root volume, or this can be done when creating AMI's (lab to follow) in the AWS console or using the API.
- Additional volumes can be encrypted.

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EC2 SUMMARY

Security Groups

A CLOUD GURU

- All Inbound traffic is blocked by default.
- All Outbound traffic is allowed.
- Changes to Security Groups take effect immediately.
- You can have any number of EC2 instances within a security group.
- You can have multiple security groups attached to EC2 Instances.

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EC2 SUMMARY

Compare EBS Types

A CLOUD GURU

Solid-State Drives (SSD)			Hard disk Drives (HDD)		
Volume Type	**General Purpose SSD**	**Provisioned IOPS SSD**	**Throughput Optimized HDD**	**Cold HDD**	**EBS Magnetic**
Description	General purpose SSD volume that balances price and performance for a wide variety of transactional workloads	Highest-performance SSD volume designed for mission-critical applications	Low cost HDD volume designed for frequently accessed, throughput-intensive workloads	Lowest cost HDD volume designed for less frequently accessed workloads	Previous generation HDD
Use Cases	**Most Work Loads**	**Databases**	**Big Data & Data Wharehouses**	**File Servers**	**Workloads where data is infrequently accessed**
API Name	gp2	io1	st1	sc1	Standard
Volume Size	1 GiB - 16 TiB	4 GiB - 16 TiB	500 GiB - 16 TiB	500 GiB - 16 TiB	1 GiB-1 TiB
Max. IOPS**/ Volume	16,000	64,000	500	250	40-200

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EC2 SUMMARY

EBS Snapshots

A CLOUD GURU

- Volumes exist on EBS. Think of EBS as a virtual hard disk
- Snapshots exist on S3. Think of snapshots as a photograph of the disk.
- Snapshots are point in time copies of Volumes.
- Snapshots are incremental — this means that only the blocks that have changed since your last snapshot are moved to S3.
- If this is your first snapshot, it may take some time to create.

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EC2 SUMMARY

EBS Snapshots

A CLOUD GURU

- To create a snapshot for Amazon EBS volumes that serve as root devices, you should stop the instance before taking the snapshot.
- However you can take a snap while the instance is running.
- You can create AMI's from both Volumes and Snapshots
- You can change EBS volume sizes on the fly, including changing the size and storage type.
- Volumes will ALWAYS be in the same availability zone as the EC2 instance.

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EC2 SUMMARY

Migrating EBS

A CLOUD GURU

- To move an EC2 volume from one AZ to another, take a snapshot of it, create an AMI from the snapshot and then use the AMI to launch the EC2 instance in a new AZ.
- To move an EC2 volume from one region to another, take a snapshot of it, create an AMI from the snapshot and then copy the AMI from one region to the other. Then use the copied AMI to launch the new EC2 instance in the new region.

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EC2 SUMMARY

EBS Encryption

A CLOUD GURU

- Snapshots of encrypted volumes are encrypted automatically.
- Volumes restored from encrypted snapshots are encrypted automatically.

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EC2 SUMMARY

EBS vs Instance Store

A CLOUD GURU

- Instance Store Volumes are sometimes called Ephemeral Storage.
- Instance store volumes cannot be stopped. If the underlying host fails, you will lose your data.
- EBS backed instances can be stopped. You will not lose the data on this instance if it is stopped.
- You can reboot both, you will not lose your data.
- By default, both ROOT volumes will be deleted on termination. However, with EBS volumes, you can tell AWS to keep the root device volume.

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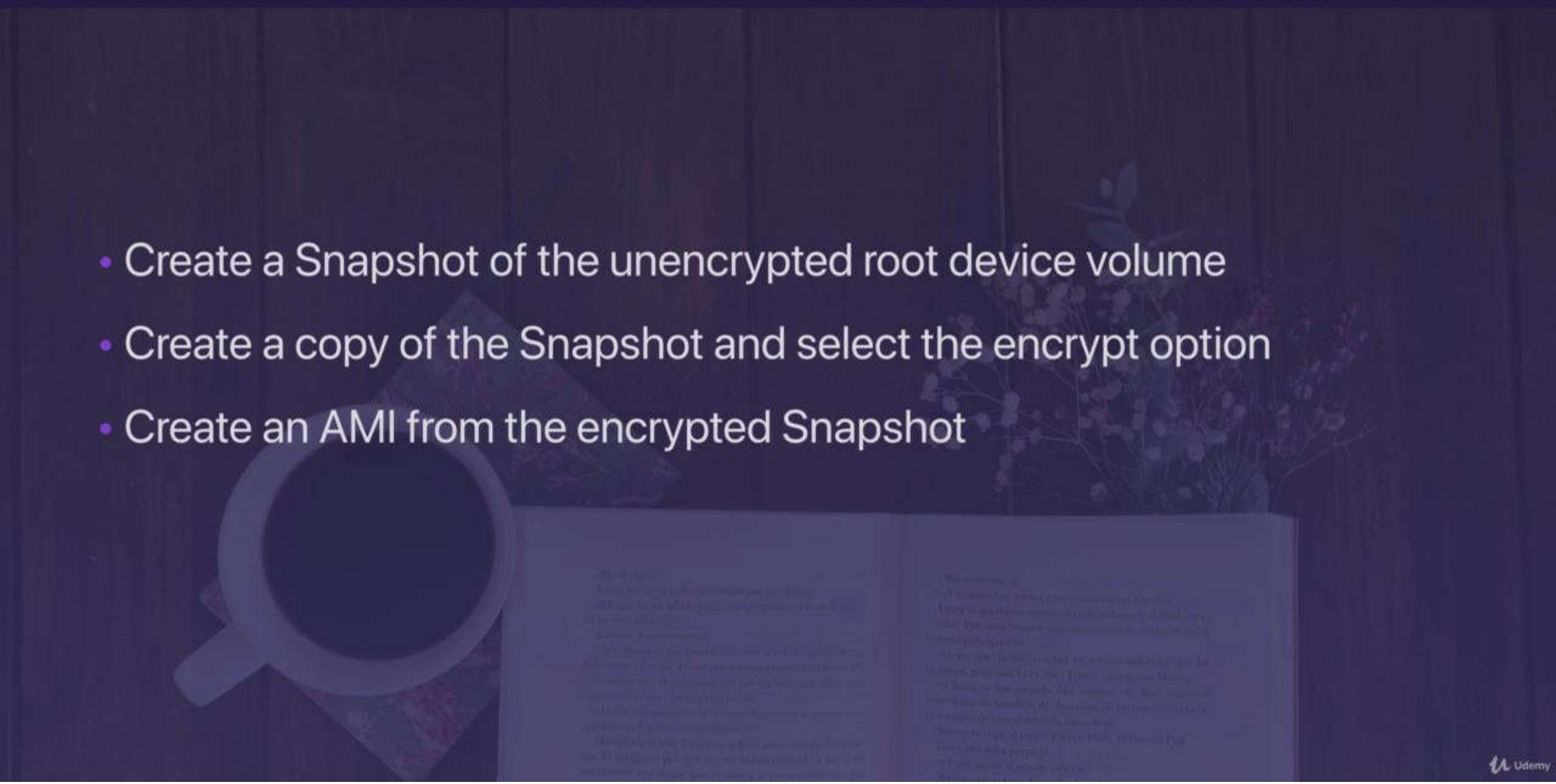
EC2 SUMMARY

Encrypting Root Device Volumes

A CLOUD GURU



- Create a Snapshot of the unencrypted root device volume
- Create a copy of the Snapshot and select the encrypt option
- Create an AMI from the encrypted Snapshot

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EC2 SUMMARY

CloudWatch

A CLOUD GURU

Remember;

- CloudWatch is used for monitoring performance.
- CloudWatch can monitor most of AWS as well as your applications that run on AWS.
- CloudWatch with EC2 will monitor events every 5 minutes by default.
- You can have 1 minute intervals by turning on detailed monitoring.
- You can create CloudWatch alarms which trigger notifications.
- CloudWatch is all about performance. CloudTrail is all about auditing.

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What Can I do With CloudWatch?

- Dashboards - Creates awesome dashboards to see what is happening with your AWS environment.
- Alarms - Allows you to set Alarms that notify you when particular thresholds are hit.
- Events - CloudWatch Events helps you to respond to state changes in your AWS resources.
- Logs - CloudWatch Logs helps you to aggregate, monitor, and store logs.

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EC2 SUMMARY

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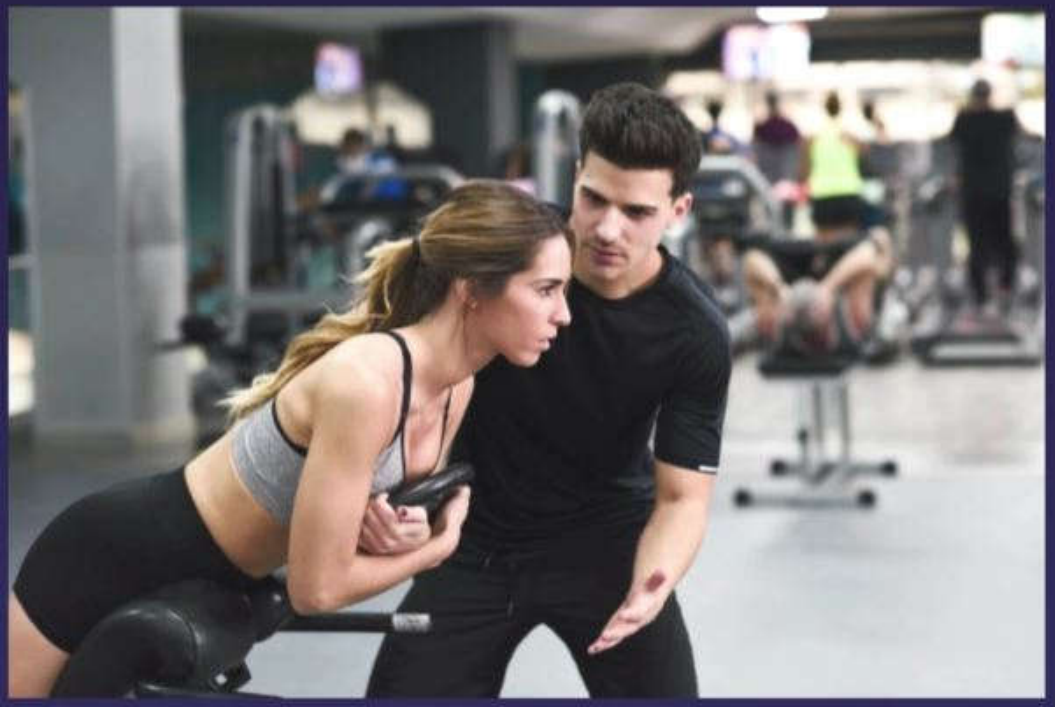

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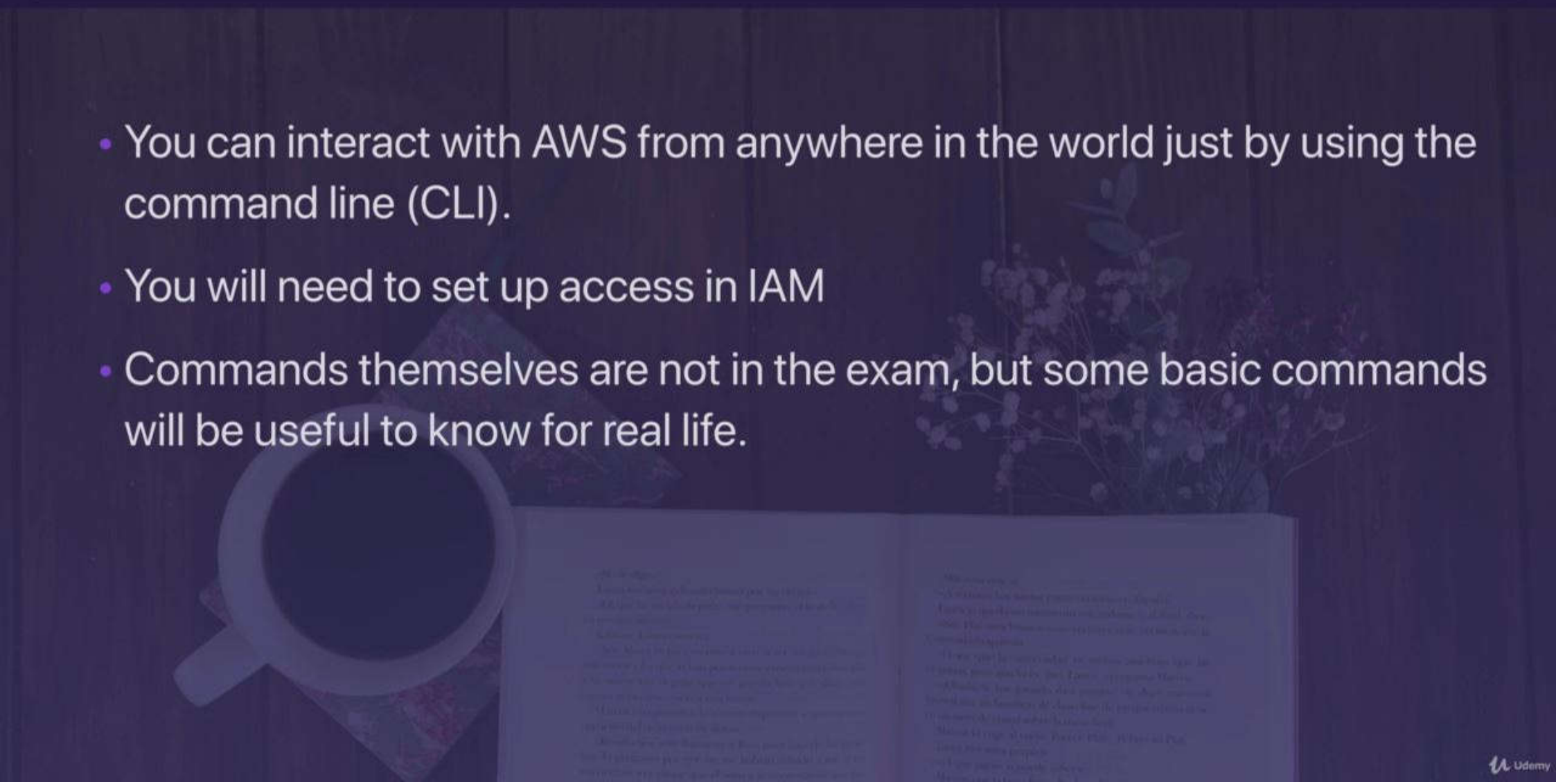
EC2 SUMMARY

The CLI

A CLOUD GURU



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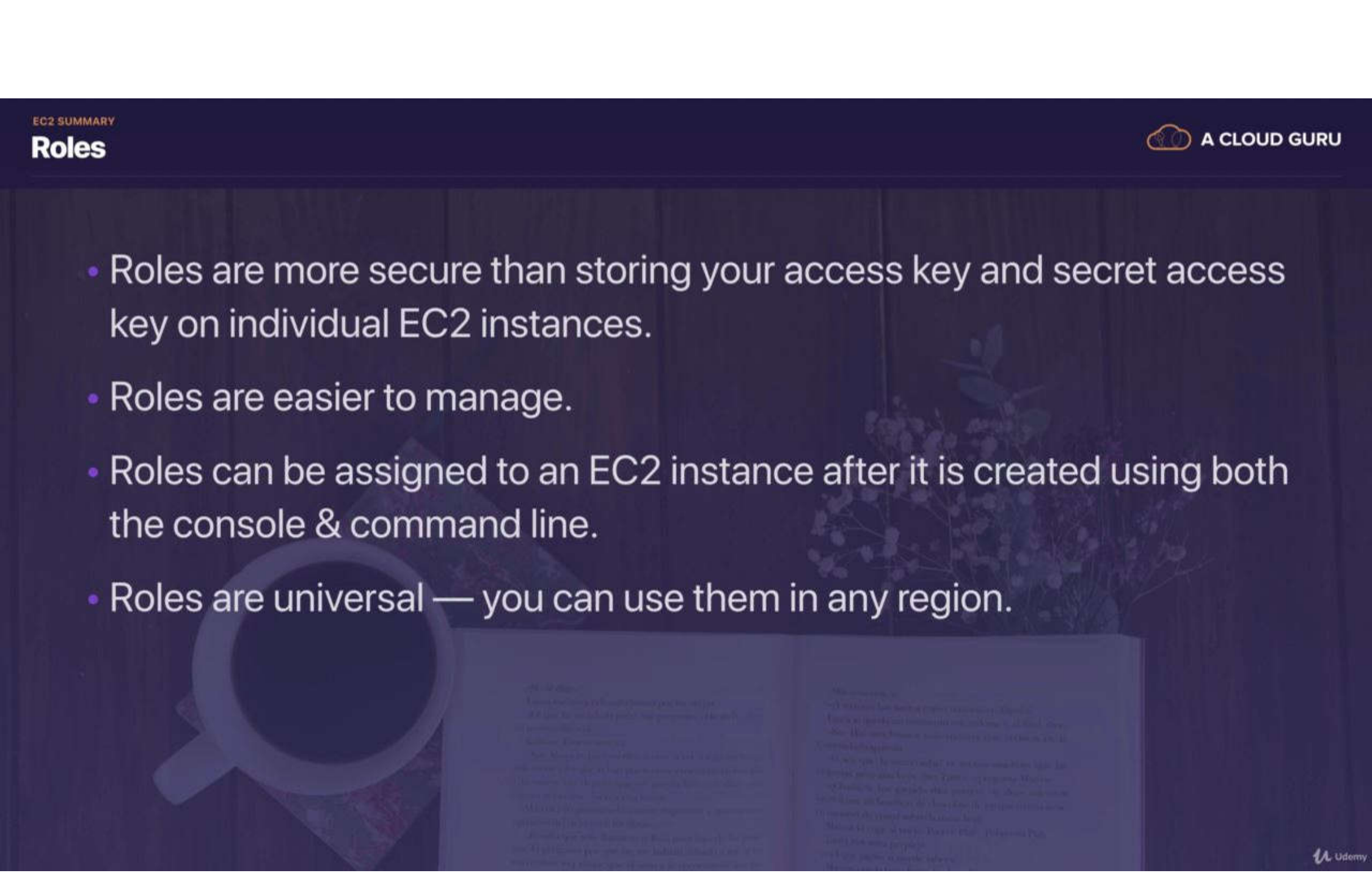

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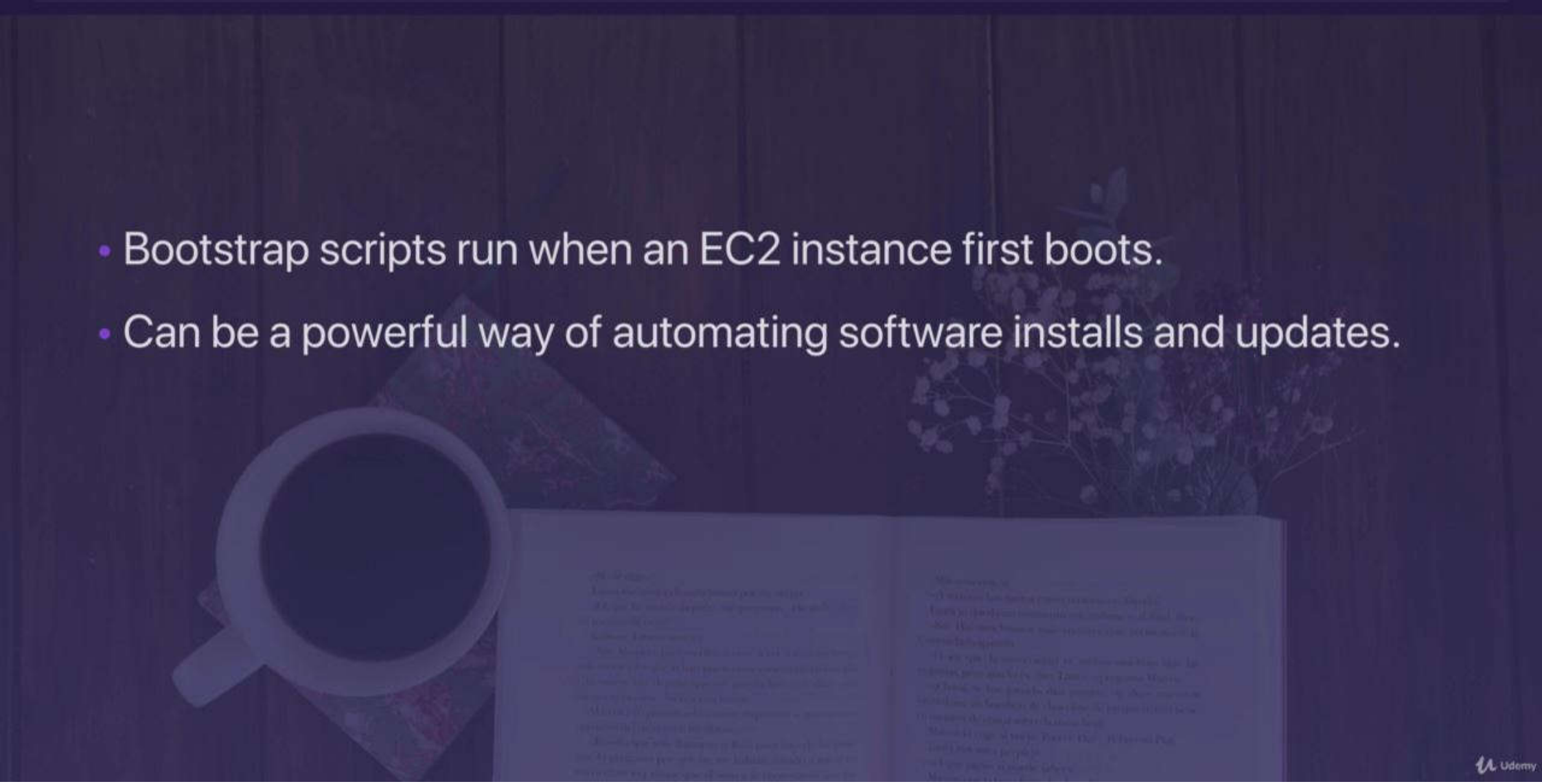
EC2 SUMMARY

BootStrap Scripts

A CLOUD GURU

- Bootstrap scripts run when an EC2 instance first boots.
- Can be a powerful way of automating software installs and updates.



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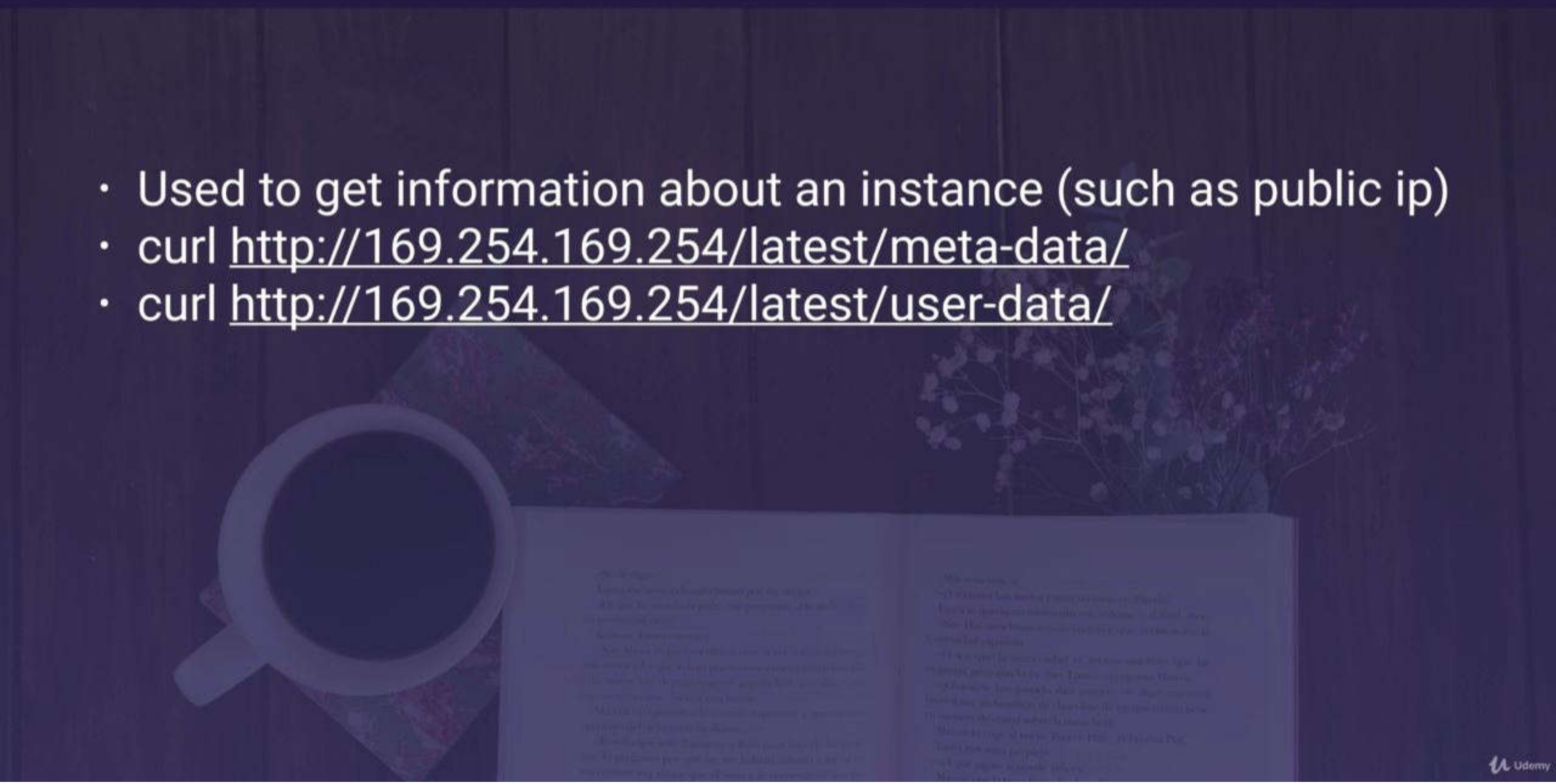
EC2 SUMMARY

Instance Meta Data & User Data

A CLOUD GURU



- Used to get information about an instance (such as public ip)
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EC2 SUMMARY

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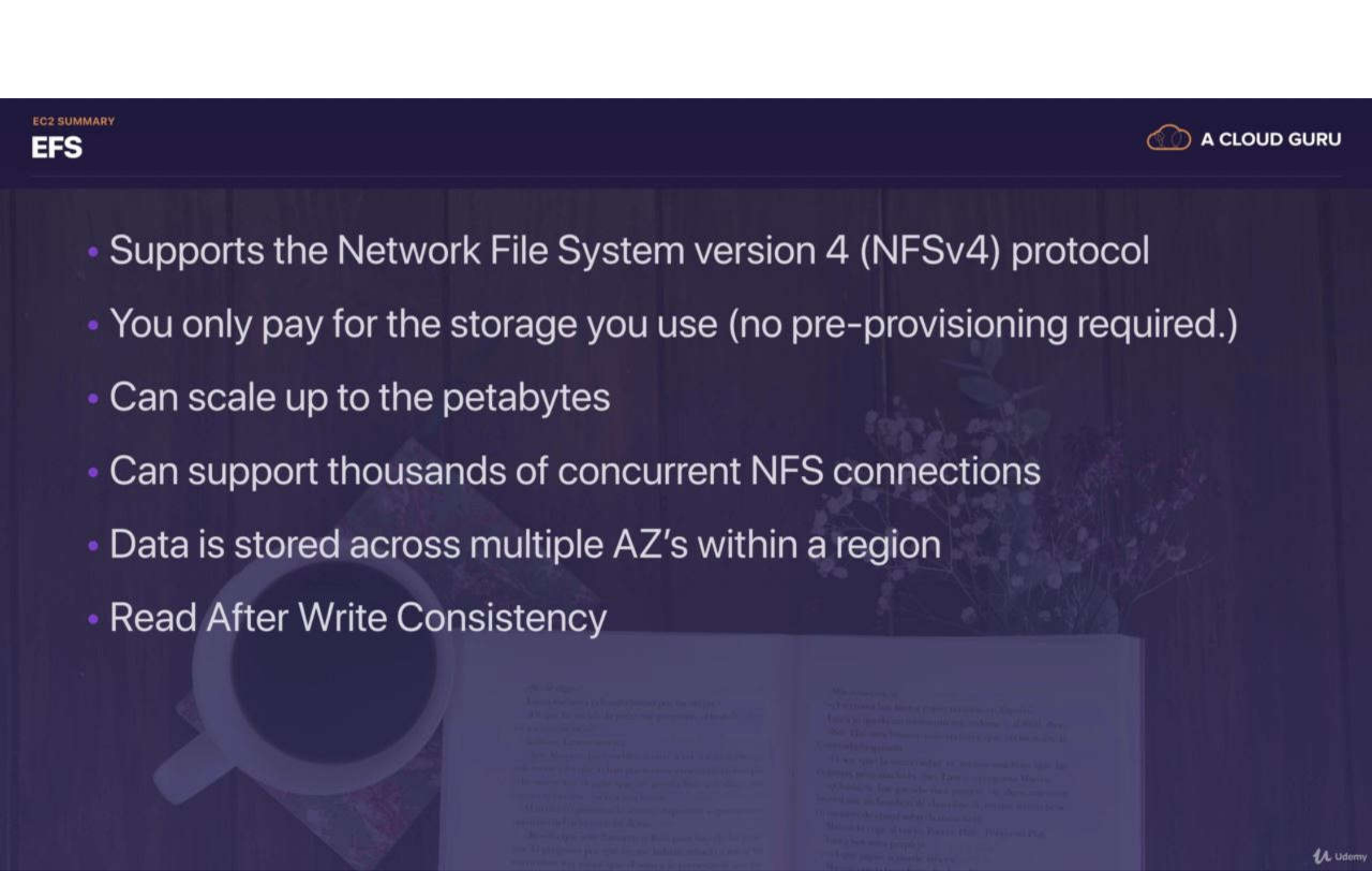

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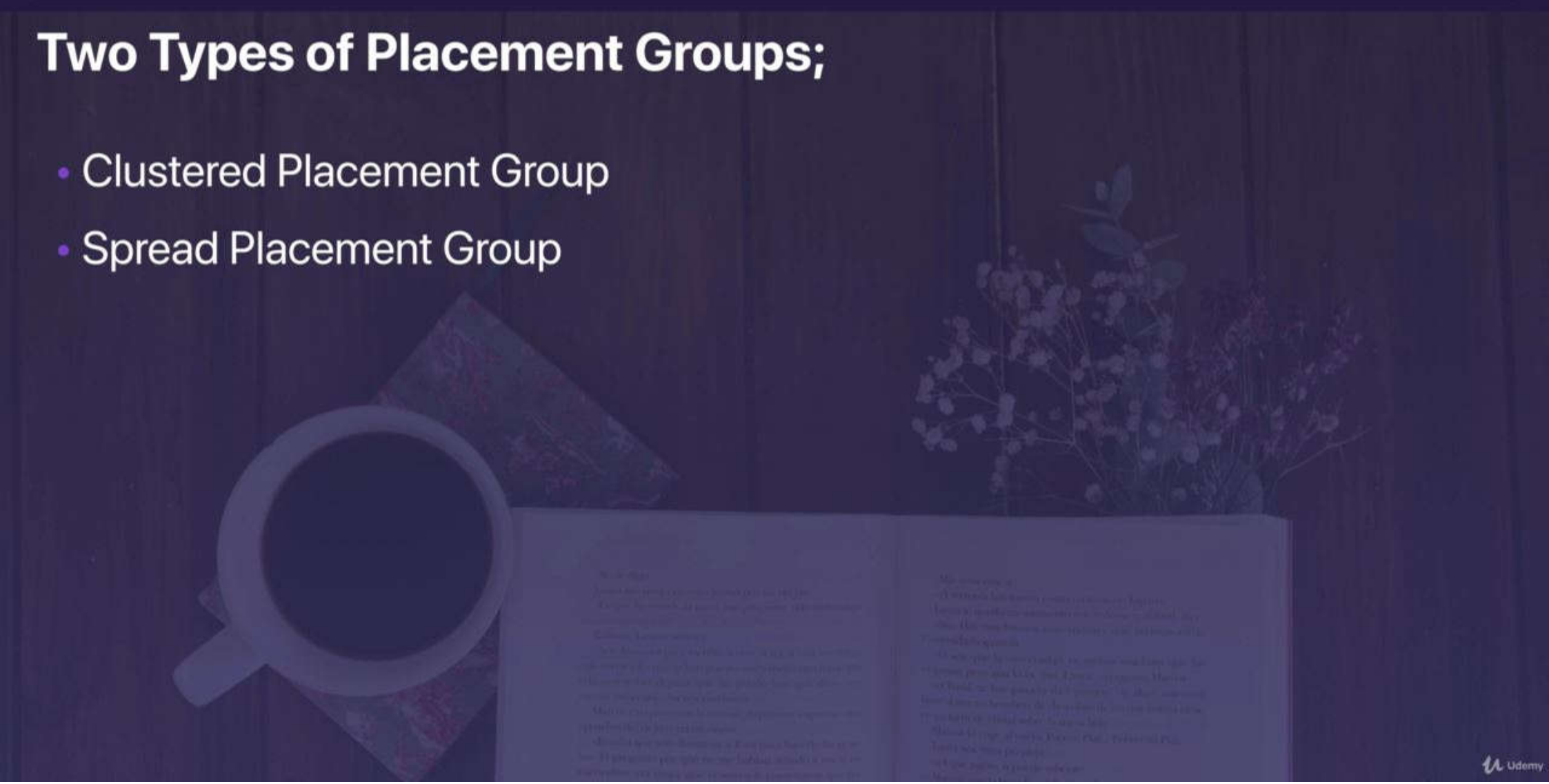
EC2 Placement Groups

Two Types of Placement Groups;

- Clustered Placement Group
- Spread Placement Group



EC2 PLACEMENT GROUPS

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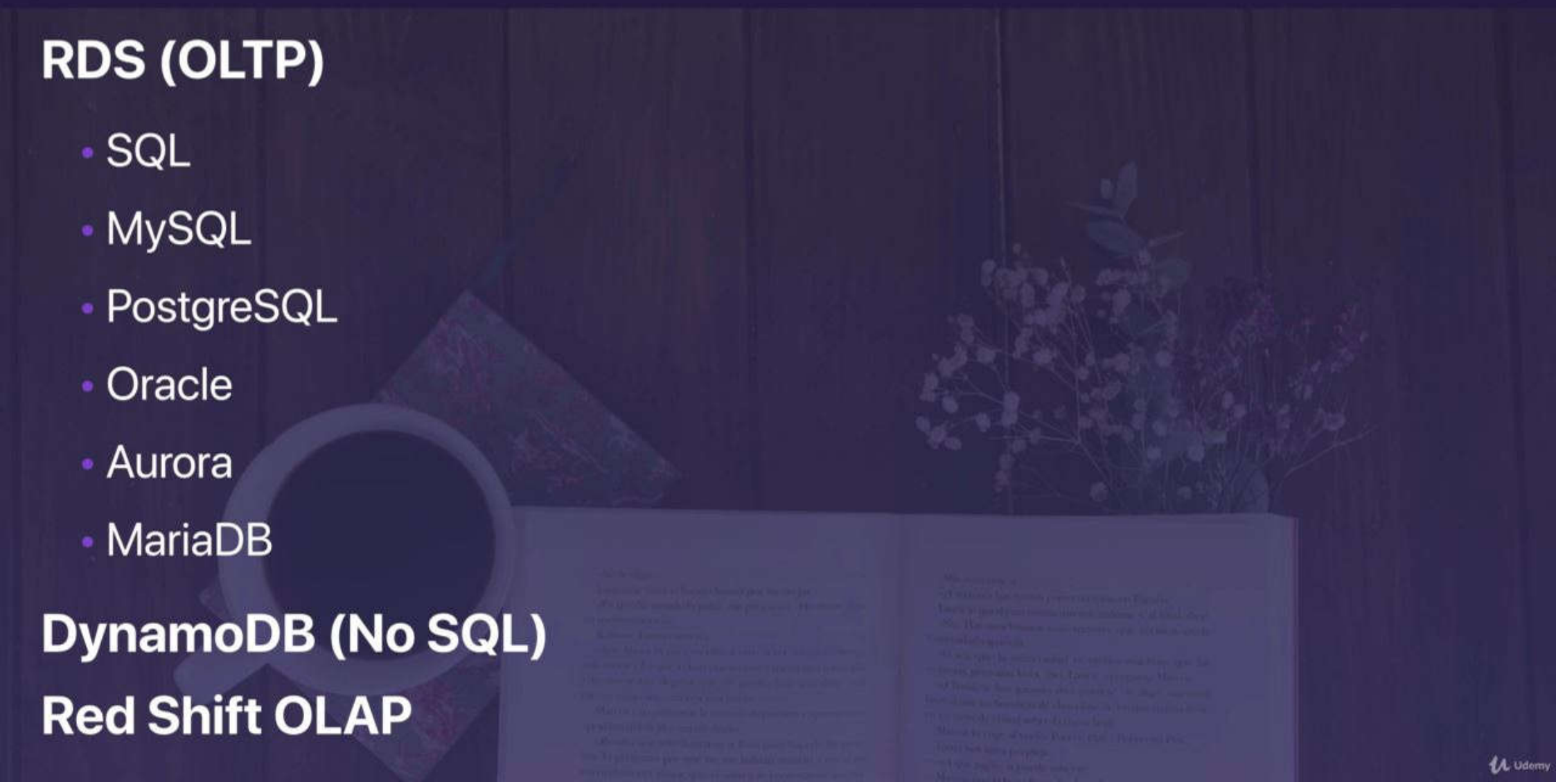
AWS Database Types - Exam Tips



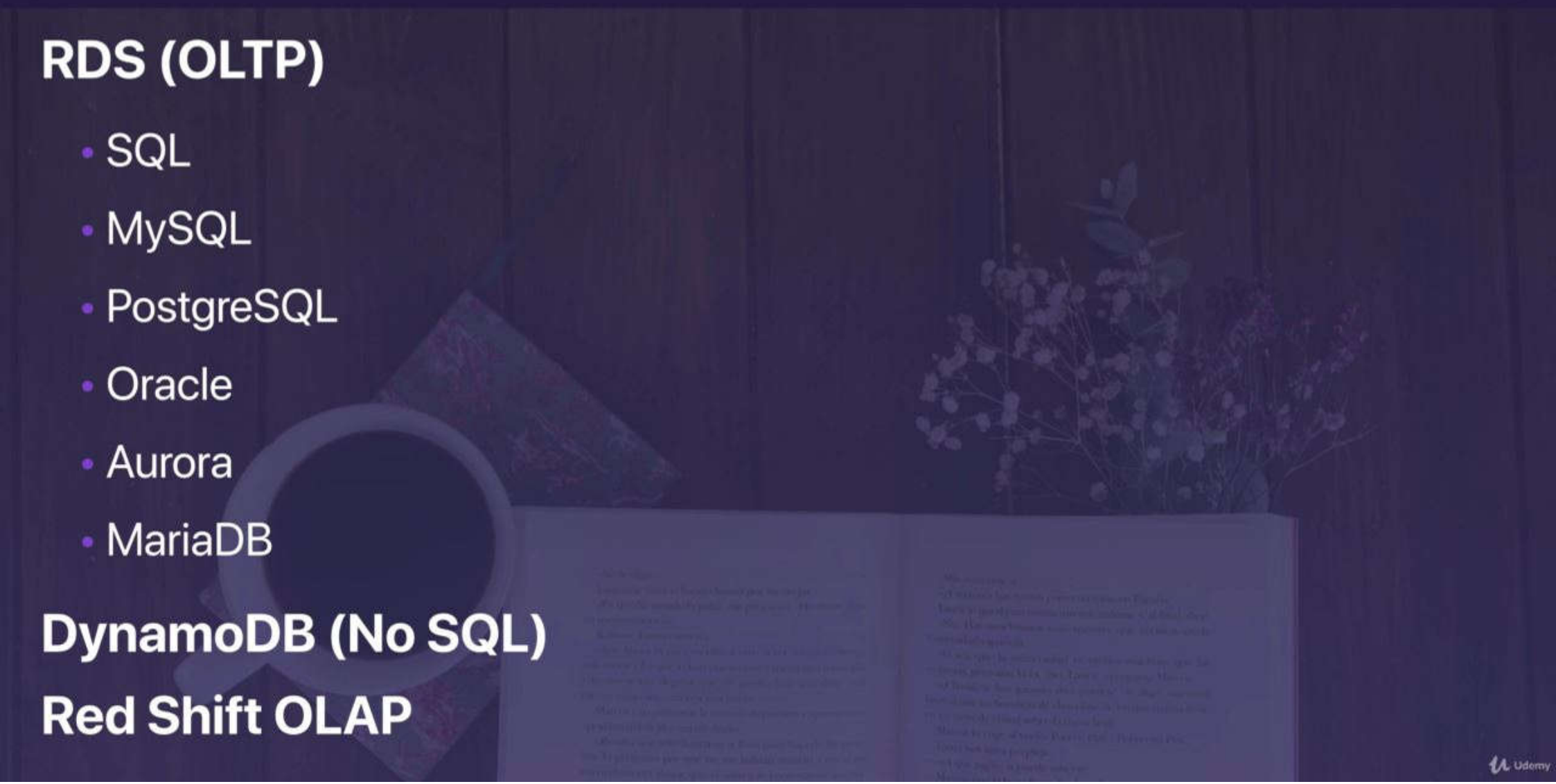
RDS (OLTP)

- SQL
- MySQL
- PostgreSQL
- Oracle
- Aurora
- MariaDB

DynamoDB (No SQL)

Red Shift OLAP

AWS Database Types - Exam Tips



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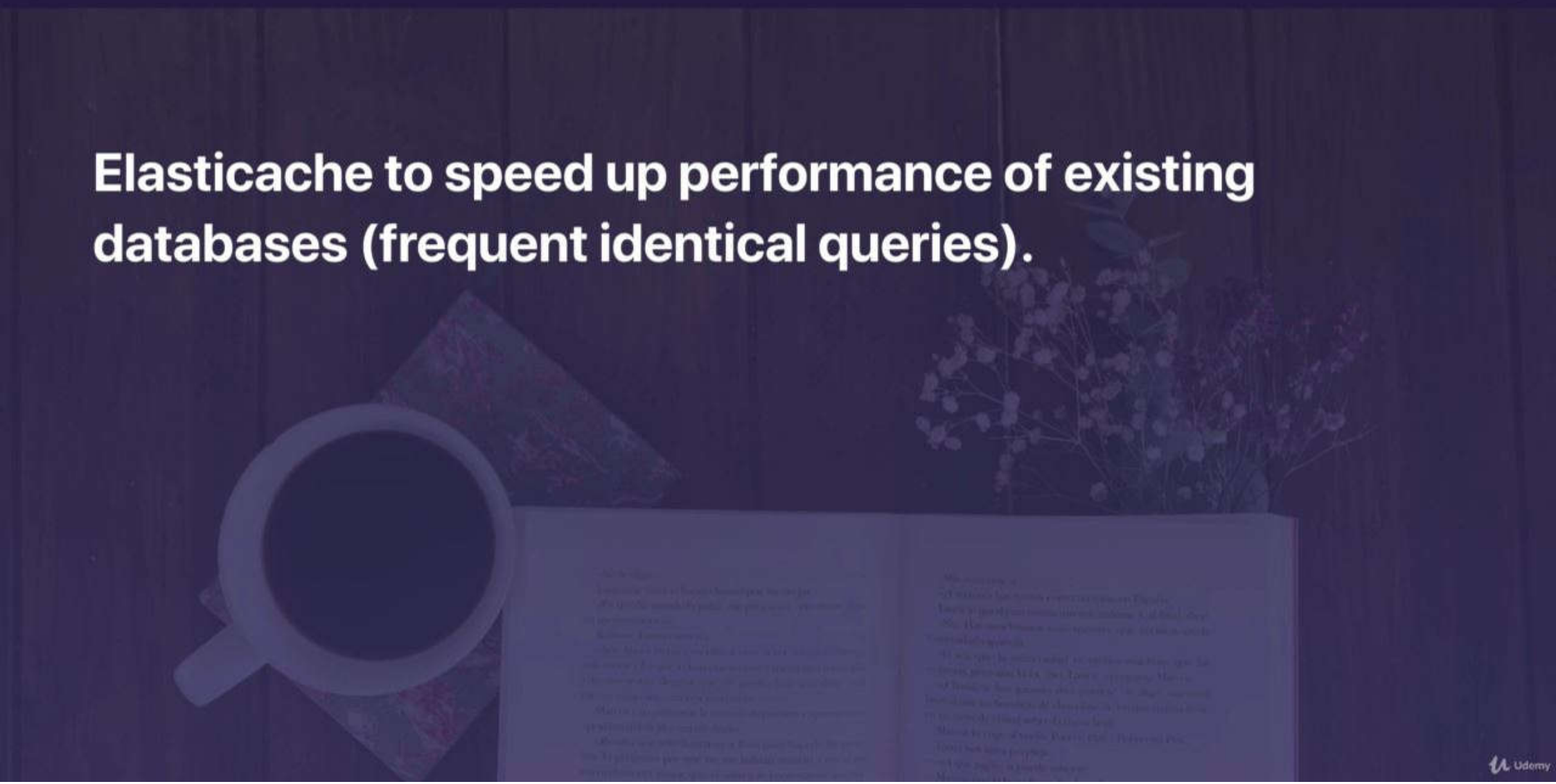
Red Shift OLAP

A CLOUD GURU

Redshift for Business Intelligence or Data Warehousing

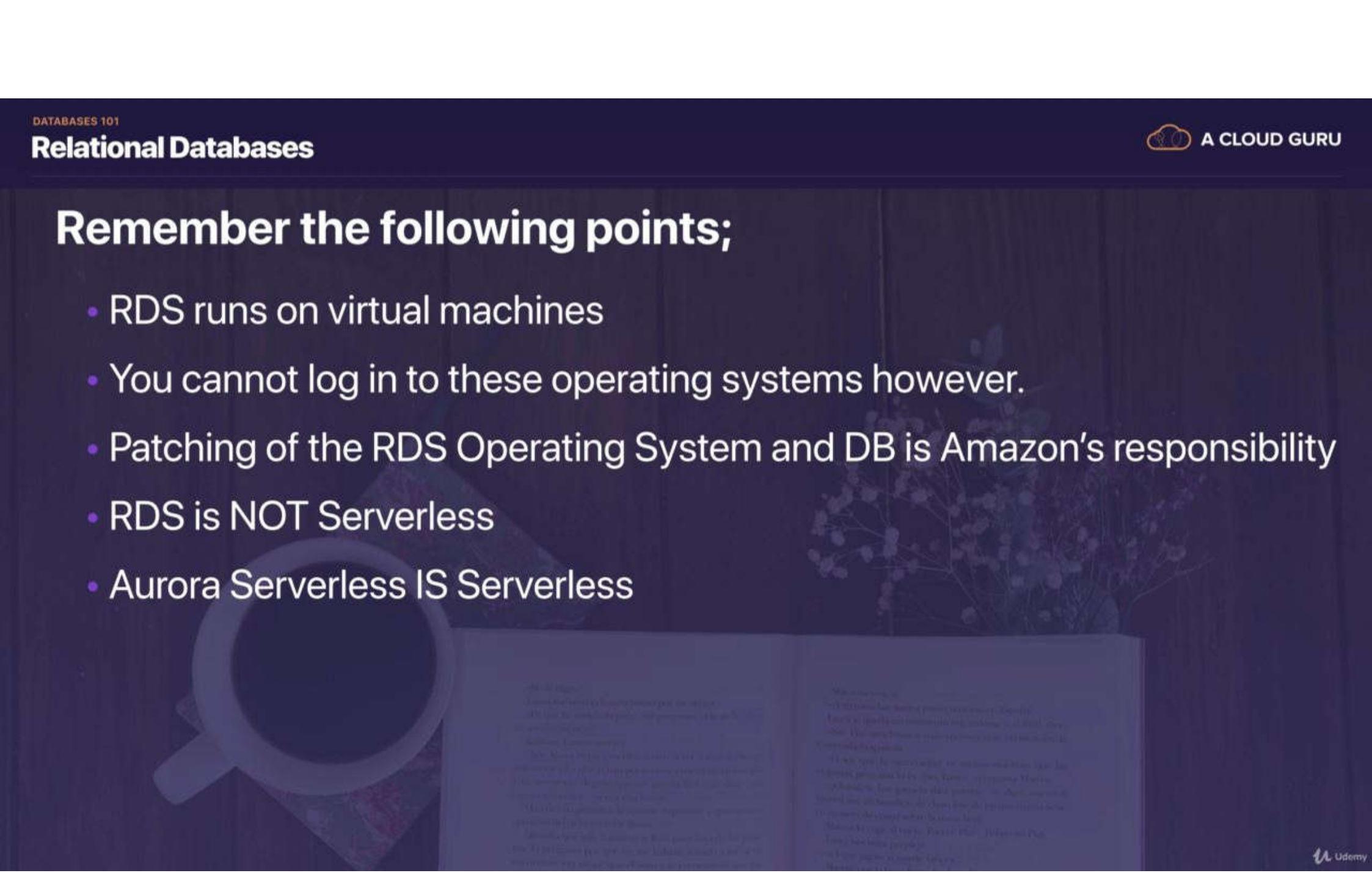
AWS Database Types - Exam Tips

Elasticache to speed up performance of existing databases (frequent identical queries).



Remember the following points;

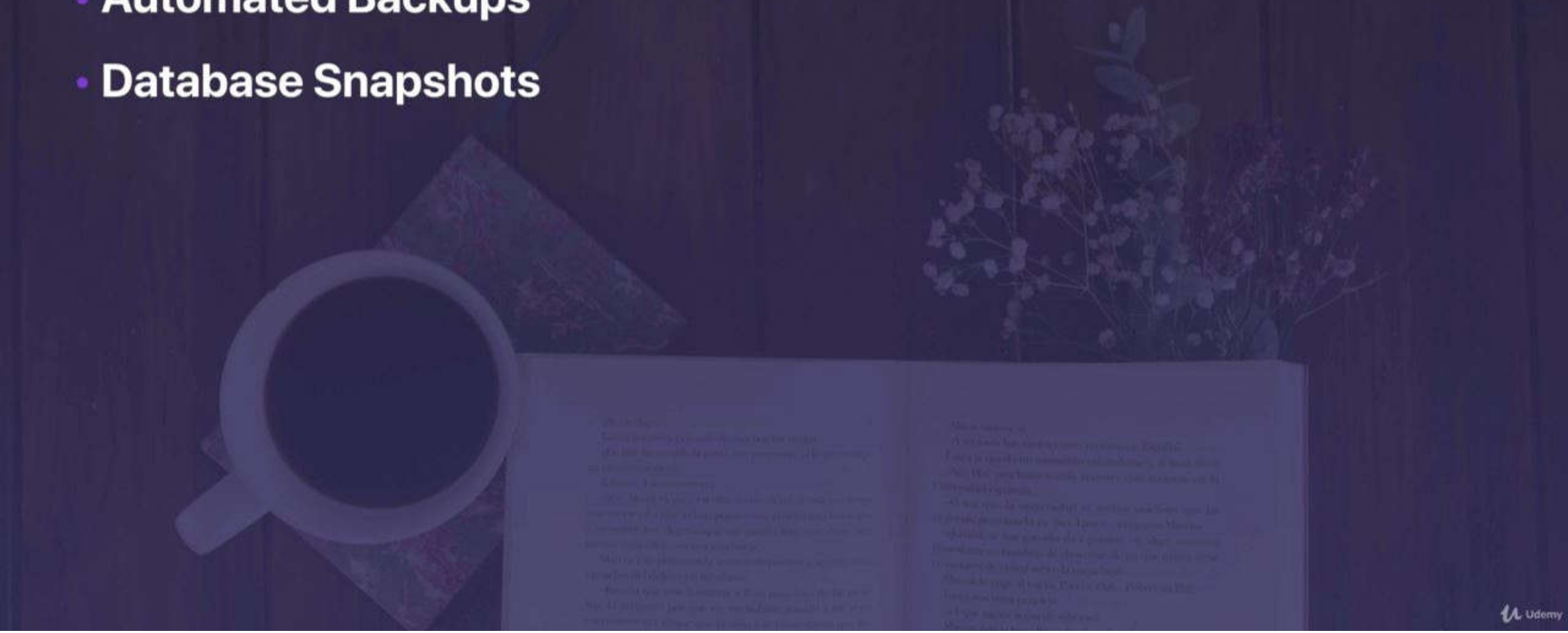
- RDS runs on virtual machines
- You cannot log in to these operating systems however.
- Patching of the RDS Operating System and DB is Amazon's responsibility
- RDS is NOT Serverless
- Aurora Serverless IS Serverless



Exam Tips

There are two different types of Backups for RDS:

- Automated Backups
- Database Snapshots



Exam Tips

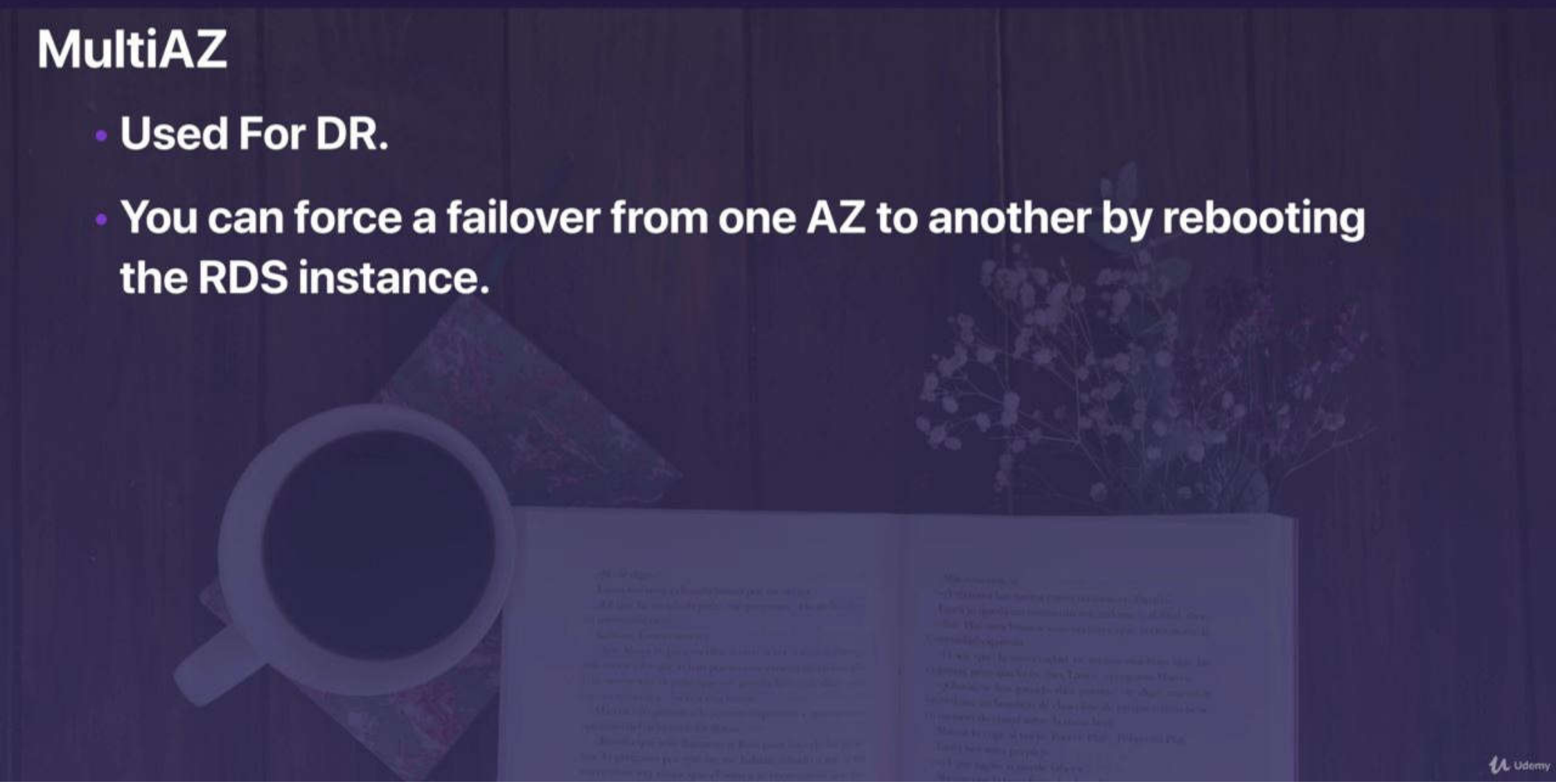
Read Replicas

- Can be Multi-AZ.
- Used to increase performance.
- Must have backups turned on.
- Can be in different regions.
- Can be Aurora or MySQL.
- Can be promoted to master, this will break the Read Replica

Exam Tips

MultiAZ

- Used For DR.
- You can force a failover from one AZ to another by rebooting the RDS instance.



Exam Tips

Encryption at rest is supported for MySQL, Oracle, SQL Server, PostgreSQL, MariaDB & Aurora. Encryption is done using the AWS Key Management Service (KMS) service. Once your RDS instance is encrypted, the data stored at rest in the underlying storage is encrypted, as are its automated backups, read replicas, and snapshots.

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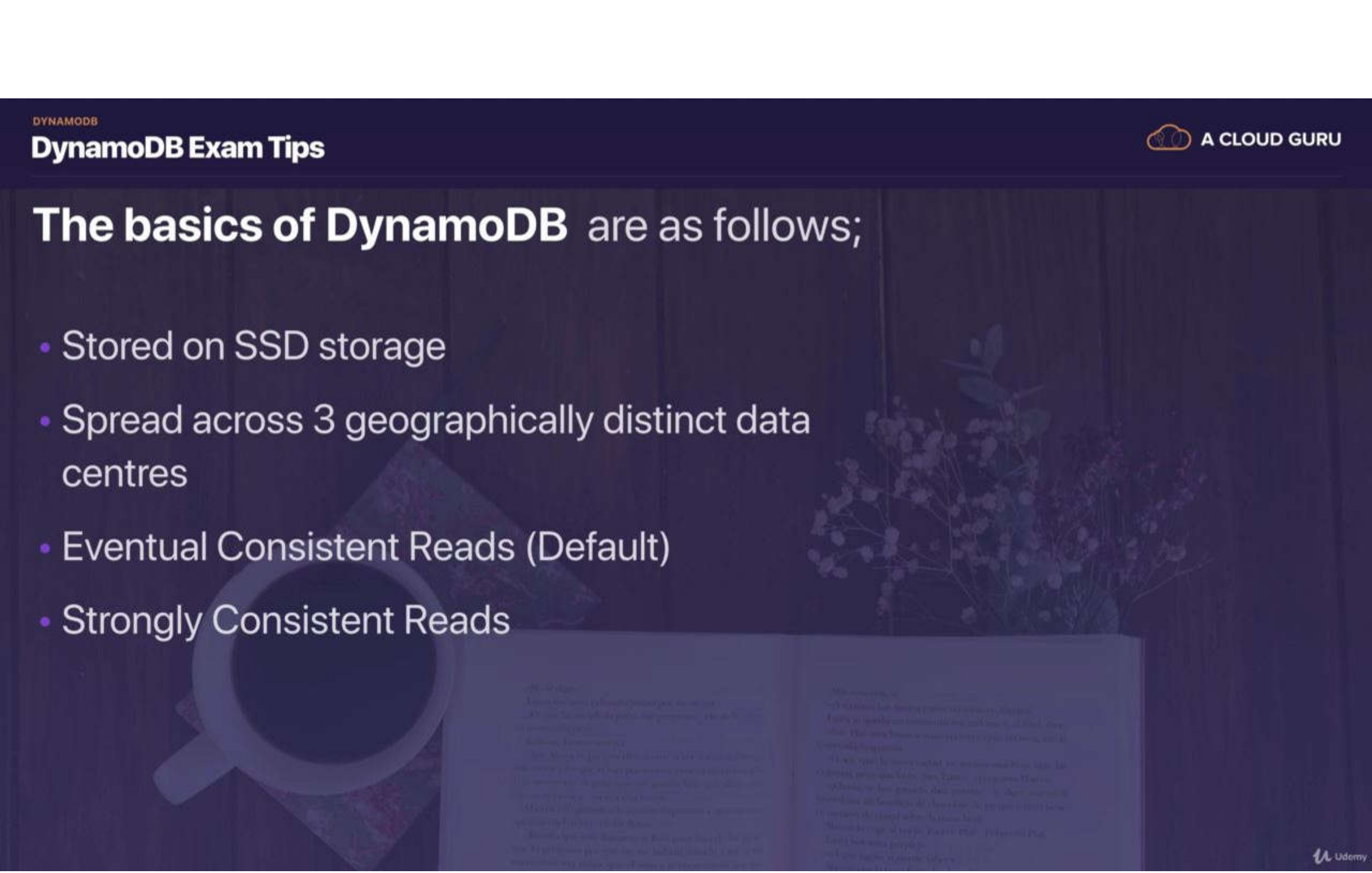
DynamoDB Exam Tips

The basics of DynamoDB are as follows;

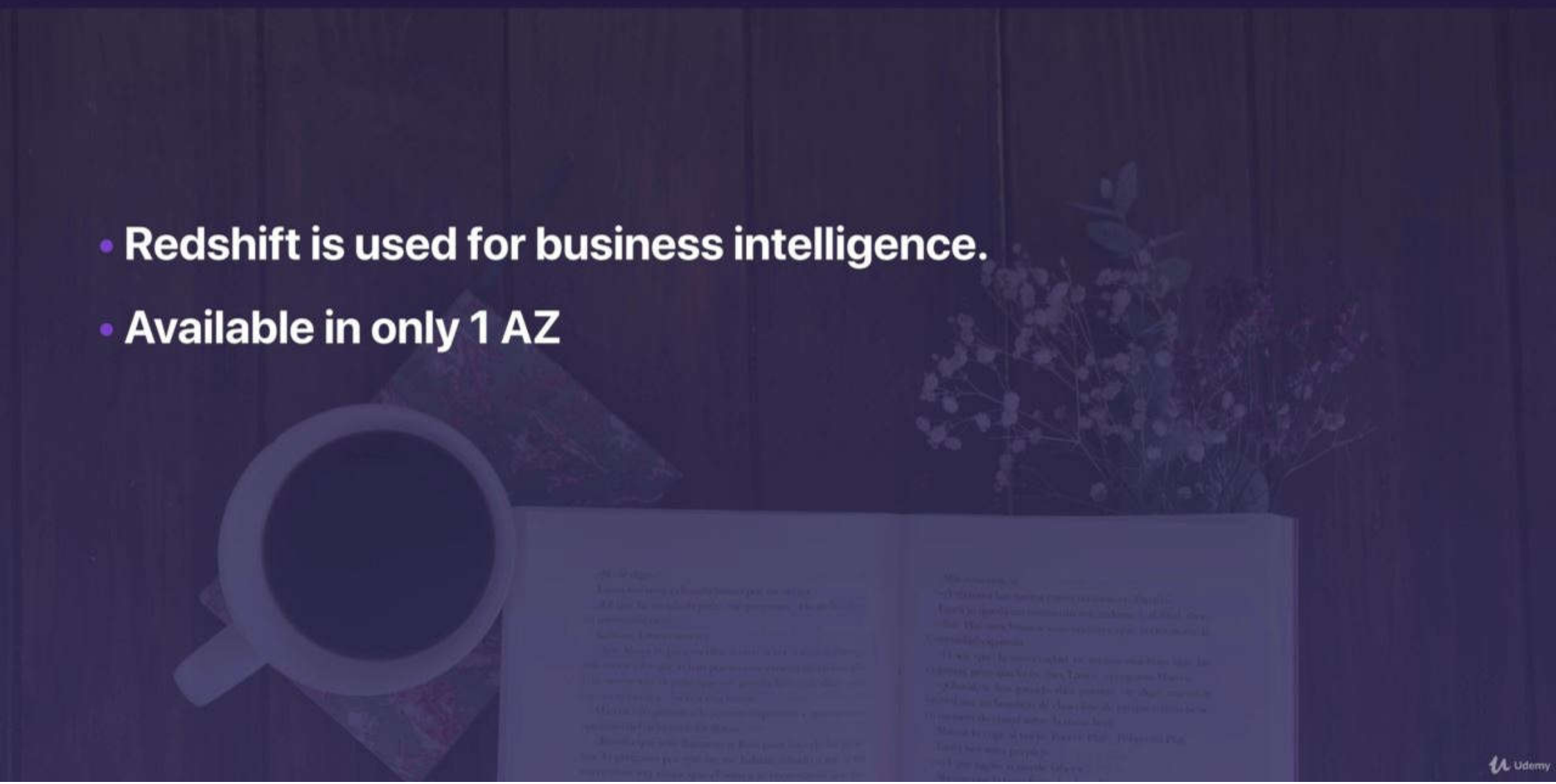
- Stored on SSD storage
- Spread across 3 geographically distinct data centres
- Eventual Consistent Reads (Default)
- Strongly Consistent Reads



REDSHIFT

Exam Tips

A CLOUD GURU



- Redshift is used for business intelligence.
- Available in only 1 AZ

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Backups

- Enabled by default with a 1 day retention period.
- Maximum retention period is 35 days.
- Redshift always attempts to maintain at least three copies of your data (the original and replica on the compute nodes and a backup in Amazon S3).
- Redshift can also asynchronously replicate your snapshots to S3 in another region for disaster recovery.

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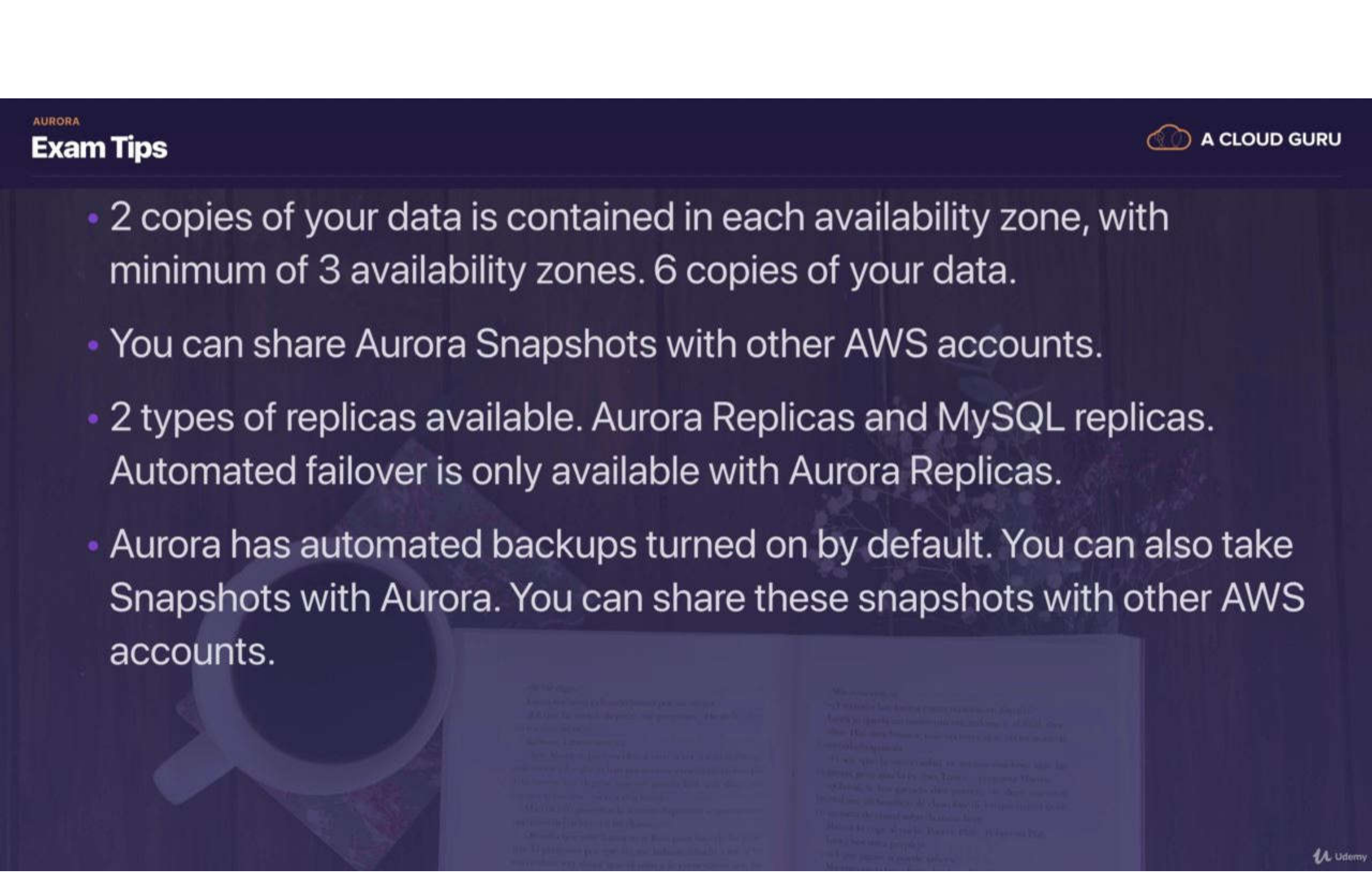
AURORA

Exam Tips

A CLOUD GURU

- 2 copies of your data is contained in each availability zone, with minimum of 3 availability zones. 6 copies of your data.
- You can share Aurora Snapshots with other AWS accounts.
- 2 types of replicas available. Aurora Replicas and MySQL replicas. Automated failover is only available with Aurora Replicas.
- Aurora has automated backups turned on by default. You can also take Snapshots with Aurora. You can share these snapshots with other AWS accounts.



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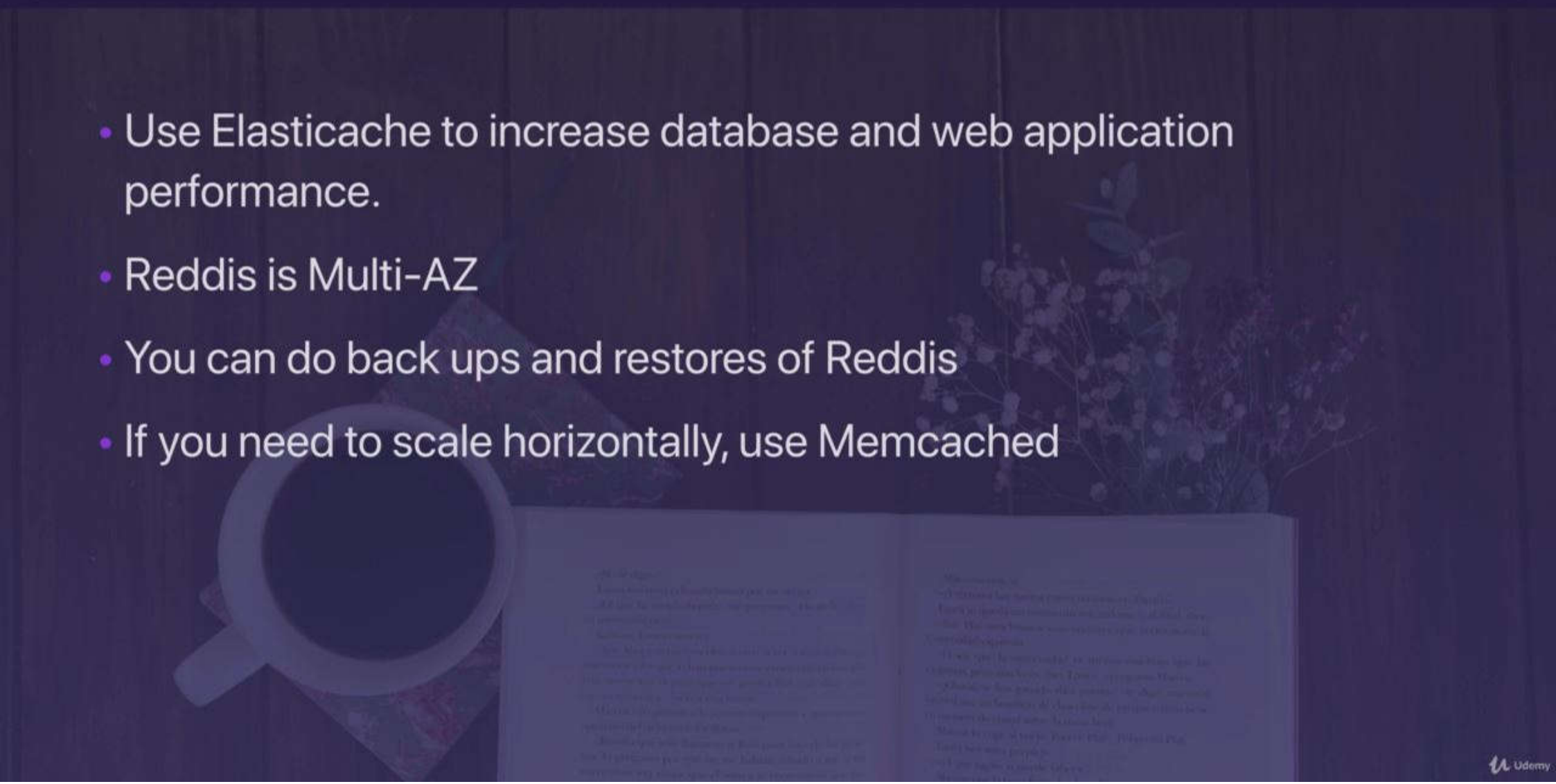
ELASTICACHE

Exam Tips

A CLOUD GURU



- Use Elasticache to increase database and web application performance.
- Reddis is Multi-AZ
- You can do back ups and restores of Reddis
- If you need to scale horizontally, use Memcached

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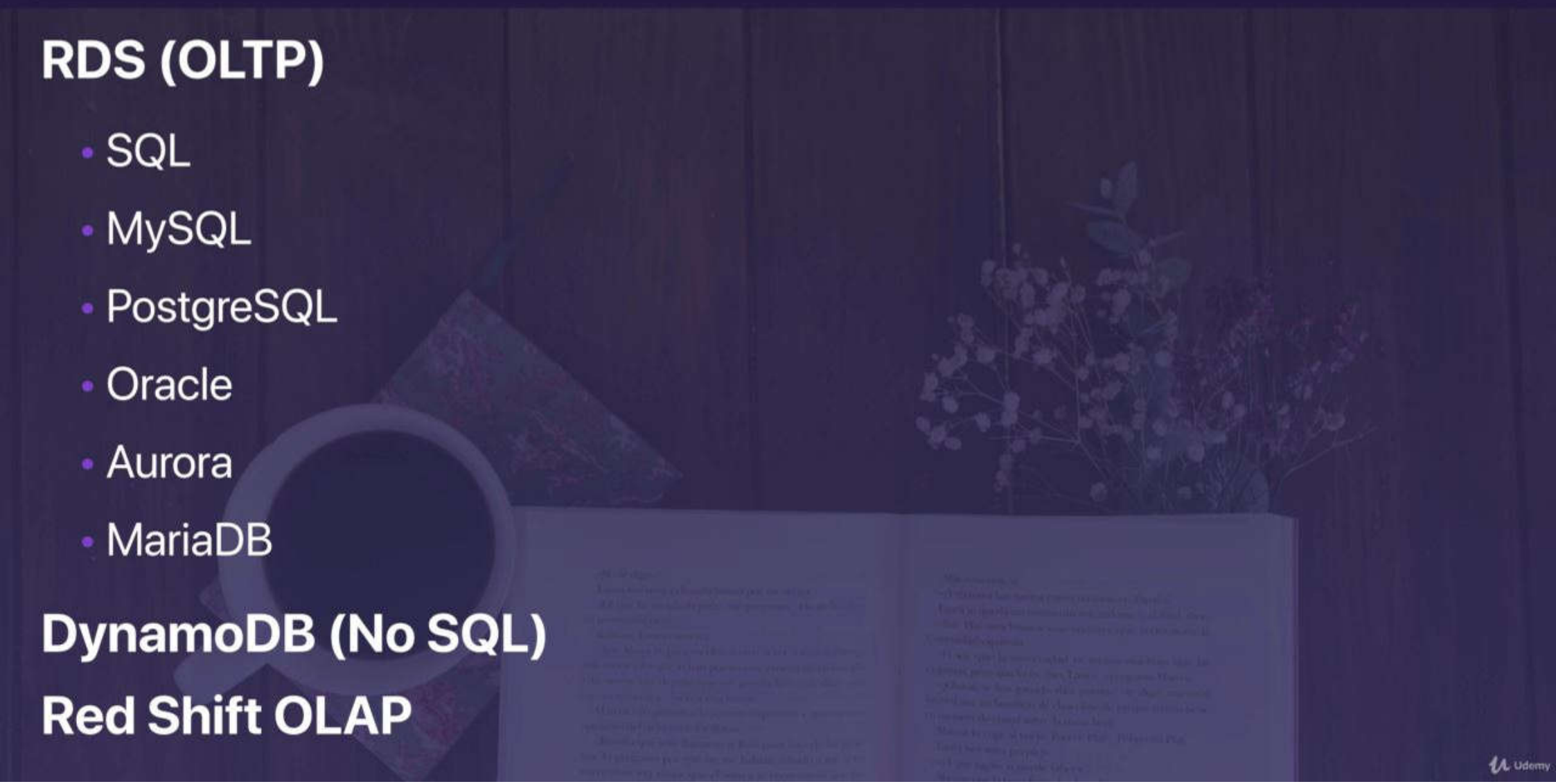
AWS Database Types - Exam Tips



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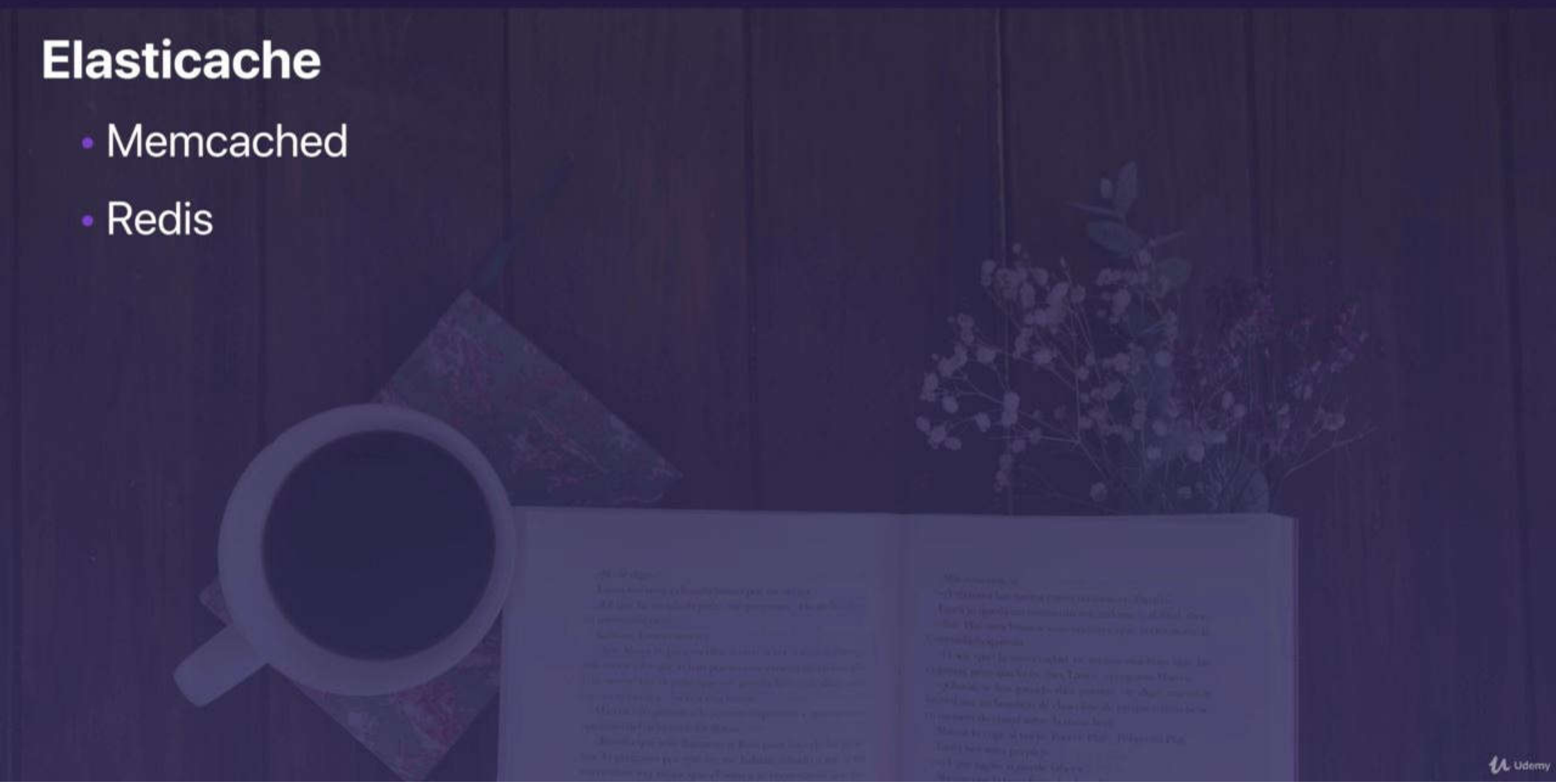
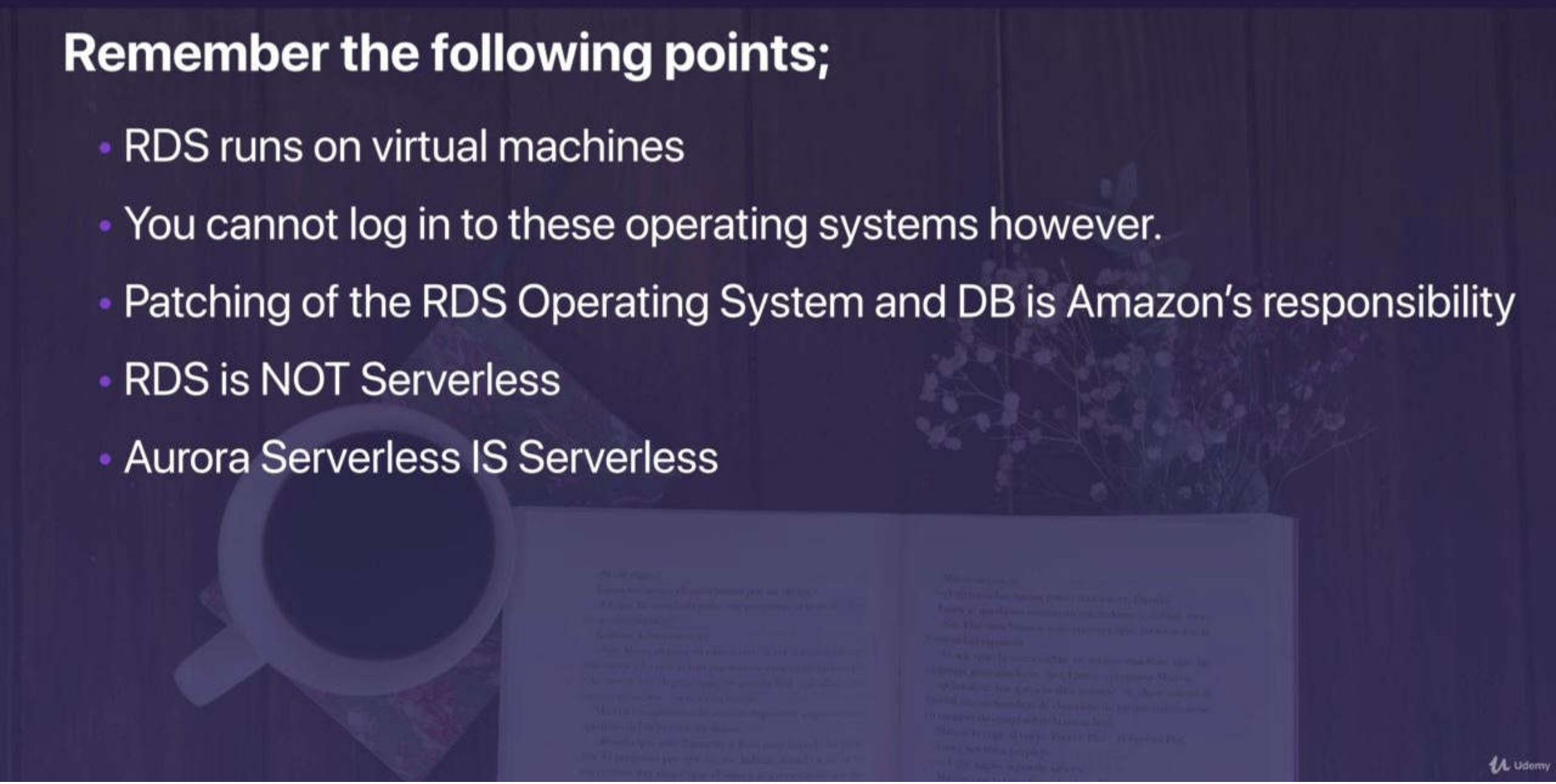


Remember the following points;

- RDS runs on virtual machines
- You cannot log in to these operating systems however.
- Patching of the RDS Operating System and DB is Amazon's responsibility
- RDS is NOT Serverless
- Aurora Serverless IS Serverless



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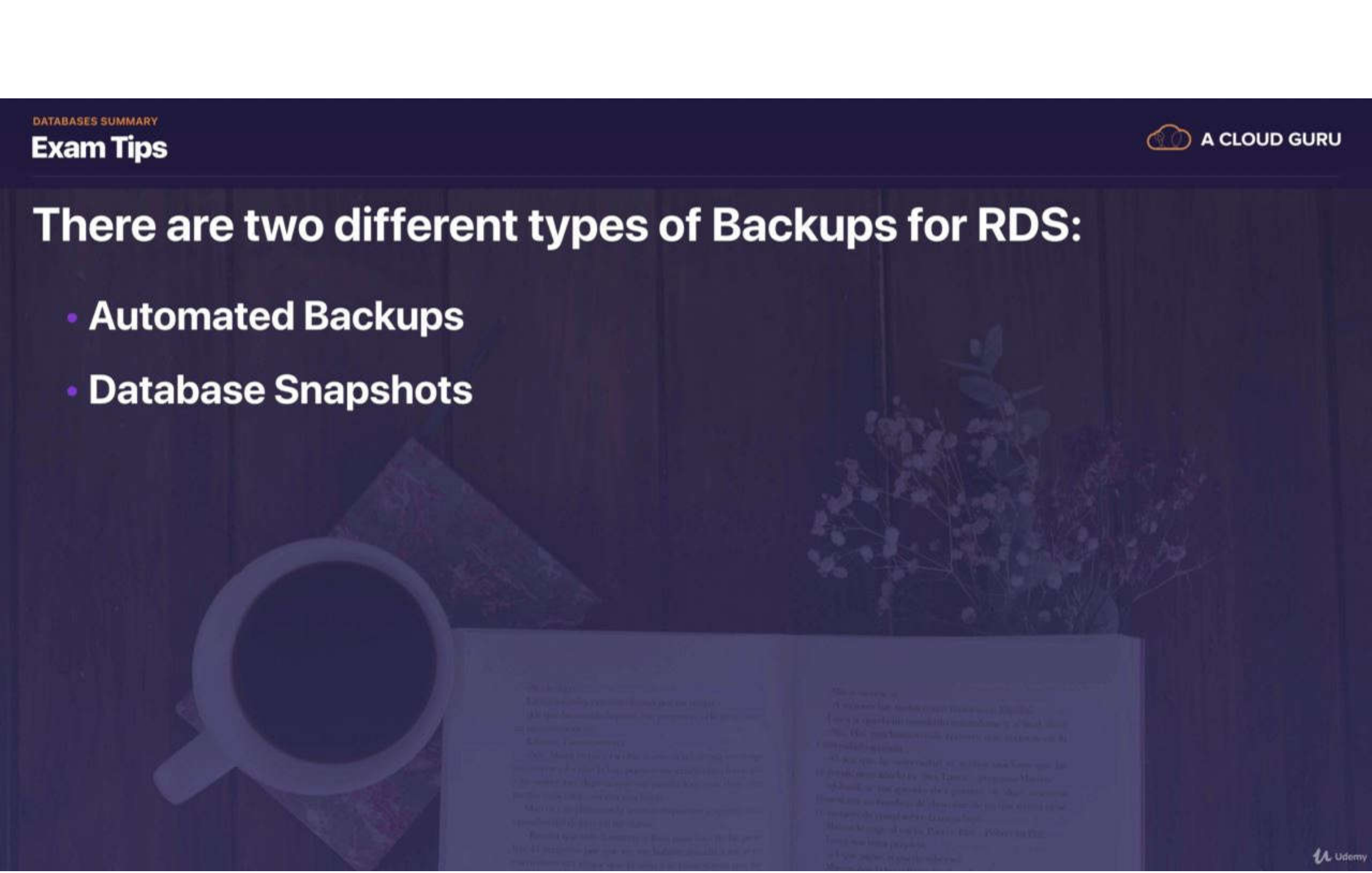
Exam Tips

There are two different types of Backups for RDS:

- Automated Backups
- Database Snapshots



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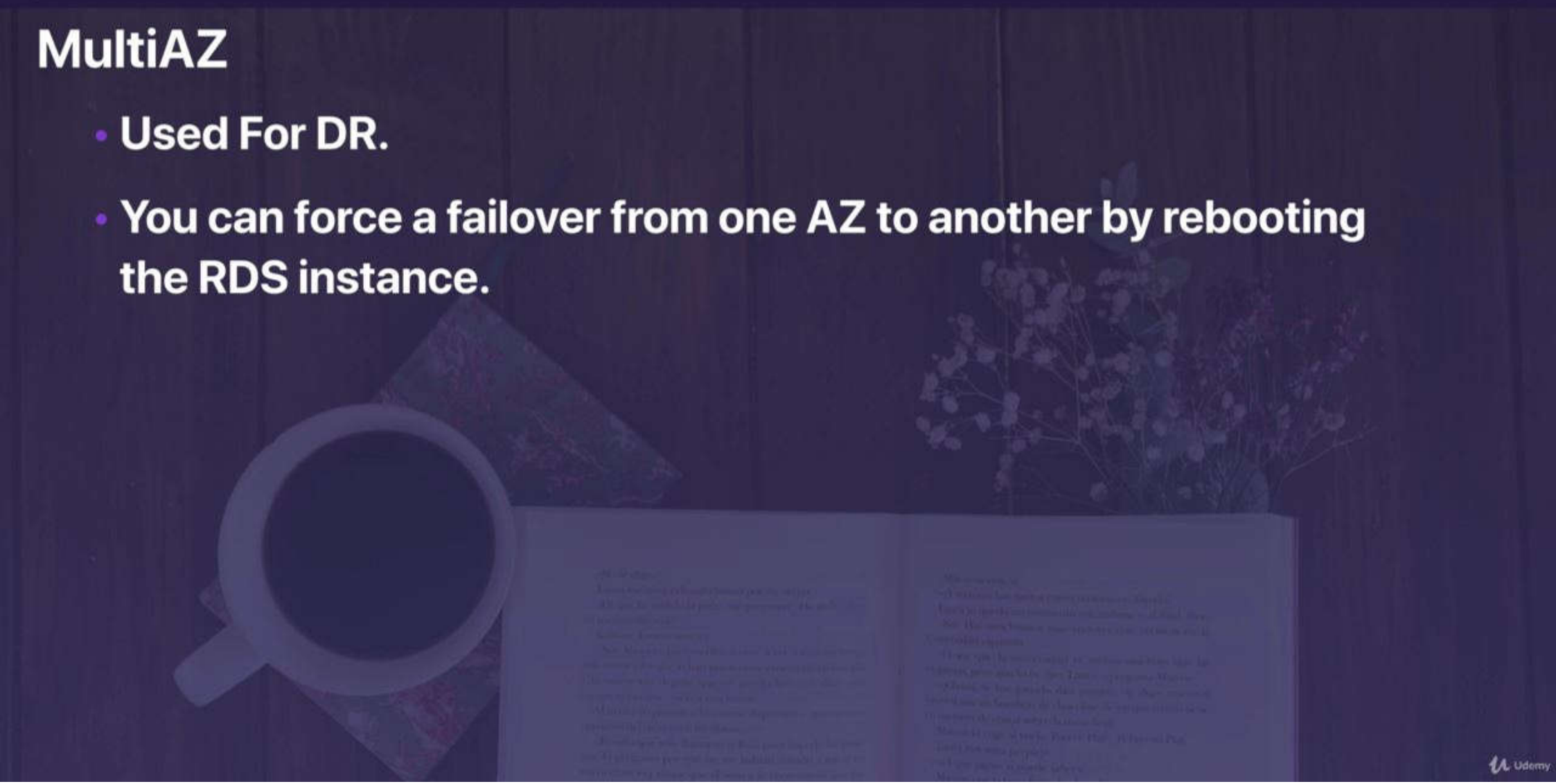
Read Replicas

- Can be Multi-AZ.
- Used to increase performance.
- Must have backups turned on.
- Can be in different regions.
- Can be Aurora or MySQL.
- Can be promoted to master, this will break the replication with the Read Replica

MultiAZ

- Used For DR.
- You can force a failover from one AZ to another by rebooting the RDS instance.



Exam Tips

Encryption at rest is supported for MySQL, Oracle, SQL Server, PostgreSQL, MariaDB & Aurora. Encryption is done using the AWS Key Management Service (KMS) service. Once your RDS instance is encrypted, the data stored at rest in the underlying storage is encrypted, as are its automated backups, read replicas, and snapshots.

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DynamoDB

- Stored on SSD storage
- Spread Across 3 geographically distinct data centres
- Eventual Consistent Reads (Default)
- Strongly Consistent Reads

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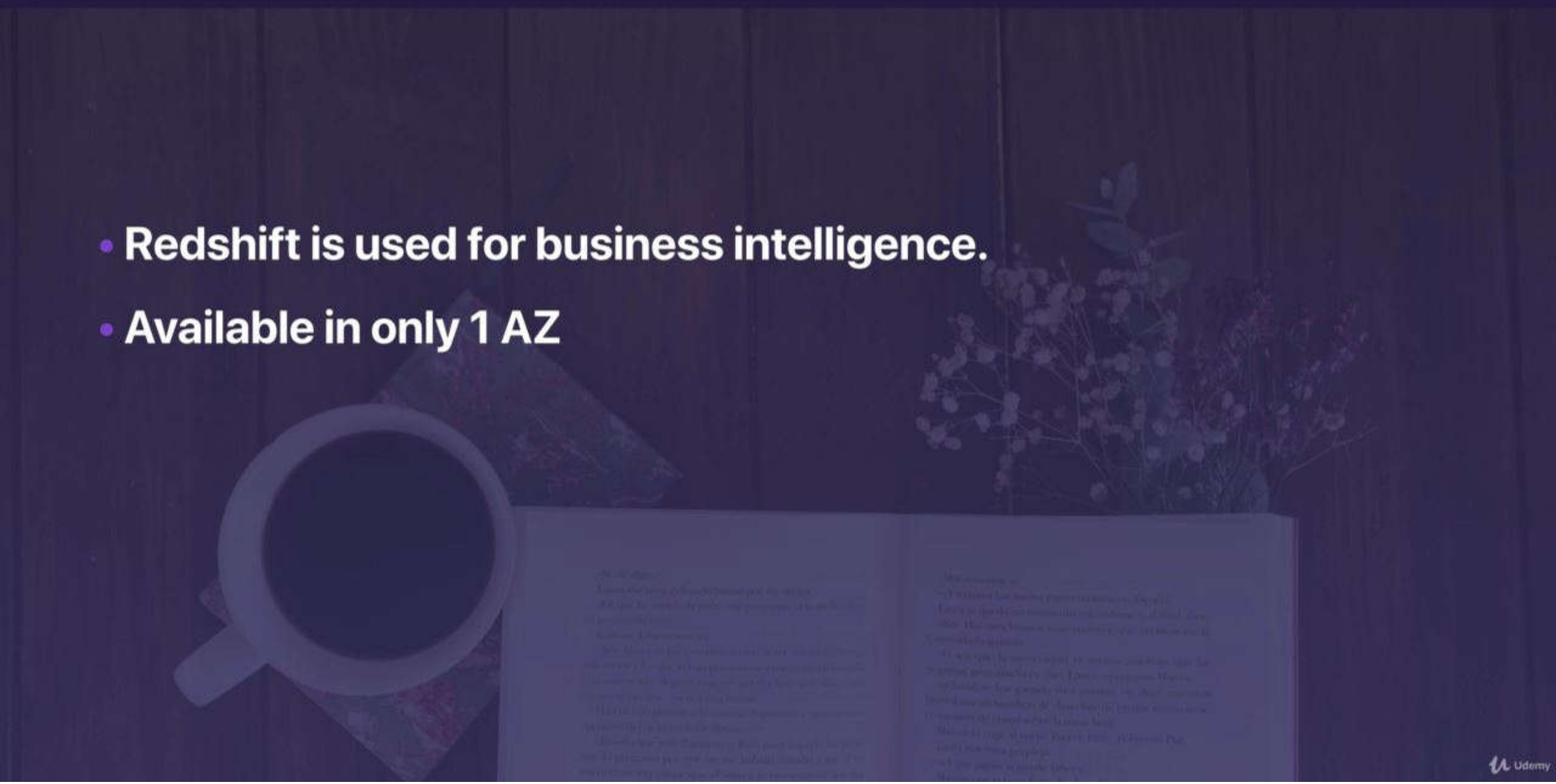
Exam Tips



- Redshift is used for business intelligence.
- Available in only 1 AZ

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Redshift Backups

- Enabled by default with a 1 day retention period.
- Maximum retention period is 35 days.
- Redshift always attempts to maintain at least three copies of your data (the original and replica on the compute nodes and a backup in Amazon S3).

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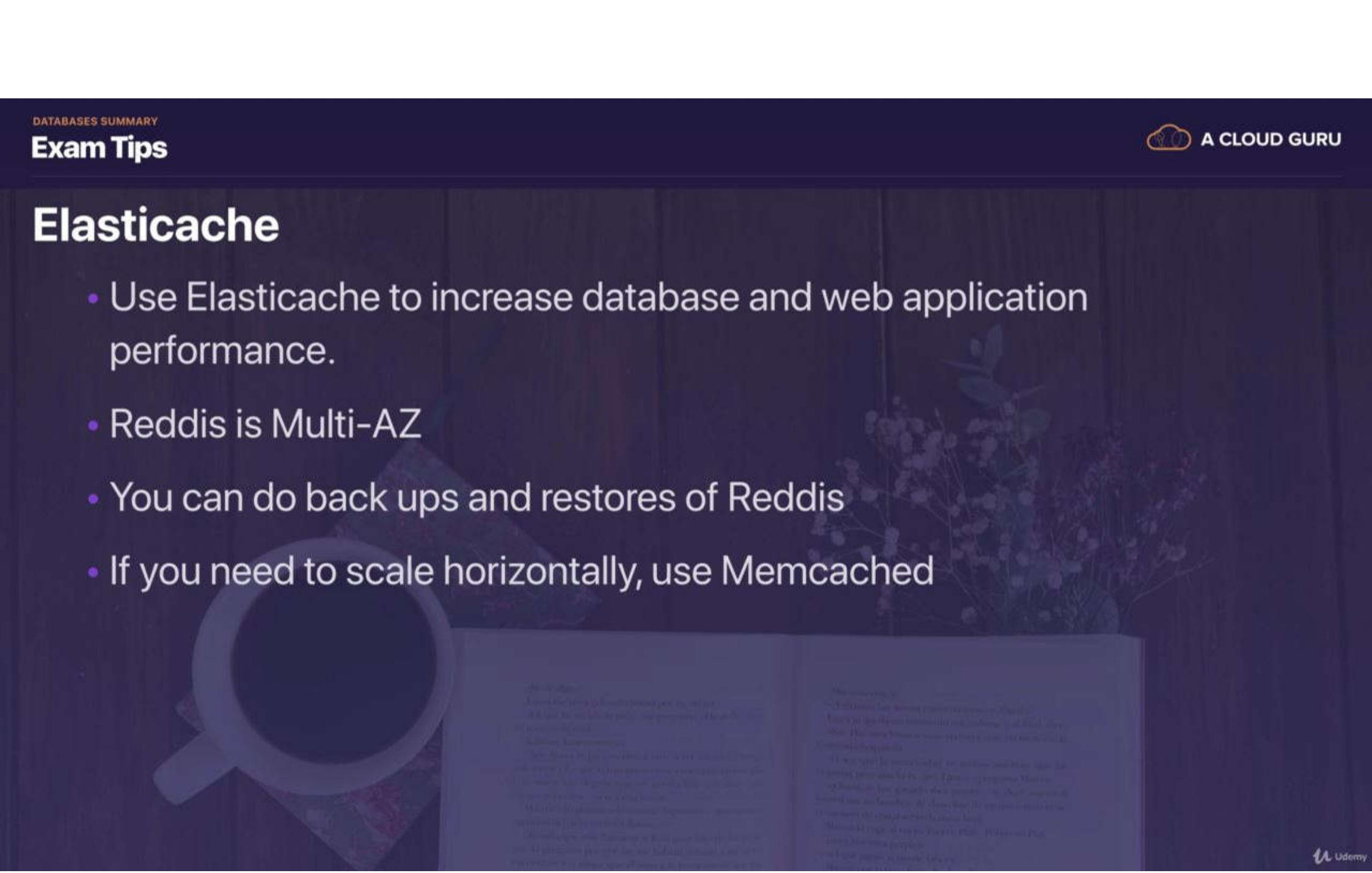
Aurora

- 2 copies of your data is contained in each availability zone, with minimum of 3 availability zones. 6 copies of your data.
- You can share Aurora Snapshots with other AWS accounts.
- 2 types of replicas available. Aurora Replicas and MySQL replicas. Automated failover is only available with Aurora Replicas.
- Aurora has automated backups turned on by default. You can also take Snapshots with Aurora. You can share these snapshots with other AWS accounts.

Elasticache

- Use Elasticache to increase database and web application performance.
- Reddis is Multi-AZ
- You can do back ups and restores of Reddis
- If you need to scale horizontally, use Memcached



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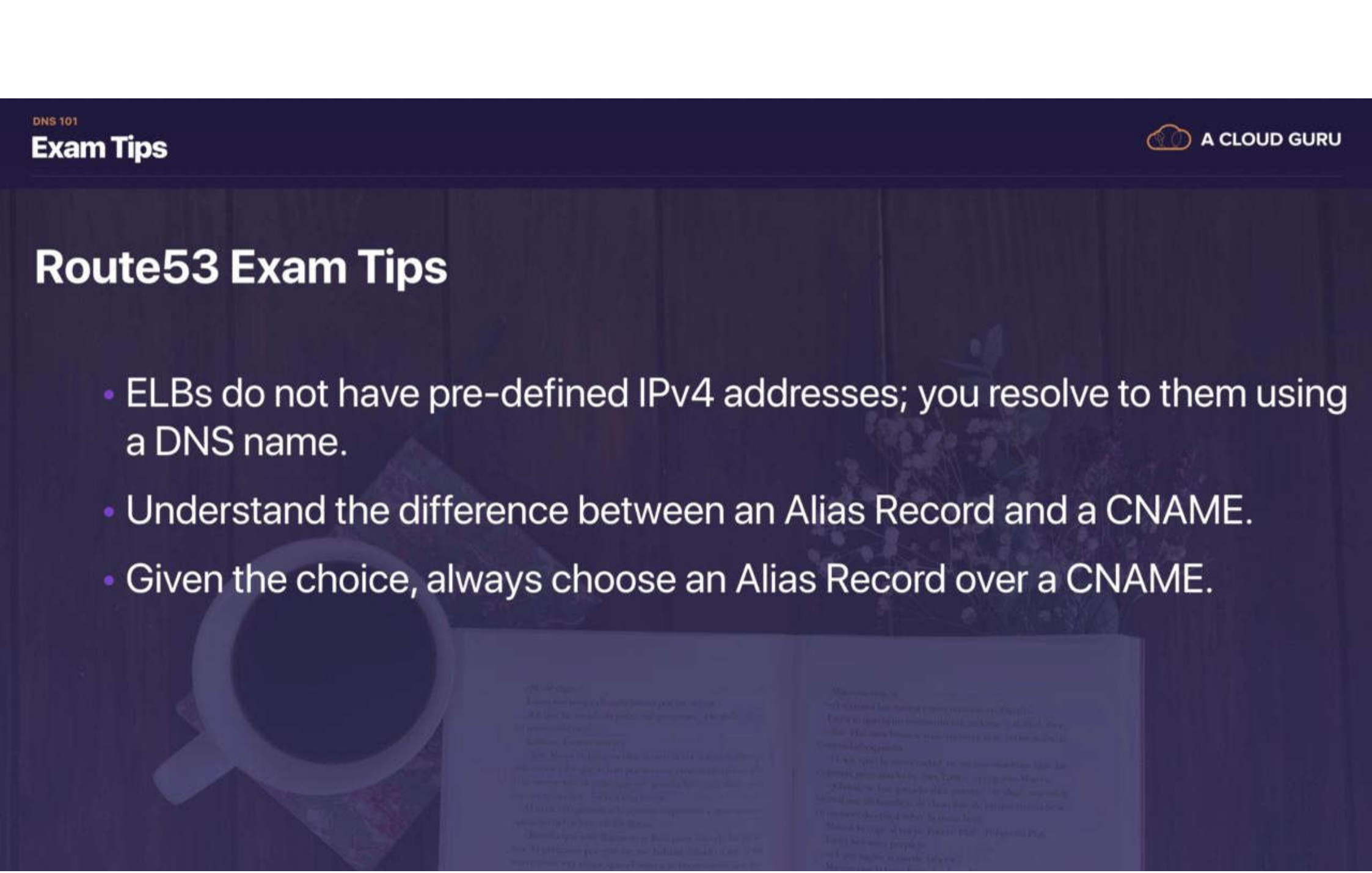
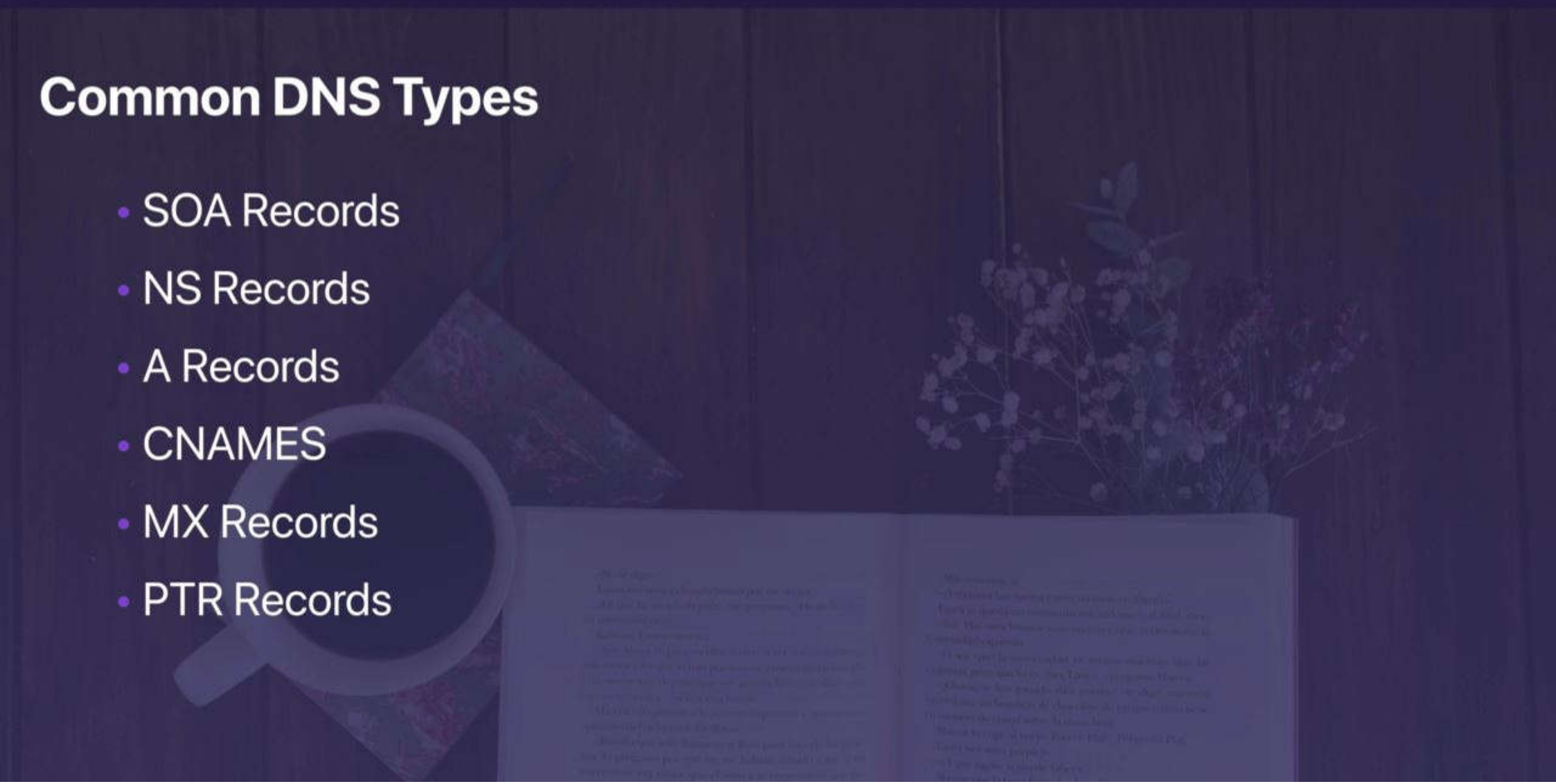
Route53 Exam Tips

- ELBs do not have pre-defined IPv4 addresses; you resolve to them using a DNS name.
- Understand the difference between an Alias Record and a CNAME.
- Given the choice, always choose an Alias Record over a CNAME.



Common DNS Types

- SOA Records
- NS Records
- A Records
- CNAMES
- MX Records
- PTR Records

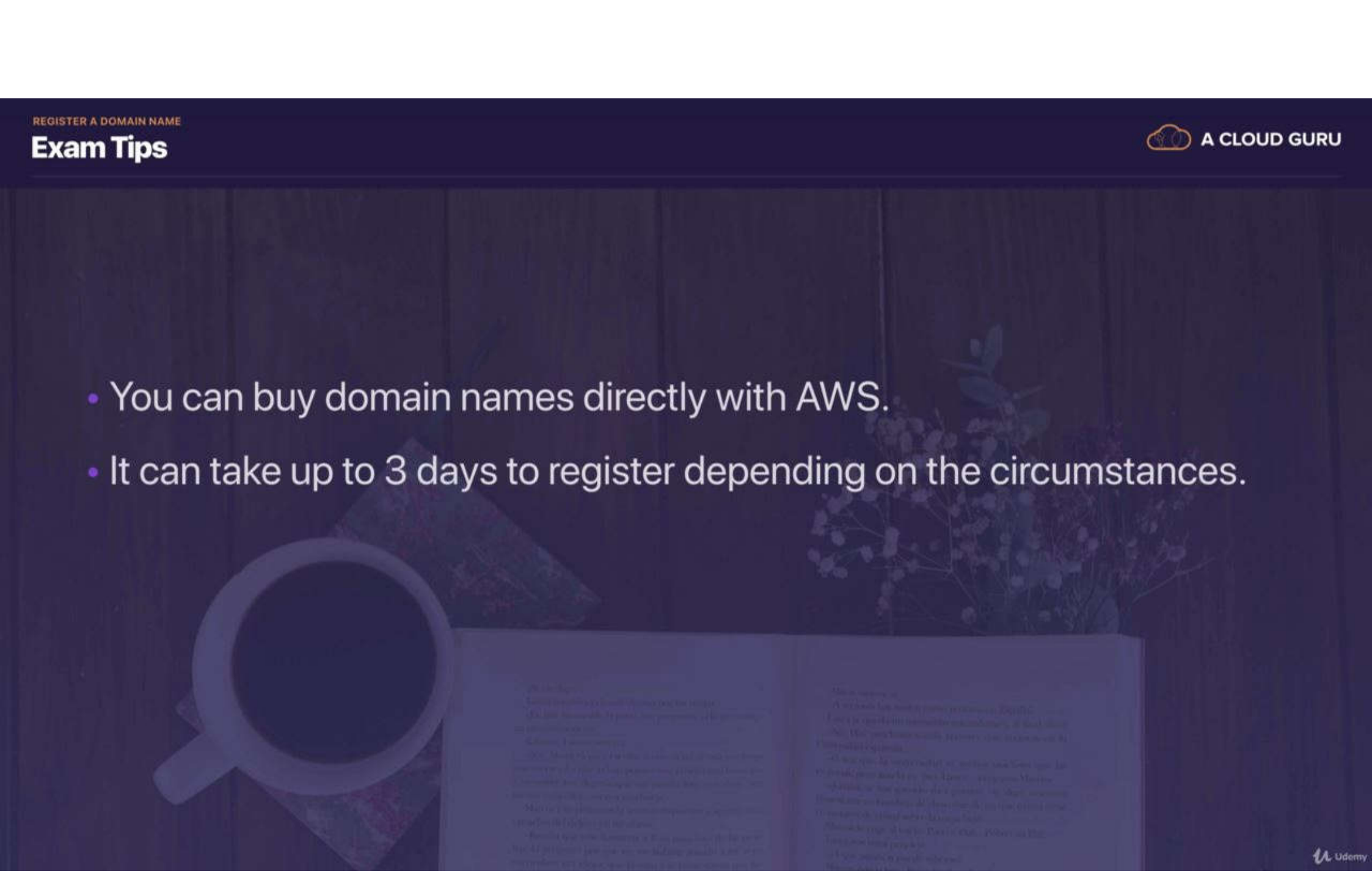


REGISTER A DOMAIN NAME

Exam Tips

A CLOUD GURU

- You can buy domain names directly with AWS.
- It can take up to 3 days to register depending on the circumstances.



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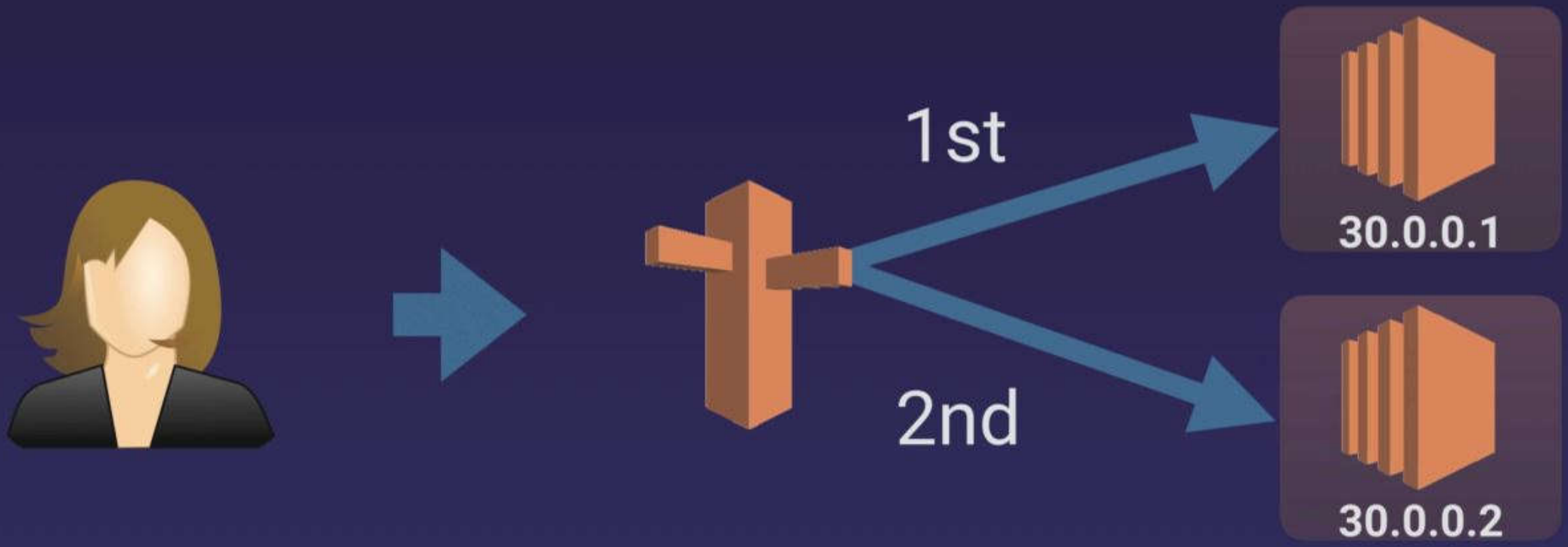
Exam Tips

Simple Routing Policy

If you choose the simple routing policy you can only have one record with multiple IP addresses. If you specify multiple values in a record, Route 53 returns all values to the user in a random order.



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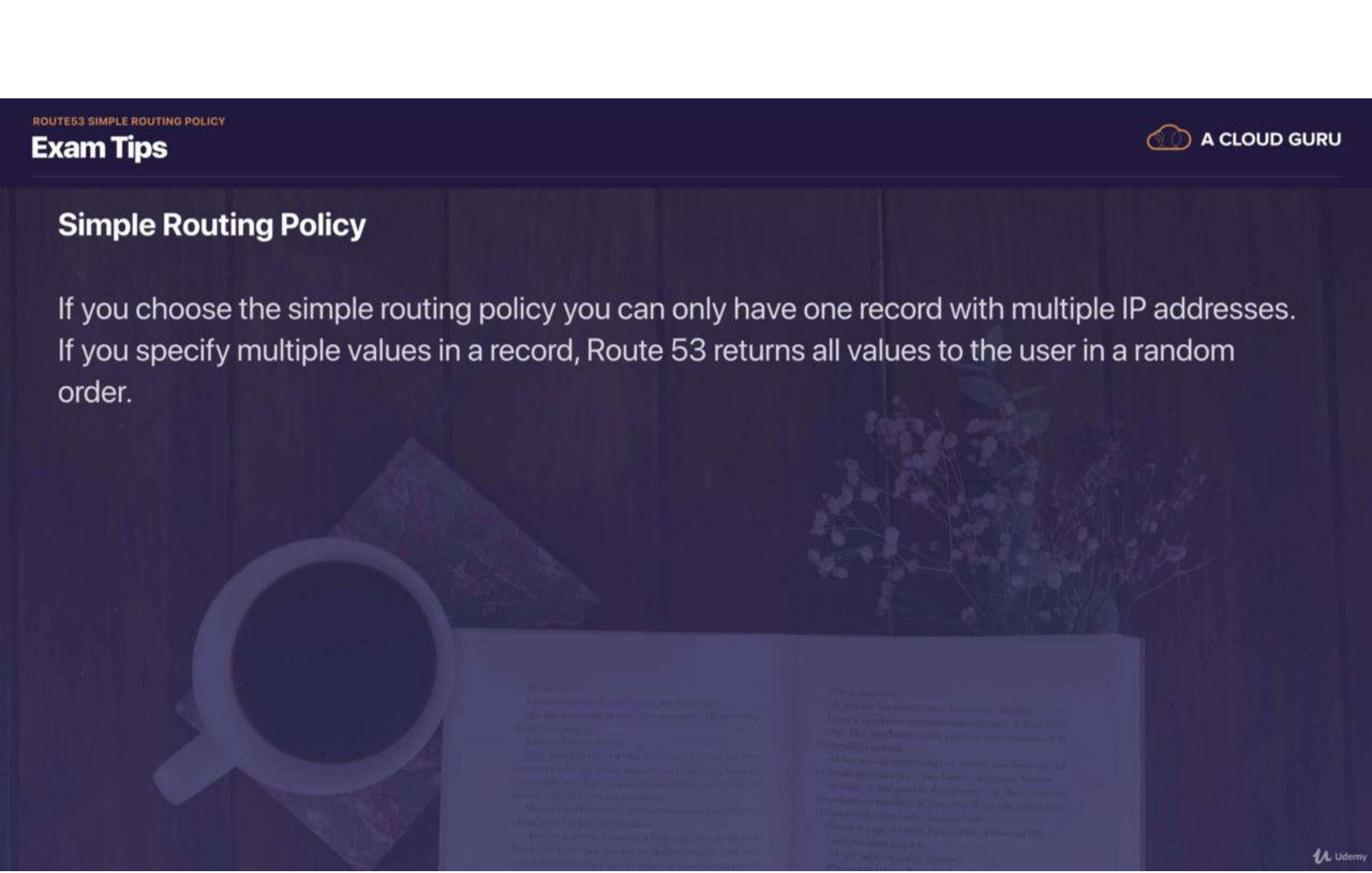
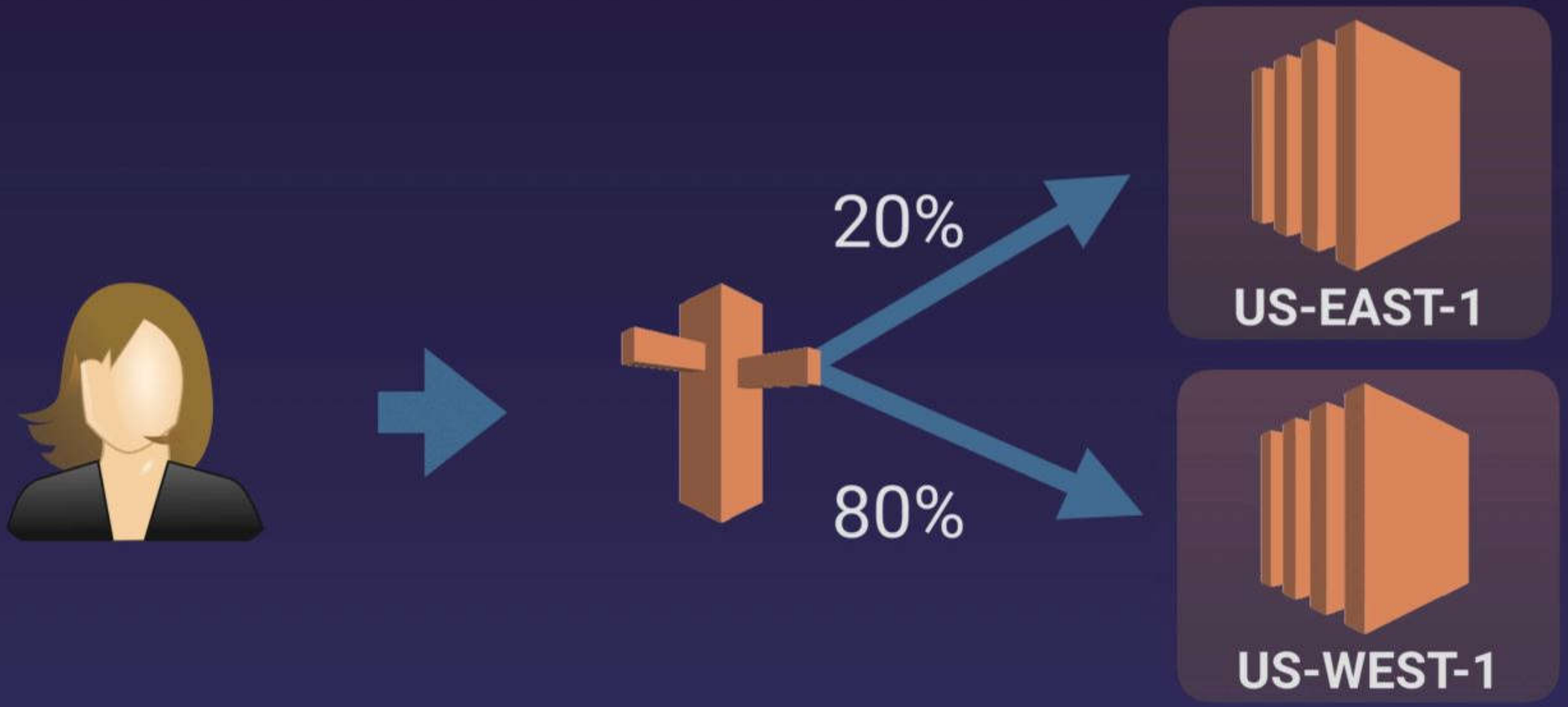


ROUTE53 WEIGHTED ROUTING POLICY

Exam Tips

A CLOUD GURU



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ROUTE53 WEIGHTED ROUTING POLICY

Exam Tips

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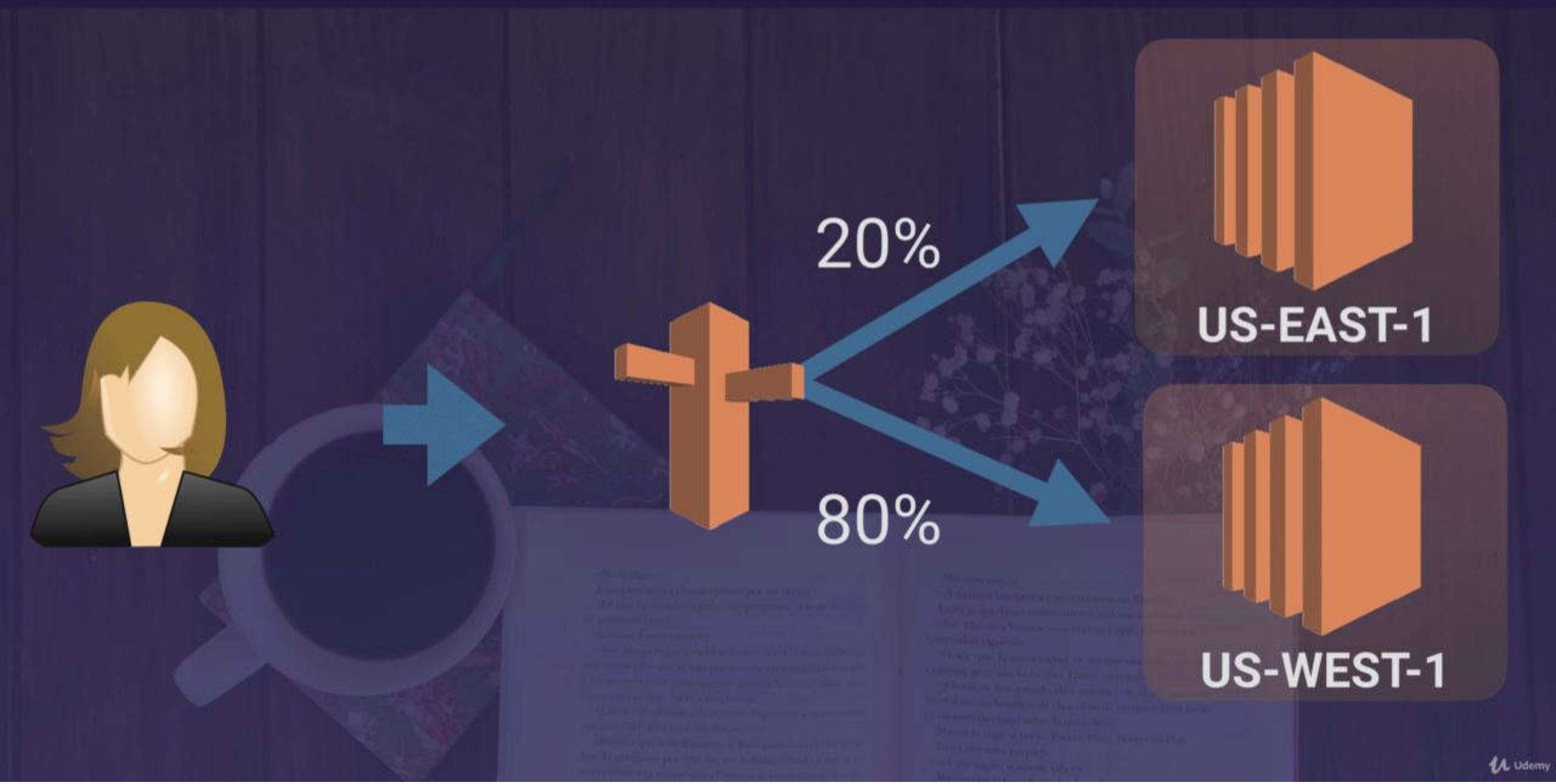

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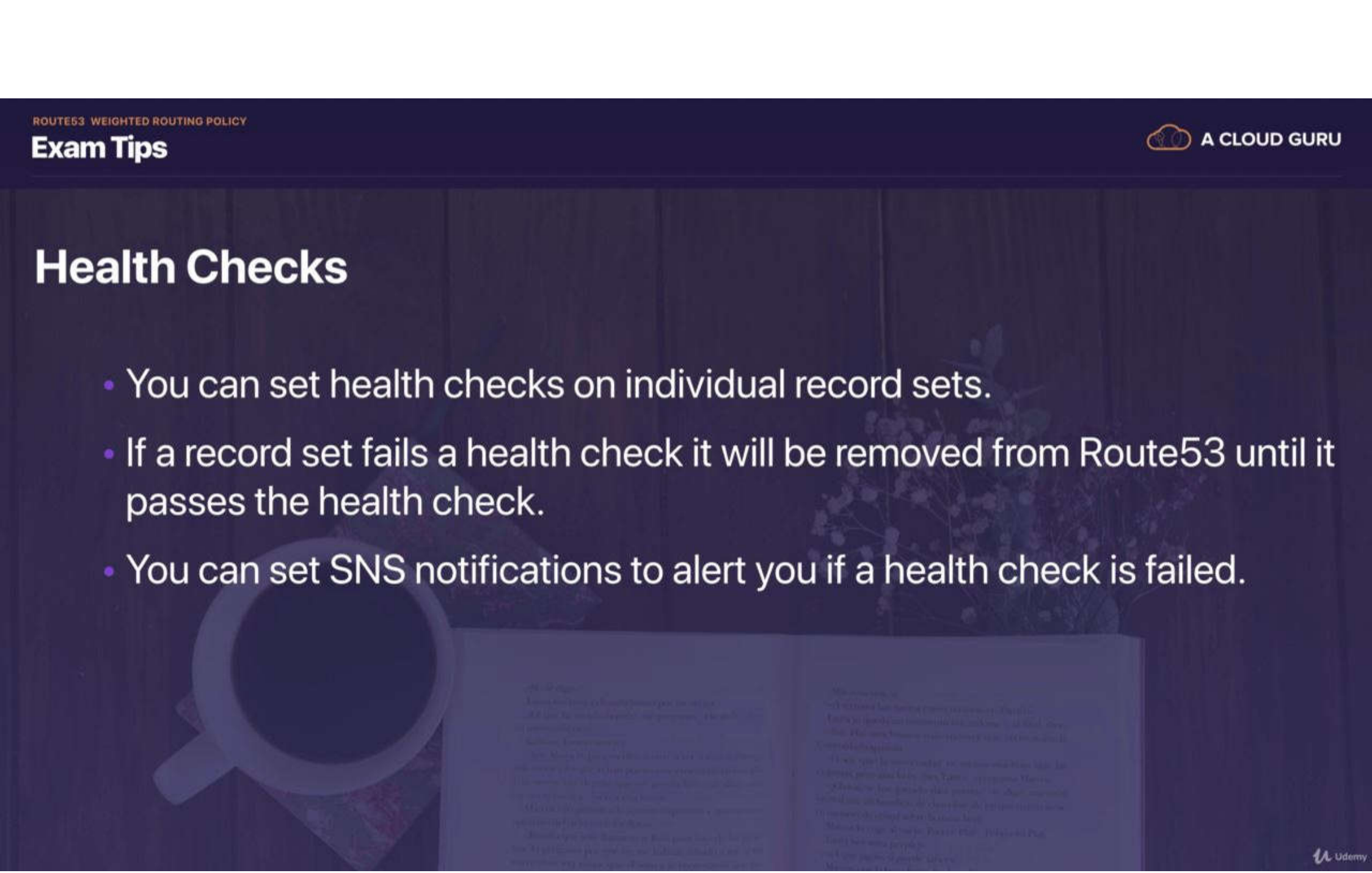
Health Checks

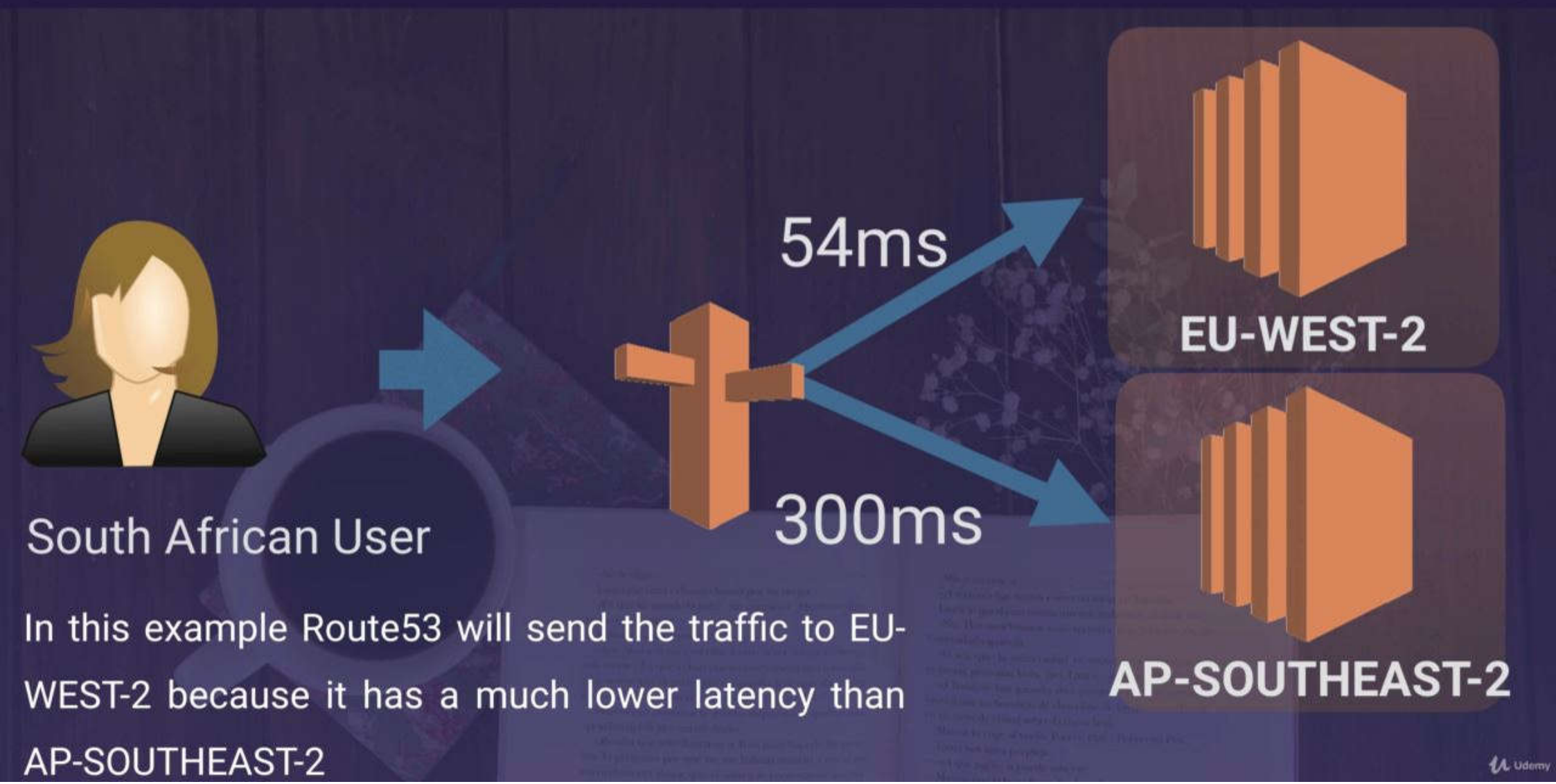
- You can set health checks on individual record sets.
- If a record set fails a health check it will be removed from Route53 until it passes the health check.
- You can set SNS notifications to alert you if a health check is failed.



ROUTE53 LATENCY ROUTING POLICY

Exam Tips

A CLOUD GURU



In this example Route53 will send the traffic to EU-WEST-2 because it has a much lower latency than AP-SOUTHEAST-2

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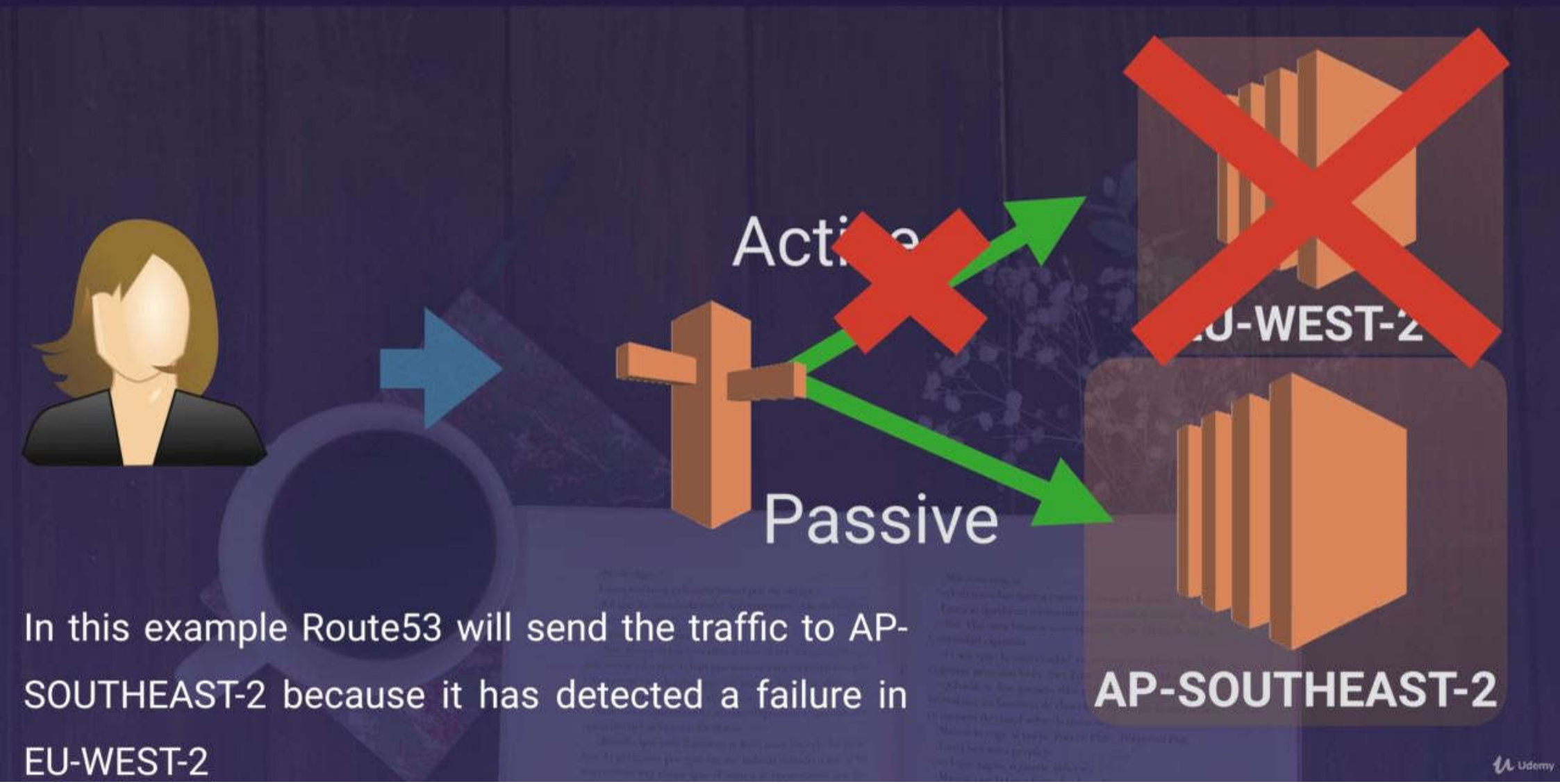
ROUTE53 FAILOVER ROUTING POLICY

Exam Tips

A CLOUD GURU



In this example Route53 will send the traffic to AP-SOUTHEAST-2 because it has detected a failure in EU-WEST-2

ROUTE53 GEOLOCATION ROUTING POLICY

Exam Tips

A CLOUD GURU

In this example, Route53 will send the European customers to EU-WEST-1 and the US customers to US-EAST-1

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ROUTE53 MULTIVALUE ANSWER POLICY

Exam Tips

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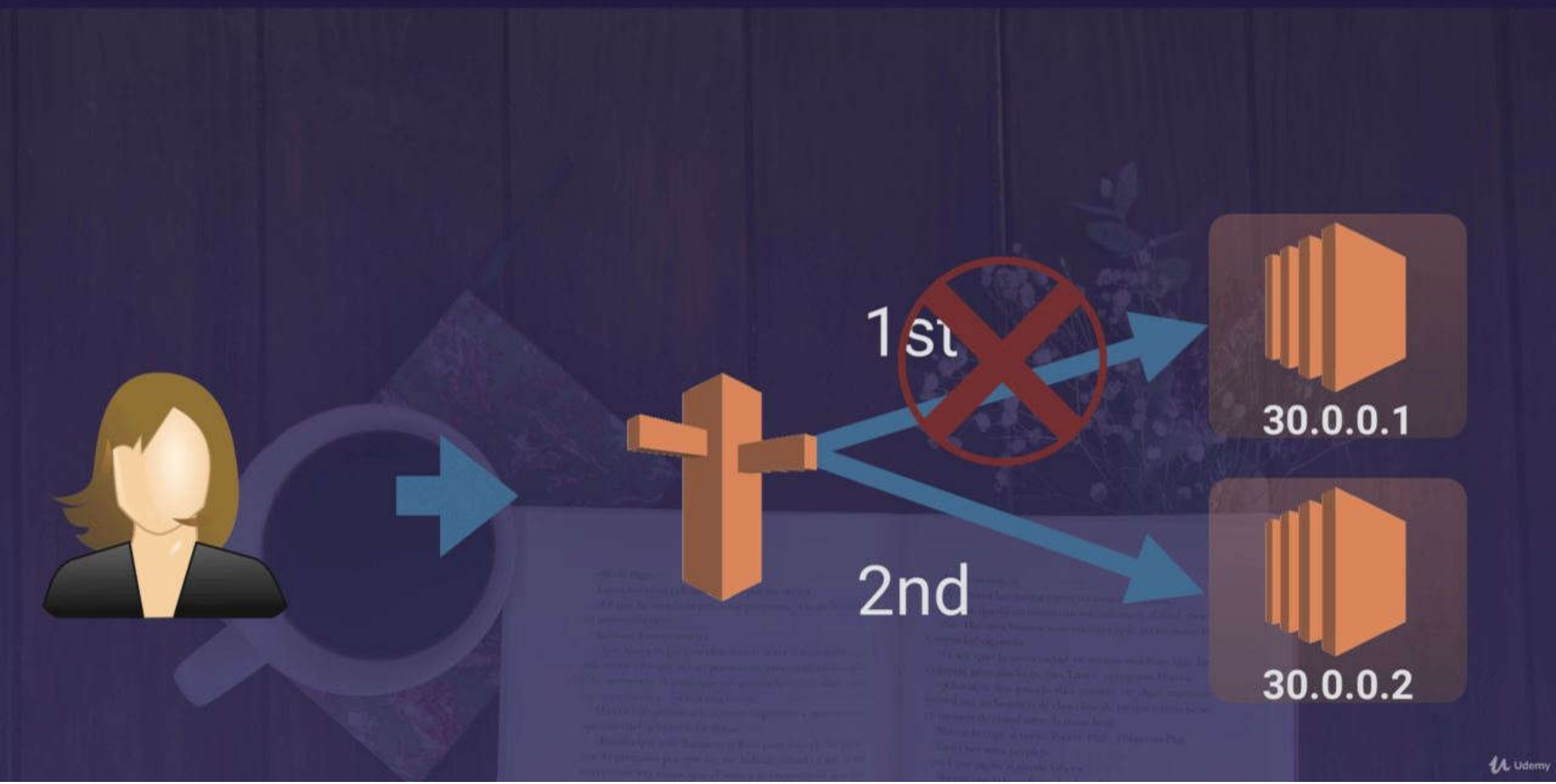

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Route53 Exam Tips

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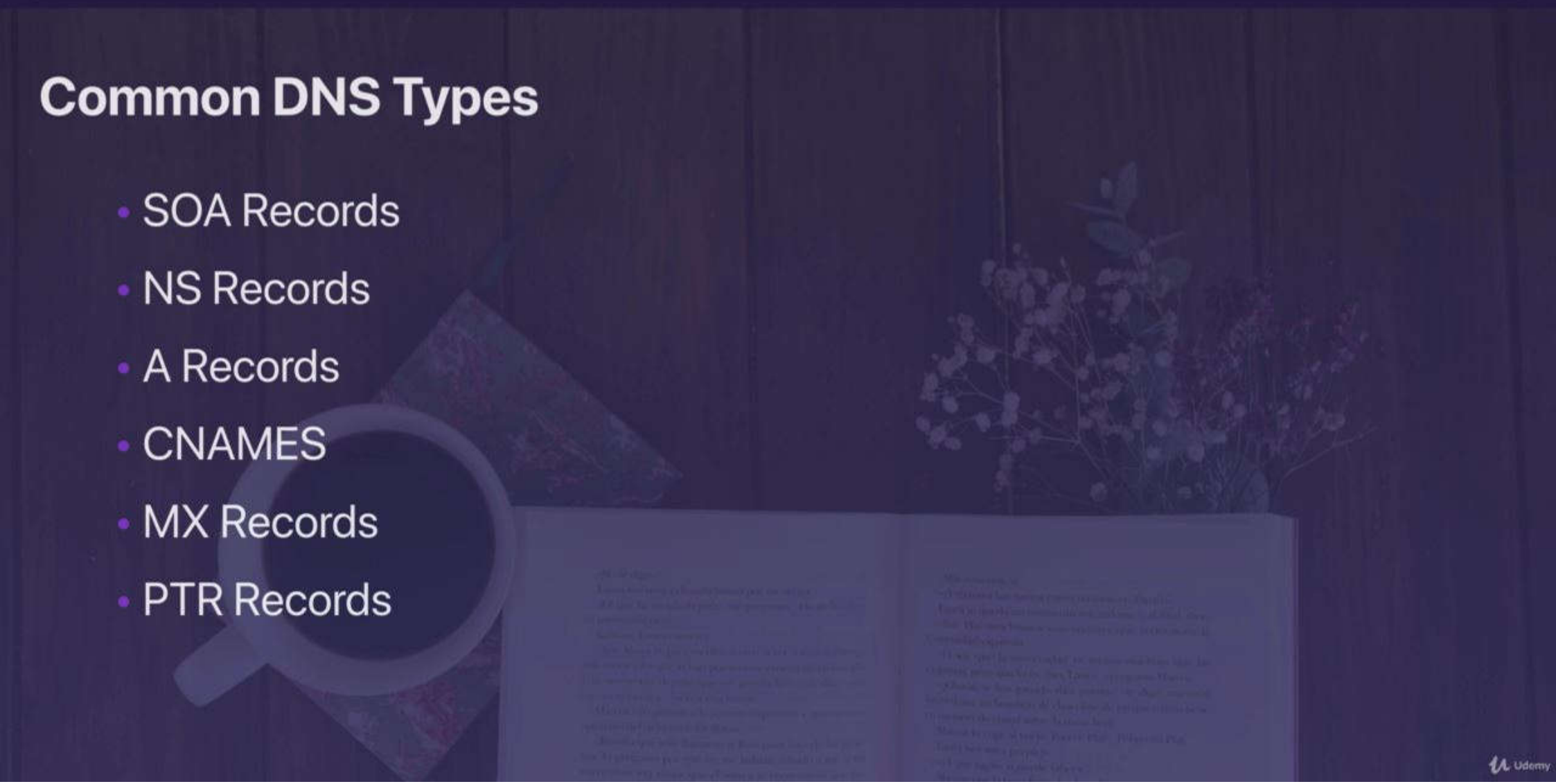

Common DNS Types

- SOA Records
- NS Records
- A Records
- CNAMES
- MX Records
- PTR Records

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Exam Tips

The Following Routing Policies Are Available With Route53:

- Simple Routing
- Weighted Routing
- Latency-based Routing
- Failover Routing
- Geolocation Routing
- Geoproximity Routing (Traffic Flow Only)
- Multivalue Answer Routing

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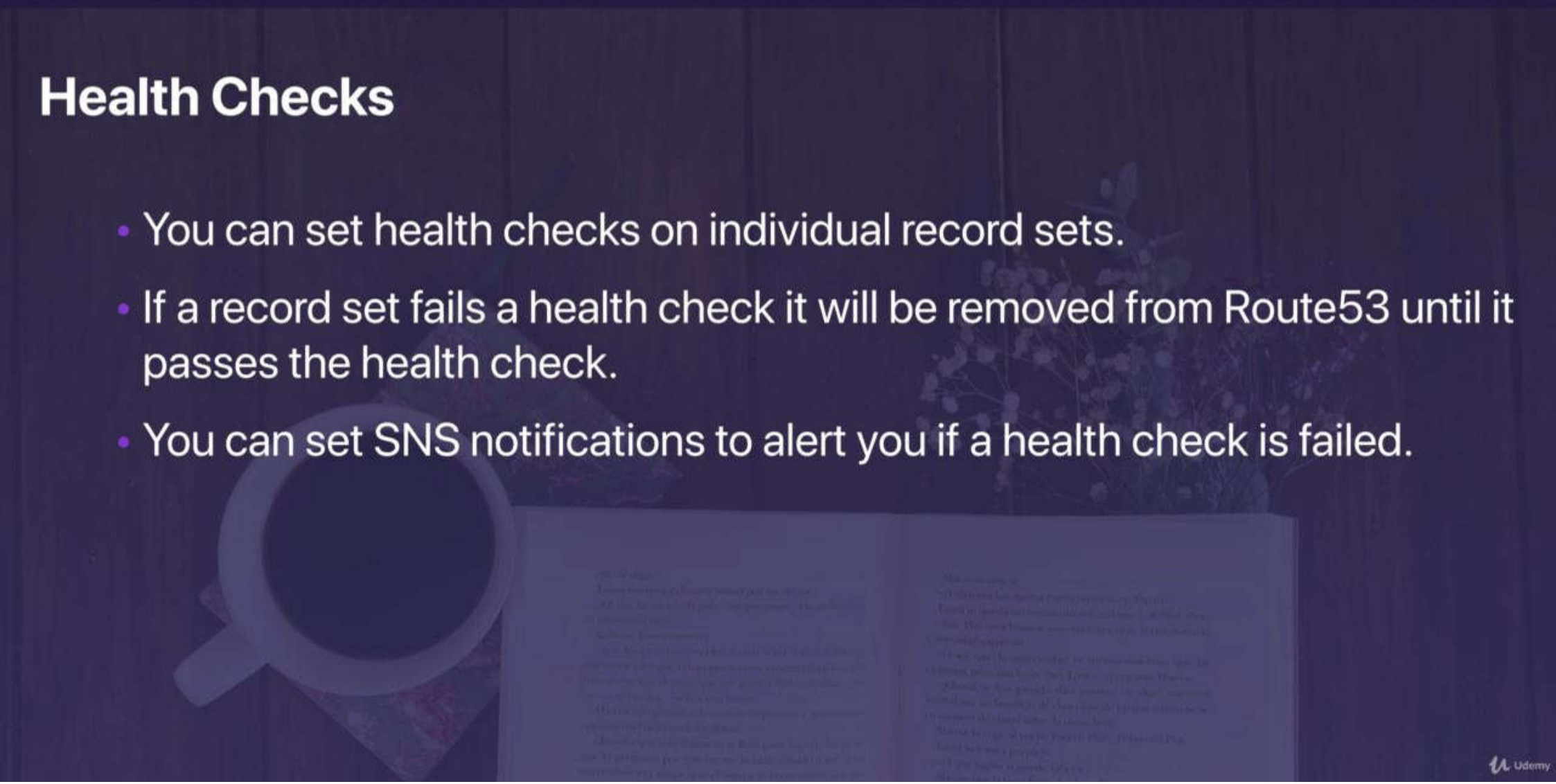

A CLOUD GURU

Simple Routing Policy

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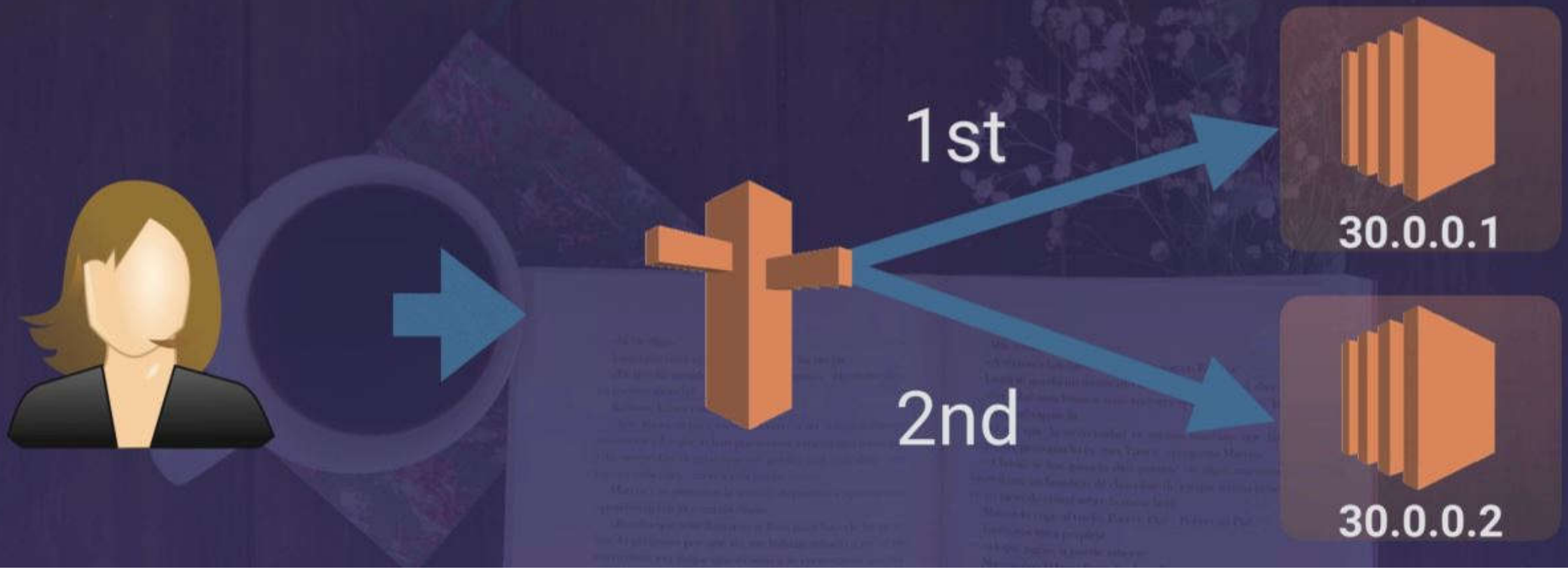

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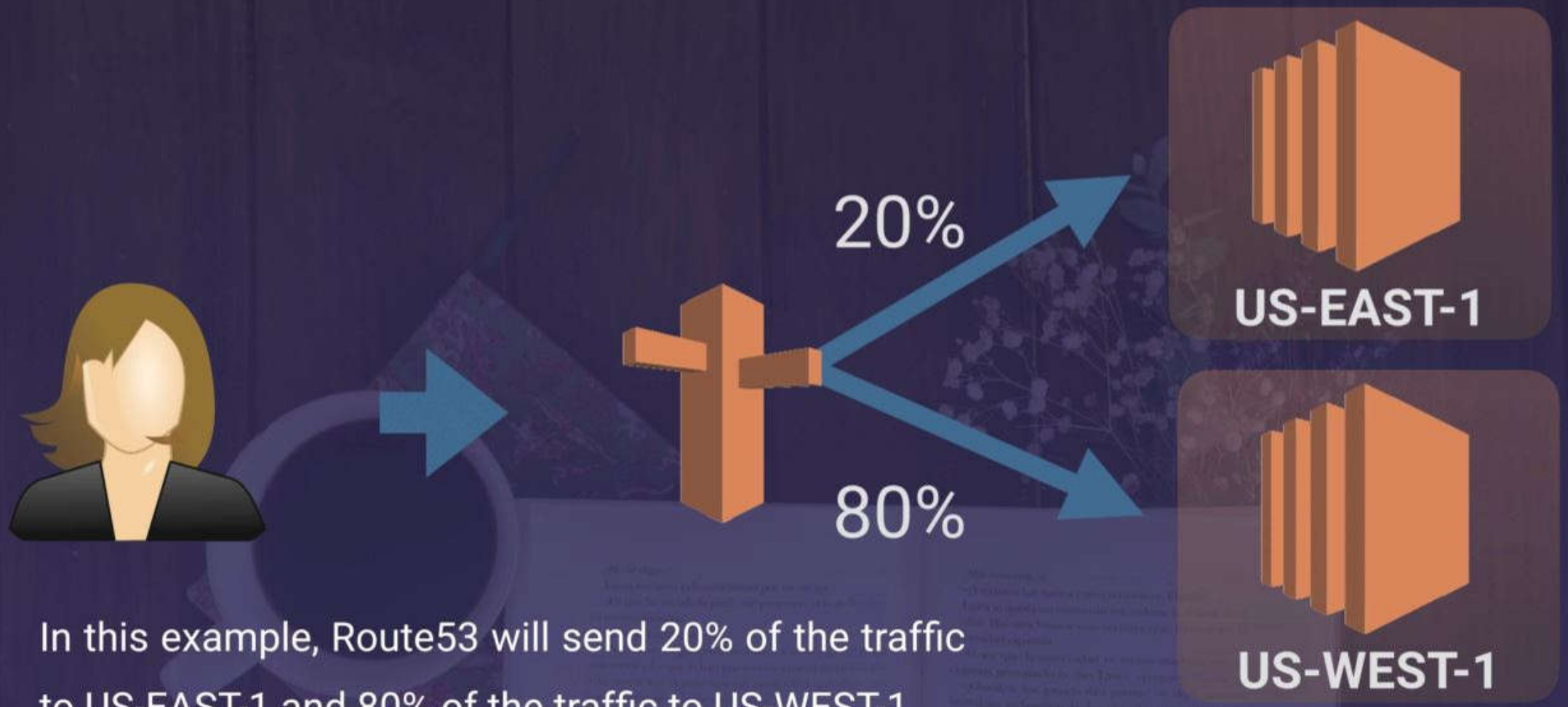
DNS SUMMARY

Weighted Routing Policy

A CLOUD GURU



In this example, Route53 will send 20% of the traffic to US-EAST-1 and 80% of the traffic to US-WEST-1

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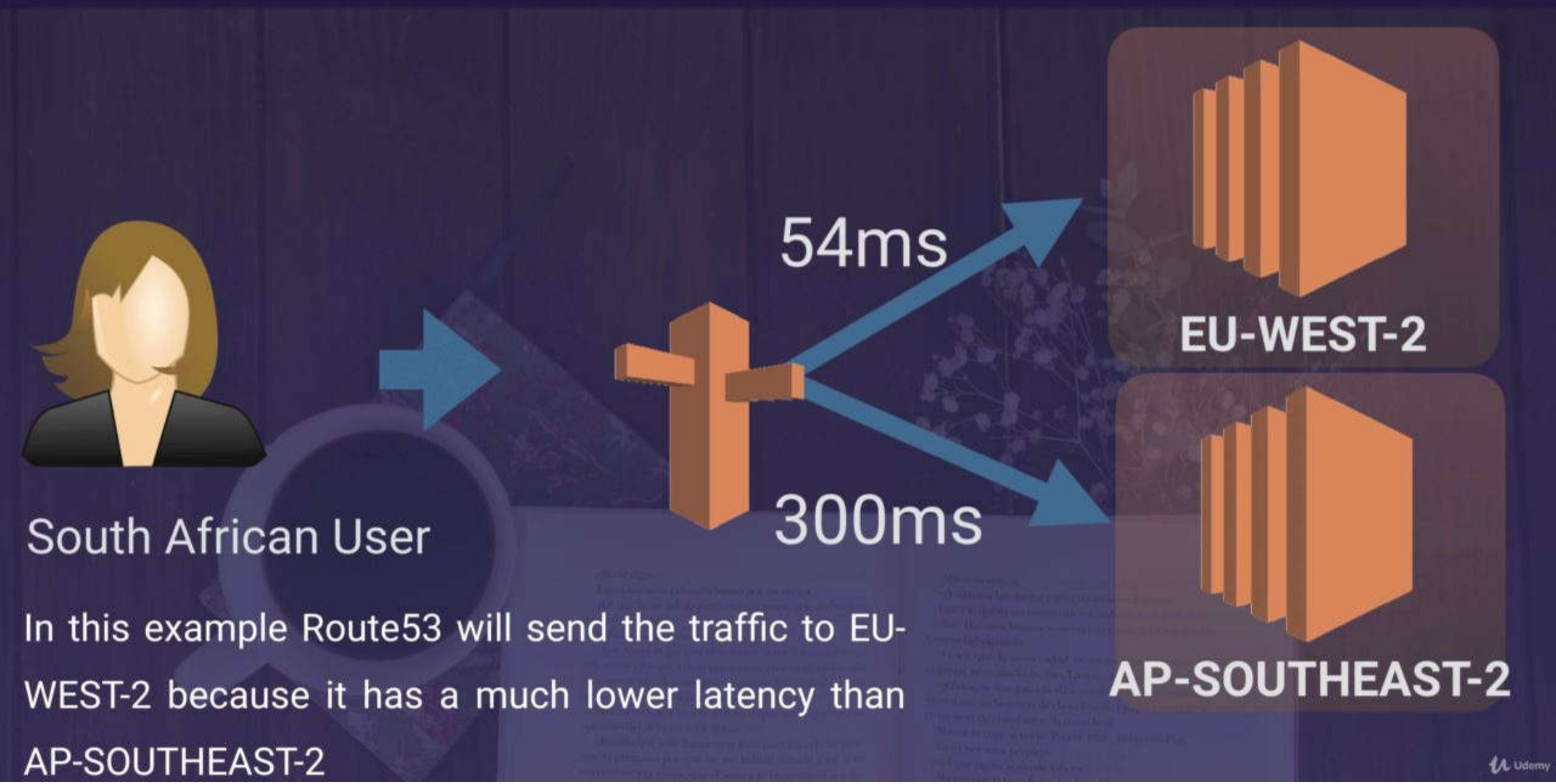
DNS SUMMARY

Latency Routing Policy

A CLOUD GURU



In this example Route53 will send the traffic to EU-WEST-2 because it has a much lower latency than AP-SOUTHEAST-2

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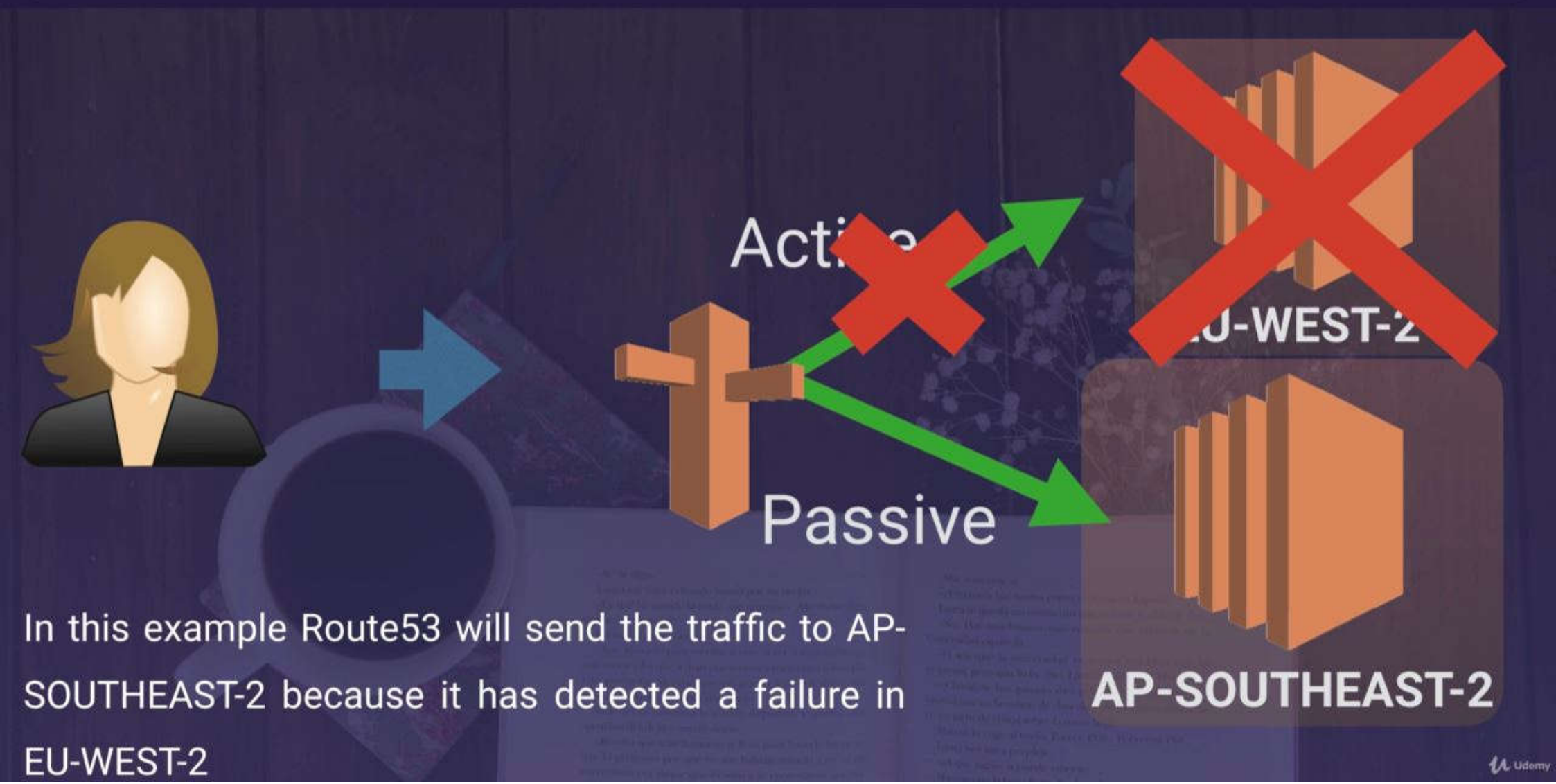
DNS SUMMARY

Failover Routing Policy

A CLOUD GURU



In this example Route53 will send the traffic to AP-SOUTHEAST-2 because it has detected a failure in EU-WEST-2

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DNS SUMMARY

Geolocation Routing Policy

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In this example, Route53 will send the European customers to EU-WEST-1 and the US customers to US-EAST-1

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Geoproximity Routing (Traffic Flow Only)

Geoproximity routing lets Amazon Route 53 route traffic to your resources based on the geographic location of your users and your resources. You can also optionally choose to route more traffic or less to a given resource by specifying a value, known as a bias. A bias expands or shrinks the size of the geographic region from which traffic is routed to a resource.

To use geoproximity routing, you must use Route 53 traffic flow.

A CLOUD GURU

Multivalue Answer Policy

Essentially the same as with Simple based routing, except you get **Health Checks.**

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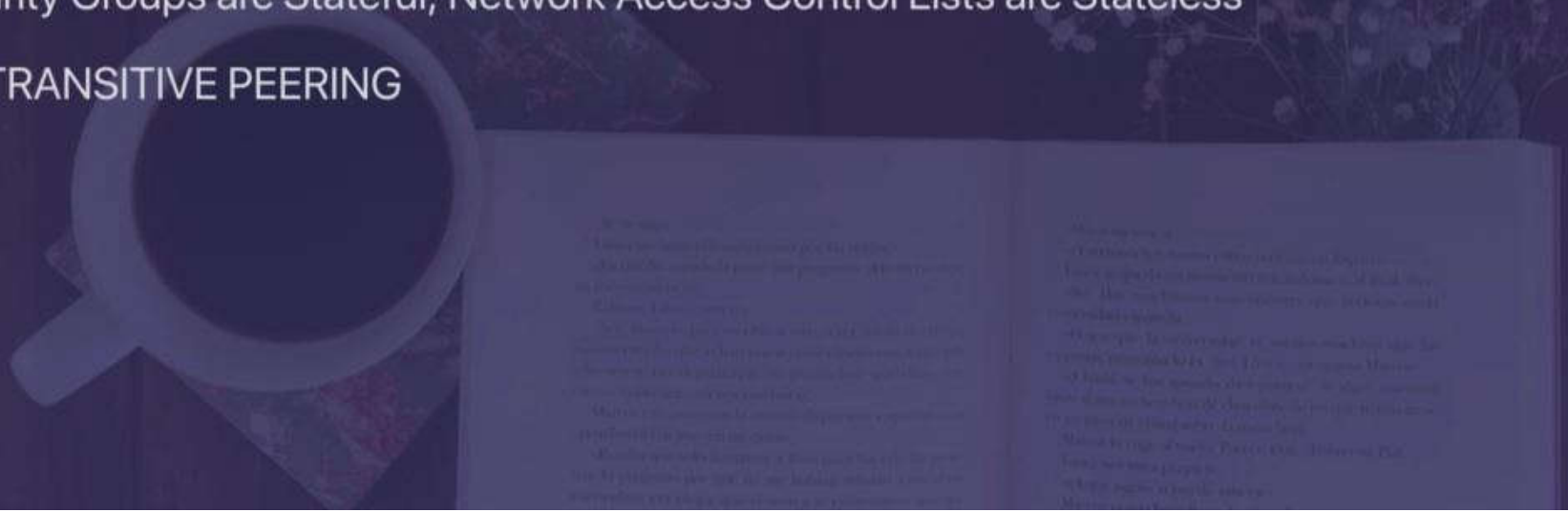
Exam Tips

Remember the following;

- Think of a VPC as a logical datacenter in AWS.
- Consists of IGWs (Or Virtual Private Gateways), Route Tables, Network Access Control Lists, Subnets, and Security Groups
- 1 Subnet = 1 Availability Zone
- Security Groups are Stateful; Network Access Control Lists are Stateless
- NO TRANSITIVE PEERING



Exam Tips

Remember the following;

- When you create a VPC a default Route Table, Network Access Control List (NACL) and a default Security Group.
- It won't create any subnets, nor will it create a default internet gateway.
- US-East-1A in your AWS account can be a completely different availability zone to US-East-1A in another AWS account. The AZ's are randomized.
- Amazon always reserve 5 IP addresses within your subnets.
- You can only have 1 Internet Gateway per VPC.
- Security Groups can't span VPCs.

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Nat Instances Exam Tips

- When creating a NAT instance, Disable Source/Destination Check on the Instance.
- NAT instances must be in a public subnet.
- There must be a route out of the private subnet to the NAT instance, in order for this to work.
- The amount of traffic that NAT instances can support depends on the instance size. If you are bottlenecking, increase the instance size.
- You can create high availability using Autoscaling Groups, multiple subnets in different AZs, and a script to automate failover.
- Behind a Security Group.

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Exam Tips

Nat Gateways

- Redundant inside the Availability Zone
- Preferred by the enterprise
- Starts at 5Gbps and scales currently to 45Gbps
- No need to patch
- Not associated with security groups
- Automatically assigned a public ip address
- Remember to update your route tables.
- No need to disable Source/Destination Checks

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Exam Tips

Nat Gateways

- If you have resources in multiple Availability Zones and they share one NAT gateway, in the event that the NAT gateway's Availability Zone is down, resources in the other Availability Zones lose internet access. To create an Availability Zone-independent architecture, create a NAT gateway in each Availability Zone and configure your routing to ensure that resources use the NAT gateway in the same Availability Zone.

Exam Tips

Remember the following for your exam;

- Your VPC automatically comes with a default network ACL, and by default it allows all outbound and inbound traffic.
- You can create custom network ACLs. By default, each custom network ACL denies all inbound and outbound traffic until you add rules.
- Each subnet in your VPC must be associated with a network ACL. If you don't explicitly associate a subnet with a network ACL, the subnet is automatically associated with the default network ACL.
- Block IP Addresses using network ACLs not Security Groups

Exam Tips

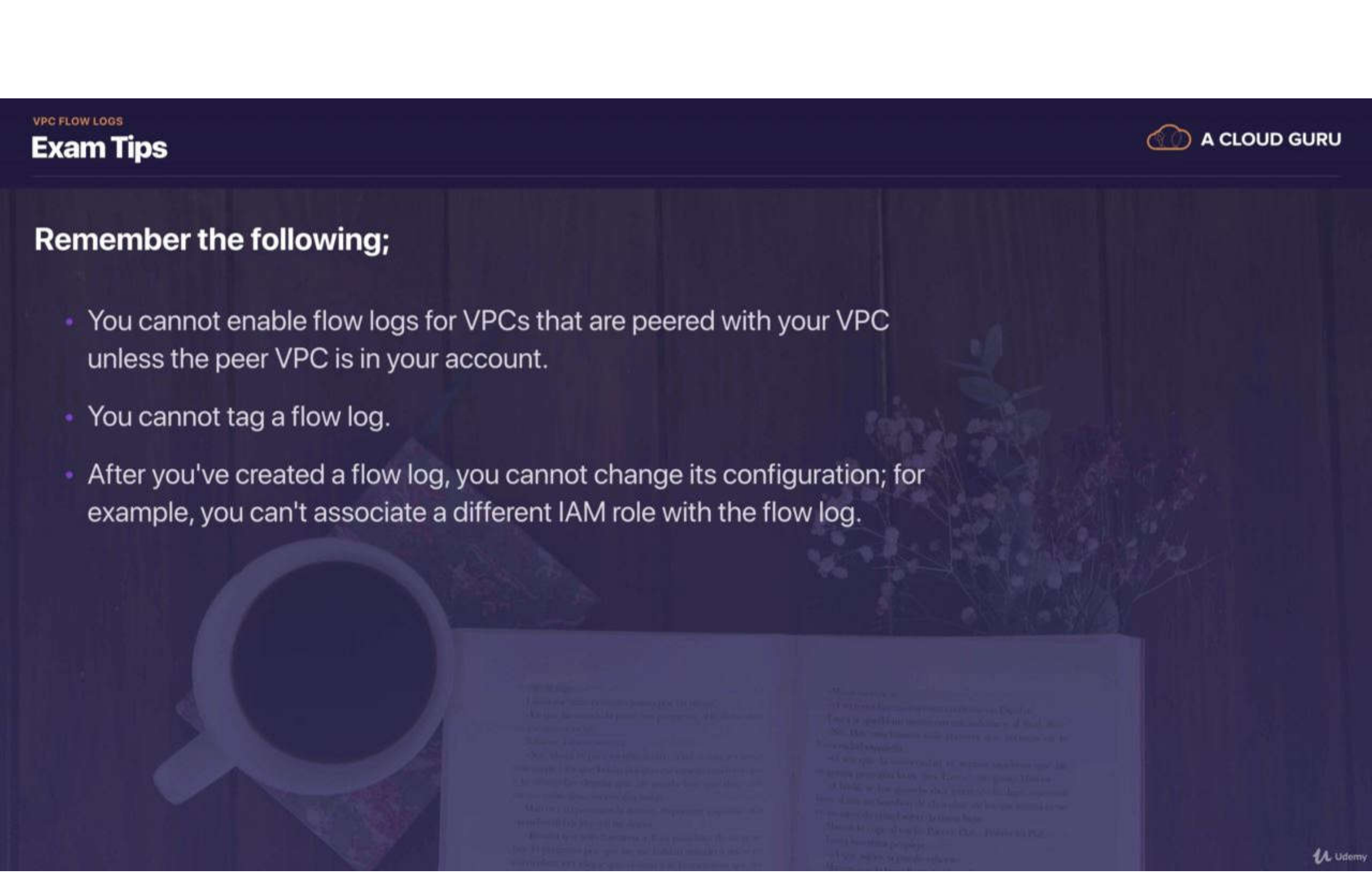
Remember the following for your exam;

- You can associate a network ACL with multiple subnets; however, a subnet can be associated with only one network ACL at a time. When you associate a network ACL with a subnet, the previous association is removed.
- Network ACLs contain a numbered list of rules that is evaluated in order, starting with the lowest numbered rule.
- Network ACLs have separate inbound and outbound rules, and each rule can either allow or deny traffic.
- Network ACLs are stateless; responses to allowed inbound traffic are subject to the rules for outbound traffic (and vice versa.)

Exam Tips

Remember the following;

- You cannot enable flow logs for VPCs that are peered with your VPC unless the peer VPC is in your account.
- You cannot tag a flow log.
- After you've created a flow log, you cannot change its configuration; for example, you can't associate a different IAM role with the flow log.



Exam Tips

Not all IP Traffic is monitored;

- Traffic generated by instances when they contact the Amazon DNS server. If you use your own DNS server, then all traffic to that DNS server is logged.
- Traffic generated by a Windows instance for Amazon Windows license activation.
- Traffic to and from 169.254.169.254 for instance metadata.
- DHCP traffic.
- Traffic to the reserved IP address for the default VPC router.

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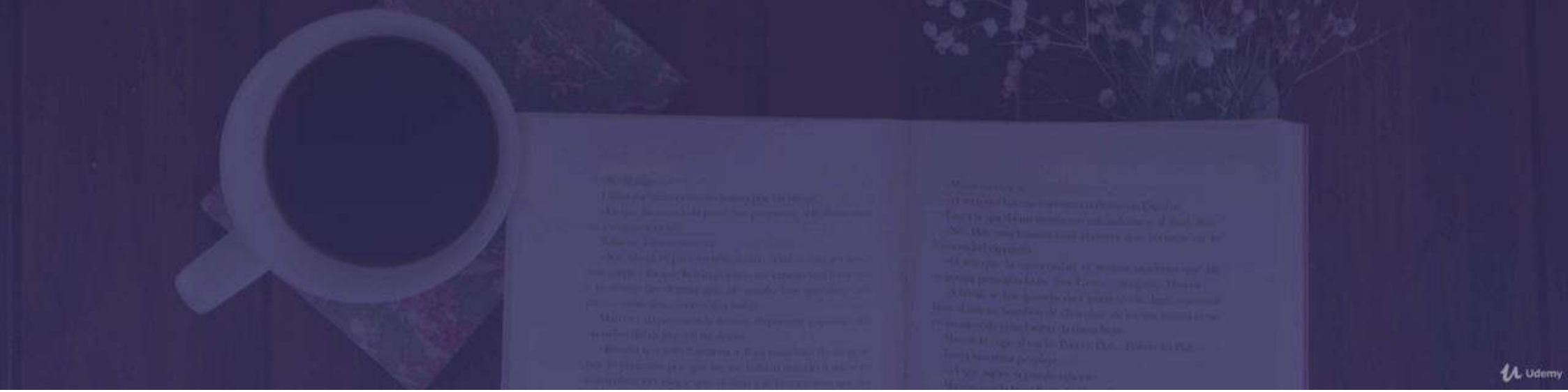
BASTION HOSTS

Exam Tips

A CLOUD GURU

Remember the following;

- A NAT Gateway or NAT Instance is used to provide internet traffic to EC2 instances in a private subnets.
- A Bastion is used to securely administer EC2 instances (Using SSH or RDP). Bastions are called Jump Boxes in Australia.
- You cannot use a NAT Gateway as a Bastion host.



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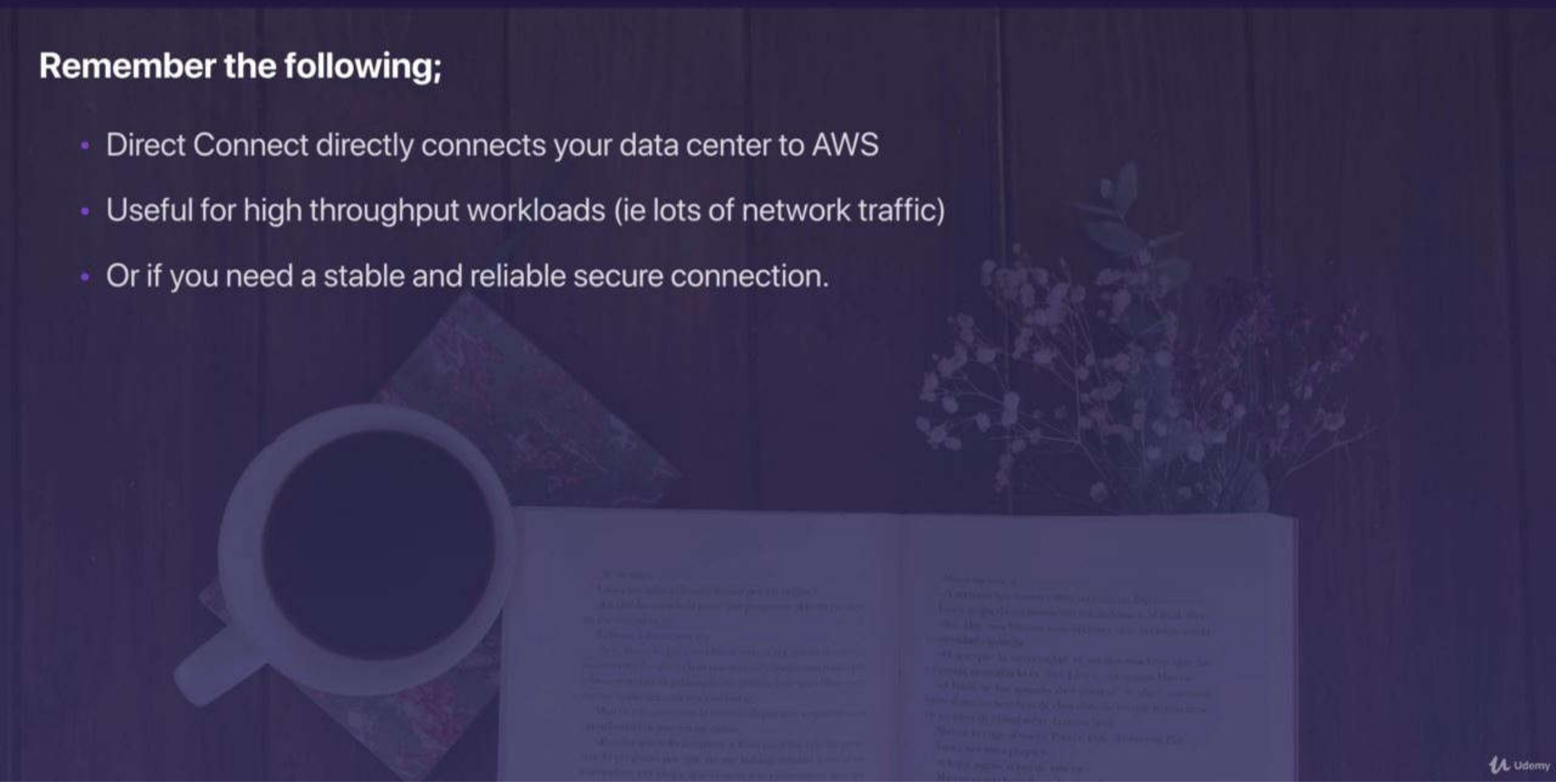
Exam Tips

Remember the following;

- Direct Connect directly connects your data center to AWS
- Useful for high throughput workloads (ie lots of network traffic)
- Or if you need a stable and reliable secure connection.



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VPC ENDPOINTS

Exam Tips

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An interface endpoint is an elastic network interface with a private IP address that serves as an entry point for traffic destined to a supported service. The following services are supported:

- Amazon API Gateway
- AWS CloudFormation
- Amazon CloudWatch
- Amazon CloudWatch Events
- Amazon CloudWatch Logs
- AWS CodeBuild
- AWS Config
- Amazon EC2 API
- Elastic Load Balancing API
- AWS Key Management Service
- Amazon Kinesis Data Streams
- Amazon SageMaker and Amazon SageMaker Runtime
- Amazon SageMaker Notebook Instance
- AWS Secrets Manager
- AWS Security Token Service
- AWS Service Catalog
- Amazon SNS
- Amazon SQS
- AWS Systems Manager
- Endpoint services hosted by other AWS accounts
- Supported AWS Marketplace partner services

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Exam Tips

A VPC Endpoint:

A VPC endpoint enables you to privately connect your VPC to supported AWS services and VPC endpoint services powered by PrivateLink without requiring an internet gateway, NAT device, VPN connection, or AWS Direct Connect connection. Instances in your VPC do not require public IP addresses to communicate with resources in the service. Traffic between your VPC and the other service does not leave the Amazon network.

Endpoints are virtual devices. They are horizontally scaled, redundant, and highly available VPC components that allow communication between instances in your VPC and services without imposing availability risks or bandwidth constraints on your network traffic.

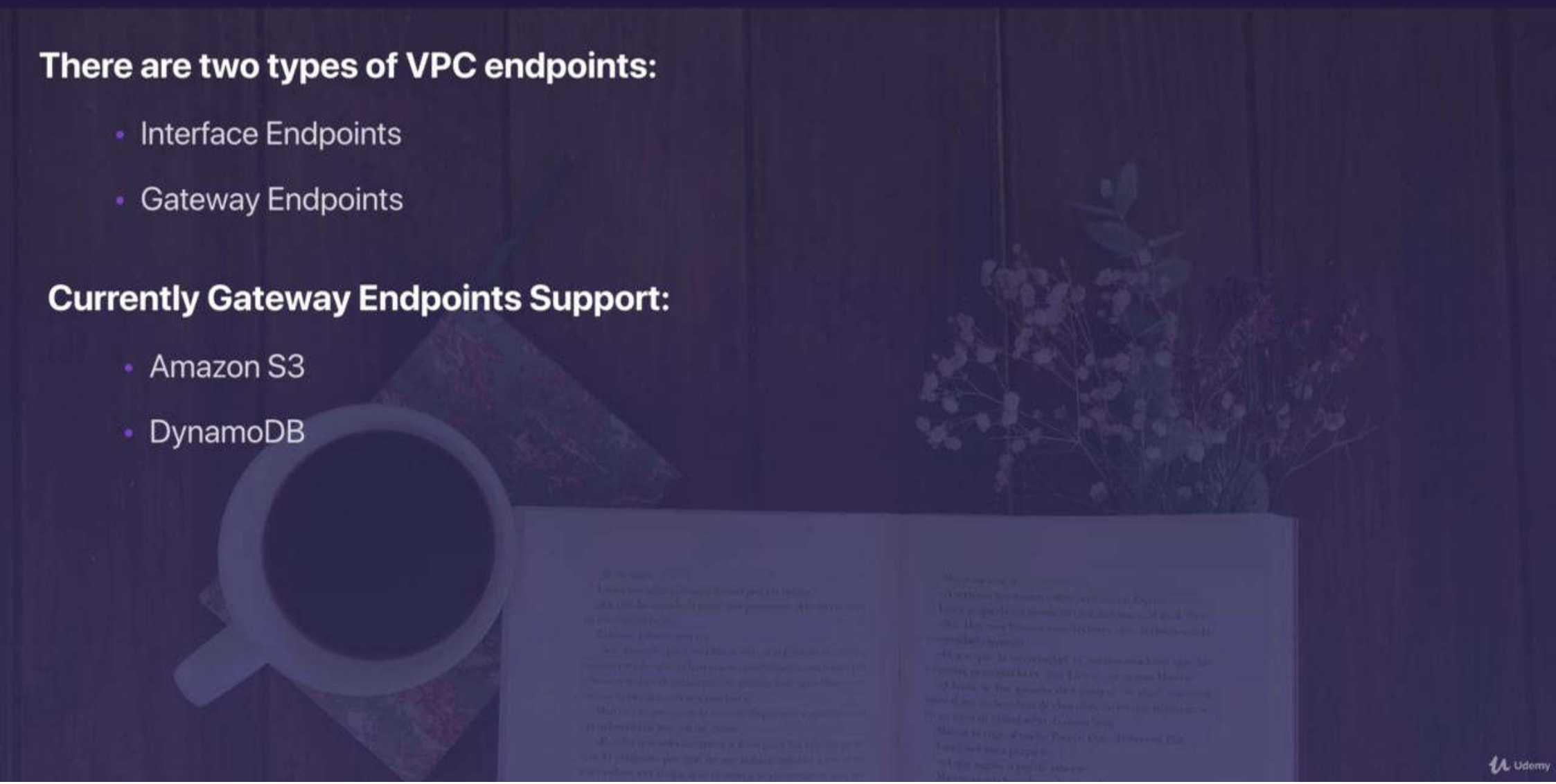
Exam Tips

There are two types of VPC endpoints:

- Interface Endpoints
- Gateway Endpoints

Currently Gateway Endpoints Support:

- Amazon S3
- DynamoDB



VPC SUMMARY

VPC Overview

A CLOUD GURU

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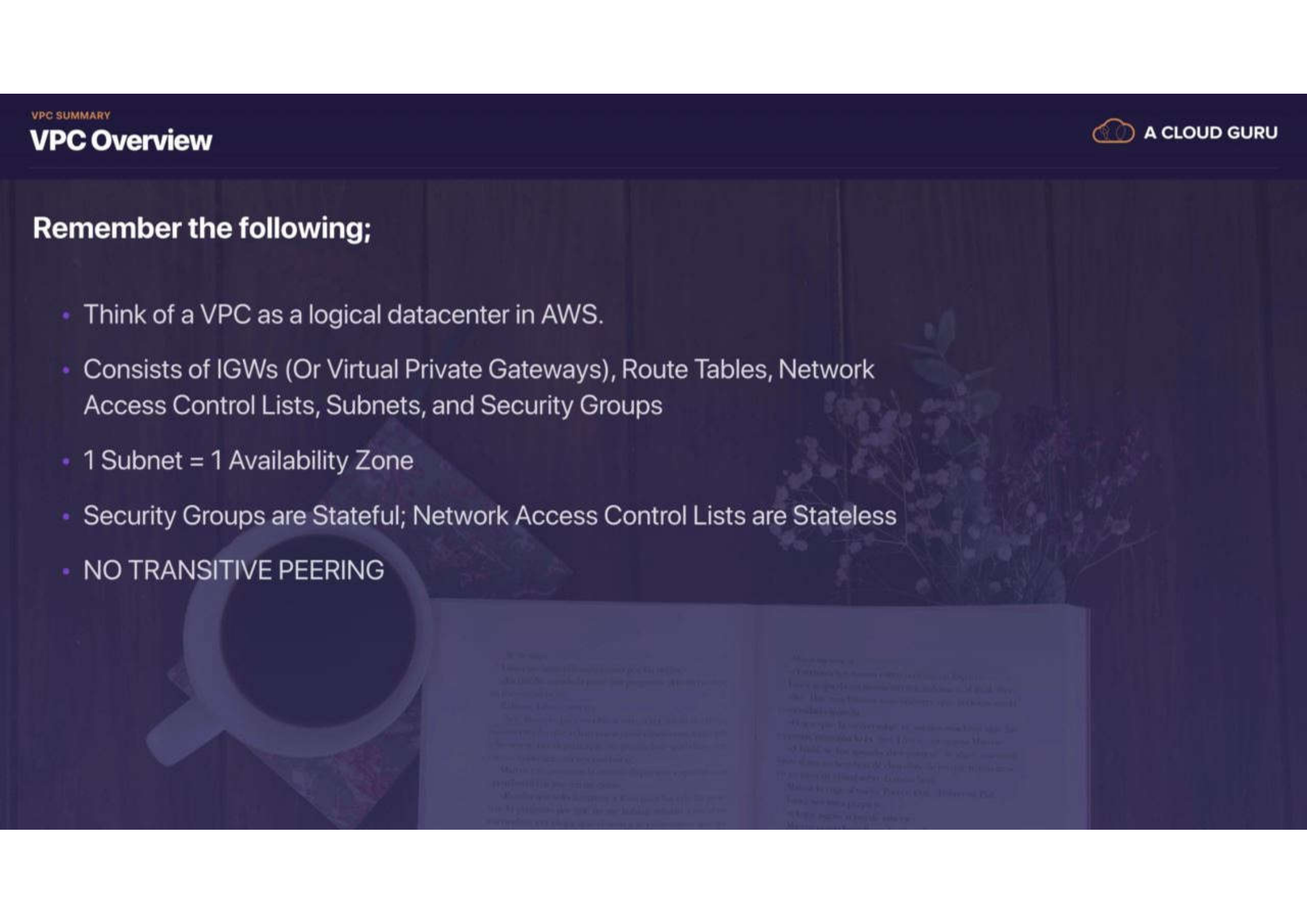

VPC SUMMARY

Building Our VPC

A CLOUD GURU

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NAT Instances vs NAT Gateways

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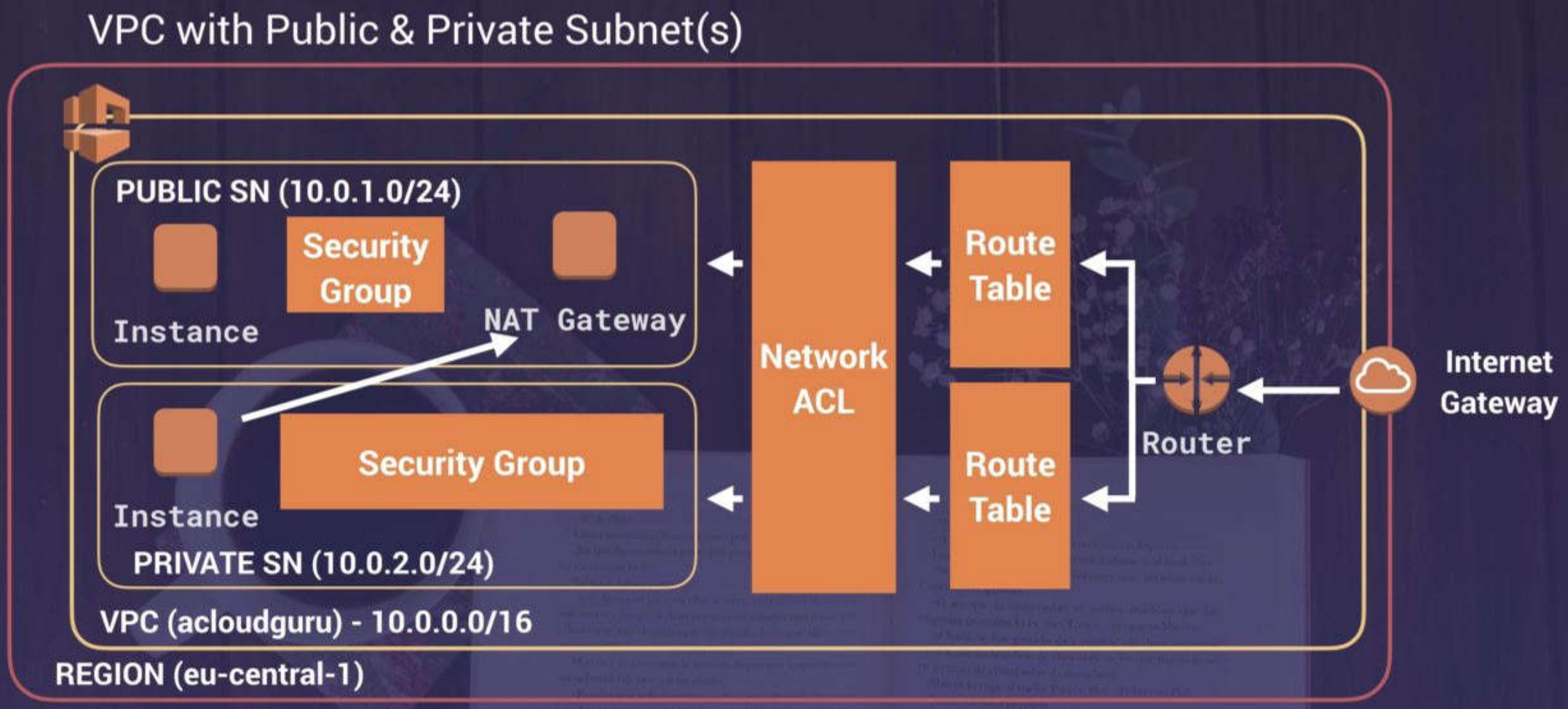
VPC SUMMARY

NAT Gateways Explained

A CLOUD GURU



VPC SUMMARY

NAT Instances vs NAT Gateways

A CLOUD GURU

Nat Gateways

- Redundant inside the Availability Zone
- Preferred by the enterprise
- Starts at 5Gbps and scales currently to 45Gbps
- No need to patch
- Not associated with security groups
- Automatically assigned a public ip address
- Remember to update your route tables.
- No need to disable Source/Destination Checks

NAT Instances vs NAT Gateways

Nat Gateways

- If you have resources in multiple Availability Zones and they share one NAT gateway, in the event that the NAT gateway's Availability Zone is down, resources in the other Availability Zones lose internet access. To create an Availability Zone-independent architecture, create a NAT gateway in each Availability Zone and configure your routing to ensure that resources use the NAT gateway in the same Availability Zone.

VPC SUMMARY

Network ACL's

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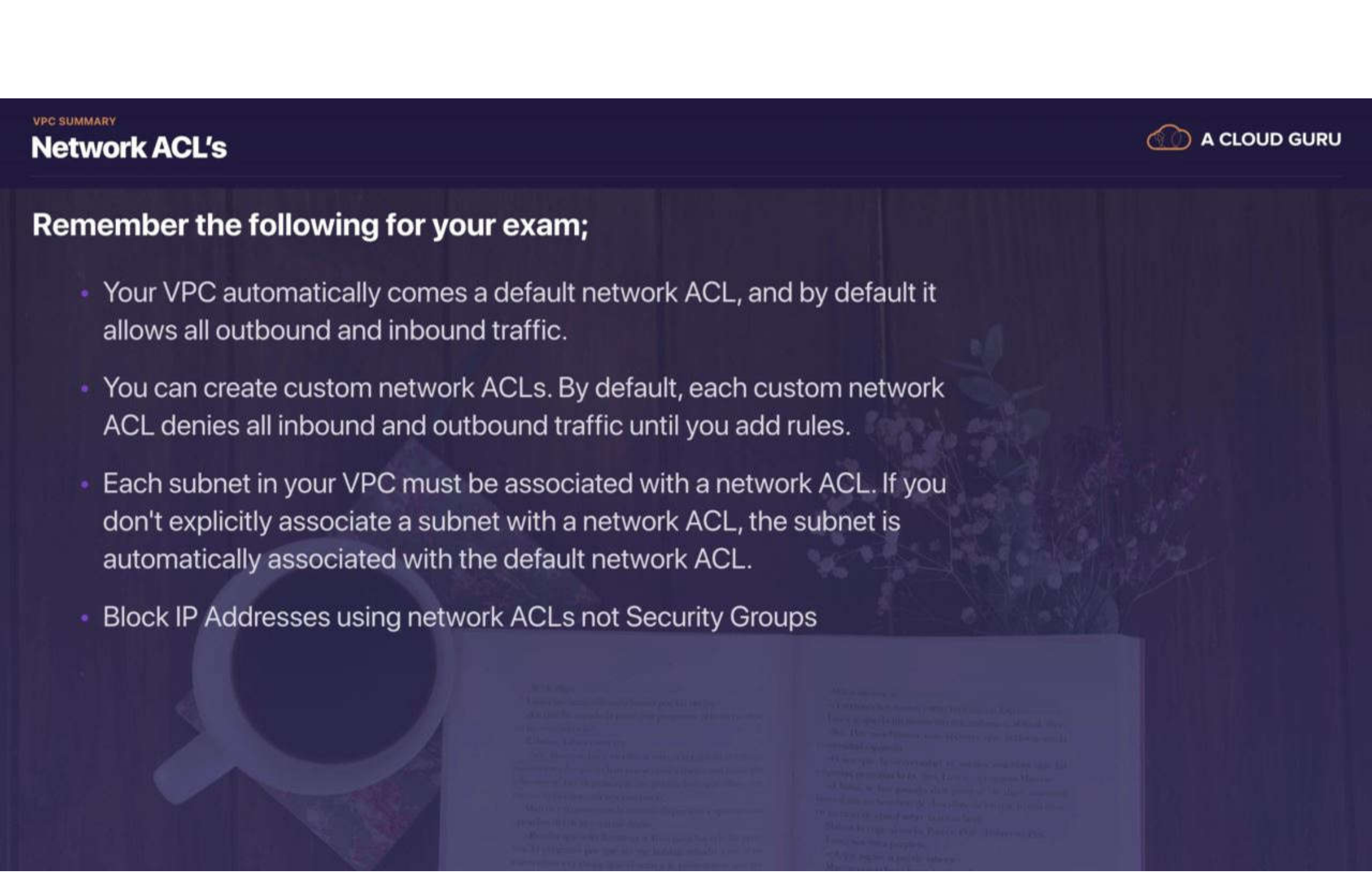
Remember the following for your exam;

- Your VPC automatically comes a default network ACL, and by default it allows all outbound and inbound traffic.
- You can create custom network ACLs. By default, each custom network ACL denies all inbound and outbound traffic until you add rules.
- Each subnet in your VPC must be associated with a network ACL. If you don't explicitly associate a subnet with a network ACL, the subnet is automatically associated with the default network ACL.
- Block IP Addresses using network ACLs not Security Groups



VPC SUMMARY

Network ACL's

A CLOUD GURU

Remember the following for your exam;

- You can associate a network ACL with multiple subnets; however, a subnet can be associated with only one network ACL at a time. When you associate a network ACL with a subnet, the previous association is removed.
- Network ACLs contain a numbered list of rules that is evaluated in order, starting with the lowest numbered rule.
- Network ACLs have separate inbound and outbound rules, and each rule can either allow or deny traffic.
- Network ACLs are stateless; responses to allowed inbound traffic are subject to the rules for outbound traffic (and vice versa.)

VPC SUMMARY

ELB's And VPCs

A CLOUD GURU

Remember the following for your exam;

- You need a minimum of two public subnets to deploy an internet facing loadbalancer.

VPC SUMMARY

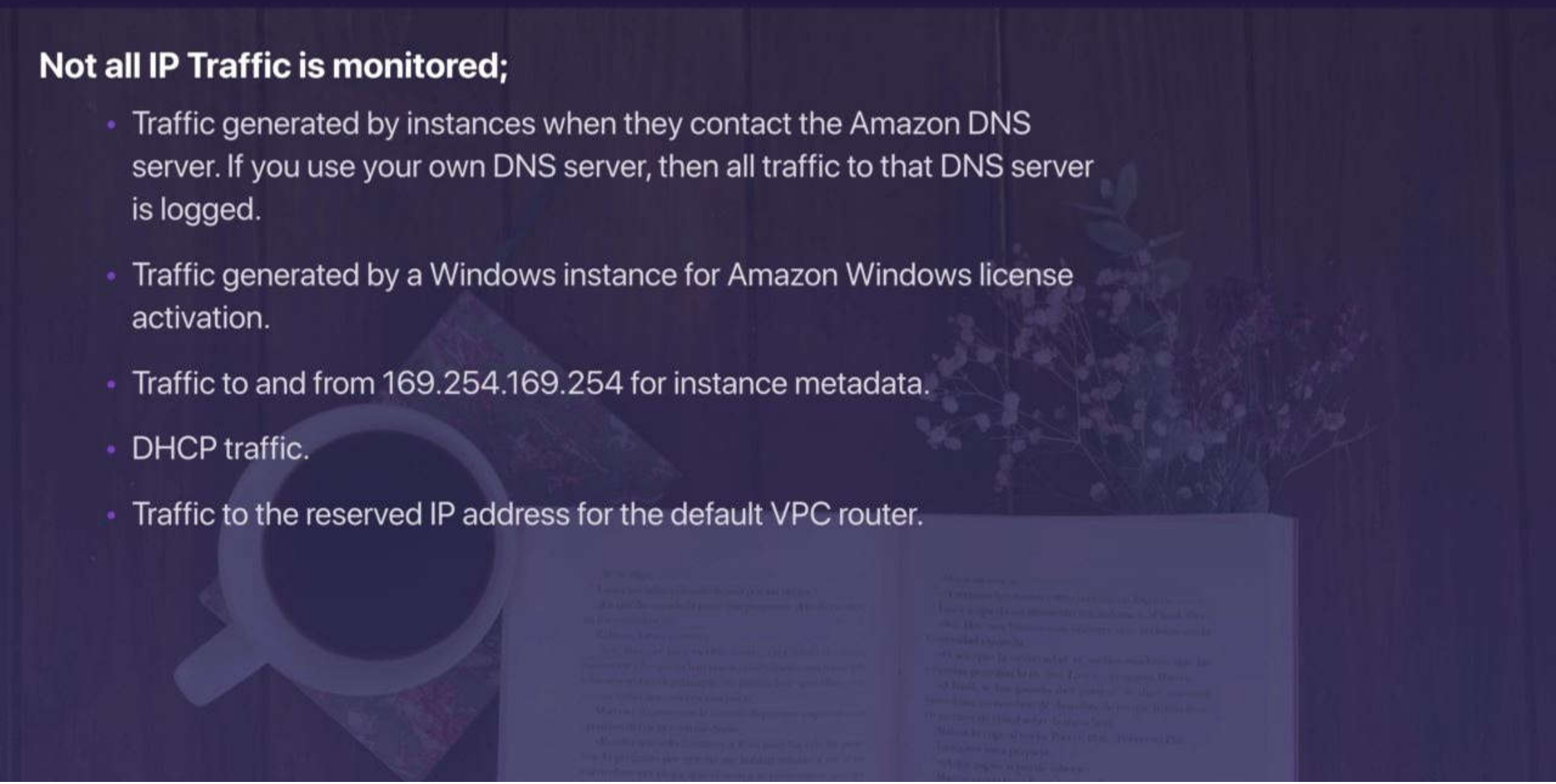
VPC Flow Logs

A CLOUD GURU

Remember the following;

- You cannot enable flow logs for VPCs that are peered with your VPC unless the peer VPC is in your account.
- You cannot tag a flow log.
- After you've created a flow log, you cannot change its configuration; for example, you can't associate a different IAM role with the flow log.

VPC Flow Logs



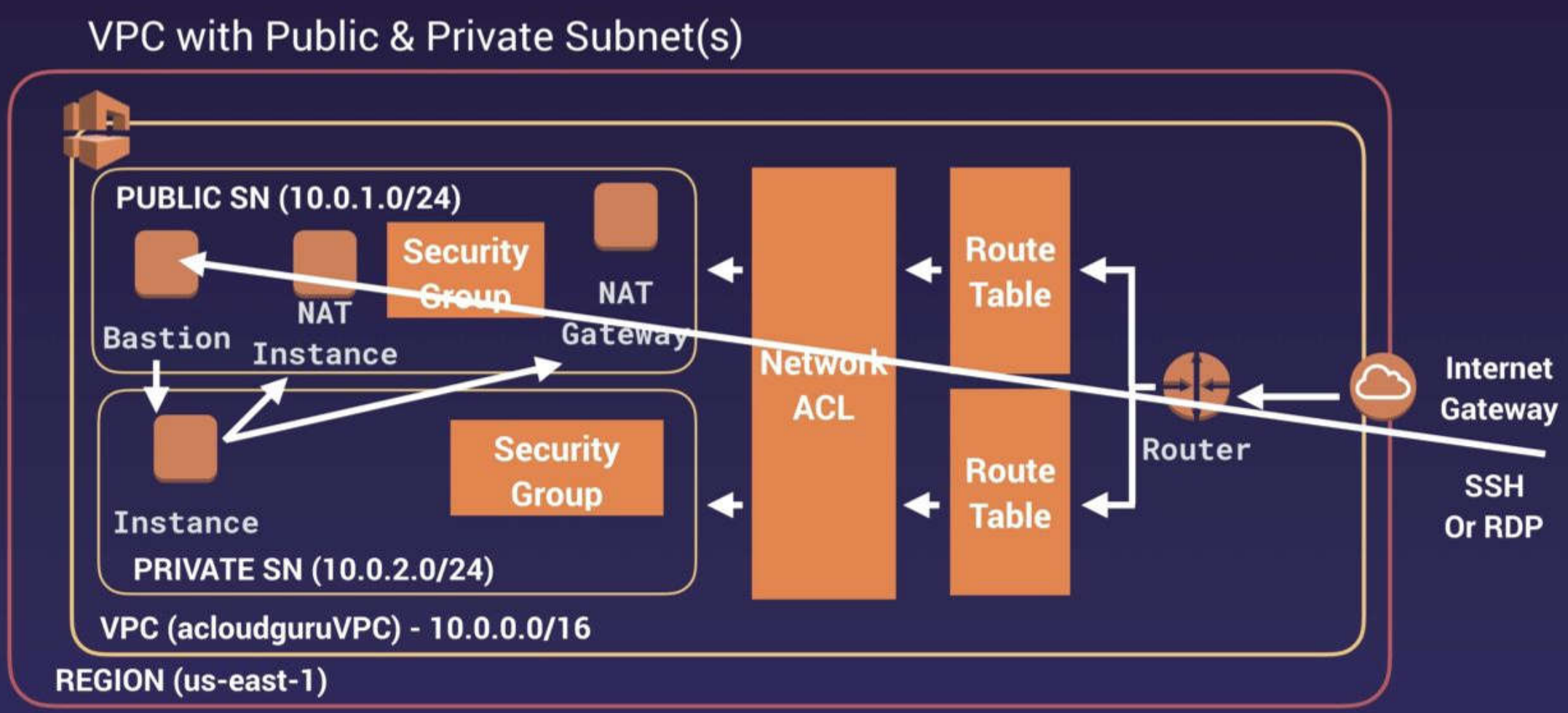
Not all IP Traffic is monitored;

- Traffic generated by instances when they contact the Amazon DNS server. If you use your own DNS server, then all traffic to that DNS server is logged.
- Traffic generated by a Windows instance for Amazon Windows license activation.
- Traffic to and from 169.254.169.254 for instance metadata.
- DHCP traffic.
- Traffic to the reserved IP address for the default VPC router.

VPC SUMMARY

Bastions In Action

A CLOUD GURU



VPC SUMMARY

Bastions vs NAT Gateways/Instances

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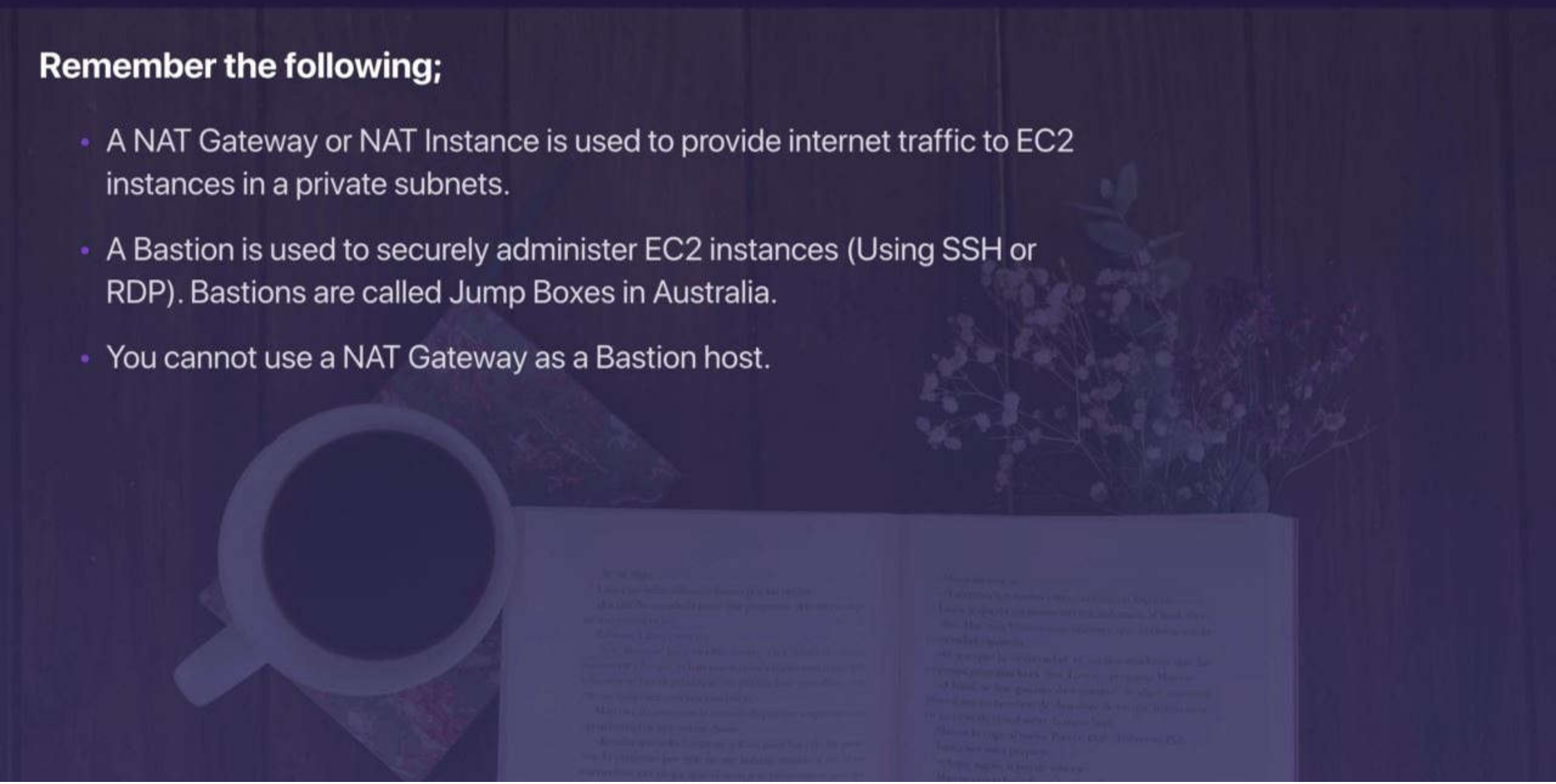

Remember the following;

- A NAT Gateway or NAT Instance is used to provide internet traffic to EC2 instances in a private subnets.
- A Bastion is used to securely administer EC2 instances (Using SSH or RDP). Bastions are called Jump Boxes in Australia.
- You cannot use a NAT Gateway as a Bastion host.

VPC SUMMARY

Direct Connect

A CLOUD GURU

Remember the following;

- Direct Connect directly connects your data center to AWS
- Useful for high throughput workloads (ie lots of network traffic)
- Or if you need a stable and reliable secure connection.

VPC SUMMARY

VPC Endpoints

A CLOUD GURU

A VPC Endpoint:

A VPC endpoint enables you to privately connect your VPC to supported AWS services and VPC endpoint services powered by PrivateLink without requiring an internet gateway, NAT device, VPN connection, or AWS Direct Connect connection. Instances in your VPC do not require public IP addresses to communicate with resources in the service. Traffic between your VPC and the other service does not leave the Amazon network.

Endpoints are virtual devices. They are horizontally scaled, redundant, and highly available VPC components that allow communication between instances in your VPC and services without imposing availability risks or bandwidth constraints on your network traffic.

VPC SUMMARY

VPC Endpoints

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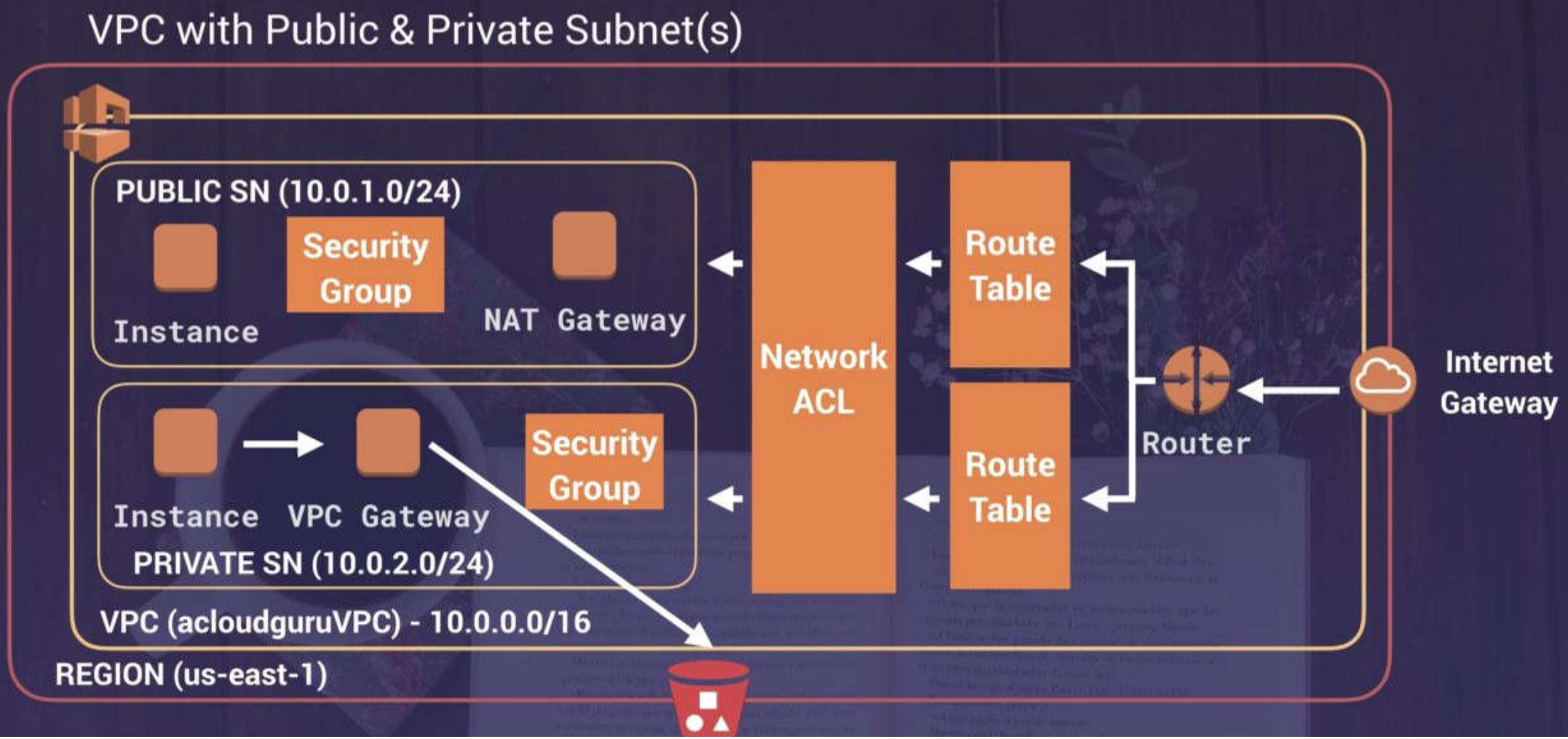

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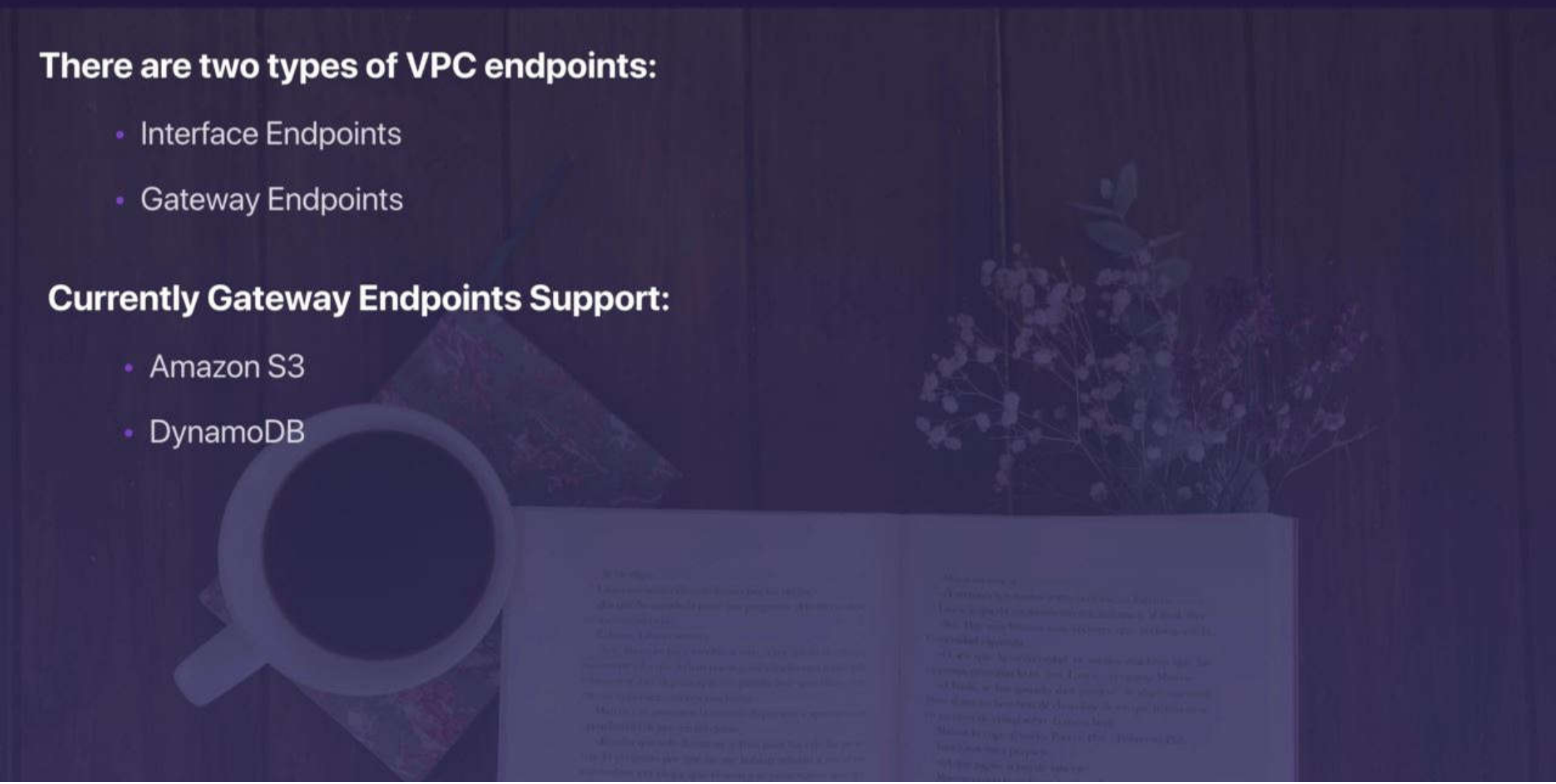


There are two types of VPC endpoints:

- Interface Endpoints
- Gateway Endpoints

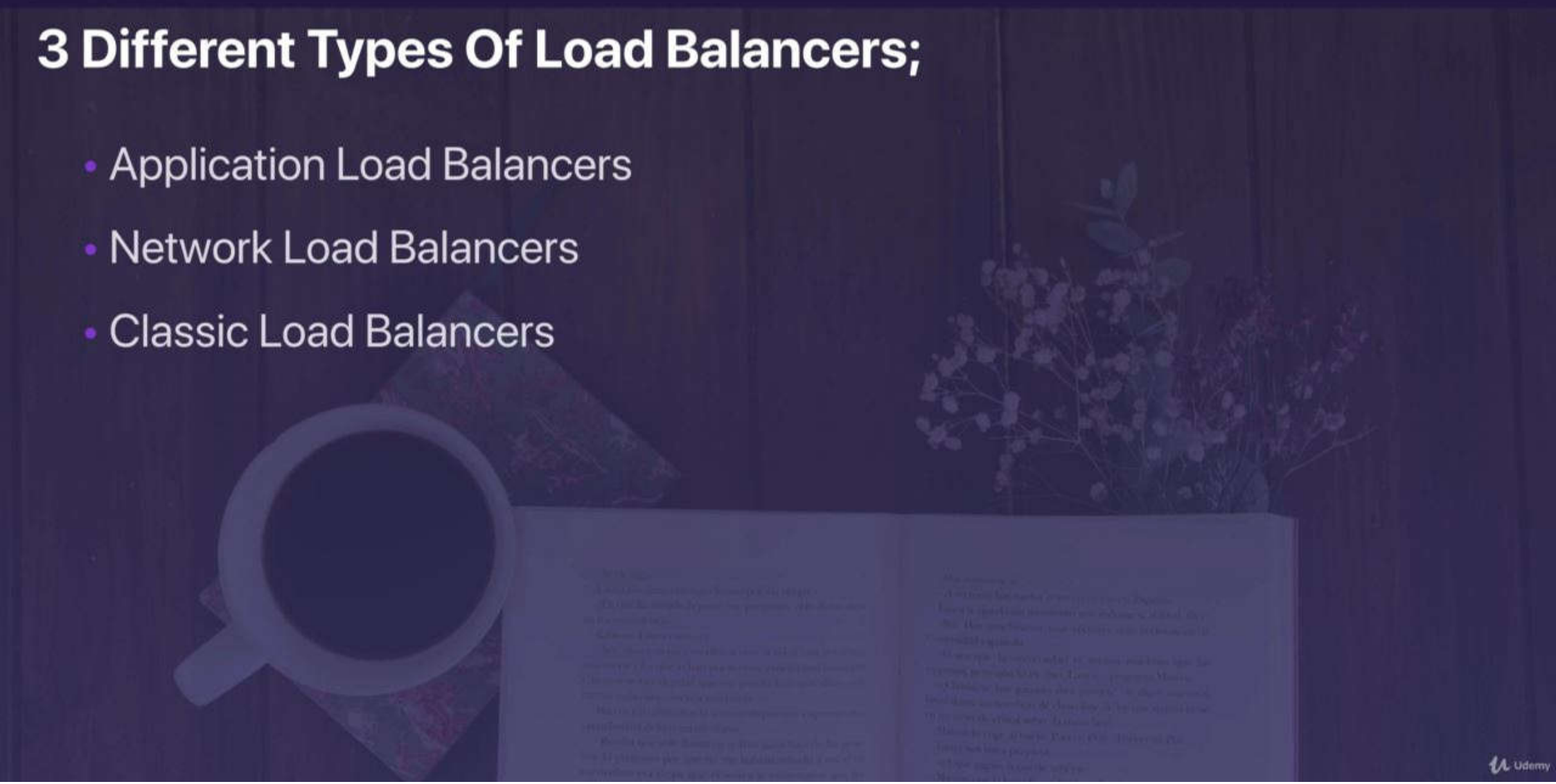
Currently Gateway Endpoints Support:

- Amazon S3
- DynamoDB

Exam Tips

3 Different Types Of Load Balancers;

- Application Load Balancers
- Network Load Balancers
- Classic Load Balancers



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LOAD BALANCERS

Exam Tips

A CLOUD GURU

- 504 Error means the gateway has timed out. This means that the application not responding within the idle timeout period.
- Trouble shoot the application. Is it the Web Server or Database Server?

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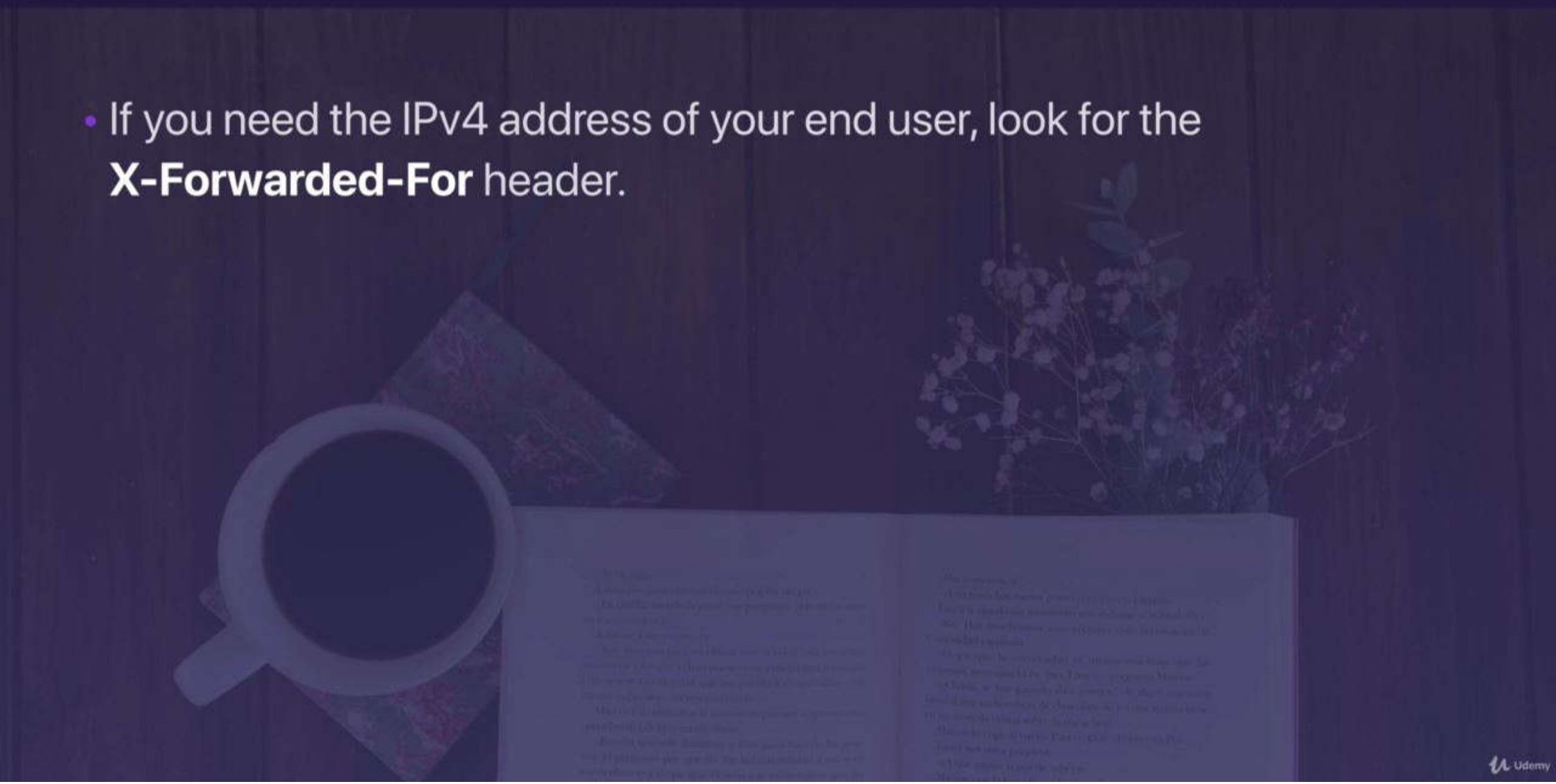
Exam Tips

- If you need the IPv4 address of your end user, look for the **X-Forwarded-For** header.



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LOAD BALANCERS & HEALTH CHECKS

Exam Tips

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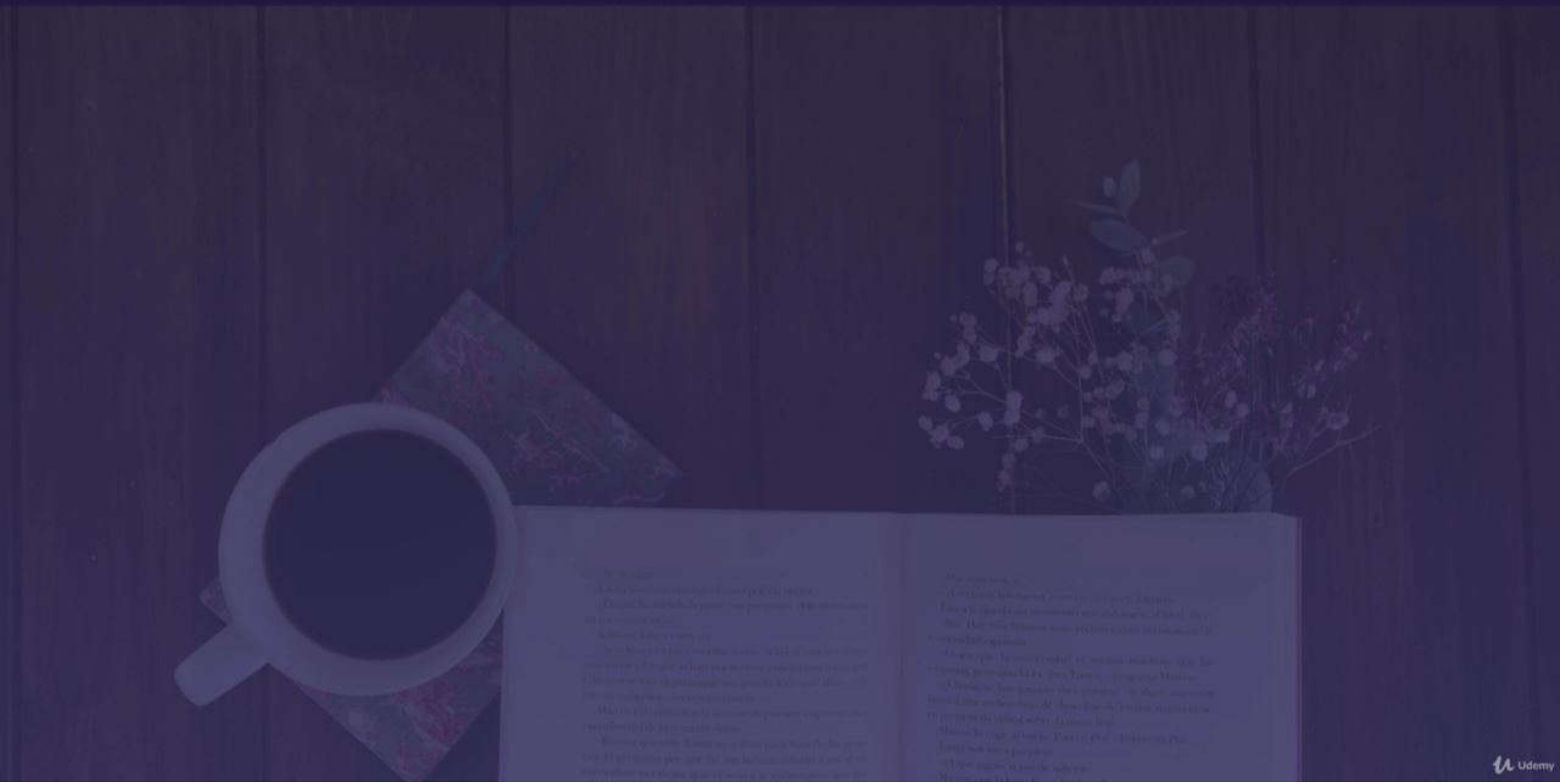

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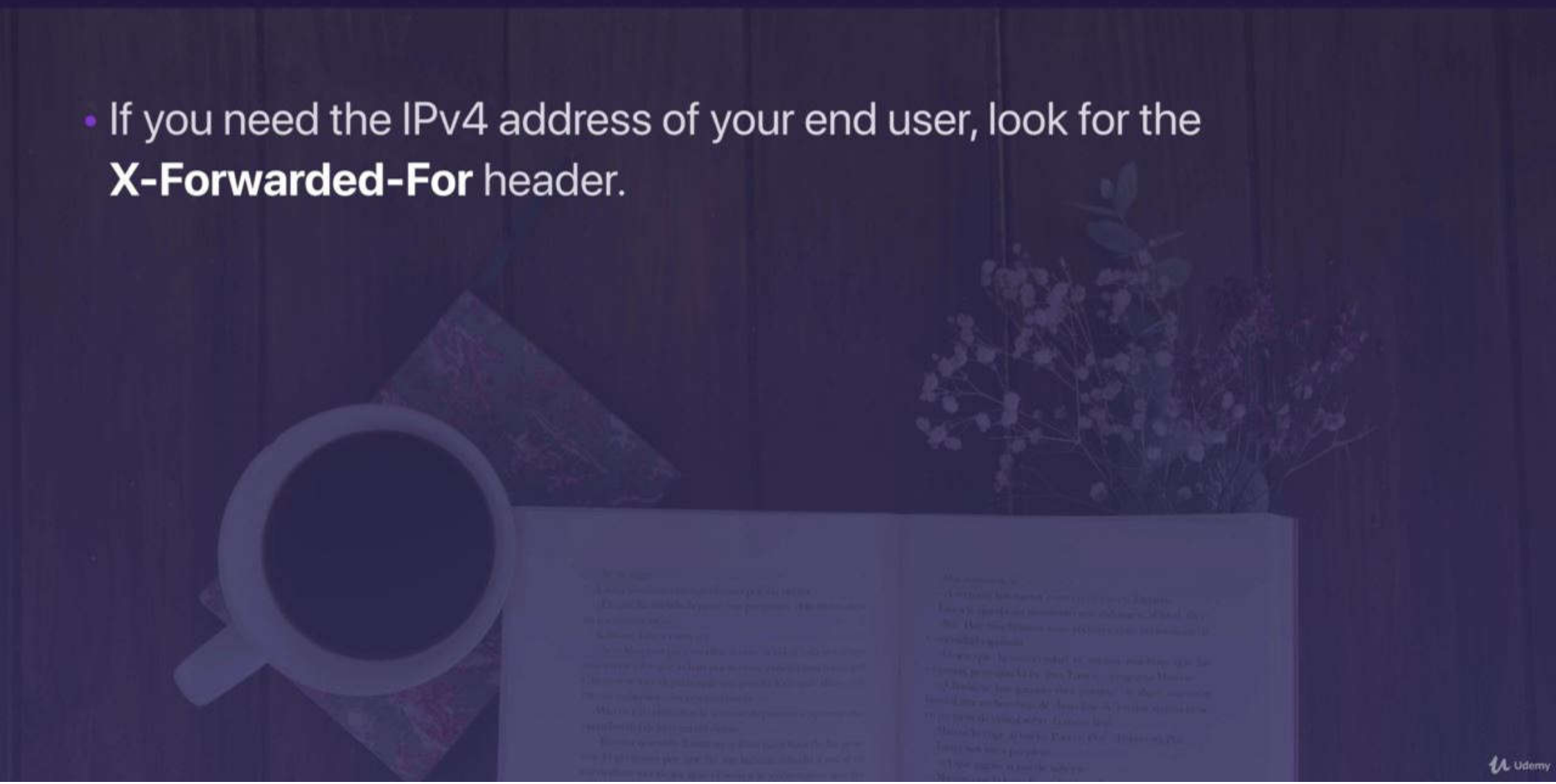

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Exam Tips

- Instances monitored by ELB are reported as ; InService , or OutofService
- Health Checks check the instance health by talking to it.
- Load Balances have their own DNS name. You are never given an IP address.
- Read the ELB FAQ for Classic Load Balancers.
- Want to deep dive on application load balancers? Check out our deep dive course!

Advanced Load Balancer Theory

- Sticky Sessions enable your users to stick to the same EC2 instance. Can be useful if you are storing information locally to that instance.
- Cross Zone Load Balancing enables you to load balance across multiple availability zones.
- Path patters allow you to direct traffic to different EC2 instances based on the URL contained in the request.

HA Sample Exam Question

Scenario: You have a website that requires a minimum of 6 instances and it must be highly available. You must also be able to tolerate the failure of 1 Availability Zone. What is the ideal architecture for this environment while also being the most cost effective?

- 2 Availability Zones with 2 instances in each AZ.
- 3 Availability Zones with 3 instances in each AZ.
- 1 Availability Zone with 6 instances in each AZ.
- 3 Availability Zones with 2 instances in each AZ.

HA Architecture Exam Tips

Remember the following

- Always Design for failure.
- Use Multiple AZ's and Multiple Regions where ever you can.
- Know the difference between Multi-AZ and Read Replicas for RDS.
- Know the difference between scaling out and scaling up.
- Read the question carefully and always consider the cost element.
- Know the different S3 storage classes.

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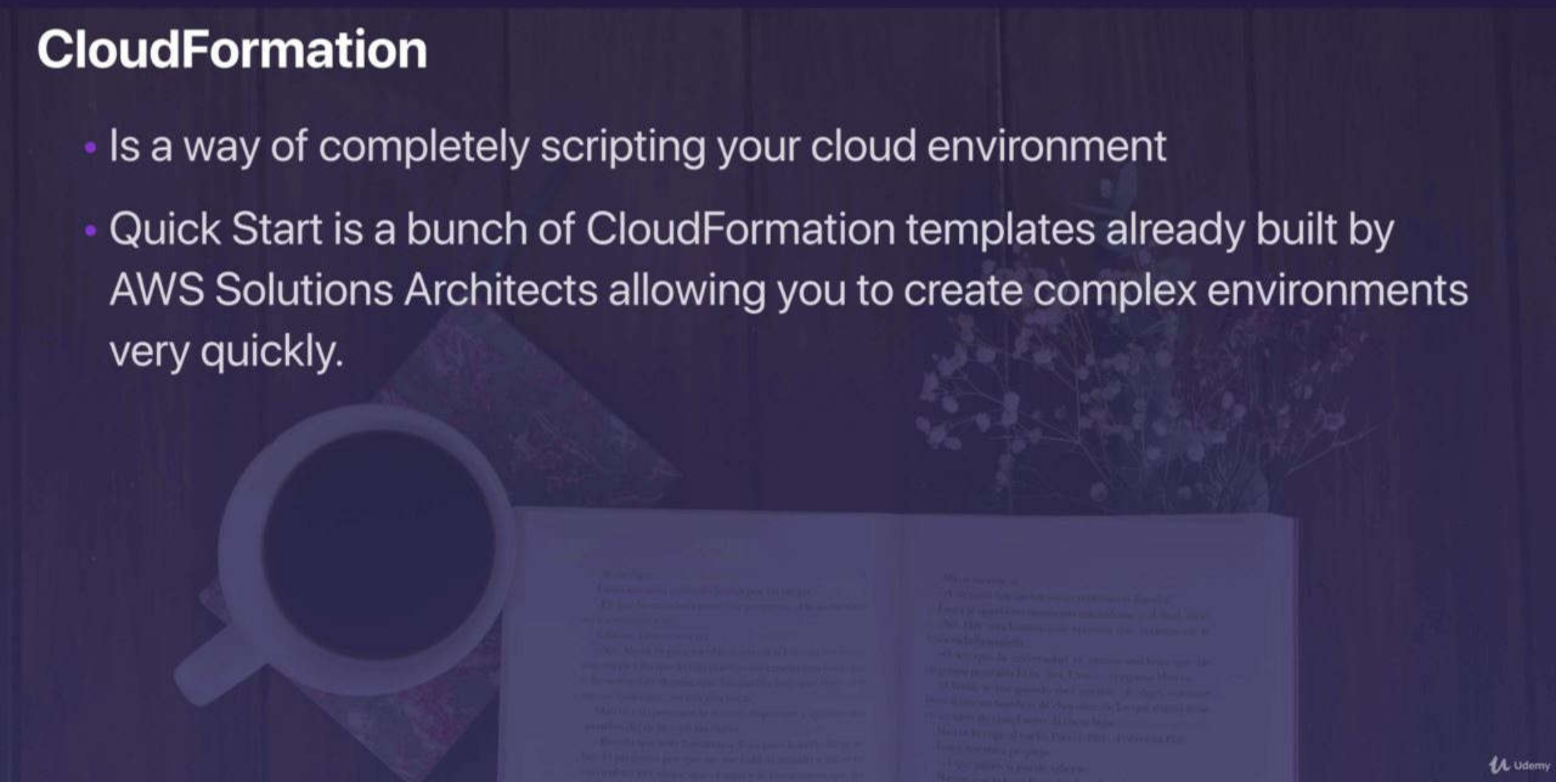
CloudFormation

- Is a way of completely scripting your cloud environment
- Quick Start is a bunch of CloudFormation templates already built by AWS Solutions Architects allowing you to create complex environments very quickly.



Exam Tips

With Elastic Beanstalk, you can quickly deploy and manage applications in the AWS Cloud without worrying about the infrastructure that runs those applications. You simply upload your application, and Elastic Beanstalk automatically handles the details of capacity provisioning, load balancing, scaling, and application health monitoring.

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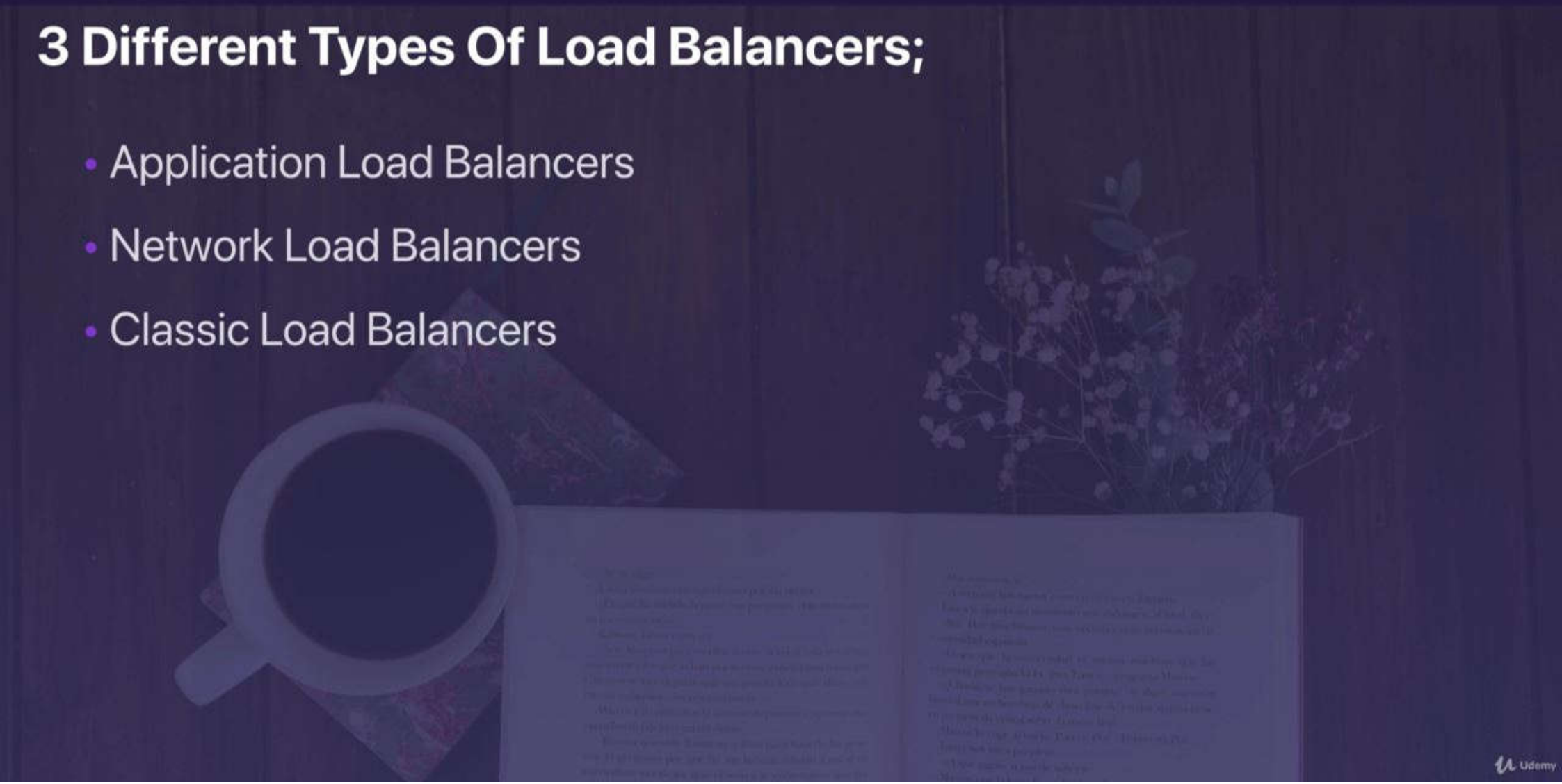

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LOAD BALANCERS

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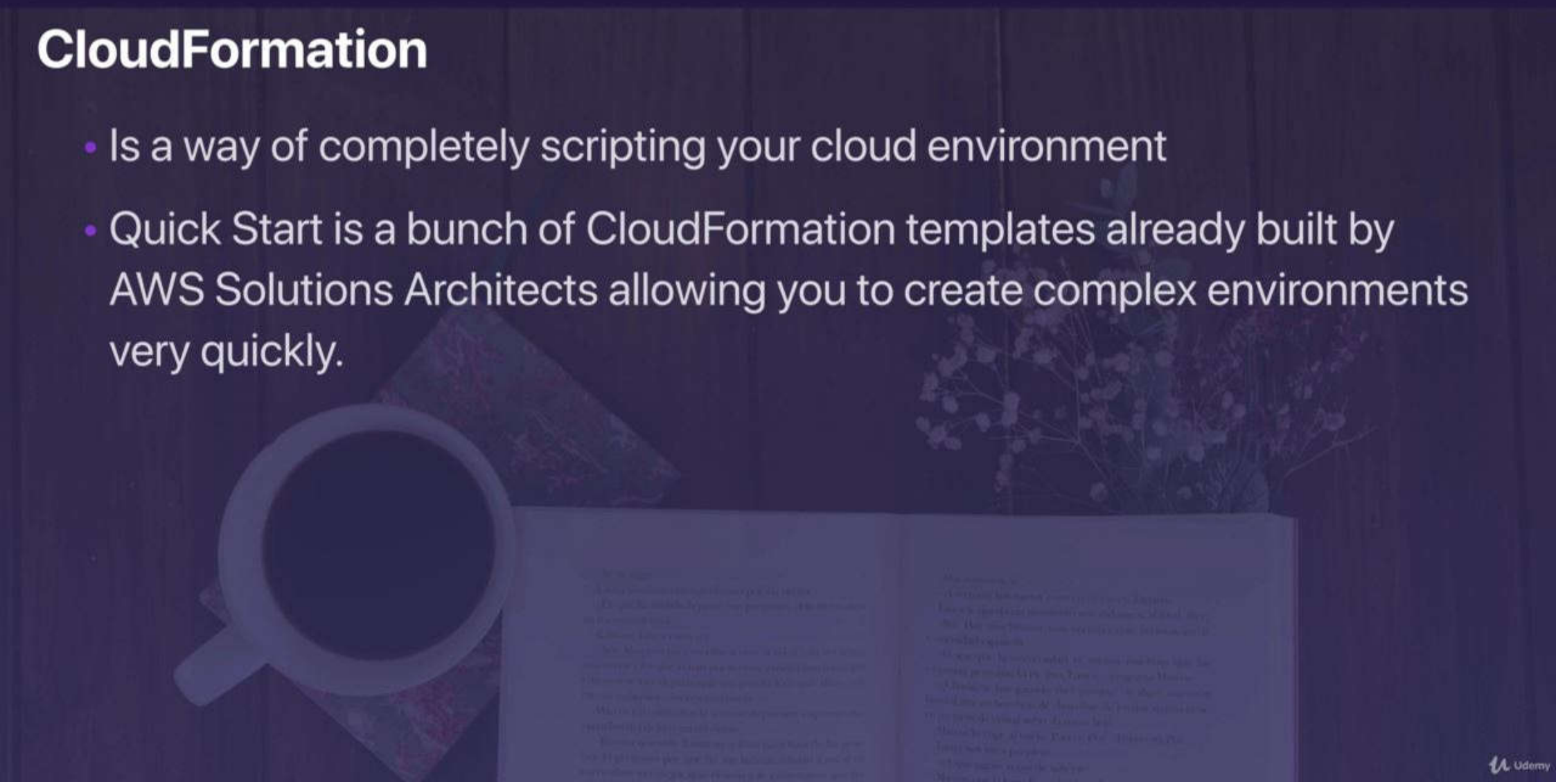

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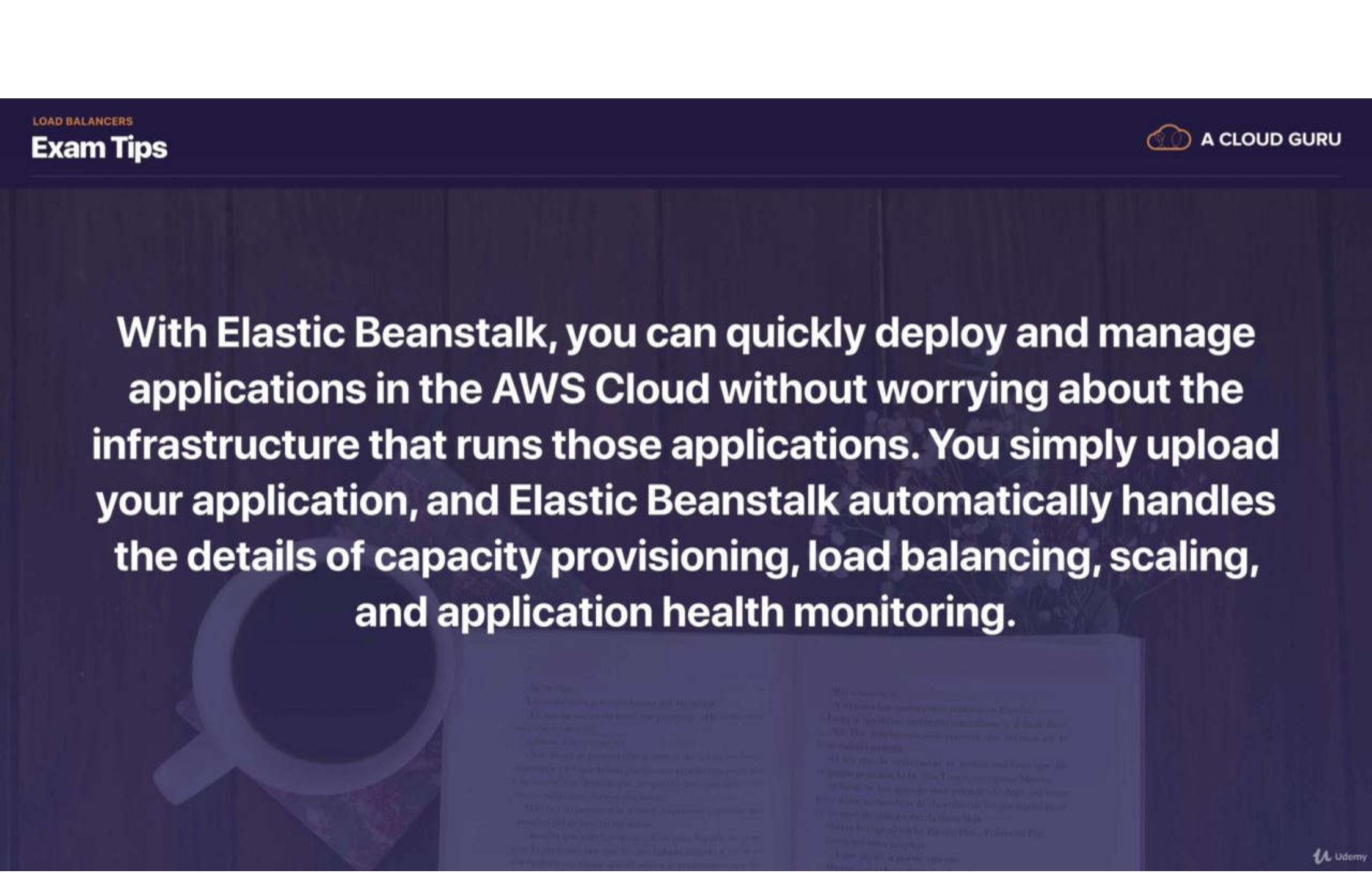
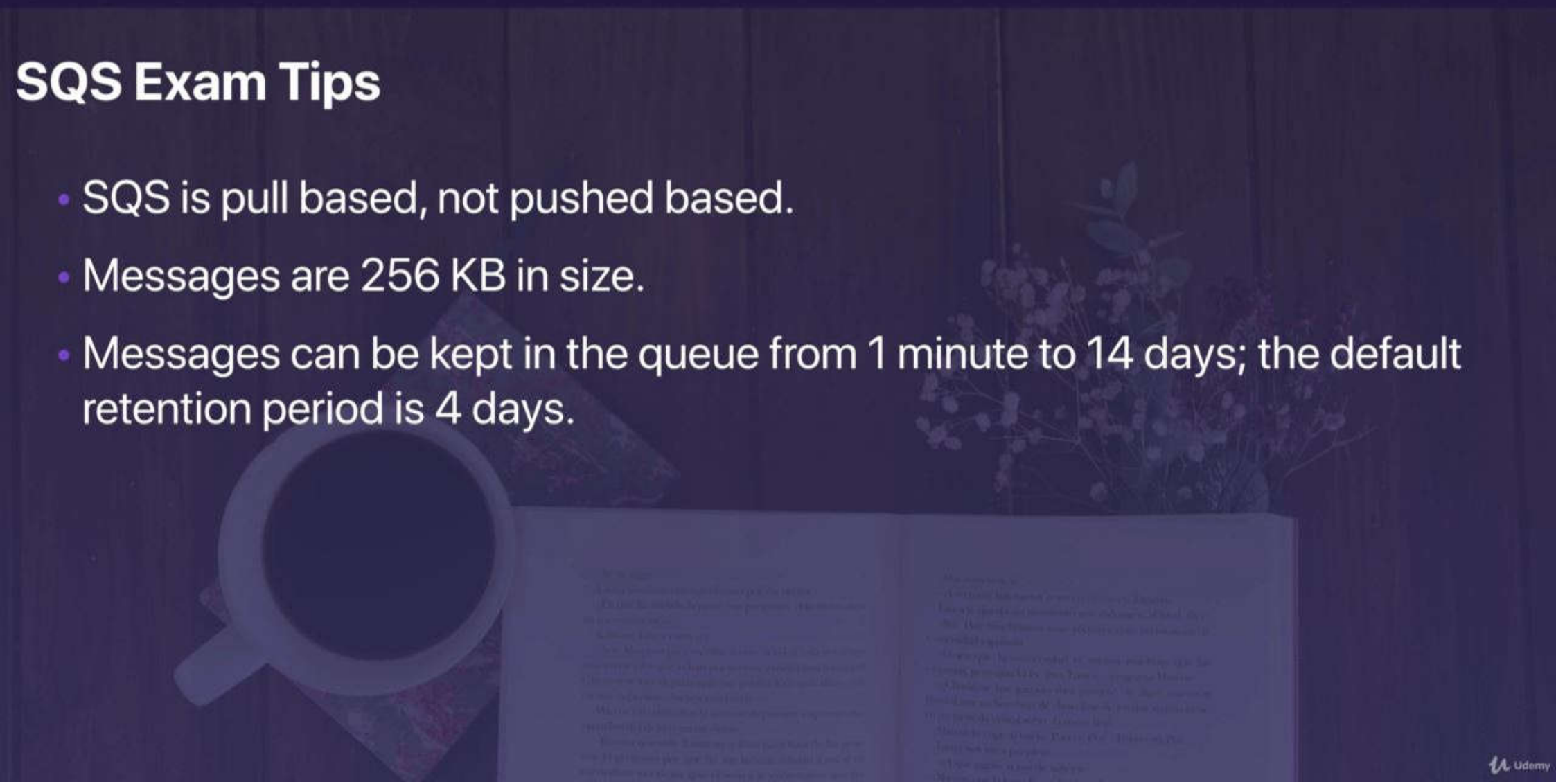


SQS Exam Tips

- SQS is pull based, not pushed based.
- Messages are 256 KB in size.
- Messages can be kept in the queue from 1 minute to 14 days; the default retention period is 4 days.



SQS Exam Tips

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- Visibility timeout maximum is 12 hours.

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SQS Exam Tips

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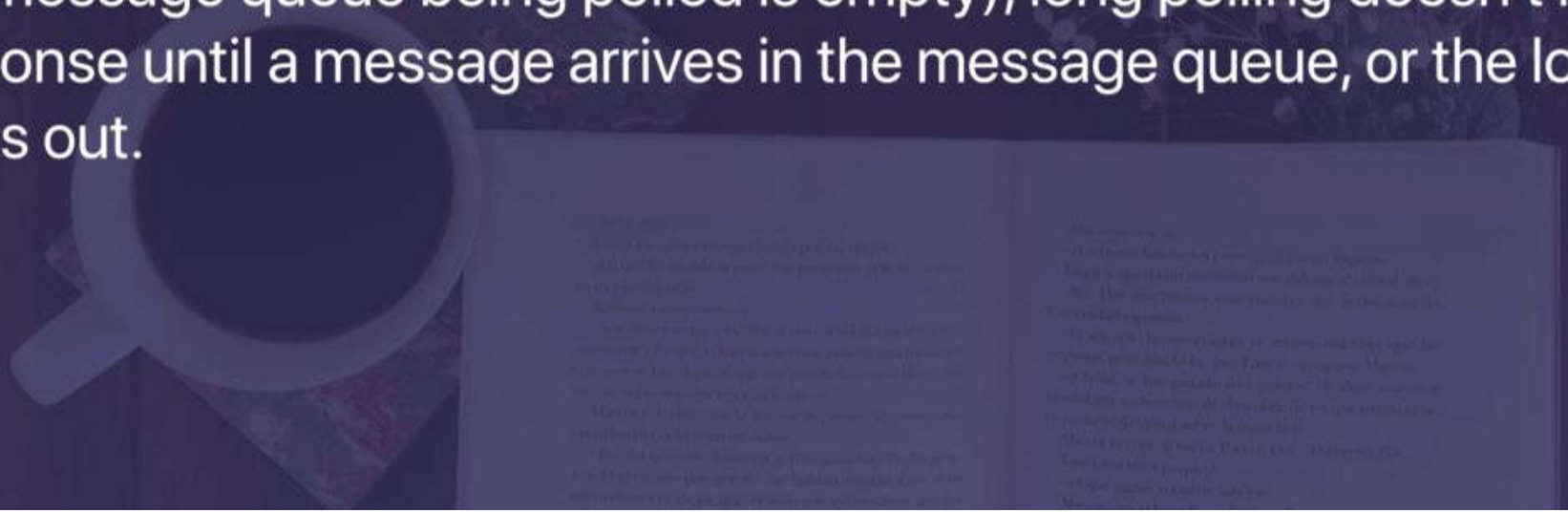

SWF vs SQS

- SQS has a retention period of up to 14 days; with SWF, workflow executions can last up to 1 year.
- Amazon SWF presents a task-oriented API, whereas Amazon SQS offers a message-oriented API.
- Amazon SWF ensures that a task is assigned only once and is never duplicated. With Amazon SQS, you need to handle duplicated messages and may also need to ensure that a message is processed only once.
- Amazon SWF keeps track of all the tasks and events in an application. With Amazon SQS, you need to implement your own application-level tracking, especially if your application uses multiple queues.

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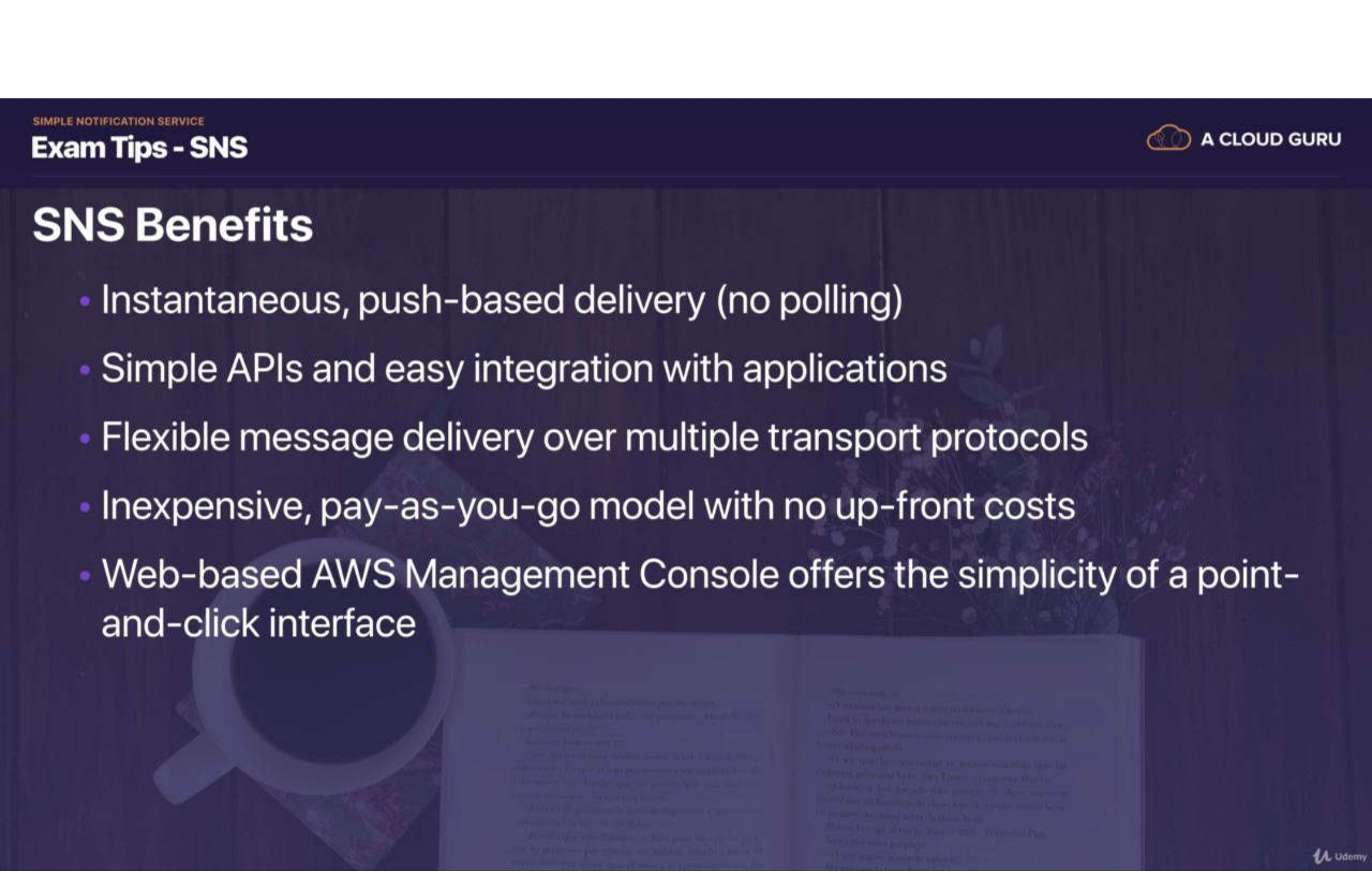
SWF Actors

- Workflow Starters — An application that can initiate (start) a workflow. Could be your e-commerce website following the placement of an order, or a mobile app searching for bus times.
- Deciders — Control the flow of activity tasks in a workflow execution. If something has finished (or failed) in a workflow, a Decider decides what to do next.
- Activity Workers — Carry out the activity tasks.

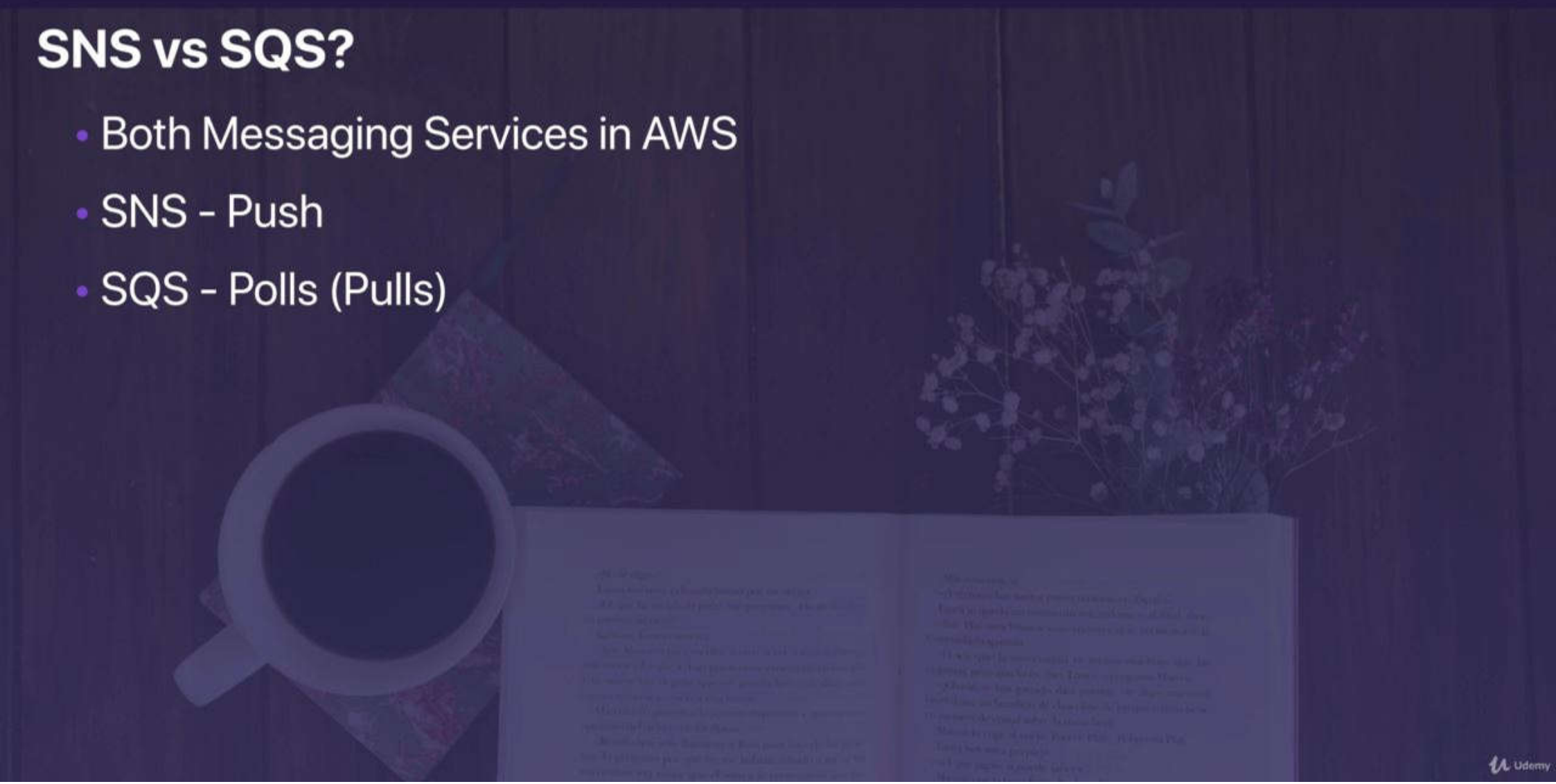
SNS Benefits

- Instantaneous, push-based delivery (no polling)
- Simple APIs and easy integration with applications
- Flexible message delivery over multiple transport protocols
- Inexpensive, pay-as-you-go model with no up-front costs
- Web-based AWS Management Console offers the simplicity of a point-and-click interface



SNS vs SQS?

- Both Messaging Services in AWS
- SNS - Push
- SQS - Polls (Pulls)



Exam Tips - Elastic Transcoder

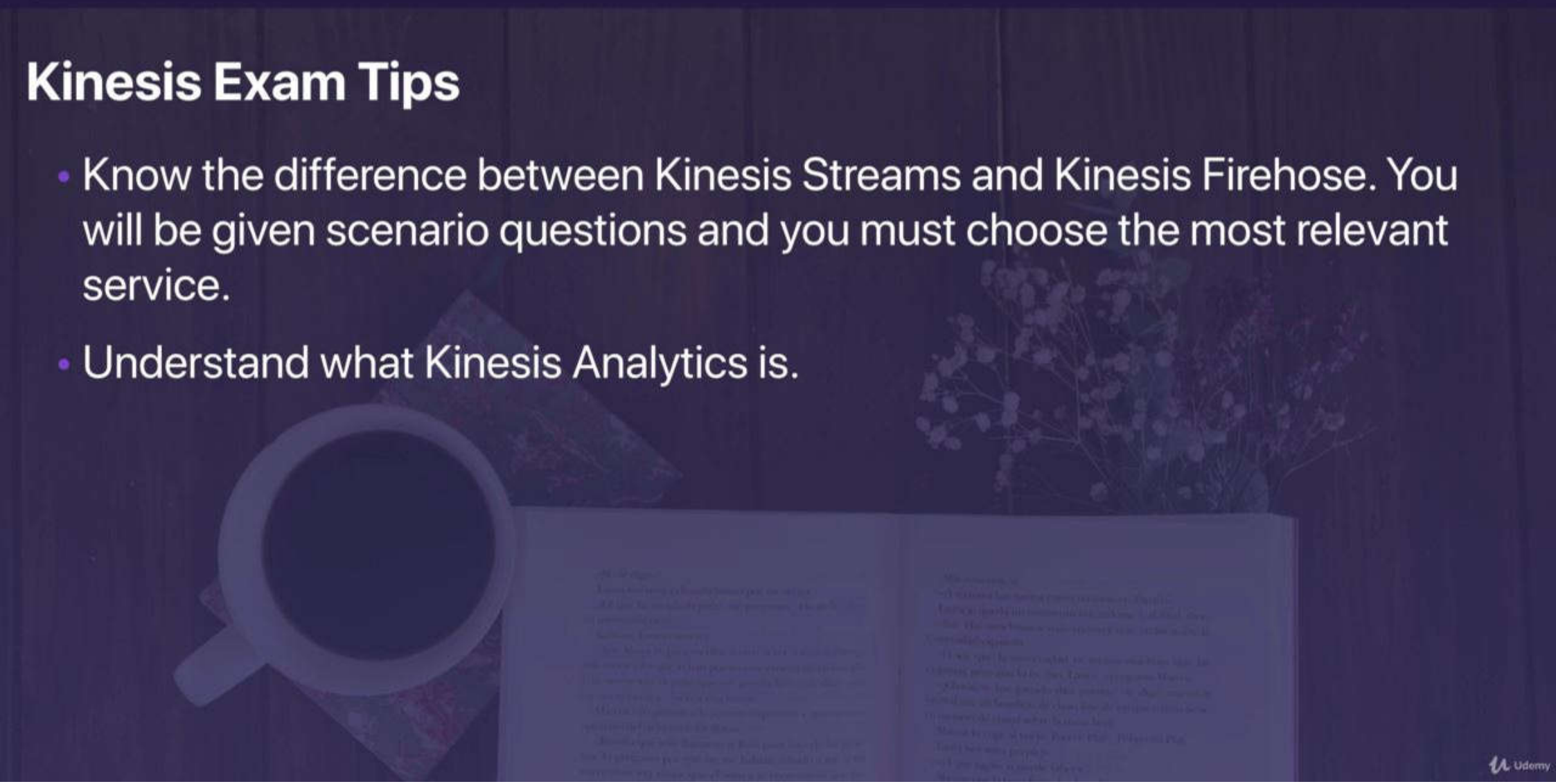
Just remember that Elastic Transcoder is a media transcoder in the cloud. It converts media files from their original source format in to different formats that will play on smartphones, tablets, PCs, etc.

API Gateway Exam Tips

- Remember what API Gateway is at a high level
- API Gateway has caching capabilities to increase performance
- API Gateway is low cost and scales automatically
- You can throttle API Gateway to prevent attacks
- You can log results to CloudWatch
- If you are using Javascript/AJAX that uses multiple domains with API Gateway, ensure that you have enabled CORS on API Gateway
- CORS is enforced by the client

Kinesis Exam Tips

- Know the difference between Kinesis Streams and Kinesis Firehose. You will be given scenario questions and you must choose the most relevant service.
- Understand what Kinesis Analytics is.



Cognito Exam Tips

- Federation allows users to authenticate with a Web Identity Provider (Google, Facebook, Amazon)
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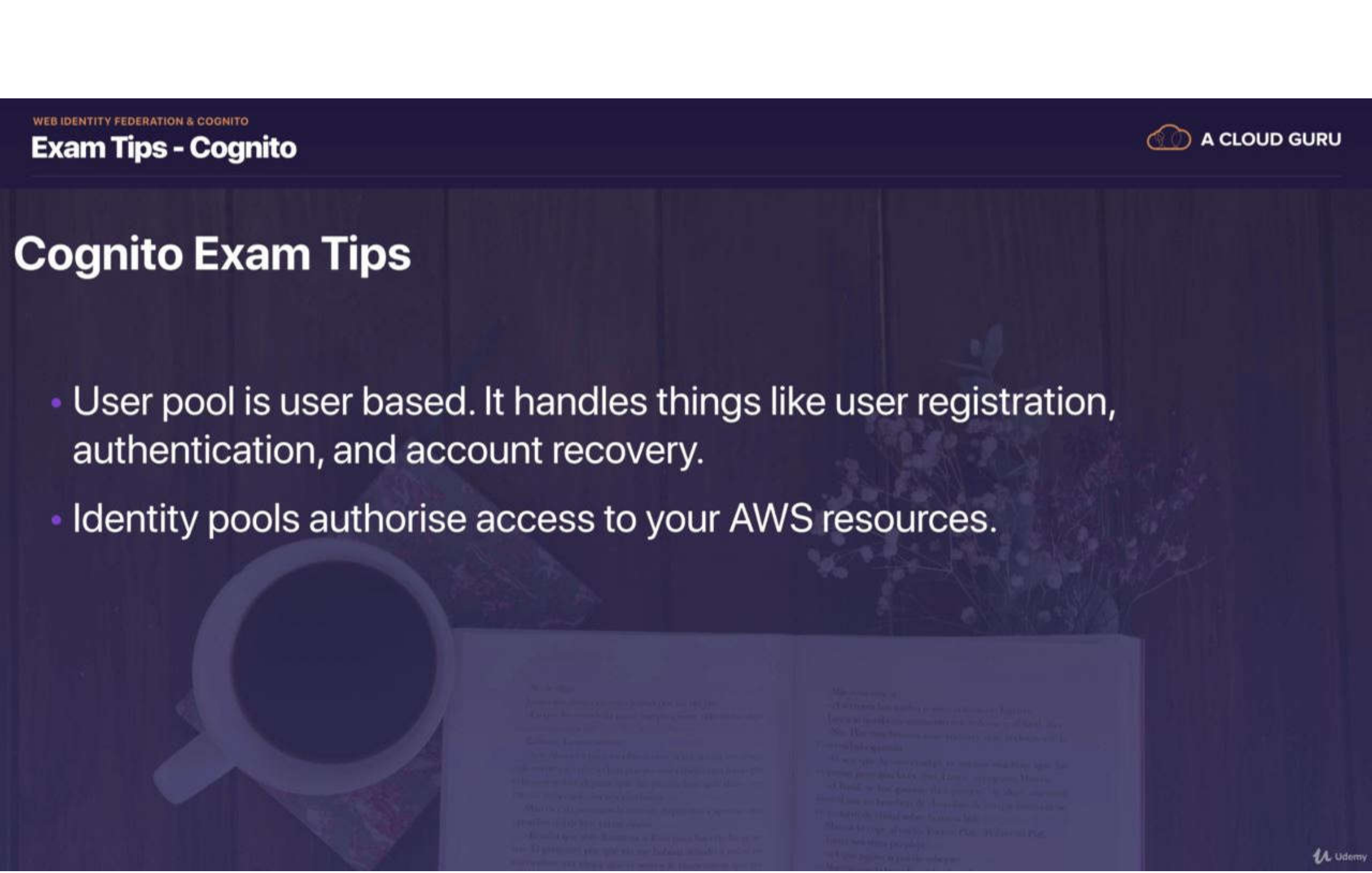
- Cognito is an Identity Broker which handles interaction between your applications and the Web ID provider (You don't need to write your own code to do this.)

Cognito Exam Tips

- User pool is user based. It handles things like user registration, authentication, and account recovery.
- Identity pools authorise access to your AWS resources.



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- Messages are 256 KB in size.
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- Standard SQS and FIFO SQS
- Standard order is not guaranteed and messages can be delivered more than once.
- FIFO order is strictly maintained and messages are delivered only once.

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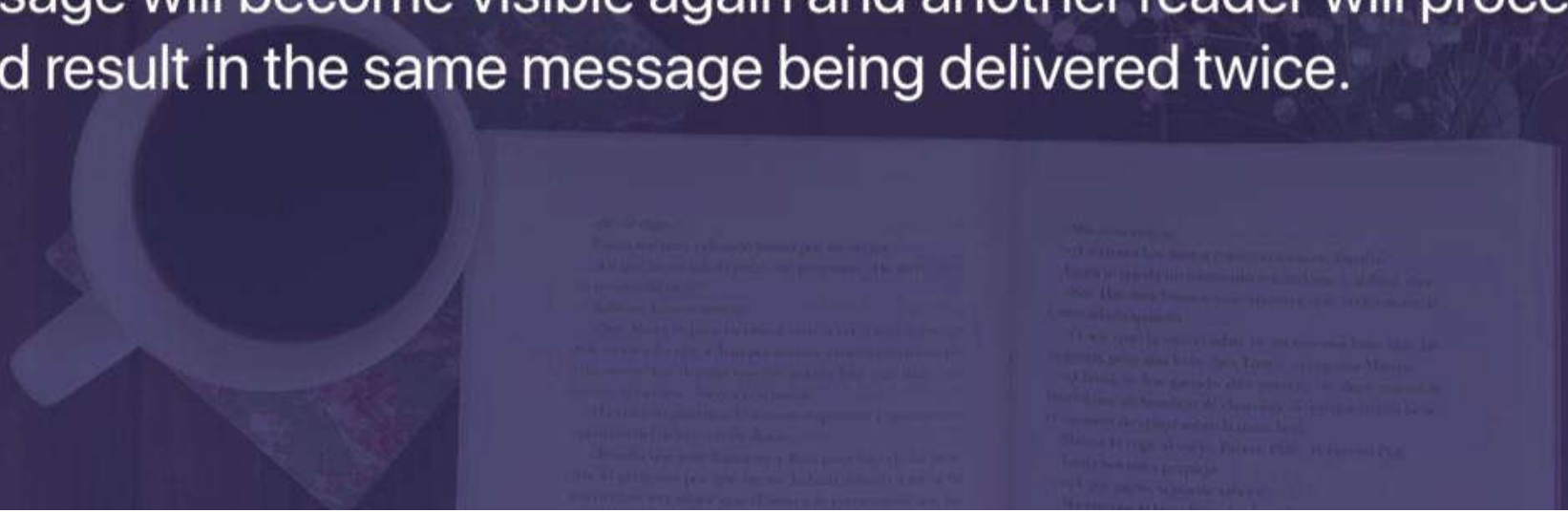

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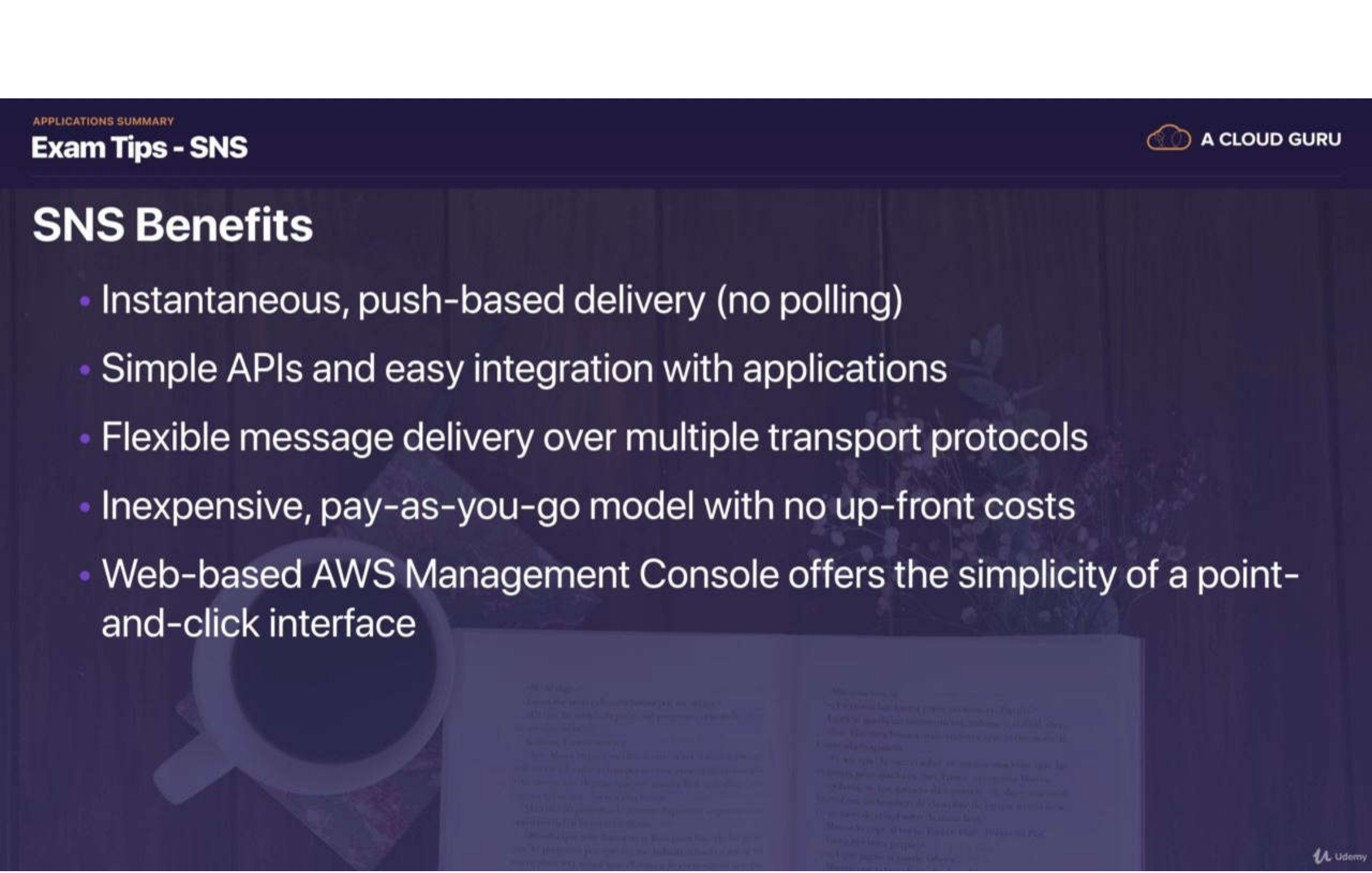

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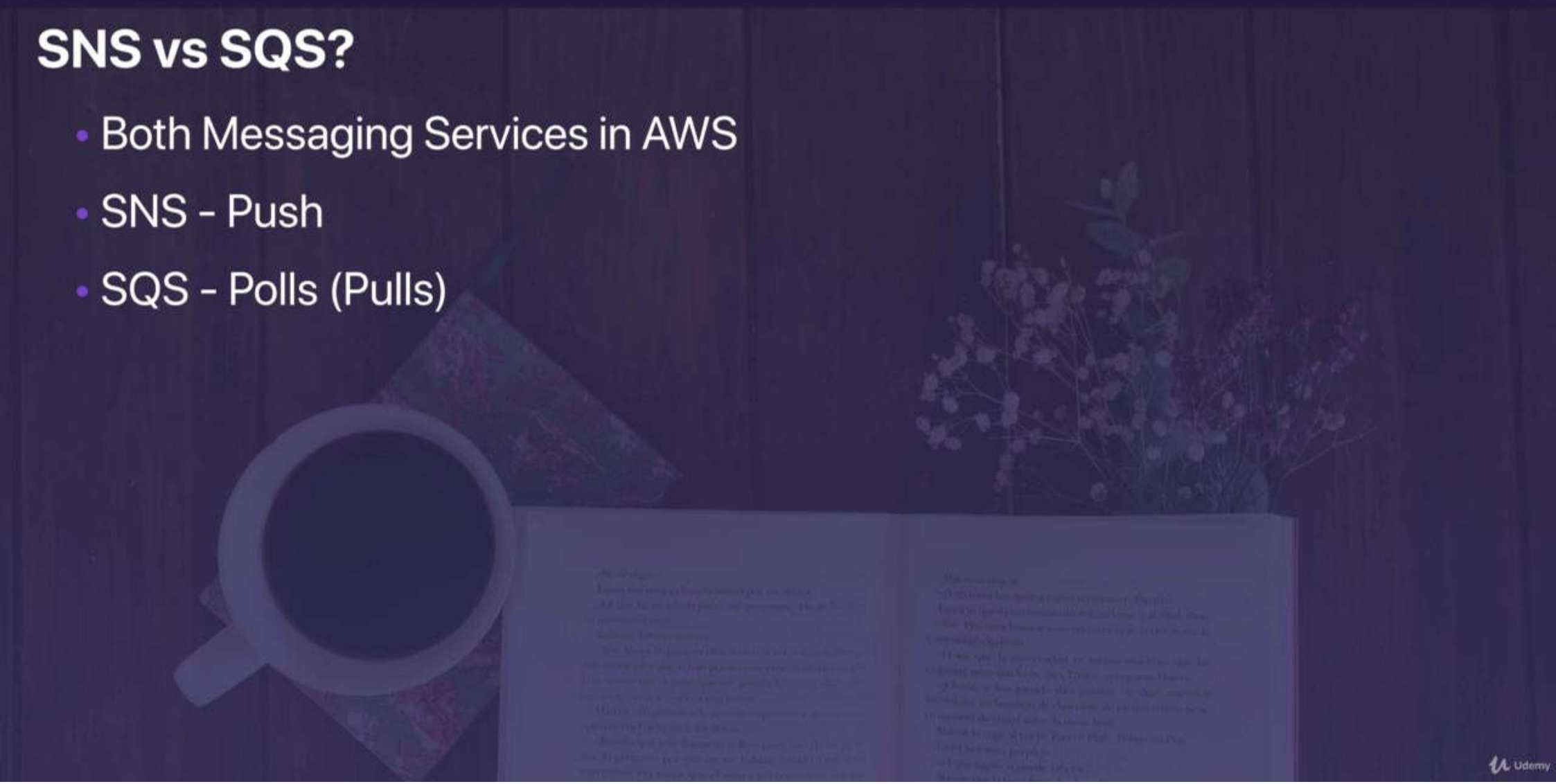

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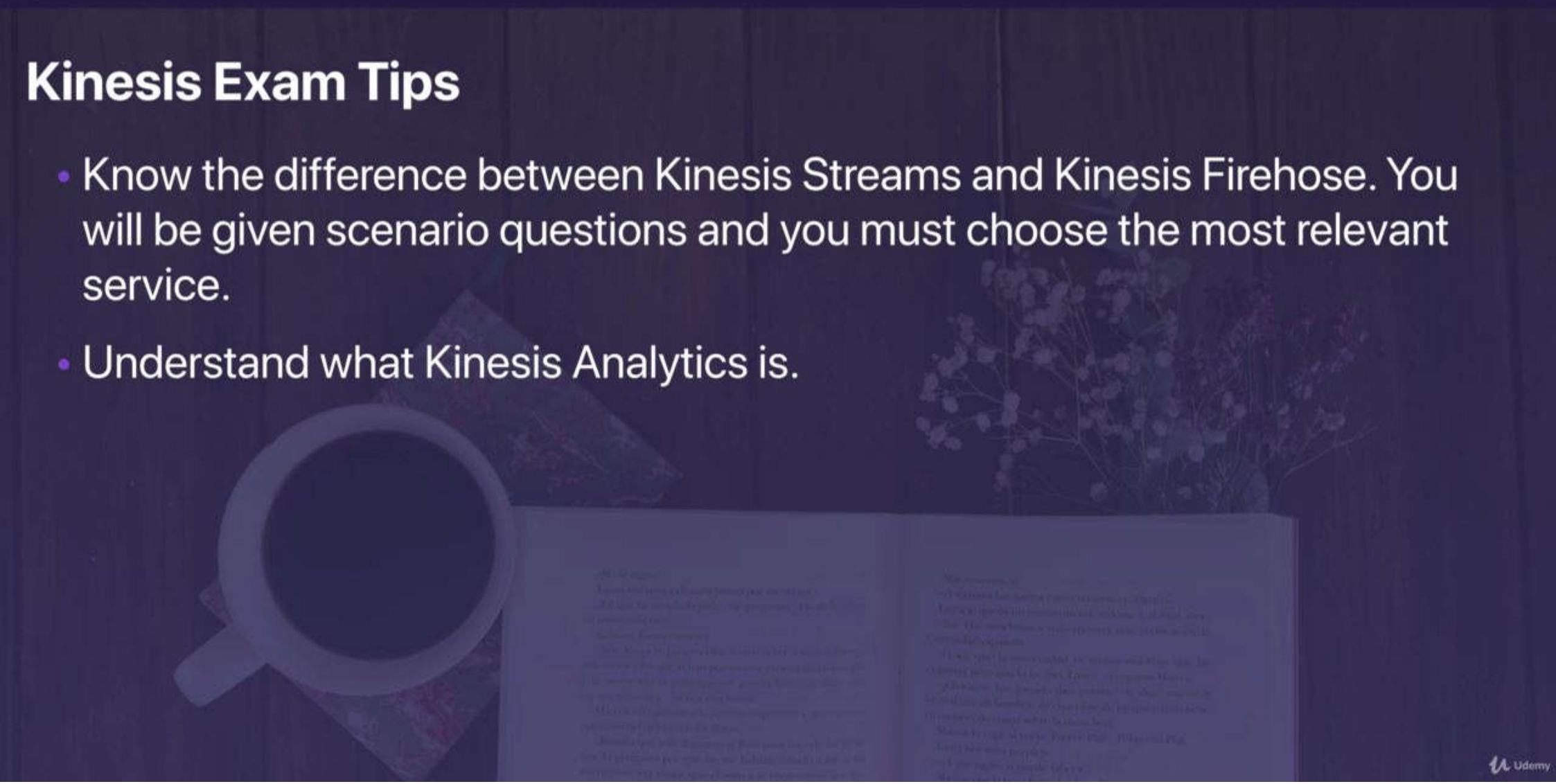

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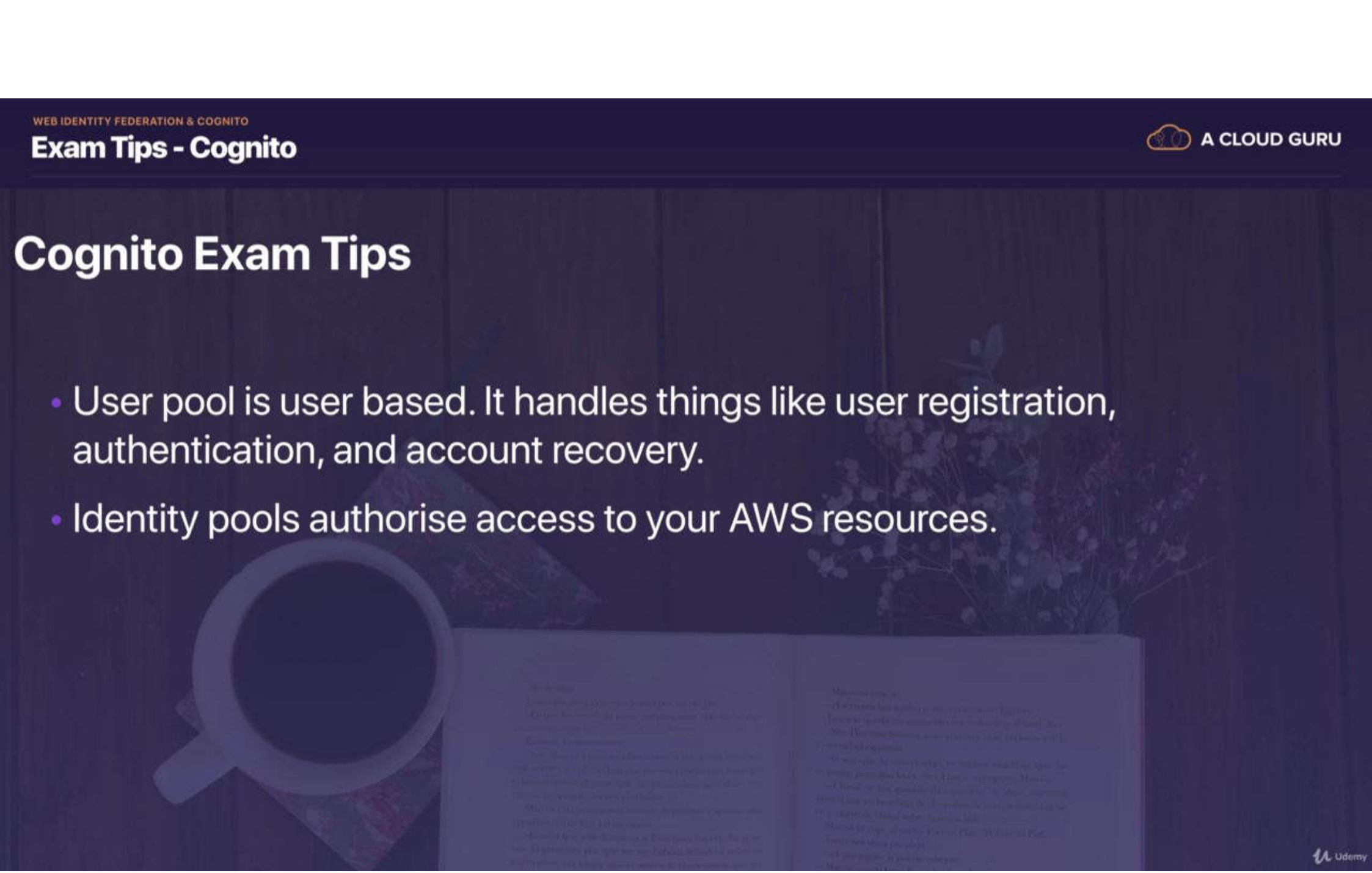
- Identity pools authorise access to your AWS resources.

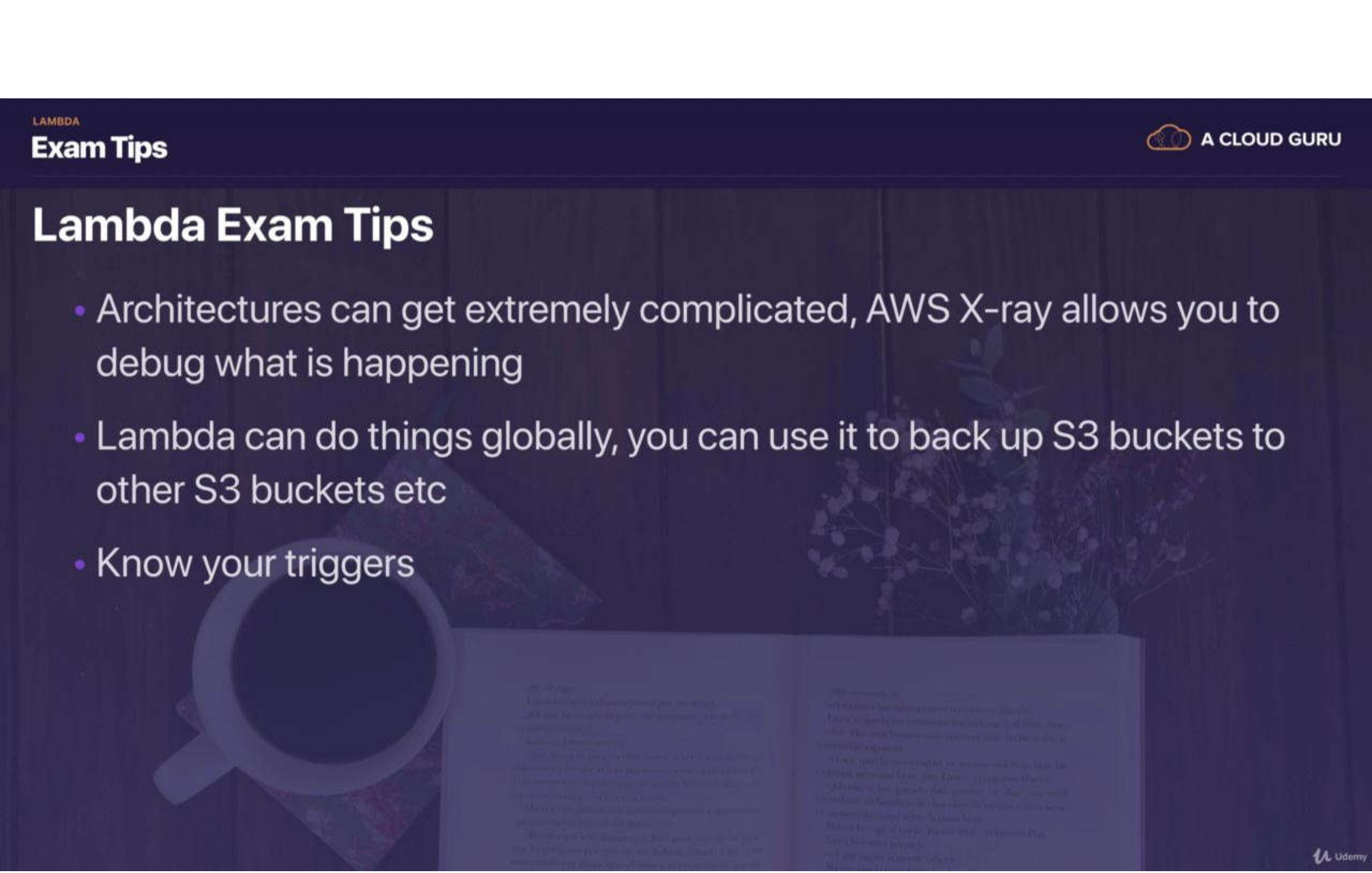


Lambda Exam Tips

- Lambda scales out (not up) automatically
- Lambda functions are independent, 1 event = 1 function
- Lambda is serverless
- Know what services are serverless!
- Lambda functions can trigger other lambda functions, 1 event can = x functions if functions trigger other functions

Lambda Exam Tips

- Architectures can get extremely complicated, AWS X-ray allows you to debug what is happening
- Lambda can do things globally, you can use it to back up S3 buckets to other S3 buckets etc
- Know your triggers



SERVERLESS SUMMARY

Traditional vs Serverless Architecture

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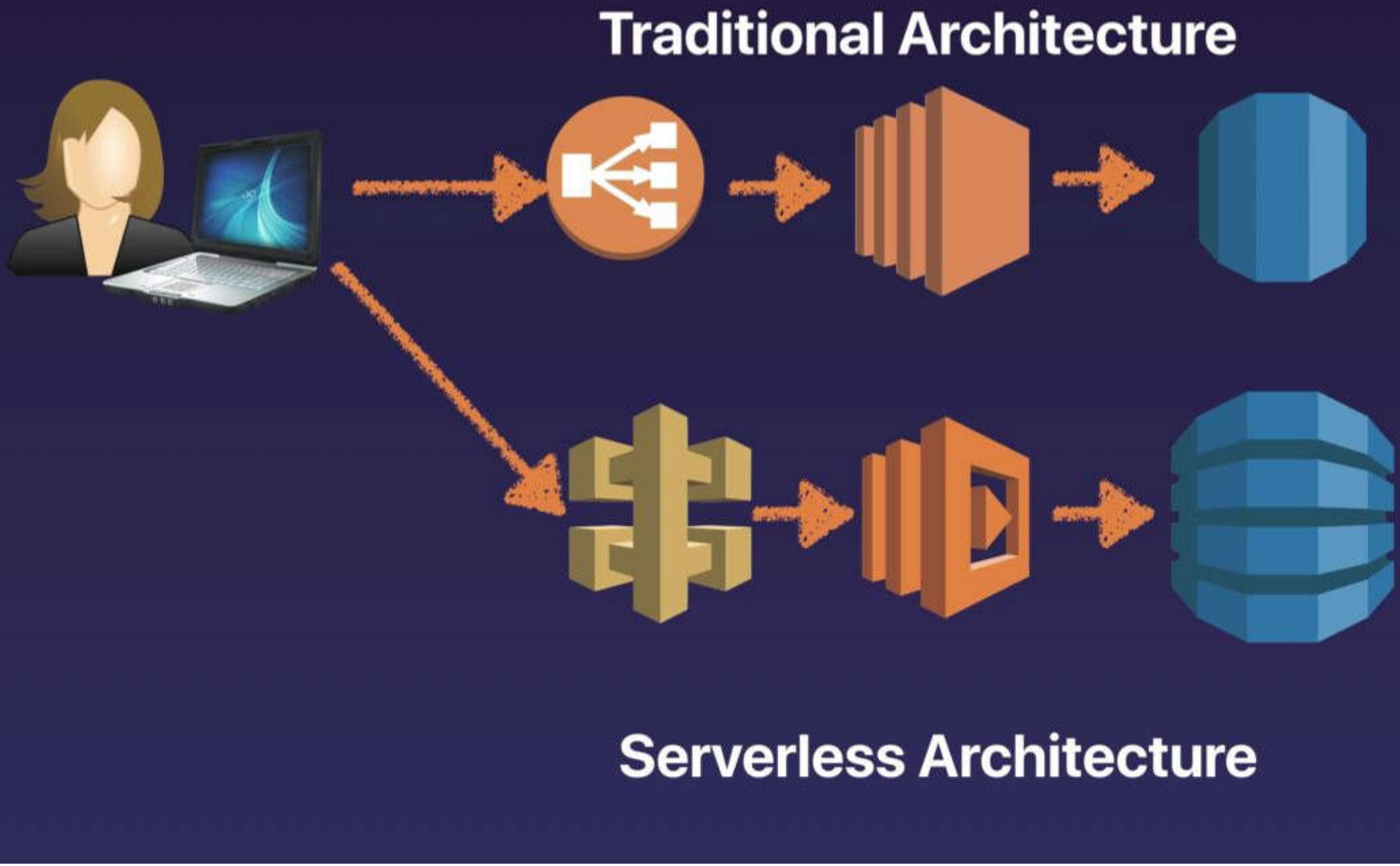

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