

KEBAB



Thinking tools for AWS
Certifications
S Green

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SJG

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Chapter 1

The variety of examinations

AWS Certifications are achieved by passing an examination. You must sit down and answer a series of multiple-choice questions. If you take one of the **Professional** exams, or one of the **Speciality** exams, you sit for three hours. Halve this for AWS newbies taking the **Practitioner** exam—and let aspiring **Associates** take half an hour longer than the Practitioners. So it's a gradual stepping up.

Now that we have established that we are dealing with an examination, the question is raised what sort of examination it is. Some exams serve to whittle down a pool of applicants. If 7,000 people apply to, say, an astronaut training institution, then the examination can be used to identify a subset of applicants possessing certain capacities. The aim is also that the exam filters the applicants, necessarily arriving at a manageable number, perhaps by rejecting some applicants who have the desirable capacities. Assuming the exam is not so difficult that nobody passes, the difficulty can be ramped up to the point at which a sufficiently small number can pass. It is a satisfactory side effect that the small number who pass

are outstandingly capable (assuming success in the exam truly tracks capability, and is not, say, based on a random question generator which is sometimes kind to candidates).

Not all exams, taken broadly, are like this, however. The Food Standards Agency, despite routinely examining the kebab shops of Britain, has no interest in settling upon a manageable subset of kebab shop owners. The food hygiene inspector is unlike the astronaut inspector. The food inspector has no desire to populate a shuttle cabin with eight capable kebab caterers. In fact, if anything, she would prefer that Britain be populated with as many hygienic kebab shops as possible. The examination of kebab shops is an inspection, to certify that certain hygiene practices are being followed¹

What is the purpose of such certifications? The certification stickers are often displayed clearly on the doors to all food outlets. But surely customers can see the way things are for themselves. If they discover droppings in their doner, they will duly write a scathing review online and go to the local paper.

The purpose of the certification, surely, is to authoritatively² inform the customers of things they have not the time

¹In the UK, there is currently a debate about inspections of schools. The *argument* against Ofsted seems to be this: the categories into which it sorts schools are too broad. They therefore do not have enough descriptive power. The brutal nature of the judgements (one-word categories) can severely affect the well being of staff, particularly headteachers. This is partly because many people use the judgements as testimonial knowledge of what the school (made up of staff)—so, what its *staff*—are like.

²More generally, the term **authorization** refers to the act of one person X providing authority (usually indirectly) to another person Y for Y to do something ϕ . To have authority to do something is, roughly, to do it justly. *So authorization involves a person outsourcing to another the justification for their own action.* There are a plethora of interesting cases here—for example, consider the “Challenge 21” policy. Bartenders are trained to ask for ID if they believe the customer appears to be under 21 years of age, despite the fact that serving the drink is illegal if the customer is less than *eighteen* years old. When the bartender asks for ID

to verify themselves. We would prefer that food poisoning, from invisible bacteria, never *even* occur. (“Even” because it is not good enough that the *market* learn that certain individuals are causing illness with their product.). Furthermore, the food inspector is trained. She is permitted to look in the back room of the food outlet, knowing where to look—under the fridge, say. She knows what to look for - which temperatures, measured using a probe, indicate danger. Once she has delivered a judgment, such as a GOOD hygiene rating, a multitude of customers can rely on this testimony, for quite some time. The independent authority of the Food Standards Agency benefits the kebab industry overall. Cautious customers can have confidence in food outlets they might otherwise not have confidence in. The industry benefits from increased business and, in turn, the country’s economy prospers more so than otherwise.

1.1 The Testimony Use

It seems to me that AWS Certifications function in a similar manner. Potential employers who are cautious can have con-

from persons who appear to be aged *twenty*, he is obviously authorized to do this. If we conceive authorization as outsourcing justification, then the bartender’s manager—not the bartender—justifies the act of asking for ID. Yet we do not want to say that the justification for the action was not the bartender’s, because we want to maintain that bartenders *themselves* bear responsibility for adhering to the law concerning alcohol. So, our definition of “authorization” is problematic. See Robert Wolff who describes this conflict between authority and autonomy.

Certifications authoritatively inform. How do we make sense of this in terms of authorization? The authoriser X is Maureen Lonergan, responsible for AWS certifications. Y is an employer, yearning for somebody with expertise on AWS and observing that a candidate possesses a certification. The act ϕ which Y is justified in performing—by Lonergan—is that of *trusting the certification’s testimony*.

fidence in the skills of an individual. Corporations can have confidence in the skills of their existing employees. The AWS Certification acts as helpful testimony, the same way that a displayed food hygiene rating can.³ Some employers may not know how to find out whether somebody possesses knowledge of machine learning. They can, however, look for the possession of the Machine Learning Certification, and rely on this testimony.

To this “testimony” function, we must add at least one more use. Although the Food Standards Agency and the Health and Safety Executive may cause you to visualize dull things (such as a man with a white netted hat sticking a temperature probe into a piece of meat in a backroom stuffed full of grubby metallic refrigerators, or the HSE posters in the cardboard-box-stuffed backroom of any UK workplace), it is an impressive architecture, not that far behind a building such as the Palace of Westminster.

Kebab shops are cleaner following an inspection, after the inspector has imparted a few stern words of advice to its owners and shown them how to properly clean the filters on certain machines. The shop was probably much stickier—prior to that thorough clean which the owners performed, in *anticipation* of the inspector.

Even after delivering a GOOD verdict, a good inspector might take a minute to show a technique. For example, they might show how they remember to remove fat from the grill at the end of each day. It doesn’t help to pass the inspection.

³The reason the testimony of AWS certifications is *helpful* is that what they say (“this student has certain knowledge”) does not require lots of research to verify. The act of establishing that a claim represents the truth (its *authenticity*) is **authentication**. In computer security, “authentication” usually refers to, specifically, claims about *the identity* of the speaker. So, AWS Certifications are helpful as testimony because what they say about the student of the certification does not require extensive authentication.

Yet the inspector is listened to - both parties know that the inspection is *really* about health. Both parties care about this. Health is neglected only unintentionally; no one does wrong willingly. The inspector's visits provide a local motivation to keep things clean.

The kebab shop workers may be ignorant of the precise day on which the inspector will visit. They may also lack knowledge of which machines the inspector will decide to check behind.⁴ If they are, this is a virtue of the system. *Quite a lot of machines end up getting cleaned, in anticipation.* Without this ignorance, it would all be “too quick”. So this ignorance is quite important. In contrast, suppose the kebab shop owners do not know how to carry out certain cleaning tasks themselves—which they may want to. This sort of ignorance is not a virtue of the system.

With both AWS—and Food Standards—certifications, we are dealing with an architecture because both involve something with a structure, which can be repeatedly visited and which was architected. However, people are different from kebab shops. A *person*, repeatedly visited by exam questions which challenge them, changes in a way that is more significant than the changes in a kitchen repeatedly visited by an inspector. Because the value of AWS certifications is often questioned in YouTube videos, I want to take a moment to develop this point.

⁴Every service team in AWS has an operational dashboard giving insights into the health of the service. It has graphs on with latency percentiles, faults, and so on. In a Wednesday meeting, a wheel would be spun, and whichever team it landed on would have to explain their dashboard. Weiss, Becky (2019), “Amazon’s Approach to Failing Successfully”

Chapter 2

The second use of certifications

The second use of an AWS Certification is to increase the knowledge of the individual who achieves it. Sometimes individuals already have the requisite knowledge, and the gaining of the certification merely achieves a public display of this fact. *Stampers*.

But for other students, the gaining of the certification was the *means* by which they gained the requisite knowledge. The certification is a ladder they climb up; these students are not Stampers but *Climbers*. A student reads the exam guide, and this causes them to study various User Guides, blogposts and mock exam questions. Through this process, somebody who is not a DevOps Professional comes to possess many of the facts possessed by the DevOps professional. Possessing such facts helps you to become a DevOps Professional (or Machine Learning specialist, or whatever).

Possessing this body of facts does not make you a DevOps professional. Many people point this out rather gleefully. “Certifications aren’t enough!” they shout. Such possession does, however, allow you to understand what your friend—

a DevOps professional—is talking about. In the course of achieving the certification, you have hopefully learned about forums which allow you to troubleshoot DevOps issues; hopefully you can name a couple of news sites that report on the DevOps services; hopefully you now follow a few DevOps professionals on social media; hopefully you learned a definition, or image, of DevOps, so that you know what to aim towards (and what not to aim towards). You are attuned. You have entered a new world. This means that you are disposed to become a DevOps Engineer.

The point of comparison must be to the student prior to taking the certification¹. Suppose you encounter a Tweet which states that Amazon GuardDuty has added a new feature, of considerable importance. Before having achieved the Security certification (assuming you came from a place of ignorance), the Tweet would have no significance for you. You have no idea what GuardDuty is. Your eyes would not have been drawn to the Tweet in the first place. Certifications ensure you are *disposed* to gain knowledge. They alter the perception of the student. The student’s knowledge increases long after the date of passing the exam, potentially.

2.1 Bootstrapping

The above comments could serve as a first response to the many YouTubers who pose a question along the lines of “Are AWS Certifications worth it?”. Namely, the exam (preparing for the exam) provides a motivational framework for imbibing quite a considerable, and structured, body of knowledge. It is

¹A person who has passed the certification does not know what it would be like to not have the certification, at that point in their life. It is therefore not obvious that they are qualified to speak on the value of the certification.

highly questionable whether any other process could achieve this, assuming the student is truly a novice, and needs to be propelled into the world of AWS Security, or AWS Databases. Seemingly innocuous features of the process, such as the deadline (that is, the exam being at a particular time and date) and the fact that a sacrifice of time and money is made for the exam, give the topics of the exam a claim on the attention of the student for a sustained period of time. Put bluntly, the student is “making good” on the cash they spent on the exam². The whole mechanism therefore allows the student to **bootstrap** themselves into a new field of knowledge. Some knowledge requires repeated visitation, and the exam’s preparation period is a mechanism for ensuring this. Once booked, the exam *demand*s the student’s attention.

Many people comment under MIT and Harvard lectures on YouTube that they can get a Harvard education for free on the Internet (presumably jokingly, but I am not so sure). But of course you’ve been able to obtain all the books of many university courses from libraries for quite some time now. Yet people don’t. (Is this true?). This idea—that to merely have the information is all that is necessary to have knowledge—I believe to be *particularly* rampant today, sustained by the major tech companies. The idea elevates the value of a product which gives access to information. Yet the human mind misinterprets information, and draws incorrect inferences, with the same reliability that human hair grows from the head. For this reason, teachers will have as much job security in the future as hairdressers do. Gaining knowledge requires much beyond availability of information. With exams, *You pay for the dead-*

²Perhaps the cash is no great loss for you. And, in fact, I do not want to end up with a conception of examinations which has financial sacrifice as an essential part. However, the *general* principle, of paying forward some personal resources (time, attention), such that the student then has reason to “make good” on them—I think that is an essential part of their mechanism.

line, not the material.

2.2 Exceptions

I have now described the way in which a certification exam can be valuable. If you are already somewhat of a cloud expert, having achieved moderate expertise in, say, Microsoft Azure, then I think that this changes things. The likelihood now is that you want to achieve the AWS Certification merely for its *Testimony* use. Certifications do indeed take time and money—the Value Question (*Are they worth it?*) now re-gains its bite, since it is not obvious that the benefit of the authoritative and public certification outweighs the time and cash demanded by the certification. It may also be, for example, that you are capable of demonstrating your capabilities to others in-person, since you work amongst those who know what to look for themselves. Thus, it is not worth the effort of generating that testimonial stamp which is an AWS certification.

2.2.1 Certification Collecting

The value of a particular AWS Certification is questionable if you are an expert in another cloud. However, there are good reasons to gain certifications in more than one cloud. For example, if I have thoroughly trained myself in only AWS, I might want to take a certification in Azure, to see how things work in this cloud. An Azure certification is a good way to be introduced to this cloud. Although I'm sure there are many similarities between AWS and Azure, there will be some differences, and the certifications may also work differently. So, we can say that: it is not true that expertise in one cloud means you should not obtain a certification in another cloud.

To be more precise, we might say that the value of an AWS

certification is questionable if it is merely going to be added to a trophy cabinet packed full of AWS Certifications. We might label this **Certification Collecting**. It is worth labelling because the idea is often alluded to. The implicit suggestion is that it is silly. The thought is: if you are not using the Certifications as testimonial stamps, to gain entry into domains, such that you no longer need to rely on *further* stamps, then you are not using the certifications properly. Certifications are “credentials” (Barr, 2013). Use them to gain access.

Or, alternatively, the thought is: If you are not using the Certification to **learn how to learn**, then you are not using them properly. I share this sentiment. This booklet culminates in the expression of an intolerant attitude. I refuse to tolerate “Damaging Testimony” from teachers. Damaging testimony involves telling students such that an exam gets passed, without imparting any skills to the student.

The problem is that we must fit testimony into the picture, as it is clearly an essential part of the social world. Andy Jassy said that “there is no compression algorithm for experience”. I think there is a truth in this. It is that: for certain achievements or insights, if they can be seen to have arisen from a short time period, then this reliably indicates that they are somehow false or inauthentic. *The notion of a carpenter with excellent experience that has been in the job two weeks is an incoherent one.*

Jassy praises experience. But because experience essentially occurs in **time**, our knee-jerk response should involve cynicism. Expressing the riposte we need to make, albeit in caricature, Lydia Tar said: “you cannot start without me”. Experience (if nothing but chunky periods of time spent in some activity) are like chunky coins - coins are bearer tokens. If you have (bear) the \$ 100 bill, then you can use it in the way anybody with it can.

Furthermore, there’s a sense in which Jassy’s famous quo-

tation is besides the point. Who wants to compress experience? Even if we could compress experience, a low-quality experience which has been *compressed* remains a low-quality experience.

With excellent narratives, and vivid models, a teacher can change the way a student perceives something. A teacher can ensure the student is consuming (being exposed to) appropriate material³⁴. A teacher can increase a student's **Learning Rate**. A teacher can make the student's perception valuable, and tending to increase in value, as time passes. I believe that if testimony is to avoid being damaging, it achieves this.

Certification Collecting can be useful. It may be that it would be to your benefit to display testimonial stamps in various areas, like an octopus holding up a badge with each tentacle, to distinct onlookers. Perhaps your job does not allow you to communicate your expertise directly. You know about machine learning. You know about SysOps. And so on. You act as an external consultant in various areas. In this situation, you appear to be silly because you are Certification Collecting, but it is in fact reasonable.

I wouldn't be so quick to assert that Cert Collecting is silly. If the time, cash, and resources that a certification demands are no great cost, then being willing to take certifications displays that you are not so arrogant that you're above them. It

³Later, see the third item in UX-CX. Students must be made aware of news sites and external commentators such as Corey Quinn, so that they become attuned to important sources of context and critical analysis. Google Search or YouTube cannot be relied upon anymore for exposure to material by serendipity

⁴See "What happened to Google Search?" by Enrico Tartarotti, YouTube, Nov 25th 2022. Suppose you Google search a question. Anecdotally, the chances are that most results were created in the past year. Now ask yourself: Of all the years digital humanity has experienced, what are the chances that all of the most relevant answers to your question were formulated in the past year?

displays a discipline in keeping up to date on the latest technologies. Nordhausen almost suggests that many within AWS think themselves above certifications⁵. Certainly, some people have expertise far beyond that required by the cert. But there is value in experiencing what it is like to take the exam. This knowledge needs to be possessed by those who hire, demanding the certifications from others. For a technical expert, taking a certification is not necessarily a display of their ignorance in knowing how the products work. Instead, it displays a willingness to gain knowledge of the choices AWS have made regarding how best to *explain*, and differentiate, their various products. Ultimately, I will characterise the Certification as one of the primary ways AWS communicates to the world what it is like. The upshot of this is that taking the certification is like learning to speak - learning to be social. Finally, coming to terms, and squaring, the products of *all* the isolated pizza teams⁶, at once, requires something more than simply familiarity with each product on its own. Use cases are often concurrently covered multiple AWS products. You only feel the full extent of this having taken a certification.

After the process of preparing for an exam and taking it, it's not quite a catharsis—but if you've been bumbling along with a concentrated and uneven interest in just one AWS service, then after leaving the exam room, your knowledge will now be more evenly spread—things are more well balanced now.

Let's assume you have no desire to generate the public tes-

⁵Cloud Certifications: Are they really worth it?, *Medium*, probably first published in 2021.

⁶Bezos suggested that *instead of seeking to optimize communication between individuals within Amazon*, the company should instead seek to minimise the probability that one person will even *need* to find a way to communicate with another. We do this by ensuring individuals are in close knit teams—enough that could be fed by two pizzas. See Alan Deutschman (2004) “Inside the Mind of Jeff Bezos”, *Fast Company*.

testimonial stamp; you merely want the knowledge. I argue that you can extract all you need from publicly-available materials. Once you know how the AWS Certifications work, you know how they work. What you arrive at is not some “hack” which removes the hard work. I still have to plough in a few weeks’ worth of hours to learn about AWS Machine Learning if I want to become knowledgeable about this.

Rather, the person who knows how AWS Certifications work would be able to look at User Guide for a new service, released tomorrow, and be able to identify which parts would make excellent exam questions. A novice (who does not know how AWS certifications work) would fail to pick out exam-question-worthy facts. They would pick out things that were true, but not quite relevant. They might, as a crude example, suppose that an exam question would test how many vCPUs come with a specific instance type (in fact, certifications do not test your recall on specific facts in this way).

Certain things would simply not strike them as salient. For experienced developers, or SysOps admins, however, there will be certain things within the User Guide (UG) that strike them as very important. Even if our novice read the very same UG, he would not get the same value from it as the experienced professional did. The novice does not know how to read it.

The person who knows how AWS Certifications work would also be looking at the appropriate User Guides. They would know how to infer, from mock exams available online, and the exam guide provided by AWS, which User Guides to perform an extraction on.

For example, suppose a person is no DevOps Professional but knows how AWS Certifications work. Through a careful study of the exam guide and the syllabi of online courses (visible even to those who have not paid), this person could infer which AWS Services, mastery of which, would produce exam success. They can then perform an extraction on these User

Guides, because they know how to do this. That is, they are patient enough to sit still and read for the time required (or, more realistically, keep **re-visisting** the UGs, throughout the distractions of life) and are able to bootstrap themselves to the point at which the salient parts of each UG stand out, probably collating their own impressive set of notes. They have used the certification to gain knowledge, without taking the exam.

2.3 Three Key Questions

There are three key questions when it comes to AWS Certifications. Whenever YouTubers or authors of articles on Medium discuss AWS Certifications, they tend to deal with these questions⁷:

1. **The Value Question**

Are AWS Certifications worth it?

2. **The Selection Question**

Of all the AWS Certifications, which one should I choose to intend to pass?

3. **The Method Question**⁸

How do you pass an AWS Certification exam, provided that you intend to?

The Value Question needs re-formulating into something more concrete, but for all formulations, the answer will be the “testimony” and “knowledge” use I have discussed. Most discussions of the Value Question are simply finer applications

⁷Bullet points would work here, but numbers have the advantage of being *places*.

of these two uses. For example: you can gain a larger salary by telling people—“telling” is all I mean by *testimony*—you have the skills you have. The discussion will often turn to Certification Collecting. I have described what does (and does not) make this practice irrational.

Bernd Nordhausen points out that he considers the Associate certifications of Azure and AWS to be “entry level certifications for technical positions”, pointing out that Google Cloud’s Associate certification is in fact as difficult as the Professional certifications.⁹

The Selection Question is answered quite easily by considering the titles of the certifications and reading the exam guides. Admittedly, there is a roadmap to follow, e.g. take Associate exams before Professional ones if you are a novice, to allow you to Climb more easily. This used to be enforced by AWS but this was relaxed in Oct 2018. As for the Method Question, I deal with this in the next chapter.

2.4 The Extraction Claim

My claim is that

Extraction Claim you can extract the knowledge from a certification without taking the exam if you know how the AWS Certification works.

I will set out my argument for this claim in the next chapter but some quick clarifications are in order. The claim is not that AWS Certifications are useless. Nor is it that taking a certification exam has no value. For example, one use of taking a certification exam is to learn how the AWS Certification works.

⁹Bernd Nordhausen, Cloud Certifications: Are they really worth it? *Medium*.

The strongest objection to this claim is this: You *can* extract the knowledge, *but you won't*. The “can” in the claim is very weak, and a bit like saying you can speak Russian simply because you have learned Spanish and know how a language works. It would be wrong to go around proclaiming that you can speak Russian. If you have not truly booked the exam, and have no intention of taking it, then you will lack the motivation to gather the appropriate knowledge. The exam focuses the mind. Because the Extraction Claim involves no exam, you cannot gain the knowledge, so the Extraction Claim is false.

Here is my response. It is true that somebody who knows how the certification works may lack the motivation to extract a certification's knowledge. But this applies to all sorts of things. You may lack the motivation to study for the certification, having truly booked the exam, for example. None of these observations imply that the Extraction Claim is false.

My conception of **Knowing How a Certification Works** is a holistic one. Informally, it involves a sort of world-weariness. It involves being capable of motivating oneself to obtain the appropriate knowledge, once you have intended to do this. That is, if you are unable to motivate yourself to obtain all the knowledge, when you desire to, then you do not in fact know how the certification works. The know-how is very much practical. Because those who know how certifications work are aware of all that it involves, they only intend an extraction when they can expect success in motivating themselves.

You may want to say *Hold on a minute* and ask

What reason is there to gain the knowledge which a certification provides (other than so as to pass the exam)?

This gets to the nub of it, so let me respond. A certification does not tell people that some arbitrary knowledge is possessed by an individual, but particular knowledge which is considered

valuable. Certifications track *valuable* knowledge. If they did not, they would not be useful as testimony. AWS would not produce them. (If AWS's products had no value, AWS would not exist.) Yet certifications clearly *are* useful as testimony.

Thus, if a student has an ability to show that they possess the certification's knowledge, then it can be valuable for the student to have the certification's knowledge. How might they demonstrate that they have the certification knowledge? They have an ability to answer certain questions, provide URLs to projects they have built. The ideal is an **in-person dialogue**. One expert can ask a few pertinent questions, and observe the responses, and this remains a fairly robust way of assessing another's knowledge (hence why it is involved in many admissions processes).

In many situations the student may not have this ability. This may be, for example, because an interviewer wouldn't know how to verify the claims of the student, even if they wanted to. They lack the expertise. Nevertheless, the point is that there conceivably *can* be reason to gain the knowledge which a certification provides.

Finally, professionals commonly say that they achieved certain certifications to prove to themselves that they could. So, it's as if they are gaining a sort of **self-knowledge**. Very well, but these individuals do not, strictly speaking, Know How the Certification Works. If they did, they would not need to take the exam. It may be said that the individual may know how the certification works, but does not know (of themselves) that they have this knowledge. Very well. According to my conception, they never in fact had the knowledge. My conception of Knowing How the Certification Works is practical.

Chapter 3

Knowing how to pass (UX-CX)

Knowing how to pass an AWS Certification involves knowing

1. how to evaluate an AWS **User** Guide, to gain the theory of the service.
2. how to collate **auXiliary** material on an AWS Service
3. the **certification**
4. **eXamcraft**

This is a rough-and-ready list, remembered by UXCX ("the User Experience of the Certification Experience" perhaps).

Many YouTubers now produce titles of the form¹:

How I passed such-and-such certification in *⟨insert period of time⟩*.

¹David (Jan 2022)

To have something to refer to them by, we might call these works *Braggers*. An alternative formulation is "How I passed x certifications" where x is an admirable number. Usually we are told that they did some things, such as reading whitepapers, and doing practice exams. We will in due course be able to appreciate why these things worked, in terms of UX-CX. Two things are worth quickly pointing out. (1) It is possible to pass an exam without knowing why it is that you passed. (2) Braggers rest on the assumption that a short preparation period for the exam is more valuable than a long preparation period. Even though this booklet argues for the real possibility of passing an AWS certification in a completely vapid manner—suggesting that I might be sceptical of short preparation periods—I do appreciate that we could conceive a **Time-to-Comprehension** metric with new technologies. All acquisition of understanding must require a certain minimum period of time. This fact alone tells us that it is not true that the smaller the time period, the more efficient your learning. Nevertheless, when the Time-to-Comprehension becomes large and bloated, the inference that there is something faulty in our method or motivation becomes unavoidable. And indeed, there are vast amounts of material available online, so it is possible to fail to achieve a state of understanding despite constantly ingesting material. A dissatisfyingly large Time-to-Comprehension is a real possibility, even for the studious student with good intentions.

Back to UX-CX. The first two are skills. With practice you get better at them. The third (know the certification) is not a skill because it is not something you ought to learn how to do. Rather, it instructs you to come to know the exam by becoming acquainted with it. You get to know the exam, becoming knowledgeable about how it tends to pitch the ball—analogue to the way you get to know a person.

The fourth point (**examcraft**) sounds like a skill. But in

fact, this item, tacked onto the end of UX-CX, denotes things which anybody can choose to do. You just do them once, and don't need to pay attention to *how* (fancy voice) you do them. The actions, although intentional, are not manifestations of an adaptive, intelligent capacity. *So, we're not dealing with skills here.*

Examcraft refers to practical things such as discipline in how many minutes you spend on each question and researching whether the test centre has parking, and these kinds of things that apply to every kind of exam (not just AWS). Because you do not have to *practice at* bringing two forms of ID and getting to the test centre on time, examcraft is not a skill. It is simply a set of things you can choose to do². I will address evaluation of a User Guide in this chapter, and the later items in later chapters.

UX-CX, then. Know how to read a User Guide, and know how to gather a bit of auxiliary material such as blogposts. That's the UX. Knowledge of a person (well, exam) is the third item in UX-CX. Then, eXamcraft is just a bunch of actions. As this booklet progressed, it became apparent that the third item (knowledge of the person—the certification setter) is the focal item. It is like a button in the fabric of a sofa that pulls the fabric around it taut. For the parts of UX-CX inform one another in various ways. For example, knowing how

²Consider the service station self-help book market and you will realize that labelling things (empathy, money management, listening) as skills is quite easy. Too easy. Some claims are obviously false; no guru can get away with telling COVID sufferers that smell is in fact a *skill*. Trying to smell will not make you able to smell or smell better.

Declaring some activity a skill is a pronouncement about what you value. You are declaring that some ways of doing the activity are more valuable than the others. You are declaring that it would be a **good** thing if other people took the time on something. Namely, took the time intending to change the way they performed the particular activity. Skill-labelling is both empowering and snobbish.

to read a UG is useless on its own. You might know how to read a UG, but choose not to bother reading any User Guides. Or you might read the wrong ones. Or too many. Seriously, this is very much a way to fail. An abundance of information will not guarantee success. So, the practice of reading UGs is informed by your knowledge of the certification (the third item). Your knowledge of the certification informs you of *which* UGs to read. Also consider the second item in UX-CX, knowledge gained from auxiliary material. Whitepapers in particular inform which UGs you read. Appropriate whitepapers also contribute to your knowledge of the certification.

3.1 Getting Started

If you want a quick answer as to how to start, I would say a long session on a mock exam (several hours). It will be painful and may make you feel rather inadequate, but you are inspecting it for clues as to which services are appropriate, and the kind of content that comes up. You have also started your relationship with C—the third item of UXCX. Next I would make notes on the appropriate whitepapers (the second item of UXCX). To find out what the pertinent ones are, research YouTubers who tell you how they prepared for the exam. See this booklet’s appendix for a bibliography of discussions of each certification.

First, though, (1). **You really can read an AWS User Guide, yourself.** To the complete beginner (to the world of IT and user guides - someone like myself) this is extremely obvious. The User Guide consists of human-readable text. If you can read, then you can read it.

A little bit of familiarity with User Guides, however, makes the claim controversial. Some User Guides are literally thousands of pages long. Its sentences are difficult because they

strive to state what is, logically, the case, rather than what the reader needs to know - the way a sarcastic computer science teenager might. This is because it is a reference material. (A User Guide is essentially condemned to try to concurrently cater for two audiences: the ignorant and the half-trained. That is, those “patching up gaps” in their knowledge - Gilbert Ryle) Settling on one part is not enjoyable because you are essentially constantly persuaded, by the incessant imperatives to look elsewhere **for more information**, that you ought not to be in the place you are actually in. These excessive **references** make you f-ing miserable (FMIS).

Often somebody from the marketing department gets their hands on the keyboard and we get **verb splatter**: “This service allows you to detect, analyze, monitor, detect, remediate, swim, run, juggle, char grille your code... all with one click!”. The first pages of User Guides attempt to persuade you that the product is **MAD STUFF**, by describing it as Managed, Available, Durable, Scalable, Tolerant of faults, Utterly simple, Financially cost effective, Frankly very reliable³.

Finally, I often find myself exasperatedly sighing with the UG, saying “Alright, mate”. This occurs when I’m looking for an explanation of what something is and all I get from the UG is “this feature *allows you to...*”. Condescending glosses. I want to know what it *is*. These brisk, utility glosses are spotted by the phrase “lets you” or “Allows **You To**”. **AYT**, pronounced “aight” .

Overall, there is the fact that it is hard to “break into” it; many sentences refer to something you have not heard of, in a way that renders the sentence useless. When you are told *For More Information See* (FMIS), the reference is to another part in the User Guide. The overall effect is something akin

³The final position in MAD STUFF is also home to resilience, which differs from reliability. For More Information See “What’s the Difference between Reliability and Resilience?” (2016) by Clark-Ginsberg

to a knot, or a ball of string, which would require the skills of Ariadne to fully map out.

So, my claim *You Can Read a UG* slips from obvious to controversial. I should clarify that by *Read a UG* I refer to the task of *gaining knowledge from a UG*, as distinguished from patching up a gap in your knowledge, the way a chemist does when he consults a list of boiling points. I am describing a sustained ransacking of the UG, for a useful model of what is going on.

I want to persuade you that the claim has a third stage. I want to show you it's possible for the claim to mature into something that just might be reluctantly accepted. In what follows, I'll try to convince you that you can read a UG, yourself.

3.2 The theory of a service

Peter Naur talked about programmers possessing the "theory" of a program⁴. His point was that they are acquainted with it; they've practiced the way they think about it. They can manoeuvre it smoothly. We know what he means. Asking them to tell what they know to a newbie is like asking a piano player to give a crash course to somebody who wants to be able to play the piano. You can certainly teach the piano intensely for two days, but what you achieve will never be what you can achieve in a longer period (Why would it be?) Similarly, I can study a map of York very, very intensely for 24 hours—and yet just two days later, an elderly resident of York will know the city better than I did, despite their never studying a map.

I can certainly come to know the city better than a resident, through intense study, but a certain amount of inhabiting is

⁴Peter Naur, *Programming as Theory Building*, 1985.

required. I need to re-learn the map a few times. This requires regularly prompting myself to cough up determinate information about the map, in a manner short of simply *looking at the map*. If I look at the map, it's too quick. There's no blank shape for me to fill in, and thus no learning. I also then have to wait until I forget enough, before I can test myself again.

Because User Guides are so large, it is not practical to read them from beginning to end. Rendered as a single PDF (Portable Document Format) document, the SageMaker UG guide has 4,108 pages, *one* of the EC2 guides has 2,100 pages. The content is also boring and dry. Our solution architecture is going to have to take into account the scale, and dryness, of User Guides, then.

First, I point out that it is possible to make a conscious attempt to optimize our ability to navigate the User Guide. You want to know how to navigate the UG. The objective is not to know what is in the UG, but know which part to go to *were* you to need to know about a particular aspect of the AWS Service. I presume that I need not explain that just because I am talking about dispositions, we are not dealing in some sort of mystical entity. Lives are saved when toddlers are *disposed* to knock on the correct neighbor's door for help in a medical emergency; a job which is *disposed* to put money in the bank can eventually result in a single concrete thing; a web page disposed to be just 100ms slower can cause profits of a retailer to plummet⁵.

3.3 Steady, watch me navigate

The question now raised is that of how we gain this kind of navigational acquaintance. We start with the top-level headings. Every UG consists of a number of top-level headings,

⁵Marissa Mayer at Web 2.0, *Geeking with Greg* [Blog]. 9th Nov 2006.

which are essentially names for containers. Amongst them, the containers account for literally everything in the UG, the same way suitably large grid squares account for everything in York.

3.4 Complete Concept

Now, I could learn a list of the top-level headings (or *topics*, from the Greek *τόποι*). I could sit with a sheet of paper and learn the list of headings by rote. But I hope you can see that there's a sense in which this suggestion misfires. Consider somebody learning a list of grid squares, each having been given an ID. This bizarre practice fails because it's too abstract. It is **complete concept**⁶. It's not *entirely* misguided, because these top-level headings are real and are going to act as a framework or glue for the contents of the UG—being aware of them will give us an edge. However, the headings demand application. They are meaningful only when applied to the contents of the chapters.

The (seemingly pedestrian) solution is to use the top-level contents to structure my time. I am going to decide what I do based on the top-level headings. I will spend half an hour making notes on Ch 1, then my next half hour will be on Ch. 2. When I read a sentence that tells me to go elsewhere, I take note of this, and consider where it is directing me to, but I do not actually follow the order. The structure is an indispensable part of what I do. What am I doing? At any given time, I am making notes on a sentence, or set of sentences, in the UG.

(If you keep reading, I go on to explain that these “notes” are in fact *questions* raised by the single part being read. Thus, the notes act as a pressure valve. From the offset I conceive

⁶It is empty. “Thoughts without content are empty, intuitions without concepts are blind” - Kant

of my task as not simply *being told things* by the part I am reading, but rather *discovering The Set of Questions raised by the part I am occupying*. You will be overwhelmed, so you place down questions, akin to messages being placed down in an SQS queue.)

Studying always involves note-taking anyhow. All I am proposing is that you are aware of where you are (amongst the top-level containers) when you make notes. Over time, across a number of repeated visitations to the UG, the aim is to slightly strengthen our knowing how to navigate it.

If these seems obvious, then perhaps it will be helpful to describe what I was doing *before* I adopted this attitude. A year or two ago, I was doing group study sessions with students on a course provided by e-Careers. Suppose a mock exam question tests my understanding of AWS Firewall Manager. I get it wrong. Hopefully, the explanation in the mock exam gives a URL to the HTML page of the UG. Most do.

I would actually go and try to read the page. The thought was that the page was there for me because I needed it at that time, like the Sword of Gryffindor materializing to those in need. I imbibe its contents, adding its insights to my knowledge of AWS Firewall (or even, just *my knowledge of AWS*). Then, having performed its job, the page drops away. I would pay no attention to the location of the HTML page in the User Guide. It was as if we have just added an extra block to the knowledge in our head (so we're chucking more data into our heads). Hard to disagree with *that*.

Studying in groups, it would be inconvenient if any one of us were to halt the group while we read the page. If I were to be brutally honest, and only move on once we understood what was on the page, we might be there for quite some time. People would just hurriedly scan it, murmur “ooh”, and click to the next question. We were operating on the model that

an incorrect question is nothing but a signal that we have a fault.

Where the *fault* is that we require more knowledge. Our getting the question wrong is similar to an indicator on our car's dashboard which means *add more fuel*. So, we went and got some more knowledge.

By the time you have read the page, you have forgotten what the original question was. But this didn't matter, because the model says that we needed more knowledge, so as long as we went and got more knowledge, it doesn't matter that we forgot what the question was. (Re-considering the question would be as bizarre as asking somebody who had just filled their car with petrol whether they remembered what colour the illumination on their dashboard was).

But, honestly? If I encountered the same exam question ten minutes later, for the second time, I would probably get it wrong again. After all, I never got to the heart of why I got it wrong. So, why did we keep doing this? Well, The thought was that:

by reading a little bit of the UG, after each incorrect question, we were adding little bits to our knowledge, and so we were improving ourselves.

Now, some prudent people in the group would bookmark the HTML page to read later. But this didn't quite hit the mark either: the page was still not situated in the UG's whole structure. And later you will have forgotten the question.

In these study sessions, the only solace was the thought that we would somehow still get better, despite not getting to the heart of why we got the question wrong. Why? Well, because we were being drilled like Pavlov's dogs to select the correct answer.

“In terms of solace, that is pretty thin gruel” you may chuckle. *What we were doing was obviously stupid.* But hear me out. Cycling round the mock exam questions, if we got one question wrong repeatedly, then the procedure would force us to start reliably getting it right. This is because we would recognise the question from the previous time. We’d eventually start to simply *remember the correct option from last time.* In a word, we *cheated.* But, look: it was a justifiable cheating, because if you know the question so well that you remember it in the *mock* exam, you’ll remember questions of this form in the *real* exam. Given that our aim is to pass the exam, and the mock exam is a reliable representation of the real exam, this ‘cheating’ was completely aligned with our aims. It was a kind of learning. So we kept doing it.

3.5 Do you need to know how Services work?

At the root of this approach was the belief that

if you fail question Q and Q involves Service S then you need to learn more about S .

This being so, you ought to go away and just learn more things about S .

What is wrong with this belief? Its problem is that it assumes that the AWS Certification exam is designed to test your understanding of how the Service works. But this is not how AWS Certifications work.

If AWS Certifications were designed to test your knowledge of how AWS Services work, then questions would require the student to provide reasons for certain behaviours of a Service. But they do not do this. AWS have no reason to disclose the inner workings of their services, and it would perhaps be rather

difficult to understand anyhow. Granted, we are sometimes given insights into how AWS use Shuffle Sharding (thank you Mr MacCarthaigh⁷) and static stability (Ms. Weiss⁸) and the QUIC protocol on CloudFront (Mr Roskind⁹) and the Bay to Bay subsea cable (Mr Scholl¹⁰). Nevertheless, questions do not demand explanations for service behaviours.

3.5.1 Ligh Level Design

Here is another entity which appears to explain how things work: the architecture diagram. Sometimes, people produce diagrams which consist of icons with arrows between them. The icons represent AWS products. Often, there is a lot going on in them, which makes them seem complicated. In truth, they are on the level of daubs of paint on cave walls.

There are no rules governing such diagrams; it really is just arrows between logos. They are undoubtedly helpful as pictorial props—just don’t suppose that because a given diagram takes a bit of time to collapse, it is depicting anything that could not be expressed in three sentences. More generally, there are a lot of marketing pitches dressed quite convincingly as sobre “explanations”. On a video explaining Snapchat’s architecture, a commenter uses the term “Ligh level Design” (a pun on High Level Design)¹¹. It captures the idea that what you are told is so high level that you are not really told

⁷AWS PrivateLink Deep Dive, *Re:Invent Conference*, Las Vegas, Fri 1st Dec 2017.

⁸AWS IAM Deep Dive, *Re:Inforce Conference*, Boston MA, Tue 26th July 2022

⁹Deliver Great Experiences with QUIC on Amazon CloudFront, *Re:Invent Conference*, Las Vegas, Mon 28th Nov 2022.

¹⁰Behind the Scenes: Exploring the AWS Global Network, *AWS Re:Invent Conference 2018*

¹¹Snap: Journey of a Snap on Snapchat using AWS, YouTube Channel: Amazon Web Services, uploaded 26th July 2022

anything at all

(Is it really a "lie" though? If they appear **empty**, it is only in the sense that they are *general*. And their generality is a virtue of these diagrams. We're given concepts, ready to be applied.

I would argue that they have come to be used in a dubious way. Dubious educators turn to these impressive props to dazzle those who don't know better. They *know* that the diagrams say little, and intend students to believe that they represent detailed explanations. A lie is an untruthful assertion which intends to cause a false belief in the listener. Ligh Level Designs are intended to cause the uninitiated to falsely believe that a degree of complexity exists. "And for just £4,000, you *too* will be able to read these diagrams!").

For certification questions the student must *reason*, undoubtedly. If you are taking the Security Speciality exam, and asked to choose between four bucket policies, only one of which will provide the correct access configuration, then you need to know how IAM policies work. You need to be acquainted with their logic. For example, you need to know that a policy that does not explicitly allow anything is not going to permit access. This is because IAM uses a "default deny" approach. (Many newbies harbour the intuition that if they use one policy to explicitly deny an action, they thereby allow everything else. This false belief is called **Red Eye**). In this way, exams certainly involve reasoning about how things work.

This observation makes my claim creek. In response, I note that this is an unusual case. Reasoning about the JSON policies is notoriously one of the harder aspects of the exam to master. This is something that makes the Security Specialty exam a Speciality exam, and indeed one of the hardest of all the AWS Certifications. Furthermore, this is a question about how to *administer* IAM. It is not a question about why IAM works the way it does. For instance, the question is not that

of why IAM adopts a policy of default deny. It is rather a question about the consequences of default deny.

Fundamentally, it tests knowledge that the default deny feature exists, not an explanation of the feature. Tricky IAM questions like this put pressure on my characterisation of the AWS Certification because they demand *application* of the knowledge of the features. Therefore, these questions *look* like they are testing knowledge of how a Service works.

But you get better at these “thinking” (or “application”) questions by repeatedly attempting them. Your failure at them is not an indication that you failed to read a particular fact in the UG, since there is no conceivable page to which we could reduce intelligent performance in these sorts of questions. These questions work more to concentrate the mind. If the tricky IAM questions were testing knowledge of how the service works, then you would get better by reading the UG. Yet, you don’t. Therefore such application questions do not in fact test knowledge of how the service works.

3.6 Sword of Gryffindor

I learnt to not treat pages of the UG as fragments—isolated nuggets of information which appear like the Sword of Gryffindor¹². Instead, I observe which top-level heading the page is part of. I may not be able to read a page in a Zoom call, but the bare fact of what chapter is being invoked—*this* I can grasp onto. Because I will remember this simple fact, I can eventually be able to read this part of the UG. Now things start to *mean* things to me. It will start to strike me if one chapter gets

¹²Good scholarly papers function like the Sword of Gryffindor. The function of “professional writing is not to communicate your ideas, it’s to change the ideas of an existing academic community”—Larry McEnerney (2014). The paper exists to give a gentle prick.

relied on a lot, because I am paying attention to the top-level headings. I am paying attention to **where I am**. It may later strike me that actually studying some particular chapter (in itself) may be worth it. The chapter has gradually earned a mandate to take up some of my time, by coming up again and again. It has earned a deep dive. I only notice which chapters come up repeatedly in the first place because I have briefed myself on the top-level headings—learned the UG’s structure.

The shift was from listening to some *page* in the User Guide to listening (well, watching) the *instructor*, and paying attention to how they observed some topic in the UG, which she has utilized in constructing the mock exam question. *We both look at the same thing*. If you’ve spent time cycling round the top-level headings of the UG, this all gets enhanced—it becomes an interesting thing to observe (namely, how they have chosen to draw on the UG).

If you’ve spent time learning the sub-headings, you’ll be wondering about what certain topics are *about*. In other words, there’s a tension¹³, and it’s now disposed to be broken.

3.7 Rumble

Consider this exercise. You test yourself on the headings and sub-headings within a UG. This is only useful after you have spent time appreciating the contents (after a few months, or whatever) and you want to revise a service that has many aspects to it, right before an exam.

¹³No, not a dramatic tension. Scientists use tension: scientific scholarly papers involve an introduction. It tells the reader what their results are going to show. They do not simply *show the detailed results* (with no introduction)

3.7.1 An elixir not of memory

This sounds strange but you can refresh yourself on quite a lot of information, quite intensely. A lot of the difficulty of the exam is accounted for by simply remembering the various names of the products. This exercise targets that muscle very effectively.

The sub-headings are also little nudges for the ideas they stand for. You gradually remember various details as the cobwebs come off the cogs. Cycling round, testing yourself on the structural skeleton of a UG in a concentrated manner like this is a RUMBLE.

It is *revision*: briskly considering signs which denote certain ideas, *because you previously knew the ideas*¹⁴. A rumble is only appropriate in these circumstances. Consider a rumble of the CloudTrail UG the night before a Security Speciality exam.

3.7.2 Cloud Rumble

I would make a serious student do a *Cloud* rumble. It involves looking at the page which lists all the User Guides, and testing myself on all the blocks into which the products are sorted (e.g. database, storage, data analytics). You are almost learning the architecture of the cloud. Another task in the exercise would be to come up with a (non-marktingBS) definition for each the products. A bit of time and effort, yes, but helpful in the long run. (Another massive help was Jerry Hargrove's list of the years that the products were released. A timeline tells you so much. For example, many fundamental products came

¹⁴Hence why it is somewhat damaging for Neal Davis to provide a published book of his own shorthand revision notes. His target audience (IT newbies) will think that studying these notes brings about knowledge. It won't.

earlier.).

3.8 Collapsing the UG

When I have evaluated a User Guide, I say that I have **Collapsed** it. This may take several days, going through all the sections.

You are squeezing out surprises. For example, *Section 1 has 5 sub-sections. But, oh, when I expand Section 2, there are 18 sub-sections.* Sometimes, you will encounter two pages (or two sections) which look exactly the same. You think “Hold on, have they printed it wrong?” and very often you need to look more carefully, and notice how the sections in truth deal with subtly different situations. So, collapsing a UG involves (‘here as in all other cases’) setting down the appearances.

Another example is learning that one subject is in fact covered in lots of different places in the User Guide. Consider this non-AWS example:

In the Kubernetes UG, suppose I want information about security. I could go to (1) the “Security” topic in the “Concepts” top-level heading or (2) the “Kubernetes Issues and Security” topic in the “Reference” top-level heading or (3) the best practices for managing secrets in the “Tasks” top-level heading.

Collapsing a UG involves becoming aware of the way certain subjects are *concurrently covered* - touched upon, by different places in the UG, at the same time.

Collapsing a UG involves becoming familiar with landmarks. In a city, there is a statue here, and a restaurant you spent the other night in over there (reference points). In

a UG, there are diagrams, long lists, a section you spent the other night in over there. Generally, you are re-cognizing the sizes and shapes of the sections.

This makes it sound superficial, though. Collapsing a UG, or coming to know how to use it, also involves a certain *coming to terms* with the contents. You interrogate each part. Collapsing a UG involves understanding why each chapter is there (what contribution it makes to the UG) and turning it into a reference guide for you.

To understand this notion of *turning something into a reference guide*, consider a dictionary. It is not a reference guide for a toddler, but it usually *is* by the time they have finished school, and are able to (1) turn over pages (2) appreciate the position of a letters in the alphabet and even (3) appreciate the significance of a definition (whether definitions are prescriptive, or merely descriptive of usage, for example).

Ideally, you get lost in the detail of one part, absorbed by it. You forget where you are for a limited period of time. (The time has intentional limits around it, from the offset.) Doing this repeatedly, the bigger picture will eventually emerge. When you are in each area, you naively commit. You (literally) zoom in to make the text large, making yourself comfortable and go for it.

Collapsing a UG is analogous to Collapsing an exam question. You have analysed the four options, and worked out how they differ by repeatedly comparing the aspects of each. Now you have reduced the question to its structural bare bones.

Having the architecture of a User Guide is useful. It is not necessarily possessing expertise of using the product but it gives you (1) an awareness of how much about the product you do not know, since you know there are places you haven't visited. (2) Explanations, on standby, for situations in which the product misbehaves or you get an exam question wrong

(specifically, the explanation is: *You've never read section X*).

3.9 Conclusion

I started out by advising that you read the UG. And I stand by this. Maintain a presence in the UG. Read it to pay attention to how all its parts fit together. *Collapse* it. If you are studying it, ignore the cross-references, and systematically move through it, making notes. My notes are questions. I make twenty, then I stop. Later on, I can ask myself whether I can name—nevermind *everything* in the UG—but just *one* single thing in a particular UG chapter. Well, this can be quite an alarming wake up call. (I know that the aim is not to know everything in a UG, but if you can't name one single thing in it, this surely tells you something about your understanding.) Becoming knowledgeable about something involves occasionally coughing up, or being tested. There is no way around this.

3.10 Complete Fog

To give you some background to all this, I am consciously aware of the experience of reading sentences in an unfamiliar UG and having no clue whatsoever regarding what it is talking about. It is complete fog. You can connect nothing with nothing. If you were asked by somebody what you did not understand, then you would not even be able to formulate *that*! You might then give up, or feel that you cannot read *any* of the UG. For example, the sentence in the UG will employ a term and you will have no idea what it means. The sentence is rendered useless to you. (I'll chuck an unfamiliar term into the next paragraph, because I'm like that. You'll just have to wonder what it means.)

And it is *this* sort of situation I am attempting to provide solutions for. I want to say: the sentence is always at least grammatical—I may not be able to appreciate its significance but I can at least construct a question to which the sentence is the answer. So I do. When I talk about “notes”, I am referring to this set of questions I generate (sprinkled with Qwata).

So Rule 14 says **Return to Your Notes**, and it is this set of questions you re-visit. On returning, you wonder about possible answers¹⁵. Generating this set of questions (notes), for the various parts of the UG, is my aim, and this deals with the fact that the UG is boring to read. I am not reading it in the way I might read a novel. I always have some **local motivation**, namely, “I need to generate a question for this particular section”).

The UG now seems to provide the actual answers, when you next expose yourself to it. You are bootstrapping your way into understanding.

You cycle round the top-level headings, giving the earlier explanatory sections a special focus—these tend to enable you to understand later chapters. My method¹⁶ of Collapsing a UG is governed by two rules. Rule 13: **Don’t double down**. Move *across* chapters, don’t drill down into one. This is especially the case if you feel you feel you are just getting started at the end of that section’s allotted time. Rule 14: Return to your notes (quiz questions). Return to something which leaves a determinate gap for you to fill in. Returning to the UG itself is “too quick”. It doesn’t matter that you do not cover everything in one chapter. Overall, you are now disposed to

¹⁵Ignorance plays an essential part in Rawls’s *Justice as Fairness* (1971). Nozick scoffed “How can we better when we know less?” and so on. Interestingly, Rawls’s two Principles are *restrictions*; similarly, in his thesis which outlines **Representational State Transfer**, Roy Fielding understands architectural designs as the use of “constraints”

¹⁶Sam Green, What is an AWS User Guide?

dive deep.

This is all well and good; we have a method for studying a UG and I'm about to end this chapter. Perhaps the main objection to the method will be that it takes a lot of time and it is hard work. The first part of my response to this is that I accept this. All things excellent are difficult etc. We have a way. I am content with this, because originally I did not even know there was a way. The second part of my response is that it should start to feel enjoyable. *Woah!* Did I just say that? Enjoyable? Crazy, I know... But it's about not viewing it as some awful, pitiful task you have to push through. Because it's not. "You need to relax, learn to take some joy in your work" - Kay (*Men in Black*, 1997).

If we stand back, however, you might recall that earlier in the chapter I described a belief as false. Namely, the belief

that if you fail Q , which involves S , then you need to go away and learn more about S .

This might strike you as puzzling. On the one hand, I am advising that you develop the skill of reading a UG, structuring your time to cover its contents. On the other hand, I have said that certifications do not test your knowledge of how a service works, almost as if reading a UG is pointless. So, my advice is contradictory, saying to both read and not read the UG.

To make sense of this, I need to provide a positive account of what AWS Certification exams are testing. I have already pointed out two "uses" which certifications have (**testimony** and **knowledge**). But we have not yet looked at the question of what the questions in the exam are testing for. So far I have only argued *negatively*—arguing that they are not testing understanding of how a service works. In the next chapter, I argue that Certifications are testing that you know what AWS thinks of itself.

Chapter 4

Certification as communication

In this chapter, I present a more helpful model for how we should think of AWS Certifications. They are a means of AWS expressing what they think of themselves. AWS now has hundreds of services and products. The issue is therefore how to make sense of them all. I will argue that AWS want to lead the way in making it easier for customers to navigate their products. AWS Certifications are one of the ways AWS communicate how they make sense of their vast array of services. AWS are projecting their **self-knowledge** into the world, the way a dandelion happily lets the wind take its seeds, if it should choose to. A corporation's certifications allow a chunk of the population to have knowledge of its products at a higher level of resolution that can be achieved in most of the population via advertising. If we understand this, it can dramatically improve the way we study for AWS Certifications.

I will call this view **Certification as Communication**. This is certainly a “use” of certifications, from the perspective of AWS, so we can perhaps add it to the “testimony” and “knowledge” uses introduced earlier. But it is appreciation

of “Certification as Communication” that will be particularly helpful for somebody taking the exam. In contrast, if a student only appreciates the “knowledge” use—and has this at the front of their mind when preparing for the exam—there is lots of scope for the student to veer off course. They might attempt to collate as many facts as possible about all AWS products—an interminable, and unfocused objective which, strangely enough, will not necessarily lead to success in the exam.

Although I’m sure you know this, I want to here state explicitly that: the AWS Certification is not (primarily¹) a means of AWS learning about the student’s capabilities but a way of AWS communicating facts about themselves to the world.

The role of the student of the Certification now shifts from being that of studying AWS’s products (for instance, by reading their UGs) to one of studying what AWS thinks of itself. What is the official line, regarding the distinction between AWS Shield and AWS CloudFront? What is the official line regarding what to do in a DDoS attack? You are learning about official lines. It should now be even more clear that AWS Certifications are not testing your knowledge of how an AWS service works.

What follows from this? It is possible that sometimes what it thinks about itself is not correct. Perhaps. More importantly, just as humans hold certain narratives about themselves, the AWS certification-setters must produce pleasing models to make sense of AWS. Certification-as-Communication helps to explain why heavily researching one aspect of AWS very deeply will not actually help you to pass the exam. Any

¹Yes, very good, AWS collect data from the exams. But exams (bunches of questions) cannot have been brought into existence in order to learn more about questions which make up the exam, since these did not exist

such deep study undercuts your aims, because you now know more than the people setting the certification. And this is pointless if your immediate aim is to pass the certification.

4.1 Slogan Matching

Sometimes (not always) the Certification exam is a very trivial matching game. Certain expressions get associated with certain products. If the question namechecks the expression, then you select the product. For example, if you see “identify root causes” in the question, I can tell you now that the correct option will be Amazon Detective.

If the question mentions “vulnerability”, then the correct option will be Amazon Inspector. “Sensitive data” - Amazon Macie. “Interactive business dashboards” - Amazon Quick-sight. Sometimes, it is this very trivial game of spotting the slogans for services—an example of AWS making sense of itself, and promulgating official lines. Have you come across any other examples of **Slogan Matching**?

4.2 Two Controversial Ideas

Reading the UG helps to pass the exam to the extent that it helps understand what AWS thinks of itself.

So, the U (for User Guide) in UX-CX does deserve its place. But we’re reading the User Guides to understand the way in which the UG is being interpreted by the exam setters. I read it to see what they took from it (and, crucially, what they did not). If you can learn how they tend to draw on one User Guide, plainly you can then apply this to other User Guides; you can start to predict which parts of the UG might be tested. There are a large number of services mentioned in

any certification, however, so reading all the pertinent UGs remains practically impossible.

And this is the elephant in the room, if I'm going to suggest that you read UGs yourself: the Sheer Volume Problem.

I introduce **two controversial but powerful ideas**, which are a clumsy attempt to rescue my position from absurdity.

You may want to skip this section, going to the QWATA sub-heading.

FIVE GUYS For any AWS Certification, you can name five core services such that studying these five services in detail produces success in the exam.

DIFFERENCE BETWEEN For any Certification, the attention should be on the difference between AWS services, not detailed knowledge of services in themselves.

When I say "study in detail" I am referring to Collapsing the UG: a controlled, limited process of becoming familiar with the UG (described in the previous chapter). So, for five services, you might choose to collapse their UGs. Then, for the remaining services which the Certification concerns, you are not going to read their UGs, and merely study how these remaining services differ from one another (this latter task being less demanding of time). About 40 or more services are in scope for, say, the Solutions Architect Pro exam.

My motivation for putting in FIVE GUYS was that very early on in my studies, I wasn't really even aware that you could study a UG. I felt silly doing it because they were so large, and no one ever really talked about doing it. Eventually, I decided to make a vigorous effort, testing myself on what each part of the Key Management Service UG stated. This felt like using a sledgehammer to crack a walnut, but showed me it was possible. Once you try it a few times, you can start to do it in a more controlled manner.

You will notice that these principles (FIVE GUYS, DIF BET) are opposites. The first suggests you study some UGs in detail. The second suggests you hold back from diving deep.

A few examples of FIVE GUYS. For the AWS Security Speciality, it is EC2, CloudTrail, VPC, IAM, and KMS. These would correspond to the five domains (Incident Response, Logging and Monitoring, Infrastructure security, Identity and Access Management, and Data protection).

This is misleading though, because the Security Specialist is paying attention only to certain aspects of EC2, for example, and there are services he must also consider (such as CloudWatch and S3). The truth which the idea *does* capture is that a thorough grounding in CloudTrail and KMS will stand you in good stead for the exam. It is not sufficient, however.

For the Machine Learning Speciality exam, SageMaker is undoubtedly the principal service. Then, there are numerous high-level ML services (Amazon Polly, Translate, Transcribe, Lex and so on). This makes it difficult to name Five Guys.

For the Solutions Architect Pro exam, it is again difficult to name five services. This is because the role of a Solution Architect is essentially to know of large number of services. The DIFFERENCE BETWEEN principle is more important here. If you begin learning about services in detail you are doomed to fail. You need knowledge of how the services differ from one another. This relational knowledge is practically achievable. "Learn about EC2" is a task with no determinate end. There are thousands of pages in the EC2 UG. Also, depending on what your objective is, (security, availability), you will take different things from the EC2 UG. So, "Learn about EC2" or "Learn how EC2 works" is an interminable task. In contrast, the question "What is the difference between EC2 and ECS?" is a determinate question with a finite answer.

For the SysOps admin, a good grounding in CloudForma-

tion, Systems Manager, EC2, Auto Scaling, and Elastic Load Balancing. Again, it is not so much EC2 but compute which the SysOps admin needs to be familiar with. She must therefore consider AWS Lambda and container services (ECS, EKS, ECR).

The ideas (**FIVE GUYS** and **DIF BET**) are still helpful heuristics. To make better progress, you can tune them. Each certification involves a mixture of each. If I am struggling, repeatedly, at certain mock exam questions, I can simply say "FIVE GUYS"—meaning, "perhaps I should be looking further into the detail of this service. There are certain models I am missing, so I need to slow down, and just take some time to dive deep". I have to be careful though, because if I scrutinised every service I would not have enough time, and would fail the certification. At other times I say "DIFFERENCE BETWEEN"—meaning "perhaps I need to focus only on the *relations* between the services". What is the difference between AWS Network Firewall and AWS WAF? What is the difference between EC2 Instance Connect and Systems Manager's Session Manager? (The User Guides will help for this task no doubt, alongside search engines and web pages, but I am not learning the architecture of each UG in itself.)

Arbitrary but not irrational

Importantly, just because you settle on five services and it is somewhat arbitrary, this does not necessarily make it irrational. *That these particular five services should be known* is a strategically helpful belief to hold. Someone studying Spanish who learns five words each day is not exactly failing simply because the Spanish language does not consist of only five words. And in studying just *one* User Guide thoroughly, you do learn certain things about User Guides in general. There are certain repeated patterns. For example, there is a **Practical Pref-**

ace, consisting of a chapter called Getting Started and one called Setting Up. There is a chapter on Security near the end. There are countless other subtle things, which it is hard to put into words, such as the way the UG writers tend to express themselves—the way they will sometimes say incredibly important things in a brief and casual manner.

The fact is that it is worthwhile doing a thorough study once, even if it is not practical to do it for all services. It helps you to gain knowledge of the third item in UX-CX, which is knowledge of the exam. This third item is analogous to knowing a person (ultimately, it is: it is coming to know the exam-setters). How does the exam tend to pitch the ball? What juicy tidbits of pedantry in a UG do the exam-setters like to reach for?

4.3 QWATA

I have found that most online educators have not paid enough attention to DIFFERENCE BETWEEN. If somebody was at the beginning of their course of study, brief consideration of certain framing questions can calibrate the student's attention from the offset, in a useful manner. This is because AWS push out services which have considerable overlap.

For example, *What, exactly, is the difference between CloudTrail and CloudWatch?* or *What, exactly, can AWS Config do which CloudWatch Events cannot do (and vice versa)?* or *What are the differences between Auto Scaling and Elastic Load Balancing?* Frankly, these can be given pleasing, crisp answers if you go away and do your homework. And once arrived at, the answers can really help students. It is *not* about going into detail, merely avoiding confusion.

But suppose you are incapable of answering them, because you are the student, and do not have the knowledge. Posing

such critical thinking questions upfront is still helpful because it prevents the student from experiencing an intellectual acid reflux half-way through their studies, in which they are **surprised** by exam questions which ask them to tease apart two services. They never considered these questions! They studied Auto Scaling. Then they studied Elastic Load Balancing. They have never given a moment's thought to how they differ. The fact is that if you post some Initial Framing Questions, the answers *will* likely be encountered, eventually, if you are moving through material (blogposts, UGs, mock exam questions). Try to adopt an attitude of making your progress non-dependent on immediately having the answers,

Now I habitually note questions which come to mind. I call them QWATA - Questions You Want to be Able to Answer. I will sprinkle QWATA into my notes on the User Guide, for example. It can be absolutely anything. A term you don't understand. "What is a resource declaration?" or "What is the difference between a launch configuration and a launch template?"

There will tend *to be* questions like this which arise. Any visit to a UG tends to be massively insufficient for complete understanding. It will tend to raise more questions than it answers. Don't internalise your grumblings like a Victorian aristocrat, as if the more questions you spurt out (which are not yet mated with an answer), the stronger the evidence for your stupidity. I have a Zero Tolerance Policy for things that don't quite add up. My QWATA have unfettered access to my notes, 24/7.

If you really want to gain knowledge about a technology (a product) without actually using it—something which you should of course do if you can—then you need to be less like an obedient student, in reading a UG, and more of a detective.

4.4 Service Mush

To help you to appreciate why QWATA are so valuable, you must appreciate that there are bunches of AWS services that are remarkably similar. It is very hard to find crisp and succinct explanations differentiating them. Sometimes, *especially* from AWS because the internal teams are competing—and namechecking another team’s name (on your inaugural presentation) would be weird—this is *their* big release day. Imagine if Obama’s inaugural speech mentioned George W Bush seventeen times. Besides, if they did define themselves in terms of other AWS products (and how they differ), they would be accused of relying on people’s prior knowledge of AWS. They would be accused of not making things easy to understand for beginners to AWS.

I call a cluster like this a **Service Mush**. Exam questions tend to ask you to choose amongst the members of the Mush. Here are some examples of Service Mushes.

1. QuickSight and Athena
2. Trusted Advisor and Personal Health Dashboard
3. AWS Config and Systems Manager and CloudWatch Events
4. Step Functions and Simple Workflow
5. Cost Explorer, Budgets, C&U Reports
6. AppSync, AppFlow, AppRunner
7. AppSync, DataSync

The second-to-last Service Mush is just three services whose

name have a common element (“app”).² The last Service Mush again has a common element (“Sync”). It is not only product names sharing a common element, such as “app” or “sync”. It is the fact that the product names often fixate upon the *broad idea* of

moving data from A to B.

This idea is as broad as that denoted by “Information and Communication Technology” (ICT) the phrase probably first introduced by Dennis Stevenson, in a report for Tony Blair and David Blunkett on the state of technology education in British schools³.

Anyhow, this is very sensible from a marketing point of view, as it states the product’s function in the simplest terms; that the product is not reducible to this idea is besides the point.

The problem for us is that we might reasonably describe that **broad idea** using *any* of:

stream, flow, sync connect, link.

There is a therefore *semantic* overlap across the product names. That is to say, not only do the product names have common elements, but they in fact all denote the same idea. This will mean that somebody will have a tendency to refer to, say, AppFlow as AppSync, or AppLink, or perhaps even AppMesh.

²“AppSync” sounds like *apps ink*. Ink is for sketching out graphical things on a napkin. And AppSync is about graphical APIs.

Meanwhile, if you are lazy and don’t want to sort out your own containers, AWS can employ a guy behind the scenes—a weirdly energetic guy, always eating salads in tupperware boxes, who enjoys ultra marathons. He will run all your containers for you. That’s **AppRunner**.

To have records from SaaS applications flow into S3 (or out), you use **AppFlow**

³“Information and Communications Technology in UK Schools: An Independent Inquiry”, March 1997.

The reason I describe this phenomenon is that many job roles related to the cloud require you to be able to differentiate the various products. If you are in a sales role, being capable of using the correct name for a product is crucial. So by recognising this phenomenon, we can put in place solutions. Part of it is just paying attention. You might pay attention to the acronym formed by the phrase, as this sort of “locks in” the specific words used. So, if you remember the acronym but not the words, then the acronym is an error-correction device. For example, you might associate the AWS service which can use physical infrastructure to connect AWS to on-premises locations—visualize roads being ripped apart—with DC Comics (AWS Direct Connect). ⁴.

What is particularly annoying is that AWS sometimes address Service Mushes, usually in their FAQs pages for products. Yet they give you one line and its woefully insufficient.

I know that the AWS chiefs have some idea that there may be confusion over their products, but I’m not entirely sure they appreciate just *how* confusing it can be to students.

4.5 What kind of communication?

Anyone with the faintest interest in technology will know that there are many *ways* for A to communicate with B. For example, if B waits upon A for deliverance of a message, like one of King Charles’s footmen, waiting to learn what colour suit is desired this morning, this is *synchronous* communication. But if a journalist deposits an email in the inbox of Prince Andrew, inviting him for a *Newsnight* Interview, this is *asynchronous* communication.

Simple Queue Service was the first AWS product. Jerry

⁴Google Cloud has Dataflow, Dataplex, Dataprep, datastream...

Hargrove suggests it was released in 2004, perhaps referring to its internal usage, since AWS is usually said to have officially began in 2006. With SQS, messages are stored in a queue. You can see how this provides some elasticity, or “give” into communication. B is not waiting on A like a footman. B can finish what they are currently doing, compose themselves, and then pick up a note left by A.

With AWS Simple Notification Service (SNS), various endpoints are notified of something timely. These can be mobile phones receiving an SMS, or a notification, or email inboxes. The destination can also be an Lambda function or an SQS queue. In fact, *many* endpoints can all be attuned (the proper term is “subscribed”) to a single channel. I take it that because we have *many* viewpoints of a single thing, it is as if there is a objective *place* in the world. And so the term used by SNS is **topic**. .

If we hold **Certification as Communication**, what sort of communication is it? It is asynchronous. The student pulls the material when they are ready to. This is what makes AWS Certifications particularly helpful for Climbers (those using the certification to gain knowledge). You can take the exam for the certification when you want to. You can book it for any month of any year. Most people book it when they think they will pass.

This chapter began with a cynical tone. But such is its scale that when you are tired of AWS, you are tired of IT itself. AWS Certifications may well be a force for good.

AWS certification exams are unlike inspections of a Kebab shop (or school), which use a push model, not a pull model. The inspector chooses when they occur.

Chapter 5

Auxiliary Material (X)

I said that knowing how to pass an AWS Certification involves four subsidiary pieces of knowledge (UX-CX).

Having talked about the U (for User Guide), I move along to the first X. This is collating auXiliary information. "Auxiliary" means supplemental.

5.1 Whitepapers bring extremely swift victory

The AWS User Guides are not the only source of information. They are supplemented by:

1. Whitepaper
2. Blogposts
3. Exam Guide
4. Standalone items (e.g. articles which are part of the "AWS Knowledge Center")

5. videos

I have listed these in order of importance. These five broad-brush items can be remembered by WBE-SV (Whitepapers Bring Extremely Sure Victory). ‘

5.2 FAQs

I need to add FAQs. These would go below Whitepapers (so they are very helpful. Several individuals have made the observation that reading the *Frequently Asked Questions* web pages tends to be very helpful for the exam. See Author (Aug 2021) for example. Why is this? First, FAQs pages can be read because they are not as large as a User Guide. Second, frequently asked questions target false beliefs which have a tendency to arise in individuals. FAQs deal with *misconceptions*. And that is what the AWS Certification is all about: correcting misconceptions in the mass population, and bringing about (**communicating**) an order in the way people think of AWS.

‘Videos’, by which I mean AWS employees being recorded speaking at conferences, is low down because you can spend a lot of time watching them, without getting much focussed information. They can mop of your time like a sponge. The video speaker is not usually addressing a student of an AWS Certification. It is therefore not focussed enough. Of course, it is hard to state that a presentation entitled ” “AWS Web Application Firewall” will not help you to learn about AWS Web Application Firewall. But *my* claim is that the video will be too lax and dilute. The speaker is not there to teach you the tricky parts of configuring the service, but to come across as genial to those considering buying the product. For a beginner, you also need to recognise technical terms. You need to see how they are spelt and if that ”code” font is being used. You do not see this with audio.

Entities which you configure are often given very casual names. For example, there are entities in CloudFront called *behaviors*. It's nothing complicated; a *behavior* is simply a set of preferences. But you can see how this might be misleading to a complete beginner who thinks that the speaker is just talking, on a *slightly* more general register, about how CloudFront behaves. I call these **Cwufpots**: Casual words used for precise things.

5.3 Whitepapers

Whitepapers are first because reading the correct whitepapers early on can inform you of how AWS thinks. Whitepapers also aim to synthesize material from across User Guides. No User Guide will tell you what to think about when responding to an incident. This guidance is found in a whitepaper on incident response. Whitepapers are produced by AWS. Some can be quite long, perhaps forty pages. They tend to be easily readable and non-technical.

This can calibrate you. That is, ensure that you read about the appropriate aspect of any UG you read. What should the Security Specialist be thinking about? Whitepapers are an important part of the Security exam; I am not sure about the importance in other exams.

Early on, spend a little time exploring all the whitepapers available. There are likely to be seven or so important ones. Locate them. Make swift work of them by doing Serious Reading: pen in hand, making marks (highlights) on the page with Acrobat reader, and make notes.

5.4 Blogposts

Many who provide online mock exams refer to blogposts in their explanations. Blogposts often provide creative and interesting applications of AWS Services, thus providing information that is not found in the User Guides. Official blogposts are a significant part of how tech companies communicate. Sometimes their information can help you to understand things but on the whole, there is nothing in blogposts which is not in User Guides.

If you want to dive deep on a service, however, reading a few of them, collating them into a bibliography, is a useful task. Remember, our task is to learn about how AWS make sense of themselves. We are studying what AWS thinks of its services, not AWS's services. This makes blogposts particularly helpful because authors express how they think of the services. An often quoted blogpost in mock exams is Holly Willey's (2017) *How to protect dynamic web applications against DDoS attacks by using Amazon CloudFront and Route 53*. Why? Because Willey is presenting how to integrate a number of services. This is the relational knowledge we are after (recall DIF BET). Another blogpost is *Monitor and Notify on AWS Account root user activity* by Sudhanshu Malhotra (2017). This solution uses CloudWatch Events and Lambda.

5.5 Exam Guide

Read the exam guide carefully.

I must say, however, that I find the exam guides unsatisfactory in a number of ways.

They are vague. I can't say, specifically, how but...

5.6 Standalone material

5.7 Videos

Videos can be good for expanding upon a good grounding in the documentation, but watching a series of videos cannot itself provide this grounding.

Let me try to pin down some issues with videos you find on YouTube.

(1) **Misaligned aims** The speaker in fact has an aim that does not align with your aims. For example, the speaker is attempting to persuade listeners who are present that they have reason to use a product. If you are studying for a certification, your aim is to gain knowledge of the product, and how it differs from other products. Sometimes these aims align of course, but this is thin gruel.

(2) **Audio problems** You cannot hear what the speaker says at certain points, because of the mic or mumbling.

(3) **Cwufpots** The speaker mentions Cwufpots (Casual Words Used for Precise Things). Often, a product has a number of key terms, such as *data source* and *provider* and *provisioner*. Understanding the service is understanding the interplay of these concepts. But if you watch the video, without a grounding in the architecture of the documentation, these terms will not pop out for you. They will seem to be being used in a general way.

(4) **Apathy** Somebody might have nothing to say, and it is simply their job to get on stage to speak about something for a period of time. (It happens to us all.) Then there are the execs, looking to slip in that they enjoy baseball(?).

Also, have you ever witnessed somebody speaking using a PowerPoint they did not create? Once you know what to look

for, this is easy to spot. The speaker comes to a conclusion on some topic; they click; and the next slide has other thoughts, causing them to verbally *tack on* some extra point on the topic. The slides are controlling them, not the other way around. Presentations are often group projects, and so you will often see one person "responding live" to the slides the other person created (there are many other signs).

Finally, consider the scale of things. Let's take one conference as an example. KubeCon took place in Detroit, Michigan. It started Monday 24th October and ended Friday 28th Oct 2022. Shortly after, the YouTube Channel *Cloud Native Computing Foundation* creates a playlist containing 281 videos from the event. I'd guess the average duration is 35 minutes. The conference has spat out 164 hours of content.

If I made you select one video to watch from this playlist, what might you look for? You would probably look at the titles for something on a familiar topic. I would also look for any videos with a greater number of views than the others, as higher quality presentations eventually start to bear the mark of a greater view count. If I have really tuned in to this area (for example, attuned myself to the Kubernetes area—to the point that I can recognise the names of chairs of Special Interest Groups), I might be recognising names of speakers, and be using *this* as a criterion.

While we are here, you do know that providing miserable comments under someone's presentation, such as "The person's accent is hard to understand", is wrong, don't you? One day you might be asked to present.

5.7.1 Techniques

There are nevertheless reasons to watch presentations online. Speakers sometimes use presentations to talk about best prac-

tices related to a technology. Use the following techniques to watch online videos:

1. **Architecture** Work out the structure of the video. However rushed and chaotic the presentation may seem, often, at least some of the responsibility for this is *you*, the listener, not paying enough attention to the structure of the presentation. There is often a roadmap presented at the beginning.
2. **Silent Reccy** Mute the speaker and move the cursor along, examining their PowerPoint slides. Hence, it is a silent reconnaissance exercise. In doing this, you are reading a set of notes uninterrupted by the speaker. Some speakers have this strategy: present slides with text on, adding "salad dressing" to what is written using their voice. Well, this is a workhouse for the listener, who is expected to read the slides to catch up to the speaker, constantly attempting to simultaneously process the text and the audio. Patrick Winston says "we only have one language processor"¹

Good presentations involve the speaker inviting the listener to join them in making observations on the slides. In *The Sense of Style* Pinker talks about Classic Style, a style of writing which involves the writer seeing something in world. The reader has not yet noticed it. The writer positions the reader, so that the reader can see it with their own eyes².

3. **Pause** Pause the video if you are ever presented with a view with lots going on. Study it.

¹*How to Speak*, Patrick Winston, YouTube Channel: MITOpenCourseware

²Pinker draws on "Clear and Simple as the Truth" (2011) by Francis-Noël Thomas and Mark Turner. This booklet (Kebab) certainly descends into their *Self-conscious* style at times.

4. **Conference Branding** There is the *Re:Invent* conference for AWS; the clumsily titled *KubeCon and Cloud-Native* conference for Kubernetes; *Hashiconf* for Hashicorp.

In fact, that's something right there—know your conferences. If you're going to be in this field, won't it be helpful for you to be on top of this? Learn the architecture of the year.

You can then search for the playlist of a year at a conference. Notice the unique branding of that year.

Re:Invent 2017 had lime green vertical bars.

In 2018 all slides had a large pink shape on, since this was the year Transit Gateway was announced, which allows traffic to slip between VPCs like a pink salmon. (In truth, it was a homage to Jeff Barr's hair).

In 2019, EventBridge was announced. This if for event-based architectures, which involve records of something which has happened (“events”) being placed down somewhere, for another component in the architecture to pick up when it is ready. The 2019 slides are as if somebody was ordered to take a photo of a rocket flying from left to right.³ But they were simply passed a note, to read when they were ready. So, they only caught the tail-end flames of the rocket.

It was March 2020 when Coronavirus really spread. This was the year of microscopic pathogens. Fittingly, any presentations from 2020 have a hollow-shaped oval in the top right⁴. It has a smaller capsule within it, and sometimes another within *that* and they form concentric—but

³Consider this presentation by Tim Bray, when he was an AWS Distinguished Engineer “Moving to event-driven architectures” *ReInvent 2019*.

⁴Consider Robert Zhu's excellent “Introduction to GraphQL”, *ReInvent 2020*

irregular—blobs. The throbbing shapes look like euglena or some other bacterium.

In 2021, a sharp red line is scored across the top right corner of slides; rage still festered after AWS had lost a big customer the previous year.⁵

By 2022, a vibrant red and yellow blur is present, depicting a new dawn (or is it as if somebody dropped a Windows logo in a puddle of oil?). Now if you encounter videos on their own, you see what year they're from.

I have just taken the time to develop a conception of each conference (even particular conference years). Why? These conferences are **bookshelves**. When you want to know more about a topic, or subject, you flick through the books on a bookshelf. You might look at a few shelves before you find what you're looking for. You might leave the library with a stack of books.

The shift to having bookshelves had dramatic results for me. Previously, if I wanted to know more about a topic, I would simply search for appropriate terms in the YouTube bar. And, for reasons I cannot explain, the results would be unhelpful. I only ever found marketing material, amateur YouTube videos of low quality, and material produced very recently (last few days).

5. **Talks of tradition.** Many presentations are part of a tradition—every year, the same subject matter is given an update. Perhaps this is obvious to you, but it took me some time to realise because YouTube's recommendation engine only provides very recent material.

For example, at the *Re:Invent* Conference, every year

⁵Tom Hoggins, "The real reason Amazon lost the Pentagon's \$10bn 'war cloud' Contract", *The Telegraph*, 15th Nov 2019.

there is an IAM Deep Dive presentation⁶. There is an S3 State of the Union presentation annually⁷, and always one called "Day in the Life of a Billion Packets"⁸.

⁶Jeff Wierer, "How to become an IAM Policy Ninja in 60 Minutes or Less", *AWS Re:Invent Conference*, 2016

⁷Mai-Lan Tomsen Bukovec, "State of the Union: AWS Storage Services", *AWS Re:Invent Conference*, 2015.

⁸Day in the Life of a Billion Packets, Eric Brandwine, *Re:Invent Conference*, Las Vegas, 2013

Chapter 6

Knowing the Certification (C)

Having the ability to evaluate a User Guide, when you need to, is only so helpful. You also need to know how to work out what the certification is testing for. At what level are its questions? In the construction of the exam questions, what do they go for? This knowledge of what the certification is testing for is something that is hard to pass onto someone in words. It is gained by spending time on mock exam questions.

The background knowledge about how hard they pitch helps you on difficult questions. There's always something which the question is **getting at** and the job is to find it. In some situations, it will seem that the question could be getting at a number of things. Being aware of how hard the exam pitches will help narrow it down. This is because you know that it tends to only ask things of a certain degree of difficulty, or only tends to be aware of things which have been around for a couple of months. For example, on the night before my Security Specialty exam, I listened to Peter O'Donnell say that AWS HSMs were now validated at FIPS Level 3 (and not merely Level 2), and then the next day on my real exam, a

question asked what level the HSMs were validated at. Level 3 was an option. I did not select it, because I knew the exam. I knew that the exam tends to have an *ever so slight* lag in it, when it comes to keeping up with recent innovations. (It's not really a lag - the innovations are at breakneck speed.)

You can only come to know the certification by (1) practicing mock exams which reliably simulate the real exam and (2) taking the real exam. Perhaps testimony can help here too—people *telling* you what the exam is like. You can see how this is not sufficient though. Consider how insufficient it is to be told what a *person* is like.

I have nothing else to say on this because there is nothing else to it. Take the time with mock exams.

Chapter 7

Examcraft (X)

Examcraft denotes all the usual things you should do for success in an exam. These are not skills (people throw the word *skill* around too loosely), just things you choose to do.

1. **Know exam guide inside-out** Read the exam guide - learn the names of the domains, early on in your preparation. If you are a Climber, the domains of the exam guide will probably appear quite vague, so don't dwell on them. Try to give them meaning, by diving into detail, and periodically returning to the exam guide to consider what makes each domain unique.
2. **Time discipline** Do the calculation to work out how many minutes you should spend on each question. Get used to making a decision in situations in which you cannot be sure of the correct option. You must move things along. Especially in the Speciality exams, it is about keeping the pace up, and concentrating quite intensely for a sustained period of time (three hours).

It is intense because there is a lot to read on each question, and there is a lot of analysis. It is working out

what the differences between the four answer options are. They are often subtly different. Thus, you must spend two minutes analysing, playing spot-the-difference, and **collapsing** the question down to its essential components. This means that a lot of time is spent *establishing the question* (as opposed to simply considering the various answers to a question).

To those unfamiliar with AWS certifications, let me try to clarify what I mean by **collapsing the question**. Suppose that a restaurant has decided for some peculiar reason to avoid writing *vegetarian* next to meat-free dishes on its menu. Instead, they print all the ingredients. You have to scan every ingredient to check for meat items. And you're at a Sushi restaurant, with four dishes arriving on the moving conveyor belt every 167 seconds. You are with a VIP who always demands to be informed of which of the four dishes has the fewest meat ingredients, and she then likes to ponder the choice, once you have told her. Put simply, you're in for an evening of frantic menu reading and comparison of dishes. Not impossible, no, but *laborious*. (Is this collapsing a skill that the exam tries to inculcate? And is this even possible, given that real customers in the real world do not present as sets of four options? The question is: what, exactly, is the capacity that is transferred into real situations?)

3. ***Professionals talk Logistics*** Set aside time to clarify the date, time and location of the examination. Make a fault-tolerant route to the exam centre so that you'll still get there on time if there is a traffic jam. Well why not—plan to win. If the traffic behaves you can get a coffee from McDonald's and revise.

The things listed here, in EXAMCRAFT, are necessary but insufficient for passing the exam.

7.1 Knowing you're ready

I knew I was ready to take the exam when I was was doing practice exams, and was no longer being surprised by things. Questions are no longer referring to products I have not heard of. For the majority of questions, you can work out what item of knowledge they are testing (eventually).

You are no longer completely lost. When you do temporarily get lost, you are disposed to find out where you are (and what is going on) quite quickly.

You will certainly never reach a state at which you get all questions correct, and know that you are getting them correct. Do not hold out for perfection.

Every time I have passed an AWS certification, I could not be confident I had passed when I finished the questions of the real exam.

You know when you are ready. Very late in your preparation, perhaps the night before the exam, you should do something that forces you to just dart around, disturbing (reawakening) a broad range of material quite rapidly—if you can, do a mock exam you have never encountered before and try to finish it.

Chapter 8

Recognising faulty tools

Some courses which you must pay for online are not up to scratch. The course designers have been keen to generate some cash, and produced the course as quickly as possible. You can sometimes tell.

It is important to be on the lookout for poor explanations so that you can make suitable adjustments and accommodations, and perhaps one day do better.

8.1 Instructor-led courses

One of the benefits of reading a User Guide yourself is that you start to be able to tell when people are simply plagiarising the User Guide. I am not talking about quoting from an authoritative source (for the UG is authoritative). I am rather talking about regurgitating its contents unthinkingly. In fact, sometimes, the words in the UG express facts which are beyond the understanding of the person speaking them.

Consider a course which intends to prepare people for AWS certifications. What make such a course faulty? Here are some signs. Definitions are not provided of key terms. There has

not been much thought about the structure of the course. This means that at the beginning, you are not told about the plan of the course. Throughout, the instructor never loops back on what they have said. They never stop to reflect, and to relate the later topics to the earlier ones. It is as if once they have pushed out each discrete video, they are done with it. There are no signs whatsoever of any connective tissue. There are no comments on how seemingly similar services in fact differ.

You often find that instructors do not explain names. Why is called the *unified* CloudWatch Agent? The first duty of a teacher explaining a product is to link the name to what it denotes.

If you ask them a question such as “What is the difference between an endpoint and a URL?” then the teacher should say that they do not know if they do not know, as opposed to “it depends on the context” or some other waffle, which suggests that the vagueness they possess is also in the world.

It took me an embarrassingly long time to realise that instructors were getting absolutely *everything* from the UG. This is all they are doing. And they never add value by providing interpretative guidance. (The only apparent value seems to be in having done the heavy lifting—having examined all the UGs themselves, selectively extracting what is important). It is never “here’s how I read this UG”, inviting the student to join them in examining the UG. Instead, where they got their material from is bizarrely never disclosed, almost as if they are ashamed.

8.2 Exam Guides

Some exam guides, produced by AWS, are not very helpful.

8.3 Mock exams

8.3.1 Cheaply manufactured falsity (CMF)

Some mock exam creators overreach with questions. You read the explanations provided for the questions and can't quite make it fit. They use the blogposts to concoct questions, by replacing the services which *are* truly involved in the solution with similar services which are *not* in the solution. This is how they generate their false options for the multi-option questions.

But the concocter fails to articulate the reason why the false option is inappropriate. Often, the fictitious possibility (which the student is supposed to be able to spot *simply in virtue of its cheaply manufactured falsity*) is in fact just as reasonable as the reality. See if you can spot any questions like this in mock exams online.

When you spot them you say **Cheaply Manufactured Falsity** (CMF). In trying to make sense of things, you just Can't Make... Fit.

There are plenty of things which happen not to be the case, but which could very well be the case. Philosophers call things that are true (but not necessarily true) *contingent truths*. In concocting questions, the false options must represent states of affairs which cannot be so (rather than merely happening not to be so). If mock exams are to teach the student, it must provide (or speculate even) as to *why* the incorrect options are incorrect. Play the reason game. If the reason is nothing but the fact this is the AWS official line, then this is fine, and should be made plain, and we should give just one sentence speculating why this is their official line.

8.3.2 Distractors

Some false options have a very expensive manufacturing process. The concocter has crafted them with cunning. These false options are tempting for those who are half-trained. This species of false option are called *distractors*. They exploit not ignorance but partial knowledge. The distractor *intentionally* targets a belief which is known to arise in some students—a false belief.

Not all false options are distractors. In fact the majority of false options are not distractors. Now, it is true that these options might be selected because of false beliefs which arise in students, in the course of considering the question. But here, the concocter is not intentionally targeting *known* false beliefs. These sorts of incorrect options test for lack of beliefs, or lack of thought. So these are not distractors.

If you want to have a conception of **Distractors**, you must assume that:

some incorrect options are not merely false but *im-plausible*.

Such options are **not** distractors. To be a distractor, an option has to be really rather sensible.

Being targeted by a distractor is a rich learning experience. However, we cannot expect all false options to be distractors because they are hard to create¹. The exam-creator does not always know what people tend to think! The exam setter suffers from the Curse of Knowledge, and must make a conscious effort to sympathise with those who have false beliefs, and provide accurate representations of these beliefs. Professional exam creators have to harvest data to work out false beliefs that people tend to possess.

¹For a recent discussion see Shin, Guo and Gierl (2019), “Multiple-Choice Item Distractor Development Using Topic Modelling Approaches”

We have already talked about Cheaply Manufactured Falsity (CMF)—cases in which no reason is provided as to why the false options are false. You also often see faulty explanations for mock exam questions.

Derren Brown describes a technique which magicians use in their patter.² The term “patter” is used for what magicians say while performing the trick, and the narrative which they can shape with these words. A card trick will often involve a lengthy procedural set-up (pick a card, return it, shuffle etc). So just prior to the trick’s punchline, the magician has a chance to take stock and summarise what has happened so far. “So, you picked a random card, then you returned it...” he says.

8.3.3 Narrative Moulding

Because the spectator is just gasping for the big reveal, and eager to do anything that will hasten the magician’s departure, they enthusiastically nod, assenting to all the things in his account. This summary account can “do work”, however. The magician can re-describe what happened, moulding the spectator’s memory, since the spectator will not remember all the details. For example, the magician may have asked the spectator to pick from some packets of cards which he pre-selected for them, narrowing down the choice. In other words, the selection was far from random. But it has become the sexier

”you picked a random card”

in the magician’s summary account. This narrative moulding enhances the big reveal, which is all good fun³.

² *Tricks of the Mind* (2006), p34.

³ I have placed two examples of narrative moulding in Chapter 1 of this booklet. There is also one placed in the final chapter—and many more.

In some explanations to mock exam questions, you might be told:

This option is incorrect, as previously explained.

(This would be written next to a particular answer option, and is referring to the general explanation given). Now, *did* they previously explain it? Did they reason, or did they just *state* which option was incorrect?

Of course we cannot ask *WHY* repeatedly, driving down into deeper explanations. But if our job is going to be to remember something contingent (that is, something that is the case, *because-it-is-now-eat-your-porridge*) then we should put in place a solution to help us not select the incorrect option again. This can be just a stated principle, but preferably a memorable slogan. You should also make note of a QWATA. For example, to remember that Security Groups are stateful, they are an *Inner Intelligent firewall around the Instance, (III)*. Otherwise, if you're going to get the question wrong next time... well, what are you doing? Humans love reasons. If the true reason is inaccessible, manufacture one. I shout **WAF FIRST!** in the bath sometimes. This slogan "explains" why a Firewall Manager (FM) policy never adds a WAF to a resource which is *already* covered by a WAF policy (put in place by another FM policy). *FM policies never tread on one another's toes. WAF wins.* Secondly, if a Shield Advanced policy puts in place a WAF, this will get overridden by an FM policy. *WAF wins.*

If there are facts which I must have at my command, in order to pass the exam, then I have one job: to be in control of them. If I'm aiming to pass the exam, then explanations (under incorrect questions) need to either (1) provide an explanation or (2) provide me with a tool for reliably getting the question correct next time.

8.4 Shadows

Anybody can place things on the Internet (consider this, for example). They do not have to be an expert, or be very good at articulating certain ideas crisply. I have been tempted in the past to start with YouTube when learning a new technology. I believed that if, instead of just going straight to the technology, I warm myself into it—prime myself for it—by imbibing the warnings and guidance of those who have been there already, then I will achieve understanding more quickly. The thought ran like this: *The source material must be hard to understand, and this is why other people have chosen to produce their own “explainers”.* The more of these explainers I mop up, the better. If it is there, I will watch it.

Like a piece of bread mopping up gravy on a plate, these videos can mop up your time, and you won’t really get much from them. Even more crucially: you won’t get much from *lots* of them. There will be no helpful abstractions that emerge from them *all*. The people have not spent much time thinking about what they have produced because the aim is simply to promote themselves. They care not so much for what they are saying but that they are the one saying something.

Now to the positive side. The creators of many technologies are sometimes very good communicators. They craft their sentences carefully because they are used to writing code. Their writing, or their presentation, has the zing—the extra something—which you get from listening to the architect themselves. Five hours listening to people mumbling about Latex on YouTube is equivalent to two hours reading Leslie Lamport’s book on Latex. One hour listening to people talk about AWS WAF is equivalent to half an hour listening to the developers who worked on it unveil it in 2015. An hour of someone mumbling about C++ is worth half an hour of Bjarne

Stroustrup⁴ giving one of his well-spoken lectures explaining C++. Half an hour of amateur hour on Terraform is worth ten minutes of Armon Dadgar using the whiteboard⁵. But of course, YouTube’s algorithm won’t give you that.

Treat yourself to the best. When I start to feel that people are not quite getting to the heart of things—when you start to wonder who *this* person is relying on—I just say “shadows”.

8.5 This booklet

There is an AWS community, and I hope not to come across as discourteous to any of its members here. I have (like many others) benefited from material which people have chosen to provide online. It is precisely because these tools can be so helpful, that it is worthwhile discussing how they might become faulty.

Where to start with this booklet? First, it is itself testimony, and is perhaps occasionally an example of damaging testimony. Second, the final chapter, with its notion of accidentally passing, is perhaps a good depiction of thoughts which lead to “imposter syndrome”. Third, perhaps it does certain individuals an “testimonial injustice”. Suppose there’s

⁴Stroustrup is clear about the value of the education he received at Cambridge, but also... sober, and clear about how it works. On being mentored by David Wheeler at Cambridge: “basically, the tuition style was to listen to what I said, then shoot it full of holes, ever so politely. I was given a lecture for about an hour, on topics related to it. I would go away feeling about this big, and then I would come back again the next week for the same”. Employees at another company reflect on it in a way similar to Stroustrup here. You will be improved. “Oral History of Bjarne Stroustrup”, YouTube Channel: Computer History Museum, 2015.

⁵Introduction to Terraform, Armon Dadgar. Uploaded Tue 29th May 2018. YouTube Channel: HashiCorp.

a speaker and a hearer. If the hearer depresses the level of credibility they assign to the speaker (perhaps owing to a prejudice), they do the speaker a testimonial injustice⁶. (Katherine Hawley has investigated what is involved in being trustworthy. She argued it involved raising proper expectations (anticipation?). This looks like a very good area to start to improve things) Daniel Dennett lists a number of phrases, thinking tools, that can be used as weapons. Consider simply saying "sour grapes", as a response, for example. Finally, where is the get-go optimism that America is saturated in? Not in this booklet. Yes, I would start with that point.

8.6 Alarm bells

The comedian Tim Vine performs a song called *Alarm Bells*.

- An educational company promises to give you a job in the cloud, but doesn't tell you that the term "Solutions Architect" is ambiguous between a sales role and a heavily technical implementation role. Alarm bells.
- An educational company promises to give you a job in the cloud, but never discusses a method for applying to jobs or situations in which all job posting ask for experience, and you don't have experience. Alarm bells.
- An instructor makes you pay for his online course, to help you achieve a SysOps certifications, but does not begin with a description of what does (and does not) count as SysOps. Alarm bells.
- The instructor is not providing any references to important papers, or important whitepapers. This is especially the case when there are experts who know how to

⁶Epistemic Equality?, by Miranda Fricker

explain things well, and they simply need to be quoted. For example, a term such as "learning rate" on the Machine Learning speciality. If the instructor speaks as if this term is hard to define ("it's about X" etc "About?" Are you serious? Are we going to design a mood board next?), it is because they have not bothered to research the definition. It is not because the term is hard to define, since it is used used by mathematicians and scientists, who work with carefully defined things. They would of course say that they are merely providing an informal introduction. But just because the exam requires only a gentle acquaintance, this is no reason for fuzzy guff whatsoever. Alarm bells.

- You ask the person at a company for advice on something (e.g. finding a job) and they respond with something pithy such as "Got to be in it to win it" which, if it needs saying, is a necessary but woefully insufficient condition for winning. Alarm bells.
- You witness behaviours you would expect from a cult. For example, "It's an investment in yourself". Idol worship of the leader of the educational company⁷. "How long you take is up to you". and so on. Alarm bells.
- You are on an AWS course, and nobody decides to impress upon you the format of an Amazon Resource Name.

Salespeople make claims about **time**. They persuade you that you need to part with your cash now. This time period,

⁷The BBC aired a documentary entitled "A Very British Cult" on Wednesday 5th April 2023. It described the cult-like behaviors in a life-coaching company. For example, members would sit on hours-long Zoom calls and somebody was responsible for noting down everything the charismatic leader said (testimony).

during which your parting with your cash will bring you great benefits, will soon end!

Most of the rest of this booklet is from the perspective of a *Climber*.

Chapter 9

Accidentally Passing

You must be pretty important, you've got the whole plane to yourself. Where do you want to go?

– Pilot to Maya

You can accidentally achieve a certification or know how to achieve it. I can successfully make a meal by skewering chicken, and adding a Teriyaki sauce, but only by following the steps of my recipe book¹. My success at this meal is *accidental*. I am the shadow. I don't know why each ingredient has to be present and I rely on the recipe book like a zimmerframe.

I do not want to induce anxiety in those who pass an AWS Certification. Passing is unquestionable evidence of a certain amount of knowledge and if you have passed, you should be congratulated. Rather, my aim is to describe ways to *flourish*—ways to squeeze more value from the certification. Passing the exam is no guarantee that the student appreciates, or understands, certain things—things for which the exam preparation period is the prime period to understand them.

¹200 Student Meals, Hamlyn All Color Cookbooks

The certification is often a means to an end. So we can ask how we bring about a greater degree of alignment with these ends, by preparing for the examination in certain *ways*. Examples of such ends, to which the certification is a means, include

- becoming a DevOps Professional;
- achieving a promotion at work;
- getting a particular job role

and so on. On reflection, the Certification is never *not* a means to an ends.

9.1 Damaging Testimony

I think it is possible to achieve the certification in a damaging way. Namely, online instructors can tell you what you need to know (in order to pass) by *testimony*. And it can work - the student can pass.

It is damaging because the student never develops the subsidiary skills themselves (UX-CX). The student therefore possesses the certification, but it's not from them. They are the shadow.

Do I propose silent teachers? No. I resent boomer teachers who dismiss “spoon feeding” students, in between reminiscing about how they were free to play in the brooks and streams in the Olden Days. They use the notion of “spoon feeding” as a justification to *do no teaching*. Think of a schoolteacher that will “nobly” check their emails every lesson, just so that the students can practice independent studying.

I reject the view that the teacher must inculcate the crucial skills by *stepping back*. I think this is a confused belief. The

student will have many decades to come, and the teacher will be absent for all of them. Installing powerful theories, impressing things with force and vivacity—the teacher can continue to do these things. They need to *show* what they are doing. They need to show where they are getting their material from.

The teacher must be social and refer to others. Provide unobtrusive references (in faint grey, or small font). Understanding is not dependent on them. In other words, don't make it seem as if what you say in *this* place depends upon what is at the references. The benefit is this: The student can fail over to the source, should the teacher's explanation fail. The student can also now **see** how the source was interpreted by the teacher.

I have relied heavily on testimony myself. For example, doing mock exams, you benefit from much accumulated research, on the part of the exam creator, about the questions that tend to come up. You revert to it, indulging in it, because of the **vast volume** of material. And frankly, there *are* certain specific items of knowledge that come up repeatedly. That is to say, attempting a mock exam is not primarily letting you practice a skill; rather, it is implicitly informing you of the set of facts you need to know for the exam. It is a diluted, distributed cheating. Many secondary schools know this, in preparing their pupils. You ingest the cheat sheet piecemeal, reading one answer-explanation after another.

Use testimony. But watch what you are being told. Observe the flow from the source.

I think that if the AWS exam guides were better, *they* could fulfil this role and it would be better if they did. The AWS Cert should admit that people pass the certification by coming to know a set of specific things. At the moment, exam guides possess vague, wide-ranging objectives which leaves students guessing what they should study (recall that User Guides are hundreds and hundreds of pages).

The certification materials, particularly the Solutions Architect ones, often mention the Well-Architected Framework . The framework consists of five pillars (or whatever number of pillars it is today)². We have: reliability, operational excellence, security, cost-optimization and performance efficiency. The idea seems to be as follows. If, in architecting a solution, all five pillars have been properly considered, then the solution has been architected *well*.

In practice, the only way the Framework seems to make its mark is in the fact that certification exams occasionally have a question that asks for, say, a cost effective solution. This supposedly invokes the cost optimisation pillar. The student's job is to avoid the expensive product which is sitting among the answer options.

Oh, *bravo!* All that has occurred is slogan matching: “expensive” goes with “Global Accelerator”. You will notice that the Framework could drop out of the picture entirely. What AWS ought to do, in material around the exam, is provide tips to students for how to research and assess the cost of a product (a task which is not *entirely* self-explanatory). As it stands, certification students simply remember, for example, that AWS Global Accelerator is expensive. What's even worse is that the student did not themselves find out that AWS Global Accelerator is expensive; they encountered a mock exam question which told them that Global Accelerator was expensive.

I presume the Well Architected Framework intends to promote good judgement, since “good judgement” involves balancing several factors when making a decision. Each pillar of the framework is a factor to consider.³

²AWS Well-Architected Framework, *AWS Whitepaper*, July 2020.

³Jassy understands the Amazonian leadership principle “Be right, a lot” to be a “proxy for judgement”. See “The Leadership Principles Explained”, uploaded 15th Nov 2021. YouTube Channel: Inside Amazon

It's not merely that the student can pass the exam without having exercised any judgement. It's that the student doesn't ever have to *attempt* to make a judgement. The student doesn't increase their knowing how to judge, or how to locate the facts needed for a judgement, *one iota*.

9.1.1 Cloud Cowboys

The promise of many of the companies which we have seen crop up is that they will help you to pass the exam. They also promise a six-figure salary and a job. Crucially, the claim is that *anybody* can. And *anybody* should want to. There are no limits whatsoever on their intended audience.

If I had to, what would I say is most damaging about the way **Cloud Cowboys** operate? It is probably the implicit suggestion, to novices, that it is impossible for the student to find the answers themselves. The cowboy presents themselves as essential to the process. It must be impossible to research the appropriate User Guides *yourself* (or so runs the suggestion). They provide mock exams and perhaps live tutorials over the Internet, using Skype or Zoom. They are often reading out sections from User Guides word-for-word.

It is the fact that their business model involves intentionally attracting people who have no idea what they are doing. It involves attracting people who **do not** know how the industry works, or how User Guides work. It is this which makes the Cloud Cowboys worthy of criticism⁴. They *explicitly* seek to attract people without the appropriate skills and then do not impart any skills. (And they are not equipped to, anyhow. What's really needed is some sort of mentorship.)

Videos

⁴Similarly, see “The Case Against AI, UX and Coding Bootcamps”, *Forbes*, 22nd Feb 2020.

9.2 Look Twice

I would advise you to **look twice**. Many Cloud Cowboys will indeed say that they provide skills. They will *say* that they provide tools for getting a job in the area in question. I am aware of this. But *look twice*. What, exactly, are they able to offer? They're not going to be able to talk to you individually if they run a bootcamp. So, what exactly are they offering? Perhaps it is an article describing what different job titles do. Seriously, have a go at thinking what it might be. Note how anybody can say they offer skills training. Here we go:

I offer skills training.

9.3 Listing litmus

Do they have anything **concrete** to say in answer to the problem of a job posting asking for **experience** which you do not have? The answer is likely no. I propose the **Listing Litmus**:

If some piece of advice for getting a job is not *about* a real job listing,
then it is useless advice.

This claim should not be understood as hyperbole, but something which necessarily holds. It is certainly possible to talk about concepts, knowledge of which will help in applying to jobs. But unless these concepts are *applied* to job listings in the world, the purely conceptual babblings *literally* have no significance.

A workshop, or presentation, on job finding *in itself* is clearly very tempting, and apparently useful, to an unemployed person. It attracts people. If there is to be a session on job hunting, it ought to involve a demonstration of combining

and ordering material, of applying validity criteria to various job postings.

(Later, we will see that these companies are *unable* to offer these sorts of demonstrations, because they are exploiting an ambiguity in the term "Solutions Architect".)

Anybody can babble on for 40 minutes about improving your CV. But at the end of the day, if real job postings are making demands which you cannot meet, then that advice is diddly squat. Matching yourself to job postings, managing them, and for example, deciding when you might consider applying even though you do not have what is required—this is a skill. There are companies right now in the UK (for example, "e-careers"⁵) running "jobs advice" sessions, run by people who have never looked at any posting for a Solutions Architect. They are preparing people for *no job in particular*. It is bamboozling.

Meaningful, helpful advice would be centred on a specific job listing they have pulled up—seriously, right there. On their screen. On the browser. There is no reason for them to not do this. Otherwise, they've got free reign; the Cloud Cowboy can do whatever he or she wants. If they are not **referring** to actual job listings, they are not being held accountable by market demands, consisting in real postings.

I've sat through sessions with somebody providing lecturing services to a company in the UK (let's call them Sandy) and Sandy would bring up job postings "live", for everybody on the Zoom call to see, brashly declaring "Here we go, there are thousands of people needing these AWS jobs". Of course, we never got into the details; we never read through the REQUIREMENTS section calmly, the way you would do with somebody if you were serious about their getting a job. It's in this section that

⁵E-CAREERS LIMITED, registered at Unit 6 Waterside Drive, Langley, SL3 6EZ

years of experience are asked for, or familiarity with technologies beyond those studied in the certification.

My claim is not that *things are hard*. I know that there are ways of being good at applying to jobs and careercraft and so on. My claim is that if the Cloud Cowboys have one job, it is to inculcate the skill of dealing with these difficulties. For example, knowing when a job is appropriate to apply for, tuning your judgement as to whether you should apply for a job *despite* not having everything it demands, and so on. And Cloud Cowboys do not inculcate these things.

If they looked at a posting, they would see that nobody wants a Solutions Architect with no experience. They would see that *Solutions Architect* is in fact a term often reserved for very experienced professionals, who have decades of experience. So, to mislead individuals into thinking it is an entry role is morally wrong⁶.

Before returning to me with the suggestion that the Cloud Cowboys are *already* imparting suitable training—Look. Again.

9.3.1 “Home Truths”

Recently, a trend has begun involving Cloud Cowboys producing pseudo justifications for what they do. An example might be a video entitled *How many certs do I need to get a cloud job?* The very question frames the issue misleadingly. It also supports the idea that if you were able to pass an exam, then you know how to pass an exam, and have the skills needed for the job. An article on major educational company *A Cloud*

⁶See “The Two Solutions Architects”, suggesting the term is now ambiguous between a sales role and a implementation role, the way the term “bank” denotes both the side of a river and a financial institution. Nevertheless, even sales solutions architects require experience often.

Guru states⁷:

Certifications don't guarantee you'll get a cloud job. They're proof of knowledge, not experience.

This appears to be admirably frank. Notice how knowledge is pitched against experience, suggesting that the *knowing how* to do things—skills—which arise from experience, are being excluded from the author's conception of **knowledge**. Another example is an article entitled *Why an AWS Certification Alone Won't get You a Job*.⁸

Now, *Why are articles like this produced?* Why have these educators gone out of their way to deliver some home truths? Perhaps it is because they want the people who use their services to be under no misconceptions. *To benefit their students, they make it clear that AWS Certifications are necessary but insufficient for a job in the cloud.*

9.4 Chunk of chicken

But this perpetuates a damaging model. For AWS Certifications are presented as a necessary (but insufficient) item. “Achieve one by whatever means necessary, and then obtain the *other* items”. Keep adding until you have competence, or a job, or whatever. Gaining an AWS certification is therefore similar to sliding the first chunk of chicken onto a wooden kebab skewer. Other items are to be added next. Any discussion of *ways* of doing that task are not helpful.

⁷Ryan Kroonenberg, “8 AWS jobs you can get with an AWS Certification”. Acloudguru.com. Available at: <https://acloudguru.com/blog/engineering/8-aws-jobs-you-can-get-with-an-aws-certification>

⁸Available at: <https://digitalcloud.training/why-an-aws-certification-will-not-get-you-an-aws-job/>

But I have shown that there are multiple ways of passing. You can pass an AWS Certification without gaining the subsidiary skills. You can accidentally pass, because the Cowboys have done the heavy lifting that's going to *differentiate* you. Using AWS products involves being able to navigate the documentation yourself. You need to gradually build this up, by repeatedly re-visiting certain User Guides. If you intend the certification to help you ultimately use the products, then deferring this acquaintance is irrational. You also need to be equipped with skills for researching, managing large quantities of information, and cutting through the noise. In fact, *starting* this journey while studying for a certification is a very sensible thing to do. No—it is **the perfect time to begin this**: you will have an increased interest in the material, because there is an exam coming up. And I think this is how AWS intend certifications to be used. Yet, the model presented by the Cloud Cowboys contradicts this. It contradicts the idea that you should pay any attention to the *way* you pass the exam, since passing the exam is the first sequential item in a process. *Take the testimony, sort everything else out later.* We now see that the business model of the Cloud Cowboys perpetuates a logical confusion.

I suggest that these “Home Truths” articles help the Cowboys justify to themselves what they do—helps them sleep at night⁹. Consider one author of the aforementioned articles. He may write his ‘beneficial’ home-truths article in the day; in the night he sends out an email campaign entitled “Become a Solutions Architect - unlock a six figure salary!”¹⁰. An essential part of their operation is the *suggestion* that certifications are sufficient. Producing their *Home Truths* articles does not ex-

⁹It is analogous to AWS introducing the Sustainability Pillar into their Well-Architected Framework. Consider watching Richard Bilton’s documentary, “Is the Cloud Damaging the Planet”, which aired on Sat 11th Feb 2023. Spoiler alert: it is.

¹⁰Email from *Digital Cloud Training*. Tuesday 18th April 2023.

cuse them. These articles add to the problem, by perpetuating the Chicken Chunk confusion.

9.5 Celebrated Students

They will be quick to point out some people who used their services who did in fact get jobs in the cloud, or six-figure salaries. In fact, they do often stumble across star pupils, and say Let's Get This Guy In Front of A Crowd. Now, my original hypothesis was something like this:

most people who use the cloud cowboy services are professionals, who already know how to read User Guides, and most of the jargon, and have all the subsidiary skills

They come along and use the mock exams and videos (provided by the Cloud Cowboys) to fast-track their achieving the cert.

Perhaps this could work as an explanation... So, the professionals know exactly how to use the diluted cheat sheet that is the mock exams, and are knowingly taking on some... **capacity debt** (analogous to technical debt). They'll do their research, and read the UGs etc, *later*. This is all well and good, but it does not mean that the Cloud Cowboy can take credit for knowing how to *make* these individuals. That would be like a single Etonian teacher boasting that he is a Prime Minister Producer. Yet that's what the Cloud Cowboys do, in parading around these individuals.

The hypothesis continues by saying:

What makes these people *cowboys* is the fact that a substantial proportion of their customers are *unknowingly* taking on capacity debt. Cowboys also

look to be exploiting the fact that the CLOUD is a new, unfamiliar technology (even if it is becoming increasingly familiar by the day).

This hypothesis may sometimes hold, but it assumes that the cowboys intend to impart technical capacities to their students. But part of the way Cowboys defend themselves is by holding their hands up and claiming they are not even concerned with technical capacities (but some other category, such as capacities involves in selling products). So, it is the next hypothesis that gets to the heart of the mechanism of the Cloud Cowboys.

9.6 Exploiting an ambiguity

Earlier, I discussed how the job title Solution Architect is ambiguous. An ambiguous term has multiple meanings. *Solutions Architect* is ambiguous between an **implementation** role and a **sales** role. It is clear to me now that Cloud Cowboys exploit this ambiguity. For they suggest that they are catering for the *implementation* sense by offering practical labs (simulations of the AWS console, allowing students to *implement* EC2 instances with Security Groups etc). Yet it is clear that their course is nowhere near what is required to produce an implementation Solutions Architect (the term is usually used to denote individuals with **decades** of experience). Meanwhile, if you notice the details of their Celebrated Students, you will see that their jobs are in fact essentially *sales* roles.

So, there is a mismatch between the claims of the course (providing practical, *technical* training) and the Celebrated students. This relies on the ambiguity in “Solutions architect”, or more generally, a failure to disclose what the job actually involves. The consequences of this are that Celebrated Student is not evidence that the Cowboy’s course can provide students

with the tools to become an *implementation* solutions architect. (Crucially, the mismatch is too subtle for their target market to notice. I believe that Cowboys are aware of this.)

9.7 The Selling Stance

Much of the material which is produced by the Cloud Cowboys takes what we might call the *selling stance*. Because they are parroting AWS material—taking things unaltered from User Guides—they address the students as if they are customers. You can tell because, for example, the discourse still contains MAD STUFF. The Cowboys are not inviting the student to see AWS as they do—to interact with AWS as they do. If they’re going to start calling themselves educators, they need to ditch the Selling Stance and adopt a different stance. (Recall that Pinker describes the Classic Style in writing. It involves the writer inviting the reader to notice something in the world which the reader has not noticed yet).

Cowboys, in operation probably from around 2017, cannot believe their luck. They cannot believe that they can get away with lifting and shifting the AWS discourse, delivered from the selling stance, presenting it *as if it were* explanatory material, from an Expository Stance. They often haven’t done the boring, lengthy work of gaining that slightly enhanced insight that I think a teacher must have (Stroustrup agrees: you need to know your stuff to teach). Cloud Cowboys sit opposite the table to their students. But educators ought to stand shoulder-to-shoulder. The Cowboys are living, breathing AWS content delivery networks.

9.8 Three Responses

I now want to consider responses to what I have said. **First**, somebody might say: Because these people are educators, it is wrong to critique their activities. Educators don't *have* to do what they do. There could well be *nobody* who offers courses, or educational material. Educators have good intentions and take time to do what they do. Also, they have to earn a living, like anybody else. By criticising an educator, I discourage others and fail to express any gratitude. More generally, I make the world a worse place. It is always easier to destroy than to build.

I want to hold this view. But taking this point seriously reveals its incoherence. If the Cloud Cowboys are doing some sort of public duty, then they situate themselves amongst schoolteachers and food outlets and so on—all of whom are held to account, since what they do reaches intimately into the lives of others. Alternatively, they are providing a product on the market. Well then their product ought to be subject to reviews like any product on Amazon.com.

A review site such as TrustPilot, by the way, is completely unlike an external inspector such as Ofsted or the Food Standards Agency. This site hosts reviews from individuals so it appears to provide an independent review of the educational company. Why is this merely an appearance? It works as follows. The educational company instructs its employees (probably called Success Coaches, or something) to seek a review from their student, as a matter of procedure. The Success Coach presents the review, to the student-customer, as a judgement of themselves—of the Success Coach (and not the company). Therefore, it has a tendency to be positive. A negative review, after all, would damage the relationship, which is still ongoing. And if the company has failed in some respect (such as sending textbooks two months late), this is no

reason to tarnish the career of somebody who was not responsible. The Success Coach was most likely *not* responsible. This **re-framing** technique reliably produces favourable reviews.

It is essential to the system that the reviews are delivered reliably, as a matter of procedure, so that even if a negative review were to arise, it would soon pale in comparison to the vast abundance of reviews. The solution involves seeking an *abundance* of reviews, slightly disposed to be positive (owing to the aforementioned re-framing technique) as opposed to merely *asking for positive reviews*, a solution which is not as scalable. The consequences of this are that e-Careers is just a company passing judgement on itself.

Anyhow, Cloud Cowboys are not like products on Amazon.com in that they boast the power to transform the socio-economic standing of others. A substantial proportion of their target market is unemployed people. The Cowboys take their cash.

Now, a **second** response to what I have said. This one has a refreshing liberal kick to it. It says:

The final chapter of this booklet is *pathetic*. To a large extent, people (in the UK and USA and so on) are free to do as they please.

You want to smoke thirty cigarettes a day? Go for it. You want to swim outside the lifeguard flags on the beach? Go for it.

You want to sign up to an educational course? Go for it.

I believe we would have to ask if the students of the course are aware of the risks involved in what they are signing up to.

Finally, a **third** response to what I have said. The content

on the Internet is in the world. It is available to anybody. Therefore, other people can view it.

If some student has a complaint about not having been told about helpful information, and it is available online, this the student is lazy. It is, in any number of respects, the student's fault. "There are no excuses nowadays".

I do want to come back at this third point, immediately. Many people are aware that algorithms personalize the suggestions they are given on YouTube and results on Google. Yet for many, this is compatible with the idea that you see the same things others do. The thought is that you leave a trail online, which adds a personal tinge to content you see. However, because (1) you had the freedom to select the initial, *determining* content yourself and (2) you have as much freedom as everybody else... you arrive at determined content that others arrive at. The personalization does not fully determine your content.

However, the existence of graph theory and so on informs us that it is a better model to say that algorithms today come to know *you*. The idea that there is a trail, with your last search having some influence—but nothing further back than that having any influence—is wrong. Everything comes to bear with each interaction. Thus, your algorithm has come to know you over a period of time.

This is important because if a person believes that what they see online is what *others* see online (such as a student), they will not see the need to communicate to others what they see. They will not reference. This might manifest in an attitude of intolerance of students, who have seemingly not done basic research.

People who have been in Cloud Computing (or any field) a long time are literally being given different content to people who are not in Cloud Computing. A given search term is

generating different results for the student than for the teacher. Even sequences of searches.

Algorithms now “reward” months of massaging.

A Cowboy might revert to the defence that:

because there is so much content online, there is no excuse for not seeing any particular item of information.

It is as if the marvels of the Internet make virtually any ignorance in the student inexcusable. The Cowboy thus slides off the greasy hook so far that it is hard to say they are responsible for passing along *anything* to the student. They completely fall out of the picture.

We might call this the visibility, or Availability Fallacy. It is a fallacy (faulty reasoning) because in fact, the more content there is, the greater proportion of it is hidden at any one time. AWS are now advising customers to use multiple AWS accounts partly because if there are multiple resources within a single account, then finding any one resource is harder. More accounts means more smaller containers, and so improved navigational competence.

If you are a teacher and want to help a student, you should show them the video-lectures, and articles, and other sources, which **you** have seen on your computer. This is why I argue for referencing. If there are a large number of resources available online, this is a reason *for* referencing, not against it.

9.9 Conclusion

Cloud Cowboys *tell you what you need to know to pass the exam*. At first glance, this is very reasonable. On second glance, you realize that they are devoting not one second to

the skills required to pass. The point I have been building to is this:

If you are achieving a certification in order to learn technology X and;

using X well (in the long run) requires familiarity with the documentation;

then why on earth would you want to defer becoming familiar with the documentation yourself?

It is bizarre to defer the gaining of the navigational competence.

Mentoring students involves persuading them that it is worthwhile adopting various habits. It involves lots of repeated persuasions that the student should take their time doing certain things (even though these things *appear* to be a waste of time). Yet “persuasion depends on what [the listener] doubts” (Larry McEnerney). You can only persuade specific people, not *anybody*.

The charges against the Cloud Cowboys have now been laid out. Their audience is *anybody*: both Climbers and Stampers (a distinction introduced in Chapter 2 of this booklet), both those wanting to learn the skills for a *sales* role and those for a technical *implementation* role. In attempting to cater for all these aims at once, they excel at none in particular. Mentoring and feedback cannot be delivered on their model—not everyone needs it, no doubt—but the crucial point is that they are most certainly attracting many who need it.

This blurring of aims also enables a surrendering of responsibility for any one thing. “I get confused between the names of the products”—*Well don’t worry*, reassures the happy-go-lucky Cowboy, chuckling, *You’re going to implement them, not speak to customers about them*. “I don’t know how to do such-

and-such”. *Well, don’t worry you’re going to be “merely architecting”.* The Cowboy is a slippery fish.

No Cloud Cowboys are named in this booklet. It is intended as a regulative concept.

They are not interested in teaching you how to pass an AWS Certification (the art). They are telling you things such that an exam gets passed. Learn to tell the two apart.

Chapter 10

Appendix

10.1 Examples of faulty tools

10.1.1 Narrative moulding

Consider the mock exam question below, from a company called Digital Cloud Training¹:

A security engineer must configure AWS WAF to store logs in a central location for later analysis. What is the MOST operationally efficient solution that meets this requirement?

1. Configure AWS WAF to send its log files to an Amazon *CloudWatch Logs* log group and then export to an Amazon S3 bucket.
2. Configure AWS WAF to send its log files to Amazon *Kinesis Data Firehose* and then to stream the logs to an Amazon S3 bucket.

¹Level 3, Tower Business Centre, Tower Street, Swatar Birkirkara BKR 4013, **Malta**

3. Configure AWS WAF to send its log files directly to Amazon *Kinesis Data Analytics* for analysis.
4. Configure AWS WAF to send its log files directly to an Amazon S3 bucket for later analysis.

Once you have collapsed this question, the four options are to send log files to:

1. CloudWatch Logs
2. {...} Firehose
3. {...} Analytics
4. S3 bucket.

The answer explanation says:

With AWS WAF you can enable logging to get detailed information about traffic that is analyzed by your web ACL. Logged information includes the time that AWS WAF received a web request from your resource, detailed information about the request, and details about the rules that the request matched.

You can send your logs to an Amazon CloudWatch Logs group, an Amazon Simple Storage Service (S3) bucket, or an Amazon Kinesis Data Firehose. In this case the most operationally efficient solution is to send the logs directly to Amazon S3.

CORRECT: “Configure AWS WAF to send its log files directly to an Amazon S3 bucket for later analysis” is the correct answer (**as explained above**).

INCORRECT “Configure AWS WAF to send its log files directly to Amazon Kinesis Data Analytics for analysis” is incorrect. You cannot send log files from AWS WAF to Kinesis Data Analytics.

INCORRECT “Configure AWS WAF to send its log files to an Amazon CloudWatch Logs log group and then export to an Amazon S3 bucket.” is incorrect. This is less operationally efficient and more expensive as Kinesis Data Firehose is being used in addition to S3 rather than sending directly to Amazon S3.

INCORRECT “Configure AWS WAF to send its log files to Amazon Kinesis Data Firehose and then to stream the logs to an Amazon S3 bucket” is incorrect. This is less operationally efficient and more expensive as Kinesis Data Firehose is being used in addition to S3 rather than sending directly to Amazon S3.

Next to the correct option is written “as explained above”. If we look at the text which is above, we can see that the ‘explanation’ being referred to is the sentence:

In this case, the most operationally efficient solution is to send the logs directly to S3.

But this is not an explanation. This is a statement of that which requires an explanation. So, we were never in fact given an explanation. We have not been told about any property of S3 buckets which is not possessed by Kinesis Data Firehose, which renders only the former (and not the

latter) operationally efficient. Narrative Moulding has occurred.

Is *anything* actually explained? Well, suppose I opt for the third option: Kinesis Data Analytics. This option *looks* to be correct because we want to analyse our log files. Kinesis Data Analytics has *Analytics* in its name, so it can help you with analysis. According to the answer-explanation, this option is incorrect because it is impossible:

You cannot send log files from AWS WAF
to Kinesis Data Analytics

This passes as an explanation by the skin of its teeth. *Choosing Analytics as an option is incorrect because it is impossible to do this.* It just so happens that AWS have not integrated AWS WAF and Amazon Kinesis Data Analytics. Because this question seems to be targeting students who believe that they *are* integrated, this question might be argued to be a Distractor. Distractors are excellent questions.

But I think that we can demand more from an answer-explanation. AWS listen to their customers²

²I think most people's interpretation of this Amazonian principle is wrong. Originally at least, "customer" did not refer exclusively to actual customers. Yet most people understand the principle this way, as well as taking "listening" to involve testimony. *Current customers tell you things.*

But Bezos is intensely analytical. The decisions Bezos makes take a *vastly* long term view. There is no end to it. According to Alan Deutschman, in 2004 Bezos said: "I started receiving letters from well-meaning folks saying that perhaps you don't understand your business. You make money when you sell things. Why are you allowing negative reviews on your Web site? But our point of view is we will sell

and design products which will be useful. The question raised is therefore *Why can you send log files to Firehose but not Analytics?* If we are to avoid getting this question wrong again next time, we need a solution in place. So we need to try and answer the aforementioned question, even with a speculative answer. I'd argue we should expect insights like this, from somebody offering to train others for a fee.

10.1.2 Distractor

10.1.3 Slogan Matching

10.1.4 Cheaply Manufactured Falsity (CMF)

An option's falseness is *cheap* if we are not told the *reason* the option is incorrect. We are left to presume that the option is incorrect *just because it is false*.

With CMF, the incorrect option is just as reasonable as the correct option.

Consider the question below, from educational company Udemy. It is from a course for the AWS Certified Security Speciality exam.

A data analytics company processes the sensitive data of several financial institu-

more if we help people make purchasing decisions.” Always look for the advantage. The referent of “customer” is potential customers, not actual ones—and it is about watching and observing, not testimony.

tions across the country. The company needs an automated and efficient way to identify sensitive information and operationalize security for its customers while keeping costs low.

The solution should also have a security dashboard that aggregates alerts and facilitates automated remediation of security issues while having a complete view of the security architecture of the systems. A high-performing interactive query service is also needed for business purposes.

As a security engineer, which options will you combine to implement a cost-optimal and high-performance solution for the given requirements? (Select three)

1. Configure AWS Security Hub to have a central dashboard for higher visibility of the environment and remediate issues quickly.
2. Store the data cost-effectively on Amazon S3 buckets and use Amazon Macie to automatically discover, classify and protect the highly sensitive data.
3. Use Amazon S3 buckets to store data and include S3 Intelligent-Tiering for automatic cost savings for data with unknown or changing access patterns.
4. Use Amazon Athena to analyze data in Amazon Simple Storage Service (Amazon S3) to retrieve any amount of data from anywhere - using stan-

dard SQL

5. Use Amazon QuickSight to quickly embed interactive dashboards and visualizations into your application without needing to build your own analytics capabilities.
6. Configure Amazon Detective to analyze, investigate, and quickly identify the root cause of potential security issues along with Amazon GuardDuty. Use Amazon GuardDuty to continuously monitor for malicious activity and unauthorized behavior to protect your AWS accounts, and Amazon Elastic Compute (EC2) workloads.

The correct options are the first (Security Hub), second (Macie), and fourth (Athena). Let's suppose you select the fifth option involving QuickSight, since QuickSight helps with querying data and the question demands a "query service". The explanation next to this incorrect option is:

Amazon QuickSight has a serverless architecture that automatically scales to hundreds of thousands of users without the need to set up, configure, or manage your own servers. It also ensures that your users don't have to deal with slow dashboards during peak hours when multiple business intelligence (BI) users are accessing the same dashboards or datasets.

Amazon QuickSight offers amazing visualizations, unlike traditional Business In-

telligence (BI) solutions. **However**, this option is not the best fit for the given use case.

We can forgive the lengthy background to QuickSight, as this can provide helpful context. And we know that many people use mock exams as a distributed cheat sheet—to be told things (testimony) in a piecemeal manner.

Notice the word “however” in the explanation. This is contained in most answer-explanations, the word being a queue for a beautiful explanation. Maarek’s materials are excellent.

However, the rare specimen above is an example of CMF. The *one* thing which the student needs to know is why QuickSight is inappropriate. Therefore, this answer-explanation will not fit for the student’s use case.

10.2 History of AWS Certifications

I want to print the original press release here³.

Announcing Amazon Web Services Global Certification Program

Posted On: Apr 30, 2013

³Available at: <https://aws.amazon.com/about-aws/whats-new/2013/04/30/announcing-amazon-web-services-global-certification-program/>

We are excited to announce the launch of the Amazon Web Services Global Certification Program. AWS Certifications designate individuals who demonstrate knowledge, skills and proficiency with AWS services. This program is built around the three primary roles for engineering teams delivering cloud-based solutions: Solutions Architect, SysOps Administrator, and Developer. Role-based certification credentials can be earned on three proficiency levels: Associate, Professional and Master.

AWS certifications are designed to certify the technical skills and knowledge associated with best practices for building secure and reliable cloud-based applications using AWS technology. To earn an AWS Certification, individuals must prove their proficiency by passing an exam. Exams are administered through Kryterion testing centers in more than 100 countries and 750 testing locations worldwide. Once achieved, individuals can display the AWS Certified logo on business cards and resumes to gain visibility for their AWS expertise while fostering credibility with employers and peers.

The first certification to be offered is the “AWS Certified Solutions Architect – Associate Level,” which certifies skills for technical professionals and solutions architects involved in the design and de-

velopment of applications on AWS. Additional role-based certifications, including certifications for Systems Operations (SysOps) Administrators and Developers, will follow later this year.

To learn more about the AWS Certification Program, visit <http://aws.amazon.com/certification>.

Jeff Barr introduced the AWS Certification as a “credential”⁴.

Further developments

May 2014 Jeff Barr writes⁵:

Today we are enhancing the program with the addition of our first exam at the Professional Level. Going above and beyond the requirements of the existing Associate Level, the new AWS Certified Solutions Architect – Professional Level exam validates advanced technical skills and experience

Nov 2014 DevOps Engineer Professional certification announced. Barr (2014) writes⁶: “You must already be certified as an *AWS Certified Developer – Associate* or *AWS Certified SysOps Administrator – Associate* before you are eligible to take this exam.”

⁴“The AWS Global Certification Program”, *AWS News Blog*, Apr 30th 2013. Available here.

⁵“New Professional Level Certification Exam Available for AWS Solutions Architects”, *AWS News Blog*, May 7th 2014. Available here.

⁶Barr, Jeff (2014). “New DevOps Engineer Certification”, *AWS News Blog*, Nov 7th 2014.

May 2017 AWS Announce the release of the Networking Speciality Certification and the Big Data Specialty certification⁷

I believe these are the first speciality exams. Before the specialties, there were only “five role-based certifications: three Associates... and two Professionals (DevOps, Architect)” says Rouxel (2018).⁸

Apr 2018 Press release announces the Security Speciality certification⁹.

Oct 2018 More flexibility: “We offer a total of 9 exams at the Foundational, Associate, and Professional level. In the past, we required you to pass an Associate or Foundational level exam before pursuing a Professional or Specialty certification.

We listened to our customers, and heard you wanted more flexibility, so we are eliminating these requirements. You are no longer required to have an Associate certification before pursuing a Professional certification, and you are no longer required to hold a Foundational or Associate certification before pursuing Specialty certification.”¹⁰

Nov 2018 Press release announces Machine Learning certification.¹¹¹²

⁷ “Announcing New AWS Certification Specialty Exams and Benefits”, May 30th 2017.

⁸ Onica.com. Available here.

⁹ April 23th 2018. “Announcing the AWS Certified Security - Specialty exam”.

¹⁰ “Announcing more flexibility for AWS Certification Exams”, Available here

¹¹ Nov 26th 2018. Available here

¹² Loneragan, Maureen (2019), “Become a certified machine learning de-

Mar 2020 Database specialty announced¹³

Apr 2020 Big Data certification starts to be referred to as “Data Analytics” Certification.

10.3 Discussions of the Three Key Questions

What is the value of AWS Certifications? Which one should I take? How do I prepare?

Solution Architect Associate

Wences (Aug 2017); Clark (Sept 2019); Caballero (Feb 2021); Author (Aug 2021) Win (Dec 2021); Ilyas (July 2021) White (Mar 2023);

Developer Associate

Diva (Aug 2014); Ellis (Mar 2018) Davis (March 2020); Clark (May 2020); Author (Oct 2022)

SysOps Admin Associate

Thomas (Jan 2016); Gardiner (Feb 2020); Lucy (Jan 2021); Sameesh (June 2021); Verma (July 2022); Dalton (Aug 2021) Spires (Apr 2022);

Solutions Architect Professional

Brett (Sept 2020); Fisher (Sept 2020); TechDev (Nov 2020); ByteMonk (Dec 2021); Wang (Jan 2022); AWS (Nov 2022)

veloper”, Mar 18th 2019, *AWS Machine Learning Blog*.

¹³ “New AWS Certification validates expertise in AWS databases”, Mar 10th 2020. Available here.

DevOps Professional

Gaonkar (2016); Author (Sept 2019); Fisher (Oct 2020); Sood (Oct 2022); Brett (Nov 2020);

Networking Specialty

Harris (Apr 2021); Uzit (Sept 2022); Harris (2021); Daniel (Jan 2022)

Security Speciality

Scott (June 2018); Tanya (Oct 2018) Sept 2019 Clark (Sept 2019); Brett (Sept 2020);

Data Analytics (Formerly “Big Data”) Speciality

Stoneman (Jan 2022);

Database speciality

Haslett (June 2018); Cole (Sept 2020);

Machine Learning Specialty

Brett (Oct 2020); Cole (Apr 2021);

Brown (Mar 2021) comments on all certifications, as does Elmore (May 2021).

(Brett Jan 2021) discusses the Value Question, in a discussion reflecting upon his completion of 10 certifications. Brett says at one point, talking about the Analytics and Networking speciality, “they’re very in depth certifications - I didn’t want to get them and barely pass”. This is similar to the notion of Accidentally Passing.

Spires (May 2023) also discusses the Value Question.

Lucy (Aug 2022) addresses the Method Question. So does Spires (May 2023). Cantrill (Mar 2021) addresses the Selection Question, *excellently*. Davis (Apr 2022) addresses the Selection Question. So does Clark (Sept 2020), who addresses the topic of choosing between the Solutions Architect Associate and Developer Associate certification. Clark concludes that if you only will take one, and want to go into more detail of services, go for Developer.

10.4 History of “Solutions Architect”

Let’s take a look at how usage of the term “Solutions Architect” has changed over time. This will allow us to see what has happened.

I will use references here, but I am wary of the references being removed, perhaps even caused by this piece, and so I will also describe what exists quite tediously.

The term “Enterprise architecture” has a very long history. For example, see Leonard Fehskens’s presentation entitled “Architecture and Design”. There is something called the *Association of Enterprise Architects*. It is linked to the Open Group, and the details of this are beyond the scope of this booklet. Fehskens’s discussion is very vigorous (appearing, at times, to be emulating the rigour of analytic philosophy). For example, he writes that “undertaking a successful endeavor requires that we know three things” which are:

1. The Mission

The criteria by which we judge whether the task was successful.

2. The solution

The means by which the task is to be achieved.

3. The Environment

The totality of all the factors which we must take into account, because they affect the achievement of the endeavor.

Anyhow, we'll leave that for now.

This **2011** video (*Role of an IT Solution Architect*) on YouTube depicts a diagram. This is not an official video, just amateur notes. The point is not that this is a high quality, informative video; it is just an evidential artifact. The Solutions Architect is shown to mediate between domain experts and a team of developers.

I watch a video from **2012** which involves Jeff Barr interviewing Ulf Schoo, who is introduced as a Solutions Architect.¹⁴ This is one year before the Certification program is launched. We can observe that, respectfully, Schoo is not in an entry level position.

Nov 2012 Jeff Barr interviews Paul Duffy, starting by asking what being a solutions architect is all about¹⁵ Duffy says:

Solutions architects get to work with customers who want to know more about

¹⁴Ulf Schoo, AWS Solutions Architect, Oct 19th 2012, YouTube Channel: Amazon Web Services.

¹⁵Want to be an AWS Solution Architect? - Apply to work at Amazon Web Services, Nov 19th 2012, YouTube Channel: Amazon Web Services.

the AWS cloud, or potentially want to deploy their applications in the AWS cloud. And they get to explain to customers how they can use all these building blocks, and how they can have a successful deployment—one that’s secure, reliable, that scales appropriately, and that’s going to meet those needs.

This discussion is about employees of AWS. Interestingly, Duffy refers to whitepaper-authoring as a typical SA practice. Barr later asks “What kind of training or background does a typical solution architect have, on our team?” The response is that:

It’s a real range. Some solutions architects have come from small environments. They’ve worked in startups, and maybe done a lot of work in AWS.

Other solutions architects have spent a lot of time working in enterprise environments.

And then we’ve got people on the team who have specialisations in things like Big Data. So, they’ve done a lot of stuff with Elastic Map Reduce, and so on.

I want to draw attention to the phrases “lot of work”, “lot of time”, and “specialisations”. So, even if it is implicit, I think that Duffy here reveals that solutions architects are senior, experienced individuals. Barr adds that he thinks that a lot of “our architects” came out of the community. (By

community, Barr is referring to those who are enthusiastic, and perhaps expert, at AWS technologies but do not work for AWS.) Obviously, then, at this point in time, it is certainly not the case that *anyone* can be a solutions architect. Notice how Barr doesn’t even say that the AWS Community has solutions architects in it. He’s merely pointing out that many of those within AWS *used to be* in the community. Barr’s insight, of course, wouldn’t work today.

What’s clear is that at this point (Nov 2012 - a year before the certification program), solution architects are a part of AWS. Revealingly, Barr asks:

So, what kind of customer successes have we seen as a result of having our solution architects team?

This tells us that AWS intentionally had a Solutions Architect Team. This was almost an initiative; notice the talk of its “results”. And Duffy suggests that those in this team had practical experience.

Aug 2017 AWS publish a video entitled “What it’s like to be a Solution Architect at AWS?” It has just over 250,000 views.

One person states “if you like to learn new things, be exposed to the cutting edge—the bleeding edge—and to very, very established products, then this is a candy store”.

So, the bleeding edge and established products...

In this video, the seamless slide from the previous conception is in full swing. After all, one contributor says “a solutions architect gets to work with

all the teams” and uses the word *building*. This suggests the traditional conception. Nevertheless, everything said in this video is compatible with the sales roles having been now established. ”I think it starts and really revolves around the customer—so if customer obsession is something that you bring to the table, it’s really one of the superpowers that our solution architects bring to our customers”.

I understand this: It will be helpful for AWS to have solutions architects. Fine. But they went further and produced a certification called “Solutions Architect”, and so it starts to be as if people who achieve the certification are “Solutions Architects”. But these people are not going to work for AWS. They are jokingly solutions architects, like if a child buys an official Manchester United football kit from Old Trafford. He shouts “I play for Manchester United” as he rolls about in the garden and his parents smile and say *Yes you do*.

AWS control their job titles. They are perfectly entitled to do whatever they want with their own job titles. What is unfortunate is this shift *combined* with the emergence of the namesake certification, *combined* with the Cloud Cowboys filling the vacuum that opens up behind the certification. All have coincided to produce a very mild misery for a number of people.

The Cloud Cowboy proposition doesn’t work. Let’s suppose you *are* a solutions architect because you achieved its certification namesake. Why would a company want this person? You are not from AWS. You do not have experience. Why on earth would they trust an entry level person with this? For a start, they could go to AWS themselves.

I think that because most Cloud Cowboys just happen to be really not very great teachers—this is what does it for me. If they were excellent teachers, they might be forgiven for the false promises and the training for an blurred job title. But many of them suffer from the Curse of Knowledge. This affliction involves those who know things forgetting just what it’s like to not know. They’re men (yes - it so happens that *every* instance I have encountered has been a man), who have spent a decade or two in I.T. There is a trend with textbooks to just write a textbook having retired, because why not? And they’re full of vague reminiscings, and warnings (“Make sure you plan your cloud migration”) not untruthful, but unable to be utilised by any reader, in any concrete actions. Cloud Cowboys tend to be younger than retirement age, though. They have essentially just decided that they can teach. They may fail to appreciate all they know, built up over the years. They forget that other people lack all the subsidiary skills that they lack. So, sometimes, they have good intentions. Anyhow, it doesn’t make them good teachers.

One commenter underneath the Aug 2017 video, from Amazon Web Services, writes:

I got trained in AWS but i didn’t get a job coz no one was hiring a less experience guy. So i switched to another field. After 2 years when i see this video, i got goosebumps. I too had a dream of becoming solution architect but that dream never became reality.

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