

Background

The current AWS Implementation Guides for AWS Solutions provide context and instructions to customers on how to deploy a solution into their AWS environment. Solutions are built by AWS employees and provide deployable CloudFormation templates that address common customer problems and use cases. One path customers can take to access a solution is to navigate from the Documentation Landing Page to the [AWS Solutions Library](#), where they can browse by industry or technology to find a solution that fits their needs. As they move forward with a selected solution (e.g., [IoT Device Simulator](#)), customers are provided with further information (benefits, cost, deployment time, architectural diagram, etc.) pertaining to the solution to support them in making their decision to move forward or not with the solution. Once on the [Implementation Guide](#) page, they are presented with additional information, such as a “Welcome” page that provides an overview of the solution, a section with step-by-step instructions on [deployment](#), information around [cost](#) and [security](#), as well as other guiding resources like how to [uninstall the solution](#), [contributors](#), and [revisions](#). This overall path is what participants were guided through for this research.

The primary objective of this research was to understand how customers interact with these implementation guides. Specifically, we looked to understand:

- How do customers prefer to browse for solutions on the AWS Solutions Library Page?
- What information do customers need to see in order to move forward with viewing the Implementation Guide?
- What parts of implementation guides do customers consume?
- What information or features may be missing?
- In addition, some participants were tasked with actually deploying and configuring the solution for the IoT Device Simulator.

This study was a qualitative inquiry consisting of 60-minute interviews with 8 AWS customers. Participants were selected if they either 1. Contribute to the business decision to adopt an AWS Solution (Business Decision Makers, Group 1, n=3) or 2. Execute the implementation of a solution (IT Professionals, Group 2, n=5). Interviews were conducted between August 22nd and September 6th, 2023.

Executive Summary

Findings for this study were focused on four main areas: 1. Discoverability, 2. A Customized Experience, 3. Implementation Guide: Left-side navigation, and 4. Implementation Guide: Deployment. In terms of discoverability, there were many features throughout the study that went completely unnoticed by participants. While this is concerning when the feature provides vital information to a customer (e.g., cost), it also suggests that customers may not find these features valuable (e.g., “Resources” on solution landing page), and could be removed. Participants spoke to wanting a customized experience with solutions and that this plays a large role in whether or not they will “hire” an AWS solution. Examples of this include interactive diagrams, a “cost calculator” to provide them with a more realistic cost according to their needs, and providing customers with examples that are specific to certain scenarios. In addition, the placement and length of text through the implementation guide needs to be reevaluated, as only some customers value it. When it came to the implementation guide, most participants wanted a reimagined left-side navigation, with some topics condensed to take up less space (e.g., “Contributors”, “Revisions”, and “Notices”) and other sections highlighted more (e.g., “Deployment”). Participants also spoke to wanting topics nested within each other and having the option to expand or collapse information within topics on the left-side navigation. This was particularly important to participants when it came to the steps for deployment and the auto demo. Participants struggled with matching these steps on the implementation guide to what they needed to do in the console. They felt there was inconsistency in designs, and wanted to see the steps more clearly defined and organized, each on their own page of the implementation guide with accompanying screenshots.

1. **Finding: Participants from Group 1 and Group 2 were split on whether they preferred to see “Browse Solutions by Technology” before seeing “Browse Solutions by Industry” on the AWS Solutions Library Page.**

Group 1 participants (BDMs), preferred to see “Browse Solutions by Industry” before seeing “Browse Solutions by technology”. While participants in this group said that they could probably find what they need within the technology section, the industry section spoke to them more. Group 2 participants (IT Professionals) preferred to see “Browse Solutions by Technology” before “Browse Solutions by Industry”, with several pointing out that they would be unable to find what they needed by industry. ([See Appendix D for AWS Solutions Library Screenshot](#))

“‘By technology’ pops out to me more than ‘by industry’. This is where I would find the building blocks, especially if it’s for something I’m not familiar with like machine learning.” -P 1, IT professional

Recommendation: Consider a redesign of this page, where customers can search and navigate efficiently based on their need of solutions by industry or by technology.

2. **Finding: Participants from both groups found the information on the AWS Solutions Library page to be overwhelming, with several pointing out that many of the services on each individual product card were not intuitive.**

Regardless of what group customers were in, participants felt the page was text and scroll heavy and wanted a faster, more efficient way to find what they needed. No participants noticed the small navigation bar up top, where they could expand by industry, organization, and technology. In addition, several participants pointed out that the wording for the various services each product provided were not always common, making it unclear of what the product actually provided. ([See Appendix D for AWS Solutions Library Screenshot](#))

“Virtual waiting room makes total sense, but Glacier Refreezer? What is that? Someone may want to know more and click on it to read more; others would move on. Micro Focus Platespin Migrate? I have no idea what that is, I would move on.” -P 06, BDM

Recommendation: Consider future research through user testing to improve the language on each individual product card on the AWS Solutions Library homepage.

3. **Finding: When it came to using an AWS solutions vs having their engineering team build their own vs using a third-party software package, participants said the decision really depended on several conditions, including time, cost, and how well it fits their use case.**

Most participants from both groups said they would look to AWS solutions first to see if there is an existing solution that would save them time. However, many explained that, in the end, the decision comes down to how much the solution would cost and how much bandwidth does their engineering team have to build it.

“I would tend more to AWS first before I would look at investing in something else. It would depend on how well that particular resource has been thought out. We get updates on new AWS things and sometimes we will go in and test them and they aren’t ready for production yet. We have to weight this against the demand from a customer. So really, we have to weight time vs our engineering team’s bandwidth vs the cost.” -P 04, IT Professional

In addition, participants said they have to consider the specific use case or integration that they were trying to do, and if AWS does not provide something particular to their needs, they will build their own.

"For me, it's an easy decision. What it comes down to is "Is the requirement very specific to our application?" If it is, we would build it for the specific function." -P 07, BDM

Recommendation: Participants stressed how making the decision to use an AWS solution vs building one their own really comes down to three key issues: Time, cost, and use case. Consider providing this information upfront and a clearly visible way to customers so they can easily find this information and make an informed decision.

4. **Finding:** When prompted to click on their assigned solution, participants had mixed first impressions about the landing page. While Business Decision Makers (BDM) focused on reading the language at the top of the page, IT Professionals went straight to the diagram. Participants from both groups struggled to discover several page features.

Group 1 participants, or BDM, were given a choice of three different solutions pages to view, with all three selecting the "Automated Security Response" solution. When they clicked into this solution, participants all read the "What does this AWS Solution do?" and "Benefits" sections first. While all BDM participants appreciated seeing this information upfront, some felt the text felt a bit more "sales" focused instead of information that clearly communicated the business value of the solution. (See Appendix D for "Automated Security Response" Screenshot)

"The benefits are more marketing fluff...no tool delivers on marketing promises. I'm skeptical of this. I want to see the nitty gritty of what you are actually doing and what it will look like for me." -P 8, BDM

Group 2 participants, or IT professionals, all visited the IoT Device Simulator solution. Once they landed on the page, all skipped the "What does this AWS Solution Do?" and "Benefits" sections at the top of the page, going straight to the diagram. When directed back to the top of the page to read these sections, most participants from this group said they wouldn't spend time reading the text. Many said they would prefer a video at the top of the page that explained to them what the solution does, how it works, and why it may be useful to them. ([See Appendix D for IoT Device Simulator](#))

"Well, I saw you had a video at the bottom of the page. What is the purpose of that video? Can I watch it instead of reading this information? How long is the video? I would watch the video and go over the architecture guide as I listen to the video." -P 03, IT Professional

When asked about what additional information they needed to see on the solution landing page to make their decision about moving forward or not with this solution, participants from both groups said cost and deployment time. While both cost and deployment time are linked on the right-side navigation, they were missed by most participants. When pointed out to participants, both groups said that these "Call to Actions" (CTA) needed to be more obvious since both would help them decide if they would move forward or not with this solution. Most participants said the "estimated cost" should be similar to the "view implementation guide" CTA. In addition, participants did not call out any additional information they would like to see and no participants noticed the "Resources & FAQ" section at the top of the page.

Recommendation: Customers need a landing page that provides them with the information they need in an easily discoverable way. To ensure clear communication of the business value of a solution, consider redesigning the "What does this AWS solution do?" and "Benefits" sections and/or adding a short informational video to the top of the page. A "cost" CTA similar to the "view implementation guide" one would make this vital information more discoverable. Additionally, further research can help flesh out what exact elements of the page are necessary and beneficial to customers, and what other elements can be eliminated.

5. **Finding:** Participants from both groups were most excited about the diagram on the solution landing page. They felt it was relevant to their work and would help them make an informed decision about moving forward or not with this solution.

Participants also appreciated that they could enlarge the diagram to view it better. However, most were confused about the “Read more” section underneath the diagram. They felt that there was a disconnect between this section and the diagram itself, as they couldn’t tell if this section and the diagram were related at first glance. Many participants initially thought the text under the diagram were “steps” required to launch the solution and did not notice that each numbered section aligned with what they were seeing in the architecture diagram. Participants felt this needed to be made more obvious to them, most suggesting that the icons in the architecture diagram should be interactive with the ability to click on each for further information. [\(See Appendix D for IoT Device Simulator Diagram Screenshot\)](#)

“I would like a tool tip to appear when I hover over each icon in the diagram. These “steps” underneath are not discoverable. I want to understand everything by looking at the picture. The map underneath is not intuitive or accessible.” -P 04, IT Professional

Recommendation: Participants find the diagram helpful in understanding more about the solution. However, they struggled with understanding how the “Read more” section below the diagram fits in. Consider making the “Read more” section more discoverable. Alternatively, consider making the diagram interactive, where they can hover over each icon to find out further information as well as making each icon clickable.

6. **Finding:** Most participants were able to find the “View implementation guide” CTA located in the middle of the page by the diagram. Only one participant also noticed the same CTA at the top of the page.

When the top CTA was pointed out to participants, they felt it wasn’t needed. In addition, they felt that the CTA in general could be made bigger and a little more pronounced, adding that the “estimated cost” link should follow a similar design to make it more discoverable. [\(See Appendix D for CTA screenshots\)](#)

Recommendation: Consider removing the “View implementation guide” CTA at the top of the screen and making the one near the diagram more discoverable. This can be validated through A/B testing.

7. **Findings:** Participants from both groups said they would not read the “Welcome” page once on the implementation guide.

No participants read through the “Welcome page” on their own and, when prompted to, felt it was too text heavy. While BDM felt this page could be useful if shortened, IT professionals felt they wouldn’t read this section regardless. Participants from both groups commented that anything of value on the welcome page should have already been on the previous page. In addition, several participants from both groups said that they rather look at the architecture overview and cost to derive the business value of the solution. This feedback reflects insights from the recent [Metadata Traits study](#), which found that users skim doc content in order to quickly get the information that matters most to them, skipping over any text they deem irrelevant to the task at hand. [\(See Appendix D for Implementation Guide screenshots\)](#)

“The big thing here is the architecture overview and cost but what is the “Welcome Page” in addition to this? What is the intent of having a welcome page? The business value was communicated to me on the previous page and why I would have moved forward to this page. I would not read the welcome page. Too text heavy.” – P04, IT Professional

Recommendations: Consider reevaluating the usefulness of the information provided to customers on the “Welcome” page of the implementation guide.

8. Finding: Participants from both groups struggled to discover the “deployment” section on the left-side navigation of the implementation guide.

The first thing most participants sought out were instructions on how to deploy the solution. Most said they expected to see a step-by-step guide on how to start this process. When asked where they expected to go to find this, most participants had to click through several different topics on the left-side navigation before landing on “deployment”.

“Nothing is really standing out, just feels like I have to read my way through. Not clear where first steps are, which is really what I am looking for. I do like seeing the cost at the top. I mean, this looks comprehensive, but there is not a clear “where to start” on the execution. It should jump out and it doesn’t.” -P 07, BDM

Recommendations: Consider making the “deployment” link on the left-side navigation more discoverable, as it is a key feature that participants look for. In addition, consider allowing customers to view each step of deployment on a separate page nested under the deployment link that they can expand and collapse. (See more information regarding this in Finding 11)

9. Finding: All participants noticed and noted the importance of the “cost” section on the left-side navigation of the implementation guide. While they valued this information, they also want a more customized experience when it comes to calculating cost.

Participants from both groups noticed and clicked on the “cost” section towards the top of the left-side navigation, pointing out how important this information was. Once on the cost page, they were pleased with the table providing the example cost breakdown to run 100 device simulations per month. However, several participants added that they would appreciate a “calculator feature”, where they could input their specific needs and use cases to get a more accurate and personalized cost. In addition, a few participants noticed that the information on this page was out of date and set for N. Virginia, and wanted the option to change this according to their location. These findings speak back to the notion of how unique features of a use case can ultimately govern the decision of whether to adopt the solution or not. ([See Appendix D for Cost screenshots](#))

“We are very careful with our costs now. So, I want to know the cost to implement and test right away. So having cost at the beginning is very good. It says November 2021, so it’s out of date. And it is set for N. Virginia, which I rarely use. I’m wondering what it would cost in other areas. A calculator link would be really helpful where I could input everything on my end to get a more accurate cost. Would have to dig through all the other information to figure it out.” – P 01, IT Professional

“This is exactly the information I need to present to our finance team. This is the core of what they are looking for to decide whether or not we can move forward with purchasing this solution.” -P 08, BDM

Additionally, while participants also pointed out the architecture overview on the left-side navigation, they felt it was more of a “nice to have” than completely necessary. Some said it was helpful to have there as a reminder, but that they absorbed it on the previous page.

Recommendations: As with the deployment link, participants found the cost link on the left-side navigation to be very valuable. Consider adding in a more customizable cost calculator in addition to the information already provided. Specifically, consider providing customers with a customizable experience, where they can enter in their specific criteria to get a more accurate cost of the solution for their particular needs.

10. Finding: Participants from both groups felt that the list of topics on the left-side navigation of the implementation guide were too long, suggesting that topics of less value be combined into one category and others of more value be more pronounced.

Participants from both groups felt that many of the topics on the left-side navigation were important enough to be their own section. Specifically, many participants said that “deployment” and “cost” should be highlighted more, as they are very valuable but get lost in the list of topics. However, participants felt that the “contributors”, “revisions”, “notices”, and “AWS glossary” sections at the bottom of the left-side navigation did not provide nearly as much value to them and could be combined into one. In addition, they wanted some sections on the left-side navigation to have the option to expand or collapse with more information. For example, participants pointed out that they would want to click on “components” and it expand on the left-side navigation to provide more topics they could click into. A few later pointed out that this would help with the steps involved in deployment. Finally, when asked if they would prefer a guide that was split up into different pages vs having all the information on a single page, all participants preferred having the guide split up as is. [\(See Appendix D for Implementation Guide screenshots\)](#)

“With the left-side navigation, I want the option to expand some of those. Some of the steps under the deployment page should be listed under deployment, where you could expand or collapse. The contributors’ section and down should be rolled into one topic and you can collapse and expand that. Keep the meat and potatoes up at the top and roll the rest of it together.” -P 04, IT Professional

“Technical documentation is always tough. You need a balance of putting the technical information there, but also balancing the aesthetics. This page is fine, but you have to step through everything on the left-side navigation to see what is there instead of having it nested. So much of this implementation guide could really just be a few pages.” -P 06, BDM

In addition, features such as “Need help?”, “Did this page help you?”, and “Next/Previous topic” at the bottom of the page went unnoticed by all participants. No participants called out the PDF link of the implementation guide either.

Recommendations: Consider additional user research through a card sorting activity to determine what topics on the left-side navigation can be grouped together and separately. In addition, this activity would also highlight what topics can be fully removed and what, if any, customers want added.

11. Finding: While Group 2 participants were excited to see a step-by-step layout on the page when they clicked into “deployment”, they struggled with carrying out many of the steps to successfully launch a stack.

The number one thing Group 2 participants struggled with was lining up which step they were on with what they were seeing on the console. Most participants would skip ahead to “Step 2. Sign in to the web interface”, thinking this was step 2 of deployment and not realizing this step came after the stack had been created. No participants noticed or read through the “Deployment Overview” at the top of the page, as well as the “Important” sections in red. It is important to note that part of this confusion may have been due to the participants going back and forth between the two pages, some pointing out they would normally do this in a “split screen” mode. [\(See Appendix D for Deployment screenshots\)](#)

Several participants also struggled with naming the stack. For example, when asked to enter “Stack name” in Step 2 of deployment, some participants hesitated and said they would appreciate guidance or examples on what name to put here. Continuing on with the steps of deployment, participants were confident in and satisfied with what they saw, and all participants were able to successfully create the stack. [\(See Appendix D for stack creation screenshot\)](#)

Recommendation: Participants seek clear step-by-step guidance in order to successfully complete deployment. While there are thorough steps provided to them on the deployment page, the page itself is overwhelming and participants are getting lost. Clear distinctions between the steps need to be made. Consider putting each section on separate pages, which customers can “expand and collapse” on the left-side navigation. Each step

should also include an up-to-date screenshot of what they are looking for in the console. In addition, providing customers with examples in the step-by-step instructions of what to name the stack will help them move forward successfully.

- 12. Finding: When prompted to move on with the “Automotive Demo” page following the stack creation, most Group 2 participants struggled to navigate the steps provided to them to successfully carry out the task. They also described the design on the console as different than what they were used to seeing and felt like it was not part of AWS.**

Once the stack was successfully created, participants had no issues with retrieving their log-in information and logging into the IoT Device Simulator. However, most participants naturally gravitated back to the “deployment” page to continue with “Step 3. Create the device types”. Once participants were redirected to the automotive demo page, they found the step-by-step instructions to be challenging when trying to match them up with what they were seeing on the console. Specifically, they struggled with locating “create a device type”, “automotive device”, “simulations page”, and “create a simulation” throughout the process. While some of this struggle may again have been due to moving back and forth between the two screens, most participants pointed out that the links were unnoticeable and varied in font color and size. In general, participants felt there was inconsistency in the general design of the page, including headers and sub-text organization, making it difficult to identify where to find what they needed.

“Some pages really threw me for a loop. I didn’t know where the “view” button was. Also, hard to find the “refresh” button and the “add simulation” button. I also prefer live refresh.” – P 05, IT Professional

Most participants also struggled with the “Data transmission interval” and “Data transmission duration”, as the first interval had to be less than the duration and this was not clearly communicated to them. Finally, it was also unclear to participants how to start the simulation, with all participants not finding it intuitive to first select the simulation in order for the “Start simulation(s)” and “Stop simulation(s)” buttons to appear. Once selected, many participants also pointed out that once they clicked “Start simulation(s)”, the color of the button remained unchanged and it was not clear to them if the simulation was running or not.

“The UI is not very familiar on the simulations page. It feels like I’m not in the AWS console. All the buttons should look similar in design. This gives me the feeling that this isn’t AWS and is something outside AWS. Makes me feel like maybe it is still under development and less reliable.” -P 02, IT Professional

Recommendation: Similar to those in deployment, the step-by-step instructions for this section should be more clearly organized so that customers do not get lost. Having the steps expand and collapse under Automotive Demo on the left-side navigation would help with this. In addition, providing up-to-date screenshots of what they would see on the console for each step will help customers get through the demo more efficiently without hesitation or frustration.

- 13. Finding: When asked about what additional features the solutions implementation guides could have, participants were most excited about anything allowing them to create a more customized experience.**

Participants from both groups were excited about the idea of making the solutions guides more customizable to their own needs. This included providing editable versions of the diagrams and more specific examples of how the solutions could be used. In addition, participants loved the idea of being able to customize a solution and said they preferred to find the instructions on how to do this on the AWS website over Github.

“Even if the examples are somewhat generic, it would be helpful just to have an idea of what this is useful for. There has been a number of times I’ve seen documentation for a tool and thought it would be useful, but then I dive in and it doesn’t really address the use case I thought it did. Helpful to see more

about what it does before I get into it. Or how it could be used. But I would want this information upfront, before I clicked into the implementation guide.” – P 07, BDM

“An editable version of the diagram would be helpful especially when you are a manager, because you are taking the team through things and it would be great to drop certain elements into a particular window or specific dashboard for the team. Nobody does this really well.” – P 04, IT Professional

While they still felt it would be helpful, participants were less excited about additional information that would dive deeper into deconstructing the solutions, providing information on how and why the solution was built the way it was. Some pointed out that while all the information does help them in making the decision with moving forward or not with a particular solution, what they find most valuable is anything that can customize the experience for them. If we were to include this additional information, some participants suggested we have it in video form to avoid more text.

“I think it could be helpful, because many times you are learning about a new resource you haven't used in the architecture scheme. There were one or two elements in the diagram that aren't a common resource and you are connecting without knowing how or why. I would want to read more about the solution and why it was built to help me understand how it all connects.” – P 04, IT Professional

Recommendation: Participants are excited about future directions for more options with implementation guides. Consider focusing first on options that allow for customers to make implementation guides customizable, including editable versions of the diagrams and more specific scenarios of how the solution could be used. Less pressing are options around showing customers how and why the solution was built the way it was.

Next Steps:

Based on the findings detailed above, the following next steps are suggested:

1. Consider a redesign of the AWS Solutions Library homepage. This redesign should look to reimagine how customers can easily browse and find what they are looking for with minimal scrolling, as well as assessing the language on the product cards to make sure customers understand what the product is.
2. Consider reevaluating what is presented to customers on a solution landing page. Features like cost, deployment time, and possible sample scenarios should be easily discoverable to customers. Text should be minimal while still getting the value of the solution across to the customer. Other features, like “Resources” and “FAQ” were not as valuable to customers and can possibly be condensed into one section or eliminated.
3. Consider ways to make the diagram on the solution landing page more valuable to customers. This could include adding in tool tips and/or other interactive ways to provide customers with all the information they need.
4. Consider reevaluating the usefulness of the text on the “Welcome” page once on the implementation guide. Some customers suggested a short video would be more helpful here.
5. Consider conducting future research to help in redesigning the left-side navigation of the implementation guide. A card sorting activity would provide clarity on what topics customers think should stand on their own, and what topics should be combined into one. This would help clean up the page and allow customers to find what they are looking for more efficiently.
6. Consider ways to enhance the step-by-step instructions for deployment and auto demo sections. Suggestions for this include having each step as a separate page nested under each topic, where customers can expand and collapse as needed. In addition, up-to-date screenshots of the path they must follow in the console will help guide customers more successfully.
7. Consider moving forward with elements of customization, such as a “cost calculator”, editable diagrams, and customizable solutions.

Appendix A – Methodology & Customer Recruit

Interviews were conducted between August 22nd and September 6th, 2022. Participants were recruited through the AWS research operations team. All participants met the following criteria:

- Be over the age of 18
- Does not work for a competitor
- Be based in North America
- Work at an organization that uses public cloud services
- Work in an organization or department that currently uses AWS
- Interact with AWS for professional work at least once per month
- Identify as an IT Professional, Developer, or IT Manager.
- Have all or significant workloads migrated to AWS

Appendix B – Participant Information

P#	Title	Participant Group	Company Size (employees)	AWS Usage	Core AWS products
P1	Developer	Group 2	51-500	1-3 years	EKS, S3, Lambda, SageMaker
P2	Developer	Group 2	51-500	1-3 years	Redshift, SageMaker
P3	IT Professional	Group 2	1,000-5,0000	3+ years	EC2, EKS, and Lambda
P4	IT Professional	Group 2	51-500	3+ years	ECS, Aurora, S3, SageMaker, QuickSight
P5	Developer	Group 2	51-500	3+ years	EC2, EKS, Lambda
P6	Manage IT/Development Teams	Group 1	51-500	3+ years	S3, EC2, EKS, RD, SageMaker, Lambda
P7	Manage IT/Development Teams	Group 1	51-500	3+ years	CloudWatch, CloudTrail, Lambda, S3
P8	Manage IT/Development Teams	Group 1	51-500	1-3 years	EC2, S3, Lambda

Appendix C – Protocol Questions

Background information including AWS Usage

- Tell me about your role, what industry you work in, your main responsibilities, and your team.
- How long have you been using AWS/What products do you mainly use?
- What has the experience of using AWS products been like for you?
- How are you involved in deciding/purchasing what AWS products your team uses?

AWS Solutions Library

- To what extent are you familiar with the AWS Solutions Library?
- What are your likes/dislikes of the information and organization of the AWS Solutions Library? What, if anything, is missing?
- When is an AWS solution useful in your work?
- When would you use an AWS solution vs having your eng team build their own vs a third-party software package?

Solutions Landing Page (IoT Device or Automated Security)

- What information stands out to you on this landing page? What information is helpful in deciding whether or not to adopt this solution? Unhelpful? Missing?
- What are your thoughts on the diagram?
- Where would you go to review the implementation guide for this solution?
- What are your expectations of what you will find once you click on the implementation guide link?

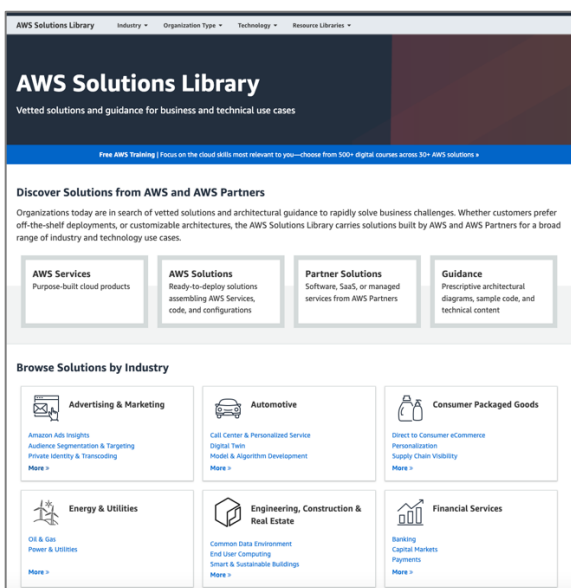
Implementation Guide (IoT Device or Automated Security)

- Does this implementation guide meet your expectations? What, if anything, is confusing or missing?
- How do you feel about the layout and navigation of the implementation guide?
- Would you move forward with this implementation guide? Why or why not?
- Deployment and Auto Demo Configuration Task for Group 2
- What are your thoughts on the cost page?
- How could this implementation guide be improved?

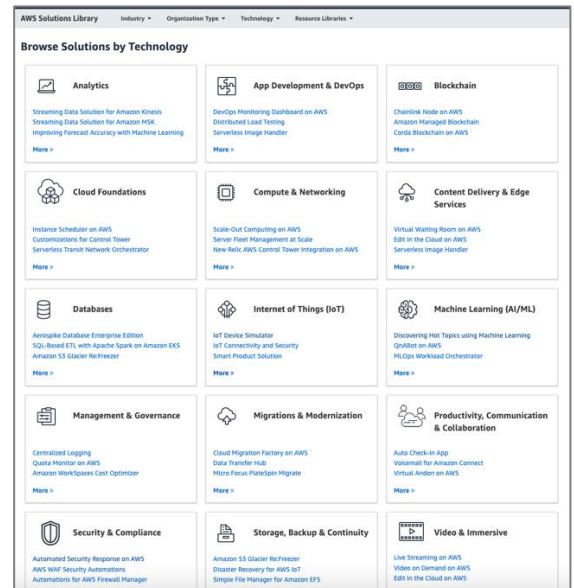
Additional Features

- Would it be helpful for this guide to include examples of how this solution can be used? Why or why not?
- Would you like additional information to be added that dives deeper into how/why the solution was built the way it was?
- Would a deconstruction of a Solution be helpful, including information like how it was built, constructed, how the services were selected and configured, how we conform with Well-Architected, and why the Solution was architected the way it was (e.g. why did we go with event driven?)?
- Would instructions on how to customize this Solution be helpful to you? Why or why not? If yes, would you like to see those instructions here, or would you prefer to see them on Github?

Appendix D – Screenshots



AWS Solutions Library:
Browse Solutions by Industry



AWS Solutions Library:
Browse Solutions by Technology

Automated Security Response on AWS

Free AWS Training | Focus on the cloud skills most relevant to you—choose from 100+ digital courses across 30+ AWS solutions »

This AWS Solution is an add-on that works with **AWS Security Hub** and provides predefined response and remediation actions based on industry compliance standards and best practices for security threats. It helps AWS Security Hub customers to resolve common security findings and to improve their security posture in AWS.

Benefits

- AWS Security Hub integration**
Initiate remediations and findings using custom actions in the Security Hub console.
- One-click cross-account remediation**
Easily deploy the Solution across primary and member accounts.
- Remediation playbooks**
Access remediation playbooks supporting the Center for Internet Security (CIS) AWS Foundations benchmarks v1.2.0, AWS Foundational Security Best Practices (FSBP) v1.0.0, and Payment Card Industry Data Security Standard (PCI-DSS) v3.2.1.
- Automatic remediations**
Deploy a predefined set of response and remediation actions to respond to threats automatically.

AWS Solution overview

The diagram below presents the serverless architecture you can build using the Solution's implementation guide and accompanying AWS CloudFormation template.

Automated Security Response on AWS

Version: 1.0.0
Release date: 06/2022
Author: AWS

Estimated deployment time: 15 min

Estimated cost: Source code: [?/](#)
CloudFormation template: [?/](#)

[View implementation guide](#)

[Launch in the AWS Console](#)

[Deploy with an AWS IQ expert](#)

Automated Security Response Solution:
Group 1, BDM

IoT Device Simulator

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What does this AWS Solution do?

The IoT Device Simulator helps customers test device integration and improve performance of their IoT backend services, via an intuitive web-based graphical user interface (GUI). The solution allows customers to create and simulate hundreds of connected devices, without having to configure and manage physical devices, or develop time-consuming scripts.

Benefits

- Custom simulation engine**
Leverage the IoT Device Simulator out-of-the-box, or as a reference implementation and utilize the customizable simulation engine to test device integration and IoT backend services with simulated data sets.
- Intuitive user interface**
A web-based graphical user interface (GUI) console allows customers to create and simulate hundreds of connected devices, without having to configure and manage physical devices, or develop time-consuming scripts.

AWS Solution overview

The diagram below presents the architecture you can automatically deploy using the solution's implementation guide and accompanying AWS CloudFormation template.

IoT Device Simulator

Version: 5.0.0
Last updated: 11/2021
Author: AWS

Estimated deployment time: 10 min

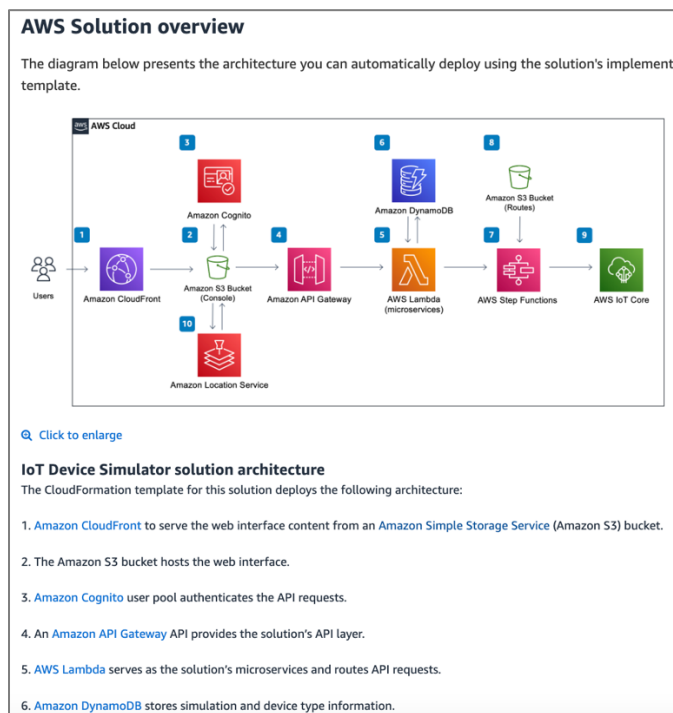
Estimated cost: [?/](#)
Source code: [?/](#)
CloudFormation template: [?/](#)

[View implementation guide](#)

[Launch in the AWS Console](#)

[Deploy with an AWS IQ expert](#)

IoT Device Simulator
Group 2, IT Professionals



IoT Device Simulator Diagram

IoT Device Simulator

Version 3.0.0
Last updated: 11/2021
Author: AWS

Estimated deployment time: 10 min

Estimated cost [↗](#)
Source code [↗](#)
CloudFormation template [↗](#)

View implementation guide

Launch in the AWS Console

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Estimated cost CTAs

aws

Search in this guide

English ▼ [Sign in to the Console](#)

AWS > Documentation > IoT Device Simulator > Implementation Guide

Feedback 🗨 Preferences ⚙

IoT Device Simulator

Implementation Guide

Welcome

Cost

Architecture overview

Components

Security

Design considerations

AWS CloudFormation template

Deployment

Resources

Step Functions workflow

Automotive demo

Device type JSON structure

Uninstall the solution

Operational metrics

Source code

Contributors

Revisions

Notices

AWS glossary

Create and simulate hundreds of virtual connected devices without having to configure and manage physical devices

[PDF](#)

Publication date: May 2018 (last update: November 2021)

Amazon Web Services (AWS) provides many services to help customers build serverless IoT applications that gather, process, analyze, and act on connected device data, without having to manage any infrastructure. With AWS, customers can also build a secure, agile, and scalable backend for their IoT applications. This eliminates the need for customers to develop and manage their own backend resources and can help reduce costs and increase productivity and innovation. However, it is costly and can be a challenge to test IoT applications and backend services without a large pool of physical, connected devices.

IoT Device Simulator is designed to help customers more easily test device integration and IoT backend services, without the need for physical devices. This solution provides a web-based graphical user interface (GUI) that allows customers to create and simulate hundreds of connected devices, without having to configure and manage physical devices, or develop time-consuming scripts. This solution is designed to work out-of-the-box, or you can use this solution as a reference implementation to build a custom simulation engine for your specific use case.

IoT Device Simulator provides a web interface that lets users launch fleets of virtually connected devices from a user-defined template and then simulate them to publish data at regular intervals to AWS IoT. You can also monitor devices from the simulator or observe how backend services are processing the data.

This implementation guide discusses architectural considerations and configuration steps for deploying the IoT Device Simulator in the Amazon Web Services (AWS) Cloud. It includes a link to an [AWS CloudFormation](#) template that launches, configures, and runs the AWS services required to deploy this solution using AWS best practices for security and availability.

The guide is intended for IT infrastructure architects, administrators, and DevOps professionals who have practical experience with IoT devices, and the AWS Cloud.

Note

This solution is designed to simulate device data for testing. It is not recommended for use in production environments.

IoT Device Simulator Implementation Guide:
Welcome Page

Amazon Confidential

12

AWS > Documentation > IoT Device Simulator > Implementation Guide

IoT Device Simulator
Implementation guide

Welcome

Cost

Architecture overview

Components

Security

Design considerations

AWS CloudFormation template

Deployment

Resources

Step Functions workflow

Automotive demo

Device type JSON structure

Uninstall the solution

Operational metrics

Source code

Contributors

Revisions

Notices

AWS glossary

Cost

[PDF](#)

You are responsible for the cost of the AWS services used while running this solution. As of November 2021, the estimated cost for running the IoT Device Simulator solution using the 100 automotive demo device types in a single simulation, sending a message every two seconds in the US East (N. Virginia) Region is **\$3.05** per month for a simulation running six hours per day, **\$6.11** per month for a simulation running 12 hours per day, and **\$12.22** per month for a simulation running 24 hours per day. This includes estimated charges for Amazon API Gateway, AWS Lambda, AWS Step Functions, Amazon DynamoDB, and AWS IoT Core.

The following table provides an example cost breakdown to run 100 device simulations per month in the US East (N. Virginia) Region.

AWS service	6 hours per day	12 hours per day	24 hours per day
Amazon API Gateway	\$0.000105	\$0.000105	\$0.000105
AWS Step Functions	\$0.02	\$0.04	\$0.08
AWS Lambda	\$2.70	\$5.40	\$10.80
Amazon DynamoDB	\$0.01	\$0.02	\$0.04
AWS IoT Core messaging	\$0.32	\$0.65	\$1.30
Total:	\$3.05*	\$6.11*	\$12.22*

*Cost to run 100 device simulations per month.

We recommend creating a [budget](#) through [AWS Cost Explorer](#) to help manage costs. Prices are subject to change. For full details, refer to the pricing webpage for each AWS service you will be using in this solution.

IoT Device Simulator Implementation Guide: Cost

IoT Device Simulator
Implementation guide

Welcome

Cost

Architecture overview

Components

Security

Design considerations

AWS CloudFormation template

Deployment

Resources

Step Functions workflow

Automotive demo

Device type JSON structure

Uninstall the solution

Operational metrics

Source code

Contributors

Revisions

Notices

AWS glossary

Automated deployment

[PDF](#)

Time to deploy: Approximately 10 minutes

Deployment overview

Important

You cannot update version 2.x or earlier versions of this solution to version 3 using the AWS CloudFormation console due to changes with how resources are deployed. To use version 3, you must launch a new stack using version 3.0.0 of the AWS CloudFormation template. You can [uninstall](#) your previous version of this solution.

Use the following steps to deploy this solution on AWS. For detailed instructions, follow the links for each step.

Step 1. Launch the stack

- Launch the AWS CloudFormation template into your AWS account.
- Review the template parameters and enter or adjust the default values as needed.

Step 2. Sign in to the web interface

Step 3. Create the device types

- Create device types which your devices will represent.

Step 4. Create the simulations

- Create simulations to define the simulation you want to run.

Step 5. Run and manage the simulations

- Start one or more simulations.
- View simulation details and the messages of a simulation if it is currently running.

IoT Device Simulator Implementation Guide: Deployment

CloudFormation > Stacks > Create stack

Step 1
Specify template

Step 2
Specify stack details

Step 3
Configure stack options

Step 4
Review

Specify stack details

Stack name

Stack name

Enter a stack name

Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-).

Parameters

Parameters are defined in your template and allow you to input custom values when you create or update a stack.

Console access

* Console Administrator Email
The user E-Mail to access the UI

Cancel Previous **Next**

Create Stack: Step 2 Specify stack details