

AWS Architecture Monthly



October 2020

AWS Solutions

Notices

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Editor's note

"The solution often turns out more beautiful than the puzzle." — Richard Dawkins

For this month's issue, we're going to explore the [AWS Solutions Library](#), a collection of cloud-based solutions for dozens of technical and business problems. Whether you want to combine pre-built, well-architected multi-service patterns to create your own solution, deploy vetted architecture directly into your AWS account, or get help deploying vetted architecture from AWS Competency Partners, we can help. Our expert, Tom Begley, runs us through the various offerings you can take advantage of, and some of our other guest writers will go more deeply into the individual options.

We hope you'll find this edition of Architecture Monthly useful, and we would like your feedback. Please give us a star rating and your comments on the [Amazon Kindle](#) page. You can [view past issues](#) and reach out to aws-architecture-monthly@amazon.com anytime with your questions and comments.

In October's issue:

- **Ask an Expert:** Tom Begley, Senior Manager, AWS Solutions Builder
- **Customer Success Story:** App8: Helping Restaurants Succeed during COVID-19
- **AWS Solutions Implementations:** Video on Demand & Operations Conductor
- **AWS Solutions Constructs:** Build faster and more confidently with vetted architecture patterns
- **AWS Solutions Consulting Offers:** Enhancing the AWS Solutions Library to address customer needs
- **Related Videos:** Watch what AWS Solutions can do for you

Annik Stahl, Managing Editor



Ask an Expert:

Tom Begley,
Senior Manager, AWS Solutions Builder

What are AWS Solutions and how do they factor into the future of cloud architecture?

As AWS adds more and more features and services, customers are looking for prescriptive and well-architected answers to their problems so that they don't have to start from scratch every time. We work to provide these answers through various types of offerings that customers might want. For example, [AWS Solutions Implementations](#) allow customers to have a one-click deployment of an entire solution into their account. [AWS Solutions Constructs](#) enable customers to quickly develop their own solutions by leveraging a growing library of well-architected, multi-service patterns that we have integrated together following AWS best practices.

Finally, [AWS Solutions Consulting Offers](#) allow our customers, who might need some extra expertise outside of their organization, to solve problems with some of our established partners

We continue to look at additional ways customers might want answers in the future> This will include consolidating reference architecture diagrams or adding technology and industry frameworks (think multiple solutions layered on top of each other) to the AWS Solutions Library, while bringing in expertise from outside AWS.

Our goal is to provide our customers with trustworthy answers in a manner they want to consume. We will continue to expand the number of solutions we provide and the number of different methods we offer those solutions.

Why are AWS solutions and reference architectures a hot topic in the cloud industry?

As the cloud industry matures, many challenges our customers face have already been solved by early cloud adopters; there's no need to reinvent the wheel. By leveraging reference architectures (such as diagrams, Solutions Implementations, Solutions Constructs, and other proven answers), companies can now spend more time solving problems specific to their industry or company by building on the work of others who have gone before them. Technology growth is simply abstracting further and further away from the 0's and 1's. (Remember punch cards? I do...but I'm old.) Reference architectures let you abstract further up the technology "food-chain" so we don't worry about 0's and 1's anymore. With reference architectures, we don't have to worry about things like [how to configure my WAF](#)

[correctly](#) or how can I [simulate IoT Devices](#). These things—and many others—have already been figured out and are available to help you solve your next challenges for your business.

What industry trends are AWS Solutions helping to solve for today?

When we founded AWS Solutions in 2016, our goal was to provide solutions to some of the most common technical problems our customers were experiencing. As customers moved more mission-critical systems to the cloud, they asked for more industry-specific solutions. In response to those needs, we created industry-based teams for Manufacturing (Amazon Virtual Andon and Smart Product), Energy (oil and gas-focused) and Media and Entertainment (Live Streaming on AWS, Media2Cloud, and Video on Demand on AWS.).

We plan to continue building industry-focused teams that can provide the expertise and solutions in specific vertical markets.

What other important information would you like for customers to know about AWS Solutions?

There are two things I hope readers remember about AWS Solutions. First, we publish all of our assets with a “production ready” mindset. Everything must pass rigorous quality, testing, and approval processes before publication. We know customers might not blindly deploy our solutions into their production accounts, but we do the necessary work to ensure they can do so safely. We also provide the underlying code on Github as well as documentation so customers can customize solutions to fit their needs. Second, we are constantly looking to expand the number of solutions we provide and the number of different ways we offer those solution to our customers. So, if you have specific ideas on how something might apply to a large customer base or industry vertical, [let us know](#). And check back often as our portfolio grows.

About our expert



Tom Begley joined Amazon Web Services in June 2017 and is a Senior Manager on the AWS Solutions Builder team. He currently leads a team focused on providing the tools to help internal and external customers build well-architected solutions. Since 1989, Tom has worked in the technology field at large companies, start-ups, and even his own technology consulting company. Tom has a B.S. in Mathematics from Fairfield University.

AWS Customer Success Story:

App8: Helping Restaurants Succeed During COVID-19

By Johny Duval, Product Manager, AWS Solutions

Based in Ottawa, Canada, [App8](#) empowers restaurant guests to browse menus, order, and retrieve and pay bills from their phones without requiring an account or an app. This touchless experience increases restaurant table turnover and maximizes the time of restaurant servers. Furthermore, App8 provides AI-driven forecasting analytics to restaurateurs in order to enable them make informed data-driven decisions.

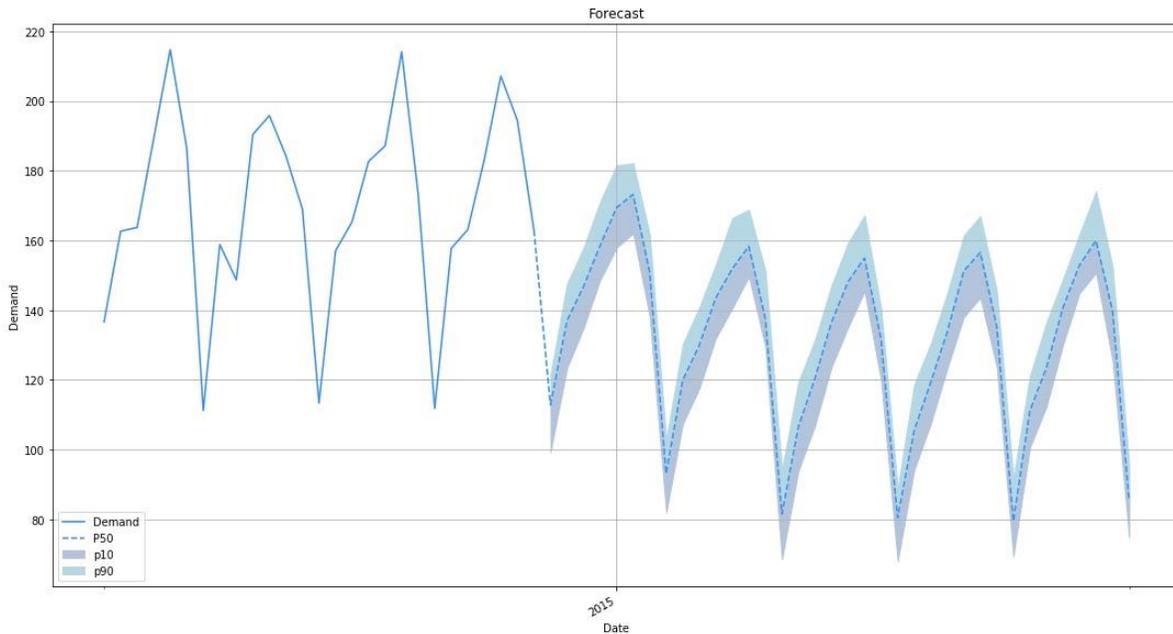
App8 services have been especially important during the COVID-19 pandemic, as restaurateurs have been forced to improve their inventory and workforce planning. App8 uses the data captured from customer interactions with their service to allow restaurants to better predict patronage and popular menu items. As a result, businesses are able to intelligently staff and stock perishable items, ultimately helping them to better operate in these uncertain times.

App8 built its own in-house service for forecasting and predicting demand but it proved to be relatively complicated, and required a significant amount of development overhead to maintain, including monthly service costs as well as data scientists' and developers' time.

App8 is one of many customers who have tapped into the innovations of AWS services to attain their business goals. [Amazon Forecast](#), Amazon's fully managed forecasting service, has accomplished most of what App8's in-house service could perform. By automating its usage through Amazon's new [AWS Solutions Implementations](#), the [Improving Forecast Accuracy with Machine Learning](#) solution, the company was able to generate more meaningful insights such as "what-if" scenarios to suit its customers' requirements.

This AWS Solutions Implementation provides an automated pipeline for generating, testing, and comparing Amazon Forecast predictors and forecasts. This allows developer and data scientists to save development time, reducing the overhead costs of developing new forecasts or optimizing their existing forecasting processes. Businesses can configure this solution, then drag-and-drop formatted demand data into [Amazon Simple Storage Service](#) (Amazon S3) to generate forecasts using combinations of related data, and then visualize results in the included [Amazon SageMaker Jupyter Notebook](#).

The solution outputs probabilistic predictions at three default quantiles to address each business's sensitivity to overstocking and understocking. You can see sample forecasting graph below.



Businesses avoiding overstocking can use the p10 forecast, where the true future demand value is expected to be lower than the predicted value only 10% of the time. Businesses more sensitive to missing customer demand can use the p90 forecast, where the true value is expected to be lower than the predicted value 90% of the time. And, businesses aiming to retain compatibility with their legacy tools, or equal sensitivity to overstocking and understocking, can use the p50 forecast.

The Improving Forecast Accuracy with Machine Learning solution is especially impactful in the supply chain industry. Here are there examples of use cases where this solution has benefitted customers:

Inventory Planning. Businesses want products in stock and immediately available to customers, and also would want minimal total inventory in order to keep associated holding costs, and thus prices, low. To achieve both, accurate forecasting helps plan for the right amount of inventory.

Workforce Planning. Depending on the product demand forecast, businesses plan their workforce to support the increase or decrease in demand. Workforce forecasting is important at call centers, retail stores, production floor, restaurants, and hotels.

Financial Planning. Forecasting is key to predicting financial metrics. Forecasting free cash flows is critical to prepare a business from not running out of cash.

Learn more about the [Improving Forecast Accuracy with Machine Learning solution](#).

AWS Solutions Implementations

Video on Demand & Operations Conductor

What are AWS Solutions Implementations?

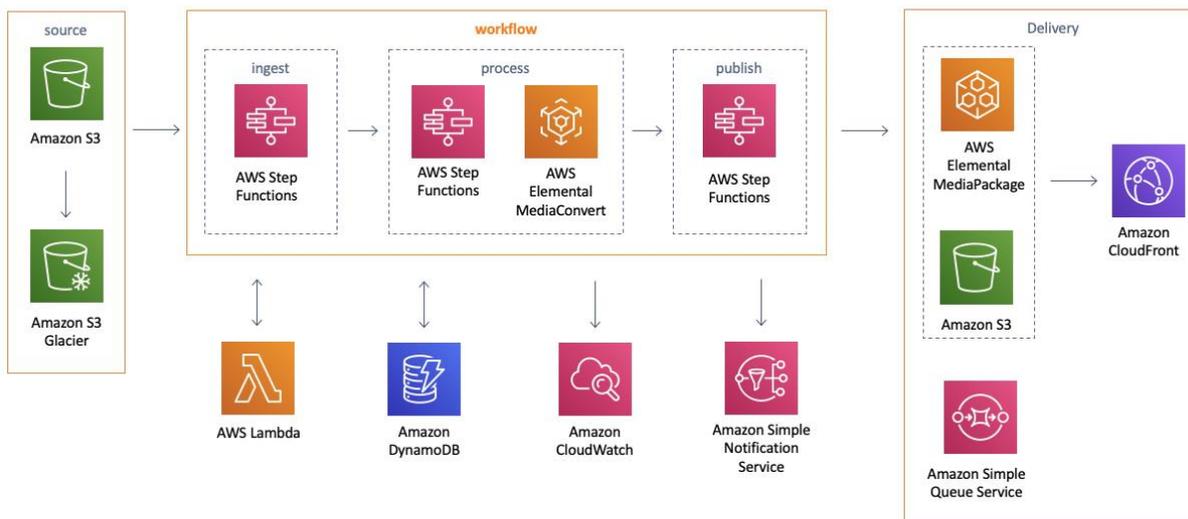
The AWS Solutions program accelerates customers' ability to realize the value of the cloud by providing gold standard, cross-service solutions through do-it-yourself and consulting-based offerings. [AWS Solutions Implementations](#) help you solve common problems and build faster using the AWS platform. All AWS Solutions Implementations are vetted by AWS architects and are designed to be operationally effective, reliable, secure, and cost efficient. Every AWS Solutions Implementation includes a solution overview, detailed reference architecture, an implementation guide, GitHub source code repository, and an automated mechanism (typically a CloudFormation template) to deploy directly into a customer account on AWS. Many of our AWS Solutions focus on helping to accelerate the adoption of the platform, as well as expand capabilities in services (for example, AWS Instance Scheduler, AWS Ops Automator, Real Time Insights on AWS Account Activity).

Below are a couple of examples of our most popular solutions.

Video on Demand

[Video on Demand on AWS](#) automatically provisions the AWS services necessary to build a scalable, distributed video-on-demand workflow. The video-on-demand solution ingests metadata files and source videos, processes the videos for playback on a wide range of devices, stores the transcoded media files, and delivers the videos to end users through [Amazon CloudFront](#).

The diagram below presents the Video on Demand on AWS architecture you can deploy in minutes using the solution's implementation guide and accompanying AWS CloudFormation template.



Video on Demand on AWS solution architecture

This solution uses [AWS Lambda](#) to trigger [AWS Step Functions](#) for ingest, processing, and publishing workflows.

A Step Functions workflow ingests a source video, or a source video and metadata file, validates the source files, and generates metadata on the source video. A second Step Functions workflow generates an encoding profile based on the metadata and submits encoding jobs to [AWS Elemental MediaConvert](#). After the video is encoded, a third Step Functions workflow validates the output.

AWS Elemental MediaConvert uses two-pass encoding to generate multiple high-quality versions of the original file. Source and destination media files are stored in [Amazon Simple Storage Service](#) (Amazon S3) and file metadata is stored in Amazon DynamoDB. If enabled, source files are tagged to allow the files to be moved to [Amazon Glacier](#) using an Amazon S3 lifecycle policy.

The solution also includes the option to use [AWS Elemental MediaPackage](#) as part of the workflow. When enabled, the solution creates a separate set of MediaConvert custom templates, and a packaging group in MediaPackage that is configured to ingest the MediaConvert HLS output stored in Amazon S3. MediaPackage packages the content, formatting it in response to playback requests from downstream devices. By default, this solution creates packaging configurations for HLS, DASH, MSS, and CMAF.

View the [deployment guide](#) and see the [full solution online](#).

Solving with AW: Video on Demand (Video)

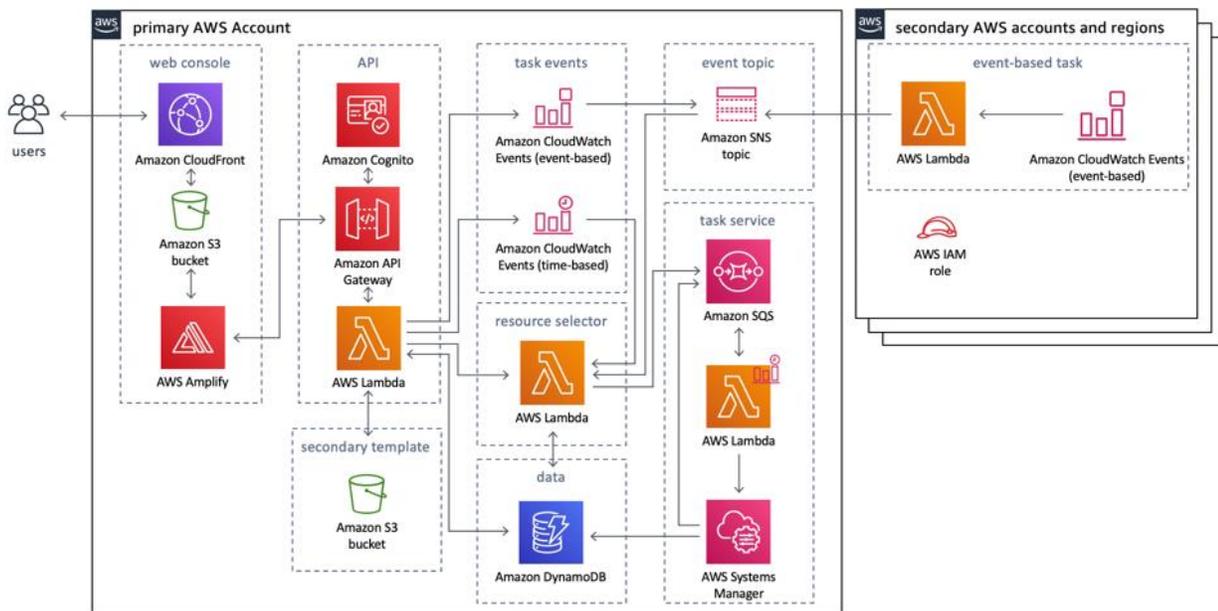


Be sure to check out the [Solving with AWS: Video on Demand](#) video to hear from experts about this Solution Implementation.

Operations Conductor

[Operations Conductor](#) helps customers reduce operational complexity and enables administrators to quickly create manual, event-based, or time-based triggers for managing resources. This AWS Solution creates a simple web interface for automating and orchestrating operational tasks, and deploys a set of common operational actions that can be configured to automate administration tasks, resource scaling, and cost management. The solution can be customized and extended to fit your business needs.

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



Operations Conductor architecture on AWS

This solution includes an [AWS CloudFormation](#) template that you deploy in the primary account. This template launches an [Amazon API Gateway](#) to invoke the solution's microservices ([AWS Lambda](#) functions). The microservices provide the business logic to

manage events and tasks. The microservices interact with [Amazon Simple Queue Service](#) (Amazon SQS), [AWS Systems Manager](#), and [Amazon DynamoDB](#) to provide storage for task details and results.

The primary template automatically generates additional AWS CloudFormation templates in an [Amazon Simple Storage Service](#) (Amazon S3) bucket. The templates enable you to create cross-account and region [AWS Identity and Access Management](#) (IAM) roles to perform actions in secondary accounts and regions, and forward events. You can modify and build upon these templates to create custom actions that extend the solution's functionality.

View the [deployment guide](#) and see the [full solution online](#).

Solving with AWS: Operations Conductor (Video)



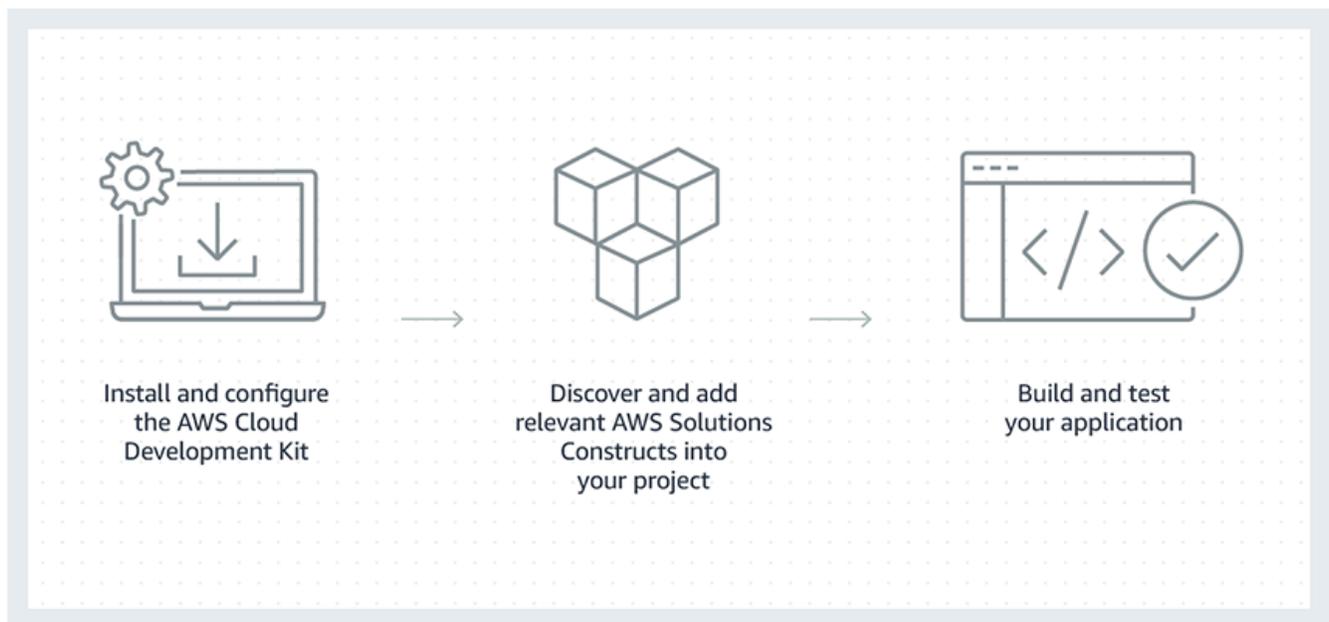
Be sure to check out the [Solving with AWS: Operations Conductor](#) video to hear our experts talk about this AWS Solution Implementation.

AWS Solutions Constructs

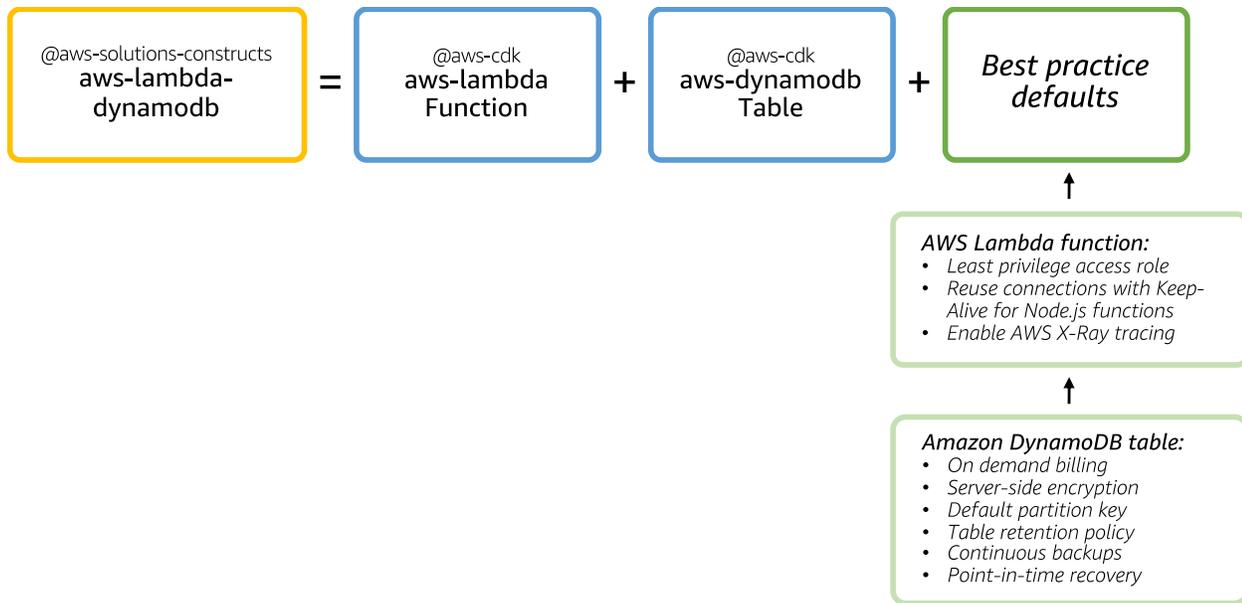
Ryan Hayes, AWS Solution Builder

When building a solution or application, it's no surprise that customers want to invest more time in developing the features that make it unique, and less time "reinventing the wheel" with their infrastructure. More often than not, building a solution involves defining and configuring many of the same cloud resources, which creates quite a bit of repetition. Ensuring that cloud best practices are applied correctly along the way can make the experience even more daunting and time-consuming.

How it works



[AWS Solutions Constructs](#) enable customers to build faster and more confidently with a growing repository of vetted architecture patterns, spanning the most frequently used combinations of services on the platform. Solutions Constructs are higher-level abstractions of [AWS Cloud Development Kit](#) (CDK) constructs, and have a multi-service focus to make assembling production-ready workloads possible in fewer steps. For example, a single Solutions Construct can be used to provision an [AWS Lambda](#) function, an [Amazon DynamoDB](#) table, and any permissions needed for the function to perform read/write operations on the table. This enables customers to cut down on configuring individual CDK constructs to achieve the same result.



Anatomy of an AWS Solutions Construct (the `aws-lambda-dynamodb` pattern)

While all Solutions Constructs are fully customizable, each comes pre-configured with best practice defaults to help customers ensure that their workload, as a whole, is well-architected. This gives customers the ultimate flexibility to use a particular Solutions Construct off-the-shelf, with zero configuration. Or, they can fine-tune it to meet the unique needs of their solution. Regardless of the decision, customers are given the confidence and power to build knowing that all of their bases are covered from the start.

Solutions Constructs are designed to be completely frictionless, and each Solutions Construct can be used alongside others, as well as CDK constructs. This allows customers to continue using the same programming languages and logic to define both their infrastructure, as well as their actual applications, without ever having to leave their integrated development environment (IDE). In addition, Solutions Constructs share the same testing and deployment capabilities as the CDK, providing for even tighter integration and a greater degree of maintainability.

Learn how to use [AWS Solutions Constructs](#) to build well-architected applications faster and more confidently.

AWS Solutions Consulting Offers

Jim Farman, Partner Business Development

The [AWS Solutions Library](#) offers a collection of cloud-based solutions for dozens of technical and business problems. Over the past four years, AWS customers and [AWS Partner Network](#) (APN) Consulting and Technology ISV Partners have utilized the solutions for application development and operational efficiency, as well as to build faster on AWS. As we've learned from working directly with customers, they need strategic and technical support to design, implement, and continually modernize workloads on AWS. In particular, senior executives, IT leaders, line of business owners, and digital strategists want a pragmatic method to discover, qualify, and engage with solutions delivered in a consultative approach. To respond to these requests, we launched [AWS Solutions Consulting Offers](#) in April 2020, enhancing the AWS Solutions Library to address customer needs.

The AWS Solutions Consulting Offers are for customers with modern application business objectives as well as approaching business and technology challenges that can benefit from [AWS Competency Partners](#) in the APN. When teaming with our Competency Partners, customers can accelerate innovation on AWS while enabling their in-house teams to rapidly adopt cloud development and infrastructure technologies. Solution Consulting Offers, delivered by Competency Partners, layer consultative or professional services on top of a repeatable technical solution. These offers may include deployment, configuration, customization, or ongoing operations and managed services for a particular workload on AWS. All Competency Partners must meet a high standards bar and technical validation, including proven expertise through customer references and examples.

Each Solutions Consulting Offers listing provides, up front for our customers, a list of deliverables that include a solution overview, how it works, key customer contributions, reference architecture diagram, partner profile, and direct engagement through an [APN Customer Engagement](#) (ACE) request form. The underlying consulting offer reference architecture can include a mixture of partner-developed technology, [AWS Solutions Implementations](#), [AWS Quick Starts](#), and independent third-party software vendor (ISV) applications. Solutions Consulting Offers address a wide range of solution categories, including Analytics, Databases, IoT, Management & Governance, DevOps, Migration, Networking, Storage, and Security, Identity, & Compliance. Each month, we add new consulting offers to the Solutions Library, including workload-focused offers for Oracle, SAP, JD Edwards, and industry vertical specializations for Government, Healthcare, and Retail.

All Solutions Consulting Offers are vetted by AWS, meaning customers are assured that the architecture used to solve their problems and drive their business outcomes is validated by AWS Solutions Architecture. AWS Solutions Architects use AWS best practices established by a decade of experience building in the cloud. We evaluate the underlying architecture for every consulting offer using a standardized process that incorporates frameworks, such as the [AWS Well-Architected Framework](#).

Examples of AWS Solution Consulting offers

Explore the consulting offer overview and walk through the reference architectures for these three available consulting offers:

[Trek10 IoT Foundations](#): The most difficult stage of bringing an IoT device to market is connecting it to the cloud. IoT Foundations by Trek10, helps organizations connect devices to AWS with a strong focus on reliability, scalability, and security. You'll be able to understand, customize, and maintain the AWS IoT infrastructure while working with a partner that equips your business to utilize your data in a meaningful way.

[Linke AWS Connector for SAP](#): For many organizations, SAP systems represent some of the most critical, deeply integrated database and storage workloads. Linke will guide you through the consulting and execution process between your SAP workloads and AWS, completely written in the language that enables integration. The solution includes dedicated technical support for your unique use case.

[Pariveda Knowledge Work Automator](#): Extracting structured information from your unstructured data can be a time consuming and error-prone manual process. This Solution Consulting Offer leverages the AWS suite of AI technologies to help improve your business' efficiencies. Pariveda's serverless Knowledge Work Automator is easily deployed within a number of fields: healthcare, manufacturing, legal, and financial services.

By promoting [AWS Solutions Consulting Offers](#) in the [AWS Solutions Library](#), we are providing our customers greater visibility and experiences to solutions created by and delivered through consulting engagements, with AWS Competency Partners.

Related Videos

AWS Solutions: Real-Time IoT Device Monitoring with Kinesis Data Analytics

Monitoring IoT devices in real-time can provide valuable insight that can help you maintain the reliability, availability, and performance of your IoT devices. You can track time series data on device connectivity and activity. This insight can help you react quickly to changing conditions and emerging situations

<http://amzn.to/AWS-Solutions-IoT-monitoring>

AWS Solutions: Multi-Region Availability with Amazon DynamoDB, Amazon S3, and Amazon Cognito

George Bearden from the AWS Solutions Builders team sheds light on common challenges of multi-region availability. In many cases, data redundancy can be achieved through built-in features such as Amazon S3's cross-region replication and versioning. However, services like Amazon Cognito require a bit more work. Learn what AWS has done to help you minimize your effort.

<http://amzn.to/AWS-Solutions-availability>

AWS Solutions: AI Powered Speech Analytics for Amazon Connect

The AI Powered Speech Analytics for Amazon Connect solution provides customer insights in real time, and helps agents and supervisors better understand and respond to customer needs so they can resolve customer issues and improve the overall customer experience. The solution includes pre-trained AWS artificial intelligence (AI) services that enable customers to transcribe, translate, and analyze each customer interaction in Amazon Connect, and presents this information to assist contact center agents during their conversations.

<http://amzn.to/AWS-Solutions-speech-analytics>

AWS Solutions: Media Analysis

Join us to discuss a turnkey solution created by AWS for Media Analysis. The Media Analysis solution uses advanced ML services such as Amazon Transcribe, Amazon Comprehend, Amazon Rekognition, and others to understand and interpret what is happening in a video clip. The analysis of this content then leads to a set of metadata that can be automatically generated and used to build a comprehensive media library. The workflow is implemented with AWS Lambda and step functions.

<http://amzn.to/AWS-Solutions-media-analysis>

AWS Solutions: Video on Demand (VOD)

Tom, from our very own AWS Solutions Builder team, walks us through an end-to-end solution that he built for video on demand (VOD) on AWS. Customers are already using this solution to run over 60,000 encoding jobs every month. You'll learn how Tom used Step Functions for the orchestration layer, Lambda for Node.js microservices, Elemental Media Convert to generate videos in a variety of file formats, and many more services to complete the solution, including S3, CloudFront, CloudWatch, DynamoDB, and CloudFormation.

<https://amzn.to/AWS-ED-VOD>