



How to enhance your customer's mobile experience through third-party data

How organizations are developing user-friendly mobile apps to create better personalized experiences for customers



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Building personalized apps on mobile devices

When building a mobile app, it's important to consider who you're building it for. Consumers today have different expectations than consumers from even five years ago. This, of course, leads to an entirely new set of standards organizations should follow to appeal to those customers.

For example, 90% of consumers believe that a brand's ability to personalize their shopping experience impacts the amount they spend or shop with that brand ([Inmar Intelligence](#), 2021). By increasing the amount of personalization, organizations can meet customer demands and increase customer lifetime value.

These expectations go beyond just building a positive relationship, as the lack of personalization can negatively impact the ways customers view your brand. One

example of this is the finding that 76% of customers get frustrated when companies don't deliver personalized experiences ([McKinsey & Company](#), 2021). This generally stems from a combination of receiving poorly targeted messaging, irrelevant product recommendations, and simply that businesses aren't recognizing consumers' individuality.

To make customers feel truly understood, you need to deliver personalized experiences across every touchpoint. In fact, consumers who believe personalized experiences are "very appealing" are 10x more likely to be a brand's most valued customer and make more than 15 transactions per year ([Epsilon](#), 2021). Not only are customers enjoying personalized experiences, but they're rewarding the brands that deliver them.



"If we want to have 20 million customers, then we want to have 20 million 'stores'. Our mission is to be the earth's most customer-centric company."
- **Jeff Bezos**, founder and executive chairman of Amazon during a 2000 keynote address.



Challenges of personalization and solutions

Personalization often comes with a variety of challenges for organizations, ranging from a lack of data to dealing with increased privacy concerns. Here, Colin Marden, a Senior Solutions Architect at Amazon Web Services (AWS), overviews some of these challenges and how they can be solved.



Challenge: Not enough data

In the past, it was difficult to identify traffic with just an IP address or email. Attempts to do so often led to inaccurate results and inefficient processes. In some cases, you may not even be able to reliably trust the data.

Solution: Diversify massive data sets

Today, with an email address or IP address, you can tap into a third-party data source to pull information on these previously anonymous visitors. Infutor, who we will introduce in a later chapter, offers solutions to resolve these identities and enrich your data. Sources like Infutor can add confidence in your personalization and the accuracy of your first-party data.



Challenge: Attribution difficulties

Properly collecting, tracking, and attributing a user's journey across different channels, devices, and touchpoints can be difficult for many organizations. The data may exist on different platforms or in different formats, making it hard to centralize and use for personalization.

Solution: Simplify management

When we look at solving challenges in tracking the customer journey, we look towards centralization. The [AWS Lake House Architecture](#), for example, enables you to connect your data lake, data warehouse, and all your other purpose-built services into a coherent whole. This can help you centralize and efficiently access large volumes of data.





Challenge: Time and resources

There can be a high learning curve associated with deploying personalized customer experiences. You might find the need for an entire team dedicated to tackling the task, without the dedicated resources. This could lead to misalignment of the people and skills needed for the job. For example, your marketing team might be more familiar with point-and-click Software as a Service (SaaS) solutions than they are with data wrangling.

Solution: Streamline integration

AWS's managed services and service integrations pass much of the undifferentiated heavy lifting from you (the user) to us (the provider). Third-party data from AWS Data Exchange is also readily available to sample and has been cleansed, normalized, and validated before you even access it. AWS can even automatically ensure your data sets are automatically updated when new revisions of data are available.



Challenge: Customization differs from personalization

Organizations occasionally conflate personalization with customization - but they are not the same thing. Customization of an app refers to an action and reaction that is initiated by the user. Whereas personalization shifts the content, products, or experiences without your knowledge. If the two are confused, you may end up asking customers for too much information – including information that could have come from third-party data sources.

Solution: Accelerate seamless personalization

It is important to avoid requiring excessive customization to drive personalized experiences for users. Instead, leverage customer-initiated actions or telemetry to drive experiences and train your machine learning and analytics tools to personalize behind the scenes. Like many streaming services, consider the metrics on what was viewed and for how long – as well as what was not viewed – to create personalized experiences.





Challenge: Out-of-date data

Organizations typically find it vital to ensure that things like sales figures are accurate and up to date, and for good reasons. Faulty, outdated information can lead to problems down the road. In the same vein, out-of-date data used for personalization can lead to poor user experiences. In some cases, flawed data might harm engagement and transactions, such as products that are recommended after consumers have already purchased them.

Solution: Refresh data with ease

To overcome the inability to keep data fresh, practice good data hygiene by cleansing and validating your data. [Amazon Redshift](#) Data Sharing enables instant, granular, and high-performance data access across Amazon Redshift clusters within an AWS account. It also eliminates the need to move or copy data. Data Sharing provides live access to the data so that your users always see the most up-to-date and consistent information as it is available in the data warehouse. When bringing in third-party data from AWS Data Exchange, take advantage of Auto-Export. Enabling Auto-Export automatically delivers fresh data to the Amazon Simple Storage Solution (S3) bucket of your choice, notifying you if errors occur.



Challenge: Privacy concerns

Research from Gartner has shown that while most companies collect data from their customers, only around 23% of those companies use it to personalize experiences. With more privacy-aware customers, who often need to provide consent, collecting and asking for excessive amounts of data without adding value to customers can cause friction. You need to be responsible and transparent about your collection and use of data.

Solution: Maintain customer trust

Employing third-party data can help you reduce and right-size your own data collection, enabling your organization to collect less consumer data. With the data that you collect, ensure that it is useful and makes sense for your industry and use case. Use data responsibly, with consent, and avoid using irrelevant or sensitive data in personalization. For example, a personal medical app might have a different expectation of personalization than something like a shopping app.

While we covered a few instances of using third-party data from AWS Data Exchange, we'd like to spotlight two data providers. Over the next two sections, see how data providers Foursquare and Infutor help businesses build personalized experiences for their customers.



AWS Data Exchange provider spotlight: FOURSQUARE

While some people think of Foursquare as the check-in app, today they're a leading independent location-based platform. Foursquare uses location and proprietary technologies to help brands, developers, marketers, and analysts understand how consumers move through the world around them. From geotagging tweets to using geofilters on Snapchat, Foursquare has been powering the places in our pockets for years.

Foursquare Places POI

One of the several solutions they provide is Foursquare Places POI data in AWS Data Exchange. Delivered in either application programming interface (API) or flat-file, Foursquare Places contains rich POI attributes from over 100+ million venues, 200+ countries and territories, and 900+ venue categories.

Maintained by over 14 billion user verified check-ins, Foursquare Places houses information like addresses, hours of operations, phone numbers, photos, and more. This makes Foursquare Places POI known for its accuracy at scale.

Here are a few examples of how some well-known businesses leverage Foursquare data to improve their user experience.



Uber

Challenge

Setting pick-up and drop-off locations (especially in dense, urban environments) requires user awareness of not just address – but also venue name.

Solution

Foursquare Places data powers Uber's venue look-up feature, allowing users to search for a venue by name based on their current location. This helps prevent inaccurate pick-up and drop-off requests.

Hilton Honors

Challenge

Hilton wanted guests to have up-to-date information on bars, restaurants, and attractions near their hotel, all on the Hilton Honors app.

Solution

The Foursquare Places API surfaces recommendations based on users' check-in location, driving a single-threaded search and discovery experience for hotel guests.

nextdoor

Challenge

Nextdoor needed a way to limit inaccurate business registrations while preventing fraud and ensuring user trust and compliance.

Solution

Foursquare Places verifies new businesses signing up for Nextdoor, validating POIs during the onboarding process.

DOORDASH

Challenge

DoorDash lacked the first-party venue data for customers to request new restaurant locations, especially with Covid-related openings and closures.

Solution

Foursquare Places data powers the intuitive "Request a Restaurant" feature, which is also a crucial feedback loop for DoorDash's market planning efforts.

Foursquare on AWS Data Exchange

Today, you can consume Foursquare Places data sets as a flat file through [Amazon S3](#). Now, you can purchase Foursquare's API in AWS Marketplace and consume Foursquare data as an Amazon Redshift data share. Working closely with AWS empowers Foursquare's customers to build applications on top of location data in the cloud. Foursquare actively consults these customers on how to integrate their data with services like [Amazon Neptune](#), [Amazon SageMaker](#), [Amazon Personalize](#), and [Amazon Quicksight](#).

[Foursquare Places API – PayGo Option in AWS Data Exchange.](#)

AWS Data Exchange provider spotlight: **infutor**

Infutor Total Consumer Insights (TCI) Standard API is a data set that matches inputs to an identity graph that outputs additional consumer data. Infutor's TrueSource™ Identity Graph provides information on 265 million active US consumers tied to over 120 million households. With a simple input of a name or email address, this API can provide additional information like demographics, household income, occupation, and more.



This diagram represents the flow of data, left to right, starting with various inbound sources. This data routes through a complex web of services in your tech stack, and ultimately gets deployed to drive intended outcomes from in-app experiences.

Without personalization, consumer data comes from the left and every app user has the same experience. However, when personalization is considered, those experiences are made unique and positively impact business outcomes.



Customer story: How to improve an award-winning app

Problem:

Consumers demand personalized experiences, but you can't deliver that effectively with first-party data.

Infutor's customer, a Fortune-25 specialty retailer, came to them when they already had a best-in-class mobile app experience. However, the retailer wanted to keep pushing the bar, meet consumer expectations, and not let competitors catch up to them.

Solution:

Identity resolution and enrichment across data silos drives a more cohesive view of the consumer and a personalized experience.

As users started a session, their account was authenticated and used to do a real-time lookup. That real-time response of Infutor's API was used by the retailer to personalize the shopping experience based on the attributes returned. These attributes held incredibly valuable information such as consumer age, gender, household income, occupation, presence of children, and more.

By taking the approach of real-time API enrichment of first-party email addresses to get third-party demographic data, the retailer saw real results. That personalized experience resulted in a 238% increase in consumer engagement in their already award-winning mobile app. These incredible results prove that third-party data can exceed customer expectations for personalization and deliver serious outcomes for brands.

Infutor on AWS Data Exchange

[Expand your tech stack and deliver better outcomes using Infutor's solutions on AWS Data Exchange.](#)



Common questions

Speaking to their personal experiences, experts provide insight on privacy concerns, technical advice, and solutions to the challenges that come with personalization. Discover what thought leaders in the industry are saying about mobile app personalization using third-party data.





Ankit Patel

Senior Vice President,
Engineering, Foursquare

Q In addition to providing information about venues, can you also lend insight into how people move throughout the real world?

A Yes, for the purpose of this eBook, we focused on how our Places data can drive innovation from mobile experiences. We have an entire visits product suite built for helping advertisers understand ad effectiveness of their medium. This helps enterprises target users and enrich their CRM databases, driving insights around user traffic.

Q How has AWS Data Exchange's role in data ingestion and preparing analysis changed your approach with customers?

A We've seen some really positive feedback from our customers receiving data through AWS Data Exchange. Some customers have relied on legacy endpoints, like Secure File Transfer Protocol (SFTP) receiving Foursquare deliveries. It's been great to see them transition to AWS Data Exchange and truly accelerate the time to installation. As we deploy our Amazon Redshift integration with AWS Data Exchange, we're excited about the prospects of cutting out Extract, Transform, and Load (ETL) entirely. This is getting our customers toward data faster than ever.

"We've seen some really positive feedback from our customers receiving data through AWS Data Exchange."

Q You mentioned your visits products can target users and enrich CRM databases. What is Foursquare's approach to privacy?

A Privacy is at the core of every business and product decision we make at Foursquare. Our Visits data is sourced from our own apps and our SDK partners that ask users not once, but twice, for location services. There's a clear value exchange because we know that our technology makes their app experience worthwhile. We'd never engage in a partnership with a flashlight app, for example, where there's no need for location data. We put in a lot of time and effort to make sure we're compliant with General Data Protection Regulation (GDPR) and California Consumer Privacy Act (CCPA). Not only that, but we make sure that the partnerships we engage with are privacy-centric and valuable for our end-users.

"Privacy is at the core of every business and product decision we make."



John Barnes

Chief Technology Officer,
Infutor

Q We talked about how real-time personalization can help the user experience, but for data scientists, how can personalization data help them with modeling?

A What we've found with data scientists is that model drift is a critical challenge for them. The key way to identify model drift and correct it is with well-linked and fresh data. It's important to note that for the original model build, exhaustive consumer data is hugely valuable. We have products that we refer to as model fuel. Those provide hundreds and thousands of attributes that help improve the accuracy of models after the build is done.

Q What data do you need on the input to allow me to personalize a consumer's experience?

A We can work off as little as a single identifier. You know, several times if you provide more data, that sometimes is helpful. However, it really depends on the workflow. Being given a single identifier, such as a device ID or email address, can allow us to unlock up to thousands of attributes for personalization.

"Being given a single identifier, such as a device ID or email address, can allow us to unlock up to thousands of attributes for personalization."

Q How long does it take to start consuming your data?

A AWS Data Exchange makes it simple. Depending on how familiar your team is with APIs, that process can usually be a day or less. Whether it takes a day or a week, our Infutor team is here to help you throughout the process.

Q Do you license data in ways other than API?

A Yes, very similar to what Ankit mentioned, we have licensed data sets that go up to all 265 million of our adult US consumers. That includes hundreds of attributes for each consumer. You'll see many of these data sets are listed and available in the AWS Data Exchange alongside our APIs.



Colin Marden

Senior Solutions Architect,
AWS

Q Can you overdo personalization?

A Yes. One of the challenges with personalization and customization is that you can inadvertently limit or affect your end user's experience, for better or for worse. As an example, in recommendation engines, we might refer to that situation as a filter bubble. By personalizing all your recommendations, you run into a risk of presenting an increasingly homogeneous stream of content. That might not offer the consumer the kind of depth or breadth that they seek. So, it's a balance.

"These days attention spans are short, and competition is everywhere. Finding the right combination of personalization, and then optimizing it through continuous analysis, is difficult. That's why we're here to help."

Q What are the reasons AWS customers give you for wanting personalization?

A Ultimately, with personalization, our customers are looking for those factors that drive more engagement, high user retention, and increasing brand loyalty. These days attention spans are short, and competition is everywhere. Finding the right combination of personalization, and then optimizing it through continuous analysis, is difficult. That's why we're here to help. That help could be through our services and free online training, or through engaging with AWS account teams and solution architects like me. We can help you meet your goals and requirements in terms of personalization and third-party data.

Demo: AWS Data Exchange for APIs

Led by Colin Marden,
Senior Solutions Architect, AWS

AWS Data Exchange for APIs allows you to call partner APIs the same way they call any other AWS service. This removes the need for custom API integrations, giving you more data from more vendors in more formats. You can also receive automatic updates to your data sets.

AWS Data Exchange for APIs enables you to make restful or GraphQL or API calls directly to AWS Data Exchange and receive synchronous responses. Instead of potentially downloading and operationalizing an entire third-party data set, you can query the third-party API in real-time. The return contains just the information that is required for you and your consumer.

Here's how to quickly get started with AWS Data Exchange API functionality.

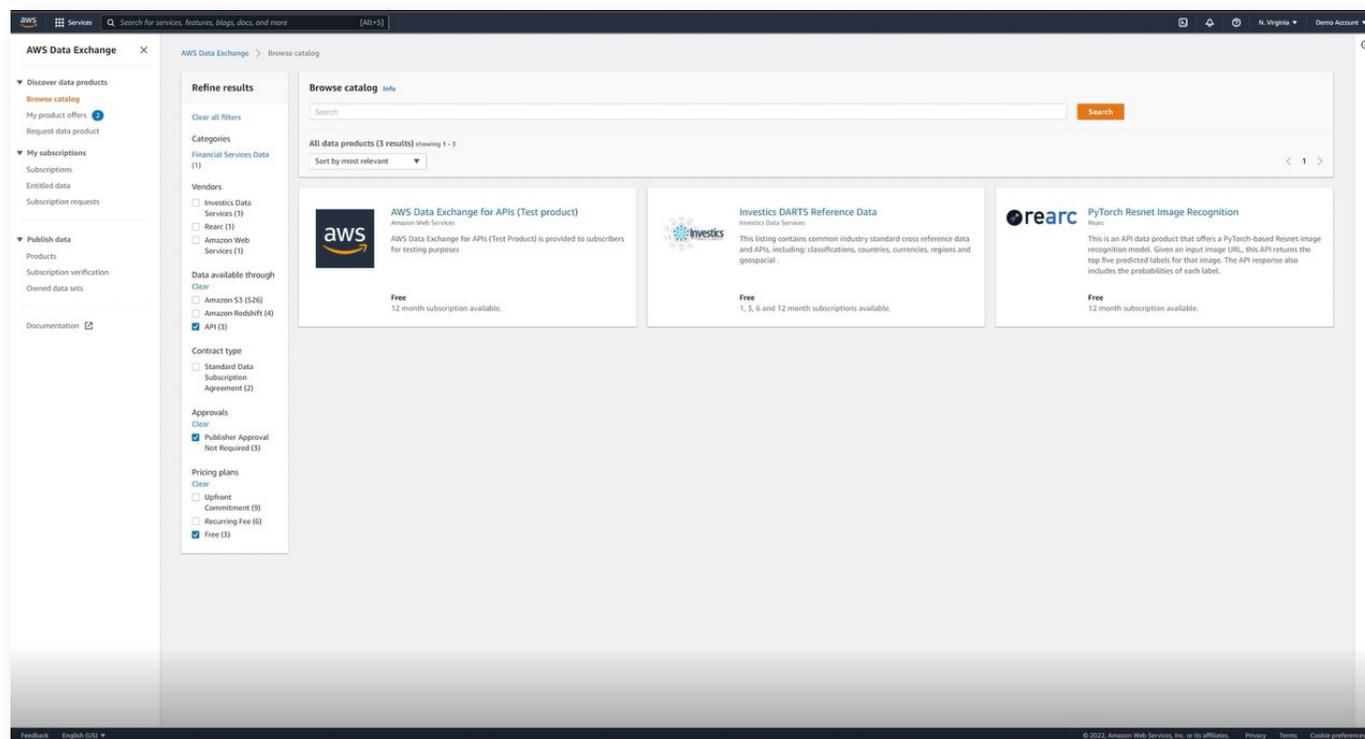


Step 1:

Find an API product to query

On the [AWS Data Exchange](#) landing page, select “Explore available data products” button to browse the data products catalog.

Once the catalog is visible, look through the filters on the left side of the screen to select relevant data products for you. In this overview, we'll select the PyTorch Resnet Image Recognition API provided by Rearch. This API takes an input image and returns five predictions of what the image could be, based on the image itself.



The screenshot shows the AWS Data Exchange 'Browse catalog' interface. On the left, there is a 'Refine results' sidebar with various filters. The main area displays a grid of data products. Three products are visible:

- AWS Data Exchange for APIs (Test product)**: Amazon Web Services. AWS Data Exchange for APIs (Test Product) is provided to subscribers for testing purposes. Pricing: Free (12 month subscriptions available).
- Investics DARTS Reference Data**: Investics Data Services. This listing contains common industry standard cross reference data and APIs, including: classifications, countries, currencies, regions and geospatial. Pricing: Free (1, 3, 6 and 12 month subscriptions available).
- PyTorch Resnet Image Recognition**: Rearch. This is an API data product that offers a PyTorch-based Resnet image recognition model. Given an input image URL, this API returns the top five predicted labels for that image. The API response also includes the probabilities of each label. Pricing: Free (12 month subscription available).

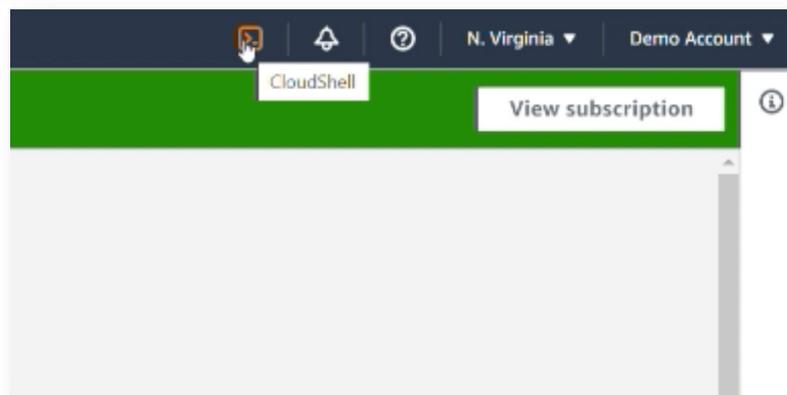
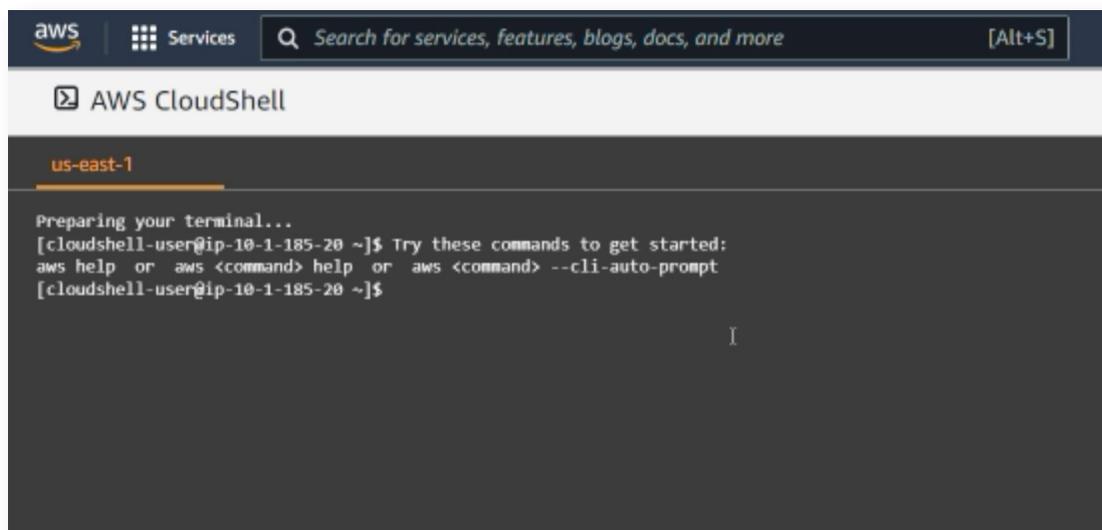
The 'Refine results' sidebar includes filters for Categories (Financial Services Data (1)), Vendors (Investics Data Services (1), Rearch (1), Amazon Web Services (1)), Data available through (Amazon S3 (526), Amazon Redshift (4), API (3)), Contract type (Standard Data Subscription Agreement (2)), Approvals (Publisher Approval Not Required (3)), and Pricing plans (Upfront Commitment (9), Recurring Fee (6), Free (3)).

Step 3:

Launch AWS CloudShell

[AWS CloudShell](#) is a browser-based shell that makes it easy for you to securely manage, explore, and interact with your AWS resources. You can access AWS CloudShell by using the icon in the top right of your screen. Right click on that icon and choose to open AWS CloudShell in a new tab.

Moving tabs to AWS CloudShell, you'll now have an interactive shell that allows you to provide simple AWS API commands. AWS CloudShell already understands who the user is and that they have the appropriate access rights to access the AWS Data Exchange product.



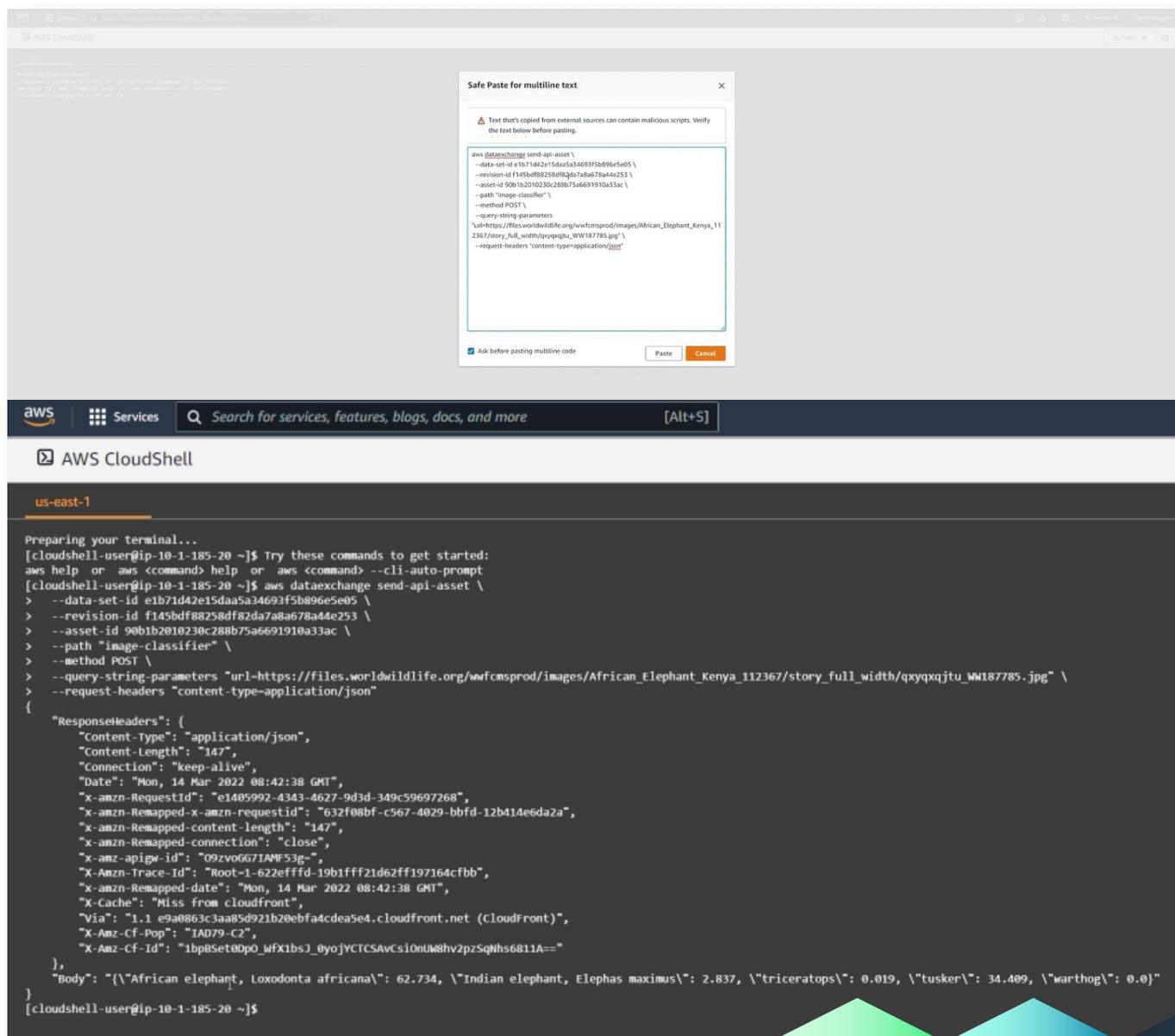
Step 4:

Type or paste command

For our demo today, I've prepared a simple command, which I'll paste in. What we're going to do is ask AWS Data Exchange to send an API asset.

Following the template from AWS Data Exchange for usage, you'll provide the data set ID, revision ID, and asset ID. You'll also provide the method, in our case the image classifier, and a query string with the URL of the image.

Once you've done that, you can paste or type that content. As you can see, AWS Data Exchange will respond with a series of headers and a body.



```
aws dataexchange send-api-asset \
--data-set-id e1b71d42e15daa5a34693f5b896e5e05 \
--revision-id f145bdf88258df82da7a8a678a44e253 \
--asset-id 90b1b2010230c288b75a6691910a33ac \
--path "image-classifier" \
--method POST \
--query-string-parameters "url=https://files.worldwildlife.org/wmfmsprod/images/African_Elephant_Kenya_112367/story_full_width/qxyxqjtu_WN187785.jpg" \
--request-headers "content-type=application/json"
```

```
Preparing your terminal...
[cloudshell-user@ip-10-1-185-20 ~]$ Try these commands to get started:
aws help or aws <command> help or aws <command> --cli-auto-prompt
[cloudshell-user@ip-10-1-185-20 ~]$ aws dataexchange send-api-asset \
> --data-set-id e1b71d42e15daa5a34693f5b896e5e05 \
> --revision-id f145bdf88258df82da7a8a678a44e253 \
> --asset-id 90b1b2010230c288b75a6691910a33ac \
> --path "image-classifier" \
> --method POST \
> --query-string-parameters "url=https://files.worldwildlife.org/wmfmsprod/images/African_Elephant_Kenya_112367/story_full_width/qxyxqjtu_WN187785.jpg" \
> --request-headers "content-type=application/json"
{
  "ResponseHeaders": {
    "Content-Type": "application/json",
    "Content-Length": "147",
    "Connection": "keep-alive",
    "Date": "Mon, 14 Mar 2022 08:42:38 GMT",
    "x-amzn-RequestId": "e1405992-4343-4627-9d3d-349c59697268",
    "x-amzn-Remapped-x-amzn-requestid": "632f08bf-c567-4029-bbfd-12b414e6da2a",
    "x-amzn-Remapped-content-length": "147",
    "x-amzn-Remapped-connection": "close",
    "x-amz-apigw-id": "092voGG7LAWF53g-",
    "X-Amzn-Trace-Id": "Root-1-622efffd-19b1fff21d62ff197164cfbb",
    "x-amzn-Remapped-date": "Mon, 14 Mar 2022 08:42:38 GMT",
    "X-Cache": "Miss from cloudfront",
    "Via": "1.1 e9a0863c3aa85d921b20ebfa4cdea5e4.cloudfront.net (CloudFront)",
    "X-Amz-Cf-Pop": "IAD79-C2",
    "X-Amz-Cf-Id": "1bp8Set0Dp0_wFX1bs3_0yojVCTCSAvCsionUW8hv2pzSqMhs6811A=="
  },
  "Body": "{\"African elephant, Loxodonta africana\": 62.734, \"Indian elephant, Elephas maximus\": 2.837, \"triceratops\": 0.019, \"tusker\": 34.409, \"warthog\": 0.0}"
}
[cloudshell-user@ip-10-1-185-20 ~]$
```

Step 5:

Return information

The body highlights that the image classifier believes the highest likelihood is that our picture is an African Elephant. If we open the URL, it's clear that our input was an African elephant.

This was just a simple example of how you can use the AWS Data Exchange API functionality to return information from a third-party data set.

```
aws | Services | Search for services, features, blogs, docs, and more [Alt+S]
AWS CloudShell
us-east-1
Preparing your terminal...
[cloudshell-user@ip-10-1-185-20 ~]$ Try these commands to get started:
aws help or aws <command> help or aws <command> --cli-auto-prompt
[cloudshell-user@ip-10-1-185-20 ~]$ aws dataexchange send-api-asset \
> --data-set-id e1b71d42e15daa5a34693f5b896e5e05 \
> --revision-id f145bdf88258df82da7a8a678a44e253 \
> --asset-id 90b1b2010230c288b75a6691910a33ac \
> --path "image-classifier" \
> --method POST \
> --query-string-parameters "url=https://files.worldwildlife.org/wfcmprod/images/African_Elephant_Kenya_112367/story_full_width/qxyqxqjtu_WM187785.jpg" \
> --request-headers "content-type=application/json"
{
  "ResponseHeaders": {
    "Content-type": "application/json",
    "Content-Length": "147",
    "Connection": "keep-alive",
    "Date": "Mon, 14 Mar 2022 08:42:38 GMT",
    "x-amzn-RequestId": "e1405992-4343-4627-9d3d-349c59697268",
    "x-amzn-Remapped-x-amzn-requestid": "632f08bf-c567-4029-bbfd-12b414e6da2a",
    "x-amzn-Remapped-content-length": "147",
    "x-amzn-Remapped-connection": "close",
    "x-amz-apigw-id": "09zvoGG7IAMP53g-",
    "X-Amzn-Trace-Id": "Root-1-622efffd-19b1fff21d62ff197164cfbb",
    "x-amzn-Remapped-date": "Mon, 14 Mar 2022 08:42:38 GMT",
    "X-Cache": "Miss from CloudFront",
    "Via": "1.1 e9a0863c3aa85d921b20ebfa4cdea5e4.cloudfront.net (CloudFront)",
    "X-Amz-Cf-Pop": "IAD79-C2",
    "X-Amz-Cf-Id": "1bp8Set0DpO_WfX1bsJ_0yojYCTCSAvCs1OnuM8hv2pzSqHhs6811A=="
  },
  "Body": "{\n\"African elephant, Loxodonta africana\": 62.734, \n\"Indian elephant, Elephas maximus\": 2.837, \n\"triceratops\": 0.019, \n\"tusker\": 34.409, \n\"warthog\": 0.0}"
}
[cloudshell-user@ip-10-1-185-20 ~]$
```



[View the full demo in the webinar](#)

Getting started with third-party data with AWS Data Exchange

Why use AWS Data Exchange?

AWS Data Exchange makes it easy to find, subscribe to, and use third-party data in the cloud. AWS Data Exchange has hundreds of commercial data products from category leaders in financial services, healthcare, retail, media and entertainment, and other industries. There are also hundreds of free data sets, including both data collected from popular public sources and trials for commercial products so you can explore before you subscribe.



Over 3,000 data products



From more than 250 data providers

[Explore all AWS Data Exchange data sets](#)

AWS Data Exchange also simplifies access to data—eliminating the need to receive physical media, manage FTP credentials, or integrate with different APIs from multiple providers. When providers publish updates to their data sets, you will receive a notification so you can automatically consume new data as it's published.

You can quickly copy data to [Amazon S3](#) to immediately transform, process, analyze, or build machine learning models on it.

With [AWS Data Exchange for Amazon Redshift](#), you can directly query third-party data in Amazon Redshift without extracting, transforming, and loading it. This enables you to quickly query, analyze, and build applications with third-party data.

Additionally, [AWS Data Exchange for APIs](#) enables you to find, subscribe to, and use third-party API products from providers on AWS Data Exchange. With AWS Data Exchange for APIs, you can use AWS-native authentication and governance, explore consistent API documentation, and utilize supported AWS software development kits to make API calls.

You can also integrate with the full portfolio of AWS analytics services. These include:



[Amazon EMR](#)

Big data processing



[Amazon Redshift](#)

Data warehousing



[Amazon Athena](#)

Instant querying



[AWS Glue](#)

Data integration and extract, transform, and load (ETL)



[AWS Lake Formation](#)

Build data lakes

For data providers, AWS Data Exchange makes it easy to reach the millions of AWS customers migrating to the cloud by removing the need to build and maintain infrastructure for data storage, delivery, billing, and entitlement.

Browse all data products by visiting [AWS Data Exchange](#).



