



# aws SUMMIT

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D O P 2 0 1

# Code fast with Amazon CodeWhisperer, a generative AI coding companion

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# Quickly building reliable code is challenging



Shortage of developers<sup>1</sup>



Time spent on undifferentiated code



Appropriate use of open source



Shortage of focus time<sup>2</sup>



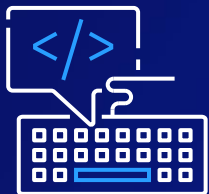
Time spent learning technologies, APIs, and best practices



Application security

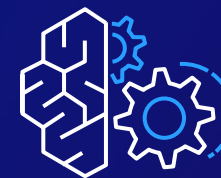
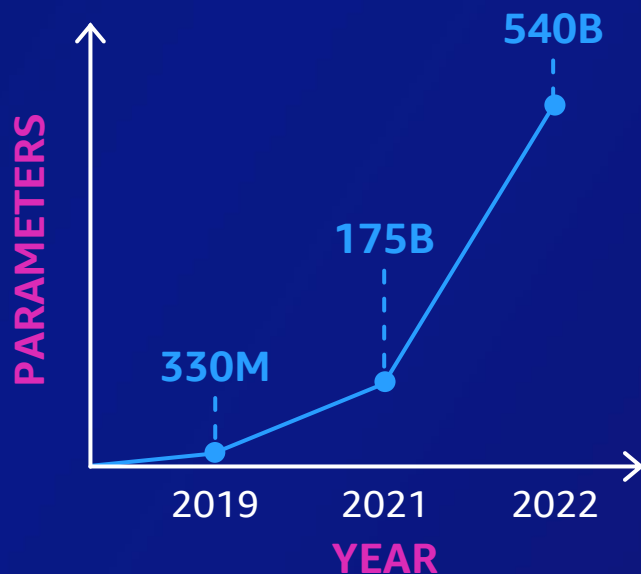
<sup>1</sup>Gartner: [2023 Planning Guide for Application Development](#) | <sup>2</sup>Computerworld: [Too many meetings, too little 'focus' time](#)

# Modern teams are using AI to get more done faster



Developer time spent  
exploring, learning,  
hand coding

**Before**

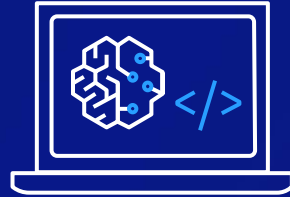


Real-time AI  
coding companion

**Today**

# Amazon CodeWhisperer

BUILD APPLICATIONS FASTER AND MORE SECURELY WITH YOUR AI CODING COMPANION



## Code generation



AND

Go, Rust, PHP, Ruby, Kotlin, C, C++,  
Shell scripting, SQL, and Scala



AND

Amazon SageMaker Studio, JupyterLab,  
CLion, GoLand, WebStorm, Rider,  
PhpStorm, RubyMine, and DataGrip

# Developer productivity with CodeWhisperer

**57%**

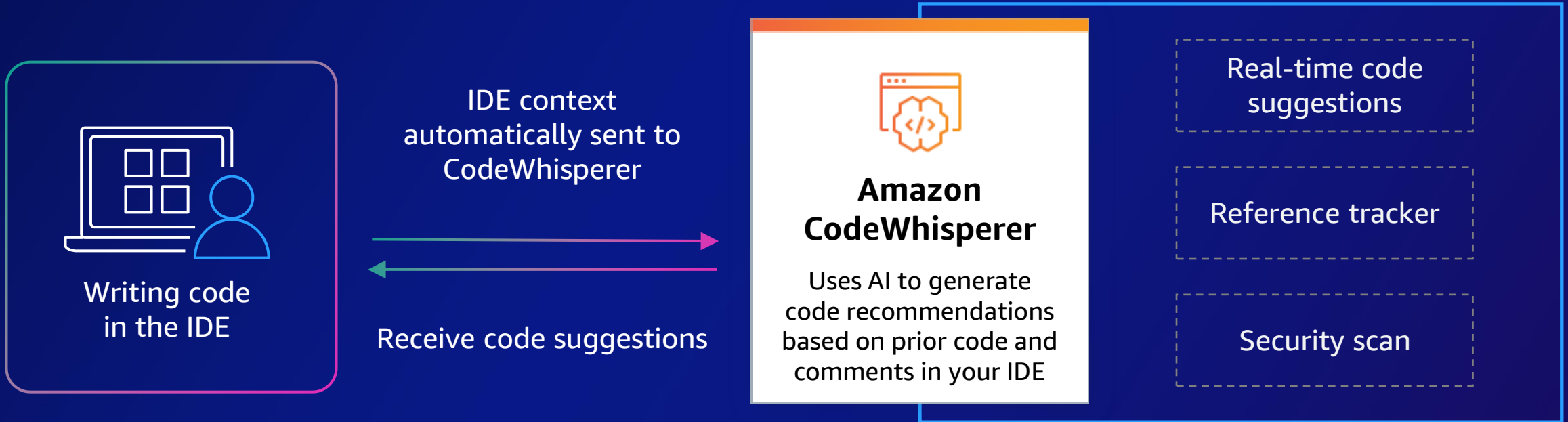
**faster**

**27%**

**more likely to succeed**

During the preview, Amazon ran a productivity challenge and participants who used CodeWhisperer were 27% more likely to complete tasks successfully and did so an average of 57% faster than those who did not use CodeWhisperer

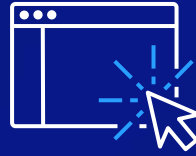
# How it works



# Benefits



Quickly accomplish  
basic coding tasks



More easily use unfamiliar  
APIs and frameworks



Get high-quality  
suggestions for  
AWS services



Use AI responsibly



Improve  
application security



Use your  
favorite tools



# Code generation

- Get multiple code suggestions in seconds based on natural language (English) description of coding task and surrounding code
- Code generation can range from single-line suggestions to full-function blocks
- Provides high-quality suggestions for popular AWS services
- Generated code matches developer style and patterns

```
J SQSIdentityFunction.java M src/main/java/com/amazonaws/services/sqs/SQSIdentityFunction.java
package com.amazonaws.services.sqs;
import java.util.Map.Entry;
import java.util.stream.Collectors;
import com.amazonaws.services.lambda.runtime.Context;
import com.amazonaws.services.lambda.runtime.RequestHandler;
import com.amazonaws.services.lambda.runtime.events.SQSEvent;
import com.amazonaws.services.lambda.runtime.events.SQSEvent.MessageAttribute;
import com.amazonaws.services.lambda.runtime.events.SQSEvent.SQSMessage;
import com.amazonaws.services.sqs.model.MessageAttributeValue;
import com.amazonaws.services.dynamodbv2.AmazonDynamoDBClientBuilder;
import com.amazonaws.regions.Regions;

/*Create a lambda function that stores the body of the SQS message
into a hash key of a DynamoDB table. */
public class SQSIdentityFunction implements RequestHandler<SQSEvent, String> {

    private static final String TABLE_NAME = "SQSMessage";
    private static final String HASH_KEY = "MessageId";

    private AmazonDynamoDBClientBuilder builder = AmazonDynamoDBClientBuilder.standard();
    private AmazonDynamoDB client = builder.withRegion(Regions.US_EAST_1).build();

    @Override
    public String handleRequest(SQSEvent event, Context context) {
        for (SQSMessage message : event.getRecords()) {
            String messageId = message.getMessageId();
            String messageBody = message.getBody();
            context.getLogger().log("MessageId: " + messageId + " MessageBody: " + messageBody);
            storeMessage(messageId, messageBody);
        }
        return "Success";
    }

    private void storeMessage(String messageId, String messageBody) {
        client.putItem(TABLE_NAME, HASH_KEY, messageId, messageBody);
    }
}
```

# Demo



demo.py > ...

```
1 test_users = [  
2     {"name": "George Washington", "id": "user1"},  
3 ]
```







# Context



















# Algorithms







# Testing







# SQL









# Command line







# Data science and machine learning





•[9]: *# define torch nn.module with 1 input layer, 3 hidden layers, and 1 output layer* |



[ ]:

# Security scanning





codewhisperer-demos



example1.py ×



08\_security > example1.py > ...

```
1  # Running a command without validating input
2  import subprocess
3  cmd = input('Enter a command to run. ');
4  subprocess.Popen(cmd, shell=True, stdin=subprocess.PIPE)
```



0 2



AWS: AWS Builder ID



CodeWhisperer

Spaces: 4

UTF-8

LF



Python

3.9.16 64-bit





# Additional capabilities



Reference tracking



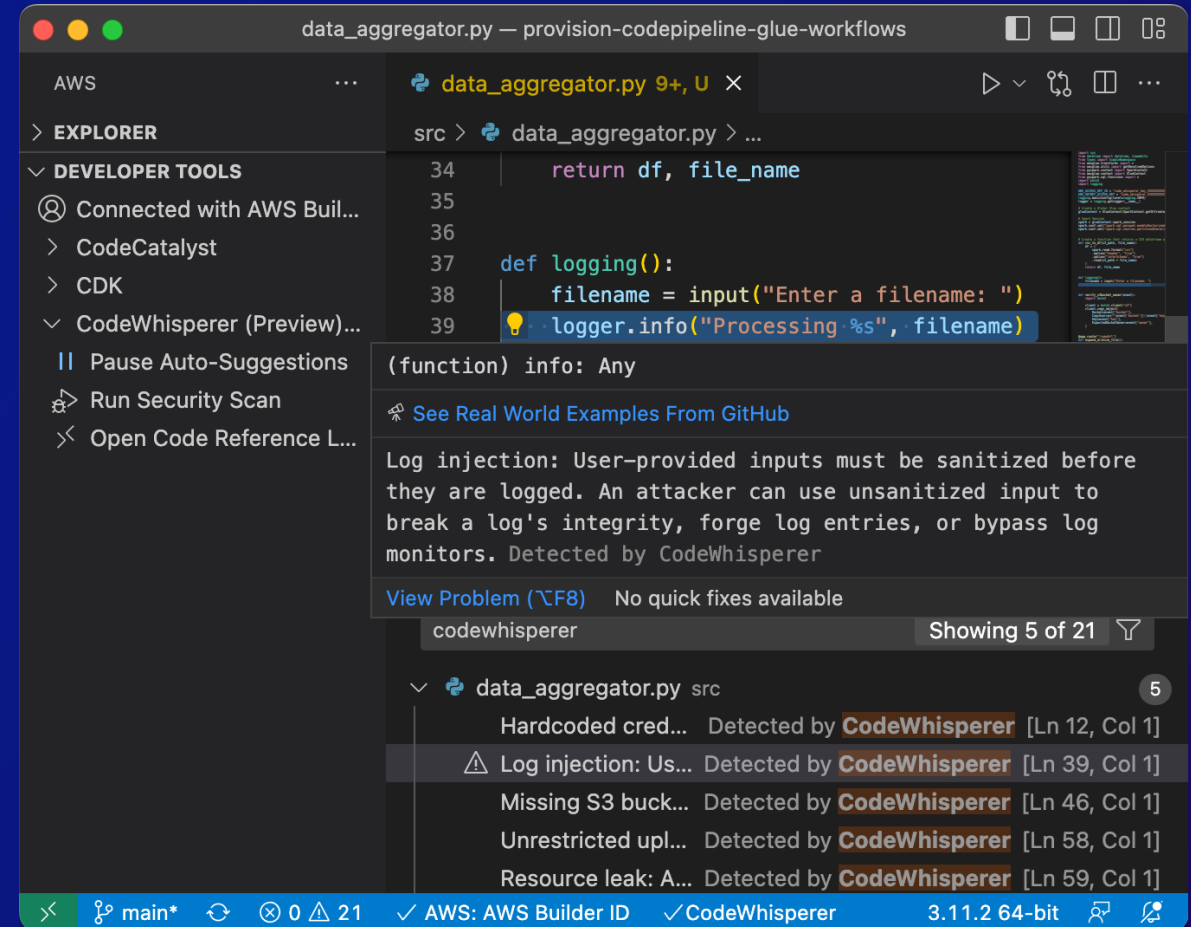
Security scanning



Bias avoidance

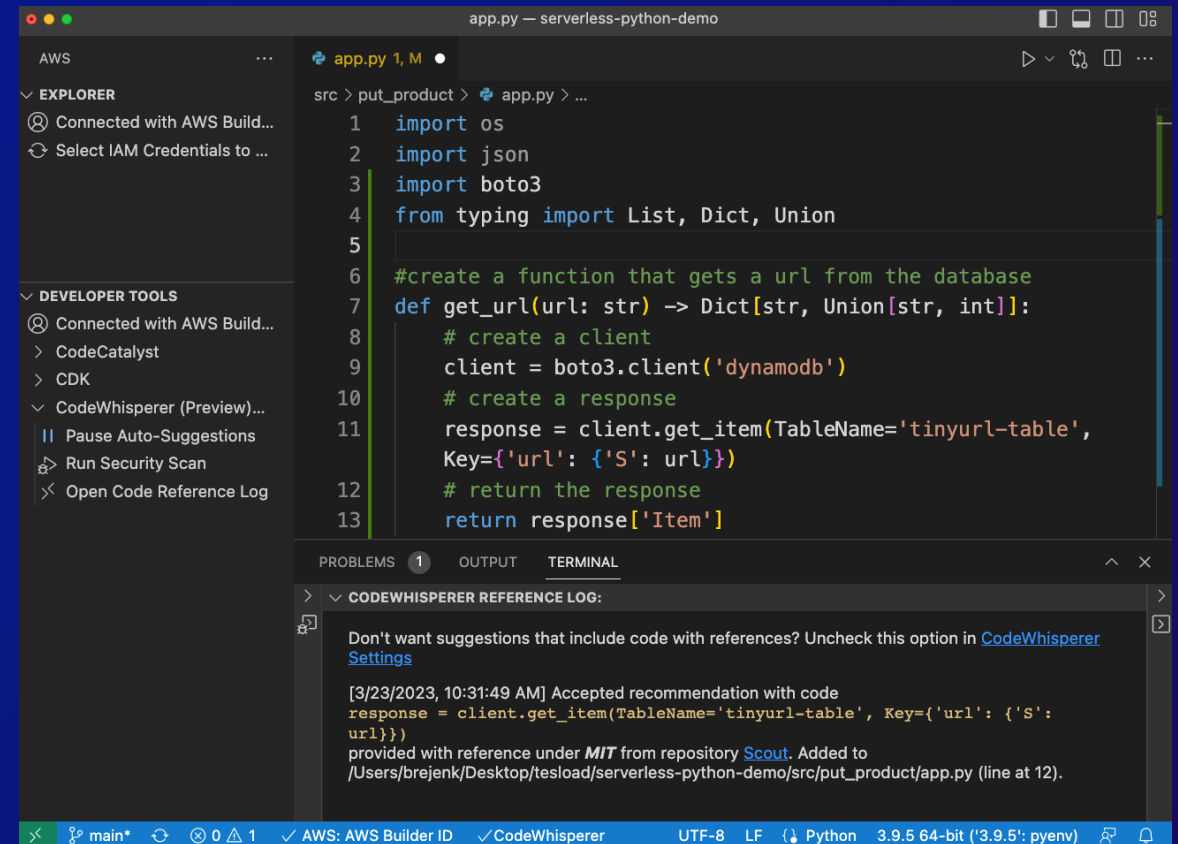
# Security scanning

- Scan generated and developer-written code to detect security vulnerabilities
- Receive vulnerability remediation suggestions
- Scan for hard-to-find security vulnerabilities
- Supports VS Code and JetBrains IDEs for Python, Java, and JavaScript



# Reference tracking

- Trained on billions of lines of code
- Flags code similar to open source training data
- Tracks accepted suggestions so that you can provide appropriate attribution
- Enterprise controls to more easily deactivate/filter code suggestions similar to open source training data



The screenshot shows a VS Code editor window titled 'app.py — serverless-python-demo'. The editor is open to a Python file 'app.py' with the following code:

```
1 import os
2 import json
3 import boto3
4 from typing import List, Dict, Union
5
6 #create a function that gets a url from the database
7 def get_url(url: str) -> Dict[str, Union[str, int]]:
8     # create a client
9     client = boto3.client('dynamodb')
10    # create a response
11    response = client.get_item(TableName='tinyurl-table',
12                               Key={'url': {'S': url}})
13    # return the response
14    return response['Item']
```

The left sidebar shows the 'EXPLORER' and 'DEVELOPER TOOLS' panels. The 'DEVELOPER TOOLS' panel is expanded, showing 'CodeWhisperer (Preview)...' with options to 'Pause Auto-Suggestions', 'Run Security Scan', and 'Open Code Reference Log'.

The bottom panel shows the 'PROBLEMS' tab with a 'CODEWHISPERER REFERENCE LOG' entry:

```
[3/23/2023, 10:31:49 AM] Accepted recommendation with code
response = client.get_item(TableName='tinyurl-table', Key={'url': {'S':
url}})
provided with reference under MIT from repository Scout. Added to
/Users/brejenk/Desktop/tesload/serverless-python-demo/src/put_product/app.py (line at 12).
```

# Enterprise controls

- Provision and manage team access through AWS IAM Identity Center and single sign-on
- Set organizational policies, such as automatic filtering of code suggestions similar to open source code

Amazon CodeWhisperer > Set up CodeWhisperer

## Set up CodeWhisperer

Select which users and groups in your organization have access to CodeWhisperer. Authorized users can activate CodeWhisperer through the AWS Toolkit in Visual Studio Code, AWS Cloud9 or JetBrains. CodeWhisperer will then provide suggestions, inside the IDE, for completing the user's code. Before users and groups appear in the lists below, you must add them to your organization in IAM Identity Center. [IAM Identity Center](#)

### Details

This setting applies to all users and groups.

### Suggestions

☒ **Include suggestions with code references**

CodeWhisperer learns, in part, from open-source projects. Sometimes, a suggestion it's giving you may be similar to a specific piece of training data. Keeping this box checked allows CodeWhisperer to offer suggestions in such cases. CodeWhisperer will also provide references, so that you can learn more about where the training data comes from. Un-checking this box causes CodeWhisperer to hide recommendations that have references associated with them.

### Terms

By setting up CodeWhisperer, you agree to the terms.

[View terms](#)

**Users (3)**

**Groups (1)**

### Users (3)

< 1 >

| <input type="checkbox"/> | Name | Email |
|--------------------------|------|-------|
| <input type="checkbox"/> |      |       |
| <input type="checkbox"/> |      |       |
| <input type="checkbox"/> |      |       |

No users or groups will be given access to CodeWhisperer.

[Cancel](#) [Set up CodeWhisperer](#)

# Why use CodeWhisperer



Focus on  
innovation and business-  
critical problems



Accelerate time  
to market



Enhance code security

# Top use cases



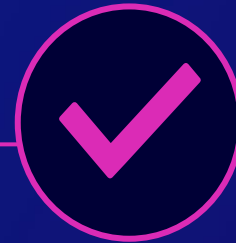
Accelerate  
time-consuming  
development tasks



Quickly adopt new  
technologies to build  
complex solutions



Adopt AWS services  
more easily and with  
confidence



Improve application  
security



# SmugMug improved focus

“Distractions are a constant challenge while coding, especially when it’s necessary to switch context to look up code samples and documentation on the web. Amazon CodeWhisperer **keeps me focused on the code** by automatically offering helpful suggestions right when I need them, so I never have to leave my editor.”

---

**Ryan Grove**

Staff Software Engineer, SmugMug



# Koch Industries rekindled the joy of programming

**“** I used CodeWhisperer in Python – a language I am a novice in. **In minutes, I had a program** that could connect to my AWS account and list S3 buckets with a slew of info, like name, creation date, and Region. I believe **this tool will make developers more productive and rekindle their joy for programming in a new world.** **”**

---

**Sam Gentsch**

Principal Data Engineer, Georgia Pacific (Koch Industries)





# Accenture improved developer productivity

“Accenture is using Amazon CodeWhisperer to accelerate coding as part of our software engineering best practices initiative in our Velocity platform. The Velocity team was looking for ways to improve developer productivity. After searching for multiple options, we came across **Amazon CodeWhisperer, which reduced our development efforts by 30%**. We are now focusing more on improving security, quality, and performance.”

---

**Balakrishnan Viswanathan**

Tech Architecture Sr. Manager, Accenture



# CodeWhisperer is free to use for individual developers



**Get started**



**Dive deep with  
a workshop**



**Learn how to build an  
event-driven  
serverless app**

skillbuilder.aws 

# **Your time is now**

Build in-demand cloud skills *your way*



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# Thank you!



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