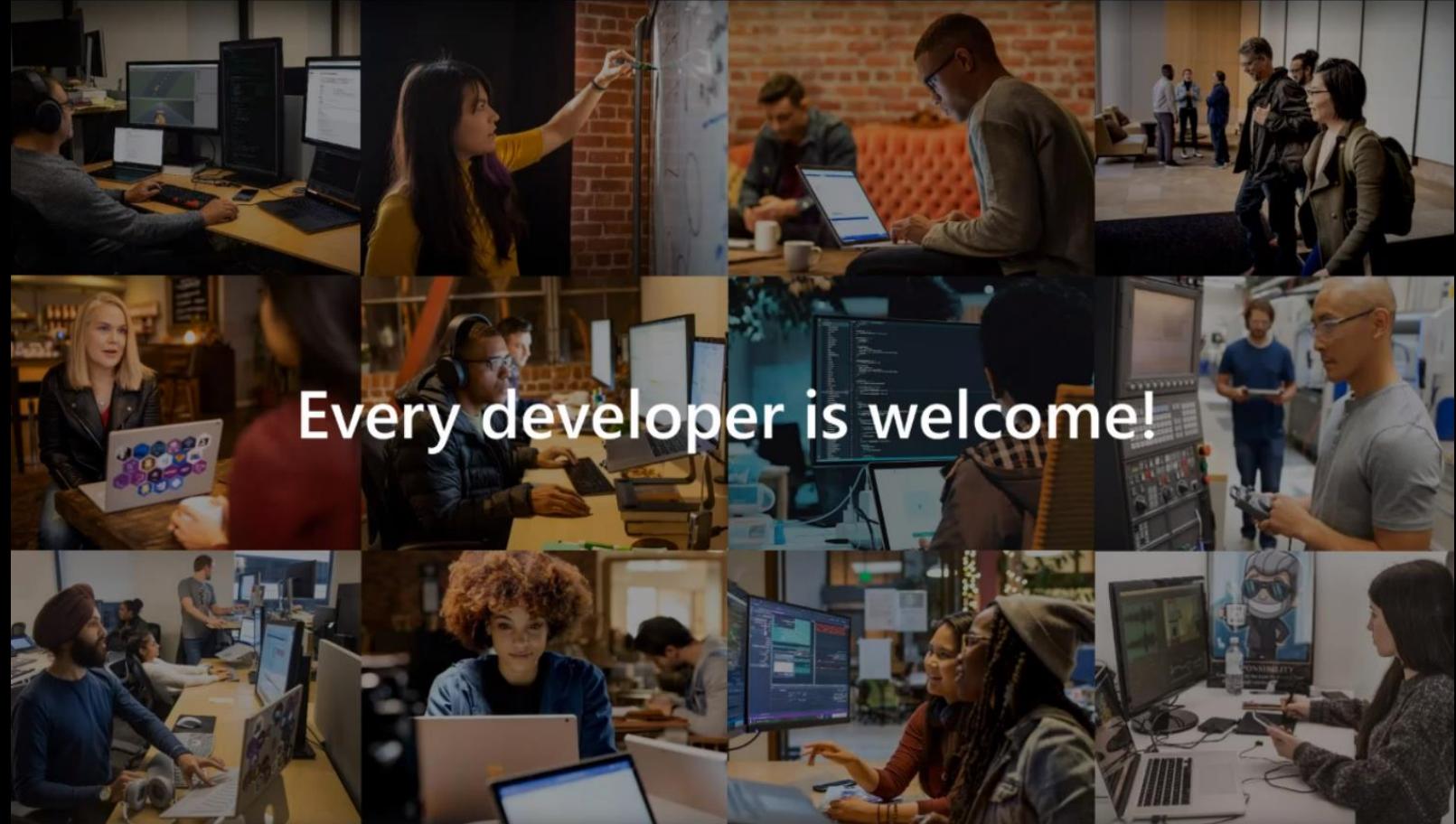




# 오픈 소스와 개발 환경

최영락  
Developer Relations,  
Microsoft APAC

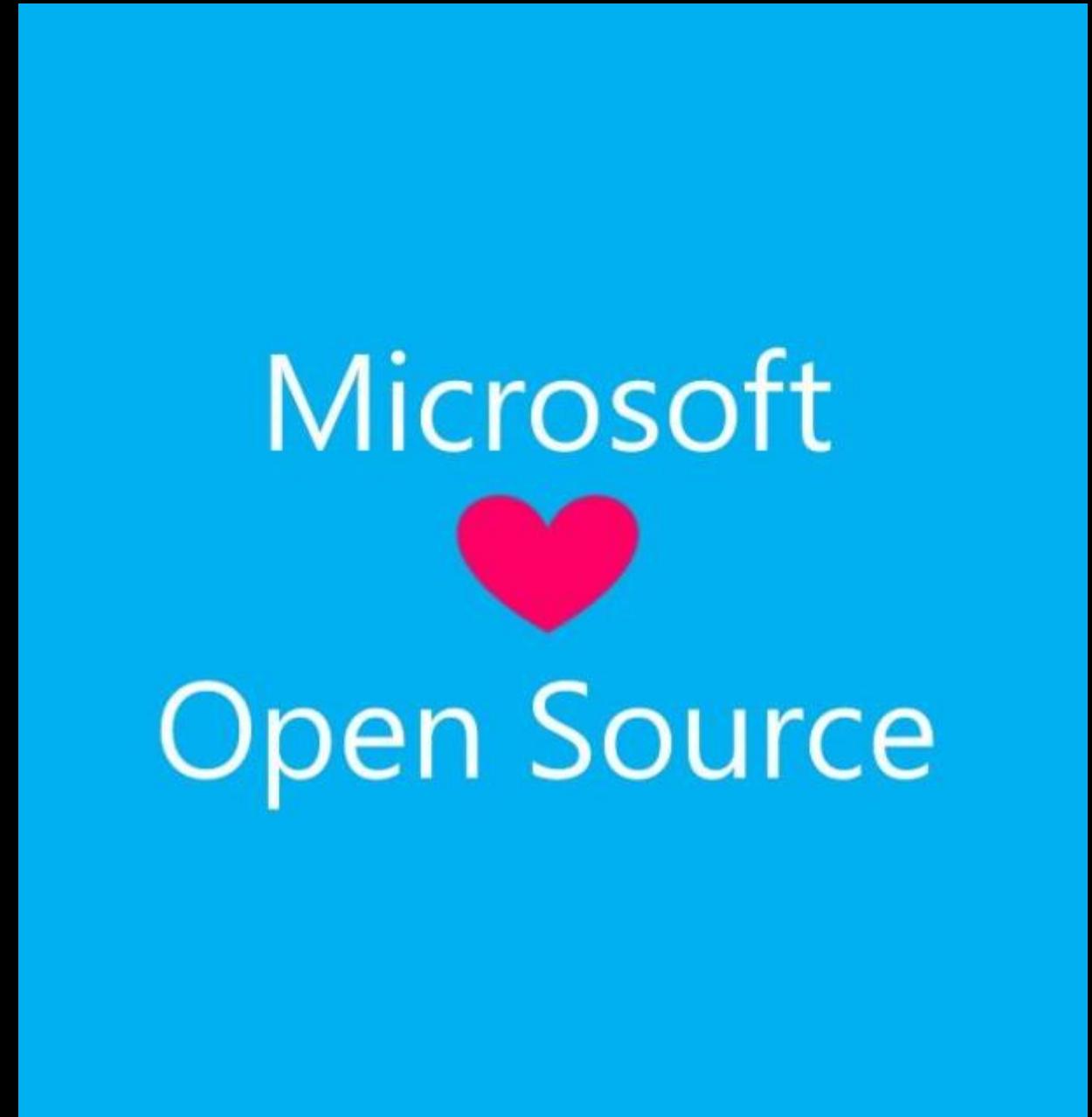


Every developer is welcome!

# Contents

- 마이크로소프트와 오픈 소스
- Build 2020 하이라이트
- AI에서 살펴보는 오픈 소스 & 개발 환경

# 1. 마이크로소프트와 오픈 소스



# Microsoft ❤️ Linux

연도/월	Azure 내 Linux OS 비율 (%)
2019년 6월	<b>&gt;50%</b>
2018년 9월	<b>~50%</b>
2017년 10월	<b>~40%</b>
2015년 10월	<b>~25%</b>

# Microsoft ❤️ Open Source



2012

TypeScript 출시

Visual Studio 및 팀  
파운데이션 서버에서  
Git 지원 추가

2014

Satya 회장: "Microsoft  
loves Linux"

GitHub에 Microsoft 조직  
생성

.NET Foundation 설립

2015

Visual Studio Code  
출시

HDInsight (Hadoop/  
Ubuntu) 발표

Microsoft: Node.js  
Foundation 공동으로  
구성 & 참여

2016

.NET Core 1.0

PowerShell Core

Windows 10 내 Linux를  
위한 Windows  
Subsystem

Microsoft: Linux  
Foundation 가입

GitHub에서 Microsoft가  
최대 오픈 소스  
컨트리뷰터 회사로 인정

2017

Microsoft  
Azure Kubernetes  
Service 출시 & 시작

Kubernetes 커뮤니티에  
Draft, Brigade, Kashti  
프로젝트를 제출

Microsoft: Cloud Native  
Computing & Cloud  
Foundry Foundation에  
가입

SQL 2017 on Linux

Windows 소스 코드를  
Git로 이동

Azure Databricks  
(Apache Spark) 발표

2018

Visual Studio Code:  
개발자 도구 1위로 선정

Azure Service Fabric  
오픈 소스화

Linux 커널로 동작하는  
Azure Sphere

GitHub 인수 의사를 공식  
발표

약 5,000명의 Microsoft  
직원이 GitHub에 오픈  
소스 프로젝트 커밋 활동

Azure: 거의 절반이  
Linux로 구성

GitHub에 오픈 소스  
프로젝트를 기여하는  
최대 컨트리뷰터 회사로  
계속 자리매김

2012

2014

2015

2016

2017

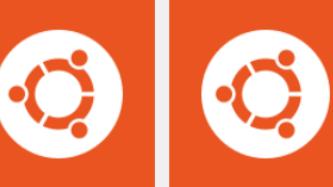
2018

← 홈 게임 엔터테인먼트 생산성 특가

검색 결과: Linux

유형 모든 부서 사용 가능한 대상 PC

앱(92) 모두 표시

 Ubuntu ★★★★★ 44 설치됨	 Kali Linux ★★★★★ 7 무료	 Ubuntu 20.04 LTS ★ 무료	 Ubuntu 18.04 LTS ★★★★★ 16 무료	 SUSE Linux Enterprise Server... ★ 무료	 Debian ★★★★★ 5 무료
--	--	--	--	---	--



Microsoft: We were wrong about open source



Microsoft president and chief legal counsel Brad Smith has taken his turn at admitting Microsoft's former stance on open source put it on the "wrong side of history". In 2001 former Microsoft CEO Steve Ballmer famously said, "Linux is cancer that attaches itself in an intellectual property sense to everything it touches." Shortly after that and for the same reason, Microsoft co-founder Bill Gates described the open-source GPL (GNU General Public License) as "Pac-Man-like". Ballmer has since made peace with open source, and now



Customer story

## Microsoft & GitHub

You know the story. Decades ago, Microsoft held tight to their IP: a ubiquitous software product line, productivity suites, and developer frameworks and tools. Known in part for their opposition to open source, they were hesitant to evolve with the industry's wind changes. But as open source redefined how software was

Location

Redmond, Washington USA

Company size

144,000+

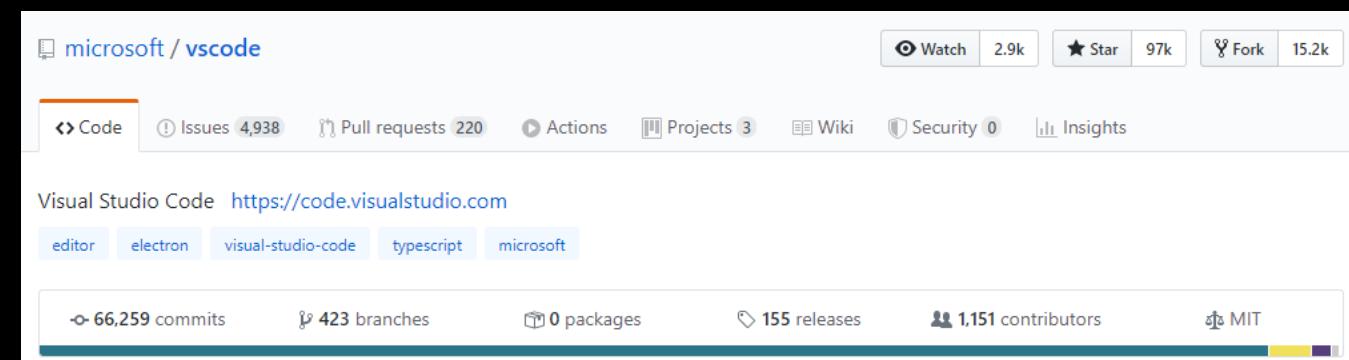
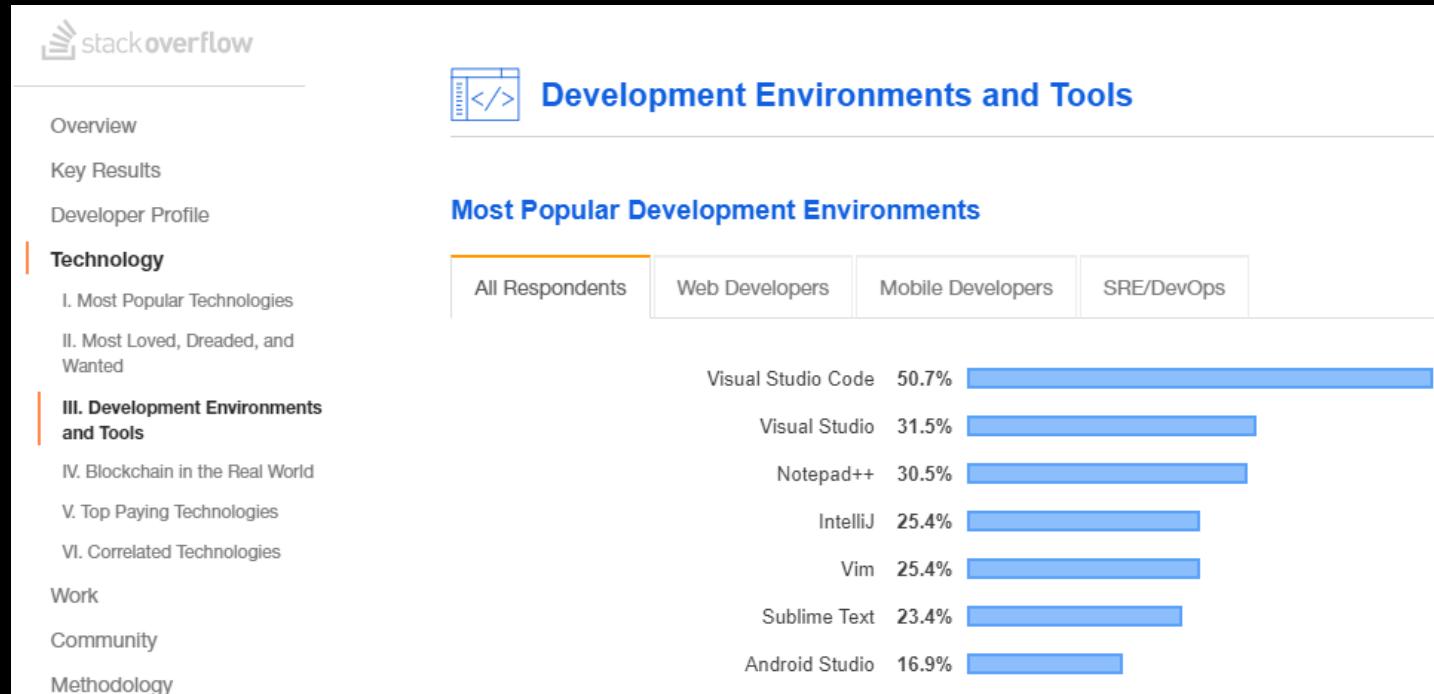
Industry

Technology

Product

GitHub Enterprise Cloud and Server

# VSCODE: 가장 많이 사용하는 오픈 소스 개발 환경 도구



[insights.stackoverflow.com/survey/2019/#development-environments-and-tools](https://insights.stackoverflow.com/survey/2019/#development-environments-and-tools) / [github.com/Microsoft/vscode](https://github.com/Microsoft/vscode)

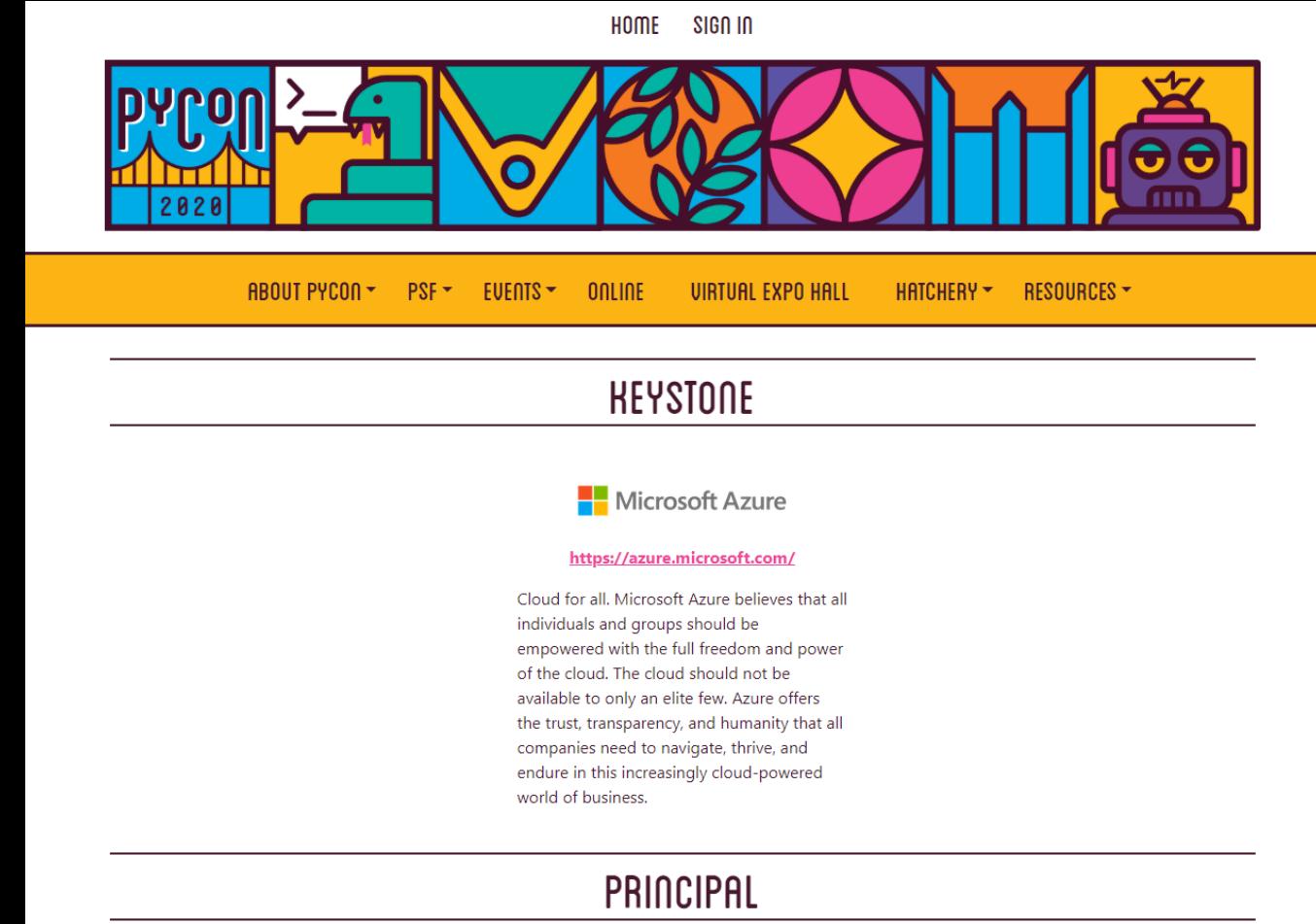
# 커뮤니티와 함께 하는 마이크로소프트

KubeCon 2019 (11/18-21)



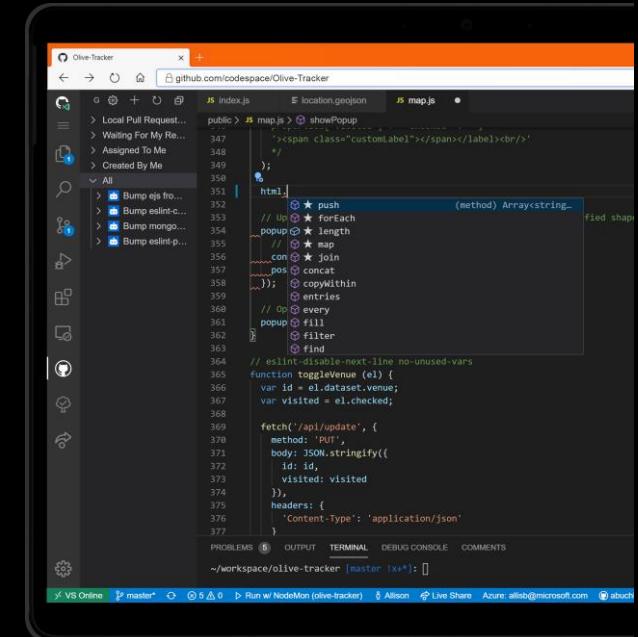
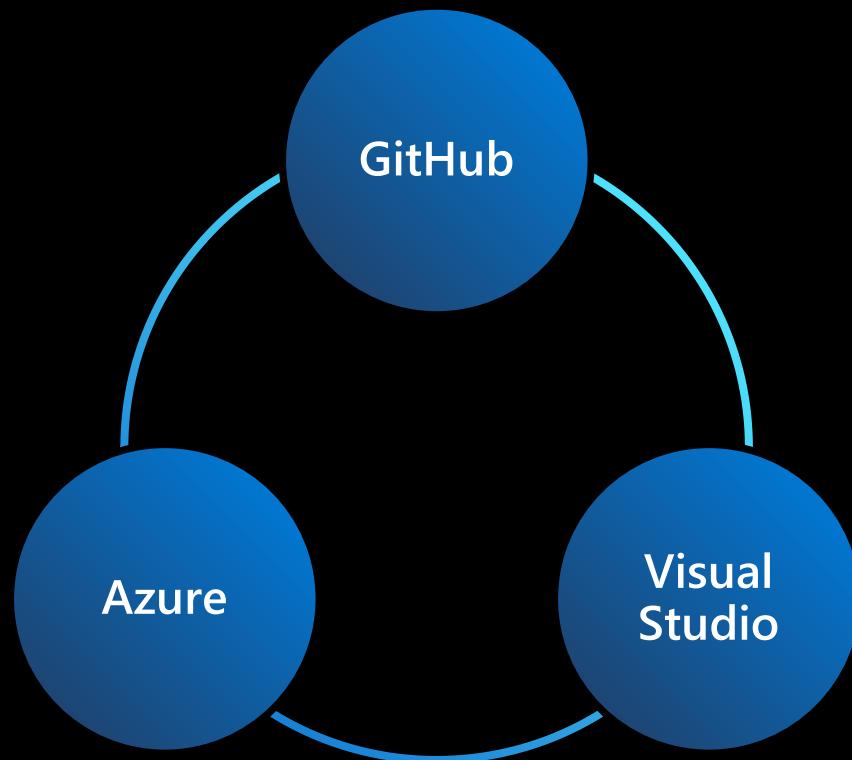
The screenshot shows the KubeCon + CloudNativeCon North America 2019 website. At the top, there are logos for KubeCon and CloudNativeCon, both with red and yellow designs. Below them, it says "North America 2019". The background features a colorful illustration of palm trees, a sunset, and beach elements like a surfboard and a beach ball. A red banner at the bottom left states "This event has passed. Please visit the current KubeCon + CloudNativeCon North America site." Below this, there's event information: "November 18 - 21 | San Diego Convention Center, San Diego, California | #KubeCon #CloudNativeCon" and "November 18: Day Zero Co-Located Events + Lightning Talks | November 19 - 21: Conference". A large orange "SPONSORS" section follows, featuring logos for Cisco, Microsoft Azure, Google Cloud, Intel, Red Hat, and VMware.

PyCon US 2020 (4/15-23)



The screenshot shows the PyCon US 2020 website. The header features the PyCon logo and the year "2020". The navigation bar includes links for "HOME", "SIGN IN", "ABOUT PYCON", "PSF", "EVENTS", "ONLINE", "VIRTUAL EXPO HALL", "HATCHERY", and "RESOURCES". Below the navigation, there's a section titled "KEYSTONE" featuring the Microsoft Azure logo and a link to <https://azure.microsoft.com/>. A descriptive paragraph about Microsoft Azure follows. At the bottom, there's another section titled "PRINCIPAL".

## 2. Build 2020 하이라이트

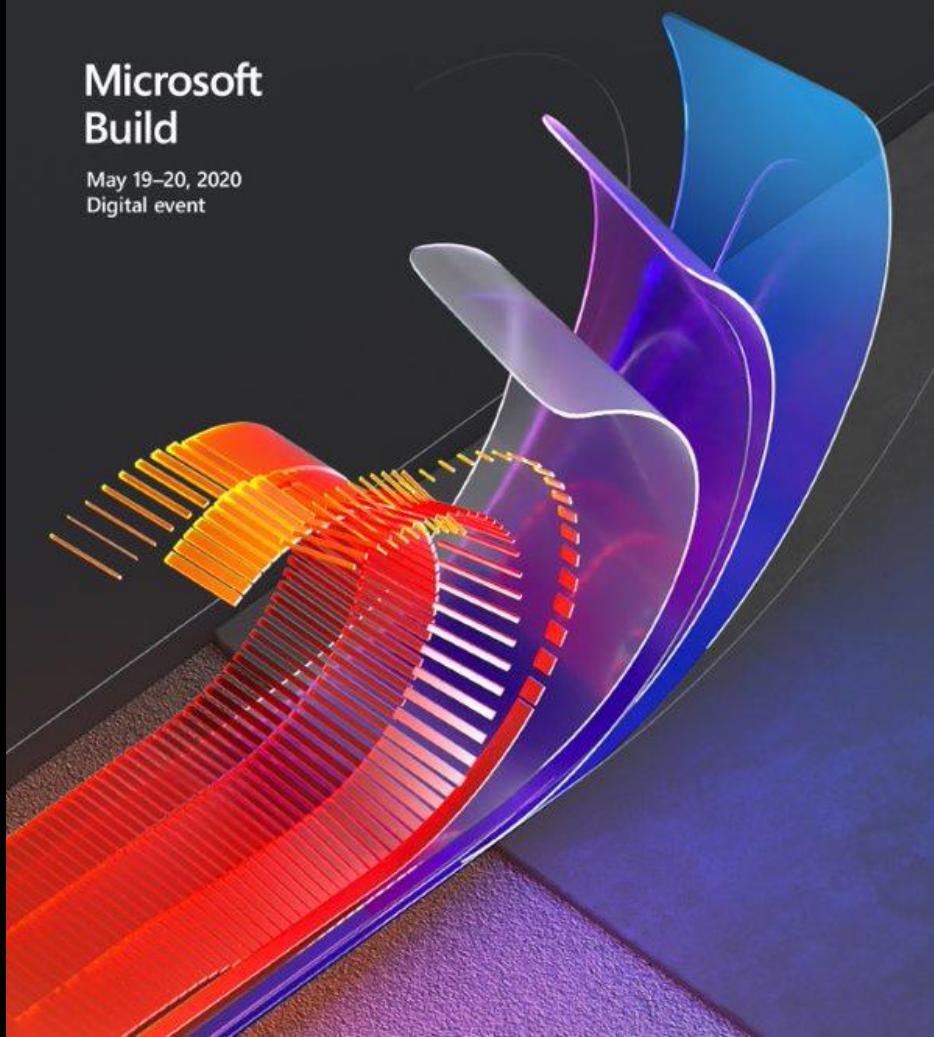




# Learn. Connect. Code.

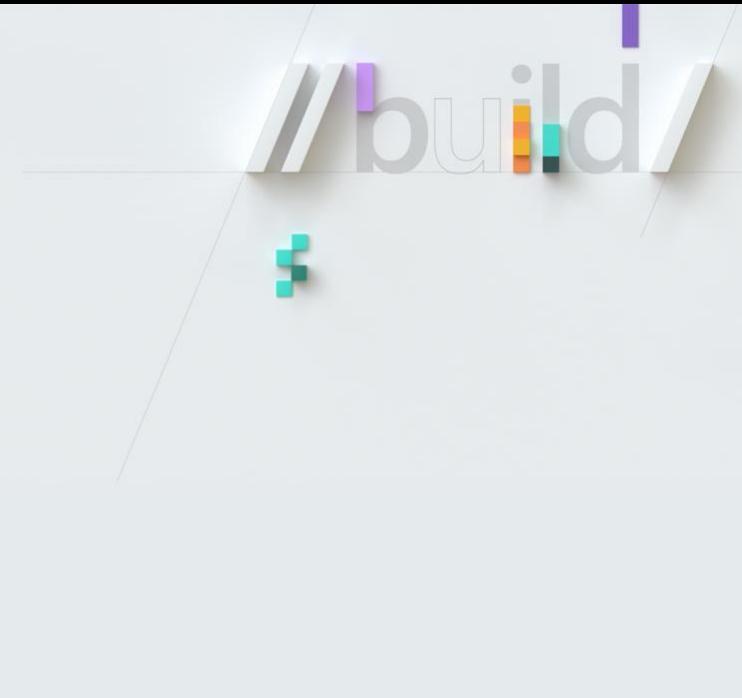
**Microsoft  
Build**

May 19–20, 2020  
Digital event



# Microsoft Build

May 6–8, 2019





# Windows Terminal

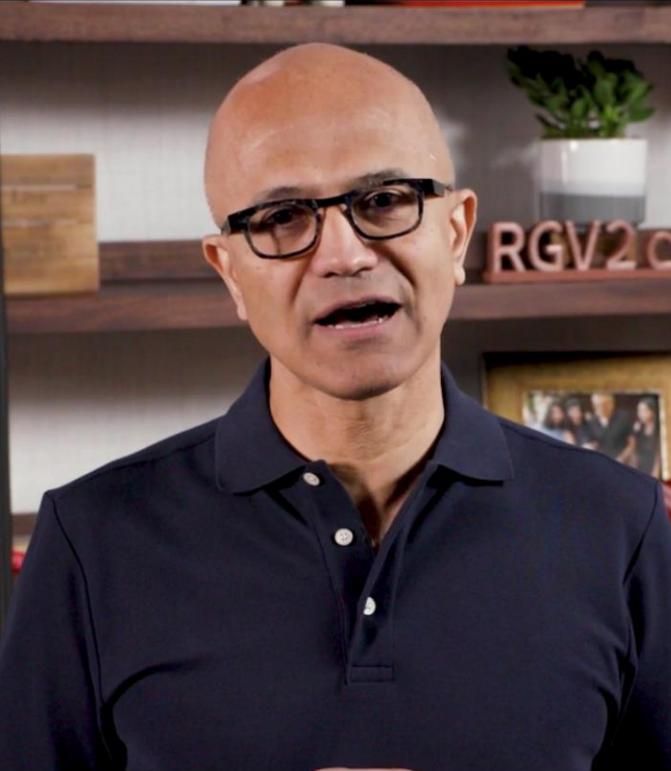
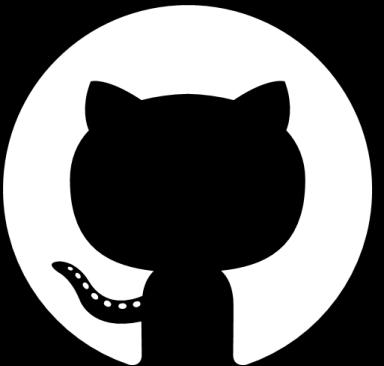
Optimize workflows with tabs  
and panes

Fully customizable and open  
source

Windows Terminal 1.0 available  
today

[aka.ms/terminal](https://aka.ms/terminal)





The largest developer community on the planet

36M+ developers

100M+ repositories

1.1B+ contributions

GitHub  
50M  
developers



## Codespaces

# Your instant dev environment

Get the full Visual Studio Code experience without leaving GitHub.

[Request early access](#)

```
physics_anime_cloth.html
examples > physics_anime_cloth.html > index.html > body > script > initGraphics
  initPhysics();
  createObjects();
  initInput();
}

function initGraphics() {
  container = document.getElementById('container');
  camera = new THREE.PerspectiveCamera(60, window.innerWidth / window.innerHeight);
  scene = new THREE.Scene();
  scene.background = new THREE.Color(0xbada55);
  camera.position.set(0, 0, 5);
  renderer = new THREE.WebGLRenderer();
  renderer.setPixelRatio(window.devicePixelRatio);
  renderer.shadowMap.enabled = true;
  container.appendChild(renderer.domElement);
  controls = new OrbitControls(camera, renderer.domElement);
}
```

## Codespaces

Private Preview: Codespaces on GitHub.com

[github.com/features/codespaces](https://github.com/features/codespaces)

Preview: Visual Studio Codespaces

Private Preview: Visual Studio 2019 support

[aka.ms/codespaces](https://aka.ms/codespaces)

```
index.js
public > js map.js > showPopup
  ><span class="customLabel"></span><label><br/>
    > Up > forEach
    > map
    > join
    > concat
    > copyWithin
    > entries
    > every
    > fill
    > filter
    > find
  > eslint-disable-next-line no-unused-vars
  function toggleVenue (el) {
    var id = el.dataset.venue;
    var visited = el.checked;
    fetch('/api/update', {
      method: 'PUT',
      body: JSON.stringify({
        id: id,
        visited: visited
      }),
      headers: {
        'Content-Type': 'application/json'
      }
    })
  }

PROBLEMS 5 OUTPUT TERMINAL DEBUG CONSOLE COMMENTS
~/workspace/olive-tracker [master | x+*]:
```

# Visual Studio Code

Tailor your editor experience with  
21,000+ extensions

Develop locally, remotely, or  
even in the browser

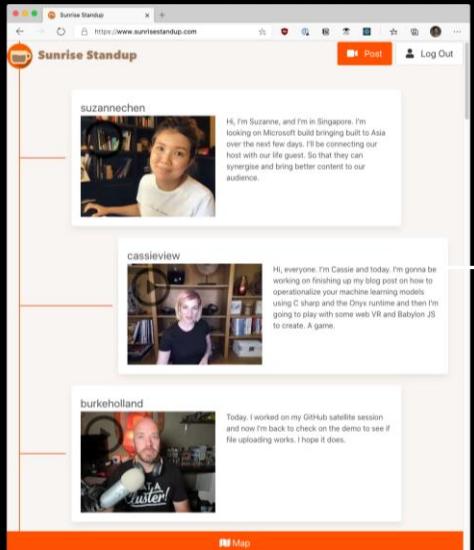
Preview: Sync and roam your  
settings and extensions

[code.visualstudio.com](https://code.visualstudio.com)

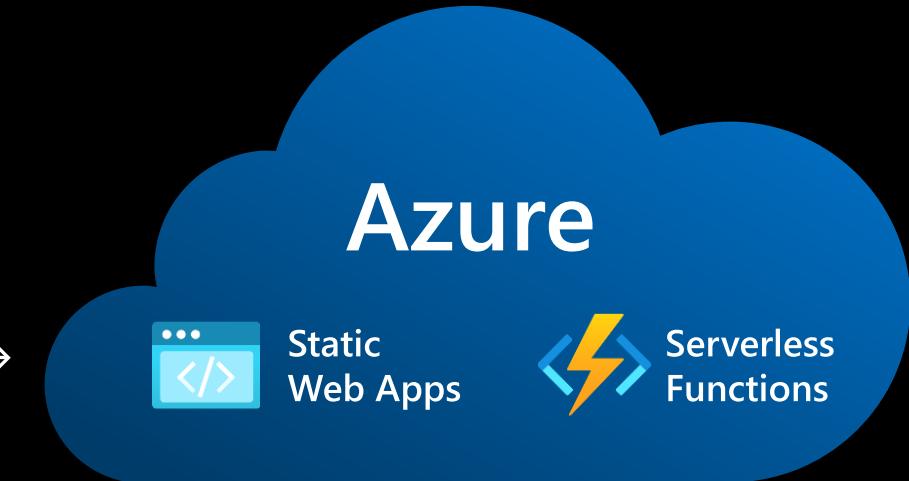
The screenshot shows the Visual Studio Code interface running on a MacBook Pro. The left side features the Extensions Marketplace with a search bar and a list of popular extensions like Python, C/C++, ESLint, and Prettier. The right side shows a code editor with tabs for 'main.ts', 'App.svelte', and 'server.go'. The 'server.go' tab is active, displaying Go code for a Gin server. A snippet of code for a PATCH request is highlighted. The status bar at the bottom provides information about the file ('server.go'), line ('Ln 62, Col 15'), and encoding ('UTF-8'). The Mac OS X dock is visible at the bottom.

```
server.go — go-app
server > server.go > {} server > (*Server).Start
43 // Set gin to production mode
44 gin.SetMode(gin.ReleaseMode)
45
46 // Start gin server
47 router := gin.New()
48
49 // Add middlewares: logger (if desired) and recovery
50 if s.Verbose {
51     router.Use(gin.Logger())
52 }
53 router.Use(gin.Recovery())
54
55 // Add routes
56 router.GET("/file/: fileId", s.FileHandler)
57
58 // APIs
59 apis := router.Group("/api")
60 apis.GET("/tree/*path", s.GetTreeHandler)
61 apis.POST("/tree/*path", s.PostTreeHandler)
62 apis.PATCH
63 apis.POST
64 apis.PUT
65 apis.pkgm
66 apis.bn
67 func(relativePath s
68
69 // Redirect from / to the UI
70 router.GET("/", func(c main.Context) {
71     c.Redirect(http.StatusTemporaryRedirect, "/ui"))
72 })
```

MacBook Pro



Single-page app



Announcing

## Azure Static Web Apps



GitHub



Visual Studio Code

Serverless hosting  
for dynamic scaling

GitHub native  
workflow

Unified hosting  
and management

# .NET Core 3.1

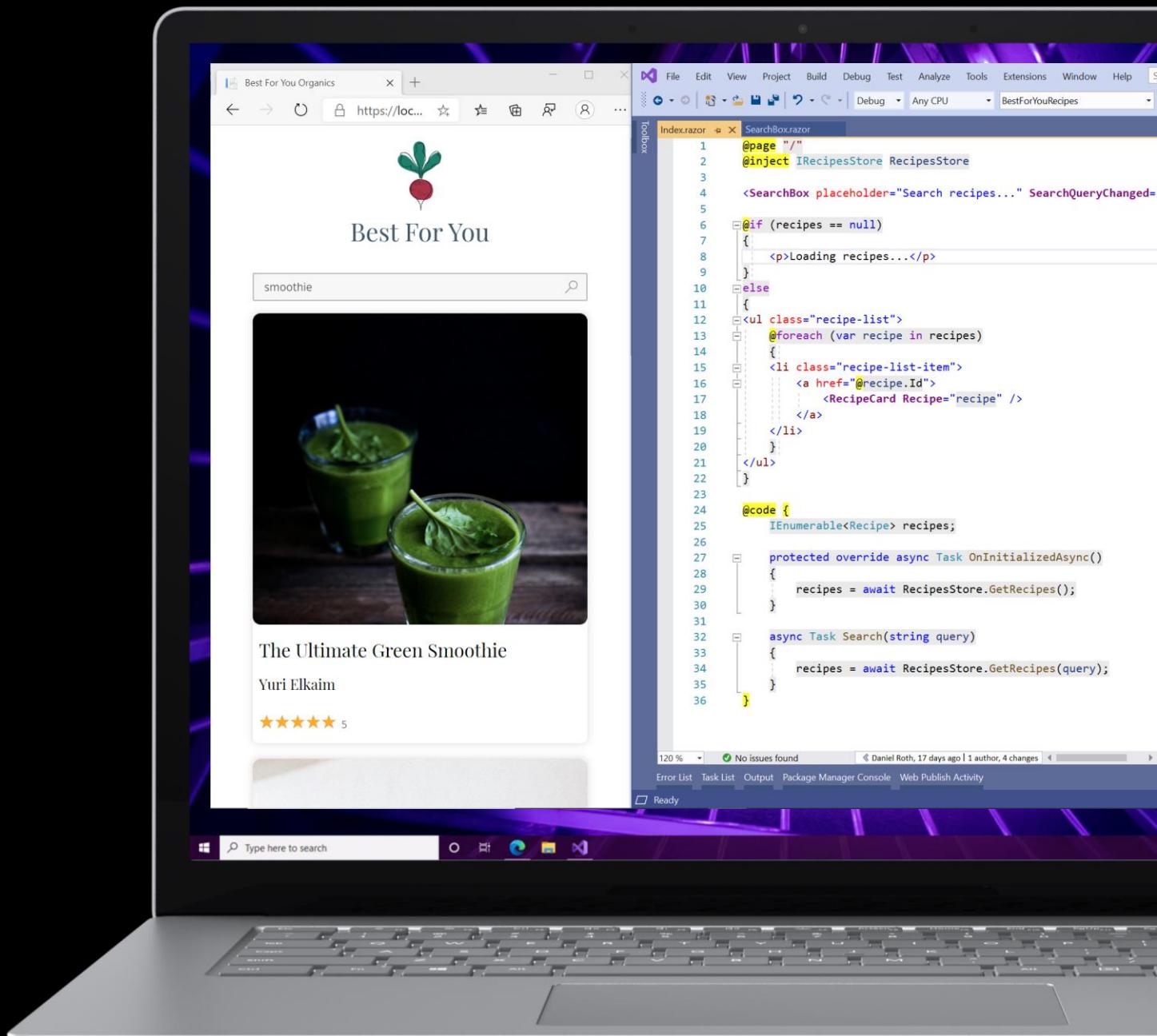
Long-Term Support (LTS)

WPF and Windows Forms support

Side-by-side support & self-contained EXEs

Modern web UI with ASP.NET Blazor

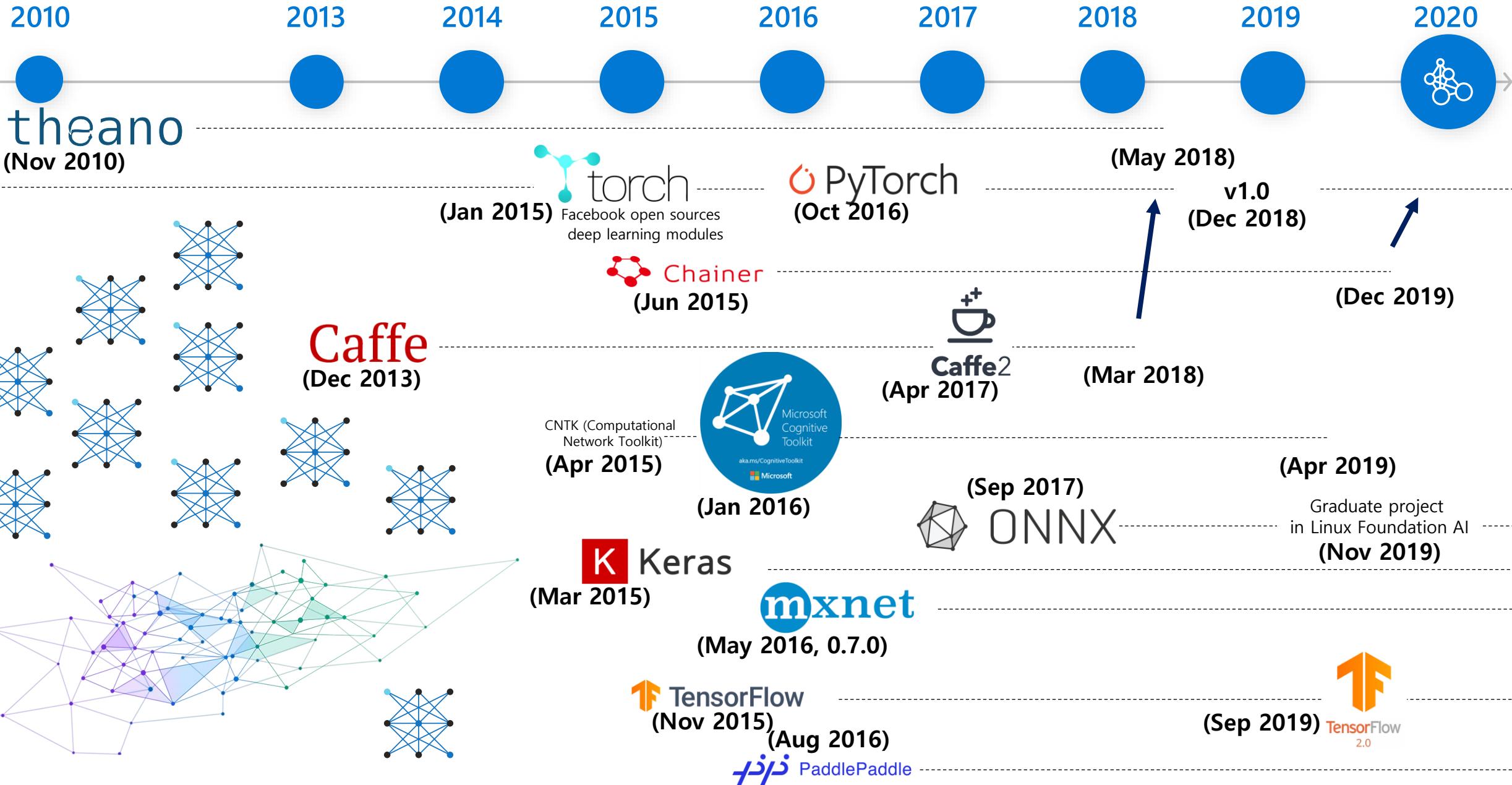
[dot.net/get-core3](https://dotnet.microsoft.com/download/dotnet/core/3.1)



### 3. AI에서 살펴보는 오픈 소스와 개발 환경



# 참고: 오픈 소스 AI/딥러닝 프레임워크



# AI 개발자를 위한 다양한 Azure & 개발 도구

**정교하게 미리 학습된 도메인별 모델**  
솔루션 개발을 손쉽게 구현하기 위한 방법



Vision



Speech



Language



Search

**익숙한 IDE / 데이터 과학자 도구 사용**  
쉽게 모델 개발 및 테스트를 하기 위한 방법



Visual Studio Code



Azure Notebooks



Jupyter



Command line

**유용한 프레임워크 활용**  
고급 딥러닝 솔루션을 구축하기 위한 방법



PyTorch



TensorFlow



Scikit-Learn



ONNX

**다양한 서비스 활용을 통한 생산성 향상**  
데이터 사이언스와 개발 팀을 위한 역량 강화



Azure  
Databricks

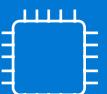


Azure Machine  
Learning



Machine  
Learning VMs

**강력한 인프라스트럭처**  
효율적이고 원활한 딥러닝 환경 제공



CPU



GPU



FPGA

Microsoft Azure Notebooks Preview My Projects Help ianychoi computervisiontest (autosaved) computervision-api-demo-test Trusted Python 3.6

```

# Asynchronous SDK call
rawHttpResponse = client.batch_read_file(url, mode, custom_headers, raw)

# Get ID from returned headers
operationLocation = rawHttpResponse.headers["Operation-Location"]
idLocation = len(operationLocation) - len(operationId)
operationId = operationLocation[idLocation]

# SDK call!
while True:
    result = client.get_read_operation_result(operationId)
    if result.status not in ['NotStarted', 'Running']:
        break
    time.sleep(1)

# Get data
if result.status == TextOperationStatusCodes.succeeded:
    for textResult in result.recognition_results:
        for line in textResult.lines:
            print((line.text))
            #print((line.bounding_box))

CLOSED
WHEN ONE DOOR CLOSES, ANOTHER
OPENS. ALL YOU HAVE TO DO IS WALK IN

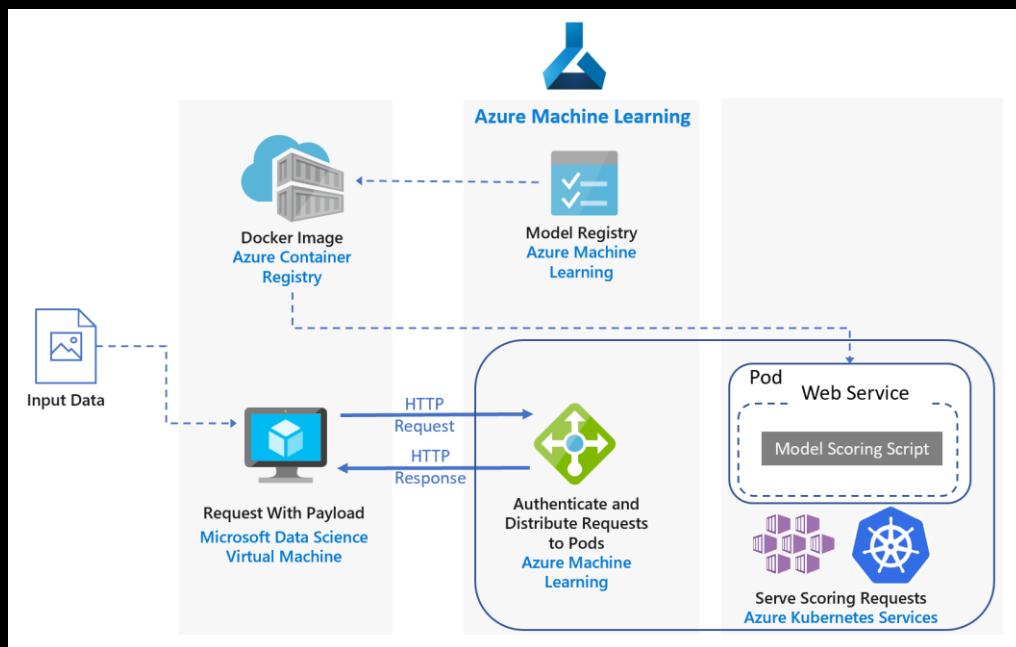
```

File Edit Selection View Go Debug Terminal Help Python Interactive - Demo - Visual Studio Code

lliveDataScience.py x Run Cell | Run All Cells 1 # %% [markdown] 2 # ## This is markdown. 3 Run Cell | Run All Cells 4 #%% 5 # Let's load and review some data 6 import pandas as pd # pandas is a datafram 7 df = pd.read\_csv("./data/pima-data.csv") # 8 df.head(5) 9 Run Cell | Run All Cells 10 #%% Let's plot the correlation between dat 11 import matplotlib.pyplot as plt # matplotlib 12 import matplotlib.style as style 13 style.use('dark\_background') 14 15 def draw\_corr(df, size = 11): 16 corr = df.corr() # data frame correlat 17 fig, ax = plt.subplots(figsize=(11, 11) 18 ax.matshow(corr) # color code the rect 19 plt.xticks(range(len(corr.columns)), c 20 plt.yticks(range(len(corr.columns)), c 21 22 draw\_corr(df)

[S] #%% ... num\_preg glucose\_conc diastolic\_bp thickness insulin bmi dia 0 6 148 72 35 0 33.6 1 1 85 66 29 0 26.6 2 0 183 64 0 0 23.3 3 1 89 66 23 94 28.1 4 0 137 40 35 168 43.1

[E] #%% Let's plot the correlation between data columns... num\_preg glucose\_conc diastolic\_bp thickness insulin bmi dia pred age skin diabetes num\_preg glucose\_conc diastolic\_bp thickness insulin bmi dia pred age skin diabetes



# 다시 WSL2로 돌아와서.. WSL2 + GPU?!

## WSL will support GPU Compute workflows

Adding [CUDA](#) and/or [GPU Compute support](#) to WSL has been our #1 most requested feature since our first release! Over the last 3+ years, the WSL, Virtualization, DirectX, Windows Driver teams, and our silicon partners have been working hard on a complex engineering feat to deliver this capability.

This is why we're thrilled to announce that we will start previewing GPU compute support for WSL in Windows 10 Insider builds within the next few months!

Initially, the GPU compute capability will support two scenarios:

- [NVIDIA CUDA](#)
  - Supports existing Linux tools & workflows used by professionals
- [DirectML](#)
  - Initially targeting beginners and students, leveraging DirectX 12 capable GPUs from several vendors
  - The team will be releasing a preview package of TensorFlow with a DirectML backend enabling hardware agnostic acceleration of AI & ML workloads across the breadth of Windows hardware – DirectML will also support native Windows too, including TensorFlow on Windows!

# TensorFlow on WSL2 with GPU!

```
clarker@DESKTOP-5OQJ7CF: ~/ < / + < - X
(directml) clarker@DESKTOP-5OQJ7CF:~/tfmodels/squeeze$ python train.py
WARNING:tensorflow:From /home/clarker/miniconda3/envs/directml/lib/python3.6/site-packages/tensorflow_core/python/autograph/converter/directives.py:119: The name tf.FixedLenFeature is deprecated. Please use tf.io.FixedLenFeature instead.

WARNING:tensorflow:From /home/clarker/miniconda3/envs/directml/lib/python3.6/site-packages/tensorflow_core/python/autograph/converter/directives.py:119: The name tf.parse_single_example is deprecated. Please use tf.io.parse_single_example instead.

WARNING:tensorflow:From /home/clarker/miniconda3/envs/directml/lib/python3.6/site-packages/tensorflow_core/python/autograph/converter/directives.py:119: The name tf.image.resize_images is deprecated. Please use tf.image.resize instead.

WARNING:tensorflow:
The TensorFlow contrib module will not be included in TensorFlow 2.0.
For more information, please see:
 * https://github.com/tensorflow/community/blob/master/rfcs/20180907-contrib-sunset.md
 * https://github.com/tensorflow/addons
 * https://github.com/tensorflow/io \(for I/O related ops\)
If you depend on functionality not listed there, please file an issue.

Train Step 0    : 0.1562
Evaluation Step 0   : 0.1
```

# (NVIDIA에서도 발표)

NVIDIA DEVELOPER   SOLUTIONS ▾   PLATFORMS ▾   DOCUMENTATION ▾   DOWNLOADS ▾   RESOURCES ▾   COMMUNITY ▾   Q Ian Y. ▾

RTX   GAMEWORKS   DESIGNWORKS   VRWORKS   HPC   METROPOLIS   DRIVE   CLARA   OPEN SOURCE

Home > High Performance Computing > CUDA ZONE > GPU in Windows Subsystem for Linux (WSL)

## CUDA on Windows Subsystem for Linux - Public Preview

Microsoft Windows is a ubiquitous platform for enterprise, business, and personal computing systems. However, industry AI tools, models, frameworks, and libraries are predominantly available on Linux OS.

Soon all users of AI - whether they are experienced professionals, or students and beginners just getting started - can benefit from innovative GPU-accelerated infrastructure, software, and container support on Windows.

The **Microsoft GPU in WSL** and **NVIDIA CUDA on WSL Public Preview** brings NVIDIA CUDA and advanced AI together with the ubiquitous Microsoft Windows platform to deliver advanced machine learning capabilities across numerous industry segments and application domains.

NVIDIA will make a CUDA on WSL preview version available soon for **Microsoft Windows Insiders** program members who have registered in the [NVIDIA Developer Program](#).





감지되는 감정은 분노, 경멸, 역겨움, 두려움, 행복, 중립, 슬픔 및 놀람입니다. 이러한 감정은 특정 얼굴 표정으로 서로 다른 문화에서 보편적으로 의사 소통하는 것으로 이해됩니다.

실제 작동되는 방식을 확인해보세요.



이미지 URL



# 오픈 소스 개발 환경과 Azure 클라우드의 만남



# Designing trustworthy AI

**How do I understand how my AI models work?**

**Are my AI models fair or biased?**

**How do I build AI models on sensitive, private data?**

**How do I stay compliant with industry regulations?**

Announcing

# Azure Machine Learning Responsible ML

**Understand**  
Interpretability  
Fairness

**Protect**  
Differential privacy  
Confidential machine learning

**Control**  
Datasheets  
Audit trail

Preview Microsoft Azure Machine Learning

ResponsibleAI > Experiments > Fairlearn\_InterpretML\_Census\_Demo\_Sonal > Run 1

Run 1 ✓ Completed

[Switch to old experience](#)

Refresh Resubmit Cancel

Details Metrics Images Child runs Outputs + logs Snapshot Raw JSON Explanations (preview) **Fairness (preview)**

84.4% Is the overall accuracy | 12.3% Is the disparity in accuracy

[Edit configuration](#)

How to read this chart

Underprediction (predicted = 0, true = 1)  
Overprediction (predicted = 1, true = 0)

The bar chart shows the distribution of errors in each group.

Errors are split into overprediction errors (predicting 1 when the true label is 0), and underprediction errors (predicting 0 when the true label is 1).

The reported rates are obtained by dividing the number of errors by the overall group size.

sex	Accuracy	Underprediction	Overprediction
female Max	92.6%	5.6%	1.7%
male Min	80.3%	13%	7.1%

sex

Accuracy

Underprediction

Overprediction

female Max

92.6%

5.6%

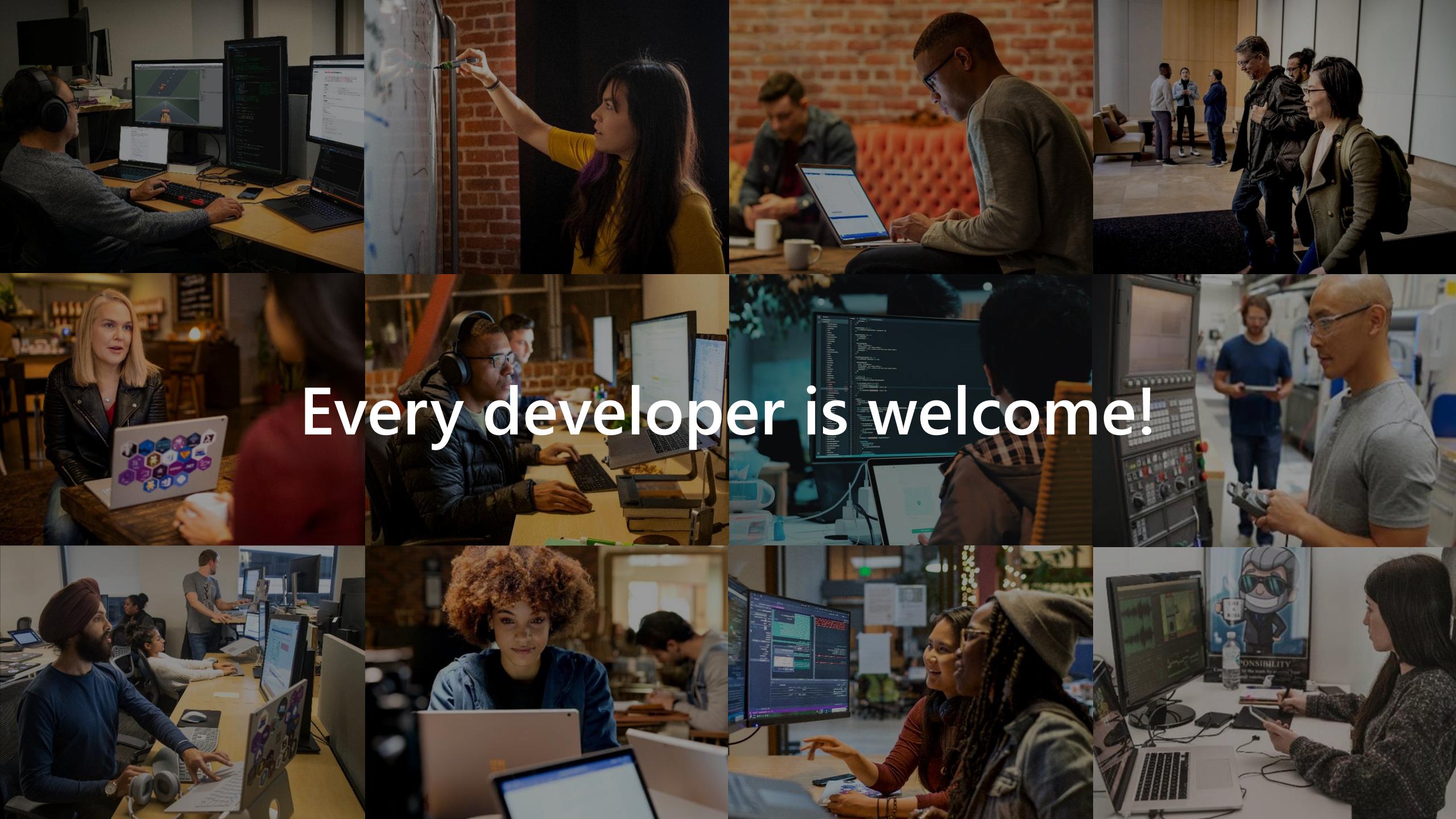
1.7%

male Min

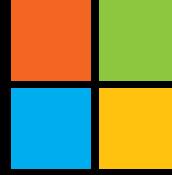
80.3%

13%

7.1%



Every developer is welcome!



# Microsoft Azure

Invent with purpose

