

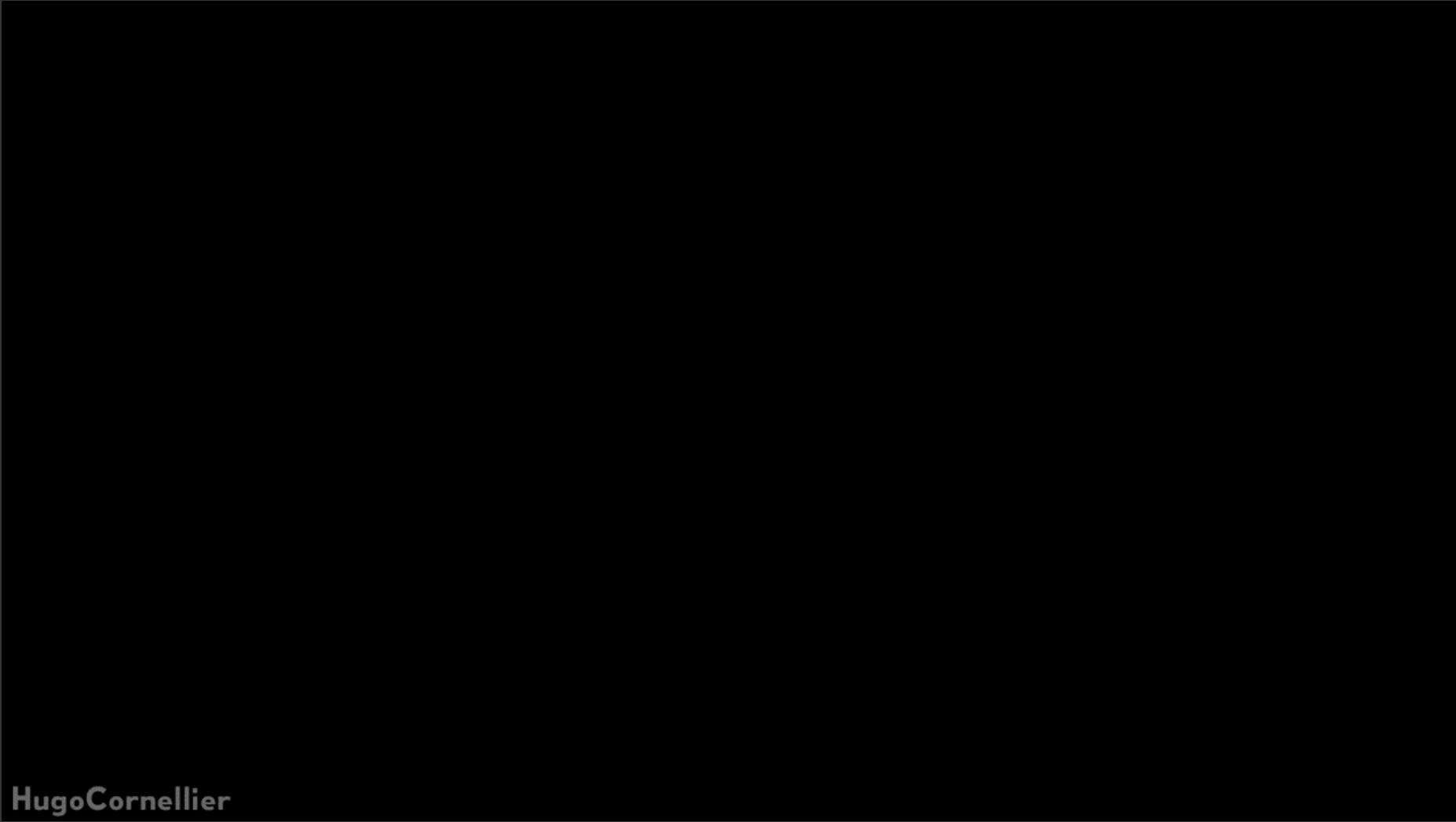


Why Cloud is Good 4 Devs: A Personal Story with a Demo

Dmitry Soshnikov

*Cloud Developer Advocate, Microsoft
Associate Professor, MIPT/HSE/MAI
Amateur Science Artist
<http://soshnikov.com> -- @shwars*

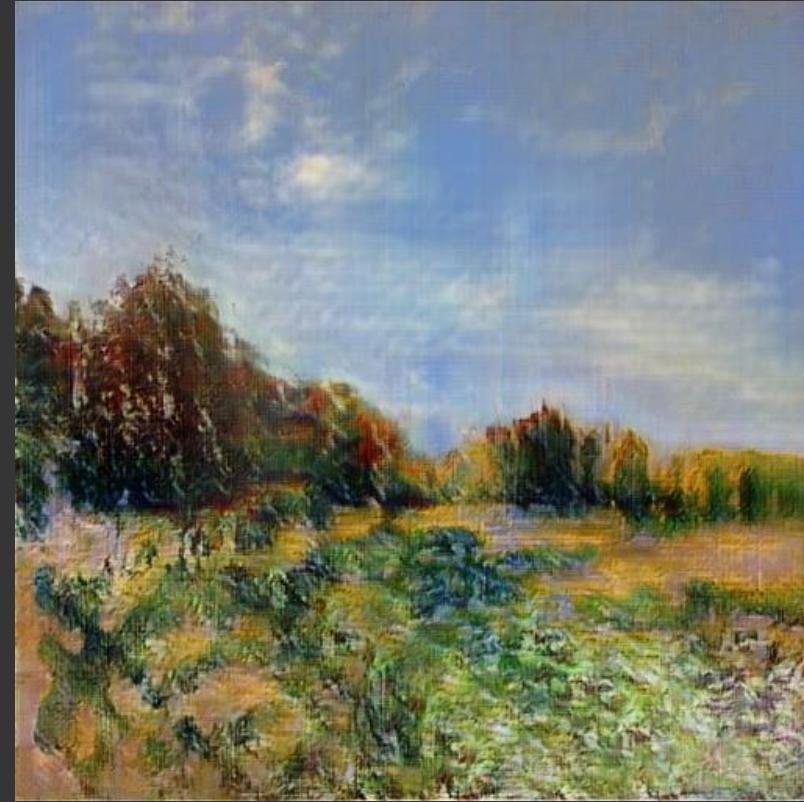




HugoCornellier

Fun Fact about Myself

<http://soshnikov.com>



<http://bit.do/peopleblending>

@art_of_artificial

SCIENCE
ART

Why Cloud is Good for Developers?



Nice Definition:



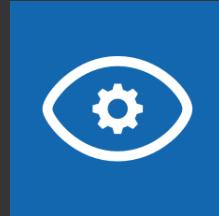
Cloud is a way to abstract the place where code runs, so that we do not have to think about the details...

Ideally, cloud should handle things like:

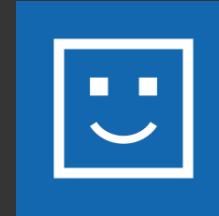
- Scalability
- Elasticity
- Security
- Software updates
- ...

AZURE AT A GLANCE

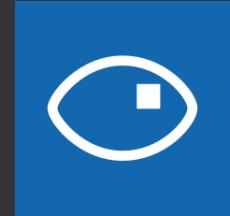
PaaS+



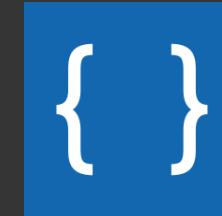
Vision



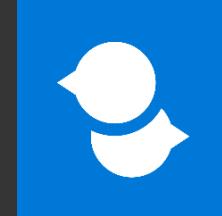
Face



Custom Vision



LUIS + Text



QnA Maker



Power Apps

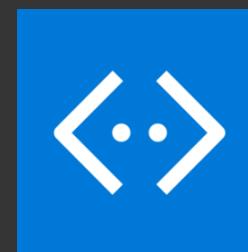


Power BI

PaaS



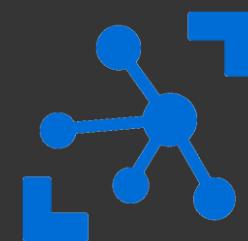
Azure Web App



Bot Framework



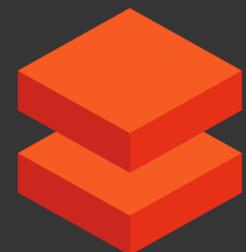
Azure Function



Azure IoT



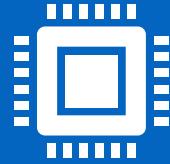
Azure ML



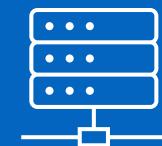
Databricks

IaaS

Compute



Virtual Machine



Azure Batch



AKS (Cluster)

Table
Queue
Blob
File Share



CosmosDB



Azure SQL



Data Lake

Datacenter Hardware

LINKS



<http://eazify.net/azref>



Storage: http://aka.ms/az_stor
CosmosDB: http://aka.ms/az_cosmos



ML: http://aka.ms/az_ml_docs
<http://aka.ms/azmlstarter>



Web App: http://aka.ms/az_web



Data Sci VM: http://aka.ms/az_dsvm
Virtual Machines: http://aka.ms/az_vm



Azure Functions:
http://aka.ms/az_fun



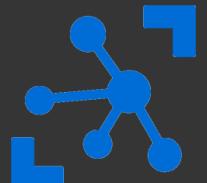
Cognitive Services:
http://aka.ms/az_cognitive



Azure Containers & Kubernetes:
http://aka.ms/az_containers



Azure Databricks:
http://aka.ms/az_databricks



Azure IoT:
http://aka.ms/az_iot



Azure Bots:
http://aka.ms/az_bots

Cognitive Services

<http://aka.ms/coserv>



Vision

- Object, scene, and activity detection
- Face recognition and identification
- Celebrity and landmark recognition
- Emotion recognition
- Text and handwriting recognition (OCR)
- Customizable image recognition
- Video metadata, audio, and keyframe extraction and analysis
- Explicit or offensive content moderation



Speech

- Speech transcription (speech-to-text)
- Custom speech models for unique vocabularies or complex environment
- Text-to-speech
- Custom Voice
- Real-time speech translation
- Customizable speech transcription and translation
- Speaker identification and verification



Language

- Language detection
- Named entity recognition
- Key phrase extraction
- Text sentiment analysis
- Multilingual and contextual spell checking
- Explicit or offensive text content moderation
- PII detection for text moderation
- Text translation
- Customizable text translation
- Contextual language understanding



Knowledge

- Q&A extraction from unstructured text
- Knowledge base creation from collections of Q&As
- Semantic matching for knowledge bases
- Customizable content personalization learning



Search

- Ad-free web, news, image, and video search results
- Trends for video, news
- Image identification, classification and knowledge extraction
- Identification of similar images and products
- Named entity recognition and classification
- Knowledge acquisition for named entities
- Search query autosuggest
- Ad-free custom search engine creation

IDEA: COGNITIVE PORTRAIT

http://eazify.net/cognitive_portrait/



Cognitive Portrait

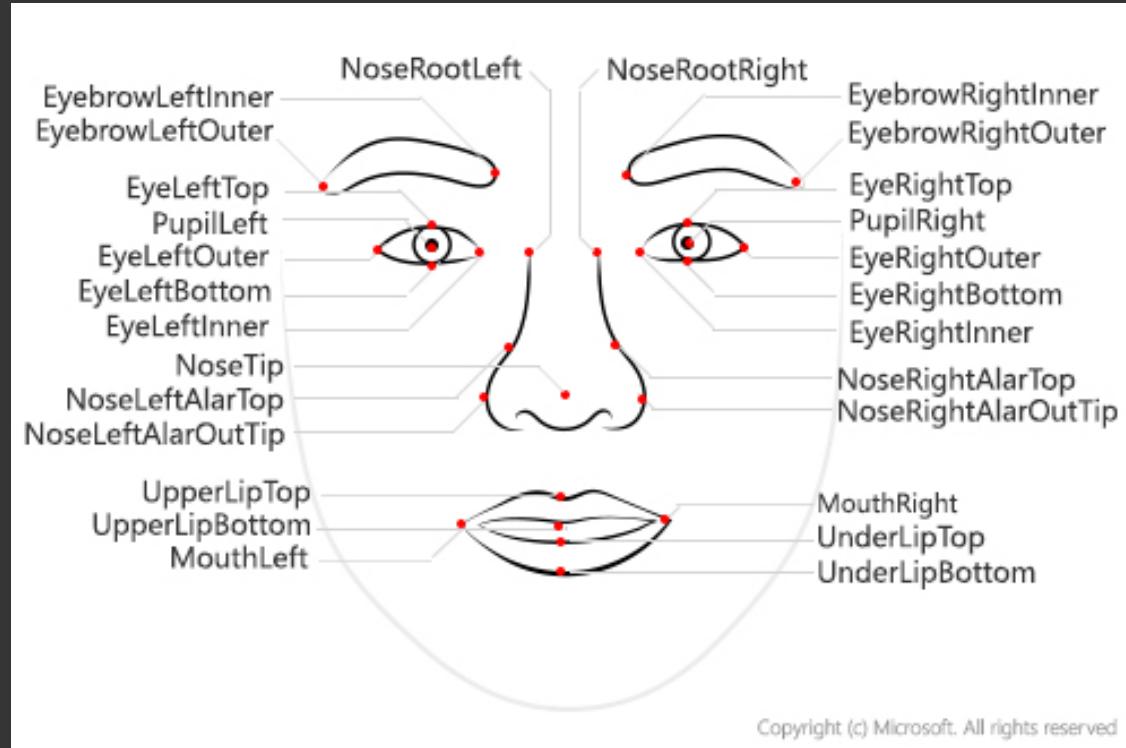
Cognitive Services

<http://aka.ms/coserv>



Affine Transformation

http://eazify.net/cognitive_portrait



```
def affine_transform(img, attrs):
    mc_x = (attrs['mouth_left']['x']+ attrs['mouth_right']['x'])/2.0
    mc_y = (attrs['mouth_left']['y']+ attrs['mouth_right']['y'])/2.0

    tr = cv2.getAffineTransform(np.float32([
        attrs['pupil_left']['x'],
        attrs['pupil_left']['y'],
        (attrs['pupil_right']['x'],
        attrs['pupil_right']['y']),
        (mc_x,mc_y)]), target_triangle)

    return cv2.warpAffine(img,tr,(size,size))
```



Visual Studio Code



GitHub

CodeSpaces

<http://github.com/CloudAdvocacy/CognitivePortrait>



Call for Code

<https://github.com/features/codespaces>

<http://github.com/CloudAdvocacy/CognitivePortrait>



What cloud helped me to do:

- ① Use pre-trained NN model as a building block
- ② Easily run Python code

ВЫСТАВОЧНЫЙ
ПАРК МУЗЕЙ
В РОСТОКИНО

ЭЛЕКТРОМУЗЕЙ

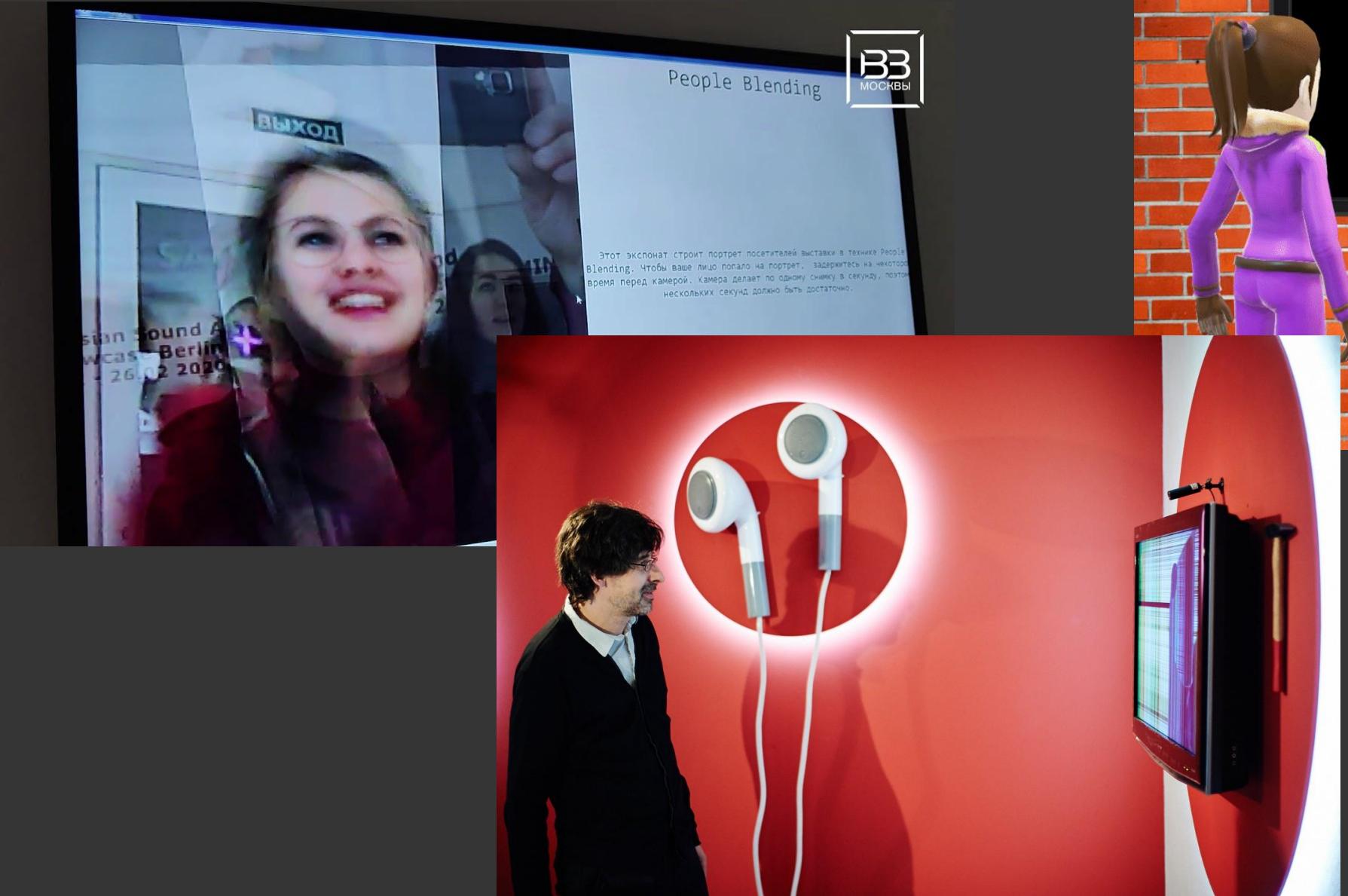
В РОСТОКИНО

Департамент культуры города Москвы

25 октября - 16 ноября 2014 г.

Маркус Понтт OvalArc

Cloud Exhibit





New New
mail Items >

Del
Delete

New

De

Drag Your Favorite Folders Here

dmitryso@microsoft.com

Входящие

Черновики

Отправленные

Даленные

Conversation History

Deprecated Contacts

Lists

News Feed

RSS-подписки

Архив

Исходящие

Желательная почта

Search Folders

Groups

Online Archive - dmitryso@microsoft.com

sharePoint Lists

File Search Filter

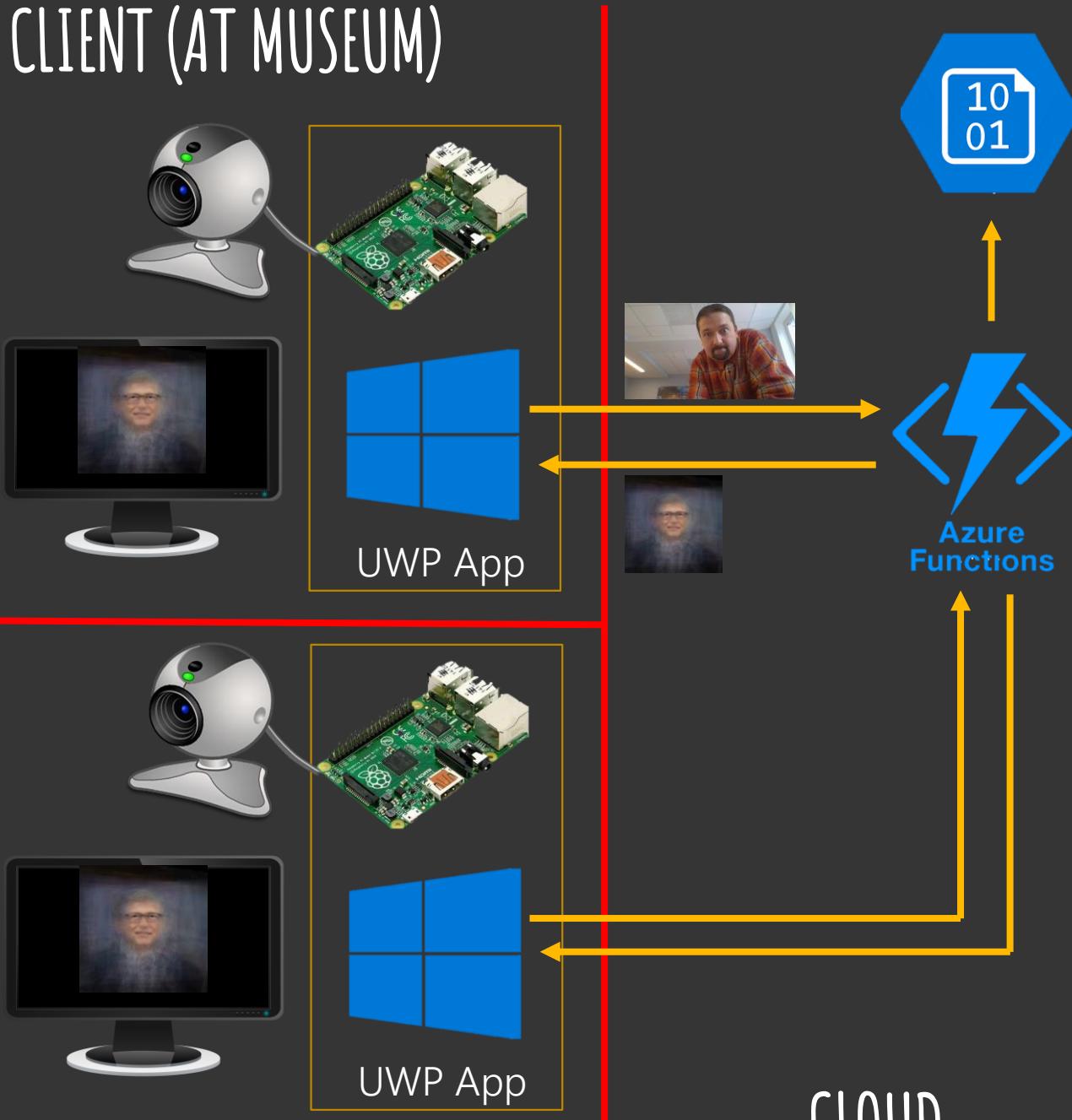
39,997 Unread 7,681

Customer Service
Reservation Re

Cloud Exhibit

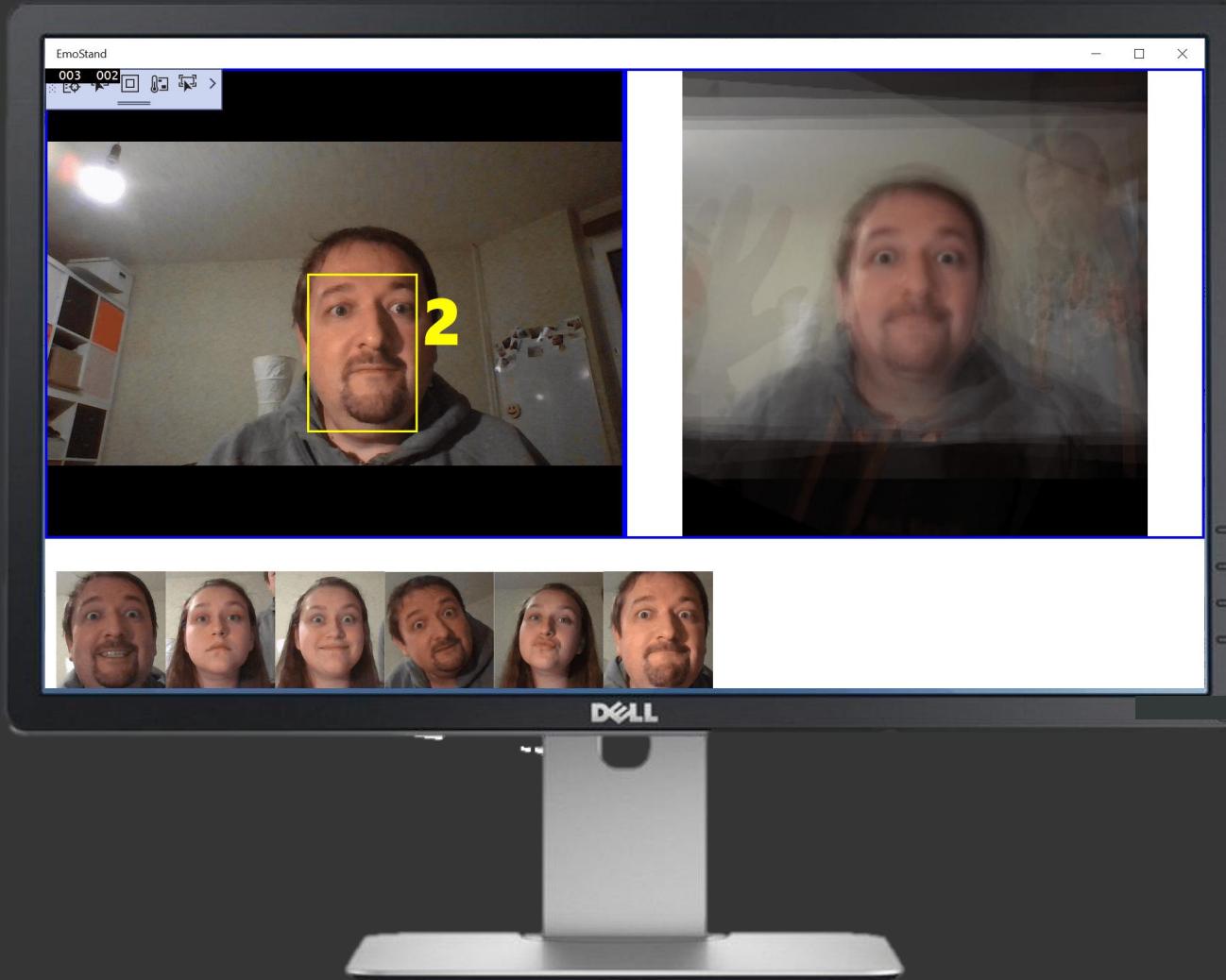
EXHIBITION 2 (ANYWHERE)

EXHIBITION 1 (MOSCOW)



UWP Client App

<http://github.com/shwars/VirtualExhibit> -> UWPClient



This version of Visual Studio is not secure and must be updated. You need to update to the latest version of Visual Studio 2019 now, or Core Services Engineering will do it for you shortly. [Update Now](#) [More info](#)

FILE EDIT VIEW PROJECT BUILD DEBUG TEST ANALYZE TOOLS EXTENSIONS WINDOW HELP Search (Ctrl+Q) PhotoStand

MainPage.xaml.cs* MainPage.xaml

PhotoStand

PhotoStand.MainPage

CounterCallback(object sender, object e)

```
68     private async void CounterCallback(object sender, object e)
69     {
70         counter--;
71         Counter.Text = counter.ToString();
72         if (counter==0)
73         {
74             dt.Stop();
75             if (DFace == null) return;
76             var ms = new MemoryStream();
77             await MC.CapturePhotoToStreamAsync(ImageEncodingProperties.CreateJpeg());
78             Point p; Size sz;
79             ExpandFaceRect1(DFace.FaceBox, out p, out sz);
80             var cb = await CropBitmap.GetCroppedBitmapAsync(ms.AsRandomAccessStream());
81             Faces.Add(cb);
82             // var res = await CallCognitiveFunction(ms);
83             // ResultImage.Source = new BitmapImage(new Uri(res));
84             await WriteableBitmapToFile(cb);
85             Counter.Visibility = Visibility.Collapsed;
```

Server Explorer

Toolbox

Solution Explorer

Search Solution Explorer (Ctrl+Shift+F)

Solution 'PhotoStand' (1 of 1 project)

PhotoStand (Universal Windows)

- Connected Services
- Properties
- References
- Assets
- App.xaml
- CropBitmap.cs
- EmoStand_TemporaryKey.pfx
- MainPage.xaml
- MainPage.xaml.cs
- Package.appxmanifest

Diagnostic Tools

Output

Show output from: Debug

The thread 0x3ed4 has exited with code 0 (0x0).
The thread 0x3274 has exited with code 0 (0x0).
The thread 0x3960 has exited with code 0 (0x0).
The thread 0x1270 has exited with code 0 (0x0).
The program '[1800] EmoStand.exe' has exited with code 1 (0x1).

Web Publish Activity Error List Output miniconda3 (3.7, 64-bit) Interactive F# Interactive

Add to Source Control

Ready

9:40
ENG
17.06.2020

Serverless!

<http://aka.ms/pyfunc>



What is Azure Function?

1. Function that triggers as a reaction to a specific event
 - Something is places into blob storage / queue
 - HTTP REST call
2. Supports automatic binding with cloud services
3. Two billing modes (dedicated VM / serverless)

Creating Azure Function

```
$ func init coportrait --python
$ cd coportrait
$ func new --name pdraw --template "HTTP trigger"
$ func start
```



(base) C:\demo>

Anatomy of an Azure Function

__init__.py

```
def main(req:func.HttpRequest) -> func.HttpResponse:
    logging.info('Execution begins...')

    name = req.params.get('name')

    if name:
        return func.HttpResponse(f"Hello {name}!")
    else:
        return func.HttpResponse(
            "Need name query parameter",
            status_code=400)
```

function.json

```
{
  "scriptFile": "__init__.py",
  "bindings": [
    {
      "authLevel": "function",
      "type": "httpTrigger",
      "direction": "in",
      "name": "req",
      "methods": [
        "get",
        "post"
      ]
    },
    {
      "type": "http",
      "direction": "out",
      "name": "$return"
    }
  ]
}
```

Cognitive Portrait Azure Function

<http://aka.ms/pyblob>



1 Storing input images into Blob Storage

- Clever naming!

```
blob = BlockBlobService(account_name=acct_name, account_key=acct_key)

body = req.get_body()

sec_p = int((end_date-datetime.datetime.now()).total_seconds())
name = f"{sec_p:09d}-{time.strftime('%Y%m%d-%H%M%S')}

blob.create_blob_from_bytes("cin", name, body)

img = imdecode(body)
```

Cognitive Portrait Azure Function

<http://aka.ms/pyblob>



2

Processing an image

- Call Cognitive Service
- Do Affine Transform
- Store into another blob storage

```
cogface = cf.FaceClient(endpoint,CognitiveServicesCredentials(key))
res = cogface.face.detect_with_stream(io.BytesIO(body),
                                         return_face_landmarks=True)
if res is not None and len(res)>0:
    tr = affine_transform(img,res[0].face_landmarks.as_dict())

    _,body = cv2.imencode('.jpg',tr)
    blob.create_blob_from_bytes("cmapped",name,body.tobytes())
```

Cognitive Portrait Azure Function

<http://aka.ms/pyblob>



3

Creating Result

- Ask for 10 last blob images
- Average them
- Store into output blob storage
- Return URL

```
imgs = [ imdecode(blob.get_blob_to_bytes("cmapped",x.name).content)
          for x in itertools.islice(blob.list_blobs("cmapped"),10) ]  
  
imgs = np.array(imgs).astype(np.float32)/255.0
res = (np.average(imgs, axis=0)*255.0).astype(np.uint8)  
  
b = cv2.imencode('.jpg',res)[1]
r = blob.create_blob_from_bytes("out", f"{name}.jpg", b.tobytes())  
  
return func.HttpResponse(f"https://{act}.blob.core.windows.net/out/{name}.jpg")
```

File Edit Selection View Go Run Terminal Help _init_.py - demo - Visual Studio Code

EXPLORER bot.py _init_.py myconfig.py config.py

coporait > pdraw > _init_.py > main

```
1 from .myconfig import *
2
3 import logging
4 import azure.functions as func
5 from azure.storage.blob import BlockBlobService
6 import azure.cognitiveservices.vision.face as cf
7 from msrest.authentication import CognitiveServicesCredentials
8 import time,io,datetime
9
10 import cv2
11 import numpy as np
12
13 no_images = 10
14 end_date = datetime.datetime(2021,1,1)
15
16 blob = BlockBlobService(account_name=storage_acct_name, account_key=storage_acct_key)
17 cogface = cf.FaceClient(cognitive_endpoint,CognitiveServicesCredentials(cognitive_key))
18
19 target_triangle = np.float32([[130.0,120.0],[170.0,120.0],[150.0,160.0]])
20 size = 300
21
22 def affine_transform(img,attrs):
23     mc_x = (attrs['mouth_left']['x']+attrs['mouth_right']['x'])/2.0
24     mc_y = (attrs['mouth_left']['y'] + attrs['mouth_right']['y']) / 2.0
```

PROBLEMS 44 OUTPUT DEBUG CONSOLE TERMINAL 1: Python

Executing transaction: done
PS C:\demo>

Python 3.8.0 64-bit ('azureml': conda) ⊗ 9 Δ 1 ⓘ 34 ✓ python | ✓ _init_.py Azure: dmitryso@microsoft.com Ln 74, Col 49 Spaces: 4 UTF-8 CRLF Python ⚙ 14:31 ENG 25.03.2020

Deploy Azure Function to Azure

1 Create Azure Function using CLI or on Portal

```
az functionapp create --resource-group <group>
  --os-type Linux
  --consumption-plan-location westeurope
  --runtime python --runtime-version 3.7 --functions-version 2
  --name <APP_NAME> --storage-account <STORAGE_NAME>
```

2 Publish Function

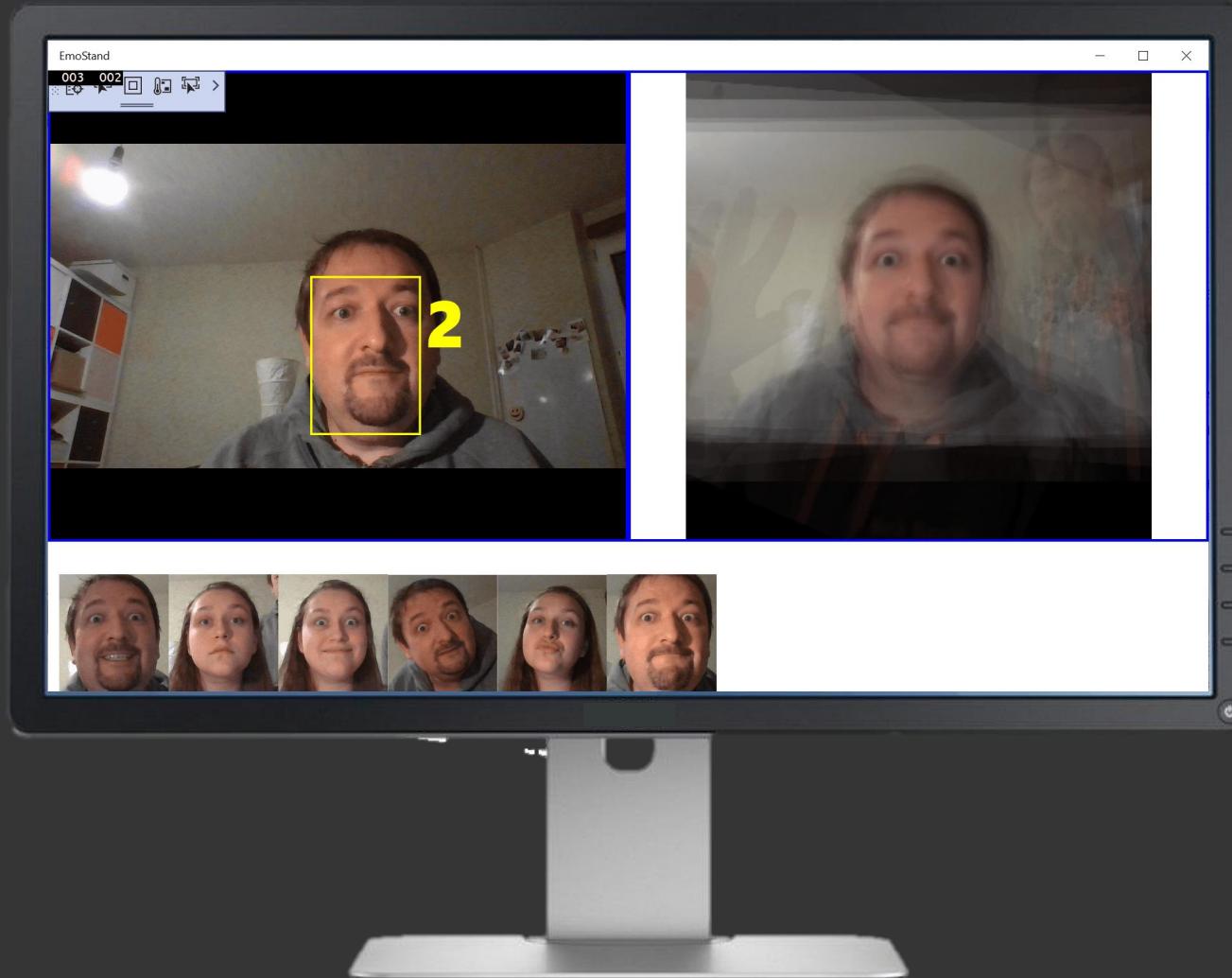
```
$ func azure functionapp publish <name>
```

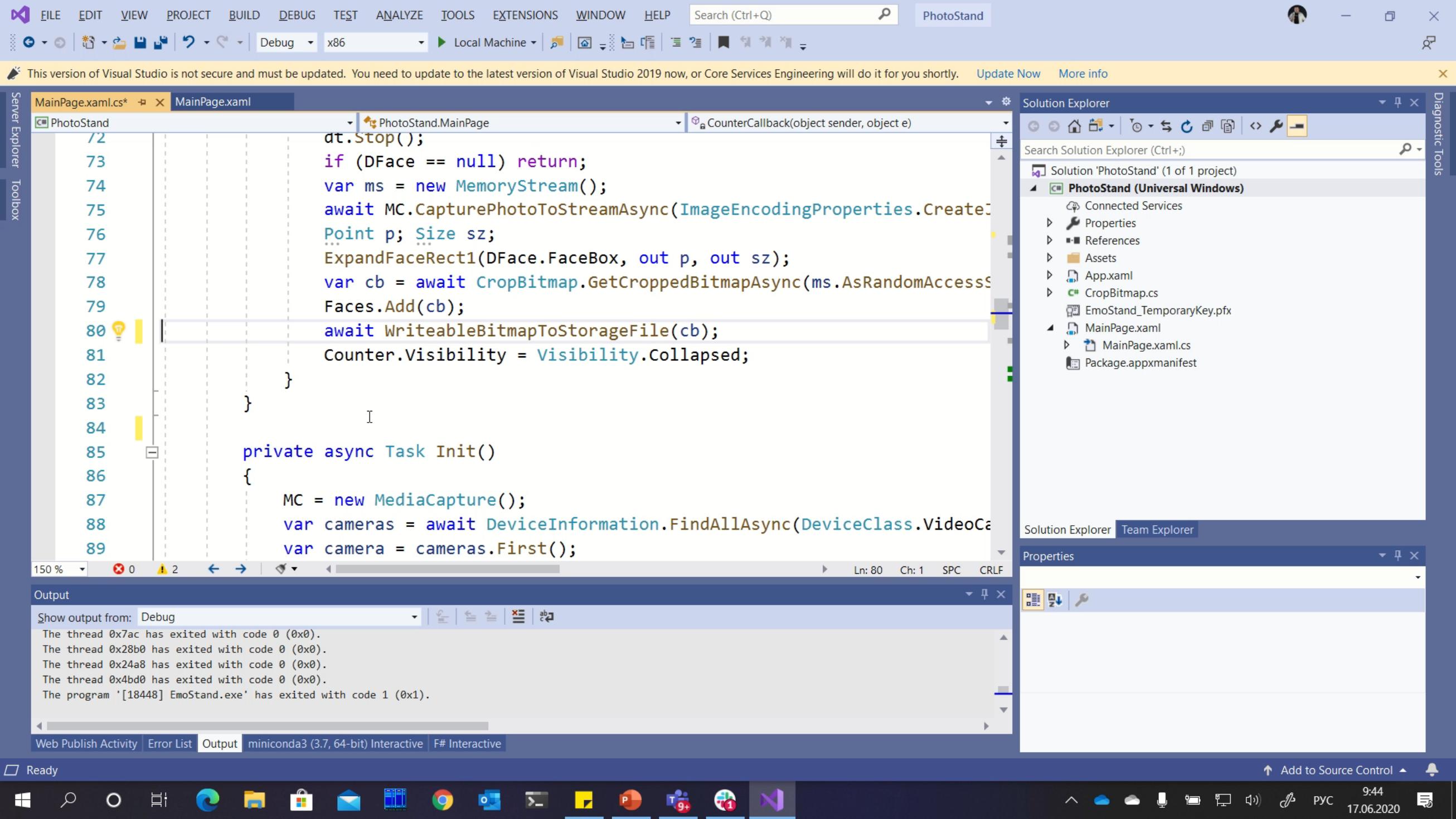
3 Debug

- Wrong lib versions (make sure you have requirements.txt!)

Заканчиваем UWP-приложение

<http://github.com/shwars/VirtualExhibit> -> UWPClient





This version of Visual Studio is not secure and must be updated. You need to update to the latest version of Visual Studio 2019 now, or Core Services Engineering will do it for you shortly. [Update Now](#) [More info](#)

MainPage.xaml.cs MainPage.xaml

```
38
39     protected string function_url = "https://coportrait.azurewebsites.net/api/pd
40
41     MediaCapture MC;
42     DispatcherTimer dt = new DispatcherTimer() { Interval = TimeSpan.FromSeconds(1) };
43
44     HttpClient http = new HttpClient();
45
46     FaceDetectionEffect FaceDetector;
47     VideoEncodingProperties VideoProps;
48
49     bool IsFacePresent = false;
50
51     ObservableCollection<WriteableBitmap> Faces = new ObservableCollection<WriteableBitmap>();
52
53     int counter;
54
55     public MainPage()
```

Output

```
Show output from: Deployment
isHyperVRunning = True
DetectSlat: END (Success, 0:00:00,023)
    SlatState = SlatAndHWEEnabled
    IsEmulatorSupported = True
IsEmulatorSupported: END (Success, 0:00:00,024)
```

Web Publish Activity | Error List | Output | miniconda3 (3.7, 64-bit) Interactive | F# Interactive

Solution Explorer

- PhotoStand (Universal Windows)
 - Connected Services
 - Properties
 - References
 - Assets
 - App.xaml
 - CropBitmap.cs
 - EmoStand_TemporaryKey.pfx
 - MainPage.xaml
 - MainPage.xaml.cs
 - Package.appxmanifest

Properties

Ready

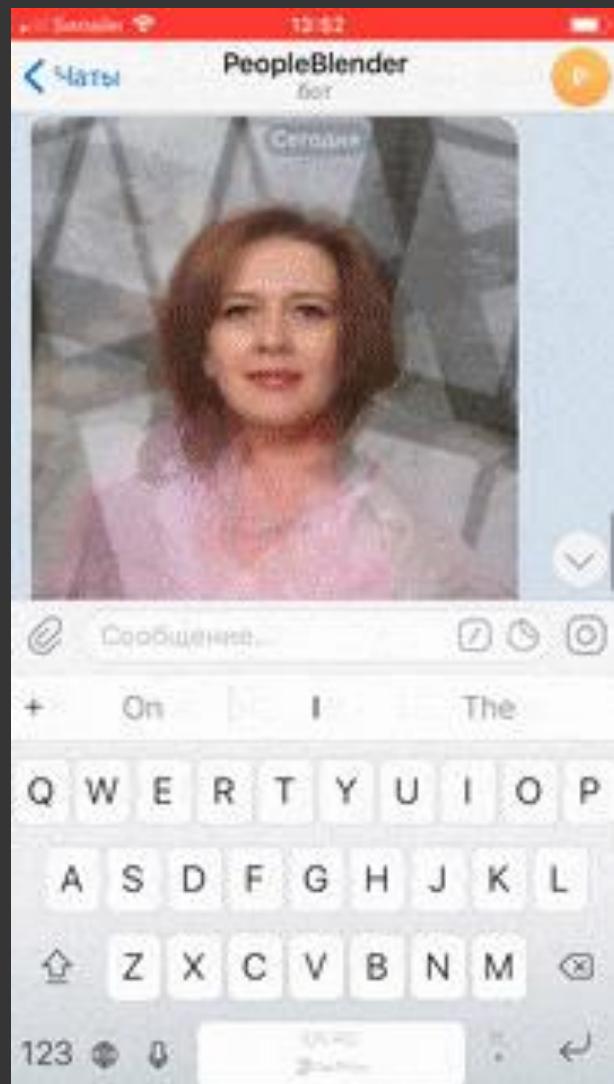
Add to Source Control

9:36
17.06.2020

What cloud helped me to do:

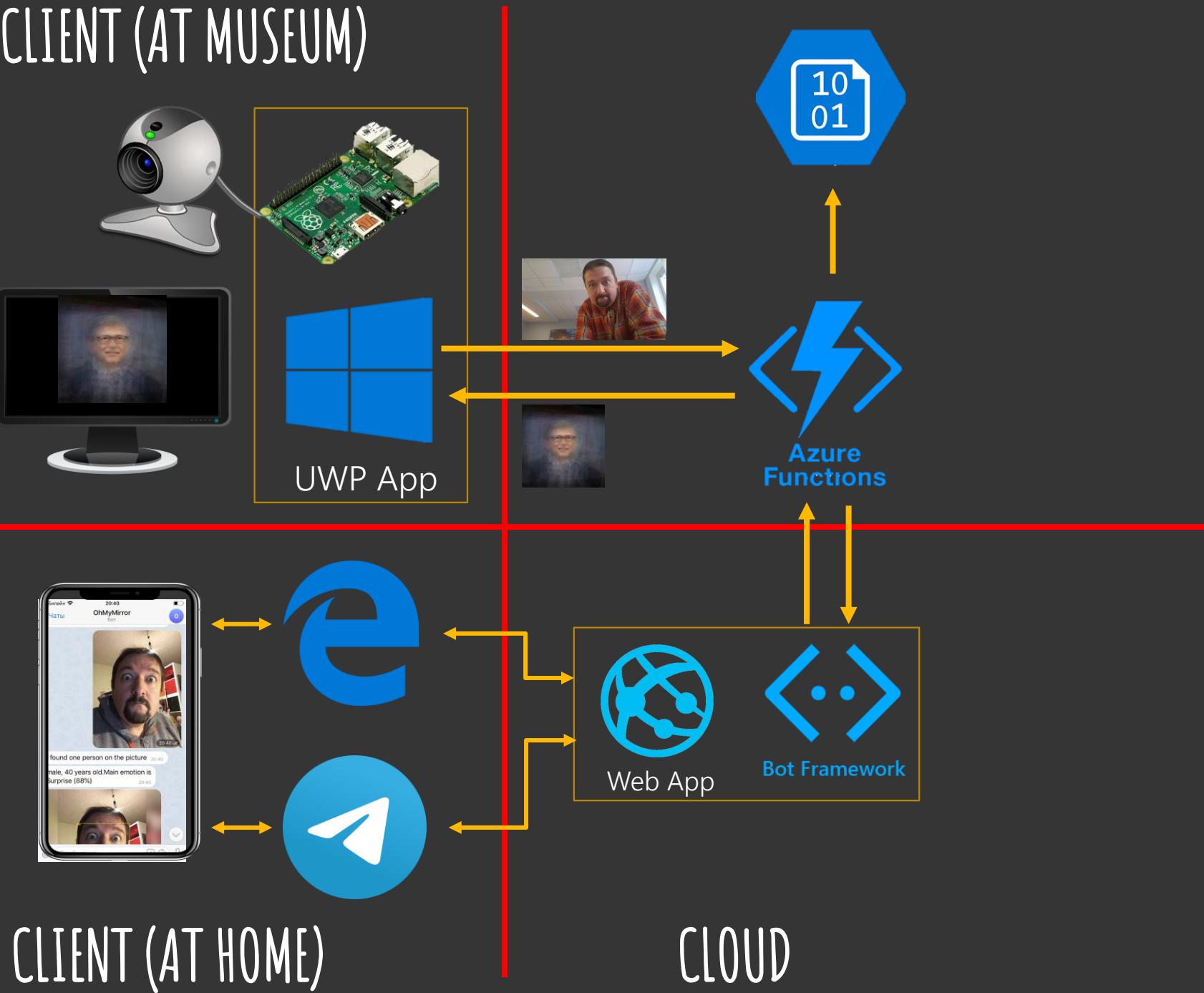
- ① Use pre-trained NN model as a building block
- ② Easily run Python code
- ③ Run pieces of code in the cloud w/out worries
- ④ Store binary data w/out worries

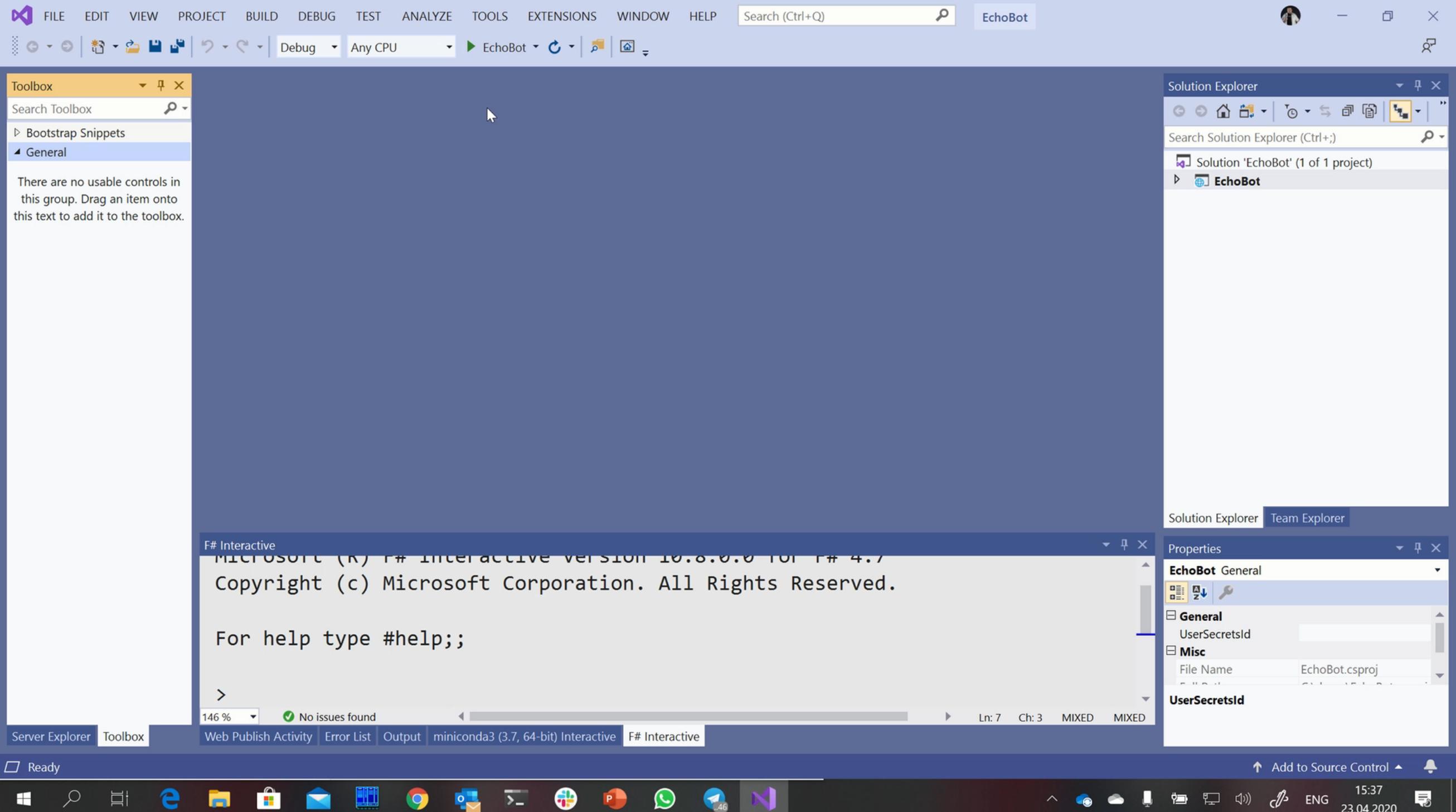
Remote Exhibit: Bot

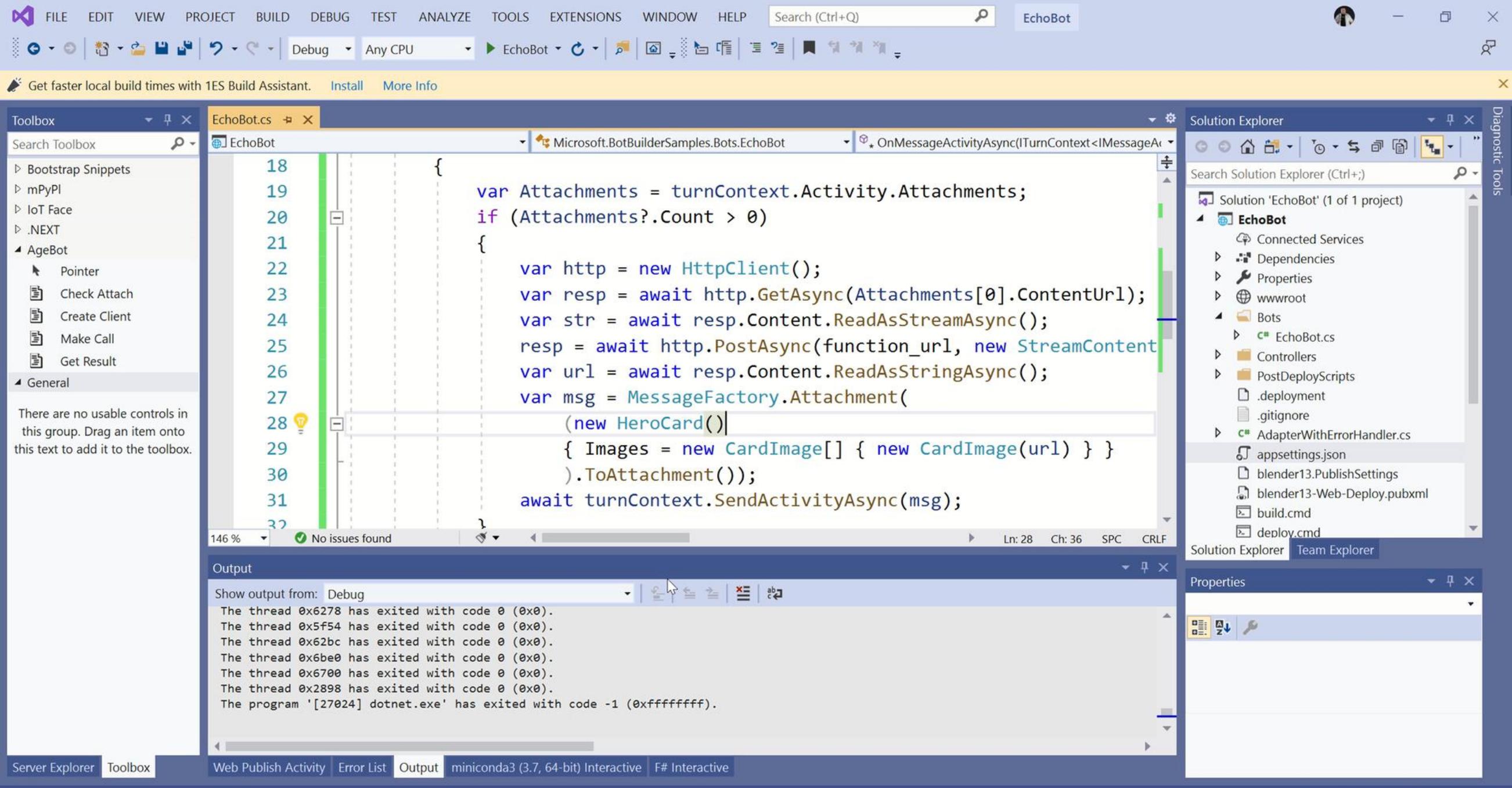


Remote Exhibit

REAL EXHIBIT | VIRTUAL EXHIBIT







FILE EDIT VIEW PROJECT BUILD DEBUG TEST ANALYZE TOOLS EXTENSIONS WINDOW HELP Search (Ctrl+Q) EchoBot

Get faster local build times with 1ES Build Assistant. Install More Info

Toolbox EchoBot EchoBot

Search Toolbox Bootstrap Snippets mPyPI IoT Face .NEXT AgeBot Pointer Check Attach Create Client Make Call Get Result General

There are no usable controls in this group. Drag an item onto this text to add it to the toolbox.

App Service Host your web and mobile applications, REST APIs, and more in Azure Microsoft dmitryso@microsoft.com

Subscription Internal Microsoft Subscription

View Resource group

Search

Output BBot ElizaBot MyProjects

Show output from: De The thread 0x6278 The thread 0x5f54 The thread 0x62bc The thread 0x6be0 The thread 0x6700 The thread 0x2898 The program '[270:

OK Cancel

Solution Explorer Solution 'EchoBot' (1 of 1 project) EchoBot Connected Services Dependencies Properties wwwroot Bots EchoBot.cs Controllers PostDeployScripts .deployment .gitignore AdapterWithErrorHandler.cs appsettings.json blender13.PublishSettings blender13-Web-Deploy.pubxml build.cmd deploy.cmd

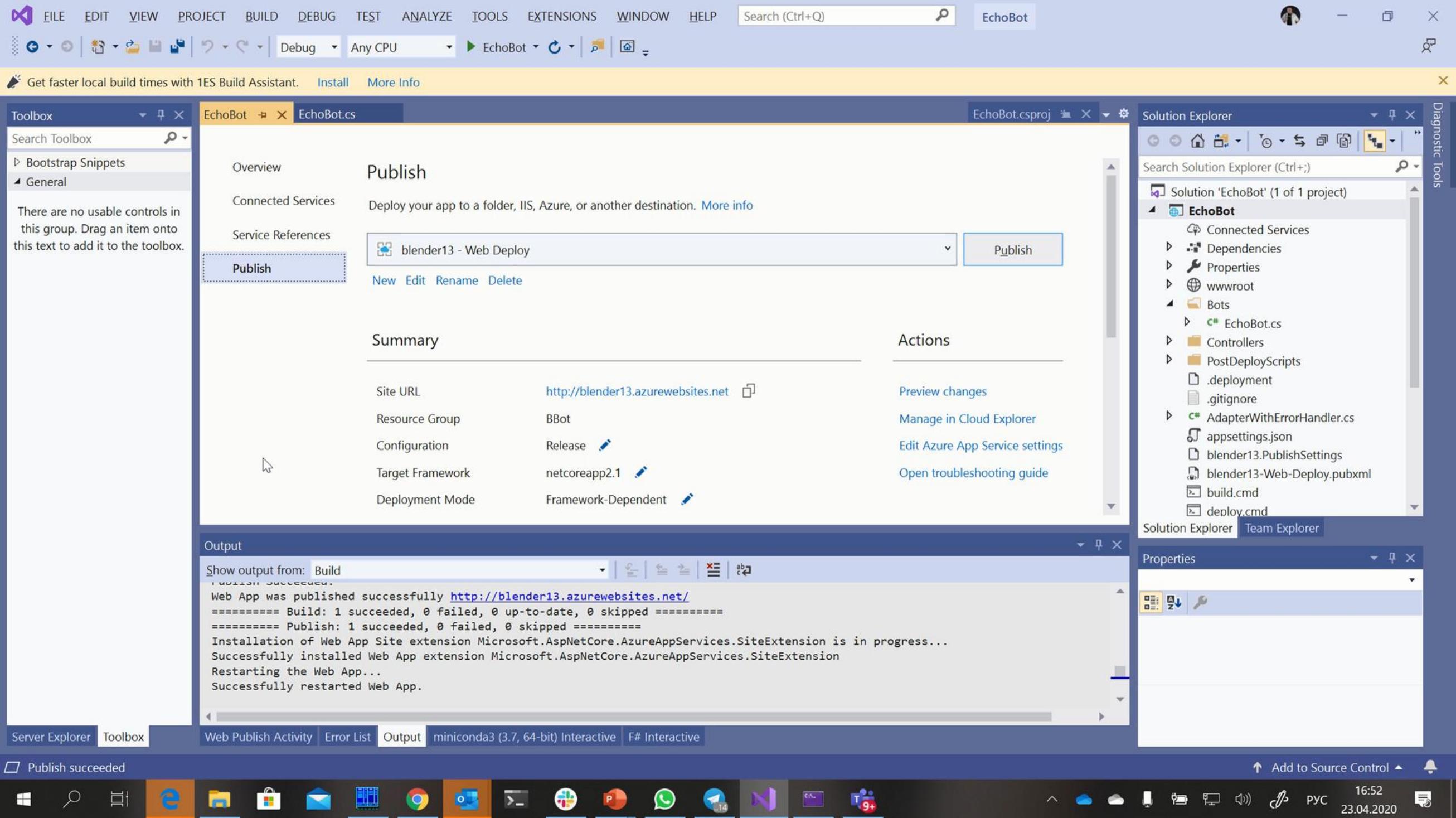
Properties

Server Explorer Toolbox Web Publish Activity Error List Output miniconda3 (3.7, 64-bit) Interactive F# Interactive

Add to Source Control

Ready

16:49 ENG 23.04.2020



Home > Resource groups > BBot > Blender13 | Test in Web Chat

Blender13 | Test in Web Chat

Web App Bot

Search (Ctrl+ /)

Test

Start over

Overview

Activity log

Access control (IAM)

Tags

Bot management

Build

Test in Web Chat

Analytics

Channels

Settings

Speech priming

Bot Service pricing

App Service Settings

...

Hello and welcome!

Please send picture

Just now



Sending



Type your message



What cloud helped me to do:

- ① Use pre-trained NN model as a building block
- ② Easily run Python code
- ③ Run pieces of code in the cloud w/out worries
- ④ Store binary data w/out worries
- ⑤ Easily create chat bots
- ⑥ Host web applications

Try Interactive Exhibit: Let's Create Joint Portrait!

<http://eazify.net/peopleblend>



@peopleblenderbot



Web Apps

http://aka.ms/learn_web



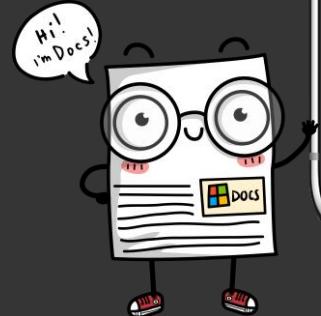
Bots

<http://aka.ms/botfw>



Cognitive

<http://aka.ms/coserv>



Serverless

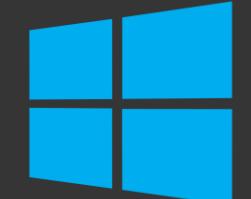
<http://aka.ms/azfuu>



Storage



UWP Apps





Dmitry Soshnikov, «Growing Up»
2020, cognitive portrait



Dmitry Soshnikov

Cloud Developer Advocate, Microsoft

<http://soshnikov.com> -- @shwars

