

# JOURNEY TO THE CLOUD

A Developer's Perspective

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MY JOURNEY TO THE CLOUD...

Frustration with limited resources





# MY JOURNEY TO THE CLOUD...

## Disparity between development teams



A human skeleton is depicted sitting at a desk, leaning forward with its right hand resting on its chin in a contemplative pose. The skeleton is positioned in front of a black computer monitor. The background is a solid, dark grey. The text "MY JOURNEY TO THE CLOUD..." is overlaid in the upper right quadrant of the image.

MY JOURNEY TO THE CLOUD...

Having to rely on another team

# MY JOURNEY TO THE CLOUD...

Research Cloud Computing Providers



Microsoft Azure



And many more...



# BENEFITS OF EMBRACING THE CLOUD

- Saves Time
- Simplicity
- Flexibility
- Integration
- Save Your Sanity!

# Microsoft Azure



Azure App Service



Web Apps



Mobile Apps



API Apps

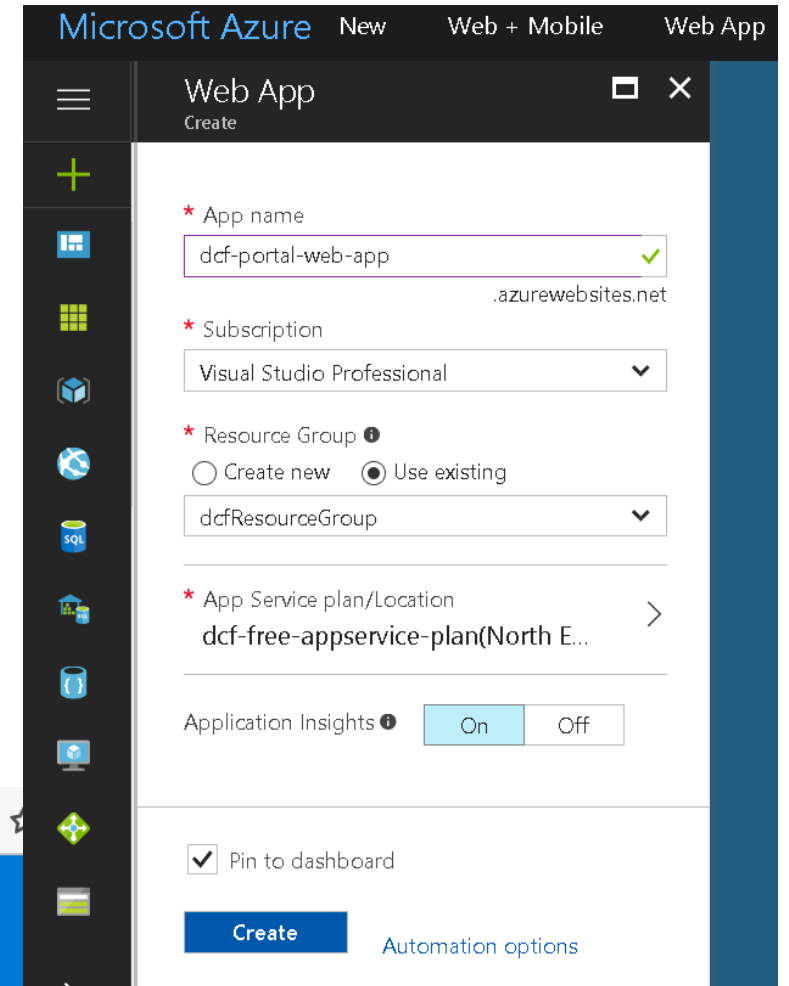
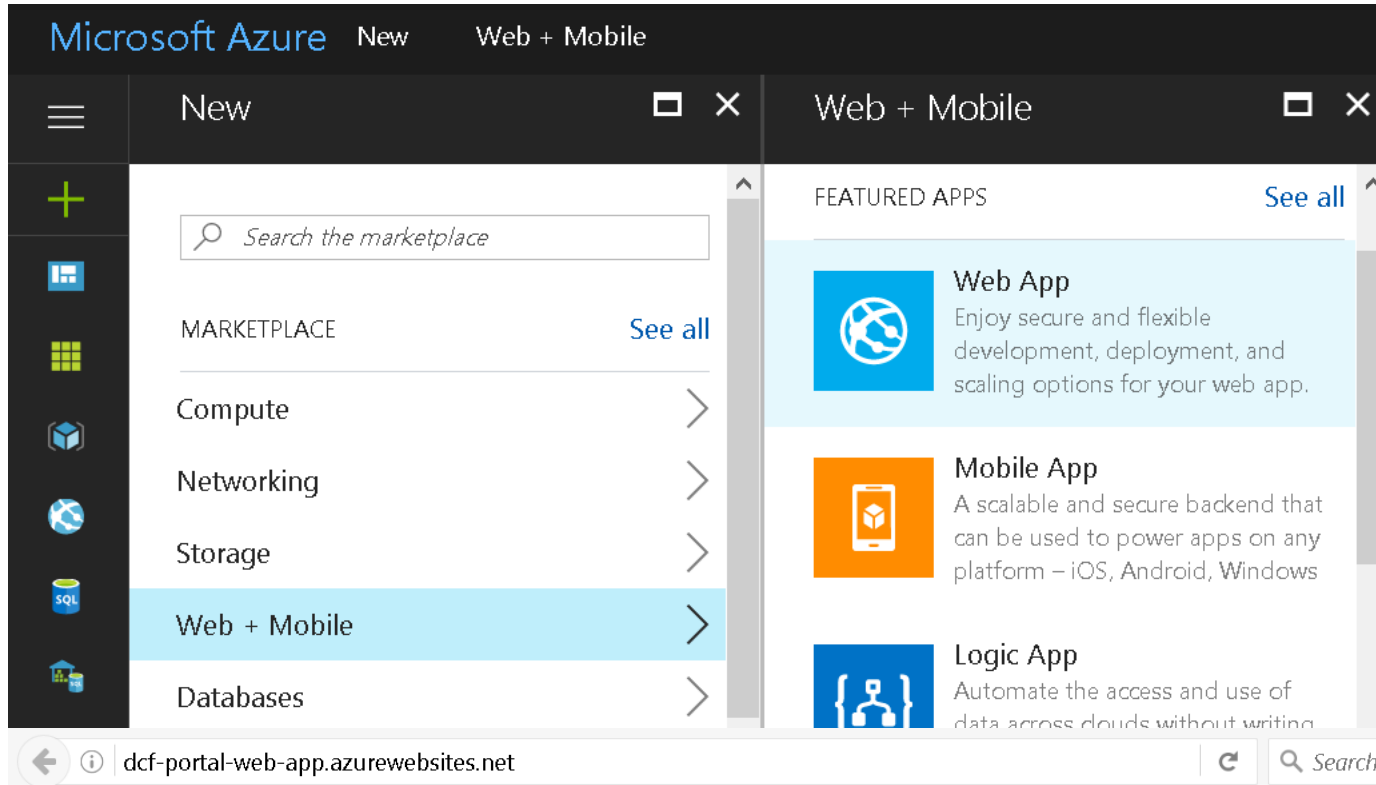


Logic Apps



# AZURE WEB APPS VIA PORTAL

<https://portal.azure.com>



Your App Service app has been created

Go to your app's **Quick Start** guide in the Azure portal to get started or read our [deployment documentation](#).

# AZURE WEB APPS VIA AZURE CLI

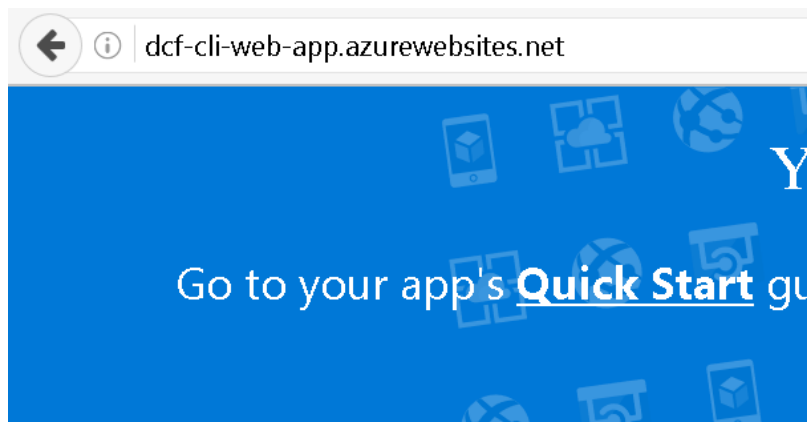
<https://docs.microsoft.com/en-us/cli/azure/install-azure-cli>

```
C:\Users\Dionne>az group create --location "North Europe" --name dcfResourceGroup
```

```
C:\Users\Dionne>az appservice plan create --name dcf-free-appservice-plan --resource-group dcfResourceGroup --sku FREE
```

```
C:\Users\Dionne>az appservice web create --name dcf-cli-web-app --resource-group dcfResourceGroup --plan dcf-free-appservice-plan
```

```
C:\Users\Dionne>az appservice web source-control config --name dcf-cli-web-app --resource-group dcfResourceGroup --repo-url "https://github.com/azure-appservice-samples/JavaCoffeeShopTemplate.git" --branch master --manual-integration
```



Cappuccino

\$3.45

Cappuccino

# AZURE WEBAPPS VIA TOOLKIT FOR IDE

The screenshot displays the IntelliJ IDEA interface with the 'Deploy to Azure Web App Container' dialog open. The 'Azure' menu is expanded, showing options like 'Configure Application Insights...', 'Publish as Azure Web App...', and 'Publish as Azure Cloud Service...'. The 'New Web App Container' dialog is also open, showing the 'Basic' tab with fields for DNS Label, Web Container, Subscription, Resource Group, and App Service Plan. The 'JDK' tab is also visible, showing options for deploying the default JDK or a 3rd party JDK.

**Deploy to Azure Web App Container**

Choose an existing Azure Web App container to deploy this application to:

- dcf-edipse-april (JRE 1.8.0\_73; TOMCAT 8.0)
- dcf-edipse-multi-web-apps (JRE 1.8.0\_73; TOMCAT 8.0)
- dcf-edipse-web-app (JRE 1.8.0\_73; TOMCAT 8.0)

**New Web App Container**

**Basic** | JDK

DNS Label: dcf-edipse-april30.azurewebsites.net

Web Container: Apache Tomcat 8 (Latest)

Subscription: Visual Studio Professional

Resource Group: dcfResourceGroup

App Service Plan: dcf-free-appservice-plan

[Pricing](#)

Location: North Europe

Pricing Tier: Free

Instance Size: Small

**JDK**

☒ Deploy the default JDK offered by Azure Web Apps service (JDK 8)

☐ Deploy a 3rd party JDK available on Azure:

Azul Zulu, OpenJDK 1.8.0\_u92

☐ Deploy my own JDK from this download location:

JDK zip archive URL:

Storage account key (if the URL above is a private blob):

(Note: For custom JDK, ideally you should have only one web app container per app service plan with small instance size.)



# AZURE WEBAPPS DEPLOYMENT

Azure Toolkit for IDEs



FTP or Open Source Version Control Repositories or Private Repositories

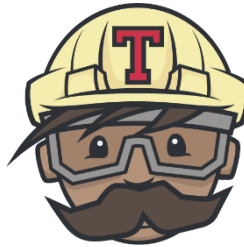


**GitHub**



**Bitbucket**

Integrate with your favourite Continuous Integration/Continuous Deployment tools



# AZURE VIRTUAL MACHINES



- 1 in 3 Azure VMs are running Linux e.g. Centos, Suse, Core OS VMs, Red Hat, Ubuntu



- Control over the Operating System, Software Installation, Maintenance, Updates, Security, etc. You are responsible!

# AZURE LINUX VM – BASICS AND SIZE

The screenshot displays the Microsoft Azure portal interface for creating a new virtual machine. The 'Basics' panel is active, showing the following configuration details:

- Name:** dionneTestVM
- VM disk type:** HDD
- User name:** dcfuser
- Authentication type:** SSH public key (selected), Password
- Password:** [Masked]
- Confirm password:** [Masked]
- Subscription:** Visual Studio Professional
- Resource group:** Create new (selected), Use existing, dcfVMResourceGroup
- Location:** West Europe

The 'Choose a size' panel is also visible, showing the 'D1\_V2 Standard' size selected. The table below summarizes the available sizes and their features:

D1_V2 Standard		D1 Standard		A1 Standard	
1	Core	1	Core	1	Core
3.5	GB	3.5	GB	1.75	GB
2	Data disks	2	Data disks	2	Data disks
2x500	Max IOPS	2x500	Max IOPS	2x500	Max IOPS
50 GB	Local SSD	50 GB	Local SSD		
	Load balancing		Load balancing		Load balancing



# AZURE LINUX VM – VIA PORTAL

## SETTINGS AND SUMMARY

Microsoft Azure

New

Compute

Ubuntu Server 16.04 LTS

Create virtual machine

Settings

Create virtual machine

1 Basics Done ✓

2 Size Done ✓

3 Settings Configure optional features >

4 Summary Ubuntu Server 16.04 LTS >

Storage

Use managed disks

No Yes

\* Storage account (new) dcfvmresourcegroup666

Network

\* Virtual network (new) dcfVMResourceGroup-vnet

\* Subnet default (10.0.0.0/24)

\* Public IP address (new) dionneTestVM-ip

\* Network security group (firewall) (new) dionneTestVM-nsg

Extensions

Extensions No extensions

High availability

\* Availability set None

Monitoring

Boot diagnostics Disabled Enabled

Guest OS diagnostics Disabled Enabled

\* Diagnostics storage account (new) dcfvmresourcegroup616

OK

Microsoft Azure

New >

Compute >

Ubuntu Server 16.04 LTS >

Create virtual machine >

Summary

Create virtual machine

Summary

1 Basics Done ✓

2 Size Done ✓

3 Settings Done ✓

4 Summary Ubuntu Server 16.04 LTS >

Validation passed

Subscription Visual Studio Professional

Resource group dcfVMResourceGroup

Location West Europe

Settings

Computer name dionneTestVM

Disk type HDD

User name dcfuser

Size Standard D1 v2

Storage account (new) dcfvmresourcegroup643

Managed No

Virtual network (new) dcfVMResourceGroup-vnet

Subnet (new) default (10.0.1.0/24)

Public IP address (new) dionneTestVM-ip

Network security group (firewall) (new) dionneTestVM-nsg

Availability set None

Guest OS diagnostics Disabled

Boot diagnostics Enabled

Diagnostics storage account dionneTestVM-diag743

OK

Download template and parameters

# AZURE LINUX VM - CONNECT VIA PUTTY (SSH)

```
C:\Users\Dionne>az vm list --output table
Name                        ResourceGroup      Location
-----
dionneTestVM               DCFVMRESOURCEGROUP westeurope
DionnesVM                  DIONNECFDEMO       westeurope
```

```
dcfuser@dionneTestVM: ~
login as: dcfuser
dcfuser@5[REDACTED]3's password:
Welcome to Ubuntu 16.04.2 LTS (GNU/Linux 4.4.0-71-generic x86_64)

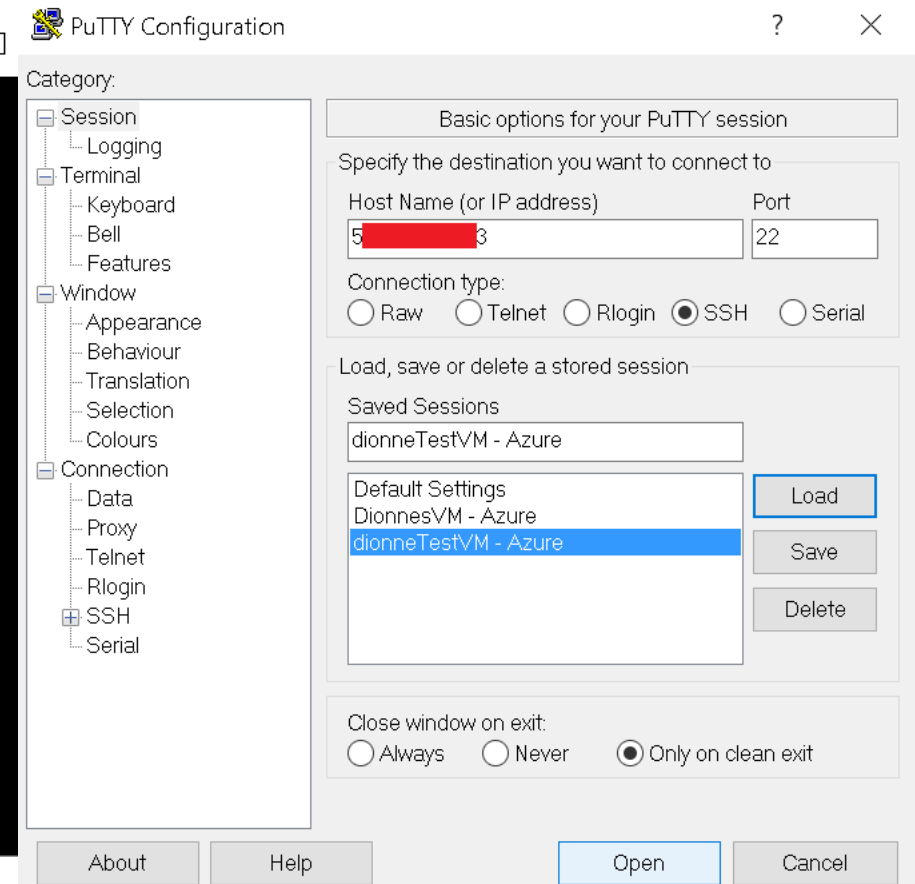
 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud

0 packages can be updated.
0 updates are security updates.

Last login: Sat May  6 00:00:18 2017 from [REDACTED]
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

dcfuser@dionneTestVM:~$
```

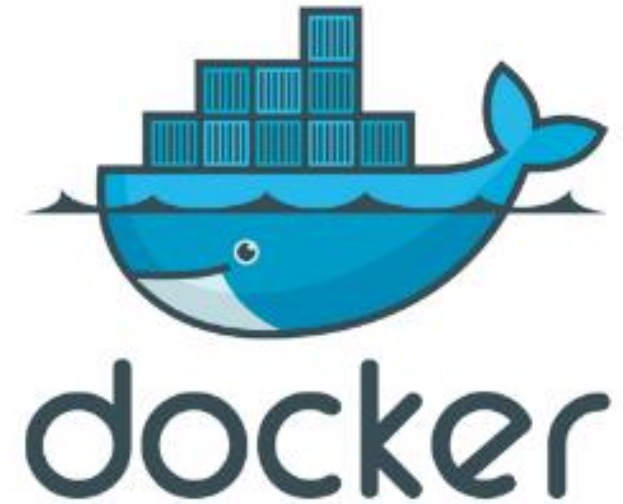


# AZURE LINUX VM - SET UP

*“Docker automates the repetitive tasks of setting up and configuring development environments so that developers can focus on what matters: building great software.*

*Developers using Docker don’t have to install and configure complex databases nor worry about switching between incompatible language toolchain versions. When an app is dockerized, that complexity is pushed into containers that are easily built, shared and run.”*

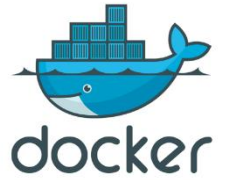
*[docker.com](https://docker.com)*





# AZURE VM AND DOCKER

## VIA DOCKER MACHINE AZURE DRIVER



```
C:\Users\Dionne>docker-machine create -d azure --azure-ssh-user ops --azure-subscription-id 7[REDACTED]9c --azure-resource-group dcfVMDockerMachineGroup --azure-location westeurope --azure-open-port 80 dcfmachine
```

```
Running pre-create checks...
(dcfmachine) Completed machine pre-create checks.
Creating machine...
(dcfmachine) Querying existing resource group. name="dcfVMDockerMachineGroup"
(dcfmachine) Creating resource group. name="dcfVMDockerMachineGroup" location="westeurope"
(dcfmachine) Configuring availability set. name="docker-machine"
(dcfmachine) Configuring network security group. location="westeurope" name="dcfmachine-firewall"
(dcfmachine) Querying if virtual network already exists. name="docker-machine-vnet" rg="dcfVMDockerMachineGroup" location="westeurope"
(dcfmachine) Creating virtual network. location="westeurope" name="docker-machine-vnet" rg="dcfVMDockerMachineGroup"
(dcfmachine) Configuring subnet. name="docker-machine" vnet="docker-machine-vnet" cidr="192.168.0.0/16"
(dcfmachine) Creating public IP address. static=false name="dcfmachine-ip"
(dcfmachine) Creating network interface. name="dcfmachine-nic"
(dcfmachine) Creating storage account. name="vhds4l0fa5lso94q2weg40qu" location="westeurope" sku=Standard_LRS
(dcfmachine) Creating virtual machine. location="westeurope" size="Standard_A2" username="ops" osImage="canonical:UbuntuServer:16.04.0-LTS:latest" name="dcfmachine"
Waiting for machine to be running, this may take a few minutes...
Detecting operating system of created instance...
Waiting for SSH to be available...
Detecting the provisioner...
Provisioning with ubuntu(systemd)...
Installing Docker...
Copying certs to the local machine directory...
Copying certs to the remote machine...
Setting Docker configuration on the remote daemon...
Checking connection to Docker...
Docker is up and running!
To see how to connect your Docker Client to the Docker Engine running on this virtual machine, run: docker-machine env dcfmachine
```

# AZURE VM AND DOCKER EXTENSION VIA ARM Templates

<https://portal.azure.com/#create/Microsoft.Template>

## Azure QuickStart Template

<https://github.com/Azure/azure-quickstart-templates/tree/master/docker-simple-on-Ubuntu/azuredeploy.json>

Edit template

Edit your Azure Resource Manager template

+

Add resource

↑

Quickstart template

↶

Load file

⬇

Download

Parameters (5)

Variables (17)

Resources (6)

[parameters('newStorageAccountName')]

[variables('publicIPAddressName')]

[variables('virtualNetworkName')] (...)

[variables('nicName')] (Microsoft.Ne...

[variables('vmName')] (Microsoft.C...

[concat(variables('vmName'), '/', var...

```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTe
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "newStorageAccountName": {
6       "type": "string",
7       "metadata": {
8         "description": "Unique DNS Name for the Storage Account where the \
will be placed."
9       }
10    },
11    "adminUsername": {
12      "type": "string",
13      "metadata": {
14        "description": "Username for the Virtual Machine."
```

Save

Discard

Deploy an Ubuntu VM with Docker Engine

Azure quickstart template

TEMPLATE

docker-simple-on-ubuntu

6 resources

Edit template

Learn more

BASICS

\* Subscription

Visual Studio Professional

\* Resource group ⓘ

Create new

Use existing

dcfVMDockerExtensionGroup

\* Location

West Europe

SETTINGS

\* New Storage Account Name ⓘ

dcfvmdockerextstorage01

\* Admin Username ⓘ

dcfvmdockerextuser

\* Admin Password ⓘ

.....

\* Dns Name For Public IP ⓘ

dcfvmdockerext

Ubuntu OS Version ⓘ

16.04.0-LTS

TERMS AND CONDITIONS

Template information

Azure Marketplace Terms

Azure Marketplace

By clicking "Purchase," I (a) agree to the applicable legal terms associated with the offering; (b) authorize Microsoft to charge or bill my current payment method for the fees associated the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s); and (c) agree that, if the deployment involves 3rd party offerings, Microsoft may share my contact information and other details of such deployment with the publisher of that offering.

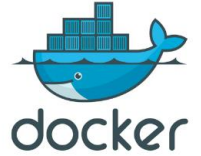
Microsoft assumes no responsibility for operations performed by third-party templates and does not provide rights for third...

☐ I agree to the terms and conditions stated above

☐ Pin to dashboard

Purchase

# DOCKER EXAMPLE



- Pre-built Image - Oracle XE 11g <https://hub.docker.com/r/wnameless/oracle-xe-11g>

```
docker pull wnameless/oracle-xe-11g
```

```
docker run -d -p 49160:22 -p 49161:1521 -p 49162:8080 wnameless/oracle-xe-11g
```

- Custom Image – Based on JBOSS Wildfly <https://hub.docker.com/r/jboss/wildfly>

1) Create a Dockerfile

```
FROM jboss/wildfly
```

```
ADD hello.war /opt/wildfly/standalone/deployments/
```

2) Build the Dockerfile to create an image: ***docker build --tag=wildfly-app .***

3) Run container based on the built images: ***docker run -it -p 8080:8080 wildfly-app***

4) Check container is running: ***docker ps***



# DOCKER EXAMPLE VIA COMPOSE

~\$vi docker-compose.yml

```
wildfly:
  image: jboss/wildfly
  depends_on:
    - db-oracle:db
  ports:
    - 80:80

db-oracle:
  image: wnameless/oracle-xe-11g
  ports:
    - 49161:1521
    - 49162:8080
```

\$docker-compose ps

~\$docker-compose up -d

```
dcfvmdockerextuser@MyDockerVM:~$ docker-compose up -d
Pulling db-oracle (wnameless/oracle-xe-11g:latest)...
latest: Pulling from wnameless/oracle-xe-11g
8aec416115fd: Pull complete
695f074e24e3: Pull complete
946d6c48c2a7: Pull complete
bc7277e579f0: Pull complete
2508cb0de94b: Pull complete
0f39b2269587: Pull complete
72a6f16c5b79: Pull complete
Digest: sha256:e19b086b2d96325a4473d1a9cf44b9d8273b259c34b86d54e5c92452ac97ba54
Status: Downloaded newer image for wnameless/oracle-xe-11g:latest
Creating dcfvmdockerextuser_db-oracle_1
Pulling wildfly (jboss/wildfly:latest)
latest: Pulling from jboss/wildfly
93857f76ae30: Pull complete
cde6403934ad: Pull complete
f847b784f425: Pull complete
ab2339d8111f: Pull complete
c800c0516286: Pull complete
Digest: sha256:c640e962467ca5047a96a94
Status: Downloaded newer image for jboss/wildfly:latest
Creating dcfvmdockerextuser_wildfly_1
```

```
dcfvmdockerextuser@MyDockerVM:~$ docker-compose ps
```

Name	Command	State	Ports
dcfvmdockerextuser_db-oracle_1	/bin/sh -c /usr/sbin/start ...	Up	0.0.0.0:49161->1521/tcp, 22/tcp, 0.0.0.0:49162->8080/tcp
dcfvmdockerextuser_wildfly_1	/opt/jboss/wildfly/bin/sta ...	Up	0.0.0.0:80->80/tcp, 8080/tcp

## Life Before Docker



Stressed Out!

## Life Since Docker



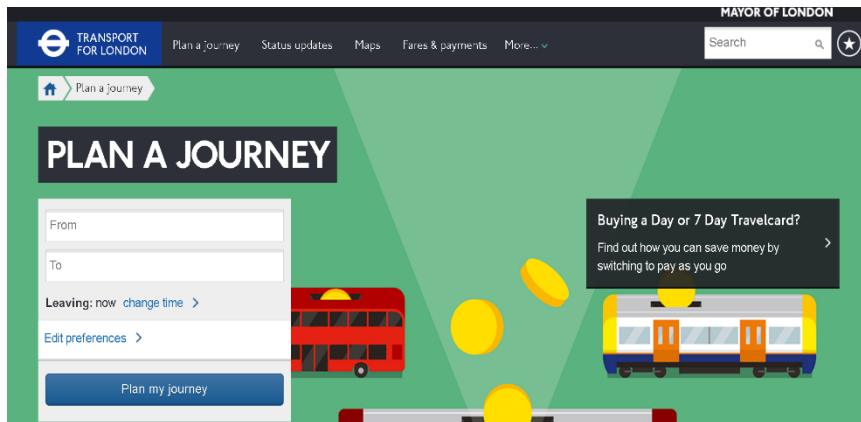
Stress Free and Relaxed

# TFL AND THE CLOUD



AZURE

AWS



AWS

AZURE



# TFL AND THE CLOUD

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- TfL Wide Application Hosting Strategy currently being planned
- Cloud First approach, followed by Hybrid Cloud/On-premises approach
- Initial review shows over 50% of existing applications ready for cloud hosting (i.e. lift and shift).
- Deeper dive discovery is planned to confirm.

# JOURNEY TO THE CLOUD

## A Developer's Perspective

- Cloud Computing provides time savings, simplicity, flexibility for Developers
- Many Cloud Computing Providers out there to learn about
- Get started with Azure App Service and Azure Virtual Machines
- Save your sanity, just use Azure VMs with Docker and Compose
- Give it a go.... Cloud computing is not as complicated as it first seems

<https://azure.microsoft.com/en-us/try/app-service/>

<https://azure.microsoft.com/en-gb/campaigns/developer-guide/>

- Slides: [https://github.com/dionnecf/journey\\_to\\_the\\_cloud](https://github.com/dionnecf/journey_to_the_cloud)