Docker and Microsoft Azure Kubernetes Service

4 .NET Developers

Daniel Krzyczkowski

Daniel Krzyczkowski

- **Software Developer @ Predica.pl**
- **Microsoft Most Valuable Professional**

DevIsland.pl

@DKrzyczkowski

Agenda

- Docker glossary
- Kubernetes glossary
- Introduction to Azure Kubernetes Service
- Introduction to Azure Container Registry
- Helpful tools for .NET Developers
- All together!

Docker glossary

Docker glossary

Docker

An open, containerization platform for developers and sysadmins to build, ship, and run distributed applications. It enables to package and deploy an application or service as an isolated unit containing all of its dependencies whether on laptops, data center VMs, or the cloud

Container image

Container image an be explained as a box with all the dependencies and information required to create a container instance. Image is defined by the Docker file (described below) and it becomes immutable once built. Images can inherit configuration from other images – so the same as in .NET class can extend another class

Container

Docker container is an instance of a Docker image and represents the execution of a single application, process, or service. You can create multiple container instances from the same image. In our case we runned one container with ASP .NET Core Web API application

Dockerfile

A text file that contains instructions for how to build a Docker image

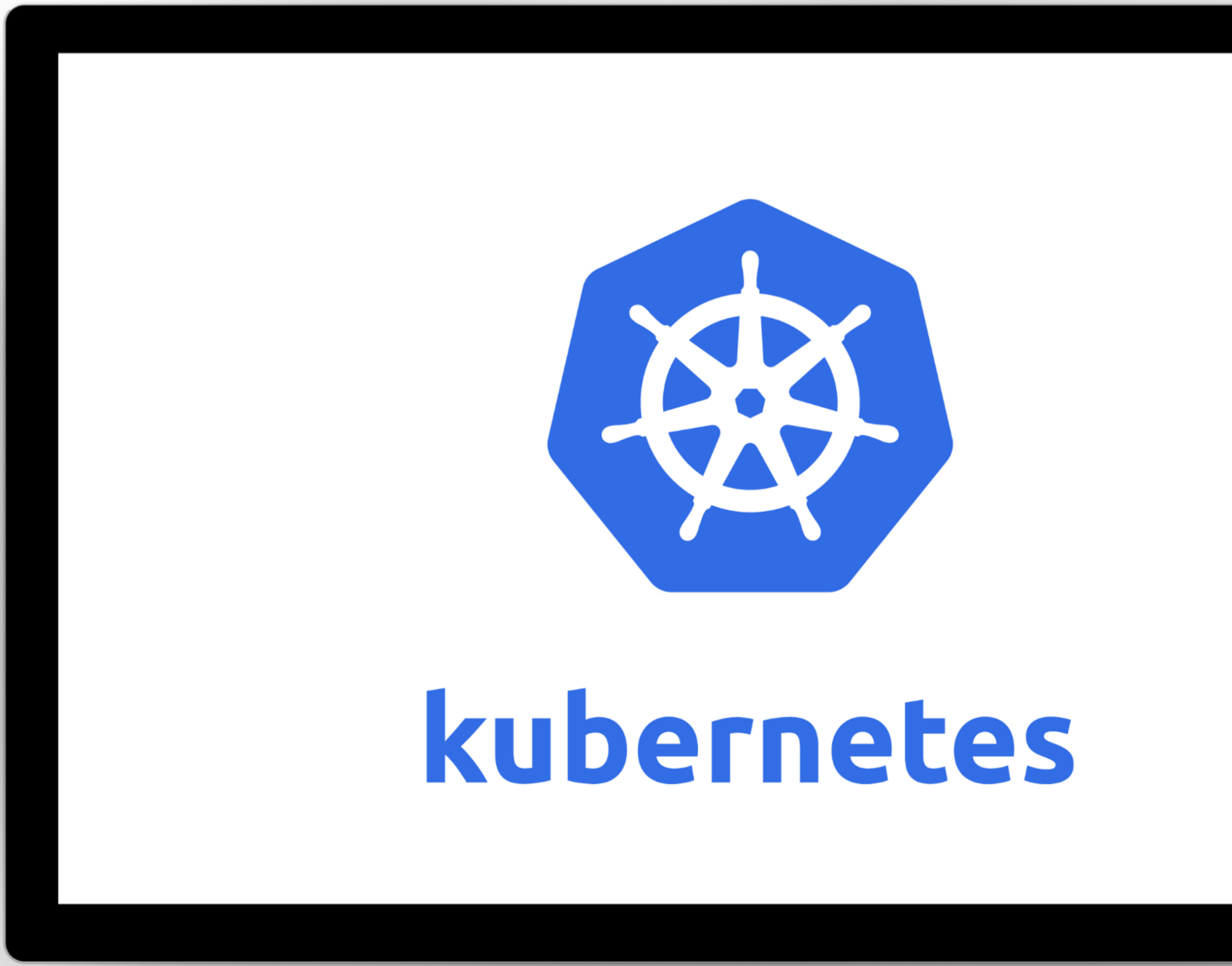
Docker compose

Docker compose YAML file specifies one or more containers that make up a single application or system. Within this file you have to specify the images that need to be started inside Docker containers, what are their dependencies or under which ports they should be available

Container host

Docker host is the underlying Operating System (OS) on which you will run Docker containers. It can be Physical or Virtual computer system. Docker will utilize shared OS kernel resources to run containers. Currently there are two types of Docker hosts: Linux and Windows

Kubernetes glossary



Kubernetes glossary I

Kubernetes

Kubernetes is an open-source system for automating deployment, scaling, and management of containerized applications. It is also called “containers orchestrator” because it enables managing groups of running containers and their lifecycle

Ingress

Ingress is load balancer which enables exposition one or more services to the outside world providing externally visible URLs to services and load-balance traffic with SSL termination

Node

Node is a host within a Kubernetes cluster – either physical or virtual machine. Nodes are managed by master – a collection of components, such as API server, scheduler, and controller manager. You can increase or decrease number of nodes within Kubernetes cluster

Cluster

Kubernetes cluster consists of nodes - physical or virtual machines that run applications and cloud workflows

Pod

Kubernetes Pod hosts application instance. A Pod is a Kubernetes abstraction that represents a group of one or more application containers (in our case Docker) and some shared resources for those containers like: shared storage or networking

Service

Kubernetes Service is an abstraction which defines a logical set of Pods including policy by which to access them. To clarify and not make topic so complicated imagine that service is just an abstraction which enables decoupling between pods and external world and access to applications within containers in the pod

Kubernetes glossary II

ReplicaSet

ReplicaSet manages a group of pods of the same type and ensures that a specific number of pods are always running. If a pod crashes, a replica set restores it

Deployment

Deployment is a resource that ensures the reliable roll out of an application. It creates a replica set that is used to manage a group of pods of the same type. If a pod crashes then another one is automatically created through the replica set

ConfigMap

ConfigMap enables keeping image configuration options separate from containers and pods. Configuration options are stored as a key-value pairs and exposed as an environment variables

Secret

Secrets are very similar to ConfigMaps but they are responsible for storing sensitive information like passwords

Namespace

Namespace can be compared to namespace from .NET world. Each namespace is isolated. Each application (or micro-service) can be deployed to specific namespace. Kubernetes cluster has at least two built-in namespaces. These are default and kube-system

Helm

Packages manager for Kubernetes

Azure Kubernetes Service (AKS)

kubernetes

Azure

AKS benefits

Kubernetes master and all nodes are deployed and configured

Azure Kubernetes Service supports the Docker image format

AKS clusters are created with support for Azure Files and Azure Disks

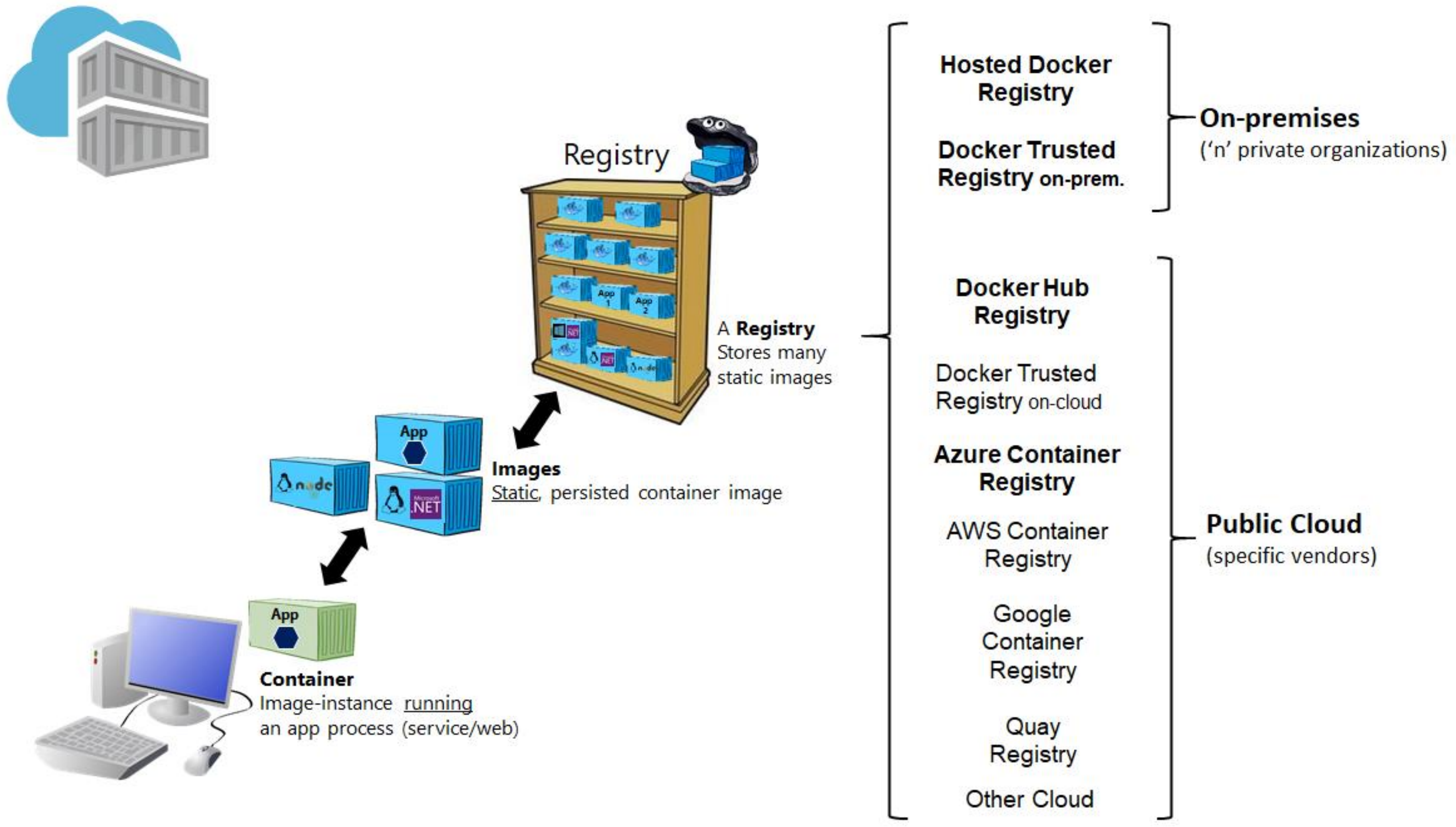
Integration with Azure Container Registry (ACR)

HTTP Application Routing solution makes it easy to access applications deployed to AKS cluster

Azure Kubernetes Service enables reduction of the complexity and operational overhead of managing Kubernetes.

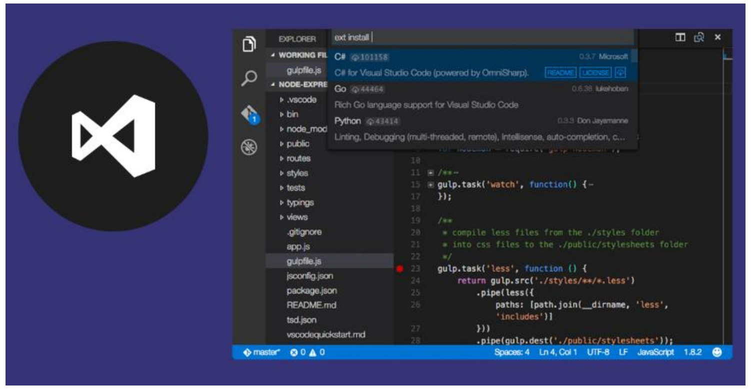
Azure Container Registry

Azure Container Registry



Helpful tools for .NET Developers

Helpful tools for .NET Developers



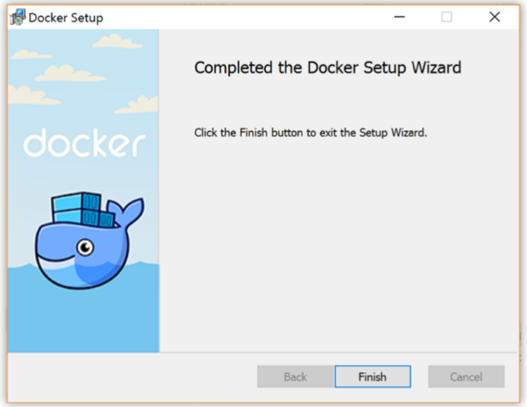
ext install

C# 101158 — 0.3.7 Microsoft
C# for Visual Studio Code (powered by OmniSharp). README LICENSE
Go 44464 — 0.6.38 lukehoban
Rich Go language support for Visual Studio Code
Python 43414 — 0.3.3 Don Jayamanne
Linting, Debugging (multi-threaded, remote), Intellisense, auto-completion, c...

```
/**-
gulp.task('watch', function() {-
});

/**
 * compile less files from the ./styles folder
 * into css files to the ./public/stylesheets folder
 */
gulp.task('less', function () {
    return gulp.src('./styles/**/*.less')
        .pipe(less({
            paths: [path.join(__dirname, 'less',
            'includes')]
        }))
        .pipe(gulp.dest('./public/stylesheets'));
```

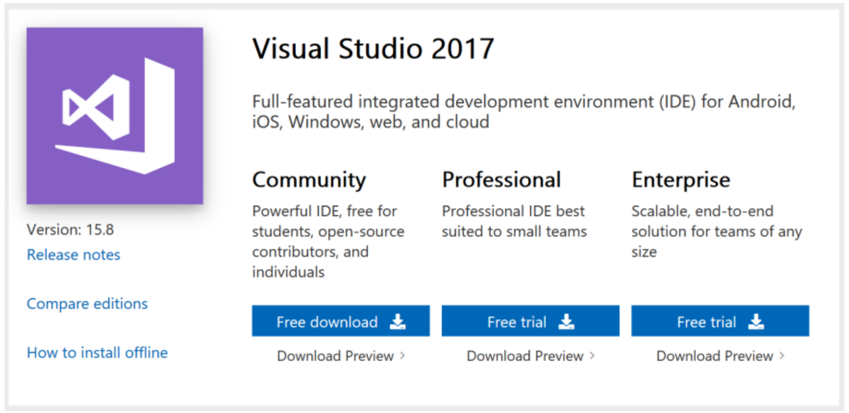
[Visual Studio Code]



Completed the Docker Setup Wizard

Click the Finish button to exit the Setup Wizard.

[Docker for Windows]


Visual Studio 2017

Full-featured integrated development environment (IDE) for Android, iOS, Windows, web, and cloud

Version: 15.8
Release notes

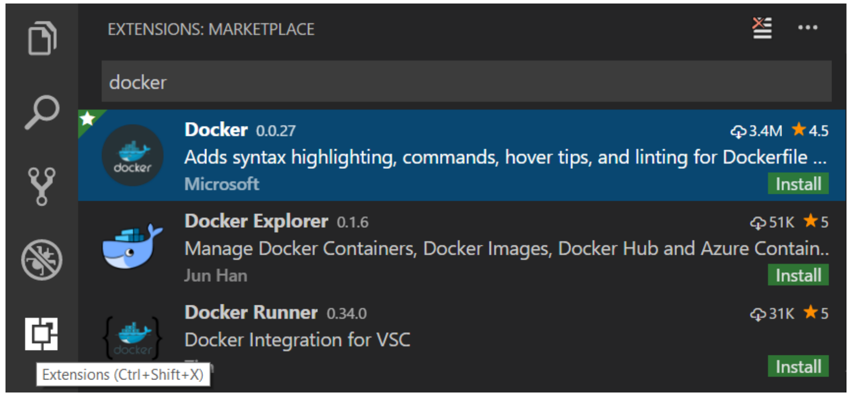
Compare editions

How to install offline

Community	Professional	Enterprise
Powerful IDE, free for students, open-source contributors, and individuals	Professional IDE best suited to small teams	Scalable, end-to-end solution for teams of any size
Free download	Free trial	Free trial
Download Preview ›	Download Preview ›	Download Preview ›

[Visual Studio 2017]

Helpful tools for .NET Developers


EXTENSIONS: MARKETPLACE

docker

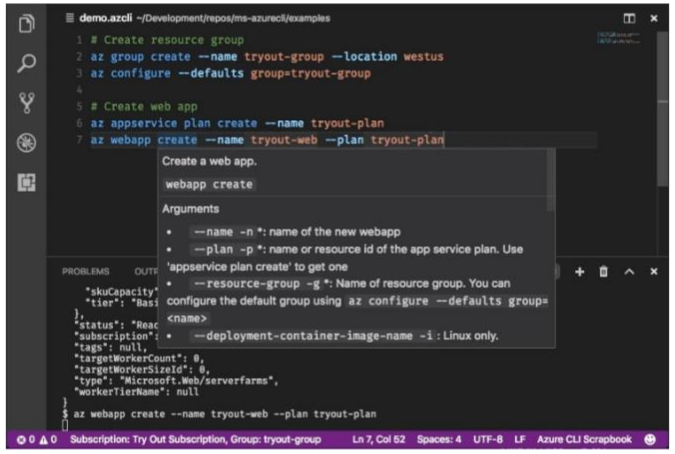
Docker 0.0.27 3.4M ★4.5
Adds syntax highlighting, commands, hover tips, and linting for Dockerfile ...
Microsoft Install

Docker Explorer 0.1.6 51K ★5
Manage Docker Containers, Docker Images, Docker Hub and Azure Contain..
Jun Han Install

Docker Runner 0.34.0 31K ★5
Docker Integration for VSC
Install

Extensions (Ctrl+Shift+X)

Docker extension for Visual Studio Code


demo.azcli ~/Development/repos/ms-azurecli/examples

```
# Create resource group
az group create --name tryout-group --location westus
az configure --defaults group=tryout-group

# Create web app
az appservice plan create --name tryout-plan
az webapp create --name tryout-web --plan tryout-plan
```

Create a web app.

`webapp create`

Arguments

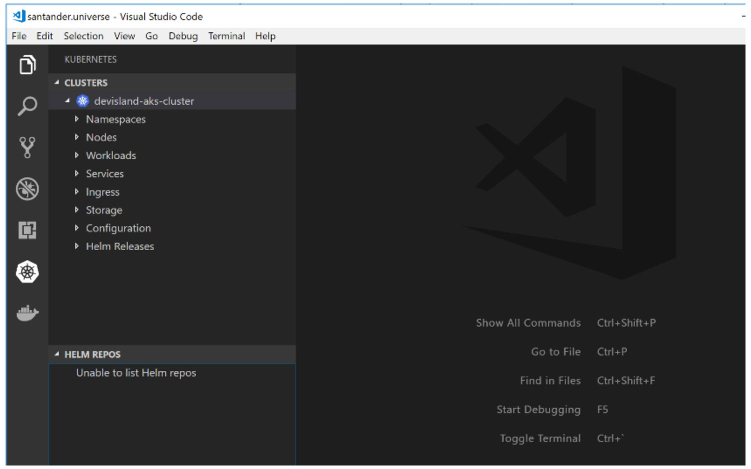
- `--name -n` *: name of the new webapp
- `--plan -p` *: name or resource id of the app service plan. Use 'appservice plan create' to get one
- `--resource-group -g` *: Name of resource group. You can configure the default group using `az configure --defaults group=<name>`
- `--deployment-container-image-name -i` : Linux only.

PROBLEMS OUTP

```
    "skuCapacity"
    "tier": "Basi
  },
  "status": "Reac
  "subscription":
  "tags": null,
  "targetWorkerCount": 0,
  "targetWorkerSizeId": 0,
  "type": "Microsoft.Web/serverfarms",
  "workerTierName": null
}
$ az webapp create --name tryout-web --plan tryout-plan
```

⊗ 0 ⚠ 0 Subscription: Try Out Subscription, Group: tryout-group Ln 7, Col 52 Spaces: 4 UTF-8 LF Azure CLI Scrapbook

Azure CLI Tools for Visual Studio Code


santander.universe - Visual Studio Code

File Edit Selection View Go Debug Terminal Help

KUBERNETES
CLUSTERS
devisland-aks-cluster
Namespaces
Nodes
Workloads
Services
Ingress
Storage
Configuration
Helm Releases

HELM REPOS
Unable to list Helm repos

Show All Commands	Ctrl+Shift+P
Go to File	Ctrl+P
Find in Files	Ctrl+Shift+F
Start Debugging	F5
Toggle Terminal	Ctrl+`

Kubernetes Tools extension for Visual Studio Code

All together!