There are only 10 kinds of people
those who understand binary
and those who don’t.

The Joy of…

Mike Benkovich
Principal Cloud Engineer
www.benkoTIPS.com

Title for this session…

Joy of sex

Title for this session…

~~Joy of sex~~

Joy of Code

Title for this session…

~~Joy of sex~~

~~Joy of Code~~

Joy of Dot Net Core

Title for this session…

~~Joy of sex~~

~~Joy of Code~~

~~Joy of Dot Net Core~~

Joy of Microservices

Title for this session…

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Joy of Containers

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~~Joy of Containers~~

Joy of Docker

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~~Joy of Code~~

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~~Joy of Containers~~

~~Joy of Docker~~

A Developer’s Dive into AZD and Dotnet Aspire

Title for this session…

A Developer’s Dive into AZD and Dotnet Aspire

A Developer's Dive into AZD and Dotnet Aspire

Mike Benkovich
Principal Cloud Engineer
www.benkoTIPS.com

Mike Benkovich

- Enterprise Cloud Architect & Consultant
- Live in **Minneapolis**
- Founder of **Imagine Technologies**, Inc.
- Developing Courses for **LinkedIn** Learning
- Blog www.benkoTIPS.com
- Follow @mbenko on **Twitter**
- Send me **Feedback**! mike@benko.com
- Azure **Office Hours** on Fridays! https://bit.ly/BnkAzHrs

Knowledge is knowing a tomato is a fruit.
Wisdom is not putting it in a fruit salad

Takeaways from today

What does **modernization** mean?

Should I **rewrite** in **.NET Core** ?

What about **Microservices**?

What are my Compute Options in **Azure?**

Virtualization vs **Containerize** vs **Cloud Native** ?

Do I need **Orchestration**?

Modernizing Compute: Options in Azure

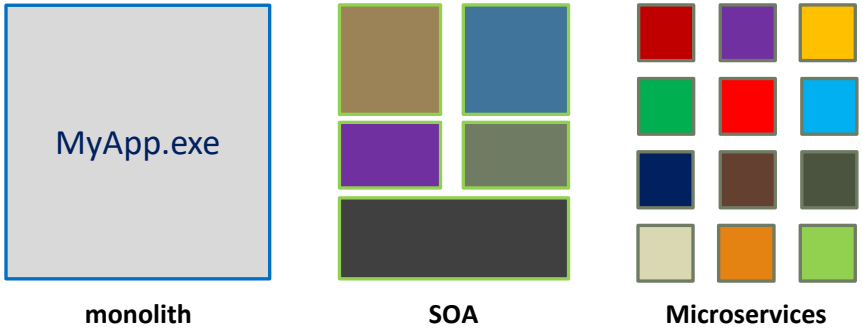
What does **modernize** mean to you?

.NET Core Cross Platform opens up choices

Virtual Machines vs **Containers**

Application **architectures** have evolved

- **Mono**lith
- **S**ervice **O**riented **A**rch
- **Micro**services

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I THINK WE SHOULD VIRTUALIZE THE PROCESS AND MOVE IT TO THE CLOUD.
HEY, THAT'S A GREAT IDEA!
NOW IT'S JUST ALL TOO EASY.
Dilbert.com DilbertCartoonist@gmail.com
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.NET “Core”

.NET 8.0

Cross Platform

Dependency Injection

Configuration

Cleaner code

Better Performance

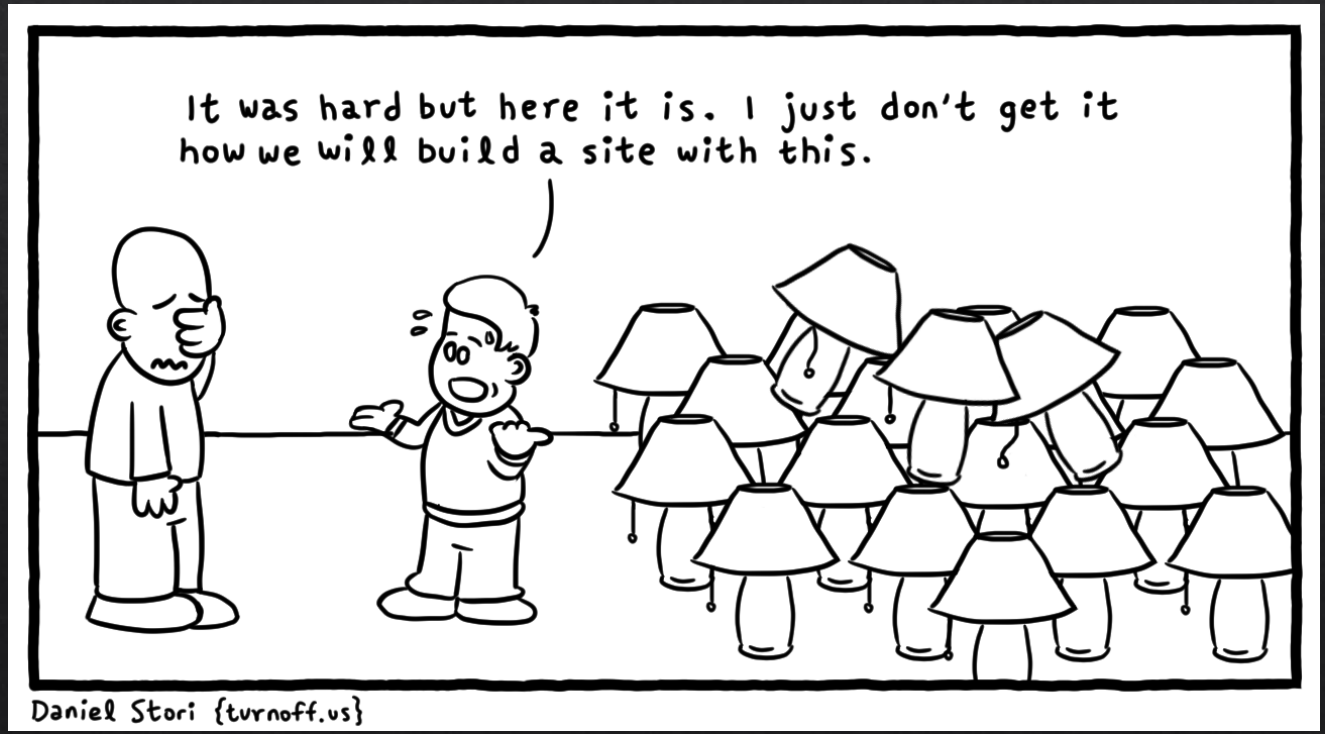
Tools

Visual Studio

VS Code

Command line (CLI)

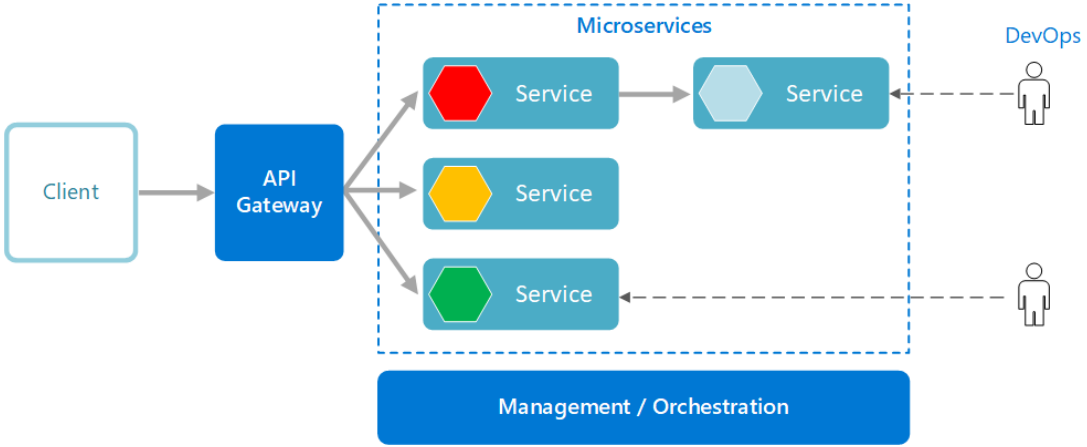
DEMO



http://turnoff.us/geek/wrong-architect/

Microservices

- Loosely coupled
- Bounded context
- Data Isolation
- Polyglot frameworks
- Scalable
- Versioned



A programmer had a problem.
He decided to use Java.
Now he has a **ProblemFactory**.

Project Tye – https://github.com/dotnet/tye

Explore containers without knowing about containers

Open source experiment

Service discovery

Streamline Deploy to Kubernetes

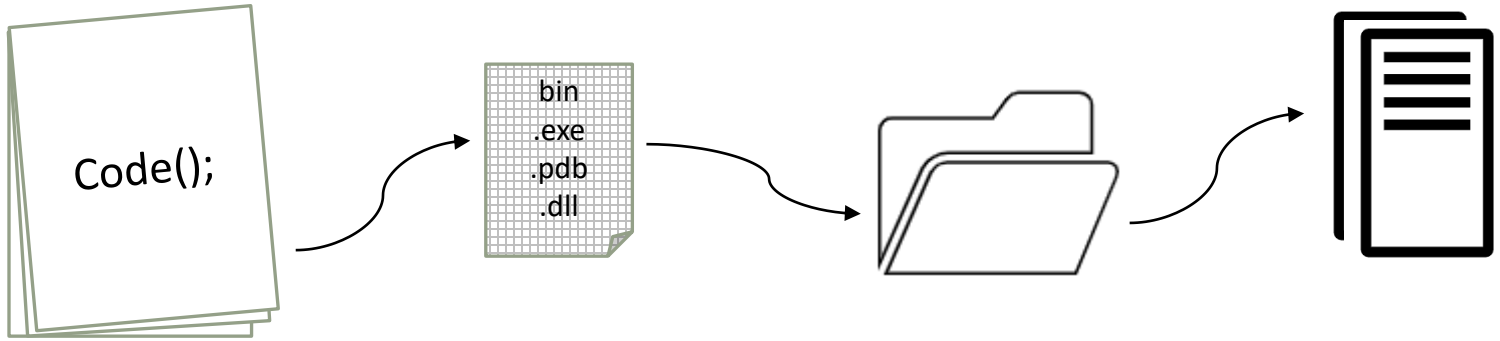
```
> tye run
> tye build
> tye deploy
```

Traditional App Deployment

Build executables into folders

Package **artifacts** .exe, .pdb, etc. according to needs

Copy **code** to running machines




APM TERMINALS
MAERSK LINE
MARSEILLE MÆRSK
KØBENHAVN

Containerization

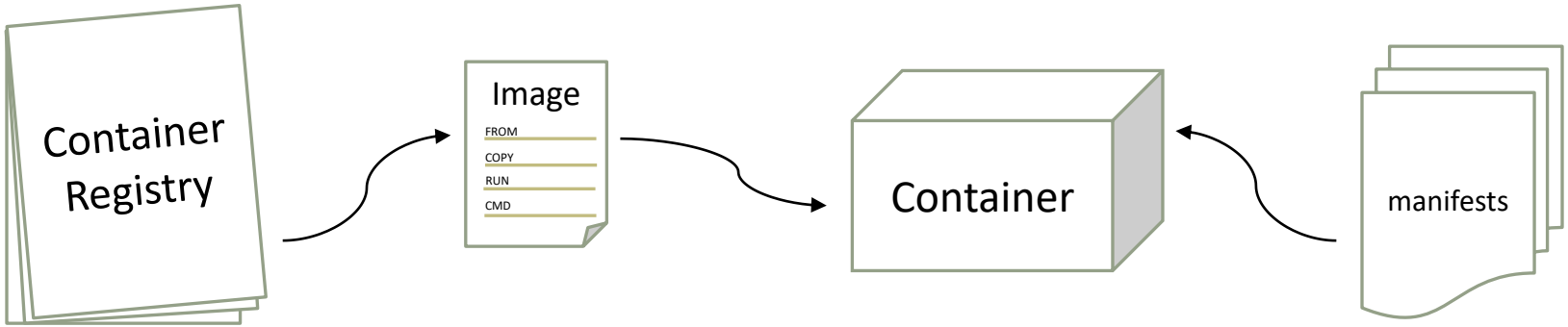
Process Virtualization vs **Machine** Virtualization

Instead of **code** deployment … **Image** delivery

Image is **File System** defined as diffs from base image

Image pushed to **Container Registry**

Pods pull image from Registry to start running **Container**



Docker file system

- Layers defined by commands in dockerfile
- Each layer is diff from previous layer
- Last layer typically is command to run image

Dockerfile - simple

```
FROM mcr.microsoft.com/dotnet/aspnet:7.0

WORKDIR /app

COPY dist .

RUN

ENV EnvName=SimpleDocker
EXPOSE 80

CMD ["dotnet", "myApp.dll"]
```

Dockerfile – vs code

```
FROM mcr.microsoft.com/dotnet/sdk:7.0 as build
WORKDIR /src
COPY bnkApp.csproj .
RUN dotnet restore
COPY . .
RUN dotnet publish -c release -o /app

FROM mcr.microsoft.com/dotnet/aspnet:7.0 as publish
WORKDIR /app
ENV EnvName=Docker
COPY --from=build /app .
ENTRYPOINT ["dotnet","bnkApp.dll"]
```

Docker commands

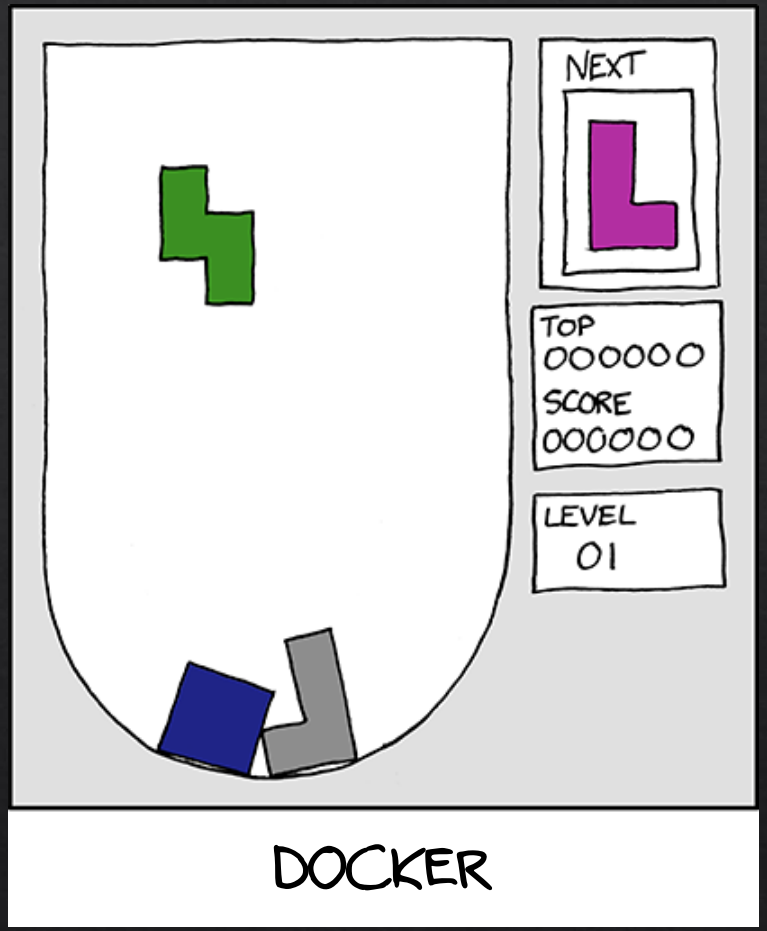
```
> docker build -t imagename .

> docker image list

> docker run   -it --rm -p 5000:80 imagename

> docker push
```

DEMO



http://xkcd.com/724/

Docker-Compose

- Run docker commands for you
- Build and run many services
- Define dependencies

Docker-Compose.yml

```
version:  '3’

services:
  bnkapp:
    image: bnkapp
    ports:
    - 5100:80
    environment:
    - EnvName=DockerCompose
    depends_on:
    - bnkapi

 bnkapi:
    image: bnkapi
    ports:
    - 5200:80
```

Docker Compose commands

> docker-compose build

> docker compose up

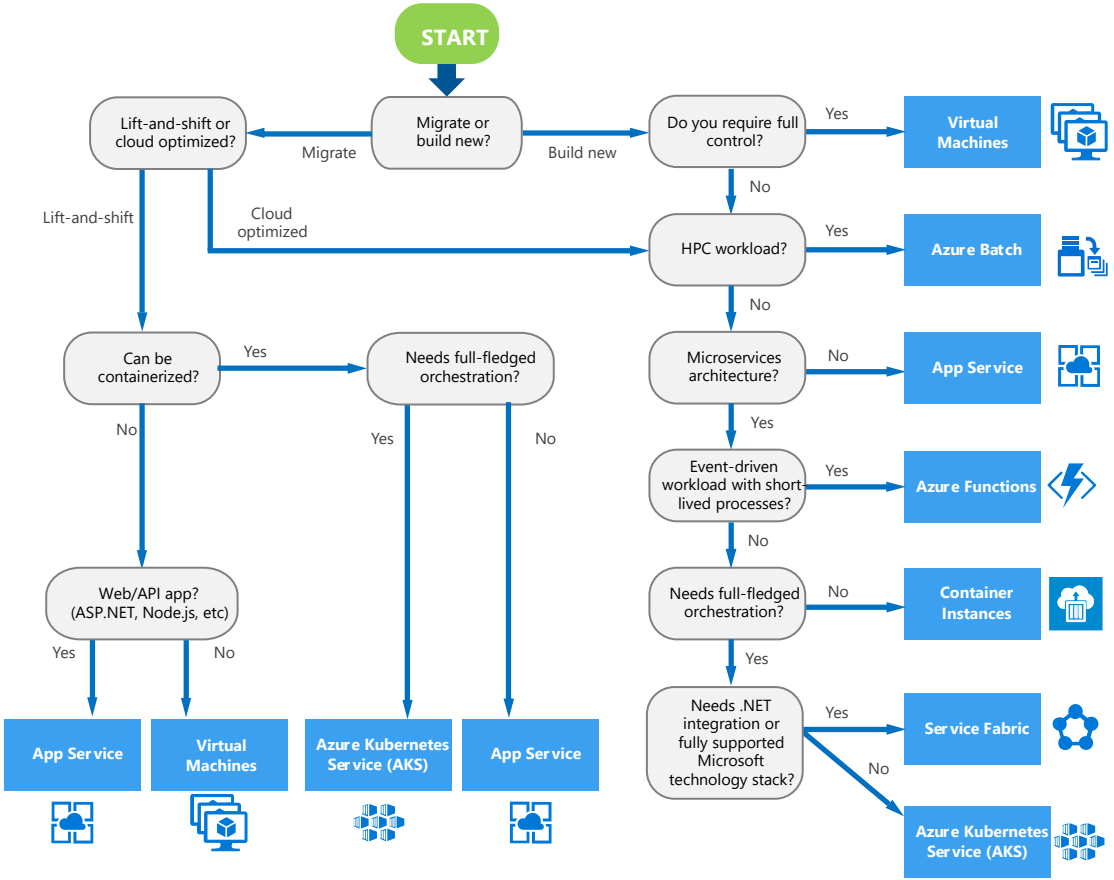
> docker compose down

DEMO

You do not need a parachute to skydive you need a parachute to skydive twice

Azure Options

- Is it legacy or green field?
- Do we re-write or port?
- Can it be containerized?
- Monolith vs Microservices?
- Serverless?



https://docs.microsoft.com/en-us/azure/architecture/guide/technology-choices/compute-decision-tree

Create image with ACR

```
az acr build
  --image $appImg
  --registry $acrName
  -f ./src/$appName/Dockerfile ./src/$appName
  --build-arg tag=latest
```

Choose an Azure container service - Azure Architecture Center | Microsoft Learn - https://bit.ly/azcontaineropts

Container Options in Azure

Web App for Container

- App Service Plan
- Most PaaS
- Least customization and control
- Quick deployment CI/CD
- Automatic Integrations

NOT Best when…

- Complex Microservices
- Granular OS/Network needs

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```
az appservice plan create
  --name $planName
  --resource-group $rg
  --sku B1 --is-linux


az webapp create
  --resource-group $rg
  --plan $planName
  --name myweb-ctr
  --deployment-container-image-name
        $appImg
```

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- Environments
- Host single workload
- Integration with DAPR, KEDA
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- Full K8S features
- Specific Kubernetes tooling

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```
az containerapp up
-n $appName-aca
-g $rg
--environment $env
--image $appImg
--ingress external
```

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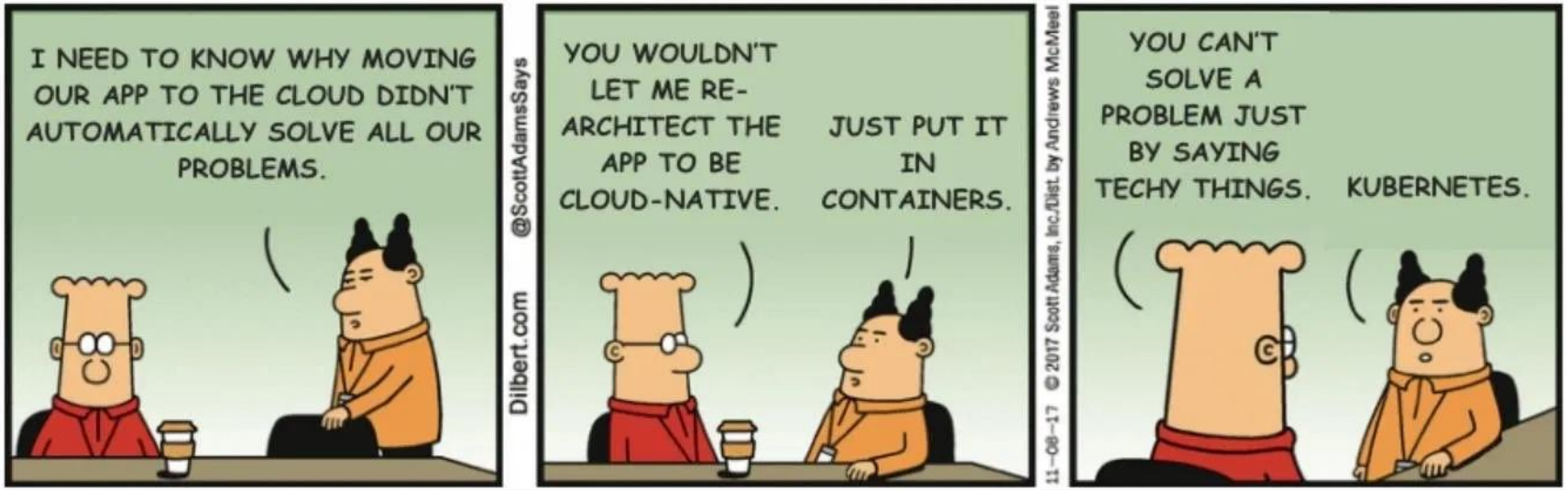
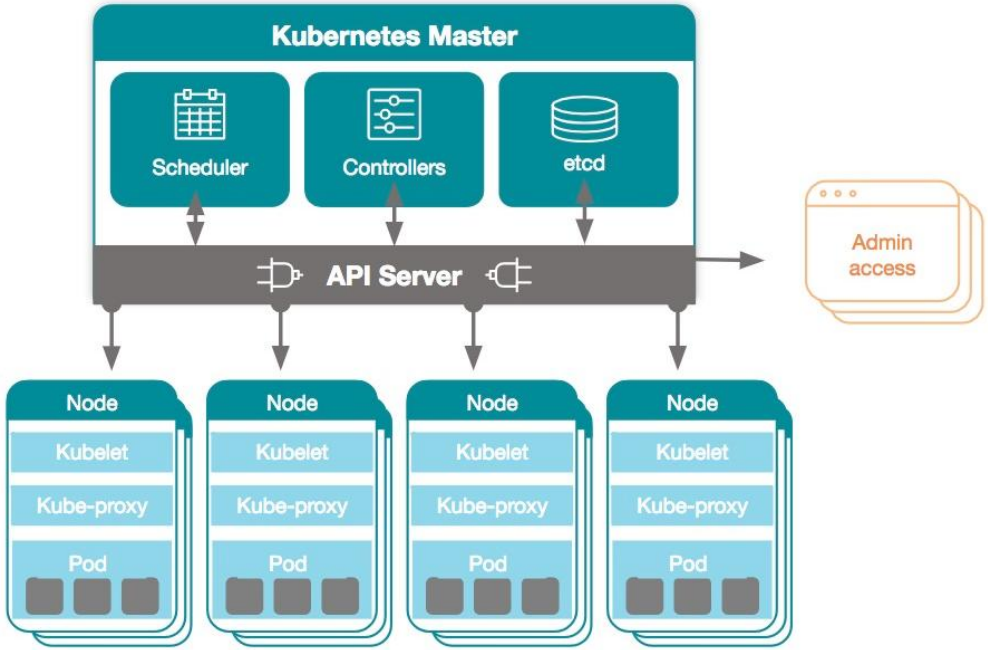

I NEED TO KNOW WHY MOVING OUR APP TO THE CLOUD DIDN'T AUTOMATICALLY SOLVE ALL OUR PROBLEMS.
Dilbert.com @ScottAdamsSays
YOU WOULDN'T LET ME RE-ARCHITECT THE APP TO BE CLOUD-NATIVE.
JUST PUT IT IN CONTAINERS.
11-08-17 © 2017 Scott Adams, Inc./Dist. by Andrews McMeel
YOU CAN'T SOLVE A PROBLEM JUST BY SAYING TECHY THINGS.
KUBERNETES.

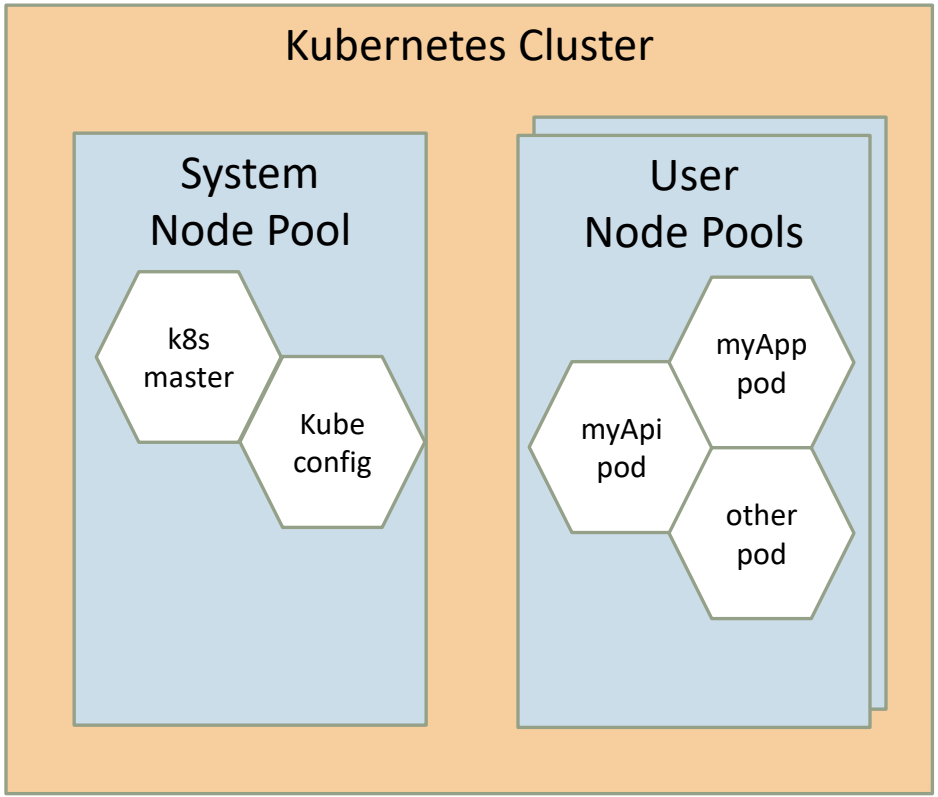
Orchestration – Kubernetes (AKS)

- Portability
- Deployment options
- Self-healing
- Scheduling
- Scalability
- Availability
- Service discovery



Kubernetes

- Cluster
- Node Pools
- Nodes (VM Scale Set)
- Pods
- Containers
- Sidecars



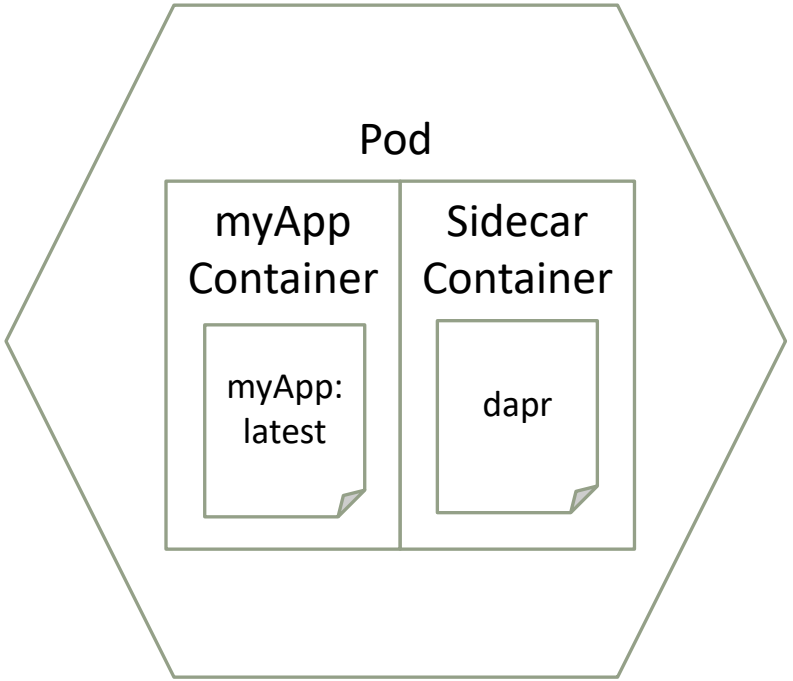
Pod

Runs on a Node

Starts container from image

Container has addressable IP

Consumes memory & cpu



Kubectl – Interact with control plane

Works with Kubernetes objects in form of YML

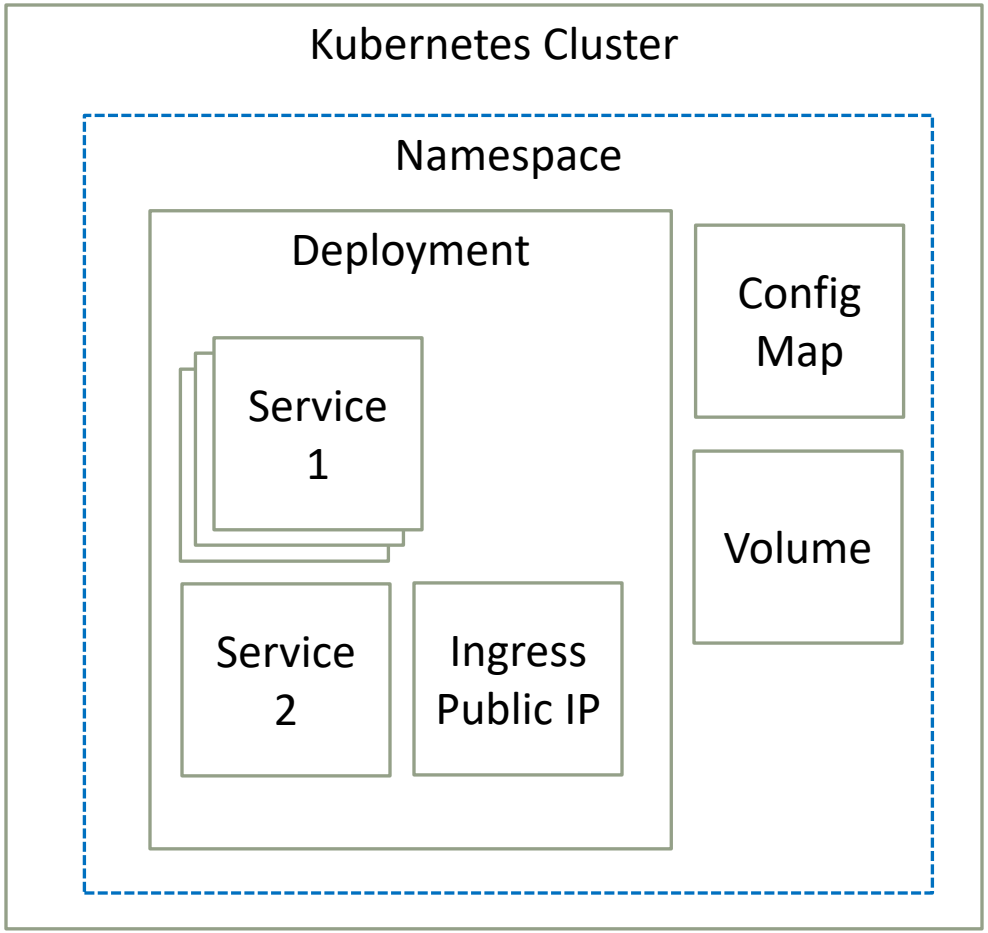
Saves connection info in .kubeconfig in user folder

Set context for cluster before entering commands, for example:

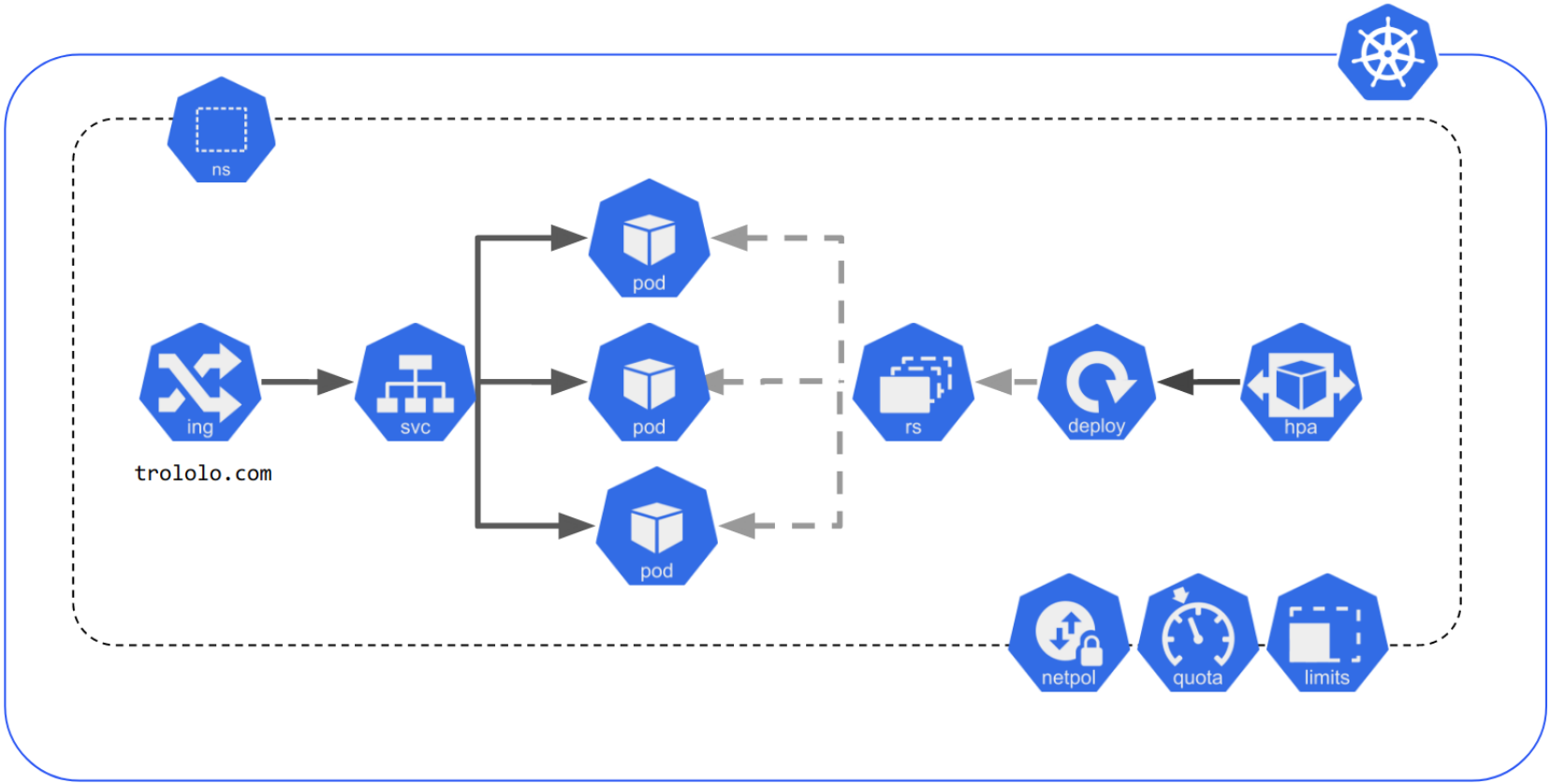
```
kubectl cluster-info
kubectl get all –A
kubectl run myapp-pod --image ghcr.io/mbenko/myapp:latest
kubectl exec -ti myapp-pod -- bash
kubectl port-forward myapp-pod 8080:80
kubectl logs myapp-pod
kubectl apply –f my-service.yml
```

Kubernetes Objects

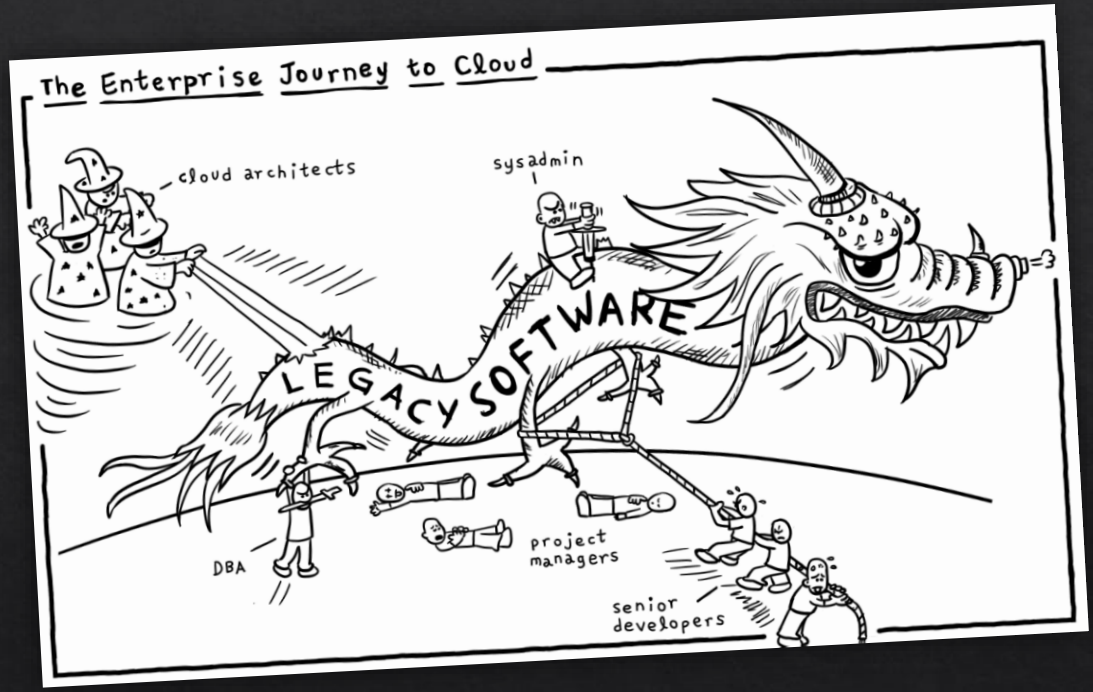
- Namespaces
- Deployment
- Service
- Ingress/Load Balancers
- Config Maps
- Volumes
- Other…



For example...


ns
ing
trololo.com
svc
pod
pod
pod
rs
deploy
hpa
netpol
quota
limits

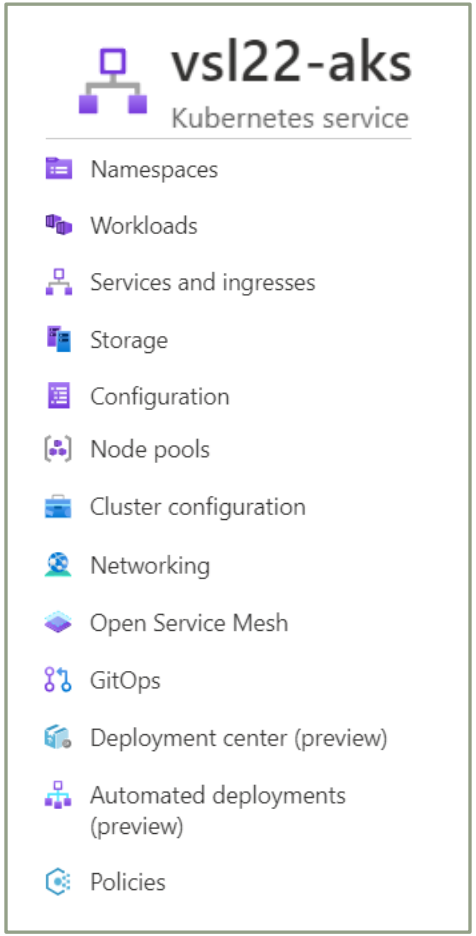
DEMO

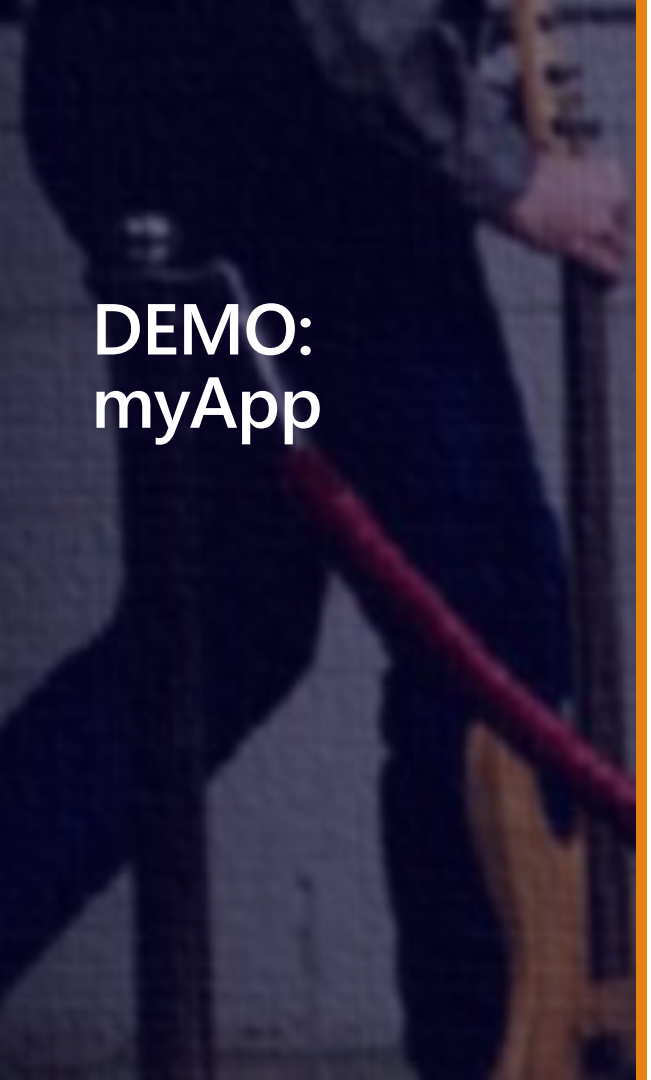


http://turnoff.us/geek/enterprise-vs-startup-journey-to-cloud/

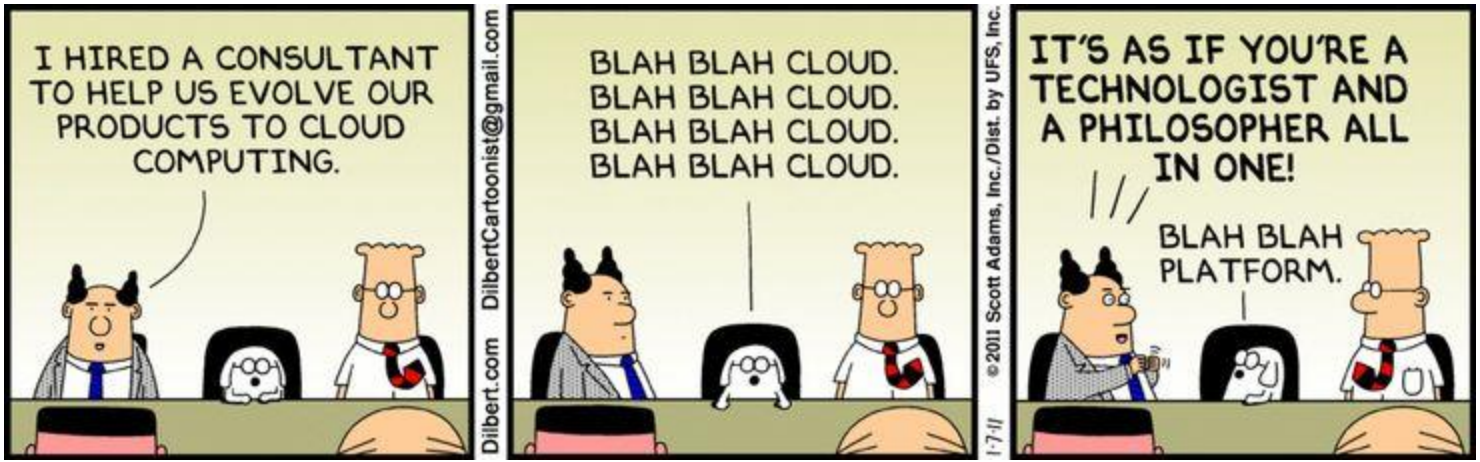
AKS = Azure Kubernetes

- Managed Kubernetes
- Enables managed identity
- Security & compliance done right
- Resource choices
- Integrated with Azure Services





DEMO: myApp


I HIRED A CONSULTANT TO HELP US EVOLVE OUR PRODUCTS TO CLOUD COMPUTING.
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BLAH BLAH CLOUD.
BLAH BLAH CLOUD.
BLAH BLAH CLOUD.
BLAH BLAH CLOUD.
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IT'S AS IF YOU'RE A TECHNOLOGIST AND A PHILOSOPHER ALL IN ONE!
BLAH BLAH PLATFORM.

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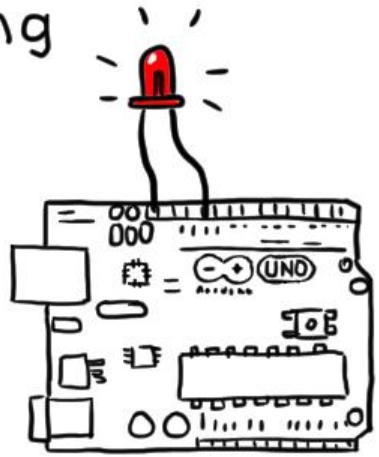
Conclusion

The **journey** to the cloud can be challenging

Take it a **step** at a time

Be aware of the **tools** that can ease the way

Just finished my first Arduino project:
A blinking led.



Next Step:
Update my LinkedIn profile.

Add Skill

Mechatronic Engineer

http://turnoff.us/geek/arduino-project/

Call to Action – Where can I get more info?

Visit my blog

www.benkotips.com

Schedule a **workshop** to make your IT workforce cloud aware

mike@benko.com

Try it out with **low hanging fruit** white chips