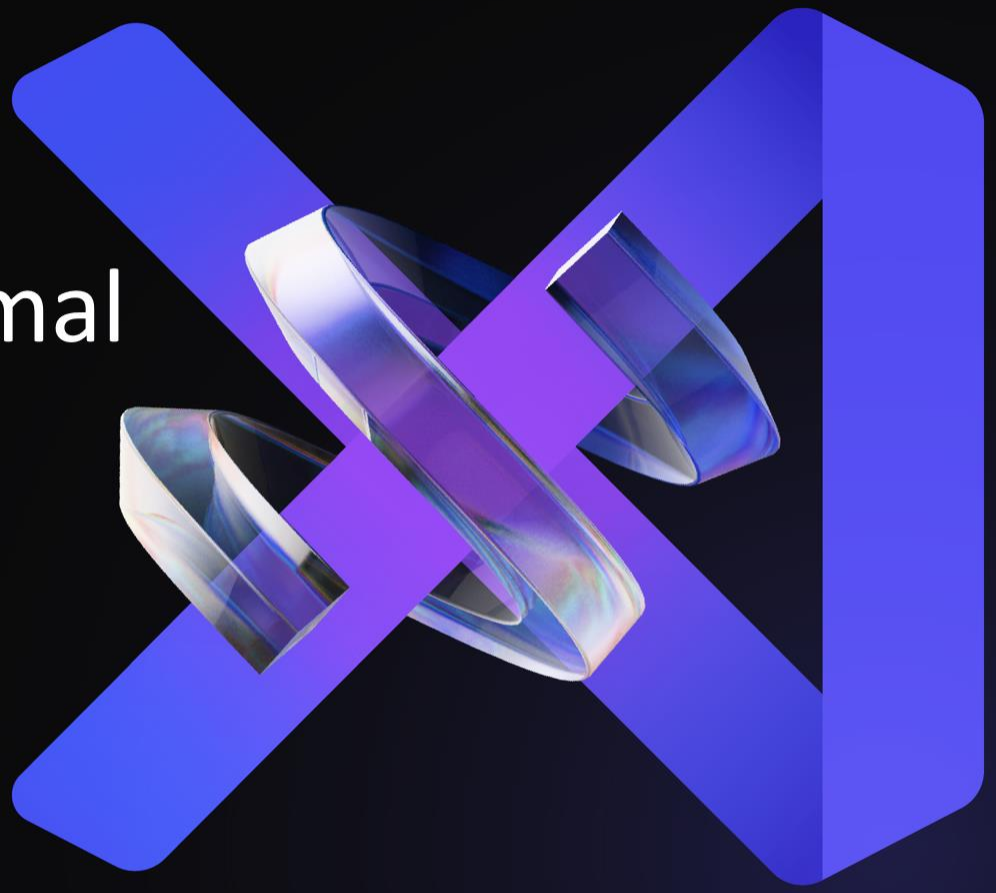
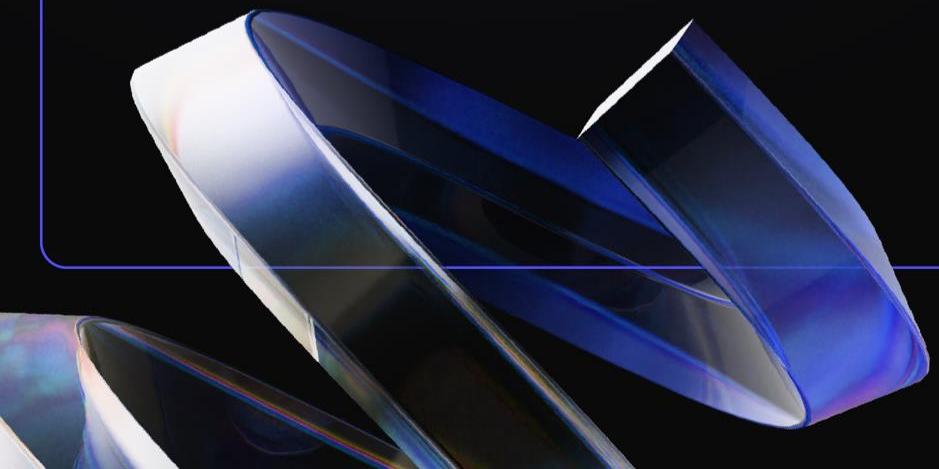
//MSTS/ MS TECH SUMMIT

Scaling to Success Leveraging KEDA and Kubernetes for Optimal Azure DevOps Pipeline Performance

Wolfgang Ofner





Organizatorem wydarzenia jest Fundacja Academic Partners

ACADEMIC PARTNERS

Wolfgang Ofner

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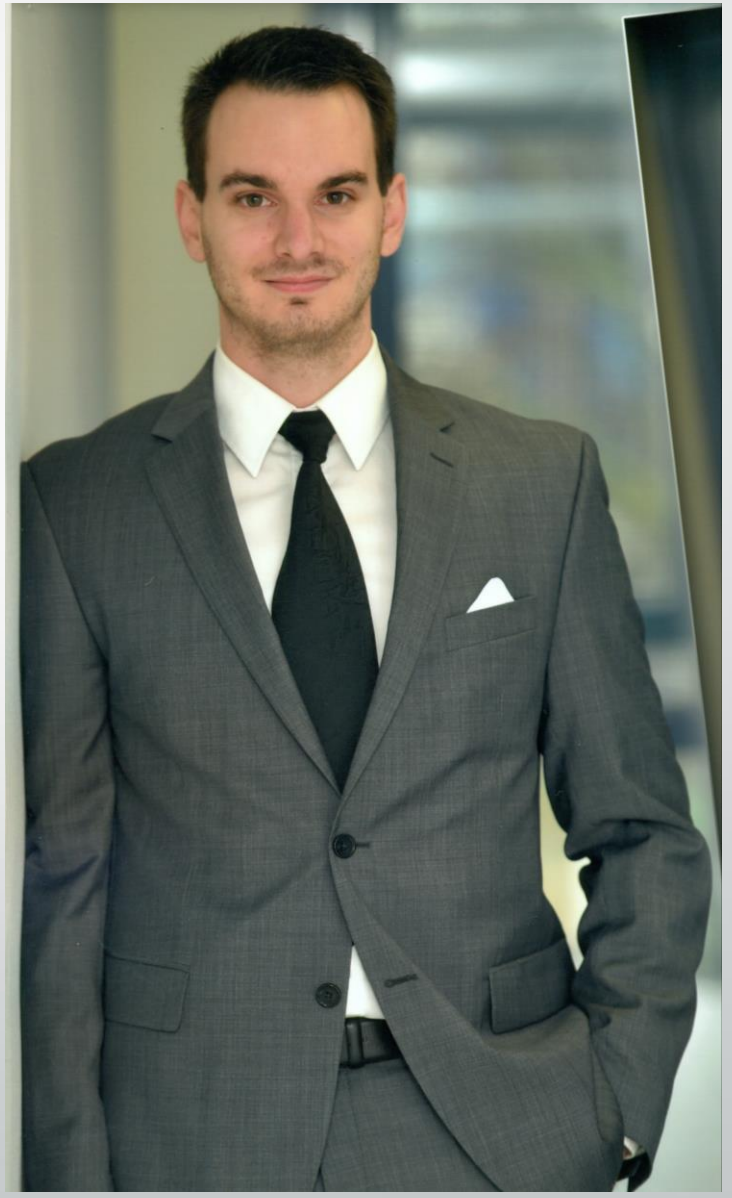
Focus on Azure, Kubernetes, DevOps, and .NET

https://programmingwithwolfgang.com

https://www.linkedin.com/in/wolfgangofner

https://www.youtube.com/@programmingwithwolfgang



Agenda

Architecture in SW projects

Introduction to KEDA

Scaling Azure DevOps Agents in Kubernetes

KEDA Conclusion

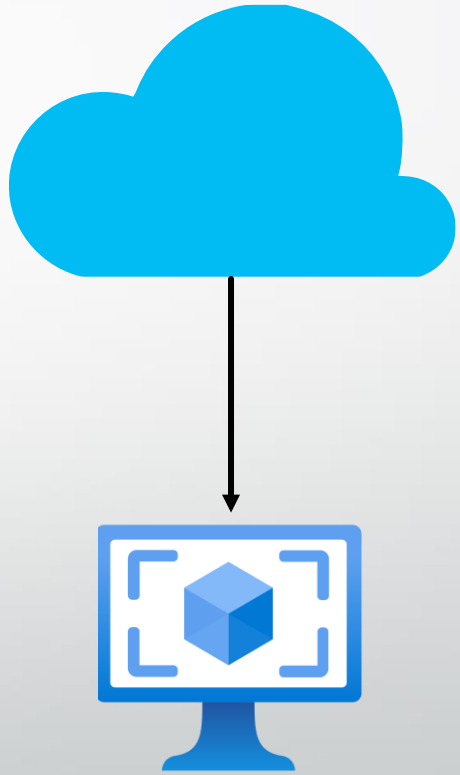
Simplified Architecture History

Server – Client Architecture

Only few clients

No redundancy

No high availability

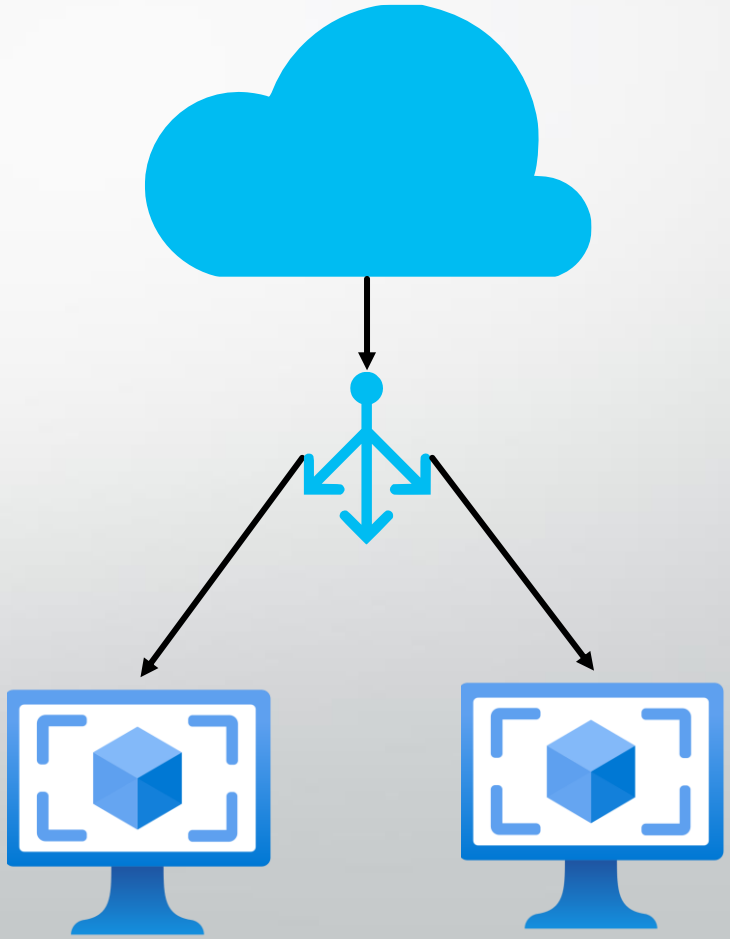


Simplified Architecture History

Static load balancing

New VMs need to be added by hand

Expensive on-premises hardware

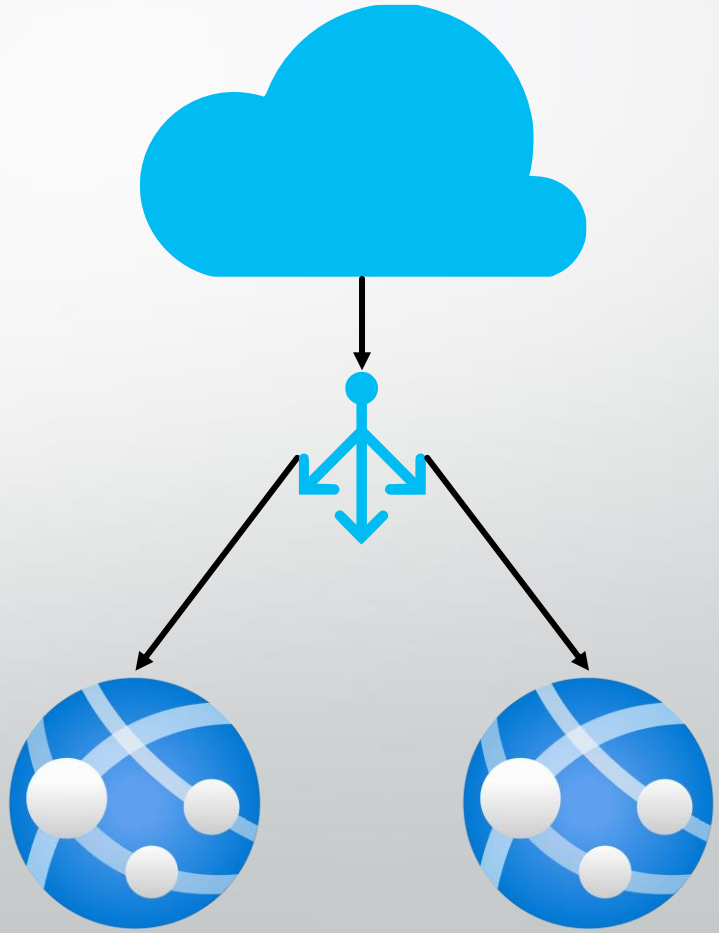


Simplified Architecture History

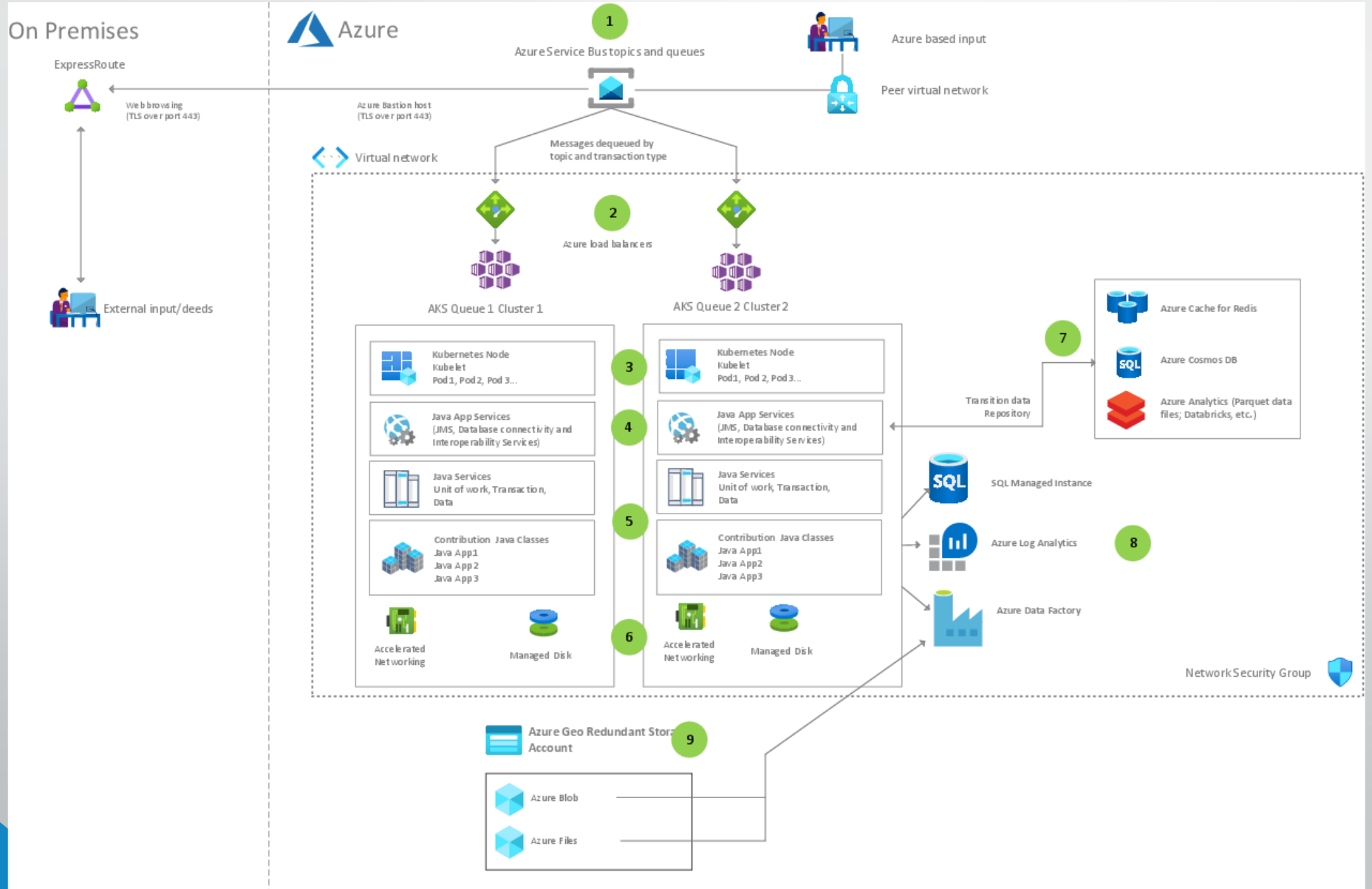
Automatically adding additional hardware

Pay only what you need

Mostly CPU or RAM based scaling



Modern Architecture



Kubernetes

Horizontal Pod Autoscaler (HPA)

- Scaling according to CPU and/or RAM

Architectures get more and more complex

Dependencies on external components

Applications have to react to events

- Database
- Service Bus
- Streams

Horizontal Pod Autoscaler

Scales Deployments or StatefulSets

Adds or removes pods

Scaling based on CPU or RAM usage

Scaling based on custom metrics

- Query custom metrics from Kubernetes API
- Prometheus
- requests per second

Horizontal Pod Autoscaler Configuration

```yaml
apiVersion: autoscaling/v1
kind: HorizontalPodAutoscaler
metadata:
  name: customerapi
  namespace: customerapi-test
spec:
  maxReplicas: 10
  minReplicas: 1
  averageCpuUtilization: 50
  scaleTargetRef:
    apiVersion: apps/v1
    kind: Deployment
    name: customerapi
```

```yaml
behavior:
  scaleDown:
    policies:
    - type: Pods
      value: 4
      periodSeconds: 60
    - type: Percent
      value: 10
      periodSeconds: 60
    selectPolicy: Min
```

```yaml
  scaleUp:
    policies:
    - type: Pods
      value: 5
      periodSeconds: 60
    - type: Percent
      value: 12
      periodSeconds: 60
    selectPolicy: Max
```

Limitation of the HPA

Black Friday

Thousands of orders are stored in a queue

Scaling using CPU or RAM is not sufficient

No option for scaling in this scenario

KEDA – Kubernetes Event-driven Autoscaling

Kubernetes Event-driven Autoscaling

Open source

CNCF Project

KEDA – Kubernetes Event-driven Autoscaling

Kubernetes Event-driven Autoscaling

Open source

CNCF Project

Maintained by

- Docplanner Tech
- Microsoft
- Red Hat

KEDA

64 built-in Scaler

- Apache Kafka
- Azure Blob Storage
- Azure Monitor
- Azure Service Bus
- Elastic Search
- MongoDB
- Prometheus
- Redis Streams

KEDA Use Cases

Scale according to external events

Scale to Zero

- Bring serverless to your datacenter
- Recreate Azure Functions architecture
- Better resource usage

KEDA Installation

Installation via Helm charts

Namespace: keda

KEDA Installation

kubectl create namespace keda

helm repo add kedacore https://kedacore.github.io/charts

helm repo update

helm install keda kedacore/keda --namespace keda

KEDA Resources

```
PS C:\Users\Wolfgang> kubectl get all -n keda
NAME                                                READY   STATUS    RESTARTS   AGE
pod/keda-operator-5748df494c-mxz9p                  1/1     Running   0          124m
pod/keda-operator-metrics-apiserver-cb649dd48-jjhpc   1/1     Running   0          124m

NAME                                       TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)          AGE
service/keda-operator-metrics-apiserver    ClusterIP   10.0.241.182   <none>        443/TCP,80/TCP   124m

NAME                                           READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/keda-operator                  1/1     1            1           124m
deployment.apps/keda-operator-metrics-apiserver   1/1     1            1           124m

NAME                                                      DESIRED   CURRENT   READY   AGE
replicaset.apps/keda-operator-5748df494c                  1         1         1       124m
replicaset.apps/keda-operator-metrics-apiserver-cb649dd48   1         1         1       124m
```

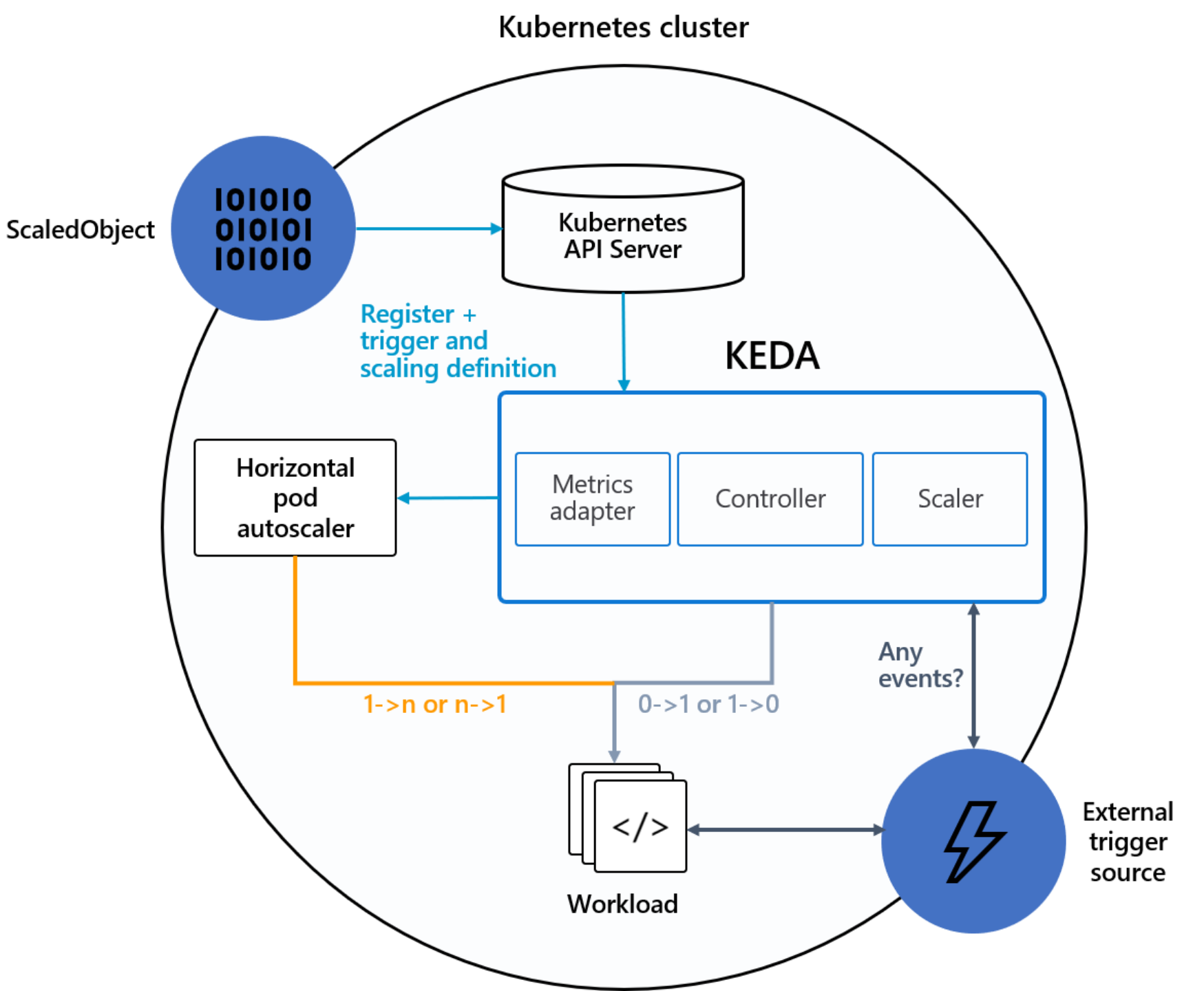
KEDA Architecture

2 components for KEDA

- Agent or Operator
- Metrics Server

Uses HPA for scaling

Seamless integration into existing architecture


Kubernetes cluster
ScaledObject
Kubernetes API Server
Register + trigger and scaling definition
KEDA
Horizontal pod autoscaler
Metrics adapter
Controller
Scaler
1->n or n->1
0->1 or 1->0
Any events?
</>
Workload
External trigger source

KEDA Architecture

2 components for KEDA

- Agent or Operator
- Metrics Server

Uses HPA for scaling

Seamless integration into existing architecture

2 custom K8s resources for scaler

- ScaledObject
- TriggerAuthentication

ScaledObject

```yaml
apiVersion: keda.sh/v1alpha1
kind: ScaledObject
metadata:
  name: kedademoapi-scaler
```

```yaml
spec:
  scaleTargetRef:
    name: kedademoapi
  minReplicaCount: 0
  maxReplicaCount: 10
  pollingInterval: 30
  cooldownPeriod: 30
```

```yaml
triggers:
  - type: azure-servicebus
    metadata:
      queueName: KedaDemo
      queueLength: '5'
    authenticationRef:
      name: trigger-authentication-kedademoapi
```

TriggerAuthentication

```yaml
apiVersion: keda.sh/v1alpha1
kind: TriggerAuthentication
metadata:
  name: trigger-authentication-kedademoapi
spec:
  secretTargetRef:
    parameter: connection
    name: kedademoapi-connectionstrings
    key: AzureServiceBus__ConnectionString
```

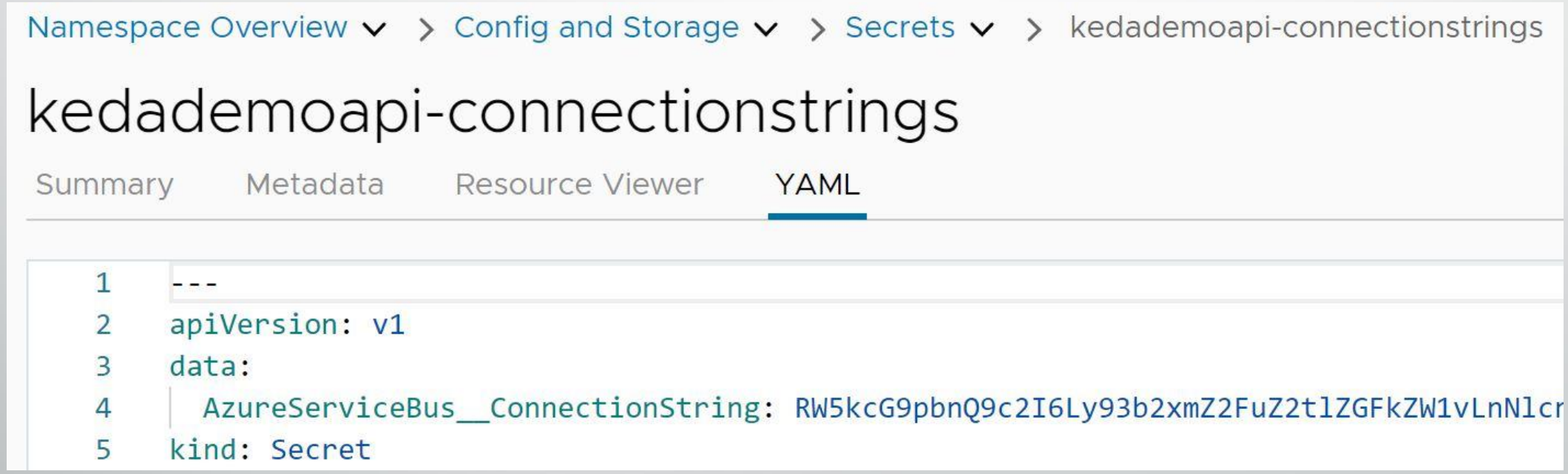
Kubernetes Secret

```
PS C:\Users\Wolfgang> kubectl get secrets
NAME                                                  TYPE                                  DATA   AGE
default-token-88lzb                                   kubernetes.io/service-account-token   3      26h
kedademoapi-connectionstrings                         Opaque                                1      26h
kedademoapi-tls                                       kubernetes.io/tls                     2      26h
sh.helm.release.v1.kedademoapi-kedademoapi-test.v1    helm.sh/release.v1                    1      26h
sh.helm.release.v1.kedademoapi-kedademoapi-test.v2    helm.sh/release.v1                    1      22h
PS C:\Users\Wolfgang> kubectl describe secret kedademoapi-connectionstrings
Name:         kedademoapi-connectionstrings
Namespace:    kedademoapi-test
Labels:       app.kubernetes.io/managed-by=Helm
Annotations:  meta.helm.sh/release-name: kedademoapi-kedademoapi-test
              meta.helm.sh/release-namespace: kedademoapi-test

Type:  Opaque

Data
====
AzureServiceBus__ConnectionString:  165 bytes
```

Kubernetes Secret



Azure DevOps Agent with KEDA Demo

Scaling ADO Agent with KEDA

Azure DevOps preparation

Build Docker image

Test locally

Deploy to Kubernetes

Apply KEDA scaling

Azure DevOps

User settings

Wolfgang Ofner

Account

- Profile
- Time and Locale
- Permissions

Preferences

- Notifications
- Theme
- Usage

Security

- Personal access tokens
- SSH public keys
- Authorizations

Personal Access Tokens

These can be used instead of a password f

+ New Token

Token name

Git: https://dev.azure.com/programming
Code (Read & write); Packaging (Read)

Git: https://dev.azure.com/programming
Code (Read & write); Packaging (Read)

Git: https://dev.azure.com/programming
Code (Read & write); Packaging (Read)

Create a new personal access token

Name

KedaAdoAgent

Organization

programmingwithwolfgang

Expiration (UTC)

30 days

4/11/2023

Scopes

Authorize the scope of access associated with this token

Scopes
- Full access
- Custom defined

Agent Pools

Manage agent pools and agents

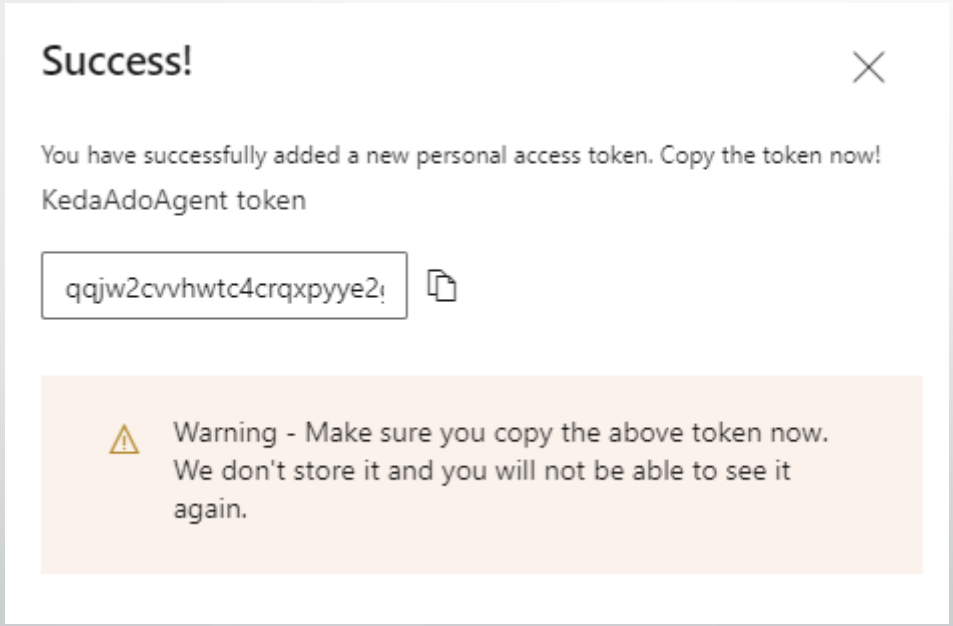
- Read
- Read & manage

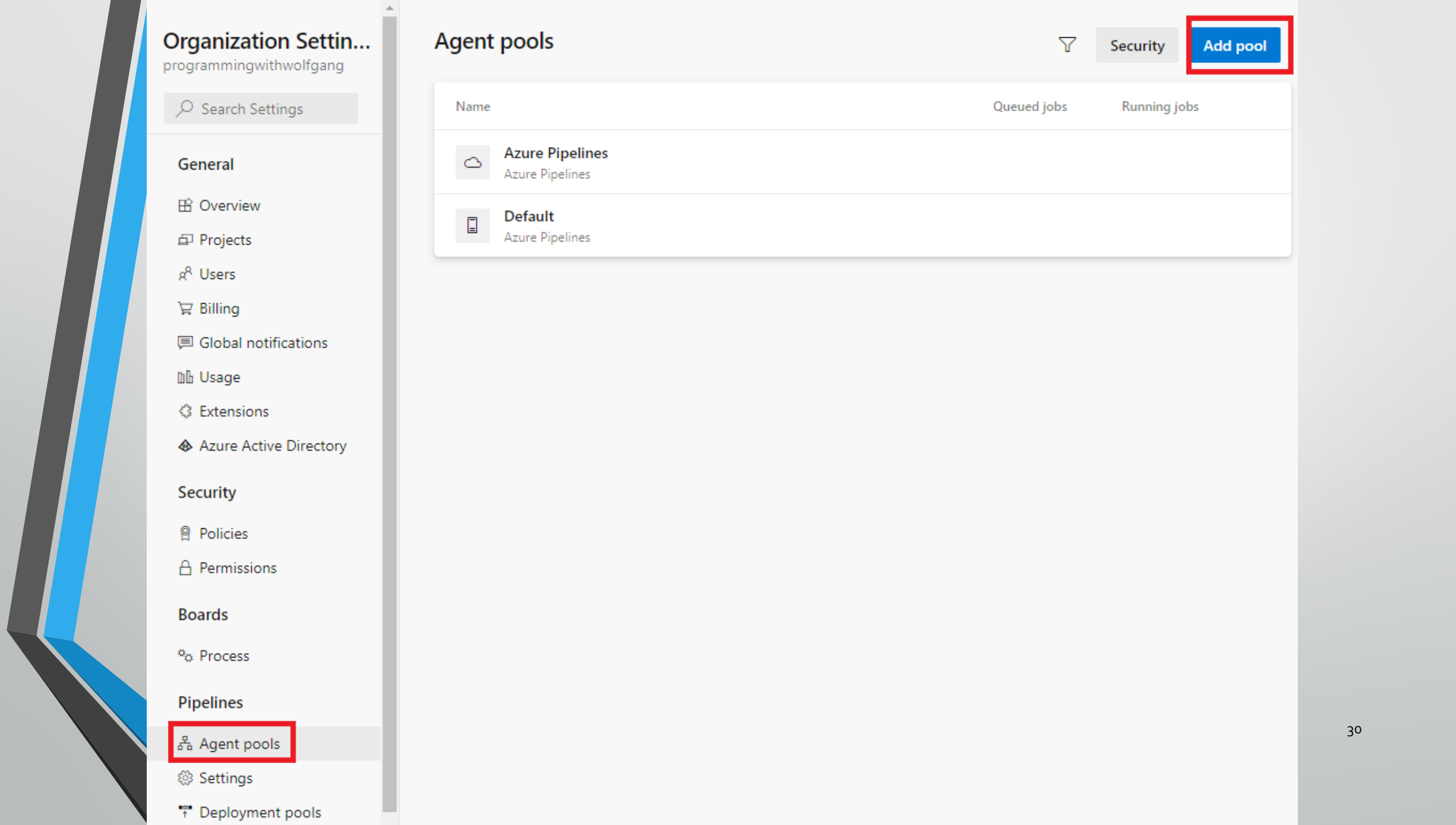
Analytics

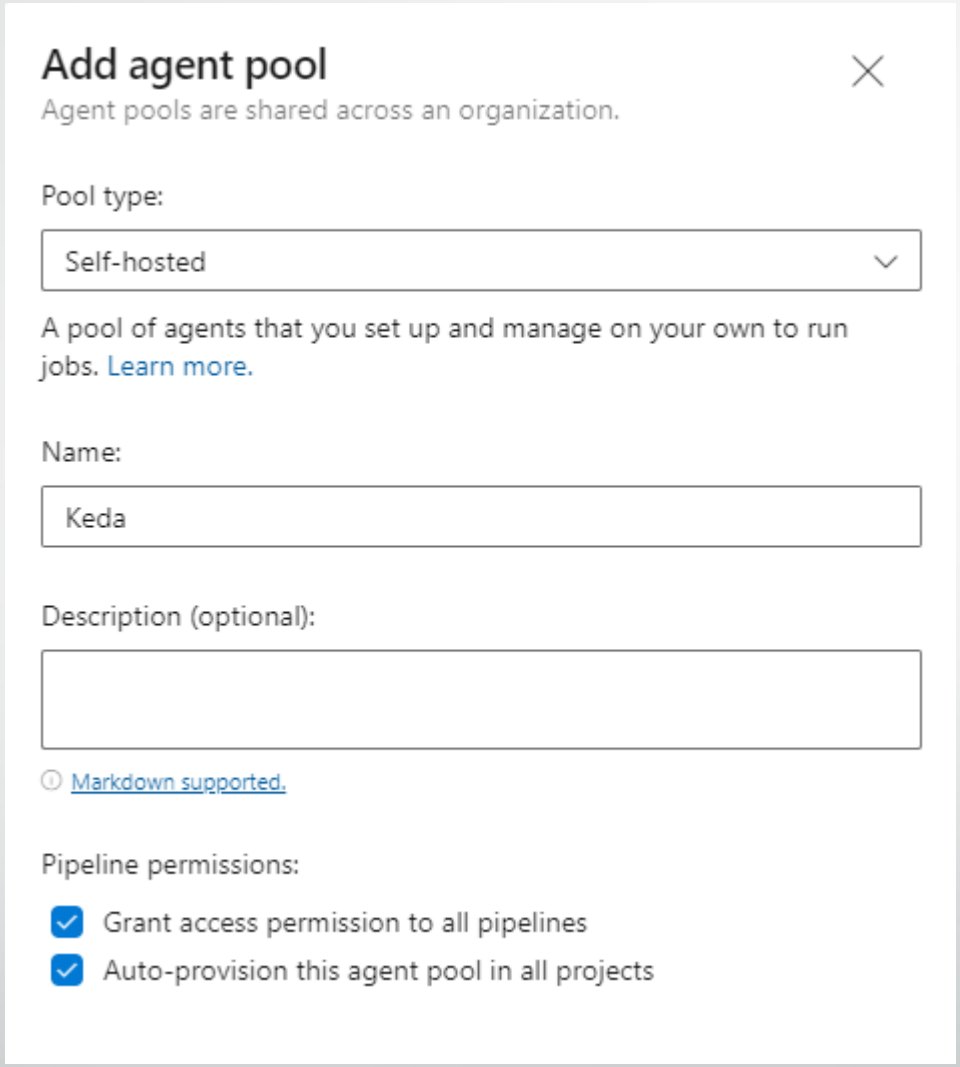
Read data from the analytics service

- Read

Copy the PAT


Success!
You have successfully added a new personal access token. Copy the token now!
KedaAdoAgent token
qqjw2cvvhwtc4crqxpyye2
Warning - Make sure you copy the above token now. We don't store it and you will not be able to see it again.


Organization Settin...
programmingwithwolfgang
Search Settings
General
Overview
Projects
Users
Billing
Global notifications
Usage
Extensions
Azure Active Directory
Security
Policies
Permissions
Boards
Process
Pipelines
Agent pools
Settings
Deployment pools
Agent pools
Security
Add pool
Name
Queued jobs
Running jobs
Azure Pipelines
Azure Pipelines
Default
Azure Pipelines


Add agent pool
Agent pools are shared across an organization.
Pool type:
Self-hosted
A pool of agents that you set up and manage on your own to run jobs. Learn more.
Name:
Keda
Description (optional):
Markdown supported.
Pipeline permissions:
Grant access permission to all pipelines
Auto-provision this agent pool in all projects

Building the ADO Docker Image

Dockerfile

start.sh (with LF EOF)

```
FROM ubuntu:20.04
RUN DEBIAN_FRONTEND=noninteractive apt-get update
RUN DEBIAN_FRONTEND=noninteractive apt-get upgrade -y

RUN DEBIAN_FRONTEND=noninteractive apt-get install -y -qq --no-install-recommends \
    apt-transport-https \
    apt-utils \
    ca-certificates \
    curl \
    git \
    iputils-ping \
    jq \
    lsb-release \
    software-properties-common \
    wget

RUN curl -sL https://aka.ms/InstallAzureCLIDeb | bash

RUN wget https://packages.microsoft.com/config/ubuntu/20.04/packages-microsoft-prod.deb -O packages-microsoft-prod.deb
RUN dpkg -i packages-microsoft-prod.deb
RUN rm packages-microsoft-prod.deb
RUN apt-get update && apt-get install -y dotnet-sdk-6.0
RUN apt-get update && apt-get install -y dotnet-sdk-7.0

# Can be 'linux-x64', 'linux-arm64', 'linux-arm', 'rhel.6-x64'.
ENV TARGETARCH=linux-x64

WORKDIR /azp

COPY ./start.sh .
RUN chmod +x start.sh

ENTRYPOINT [ "./start.sh" ]
```

```
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> docker build . -t adoagentkeda
[+] Building 376.5s (18/18) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 954B
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [internal] load metadata for docker.io/library/ubuntu:20.04
 => [ 1/13] FROM docker.io/library/ubuntu:20.04@sha256:9fa30fcef427e5e88c76bc41ad37b7cc573e1d79cecb23035e413c4be6e4
 => => resolve docker.io/library/ubuntu:20.04@sha256:9fa30fcef427e5e88c76bc41ad37b7cc573e1d79cecb23035e413c4be6e476
 => => sha256:9fa30fcef427e5e88c76bc41ad37b7cc573e1d79cecb23035e413c4be6e476ab 1.13kB / 1.13kB
 => => sha256:3626dff0d616e8ee7065a9ac8c7117e904a4178725385910eeecd7f1872fc12d 424B / 424B
 => => sha256:61c45d0e97988ff0cfa876e9ec145445974b9b384fe0a150b057ffc46039b3a0 2.30kB / 2.30kB
 => => sha256:47c7644723910b6dfc6ec8b3bd9fed3ac32778cf485ce3a6535ff6b6da06f743 27.50MB / 27.50MB
 => => extracting sha256:47c7644723910b6dfc6ec8b3bd9fed3ac32778cf485ce3a6535ff6b6da06f743
 => [internal] load build context
 => => transferring context: 2.52kB
 => [ 2/13] RUN DEBIAN_FRONTEND=noninteractive apt-get update
 => [ 3/13] RUN DEBIAN_FRONTEND=noninteractive apt-get upgrade -y
 => [ 4/13] RUN DEBIAN_FRONTEND=noninteractive apt-get install -y -qq --no-install-recommends     apt-transport-htt
 => [ 5/13] RUN curl -sL https://aka.ms/InstallAzureCLIDeb | bash
 => [ 6/13] RUN wget https://packages.microsoft.com/config/ubuntu/20.04/packages-microsoft-prod.deb -O packages-mic
 => [ 7/13] RUN dpkg -i packages-microsoft-prod.deb
 => [ 8/13] RUN rm packages-microsoft-prod.deb
 => [ 9/13] RUN apt-get update && apt-get install -y dotnet-sdk-6.0
 => [10/13] RUN apt-get update && apt-get install -y dotnet-sdk-7.0
 => [11/13] WORKDIR /azp
 => [12/13] COPY ./start.sh .
 => [13/13] RUN chmod +x start.sh
 => exporting to image
 => => exporting layers
 => => writing image sha256:11167e8091f1222ebe05f84e4f7e711e20fcb1c9ec0bddc7527604747 7f39d03
```

Building the ADO Docker Image

Dockerfile

start.sh (with LF EOF)

Azure DevOps values:

- PAT
- Pool Name
- URL

```
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> docker run -e AZP_URL=https://dev.azure.com/programmingwithwolfgang -e
 AZP_TOKEN=qqjw2cvvhwtc4crqxpyye2gbrumtirgdff6wh6fvjlqir32qfzsa -e AZP_AGENT_NAME=agent -e AZP_POOL=Keda adoagentkeda
1. Determining matching Azure Pipelines agent...
2. Downloading and extracting Azure Pipelines agent...
3. Configuring Azure Pipelines agent...


  ___                      ______ _            _ _
 / _ \                     | ___ (_)          | (_)
/ /_\ \_____   _ _ __ ___  | |_/ /_ _ __   ___| |_ _ __   ___  ___
|  _  |_  / | | | '__/ _ \ |  __/| | '_ \ / _ \ | | '_ \ / _ \/ __|
| | | |/ /| |_| | | |  __/ | |   | | |_) |  __/ | | | | |  __/\__ \
\_| |_/___|\__,_|_|  \___| \_|   |_| .__/ \___|_|_|_| |_|\___||___/
                                   | |
        agent v2.217.2             |_|          (commit ef0b5a5)


>> End User License Agreements:

Building sources from a TFVC repository requires accepting the Team Explorer Everywhere End User License Agreement. This
 step is not required for building sources from Git repositories.

A copy of the Team Explorer Everywhere license agreement can be found at:
  /azp/license.html


>> Connect:

Connecting to server ...

>> Register Agent:
```

K8sAdoAgent

main

K8sAdoAgent / azure-pipelines.yml

```yaml
trigger: none

pool: Keda

variables:
  buildConfiguration: 'Release'

jobs:
- job: job1
  steps:
  Settings
  - task: Bash@3
    inputs:
      targetType: 'inline'
      script: ''
    displayName: Check if job is running
```

Jobs in run #20230312.1

K8sAdoAgent

Jobs

- job1 — 6s
  - Initialize job — <1s
  - Checkout K8sAdoAgent... — 1s
  - Check if job is running — <1s
  - Post-job: Checkout K8... — <1s
  - Finalize Job — <1s
  - Report build status — <1s

job1

```
1  Pool: Keda
2  Queued: Just now [manage parallel jobs]
3  Agent: agent
4  Started: Just now
5  Duration: 6s
6
7  The agent request is already running or has already completed.
8  ▶ Job preparation parameters
9  Job live console data:
10 Starting: job1
11 Finishing: job1
```

```
>> Connect:

Connecting to server ...

>> Register Agent:

Scanning for tool capabilities.
Connecting to the server.
Successfully added the agent
Testing agent connection.
2023-03-12 11:12:31Z: Settings Saved.
4. Running Azure Pipelines agent...
Scanning for tool capabilities.
Connecting to the server.
2023-03-12 11:12:33Z: Listening for Jobs
2023-03-12 11:15:50Z: Running job: job1
2023-03-12 11:16:01Z: Job job1 completed with result: Succeeded
Cleanup. Removing Azure Pipelines agent...
Removing agent from the server
Connecting to server ...
Succeeded: Removing agent from the server
Removing .credentials
Succeeded: Removing .credentials
Removing .agent
Succeeded: Removing .agent
```

Push the Docker Image

```
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> docker tag adoagentkeda wolfgangofner/adoagentkeda
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> docker push wolfgangofner/adoagentkeda
Using default tag: latest
The push refers to repository [docker.io/wolfgangofner/adoagentkeda]
9ab694b94e06: Pushed
95d099e671b0: Pushed
f5f935017b9d: Pushing [============>                                      ]  132.4MB/518.1MB
b5f309652342: Pushing [=======>                                           ]  74.44MB/509.2MB
acd9adb1ef6d: Pushed
b79abcab2382: Pushing [================================================>]  726.5kB
ed3d14f25ed7: Pushed
e82e11b3ff01: Pushing [=>                                                 ]  30.55MB/1.185GB
85d422d04b2e: Waiting
76674757e35e: Waiting
587658be1954: Waiting
6021993d84a2: Waiting
```

Create a Secret with the PAT

```yaml
apiVersion: v1
kind: Secret
metadata:
  name: ado-agent-secret
data:
  AZP_TOKEN: cXFqdzJjdnZod3RjNGNycXhweXllMmdicnVtdGlyZ2RmZjZ3aDZmdmpscWlyMzJxZnpzYQ== # replace with your value / (base64 encoded)
```

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: ado-agent-deployment
  labels:
    app: ado-agent
spec:
  replicas: 1
  selector:
    matchLabels:
      app: ado-agent
  template:
    metadata:
      labels:
        app: ado-agent
    spec:
      containers:
      - name: ado-agent
        image: wolfgangofner/adoagentkeda # replace with your value
        env:
          - name: AZP_URL
            value: https://dev.azure.com/programmingwithwolfgang # replace with your value
          - name: AZP_POOL
            value: Keda # replace with your value
          - name: AZP_TOKEN
            valueFrom:
              secretKeyRef:
                name: ado-agent-secret
                key: AZP_TOKEN
```

Deploy the ADO Agent in K8s

```
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> kubectl create ns ado-agent
namespace/ado-agent created
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> kubectl config set-context --current --namespace=ado-agent
Context "microservice-aks" modified.
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> kubectl apply -f ./deployment.yaml
secret/ado-agent-secret created
deployment.apps/ado-agent-deployment created
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> kubectl get pod --watch
NAME                                  READY   STATUS              RESTARTS   AGE
ado-agent-deployment-5cdc9bc464-4sq65   0/1     ContainerCreating   0          4s
ado-agent-deployment-5cdc9bc464-4sq65   1/1     Running             0          88s
```

General
Overview
Projects
Users
Billing
Global notifications
Usage
Extensions
Azure Active Directory

Security
Policies
Permissions

Boards
Process

Pipelines
Agent pools
Settings
Deployment pools

Keda

Update all agents

Jobs Agents Details Security Settings Maintenance History Analytics

Name	Last run	Current status	Agent version	Enabled
ado-agent-deployment-5cdc9bc464-4sq65 Online		Idle	2.217.2	On

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Settings
Deployment pools

Keda

Update all agents

Jobs Agents Details Security Settings Maintenance History Analytics

Name	Last run	Current status	Agent version	Enabled
ado-agent-deployment-5cdc9bc464-4sq65 Online		Idle	2.217.2	Off

```yaml
apiVersion: keda.sh/v1alpha1
kind: ScaledJob
metadata:
  name: ado-scaledjob
spec:
  jobTargetRef:
    template:
      spec:
        containers:
        - name: ado-agent-job
          image: wolfgangofner/adoagentkeda # replace with your value
          imagePullPolicy: Always
          env:
          - name: AZP_URL
            value: https://dev.azure.com/programmingwithwolfgang # replace with your value
          - name: AZP_TOKEN
            valueFrom:
              secretKeyRef:
                name: ado-agent-secret
                key: AZP_TOKEN
          - name: AZP_POOL
            value: Keda # replace with your value
  pollingInterval: 10
  successfulJobsHistoryLimit: 5
  failedJobsHistoryLimit: 5
  maxReplicaCount: 10
  scalingStrategy:
    strategy: "default"
  triggers:
  - type: azure-pipelines
    metadata:
      poolID:  "10" # <azure-devops-pool-id> (must be a string) (https://dev.azure.com/{Organization}/_apis/distributedtask/pools?api-version=7.0)
      organizationURLFromEnv: "AZP_URL"
      personalAccessTokenFromEnv: "AZP_TOKEN"
```

Deploy the KEDA Scale Job

```
PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> kubectl apply -f ./keda-scaled-jobs.yaml
scaledjob.keda.sh/ado-scaledjob created
```

K8sAdoAgent

main K8sAdoAgent / azure-pipelines.yml

```yaml
trigger: none

pool: Keda

variables:
  buildConfiguration: 'Release'

jobs:
- job: job1
  steps:
  Settings
  - task: Bash@3
    inputs:
      targetType: 'inline'
      script: 'sleep 5m'
    displayName: Wait for 5 minutes
- job: job2
  steps:
  Settings
  - task: Bash@3
    inputs:
      targetType: 'inline'
      script: 'sleep 5m'
    displayName: Wait for 5 minutes
- job: job3
  steps:
  Settings
  - task: Bash@3
    inputs:
      targetType: 'inline'
      script: 'sleep 5m'
    displayName: Wait for 5 minutes
```

PS C:\Users\Wolfgang\source\repos\Ado-Agent-Keda> kubectl get pod --watch

```
NAME                                     READY   STATUS              RESTARTS   AGE
ado-agent-deployment-5cdc9bc464-4sq65    1/1     Running             0          22m
ado-scaledjob-xlgcg-6ts6h                0/1     Pending             0          0s
ado-scaledjob-6nvks-9x5wm                0/1     Pending             0          0s
ado-scaledjob-45s68-st64h                0/1     Pending             0          0s
ado-scaledjob-xlgcg-6ts6h                0/1     Pending             0          0s
ado-scaledjob-vwbxw-dr5wf                0/1     Pending             0          0s
ado-scaledjob-45s68-st64h                0/1     Pending             0          0s
ado-scaledjob-6nvks-9x5wm                0/1     Pending             0          0s
ado-scaledjob-vwbxw-dr5wf                0/1     Pending             0          0s
ado-scaledjob-j6vcg-jvpn6                0/1     Pending             0          0s
ado-scaledjob-xlgcg-6ts6h                0/1     ContainerCreating   0          0s
ado-scaledjob-j6vcg-jvpn6                0/1     Pending             0          0s
ado-scaledjob-45s68-st64h                0/1     ContainerCreating   0          0s
ado-scaledjob-vwbxw-dr5wf                0/1     ContainerCreating   0          0s
ado-scaledjob-6nvks-9x5wm                0/1     ContainerCreating   0          0s
ado-scaledjob-j6vcg-jvpn6                0/1     ContainerCreating   0          0s
ado-scaledjob-6nvks-9x5wm                1/1     Running             0          2s
ado-scaledjob-j6vcg-jvpn6                1/1     Running             0          3s
ado-scaledjob-vwbxw-dr5wf                1/1     Running             0          13s
ado-scaledjob-45s68-st64h                1/1     Running             0          20s
ado-scaledjob-xlgcg-6ts6h                1/1     Running             0          20s
```

#20230312.4 • Update azure-pipelines.yml for Azure Pipelines

K8sAdoAgent

Cancel

Summary

Manually run by WO Wolfgang Ofner

View change

Repository and version	Time started and elapsed	Related	Tests and coverage
K8sAdoAgent	Just now	0 work items	Get started
main b96efdac	32s	0 artifacts	

Jobs

Name	Status	Duration
job1	Queued	
job2	Queued	
job3	Running	24s
job4	Running	24s
job5	Queued	

Azure DevOps Limitations

ADO Pipelines support scale to zero but need at least one agent registered

ADO Pipelines can not queue a job with an empty agent pool

Licensing limits parallel jobs

KEDA ADO Scaling Limitations

Cancelling a pipeline does not stop running pods

KEDA does not remove completed pods

Azure DevOps does not remove offline agents from the agent pool

KEDA Limitations

Scaler not available for used technology

Cluster runs out of resources

KEDA Limitations

Pods

Name	Labels	Ready	Phase	Restarts	Node
kedademoapi-6f986c4b76-2zfxc	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-6w9tc	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-777r8	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-9vs76	app:kedademoapi draft:draft-app 1+	1/1	Running	0	aks-nodepool1-35436033-vmss000000
kedademoapi-6f986c4b76-jdd8x	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-mdj62	app:kedademoapi draft:draft-app 1+	1/1	Running	0	aks-nodepool1-35436033-vmss000000
kedademoapi-6f986c4b76-qg298	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-rzgfm	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-s56q6	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-wb7rr	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>

KEDA Limitations

Pods

Name	Labels	Ready	Phase	Restarts	Node
kedademoapi-6f986c4b76-2zfxc	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-6w9tc	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-777r8	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-9vs76	app:kedademoapi draft:draft-app 1+	1/1	Running	0	aks-nodepool1-35436033-vmss000000
kedademoapi-6f986c4b76-jdd8x	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-mdj62	app:kedademoapi draft:draft-app 1+	1/1	Running	0	aks-nodepool1-35436033-vmss000000
kedademoapi-6f986c4b76-qg298	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-rzgfm	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-s56q6	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>
kedademoapi-6f986c4b76-wb7rr	app:kedademoapi draft:draft-app 1+	0/1	Pending	0	<not scheduled>

KEDA Limitations

KEDA Limitations

Scaler not available for used technology

Cluster runs out of resources

- Azure Cluster Autoscaler
- Define replica limit
- Monitor cluster usage

KEDA in Production

Microsoft uses KEDA for Azure Services

- Azure Container Apps
- Azure App Services with Azure Arc
- KEDA addon for AKS

KEDA 1.0.0 → 17. Nov 2019

Currently 2.14

Over 7.9k GitHub stars

Resources

KEDA

KEDA GitHub

KEDA Demo App GitHub

KEDA Azure DevOps Agent GitHub

KEDA - Kubernetes Event-driven Autoscaling - Blog Post

Welsh Azure User Group - March 2023

Scaling to Success Leveraging KEDA and Kubernetes for Optimal Azure DevOps Pipeline Performance - Warsaw IT Days 2023

//MSTS/ MS TECH SUMMIT

Scaling to Success Leveraging KEDA and Kubernetes for Optimal Azure DevOps Pipeline Performance

Wolfgang Ofner