

# **AKS Version Upgrade - Guide to Upgrade AKS with minimum downtime of Apps**

Advanced Conversational Engagement

Exported on 06/06/2025

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Shared AKS Version should be done Quarterly in all the environments DTAP. The aks version should be uniform across all the environments

In Order to Make the AKS Upgrade with minimum disruption , we have to follow below Guidelines

**Max Surge** - Max Surge is the configuration in the aks cluster which make the cluster upgrade more faster and max surge ensure that the how many nodes can we upgraded for a nodepool at a given time . The Microsoft recommends that Max Surge for all the node pools should be 33% .

**Pod Disruption Budget** - In Order to make application highly available during upgrade , PDB should be configured for the application .

Microsoft Recommends typically a low-traffic period, to minimize workload impact. recommendation from Microsoft is to have a time window duration of at least *four hours for AKS UPGRADE*

**Max-Surge** - Max Surge on the node pool allows requesting extra quota during the upgrade process and limits the number of nodes selected for upgrade simultaneously. A higher max surge results in a faster upgrade process. Microsoft don't recommend setting it at 100%, as it upgrades all nodes simultaneously, which can cause disruptions to running applications. **Microsoft recommend a max surge quota of 33% for production node pools.**

### Two ways to update the Max surge

Using Az command for updating existing Nodepool surge

Update using Biceps . This will be added as the configurations under nodepool profile

Max Surge update using AZ command

```
az aks nodepool update --name mynodepool --resource-group MyResourceGroup --cluster-name MyManagedCluster --max-surge 33%
```

Max Surge Update using aks Biceps under agentProfiles

```
agentPoolProfiles:
  upgradeSettings: {
    maxSurge: 'string' or '33%'
  }
```

### How to make Users Application highly available during Upgrade ?

Application/pods high availability are two types -

1. System Namespace and System NodePool Pods
2. User Namespace and UserNodepool Pods on

**High Availability to system Namespace and Nodepool running PODS** - You don't need to do any extra effort on the system node pool. And It's recommended not to make changes on the pods in the kube-system namespace. Since Kube-system pods have Pod Disruption Budget setup by microsoft .Hence the system pods are very minimal or no downtime .

**User Namespace and UserNodepool PODS** - When It comes to user pods High availability during upgrades . Application Team Have to create the Pod Disruption Budget for every application .

**PDB is set for service applications and limits the number of pods that can be down during voluntary disruptions, such as AKS-controlled node upgrades. It can be configured as `minAvailable` replicas, indicating the minimum number of application pods that need to be active, or `maxUnavailable` replicas, indicating the maximum number of application pods that can be terminated, ensuring high availability for the application.**

To make Applications Pods HA during AKS version Upgrade (especially in Acceptance and Production Env ) it is always recommended that - *the application POD should have minimum of 2 replicas running . Maximum replica of pods can be ANY (max replica of pod is purely based on application criticality ) but minimum should be two replicas of Pod .*

**How to Set Pod Disruption Budget ? (This yaml is Recommended to be Deployed by Application Team )**

```
apiVersion: policy/v1
kind: PodDisruptionBudget
metadata:
  name: <Application-name>-pdb
  namespace:
spec:
  minAvailable: 1
  selector:
    matchLabels:
      app: <app label>
```

Point to note : Setting the MinAvailable to 1 means that during the AKS upgrade or any disruption in AKS - at-least one Pod of the application will be available that means , when AKS will perform Cordon and drain of PODS from one node to another node then the application will have not be down as one pod will be always available . hence maintaining application availability

**How to Upgrade the AKS ?**

AKS upgrade should be always done using az command , biceps is not the recommended by to upgrade the aks cluster . AKS Upgrade process involves two parts

1. Node Image Upgrade
2. AKS Version Upgrade

*As we are following the Quarterly upgrade hence we do not have to worry for Node image upgrade as it will be taken care as a part of Quarterly AKS VERSION UPGRADE*

**How to Upgrade the AKS Version** : (Pipeline is under construction ) Pipelines - Runs for AKS UPGRADE (azure.com)<sup>1</sup>

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<sup>1</sup> [https://dev.azure.com/cbsp-abnamro/GRD0001014/\\_build?definitionId=92813](https://dev.azure.com/cbsp-abnamro/GRD0001014/_build?definitionId=92813)