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North America 2023

Rapidly Scaling for Breaking News with Karpenter and KEDA

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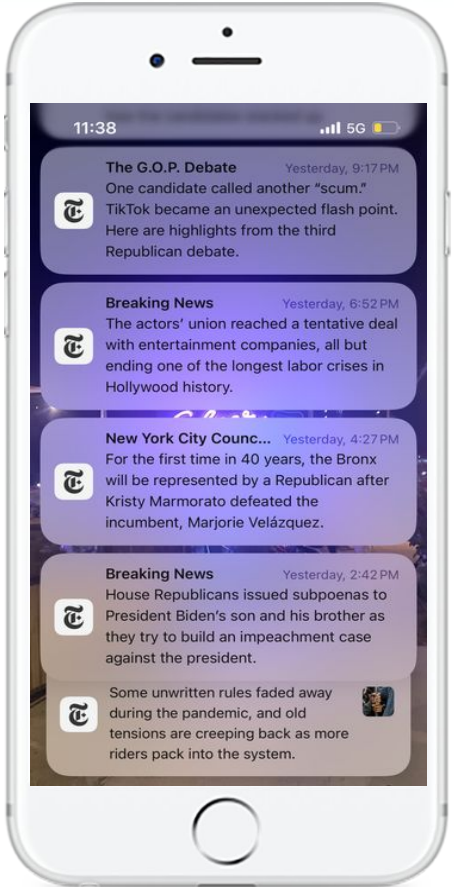
Breaking News Alert

- Breaking News Alerts (BNAs) are the push notifications notifying users of an article



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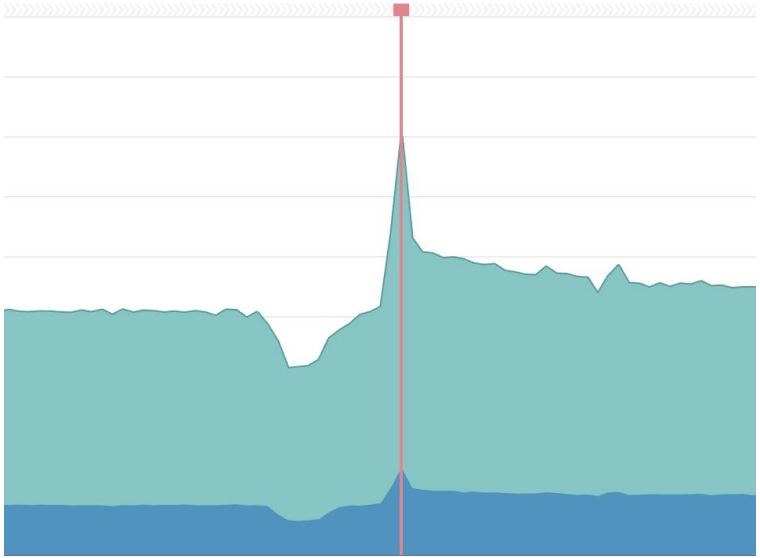
The Problem

- Sudden spiky traffic
- Reaches peak in 20 seconds for a duration of 2-3 minutes
- Goal: Use the fewest and cheapest node as possible



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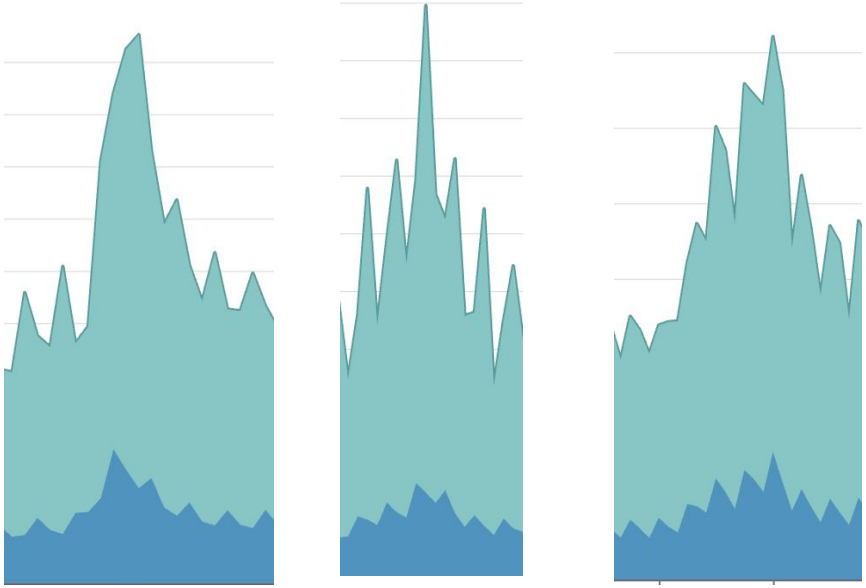
Predictable Traffic Spikes

- Games daily release leads to up to 3x spike in traffic
- Spike lasts for a small time period



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1 **What we're scaling**
2 How we're scaling: Karpenter
3 Scaling Demo
4 How we're scaling: KEDA
5 Lessons Learned

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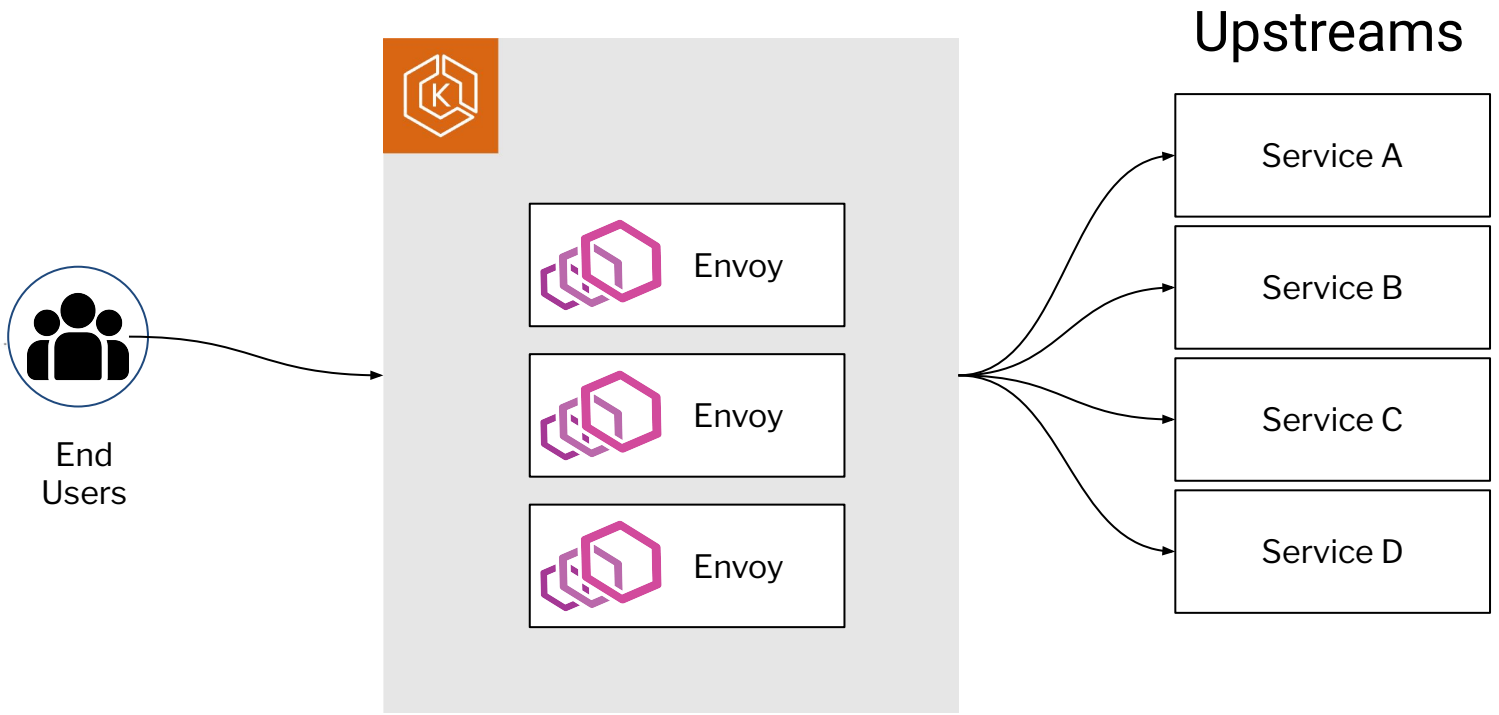
What We're Scaling: Unified HTTP Ingress



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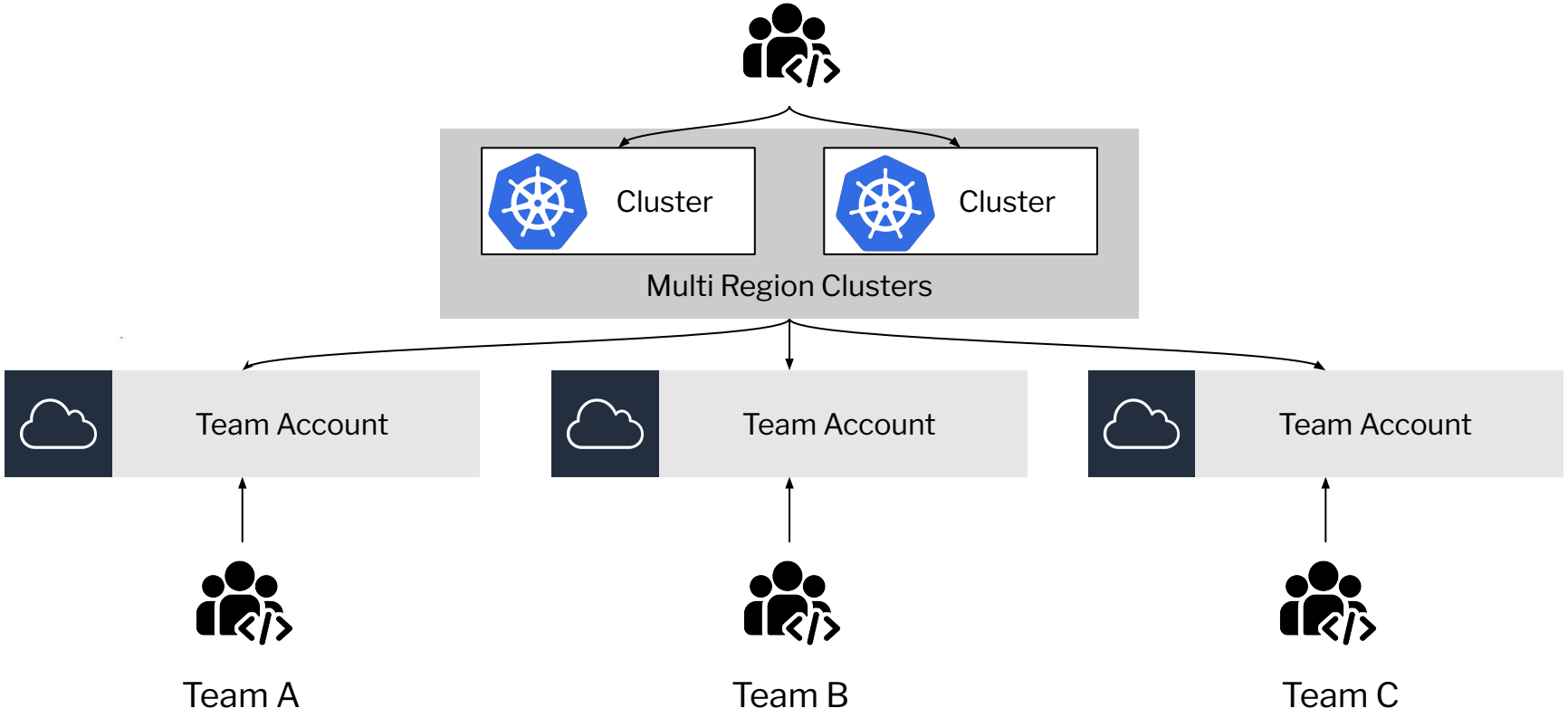
Multi-Tenant Architecture



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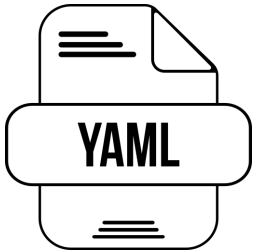
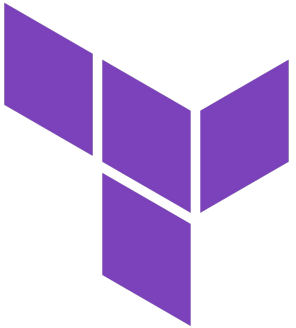
Why not just Autoscaler?



VS



HashiCorp
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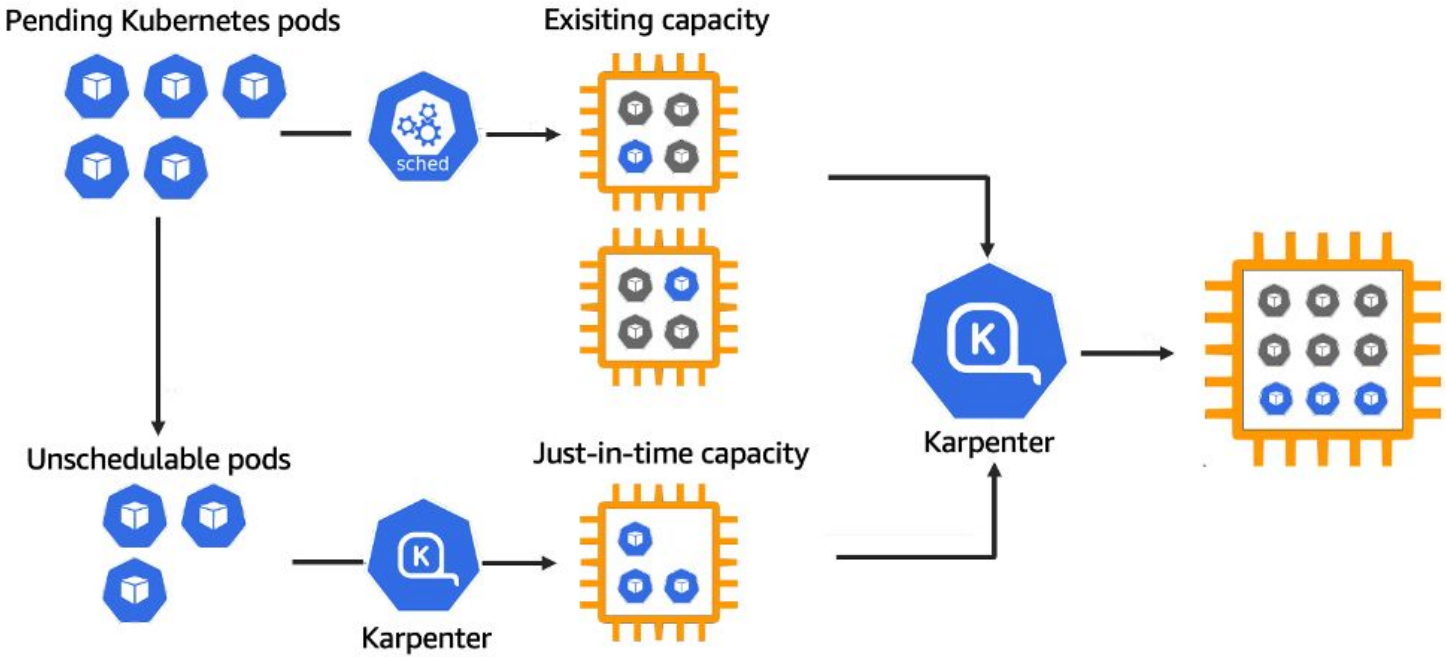

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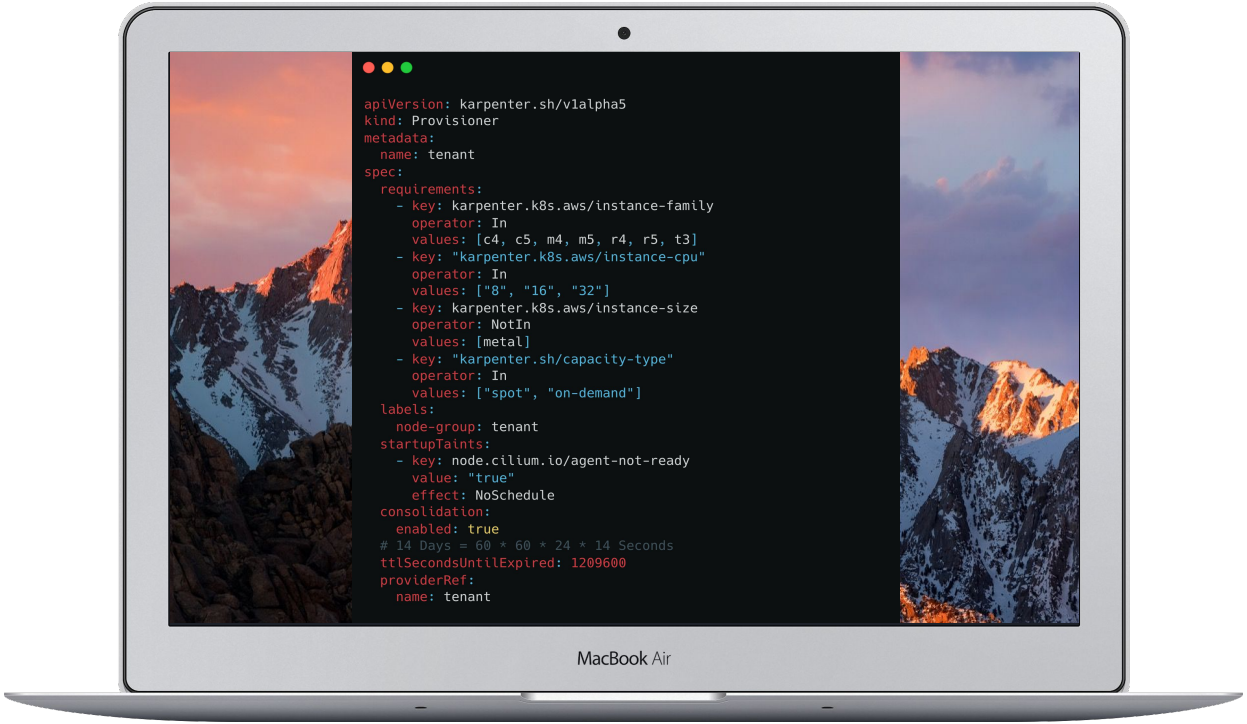
Migrating to Karpenter

- Groupless autoscaling
- Provisioners
  - NodePools
  - Spot instances vs. on-demand
  - Expiration
  - Consolidation



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Consolidation

Reduces cluster cost by deleting or replacing nodes when:

- They’re empty
- Their workloads can run on other nodes
- They can be replaced with cheaper nodes

```yaml
apiVersion: karpenter.sh/v1beta1
kind: NodePool
metadata:
  name: default

  # Describes the ways to disrupt and replace nodes
  disruption:

    # Types of nodes to consider for consolidation
    consolidationPolicy: WhenUnderutilized | WhenEmpty

    # Time to wait after discovering a consolidation decision
    consolidateAfter: 30s

    # Time a node can live on the cluster before it's removed
    expireAfter: 720h
```

The New York Times

Karpenter and Spot Instances


```
func filterUnwantedSpot(instanceTypes []*cloudprovider.InstanceType) []*cloudprovider.InstanceType {
    cheapestOnDemand := math.MaxFloat64

//first, find the price of our cheapest available on-demand instance type that could support this node
    for _, it := range instanceTypes {
        for _, o := range it.Offerings.Available() {
            if o.CapacityType == v1alpha5.CapacityTypeOnDemand && o.Price < cheapestOnDemand {
                cheapestOnDemand = o.Price
            }
        }
    }

//Filter out any types where the cheapest offering, which should be spot, is more expensive than the
cheapest on-demand instance type
    instanceTypes = lo.Filter(instanceTypes, func(item *cloudprovider.InstanceType, index int) bool {
        available := item.Offerings.Available()
        if len(available) == 0 {
            return false
        }
        return available.Cheapest().Price <= cheapestOnDemand
    })
    return instanceTypes
}
  return go(f, seed, [])
}
```

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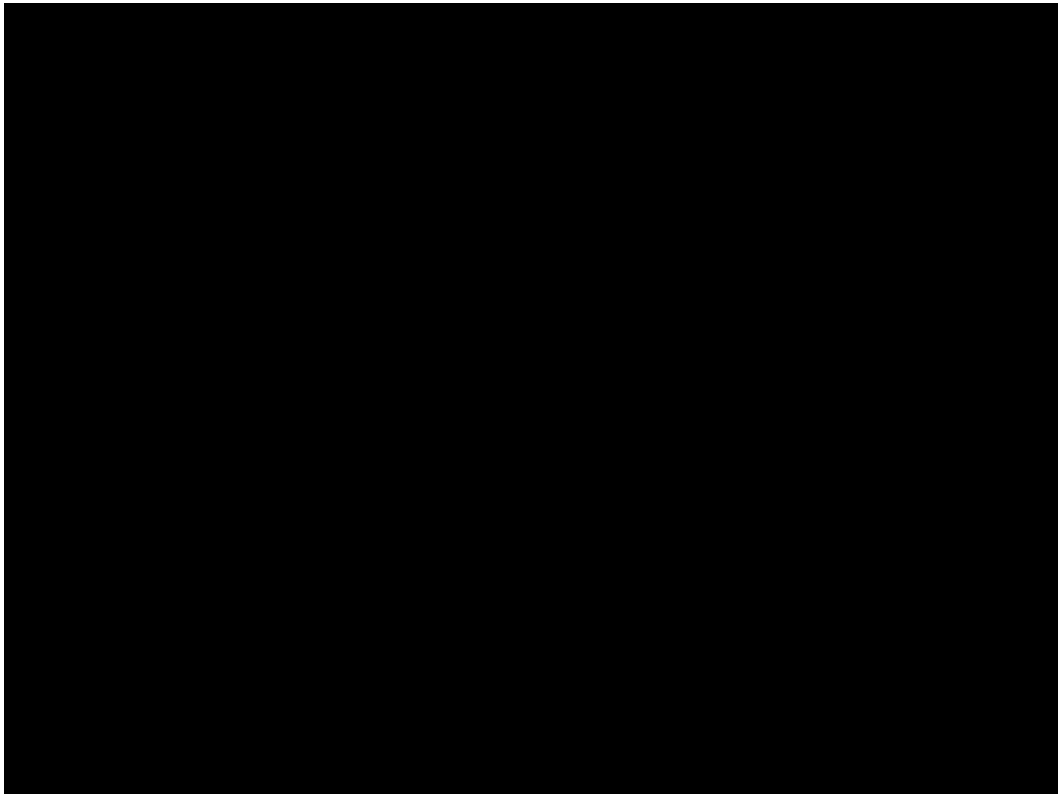
Karpenter Scaling Demo



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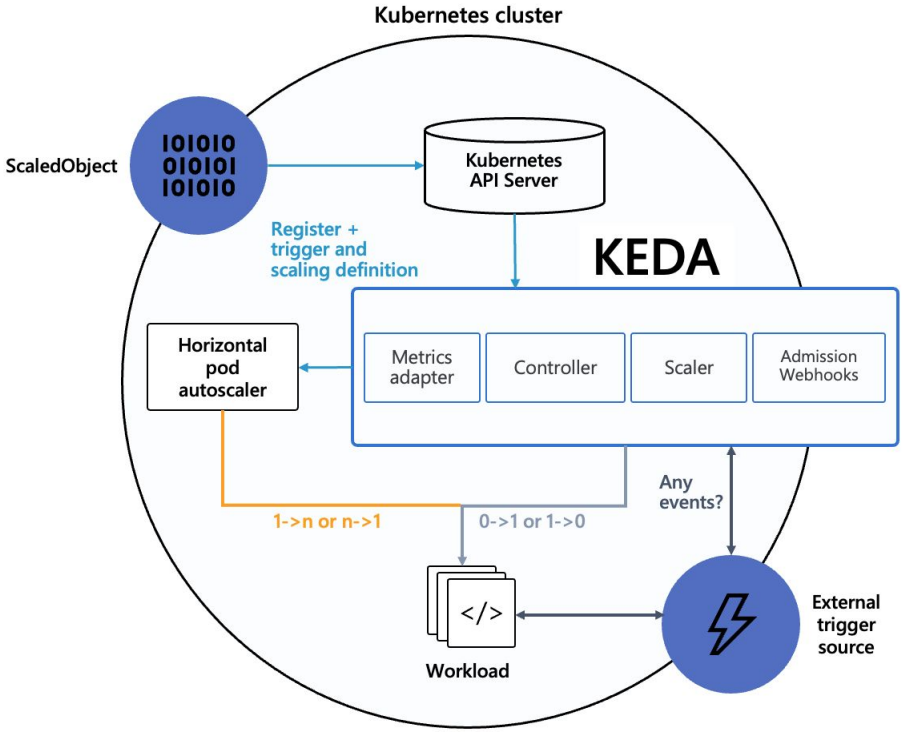
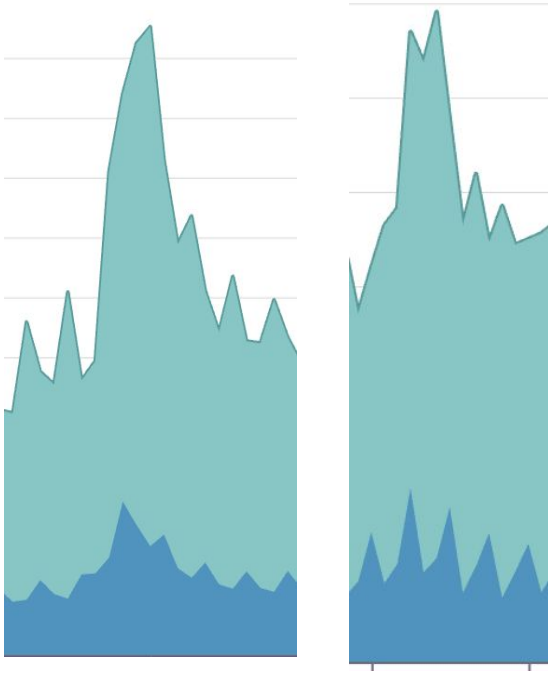
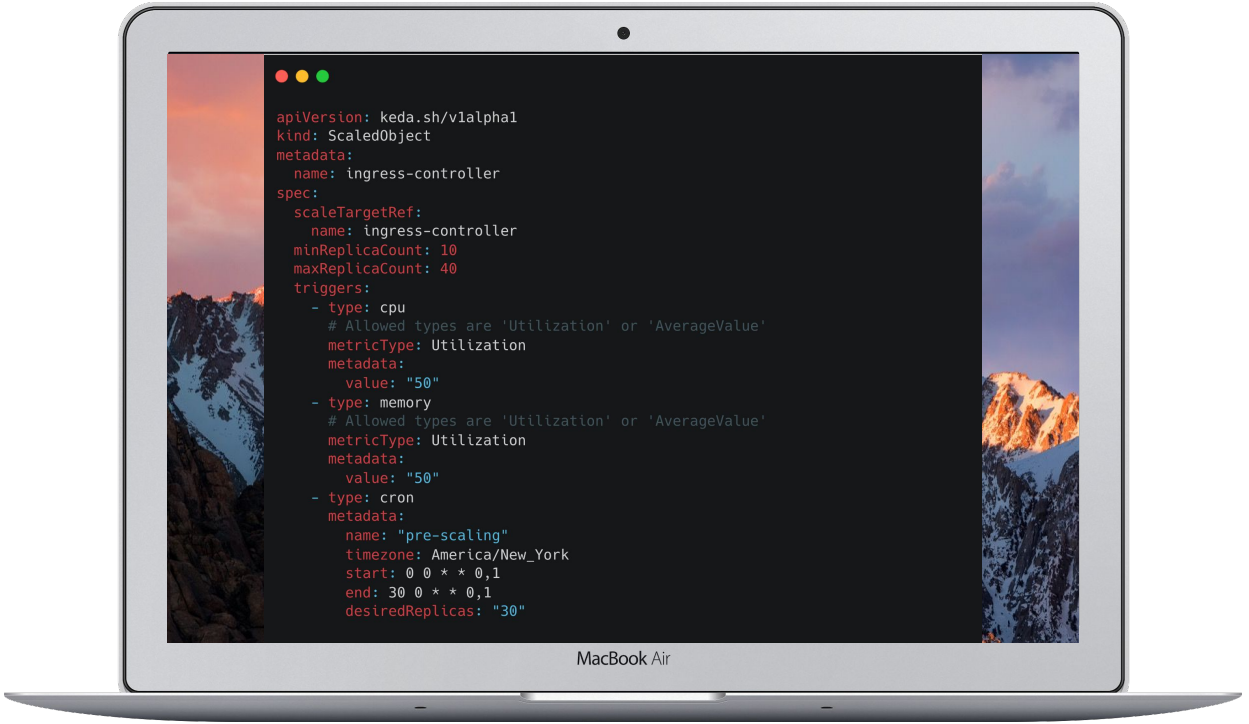
Kubernetes Event-Driven Autoscaling (KEDA)



ScaledObject





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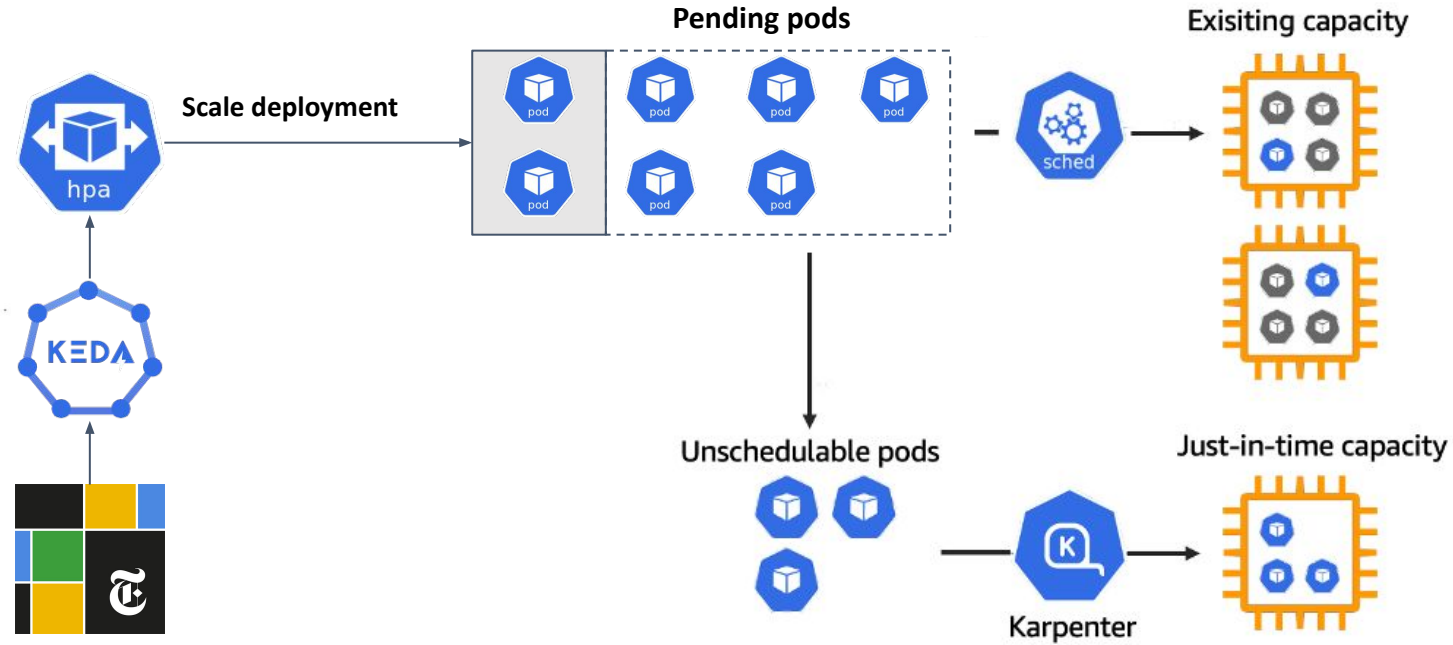
Games Release



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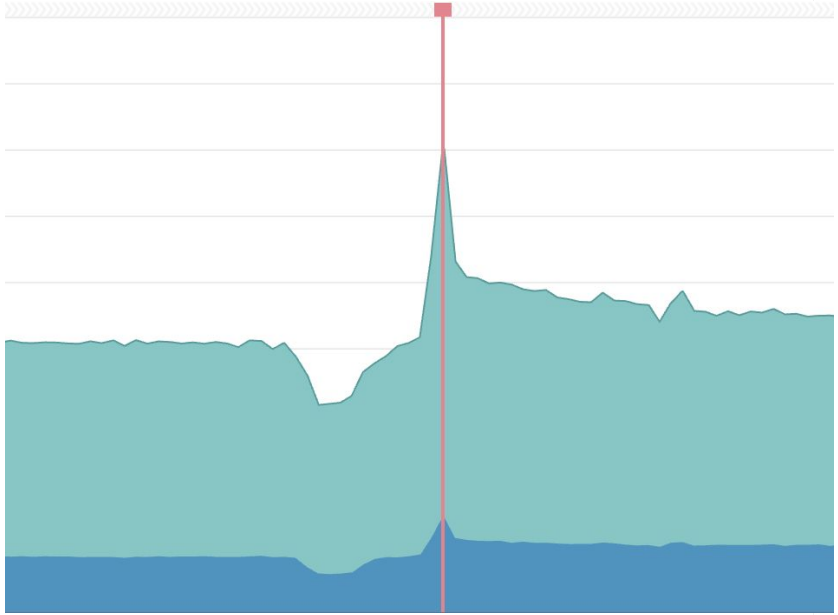
Exploring Other Events



```yaml
apiVersion: keda.sh/v1alpha1
kind: ScaledObject
metadata:
  name: my-deployment-scaling
  namespace: my-team
spec:
  scaleTargetRef:
    name: my-deployment
  triggers:
    - type: external-push
      metadata:
        scalerAddress: bna-scaler.svc.local:9090
        supportedPodRPS: 2000
        eventWindow: 10m
```

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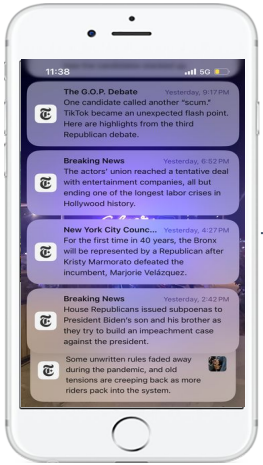
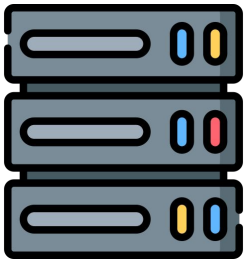
External Scaler



Webhook Server



GRPC Server

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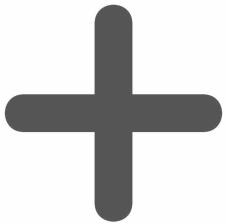
Cost Savings

25% decrease in cost

- Less overprovisioning
- Node consolidation
- Spot instances
- More instance types

Further improvements

- More flexibility with unified HTTP ingress instances
- External BNA scaler
- KEDA as a service for tenants



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Shared Platform: Centralization & Standardization

- First place problems surface
- Establishes baseline
- Locate outliers
  - Why does one service have significantly higher RPS?
- Unified HTTP ingress traffic spikes
  - Some tenants making significantly more requests
  - As we onboard more tenants, will likely see similar thing
- We scale the architecture, tenants don’t need to

THANK YOU

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The ArgoCD AppProject - What Is a Project and How to Power Your Multi-Tenant Security

Luke Philips & Serhiy Martynenko

Multi-TenancyCon - Monday, November 6

What We Learned Designing & Securing a Multi-Tenant Developer Platform at The New York Times

Ahmed Bebars & David Grizzanti

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