



spectro cloud

15,000 Minecraft players
vs. one K8s cluster
Who wins?

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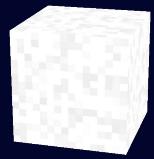
Loading.....

There and back again...



... a journey to modern bare-metal.

Agenda



Placing our first block in the clouds



Laying the foundation for bare-metal



Breaking the surface of lifecycle management



Unlocking achievements

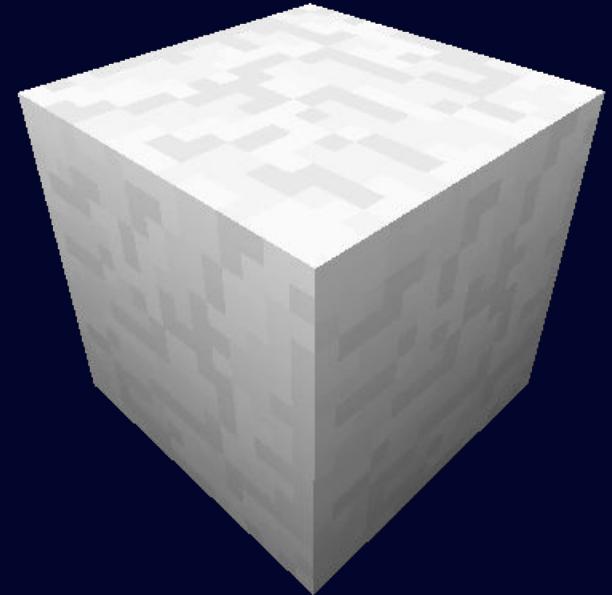
Overview of Super League and Minehut

**SUPER
LEAGUE**



Survival Mode

**Placing our first
block in the clouds**



First we moved to the cloud

OVH ⇒ AWS ECS

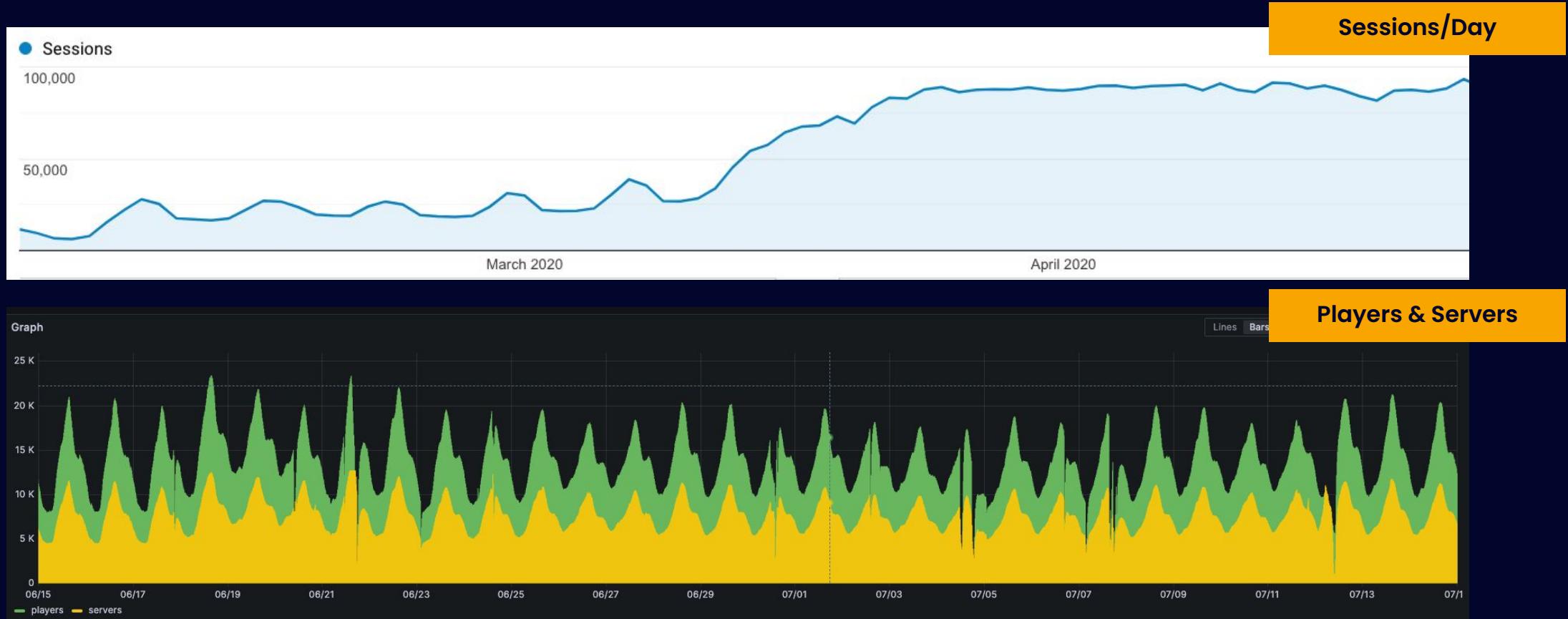
- ❑ Stability, professionalism, support
- ❑ On demand infrastructure resources
- ❑ Automation through API driven everything
- ❑ Container orchestration platform

AWS ECS ⇒ GCP GKE

- ❑ AWS infrastructure compromised
- ❑ Consulting solution recommended
Kubernetes
- ❑ GKE was THE place to run Kubernetes



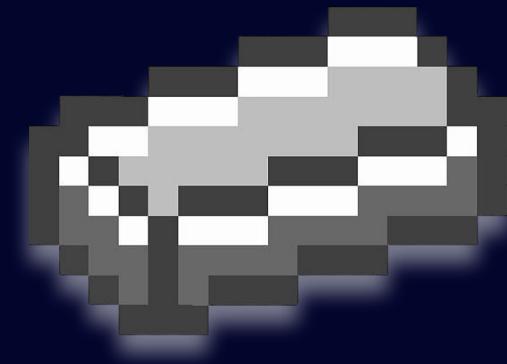
But then the pandemic



Could we reduce costs without losing all the benefits we get from the cloud?

Creative Mode

Laying the foundation
for bare metal



Price comparison

In GCP, spend reached \$200,000/mo

- Mostly compute
- 20% network egress

Bare-metal promised cost savings

- Machines 50%
 - Local storage
- Network 90%



But Cloud and Kubernetes have Advantages



Operational efficiencies with
orchestrated containers



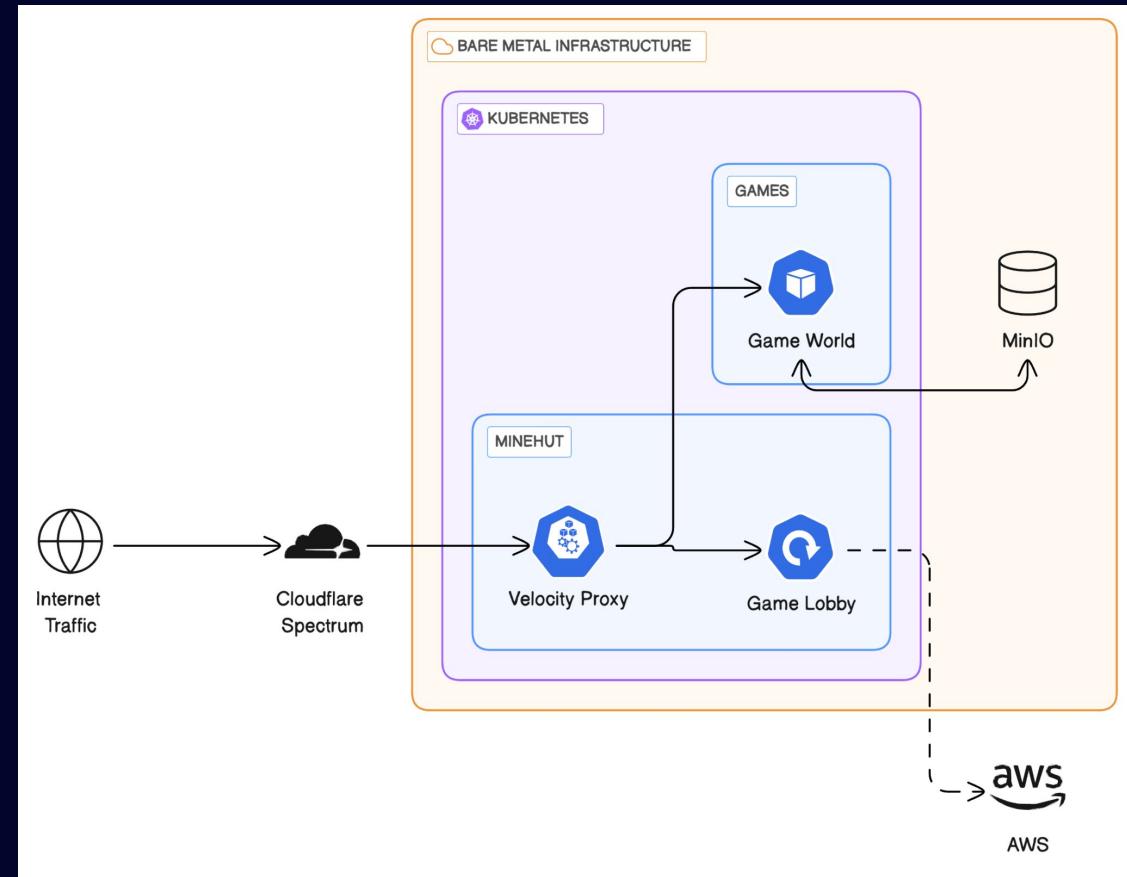
Composition and automation with
APIs



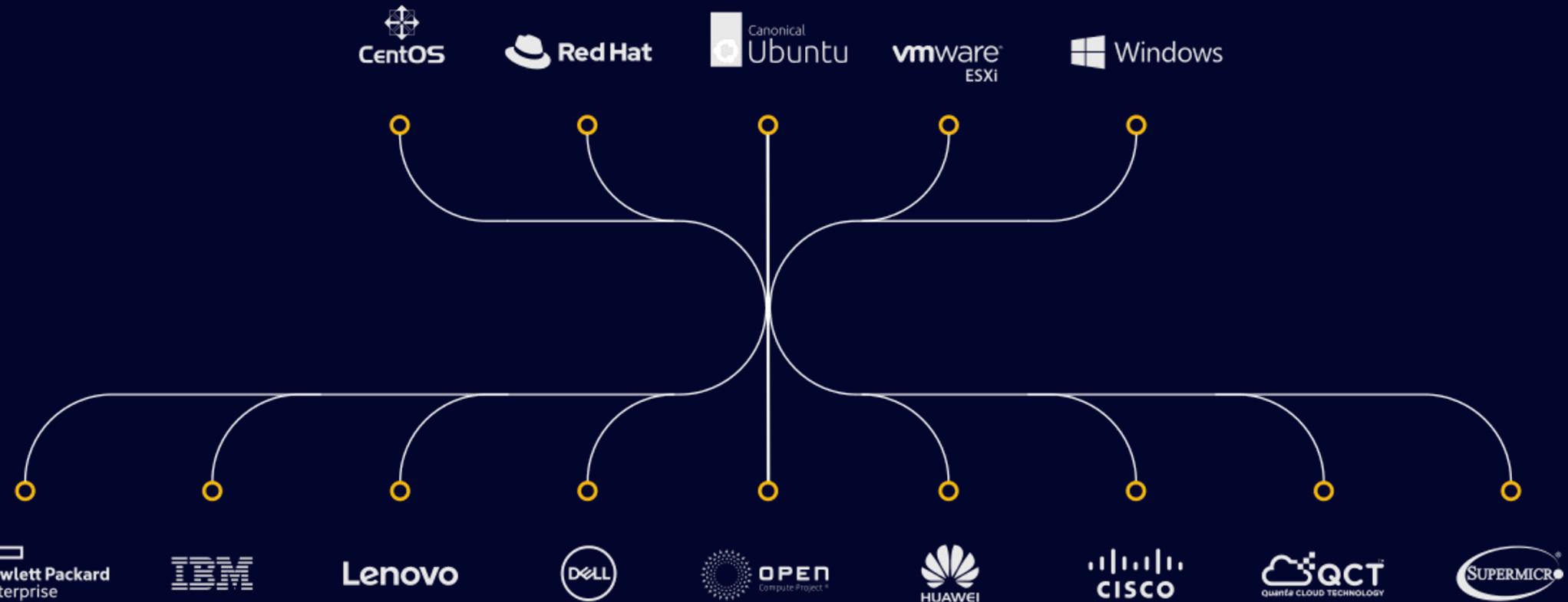
Right-sizing with
elastic capacity

Minehut on Kubernetes

- ❑ Player flow
- ❑ Velocity Proxy
 - ❑ BGP “sticky” ECMP Load Balancer
- ❑ Game Lobby
 - ❑ Community events
- ❑ Game World
 - ❑ Player’s game environment



Cloud-like API for Bare Metal → MAAS



Turning that into Kubernetes → CAPI Provider

Node pool name
worker-pool

Enable Autoscaler

Number of nodes in the pool
5

Additional Labels (Optional)

Taints

Rolling update
 Expand First Contract First

Resource pool
demo-bm

Minimum CPU
16

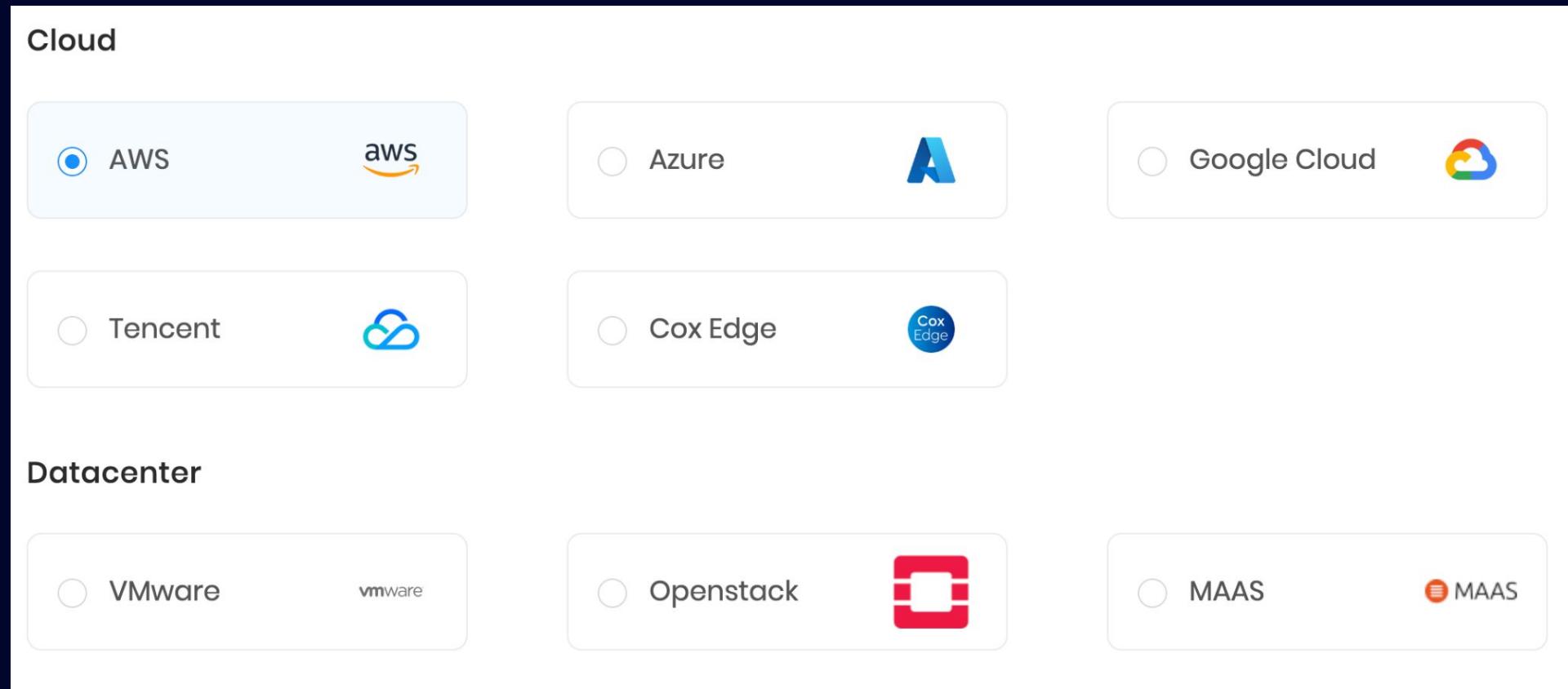
Minimum Memory (GB)
64

Availability zones
 az1 az2 az3 default

```
ubuntu-maas LTS_2204

1 kubeadmconfig:
2   preKubeadmCommands:
3     - 'echo "====> Applying pre Kubeadm commands"'
4     # Force specific IP address as the Node InternalIP for kubelet
5     - |
6       PRIVATE_NETWORK="bond_mgmt.10"
7       ADDR_PRIV=$(networkctl status $PRIVATE_NETWORK | grep "    Address: " | awk '{print $2}')
8       if [ "$ADDR_PRIV" != "" ]; then
9         echo " --node-ip=$ADDR_PRIV" >> /etc/default/kubelet
10        fi
11      # Build 0.9.5 of multipath-tools
12      - |
13        apt install -y make pkg-config gcc libmount-dev libdevmapper-dev libaio-dev libudev-dev libjson-c-dev liburcu-dev libsystemd-dev
14        mkdir /tmp/mpools
15        cd /tmp/mpools
16        wget "https://github.com/opensvc/multipath-tools/archive/0.9.5.tar.gz" -O multipath-tools-0.9.5.tar.gz
17        tar xvf multipath-tools-0.9.5.tar.gz
18        cd multipath-tools-0.9.5
19        make
20        make install
21        ldconfig /lib64
22      # Start multipath-tools and containerd with new configuration
23      - udevadm control --reload-rules && udevadm trigger
24      - systemctl daemon-reload
25      - systemctl restart containerd
26      - systemctl restart multipathd
27    postKubeadmCommands:
28      - 'echo "====> Applying post Kubeadm commands"'
29    files:
30      - targetPath: /etc/multipath.conf
31        targetOwner: "root:root"
32        targetPermissions: "0644"
33        content: |
34          defaults {
35            find_multipaths yes
36            polling_interval 10
37          }
```

Many CAPI Providers



So how does elasticity work with Bare Metal?

Bootstrap

15 minute deployment times

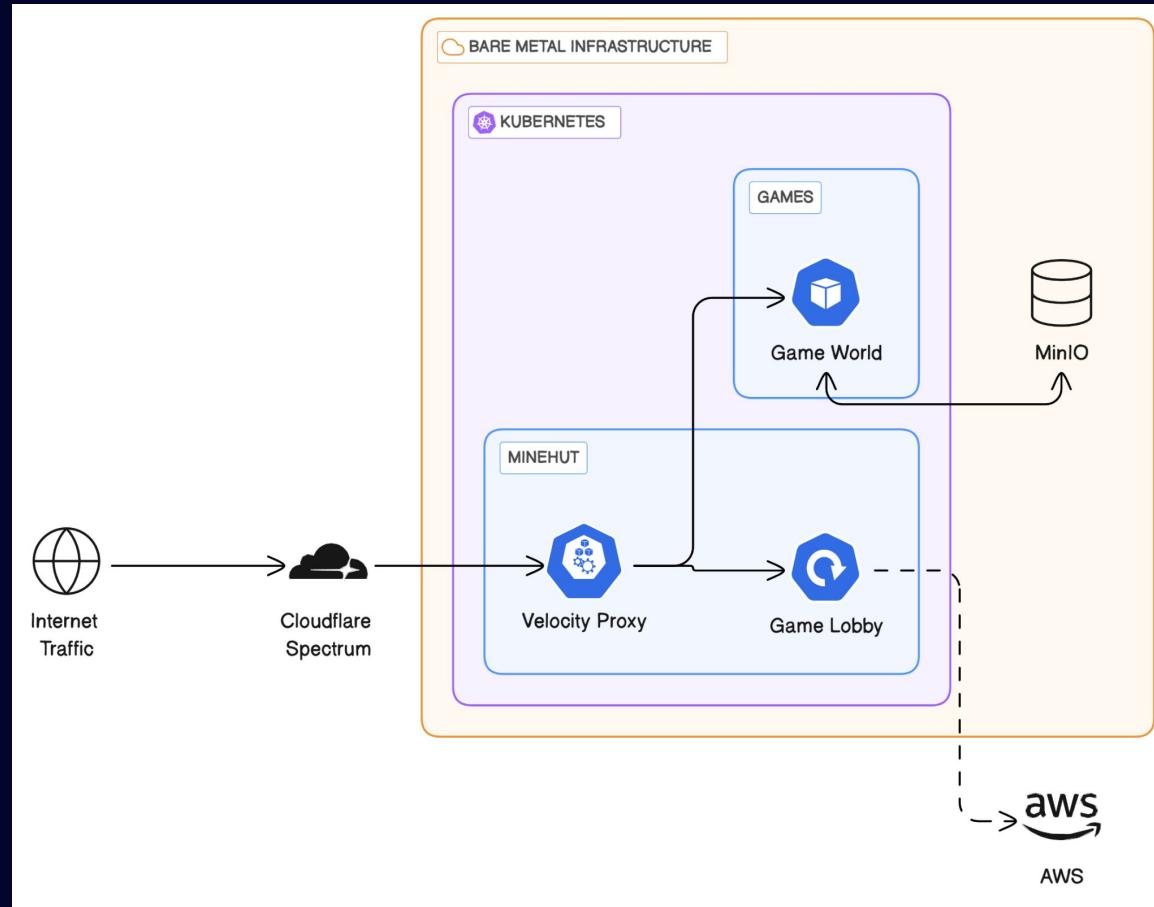
Dedicated

Control-Plane, Default, and Proxy node pools

Autoscaler - Games

- Separate node pools for paid vs free plans
- Overprovisioning deployments w/ PodPriority
- Paid Scheduler: Default, spread
- Free Scheduler: NodeResourcesFit.MostAllocated, bin-packing

But what about all of the other stuff?



K8s Services

- ❑ Databases, messaging, observability, etc...

- ❑ TopoLVM

Bare-metal

- ❑ MinIO

Multi-cloud

- ❑ Major clouds and SaaS offerings
- ❑ Specialize when needed per cloud
- ❑ Select tooling that works across clouds
- ❑ Create depth in your tooling choices

K8s services

The screenshot displays the Spectro Cloud K8s services catalog, organized into several sections:

- Services**: Includes Container Deployment, Helm, and Manifest.
- Databases**: Includes CockroachDB, MongoDB, MySQL, PostgreSQL, Redis, and YugabyteDB (labeled as COMING SOON).
- Object Storage**: Includes Amazon S3 (labeled as COMING SOON).
- Messaging Systems**: Includes Kafka and NATS.
- Security**: Includes Vault.
- Authentication**: Includes AWS EKS OIDC, Dex, External Secrets, External Secrets Operator, RBAC Manager, and Permission Manager.
- Ingress**: Includes Ambassador, Gloo, Kong, Nginx, and ngrok Ingress Controller.
- Load balancer**: Includes AVI, AWS Application Loadbalancer, ExternalDNS, and F5.
- Logging**: Includes Datadog, Elasticsearch-Fluentd-Kibana, Fluentbit, and Splunk Connect for Kubernetes.
- Monitoring**: Includes Spectro Kubernetes Dashboard, AppDynamics, Appdynamics Collector, Appdynamics Operator, Cilium Tetragon, and Heartbeat.

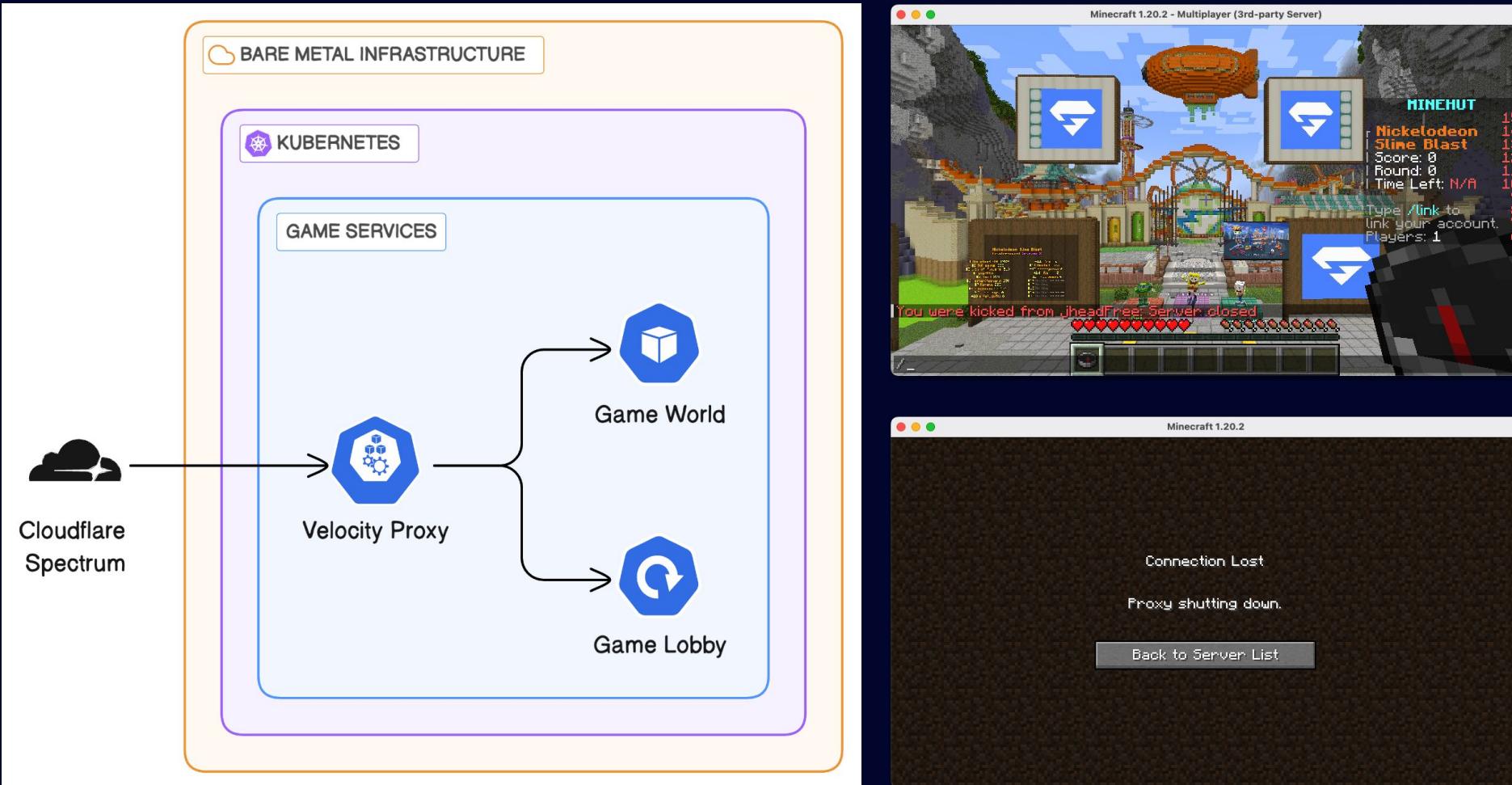


Hardcore Mode

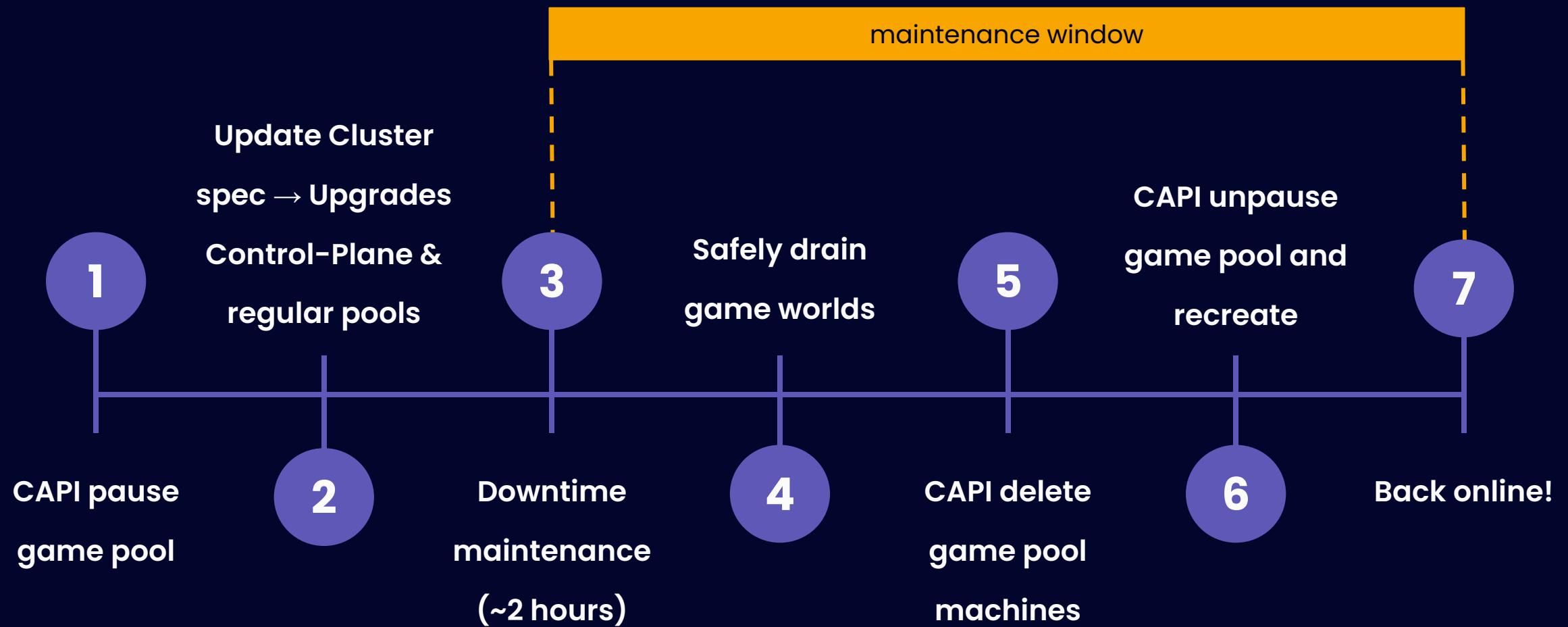
Breaking the surface of
lifecycle management



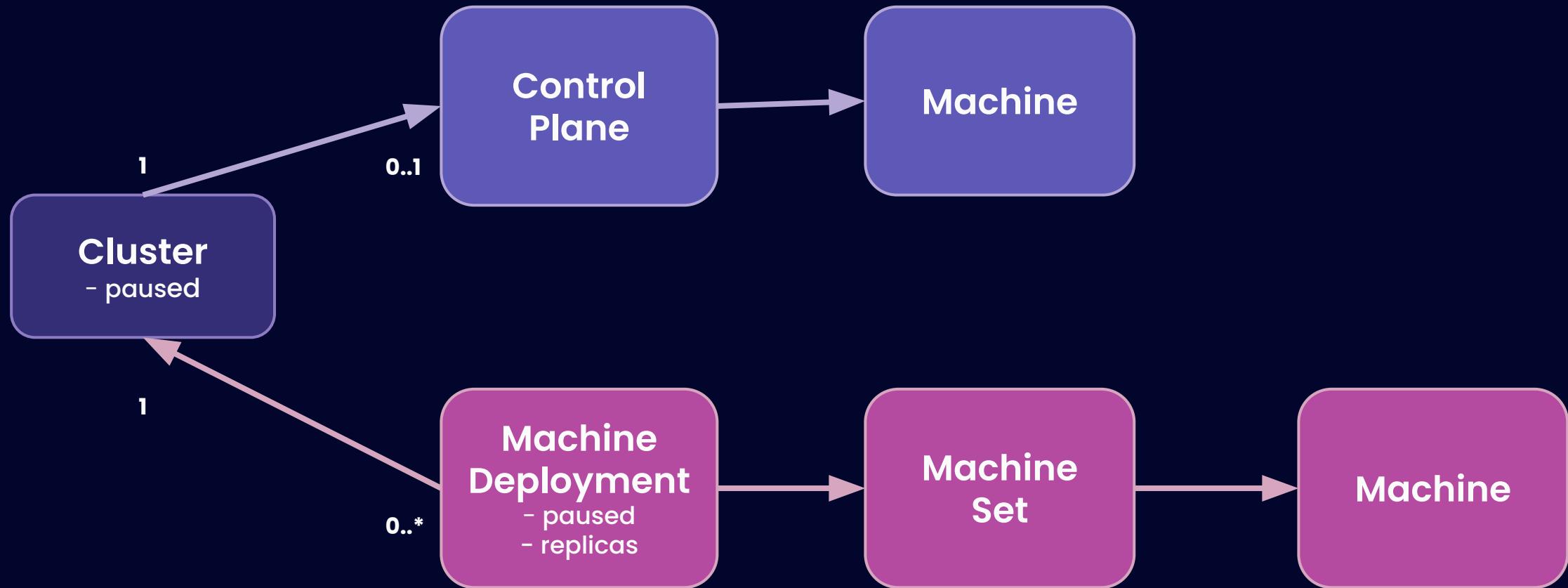
Statefulness of Minecraft



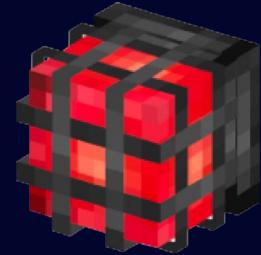
Platform Upgrades with Spectro Cloud Palette



Controlling CAPI



Emergency maintenance



- ❑ OS or Kubernetes security
- ❑ Node Problem Detector (NPD)
- ❑ Kubernetes Reboot Daemon (Kured)
- ❑ Game nodes and pods
 - ❑ Cordon node
 - ❑ Extend the pod terminationGracePeriodSeconds
 - ❑ Pod catches TERM and performs a safe game world save

Adventure Mode

Unlocking achievements



Achievement Made!
Modern Bare Metal

Results

- ❑ Achieved 65% cost reduction
 - ❑ Machines 55-66%
 - ❑ Network 90-100%
- ❑ Performance Bonus!
 - ❑ Running on bare metal netted a nearly 15% increase in performance
- ❑ Minimal management overhead
- ❑ Downsides:
 - ❑ Cloud services not as stressed
 - ❑ Infrastructure iteration takes longer

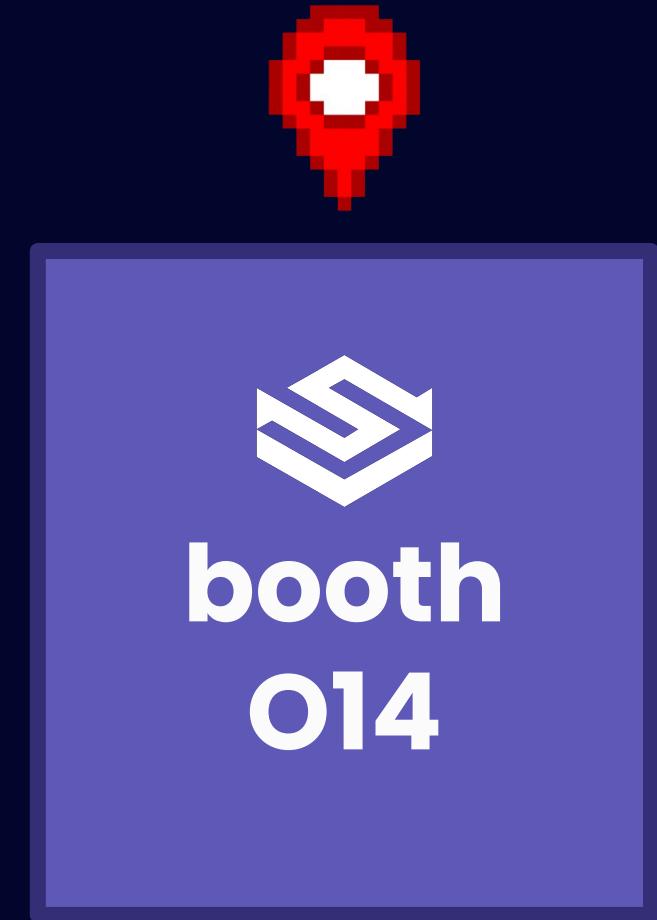
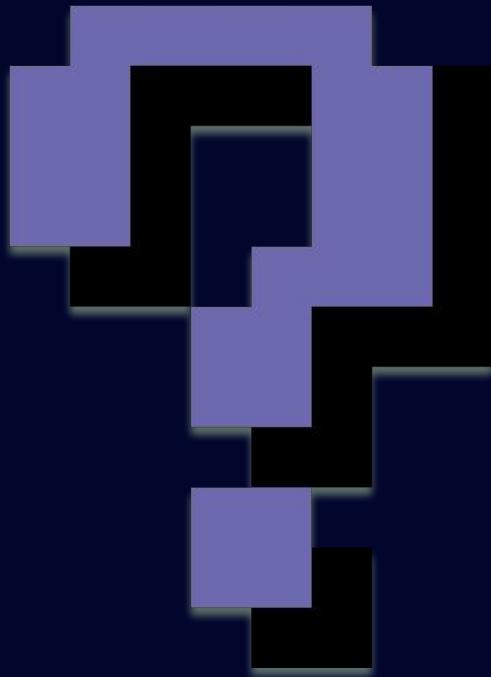


And what's the next level for Super League?



- ❑ Recently migrated to Cox Edge
- ❑ Hybrid, multi-region game worlds
- ❑ Distributed player traffic
- ❑ Full automation K8s upgrades

Logging off...



THANK YOU

Quit

Restart

