Who are we?

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What we'll cover

- Cluster API (CAPI) overview

- Cluster API Provider AWS (CAPA) overview

- New features in CAPA

- Demo

- Roadmap

- How you can get involved!

What is Cluster API (CAPI)?

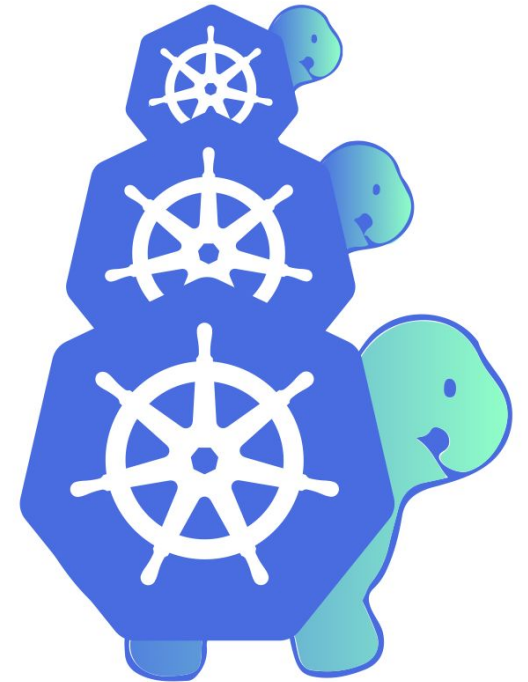- Easy abstraction for cluster lifecycle management (day 0/1/2 operations)
  - Creation
  - Scaling
  - Remediation
  - Upgrades
  - Deletion

Cluster API - Cloud providers

https://cluster-api.sigs.k8s.io/reference/providers.html

What is Cluster API (CAPI)?

- Declarative specification of clusters

- Distribution of nodes automatically across failure domains

- Machine health checks to automatically replace unhealthy nodes

- **clusterctl** handles the lifecycle of a CAPI management cluster

Want to know more about CAPI? The see this session:
- Cluster API Deep Dive @ Friday May 7th 11:50-12:25

What is Cluster API (CAPI)?
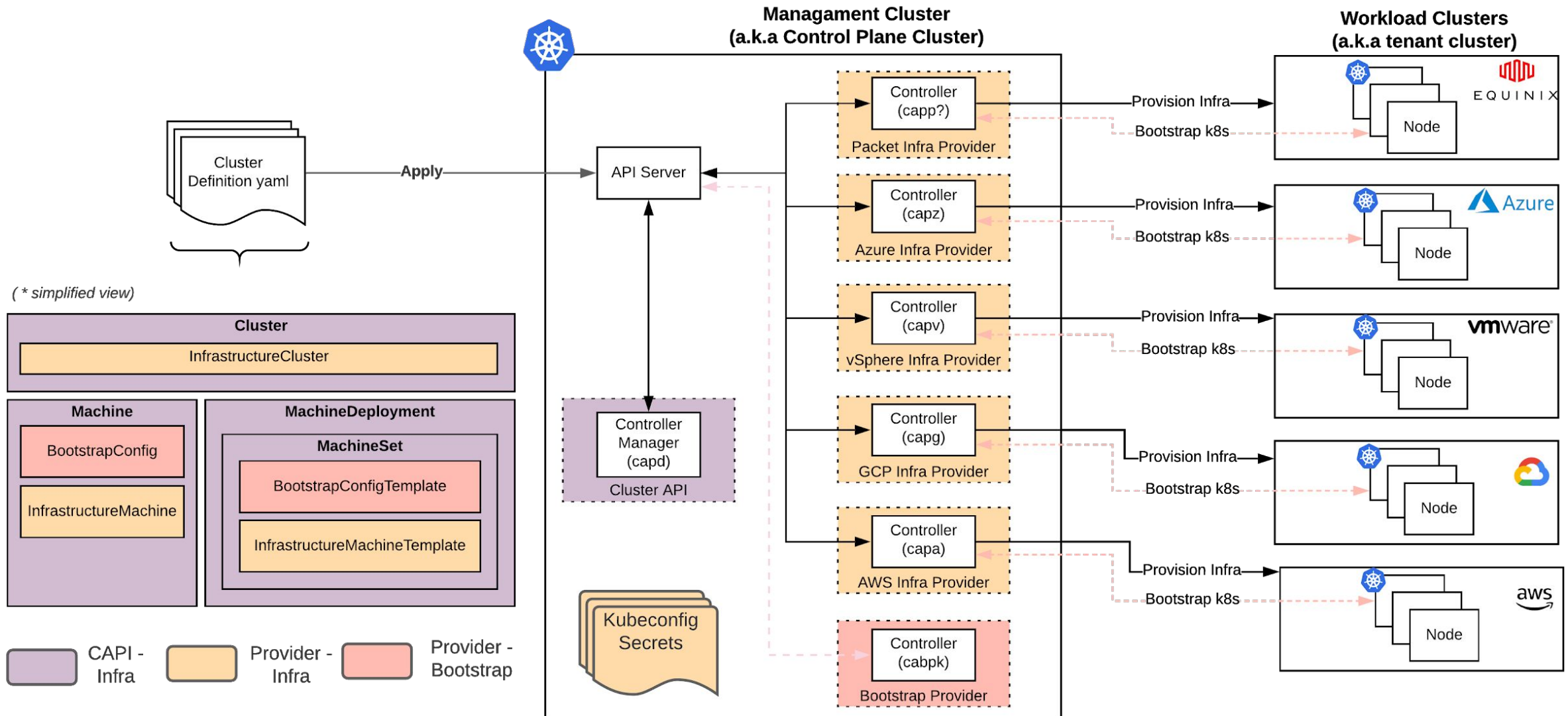
What is CAPA?

- Cluster API Infrastructure Provider

- Specifically for running clusters in AWS
  - Creates all the AWS infrastructure required to provision a k8s cluster
  - Can bring your own infrastructure

- Supports creating 2 different types of cluster
  - **Unmanaged** - EC2 Instances & Kubeadm Bootstrapped
  - **Managed** - EKS

CAPA Resources
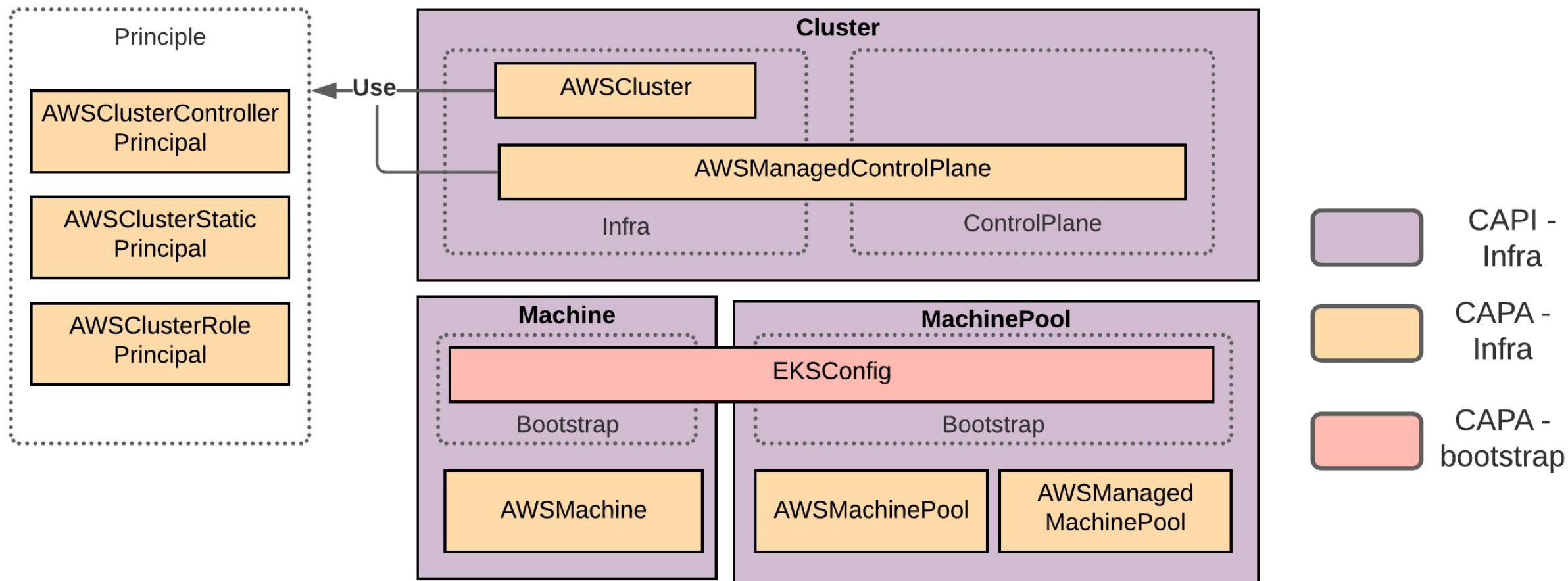
(* simplified view)

clusterawsadm

- Command line utility for CAPA

  - `$ clusterawsadm bootstrap`

  - `$ clusterawsadm ami`

  - `$ clusterawsadm eks`

New features v0.6

- Multitenancy
    - New CRDs:
        - AWSClusterControllerPrincipal
        - AWSClusterRolePrincipal
        - AWSClusterStaticPrincipal
    - A new controller for backward compatibility
        - Feaute-gate: AutoControllerPrincipalCreator

- AWSMachinePools support for EC2 autoscaling groups
    - New CRD: AWSMachinePool
    - Feature-gate: MachinePool

CloudFormation - Stack cluster | IAM Management Console | Subnets | VPC Management C | EC2 Management Console | EC2 Management Console | EC2 Management Console | +

us-west-1.console.aws.amazon.com/ec2/v2/home?region=us-west-1#LaunchTemplateDetails:launchTemplateId=lt-06bc4742c13e8db24   Incognito   Update

gmail   apple+   email   VMware Source -...   VMware Intelligen...   confluence   HelpNow+   Google Cloud Plat...   VMware GitHub M...   siralama   travel   handson   tkg confluence   k8s calendar   ccsig   tkg jira   Misc   »   Reading List

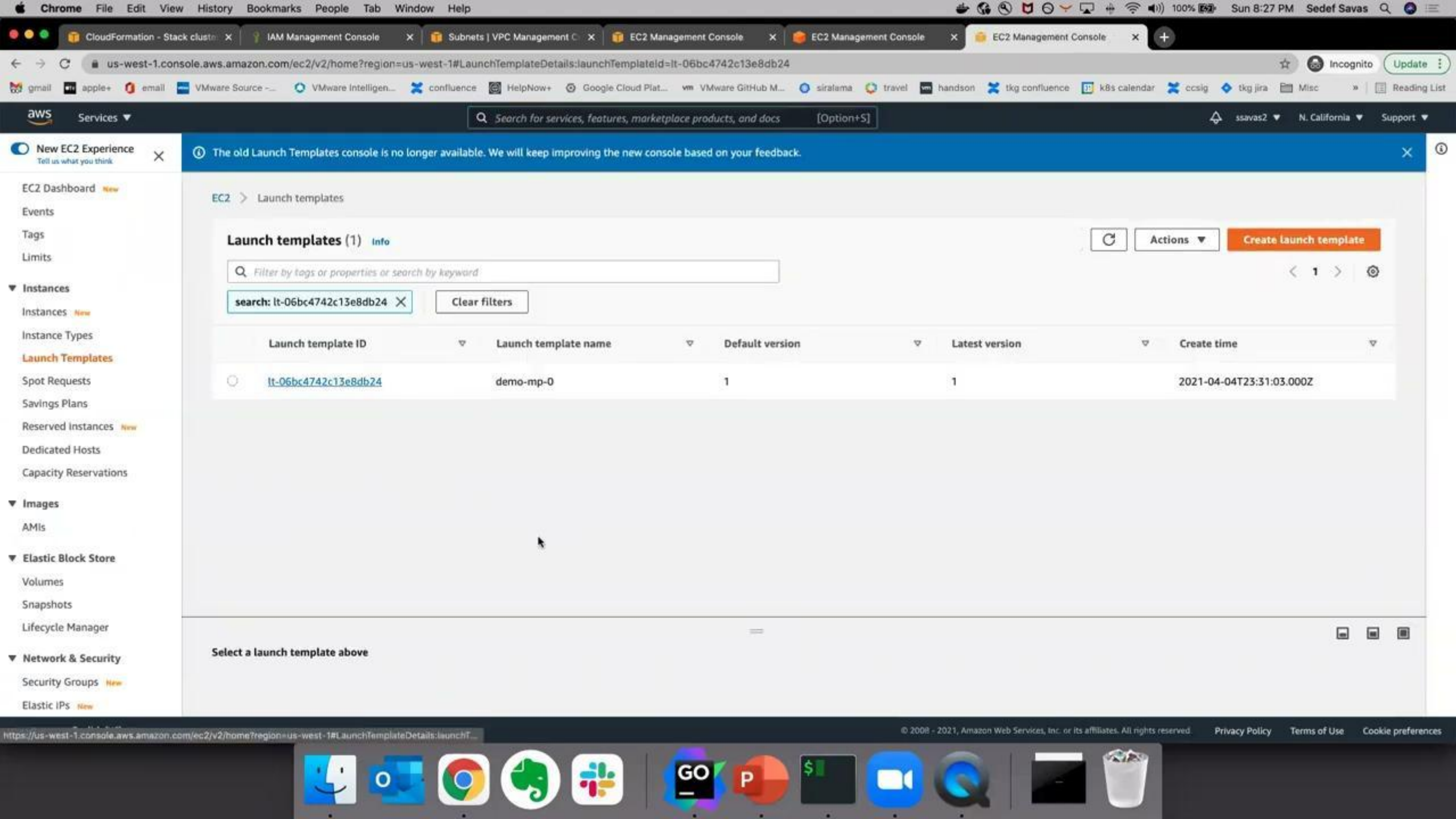aws   Services ▼   🔍 Search for services, features, marketplace products, and docs   [Option+S]   🔔 ssavas2 ▼   N. California ▼   Support ▼

New EC2 Experience   ⓘ The old Launch Templates console is no longer available. We will keep improving the new console based on your feedback.   ✕   ⓘ
Tell us what you think

EC2 Dashboard   New
                                    EC2 > Launch templates
Events

Tags   Launch templates (1) Info   🔄   Actions ▼   Create launch template

Limits   🔍 Filter by tags or properties or search by keyword

▼ Instances   ‹   1   ›   ⚙

Instances   New   search: lt-06bc4742c13e8db24 ✕   Clear filters

Instance Types

Launch Templates   Launch template ID   ▽   Launch template name   ▽   Default version   ▽   Latest version   ▽   Create time   ▽

Spot Requests
                                    ○ lt-06bc4742c13e8db24   demo-mp-0   1   1   2021-04-04T23:31:03.000Z
Savings Plans

Reserved Instances   New

Dedicated Hosts

Capacity Reservations

▼ Images

AMIs

▼ Elastic Block Store

Volumes

Snapshots   ═

Lifecycle Manager   ▫ ▫ ▫

▼ Network & Security   Select a launch template above

Security Groups   New

Elastic IPs   New

https://us-west-1.console.aws.amazon.com/ec2/v2/home?region=us-west-1#LaunchTemplateDetails:launchT...   © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved   Privacy Policy   Terms of Use   Cookie preferences

New features v0.6 (cont.)

- EC2 Spot instance support

- EC2 state change detection with EventBridge and SQS (experimental)

- Dedicated instance support

- AWS request throttler logic

New features: managed

EKS support in CAPA is new in v0.6
- Experimental and enabled via **EKS** feature flag
- *AWSManagedControlPlane* & *EKSConfig* CRDs

Worker nodes:
- Machines - EC2 Based
  - use Machine & **AWSMachine**
- Machine Pools - EC2 Auto Scaling Groups
  - use MachinePool & **AWSMachinePool***
- Managed Machine Pools - EKS node groups
  - use MachinePool & **AWSManagedMachinePool***

*Machine pools requires enabling the MachinePool feature flag

New features: managed (cont)

- Per cluster IAM Role creation (control plane and worker nodes)

- IAM Authenticator configuration

- EKS Addons

- Fargate Profiles (in 0.6.5)

```
export EXP_EKS=true                 # Enable EKS support
export EXP_EKS_IAM=false            # Enable roles per cluster
export EXP_EKS_ADD_ROLES=false      # Allow roles to be added
export EXP_MACHINE_POOL=true        # Enable machine pools

clusterctl init --infrastructure=aws --control-plane aws-eks --bootstrap aws-eks
```

New features: managed

```
19    kind: AWSManagedControlPlane
20    apiVersion: controlplane.cluster.x-k8s.io/v1alpha3
21    metadata:
22      name: "wkp-mgmt01-control-plane"
23    spec:
24      region: "eu-west-2"
25      principalRef:
26        kind: AWSClusterControllerPrincipal
27        name: default
28      sshKeyName: "capi-management"
29      version: "v1.18.0"
30      addons:
31        - name: "vpc-cni"
32          version: "v1.6.3-eksbuild.1"
33          conflictResolution: "overwrite"
34      iamAuthenticatorConfig:
35        mapRoles:
36        - username: "kubernetes-admin"
37          rolearn: "arn:aws:iam::1234567890:role/AdministratorAccess"
38          groups:
39          - "system:masters"
```

A

```
58    apiVersion: infrastructure.cluster.x-k8s.io/v1alpha3
59    kind: AWSManagedMachinePool
60    metadata:
61      name: "wkp-mgmt01-pool-0"
62    spec:
63      scaling:
64        minSize: 2
65        maxSize: 3
```

B

Roadmap

- Alpha stage
  - v0.6.x (compatible with CAPI v1alpha3) --- a stable api option
  - v0.7.x (compatible with CAPI v1alpha4) → focus is more on stability and UX to lead beta release

- Backport only bug fixes to v0.6 release

v0.7 (v1alpha4) ~ Q2 2021

- **Unmanaged**
  - Extend Spot Instance support to Amazon EC2 Fleet & Spot Fleet
  - GPU instance support with NVIDIA GPU operator
  - Ignition support (might be earlier)

- **Managed**
  - OIDC Provider Association
  - Improved Launch template functionality/support
  - *AWSManagedControlPlane* refactor (and *AWSManagedCluster* deprecation)

How to get started?

- Try CAPI/CAPA using the quick start guide:
  - https://cluster-api.sigs.k8s.io/user/quick-start.html

- Checkout CAPA book for more details:
  - https://cluster-api-aws.sigs.k8s.io

- Look at the project repo to see the code, issues etc:
  - https://github.com/kubernetes-sigs/cluster-api-provider-aws

- Discuss the provider in the Kubernetes slack:
  - #cluster-api-aws

- Attend the office hours calls:
  - Bi-weekly meeting on Monday @ 10:00AM PT (6:00PM UTC)

How to contribute?

📝 Writing skills?
- Document our [book](): quick start, architecture diagrams, contracts, and so on!

🧬 Product skills?
- Gather use cases, compile user pulse surveys, draw roadmaps.
- Work with project's maintainers and the community to shape our product.
- Help with backlog grooming, maintain milestones.

👨‍💻 Coding skills?
- Review pull requests, become an approver.
- Search for help wanted, or good first issues across our repositories.

🙌 Other skills? Have feedback, use cases, demos, or questions?