

CONF42.COM – DEVOPS 2024

Bootstrapping Clusters with EKS Blueprints

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Agenda

Kubernetes and EKS Overview

What is EKS Blueprints?

Resources

Demo



I have chosen to use Kubernetes now what?



Why modernize with Kubernetes?

Ease

Declarative and self-reconciling
Flexible and extensible

Consistency

Same API, regardless of where
you run or at what scale

Ecosystem

Hundreds of solutions across the
CNCF ecosystem

Community

De facto standard with numerous
enterprises helping chart the future

Amazon EKS in the cloud



- Single tenant
- Highly available cluster API endpoint
- 99.95% SLA
- 24x7x365 support
- Instances scaled up/down seamlessly
- Upgrade and patching
- **Focus on apps**

Kubernetes with AWS

HOW YOU WANT IT, WHERE YOU NEED IT

AWS is pushing the boundaries with AWS Outposts, AWS Wavelength, AWS Local Zones, and now on-premises, edge, and hybrid capabilities



Customer
infrastructure



AWS
Outposts



AWS
Wavelength



AWS
Local Zones



AWS
Regions

Amazon EKS Anywhere

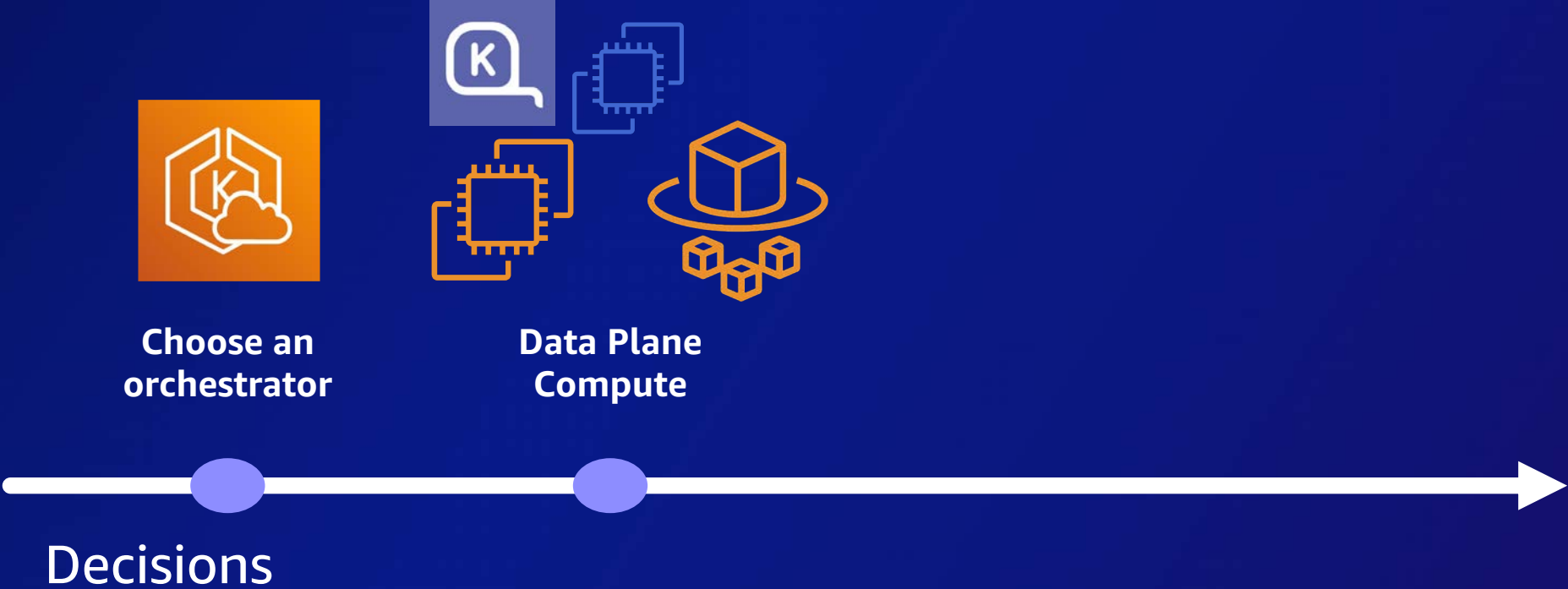
Amazon EKS



**I have chosen Amazon EKS for
my Kubernetes cluster - now
what?**



Kubernetes Journey

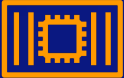


Amazon EKS Runtimes Overview

Administrator
deploys Pod



Kubernetes
schedules the pod



Amazon EC2

Run containers on EC2 instances within your account that you manage and configure.



AWS Fargate

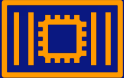
A fully managed container environment with no infrastructure management.

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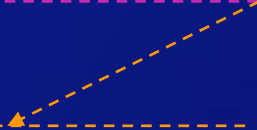
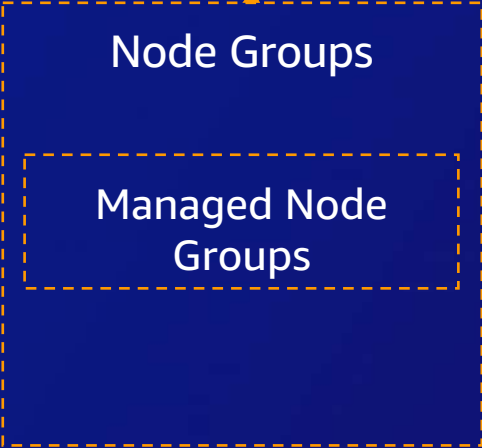


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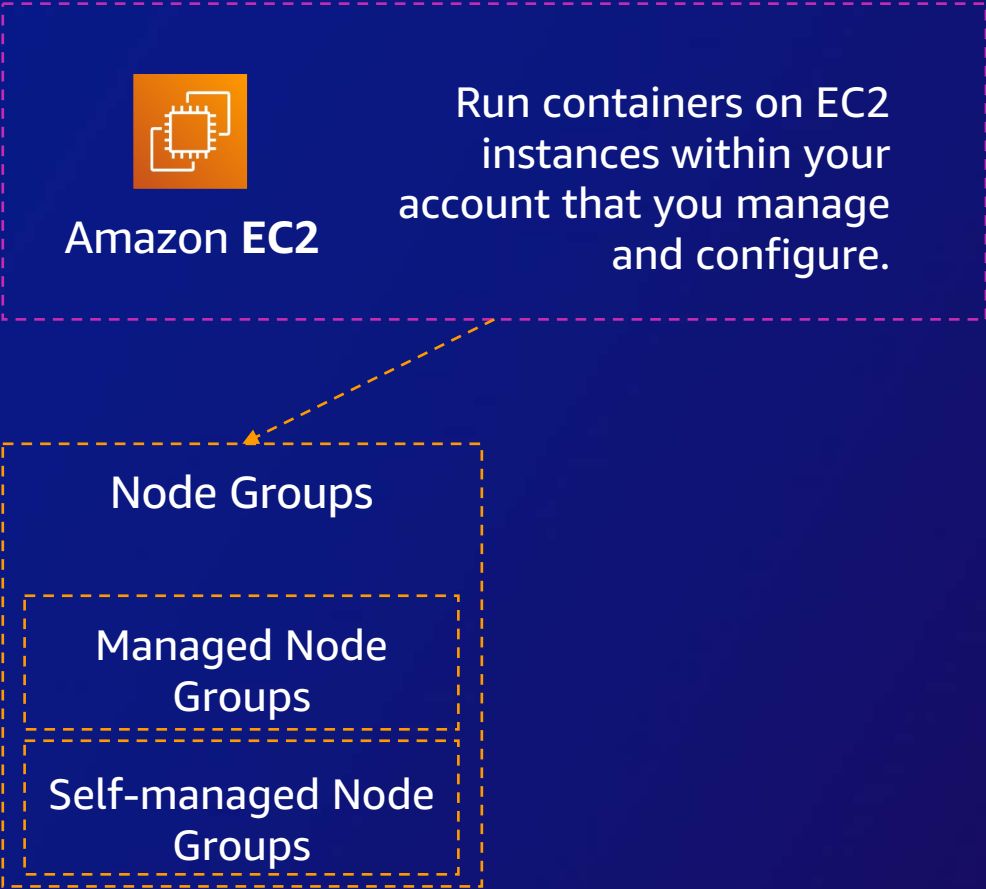
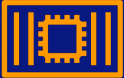


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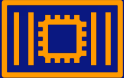


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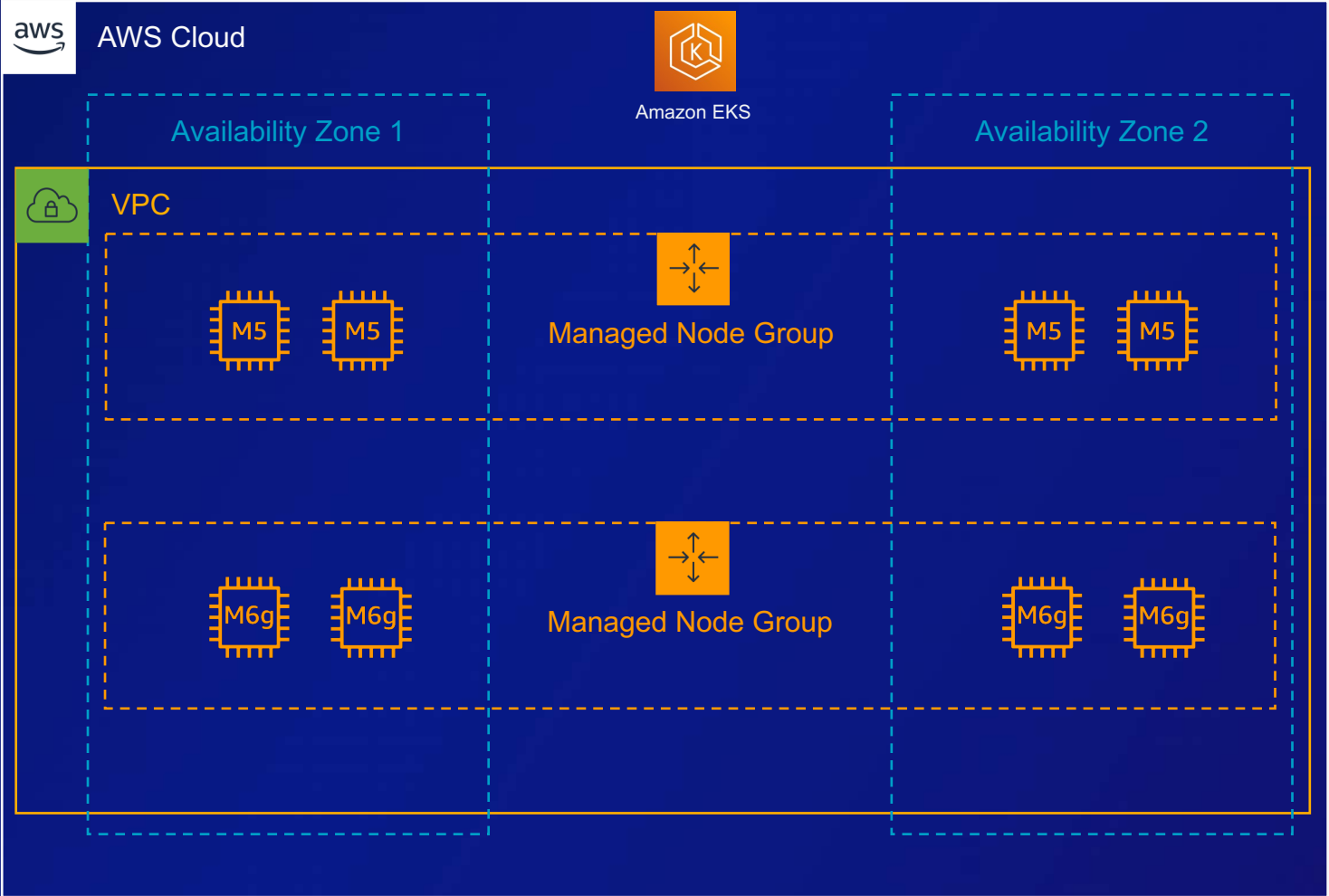
Administrator
deploys Pod



Kubernetes
schedules the pod



We decided on this



Container Journey



CNCF Cloud Map



“There is no **shortage of amazing tooling** in the K8s ecosystem, but there is no guide for how to **put all the tools together**”



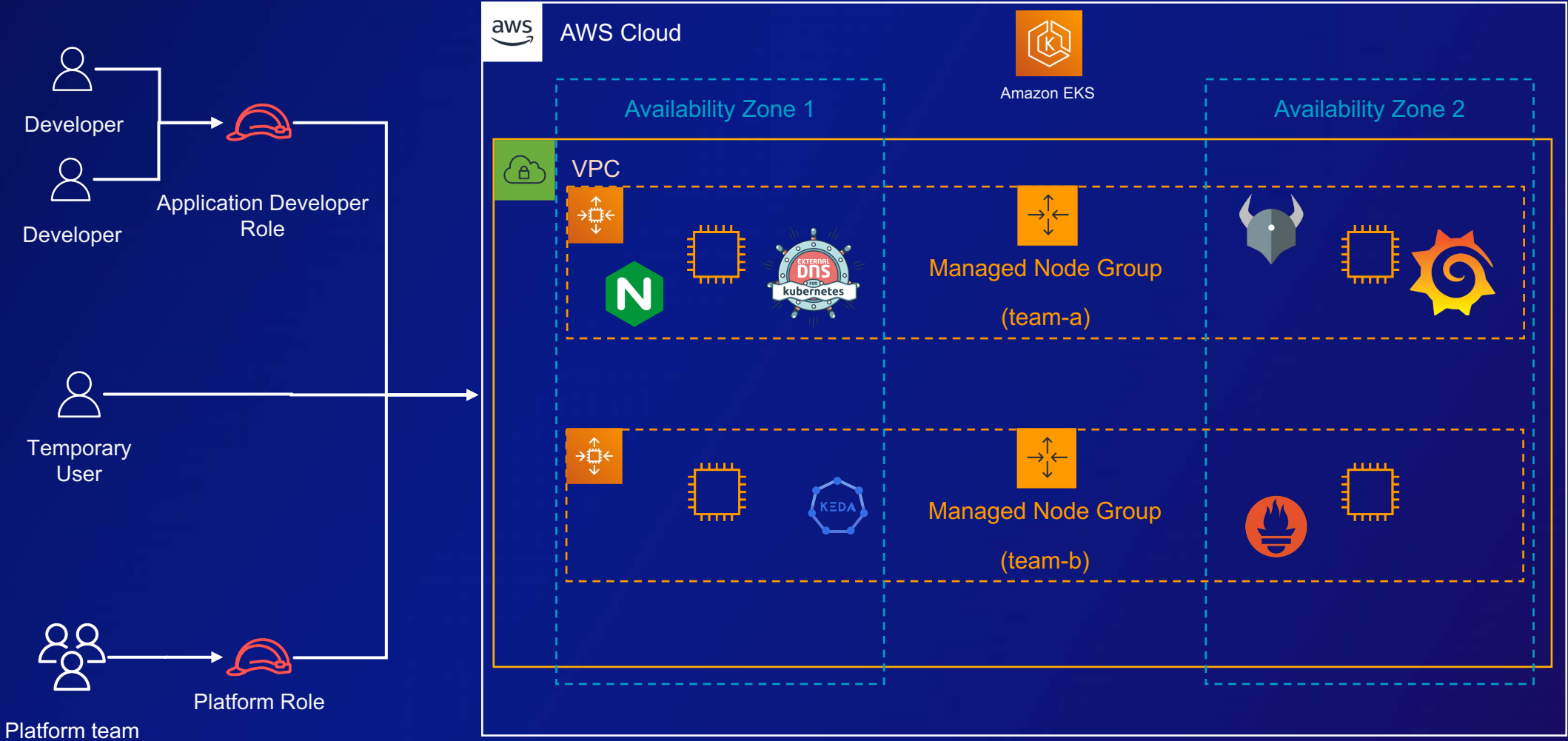
We arrived at this solution



Kubernetes Journey



Multi-Team Considerations



Multi-environment



Dev/Test account (single/multiple regions)



Dev environment



Test environment



Production account



Production environment

Amazon EKS Blueprints



Amazon EKS Blueprints

An open-source framework that allows you to **configure and deploy complete** EKS clusters



Infrastructure as Code with Terraform and CDK



Based on AWS best practices and recommendations



Integrated with popular K8s tools and services



Fully extensible and customizable

Leverage your preferred tool



CDK EKS Blueprints



Terraform EKS Blueprints



Open Source Repositories

This screenshot shows the GitHub repository page for 'aws-quickstart/cdk-eks-blueprints'. The repository is public and has 14 watchers, 41 forks, and 98 stars. It features a navigation bar with links to Code, Issues (114), Pull requests (4), Actions, Projects (1), Security, and Insights. The main content area displays a file tree with folders like .github/workflows, bin, ci, docs, examples, lib, scripts, and test, along with files like .code, .eslintrc.js, .gitignore, .npmignore, CODEOWNERS, and LICENSE. A recent merge pull request #357 is highlighted at the top.

This screenshot shows the GitHub repository page for 'aws-ia/terraform-aws-eks-blueprints'. The repository is public and has 25 watchers, 162 forks, and 340 stars. It features a navigation bar with links to Code, Issues (9), Pull requests (11), Actions, Projects (1), Wiki, Security (17), and Insights. The main content area displays a file tree with folders like .github, deploy, docs, examples, images, and modules, along with files like .gitallowed, .gitignore, .pre-commit-config.yaml, CODEOWNERS, CODE_OF_CONDUCT.md, CONTRIBUTING.md, KNOWN_ISSUES.md, LICENSE, and OWNERS. A recent commit by github-actions[bot] and kcoleman731 is highlighted at the top. The right sidebar contains an 'About' section with a description of EKS Blueprints for Terraform, a list of related tags, and a 'Releases' section showing the latest version v4.0.1.

EKS Blueprint solution – Cluster & Infrastructure

Clusters



Amazon EKS



Bottlerocket



AWS Fargate

EKS Blueprint solution – Add-Ons

Add-ons



ArgoCD



CoreDNS



External DNS



Grafana



Nginx



Cluster Autoscaler



OPA



Prometheus

Clusters



Amazon EKS



Bottlerocket



AWS Fargate

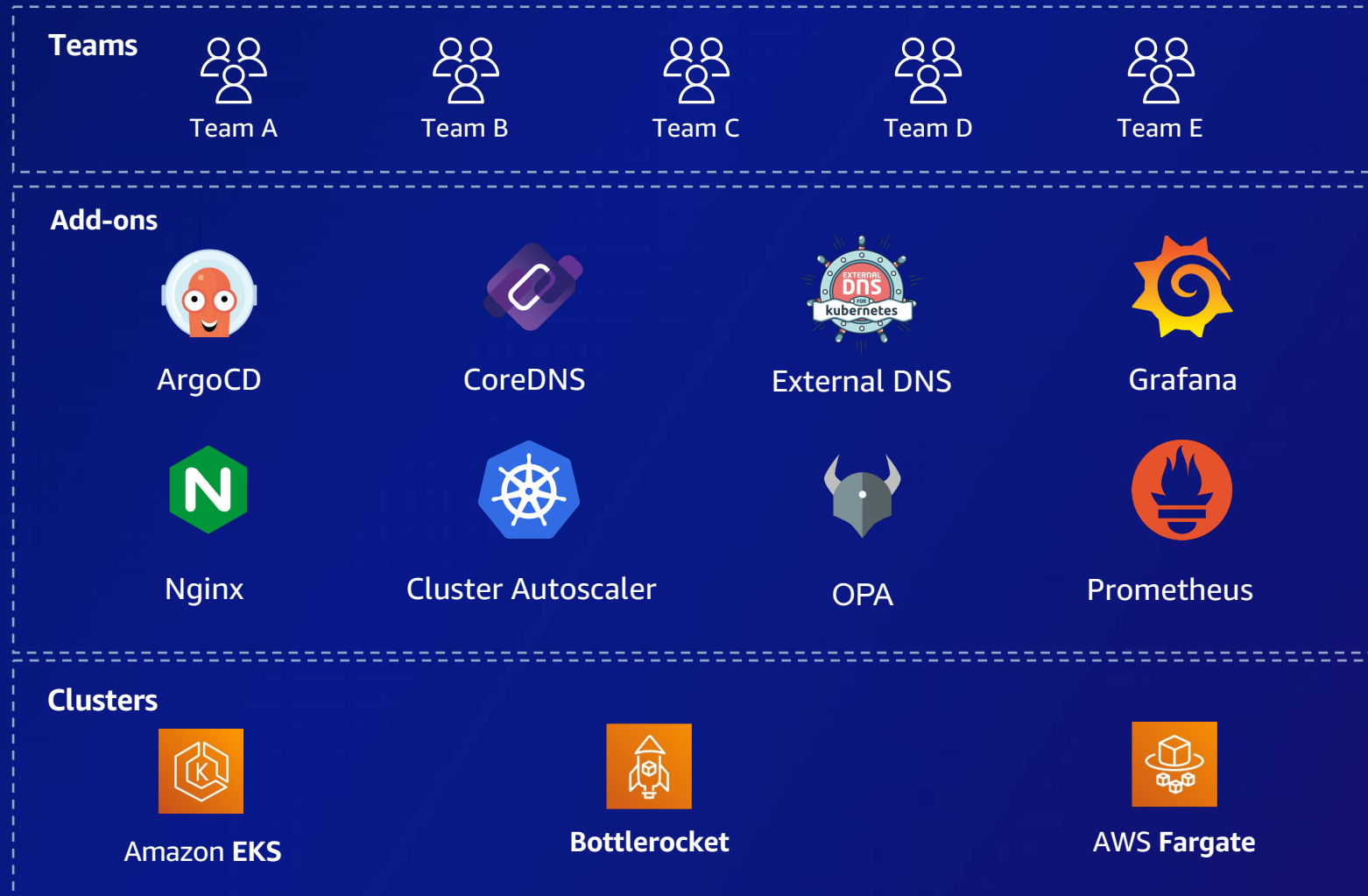
Install addons according to best practices

```
module "eks_blueprints_kubernetes_addons" {  
  source = "../../modules/kubernetes-addons"  
  
  eks_cluster_id      = module.eks_blueprints.eks_cluster_id  
  enable_metrics_server = true  
  enable_kubecost     = true  
  
}
```

<https://aws-ia.github.io/terraform-aws-eks-blueprints/v4.29.0/add-ons/>



EKS Blueprint solution – Access & Permissions



What you get with Amazon EKS Blueprints

Cluster Management

- Configure and deploy EKS clusters according to AWS best practices.
- Replicate clusters across AWS accounts and regions.
- Integrate with an existing VPC or leverage the solution to deploy a new one.

Add-on Management

- Out of the box integrations with popular Kubernetes add-ons.
- Provisions AWS resources that are necessary to support add-on functionality.

Team Management

- Create distinct teams for both administrators and application owners.
- Manage secure namespaces access for application teams.

Workload Management

- Leverage GitOps tooling to manage workloads that run across your clusters.
- Self-service onboarding of new workloads via a Pull Request.

Resources



Leverage your prefer tool



EKS blueprint pour Terraform

<https://aws-ia.github.io/terraform-aws-eks-blueprints>



EKS blueprint pour CDK

<https://aws-quickstart.github.io/cdk-eks-blueprints>

Step by Step Workshops :

<https://catalog.workshops.aws/eks-blueprints-terraform>

<https://catalog.workshops.aws/eks-blueprints-for-cdk>

We provide lots of different patterns (examples)

- Complete examples with addons
- EKS cluster with external DNS
- EKS Fargate cluster
- Fully private EKS clusters
- Gitops with ArgoCD
- Gitlab CI/CD
- EFS shared storage
- EMR on EKS
- Cert-manager examples
- IPV6 cluster
- IPV4 Prefix delegation
- Karpenter
- Multi-tenancy with teams
- Nodes groupes advanced configurations
- Apache Airflow
- Stateful cluster
- Observability (Adot, opensearch, managed prometheus..)

Additional features with CDK pipelines

- Full pipeline multi-region / multi account

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Demo Time



Thank you!

