

CAB432 Cloud Computing

Lecture 2: Container as a Service

Faculty of Science





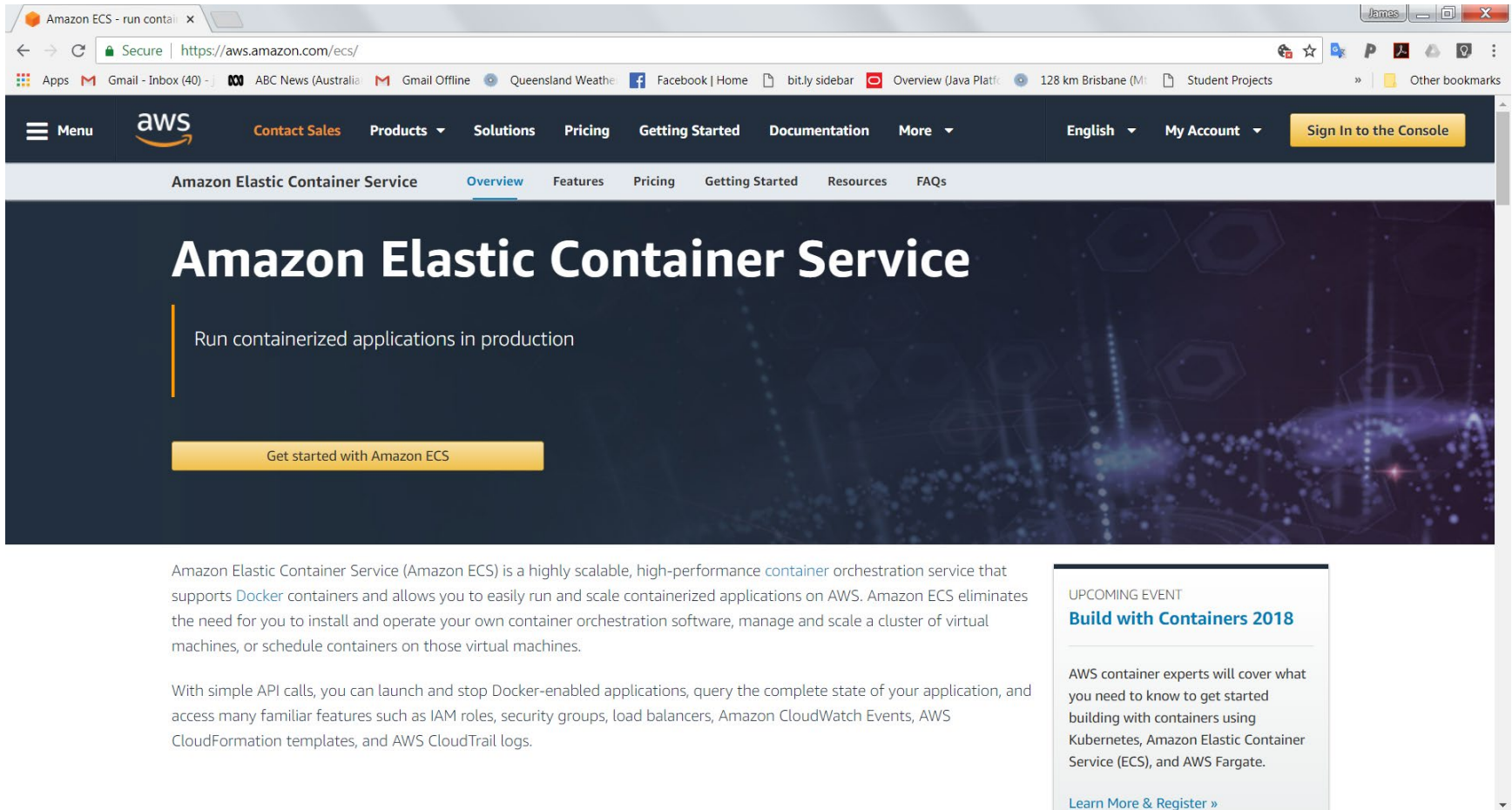
CaaS Offerings and Orchestration

CAAS SERVICES



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Amazon EC2 Container Service



The screenshot shows the Amazon ECS website interface. At the top, there's a navigation bar with the AWS logo, a menu icon, and links for Contact Sales, Products, Solutions, Pricing, Getting Started, Documentation, and More. A 'Sign In to the Console' button is on the right. Below this is a sub-navigation bar for 'Amazon Elastic Container Service' with links for Overview, Features, Pricing, Getting Started, Resources, and FAQs. The main content area has a large heading 'Amazon Elastic Container Service' and a sub-heading 'Run containerized applications in production'. A yellow button 'Get started with Amazon ECS' is prominent. To the right, there's a sidebar with an 'UPCOMING EVENT' section titled 'Build with Containers 2018', which includes a description of the event and a 'Learn More & Register' link.

Amazon Elastic Container Service (Amazon ECS) is a highly scalable, high-performance [container](#) orchestration service that supports [Docker](#) containers and allows you to easily run and scale containerized applications on AWS. Amazon ECS eliminates the need for you to install and operate your own container orchestration software, manage and scale a cluster of virtual machines, or schedule containers on those virtual machines.

With simple API calls, you can launch and stop Docker-enabled applications, query the complete state of your application, and access many familiar features such as IAM roles, security groups, load balancers, Amazon CloudWatch Events, AWS CloudFormation templates, and AWS CloudTrail logs.

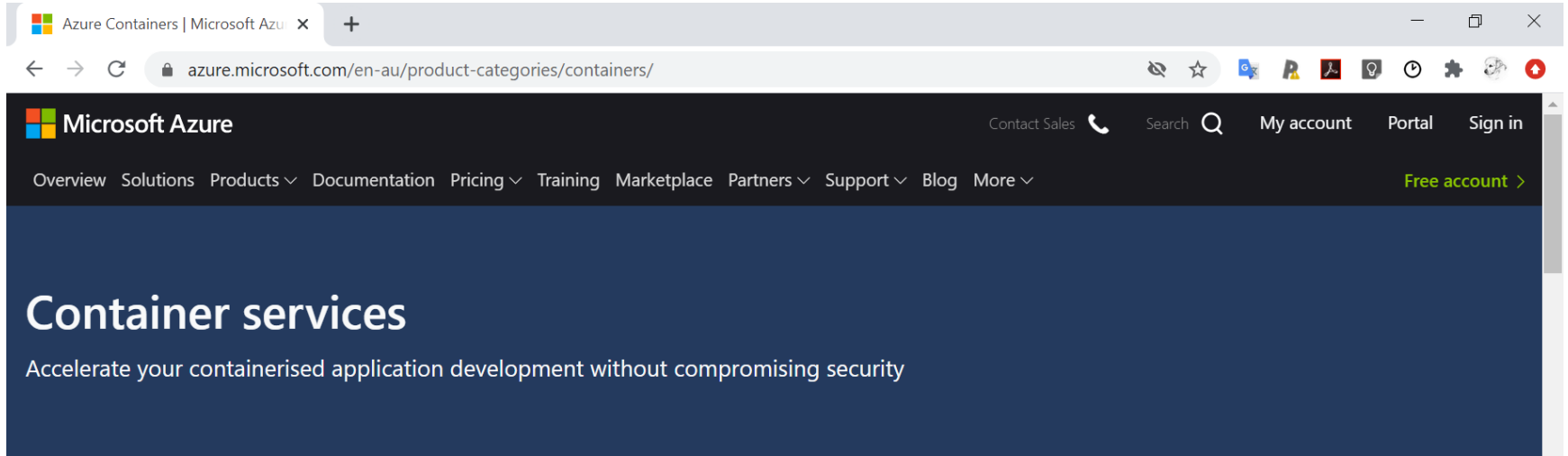
UPCOMING EVENT
Build with Containers 2018

AWS container experts will cover what you need to know to get started building with containers using Kubernetes, Amazon Elastic Container Service (ECS), and AWS Fargate.

[Learn More & Register »](#)

<https://aws.amazon.com/ecs/> (2019 Image)

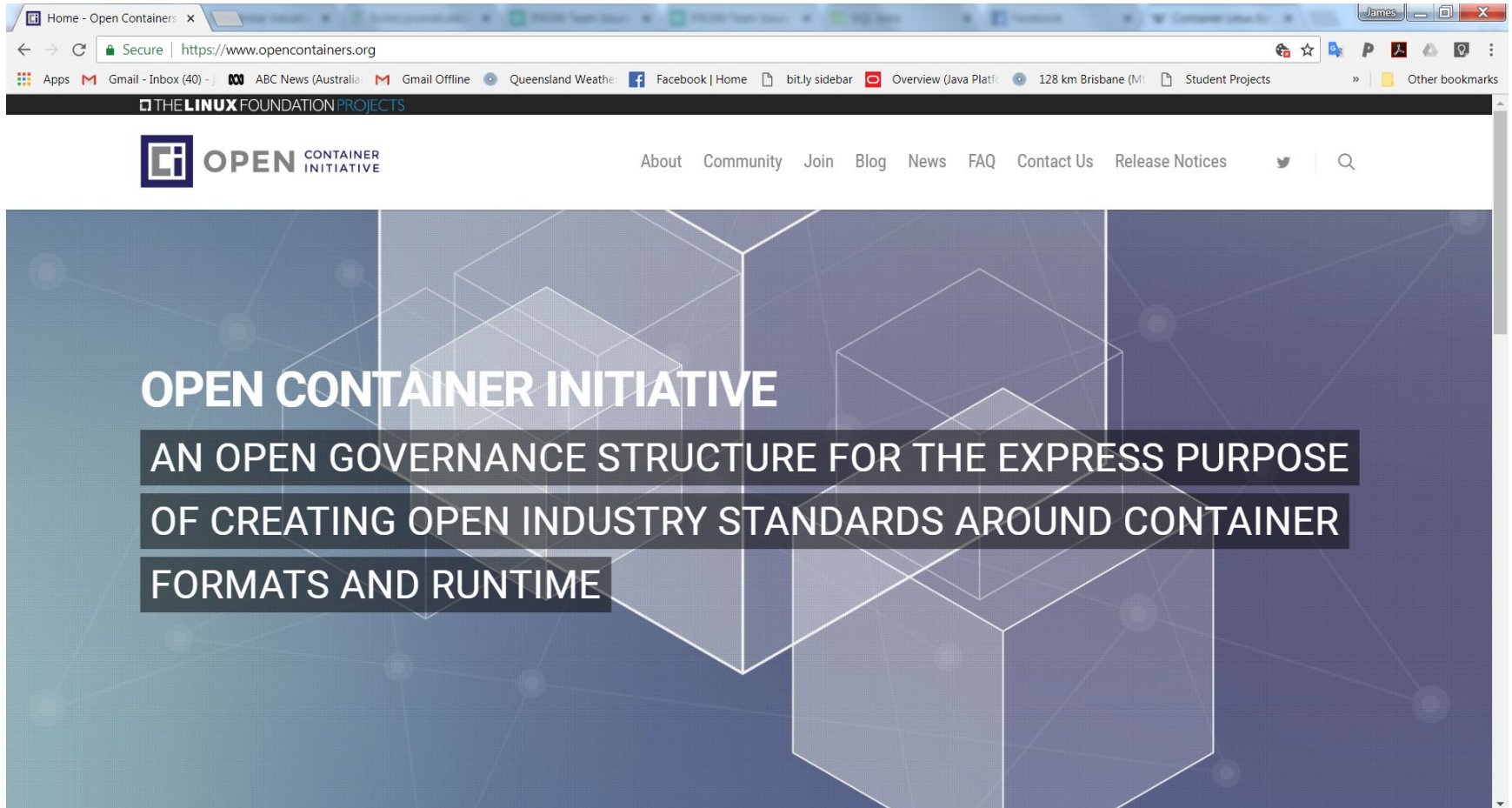
Azure Container Services



Save costs by lifting and shifting your existing applications to containers, and build microservices applications to deliver value to your users faster. Use end-to-end developer and CI/CD tools to develop, update and deploy your containerised applications. Manage containers at scale with a fully managed Kubernetes container orchestration service that integrates with Azure Active Directory. Wherever you are in your app modernisation journey, accelerate your containerised application development while meeting your security requirements.

<https://azure.microsoft.com/en-au/product-categories/containers/>

Open Container Initiative



<https://www.opencontainers.org/>

Members



<https://www.opencontainers.org/about/members>

Members



<https://www.opencontainers.org/about/members>

Container Orchestration

- We will discuss these, though others exist:
 - Kubernetes (<https://kubernetes.io/>)
 - Docker Swarm (<https://docs.docker.com/engine/swarm/>)
- Both designed to simplify the provision of multiple services to a cluster of servers.
 - “At the end of the day, both tools let you deploy 1 or more services onto a cluster of servers. Then, you can operate on that cluster instead of individual servers”
 - See <https://nickjanetakis.com/blog/docker-swarm-vs-kubernetes-which-one-should-you-learn>

Final Comments on Docker

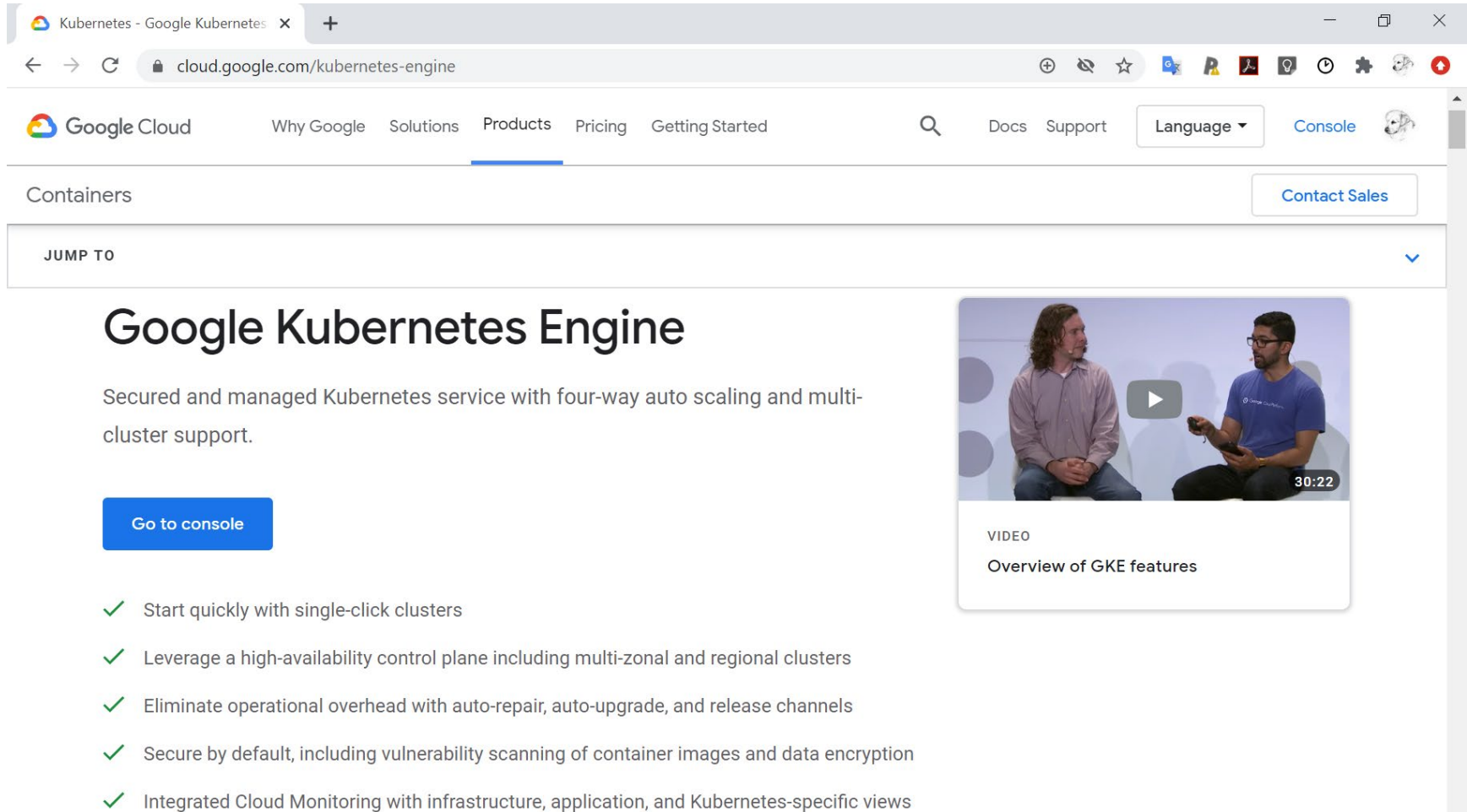
- Swarm is Docker specific, built into the CLI.
 - <https://docs.docker.com/engine/swarm/swarm-tutorial/>
- For swarms, the idea is to deploy from a manager node to multiple worker nodes across a network.
- The docker daemon runs on the worker nodes and will handle the deployment when shared from the manager node.
- Simpler and easier to install than Kubernetes
- But not as a flexible as a container scheduler

Kubernetes

- Initially developed by Google and the open sourced.
 - <https://kubernetes.io/>
 - <https://kubernetes.io/docs/tutorials/kubernetes-basics/cluster-intro/>
- Supports Docker and other container images
 - Harder to do easier stuff, easier (able) to do harder stuff

Kubernetes

- Managed services from the majors
 - “GCP Kubernetes” <https://cloud.google.com/kubernetes-engine>
 - “CoreOS + Red Hat” (<https://coreos.com/blog/coreos-tech-to-combine-with-red-hat-openshift>)
 - AWS Kubernetes Service (<https://aws.amazon.com/eks/>)
 - Azure Kubernetes Service (<https://azure.microsoft.com/en-au/services/kubernetes-service/>)



The screenshot shows the Google Cloud Kubernetes Engine page. The browser address bar displays 'cloud.google.com/kubernetes-engine'. The navigation bar includes 'Google Cloud', 'Why Google', 'Solutions', 'Products' (which is underlined), 'Pricing', and 'Getting Started'. There are also links for 'Docs', 'Support', a 'Language' dropdown, and a 'Console' button. The main heading is 'Containers', with a 'Contact Sales' button to its right. Below this is a 'JUMP TO' section. The main content area features the title 'Google Kubernetes Engine' and a description: 'Secured and managed Kubernetes service with four-way auto scaling and multi-cluster support.' A blue button labeled 'Go to console' is present. A list of five features is shown, each preceded by a green checkmark. To the right of the text is a video player showing two men in a discussion, with a play button and a duration of 30:22. Below the video, it is labeled 'VIDEO' and 'Overview of GKE features'.

Google Kubernetes Engine

Secured and managed Kubernetes service with four-way auto scaling and multi-cluster support.

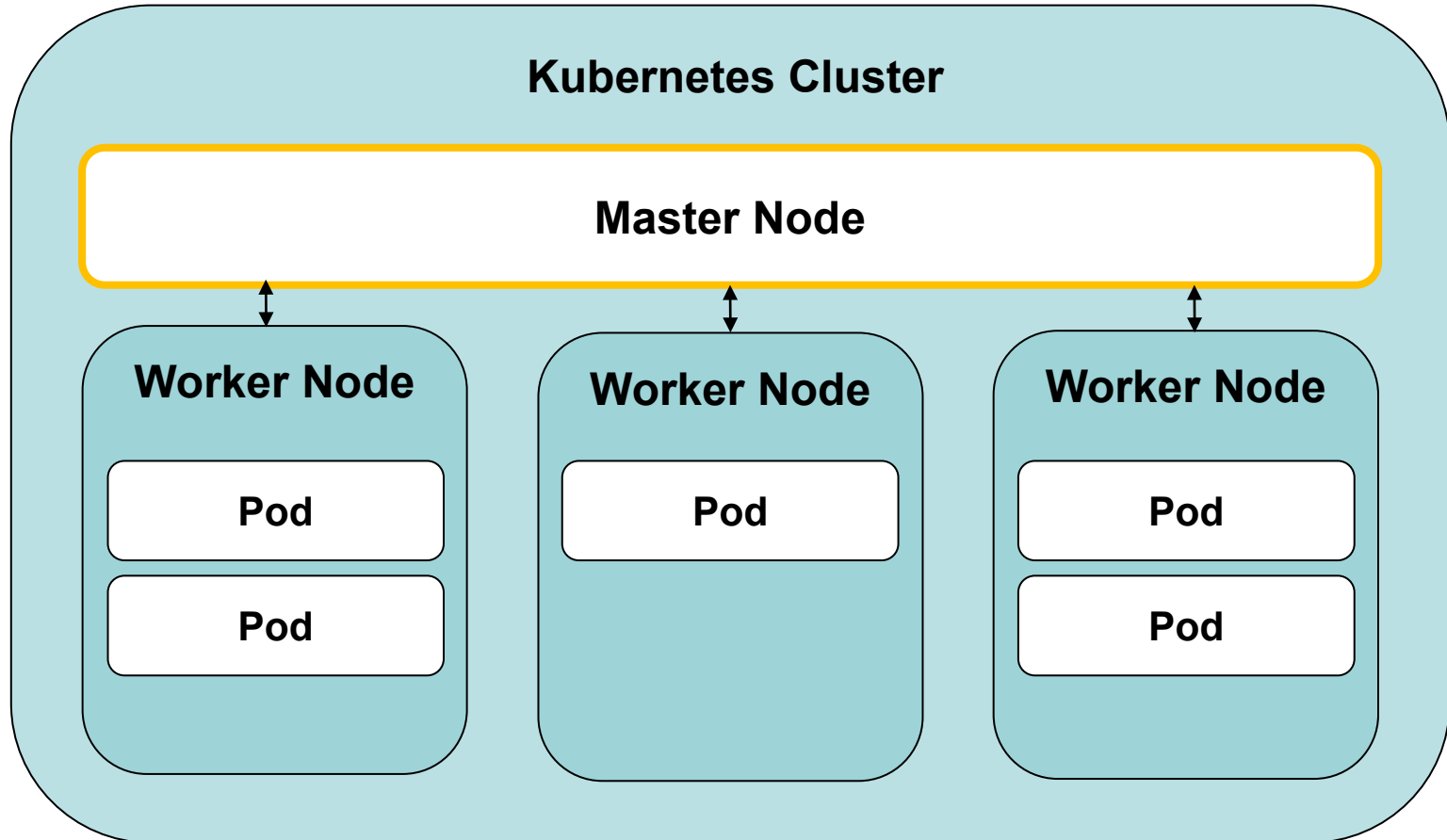
[Go to console](#)

- ✓ Start quickly with single-click clusters
- ✓ Leverage a high-availability control plane including multi-zonal and regional clusters
- ✓ Eliminate operational overhead with auto-repair, auto-upgrade, and release channels
- ✓ Secure by default, including vulnerability scanning of container images and data encryption
- ✓ Integrated Cloud Monitoring with infrastructure, application, and Kubernetes-specific views

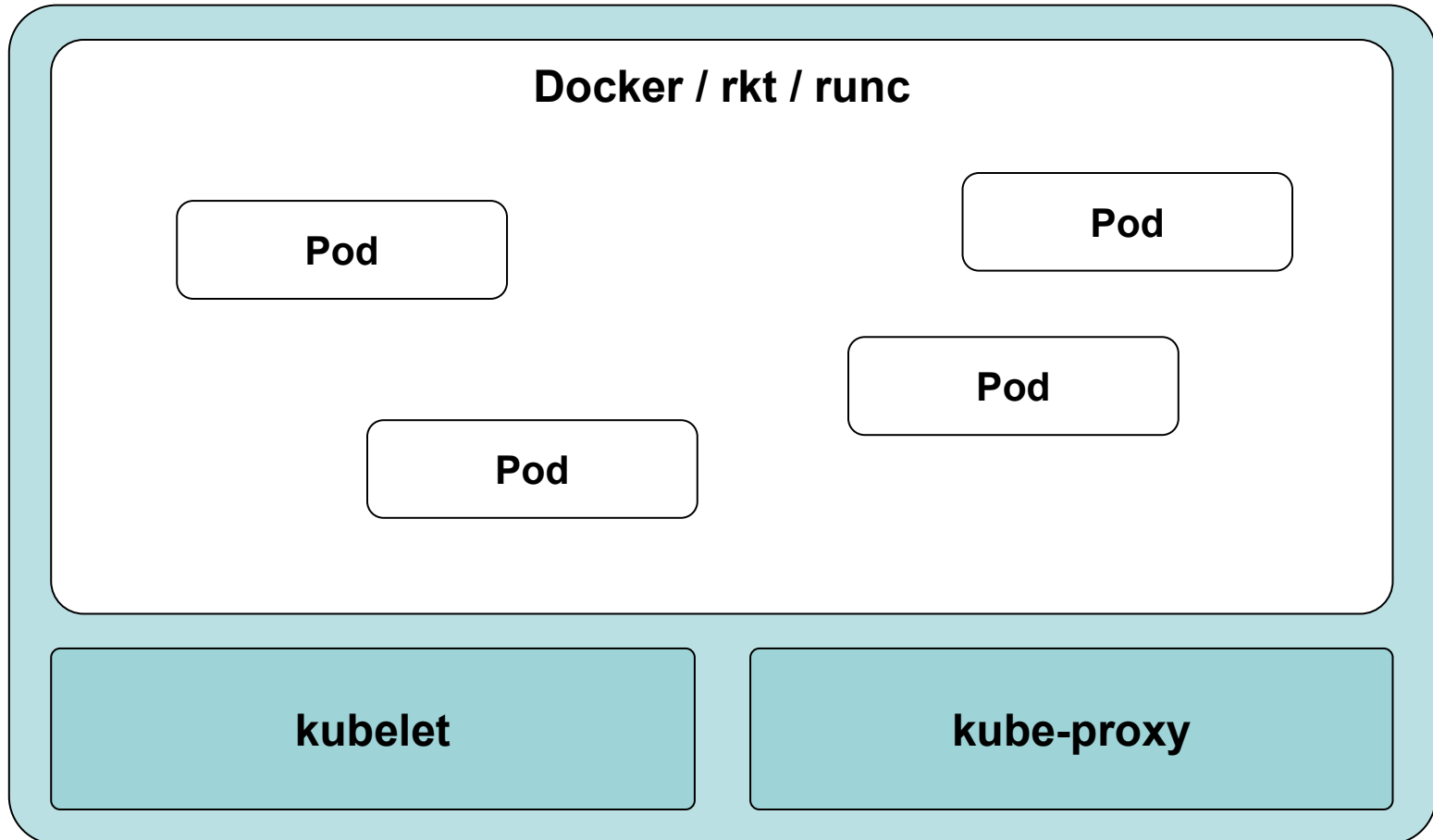
VIDEO
Overview of GKE features

<https://cloud.google.com/kubernetes-engine>

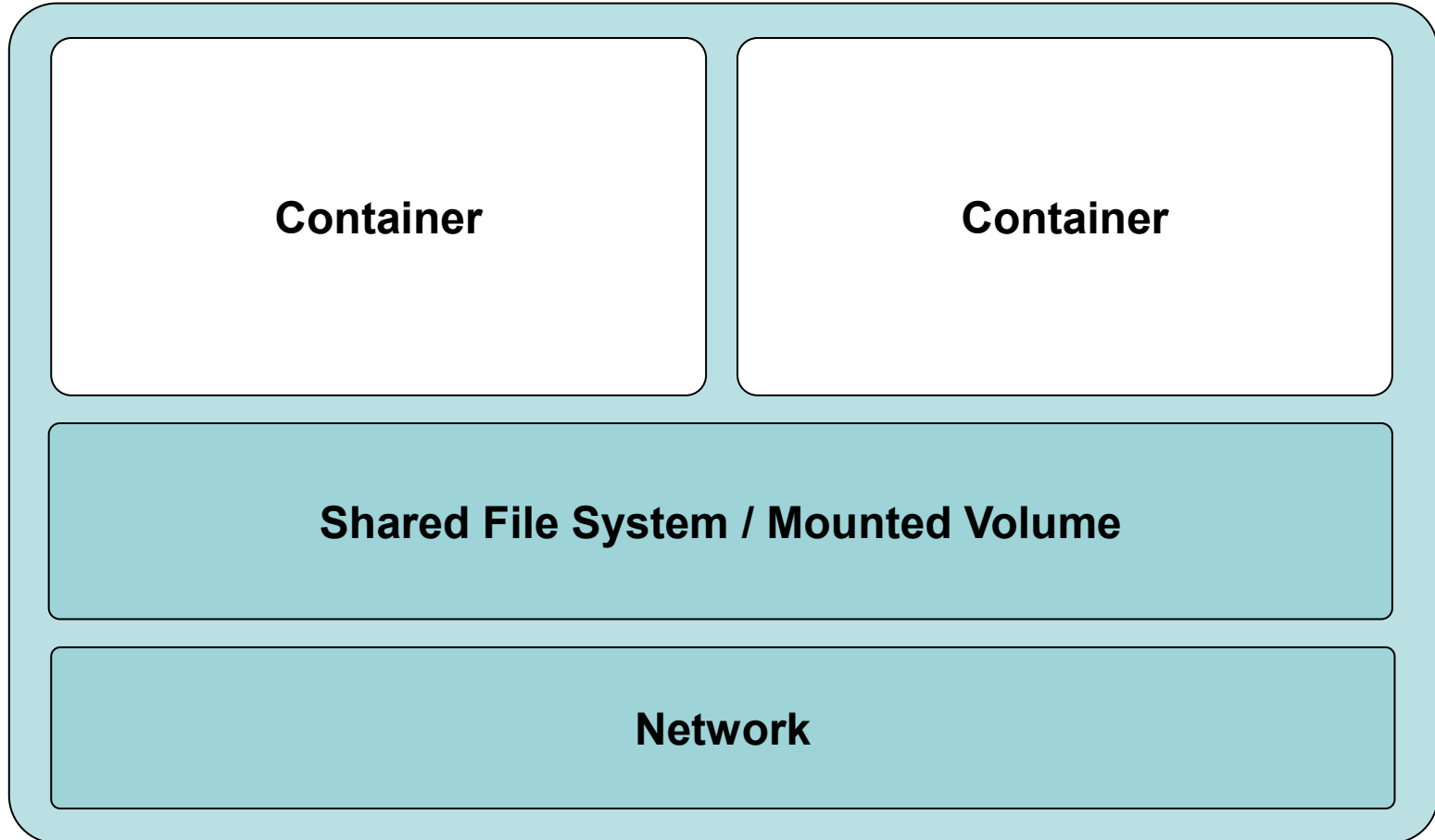
Architecture Visualisation



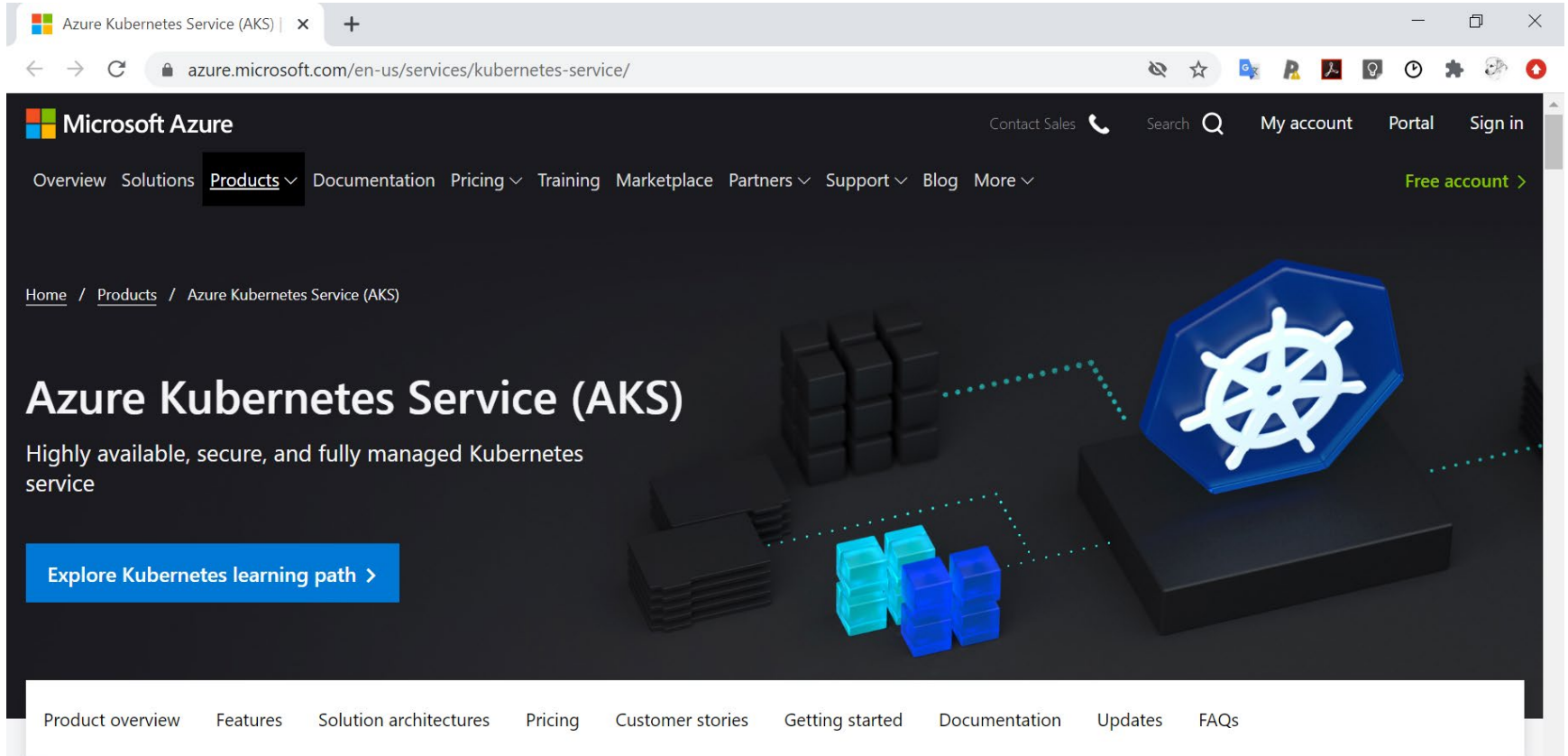
Inside a Worker Node



Inside a Pod



Azure Kubernetes Service



The screenshot shows the Azure Kubernetes Service (AKS) page on the Microsoft Azure website. The browser address bar displays the URL <https://azure.microsoft.com/en-us/services/kubernetes-service/>. The page features a dark blue header with the Microsoft Azure logo, navigation links (Overview, Solutions, Products, Documentation, Pricing, Training, Marketplace, Partners, Support, Blog, More), and user options (Contact Sales, Search, My account, Portal, Sign in). A green button for "Free account" is also visible. The main content area has a large heading "Azure Kubernetes Service (AKS)" and a subheading "Highly available, secure, and fully managed Kubernetes service". A blue button labeled "Explore Kubernetes learning path >" is positioned below the subheading. To the right, there is a 3D graphic of a ship's wheel (Kubernetes logo) on a pedestal, surrounded by stacks of blue and cyan cubes. A dotted line connects the cubes to the ship's wheel. At the bottom, a white navigation bar lists various links: Product overview, Features, Solution architectures, Pricing, Customer stories, Getting started, Documentation, Updates, and FAQs.

<https://azure.microsoft.com/en-us/services/kubernetes-service/>