
AWS
re:Invent
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CON320

Run a hybrid cloud environment at the edge with Amazon ECS Anywhere

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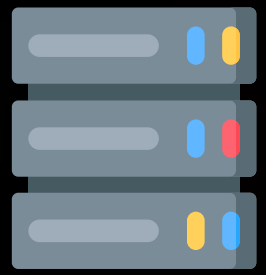
What is hybrid cloud?

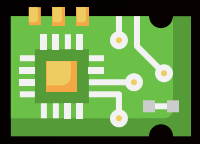
Your application on your hardware



On-premises server

Point-of-sale device

Vehicle



Internet of Things

+

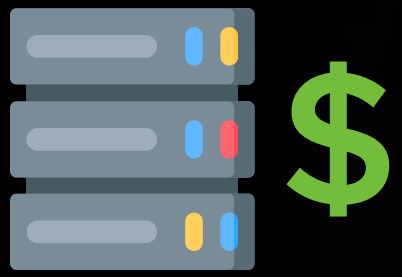
Your application on AWS

Amazon Elastic Compute Cloud (Amazon EC2)

AWS Fargate

AWS Lambda

Why hybrid cloud?



Capital expenditure investment

On-premises data center is bought and paid for already. That capital investment needs to be amortized before moving to the cloud.

On-premises data center isn't quite large enough. You don't want to make a big up-front expenditure on hardware, so you want to burst to the cloud.

Why hybrid cloud?

Compliance requirements

Some industries have specific compliance requirements about where data is stored or how data is processed

Examples:

Healthcare data

EU General Data Protection Regulation

Why hybrid cloud?

Data gravity and proximity

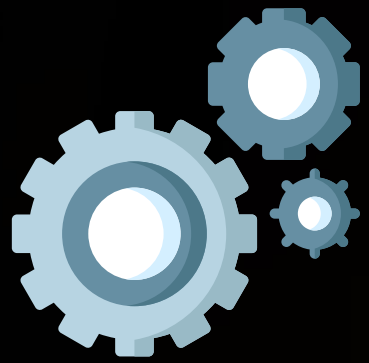
Some industries have large amounts of data and need to process that data on location

Examples:

Video rendering studio where artists need to work with large asset files, and servers do 3D rendering of scenes from that same data

Applications that require extremely low latency or to operate in disconnected mode

Why hybrid cloud?



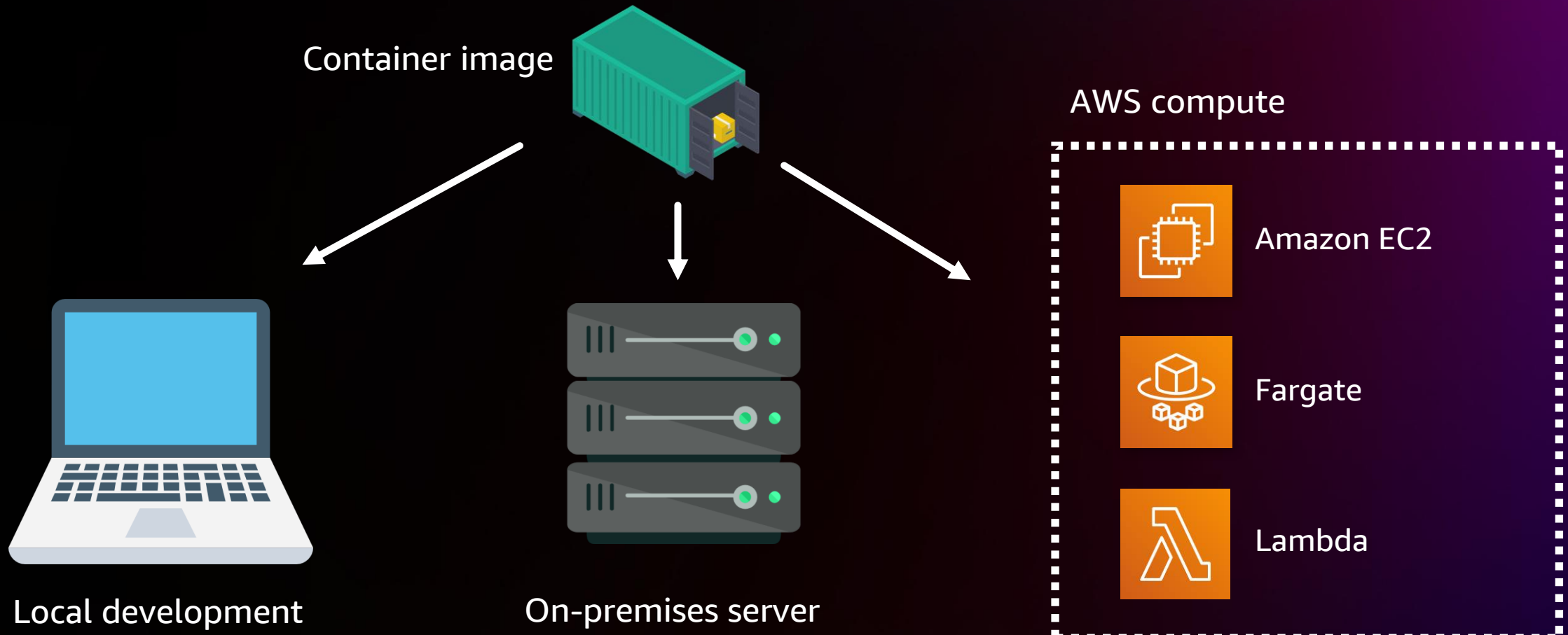
Consistent operations

Rather than treating on-premises and in-cloud workloads as separate silos, a good hybrid cloud strategy lets you use a similar operational model in both cases

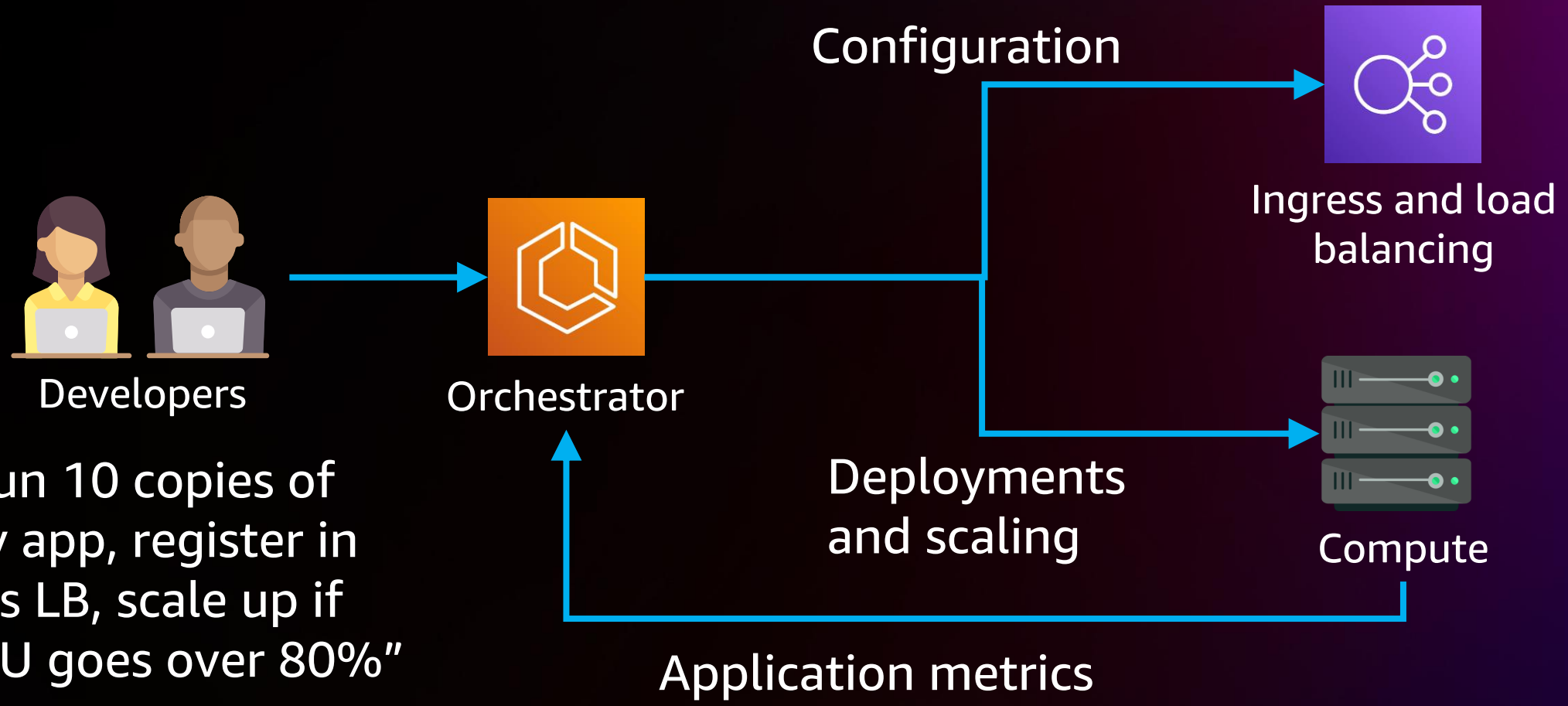
Why do companies adopt containers?

 Velocity	Improve developer velocity with consistent environment
 Reduced risk	Automation increases ability to test and iterate
 Quality	Uniform security across environment, easy to update applications with patches
 Operational excellence	Focus on business logic and infrastructure separately

One application artifact for everywhere



Container deployments need an orchestrator



AWS container services landscape

Application networking
Service discovery and service mesh

AWS Cloud Map

Management
Deployment, scheduling, scaling, and configuration of containerized applications

Amazon Elastic Container Service (Amazon ECS)

Amazon Elastic Kubernetes Service (Amazon EKS)

Hosting
Where the containers run

Amazon EC2

Fargate

Image registry
Container image repository

Amazon Elastic Container Registry (Amazon ECR)

AWS hybrid container deployments landscape

Elastic container service

Fully managed container orchestration service to deploy, manage, and scale containerized applications

AWS Outposts

Amazon ECS Anywhere

Elastic Kubernetes service

Managed container service to run and scale open-source Kubernetes deployments

Outposts

Amazon EKS Anywhere

Internet of Things

Open-source edge runtime and cloud service that helps you build, deploy, and manage device software

AWS IoT Greengrass

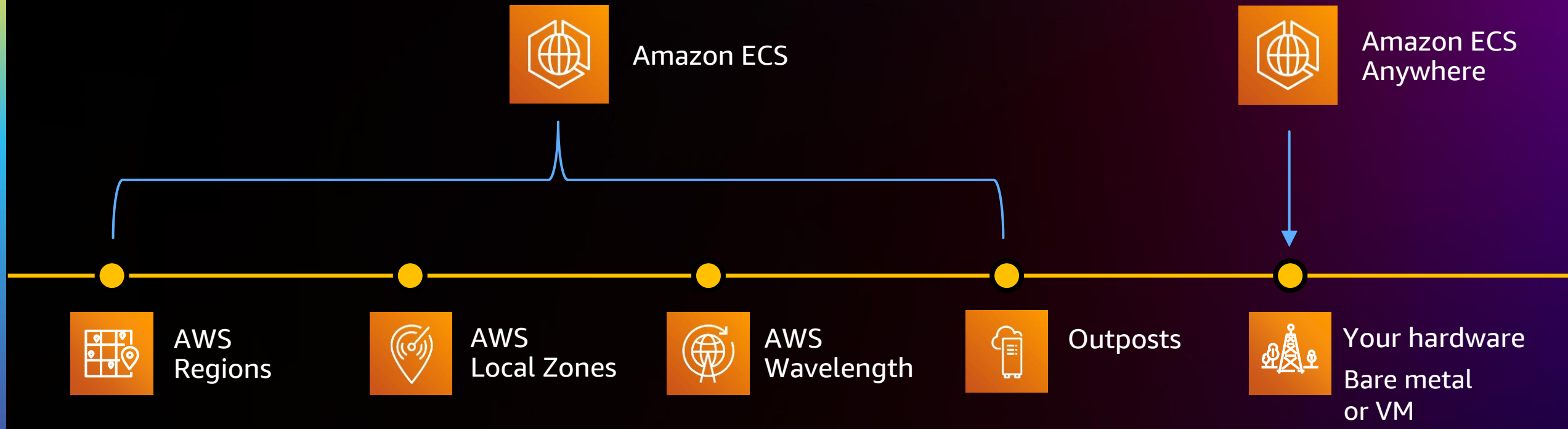
Rugged edge

Move petabytes of data to and from AWS, or process data at the edge

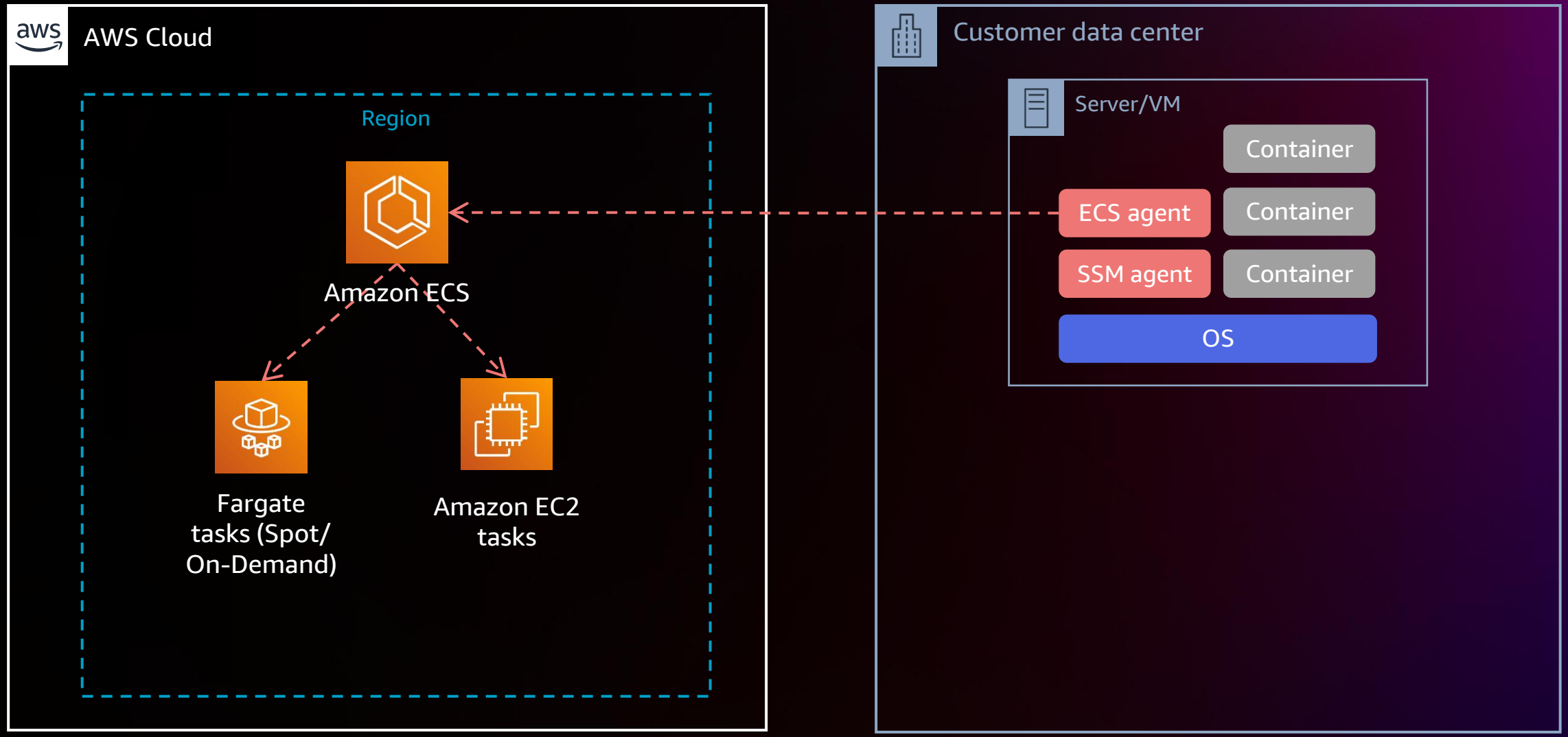
AWS Snowball Edge

Amazon ECS Anywhere
How does it work?

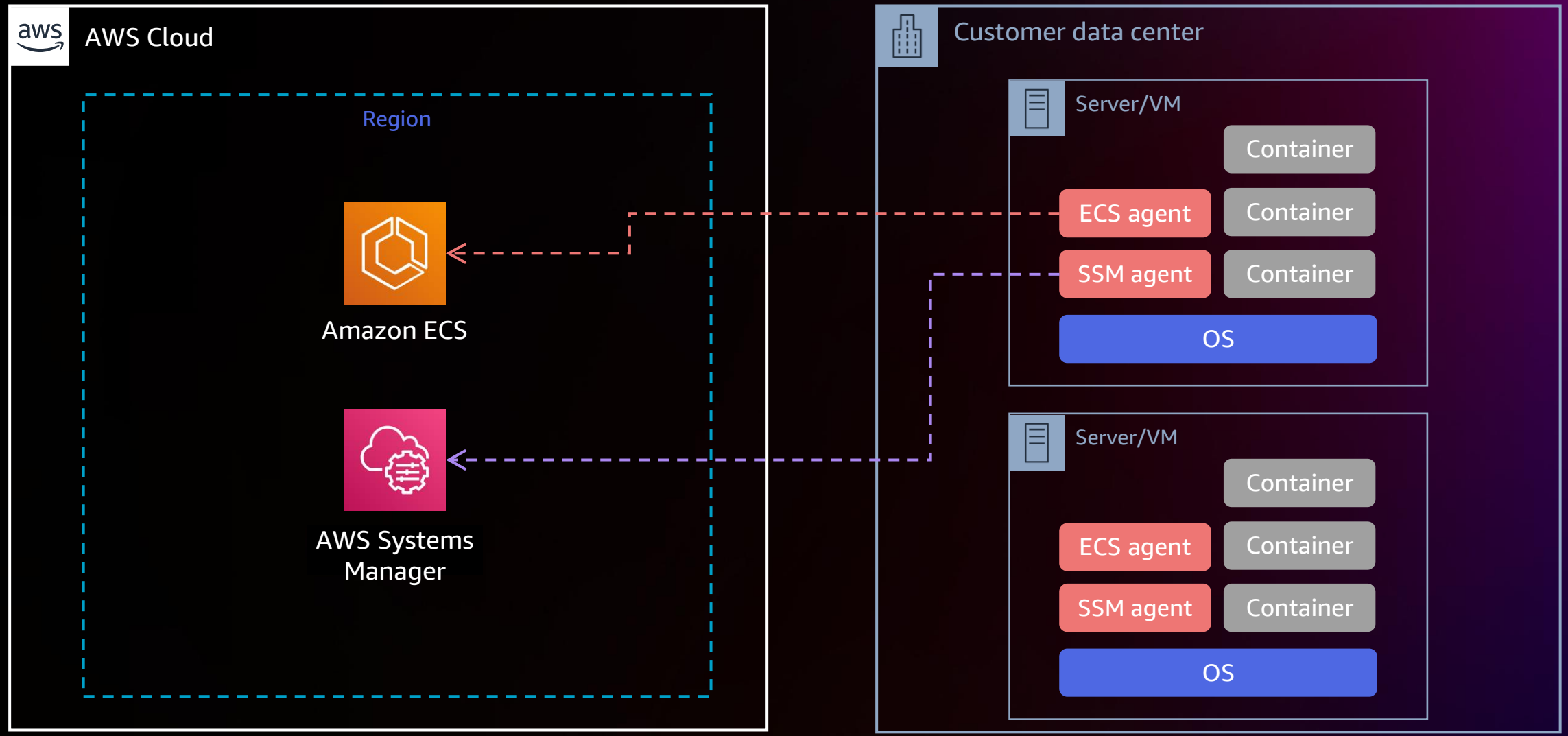
A spectrum of compute options for your code



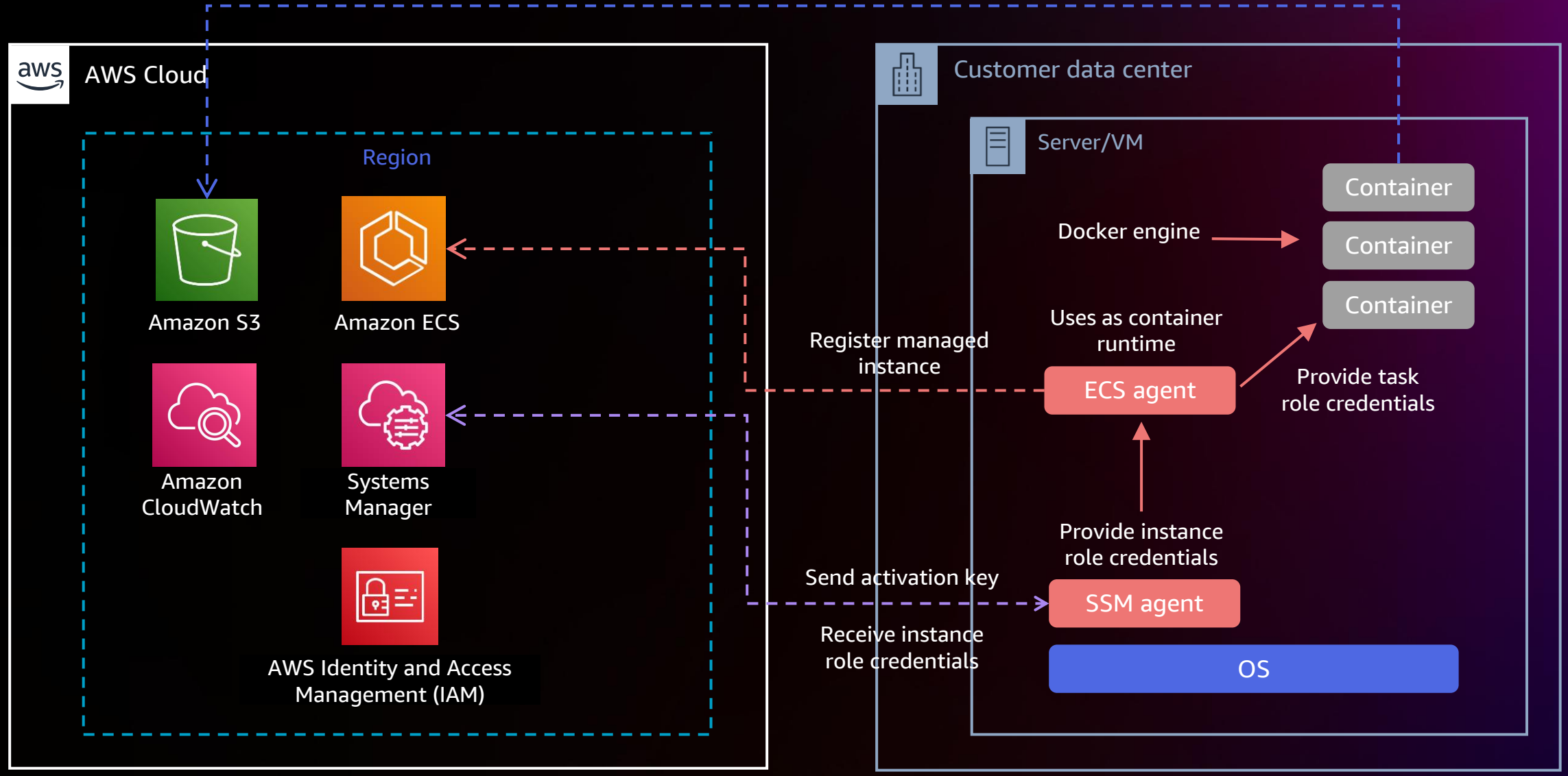
The same orchestrator, different compute



How does it work?



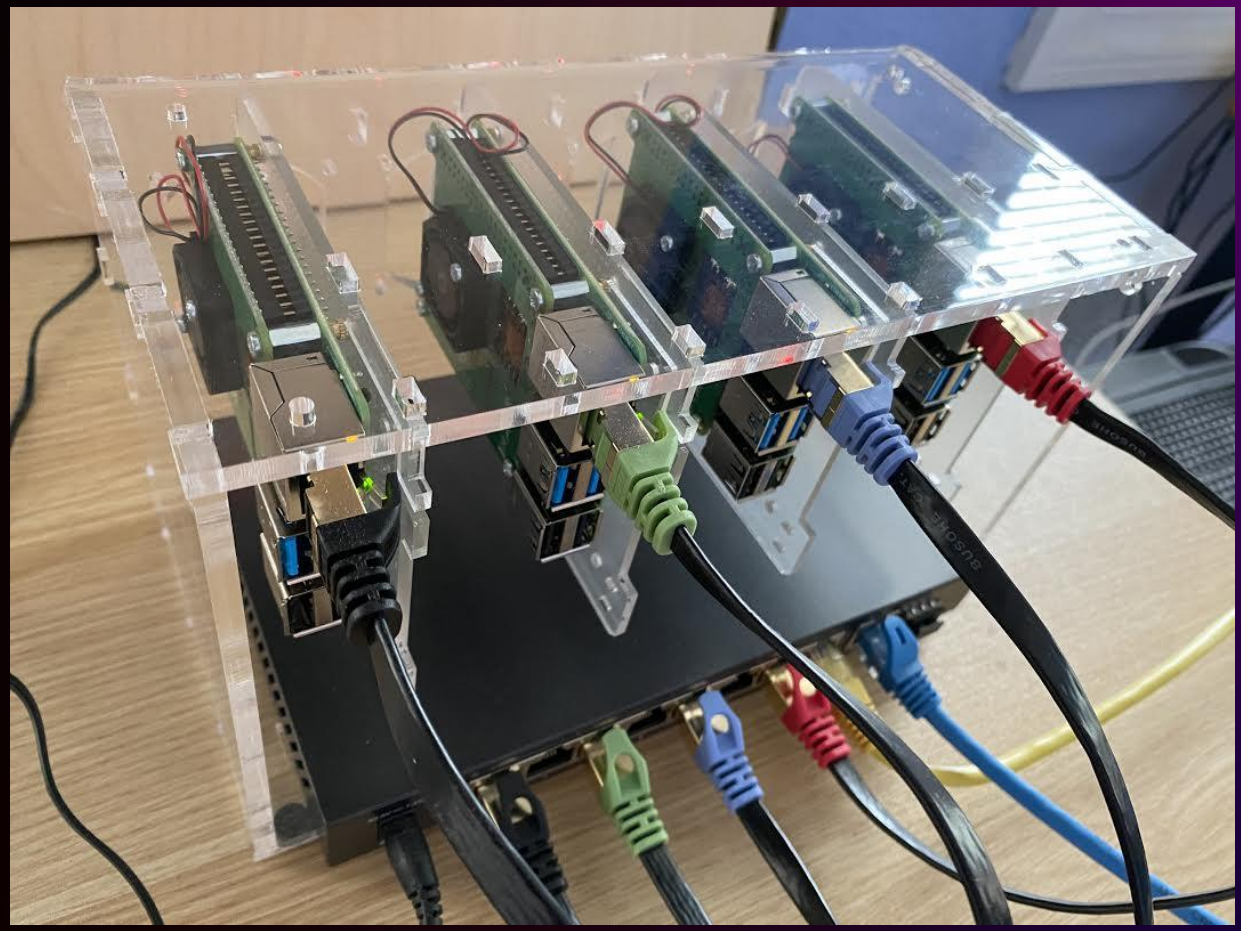
A closer look



Amazon ECS Anywhere agents are lightweight

Amazon ECS Anywhere is ideal for edge devices that are low power or running older hardware

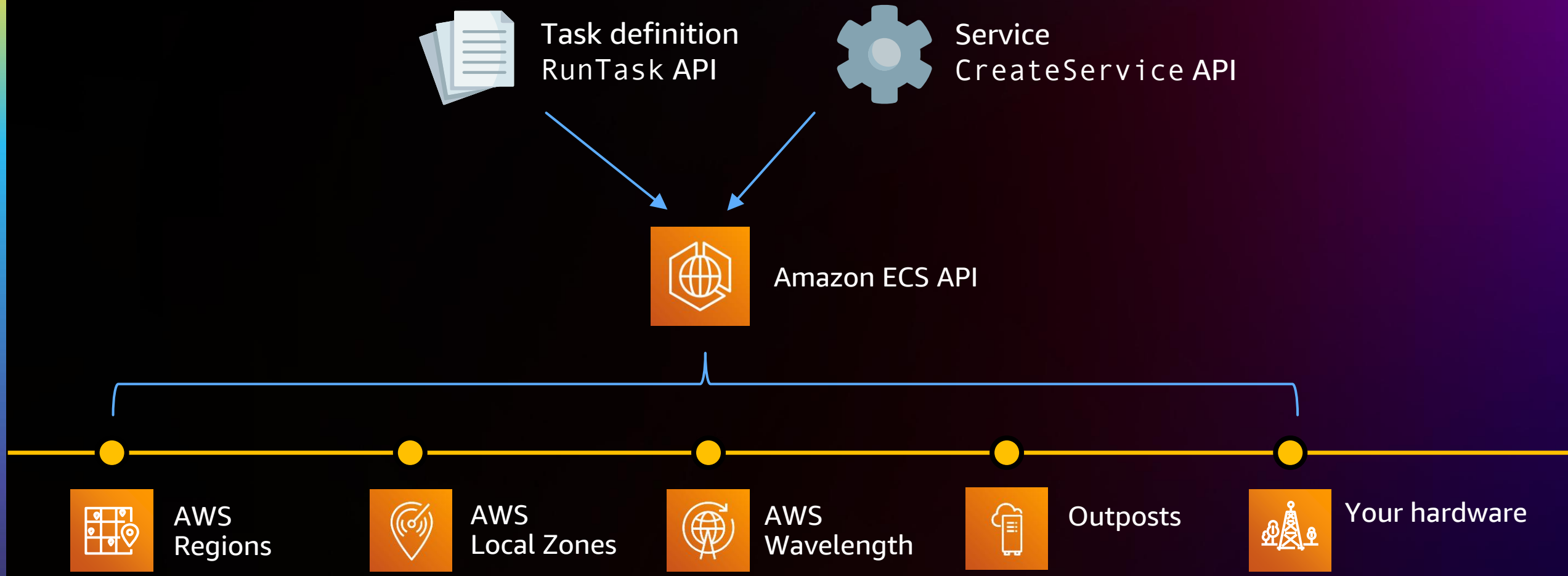
The Amazon ECS agent and SSM agent do not require much system resources; more of the underlying resources are available to your application code



ARM architecture Raspberry Pi devices, as Amazon ECS capacity

Amazon ECS Anywhere
What are the key use cases?

Consistent hybrid workloads



Tempus Ex processes live video for NFL at 40x speed in hybrid solution

Challenge

To handle high-resolution video transcoding, Tempus Ex purchased specialized hardware but needed a simple way to redeploy its solution on premises while keeping most of its infrastructure on AWS

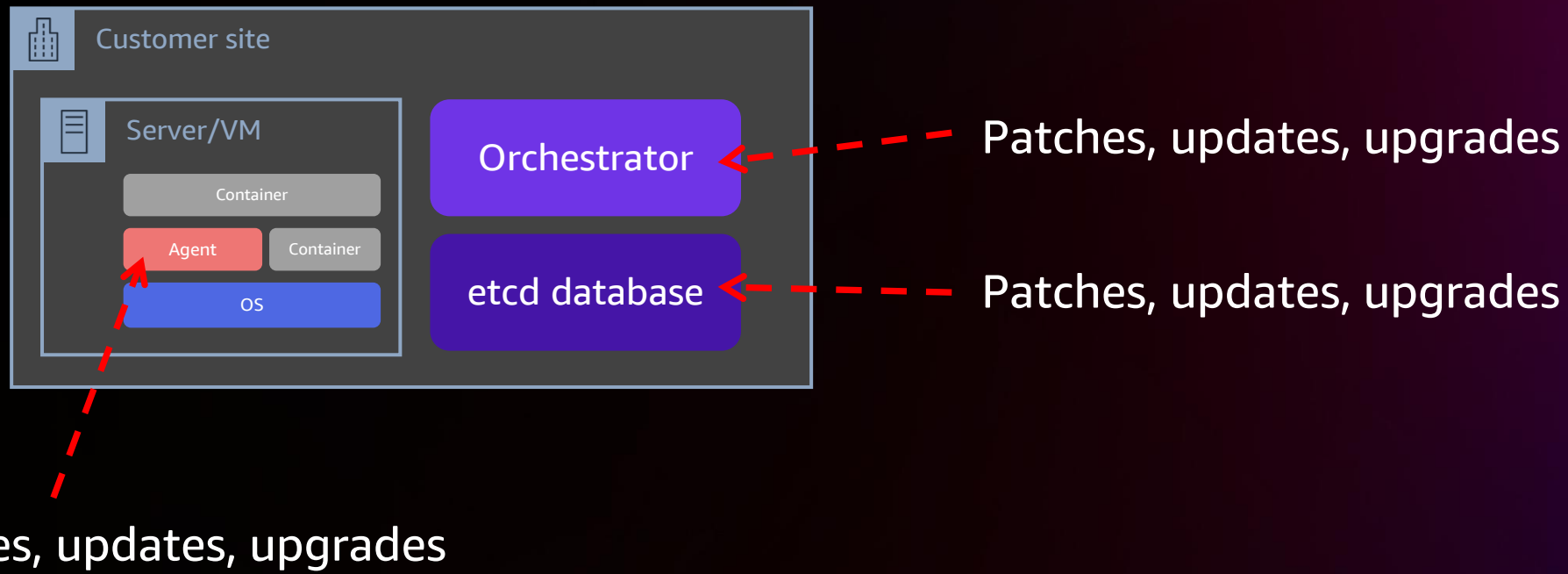
Solution and results

Using Amazon ECS Anywhere, Tempus Ex uses the same processes to deploy on premises as it did in the cloud, **facilitating processing speeds that are 40 times faster** while keeping the workflow simple

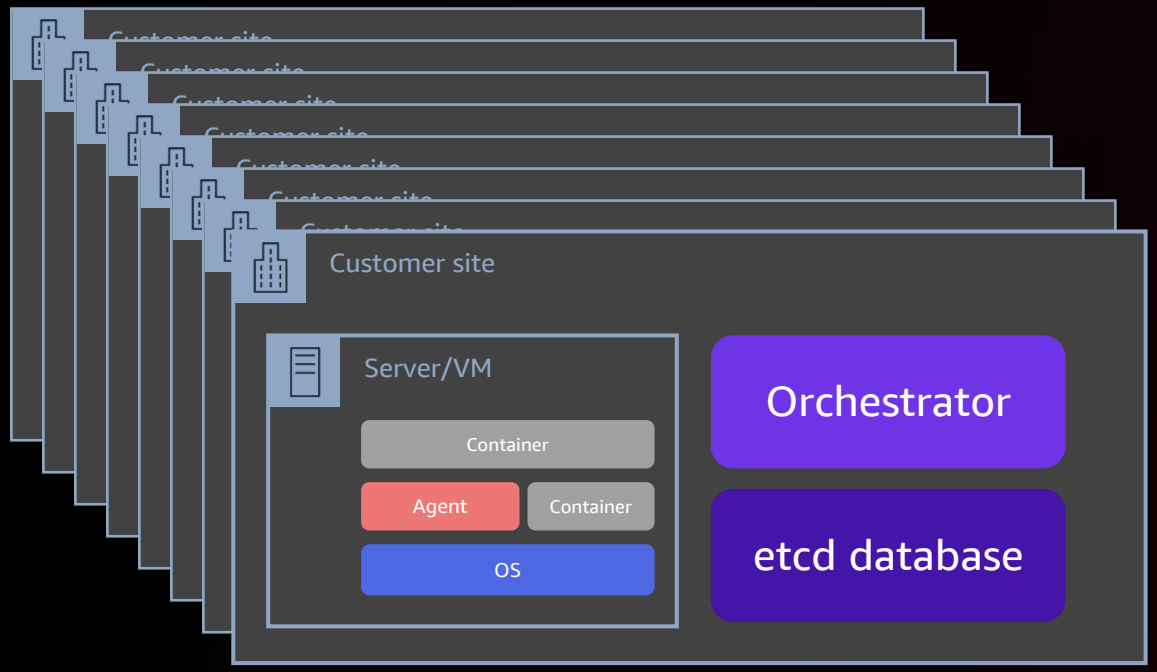
> "Using Amazon ECS Anywhere saves us time and improves our workflow because we can use the same hardware in the cloud or on our local machines."

Chris Brown, Staff Software Engineer and Information Security Officer, Tempus Ex

Edge orchestration challenges

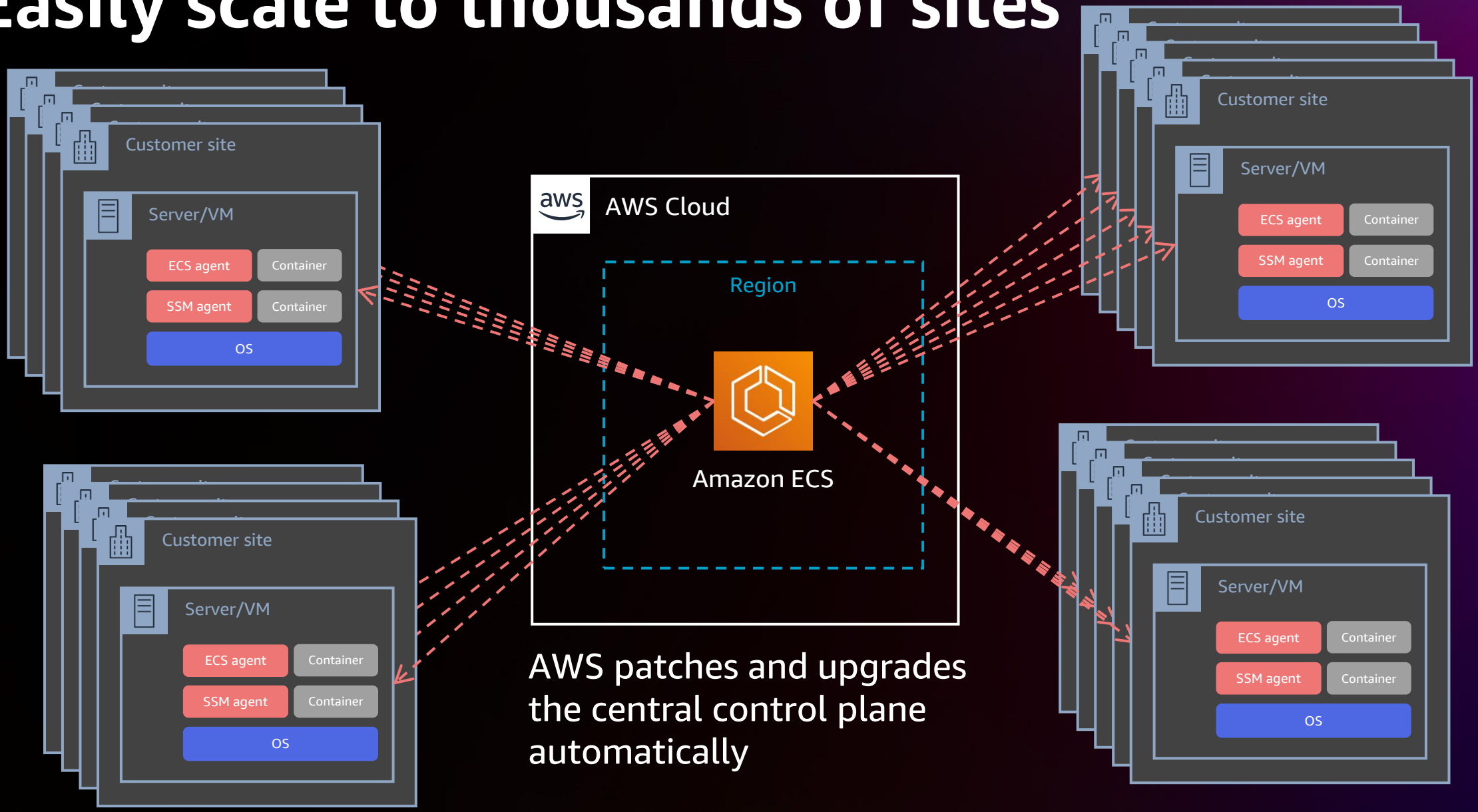


What about when you have a lot of locations?



As you add more locations, operational overhead and potential failure points multiply!

Easily scale to thousands of sites



AWS patches and upgrades the central control plane automatically

Simplifying on-premises deployment for video streaming applications

Challenge

3dEYE, a Toronto-based high-tech company, had manual and hard-to-scale deployment, maintenance, and monitoring of their **3dEYE Pure Cloud Video Surveillance Platform**. That platform allowed any camera to be connected without additional hardware/software. The company wanted to automate and streamline those tasks, while managing its customers' private cloud on-premises data centers.

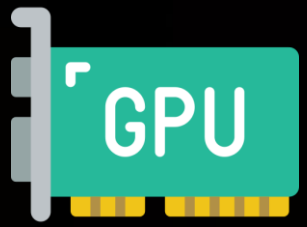
Solution and results

With cloud-native integration to Amazon ECS and a centralized cloud control plane, 3dEYE can fully manage its video streaming application on third-party data centers **10 times more efficiently.**

"As you scale, the amount of work to deploy and maintain on-premises workloads with third-party software increases exponentially. Amazon ECS Anywhere makes growing our business a breeze by offloading the manual heavy lifting while natively integrating with our existing Amazon ECS infrastructure."

Slava Hrytsevich, CEO, 3dEYE Inc.

More Amazon ECS Anywhere features



GPU scheduling

GPU-aware workload scheduling helps with video processing workloads, machine learning workloads, and 3D rendering workloads

Schedule workloads across all three dimensions:

CPU, GPU, and memory

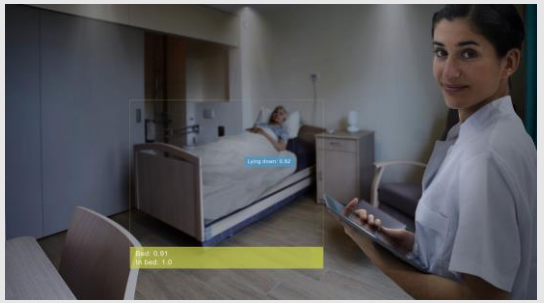
Kepler provides effective monitoring of elderly care home residents using AWS

Kepler, a Netherlands-based **deep learning** startup, created Kepler Night Nurse – a monitoring solution that uses automated video analysis to look after elderly care home residents.

Kepler built a hybrid solution on AWS using edge devices managed by Amazon ECS Anywhere to **easily scale and increase the speed of connecting new sensor devices**. It also used Amazon EC2 to improve its development speed.

The **speed of connecting new sensor devices has been increased from 50 to 500 a week**. Development speed has also been increased from several weeks to a few hours. Residents' safety is improved as caregivers are notified of residents needing help within 30 seconds.

KEPLER VISION TECHNOLOGIES



"We've improved the quality of care in elderly homes. Built on AWS, our solution helps staff provide attentive care while affording residents the privacy and dignity they deserve."

Dr. Harro Stokman
Chief Executive Officer and Founder
Kepler Vision Technologies

More Amazon ECS Anywhere features

ECS exec

Secure alternative to SSH for Amazon ECS Anywhere workloads

No need to open port 22!

Control who can get a command line using IAM roles and IAM policies

More Amazon ECS Anywhere features

CloudWatch monitoring

Stop running out of disk space for logs, or losing logs and metrics when you have to replace hardware

Gather all logs and metrics from all hosts into one centralized store in CloudWatch

Explore logs and metrics using a robust query language, aggregate, and graph with Amazon CloudWatch Logs Insights

Accelerating workload deployment & monitoring at the edge with ECS Anywhere

Challenge

The **Just Walk Out technology** team needed to deploy applications for data storage and processing on top of edge devices in their physical stores. They wanted to streamline the development and deployment of software from cloud to the edge, as well as instrument metrics to monitor container health for edge applications.

Just Walk Out technology powers **Amazon Go**, as well as select **Amazon Fresh** and **Whole Foods Market** stores. The technology is live not only in Amazon's own physical stores but also in third-party retail, hospitality, travel, and stadium environments. Just Walk Out technology is available in more than 50 Amazon stores and more than a dozen third-party customer stores.

Just Walk Out
technology by amazon

Solution and results

With cloud-native integration to Amazon ECS, a centralized cloud control plane, and the same operational experience running in the cloud or on premises, the Just Walk Out technology team can fully manage their data storage and processing applications at the edge.

> "As we continue to scale Just Walk Out technology, we look for ways to accelerate our deployment processes for in-store workloads. ECS Anywhere helps us to expand faster by maintaining the same deployment processes, metrics, and tooling on premises and in the cloud, while standardizing our container orchestration on Amazon ECS."

Ameet Vaswani, Director, Physical Retail Technology, AWS

Amazon ECS Anywhere at Ocado Technology

Cam Mac

Head of Product
Ocado Technology

Ocado Technology: Technology pioneers

We're solving some of the **toughest technological challenges** of our age

We bring together some of the greatest minds in engineering, product, data science, robotics, and UX

12 development centers out of **8 countries**

11 global retailer partners

Over 500+ patents granted and counting

2,500+ technologists

The future of online grocery and beyond

We’re pioneering the future of online grocery and beyond through cutting-edge technology and serial innovation

We create and support the cutting-edge technology that powers the Ocado Smart Platform (OSP)

OSP combines advanced capabilities in AI, robotics, digital twins, IoT, cloud, and big data

Some of the world’s leading grocery retailers have selected OSP to leapfrog their competition, offering online grocery with the best customer experiences and superior economic returns

Our retail partners

The Ocado Smart Platform

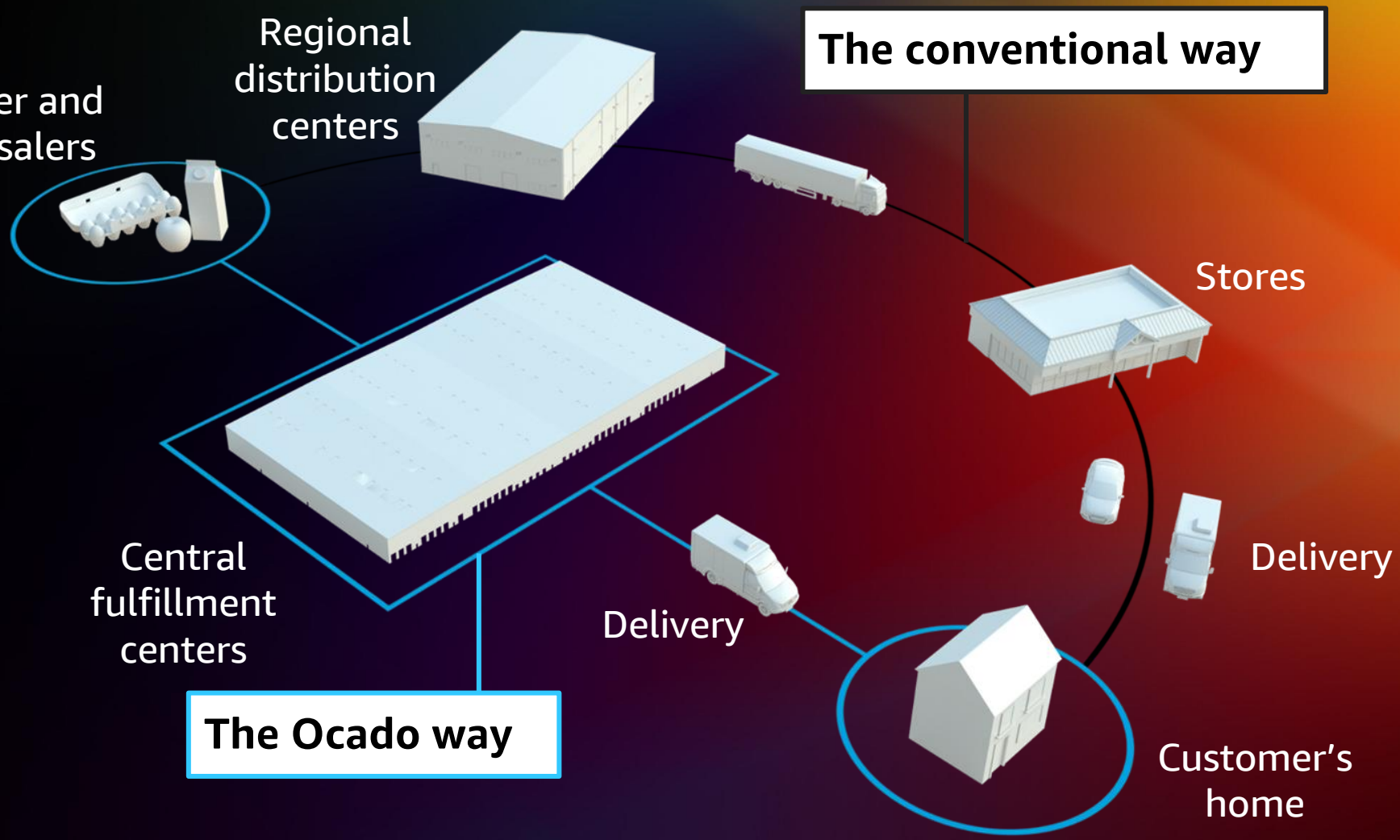
Pioneering the future of online grocery

The Ocado Smart Platform (OSP) is the most advanced ecommerce, logistics, and fulfilment platform for groceries in the world

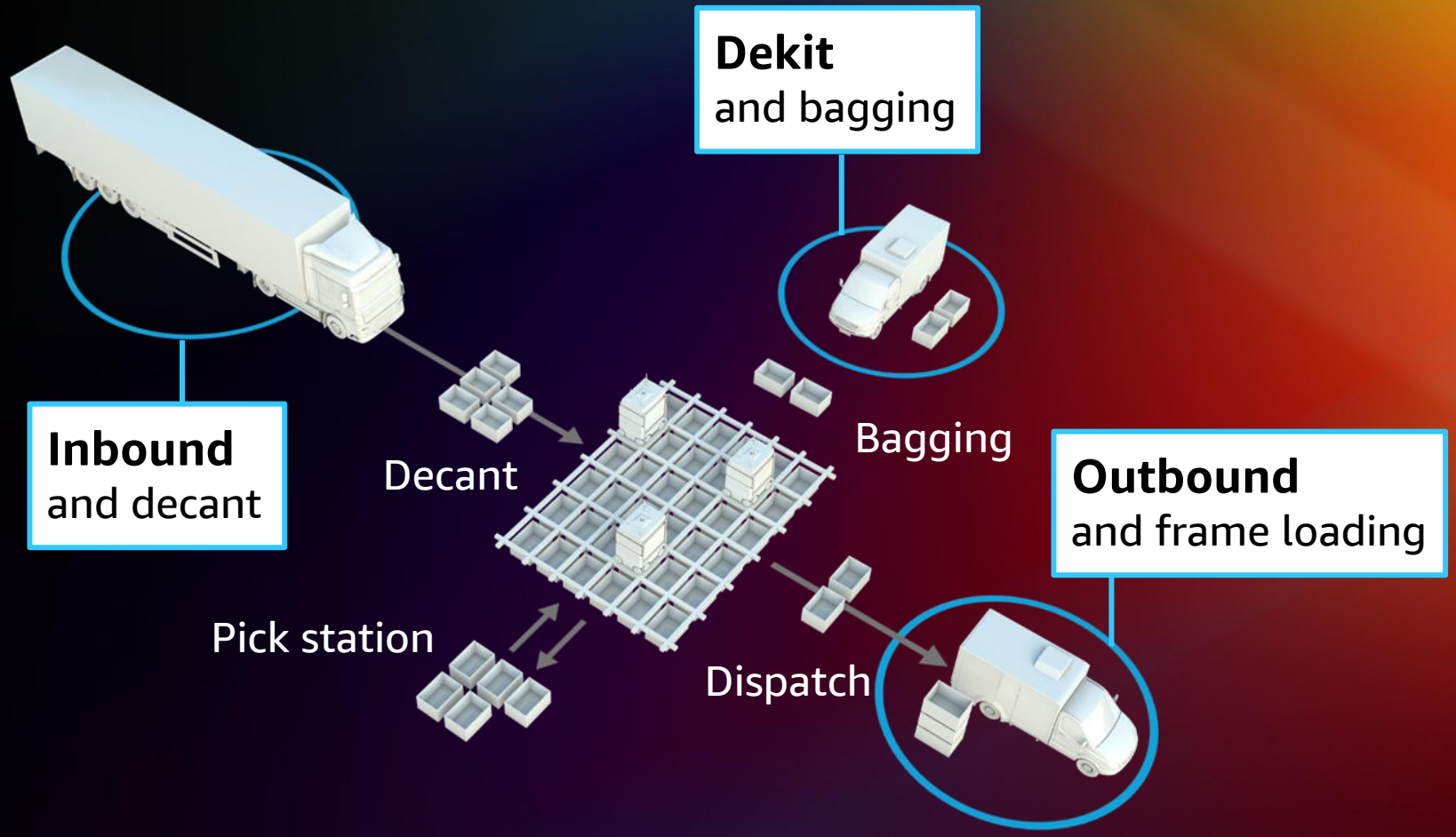
OSP leverages the latest advances across robotics, artificial intelligence, machine learning, data science, and more

We've developed a flexible ecosystem of products and services to suit the unique needs of our partners across the globe

The Ocado way



The OSP warehouse



The problem space

- To deploy and maintain containerized workloads on local compute devices
- Provide support for multiple workloads and targeted delivery
- Integration with our in-house development platform
- Consistent user experience

The requirements

Easy to use

Support device groupings

Centralized management

Ease of adoption

Why Amazon ECS Anywhere?

Extension of AWS

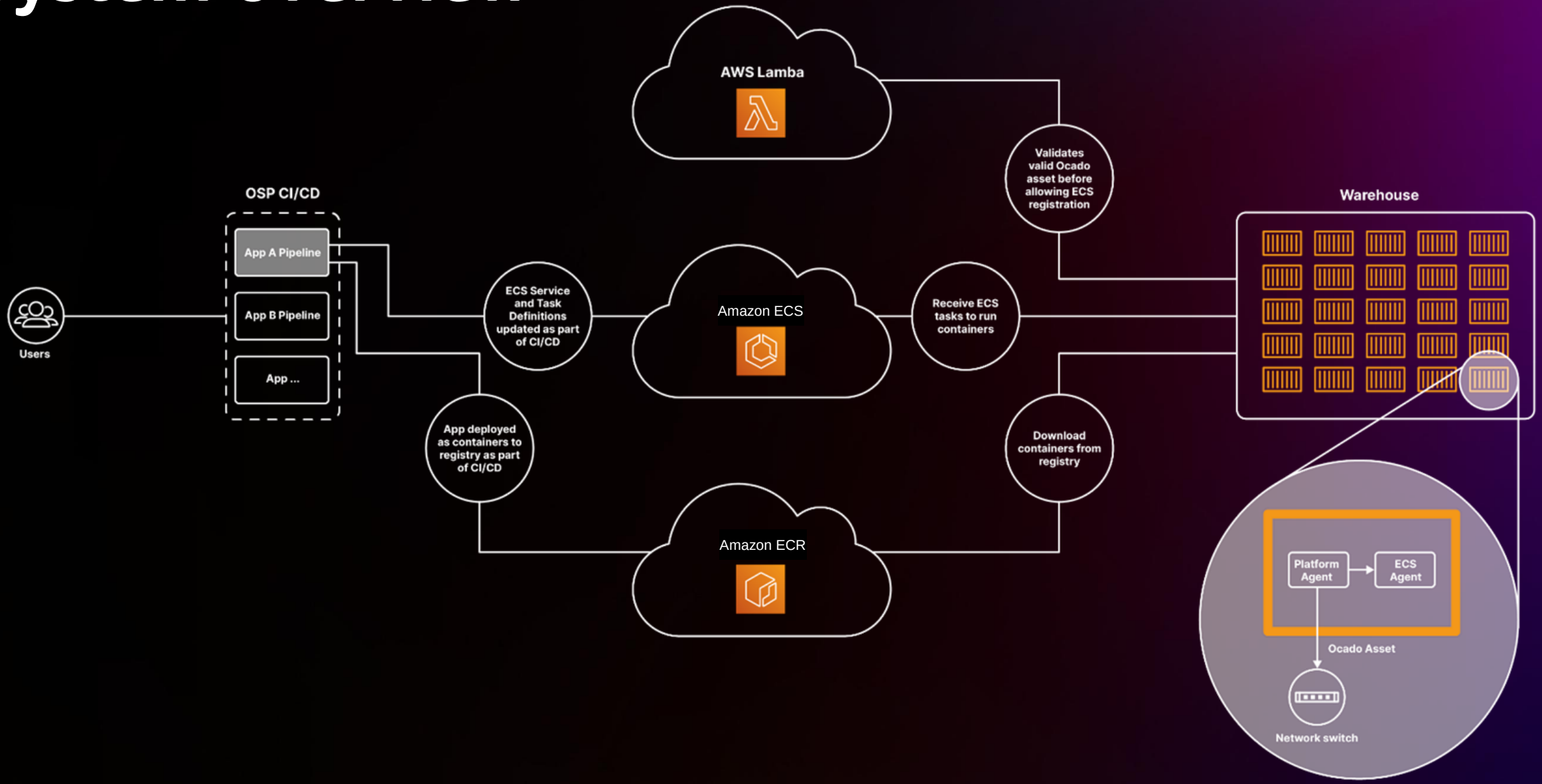
Great match for our requirements

Alignment with product strategy

No VPNs

Customizable

System overview



The outcome

- Rapid integration
- A productionized solution operating globally to support our business partners
- A secure, reliable, and scalable product
- High levels of interest in adopting the solution

Thank you!

Nathan Peck
@nathankpeck

Cam Mac

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