
AWS
re:Invent
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SUS206

Destination zero: Insights and tactics for sustainable architectures

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The Climate Pledge

On September 19, 2019, Amazon and Global Optimism announced The Climate Pledge, a commitment to meet the Paris Agreement 10 years early

- Commitment to reach net-zero carbon by 2040
- Over 525 company signatories committed across 45 countries and 58 industries
- Signatories collaborating on joint action projects to drive change
- $2B Climate Pledge Fund investing in pioneering climate technologies

AWS data center sustainability as part of net-zero carbon by 2040

Carbon-free energy & reduction

Amazon is investing in carbon-free energy to match the electricity use of our data centers

First-of-its-kind data center campus co-located with an existing nuclear facility

Using recycled by-products to replace carbon-intensive materials in data center construction

Transitioning to power backup generators at AWS data centers with hydrotreated vegetable oil

Circular economy & waste reduction

Designing server racks to be reusable, operate efficiently, and recovering value

14.6M hardware components diverted from landfills

More sustainable transport of hardware

Becoming water-positive

Optimizing water consumption by analyzing real-time water use and identifying leaks

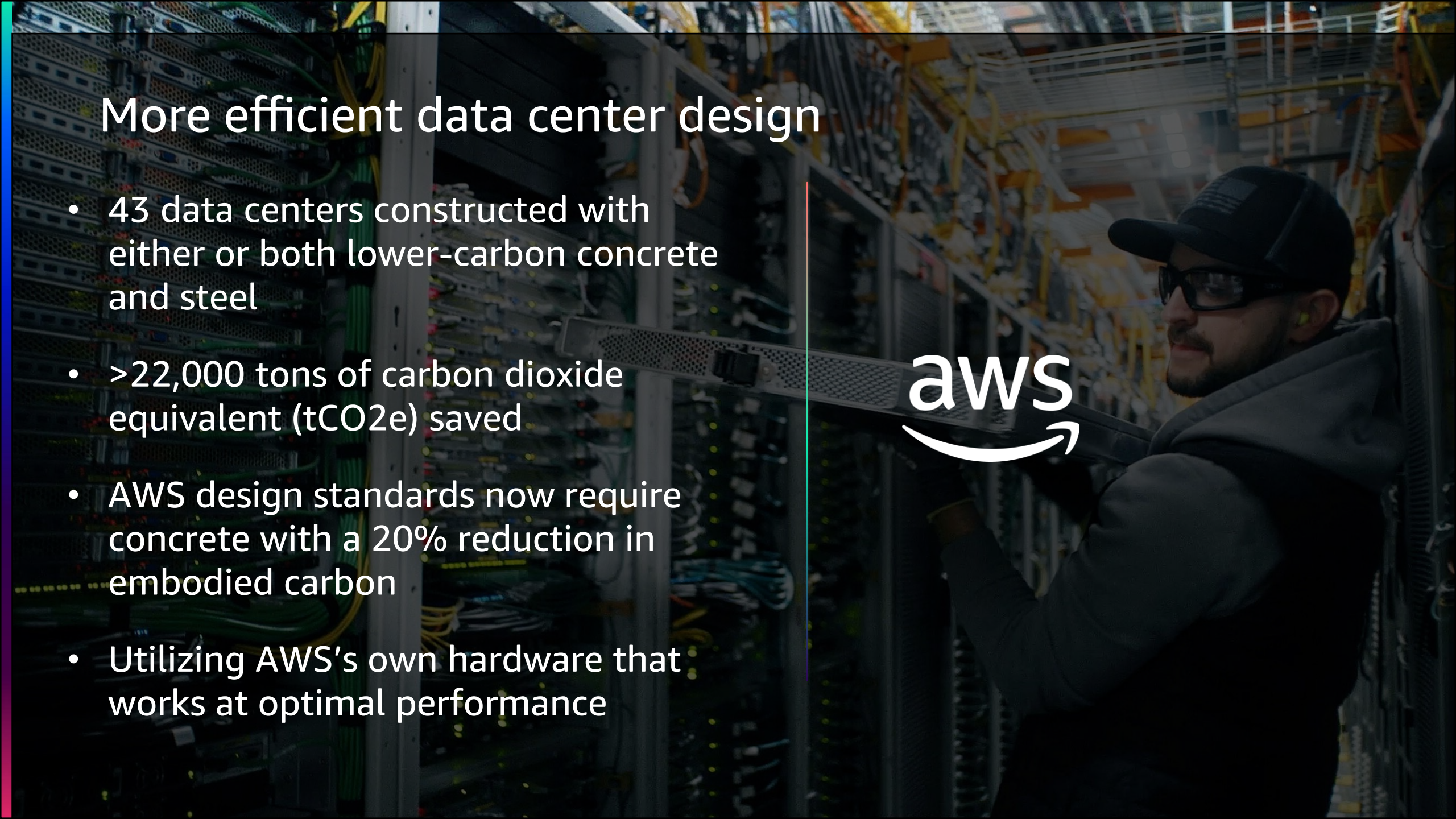
Using more sustainable water sources; 24 data centers already use recycled water for cooling

AWS makes its spent cooling water from data centers available to farmers in Oregon for irrigation

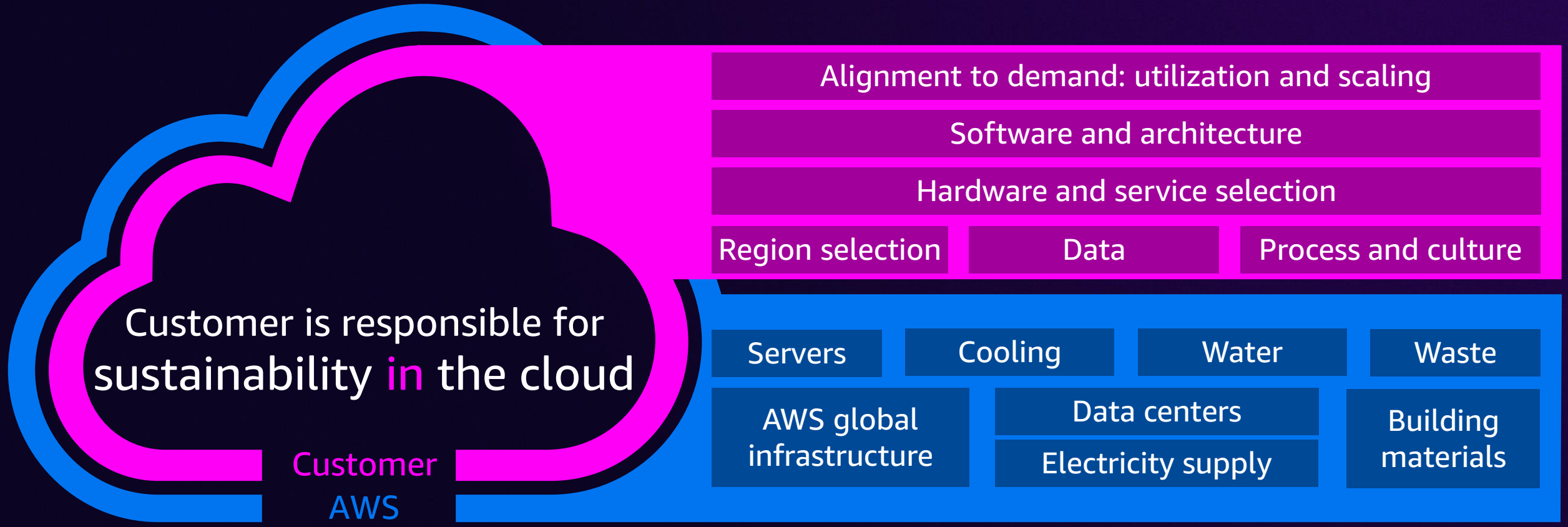
AWS invests in water replenishment projects in communities; expanding water access, availability, and quality

More efficient data center design

- 43 data centers constructed with either or both lower-carbon concrete and steel
- >22,000 tons of carbon dioxide equivalent (tCO2e) saved
- AWS design standards now require concrete with a 20% reduction in embodied carbon
- Utilizing AWS's own hardware that works at optimal performance



Shared Responsibility Model for sustainability



AWS is responsible for sustainability **of** the cloud

Data sources for insights

Carbon emissions or Proxy metrics

Customer Carbon Footprint Tool

Start month: Nov 2021 | End month: Jun 2024 | Download

Your carbon emissions summary

Compares your carbon emissions with on-premises computing equivalents

1.423 MTCO2e — Your estimated AWS emissions

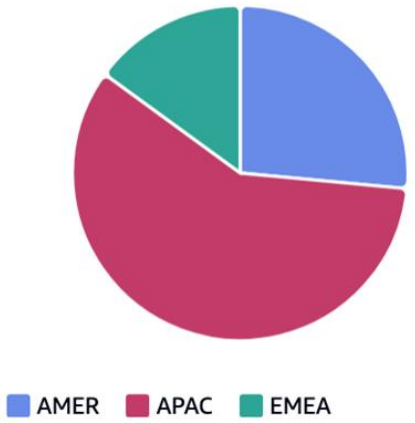
6.835 MTCO2e — Your emissions saved on AWS

Your emission savings

5.805 MTCO2e — Saved from AWS renewable energy purchases

1.03 MTCO2e — Saved by using AWS computing services

Your emissions by geography



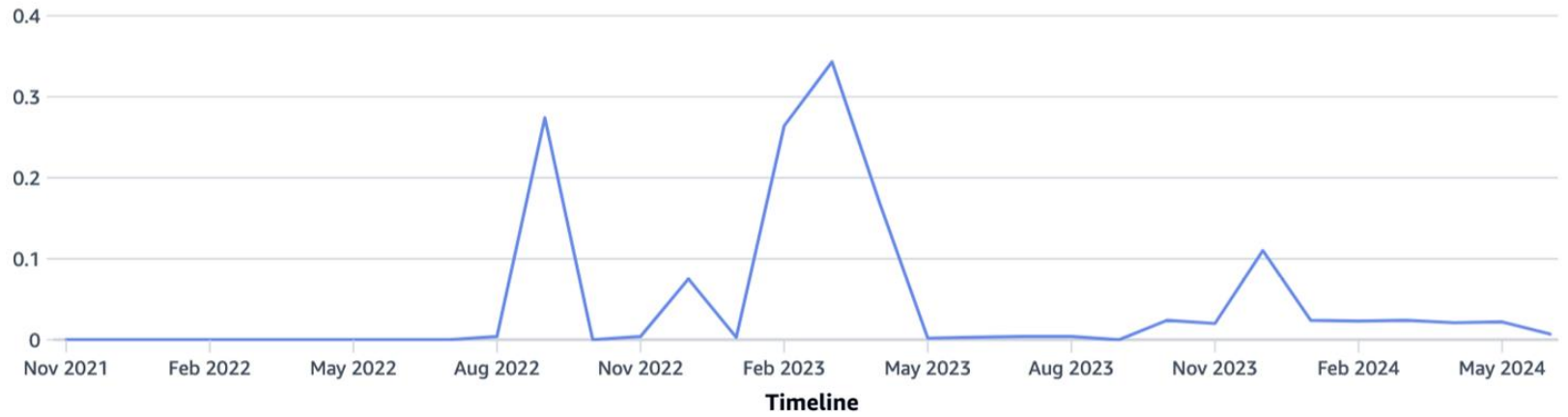
Your emissions by services

Service	Carbon emissions	%
EC2	0.0 MTCO2e	0%
S3	0.0 MTCO2e	0%
Other	1.423 MTCO2e	100%
Total	1.423 MTCO2e	100%

Your AWS carbon emission statistics

Month | Quarter | Year

Carbon emissions (MTCO2e)

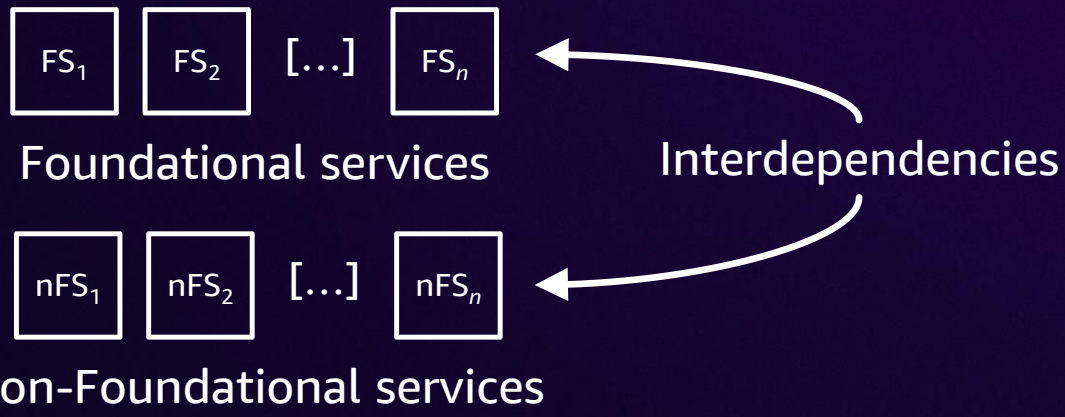


Top down allocation of carbon emissions

Cluster level emissions
GHG Scope 1 and Scope 2

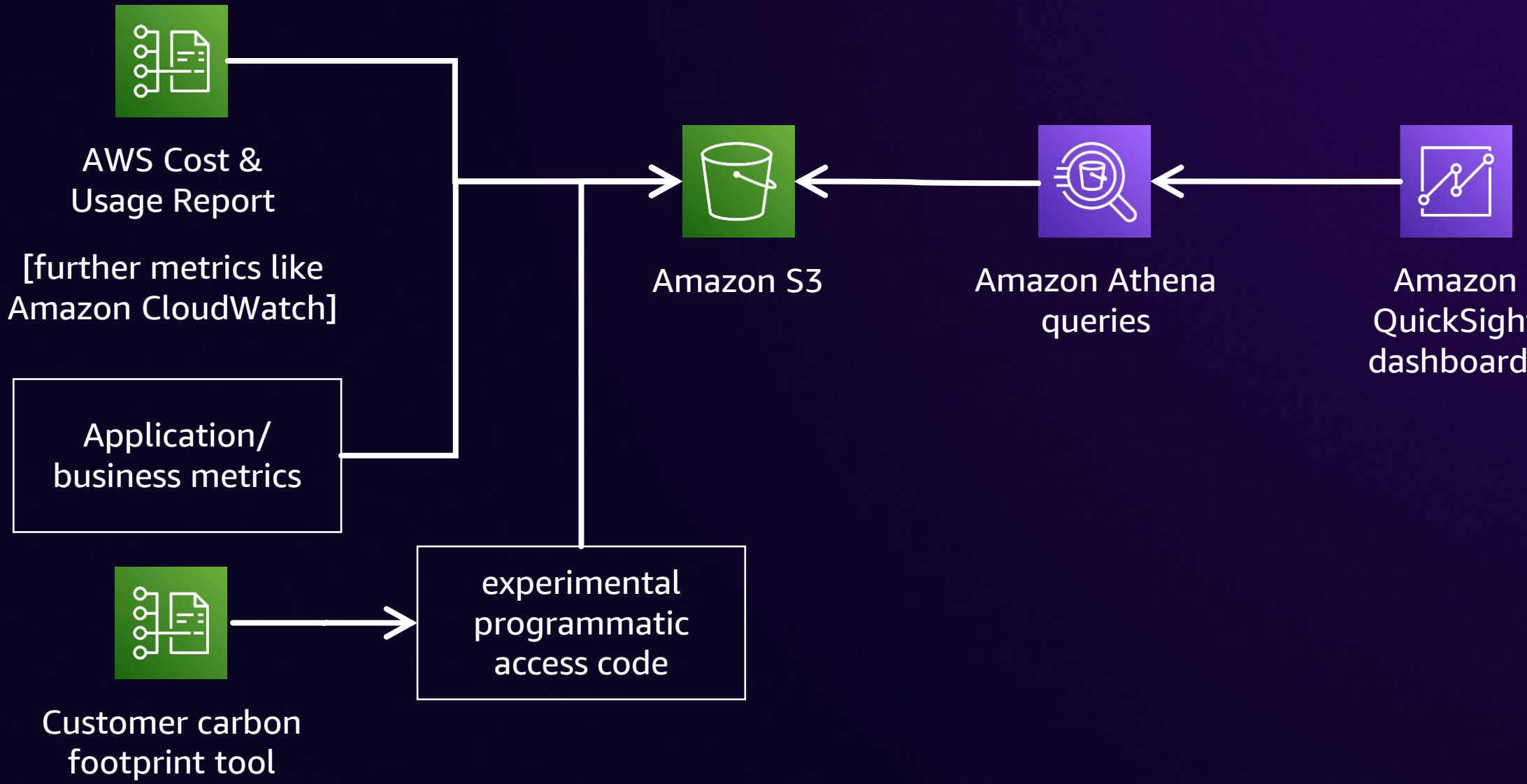
↓ allocation by power draw
Rack level emissions

↓ usage and economic based allocation
Service level emissions

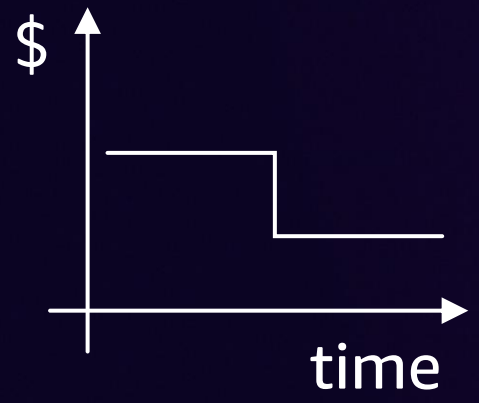


↓ usage and economic based allocation
Customer level emissions

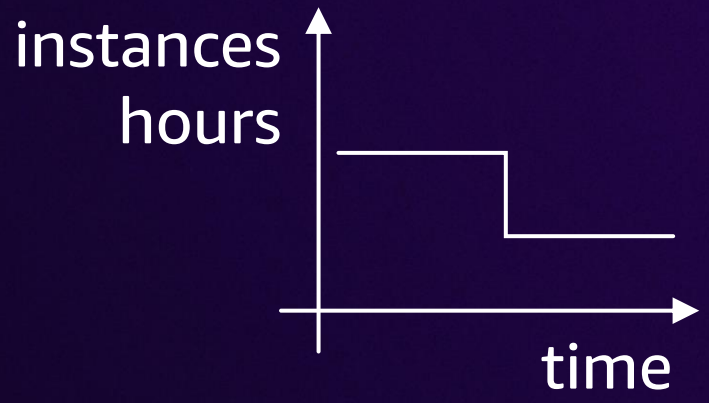
Build dashboards from carbon/proxy metrics data



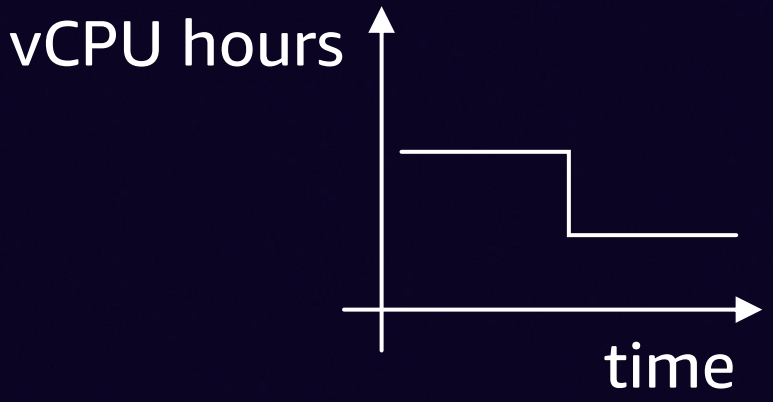
Visualizations



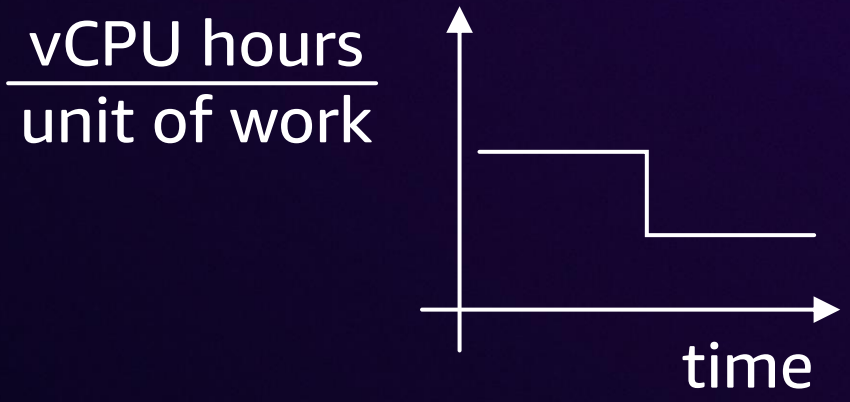
⚠ commercial discounts



⚠ resource size



⚠ application usage/efficiency



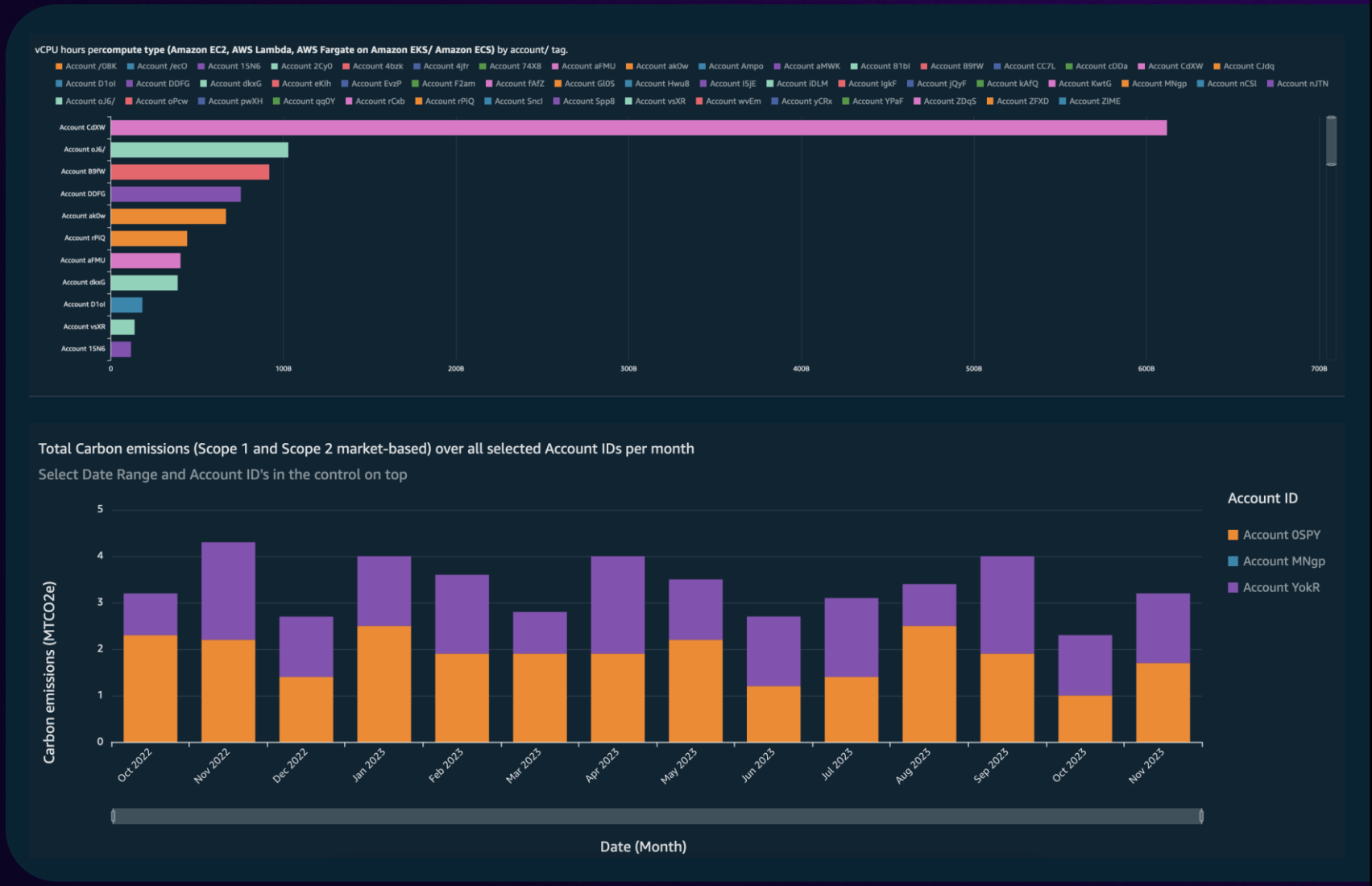
Sustainability proxy metrics

Cloud intelligence dashboards

Open source framework with sample code for sustainability proxy metrics and customer carbon footprint tool data integration

Deployment guide: https://catalog.workshops.aws/awscid/

Demo: https://cid.workshops.aws.dev/demo



The AWS Well-Architected sustainability pillar

Shared responsibility model

Design principles

Improvement process

Sustainability KPIs and proxy metrics

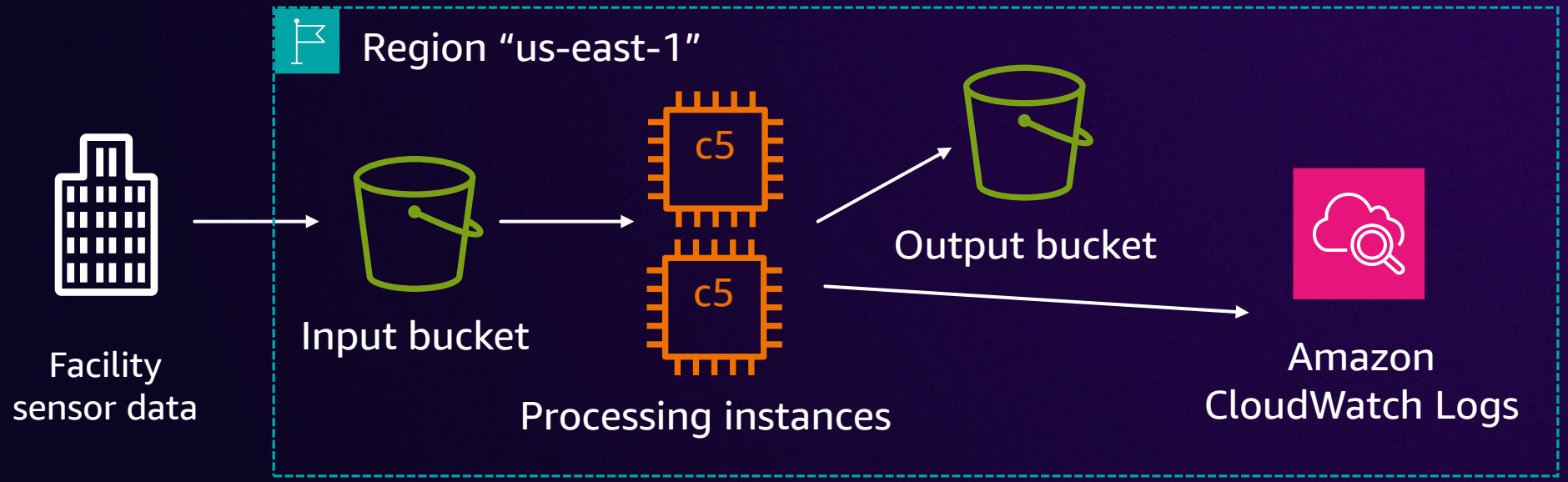
Non-functional requirements and trade-offs

Best practices

- Region selection
- Alignment to demand
- Software and architecture
- Data management
- Process and culture
- Hardware and services

Shift responsibilities, gain resource efficiency

Optimization



Customer carbon footprint tool		“S3”	“EC2”	“S3”	“Other”
Proxy metric		GB-months	vCPU-hours	GB-months	GB-months
Improvements	Region selection	Data lifecycle	Rightsizing, autoscaling, managed & serverless options	Formats & storage patterns	Data lifecycle

Call to action

- Use both, the customer carbon footprint tool and proxy metrics
- Optimize with Well-Architected Sustainability Pillar best practices
- Document paths to shift responsibility to AWS, and tradeoffs

Thank you!

Please complete the session survey in the mobile app

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