



Module 2: Cloud Economics and Billing

AWS Academy Cloud Foundations

AWS pricing model

Three fundamental drivers of cost with AWS

Compute

- Charged per hour/second*
- Varies by instance type
 - **by location**

*Linux only

Storage

- Charged typically per GB
 - **storage type**

Data transfer

- Outbound is aggregated and charged
- Inbound has no charge (with some exceptions)
 - if **internal**
- Charged typically per GB

How do you pay for AWS? → Rent , Reserve , Volume-based discount , Time

Pay for what you use
Rent / On-demand



Pay less when you reserve
1 or 3 yr commitment



Pay less when you use more and as AWS grows

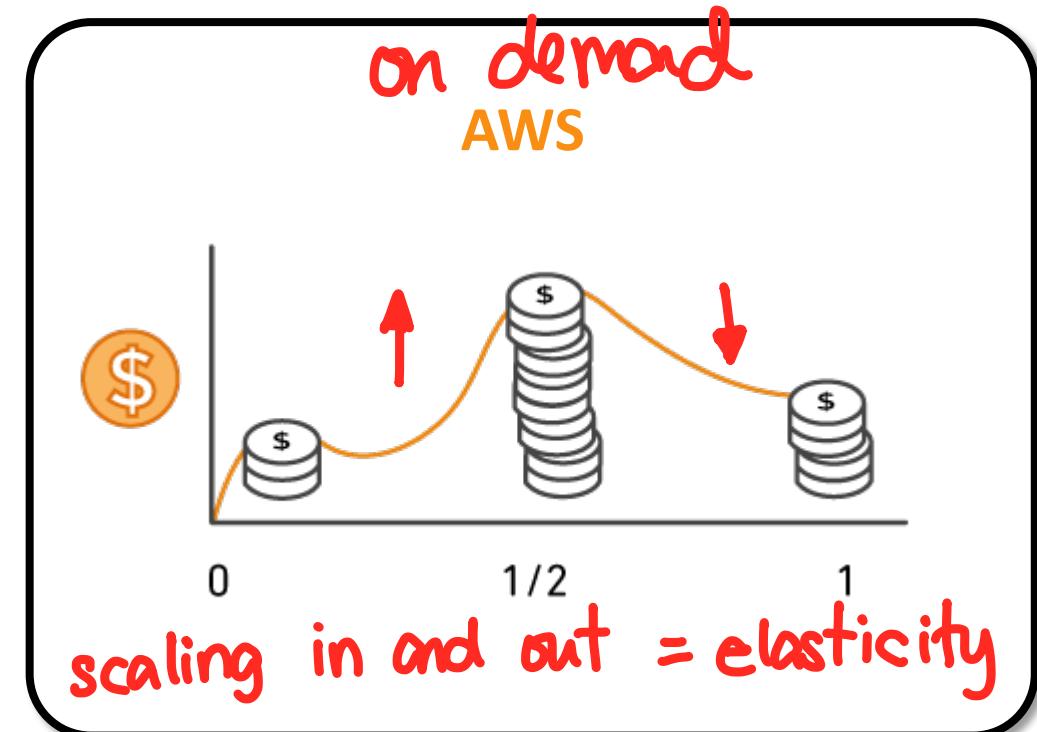
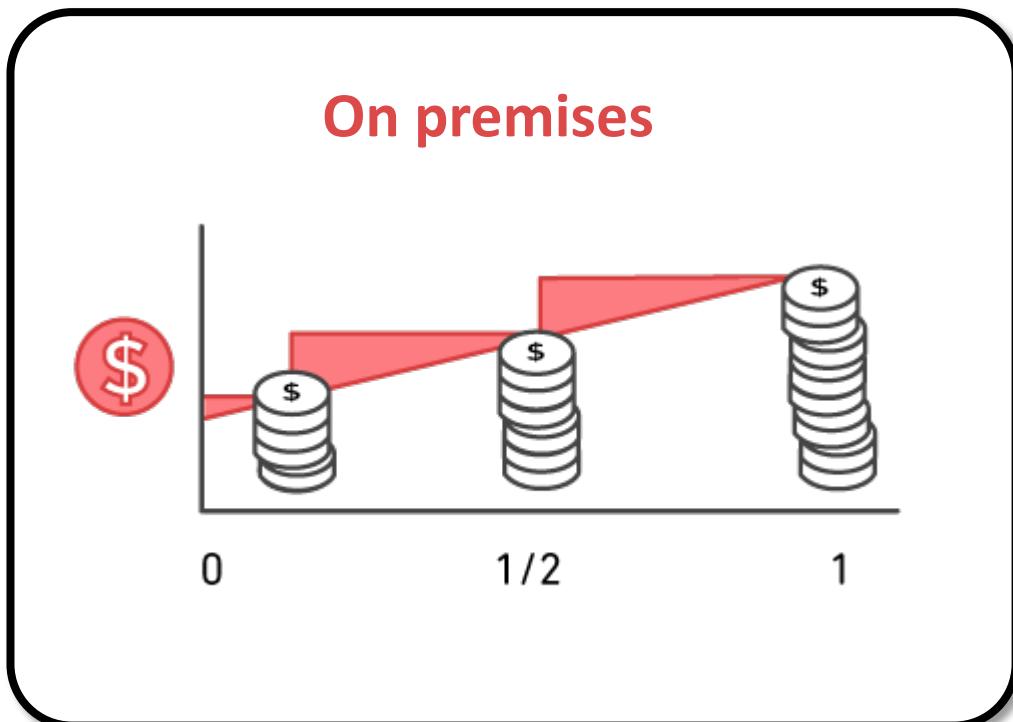


* note : if you reserve you lose scaling on demand advantage

Pay for what you use

Rent or OpEx

Pay only for the services that you consume, with no large upfront expenses.

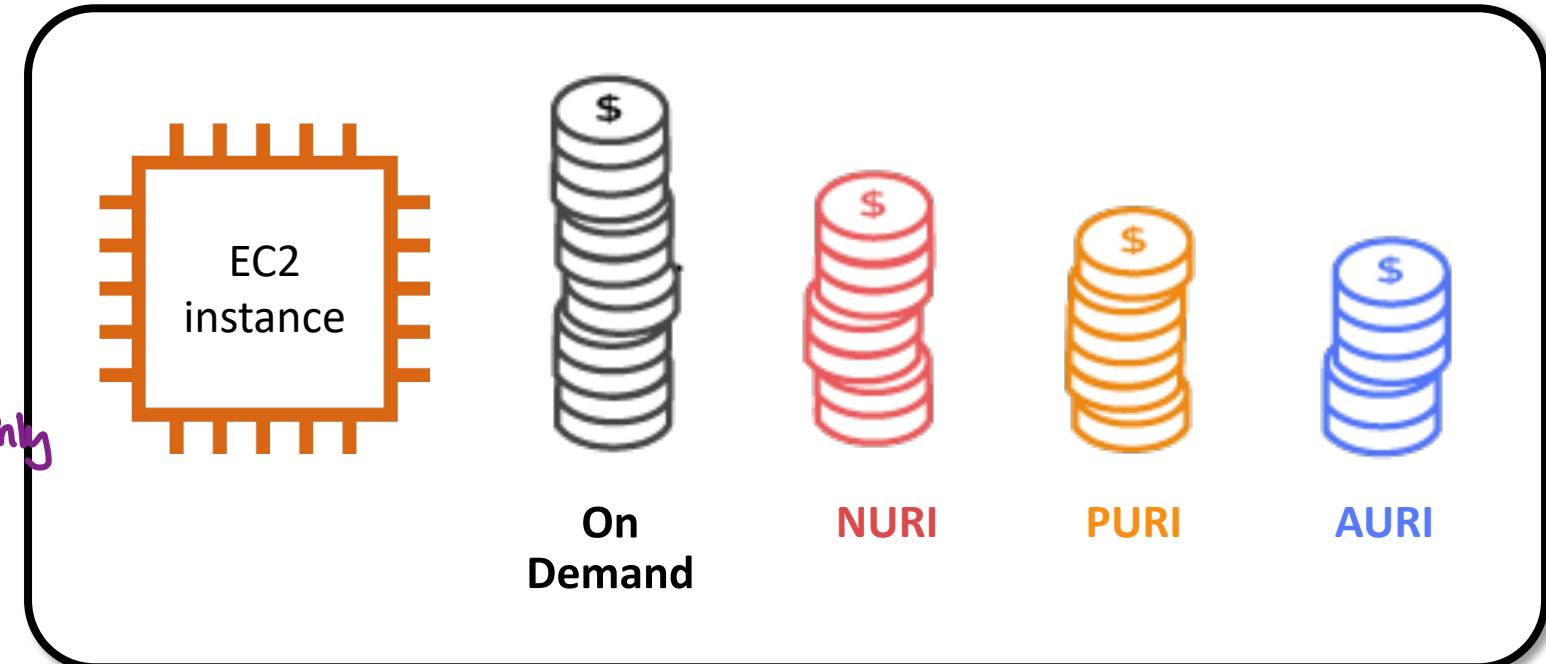


Pay less when you reserve → lower cost at the expense of gressing capacity

Invest in Reserved Instances (RIs):

- Save up to 75 percent
- Options:
 - **All Upfront Reserved Instance (AURI)** → largest discount
*↑ capex
↓ opex*
some w/ traditional
 - **Partial Upfront Reserved Instance (PURI)** → lower discounts
↑ capex + opex
↓ capex
down payment + monthly
 - **No Upfront Payments Reserved Instance (NURI)** → smaller discount
*↑ opex
↓ capex*
↓ rent but w/ commitment

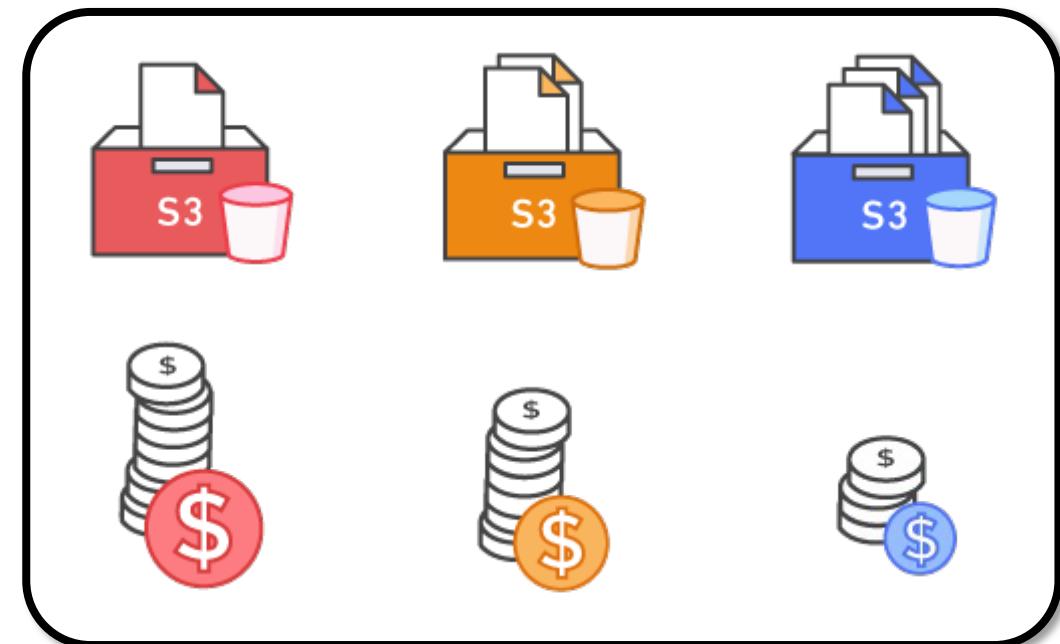
On Demand
↓ no commitment



Pay less by using more → volume based discounts

Realize volume-based discounts:

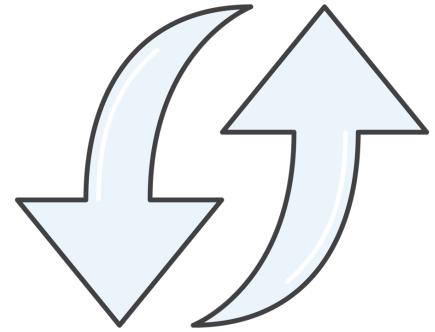
- **Savings** as usage increases.
- **Tiered pricing** for services like Amazon Simple Storage Service (Amazon S3), Amazon Elastic Block Store (Amazon EBS), or Amazon Elastic File System (Amazon EFS) → the more you use, the less you pay per GB.
- Multiple storage services deliver **lower** storage costs based on needs.



Pay even less as AWS grows → services become cheaper over time

As AWS grows:

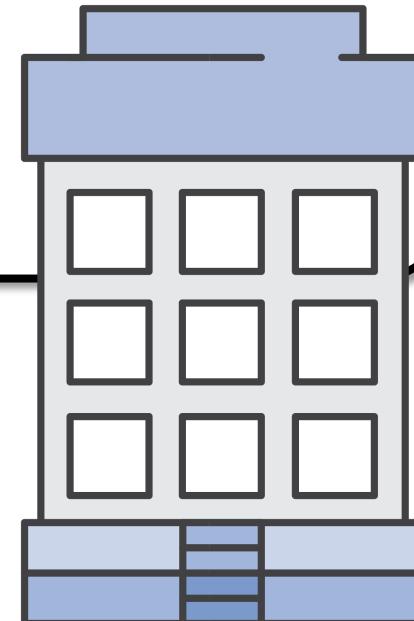
- AWS focuses on lowering cost of doing business.
- This practice results in AWS passing savings from economies of scale to you.
- Since 2006, AWS has **lowered pricing 75 times** (as of September 2019).
- Future higher-performing resources replace current resources for no extra charge.



Custom pricing

→ *special pricing for high volume clients*

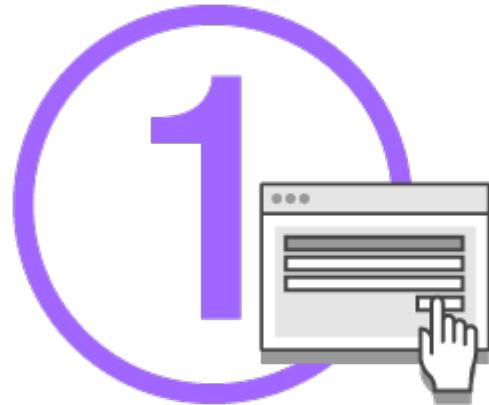
- Meet varying needs through custom pricing.
- Available for high-volume projects with unique requirements.



Google Cloud & Azure too!

AWS Free Tier → free use or credits for some services

Enables you to gain free hands-on experience with the AWS platform, products, and services. Free for 1 year for new customers.



Sign up for an AWS account



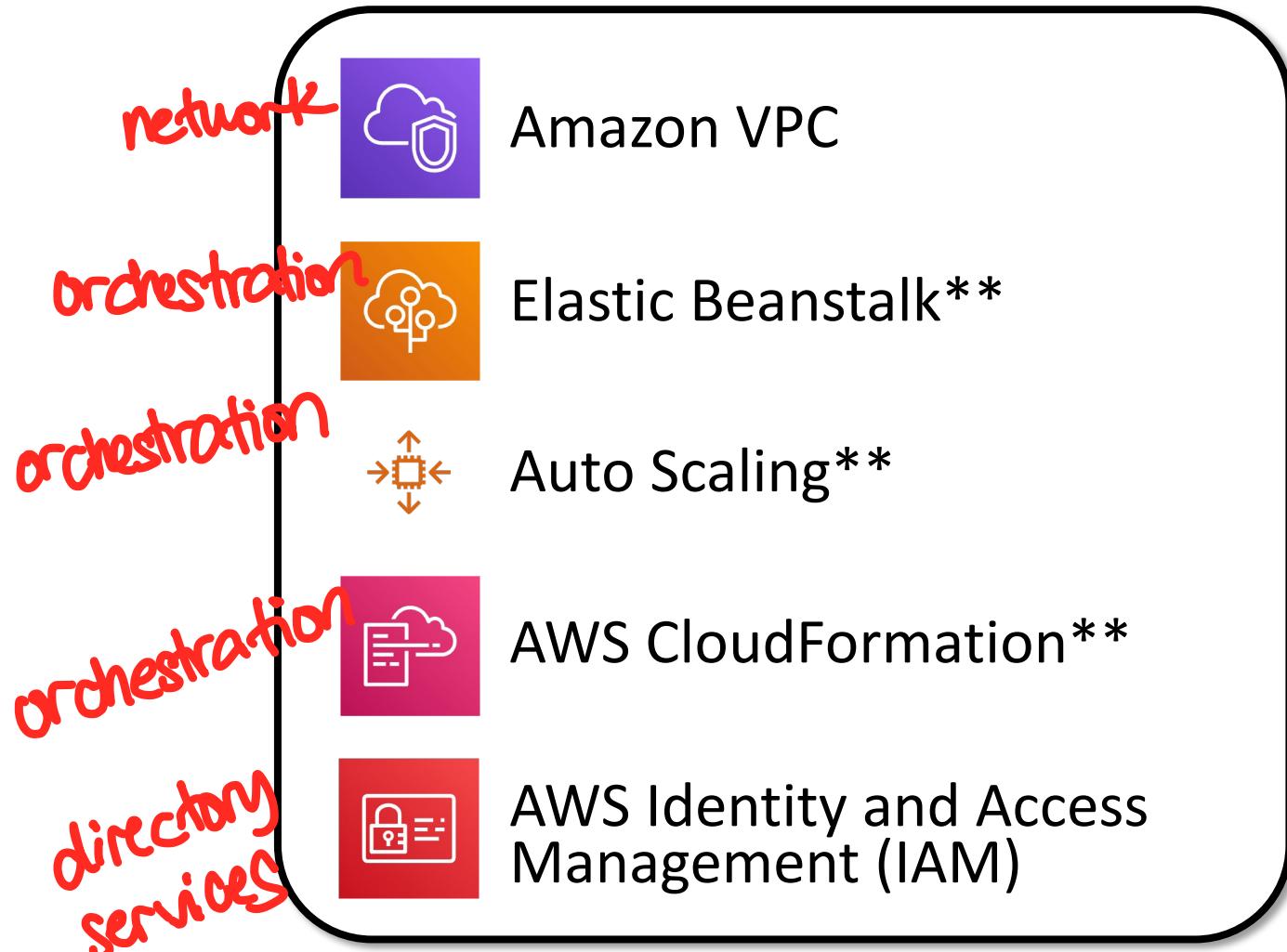
Learn with 10-minute tutorials



Start building with AWS

Services with no charge

→ no cost for configuration / orchestration
but you pay for services that they provision



****Note:** There might be charges associated with other AWS services that are used with these services.

Section 2: Total Cost of Ownership

Module 2: Cloud Economics and Billing



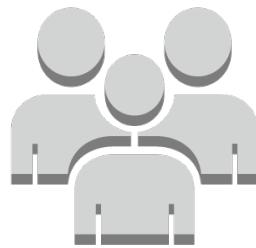
On-premises versus cloud

→ they are very different, but COST can be a common factor to consider

Traditional Infrastructure



Equipment



Resources and administration



Contracts



Cost



AWS Cloud



No upfront expense—pay for what you use



Improve time to market and agility



Scale up and down



Self-service infrastructure

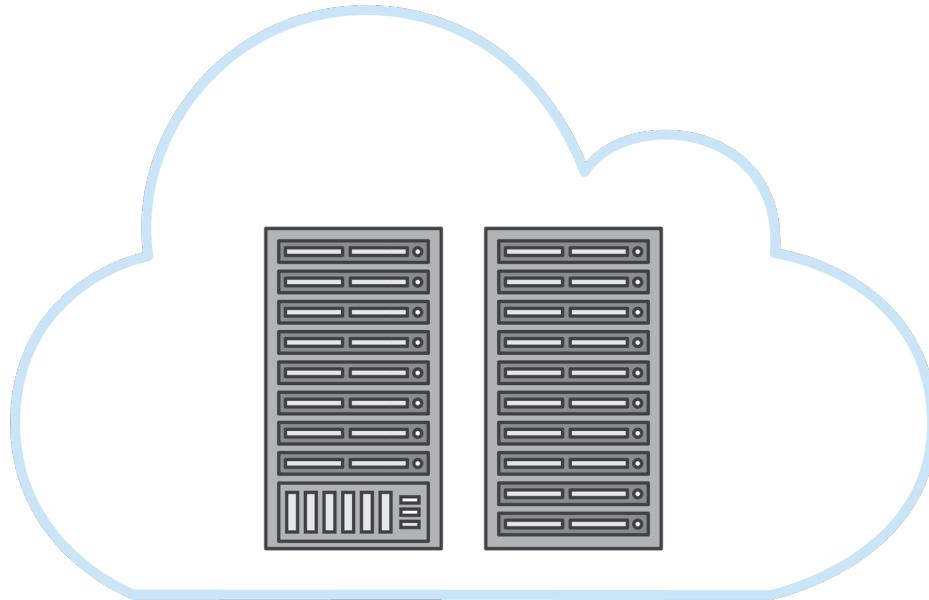
What is Total cost of Ownership (TCO)?

Financial Estimate of
Renting (Cloud) vs Owning
vs On Premise)

Total Cost of Ownership (TCO) is the financial estimate to help identify direct and indirect costs of a system.

Why use TCO?

- To compare the costs of running an **entire infrastructure environment or specific workload** on-premises versus on AWS
- To budget and **build the business case** for moving to the cloud



TCO considerations

→ On Premise considers HW, SW, Facilities, and Labor as considerations for TCO

1 Server Costs

Hardware: Server, rack chassis power distribution units (PDUs), top-of-rack (TOR) switches (and maintenance)

Software: Operating system (OS), virtualization licenses (and maintenance)

Facilities cost

Space

Power

Cooling

2 Storage Costs

Hardware: Storage disks, storage area network (SAN) or Fibre Channel (FC) switches

Storage administration costs

Facilities cost

Space

Power

Cooling

3 Network Costs

Network hardware: Local area network (LAN) switches, load balancer bandwidth costs

Network administration costs

Facilities cost

Space

Power

Cooling

4 IT Labor Costs

Server administration costs

Azure & Google Cloud too!

AWS Pricing Calculator

All cloud providers give a way
to estimate the cost of services

Use the AWS Pricing Calculator to:

- Estimate monthly costs
- Identify opportunities to reduce monthly costs
- Model your solutions before building them
- Explore price points and calculations behind your estimate
- Find the available instance types and contract terms that meet your needs
- Name your estimate and create and name groups of services

The screenshot shows the AWS Pricing Calculator homepage. At the top, there's a dark header with the title "AWS Pricing Calculator" and a subtext "Estimate the cost for your architecture solution." Below this is a section titled "How it works" with four steps: 1. "AWS Pricing Calculator" (Estimate the cost of AWS products and services), 2. "Add services" (Search and add AWS services that you need), 3. "Configure service" (Enter the details of your usage to see service costs), and 4. "View estimate totals" (See estimated costs per service, service group, and totals). To the right of the main content area, there are three columns: "Create an estimate" (with a "Create estimate" button), "Getting started" (links to "What is the AWS Pricing Calculator?", "Getting started", and "Generating estimates"), and "More resources" (links to "User guide", "FAQs", "Pricing assumptions and variations", and "Need help with estimation? Connect with AWS certified expert on AWS IQ").

Access the [AWS Pricing Calculator](#)

Additional benefit considerations

→ consider if it is beneficial to your business and technology needs

Hard benefits

- Reduced spending on compute, storage, networking, security
- Reductions in hardware and software purchases (capex)
- Reductions in operational costs, backup, and disaster recovery
- Reduction in operations personnel

Note: You don't necessarily reduce spending

but instead you:

1. Outsource
2. Rent / Subscribe (OpEx)



Soft Benefits

- Reuse of service and applications that enable you to define (and redefine solutions) by using the same cloud service
↳ focus on PaaS/SaaS or Infra as SW
- Increased developer productivity
- Improved customer satisfaction
↳ speed & agility
↳ latency & ease of use
- Agile business processes that can quickly respond to new and emerging opportunities
- Increase in global reach

Section 4: AWS Billing and Cost Management

Module 2: Cloud Economics and Billing



AWS Billing Dashboard

→ Visualizing Cost can help better understand where your money goes & how to reduce spending

Billing & Cost Management Dashboard

Spend Summary

Welcome to the AWS Account Billing console. Your last month, month-to-date, and month-end forecasted costs appear below.

Current month-to-date balance for October 2017

\$7,453.41

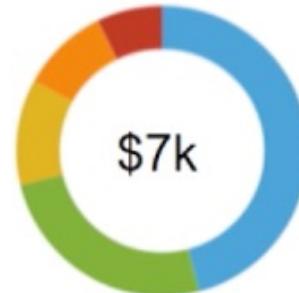


Cost Explorer

Monthly-to-Date Spend by Service

Bill Details

The chart below shows the proportion of costs spent for each service you use.



EC2	\$3,700.71
RDS	\$1,876.36
ElastiCache	\$938.18
DynamoDB	\$625.44
Other Services	\$312.57
Tax	\$0.16

Tools → there are many tools to help you understand your spending



AWS Budgets



AWS Cost and Usage Report



AWS Cost Explorer

Monthly bills → simplified billing list as a table

BILLS | COST EXPLORER | BUDGETS | REPORTS

Total	\$7,453.41 USD
AWS Marketplace Charges	\$15.00
▼ Usage Charges and Recurring Fees	\$15.00
Invoice 32342548 – AWS Service Charges: Usage charge for this statement period	2017-10-10
AWS Service Charges	\$7,438.41
▼ Usage Charges and Recurring Fees	\$7,414.41
Invoice 32342513 – AWS Service Charges: Usage charge for this statement period	2017-10-10
▼ Usage Charges and Recurring Fees	\$24.00
Invoice 32342507 – AWS Service Charges: Subscription charge	2017-10-10

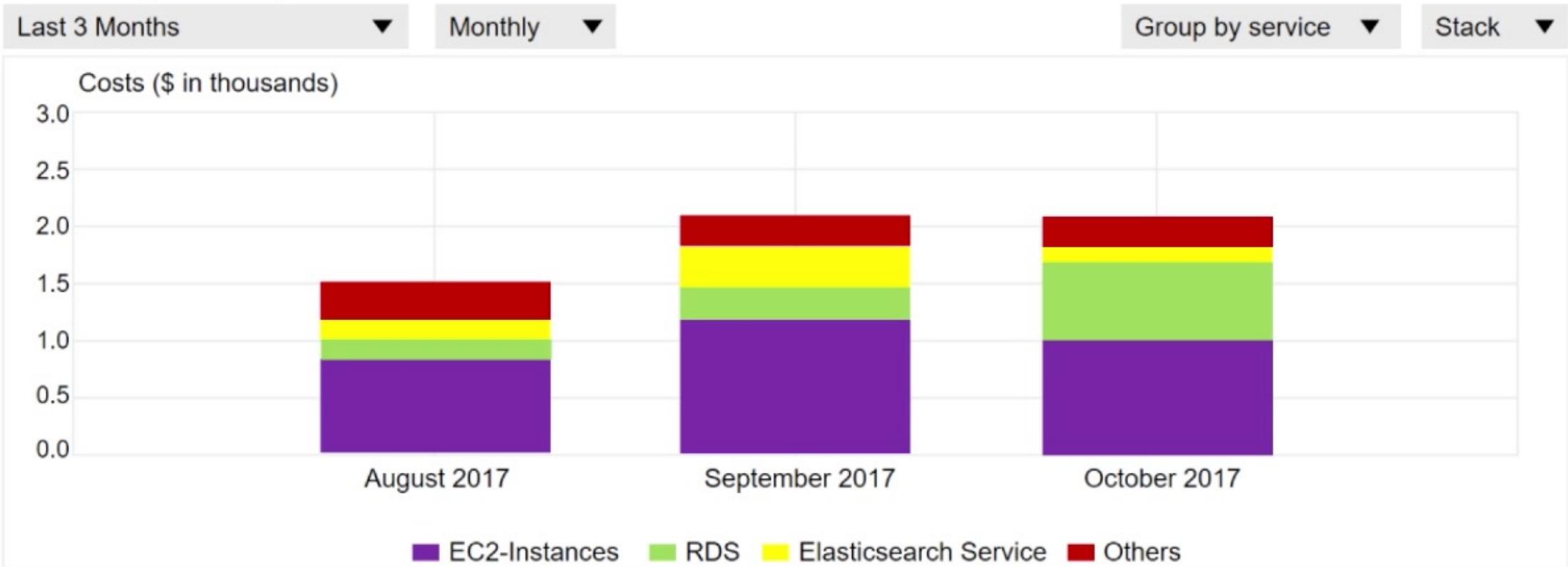


Cost Explorer

→ cost visualization & prediction for analysis

BILLS | COST EXPLORER | BUDGETS | REPORTS

Monthly costs by service



Forecast and track costs *→ set budgets & alerts*

BILLS | COST EXPLORER | **BUDGETS** | REPORTS

Create budget Copy Edit Delete Download CSV

Filter by budget name

	Budget name	Current	Forecasted	Budgeted	Current vs. budgeted	Forecasted vs. budgeted
<input type="checkbox"/>	▶ Total Monthly Cost	\$760.27	\$787.44	\$1,000.00		
<input type="checkbox"/>	▼ S3 Usage Bucket	2978.00 Req	3650.16 Req	3000.00 Req		

Budget details

Start date 10/01/17

End date -

Budget Period Monthly

Variance analysis

Cost and usage reporting *→ tabular cost for detailed listing*

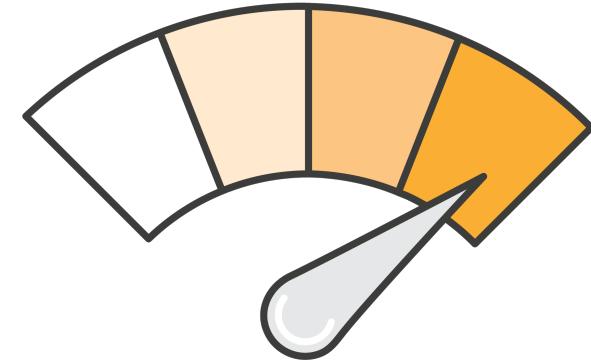
BILLS | COST EXPLORER | BUDGETS | REPORTS

Product Code	Usage Type	Operation	Availability Zone	Usage Amount	Currency Code	Line Item Description
Amazon S3	Requests – Tier 1	ListAllMyBuckets		2	USD	\$0.00 per request – PUT, COPY, POST, LIST under the global free tier
Amazon EC2	USW2-Boxusage:t2.micro	Runinstnaces:0002	us-west-2a	1	USD	\$0.00 per Windows t2.micro instance-hour under monthly free tier
Amazon S3	Requests – Tier 1	ListAllMyBuckets		2	USD	\$0.00 per request – PUT, COPY, POST, LIST under the global free tier
Amazon EC2	USW2-Boxusage:t2.micro	Runinstnaces:0002	us-west-2a	1	USD	\$0.00 per Windows t2.micro instance-hour under monthly free tier
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Support plans → help in troubleshooting as well as setup & deployment needs

AWS Support offers four support plans:

- **Basic Support** – Resource Center access, Service Health Dashboard, product FAQs, discussion forums, and support for health checks
- **Developer Support**: Support for early development on AWS
- **Business Support**: Customers that run production workloads
- **Enterprise Support**: Customers that run business and mission-critical workloads



Case severity and response times

→ Prioritization is key

	Critical	Urgent	High	Normal	Low
Basic	No Case Support				
Developer Plan (Business hours)				12 hours or less	24 hours or less
Business Plan (24/7)		1 hour or less	4 hours or less	12 hours or less	24 hours or less
Enterprise Plan (24/7)	15 minutes or less	1 hour or less	4 hours or less	12 hours or less	24 hours or less