



Introduction to Amazon EC2

Sebastian Dreisch

AWS - Business Development Manager



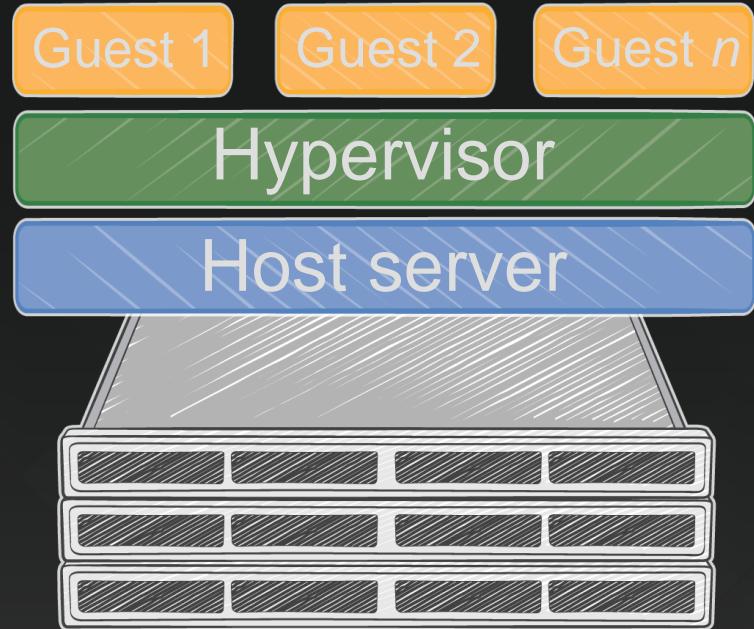


What is EC2?

Amazon Elastic Compute Cloud - Elastic **virtual servers** in the cloud



Server rack



Amazon EC2

Purchase options



Virtual machines



User experience



Networking





A brief look back...

EC2: Eight years young

EC2 eight years ago...

- Single instance family and size
 - m1.small (1 vCPU, 1.7 GiB RAM, 160 GB storage)
- Linux only
- On-Demand pricing only



Since then

- Instance choice
 - CPU
 - Memory
 - Storage
- Deployment options
- OS
- Applications
- Amazon Elastic Block Store
- Elastic IP addresses
- Amazon VPC
- Auto Scaling
- Elastic Load Balancing
- Performance, security, manageability, and scalability improvements
- Amazon ECS



AWS global infrastructure

Over 1 million active customers across 190 countries

900+ government agencies

3,400+ educational institutions

11,200+ nonprofits

11 regions

28 Availability Zones

53 edge locations

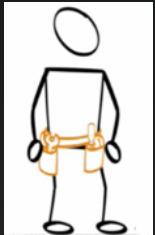




Every day, Amazon Web Services adds enough new server capacity to support all of Amazon's global infrastructure when it was a \$7B enterprise

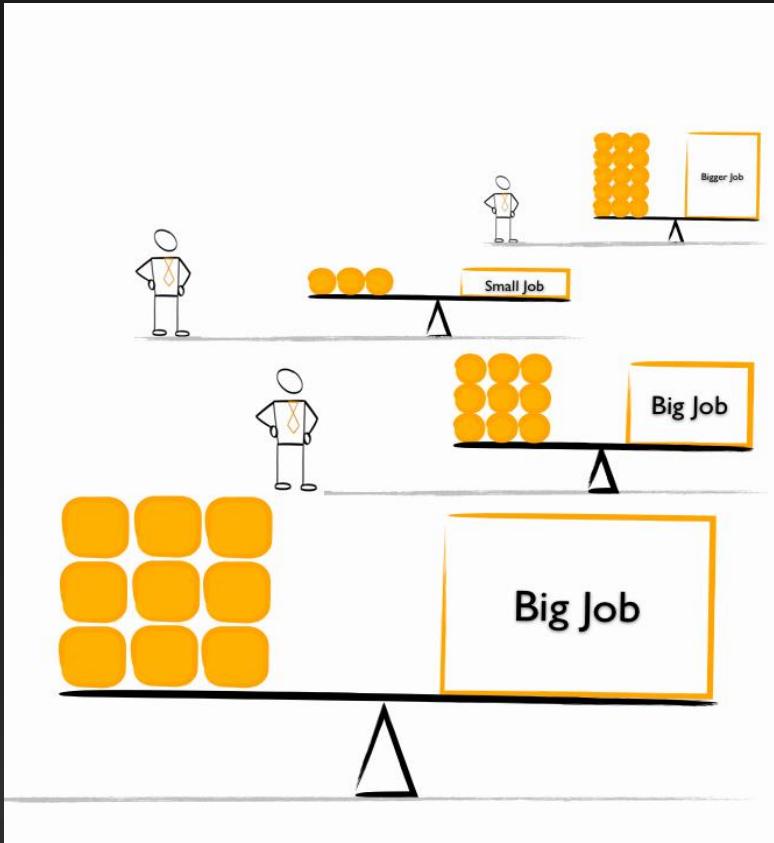


EC2 instances: Families and Generations



General-purpose:	M1, M3 , T2
Compute-optimized:	C1, CC2, C3, C4
Memory-optimized:	M2, CR1, R3
Dense-storage:	HS1, D2
I/O-optimized:	HI1, I2
GPU:	CG1, G2
Micro:	T1, T2

EC2 instances: Sizes



EC2 instances: Types

Instance generation

c4.large

Instance family

Instance size

Performance factors: CPU

Intel Xeon E5-2670 (Sandy Bridge) CPUs

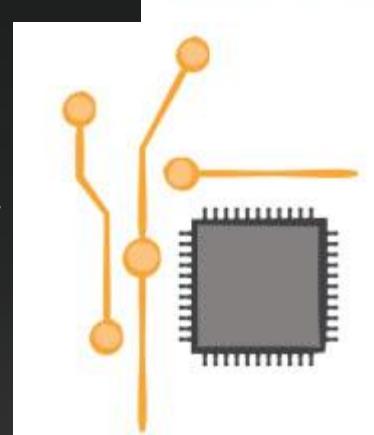
- Available on M3, CC2, CR1, and G2 instance types

Intel Xeon E5-2680 v2 (Ivy Bridge) CPUs

- Available on C3, R3, and I2 instance types
- 2.8 GHz in C3, Turbo enabled up to 3.6 GHz
- Supports Enhanced Advanced Vector Extensions (AVX) instructions

Intel Xeon E5-2666 v3 (Haswell – AVX2) CPUs

- Available on C4 instance types
- 2.9 GHz in C4, Turbo enabled up to 3.5 GHz (with Intel Turbo Boost)
- Supports 256-bit integer vectors and can process 32 single-precision 16 or double-precision floating-point operations per cycle



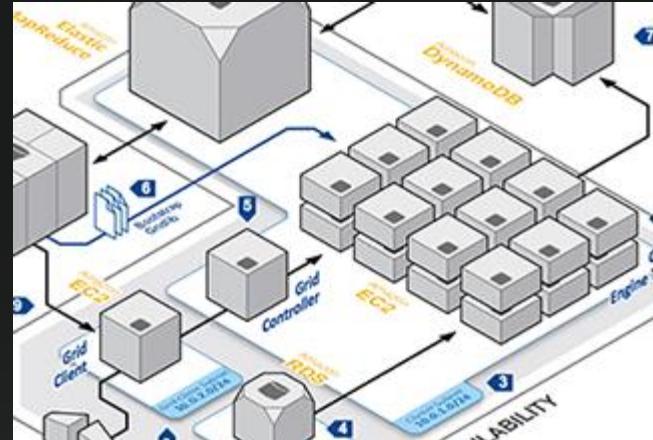
Performance factors: Networks

AWS proprietary 10Gb networking

- Highest performance in .8xlarge instance sizes
- Full bi-section bandwidth in placement groups
- No network oversubscription

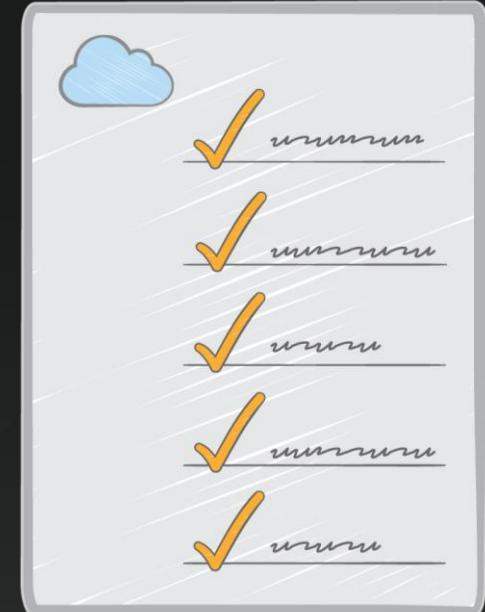
Enhanced Networking

- Available on D2, C3, C4, R3, I2 (in VPC with HVM)
- Over 1M PPS performance, reduced instance-to-instance latencies, more consistent performance



Tip: Use Enhanced Networking

- Available on D2, C4, C3, R3, I2 instance families
- HVM virtualization type
- VPC-only
- Required kernel version
 - Linux: 2.6.32+
 - Windows: Server 2008 R2+
- Appropriate virtual function driver
 - Linux: ixgbevf 2.14.2+ module
 - Windows: Intel 82599 virtual function driver



Performance factors: Storage

- Locally attached or “instance storage”
- Amazon EBS General Purpose (SSD) volumes
- Amazon EBS Provisioned IOPS (SSD) volumes
- Amazon EBS Magnetic volumes
- S3/Glacier

T2 and EC2 Free Tier instances

- T2 is a Burstable Performance Instance
 - Burstable Performance Instances provide a baseline level of CPU performance with the ability to burst above the baseline
 - T2 instances are for workloads that don't use the full CPU often or consistently, but occasionally need to burst
 - Great for getting started on EC2
- EC2 Free Tier
 - 750 hours of EC2 Linux t2.micro instance usage (1 GiB of memory and 32-bit and 64-bit platform support)



Why do customers use EC2?

Using AWS, AdRoll has achieved scalability and flexibility that has allowed the organization to grow by over 15,000% in one year



When our business was growing really fast, using AWS allowed us to scale and optimize our algorithms—and get rid of extra capacity. AWS saves us time and money. We don't need a bigger data center, we don't need to get more operations people on board, and we don't need to acquire more machines just because we have to scale up.

– Valentino Volonghi
CTO, AdRoll

- AdRoll is a global leader in retargeting with more than 10,000 active advertisers across more than 100 countries. The company provides cross-platform reach across large display inventory sources and tools that personalize ad campaigns based on a visitor's browsing behavior.
- To effectively serve up ads, AdRoll needs the flexibility to add capacity at a moment's notice, rapid-fire response times to win bids in real time, and the automation to ensure that the system can respond to bids quickly.
- Using AWS has made it easy for AdRoll to onboard new customers and quickly build business by joining new exchanges, no matter where they are physically located.



Conde Nast completed its data center migration to AWS in just 4 months, reducing costs by 40%



Completed migration in 4 months:

500+ servers

1 PB of storage

Mission-critical apps (HR, Legal, Sales apps)

100+ database servers

Sunsetting data center operations

100+ switches, routers, firewalls...

100+ telecom lines (MPLS, point-to-point, etc.)

And have 24x7/365 support & coverage

- Condé Nast is a well-established media and publications company known for producing high-quality lifestyle content suited for everyone.
- Deciding they no longer wanted to be in the business of running data centers, Conde Nast made the decision to migrate completely to AWS.
- In four months, Conde Nast completed a full data center migration of over 500 servers, 1 PB of storage, mission-critical apps (such as HR, Legal, Sales apps), and 100+ database servers to AWS. With this migration, they reduced costs by 40% and improved operational performance by 30-40%, enabling the business to create content better and faster.



Some EC2 benefits

- Elasticity
- Completely Controlled
- Flexibility
- Breadth of Functionality
- Reliability
- Security
- Cost Effectiveness
- Scalability



Elasticity

Server load

Hour of day



Traditional capacity required

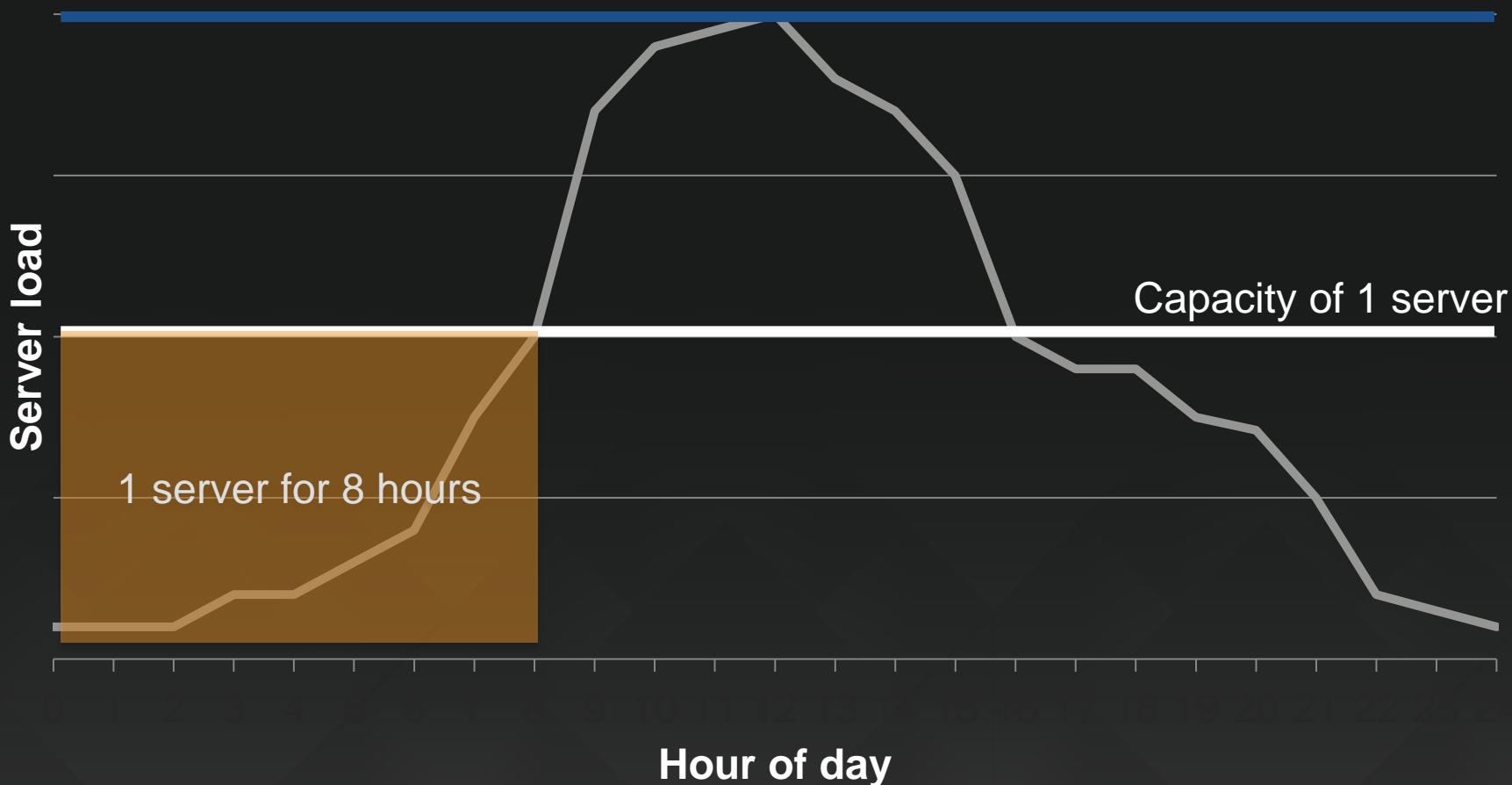
Server load

Capacity of 1 server

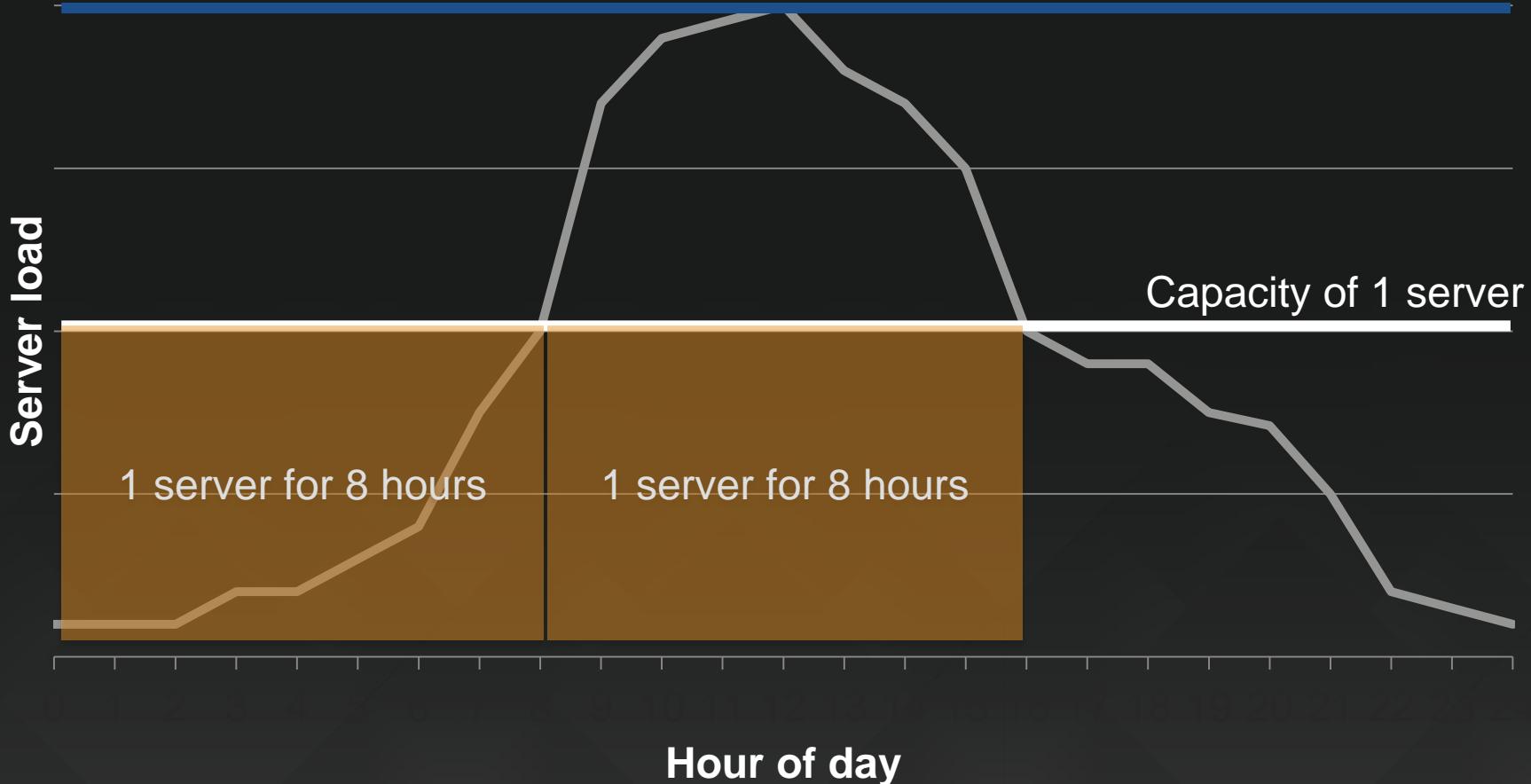
Hour of day



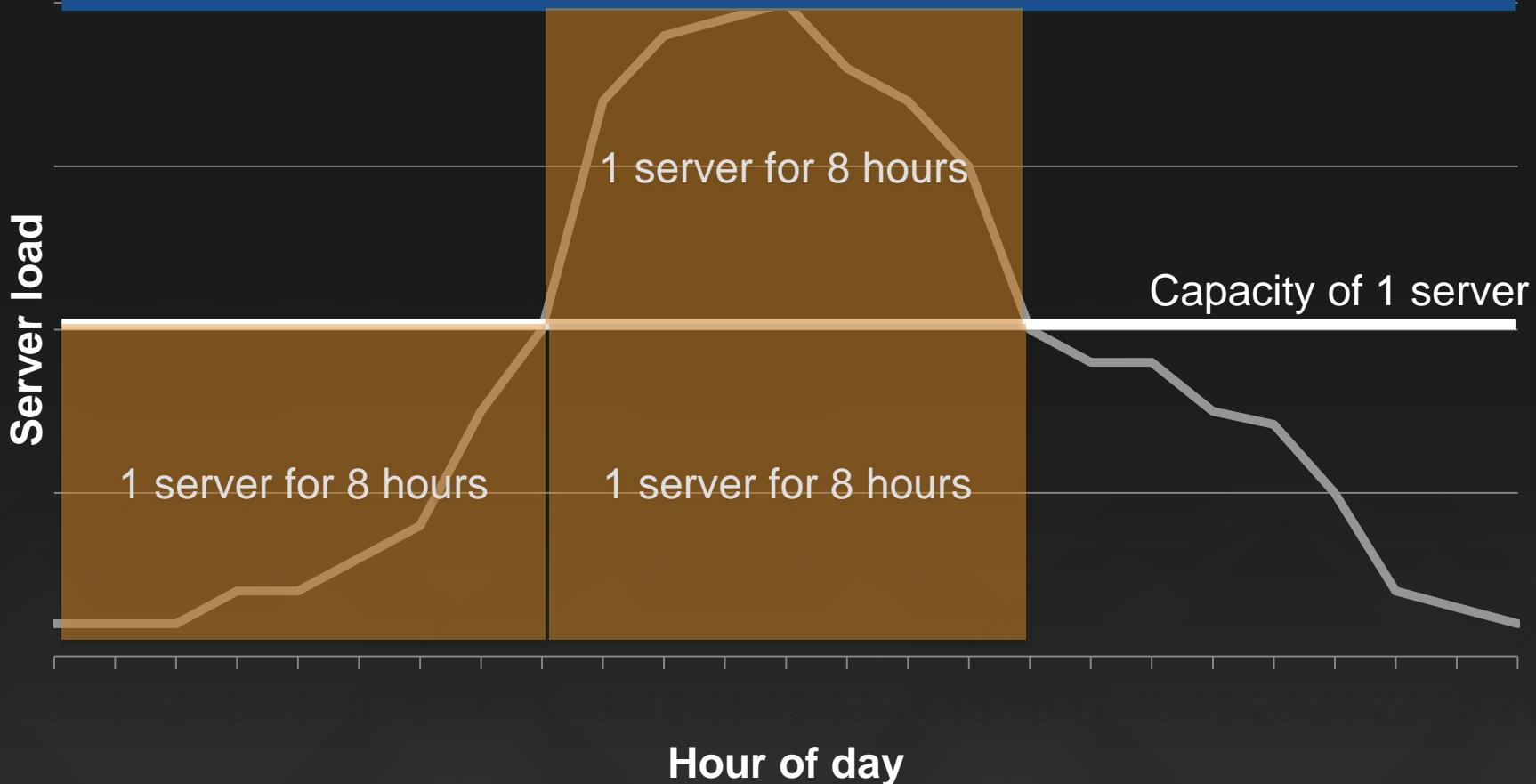
Traditional capacity required



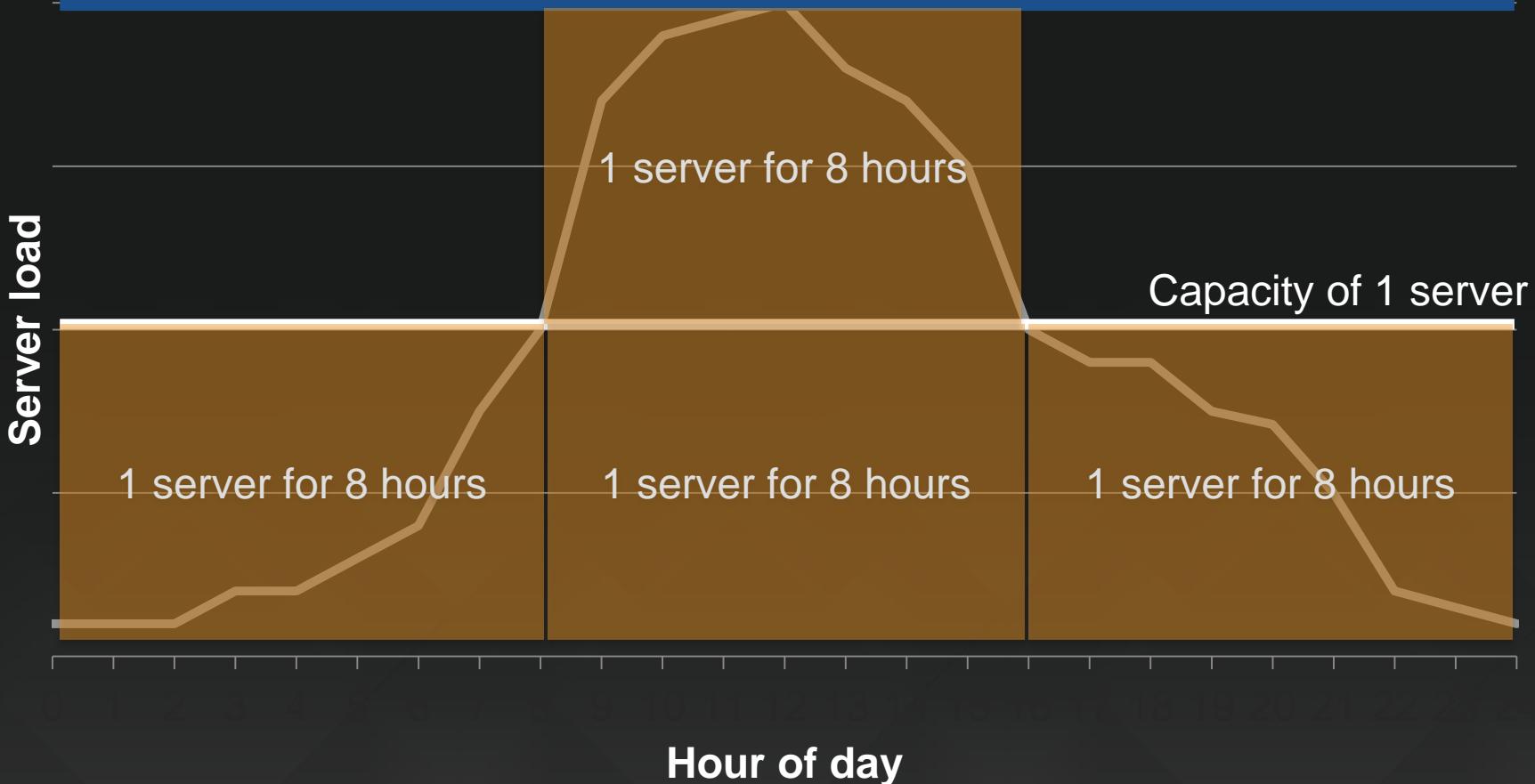
Traditional capacity required



Traditional capacity required

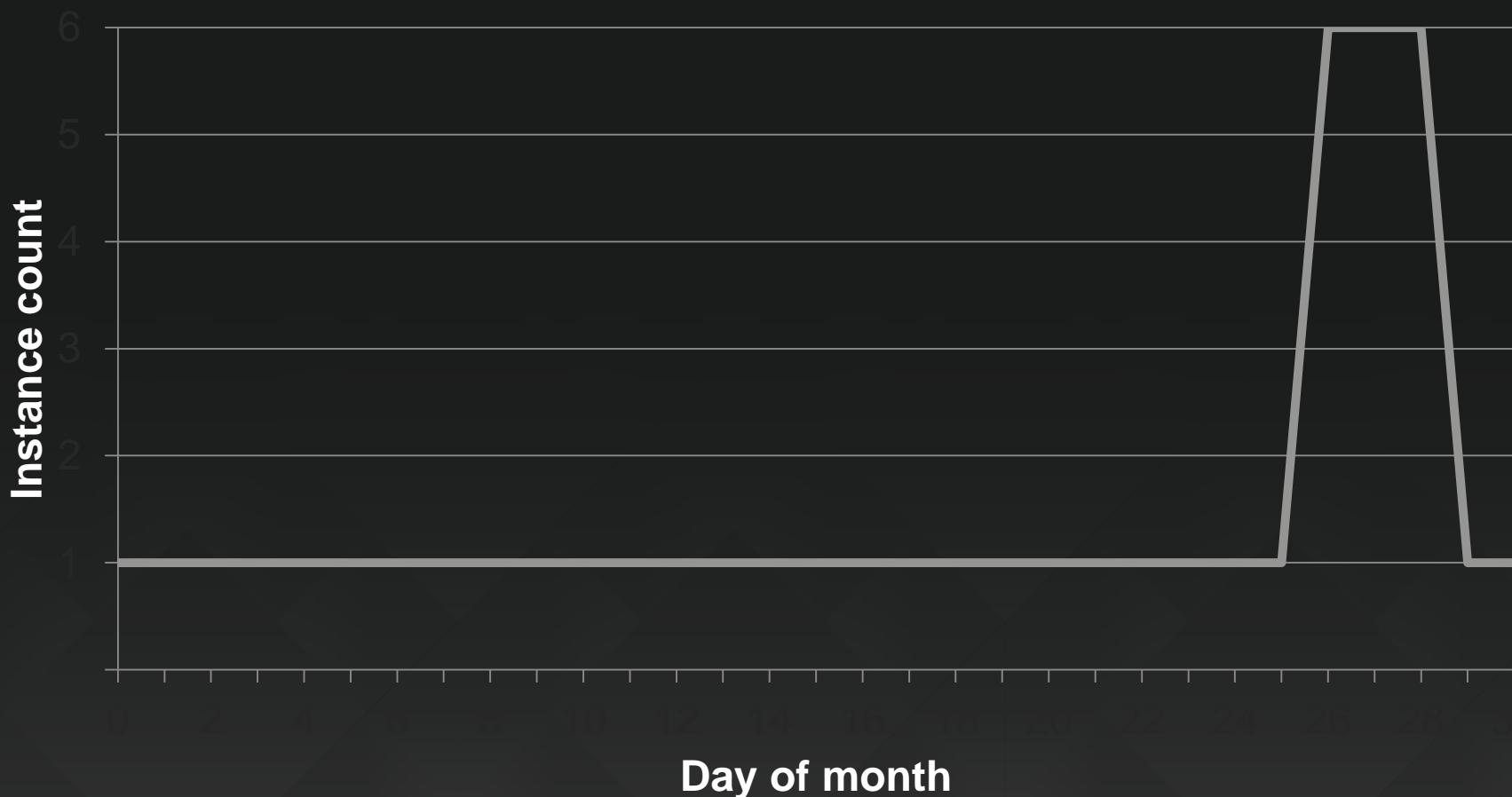


Traditional capacity required



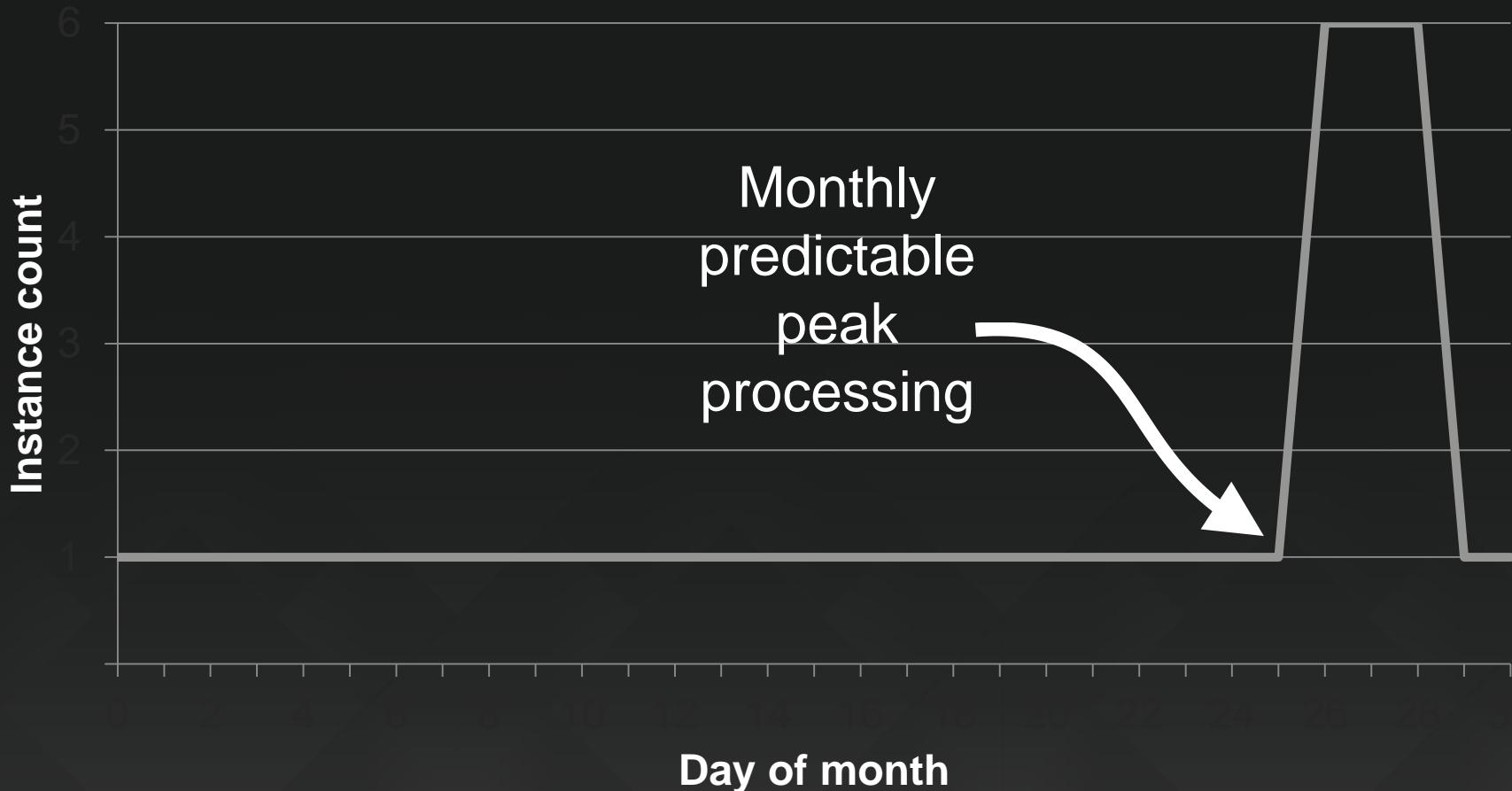
Traditional capacity required



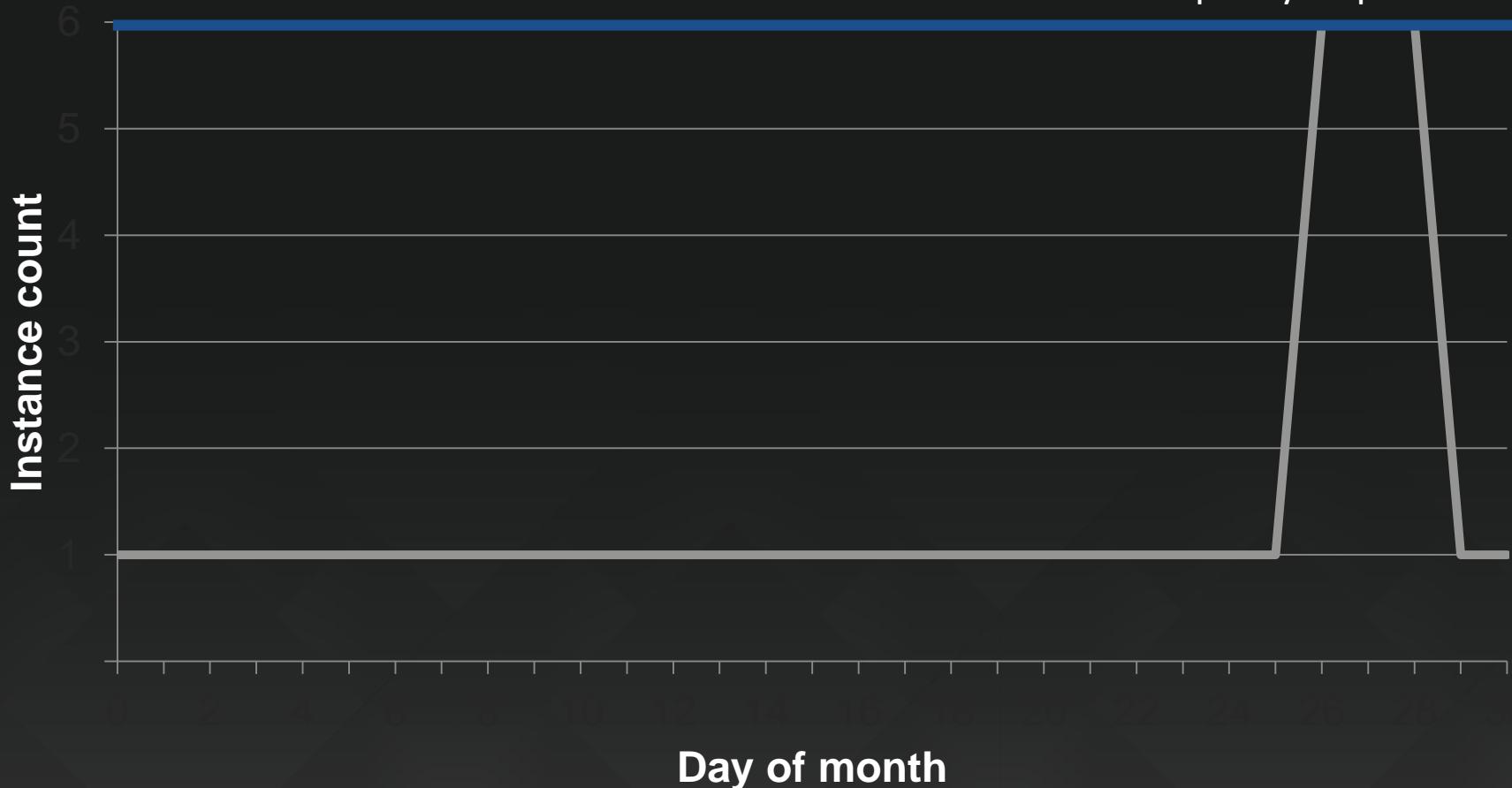


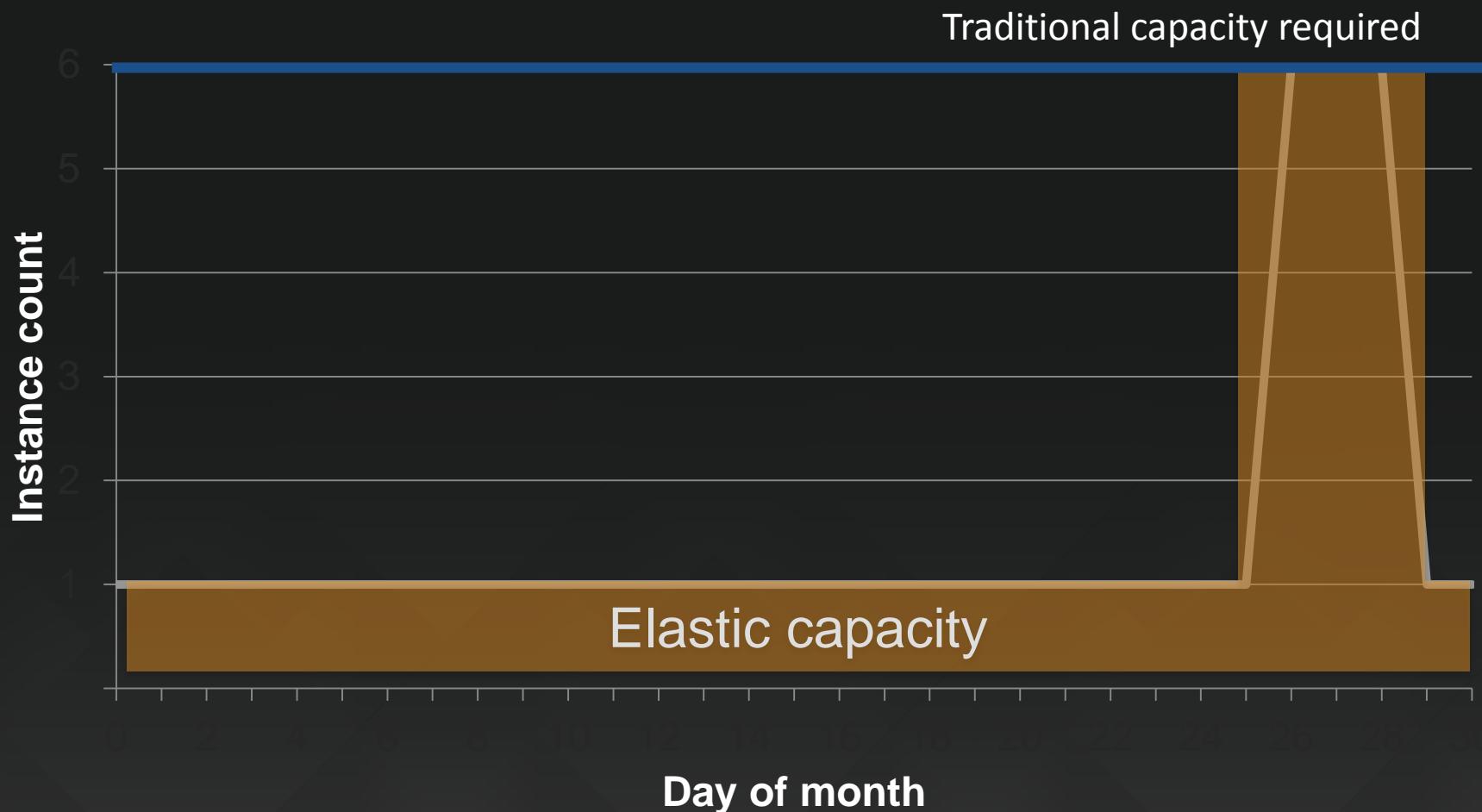
Day of month





Traditional capacity required





Traditional capacity required

Instance count

75% savings

Elastic capacity

Day of month

Scaling automatically

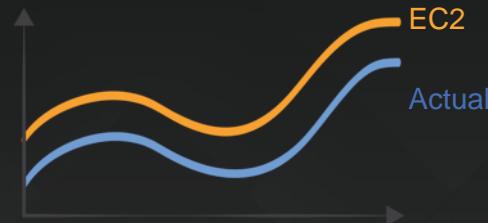
EC2

Elastic **virtual servers**
in the cloud



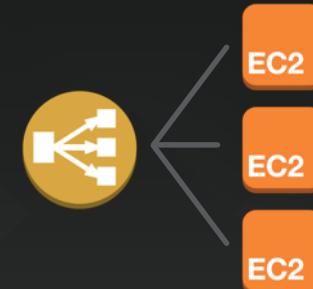
Auto Scaling

Automated scaling
of EC2 capacity



ELB

Dynamic **traffic distribution**





Completely Controlled

Completely Controlled

- You have control of your instances
- Log on as root (Linux)/Administrator (Windows)
- Install the software you need
- Start/stop and control instances with console or APIs
- Make the configuration changes you like
- Create an AMI (Amazon Machine Image)



Flexibility

Multiple instance types

- Choose the instance type that suits you
- Change the instance type when you want to
- Attach as much or as little storage as you need
- Choose your operating system
- Choose a pre-configured image (AMI)

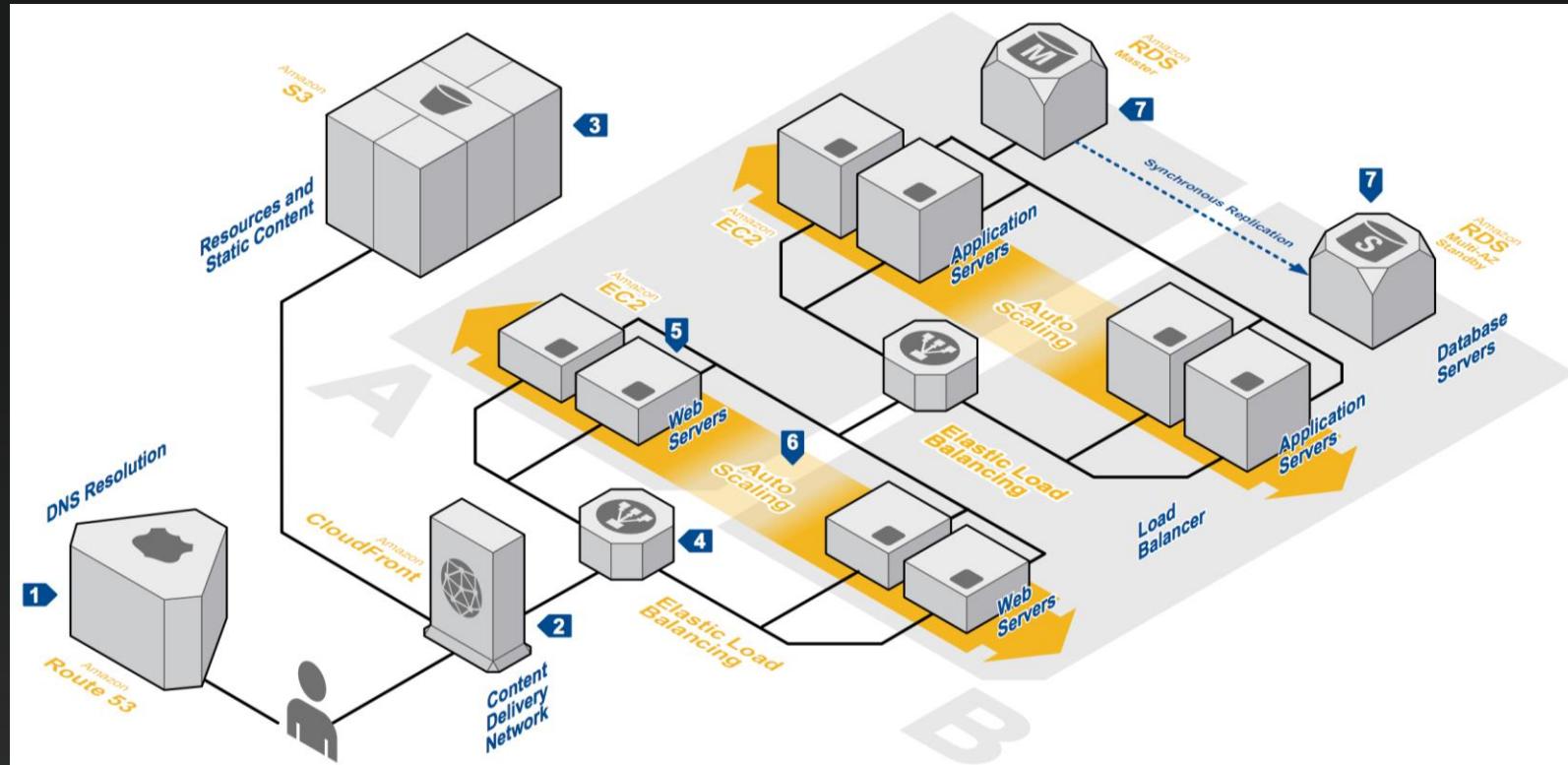


Reliability

Build reliable architectures

- Easily build highly available applications
- ELB distributes load
- Auto Scaling helps ensure availability and scale
- Use multiple Availability Zones (AZs)

Example: 3-tier web application architecture





Security

Our No. 1 priority!

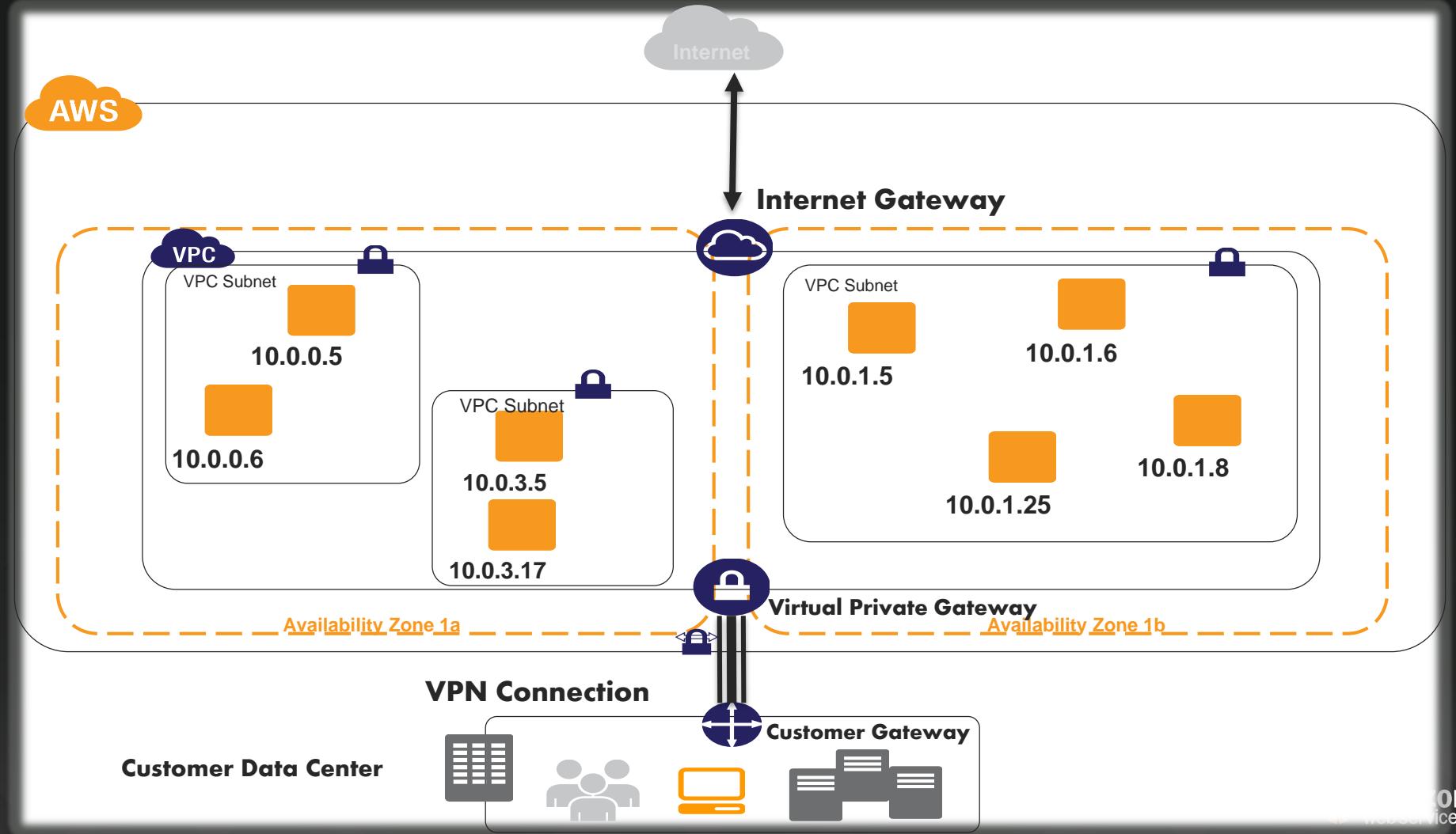
- Secured premises
- Secured access
- Built-in firewalls
- Unique users
- Multi-factor authentication
- Private subnets
- Encrypted data storage
- Dedicated connection

A few of our many certifications:



VPC - Virtual Private Cloud

- Provision a logically isolated section of the AWS cloud
- Control your virtual networking environment with:
 - Subnets
 - Route tables
 - Security groups
 - Network ACLs
- Control if and how your instances access the Internet
- Connect to your on-premises network via a hardware VPN or Direct Connect





Cost Effectiveness

Purchase options that fit your workloads

On-Demand

Pay for compute capacity by the hour with no long-term commitments

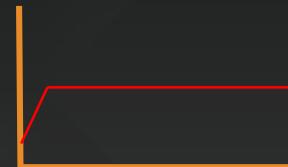
For spiky workloads, or to define needs



Reserved

Make an EC2 usage commitment and receive a significant discount.

For committed utilization



Spot

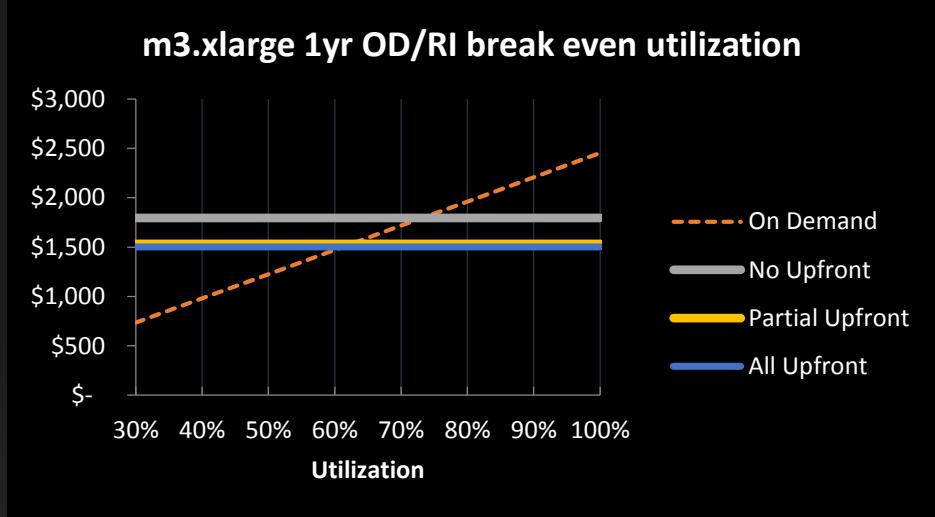
Bid for unused capacity, charged at a Spot Price which fluctuates based on supply and demand

For time-insensitive or transient workloads



Reserved Instance Payment Options

- The **No Upfront** option provides a discount compared to On-Demand (up to 55% off) and does not require an upfront payment
- The **Partial Upfront** option balances the payments of a Reserved Instance between upfront and hourly and provides a higher discount (up to 76%) compared to the No Upfront option
- With the **All Upfront** option you benefit from the highest discount compared to On-Demand (up to 77% off)



Reserved Instance Marketplace

Buy a smaller-term instance

Buy an instance with different OS or type

Buy a Reserved Instance in different region

Sell your unused Reserved Instance

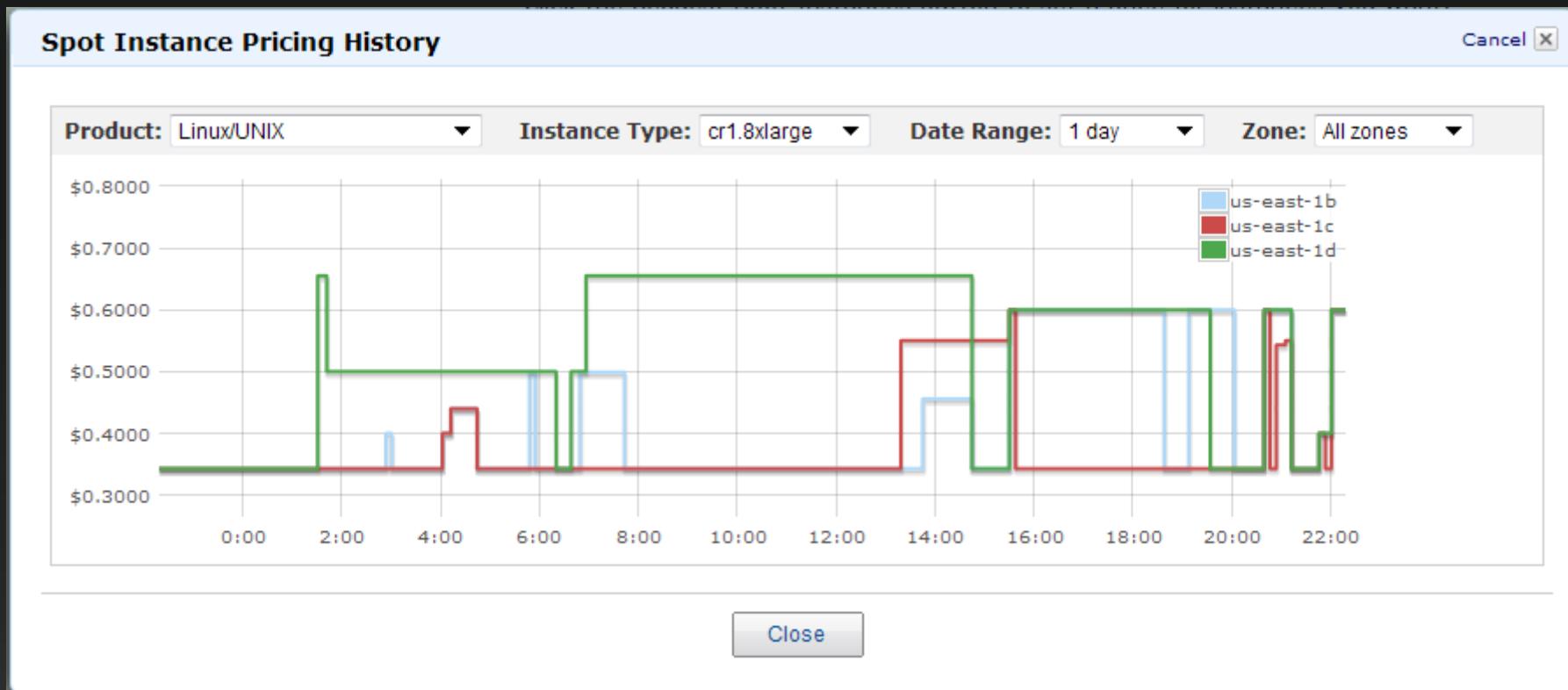
Sell unwanted or over-bought capacity

Further reduce costs by optimizing

Purchase Reserved Instances											Cancel			
Platform:			Linux/UNIX	Term:		Any	Tenancy:			Default	Offering Type:		Heavy Utilization	Search
Instance Type:		m1.xlarge	Availability Zone:		Any									
Seller	Term	Effective Rate	Upfront Price	Hourly Rate	Availability Zone	Offering Type	Quantity Available	Desired Quantity						
AWS	36 months	\$0.239	\$2320.00	\$0.151	ap-southeast-1a	Heavy Utilization	Unlimited	1	Add to Cart					
AWS	36 months	\$0.239	\$2320.00	\$0.151	ap-southeast-1b	Heavy Utilization	Unlimited	1	Add to Cart					
3rd Party	4 months	\$0.339	\$400.00	\$0.20	ap-southeast-1a	Heavy Utilization	2	1	Add to Cart					
AWS	12 months	\$0.359	\$1478.00	\$0.19	ap-southeast-1a	Heavy Utilization	Unlimited	1	Add to Cart					
AWS	12 months	\$0.359	\$1478.00	\$0.19	ap-southeast-1b	Heavy Utilization	Unlimited	1	Add to Cart					



Spot for interruptible workloads and best pricing



Best Spot use-cases include any batch-oriented, fault-tolerant application





It's easy to get started!

AWS Console

The screenshot shows the AWS EC2 Management Console interface. The left sidebar menu is visible with the following items under the 'INSTANCES' section: EC2 Dashboard, Events, Tags, Reports, Instances (which is selected), Spot Requests, Reserved Instances. Under 'IMAGES', there are AMIs and Bundle Tasks. Under 'ELASTIC BLOCK STORE', there are Volumes and Snapshots. Under 'NETWORK & SECURITY', there are Security Groups, Elastic IPs, Placement Groups, and Load Balancers. The main content area displays a message: 'You do not have any running instances in this region.' It includes links for 'First time using EC2? Check out the Getting Started Guide.' and 'Click the Launch Instance button to start your own server.' A large blue 'Launch Instance' button is centered. A black rectangular overlay at the bottom contains the URL: <http://aws.amazon.com/getting-started/>. At the bottom of the page, there is a footer with copyright information: '© 2008 - 2014, Amazon Web Services, Inc. or its affiliates. All rights reserved.' and links to 'Privacy Policy' and 'Terms of Use'. A 'Feedback' button is also present.



AWS Marketplace is in the console

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace, or you can select one of your own AMIs.

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Categories

- All Categories
- Software Infrastructure
 - Application Development (136)
 - Application Servers (86)
 - Application Stacks (173)
 - Big Data (53)
 - Databases & Caching (67)
 - Network Infrastructure (99)
 - Operating Systems (61)
 - Security (91)
- Operating system
 - All Windows
 - Windows 2003 R2 (4)
 - Windows 2008 R2 (22)
 - Windows 2008 (12)

Search AWS Marketplace Products

CentOS

CentOS 6 (x86_64) - with Updates

★★★★★ (11) · 6 - 2013-05-27 | Sold by CentOS.org

\$0.00/hr for software + AWS usage fees

Linux/Unix, CentOS 6 | 64-bit Amazon Machine Image (AMI) | Updated: 5/28/13

This is the Official CentOS 6 x86_64 image that has been built with a minimal profile. The image contains just enough packages to run within AWS, bring up an SSH Server....

More info

Select

CentOS

CentOS 6.3 (x86_64) - Release Media

★★★★★ (14) · 6.3 - 2012-07-09 | Sold by CentOS.org

\$0.00/hr for software + AWS usage fees

Linux/Unix, CentOS 6.3 | 64-bit Amazon Machine Image (AMI) | Updated: 5/28/13

This is the Official CentOS 6.3 x86_64 image that has been built with a minimal profile. The image contains just enough packages to run within AWS, bring up an SSH Server....

More info

Select

Debian

Debian GNU/Linux

★★★★★ (36) · 7.1 | Previous versions | Sold by Debian

\$0.00/hr for software + AWS usage fees

Linux/Unix, Debian 7.1 | 64-bit Amazon Machine Image (AMI) | Updated: 7/10/13

Debian is a computer operating system composed of software packages released as free and open source software primarily under the GNU General Public License along with ...

More info

Select

CentOS

CentOS 6.4 (x86_64) - Release Media

★★★★★ (4) · 6.4 - 2013-03-09 | Sold by CentOS.org

Browse, search, discover, and launch thousand of AWS Marketplace Amazon Machine Images (AMIs) directly from within the EC2 console

1,900+ products listed in 23 categories



Next Steps

- Sign-up for an AWS account!
- Take advantage of the Free Tier:
aws.amazon.com/free
- Learn more: aws.amazon.com/ec2
- Join us at the booth



Thank You
SAN FRANCISCO