Introduction to AWS Inferentia and Amazon EC2 Inf1 instances

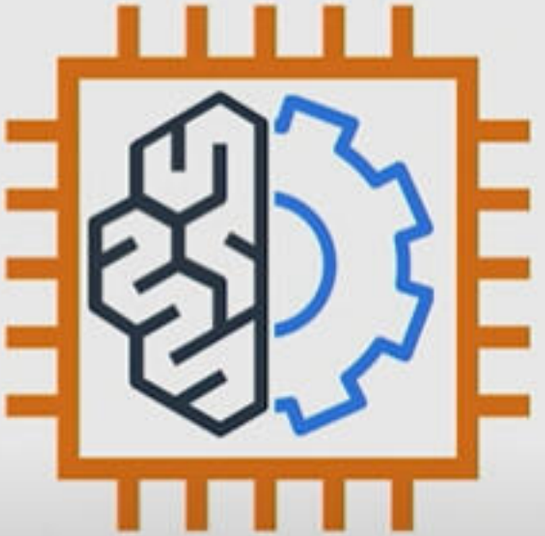
Vibhav Viswanathan

aws training and certification

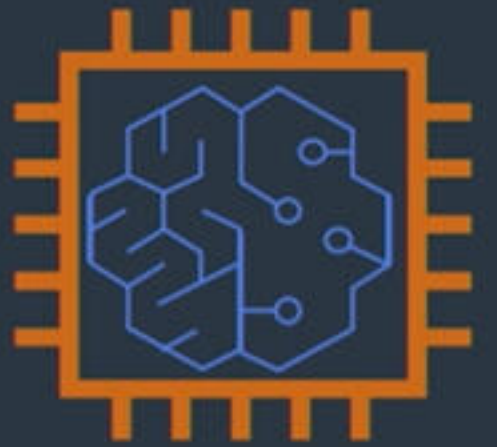
In this video

aws training and certification

- Machine learning use cases and challenges
- AWS Inferentia overview
- Amazon EC2 Inf1 instances introduction
- Benefits
- Pricing and availability



AWS Inferentia



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AWS Inferentia accelerators

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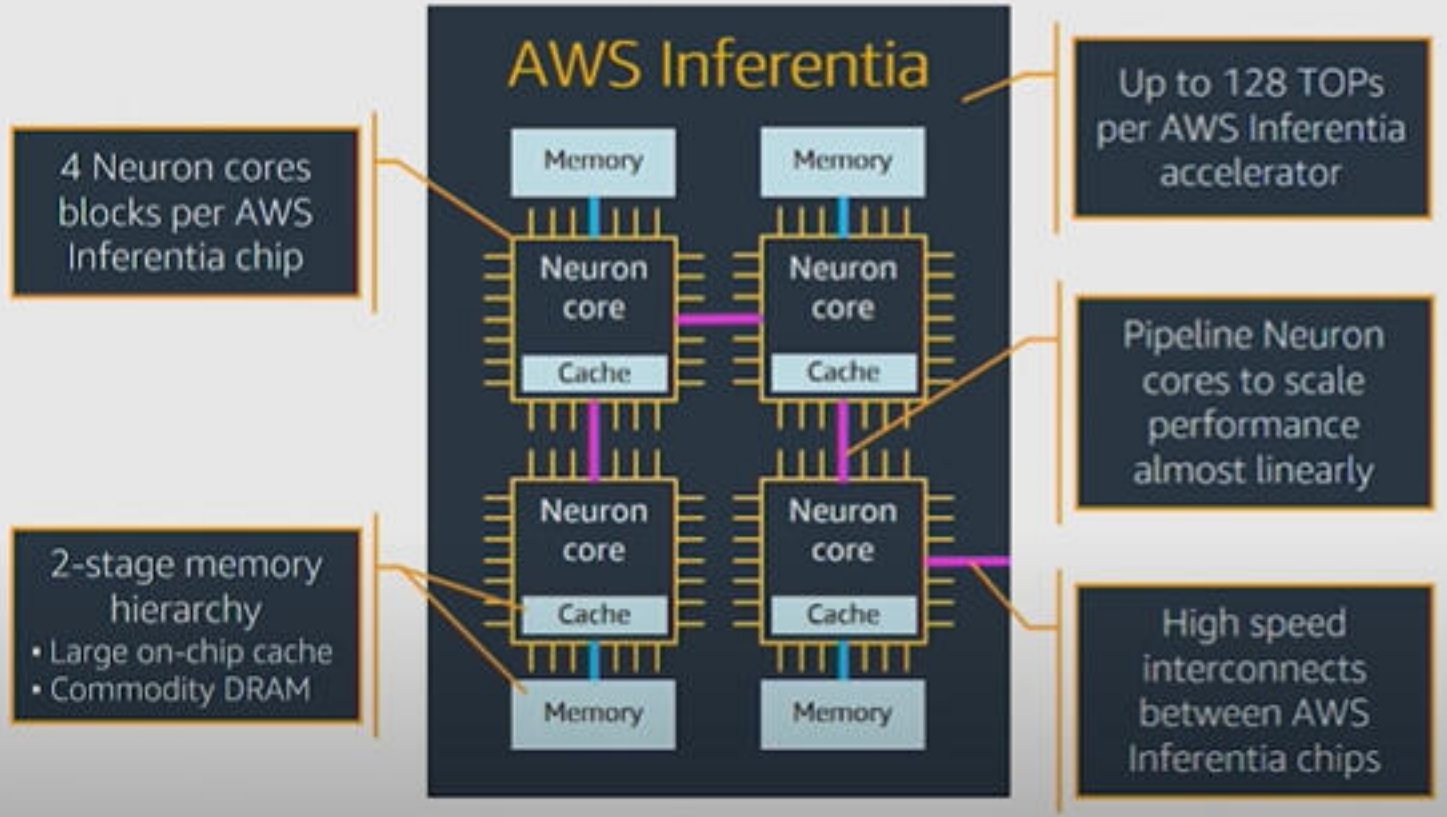

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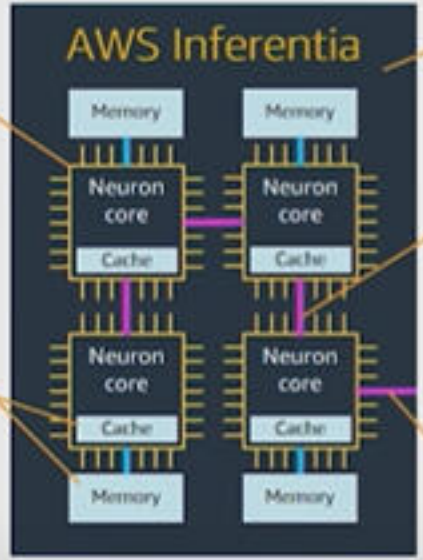

4 Neuron cores blocks per AWS Inferentia chip

2-stage memory hierarchy
- Large on-chip cache
- Commodity DRAM

Up to 128 TOPs per AWS Inferentia accelerator

Pipeline Neuron cores to scale performance almost linearly

High speed interconnects between AWS Inferentia chips

Data types

- INT8
- BFloat16
- FP16 with mixed precision

ML frameworks

- TensorFlow
- MXNet
- PyTorch

AWS Neuron software

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Build

Neuron Compiler
(NCC)

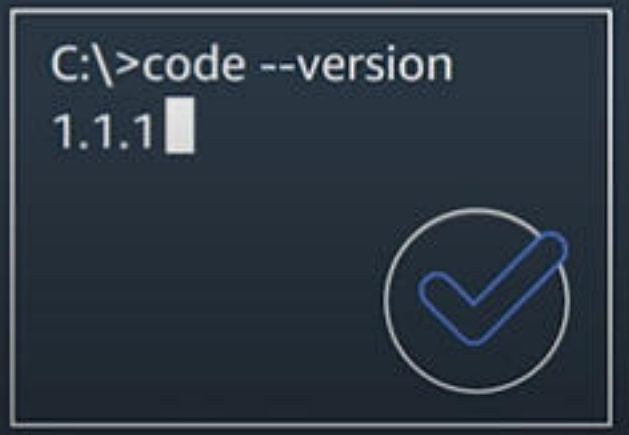
Deploy

Neuron Runtime
(NRT)

Neuron Binary
(NBIN)

Debug/profile

Neuron Debugger/
Profiler



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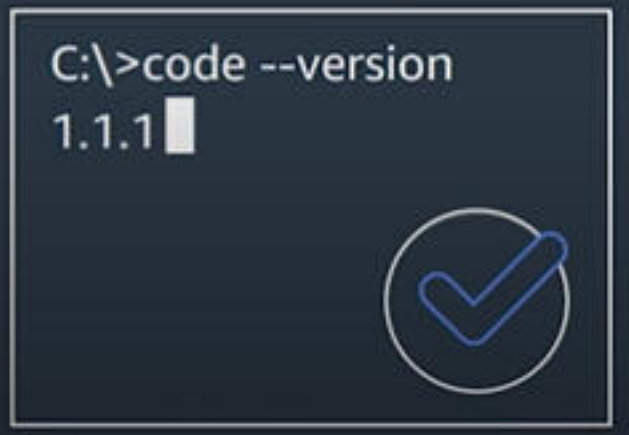

AWS Neuron software

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Build

Deploy

Debug/profile

Neuron Runtime (NRT)

Neuron Debugger/ Profiler

```
C:\>code --version
1.1.1
```

Neuron Compiler (NCC)

Neuron Binary (NBIN)

AWS Neuron software

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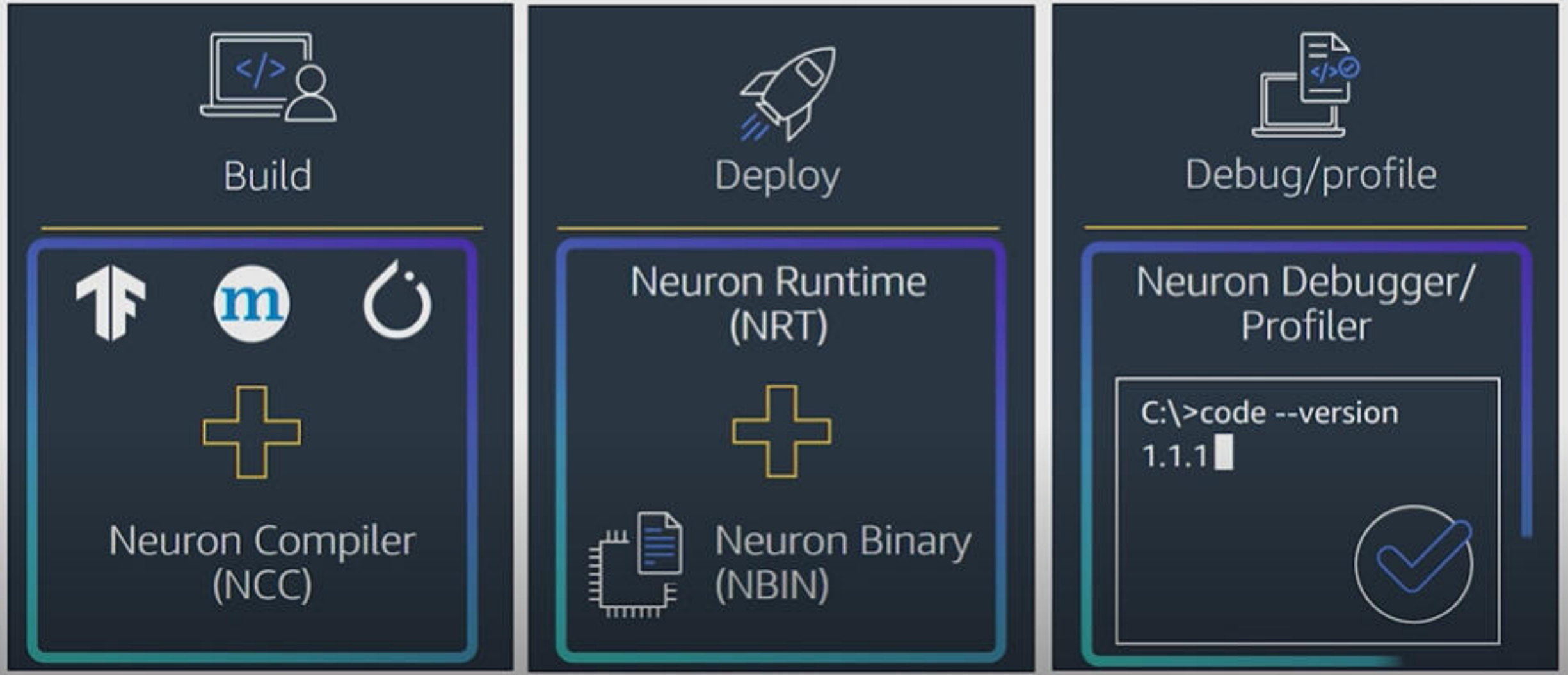

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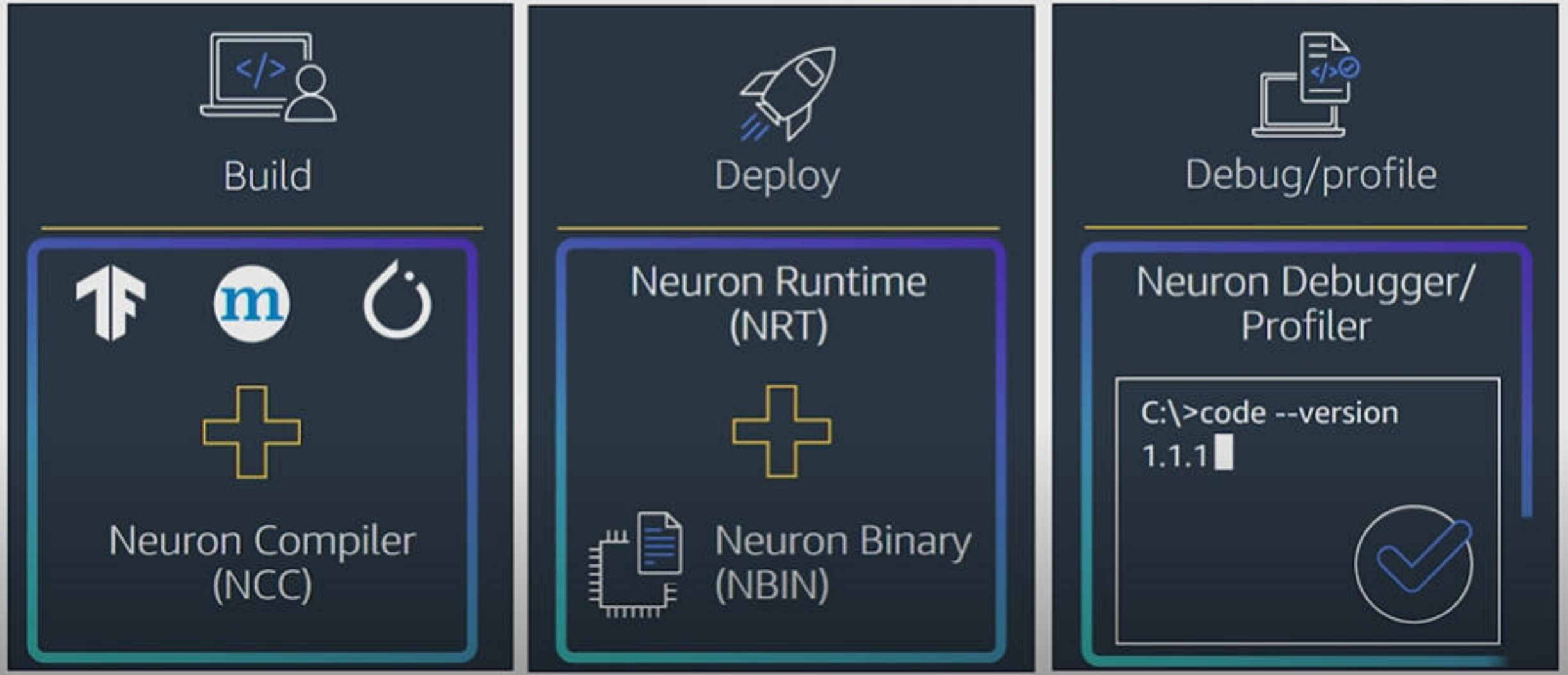
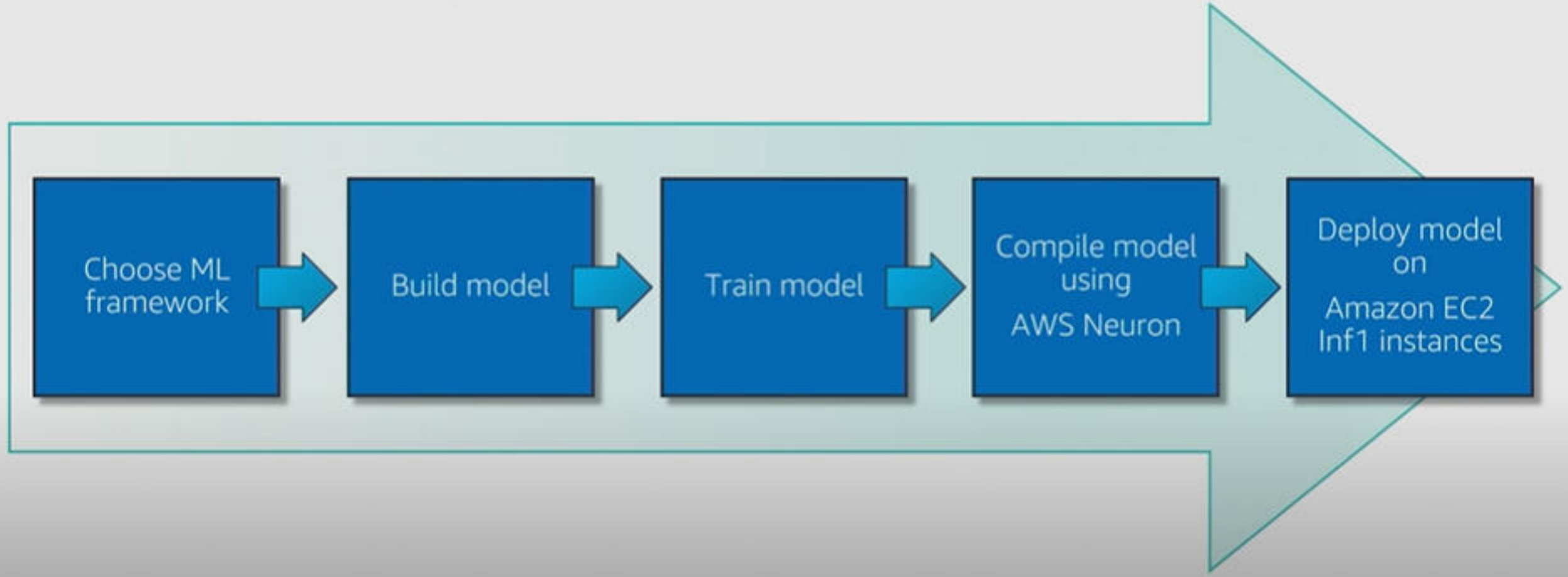


AWS Neuron developer flow



AWS Neuron highlights

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Smart partitioning

Automatically optimize neural-net compute

Auto FP32 casting

Ingest FP32 trained model, and cast to BFloat16

AWS Neuron Core pipeline

Super low-latency full bandwidth

AWS Neuron Core groups

Concurrently run multiple models

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AWS Neuron Core groups

Concurrently run multiple models

Amazon EC2 Inf1 instances powered by AWS Inferentia

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Amazon EC2 Inf1 instances use:

- Custom Intel Cascade-Lake processors
- Custom AWS Inferentia ML acceleration chips
- AWS Nitro up to 100-Gbps networking

Amazon EC2 Inf1 instance benefits

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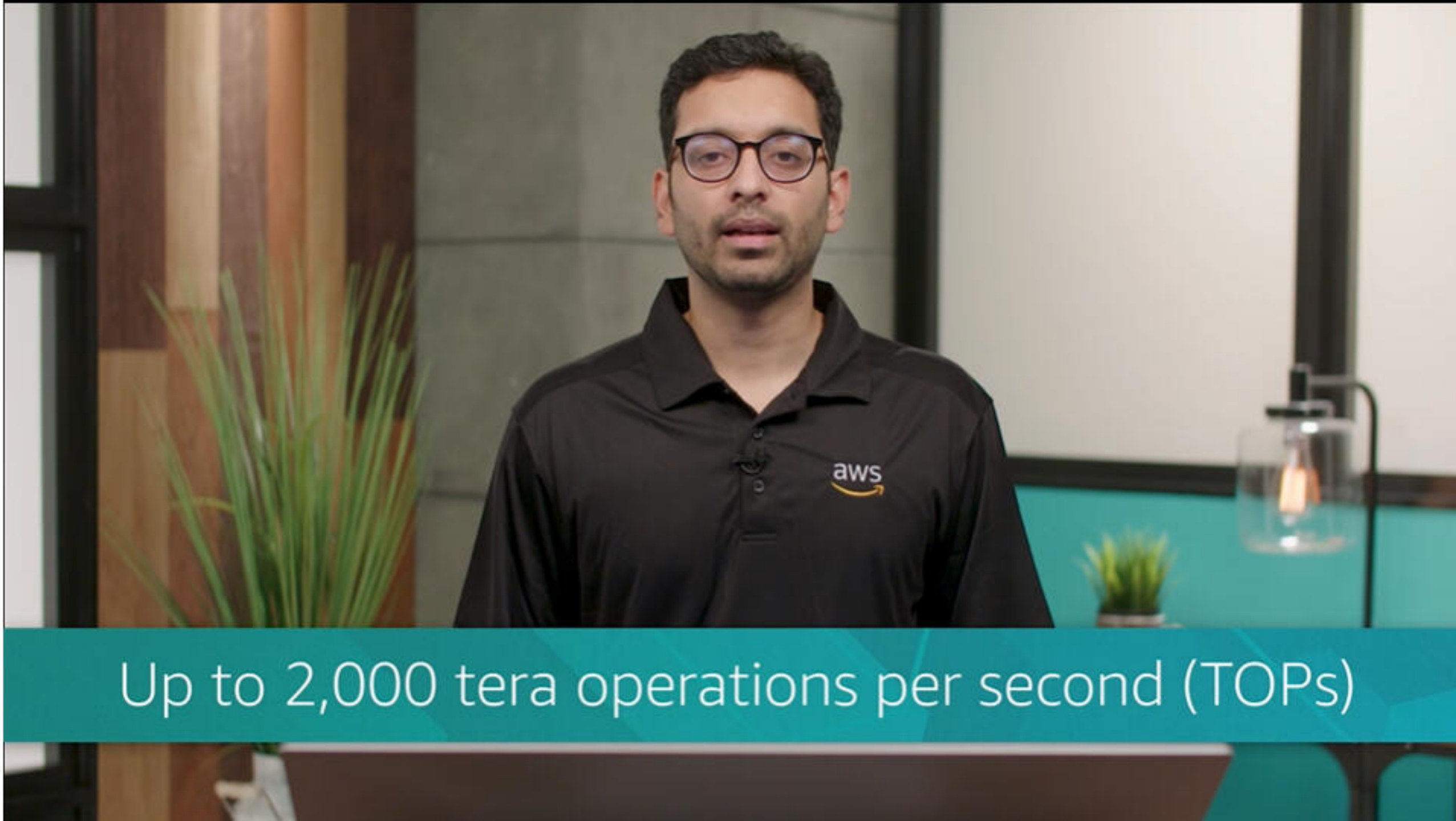
Low cost

High performance

Increased agility to meet ML needs


aws
Up to 2,000 tera operations per second (TOPs)

Amazon EC2 Inf1 instance benefits

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High performance

Increased agility to meet ML needs

Amazon EC2 Inf1 instance benefits

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Low cost

High performance

Increased agility to meet ML needs

Instance sizes

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Instance size	vCPUs	Memory (GiB)	AWS Inferentia chips	Chip-to-chip interconnect	Storage	Network bandwidth	Amazon EBS bandwidth
Inf1.xlarge	4	8	1	N/A	EBS only	Up to 25 Gbps	Up to 3.5 Gbps
Inf1.2xlarge	8	16	1	N/A	EBS only	Up to 25 Gbps	Up to 3.5 Gbps
Inf1.6xlarge	24	48	4	Yes	EBS only	25 Gbps	3.5 Gbps
Inf1.24xlarge	96	192	16	Yes	EBS only	100 Gbps	14 Gbps

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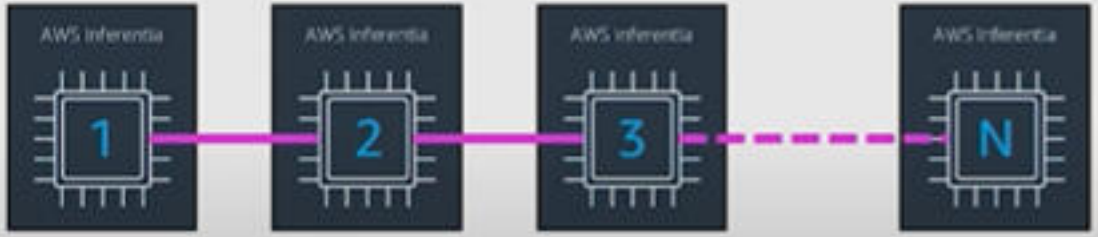
AWS Inferentia chip-to-chip fast interconnects



AWS integration

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AWS Deep Learning AMIs

AWS Deep Learning Amazon EC2 AMIs

Amazon EKS

Amazon ECS

AWS Deep Learning Containers

Amazon SageMaker

Amazon SageMaker managed ML service

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Pricing models and availability

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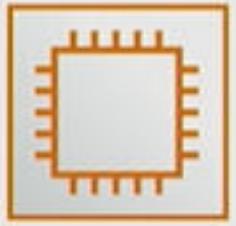
Pricing

- Supports all Amazon EC2 pricing models

On-Demand instances



Reserved instances

Spot instances

Pricing models and availability

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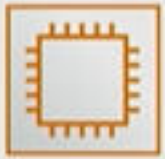
Pricing

- Supports all Amazon EC2 pricing models

On-Demand instances



Reserved instances

Spot instances

Pricing models and availability

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Pricing

- Supports all Amazon EC2 pricing models

On-Demand instances

Reserved instances

Spot instances

Availability

- Initial launch December 2019
- Deployment to all AWS Regions

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Certificate of Completion

Hem Bahadur Gurung

Has successfully completed

Introduction to AWS Inferentia and Amazon EC2 Inf1 Instances

Director, Training and Certification

15 minutes

Duration

10 September, 2021

Completion Date

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