



Achieve high performance and cost-effective model deployment

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Today's agenda

- Deploy ML models on Amazon SageMaker
- Pick the right deployment solution
- Perfect your deployment
- Deploy thousands of models with SageMaker multi-model endpoints
- Demo

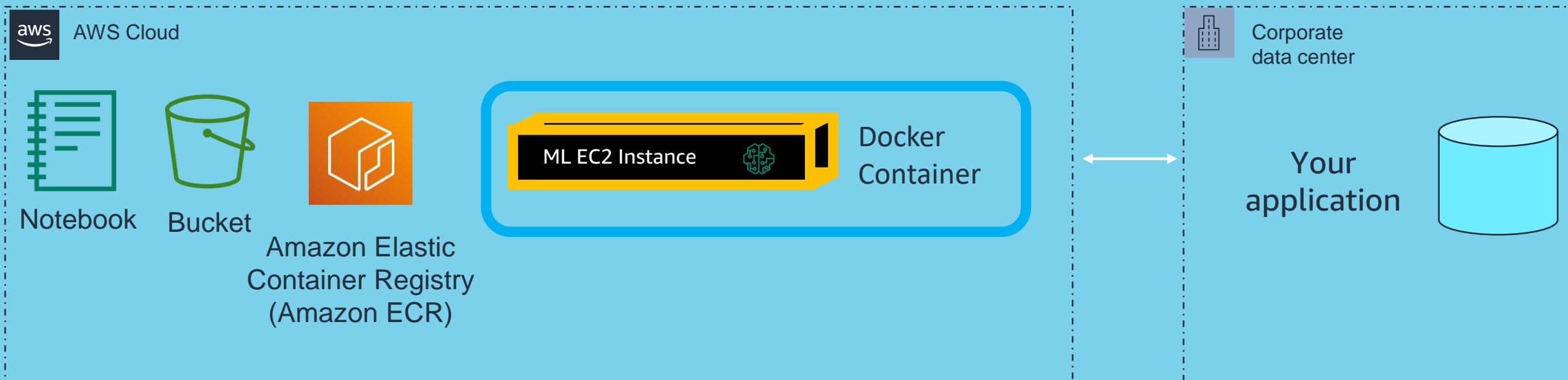
So you want to host a model on the cloud



Model

- model.tar.gz
- inference.py

```
model = Model(ecr_image_uri, s3_model_data)
predictor = model.deploy(1, 'ml.g5.xlarge')
result = predictor.predict(payload)
```



Amazon SageMaker deploys your model and inference code onto real-time endpoints with low latency

Bring your own pretrained models to host on SageMaker using script mode

```
from sagemaker.tensorflow import TensorFlowModel

model = TensorFlowModel(model_data='s3://mybucket/model.tar.gz', role='MySageMakerRole')

predictor = model.deploy(initial_instance_count=1, instance_type='ml.c5.xlarge')
```

Use our built-in inference script with deep learning containers,
or **bring your own script**

```
pytorch_model = PyTorchModel(model_data='s3://my-bucket/my-path/model.tar.gz', role=role,
                              entry_point='inference.py')

predictor = pytorch_model.deploy(instance_type='ml.c4.xlarge', initial_instance_count=1)
```

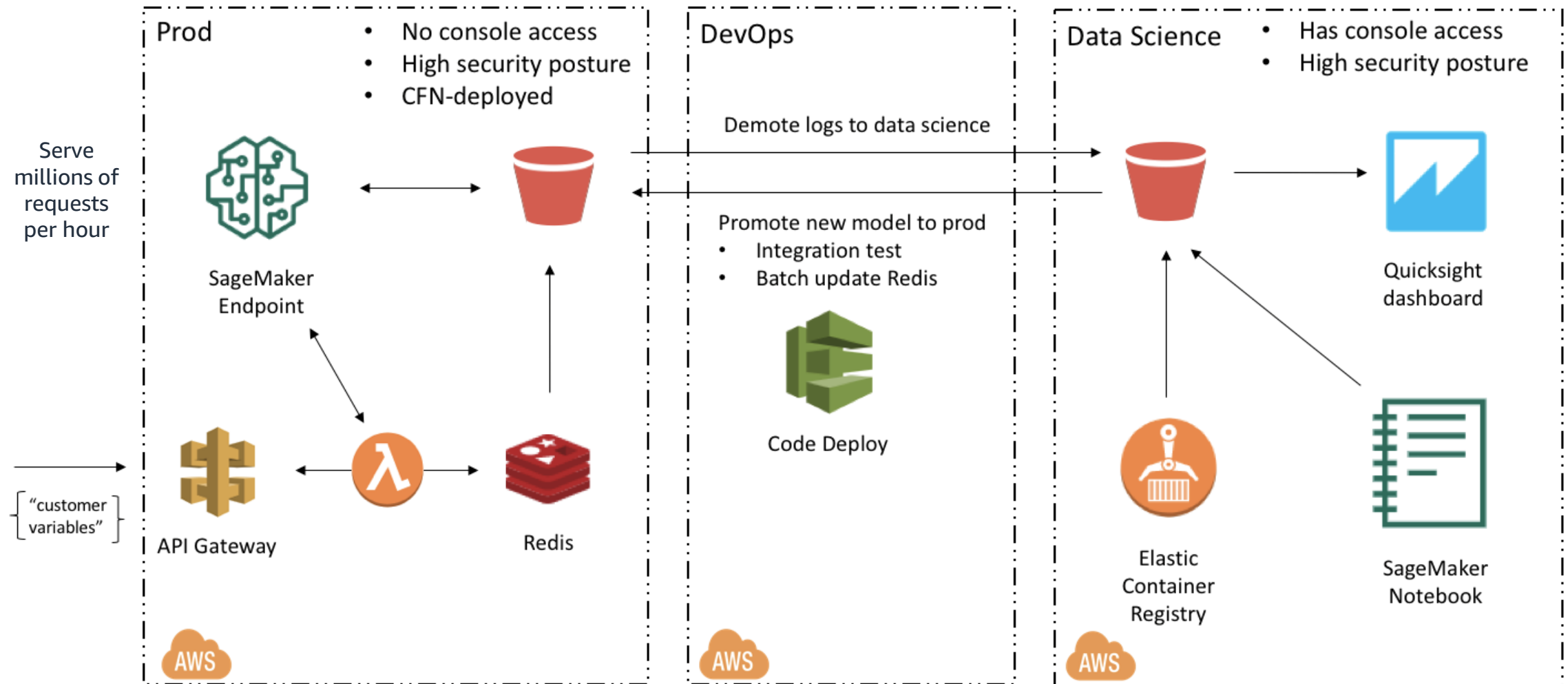
Deploy any open source model on SageMaker

AutoGluon	Chainer	DMLC XGBoost	H2O.ai	C++ Language	NVIDIA	Julia Language
RayRLlib	DeepSpeed	DataRobot	Docker	Go Language	Apache Airflow	AWS ML Marketplace
Deeplearning4j	Apache SparkML	Databricks	Deep Graph Library	PyCharm	Kubernetes	AWS IOT Greengrass

Amazon SageMaker supports the leading machine learning frameworks, toolkits, and programming languages



Leverage MLOps and account isolation at scale



Pick the right ML instance type and size

type
ml.g4dn.24xlarge
generation capabilities size



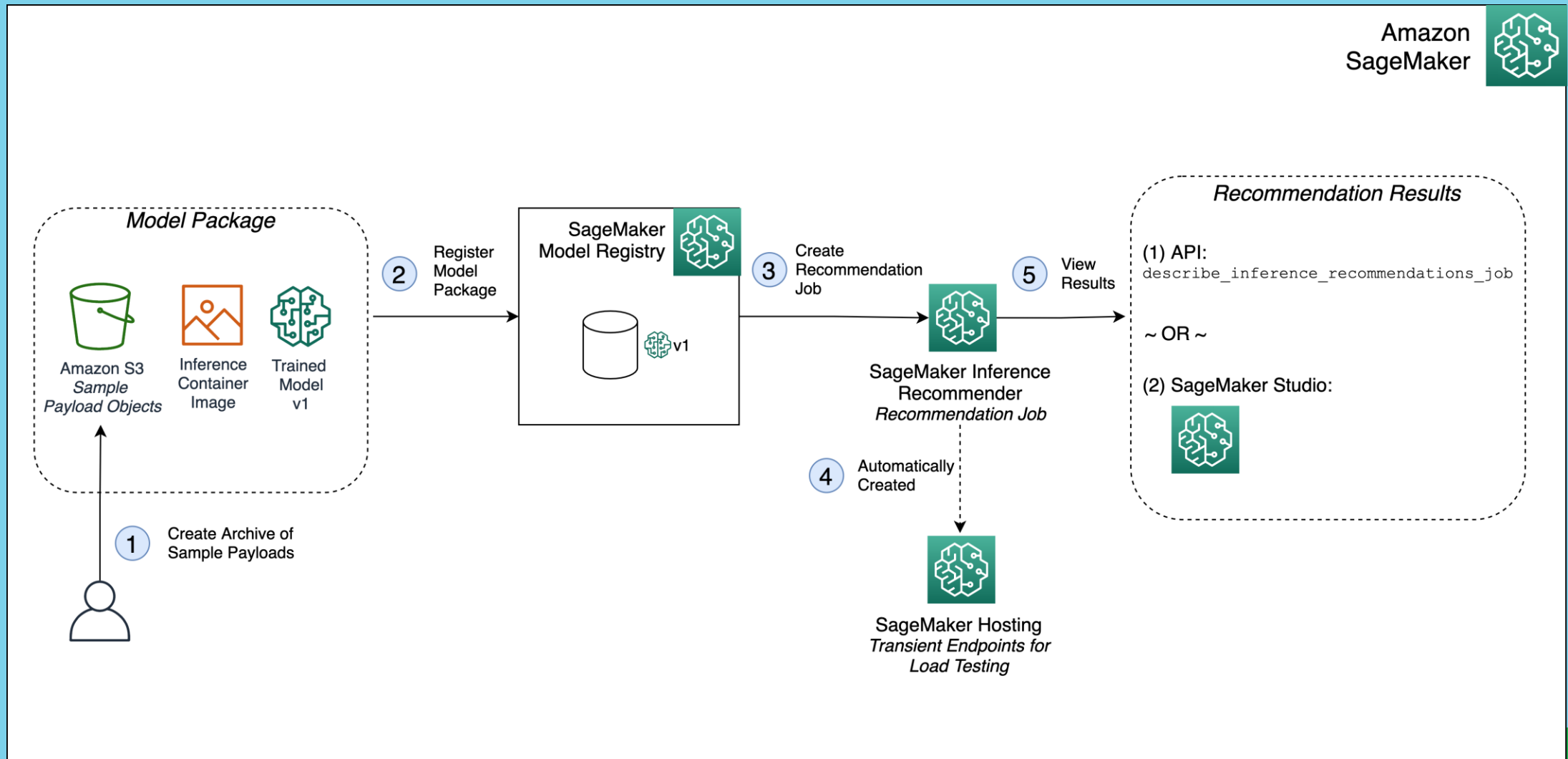
70+ options across 22 regions

General Purpose		.large	.2xlarge	.12xlarge	.24xlarge
	t2	2 vCPU 4 GiB	8 vCPU 32 GiB		
	m5	2 vCPU 8 GiB	8 vCPU 32 GiB	48 vCPU 192 GiB	96 vCPU 384 GiB
	m5d	2 vCPU 8 GiB	8 vCPU 32 GiB	48 vCPU 192 GiB	96 vCPU 384 GiB
Compute Optimized				.9xlarge	.18xlarge
	c5	2 vCPU 4 GiB	4 vCPU 8 GiB	36 vCPU 72 GiB	72 vCPU 144 GiB
	c5d	2 vCPU 4 GiB	8 vCPU 16 GiB	36 vCPU 72 GiB	72 vCPU 144 GiB
				.16xlarge	.24xlarge
Accelerated Computing	p3		8 vCPU 61 GiB	64 vCPU 488 GiB	
	g4dn	4 vCPU 16 GiB	8 vCPU 32 GiB	64 vCPU 258 GiB	
	inf1	4 vCPU 8 GiB	8 vCPU 16 GiB		96 vCPU 192 GiB

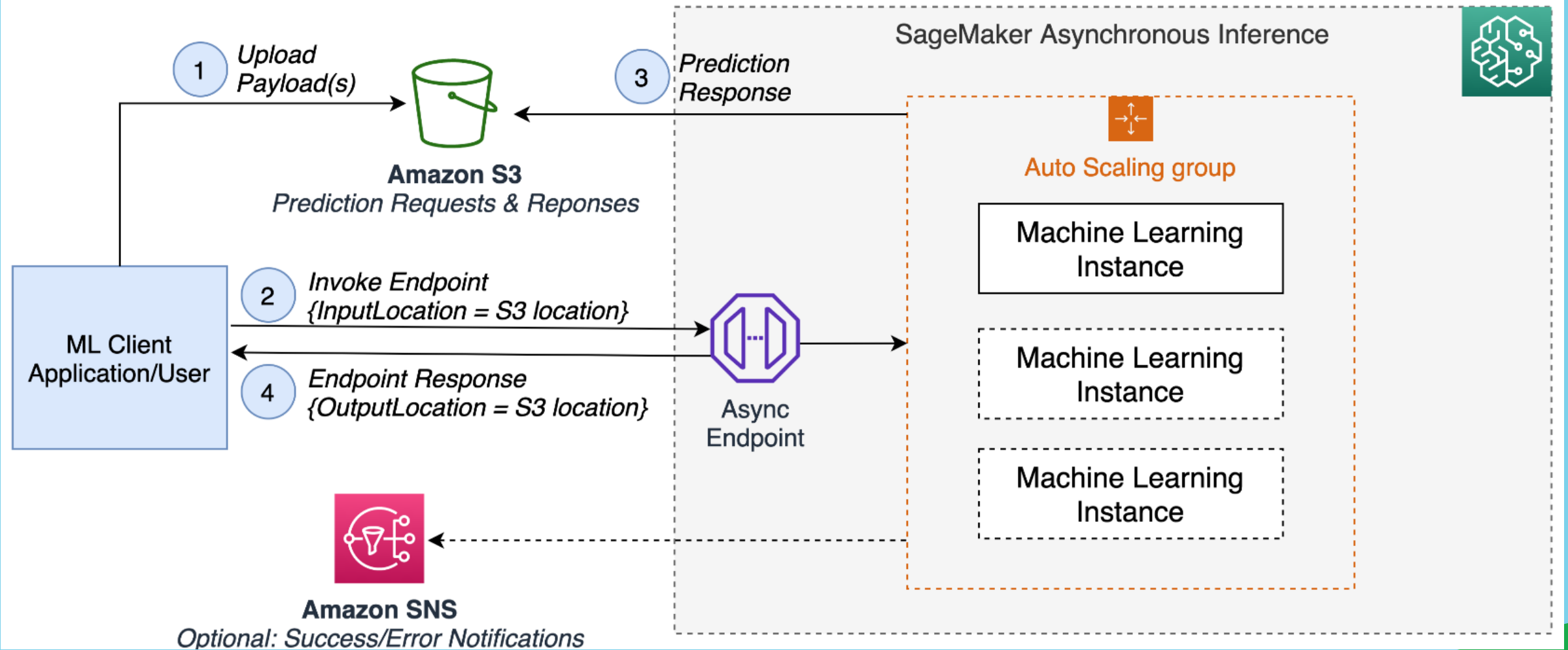
Announcing SageMaker Inference Recommender

re:Invent 2021

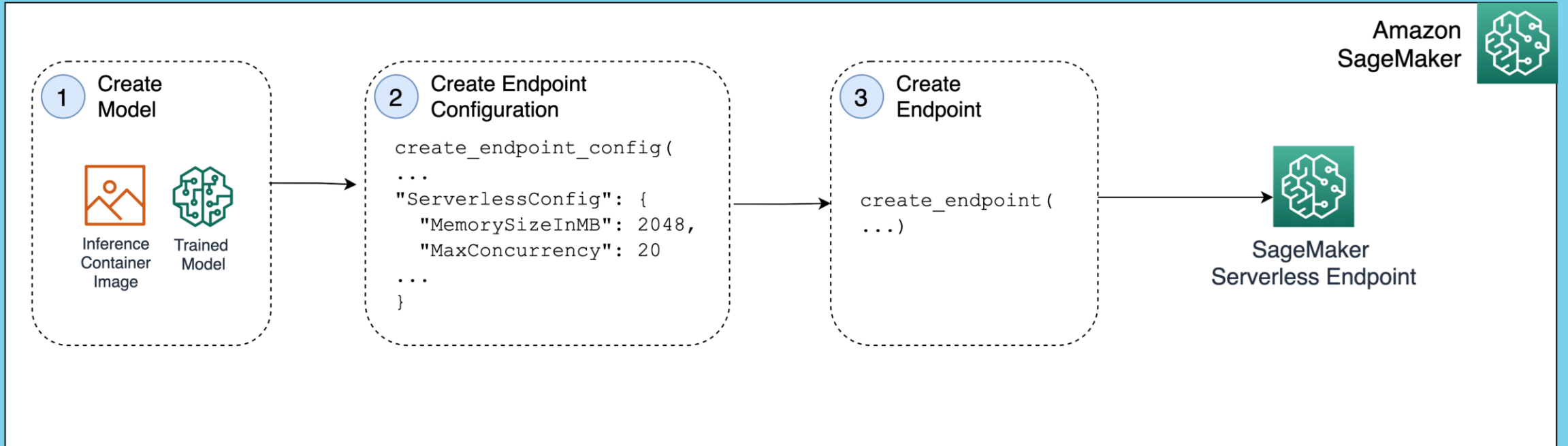
Amazon
SageMaker



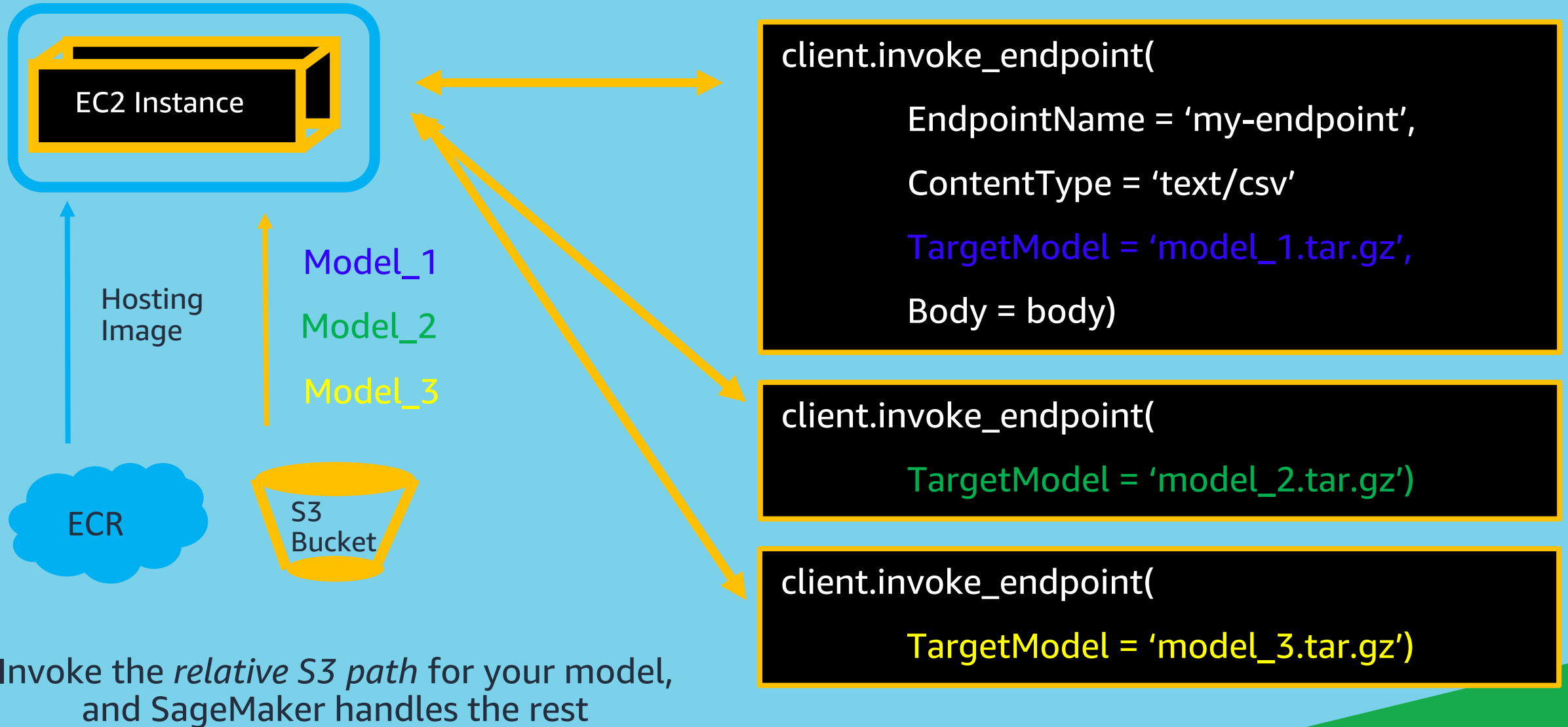
Asynchronous inference with SageMaker



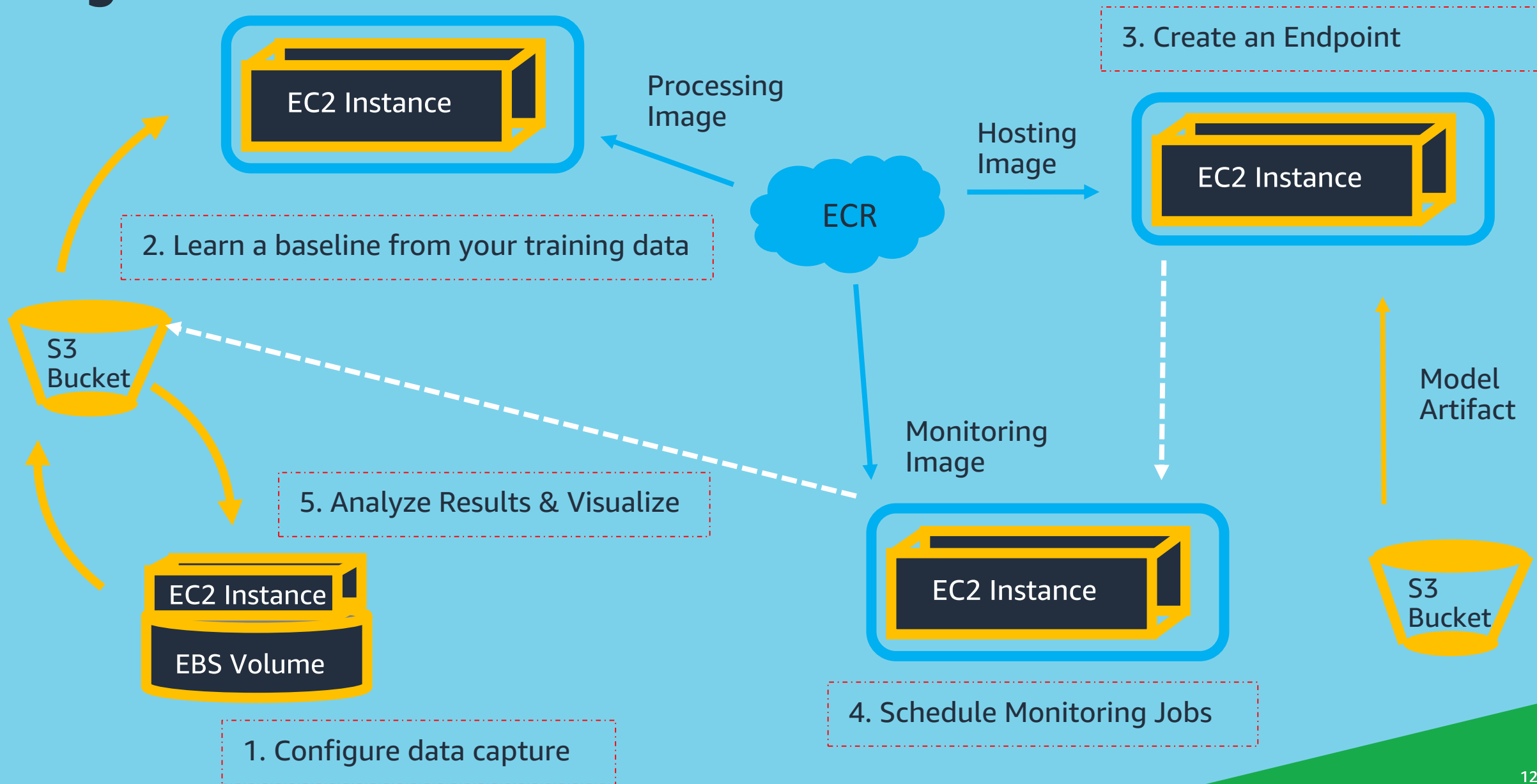
Serverless inference with SageMaker



Serve thousands of models with Multi-Model Endpoints



SageMaker Model Monitor



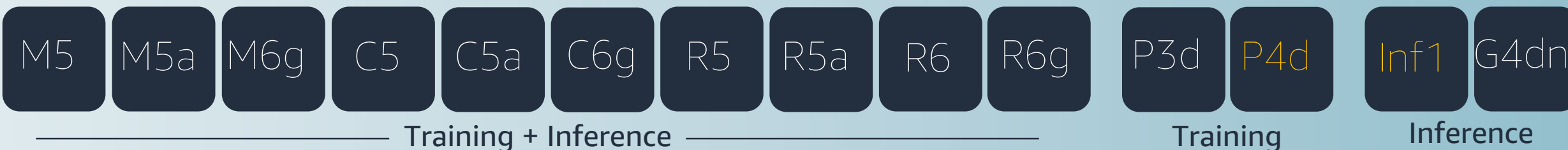
Create inference pipelines with SageMaker Pipeline Models



Create up to 5 containers, and connect these by creating a *Pipeline Model*.
Run this on both endpoints and batch transform. This is how Autopilot deploys!

```
scikit_learn_inference_model = sklearn_preprocessor.create_model()  
linear_learner_model = ll_estimator.create_model()  
  
model_name = 'inference-pipeline-' + timestamp_prefix  
endpoint_name = 'inference-pipeline-ep-' + timestamp_prefix  
sm_model = PipelineModel(  
    name=model_name,  
    role=role,  
    models=[  
        scikit_learn_inference_model,  
        linear_learner_model])
```

Drive down cost per inference with accelerators



AWS Inferentia

45% lower cost performance
30% higher throughput
Runs billions of Alexa inferences 25% faster

AWS Trainium

Most teraflops of any ML instance in the cloud
Same Neuron SDK as Inferentia
Available in 2022 as EC2 and SageMaker instances

Fastest training times on Mask-RCNN and T5-3B



Mask-RCNN
From 28 min to
6 min, 13 sec



T5-3B
From weeks to
5.9 days

Train and deploy 26k+ Hugging Face models on SageMaker

```
from sagemaker.huggingface import HuggingFace

huggingface_estimator = HuggingFace(
    entry_point='run_summarization.py',
    source_dir='./examples/pytorch/summarization',
    git_config=git_config,
    instance_type='ml.p3dn.24xlarge',
    instance_count=2,
    transformers_version='4.6',
    pytorch_version='1.7',
    py_version='py36',
    role=role,
    hyperparameters = hyperparameters,
    distribution = distribution
)

huggingface_estimator.fit()
```

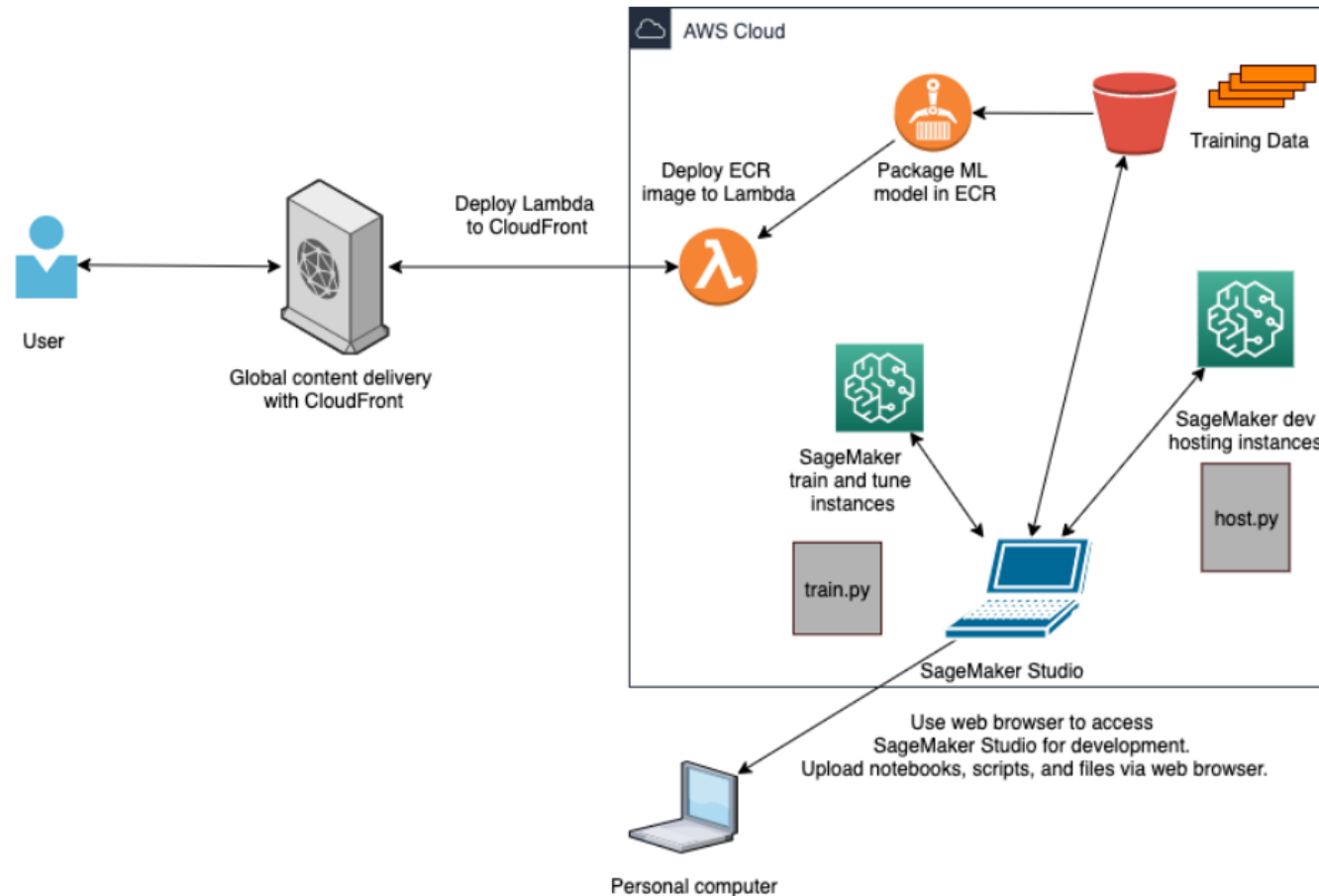
- ✓ Built-in integration with SageMaker distributed libraries
- ✓ Default to latest versions of frameworks
- ✓ Customize with any packages / software you prefer
- ✓ Config generation for hundreds of supported models



 [huggingface / transformers](https://huggingface.co/transformers)

Hybrid ML patterns for deployment

Host ML Models with Lambda at Edge to applications on-premises



Demo



Thank you!