



CUDA Python Top 5

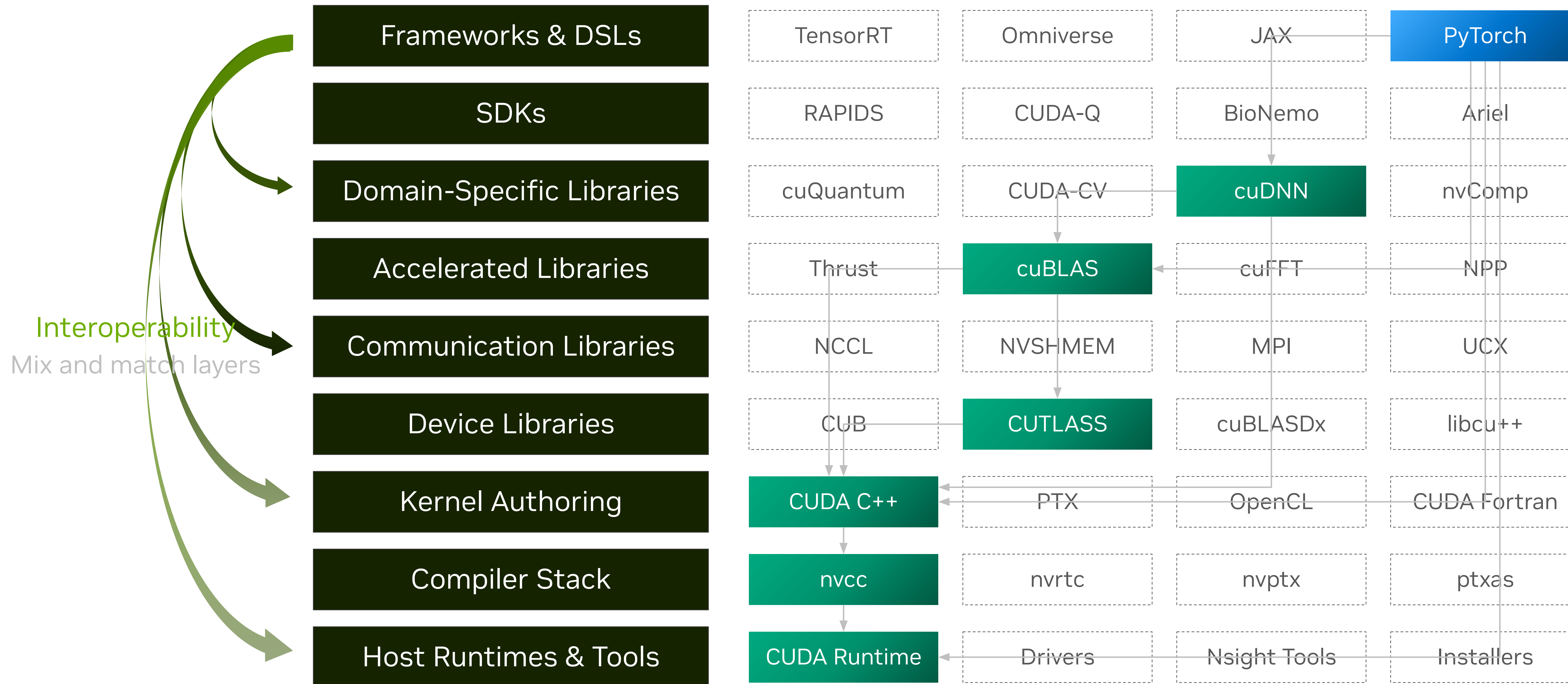
Andy Terrel, CUDA Python Product Lead
Wheel Next Summit
May 21, 2025

CUDA is a platform, with many pieces

	CUDA Python				
Frameworks & DSLs	TensorRT	Omniverse	TensorRT	Omniverse	Warp
SDKs	RAPIDS	CUDA-Q	RAPIDS	CUDA-Q	Holoscan
Domain-Specific Libraries	cuQuantum	CUDA-CV	cuPyNumeric	cuDNN-python	...
Accelerated Libraries	Thrust	cuBLAS	cuda.parallel	nvmath-python	...
Communication Libraries	NCCL	NVSHMEM	mpi4py	nvshmem4py	...
Device Libraries	CUB	CUTLASS	cuda.cooperative	nvmath-python	...
Kernel Authoring	CUDA C++	PTX	numba-cuda	cuTile	CUTLASS
Compiler Stack	nvcc	nVRTC	nvptx	ptxas	...
Host Runtimes & Tools	CUDA Runtime	Drivers	cuda.bindings	cuda.core	Nsight Tools

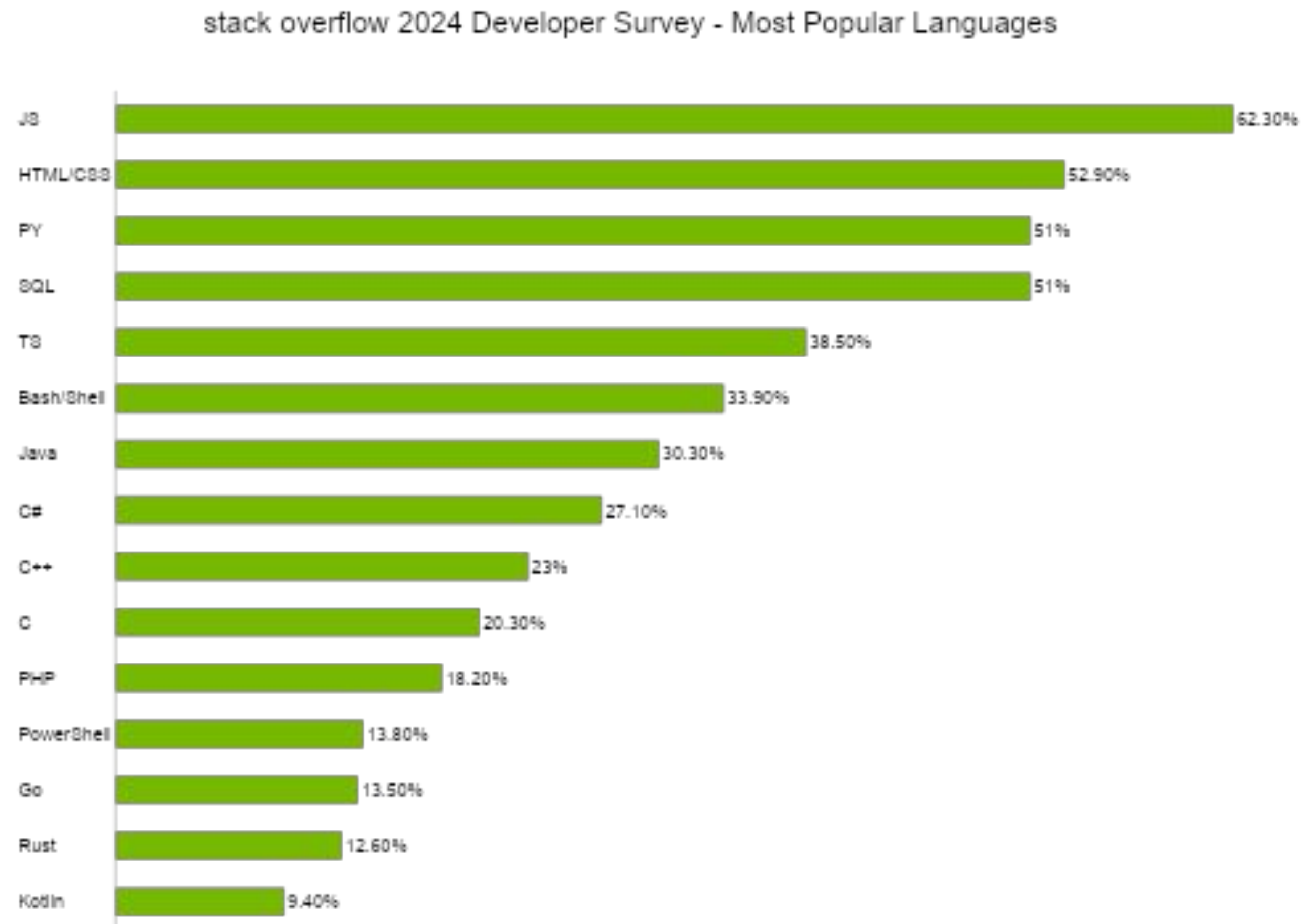
Interoperability is What Makes CUDA a Platform

Use the right tools for the job you need to do



Python Powers the Innovation of the World

By making a vendor neutral universe, we have more opportunities to interact with users



CUDA Developers Already Using CUDA Directly

6 M

NVIDIA Python Packages: Downloads for 2024
*PyPi

1.2 B

CUDA Python

Top 5 things

- Promoting the scientific computing and machine/deep learning needs within the Python OSS community
 - We represent a tiny fraction of the number of packages
 - We have a harder installation story with more exotic deployment
- Focus on reducing the size of packages
 - Shared library support
 - Symlinks for consistent OS experience
- Allow packages to support specialize hardware
 - Just in time compiler support
 - Detection of hardware at install time
- Variants for supporting different versions of the tool chain
 - Compiler stacks are very often incompatible
 - Communication stacks add another layer incompatibilities
- Better UX for alternative indexes
 - --extra-index is nondeterministic
 - Names from one index to the other lead to security vulnerabilities

What to achieve

Top 5 things

- PEPs that we are willing to go to the wider community with and promote
- Implementations that show the community this is not an impossible problem to solve
- Participation from all in helping make sure Python Software infrastructure can remain alive and healthy

