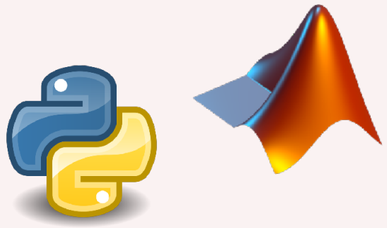
Introduction to Julia for High-Performance Computing

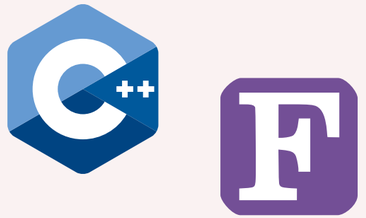
Carsten Bauer @ TU Delft

October 15, 2024

Convenience

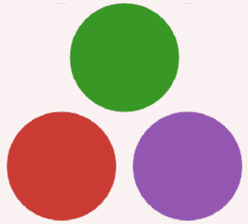


Performance

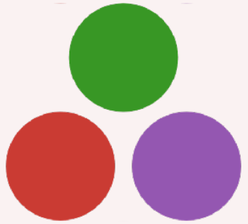


Language Barrier

Convenience



Performance



Gradual transition

	Tuesday	Wednesday	Thursday	Friday
	Foundations	**Core**	**Node**	**Cluster**
09:00 - 10:45	Getting Started	Type & Memory Optimizations	Multithreading	Distributed Computing
10:45 - 11:00	Break	Break	Break	Break
11:00 - 12:30	Fundamentals Exercises	Exercises	Exercises	Exercises
12:30 - 14:00	Lunch	Lunch	Lunch	Lunch
14:00 - 15:30	Compilation	SIMD	GPU Computing	Profiling
15:30 - 15:45	Break	Break	Break	Outro
15:45 - 17:00	Exercises	Exercises	Exercises	

Quick Live Survey

Julia’s Weaknesses

HPC with Julia is currently a niche.

Achieving
high performance
can be tricky.

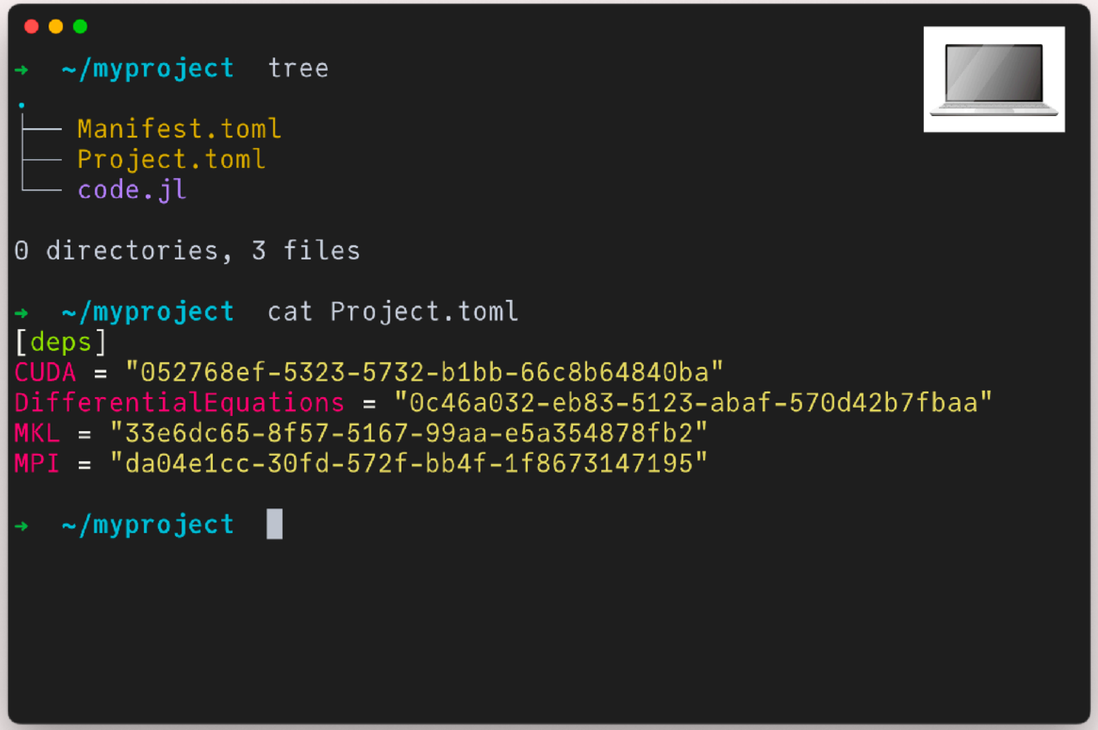
No great way to produce (small) binaries.

Julia's Strengths

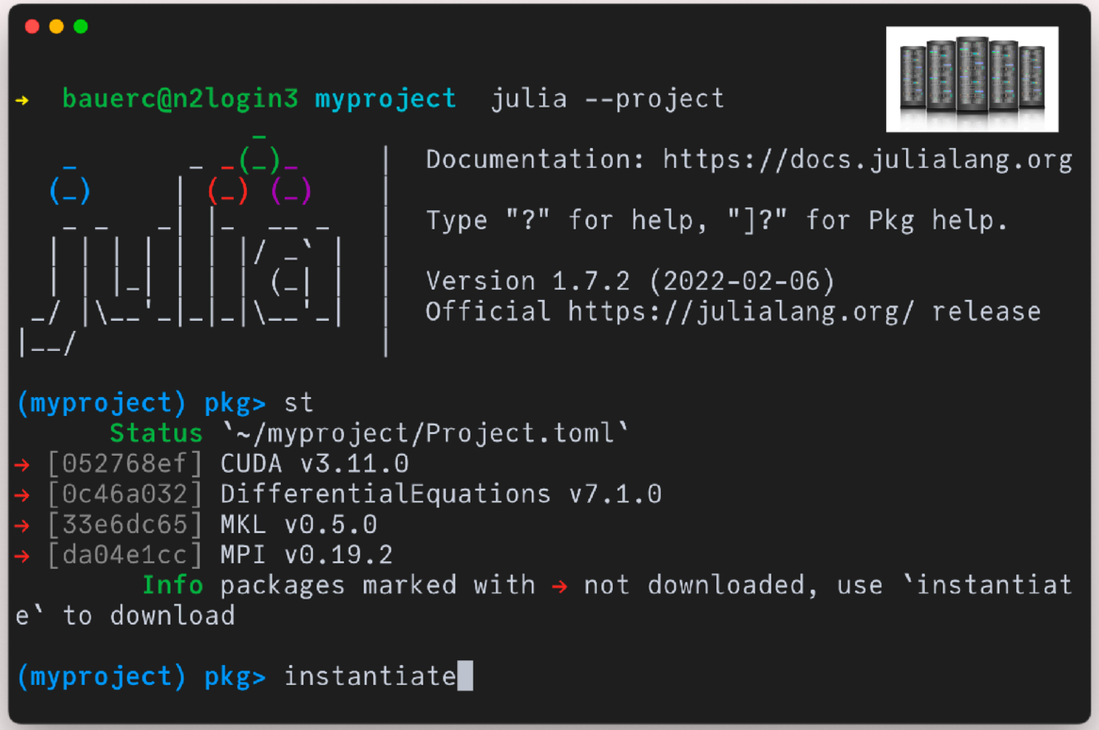
Julia is interactive and convenient.

Julia has a great package manager

Laptop

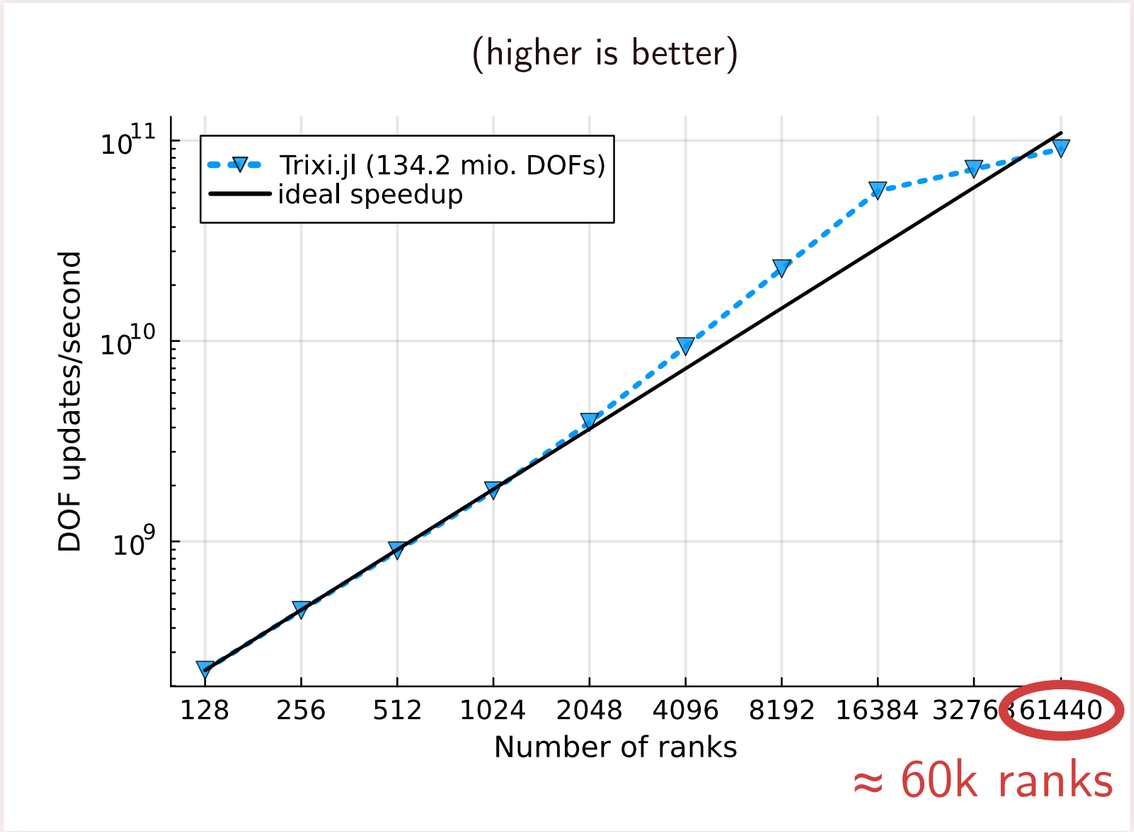


HPC Cluster

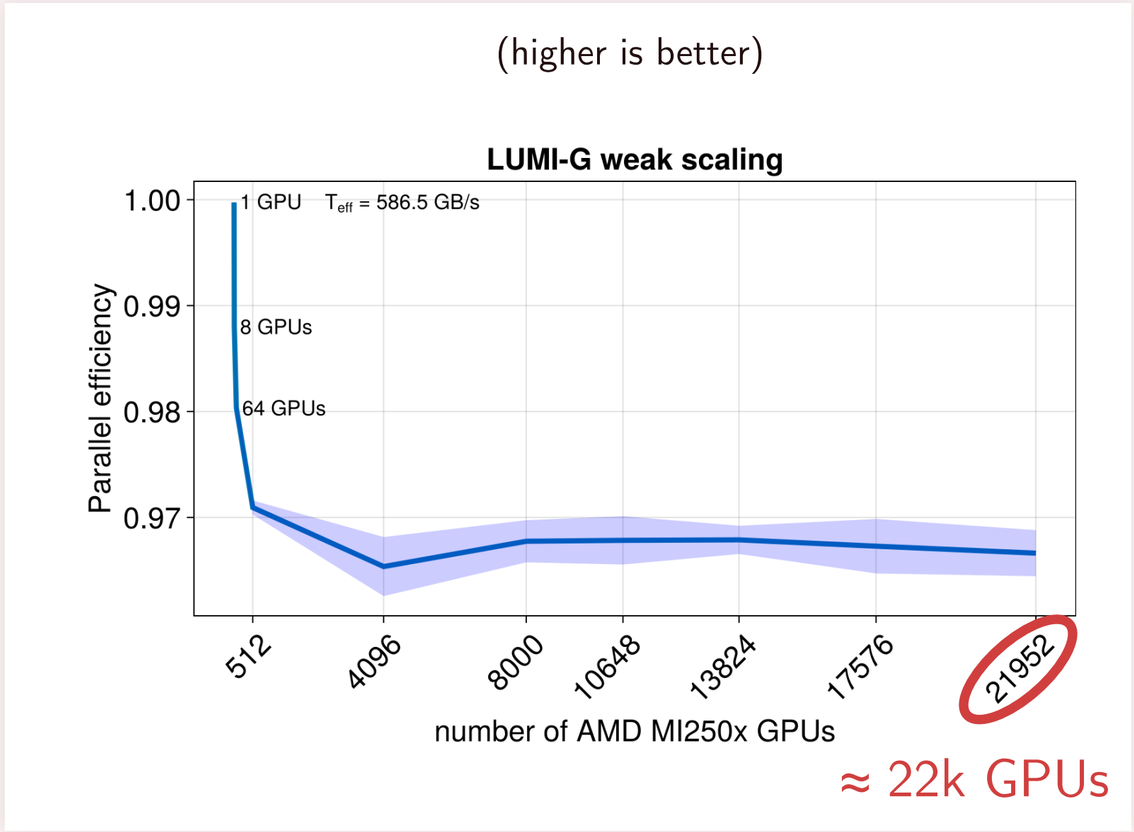


Julia code can be
fast and scalable.

Example: Good scaling of PDE codes



Trixi.jl (Multi-CPU)



ParallelStencil.jl (Multi-GPU)

HPC with Julia is currently a niche! 👍

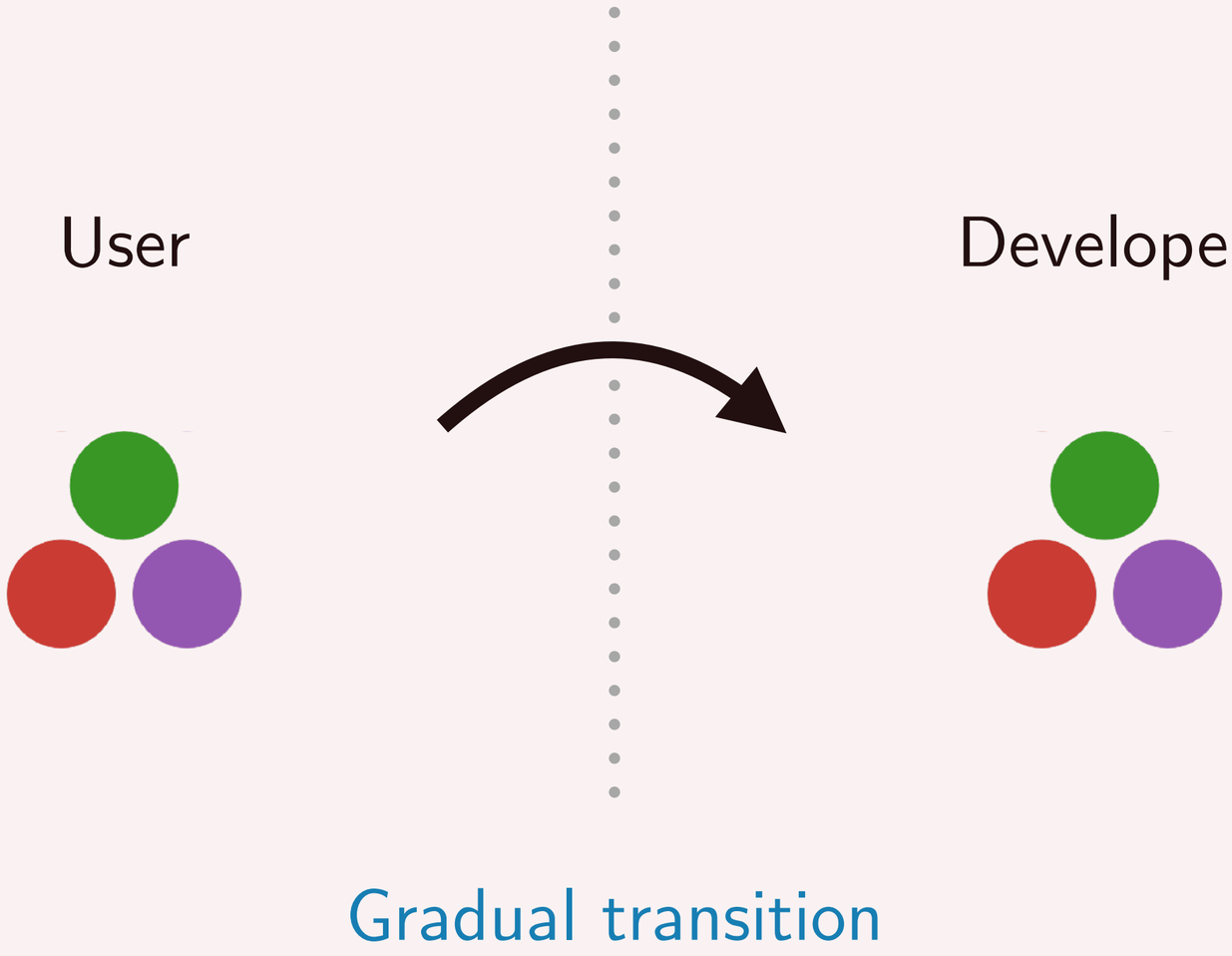
Join us at conferences ...

... or in our monthly Zoom call

(open to everyone!)

Julia invites you to gradually delve deeper.

Julia makes it easier to become a developer.



Let us delve deeper!