LAPP
Laboratoire d'Annecy de Physique des Particules

Plantage du décor

Pierre Aubert

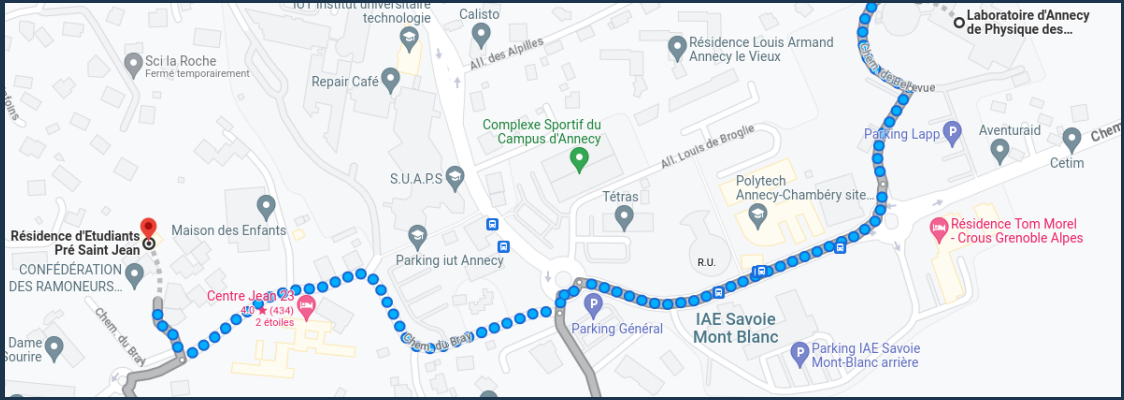
ESCAPE

cta
cherenkov telescope array

cnrs

UNIVERSITÉ SAVOIE MONT BLANC

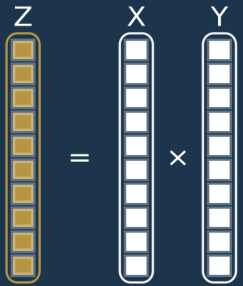
Introduction



Simple Examples

Simple Examples

Hadamard Product



Simple Examples

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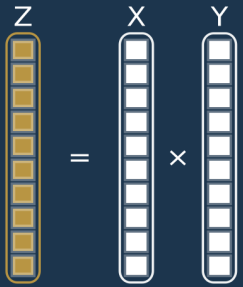
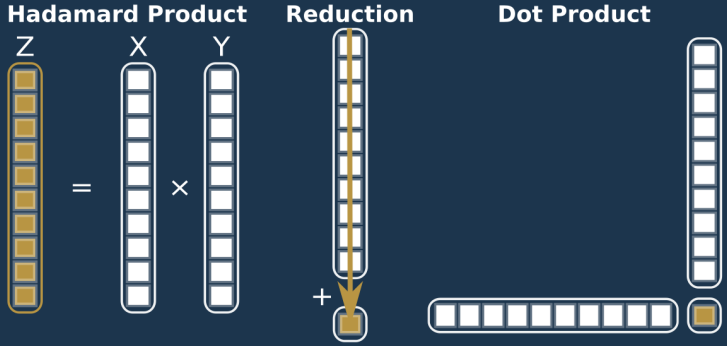


Reduction

Simple Examples



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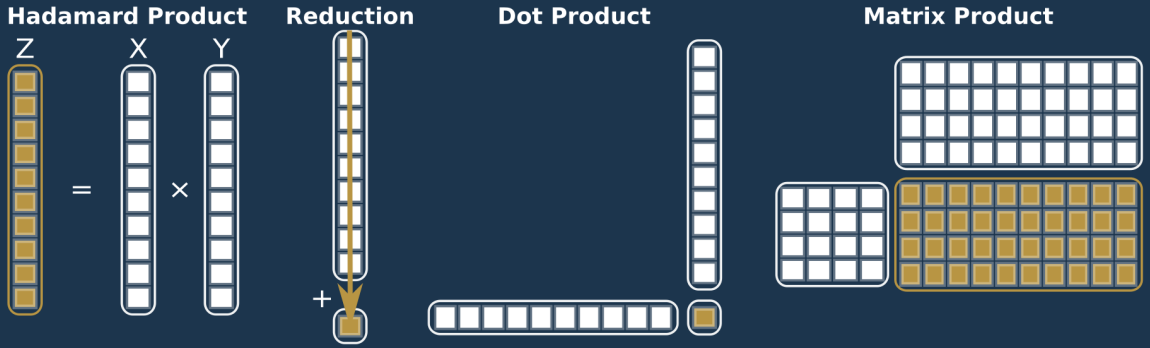

Simple Examples

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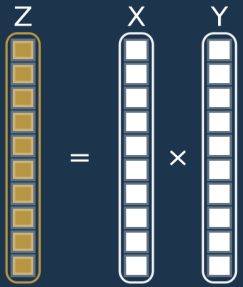
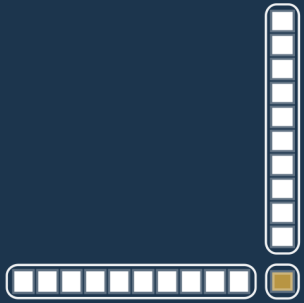
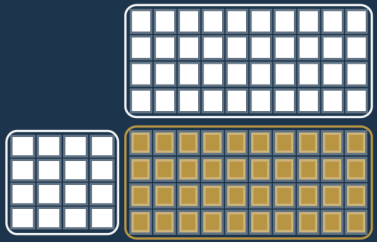


Reduction

Dot Product



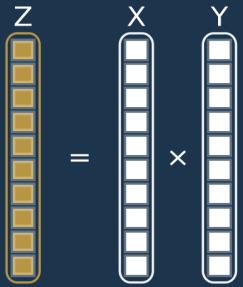
Matrix Product



MKL

Simple Examples

Hadamard Product



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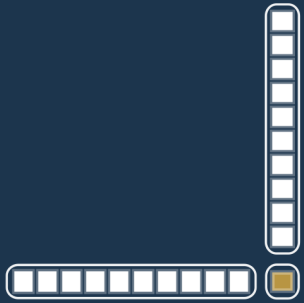

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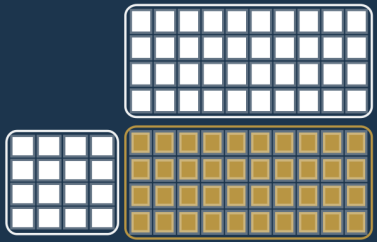
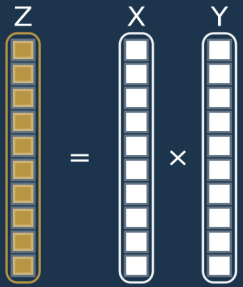


MKL

Eigen

Simple Examples

Hadamard Product



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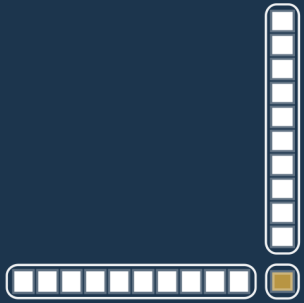

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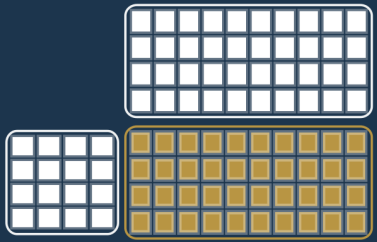

MKL

Eigen

Armadillo

Simple Examples

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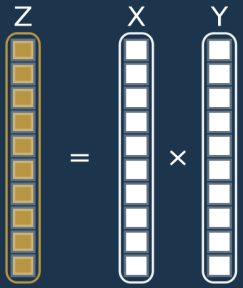

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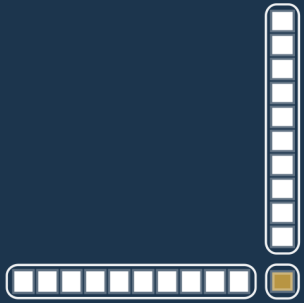

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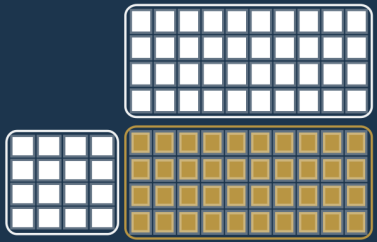

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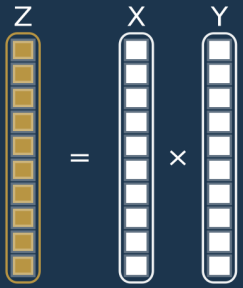

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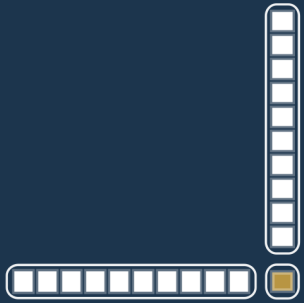

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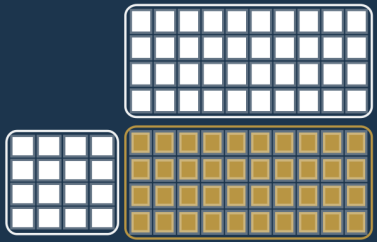

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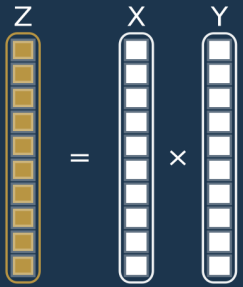

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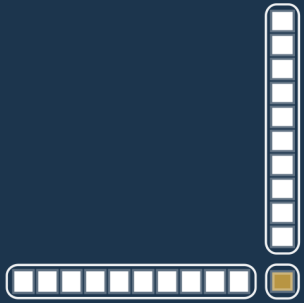

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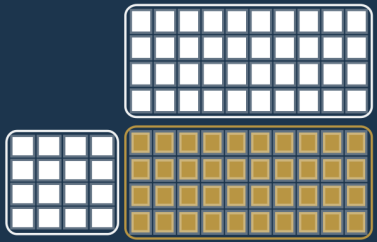

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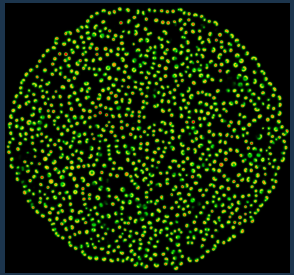
School computing example

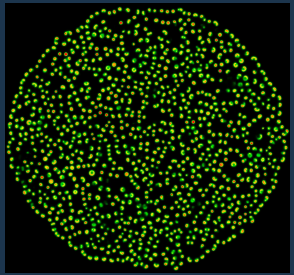
Gray Scott reaction (a chemistry game of life)



School computing example

Gray Scott reaction (a chemistry game of life)

$$U + 2V \longrightarrow 3V$$
$$V \longrightarrow P$$



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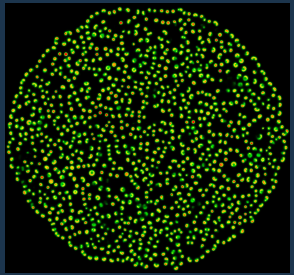

Computing :

$$\begin{aligned} U + 2V &\longrightarrow 3V \\ V &\longrightarrow P \end{aligned}$$

$$\begin{aligned} \frac{\partial u}{\partial t} &= r_u \nabla^2 u - uv^2 + f_r \times (1 - u) \\ \frac{\partial v}{\partial t} &= r_v \nabla^2 v + uv^2 - (f_r + k_r) \times v \end{aligned}$$

- u and v are concentration of product **U** and **V**
- r_u and r_v diffusion rate of **U** and **V**
- k_r (**Kill Rate**), conversion rate from **V** to **P**
- f_r (**Feed Rate**), speed of process which feed **U** and kills **V** and **P**
- $\nabla^2 u$ and $\nabla^2 v$ are différence of space concentration between current cell and its neighbours

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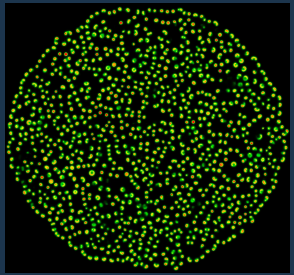

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- Easy to understand
- Not so easy for the compiler
- Possibility of high speed up

Languages / Technos

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Fortran

Languages / Technos

Fortran

Languages / Technos

Fortran

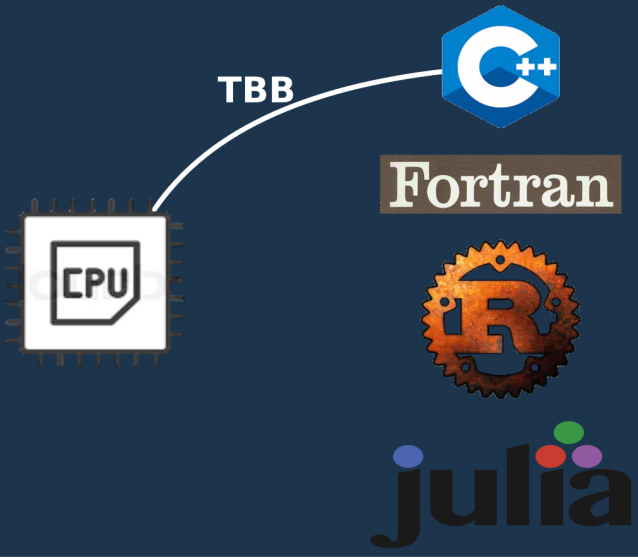
julia

Languages / Technos

Fortran

julia

Languages / Technos



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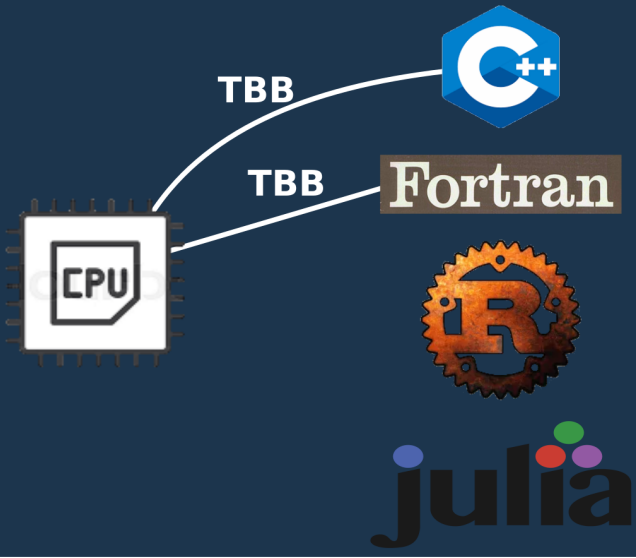

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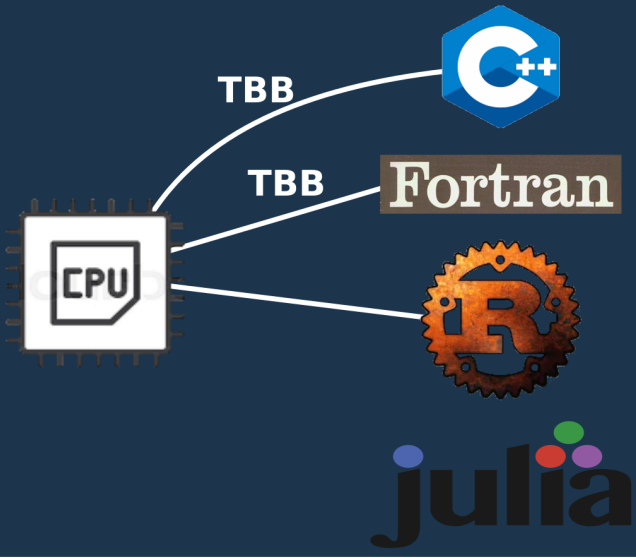

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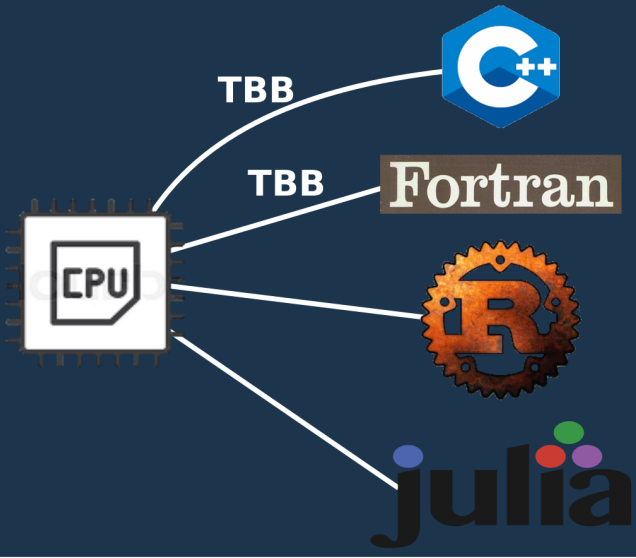

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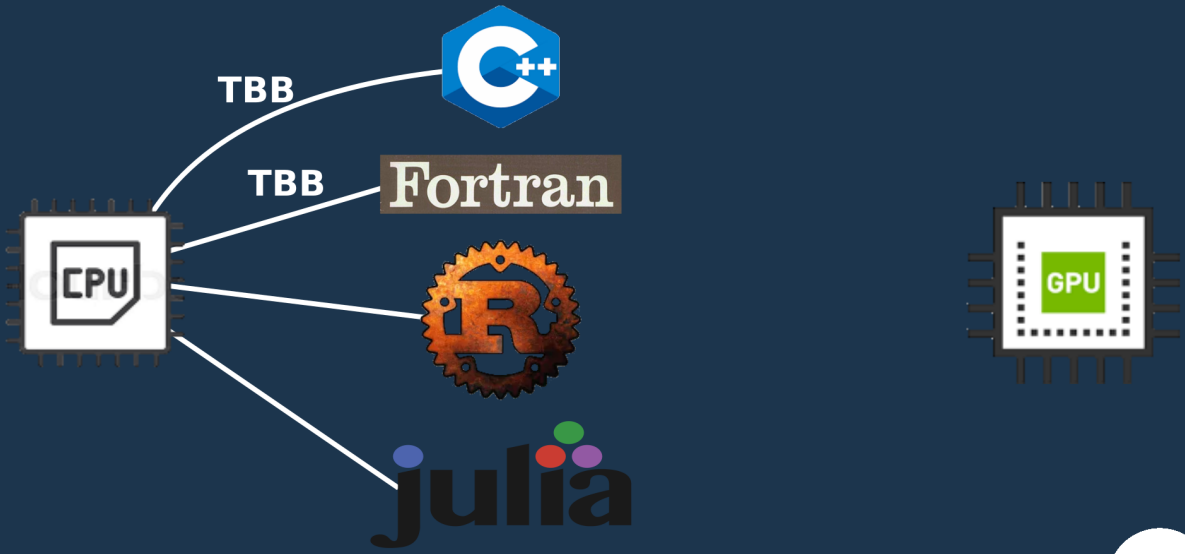
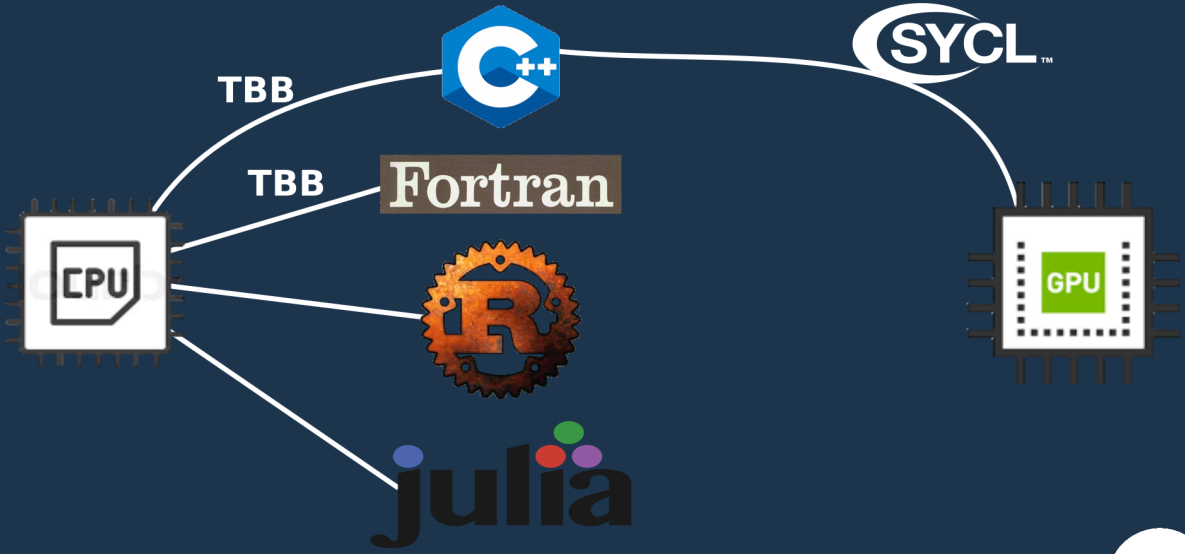
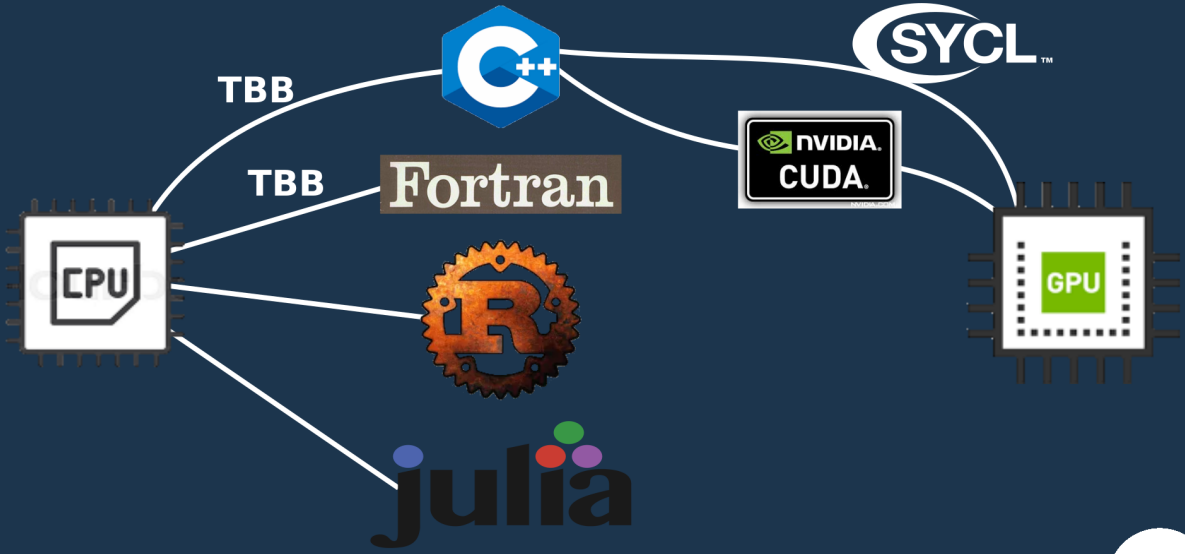


Languages / Technos



Languages / Technos



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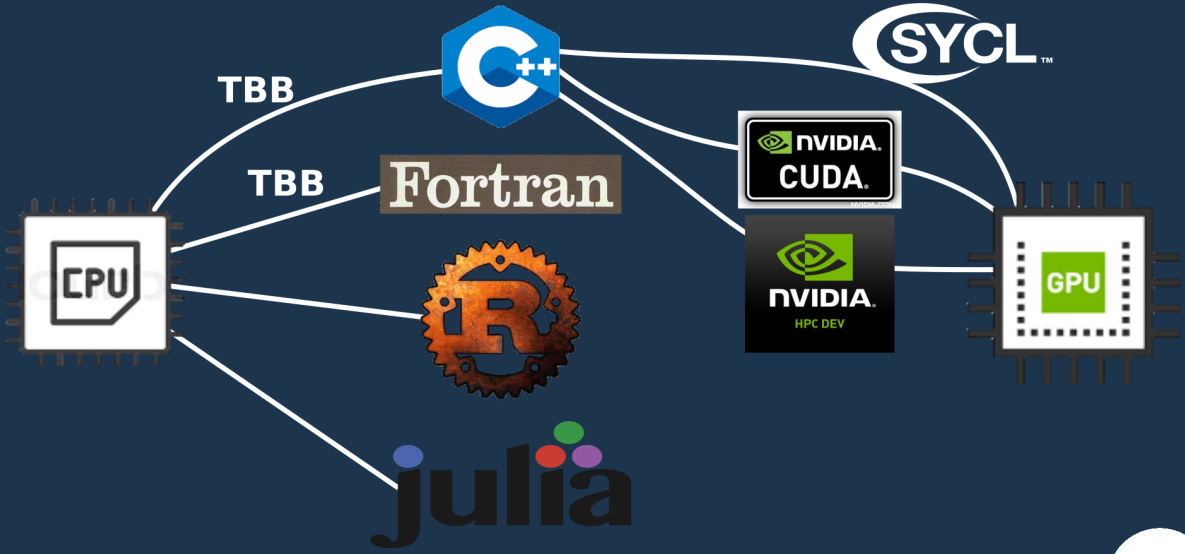

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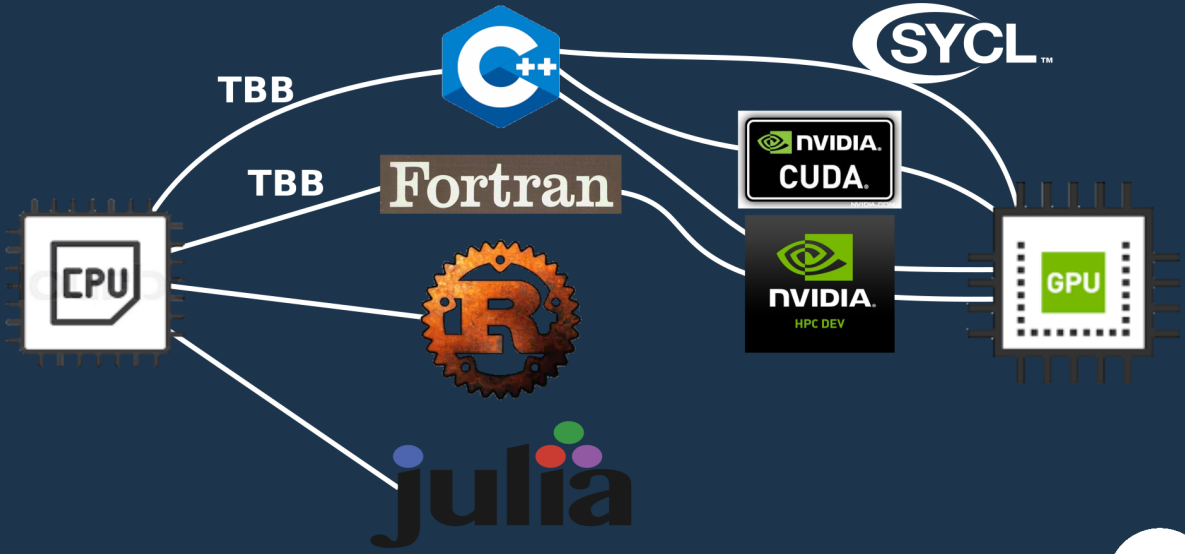

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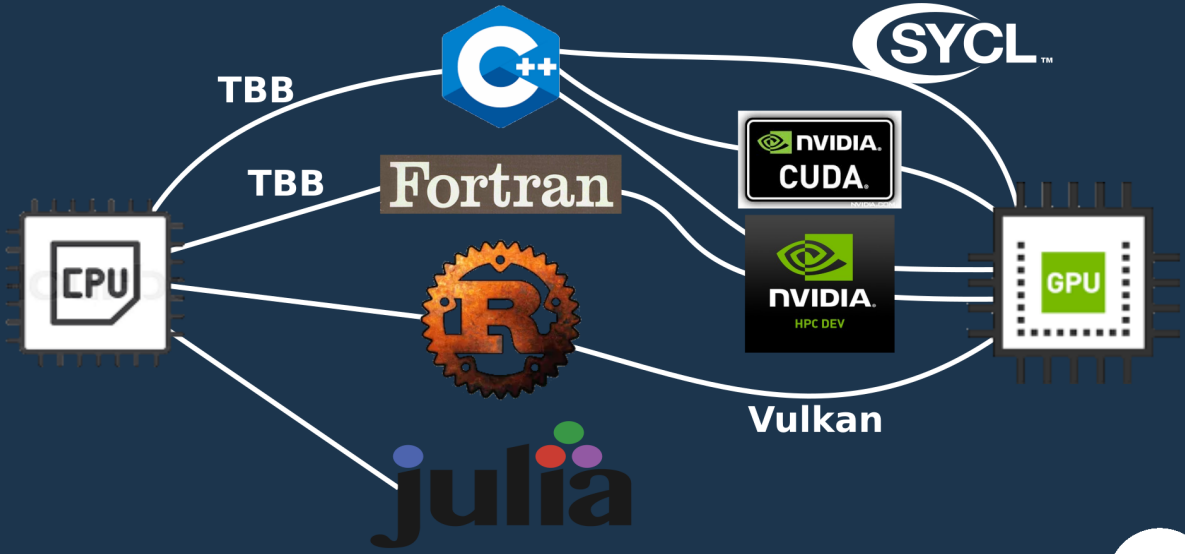

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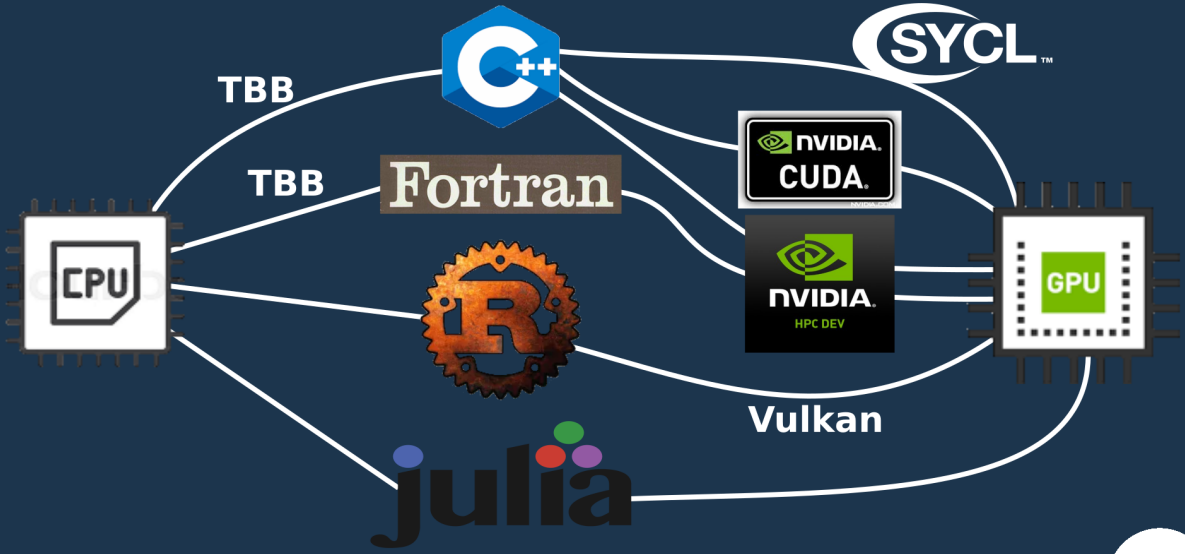
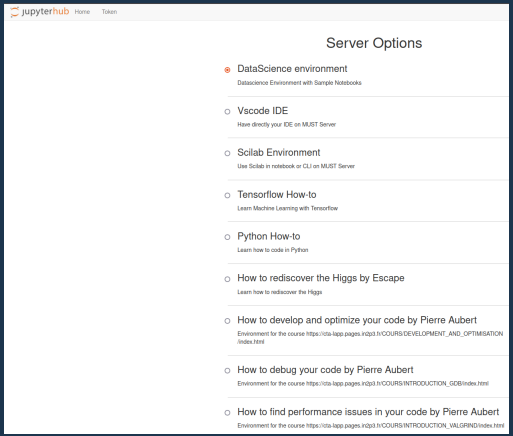


GPU MUST

	K80	P6000	T4	V100	A100	A100 80GB
TFlops (float)	8.73 (boost)	12.6	8.1	14	19.5	19.5
Memory (GB)	11.441 (24)	24	15	16	40	80
Nb Cuda Cores	2496 (4992)	3840	2560	5120	6912	2688
Clock rate (GHz)	0.824	1.645	1.590	1.380	1.410	1.410
Generation	3.7	6.1	7.5	7.0	8.0	8.0

MUST Services

https://jupyter.must-dc.cloud/hub/



HTCondor Software Suite

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