RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

FRANCE 2030 PROGRAMME DE RECHERCHE CLIMAT

cnrs

METEO FRANCE
À VOS CÔTÉS, DANS UN CLIMAT QUI CHANGE

Secrétariat général pour l'investissement

anr

WGNE39 + WGNE/WGSIP Joint Meeting | Toulouse, 4 Nov 2024

FRANCE 2030 PROGRAMME DE RECHERCHE CLIMAT

COMputing PAradigms towards efficient, modular and trainable Climate Models

Julien Le Sommer

with : S. Valcke, Y. Meurdesoif, T. Dubos, P. Rampal

Specific drivers for COMPACT project

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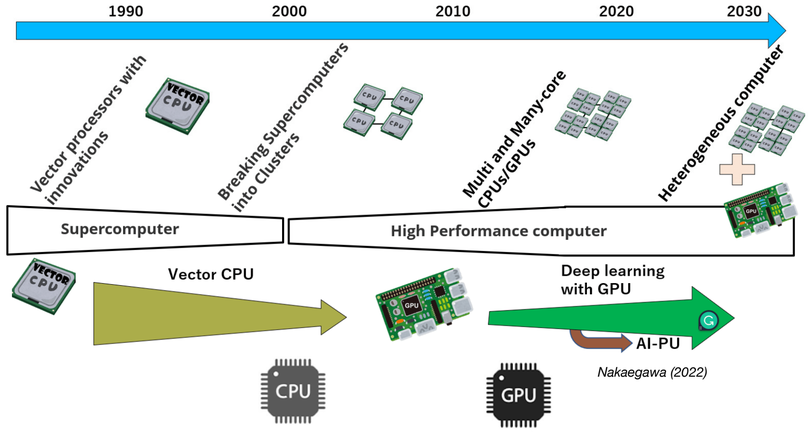
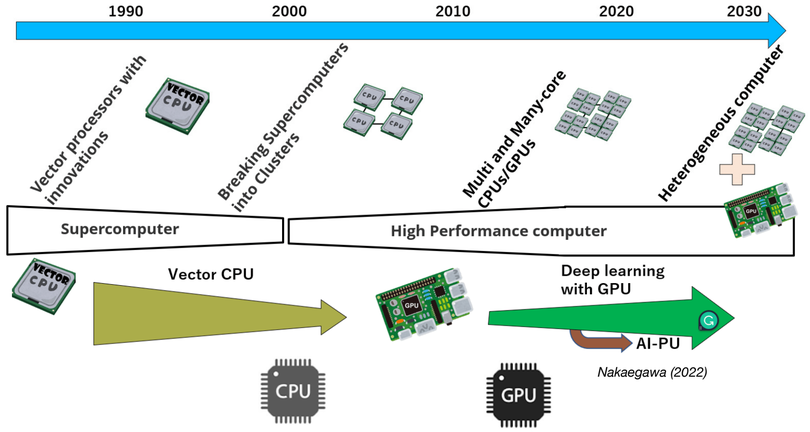


Heterogeneous computing architectures

Specific drivers for COMPACT project

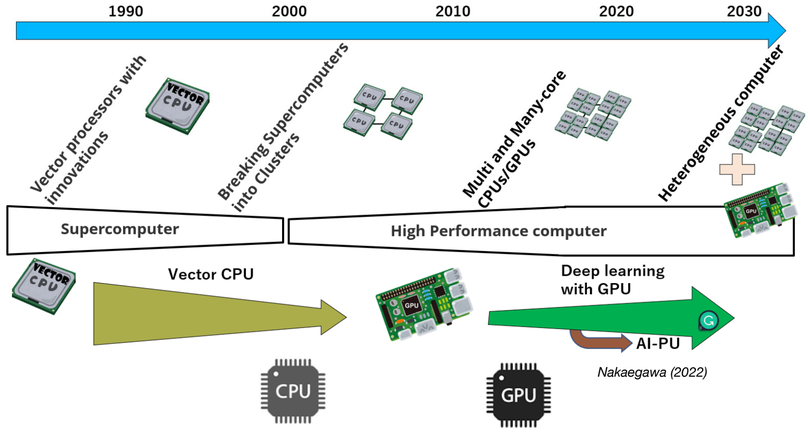


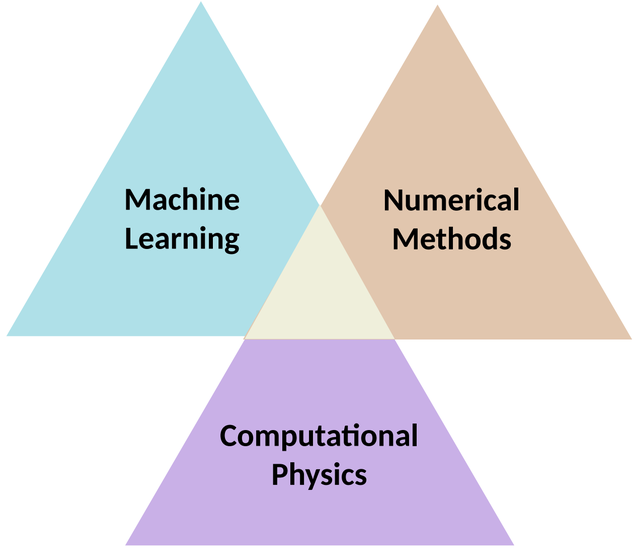
Nakaegawa (2022)

Heterogeneous computing architectures

New usages of models with climate services

Specific drivers for COMPACT project



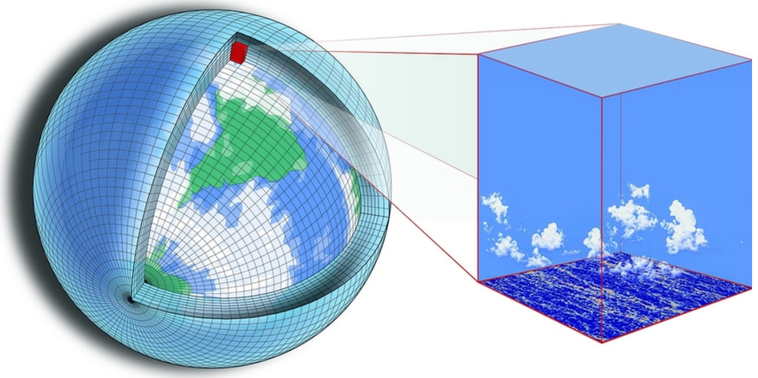


Heterogeneous computing architectures

Emerging paradigms in scientific computing

New usages of models with climate services

Ambition and positioning of COMPACT



ESMs as software systems

Ambition and positioning of COMPACT

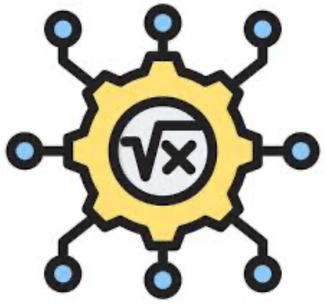
ESMs as software systems

Ambition and positioning of COMPACT

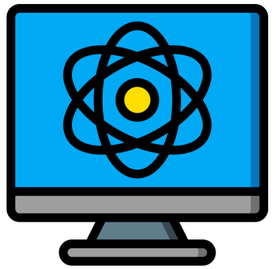
ESMs as software systems

- gradual evolution of systems
  - long term engineer positions
- higher risk / reward activities
  - through PhDs / research projects

Ambition and positioning of COMPACT



Applied maths



Computer science

evidence / science based decisions

ESMs as software systems

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Ambition and positioning of COMPACT

ESMs as software systems

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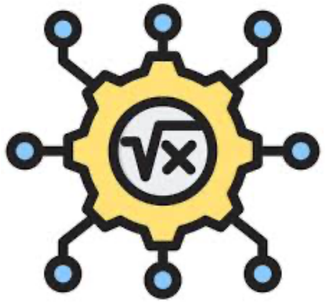

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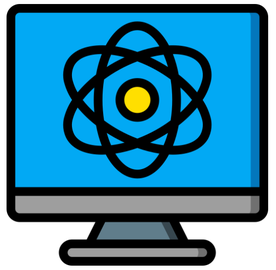


Computer science

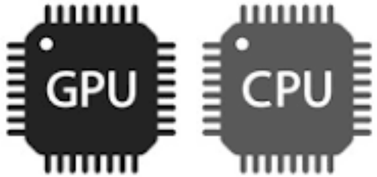
evidence / science based decisions

community / open science driven

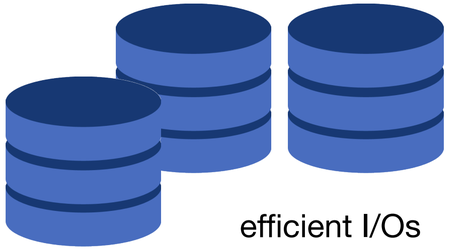
software carpentry

A 8-years roadmap

A 8-years roadmap



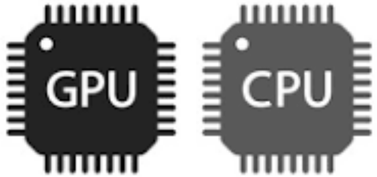
porting codes to GPUs



efficient I/Os

Computational **efficiency**
and portability

A 8-years roadmap



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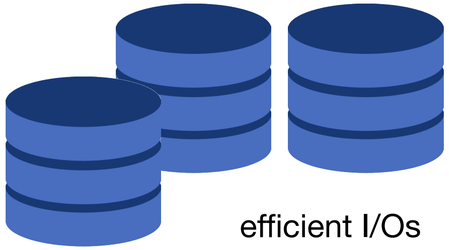


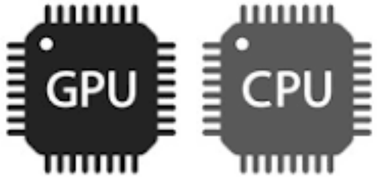
efficient I/Os

Computational **efficiency** and portability

internal interfaces
across subcomponents

Modularity, APIs and system-wide design

A 8-years roadmap



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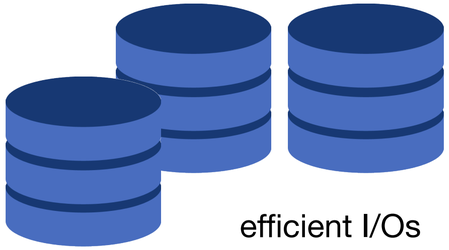

efficient I/Os

Computational **efficiency** and portability

internal interfaces
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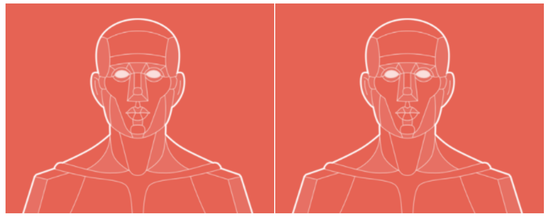
Modularity, APIs and system-wide design

protocols for online inference



neural emulation of components

AI-readiness, emulation and differentiability