



## **Crossing the Chasm: How to develop weather and climate models for next generation computers?**

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Weather and climate models are complex agglomerations of software, next generation computers are complex agglomerations of hardware. The pieces of these agglomerations all develop under high pressure, mostly rather independent of each other. On the hardware side diversity is rising, performance increases can only be gained by playing with this rise, and with „broader“ machines, mandating to master communication issues. On the software side complexity is rising, as is the hunger for more performance/extreme resolution.

This combination of challenges poses the very real possibility that weather and climate modelling has already arrived or will arrive very shortly at a chasm which will separate scientific aspiration from our ability to develop and/or rapidly adapt codes to the available hardware.

In the presentation we will

- illuminate the problem,
- propose approaches to bridge the chasm by describing current progress in addressing some of the tools available,
- discuss that the existing method of incremental model improvements employing small steps which adjust to the changing hardware environment is likely to be inadequate for crossing the chasm,
- outline a methodology based on large community efforts in engineering and standardisation, and
- propose that the community needs to organize the identification of common patterns in weather and climate codes as a basis for the collaborative build-up of key components like commonly needed tools, libraries or (a) domain specific language[s].