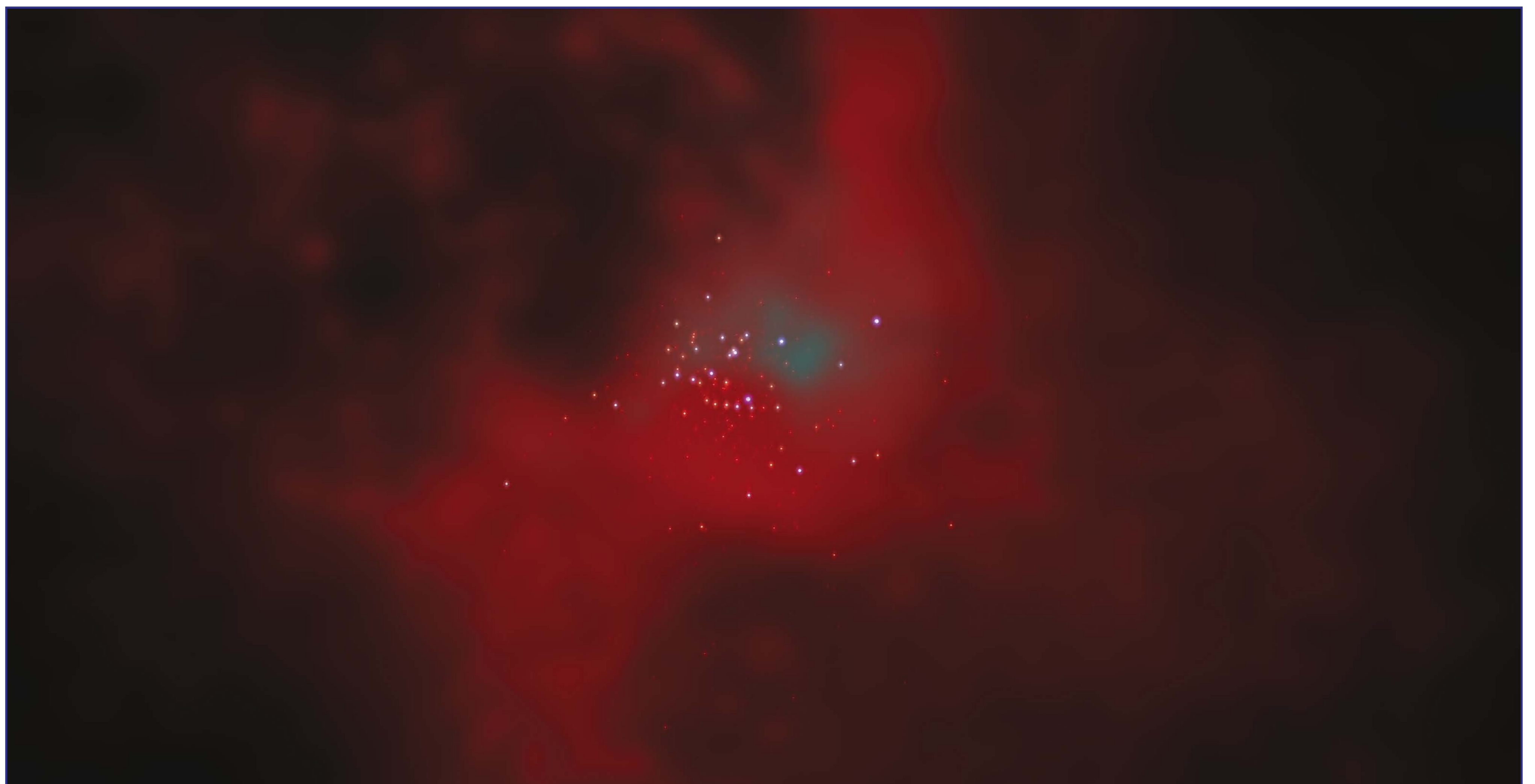


JUNGLE COMPUTING, OR: MULTI-MODEL STAR CLUSTER EVOLUTION



Many scientific problems are of such complexity that solutions are obtained only by using a wide variety of computing hardware – all at once. The concurrent use of e.g. multiple clusters, Grids, and Clouds (called 'Jungle Computing') is realized easily using the Ibis eScience software framework (www.cs.vu.nl/ibis). We demonstrate an example multi-model simulation of early star cluster evolution using the Jungle Computing paradigm.



The early evolution of star clusters in the galaxy is a multi-physics problem, with spatial scales covering 14 orders of magnitude between the smallest relevant structures and the size of a cluster. The range of physical domains (gravitational dynamics, stellar evolution, radiative transport, hydro-dynamics) renders modeling the birth of star clusters one of the biggest challenges in computational astrophysics.

Although the physical domains are all modeled effectively using the AMUSE framework (amusecode.org), gravitational dynamics is best solved using a GPU, while stellar evolution is best computed using a compute cluster (or Grid, cloud). Full simulations must therefore be performed using the Jungle Computing paradigm.

Our demonstration shows a reduced simulation (1K stars and 100K gas particles), performed live using a variety of compute resources located in The Netherlands.

