
We recommend you cite the published version.
The publisher’s URL is: http://www.climatelinc.eu/events/linc-mid-term-review-17-20-nov-potsdam/

Refereed: No

(no note)

Disclaimer

UWE has obtained warranties from all depositors as to their title in the material deposited and as to their right to deposit such material.

UWE makes no representation or warranties of commercial utility, title, or fitness for a particular purpose or any other warranty, express or implied in respect of any material deposited.

UWE makes no representation that the use of the materials will not infringe any patent, copyright, trademark or other property or proprietary rights.

UWE accepts no liability for any infringement of intellectual property rights in any material deposited but will remove such material from public view pending investigation in the event of an allegation of any such infringement.

PLEASE SCROLL DOWN FOR TEXT.
Parallel Software Package for The Construction and Analysis of Complex Networks
Hisham Ihshaish and Johan Dijkzeul
VORtech B.V. - Delft (The Netherlands)

Abstract
In climate research, big and complex networks could be generated by the big climate data produced by high resolution climate models, and also observations. To analyze such complex networks, there are two main computational challenges concerning both the construction and the analysis of these complex networks:

- the construction of the network, as such, the size of the on-chip physical memory of single processor computing machines might limit the possibility to efficiently construct such big networks.
- computational time needed to analyze complex networks stands to be another real challenge.

High-performance software tools are needed to process both steps (construction and analysis) efficient.

A description of the parallel software package which had been developed in LINC project is presented here.

Parallel software tools for network construction
Parallel processing techniques are applied to fasten the process of network construction from large sets of time series (hundreds of thousands to millions). As such, the calculation of the similarity matrix (for instance), corresponding to each node is done independently, so that the correlation of each chunk of nodes is processed in parallel.

Parallel software tools for network analysis
Igraph library was paralleled applying the shared-memory parallel programming model OpenMP. Most of the implemented algorithms in Igraph library are now parallel.