1. INTRODUCTION

Our goal with this tool is the search for a non-uniform 2D partition in order to minimize the cost of communications. For this we use as a reference the algorithm proposed by Beaumont, introducing differents modifications that we will explain below.

In addition, we will use the TauLop library, which can be found in our GitHub repository (https://github.com/hpc-unex/), in order to find the best distribution based on the estimated cost of communications offered by our T-Lop tool.

2. INSTALLATION

- Create compile data:
  - aclocal # with any option needed (such a -I m4)
  - autoconf
  - automake --add-missing
- Configure environment:
  - ./configure --prefix=<route>   --with-taulop=<libtaulop.a route>
  - make
  - make install

3. HOW TO USE

There are differents way to execute this data partitioning algorithm.

- Using part.2dist file:

```
#size 5
#N 256
#kb 32
```

#host time	rank_intra	i	j	x	y	w	h	w*h	mem
2	0	0	1	133	0	123	66	8118	0	0
0	1	3	1	133	194	123	62	7626	0	0
0	0	2	1	133	115	123	79	9717	0	0
1	1	4	0	0	199	133	31	4123	0	0
1	2	5	0	0	230	133	26	3458	0	0

To execute this option, run:

./beaumont -p input_part.2dist **-v -o** output_part.2dist **-i** part_image.gpl **-O** order

Example:

./beaumont -p part.2dist -v -o part_output.2dist -i partsquares.gpl -O BY_SPEED

You can check available options with:

./beaumont --help

Also -O options to specify what algorithm to use:

BY_SPEED: beaumont metric, ordered by relative processes speeds.
BY_NODE: beaumont metric, ordered by same processes nodes.
BY_HIERARCH: modified beaumont metric, using relative nodes speeds as the summation of the relative speeds that composes a node.
BY_SCATTER: modified beaumont metric, ordering the processes of different nodes contiguously.
BY_DEFAULT: default partition using FPM. 5 Parameters (delta folder network comm_mode kernel).

- Using .cpm file:

0 1 2 3 4 5 6 7 (number of processes)
0 1 2 3 0 1 2 3 (node of processes)
0.05 0.05 0.08 0.10 0.10 0.12 0.20 0.30 (speeds of processes)

To execute this option, run:

./beaumont -c file.cpm **-P** number_of_processes **-B** block_size **-N** matrix_size **-a** kernel **-n** network **-m** comm_pattern **-v -o** part_output.2dist **-i** part_image.gpl **-O** order

Example:

./beaumont -c p8_het.cpm -P 10 -B 32 -N 256 -a MxM -n IB -m P2P -v -o part_beta.2dist -i part_beta.gpl -O BY_NODE

4. OUTPUTS

Two outputs are taken:

- ***part_output.2dist***, which is the distribution of the data along the matrix with the used algorithm
- ***part_squares.gpl***, which is the gnuplot archive to generate the image of the distribution