Objective: To design an HPC-oriented cluster, based on real components, with the following characteristics:

- Computation: Maximize the number of GFLOPs, making sure that no more than 30% (approx.) of the total GFLOPs of the machine come from accelerated compute nodes
- Memory: 2 GB per CPU core, minimum flops/byte at the socket level (between 8-16)
- No local storage in nodes (optional)
- Interconnection network for all nodes in the system:
  - HPC requirements in terms of inter-node communication.
  - Discrete network interface card (through PCIe) on board integrated.
  - Minimum flops/byte ratio at node level (between 256-1024).
- Number of racks (42U each): 2, including compute nodes and interconnection network (no storage nodes, optional)
- Power: no restrictions in terms of power consumption, but try to maximize the energy efficiency
- Total cost: Less than 1.5 M€ (only including compute and network nodes, not storage and racks)

Note: If any of the above constraints is not reasonable (i.e. cannot be attained), please just justify and override with reasonable values.

Deliverable: document describing the proposed design, including but not limited to:
1. A description of the overall system, with the final specifications in terms of computational power, power dissipation, energy efficiency and cost.
2. List of the different components used to design the system (with links to the source of information or provider), demonstrating that the design does not exceed the resources provided by these components (e.g. sufficient socket slots, memory slots, PCIe ports, ports per switch, U per rack, …)
3. Roofline representation at the socket and node levels, showing how the theoretical flops/byte ratio that are obtained in your design.

Date: no later than June 3rd, 2018

Some links (do not limit to these ones):
- CPUs
  - Intel Xeon server processors, boards and racks: http://ark.intel.com
  - AMD EPYC and Opteron server processors: https://www.amd.com/en/products/servers-processors
  - Marvell ThunderX ARM processors: https://www.marvell.com/products/server-processors.html

- Boards and other components:
  - Supermicro boards: http://www.supermicro.nl/products/motherboard
  - Gigabyte boards: https://b2b.gigabyte.com/High-Performance-Computing-System (include ARM based servers)
  - Thinkmate distributor and boards: http://www.thinkmate.com
  - Rackmountpro distributor: https://www.rackmountpro.com
  - Pogo Linux distributor: http://www.pogolinux.com/index.php

- o Dell: https://www.delltechnologies.com/en-us/solutions/high-performance-computing/index.htm?~ck=mn

- Networking solutions:
  - o Mellanox Infiniband and Ethernet products: http://www.mellanox.com/page/products_overview
  - o Intel fabric products: https://www.intel.com/content/www/us/en/products/network-io/high-performance-fabrics.html
  - o Cisco Ethernet products: https://www.cisco.com/c/en/us/products
  - o Dell: https://www.dell.com/en-us/work/shop/scc/sc/networking-products