DE LA RECHERCHE À L'INDUSTRIE

How will legacy codes survive the next generations of systems?

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AGENDA

- Part 1
  - Talk 1 : Setting the landscape
- Part 2
  - Discussions with the audience

- Definition: a legacy code (LC) is a code
  - That is older than 10 years
    - Has seen at least two system generations
      - Sometimes more than 6 !
  - That is vital to the entity
  - That needs to be ported to newer systems

WHO ARE THE ACTORS

- Large Research Entities (LRE)
  - E.g. CEA
    - Some codes are older than 20 years
- ISVs
  - Some code roots are coming from LREs
- SMEs?
  - Too often no

LEGACY CODE CHALLENGES (1/2)

- "Old" implementations
  - Older versions of standards
    - F77
- "Old" data structures
  - "à la CRAY"
- Parallelism somewhat limited
  - MPI only, seldom GPU versions or OpenMP
- Relies on "old" third party libraries
  - E.g: IMSL to manipulate strings in Fortran

LEGACY CODE CHALLENGES (2/2)

- Original team not available anymore
  - Need to “educate” new generations of developers
- Large source code
    - >> 1M SLOC
  - Intimate knowledge is lost
- Funding to maintain the code
- Funding to port to the next generations of machines

LEGACY CODES: AN EXDCI-2 VISION

- Establish a quantitative measure of LC potential of evolution
  - “Code Viscosity”
    - Survey to fill
      - Pointers to contributors needed (x.y@z.t)
  - Assumption: Exascale+ systems will be accelerated

- Goal: demonstrate to the commission
  - The importance of LC
  - The richness of the European portfolio
  - The associated costs and needs of funding.

CODE VISCOSITY

$$V = \frac{A * L}{TC * P}$$

- A = age of code
- L = SLOC
- TC = TEAM confidence to develop accelerated codes
  - [0.001, 1]
- P = % of acceleration
  - [0.001, 1]

Discussions

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DISCUSSION ITEMS

- Importance of legacy codes in your institution?
- Are you ready / staffed / funded / … to do the port?
- Is a complete rewrite envisioned / feasible / …?
- Evolution of programming languages foreseen?
- Which tools are you lacking to move forward?
- What would be your key messages to the commission?

THANKS