



**RWTH Aachen University**  
Center for Computing and  
Communication

**March 21 – 25, 2011**

# **Parallel Programming for Computational Engineering & Science**

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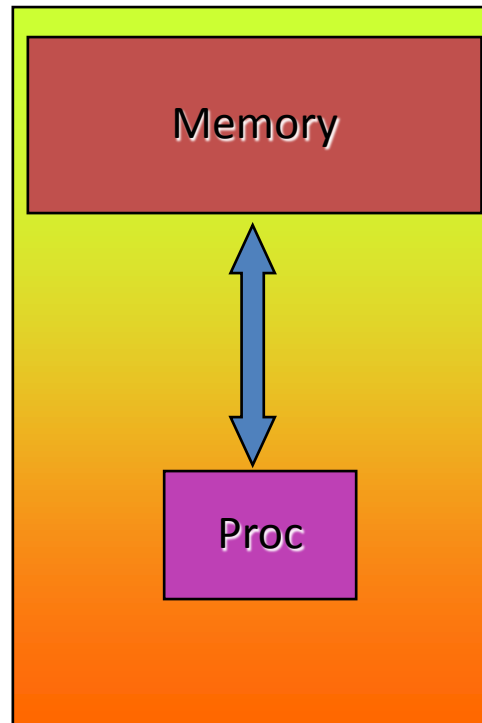


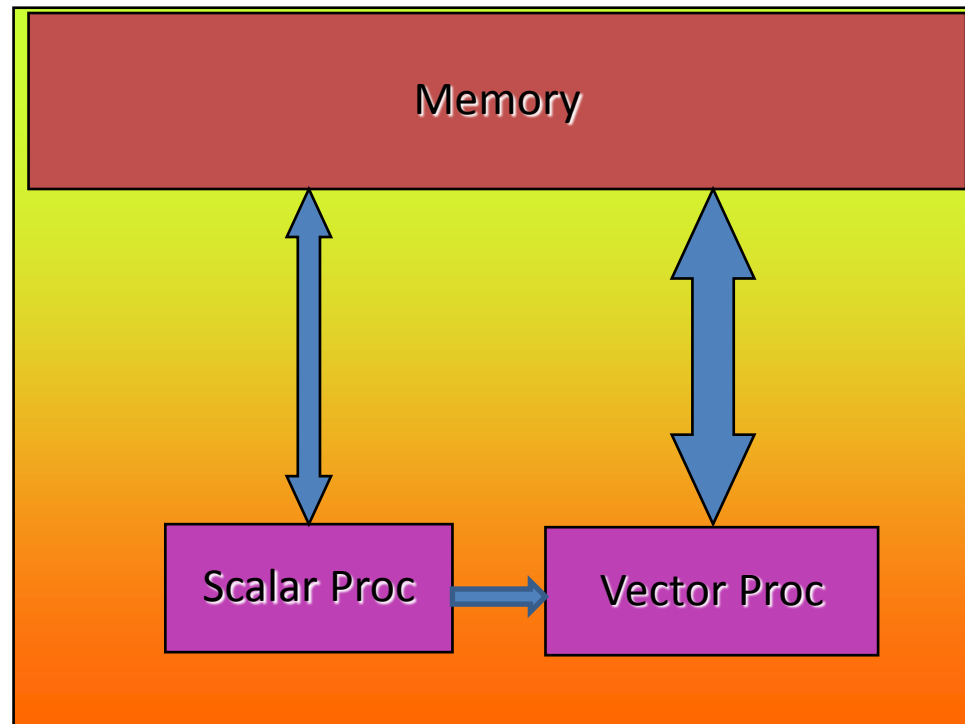
**Microsoft®**



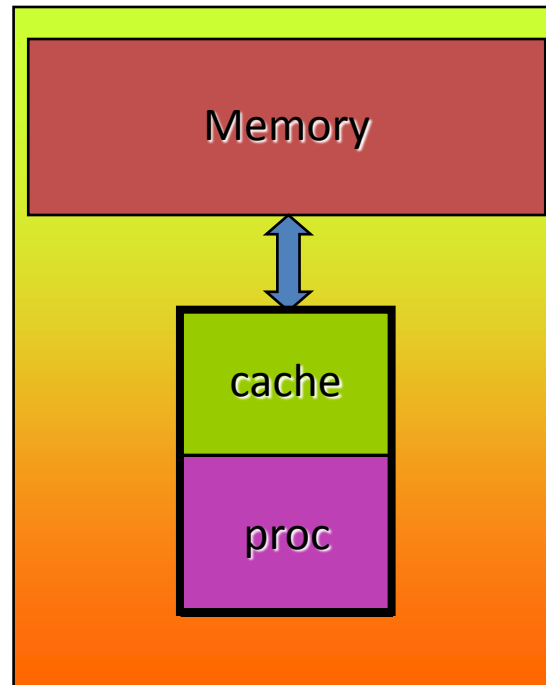
PPCES 2009

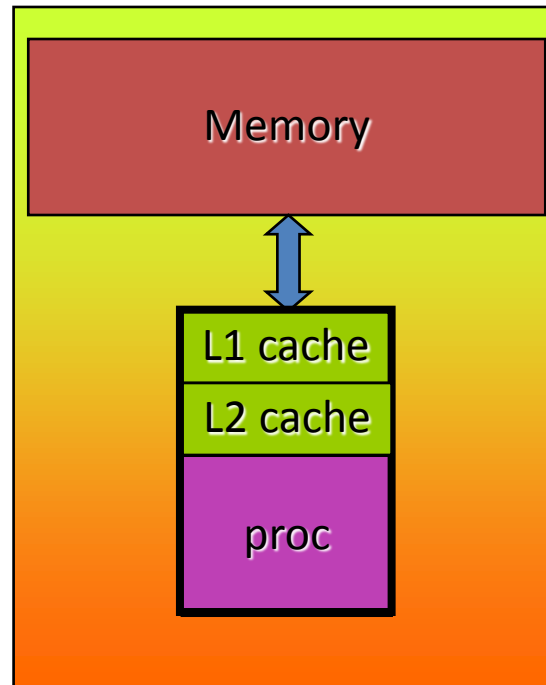


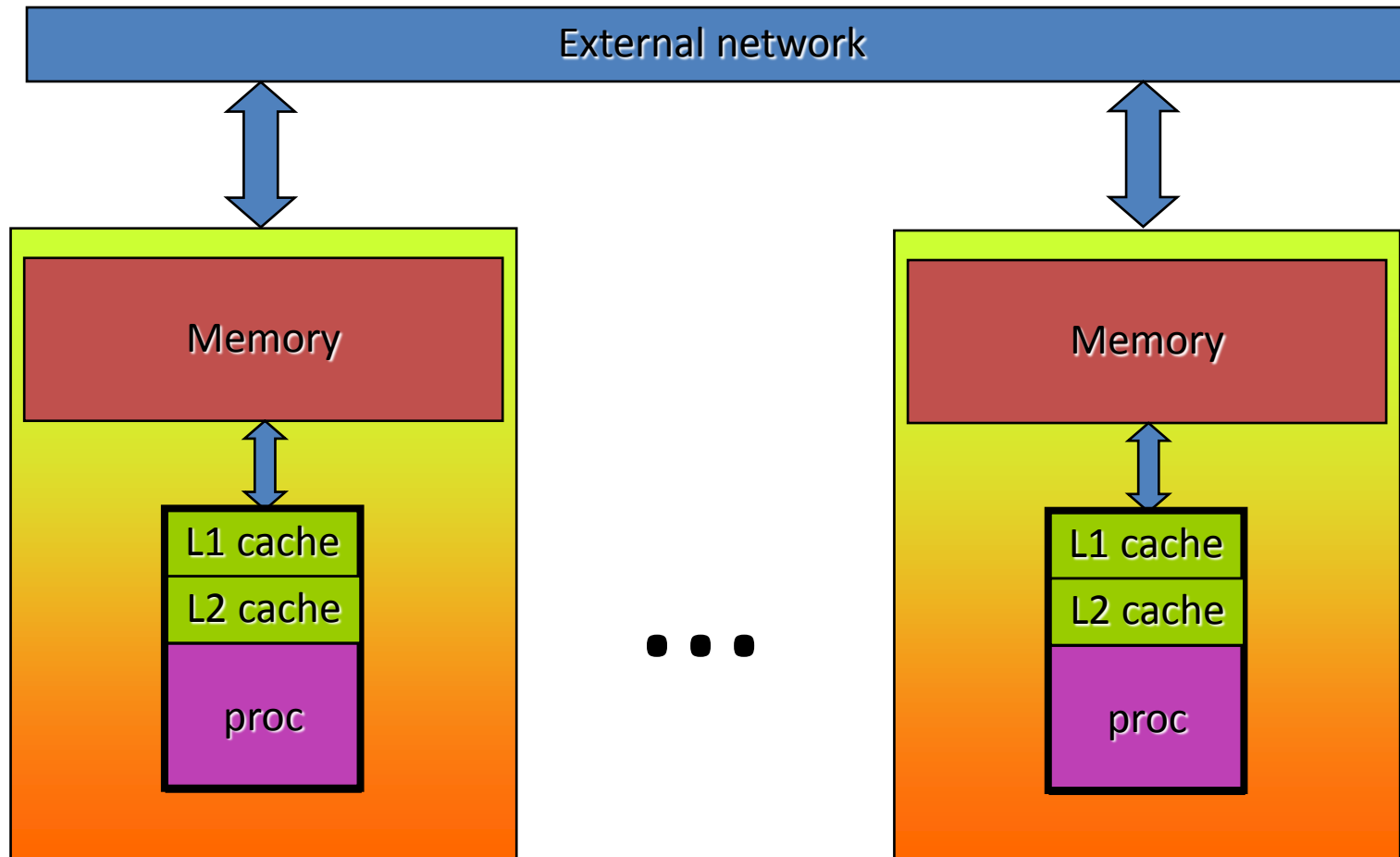


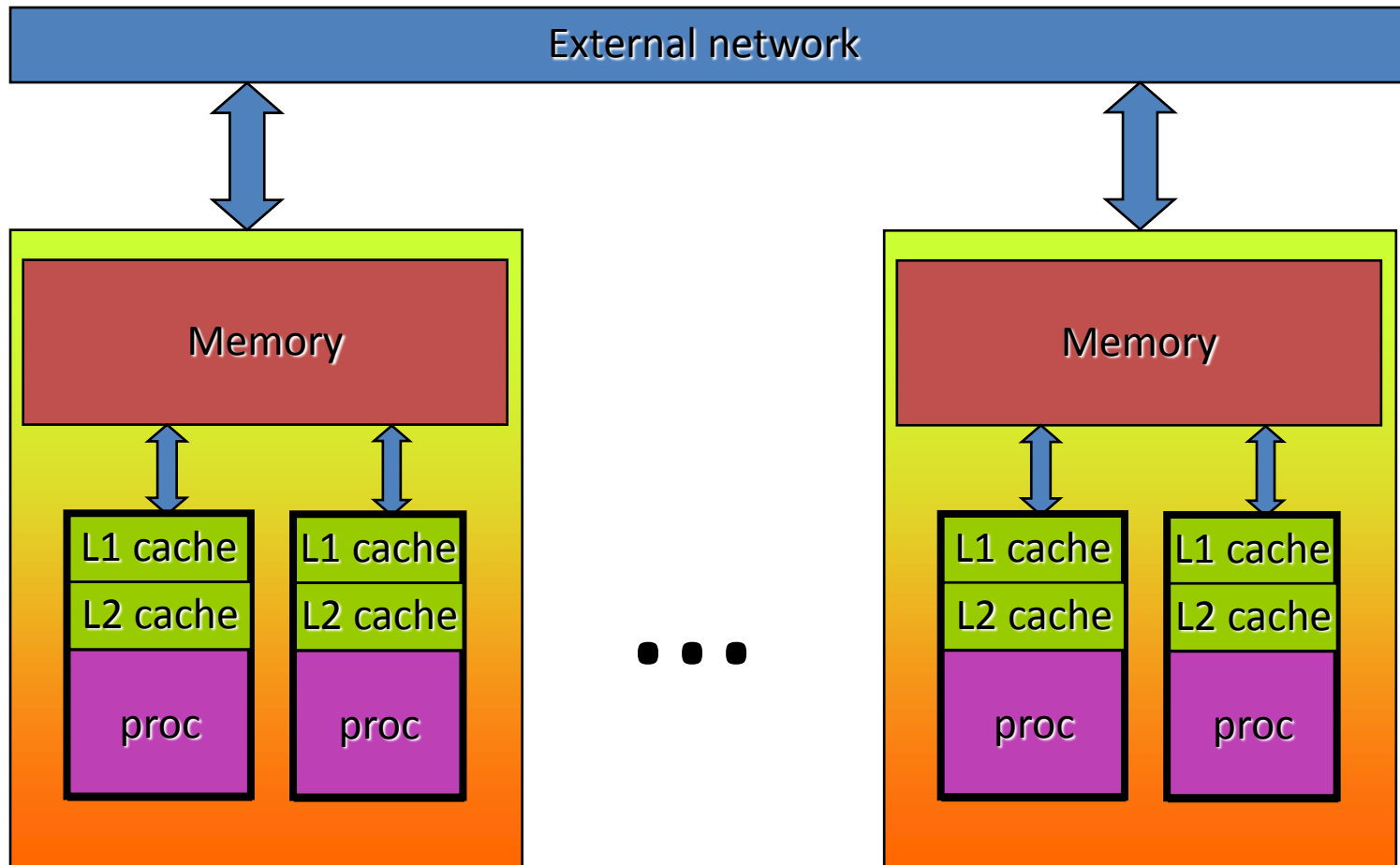


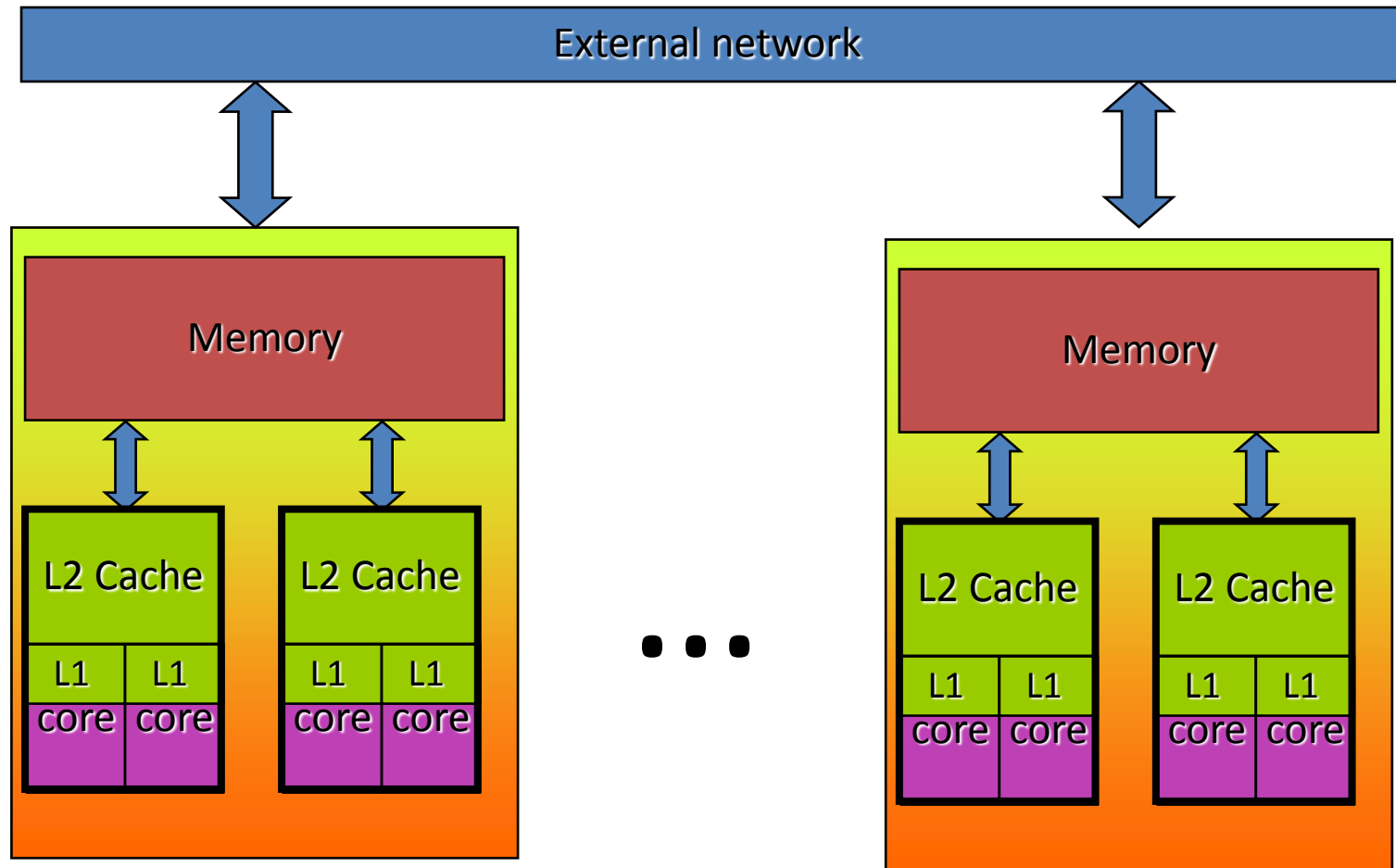
```
DO I = 1, 65535  
  A(I) = B(I) + X * C(I)  
END DO
```

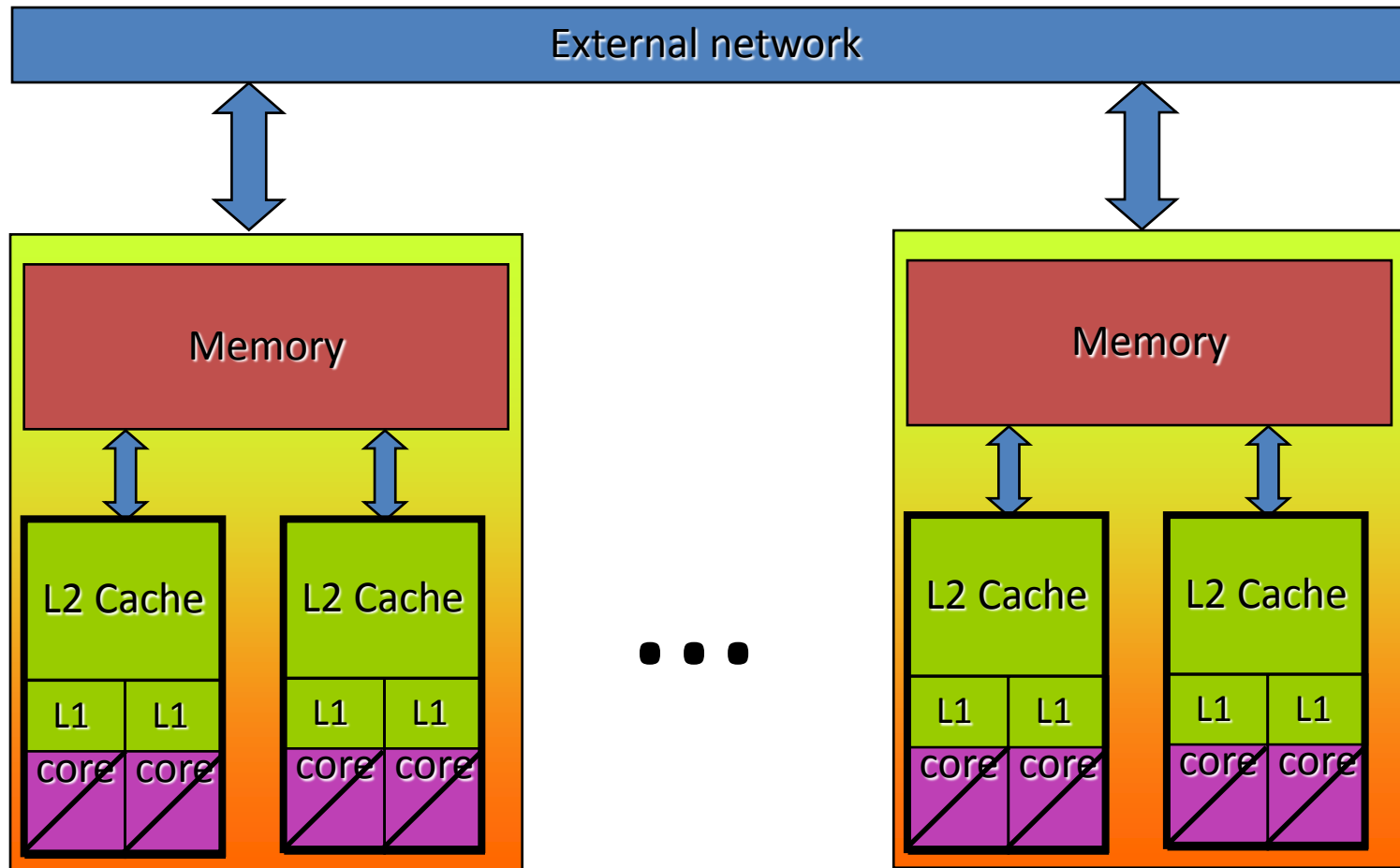


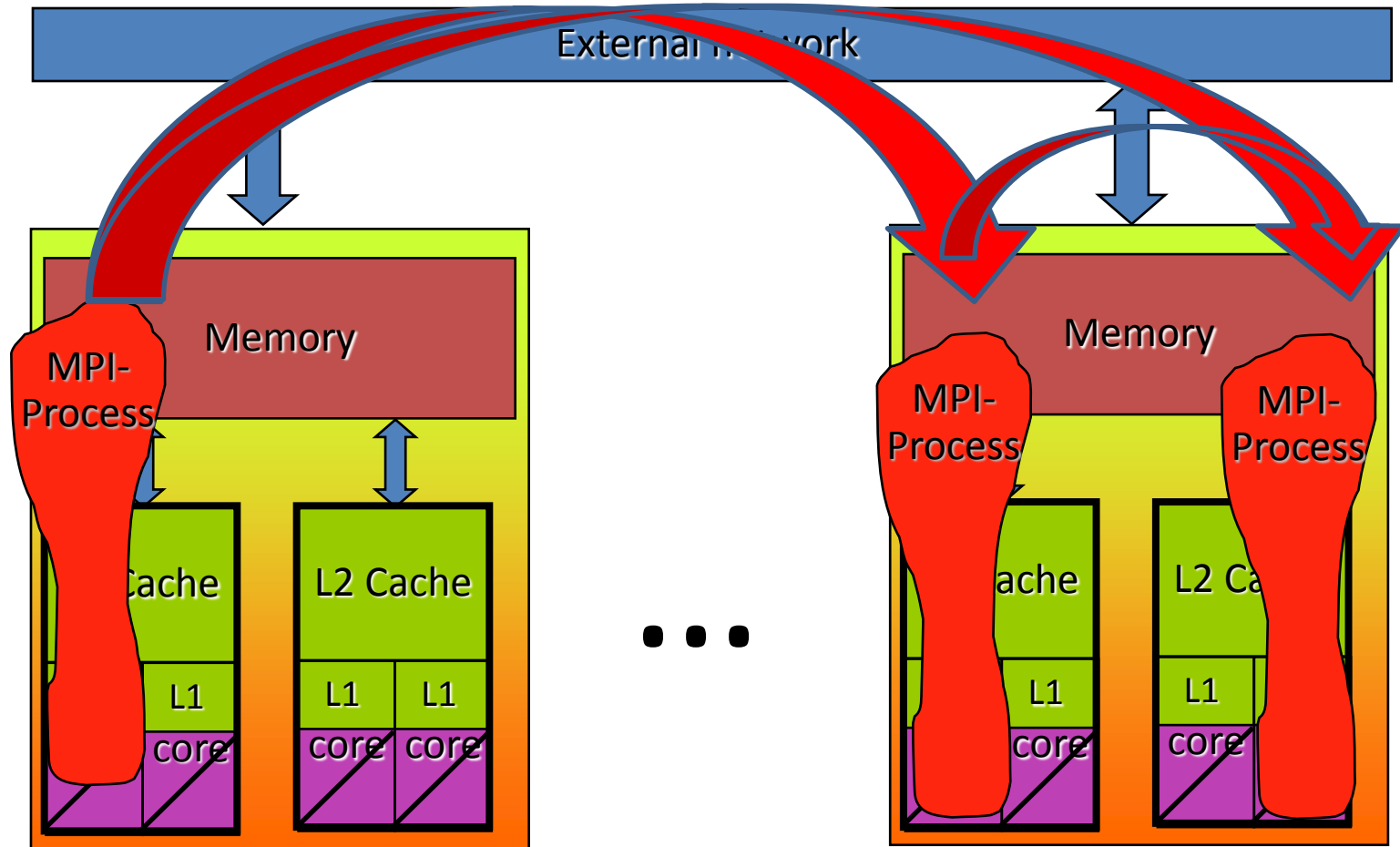


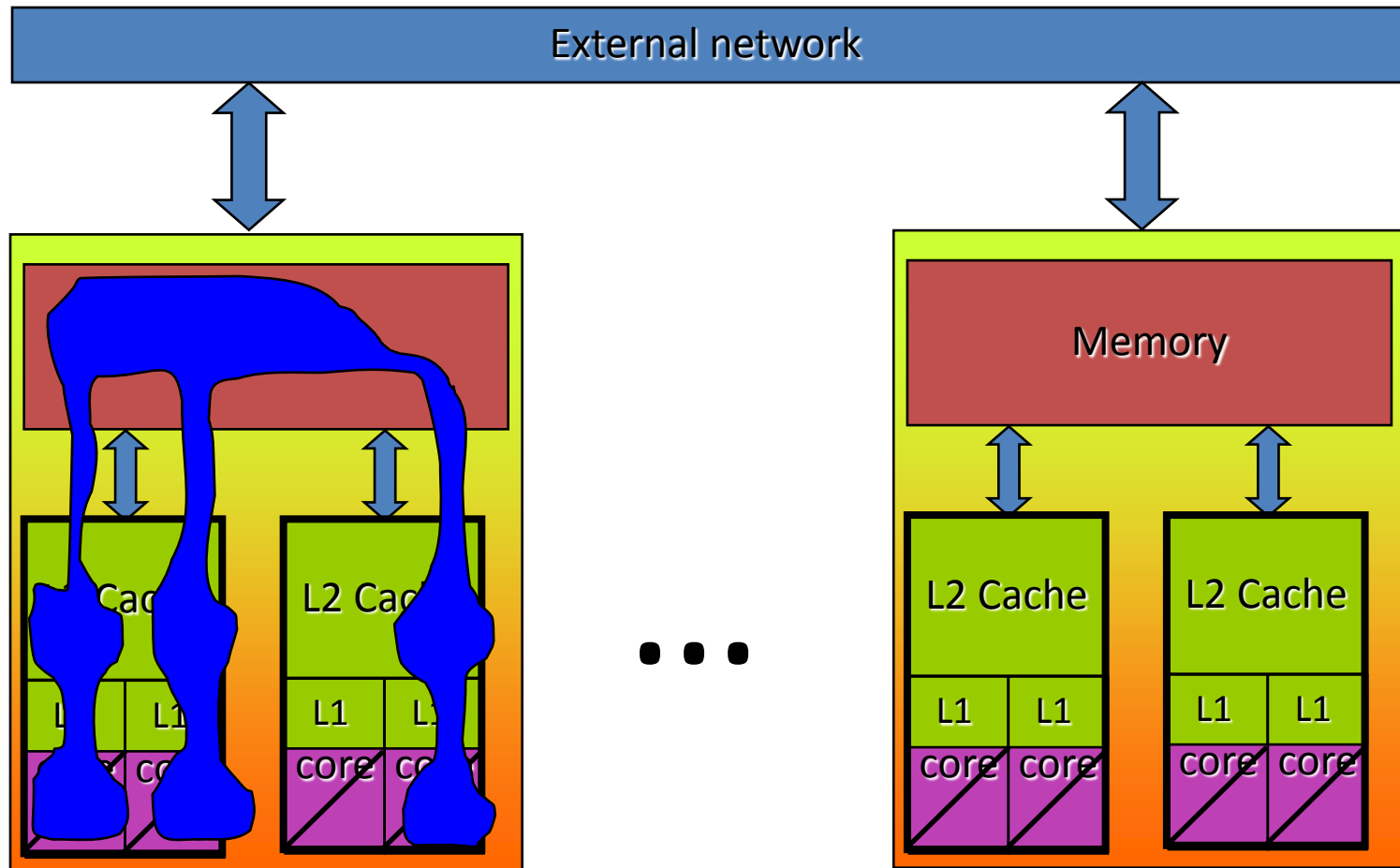


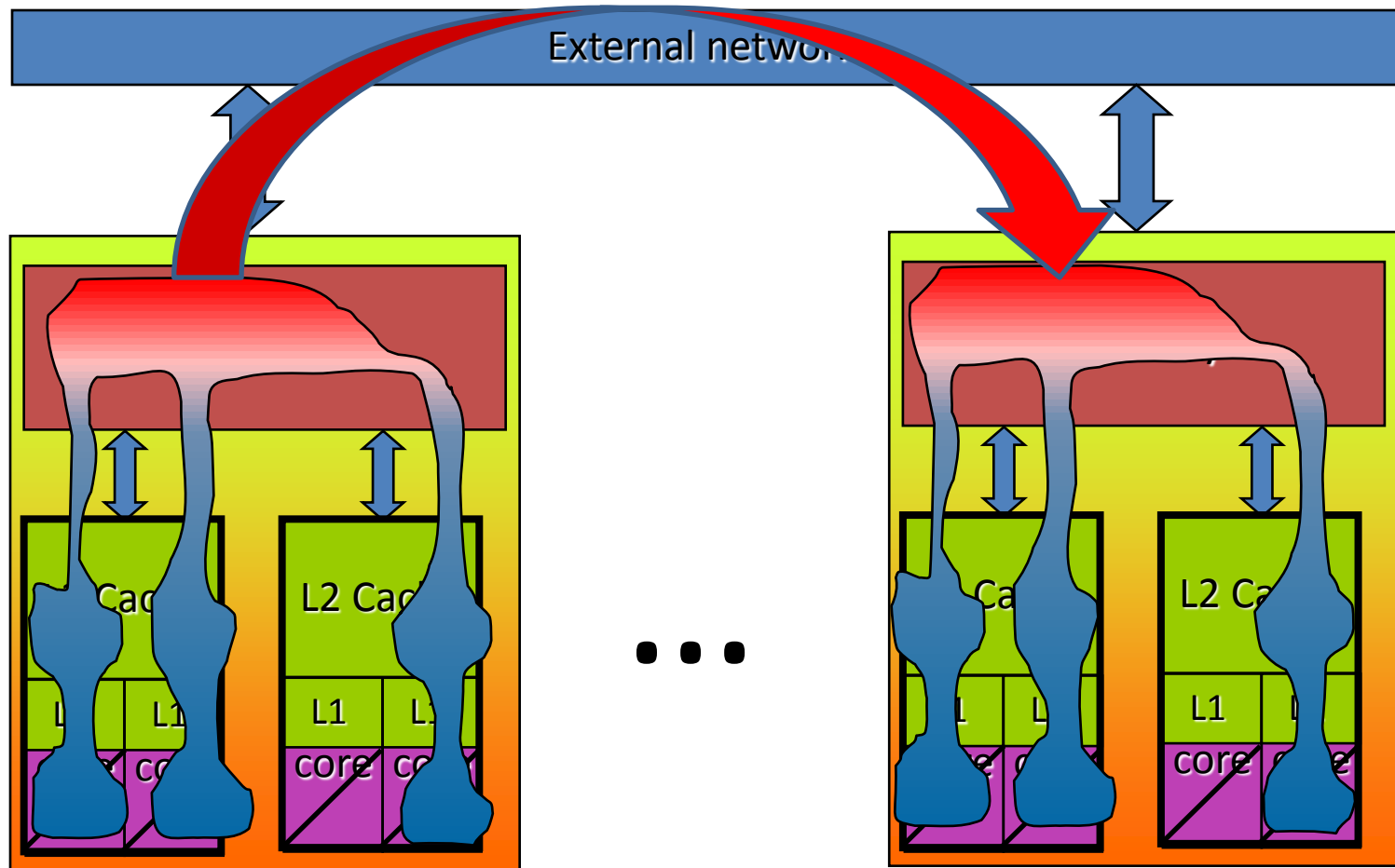


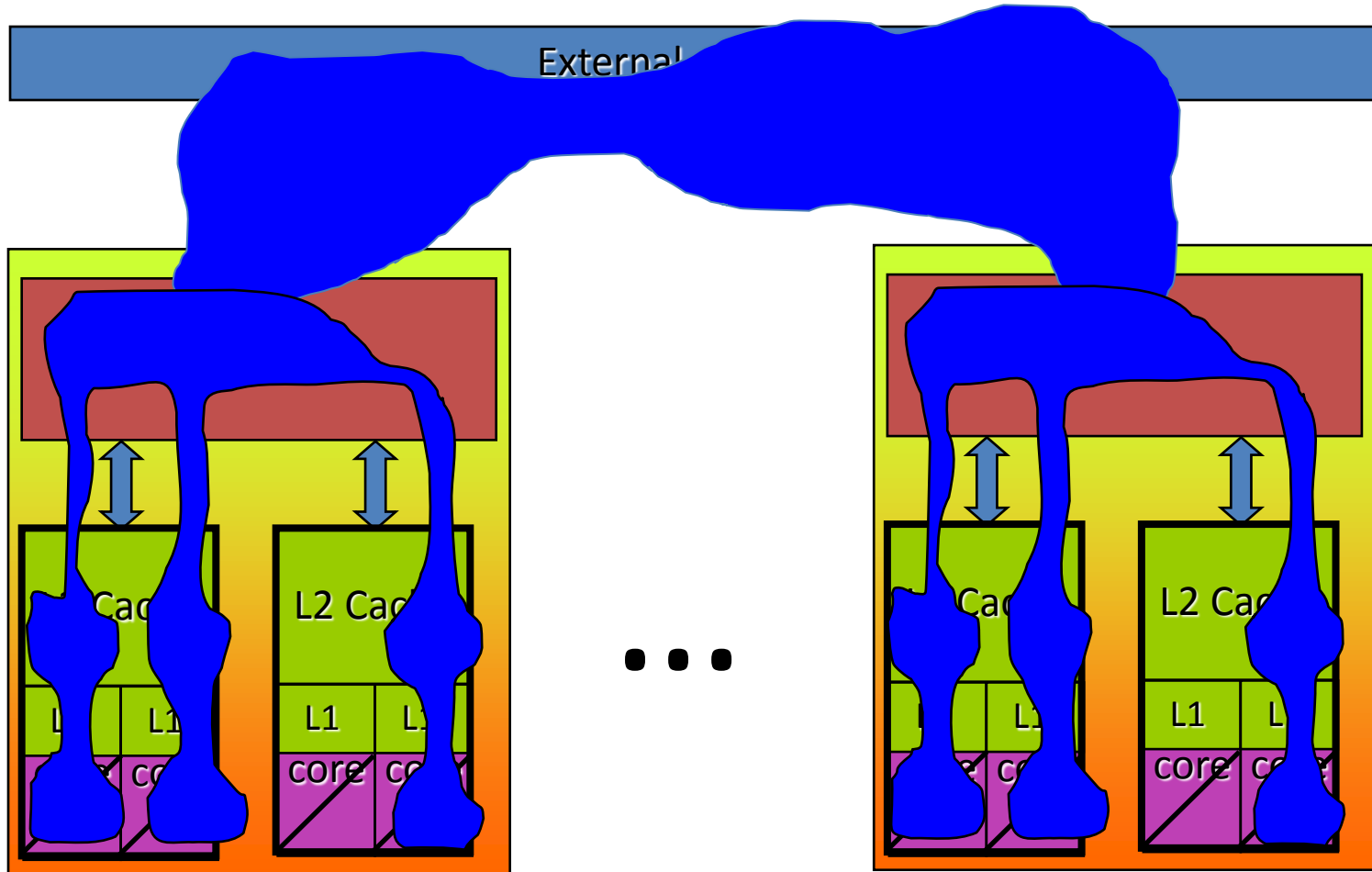






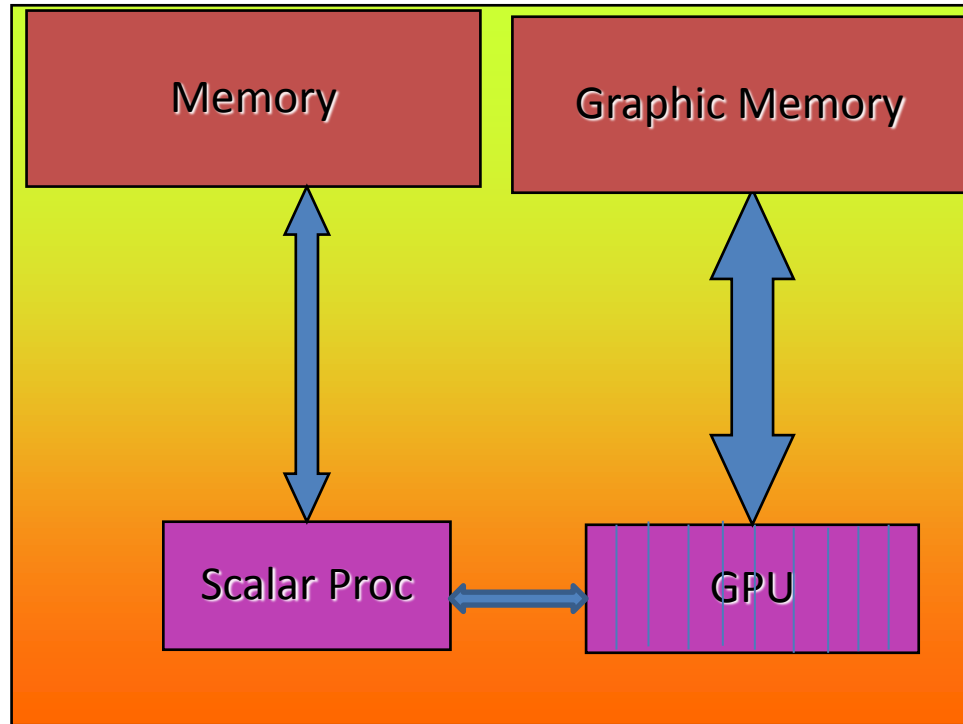






# How to deal with this Complexity?

... and then there are GPGPUs ...



```
!$acc region do copyin(b,x,c) copyout(a)
DO I = 1, 65535
  A(I) = B(I) + X * C(I)
END DO
```

|                                                                |                                                       |
|----------------------------------------------------------------|-------------------------------------------------------|
| <b>Part I</b><br><b>Monday, March 21,</b><br><b>14-17:30</b>   | <b>Announcement of the new RWTH HPC-Cluster</b>       |
| <b>Part II</b><br><b>Tuesday, March 22,</b><br><b>9-17:30</b>  | <b>Processor Architectures and Serial Programming</b> |
| <b>Part III</b><br><b>Wednesday, March 23, 9-17:30</b>         | <b>Shared Memory Programming with OpenMP</b>          |
| <b>Part IV</b><br><b>Thursday, March 24,</b><br><b>9-17:30</b> | <b>Message Passing with MPI</b>                       |
| <b>Part V</b><br><b>Friday, March 25, 9-15:30</b>              | <b>GPGPU Programming</b>                              |

# Announcement of the new RWTH Compute Cluster

|                     |                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------|
| 14:00<br>–<br>15:30 | Welcome and Introduction<br><i>Dieter an Mey, RWTH Aachen University</i>                                       |
|                     | The New Compute Cluster of the RWTH Aachen University<br><i>Thomas Warschko, Bull</i>                          |
|                     | Technology Outlook on HPC<br><i>Herbert Cornelius, Intel</i>                                                   |
|                     | Future Trends towards Exascale and its Impact<br><i>Jean-Pierre Panziera, Bull</i>                             |
| <i>coffee break</i> |                                                                                                                |
| 16:00<br>–<br>17:30 | Brainware for Green HPC<br><i>Dieter an Mey, RWTH Aachen University</i>                                        |
|                     | A Methodology To Evaluate The Throughput Performance Of Multithreaded Cores<br><i>Ruud van der Pas, Oracle</i> |
|                     | Moore's Law - Will the Tools eventually Catch Up<br><i>Felix Wolf, GRS</i>                                     |