Harnessing the complexity of large amounts of data is a challenge in itself. But Big Data is more than that: originally characterized by the 3 Vs of Volume, Velocity and Variety, it often requires dedicated computing solutions, which will be explored in this module.

Prerequisites
- Engineering Degree on Computer Science or a related domain (telecommunications, etc).
  OR
- Engineering Degree on another subject with a major on Computer Science.
  OR
- Work experience on Computer science.

Learning objectives
After completing this course, participants will be able to:
- Implement the distribution of simple operations via the Map/Reduce principle in Spark;
- Explain the difference between CPU and GPGPU computation;
- Connect on a cloud computing engine (e.g. Google Cloud Platform) and launch a simple task;
- Understand the usefulness of containers
- Deploy a Docker container.

Key elements
Dates: December 12 to 15, 2022
Duration: 28 hours, 4 days
For whom: recent graduates, jobseekers and experienced employees
Location: ISAE-SUPAERO, Toulouse
Course fees: €2,300
Language: English

Practical information and registration
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**Course Content**

Distributed computing with Spark:
- History
- MapReduce paradigm
- Hadoop Stack
- Hadoop Distributed File System
- MLib Machine Learning library

Virtualization and cloud computing:
- Different approaches to virtualization
- Economical models
- Technical benefits (snapshots, dynamic deployment and migration, failover...)
- Cloud engines (principles, deployment examples, node choices)

Docker:
- History,
- Fundamental differences w.r.t. virtualization
- Docker components
- Tools

**Teaching methods**

<table>
<thead>
<tr>
<th>Teaching methods</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Lectures / tutorial</td>
<td>X</td>
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<tr>
<td>Collaborative learning</td>
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<td>Flipped classroom</td>
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<td>Blended learning (online and face to face)</td>
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<td>Learning by doing</td>
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<td>Project-based</td>
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<td>Simulation</td>
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<td>Case study</td>
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**Assessment**
- Hands-on evaluation on a computer (100 %)