IC1406 Working Groups Annual Reports – 1st Grant Period

WG1

WG Name: Enabling infrastructures and middleware for Big-Data modelling and simulation
WG Leaders: Ewa Niewiadomska-Szynkiewicz

WG1 structure	
Total number of members	46
Number of countries represented in WG1	17
Gender balance:	
Males	40
Females	6
Number of MC members in WG1	22
Number of young researchers (until PhD+8)	22
Number WG1 members from of target countries	25
Number of WG1 members from industry	3
Cost Tools Utilisation	
Number of STSM beneficients from WG1	5
Number of STSM visits hosted in institutions represented in WG1	2
Number of Cost meetings hosted in institutions represented in WG1	1
Realization of the workplan	
Tasks planned for 1st Grant Period	• Survey of the state-of-the-art of infrastructures and middleware for Big Data modelling and simulation • Development of the comprehensive full taxonomy of Big Data systems for life, physical, and socio-economical applications • Establish a cooperation and common ground with all other WGs and companies
Tasks realized in the 1st Grant Period	• Survey of the state-of-the-art of infrastructures and middleware for Big Data modelling and simulation • Development of the comprehensive full taxonomy of Big Data systems for life, physical, and socio-economical applications • Establish a cooperation and common ground with all other WGs and companies

Achievements and results	Methods and collaboration tools were selected and the collaboration was arranged. A knowledge map of WG1 participants and their expertise was created. Based on the knowledge map of WG1 participants and the outcome of the discussion during the telco meetings and face-to-face WG1 members meeting in Cracow an initial division of research into selected topics was proposed for consideration and subgroups consisting of WG1 members with the similar scope of activity were identified. The draft version of scientific report "Survey and taxonomy of Big data system architectures and middleware" was prepared by WG1 members. Dissemination activity: Springer volumes: 1. Advances in mobile cloud computing and big data under the 5G era 2. Intelligent Agents in Data-intensive Computing Draft versions of papers for special issues of journals: 1. Journal of Computational Science, 2. Applied Mathematics and Computer Science. Participation in program and steering committees of conferences on Big Data. Arrangement of international cooperation (3 WG1 virtual meetings). Presentation and dissemination of cHipSet during seminars organized by partners at their home institutions.
Summary and remarks	The collaboration framework of WG1 members was arranged. New members and institutions joined the group. The scope of research and research topics were identified and disseminated. Most WG1 members provided their contributions to WG1 scientific annual report. The inspiration for the research presented in a few submitted papers and organization of scientific events are the results of collaboration of people in cHiPSet.

WG2

WG Name: WG2: Parallel Programming Models for Big-Data Modelling and Simulation
WG Leaders: Marco Aldinucci (chair), Christoph Kessler (vice-chair), Peter Kilpatrick (vice-chair)

WG2 structure	
Total number of members	61
Number of countries represented in WG2	22
Gender balance:	
Males	49
Females	12
Number of MC members in WG...	22
Number of young researchers (until PhD+8)	7

Number WG2 members from of target countries	22
Number of WG members from industry	0
Cost Tools Utilisation	
Number of STSM beneficients from WG…	3 (1 WG2, 1 WG1-2, 1 WG2-3)
Number of STSM visits hosted in institutions represented in WG…	3
Number of Cost meetings hosted in institutions represented in WG…	3
Realization of the workplan	
Tasks planned for 1st Grant Period	• Constructively aggregate the participants' regionally and technically dispersed expertise and contacts to foster HPC routine. • Review currently used programming models in the development of MS software, and the state-of-the-art parallel programming techniques in both DSL and MDE approaches
Tasks realized in the 1st Grant Period	The first task has been accomplished and the second task is underway and completed at 80%.
Achievements and results	We designed two main ways to gather and process state-of-the-art of parallel programming techniques. 1. The design and distribution to Action members of a **questionnaire** aiming to assess participant expertise and the applications in the area of model and simulation they develop or use. Also the questionnaire aims to assess the nature of data processed by these applications, the processing framework, the limits of the current approaches, etc. The questionnaire targets Action participants in all WGs, and thus is an initial means to integrate and elaborate information across different WGs. The answers to questionnaires will be produced as a technical annex of the first year report. 2. The design and implementation of a systematic **literature review process**. This process aims to gather and comparatively evaluate related works according to a carefully selected matrix of features. The whole process is implemented according to a well-founded scientific approach and targets a universal sample (i.e. not only works from Action members) of the literature on the field extracted from well-know scientific DBs, such as Scopus. The Action members from different WGs have contributed a significant number of questionnaires, specifically 19 from WG2, 14 from WG3, 9 from WG4. We next plan to turn both efforts into publications. They will be not merely the collection of members contributions, but rather a critical analysis in terms of dominant features and the relations among features of programming models and frameworks across the Action members' activities and in the literature.
Summary and remarks	A significant number of new participants have joined the WG during the grant period and we are incorporating their new expertise and networks into the action. We plan to finish the first state-of-the-art report within the next few months. We are currently peer-reviewing the submissions.

WG3

WG Name: HPC-enabled modelling for socio-economical and physical sciences
WG Leaders: Andrea Bracciali, Salvatore Vitabile

WG3 structure	
Total number of members	23
Number of countries represented in WG..	
Gender balance:	
Males	14
Females	9
Number of MC members in WG3	
Number of young researchers (until PhD+8)	5
Number WG members from of target countries	7
Number of WG members from industry	1
Cost Tools Utilisation	
Number of STSM beneficiaries from WG3	2
Number of STSM visits hosted in institutions represented in WG3	2
Number of Cost meetings hosted in institutions represented in WG3	0
Realization of the workplan	
Tasks planned for 1st Grant Period	• Constructively aggregate the participants' regionally and technically dispersed expertise and contacts to foster HPC routine. • Formal description of the state-of-the-art□ implementations and concepts supporting modelling and simulation models for big data
Tasks realized in the 1st Grant Period	The first task has been accomplished and novel links of an European network of experts are emerging. The second task is underway, a first result being a preliminary draft summarizing relevant problems and techniques, which is being edited in collaboration with WG4.
Achievements and results	We have designed and distributed a questionnaire to Action participants with the aim of collecting information on expertise that is represented in the Action, across the WGs, and specifically in WG3. Such material is still being organized and a part of it informs the content of the Action web page, which presents our expertise to the research community. We have identified key application areas that involve several groups in WG3. Some of these overlap and are complemented by areas covered by WG4, paving the way for a first integration of the two WGs. This has resulted in a WG3-WG4 joint book of abstracts, edited by Larsson and Bracciali, the WG leaders, which is in the final stages of preparation. Contributions by WG members have been organised around relevant techniques and methodologies. New interactions and links have been developed in the pro-

	cess and such collection will provide, as planned, useful test cases for the HPC side of the Action. Where appropriate, we are planning to publish selected contributions in peer-reviewed journals. New (and existing) links are expected to foster further research. Two STMSs have contributed to the activities of WG3. We are planning to extend participation in such COST instrument in the next GP.
Summary and remarks	WG3 members have doubled in the first GP, with the addition of very active and engaged groups. Several members have interests in other WGs, fostering integration, the main aim of the action. Lately some participants from industry have also joined. First steps of the activity of WG3 in GP2 will focus on the organization of the state-of-art collected contributions, and their finalisation in suitable publications as appropriate.

WG4

WG Name: HPC-enabled modelling for socio-economical and physical sciences
WG Leaders: Elisabeth Larsson, Esko Turunen, Otthein Herzog

WG4 structure	
Total number of members	26
Number of countries represented in WG..	17
Gender balance:	
Males	15
Females	11
Number of MC members in WG...	18
Number of young researchers (until PhD+8)	4
Number WG members from of target countries	25
Number of WG members from industry	0
Cost Tools Utilisation	
Number of STSM beneficients from WG...	3
Number of STSM visits hosted in institutions represented in WG...	3
Number of Cost meetings hosted in institutions represented in WG...	0
Realization of the workplan	
Tasks planned for 1st Grant Period	• Constructively aggregate the participants' regionally and technically dispersed expertise and contacts to foster HPC routine. • Formal description of the state-of-the-art□ implementations and concepts supporting modelling and simulation models for big data
Tasks realized in the 1st	The first task has been accomplished and the second task is un-

Grant Period	derway.
Achievements and results	We have collected questionnaires from the WG-participants to collect the various types of expertise that is represented in the group. Each participant typically provides a range of experiences. We have identified key application areas that involve several groups in the WG. These are economics, traffic, health care and social networks. The WG members have produced (joint) extended abstracts regarding their research methodologies and their relation to HPC and the current state-of-the-art. These will be collected in a book of abstracts from WG3 and WG4 jointly as there are many areas of connections. We next plan to develop a selection of the abstract into publications for a special issue in a suitable journal.
Summary and remarks	New participants have joined the WG during the grant period and we are incorporating their new expertise and networks into the action. We plan to finish the first state-of-the-art report within the next month. We are currently peer-reviewing the submissions.