

## 1. PUBLISHABLE SUMMARY

During the reporting period the project has completed development of the JUNIPER tools and technologies and has carried out the integration of the technologies into a common platform that has been used for both preliminary and final validations by the industrial user partners. The dynamic acceleration capabilities using FPGA has been completed and supporting tools to assist application developers in exploiting these improved performance capabilities have also been developed. The application model has been finalised and additional features in support of communications groups have been developed as requested by the industrial user partners during their preliminary evaluations.

The system software environment has undergone extensive laboratory evaluations in preparations for the industrial validation work later carried out in the reporting period. Further work to automate and expand the Scheduling Advisor capabilities within the modelling environment and to enhance the Schedulability Analyser and run-time monitoring capabilities were also completed providing strong tools to assist big data application developers to identify designs that optimise performance.

Improved support for Java 8 features was implemented and further features were added to the concurrent garbage collector for additional handling of parallelisation. Final evaluations and minor improvements of the real-time enhancements for the OS used in conjunction with the Jamaica VM were also carried out and new OS facilities (i.e. system calls) needed by the Jamaica VM to reduce the impact of kernel scheduling events were implemented. The modelling environment was further updated with additional modules to support big data modelling and use of popular big data management systems MongoDB and PostgreSQL. Further integration of the tools with the modelling environment was also carried out.

The industrial user partners have each adapted their applications to utilise the JUNIPER tools and platform technologies and have carried out preliminary validations and benchmarking midway through the reporting period. The results have been used to identify and implement further enhancements of the project technologies in preparation for the final industrial evaluations that were completed during the final months of the weeks of the project. Industrial big data volumes and real-time requirements were validated for the Financial Use Case applications adapted to JUNIPER and important improvements provided by the project technologies were quantified.

The project deliverables have been mostly completed on schedule with the exception of the preliminary user validation deliverables, which required an additional five weeks to complete in order to accommodate learning and better understanding of the new project technologies, and the final validation report for the Financial Use Case application where additional analysis of data collected during the evaluations was carried out to more clearly quantify the impact of the technologies in support of the final project reporting. While the second industrial evaluation partner had to withdraw from the project in the final project weeks preventing the submission of their final Web Use Case evaluation report, they did complete their preliminary evaluations and report and the

project consortium was still able to achieve the targeted objectives for the new project technologies as originally set out for the project.

The project partners have finalised the exploitation planning and have made the technologies accessible online to European industry on a no-fee basis for evaluations, with most of the technologies developed in the project available in open source form. The project has also been successful in having the real-time OS extensions adopted within the industry standard Linux distribution, and has influenced the newly published real-time Java standard. A sustainability plan for the open source technologies has been put in place to ensure the project technologies evolve after project completion and further actions towards standardisation of project results have been taken and will continue after project completion.