



## D2.13

# Extensions to scheduling mechanisms Revised

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Author	Francesca Finocchiaro (eProxima)
Contributors	all partners
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Abstract	This document provides information about the optional deliverable on scheduling mechanisms.



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## 1 Purpose of this document

This document presents the rationale of why the deliverable D2.13 is not going to be delivered, likewise its predecessor, deliverable D2.12 Extensions to scheduling mechanisms - Initial. As stated in the innovation action annexed to the grant agreement: “If necessary, extensions and enhancements to the scheduling mechanisms will be released together with previous deliverable (“Report on RTOS scheduling”).”, these two deliverables are optional. Therefore, as well as with the initial version (D2.12), the Consortium considered that the revised version (D2.13) of this deliverable is not required either.

## 2 Rationale for Optional deliverable not delivered

The decision of not delivering these deliverables comes from the RTOS scheduling mechanism research endeavoured in Task 2.4 along with Task 4.2 Predictable scheduling and execution work.

While we designed the first concept for a fine-grained execution mechanism named Callback-group-level Executor and implemented this for rclcpp, on-going analysis of the lower layers of the ROS 2 and micro-ROS stack revealed the need to re-design and to re-implement several more artifacts related to the Executor concept to achieve a well-defined overall execution model. Therefore, we have focused on improving the ROS 2 and micro-ROS stack in this matter before designing and implementing any extensions to the underlying RTOS scheduling mechanisms. Also, instead of creating extensions to a particular real-time operating system, we decided to direct our work towards the support of the three real-time operating systems: NuttX, FreeRTOS and Zephyr, which goes much beyond the scope of the project plan. As a consequence, micro-ROS can be used for more micro-controllers and application areas than originally planned.

As a consequence, we did not deliver any of the RTOS scheduling extensions (deliverable D2.12 in 2018 and deliverable D2.13 in 2020). Note that both D2.12 and D2.13 were defined as optional from the very beginning (cf. description of D2.4b [M12, M30] - Extensions to scheduling mechanisms, ALR (Other, PU): “If necessary, extensions and enhancements to the scheduling mechanisms will be released together with D4.2a.”). If the research in the second half of 2020 and/or 2021 reveals the need for such extensions, they will be provided in a later revision of the deliverable.