



D3.7

Micro-ROS Agent Software Release Y1

Grant agreement no.	780785
Project acronym	OFERA (micro-ROS)
Project full title	Open Framework for Embedded Robot Applications
Deliverable number	D3.7
Deliverable name	Micro-ROS Agent
Date	December 2018
Dissemination level	public
Workpackage and task	3.3
Author	Borja Outerelo Gamarra (eProsima)
Contributors	Javier Moreno (eProsima)
Keywords	micro-ROS, ROS2, microcontrollers, DDS-XRCE
Abstract	This document provides links to the released software and documentation for deliverable D3.7 <i>Micro-ROS Agent Release Y1</i> of the Task 3.3 <i>ROS Bridging & Interoperability</i> .



Contents

1	Summary	2
2	Acronyms and keywords	2
3	Overview to Results	3
4	Links to Software Repositories	3
5	Annex 1: GitHub documentation	3
5.1	Run workflow	3
5.2	XML automatic generation	4
5.3	Agent-Client communication mechanism	4

1 Summary

micro-ROS Agent is a ROS2 node wrapping the [Micro XRCE-DDS Agent](#). This node acts as a server between DDS Network and micro-ROS nodes inside MCU. It receives and sends messages from micro-ROS nodes. It also keeps track of the micro-ROS nodes exposing them to the ROS 2 network. The node interacts with DDS Global Data Space on behalf of the micro-ROS nodes.

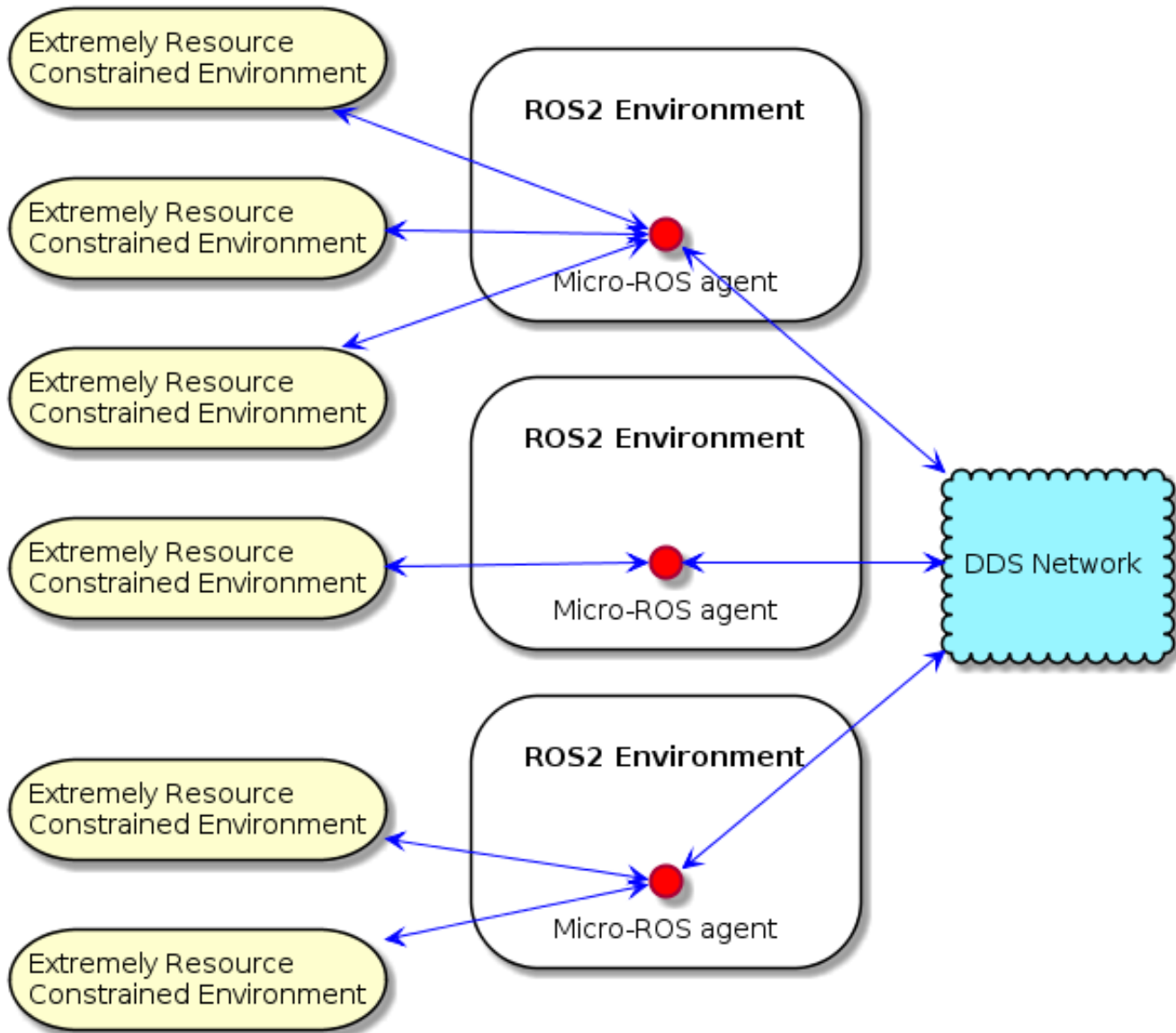


Figure 1: image

2 Acronyms and keywords

Term	Definition
XRCE	Extremely Resource Constrained Environments
DDS	Data Distribution service
ROS2	Robot Operating System

3 Overview to Results

This document provides links to the released software and documentation for deliverable D3.7 *Micro-ROS Agent Release Y1* of the Task 3.3 *ROS Bridging & Interoperability*.

4 Links to Software Repositories

The micro-ROS agent is provided as a ROS2 package available at:

- Git repository: <https://github.com/microROS/micro-ROS-Agent.git>
Package name: uros_agent
Package path: ./uROS_Agent
commit: [8cb1bfe91aa99c88effbc4b6d0cebf0bf610f456](#)

The micro-ROS agent module is provided as a ROS2 package available at:

- Git repository: <https://github.com/microROS/micro-ROS-Agent.git>
Package name: microxrcedds_agent_cmake_module
Package path: ./microxrcedds_agent_cmake_module
commit: [8cb1bfe91aa99c88effbc4b6d0cebf0bf610f456](#)

Package documentation is available at:

- Git repository: <https://github.com/microROS/micro-ROS-doc.git>
Package path: ./MicroROS_Agent
Commit: [d7864d8073a3645a950a63a9dc9b764f34ee4d77](#)

5 Annex 1: GitHub documentation

5.1 Run workflow

micro-ROS Agent is meant to be run as a ROS2 node using rclcpp. However, just until the next release, the package compilation generates an executable that will run a [micro XRCE-DDS Agent](#) without any of the rclcpp node characteristics.

At the start moment, the micro-ROS agent will load and send to the Micro XRCE-DDS Agent all default XML profiles located at the same level as the node executable. Inside the XML profiles file will be placed all pre-configured profiles for data types. These pre-configured profiles may be referenced at runtime by the micro-ROS node instead of sending it. Referenced profiles usage has three main benefits:

- micro-ROS node binary code size may be decreased due to it only has to store profile reference string instead of an XML content string.
- TX/RX communication bandwidth may be decreased when sending XML reference instead of sending XML content.
- Using XML references gives more flexibility when the user wants to change the profile configuration.

5.2 XML automatic generation

During the build process, micro-ROS agent package will look for all ROS2 messages to generate an initial list of XML profiles. These profiles can be referenced in the Agent-Client communication to avoid sending the full XML content. This reference mechanism can be switched on and off from the [Micro XRCE-DDS middleware](#) layer.

By now, XML generator will only generate standards profiles for all message type completed in the ROS2 workspace. Only one profile will be generated for each message type. Also, the generated references name will be set by the micro-ROS agent package. The generated profile characteristic is not configurable. In the next release, the characteristic will be extended in the following points:

- The profile reference name will be set by the user and not by the micro-ROS agent package.
- Profiles characteristic will be configurable by the user.

5.3 Agent-Client communication mechanism

Communication between the micro-ROS Agent and the micro-ROS nodes at the moment supports two types of transport:

- UDP.
- Serial Port.

All available configurations are supported directly by the Micro XRCE-DDS agent. The communication method and it's [configuration](#) is handled directly by the Micro XRCE-DDS Agent.