



Connect sensors, devices
& software into one
distributed network.

Multi-Agent Distributed System

Apache v2.0 · OPEN SOURCE

WHAT IS MADS?

MADS is a lightweight, cross-platform framework for building networks of **distributed agents** that exchange data over **ZeroMQ**. Wire up heterogeneous sensors, devices and software into one cooperating system — and start collecting and processing live data in **about one hour**.

Every agent is a **source**, a **filter** or a **sink**. Customize behaviour with C++ plugins, or prototype in Python, R and Lua. No heavyweight middleware, minimal dependencies, tiny footprint.



WHY MADS?

● Tiny footprint

~20 MB installer with minimal dependencies — against ~750 MB for ROS 2.

● Gentle learning curve

Productive in ~1 hour. The whole plugin API is barely 5 methods.

● Runs everywhere

Windows, macOS, Linux — down to small boards like the Raspberry Pi.

● Fast by design

~150k messages/s (10 kB each) over the binary MsgPack protocol.

● Truly extensible

Native C++/Rust plugins, or full agents scripted in Python, R and Lua.

● Distributed & secure

Over-the-air plugin delivery and optional end-to-end encryption.

20 MB

INSTALLER SIZE

1 h

TO FIRST NETWORK

150k

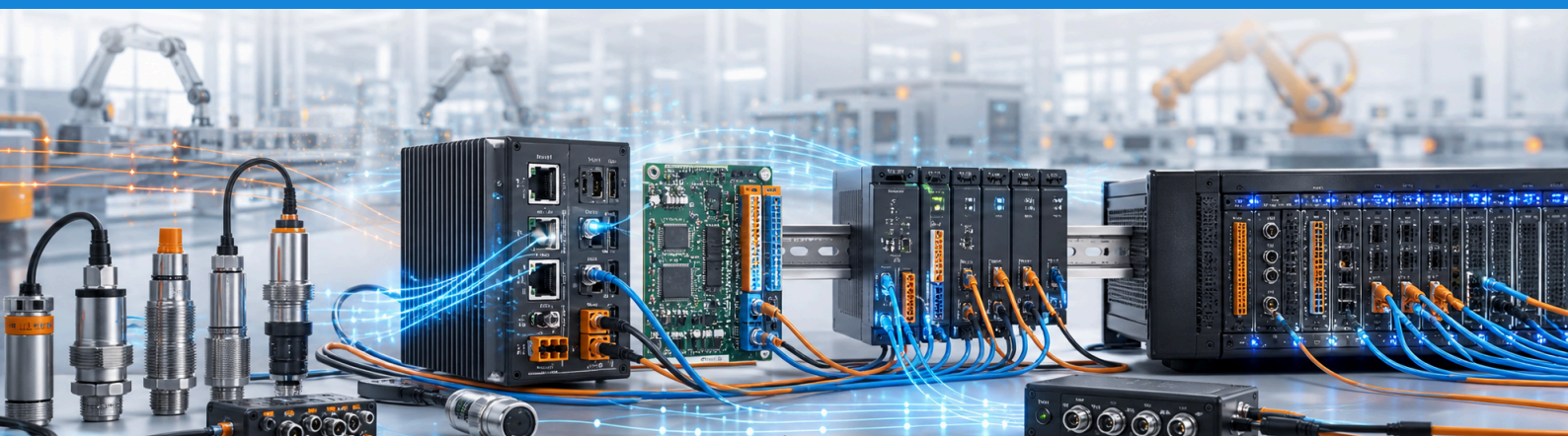
MSGs / SECOND

5

METHODS PLUGIN API

4+

PLATFORMS



One network, every interface

A minimal core of general-purpose agents, extended by a growing ecosystem of plugins and agents at github.com/MADS-Net.

I/O & devices

Arduino

Arduino Uno Q

Bluetooth LE

Raspberry Pi GPIO

Serial

Languages

C++ plugins

Rust plugins

Python agent

Python library

R

Lua

AI & simulation

ONNX models

FMU / digital twins

Data & storage

HDF5

MongoDB

CSV replay

Bridges & UI

MQTT

Text-to-speech

Terminal UI

Rerun live plots

Networking

Federation

Auto-discovery

OTA plugins

WHO'S USING MADS

University of Trento • MiRO Lab

Software stack of a **robotic walker** for neuro-rehabilitation of patients.

University of Brescia • MMTLab

Edge-AI cameras for real-time **3D human pose estimation**.

University of Perugia • Measurement Group

Data collection from **wearable sensors** and RFID transponders.

INSA Toulouse • Institut Clément Ader

Multi-sensor **energy-efficiency** monitoring on machining shopfloors.

TEACHING

The new **MASSMa** course (Multi-Agent Systems for Smart Machining) runs jointly at the University of Trento and INSA Toulouse under the ECIU umbrella.

GET STARTED

GET MADS git.new/MADS**DOCS** mads-net.github.io**SOURCE** github.com/pbosetti/mads**PLUGINS** github.com/MADS-Net**VS CODE** MADSCode extension

CONTACT

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MADS (v2.3 or later) is released under Apache 2.0 — free to use for any application.

