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The Big Picture:
We introduce RobotPerf, a vendor-agnostic benchmarking suite designed to evaluate robotics computing performance across a diverse range of hardware platforms using ROS 2 as its common baseline. Emphasizing adaptability, portability, and a community-driven approach, RobotPerf aims to provide fair comparisons of ROS 2 computational graphs across CPUs, GPUs, FPGAs and other accelerators through both grey-box and black-box approaches.

github.com/robotperf/benchmarks

Principles and Methodology:
RobotPerf’s key design principles include:
• Non-Functional Performance Testing
• ROS 2 Integration & Adaptability
• Platform Independence & Portability
• Reproducibility & Consistency
• Flexible Methodologies for Benchmarking and Opaque Performance Tests that do NOT Alter Workloads of Interest and can be accomplished through either Grey-Box or Black-Box Approaches

Evaluation Highlights:
• RobotPerf’s Beta release benchmarks across a wide variety of heterogeneous hardware platforms (18) and workloads (16).

• The “one-size-fits-all” strategy is suboptimal. E.g., the control latency plot (col 3, row 1), shows that the 17H outperforms NO on benchmarks C1, C3, C4, and C5, but is 6.5x slower on benchmark C2.

• Hardware acceleration improves performance. E.g., in the perception benchmarks (col 1), the ROBOTCORE Perception accelerator (KR) provides its hardware platform with gains of as much as 11.5x over the non-accelerated variant (KK).

Benchmarks Methodology: • Black-box Testing • Grey-box Testing