How we deal with software complexity in robotics: "links and nodes" and the "robotkernel"

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Abstract

At DLR's Institute of Robotics and Mechatronics we have developed two cross-platform solutions to A) reduce our development effort when integrating software and writing new drivers for novel robotic systems and B) to increase the quality in terms of system stability, determinism, scalability and maintenance:

- links and nodes (LN): process management and realtime capable communication middleware for distributed systems
- robotkernel (RK): framework to configure, manage and interconnect driver modules via human readable config files

Both concepts were developed over the past four years and are based on our institute's long experience with complex, distributed real time systems and custom hardware in a heterogeneous computing environment. They allow to compose systems without a compilation step simply by writing config files and combining existing modules in a new way.

The talk will give an overview of how they are applied in a wide variety of our robotic systems like the humanoid robots toro, rollin' justin, space justin, hand-arm-system and other systems like MiroSurge, flying robots, mobile robots and experimental setups.