

## SOLUTION BLUEPRINT

# Combination of hard real-time data acquisition and Linux based industrial interface usage on one platform

Solution Partner

Gantner  
instruments

Linux provides a broad range of industrial interfaces and is widely used in industrial applications. But when it comes to hard real-time performance, the off-the-shelf capabilities of Linux are not sufficient. Safe and secure virtualization solves this issue by allowing the combination of Linux side by side with real-time operating systems on one platform. Furthermore, legacy code can be reused in its own partition – saving time and money.

Linux makes industrial interfaces like Ethernet, TCP/IP, EtherCat, and CANOpen available, allowing high speed data collection. The acquisition, storage, and processing of electrical, thermal, and mechanical quantities require real-time capabilities that cannot be handled by Linux. Using PikeOS partitioning capabilities, Linux and other operating system interfaces (e.g. POSIX) can run side by side on one hardware platform.

#### Using Linux for industrial hard real-time applications

Gantner Instruments designed the new control unit e.gate as part of a family of measurement modules and test controllers. This data concentrator collects and synchronizes data of up to 120 remote modules and packs and transmits it via standard interfaces. Measuring modules convert signals with a measuring rate of up to 100 kHz. In order to make use of Linux industrial interfaces, Gantner searched for an integration of hard real-time and Linux. The virtualization platform PikeOS offered a solution by separating the POSIX based I/O data acquisition and the Linux based Network into different partitions, thus bringing hard real-time and Linux together. Furthermore, for a new engine test bed, Gantner was able to reuse its legacy code on top of a POSIX API making the application software standard based and future-proof. That way, Gantner Instruments was able to meet tight schedule and budget constraints.

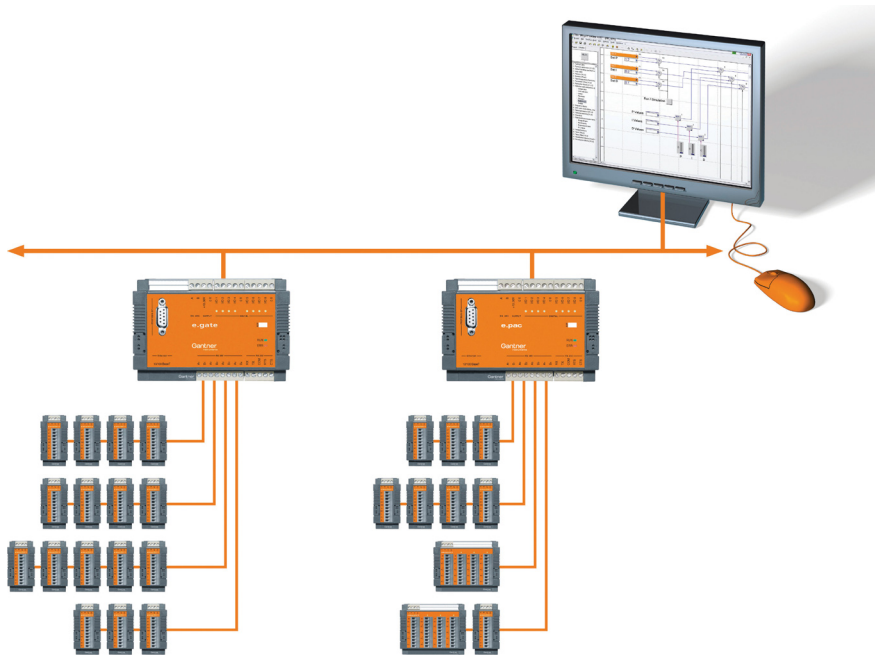


Fig 1: PikeOS offers the separation of POSIX based I/O data acquisition and the Linux based Network into different partitions.

#### About PikeOS

PikeOS is an innovative product providing an embedded systems platform where multiple virtual machines can run simultaneously in a safe and secure environment. Its safe and secure virtualization technology allows multiple OS APIs to run concurrently on one machine, e.g. a safety-critical ARINC-653 application together with Linux. The PikeOS microkernel architecture allows it to be used in cost sensitive, resource constrained devices as well as large, complex systems. The simplicity and compactness of the PikeOS design results in real-time performance that competes head-to-head with conventional proprietary RTOS solutions.

#### About Gantner Instruments

Gantner Instruments specializes in the acquisition of electrical, thermal, and mechanical quantities regarding engine testing, component testing, process monitoring, and long-term monitoring. Open protocols and data formats allow total integration. The measurement modules and test controllers of the e.series product family offer an optimal signal acquisition and processing solution on all levels.

#### About SYSGO

SYSGO provides operating system technology, middleware, and software services for the real-time and embedded market. A differentiating capability of SYSGO is the secure PikeOS paravirtualization operating system which is built upon a small, fast, and safe microkernel. It supports the co-existence of independent operating system personalities on a single platform, including ELinOS, SYSGO's embedded Linux distribution. SYSGO supports international customers with services for embedded Linux, real-time capabilities and certification for safety-critical applications. Markets include Aerospace & Defense, Industrial Automation, Automotive, Transportation and Network Infrastructure. Customers include Airbus, Honeywell, Thales, Daimler, Raytheon, Rheinmetall, Rockwell-Collins, Siemens, and Rohde & Schwarz. SYSGO has six facilities in Europe, including Germany, France, and the Czech Republic and offers a global distribution and support network, extending to North America and the Pacific Rim.