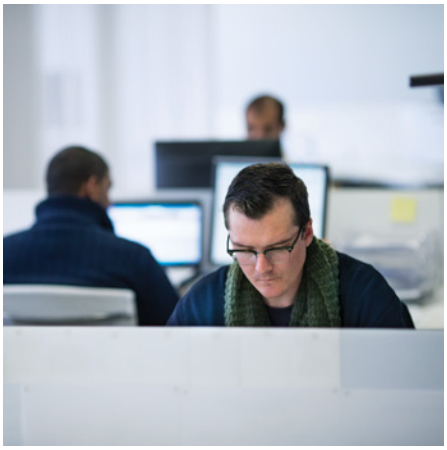
SOLUTION BRIEF

nomos Operating System* with Intel® IoT Platform

Uniting the Internet of Things Ecosystem



nomos Operating System* and Intel® architecture unlock and connect IoT protocols to create a seamless user experience

An increasingly connected world

The world is fast becoming a very connected place. The rise of the Internet of Things (IoT) means computing power, cloud connectivity, analytics and automation are now being added to everything from specialist factory equipment to the family refrigerator. And the pace of transformation shows no sign of slowing, with Gartner predicting 25 billion connected devices worldwide by 2020[1].

As the potential benefits of IoT – greater convenience, lower costs and more informed decision-making to name a few – are lauded in the media, consumers increasingly demand and expect their connected devices to 'just work'. In industries as diverse as automotive, retail, healthcare, government and hospitality, having a highly functioning IoT environment is now a key part of business strategy for many organizations.

However, as a relatively new and still-evolving technology, the IoT still lacks a universally accepted set of standards and protocols upon which to operate. Different IoT organizations are creating consortia to agree common standards that will ensure interoperability between their solutions, but with each consortium setting its own standards, this interoperability can only go so far. Businesses and consumers are left unable to link up key parts of their IoT infrastructures where solutions run on different standards.

When nomos system AG set out to address this issue, its goal was simple but ambitious: to create a software engine capable of connecting all devices in all environments and creating universal interoperability, regardless of standards or protocols.

Benefits for business and consumers

The nomos Operating System* (noS*) with the Intel® IoT Gateway connects all IoT devices and environments, delivering benefits to both business and consumer users.

With greater intelligence and automation, **businesses** are able to identify opportunities for growth or improvement which would not have been evident before. Process efficiencies can be achieved in new areas – for example, a facilities manager in a smart office building can set a sensor to monitor toner levels in office printers and automatically trigger an order for a new cartridge when one falls below 20 percent full. Meanwhile, costs can be saved with smarter management of air conditioning, heating, lighting and

other energy-consuming operations across the company. For instance, movement sensors can help ensure that lights remain on in the evenings only if and when an employee is still working at his or her desk.

In the **residential** sphere, users can not only centralize and more easily control their home entertainment systems, but can also gain peace of mind when they're away. For example, when a family goes on vacation, plant sensors can alert a neighbor when it's time to go and water the plants, or an emergency alert can be sent to the neighbor in the event of a water leak. Even when heading out for the evening, homeowners can achieve greater convenience by switching off all lights and electrical appliances when they leave, at the tap of a button on a smartphone app.

TECHNOLOGY BENEFITS	BUSINESS BENEFITS	CONSUMER BENEFITS
Solve interoperability obstacles by enabling all devices to communicate with each other	Different models of solution to fit specific business needs	Add convenience to smart home environments by eliminating multiple remote controls and apps
Universal translator for devices across every protocol	Ready-to-implement solution that can be executed quickly to speed time-to-market	Save costs through more efficient energy use
Capable of enabling any company to enter the automation market	Development platform enables IoT solutions to be tailored to organizational requirements	Increase peace of mind with the ability to monitor aspects of home safety and security remotely
Complete, tailorable functionality at any point or level	Community of integrators support projects of any size or complexity	

Table 1: Benefits of nomos Operating System* with the Intel® IoT Gateway

Versatile use cases

A wide range of organizations across industries are already using the nOS solution to deliver enhanced services to their customers.

• At the OverTime Sports Bar in Arosa Switzerland, the Intel IoT Gateway and the nOS platform enable busy bar staff to maintain a welcoming and comfortable environment. In a bar full of loud music and clamoring customers, the staff are under pressure to focus on their core role of serving food and drinks. They use tablets installed at the bar to not only select and change music, but also to keep tabs on other aspects of the environment, such as light levels and ventilation in the smoking area. The staff can even set the lighting to flash or change color in celebration when the local team is winning a game on the big screens around the bar.

• A ski resort in the Alps is using the solution to improve its ability to take advantage of real-time information to drive up visitor numbers. It uses sensors to track the number of cars in its parking garage, the weather and sun levels on the slopes, and the quality of the snow. It then automates postings to its social media channels to let nearby skiing fans know when conditions are just right to hit the slopes.

• The physics department at the University of Montreal must keep tight control over its equipment to ensure safety and costs are maintained. It uses nOS running on Intel architecture to monitor pressure levels in its tanks of helium gas. In the event of a sudden or abnormal increase or decrease in pressure, an automated alert flags the issue to a lab technician, who is then able to check the tank and address any issues before they become dangerous or goes to waste.

• Brabus is an after-market tuning company that specializes in optimizing high-value cars, such as Bentleys* and Mercedes*. The company has used the nOS platform with Intel technology to create a personalized environment within the car. With the solution in place, a driver may leave their home, where they had been listening to their favorite song on Spotify* or iTunes*, and get into the car, which then begins playing the song where it left off in the house. Lighting and other settings may be tailored to automatically respond to the driver's preferences, and the in-car navigation system may send push notifications alerting the driver to potential delays or points of interest along their route.

Universal integration with nomos and Intel

The nOS is designed to unlock all multimedia, software, service and building automation protocols known today.

Built on Intel architecture since its initial development in 2007, the solution connects all devices by elevating them to one consistent language, handling

all logistics and ensuring commands are executed without interruption. The broad compatibility of both nOS and Intel technology offers a future-ready platform to support the growth of the connected device ecosystem over the coming years.

The nOS infrastructure was designed in C++ to maintain zero latency and allow modular accessibility locally and independent from the Internet connection, via the cloud or through socket.io API. With a data footprint of just 613KB, it can be compiled even to a single chipset.

The solution supports a diverse range of automation, including lighting, heating/air conditioning (HVAC), energy management, security/CCTV, AV distribution and entertainment. Support for both residential use and high-intensity industrial environments were built in from the outset. It offers the solidity and reliability to support smart building controllers, and the flexibility to integrate with consumer multimedia platforms such as OSX*. The horizontal solution features a range of different functionality for different flavors of deployment, which can be activated or switched off as needed.

Designed to meet business and consumer needs across a range of environments and use cases, the nOS is a horizontal solution. By using the Intel IoT Gateway to capture and filter data coming from connected devices to the nOS software, this horizontal compatibility is maintained. With nOS installed on the gateway devices, users can collect and control data and multimedia, access cloud-based management services and even deploy additional services back to the IoT environment.

For more information on Intel's Internet of Things solutions visit **www.intel.com/iot**
For more information about nomos System visit: **www.nomos-system.com**

[1] Gartner Says 4.9 Billion Connected "Things" Will Be in Use in 2015, http://www.gartner.com/newsroom/id/2905717