

## NGOS: NETGEAR OS

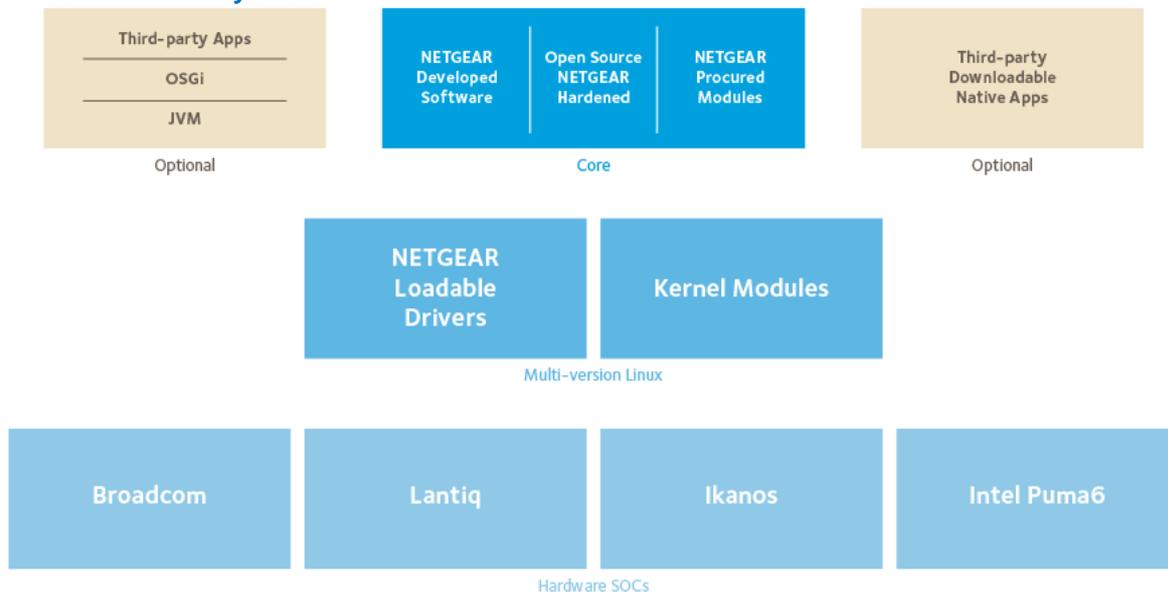
NGOS, NETGEAR’s router and gateway software platform, was created to be an extremely flexible platform that offers service providers the ability to customize their products in accordance with their deployment needs. The platform, which is capable of running on SOCs from multiple vendors, brings service providers the acceleration of new feature deployment from independent feature development by NETGEAR to custom features for multiple carriers around the world and features developed by SOC vendors.

The platform has been hardened to match carrier requirements and is deployed in several large Tier-1 accounts globally, including AT&T. It is based upon an embedded Linux operating system and consists of a core and two optional modules. The core, enhanced and hardened by NETGEAR, runs on top of the Linux kernel provided by the SOC vendor. Depending upon carrier requirements, one or more of the optional modules are included in the image.

### Field Proven Globally.

NGOS is a mature chipset-independent gateway and router software platform that has been deployed in over 30 million units globally. It has been deployed on multiple Linux kernels and ARM, MIPS, and x86 architectures. Utilizing this feature-rich platform with its flexible architecture, NETGEAR service provider customers can feel confident that their products will reflect the innovation, quality, and ease-of-use and integration that NETGEAR is known for and customers have come to expect.

Figure A: NGOS Gateway Software Stack



SOCs are examples of capabilities. NETGEAR is not limited to the SOCs listed and can work with multiple SOCs.

### Software model

The software delivered consists of an application image and factory test images. The application image is the officially approved carrier image and optionally signed by the customer. The application image comprises of a bootloader, Linux kernel, and what is shown in **Figure A** as the Core module.

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The NETGEAR software model is a hybrid model, as compared to the two traditional models where either the entire software platform is developed in-house or the demo package from the SOC vendor is taken and manipulated to provide a product.

The hybrid model used by the NETGEAR software platform ensures that it benefits from the performance and feature improvements from the SOC vendor and also assures NETGEAR service provider customers that they are on a carrier-hardened version of the software.

In comparison, completely developed in-house models can create situations where kernel version incompatibilities can cause issues. Specifically, quality issues can occur when the driver is developed by the chip vendor using one version of the kernel and ported to a different version. It also creates instances where it can be difficult to upgrade and provide support for new features, e.g. when IPv4 to IPv6 transition is needed. Also, optimal networking performance can be difficult to achieve from the product as SOC vendors make adjustments and enhancements that require both a driver and a kernel component to achieve the benefit.

Another commonly used model, more commonly known as the faster-to-market model, is when a demo package from a SOC vendor is used as the base. The demo package is always a SDK, making any enhancements that need to be made to create a carrier-class software platform a lengthy process. This can become particularly cumbersome when switching SOCs, or when the SOC vendor EOLs their software release long before they EOL their product, as it requires the enhancements that were made to be repeated many times over—creating inefficiencies in both time and process.

## **Module Tab**

### **Core Module**

At the heart of NGOS resides the core module. The module consists of features that form the core of the product and includes common routing IPv4/IPv6, bridging, NAT, firewall and wireless features. Additionally, it contains several value-added features like parental control, VPN Server, WAN failover, auto WAN detect, VLAN, IMS SIP, VoLTE, MGCP, etc. For a detailed and updated list of features, please contact your local sales representative.

### **Smart Network Module**

This optional module, when enabled for a product, adds a base Java virtual machine and OSGi interface to the base image. A service provider (or their ecosystem of partners) can add OSGi-compliant applications during the run time of the product. A factory reset will wipe out all the applications that were installed after the product has shipped from the factory.

### **Native Application Module**

This optional module allows creation of native applications that require faster processing when the inclusion of Java is not a possibility. However, modules developed using this approach require NETGEAR involvement to package them into a format that can be applied as an upgrade to the field product. Adding this package can be achieved using the TR-069 protocol. However, it's important to note that a factory reset of the device will remove this module from the product.