



DATASHEET

Carrier Grade Disaggregated IP/MPLS Routing Solutions

Exaware provides one of the most advanced IP routing operating systems to power the market shift to network disaggregation for fixed, mobile operators, and enterprises.

What is disaggregation?

Prior to 2016, selecting network equipment in the IP networking industry was fairly simple—the choice was Cisco, Juniper, Nokia, or Huawei. Back then, a router was sold as a package of hardware and software, with no possibility of changing anything in the software.

Disaggregation changed the status quo, under the influence of major hyperscale cloud providers such as Google and Amazon who built their own switching equipment by using

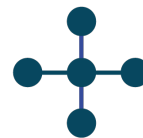
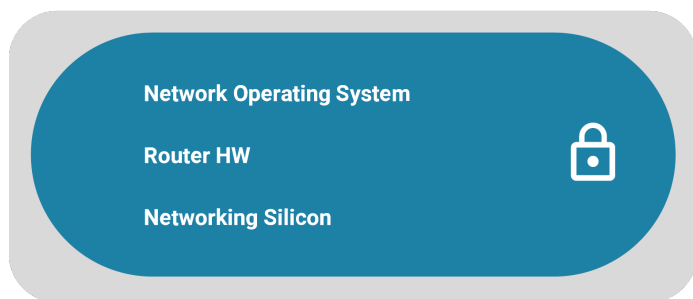
third party hardware manufacturers and by embedding their own IP switching software with required features.

In 2016, Broadcom, a leading chipset manufacturer, released its DNX chipset family, beginning a new era in large scale IP routing. This event triggered the same excitement that occurred in data centers; for the first time, a disaggregated IP router could be built with all the features found in traditional routers (from Cisco, Juniper, Nokia, and Huawei).

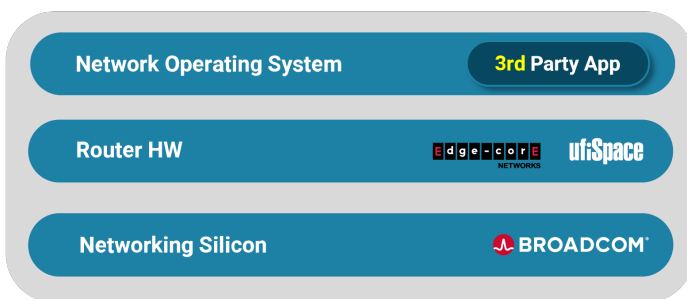
VERTICAL VS. DISAGGREGATED ROUTER



Vertically Integrated Monolithic Router



Disaggregated Router



With disaggregation, the hardware, network operating system (NOS), and applications are separate components in an open ecosystem, so each component can be purchased from a different vendor.

Customers choose the hardware and the software they want, based on price, features, and applications.

Benefits of Disaggregation

The flexibility to build a customized router comes with several benefits.

Disaggregation breaks vendor lock-in

With traditional proprietary networking solutions, once a network is deployed and in operation, you are forced to continue to use the same vendor as you increase network capacity over time.

Because you are dependent on one vendor, you are tied to that vendor's rigid feature roadmap, which can hamper innovation in the network.

Additionally, your costs are greater with traditional vendor solutions.

Disaggregation enables major cost savings

Similar to what happened in the personal computer industry where the hardware became low cost commoditized products while differentiation took place in the software operating system, disaggregation provides substantial cost benefits, such as:

- Lower cost per bit
- Lower operational cost compared to traditional routers
- Lower initial investment cost compared to traditional routers
- Easy and affordable expansion
- Reduced cost of floor space, electricity, and cooling

Opens a New Ecosystem of Networking Applications

The fundamental principle of disaggregation is open networking. The telecommunications industry requires a high degree of openness to become more like the hyperscalers in terms of agility, time to market, and innovation.

With disaggregation, you can connect any application with the network.

For example, you can provide your customers with instant VPN provisioning. Your customer orders a new VPN service, and 5 minutes later enjoys the service, which required no human intervention to set up.

Customers can also order extra bandwidth capacity for a spot operation (needed for only a few hours or a few days), with everything online and running automatically, enabling you to generate new sources of revenue.

This is only a small subset of the infinite possibilities enabled by the disaggregation model.

Simplified Operations

Communication Service Providers (CSP) have a large installed base of legacy routers, resulting in complex operations and requiring CSPs to maintain a skilled workforce.

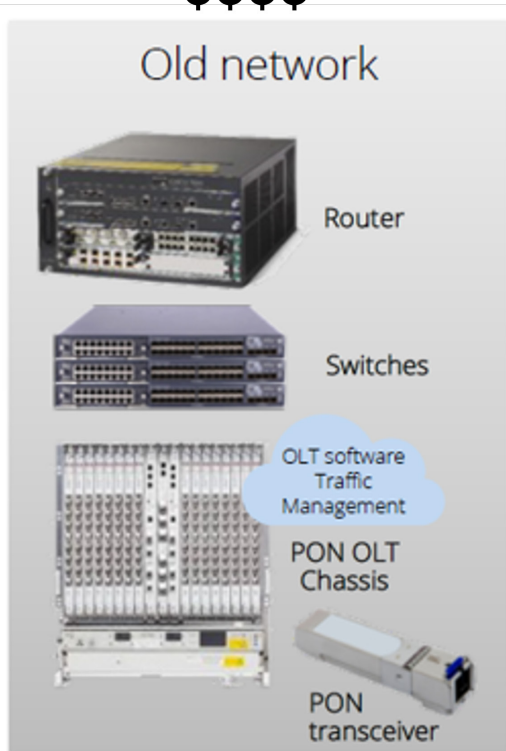
Disaggregation brings an end to this headache. The same software runs on all your routers, throughout the network. The hardware becomes standardized and a unified stock of spare parts can be maintained in a cost-efficient manner.

Unleashes Petabit Scalability

With disaggregation, the traditional routing chassis becomes virtual and does not require an expensive upfront investment. It is now possible to grow your network by small increments, only purchasing the capacity you need. This approach follows the scale-out strategy from hyperscale cloud providers as opposed to the traditional scale up approach in the networking industry.

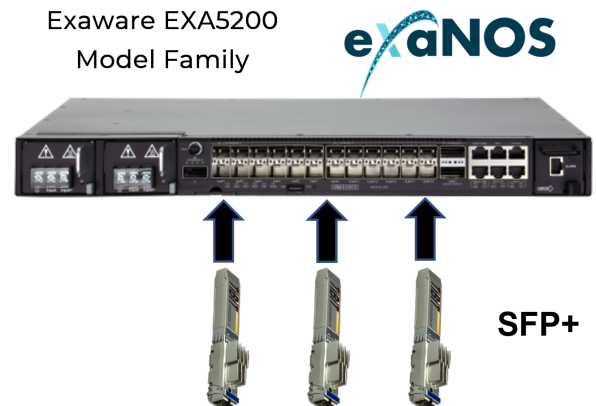
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Old network



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New network



Exaware's Carrier Grade Disaggregated IP/MPLS Routing Solutions

In the networking industry, experience is critical. Because networking protocols are very complex to develop and the features required by large networks are numerous and need to interoperate with other parts of the network, a reliable solution requires years of development and real production experience.

This is Exaware's advantage over other NOS vendors in the disaggregated space because we have been in the industry since 2008 and developed a complete router, both software and hardware.

Our network operating system (NOS) was released as a disaggregated solution in April 2019, and has been installed in live networks. We support most access, aggregation, edge/PE, and network peering applications.

We partner with leading hardware vendors, such as Edgecore Networks and UfiSpace, to provide a complete solution, which operates successfully straight out of the box.

Our economic model is simple — we sell you a license to use our NOS, which you can use on any supported hardware of your choice. This license is based on the bandwidth

capacity you need and the type of hardware configuration (chassis or standalone router, redundant or non-redundant configuration).

Once you have acquired your license, you keep it forever. Should you wish to upgrade your hardware, no need to buy another license; you simply reuse your current license on your new hardware.

Exaware provides a complete Level 1, 2, or 3 support service. Level 1 and Level 2, which deal with basic issues, hardware failures, or software fixes, are usually performed locally by our partners, in order to provide the responsiveness you need. Level 3 support is performed by our team of experts, who work with our local partners. From your standpoint, everything is seamless, you have one local contact who coordinates with us to ensure your service continuity. The Maintenance & Support service is charged annually as a percentage of your installed router base.

With Exaware, you get a full IP router, together with the benefits of disaggregation.



Applications

Exaware's solutions span the whole spectrum of network applications, for mobile, fixed, and enterprise networks.

Access - Economically deploy reliable FTTx residential, business, and wireless backhaul services with maximum networking flexibility

Aggregation - Transparently consolidate multi-service network access traffic at scale to meet growing needs

Edge/PE - Cost effectively mitigate network bottlenecks and improve wide area network quality of service

Network peering - Reduce cost and increase flexibility when exchanging traffic with cloud, data center, transport, and internet peering off-net partners

From 800G to 1,300T, there is a solution available for your needs.

Summary

Exaware provides a robust solution, readily available for deployment, with the following advantages:

- A complete network operating system, with over 3 million lines of code and \$80 million invested in its development
- Developed from the ground up with carrier requirements in mind
- A robust carrier-grade operating system that handles millions of routes, suited to large scale internet and high availability routing

- A wide range of carrier applications (mobile cell site, mobile backhaul, BGP peering, PE, data center interconnect)
- Experience with Tier 1 carriers (NTT America, Comcast, Rostelecom)