

**exaware**

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# **EXAWARE DISAGGREGATED ROUTING SOLUTIONS**

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**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?

Ever since the IP networking industry developed into a \$16 bn market (Dell Oro 2016), choosing a network equipment was fairly simple, the choice was either Cisco, Juniper, Huawei or possibly Nokia. Often times, this would be a choice by default, as no single solution would always fit the customer requirements. Up until recently, a router was sold as a package of hardware and software, without the possibility to change anything to the software.

Disaggregation came to change the status quo, under the impulse of major Hyperscale Cloud Providers such as Google and Amazon, who built their own switching equipment, using third-party hardware manufacturers and by embedding their own IP switching software with their required features.

In 2016, Broadcom, a leading chipset manufacturer, released its DNX chipset family, opening a new era in large scale IP routing. This event triggered the same excitement which occurred in Datacenters and enabled for the first time to build a disaggregated IP router with all the features found in traditional routers (from Cisco, Juniper and Huawei...).

With disaggregation, the Hardware, Network Operating System (NOS) and Applications are now separate components in an open ecosystem, so each component can be purchased from a different vendor.

Customers have now the choice to pick the hardware and the software he wants, based on price, features and applications.



### Vertically Integrated Monolithic Router

Network Operating System

Router HW

Networking Silicon



JUNIPER  
NETWORKS

NOKIA



### Disaggregated Router

Network Operating System

Router HW

Networking Silicon

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## BENEFITS OF DISAGGREGATION

The flexibility to build a customized router brings many benefits, listed below:

### Breaks vendor lock-in

Once a network is deployed and in operation, using one of the vendors in the industry, there is not much choice left but to keep increasing the capacity using one and the same vendor. This increases costs and locks the customer to a rigid feature roadmap, thereby hampering innovation in the network.

### Enables major cost-savings

Very much like what happened to the Personal Computer industry, where the hardware became commoditized and low-cost, while the differentiation took place in the software operating system, disaggregation provides substantial costs benefits, such as:

- Lower cost per bit
- Lower Operational cost in comparison to traditional routers
- Lower Initial investment cost in comparison to traditional router vendors
- No lock-in with Optics
- Easy and affordable expansion
- Reduced cost of floor space, electricity and cooling

## Simplifies Operations

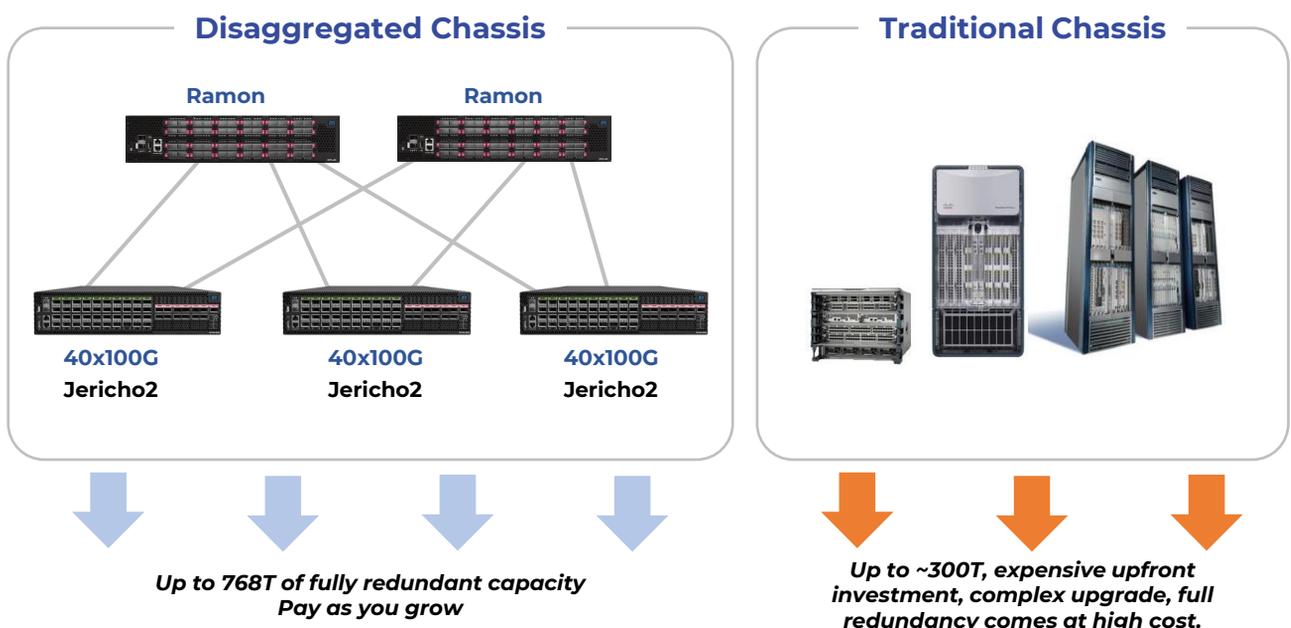
Communications Service Providers (CSP) have a large installed base of legacy routers, resulting in complex operations and requiring CSPs to maintain skilled people.

Disaggregation brings an end to this headache. The same software runs on all your routers, throughout the network. The hardware becomes standardized and enables to maintain a unified stock of spare parts 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.

(Contact us for more details).



## **Opens up a new ecosystem of networking applications**

The fundamental principle of disaggregation is open networking.

The Telecommunication industry needs a much higher degree of openness to become more like the Hyperscalers in terms of agility, time to market and Innovation.

With Disaggregation, it now becomes possible to 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 it up.

Your customers can also order extra bandwidth capacity for a spot operation (a few hours or a few days), everything online and automatically, enabling you to generate new sources of revenues.

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

## **EXAWARE OFFERING**

In the networking industry, experience is critical. Because networking protocols are very complex to develop, 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, as we have been in the industry since 2008 and developed a complete router, both software and hardware (see below section "About Us").

Our Network Operating System (NOS) was released as a disaggregated solution in April 2019, and since then, was installed in live networks. Many features are already available (see list below), enabling you to deploy common applications, such as Peering, Aggregation and Cell Site Gateway (See "Applications and Use Cases" section for further details).

We partner with leading hardware vendors, such as Delta Networks, Ufispac and Edge Core, to provide a complete solution, which works 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 again a license, you simply reuse your current license on your new hardware.

Exaware provides a complete Level 1/Level 3 support service. Level 1 and Level 2, which deal with basic issues, hardware failures or software fixes are usually operated locally by our partners, in order to provide the reactivity you need. Level 3 support is operated 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. 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

Our solution spans the whole spectrum of network applications, for Mobile, Fixed and Enterprise networks:

**Peering** allows you to establish a scalable connection with other Service Providers for your internet traffic needs. These connections use the BGP protocol, which comes with numerous features, to ensure the reliability of your connection and the security of your networks and your customers.

**Cell Site Gateway** is a critical component of a mobile network, it is the connection between every mobile cell and the core network. Synchronization is one of the important features to keep voice traffic flowing with the required Quality of Service.

**Datacenter Gateway** is a key application that requires a robust routing configuration, to provide both scale and redundancy. It ensures access from users to many internet content providers. This is typically an application that can take advantage of our distributed Chassis architecture.

**Mobile Backhaul and Access Aggregation** are the central points in the network which will concentrate the traffic coming from the edges, before it enters into the core network. Redundancy is required as the failure of one router will impact potentially thousands of customers.

**From 60G to 768T, there is a solution available for your needs.**

Non-Redundant "Pizzabox"	Redundant Back-to-back	Redundant Distributed Chassis
 <p><b>Cell-site</b> 60 – 300 Gbps Qumran AX, UX</p>  <p><b>N-R Peering, Edge, Core</b> 0.8T, 2.4T (Q-MX/2C) 4.8T (Jericho2)</p> <p><b>60G to 4T</b></p>	<p>Active/Standby solution for mid-size bandwidth. Qumran AX and Jericho2C</p>  <p><b>Aggregation, Edge</b></p> <p><b>300G to 2.4T</b></p>	<p>High scale based on DNX technology Modular line cards - Jericho2 Modular fabric - Ramon</p>  <p><b>Edge to Core</b></p> <p><b>Up to 768T</b></p>

**DDoS Mitigation** is one of the key applications that every Communications Service Provider needs to have. DDoS attacks have a massive operational and financial impact and current solutions are either ineffective or expensive. Exaware enables DDoS mitigation at the peering point, allowing your network to stay clean of attacks. [Contact us](#) for more details.

## 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 a \$80 million investment in its development.

- Developed from the ground up with carrier requirements in mind
- A robust carrier-grade operating system which 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, Core, Datacenter Interconnect)
- Experience with Tier-1 Carriers (NTT America, Comcast, Rostelecom)

2008	2012	2016	2019
<p><b>Compass Networks founded</b> Developed Compass Networks 800G Carrier grade router</p> <ul style="list-style-type: none"> <li>▪ <b>Multi-line cards</b></li> <li>▪ <b>Fully redundant</b></li> <li>▪ Optical backplane connectivity</li> <li>▪ <b>High scale/performance carrier grade IP/MPLS routing OS</b></li> </ul>  <p>About 85MS invested in the development of a carrier grade, IP/MPLS routing OS</p>	<p><b>Compass Router in 3 live Tier-1 Service Providers Networks</b></p> <p> <ul style="list-style-type: none"> <li>▪ Peering router</li> <li>▪ BGP scale and interoperability</li> </ul> <hr/> <p> <ul style="list-style-type: none"> <li>▪ Provider Edge and Peering</li> <li>▪ MPLS – RSVP, LDP</li> <li>▪ BGP</li> </ul> <hr/> <p> <ul style="list-style-type: none"> <li>▪ Provider Edge</li> <li>▪ L3VPN/L2VPN</li> </ul> </p> <div data-bbox="449 1042 1015 1265" style="border: 1px solid #ccc; padding: 10px; background-color: #e6f2ff;"> <p>(*) "The <b>software and feature set were extremely stable</b> and preformed as tested and expected. During the years I have worked with the Compass product <b>I found the software to be as reliable, feature rich, and easy to use as other vendors</b> within the network, if not more robust."</p> <p><b>Joe Sapienza, Architect Subject Matter Expert for Core Routers and Transport at Comcast</b></p> </div> </p></p>	<p style="text-align: center;"><b>exaware</b></p> <ul style="list-style-type: none"> <li>▪ Restructured operations to refocus on software only under the <b>Exaware</b> brand</li> <li>▪ Development of <b>carrier-grade service provider network operating system for disaggregated routing solutions</b></li> </ul>	<p>Exaware's <b>Disaggregated routing solution</b> based on Exaware's software (Exa-NOS) <b>running over 3rd party standard low-cost white-boxes hardware</b> installed in <b>live service provider network</b></p>  <p>  </p>

## CONTACT US

 [www.exaware.com](http://www.exaware.com)

 [info@exaware.com](mailto:info@exaware.com)

 Tel: +972-73-2124500