In this newsletter read about

CCR2216-1G-12XS-2XQ

$ 2795

Unleash the power of 100 Gigabit networking with L3 Hardware Offloading!

MILLIONS OF PACKETS PER SECOND WITH L3HW OFFLOADING!	
POWERFUL AMAZON ANNAPURNA LABS ARMV8 16-CORE CPU	
MARVELL PRESTERA® ALDRIN2 DX8525	
12X 25 GIGABIT SFP28	
LOWER POWER CONSUMPTION THAN THE PREVIOUS FLAGSHIP	
DUAL-REDUNDANT HOT-SWAP 150W PSU'S	
GIGABIT ETHERNET	
2X 100 GIGABIT QSFP28	
16 GB RAM	
2X M.2 SATA	

This is the perfect **drop-in upgrade for CCR1072** users: you can keep using your SFP modules and PSU's!

Start your 100 Gigabit journey with our new flagship product: the Cloud Core Router 2216! Its **powerful 16-core CPU** can trade blows with the mighty 72-core Tile CPU of our previous flagship - the CCR1072.

But the exceptional **Marvell Prestera Aldrin2 switch-chip** really takes it to the next level with **L3 Hardware Offloading**! Our previous CCR2116 featured a switch-chip with four 10G CPU connection lines, but this time there are four 25G lines!

Hardware offloading for:
☑ IPv4 Routing (L3HW)
☑ Inter-VLAN routing
☑ Fasttrack Connection
☑ NAT4
⊙ IPv6 Routing
⊙ NAT6
⊙ QoS
⊙ MPLS
⊙ VRF
⊙ VRRP
⊙ and more...

CCR2216-1G-12XS-2XQ

		1518 byte	
Mode	Configuration	kpps	Mbps
Bridging	Switching	**16254.8+**	**197398.3+**
Routing	L3HW	**16254.8+**	**197398.3+**
Routing	25 ip filter rules + L3HW	**16254.8+**	**197398.3+**

*Tested with the Xena 200Gbps test platform

With L3HW offloaded connections, this CPU can be at least 4x faster than the CCR1072 Tile CPU!
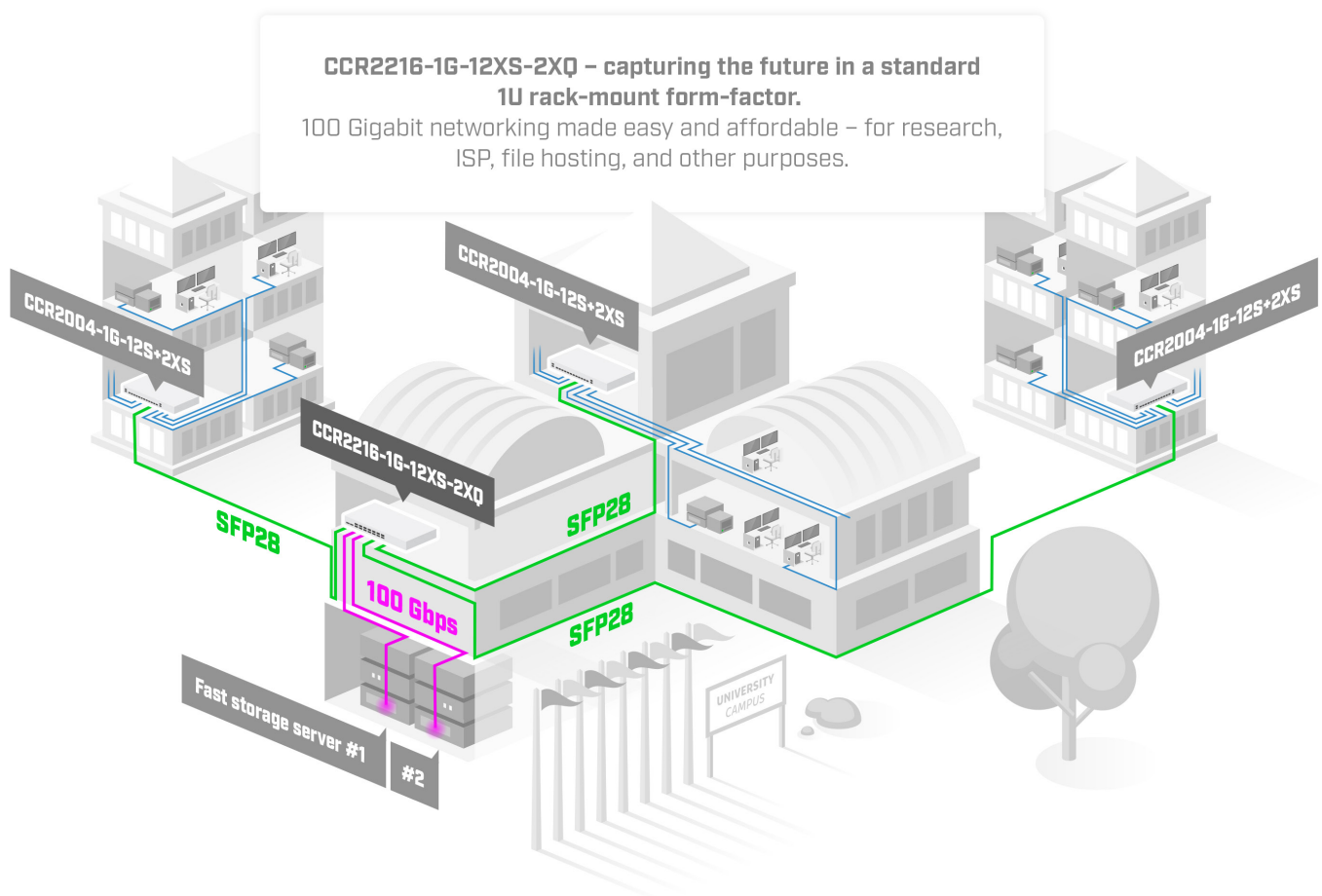
CCR2216-1G-12XS-2XQ

CCR1072
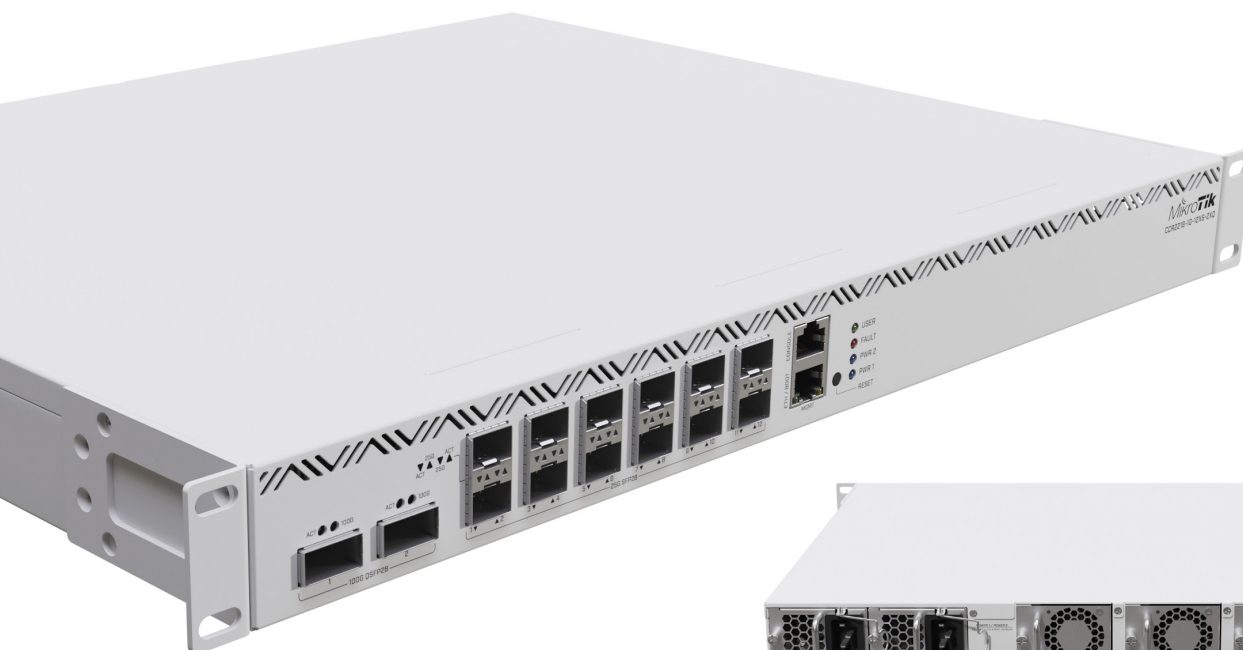
There are **2x QSFP28** cages for blazing-fast 100 Gigabit connectivity, **12x SFP28** cages for 25 Gigabit networking, and a **Gigabit Ethernet** port. The device comes with **16 GB of RAM**, decent **NAND** storage, and **two M.2 SATA slots** for additional storage. There are four hot-swappable fans, as well as dual-redundant hot-swap power supplies. And these PSUs might look familiar if you have used our CCR1072 before: you can keep using your previous hot-swap power supplies and SFP modules.

> *You're saving time and money on accessories, while also getting better performance with lower power consumption..* ***This is the perfect drop-in upgrade for existing CCR1072 setups!***

CCR2216-1G-12XS-2XQ – capturing the future in a standard 1U rack-mount form-factor.
100 Gigabit networking made easy and affordable – for research, ISP, file hosting, and other purposes.

MikroTik 802.11ay is here:

enjoy a smooth 60 GHz experience with
Cube 60Pro ac and **CubeSA 60Pro ac**!

Cube 60Pro ac	**$ 149**	🌐
CubeSA 60Pro ac	**$ 199**	🌐
Wireless Wire Cube Pro	**$ 298**	🌐

|			
GIGABIT ETHERNET	**POWERFUL QUAD-CORE CPU**	**5 GHZ FAILOVER**	**TDMA GPS SYNC**
REACH GREATER DISTANCE THAN EVER WITH CHANNEL 5 SUPPORT	**IMPROVED DESIGN AND MOUNTING OPTIONS**	**60 GHZ 802.11AY, COMPATIBLE WITH PREVIOUS 802.11AD PRODUCTS**	

Cube 60Pro ac

Long gone are the days when you had to rely on cables for speed and stability. 60 GHz solutions offer fiber-like speed and stability - while saving you plenty of time and money on installation and maintenance. Our latest Cube 60Pro product line is taking the advantages of 60 GHz networking to the next level – with the **802.11ay standard** for even higher distances, stability, speed, and convenience.

The **Cube 60Pro ac** CPE allows you to establish ultra-fast point-to-point connections over distances as far as 1 km. And that's not all – we have added Channel 5* support, so you can reach even higher distances if necessary. In our tests, the **Cube 60Pro ac** easily maintained a reliable connection over 2.4 km. Bridging two locations has never been easier!
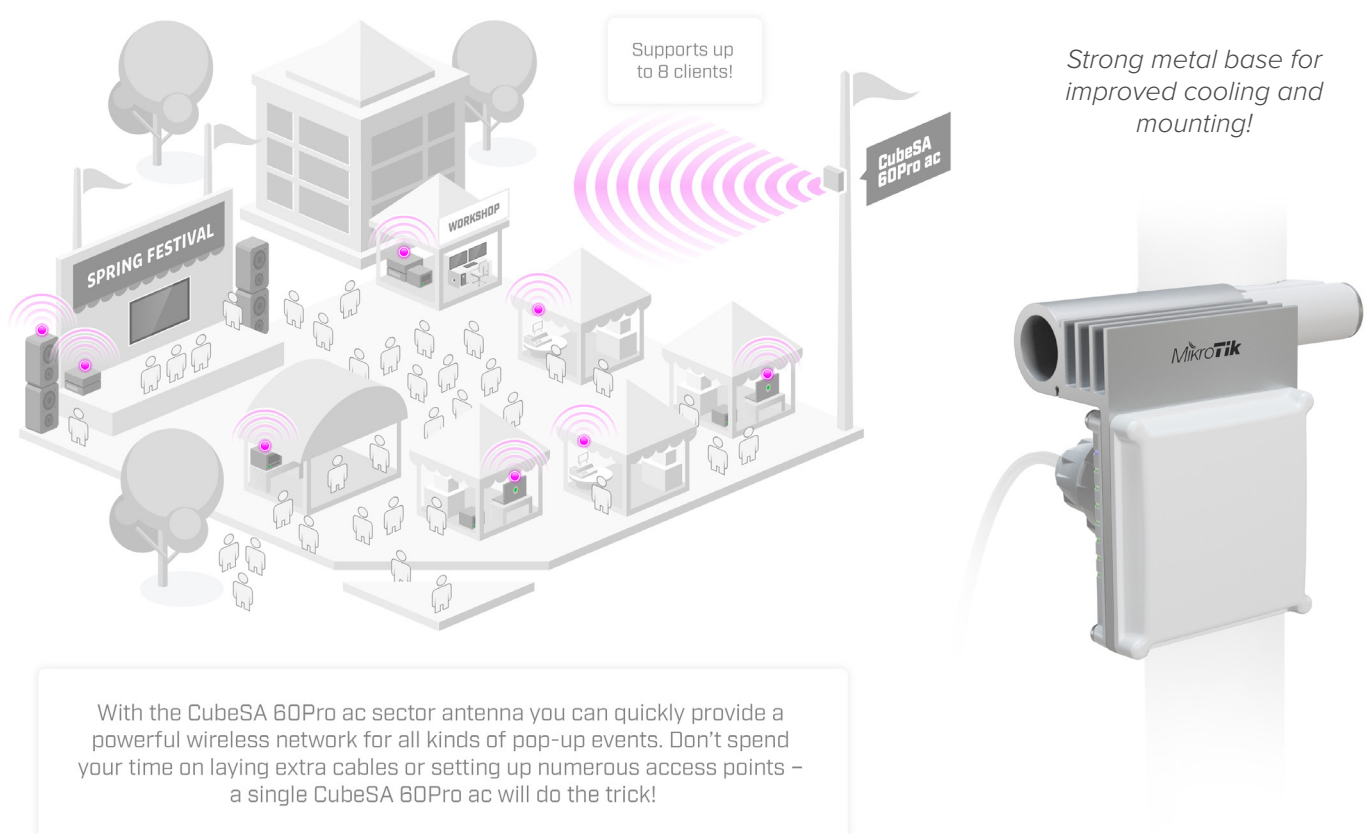
You can get a preconfigured kit of two Cube 60Pro ac devices: the **Wireless Wire Cube Pro**. Just point the Cubes at one another and power them on! They will form a blazing fast encrypted wireless connection. Pure plug-and-play!

Cube 60Pro ac – the easiest way to create a blazing fast connection without the hassle of cables.
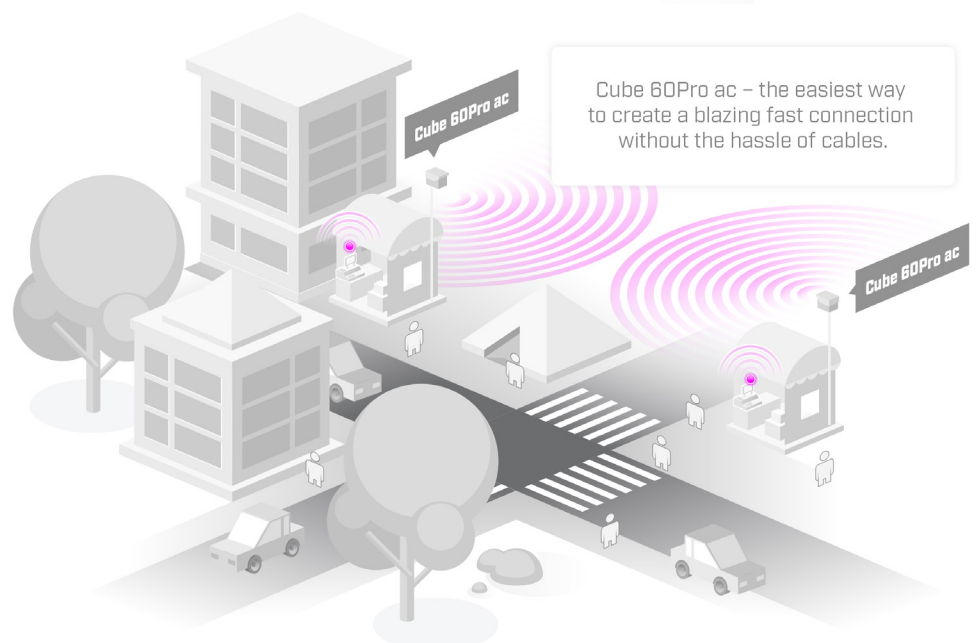
CubeSA 60Pro ac

If you need to connect multiple devices — take a look at the **CubeSA 60Pro ac** sector antenna. Reaching distances around 600 meters in point-to-multipoint mode, this device can be very helpful for all kinds of event management: from live shows, festivals, and workshops to construction sites, pop-up vaccination clinics, and so on. No need for complex wired installations in every location — the portable and handy **CubeSA 60Pro ac** has got you covered! Depending on your setup, the distance can be even greater. For example, with devices like MikroTik nRAY, you can reach up to 800 meters.

Supports up to 8 clients!

Strong metal base for improved cooling and mounting!

With the CubeSA 60Pro ac sector antenna you can quickly provide a powerful wireless network for all kinds of pop-up events. Don't spend your time on laying extra cables or setting up numerous access points – a single CubeSA 60Pro ac will do the trick!

Forget about downtime with the automatic 5 GHz backup connection

The 60 GHz frequency is unaffected by the crowded wireless spectrum, it offers high speed and capacity. But it can sometimes struggle during bad weather conditions. That's why both Cube 60Pro devices feature an automatic 5 GHz failover. We have added a powerful directional antenna so that the 5 GHz range can keep up with the 60 GHz.

More durability, less unwanted attention

We have upgraded the enclosure to feature a strong metal base — for better mounting and cooling options. The Cube form-factor emerges from pure practicality: it is durable, unobtrusive, and compact.

CCR2004-1G-2XS-PCIe

The smart and easy way to create 25 Gigabit networks if you want to save space in your server room.

ALL ROUTEROS FEATURES	**QUAD-CORE ARMV8 CPU**	**FULLY FUNCTIONAL CCR2004 IN PCIE 3.0 X8 FORM-FACTOR**	**2X SFP28 CAGES FOR 25 GIGABIT NETWORKING**
GIGABIT ETHERNET	**4GB DDR4 RAM**	**LOW-PROFILE FORMAT – FITS IN 2U SERVER CHASSIS**	**POWERED BY THE SERVER MOTHERBOARD**

Save space in your server room by adding a real CCR2004.. within the server itself! This unique product combines a simple 2x 25 Gigabit PCIe Ethernet adapter with the impressive capabilities of a fully-fledged router.

By default, the PCIe interface will show up as four virtual Ethernet interfaces. Two interfaces in passthrough mode to the 25G SFP28 cages. Remaining two virtual Ethernet-PCIe interfaces are bridged with the Gigabit Ethernet port for management access. The user can configure all interfaces and settings freely since we are running fully functional RouterOS here.

MoBo

eth0

CCR2004 PCIe

sfp28-1*

passthrough mode

sfp28-2*

passthrough mode

ether1

bridge1

* SFP28 ports work in 2 x 25G or 2 x 10G modes

ether-pcie1	ether-pcie2	ether-pcie3	ether-pcie4
eth1	eth2	eth3	eth4

Physical interface | Virtual interface | As seen by CCR2004 | As seen by host system

To get this CCR device to work as an NIC, a new Passthrough mode was implemented. Basically, a FastForward FastPath mode that can also pass hardware link statuses.

> *This NIC can reach wire-speed (100Gbps) with Jumbo frames.*
> *It ensures that in most server setups this CCR network card will*
> *not be the bottleneck.*

With **4 GB of RAM, 128 MB of NAND** storage, and a powerful **quad-core ARMv8 64-bit CPU**, this device can handle a lot: firewalls, user management and access control for home media and file servers, and even some traffic control in data centers – without the need for a stand-alone router.
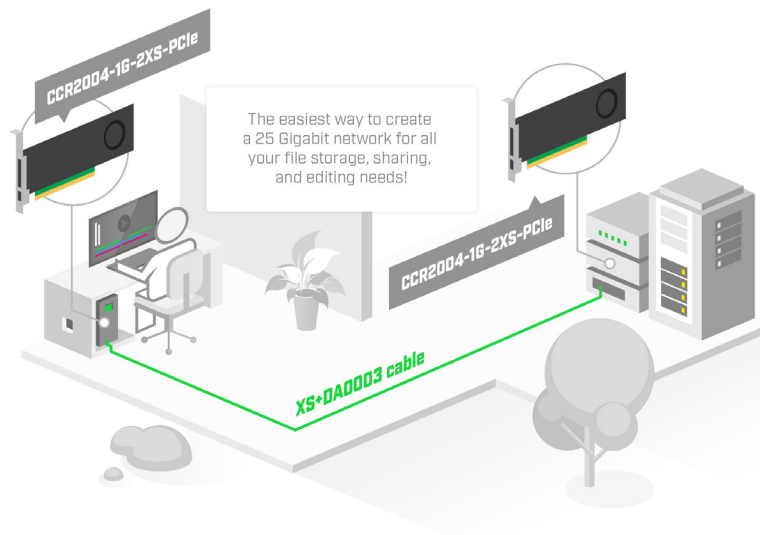
This form-factor does come with certain limitations that you should keep in mind. The CCR NIC card needs some time to boot up compared to ASIC-based setups. If the host system is up before the CCR card, it will not appear among the available devices. You should add a PCIe device initialization delay after power-up in the BIOS. Or you will need to re-initialize the PCIe devices from the HOST system.

Here's how you can do it in Linux:

```
echo "1" > /sys/bus/pci/devices/0000\:03\:00.0/remove
sleep 2
echo "1" > /sys/bus/pci/rescan
```

where 0000\:03\:00.0 is this device ID

We are looking forward to see your unique use-cases for this unconventional device: a simple high-speed networking card combined with a powerful Cloud Core Router. **Unleash the potential of your server with the fierce power of RouterOS!**
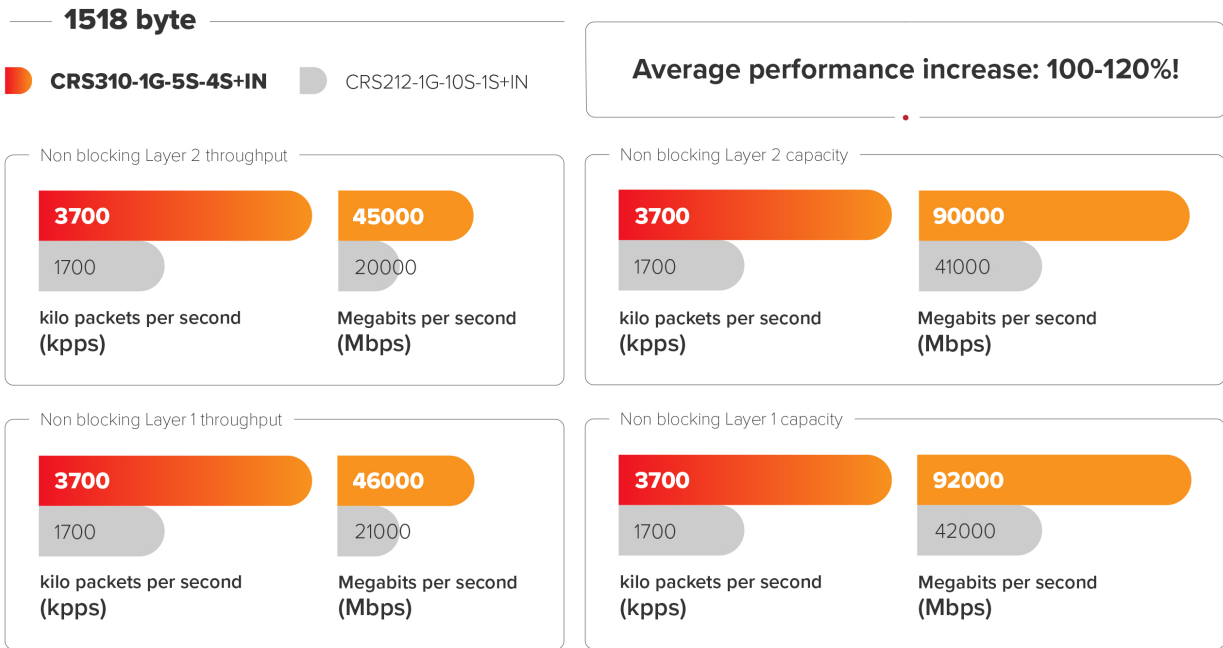
CRS310-1G-5S-4S+IN

10 Gigabit fibre connectivity way over a 100 meters – for small offices or ISPs. Hardware offloaded VLAN-filtering and even some L3 routing on a budget!

GIGABIT ETHERNET	**5X 1 GIGABIT SFP**	**4X 10 GIGABIT SFP+**	**POE-IN**	**100-120% FASTER THAN THE CRS212**

This switch is an indoor variation of the prominent netFiber 9 switch – used by many small and medium ISPs for reliable 10 Gigabit fibre connections stretching over a 100 meters. With five 1G SFP ports, four 10G SFP+ ports, and an additional Gigabit Ethernet port, this is the perfect upgrade for existing CRS212 setups. You're getting the modern ARM v7 CPU, 256 MB of RAM, and better cooling. The new Marvell switch-chips bring

1518 byte

■ **CRS310-1G-5S-4S+IN** ▢ CRS212-1G-10S-1S+IN

Average performance increase: 100-120%!

Non blocking Layer 2 throughput

3700	45000
1700	20000
kilo packets per second **(kpps)**	Megabits per second **(Mbps)**

Non blocking Layer 2 capacity

3700	90000
1700	41000
kilo packets per second **(kpps)**	Megabits per second **(Mbps)**

Non blocking Layer 1 throughput

3700	46000
1700	21000
kilo packets per second **(kpps)**	Megabits per second **(Mbps)**

Non blocking Layer 1 capacity

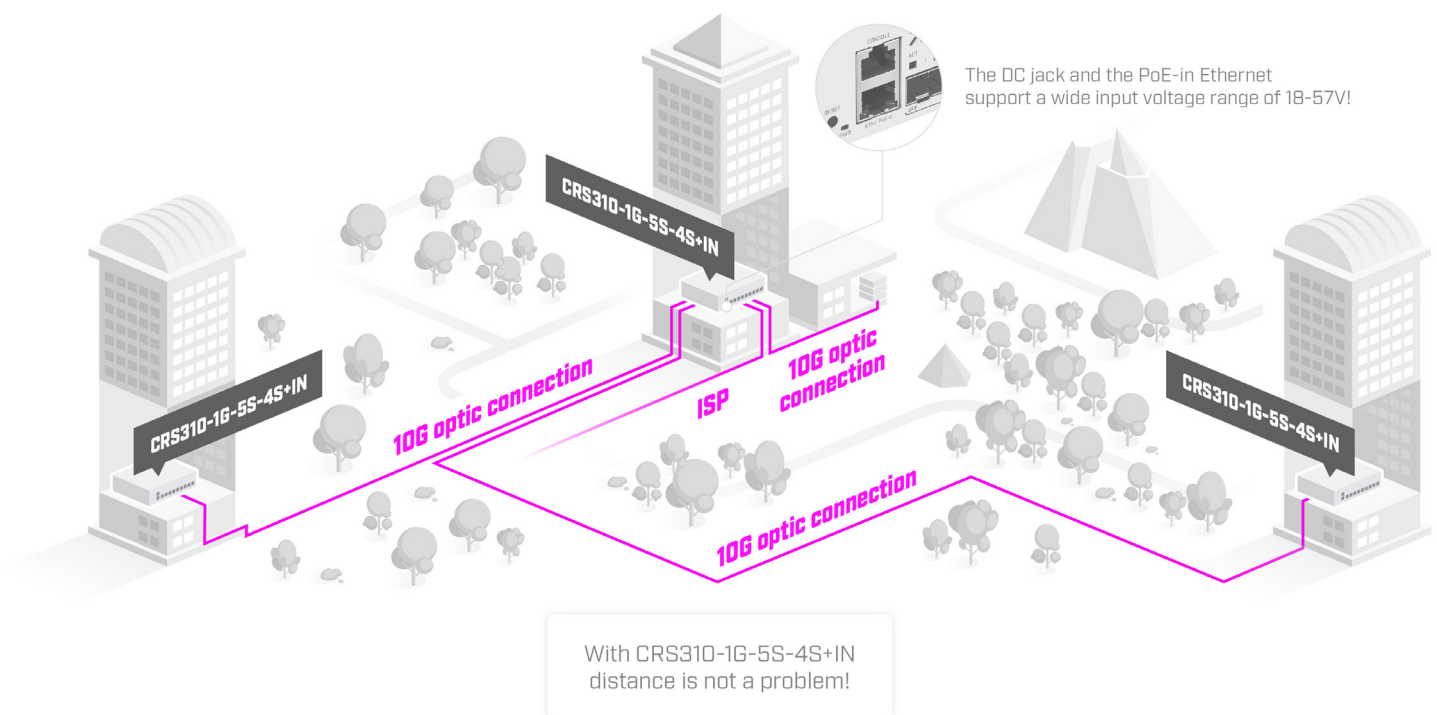| 3700	92000
1700	42000
kilo packets per second **(kpps)**	Megabits per second **(Mbps)**

The Gigabit Ethernet port has a direct connection to the switch chip — so you can enjoy full gigabit speed there. And it supports PoE-in, giving you an additional powering option in tricky spots.

> *You can mount this switch in a standard 1U rack to keep everything organized. And it has all the power you would expect from a rackmount device: CRS310 supports hardware offloaded VLAN-filtering. And even some hardware offloaded Layer-3 routing.*

CRS310-1G-5S-4S+IN is a fantastic tool for anyone working with indoor connections over 100 meters while keeping data loss and ping low. Optical fiber can be a great alternative to copper if you are worried about electromagnetic interference, tampering or eavesdropping.


The DC jack and the PoE-in Ethernet support a wide input voltage range of 18-57V!

With CRS310-1G-5S-4S+IN distance is not a problem!

MikroTips: How to firewall

A quick overview of a MikroTik firewall: what rules are there by default, what these rules do and how to make your own.

MikroTikTok

Are you looking for more teasers, behind-the-scenes, and all kinds of experimental RouterOS content? Follow us on TikTok and see how deep the rabbit hole goes!
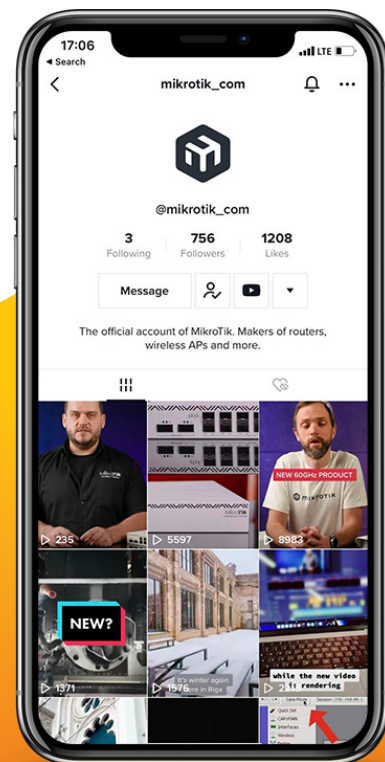
LMT and MikroTik's "Chateau" 5G router results in stronger internet and happier clients

From May 2021, a Latvian-made LTE/5G-supporting router brings 5G capabilities to a much wider audience, and the device has been the No.1 router choice among LMT network users ever since.

In 2021, LMT's clients saw the 5G network turn into an accessible reality, as LMT's product offering grew to include the Chateau 5G router, jointly developed by LMT and Latvian technology company MikroTik.
The LTE/5G-supporting router became available to LMT clients in May 2021 and instantly met a high demand. Since then, the Chateau 5G has been the No.1 router choice among LMT network users.

> *According to the OECD, Latvia is among the top 3 countries in mobile data usage. Therefore, as a Latvian mobile operator, LMT is closely familiar with the requirements of demanding mobile network users. By developing the Chateau 5G router in close collaboration with MikroTik, we made sure the device provides needed functionalities to both mobile operators and the 5G network end-users.*

*Ingmārs Pūķis, Vice President,
Member of the Management
Board of LMT*

The Chateau 5G router is equipped with highly versatile software – RouterOS, making it possible to adjust the router's features to client needs. Plus, the router supports TR-069 technology, which enables a custom remote client management option, allowing mobile operators to, for example, update the router's configuration permissions and customize parameters. The router also supplies mobile operators with much-needed monitoring capabilities.

Additionally, MikroTik offers a convenient mobile app to the Chateau 5G router users, enabling them to manually configure router parameters in case of need.

LMT's customer service team has reported that clients who had previously experienced issues with network coverage have seen a significant improvement in network availability with the Chateau 5G router in place. Moreover, in case of any technical issues with the routers, MikroTik's specialists are quick to respond and solve occurring difficulties.

5G has moved from dreams into reality, enabling new technological possibilities. Such products as the Chateau 5G router can provide fast and reliable connectivity to a wide range of users. However, it isn't just about having a faster internet connection; 5G network availability can enable innovations in many areas, such as science, medicine, education, business, and more.

John Tully, MikroTik's CEO.

JVLMA: CRS powered jazz big-band rehearsal

Can't surprise anyone with remote work these days... But how about an orchestra rehearsal? Not a problem if you're using MikroTik CRS switches! Take a break and see how jazz is born in the Jāzeps Vītols Latvian Academy of Music — a place of passion, innovation, and pure art.

The musicians needed to see and hear each other in perfect sync, so the lowest possible latency was crucial. Our friends at SPX used CRS309 and CRS328 devices to transmit NDI/DANTE (audio/video) protocol data without delay.

> *With the new digital system that provides an audio signal without delay from anywhere in JVLMA, we have the opportunity to work together with large teams in different rooms during these strange times. It actually feels like normal studio work.*

Dāvis Jurka from the Department of Jazz Music at JVLMA

Here you can download all the visuals used in this newsletter