

### Packetmaster EX2 - A desktop NPB

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### The "Swiss army knife" network device



The Cubro Packetmaster EX2 series devices are Network Packet Brokers (switch-like devices) based on a newly designed ASIC and purpose-built for network traffic filtering and aggregation applications.

- Very portable
- Same feature set as full 1RU units.
- Graphical User Interface (GUI)
- Can be customized to customer's requirement



- An aggregation TAP
- A media converter
- An aggregation filter TAP
- An aggregation filter converter TAP
- An sflow generator
- GRE endpoint (virtual TAP endpoint)
- A desktop/tactical network packet broker

#### Packetmaster EX2





Front view



Cubro Packetmaster supports all SFP brands and SFP types including 10 Gbit copper

### **Optical TAP included**





Rear view

Optionally, the EX2 can be equipped with an internal optical TAP (one SM link and one MM link) - this is the EX2+ model





### Easy to use Web UI



EX2 "B0B #	Rule Ta	Add Rule	🔲 Group Tabl	e 🕂 Add Gro	up 🗎 Save-Poi	nts 🏦 Apps 🛱 P	orts - EDevice -					Log Out "admin"	(super rights)	CUBRO 🚼
	columns O De	elete All Rules	Reset Rule Counte	rs								ТСАМ	Flows Used: 2'	1 out of 2000
	Name 🔨	Description \$	Priority 🗘	In Ports 🗘	Protocol 🗘	VLANs 🗘	MAC Src \$	MAC Dst 🗘	IP Src 🗘	IP Dst 💠	Actions \$	Data/Sec. \$	Packets 🗘	TCAM Flows
	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter
6 🖬 📋	asd		32768	6							output:4	0.0 b	0	1
6 🖻 📋	asd		32768	4							output:5	0.0 b	0	1
6 🖻 📋	asd		32768								output:2	0.0 b	0	1
6 🖬 📋			32768	1–6		VLAN present, ID: 11,13-15, PCP: 0x7	00:00:00:00:00:01/00:00:00:00:FF:FF	FE:ED:FE:ED:FE:ED			mod_vlan_vid:4 output:1–2	0.0 b	0	18
												0.0 b	0	21

Refresh Automatically

### **EX2 supports Cubro Vitrum Management Suite**



Vitrum 📰 Network Devices 🔛	Network Map 🚳 Monitoring 🖌 Settings 👻 👹 User 👻		Ack all Error Notifications
Map	obil Monitoring Monitoring • Add new ma		Past Error Link was DOWN: eth-0- 49 EX48400
Show/hide menu		GI EXX2plus 192.166.2.22X	New Error Optical Tap Rack2
Device List			Past Error Link was DOWN: eth-0-
Device	^		49 EX48400 192.168.1.249
Filter		+#0-4 2028 008 +#0-5 288 008 	Past Error Link was DOWN: eth-0- 5 EX48400
DAK EX2 (IP: 192.168.2.101) DAK Raspberry (IP: 192.168.2.102)	Main features and benefits:		Past Error
EX2 192.168.2.202 (IP: 192.168.2.2		Onticel Tao Rack2	Past Error Link was DOWN: eth-0-
EX5-2 (IP: 192.168.1.252)	<ul> <li>Single point of control for a network visibility</li> </ul>		Past Error EX20400 is now online
<u>EX32plus 192.168.2.233 (IP: 192.16</u>		in out	a 1
EX20400 (IP: 192.168.1.240)	solution		Past Error
EX48400 (IP: 192.168.1.248)	<ul> <li>Inventory database</li> </ul>	1 m 2	Past Error PHK EX2 is now online
Internet Connection (IP: null)		PDN GW	Past Error DAK EX2 is now online
NIJ EX2 (IP: 192.168.2.160)	<ul> <li>Meta to real world correlation</li> </ul>		Past Error Link was DOWN: eth-0-
Optical Tap Rack2 (IP: null) Optical Tap Rack2 (IP: null)	<ul> <li>Troubleshooting the TAP network</li> </ul>	CCC / CD	51 EX48400
Optical Tap Rack3 (IP: null)		S GW bit cost	EX48400
PHK EX2 (IP: 192.168.2.130)	<ul> <li>Helps to extract only the relevant Data</li> </ul>	ethol 20455 008 ethol 2045 008	Past Error EX5-2 is now online
<u>Probe 1_((P: hull)</u>	<ul> <li>Reduces monitoring costs</li> </ul>		New Error LINK DOWN: eth-0-10
Drawing Tools		+0-51 008 2000 +0-032 008 008 +0-033 008 008	EX48400
Selection	<ul> <li>Cuts down on the mean time to resolution</li> </ul>	S1-U 008 008	New Error LINK DOWN: eth-0-3/1
Marcania	(MTTR)	ack1	EX20400
Map Settings	(MITTIX)	cut	Past Error
Map Tools	<ul> <li>Security protect data from unlawful usage</li> </ul>		New Error LINK DOWN: eth-0-9 EX20400
Navigation	<ul> <li>Extended Monitoring and Statistics of the</li> </ul>		New Error LINK DOWN: eth-0-3/2
	TAP System		
	Eully automated Applications		



- 10 Gbit support
- Fibre TAP included on EX2+
- More ports than a regular Aggregation TAP
- Copper TAP fail safe
- Same price as any Aggregation TAP available on the market



Aggregation	1 copper link input 1 Gbit	2 copper link input 1 Gbit	1 fibre link input 1 Gbit	1 fibre link input 10 Gbit
1 copper output	0	0	0	0
2 copper output	0	0	0	0
3 copper output	0		0	0
4 copper output	0		0	0
1 fibre output Gbit		0	0	
2 fibre output Gbit		0	0	
1 fibre output 10 Gbit	0	0		0
2 fibre output 10 Gbit	0	0		0



EX2 + fail safe copper TAP 10/100 also available in 10/100/1000 mounted in 19" frame



### **EX2 - A filter TAP & Aggregator**





- · Filter on all fields marked with red dot
- Filter and Aggregate at the same time
- 2000 filter rules can be handled in parallel
- A packet load of 48 Gbit can be achieved due to the non-blocking design





The EX2 is an intelligent media & bandwidth converter

- Can convert 10 Mbit copper to 10 Gbit fibre and all bandwidth combinations in any direction
- Can also be used inline to limit the bandwidth
- Can also be an inline traffic converter (change almost any field in layer 4)



#### **Media converter matrix**



The EX2 can convert from copper to fiber and fiber to copper

The EX2 can also convert bandwidth from 10 Mbit up to 10 Gbit and vice versa

aggregation	1 copper link input 1 Gbit	2 copper link input 1 Gbit	1 fiber link input 1 Gbit	1 fiber link input 10 Gbit
1 copper output		0	0	0
2 copper output		0	0	0
3 copper output			0	0
4 copper output			0	0
1 fiber output Gbit	0	0		
2 fiber output Gbit	0	0		
1 fiber output 10 Gbit	0	0		
2 fiber output 10 Gbit	0	0		

### EX2 - A desktop network packet broker



- Built in optical TAP
- Battery operated as an option
- Wireless control as an option
- A desktop/tactical network packet broker



# Aggregation of one 10 Gbit link with optical splitter to 10 Gbit fibre output

To aggregate two directions of a 10 Gbit link you normally need three 10 Gbit ports. It is different and easy with the EX2.

- First you connect the two cables from the link over the splitter on the backside of the EX2.
- Then you connect the two monitoring outputs with the two 10 Gbit receivers on the EX2.
- The 10 Gbit transmitters are still available and can be connected to the probe.



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aggregated output



## Aggregation of one 10 Gbit link with optical splitter to 1 Gbit copper output

To aggregate the two directions of a 10 Gbit link to a 1 Gbit output. This will work only if the total load is less than 1 Gbit, or if filters are used to reduce the load on the output.

- First you connect the two cables from the link over the splitter on the backside of the EX2.
- Then you must connect the two monitoring outputs with the two 10 Gbit receivers on the EX2.
- Then connect your capture device on one copper port.





### Aggregation of one 10 Gbit link to 1 Gbit copper output

To aggregate the two directions of a 10 Gbit link to a 1 Gbit output. This will work only if the total load is less than 1 Gbit, or if filters are used to reduce the load on the output.

If you do not have the optical TAP or if you have a low optical budget you can also use the EX2 in line. You must connect the two outputs with the two 10 Gbit ports on the EX2. Then connect your capture device on one copper port.





# Aggregation of two 10 Gbit span ports to 1 x 10 Gbit output with EX2+

This application is normally not possible because the EX2+ has only two 10 Gbit ports and you need three to do this job. Therefore, Cubro units have some extra features to accomplish this with two ports.

An optical port has a transmitter and a receiver part. The two "ports" can be used separately in all Cubro NPBs. The other required feature is the optical TAP at the back.

- 1. You must connect only the TX from the span port with the RX from the EX2+. The TX from the EX2+ are still available.
- 2. One of the TX are used as output to the probe
- 3. Because of a security feature, an optical interface does not start sending data until it receives light on the RX
- 4. So we use the second TX on the EX2+ to produce this light, (not traffic only layer 1 light)
- 5. In this case we need to light sources because we have two span ports, so we use the optical
- 6. TAP splits the light in two and connects it with the RX of the span ports.
- 7. Finally you must do a filter input 1 -> output 1 and output 2 -> output 1



### Aggregation of one 10 Gbit link with optical splitter to 4 parallel 1 Gbit copper outputs

In this application the traffic is forwarded between the optical ports (passive TAP) and at the same time the traffic is aggregated and forwarded (load balanced) to 4 x Gbit outputs.

This works only if the total traffic on the 10 Gbit link is less than 4 Gbit , or filters are used to reduce the output traffic.



UBRO

### Aggregation one 10 Gbit link to 4 parallel 1 Gbit copper outputs

In this application the traffic is forwarded between the optical ports (active TAP) and at the same time the traffic is aggregated and forwarded (load balanced) to 4 x Gbit outputs.

This works only if the total traffic on the 10 Gbit link is less then 4 Gbit , or filters are used to reduce the output traffic.



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### Aggregation of one 1 Gbit link to 1 Gbit copper without TAP (active TAP)

To aggregate the two directions of a 1 Gbit link to a 1 Gbit output, the total load should be less than 1 Gbit or you need filters to reduce the load on the output.

If you do not have a copper TAP, the EX2 can be used in line. Connect the two outputs with two 1 Gbit ports on the EX2. Then connect your capture device on one copper port.





# Aggregation of one 2 x 1 Gbit link to 2 Gbit copper outputs

The two SFP ports of the EX2 can be equipped with copper SFP as well.

If you do so the EX2 supports 6 copper ports.

In this example we show how you can tap two copper links inline and send the traffic to two copper outputs at the same time.





Virtualisation is a very common approach in data centers, but for monitoring purposes it is somehow not so easy. This is because the network communication within the hypervisor is not transported over the physical NIC in the server, rather, itt is transported over the virtual switch. Thus, there is no access to this traffic. It is common to use virtual TAPs to solve this issue. Virtual TAPs cannot send the traffic directly out;, they usually use a GRE tunnel.

GRE (Generic Route Encapsulation) is an L2 transparent tunnel, and the EX2 can terminate the tunnel and remove the header at line rate.





#### **Application example**



### 10 Gbit <-> 1 Gbit media bandwidth - converter

The EX2 can also work as a "simple" media converter.

The device can not only convert the media layer (optical electrical), it can also convert between the bandwidths 1 Gbit -10 Gbit in order to connect a 1 Gbit device to a 10 Gbit network and vice versa.



10 Gbit copper

10 Gbit fiber (SM or MM)

10 Gbit fiber (SM or MM)

### **Application Example EX2 + Micro Server**



A nice combination of an EX2 and a high performance server on an 19 inch tray

The EX2 does aggregation and filtering and the Server runs any software to analyze the traffic



### **Application Example**





#### **Application Example Micro Server**



- Wireshark (capture tool and protocol analyzer) "<u>https://www.wireshark.org</u>"
- NTOP several tools from capture, DPI and netflow generator "<u>https://www.ntop.org/</u>"
- Colasoft (comercial Capture and protocol analyzer) "<u>https://www.colasoft.com/</u>"
- Savvius (comercial Capture and protocol analyzer) "<u>https://www.savvius.com</u>"
- QXIP (comercial Capture and voice protocol analyzer) "<u>http://qxip.net</u>"

any many more



### **Control the Packetmaster via Wi-Fi**

The EX2 can be managed and controlled remotely using a Wi-Fi bridge. In this way a laptop computer with only one Ethernet port can be used for management (using Wi-Fi) and traffic monitoring (using the Ethernet port) simultaneously.







### **Insertion of Traffic**

The idea is to insert the EX2 in a live 10 Gbit link, and connect a standard PC to this link. The Packetmaster works like a "switch" but offers full control and the 1 Gbit PC can be part of a 10 Gbit network.

The IP or the MAC address of the PC must be known!





### Thank you

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