

QNAP

QuCPE-7012

網通虛擬化終端設備

搭載 Intel® Xeon D 多核心處理器，
SR-IOV 硬體加速大解密





QuCPE-7012-D2166NT-64GB



QuCPE-7012-D2146NT-32GB



QuCPE-7012-D2123IT-8GB



QuCPE-3034-C3758R-16G



QuCPE-3032-C3558R-8G

QuCPE

CPU	Intel Xeon D-2166NT 12 cores, 24 threads 2.0GHz (Max 3.0GHz)	Intel Xeon D-2146NT 8 cores, 16 threads 2.3GHz (Max 3.0GHz)	Intel Xeon D-2123IT 4 cores, 8 threads 2.2GHz (Max 3.0GHz)	Intel Atom C3758R 8 cores, 8 threads 2.4GHz	Intel Atom C3558R 4 cores, 4 threads 2.4GHz
Memory	64GB DDR4 ECC (4x16GB)	32GB DDR4 ECC (2x16GB)	8GB DDR4 ECC (2x4GB)	16GB DDR4 (2x8GB)	8GB DDR4 (2x4GB)
Port	10GbE SFP+ x4 2.5GbE RJ45 x8	10GbE SFP+ x4 2.5GbE RJ45 x8	10GbE SFP+ x4 2.5GbE RJ45 x8	10GbE SFP+ x4 2.5GbE RJ45 x8	10GbE SFP+ x2 2.5GbE RJ45 x8
Network Module	1	1	1	-	-
PCIe Slot	1x PCIe Gen3 x8	1x PCIe Gen3 x8	1x PCIe Gen3 x8	-	-
HDD Slot	2x 2.5" SATA slots	2x 2.5" SATA slots	2x 2.5" SATA slots	-	-
M.2 SSD Slot	-	-	-	2x 2280 M.2 MVMme	2x 2280 M.2 MVMme
SR-IOV support	V	V	V	V	V

QuCPE-7012 內部設計揭密!

Intel® Xeon® D 資料中心處理器

- Xeon D-2123IT
- Xeon D-2146NT
- Xeon D-2166NT



1個PCIE Gen3 x 8
擴展槽 (FH/HL)

1個網路模組擴展槽
支援更多10GbE /
25GbE網路

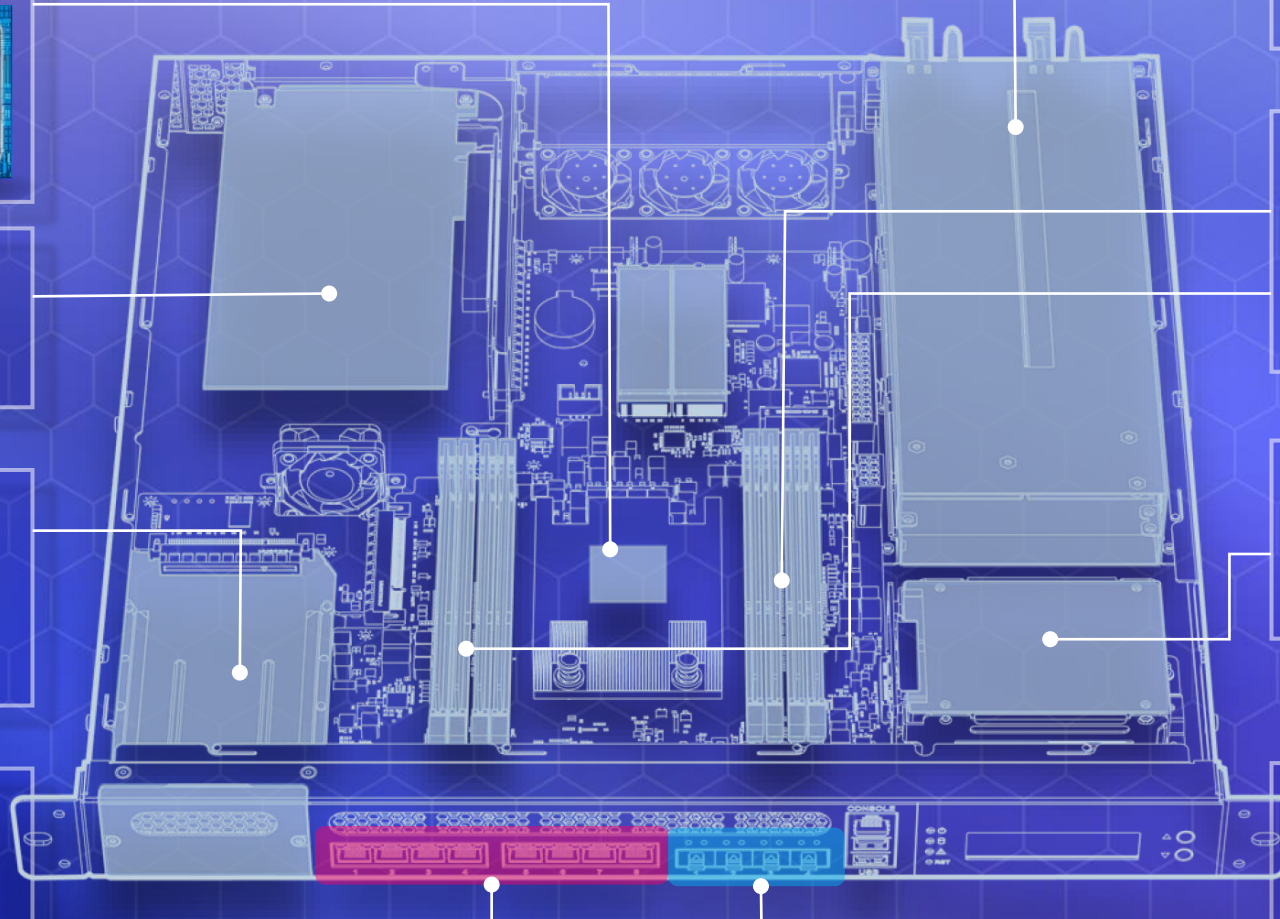
8埠2.5GbE RJ45網路
(QuCPE-7012)

雙300瓦電源供應
(主要與備援)

8個DDR4記憶體插
槽支援雙通道加速
最大支援128GB

2個2.5吋硬碟槽
支援SATA 6Gbps

4埠10GbE SFP+
光纖網路



應付未來的業務增長需求-高速網路擴展槽

QuCPE



PuIM-10G4SF-XL710



PuIM-10G4SF-MLX



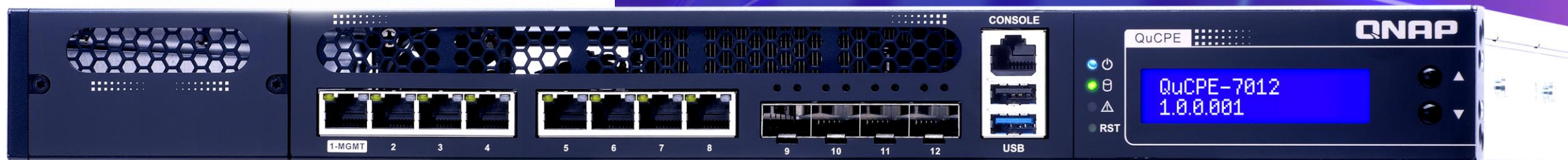
PuIM-25G2SF-MLX

	PuIM-10G4SF-XL710	PuIM-10G4SF-MLX	PuIM-25G2SF-MLX
速率	10 GbE	10 GbE	25 GbE
網路埠數量	4	4	2
網路介面	SFP+	SFP+	SFP28
晶片	Intel XL710	Nvidia Mellanox ConnectX-4	Nvidia Mellanox ConnectX-4
匯流排	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8

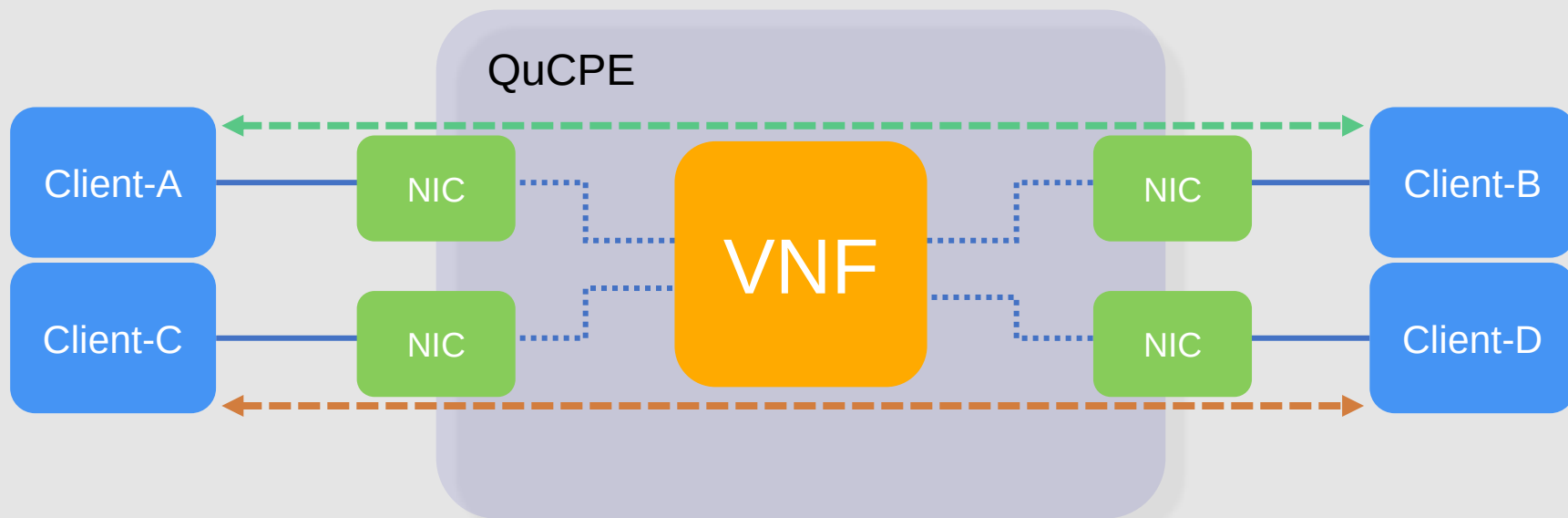
何謂SR-IOV?

在新一代智慧網卡支援的SR-IOV技術下，透過SR-IOV獨特的實體功能(Physical function)和虛擬功能(Virtual function)，虛擬機器可以直接的存取實體網卡資源，封包的轉送不再需要透過主機本身的作業系統做封包運算以及轉送，加上一個實體功能(Physical function)可以支援多個虛擬功能(virtual function)的特性，多個不同虛擬主機也可有效的共享單一實體網卡的資源。

在SR-IOV技術的支援下，可以有效率的提升虛擬主機的封包轉發效率並大幅度的降低CPU使用資源。



SR-IOV 測試



封包轉發流程圖

QiuCPE



PF / VF

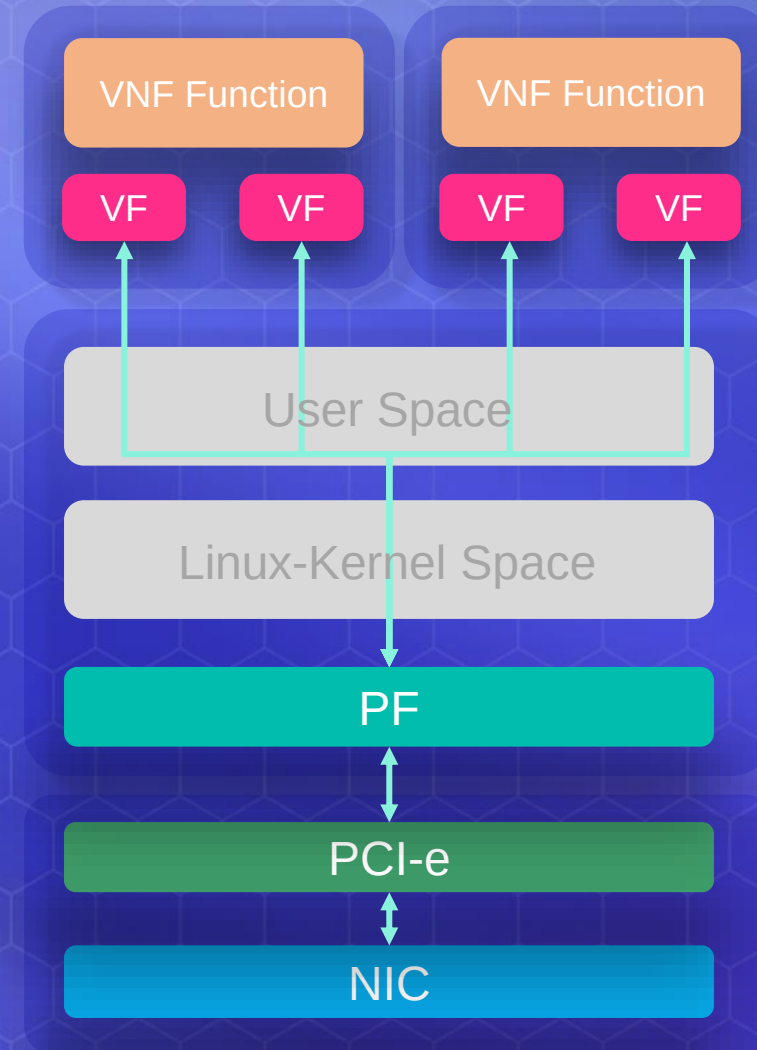
QuCPE

PF (Physical Function)

1個PF對應到一張“實體”且有支援SR-IOV的網卡，以QuCPE為例，內建的4 ports 10GbE SFP+ 採用Intel X722 Ethernet Controller接支援SR-IOV，並可透過額外擴充槽外加4 ports 支援SR-IOV的10GbE網卡，QuCPE 3032/3034系列內建的10GbE網卡也支援SR-IOV功能。

VF (Virtual Function)

SR-IOV透過VF (Virtual Function)搭配PF(Physical Function) 達成將封包直接從PCI-E網卡直接傳送到虛擬主機上，對應虛擬主機上會看到由VF構成的SR-IOV網卡，每一個PF可以對應多個VF，取決於不同網卡晶片支援，以QuCPE 7012系列為例，內建的Intel X722 Ethernet Controller支援單一PF對應到32個VF，但須注意因硬體link speed上限為10GbE，單一PF所對應的所有VF流量上限為單向10GbE，雙向20GbE。

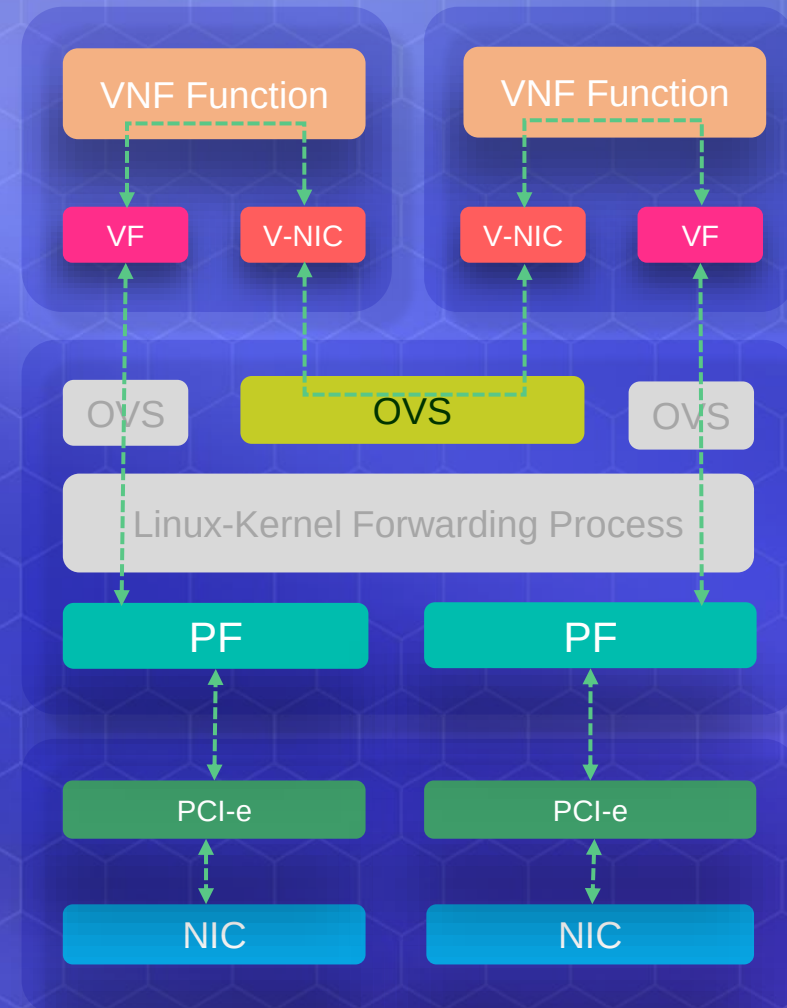


Application Notes

QuCPE



每個VF必須對應到一個PF，也就是說當需要將多個不同的VNF串接再一起的時候(如上圖)，因為VNF與VNF中間的虛擬網卡並無直接對應到任何實體網卡，因此無法啟用SR-IOV在中间的連線，但VF跟V-NIC可混和搭配使用在同一個VNF中，實際上的packet flow就會如右圖所示。

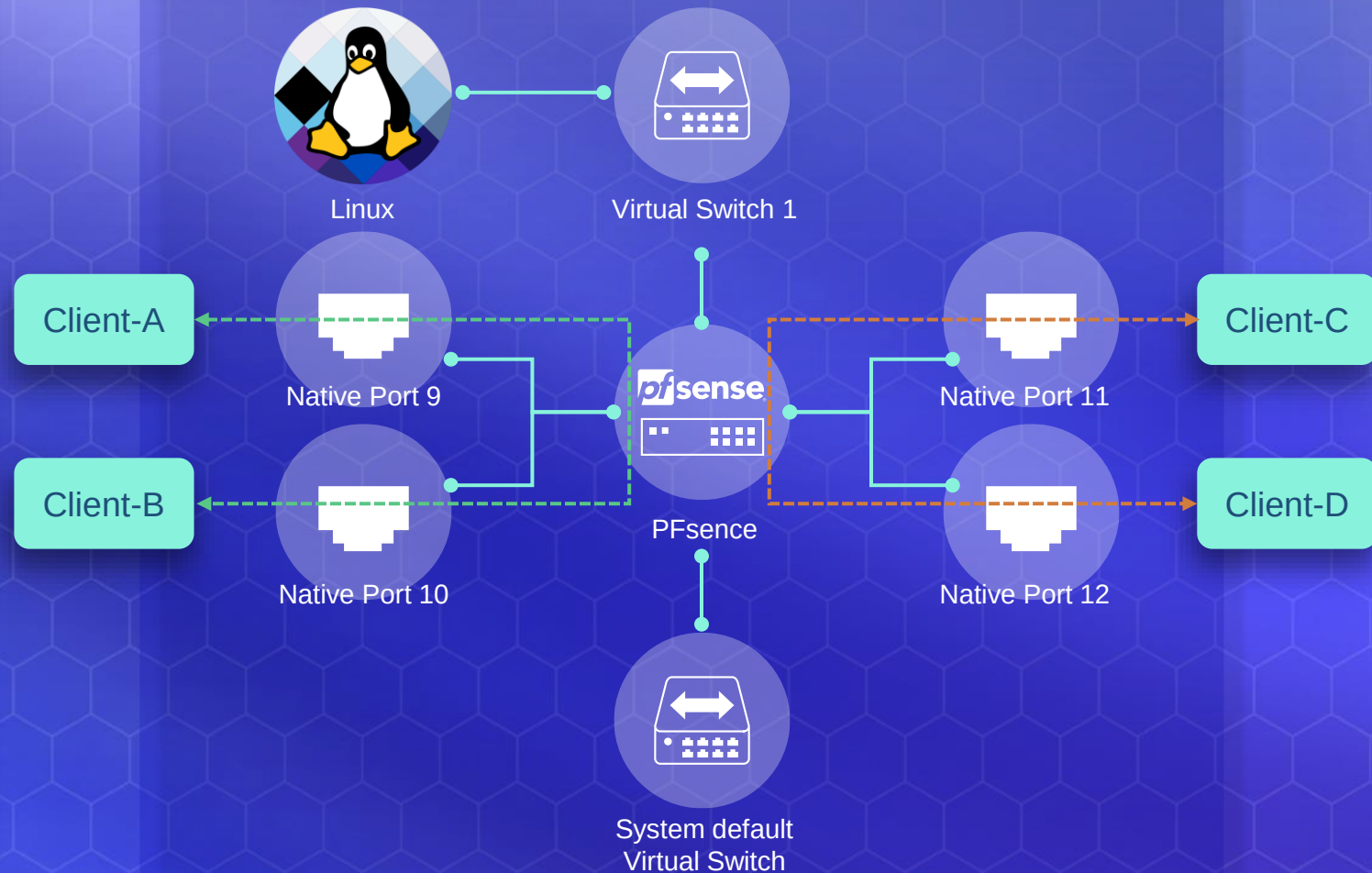
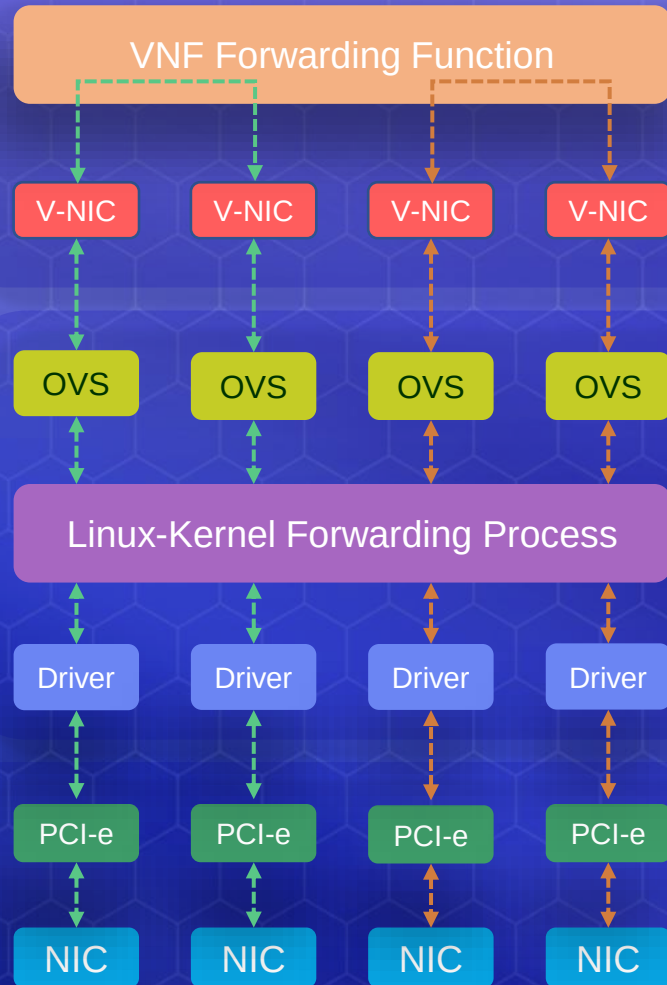


LIVE DEMO

Q u C P E - 7 0 1 2



Test Setup – Without SR-IOV



Test Setup – Without SR-IOV

QuCPE

Client

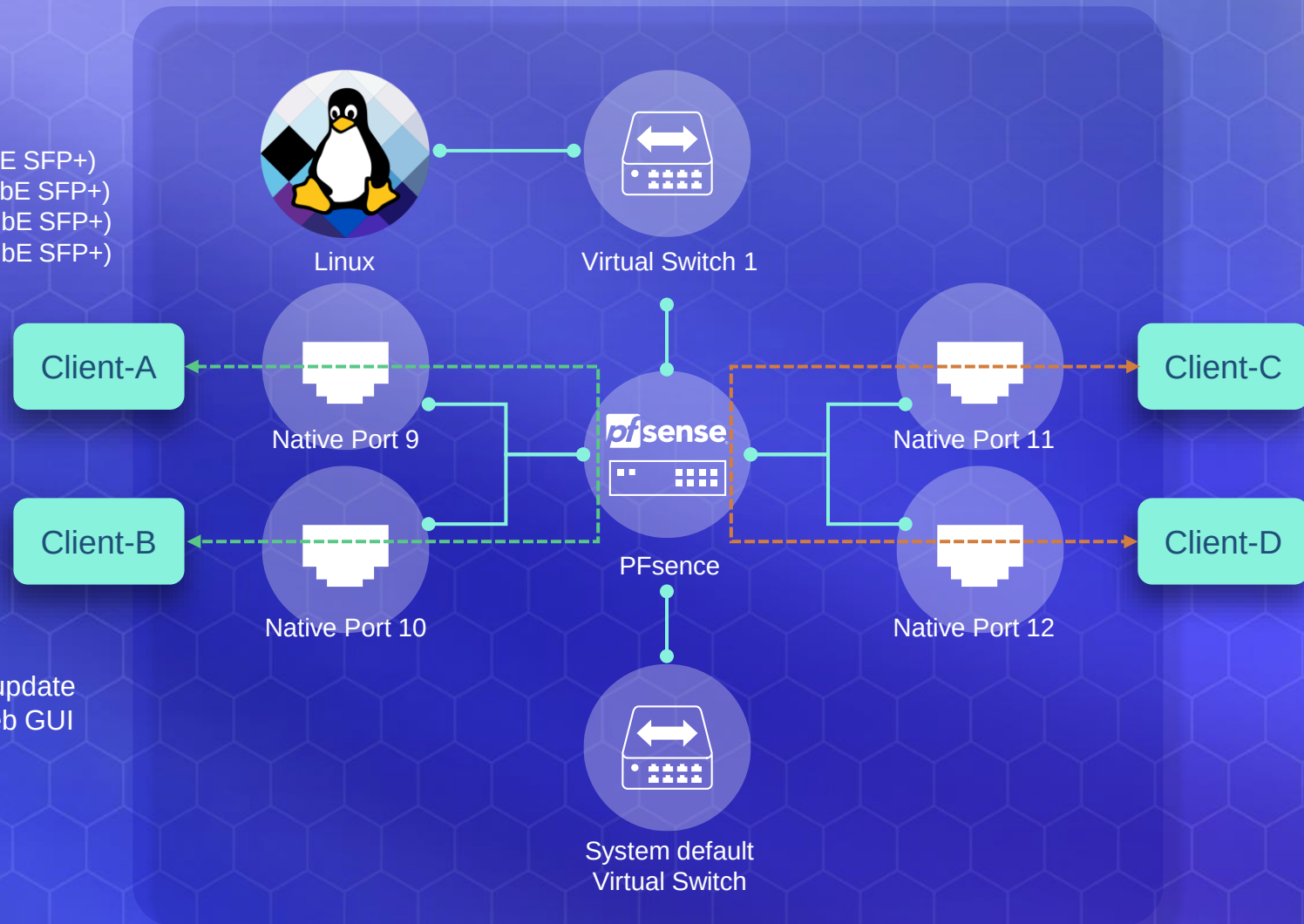
- OS: QNE 1.0.3.q573
- Tool: Iperf 3.1.3
- Client-A: 192.168.61.1/24, connect to QuCPE 7012 port 9 (10GbE SFP+)
- Client-B: 192.168.62.1/24, connect to QuCPE 7012 port 10 (10GbE SFP+)
- Client-C: 192.168.63.1/24, connect to QuCPE 7012 port 11 (10GbE SFP+)
- Client-D: 192.168.64.1/24, connect to QuCPE 7012 port 12 (10GbE SFP+)

QuCPE-7012

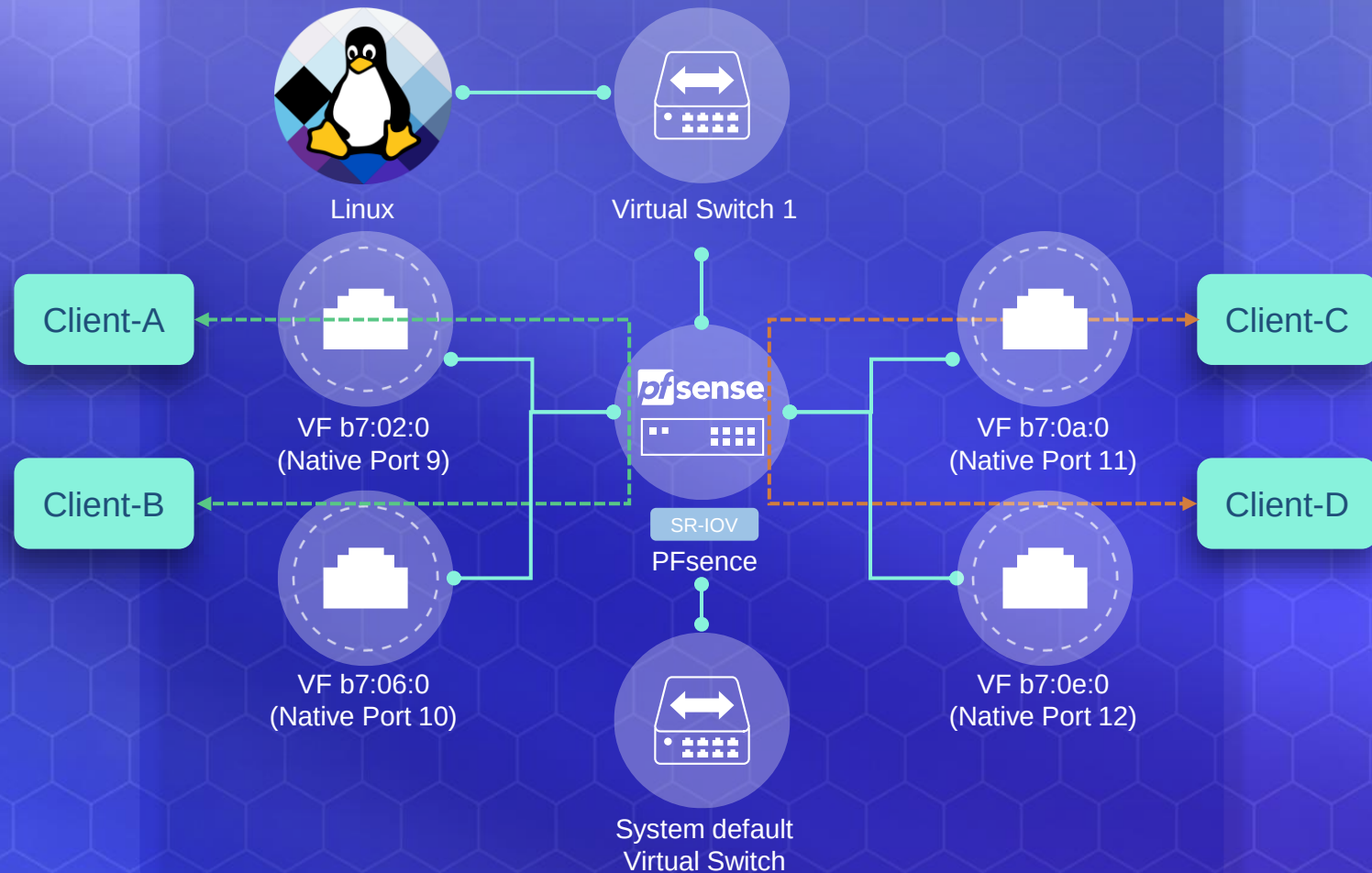
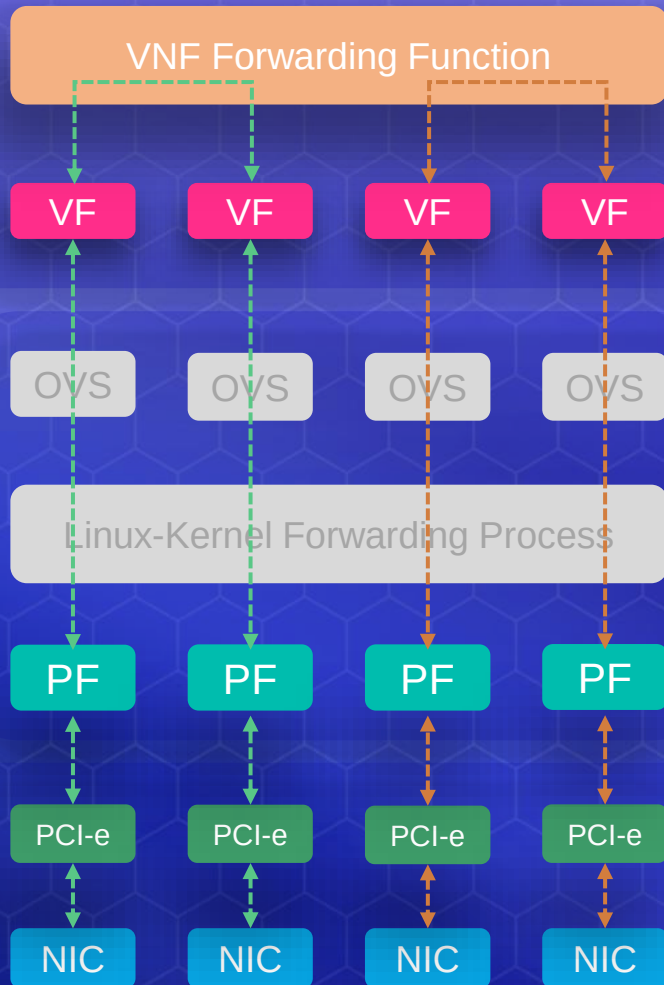
- CPU: Intel Xeon-D 2146NT
- RAM: 32GB
- OS: QNE 1.0.3.573

Pfsense:

- CPU assign: Core 3-8 (Total 12 threads)
- RAM: 1G
- HDD: 100G
- Version: 2.6.0 Release
- WAN: DHCP from system default virtual switch for system update
- LAN: 192.168.60.254/24 to Virtual switch 1 (for pfsense Web GUI access)
- OPT1: 192.168.61.254/24, VirtIO to Native Port 9
- OPT2: 192.168.62.254/24, VirtIO to Native port 10
- OPT3: 192.168.63.254/24, VirtIO to Native port 11
- OPT4: 192.168.64.254/24, VirtIO to Native port 12



Test Setup – With SR-IOV



Test Setup – With SR-IOV

Client

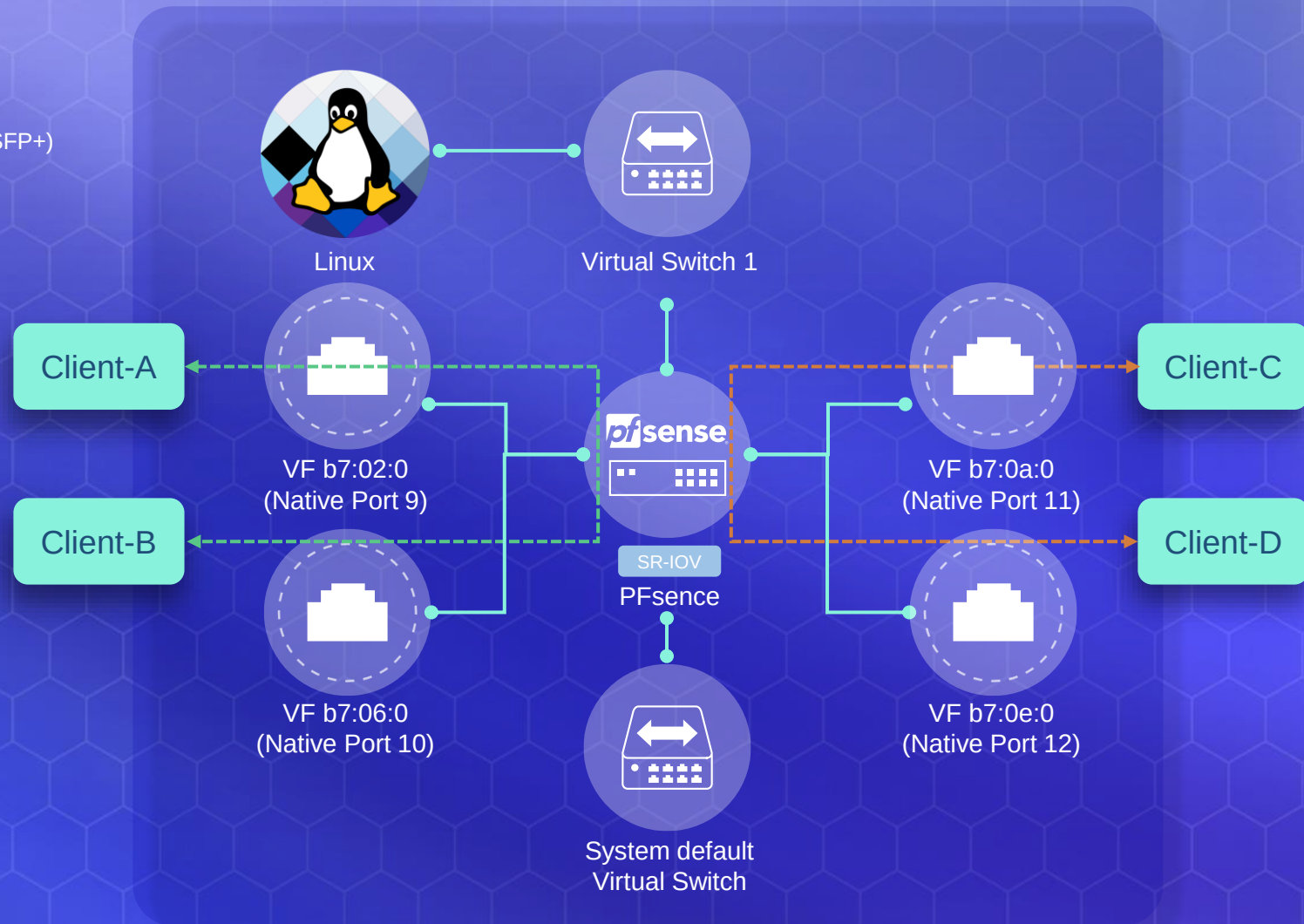
- OS: QNE 1.0.3.q573
- Tool: Iperf 3.1.3
- Client-A: 192.168.61.1/24, connect to QuCPE 7012 port 9 (10GbE SFP+)
- Client-B: 192.168.62.1/24, connect to QuCPE 7012 port 10 (10GbE SFP+)
- Client-C: 192.168.63.1/24, connect to QuCPE 7012 port 11 (10GbE SFP+)
- Client-D: 192.168.64.1/24, connect to QuCPE 7012 port 12 (10GbE SFP+)

QuCPE-7012

- CPU: Intel Xeon-D 2146NT
- RAM: 32GB
- OS: QNE 1.0.3.573

Pfsense

- CPU assign: Core 3-8 (Total 12 threads)
- RAM: 1G
- HDD: 100G
- Version: 2.6.0 Release
- WAN: DHCP from system default virtual switch for system update
- LAN: 192.168.60.254/24 to Virtual switch 1 (for pfsense Web GUI access)
- OPT1: 192.168.61.254/24, connect to port 9 with SR-IOV VF
- OPT2: 192.168.62.254/24, connect to port 10 with SR-IOV VF
- OPT3: 192.168.63.254/24, connect to port 11 with SR-IOV VF
- OPT4: 192.168.64.254/24, connect to port 12 with SR-IOV VF





QuCPE-7012

是你最好的選擇