

Cisco 7500 Single-Port vs. Dual-Port Fast Ethernet Port Adapter Performance Study (PA-FE vs. PA-2FEISL)

The Cisco 7500 currently has two versions of Fast Ethernet port adapters available:

- A single-port version for 100BaseTX and 100BaseFX (PA-FE)
- A dual-port version for 100BaseTX and 100BaseFX (PA-2FEISL)

The single-port version provides the highest packet-per-second (pps) throughput within the PA-FE family. This version has been designed to maximize performance and is the product of choice for applications where high packet forwarding rates or line saturation are expected. Typical applications include connecting a Fast Ethernet backbone or department switches where traffic from several hosts converge to a single router port and in intranets where traffic between subnets is high and at times unpredictable.

The dual-port version has been designed to maximize port density for applications requiring moderate packet-forwarding performance and moderate link utilization. This version has also been enhanced to support large maximum transmission unit (MTU) sizes in support of Token Ring Inter-Switch link (ISL). Typical applications include AS5200 dial aggregation, Token Ring Inter-Switch Link (ISL) inter-virtual LAN (VLAN) routing, and others that do not need line performance.

Performance Study

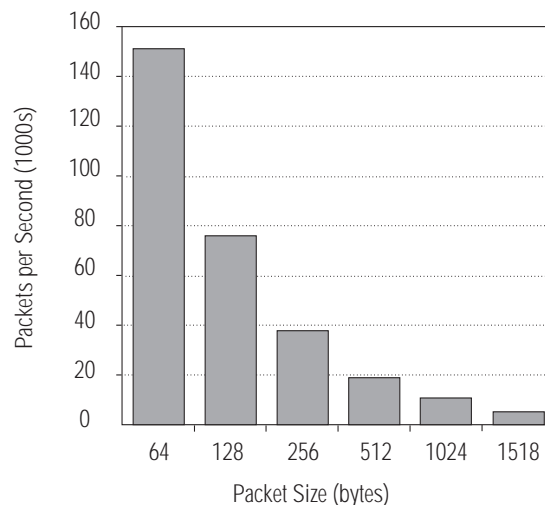
The actual performance numbers attained are a function of the adapter card (port adapter or PA) under test, main route processor Route Switch Processor or (RSP) selection, and the

THIS PERFORMANCE STUDY COMPARES THE DISTRIBUTED PACKET-FORWARDING CAPABILITY OF THE FAST ETHERNET PORT ADAPTER FAMILY FOR CISCO 7500 SYSTEMS ON VERSATILE INTERFACE PROCESSORS (VIPs).

Cisco IOS® image version. Within the Cisco 7500, the choice of versatile interface processor (VIP2) and switching mode also affects the overall performance.

Line rate for Fast Ethernet (in packets per second) refers to the maximum number of Ethernet frames that are transmitted out of the maximum possible bit rate of 100 Mbps based on a given packet size. The line rate for Fast Ethernet 64-byte packets is 148,810 (see Figure 1).

Figure 1 Packet Throughput Required for Fast Ethernet Line Rates



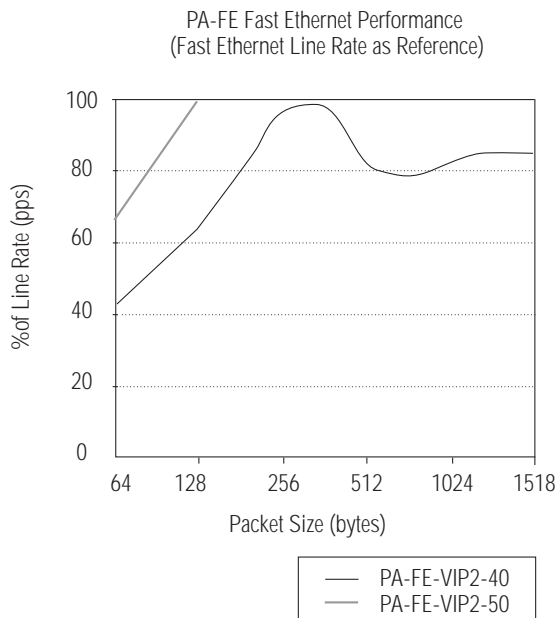
Test 1: One Single-Port PA-FE with VIP2-40 and VIP2-50

Figure 2 compares the single-port FE port adapter (PA-FE) in conjunction with the VIP2-40 and VIP2-50 with the Fast Ethernet line rate. As the figure shows, the VIP2-50, with its additional memory and processing power, provides significantly higher packet processing throughput for small packet sizes.

The port adapter is operating in full-duplex mode with traffic equally distributed on the TX and RX ports.

Test Conditions	
Platform	Cisco 7513
Processor	RSP4 with 64 MB
VIP	VIP2-40 VIP2-50 with 2 MB SRAM, 32 MB DRAM
Cisco IOS Image	rsp-jv-mz.111.13.1.CA, (first interim build with VIP2-50 support)
Switching Mode	Distributed optimum

Figure 2 Single-Port Fast Ethernet Performance Study with VIP2

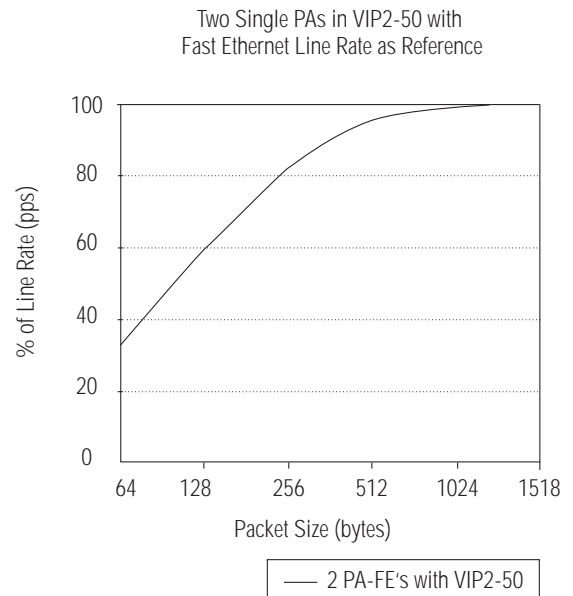


Test 2: Two Single-Port PA-FEs on VIP2-50

Figure 3 shows the performance of a VIP2-50 with two single-port PA-FEs assuming equal distribution of traffic on each port adapter. The port adapters are in full duplex mode with traffic balanced equally on both the TX and RX sides.

Test Conditions	
Platform	Cisco 7513
Processor	RSP4 with 64 MB
VIP	VIP2-50 with 2 MB SRAM, 32 MB DRAM
Cisco IOS Image	rsp-jv-mz.111.13.1.CA (first interim build with VIP2-50 support)
Switching Mode	Distributed optimum

Figure 3 Two Single-Port Fast Ethernet Performance on VIP2-40

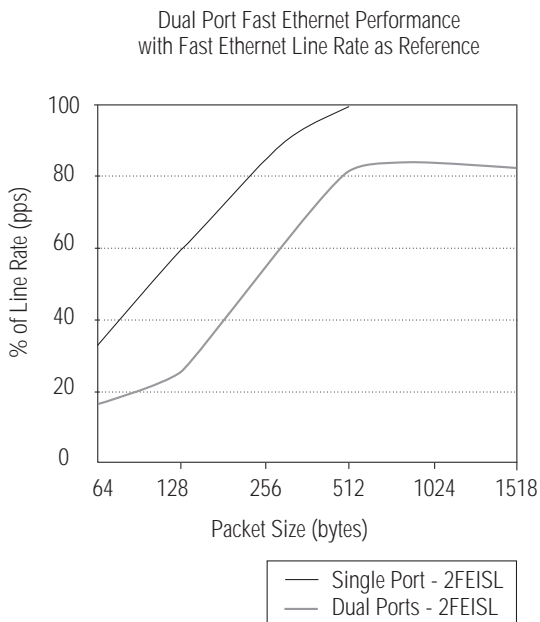


Test 3: Dual-Port PA-2FEISL, One Port vs. Two Port with VIP2-40

Figure 4 compares performance of one port versus both ports of a Dual-port Fast Ethernet card with line rate as the reference. It is clear that using only one port on the card gives slightly better performance than using both ports simultaneously. The port adapter is operating in full-duplex mode with equal traffic on the TX and RX ports.

Test Conditions	
Platform	Ciso 7513
Processor	RSP4 with 64 MB
VIP	VIP2-40 with 2 MB SRAM, 32 MB DRAM
Cisco IOS Image	rsp-jsv-mz.113-2.6.T
Switching Mode	Distributed optimum

Figure 4 Dual-Port Fast Ethernet Performance on VIP2-40



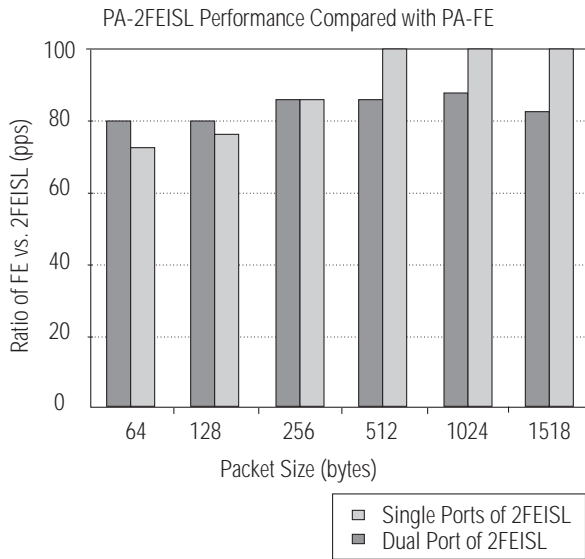
Test 4: Dual-Port PA-FEISL to Single-Port PA-FE

Figure 5 compares the performance on one port to both ports of a PA-FEISL card with the PA-FE card performance as the reference. The test first compares one port of a dual-port PA-2FEISL with a single-port PA-FE and then compares both the ports of a dual-port PA-2FEISL with two single-port PA-FEs. The first bar represents the performance data point when both ports of the dual-port PA-FE are compared to two single-port PA-FEs. The second bar represents the performance data point when only one port of a dual-port PA-FE is compared to one single-port PA-FE. This graph shows the relative throughput of the PA-2FEISL adapter, assuming that the single-port PA-FE adapter is operating at 100 percent.

The chart shows that the dual-port FE adapter (PA-FEISL), with both ports in full-duplex mode, operates at about 80 percent of the throughput capacity of two single-port PA-FEs on a VIP2-40. This data clearly recommends the single-port PA-FE card where high link utilization and small packet performance is required. The dual Fast Ethernet card gives more port density and should be used for applications that do not demand full link utilization.

Test Conditions	
Platforms	Cisco 7513
Processor	RSP4 with 64 MB
VIP	VIP2-40 with 2 MB SRAM, 32 MB DRAM
Cisco IOS Image	rsp-jsv-mz.113-2.6.T
Switching Mode	Distributed optimum

Figure 5 Dual-Port Fast Ethernet vs. Single-Port Fast Ethernet



Conclusions

This performance study concludes that the single-port Fast Ethernet adapter (PA-FE) provides higher data throughput and small packet handling than the dual-port version. Cisco highly recommends using the PA-FE card for high-performance applications. If throughput can be marginally compromised, the dual-port version could be used to greatly improve Fast Ethernet port density.



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