

WHITE PAPER

June 1998

Compaq Computer Corporation

CONTENTS

Executive Summary	1
Introduction.....	2
Customer Investment Protection	3
Compaq ProLiant Migration Path.....	4
Compaq Customer Advantages Using Intel Pentium II Xeon Technology vs. Intel Pentium Pro Technology	5
Superior Performance.....	6
Performance Results.....	6
ProLiant 6000, 6500, and 7000 Upgrade Benefits.....	7
Summary.....	8

Investment Protection for the ProLiant 6000, 6500, and 7000

Executive Summary

With the Compaq ProLiant 6000, 6500, and 7000, Compaq customers are reassured they have the highest investment protection for their enterprise servers today and in the future. By offering upgrade paths from the Intel Pentium Pro to future Intel Pentium II Xeon technology, Compaq provides opportunities for you to increase scalability without having to purchase new systems.

Because your business is always changing, Compaq has designed the ProLiant 6000, 6500, and 7000 to be upgradable, allowing the introduction of the Intel Pentium II Xeon technology while protecting your investments in memory, drives, and high availability features. These upgraded servers are **fully** optimized for Intel Pentium II Xeon and will contain all the high availability features of new Compaq servers featuring Intel Pentium II Xeon processors.

Compaq has designed upgrade kits, which are fully tested by our factories to ensure a seamless transition. These kits are tested again after the service personnel completes the upgrades. The kits include all of the components necessary to upgrade the server to allow Intel Pentium II Xeon 4-way and, in the future, 8-way SMP capability (ProLiant 7000 only) plus domestic on-site installation. A parts and support staff is available to make the upgrade as easy as possible.

Compaq's strategy to upgrade to Intel Pentium II Xeon technology with the ProLiant 6000, 6500, and 7000 is designed to serve both customers' current requirements as well as fulfill future demands with the following features:

- **Investment Protection** - Intel Pentium II Xeon technology is at the beginning of its lifecycle. Compaq servers using Intel Pentium II Xeon technology begin with a 400MHz core speed and 512KB or 1MB cache size that will increase with future enhancements. The Compaq ProLiant 6000, 6500, and 7000 servers using Intel Pentium II Xeon technology will also support future versions of Intel Pentium II Xeon technology for maximum scalability and longevity.
- **Superior Performance** - The Intel Pentium II Xeon technology increases performance by greater than 40-60% over Intel Pentium Pro 200MHz with similar cache sizes. In fact, Compaq estimates show that initial 4-way SMP Intel Pentium II Xeon technology outperforms leading 8-way Intel Pentium Pro servers at a lower cost and with far greater longevity.
- **Leadership in Industry-Standards** - Compaq is committed to leadership by offering customers ease of upgradability with Compaq's industry-standard 8-way development partnership with Corollary. The combination of Compaq's joint development with Corollary on the Profusion architecture and Intel Pentium II Xeon technology will yield a balanced, high-performance industry-standard 8-way system architecture.

Because of Compaq's commitment to its customers and a lower total cost of ownership, you can buy the ProLiant 6000, 6500, or 7000 servers with the confidence of superior investment protection and stability, recognizing that Compaq servers provide leading performance today and future upgradability to the next generation of performance.

COMPAQ

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**White Paper: Investment Protection for ProLiant 6000, 6500,
and 7000**

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“Compaq has a solid strategy. There’s a strong possibility that Intel’s Intel Pentium II Xeon technology will be introduced within six months and systems released today based on the Intel Pentium Pro will have to be upgraded or swapped out to the newer technology. IT managers don’t like to transition installations in such quick cycles.”

– Jerry Sheridan, Principal Analyst for Servers at DataQuest, 11/97, on the longevity of 8-way Intel Pentium Pro servers.

INTRODUCTION

Once again, Compaq’s technical leadership continues to deliver systems that meet your most critical needs. When Compaq introduced the ProLiant 6000, 6500, and 7000 servers, customers were ensured superior investment protection by enabling upgrades from the Intel Pentium Pro technology to Intel’s next generation processor, the Intel Pentium II Xeon. Compaq continues to offer you leading investment protection by providing processor upgrades to future Intel Pentium II Xeon processors, and future 8-way upgrades on the ProLiant 7000. These upgraded servers are fully optimized for Intel Pentium II Xeon and contain all the high availability features of new Compaq servers featuring Intel Pentium II Xeon processors.

Compaq’s Pentium II Xeon-based server models build on Compaq’s award-winning ProLiant product line at the high end, enhancing processor power, I/O bandwidth, and availability technologies beyond previous offerings. Customers can deploy ProLiant servers with confidence because of Compaq’s commitment to delivering leading industry standard technology today while providing superior customer investment protection for the future.

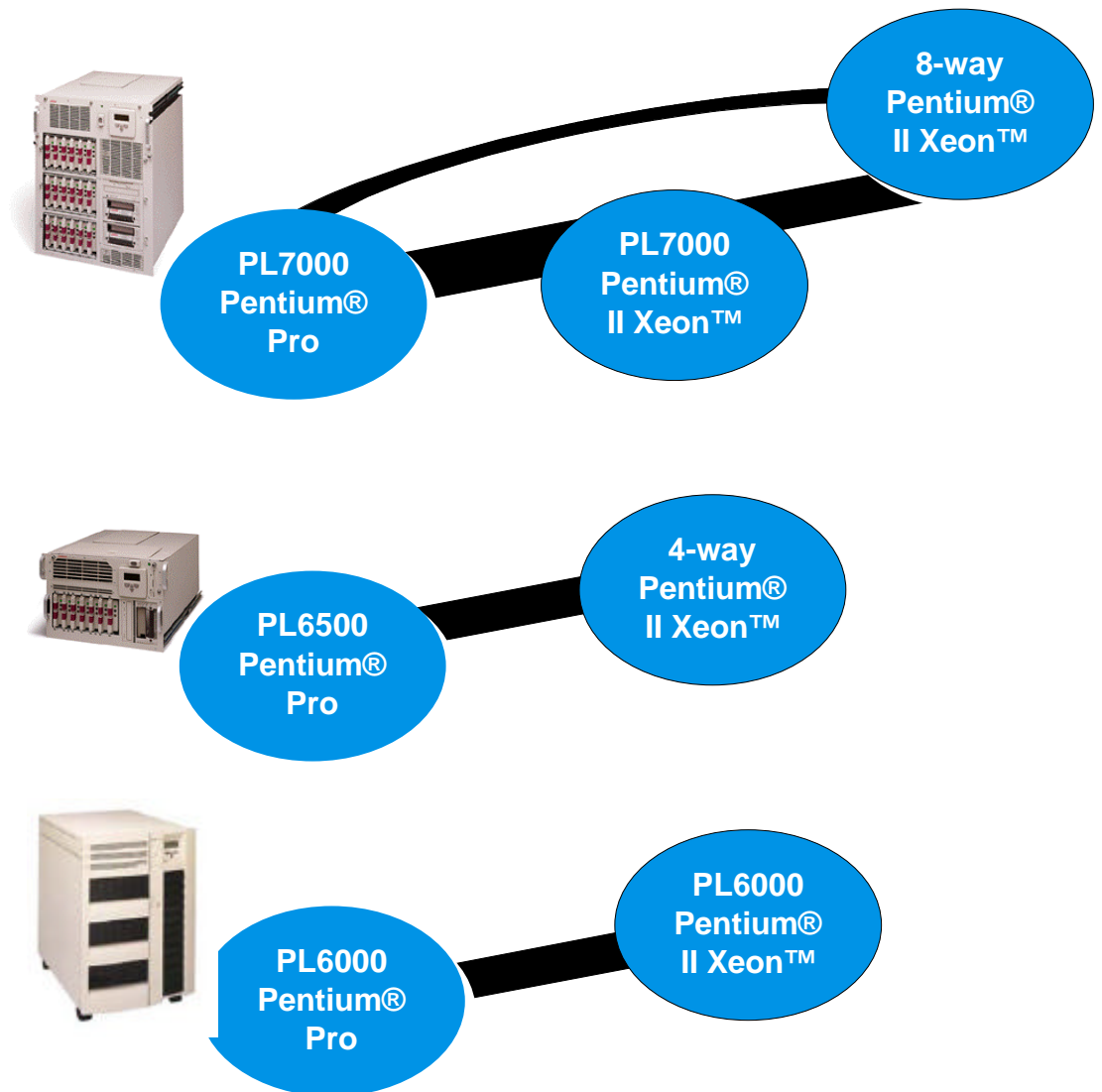
Customer Investment Protection with the ProLiant 6000, 6500, and 7000

With your business needs always changing, you can be reassured that your Compaq servers can quickly evolve to meet growing demands without compromising your investment. Compaq offers a wide range of servers, which move you to the next level of performance. Today’s ProLiant 7000 offers superior performance, availability, and investment protection for 7 x 24 environments. The ProLiant 6500 provides breakthrough availability, optimized for 7 x 24 multi-server rack-mount environments; while the ProLiant 6000 features superior value, performance, and expansion for business-critical computing.

Compaq is again positioning itself as the leader of the server industry by partnering with Corollary developing the new revolutionary eight-way SMP Profusion architecture for next generation Intel Pentium II Xeon processing.

The ProLiant 7000 will be Compaq's first server upgradable to 8-way Intel Pentium II Xeon. You can choose to upgrade your Intel Pentium Pro ProLiant 7000 first to 4-way Intel Pentium II Xeon and then to 8-way Intel Pentium II Xeon, or move straight to 8-way Intel Pentium II Xeon, when available, the ultimate in scalability. The ProLiant 6500 and 6000 offer you upgradability to 4-way Intel Pentium II Xeon processing power.

Figure 1: The ProLiant servers' migration path to future technology*



* The ProLiant 7000 can be upgraded first to 4-way processing or, in the future, upgraded straight to 8-way processing

Award-winning ProLiant servers

ProLiant 7000
1998 Network Magazine Product of the Year for Enterprise PC Servers Award

*"We looked for products that are sure to make a significant impact on our readers' networks, and therefore, on their businesses."
 -Alan Zeichick, Editor-in-Chief, Network Magazine*

ProLiant 6500 and 7000
"InternetWeek Approved" designation for enterprise-class servers, 1997
 -InternetWeek

ProLiant 6000
Large Workgroup Server A-List, Top Pick, 1998
 -PC Computing/ZDNet
1997 Analyst's Choice Award
 -PC Week
Most Valuable Product 1997
 -PC Computing

*"When it comes to singling out the best of the best in every major category, nothing else comes close."
 -PC Week Magazine*

Compaq ProLiant Family
1997 World Class Award for Best Network Server

*"Compaq's line of ProLiant workgroup servers continues to get raves for expandability, streamlined design, hot-swappable drives, and server management software."
 -PC World Magazine*

Compaq Customer Advantages Using Intel Pentium II Xeon Technology vs. Intel Pentium Pro Technology

The Intel Pentium II Xeon is at the beginning of its lifecycle and enhancements will continue into the future, unlike the current Intel Pentium Pro processor. The Intel Pentium Pro has reached its limits in processor speeds, front-side bus speed, cache size, and cache speed. These four factors are especially critical for eight-way scalability, leading to a rapid fall-off in scalability for systems with greater than four Intel Pentium Pro processors. The benefits of Intel Pentium II Xeon processors over Intel Pentium Pro include support for a 100 MHz system bus, large secondary cache size (>512K), a faster, full-speed internal cache bus, and a higher internal (core) frequency.

The following table illustrates a comparison of how Intel Pentium II Xeon technology will bring customers to the next generation of performance with the Intel Pentium Pro and Intel Pentium II processing choices:

Table 1: Comparison of Intel Pentium Pro, Intel Pentium II, and Intel Pentium II Xeon processors

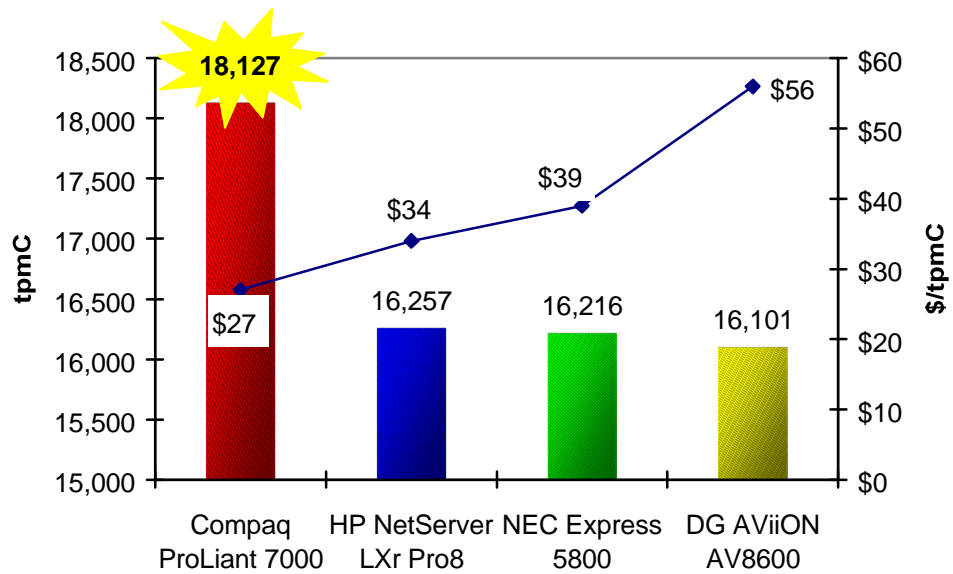
Feature	Pentium Pro	Pentium II	Pentium II Xeon
Core Speed	166, 180, 200 MHz	266, 300, 333MHz	400, 450 MHz and greater
System Bus Speed	66 MHz	100 MHz	100 MHz
L2 Cache Bus Speed	Full Speed	Half Speed	Full Speed
L2 Cache Size	256K, 512K, 1M	512K	512K, 1M, and greater
Cacheable Address Space	4GB	512MB for 300MHz and less 512MB for initial 333MHz 4GB for extended tag 333MHz and beyond	8GB and greater
MMX™ Technology	No	Yes	Yes



Superior Performance

Compaq has engineered these new Pentium II Xeon-based servers with a balanced architecture to provide increased performance through I/O and memory, which takes advantage of the increased performance offered by the Intel Pentium II Xeon chip. Compaq testing has indicated that customers will experience significant performance increases, especially in enterprise class applications. Recent TPC-C results show that four-way Intel Pentium II Xeon servers outperform leading eight-way Intel Pentium Pro servers at a lower cost and with far greater processor longevity.

Figure 2: Comparison of 8-way Intel Pentium Pro and Intel Pentium II Xeon performance using Microsoft SQL Server on Windows NT. Four-way Intel Pentium II Xeon processing outperforms 8-way Intel Pentium Pro performance.



System	# of proc.	tpmC	\$ per tpmC	Total System Cost
Compaq ProLiant 7000	4	18,127	\$27	\$442,000
HP NetServer LXr Pro8	8	16,257	\$34	\$547,374
NEC Express 5800 HV8000	8	16,216	\$39	\$632,405
DG AviiON AV8600 Server	8	16,101	\$56	\$897,290

Based on Published TPC-C Results as of 6/29/98

Compaq is currently evaluating its Intel Pentium II Xeon-based servers, performing a variety of benchmark testing including TPC-C, TPC-D, SAP, and Microsoft Exchange, among others to be published. For complete testing results, refer to

<http://www.compaq.com/products/servers/benchmarks>.

ProLiant 6000, 6500, and 7000 Upgrade Benefits

Compaq's upgrade program provides maximum investment protection and best value. A ProLiant 6000, 6500, or 7000 customer upgrading to next generation Intel Pentium II Xeon processors preserves what could be a sizeable investment in memory, disk drives, and peripherals.

Redeploying server components within ProLiant servers minimizes expenses over a longer period of time, lowering total cost of ownership.

Compaq is the only vendor providing customers a true upgrade that protects existing hardware investments. Because these are true in-chassis upgrades, and therefore, maintain your all important system serial number, Compaq enables you to amortize your investments unlike other vendors offering "upgrades" requiring additional capital expenditures.

As NT servers move higher in the enterprise, requirements for reliability, robustness, and scalability increase. Compaq engineering for Intel Pentium II Xeon platforms meets these requirements beginning with 4-way designs of the ProLiant 6000, 6500, and 7000. Early engineering analysis showed that the Intel Pentium II Xeon processors and the 100 MHz bus supported by the Intel Pentium II Xeon processors would create more power and thermal load than current Intel Pentium Pro-based systems. Planning in advance for Intel Pentium II Xeon and 8-way requirements, Compaq engineered the ProLiant 6000, 6500, and 7000 power supplies and cooling to accommodate these additional loads. These examples are just a few of the advanced engineering features designed into ProLiant servers to ease migration.

Specific customer advantages in buying the upgradable ProLiant servers include:

- Maintaining the serial number of the server, which means you can continue to lease or depreciate your server on schedule (may also be tied to Operating System and Application License Fees);
- Leasing advantages. When you use Compaq Capital as your financial source, your options for upgrading are both more flexible and affordable. Leasing is an excellent means to manage technology obsolescence risk without the burden of ownership;
- Protecting investments by transferring memory (4-way migration only), disk drives, power supplies, and peripherals;
- Providing free installation¹ that will minimize expense and server downtime;
- Pre-planned next generation optimization on current platforms including superior cooling and 750 watt redundant power supplies for the ProLiant 6000, 6500; and 7000; and
- Enhanced scalability with next generation Intel Pentium II Xeon processing.

¹ Available Monday - Friday, 9 a.m. to 5 p.m.

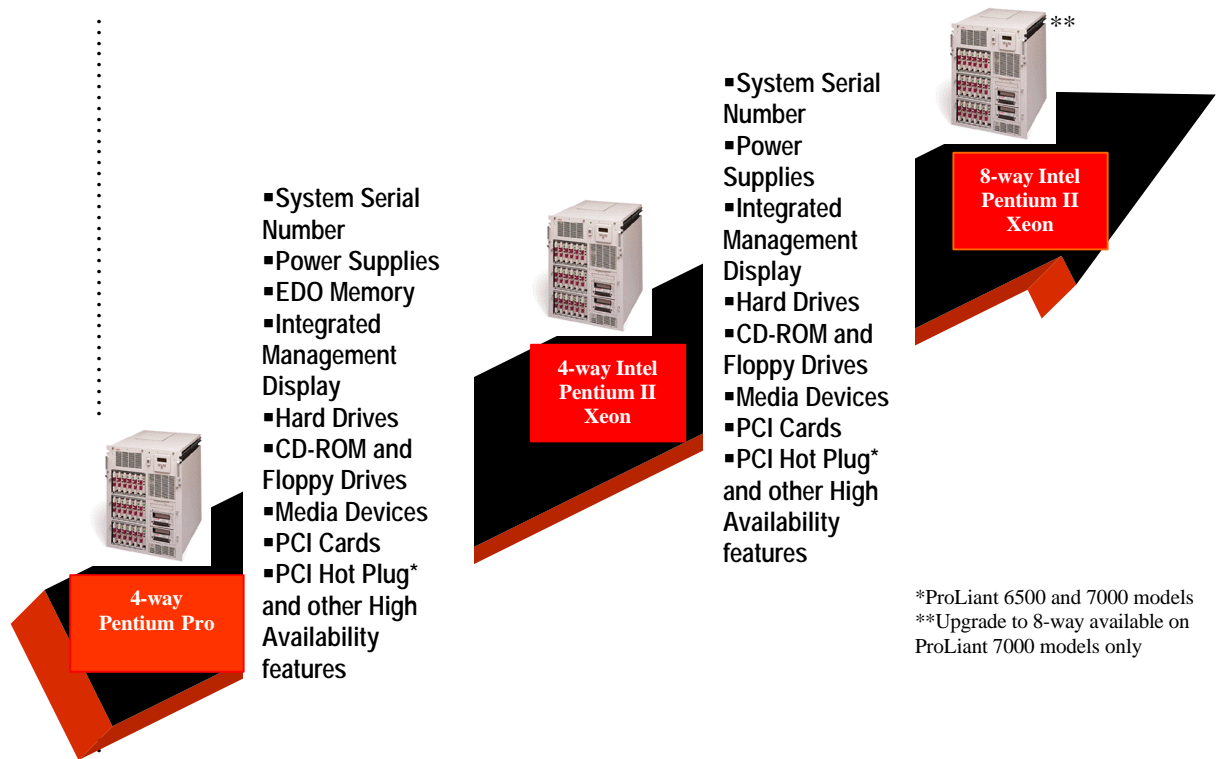


Figure 4: When upgrading the ProLiant 6000, 6500, or 7000 servers to Intel Pentium II Xeon technology, customers leverage the following components:

Upgrade Service and Support

You can be assured that a parts and support staff is available to make the upgrade as easy as possible. A special upgrade installation service has been created for the installation of both 4-way and 8-way upgrade components. Hardware installation by trained and qualified technicians (Monday through Friday 9–5) is standard and included in the kit. Optional after hours hardware installation is available as well as restoration. For more information on the upgrade kit features, refer to Compaq’s website at <http://www.compaq.com/products/servers/upgrade/index.html>.

Summary

With the Intel Pentium II Xeon technology at the beginning of its lifecycle, Compaq customers can buy ProLiant 6000, 6500, or 7000 enterprise class servers with the confidence of superior investment protection and longevity knowing their servers provide leading performance today and future upgradability to the next generation of server technology.