

Quantifying the Bathtub Curve:

Measuring Your Capex Reduction and Delayed IT Expenditures from Sourcing Hardware from OSI is Easy

– But Don't Overlook the Time and Cost Savings Gained by Avoiding the Higher Failure Rates of New Equipment Burn-In



For organizations accustomed to purchasing pre-owned IT hardware, the advantages of stepping away from an OEM-only approach are obvious. Guaranteed compatibility, easy parts replacement, next-day delivery, faster implementation, and reduced maintenance costs are all part of the value proposition of buying thoroughly inspected, tested, and Lifetime Warrantied gear from OSI Hardware. Couple these operational benefits with savings of 40% to 80% off the most aggressive discount pricing offered by manufactures, and its obvious why the third-party hardware market has matured and expanded so rapidly.

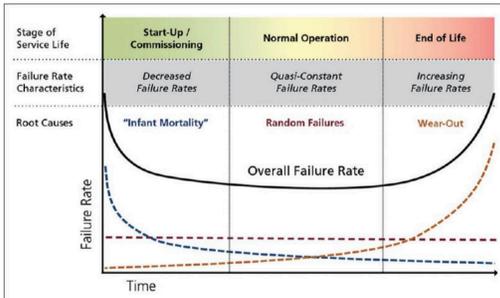
Most infrastructure and operations managers are acquainted with the bottom line benefits achieved through the avoidance of End Of Life and End Of Support policies propagated by Cisco and other manufacturers. However, when championing their reliance on secondary market equipment to their senior managers, they understandably may overlook the other less obvious but equally impressive cost- and time-savings from stepping off the 3-to-5-year upgrade cycle propagated by Cisco and other OEMs.

Specifically, failure rates are lower for pre-owned hardware than new equipment, resulting in fewer unexpected outages and a reduced level of costly downtime. The fact is, the overall reliability of fully vetted, used hardware is significantly better than new products shipped to distributors and VARs directly from the factory. While the idea of secondary market hardware offering measurably lower failure rates than OEM may seem counter-intuitive, the reason stems from the well-known 'Bathtub Curve', a central principle of reliability engineering.

OEM Customers Used to Taking a Bath?

New components shipped by OEMs are generally expected to experience a 2% to 5% failure rate during their useful life. Due to several factors, the risks for failure are highest upon installation of new components and remain elevated during the "burn in" period. The Bathtub Curve reproduced below is to used in reliability engineering to define the levels of risk for hazard function (failure) during the lifecycle of a given component.

Universally accepted by systems engineers conducting lifecycle management in products in all industries, this visual representation describes failure probability across three phases:



The ‘Bathtub Curve’ timeline of failure

Hazard function (black solid line) incorporates rates of early failure (blue dotted line) with end of life wear-out failure (yellow dotted line), and continuous, unchanging random failure rates (red dotted line)

Infant Mortality: Higher probability for early failures upon first use and burn-in period

Random: Flat or constant failure rate due to arbitrary causes of failure

Wear Out: Probability for failure increases due to expiration of design lifetime

Unfortunately, highly granular failure rate information for new OEM hardware is generally unavailable beyond their published MTBF (Mean Time Between Failure) data. However, it is possible to gain insight into the average reliability of infrastructure equipment through category-specific analysis. For example, failure projections compiled by server manufacturers to qualify for federal/military contracts show that the highest expected failure points are hard drives, fans and power supplies. During the first three years, apparently manufacturers expect 1% to 5% of these components to fail during the first 3 years. Following this infant mortality phase, failure rates then stabilize at roughly 1% until the wear out/end of life phase begins, a tipping point which varies widely depending on the product.

If stakeholders in the procurement and maintenance of IT hardware are often unaware of the 2% to 3% failure rate of factory fresh gear, it’s understandable that they’d be equally surprised by the roughly .05% failure rate of pre-owned hardware. Of course, the factor that skews OEM data higher can be explained by the Bathtub Curve. By far the largest percentage of hardware failures occur during the first 30 days of installation. Whether shipped D.O.A. (not functioning straight out of the box) or due to catastrophic failure during the start-up and commissioning phase, “infant mortality” is a quantifiable failure risk in brand new, out-of-the-box network hardware.

Testing Identifies Problems, Avoids Failures

When making any purchase, as a consumer, IT manager, or procurement professional, buyers understandably have pre-conceived dependability expectations. Upon assuming ownership, when a product is “new” – fresh from the manufacturer and unused – it is presumed to be just beginning its useful life and expected to be trouble-free. Although this assumption of product integrity should hold true for infrastructure hardware, two factors are thought to play a role in compromising reliability.





OSI's Network Operations Test Center
Each pre-owned, surplus, and 'new in box' unit is inspected, and bench tested twice prior to certification as "like new" and placed in OSI Global IT inventory



The first are the practices governing the sourcing of components. Just three decades ago the bulk of consumer and business computer hardware was designed and manufactured in Silicon Valley and assembled domestically, mostly in Texas. Today, the vast majority of IT products are built with parts from China, Taiwan, the Philippines and Indonesia, and assembled in contract manufacturing facilities in the city of Shenzhen, China where it is estimated close to 90% of the world's electronic devices are manufactured. Many tech industry analysts believe that the worldwide supply chain used by OEMs has introduced quality assurance issues, security vulnerabilities, and standardization challenges.

The second likely culprit are the testing protocols in use by virtually all OEM hardware contract manufacturers. For cost-saving and practicality reasons, it is estimated that only a percentage of name brand routers, switches, servers and consumer PCs are actually bench tested prior to shipping. While this practice of spot-checking can undoubtedly be useful in discovering QA problems that are statistically significant, clearly it allows anomalies which can affect the failure of a single unit to pass undetected.

Due to the nature of pre-owned hardware, the standards for certifying the operational integrity of each component demands rigorous testing methodologies. While most vendors of secondary market hardware have a strong commitment to in-house bench testing, we believe our 15-point Inspection and Testing protocols are among the most demanding in the industry. All pre-owned switches, routers, servers and optics undergo intensive scrutiny by our Hardware Operations Engineers, using procedures based on industry accepted best practices.

After performing dozens of diagnostic tests and reliability assessments, each unit is subject to meticulous inspection to confirm authenticity, certify that all parts are original, and eliminate units containing refurbished components or which may be counterfeit. By buying thoroughly tested, previously deployed hardware our customers avoid the risk, disruption, and outage costs associated with early failure. For the full list of our testing protocols, look for our white paper 'A Look Inside OSI's Lifetime Warranty' or ask your OSI Account Representative to e-mail you a copy.

The result is an average RMA (return rate) of just .05%. Unlike many Third-Party Market (TPM) vendors offering 1-year or "limited" warranty, we provide a lifetime repair or replacement warranty. This "true" Lifetime Warranty coverage applies to all pre-owned, surplus and new-in-box hardware components sold by OSI Hardware, OSI Optics, and which qualify under our Sustain IT Maintenance support programs. To maintain the highest performance standards possible, we do not sell refurbished hardware or replace any components in the units we inspect with non-OEM parts.

In the event of a failure within the first year, immediately upon notification our technical engineering support team will troubleshoot the issue until resolution or immediately approve an overnight advance replacement unit. By providing a level of support and responsiveness beyond standard OEM warranties, we consistently solve problems more quickly and help our clients avoid costly downtime and disruption of core business functions. Thereafter, should a failure occur, repair or replacement is included under the OSI Lifetime Warranty which covers all products purchased from OSI by the end-user.

True Lifetime Warranty

OSI Hardware OSI understands that network uptime is mission critical for any business, and our warranty is designed with that in mind. OSI offers a true lifetime warranty on all used and unused equipment.

Dedicated Technical Support

If you experience an equipment failure within one year of purchase, our technical engineering support team will either solve your problem over the phone with a sense of urgency or approve an overnight advance replacement unit.

Advanced Equipment Replacement

Our advance replacement allows for replacement units to be sent before the original unit has left your location. There will be no wait for repair or return of original equipment and we cover freight for the replacement as well as the return within this 1-year time frame.

Repair or Replacement for Life

After the first year, and for as long as you own the equipment, if you experience an equipment failure, you can send the equipment back to OSI and we will repair or replace the equipment with the exact model, or a model with the same functionality within 7 days of receipt.

[Click here](#) for the full terms of our warranty.

100% Guaranteed Protection at an Affordable Price

For guaranteed overnight next business day advance replacement SLAs, our OSInet Hardware Maintenance & Support alternative provides the 100% guaranteed protection your network requires at a very affordable price.





About OSI Hardware

OSI Hardware is a leading supplier of pre-owned, surplus and new in-box IT infrastructure hardware for organizations seeking to break free from the constraints imposed by outmoded and self-serving OEM business practices. Our expertise and strong partnerships within the secondary market empowers our customers to avoid unnecessary expenditures, minimize complexity, and maximize the buying power of their IT budgets. OSI Hardware's massive inventory of name brand routers, switches, servers, optics and cabling manufactured by Cisco, Juniper, Brocade and dozens of other vendors are consistently priced at 10% to 40% less than any available OEM price discounts.

Our global reach and dedication to ensuring technology serves the business requirements of our customers has made us the "go-to" technology resource for clients here in the U.S. and Canada, and across the globe.

Let's get to work.™

For more information, call 1-866-602-4674 or visit www.osihardware.com.



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