

A Forrester Consulting Thought Leadership Paper Commissioned By Hewlett-Packard

UNIX: Compelling Value And Bright Future

Legacy UNIX Strengths Continue To Deliver Value For Mission-Critical Workloads

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FORRESTER

Headquarters | Forrester Research, Inc.
400 Technology Square, Cambridge, MA 02139 USA
Tel: +1 617.613.6000 | Fax: +1 617.613.5000 | www.forrester.com

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Executive Summary

Much has been written about the continued migration of UNIX workloads to other operating systems, potentially giving the impression that the market for UNIX technology is rapidly disappearing. A more considered look reveals a very different reality: The overall market for UNIX systems is declining at a very slow rate, weighted by declines in revenues from one key vendor in the second half of the decade, while other UNIX vendors have reported modest upticks in revenue. While Linux shipments may be growing at a more rapid rate, there remains a substantial group of enterprises that continue to use UNIX, and their motivations and behavior have not been the focus of any substantial body of published research.

In November 2010, Hewlett-Packard (HP) commissioned Forrester Consulting to investigate the other side of the UNIX migration question: Why do users of current RISC/UNIX platforms continue to use UNIX in the face of increasingly robust Linux offerings, often from the same vendors that provide their RISC/UNIX platforms, running on less expensive x86 platforms? Forrester developed and tested the hypothesis that UNIX continues to deliver high value to current and future users who have requirements that place significant weight on the historical strengths of a RISC/UNIX environment, including reliability, scalability, and security.

To test this hypothesis, Forrester conducted in-depth interviews with senior IT operations executives at 15 medium to large companies that are current UNIX users. Forrester found that most are planning on continued UNIX use for at least the next five years — and probably for even longer — for a variety of reasons.

Key Findings

Forrester's study yielded several key findings regarding the continued use of UNIX as a mainstream enterprise platform:

- **Reliability.** Interviewees reported better reliability from UNIX systems than for any other alternative except mainframes.
- **Scalability.** UNIX systems represent the high-water mark for non-mainframe performance and, in the opinion of the interviewees, offer better economics than mainframes.
- **Availability.** UNIX systems are perceived as being more available, with the ability to perform more online maintenance than on other operating systems such as Linux, which reduces planned downtime significantly.
- **Disaster recovery.** UNIX systems are also perceived as having better integrated clustering, high availability (HA), and disaster recovery (DR) capabilities.
- **Immaturity of alternative environments.** Interviewees consistently cited perceived shortcomings in alternative environments in all of the above capabilities.
- **Total cost of ownership.** Interviewees felt that their UNIX systems were less expensive to manage in terms of large workloads. Most believed their x86 systems, which run other operating systems, would not be able to handle the type of workloads being run on their UNIX systems in a cost effective manner.

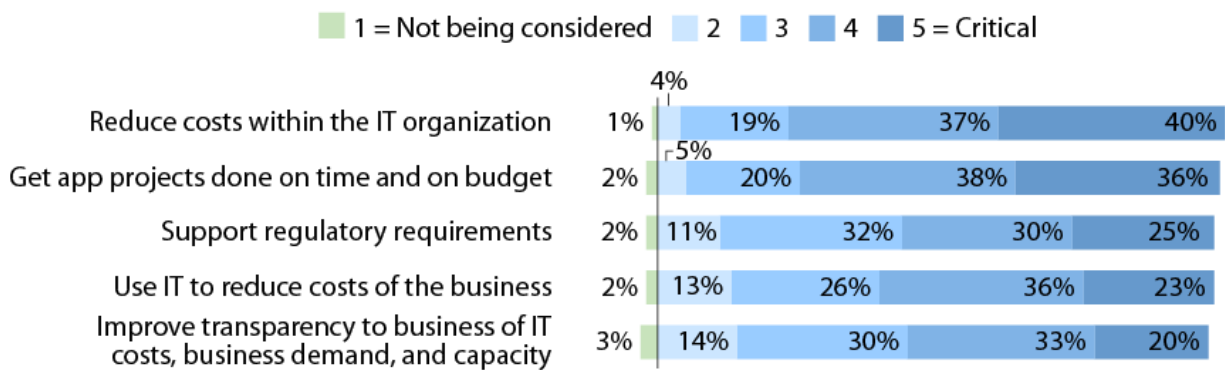
Increasing Complexity And Constrained Budgets

Pressures on IT management have been relatively constant over the past decade, and surveys reveal a consistent pattern of pressures on IT — increased demands from users, coupled with a more demanding regulatory environment, all against a background of flat or nearly flat revenues.

Forrester’s recent research validates that these underlying pressures have not changed, as typified by a Forrester survey of enterprise architects conducted by Forrester Research (see Figure 1).

Figure 1
Major IT Drivers

“On a scale of 1 to 5, what is the importance of the following IT drivers over the next year?”



Base: 416 IT professionals familiar with enterprise architecture (EA)
(percentages may not total 100 due to rounding)

Source: “The State Of Enterprise Architecture 2010: Drivers, Initiatives, And Technology Priorities,” Forrester Research Inc., February 9, 2010

At the same time, overall budgets will not change much to support these priorities (see Figure 2).

Against these budgetary pressures, there has been a steady flow of publicity surrounding the benefits of migrating workloads from older proprietary UNIX platforms to x86-based systems running Linux, in many ways similar to the debates surrounding the flow of workloads from mainframes to UNIX systems in the 1980s and 1990s. And just as many customers decided in the end to stay with their mainframe environments and continue to invest in them, so it appears that the majority of UNIX users appear to be committed to their UNIX technology, and will continue to invest in it for many more years due to factors other than raw capital costs.¹

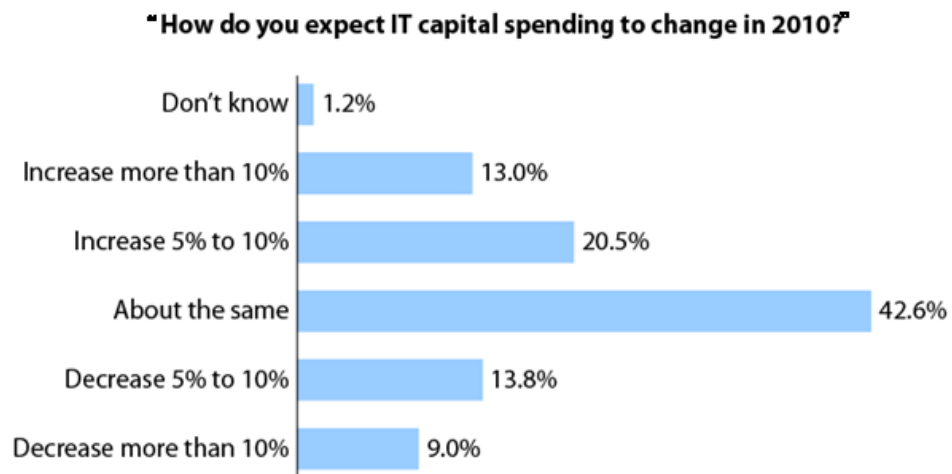
In the end, the decision to either migrate or stay with a current UNIX platform is complex and informed by a complex set of variables that are not often captured well or communicated clearly in the rash of press coverage about UNIX-to-Linux migration.

Against this background, Forrester Consulting, commissioned by Hewlett-Packard, set out to conduct detailed interviews with a sample of enterprises that currently use UNIX for production applications to understand the value they derived from UNIX, how they made decisions about platforms for current and future workloads, and their intentions regarding future use of UNIX (details of the methodology and respondent demographics can be found in Appendix A).²

Our findings reinforced our basic hypothesis that UNIX continues to deliver significant value, in particular delivering extraordinary overall reliability and availability for critical applications (see Figure 3).³

Figure 2

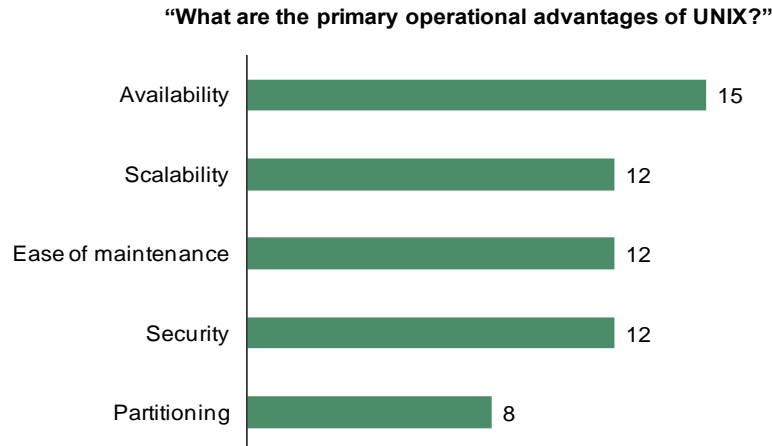
Change In Capital Spending For IT



Base: 1,032 IT decision-makers
(percentages do not total 100 because of rounding)

Source: “2011 IT Budget Planning Guide For CIOs,” Forrester Research Inc., October 7, 2010

Figure 3The Major Advantages Of UNIX



Base: 15 IT executives involved in IT UNIX server decision-making
(shown by count only; sample is not statistically valid)
(multiple responses accepted)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, January 2011

These results track well with other sources of data, including the stream of infrastructure-and-operations-related inquiries from Forrester’s clients every year.⁴ Interestingly, these characteristics are the ones that usually surface in discussions with production mainframe users, leading us to further expand our hypothesis to include the notion that UNIX has effectively replaced the mainframe in many companies as the ultimate in reliability for business-critical processing.

Availability Is King

“We haven’t had an unplanned outage of the service in the seven years that I have been here.” (Large metro area emergency response system)

Our interview cited overall availability more often than any other single factor in response to inquiries about the valuable attributes of UNIX compared to other operating systems. Significantly, all made the distinction between reliability, the avoidance of unplanned outages, and availability as significant differentiators. The ability to keep a UNIX system online while performing maintenance was another key differentiator that was also given a high level of importance.

Planned maintenance is a major part of overall availability for our users and is accomplished under two distinct models:

- **Complete service outages while the systems were maintained, patched, etc.** These were never more often than monthly, and often quarterly or semiannually.
- **Using the configured HA and DR capabilities to migrate the application to either a separate system or a separate partition within the same system.** For software maintenance, the ability to drain resources from the production partition and add them to the spare partition was invaluable, allowing users to maintain constant performance while they performed maintenance on the now quiescent partition. **All interviewees who use this method of maintenance cited online maintainability as a factor in their decision to continue using UNIX. Currently there are no x86 systems that can offer this level of online maintainability.**

On the ability to stay online and avoid planned outages, three factors were cited across all UNIX vendors:

- An overall level of kernel maturity that is perceived as higher than that of other operating systems such as Linux, providing better reliability, particularly under heavy loads.
- Better error recovery from transient errors, especially network and I/O device failures.
- Predictive diagnostics are better, with UNIX giving better warning of impending component failures.
- Much more mature clustering for both HA and DR than either x86 alternative.

In combination, the operational results among the members of the interview panel have been impressive, with all reporting that they had no more than one unplanned outage per year, and many reporting multiple years between events. **The interviews validate the perception that UNIX can deliver a level of reliability at a scale that had previously only been available on mainframes and proprietary fault tolerant systems, both of which carry considerable premiums in cost.**

“We have been averaging about 20 minutes a year of unplanned unavailability per year for our primary ERP application, about 1.5 minutes per month.” (Major aerospace manufacturer, ERP system)

Scalability Under Load Is Critical

“When we looked at moving this off the mainframe, there was no other platform that could handle our transaction volumes.” (Large manufacturing company, ERP system)

Strongly associated with availability was scalability — the ability to deliver the required levels of availability at continuous high loads, often well in excess of 90% utilization. **Multiple interviewees reported that their internal benchmark tests had indicated that UNIX delivered superior scalability to other OS environments available to them, and that x86 systems were incapable of running their production workloads at capacity despite system vendor and ISV claims.**⁵

The Combination Of Hard Partitions And VMs Streamlines Operations

“Using multiple hardware partitions in our UNIX system allows us to add resources to one of our development partitions, roll the production workload over, and perform maintenance on the original partition without ever having to take the application down.” (Consumer products company)

Approximately 80% of the interviewees reported using some form of hardware partitioning, and about half of those also used the accompanying software partitioning or UNIX VMs with them. Use cases for partitioning fell into two distinct patterns:

- **Subdividing a machine into production and development partitions with greater isolation than software VMs provide.** Approximately half of those using hardware partitions also used software partitioning with them, most often within the development hard partition.
- **Splitting a larger system to isolate the application and database tiers of a multi-tier application.** Some users combined the approaches and ran multiple application and database partitions along with separate development partitions.

The ability to dynamically move resources between running partitions and the ability to perform maintenance, including some level of hardware maintenance, on a partition without affecting the operation of adjacent partitions was cited by the majority of those using partitions as a major operational benefit of their UNIX platforms.

Users Report That UNIX Costs Less To Manage On A Workload-Adjusted Basis

Comparisons of operating costs normalized for workloads are difficult, and none of the companies interviewed for this study even attempted to collect this level of detail, but nonetheless **there was a consistent belief expressed by all the interviewees that their UNIX systems were cheaper to manage than the x86 systems running other operating systems such as Linux that would be required to handle the same workloads.** Among the factors cited by various respondents were:

- UNIX systems required much less frequent patching, not only reducing the number of patching operations, but reducing any testing needed to ensure proper operation of the patched systems. This is significant because all of the users had environments in which “patch and pray” was not an option as an operational discipline.
- UNIX clustering, used by many respondents as part of their HA and DR architectures, was consistently cited as being easier to set up and more reliable than alternatives.
- **To duplicate their current performance, even assuming that reliability goals could be met, most of those surveyed believed that they would end up with two to four times the number of systems they currently had, with commensurate increases in management costs and increases in potential points of failure in non-UNIX environments (a consideration that also speaks to overall availability as well).**

Staffing And Skills Are Not An Issue

The perception that UNIX skills are scarce and expensive does not appear to be an issue for the group we interviewed. Three elements appeared to factor into this lack of scarcity cited by our respondents:

- While there are fewer experienced UNIX professionals compared to Linux and other operating systems, there is also less demand.
- Forrester consistently heard that the UNIX administrative groups tended to be very stable, with tenures of five years or more being common.
- There was a high degree of internal training of staff.

Taken as a whole, Forrester believes that the issue of skilled technical staff is neutral across the major operating environments.

Future Plans Are For Continued UNIX Use

The most telling indication from our group of interviewees was their future plans. Two key findings summarized the mood and intentions of this group:

- None of the interviewees had plans to migrate their core production workloads from UNIX, although some of them indicated plans to investigate and/or actually move selected non-mission-critical workloads to Linux.
- Fourteen out of the 15 companies stated that they will continue to use UNIX for their core enterprise applications for at least the next five years. **This stickiness reinforces the fundamental perception of interviewees that UNIX is the best choice for their workloads.**

One ancillary finding was that **UNIX brand choices tend to be sticky.** Even in those shops where one brand was being phased out in favor of standardizing on a single vendor, the minority choices will still linger for years. One organization still had a dozen systems running a hardware and software combination that has not been sold for a decade, anchored by complex software.

KEY RECOMMENDATIONS

UNIX continues to represent a major asset to many companies, and the rumors of its death, as Mr. Clements would say, “are greatly exaggerated”. Significantly, UNIX has several core attributes that still differentiate it from other non-mainframe environments such as Linux, and potential users should consider UNIX for environments where there is a requirement for:

- **Extreme availability.** It is apparent from our study that the combination of fundamental kernel reliability, advanced hardware architectures, and enhanced HA and DR tools delivers a level of overall availability that cannot be found with Windows or Linux today.
- **Scalability.** Coupled with overall reliability is the ability of UNIX systems to deliver this availability at very high performance. Modern UNIX systems can offer single image scalability for transactional, database, and other workloads that cannot easily or reliably be run on highly distributed systems.
- **Compelling total cost of ownership.** On a workload-adjusted basis, there appears to be little support for the notion that UNIX is inherently more expensive to manage, and our survey group emphatically indicated the opposite.

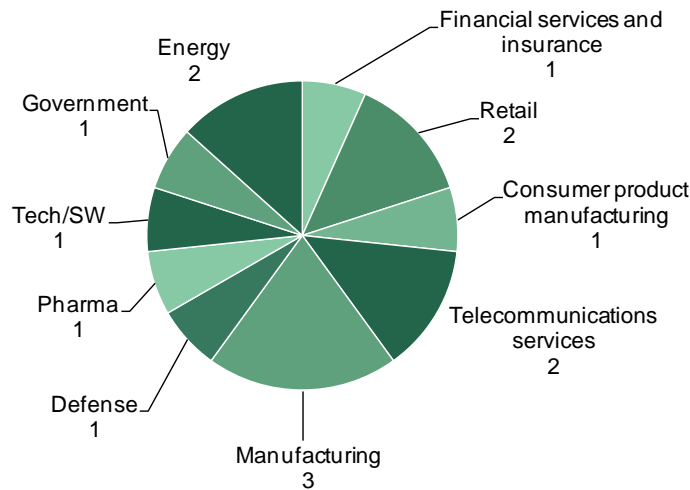
Based on the experiences of our survey group and the anticipated product plans of the major suppliers, there seems to be little reason for current users of UNIX to consider looking elsewhere, and many reasons to continue to use UNIX as a mainstream platform through the next decade.

Appendix A: Methodology

In this study, Forrester interviewed 15 senior IT operations executives across a spectrum of company sizes and industries to study their use of UNIX and their plans for potentially migrating to other platforms. Approximately half of them also had responsibility for other computing platforms, as well. Survey participants included decision-makers in IT operations, infrastructure architecture, and management roles. The study began in November 2010 and was completed in January 2011. The sample represented multiple industries (see Figure 4).

Figure 4
Industry Mix

“Which of the following best describes the industry to which your company belongs?”



Base: 15 IT executives involved in IT UNIX server decision-making
(shown by count only; sample is not statistically valid)
(multiple responses accepted)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, January 2011

In total, the interviews managed almost 4,600 UNIX systems. A number of respondents had multiple flavors of UNIX, broken down as shown in Figure 5.

Figure 5

Breakout Of Respondent Systems

Number of respondents reporting running multiple variants of UNIX and numbers reporting using Linux on x86.

	Number	%
Single UNIX	5	41%
Dual UNIX	3	25%
Three or more UNIX variants	4	33%
Linux on x86	9	75%

Note – Percentages provided to **outline the breakdown of variants in our interview pool. Our sample is not statistically valid.**

Base: 15 IT executives involved in IT UNIX server decision-making
 (shown by count only; sample is not statistically valid)
 (multiple responses accepted)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, January 2011

Appendix B: Endnotes

¹ An earlier survey of 150 IT decision-makers performed for HP by Forrester Consulting in 2010 clearly showed that even for the weakest UNIX vendor, the majority of customers were not planning on migrating.

² While this study was commissioned by Hewlett-Packard, Forrester conducted the interviews without regard for which UNIX variant the interviewee was using and included users of a legacy UNIX variant that is no longer sold.

³ For the purposes of this study, UNIX was defined to be the proprietary UNIX OS and system combination sold by major vendors. Our sample turned up only 12 systems out of about 4,600 that were not the three major variants of UNIX. In the results we did not attempt to distinguish between brands, but attempted to focus on the attributes of UNIX as differentiated from other alternative operating environments, among them Linux running on x86 servers.

⁴ Forrester's Infrastructure and Operations group handles thousands of inquiries annually from its clients, of which well over 2,000 are related to servers, OS, HA/DR and operations. From this constant stream of client interactions, we can see common patterns.

⁵ As a group, these UNIX users relied on benchmarks of their own applications. There were no mentions of using standardized benchmarks for evaluating system performance. Forrester believes in general that the use of proprietary internal benchmarks is a much better way to assess systems performance than standard benchmarks.