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Optimizing Users And Applications In A Mobile World

A commissioned study conducted by Forrester Consulting on behalf of Riverbed

FORRESTER®

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Executive Summary

Based on interviews of more than 300 IT decision-makers in seven countries, Forrester sees the increasing fragmentation of organizations. The problem is threefold:

1) **Companies are becoming increasingly distributed.** We found that companies must support a large number of branch locations, outsourcing relationships, and employees that are simply no longer in the traditional headquarter location.

2) **Users are becoming increasingly mobile.** On top of more remote locations, users are also becoming more mobile — relying on broadband wireless technologies to stay connected and productive.

3) **Applications are becoming increasingly complex.** IT must support all of these locations and users with a very broad mix of applications. In fact, a large organization can support hundreds if not thousands of unique apps. But to make matters worse, new application types like software-as-a-service (SaaS) force IT to recalibrate support mechanisms.

The result of all this is poor performance and users will no longer tolerate it. Today's mobile worker expects access to any application, and when something goes wrong, the help desk gets the call. However, we already know that companies are successfully overcoming this hurdle by deploying WAN optimization solutions that are specifically tuned for a mobile environment. Mobile WAN optimization provides the acceleration needed to ensure consistent performance, room for new applications, and the ability to ensure end user productivity at all times.

Research Methodology

In September 2007, Forrester Consulting conducted an online survey of 302 IT decision-makers and influencers in North America, Japan, China, France, The United Kingdom, Germany, and India. Respondents represented a broad range of industries and included the following breakdown:

- Thirty-seven percent of respondents were the seniormost decision-makers in the company; 26% were application developers; 24% were network operations and architecture professionals; 8% were enterprise architecture professionals; and 6% were storage director or architecture professionals. (Please note that the sum of percentages in this paper may not equal 100 due to rounding.)

- Fifty-one percent of the respondents were from companies headquartered in the United States; 8% were headquartered in India; 8% were headquartered in United Kingdom; 8% were headquartered in Germany; 8% were headquartered in France; 8% were headquartered in China; and 8% were headquartered in Japan.

- Thirteen percent of respondents had 500 to less than 1,000 employees; 30% had 1,000 to less than 5,000 employees; 28% had 5,000 to less than 20,000 employees; and 29% had 20,000 employees or more.

- Nineteen percent of respondents were from companies with revenues of $50 million to less than $200 million; 25% with revenues of $200 million to less than $750 million; 24% with revenues of $750 million to less than $5 billion; 25% with revenues of greater than $5 billion; and 7% did not know their company's revenue.

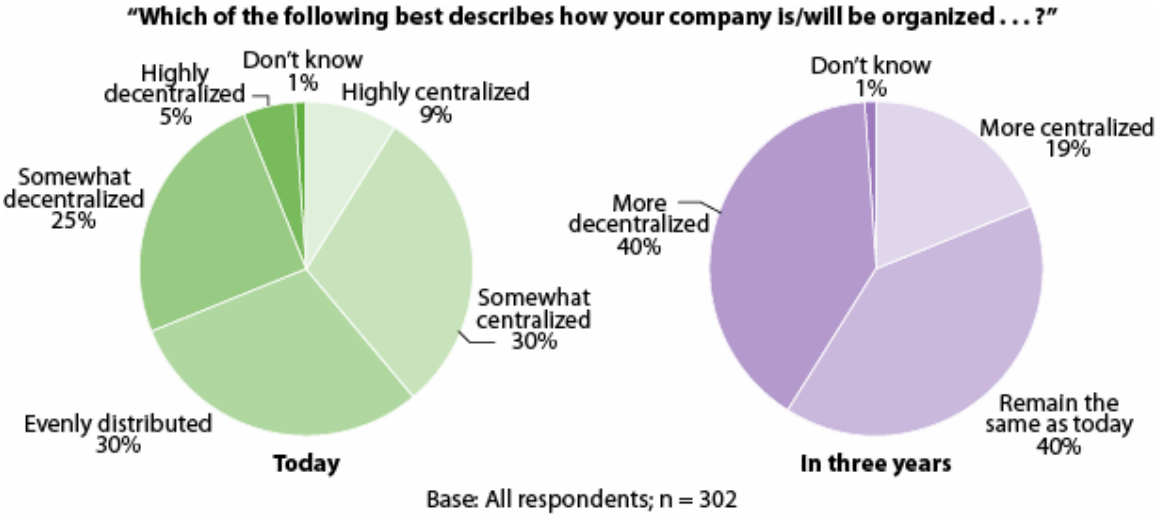
Companies Are More Distributed Than Ever

Today's IT departments are faced with a dilemma: Users and applications are being pulled further apart. On one end you have virtualization and consolidation efforts that are centralizing applications and data into fewer locations; on the other, you have users that are becoming increasingly distributed across work sites. A lot of energy has been spent studying, analyzing, and addressing the server centralization aspect. We've seen an entire industry that has grown up around IT consolidation using advanced virtualization and management tools. But how many companies are addressing the fact that people — not technology — are becoming increasingly decentralized?[1] We think this is where the majority of friction will occur moving forward. Specifically, Forrester found that:

- **Branch offices are found in all industries and company sizes.** Eighty-one percent of organizations responded that they have branch offices, with more than 30% of companies indicating they support more than 100 branch offices.

- **Branches will proliferate as companies further decentralize.** And it will get worse: 40% of respondents noted that their organizations would likely be more decentralized three years from now. Less than 20% of organizations cited a trend of centralization at their organizations, likely due in large part to the increase in the prevalence of technologies to empower the mobile worker (see Figure 1).

Figure 1: Enterprises Surveyed Are Increasingly Decentralized Organizations



Base: All respondents; n = 302

Source: Mobility Custom Study, Forrester Consulting, Prepared for Riverbed, September 2007

- **The majority of users are located in these remote locations and branches.** In addition to the fragmentation of physical locations within organizations, the data shows that the companies surveyed are increasingly mobile. So where are these users? Employees require access to the network from branch offices, home offices, and external work sites. Surprisingly, less than 30% of employees at companies surveyed are located at respondent companies' headquarter locations (see Figure 2).

- **Noncorporate users grow as outsourcing takes hold.** The majority of companies want to take advantage of external workforces through outsourcing. Currently, 26% of departments within companies surveyed are outsourced, with that percentage growing to

33% in three years. Only 20% of respondents cited no outsourcing for today's business needs (see Figure 3).

Figure 2: Only 27% Of Employees Reside At Headquarters

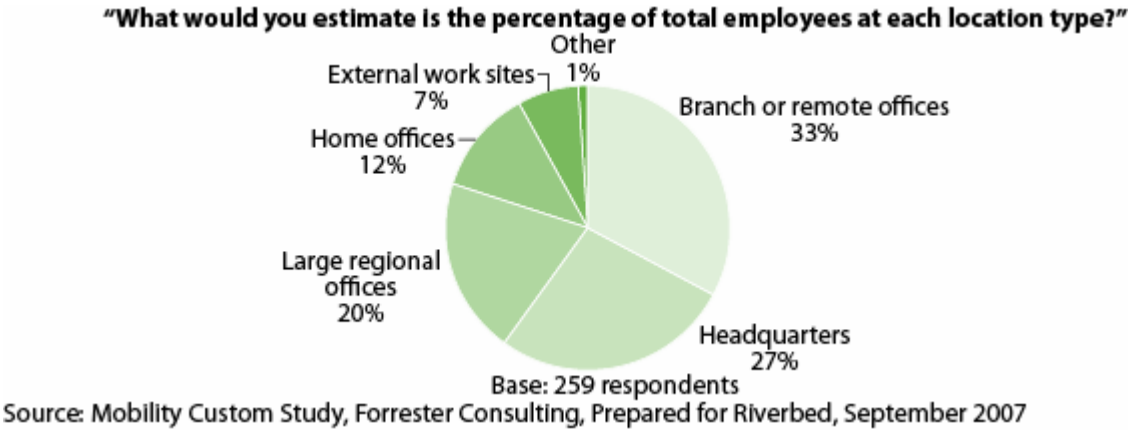
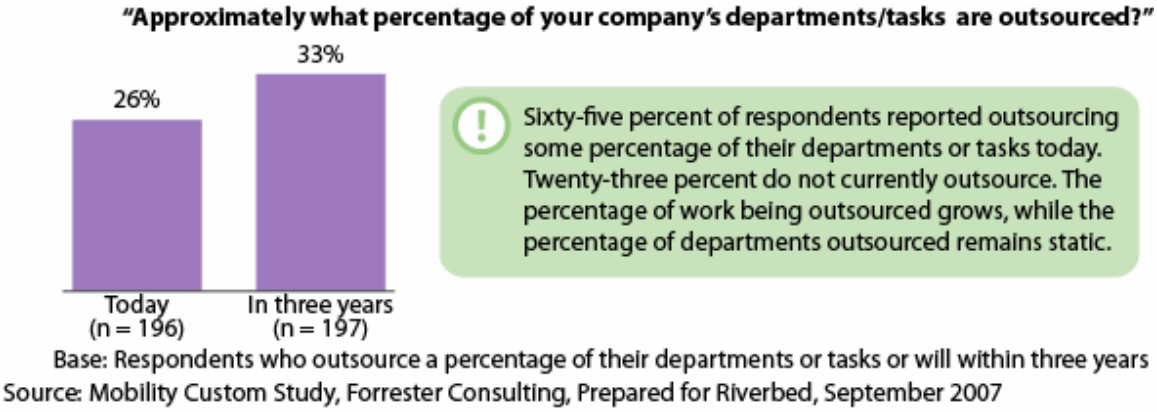


Figure 3: Outsourcing Comprises An Increasing Percentage Of Departmental Work



And Workforces Are Demanding More Mobile Environments

The trend for companies to become more decentralized is only the tip of the iceberg. Companies are also becoming more *mobile*. What started as occasionally working from the road has become a requirement for today's incoming workforce. Just how mobile have we become?

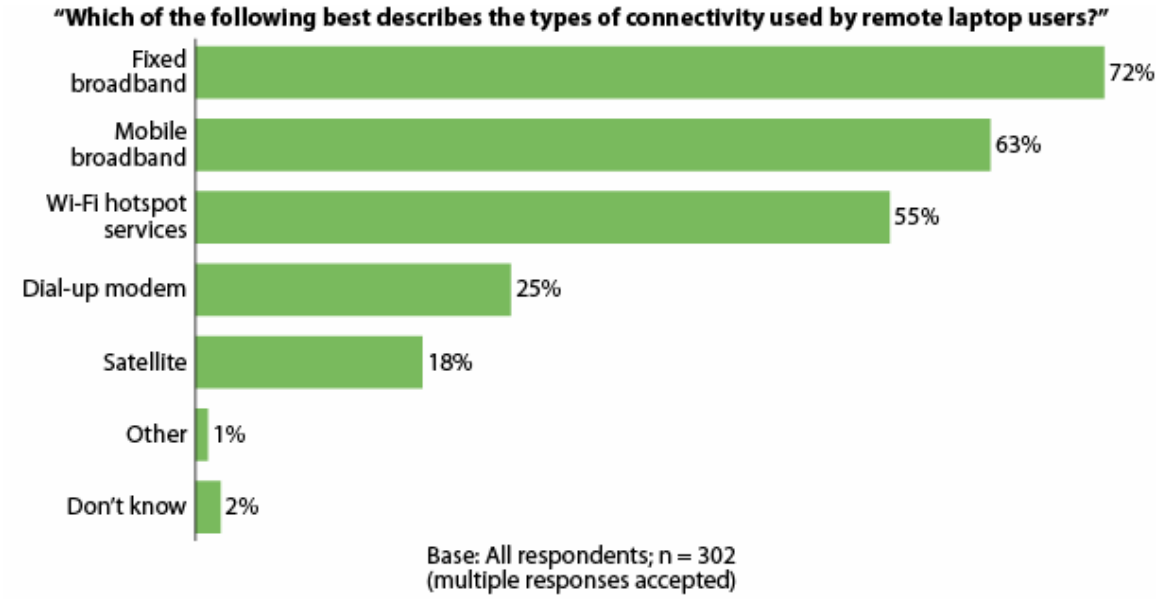
- **Fixed broadband still rules connection types, but wireless is quickly gaining.** Fixed broadband is the most common connection type at 72, but we found an astounding 63% of respondents note their usage of carrier-based mobile broadband solutions with 55% using Wi-Fi hot spots for connectivity, a trend that Forrester syndicated data also supports (see Figure 4).

- **Users are untethering and leaving the desk behind.** Thirty-six percent of employees within respondent organizations make use of laptops to work remotely. In general, nearly half — 43% of users — spend some time away from their desks. Laptops are supplanting desktops, solutions for secure access such as SSL VPN technology are taking hold in both

the enterprises and SMBs, and this means that users are increasingly finding that "work" no longer is represented by a desk and an office.

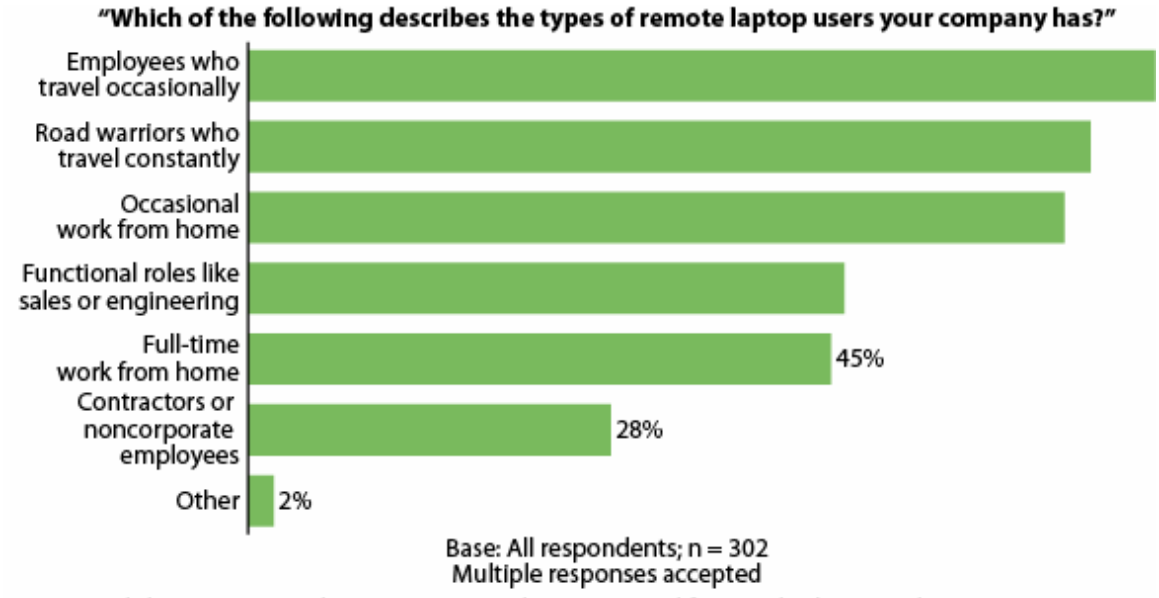
- **Mobility is spreading down to the broader base of the corporate pyramid.** Mobile users, not the standard road warriors of the past, are a diverse group: 63% occasionally work from home; 45% are work from home full time; and 28% are contractors or other noncorporate employees (see Figure 5).

Figure 4: Mobility Networks Are Quickly Becoming The Preferred Connectivity Type



Source: Mobility Custom Study, Forrester Consulting, Prepared for Riverbed, September 2007

Figure 5: Road Warriors Aren't Who They Used To Be



Source: Mobility Custom Study, Forrester Consulting, Prepared for Riverbed, September 2007

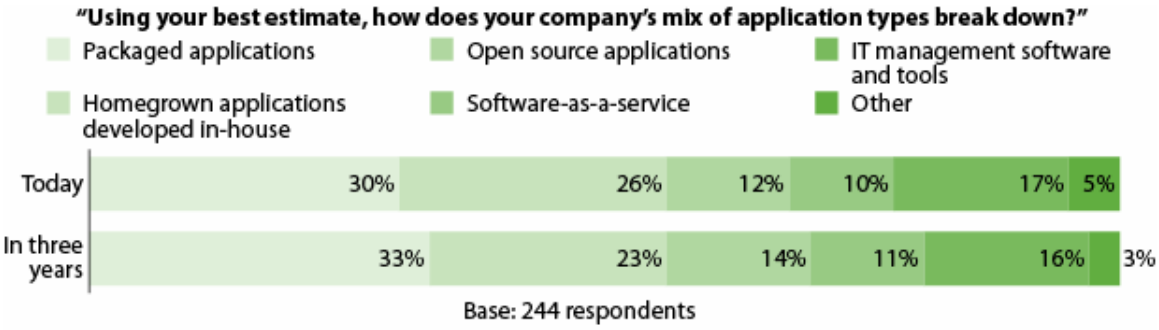
IT Struggles To Keep Up As Users Demand Applications That Are Always On, Always Available

The current rate of change in IT is unprecedented. Companies struggle to balance IT/business alignment with an ever-growing list of IT projects. But through all this change one aspect remains constant: Users still expect access to their applications. In fact, in today's environment, companies must ensure business continuity, which requires that applications are available from any location at any time. For most companies, the challenge is exacerbated by:

- **A complex mix of applications . . .** The current mix of applications, which combines software-as-a-service (SaaS), homegrown, and packaged applications, will remain relatively static over the next three years. But it's still a daunting list with no one category dominating. We found packaged applications consumed only a third of the application portfolio and homegrown apps only another quarter. On the rise are more network-centric options like SaaS-based applications, which challenge traditional governance and budgeting processes (see Figure 6).

- **. . . deployed to meet business requirements.** We asked respondents what was driving a change in the application mix. To no surprise, we found cost and upgrades still reign supreme, but business alignment is right behind. We are beginning to see IT budgets show a little life, and IT is quick to capitalize on the new funds to support new, innovative business projects. Rounding out the top five drivers were user productivity, business process improvement, and customer satisfaction. (see Figure 7).

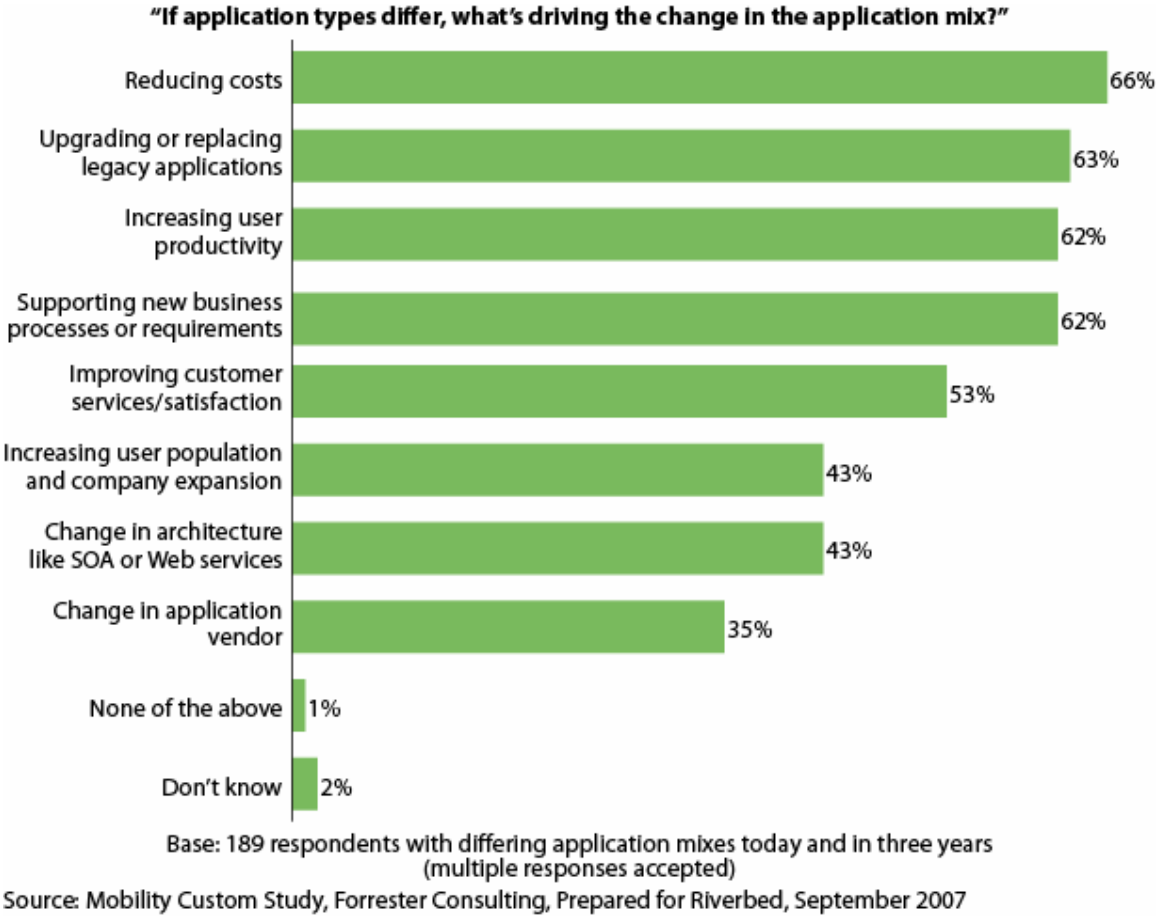
Figure 6: Large Enterprise Packaged Apps Make Up The Largest Part Of The Application Mix



Base: 244 respondents

Source: Mobility Custom Study, Forrester Consulting, Prepared for Riverbed, September 2007

Figure 7: Business Requirements Trail Right Behind Cost And Upgrades

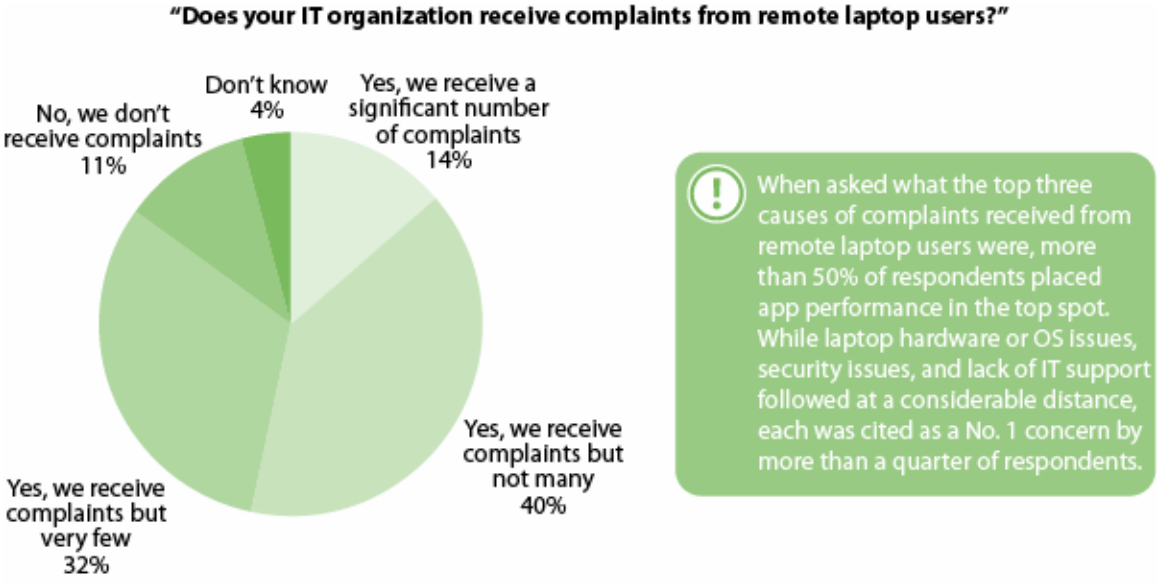


As Apps Go Mobile, IT Is Failing To Meet End User Expectations

What happens when you mix decentralization, mobilized workforces, and a complex application mix? A busy help desk. According to survey respondents, complaints from IT constituents are not uncommon. In fact, 86% of organizations indicated that they receive end user complaints. And the most common complaint, far and away, is application performance. In fact, laptop hardware or OS issues came in as a distant No. 2 (see Figure 8).

Traditional application woes will not diminish, either. As enterprises increase the number and complexity of applications that are deployed to mobile users, the potential for application performance issues grows. The increasing mobility of commodity data — email, contacts, and calendaring — gives way to more role-specific and task-essential applications such as field service applications and sales force automation applications (see Figure 9). These applications, while more essential to workers when mobile, also demand greater bandwidth and a network that can handle multiple users pulling from one or a small number of data stores across multiple networks.

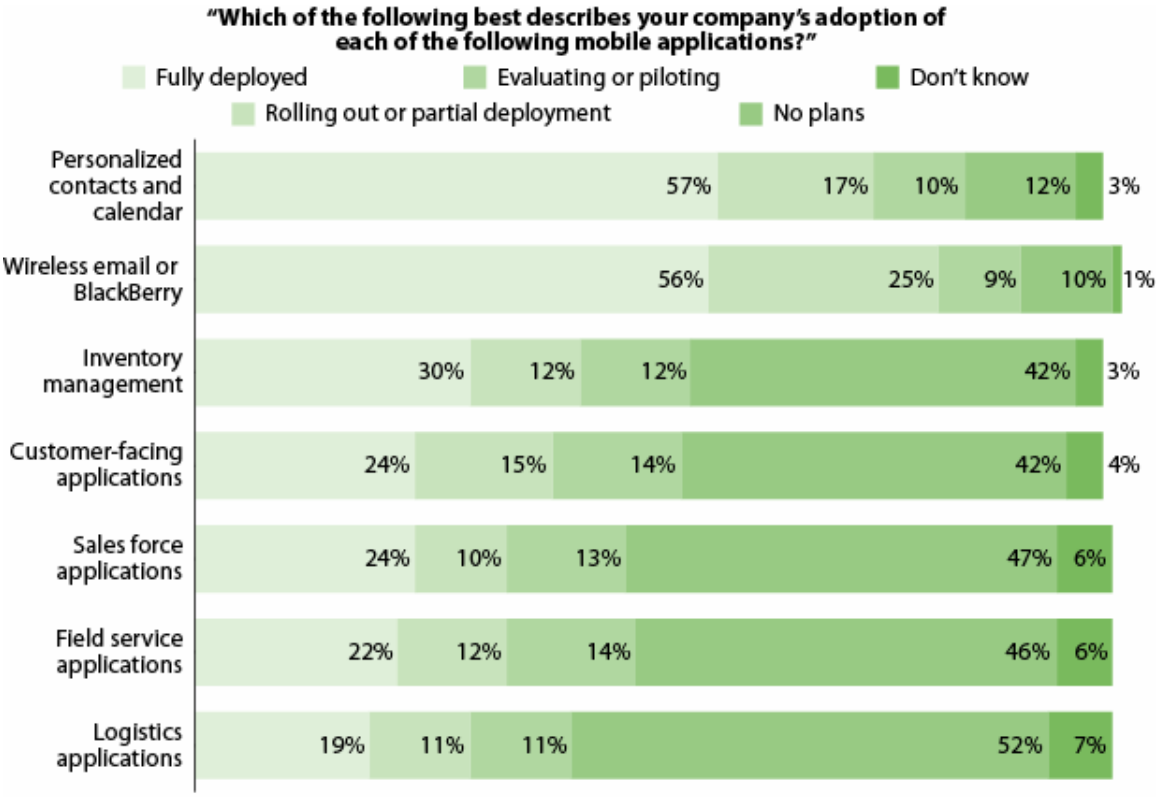
Figure 8: The Vast Majority Of Companies Incur Complaints From Remote Users



Base: All respondents; n = 302

Source: Mobility Custom Study, Forrester Consulting, Prepared for Riverbed, September 2007

Figure 9: Mobility Is Trending Toward Role- And Task-Specific Applications



Base: 538 mobile technologies and services decision-makers at North American and European enterprises (percentages may not total 100 because of rounding)

Source: Enterprise Network And Telecommunications Survey, North America And Europe, Q1 2007

Companies Are Already Looking To The Network To Solve Woes

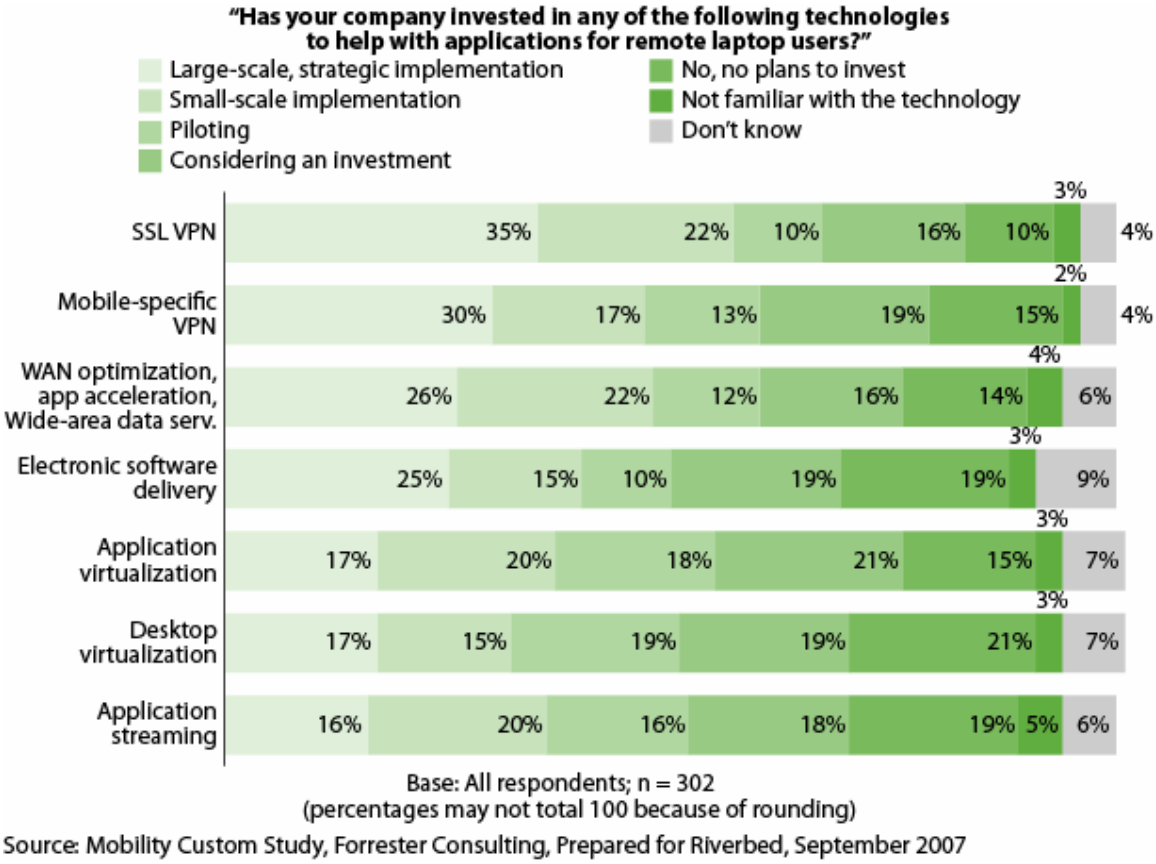
The networks that enterprises use are moving beyond the role of dumb transport played in the past. Security and acceleration technologies are key initiatives for organizations that must deploy applications to a mobile, laptop-carrying workforce. In fact, we found that:

- **VPN technology is the most prevalent technology for users accessing applications.** SSL VPNs are a critical underpinning for applications in a mobile world. Respondents agreed, and 35% are currently underway with a large-scale, strategic deployment of SSL VPN technology. Not far behind are niche mobile VPN technologies, with 30% of enterprises citing a large-scale, strategic initiative underway (see Figure 10).

- **WAN optimization is the second most common technology to overcome woes.** In addition to ensuring secure access to network resources, enterprises surveyed are looking to WAN optimization — sometimes referred to as wide-area data services or WAN acceleration — to improve the performance and end user experience. Forty-eight percent of enterprises surveyed noted a current implementation of the technology, with 26% considering the existing implementation as already large-scale and strategic.

- **Emerging virtualization technologies are in nascent stages.** Moving beyond the network, we see that organizations are looking to client management and virtualization technologies to help alleviate the application deployment woes; however, we expect that these technologies will take hold in 2008 as they mature. Moreover, we expect these bandwidth hungry technologies to further drive the need for VPN and WAN optimization.

Figure 10: Access Technologies, Network Optimization Top IT's Investment List



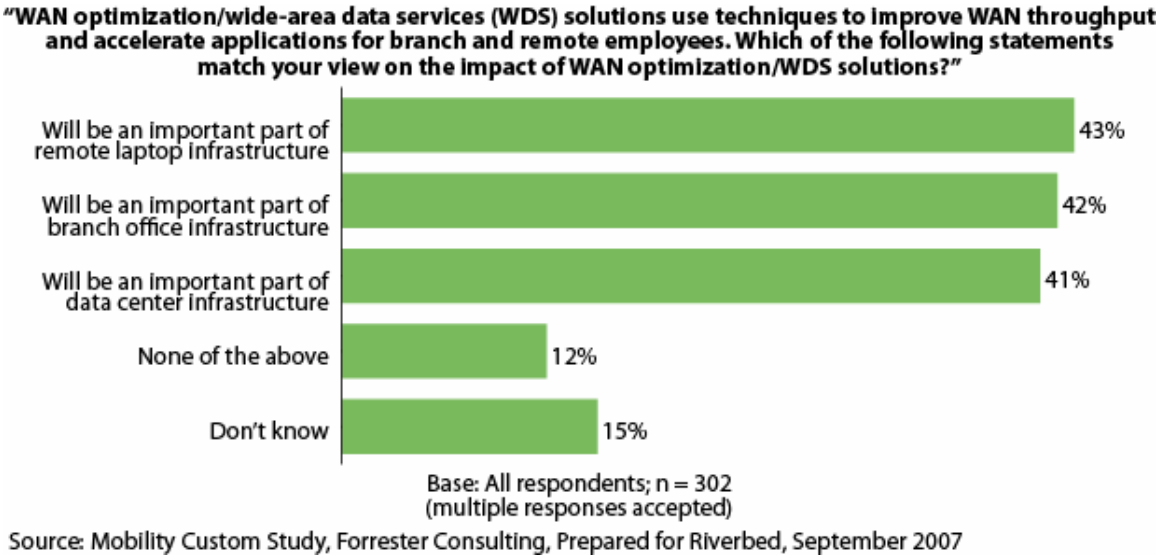
Base: All respondents; n = 302
(percentages may not total 100 because of rounding)

Source: Mobility Custom Study, Forrester Consulting, Prepared for Riverbed, September 2007

Overcoming The Challenge: Optimizing The Mobile WAN

We already know that companies are looking to the network to help overcome application woes. But we believe that one technology stands out as providing the most potential for solving the mobile bottleneck: WAN optimization. We know that this is a fairly well understood technology, but we also wanted to see just how strategic this was for today's organizations. We were shocked to find that more than 40% of respondents believe that WAN optimization is absolutely a strategic component to today's distributed and mobile environments (see Figure 11). This technology is seen as critical to the success of distributed organization, despite that fact that it is not yet a well-adopted technology. Why is this?

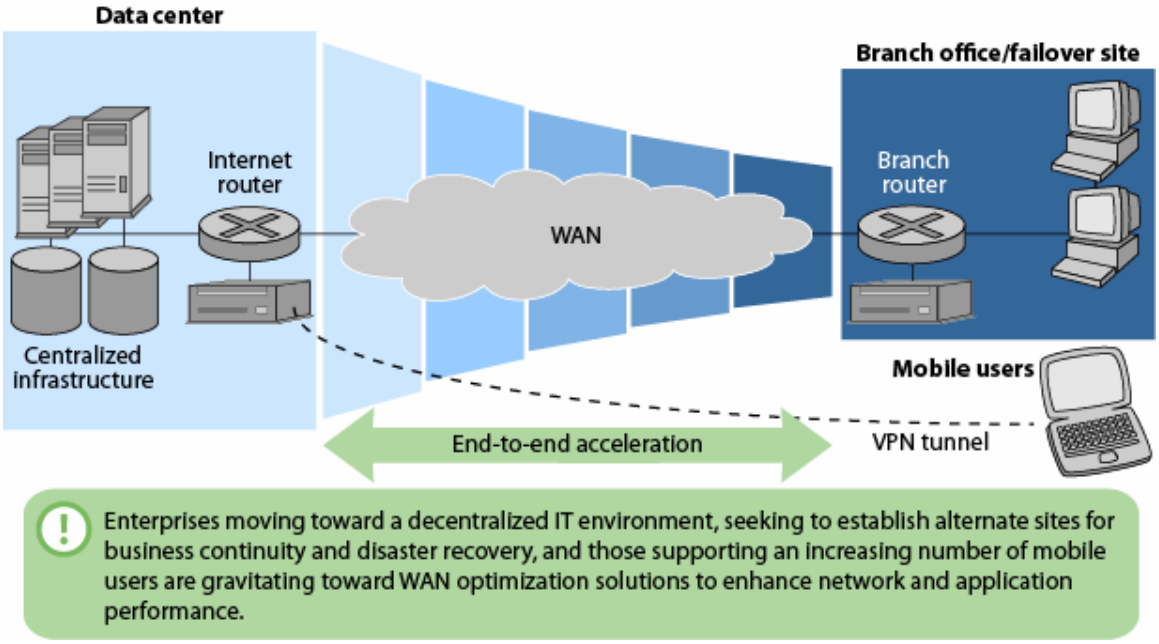
Figure 11: Companies See WAN Optimization/WDS As Important Infrastructure



Source: Mobility Custom Study, Forrester Consulting, Prepared for Riverbed, September 2007

WAN optimization, at its simplest level, is a technology designed to improve application performance by increasing throughput and decreasing latency. It's a symmetrical technology, meaning that hardware or software on both ends of the link help achieve end-to-end optimization. WAN optimization applies four common optimization techniques: 1) caching; 2) protocol optimization; 3) compression; and 4) traffic management. Caching keeps local data at your remote sites, which tackles both throughput and latency by avoiding unnecessary trips across the WAN.[2] Protocol optimization aims to reduce latency by removing inefficiencies in key protocols like MAPI, CIFS, and TCP.[3] Compression increases throughput by removing redundant patterns.[4] And finally, traffic management uses quality of service (QoS) mechanisms to shape bandwidth and prioritize your most critical apps (see Figure 12).[5]

Figure 12: WAN Optimization Accelerates Apps And Data To Branches And Mobile Users



The Benefits Of WAN Optimization For Mobile Users

As enterprises continue their march toward mobility and an increasingly distributed organization, the importance of accelerating access to network assets and applications proves increasingly critical. WAN optimization solutions aid users connecting to the network and accessing information, regardless of the access network from which they originate. In addition to simply empowering the mobility transition in the organization, WAN optimization solutions can guarantee a continuity of experience inside and outside the organization. Specifically, mobile WAN optimization helps tackle the top issues plaguing IT (see Figure 13):

- **Consistent performance for all applications.** More than 30% of respondents claimed that performance was very important across extranets and intranets. WAN optimization not only improves end-to-end application performance, but it also irons out performance wrinkles — providing a consistent end user experience regardless of location. Mobile WAN optimization can also provide a cost-effective way of accelerating apps where a software agent is more feasible than a hardware appliance on the remote end.

- **Room for deploying new business applications.** For many companies, the mobile WAN is simply too latent or too congested to support innovative new line-of-business apps. However, WAN optimization provides the means for decreasing overall WAN utilization and freeing up considerable bandwidth. The result? IT can take confidence in changing the application portfolio and add apps that drive user productivity, business process improvement, and customer satisfaction.

- **Improved availability and disaster preparedness.** WAN optimization solutions are also critical in providing the data acceleration needed for backup and replication software. We've already seen companies achieve tenfold improvement in backup software running across the WAN to branch offices. But with the addition of a mobile WAN optimization agent, this same benefit can be extrapolated to any remote user. This ensures workforce continuity

and decreases end user downtime while they're brought back to a productive state, should something go awry.

Figure 13: WAN Optimization Solves The Top Issues Effecting Apps On The Mobile WAN

Top deployment issues	How mobile WAN optimization helps
Application performance issues for mobile environments	Provides acceleration out to individual users to smooth out wrinkles and provide consistent performance for all applications
Insufficient bandwidth for new applications to drive the business	Improves WAN utilization and avoids congestion, freeing up bandwidth for new, innovative applications
Inability to quickly restore end users in the case of a disaster	Accelerates backup and recovery applications needed to ensure high availability and quick time-to-restore

Recommendations For Mobile WAN Optimization Solutions

Choosing the right mobile WAN optimization solution requires understanding a few key criteria.

Buy Now; Plan For Tomorrow

Taking on a WAN optimization solution should take into account more than simply the application or applications that the solution may initially be adopted to accelerate. WAN optimization, when properly applied, will work to improve the experience of users on the network, ensuring peak performance from any location, on any access network, as well as the performance of specific applications those users are attempting to access.

Understand and have a plan for how the technology will scale. Be sure to select a WAN optimization solution that both scales up and scales out. Scale-up means technology that supports more applications over time and an increasing amount of data. The tricky one is scale-out, though, which means supporting an increasing swath of users, not simply the "road warriors" that make up a small percentage of users in most organizations. This means selecting a vendor that understands the software agent and has thought through how that agent can be easily deployed and supported on a large number of remote laptops and desktops. It also means selecting a vendor that understands both branch offices and mobile workforces so that you can scale out with your users and provide a consistent experience across all remote activity.

Pay Attention To What's Under The Hood

Evaluating solutions for WAN optimization should take into account more than the optimization of network traffic. Evaluate a solution with respect to the underlying appliance architecture. Pick a vendor that supports clustering and redundancy to ensure maximum reliability. WAN optimization will become a critical part of your mobile architecture, and potential failure may cause your traffic load to extend beyond your network's capacity. Also, pick an appliance that fits into existing security architectures to ensure that SSL-encrypted traffic can still be accelerated for your mobile apps.

Pick A Vendor With Operational Maturity

No two WANs are alike. Working with a vendor that has experience in solving the specific issues of your organization will ensure that late-term support and performance issues do not arise. This is even more true with mobile WANs. Make sure the vendor has plenty of references in your industry that can attest to support. Otherwise, you may get stuck with a networking vendor that doesn't truly understand how to support a software agent or specific acceleration tricks that need to be applied to the nuances of a mobile environment.

Appendix A: Endnotes

[1] For the remainder of this paper, we will use “decentralization” to refer to the distribution of employees and the move toward an increasingly mobile workforce.

[2] Caching has come a long way in the past 10 years. There's object caching, which stores an entire object like a GIF graphic or PowerPoint file on disk, and byte caching, which looks for repeating patterns, stores those to disk, and then only sends small deltas to those patterns as the data gets updated. Object and byte caching combine to offer the biggest impact on improving Web-based applications, email, and file services.

[3] Not all protocols can be optimized, but many of the "chatty" ones can be. Here's how it works. WAN optimization removes the unnecessary roundtrips that many protocols — which were never designed to run in a WAN environment — introduce as part of their set-up process. For example, take Common Internet File System (CIFS), which is a common protocol used for Microsoft file sharing. If you were to open up a file located in a central file server, then it would not be uncommon for CIFS to use 25 roundtrips of overhead before data is even transferred. If your WAN had 80 ms of latency, then you'd pay a "penalty" of 2,000 ms (2 seconds) in just overhead! Protocol optimization reduces these roundtrips to the minimum 160 ms by parallelizing the protocol handshakes. Protocol optimization is best-suited to Web traffic (TCP and HTTP), email (MAPI), and file sharing (CIFS for Windows, NFS for Unix and Linux).

[4] Compression has been around for more than a decade, with the most common approach being the standard GZIP algorithm. Compression reduces bandwidth consumption but is not suitable for real-time traffic or precompressed data, like graphics files.

[5] Traffic management has also been around for nearly a decade. It's not an acceleration technology, but it does help by using common Differentiated Services Code Points (DSCP) and IP Type of Service (IPTOS) as mechanisms that prioritize your application data. Furthermore, most WAN optimization solutions can rate-shape traffic. For example, you could determine that voice gets 40% of your link capacity; mission-critical apps get 40%; and everything else gets the remaining 20%.