Peer Research

Desktop Virtualization Insights for IT Strategic Planning

Intel's IT Manager Survey on Desktop Virtualization

Why you should read this document:

This report describes key findings from a survey of 200 IT professionals that can inform your desktop virtualization planning, including the following:

- Sixty percent are making significant financial investments in desktop virtualization.

- Increasing client security is a top driver to implementation.

- User productivity tops the list of how IT professionals will measure return on investment.

- More than half of respondents see cost as a major barrier to implementation.

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Intel IT Center

Desktop Virtualization Earns Its Stripes
Intel's IT Manager Survey on Desktop Virtualization

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About This Report

While most industry buzz about virtualization has centered on servers, IT organizations have also kept their sights on the potential benefits of desktop virtualization. With server virtualization now a mainstream IT practice, we wanted to find out what progress IT professionals have made with virtualization on the client side.

We surveyed 200 IT professionals[1] about a wide variety of desktop virtualization topics, including the business and technology drivers behind their implementation plans, how they plan to measure return on investment (ROI), and which delivery models and software vendors they are considering.

The aim of this report is to provide benchmarking data you can use in your own desktop virtualization planning.

The results of our survey are detailed in this report. The goal is to provide benchmarking data about how your peers are approaching desktop virtualization so that you can use this data in your own IT planning efforts.

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1   Survey respondents are IT professionals in organizations of 100 to 1,000-plus employees across a variety of industries. See "Appendix" for detailed information on the respondent profile.

Executive Summary:
Desktop Virtualization Key to IT's Strategic Plans

The IT professionals in our survey represent companies across the continuum of desktop virtualization experience, from having already implemented (31 percent) or being in the process of implementing a solution (32 percent) to currently evaluating (30 percent) or planning to evaluate a solution in the future (7 percent).

Among this group, desktop virtualization is becoming a strategic IT practice that plays an important part in their overall IT environment.

- Ninety percent say that desktop virtualization plays either a foundational role or a strong role in their larger IT initiatives.

- Respondents place a high value on the role of desktop virtualization in their strategic plans as a whole, giving it a mean and median score of 6 on a scale of 1 to 7.

Role of Desktop Virtualization in IT Initiatives *(n=200)*

No Role
1%

Small Role
9%

Foundation
23%

Strong Role
67%
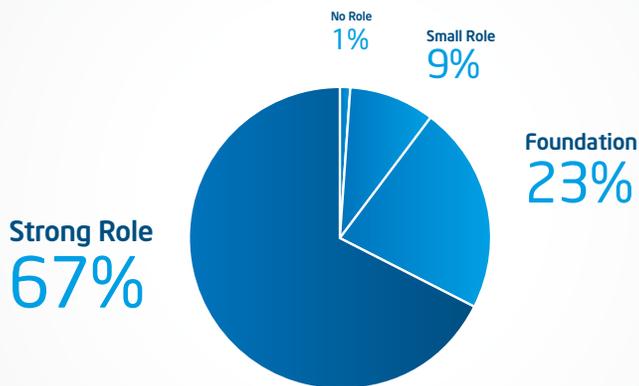
Q: *Which of the following best represents the role that desktop virtualization plays in any larger IT initiatives your organization is taking on?*

Key Finding:

Desktop virtualization is becoming a strategic IT practice.

What makes desktop virtualization so strategic to IT professionals? The data points to three key reasons:

Platform for the future. Fifty percent of respondents believe that desktop virtualization will better position them to implement future changes to their IT environment, such as new client operating system migrations, different client types, and the move to cloud computing.

Business benefits as well as IT benefits. While IT professionals see desktop virtualization as a way of achieving IT efficiencies, they also believe it will enable them to deliver strategic business benefits: 42 percent believe that it will deliver increased user productivity, for example, and 34 percent believe that it will enable the organization to achieve better business outcomes by empowering employees with tools that let them perform at their best.

IT equilibrium. Forty-two percent of respondents believe that desktop virtualization is a tool that will help them achieve an important equilibrium: balancing the needs of employees, who want flexibility and freedom, with their need to maintain security, retain management control, and contain costs.

Key Finding:
IT professionals view desktop virtualization as a way of balancing user needs with their own needs for security, management control, and cost containment.

Other key findings from the survey include the following:

Security is a major driver. The most common driver of desktop virtualization deployment is the need to improve client security (39 percent). Security is also important to business management; concerns about security are among the top challenges IT professionals face when trying to promote desktop virtualization to upper management.

ROI calculations are driven by productivity. User productivity is the factor that IT professionals are looking at the most often in their ROI calculations. They are also factoring IT management and operational improvements into the equation and expect savings in desktop support and management costs (66 percent), software licensing costs (58 percent), and the cost of endpoint hardware (56 percent).

Cost is the major barrier. By a wide margin, the primary barrier to desktop virtualization is the cost of deployment (52 percent). This is followed by the difficulty of choosing both the right approach (30 percent) and the right software vendor (30 percent).

Multiple models are considered. IT professionals are exploring a variety of delivery models for desktop virtualization. The top four are virtual hosted desktops (75 percent), application streaming/virtualization (51 percent), terminal services (38 percent), and client-side virtual containers (37 percent).

There is no difference by company size. We included a diverse range of company sizes in our survey so that we could measure how company size affects desktop virtualization implementations. However, the data reveals no significant differences among different segments (100 to 499 employees, 500 to 999 employees, and 1,000-plus employees).
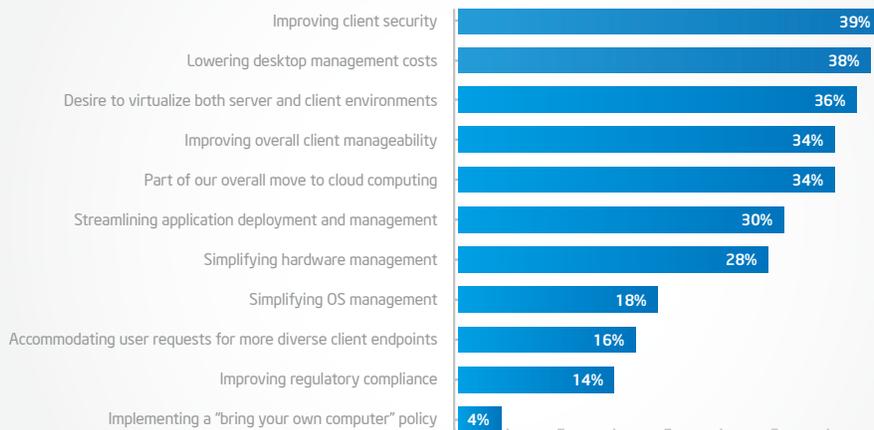
Key Drivers and Benefits of Desktop Virtualization

Security Tops List of Drivers, but Reducing Costs Is Close Behind

We asked IT professionals about the key drivers influencing their move to desktop virtualization, and security was at the top of the list. While upper management has some security concerns about desktop virtualization, IT views the technology as a way of improving client security (39 percent). Almost equally important are desktop management drivers, with lowering the cost of desktop management (38 percent) and improving overall client manageability (34 percent) ranking high on the IT professionals' list.

Larger IT initiatives are also driving desktop virtualization, as shown by the number of IT professionals reporting that they are virtualizing both the server and client environments (36 percent) and those who see desktop virtualization as part of their overall move to cloud computing (34 percent).

Needs Driving Desktop Virtualization Plans (*n=200*)

Improving client security	39%
Lowering desktop management costs	38%
Desire to virtualize both server and client environments	36%
Improving overall client manageability	34%
Part of our overall move to cloud computing	34%
Streamlining application deployment and management	30%
Simplifying hardware management	28%
Simplifying OS management	18%
Accommodating user requests for more diverse client endpoints	16%
Improving regulatory compliance	14%
Implementing a "bring your own computer" policy	4%

Q: *What would you say are the main business or IT needs that [drove/are driving your current/future] desktop virtualization plans?*

Key Finding:

The desire to improve client security is a top driver of desktop virtualization.

Interestingly, while "bring your own computer" policies have received significant industry attention—with desktop virtualization enabling these policies—this appears to be the least important driver for the technology, with only 4 percent of IT professionals reporting it as a need.

Benefits Extend across the Enterprise

While the main drivers behind desktop virtualization deployments are all about IT, once the technology is implemented, IT professionals see its benefits extending throughout the entire organization. They view desktop virtualization as a means of delivering strategic benefits to the business and end users.

- Forty-two percent believe that desktop virtualization increases user productivity by enabling workplace flexibility and decreasing downtime.

- More IT professionals believe that desktop virtualization will deliver better business outcomes by enabling employees to use the right tools (34 percent) than believe desktop virtualization will reduce money spent on client hardware (32 percent).

- At the bottom of the list—though still important to 13 percent of IT professionals—is the ability for them to say yes to senior business management who want IT to support new client types, such as tablets.

Expected Benefits of Desktop Virtualization (*n=200*)

Benefit	Percentage
Better positioned to handle future changes	50%
Balance employee needs with IT needs (security, control, cost)	42%
Increase user productivity by enabling workplace flexibility and decreasing downtime	42%
Increased data security	38%
Better business outcomes by enabling employees to use tools to perform at their best	34%
Reduce money spent on endpoint hardware	32%
Improved regulatory compliance	18%
Drive costs out of client management	14%
Say yes to senior business management who want IT to support new client types	13%

Q: *What are the main benefits your organization is hoping to see as a result of adopting this technology?*
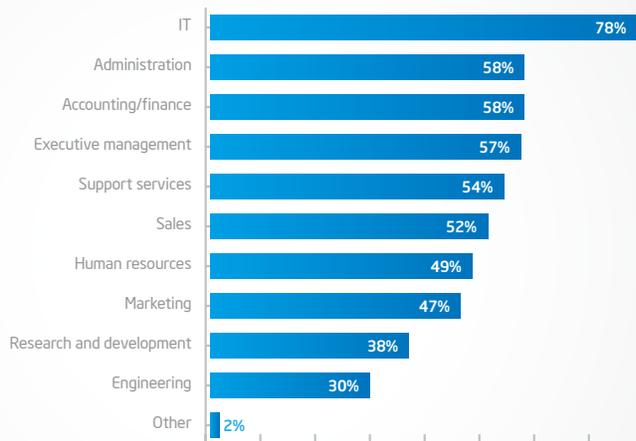
Key Finding:

IT professionals believe desktop virtualization can deliver powerful business benefits as well as IT benefits.

At the top of the list, however, is a highly strategic IT benefit. IT professionals are implementing desktop virtualization now in the expectation that it will better position them to handle future projects and initiatives—including new desktop operating system migrations, new client types, and cloud computing.

Deployment Expectations

We asked IT professionals which departments in their organization are currently using or would use desktop virtualization after it is fully deployed. Seventy-eight percent expect IT staff to use the technology for their own desktops. From there, deployment plans are concentrated primarily on administrative and support staff. Research and development teams and engineering staff were identified as the least likely to use desktop virtualization.

Likely End Users of Desktop Virtualization (*n=200*)

Department	Percentage
IT	78%
Administration	58%
Accounting/finance	58%
Executive management	57%
Support services	54%
Sales	52%
Human resources	49%
Marketing	47%
Research and development	38%
Engineering	30%
Other	2%

Q: *Which departments within your organization [are/do you expect to be] the end users of desktop virtualization [once fully adopted]?*

We also asked IT professionals how likely they would be to implement desktop virtualization for mobile devices; 51 percent were very likely and 32 percent were somewhat likely to do so.
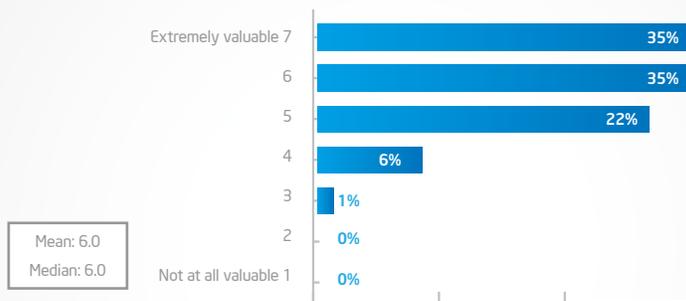
Likelihood of Mobile Utilization (*n=200*)

Likelihood	Percentage
Very likely	51%
Somewhat likely	32%
Somewhat unlikely	8%
Not at all likely	3%

Q: *How would you rate your organization's likelihood to use desktop virtualization technology via mobile devices in the future?*

Strategic Value, Level of Investment, and ROI

The IT professionals surveyed view desktop virtualization as an important component of their overall IT initiatives, with high value for their strategic plans.

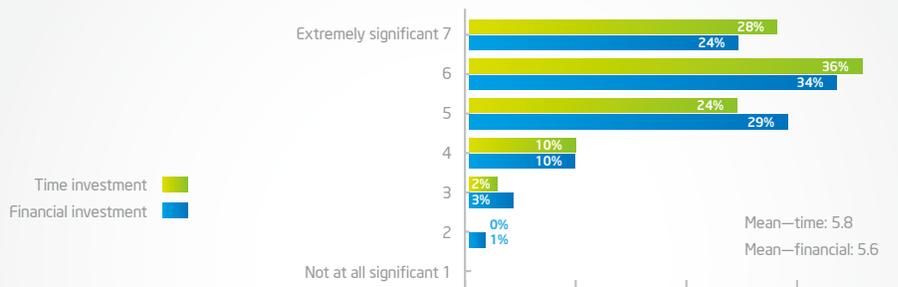## Value of Desktop Virtualization in Strategic IT Plans (*n=200*)

Rating	Percentage
Extremely valuable 7	35%
6	35%
5	22%
4	6%
3	1%
2	0%
Not at all valuable 1	0%

Mean: 6.0
Median: 6.0

Q: *How would you rate the value of desktop virtualization technology in the strategic plans of your IT organization?*

This perceived strategic value could be one of the factors driving the relatively high levels of investment, both in time and money, that organizations are making in the technology.

- Sixty percent of respondents say they are making a significant level of financial investment, and 64 percent say they are making a significant level of time investment in desktop virtualization.

- Additionally, the high levels of financial and time commitment required to implement desktop virtualization were significant factors in their organizations' decision of whether to implement the technology.

Level of Investment in Desktop Virtualization (*n=200*)

Time investment
Financial investment

Level	Time	Financial
Extremely significant 7	28%	24%
6	36%	34%
5	24%	29%
4	10%	10%
3	2%	3%
2	0%	1%
Not at all significant 1		

Mean—time: 5.8
Mean—financial: 5.6

Q: *How would you describe the level of [financial investment/time investment] your organization [has made/is making/is planning to make] in order to implement desktop virtualization technology?*
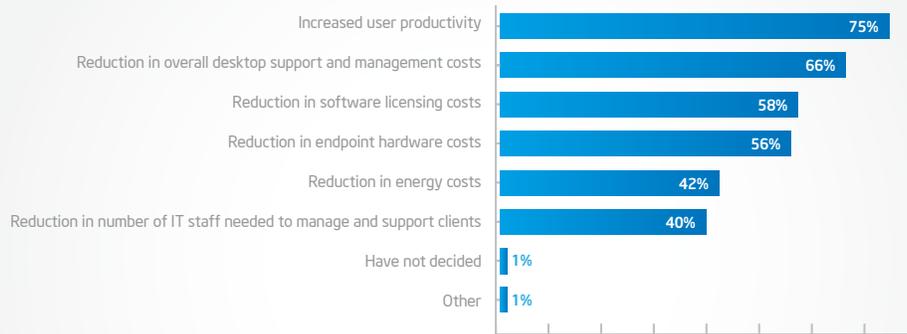
Key Finding:
Organizations are making significant investments of money and time in implementing desktop virtualization.

These significant levels of investment, in turn, may be driving IT planning in terms of ROI. IT professionals are starting to understand how to measure ROI for their desktop virtualization environment. Not surprisingly, some very specific desktop management and IT operations issues factor heavily in these ROI calculations, including reductions in support and management costs, software licensing costs, and hardware costs.

Topping the list, however, is a business benefit rather than an IT benefit. Increased user productivity—one of the top benefits that IT professionals expect from desktop virtualization—is the number-one factor they're considering when calculating ROI (75 percent).

ROI Considerations (*n=200*)

Factor	Percentage
Increased user productivity	75%
Reduction in overall desktop support and management costs	66%
Reduction in software licensing costs	58%
Reduction in endpoint hardware costs	56%
Reduction in energy costs	42%
Reduction in number of IT staff needed to manage and support clients	40%
Have not decided	1%
Other	1%

Q: *What factors are you considering/planning to consider when calculating the ROI of your desktop virtualization project?*
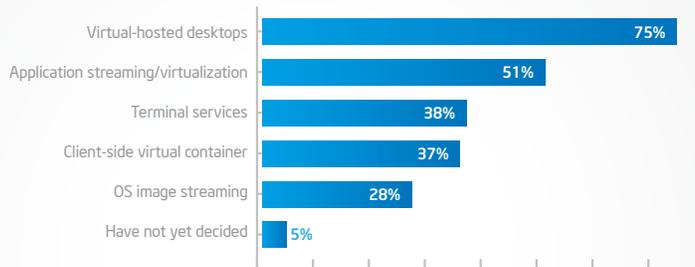
Key Finding:

User productivity tops the list of how IT professionals plan to measure ROI.

Delivery Models and Vendors

Multiple Models under Consideration

While the virtual-hosted desktop model (also known as virtual desktop infrastructure, or VDI) is currently the most common delivery model for desktop virtualization—and, indeed, the number-one model that these IT professionals are using or investigating—respondents are evaluating a number of other models as well.

Virtualization Delivery Model (*n=200*)

Model	Percentage
Virtual-hosted desktops	75%
Application streaming/virtualization	51%
Terminal services	38%
Client-side virtual container	37%
OS image streaming	28%
Have not yet decided	5%

Q: *Which of the following models of desktop virtualization has your organization chosen, or is your organization currently considering, for implementation?*

Desktop Virtalization Delivery Models: Definitions

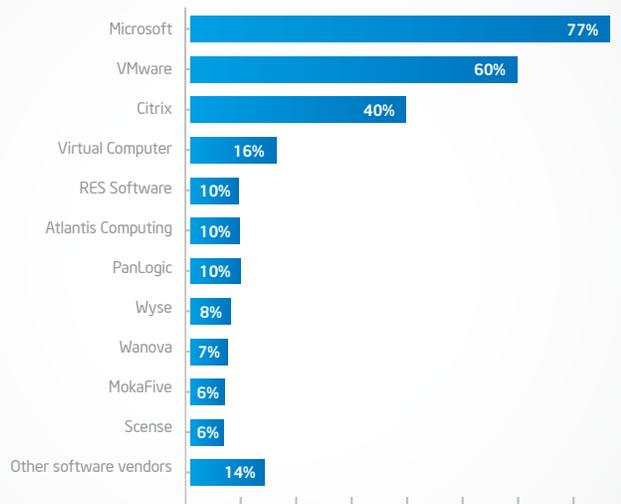|	
Virtual-hosted desktops	Server-based model, sometimes called VDI. All computation and storage are centralized, but users have their own complete virtual machine and customized desktop, including the operating system, applications, and settings.
Application streaming/virtualization	Client-based model. The client operating system is locally installed, but applications are streamed on demand from the data center to the client, where they are executed locally.
Terminal services	Server-based model. The client is only a display and input device. All computation is done centrally on the server, and all data is stored in a data center.
Client-side virtual container	Unlike a locally installed or streamed operating system, the virtual container is abstracted from the platform via a client-based virtual machine manager (VMM).
OS image streaming	Client-based model. No operating system image is installed locally. The operating system is stored and managed in the data center and streamed to the client over the network for local execution.

After virtual-hosted desktops, the most popular delivery model is application streaming/virtualization (51 percent), in which the client operating system is installed locally and applications are streamed to the endpoint for local execution.

Whether IT plans to extend desktop virtualization to mobile devices appears to have an effect on which delivery models they consider. IT professionals who are very or somewhat likely to incorporate mobile devices are more likely to consider the client-side virtual container model (42 percent versus 37 percent for all) and the OS image streaming model (32 percent versus 28 percent for all).

Microsoft, VMware, and Citrix Top the Vendor List

Not surprisingly, the three biggest providers of desktop virtualization software—Microsoft, VMware, and Citrix—top the list of vendors either selected by or currently under consideration by the IT professionals in this survey. But respondents are also willing to consider a number of smaller vendors. While no one of these smaller companies is getting the same level of consideration as the established players, collectively they are attracting the attention of IT.

Software Vendors Considered (n=200)

Vendor	Percentage
Microsoft	77%
VMware	60%
Citrix	40%
Virtual Computer	16%
RES Software	10%
Atlantis Computing	10%
PanLogic	10%
Wyse	8%
Wanova	7%
MokaFive	6%
Scense	6%
Other software vendors	14%

Q: *Which of the following software vendors have you chosen, or are you currently considering, for implementation of desktop virtualization?*

Barriers to Implementation

IT professionals are very clear on the primary challenge to implementation: The major barrier to desktop virtualization is cost. More than half of respondents rate cost as a major barrier to introducing desktop virtualization into their organization.

Main Barriers to Implementation (*n=200*)

Barrier	Percentage
Cost of deployment	52%
Choosing right approach	30%
Choosing right software vendor	30%
Lack of time	29%
Unsure of ROI	24%
Vendor products' functionality	23%
Business management support	14%
IT management support	8%
Other	1%
Not an IT priority	4%
No barriers	12%
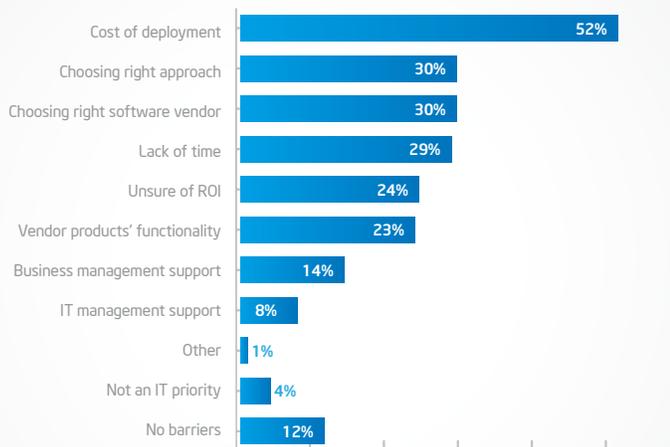
Q: *Which of the following would you say are the main barriers to implementing desktop virtualization?*

Many IT professionals are also having difficulty choosing from among the many available approaches and vendors. Nearly one-third indicate that the difficulty in choosing the right model and vendor for their organization is a primary obstacle to deployment. For almost another one-third of respondents, time—or more specifically, the lack of it—is a primary barrier.

One interesting difference in this category occurs between IT professionals who are currently implementing desktop virtualization and those still in the evaluation process. Of those currently implementing, 41 percent say that the functionality of vendor products is a primary barrier to implementation—second only to cost.

For companies still in the evaluation phase, however, only 17 percent of IT professionals who are fewer than three months out from implementation—and only 15 percent of those more than three months out—find product functionality to be an issue. It may be that IT professionals are learning some hard lessons during the implementation process, and that those unconcerned with this issue now will find it to be more of a problem as their plans progress.

What Can Vendors Do To Help?

We asked IT professionals what vendors could do to help them overcome the barriers to desktop virtualization. Responses varied widely. While 52 percent saw cost as a primary barrier, only 18 percent suggested that vendors lower their prices. Among the other suggestions for vendors were improving support (14 percent), providing tangible cost information about ROI and total cost of ownership, or TCO (12 percent), and improving ease of implementation and use (10 percent).

Suggested Vendor Changes (*n=200*)

Lower costs	18%
Improve / provide support / support resources	14%
Provide tangible cost information (ROI/TCO)	12%
Improve ease of implementation / use	10%
Improve / provide communication / information	8%
Improve security	6%
Improve performance / reliability / stability	5%
Provide relevant / tailored solution	4%
Improve / provide training	4%
Provide complete / all-in-one solution	4%
Other	19%[1]
Nothing / satisfied	6%
Don't know / no response	9%

[1]*No single "other" mention accounts for more than 3% of the total.*

Q: *What could technology providers do to help you overcome barriers and make the decision/implementation of desktop virtualization easier?*

Convincing Upper Management

Making the business case to upper management—and getting executive buy-in—can be a challenge for many IT professionals, regardless of project. In the case of desktop virtualization, 57 percent of IT professionals report that obtaining management support for desktop virtualization was a moderate challenge, with another 8 percent identifying it as a heavy challenge.
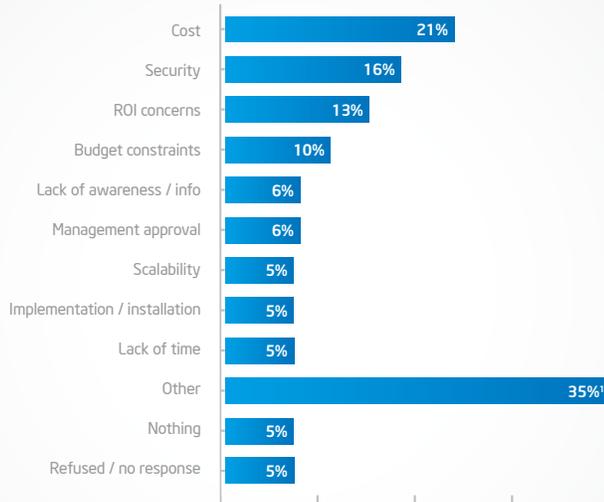
Level of Challenges Experienced (n=127[1])

Heavy
8%

None
13%

Moderate
57%

Slight
21%
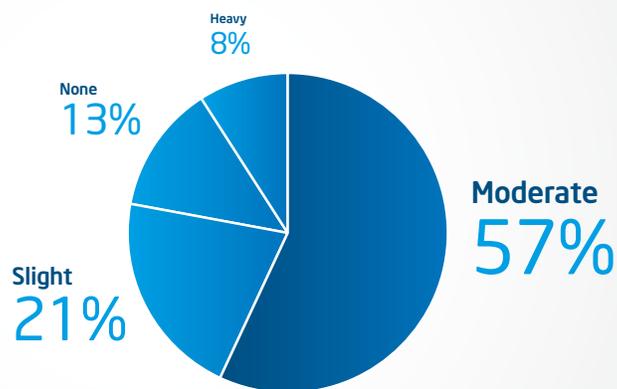
[1]Have implemented or are in the process of implementing desktop virtualization.

Q: *How would you describe the challenges you experienced in obtaining buy-in from upper management on the decision to adopt desktop virtualization?*

The specific issues that IT professionals faced as they sought executive approval varied widely, but—not surprisingly—three of the top four reasons boil down to money: cost, ROI concerns, and budget constraints. Overcoming security concerns was a challenge for 16 percent.

Top Challenges Experienced (*n=82*)

Challenge	Percent
Cost	21%
Security	16%
ROI concerns	13%
Budget constraints	10%
Lack of awareness / info	6%
Management approval	6%
Scalability	5%
Implementation / installation	5%
Lack of time	5%
Other	35%[1]
Nothing	5%
Refused / no response	5%

Q: *What, specifically, were these challenges?*

[1]No single "other" mention accounts for more than 4 percent of the total.

We asked the IT professionals in our survey how they overcame these challenges to get executive buy-in on the implementation. Again, approaches varied across the board, with no single solution for every situation.

Some IT professionals chose an organizational route, forming committees that included important stakeholders they needed to convince. Others found success by demonstrating ROI numbers and long-term benefits and by presenting information that allayed security concerns. Many turned to their vendors—and some to consultants—to help them make these presentations. At least one IT professional found success by showing executive management what their organization's competitors were doing with the technology.

Key Finding:

There's no single approach to getting executive buy-in.

Conclusion

Desktop virtualization is clearly earning its stripes as a strategic IT practice. Through the technology, IT professionals can prepare a platform for future success and deliver important business benefits to their organizations. IT departments are making significant investments of time and money in desktop virtualization, and they are looking for the technology to pay them back in user productivity gains, security increases, and reduced desktop management costs.

But the road to desktop virtualization isn't clear sailing for IT professionals. Issues of cost, difficulty in choosing the right approach and vendor, and getting buy-in from management are key challenges.

For additional information from Intel's IT department on desktop virtualization, see the following documents.

Defining Desktop Virtualization

Developing an Enterprise Client Virtualization Strategy
Starting in 2007, Intel IT has been studying a variety of virtualization techniques to see which would provide the widest range of benefits for Intel. We summarize the pros and cons in this paper.
intel.com/content/www/us/en/enterprise-reliability/intel-it-enterprise-client-virtualization-strategy-paper.html

Enabling Device-Independent Mobility with Dynamic Virtual Clients
Intel IT is investigating dynamic virtual client technology, which uses containerized software appliances to abstract the OS; applications; and corporate data, personal data, and workspaces.
intel.com/content/www/us/en/mobile-computing/intel-it-mobile-computing-independent-mobility-dynamic-virtual-clients-paper.html

Benefits of Virtualization

Virtualizing the Client PC: A Proof of Concept
Intel IT conducted a proof of concept and found that desktop virtualization could reduce total cost of ownership by streamlining PC client builds.
intel.com/content/www/us/en/virtualization/intel-it-virtualization-virtualizing-the-client-pc-paper.html

Intel IT Considering Dynamic Virtual Client
In this video, Dave Buchholz, Technology Evangelist, discusses the specifics of how virtual client technology can help companies support IT consumerization while reducing total cost of ownership and improving productivity.
http://communities.intel.com/docs/DOC-4313

Selecting the Right Endpoint

Increasing Productivity with Mobile Business PCs

Intel IT conducted a detailed study and compared computing models and devices against our computing requirements. After analysis, we selected mobile business PCs as our standard platform. One key factor was their ability to support emerging technologies such as virtualization.

intel.com/content/www/us/en/mobile-computing/intel-it-mobile-computing-business-pc-paper.html

Better Together: Rich Client PCs and Cloud Computing

The Intel IT environment contains a mixture of conventional and cloud computing services, delivered primarily to mobile business PCs. As we add new delivery models such as desktop virtualization, we expect to realize benefits such as increased end-user productivity and lower TCO.

intel.com/content/www/us/en/cloud-computing/cloud-computing-vpro-intel-it-rich-client-pcs-and-cloud-computing-study.html

Evaluating Thin-Client Security in a Changing Threat Landscape

Intel IT conducted a security analysis of thin clients versus mobile business PCs. We found that while thin clients may be suitable for some niche uses, we have chosen mobile business PCs to support the functionality and flexibility our employees require. In addition, mobile business PCs position us to take advantage of the benefits of desktop virtualization.

intel.com/content/www/us/en/enterprise-security/intel-it-enterprise-security-thin-client-paper.html?wapkw=evaluating thin client security

A New Model of Client Computing

The Future of Enterprise Computing: Preparing for the Compute Continuum

By taking advantage of a combination of technologies and trends, such as ubiquitous Internet connectivity, virtualization, and cloud computing, we have an opportunity to meet changing employee requirements and refine the way we provide services.

intel.com/content/www/us/en/it-management/intel-it-the-future-of-enterprise-computing-preparing-for-the-compute-continuum-paper.html

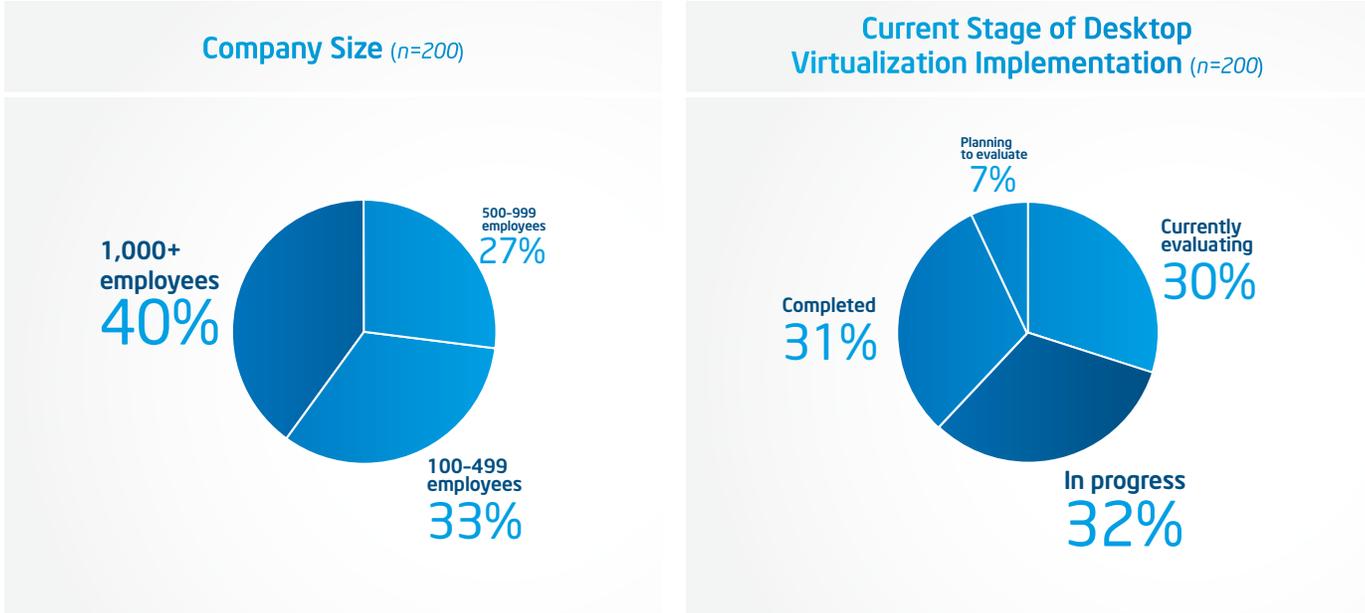# Appendix: Methodology and Audience

Responses to this survey were gathered via an online questionnaire; 200 responses were received between May 25, 2011 and June 2, 2011. A sample size of 200 has a maximum sampling variability of ±6.9 percent at the 95 percent confidence level.

Respondents were screened to ensure that they meet the following criteria:

- Work in a company of 100-plus employees
- Are IT professionals
- Are involved in decision making processes and strategic planning for clients in their organization
- Have implemented, are currently implementing, are evaluating, or plan to evaluate desktop virtualization
- Represent what Intel identifies as a "tech enthusiast" company—that is, a company that considers IT to be a driver of business success

Being an Intel customer was not a consideration for inclusion in the survey. Quotas for company size and industry were enforced to ensure a representative sample.

Respondent Profile Information

Company Size (*n=200*)

1,000+ employees
40%

500-999 employees
27%

100-499 employees
33%

Current Stage of Desktop Virtualization Implementation (*n=200*)

Planning to evaluate
7%

Currently evaluating
30%

Completed
31%

In progress
32%

Industry (n=200)

Professional services	15%
Financial services	11%
Manufacturing	10%
Transportation & logistics	10%
Computer-related business or service	9%
Healthcare	8%
Education	7%
Retail	6%
Telecommunications	4%
Construction	4%
Government	3%
Utilities	3%
Others (1% or less)	10%

Company Computers (n=200)

Less than 250 computers	20%
25–499 computers	24%
500–999 computers	22%
1,000+ computers	33%
Unsure	<1%

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