

A Smart Guide published by



User Virtualization

Beyond device-centric computing



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Whose desktop is it anyway?

Today, two forces typically dominate the way in which technology is used in an organization:

- The needs of the business, centered on value creation, risk mitigation and cost management.
- The needs of the IT department, usually focused on management and control, as well as minimization of overheads and hassle, and staying within budget.

It is of course essential that those needs and requirements are taken care of, otherwise the organization wouldn't be able to function. But there is another party to be taken into consideration, and it's one whose needs and preferences are frequently downplayed: the end user. Often, end users have little influence over IT choices, and are expected to work with what they're given.

But so what? Surely if business requirements are considered and IT is able to manage risk and cost effectively and efficiently, why should it matter what users think and feel? After all, they are being paid to do a job!

Well it does matter, and in some very tangible ways.

If what users are given is a good match for what they need to do their work effectively, without IT getting in the way, that's fine. If it's not a good match, they will try and find ways around constraints and mismatches in the technology they're provided

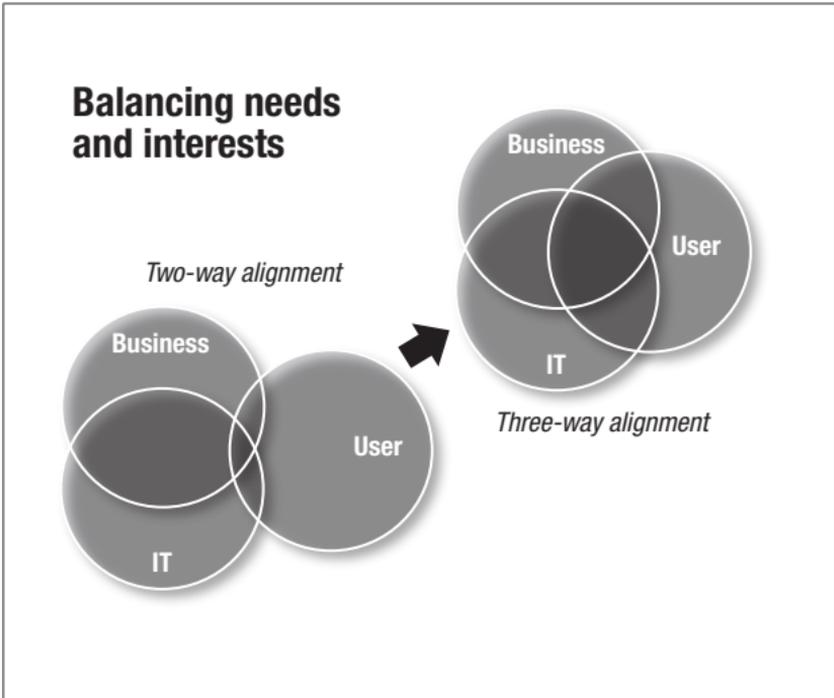
with; this inevitably has consequences in terms of support costs, as well as security and compliance issues. Also, loss of productivity and morale often result when new IT solutions are introduced that users have difficulty coming to terms with; a poor return on investment is the likely consequence.

For many organizations, other dynamics are coming into play. Users are getting ever more technology-savvy, and the devices and software they are using in their personal lives are, at times, better than what they're being provided with at work. Not surprisingly, this is making them more demanding when it comes to IT, as well as more able (and likely) to try and take the initiative to get things working the way they want them to.

But this isn't just about users pushing back or acting selfishly. End user frustrations, complaints or unilateral actions can also be a symptom of capability shortfalls, or missed opportunities for improvement. Furthermore, when users have a poor impression of IT, this impacts the reputation of the IT department, which in turn has consequences in terms of levels of cooperation and tolerance, and even difficulties in securing funding for IT-initiated projects.

The reality is that paying more attention to the needs and wants of end users ultimately is in the interests of both IT and the business.

This principle is relevant to many aspects of IT and business, but is particularly important where the rubber meets the road: end user computing. It's the point of consumption where users really experience IT, and where big benefits can be gained through properly balancing the needs of all three parties.



Before getting into this balancing act, however, we need to take time to consider what's going on in end user computing in general, as this is a very dynamic space.

End user computing is at an inflection point

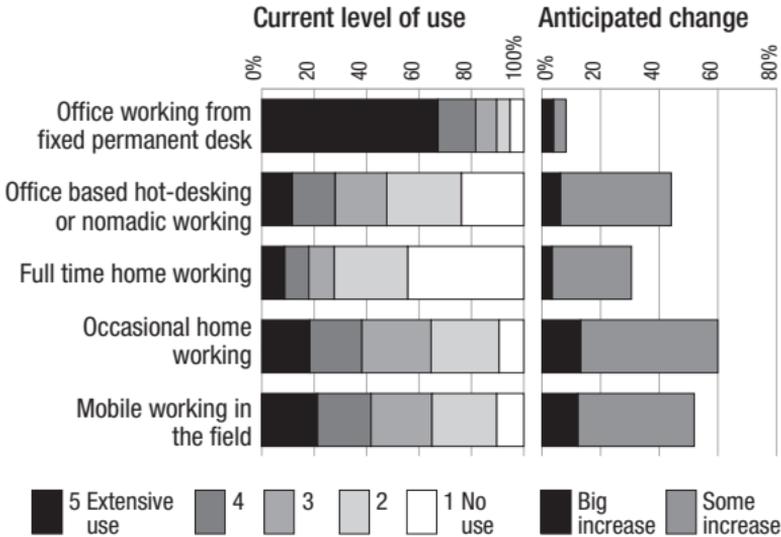
Many factors are coming together that are causing organizations to re-evaluate how end user computing is delivered.

Some of these factors have been around for a long time; end user push back and complaints are nothing new. But as we've already mentioned, there are new forces in play now: against a backdrop of increasingly sophisticated and powerful personal technology, users have become more demanding, and are even more ready to work around constraints in the technology they've been given. In many cases, they're succeeding; this in turn puts additional stress on the IT/user relationship. Typically, IT has to ride to the rescue when an end user's 'do-it-yourself' attempt has gone wrong. And it's IT that gets the blame when security and compliance issues arise; it's also IT that typically carries the burden of addressing them.

Working around constraints isn't confined to the hardware and software provided by IT. Employees and contractors alike increasingly want to use work applications on their own devices. In a nutshell, the 'consumerization' of IT acts as a magnifier on an existing issue – and there's no turning back the tide. That's not to say that all companies are affected in the same way; and indeed, in some industry segments, 'bring your own device' is not going to be a viable option in the foreseeable future. But for many, an overly restrictive approach is exacerbating the very security, compliance and support issues that IT is trying to avoid.

Hand-in-hand with consumerization goes another trend: the growth in home working, remote working, mobile working, flexible working, and hot-desking. As shown in the chart over the page, even in businesses where the majority of the workforce remains largely desk-bound, a lot of work gets done away from the office.

To what degree have the following ways of working been adopted within your organization, and do you see this changing over the coming three years?



Source: Freeform Dynamics, 2011 (online survey 357 IT & business professionals)¹

But it's not just about end users and work patterns. Times remain tough, and many businesses are continuing to seek ways of optimizing efficiency, and minimizing cost. However, there are also those who are emerging from recession-induced paralysis and actively exploring new ways of working to drive business efficiency and effectiveness. Both scenarios put additional pressure on IT, which may need to consider new delivery models in order to meet the seemingly conflicting demands of greater flexibility, increased functionality, and lower cost. Added IT issues

arise when economic pressures force the business to push into new market segments or countries in order to achieve growth.

Another key IT driver for reviewing end user computing is desktop renewal. Periodically, organizations are faced with the need to replace aging desktop and laptop estates that are not only prone to failure and require more support, but are getting in the way of efficient working. Alternatively, they may need to upgrade to the latest software versions. And in many cases, they're ending up doing both simultaneously.

Some – not to say all – of these factors need to be addressed sooner rather than later. But it's arguably not viable to rely only on established approaches when tackling them. Doing so would likely exacerbate many of the support and security issues outlined above. So now is not only a good time to review the existing desktop management tool kit, it's also an opportunity to rebalance the business/IT/user triangle to take more account of the end user.

To address this, desktop service delivery options have begun to emerge that offer new ways for users to interact with systems and information. If implemented effectively, these options can assist with rebalancing the triangle. They include new devices, a range of desktop virtualization solutions, and the latest generation of enhanced desktop management tools.

Let's start by looking at the most important element of this – the Windows PC environment.

P' is for 'personal'

The history of the PC in many ways is a microcosm of the on-going struggle between users and IT:

- Users want freedom and flexibility.
- IT needs control and an ability to manage systems and services.

Few would dispute that PCs are critical to the business, but running and supporting them is a large, though frequently hidden, cost. Over the years, IT has attempted to standardize and centralize management; PCs have increasingly had their operating system and applications locked down, and in specific cases replaced with 'thin clients'. Users, on the other hand, have pushed back. They resent the (perceived) loss of freedom, and – where thin clients have been deployed on inadequate network infrastructure or forced onto more demanding users – the loss of performance. Modern desktop virtualization technologies are helping with the management element and can be used in a wider range of scenarios than traditional thin clients. In either case, the personalization versus standardization tug-of-war continues.

Research confirms² that many organizations are now considering desktop virtualization as an option in their desktop deployment, but traditional, full-function PCs remain an important part of the mix.

Another significant change is the departure from the one-machine-per-user principle. Some users are already accessing applications and data from a combination of PCs – dedicated work desktop, laptop, home PC, hot-desk machine, hotel business center

equipment, terminal in an airport lounge, and so on. Others are increasingly working in a virtual desktop environment, or with thin clients deployed to contact centers, admin departments, etc.

In all of these scenarios, the ‘personal’ aspect never goes away, as anybody with experience in PC support will know. Whether it’s the look and feel on the desktop, favorites and shortcuts for accessing web sites and internal resources, or the way in which individual applications such as email are set up and configured – personalization is a big issue with regard to both productivity and user contentment.

The challenge: meeting user needs while managing costs, security and risk

Personalization-related issues are a major cause of IT support incidents, though. Setting up preferences on a new device or desktop, loss and corruption of those preferences, replicating them across different machines, what can and can’t be personalized in a virtual environment – all of these can be time-consuming to resolve, and they need to be resolved time and time again.

And that’s before we’ve even taken into consideration what it means to migrate preferences when PCs or operating systems are upgraded or migrated. Migration is a sensitive and potentially stressful time for IT and users alike. The last thing the organization needs are conflicts around user settings and preferences needing to be manually rescued. This is particularly important at the time of writing³ as lots of organizations have XP to Windows 7 migration on their agenda.

Finally, there's another aspect to personalization, and it has nothing to do with what the user wants or decides. The company has a responsibility to put in place policies governing what can or can't be done when using corporate IT equipment and networks. In particular, this should include user- and context-specific policies in relation to security, access, compliance and user-initiated software installation. Naturally, such policies also need to be propagated and maintained across multiple physical and virtual environments.

Some of these challenges will probably never be addressed to everybody's satisfaction. But there is an emerging approach and solution set that can help deal with some of these immediate PC-related challenges; it can also prepare the groundwork for addressing issues on the horizon, mainly around the proliferation of devices such as non-Windows PCs, slates and smart phones, as well as the routine use of multiple platforms.

Introducing 'user virtualization'

The emerging discipline referred to above has various names, depending on which analyst or IT vendor you ask – 'profile management', 'workspace management', and 'user virtualization', to cite just a few. For the purposes of our discussion, we're going to stick with the term 'user virtualization', since – just like other forms of virtualization – it is about decoupling and abstraction:

- Operating system virtualization decouples the OS from the underlying hardware.
- Application virtualization decouples applications from the underlying OS.
- User virtualization decouples user-specific settings and policies from the physical or virtual machine.

User virtualization allows users the flexibility to manage their own preferences across multiple physical or virtual devices, but it does so within a framework that is monitored and controlled by IT. The same framework can be used to manage the propagation and maintenance of user-specific policies that aren't easily dealt with by other management tools, such as permissions and rights.

It's fair to say that some functionality in this area is included in desktop virtualization solutions. Where this is the case, however, it has to date been tied to OS virtualization, and therefore doesn't deal with the majority of users running traditional physical PCs with full local functionality. More traditional mechanisms, such as 'roaming profiles', have often been reported as being limited and difficult to manage, particularly in large scale and/or dynamic environments. As importantly, where solutions have been available, the emphasis has typically been on IT and business benefits in terms of cost and risk control, rather than user wants/needs.

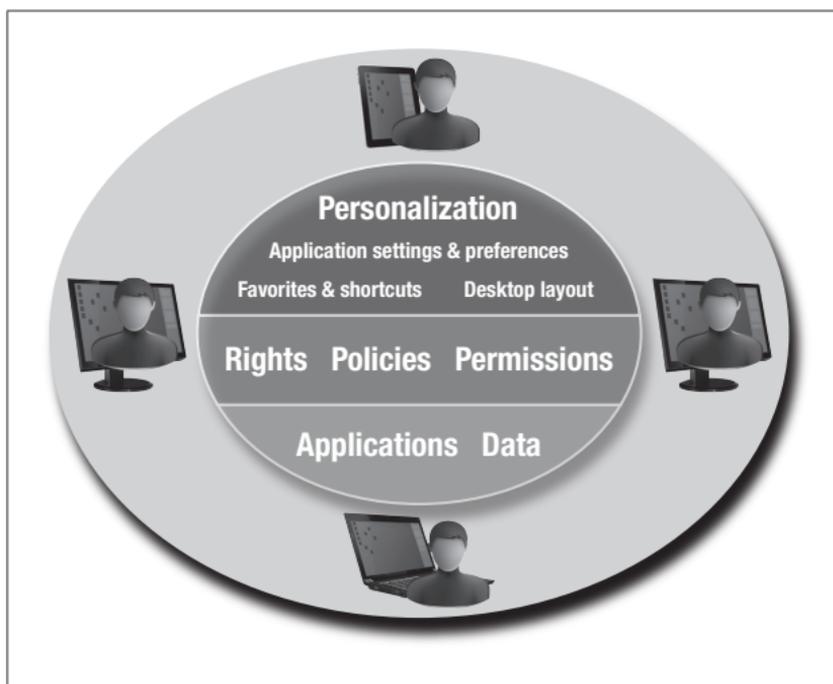
User virtualization, on the other hand, takes care of many of these aspects. Most importantly, user virtualization doesn't just apply to virtual desktops – it is a discipline in its own right, and equally applicable to physical machines.

So how does it work?

User virtualization in action

The starting point is an analysis of what makes up a user's 'virtual personality', and includes elements of both user preference and IT policy.

The key elements of a 'virtual personality' are:



User virtualization is about creating, and using, a central repository of virtual personalities. The specifics of this would include some of the personalization and policy management capabilities we've already touched upon, but when looking at solutions in this area, there are a number of other things to consider.

Managing the elements of a 'virtual personality'

Personalization: Also referred to as 'profile management'; essentially consists of ensuring users have a common look and feel to the desktop and applications they use, irrespective of device. The requirement is for cross-platform, cross-application delivery, and independent of the underlying operating system and applications.

Policy: Provides administrators with the ability to shape the scope of changes users are permitted to make to their operating environment. Ideally, takes note of user's context (device type, location, ownership, connectivity, services to be accessed, etc.) to allow maximum flexibility and comfort, while maintaining security and corporate governance.

User rights: Used to enforce policies concerning what applications and services the user can run, when they can run them, and which network connectivity and device types are permitted to access particularly sensitive applications or services.

User permissions: Used to control level of 'elevation'. For example, administrator privileges may be required to install an application, but not to run it. Preferably, permissions are confined purely to the service or application concerned for a fixed event (e.g. installation or modification), rather than being generally allocated to the user or device until revoked.

User data: This allows policies to be activated that control which data users can access, and whether they're allowed to make changes. Permissions ideally are granular enough to allow different levels of access (write, copy, delete, etc.).

Private data, applications and services: Policy covers whether the user has the ability to install applications, tools, plug-ins, etc., beyond those supplied by the organization, and where and when these can be accessed. This includes storage of private data on company machines.

Once the virtual user personalities have been created and stored, a fully featured user virtualization solution ensures that they can be synchronized with any physical or virtual device that the user is authorized to use for work. This process is of course seamless and transparent to the user. Offline use is also supported, as most organizations will have users that are disconnected from the network for part (or even much) of the time.

For those working with more than one device, settings changed on one machine are automatically migrated to the others used by that person. And what if somebody made a mistake? A rollback function takes care of this scenario, by allowing the user to go back to previous settings without major IT involvement.

A detailed list of user virtualization capabilities is included in the Appendix.

Applying user virtualization

There's a variety of scenarios where user virtualization can help to lower support costs, enhance security and risk management, speed up IT processes, and reduce friction between users and IT. Key scenarios include:

- Desktop migration.
- User support optimization.
- Support for flexible working.

So let's take a look at each of these in turn.

Desktop migration

User settings may not be top priority when it comes to migrating to a new operating system: the biggest effort is usually in getting the applications to work in the new environment. But migration of user settings is nevertheless a major issue, as it's typically not so much 'migration' of settings, as 're-creation' – with all the attendant frustration and wasted time for both IT and the user.

User virtualization potentially provides the ability to harvest settings prior to migration by tracking activity over a period of time. When a new machine is allocated (or the existing machine has the new operating system installed), it should then simply be a case of synchronizing the relevant user settings.

User support optimization

Many helpdesk-related issues are aggravated – or even caused – by users configuring or reconfiguring their machine and applications without really knowing what they are doing. Users tend to rely on a trial and error approach to changing settings, which leads to unintended consequences; more often than not, they won't know how to reverse the changes they've made.

Maintaining a central view of machine configuration around policies and preferences, with historical snapshots and the ability to roll back to a previously good state, can shortcut the troubleshooting and remedial process. If a configuration

rollback capability is available to the user on a self-service basis, some calls to the helpdesk can even be avoided altogether.

In extreme situations where a machine needs to be rebuilt or replaced, applying the centrally-held profile to recreate the original setup reduces IT effort and increases user satisfaction, especially when combined with effective asset management and software deployment solutions.

All in all, considerable time savings can be achieved for users and IT alike, as well as reducing frustration on both sides.

Support for flexible working

Whether it's hot-desking, mobile working, home working, or the use of multiple devices – many IT departments are having a hard time trying to optimize support for these various scenarios. Indeed, some are prohibiting home or mobile working (to mention just two scenarios) because they feel they'd be overstretched. And that's before we've even thrown consumerization – or 'bring your own device' – into the equation.

User virtualization has the potential to play a major role in managing the increasing location-independence of work, as well as getting to grips with the on-going proliferation of device types (some of which may be acquired unilaterally by users). All in all, user virtualization could lay a strong foundation for the future, which we'll consider in the next section.

User virtualization case example: Microsoft Windows 7 migration

Situation and objective: Large manufacturer with 40,000 desktops, wishing to migrate to Windows 7 as part of an initiative to improve service levels to users and reduce the cost, risk and general overhead of the current end user computing environment.

Approach and considerations: The desktop software portfolio would be rationalized, and the management and deployment of most remaining software centralized through the use of application virtualization/streaming. One way or another, all desktops would need to be recreated from scratch and all software freshly redeployed. The challenge was how to migrate settings and preferences to minimize disruption to users, and how to apply new access policies to avoid activity drifting out of control again.

Role of user virtualization: A user virtualization solution was installed for a period prior to migration, and user settings were 'harvested' into a central repository by simply tracking normal user activity. IT then added access policies to the repository. After that, each new desktop was then set up to pull the relevant settings for preferences and policy automatically from the repository, both on first use and on an on-going basis.

The benefits: The time and cost of the Windows 7 migration were reduced, and user disruption minimized. Better control increased the efficiency and effectiveness of on-going operations, with the spin-off benefit of superfluous software proliferation being curtailed.

User virtualization case example: Improved compliance, security, and user experience

Situation and objective: Global bank with a mix of physical and virtual desktops, 31,000 in total. With changing working patterns and a continued need to meet security and compliance requirements, it was becoming increasingly difficult to ensure that desktops were configured appropriately and able to deal with different user scenarios.

Approach and considerations: Access to applications and data needed to adapt depending on the location of the user, the device they were on, the way in which they were connecting, and the mechanism used to deliver the desktop. The scripts currently in use were becoming overly complex and difficult to administer safely and cost effectively. Meanwhile, users were complaining of excessive log-on times.

Role of user virtualization: A user virtualization solution was employed to replace existing profiles and scripts, allowing IT to manage rules within a well-structured policy-driven environment. With the solution enforcing appropriate policy automatically and efficiently depending on user, device and location, across both physical and virtual desktops, security and compliance could be assured while actually improving the user experience.

The benefits: Log-in times were reduced from minutes to seconds. Access-related risk management was improved and easier to demonstrate – when required – through the more robust and automatic application of controls. IT benefited from reduced administration and support overhead, and controls became far less intrusive for users.

Laying the foundations for the future

There are four key trends that are already causing headaches for many IT professionals, but trying to stop them is not a realistic proposition. The trends are:

- Continued evolution of working practices.
- Proliferation and diversification of client technology.
- Evolution of the delivery infrastructure.
- Consumerization of IT.

Continued evolution of working practices

Many of the flexible working trends that we've already mentioned will continue to evolve. In particular, home working, mobile working and hot-desking are on the increase; however – as our research shows – for many organizations, this will not be instead of sitting at a desk in the office, but in addition to.

Proliferation and diversification of client technology

Nobody needs reminding that there is now more compute power in people's hands – literally – than ever before. In the shape of smart phones and tablets, that capability is connected, and

switched on most of the time, if not 24/7. In a work context, various types of smart phone are in use as email clients. Tablets are unlikely to replace the PC, but are finding a niche as 'consumption' devices for viewing and reading. Only one thing's for sure: the proliferation of form factors and variety of operating systems is set to continue. Last, but by no means least, there's the Apple Mac as a potential direct PC substitute.

Evolution of the delivery infrastructure

Operating systems and networking technology not only continue to evolve, but are also becoming more fragmented. Going forward, the virtual personality also needs to deal with increasingly virtualized desktops, virtualized applications as well as Web applications. This includes having to deal with hybrid environments that mix any combination of local, streamed and cloud-based applications. And of course there will also be growing use of mobile apps and associated middleware. Enforcing security and other policies across ever-more fragmented access mechanisms and delivery models is as important as synchronizing preferences in order to ensure that risks are mitigated.

Consumerization of IT

As we've already mentioned, home and personal technologies are not only raising users' expectation levels when it comes to technology at work, it also makes them more demanding

and – in many cases – more influential. The way in which personal equipment is used has already started to blur the lines between business and personal use (e.g. Web access to corporate email from a home computer or smart phone), and users will increasingly take it for granted that they'll be able to gain access to at least some corporate applications on their personal devices.

In order to handle these trends safely and effectively, and preserve the interests of the users alongside the interests of IT and business, it makes sense to adopt a mind-set that separates the 'essence' of the user – i.e. their virtual personality – from the other moving parts. The overall aim is to lay a framework that provides as much flexibility as possible at the edge of the network while retaining central control over the data, applications and services. The key is to give users an appropriately personalized experience, while at the same having the mechanisms in place to protect the organization from excessive cost and risk.

Final considerations

As already outlined, user virtualization is based on similar principles to desktop virtualization, namely decoupling and separation; nevertheless the two shouldn't be equated. Desktop virtualization is not suitable for all types of user, and is typically deployed selectively. User virtualization, on the other hand, applies to both physical and virtual environments, and should be considered separately.

It is, of course, always a challenge to put together a business case when productivity and user empowerment are involved; but there are some specifics on which to focus.

Potential business benefits of user virtualization:

- Lower desktop migration cost and risk, both short-term and long-term.
- Lower on-going desktop support costs.
- Reduced business risk through easier enforcement of security and compliance policy.
- Better support for more productive and efficient ways of working.
- Less distraction and downtime, and less friction.
- Future-proofing an important aspect of the end user computing environment.

When selecting solutions, it helps to focus on the immediate problems that need to be solved. These are likely to be associated with the Windows PC environment in the first instance; it may well be that migration to Windows 7 is the catalyst.

Most other aspects of end user computing are extremely volatile at the moment. For example, who knows:

- How far the Mac and Linux will ultimately penetrate the business desktop sector?
- Which vendors and operating systems will thrive in the smart phone wars?
- How the slate form factor will evolve, and what it'll prove useful for?
- Which other form factors may emerge?

The reality is that beyond the Windows PC environment, we simply don't have a clear view of requirements. This means it's not possible for anyone to deliver a solution that can deal with all future needs. However, it is important that the vendors being considered are able to articulate a clear strategy and vision, into which specifics will be dropped over time to create a more definitive roadmap.

Last, but by no means least, all of this depends on a shift in emphasis: creating an environment in which the needs, and wants, of the user are placed on the same level as those of IT and the business. This will often require a cultural change, particularly within IT, but it's one that is important to make.

We hope this Smart Guide has provided some insight into how user virtualization can help you start to balance the business/IT/user triangle in your organization.

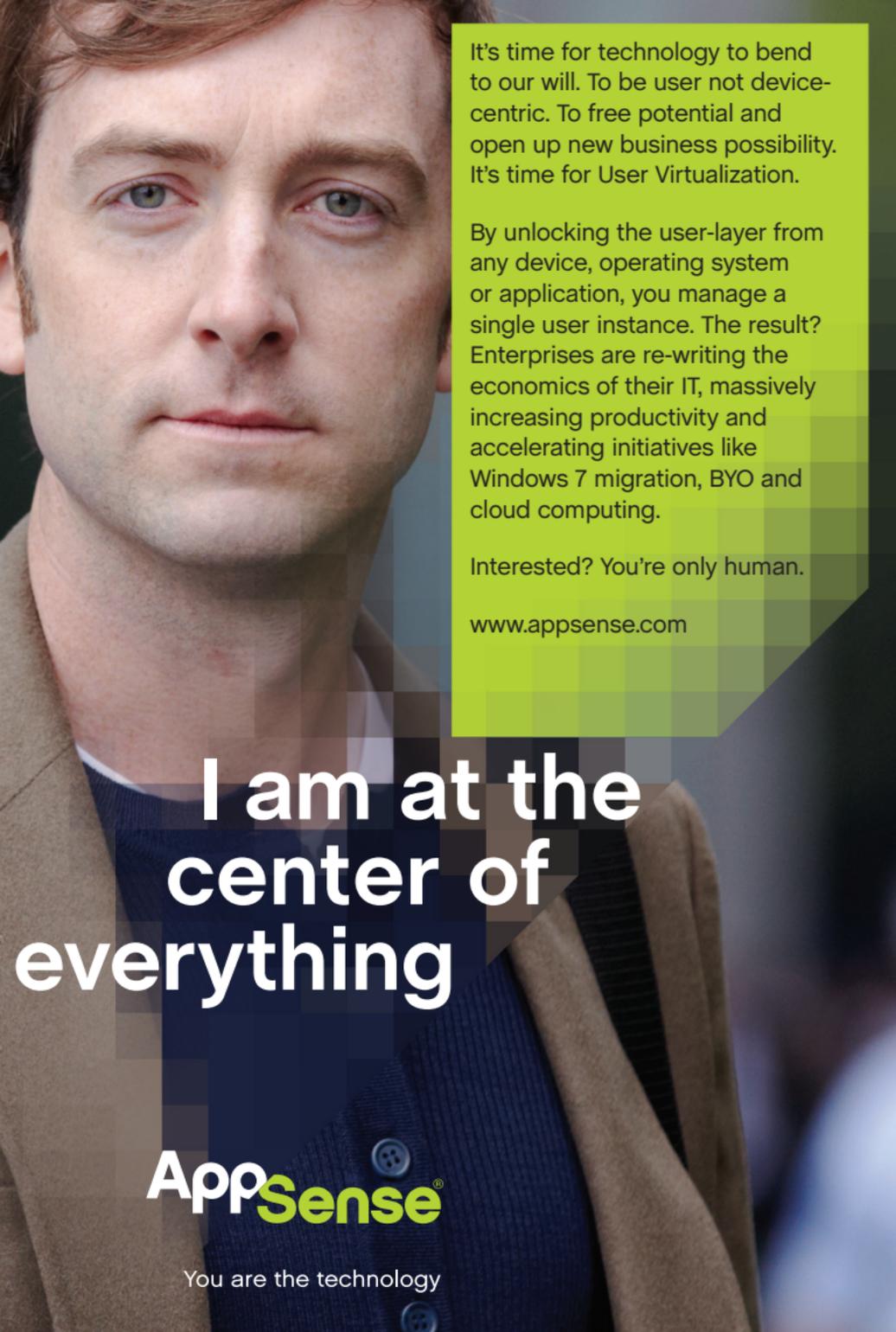
Appendix – Feature list of ideal user virtualization solution

- Support a wide range of operating system and hypervisor platforms, such as Windows (XP, Vista, 7 etc.), Mac, Linux, VMware, HyperV, Xen.
- Provide a rich set of capabilities across all supported platforms and operating systems (as opposed to a set of lowest common denominator features).
- Central management and profile/service policy administration.
- User profile discovery capabilities.
- User profile/policy – comparison and remediation.
- Very granular control and policy setting (application service, printers, network drives, home drives, shared systems).
- Application and service white listing/black listing.
- Comprehensive usage monitoring and reporting – including policy breaches.
- Software license management and usage audit reports.
- Integration with change management systems, help desk/ service desk tools.

- Integration with the major high level system management tools.
- Profile delivery in a context sensitive fashion (e.g. time of day, day of week, different devices, different network access etc.).
- Web site access control.
- Security service checking (e.g. is anti-virus software, etc. deployed and up-to-date).
- Build service profile dynamically at user start up.
- Capable of running with physical devices or desktop virtualization systems, including application streaming etc.

References

- 1 More details can be found in the following Freeform Dynamics publication:
End User Productivity Revisited, August 2011
Please note that the web survey approach used in this research was subject to the self-selection principle, which means that people with a greater knowledge of, or interest in, the topic were more likely to have responded.
- 2 For further details, please refer to the following Freeform Dynamics publications:
The changing shape of the desktop, November 2010
Applied Desktop Virtualisation, January 2011
- 3 More information can be found in the previously referenced Freeform Dynamics publication:
The changing shape of the desktop, November 2010



It's time for technology to bend to our will. To be user not device-centric. To free potential and open up new business possibility. It's time for User Virtualization.

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The primary driver of today's IT leaders is to enable better business management and execution, putting business needs at the center of IT service delivery. But as technology becomes more embedded in our personal as well as business lives, the 'tech savvy' employee is increasingly becoming the norm rather than the exception. Whether it's applications or devices, or how these are configured, users cite choice, flexibility and personalization as key enablers of productivity, creativity and overall effectiveness.

Considered in the context of ongoing management of end user computing and periodic desktop modernization, however, the increased emphasis on the user needs and wants presents IT with new challenges. The imperative to maintain security and control costs is often at odds with user flexibility.

Enter 'user virtualization', an emerging technology that enables the central management of users' profiles, settings and policies independently of the physical or virtual devices they use. We discuss how this user-centric approach can make life easier for IT departments, and enable the triangle of business, IT and user needs to be better balanced.