

# BYOD & CONSUMERIZATION: WHY THE CLOUD IS KEY TO A VIABLE IMPLEMENTATION

It is nearly impossible to fully understand enterprise-strength IT challenges these days without some discussion of BYOPC and BYOD & Consumerization. While these terms are often used interchangeably, in reality BYOPC and BYOD are distinct in both scope and potential for long term success.

While most formal corporate attempts to leverage BYOPC have since been abandoned, the impact of BYOD & Consumerization is here to stay. Organizations looking to avoid excessive risk, high costs, and unhappy users must understand why BYOD & Consumerization is shaping IT policy where BYOPC failed.

This paper was written to support two conclusions:

- BYOPC has failed due to two reasons:
  1. ROI – given the current TCO for supporting PCs, unless a company is highly efficient in supporting new (mainly consumer) devices there will be a financial drain on their organization, resulting in a very negative ROI.
  2. Missing the mark with users real needs.
- BYOD & Consumerization is here to stay and quickly expanding in scope. Unless an organization can manage both effectively, their organization will be exposed to security breaches and cost challenges. Cloud computing will add significant value beyond the datacenter as the client's browser becomes the window to the cloud.

## DEFINING BYOPC, AND BYOD & CONSUMERIZATION

Without a doubt, Bring Your Own Device (BYOD) & Consumerization top the list of potential challenges for every corporate IT shop, and recent studies<sup>1</sup> prove this out:

- 75% of enterprises expect the share of employee-owned devices connecting to company networks to increase somewhat to significantly over the next two years
- 88% of IT leaders are seeing BYOD growth in their enterprise

While the terms BYOPC, and BYOD & Consumerization have often been used interchangeably, there are important differences.

The Bring Your Own PC (BYOPC) approach to corporate IT was first discussed by Gartner at their 2008 IT Symposium, with organizations looking to control IT costs and improve user productivity by allowing employees to choose (and support) the PC of their choice. This would theoretically offload procurement and support costs to the user, generating huge IT savings.

**If an organization is slow to respond with a solution, the user simply implements their own.**

In reality, formal implementations of BYOPC were mostly unsuccessful. Since IT was still responsible for managing the device on the network and other security and compliance issues, the diversity of devices envisioned by BYOPC advocates actually drove TCO up. Additionally, users were also unhappy with the idea, since it did little to expand their access to key resources.

Roughly two years later, BYOPC became BYOD as consumer-oriented smartphones, tablets and other devices flooded the market. The popularity of these devices and their applications created user expectations over connectivity to key corporate IT resources like email, calendar, and contacts. Organizations realized the potential productivity gains and looked for ways to respond.

Early concerns around BYOPC included which devices to support, which resources to share, and how to support the program (formal vs. peer to peer). In reality, there have been few formal BYOPC implementations to date. A study conducted in 2011 by a major beverage distributor, seeking insight from other's efforts, could only find four companies with formal BYOPC programs.<sup>2</sup> Two of the four could be dismissed as self-serving, since they were companies that sold BYOD-enabling solutions.

As a trend, consumerization is about more than just hardware, and includes the rapid adoption of web-based technologies for collaboration, storage, and email applications. Spoiled by easy-to-use technology outside of the office, users are expecting corporate IT to provide similarly elegant tools. If an organization is slow to respond with a solution, the user simply implements their own.

Unlike BYOPC, BYOD & Consumerization is not a formal program, but rather an attempt to give employees what they expect: seamless access to critical corporate resources, regardless of device or location. Moreover, the next phase of consumerization, Bring Your Own App (BYOA), expands upon this movement by expanding Consumerization beyond hardware.

At a minimum, employees are looking for access to three key corporate resources: calendar, contacts, and e-mail. Users are demanding access to their corporate network resources from these consumer devices, generally when not at work, such as:

- Salesforce.com
- Microsoft Office, Lync and SharePoint
- SAP
- Internal HR/finance apps

Additionally, employees are looking to connect to personal (traditionally non-approved) applications while at work, including social networks, cloud-based email, and instant messaging. Just like the consumerization of devices, the mass adoption of these tools makes their enterprise exposure inevitable.<sup>3</sup>

- Social networks
- Cloud-based email
- Instant messaging

Organizations that can find ways to securely and efficiently leverage consumerization can reduce costs and improve user satisfaction while maintaining policy and security control.

## Building the Best of Both Worlds for Users and Corporate IT

While it is clear users want to access corporate networks and data using personal non-corporate devices, the same users want their company to continue issuing a standard PC and to continue supporting them in the manner they have traditionally enjoyed.

In fact, when a Fortune 50 company surveyed over 2,000 of its employees, the majority reported wanting to continue using the corporate issued PC. BUT, they also wanted IT organization to support their ability to connect consumer devices to the corporate network or reach and run key corporate applications from their personal device.

Top User Priorities<sup>4</sup>:

- 40% want access from any device, any location
- 38% want to conduct personal activities during work and work activities during personal time

These attitudes represent the priorities of BYOD & Consumerization, not BYOPC. Corporate attempts to slow consumerization down have done little to change expectations, and the challenge actually grows more and more complex. While all BYOPC efforts to date have focused on replacing the corporate issued PC with a user selected PC, this still does not address the fact that users have more than one device they want to connect to their company's resources. According to Gartner, today's average user actually owns 2.8 devices – and that number will be 3.3 by 2014.<sup>5</sup>

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When deciding whether or not to implement BYOPC, several factors can influence end users and technology decision makers both ways, either for or against:

- **Long replacement cycle.** The longer the corporation's replacement cycle, the more likely the user views a BYOPC program as a way to "get a newer PC."
- **Stipend.** A larger upfront payment more heavily influences the desire for BYOPC. When over 70% of the cost of a new PC is offered as a single payment upfront and every three years thereafter, the majority of users will favor a BYOPC program.
- **"Sandboxing" personal data from corporate data.** Many IT organizations today make users sign a consent agreement that the corporate IT organization has the right to wipe ALL data on the BYOD or Consumer device as part of allowing such. End users would prefer a solution that allows personal and corporate data to be properly segregated.
- **IT support versus peer-to-peer support.** While there is often a blend, it's at the expense of the user being able to purchase any device versus an approved list. This ambiguity can create frustration for the user and uncertainty for IT, especially if they don't have the tools to manage the new devices.

3 Forrester. The Personal Cloud: Transforming Personal Computing, Mobile, and Web Markets by Frank E. Gillett

4 Consumerization of IT. April 2011 Fortune 50 company

5 BYOD and Virtualization, Insights from the Cisco IBSG Horizons Study, May 2012

For the IT organization, factors that influence them when they look to implement some flavor of BYOD, or consumerization, are primarily concerned with:

- Securing data (the number one concern by a wide margin)
- Implementing a Mobile Device Manager (MDM) application
- Limiting consumerization programs to smartphones and tablets

## The Potential Benefits

If properly implemented, BYOD & Consumerization can add value to an organization in two important ways:

### • Attracting and retaining talent

The ongoing struggle between limiting users and showing support is part of any IT decision. More and more organizations believe that supporting BYOD & Consumerization is becoming a new employee recruitment necessity.

### • Increasing productivity

We all know the value of added productivity provided by our consumer devices in our personal life, and believe it carries over to the corporate world. While this is true, studies<sup>6</sup> show that productivity varies according to type of worker and activity. For example, over three years, the direct value of consumerization varies with function.<sup>7</sup>

TYPE OF WORKER	ACTIVITY	VALUE
Executive	Collaboration	\$1,300
Field Sales	Customer face time	\$700
Knowledge Worker	Productivity	\$300

## BYOPC AS NICHE, CONSUMERIZATION AS PERSISTENT MEGATREND

While BYOPC adoption has been slow and uneven, BYOD & Consumerization continues to explode at a rapid pace. Even as the differences between BYOPC and BYOD & Consumerization might seem subtle, a closer look reveals some critically important distinctions that affect their success.

### BYOPC and TCO

According to Gartner Group, over the last 15 years the Total Cost of Ownership (TCO) of a PC is generally around 15% Capex and 85% Opex, and the vast majority of that Opex cost is support. As a result, a BYOPC program saving 25% of the 15% Capex expense (or 3.75% of the total), could erase those savings if Opex rises even just a little (4.4%).

If you look at the original Gartner Best Practices and Chart of Accounts for Client manageability<sup>8</sup>, supporting multiple platforms within an organization can drive increases in TCO by 5% to 15% due to expenses related to managing multiple images, configurations within those images, spare parts sets, and software licenses. Combined with other factors, these costs can make BYOPC significantly more expensive than a well or “best managed” organization that limits the number of OEM suppliers and the number of models within any one supplier.

So, if Gartner’s latest TCO estimates are accurate, the average TCO for a company in North America ranges from \$5,867 to \$3,413 annually.<sup>9</sup> Compare that to the productivity gains listed above, and for all but the Executive employee there’s little chance of generating significant ROI.

More importantly, even if an organization can justify a BYOPC program, that does nothing to mitigate the need to support BYOD & Consumerization. Remember the average user owns 2.8 devices (headed towards 3.3) that they expect to connect those devices to key corporate resources.

6 BYOD and Virtualization, Insights from the Cisco IBSG Horizons Study, May 2012  
 7 BYOD and Virtualization, Insights from the Cisco IBSG Horizons Study, May 2012  
 8 Gartner Research. Desktop Total Cost of Ownership: 2008 Update  
 9 Gartner Research. Desktop Total Cost of Ownership: 2008 Update

## ALTERNATIVE ARCHITECTURES: RESPONDING TO BYOD & CONSUMERIZATION

In the face of both BYOPC and BYOD & Consumerization, several potential solutions have emerged. While these ideas are sometimes well-suited to manage narrow use cases within BYOD & Consumerization, none of them can fully leverage the benefits of consumerization or BYOD while also providing necessary control over security and user experience.

### Mobile Device Managers

While many organizations have used MDM solutions to provide access to calendar, email, contacts functionality, users expect full access to all corporate resources.

- Average share of IT spending devoted to mobility initiatives in 2014 is projected to reach 20%, up from 12% in 2010<sup>10</sup>
- MDM is simply unsuitable as a platform to make this move to mobility successful

This narrow focus, in conjunction with the increasing number of users with consumer devices, will drive corporate customers to look for other solutions.

### VDI & Terminal Services

Increased interest in both BYOPC and BYOD has also led to the rise of popular alternatives like Virtual Desktop Infrastructure (VDI). Since server virtualization has proven extremely successful, it was logical that corporate IT would begin looking to get similar benefits from virtualizing the desktop.

Unfortunately VDI has been a bust. Even Brian Madden (see BrianMadden.com), one of its most consistent and enthusiastic proponents, has come to the same realization: I'm going to come right out and say it. I don't believe that the datacenter-based desktop, VDI or otherwise, will make sense for the masses anytime soon.<sup>11</sup>

Organizations implementing VDI solutions typically face the same challenges:

#### Higher than expected Capex

While vendors proclaim significant cost savings, the reality is quite different. Once all the related costs of VDI are considered – servers, storage, datacenter space, additional software licensing – and further considering that in a VDI world redundancy matters, **Capex often exceeds a traditional desktop replacement by 40% to 100%.**

At financial institutions, the mainstay of the VDI install base, once the deployment is underway and the realization that costs are exceeding predictions, the focus quickly shifts to the security benefits of VDI and not the potential ROI.

#### Marginal Opex savings

While the TCO benefits of Server Based Computing (SBC) are appealing, and VDI is clearly the latest form, many customers already running a well-managed network will see little savings. A well-managed organization already uses tools like Microsoft's SCCM or LANDesk or other systems management application that automates management of traditional clients like software patching, asset management, etc. According to Gartner, the Opex savings between a highly managed client and a Server Based Computing (SBC) architecture is roughly 8%.<sup>12</sup>

10 BYOD and Virtualization, Insights from the Cisco IBSG Horizons Study, May 2012  
11 <http://www.brianmadden.com/blogs/brianmadden/archive/2011/09/08/the-myth-of-desktop-transformation-will-we-ever-get-there-or-will-the-big-3-lead-us-astroy.aspx>  
12 Gartner. Total Cost of Ownership Comparison of PCs With Server Based Computing, 2011 Update

## User dissatisfaction

Moreover, TCO should never be the sole determinate of a solution's success. Users have come to expect a certain amount of performance or responsiveness from their desktop or notebook PC. A SBC implementation like VDI, heavily reliant upon the network, introduces latency and other performance-robbing results which put the real value of any savings in question.

## Terminal Services

As new as VDI is, Terminal Services (TS) or thin clients have been around for a long time and are often the other SBC architecture considered when a corporation looks to address consumerization. TS have existed long enough for corporations to do their assessment, and every year it seems at least one projecting agency shows an expected growth in this technology is just around the corner.

TS has definitely succeeded in limited-use cases like call centers and reservation desks over the years, the technology problems have been well-documented. While current TS programs are limited in scope, the potential of thin clients remains mixed but positive.

As organizations race to meet user expectations while still enforcing policy and security, a consensus is slowly building that the best thin client is in fact the web browser itself. This realization has cleared the way for the one solution that satisfies the demands of BYOD & Consumerization for end users and IT shops alike: a move to the cloud.

## THE CLOUD IS COMING – FOLLOW THE APPS

Consumerization has taught end users one thing: it's all about the apps. The future of computing lies in understanding how the idea of the almighty application is affected by the explosion of both devices (PCs, tablets, smartphones) and operating systems (Windows, Android, iOS).

Generally speaking, today's applications fall into several categories:

- Traditional applications that run on a single device and OS (e.g. Microsoft Office)
- New applets that can be downloaded to smartphones and tablets via app stores like Android Marketplace
- Terminal Services apps (or thin client apps) that run remotely on a server and are displayed locally via a protocol ( RDP or ICA)
- Virtualized Applications are applications updated to remove dependency upon underlying OS and hardware like (Microsoft's App V)
- Cloud or Web applications (Salesforce.com)

**Nearly 50% of all respondents have stated they will be cloud-based companies by the end of 2014.**

## Applying the Power of the Cloud and Consumerization

Several recent studies have asked senior IT level employees where their company's cloud efforts are heading. Nearly 50% of all respondents have stated they will be cloud-based companies by the end of 2014.<sup>13</sup> In addition to the standard benefits of virtualization and distributed computing, the cloud also brings huge benefits to the application development and deployment process.

The advantages of cloud applications are significant:

- Patch an application once and have every user receive the update at the same time
- Keep data inside the corporate firewall for safe protection
- Any device that runs a browser can run a cloud app
- Any app will run across any OS & any processor type

With all these benefits, it's easy to understand the interest in web and cloud based applications being offered by many software as a service (SaaS) vendors. The next step forward will be for more organizations to embrace in-house development of cloud applications.

Since cloud applications run in a browser, they are hardware and OS independent. This is one of the key reasons the cloud is driving consumerization. While traditional platforms cannot manage user and resource access across a myriad of consumer and enterprise devices, the cloud was built for exactly such a task.

## THE SECURE CLOUD ACCESS (SCA) SOLUTION

Lenovo recognized the emerging trends of BYOD & Consumerization early and began developing solutions to meet these challenges. In addition to BYOD & Consumerization, two other customer use cases were not adequately addressed by the other SBC solutions.

Examples include:

- Employees working from home with their own PC
- Temporary or contract employees needing access to the company's resources with the IT organization reticent to grant access inside their firewall and unwilling to provide a company PC

All of these needs led Lenovo to look beyond the delivery of data-center content (IaaS/SaaS/PaaS), which is where most organizations were implementing or experimenting with the cloud. Lenovo chose a unique focus, built around the importance of the client to any cloud solution. How could the client become the agent for delivering critical elements like a corporate software image, shared files, and other resources through web or cloud technology?

Secure Cloud Access (SCA) was the solution: A contextually aware framework that could deliver any corporation's corporate image and user's data to any device that runs a browser. Since all consumer devices run a browser, this methodology could resolve the needs of consumerization. The client was the key to enforcing strong security regardless of device.

### SCA vs. VDI

It might be easy to assume that a corporate image delivered through a browser and VDI is virtually the same thing. However, the difference is simple and significant. We have come to believe that the OS and the Graphical User Interface (GUI) users see are one and the same. When considering traditional computers and VDI, this is correct – they are one and the same.

Here is where SCA becomes different: it separates the GUI from the OS – meaning the user now sees the image GUI through the browser without the constraints of the OS. This gives consumerization the opportunity to function agnostically and simply use the browser as the form of access.

While SCA's separation of the GUI was a critical first step, two additional strategies were required to deliver a better user experience in the face of consumerization. The first is to recognize various attributes about the user and the user's connection like user ID, user location, user device, time of day, etc. This "context awareness" provides a great deal of data that IT can use to configure SCA to intelligently manage user access.

The second step is taking advantage of this intelligence. Remember, if you know the user has an iOS device, you already know flash based services won't be rendered on the device and likely will be a very poor experience if done via VDI in the data center. Now that you have intelligence about the user and their role plus which device they are using, IT can selectively provision resources based on that information.

This is especially important for all those legacy thick applications that, with the move to Windows 7, were in the corporate image, virtualized, and published in the data center. Now, with SCA and intelligence, IT can program the solution to order the delivery that allows for the best experience and lowest cost while maintaining security policy.

## Client Intelligence in Action

Inside SCA, a typical client/application interaction looks like this:

- 1 Client checks for application locally on device.
- 2 If application is there, and it's the corporate app, that indicates a managed device with corporate security policies intact and access is granted.
- 3 If the app isn't present, and the user has the right type of device, connection and security, they would be given access to a virtual app – the second most ideal choice.
- 4 Finally, the published app is used as the last choice. The high cost and worst experience make it the least ideal choice.
- 5 Finally, if all intelligence indicates a bad experience or unacceptable security, the app may not be shown at all, which is obviously the least ideal choice.

This model enables consumerization without interfering with how IT manages security and provisions access. It also ensures an optimized end user experience, especially for users connecting from outside the Windows platform.

## The Time is Now

As the device choices become more varied, powerful, and user defined, IT will need an answer for consumerization. Creating "an app for that" may be too expensive, VDI becomes a zero ROI game as experience suffers, and waiting for web-delivered applications may take a long time. Having technology that guarantees the best possible experience for all users and all devices is the ideal solution, now and for at least the very near future.

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## CLOUD FIRST STEPS

The cloud and SCA can be easily integrated into any corporation's image strategy – it does not have to be rip and replace. SCA can seamlessly deliver a variety of application types, from a variety of sources, to any end user regardless of location or device.

SCA provides the flexibility to utilize work already completed by other projects. Many corporations, for example, virtualized as many applications as possible as part of their migration to Windows 7. A virtualized app is an easy app for SCA to deliver. With Intelligence, the app can be delivered locally off the image, virtually to the image, or in an SBC model. Finally, the application may not be shared at all if intelligence shows that the user and their device will not provide a good experience or may be a nightmare to deliver in terms of cost and user/help desk frustration.



The first step is to determine what applications would be appropriate to be delivered in a consumerization program. Here is a list of apps that one Global Manufacturing customer elected to use. The **1** and **2** show when they would deliver the app and the **X** is where they decided not to deliver the app at all. In the final analysis, just because you can deliver an app doesn't mean you always should, and security, user experience, and cost must always be considered.

APP	Location	SSO?	Corporate Managed PC		Managed Thin (Any Terminal)		Home BYOD Win		Home BYOD MAC		Tablet		Smart Phone	
			Knowledge	Task User	Knowledge	Task User	Knowledge	Task User	Knowledge	Task User	Knowledge	Task User	Knowledge	Task User
Word, Excel, PowerPoint	Local	N/A	1	1	X	X	2	X	X	X	X	X	X	X
Word, Excel, PowerPoint	Terminal Server	Yes	X	X	1	1	1	1	1	1	1	1	1	1
Word, Excel, PowerPoint	ZOHO	Yes	X	X	X	X	X	X	X	X	2	2	2	2
Share Point	Data Center	Yes	1	1	1	1	1	1	1	1	1	1	1	1
JD EDWARDS (Internal)	Data Center	No	1	1	X	X	X	X	X	X	X	X	X	X
JD EDWARDS (Internal)	Terminal Server	No	2	2	1	1								
JD EDWARDS (External User)	Terminal Server	No	1	1	1	1	1	1	1	1	X	X	X	X
JD EDWARDS (External User)	Data Center	No												
Outlook Client	Local	Yes	1	1	X	X	X	X	X	X	X	X	X	X
Outlook Web Application (OWA)	Data Center	No	1	1	1	1	1	1	1	1	X	X	X	X
Outlook Web Application (OWA)	Terminal Server	No	X	X	1	1	X	X	X	X	X	X	X	X
Common Storage	Data Center	Yes	1	1	1	1	X	X	X	X	X	X	X	X
File System Local Share	Local	Yes	1	1	X	X	X	X	X	X	X	X	X	X
Fed Ex	Internet	No	1	1	X	X	X	X	X	X	X	X	X	X
Fed Ex	Local	No	1	1	X	X	X	X	X	X	X	X	X	X
AutoCAD	Local	Yes	1	1	X	X	X	X	X	X	X	X	X	X
Cognos	Data Center	No	1	1	X	X	X	X	X	X	X	X	X	X
Cognos	Local	No	1	1	X	X	X	X	X	X	X	X	X	X
Cognos (excel add-on)	Local	No	1	1	X	X	X	X	X	X	X	X	X	X
Hyperion	Data Center	No	1	1	X	X	X	X	X	X	X	X	X	X
Hyperion (excel add-on)	Local	No	1	1	X	X	X	X	X	X	X	X	X	X

SOURCE: Gartner – Checklist for Determining Enterprise Readiness to Support Employee-Owned Devices. 18 June 2012

Once the cloud desktop(s) are defined, it's a matter of creating links, standing up the SCA Relay and Gateway servers, and configuring them according to policy. It's about that easy, and for most corporations it's a two or three day effort. All that's left is to notify users and you're off.

## SUMMARY

The demands on corporate IT have changed considerably over the last few years. The growth of new user devices, mainly smartphones and tablets, has created the challenges of both BYOD & Consumerization. In addition, renewed interest in Server Based Computing (SBC) has increased with the release of Virtual Desktop Infrastructure (VDI). With any new technologies or trends, it takes time for a consensus to emerge.

Nonetheless, it is apparent to the author that two conclusions can be reached today:

- 1 VDI will not become a wide spread computing architecture for client computing. The lack of adoption is driven by fundamental barriers of cost, user dissatisfaction and scale. However, interest in VDI will continue but be limited to niche areas like financial trading floors, call centers, hospitals and programming.
- 2 BYOPC as a formal program will be limited given user preferences and a lack of an obvious (ROI). Users still want a company issued and supported PC.

BYOD & Consumerization is here to stay and should be embraced and endorsed as a way to drive increased productivity and user satisfaction, including home/work balance. Consumerization is a way of thinking these days as users have grown more sophisticated and technologies, like cloud technologies, have grown more diverse and robust. Lenovo's belief is the cloud – at the client level – will be the enabling technology that can make consumerization a reality without overtaxing corporate IT, driving up existing TCO, or limiting user choice. Moreover, it will do all of this without sacrificing adequate security.

The easiest way for a corporation to validate this paper's conclusion is to set up a pilot in support of a BYOD & Consumerization initiative. SCA is an easy architecture to stand-up and it takes advantage of existing resources like web apps, published apps, virtualized app or even local apps. It doesn't require special ports to be opened and policy can be inherited from the user's Active Directory rights. SCA represents the future of the cloud, and thus the future of computing, made very simple.



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Rich Cheston is Lenovo Chief Technical Architect for Software & Peripherals. Past innovations include the creation of the now universal Wake on LAN standard and groundbreaking work on Gartner's original Total Cost of Ownership (TCO) model. Rich is now responsible for Lenovo's Cloud strategy, guiding technical development and working with our corporate customers all over the world to develop transformational cloud solutions.