TEST REPORT

Tolly.

#220103

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Commissioned by
IGEL Technology

Windows 7 to Windows 10 Migration TCO & Features
IGEL OS 11 Endpoint vs. Traditional Windows 10 Laptop

Executive Summary

January 14, 2020 marked the end-of-support (EOS) date for Microsoft Windows 7. According to Computerworld, over 400 million users were still running Windows 7 as of January 2020. This once-in-a-lifecyle event is forcing a migration to Windows 10 for millions of users.

IGEL developed IGEL OS 11 as a software-defined endpoint that provides simple, secure, high-performance access to virtual desktop infrastructure (VDI) and cloud workspaces. This Linux-based system runs on any compatible 64-bit x86 hardware.

IGEL commissioned Tolly to evaluate a Windows 10 migration total cost of ownership (TCO) model that compared the costs of migration using a traditional ("fat client") approach requiring new PC/laptop hardware vs. leveraging IGEL OS and legacy hardware to provide Windows 10 virtual desktops for users. Additionally, breadth of IGEL VDI support and client management were evaluated.

The TCO evaluation demonstrated the dramatic economic benefits of leveraging existing hardware for use as a virtual desktop client along with corresponding reductions in support costs with lightweight endpoints running IGEL OS. (See Figure 1.) Tolly engineers confirmed the fast and easy conversion of legacy PCs into IGEL virtual desktop clients along with the depth of management support. *(Cont. on next page…)*

The Bottom Line

IGEL delivers:

1 Dramatic cost savings vs. hardware upgrade to business-class Windows 10 laptop

2 Ability to leverage existing, legacy computer hardware (laptops and desktops) as virtualized Windows 10 endpoints

3 Simple, quick conversion of legacy x86 hardware into IGEL client

4 Extensive VDI and cloud DaaS support that includes Citrix ICA/HDX, Microsoft RDP/RemoteFX, VMware Horizon, IBM iAccess, Teradici PCoIP, VNC, Amazon Workspaces, and Azure Windows Virtual Desktop (WVD)

5 Unified management system for local and remote clients

IGEL OS Windows 10 TCO Estimated Savings vs. New HP EliteBook 850 G5 Laptop
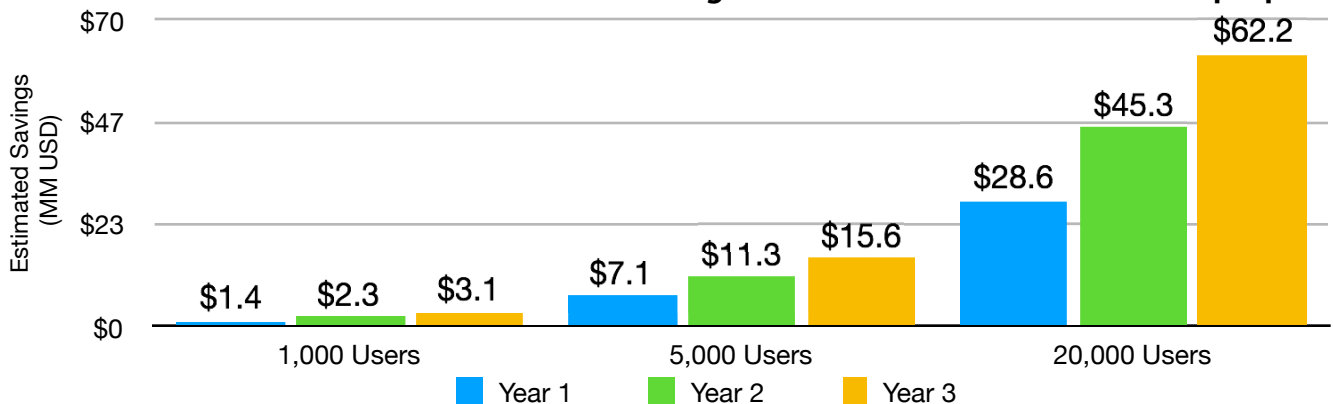
Note: Comparison assumes IGEL OS on existing, depreciated computer vs. street-price purchase of an HP EliteBook 850 G5 (Intel i5, 8GB) laptop.
Source: Tolly, January 2020

Figure 1

Evaluation Scenario

Tolly evaluated the initial and recurring costs associated with migrating users from Microsoft Windows 7 to Windows 10 by either: 1) purchasing a new Windows 10 computer, or 2) migrating to an IGEL-based Windows 10 virtual desktop leveraging existing hardware.

Key TCO Benefits

In evaluating the two alternatives, Tolly identified several compelling cost benefits to the IGEL approach: 1) "Free hardware," 2) lower power costs, 3) lower maintenance inherent to virtual desktops, 4) integrated, no-cost client management.

To quantify these benefits, Tolly built a hypothetical comparison of the two alternatives outlining various costs. The individual elements of that comparison are found in Tables 1-3 with Figure 1 showing those results scaled up to 1,000, 5,000 and 20,000 users.

As can be seen in our example, initial hardware savings of $1,001 per annum combined with estimated annual recurring cost savings of $422 deliver savings that grow to over $3,100 per user over five years. Scaled up to 5,000 users or more this can result in tens of millions of dollars in savings over five years.

"Free Hardware"

Given the demands of Windows 10, new computer hardware is assumed to be needed to run a traditional "fat client" deployment where the full OS and applications reside on the local computer.

For our analysis, we used the cost of an HP EliteBook of approximately $1,100. Business-class laptops from vendors like HP and Dell run from between $500 to $2,000 thus we

Single-User Windows 10 Annual TCO:
IGEL-Powered Endpoint vs New Laptop Fat Client
Initial Costs

Category	Traditional "Fat Client"	IGEL OS 11 Endpoint	IGEL Savings
PC Hardware[1]	$1,087.50	$0.00	
Windows 10[2]	N/A	$14.00	
IGEL OS 11[3]	N/A	$125.00	
Labor[4] (deployment)	$70.00	$18.00	
Total Initial Costs	$1,158	$157	$1,001

Monthly Recurring Costs

Category	Traditional "Fat Client"	IGEL OS 11 Endpoint	IGEL Savings
VDI (Desktop As A Service)[5]	N/A	$14.00	
Windows 10	$0.00	$0.00	
IGEL software	N/A	$0.00	
Management software	$10.00	$0.00	
Labor: OS maintenance updates (proactive)	$35.00	$6.00	
Labor: tech support (reactive)	$18.00	$6.00	
Software maintenance license OS	$0.00	$1.83	
Monthly Recurring Costs	$63.00	$27.83	
Annual Recurring Costs	$756	$334	$422

Estimated IGEL Per-user Savings (Initial + Recurring)

Year 1:	$1,422.50	Year 3:	$2,266.50	Year 5:	$3,110.50

Notes: 1) HP EliteBook 850 G5 (Intel i5, 8GB, 128GB SSD) US selling price as of Dec. 2019 used for PC hardware. IGEL assumes using existing PC hardware. 2) Windows license included with PC hardware, IGEL client uses VDI server. 3) US list price. 4) Labor rate of $35, based on US BLS for computer specialist plus 40% "uplift." All labor times are approximate and should be adjusted to your individual situation. 5) VDI servers are a shared cost. For our model we used the cost of a US provider of shared desktop services. Companies hosting their own VDI should have similar or lower per-user monthly costs.

Source: Tolly, January 2020   Tables 1 - 3

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believe this is a reasonable estimate.

The lightweight IGEL OS runs on your existing 64-bit x86 computers. Thus, the computers you currently use to run Windows 7 can be repurposed to run as Windows 10 virtual desktops for the foreseeable future. Assuming that this old hardware has been fully depreciated, this amounts to "free hardware" for your upgrade. The IGEL software required to convert the hardware to an IGEL OS powered VDI endpoint has a current list price of $125 per client.

Lower Power Costs

Given the very light footprint and minimal CPU and memory needs of IGEL OS, laptop and desktop PCs run much more efficiently and draw much less actual power when running IGEL vs. local Windows 10. While this report does not attempt to quantify the resulting power savings of this efficiency increase over time, organizations can expect reduced long-term energy costs on a per endpoint basis after installing IGEL OS.

In industries such as healthcare where workstations-on-wheels (WoWs) are commonly used, this significant power draw difference can also have substantial impact on how long WoWs can remain in use before needing to recharge the battery.

Lower Maintenance of VDI

Migrating to IGEL brings you all of the strategic benefits inherent to VDI. Chief among these is that system administrators need only apply Windows 10 operating system, application and utility updates to the single, centralized VDI system rather than needing to apply updates individually to potentially thousands of client stations. This is a significant and permanent benefit.

Unified, No-Cost Client Management

Managing traditional endpoints, as noted, is much more expensive and complex than managing IGEL OS powered clients. Managing fat client deployments typically involves agent-based management that is oftentimes costly and often vendor- or OS-specific.

Full Windows management typically requires extra-cost management systems.

IGEL provides its Universal Management Suite (UMS) as a no-cost, integrated component of its environment. (More details below.)

VDI and Cloud Workspaces Support

Tolly noted that IGEL supports a wide range of VDI environments that includes not only the most prominent vendors and protocols but niche vendors as well. IGEL OS also supports direct connectivity to desktop-as-a-service (DaaS) offerings from Amazon Workspaces and Windows Virtual Desktop (WVD) services from the Azure cloud. The IGEL client configuration provides for leveraging a wide range of remote client options including USB redirection, serial port redirection, drive mapping, smart card and so forth. See Figures 2 and 3 for example application and configuration screens.

Client Management

IGEL UMS is purpose-built to provide extensive and fine-grained management capabilities for all IGEL endpoints.

Benefits start at deployment as newly-installed clients automatically attempt to connect to a UMS system. When connected, the client downloads its configuration,

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licensing, certificates, and corporate branding directly from the management server.

Software NOT Needed on IGEL Endpoints

The purpose-built IGEL OS is an inherently simpler operating environment than Windows OS, and especially Windows 10. Software typically required on each Windows PC that is NOT needed when deploying an IGEL endpoint includes:

Anti-virus, disk encryption, remote control (since IGEL provides VNC and secure VNC built into IGEL OS), VPN, extended support, and miscellaneous third-party tools, etc.

All of the software needed on a typical Windows PC represents complexity, maintenance, and added software costs per PC.

This report does not attempt to quantify the monetary impact of the need for the traditional extra software in order to keep this report and TCO model from becoming overly complex.

The management system maintains very granular information about the complete hardware configuration of each client.

The system also handles updates to the software/firmware of the IGEL endpoints. Those updates can be initiated from the management system and can be performed on demand or scheduled to be performed at various times, including during boot or on shutdown.

The management system provides a single-pane-of-glass view into all of the IGEL clients in the environment.

IGEL clients that are not on the same network as the management server can reach the server via the IGEL Cloud Gateway. This capability extends management and control for remote/mobile worker and work-from-home usage scenarios.

See Figure 4 for some example screens from UMS. IGEL notes that the management system can handle up to 100,000 devices[1].

IGEL VDI Support Overview
IGEL OS 11 Session Configuration Screen
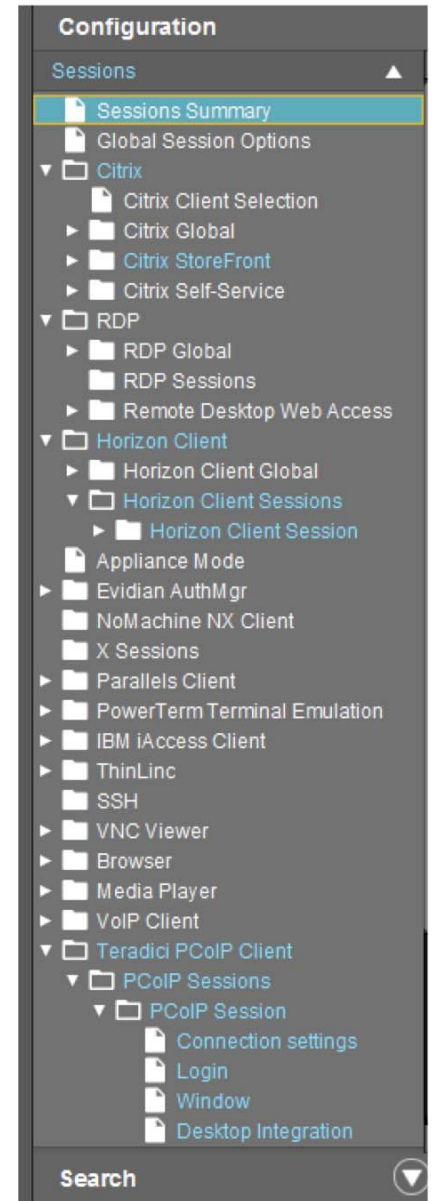
Note: IGEL OS 11.03.100.01
Source: Tolly, January 2020   Figure 3

Windows Virtual Desktop Example Screen
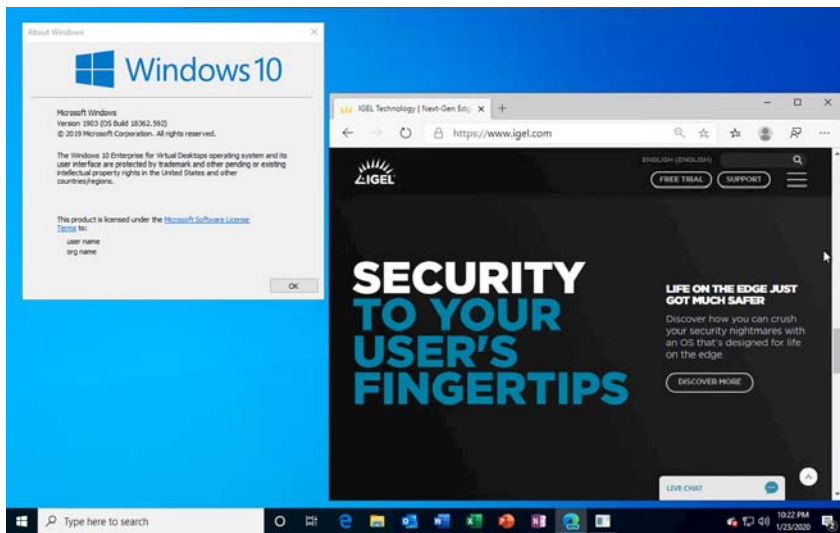
Source: Tolly, January 2020   Figure 2

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[1] Management system capacity not validated by Tolly.

TCO Notes

The goal of the TCO model is to illustrate the potential cost benefits of the IGEL solution using a general model that customers could modify to suit their own environments, rather than an attempt to provide a universal model suitable for complex mixes of existing equipment and requirements.

IGEL OS 11

IGEL OS is a lightweight purpose-built, endpoint device operating system. It can be used to turn older, legacy computer hardware into effective virtual desktops capable of accessing any Windows 10 (or other) application system and providing a good user experience. It can also be used to upgrade existing dedicated thin client hardware from vendors such as Dell/Wyse or HP. The IGEL OS can even be run from a thumb drive for those wanting complete portability or wishing to test a VDI solution before converting existing PCs. For the purposes of the TCO calculations, analysts assumed that an existing, legacy x86 PC would be used to run the IGEL OS software.

PC Hardware

As noted above, the model chose a business-class HP notebook that was in the lower part of the range of $500 to $2,000 for a business-class laptop from leading PC vendors such as Dell and HP.

Thin Client Hardware

No PC lasts forever. Ultimately, repurposed PCs could be replaced with compact, economical "thin" endpoint devices which are generally lower power-consumption and often made with recycled materials. Typical thin clients from the likes of Dell, HP, IGEL, or Lenovo usually cost between $300 and $500.

IGEL Universal Management System
Example Screens
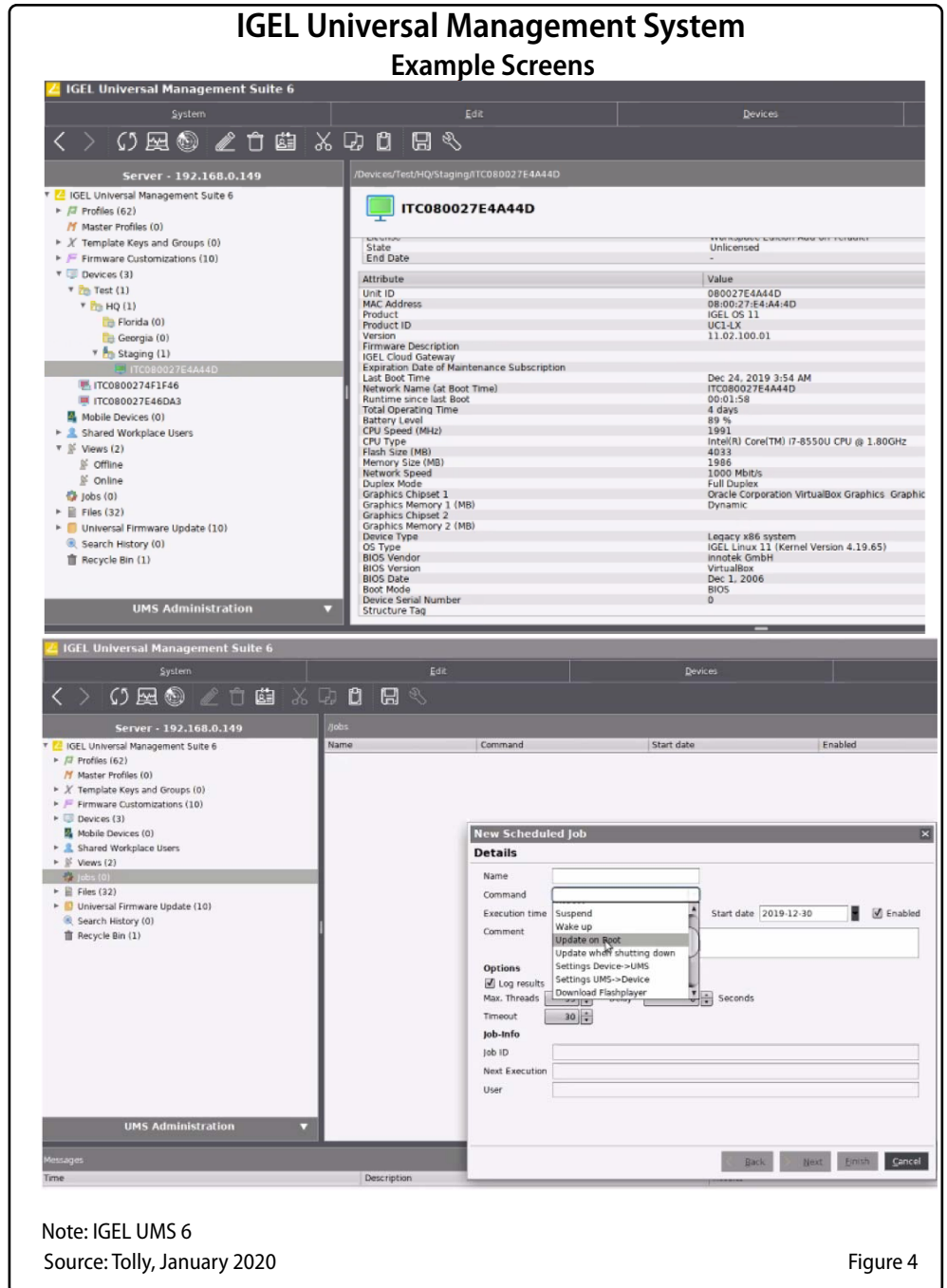
Note: IGEL UMS 6
Source: Tolly, January 2020   Figure 4

IGEL has found with its customers that, typically, PCs run 2-3 years more or longer with IGEL OS than they do running Windows.

Additionally, IGEL offers its UD Pocket product that connects via USB and does not use the legacy PC disk whatsoever. This can extend the life of a PC or laptop significantly.

Windows 10

A new computer includes the Windows 10 Enterprise license. For IGEL, it is assumed that

Windows will be running on virtual desktop infrastructure.

While there is a cost associated with VDI, it is difficult to estimate the "per user" cost without knowing how many users will be accessing the VDI system. Instead, analysts used a cost of $14 per month as a per-user cost for accessing a DaaS environment. Users already running VDI might have lower per-user costs as they simply scale up. Users new to VDI will need to factor in a per-user cost for their new VDI server(s).

IGEL OS

Analysts used the list price for the Workspace Edition software which includes IGEL OS and the UMS management capabilities for each station but does not include, for example, the IGEL Cloud Gateway.

Labor Rates

Labor rates were based on the US Bureau of Labor Statistics (BLS) for the job title of "Computer Support Specialist" the job function of which was listed as "set up or repair computer equipment and related devices." The hourly rate was listed as $25.70. To this we added a 40% "uplift" to account for various overhead costs giving us a rate of approximately $35 per hour.

Labor Effort

The amount of effort for deployment, proactive maintenance and reactive maintenance will certainly vary across environments but it will almost certainly be lower in a thin client/VDI deployment. This is reflected in the model but users can adjust these values to better reflect their own environments.

IGEL Support

There is no annual cost for using IGEL OS 11 after purchase. There is, however, a support and maintenance cost for ongoing updates and upgrades. Software maintenance, which includes basic support, for the perpetual Workspace Edition is $20/yr when purchased over 3, 4, or 5 years. For one year it's $25 per Workspace Edition license. For our TCO model we used $22 for each Workspace Edition license as a "blend" of those values.

UMS Console & Database Server

The UMS Console runs on 64-bit versions of Windows and Linux. While the UMS Console is run most frequently from desktop versions of the operating systems, it runs equally well on server versions.

Like the UMS Console, the UMS Server runs on 64-bit versions of Windows and Linux. The database system used by the IGEL management system runs embedded on the same system as the UMS Server. IGEL also supports SQL Server, Oracle, PostgreSQL and Apache Derby as stand-alone database systems. Both SQL Server Cluster and Oracle RAC are supported solutions for use with the IGEL UMS HA solution. The embedded database is the most popular choice for the UMS database, and this approach was used in the TCO model.

Windows 7 User Base: January 2020

Computerworld calculated that some 446 million users of Windows 7 were active as of the EOS date. See: https://www.computerworld.com/article/3199373/windows-by-the-numbers-windows-10-resumes-march-towards-endless-dominance.html .

ZDNET estimates a still substantial 200 million users. See: https://www.zdnet.com/article/how-many-pcs-are-still-running-windows-7-today/.

About Tolly

The Tolly Group companies have been delivering world-class IT services for over 30 years. Tolly is a leading global provider of third-party validation services for vendors of IT products, components and services.

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About IGEL

IGEL Technology is a technology provider delivering endpoint management and control software for the delivery of virtual apps, desktops, and cloud workspaces. IGEL also offers compact, low-power endpoint hardware devices for those looking for a complete, integrated hardware/software solution.

IGEL OS 11 is at the heart of the most powerful and feature-rich software-defined endpoint management security and optimization platform IGEL has ever introduced. Designed specifically for simple, secure, high-performance access to virtual desktops and cloud workspaces, Linux-based IGEL OS 11 runs on any compatible 64-bit x86 endpoint hardware and brings ground-breaking new capabilities.

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