ESG Lab Review

Liquidware Labs Essentials Suite for Citrix: Enhancing XenApp and XenDesktop for Users and IT

Date: June 2016 **Author:** Kerry Dolan, Senior Lab Analyst

Abstract

This ESG Lab Review documents hands-on testing of the Liquidware Labs Essentials suite, which extends the functionality of Citrix end-user computing applications with full User Environment Management (UEM), Application Layering, and User Experience Monitoring/Diagnostics.

Background

Citrix XenDesktop and XenApp are premier virtual desktop and applications solutions. They enable users to be more productive regardless of endpoint, and they simplify and streamline the tasks of properly maintaining desktops, applications, and devices. By enabling greater IT control, XenDesktop and XenApp can not only help reduce risks to applications and data, but also reduce the costs of data center and desktop infrastructure and management.

But the fact remains that any such implementation is complex. IT struggles with many parts of the process, from ensuring that the right user profile and applications are available where needed, to maintaining security across endpoints and networks, to simply meeting end-user performance expectations. And the more complex the system, the harder it is to scale the environment to include more users.

These end-user computing challenges can be a drag on productivity and security. ESG Research indicates that the top considerations for justifying IT expenditures are improving security/managing risk, improving ROI and business processes, and reducing OPEX.[1] Solutions that deliver on these objectives for end-user computing can vastly improve the business environment.

Figure 1. Top Five Most important Considerations for Justifying IT Investments

Source: Enterprise Strategy Group, 2016

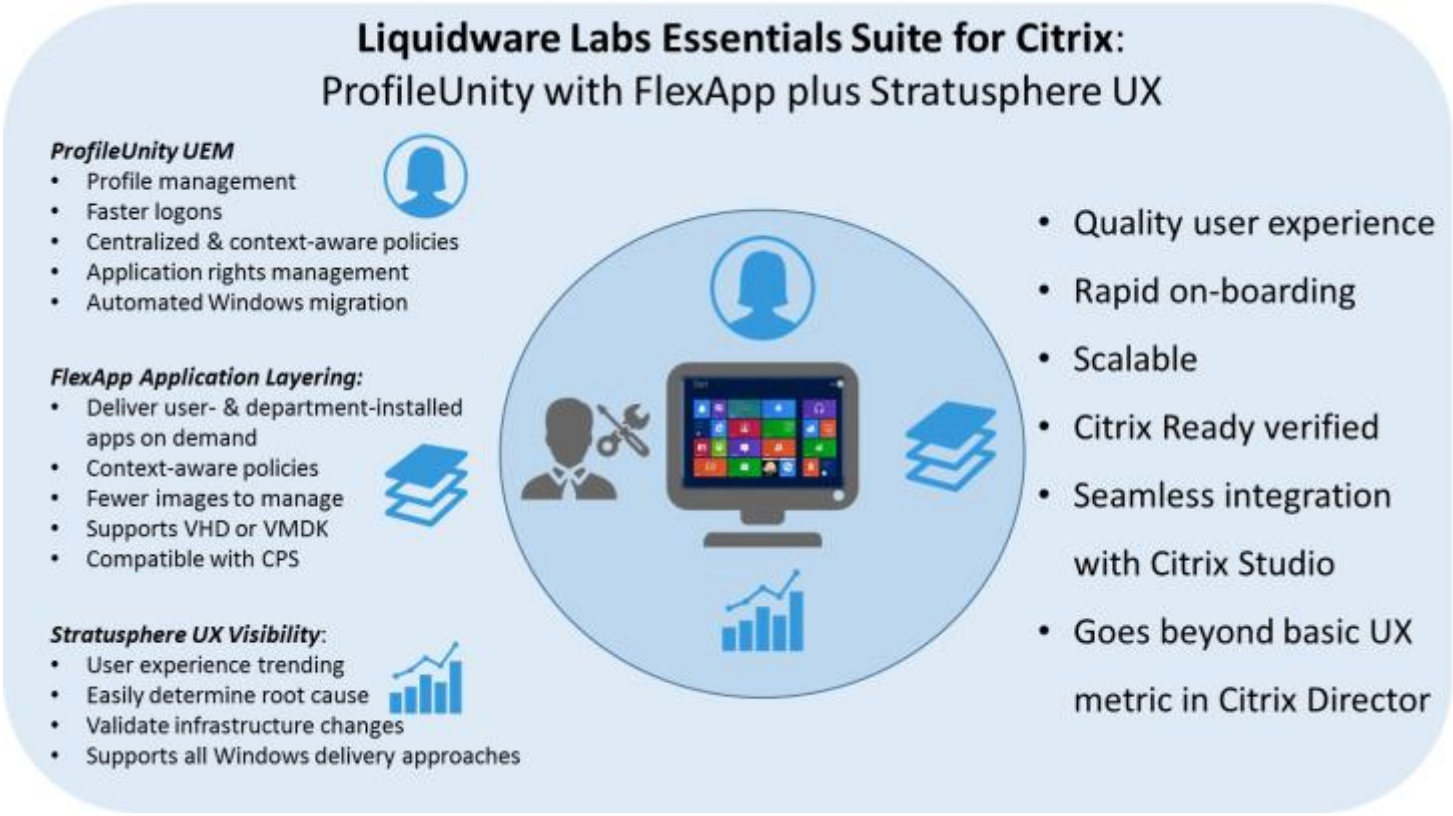
[1] Source: ESG Research Report, *2016 IT Spending Intentions Survey*, February 2016.

In addition to the desktop and application services themselves, Citrix offers basic functionality for managing user profiles, layering applications, and monitoring, but these solutions are often insufficient for the enterprise use case. To gain the full advantages of desktop and application services, organizations need full user environment management, application layering, and end-user diagnostics and visibility. Citrix partners with Liquidware Labs, part of the Citrix Ready partner community, for these use cases.

The Solution: Liquidware Labs Essentials Suite for Citrix[2]

The Liquidware Labs Essentials Suite consists of ProfileUnity with FlexApp for UEM and application layering, and Stratusphere UX for user-centric diagnostics and visibility. This cost-effective solution enables organizations to deliver the optimal desktop experience for every user while reducing infrastructure and management costs. Virtual, physical, and cloud-based desktops are supported. While a complete exploration of the comprehensive Essentials Suite feature set is beyond the scope of this paper, a few highlights are listed below.

Figure 2. Liquidware Labs Essentials Suite for Citrix



Source: Enterprise Strategy Group, 2016

ProfileUnity

ProfileUnity provides full user environment management. It enables a single user profile across VDI, RDSH, desktop-as-a-service, and physical desktops, along with faster, more dependable logons. Centralized policies go far beyond the standard Microsoft Group Policies, and include privilege elevation and application/user rights management. It delivers a persistent user personalization experience using non-persistent desktops, saving on storage and licensing costs, as well as fast on-boarding and smooth Windows migrations.

ProfileUnity extends beyond Citrix User Profile Manager (UPM) in many ways. Key among them are:

[2] The Liquidware Labs Essentials Suite also supports VMware Horizon.

- Support for multiple Windows versions.
- Greater reach into registry and file settings for more granular profile tailoring.
- Ability to assign 300+ built-in, context-aware attributes to profiles.
- Centralized printer and drive mapping.
- Robust folder redirection and automatic user-authored data migration.
- Automatic fallback to previous profile, eliminating typical profile corruption.
- Single console for ProfileUnity and FlexApp.

FlexApp

Integrated with ProfileUnity (although it can be licensed separately), FlexApp delivers application layering. Applications are packaged and can be "snapped in" by group, department, machine, or user. VHD or VMDK virtual hard disks are created and stored on a network file share, appearing and acting like natively installed applications. This results in a higher success rate for application delivery, as well as easier packaging, more seamless operation with the OS and other applications, and portability. Having ProfileUnity and FlexApp in the same management console is advantageous, as administrators can securely manage applications and privileges and apply context-aware application filters.

While basic application layering solutions are limited to machine-level assignment and applications without file system drivers and services, FlexApp has no such restrictions. Its layers are truly portable and independent of hypervisor, and can be assigned using the 300+ context-aware filters in ProfileUnity. Because it can reduce the number of master images to maintain and bring more types of users into the VDI environment, FlexApp is well-suited to the enterprise production use case.

Stratusphere UX

Stratusphere UX provides user-experience monitoring and diagnostics for physical and virtual desktops. By providing granular visibility into endpoint, user, application, host, storage, and network performance, Stratusphere UX helps administrators diagnose and solve problems to prevent downtime and efficiently manage and scale the user environment. It is often used to assess the environment before implementing VDI to determine the application strategy and equipment needs. From concept through migration, Stratusphere UX can help to baseline the user experience, validate the migration, quantify success, diagnose problems, and identify constraints in infrastructure and architecture before they become systemic problems.

ESG Lab Tested

ESG Lab tested the Liquidware Labs Essentials Suite with a focus on ease of management. Remote testing was performed using a cloud-hosted demo environment. The test bed consisted of ProfileUnity and FlexApp version 6.5; Citrix XenApp and XenDesktop version 7.6; a management console running on Windows Server 2012 R2; Windows 7 and Windows 10 virtual desktops; cloud-hosted NetApp storage; and a 10GbE network. It should be noted that our testing merely scratched the surface of the comprehensive capabilities of the Essentials Suite.

ProfileUnity with FlexApp

ProfileUnity with FlexApp runs on any existing Windows server in the data center—no additional servers or proprietary databases are needed. It uses Microsoft Active Directory (AD) and file shares, and places only 20 MB on the file share. Any scalable, replicated file share can serve as the hosting point (for example, the Netlogon file share of the domain controller). Based on the configuration file, an agent identifies how to implement profile attributes, policies, user-authored data, and FlexApp applications. For FlexApp layering, both VHDs and VMDKs are supported simultaneously.

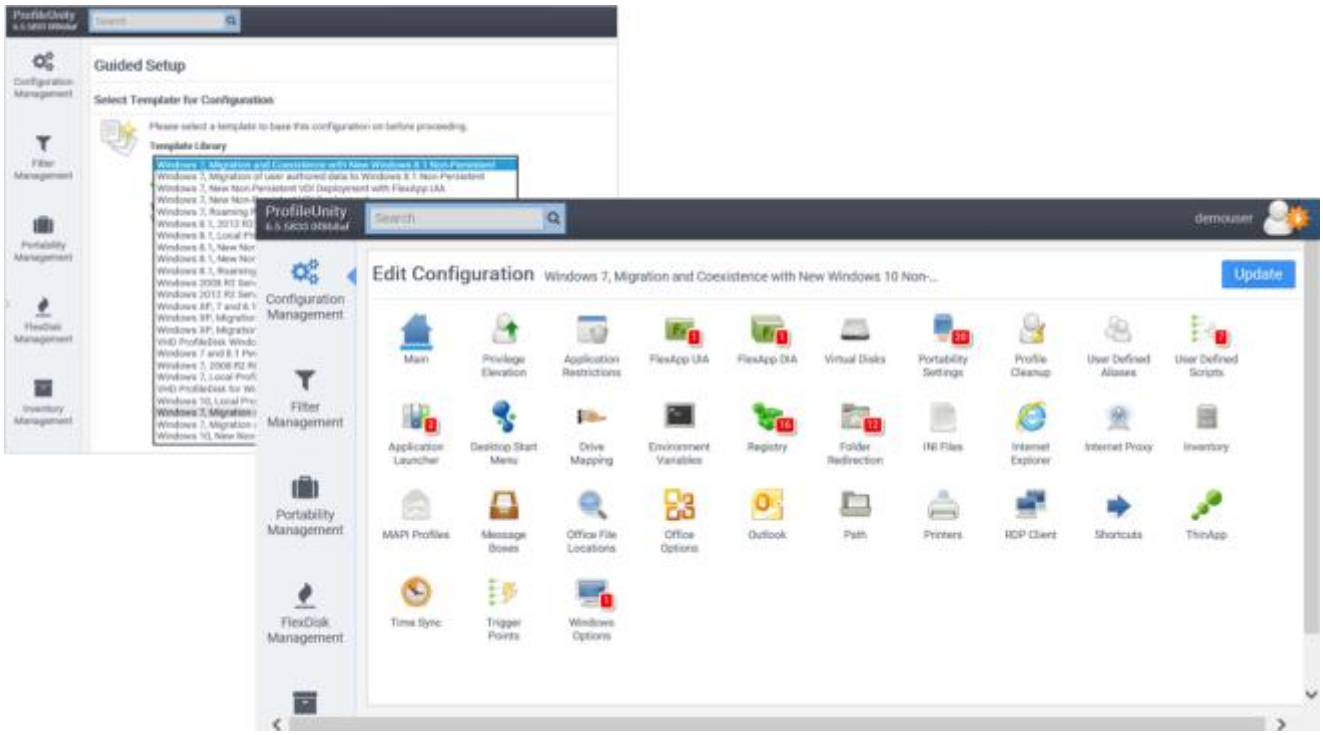
A central, web-based management console can gather performance and inventory logs continuously, but it can be powered off without impact in VHD layered deployments, since the agent files, services, and configurations are on the highly available file share. With VMDK deployments, the management console must remain online to communicate with vSphere in order for FlexApp to bring in VMDKs.[3] A highly available clustering and replication design is included for always-on communication with vSphere.

Installation

ESG Lab began by testing the installation process with previously configured license groups and agents. Once the software was downloaded from the Liquidware Labs website, we ran the executable file on the console machine; with a few clicks it kicked off a wizard to integrate with AD, automatically roll out Group Policies, and launch the web-based GUI and other tools needed. After confirming that the right machines were in the ProfileUnity license group, we selected the guided installation and chose a template from a drop-down list (Figure 3, top). The template options enable faster, more accurate installation. After identifying what home share would store user-authored data, the configuration was immediately rolled out.

The main console Configuration Management screen shows the available features (Figure 3, bottom); some of the most popular are mapping drives and printers, privilege elevation, application restrictions, department- and user-installed applications, registry settings, folder redirection, and trigger points. All of these features and more can be tailored to a profile. The profile is saved back at logoff or at configurable trigger points; this enables the user to log out of one session and into another device and have the identical experience.

Figure 3. Guided Installation and Main Configuration Screen



Source: Enterprise Strategy Group, 2016

[3] See the Liquidware Labs website for architectural differences for VHD and VMDK deployments, and built-in clustering cost advantages over other solutions that require extra equipment.

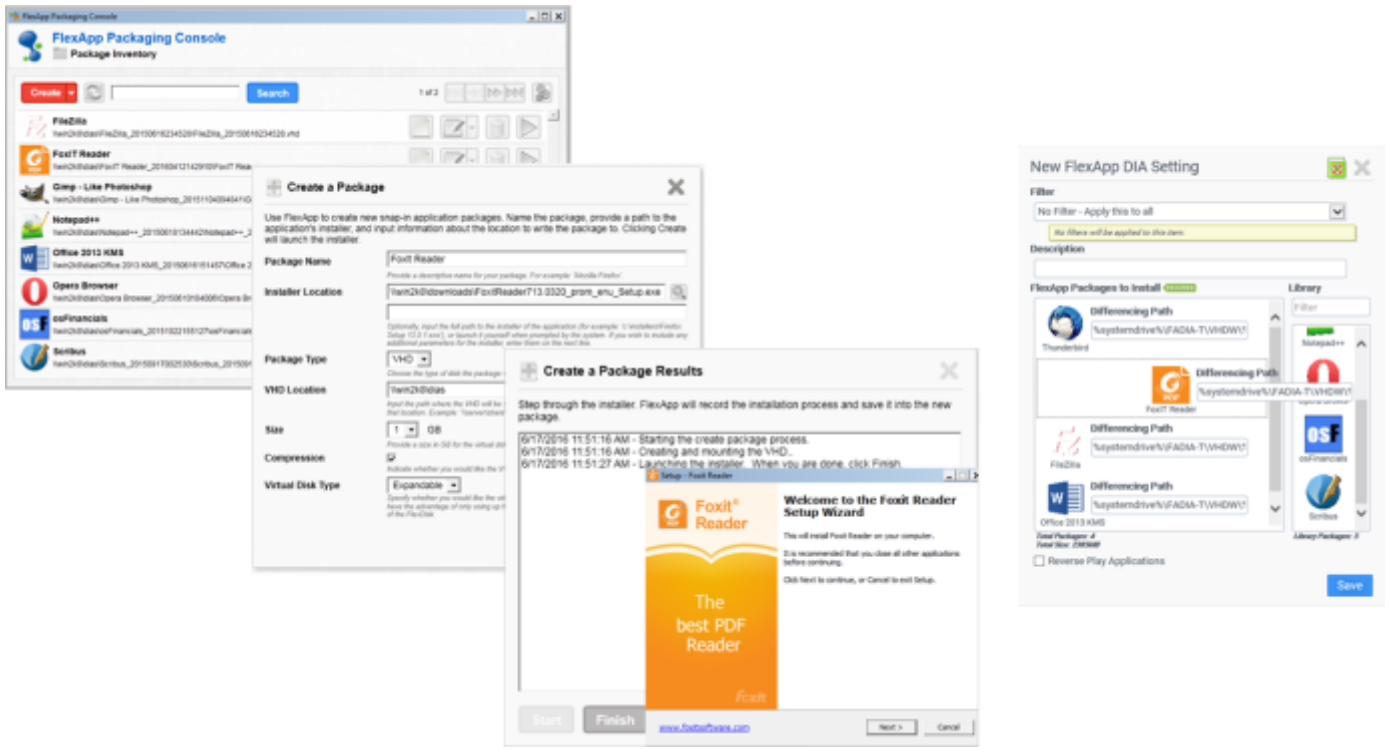
FlexApp Packaging Console

Next, we looked at the simple process of preparing a FlexApp application using the Packaging Console that communicates with the ProfileUnity management console. This is done in a virtual desktop that mirrors where it will be layered—for example, for applications being layered on a 64-bit Windows 7 image, a 64-bit Windows 7 virtual desktop packaging console should be used.

Figure 4 shows how easy it is to create an application package and assign it. To create a package for the secure PDF reader application Foxit Reader, ESG Lab clicked ***Create Package*** in the Packaging Console GUI and inserted the package name, location of the installer, package type, VHD location, and disk size, and enabled compression. By default, it creates an expandable virtual disk. After we clicked ***Create***, accepted the license agreement, and clicked Finish, it optimized the VHD and completed the process. The total time for the task was less than 2 minutes. This is notable, as other solutions require additional steps to seal the VHD, which can take 15 minutes.

Returning to the ProfileUnity console, we assigned the new application by clicking on the FlexApp DIA icon and editing the settings; we dragged the new Foxit Reader icon into the space for FlexApp Package to Install. At that point we could have added a filter for an AD group, individual user, or any of the more than 300 filter attributes. Once we clicked ***Save***, the package was complete. Packages can be cloned, extended, deleted, or updated—there is no need to start over and re-package for application updates. It should be noted that packages can also be loaded on a XenApp server and managed through Citrix Studio.

Figure 4. Create Application Package



Source: Enterprise Strategy Group, 2016

Login

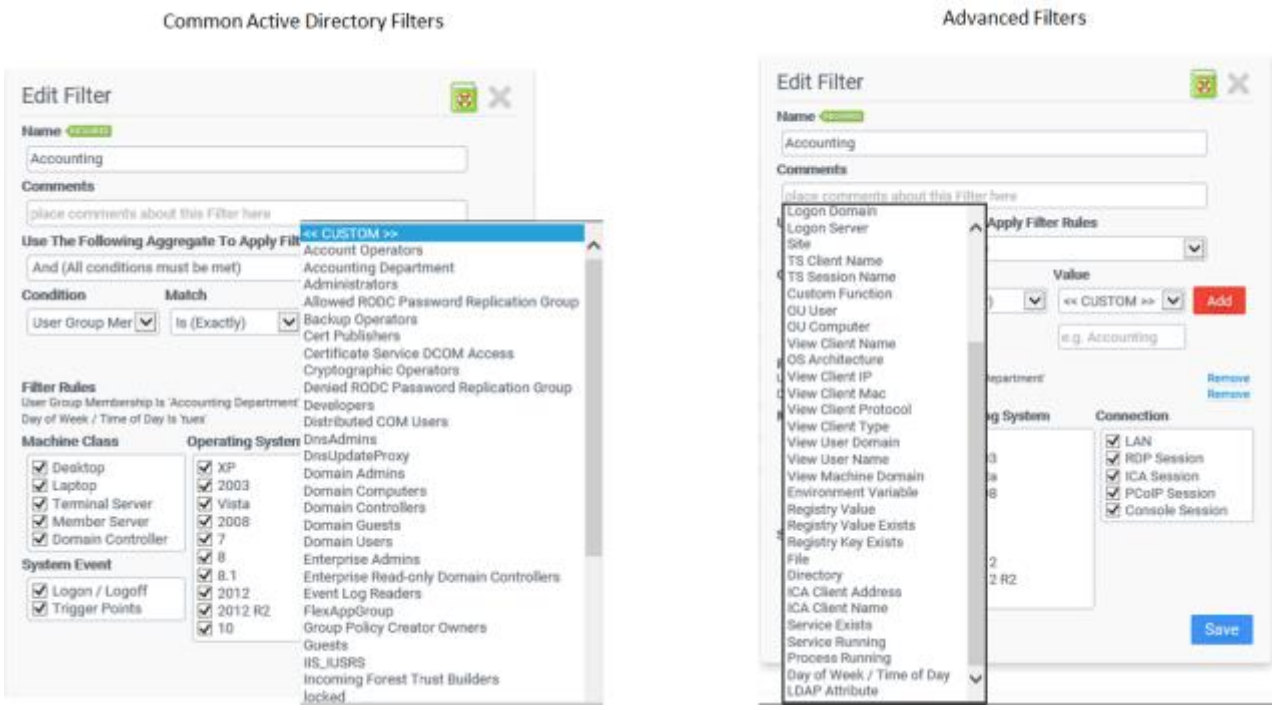
The next step was to execute a typical user login. Once username and password were entered, ProfileUnity loaded all the customization that is layered onto the base image according to the profile. In less than 15 seconds, the desktop was fully available and included the personalized wallpaper, application shortcuts, user-authored data, and FlexApp applications. ESG

Lab noted that all applications, including those with drivers and services that depend on the OS, operated normally. This is in contrast to virtualized applications that are isolated; their "bubble" must be opened manually to support drivers, services, and printers. The FlexApp layers make updating applications non-disruptive: Administrators can clone an application and update it in the Packaging Console, where it will go live with the next login.

Context-aware Filters

Next, we explored the powerful filters for assigning applications, mapping drives and printers, etc. These can be accessed from the Filter Management tab on the left nav of the ProfileUnity GUI. While some solutions can assign only by AD group, ProfileUnity offers 300+ filters that enable IT to not only deliver the right experience for every user, but to improve efficiency, better protect data, and ensure regulatory compliance. For example, filters can be used to make an application available only to certain accounting employees, only when they are in a specific range of IP addresses and at a particular time of day. Or, a doctor could access one printer from his first floor office, and automatically access another during patient rounds on the 7th floor. These capabilities demonstrate the ability to optimize the user experience while maintaining security and reducing risk. Figure 5 shows some of the AD filter options on the left, and some of the extensive features that go deeper than AD on the right.

Figure 5. Extensive Context-aware Filter Options



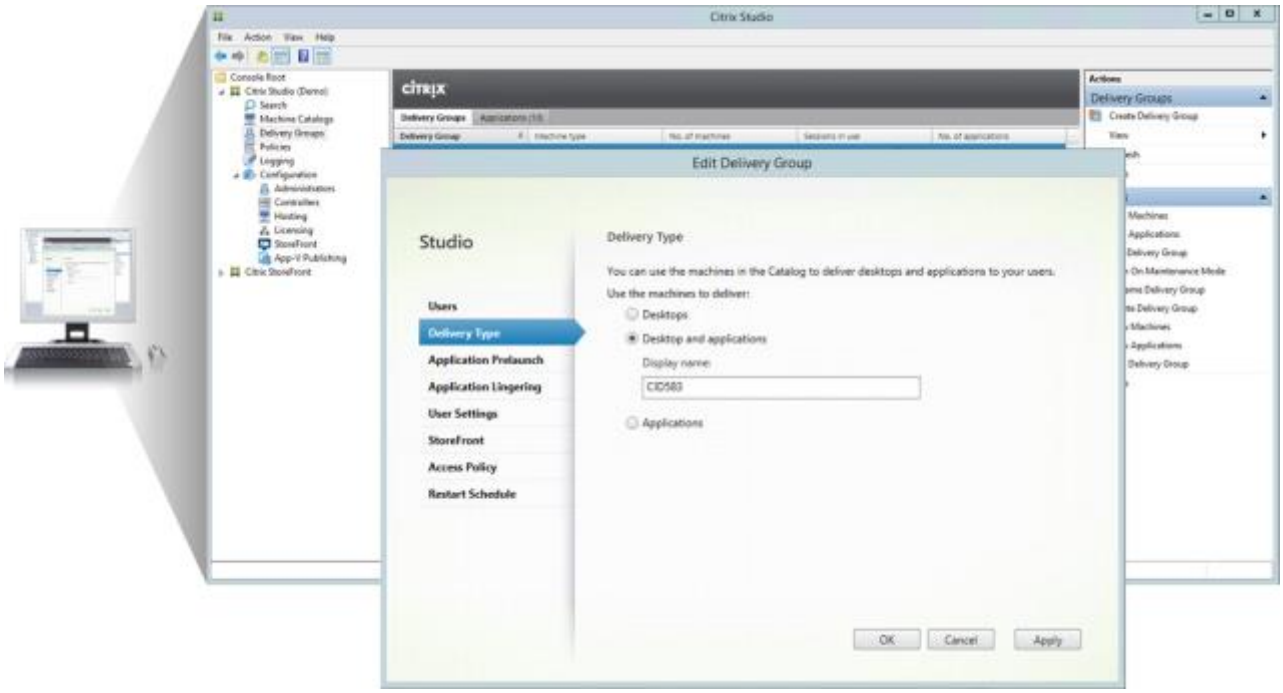
Source: Enterprise Strategy Group, 2016

Several other features contribute to the advanced capabilities of ProfileUnity with FlexApp.

- Trigger points can be enabled to take actions such as profile cleanup, application restrictions, or privilege elevation, based on triggers such as time intervals, PCoIP connections, desktop unlocks, IP address changes, etc. For example, a registry key can disable USB key storage in certain areas of a building to maintain data safety. This enables the portability of the user experience, but with parameters that can enhance security.
- It supports smooth roaming to ensure that users can switch between devices without interruption, and FlexCast to enable optimal desktop deployment.
- It is integrated with Citrix Studio, the management application for XenApp and XenDesktop. As figure 6 shows, the ProfileUnity with FlexApp environment appears native in XenApp, and enables administrators to manage FlexApp applications just like other applications in Citrix Studio.

- Extensive documentation and summary reports make it easy to transfer administrative control and to prove compliance.
- ProfileUnity with FlexApp is compatible with Citrix Provisioning Services, so it doesn't interfere with the normal workflow for Citrix desktop delivery.

Figure 6. Integration with Citrix Studio



Source: Enterprise Strategy Group, 2016

Why This Matters

User satisfaction and productivity are essential to the success of VDI deployments. But many organizations struggle with desktop and application delivery to users on various devices. Profile corruption and lengthy login times are common problems, along with Windows version requirements and migrations. Managing desktops and applications for users with different needs can be a time-consuming challenge that decreases productivity and increases costs.

ESG Lab validated the ease of installation of ProfileUnity with FlexApp, with no additional infrastructure. We validated the speed of login, bringing in all profile attributes including FlexApp applications and desktop personalization in less than 15 seconds, a significant improvement over traditional group policies that can take minutes to load. We created a FlexApp package with just a few clicks in under two minutes, and validated the extensive context-aware filter and trigger options.

Profile management and user applications go hand in hand. Having a combined management console for full UEM and application layering simplifies management and enables IT to more easily deliver the right environment for every user. The capabilities that ProfileUnity with FlexApp provide would traditionally require assembling multiple third-party applications and additional equipment at much higher costs. It saves money not only by simplifying management, but also by reducing the number of master images required; providing the persistent personalization users need with non-persistent desktops; and enabling application updates without downtime.

Stratusphere UX

Stratusphere UX provides user experience metrics and information necessary to provide visibility throughout the user and desktop lifecycle, from physical desktops through the migration to virtualized data center desktops and applications. The key to its power is that it captures all details—on all users, machines, and applications—all the time; other solutions capture only current details, or only a subset of the fine detail. There are four key processes that Stratusphere UX impacts: diagnostics drill-down, operations and first tier support, performance validation and optimization, and baselining and onboarding users. ESG Lab testing focused on Stratusphere UX's diagnostics capabilities.

Deployment

Stratusphere UX is deployed as a pair of hardened virtual CentOS appliances: A hub appliance for the user interface, alerting, reporting, and APIs, and a Postgres database appliance to which the hub is connected. These run on Citrix, RedHat, Microsoft, Nutanix, and VMware hypervisors. Most deployments are up and running in less than one hour. In addition to collecting user, group, application and login details from AD, detailed, user-centric information is collected from two locations:

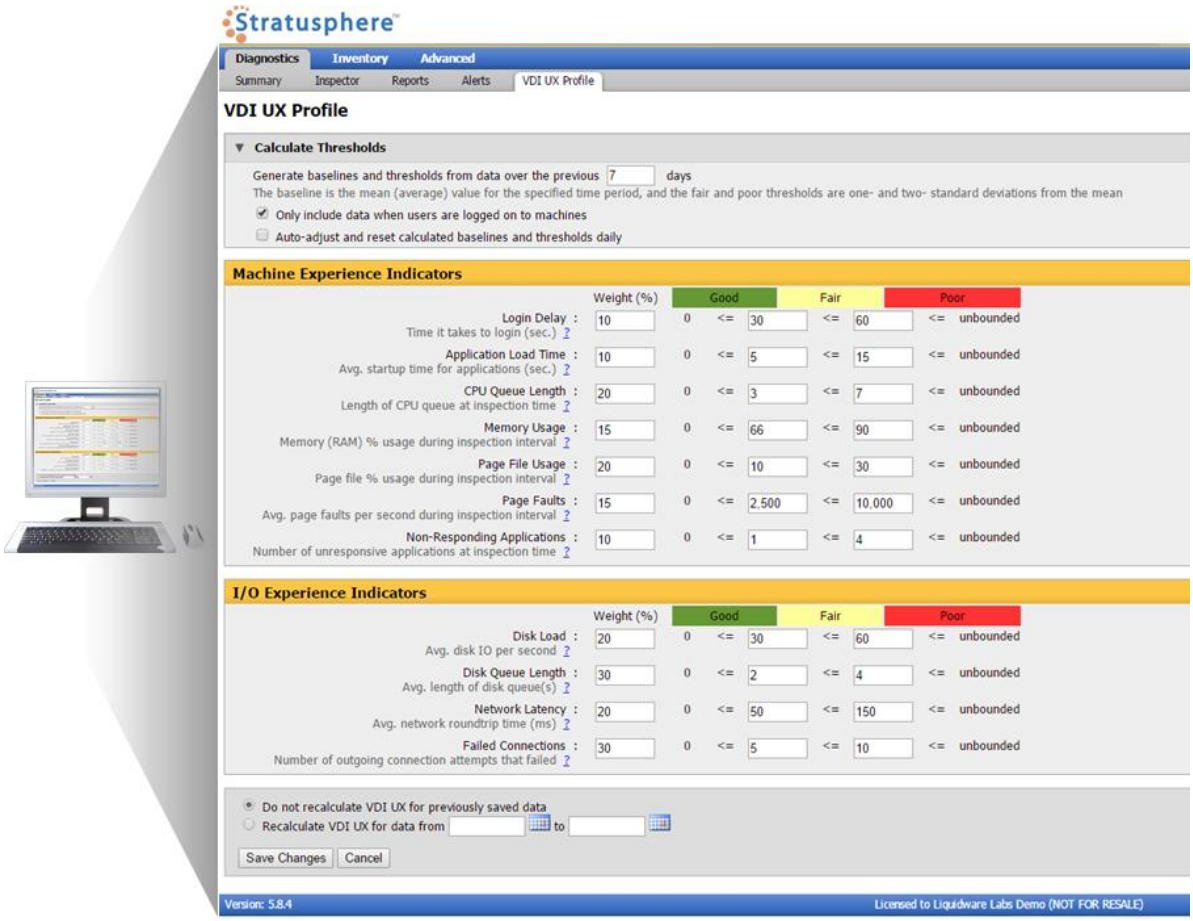
- The Connector ID Key collects details from various Windows locations, including the kernel, file system, and through Windows Management Instrumentation (WMI). Administrators can configure how often to collect details, how often to report them, and how long to retain information.
- The Network Station is a virtual switch sniffer that collects details about traffic between virtual infrastructure components, to identify metrics such as how long AD or DNS take to respond, details that are then time-correlated back into a user-centric point of view.

ESG Lab testing was conducted on a cloud-installed version of the Liquidware Labs Stratusphere UX architecture using Stratusphere UX version 5.8.4. The hub and database appliances were provisioned on VMware vSphere version 6.x hosted on a 16-CPU Dell PowerEdge C8000 Series compute node. The hub appliance was provisioned with 6 vCPUs and 8 GB of vRAM, while the database appliance was provisioned with 4 vCPUs and 12 GB of vRAM. NFS storage was local to the host infrastructure and connected via 10GbE.

User Experience Profile

Stratusphere UX defines the user experience based on machine experience indicators (login delay, application load time, CPU queue length, memory usage, page file usage, page faults, and non-responding applications) and I/O experience indicators (disk load, disk queue length, network latency, and failed connections). Each indicator can be weighted, and demarcation points can be established, to identify good, fair, and poor experiences, regardless of Windows delivery type. This provides quantifiable metrics and visual indicators of user experience that can be applied to users, groups, and time periods with their own success characteristics (Figure 7).

Figure 7. User Experience Profile



Source: Enterprise Strategy Group, 2016

Stratusphere UX also includes dashboards and charts for enhanced visibility. The metrics and information collected can be exposed through a RESTful API to populate help desk applications for first tier support. This information can be exported in JSON, HTML, CSV, and native Excel formats. Because they maintain the user-centric view, these metrics transcend the platform or component and are applicable to physical desktop, infrastructure, and virtualization teams as well.

Diagnostic Drill-down

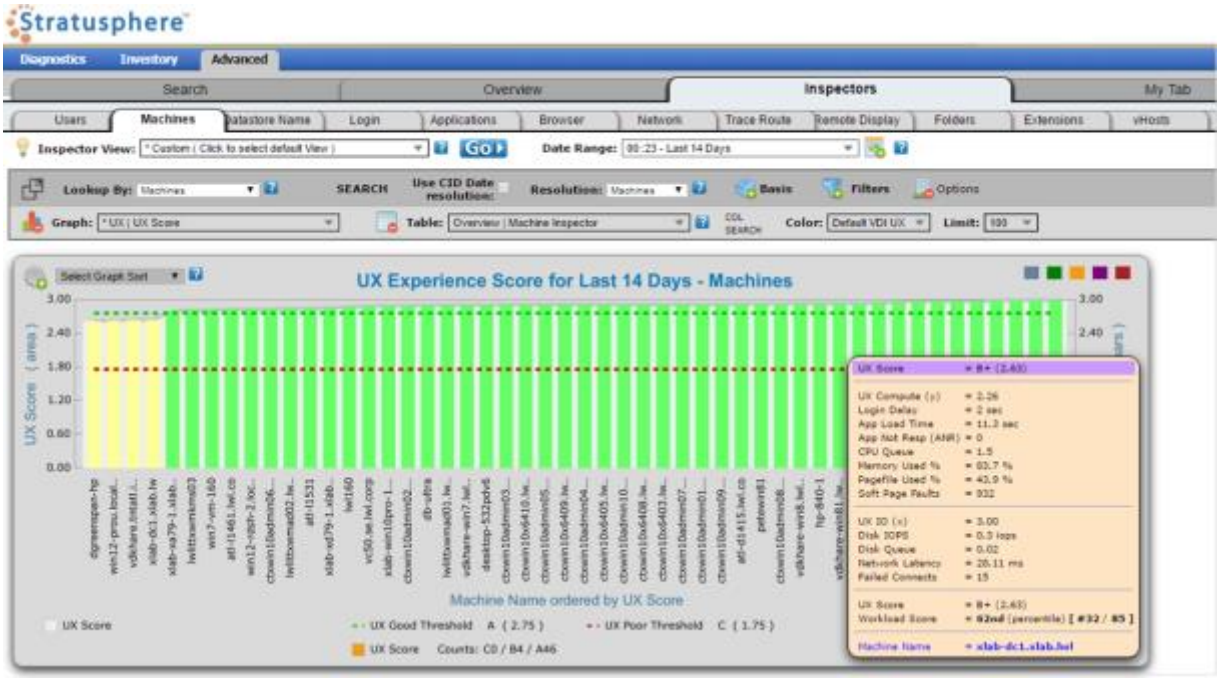
Stratusphere UX supports extensive diagnostics that are enabled by its always-on, detailed, user-centric data collection. Administrators can review myriad details on users, machines and applications; the ability to see trends back to the time when a problem started and visualize cyclical anomalies enable faster problem identification and resolution.

By comparison, many solutions can monitor infrastructure to show where processors or I/O are constrained, but not identify the true root cause. For example, storage administrators might notice an IOPS problem and add faster disks, but never fix the real problem (e.g., a user requiring a 4GB desktop image may be mis-provisioned on a 2GB VM). Detailed user-experience tracking would identify the constant paging to disk as the culprit. Similarly, component monitoring may show that hosts, storage, and networks are healthy, leading administrators to incorrectly assume that all is well with the user.

The Stratusphere UX Advanced Inspector views provide access to details and trends for identifying root causes; Inspector tabs can present details in categories such as user, machine, datastore, login, application, browser, remote display, and more. For this testing, ESG Lab viewed the user experience scores for various machines over a 14-day period; when that information was presented in a graph, we rolled over an individual machine name to view the experience score details.

Figure 8 shows the demo environment with green bars for machines with scores in the Good range, and yellow in the Poor range. The inset shows the details of one machine, with 14-day averages for each metric.

Figure 8. Inspector View: User Experience by Machine



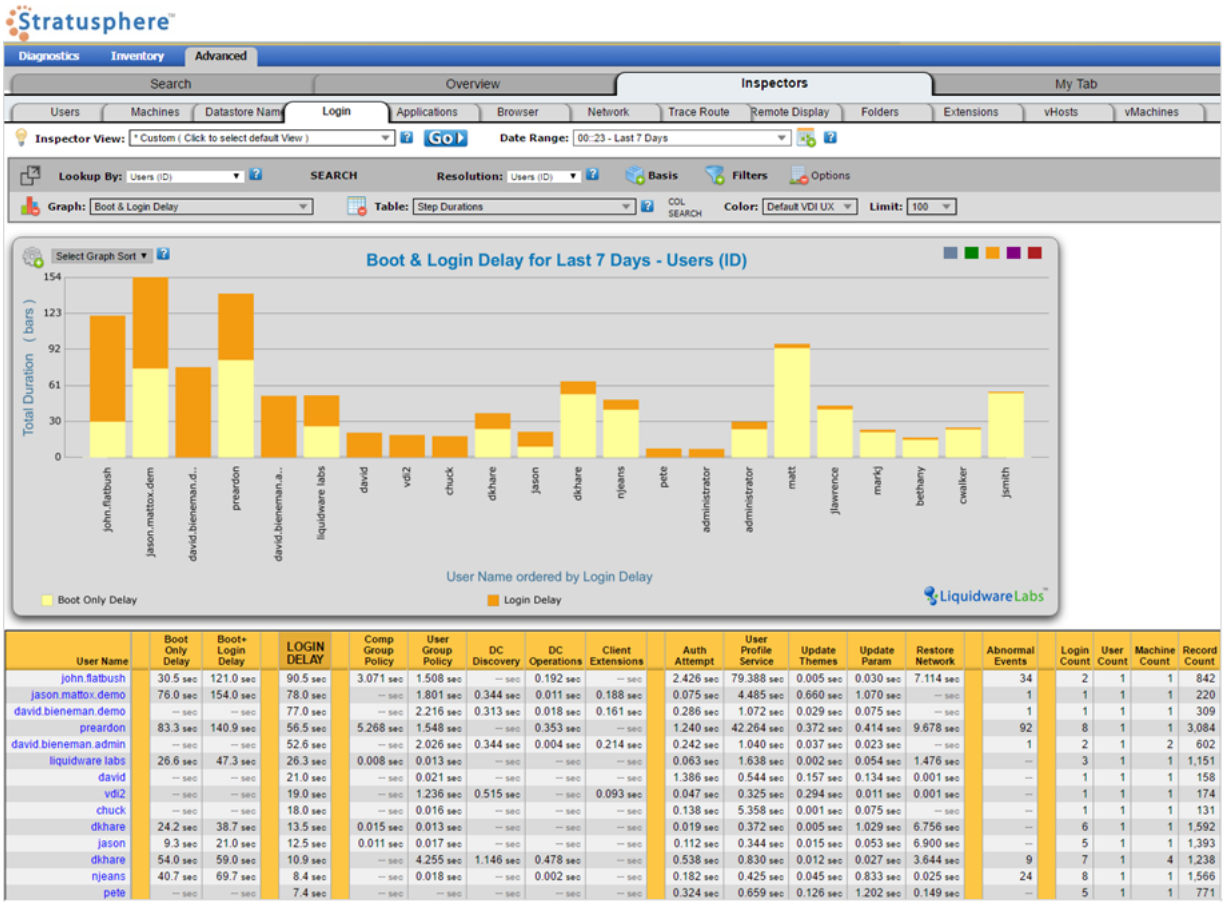
Source: Enterprise Strategy Group, 2016

We also drilled down to show single-machine details by date, then drilled further into each day and hour. This is possible because of Stratusphere UX's constant recording of data over time, and enables administrators to easily and quickly gather the details they need for diagnosis and troubleshooting.

Machine Boot and Login Breakdown

Finally, ESG Lab looked at the detail Stratusphere UX provides for a common virtual desktop challenge, the login. Stratusphere UX defines major steps in the login process and can show timeline, duration, and details for each. The solution breaks the login process into hundreds of individual records, and can display them in a single screen. This enables IT to view such details as the network latency for grabbing policy rules from the domain controller, how long a printer took to map, etc. Stratusphere UX can also filter events, such as tasks that took longer than two seconds, or tasks that required the user profile service. Much of this information is available in other places, but it would take multiple separate applications to collect it, and it would not be possible to combine the details to view the whole picture. Stratusphere UX takes the information, organizes it, and makes it truly useful. Figure 9 shows a graph of boot (yellow bar) and login (orange bar) delay for users. Below the graph, a chart details specific tasks and their duration by user. The ability to see the complete breakdown of every step in the login process enables IT to identify problems and resolve them quickly, resulting in a better user experience.

Figure 9. Inspector View: Boot and Login Delay



User Name	Boot Only Delay	Boot+ Login Delay	LOGIN DELAY	Comp Group Policy	User Group Policy	DC Discovery	DC Operations	Client Extensions	Auth Attempt	User Profile Service	Update Themes	Update Param	Restore Network	Abnormal Events	Login Count	User Count	Machine Count	Record Count
john.flatbush	30.5 sec	121.0 sec	90.5 sec	3.071 sec	1.508 sec	-- sec	0.192 sec	-- sec	2.426 sec	79.388 sec	0.005 sec	0.030 sec	7.114 sec	34	2	1	1	842
jason.mattox.demo	76.0 sec	154.0 sec	78.0 sec	-- sec	1.801 sec	0.344 sec	0.011 sec	0.188 sec	0.075 sec	4.485 sec	0.660 sec	1.070 sec	-- sec	1	1	1	1	220
david.bieneman.demo	-- sec	-- sec	77.0 sec	-- sec	2.216 sec	0.313 sec	0.018 sec	0.161 sec	0.286 sec	1.072 sec	0.029 sec	0.075 sec	-- sec	1	1	1	1	309
preardon	83.3 sec	140.9 sec	56.5 sec	5.268 sec	1.548 sec	-- sec	0.353 sec	-- sec	1.240 sec	42.264 sec	0.372 sec	0.414 sec	9.678 sec	92	8	1	1	3,084
david.bieneman.admin	-- sec	-- sec	52.6 sec	-- sec	2.026 sec	0.344 sec	0.004 sec	0.214 sec	0.242 sec	1.040 sec	0.037 sec	0.023 sec	-- sec	1	2	1	2	602
liquidware labs	26.6 sec	47.3 sec	26.3 sec	0.008 sec	0.013 sec	-- sec	-- sec	-- sec	0.063 sec	1.638 sec	0.002 sec	0.054 sec	1.476 sec	--	3	1	1	1,151
david	-- sec	-- sec	21.0 sec	-- sec	0.021 sec	-- sec	-- sec	-- sec	1.386 sec	0.544 sec	0.157 sec	0.134 sec	0.001 sec	--	1	1	1	158
vdi2	-- sec	-- sec	19.0 sec	-- sec	1.236 sec	0.515 sec	-- sec	0.093 sec	0.047 sec	0.325 sec	0.294 sec	0.011 sec	0.001 sec	--	1	1	1	174
chuck	-- sec	-- sec	18.0 sec	-- sec	0.016 sec	-- sec	-- sec	-- sec	0.138 sec	5.358 sec	0.001 sec	0.075 sec	-- sec	--	1	1	1	131
dkhare	24.2 sec	38.7 sec	13.5 sec	0.015 sec	0.013 sec	-- sec	-- sec	-- sec	0.019 sec	0.372 sec	0.005 sec	1.029 sec	6.756 sec	--	6	1	1	1,592
jason	9.3 sec	21.0 sec	12.5 sec	0.011 sec	0.017 sec	-- sec	-- sec	-- sec	0.112 sec	0.344 sec	0.015 sec	0.053 sec	6.900 sec	--	5	1	1	1,393
dkhare	54.0 sec	59.0 sec	10.9 sec	-- sec	4.255 sec	1.146 sec	0.478 sec	-- sec	0.538 sec	0.830 sec	0.012 sec	0.027 sec	3.644 sec	9	7	1	4	1,238
njeans	40.7 sec	69.7 sec	8.4 sec	-- sec	0.018 sec	-- sec	0.002 sec	-- sec	0.182 sec	0.425 sec	0.045 sec	0.833 sec	0.025 sec	24	8	1	1	1,566
pete	-- sec	-- sec	7.4 sec	-- sec	-- sec	-- sec	-- sec	-- sec	0.324 sec	0.659 sec	0.126 sec	1.202 sec	0.149 sec	--	5	1	1	771

Source: Enterprise Strategy Group, 2016

While a complete description of Stratusphere UX is beyond the scope of this paper, several other capabilities are of note:

- *Remote display protocols.* The solution captures significant detail on display protocols such as PCoIP, RDP/RFX, and ICA/HDX. Performance and quality information on image, audio, and USB channels are presented within the Stratusphere UI through reports and via export. The detail and granularity facilitate troubleshooting and optimization efforts.
- *Onboarding*. Stratusphere UX can help with onboarding, as most organizations start by moving a small group of users to the virtual desktop environment, and over time move additional groups. By identifying the user experience, IT can assess which users and groups can migrate to data center desktops, in what order, and with what specific environments. Baselining and tracking user experience helps to identify the right environments, manage user expectations, and minimize risk and downtime.
- *Browser visibility*. While other solutions only show how much CPU the browser is consuming, Stratusphere UX can peer inside the browser and aggregate domain information. This enables IT to recognize where resources might be insufficient for the tasks being executed.
- *Reporting*. The solution includes 200+ built-in reports that can be edited, filtered, scheduled, emailed, and exported. This eliminates the need to capture and save workflows in order to create a report.
- *API*. The API builder can be used to export the metrics and data displayed on any Inspector view so that details can be brought into infrastructure monitoring tools, enabling teams to gain the benefit of Stratusphere UX information in their standard workflow.

Why This Matters

VDI, application virtualization, and other data center-based Windows deployments can fail if the user experience is not up to par. But most organizations have no real idea of the user experience because they monitor the infrastructure only. Infrastructure- or application-centric monitoring tools only measure the platform, not the user experience. If you are measured on uptime of servers and storage, then component tools are acceptable, but not if success is defined by user productivity.

ESG Lab validated the powerful diagnostic capabilities of Stratusphere UX, including the user profile scores, Advanced Inspector views, and boot/login delay. Stratusphere UX provides the 30,000-foot view as well as extensive detail, enabling rapid problem identification and resolution. It arms administrators so they can be proactive and effective. Generating the full picture with traditional solutions would require many separate applications and still not create a complete picture.

Stratusphere UX is a powerful, user-centric visibility engine for a complex system, with diagnostics that are critical to well-functioning virtual deployments. Problems don't impact just one user, but whole departments and even whole companies, so the ability to diagnose and remediate problems is essential.

The Bigger Truth

Virtual desktop and application services are transforming the way organizations provide the environments employees need to be productive. Organizations deploy them to deliver a robust user experience across devices and improve IT efficiency. Moving desktop services into the data center and away from individual PCs makes it easier to provide what employees need regardless of their location or device, and it enables IT to consolidate infrastructure, better maintain and upgrade applications, improve data security and compliance, and reduce costs.

However, if the user experience suffers after moving desktop services into the data center, your deployment will fail. That's why so many organizations choose Citrix—it is a premier provider of desktop/application services through XenDesktop and XenApp. For the enterprise use case, it is critical to tailor the services and applications for each user, and the key to that lies in management of the profile and applications. Since Citrix provides only the basics of profile management and application layering, the company partners with the Liquidware Labs Essentials Suite for enterprise-level UEM with profile services (ProfileUnity), application layering (FlexApp), and user-centric visibility and diagnostics (Stratusphere UX). These cost-effective extensions to XenApp and XenDesktop provide the advanced features that enterprise organizations need.

When the user desktop and applications are in the data center, organizations simply must view them differently than when they are standalone—because problems impact many users, not just one. Virtual desktops and applications can deliver efficiency and TCO benefits. They can provide users with a consistent experience across devices. But with the advanced features that ProfileUnity with FlexApp provides, users can have an even better experience, for example, using filters and trigger points to tailor the experience as they change locations. It also makes IT's job easier, protects data and applications better, and improves compliance. And Stratusphere UX can deliver the insight required to keep the environment running smoothly. Ultimately, the Liquidware Labs Essentials Suite can help to ensure that your Citrix XenDesktop/XenApp deployment delivers a state-of-the-art, scalable, dependable user experience.

ESG Lab was quite impressed with the depth of functionality in the Liquidware Labs Essentials Suite, and with the ease of integration with Citrix platforms. The Windows desktop environment is a complex mechanism, and enabling access and functionality that users and IT need today is a tall order. Liquidware Labs and Citrix are providing a fully featured, mobile, tailored desktop and application experience that looks seamless to the end user, while maintaining security, compliance, and cost objectives.

We were only able to scratch the surface of its capabilities, but it is clear that with the combination of Citrix XenApp/XenDesktop and Liquidware Labs Essentials Suite, the whole is definitely greater than the sum of its parts. For the enterprise, Liquidware Labs ensures that you gain the most in terms of simplicity, security, and TCO —the objectives that most likely drove your Citrix implementation in the first place.