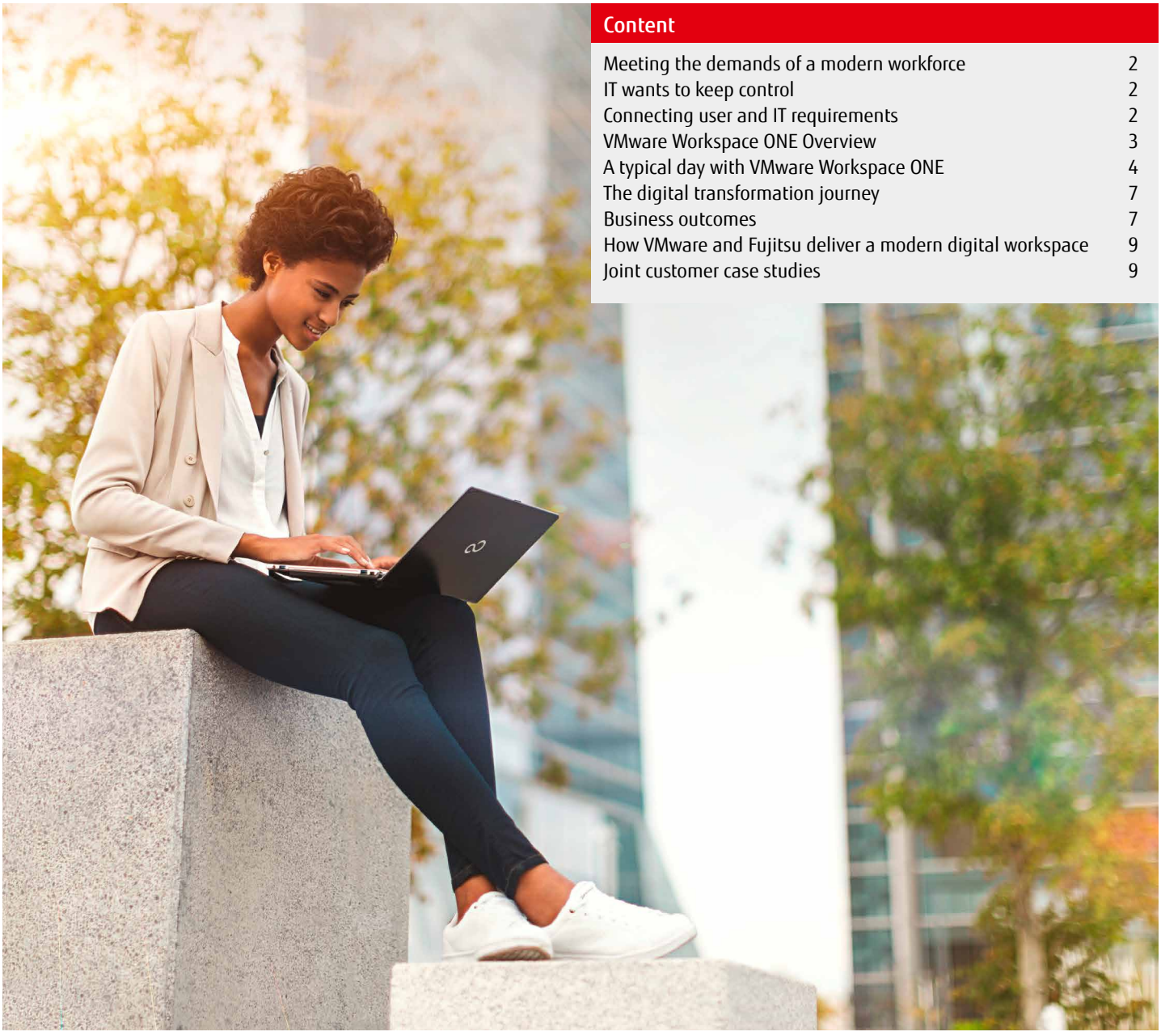
White paper
Enabling Business Mobility and Digital Workspaces

Many of today's organizations embarking on a digital transformation journey find that digital transformation is less likely to succeed without digital workspace investment. Products, services, and rewarding customer experiences are designed, delivered and managed by employees. Hence organizations must do all they can to spark creativity and drive productivity by investing in the skills, tools, and environment of their workforce.



Content

Meeting the demands of a modern workforce

In many organizations in recent years, end user experience has failed to keep pace with the experience the same users could achieve with modern devices they use in their private lives. While we install and use applications on our private smartphones in a matter of minutes, IT departments often need weeks to deliver new office applications. Booking hotels or flights for our holidays is so much easier than organizing a business trip using the company's internal travel portal.

It is hard to understand, why we have to boot up the corporate notebook to work on a customer presentation, while using a much more convenient device to chat with our friends or watch our favorite popular TV series.

Delivering a modern workspace to employees has become an important priority for CEOs and IT departments. Companies that follow this principle are more successful in recruiting sought-after professionals and have been also able to increase employee satisfaction.

VMware found that 60% of employees prefer to use a personal device for work and play, the adoption rate of BYOD ("Bring Your Own Device") among enterprises is about 70%, while the demand for mobile applications is predicted to grow five times faster than IT departments can deliver them[1]. Meanwhile the top 10 largest global banks, 8 of the top 10 universities internationally, 9 of the top 10 global retailers, all 5 branches of the U.S. armed forces and the top 5 U.S. hospitals are already using mobility and digital workspace solutions.

This paper discusses how VMware and Fujitsu help customers transform to a modern end-user computing environment by providing an easy-to-use, secure computing experience that can deliver the applications and data the employee needs, on any device the employee will use and from any location where the employee may be.

IT wants to keep control

A lingering question of CIOs when confronted with such modern working environments is how to implement effective security mechanisms and keep control of data and application delivery.

Traditionally, this hasn't been such a difficult job. IT departments used to deliver complete end-to-end solutions, including access devices and management solutions. They controlled applications and access to data, as well as the back-end infrastructure.

However, the introduction of privately owned devices and cloud-based services, as well as new business mobility requirements, challenge existing solutions for protecting corporate assets. In place of the familiar managed infrastructure we have unmanaged devices, unknown applications and unsecure networks.

IT departments cannot proof applications an employee has installed on his private smartphone. They are not able to manage these privately owned devices, nor are they able to strengthen their security or configure them. The daily increasing number of publicly known threats demonstrates that existing solutions are weak and unable to stop data theft. Furthermore, IT departments are facing much stricter legal guidelines for protecting private data, such as the EU General Data Protection Regulation (GDPR).

Connecting user and IT requirements

How can we satisfy both sides? How can IT deliver data and applications in a way that meets employees' expectations without breaching security and compliance requirements?

VMware Workspace ONE™ is the enterprise platform that enables IT to deliver a digital workspace that empowers the workforce to securely bring the technology of their choice — whether devices or applications — at the pace and cost the business needs. Workspace ONE enables you to drastically improve experiences and tasks that were previously costly, time consuming, and resource intensive. Workspace ONE enables IT organizations to:

- Onboard new employees with all of their apps and devices in under an hour without tickets and help desk calls
- Set and enforce access and data policies across all apps, devices, and locations in one place
- Complete business processes from mobile devices in a process similar to consumer experiences
- Provide a new corporate laptop out of the box, anywhere in the world, from the cloud within minutes

[1] www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/products/workspace-one/infographic-identity-defined-workspaces.pdf

VMware Workspace ONE Overview

The graphic below shows the major components of Workspace ONE. Most components are delivered as virtual appliances, while some are delivered as Windows applications.

- VMware Unified Access Gateway secures external access to internal content on corporate network shares or internal repositories. Users are only allowed to access the files and folders for which they have access rights.
- VMware Identity Manager™ is an Identity as a Service offering that provides enterprise identity management, a browser-based user portal, single sign-on and a self-service app store.
- VMware AirWatch® is a comprehensive enterprise mobility platform that delivers simplified access to enterprise applications, secures corporate data, and enables mobile productivity.
- The Workspace ONE Native Mobile App offers a unified app catalog with single sign-on, enabling users to search and launch virtual desktops and applications.
- VMware Horizon® delivers virtualized or hosted desktops and applications through a single platform to end users. These desktop and application services can all be accessed from one digital workspace across devices, locations, media, and connections without compromising quality or user experience.

Customers have several options when deploying Workspace ONE, as the entire solution is available either as a cloud service or as a licensed product. It is even possible to consume some elements from the cloud and combine them with on-premises installations.

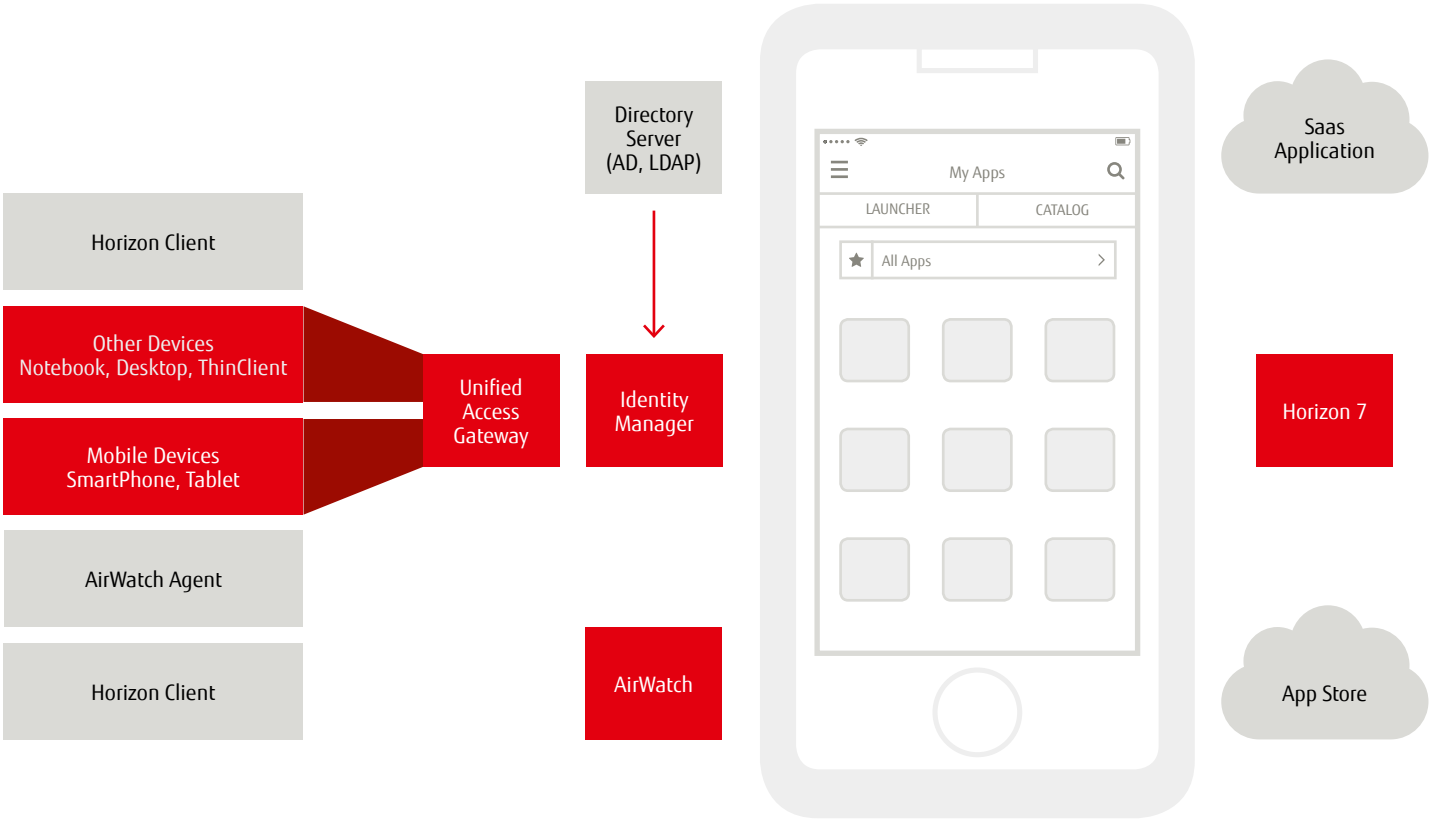


Figure 1: VMware Workspace ONE at a glance

A typical day with VMware Workspace ONE

The following chapters describe the capabilities and features of a modern digital workplace from an end user perspective in combination with technical aspects.

Access to App Catalog

Let's assume you're starting your first day in a new company. Once you have been welcomed, your new colleague will show you how to enable your smartphone for business use. He will simply give you a link to VMware Identity Manager and you then visit the single sign-on site using the browser of your smartphone.

VMware Identity Manager supports different types of credentials, such as user name and password or RSA token. It supports biometrical security devices and users from Microsoft Active Directory. In addition, conditional access will differentiate the content of the app catalog, depending on network location, device type, device status and other criteria.

After having entered a user name and password, you will see the app catalog. This lists all the IT services available for you to access. It shows all the available applications that your current device supports, and allows you to bookmark frequently used apps or data stores (i.e., Microsoft SharePoint™, Microsoft OneDrive™, etc.)

The app catalog is a website (accessible via a standard browser or the Workspace ONE mobile app) and is therefore available on every device an employee may use. The app catalog contains different types of applications and services, such as web-based services (i.e., SalesForce), typical Windows applications (i.e., a web browser), access to file shares (i.e., SharePoint), databases or any client server applications, virtual desktops, hosted applications – even existing server hosted applications, e.g., based on Citrix XenApp®, can be integrated.

Thanks to the single-sign on feature of VMware Identity Manager, the launch of such applications or services does not require additional credentials. The solution creates anonymous credentials for every required logon, which also allows IT to prevent access to all applications by denying access to the app catalog.

You may also be wondering how a Windows application can be accessed from your tablet. Workspace ONE offers a couple of methods for this. In the case of SaaS applications, Workspace ONE will log you in and display the applications in your browser. Windows applications will run in a full screen window – either on a dedicated virtual desktop or hosted by a Windows Server.

Securing your mobile devices

Mobile devices can easily get lost or stolen. In order to minimize the negative impact of such an event, VMware AirWatch offers a number of features to secure your company assets.

- An AirWatch agent installed on your private mobile device allows you to encrypt data on your device, prevents you from copying data to unsecured applications, and can delete all corporate data in the event of device loss or theft
- VMware Boxer and VMware Browser offer much more secure alternatives to your standard email or browser applications, preventing you from copying data from your mailbox to your Facebook account
- VMware Content Locker stops attempts to copy/paste data and files to file shares like Microsoft SharePoint, Office 365, Box or OneDrive
- VMware Socialcast enables secure enterprise chat and collaboration, so that employees can get work done faster
- VMware People Search makes managing employee information effortless by integrating with identity features
- AirWatch Tunnel enables you to use separate VPN connections for applications, a methodology which is much harder to attack than traditional VPN solutions, just setting up a single VPN connection for the entire data center

All these functions and mobile apps can be delivered as a virtual appliance for on-premises use, or are available as a cloud-based service. VMware AirWatch supports all major mobile operating systems (Android, iOS and Windows) and manages the majority of smartphones and tablet devices.

For developers of mobile apps VMware provides the AirWatch SDK and AirWatch application wrapper. With both tools, new mobile apps will follow the applied data loss prevention policies.

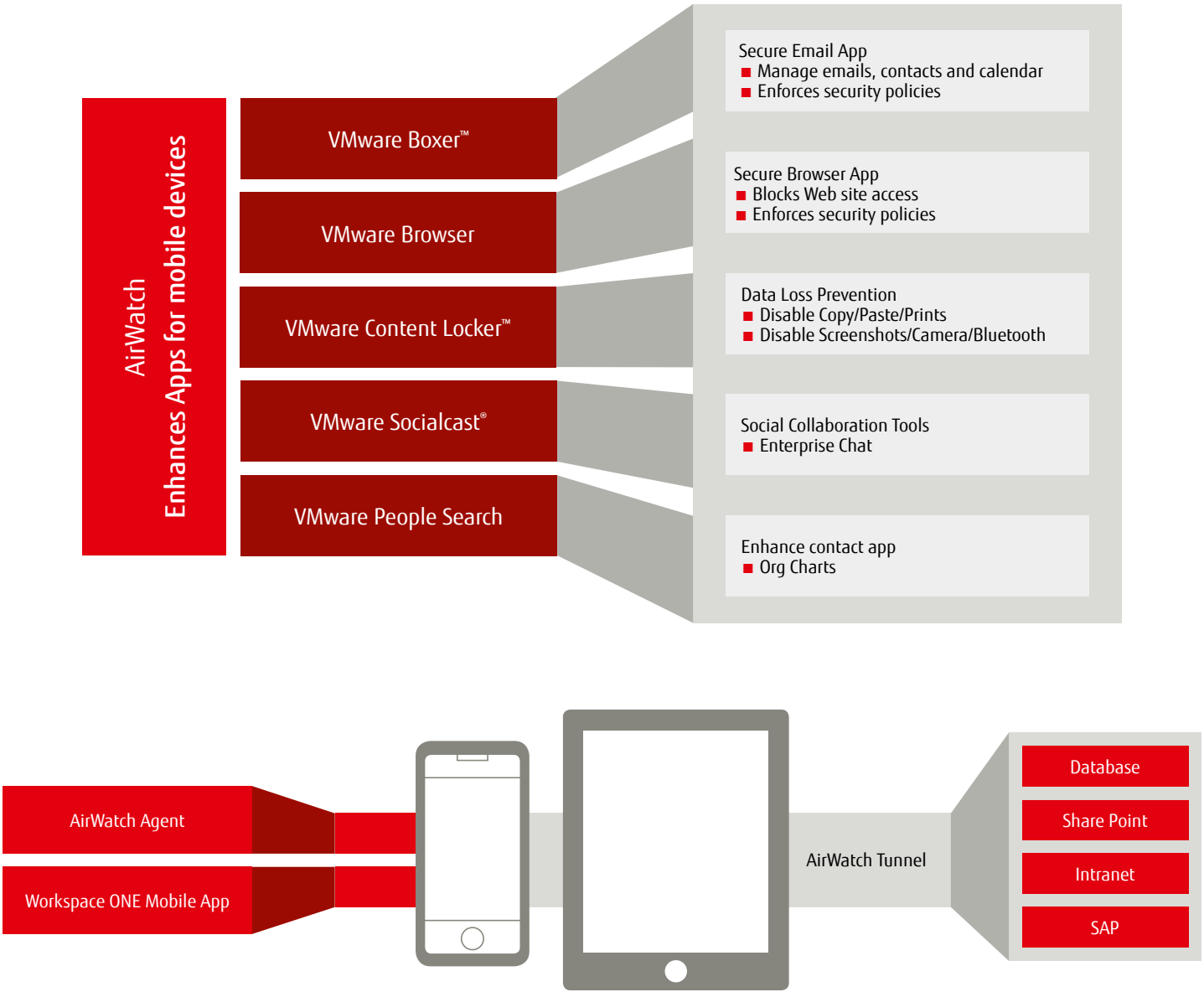


Figure 2: VMware Airwatch at a glance

Virtual Applications and Desktops

Your smartphone is now ready to use and you are already able to log on with your password (or RSA token). Perhaps on the second day in your new company, you start up your device, which you found at your desk. This might be a traditional desktop, a laptop or even a thin client. You use this device to access your virtual desktop. As you have never worked with a virtual desktop before, you are skeptical and concerned. What about performance? What about the quality of pictures and videos? Will Skype for Business work at all? How are files and documents stored? Can you copy them to your USB device? VMware Horizon, as part of Workspace ONE will give you the answers you need.

Once you have found your virtual desktop, you will see that it is already running. Horizon has a few more desktops running than currently needed, so you get instant access to your virtual desktop – much faster than on a traditional PC.

When you log in, VMware Horizon personalizes your environment. It maps your data and applications to your virtual desktop. You may use these applications in the familiar way, or you may prefer to use the app catalog, which you have previously seen on your smartphone or tablet. You will be able to work with various types of applications on your virtual desktop. These may be locally mapped, hosted or web-based applications – all of them will be available on your virtual desktop.

VMware Horizon uses a couple of advanced technologies to provide users with a better experience compared to physical desktops.

As shown in the graphic below, a user will access his environment with his web browser and will log on to the Unified Access Gateway (which establishes a VPN tunnel). The Connection Server will present virtual desktops and / or applications. Using the login, the User Environment Manager takes an empty virtual desktop (created as a linked clone by View Composer). A linked clone is a copy of a virtual desktop, which uses a link to the virtual disk of the original virtual desktop (instead of a full copy). This clone will therefore require much less storage capacity than a full copy.

User Environment Manager will now personalize this empty virtual desktop with the user's server mappings, desktop settings and applications. Instead of installing applications on the empty virtual desktop each time a user logs in, a tool to simplify application deployment in virtual desktop infrastructures known as VMware App Volumes will "install" user specific applications by adding an already prepared additional virtual disk on which those applications are already installed.

Of course, your virtual desktop will not be available in your office only – you can use it anytime, anywhere. You just need a device with a browser to get access. You can even see your virtual desktop on your smartphone. It makes no difference whether you use your tablet or the publicly available desktops in your hotel. And, in case you just have your smartphone to hand and need to get Microsoft Internet Explorer running, Horizon delivers this application in full screen, while adding some enhancements to enable you to access legacy applications even with a touch screen.

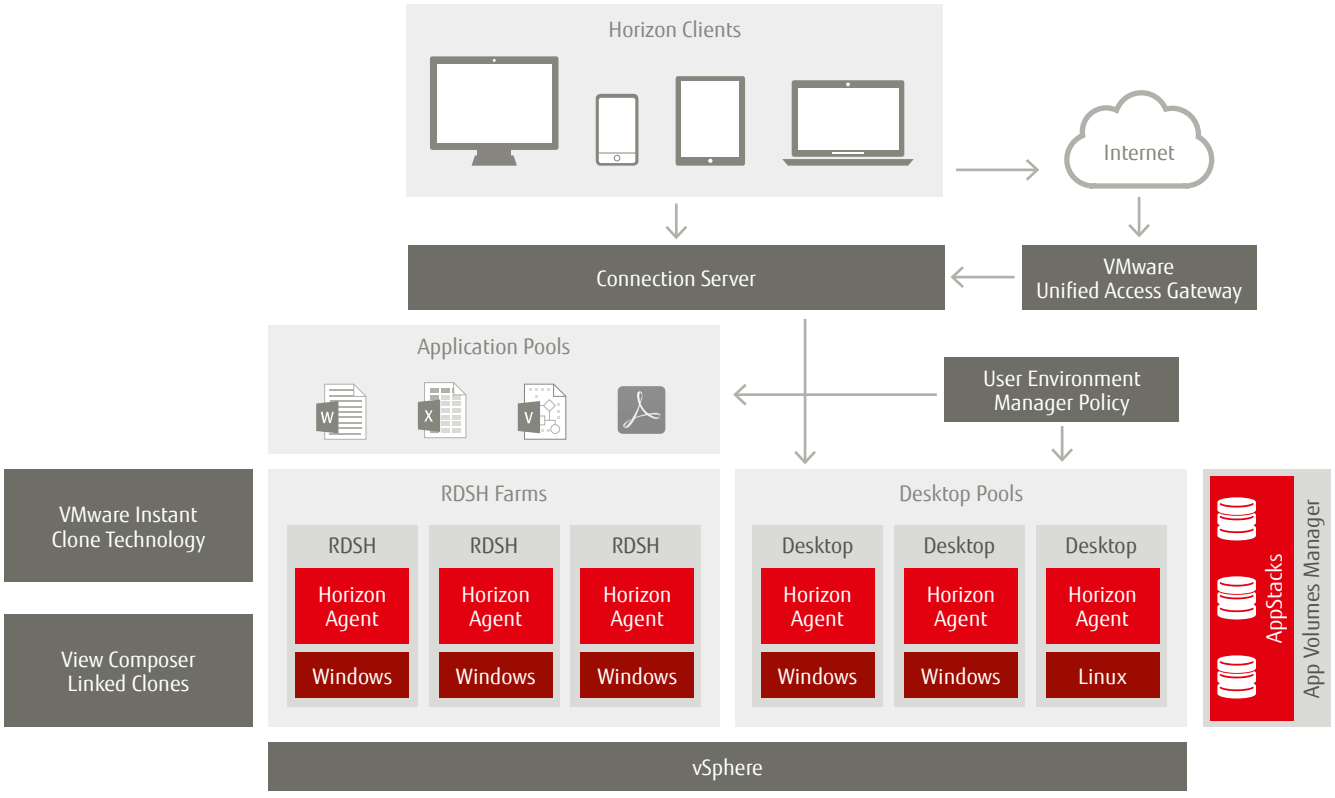


Figure 3: VMware Horizon at a glance

The digital transformation journey

Companies have many choices when establishing digital workspaces and introducing business mobility. Some might already use parts of Workspace ONE and already have virtual desktops in place. In this case, individual components (Identity Manager, AirWatch, App Volumes) can be added to complete the solution. Since Workspace ONE bundles VMware Horizon and VMware AirWatch, it is easy to add any missing products as and when they are needed.

The journey can be also started with AirWatch for addressing security concerns with mobile devices. Other companies may use Horizon Cloud to increase their number of virtual desktops almost on demand by adding cloud-hosted virtual desktops to their VDI environment. Alternatively, they may be interested in implementing App Volumes for speeding up delivery of (new, patched or upgraded) applications to their employees.

VMware Workspace ONE is available in three versions. The Standard Edition includes the app catalog, Identity Manager with SSO and mobile device management functions. Conditional access control, mobile application management including VMware Browser, Content Locker and the AirWatch tunnel are available in the Advanced Edition. The Enterprise Edition includes Horizon for virtual applications and desktops.

VMware offers test and trial versions, providing a fast and easy way to test-drive the full technical capabilities of these products. These demo versions are free, will be up-and-running on your browser in minutes, and require no installation.

Business outcomes

The financial results and benefits of implementing this solution depend on various parameters. We will therefore describe the business outcomes of VMware's own implementation of Workspace ONE, which have been documented in a whitepaper entitled "VMware's move to a digital workspace"[1]. VMware implemented Workspace ONE during the first half of 2016. After the migration in October 2016, around 30,000 users worked with about 51,000 devices. Workspace ONE manages around 400 different applications, about 370 of them SaaS / web-based.

VMware defined two sets of objectives, which should be achieved by implementing Workspace ONE:

- End-user service objectives:
  - Faster response to new employees when introducing new applications and services
  - Improved end user experience
- Security and risk management objectives
  - Controlled and managed IT reality ("shadow IT", unchecked applications, BYOD)
  - Pro-active risk management (reduce time on remediation of exploits)
  - Improved resilience (higher application availability for internal and external facing services)

After rolling out Workspace ONE, the company analyzed financial and non-financial results in order to measure the return of investment. For analyzing the financial achieved ROI, the following parameters were considered:

- Deployment costs
- Cost savings in operations
- User productivity through time savings

Hardware, software and project costs represented a total cost of $ 3.83 million. For the savings, the paper identifies two major tasks IT operations had to execute: password support issues, as well as the identification and remediation of incidents:

Hardware costs	$ 1.15 million
Software costs	$ 2.60 million
Project costs	$ 0.076 million
Total costs per year	**$ 3.83 million**
Password support issues savings	$ 1.32 million
Identifying and remediating incidents	$ 4.46 million
Total savings per year	**$ 5.78 million**

Measurement of user productivity showed that Workspace ONE helped save approximately 3,140 working days annually.

The above calculations resulted in an ROI of 150% in the first year. For the coming years, the ROI was expected to increase over time, since there are lower costs in the following years, while the savings remain unchanged. In addition to the positive ROI, Workspace ONE led to additional benefits for the company. Significant improvements were identified in the management and mitigation of security risks, as well as a reduction in the need to develop and deploy new mobile applications.

[1] https://www.air-watch.com/lp/vmwares-move-to-a-digital-workspace/

The above analysis presents the specific situation within VMware. For other environments, various tools are available to calculate potential financial savings.

- The "End-User Computing Business Case Calculator" analyzes the total cost of ownership of various virtualized desktops compared to a classic physical desktop infrastructure.
- When using App Volumes a small "Business Case Estimator" can help determine cost savings.
- Together with SysTrack, VMware developed a desktop assessment tool specifically designed to analyze Windows 10 migration scenarios.
- The "Horizon 7 Edition Selector" helps you define which Horizon edition fits a given situation.

In addition to VMware's own experience, various analyst firms acknowledge the benefits of VMware's approach.

- In a study published by Principled Technologies, the analyst firm concluded "VMware Workspace ONE created a better experience for feature-rich management than Microsoft EM+S (Microsoft Enterprise Mobility + Security)". They found out that Workspace ONE requires 78 fewer steps and 35% less time for all processed scenarios[1].
- Having tested Workspace ONE in a lab validation, ESG was impressed with the ease and speed with which an application could be added to the App Catalog for SSO, and how simple multi-factor authentication can be[2].
- Finally, Gartner appointed VMware as a leader in their "Magic Quadrant for Enterprise Mobility Management (EMM) 2017" for the seventh consecutive year[3].

[1] http://www.principledtechnologies.com/clients/reports/VMware/Workspace_ONE_admin_experience_0917.pdf

[2] http://www.itbusinessbook.com/admin/downloadpdf.php?file=50513-esg-validation-report-workspace-one-.pdf

[3] http://ir.vmware.com/overview/press-releases/press-release-details/2017/VMware-Named-a-Leader-in-Gartner-Magic-Quadrant-for-Enterprise-Mobility-Management-Suites-for-Seventh-Consecutive-Year/default.aspx

How VMware and Fujitsu deliver a modern digital workspace

With over a decade of strategic partnership, VMware and Fujitsu offer one of the industry's most complete VDI portfolios, covering a broad range of client and data center solutions and services. Delivered on-premises, off-premises or from the cloud, the sheer breadth of the portfolio gives you unprecedented choice to find a tailored virtual desktop solution that exactly fits to your organization's needs. With one-stop shopping for an entire VMware VDI environment, Fujitsu provides you with the fastest on-ramp to VDI.

Fujitsu data center systems for VMware VDI

Fujitsu data center systems featuring all-flash storage, hyper-converged systems and server-side graphics processing provide a high-performing platform for VMware virtual desktop environments. With excellent price / performance ratio leading 70% of VMware's VMmark benchmark categories, Fujitsu x86 servers provide the most powerful virtualization platform. And with tailor-made Fujitsu integrated systems featuring VMware vSphere, vSAN and Horizon, we reduce complexity, time, risk and cost in VDI infrastructure deployment to provide you with fastest time to production.

Fujitsu client systems for VMware VDI

With a broad range of flexible, secure and reliable stationary and mobile devices certified for VMware virtualization technologies, Fujitsu client systems meet every user requirement. Fujitsu thin client systems provide integrated security features supported by VMware's Identity Manager, be it SmartCard or biometrics support like palm vein scanning based on Fujitsu's PalmSecure technology, enabling multi-factor authentication. In addition, lean and customizable operating system support in combination with best-in-class client management provides an operating platform that is used for the largest thin client deployment world-wide with over 200,000 devices.

Fujitsu cloud hosted virtual desktops and applications

Fujitsu provides a fast, flexible and low risk cloud-based service offering for VMware virtual desktops and applications from its public cloud platform significantly lowering the barrier to virtual desktop adoption. The service is highly scalable, provides 24*7 availability and predictable costs on a "pay as you go" basis with no up-front investment. It's extremely easy to get started: Your virtual desktop is just 5 clicks away.

Fujitsu services for VMware VDI

Fujitsu offers a broad range of VDI-related services provided by Fujitsu or its local partners, covering professional services, infrastructure support services, financial services, security services and managed services. Fujitsu's global service capabilities are available both on-shore and off-shore from 5 global delivery centers and local service desks in more than 30 countries. You profit from the experience of a global service provider managing over 5 million desktops worldwide making Fujitsu a leader in the Gartner Magic Quadrant for Managed Workplace Services.

Joint customer case studies

Fujitsu has successfully delivered many VMware VDI projects across various industries:

- Fujitsu has been building a company-wide, secure and easy-to-use virtual desktop infrastructure based on VMware technology for approximately 80,000 of the Fujitsu Group employees in Japan, including affiliates.
- For Nakilat, a Qatari-owned shipping and maritime company running the world's largest LNG (Liquefied Natural Gas) shipping fleet, Fujitsu provided a highly reliable backend data center infrastructure running VMware Horizon.
- For BBAC, one of the top 10 banks in Lebanon. Fujitsu revamped the aging VMware Horizon deployment with high-performance and secure server and storage systems supporting all key banking applications.
- By expanding the virtual desktop infrastructure of Gunsan City Hall, Fujitsu helped the local Korean government agency to implement their low carbon policy to achieve a green IT environment.
- For the Mediterranean University of Reggio Calabria in Italy, Fujitsu created a virtual desktop environment based on VMware vSAN and Horizon that puts the university at the cutting edge in terms of facilities and infrastructure for food and agriculture research.
- For East Japan Marketing & Communications, Inc., an advertising agency of the East Japan Railway Company, Fujitsu provided a VMware virtual desktop infrastructure based on thin clients to make their sales staff more efficient by introducing a hot desk workplace system and a secure remote access environment.
- For Callidus, an Australian manufacturing company. Fujitsu provided a comprehensive end-to-end VDI solution, which allowed the customer to introduce a rich media environment with centralized management and a more scalable desktop platform.

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