Virginia Information Technologies Agency

Enterprise Architecture Technical Brief

Desktop Virtualization (DV)

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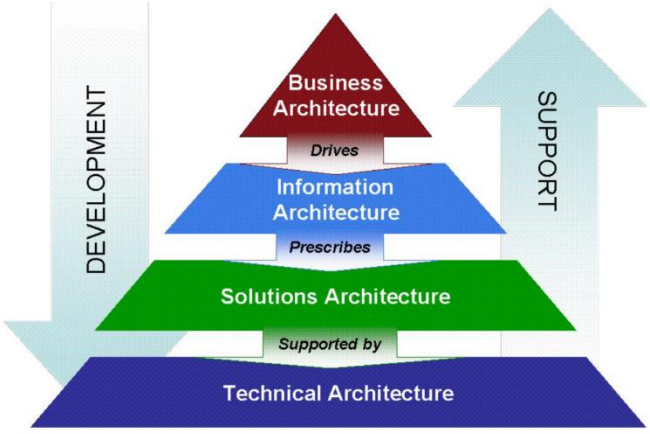

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Desktop Virtualization (DV) Recommendations

- DV is a robust technical solution that should be evaluated as a flexible, digital, end-user workplace computing option that can provide enhanced security and more stable desktop computing environments for end-users, replacing traditional desktops such as a PC's, laptops, netbooks, etc.
- Prior to implementing DV, be sure to create a business case to determine whether this capability would be most useful and practical for implementation.

For any comments, questions, and/or concerns with this technical brief, please contact VITA EA: ea@vita.virginia.gov

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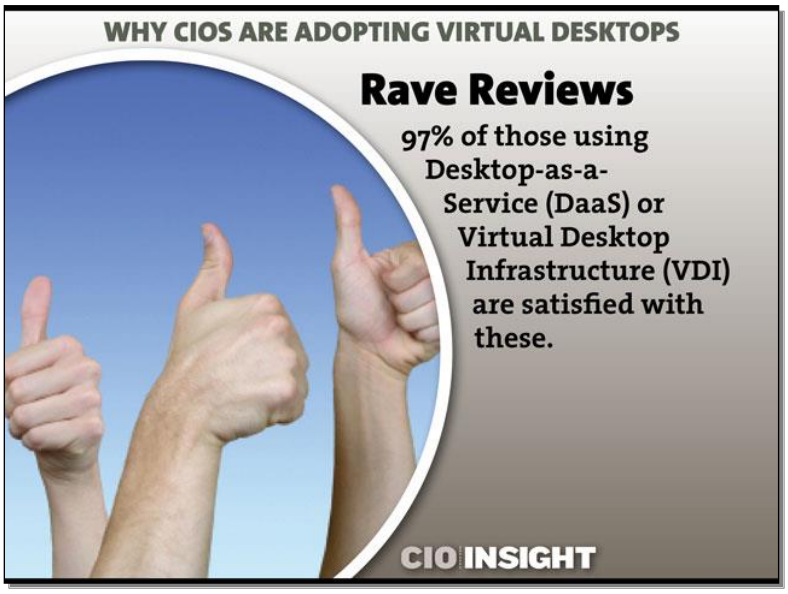
Desktop Virtualization (DV) Background

- Desktop Virtualization (DV) is Software technology that separates/decouples a user's desktop environment from their physical device used to access it such as a laptop or PC.

  Gartner → http://www.gartner.com/it-glossary/desktop-virtualization/

- DVI is when a user's desktop environment becomes a virtual machine (VM), which is stored in a centralized server that can be accessed through a network from a remote client device such as a tablet, notebook, netbook, laptop, home pc, smart phone, etc.
  - There are various desktop virtualization technologies targeting different use cases, such as hosted virtual desktop (HVD), local VM, streaming desktop, and hosted shared desktop.
- A common DV deployment is using VMware's Virtual desktop infrastructure (VDI). VDI is a variation on the client-server computing model, sometimes referred to as server-based computing, which is a term coined by VMware.
  - There are two main approaches to VDI: Persistent and Nonpersistent.
    - Persistent VDI provides each user with his or her own desktop image, which can be customized and saved for future use, much like a traditional physical desktop.
    - Nonpersistent VDI provides a pool of uniform desktops users can access when needed. Nonpersistent desktops revert to their original state each time the user logs out.

    https://en.wikipedia.org/wiki/Desktop_virtualization



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Desktop Virtualization (DV) Benefits

- Work is no longer a place – it's something you enable.
    - App and Desktop virtualization is to embrace workforce mobility and empower your employees to work anywhere, anytime, on any device; DV provides mobile access to applications securely.

    12 Ways App & Desktop Virtualization Is Transforming IT (Infographic) - March 22, 2016 https://www.lewan.com/blog/12-ways-app-desktop-virtualization-is-transforming-it-infographic
- DV is regarded as a highly mature solution for delivering secure, reliable, centrally managed desktops with many advantages over traditional PCs and laptops.
    - Additionally, VDI has dramatically improved over the years in terms of support for more exotic use-cases such as graphic intensive workloads (e.g. GIS), physical devices, printing, and offline access.

    CIO Insight, March 22, 2017: http://www.cio.com/article/3183473/cloud-computing/the-evolution-of-desktop-virtualization.html
- As White Hat Virtual mentions, "Those concerned about moving to desktop virtualization need not worry. Cloud computing is more mature and more prevalent than ever, and as more companies - even Fortune 500 companies - move toward the cloud, the offerings will only improve. With virtualized machines, the cost savings, security, and flexibility alone are such benefits to SMBs, which can then concentrate on their core business rather than IT issues." http://www.whitehatvirtual.com/blog/bid/334816/top-5-benefits-of-desktop-virtualization
- DV can be used in conjunction with application virtualization, and user profile management systems, now termed "user virtualization," to provide a comprehensive desktop environment management system.
    - In this mode, all components of the desktop are virtualized, which allows for a highly flexible and much more secure desktop delivery model.
- A significant benefit is giving IT administrators a centralized and easier way to manage employees' computers because no longer is each laptop or computer separately contained on a desktop; allows administrators to create a handful of VMs or VM templates for different roles within an organization.
    - For instance, an organization may create one VM to be used for call center staff, and another VM for project team staff. These VMs would include the operating system, and any applications and drivers the employee would need. Such deployments work best where many staff need essentially the same functionality.
    - When desktop components are virtualized, the delivery model becomes more flexible and much more secure.
    - Administrators can personalize and manage desktops through a single interface, eliminating the need to drill down to individual desktops.
- Ease of maintenance because the virtualized desktop can be reset nightly where applicable, removing any potential rogue downloaded software or problematic customizations that may have added to a computer.

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  - Prevents software and customizations from slowing down the VM while providing an easier troubleshooting method, which would be to simply restore the original desktop.

- Security is another significant benefit of desktop virtualization.

  TechTarget → http://searchitchannel.techtarget.com/feature/The-benefits-of-desktop-virtualization

  - For instance, DV increases desktop security because it allows an administrator to set permissions that prevent documents carrying Trojan horses from residing on end user systems.

- No data is saved to the end-user's device.
  - If that device were lost or compromised, there is much less chance any critical data would be retrieved.
- DV is a great way to help clean up data in the COV because it reduces end points and individualized data storage, which simplifies the data environment and increases data rationalization for more accurate data when using data / BI analytics tools.
- DV makes it easier to onboard new hires through just a few mouse clicks because DV's are flexible and reduce the need to configure desktops/laptops for staff.
- DV supports a more complete desktop disaster recovery strategy as all components are essentially saved in the data center and backed up through traditional redundant maintenance systems with no ability to save to the local device.
    - If a user's device or hardware is lost, the restore is straightforward and simple, because the components will be present at login from another device.

  Wikipedia → https://en.wikipedia.org/wiki/Desktop_virtualization

- DV does not require individual maintenance.

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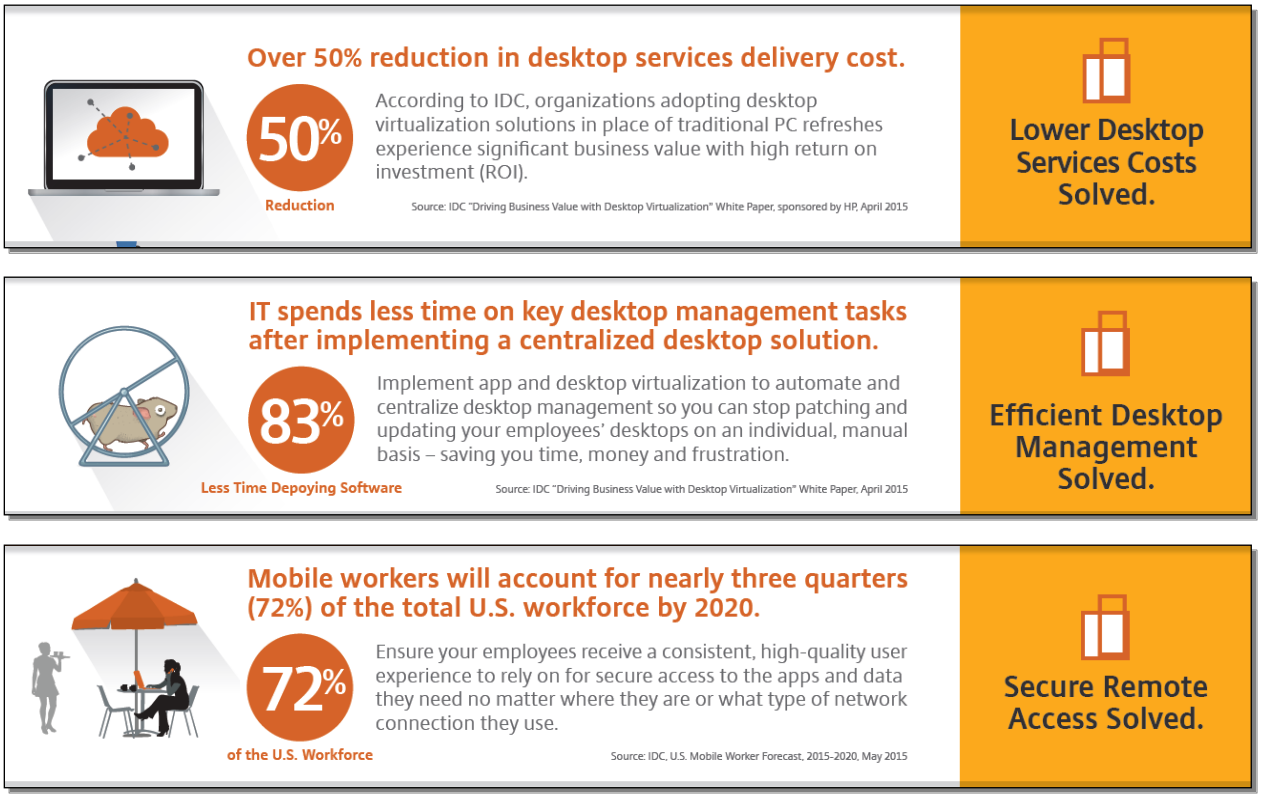
Desktop Virtualization (DV) Statistics

- 12 Ways App & Desktop Virtualization Is Transforming IT (Infographic) - March 22, 2016 https://www.lewan.com/blog/12-ways-app-desktop-virtualization-is-transforming-it-infographic



- Percentage of state and local governments that have adopted a virtual desktop infrastructure to support mobility – **62%**. Source: Mobile Work Exchange, "State and Local Mobility Map: Road to Readiness," July 2014

  Obtained via article titled, "How Virtual Desktops Enable Employee Mobility" by State Tech Magazine - January 25, 2015 http://www.statetechmagazine.com/article/2015/01/how-virtual-desktops-enable-mobility

- Imprivata Healthcare Desktop Virtualization Five-Year Trends – 2017

  The healthcare industry has been rapidly increasing its virtualization adoption in order to facilitate clinical workflows. We have tracked multiple VDI trends over the past five years, and have found that:

  - Adoption of VDI technology in healthcare has increased steadily from 2011 to 2015, from 35% to 66%.

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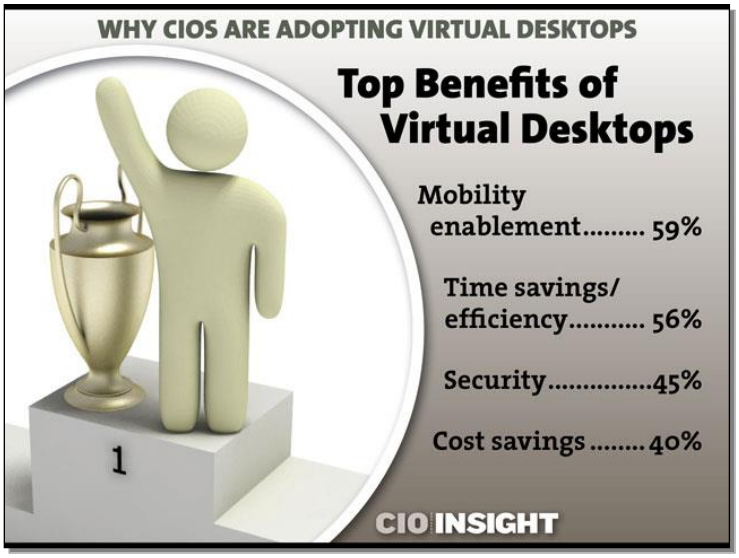
        - By the end of 2017, adoption is forecasted to be 81%.
    - Adoption of VDI with single sign-on (SSO) is an essential combination.
        - In 2015, 88% of surveyed respondents deploying VDI over the next 24 months plan to include SSO.
    - Reliance on PCs as delivery endpoints for VDI is being reduced, with thin and zero clients maturing.
        - In 2015, 83% of respondents used thin clients, while 42% used zero clients.

    All trends indicate the healthcare industry is rapidly moving toward VDI as a way to enable faster, more convenient access to patient information, which benefits everyone across a healthcare environment, from clinicians to IT.

    https://www.imprivata.com/blog/healthcare-organizations-tell-all-new-report-desktop-virtualization-adoption-trends-explained

- CIO Insight, March 22, 2017: http://www.cio.com/article/3183473/cloud-computing/the-evolution-of-desktop-virtualization.html



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Desktop Virtualization (DV) Conclusions

- "**The days of an IT-dictated end-user environment are over**," commented Ian Song, Research Manager, Client Virtualization, IDC. "Virtual client computing software is the solution for IT to bridge traditional desktop management with the new mobility-centric use cases."
  CIO Insight, March 22, 2017: http://www.cio.com/article/3183473/cloud-computing/the-evolution-of-desktop-virtualization.html

- **Virtual desktops cheaper than PCs**: For VDI, a longstanding challenge has been making the case for long-term benefits of installing virtual desktops requiring higher upfront costs than simply purchasing new PCs. Increasingly, IT managers won't have to make that case. Some vendors estimate it's possible to set up a new virtual desktop for less than $600. That's less than an $800 new PC, not to mention the savings that come with administering a network of virtual workstations.
  VDI Trends to Watch in 2016: http://windowsitpro.com/desktop-vdi/vdi-trends-watch-2016

- **By virtualizing the desktop vendor expects VITA to see benefits** such as:

  1) Uniform images
  2) Less expensive desktop upgrades
  3) Faster troubleshooting processes
  4) Potentially more secure data.

  With the benefits mentioned above, a good business case can be created for migrating to a VDI environment.

  Vendor response to VITA RFI #2017-14 – 2016

A strong use business case for VDI being deployed by central IT to a large number of users is to improve productivity and service levels in desktops and reduce costs.

As an example, central IT, from a state with a similar size to VITA deployed an on premise VMware Desktop as a Service solution. The objectives of the project aimed to:

- Increase productivity for employees and desktop support staff
- Improve security for mobile users
- Lower operational and capital expenses
- Simplify management of upgrades to OS and applications

By implementing a virtual desktop infrastructure, they achieved:

- Enhanced security by centralizing data and apps into the data center
- Centralized desktop management lowering costs and easing OS upgrades
- Reduced downtime, increased availability and lowered costs

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- Reduced help desk calls and accelerated new user provisioning
- Extended hardware refresh cycle and lowered capital expenditures

Based on the similarity of VITA to the case above, VITA too can achieve similar benefits. Therefore, we feel VITA could build a business case to implement a VDI solution.

Vendor response to VITA RFI #2017-14 – 2016

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