Considerations for a Move to Virtual Desktops

What strategic, technical, and support implications should be considered in support of a move to VDI or DaaS?

Executive Summary

Insight

End-user experience is your#1 consideration

Virtual desktop infrastructure (VDI)/desktop as a service (DaaS) users expect their user experience to be at least equal to that provided by a physical PC, and they do not care about the underlying infrastructure. If the experience is less, then IT has failed in the considerations for VDI/ DaaS. In this research we analyze the data that the IT industry tracks but doesn't use or sometimes even look at regarding user experience (UX).

Identify the gaps in your IT resources that are critical to success

Understanding the strengths and weaknesses in your in-house technical skills and business requirements will assist you in making the right decision when it comes to VDI or DaaS solutions. In the case of DaaS this will include a managed service provider for small to medium-sized IT teams. Many IT teams lack a seasoned IT project manager who can identify gaps, risks, and weaknesses in the organization's preparedness. Redeploy your IT staff to new roles that impact management and monitoring of UX.

IT *should* think about VDI and DaaS solutions

Ultimately, IT needs to reduce its complexity, increase user satisfaction, reduce management and storage costs, and maintain a secure and effective environment for both the end user and the business. They must also ensure productivity standards throughout the considerations, strategically, tactically, and in support of a move to a VDI or DaaS solution.

Executive Summary

Your Challenge

With the evolution of VDI over the last 15-plus years, there has been a proliferation of solutions, such as Citrix desktop services, VMware Horizon, and in-house hypervisor solutions (e.g. ESX hosts). There has also been a great deal of growth and competition of DaaS and SaaS solutions in the cloud space. Hybrid work environments, remote from anywhere and any device, and the security concerns that go hand-in-hand with these strategies have certainly accelerated the move to VDI and DaaS.

How will you manage and navigate the right solution for your organization?

Common Obstacles

IT departments can encounter many obstacles to VDI and DaaS, many of which will be determined by your business model and other factors, such as:

- Complicated shared infrastructure such as federated multitenant partners and legacy app servers.
- Inadequate in-house training or insufficient staff to execute migration or manage post-migration activates such as governance and retention policies.
- Security, compliance, legal, and data classification concerns. Some security tools cannot be deployed in the cloud, limiting you to an on-premises solution.

STAHL's Approach

By defining your end goals, framing solutions based on end-user workloads, and understanding the pros and cons of what solution(s) will meet your needs, you can visualize what success looks like.

1. Define your KPIs by end-user experience.
2. Knowing what the decision gates are for a successful VDI/DaaS deployment will prove out your selection process.
3. Define your hypothesis for value. How you determine value will make your decision more accurate and gain C-suite buy-in.

Every IT organization needs to be asking what success looks like. If you do not consider how your end user will be impacted, whether they are doing something as simple as holding a team meeting with voice and video or working with highly technical workloads on a virtual environment, you will run into multiple issues that affect end-user satisfaction, productivity, and adoption. Understand the tension metrics that may conflict with meeting business objectives and KPIs.

Voice of the customer

STAHL's Client-Driven Insight

Different industries have different requirements and issues, so they look at solutions differently.

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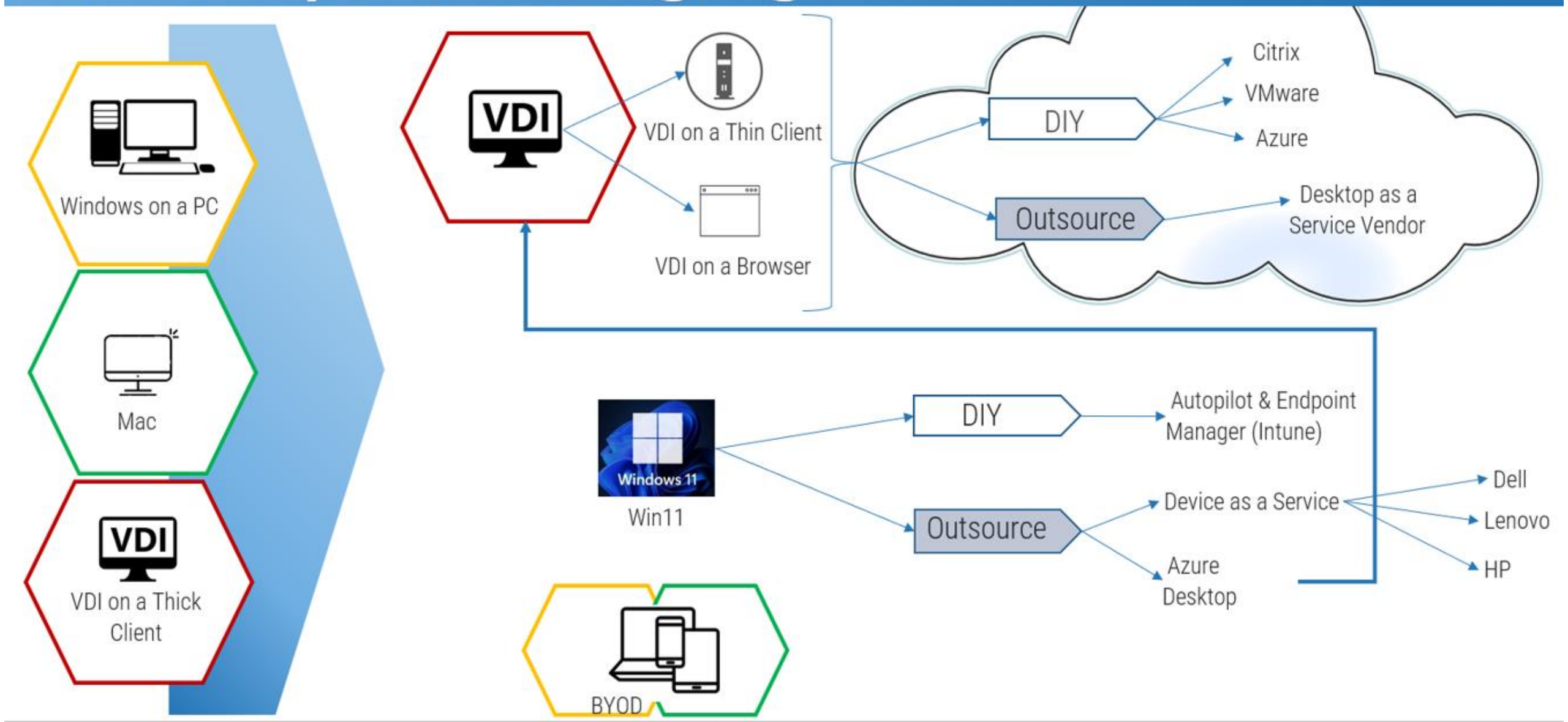
If end-user experience is at the forefront of business requirements, then any solution that fits the business KPIs can be successful.

Client Pain Point	Description Indicators
Flexible work environment	What VDI solution can support a work-from-anywhere scenario? Possible solutions: Azure Virtual Desktop, IGEL client, Citrix virtual apps, and desktop services.
Security concerns	Corporate resources need to be secure. Working with untrusted endpoints or unsecured locations. Using VPN-type solution.
End-user experience	What performance metrics should be used to evaluate UX? Are there issues around where the endpoint is located? What kind of link do they have to the virtual desktop? What solutions are there?
Optimization of routing	What routings need to take place to achieve reduced latency and improved experience?
Multifactor authentication	Security features such as a multilayered MFA and corporate data protection.
Business continuity	What are the options when dealing with cloud outages, meeting SLAs, and building resilience?
Optimizing app performance and response times	Define users based on a multiuser environment. Engineers and designers require more CPU resources, which negatively impacts on other users. Optimize CPU to avoid this situation. MS Teams and video streaming apps are not performing in an optimized manner.
Optimization of cloud costs	Scalability and usage schedule. Minimize cloud costs with tools to handle workloads and usage.
Third-party access outsourcing	Contractors and third parties accessing business resources need to control data and source code along with developer tools in a centrally managed SaaS.

The enterprise end-user compute landscape is changing

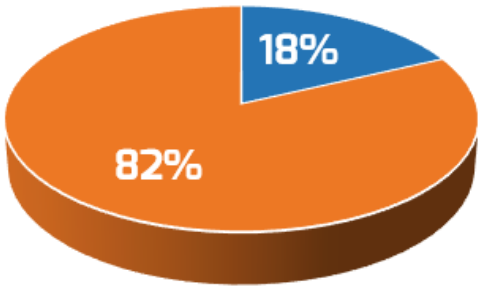


STAHL's surveys are telling us a story

Questions you should be asking before you create your RFP

- What are the use cases and types of workloads?
- What is the quality of the network connection and bandwidth for the user base?
- What are the application requirements?
- What type of end points does the user have and what is the configuration?
- Where are the data storage containers, how are they accessed, and are there proximity constraints?
- What is the business security and identity policy requirements?
- What are the functional and nonfunctional requirements?
- Will the virtual desktops be persistent or non-persistent?

How would you rate the user experience on your VDI/DaaS solution?



- 18% of CISOs say their employees are happy with their company's VDI/DaaS solution
- 82% say their employees are neutral or unhappy with their company's VDI/DaaS solution

Source: Hysolate, 2020

STAHL/Info-Tech Insights

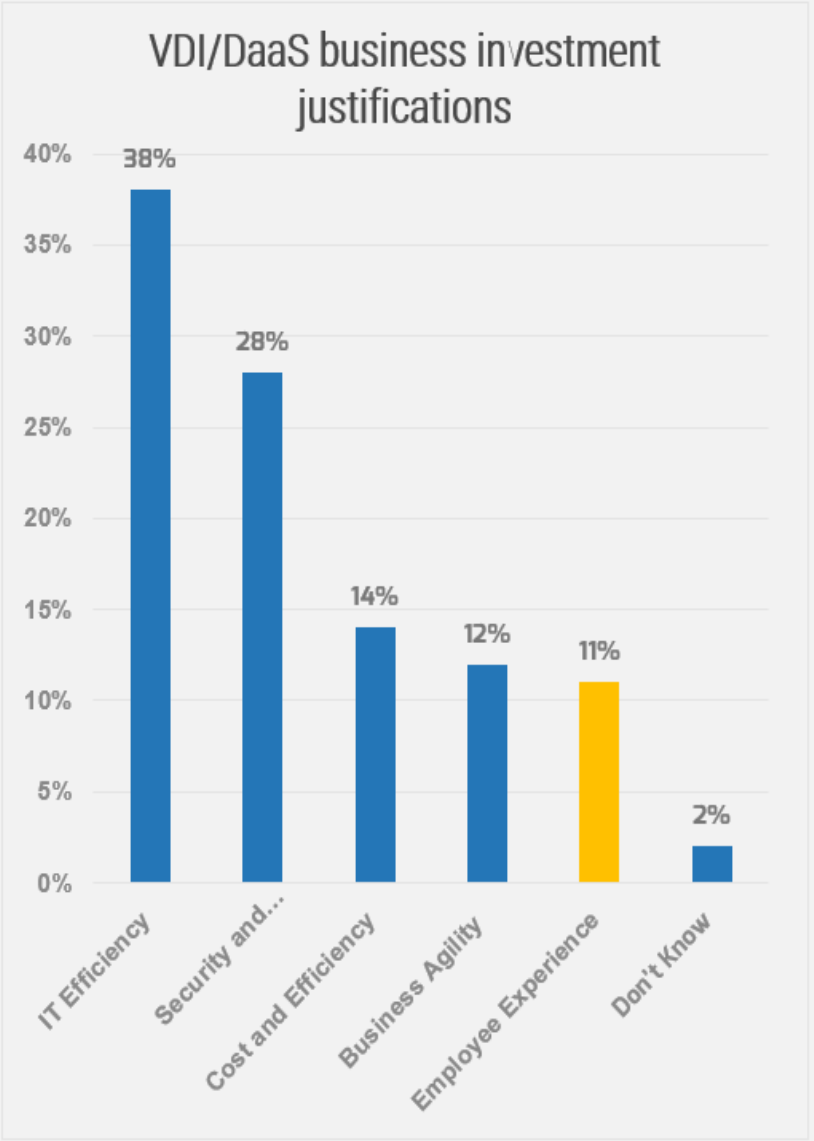
Asking critical use-case questions should give you a clear picture of the end-user experience outcome.

Security is always quoted as a primary justification for VDI/DaaS, while UX is far down the list of KPIs. WHY?

End-user KPI metrics are difficult to gather

IT engineers use network and performance metrics to manage end-user complaints of "slowness," which in reality is not what the user is experiencing.
IT needs to invest in more meaningful metrics to manage end-user pain:

- Logon duration
- App load time
- App response time
- Session response time
- Graphic quality and responsiveness and latency
- Application availability and performance



Source: Enterprise Strategy Group, 2020

Dimensions of user experience

The dimensions of end-user experience can be broken down into four distinct categories that will impact not only the end user but also the business.

Picturing your landscape in this framework will help clearly define your considerations when deciding on whether a VDI or DaaS solution is right for your business. We will investigate how these scenarios impact the end user, what that means, and how that can guide the questions that you are asking as you move to an RFP.

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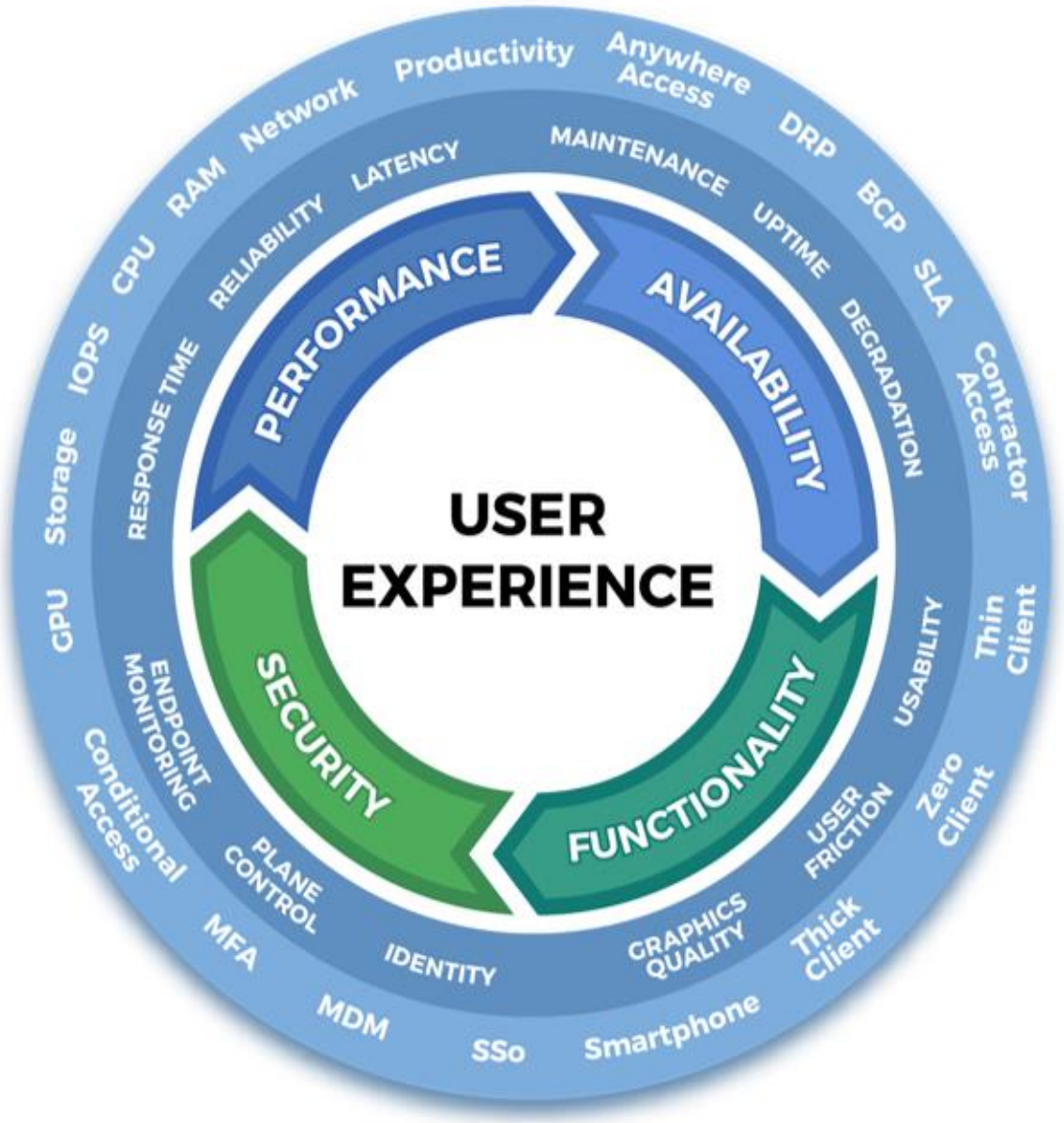
In the world of VDI and DaaS, if you do not get buy-in from the end user, the rate of adoption and the overall success of the implementation will prove difficult to measure. It will be impossible to calculate ROI even as you feel the impact of your TCO.



What IT measures

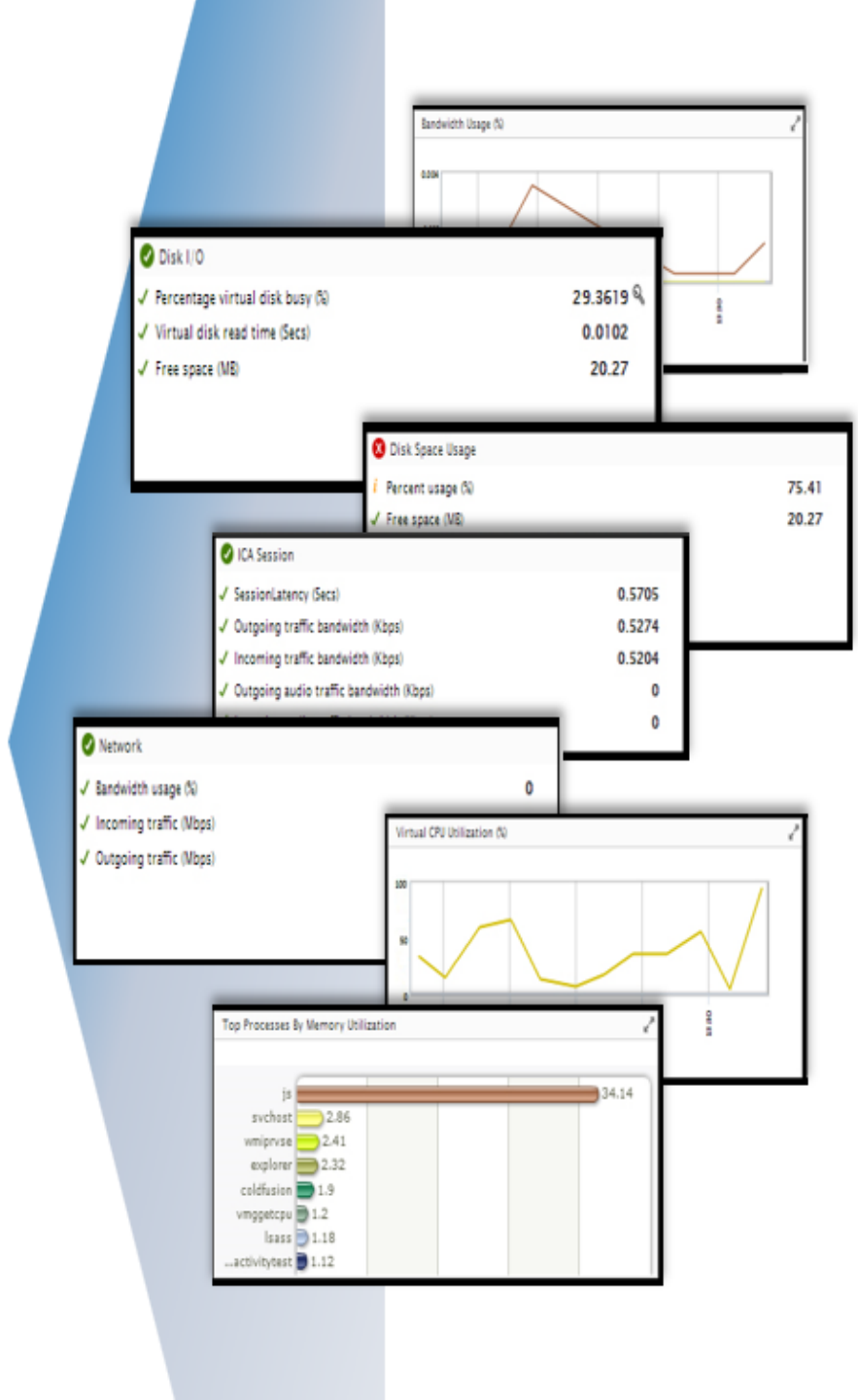
Most business KPI objectives concentrate on business goals, whether it be cost containment, security, simplification, ease of management, or centralization of apps and data, but rarely is there a KPI for end-user experience.

You can't fix what you can't see. Putting a cost benefit to end-user satisfaction may come in the form of productivity.

This may be a central reason why VDI has not been widely adopted as an architecture since it came to the marketplace more than 15 years ago.

KPIs and metrics

- Understand the types of end-user activities that are most likely to be reported as being slow.
- You need to know what storage, CPU, memory, and network resources are being used when the user performs those activities. In other words, what is the OS doing behind the scenes and what hardware is it using?
- Once you have determined which resources are being used by the various activities you will have to monitor the UX metrics to see which OS, network, storage, or server configuration issue is causing the performance issue that the user is reporting.



VDI processes to monitor

Monitoring end-user metrics will mitigate the tension between business KPIs and end-user satisfaction

		Metric	Description
End-User Experience	PERFORMANCE	Logon duration	Once the user puts in their password, how long does it take to get to their desktop? What is the measurement and how do you measure?
		App load time	When an app is launched by the user there should be immediate indication that it is loading.
		App response time	When the user performs a task, there should be no wait time, or hourglass icon, waiting for the app to catch up to the user input. (There is no succinct way to measure this.)
		Session response time	How does the user's OS respond to I/O? The user should not experience any latency issues when doing a drag and drop, clicking on a menu item, or doing a search.
	AVAILABILITY	SLAs	When something goes wrong in the VDI/DaaS environment, how quickly can the user expect to get back to their tasks?
		Geographic location	When all other considerations are configured correctly, the user experience may be impacted by their location. So, for example, a user working out of Mexico and logging into a VDI may experience latency based on location compared to a user in California, for example, where the resources are stored, managed, and monitored.
		Application availability	Much like app load time and response time, the only factor affecting the user experience is the back-end load on the app itself, for example a CAD or heavy resource app not properly resourced.
	FUNCTIONALITY	Configuration of user desktop	Degradation in functionality is caused by improper allocation of CPU, RAM, and GPU for the tasks at hand, creating a bad UX and end-user satisfaction score.
		Graphics quality and responsiveness	The user should have the same experience as if on their own physical machine. A video experience should not have any lag in it, for example. MS Teams should not have latency or sound quality issues.
		Predictive analysis	Continuous performance and availability monitoring.
	END USER	Browser real user monitoring (RUM)	A real-time view into how the web application is performing from the point of view of a real end user.
		Customer satisfaction score	Survey-based metrics on customer satisfaction.

"If employees are the competitive edge and key differentiator for a business, I&O has a duty of care to ensure that the employees' digital experience enables and does not impede the value of that asset."

– John Annand, Principal Director, Info-Tech Research Group

The case for VDI today

Is security and data sovereignty the only reason?

Technical capability

AVAILABILITY	VDI is a better fit than DaaS in organizations that have limited or unreliable internet connectivity.
FUNCTIONALITY	Application flexibility: Resource-intensive applications may require specific virtual desktop configurations, for example in-house GIS apps, CAD, and gaming software requiring specific GPU configurations.
SECURITY	Data protection is often stated as a need to maintain an on-premises VDI solution, ensuring sensitive and highly privileged data does not travel across the internet.
AVAILABILITY	While some cloud providers will allow you to bring your OS licensing along with a cloud migration, many subscriptions already include OS licensing, and you may be paying additional licensing costs.
SECURITY	VDI makes sense if security and control are primary business KPIs, the IT resources are experienced virtual infrastructure engineers and administrators, and funding is not a hindrance.
PERFORMANCE	When processing power is a functional requirement, such as CPU, GPU, and storage capacity, VDI offers performance benefits over a standard PC, reducing the need to deploy high-powered PCs to end users.

> "Though the desktops are moving to the cloud, accountability is not."
>
> – Gary Bea, Director of Consulting Services and Technical Operations, Goliath Technologies

Technical capability comparison

		VDI			Desktop as a service	Device as a service	Win11 w/ Autopilot & Intune
		Thin Client	Thick Client	Web Client			
PERFORMANCE	Reliability						
	Response Time						
	Latency						
AVAILABILITY	Uptime						
	Degradation						
FUNCTIONALITY	Usability						
	Graphics Quality						
	User Friction						
SECURITY	Endpoint Mgt.						
	Control Plane						
	Identity						

X as an endpoint client

From an end-user experience perspective, what makes sense in terms of usage and cost?

Thin Client

- ✓ Easy provisioning and simple to use and manage
- ✓ Easy to secure and update
- ✓ Less vulnerable to data loss
- ✓ Easily scaled
- ✓ Requires less power
- ✓ Cheaper than PCs

- x Less than optimal features compared to a PC
- x Not powerful enough to manage loads such as CAD
- x Infrastructure and network must be robust and up to date to avoid possible network latency

- o Examples: Terminals, Dell Wyse 5070, Lenovo M625, IGEL, HP Thin Client, repurposed PCs, Chromebook

Desktop as a Service

- ✓ Flexibility: work from anywhere, on any device, collaboratively
- ✓ Resource scalability not reliant on on-premises server hardware
- ✓ Easy to configure, install, and maintain
- ✓ Reliable and easy to provision
- ✓ Centralized sensitive data cloud security

- x Requires high-speed internet, especially for remote users
- x Learning curve can cause user friction
- x Workload configuration use cases

- o Examples: Citrix, VM Horizon, AWS WorkSpaces, WVD, BYOD

Thick Client

- ✓ Completely flexible, for use with on-premises or cloud infrastructure
- ✓ Able to work offline
- ✓ Multimedia or bandwidth-intensive resource processing
- ✓ Higher server capacity due to less resource load on servers

- x Higher maintenance and updates attention
- x Patching, security, and data migration friction
- x More security vulnerability
- x Less cost effective

- o Examples: Windows, MacOS desktops, laptops, smartphones, tablets

Device as a Service

- ✓ Device supply chain flow fulfillment, services, and recovery
- ✓ Able to update to new equipment more frequently
- ✓ Scale up and down as needed
- ✓ Better device backup, asset tracking , security, and EOL disposal

- x Challenging risk management, regulatory obligations, and liabilities
- x Change in helpdesk and business workflows
- x Vendor may limit selection

- o Examples: PCs, smartphones, mobile computing devices, Lenovo, HP, Microsoft, Dell, Macs, iPads, iPhones

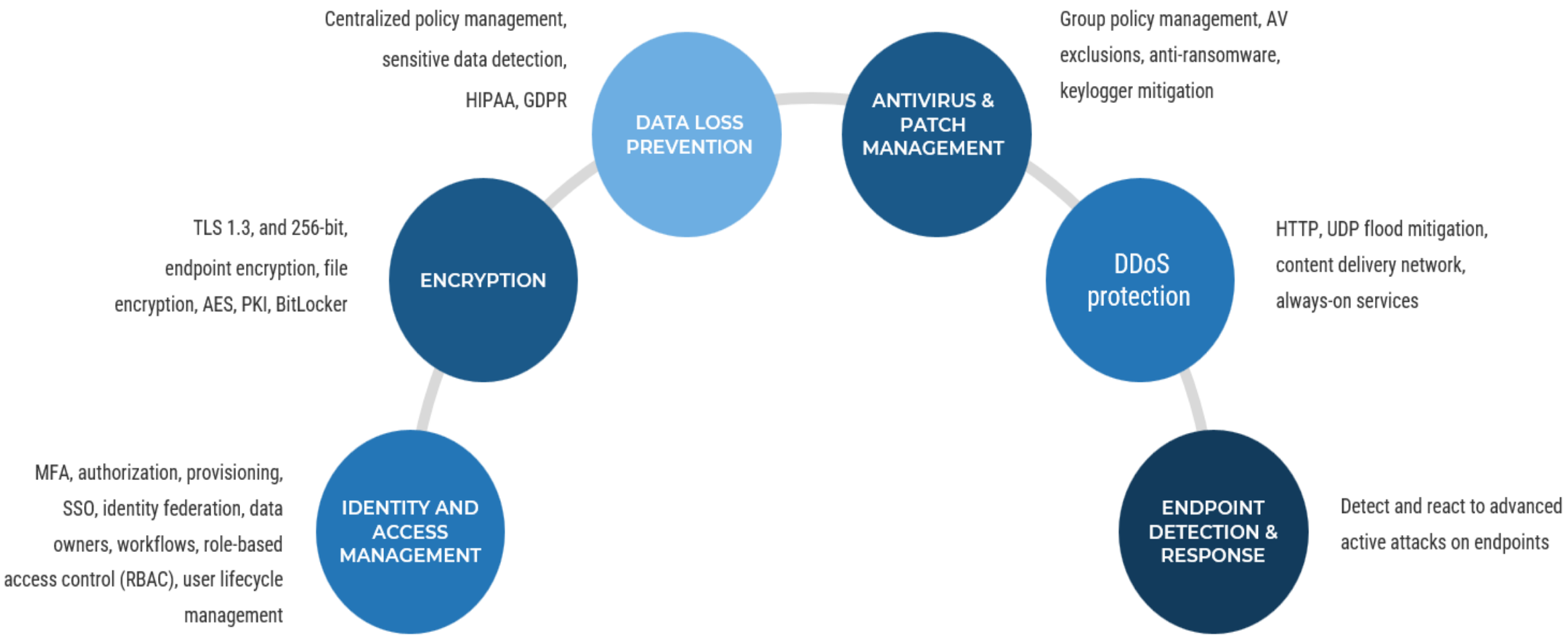
Web Client

- ✓ Can be accessed from any computer; only requires username and password
- ✓ Client works with a URL, so browser-based
- ✓ Updates are easier than on a Windows client

- x Security risk and information leakage
- x Dependent on internet access
- x Unable to work on high-impact resource apps (e.g. CAD, graphics)
- x Limited user base, less technical operations

- o Examples: Chrome, Edge, HTML5

Security needs for VDI and DaaS



Activity

Define the virtual infrastructure solution for your end users

1. Define and build your value hypothesis/proposition

   a) What is the business case? Who is championing the investment?
   b) Identify the project management team and stakeholders.
   c) Set goals to be achieved based on value.
   d) Identify KPIs and metrics to measure success.

2. Identify use cases and personas

   a) Identify possible user friction (e.g. emotional, cognitive, interaction).
   b) Understand current infrastructure shortcomings/capabilities (e.g. network, security posture/tolerance, staffing needs, qualified technicians, end-user devices).

3. Articulate use cases into functional and nonfunctional requirements

   a) Separate must haves and nice to haves.
   b) Categorize requirements into identifiable functionality capabilities.
   c) Review your outputs and identify "gotchas" using the MECE (mutually exclusive, collectively exhaustive) principle.

Related STAHL Info-Tech Research

Modernize and Transform Your End-User Computing Strategy

Phase 3.2 of this research set covers virtual desktop infrastructure.

Implement Desktop Virtualization and Transition to Everything as a Service

Follow Info-Tech's process for implementing the right desktop virtualization solution to create a project plan that will help ensure that you not only choose the right solution but also implement it effectively.

Cloud Strategy Workbook

Use this tool to assess cloud services (desktop-as-a-service).

Desktop Virtualization TCO Calculator

This tool is designed to help you understand what desktop virtualization looks like from a cost perspective.