

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?



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STAHL Consulting program manages the BiC-1 JV, providing a wide variety of services, including primary and secondary research information, analysis and recommendations. STAHL Consulting has forged a powerful relationship with Info-Tech who provide business analysts, research and insights to industry. STAHL helps CIOs with their roadmap, design to actionable implementations.

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 don't 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, but many IT teams lack a seasoned IT Project Manager who can identify gaps, risks, and weaknesses in the organization's preparedness. You should 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. IT must also ensure productivity standards throughout the considerations process, 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.

So, 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 and/or manage post-migration activities, such as governance and retention policies.
- Security, compliance, legal, and data classification concerns. Some security tools can't be deployed in the cloud, limiting you to an on-premises solution.

IBiC-1'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 will look like.

1. Define your KPIs by end-user experience.
2. Establishing the decision gates 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.

BiC-1 Insight

Every IT organization needs to be asking what success looks like. If you don't consider how your end user will be impacted in every respect, 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

Client-Driven Insight

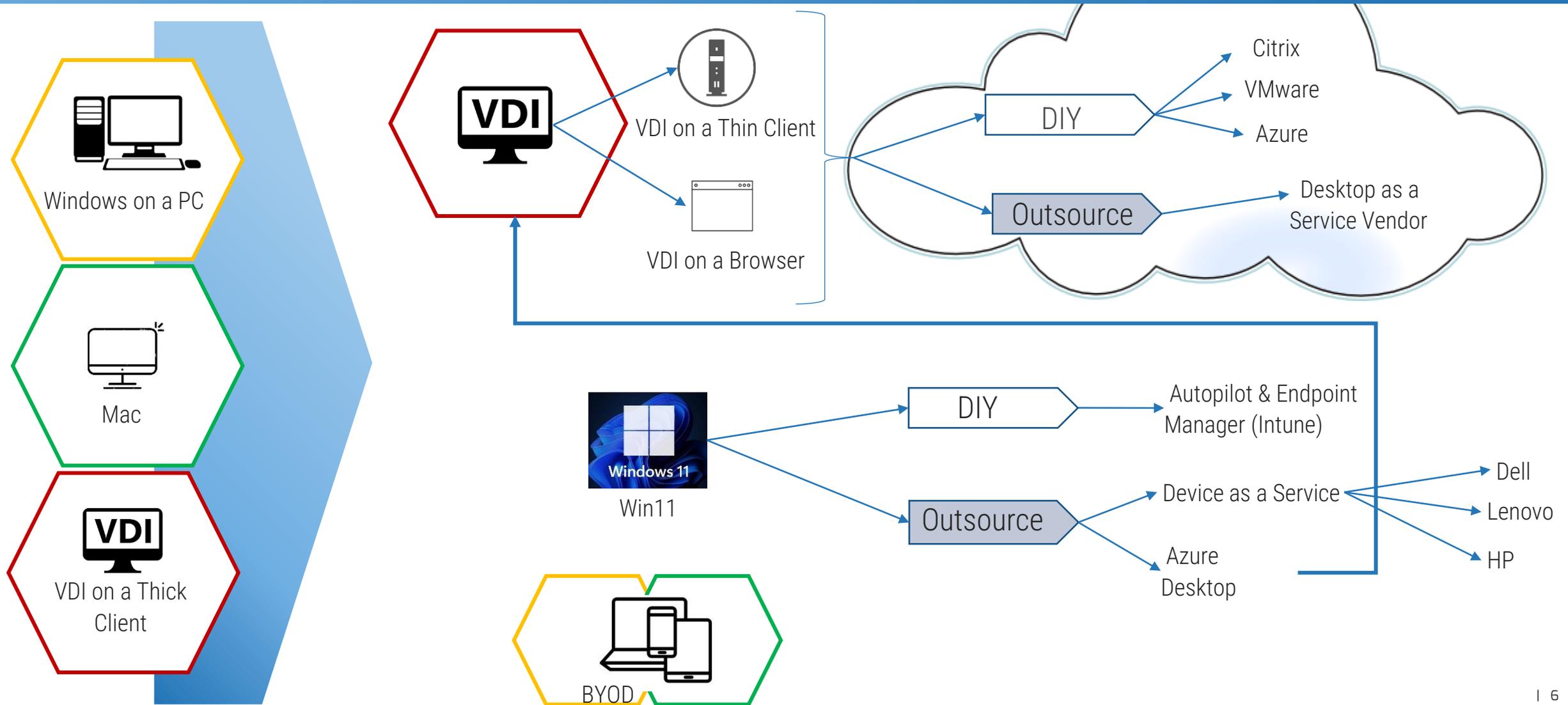
Different industries have different requirements and issues, so they look at solutions differently.

BiC-1 Insight

If the 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 are problems and must be considered in using VPN-type solutions. |
| 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 upon 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 must perform in an optimized manner. |
| Optimization of cloud costs | Scalability and usage schedules must be considered. Minimize cloud costs with tools to handle workloads and usage. |
| Third-party access outsourcing | Contractors and third parties accessing business resources need to be controlled; data and source code along with developer tools need a centrally managed SaaS. |

The enterprise end-user compute landscape is changing

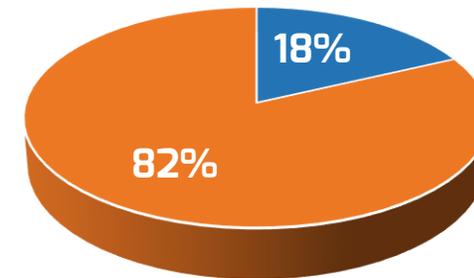


Surveys are telling us a story

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

BiC-1 Insights

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

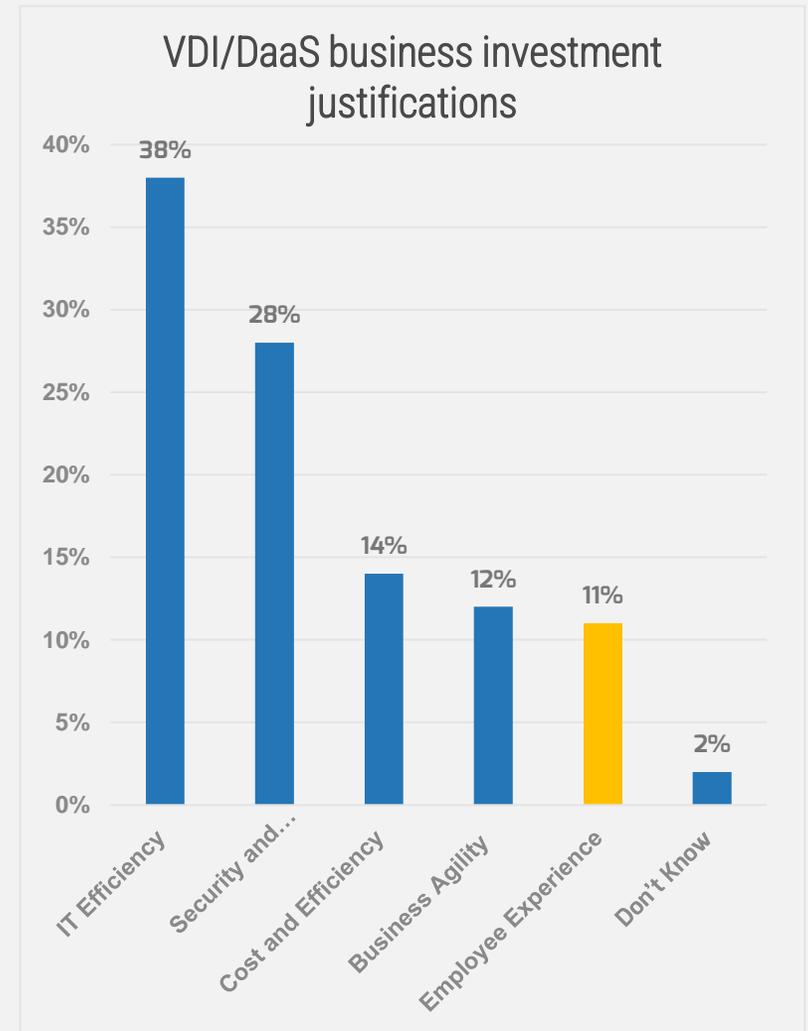
Security is always quoted as a primary justification for VDI/DaaS, while UX is far down the list of KPIs.
WHY?

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 cares about.

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

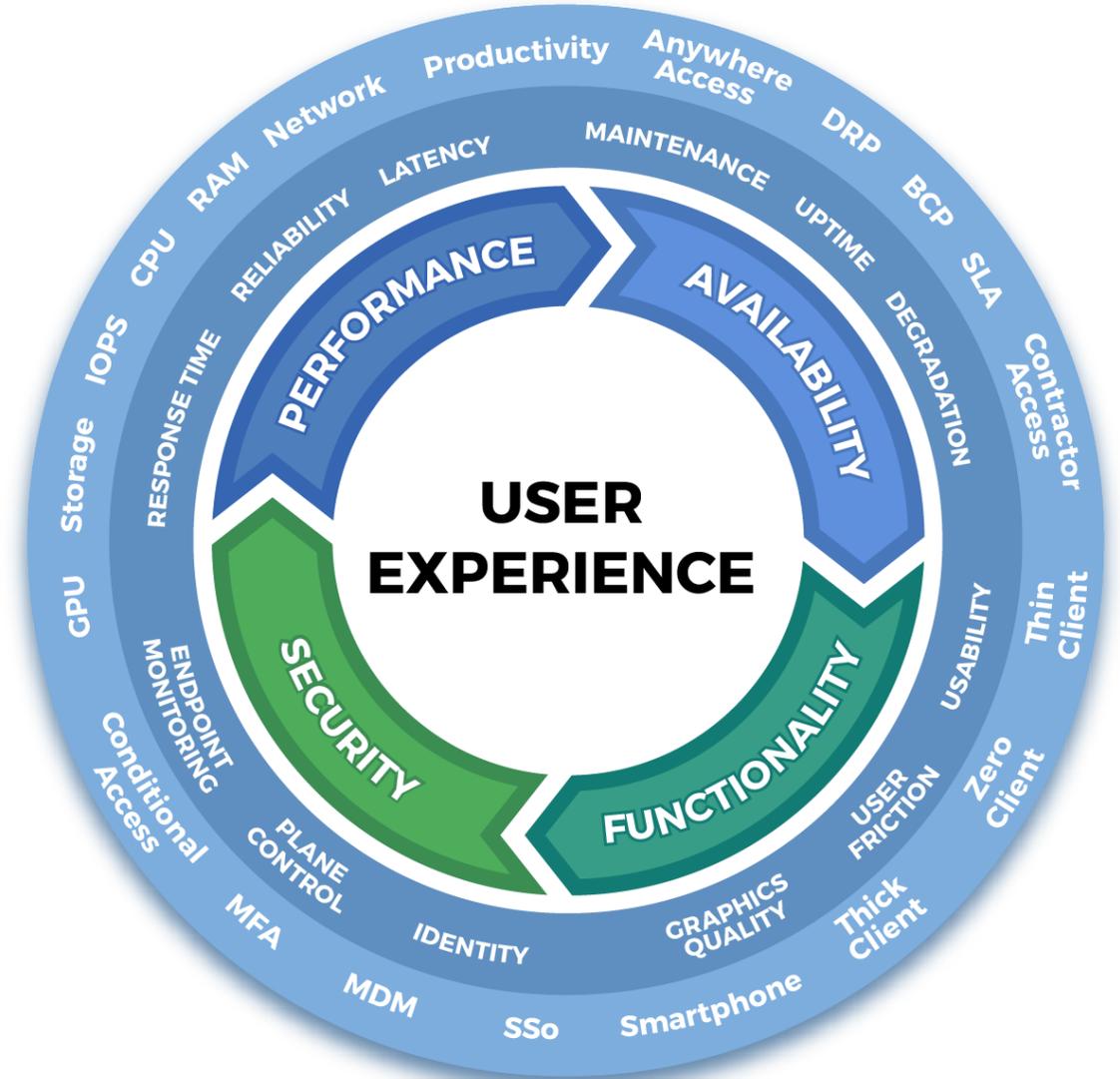
Dimensions of user experience

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 organization.

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 organization. We will investigate how these scenarios impact the end user, what that means, and how that can guide the questions that you ask as you move to an RFP.

BiC-1 Insight

In the world of VDI and DaaS, if you don't 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.



Dimensions

Operational Metrics

Technical Capabilities/ Controls

What IT measures

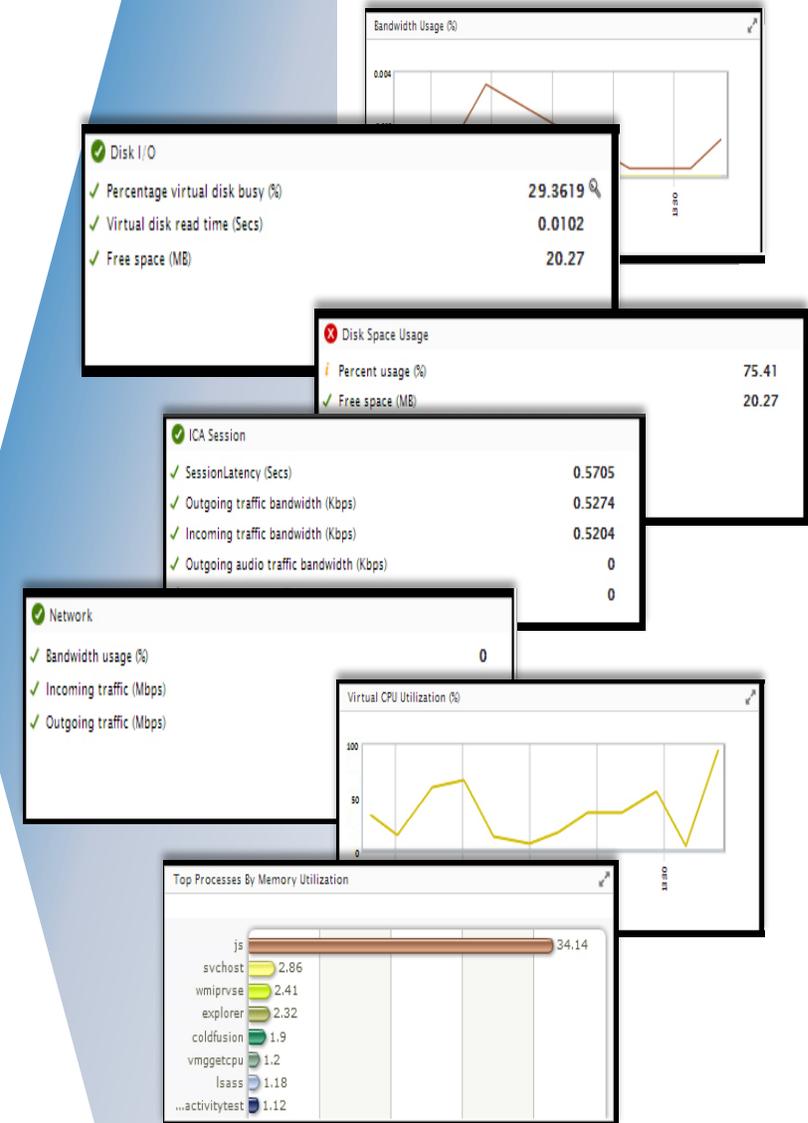
Most business KPI objectives concentrate on business goals, whether it be cost containment, security, simplification, ease of management, or centralization of apps and data, but rarely is there a KPI for end-user experience.

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 it? |
| | | 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 shouldn't 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 shouldn't 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 an organization, 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 doesn't 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

The case for DaaS

Any device anywhere: key benefits of DaaS

Technical capability

AVAILABILITY

Delivers a consistent, user experience, regardless of location or device.

SECURITY

Enhances security posture by eliminating your client VPN and keeping sensitive data off the endpoint device.

FUNCTIONALITY

Onboard and offboard users quickly and securely.

FUNCTIONALITY

Provides centralized workspace management.

FUNCTIONALITY

Scale up or down on demand, with a consumption-and-subscription-based contract.

FUNCTIONALITY

Significantly reduce operational overhead, compared to managing a traditional VDI deployment.

Challenges

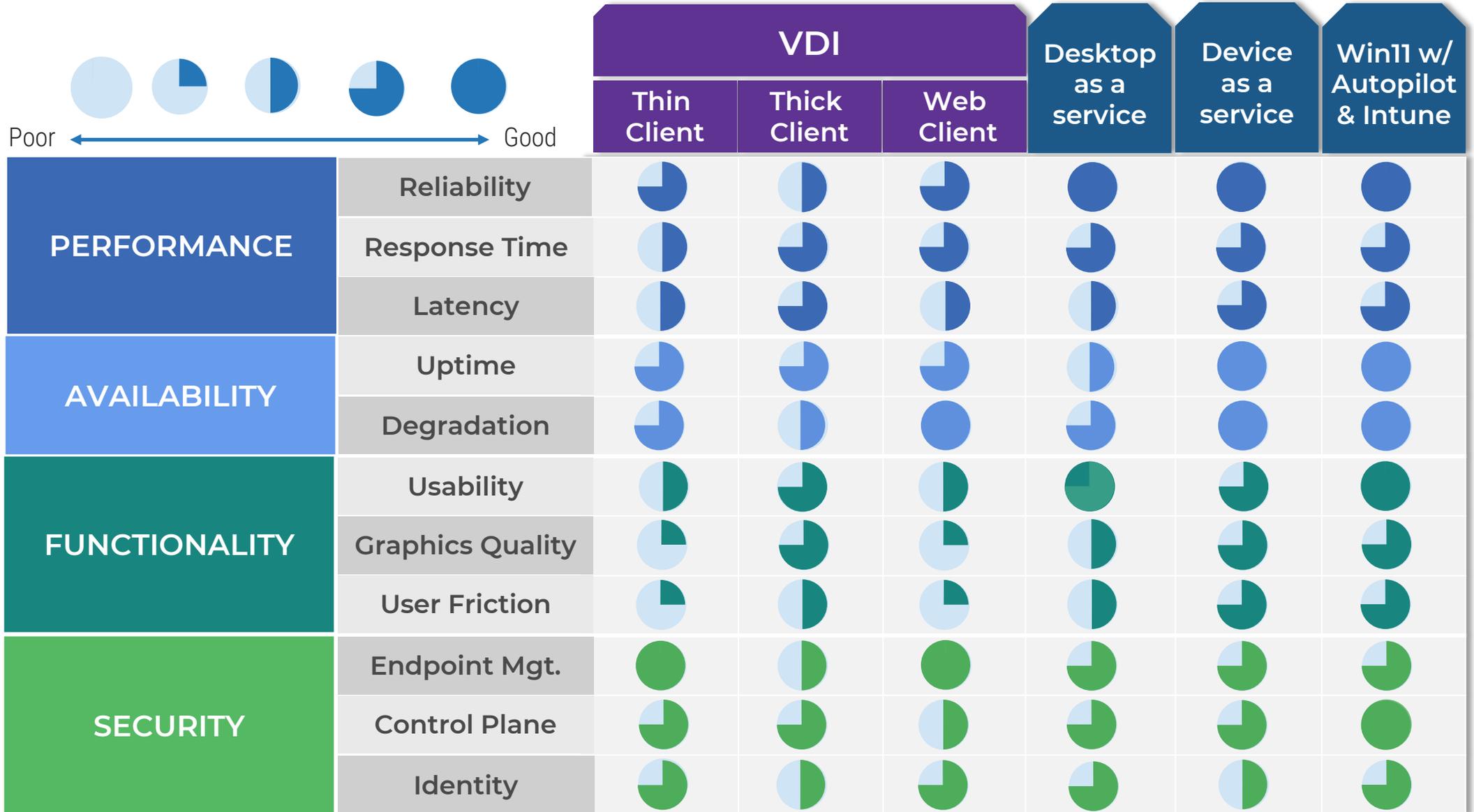
BiC-1 Insight

The total cost of the solution may be much higher than you anticipate, and management is complex. Additionally, your ability to set your conditions and controls is limited.

BiC-1 Insight

Depending on your technical abilities and experience with cloud services, you will likely benefit from professional, third-party services, technical services, and consulting, which can be critical when deciding if DaaS can fit into your current IT architecture, processes, and security posture.

Technical capability comparison



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: on-premises versus cloud

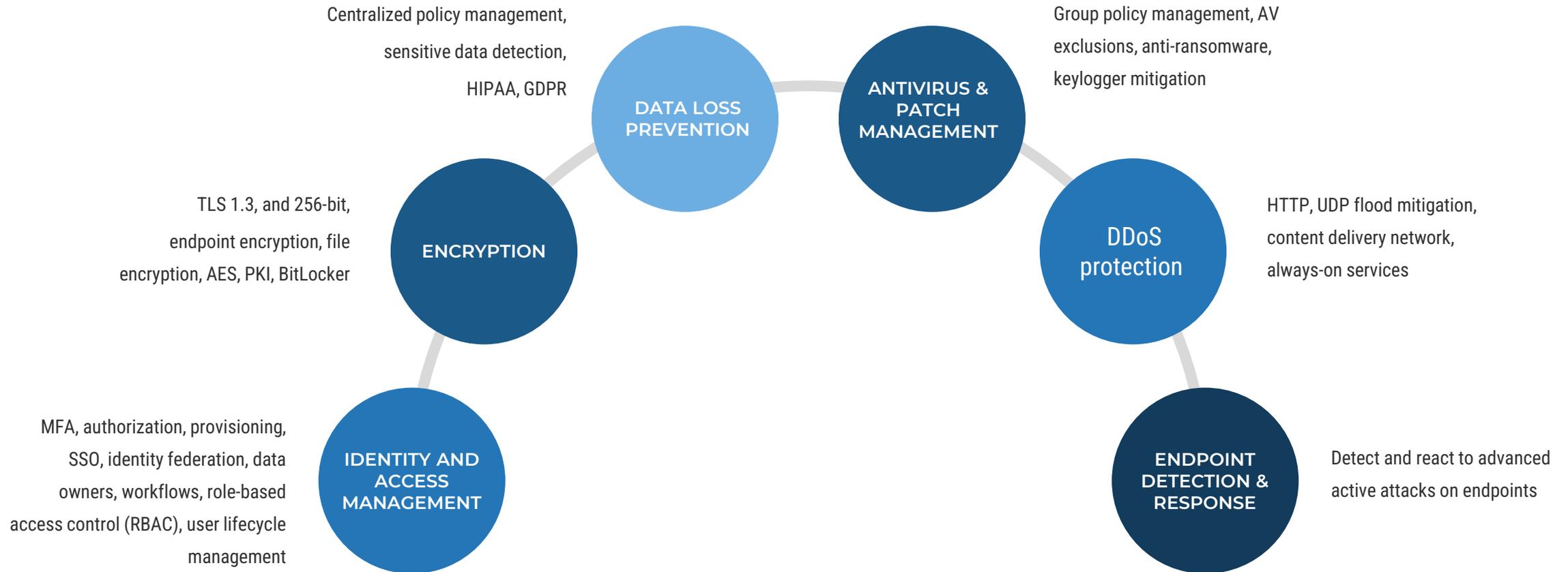
Security decisions based upon risk tolerance

- **What is your risk tolerance?** When deciding between VDI and DaaS, the first consideration is whether the organization is better served with an on-premises or a cloud solution.
- **Low risk tolerance:** Considerer data sovereignty, complex compliance requirements, and data classification. For example, at the Pentagon, DoD requires heavy compliance with security and data sovereignty. DaaS cloud providers may be in a better position to respond to threats and attacks in a timely manner.
- **Low risk tolerance:** If the organization mandates security tools that can't be deployed in cloud solutions, VDI is a better solution.
- **Low risk tolerance:** Smaller organizations that don't have resources with the expertise and skill set to handle security are better served in the cloud. Security operations centers (SOCs) are more likely to present in large organizations.
- **Low risk tolerance:** When patching requires customization, for example in legacy applications, the ability to test patches is impacted, which may cause possible complications or failures.
- **High risk tolerance:** For cloud-based solutions, patching is taken out of the IT team's hands, and testing is performed against the complete cloud solution.

BiC-1 Insight

What is the better security posture and control plane? Clarify your stakeholders' objectives, then see if VDI is an adequate solution.

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 Info-Tech Research



Modernize and Transform Your End-User Computing Strategy

Phase 3.2 of this research set covers virtual desktop infrastructure.



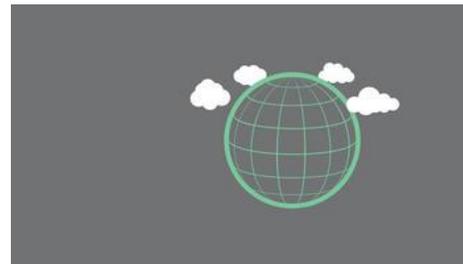
Implement Desktop Virtualization and Transition to Everything as a Service

Follow BiC-1'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 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.

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