

HOW TO DESIGN A GAME -Changing VDI Strategy In the Aec Sector

(and what kind of results you can expect)

Executive summary

For architecture, engineering & construction (AEC) companies as well as other sectors, such as the automotive and media industry, brilliant collaboration translates into superior competitive advantage. The key is to get more from core applications – like computer-aided design (CAD) – by replacing inflexible fixed expense models with agile consumption-based costing.

The readymade opportunity is for CAD to be delivered over virtual desktop infrastructure (VDI). Yet success to date has been limited. Lots of people know how to do VDI, so what's the secret sauce? How do you turn a just okay VDI solution into a game changer?

This paper examines the business and technical issues that need to be considered for a successful transition.

Why now?

VDI has reached the tipping point. The technology is mature. And the underlying networking, compute, storage and virtualisation components are more reliable and higher performing. For example, we are seeing high density servers fitted with graphics cards and virtual storage area networking, offering dramatically improved input/output operations per second and the ability to slice up and allocate Virtual graphics processor units (vGPU) to high end user profiles. But one still has to put all the right pieces in place and build the VDI solution correctly. To do that requires an innate understanding process and workflow.

Old collaboration challenges

Companies need to digitalise and collaborate. Yet time and distance conspire to derail collaboration and delay project delivery. Figure 1 illustrates a typical pre-VDI collaboration workplace example. In this scenario it makes sense for the data to reside with the project team in London. However the CAD team in India would need to take a copy, work on the file and send it back as, collaborating over a WAN is still challenging. Given the size of the data being exchanged this could take up to 48 hours.

During this time mechanical and engineering experts and solution architects aren't able to do any work as the file locking needs to be active to maintain data integrity ensuring the India CAD team are working on the latest copy. Once the CAD team have input their content, the same process is repeated with data passing back and forth between London, India, New York and Singapore. Pushing lead times out by weeks or more, leaving the company playing catch-up for the rest of the project.



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After years of the promise, it's finally here. VDI is the game changer

So, what are the obvious gotchas to avoid when planning and designing a VDI solution?

There's no magic one-size-fits-all solution

Each VDI solution has to be custom-built to suit the specific needs of the organisation. While this seems obvious, it's amazing how many sub-standard installations are actually off-the-shelf products tied together with a sprinkling of integration. So, beware proposals hosted or on-premise that advocate such practice, as they're unlikely to deliver the results you want.

VDI is only as strong as its weakest link Here are a few golden rules:

- Data, along with monitoring and reporting, absolutely have to sit on the same LAN as the VDI.
- While it's okay to have a bottleneck at the WAN, which technologies like VMware Horizon can fix, there are no protocols to overcome LAN infrastructure issues such as over-subscription, sub-10Gbps speeds and availability issues.
- Keep satisfaction high and costs low by matching planned VDI service to different user profiles (discussed in more detail later).

Real world example

Thankfully it no longer has to be this way. Increasingly, organisations are thinking about VDI solutions differently, redefining best practice in solution design, implementation and ongoing management. So what does good look like?

One of the world's leading AEC companies points the way. Its project, the largest VMware Horizon deployment globally, has enhanced VDI performance to a level that allows global design centres to pool expertise. They can work simultaneously on high-end building information, modelling CAD files collaboratively and in real time, reducing project delivery delays and the huge financial penalties that come with these.

Delivered as infrastructure-as-a-service, this managed solution provides secure virtual desktops to 400 users based in India, Romania and China.



The private cloud design ensures single tenancy (as opposed to shared infrastructure) and compliance for some data sovereignty requirements. The custom-built components sit on the company's existing data centre infrastructure and include:

- Dell RX730 servers fitted with the latest NVIDIA K1 and K2 graphics cards (soon to be Tesla)
- VMWare Horizon including software defined virtual storage capabilities
- ProjectWise CAD document management system for data storage
- Cisco Infrastructure for automated, easy-to-manage
 100Gbps networking
- Dual-capacity WAN links
- Systrack monitoring and reporting tools

Superior VDI performance and user experience at lower cost

The results from an initial proof of concept (POC) provided the confidence to make VDI a real business driver. When the solution went live, the company conducted a second benchmark (see Table 1), comparing performance between a two-year old PC, a new PC, an old VDI client and a new VDI client. The results exceeded the performance at POC by 40%. *The thin clients, costing around \$150 a month, are also 15% faster than the company's brand new Dell high-end BIM specification computers, which cost up to \$6,000. (I would like to call out this statement please)*

	PHYSICAL		VDI	
HARDWARE TESTED	Approx 2yr old PC	New PC	Old VDI	New VDI
			1 client / 1 host	16 clients / 1 host
Make	Dell	HP		VSAN
Model	T3610	Z440	Vmware	Vmware
Processor	Xeon E2.8 @ 1603-5GHz	Xeon E1603-5 v2.8@ 3GHz	E2.60 @ 2670-5GHz	E2690-5 v2.60 @ 3GHz
RAM	32GB	32GB	24GB	20GB
Graphics	NVIDIA Quadro K5000	NVIDIA Quadro K4200	NVIDIA Grid K240Q	NVIDIA Grid K220Q
			Single client test*	Contended (256 Clients)****
MODEL CREATION AND VIEW EXPORT BENCHMARK				
Opening and loading the custom template	5.45	5.06	13.52	4.45
Creating the floors levels and grids	15.39	14.24	39.74	12.17
Creating a group of walls and doors	38.68	26.19	96.66	25.2
Modifying the group by adding a curtain wall	76.81	48.47	209.71	48.73
Creating the exterior curtain wall	21.5	16	57.67	14.33
Creating the sections	12.84	11.79	38.66	9.4
Changing the curtain wall panel type	6.85	5.63	16.7	4.94
Export all views as PNGs at 150 dpi	48.8	33.98	113.26	33.93
Export some views as DWGs	61.36	40.67	122.28	41.72
τοτοι	207.60	202.02	70.0.2	10.4.99
Ponder Penchmark	207.08	202.03	708.2	194.88
Render w/ nvidia mental ray	266,54	175.8	272.6	193.93

Table 1 – VDI performance benchmark analysis

People work more efficiently, interact more effectively

Now, people at the company's global design centres are able to work on models across multiple locations, saving up to two hours per person per day in file synchronization. Data is stored in one location, reducing the time spent on version control and rework. And, because there's no need to move large files back and forth across the network, project leads times have shrunk dramatically. Ultimately that leads to improved client service.

Return on investment in under two years

Based on an initial rollout to 400 users, the VDI project provided a ROI of less than two years. In addition to productivity gains, the company reduced VDI costs per person per month by developing a better understanding of workers and their specific needs. Deeper analysis revealed four different user profiles (see Figure 2), uncovering a financial saving by correctly reclassifying and moving a number of users from platinum to gold category.





Total cost of ownership fell

ROI was improved further still in additional IT benefits, resulting in a significant reduction in total cost of ownership. By outsourcing ongoing VDI management, the company realised savings in IT infrastructure and eliminated the need for costly PC and laptop refreshes. Further synergies and economies of scale included the centralisation of BIM libraries and making better use of vacant BIM workstation licenses, which can be accessed from anywhere on any device, including low-cost terminals.

Data security is better and IT has more time to innovate

Hosting data from one central location, with centralised backup and disaster recovery, has improved security and reduced the risk of data loss. Unlike before – when users stored data and apps locally on hard drives – the company now pushes out software centrally; completing updates faster and in a more controlled fashion. So, IT spends less time supporting malware and desktop-related issues, leaving more space for strategic initiatives to transform the business.







"The thin clients, costing around \$150 a month, are also **15% faster** than the company's brand new Dell high-end BIM specification computers, which cost **up to \$6,000".** *Global AEC Client*

To get further insight into how VDI could transform your organisation, contact us enquiries@creative-itc.com or visit creative-itc.com

NEXT STEPS

Not surprisingly the AEC company featured is currently looking to extend VDI right across the business to over **35,000 employees** in the next few years.