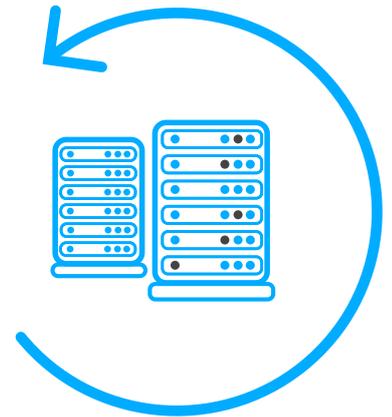**COMPUTER WORLD**
Helping Businesses Define Tomorrow™

OVERVIEW

How to refresh your data centre: a definitive guide

Every business wants to maximise its investments, prolonging the time between large capital expenditures. While this strategy may work in many cases, did you know that it may actually harm your business when applied to a data centre refresh?

With IT infrastructure now so critical to a business on many levels, an outdated data centre can hamper efficiency and productivity, handing your competitors an advantage. Examining your existing infrastructure to see if it meets current and future business requirements is critical, and companies need to be prepared to invest in their data centres to stay competitive.

Refreshing your data centre may be an expensive job, but it's a business-critical one. In part, data centre investment needs to be thought of differently. Rather than a simple capital expenditure on supporting hardware (like buying new office furniture), a data centre should be thought of as an investment that drives business initiatives. By investing in your IT infrastructure, and continuing to do so with cyclical refreshes, your company continues to move forward with the tools it needs to expand, to find new opportunities and to maximise the competitive edge gained over your competition.

In this guide, we'll show you how best to approach a refresh, outlining the key benefits of the process.

39%
The peak performance loss caused by a failure to upgrade server infrastructure can lead to a dramatic loss in real-time performance, according to IDC[1]

3 key reasons to refresh a data centre

There are many good business reasons to refresh your data centre so that it can support your business goals. We present the big three as key objectives.

1 Maximising investment

Ageing hardware and software tend to grow in scale and complexity, increasing the burden of management. Also, as old hardware is less power efficient, you can suffer from high running costs.

Old infrastructure can often be over-specified and underutilised, showing a profound waste of initial investment. By switching to a modern data centre, you can maximise your hardware investment. Moving some workloads to the cloud can further help cut existing running costs and simplify your data centre management.

2 Increasing performance

Old data centres can hamper performance, particularly as relative server performance decreases over time. Trying to run increasingly complicated applications on old hardware often becomes difficult.

But with a data centre architecture built around virtualisation, as most now are, it's easy to provide the performance platform that you need today. And it's one that has a simpler upgrade path and the ability to scale as your company and its data needs expand.

A data centre refresh can also increase redundancy and reduce downtime, saving your company real money.

3 Future-proofing

IT has to be used in a strategic role to develop business, rather than in its traditional supporting role. A data centre refresh can provide you with the infrastructure you need to utilise new applications, drive adoption and provide more powerful business-led tools.

And, getting your data centre technology right today, makes future expansion easier without over-complicating hardware management.

---

620 billion kWh
The predicted energy savings for US servers between 2010 and 2020, made possible by more power-efficient hardware[2]

14%
The average annual decline in relative server performance occurring each year. After five years, a typical server will only have 40% of the performance it had when it was brand new[1]

18.3 million
The number of annual server instances avoided in 2015, due to the use of new virtualised servers and the redeployment of existing hardware into a virtual environment[3]
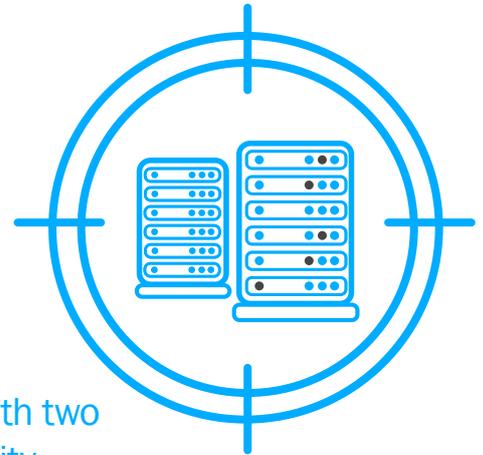
37%
The number of companies that have adopted a hyperconverged infrastructure in 2016, up 13% on the year before[4]

Up to 15%
The percentage of maximum computing output, that (on average) a typical server in a data centre delivers in a year, according to research by McKinsey and Company[5]

How to specify your new needs

Any data centre refresh needs to provide your company with two things: the tools it needs to do its job today and the flexibility to adapt to tomorrow's needs. Meeting both targets today helps reduce costs and simplify management, giving you the IT infrastructure to support and grow your business.

At ComputerWorld, we offer advice to help our customers plan and implement their data centre refresh. These are the key tasks that you need to tackle.

1 Document what's running in your data centre

First, you need to get a detailed overview of what's currently running in your data centre. A service catalogue should be created, documenting every single service run by IT. Don't focus on the hardware or virtualised infrastructure, but look closely at the services you currently provide to the business.

2 Set downtime limits

For each service you provide, you need to ask yourself the following question: how long could your business survive without access to this service? From this starting point, you can set your Recovery Time Objective (RTO), or the time it takes to recover from a problem. You can also set the Recovery Point Objective (RPO), or how much data you can lose in the event of a problem.

Setting these values helps you design the solution you'll need to meet these downtime limits.

3 Analyse performance and capacity requirements

Measure and review server and service performance today, measuring total load and capacity. From this, you can start to build the hardware requirements for your new data centre. Consider the RAM, CPU and storage requirements that you need to hit your business objectives. You should plan for expansion and scale, even if that means assessing availability of upgrades in the future.

4 Consider the cloud

Most businesses aren't ready to fully move to the cloud. But examining which workloads could be moved from local servers to the cloud is a job best performed now. Identification at this point gives you a choice in the future, and you may find that certain workloads can be performed much more cost-effectively using cloud infrastructure.

£6,790

The average cost per minute that unplanned downtime costs businesses[6]

How to reduce the cost of a new infrastructure

A simple server-for-server replacement is not the best way to implement your data centre refresh. You'll certainly see some benefit from new hardware, but it's easy to overspend, ending up with a data centre running at a fraction of its capacity. Instead, a refresh is an opportunity to cut costs, especially if you follow our advice.

Consolidate your servers

With the latest generation of server hardware, it's likely that you can consolidate your workloads, with fewer hosts running your required number of virtual machines. Look at the performance analysis that you completed previously and consider if increasing the number of CPU cores or RAM in a host could allow you to reduce the total number of hosts. As well as offering you a saving in hardware costs and management burden, fewer hosts are likely to reduce your software licensing and power costs, too.

However, don't forget that your virtualised infrastructure should be built using an N+1 design, meaning that you have the total amount of servers to meet your performance needs, plus an additional server for redundancy.

Don't over-specify VMs

Converting physical machines to virtual machines often results in the VM being over-specified. Carefully match each VM's requirements to the current workload requirements. Remember, you can boost a VM's resources at a later date if performance becomes an issue down the line.

Utilise the cloud

Your initial analysis would have told you which workloads you can potentially move to the cloud, but now is the time to analyse this in-depth. Utilising a SaaS-first policy, you should seriously consider offloading some workloads. You may see considerable cost savings as a result.

Don't just consider moving entire services; you may find that you can use short-term cloud rental for burst traffic, such as processing year-end sales. In all cases look at both the Capex and Opex costs, so you can better calculate the total cost of ownership.

ComputerWorld are seeing a growing adoption of cloud technologies within its customer base, starting with email migrations to Microsoft Office 365. Consider these key questions before you move any workload to the cloud:

1. How is data backed up and how easy is it to recover?

2. If you are rolling out a new Software as a Service (SaaS) solution have you considered user education? An important success factor is user adoption and satisfaction. This is often overlooked until it's too late.

3. Have you planned a migration strategy that minimises downtime?

£0.95 billion to £1.7 billion

The annual cost that unplanned downtime costs Fortune 1000 companies, according to IDC[7]

The choices available to you: Traditional virtual infrastructure

With a **traditional virtual infrastructure**, every component (storage, servers, backup and networking) is bought individually from different companies and managed separately. Each part can be individually tuned and controlled, but there's a significant management overhead that can require a team of IT experts.

A traditional virtual infrastructure will be made up of a number of core components. These include: virtualisation hosts running a hypervisor, such as VMware ESXi or Hyper-V, shared storage, both LAN and storage networks, as well as supporting management components and backup.

When selecting the components for this infrastructure you should understand the ability for growth. Consider elements such as how

easy it is to add storage, increase memory and add virtualisation hosts to the overall solution.

Other important considerations may be focused around the available bandwidth. Whilst you may not have a direct business need for 10Gb Ethernet now, you may look to save costs by implementing 1Gb switching. Of course, this could be a false saving in the short term if you find you need additional bandwidth in the future.

TIP:
If a traditional virtual infrastructure is the right choice for you and your business, ensure that it offers simplified and integrated management tools alongside the ability to grow any component in a granular fashion.

TRADITIONAL VIRTUAL INFRASTRUCTURE
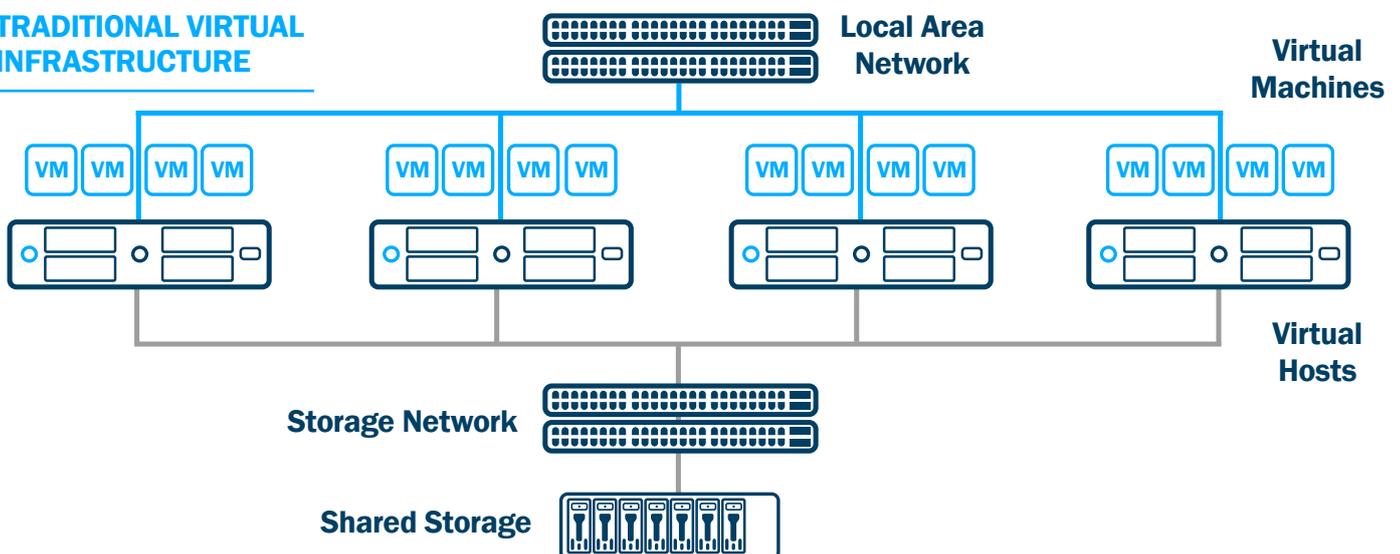
The choices available to you: Traditional virtual infrastructure

There are a number of considerations you should make when designing a traditional virtual infrastructure. You should also understand the limitations of this approach when selecting which option is right for you.

When designing a traditional virtual infrastructure there are a number of important elements to consider.

No single point of failure
A well designed virtual infrastructure will offer no single point of failure. This is achieved by designing the solution for N+1 availability. This means understanding the performance required and specifying the virtualisation hosts to meet this requirement. But it also means adding an additional host to cater for a host failure or host maintenance.

Another benefit of the traditional approach is that each core component can be be replaced, tuned and upgraded independently. This may suit organisations that have recently invested in servers or shared storage, or who have a segregated team of technology specialists with a defined skill set. A traditional infrastructure may offer a more granular way of scaling, particularly storage, independently of compute.

Comprehensive integration
When choosing a traditional virtual infrastructure, you should consider a hybrid or all-flash storage solution, to

meet business needs and demands. And, you should ensure that your chosen infrastructure has comprehensive integration with your chosen hypervisor and management tools. This will make management of your virtual environment considerably easier in the long run.

We find that selecting the three major components (servers, storage and networking) from a single provider is a good choice, too. This gives you easier support, maintenance and upgrades while reducing the management burden.

The disadvantages
Whilst a traditional virtual infrastructure has served us very well to date, there are some disadvantages that must also be considered. First is 'complexity'. Initial configuration and on-going management of a traditional virtual infrastructure can incur additional man hour requirements, with complex initial configuration and multiple management consoles. Second, there's the issue of 'limited scale'. Most traditional infrastructure solutions will require you to predict future growth to choose the right solution. This can make the initial design decision difficult and you run the risk of under/over specifying.

TIP:
When choosing a traditional virtual infrastructure, you should consider a hybrid or all-flash storage solution.

£3,800
The money saved by deploying a virtual server when compared to a physical one, according to Cisco[8]

The new choice available to you: Hyper-converged infrastructure

A **hyper-converged infrastructure** consolidates compute and storage into single appliances, which means faster deployments and increased ease of management and support. Costs can be also be reduced with cheaper initial purchases and on-going opex and capex costs.

One of the biggest trends we are seeing within the industry is the growth of the Software Defined Data Center (SDDC).

The SDDC expands the concepts of virtualisation including hardware abstraction and pooled resource to storage and networking. A hyper-converged approach takes these principles and allows for hybrid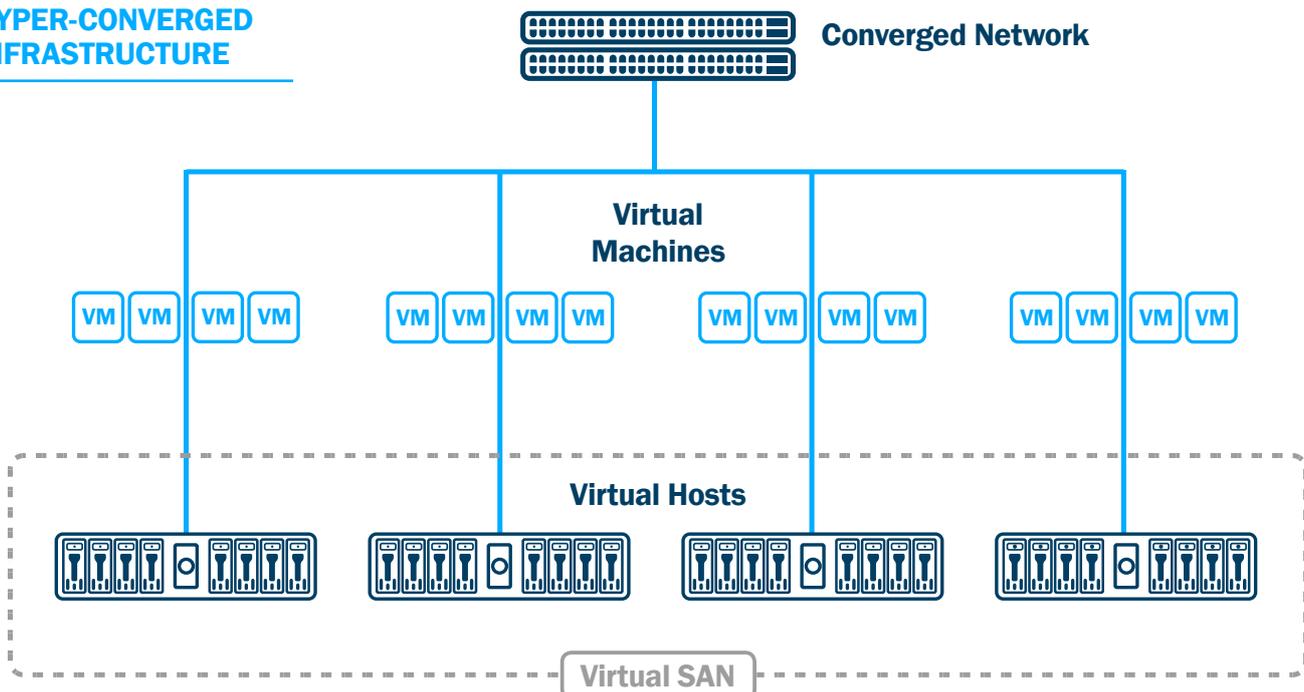 or all-flash storage to be installed physically in the virtualisation hosts, whilst pooled into a virtual shared storage device through the use of software.

Combine this with the benefits of network virtualisation, with technologies such as VMware NSX and you gain access to increased performance, ease of management and the ability to scale one node at a time as you grow.

TIP:
Hybrid or all-flash storage can help deliver the performance you need to achieve your business objectives.

HYPER-CONVERGED INFRASTRUCTURE

Converged Network

Virtual Machines

VM VM VM VM   VM VM   VM VM   VM VM   VM VM   VM VM   VM VM

Virtual Hosts

Virtual SAN

Hyperconvergence and the software defined data centre

Replacing a traditional infrastructure with a hyper-converged solution can save you time and money. Not only that, it can make it easier to expand your data centre in the future and support emerging ways of working.

For many companies, a traditional virtual infrastructure doesn't offer the flexibility or ease of management required. The alternative is a hyper-converged infrastructure, which uses single appliances that house your compute and storage components, making deployment far simpler.

A hyper-converged infrastructure is far easier to manage, too. Rather than having a collection of management consoles, you have a single console that manages all aspects of your virtualised environment. Add in the simplified physical infrastructure (each hyper-converged appliance is largely plug-and-play), and your company benefits from a reduced management burden. As a result, opting for a hyper-converged approach often reduces both Capex and Opex costs.

Achieving scale
Scale can be achieved, both by upgrading within nodes or by adding additional nodes. This makes it relatively straightforward to grow your hyper-converged infrastructure to meet new demands, as well expanding it to encompass new workloads. A hyper-converged solution will also offer the ability replicate and fail-over to alternative nodes, helping you meet your availability and DR targets.

Software defined data centres
Hyperconvergance is also a critical component of what's defined as the software defined data centre (SDDC). In an SDDC, virtualisation is taken to the next level, allowing even greater flexibility. All infrastructure elements (storage, networking, and compute) are virtualised and then delivered as a service. Managed centrally via software, an SDDC keeps deployment, provisioning and configuration abstracted from physical hardware.

Hyperconvergence takes these principles and allows for hybrid or all-flash storage to be installed physically in virtualisation hosts. Not only that, but it can be pooled into a virtual shared storage device through software and a single management console. And as stated before, combined with the benefits of network virtualisation, technologies such as VMware NSX and an SDDC, you should get increased performance, simpler management and cost-effective growth as you scale one node at a time.

2020
The date by which an SDDC's capabilities will be a requirement for 75% of businesses[9]

COMPUTER WORLD

Helping Businesses Define Tomorrow™

How to specify a hyper-converged infrastructure, and plan for the future

The beauty of a hyper-converged infrastructure is that you buy complete units and build them together, Lego-style. It's important to choose the right appliances from the start, both to meet your current business needs and to provide the scale that you'll need in the future. Here are the main questions you need to ask...

Will it work with current and planned workloads?

A hyper-converged appliance needs to be tailored for the workload it will be performing. Ensure that any appliances you buy have enough processing power, RAM and storage speeds to meet your requirements, as set out in the document you created when you analysed your existing data centre. Look for the expansion options available to see how far you can scale to support future workloads, too.

How far can it scale?

You need to know the minimum and maximum number of nodes that the solution you're buying supports. The starting point sets out your initial minimum spend, with many vendors starting at three nodes (one of the reasons that hyperconvergence may not be suitable for small businesses). At the top end, the maximum number of nodes lets you work out how far you can scale your new infrastructure and if your choice will support your predicted needs.

Which hypervisors are supported?

Our advice is to look at the vendor specific solutions first, e.g. VMware or

Microsoft, then consider third party options. Solutions designed on VMware vSAN are hypervisor-integrated, which can offer benefits including increased performance, simplicity of architecture and easier support. If you're planning a migration to a different hypervisor in the future, do ensure the solution you choose will support this migration.

Can it integrate with existing and planned infrastructure?

Your initial hyper-converged appliances will likely need to communicate with your existing data centre and virtual infrastructure, so look for products that will integrate easily. If you plan for nodes that can integrate with your planned infrastructure, you can adapt without having to replace hardware in the future.

Does it support your storage needs?

Storage is integrated into the nodes of the appliance that you buy, so it's vitally important that you take this into account. To make the most of your money, be sure that you buy the right amount of storage to meet your current needs. Future expansion can be actioned within the nodes, so pick a disk-dense option that will give you room to grow.

34%

The number of companies that have experienced an incident in the last five years that required disaster recovery[10]

58%

The number of companies that have a scenario-specific business continuity plan (BCP) according to Forrester[11]

Availability, backup and DR with a hyper-converged infrastructure

Should your infrastructure go down, your business can suffer financially. Backup, availability and disaster recovery are all critically important in a hyper-converged environment. Fortunately, they can all be simplified, with hyperconvergence making management of disaster recovery far easier than with a traditional infrastructure.

To properly plan your DR strategy, you need to go back to your service catalogue and your defined RPO and RTO targets. From this, you should examine how you can deliver a three-tier protection strategy, matching business requirements for each workload, and working within your budget. For example, Gold tier may be one-hour RPO and RTO; Silver could be four-hour RPO and RTO; and Bronze could be 24-hour RPO and RTO. When considering how to achieve your targets, availability, backup and DR all need to be accounted for.

Availability

Availability is all about having the equipment and plans in place to prevent errors or downtime. RAID is a must, protecting storage from a one- or two-disk failure; this technology is built into shared storage appliances. A redundant Array of Independent Nodes (RAIN) as used in hyper-converged solutions is a second option. In simple terms, data stored on one node is replicated to another node. Should a node fail, its data is immediately available, elsewhere. Replication can be performed locally, to other nodes in the same cluster, remotely, or to the cloud.

Backup

All companies should follow a 3-2-1 backup strategy. This means that you should have three copies of your data, stored on a least two different mediums with at least one held off-site. In the past, this usually meant keeping tapes offline, either in a different office or a dedicated storage facility. Today, cloud solutions can offer a smarter solution, giving you faster access to your data in the event of a problem. While traditional file-based backups will keep data safe, the physical state of your backup machines will need monitoring. Snapshots should also be considered, letting you roll back changes and reduce downtime.

Disaster recovery

Should the worst happen, how quickly could you recover? Planning for a worst-case scenario usually means considering off-site options. Replication of servers to the cloud or an alternative server cluster can keep you running and you should focus on replicating your most valuable, business-critical workloads. Maintaining at least one copy of your data offsite, as part of the 3-2-1 strategy we've detailed,

49%
The percentage of BCP invocations caused by IT failure, according to Forrester[12]

60%
Percentage of SMBs that will shut down within six months of losing data[13]
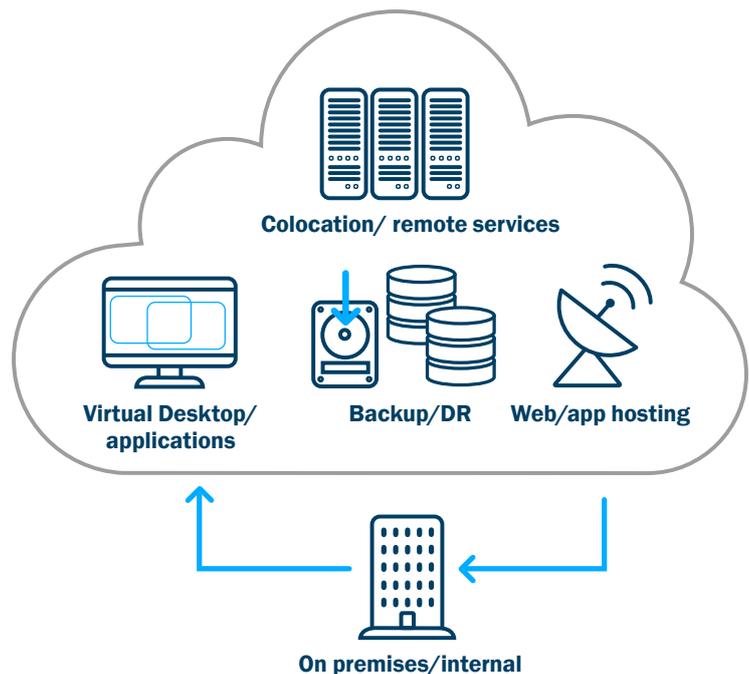
SUMMARY:

Why do you need to refresh your data centre today?

A data centre refresh is an opportunity not just to improve your IT infrastructure, but to build the tools that your business needs to grow and thrive. Making the right choices during your project is key, allowing you to focus on building a data centre that not only meets today's requirements but gives you room to grow in the future.

Cutting down on management and infrastructure complexity can help you meet these goals, and reduce cost at the same time. For these reasons, hyper-converged infrastructure is one new technology that can help you here, giving you a virtualised infrastructure without the headache of having to manage a diverse array of systems. At the same time, examining workloads and shifting some to the cloud can help improve user satisfaction, while reducing the burden of management on your IT team.

Get all of these things correct today and, with ComputerWorld's expert advice, you'll be in the best possible position to grow your business while extending your advantage over your competitors.

Colocation/ remote services

Virtual Desktop/ applications

Backup/DR

Web/app hosting

On premises/internal

SOURCES
1. https://www.emc.com/collateral/analyst-reports/idc-why-upgrade-server-infrastructure.pdf
2. http://www.datacenterknowledge.com/archives/2016/06/27/heres-how-much-energy-all-us-data-centers-consume/
3. https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/sustainability/vmware-greenit-virtualization-delivers-energy-carbon-emissions.pdf
4. http://www.hyperconverged.org/wp-content/uploads/2016/07/2016-State-of-Hyperconverged-Infrastructure-Market-Report-final-v1.pdf
5. https://www.forbes.com/sites/benkepes/2015/06/03/30-of-servers-are-sitting-comatose-according-to-research/#dcd291a59c79
6. http://www.dobson.net/much-downtime-really-cost-business/
7. http://devopsdigest.com/idc-survey-appdynamics-devops-application-performance
8. https://www.energystar.gov/products/low_carbon_it_campaign/12_ways_save_energy_data_center/server_virtualization
9. http://www.gartner.com/newsroom/id/3136417
10. http://www.evolveip.net/resources-library/2015-disaster-recovery-and-business-continuity-survey
11. http://drj.com/images/surveys_pdf/forrester/2014-Forrester-Survey.pdf
12. https://clutch.co/cloud/resources/world-backup-day-2017
13. https://www.krollontrack.co.uk/resources/press/details/kroll-ontrack-shares-data-loss-realities-from-2016-data-loss-index/

ComputerWorld is the largest provider of expert business IT solution and services in the South West and Wales. Over the last 25 years it has grown to become one of the UK's most trusted providers of best-in-class IT consultancy, support, procurement, recruitment and training for all kinds of business and educational establishments – both large and small.

Areas of expertise

Virtualisation & Cloud
We design, deliver and protect custom built virtualised solutions – bringing our customers the latest technology that allows them to focus on where their business is going, not just where it is!

Networking
We provide fast and secure networks for enterprises of all sizes and across all sectors, from education to heavy industry.

Microsoft Technology
Nobody knows more about how to maximise your Microsoft investment than ComputerWorld's engineers, most of whom are MCSE qualified or greater. Our team has been offering expert Microsoft solutions since day one and bring to the table an unparalleled amount of experience,

whether you're looking to migrate to Office 365 or for traditional Microsoft services.

Workspace Transformation
IT departments are finding ever increasing demand to deliver the flexible working environments their employees need to fully optimise their output. We work alongside industry-leaders in business mobility to help businesses realise the true potential of their workforce and to combat Shadow IT.

Security
ComputerWorld's security consultants have all of the expert knowledge and certifications needed to offer businesses the most robust solutions for all aspects of IT security. We work in close partnership with some of the industry's most respected hardware and software vendors.

Contact ComputerWorld today

enquiries@computerworld.co.uk

01454 338 338

Apex House
Turner Drive
Westerleigh Business Park
Yate
Bristol
BS37 5YX

computerworld.co.uk