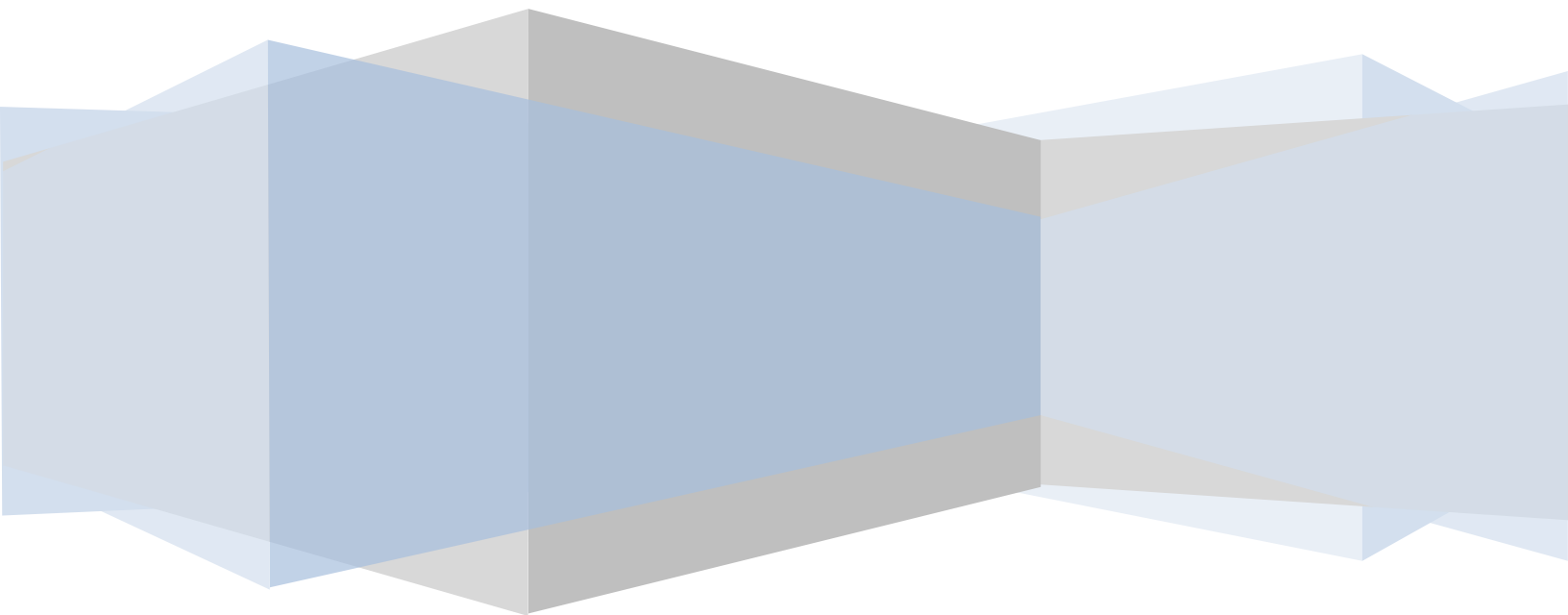# CIO's IT Optimization Toolkit: A New Age for IT Cost Saving and Increasing Productivity

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The looming economic recession is not only changing priorities around one's kitchen table, but is also changing priorities of CIOs. In a 2008 survey conducted by IDG Research and referenced in CIO Magazine, CIOs were asked what the company is doing to prepare for an economic recession. The top choice was: Optimizing current IT infrastructure and resources. 47% of the respondents had this as their top priority.

Today, CIOs are increasingly asking: Can we do more with less? What have we already purchased? What are we actually using? How are we using it? Can IT resources be shared between sites? Can we get rid of software licenses that are not in use? Do we really need another server, before we know if we have spare capacity in our existing servers? Can our IT resources be deployed more efficiently? This boils down to knowing who are using what, where and when?

It sounds complicated to sort out all these questions, but partnering with service providers who offer new age cost saving solutions will give you the answers - quick and easy. The cost saving solution such as

1. **Remote Infrastructure Management**

2. **Managed Printing**

3. **Bandwidth Optimization**

4. **Thin Client**

5. **Virtualization and**

6. **Shared Disaster** Recovery (DR).

Let's have a look at each of these solutions in detail and their cost saving features.

Remote Infrastructure Management Services (RIMS):

RIMS is a delivery model of Infrastructure Management. The model involves monitoring and managing a company's IT infrastructure like applications, helpdesk, databases, servers, networks and storage from a remote location. A company can reduce the costs of managing its IT infrastructure by engaging in RIMS. Going by the experience of the leading RIMS Service providing companies, there has been a 30 % to 40 % cost reduction. During the engagement of RIMS, better efficiency and effectiveness, better processes, tooling and automation has lead to further reduction in costs.

Typically day-to-day operations and management across the entire range of infrastructure towers can be done 80 % to 85 % remotely. For a service like helpdesk, the remote ability is as high as 100 %. However, for a service which requires hands and feet support, break-fix, hardware repair and maintenance, data centre tape backup, desk-side support are predominantly performed onsite. Many services for desktops like software distribution, patch management and troubleshooting can be also done remotely. Project implementation services like upgrades, rollouts and migration across these infrastructure towers can be performed 70 % to 75 % offshore, and design and architecture work can be done 50 % to 60 % remotely.

By availing RIMS from a service provider, a company can get access to

- Highly skilled professionals
- Dedicated services from a remote location
- Ensuring uptime
- Managing planned downtime and
- Systems Availability

With RIMS, users can have desk-like access experience, allowing them to work the same way as in office, minimizing confusion and reducing training.

Organizations today are looking towards RIMS because of its significant benefits like easy management, efficiency and security for business critical IT infrastructure. Following are many of the benefits that RIMS offers:

- Improved IT infrastructure uptime and productivity
- Simplified operations management & Focus on core competencies
- Enhanced ability to adopt new technology
- Transparency and control
- Better Return On IT Investment (ROI)
- Scalability on the fly: upgrade or downgrade according to the requirements and avoid fixed overhead costs
- Access to domain expertise and 24/7/365 availability
- Industry best practices & quality

As per a recent report by NASSCOM-McKinsey titled 'Remote Infrastructure Management Services: The report states that with global CIOs' continued comfort with India as a "primary" offshore destination, the country will capture greater than 50% of the world market i.e., US $13 billion to US $15 billion in revenue by 2013, which would create 325,000 to 375,000 jobs.

These numbers validate the exponential growth in demand for RIMS. Surveys of over 140 CIOs by McKinsey & Company suggest that, as customer environments mature and they have more control over processes, they are more likely to adopt RIM. While 18 % of CIOs surveyed had offshored some part of infrastructure management, an additional 7 % plan to offshore in the next three years while a further 15 % plan to offshore, though without a specific timeline. Another witness to this interest is the steep rise in solicited infrastructure RFPs (Request for Proposals) to offshore vendors, which has grown by 440% since 2000 from 52 RFPs in 2000 to 229 RFPs in 2007.

- Cost Efficiency: Drive down the IT infrastructure cost by as much as 40%
- Proactive problem identification and Preemptive problem resolution
- Improves reliability of infrastructure and increases flexibility in operations
- Improves asset utilization
- SLA based service management

There are multiple drivers for the Infrastructure Management Services (IMS) and the RIMS industry such as

- Increasing complexity of IT systems
- Labor becoming the largest addressable cost in the total IT infrastructure spend,
- Increasing demand for virtualization in the current difficult environment and
- Rising realization within global enterprises about economic viability of RIM.

At the same time, offshore vendors have also been pushing RIMS due to its non-linearity, higher profitability and pricing resilience. The ongoing economic slowdown and increasing cost pressures on global enterprises would accelerate growth of IMS; especially RIMS. Global IT spends could be prioritized in favor of IMS/ RIMS as enterprises try to optimally utilize and increase efficiency of their existing IT infrastructure.

Managed Printing:

According to the Gartner Group, office printing consumes 1-3% of a company's annual revenue. To make matters worse, overall print volumes grow at 11% per year and color print usage grows at 19% per year. This is especially important since color prints cost 5 to 10 times the amount of black and white prints. On top of the growing costs, most companies have multiple vendors for printer hardware, supplies and repairs. Managing these relationships and processing multiple invoices creates unnecessary costs.

Printing also affects the productivity of your company. Delivering documents to the correct location at the right time is at the heart of many workflows. Inefficient, aging printers are prone to breakdown, hampering office effectiveness. The neglect of proper preventative maintenance not only leads to interrupted workflows, it also reduces the usable lifecycle of your printers.

IT departments are also impacted by inefficient printing infrastructures. It is estimated that in some organizations, up to 50% of the help desk calls are related to printers. Since printers are mechanical devices, many of these calls require an IT person to go to the printer. Often, the

Office printing also has a tremendous impact on the environment. The average office employee consumes 10,000 pages of paper per year. Since it takes 60% of a tree to make a case of paper, each office worker consumes approximately **1.2 trees per year**.

Printers and copiers also consume a large amount of electricity since they use heat during the print process to fuse the toner to the paper. As such, printers are some of the biggest consumers of electricity in an office. Printer supplies can also have an environmental impact. The average printer cartridge takes 3 gallons of oil to produce. If it is not recycled, it takes over 1,000 years for the cartridge to decompose in a landfill.

problem with the printer is mechanical, meaning that the IT person has to call in a third party to repair the device. Multiple brands and models of printers further compound this problem. Each model has a different print driver and user interface that has to be updated each time Microsoft updates their operating systems.

Perhaps the biggest impact is that printers distract your expensive IT resources from critical corporate initiatives. Creating a strategy to outsource printer management can help you control your IT costs.

A managed print services strategy should begin with a comprehensive assessment of your current situation. The goal should be to discover the Total Cost of Ownership (TCO) of your office printing. This assessment provides both a baseline to measure improvement and a snapshot of the current situation to uncover improvement opportunities.

Proactively managing your fleet of printers also enables implementation of strategies to reduce the carbon footprint of your company. Reducing paper usage not only reduces the amount of trees consumed by your company, it also helps offset the rising cost of printer paper.

The most obvious place to start is by reducing paper usage. There are several practical ways to do this. You can leverage duplex or two-sided printing to cut paper usage. Some companies leverage electronic forms technology to eliminate the use of costly pre-printed forms.

You can also reduce electrical usage by ensuring power-saving measures are implemented to put the systems in standby mode during slow usage times. Fleet optimization could include consolidating redundant devices, further reducing your electrical usage and costs.

A well-implemented managed print strategy can boost productivity. At the most basic level, employees will face less distraction from printers that are broken or out of toner. Unlike most IT departments that simply respond to broken systems, a preventative maintenance strategy combined with an automatic supply restocking program ensures your fleet is operating consistently. Instead of fielding calls from frustrated users with printer issues, your IT team can focus on core initiatives like security and new software deployments.

Printing seems to be one of the most trivial activities that most corporate conduct every day. However it is observed that when corporates have looked at total costs of Printing they have been much higher than expected. The reasons for such include misuse, non-optimized inventory management, uncontrolled printing, etc. While these issues lead to higher costs they still do not guarantee any uptime to users for printing and they face availability issues during critical business hours. Organizations with offices spread across many locations find it even more difficult to manage these issues.

Managed Printing solution providers have acknowledged these issues and have built a unique but simple solution for enterprises to reduce their printing *Costs* and at the same time provide an *Uptime* guarantee to their users. This combination makes this solution a very compelling proposition for Enterprises to implement across their entire Printing infrastructure & gain full control of the same.

Managed Printing solution is a very innovative yet simple solution with a clear focus of reducing customers' costs, overheads & wastage but at the same time providing a very high uptime to the users to ensure that business needs are met with at all times.

The Solution consists of the following Components:

HelpDesk for Incident Management	Remote Resolution for recorded incidences	Asset Management for Printers - AMC
OnSite Support with higher SLAs	Web Based Application to Manage & Control Usage	Centralized Consumable Management

Bandwidth Optimization:

Sometimes the bandwidth on an enterprise network is like a piece of cheap clothing: After a few washes, it seems too tight and restrictive and you want something with more room. But bandwidth doesn't really shrink, it just seems that way. What really happens is that network traffic grows to consume the available bandwidth. In the old days--really just a few years ago--businesses would throw more bandwidth at the problem and buy faster network links. But the tough economy and tight IT budgets make it hard for companies to justify adding another fat pipe.

The problem isn't bandwidth per se; it's having the predictive tools to understand network problems and putting in place preventive measures to deal with congestion. IT departments are trying to find an easier way to use existing bandwidth without constantly upgrading and make smarter upgrade decisions. That's why more businesses are turning to a variety of bandwidth-optimization technologies and techniques to get better performance out of their networks and make the most of the bandwidth they're already paying for.

Optimization technology offers the opportunity to decrease bandwidth needs and monthly costs while providing better service to users. Because bandwidth optimization devices are relatively inexpensive, return on investment (ROI) is quite fast, allowing these devices to provide "something for nothing."

As a coarse example of bandwidth optimization's rapid ROI, consider a simple case where two small bandwidth optimization appliances, costing $6,000 each plus maintenance and other overhead expenses, are installed at the two ends of a WAN link. If they reduce the traffic on the link by 50%, thereby avoiding the need to increase capacity by adding an

additional link, they will probably save the enterprise over $1,000 per month in WAN charges. Payback therefore occurs in less than one year.

In addition to the savings in bandwidth costs, there are other savings in IT staff and equipment that are made possible by moving servers and backup systems to a central facility. These cost savings may be greater than the savings in bandwidth costs alone.

Most bandwidth optimization techniques can fit into one of three categories: Efficiency, Compression, and Omission. These are as follows:

Efficiency:

Efficiency techniques involve changing the web content in order to minimize the number of bytes that need to be sent. For example, use external files (which will cache) instead of inline styles and scripts, reuse icon images, use semantic markup. Fix any broken images, since these often send a verbose 404 error page.

Compression:

Use compression on the server to squash files before they are sent. Compression is a well-established technique in telecommunications; since without significant bandwidth compression, the telephone grid could not handle the amount of data that passes through it. On the web the most popular compression algorithm for real-time compression is gzip. The topic of compression also includes image compression e.g. JPG, PNG, GIF.

Omission:

Omit unneeded bytes. Remove comments, whitespace, and don't send <meta> tags.

At the most basic level, moving the data closer to the user improves response time. Service providers offer different services that let businesses cache frequently accessed Web pages or set up mirror sites for in-demand content in locations that are closer to the user seeking the information. Companies also have improved performance by minimizing the number of bandwidth-intensive elements, such as real-time images or video clips that are offered on their Web pages and by keeping each page well under a 2-Mbyte threshold.

Another proven approach is to assign priority levels to different types of traffic, applications, departments or even individual IP addresses. Those with the highest priority get first dibs on bandwidth. This technique goes by different names: quality of service, policy networking and traffic shaping. In addition, companies often use load balancing in their data centers to improve transaction speed, both internally and externally. Many businesses use technology to implement a thin-client application model to optimize both - network and systems performance as well as the user experience. More sophisticated approaches include compression appliances that sit in front of routers or servers and treat incoming or outgoing traffic sort of like a Zip file--compressing or decompressing as needed.

Many companies use a combination of these techniques because every enterprise network is unique, reflecting the number of locations that need to be connected and the types of applications and traffic needed to conduct business.

Thin Client:

In place of a PC, Thin Client devices are simple computers designed to run applications from a central server. A Thin Client is a desktop appliance with no hard drive, floppy drive, CD-ROM or other moving components. It is typically a Windows-based terminal, although it can be a Personal Computer (PC) running the Thin Client emulator or even a handheld device, such as a Personal Digital Assistant (PDA).

All the application processing takes place on one or more centralized servers. Users can access these applications, locally or remotely via virtually any connection using a standard desktop device, a wireless device, Web browser or Thin Client device. Because the server handles application processing and memory demands, almost any computer can function as a Thin Client. However, there are devices that are specifically designed and optimized for Thin Client protocol and offer the greatest advantages.

Thin Client computing is now an accepted strategy for business computing. It is the next generation and the most technologically advanced computing created to solve the problems experienced with the computing desktops of the corporate environment. The Thin Client concept has brought about a higher level of centralized control to the desktop. A major force behind the success of Thin Client computing is the lower Total Cost of Ownership (TCO) as compared to other models. It is a proven fact that Thin Client computing offers significant savings.

There are many advantages to Thin Client computing including lower cost, ease-of-use, reliability and security, in addition to some of the following advantages as listed below:

- A standard Thin Client network builds on existing infrastructure; networks, servers, computing devices and software.
- There is reduced time spent in troubleshooting problems and less time trying to fix and maintain computers.
- Thin Clients are a fraction of the cost of PCs.
- Thin Clients are more energy efficient than PCs with some models using 85% less energy than their PC rivals in the real world environment. Less energy translates into cost savings.
- Thin Clients use the network to access data and applications from servers rather than storing information or processing power at the desktop. PCs require substantial memory and computing power.
- An optimized Thin Client, with fewer moving parts and less software complexity, will function without failure significantly longer than a typical PC and require less maintenance. According to studies, Thin Clients run without failure up to 5 times longer than PCs and have 9 times the hardware reliability of the PC. Thin Clients do not have to be replaced every 18-36 months unlike PCs which have a short product life.

- Users do not need to administer Thin Clients and they can be setup in minutes by anyone.
- Thin Clients start in seconds rather than minutes like PCs and are quiet, easy-to-deploy and simple to use.
- Information can be backed up on the server instead of on all the individual PCs. This increases the probability of data getting backed up.
- The size is small, which improves desk space as much of the hardware components of a standard PC are not necessary.
- It is not necessary to keep a large inventory of drives and PCs waiting for a failure to occur. If a Thin Client desktop breaks, a complete replacement can be provided to bring the user back up immediately.
- Obsolescence is greatly reduced. The latest CPU available on the market is not necessary for Thin Client computing, while PCs, to run the latest software often require the latest technology.
- With Thin Clients, it is not necessary to go onsite to adjust the user's desktop as all the administration is brought into the network domain. Updates are made from a central location.
- Even with a diversity of application programs, the desktop is easily supported. A Thin Client can be configured in 5 minutes while a PC or workstation can be configured in 30 minutes, which is 6 times longer.
- Thin Clients are virtually virus proof as they do not have vulnerable openings like floppy drives or CD ROMs where viruses can be introduced. Users cannot load or use unauthorized software on Thin Clients.
- Thin Clients have a lower risk of equipment theft when compared to a PC. By itself, the PC has no great value as the processing power, memory and data are secure on the server.
- Software upgrades, operating system and application software are done once on the server which reduces the downtime for users.
- Network resources are preserved. Demands for increased bandwidth are significantly lowered.
- Thin Client technology delivers central management of IT resources, plus faster and more frequent deployment of new applications and software.
- It permits remote, hands-off configuring, monitoring and administration of desktop devices.
- Utilizing Thin Client technology allows IT personnel to devote more time to more challenging strategic work.
- Thin Clients help people get their work done more efficiently which is beneficial for the individual and the organization.
- With Thin Clients, remote offices can normally be set up in hours and do not need expensive network equipment, configuration and support that are required in a distributed PC environment.
- Thin Client devices are designed to cost less than PCs to run and maintain.
- According to Gartner, Thin Clients can save an IT department 80% in support-staff costs.

It is clear that cost is a key consideration for any organization considering a change in computing environments. Most organizations should see large returns in the first year of Thin Client deployment. Support and desktop related costs drop off quickly. Other major savings will result from reduced application downtime and diminished need for user support and training.

In this time of tighter spending and more focused technology investments, Thin Client technology keeps costs low and manageability high. The end result is organizations using Thin Clients are able to manage their bottom lines more effectively.

Less expensive, more efficient, more productive and safer IT architecture are some of the benefits of Thin Clients. Thin Clients and Terminal Services combine the best features of PCs and mainframes; the user-friendly interface and software of PCs plus the reliability and security of mainframes. Thin Client computing is poised to become a major enterprise and business architecture in the coming years as it is a very enticing solution.

Virtualization:

After years of vendor hype about virtualization, customers are realizing real-life business and IT benefits from implementing this technology. By moving away from the traditional 'silo' approach of linking applications to a specific IT infrastructure towards an approach that creates shared pools of virtualized server, storage and network resources, customers can dynamically assign the pooled resources wherever and whenever needed.

Although many vendors have focused their selling and marketing efforts on the virtualization benefits for enterprise-class customers, more and more SMB customers are reaping virtualization rewards as well. Virtualization's benefits of increased utilization, improved service reliability and the positive impact on both internal and external business processes apply to SMB as well as to enterprise-class operations.

The products of companies offering virtualization deployment services, particularly in server virtualization, logically 'break' each physical server into several independent virtual servers, allowing customers to run multiple operating systems and applications on a single machine simultaneously. Each virtual server is independent of the others, so failure in one will not affect others. Furthermore, the workload from the failed virtual server can be reassigned to another virtual machine.

In a 2007 IDC survey of 19 North American-based IT organizations, 80% of the companies reported adding virtual machines to their systems management portfolios.

Some of the benefits of virtualization are:

1. Lower number of physical servers - one can reduce hardware maintenance costs because of a lower number of physical servers.

2. By implementing a server consolidation strategy, one can increase the space utilization efficiency in their data center.
3. By having each application within its own "virtual server", one can prevent one application from impacting another application when upgrades or changes are made.
4. One can develop a standard virtual server build that can be easily duplicated which will speed up server deployment.
5. One can deploy multiple operating system technologies on a single hardware platform (i.e.
   Windows Server 2003, Linux, Windows 2000, etc).

When running in a virtual machine, an operating system can't tell whether it is running on a virtual machine or a physical server, nor can applications or other computers on a network. Nevertheless, a virtual machine is composed entirely of software and contains no hardware components whatsoever. As a result, virtual machines offer a number of distinct advantages over physical hardware:

- **Compatibility**. Virtual machines are compatible with Sun x64 servers powered by AMD Opteron and Intel Xeon processors.
- **Isolation**. Virtual machines are isolated from each other as if physically separated.
- **Encapsulation**. Virtual machines encapsulate a complete computing environment.
- **Hardware independence**. Virtual machines run independently of underlying hardware.

Business Benefits of Virtualization:

When IT organizations virtualize the hardware, they empower themselves to make more flexible, dynamic choices in their application deployment and their allocation of resources — business benefits that affect the bottom line- including higher server utilization, improved service levels, ability to better meet changing business requirements, increased business continuity and disaster recovery.

- **Zero downtime maintenance**. Through the use of virtualization technology, the days of bringing applications down because of scheduled server maintenance are over. Instead, IT organizations use virtualization to migrate running applications from a server they wish to take down to a backup server. With all applications moved off a server without disruption, it can be maintained or even replaced without any impact on service delivery.
- **Freedom from vendor-imposed upgrade cycles**. Some solutions virtualize the hardware itself, including the processor, memory, disk and I/O resources. Because the hardware that the operating system sees is virtual and not physical, the OS and the software installed on it can be moved from server to server without concern for the underlying platform — freeing IT organizations from vendor-imposed hardware and software upgrade cycles.
- **Virtual hardware to support legacy operating systems**. IT organizations can migrate entire environments from physical servers whose service plans have expired to virtual machines running on state-of-the-art Sun x64 servers. This helps address

performance and space, power and cooling concerns by supporting multiple such environments per server.

- **Dynamic resource sharing.** Because some solutions virtualize disk drives as flat files, these files can be moved from server to server to optimize utilization levels and to manage service levels. Resource allocation can be used to manage complimentary applications on the same server. For example, it could be configured to favor a busy On-Line Transaction Processing (OLTP) database during the day, while favoring long-running data warehousing operations at night. For even more dynamic resource management, virtualization technology can dynamically migrate running environments between servers, giving IT organizations the ability to respond to workload fluctuations in real time.
- **Security and Fault Isolation.** Virtualizing at the hardware level encapsulates each guest operating system in its own virtual machine, containing faults to a single environment. This helps increase reliability by limiting the propagation of faults and allowing them to be handled by software, rather than hardware mechanisms. Likewise, because each virtual machine isolates its guest operating system and applications, any security flaw affecting one environment does not affect another.
- **Business continuity and backups.** With operating systems and applications encapsulated into disk files, they can be backed up as a complete unit and they can be migrated to a secondary datacenter, ready to activate in the event of a failure at the primary location.

Shared DR:

Disaster recovery is the process, policies and procedures related to preparing for recovery or continuation of technology infrastructure critical to an organization after a natural or human-induced disaster.

Disaster recovery planning is a subset of a larger process known as business continuity planning and should include planning for resumption of applications, data, hardware, communications (such as networking) and other IT infrastructure. A business continuity plan (BCP) includes planning for non-IT related aspects such as key personnel, facilities, crisis communication and reputation protection, and should refer to the disaster recovery plan (DRP) for IT related infrastructure recovery / continuity.

A disaster recovery plan covers both the hardware and software required to run critical business applications and the associated processes to transition smoothly in the event of a natural or human−caused disaster.

Shared Recovery Services enable the DR Service provider's clients to share facilities and data connections, in the event of a disaster.