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## Dark Fibre, SANLink and High Speed Service Solutions

White Paper

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## 1 Purpose of Document

This white paper looks at the different solutions that can be deployed by customers to keep their important data safe. At Colt, we have a portfolio of network solutions that a customer can use in order to connect Data Centres together in order create a secure and resilient environment to store the data on which their companies depend.

Whether they are manufacturers, banks or retailers, companies have come to the realisation that the data that is held by the servers within their IT facilities has become central to the operation of their businesses. This data can be records of who their customers are, what they have ordered, where they want it delivered and whether they have paid for the goods or services or not. The data can also be records of transactions between financial organisations whose accuracy and security is central to the viability of business.

The loss of such essential data can threaten the very existence of these companies so they are now taking steps to ensure the security of this information.

This is commonly done by replicating the data in two or more geographically separated Data Centres and deploying highly resilient networks between them to create what are called Storage Area Networks (SANs) or Distributed Storage Area Networks (DSANs).

This document examines the options that Colt can provide customers to connect Data Centres together in a secure manner.

## 2 Introduction

Connecting data centres together in order to create a Storage Area Network (SAN) or Distributed Storage Area Network (DSAN) can be done in several ways depending on how the customer is operating their storage servers. In this paper, we will concentrate on the enterprise storage market where the customer has chosen to replicate data in two or more geographically dispersed Data Centres in real time.

In the unlikely event that customers can withstand a loss of data for a relatively long period of time (hours or days), then the options open to them are greater. They can send magnetic tapes over to the second site in a taxi or connect their Data Centres together with simple leased lines or relatively insecure IP connections.

When the business needs to keep two sets of data in two geographically diverse Data Centres synchronised, then operating a Storage Area Network makes sense.

The following diagram illustrates a typical Colt High Speed Service (HSS) design. This

network can also be used for running all the communication requirements between the sites such as Voice, Mail and Internet access.

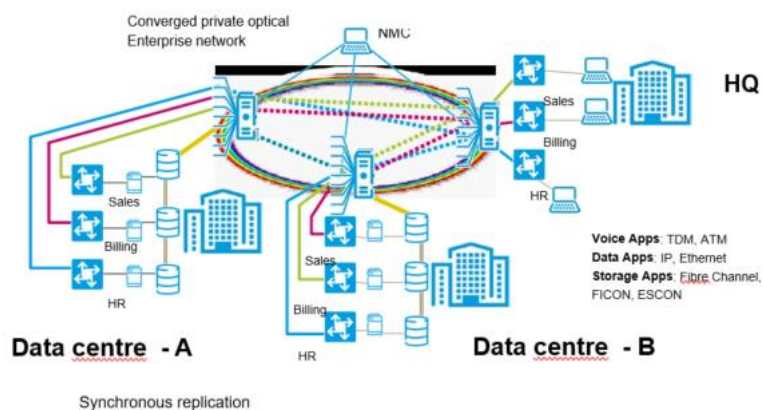


Figure 1: Typical HSS design

## 3 Solutions for Storage Area Networks

### 3.1 SANLink and High Speed Service

Colt offers two managed services that enable the data in two or more Data Centres to be synchronised in real-time. Both these services run on a Fibre Optic Network dedicated to the customer.

The first of these is called Colt SANLink and is cost-effective between two sites when up to about three separate parallel links are required. These links carry either standards based on Fibre Channel or the proprietary IBM equivalent, FICON, enabling encoded data transmission between the two sites. A characteristic of this service is that each link is carried over a separate fibre path.

The second, more scalable service is called HSS. This service uses Wave Division Multiplexing (WDM) to carry either 8 CWDM (Course) or 48 DWDM (Dense) waves along a single fibre. This service allows the addition of extra links to the service by simply inserting extra interface cards into the equipment chassis. This means that the service can be upgraded with zero downtime. The startup costs are greater than for the SANLink service, but the cost to upgrade the service is much lower as customers do not need to connect an extra fibre for each extra link. The service can be designed as a point-to-point service or can be arranged as a ring between three

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or more sites.

### 3.2 Benefits of a managed service

The benefits of buying a managed service such as SANLink or HSS over a DIY solution such as the Dark Fibre approach are largely to do with the expertise available within the design and operations departments of Colt.

Designing, installing and operating a complex multi-interface network that is carrying such valuable data is no small task. If all goes well, the network will be taken for granted. The day there is a problem, sufficient resource with the right experience has to be available 24 hours a day, seven days a week. Colt has significant experience in managing SAN and HSS services for enterprise customers across Europe/

As the data running on these storage networks is so crucial to the business and any disruption is potentially so devastating, it is worth looking at the level of resilience that it is possible to build into the design and operation.

The first consideration has to be one of location. It is now generally accepted that Data Centres are best located away from centres of population and certainly away from the company locations where the day-to-day business is done. This goes some way in securing the data against a range of failures ranging from spilling a cup of coffee into a server through to acts of terrorism. By connecting to two separate power generating stations and providing sufficient on-site battery backup and generator capacity, the network can be assured continuity of power supplies. Other considerations involve the geological stability of the site and increasingly in these times of climate change the risks associated with flooding have to be considered.

After the locations of the remote Data Centres are established, the availability of diversely routed fibres connecting them together and back to the parent company is important. It is not unusual for as many as four separate fibre routes all carrying the same data to be used.

After all the physical considerations such as location, security of power and connectivity have been addressed, the question of service assurance and fault resolution must be taken into account.

The health of the Storage Area Network also needs constant monitoring to ensure optimum service performance.

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Ideally, the Network Management Centre (NMC) should be remote from the Data Centres and the management traffic should be on a separate network to that carrying live data traffic. Any potential problem with power or connectivity must not impact on the ability to manage the integrity of the all important data.

The ability of the NMC staff to effectively manage any problems that occur on the SAN is both a function of the monitoring and control systems to which they have access and the level of expertise that is available.

This is where buying a managed service from Colt shows the real benefit. By outsourcing the service, the customer can focus on their core business safe in the knowledge that their critical networks are being cared for by experienced professionals.

Beyond HSS, Colt has 18 purpose-built Data Centre facilities across Europe where the customer can benefit from a complete range of managed services including Infrastructure Management Services, Network and Facility Services, Application Hosting Services and Managed IT Services.

### 3.3 Managing risk

Every time the SAN is compromised by equipment failure or degradation of one or more of the fibre paths, a crisis situation is created. Even though there will be a backup circuit ensuring service continuity during this period, that circuit itself is at risk from any card, power supply or fibre problem that will bring the service crashing down.

It is possible to reduce the effect of a network failure on the security of the critical data by good design, but by far the most important safeguard is to have the service managed by experienced Operations staff. All Colt SAN designs are scrutinised in detail before delivery by the Colt Operations staff to ensure that they can deliver the highest levels of customer service. This is because the Operations staff will be ultimately responsible for the experience the customer has of the network and it is in their interest that the design offers the highest level of resilience.

That expertise can really only be borne out of experience. At Colt, we have been operating Data Centre Interconnect services for more than 13 years on behalf of some of the most demanding customers. When the links customers are operating

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carry live data on million dollar transactions, they cannot afford to have any degradation or down time.

Making the right decisions in a timely manner on a system that is well designed is the key to high reliability. Colt has deployed a number of network management systems all overseen by the MicroMuse Netcool system, the industry leading manager of managers. This expert system filters and consolidates error messages that can be generated in all the different network elements to present the operator with a clear view of any root cause of a problem. This information helps the operator to assess the degree of risk the service is now facing and to make the right decision about fixing the fault.

Involving the customer in this decision is seen as a crucial part of resolving the issue - it may be that server maintenance is underway on one of the reserve paths and that switching traffic could degrade the integrity of the service even further.

These software tools, together with very rigorous and well-proven written procedures, help our very experienced staff make decisions with the customer that ensure the highest levels of availability.

### 3.4 Dark Fibre solutions

Another option available to customers is to purchase Dark Fibre and either install a solution themselves or pay a system integrator to design and manage the SAN installation. This can at first seem a cheaper option but any problems with the design or operation of the service could easily be wiped out if the company loses substantial business due to the failure of its IT systems.

With the right level of expertise, a Dark Fibre solution can hopefully provide the right level of data security. It must be said, however, that when it comes to the data on which the company survival rests, hope is not the best strategy.

### 3.5 Total Cost of Ownership

It is interesting to compare the total cost elements of a typical managed Data Centre interconnect service to a typical DIY solution.

Total Cost of Ownership will usually take into consideration the capital cost of

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procurement for equipment and spares, the cost of the fibre acquisition and maintenance, design and installation costs together with the ongoing cost of operating the system.

On a DIY basis, assuming a system integrator could get the same volume discounts as Colt, the capital cost of the equipment would be the same, but the cost of spares would be at greater as the spares holding could not be spread over multiple customers. Customer-specific card spares are usually held on the customer site, but spare chassis and common equipment is held in a pool centrally. Obviously, the more customers are being served, the greater the savings on spares holding.

The cost of Operations staff is where the majority of the difference is felt. At a Colt NMC, an Operations Engineer will typically oversee 10 customer networks, meaning that the cost of the typical seven heads required to cover operations 24 hours a day, seven days a week, including holiday and sickness cover, is divided by 10.

On a DIY basis, the staff who manage the SAN service can also be used to manage other parts of the company infrastructure. The disadvantage of this approach is that given the inherent reliability of a well designed SAN, the day it goes wrong, the level of skill and experience available may not be sufficient.

This has given rise to the practice of customers backing up a DIY provided service with a fully managed service to provide peace of mind. Most companies are put off operating in a totally unsupported way by the potential disastrous consequences of any down time.

Often, the managed service has become the primary route with the DIY solution relegated to backup. Whichever way a SAN network is set up, it must be designed and operated with the worst case scenario in mind. Colt's design specialists take this approach to provide the customer with the best solution for their needs.

### 3.6 Conclusion

Good location, secure power, excellent connectivity together with a good SAN design are all elements that can protect a company's data. However, expertise in managing the overall solution ensures that a company does not suffer any catastrophic failures.