Opting to have your own Dark Fiber

10 Reasons why it makes sense to have your own Dark Fiber set-up

Why it **makes sense** to have your own Dark Fiber set-up

1.
It's cheaper

2.
Multiple parallel and independent connections running alongside each other

3.
Upgrade to higher speeds at no additional monthly cost

4.
Greater reliability

5.
Encryption options

6.
Invest in your customer connection yourself

7.
Outsource your management but keep control yourself

8.
Offsite storage backup is easy to arrange

9.
Link-up to multiple ISPs

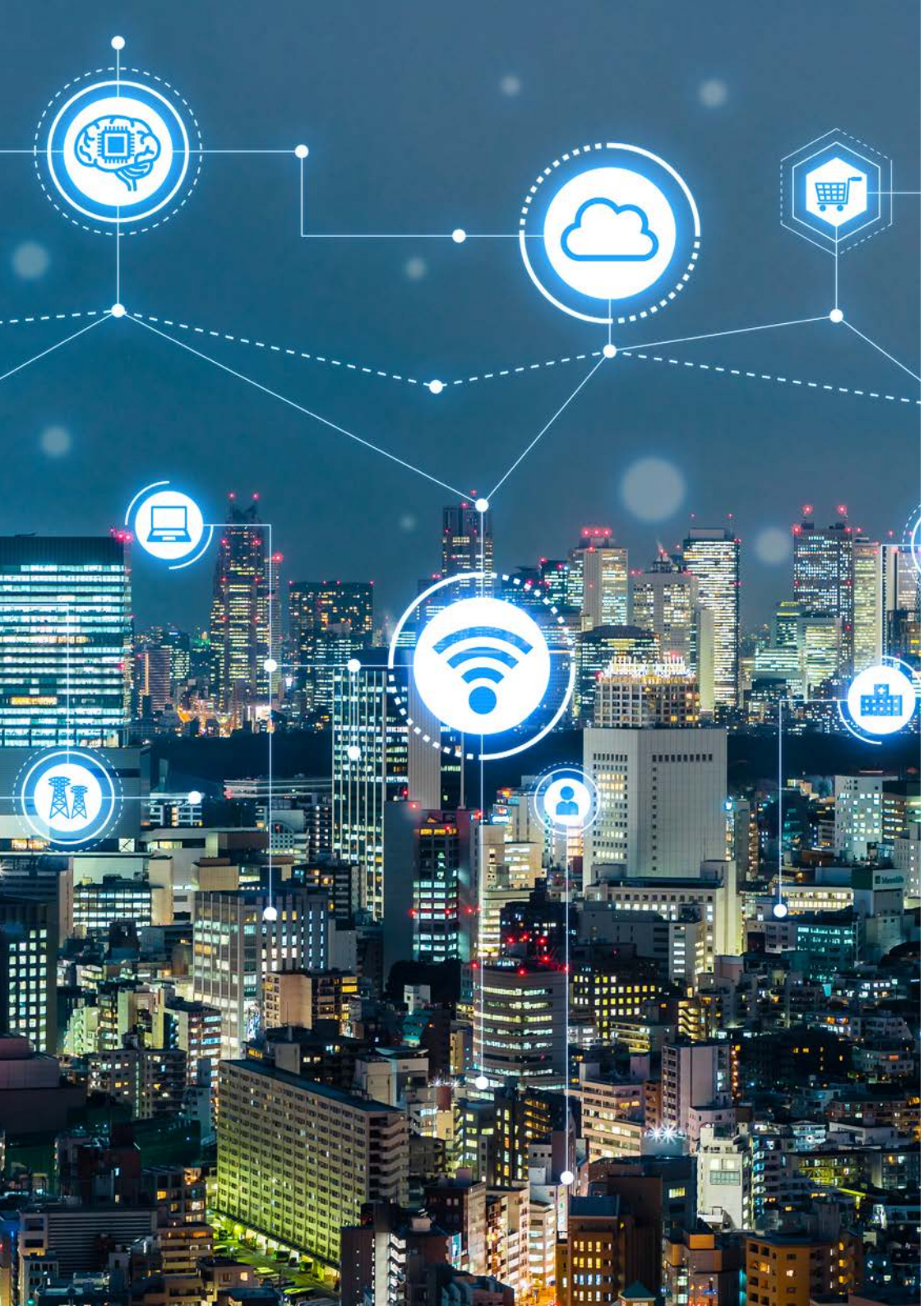
10.
Simplified architecture for your network

Provide a **backup** of your data

Consolidating servers and applications into a single data center has many benefits but it is not without risk. This is because if the data center fails your applications will be inaccessible, with your organisation also becoming inaccessible to both internal employees and end-users.

Backup-data center

A backup-data center has now become a 'must' and can be deployed in two ways, via either synchronous of asynchronous replication. In both cases, a lot of network capacity is needed between the two data centers (and possibly to your organisation's main location too). This network capacity is to be divided into Ethernet connections (for linking servers and users to these servers) and FiberChannel connections (for the links between storage systems). The network connections between the two data centers (and possibly with the main location too) have to be executed redundantly in order to take care of the scenario where one connection fails.



Distance between the data centers

The two data centers must be located at some distance from each other, namely 20 to 80 kilometres apart. It is not a good idea to have them too far apart as then synchronous replication becomes impossible. The advantage of them being sufficiently far apart is that in the event of an emergency such as a natural disaster, a gas leak or a prolonged power cut, it would be unusual for both data centers to be affected. The large-scale network capacity (1G or 10 Gb/s), the different protocols (Ethernet and FiberChannel) and the geographical separation make Dark Fiber the ideal solution to deploy here. Wave Division Multiplexing (WDM) equipment ensures that the different signals can still be transmitted independently alongside each other through a single pair of glass fibres, with a second glass fibre route providing the necessary redundancy. Here too, WDM equipment is used to provide independent Ethernet and FiberChannel connections. WDM equipment prevents different parallel glass fibre pairs being needed between the data centers.

10 Reasons to opt for your own Dark Fiber connection with WDM equipment

1. It's cheaper

If you relocate your server park and applications to two data centers or set up a synchronous backup data center then the capacity you need will increase quickly. Multiple 1 Gb/s set-ups or even a single 10 Gb/s set-up is/are very commonplace. Note that the monthly price for a leased managed connection increases quickly and the contractual lifetimes are long (3 years or longer). In other words, this is a good time to consider implementing your own Dark Fiber set-up. If you do then your head office and the data center(s) will not usually need to relocate for some time to come, with it certainly being cheaper to install your own ring-shaped fibre-optic (i.e. glass fibre) network over a period of 5 to 10 years.

2. Multiple parallel and independent connections running alongside each other

Urban fibre optic connections can usually be obtained relatively cheaply. However, as soon as the distance increases, the price rises sharply. WDM equipment allows you to have independent connections with just a single pair of glass fibres (or with just two pairs of them via separate routes in the case of redundant connections) without increasing your monthly costs. Each WDM channel (wavelength/colour) can have its own protocol and

application to ensure they are really independent of each other and do not affect each other at all.

3. Upgrade to higher speeds at no additional monthly cost

One thing is certain: your data capacity needs will increase. Ethernet connections to the servers/applications (and between the applications themselves) and storage capacity follow Moore's Law i.e. they double every 18 months or so. Having your own Dark Fiber and flexible WDM equipment means you yourself can increase the speed when necessary, independently of your operator / service provider. Having the right WDM equipment means you will be able to handle this growth very easily by adding or replacing cheap customer interfaces to the Ethernet and Fiber-Channel switches.

4. Greater reliability

If you lease managed or wavelength services then you are dependent on a single service provider who lets multiple customers use the same glass fibre. Adding customers causes interruption and can potentially lead to long-term interruptions. Routes can even change, which may lead to an increase in the round-trip delay, something that can have a critical effect

Unlit glass fibers are **safer**

on synchronous replication. In contrast, having your own unlit glass fibre set-up means your organisation has exclusive use of it and that it is completely under your own control. Furthermore, it is you who decides if and when upgrade work should be carried out.

5. Encryption options

Leased connections and Dark Fiber glass fibres travel across public land, which means they can be 'broken into'. Unlit glass fibres (Dark Fiber) are inherently more secure because you manage the peripheral equipment yourself. It is also possible to add another layer of protection (namely encryption) to the signal. This is an attractive option for such organisations as banks and hospitals that handle sensitive data. By applying encryption directly in the WDM equipment, you protect per wavelength/colour i.e. per connection. Another advantage of encrypting at glass fibre-level is that there is less delay than with (IP or other) encryption at higher system levels or at the level of the application. Centralise your encryption key management by entrusting it to a single security officer so that this is kept separate from the network department and/or the server/application department. This can even be done separately for each encrypted connection at the associated organisation, department or business unit.

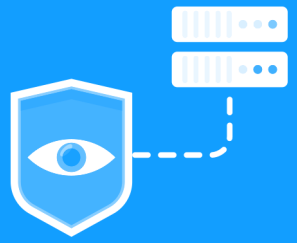
6. Invest in your customer connection yourself

If your head office does not have a glass fibre connection yet then in the case of a leased managed service you will have to pay a high one-off fee for your connection. As soon as the contract ends and you want to switch to a different provider, you will have to pay this fee again. This means in practice you are more or less bound to a single permanent provider. However, if instead you make a one-off investment in the customer connection (and if desired depreciate it as real estate) then you will continue to have a much greater range of options open to you.

7. Outsource your management but keep control yourself

Many businesses opt for a managed service because they want a full-service solution. However, in many cases you are still the one who notices if a connection is lost or slows down. In addition, there is a misconception that purchasing Dark Fiber and WDM equipment is an expensive and complicated solution. It is of course true that CWDM/DWDM technology is different to switching and routing but because connections and protocols are now being kept separate from each other on Layer 1 (the physical layer), WDM equipment does not have the complex software layer that routers have. What's more, routers are often difficult to implement and can add

Freedom of choice to purchase internet capacity from various ISPs



bugs to your system. In other words, the complexity actually stems from the lack of familiarity, not from the technology itself.

8. Offsite storage backup is easy to arrange

Even if you decide to house all your servers and applications in two external data centers and implement synchronous replication, it still makes sense to have a backup option at your head office. Uses for this could include making offline analyses of databases or developing new applications using some or all of the backup data. Ring-shaped unlit fibre-optic networks between the synchronous data centers and your head office will give you a great deal of flexibility when it comes to simply creating an additional connection (e.g. 1 GigE) to the head office to use with an off-site storage backup location. Another benefit of using offsite storage is that speed and round-trip delay become less important.

9. Link-up to multiple ISPs

Demand for Internet capacity is increasing every year, especially for organisations that have a large number of end-users as their customers. In addition, we are becoming ever more dependent on the Internet. Having your own Dark Fiber set-up and WDM equipment, along with access to a

range of ISPs in carrier-independent data centers, gives you the option of buying in Internet capacity from a range of ISPs. Apart from the benefit of redundancy (which is an important resource in respect of DDoS attacks) this keeps the ISPs on their toes in respect of their pricing.

10. Simplified architecture for your network

In the case of managed leased services, there is often a need to first bring all internal applications to layer 3. This makes some applications more complex and means expensive routers with fast ports are needed (1 GigE or even 10 GigE), even though this could be dealt with at the Ethernet level. The increase in speed combined with the many different applications means an (expensive) IP expert would be needed for the initial configuration and for maintaining this Layer 3 architecture. What's more, storage applications that are based on FiberChannel may find it difficult to function via the IP. Keeping the applications on the WDM layer and Ethernet layer separate from each other greatly simplifies the architecture and means that routers only need to be deployed where necessary (which means less investment is needed in peripheral equipment), this in turn meaning that the round-trip delay is kept within limits and that system management is simplified.