CORNING

CASE STUDY

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leumi

Bank Leumi maximises data centre survivability, computing flexibility and power efficiency.

One of the world's most unusual data centres is built 18 metres underground, providing an ultra-secure facility for Bank Leumi. Designed to survive missile, chemical and biological attack, the facility is one of the most power-efficient data centres in the world. In operation since 2010, it has become a de facto standard for data centres in Israel.

Background

Bank Leumi is an Israeli bank providing retail, commercial, corporate, private banking, capital markets and financial management in its domestic market and has international subsidiaries around the world.

The bank's existing 20-year-old data centre was at its end of life, running out of space and power, therefore unable to meet the future computing and applications needs of the business. As part of its IT strategy, the bank needed to extend the existing data centre's life while building a new state-of-the-art data centre – one capable of meeting its business continuity needs including the threat of hostile or terrorist attack.

Data centres are complex environments where skilled planning, design and implementation are necessary to optimise space and energy usage, maintain high availability, while providing the manageability and scalability for future growth. Therefore upgrading the existing data centre to meet short-term needs, building and relocating services to a new data centre, which could meet the bank's needs for the next 20 years, was a sophisticated multidiscipline project. Triple-T was commissioned to provide planning and integration services for a tailored and optimised solution around the particular requirements and constraints of the bank.

Retrofitting the Existing Data Centre

In 2004 the project team, involving the bank's IT services and Triple-T, defined its strategic plan for the data centre following best practices and knowledge of available and planned technology solutions. The plan included the need to upgrade the bank's existing data centre to meet short-term needs over five years by retrofitting with scalable infrastructure and additional power. Following this upgrade, a new data centre would be built with the requirement to relocate all services by the end of the five-year planning period.

Building the New Data Centre

The new data centre was designed on two floors. The first floor houses the core electrical and cooling infrastructure and the chemical/biological filters. The second floor provides 2250 square metres (24,218 square feet) of space and houses the entire IT infrastructure with separate environments for servers, storage, communications, the IBM platform and the operations centre. This layout involved the installation of 280 racks of IT and networking equipment. The whole facility was designed so that it can be remotely operated or run autonomously for 72 hours in the aftermath of any hostile attack.

The Cabling Architecture

From an infrastructure perspective, the design needed to meet a number of objectives:

- Reliability: resilient and able to support high availability 24/7
- Flexibility: accommodate changing requirements, easy to manage and adjust for minimal downtime during moves, adds and changes (MACs)
- Scalability: support data centre growth – both in additional IT equipment and increasing data rates over time
- Efficiency: support the need to improve data centre energy efficiency and help to reduce overall power consumption
- Service life: meet the challenges of the data centre over the next 20 years

In order to meet these requirements, Triple-T deployed a structured cabling infrastructure based on Corning Cable Systems LANscape® Pretium® Solutions. The design of the cabling infrastructure involved

a primary and secondary main distribution area (MDA), both of which extended backbone connectivity to the zone distribution area (ZDA) in each of the separate server, storage and switch environments. The MDA and ZDA topology improves the manageability of the cabling infrastructure, simplifying MACs, with the primary and secondary design providing a fully redundant mesh structure for the support of high-availability data centre services.

Bank Leumi Structured Cabling Solution

- Deployment of TIA-942-compliant structured cabling with modular high-density cabling solutions to improve manageability through better troubleshooting and simpler MACs
- Deployment of high-density, MTP®Connector-based connectorisation to enable the fibre optic connectivity to scale to thousands of fibre optic ports, supporting high-density equipment and future expansion of servers, switches and storage devices
- Deployment of Corning OM3 optical fibre to enable the data centre to support existing 1G and 10G speeds as well as future requirements for Ethernet speeds of 100G and Fibre Channel speeds to 32G and beyond
- Deployment of low-loss optical fibre connectivity model from day one to meet the distance and insertion loss budget with migration to higher speeds over its 20-year life

Flexibility and Scalability

The cabling to the servers, storage devices and IBM platform are all routed to the MDA to service connectivity of all the Fibre Channel and Ethernet ports. The use of Corning high-density, MTP Connector-terminated cabling between the ZDAs and the main distribution area (MDA) reduced cabling trunks and improved the scalability and flexibility within the data centre. The solution enabled the consolidation of hundreds of jumpers to just a few low-profile, high-fibre-count trunk cables routed to each of the zone locations. The modularity of the overall design supports flexible provisioning to respond quickly to the bank's changing business needs. For instance, new cabling trunks can be quickly added, interconnected at the ZDA and easily routed to the new IT equipment racks without any disruption to operations.

Low-loss Connectivity to Support Future Needs

The bank and Triple-T chose to standardise on Corning® ClearCurve® bend-insensitive OM3 fibre cables. The Corning cable provides the longevity necessary through the support of parallel optic transmission for easy migration to higher speeds in the future, such as 100G. In addition, the OM3 cable, together with the low-loss MTP Connectors, minimised the optical link-loss budgets for extended distances throughout the data centre. This enabled the data centre design to be based on a model where no link was longer than 110 metres (360 feet) with a maximum attenuation of 1.5dB – well within the tolerances for future 100G speeds using the Corning cabling solution.

Rapid Time to Operation

The high-density modular connectivity, factory-terminated MTP Connector assemblies and harnesses, helped Triple-T improve the on-site installation processes. Cabling time was reduced in comparison to the time it took in the bank's traditional data centre facility. This efficiency ensured that the stringent time frames were met in order to complete the existing data centre upgrade and subsequently enable the new data centre to be operational with all services relocated.

The Corning solution reduced the variability of installation costs, as well as increasing the versatility and productivity of the cabling infrastructure installation.

Corning Solution Benefits

- Flexible and scalable with low-loss, extended-distance, high-density fibre connectivity
- High availability (Uptime) with preterminated connectorisation and resilient mesh deployment
- Longevity of solution through bend-insensitive OM3 fibre optic cable and support of parallel optics
- Energy efficient via low-loss optics and high-density cabling to reduce congestion

Energy Efficiency

Improving the energy efficiency was integral to the design of the data centre. Triple-T's design was integral to achieving heat extraction from the data centre. Heat produced by IT equipment is held within the hot aisle containment systems (HACS) and removed from the hot aisle via cooling units. In addition, the deployment of virtualisation solutions enabled more efficient use of servers and storage devices.

The optical cable infrastructure design also contributed to the increased energy efficiency of the data centre. First, the optical switches and server adapter cards require less power to operate than copper equivalents – typically 0.5W per port versus 15W per port for 10G connectivity. Second, the high fibre counts and low profile of Corning cable resulted in up to 30 percent reduction in physical cable space, which helps keep ductwork and void space clear to improve cooling efficiency.

Benefits of Design Approach

- Rapid relocation of services – provided on time
- 30 percent reduction in power – with more servers
- PUE of 1.6 achieved

Through these designs, Triple-T was able to reduce power consumption in the new data centre by 30 percent while supporting more servers and storage devices. An overall power usage effectiveness (PUE) of 1.6 was achieved compared to the global average of 2.5. This achievement is significant given the hot climate in Israel and the extreme humidity challenges in an underground environment.

Results

The project outcome met with the guidelines set up at the start of the project. These included:

- Relocation of services to the new data centre was completed on time and nearly on budget. The slight discrepancy was due to the rise in cost of metals over the 5-year period.
- The site has become a flagship and de facto data centre design for Israel, with over 1000 visitors since it went into operation.

The Corning solution embodies state-of-the-art modularity and plug-and-play simplicity, ensuring that the infrastructure can support migration to 100Gbps with zero disruption. The use of high-density low-profile fibre cable opens up void spaces and ducts to benefit cooling and reduce overall cabling. The preterminated cables eased installation to realise a 24-month build from site acquisition to server operation.

The data centre is a significant source of pride for Bank Leumi's IT department and has become a regular attraction for visitors.

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