banking technology

SPECIAL REPORT

START YOUR ENGINES
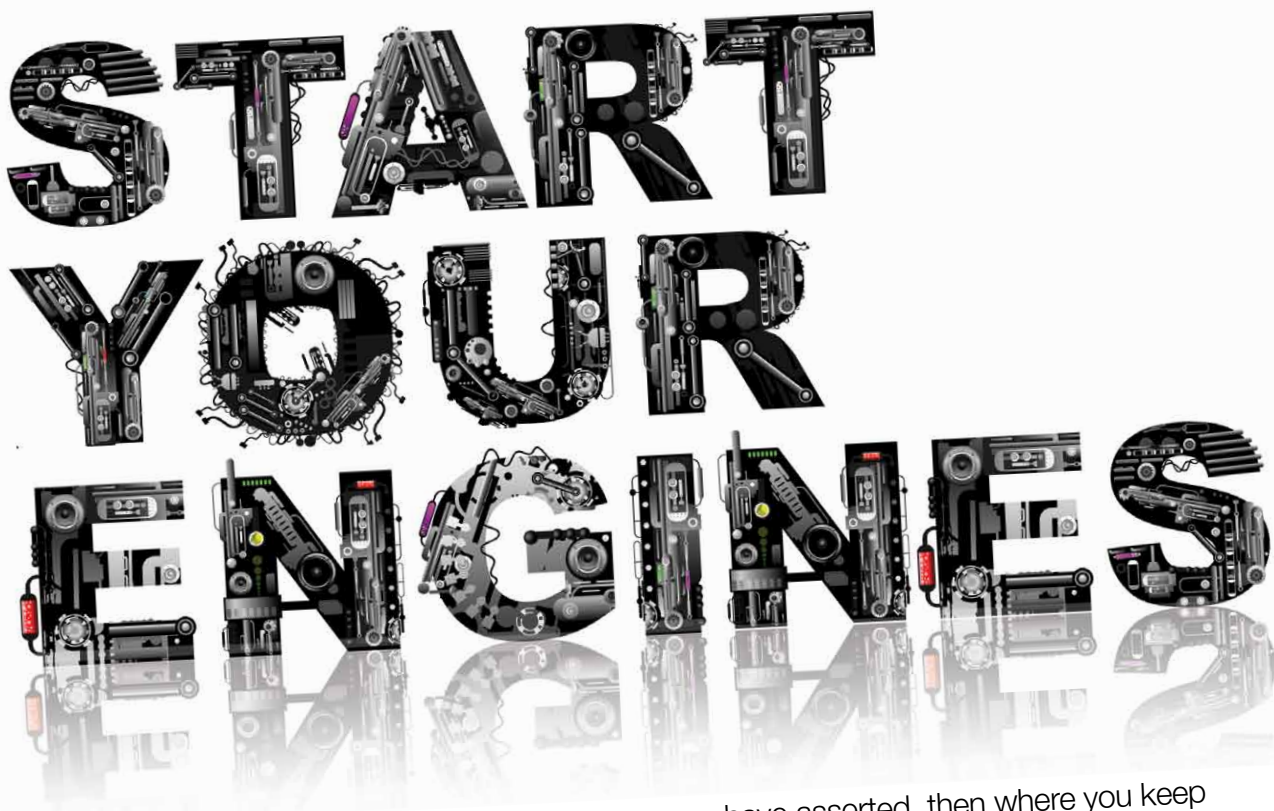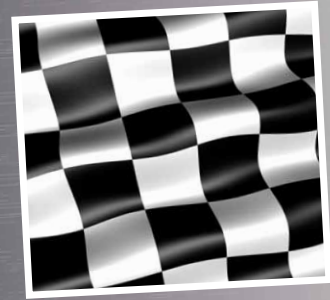
If financial services truly is a data business, as many have asserted, then where you keep that data is a key consideration. The data centre should be the engine that drives your business. **Neil Ainger** introduces this special report on data centres, examining the various merits of co-location and proximity hosting, the pros and cons of outsourcing versus self-builds, the best technologies to maximise efficiency and other key trends, such as the impact of carbon tax schemes on the sector and regulation. Get ready to rev your engines ...

The heart of any business depends on getting the basics right and the most common engine of growth at financial institutions is data. Customer data to cross- or up-sell, regulatory data to ensure you keep your license, market data, and the speed it is delivered at, to beat trading rivals – all of these things rely on data. How you store it, mine it, deliver it and so forth are all vital elements but everything relies on the first component of storing it effectively and efficiently. That is why the data centre, where it is located, its cabling, network connectivity, flexibility and the technologies used within it, is at the core of financial institutions' operations today.

Making sure that your engine is fine-tuned by deploying data centre optimisation technologies like server virtualisation, efficient air cooling/design, data deduplication, intelligent infrastructure management devices, more powerful chips and so forth, is also essential to ensure adequate performance and capacity as data loads increase. All of these technologies can help you achieve a more efficient data centre, which has been important over the last few years when facilities managers' budgets have been tight post-crash and will become more important after the UK government introduced its CRC Energy Efficiency Scheme this year (formerly ➲

known as the Carbon Reduction Commitment). The EU has its own carbon trading scheme as well, of course – Emissions Trading Scheme Phase II – which also seeks to use market forces to penalise inefficient data centres that use too much power and spew out CO_2. The US and others are also looking at similar 'cap and trade' schemes, which will cover data centres as they are so power hungry.

The trend over the last few years has been to optimise existing data centres as budgets have been tight or to outsource the facility to external service providers, such as Equinix, Interxion and others, who will run a data centre for you if so desired, either on a co-located basis or via a more comprehensive cloud computing model with the vendor providing the entire web of IT equipment and network connectivity – applications are merely pulled out of the cloud provided by the third party supplier.

Co-location facilities, housing many different end users where the client still owns and manages the hardware but rents cabinet or cage space – sometimes power, connectivity and network support services too – have become increasingly popular for smaller financial institutions that cannot afford the huge upfront capital cost of building a new, more efficient data centre, although the arrangement does mean a loss of control. Strong contracts, oversight and Service Level Agreements can, however, ensure the arrangement works. As Simon Neal, chief operating officer of co-lo provider The Bunker, warns: "FIs need to think very carefully before outsourcing any part of their operations to a third party data centre because it's an incredibly dangerous thing to do without the proper security measures and SLAs being in place. You need to look beyond the marketing hype and ask probing questions to ensure that SLAs will be upheld." If you are examining co-location partners you should always check that due attention has been paid to providing efficient premises in terms of its design layout and that sufficient power is available in that locality (a particular concern for data centres in and around London as the 2012 Olympics draw near). Then negotiate any rents accordingly.

The latency arms race in the investment banking sector has lead to a related data centre trend for proximity hosting, with firms co-locating right next to a matching engine in a data centre, to maximise the speed of trades and, in some cases, data delivery. A fast liquidity data centre is effectively formed.

The cloud computing concept is also encouraging some third party suppliers to construct new facilities in the hope that 'if you build it, they will come'. Any move to a new data centre needs to come with a robust migration strategy, and a good cabling and switching design to provide adequate connectivity. The correct mix of fibre and copper cabling and port options can also help to reduce heat, maximise latency and improve efficiency.

This special report on data centres will examine each of these trends in turn – co-location, proximity hosting and new builds versus optimising existing facilities – and try to give you a feel for the prevailing direction of the

sector and an indication of what package is best suited to you. What to specify in your data centre to help you attain efficiency and which procedures to follow will also be examined – whether to use expensive intelligent infrastructure monitoring devices, for example, or water chillers, to locate in the far north to take advantage of 'free cooling' or use virtualised servers to reduce the number of servers and data centres required.

New builds

The increased power demands being placed on financial institutions' data centres is created by demand-led drivers such as the adoption of desktop virtualisation, algorithmic trading and the rising amount of customer and regulatory data that financial institutions need to keep post-crash and to cross-sell effectively.

More power means more cooling expense and extra electricity costs, however, and if capacity is running out a new data centre is required. The great freeze imposed on new builds after the banking crisis is slowly beginning to thaw out. As Adam Levine, European vice president at vendor Digital Realty Trust says: "In the intervening years since 2008, the data centre markets in both the US and Europe experienced a precipitous fall in demand from financial services sector customers. However, it is becoming clear that the IT projects that existed pre-September 2008 did not just evaporate but were rather just 'resting' and are now being reactivated."

Optimising data centre facilities to cope with bulging data loads and keep electricity and running costs down is still a key concern

Optimising data centre facilities to cope with bulging data loads and keep electricity and running costs down is still a key concern, whether it's a new build facility, co-location migration or a technology overhaul in an existing facility. Sweating your IT equipment is paramount while budgets are still tight and building and running new premises is very difficult for all but the largest financial institutions to attempt alone. It's only global trading firms and exchanges that need to offer latency and proximity hosting services, such as NYSE Euronext – which has just opened its new data centre in Essex (*see page 38*) – that are building really big new internal facilities at the moment, or large institutions that need to consolidate acquisitions made during the banking crisis of 2008.

Nomura, for instance, has just opened a new, dual data centre facility in the UK after acquiring Lehman Brothers' European operations (*see page 36*), although interestingly this latter project is a co-location initiative undertaken with Sentrum and Digital Realty Trust's help. Nomura's Shinkyo ('new home') project won the *Banking Technology* Awards 2010 trophy for Best Infrastructure Achievement and involved migrating to two new high-spec data centres and decommissioning four old facilities, thereby improving the capacity, scalability, reliability and efficiency of the bank's entire IT infrastructure.

After a six-year build, €500 million investment, and the creation of a technology and customer services team with more than 800 people, **Visa Europe** completed its new European inter-bank processing service this year, another significant new build in the financial services data centre ❯

BANKING TECHNOLOGY AWARD WINNER: NOMURA'S IT INFRASTRUCTURE PROGRAMME AND NEW DATA CENTRES

Nomura opened two new data centres in Surrey, to the south of London, during May, equipped with leading edge technology and efficient green technologies that will stand the investment bank in good stead for years to come, providing it with a high performing infrastructure that can underpin future growth. With a combined floor space of 2,920 m^2, the two new facilities were ready just nine months after work started on the multi-million pound project, against an expectation of two years for such a large undertaking. An equally aggressive target to migrate all the applications to the two new co-location data centres (run by Sentrum and Digital Realty Trust, with Nomura in charge of all of the technology) was achieved by September 2010. Each trading floor was moved in an aggressive three-month schedule, alongside a simultaneous move to Nomura's new EMEA headquarters in the City of London, which houses 3,000 staff, and was part of Project Shinkyo ('new home' in Japanese).

The acquisition of Lehman Brothers European operations was the catalyst for Project Shinkyo. The bankrupt firm's old data centres did not meet Nomura's demanding objectives on efficiency and environmental impact and the investment bank wanted to invest in a new flexible platform, covering offices, telecoms and data centres, that would support growth, new product development and changing market conditions. More pressingly, Lehman's operations also had to be quickly unwound from ties in Europe and the US, as different parts of the bank were sold off to different bidders. The decision was made, therefore, to go for completely new facilities and to consolidate four old data centres into the two new state-of-the-art data centres in Surrey. The server estate was reduced from 7,400 down to 3,658 and efficiency was further encouraged by increasing the number of virtualised VMWare servers from 2% of the total up to 35%. Purchasing new servers meant that 64-bit operating systems could be used across the board, enhancing utilisation rates and efficiency. This was underpinned by the largest installation in the banking industry of Cisco's flagship Nexus switching system for the network. Several tiers of storage were deployed to increase cost efficiency, while meeting the performance requirements of different applications.

The extensive green innovations implemented by Nomura included variable speed computer room air conditioning (CRAC) units to reduce power consumption. Cold aisle containment and adjustable vented tiles were also used to improve cooling and airflow, and the whole design was optimised using CAD modelling. Top of rack switching reduced the quantity of copper cabling by two thirds. These switches were then linked back to the centralised network infrastructure using fibre cabling, reducing the required power levels, while future proofing Nomura's infrastructure by enabling higher bandwidths.

Individual cabinet monitoring devices are used in the Surrey data centres to check temperatures and power consumption rates on all the 630 cabinets. These intelligent infrastructure devices can make dynamic real-time adjustments where required to ensure optimal configuration and efficiency. Back at Nomura's new City HQ, water-cooled trading desks are used to further improve the efficiency of the new IT platform, in comparison to standard air conditioning.

As a result of all these innovations, the team at Nomura has been able to increase computing power by 20%, enhance reliability and latency, and provide an additional 51% of spare capacity. Over 2,000 terabytes of data has been migrated along with 1,000 application components. Nomura also implemented an innovative telecoms hub, developed with Verizon, which leverages low-latency fibre links between the two Surrey data centres and its new London HQ to improve performance. In addition, the investment bank has reduced its total power consumption, including mechanical and electrical systems, from 11.5MW down to 6.4MW, which will save 24,399 tonnes of CO_2 per year, lowering the bank's data centre carbon footprint by 44%. The Power Usage Effectiveness ratio has been lowered from 2.6 to 1.6. PUE is one measurement of how green or efficient a data centre is.

This was truly an impressive project and a worthy winner of our *Banking Technology* Awards 2010 trophy for Best Infrastructure Project. As Sam Ruiz, MD and European co-head of equities at Nomura says, "what the technology team has accomplished in such a short space of time is quite extraordinary."

market. The dedicated European authorisation, clearing and settlement system runs on two new 5,000 square foot data centres in the UK.

Thanks to the new facilities the payments processor is now strategically positioned to deliver a single payments processing network to its 4,000 member banks across Europe, helping meet EU data privacy demands and the coming Single Euro Payments Area stipulations.

The inter-bank payment processing platform has a capacity of 2,500 transactions per second, giving Visa Europe plenty of room for future growth in volumes. The platform has an average speed of 20 milliseconds and is expected to deliver faster point-of-sale transactions and stand-in-processing capabilities to member banks and retailers across the European continent. It also offers same day national settlement services to European member banks in 18 different currencies, minimising exposure to currency fluctuations, and provides efficiencies and cost benefits from upgrading to a newer infrastructure.

Two identical systems ensure that the total system estate, spanning 10,000 square foot across the two separate data centres, is a highly resilient one, with claimed in-built failover and disaster recovery capabilities. When the last management consoles came online during the final ramp up procedure in August 2010 an average of 28.6 million transactions a day were processed, worth a total of €1.7 billion.

"We've developed an inter-bank processing service that uses open system technology delivering scale, processing efficiency and unparalleled resiliency," says Steve Chambers, Visa Europe's chief information officer. "It can handle cross-border and domestic market processing services with low costs and high reliability. Plus, we now have the capability and capacity to provide further services to our member banks in future, such as SMS mobile transaction text alerts, real-time scoring fraud detection and device profiling."

Optimising existing data centres

Other examples of new builds are few and far between, illustrating that the market hasn't returned to the boom years of the mid-noughties, except for niche areas such as proximity hosting facilities – for example, Equinix's on-going investment in its Slough data centres to host Chi-X Europe's trading platform and associated trading firms. The market for new builds isn't going to recover to the levels that existed pre-crash for a while, when huge great projects such as Citi's European data centre in Frankfurt were undertaken, with a green turf roof, green efficient technologies and a large upfront capital expenditure.

Indeed, only this time last year **HSBC** cancelled its planned £300 million data centre in York, which was to have been paired with a facility in nearby Leeds, creating one of the bank's most important global data centre hubs. The York DC was cancelled due to the fact that budgets were tight post-crash but the decision was also due to the efficiency gains already achieved at other HSBC data centres that were developed slightly earlier in the UK, principally in Leeds and North London. The latter facility won the first ever 'excellent' rating in September 2008 for its green and efficient design under the Building Research Establishment's Environmental Assessment Method (BREEAM) certification programme. To be fair,

the bank is also focusing more on growth in Asia, where better prospects lie ahead in the next decade, and that is why it built a new £165 million data centre in eastern Kowloon, Hong Kong, to accommodate future growth in the region. As Ken Harvey, chief technology and services officer at the time of the York cancellation, said: "We've been investing heavily in data centre capacity since 2007 and have determined that we can meet our short and medium-term European business needs with the expanded capacity in Leeds and North London and via better utilisation of our global data centre network". The York decision proves that if you improve the efficiency of existing data centres thoroughly enough, via the use of server virtualisation to drive up utilisation rates and good design principles to ensure the premises are run efficiently you may not need so many facilities in the future.

Some other large retail banks are also putting money into overhauling their existing data centres, rather than building new ones, whether that is through necessity or choice doesn't really matter. **RBS** for example launched its Edinburgh data centre optimisation (Edco) project last year, as the existing facility in the Scottish capital was rapidly running out of space but funds weren't in place at the time for a new build data centre. By mandating a port audit – and closing off any port connections that weren't in use – and introducing procedures that forced any new IT projects at the bank to identify what could be decommissioned to make room in the data centre, the bank was able to dramatically improve the efficiency of its existing data centre.

According to Wil Cunningham, who headed the RBS optimisation project at the time and is now lead contractor on Lloyds Banking Group's integration project, new smarter power management solutions and refitting the RBS premises with better racking, air cooling and design parameters also helped. "The impact of losing a very minor disaster recovery system is negligible too," he says. "DR for critical systems is obviously vital but there's a lot of duplication that can be removed." It wastes power, in his opinion, and turning off unimportant basic DR systems considerably reduced the load on the Edinburgh data centre, extending its lifetime and efficiency.

Lloyds Banking Group has also overhauled its data centre in London this year, working in conjunction with Hitachi Data Systems. The project was necessary because like many banks that took over rivals during the banking crisis, LloydsTSB, had to absorb HBOS' operations into its own and consolidate facilities and applications into a single entity. LBG's Wholesale Markets and Treasury and Trading department is made up of the old Bank of Scotland treasury unit and Lloyds Corporate Markets and the new conglomerate wanted to optimise the data centre capabilities and services that could be offered to its wholesale banking staff. As Colin Everett, head of IT architecture at WMTT explains, "the transition to a next generation storage solution is a key enabler for our infrastructure maturity strategy."

The old storage platforms couldn't scale to meet the increased demands of both the pre-merger banks. The enterprise environment had effectively doubled following the takeover of HBOS, with a 20% quarterly rise in structured data and 30% in unstructured data – way more than the industry average. WMTT needed to ensure it could cope with sustained growth of this nature, especially as Lloyds Banking Group is targeting the segment for aggressive growth. Consequently, a vendor selection process was undertaken and HDS was chosen to install:
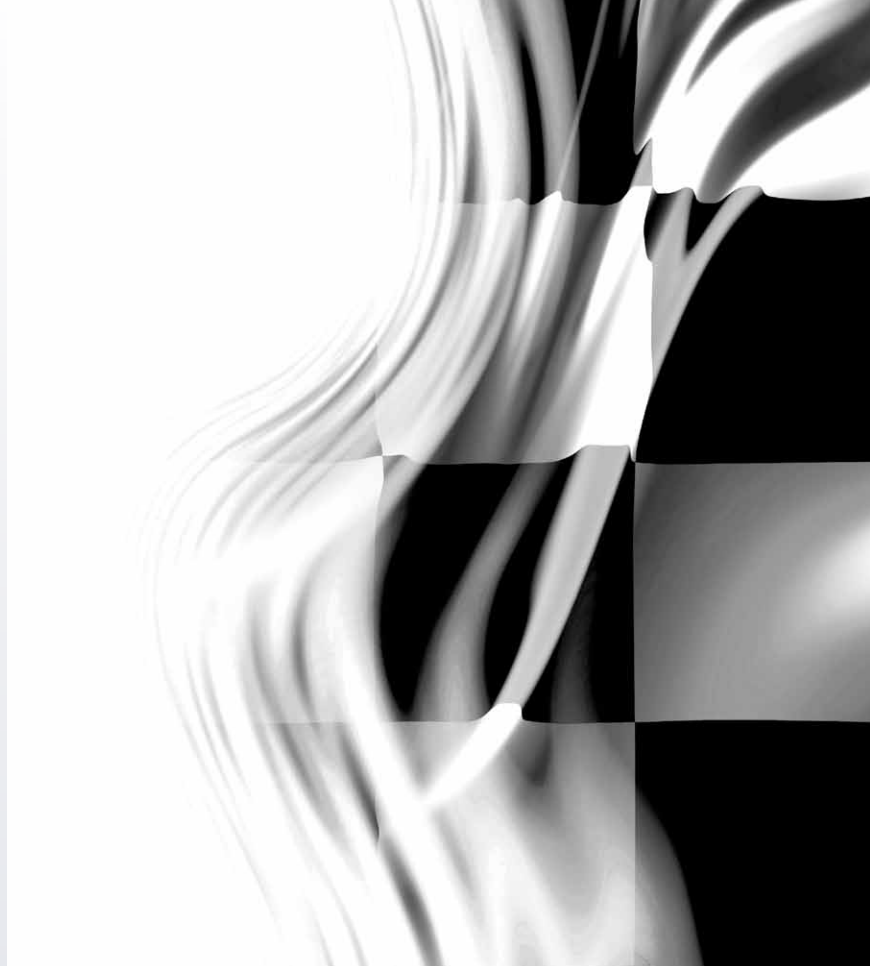
- One Hitachi Universal Storage Platform V to support the primary data centre in London upon which WMTT operations were being consolidated
- Another USP V unit supporting its disaster recovery solution.

Another two units were installed, alongside one Hitachi Universal Storage Platform VM to support the department's development environment on a separate site outside London. The bank then virtualised its live storage environment behind the USP Vs, enabling its entire Storage Area Network, which holds 1 petabyte of data, to be pooled into one virtual resource. A more flexible IT service is now available to business users, with resources dynamically being assigned as required, while providing a more stable infrastructure.

The new Virtual Storage Platform from Hitachi, which automates dynamic tiering to ensure the most appropriate storage media is used, improving utilisation and performance, is also currently being tested by Lloyds Banking Group. The bank was attracted by the future flexibility offered by the open architecture, which allows multivendor assimilation.

If the trial is successful the VSP will be deployed on the business-critical batch-based 4 Terabyte Microsoft SQL Server 2005 database that loads 50 million transactions every night, as well as being constantly updated throughout the day. The program is mirrored to the disaster recovery site as well to increase business continuity.

The trial has so far increased application provisioning times, oversight, resilience and administrator productivity, meaning it is likely to be rolled out fully in the new year. ❯

This type of intelligent infrastructure management system is what is needed in complex data centre operations these days to optimise performance further.

HP offers a similar hands-on optimisation technology, this time for air conditioning purposes. It's called Dynamic Smart Cooling, which automatically controls the ambient temperature in a DC to ensure there are no server blackouts and provide the best possible performance. Cutting the amount of data in the first place with data deduplication software – which does exactly what it says on the tin – also delivers a more efficient data centre. Better quad-core microchips, from the likes of Intel or AMD, can drive up utilisation rates too, just as we have seen server virtualisation does with the Nomura case study on page 36 – although if these two latter options are chosen to optimise a DC then the adoption of dynamic cooling and CAD airflow modelling is a must to deal with the intense heat.

Green DCs and carbon taxes

One of the drivers towards the so-called green data centre, which is a pretty oxymoronic phrase when you think about how much CO_2 is spewed out by these facilities, is the UK CRC Energy Efficiency cap and trade scheme and its forerunner the EU ETS. These 'carbon tax' initiatives effectively create another reason for investing in the engine of a financial institution – namely, its data centre.

Carbon emissions are not only environmentally – and reputationally – damaging, they hit the bottom line too. Large organisations and polluters, and this includes massive FI data centres, now have to buy allowances for each tonne of CO_2 they emit and will, eventually, be placed in a league table that assesses their performance. Under the scheme, the money raised is redistributed with the best performers getting a rebate – perhaps even making a profit – while the worst performers suffer 'fines' or higher

CASE STUDY: NYSE EURONEXT'S NEW EUROPEAN DATA CENTRE

The need for speed and alternative proximity hosting examples

The new NYSE Euronext data centre in Basildon, Essex, opened fully for business on 25 October 2010 when the Liffe derivatives exchange moved into the new facility located 30 miles to the east of the City of London. All four matching engines for the exchange's core European markets are now situated in the huge new data centre, with the trading systems for its equity Euronext business and the dark pool of liquidity that is SmartPool moving into the new premises during September (the former necessitating a politically charged move from Paris to London). NYSE Arca Europe, the group's multilateral trading facility migrated on 11 October, bringing the three-year project to a close.

According to **NYSE Euronext** the new data centre in Essex is designed to provide and facilitate an array of state-of-the-art technology solutions and will offer co-location services, with more than 40 high frequency trading firms already migrating to the facility during phase one in May. The project, managed and run by the NYSE Technologies subsidiary, also includes a 100G fibre optic network, provided in partnership with Ciena, flexible configuration options and ultra-low latency market data delivery, thanks to the proximity hosting capability. It joins a similar US liquidity data centre launched earlier this year by the exchange in Mahwah, New Jersey. Both facilities are designed to maximise trading efficiency and resiliency with less than 50 microseconds of internal latency between customers' equipment and the matching markets, which are stored in-house.

Dominique Cerutti, president and deputy chief executive of NYSE Euronext, says he sees the two data centres in the UK and US as "the centrepiece of our vision for the future of global markets", adding that they "offer customers a combination of market access, technology solutions and market data services … and show how we plan to innovate capital markets and empower traders worldwide."

The initial idea for the Basildon data centre had been to provide exclusive NYSE Euronext co-location services but third-party providers of 'co-lo' have now been invited in as well, mirroring the London Stock Exchange's own recent move to allow the same practice. The LSE rescinded its privileged arrangement with QuantHouse, whereby only it could provide co-lo proximity related services, such as market data feeds, in October 2010. Both announcements show that trading venues are at last realising that they must allow connectivity to other exchanges and trading

platforms and facilitate interoperability. Limiting their co-location services to the few traders who might want to connect solely to the host venue was unrealistic. Stanley Young, chief executive of the operators NYSE Technologies, is sure that there is more than enough spare capacity in the new Essex facility to host other trading venues and markets, something they are confident of achieving in the new year, illustrating the change in attitude.

Among a host of other firms, Fixnetix is now providing trading and data services in NYSE Euronext's Essex data centre; just as it now is in the **LSE**'s newly 'liberalised' central London data centre, which incidentally now plays host to the Norwegian and Italian cash markets, alongside the core London equity venue, its EDX derivatives markets and the Turquoise MTF. The latter is using a new trading platform from MillenniumIT, the Sri Lankan IT company bought by the LSE in 2009, to overhaul its systems and improve group-wide latency and performance.

NYSE Euronext's has its own Universal Trading Platform programme of course, due for completion next year, further illustrating the vertical and integrated proposition that exchanges now want to bring to market, encompassing everything from the trading solution, to data feeds and the data centre. They clearly believe this is where the money is post-MiFID I, although some rival data centre providers would no doubt contend that they can offer hosting facilities more cheaply. Interxion, for instance, has its data centre in East London and a further 11 across Europe, while Equinix have their financial eXchange proximity hosting community, which notably supports **Chi-X Europe**, the most successful of the new MTFs. The venue uses Equinix's Slough data centre, to the west of London, to host its platform and firms looking for proximity services, with the new LD5 facility opening up capacity for future growth as and when required. A new Point of Presence (PoP) offering at Equinix's Frankfurt data centre (FR2) has also been added by Chi-X and the MTF's business continuity solution is outsourced to the vendor's Park Royal centre in London (LD3).

Outsourcing your data centre, and associated services, is therefore eminently possible for financial institutions. Pricing will be a key factor in where market participants decide to place their trading engines. In an era of low equity trading volumes post-crash, latency, convenience and capacity – while still paramount – won't be the only considerations.

rates accordingly. Other so-called 'cap and trade' carbon tax initiatives that seek to use market forces to cut CO_2 and increase efficiency are underway worldwide, with the US and Asia looking to follow the European lead.

The data explosion in financial services, caused by business and regulatory demands for more customer data on the retail side and High Frequency Trading on the investment side, mean that FI data centres are now major polluters – some even claim the sector will overtake the aviation industry in the end – so cutting emissions is a key requirement. It's not for some spurious environmental or CSR reason either, but because improving efficiency cuts onerous carbon 'taxes', improves running costs and the Total Cost of Ownership calculation for large data centres, which are generally expected to last for 10 years or more.

"Interxion see the CRC and ETS as playing a crucial role in furthering the green agenda," says the company's managing director, Greg McCulloch. "We've been focused on power profiling and forward power profiling for many years now and have done the big things like free cooling, but it's also about doing the little things like installing passive infrared sensor lights to economise on lighting and installing blanking panels within the server cabinet racks to channel the flow of air to assist cooling. All these things help."

Some of Nomura's 630 cabinets

The idea of a green DC may seem contradictory but the philosophy behind it is not useless because all the term really means is making your facility as efficient as it can possibly be, with some sustainable elements like turfed roofs, recycled water and construction materials thrown in for your Corporate Social Responsibly programme. Whether you buy the greenwash or not doesn't really matter as long as you get the efficiency improvements that utilising servers more effectively brings.

"We expect that data centre energy consumption will continue to rise up the social and political agenda in the coming years, increasing the scrutiny on energy efficiency," says Rob Coupland, chief operating officer of Telecity Group.

The vendor rolled out the EU Code of Conduct on Data Centres to all of its 24 European facilities last year, the first to achieve such a feat, and it complied with the UK Carbon Trust Standard at the same time for its 10 UK data centres around London and Manchester. Voluntary codes of conduct rarely change things however, and it is likely that carbon tax initiatives, such as the CRC, will be the real drivers of change.

Complying with voluntary efficiency codes will, at best, give you a head start over rivals.

A recent survey by data centre co-lo specialists Sentrum showed that only 15% of large UK organisations had adopted the EU Code of Conduct this year, with 36% of IT managers saying there had been other more important matters to attend to and 48% citing stretched resources. Even those who had signed up had not necessarily complied with the Code's efficiency recommendations, so a better bet might well be to comply with the green tax stipulations and use the Code as a guideline at best.

The cloud

The nebulous concept of cloud computing is either a key trend or a one for the birds depending upon your definition of it. If you think, as is common now, that it is "... internet-based computing, whereby shared resources, software and information are provided to computers and other devices on demand ... delivering common business applications online, while the software and data are stored on servers," then you agree with Wikipedia and the orthodox viewpoint, and no doubt expect major growth in cloud services. If, however, you agree with Oracle chief executive Larry Ellison, who famously criticised the term at the 2008 OpenWorld event, by saying that cloud computing simply meant "everything that we currently do" and that it will have no effect except to "change the wording on some of our ads", then you understand that the practice has already been around for 10 years or more, simply under a different name.

Whichever side of the argument you subscribe to – whether it's new or not – the fact remains that cloud computing's attractiveness continues to grow. In reality, the concept has caught up with the technology. You need to build some data centres to host these web-delivered applications and services, and third party suppliers are doing just that. Some smaller FIs may want to outsource all their data needs to just such a cloud provider (perhaps they'll call it datacentre-as-a-service – the terminology doesn't matter). Exiting the expensive business of running your own DCs and IT environment is a distinct possibility for some.

There is a need for standardisation if the cloud is to achieve widespread adoption however, and concerns remain about security, data protection and interoperability. That is why the Cloud Industry Forum (CIF) collective has developed a code of conduct and certification for cloud service offerings.

The new Open Data Centre Alliance is also fighting to ensure open, interchangeable data centre and cloud standards, and to avoid silos. It has recently added Deutsche Bank, JP Morgan Chase, NAB and UBS as members to its steering committee.

The cloud trend is on the rise and as data loads go up, green carbon taxes hit and flexibility becomes more important it is possible that in future all but the largest multi-national FIs will exit the business of maintaining their own DCs or undertaking basic co-location, in favour of handing over the entire IT environment to a cloud provider. It's a risky move at this early stage, and by no means certain to happen despite large vendors' fervent wishes.

An instance of the popularity of the cloud concept can be gleaned from the new **Thomson Reuters** cloud-delivered high speed aggregated data distribution network and hosting environment launched this year. This uses the firm's Elektron fibre optic network and various data centres around the world to enable hedge funds, asset managers, banks, brokerages and exchanges to share information and connect with global trading partners.

This 'cloud' links strategically located proximity and co-location hosting centres, opened in New York, Chicago, London, Frankfurt, Tokyo and Singapore this year. Hong Kong, Indian and Brazilian data centres will follow in 2011. By using the open, neutral network, liquidity providers will ❯

be able to publish messages and content directly to their discrete counterparties and subscribe to service providers' analytics, algorithms and risk models, as well as to post-trade facilities and reference data resources. The aim is to aid trade automation by enabling firms to trade faster, using comprehensive real-time financial information, while connecting to many different markets and interacting freely via the global, secure cloud. Thomson Reuters says users will see lower running costs and quicker speed to market for new tools and strategies. The community launched in April with Chi-X Europe one of the first customers. Interestingly, it is a private cloud being offered by Thomson Reuters – public clouds are not gaining traction in the financial services arena because of security concerns. As Sandy Hamilton, vice president of EMC Consulting comments, "new technologies such as virtualisation and cloud computing have forced data centres to generate new ways of regulating data access and usage, ensuring that customer information is continually kept out of harm's way – after all banks are a prime target for fraudsters." Appropriate access control is the crucial requirement as this mitigates the insider threat too.

Nasdaq OMX has also launched a cloud-delivered service that lets customers access huge amounts of historical tick data on demand, eliminating the need for ever larger in-house databases and ultimately the data centre space needed to support them. The Data-on-Demand service is aimed at everyone from retail investors to algo traders and large multinational traders and covers Nasdaq OMX records, NYSE Euronext and other securities. "Customer are able to cut costs by getting the data they need when they need it," claims Randall Hopkins, senior vice president of global data products at the exchange.

Virtualisation

Virtualising your servers is perhaps the biggest single step that you can take to improving the efficiency of your data centres but most large financial institutions have already taken this step. (If you haven't already, why not?)

"Virtualisation has played a key role in enabling financial institutions to consolidate their information and the number of data centres [closing older unwanted facilities to cut costs]," explains EMC Consulting's Hamilton. "Consolidating your data centre estate across multiple countries – with different regulations, data protection acts and so forth – is difficult but it is possible to only have two or three huge global data centres serving the regional needs of multi-national banks, thanks to virtualised servers and the computing power they can pack into a large facility."

Many FIs, such as **Morgan Stanley**, which has developed a cluster around New York, Tokyo and London recently, have used server virtualisation to reduce the cost of its DC estate and enhance capabilities at the same time. With virtualisation, for instance, mirroring to a standalone business continuity facility becomes easier and new product launches are speeded up.

Server virtualisation is the biggest step to improving data centre efficiency but most large financial institutions have already taken it

Dealing with the aftermath of virtualising your data centre is the next most important step, as installing VMWare or whatever system you have specified, generally raises temperatures significantly as utilisation rates – and consequently heat – goes up for each virtualised server. It is working harder, so the cooling systems will be too. That is why adopting dynamic CRAC units that can respond to temperature changes, installing cold aisle containment and utilising good design layout is essential in virtualised facilities if power requirements and running costs are not to skyrocket. A 'green' data centre (i.e. efficient facility) is one that has been virtualised but where other management software and design-led initiatives have been deployed to contain the heat generated.

The heat problem at virtualised DCs, and the subsequent power/cooling challenge, is only likely to get worse as future trends kick in such as the increasing adoption of desktop virtualisation (or thin clients as they used to be called). If you take the hard drive away from the office or branch computer and deliver applications and operating systems directly from the data centre, then you are adding another source of heat to the facility – compounding the cooling challenge.

Morgan Stanley has adopted a Virtual Desktop Infrastructure, as part of its wider data centre consolidation and technology overhaul, and aims to complete the VDI rollout in the new year. A standardised Citrix Xen desktop with Windows 7 has been specified for bank staff, using VMWare Hypervisor and NetApp for storage and replication duties. With approximately 60,000 desktops at the bank however, it's been a tough project to manage but Morgan Stanley are clear as to the benefits – security will be enhanced because users cannot plug in USBs anymore and access control is centralised and strengthened, plus traders won't have to wear shorts on the floor anymore because the offices won't be so hot without hard drives there.

The main thing, though, is the flexibility VDI gives the bank as it extracts products and services from the physical location, making speedier delivery and roaming work practices possible. VDI will add a lot of demand to your DC though so this is one future trend to watch out for. As EMC Consulting's Hamilton says: "If the virtualisation of 100 servers has been challenging for some, then the virtualisation of 100,000 desktops opens up a whole new array of energy and IT challenges. However, we believe VDI will take off in 2011, so get ready for it and expect it to impact your data centre."

Whether you go for a new build data centre, decide to optimise your old one, co-locate or go up into the cloud you must ensure that you have a clear idea of your objectives and manage the migration without disrupting the business. Hopefully, this special report has given you some ideas, highlighted some technologies, and provided some case studies to guide you in any such project, and assisted you in revving up your engine of growth.

Start your data centre engines now, armed with the case studies and ideas of your peers. **BT**