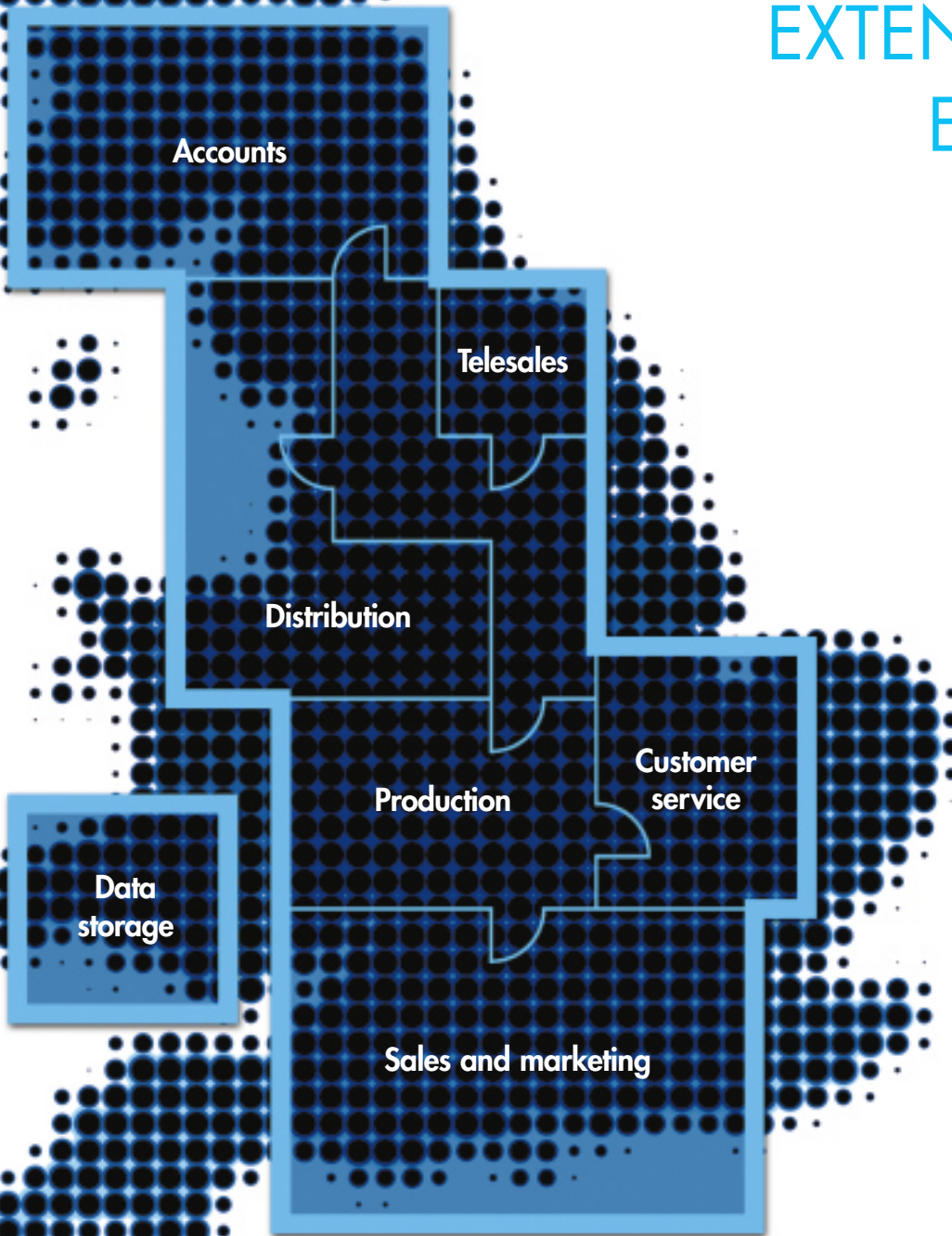


# NATIONAL ETHERNET: EXTENDING THE ENTERPRISE

Technology briefing



## INTRODUCTION

The ebusiness era has opened up many new market opportunities and chances for profitable commercial collaboration, but B2B and B2C automation creates massive integration and business process extension challenges for IT designers. The ongoing drive for network-enabled ebusiness capabilities means that fewer automated processes are completely owned, managed and used in house. Given the complexity of the average enterprise IT system, it's not a trivial task to give customers and suppliers real time interactive access to back office and front office systems across a Wide Area Network (WAN).

Traditional WAN data services, including Frame Relay, ATM and Leased Lines, have often been major obstacles for enterprises who want to interoperate with customers and suppliers via web services and powerful distributed computing applications. "Suppliers" in this context encompasses a wide range of material suppliers and service providers, including: business process outsourcers, co-marketing partners, boutique service companies, ecommerce providers, joint venture participants and other diverse trading partners. Due to the cost and inflexible nature of existing WANs, the network has become a bottleneck that encourages the isolation of users, data and applications. The isolated nature of many core business applications goes against the need for business processes that seamlessly cross boundaries

between departments, business units and enterprises. With traditional WAN circuits the amount of bandwidth available to wide area applications is typically less than 10% of what they would receive on a standard Ethernet LAN.

Existing WANs are slow and they are also expensive and time consuming to configure and change, taking weeks or months for a simple bandwidth upgrade in many cases. To make things worse, traditional WANs use protocols, devices and network management systems that have very little in common with the low cost standards-based technologies used in Ethernet LANs. Bottom line: the high costs and low speed of circuit based WAN links are limiting the ability of enterprises to deploy effective business integration and extension methods.

### Reach out across the WAN

Flexible, low cost, high-speed WAN bandwidth is a necessary prerequisite for the latest generation of business integration and extension methods, including web services, XML and multi tier distributed computing architectures. National Ethernet breaks the bottleneck imposed by traditional WAN circuits by giving enterprises LAN quality connectivity across the wide area, uniting a large diversity of multi vendor platforms, operating

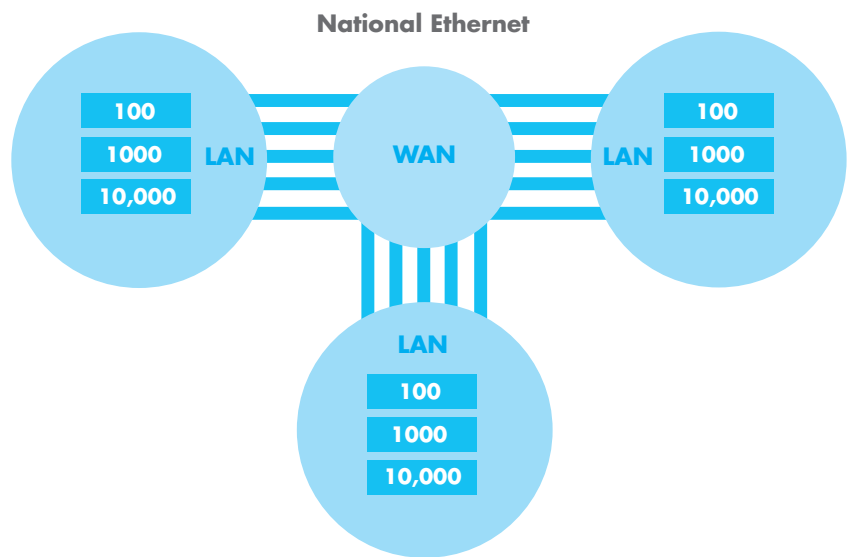
In addition to its low installation and maintenance costs, National Ethernet also has the advantage of being software provisioned.

systems and application programs. With National Ethernet, enterprises can now connect sites throughout a city or across the country at speeds of up to 1 Gigabit/s, far surpassing traditional WAN services in terms of bandwidth, compatibility and ease of deployment.

National Ethernet is accessed by standard Ethernet interfaces that are found on commodity LAN routers and switching devices. In addition to its low installation and maintenance costs, National Ethernet also has the advantage of being software provisioned, which means that WAN bandwidth can be easily adjusted up or down in small increments to meet the changing needs of extended enterprise business processes. National Ethernet is in many senses the ideal low latency approach to wide area connectivity in network dependent enterprises, delivering unprecedented levels of bandwidth in a service that adapts at the speed of business.

In this guide we will look at the unique connectivity possibilities that National Ethernet brings to distributed organisations in the areas of extended Enterprise Resource Planning (ERP), Supply Chain Management (SCM) and Customer Relations Management (CRM).

Traditional WAN Data Services vs National Ethernet	
Frame, ATM and Private Line Networks	National Ethernet
Expensive recurring charges and equipment costs	Affordable/flexible wide area networking that interfaces straight into the LAN
Slow to upgrade	Flexible bandwidth capability allowing you to pay for the bandwidth you need and re-grade bandwidth typically within 48hours
Operationally complex	Very streamlined, standard RJ45/SC interfaces create "plug & play" WAN with no need for protocol conversion to transport applications over the WAN
Protocols are incompatible with LANs	WAN protocols are standard 802.3 Ethernet – use any hub, router or switch for WAN access
Limited to SDH bandwidths	Scaleable in more granular, convenient steps from 2 to 1000mb



## NETWORK ENABLED ERP

For many years, IT planners have ardently pursued the goal of unified Enterprise Resource Planning (ERP) with the hope of uniting critical business processes within and between departments, business units and tightly coupled outsourcers. A typical multiplatform ERP integration effort will last 12 to 24 months and cost millions. But in spite of huge development investments, too many ERP systems remain monolithic and isolated data islands that focus only on a limited portion of back office activities or some partial subset of end-to-end business processes.

As the ebusiness era proceeds, the need for unified and extensible ERP architectures has become increasingly acute. This is particularly true considering that ERP is at the heart of other important functions, including CRM, SCM, and high end ecommerce. At the end of the day, there is no point in extending B2B and B2C business processes if internal systems are not integrated and streamlined.

Differences between application software products (SAP, Peoplesoft, i2, Oracle, BEA, etc.), operating platforms (NT, Unix, OS/390, etc.), and WAN interfaces (Frame Relay, ATM, TDM, fibre) within ERP systems are a serious impediment to integration and extension. ERP systems have to span multiple legacy and client/server applications on dispersed enterprise sites while sustaining demanding job

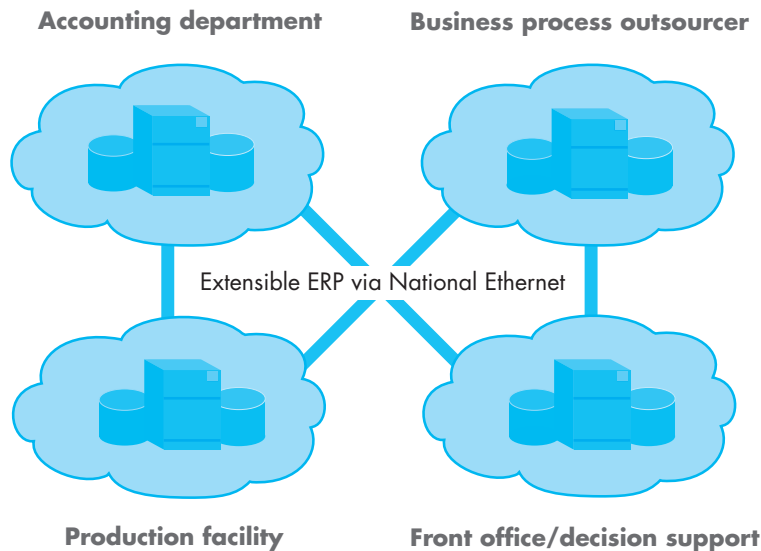
schedules and transaction throughputs. Hundreds of time-sensitive, prioritised jobs with complex interdependencies must flow back and forth across the multiplatform, multi site ERP fabric if business disruptions are to be avoided. In many cases, ERP integration is a network, systems and process management nightmare come true.

Because of the complexity and legacy, ERP integrators are constantly struggling with the inherent latencies of periodic ERP work cycles that are out of step with external business realities and customer needs. Reports and decision support data can take days or weeks to produce instead of seconds or minutes. Each system seems to exist in its own proprietary time warp. To compensate for shortcomings, additions and enhancements are often "tacked on" to ERP systems without open interfaces - so they aren't easily shared or extended.

In general, enterprise architects are confronted with many difficulties when attempting to integrate and extend ERP resources:

- > A vast array of different programming interfaces, software models, communications protocols, platforms, vendors and integration tools.
- > Narrow departmental scopes - resulting in "info silos".

At the end of the day, there is no point in extending B2B and B2C business processes if internal systems are not integrated and streamlined.



- > Slow pace of progress and enhancement.
- > Internal latencies and unresponsive production and reporting cycles.
- > Monolithic systems that don't scale or distribute easily.
- > An orientation towards internal "make it and sell it" goals as opposed to external "sense and respond" agility.

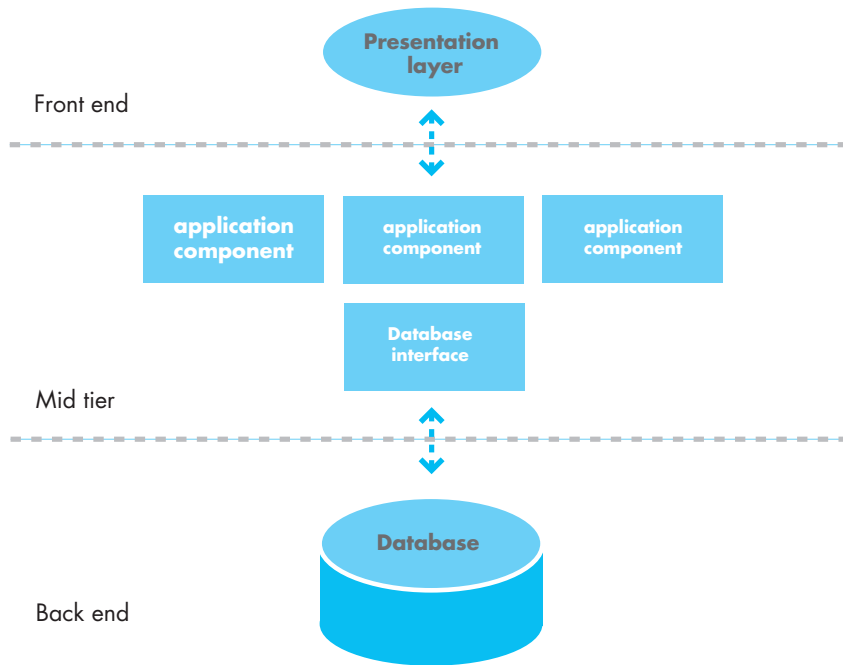
**National Ethernet:  
ERP integration superglue**

Successful ERP integration and extension initiatives often use EAI (Enterprise Application Integration) and web services methods that are based on

event-driven J2EE or .NET programming models. Application components are typically distributed onto front end, mid tier and back end servers in this approach. When these tools are used to create distributed ERP systems, mid tier applications servers can be positioned in dispersed production areas and interfaced with remote back end servers and legacy hosts via an open interface adaptation layer. On the user side, application servers are accessed by a wide range of front end applications and web interfaces throughout the enterprise.

In an environment where complex multiplatform integration is the norm, National Ethernet can virtually eliminate the negative effects that Frame Relay, ATM and private circuits have on distributed ERP applications. Traditional WAN data services introduce a complex collection of network termination devices, network management and network protocol elements right in the middle of the ERP architecture. But with National Ethernet, the interface to the WAN is the same as the interface to the LAN, bringing seamless site-to-site connectivity at 10-1,000Mbps. Virtually every platform, operating system, application and device in the ERP universe is compatible with Ethernet. It could be argued that Ethernet is the one common denominator that virtually all these IT resources can communicate and interoperate with.

Unlike traditional Frame, ATM and private line data services, which take weeks or longer to provision and upgrade, National Ethernet bandwidth can be upgraded with just a few days lead time.



National Ethernet removes bandwidth limitations and WAN complexities with simple point to multi-point Metro and inter city LAN extensions throughout the UK. National Ethernet is a fully managed service with strict service level guarantees that essentially takes the WAN out of the integration equation. When National Ethernet is used between enterprise sites and trading partners, the result is a "wide area LAN" where ERP applications can fully interoperate, regardless of their location.

ERP applications are typically transaction based which makes them sensitive to network latencies and bottlenecks as they

access back end databases and SAN arrays. In this environment, National Ethernet is used to connect the various components of a distributed ERP architecture. By using network quality of service (QoS) parameters, ERP applications can be prioritised over less time sensitive applications such as email that share the same common networking. This ensures there is adequate low-latency bandwidth between front tier, mid tier and back end servers. In the event that additional bandwidth is needed between the components of a distributed ERP architecture, National Ethernet bandwidth can be added in small increments on an as-needed basis via software provisioning. Unlike traditional Frame, ATM and private line data services, which take weeks or longer to provision and upgrade, National Ethernet bandwidth can be upgraded with just a few days lead time, in response to changes in ERP traffic patterns and ongoing application integration efforts.

National Ethernet is a uniquely valuable managed WAN service for multiplatform, multiprotocol ERP integration and extension. With a mesh or partial mesh of National Ethernet WAN links between sites, it's possible for ERP designers to integrate cross functional business process with unprecedented efficiency. National Ethernet provides a highly compatible and cost effective integration "glue" that extends enterprise LANs across the UK for seamless ERP interactions.



## NETWORK ENABLED SCM

Extended supply chain management (SCM) systems have the potential to unite enterprises with their customers and suppliers in a seamless network of real time B2B interactions. To create viable extended SCM systems, enterprises must rise above internal fiefdoms and departmental perspectives that fragment data and business processes. In this brave, new, extensible world, supply/demand chains must span multiple departments, back office applications and supplier systems. Automation must be cross functional and collaborative, so many internal and external users can share, modify and act on information in a secure and reliable distributed environment.

In traditional business systems, order management, purchasing, procurement, forecasting, accounts receivable, accounts payable and other related functions are largely shielded from the outside world. But in today's network enabled ebusinesses, interfaces to critical back and front office applications are exposed and visible to customers and suppliers who use them in real time, expecting immediate response.

To support the demands of interactive network applications, many supply chain and related back office applications are using XML (Extended Markup Language) as the standard data definition format for internal and external communications. XML is fully web capable and it excels in

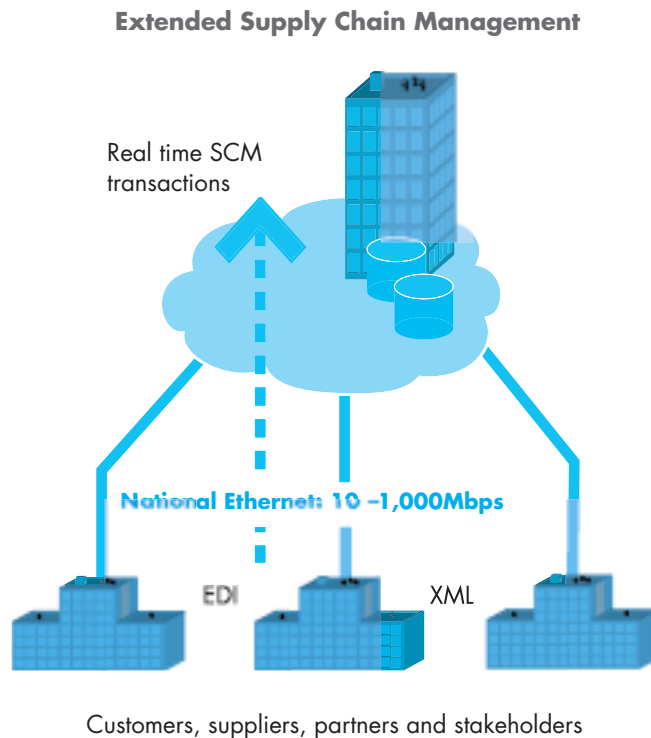
multi vendor cross platform integration environments. Consequently, XML is surpassing the traditional SCM integration standard, EDI (Electronic Data Interchange), for integration of distributed multi platform architectures and for creating interfaces to legacy systems.

When web services and XML are used between components of wide area SCM, responsiveness and transaction rates are to a large degree dependent on the availability of network bandwidth. If National Ethernet is deployed to link the various servers and tiers of the SCM system, the bottlenecks and expense of traditional Frame, ATM and private line networks is avoided. The cost of WAN bandwidth with National Ethernet is considerably lower than existing WAN circuit costs, and bandwidth can be incrementally scaled up to Gigabit levels as SCM traffic grows.

### **Put your customers and suppliers on your LAN**

In the past, traditional Frame, ATM and private circuits have been too expensive to justify use anywhere but the core of the enterprise's own backbone network. With cost effective National Ethernet, it's now economical to reach out to partners across the UK with seamless LAN extension. If you want to give your key supplier access

A tightly coupled outsourcing relationship like this can greatly reduce a company's operating costs while improving business agility and competitiveness.



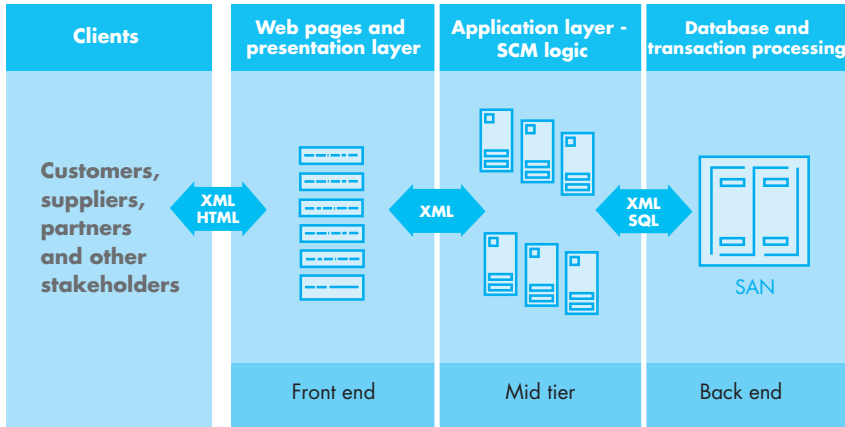
to your back office order management system, put them on your LAN and give them selective and secure access to appropriate sections of your order management systems. With National Ethernet, there is no concern for incompatibilities in protocols, network interfaces, or network management systems – it's all just Ethernet.

An example of how National Ethernet is used within the supply chain can be seen in business process outsourcing arrangements where, for instance, the mail and shipping functions of an enterprise will be outsourced to a

high-end package delivery company. In this case internal and external enterprise mail delivery and shipping logistics are handled by the delivery company and run like a high touch internal department. A tightly coupled outsourcing relationship like this can greatly reduce a company's operating costs while improving business agility and competitiveness. To ensure success, National Ethernet is used for high bandwidth connections between the enterprise and the outsourcers' core business processes.



National Ethernet is a natural choice for intra- and inter-company supply chain connectivity, because it provides seamless LAN extension between the enterprise, customer and supplier sites without the cost and complexity of Frame, ATM and private line networks.



SCM involves a lot of automated processes, but there is a human collaborative side to supply chain management as well. Critical logistical and tactical decisions are made on an hourly basis by managers and production teams. To encourage the human dimension of supply chain management, National Ethernet lets users at different enterprise, customer and supplier sites communicate with high performance video conferencing, multimedia tools, and interactive LAN productivity applications using sophisticated QoS techniques. In general, National Ethernet is a natural choice for intra- and inter-company supply chain connectivity, because it provides seamless LAN extension between the enterprise and partner sites without the cost and complexity of Frame, ATM and private line networks.

Another typical use of National Ethernet bandwidth is seen in IP based fibre channel SAN storage array extension, which can span hundreds of kilometres. With an Ethernet WAN and SAN extension, mid tier SCM application servers can be located in purchasing, distribution and accounting departments, without losing connectivity with remote back end servers and storage arrays that are located across town or in another city all together.

## NETWORK ENABLED CRM

Now that enterprises are under pressure to increase customer lifetime value and customer retention, CRM applications have attained mission critical status. In many organisations, CRM has become a core business application, as important as ERP and SCM. Consequently CRM systems must be highly reliable and available to a degree that was previously associated only with back office transaction processing systems.

Ideally, a full featured, distributed CRM function will manage data to and from a very large number of customer touch points that are embedded in the call centres, online ecommerce sites, trading portals, point of sale locations and production systems across the enterprise. The goal is to use all the data that is gathered from customer touch points to personalise and enhance customer interactions in real time.

### High-performance customer relations

CRM systems are ideally deployed in distributed multi tier architectures that use front, mid and back end servers in a loosely coupled event-driven model. With this approach, a comprehensive record of the customer's sales history and personal profile is stored in the back end database. This data is accessed in real time by a multitude of interactive mid tier applications that

enhance customer relations and personalise the customer experience. In addition to online uses of customer information, back end data is accessed and modified by pre- and post-sale customer representatives and field workers using wireless notebook and handheld computers.

To ensure full cross sell, up sell and personalisation capabilities, CRM customer records can be built automatically with the characteristics of a customer's browsing session, telephone support call histories, and information in sales force automation (SFA) systems. For CRM to work, all this data must be integrated and stored in a centralised back end system with open programming interfaces, so any off the shelf or custom application can access it. This is, of course, not possible in enterprises where customer information is fragmented across dozens or hundreds of isolated production and front office systems.

CRM applications that customise and personalise customer transactions increasingly rely on sophisticated mid tier based business logic. Mid tier software components are driving higher utilisation levels on application servers because advanced CRM applications have a greater need for posts and queries to customer databases. This in turn puts pressure on network links that connect the mid tier applications to back end CRM

National Ethernet connectivity allows the various tiers of a CRM architecture to be very flexibly deployed across multiple enterprise sites.

database servers. When CRM components are located on multiple sites, the Wide Area Network plays a crucial role.

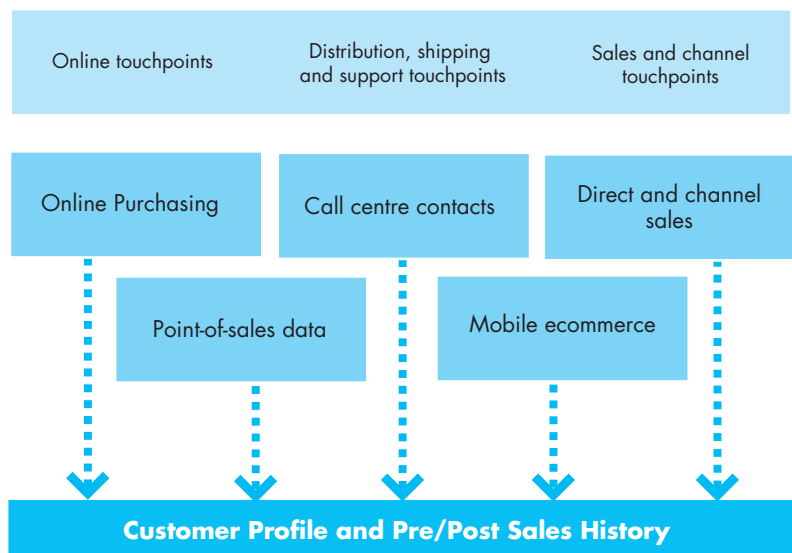
### Bandwidth bonanza

The modular nature of distributed CRM means that application servers can be placed close to the departments that use them, ensuring high levels of performance and responsiveness. Front end servers can be also distributed geographically so they are close to customers using interactive programs and web interfaces. Back end servers can remain in secure data centres.

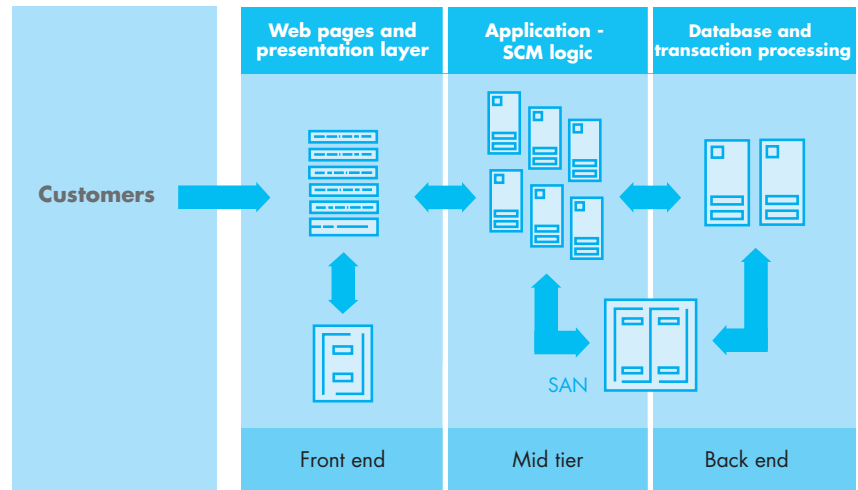
To maintain end-to-end response times, distributed CRM systems must have

enough bandwidth between vertical and horizontal components to let front, mid and back end resources communicate seamlessly, regardless of distance or location. With conventional Frame, ATM and Leased Line networks, costs are too high and bandwidth is too low to enable a fully network enabled distributed CRM architecture. But with National Ethernet, it is possible to create a full or partitioned mesh of 10 - 1,000 Mbps Ethernet links that connect all the tiers of the CRM architecture on all sites without bottlenecks or excessive latencies.

National Ethernet connectivity allows the various tiers of a CRM architecture to be very flexibly deployed across multiple enterprise sites. Front, mid and



It generally takes weeks or longer to upgrade or re-provision Frame, ATM or private line WANs. With National Ethernet the network links can be turned up or down in a matter of a few days.



back components can be combined on a single server or host system or distributed on large and small servers. Given the seamless LAN extension of National Ethernet, it's possible to locate front end web servers in one city, applications servers in a regional ISP and back end servers in a headquarters data centre.

Because it uses software provisioning controls, National Ethernet adapts to the changing needs of the CRM architecture. It generally takes weeks or longer to upgrade or re-provision Frame, ATM or private line WANs. With National Ethernet the network links can be turned up or down in a matter of a few days. Its flexible provisioning lets National Ethernet adapt rapidly to seasonal peaks and other fluctuations in customer demand, so CRM responsiveness never flags.

National Ethernet lets enterprise IT designers move away from complex expensive traditional WAN methods to a high performance Ethernet and IP infrastructure that seamlessly connects IT components across wide areas.

## IN CONCLUSION

Whether the goal is extended CRM, SCM or ERP, National Ethernet essentially creates a single LAN between data centres, and core enterprise applications, allowing any-to-any interactions between internal users and external partners. With National Ethernet for connectivity, up to 1,000Mbps of LAN-quality connectivity is available for sites that can be 100s of kilometres removed from each other. In general, National Ethernet lets enterprise IT designers move away from complex expensive traditional WAN methods to a high performance Ethernet and IP infrastructure that seamlessly connects IT components across wide areas.

If CRM, SCM and ERP applications are to reach their full potential in terms of performance and resiliency, they require a mesh of high quality, cost effective bandwidth between all major sites. By extending enterprise LANs seamlessly across wide area distances, National Ethernet from THUS provides the ideal infrastructure for enterprise integration and extension in a wide range of business types.

Bandwidth is selectable from a range of increments between 4 Mbps to 1Gbps with options to increase and decrease capacity at short notice to meet individual customer needs.

## NATIONAL ETHERNET FROM THUS

THUS's advanced portfolio of Ethernet products is the only UK National offering to boast Cisco Powered Network (CPN) Designation. THUS has addressed the market in the metropolitan area and nationally for companies to adopt a more unified network topology allowing LAN traffic and company database content to be quickly and easily accessible by all employees, regardless of location.

### Product Overview

THUS "National Ethernet" is a high availability wide area Ethernet networking service offering cost effective and seamless point to multipoint Ethernet networking across the UK.

This service is ideal for companies wishing to gain the speed and flexibility of their Local Area Network (LAN) over Metropolitan (MAN) and Wide Area Network (WAN). Sites are connected to the THUS National Ethernet (MPLS) network at various access bandwidths (10, 100 or 1000mb). Circuits can then be configured over the National Ethernet network to connect any one site to any other site. Circuit bandwidths can be the same as or less than site access bandwidths (2-1000mb) to suit your applications and budget. Furthermore, circuit bandwidths can be re-graded within a few days if required.

National Ethernet is a fully managed and high performance layer two data networking service, with guaranteed capacity and quality of service, providing:

- > UK wide network coverage, including dense metropolitan area networks.
- > Range of site access bandwidths (10Mbps, 100Mbps and 1Gbps).
- > Interfaces that are found on nearly all LAN switches/routers (RJ45/SC).
- > Scaleable circuit bandwidth available from 2Mbps to 1Gbps.
- > Short notice (48 hrs) circuit bandwidth upgrade and downgrades up to the limits of last mile connections (10Mbps, 100Mbps or 1Gbps).
- > Quality of Service (QoS) options underpinned by service level guarantees and network performance reports.

- > Support for voice, data and multimedia applications irrespective of the protocol(s) on which these applications are based.
- > Interoperability with THUS IPVPN and migration path between the two services.

### Pricing

#### Connection

Each site access circuit will attract a connection charge based on the access bandwidth and resilience (10Mbps, 100Mbps or 1Gbps).

#### Rental

Each site access will attract a rental charge based on the site access bandwidth, resilience and distance from the site to the THUS network point of presence (PoP). Circuits ranging from 2Mbps to 1Gbps, will also attract a rental charge.

#### Typical Customer Applications

National Ethernet from THUS is the ideal networking service for the following applications:

- 1 National Ethernet is the ideal wide area networking service for distributing, event-driven N-tier applications between business sites.
- 2 National Ethernet makes it far easier and affordable to distribute and share common applications between sites on your network.



- 3 As all IS systems and applications can be effectively glued together using National Ethernet, it becomes possible to maintain real time information in a single decision support system (DSS) allowing different levels of management to access financial and operational performance information that they require.
- 4 National Ethernet allows consolidation of IT resources and improved server and storage utilisation across your network.
- 5 National Ethernet makes it more affordable to unite enterprises with their suppliers, customers and partners in a seamless network of real time B2B interactions. As extended supply chain management (SCM) traffic increases, the National Ethernet service is flexible to be upgraded within days.
- 6 National Ethernet is compatible with IT systems running ERP applications allowing seamless, cost effective, extension of these applications between, sites contributing to the goal of uniting critical business processes between departments, business units and other stakeholders irrespective of geographic location.
- 7 National Ethernet is the ideal networking media for transporting a range of storage networking applications. As well as offering cost effective and flexible high

bandwidth networking, National Ethernet is compatible with Network Attached Storage, Storage Area Networks and Data-backup mirroring applications.

### Customer Benefits

- > Managed Service - As a managed service the customer is freed from the concerns of both planning and providing network capacity and connectivity
- > Capital and Revenue Savings - Customers find Ethernet connectivity a more cost effective medium, not only due to the improved price/performance versus traditional Telecom bandwidth, but also because of the lower port costs and reduced complexity of the LAN configurations and management. A further benefit lies in the opportunity to centralise distributed Application and Data Servers into a single central resource, delivering both economies of scale in IT configurations and significant reductions in IT support costs.
- > Pay for the bandwidth you need – Sites are connected at LAN speeds, but customers pay for the circuit bandwidth that they need, over the THUS National Ethernet network, to suit their applications and budget.
- > Scalability - Customers can quickly and easily re-grade circuit bandwidth in as little as 48 hours to meet their future needs. Currently network

managers are likely to spend large amounts of their time planning site capacity, but with National Ethernet, circuit bandwidths can be scaled within days reducing the capacity planning overhead.

- > High availability service, with comprehensive service levels and network performance reports allowing customers to review bandwidth utilisation, quality of service performance and other useful statistics across their National Ethernet network.
- > Access to other THUS services – Once National Ethernet is installed at a site, it is possible to access other THUS services over this networking such as our IP VPN service which allows ADSL and private circuit access for your smaller sites. For further information, please call 0800 027 0585.

**This guide is part of a series on advanced Wide Area Network solutions from THUS. For additional information, please see these publications:**

#### **NATIONAL ETHERNET: ARE YOU READY?**

A managers' guide for those interested in preparing for and deploying National Ethernet in UK enterprises.

#### **NATIONAL ETHERNET: FACILITATING THE REAL TIME ENTERPRISE**

Along with event driven IT systems, advanced business intelligence and flexible capacity planning, National Ethernet is a key factor in the realisation of low-latency Real Time Enterprises.

#### **NATIONAL ETHERNET: EXTENDING THE ENTERPRISE**

A guide to using National Ethernet to extend business critical IT applications to supply chain partners, customers and virtual workgroups across the UK.

#### **NATIONAL ETHERNET: ACHIEVING BUSINESS CONTINUITY**

A "how to" primer on using advanced National Ethernet connectivity to create a resilient "bullet proof" IT infrastructure.

#### **EVOLVING TO MPLS VPNs**

An in depth look at the state of today's enterprise network and how the evolution from PVC circuits to packet-based IP virtual private networks pave the way for a powerful new peer-to-peer voice, video, CRM and workgroup applications - and the ability to give time sensitive interactive applications and ERP, back office and transaction processing systems, a higher level of traffic priority on a cost effective, IP-based any-to-any mesh network.

**For further information on National Ethernet please call 0800 027 0585**  
[www.thus.net](http://www.thus.net)

